Test Plan for Wireless Device Over-the-Air Performance

CTIA 01.50 Wireless Technology, 3GPP Radio Access Technologies

Version 5.0.0

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Use Instructions

All testing shall be performed in a CTIA Certification Authorized Test Lab and shall be initiated through one of the following methods:

1. By submitting a PTCRB or IoT Network Certified device certification request at https://certify.ptcrb.com/

2. By submitting an OTA Test Plan use request at https://certify.ctiacertification.org/

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Section 1 Introduction

1.1 Radiated Power Introduction

The following radiated power tests for 3GPP Radio Access Technologies will use the settings specified in this document: EIRP, TRP, NHPRP, maximum output power – EIRP, maximum output power – TRP, and maximum output power – spherical coverage.

It is recommended that one of the two following steps be taken to properly characterize the impact of transmit power drift due to thermal heating.

1. Perform the radiated power test concurrently with the radiated sensitivity test, except when different settings are used for radiated power and radiated sensitivity tests.
2. Allow the DUT to warm up by turning the transmitter to maximum power for 5 minutes prior to conducting the radiated power test.

1.2 Radiated Sensitivity Introduction

The following radiated sensitivity tests for 3GPP Radio Access Technologies will use the settings specified in this document: EIS, TIS, C-TIS, NHPIS, relative sensitivity on Intermediate channel, LAA un-licensed degradation (LUD) test, REFSENS – EIS and REFSENS – spherical coverage.

Sensitivity measurements shall be equivalent to the minimum RF power level that passes the protocol specific error rate and confidence requirements. The algorithms/methods used to arrive at these results can be optimized for speed by finding alternate points on the error curve as long as the data is eventually normalized to a value equivalent to the protocol specific error rate requirement. The normalization value shall be determined in the same test configuration used to make the other error measurements and shall be derived from an actual sensitivity measurement of the protocol specific error rate requirement and not based on an interpolation. In either case, the appropriate contribution to the measurement uncertainty shall be included. Refer to *CTIA 01.20* [1], *CTIA 01.21* [2] or *CTIA 01.22* [3] for details on this procedure and *CTIA 01.70* [4] for details on this measurement uncertainty. The forward power step size shall be no more than 0.5 dB when the RF power level is near the target sensitivity level. The power control setting shall be changed to maximum power when the final sensitivity measurement is made for each test point, as well as when any error reference curve is generated. The forward link power and the power control settings should be set back to defaults prior to changing to the next test point.

1.3 Acronyms

Table 1.3-1 contains specialized terms and acronyms are used throughout this document.

Table 1.3-1 Acronyms and Definitions

Acronym/Term	Definition
A-GNSS	Assisted Global Navigation Satellite System
ARFCN	Absolute Radio Frequency Channel Number
BER	Bit Error Rate
BLER	Block Error Rate
BTS	Base Transceiver Station

Acronym/Term	Definition
BW	Bandwidth
CA	Carrier Aggregation
CC	Component Carrier
CG	Cell Group
CRC	Cyclic Redundancy Check
CS	Coding Scheme
C-TIS	Combined TIS
DL	Downlink
DUT	Device Under Test
EARFCN	E-UTRA Absolute Radio Frequency Channel Number
EIRP	Effective Isotropic Radiated Power
EIS	Effective Isotropic Sensitivity
FDD	Frequency Division Duplex
FR1	Frequency Range 1
FR2	Frequency Range 2
FS	Free Space
HD-FDD	Half- Duplex FDD
Informative	Optional testing/condition that is not part of certification testing
I-TIS	Individually measured TIS
LAA	Licensed-Assisted Access
LUD	LAA un-licensed degradation
MCG	Master Cell Group
MCS	Modulation Coding Scheme
MU	Measurement Uncertainty
NHPIS	Near-Horizon Partial Isotropic Sensitivity
Normative	Mandatory aspect for certification testing
NR	New Radio

Acronym/Term	Definition
OCNG	OFDMA Channel Noise Generator
OFDMA	Orthogonal Frequency Division Multiple Access
OOBE	Out-of-band emissions
OTA	Over-the-Air
PCC	Primary Component Carrier
PCL	Power Control Level
PDCCH	Physical Downlink Control Channel
PER	Packet Error Rate
R&D	Research and development
RB	Resource Block
RBER	Class II Residual Bit Error Rate
RF	Radio Frequency
RX	Receive
SA	Stand-Alone
SCC	Secondary Component Carrier
SCG	Secondary Cell Group
SCS	Subcarrier spacing
TDD	Time Division Duplex
TIS	Total Isotropic Radiation
TRP	Total Radiated Power
TX	Transmit
UARFCN	UTRA Absolute Radio Frequency Channel Number
UE	User Equipment
UL	Uplink

1.4 Document References

The following documents are referenced in this test plan:

Document Number, *Document Name*
[1] CTIA 01.20, *Test Methodology, SISO, Anechoic Chamber*
[2] CTIA 01.21, *Test Methodology SISO Reverberation Chamber*
[3] CTIA 01.22, *Test Methodology, SISO, Reverberation Chamber*
[4] CTIA 01.70, *Measurement Uncertainty*
[5] CTIA 01.73, *Supporting Procedures*
[6] CTIA 01.71, *Positioning Guidelines*
[7] 3GPP TS 05.05, *Radio Transmission and Reception*
[8] 3GPP TS 51.010-1, *Mobile Station (MS) conformance specification; Part 1: Conformance specification*
[9] 3GPP TS 34.121-1, *User Equipment (UE) conformance specification; Radio transmission and reception (FDD); Part 1: Conformance specification*
[10] 3GPP TS 34.108, *Common test environments for User Equipment (UE); Conformance testing*
[11] 3GPP TS 34.109, *Terminal logical test interface; Special conformance testing functions*
[12] 3GPP TS 36.521-1, *Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Conformance testing*
[13] 3GPP TS 36.508, *Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); Common test environments for User Equipment (UE) conformance testing*
[14] 3GPP TS 36.101, *Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception*
[15] CTIA 01.01, *Test Scope, Requirements, and Applicability*
[16] 3GPP TS 38.521-1, *NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Range 1 standalone*
[17] 3GPP TS 38.508-1, *5GS; User Equipment (UE) conformance specification; Part 1: Common test environment*
[18] 3GPP TS 38.521-3, *NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 3: Range 1 and Range 2 Interworking operation with other radios*
[19] 3GPP 38.521-2, *NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 2: Range 2 standalone*

Section 2 2G Technology

2.1 GSM

2.1.1 Transmit Power Test Settings

The power radiated by the DUT shall be measured using a calibrated and accurate RF measuring instrument (e.g., a spectrum analyzer, measurement receiver, or power meter) capable of averaging across bursts. See Section 3 of *CTIA 01.73* [5] for power measurement considerations.

Using the settings in Table 2.1.1-1 or Table 2.1.1-2, page the DUT and direct it to a voice/traffic channel.

Table 2.1.1-1 PCL Setting for GSM 850

Device Class	Setting
2	2
3	3
4	5
5	7

Table 2.1.1-2 PCL Setting for GSM 1900

Device Class	Setting
1	0
2	3
3	30

Tests shall be performed for three different channels across the bands supported by the DUT, as defined in Table 2.1.1-3.

Table 2.1.1-3 GSM RX and TX Test Frequencies

Band	Channel Pair	Frequency (MHz)
GSM 850 (Cellular)	128	824.20
	128	869.20
	190	836.60
	190	881.60
	251	848.80
	251	893.80
GSM 1900 (PCS)	512	1850.20
	512	1930.20
	661	1880.00
	661	1960.00
	810	1909.80
	810	1989.80

2.1.2 Receiver Sensitivity Test Setings

Receiver Sensitivity measurements shall be performed using the communication tester to determine the Device Under Test's (DUT's) receiver sensitivity by reporting the minimum forward-link power resulting in a Class II Residual Bit Error Rate (RBER) of 2.44% or less with 95% confidence. The number of frames observed shall be consistent with a 95% confidence level but may be limited to 135 frames maximum.

TIS shall be fully measured as described and calculated pursuant to *CTIA 01.20* [1] or *CTIA 01.21* [2] for the 3 channels (low, middle and high) specified in Table 2.1.1-3 for all frequency bands supported by the DUT and required to be tested per this test plan.

2.1.2.1 GSM Relative Sensitivity on Intermediate Channel Measurements

All channels shall be tested for GSM 850/1900 for the intermediate channel test.

2.1.3 Optional Frequency Bands and Channel Configurations (Informative)

The following GSM bands/frequencies can be tested.

Table 2.1.3-1 GSM Frequency Bands

Operating Band	UL Frequencies MS Transmit, BTS Receive (MHz)	DL Frequencies MS Receive, BTS Transmit (MHz)
P-GSM 900	890 - 915	935 - 960
E-GSM 900	880 - 915	925 - 960
DCS 1800	1710-1785	1805-1880

Table 2.1.3-2 GSM Channels

Operating Band	Channels		
	Low	Mid	High
P-GSM 900	1	62	124
E-GSM 900	975	38	124
DCS 1800	512	699	885

All test parameter settings as specified in Section 2.1.1 and Section 2.1.2 shall be used where applicable. The following items are not required for these bands:

- Ripple tests
- Measurement uncertainty limits
- Intermediate channel testing
- GPRS/EDGE measurements
- A-GNSS measurements

Some test configurations may be excluded.

As noted, measurement uncertainty limits will not be required, because ripple testing is not required. However, measurement uncertainty calculations can be provided as an estimation using MU values from the closest frequency band where full MU assessment is required.

2.2 GPRS

2.2.1 Transmit Power Test Settings

The measurement site and DUT shall be configured as specified in *CTIA 01.71* document. The power radiated by the DUT shall be measured using a calibrated and accurate RF measuring instrument (e.g., a spectrum analyzer, measurement receiver, or power meter) capable of averaging across bursts. See Section 3 of *CTIA 01.73* [5] for power measurement considerations.

Using the settings in Table 2.2.1-1, Table 2.2.1-2 and Table 2.2.1-3, establish a GPRS data loopback session between the DUT and a GPRS-capable communication tester. Configure the GPRS communication tester to direct the DUT to an appropriate packet traffic channel. During this test, the maximum number of uplink time slots supported by the DUT shall be utilized, and the uplink coding scheme should be CS-1.

Table 2.2.1-1 PCL and Gamma Setting for GMSK Modulation in GSM 850 Band

Device Class	PCL Setting	Gamma Setting
2	2	0
3	3	1
4	5	3
5	7	5

Table 2.2.1-2 PCL and Gamma Setting for GMSK Modulation in GSM 1900 Band

Device Class	PCL Setting	Gamma Setting
1	0	3
2	3	6
3	30	1

Table 2.2.1-3 Coding Scheme (CS) Setting for GMSK Modulation in Either GSM 850 or GSM 1900 Band

CS
1

Coding scheme CS-1 is the preferred setting for TRP measurements, as this provides the most robust channel coding to maintain the data loopback session. Coding schemes CS-2 through CS-4 can be utilized for TRP measurements only.

Tests shall be performed for three different channels across the bands supported by the DUT, as defined in Table 2.1.1-3 .

2.2.2 Receiver Sensitivity Test Settings

GPRS receiver sensitivity measurements shall be performed using a GPRS-capable communication tester to determine the DUT's receiver sensitivity by reporting the minimum forward-link power resulting in a Block Error Rate (BLER) of 10% or less. Refer to Section 2 in *CTIA 01.71* [6] for set-up illustrations.

The set-up parameters defined in Section 2.1.3 shall be used with the following exceptions:

- Forward-Link Power: As needed to maintain 0% BLER at CS-1.
- Power Control Level (PCL)/Gamma adjusted to ensure that there are no communication errors introduced on the reverse channel. The DUT does not need to be set to maximum power at the initiation of the sensitivity search.
- The GPRS communication tester shall configure the DUT for GPRS data loopback mode. Refer to *3GPP TS 05.05* [7] and *3GPP TS 51.010-1* [8] for procedures and criteria for the setup of loopback mode.
- The GPRS communication tester shall be configured to transmit with the maximum number of downlink slots supported by the DUT.

Note: If the test point is occurring in a significant null, the forward-link power may have to be raised to establish/maintain an active data loopback session.

For a device supporting multiple receivers, all receivers shall be enabled during the test procedure described in the remainder of this section. In this way, C-TIS is the test result, regardless whether the device supports one or multiple receivers. In the special case that I-TIS is the desired quantity of interest, the same procedure is followed, except that all but the specified receiver-under-test on the device are disabled.

Invoke a GPRS loopback session between the DUT and the GPRS communication tester on one of the reference test channels. Verify that the GPRS communication tester is utilizing CS-1 coding on the downlink. With an active data loopback session established, invoke a BLER Measurement.

Sensitivity measurements shall be equivalent to the minimum RF power level that results in a BLER of 10% or less with 95% confidence but may be limited to 2000 received blocks maximum at each measured location on the sphere. If the alternate/normalization method is not used, the number of blocks may be limited to 200 at each measured location on the sphere. The algorithms/methods used to arrive at these results can be optimized for speed by finding alternate points on the BLER curve as long as the data is eventually normalized to a value equivalent to 10% or less at each data point. The normalization value shall be determined in the same test configuration used to make the other BLER measurements (i.e. over-the-air, GSM set-up parameters, etc.) and shall be derived from an actual sensitivity measurement of 10% BLER or less with 95% confidence but may be limited to 2000 received blocks maximum and not based on an interpolation. In either case, the appropriate contribution to the measurement uncertainty shall be included. Refer to *CTIA 01.20* [1] for details on this procedure and details on this measurement uncertainty. The forward power step size shall be no more than 0.5 dB when the RF power level is near the target sensitivity level. The Power Control Level/Gamma setting shall be changed to maximum power when the final sensitivity measurement is made for each test point, as well as when any BLER reference curve is generated.

The Forward Link Power, the Power Control Level/Gamma settings should be set back to defaults prior to tuning to the next test point. The minimum RF power level resulting in a BLER of 10% or less for each DUT test condition shall be recorded for integration pursuant to *CTIA 01.20* [1] or *CTIA 01.21* [2] to give a single figure of merit referred to as Total Isotropic Sensitivity (TIS).

TIS shall be fully measured as described above and calculated pursuant to *CTIA 01.20* [1] or *CTIA 01.21* [2] for the 3 channels (low, middle and high) specified in Table 2.1.1-3 for all frequency bands supported by the DUT and required to be tested per this test plan.

Relative sensitivity measurements or fully measured TIS will be repeated per channel on all channels. Reference channel and intermediate channel measurements shall be actual sensitivity measurements of 10% BLER or less with 95% confidence but may be limited to 2000 received blocks maximum.

2.2.2.1 GPRS Relative Sensitivity on Intermediate Channel Measurements

All channels shall be tested for GPRS 850/1900 for the intermediate channel test.

2.3 EGPRS

2.3.1 Transmit Power Test Settings

The measurement site and DUT shall be configured as specified in *CTIA 01.71* [6]. The power radiated by the DUT shall be measured using a calibrated and accurate RF measuring instrument (e.g., a spectrum analyzer, measurement receiver, or power meter) capable of averaging across bursts. See Section 3 of *CTIA 01.73* [5] for power measurement considerations.

Using the settings in Table 2.3.1-1, Table 2.3.1-2 and Table 2.3.1-3, initiate a data loopback session between the DUT and an EGPRS-capable communication tester. Configure the EGPRS communication tester to direct the DUT to an appropriate packet traffic channel. During this test, the maximum uplink time slots supported by the DUT shall be utilized, and the uplink coding scheme should be MCS-5.

Table 2.3.1-1 PCL and Gamma Setting for 8-PSK Modulation (EDGE) in GSM 850 Band

Device Class	PCL Setting	Gamma Setting
E1	5	3
E2	8	6
E3	10	8

Table 2.3.1-2 PCL and Gamma Setting for 8-PSK Modulation (EDGE) in GSM 1900 Band

Device Class	PCL Setting	Gamma Setting
E1	0	3
E2	2	5
E3	4	7

Table 2.3.1-3 Modulation Coding Scheme (MCS) Setting for 8-PSK Modulation (EDGE) in Either GSM 850 or GSM 1900 Band

MCS
5

Modulation coding scheme MCS 5 is the preferred setting for TRP measurements, as this provides the most robust channel coding to maintain the data session. MCS 6 through MSC 9 can be utilized for TRP measurements only.

Tests shall be performed for three different channels across the bands supported by the DUT, as defined in Table 2.1.1-3

2.3.2 Receiver Sensitivity Test Settings

EGPRS Receiver Sensitivity measurements shall be performed using an EGPRS-capable Communication tester to determine the DUT's receiver sensitivity by reporting the minimum forward-link power resulting in a Block Error Rate (BLER) of 10% or less with 95% confidence. Refer to Section 2 in *CTIA 01.71* [6] for set-up illustrations.

The set-up parameters defined in Section 2.3 shall be used with the following exceptions:

- Forward-Link Power: As needed to maintain 0% BLER while using downlink modulation coding scheme MCS-5
- Power Control Level (PCL)/Gamma adjusted high enough to ensure that there are no communication errors introduced on the reverse channel. The DUT does not need to be set to maximum power at the initiation of the sensitivity search.
- The EGPRS communication tester shall configure the DUT for EGPRS data loopback mode. Refer to *3GPP TS 05.05* [7] and *3GPP TS 51.010-1* [8] for procedures and criteria for the setup of loopback mode.
- The EGPRS communication tester shall be configured to transmit with the maximum number of downlink slots supported by the DUT.

Note: If the test point is occurring in a significant null, the forward-link power may have to be raised to establish/maintain an active data loopback session.

For a device supporting multiple receivers, all receivers shall be enabled during the test procedure described in the remainder of this section. In this way, C-TIS is the test result, regardless whether the device supports one or multiple receivers. In the special case that I-TIS is the desired quantity of interest, the same procedure is followed, except that all but the specified receiver-under-test on the device are disabled.

Invoke data loopback between the DUT and the EGPRS communication tester on one of the reference test channels. Verify that the EGPRS communication tester is utilizing MCS-5 coding in the downlink. With an active data loopback session established, invoke a BLER Measurement.

Sensitivity measurements shall be equivalent to the minimum RF power level that results in a BLER of 10% or less with 95% confidence but may be limited to 2000 received blocks maximum at each measured location on the sphere. If the alternate/normalization method is not used, the number of blocks may be limited to 200 at each measured location on the sphere. The algorithms/methods used to arrive at these results can be optimized for speed by finding alternate points on the BLER curve as long as the data is eventually normalized to a value equivalent to 10% or less at each data point. The normalization value shall be determined in the same test configuration used to make the other BLER measurements (i.e., over-the-air, GSM set-up parameters, etc.) and shall be derived from an actual sensitivity measurement of 10% BLER or less with 95% confidence but may be limited to 2000 received blocks maximum and not based on an interpolation. In either case, the appropriate contribution to the measurement uncertainty shall be included. Refer to *CTIA 01.20* [1] for details on this procedure and details on this measurement uncertainty. The forward power step size shall be no more than 0.5 dB when the RF power level is near the

target sensitivity level. The Power Control Level/Gamma setting shall be changed to maximum power when the final sensitivity measurement is made for each test point, as well as when any BLER reference curve is generated. The Forward Link Power, the Power Control Level/Gamma settings should be set back to defaults prior to tuning to the next test point. The minimum RF power level resulting in a BLER of 10% or less for each DUT test condition shall be recorded for integration pursuant to *CTIA 01.20* [1] or *CTIA 01.21* [2] to give a single figure of merit referred to as Total Isotropic Sensitivity (TIS).

TIS shall be fully measured as described above and calculated pursuant to *CTIA 01.20* [1] or *CTIA 01.21* [2] for the 3 channels (low, middle and high) specified in Table 2.1.1-3 for all frequency bands supported by the DUT and required to be tested per this test plan.

Relative sensitivity measurements or fully measured TIS will be repeated per channel on all channels. Reference channel and intermediate channel measurements shall be actual sensitivity measurements of 10% BLER or less with 95% confidence but may be limited to 2000 received blocks maximum.

2.3.2.1 EGPRS Relative Sensitivity on Intermediate Channel Measurements

All channels shall be tested for EGPRS 850/1900 for the intermediate channel test.

Section 3 3G Technology

3.1 UMTS (WCDMA)

3.1.1 Transmit Power Test Settings

The measurement site and DUT shall be configured as specified in *CTIA 01.71* [6] document. The power radiated by the DUT shall be measured using a calibrated and accurate RF measuring instrument (e.g., a spectrum analyzer, or measurement receiver, or power meter). See Section 3 of *CTIA 01.73* [5] for power measurement considerations.

The UMTS communication tester shall be set up according to *3GPP TS 34.121-1* [9], Section 5.2 (Maximum Output Power test) using the defaults specified in *3GPP TS 34.121-1* [9], *3GPP TS 34.108* [10] and *3GPP TS 34.109* [11], as applicable. Using the Generic Call Setup procedures described in *3GPP TS 34.108* [10] Section 7, page the DUT and place it into the loopback mode as described in *3GPP TS 34.109* [11] Section 5.3. During this test, ensure that the communication tester is continuously sending "up power" commands as described in *3GPP TS 34.121-1* [9], Section 5.2.4.2.

Tests shall be performed for three different channels across the bands supported by the DUT, as defined in Table 3.1.1-1.

Table 3.1.1-1 UMTS RX and TX Test Frequencies

Band	Channel Pair (UARFCN)	Frequency (MHz)
UMTS 850 (3GPP BAND V)	4132	826.40
	4357	871.40
	4183	836.60
	4408	881.60
	4233	846.60
	4458	891.60
UMTS 1900 (3GPP BAND II)	9262	1852.40
	9662	1932.40
	9400	1880.00
	9800	1960.00
	9538	1907.60
	9938	1987.60

3.1.2 Receiver Sensitivity Test Settings

Receiver sensitivity measurements shall be performed using the communication tester to determine the DUT's receiver sensitivity by reporting the minimum forward-link power resulting in a Bit Error Rate (BER)

of 1.2% or less at 12.2 kbps data rate with 95% confidence. Refer to Section 2 in *CTIA 01.71* [6] for set-up illustrations.

The set-up parameters defined in Section 3.1.1 shall be used with the following exceptions:

- Forward-Link Power: As needed to maintain 0% BER at 12.2 kbps data rate
- Power Control: Algorithm 2, using closed loop power control with target power sufficient to guarantee error-free uplink transmission.
- All other parameters shall be set according to *3GPP TS 34.121-1* [9] Reference Sensitivity Level test case.

Note: *If the test point is occurring in a significant null, the forward-link power may have to be raised to establish/maintain a call.*

For a device supporting multiple receivers, all receivers shall be enabled during the test procedure described in the remainder of this section. In this way, C-TIS is the test result, regardless whether the device supports one or multiple receivers. In the special case that I-TIS is the desired quantity of interest, the same procedure is followed, except that all but the specified receiver-under-test on the device are disabled.

Page the DUT and direct it to one of the reference test channels. With a digital voice/traffic channel established, invoke a BER Measurement.

Sensitivity measurements shall be equivalent to the minimum RF power level that results in a BER of 1.2% or less at 12.2 kbps data rate with 95% confidence but may be limited to 20,000 bits maximum at each measured location on the sphere. The algorithms/methods used to arrive at these results can be optimized for speed by finding alternate points on the BER curve and/or using higher data rates as long as the data is eventually normalized to a data set equivalent to 1.2% BER or less at each data point. Alternative points on the BER curve greater than 12% shall not be used. The normalization value shall be determined in the same test configuration used to make the other BER measurements (i.e., over-the-air, UMTS set-up parameters, etc.) and shall be derived from an actual sensitivity measurement of 1.2% BER or less at 12.2 kbps with 95% confidence but may be limited to 20,000 bits maximum and not an interpolation. The forward-link power step size shall be no more than 0.5dB when the RF power level is near the UMTS sensitivity level. The Power Control setting shall be changed to Algorithm 2 using all up-bits to guarantee that maximum power is transmitted when the final sensitivity measurement is made for each test point. The Forward-Link Power and the Power Control settings should be set back to defaults prior to tuning to the next test point. The minimum RF power level resulting in a BER of 1.2% or less for each DUT test condition shall be recorded for integration pursuant to *CTIA 01.20* [1] or *CTIA 01.21* [2] to give a single figure of merit referred to as Total Isotropic Sensitivity (TIS).

TIS shall be fully measured as described above and calculated pursuant to *CTIA 01.20* [1] or *CTIA 01.21* [2] for the 3 channels (low, middle and high) specified in Table 3.1.1-1 for all frequency bands supported by the DUT and required to be tested per this test plan.

Relative sensitivity measurements or fully measured TIS will be repeated per channel on a specified list of intermediate channels as shown in Section 3.1.2.1. The separation between channels is no greater than 2.5 MHz, and the intermediate channels are spaced off of the center channel.

3.1.2.1 UMTS (WCDMA) Relative Sensitivity on Intermediate Channel Measurements

This intermediate channel list shall be used for UMTS.

	The green cells represent the low, middle and high channels that are fully tested for TIS.
	The yellow cells represent the lower 25% of the intermediate channels.
	The white cells represent the middle 50% of the intermediate channels.
	The orange cells represent the upper 25% of the intermediate channels.

Table 3.1.2.1-1 UMTS 850 Intermediate Channel List

UMTS 850	
Channel	**Frequency (MHz)**
4357	871.40
4360	872.00
4372	874.40
4384	876.80
4396	879.20
4408	881.60
4420	884.00
4432	886.40
4444	888.80
4456	891.20
4458	891.60

Table 3.1.2.1-2 UMTS 1900 Intermediate Channel List

UMTS 1900	
Channel	Frequency (MHz)
9662	1932.40
9668	1933.60
9680	1936.00
9692	1938.40
9704	1940.80
9716	1943.20
9728	1945.60
9740	1948.00
9752	1950.40
9764	1952.80
9776	1955.20
9788	1957.60
9800	1960.00
9812	1962.40
9824	1964.80
9836	1967.20
9848	1969.60
9860	1972.00
9872	1974.40
9884	1976.80
9896	1979.20
9908	1981.60
9920	1984.00
9932	1986.40
9938	1987.60

3.1.3 Optional Frequency Bands and Channel Configurations (Informative)

The following UMTS bands/frequencies can be tested.

Table 3.1.3-1 UMTS Frequency Bands

Operating Band	UL Frequencies UE transmit, Node B Receive (MHz)	DL Frequencies UE receive, Node B Transmit (MHz)
I	1920 - 1980	2110 - 2170
III	1710 - 1785	1805 - 1880
VIII	880 - 915	925 - 960

Table 3.1.3-2 UMTS Channels

Operating Band	UL Channels			DL Channels		
	Low	Mid	High	Low	Mid	High
I	9612	9750	9888	10562	10700	10838
III	937	1113	1288	1162	1338	1513
VIII	2712	2788	2863	2937	3013	3088

All test parameter settings as specified in Section 3.1.1 and Section 3.1.2 shall be used where applicable. The following items are not required for these bands:

- Ripple tests
- Measurement uncertainty limits
- Intermediate channel testing
- A-GNSS measurements

Some test configurations may be excluded.

As noted, measurement uncertainty limits will not be required, because ripple testing is not required. However, measurement uncertainty calculations can be provided as an estimation using MU values from the closest frequency band where full MU assessment is required.

Section 4 4G Technology

4.1 LTE Single Carrier

4.1.1 Transmit Power Test Settings

The measurement site and DUT shall be configured as specified in *CTIA 01.71* [6]. The power radiated by the DUT shall be measured using a calibrated and accurate RF measuring instrument (e.g., a spectrum analyzer, or measurement receiver, or power meter). See Section 3 of *CTIA 01.73* [5] for power measurement considerations.

The LTE communication tester and DUT shall be configured per *3GPP TS 36.521-1* [12], Section 6.2 (UE Maximum Output Power) using the default settings specified in *3GPP TS 36.521-1* [12] and *3GPP TS 36.508* [13] as applicable. The test procedure in section 6.2 of *3GPP TS 36.521-1* [12] shall be used to measure the UE output power. When a UE operates in Power Class 1 or Power Class 2 for any operating band other than Band 41, the IE (Information Element) p-Max shall be included and set according to Table 6.2.2_1.4-2 of *TS 36.521-1* [12]. Otherwise, p-Max shall not be signaled during attach procedures or during measurements.

Tests shall be carried out for different frequency pairs (FDD; UL -uplink /DL -downlink) or frequencies (TDD) and RB allocations across the bands supported by the DUT, as defined in Table 4.1.1-1 .

Table 4.1.1-1 LTE TRP Measurements Table for the Primary Mechanical Mode[1]

Band	Channel Bandwidth (MHz)	Channel	TX Frequency (MHz) [center of UL RB allocation]	UL RB Allocation	DL RB Allocation
2[2]	10	18650	1851.58	12 RB with RBstart=0	N/A[3]
	10	18900	1880	12 RB with RBstart=19	N/A[3]
	10	19150	1908.42	12 RB with RBstart=38	N/A[3]
4[4]	10	20000	1711.58	12 RB with RBstart=0	N/A[3]
	10	20175	1732.5	12 RB with RBstart=19	N/A[3]
	10	20350	1753.42	12 RB with RBstart=38	N/A[3]
5[5]	10	20450	825.58	12 RB with RBstart=0	N/A[3]
	10	20525	836.5	12 RB with RBstart=19	N/A[3]
	10	20600	847.42	12 RB with RBstart=38	N/A[3]
7	20	20850	2502.62	18 RB with RBstart=0	N/A[3]
	20	21100	2535	18 RB with RBstart=41	N/A[3]

Band	Channel Bandwidth (MHz)	Channel	TX Frequency (MHz) [center of UL RB allocation]	UL RB Allocation	DL RB Allocation
	20	21350	2567.38	18 RB with RBstart=82	N/A[3]
12	5	23035	699.97	8 RB with RBstart=0	N/A[3]
	5	23095	707.41	8 RB with RBstart=8	N/A[3]
	5	23155	715.03	8 RB with RBstart=17	N/A[3]
13	10	23230	778.58	12 RB with RBstart=0	N/A[3]
	10	23230	782	12 RB with RBstart=19	N/A[3]
	10	23230	785.42	12 RB with RBstart=38	N/A[3]
14	10	23330	789.58	12 RB with RBstart=0	N/A[3]
	10	23330	793	12 RB with RBstart=19	N/A[3]
	10	23330	796.42	12 RB with RBstart=38	N/A[3]
25[2]	5	26065	1850.97	8 RB with RBstart=0	N/A[3]
	5	26365	1882.41	8 RB with RBstart=8	N/A[3]
	5	26665	1914.03	8 RB with RBstart=17	N/A[3]
26[5]	5	26715	814.97	8 RB with RBstart=0	N/A[3]
	5	26865	831.41	8 RB with RBstart=8	N/A[3]
	5	27015	848.03	8 RB with RBstart=17	N/A[3]
30	10	27710	2306.58	12 RB with RBstart=0	N/A[3]
	10	27710	2310	12 RB with RBstart=19	N/A[3]
	10	27710	2313.42	12 RB with RBstart=38	N/A[3]
41	20	39750	2498.62	18 RB with RBstart=0	N/A[3]
	20	40620	2593	18 RB with RBstart=41	N/A[3]
	20	41490	2687.38	18 RB with RBstart=82	N/A[3]

Band	Channel Bandwidth (MHz)	Channel	TX Frequency (MHz) [center of UL RB allocation]	UL RB Allocation	DL RB Allocation
48	10	55290	3551.58	12 RB with RBstart=0	N/A[3]
	10	55990	3625	12 RB with RBstart=19	N/A[3]
	10	56690	3698.42	12 RB with RBstart=38	N/A[3]
66[4]	10	132022	1711.58	12 RB with RBstart=0	N/A[3]
	10	132322	1745	12 RB with RBstart=19	N/A[3]
	10	132622	1778.42	12 RB with RBstart=38	N/A[3]
70	15	133047	1697.19	16 RB with RBstart=0	N/A[3]
	15	133047	1702.41	16 RB with RBstart=29	N/A[3]
	15	133047	1707.81	16 RB with RBstart=59	N/A[3]
71	10	133172	664.58	12 RB with RBstart=0	N/A[3]
	10	133297	680.5	12 RB with RBstart=19	N/A[3]
	10	133422	696.42	12 RB with RBstart=38	N/A[3]

Note 1: Primary Mechanical Mode refers to device configured in preferred mode per manufacturer instructions (typically means antenna extended, fold or portrait slide open, but depends on form factor).

Note 2: If the device supports Band 25 and Band 2, then testing is only required to be completed in Band 25. The test requirements and data comparison between Bands 2 and 25 will not be directly comparable due to the usage of different RF channel bandwidths.

Note 3: As per *3GPP TS 36.521-1* [12], Section 6.2 (UE Maximum Output Power).

Note 4: If the device supports Band 4 and Band 66, then testing is only required to be completed in Band 66.

Note 5: If the device supports Band 26 and Band 5, then testing is only required to be completed in Band 26. The test requirements and data comparison between Bands 5 and 26 will not be directly comparable due to the usage of different RF channel bandwidths.

4.1.2 Receiver Sensitivity Test Settings

Receiver sensitivity measurements shall be performed using data throughput as the measurement metric. The DUT's receiver sensitivity corresponds to the minimum downlink signal power required to provide a data throughput rate greater than or equal to 95% of the maximum throughput of the reference measurement channel. Refer to Section 2 in *CTIA 01.71* [6] for set-up illustrations.

For a device supporting multiple receivers, all receivers shall be enabled during the test procedure described in the remainder of this section. In this way, C-TIS is the test result, regardless whether the device supports one or multiple receivers. In the special case that I-TIS is the desired quantity of interest, the same procedure is followed, except that all but the specified receiver-under-test on the device are disabled.

The LTE communication tester and DUT shall be configured per section 7.3 (Reference Sensitivity Level) of *3GPP TS 36.521-1* [12] using the defaults specified in *3GPP TS 36.521-1* [12] and *3GPP TS 36.508* [13] as applicable. As the 3GPP reference does not make any mention of p-Max, nor is p-Max included in the default message content defined in *3GPP TS 36.508* [13], p-Max shall not be signaled during attach procedures or during measurements. For a given downlink RF power level, throughput shall be measured using the test procedure in section 7.3 of *3GPP TS 36.521-1* [12] using the downlink and uplink reference measurement channels defined in Annexes A.2.2, A.2.3, and A.3.2 of *3GPP TS 36.521-1* [12] and Table 4.1.2-1 . For LTE Band 13, the settings in Table 4.1.2-2 shall take precedence over the settings in Annexes A.2.2, A.2.3, and A.3.2 of *3GPP TS 36.521-1* [12]. The LTE communication tester shall send continuous uplink power control “up” commands to the DUT to ensure the DUT's transmitter is at maximum output power during the sensitivity searches. The downlink power step size shall be no more than 0.5 dB when the RF power level is near the LTE sensitivity level. The minimum RF power level resulting in a data throughput rate greater than or equal to 95% of the maximum throughput of the reference measurement channel shall be recorded as the downlink power level corresponding to the 95% throughput percentage (the data throughput rate is as defined in section 7.3 of *3GPP TS 36.521-1* [12]). Care must be taken to ensure that the duration of the throughput measurement is sufficient to achieve statistical significance according to Annex G.2 of *3GPP TS 36.521-1* [12]. The downlink signal level for each DUT test condition shall be recorded for integration pursuant to *CTIA 01.20* [1] or *CTIA 01.21* [2] to give a single figure of merit referred to as Total Isotropic Sensitivity (TIS).

TIS shall be fully measured as described above and calculated pursuant to *CTIA 01.20* [1] or *CTIA 01.21* [2] TIS measurements shall be carried out for different frequency pairs (FDD; UL -uplink /DL -downlink) or frequencies (TDD) and RB allocations across the bands supported by the DUT, as defined in Table 4.1.2-1.TIS results shall be based on total channel power.

Table 4.1.2-1 LTE TIS Measurements Table for the Primary Mechanical Mode[1]

Band	Channel Bandwidth (MHz)	Channel	RX Frequency (MHz) [center of DL RB allocation]	UL RB Allocation	DL RB Allocation
2[2]	10	650	1935	50 RB with RBstart=0	50 RB with RBstart=0
	10	900	1960	50 RB with RBstart=0	50 RB with RBstart=0
	10	1150	1985	50 RB with RBstart=0	50 RB with RBstart=0
4[3]	10	2000	2115	50 RB with RBstart=0	50 RB with RBstart=0
	10	2175	2132.5	50 RB with RBstart=0	50 RB with RBstart=0
	10	2350	2150	50 RB with RBstart=0	50 RB with RBstart=0
5[4]	10	2450	874	25 RB with RBstart=25	50 RB with RBstart=0
	10	2525	881.5	25 RB with RBstart=25	50 RB with RBstart=0
	10	2600	889	25 RB with RBstart=25	50 RB with RBstart=0

Band	Channel Bandwidth (MHz)	Channel	RX Frequency (MHz) [center of DL RB allocation]	UL RB Allocation	DL RB Allocation
7	20	2850	2630	75 RB with RBstart=25	100 RB with RBstart=0
	20	3100	2655	75 RB with RBstart=25	100 RB with RBstart=0
	20	3350	2680	75 RB with RBstart=25	100 RB with RBstart=0
12	5	5035	731.5	20 RB with RBstart=5	25 RB with RBstart=0
	5	5095	737.5	20 RB with RBstart=5	25 RB with RBstart=0
	5	5155	743.5	20 RB with RBstart=5	25 RB with RBstart=0
13	10	5230	751	15 RB with RBstart=0	50 RB with RBstart=0
14	10	5330	763	15 RB with RBstart=0	50 RB with RBstart=0
25[2]	5	8065	1932.5	25 RB with RBstart=0	25 RB with RBstart=0
	5	8365	1962.5	25 RB with RBstart=0	25 RB with RBstart=0
	5	8665	1992.5	25 RB with RBstart=0	25 RB with RBstart=0
26[4]	5	8715	861.5	25 RB with RBstart=0	25 RB with RBstart=0
	5	8865	876.5	25 RB with RBstart=0	25 RB with RBstart=0
	5	9015	891.5	25 RB with RBstart=0	25 RB with RBstart=0
30	10	9820	2355	25 RB with RBstart=25	50 RB with RBstart=0
41	20	39750	2506	100RB with RBstart=0	100RB with RBstart=0
	20	40620	2593	100RB with RBstart=0	100RB with RBstart=0
	20	41490	2680	100RB with RBstart=0	100RB with RBstart=0
48	10	55290	3555	50 RB with RBstart=0	50 RB with RBstart=0
	10	55990	3625	50 RB with RBstart=0	50 RB with RBstart=0
	10	56690	3695	50 RB with RBstart=0	50 RB with RBstart=0
66[3]	10	66486	2115	50 RB with RBstart=0	50 RB with RBstart=0
	10	66786	2145	50 RB with RBstart=0	50 RB with RBstart=0
	10	67086	2175	50 RB with RBstart=0	50 RB with RBstart=0
70	15	68411	2002.5	75 RB with RBstart=0	75 RB with RBstart=0

Band	Channel Bandwidth (MHz)	Channel	RX Frequency (MHz) [center of DL RB allocation]	UL RB Allocation	DL RB Allocation
71	10	68636	622	25 RB with RBstart=0	50 RB with RBstart=0
	10	68761	634.5	25 RB with RBstart=0	50 RB with RBstart=0
	10	68886	647	25 RB with RBstart=0	50 RB with RBstart=0

Note 1: Primary Mechanical Mode refers to device configured in preferred mode per manufacturer instructions (typically means antenna extended, fold or portrait slide open, but depends on form factor).

Note 2: If the device supports Band 25 and Band 2, then testing is only required to be completed in Band 25. The test requirements and data comparison between Bands 2 and 25 will not be directly comparable due to the usage of different RF channel bandwidths.

Note 3: If the device supports Band 4 and Band 66, then testing is only required to be completed in Band 66.

Note 4: If the device supports Band 26 and Band 5, then testing is only required to be completed in Band 26. The test requirements and data comparison between Bands 5 and 26 will not be directly comparable due to the usage of different RF channel bandwidths.

Table 4.1.2-2 Uplink Reference Measurement Channel Table (Uplink Reference Measurement Channels Are Per Annexes A.2.2 and A.2.3 of 3GPP TS 36.521-1 [12] with the Exceptions Noted in the Table for Band 13)

Parameter	Unit	Value
Channel bandwidth	MHz	10
Allocated resource blocks		15
DFT-OFDM Symbols per subframe		12
Modulation		QPSK
Target Coding rate		1/3
Payload size	Bits	1320
Transport block CRC	Bits	24
Number of code blocks - C		1
Code block CRC size	Bits	0
Total number of bits per sub-frame	Bits	4320
Total symbols per sub-frame		2160
UE Category		1-5

4.1.2.1 LTE Relative Sensitivity on Intermediate Channel Measurements

The intermediate channels as detailed below shall be used for relative sensitivity on intermediate channel measurements.

	The green cells represent the low, middle and high channels that are fully tested for TIS.
	The yellow cells represent the lower 25% of the intermediate channels.
	The white cells represent the middle 50% of the intermediate channels.
	The orange cells represent the upper 25% of the intermediate channels.

Table 4.1.2.1-1 LTE Intermediate Channel Measurements Table

Band	Channel Bandwidth (MHz)	Channel	Frequency (MHz)	UL RB Allocation	DL RB Allocation
2[1]	10	650	1935	50 RB with RBstart=0	50 RB with RBstart=0
2	10	740	1944	50 RB with RBstart=0	50 RB with RBstart=0
2	10	820	1952	50 RB with RBstart=0	50 RB with RBstart=0
2	10	900	1960	50 RB with RBstart=0	50 RB with RBstart=0
2	10	980	1968	50 RB with RBstart=0	50 RB with RBstart=0
2	10	1060	1976	50 RB with RBstart=0	50 RB with RBstart=0
2	10	1150	1985	50 RB with RBstart=0	50 RB with RBstart=0
4[2]	10	2000	2115	50 RB with RBstart=0	50 RB with RBstart=0
4	10	2090	2124	50 RB with RBstart=0	50 RB with RBstart=0
4	10	2175	2132.5	50 RB with RBstart=0	50 RB with RBstart=0
4	10	2260	2141	50 RB with RBstart=0	50 RB with RBstart=0
4	10	2350	2150	50 RB with RBstart=0	50 RB with RBstart=0
5[3, 4]	10	2450	874	25 RB with RBstart=25	50 RB with RBstart=0
5	10	2525	881.5	25 RB with RBstart=25	50 RB with RBstart=0
5	10	2600	889	25 RB with RBstart=25	50 RB with RBstart=0
12	5	5035	731.5	20 RB with RBstart=5	25 RB with RBstart=0
12	5	5065	734.5	20 RB with RBstart=5	25 RB with RBstart=0
12	5	5095	737.5	20 RB with RBstart=5	25 RB with RBstart=0
12	5	5125	740.5	20 RB with RBstart=5	25 RB with RBstart=0
12	5	5155	743.5	20 RB with RBstart=5	25 RB with RBstart=0

Band	Channel Bandwidth (MHz)	Channel	Frequency (MHz)	UL RB Allocation	DL RB Allocation
25[1]	5	8065	1932.5	25 RB with RBstart=0	25 RB with RBstart=0
25	5	8105	1936.5	25 RB with RBstart=0	25 RB with RBstart=0
25	5	8145	1940.5	25 RB with RBstart=0	25 RB with RBstart=0
25	5	8185	1944.5	25 RB with RBstart=0	25 RB with RBstart=0
25	5	8225	1948.5	25 RB with RBstart=0	25 RB with RBstart=0
25	5	8265	1952.5	25 RB with RBstart=0	25 RB with Rbstart=0
25	5	8305	1956.5	25 RB with RBstart=0	25 RB with RBstart=0
25	5	8345	1960.5	25 RB with RBstart=0	25 RB with RBstart=0
25	5	8365	1962.5	25 RB with RBstart=0	25 RB with RBstart=0
25	5	8385	1964.5	25 RB with RBstart=0	25 RB with RBstart=0
25	5	8425	1968.5	25 RB with RBstart=0	25 RB with RBstart=0
25	5	8465	1972.5	25 RB with RBstart=0	25 RB with RBstart=0
25	5	8505	1976.5	25 RB with RBstart=0	25 RB with RBstart=0
25	5	8545	1980.5	25 RB with RBstart=0	25 RB with RBstart=0
25	5	8585	1984.5	25 RB with RBstart=0	25 RB with RBstart=0
25	5	8625	1988.5	25 RB with RBstart=0	25 RB with RBstart=0
25	5	8665	1992.5	25 RB with RBstart=0	25 RB with RBstart=0
26[3]	5	8715	861.5	25 RB with RBstart=0	25 RB with RBstart=0
26	5	8755	865.5	25 RB with RBstart=0	25 RB with RBstart=0
26	5	8795	869.5	25 RB with RBstart=0	25 RB with RBstart=0
26	5	8835	873.5	25 RB with RBstart=0	25 RB with RBstart=0
26	5	8865	876.5	25 RB with RBstart=0	25 RB with RBstart=0
26	5	8895	879.5	25 RB with RBstart=0	25 RB with RBstart=0
26	5	8935	883.5	25 RB with RBstart=0	25 RB with RBstart=0
26	5	8975	887.5	25 RB with RBstart=0	25 RB with RBstart=0
26	5	9015	891.5	25 RB with RBstart=0	25 RB with RBstart=0
7	20	2850	2630	75 RB with RBstart=25	100 RB with RBstart=0
7	20	2975	2642.5	75 RB with RBstart=25	100 RB with RBstart=0
7	20	3100	2655	75 RB with RBstart=25	100 RB with RBstart=0
7	20	3225	2667.5	75 RB with RBstart=25	100 RB with RBstart=0
7	20	3350	2680	75 RB with RBstart=25	100 RB with RBstart=0
41	20	39750	2506	100 RB with RBstart=0	100 RB with RBstart=0
41	20	39930	2524	100 RB with RBstart=0	100 RB with RBstart=0
41	20	40110	2542	100 RB with RBstart=0	100 RB with RBstart=0
41	20	40280	2559	100 RB with RBstart=0	100 RB with RBstart=0

Band	Channel Bandwidth (MHz)	Channel	Frequency (MHz)	UL RB Allocation	DL RB Allocation
41	20	40450	2576	100 RB with RBstart=0	100 RB with RBstart=0
41	20	40620	2593	100 RB with RBstart=0	100 RB with RBstart=0
41	20	40790	2610	100 RB with RBstart=0	100 RB with RBstart=0
41	20	40960	2627	100 RB with RBstart=0	100 RB with RBstart=0
41	20	41130	2644	100 RB with RBstart=0	100 RB with RBstart=0
41	20	41310	2662	100 RB with RBstart=0	100 RB with RBstart=0
41	20	41490	2680	100 RB with RBstart=0	100 RB with RBstart=0
48	10	55290	3555	50 RB with RBstart=0	50 RB with RBstart=0
48	10	55380	3564	50 RB with RBstart=0	50 RB with RBstart=0
48	10	55470	3573	50 RB with RBstart=0	50 RB with RBstart=0
48	10	55560	3582	50 RB with RBstart=0	50 RB with RBstart=0
48	10	55650	3591	50 RB with RBstart=0	50 RB with RBstart=0
48	10	55740	3600	50 RB with RBstart=0	50 RB with RBstart=0
48	10	55830	3609	50 RB with RBstart=0	50 RB with RBstart=0
48	10	55910	3617	50 RB with RBstart=0	50 RB with RBstart=0
48	10	55990	3625	50 RB with RBstart=0	50 RB with RBstart=0
48	10	56070	3633	50 RB with RBstart=0	50 RB with RBstart=0
48	10	56150	3641	50 RB with RBstart=0	50 RB with RBstart=0
48	10	56240	3650	50 RB with RBstart=0	50 RB with RBstart=0
48	10	56330	3659	50 RB with RBstart=0	50 RB with RBstart=0
48	10	56420	3668	50 RB with RBstart=0	50 RB with RBstart=0
48	10	56510	3677	50 RB with RBstart=0	50 RB with RBstart=0
48	10	56600	3686	50 RB with RBstart=0	50 RB with RBstart=0
48	10	56690	3695	50 RB with RBstart=0	50 RB with RBstart=0
66[2]	10	66486	2115	50 RB with RBstart=0	50 RB with RBstart=0
66	10	66566	2123	50 RB with RBstart=0	50 RB with RBstart=0
66	10	66636	2130	50 RB with RBstart=0	50 RB with RBstart=0
66	10	66706	2137	50 RB with RBstart=0	50 RB with RBstart=0
66	10	66786	2145	50 RB with RBstart=0	50 RB with RBstart=0
66	10	66866	2153	50 RB with RBstart=0	50 RB with RBstart=0
66	10	66936	2160	50 RB with RBstart=0	50 RB with RBstart=0
66	10	67006	2167	50 RB with RBstart=0	50 RB with RBstart=0
66	10	67086	2175	50 RB with RBstart=0	50 RB with RBstart=0
71	10	68636	622	25 RB with RBstart=0	50 RB with RBstart=0
71	10	68706	629	25 RB with RBstart=0	50 RB with RBstart=0
71	10	68761	634.5	25 RB with RBstart=0	50 RB with RBstart=0

Band	Channel Bandwidth (MHz)	Channel	Frequency (MHz)	UL RB Allocation	DL RB Allocation
71	10	68816	640	25 RB with RBstart=0	50 RB with RBstart=0
71	10	68886	647	25 RB with RBstart=0	50 RB with RBstart=0

Note 1: Note that if the device supports Band 25 and Band 2, then testing is only required to be completed in band 25. The test requirements and data comparison between Bands 2 and 25 will not be directly comparable due to the usage of different RF channel bandwidths.
Note 2: Note that if the device supports Band 4 and Band 66, then testing is only required to be completed in band 66.
Note 3: Note that if the device supports Band 26 and Band 5, then testing is only required to be completed in band 26. The test requirements and data comparison between Bands 26 and 5 will not be directly comparable due to the usage of different RF channel bandwidths.
Note 4: Note that only A-GNSS ICD testing is required for Band 5. As there are no other intermediate channels, no LTE relative sensitivity testing is required.

4.1.3 Optional Frequency Bands and Channel Configurations (Informative)

The following LTE bands/frequencies can be tested.

Table 4.1.3-1 LTE Frequency Bands

Operating Band	UL Frequencies, UE Transmit, eNodeB Receive (MHz)	DL Frequencies, UE Receive, eNodeB Transmit (MHz)
1	1920-1980	2110-2170
3	1710-1785	1805-1880
8	880-915	925-960
20	832-862	791-821
38	2570-2620	2570-2620
39	1880-1920	1880-1920
40	2300-2400	2300-2400

Table 4.1.3-2 LTE TRP Channels and RB Allocations

Band	Channel Bandwidth (MHz)	Channel	UL RB Allocation	DL RB Allocation
1 Low	10	18050	12 RB with RBstart=0	None, control only[1]
1 Mid	10	18300	12 RB with RBstart=19	None, control only[1]
1 High	10	18550	12 RB with RBstart=38	None, control only[1]
3 Low	10	19250	12 RB with RBstart=0	None, control only[1]
3 Mid	10	19575	12 RB with RBstart=19	None, control only[1]
3 High	10	19900	12 RB with RBstart=38	None, control only[1]
8 Low	10	21500	12 RB with RBstart=0	None, control only[1]
8 Mid	10	21625	12 RB with RBstart=19	None, control only[1]
8 High	10	21750	12 RB with RBstart=38	None, control only[1]
20 Low	10	24200	12 RB with RBstart=0	None, control only[1]
20 Mid	10	24300	12 RB with RBstart=19	None, control only[1]
20 High	10	24400	12 RB with RBstart=38	None, control only[1]
38 Low	20	37850	18 RB with RBstart=0	None, control only[1]
38 Mid	20	38000	18 RB with RBstart=41	None, control only[1]
38 High	20	38150	18 RB with RBstart=82	None, control only[1]
39 Low	20	38350	18 RB with RBstart=0	None, control only[1]
39 Mid	20	38450	18 RB with RBstart=41	None, control only[1]
39 High	20	38550	18 RB with RBstart=82	None, control only[1]
40 Low	20	38750	18 RB with RBstart=0	None, control only[1]
40 Mid	20	39150	18 RB with RBstart=41	None, control only[1]
40 High	20	39550	18 RB with RBstart=82	None, control only[1]

Note 1: As per 3GPP TS 36.521-1, Section 6.2 (UE Maximum Output Power).

Table 4.1.3-3 LTE TIS Channels and RB Allocations

Band	Channel Bandwidth (MHz)	Channel	UL RB Allocation	DL RB Allocation
1 Low	10	50	50 RB with RBstart=0	50 RB with RBstart=0
1 Mid	10	300	50 RB with RBstart=0	50 RB with RBstart=0
1 High	10	550	50 RB with RBstart=0	50 RB with RBstart=0
3 Low	10	1250	50 RB with RBstart=0	50 RB with RBstart=0
3 Mid	10	1575	50 RB with RBstart=0	50 RB with RBstart=0
3 High	10	1900	50 RB with RBstart=0	50 RB with RBstart=0
8 Low	10	3500	25 RB with RBstart=25	50 RB with RBstart=0
8 Mid	10	3625	25 RB with RBstart=25	50 RB with RBstart=0
8 High	10	3750	25 RB with RBstart=25	50 RB with RBstart=0
20 Low	10	6200	20 RB with RBstart=0	50 RB with RBstart=0
20 Mid	10	6300	20 RB with RBstart=0	50 RB with RBstart=0
20 High	10	6400	20 RB with RBstart=0	50 RB with RBstart=0
38 Low	20	37850	100 RB with RBstart=0	100 RB with RBstart=0
38 Mid	20	38000	100 RB with RBstart=0	100 RB with RBstart=0
38 High	20	38150	100 RB with RBstart=0	100 RB with RBstart=0
39 Low	20	38350	100 RB with RBstart=0	100 RB with RBstart=0
39 Mid	20	38450	100 RB with RBstart=0	100 RB with RBstart=0
39 High	20	38550	100 RB with RBstart=0	100 RB with RBstart=0
40 Low	20	38750	100 RB with RBstart=0	100 RB with RBstart=0
40 Mid	20	39150	100 RB with RBstart=0	100 RB with RBstart=0
40 High	20	39550	100 RB with RBstart=0	100 RB with RBstart=0

All test parameter settings as specified in Section 4.1.1 and Section 4.1.2 shall be used where applicable. The following items are not required for these bands:

- Ripple tests
- Measurement uncertainty limits
- Intermediate channel testing
- A-GNSS measurements

Some test configurations may be excluded.

As noted, measurement uncertainty limits will not be required, because ripple testing is not required. However, measurement uncertainty calculations can be provided as an estimation using MU values from the closest frequency band where full MU assessment is required.

4.2 LTE Two Downlink Carrier Aggregation (Single Uplink Carrier)

4.2.1 Transmit Power Test Settings

This test procedure applies only for two downlink carrier aggregation with a single uplink carrier on the PCC. This test procedure applies for both inter-band and intra-band cases.

The measurement site and DUT shall be configured as specified in *CTIA 01.71* [6]. The power radiated by the DUT shall be measured using a calibrated and accurate RF measuring instrument (e.g., a spectrum analyzer, or measurement receiver, or power meter). See Section 3 of *CTIA 01.73* [5] for power measurement considerations.

The LTE communication tester and DUT shall be configured per *3GPP TS 36.521-1* [12], Section 6.2.2A (UE Maximum Output Power) using the default settings specified in *3GPP TS 36.521-1* [12] and *3GPP TS 36.508* [13] as applicable. The test procedure in section 6.2.2A of *3GPP TS 36.521-1* [12] shall be used to measure the UE output power of the PCC. Adjust the downlink signal power of all CCs as needed to establish/maintain the LTE connection with a BLER such that the device does not miss PDCCH grants and the transmitter is not gated off during power measurements.

In order to reduce the need for communication tester upgrades or additions, testing LTE CA 2 DL combinations in stand-alone LTE is allowed under certain conditions as long as the antenna tuning is set according to the CA 2 DL combination that is being evaluated. The PCC TRP for a 2 DL CA combination may be tested in stand-alone LTE mode with the antenna tuned for operation in the 2 DL CA combination.

For example, when evaluating an interband 2 DL CA case, CA_xA-yA, where x and y are the LTE bands and the PCC is in LTE x, then the following tests are permitted:

- TRP for x in CA_xA-yA may be tested in stand-alone LTE x with the antenna tuned for operation in CA_xA-yA.

Device manufacturers using dynamically tuned antennas should in general have a method of altering the antenna tuning in order to do the necessary antenna tuning optimization during the R&D phase. In general, the settings for the antenna tuner are stored in a tuning file. Consequently, the antenna tuning can be modified by writing a different tuning file into the device. All the stand-alone LTE bands could be tested using the normal tuning file. A second tuning file for testing the 2 DL CA modes could be created where the antenna tuner settings for the stand-alone LTE bands are changed to the antenna tuner settings for the associated 2 DL CA mode.

Tests shall be carried out for different carrier aggregation frequency combinations and RB allocations across the bands supported by the DUT, as defined in Table 4.2.1-1.

Table 4.2.1-1 LTE Carrier Aggregation Mode (2 Downlink Carriers, 1 Uplink Carrier) TRP Measurements Table for the Primary Mechanical Mode[1]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carrier (SCC) Band	PCC BW (MHz)	SCC BW (MHz)	PCC UL Channel	SCC DL Channel	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocation
CA_2A-2A[2]	2	2	10	10	18650	900	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	18900	1150	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	19150	650	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-4A[4]	2	4	10	10	18650	2350	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	18900	2350	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	19150	2350	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-5A	2	5	10	10	18650	2450	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	18900	2450	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	19150	2450	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-12A	2	12	10	5	18650	5035	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	5	18900	5035	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	5	19150	5035	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-13A	2	13	10	10	18650	5230	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	18900	5230	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	19150	5230	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-29A	2	29	10	10	18650	9720	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	18900	9720	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	19150	9720	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-30A	2	30	10	10	18650	9820	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	18900	9820	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	19150	9820	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-48A	2	48	10	10	18650	56690	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	18900	56690	12 RB with RBstart=19	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carrier (SCC) Band	PCC BW (MHz)	SCC BW (MHz)	PCC UL Channel	SCC DL Channel	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocation
			10	10	19150	56690	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-66A[4]	2	66	10	10	18650	67286	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	18900	67286	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	19150	67286	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_4A-2A[4]	4	2	10	10	20000	650	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	20175	650	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	20350	650	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_4A-4A[4]	4	4	10	10	20000	2175	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	20175	2350	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	20350	2000	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_4A-5A[4]	4	5	10	10	20000	2450	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	20175	2450	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	20350	2450	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_4A-12A[4]	4	12	10	5	20000	5035	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	5	20175	5035	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	5	20350	5035	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_4A-13A[4]	4	13	10	10	20000	5230	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	20175	5230	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	20350	5230	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_4A-29A[4]	4	29	10	10	20000	9720	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	20175	9720	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	20350	9720	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_4A-30A[4]	4	30	10	10	20000	9820	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	20175	9820	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	20350	9820	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_5A-2A	5	2	10	10	20450	1150	12 RB with RBstart=0	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carrier (SCC) Band	PCC BW (MHz)	SCC BW (MHz)	PCC UL Channel	SCC DL Channel	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocation
			10	10	20525	1150	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	20600	1150	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_5A-4A[4]	5	4	10	10	20450	2350	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	20525	2350	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	20600	2350	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_5B[2]	5	5	10	10	20450	2549	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	20600	2501	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_5A-5A[2]	5	5	5	5	20425	2525	8 RB with RBstart=0	N/A[3]	N/A[3]
			5	5	20525	2625	8 RB with RBstart=8	N/A[3]	N/A[3]
			5	5	20625	2425	8 RB with RBstart=17	N/A[3]	N/A[3]
CA_5A-30A	5	30	10	10	20450	9820	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	20525	9820	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	20600	9820	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_5A-48A	5	48	10	10	20450	56690	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	20525	56690	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	20600	56690	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_5A-66A[4]	5	66	10	10	20450	67286	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	20525	67286	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	20600	67286	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_12A-2A[5]	12	2	5	10	23035	1150	8 RB with RBstart=0	N/A[3]	N/A[3]
			5	10	23095	1150	8 RB with RBstart=8	N/A[3]	N/A[3]
			5	10	23155	1150	8 RB with RBstart=17	N/A[3]	N/A[3]
CA_12A-4A[2,4]	12	4	5	10	23035	2350	8 RB with RBstart=0	N/A[3]	N/A[3]
			5	10	23095	2350	8 RB with RBstart=8	N/A[3]	N/A[3]
			5	10	23155	2350	8 RB with RBstart=17	N/A[3]	N/A[3]
CA_12A-30A	12	30	5	10	23035	9820	8 RB with RBstart=0	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carrier (SCC) Band	PCC BW (MHz)	SCC BW (MHz)	PCC UL Channel	SCC DL Channel	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocation
			5	10	23095	9820	8 RB with RBstart=8	N/A[3]	N/A[3]
			5	10	23155	9820	8 RB with RBstart=17	N/A[3]	N/A[3]
CA_12A-66A[2,4]	12	66	5	10	23035	67286	8 RB with RBstart=0	N/A[3]	N/A[3]
			5	10	23095	67286	8 RB with RBstart=8	N/A[3]	N/A[3]
			5	10	23155	67286	8 RB with RBstart=17	N/A[3]	N/A[3]
CA_13A-2A	13	2	10	10	23230	1150	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	23230	1150	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	23230	1150	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_13A-4A[4]	13	4	10	10	23230	2350	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	23230	2350	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	23230	2350	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_13A-48A	13	48	10	10	23230	56690	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	23230	56690	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	23230	56690	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_13A-66A[4]	13	66	10	10	23230	67286	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	23230	67286	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	23230	67286	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_25A-25A	25	25	5	5	26065	8665	8 RB with RBstart=0	N/A[3]	N/A[3]
			5	5	26365	8665	8 RB with RBstart=8	N/A[3]	N/A[3]
			5	5	26665	8665	8 RB with RBstart=17	N/A[3]	N/A[3]
CA_25A-26A	25	26	5	5	26065	9015	8 RB with RBstart=0	N/A[3]	N/A[3]
			5	5	26365	9015	8 RB with RBstart=8	N/A[3]	N/A[3]
			5	5	26665	9015	8 RB with RBstart=17	N/A[3]	N/A[3]
CA_25A-41A	25	41	5	20	26065	41490	8 RB with RBstart=0	N/A[3]	N/A[3]
			5	20	26365	41490	8 RB with RBstart=8	N/A[3]	N/A[3]
			5	20	26665	41490	8 RB with RBstart=17	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carrier (SCC) Band	PCC BW (MHz)	SCC BW (MHz)	PCC UL Channel	SCC DL Channel	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocation
CA_26A-25A	26	25	5	5	26715	8065	8 RB with RBstart=0	N/A[3]	N/A[3]
			5	5	26865	8065	8 RB with RBstart=8	N/A[3]	N/A[3]
			5	5	27015	8065	8 RB with RBstart=17	N/A[3]	N/A[3]
CA_26A-41A	26	41	5	20	26715	41490	8 RB with RBstart=0	N/A[3]	N/A[3]
			5	20	26865	41490	8 RB with RBstart=8	N/A[3]	N/A[3]
			5	20	27015	41490	8 RB with RBstart=17	N/A[3]	N/A[3]
CA_30A-2A	30	2	10	10	27710	650	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	27710	650	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	27710	650	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_30A-4A[4]	30	4	10	10	27710	2000	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	27710	2000	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	27710	2000	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_30A-5A	30	5	10	10	27710	2450	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	27710	2450	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	27710	2450	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_30A-12A	30	12	10	5	27710	5035	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	5	27710	5035	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	5	27710	5035	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_30A-29A	30	29	10	10	27710	9720	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	27710	9720	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	27710	9720	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_30A-66A[4]	30	66	10	10	27710	67286	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	27710	67286	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	27710	67286	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_41A-25A	41	25	20	5	39750	8065	18 RB with RBstart=0	N/A[3]	N/A[3]
			20	5	40620	8065	18 RB with RBstart=41	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carrier (SCC) Band	PCC BW (MHz)	SCC BW (MHz)	PCC UL Channel	SCC DL Channel	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocation
			20	5	41490	8065	18 RB with RBstart=82	N/A[3]	N/A[3]
CA_41A-26A	41	26	20	5	39750	8715	18 RB with RBstart=0	N/A[3]	N/A[3]
			20	5	40620	8715	18 RB with RBstart=41	N/A[3]	N/A[3]
			20	5	41490	8715	18 RB with RBstart=82	N/A[3]	N/A[3]
CA_41C	41	41	20	20	39750	39948	18 RB with RBstart=0	N/A[3]	N/A[3]
			20	20	40620	40422	18 RB with RBstart=41	N/A[3]	N/A[3]
			20	20	41490	41292	18 RB with RBstart=82	N/A[3]	N/A[3]
CA_41A-41A	41	41	20	20	39750	40620	18 RB with RBstart=0	N/A[3]	N/A[3]
			20	20	40620	41490	18 RB with RBstart=41	N/A[3]	N/A[3]
			20	20	41490	39750	18 RB with RBstart=82	N/A[3]	N/A[3]
CA_48A-2A	48	2	10	10	55290	650	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	55990	650	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	56690	650	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_48A-5A	48	5	10	10	55290	2450	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	55990	2450	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	56690	2450	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_48A-13A	48	13	10	10	55290	5230	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	55990	5230	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	56690	5230	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_48A-66A	48	66	10	10	55290	66486	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	55990	66486	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	56690	66486	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-2A[4]	66	2	10	10	132022	650	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	132322	650	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	132622	650	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-5A[4]	66	5	10	10	132022	2450	12 RB with RBstart=0	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carrier (SCC) Band	PCC BW (MHz)	SCC BW (MHz)	PCC UL Channel	SCC DL Channel	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocation
			10	10	132322	2450	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	132622	2450	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-12A[2,4]	66	12	10	5	132022	5035	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	5	132322	5035	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	5	132622	5035	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-13A[4]	66	13	10	10	132022	5230	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	132322	5230	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	132622	5230	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-29A[4]	66	29	10	10	132022	9720	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	132322	9720	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	132622	9720	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-30A[4]	66	30	10	10	132022	9820	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	132322	9820	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	132622	9820	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66C[5]	66	66	10	20	132022	66630	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	20	132322	66930	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	20	132622	67230	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-48A[2]	66	48	10	10	132022	56690	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	132322	56690	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	132622	56690	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-66A[4]	66	66	10	10	132022	67286	12 RB with RBstart=0	N/A[3]	N/A[3]
			10	10	132322	67286	12 RB with RBstart=19	N/A[3]	N/A[3]
			10	10	132622	66486	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_70C	70	70	15	10	133047	68531	16 RB with RBstart=0	N/A[3]	N/A[3]
			15	10	133047	68531	16 RB with RBstart=29	N/A[3]	N/A[3]
			15	10	133047	68531	16 RB with RBstart=59	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carrier (SCC) Band	PCC BW (MHz)	SCC BW (MHz)	PCC UL Channel	SCC DL Channel	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocation
Note 1: Primary Mechanical Mode refers to device configured in preferred mode per manufacturer instructions (typically means antenna extended, fold or portrait slide open, but depends on form factor). Note 2: This combination creates harmonic, intermodulation, or self-desense interference to the SCC. The power level of the SCC shall be adjusted as needed to maintain the LTE carrier aggregation connection and error free operation on the SCC. Note 3: As per 3GPP TS 36.521-1 [12], Section 6.2.2A (UE Maximum Output Power for CA). Note 4: If the device supports both CA_4A-xA and CA_66A-xA (where x is the band number of the SCC), then testing is only required in CA_66A-xA. Similarly, if the device supports both CA_xA-4A and CA_xA-66A (where x is the band number of the PCC), then testing is only required in CA_xA-66A. Note 5: Since all Band 66-capable devices are required to support both CA_66B and CA_66C per 3GPP TS 36.101, testing of CA_66B is not required.									

4.2.2 Receiver Sensitivity Test Settings

This procedure only applies to two-downlink carrier aggregation with a single uplink carrier on the PCC. This procedure applies for both inter-band and intra-band cases.

Carrier Aggregation tests shall be executed as independent measurements of each CC. Therefore, CA testing as described in this section provides an assessment of radiated sensitivity on each CC with the DUT operating in the CA mode. A CA mode is defined as a specific combination of bands assigned to the PCC and SCCs used in carrier aggregation. The CA test methodology described in this section is not intended to provide a measurement of the DUT's aggregate throughput during CA operation.

CA sensitivity measurements shall be performed using data throughput on only one CC at a time as the measurement metric. The DUT's CA receiver sensitivity corresponds to the minimum downlink signal power required to provide a data throughput rate greater than or equal to 95% of the maximum throughput of the reference measurement channel on the tested CC. The CA testing will be executed using C-TIS, with all receivers active, following the guidance in Section 5.1 of *CTIA 01.20* [1]. Refer to Section 2 in *CTIA 01.71* [6] for set-up illustrations.

To remain consistent with 3GPP core specifications, the LTE communication tester and DUT shall be configured per *3GPP TS 36.521-1* [12], section 7.3A.3 (Reference Sensitivity Level for CA (inter-band DL CA without UL CA) when executing tests against the inter-band CA combinations in Table 4.2.2-1. Intra-band CA combinations in Table 4.2.2-1 require the LTE communication tester and DUT to be configured per *3GPP TS 36.521-1* [12], Clause 7.3A.2 (intra-band contiguous DL CA without UL CA) or Clause 7.3A.4 (intra-band non-contiguous DL CA without UL CA). In each case, the defaults specified in *3GPP TS 36.521-1* [12] and *3GPP TS 36.508* [13] shall be used as applicable. For a given downlink RF power level, throughput shall be measured using the test procedure in section 7.3 of *3GPP TS 36.521-1* [12] using the downlink and uplink reference measurement channels defined in Annexes A.2.2, A.2.3, and A.3.2 of *3GPP TS 36.521-1* [12] and Table 4.2.2-1. For LTE Band 13, the settings in Table 4.2.2-1 shall take precedence over the settings in Annexes A.2.2, A.2.3, and A.3.2 of *3GPP TS 36.521-1* [12].

The LTE communication tester shall send continuous uplink power control “up” commands to the DUT to ensure the DUT's transmitter is operating at maximum output power during the sensitivity searches of the PCC or the SCC. As the 3GPP reference does not make any mention of p-Max, nor is p-Max included in the default message content defined in *3GPP TS 36.508* [13], p-Max shall not be signaled during attach procedures or during measurements.

When any SCC is the CC under test, the PCC is used only to provide control of the DUT, and therefore a calibrated downlink power level for the PCC to the DUT is not required. Labs may assign any desired antenna to provide support for the untested CC so long as the selected antenna does not interfere with the tested CC measurements. Labs are encouraged to confirm that the eNodeB's PCC output power and

antenna placement is sufficient to maintain a reliable radio link to the DUT in advance of beginning the execution of a CA TIS test on the SCC. The DL of the untested CC should be configured to not impair the tested CC. When executing intra-band CA TIS tests, it's recommended that the DL power on the untested CC be limited in order to minimize the potential for interference from the test system to the tested CC.

The downlink power step size of the CA component carrier under test shall be no more than 0.5 dB when the RF power level is near the LTE sensitivity level. The minimum RF power level resulting in a data throughput rate greater than or equal to 95% of the maximum throughput of the reference measurement channel shall be recorded as the downlink power level corresponding to the 95% throughput percentage (the data throughput rate is as defined in section 7.3A.2, 7.3A.3 or 7.3A4 of *3GPP TS 36.521-1* [12] as applicable). Care must be taken to ensure that the duration of the throughput measurement is sufficient to achieve statistical significance according to Annex G.2 of *3GPP TS 36.521-1* [12]. The downlink signal level for each DUT test condition shall be recorded for integration pursuant to *CTIA 01.20* [1] to give a single figure of merit referred to as Total Isotropic Sensitivity (TIS).

TIS for the PCC and SCC shall be fully measured as described above and calculated pursuant to *CTIA 01.20* [1].

In order to reduce the need for communication tester upgrades or additions, testing LTE CA 2 DL combinations in stand-alone LTE is allowed under certain conditions as long as the antenna tuning is set according to the CA 2 DL combination that is being evaluated. The PCC TIS for a 2 DL CA combination may be tested in stand-alone LTE mode with the antenna tuned for operation in the 2 DL CA combination. The SCC TIS for a 2 DL CA combination may also be tested in stand-alone LTE mode with the antenna tuned for operation in the 2 DL CA combination as long as the SCC is not susceptible to harmonic, intermodulation or self-desense interference from the PCC TX.

For example, when evaluating an interband 2 DL CA case, CA_xA-yA, where x and y are the LTE bands and the PCC is in LTE x, then the following tests are permitted:

1. TIS for x in CA xA-yA may be tested in stand-alone LTE x with the antenna tuned for operation in CA_xA-yA.
2. TIS for y in CA xA-yA may be tested in stand-alone LTE y with the antenna tuned for operation in CA_xA-yA when LTE y is not susceptible harmonic, intermodulation or self-desense interference from LTE x.

Device manufacturers using dynamically tuned antennas should in general have a method of altering the antenna tuning in order to do the necessary antenna tuning optimization during the R&D phase. In general, the settings for the antenna tuner are stored in a tuning file. Consequently, the antenna tuning can be modified by writing a different tuning file into the device. All the stand-alone LTE bands could be tested using the normal tuning file. A second tuning file for testing the 2 DL CA modes could be created where the antenna tuner settings for the stand-alone LTE bands are changed to the antenna tuner settings for the associated 2 DL CA mode.

The following LTE bands have channels that can only be tested in DL CA mode: 29

Table 4.2.2-1 LTE Carrier Aggregation Mode (2 Downlink Carriers, 1 Uplink Carrier) TIS Measurements Table for the Primary Mechanical Mode[1]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carrier (SCC) Band	PCC BW (MHz)	SCC BW (MHz)	PCC Channel	SCC Channel	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocation
CA_2A-2A [2, 3]	2	2	10	10	650	900	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					800[4]	650	32 RB with RBstart=18	50 RB with RBstart=0	50 RB with RBstart=0
					900	1150	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					1150	650	12 RB with RBstart=38	50 RB with RBstart=0	50 RB with RBstart=0
CA_2A-4A[5]	2	4	10	10	650	2000	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	2175	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					1150	2350	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_2A-5A	2	5	10	10	650	2450	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	2525	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					1150	2600	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_2A-12A	2	12	10	5	650	5035	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
					900	5095	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
					1150	5155	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
CA_2A-13A	2	13	10	10	650	5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					1150	5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_2A-29A	2	29	10	10	650	9720	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	9720	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carrier (SCC) Band	PCC BW (MHz)	SCC BW (MHz)	PCC Channel	SCC Channel	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocation
					1150	9720	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_2A-30A	2	30	10	10	650	9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					1150	9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_2A-48A	2	48	10	10	650	55290	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	55990	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					1150	56690	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_2A-66A[5]	2	66	10	10	650	66486	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	66786	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	67086[6]	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					1150	67286	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_4A-2A[5]	4	2	10	10	2000	650	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2175	900	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2350	1150	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_4A-4A[5]	4	4	10	10	2000	2175	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2175	2350	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2350	2000	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_4A-5A[5]	4	5	10	10	2000	2450	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2175	2525	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carrier (SCC) Band	PCC BW (MHz)	SCC BW (MHz)	PCC Channel	SCC Channel	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocation
					2350	2600	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_4A-12A[5]	4	12	10	5	2000	5035	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
					2175	5095	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
					2350	5155	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
CA_4A-13A[5]	4	13	10	10	2000	5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2175	5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2350	5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_4A-29A[5]	4	29	10	10	2000	9720	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2175	9720	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2350	9720	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_4A-30A[5]	4	30	10	10	2000	9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2175	9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2350	9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_5A-2A	5	2	10	10	2450	650	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
					2525	900	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
					2600	1150	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
CA_5A-4A[5]	5	4	10	10	2450	2000	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
					2525	2175	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
					2600	2350	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carrier (SCC) Band	PCC BW (MHz)	SCC BW (MHz)	PCC Channel	SCC Channel	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocation
CA_5B[2]	5	5	10	10	2450	2549	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
					2600	2501	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
CA_5A-5A[2,7,8]	5	5	5	5	2425	2525	25 RB with RBstart=0	25 RB with RBstart=0	25 RB with RBstart=0
					2525	2625	25 RB with RBstart=0	25 RB with RBstart=0	25 RB with RBstart=0
					2625	2425	12 RB with RBstart=13	25 RB with RBstart=0	25 RB with RBstart=0
					2425[9]	2625	25 RB with RBstart=0	25 RB with RBstart=0	25 RB with RBstart=0
CA_5A-30A	5	30	10	10	2450	9820	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
					2525	9820	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
					2600	9820	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
CA_5A-48A	5	48	10	10	2450	55290	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
					2525	55990	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
					2600	56690	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
CA_5A-66A[5]	5	66	10	10	2450	66486	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
					2525	66786	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
					2525	67086[6]	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
					2600	67286	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
CA_12A-2A	12	2	5	10	5035	650	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0
					5095	900	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0
					5155	1150	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carrier (SCC) Band	PCC BW (MHz)	SCC BW (MHz)	PCC Channel	SCC Channel	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocation
CA_12A-4A[2,5]	12	4	5	10	5035	2000	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0
					5095	2175	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0
					5155	2350	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0
CA_12A-30A	12	30	5	10	5035	9820	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0
					5095	9820	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0
					5155	9820	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0
CA_12A-66A[2,5]	12	66	5	10	5035	66486	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0
					5095	66786	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0
					5095	67086[6]	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0
					5155	67286	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0
CA_13A-2A	13	2	10	10	5230	650	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	900	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	1150	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_13A-4A[5]	13	4	10	10	5230	2000	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	2175	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	2350	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_13A-48A	13	48	10	10	5230	55290	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	55990	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	56690	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carrier (SCC) Band	PCC BW (MHz)	SCC BW (MHz)	PCC Channel	SCC Channel	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocation
CA_13A-66A[5]	13	66	10	10	5230	66486	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	66786	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	67086[6]	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	67286	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_25A-25A	25	25	5	5	8065	8665	25 RB with RBstart=0	25 RB with RBstart=0	25 RB with RBstart=0
					8365	8665	25 RB with RBstart=0	25 RB with RBstart=0	25 RB with RBstart=0
					8665	8065	10 RB with RBstart=15	25 RB with RBstart=0	25 RB with RBstart=0
CA_25A-26A	25	26	5	5	8065	8715	25 RB with RBstart=0	25 RB with RBstart=0	25 RB with RBstart=0
					8365	8865	25 RB with RBstart=0	25 RB with RBstart=0	25 RB with RBstart=0
					8665	9015	25 RB with RBstart=0	25 RB with RBstart=0	25 RB with RBstart=0
CA_25A-41A	25	41	5	20	8065	39750	25 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
					8365	40620	25 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
					8665	41490	25 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
CA_26A-25A	26	25	5	5	8715	8065	25 RB with RBstart=0	25 RB with RBstart=0	25 RB with RBstart=0
					8865	8365	25 RB with RBstart=0	25 RB with RBstart=0	25 RB with RBstart=0
					9015	8665	25 RB with RBstart=0	25 RB with RBstart=0	25 RB with RBstart=0
CA_26A-41A	26	41	5	20	8715	39750	25 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
					8865	40620	25 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
					9015	41490	25 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carrier (SCC) Band	PCC BW (MHz)	SCC BW (MHz)	PCC Channel	SCC Channel	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocation
CA_30A-2A	30	2	10	10	9820	650	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
					9820	900	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
					9820	1150	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
CA_30A-4A[5]	30	4	10	10	9820	2000	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
					9820	2175	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
					9820	2350	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
CA_30A-5A	30	5	10	10	9820	2450	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
					9820	2525	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
					9820	2600	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
CA_30A-12A	30	12	10	5	9820	5035	25 RB with RBstart=25	50 RB with RBstart=0	25 RB with RBstart=0
					9820	5095	25 RB with RBstart=25	50 RB with RBstart=0	25 RB with RBstart=0
					9820	5155	25 RB with RBstart=25	50 RB with RBstart=0	25 RB with RBstart=0
CA_30A-29A	30	29	10	10	9820	9720	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
CA_30A-66A[5]	30	66	10	10	9820	66486	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
					9820	66786	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
					9820	67086[6]	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
					9820	67286	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0
CA_41A-25A	41	25	20	5	39750	8065	100 RB with RBstart=0	100 RB with RBstart=0	25 RB with RBstart=0
					40620	8365	100 RB with RBstart=0	100 RB with RBstart=0	25 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carrier (SCC) Band	PCC BW (MHz)	SCC BW (MHz)	PCC Channel	SCC Channel	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocation
					41490	8665	100 RB with RBstart=0	100 RB with RBstart=0	25 RB with RBstart=0
CA_41A-26A	41	26	20	5	39750	8715	100 RB with RBstart=0	100 RB with RBstart=0	25 RB with RBstart=0
					40620	8865	100 RB with RBstart=0	100 RB with RBstart=0	25 RB with RBstart=0
					41490	9015	100 RB with RBstart=0	100 RB with RBstart=0	25 RB with RBstart=0
CA_41A-41A	41	41	20	20	39750	40620	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					40620	41490	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					41490	39750	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
CA_41C	41	41	20	20	39750	39948[10]	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					40620	40422[11]	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					40620	40818[12]	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					41490	41292[11]	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
CA_48A-2A	48	2	10	10	55290	650	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					55990	900	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					56690	1150	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_48A-5A	48	5	10	10	55290	2450	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					55990	2525	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					56690	2600	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_48A-13A	48	13	10	10	55290	5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					55990	5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carrier (SCC) Band	PCC BW (MHz)	SCC BW (MHz)	PCC Channel	SCC Channel	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocation
					56690	5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_48A-66A	48	66	10	10	55290	66486	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					55990	66786	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					55990	67086[6]	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					56690	67286	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_66A-2A[5]	66	2	10	10	66486	650	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66786	900	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	1150	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_66A-5A[5]	66	5	10	10	66486	2450	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66786	2525	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	2600	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_66A-12A[5]	66	12	10	5	66486	5035	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
					66786	5095	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
					67086	5155	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
CA_66A-13A[5]	66	13	10	10	66486	5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66786	5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_66A-29A[5]	66	29	10	10	66486	9720	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66786	9720	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carrier (SCC) Band	PCC BW (MHz)	SCC BW (MHz)	PCC Channel	SCC Channel	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocation
					67086	9720	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_66A-30A[5]	66	30	10	10	66486	9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66786	9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_66A-48A[2]	66	48	10	10	66486	55290	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66786	55990	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	55290[13]	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	56690	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_66C[9,14]	66	66	20	20	66536	66734[10]	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					66786	66984[12]	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					67036	67234	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
CA_66A-66A[5]	66	66	10	10	66486	67286	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66486	67086[6]	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66786	66486	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	66786	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_70C	70	70	15	10	68411	68531	75 RB with RBstart=0	75 RB with RBstart=0	50 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carrier (SCC) Band	PCC BW (MHz)	SCC BW (MHz)	PCC Channel	SCC Channel	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocation

Note 1: Primary Mechanical Mode refers to device configured in preferred mode per manufacturer instructions (typically means antenna extended, fold or portrait slide open, but depends on form factor).

Note 2: This combination creates harmonic, intermodulation, or self-desense interference to the SCC. When measuring the PCC, the power level of the SCC shall be adjusted as needed to maintain the LTE carrier aggregation connection and error free operation on the SCC.

Note 3: An additional set of channel conditions was added for CA_2A-2A to address the case where Wgap is <= 10 (per Table 7.3.1A-3 of 3GPP TS 36.101 [14]).

Note 4: TIS testing is not required for the PCC on channel 800. TIS testing is only required for the SCC on channel 650.

Note 5: If the device supports both CA_4A-xA and CA_66A-xA (where x is the band number of the SCC), then testing is only required in CA_66A-xA. Similarly, if the device supports both CA_xA-4A and CA_xA-66A (where x is the band number of the PCC), then testing is only required in CA_xA-66A.

Note 6: When there is a Band 66 SCC on channel 67086, TIS testing is not required on the PCC. TIS testing is only required on the Band 66 SCC on channel 67086.

Note 7: An additional set of channel conditions was added for CA_5A-5A to address the case where receiver sensitivity relaxation is allowed per Table 7.3.1A-3 of 3GPP TS 36.101 [14]

Note 8: Single point offset testing using the pattern data from standalone mode is not allowed when the channel bandwidth in CA mode is different from the channel bandwidth in standalone mode.

Note 9: TIS testing is not required for the PCC on channel 2425 when the SCC is on channel 2625. TIS testing is only required for the SCC on channel 2625.

Note 10: TIS testing on the SCC is not required when the antenna configuration remains the same when the PCC changes to the mid channel.

Note 11: TIS testing on the SCC is not required when the antenna configuration remains the same when the PCC changes to the low channel.

Note 12: TIS testing on the SCC is not required when the antenna configuration remains the same when the PCC changes to the high channel.

Note 13: TIS testing is not required on the Band 66 PCC on channel 67086. TIS testing is only required on the Band 48 SCC on channel 55290.

Note 14: Since all Band 66-capable devices are required to support both CA_66B and CA_66C per 3GPP TS 36.101 [14], testing of CA_66B is not required.

4.3 LTE Three Downlink Carrier Aggregation (Single Uplink Carrier)

4.3.1 Transmit Power Test Procedure

The test procedure for three downlink carrier aggregation with a single uplink carrier is the same as the test procedure for two downlink carrier aggregation with a single uplink carrier (per Section 4.2.1) with the exception that there are two SCCs.

Tests shall be carried out for different carrier aggregation frequency combinations and RB allocations across the bands supported by the DUT, as defined in Table 4.3.1-1. Since only the PCC is being tested, there is no need to swap the SCCs. The SCCs have been chosen, in general, to maximize the bandwidth spanned by the antenna.

In order to reduce the need for communication tester upgrades or additions, testing LTE CA 3 DL combinations in stand-alone LTE is allowed under certain conditions as long as the antenna tuning is set according to the CA 3 DL combination that is being evaluated. The PCC TRP for a 3 DL CA combination may be tested in stand-alone LTE mode with the antenna tuned for operation in the 3 DL CA combination.

For example, when evaluating an interband 3 DL CA case, CA_xA-yA-zA, where x, y and z are the LTE bands and the PCC is in LTE x, then the following tests are permitted:

1. TRP for x in CA_xA-yA-zA may be tested in stand-alone LTE x with the antenna tuned for operation in CA_xA-yA-zA.

Device manufacturers using dynamically tuned antennas should in general have a method of altering the antenna tuning in order to do the necessary antenna tuning optimization during the R&D phase. In general, the settings for the antenna tuner are stored in a tuning file. Consequently, the antenna tuning can be modified by writing a different tuning file into the device. All the stand-alone LTE bands could be tested using the normal tuning file. A second tuning file for testing the 2 DL CA modes could be created where the antenna tuner settings for the stand-alone LTE bands are changed to the antenna tuner settings for the associated 2 DL CA mode. A third tuning file for testing the 3 DL CA modes could be created where the antenna tuner settings for the stand-alone LTE bands are changed to the antenna tuner settings for the associated 3 DL CA mode.

Table 4.3.1-1 LTE Carrier Aggregation Mode (3 Downlink Carriers, 1 Uplink Carrier) TRP Measurements Table for the Primary Mechanical Mode[1]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC UL Channel	SCC DL Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocations
CA_2A-2A-4A[2]	2	SCC1=2 SCC2=4	10	SCC1=10 SCC2=10	18650	SCC1=900 SCC2=2350	12 RB with RBstart=0	N/A[3]	N/A[3]
					18900	SCC1=1150 SCC2=2350	12 RB with RBstart=19	N/A[3]	N/A[3]
					19150	SCC1=650 SCC2=2350	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-2A-5A[2]	2	SCC1=2 SCC2=5	10	SCC1=10 SCC2=10	18650	SCC1=900 SCC2=2450	12 RB with RBstart=0	N/A[3]	N/A[3]
					18900	SCC1=1150 SCC2=2450	12 RB with RBstart=19	N/A[3]	N/A[3]
					19150	SCC1=650 SCC2=2450	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-2A-12A[2]	2	SCC1=2 SCC2=12	10	SCC1=10 SCC2=5	18650	SCC1=900 SCC2=5035	12 RB with RBstart=0	N/A[3]	N/A[3]
					18900	SCC1=1150 SCC2=5035	12 RB with RBstart=19	N/A[3]	N/A[3]
					19150	SCC1=650 SCC2=5035	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-2A-13A[2]	2	SCC1=2 SCC2=13	10	SCC1=10 SCC2=10	18650	SCC1=900 SCC2=5230	12 RB with RBstart=0	N/A[3]	N/A[3]
					18900	SCC1=1150 SCC2=5230	12 RB with RBstart=19	N/A[3]	N/A[3]
					19150	SCC1=650 SCC2=5230	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-2A-66A[2]		SCC1=2 SCC2=66	10	SCC1=10 SCC2=10	18650	SCC1=900 SCC2=67286	12 RB with RBstart=0	N/A[3]	N/A[3]
					18900	SCC1=1150 SCC2=67286	12 RB with RBstart=19	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC UL Channel	SCC DL Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocations
	2				19150	SCC1=650 SCC2=67286	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-4A-4A[4]	2	SCC1=4 SCC2=4	10	SCC1=10 SCC2=10	18650	SCC1=2000 SCC2=2350	12 RB with RBstart=0	N/A[3]	N/A[3]
					18900	SCC1=2000 SCC2=2350	12 RB with RBstart=19	N/A[3]	N/A[3]
					19150	SCC1=2000 SCC2=2350	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-4A-5A[4]	2	SCC1=4 SCC2=5	10	SCC1=10 SCC2=10	18650	SCC1=2350 SCC2=2450	12 RB with RBstart=0	N/A[3]	N/A[3]
					18900	SCC1=2350 SCC2=2450	12 RB with RBstart=19	N/A[3]	N/A[3]
					19150	SCC1=2350 SCC2=2450	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-4A-12A[4]	2	SCC1=4 SCC2=12	10	SCC1=10 SCC2=5	18650	SCC1=2350 SCC2=5035	12 RB with RBstart=0	N/A[3]	N/A[3]
					18900	SCC1=2350 SCC2=5035	12 RB with RBstart=19	N/A[3]	N/A[3]
					19150	SCC1=2350 SCC2=5035	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-4A-13A[4]	2	SCC1=4 SCC2=13	10	SCC1=10 SCC2=10	18650	SCC1=2350 SCC2=5230	12 RB with RBstart=0	N/A[3]	N/A[3]
					18900	SCC1=2350 SCC2=5230	12 RB with RBstart=19	N/A[3]	N/A[3]
					19150	SCC1=2350 SCC2=5230	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-5A-30A	2	SCC1=5 SCC2=30	10	SCC1=10 SCC2=10	18650	SCC1=2450 SCC2=9820	12 RB with RBstart=0	N/A[3]	N/A[3]
					18900	SCC1=2450 SCC2=9820	12 RB with RBstart=19	N/A[3]	N/A[3]
					19150	SCC1=2450 SCC2=9820	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-5A-48A	2	SCC1=5 SCC2=48	10	SCC1=10 SCC2=10	18650	SCC1=2450 SCC2=56690	12 RB with RBstart=0	N/A[3]	N/A[3]
					18900	SCC1=2450 SCC2=56690	12 RB with RBstart=19	N/A[3]	N/A[3]
					19150	SCC1=2450 SCC2=56690	12 RB with RBstart=38	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC UL Channel	SCC DL Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocations
CA_2A-5A-66A[4]	2	SCC1=5 SCC2=66	10	SCC1=10 SCC2=10	18650	SCC1=2450 SCC2=67286	12 RB with RBstart=0	N/A[3]	N/A[3]
					18900	SCC1=2450 SCC2=67286	12 RB with RBstart=19	N/A[3]	N/A[3]
					19150	SCC1=2450 SCC2=67286	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-12A-30A	2	SCC1=12 SCC2=30	10	SCC1=5 SCC2=10	18650	SCC1=5035 SCC2=9820	12 RB with RBstart=0	N/A[3]	N/A[3]
					18900	SCC1=5035 SCC2=9820	12 RB with RBstart=19	N/A[3]	N/A[3]
					19150	SCC1=5035 SCC2=9820	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-12A-66A[4]	2	SCC1=12 SCC2=66	10	SCC1=5 SCC2=10	18650	SCC1=5035 SCC2=67286	12 RB with RBstart=0	N/A[3]	N/A[3]
					18900	SCC1=5035 SCC2=67286	12 RB with RBstart=19	N/A[3]	N/A[3]
					19150	SCC1=5035 SCC2=67286	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-13A-48A	2	SCC1=13 SCC2=48	10	SCC1=10 SCC2=10	18650	SCC1=5230 SCC2=56690	12 RB with RBstart=0	N/A[3]	N/A[3]
					18900	SCC1=5230 SCC2=56690	12 RB with RBstart=19	N/A[3]	N/A[3]
					19150	SCC1=5230 SCC2=56690	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-13A-66A[4]	2	SCC1=13 SCC2=66	10	SCC1=10 SCC2=10	18650	SCC1=5230 SCC2=67286	12 RB with RBstart=0	N/A[3]	N/A[3]
					18900	SCC1=5230 SCC2=67286	12 RB with RBstart=19	N/A[3]	N/A[3]
					19150	SCC1=5230 SCC2=67286	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-29A-30A	2	SCC1=29 SCC2=30	10	SCC1=10 SCC2=10	18650	SCC1=9720 SCC2=9820	12 RB with RBstart=0	N/A[3]	N/A[3]
					18900	SCC1=9720 SCC2=9820	12 RB with RBstart=19	N/A[3]	N/A[3]
					19150	SCC1=9720 SCC2=9820	12 RB with RBstart=38	N/A[3]	N/A[3]
					18650	SCC1=56690 SCC2=66486	12 RB with RBstart=0	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC UL Channel	SCC DL Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocations
CA_2A-48A-66A[4]	2	SCC1=48 SCC2=66	10	SCC1=10 SCC2=10	18900	SCC1=56690 SCC2=66486	12 RB with RBstart=19	N/A[3]	N/A[3]
					19150	SCC1=56690 SCC2=66486	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-66C[4,5]	2	SCC1=66 SCC2=66	10	SCC1=10 SCC2=20	18650	SCC1=67086 SCC2=67230	12 RB with RBstart=0	N/A[3]	N/A[3]
					18900	SCC1=67086 SCC2=67230	12 RB with RBstart=19	N/A[3]	N/A[3]
					19150	SCC1=67086 SCC2=67230	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_2A-66A-66A[4]	2	SCC1=66 SCC2=66	10	SCC1=10 SCC2=10	18650	SCC1=66486 SCC2=67286	12 RB with RBstart=0	N/A[3]	N/A[3]
					18900	SCC1=66486 SCC2=67286	12 RB with RBstart=19	N/A[3]	N/A[3]
					19150	SCC1=66486 SCC2=67286	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_4A-2A-4A	4	SCC1=2 SCC2=4	10	SCC1=10 SCC2=10	20000	SCC1=650 SCC2=2175	12 RB with RBstart=0	N/A[3]	N/A[3]
					20175	SCC1=650 SCC2=2350	12 RB with RBstart=19	N/A[3]	N/A[3]
					20350	SCC1=650 SCC2=2000	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_4A-2A-5A[4]	4	SCC1=2 SCC2=5	10	SCC1=10 SCC2=10	20000	SCC1=650 SCC2=2450	12 RB with RBstart=0	N/A[3]	N/A[3]
					20175	SCC1=650 SCC2=2450	12 RB with RBstart=19	N/A[3]	N/A[3]
					20350	SCC1=650 SCC2=2450	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_4A-2A-12A[4]	4	SCC1=2 SCC2=12	10	SCC1=10 SCC2=5	20000	SCC1=650 SCC2=5035	12 RB with RBstart=0	N/A[3]	N/A[3]
					20175	SCC1=650 SCC2=5035	12 RB with RBstart=19	N/A[3]	N/A[3]
					20350	SCC1=650 SCC2=5035	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_4A-2A-13A[4]	4	SCC1=2	10		20000	SCC1=650 SCC2=5230	12 RB with RBstart=0	N/A[3]	N/A[3]
					20175	SCC1=650 SCC2=5230	12 RB with RBstart=19	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC UL Channel	SCC DL Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocations
		SCC2=13		SCC1=10 SCC2=10	20350	SCC1=650 SCC2=5230	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_4A-4A-5A[4]	4	SCC1=4 SCC2=5	10	SCC1=10 SCC2=10	20000	SCC1=2175 SCC2=2450	12 RB with RBstart=0	N/A[3]	N/A[3]
					20175	SCC1=2350 SCC2=2450	12 RB with RBstart=19	N/A[3]	N/A[3]
					20350	SCC1=2000 SCC2=2450	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_4A-4A-12A[4]	4	SCC1=4 SCC2=12	10	SCC1=10 SCC2=5	20000	SCC1=2175 SCC2=5035	12 RB with RBstart=0	N/A[3]	N/A[3]
					20175	SCC1=2350 SCC2=5035	12 RB with RBstart=19	N/A[3]	N/A[3]
					20350	SCC1=2000 SCC2=5035	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_4A-4A-13A[4]	4	SCC1=4 SCC2=13	10	SCC1=10 SCC2=10	20000	SCC1=2175 SCC2=5230	12 RB with RBstart=0	N/A[3]	N/A[3]
					20175	SCC1=2350 SCC2=5230	12 RB with RBstart=19	N/A[3]	N/A[3]
					20350	SCC1=2000 SCC2=5230	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_4A-5A-30A[4]	4	SCC1=5 SCC2=30	10	SCC1=10 SCC2=10	20000	SCC1=2450 SCC2=9820	12 RB with RBstart=0	N/A[3]	N/A[3]
					20175	SCC1=2450 SCC2=9820	12 RB with RBstart=19	N/A[3]	N/A[3]
					20350	SCC1=2450 SCC2=9820	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_4A-12A-30A[4]	4	SCC1=12 SCC2=30	10	SCC1=5 SCC2=10	20000	SCC1=5035 SCC2=9820	12 RB with RBstart=0	N/A[3]	N/A[3]
					20175	SCC1=5035 SCC2=9820	12 RB with RBstart=19	N/A[3]	N/A[3]
					20350	SCC1=5035 SCC2=9820	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_4A-29A-30A[4]	4	SCC1=29 SCC2=30	10	SCC1=10 SCC2=10	20000	SCC1=9720 SCC2=9820	12 RB with RBstart=0	N/A[3]	N/A[3]
					20175	SCC1=9720 SCC2=9820	12 RB with RBstart=19	N/A[3]	N/A[3]
					20350	SCC1=9720 SCC2=9820	12 RB with RBstart=38	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC UL Channel	SCC DL Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocations
CA_5A-2A-2A	5	SCC1=2 SCC2=2	10	SCC1=10 SCC2=10	20450	SCC1=650 SCC2=1150	12 RB with RBstart=0	N/A[3]	N/A[3]
					20525	SCC1=650 SCC2=1150	12 RB with RBstart=19	N/A[3]	N/A[3]
					20600	SCC1=650 SCC2=1150	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_5A-2A-4A[4]	5	SCC1=2 SCC2=4	10	SCC1=10 SCC2=10	20450	SCC1=650 SCC2=2350	12 RB with RBstart=0	N/A[3]	N/A[3]
					20525	SCC1=650 SCC2=2350	12 RB with RBstart=19	N/A[3]	N/A[3]
					20600	SCC1=650 SCC2=2350	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_5A-2A-30A	5	SCC1=2 SCC2=30	10	SCC1=10 SCC2=10	20450	SCC1=650 SCC2=9820	12 RB with RBstart=0	N/A[3]	N/A[3]
					20525	SCC1=650 SCC2=9820	12 RB with RBstart=19	N/A[3]	N/A[3]
					20600	SCC1=650 SCC2=9820	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_5A-2A-48A	5	SCC1=2 SCC2=48	10	SCC1=10 SCC2=10	20450	SCC1=650 SCC2=56690	12 RB with RBstart=0	N/A[3]	N/A[3]
					20525	SCC1=650 SCC2=56690	12 RB with RBstart=19	N/A[3]	N/A[3]
					20600	SCC1=650 SCC2=56690	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_5A-2A-66A[4]	5	SCC1=2 SCC2=66	10	SCC1=10 SCC2=10	20450	SCC1=650 SCC2=67286	12 RB with RBstart=0	N/A[3]	N/A[3]
					20525	SCC1=650 SCC2=67286	12 RB with RBstart=19	N/A[3]	N/A[3]
					20600	SCC1=650 SCC2=67286	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_5A-4A-4A[4]	5	SCC1=4 SCC2=4	10	SCC1=10 SCC2=10	20450	SCC1=2000 SCC2=2350	12 RB with RBstart=0	N/A[3]	N/A[3]
					20525	SCC1=2000 SCC2=2350	12 RB with RBstart=19	N/A[3]	N/A[3]
					20600	SCC1=2000 SCC2=2350	12 RB with RBstart=38	N/A[3]	N/A[3]
					20450	SCC1=2000 SCC2=9820	12 RB with RBstart=0	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC UL Channel	SCC DL Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocations
CA_5A-4A-30A[4]	5	SCC1=4 SCC2=30	10	SCC1=10 SCC2=10	20525	SCC1=2000 SCC2=9820	12 RB with RBstart=19	N/A[3]	N/A[3]
					20600	SCC1=2000 SCC2=9820	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_5A-5A-66A[2,4]	5	SCC1=5 SCC2=66	5	SCC1=5 SCC2=10	20425	SCC1=2525 SCC2=67286	8 RB with RBstart=0	N/A[3]	N/A[3]
					20525	SCC1=2625 SCC2=67286	8 RB with RBstart=8	N/A[3]	N/A[3]
					20625	SCC1=2425 SCC2=67286	8 RB with RBstart=17	N/A[3]	N/A[3]
CA_5A-29A-30A	5	SCC1=29 SCC2=30	10	SCC1=10 SCC2=10	20450	SCC1=9720 SCC2=9820	12 RB with RBstart=0	N/A[3]	N/A[3]
					20525	SCC1=9720 SCC2=9820	12 RB with RBstart=19	N/A[3]	N/A[3]
					20600	SCC1=9720 SCC2=9820	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_5A-30A-66A[4]	5	SCC1=30 SCC2=66	10	SCC1=10 SCC2=10	20450	SCC1=9820 SCC2=66486	12 RB with RBstart=0	N/A[3]	N/A[3]
					20525	SCC1=9820 SCC2=66486	12 RB with RBstart=19	N/A[3]	N/A[3]
					20600	SCC1=9820 SCC2=66486	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_5A-48A-66A	5	SCC1=48 SCC2=66	10	SCC1=10 SCC2=10	20450	SCC1=56690 SCC2=66486	12 RB with RBstart=0	N/A[3]	N/A[3]
					20525	SCC1=56690 SCC2=66486	12 RB with RBstart=19	N/A[3]	N/A[3]
					20600	SCC1=56690 SCC2=66486	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_5A-66C[4,5]	5	SCC1=66 SCC2=66	10	SCC1=10 SCC2=20	20450	SCC1=67086 SCC2=67230	12 RB with RBstart=0	N/A[3]	N/A[3]
					20525	SCC1=67086 SCC2=67230	12 RB with RBstart=19	N/A[3]	N/A[3]
					20600	SCC1=67086 SCC2=67230	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_5A-66A-66A[4]	5	SCC1=66	10		20450	SCC1=66486 SCC2=67286	12 RB with RBstart=0	N/A[3]	N/A[3]
					20525	SCC1=66486 SCC2=67286	12 RB with RBstart=19	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC UL Channel	SCC DL Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocations
		SCC2=66		SCC1=10 SCC2=10	20600	SCC1=66486 SCC2=67286	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_12A-2A-2A	12	SCC1=2 SCC2=2	5	SCC1=10 SCC2=10	23035	SCC1=650 SCC2=1150	8 RB with RBstart=0	N/A[3]	N/A[3]
					23095	SCC1=650 SCC2=1150	8 RB with RBstart=8	N/A[3]	N/A[3]
					23155	SCC1=650 SCC2=1150	8 RB with RBstart=17	N/A[3]	N/A[3]
CA_12A-2A-4A[4]	12	SCC1=2 SCC2=4	5	SCC1=10 SCC2=10	23035	SCC1=650 SCC2=2350	8 RB with RBstart=0	N/A[3]	N/A[3]
					23095	SCC1=650 SCC2=2350	8 RB with RBstart=8	N/A[3]	N/A[3]
					23155	SCC1=650 SCC2=2350	8 RB with RBstart=17	N/A[3]	N/A[3]
CA_12A-2A-30A	12	SCC1=2 SCC2=30	5	SCC1=10 SCC2=10	23035	SCC1=650 SCC2=9820	8 RB with RBstart=0	N/A[3]	N/A[3]
					23095	SCC1=650 SCC2=9820	8 RB with RBstart=8	N/A[3]	N/A[3]
					23155	SCC1=650 SCC2=9820	8 RB with RBstart=17	N/A[3]	N/A[3]
CA_12A-2A-66A[2,4]	12	SCC1=2 SCC2=66	5	SCC1=10 SCC2=10	23035	SCC1=650 SCC2=67286	8 RB with RBstart=0	N/A[3]	N/A[3]
					23095	SCC1=650 SCC2=67286	8 RB with RBstart=8	N/A[3]	N/A[3]
					23155	SCC1=650 SCC2=67286	8 RB with RBstart=17	N/A[3]	N/A[3]
CA_12A-4A-4A[2,4]	12	SCC1=4 SCC2=4	5	SCC1=10 SCC2=10	23035	SCC1=2000 SCC2=2350	8 RB with RBstart=0	N/A[3]	N/A[3]
					23095	SCC1=2000 SCC2=2350	8 RB with RBstart=8	N/A[3]	N/A[3]
					23155	SCC1=2000 SCC2=2350	8 RB with RBstart=17	N/A[3]	N/A[3]
CA_12A-4A-30A[2,4]	12	SCC1=4 SCC2=30	5	SCC1=10 SCC2=10	23035	SCC1=2000 SCC2=9820	8 RB with RBstart=0	N/A[3]	N/A[3]
					23095	SCC1=2000 SCC2=9820	8 RB with RBstart=8	N/A[3]	N/A[3]
					23155	SCC1=2000 SCC2=9820	8 RB with RBstart=17	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC UL Channel	SCC DL Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocations
CA_12A-29A-66A[2,4]	12	SCC1=29 SCC2=66	5	SCC1=10 SCC2=10	23035	SCC1=9720 SCC2=67286	8 RB with RBstart=0	N/A[3]	N/A[3]
					23095	SCC1=9720 SCC2=67286	8 RB with RBstart=8	N/A[3]	N/A[3]
					23155	SCC1=9720 SCC2=67286	8 RB with RBstart=17	N/A[3]	N/A[3]
CA_12A-30A-66A[2,4]	12	SCC1=30 SCC2=66	5	SCC1=10 SCC2=10	23035	SCC1=9820 SCC2=66486	8 RB with RBstart=0	N/A[3]	N/A[3]
					23095	SCC1=9820 SCC2=66486	8 RB with RBstart=8	N/A[3]	N/A[3]
					23155	SCC1=9820 SCC2=66486	8 RB with RBstart=17	N/A[3]	N/A[3]
CA_12A-66C[2,4,5]	12	SCC1=66 SCC2=66	5	SCC1=10 SCC2=20	23035	SCC1=67086 SCC2=67230	8 RB with RBstart=0	N/A[3]	N/A[3]
					23095	SCC1=67086 SCC2=67230	8 RB with RBstart=8	N/A[3]	N/A[3]
					23155	SCC1=67086 SCC2=67230	8 RB with RBstart=17	N/A[3]	N/A[3]
CA_12A-66A-66A[2,4]	12	SCC1=66 SCC2=66	5	SCC1=10 SCC2=10	23035	SCC1=66486 SCC2=67286	8 RB with RBstart=0	N/A[3]	N/A[3]
					23095	SCC1=66486 SCC2=67286	8 RB with RBstart=8	N/A[3]	N/A[3]
					23155	SCC1=66486 SCC2=67286	8 RB with RBstart=17	N/A[3]	N/A[3]
CA_13A-2A-2A	13	SCC1=2 SCC2=2	10	SCC1=10 SCC2=10	23230	SCC1=650 SCC2=1150	12 RB with RBstart=0	N/A[3]	N/A[3]
					23230	SCC1=650 SCC2=1150	12 RB with RBstart=19	N/A[3]	N/A[3]
					23230	SCC1=650 SCC2=1150	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_13A-2A-4A[4]	13	SCC1=2 SCC2=4	10	SCC1=10 SCC2=10	23230	SCC1=650 SCC2=2350	12 RB with RBstart=0	N/A[3]	N/A[3]
					23230	SCC1=650 SCC2=2350	12 RB with RBstart=19	N/A[3]	N/A[3]
					23230	SCC1=650 SCC2=2350	12 RB with RBstart=38	N/A[3]	N/A[3]
					23230	SCC1=650 SCC2=56690	12 RB with RBstart=0	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC UL Channel	SCC DL Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocations
CA_13A-2A-48A	13	SCC1=2 SCC2=48	10	SCC1=10 SCC2=10	23230	SCC1=650 SCC2=56690	12 RB with RBstart=19	N/A[3]	N/A[3]
					23230	SCC1=650 SCC2=56690	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_13A-2A-66A[4]	13	SCC1=2 SCC2=66	10	SCC1=10 SCC2=10	23230	SCC1=650 SCC2=67286	12 RB with RBstart=0	N/A[3]	N/A[3]
					23230	SCC1=650 SCC2=67286	12 RB with RBstart=19	N/A[3]	N/A[3]
					23230	SCC1=650 SCC2=67286	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_13A-4A-4A[4]	13	SCC1=4 SCC2=4	10	SCC1=10 SCC2=10	23230	SCC1=2000 SCC2=2350	12 RB with RBstart=0	N/A[3]	N/A[3]
					23230	SCC1=2000 SCC2=2350	12 RB with RBstart=19	N/A[3]	N/A[3]
					23230	SCC1=2000 SCC2=2350	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_13A-48A-66A	13	SCC1=48 SCC2=66	10	SCC1=10 SCC2=10	23230	SCC1=56690 SCC2=66486	12 RB with RBstart=0	N/A[3]	N/A[3]
					23230	SCC1=56690 SCC2=66486	12 RB with RBstart=19	N/A[3]	N/A[3]
					23230	SCC1=56690 SCC2=66486	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_13A-66C[4,5]	13	SCC1=66 SCC2=66	10	SCC1=10 SCC2=20	23230	SCC1=67086 SCC2=67230	12 RB with RBstart=0	N/A[3]	N/A[3]
					23230	SCC1=67086 SCC2=67230	12 RB with RBstart=19	N/A[3]	N/A[3]
					23230	SCC1=67086 SCC2=67230	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_13A-66A-66A[4]	13	SCC1=66 SCC2=66	10	SCC1=10 SCC2=10	23230	SCC1=66486 SCC2=67286	12 RB with RBstart=0	N/A[3]	N/A[3]
					23230	SCC1=66486 SCC2=67286	12 RB with RBstart=19	N/A[3]	N/A[3]
					23230	SCC1=66486 SCC2=67286	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_25A-41C	25	SCC1=41	5		26065	SCC1=39750 SCC2=39948	8 RB with RBstart=0	N/A[3]	N/A[3]
					26365	SCC1=40620 SCC2=40422	8 RB with RBstart=8	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC UL Channel	SCC DL Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocations
		SCC2=41		SCC1=20 SCC2=20	26665	SCC1=41490 SCC2=41292	8 RB with RBstart=17	N/A[3]	N/A[3]
CA_30A-2A-5A	30	SCC1=2 SCC2=5	10	SCC1=10 SCC2=10	27710	SCC1=650 SCC2=2450	12 RB with RBstart=0	N/A[3]	N/A[3]
					27710	SCC1=650 SCC2=2450	12 RB with RBstart=19	N/A[3]	N/A[3]
					27710	SCC1=650 SCC2=2450	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_30A-2A-12A	30	SCC1=2 SCC2=12	10	SCC1=10 SCC2=5	27710	SCC1=650 SCC2=5035	12 RB with RBstart=0	N/A[3]	N/A[3]
					27710	SCC1=650 SCC2=5035	12 RB with RBstart=19	N/A[3]	N/A[3]
					27710	SCC1=650 SCC2=5035	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_30A-2A-29A	30	SCC1=2 SCC2=29	10	SCC1=10 SCC2=10	27710	SCC1=650 SCC2=9720	12 RB with RBstart=0	N/A[3]	N/A[3]
					27710	SCC1=650 SCC2=9720	12 RB with RBstart=19	N/A[3]	N/A[3]
					27710	SCC1=650 SCC2=9720	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_30A-4A-5A[4]	30	SCC1=4 SCC2=5	10	SCC1=10 SCC2=10	27710	SCC1=2000 SCC2=2450	12 RB with RBstart=0	N/A[3]	N/A[3]
					27710	SCC1=2000 SCC2=2450	12 RB with RBstart=19	N/A[3]	N/A[3]
					27710	SCC1=2000 SCC2=2450	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_30A-4A-12A[4]	30	SCC1=4 SCC2=12	10	SCC1=10 SCC2=5	27710	SCC1=2000 SCC2=5035	12 RB with RBstart=0	N/A[3]	N/A[3]
					27710	SCC1=2000 SCC2=5035	12 RB with RBstart=19	N/A[3]	N/A[3]
					27710	SCC1=2000 SCC2=5035	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_30A-4A-29A[4]	30	SCC1=4 SCC2=29	10	SCC1=10 SCC2=10	27710	SCC1=2000 SCC2=9720	12 RB with RBstart=0	N/A[3]	N/A[3]
					27710	SCC1=2000 SCC2=9720	12 RB with RBstart=19	N/A[3]	N/A[3]
					27710	SCC1=2000 SCC2=9720	12 RB with RBstart=38	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC UL Channel	SCC DL Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocations
CA_30A-5A-29A	30	SCC1=5 SCC2=29	10	SCC1=10 SCC2=10	27710	SCC1=2600 SCC2=9720	12 RB with RBstart=0	N/A[3]	N/A[3]
					27710	SCC1=2600 SCC2=9720	12 RB with RBstart=19	N/A[3]	N/A[3]
					27710	SCC1=2600 SCC2=9720	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_30A-5A-66A[4]	30	SCC1=5 SCC2=66	10	SCC1=10 SCC2=10	27710	SCC1=2450 SCC2=66486	12 RB with RBstart=0	N/A[3]	N/A[3]
					27710	SCC1=2450 SCC2=66486	12 RB with RBstart=19	N/A[3]	N/A[3]
					27710	SCC1=2450 SCC2=66486	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_30A-12A-66A[4]	30	SCC1=12 SCC2=66	10	SCC1=5 SCC2=10	27710	SCC1=5035 SCC2=66486	12 RB with RBstart=0	N/A[3]	N/A[3]
					27710	SCC1=5035 SCC2=66486	12 RB with RBstart=19	N/A[3]	N/A[3]
					27710	SCC1=5035 SCC2=66486	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_30A-29A-66A[4]	30	SCC1=29 SCC2=66	10	SCC1=10 SCC2=10	27710	SCC1=9720 SCC2=66486	12 RB with RBstart=0	N/A[3]	N/A[3]
					27710	SCC1=9720 SCC2=66486	12 RB with RBstart=19	N/A[3]	N/A[3]
					27710	SCC1=9720 SCC2=66486	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_30A-66C[4,5]	30	SCC1=66 SCC2=66	10	SCC1=10 SCC2=20	27710	SCC1=67086 SCC2=67230	12 RB with RBstart=0	N/A[3]	N/A[3]
					27710	SCC1=67086 SCC2=67230	12 RB with RBstart=19	N/A[3]	N/A[3]
					27710	SCC1=67086 SCC2=67230	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_30A-66A-66A[4]	30	SCC1=66 SCC2=66	10	SCC1=10 SCC2=10	27710	SCC1=66486 SCC2=67286	12 RB with RBstart=0	N/A[3]	N/A[3]
					27710	SCC1=66486 SCC2=67286	12 RB with RBstart=19	N/A[3]	N/A[3]
					27710	SCC1=66486 SCC2=67286	12 RB with RBstart=38	N/A[3]	N/A[3]
					39750	SCC1=39948 SCC2=40146	18 RB with RBstart=0	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC UL Channel	SCC DL Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocations
CA_41D	41	SCC1=41 SCC2=41	20	SCC1=20 SCC2=20	40620	SCC1=40422 SCC2=40818	18 RB with RBstart=41	N/A[3]	N/A[3]
					41490	SCC1=41292 SCC2=41094	18 RB with RBstart=82	N/A[3]	N/A[3]
CA_48A-2A-5A	48	SCC1=2 SCC2=5	10	SCC1=10 SCC2=10	55290	SCC1=1150 SCC2=2450	12 RB with RBstart=0	N/A[3]	N/A[3]
					55990	SCC1=1150 SCC2=2450	12 RB with RBstart=19	N/A[3]	N/A[3]
					56690	SCC1=1150 SCC2=2450	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_48A-2A-13A	48	SCC1=2 SCC2=13	10	SCC1=10 SCC2=10	55290	SCC1=1150 SCC2=5230	12 RB with RBstart=0	N/A[3]	N/A[3]
					55990	SCC1=1150 SCC2=5230	12 RB with RBstart=19	N/A[3]	N/A[3]
					56690	SCC1=1150 SCC2=5230	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_48A-2A-66A	48	SCC1=2 SCC2=66	10	SCC1=10 SCC2=10	55290	SCC1=650 SCC2=67286	12 RB with RBstart=0	N/A[3]	N/A[3]
					55990	SCC1=650 SCC2=67286	12 RB with RBstart=19	N/A[3]	N/A[3]
					56690	SCC1=650 SCC2=67286	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_48A-5A-66A	48	SCC1=5 SCC2=66	10	SCC1=10 SCC2=10	55290	SCC1=2450 SCC2=67286	12 RB with RBstart=0	N/A[3]	N/A[3]
					55990	SCC1=2450 SCC2=67286	12 RB with RBstart=19	N/A[3]	N/A[3]
					56690	SCC1=2450 SCC2=67286	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_48A-13A-66A	48	SCC1=13 SCC2=66	10	SCC1=10 SCC2=10	55290	SCC1=5230 SCC2=67286	12 RB with RBstart=0	N/A[3]	N/A[3]
					55990	SCC1=5230 SCC2=67286	12 RB with RBstart=19	N/A[3]	N/A[3]
					56690	SCC1=5230 SCC2=67286	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-2A-2A[4]	66	SCC1=2 SCC2=2	10	SCC1=10 SCC2=10	132022	SCC1=650 SCC2=1150	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=650 SCC2=1150	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=650 SCC2=1150	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-2A-5A[4]	66	SCC1=2 SCC2=5	10	SCC1=10 SCC2=10	132022	SCC1=650 SCC2=2450	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=650 SCC2=2450	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=650 SCC2=2450	12 RB with RBstart=38	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC UL Channel	SCC DL Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocations
CA_66A-2A-12A[4]	66	SCC1=2 SCC2=12	10	SCC1=10 SCC2=5	132022	SCC1=650 SCC2=5035	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=650 SCC2=5035	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=650 SCC2=5035	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-2A-13A[4]	66	SCC1=2 SCC2=13	10	SCC1=10 SCC2=10	132022	SCC1=650 SCC2=5230	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=650 SCC2=5230	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=650 SCC2=5230	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-2A-48A[2]	66	SCC1=2 SCC2=48	10	SCC1=10 SCC2=10	132022	SCC1=650 SCC2=56690	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=650 SCC2=56690	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=650 SCC2=56690	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66C-2A[4,5]	66	SCC1=66 SCC2=2	10	SCC1=20 SCC2=10	132022	SCC1=66630 SCC2=650	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=66930 SCC2=650	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=67230 SCC2=650	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-2A-66A[4]	66	SCC1=2 SCC2=66	10	SCC1=10 SCC2=10	132022	SCC1=650 SCC2=67286	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=650 SCC2=67286	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=650 SCC2=66486	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-5A-5A[4]	66	SCC1=5 SCC2=5	10	SCC1=5 SCC2=5	132022	SCC1=2425 SCC2=2625	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=2425 SCC2=2625	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=2425 SCC2=2625	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-5A-30A[4]	66	SCC1=5 SCC2=30	10	SCC1=10 SCC2=10	132022	SCC1=2450 SCC2=9820	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=2450 SCC2=9820	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=2450 SCC2=9820	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-5A-48A[2]	66	SCC1=5 SCC2=48	10	SCC1=10 SCC2=10	132022	SCC1=2450 SCC2=56690	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=2450 SCC2=56690	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=2450 SCC2=56690	12 RB with RBstart=38	N/A[3]	N/A[3]
					132022	SCC1=66630 SCC2=2450	12 RB with RBstart=0	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC UL Channel	SCC DL Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocations
CA_66C-5A[4,5]	66	SCC1=66 SCC2=5	10	SCC1=20 SCC2=10	132322	SCC1=66930 SCC2=2450	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=67230 SCC2=2450	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-5A-66A[4]	66	SCC1=5 SCC2=66	10	SCC1=10 SCC2=10	132022	SCC1=2450 SCC2=67286	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=2450 SCC2=67286	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=2450 SCC2=66486	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-12A-29A[4]	66	SCC1=12 SCC2=29	10	SCC1=5 SCC2=10	132022	SCC1=5035 SCC2=9720	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=5035 SCC2=9720	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=5035 SCC2=9720	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-12A-30A[4]	66	SCC1=12 SCC2=30	10	SCC1=5 SCC2=10	132022	SCC1=5035 SCC2=9820	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=5035 SCC2=9820	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=5035 SCC2=9820	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66C-12A[4,5]	66	SCC1=66 SCC2=12	10	SCC1=20 SCC2=5	132022	SCC1=66630 SCC2=5035	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=66930 SCC2=5035	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=67230 SCC2=5035	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-12A-66A[4]	66	SCC1=12 SCC2=66	10	SCC1=5 SCC2=10	132022	SCC1=5035 SCC2=67286	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=5035 SCC2=67286	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=5035 SCC2=66486	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66C-13A[4,5]	66	SCC1=66 SCC2=13	10	SCC1=20 SCC2=10	132022	SCC1=66630 SCC2=5230	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=66930 SCC2=5230	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=67230 SCC2=5230	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-13A-48A[2]	66	SCC1=13 SCC2=48	10	SCC1=10 SCC2=10	132022	SCC1=5230 SCC2=56690	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=5230 SCC2=56690	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=5230 SCC2=56690	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-13A-66A[4]	66	SCC1=13	10	SCC1=10 SCC2=10	132022	SCC1=5230 SCC2=67286	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=5230 SCC2=67286	12 RB with RBstart=19	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC UL Channel	SCC DL Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocations
		SCC2=66			132622	SCC1=5230 SCC2=66486	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-29A-30A[4]	66	SCC1=29 SCC2=30	10	SCC1=10 SCC2=10	132022	SCC1=9720 SCC2=9820	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=9720 SCC2=9820	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=9720 SCC2=9820	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66C-29A[4,5]	66	SCC1=66 SCC2=29	10	SCC1=20 SCC2=10	132022	SCC1=66630 SCC2=9720	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=66930 SCC2=9720	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=67230 SCC2=9720	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-29A-66A[4]	66	SCC1=29 SCC2=66	10	SCC1=10 SCC2=10	132022	SCC1=9720 SCC2=67286	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=9720 SCC2=67286	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=9720 SCC2=66486	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66C-30A[4,5]	66	SCC1=66 SCC2=30	10	SCC1=20 SCC2=10	132022	SCC1=66630 SCC2=9820	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=66930 SCC2=9820	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=67230 SCC2=9820	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-30A-66A[4]	66	SCC1=30 SCC2=66	10	SCC1=10 SCC2=10	132022	SCC1=9820 SCC2=67286	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=9820 SCC2=67286	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=9820 SCC2=66486	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66D	66	SCC1=66 SCC2=66	10	SCC1=20 SCC2=20	132022	SCC1=66630 SCC2=66828	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=66642 SCC2=66930	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=66942 SCC2=67230	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66C-66A[5]	66	SCC1=66 SCC2=66	10	SCC1=20 SCC2=10	132022	SCC1=66630 SCC2=67286	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=66930 SCC2=67286	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=67230 SCC2=66486	12 RB with RBstart=38	N/A[3]	N/A[3]
CA_66A-66C[5]	66	SCC1=66 SCC2=66	10	SCC1=10 SCC2=20	132022	SCC1=67086 SCC2=67230	12 RB with RBstart=0	N/A[3]	N/A[3]
					132322	SCC1=67086 SCC2=67230	12 RB with RBstart=19	N/A[3]	N/A[3]
					132622	SCC1=66486 SCC2=66630	12 RB with RBstart=38	N/A[3]	N/A[3]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC UL Channel	SCC DL Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocations
Note 1: Primary Mechanical Mode refers to device configured in preferred mode per manufacturer instructions (typically means antenna extended, fold or portrait slide open, but depends on form factor). Note 2: This combination creates harmonic, intermodulation, or self-desense interference to one or both of the SCCs. The power level of the SCCs shall be adjusted as needed to maintain the LTE carrier aggregation connection and error free operation on the SCCs. Note 3: As per 3GPP TS 36.521-1 [12], Section 6.2.2A (UE Maximum Output Power for CA). Note 4: If the device supports both CA_4A-xA-yA and CA_66A-xA-yA (where x and y are the band numbers of the SCC's), then testing is only required in CA_66A-xA-yA. Similarly, if the device supports both CA_xA-4A-yA and CA_xA-66A-yA (where x is the band number of the PCC and y is the band number of the other SCC), then testing is only required in CA_xA-66A-yA; and if the device supports both CA_xA-yA-4A and CA_xA-yA-66A (where x is the band number of the PCC and y is the band number of the other SCC), then testing is only required in CA_xA-yA-66A. Note 5: Since all Band 66-capable devices are required to support both CA_66B and CA_66C per 3GPP TS 36.101, testing of xA-66B and 66B-xA combinations is not required.									

4.3.2 Receiver Sensitivity Test Settings

The test procedure for three downlink carrier aggregation with a single uplink carrier is the same as the test procedure for two downlink carrier aggregation with a single uplink carrier (per Section 4.2.2) with the exception that there are two SCCs.

In order to reduce the need for communication tester upgrades or additions, testing LTE CA 3 DL combinations in stand-alone LTE and/or LTE CA 2 DL is allowed under certain conditions as long as the antenna tuning is set according to the CA 3 DL combination that is being evaluated. The PCC TIS for a 3 DL CA combination may be tested in stand-alone LTE mode with the antenna tuned for operation in the 3 DL CA combination. Each SCC TIS for a 3 DL CA combination may also be tested in stand-alone LTE mode with the antenna tuned for operation in the 3 DL CA combination as long as the SCC is not susceptible to harmonic, intermodulation or self-desense interference from the PCC TX. The SCC TIS for a 3 DL CA combination may be tested in 2 DL CA with the antenna tuned for operation in the 3 DL CA combination, and the 2 DL CA uses the same PCC as the 3 DL CA, when the SCC is susceptible to harmonic, intermodulation or self-desense interference from the PCC TX.

For example, when evaluating an interband 3 DL CA case, CA_xA-yA-zA, where x, y and z are the LTE bands and the PCC is in LTE x, then the following tests are permitted:

- TIS for x in CA xA-yA-zA may be tested in stand-alone LTE x with the antenna tuned for operation in CA_xA-yA-zA.
- TIS for y in CA xA-yA-zA may be tested in stand-alone LTE y with the antenna tuned for operation in CA_xA-yA-zA when LTE y is not susceptible harmonic, intermodulation or self-desense interference from LTE x.
- TIS for y in CA xA-yA-zA may be tested in CA xA-yA with the antenna tuned for operation in CA_xA-yA-zA when LTE y is susceptible harmonic, intermodulation or self-desense interference from LTE x.
- TIS in z can be evaluated using the same logic as for TIS in y.

Device manufacturers using dynamically tuned antennas should in general have a method of altering the antenna tuning in order to do the necessary antenna tuning optimization during the R&D phase. In general, the settings for the antenna tuner are stored in a tuning file. Consequently, the antenna tuning can be modified by writing a different tuning file into the device. All the stand-alone LTE bands could be tested using the normal tuning file. A second tuning file for testing the 2 DL CA modes could be created where the antenna tuner settings for the stand-alone LTE bands are changed to the antenna tuner

settings for the associated 2 DL CA mode. A third tuning file for testing the 3 DL CA modes could be created where the antenna tuner settings for the stand-alone LTE bands are changed to the antenna tuner settings for the associated 3 DL CA mode. In this third tuning file, the antenna tuner settings for the 2 DL CA modes would also be changed to the antenna tuner settings for the associated 3 DL CA mode.

The CA testing will be executed using C-TIS, with all receivers active, following the guidance in Section 5.1 of *CTIA 01.20* [1]. Refer to Section 2 in *CTIA 01.71* [6] for set-up illustrations.

For a given carrier aggregation combination, only a subset of the possible low/mid/high-channel combinations of PCC, SCC1, and SCC2 is tested.

The following LTE bands have channels that can only be tested in DL CA mode: 29

Table 4.3.2-1 LTE Carrier Aggregation Mode (3 Downlink Carriers, 1 Uplink Carrier) TIS Measurements Table for the Primary Mechanical Mode[1]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC Channel	SCC Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC1 DL RB Allocation	SCC2 DL RB Allocation
CA_2A-2A-4A[2,3]	2	SCC1=2 SCC2=4	10	SCC1=10 SCC2=10	650	SCC1=900 SCC2=2000	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					800[4]	SCC1=650 SCC2=2175	32 RB with RBstart=18	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	SCC1=1150 SCC2=2175	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					1150	SCC1=650 SCC2=2350	12 RB with RBstart=38	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_2A-2A-5A[2,3]	2	SCC1=2 SCC2=5	10	SCC1=10 SCC2=10	650	SCC1=900 SCC2=2450	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					800[4]	SCC1=650 SCC2=2525	32 RB with RBstart=18	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	SCC1=1150 SCC2=2525	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					1150	SCC1=650 SCC2=2600	12 RB with RBstart=38	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_2A-2A-12A[2,3]	2	SCC1=2 SCC2=12	10	SCC1=10 SCC2=5	650	SCC1=900 SCC2=5035	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
					800[4]	SCC1=650 SCC2=5095	32 RB with RBstart=18	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
					900	SCC1=1150 SCC2=5095	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
					1150	SCC1=650 SCC2=5155	12 RB with RBstart=38	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
CA_2A-2A-13A[2,3]	2	SCC1=2 SCC2=13	10	SCC1=10 SCC2=10	650	SCC1=900 SCC2=5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					800[4]	SCC1=650 SCC2=5230	32 RB with RBstart=18	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	SCC1=1150 SCC2=5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					1150	SCC1=650 SCC2=5230	12 RB with RBstart=38	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC Channel	SCC Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC1 DL RB Allocation	SCC2 DL RB Allocation
CA_2A-2A-66A[2,3,5]	2	SCC1=2 SCC2=66	10	SCC1=10 SCC2=10	650	SCC1=900 SCC2=66486	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					800[4]	SCC1=650 SCC2=66786	32 RB with RBstart=18	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	SCC1=1150 SCC2=67086	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					1150	SCC1=650 SCC2=67286	12 RB with RBstart=38	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_2A-4A-4A[5]	2	SCC1=4 SCC2=4	10	SCC1=10 SCC2=10	650	SCC1=2000 SCC2=2175	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	SCC1=2175 SCC2=2350	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					1150	SCC1=2350 SCC2=2000	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_2A-4A-5A[5]	2	SCC1=4 SCC2=5	10	SCC1=10 SCC2=10	650	SCC1=2000 SCC2=2450	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	SCC1=2175 SCC2=2525	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					1150	SCC1=2350 SCC2=2600	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_2A-4A-12A[5]	2	SCC1=4 SCC2=12	10	SCC1=10 SCC2=5	650	SCC1=2000 SCC2=5035	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
					900	SCC1=2175 SCC2=5095	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
					1150	SCC1=2350 SCC2=5155	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
CA_2A-4A-13A[5]	2	SCC1=4 SCC2=13	10	SCC1=10 SCC2=10	650	SCC1=2000 SCC2=5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	SCC1=2175 SCC2=5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					1150	SCC1=2350 SCC2=5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_2A-5A-30A	2	SCC1=5 SCC2=30	10	SCC1=10 SCC2=10	650	SCC1=2450 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	SCC1=2525 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					1150	SCC1=2600 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_2A-5A-48A	2	SCC1=5 SCC2=48	10	SCC1=10 SCC2=10	650	SCC1=2450 SCC2=55290	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	SCC1=2525 SCC2=55990	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					1150	SCC1=2600 SCC2=56690	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					650	SCC1=2450 SCC2=66486	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	SCC1=2525 SCC2=66786	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC Channel	SCC Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC1 DL RB Allocation	SCC2 DL RB Allocation
CA_2A-5A-66A[5]	2	SCC1=5 SCC2=66	10	SCC1=10 SCC2=10	900	SCC1=2525 SCC2=67086[6]	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					1150	SCC1=2600 SCC2=67286	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_2A-12A-30A	2	SCC1=12 SCC2=30	10	SCC1=5 SCC2=10	650	SCC1=5035 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
					900	SCC1=5095 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
					1150	SCC1=5155 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
CA_2A-12A-66A[2,5]	2	SCC1=12 SCC2=66	10	SCC1=5 SCC2=10	650	SCC1=5035 SCC2=66486	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
					900	SCC1=5095 SCC2=66786	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
					900	SCC1=5095 SCC2=67086[6]	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
					1150	SCC1=5155 SCC2=67286	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
CA_2A-13A-48A	2	SCC1=13 SCC2=48	10	SCC1=10 SCC2=10	650	SCC1=5230 SCC2=55290	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	SCC1=5230 SCC2=55990	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					1150	SCC1=5230 SCC2=56690	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_2A-13A-66A[5]	2	SCC1=13 SCC2=66	10	SCC1=10 SCC2=10	650	SCC1=5230 SCC2=66486	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	SCC1=5230 SCC2=66786	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	SCC1=5230 SCC2=67086[6]	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					1150	SCC1=5230 SCC2=67286	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_2A-29A-30A	2	SCC1=29 SCC2=30	10	SCC1=10 SCC2=10	650	SCC1=9720 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	SCC1=9720 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					1150	SCC1=9720 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_2A-48A-66A	2	SCC1=48 SCC2=66	10	SCC1=10 SCC2=10	650	SCC1=55290 SCC2=66486	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	SCC1=55990 SCC2=66786	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	SCC1=55990 SCC2=67086[6]	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					1150	SCC1=56690 SCC2=67286	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC Channel	SCC Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC1 DL RB Allocation	SCC2 DL RB Allocation
CA_2A-66C[5,7]	2	SCC1=66 SCC2=66	10	SCC1=20 SCC2=20	650	SCC1=66536 SCC2=66734[8]	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					900	SCC1=66786 SCC2=66984[9]	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					1150	SCC1=67036 SCC2=67234	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
CA_2A-66A-66A[5]	2	SCC1=66 SCC2=66	10	SCC1=10 SCC2=10	650	SCC1=66486 SCC2=67286	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	SCC1=66486 SCC2=67086[6]	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					900	SCC1=66786 SCC2=66486	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					1150	SCC1=67286 SCC2=66786	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_4A-2A-4A[5]	4	SCC1=2 SCC2=4	10	SCC1=10 SCC2=10	2000	SCC1=650 SCC2=2175	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2175	SCC1=900 SCC2=2350	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2350	SCC1=1150 SCC2=2000	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_4A-2A-5A[5]	4	SCC1=2 SCC2=5	10	SCC1=10 SCC2=10	2000	SCC1=650 SCC2=2450	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2175	SCC1=900 SCC2=2525	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2350	SCC1=1150 SCC2=2600	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_4A-2A-12A[5]	4	SCC1=2 SCC2=12	10	SCC1=10 SCC2=5	2000	SCC1=650 SCC2=5035	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
					2175	SCC1=900 SCC2=5095	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
					2350	SCC1=1150 SCC2=5155	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
CA_4A-2A-13A[5]	4	SCC1=2 SCC2=13	10	SCC1=10 SCC2=10	2000	SCC1=650 SCC2=5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2175	SCC1=900 SCC2=5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2350	SCC1=1150 SCC2=5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_4A-4A-5A[5]	4	SCC1=4 SCC2=5	10	SCC1=10 SCC2=10	2000	SCC1=2175 SCC2=2450	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2175	SCC1=2350 SCC2=2525	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2350	SCC1=2000 SCC2=2600	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC Channel	SCC Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC1 DL RB Allocation	SCC2 DL RB Allocation
CA_4A-4A-12A[5]	4	SCC1=4 SCC2=12	10	SCC1=10 SCC2=5	2000	SCC1=2175 SCC2=5035	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
					2175	SCC1=2350 SCC2=5095	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
					2350	SCC1=2000 SCC2=5155	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
CA_4A-4A-13A[5]	4	SCC1=4 SCC2=13	10	SCC1=10 SCC2=10	2000	SCC1=2175 SCC2=5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2175	SCC1=2350 SCC2=5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2350	SCC1=2000 SCC2=5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_4A-5A-30A[5]	4	SCC1=5 SCC2=30	10	SCC1=10 SCC2=10	2000	SCC1=2450 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2175	SCC1=2525 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2350	SCC1=2600 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_4A-12A-30A[5]	4	SCC1=12 SCC2=30	10	SCC1=5 SCC2=10	2000	SCC1=5035 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
					2175	SCC1=5095 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
					2350	SCC1=5155 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
CA_4A-29A-30A[5]	4	SCC1=29 SCC2=30	10	SCC1=10 SCC2=10	2000	SCC1=9720 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2175	SCC1=9720 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2350	SCC1=9720 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_5A-2A-2A	5	SCC1=2 SCC2=2	10	SCC1=10 SCC2=10	2450	SCC1=650 SCC2=900	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2525	SCC1=900 SCC2=1150	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2600	SCC1=1150 SCC2=650	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_5A-2A-4A[5]	5	SCC1=2 SCC2=4	10	SCC1=10 SCC2=10	2450	SCC1=650 SCC2=2000	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2525	SCC1=900 SCC2=2175	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2600	SCC1=1150 SCC2=2350	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_5A-2A-30A	5	SCC1=2 SCC2=30	10	SCC1=10 SCC2=10	2450	SCC1=650 SCC2=9820	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2525	SCC1=900 SCC2=9820	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2600	SCC1=1150 SCC2=9820	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC Channel	SCC Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC1 DL RB Allocation	SCC2 DL RB Allocation
CA_5A-2A-48A	5	SCC1=2 SCC2=48	10	SCC1=10 SCC2=10	2450	SCC1=650 SCC2=55290	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2525	SCC1=900 SCC2=55990	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2600	SCC1=1150 SCC2=56690	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_5A-2A-66A[5]	5	SCC1=2 SCC2=66	10	SCC1=10 SCC2=10	2450	SCC1=650 SCC2=66486	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2525	SCC1=900 SCC2=66786	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2525	SCC1=900 SCC2=67086[6]	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2600	SCC1=1150 SCC2=67286	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_5A-4A-4A[5]	5	SCC1=4 SCC2=4	10	SCC1=10 SCC2=10	2450	SCC1=2000 SCC2=2175	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2525	SCC1=2175 SCC2=2350	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2600	SCC1=2350 SCC2=2000	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_5A-4A-30A[5]	5	SCC1=4 SCC2=30	10	SCC1=10 SCC2=10	2450	SCC1=2000 SCC2=9820	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2525	SCC1=2175 SCC2=9820	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2600	SCC1=2350 SCC2=9820	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_5A-5A-66A[2,5,10]	5	SCC1=5 SCC2=66	5	SCC1=5 SCC2=10	2425	SCC1=2525 SCC2=66486	25 RB with RBstart=0	25 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
					2525	SCC1=2625 SCC2=66786	25 RB with RBstart=0	25 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
					2625	SCC1=2425 SCC2=67086[6]	12 RB with RBstart=13	25 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
					2425[11]	SCC1=2625 SCC2=67286	25 RB with RBstart=0	25 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
CA_5A-29A-30A	5	SCC1=29 SCC2=30	10	SCC1=10 SCC2=10	2450	SCC1=9720 SCC2=9820	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2525	SCC1=9720 SCC2=9820	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2600	SCC1=9720 SCC2=9820	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_5A-30A-66A[5]	5	SCC1=30 SCC2=66	10	SCC1=10 SCC2=10	2450	SCC1=9820 SCC2=66486	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2525	SCC1=9820 SCC2=66786	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2525	SCC1=9820 SCC2=67086[6]	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2600	SCC1=9820 SCC2=67286	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC Channel	SCC Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC1 DL RB Allocation	SCC2 DL RB Allocation
CA_5A-48A-66A	5	SCC1=48 SCC2=66	10	SCC1=10 SCC2=10	2450	SCC1=55290 SCC2=66486	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2525	SCC1=55990 SCC2=66786	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2525	SCC1=55990 SCC2=67086[6]	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2600	SCC1=56690 SCC2=67286	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_5A-66C[5,7]	5	SCC1=66 SCC2=66	10	SCC1=20 SCC2=20	2450	SCC1=66536 SCC2=66734[8]	25 RB with RBstart=25	50 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					2525	SCC1=66786 SCC2=66984[9]	25 RB with RBstart=25	50 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					2600	SCC1=67036 SCC2=67234	25 RB with RBstart=25	50 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
CA_5A-66A-66A[5]	5	SCC1=66 SCC2=66	10	SCC1=10 SCC2=10	2450	SCC1=66486 SCC2=67286	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2525	SCC1=66486 SCC2=67086[6]	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2525	SCC1=66786 SCC2=66486	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					2600	SCC1=67286 SCC2=66786	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_12A-2A-2A	12	SCC1=2 SCC2=2	5	SCC1=10 SCC2=10	5035	SCC1=650 SCC2=900	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5095	SCC1=900 SCC2=1150	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5155	SCC1=1150 SCC2=650	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_12A-2A-4A[2,5]	12	SCC1=2 SCC2=4	5	SCC1=10 SCC2=10	5035	SCC1=650 SCC2=2000	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5095	SCC1=900 SCC2=2175	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5155	SCC1=1150 SCC2=2350	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_12A-2A-30A	12	SCC1=2 SCC2=30	5	SCC1=10 SCC2=10	5035	SCC1=650 SCC2=9820	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5095	SCC1=900 SCC2=9820	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5155	SCC1=1150 SCC2=9820	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5035	SCC1=650 SCC2=66486	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5095	SCC1=900 SCC2=66786	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC Channel	SCC Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC1 DL RB Allocation	SCC2 DL RB Allocation
CA_12A-2A-66A[2,5]	12	SCC1=2 SCC2=66	5	SCC1=10 SCC2=10	5095	SCC1=900 SCC2=67086[6]	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5155	SCC1=1150 SCC2=67286	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_12A-4A-4A[2,5]	12	SCC1=4 SCC2=4	5	SCC1=10 SCC2=10	5035	SCC1=2000 SCC2=2175	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5095	SCC1=2175 SCC2=2350	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5155	SCC1=2350 SCC2=2000	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_12A-4A-30A[2,5]	12	SCC1=4 SCC2=30	5	SCC1=10 SCC2=10	5035	SCC1=2000 SCC2=9820	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5095	SCC1=2175 SCC2=9820	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5155	SCC1=2350 SCC2=9820	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_12A-29A-66A[2,5]	12	SCC1=29 SCC2=66	5	SCC1=10 SCC2=10	5035	SCC1=9720 SCC2=66486	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5095	SCC1=9720 SCC2=66786	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5095	SCC1=9720 SCC2=67086[6]	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5155	SCC1=9720 SCC2=67286	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_12A-30A-66A[2,5]	12	SCC1=30 SCC2=66	5	SCC1=10 SCC2=10	5035	SCC1=9820 SCC2=66486	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5095	SCC1=9820 SCC2=66786	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5095	SCC1=9820 SCC2=67086[6]	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5155	SCC1=9820 SCC2=67286	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_12A-66C[2,5,7]	12	SCC1=66 SCC2=66	5	SCC1=20 SCC2=20	5035	SCC1=66536 SCC2=66734[8]	20 RB with RBstart=5	25 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					5095	SCC1=66786 SCC2=66984[9]	20 RB with RBstart=5	25 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					5155	SCC1=67036 SCC2=67234	20 RB with RBstart=5	25 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
CA_12A-66A-66A[2,5]	12	SCC1=66 SCC2=66	5	SCC1=10 SCC2=10	5035	SCC1=66486 SCC2=67286	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5095	SCC1=66486 SCC2=67086[6]	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5095	SCC1=66786 SCC2=66486	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC Channel	SCC Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC1 DL RB Allocation	SCC2 DL RB Allocation
					5155	SCC1=67286 SCC2=66786	20 RB with RBstart=5	25 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_13A-2A-2A	13	SCC1=2 SCC2=2	10	SCC1=10 SCC2=10	5230	SCC1=650 SCC2=900	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	SCC1=900 SCC2=1150	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	SCC1=1150 SCC2=650	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_13A-2A-4A[5]	13	SCC1=2 SCC2=4	10	SCC1=10 SCC2=10	5230	SCC1=650 SCC2=2000	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	SCC1=900 SCC2=2175	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	SCC1=1150 SCC2=2350	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_13A-2A-48A	13	SCC1=2 SCC2=48	10	SCC1=10 SCC2=10	5230	SCC1=650 SCC2=55290	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	SCC1=900 SCC2=55990	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	SCC1=1150 SCC2=56690	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_13A-2A-66A[5]	13	SCC1=2 SCC2=66	10	SCC1=10 SCC2=10	5230	SCC1=650 SCC2=66486	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	SCC1=900 SCC2=66786	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	SCC1=900 SCC2=67086[6]	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	SCC1=1150 SCC2=67286	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_13A-4A-4A[5]	13	SCC1=4 SCC2=4	10	SCC1=10 SCC2=10	5230	SCC1=2000 SCC2=2175	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	SCC1=2175 SCC2=2350	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	SCC1=2350 SCC2=2000	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_13A-48A-66A	13	SCC1=48 SCC2=66	10	SCC1=10 SCC2=10	5230	SCC1=55290 SCC2=66486	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	SCC1=55990 SCC2=66786	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	SCC1=55990 SCC2=67086[6]	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	SCC1=56690 SCC2=67286	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_13A-66C[5,7]	13	SCC1=66 SCC2=66	10	SCC1=20 SCC2=20	5230	SCC1=66536 SCC2=66734[8]	15 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					5230	SCC1=66786 SCC2=66984[9]	15 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC Channel	SCC Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC1 DL RB Allocation	SCC2 DL RB Allocation
					5230	SCC1=67036 SCC2=67234	15 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
CA_13A-66A-66A[5]	13	SCC1=66 SCC2=66	10	SCC1=10 SCC2=10	5230	SCC1=66486 SCC2=67286	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	SCC1=66486 SCC2=67086[6]	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	SCC1=66786 SCC2=66486	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					5230	SCC1=67286 SCC2=66786	15 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_25A-41C	25	SCC1=41 SCC2=41	5	SCC1=20 SCC2=20	8065	SCC1=39750 SCC2=39948	25 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					8365	SCC1=40620 SCC2=40422	25 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					8665	SCC1=41490 SCC2=41292	25 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
CA_30A-2A-5A	30	SCC1=2 SCC2=5	10	SCC1=10 SCC2=10	9820	SCC1=650 SCC2=2450	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					9820	SCC1=900 SCC2=2525	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					9820	SCC1=1150 SCC2=2600	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_30A-2A-12A	30	SCC1=2 SCC2=12	10	SCC1=10 SCC2=5	9820	SCC1=650 SCC2=5035	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
					9820	SCC1=900 SCC2=5095	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
					9820	SCC1=1150 SCC2=5155	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
CA_30A-2A-29A	30	SCC1=2 SCC2=29	10	SCC1=10 SCC2=10	9820	SCC1=650 SCC2=9720	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					9820	SCC1=900 SCC2=9720	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					9820	SCC1=1150 SCC2=9720	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_30A-4A-5A[5]	30	SCC1=4 SCC2=5	10	SCC1=10 SCC2=10	9820	SCC1=2000 SCC2=2450	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					9820	SCC1=2175 SCC2=2525	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					9820	SCC1=2350 SCC2=2600	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_30A-4A-12A[5]	30	SCC1=4 SCC2=12	10	SCC1=10 SCC2=5	9820	SCC1=2000 SCC2=5035	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
					9820	SCC1=2175 SCC2=5095	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC Channel	SCC Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC1 DL RB Allocation	SCC2 DL RB Allocation
					9820	SCC1=2350 SCC2=5155	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
CA_30A-4A-29A[5]	30	SCC1=4 SCC2=29	10	SCC1=10 SCC2=10	9820	SCC1=2000 SCC2=9720	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					9820	SCC1=2175 SCC2=9720	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					9820	SCC1=2350 SCC2=9720	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_30A-5A-29A[5]	30	SCC1=5 SCC2=29	10	SCC1=10 SCC2=10	9820	SCC1=2450 SCC2=9720	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					9820	SCC1=2525 SCC2=9720	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					9820	SCC1=2600 SCC2=9720	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_30A-5A-66A[5]	30	SCC1=5 SCC2=66	10	SCC1=10 SCC2=10	9820	SCC1=2450 SCC2=66486	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					9820	SCC1=2525 SCC2=66786	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					9820	SCC1=2525 SCC2=67086[6]	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					9820	SCC1=2600 SCC2=67286	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_30A-12A-66A[5]	30	SCC1=12 SCC2=66	10	SCC1=5 SCC2=10	9820	SCC1=5035 SCC2=66486	25 RB with RBstart=25	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
					9820	SCC1=5095 SCC2=66786	25 RB with RBstart=25	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
					9820	SCC1=5095 SCC2=67086[6]	25 RB with RBstart=25	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
					9820	SCC1=5155 SCC2=67286	25 RB with RBstart=25	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
CA_30A-29A-66A[5]	30	SCC1=29 SCC2=66	10	SCC1=10 SCC2=10	9820	SCC1=9720 SCC2=66486	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					9820	SCC1=9720 SCC2=66786	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					9820	SCC1=9720 SCC2=67086[6]	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					9820	SCC1=9720 SCC2=67286	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_30A-66C[5,7]	30	SCC1=66 SCC2=66	10	SCC1=20 SCC2=20	9820	SCC1=66536 SCC2=66734[8]	25 RB with RBstart=25	50 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					9820	SCC1=66786 SCC2=66984[9]	25 RB with RBstart=25	50 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					9820	SCC1=67036 SCC2=67234	25 RB with RBstart=25	50 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC Channel	SCC Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC1 DL RB Allocation	SCC2 DL RB Allocation
CA_30A-66A-66A[5]	30	SCC1=66 SCC2=66	10	SCC1=10 SCC2=10	9820	SCC1=66486 SCC2=67286	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					9820	SCC1=66486 SCC2=67086[6]	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					9820	SCC1=66786 SCC2=66486	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					9820	SCC1=67286 SCC2=66786	25 RB with RBstart=25	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_41D	41	SCC1=41 SCC2=41	20	SCC1=20 SCC2=20	39750	SCC1=39948[8] SCC2=40146[8]	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					40620	SCC1= 40422[12] SCC2=40818[9]	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					41490	SCC1=41292[8] SCC2=41094[8]	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
CA_48A-2A-5A	48	SCC1=2 SCC2=5	10	SCC1=10 SCC2=10	55290	SCC1=650 SCC2=2450	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					55990	SCC1=900 SCC2=2525	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					56690	SCC1=1150 SCC2=2600	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_48A-2A-13A	48	SCC1=2 SCC2=13	10	SCC1=10 SCC2=10	55290	SCC1=650 SCC2=5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					55990	SCC1=900 SCC2=5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					56690	SCC1=1150 SCC2=5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_48A-2A-66A	48	SCC1=2 SCC2=66	10	SCC1=10 SCC2=10	55290	SCC1=650 SCC2=66486	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					55990	SCC1=900 SCC2=66786	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					55990	SCC1=900 SCC2=67086[6]	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					56690	SCC1=1150 SCC2=67286	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_48A-5A-66A	48	SCC1=5 SCC2=66	10	SCC1=10 SCC2=10	55290	SCC1=2450 SCC2=66486	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					55990	SCC1=2525 SCC2=66786	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					55990	SCC1=2525 SCC2=67086[6]	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					56690	SCC1=2600 SCC2=67286	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					55290	SCC1=5230 SCC2=66486	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC Channel	SCC Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC1 DL RB Allocation	SCC2 DL RB Allocation
CA_48A-13A-66A	48	SCC1=13 SCC2=66	10	SCC1=10 SCC2=10	55990	SCC1=5230 SCC2=66786	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					55990	SCC1=5230 SCC2=67086[6]	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					56690	SCC1=5230 SCC2=67286	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_66A-2A-2A[5]	66	SCC1=2 SCC2=2	10	SCC1=10 SCC2=10	66486	SCC1=650 SCC2=900	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66786	SCC1=900 SCC2=1150	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	SCC1=1150 SCC2=650	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_66A-2A-5A[5]	66	SCC1=2 SCC2=5	10	SCC1=10 SCC2=10	66486	SCC1=650 SCC2=2450	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66786	SCC1=900 SCC2=2525	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	SCC1=1150 SCC2=2600	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_66A-2A-12A[5]	66	SCC1=2 SCC2=12	10	SCC1=10 SCC2=5	66486	SCC1=650 SCC2=5035	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
					66786	SCC1=900 SCC2=5095	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
					67086	SCC1=1150 SCC2=5155	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0
CA_66A-2A-13A[5]	66	SCC1=2 SCC2=13	10	SCC1=10 SCC2=10	66486	SCC1=650 SCC2=5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66786	SCC1=900 SCC2=5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	SCC1=1150 SCC2=5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_66A-2A-48A[2]	66	SCC1=2 SCC2=48	10	SCC1=10 SCC2=10	66486	SCC1=650 SCC2=55290	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66786	SCC1=900 SCC2=55990	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	SCC1=1150 SCC2= 55290[13]	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	SCC1=1150 SCC2=56690	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_66C-2A[5, 7]	66	SCC1=66 SCC2=2	20	SCC1=20 SCC2=10	66536	SCC1=66734[8] SCC2=650	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	50 RB with RBstart=0
					66786	SCC1=66984[9] SCC2=900	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	50 RB with RBstart=0
					67036	SCC1=67234 SCC2=1150	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	50 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC Channel	SCC Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC1 DL RB Allocation	SCC2 DL RB Allocation
CA_66A-2A-66A[5]	66	SCC1=2 SCC2=66	10	SCC1=10 SCC2=10	66486	SCC1=650 SCC2=67286	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66486	SCC1=900 SCC2=67086[6]	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66786	SCC1=900 SCC2=66486	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	SCC1=1150 SCC2=66786	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_66A-5A-5A[5]	66	SCC1=5 SCC2=5	10	SCC1=5 SCC2=5	66486	SCC1=2425 SCC2=2525	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	25 RB with RBstart=0
					66786	SCC1=2525 SCC2=2625	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	25 RB with RBstart=0
					67086	SCC1=2625 SCC2=2425	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	25 RB with RBstart=0
CA_66A-5A-30A[5]	66	SCC1=5 SCC2=30	10	SCC1=10 SCC2=10	66486	SCC1=2450 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66786	SCC1=2525 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	SCC1=2600 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_66A-5A-48A[2]	66	SCC1=5 SCC2=48	10	SCC1=10 SCC2=10	66486	SCC1=2450 SCC2=55290	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66786	SCC1=2525 SCC2=55990	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	SCC1=2525 SCC2= 55290[13]	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	SCC1=2600 SCC2=56690	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_66C-5A[5, 7]	66	SCC1=66 SCC2=5	20	SCC1=20 SCC2=10	66536	SCC1=66734[8] SCC2=2450	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	50 RB with RBstart=0
					66786	SCC1=66984[9] SCC2=2525	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	50 RB with RBstart=0
					67036	SCC1=67234 SCC2=2600	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	50 RB with RBstart=0
CA_66A-5A-66A[5]	66	SCC1=5 SCC2=66	10	SCC1=10 SCC2=10	66486	SCC1=2450 SCC2=67286	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66486	SCC1=2525 SCC2=67086[6]	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66786	SCC1=2525 SCC2=66486	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	SCC1=2600 SCC2=66786	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66486	SCC1=5035 SCC2=9720	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC Channel	SCC Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC1 DL RB Allocation	SCC2 DL RB Allocation
CA_66A-12A-29A[5]	66	SCC1=12 SCC2=29	10	SCC1=5 SCC2=10	66786	SCC1=5095 SCC2=9720	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
					67086	SCC1=5155 SCC2=9720	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
CA_66A-12A-30A[5]	66	SCC1=12 SCC2=30	10	SCC1=5 SCC2=10	66486	SCC1=5035 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
					66786	SCC1=5095 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
					67086	SCC1=5155 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
CA_66C-12A[5, 7]	66	SCC1=66 SCC2=12	20	SCC1=20 SCC2=5	66536	SCC1=66734[8] SCC2=5035	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	25 RB with RBstart=0
					66786	SCC1=66984[9] SCC2=5095	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	25 RB with RBstart=0
					67036	SCC1=67234 SCC2=5155	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	25 RB with RBstart=0
CA_66A-12A-66A[5]	66	SCC1=12 SCC2=66	10	SCC1=5 SCC2=10	66486	SCC1=5035 SCC2=67286	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
					66486	SCC1=5095 SCC2=67086[6]	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
					66786	SCC1=5095 SCC2=66486	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
					67086	SCC1=5155 SCC2=66786	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	50 RB with RBstart=0
CA_66A-13A-48A[2]	66	SCC1=13 SCC2=48	10	SCC1=10 SCC2=10	66486	SCC1=5230 SCC2=55290	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66786	SCC1=5230 SCC2=55990	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	SCC1=5230 SCC2= 55290[13]	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	SCC1=5230 SCC2=56690	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_66C-13A[5, 7]	66	SCC1=66 SCC2=13	20	SCC1=20 SCC2=10	66536	SCC1=66734[8] SCC2=5230	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	50 RB with RBstart=0
					66786	SCC1=66984[9] SCC2=5230	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	50 RB with RBstart=0
					67036	SCC1=67234 SCC2=5230	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	50 RB with RBstart=0
					66486	SCC1=5230 SCC2=67286	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66486	SCC1=5230 SCC2=67086[6]	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC Channel	SCC Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC1 DL RB Allocation	SCC2 DL RB Allocation
CA_66A-13A-66A[5]	66	SCC1=13 SCC2=66	10	SCC1=10 SCC2=10	66786	SCC1=5230 SCC2=66486	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	SCC1=5230 SCC2=66786	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_66A-29A-30A[5]	66	SCC1=29 SCC2=30	10	SCC1=10 SCC2=10	66486	SCC1=9720 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66786	SCC1=9720 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	SCC1=9720 SCC2=9820	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_66C-29A[5, 7]	66	SCC1=66 SCC2=29	20	SCC1=20 SCC2=10	66536	SCC1=66734[8] SCC2=9720	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	50 RB with RBstart=0
					66786	SCC1=66984[9] SCC2=9720	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	50 RB with RBstart=0
					67036	SCC1=67234 SCC2=9720	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	50 RB with RBstart=0
CA_66A-29A-66A[5]	66	SCC1=29 SCC2=66	10	SCC1=10 SCC2=10	66486	SCC1=9720 SCC2=67286	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66486	SCC1=9720 SCC2=67086[6]	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66786	SCC1=9720 SCC2=66486	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	SCC1=9720 SCC2=66786	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_66C-30A[5, 7]	66	SCC1=66 SCC2=30	20	SCC1=20 SCC2=10	66536	SCC1=66734[8] SCC2=9820	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	50 RB with RBstart=0
					66786	SCC1=66984[9] SCC2=9820	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	50 RB with RBstart=0
					67036	SCC1=67234 SCC2=9820	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	50 RB with RBstart=0
CA_66A-30A-66A[5]	66	SCC1=30 SCC2=66	10	SCC1=10 SCC2=10	66486	SCC1=9820 SCC2=67286	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66486	SCC1=9820 SCC2=67086[6]	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					66786	SCC1=9820 SCC2=66486	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
					67086	SCC1=9820 SCC2=66786	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0
CA_66D	66	SCC1=66 SCC2=66	20	SCC1=20 SCC2=20	66536	SCC1=66734 SCC2=66932[9]	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					67036	SCC1= 66838[12] SCC2=67234	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC Channel	SCC Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC1 DL RB Allocation	SCC2 DL RB Allocation
CA_66C-66A[7]	66	SCC1=66 SCC2=66	20	SCC1=20 SCC2=10	67036	SCC1=67234 SCC2=66486	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	50 RB with RBstart=0
CA_66A-66C[7]	66	SCC1=66 SCC2=66	10	SCC1=20 SCC2=20	66486	SCC1=67036 SCC2=67234	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0

Note 1: Primary Mechanical Mode refers to device configured in preferred mode per manufacturer instructions (typically means antenna extended, fold or portrait slide open, but depends on form factor).

Note 2: This combination creates harmonic, intermodulation, or self-desense interference to one or both of the SCC's. The power level of the SCC's shall be adjusted as needed to maintain the LTE carrier aggregation connection and error free operation on the SCC's.

Note 3: An additional set of channel conditions was added for CA_2A-2A-x to address the case where Wgap is <= 10 (per Table 7.3.1A-3 of 3GPP TS 36.101 [14]).

Note 4: TIS testing is not required for the PCC on channel 800, nor the SCC2 when the PCC is on channel 800. TIS testing is only required for the SCC1 on channel 650.

Note 5: If the device supports both CA_4A-xA-yA and CA_66A-xA-yA (where x and y are the band numbers of the SCC's), then testing is only required in CA_66A-xA-yA. Similarly, if the device supports both CA_xA-4A-yA and CA_xA-66A-yA (where x is the band number of the PCC and y is the band number of the other SCC), then testing is only required in CA_xA-66A-yA; and if the device supports both CA_xA-yA-4A and CA_xA-yA-66A (where x is the band number of the PCC and y is the band number of the other SCC), then testing is only required in CA_xA-yA-66A.

Note 6: Except for CA_2A-2A-66A and CA_5A-5A-66A, when there is a Band 66 SCC on channel 67086, TIS testing is only required on the Band 66 SCC on channel 67086 (TIS testing is not required on the PCC or the other SCC). For CA_2A-2A-66A and CA_5A-5A-66A, TIS testing is required for the PCC and both SCC's.

Note 7: Since all Band 66-capable devices are required to support both CA_66B and CA_66C per 3GPP TS 36.101, testing of xA-66B and 66B-xA combinations is not required.

Note 8: TIS testing on this SCC is not required when the antenna configuration remains the same when the PCC changes to the mid channel.

Note 9: TIS testing on this SCC is not required when the antenna configuration remains the same when the PCC changes to the high channel.

Note 10: An additional set of channel conditions was added for CA_5A-5A-x to address the case where receiver sensitivity relaxation is allowed per Table 7.3.1A-3 of 3GPP TS 36.101 [14].

Note 11: TIS testing is not required for the PCC on channel 2425 when the SCC1 is on channel 2625. TIS testing is only required for the SCC1 on channel 2625 and the SCC2 on channel 67286.

Note 12: TIS testing on this SCC is not required when the antenna configuration remains the same when the PCC changes to the low channel.

Note 13: TIS testing is not required on the PCC and SCC1. TIS testing is only required on the Band 48 SCC2 on channel 55290.

4.4 LTE LAA Downlink Carrier Aggregation (Single Licensed Uplink Carrier)

4.4.1 Receiver Sensitivity Test Settings

This procedure only applies to LAA downlink carrier aggregation with a single licensed uplink carrier on the PCC. This procedure measures TIS for Band 46 in LAA downlink carrier aggregation combinations with 2 components carriers (i.e. one licensed PCC with one Band 46 un-licensed SCC) and 3 component carriers (i.e. one licensed PCC with one licensed SCC and one Band 46 un-licensed SCC). Therefore, LAA CA testing as described in this section provides an assessment of radiated sensitivity on the Band 46 CC with the DUT operating in the LAA CA mode. An LAA CA mode is defined as a specific combination of licensed and Band 46 un-licensed bands assigned to the PCC and SCCs used in carrier aggregation. The LAA CA test methodology described in this section is not intended to provide a measurement of the DUT's aggregate throughput during LAA CA operation.

This procedure assumes the following:

- The tuning of the Band 46 antenna does not change between different LAA CA modes.
- The measurement of TRP and TIS on licensed carrier(s) within an LAA CA mode can be covered by standalone testing (one licensed carrier) and CA testing (two or more licensed carriers). That is, antenna tuning of the licensed carriers is independent of the antenna tuning for Band 46.

LAA CA sensitivity measurements on Band 46 shall be performed using data throughput on only the Band 46 CC as the measurement metric. The DUT's LAA CA Band 46 receiver sensitivity corresponds to the minimum downlink signal power required to provide a data throughput rate greater than or equal to 95% of the maximum throughput of the reference measurement channel on the tested Band 46 CC. Refer to Section 2 in *CTIA 01.71* [6] for set-up illustrations.

To remain consistent with 3GPP core specifications, the LTE communication tester and DUT shall be configured per *3GPP TS 36.521-1* [12], section 7.3A.3 (Reference Sensitivity Level for CA (inter-band DL CA without UL CA). In each case, the defaults specified in *3GPP TS 36.521-1* [12] and *3GPP TS 36.508* [13] shall be used as applicable.

For a given downlink RF power level, throughput shall be measured using the test procedure in section 7.3 of *3GPP TS 36.521-1* [12] using the downlink and uplink reference measurement channels defined in Annexes A.2.2, A.2.3, and A.3.2 of *3GPP TS 36.521-1* [12]. For LTE Band 13, the settings in Table 4.1.2-2 shall take precedence over the settings in Annexes A.2.2, A.2.3, and A.3.2 of *3GPP TS 36.521-1* [12].

The LTE communication tester shall send continuous uplink power control “up” commands to the DUT to ensure the DUT's transmitter is operating at maximum output power during the sensitivity searches of the the Band 46 SCC. As the 3GPP reference does not make any mention of p-Max, nor is p-Max included in the default message content defined in *3GPP TS 36.508* [13], p-Max shall not be signaled during attach procedures or during measurements.

When testing the Band 46 SCC, the PCC is used only to provide control of the DUT, and therefore a calibrated downlink power level for the PCC to the DUT is not required. Labs may assign any desired antenna to provide support for the untested PCC so long as the selected antenna does not interfere with the tested Band 46 SCC measurements. Labs are encouraged to confirm that the eNodeB's PCC output power and antenna placement is sufficient to maintain a reliable radio link to the DUT in advance of beginning the execution of a LAA CA TIS test on the Band 46 SCC. The DL of the untested CC(s) should be configured to not impair the tested Band 46 SCC.

The downlink power step size of the Band 46 SCC under test shall be no more than 0.5 dB when the RF power level is near the LTE sensitivity level. The minimum RF power level resulting in a data throughput rate greater than or equal to 95% of the maximum throughput of the reference measurement channel shall be recorded as the downlink power level corresponding to the 95% throughput percentage (the data throughput rate is as defined in section 7.3A.3 of *3GPP TS 36.521-1* [12] as applicable). Care must be taken to ensure that the duration of the throughput measurement is sufficient to achieve statistical significance according to Annex G.2 of *3GPP TS 36.521-1* [12]. The downlink signal level for each DUT test condition shall be recorded for integration pursuant to *CTIA 01.20* [1] to give a single figure of merit referred to as Total Isotropic Sensitivity (TIS).

Band 46 TIS shall be fully measured as described above and calculated pursuant to *CTIA 01.20* [1] for one supported LAA CA combination with 2 CC's from Table 4.4.1-1 per *CTIA 01.01* [15]. For all other LAA CA combinations in Table 4.4.1-1 and Table 4.4.1-2. that require testing, Band 46 EIS performance shall be evaluated using the LAA Un-Licensed Degradation (LUD) test as described in Section 4.3 of *CTIA 01.20* [1].

Table 4.4.1-1 LTE LAA Carrier Aggregation Mode (2 Total Downlink Carriers with 1 Licensed Carrier, 1 Uplink Carrier) TIS Measurements Table for the Primary Mechanical Mode[1]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carrier (SCC) Band	PCC BW (MHz)	SCC BW (MHz)	PCC Channel	SCC Channel	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocation
CA_2A-46A	2	46	10	20	650	46890	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
					900	50665	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
					1150	54440	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
CA_4A-46A[2]	4	46	10	20	2000	46890	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
					2175	50665	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
					2350	54440	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
CA_5A-46A	5	46	10	20	2450	46890	25 RB with RBstart=25	50 RB with RBstart=0	100 RB with RBstart=0
					2525	50665	25 RB with RBstart=25	50 RB with RBstart=0	100 RB with RBstart=0
					2600	54440	25 RB with RBstart=25	50 RB with RBstart=0	100 RB with RBstart=0
CA_12A-46A	12	46	5	20	5035	46890	20 RB with RBstart=5	25 RB with RBstart=0	100 RB with RBstart=0
					5095	50665	20 RB with RBstart=5	25 RB with RBstart=0	100 RB with RBstart=0
					5155	54440	20 RB with RBstart=5	25 RB with RBstart=0	100 RB with RBstart=0
CA_13A-46A	13	46	10	20	5230	46890	15 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
					5230	50665	15 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
					5230	54440	15 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
CA_25A-46A	25	46	5	20	8065	46890	25 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
					8365	50665	25 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
					8665	54440	25 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
CA_26A-46A	26	46	5	20	8715	46890	25 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
					8865	50665	25 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
					9015	54440	25 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carrier (SCC) Band	PCC BW (MHz)	SCC BW (MHz)	PCC Channel	SCC Channel	PCC UL RB Allocation	PCC DL RB Allocation	SCC DL RB Allocation
CA_30A-46A	30	46	10	20	9820	46890	25 RB with RBstart=25	50 RB with RBstart=0	100 RB with RBstart=0
					9820	50665	25 RB with RBstart=25	50 RB with RBstart=0	100 RB with RBstart=0
					9820	54440	25 RB with RBstart=25	50 RB with RBstart=0	100 RB with RBstart=0
CA_41A-46A	41	46	20	20	39750	46890	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					40620	50665	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					41490	54440	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
CA_66A-46A[2]	66	46	10	20	66486	46890	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
					66786	50665	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
					67086	54440	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0

Note 1: Primary Mechanical Mode refers to device configured in preferred mode per manufacturer instructions (typically means antenna extended, fold or portrait slide open, but depends on form factor).
Note 2: If the device supports both CA_4A-46A and CA_66A-46A, then testing is only required in CA_66A-46A.

Table 4.4.1-2 LTE LAA Carrier Aggregation Mode (3 Total Downlink Carriers with 2 Licensed Carriers, 1 Uplink Carrier) TIS Measurements Table for the Primary Mechanical Mode[1]

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC Channel	SCC Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC1 DL RB Allocation	SCC2 DL RB Allocation
CA_2A-4A-46A[2]	2	SCC1=4 SCC2=46	10	SCC1=10 SCC2=20	650	SCC1=2000	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
						SCC2=46890				
					900	SCC1=2175	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
						SCC2=50665				
					1150	SCC1=2350	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
						SCC2=54440				
CA_2A-5A-46A	2	SCC1=5 SCC2=46	10	SCC1=10 SCC2=20	650	SCC1=2450	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
						SCC2=46890				
					900	SCC1=2525	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
						SCC2=50665				
					1150	SCC1=2600	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
						SCC2=54440				
CA_2A-12A-46A	2	SCC1=12 SCC2=46	10	SCC1=5 SCC2=20	650	SCC1=5035	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
						SCC2=46890				
					900	SCC1=5095	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
						SCC2=50665				
					1150	SCC1=5155	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
						SCC2=54440				
CA_2A-13A-46A	2	SCC1=13 SCC2=46	10	SCC1=10 SCC2=20	650	SCC1=5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
						SCC2=46890				
					900	SCC1=5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
						SCC2=50665				
					1150	SCC1=5230	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
						SCC2=54440				
CA_2A-29A-46A	2	SCC1=29 SCC2=46	10	SCC1=10 SCC2=20	650	SCC1=9720	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
						SCC2=46890				
					900	SCC1=9720	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
						SCC2=50665				
					1150	SCC1=9720	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
						SCC2=54440				

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC Channel	SCC Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC1 DL RB Allocation	SCC2 DL RB Allocation
CA_2A-66A-46A[2]	2	SCC1=66 SCC2=46	10	SCC1=10 SCC2=20	650	SCC1=66486 SCC2=46890	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
					900	SCC1=66786 SCC2=50665	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
					1150	SCC1=67286 SCC2=54440	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
CA_4A-5A-46A[2]	4	SCC1=5 SCC2=46	10	SCC1=10 SCC2=20	2000	SCC1=2450 SCC2=46890	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
					2175	SCC1=2525 SCC2=50665	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
					2350	SCC1=2600 SCC2=54440	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
CA_4A-12A-46A[2]	4	SCC1=12 SCC2=46	10	SCC1=5 SCC2=20	2000	SCC1=5035 SCC2=46890	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
					2175	SCC1=5095 SCC2=50665	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
					2350	SCC1=5155 SCC2=54440	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
CA_4A-13A-46A[2]	4	SCC1=13 SCC2=46	10	SCC1=10 SCC2=20	2000	SCC1=5230 SCC2=46890	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
					2175	SCC1=5230 SCC2=50665	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
					2350	SCC1=5230 SCC2=54440	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
CA_5A-12A-46A	5	SCC1=12 SCC2=46	10	SCC1=5 SCC2=20	2450	SCC1=5035 SCC2=46890	25 RB with RBstart=25	50 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
					2525	SCC1=5095 SCC2=50665	25 RB with RBstart=25	50 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
					2600	SCC1=5155 SCC2=54440	25 RB with RBstart=25	50 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
					9820	SCC1=5035	25 RB with RBstart=25	50 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC Channel	SCC Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC1 DL RB Allocation	SCC2 DL RB Allocation
CA_30A-12A-46A	30	SCC1=12 SCC2=46	10	SCC1=5 SCC2=20		SCC2=46890				
					9820	SCC1=5095 SCC2=50665	25 RB with RBstart=25	50 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
					9820	SCC1=5155 SCC2=54440	25 RB with RBstart=25	50 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
CA_41C-46A	41	SCC1=41 SCC2=46	20	SCC1=20 SCC2=20	39750	SCC1=39948 SCC2=46890	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					40620	SCC1=40422 SCC2=50665	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
					41490	SCC1=41292 SCC2=54440	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0	100 RB with RBstart=0
CA_66A-5A-46A[2]	66	SCC1=5 SCC2=46	10	SCC1=10 SCC2=20	66486	SCC1=2450 SCC2=46890	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
					66786	SCC1=2525 SCC2=50665	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
					67086	SCC1=2600 SCC2=54440	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
CA_66A-12A-46A[2]	66	SCC1=12 SCC2=46	10	SCC1=5 SCC2=20	66486	SCC1=5035 SCC2=46890	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
					66786	SCC1=5095 SCC2=50665	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
					67086	SCC1=5155 SCC2=54440	50 RB with RBstart=0	50 RB with RBstart=0	25 RB with RBstart=0	100 RB with RBstart=0
CA_66A-13A-46A[2]	66	SCC1=13 SCC2=46	10	SCC1=10 SCC2=20	66486	SCC1=5230 SCC2=46890	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
					66786	SCC1=5230 SCC2=50665	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
					67086	SCC1=5230 SCC2=54440	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
CA_66A-66A-46A	66	SCC1=66 SCC2=46	10	SCC1=10 SCC2=20	66486	SCC1=67286 SCC2=46890	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
					66786	SCC1=66486 SCC2=50665	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0

Carrier Aggregation Combination	Primary Component Carrier (PCC) Band	Secondary Component Carriers (SCC1/ SCC2) Bands	PCC BW (MHz)	SCC BWs (MHz)	PCC Channel	SCC Channels	PCC UL RB Allocation	PCC DL RB Allocation	SCC1 DL RB Allocation	SCC2 DL RB Allocation
					67086	SCC1=66786	50 RB with RBstart=0	50 RB with RBstart=0	50 RB with RBstart=0	100 RB with RBstart=0
						SCC2=54440				

Note 1: Primary Mechanical Mode refers to device configured in preferred mode per manufacturer instructions (typically means antenna extended, fold or portrait slide open, but depends on form factor).
Note 2: If the device supports both CA_4A-xA-46A and CA_66A-xA-46A (where x is the band number of a licensed band SCC), then testing is only required in CA_66A-xA-46A. Similarly, if the device supports both CA_xA-4A-46A and CA_xA-66A-46A (where x is the band number of the licensed PCC), then testing is only required in CA_xA-66A-46A.

4.5 LTE Category M1

4.5.1 Transmit Power Test Settings

The measurement site and DUT shall be configured as specified in *CTIA 01.71* [6]. The power radiated by the DUT shall be measured using a calibrated and accurate RF measuring instrument (e.g., a spectrum analyzer, or measurement receiver, or power meter). See Section 3 of *CTIA 01.73* [5] for power measurement considerations.

The LTE communication tester and DUT shall be configured per *3GPP TS 36.521-1* [12], Section 6.2.2EA (UE Maximum Output Power for UE Category M1) using the default settings specified in *3GPP TS 36.521-1* [12] and *3GPP TS 36.508* [13] as applicable and using the uplink reference measurement channels defined in Tables A.2.2.2.1-1b and A.2.3.2.1-1b of *3GPP TS 36.521-1* [12] and Table 4.5.1-1. The test procedure in section 6.2.2EA of *3GPP TS 36.521-1* [12] shall be used to measure the UE output power.

Tests shall be carried out for different frequency pairs (FDD, HD-FDD; UL -uplink /DL -downlink) or frequencies (TDD) and RB allocations across the bands supported by the DUT, as defined in Table 4.5.1-1.

Table 4.5.1-1 LTE Category M1 TRP Measurements Table for the Primary Mechanical Mode[1]

Band	Channel Bandwidth (MHz)	Channel	Power Class 3		Power Class 5		DL RB Allocation
			Frequency (MHz)	UL RB Allocation	Frequency (MHz)	UL RB Allocation	
2	10	18650	1851.04	4 RB with RBstart=1	1851.13	5 RB with RBstart=1	N/A[3]
	10	18900	1880.36	4 RB with RBstart=25	1880.45	5 RB with RBstart=25	N/A[3]
	10	19150	1908.96	4 RB with RBstart=45	1908.87	5 RB with RBstart=44	N/A[3]
4	10	20000	1711.04	4 RB with RBstart=1	1711.13	5 RB with RBstart=1	N/A[3]
	10	20175	1732.86	4 RB with RBstart=25	1732.95	5 RB with RBstart=25	N/A[3]
	10	20350	1753.96	4 RB with RBstart=45	1753.87	5 RB with RBstart=44	N/A[3]

Band	Channel Bandwidth (MHz)	Channel	Power Class 3		Power Class 5		DL RB Allocation
			Frequency (MHz)	UL RB Allocation	Frequency (MHz)	UL RB Allocation	
5[2]	10	20450	825.04	4 RB with RBstart=1	825.13	5 RB with RBstart=1	N/A[3]
	10	20525	836.86	4 RB with RBstart=25	836.95	5 RB with RBstart=25	N/A[3]
	10	20600	847.96	4 RB with RBstart=45	847.87	5 RB with RBstart=44	N/A[3]
7	20	20850	2501.9	6 RB with RBstart=2	2501.9	6 RB with RBstart=2	N/A[3]
	20	21100	2535.54	6 RB with RBstart=50	2535.54	6 RB with RBstart=50	N/A[3]
	20	21350	2568.1	6 RB with RBstart=92	2568.1	6 RB with RBstart=92	N/A[3]
12	5	23035	699.34	1 RB with RBstart=0	699.52	3 RB with RBstart=0	N/A[3]
	5	23095	707.68	1 RB with RBstart=13	707.86	3 RB with RBstart=13	N/A[3]
	5	23155	715.66	1 RB with RBstart=24	715.48	3 RB with RBstart=22	N/A[3]
13	10	23230	778.04	4 RB with RBstart=1	778.13	5 RB with RBstart=1	N/A[3]
	10	23230	782.36	4 RB with RBstart=25	782.45	5 RB with RBstart=25	N/A[3]
	10	23230	785.96	4 RB with RBstart=45	785.87	5 RB with RBstart=44	N/A[3]
26[2]	5	26715	814.34	1 RB with RBstart=0	814.52	3 RB with RBstart=0	N/A[3]
	5	26865	831.68	1 RB with RBstart=13	831.86	3 RB with RBstart=13	N/A[3]
	5	27015	848.66	1 RB with RBstart=24	848.48	3 RB with RBstart=22	N/A[3]
41	20	39750	2497.9	6 RB with RBstart=2	2497.9	6 RB with RBstart=2	N/A[3]
	20	40620	2593.54	6 RB with RBstart=50	2593.54	6 RB with RBstart=50	N/A[3]
	20	41490	2688.1	6 RB with RBstart=92	2688.1	6 RB with RBstart=92	N/A[3]
71	10	133172	664.04	4 RB with RBstart=1	664.13	5 RB with RBstart=1	N/A[3]
	10	133297	680.86	4 RB with RBstart=25	680.95	5 RB with RBstart=25	N/A[3]
	10	133422	696.96	4 RB with RBstart=45	696.87	5 RB with RBstart=44	N/A[3]

Note 1: Primary Mechanical Mode refers to device configured in preferred mode per manufacturer instructions (typically means antenna extended, fold or portrait slide open, but depends on form factor).

Note 2: If the device supports Band 26 and Band 5, then testing is only required to be completed in Band 26.

Note 3: As per 3GPP TS 36.521-1 [12], Section 6.2.2EA (UE Maximum Output Power for UE Category M1).

4.5.2 Receiver Sensitivity Test Settings

Receiver sensitivity measurements shall be performed using data throughput as the measurement metric. The DUT's receiver sensitivity corresponds to the minimum downlink signal power required to provide a data throughput rate greater than or equal to 95% of the maximum throughput of the reference measurement channel. Refer to Section 2 in *CTIA 01.71* [6] for set-up illustrations.

The LTE communication tester and DUT shall be configured per section 7.3EA (Reference Sensitivity Level for UE Category M1) of *3GPP TS 36.521-1* [12] using the defaults specified in *3GPP TS 36.521-1* [12] and *3GPP TS 36.508* [13] as applicable. For a given downlink RF power level, throughput shall be measured using the test procedure in section 7.3EA of *3GPP TS 36.521-1* [12] using the downlink and uplink reference measurement channels defined in Tables A.2.2.1.1-1b, A.2.3.1.1-1b, A.3.2-1b, and A.3.2-2b of *3GPP TS 36.521-1* [12] and Table 4.1.2-2.

For the mid channel and high channel test points, the communication tester shall send two-sided dynamic OCNG Pattern OP.2 FDD/TDD for the DL signal as described in Annex A.5.1.2/A.5.2.2 of *3GPP TS 36.521-1* [12]. For the low channel test points for bands with a 10 MHz and 20 MHz macro channel bandwidth, the communication tester shall send two-sided dynamic OCNG Pattern OP.2 FDD/TDD for the DL signal as described in Annex A.5.1.2/A.5.2.2 of *3GPP TS 36.521-1* [12].

For the low channel test points for bands with a 5 MHz macro channel bandwidth, the communication tester shall send one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL signal as described in Annex A.5.1.1/A.5.2.1 of *3GPP TS 36.521-1* [12].

The LTE communication tester shall send continuous uplink power control “up” commands to the DUT to ensure the DUT's transmitter is at maximum output power during the sensitivity searches. The downlink power step size shall be no more than 0.5 dB when the RF power level is near the LTE sensitivity level. The minimum RF power level resulting in a data throughput rate greater than or equal to 95% of the maximum throughput of the reference measurement channel shall be recorded as the downlink power level corresponding to the 95% throughput percentage (the data throughput rate is as defined in section 7.3EA of *3GPP TS 36.521-1* [12]). As OCNG is used to fill the entire channel bandwidth with the same PSD at the minimum RF power level resulting in a data throughput rate greater than or equal to 95% of the maximum throughput of the reference measurement, C-TIS for LTE Category M1 shall be calculated based on the 6 RBs that compose the LTE Category M1 narrowband index. This is equivalent to the definition of REFSENS in *3GPP TS 36.521-1* [12] section 7.3EA.5. Care must be taken to ensure that the duration of the throughput measurement is sufficient to achieve statistical significance according to Annex G.2 of *3GPP TS 36.521-1* [12]. The downlink signal level for each DUT test condition shall be recorded for integration pursuant to *CTIA 01.20* [1] or *CTIA 01.21* [2] to give a single figure of merit referred to as Combined Total Isotropic Sensitivity (C-TIS).

C-TIS shall be fully measured as described above and calculated pursuant to *CTIA 01.20* [1] or *CTIA 01.21* [2]. C-TIS measurements shall be carried out for different frequency pairs (FDD, HD-FDD; UL - uplink /DL-downlink) or frequencies (TDD) and RB allocations across the bands supported by the DUT, as defined in Table 4.5.2-1. TIS results shall be based on total downlink channel power within the narrowband index (6 RBs) and shall be reported as dBm/1080 kHz.

Table 4.5.2-1 LTE Category M1 TIS Measurements Table for the Primary Mechanical Mode[1]

Band	Channel Bandwidth (MHz)	Channel	Frequency (MHz) [center of DL RB allocation]	UL RB Allocation	DL RB Allocation
2	10	650	1931.04	6 RB with RBstart=43	4 RB with RBstart=1
	10	900	1961.44	6 RB with RBstart=43	4 RB with RBstart=31
	10	1150	1988.6	6 RB with RBstart=43	4 RB with RBstart=43
4	10	2000	2111.04	6 RB with RBstart=43	4 RB with RBstart=1
	10	2175	2133.94	6 RB with RBstart=43	4 RB with RBstart=31
	10	2350	2153.6	6 RB with RBstart=43	4 RB with RBstart=43
5[2]	10	2450	870.04	6 RB with RBstart=43	4 RB with RBstart=1
	10	2525	882.94	6 RB with RBstart=43	4 RB with RBstart=31
	10	2600	892.6	6 RB with RBstart=43	4 RB with RBstart=43
7	20	2850	2621.72	6 RB with RBstart=92	4 RB with RBstart=2
	20	3100	2656.44	6 RB with RBstart=92	4 RB with RBstart=56
	20	3350	2687.92	6 RB with RBstart=92	4 RB with RBstart=92
12	5	5035	729.61	6 RB with RBstart=19	4 RB with RBstart=0
	5	5095	739.03	6 RB with RBstart=19	4 RB with RBstart=19
	5	5155	745.03	6 RB with RBstart=19	4 RB with RBstart=19
13	10	5230	747.04	6 RB with RBstart=1	4 RB with RBstart=1
	10	5230	752.44	6 RB with RBstart=1	4 RB with RBstart=31
	10	5230	754.6	6 RB with RBstart=1	4 RB with RBstart=43
26[2]	5	8715	859.61	6 RB with RBstart=19	4 RB with RBstart=0
	5	8865	878.03	6 RB with RBstart=19	4 RB with RBstart=19
	5	9015	893.03	6 RB with RBstart=19	4 RB with RBstart=19
41	20	39750	2497.72	6 RB with RBstart=92	4 RB with RBstart=2
	20	40620	2594.44	6 RB with RBstart=92	4 RB with RBstart=56
	20	41490	2687.92	6 RB with RBstart=92	4 RB with RBstart=92

Band	Channel Bandwidth (MHz)	Channel	Frequency (MHz) [center of DL RB allocation]	UL RB Allocation	DL RB Allocation
71	10	68636	618.04	6 RB with RBstart=43	4 RB with RBstart=1
	10	68761	635.94	6 RB with RBstart=43	4 RB with RBstart=31
	10	68886	650.6	6 RB with RBstart=43	4 RB with RBstart=43
Note 1: Primary Mechanical Mode refers to device configured in preferred mode per manufacturer instructions (typically means antenna extended, fold or portrait slide open, but depends on form factor). **Note 2:** If the device supports Band 26 and Band 5, then testing is only required to be completed in Band 26.					

4.6 LTE Category NB1 (NB-IoT)

4.6.1 Transmit Power Test Settings

The measurement site and DUT shall be configured as specified in *CTIA 01.71* [6]. The power radiated by the DUT shall be measured using a calibrated and accurate RF measuring instrument (e.g., a spectrum analyzer, or measurement receiver, or power meter). See Section 3 of *CTIA 01.73* [5] for power measurement considerations.

The LTE communication tester and DUT shall be configured per *3GPP TS 36.521-1* [12], Section 6.2.2F (UE Maximum Output Power for UE Category NB1) using the default settings specified in *3GPP TS 36.521-1* [12] and *3GPP TS 36.508* [13] as applicable and using the uplink reference measurement channels defined in Annex A.2.4 of *3GPP TS 36.521-1* [12] and Table 4.6.1-1. The test procedure in section 6.2.2F of *3GPP TS 36.521-1* [12] shall be used to measure the UE output power. TRP measurements shall be executed using the Category NB1 Stand-Alone (SA) mode, using the test channel configuration described in Table 4.6.1-1.

Note: as opposed to LTE, the frequency difference between the test channel (i.e., F_{UL}) and the actual center frequency for the subcarrier allocation is very small (<100kHz). Therefore, power measurements shall be done on F_{UL}.

Table 4.6.1-1 LTE Category NB1 TRP Measurements Table for Stand-Alone (SA) Operation and NS_04 signalling Using π/4 QPSK (15 kHz Sub-Carrier Spacing) in the Primary Mechanical Mode[1]

Band	Range	NB1 UL EARFCN	UL Offset to NB1 EARFCN	Frequency of NB1 UL EARFCN	Uplink Configuration		Downlink Configuration	
		N_{UL}	M_{UL}	F_{UL} (MHz)	Modulation	N_{TONES}	Modulation	Subcarriers
2[2]	Low	18602	0	1850.20	π/4 QPSK	1@0	N/A[3]	N/A[3]
2[2]	High	19198	0	1909.80	π/4 QPSK	1@11	N/A[3]	N/A[3]
4[4]	Low	19952	0	1710.20	π/4 QPSK	1@0	N/A[3]	N/A[3]
4[4]	High	20398	0	1754.80	π/4 QPSK	1@11	N/A[3]	N/A[3]

Band	Range	NB1 UL EARFCN	UL Offset to NB1 EARFCN	Frequency of NB1 UL EARFCN	Uplink Configuration		Downlink Configuration	
		N_{UL}	M_{UL}	F_{UL} (MHz)	Modulation	N_{TONES}	Modulation	Subcarriers
5[5]	Low	20402	0	824.20	π/4 QPSK	1@0	N/A[3]	N/A[3]
5[5]	High	20648	0	848.80	π/4 QPSK	1@11	N/A[3]	N/A[3]
12[6]	Low	23011	0	699.10	π/4 QPSK	1@0	N/A[3]	N/A[3]
12[6]	High	23178	0	715.80	π/4 QPSK	1@11	N/A[3]	N/A[3]
13	Low	23181	0	777.10	π/4 QPSK	1@0	N/A[3]	N/A[3]
13	High	23278	0	786.80	π/4 QPSK	1@11	N/A[3]	N/A[3]
14	Low	23281	0	788.10	π/4 QPSK	1@0	N/A[3]	N/A[3]
14	High	23379	0	797.90	π/4 QPSK	1@11	N/A[3]	N/A[3]
25[2]	Low	26042	0	1850.20	π/4 QPSK	1@0	N/A[3]	N/A[3]
25[2]	High	26688	0	1914.80	π/4 QPSK	1@11	N/A[3]	N/A[3]
26[5]	Low	26692	0	814.20	π/4 QPSK	1@0	N/A[3]	N/A[3]
26[5]	High	27038	0	848.80	π/4 QPSK	1@11	N/A[3]	N/A[3]
66[4]	Low	131974	0	1710.20	π/4 QPSK	1@0	N/A[3]	N/A[3]
66[4]	High	132670	0	1779.80	π/4 QPSK	1@11	N/A[3]	N/A[3]
71	Low	133124	0	663.20	π/4 QPSK	1@0	N/A[3]	N/A[3]
71	High	133470	0	697.80	π/4 QPSK	1@11	N/A[3]	N/A[3]

Note 1: Primary Mechanical Mode refers to device configured in preferred mode per manufacturer instructions (typically means antenna extended, fold or portrait slide open, but depends on form factor).

Note 2: If the device supports Band 25 and Band 2, then testing is only required to be completed in Band 25.

Note 3: As per 3GPP TS 36.521-1 [12], Section 6.2.2F (UE Maximum Output Power for category NB1 and NB2).

Note 4: If the device supports Band 4 and Band 66, then testing is only required to be completed in Band 66.

Note 5: If the device supports Band 26 and Band 5, then testing is only required to be completed in Band 26.

4.6.2 Receiver Sensitivity Test Settings

Category NB1 receiver sensitivity measurements shall be performed using data throughput as the measurement metric. The DUT's receiver sensitivity corresponds to the minimum downlink signal power required to provide a data throughput rate greater than or equal to 95% of the maximum throughput of the reference measurement channel. Refer to Section 2 in *CTIA 01.71* [6] for set-up illustrations.

The LTE communication tester and DUT shall be configured per *3GPP TS 36.521-1* [12], Section 7.3F.1 (Reference sensitivity level without repetitions for Category NB1) using the default settings specified in *3GPP TS 36.521-1* [12] and 3GPP TS 36.508 [13] as applicable. For a given downlink RF power level, throughput shall be measured using the test procedure in section 7.3F of *3GPP TS 36.521-1* [12] using the applicable downlink and uplink reference measurement channels defined in Annex A.3.2 and Annex A.2.4 of *3GPP TS 36.521-1* [12] and Table 4.6.2-1.

The LTE communication tester shall send continuous uplink power control “up” commands to the DUT to ensure the DUT's transmitter is at maximum output power during the sensitivity searches. The downlink power step size shall be no more than 0.5 dB when the RF power level is near the LTE sensitivity level. The minimum RF power level resulting in a data throughput rate greater than or equal to 95% of the maximum throughput of the reference measurement channel shall be recorded as the downlink power level corresponding to the 95% throughput percentage (the data throughput rate is as defined in section 7.3F of *3GPP TS 36.521-1* [12]). C-TIS shall be based on the minimum RF power level resulting in a data throughput rate greater than or equal to 95% of the maximum throughput of the reference measurement. Care must be taken to ensure that the duration of the throughput measurement is sufficient to achieve statistical significance according to Annex G.2 of *3GPP TS 36.521-1* [12]. The downlink signal level for each DUT test condition shall be recorded for integration pursuant to *CTIA 01.20* [1] or *CTIA 01.21* [2] to give a single figure of merit referred to as Combined Total Isotropic Sensitivity (C-TIS).

C-TIS shall be fully measured as described above and calculated pursuant to *CTIA 01.20* [1] or *CTIA 01.21* [2]. C-TIS measurements shall be carried out for the frequency pairs defined in Table 4.6.2-1, according to the bands supported by the DUT. C-TIS results shall be based on total channel power.

Table 4.6.2-1 LTE Category NB1 TIS/C-TIS Measurements Table for Stand-Alone (SA) Operation and NS_04 signalling Using QPSK (15 kHz Sub-Carrier Spacing) in the Primary Mechanical Mode[1]

Band	Range	NB1 DL EARFCN	DL Offset to NB1 EARFCN	Frequency of NB1 DL EARFCN	Uplink Configuration		Downlink Configuration	
		N_{DL}	M_{DL}	F_{DL} (MHz)	Modulation	N_{tones}	Modulation	Subcarriers
2[2]	Low	602	-0.5	1930.20	π/2 BPSK	1@0	QPSK	12
2[2]	Mid	900	-0.5	1960.00	π/2 BPSK	1@0	QPSK	12
2[2]	High	1198	-0.5	1989.80	π/2 BPSK	1@0	QPSK	12
4[3]	Low	1952	-0.5	2110.20	π/2 BPSK	1@0	QPSK	12
4[3]	Mid	2175	-0.5	2132.50	π/2 BPSK	1@0	QPSK	12
4[3]	High	2398	-0.5	2154.80	π/2 BPSK	1@0	QPSK	12
5[4]	Low	2402	-0.5	869.20	π/2 BPSK	1@0	QPSK	12
5[4]	Mid	2525	-0.5	881.50	π/2 BPSK	1@0	QPSK	12

Band	Range	NB1 DL EARFCN	DL Offset to NB1 EARFCN	Frequency of NB1 DL EARFCN	Uplink Configuration		Downlink Configuration	
		N_{DL}	M_{DL}	F_{DL} (MHz)	Modulation	N_{tones}	Modulation	Subcarriers
5[4]	High	2648	-0.5	893.80	π/2 BPSK	1@0	QPSK	12
12[5]	Low	5011	-0.5	729.10	π/2 BPSK	1@0	QPSK	12
12[5]	Mid	5095	-0.5	737.50	π/2 BPSK	1@0	QPSK	12
12[5]	High	5178	-0.5	745.80	π/2 BPSK	1@0	QPSK	12
13	Low	5181	-0.5	746.10	π/2 BPSK	1@0	QPSK	12
13	Mid	5230	-0.5	751.00	π/2 BPSK	1@0	QPSK	12
13	High	5278	-0.5	755.80	π/2 BPSK	1@0	QPSK	12
14	Low	5281	-0.5	758.10	π/2 BPSK	1@0	QPSK	12
14	Mid	5330	-0.5	763.00	π/2 BPSK	1@0	QPSK	12
14	High	5379	-0.5	767.90	π/2 BPSK	1@0	QPSK	12
25[2]	Low	8042	-0.5	1930.20	π/2 BPSK	1@0	QPSK	12
25[2]	Mid	8365	-0.5	1962.50	π/2 BPSK	1@0	QPSK	12
25[2]	High	8688	-0.5	1994.80	π/2 BPSK	1@0	QPSK	12
26[4]	Low	8692	-0.5	859.20	π/2 BPSK	1@0	QPSK	12
26[4]	Mid	8865	-0.5	876.50	π/2 BPSK	1@0	QPSK	12
26[4]	High	9038	-0.5	893.80	π/2 BPSK	1@0	QPSK	12
66[3]	Low	66438	-0.5	2110.20	π/2 BPSK	1@0	QPSK	12
66[3]	Mid	66786	-0.5	2145.00	π/2 BPSK	1@0	QPSK	12
66[3]	High	67134	-0.5	2179.80	π/2 BPSK	1@0	QPSK	12
71	Low	68588	-0.5	617.20	π/2 BPSK	1@0	QPSK	12
71	Mid	68761	-0.5	634.50	π/2 BPSK	1@0	QPSK	12
71	High	68934	-0.5	651.80	π/2 BPSK	1@0	QPSK	12

Note 1: Primary Mechanical Mode refers to device configured in preferred mode per manufacturer instructions (typically means antenna extended, fold or portrait slide open, but depends on form factor).
Note 2: If the device supports Band 25 and Band 2, then testing is only required to be completed in Band 25.
Note 3: If the device supports Band 4 and Band 66, then testing is only required to be completed in Band 66.
Note 4: If the device supports Band 26 and Band 5, then testing is only required to be completed in Band 26.

Section 5 5G Technology

5.1 Frequency Range 1 (FR1)

5.1.1 NR FR1 Stand Alone (SA) Single Carrier

5.1.1.1 Transmit Power Test Settings

The measurement site and DUT shall be configured as specified in *CTIA 01.71* [6]. The power radiated by the DUT shall be measured using a calibrated and accurate RF measuring instrument (e.g., a spectrum analyzer, or measurement receiver, or power meter). See Section 3 of *CTIA 01.73* [5] for power measurement considerations.

The NR communication tester and DUT shall be configured per *3GPP TS 38.521-1* [16], Section 6.2 (Transmitter Power) using the default settings specified in *3GPP TS 38.521-1* [16] and *3GPP TS 38.508-1* [17] as applicable. The test procedure in Section 6.2.1 (UE Maximum Output Power) of *3GPP TS 38.521-1* [16] shall be used to measure the UE output power.

Tests shall be carried out for different frequency pairs (FDD; UL -uplink /DL -downlink) or frequencies (TDD) and RB allocations across the bands supported by the DUT, as defined in Table 5.1.1.1-1.

Table 5.1.1.1-1 NR FR1 SA TRP Measurements Table for the Primary Mechanical Mode[1]

3GPP Config. Identifier[2]	CC BW (MHz)	SCS (kHz)	NR UL Channel	TX Frequency (MHz) [center of UL RB allocation]	NR UL RB Allocation	NR DL RB Allocation
n2[3]	10	15	371000	**1852.48**	12@6	N/A[4]
			376000	1880	12@20	N/A[4]
			381000	**1907.52**	12@34	N/A[4]
n5[5]	10	15	165800	**826.48**	12@6	N/A[4]
			167300	836.5	12@20	N/A[4]
			168800	**846.52**	12@34	N/A[4]
n12	10	15	140800	**701.48**	12@6	N/A[4]
			141500	707.5	12@20	N/A[4]
			142200	**713.52**	12@34	N/A[4]
n14	10	15	158600	**790.48**	12@6	N/A[4]
			158600	793	12@20	N/A[4]
			158600	**795.52**	12@34	N/A[4]
n25[3]	10	15	371000	**1852.48**	12@6	N/A[4]
			376500	1882.5	12@20	N/A[4]
			382000	**1912.52**	12@34	N/A[4]
n26[5]	10	15	163800	**816.48**	12@6	N/A[4]
			166300	831.5	12@20	N/A[4]
			168800	**846.52**	12@34	N/A[4]
n30	10	15	462000	**2307.48**	12@6	N/A[4]
			462000	2310	12@20	N/A[4]
			462000	**2312.52**	12@34	N/A[4]
n41	20	30	501204	**2499.9**	9@4	N/A[4]
			518598	2592.99	9@21	N/A[4]
			535998	**2686.11**	9@38	N/A[4]
n48	20	30	637334	3553.89	9@4	N/A[4]
			641666	3624.99	9@21	N/A[4]
			646000	3696.12	9@38	N/A[4]
n66	10	15	343000	**1712.48**	12@6	N/A[4]
			349000	1745	12@20	N/A[4]

3GPP Config. Identifier[2]	CC BW (MHz)	SCS (kHz)	NR UL Channel	TX Frequency (MHz) [center of UL RB allocation]	NR UL RB Allocation	NR DL RB Allocation
			355000	**1777.52**	12@34	N/A[4]
n70	5	15	339500	**1697.41**	12@6	N/A[4]
			341500	**1707.41**	12@6	N/A[4]
n71	10	15	133600	**665.48**	12@6	N/A[4]
			136100	680.5	12@20	N/A[4]
			138600	**695.52**	12@34	N/A[4]
n77 (Canada)	20	30	630668	**3453.9**	9@4	N/A[4]
			633668[6]	3505.02	9@21	N/A[4]
			636668	3550.02	9@21	N/A[4]
			639668[7]	3595.02	9@21	N/A[4]
			642666	**3646.11**	9@38	N/A[4]
n77 (USA Range A)[8]	20	30	647334	3703.89	9@4	N/A[4]
			651666[6]	3774.99	9@21	N/A[4]
			656000	3840	9@21	N/A[4]
			660334[7]	3905.01	9@21	N/A[4]
			664666	3976.11	9@38	N/A[4]
n77 (USA Range B)[9]	20	30	630668	3453.9	9@4	N/A[4]
			633334	3500.01	9@21	N/A[4]
			636000	3546.12	9@38	N/A[4]
n78	20	30	620668	**3303.9**	9@4	N/A[4]
			636666	3549.99	9@21	N/A[4]
			652666	**3796.11**	9@38	N/A[4]

Note 1: Primary Mechanical Mode refers to device configured in preferred mode per manufacturer instructions (typically means antenna extended, fold or portrait slide open, but depends on form factor).
Note 2: Unless otherwise specified, all these configurations correspond to Variant ID 1.
Note 3: If the device supports NR bands n25 and n2, then testing is only required to be completed in n25.
Note 4: As per 3GPP TS 38.521-1 [16], Section 6.2.1 (UE Maximum Output Power).
Note 5: If the device supports NR bands n5 and n26, then testing is only required to be completed in n26
Note 6: Additional lower mid (LM) test channel for wide frequency TDD bands.
Note 7: Additional upper mid (UM) test channel for wide frequency TDD bands.
Note 8: Range A for n77 USA, i.e. 3700-3980 MHz with L-LM-M-UM-H test channels. Testing is required for all UE's that support n77 USA operation.
Note 9: Range B for n77 USA, i.e. 3450-3550 MHz, with L-M-H test channels. Testing is only required if the UE supports UE capability *extendedBand-n77-r16* defined in 3GPP TS 38.306.

The Alternative Operating Bandwidths configurations presented in Table 5.1.1.1-2 are provided only for information and may be used for testing based on operator request.

Table 5.1.1.1-2 NR FR1 SA TRP Measurements Table for Alternative Operating Bandwidths in the Primary Mechanical Mode[1] (Informative)

3GPP Config. Identifier	CTIA OTA Alternative Config.	CC BW (MHz)	SCS (kHz)	NR UL Channel	TX Frequency (MHz) [center of UL RB allocation]	NR UL RB Allocation	NR DL RB Allocation
n25	Alternative BW Option 1	20	15	372000	1859.46	50@25	N/A[2]
				376500	1881.96	50@25	N/A[2]
				381000	1904.46	50@25	N/A[2]
n66	Alternative BW Option 1	20	15	344000	1719.46	50@25	N/A[2]
				349000	1744.46	50@25	N/A[2]
				354000	1769.46	50@25	N/A[2]
	Alternative BW Option 2	40	15	346000	1730	108@54	N/A[2]
				349000	1745	108@54	N/A[2]
				352000	1760	108@54	N/A[2]
n70	Alternative BW Option 1	15	15	340500	1701.87	36@18	N/A[2]
n78	Alternative BW Option 1	100	30	623334	3349.29	135@67	N/A[2]
				636666	3549.27	135@67	N/A[2]
				650000	3749.28	135@67	N/A[2]
Note 1: Primary Mechanical Mode refers to device configured in preferred mode per manufacturer instructions (typically means antenna extended, fold or portrait slide open, but depends on form factor). Note 2: As per 3GPP TS 38.521-3, Section 6.2.1 (UE Maximum Output Power).							

5.1.1.1.1. NR FR1 Relative Power on Intermediate Channel Measurements

For wide frequency TDD bands, EIRP measurements will be repeated per channel for the specified list of intermediate channels as described in Table 5.1.1.1.1-1. The procedure for measuring EIRP on intermediate channels is described in section 3.6 of *CTIA 01.20* [1].

	The green cells represent the the low, lower mid, mid, upper mid, and high channels that are fully tested for TRP.
	The yellow cells represent the lower 12.5% or 25% of the intermediate channels.
	The yellow striped cells represent the lower mid 25% of the intermediate channels.
	The white cells represent the middle 25% or 50% of the intermediate channels.
	The orange striped cells represent the upper mid 25% of the intermediate channels.
	The orange cells represent the upper 12.5% or 25% of the intermediate channels.

Table 5.1.1.1.1-1 NR FR1 Transmit Intermediate Channel Measurements Table

3GPP Config. Identifier	CC BW (MHz)	SCS (kHz)	IC Reference Channel ID	NR UL Channel	TX Frequency (MHz) [center of UL RB allocation]	Associated Reference Channel	NR UL RB Allocation	NR DL RB Allocation
n48	20	30	n48_REF L	637334	3553.89	N/A	9@4	N/A
			n48_IC1	638500	3577.5	L	9@21	N/A
			n48_IC2	639500	3592.5	L	9@21	N/A
			n48_IC3	640500	3607.5	M	9@21	N/A
			n48_REF M	641666	3624.99	N/A	9@21	N/A
			n48_IC4	642834	3642.51	M	9@21	N/A
			n48_IC5	643834	3657.51	H	9@21	N/A
			n48_IC6	644834	3672.51	H	9@21	N/A
			n48_REF H	646000	3696.12	N/A	9@38	N/A
n77 (Canada)	20	30	n77_Canada_REF L	630668	3453.9	N/A	9@4	N/A
			n77_Canada_IC1	631668	3475.02	L	9@21	N/A
			n77_Canada_IC2	632668	3490.02	LM	9@21	N/A
			n77_Canada_REF LM	633668	3505.02	N/A	9@21	N/A
			n77_Canada_IC3	634668	3520.02	LM	9@21	N/A
			n77_Canada_IC4	635668	3535.02	M	9@21	N/A
			n77_Canada_REF M	636668	3550.02	N/A	9@21	N/A
			n77_Canada_IC5	637668	3565.02	M	9@21	N/A
			n77_Canada_IC6	638668	3580.02	UM	9@21	N/A
			n77_Canada_REF UM	639668	3595.02	N/A	9@21	N/A
			n77_Canada_IC7	640668	3610.02	UM	9@21	N/A
			n77_Canada_IC8	641668	3625.02	H	9@21	N/A
			n77_Canada_REF H	642666	3646.11	N/A	9@38	N/A
n77 (USA Range A)	20	30	n77_RangeA_REF L	647334	3703.89	N/A	9@4	N/A
			n77_RangeA_IC1	648500	3727.5	L	9@21	N/A
			n77_RangeA_IC2	649500	3742.5	L	9@21	N/A
			n77_RangeA_IC3	650500	3757.5	LM	9@21	N/A
			n77_RangeA_REF LM	651666	3774.99	N/A	9@21	N/A
			n77_RangeA_IC4	652834	3792.51	LM	9@21	N/A
			n77_RangeA_IC5	653834	3807.51	M	9@21	N/A
			n77_RangeA_IC6	654834	3822.51	M	9@21	N/A
			n77_RangeA_REF M	656000	3840	N/A	9@21	N/A
			n77_RangeA_IC7	657166	3857.49	M	9@21	N/A
			n77_RangeA_IC8	658166	3872.49	M	9@21	N/A
			n77_RangeA_IC9	659166	3887.49	UM	9@21	N/A
			n77_RangeA_REF UM	660334	3905.01	N/A	9@21	N/A
			n77_RangeA_IC10	661500	3922.5	UM	9@21	N/A
			n77_RangeA_IC11	662500	3937.5	H	9@21	N/A
			n77_RangeA_IC12	663500	3952.5	H	9@21	N/A
			n77_RangeA_REF H	664666	3976.11	N/A	9@38	N/A
n77 (USA Range B)	20	30	n77_RangeB_REF L	630668	3453.9	N/A	9@4	N/A
			n77_RangeB_IC1	631534	3473.01	L	9@21	N/A
			n77_RangeB_IC2	632400	3486	M	9@21	N/A
			n77_RangeB_REF M	633334	3500.01	N/A	9@21	N/A
			n77_RangeB_IC3	634266	3513.99	M	9@21	N/A
			n77_RangeB_IC4	635134	3527.01	H	9@21	N/A

3GPP Config. Identifier	CC BW (MHz)	SCS (kHz)	IC Reference Channel ID	NR UL Channel	TX Frequency (MHz) [center of UL RB allocation]	Associated Reference Channel	NR UL RB Allocation	NR DL RB Allocation
			n77_RangeB_REF H	636000	3546.12	N/A	9@38	N/A

5.1.1.2 Radiated Sensitivty Test Settings

Receiver sensitivity measurements shall be performed using data throughput as the measurement metric. The DUT's receiver sensitivity corresponds to the minimum downlink signal power required to provide a data throughput rate greater than or equal to 95% of the maximum throughput of the reference measurement channel. Refer to *CTIA* Section 2 in *CTIA 01.71* [6] for set-up illustrations.

For a device supporting multiple receivers, all receivers shall be enabled during the test procedure described in the remainder of this section. In this way, C-TIS is the test result, regardless whether the device supports one or multiple receivers. In the special case that I-TIS is the desired quantity of interest, the same procedure is followed, except that all but the specified receiver-under-test on the device are disabled.

The NR communication tester and DUT shall be configured per section 7.3 (Reference Sensitivity) of *3GPP TS 38.521-1* [16] using the defaults specified in *3GPP TS 38.521-1* [16] and *3GPP TS 38.508-1* [17] as applicable. As the 3GPP reference does not make any mention of p-Max, nor is p-Max included in the default message content defined in *3GPP TS 38.508-1* [17], p-Max shall not be signaled during attach procedures or during measurements. For a given downlink RF power level, throughput shall be measured using the test procedure in section 7.3.2 (Reference sensitivity power level) of *3GPP TS 38.521-1* [16] using the downlink and uplink reference measurement channels defined in Annexes A.2.2, A.2.3, and A.3.2 of *3GPP TS 38.521-1* [16] and Table 5.1.1.2-1. The NR communication tester shall send continuous uplink power control “up” commands to the DUT to ensure the DUT's transmitter is at maximum output power during the sensitivity searches. The downlink power step size shall be no more than 0.5 dB when the RF power level is near the NR sensitivity level. The minimum RF power level resulting in a data throughput rate greater than or equal to 95% of the maximum throughput of the reference measurement channel shall be recorded as the downlink power level corresponding to the 95% throughput percentage (the data throughput rate is as defined in section 7.3.2.3 of *3GPP TS 38.521-1* [16]). Care must be taken to ensure that the duration of the throughput measurement is sufficient to achieve statistical significance according to Annex H.2 of *3GPP TS 38.521-1* [16] . The downlink signal level for each DUT test condition shall be recorded for integration pursuant to *CTIA 01.20* [1] or *CTIA 01.21* [2] to give a single figure of merit referred to as Total Isotropic Sensitivity (TIS).

TIS shall be fully measured as described above and calculated pursuant to *CTIA 01.20* [1] or *CTIA 01.21* [2]. TIS measurements shall be carried out for different frequency pairs (FDD; UL -uplink /DL -downlink) or frequencies (TDD) and RB allocations across the bands supported by the DUT, as defined in Table 5.1.1.2-1. TIS results shall be based on total channel power.

Table 5.1.1.2-1 NR FR1 SA TIS Measurements Table for the Primary Mechanical Mode[1]

3GPP Config. Identifier[2]	CC BW (MHz)	SCS (kHz)	NR DL Channel	RX Frequency (MHz)	NR UL RB Allocation	NR DL RB Allocation
n2[3]	10	15	387000	1935	50@2	52@0
			392000	1960	50@2	52@0

3GPP Config. Identifier[2]	CC BW (MHz)	SCS (kHz)	NR DL Channel	RX Frequency (MHz)	NR UL RB Allocation	NR DL RB Allocation
			397000	1985	50@2	52@0
n5[4]	10	15	174800	874	25@27	52@0
			176300	881.5	25@27	52@0
			177800	889	25@27	52@0
n12	10	15	146800	734	25@27	52@0
			147500	737.5	25@27	52@0
			148200	741	25@27	52@0
n14	10	15	152600	763	20@0	52@0
n25[3]	10	15	387000	1935	50@0	52@0
			392500	1962.5	50@0	52@0
			398000	1990	50@0	52@0
n26[4]	10	15	172800	864	25@27	52@0
			175300	876.5	25@27	52@0
			177800	889	25@27	52@0
n30	10	15	471000	2355	20@32	52@0
n41	20	30	501204	2506.02	50@0	51@0
			518598	2592.99	50@0	51@0
			535998	2679.99	50@0	51@0
n48	20	30	637334	3560.01	50@0	51@0
			641666	3624.99	50@0	51@0
			646000	3690	50@0	51@0
n66	10	15	423000	2115	50@2	52@0
			429000	2145	50@2	52@0
			435000	2175	50@2	52@0
n70	5	15	400500	2002.5	25@0	25@0
n71	10	15	124400	622	25@0	52@0
			126900	634.5	25@0	52@0
			129400	647	25@0	52@0
n77 (Canada)	20	30	630668	3460.02	50@0	51@0
			633668[5]	3505.02	50@0	51@0
			636668	3550.02	50@0	51@0
			639668[6]	3595.02	50@0	51@0
			642666	3639.99	50@0	51@0
n77 (USA Range A)[7]	20	30	647334	3710.01	50@0	51@0
			651666[5]	3774.99	50@0	51@0
			656000	3840	50@0	51@0
			660334[6]	3905.01	50@0	51@0
			664666	3969.99	50@0	51@0
n77 (USA Range B)[8]	20	30	630668	3460.02	50@0	51@0
			633334	3500.01	50@0	51@0
			636000	3540	50@0	51@0
n78	20	30	620668	3310.02	50@0	51@0
			636666	3549.99	50@0	51@0
			652666	3789.99	50@0	51@0

Note 1: Primary Mechanical Mode refers to device configured in preferred mode per manufacturer instructions (typically means antenna extended, fold or portrait slide open, but depends on form factor).
Note 2: Unless otherwise specified, all these configurations correspond to Variant ID 1.
Note 3: If the device supports NR bands n25 and n2, then testing is only required to be completed in n25.
Note 4: If the device supports NR bands n5 and n26, then testing is only required to be completed in n26.
Note 5: Additional lower mid (LM) test channel for wide frequency TDD bands.
Note 6: Additional upper mid (UM) test channel for wide frequency TDD bands.
Note 7: Range A for n77 USA, i.e. 3700-3980 MHz with L-LM-M-UM-H test channels. Testing is required for all UE's that support n77 USA operation.
Note 8: Range B for n77 USA, i.e. 3450-3550 MHz, with L-M-H test channels. Testing is only required if the UE supports UE capability *extendedBand-n77-r16* defined in 3GPP TS 38.306.

The Alternative Operating Bandwidths configurations presented in Table 5.1.1.2-2 are provided only for information and may be used for testing based on operator request.

Table 5.1.1.2-2 NR FR1 SA TIS Measurements Table for Alternative Operating Bandwidths in the Primary Mechanical Mode[1] (Informative)

3GPP Config. Identifier	CTIA OTA Alternative Config.	CC BW (MHz)	SCS (kHz)	NR DL Channel	RX Frequency (MHz) [center of DL RB allocation]	NR UL RB Allocation	NR DL RB Allocation
n25	Alternative BW Option 1	20	15	388000	1940	50@56	106@0
				392500	1962.5	50@56	106@0
				397000	1985	50@56	106@0
n66	Alternative BW Option 1	20	15	424000	2120	100@6	106@0
				429000	2145	100@6	106@0
				434000	2170	100@6	106@0
	Alternative BW Option 2	40	15	426000	2130	216@0	216@0
				429000	2145	216@0	216@0
				432000	2160	216@0	216@0
				436000	2180	100@0[2]	216@0
n70	Alternative BW Option 1	15	15	401500	2007.5	75@4[3]	133@0
n78	Alternative BW Option 1	100	30	623334	3350.01	270@0	273@0
				636666	3549.99	270@0	273@0
				650000	3750	270@0	273@0

Note 1: Primary Mechanical Mode refers to device configured in preferred mode per manufacturer instructions (typically means antenna extended, fold or portrait slide open, but depends on form factor).
Note 2: This configuration is asymmetric, and UL CH BW is 20 MHz at channel 354000.
Note 3: This configuration is asymmetric, and UL CH BW is 15 MHz at channel 340500.

5.1.1.2.1. NR FR1 Relative Sensitivity on Intermediate Channel Measurements

Relative Sensitivity on intermediate channel testing as specified in section 4.2 of *CTIA 01.20* [1] is required.

	The green cells represent the the low, lower mid, mid, upper mid, and high channels that are fully tested for TIS.
	The yellow cells represent the lower 12.5% or 25% of the intermediate channels.
	The yellow striped cells represent the lower mid 25% of the intermediate channels.
	The white cells represent the middle 25% or 50% of the intermediate channels.
	The orange striped cells represent the upper mid 25% of the intermediate channels.
	The orange cells represent the upper 12.5% or 25% of the intermediate channels.

Table 5.1.1.2.1-1 NR FR1 Receive Intermediate Channel Measurements Table

3GPP Config. Identifier	CC BW (MHz)	SCS (kHz)	IC Reference Channel ID	NR DL Channel	Carrier Center Frequency [MHz]	Associated Reference Channel	NR UL RB Allocation	NR DL RB Allocation
n2[1]	10	15	n2_REF L	387000	1935	N/A	50@2	52@0
			n2_IC1	388400	1942	L	50@2	52@0
			n2_IC2	389800	1949	M	50@2	52@0
			n2_IC3	391200	1956	M	50@2	52@0
			n2_REF M	392000	1960	N/A	50@2	52@0
			n2_IC4	392800	1964	M	50@2	52@0
			n2_IC5	394200	1971	M	50@2	52@0
			n2_IC6	395600	1978	H	50@2	52@0
			n2_REF H	397000	1985	N/A	50@2	52@0
n25[1]	10	15	n25_REF L	387000	1935	N/A	50@0	52@0
			n25_IC1	388400	1942	L	50@0	52@0
			n25_IC2	389800	1949	L	50@0	52@0
			n25_IC3	391200	1956	M	50@0	52@0
			n25_REF M	392500	1962.5	N/A	50@0	52@0
			n25_IC4	393800	1969	M	50@0	52@0
			n25_IC5	395200	1976	H	50@0	52@0
			n25_IC6	396600	1983	H	50@0	52@0
			n25_REF H	398000	1990	N/A	50@0	52@0
n26[2]	10	15	n26_REF L	172800	864	N/A	50@2	52@0
			n26_IC1	174200	871	M	50@2	52@0
			n26_REF M	175300	876.5	N/A	50@2	52@0
			n26_IC2	176400	882	M	50@2	52@0
			n26_REF H	177800	889	N/A	50@2	52@0
n41	20	30	n41_REF L	501204	2506.02	N/A	50@0	51@0
			n41_IC1	504204	2521.02	L	50@0	51@0
			n41_IC2	507204	2536.02	L	50@0	51@0
			n41_IC3	510198	2550.99	M	50@0	51@0
			n41_IC4	513198	2565.99	M	50@0	51@0
			n41_IC5	516198	2580.99	M	50@0	51@0
			n41_REF M	518998	2592.99	N/A	50@0	51@0
			n41_IC6	520998	2604.99	M	50@0	51@0
			n41_IC7	523998	2619.99	M	50@0	51@0
			n41_IC8	526998	2634.99	M	50@0	51@0
			n41_IC9	529998	2649.99	H	50@0	51@0
			n41_IC10	532998	2664.99	H	50@0	51@0
			n41_REF H	535998	2679.99	N/A	50@0	51@0
n48	20	30	n48_REF L	637334	3560.01	N/A	50@0	51@0
			n48_IC1	638500	3577.5	L	50@0	51@0
			n48_IC2	639500	3592.5	L	50@0	51@0
			n48_IC3	640500	3607.5	M	50@0	51@0
			n48_REF M	641666	3624.99	N/A	50@0	51@0
			n48_IC4	642834	3642.51	M	50@0	51@0
			n48_IC5	643834	3657.51	H	50@0	51@0
			n48_IC6	644834	3672.51	H	50@0	51@0
			n48_REF H	646000	3690	N/A	50@0	51@0

3GPP Config. Identifier	CC BW (MHz)	SCS (kHz)	IC Reference Channel ID	NR DL Channel	Carrier Center Frequency [MHz]	Associated Reference Channel	NR UL RB Allocation	NR DL RB Allocation
n66	10	15	n66_REF L	423000	2115	N/A	50@2	52@0
			n66_IC1	424600	2123	L	50@2	52@0
			n66_IC2	426000	2130	L	50@2	52@0
			n66_IC3	427400	2137	M	50@2	52@0
			n66_REF M	429000	2145	N/A	50@2	52@0
			n66_IC4	430600	2153	M	50@2	52@0
			n66_IC5	432000	2160	H	50@2	52@0
			n66_IC6	433400	2167	H	50@2	52@0
			n66_REF H	435000	2175	N/A	50@2	52@0
n71	10	15	n71_REF L	124400	622	N/A	25@0	52@0
			n71_IC1	125800	629	M	25@0	52@0
			n71_REF M	126900	634.5	N/A	25@0	52@0
			n71_IC2	128000	640	M	25@0	52@0
			n71_REF H	129400	647	N/A	25@0	52@0
n77 (Canada)	20	30	n77_Canada_REF L	630668	3460.02	N/A	50@0	51@0
			n77_Canada_IC1	631668	3475.02	L	50@0	51@0
			n77_Canada_IC2	632668	3490.02	LM	50@0	51@0
			n77_Canada_REF LM	633668	3505.02	N/A	50@0	51@0
			n77_Canada_IC3	634668	3520.02	LM	50@0	51@0
			n77_Canada_IC4	635668	3535.02	M	50@0	51@0
			n77_Canada_REF M	636668	3550.02	N/A	50@0	51@0
			n77_Canada_IC5	637668	3565.02	M	50@0	51@0
			n77_Canada_IC6	638668	3580.02	UM	50@0	51@0
			n77_Canada_REF UM	639668	3595.02	N/A	50@0	51@0
			n77_Canada_IC7	640668	3610.02	UM	50@0	51@0
			n77_Canada_IC8	641668	3625.02	H	50@0	51@0
			n77_Canada_REF H	642666	3639.99	N/A	50@0	51@0
n77 (USA Range A)	20	30	n77_RangeA_REF L	647334	3710.01	N/A	50@0	51@0
			n77_RangeA_IC1	648500	3727.5	L	50@0	51@0
			n77_RangeA_IC2	649500	3742.5	L	50@0	51@0
			n77_RangeA_IC3	650500	3757.5	LM	50@0	51@0
			n77_RangeA_REF LM	651666	3774.99	N/A	50@0	51@0
			n77_RangeA_IC4	652834	3792.51	LM	50@0	51@0
			n77_RangeA_IC5	653834	3807.51	M	50@0	51@0
			n77_RangeA_IC6	654834	3822.51	M	50@0	51@0
			n77_RangeA_REF M	656000	3840	N/A	50@0	51@0
			n77_RangeA_IC7	657166	3857.49	M	50@0	51@0
			n77_RangeA_IC8	658166	3872.49	M	50@0	51@0
			n77_RangeA_IC9	659166	3887.49	UM	50@0	51@0
			n77_RangeA_REF UM	660334	3905.01	N/A	50@0	51@0
			n77_RangeA_IC10	661500	3922.5	UM	50@0	51@0
			n77_RangeA_IC11	662500	3937.5	H	50@0	51@0
			n77_RangeA_IC12	663500	3952.5	H	50@0	51@0
			n77_RangeA_REF H	664666	3969.99	N/A	50@0	51@0

3GPP Config. Identifier	CC BW (MHz)	SCS (kHz)	IC Reference Channel ID	NR DL Channel	Carrier Center Frequency [MHz]	Associated Reference Channel	NR UL RB Allocation	NR DL RB Allocation
n77 (USA Range B)	20	30	n77_RangeB_REF L	630668	3460.02	N/A	50@0	51@0
			n77_RangeB_IC1	631534	3473.01	L	50@0	51@0
			n77_RangeB_IC2	632400	3486	M	50@0	51@0
			n77_RangeB_REF M	633334	3500.01	N/A	50@0	51@0
			n77_RangeB_IC3	634266	3513.99	M	50@0	51@0
			n77_RangeB_IC4	635134	3527.01	H	50@0	51@0
			n77_RangeB_REF H	636000	3540	N/A	50@0	51@0
n78	20	30	n78_REF L	620668	3310.02	N/A	106@0	106@0
			n78_IC1	621668	3325.02	L	50@0	51@0
			n78_IC2	622668	3340.02	L	50@0	51@0
			n78_IC3	623668	3355.02	L	50@0	51@0
			n78_IC4	624668	3370.02	L	50@0	51@0
			n78_IC5	625668	3385.02	L	50@0	51@0
			n78_IC6	626668	3400.02	L	50@0	51@0
			n78_IC7	627668	3415.02	L	50@0	51@0
			n78_IC8	628668	3430.02	L	50@0	51@0
			n78_IC9	629668	3445.02	M	50@0	51@0
			n78_IC10	630668	3460.02	M	50@0	51@0
			n78_IC11	631668	3475.02	M	50@0	51@0
			n78_IC12	632666	3489.99	M	50@0	51@0
			n78_IC13	633666	3504.99	M	50@0	51@0
			n78_IC14	634666	3519.99	M	50@0	51@0
			n78_IC15	635666	3534.99	M	50@0	51@0
			n78_REF M	636666	3549.99	N/A	50@0	51@0
			n78_IC16	637666	3564.99	M	50@0	51@0
			n78_IC17	638666	3579.99	M	50@0	51@0
			n78_IC18	639666	3594.99	M	50@0	51@0
			n78_IC19	640666	3609.99	M	50@0	51@0
			n78_IC20	641666	3624.99	M	50@0	51@0
			n78_IC21	642666	3639.99	M	50@0	51@0
			n78_IC22	643666	3654.99	M	50@0	51@0
			n78_IC23	644666	3669.99	H	50@0	51@0
			n78_IC24	645666	3684.99	H	50@0	51@0
			n78_IC25	646666	3699.99	H	50@0	51@0
			n78_IC26	647666	3714.99	H	50@0	51@0
			n78_IC27	648666	3729.99	H	50@0	51@0
			n78_IC28	649666	3744.99	H	50@0	51@0
			n78_IC29	650666	3759.99	H	50@0	51@0
			n78_IC30	651666	3774.99	H	50@0	51@0
			n78_REF H	652666	3789.99	N/A	50@0	51@0

Note 1: If the device supports NR bands n25 and n2, then testing is only required to be completed in n25.
Note 2: If the device supports NR bands n5 and n26, then testing is only required to be completed in n26.

5.1.2 NR FR1 EN-DC (1 LTE carrier with 1 NR carrier)

5.1.2.1 Transmit Power Test Settings

This test procedure applies only for FR1 EN-DC with one LTE component carrier and one NR component carrier. This test procedure applies for both inter-band and intra-band cases.

EN-DC tests shall be executed as independent measurements of each RAT. Therefore, EN-DC testing as described in this section provides an assessment of radiated transmit power on each RAT with the DUT operating in the EN-DC mode. An EN-DC mode is defined as a specific combination of bands assigned to E-UTRA and NR used in Dual Connectivity.

The measurement site and DUT shall be configured as specified in *CTIA 01.71* [6]. The power radiated by the DUT shall be measured using a calibrated and accurate RF measuring instrument (e.g., a spectrum analyzer, or measurement receiver, or power meter). See Section 3 of *CTIA 01.73* [5] for power measurement considerations.

The FR1 EN-DC communication tester and DUT shall be configured per *3GPP TS 38.521-3* [18], Section 6.2B.1 (UE Maximum Output Power for EN-DC) using the default settings specified in *3GPP TS 38.521-3* [18] and *3GPP TS 38.508* [17] as applicable. The test procedure in section 6.2B.1 of *3GPP TS 38.521-3* [18] shall be used to measure the UE output power with the following exception: when measuring LTE maximum output power for LTE TRP, the NR output power shall be minimized (i.e. less than or equal to 10 dBm); when measuring NR maximum output power for NR TRP, the LTE output power shall be minimized (i.e. less than or equal to 10 dBm). **NOTE**: When a UE operates in Power Class 1 or Power Class 2 for LTE and LTE is the RAT under measurement, the IE (Information Element) p-Max must be included for LTE and set according to Table 6.2.2_1.4-2 of *3GPP TS 36.521-1* [12]. Otherwise, p-Max shall not be signaled during attach procedures or during measurements for the RAT under measurement (LTE or NR).

Optionally, the LTE and NR patterns may be measured with a 50% power split between LTE and NR, followed by a LTE maximum output power measurement at the peak of the LTE pattern (with NR output power less than or equal to 10 dBm) and a NR maximum output power measurement at the peak of the NR pattern (with LTE output power less than or equal to 10 dBm). For the pattern measurement with a 50% power split, a 50% power split between LTE and NR can be achieved by setting p-MaxEUTRA-r15 to 20 dBm and p-NR-FR1 to 20 dBm (NOTE: These p-Max settings shall not be used for LTE maximum output power measurements and NR maximum output power measurements. When a UE operates in Power Class 1 or Power Class 2 for LTE and LTE is the RAT under measurement, the IE (Information Element) p-Max must be included for LTE maximum output power measurements at the peak of the LTE pattern and set according to Table 6.2.2_1.4-2 of *3GPP TS 36.521-1* [12]. Otherwise, p-Max shall not be signaled during attach procedures or during measurements for LTE and NR maximum output power measurements at the peak of the LTE/NR patterns).

Tests shall be carried out for different FR1 EN-DC frequency combinations and RB allocations across the bands supported by the DUT, as defined in Table 5.1.2.1-1. NR UL modulation DFT-s-OFDM QPSK shall be used for TRP measurements.

Table 5.1.2.1-1 NR FR1 EN-DC TRP Measurements Table for the Primary Mechanical Mode[1]

3GPP Config. Identifier	Variant ID	UL Config.	Band	CG / CC	CC BW (MHz)	SCS (kHz)	Total DL BW (MHz)	Total UL BW (MHz)	Aggregation Type	Single UL allowed	LTE UL Channel	LTE UL RB Allocation	LTE DL RB Allocation	NR UL Channel	NR UL RB Allocation	NR DL RB Allocation
DC_2A_n5A	1	DC_2A_n5A	2	MCG / PCC	10	15	20	20	Inter-band EN-DC	No	18650	12 RB with RBstart=0	N/A[2]	165800	12@6	N/A[2]
			n5	SCG / PCC	10	15					18900	12 RB with RBstart=19	N/A[2]	167300	12@20	N/A[2]
											19150	12 RB with RBstart=38	N/A[2]	168800	12@34	N/A[2]
DC_2A_n66A	1	DC_2A_n66A	2	MCG / PCC	10	15	20	20	Inter-band EN-DC	Yes	18650	12 RB with RBstart=0	N/A[2]	343000	12@6	N/A[2]
			n66	SCG / PCC	10	15					18900	12 RB with RBstart=19	N/A[2]	349000	12@20	N/A[2]
											19150	12 RB with RBstart=38	N/A[2]	355000	12@34	N/A[2]
DC_2A_n71A	1	DC_2A_n71A	2	MCG / PCC	10	15	20	20	Inter-band EN-DC	No	18650	12 RB with RBstart=0	N/A[2]	133600	12@6	N/A[2]
			n71	SCG / PCC	10	15					18900	12 RB with RBstart=19	N/A[2]	136100	12@20	N/A[2]
											19150	12 RB with RBstart=38	N/A[2]	138600	12@34	N/A[2]
DC_2A_n78A	1	DC_2A_n78A	2	MCG / PCC	10	15	30	30	Inter-band EN-DC	Yes	18650	12 RB with RBstart=0	N/A[2]	620668	9@4	N/A[2]
			n78	SCG / PCC	20	30					18900	12 RB with RBstart=19	N/A[2]	636666	9@21	N/A[2]
											19150	12 RB with RBstart=38	N/A[2]	652666	9@38	N/A[2]
DC_5A_n66A	1	DC_5A_n66A	5	MCG / PCC	10	15	20	20	Inter-band EN-DC	Yes	20450	12 RB with RBstart=0	N/A[2]	343000	12@6	N/A[2]
			n66	SCG / PCC	10	15					20525	12 RB with RBstart=19	N/A[2]	349000	12@20	N/A[2]
											20600	12 RB with RBstart=38	N/A[2]	355000	12@34	N/A[2]
DC_5A_n78A	1	DC_5A_n78A	5	MCG / PCC	10	15	30	30	Inter-band EN-DC	No	20450	12 RB with RBstart=0	N/A[2]	620668	9@4	N/A[2]
			n78	SCG / PCC	20	30					20525	12 RB with RBstart=19	N/A[2]	636666	9@21	N/A[2]
											20600	12 RB with RBstart=38	N/A[2]	652666	9@38	N/A[2]
DC_7A_n78A	1	DC_7A_n78A	7	MCG / PCC	20	15	40	40	Inter-band EN-DC	No	20850	18 RB with RBstart=0	N/A[2]	620668	9@4	N/A[2]

3GPP Config. Identifier	Variant ID	UL Config.	Band	CG / CC	CC BW (MHz)	SCS (kHz)	Total DL BW (MHz)	Total UL BW (MHz)	Aggregation Type	Single UL allowed	LTE UL Channel	LTE UL RB Allocation	LTE DL RB Allocation	NR UL Channel	NR UL RB Allocation	NR DL RB Allocation
			n78	SCG / PCC	20	30					21100	18 RB with RBstart=41	N/A[2]	636666	9@21	N/A[2]
											21350	18 RB with RBstart=82	N/A[2]	652666	9@38	N/A[2]
DC_12A_n66A	1	DC_12A_n66A	12	MCG / PCC	5	15	15	15	Inter-band EN-DC	No	23035	8 RB with RBstart=0	N/A[2]	343000	12@6	N/A[2]
			n66	SCG / PCC	10	15					23095	8 RB with RBstart=8	N/A[2]	349000	12@20	N/A[2]
											23155	8 RB with RBstart=17	N/A[2]	355000	12@34	N/A[2]
DC_13A_n2A	1	DC_13A_n2A	13	MCG / PCC	10	15	20	20	Inter-band EN-DC	No	23230	12 RB with RBstart=0	N/A[2]	371000	12@6	N/A[2]
			n2	SCG / PCC	10	15					23230	12 RB with RBstart=19	N/A[2]	376000	12@20	N/A[2]
											23230	12 RB with RBstart=38	N/A[2]	381000	12@34	N/A[2]
DC_13A_n66A	1	DC_13A_n66A	13	MCG / PCC	10	15	20	20	Inter-band EN-DC	No	23230	12 RB with RBstart=0	N/A[2]	343000	12@6	N/A[2]
			n66	SCG / PCC	10	15					23230	12 RB with RBstart=19	N/A[2]	349000	12@20	N/A[2]
											23230	12 RB with RBstart=38	N/A[2]	355000	12@34	N/A[2]
DC_66A_n2A	1	DC_66A_n2A	66	MCG / PCC	10	15	20	20	Inter-band EN-DC	Yes	132022	12 RB with RBstart=0	N/A[2]	371000	12@6	N/A[2]
			n2	SCG / PCC	10	15					132322	12 RB with RBstart=19	N/A[2]	376000	12@20	N/A[2]
											132622	12 RB with RBstart=38	N/A[2]	381000	12@34	N/A[2]
DC_66A_n5A	1	DC_66A_n5A	66	MCG / PCC	10	15	20	20	Inter-band EN-DC	Yes	132022	12 RB with RBstart=0	N/A[2]	165800	12@6	N/A[2]
			n5	SCG / PCC	10	15					132322	12 RB with RBstart=19	N/A[2]	167300	12@20	N/A[2]
											132622	12 RB with RBstart=38	N/A[2]	168800	12@34	N/A[2]
DC_66A_n71A	1	DC_66A_n71A	66	MCG / PCC	10	15	20	20	Inter-band EN-DC	No	132022	12 RB with RBstart=0	N/A[2]	133600	12@6	N/A[2]
			n71	SCG / PCC	10	15					132322	12 RB with RBstart=19	N/A[2]	136100	12@20	N/A[2]
											132622	12 RB with RBstart=38	N/A[2]	138600	12@34	N/A[2]

3GPP Config. Identifier	Variant ID	UL Config.	Band	CG / CC	CC BW (MHz)	SCS (kHz)	Total DL BW (MHz)	Total UL BW (MHz)	Aggregation Type	Single UL allowed	LTE UL Channel	LTE UL RB Allocation	LTE DL RB Allocation	NR UL Channel	NR UL RB Allocation	NR DL RB Allocation
DC_66A_n78A	1	DC_66A_n78A	66	MCG / PCC	10	15	30	30	Inter-band EN-DC	No	132022	12 RB with RBstart=0	N/A[2]	620668	9@4	N/A[2]
			n78	SCG / PCC	20	30					132322	12 RB with RBstart=19	N/A[2]	636666	9@21	N/A[2]
											132622	12 RB with RBstart=38	N/A[2]	652666	9@38	N/A[2]
DC_(n)71AA	1	DC_(n)71AA	71	MCG / PCC	10	15	20	20	Intra-band EN-DC	No[3]	133272	12 RB with RBstart=19	N/A[2]	133600	12@6	N/A[2]
			n71	SCG / PCC	10	15					133197	12 RB with RBstart=19	N/A[2]	136100	12@20	N/A[2]
											133322	12 RB with RBstart=19	N/A[2]	138600	12@34	N/A[2]

Note 1: Primary Mechanical Mode refers to device configured in preferred mode per manufacturer instructions (typically means antenna extended, fold or portrait slide open, but depends on form factor).
Note 2: As per 3GPP TS 38.521-3, Section 6.2B.1.1 (UE Maximum Output Power for Intra-Band Contiguous EN-DC).
Note 3: For UE(s) supporting dynamic power sharing it is mandatory to do dual simultaneous UL. For UE(s) not supporting dynamic power sharing single UL is allowed.

For devices supporting multiple TX antennas, the guidelines specified in Section 2.1.5.1 of *CTIA 01.01* [15] shall be used.

5.1.2.2 Radiated Sensitivity Test Settings

5.1.2.2.1. General

This test procedure applies only for FR1 EN-DC with one LTE component carrier and one NR component carrier. This test procedure applies for both inter-band and intra-band cases.

EN-DC tests shall be executed as independent measurements of each RAT. Therefore, EN-DC testing as described in this section provides an assessment of radiated sensitivity on each RAT with the DUT operating in the EN-DC mode. An EN-DC mode is defined as a specific combination of bands assigned to E-UTRA and NR used in Dual Connectivity. The EN-DC test methodology described in this section is not intended to provide a measurement of the DUT's aggregate throughput during EN-DC operation.

Receiver sensitivity measurements shall be performed on only one RAT at a time (LTE or NR) using data throughput as the measurement metric. The DUT's receiver sensitivity for the RAT under test corresponds to the minimum downlink signal power required to provide a data throughput rate greater than or equal to 95% of the maximum throughput of the reference measurement channel. Refer to Section 2 in *CTIA 01.71* [6] for set-up illustrations.

When one RAT is under test, the other is used only to provide a stable connection, and therefore a calibrated downlink power level for the RAT not tested to the DUT is not required. Labs may assign any desired antenna to provide support for the untested RAT so long as the selected antenna does not interfere with the tested RAT measurements. Labs are encouraged to confirm that the output power and antenna placement is sufficient to maintain a reliable radio link to the DUT in advance of beginning the execution of an EN-DC TIS test on the other RAT. The DL of the untested RAT should be configured to not impair the tested RAT. When executing intra-band EN-DC TIS tests, it's recommended that the DL power on the untested RAT be limited in order to minimize the potential for interference from the test system to the tested RAT.

For a device supporting multiple receivers, all receivers (on both LTE and NR) shall be enabled during the test procedure described in the remainder of this section. In this way, C-TIS is the test result, regardless whether the device supports one or multiple receivers. In the special case that I-TIS is the desired quantity of interest, the same procedure is followed, except that all but the specified receiver-under-test on the device are disabled.

Tests shall be carried out for different FR1 EN-DC frequency combinations and RB allocations across the bands supported by the DUT, as defined in Table 5.1.2.2.1-1 and following the test settings on either Section 5.1.2.2.2 or 5.1.2.2.3 depending on the DUT support of simultaneous UL operation.

Table 5.1.2.2.1-1 NR FR1 EN-DC TIS Measurements Table for the Primary Mechanical Mode[1]

3GPP Config. Identifier	Variant ID	UL Config.	Band	CG / CC	CC BW (MHz)	SCS (kHz)	Total DL BW (MHz)	Total UL BW (MHz)	Aggregation Type	Single UL allowed	LTE DL Channel	LTE UL RB Allocation	LTE DL RB Allocation	NR DL Channel	NR UL RB Allocation	NR DL RB Allocation
DC_2A_n5A	1	DC_2A_n5A	2	MCG / PCC	10	15	20	20	Inter-band EN-DC	No	650	50 RB with RBstart=0	50 RB with RBstart=0	174800	25@27	52@0
			n5	SCG / PCC	10	15					900	50 RB with RBstart=0	50 RB with RBstart=0	176300	25@27	52@0
											1150	50 RB with RBstart=0	50 RB with RBstart=0	177800	25@27	52@0
DC_2A_n66A	1	DC_2A_n66A	2	MCG / PCC	10	15	20	20	Inter-band EN-DC	Yes	650	50 RB with RBstart=0	50 RB with RBstart=0	423000	50@2	52@0
			n66	SCG / PCC	10	15					900	50 RB with RBstart=0	50 RB with RBstart=0	429000	50@2	52@0
											1150	50 RB with RBstart=0	50 RB with RBstart=0	435000	50@2	52@0
DC_2A_n71A	1	DC_2A_n71A	2	MCG / PCC	10	15	20	20	Inter-band EN-DC	No	650	50 RB with RBstart=0	50 RB with RBstart=0	124400	25@0	52@0
			n71	SCG / PCC	10	15					900	50 RB with RBstart=0	50 RB with RBstart=0	126900	25@0	52@0
											1150	50 RB with RBstart=0	50 RB with RBstart=0	129400	25@0	52@0
DC_2A_n78A	1	DC_2A_n78A	2	MCG / PCC	10	15	30	30	Inter-band EN-DC	Yes	650	50 RB with RBstart=0	50 RB with RBstart=0	620668	50@0	51@0
			n78	SCG / PCC	20	30					900	50 RB with RBstart=0	50 RB with RBstart=0	636666	50@0	51@0
											1150	50 RB with RBstart=0	50 RB with RBstart=0	652666	50@0	51@0
DC_5A_n66A	1	DC_5A_n66A	5	MCG / PCC	10	15	20	20	Inter-band EN-DC	Yes	2450	25 RB with RBstart=25	50 RB with RBstart=0	423000	50@2	52@0
			n66	SCG / PCC	10	15					2525	25 RB with RBstart=25	50 RB with RBstart=0	429000	50@2	52@0
											2600	25 RB with RBstart=25	50 RB with RBstart=0	435000	50@2	52@0
DC_5A_n78A	1	DC_5A_n78A	5	MCG / PCC	10	15	30	30	Inter-band EN-DC	No	2450	25 RB with RBstart=25	50 RB with RBstart=0	620668	50@0	51@0
			n78	SCG / PCC	20	30					2525	25 RB with RBstart=25	50 RB with RBstart=0	636666	50@0	51@0
											2600	25 RB with RBstart=25	50 RB with RBstart=0	652666	50@0	51@0

3GPP Config. Identifier	Variant ID	UL Config.	Band	CG / CC	CC BW (MHz)	SCS (kHz)	Total DL BW (MHz)	Total UL BW (MHz)	Aggregation Type	Single UL allowed	LTE DL Channel	LTE UL RB Allocation	LTE DL RB Allocation	NR DL Channel	NR UL RB Allocation	NR DL RB Allocation
DC_7A_n78A	1	DC_7A_n78A	7	MCG / PCC	20	15	40	40	Inter-band EN-DC	No	2850	75 RB with RBstart=25	100 RB with RBstart=0	620668	50@0	51@0
			n78	SCG / PCC	20	30					3100	75 RB with RBstart=25	100 RB with RBstart=0	636666	50@0	51@0
											3350	75 RB with RBstart=25	100 RB with RBstart=0	652666	50@0	51@0
DC_12A_n66A	1	DC_12A_n66A	12	MCG / PCC	5	15	15	15	Inter-band EN-DC	No	5035	20 RB with RBstart=5	25 RB with RBstart=0	423000	50@2	52@0
			n66	SCG / PCC	10	15					5095	20 RB with RBstart=5	25 RB with RBstart=0	429000	50@2	52@0
											5155	20 RB with RBstart=5	25 RB with RBstart=0	435000	50@2	52@0
DC_13A_n2A	1	DC_13A_n2A	13	MCG / PCC	10	15	20	20	Inter-band EN-DC	No	5230	15 RB with RBstart=0	50 RB with RBstart=0	387000	50@2	52@0
			n2	SCG / PCC	10	15					5230	15 RB with RBstart=0	50 RB with RBstart=0	392000	50@2	52@0
											5230	15 RB with RBstart=0	50 RB with RBstart=0	397000	50@2	52@0
DC_13A_n66A	1	DC_13A_n66A	13	MCG / PCC	10	15	20	20	Inter-band EN-DC	No	5230	15 RB with RBstart=0	50 RB with RBstart=0	423000	50@2	52@0
			n66	SCG / PCC	10	15					5230	15 RB with RBstart=0	50 RB with RBstart=0	429000	50@2	52@0
											5230	15 RB with RBstart=0	50 RB with RBstart=0	435000	50@2	52@0
DC_66A_n2A	1	DC_66A_n2A	66	MCG / PCC	10	15	20	20	Inter-band EN-DC	Yes	66486	50 RB with RBstart=0	50 RB with RBstart=0	387000	50@2	52@0
			n2	SCG / PCC	10	15					66786	50 RB with RBstart=0	50 RB with RBstart=0	392000	50@2	52@0
											67086	50 RB with RBstart=0	50 RB with RBstart=0	397000	50@2	52@0
DC_66A_n5A	1	DC_66A_n5A	66	MCG / PCC	10	15	20	20	Inter-band EN-DC	Yes	66486	50 RB with RBstart=0	50 RB with RBstart=0	174800	25@27	52@0
			n5	SCG / PCC	10	15					66786	50 RB with RBstart=0	50 RB with RBstart=0	176300	25@27	52@0
											67086	50 RB with RBstart=0	50 RB with RBstart=0	177800	25@27	52@0
DC_66A_n71A	1	DC_66A_n71A	66	MCG / PCC	10	15	20	20	Inter-band EN-DC	No	66486	50 RB with RBstart=0	50 RB with RBstart=0	124400	25@0	52@0
			n71	SCG / PCC	10	15					66786	50 RB with RBstart=0	50 RB with RBstart=0	126900	25@0	52@0

3GPP Config. Identifier	Variant ID	UL Config.	Band	CG / CC	CC BW (MHz)	SCS (kHz)	Total DL BW (MHz)	Total UL BW (MHz)	Aggregation Type	Single UL allowed	LTE DL Channel	LTE UL RB Allocation	LTE DL RB Allocation	NR DL Channel	NR UL RB Allocation	NR DL RB Allocation
											67086	50 RB with RBstart=0	50 RB with RBstart=0	129400	25@0	52@0
DC_66A_n78A	1	DC_66A_n78A	66	MCG / PCC	10	15	30	30	Inter-band EN-DC	No	66486	50 RB with RBstart=0	50 RB with RBstart=0	620668	50@0	51@0
			n78	SCG / PCC	20	30					66786	50 RB with RBstart=0	50 RB with RBstart=0	636666	50@0	51@0
											67086	50 RB with RBstart=0	50 RB with RBstart=0	652666	50@0	51@0
DC_(n)71AA	1	DC_(n)71AA	71	MCG / PCC	10	15	20	20	Intra-band EN-DC	No[2]	68736	25 RB with RBstart=0	50 RB with RBstart=0	124400	25@0	52@0
			n71	SCG / PCC	10	15					68661	25 RB with RBstart=0	50 RB with RBstart=0	126900	25@0	52@0
											68786	25 RB with RBstart=0	50 RB with RBstart=0	129400	25@0	52@0

Note 1: Primary Mechanical Mode refers to device configured in preferred mode per manufacturer instructions (typically means antenna extended, fold or portrait slide open, but depends on form factor).
Note 2: For UE(s) supporting dynamic power sharing it is mandatory to do dual simultaneous UL. For UE(s) not supporting dynamic power sharing single UL is allowed.

For devices supporting antenna switched RX diversity, the guidelines specified in Section 2.1.5.2 of *CTIA 01.01* [15] shall be used.

5.1.2.2.2. Test settings when DUT supports simultaneous LTE and NR uplink operation

The FR1 EN-DC communication tester and DUT shall be configured per section 7.3B.2 (Reference Sensitivity for EN-DC) of *3GPP TS 38.521-3* [18] using the defaults specified in *3GPP TS 38.521-3* [18] and *3GPP TS 38.508* [17] as applicable with the following exceptions: p-MaxEUTRA-r15 shall be set to 20 dBm, and p-NR-FR1 shall be set to 20 dBm (to achieve a 50% uplink power split between LTE and NR). For a given LTE downlink RF power level, throughput shall be measured on LTE using the test procedure in section 7.3B.2 of *3GPP TS 38.521-3* [18] and the downlink and uplink LTE reference measurement channels defined in *3GPP TS 36.521-1* [12]. For a given NR downlink RF power level, throughput shall be measured on NR using the test procedure in section 7.3B.2 of *3GPP TS 38.521-3* [18] and the downlink and uplink NR reference measurement channels defined in *3GPP TS 38.521-1* [16]. The EN-DC communication tester shall send continuous uplink power control “up” commands to the DUT on both LTE and NR to ensure the DUT's LTE transmit power and NR transmit power are at the p-MaxEUTRA-r15 and p-NR-FR1 output power limits of 20 dBm, respectively, during the sensitivity searches. The downlink power step size shall be no more than 0.5 dB when the RF power level is near the LTE or NR sensitivity level. The minimum LTE RF power level resulting in a data throughput rate greater than or equal to 95% of the maximum throughput of the LTE reference measurement channel shall be recorded as the downlink power level corresponding to the 95% throughput percentage. The minimum NR RF power level resulting in a data throughput rate greater than or equal to 95% of the maximum throughput of the NR reference measurement channel shall be recorded as the downlink power level corresponding to the 95% throughput percentage. Care must be taken to ensure that the duration of the throughput measurement is sufficient to achieve statistical significance according to Annex G.2 of *3GPP TS 36.521-1* [12] and Annex H.2 of *3GPP TS 38.521-1* [16] for LTE and NR, respectively. The downlink signal level for each DUT test condition shall be recorded for integration pursuant to *CTIA 01.20* [1] or *CTIA 01.21* [2] to give a single figure of merit referred to as Total Isotropic Sensitivity (TIS).

5.1.2.2.3. Test settings when DUT only supports single uplink operation

The FR1 EN-DC communication tester and DUT shall be configured per section 7.3B.2 (Reference Sensitivity for EN-DC) of *3GPP TS 38.521-3* [18] using the defaults specified in *3GPP TS 38.521-3* [18] and *3GPP TS 38.508* [17] as applicable. For a given LTE downlink RF power level, throughput shall be measured on LTE using the test procedure in section 7.3B.2 of *3GPP TS 38.521-3* [18] and the downlink and uplink LTE reference measurement channels defined in *3GPP TS 36.521-1* [12]. For a given NR downlink RF power level, throughput shall be measured on NR using the test procedure in section 7.3B.2 of *3GPP TS 38.521-3* [18] and the downlink and uplink NR reference measurement channels defined in *3GPP TS 38.521-1* [16]. When measuring LTE, no uplink traffic shall be scheduled on NR. When measuring NR, no uplink traffic shall be scheduled on LTE. The EN-DC communication tester shall not set values for p-MaxEUTRA-r15 and p-NR-FR1. The EN-DC communication tester shall send continuous uplink power control “up” commands to the DUT on the protocol that is transmitting, either LTE or NR, to ensure the DUT's transmit power is at maximum output power for the RAT under test during the sensitivity searches. The downlink power step size shall be no more than 0.5 dB when the RF power level is near the LTE or NR sensitivity level. The minimum LTE RF power level resulting in a data throughput rate greater than or equal to 95% of the maximum throughput of the LTE reference measurement channel shall be recorded as the downlink power level corresponding to the 95% throughput percentage. The minimum NR RF power level resulting in a data throughput rate greater than or equal to 95% of the maximum throughput of the NR reference measurement channel shall be recorded as the downlink power level corresponding to the 95% throughput percentage. Care must be taken to ensure that the duration of the throughput measurement is sufficient to achieve statistical significance according to Annex G.2 of 3GPP TS 36.521-1 and Annex H.2 of *3GPP TS 38.521-1* [16] for LTE and NR, respectively. The downlink signal level for each DUT test condition shall be recorded for integration pursuant to *CTIA 01.20* [1] or *CTIA 01.21* [2] to give a single figure of merit referred to as Total Isotropic Sensitivity (TIS).

5.2 Frequency Range 2 (FR2)

5.2.1 NR FR2 EN-DC (1 LTE carrier with 1 NR carrier)

5.2.1.1 Transmit Power Test Settings

Using the settings in clause 6.2B.1.4.1.4 of *3GPP TS 38.521-3* [18], establish the LTE and NR FR2 connections.

Instead of the NR test conditions defined in clause 6.2.1.1.4.1 of *3GPP 38.521-2* [19], TX test cases shall be executed for the three test frequency ranges using:

- One modulation scheme
- One operating bandwidth
- One SCS, and
- Inner Full RB allocations across the bands supported by the DUT, as defined in Table 5.2.1.1-1.

The TX beam peak search shall be performed for each of the test frequency ranges defined in Table 5.2.1.1-1 unless the device manufacturer declares that the TX beam peak direction from the mid test frequency range can be re-used for the low and high test frequency ranges. Beam peak search results cannot be re-used across different bands that are not overlapping. The report must clearly state that the beam peak directions for the low and high frequency ranges have not been determined with a beam peak search procedure but instead have re-used beam peak directions per the DUT vendor declaration.

Table 5.2.1.1-1 Test Conditions for NR Operating Bands n258, n260 and n261

Band	Bandwidth [MHz]	SCS [kHz]	Range	Modulation	UL RB Allocation (Inner Full)	DL Config.	Center Frequency of Carrier [MHz]	RF Channel Number [ARFCN]
n258	100	120	Low	DFT-s-OFDM QPSK	20@23	N/A	24300	2017499
			Mid				25875	2043749
			High				27450	2069999
n260	100	120	Low	DFT-s-OFDM QPSK	20@23	N/A	37050	2229999
			Mid				38499.96	2254165
			High				39949.92	2278331
n261	100	120	Low	DFT-s-OFDM QPSK	20@23	N/A	27550.08	2071667
			Mid				27924.96	2077915
			High				28299.96	2084165

5.2.1.2 Receiver Sensitivity Test Settings

Using the settings in clause 7.3B.2.4.4.1 of *3GPP TS 38.521-3* [18], establish the LTE and NR FR2 connections.

Instead of the NR test conditions defined in clause 7.3.2.4.1 of *3GPP TS 38.521-2* [19], the RX test cases shall be carried out for the three test frequency ranges, one modulation, one bandwidth and one SCS across the bands supported by the DUT, as defined in Table 5.2.1.2-1.

The RX beam peak search shall be performed for each of the test frequency ranges defined in Table 5.2.1.2-1 unless the device manufacturer declares that the RX beam peak direction from the mid test frequency range can be re-used for the low and high test frequency ranges. Beam peak search results cannot be re-used across different bands that are not overlapping. The report must clearly state that the beam peak directions for the DUT's low and high frequency ranges have not been determined with a beam peak search procedure but have re-used the mid frequency direction per a DUT vendor declaration.

Table 5.2.1.2-1 Test Conditions for NR Operating Bands n258, n260 and n261

Band	Bandwidth [MHz]	SCS [kHz]	Range	DL Modulation	DL RB Allocation	UL Modulation	UL RB Allocation	Center Frequency of Carrier [MHz]	RF Channel Number [ARFCN]
n258	100	120	Low	CP-OFDM QPSK	66@0	DFT-s-OFDM QPSK	64@0	24300	2017499
			Mid					25875	2043749
			High					27450	2069999
n260	100	120	Low	CP-OFDM QPSK	66@0	DFT-s-OFDM QPSK	64@0	37050	2229999
			Mid					38499.96	2254165
			High					39949.92	2278331
n261	100	120	Low	CP-OFDM QPSK	66@0	DFT-s-OFDM QPSK	64@0	27550.08	2071667
			Mid					27924.96	2077915
			High					28299.96	2084165

Appendix A Revision History

Date	Version	Description
February 2022	4.0.0	Initial release Section 2: • Contents moved from SISO OTA test plan (Sections 5.4, 5.5, 5.6, 6.4, 6.5, 6.6, K.2 and Appendix M) Section 3: • Contents moved from SISO OTA test plan (Sections 5.7, 6.7, K.3 and Appendix M) Section 4: • Contents moved from SISO OTA test plan (Sections 5.8, 5.12, 5.13, 5.15, 5.16, 6.8, 6.16, 6.17, 6.20, 6.21, 6.22, K.4 and Appendix M) • Update IE p-Max setting for LTE PC2 bands on Section 4.1.1 • Addition of alternative channels to address guard band issues for Bands 12, 13 and 71 on Section 4.6 Section 5: • Contents moved from SISO OTA test plan (Sections 5.17 and 6.23) • Contents moved from mm-wave test plan (Sections 5.1 and 6.1) • Update of test settings for NR FR1 SA per 3GPP TS 38.521-1 on Section 5.1.1 • Addition of NR FR1 SA Band n25 on Section 5.1.1 • Addition of NR FR1 EN-DC (1 LTE carrier with 1 NR carrier) test settings on Section 5.1.2
December 2022	5.0.0	Section 2: • Updated the intermediate channel sections title to “Relative Sensitivity on Intermediate Channel Measurements” in sections 2.1.2.1, 2.2.2.1 and 2.3.2.1. Section 3: • Removed UMTS Band IV. • Updated the intermediate channel section title to “Relative Sensitivity on Intermediate Channel Measurements” in section 3.1.2.1. Section 4: • Removed LTE Band 17 and the corresponding CA band combinations including Band 17. The respective notes for test reduction were removed and remaining notes were renumbered. • Clarification on the need of calibrated downlink power level for the PCC when SCC is under test in sections 4.2.2 and 4.4.1. • Updated the intermediate channel section title to “Relative Sensitivity on Intermediate Channel Measurements” in section 4.1.2.1. Section 5: • Addition of bands n12, n14, n26, n30, n48 and n77 for NR FR1 SA. • Update of test parameters for all legacy bands for NR FR1 SA and legacy band combinations for EN-DC.

		• Added Relative Power on Intermediate Channel measurements for wide frequency TDD bands. • Added Relative Sensitivity on Intermediate Channel measurements for all bands. • Moved alternative operating bandwidths (informative) for bands n25, n66, n70 and n78 into separate tables. • Removed variant 2 for the corresponding NR FR1 EN-DC band combinations. • Clarification on the need of calibrated downlink power level for the RAT not tested in section 5.1.2.2.1.