



# Wireless Device Grading Scales Criteria and Definitions

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## Section 1 Introduction

### 1.1 Purpose

This document defines the wireless industry common lexicon and process for grading wireless devices. The intention of this document is not to identify specific requirements for operationalizing grading scale tiers. Any business can modify the grading scale tiers and defect sizes or types per surface area to meet their business needs, including establishing bulk lots for resale. Any deviations from these grading scale criteria and definitions shall be disclosed to the customer in order to prevent confusion with the standards defined herein.

### 1.2 Scope

The scope of this document is limited to devices as defined in [Table 1.3-1](#).

### 1.3 Definitions

Table 1.3-1 Definitions

Term	Definition
Customer Lock	Customer initiated lock like FMIP (Find My iPhone) for iOS, Find My Device for Android or a simple screen lock.
Device	Smartphone, feature phone, tablet
Enterprise Lock	Device is locked by security services commonly needed for security management of mobile devices as defined in <a href="#">NIST Guidelines for Managing the Security of Mobile Devices in the Enterprise</a> .
Fully Functional	Device assured functional to all original applicable OEM specifications.
LDI	Liquid Damage Indicator
OEM	Original Equipment Manufacturer
Operator Lock	Device is locked by the network operator (example; AT&T, T-Mobile or Verizon) to only work on one network/carrier or only accept SIM cards from one network/carrier.
PCBA	Printed Circuit Board Assembly
RF	Radio Frequency
SIM	Subscriber Identify Module
USB	Universal Serial Bus

### 1.4 References

[1] NIST: Guidelines for Managing the Security of Mobile Devices in the Enterprise, Revision 1, June 2013

## Section 2      Grading Scales

### 2.1      Schema

An industry Grading Scales schema is defined in order to allow any seller in any secondary market of devices to universally identify cosmetic condition, functional classification, data status, lock status and kit configuration condition. Table 2.1-1 shows the Grading Scales options that define the schema.

Table 2.1-1 Grading Scales Categories

Description	Table Reference	Grading Scales Options
Cosmetic Grades	<a href="#">Table 2.7-1</a>	A, B, C, D, E or N
Functional Classification	<a href="#">Table 2.8-2</a>	0, 1, 2, 3, 4, 5, 6, 7, 8 or 9
Customer Lock Status	<a href="#">Table 2.9-1</a>	1, 2, 3, 4, 5
Enterprise and Operator Lock Status	<a href="#">Table 2.9-2</a>	1, 2, 3, 4, 5
RF Test Grading Scale	<a href="#">Table 2.10-1</a>	1, 2, 3, 4 or 5
Kit Configuration	<a href="#">Table 2.11-1</a>	1, 2, 3, 4, 5 or 6

### 2.2      Cosmetic Grade Definitions

**Grade A:** Like new condition

- Minimal scratches and blemishes
- External LDI not triggered

See [Table 2.1-1](#) for details on quantity and types of cosmetic defects allowed per surface area and in total.

**Grade B:** Light wear and tear

- Will allow more scratches and blemishes than Grade A but no lens cracks on any surface
- External LDI not triggered

See [Table 2.7-1](#) for details on quantity and types of cosmetic defects allowed per surface area and in total.



**Grade C:** More aggressive wear and tear

- Will allow some cracks on certain surface areas such as camera lens, rear lens but not on display cover lens

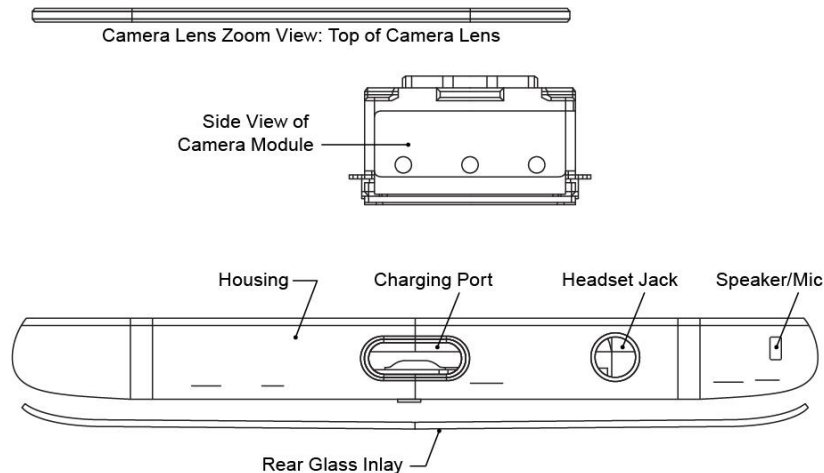


Figure 2.2-1 Camera Lens Zoom View

- Externally viewable LDI not triggered

See Table 2.7-1 for details on quantity and types of cosmetic defects allowed per surface area and in total.

**Grade D:** Heavy cosmetic damage with cover lens cracks.

- Will have excessive damage on multiple surface areas and cracks on the cover lens but not on internal display structure
- Missing small parts such as side keys, finger print sensor, speakers, flexes, front camera, daughter boards, camera/flash lens and internal mechanical parts (Display, PCBA, Main/Rear Camera, Housing and Battery not consider small)
- Externally viewable LDI triggered but no corrosion

See Table 2.7-1 for details on quantity and types of cosmetic defects allowed per surface area and in total.

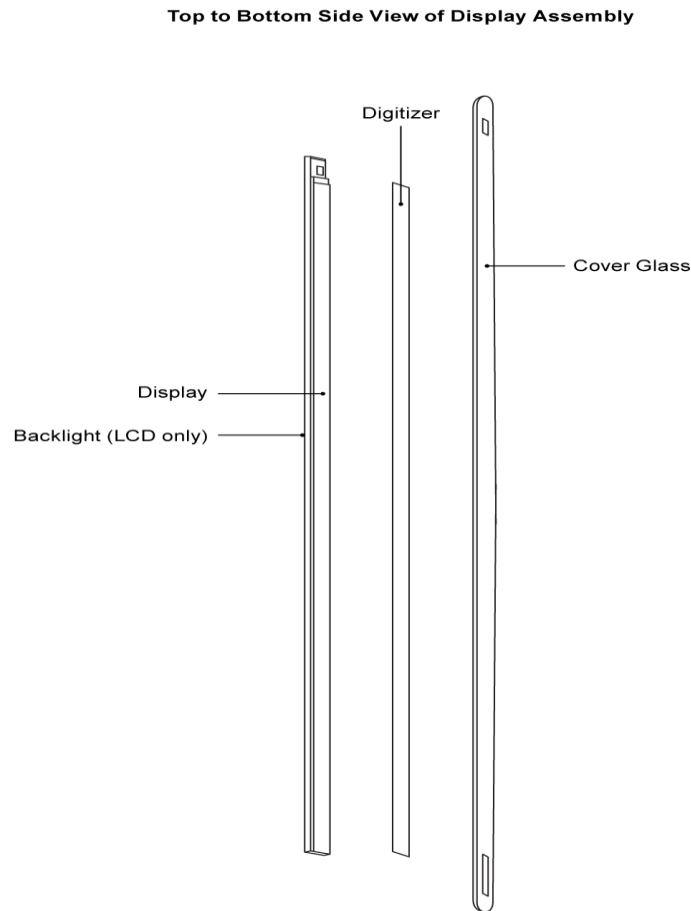


Figure 2.2-2 Top to Bottom Side View of Display Assembly

**Grade E:** Heavy cosmetic damage with display internal structure damage.

- Will have excessive damage on multiple surface areas including internal display structure
- Externally viewable LDI triggered with or without corrosion

See Table 2.7-1 for details on quantity and types of cosmetic defects allowed per surface area and in total.

**Grade N:** Not Graded.

- Device was not inspected for cosmetic defects
- Device has unknown cosmetic defects

## 2.3 Surface Area Definitions

During the visual inspection of a device evaluated for disposition, it is important to have an understanding of the industry defined surface areas and external, internal and connecting components of a device. These external surface areas are defined in this section:

**“AA” Surface** - Main (any) display and all camera lenses

- Main lens over the display \*All displays if multiple displays
- Display viewing area \*All displays if multiple displays
- Camera lens \*All cameras if multiple cameras

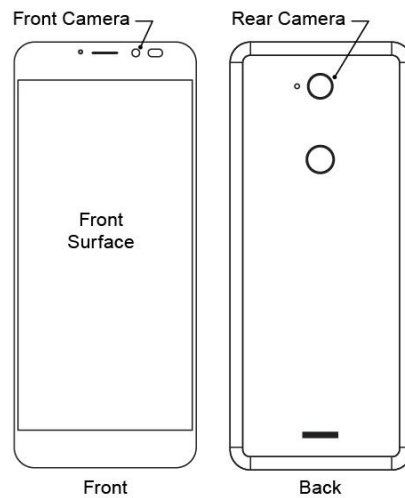


Figure 2.3-1 “AA” Surface Camera Example for Smartphones

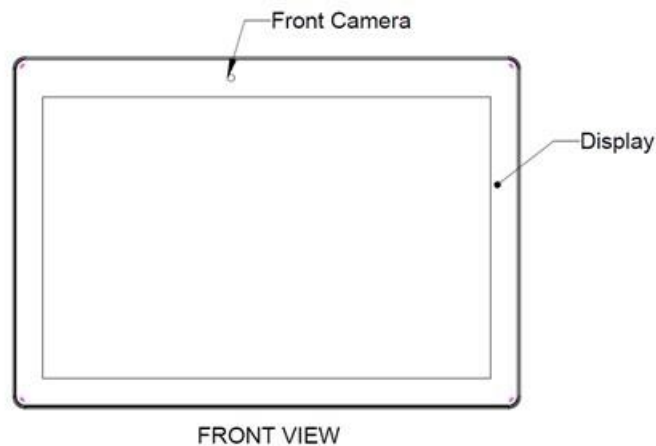


Figure 2.3-2 “AA” Surface Camera Example for Tablets

**“A” Surface** - Front housing/glass area, not including display or camera

- Front housing – only the surface areas visible when looking directly at device if not part of the back housing
- Any surface area front view that isn’t a “AA” surface
- Finger print sensor

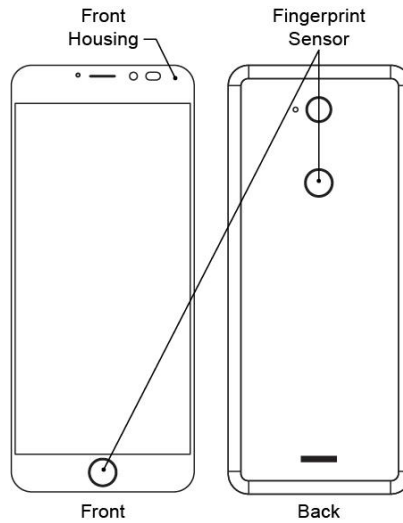


Figure 2.3-3 “A” Surface Example for Smartphones and Tablets

**“B” Surface** - Sides and back of housing

- Housing – sides/edges/corners/back

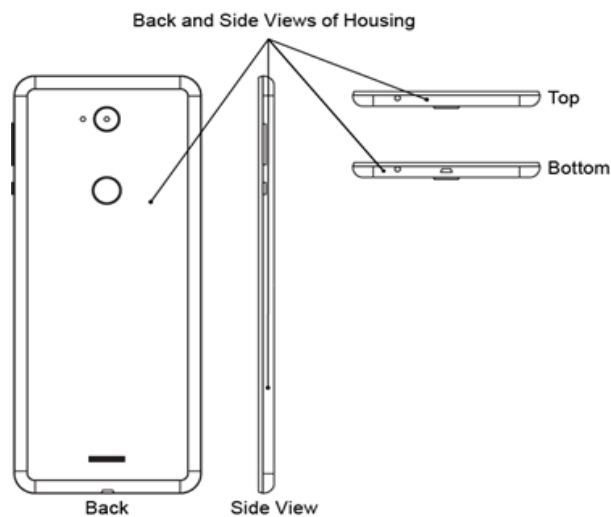


Figure 2.3-4 “B” Surface Example for Smartphones

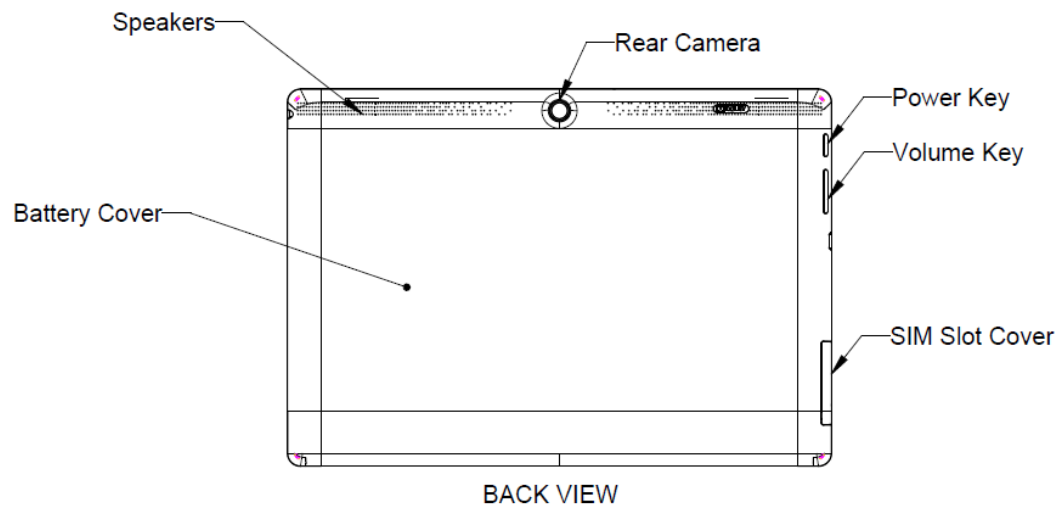


Figure 2.3-5 “B” Surface Example for Tablets

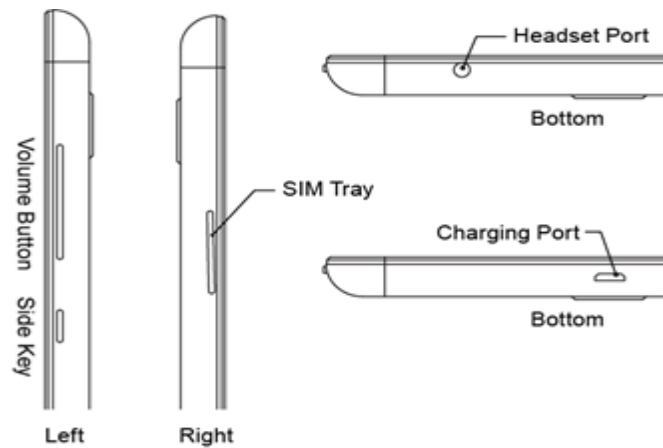


Figure 2.3-6 “B” Surface for Tablets Zoom View

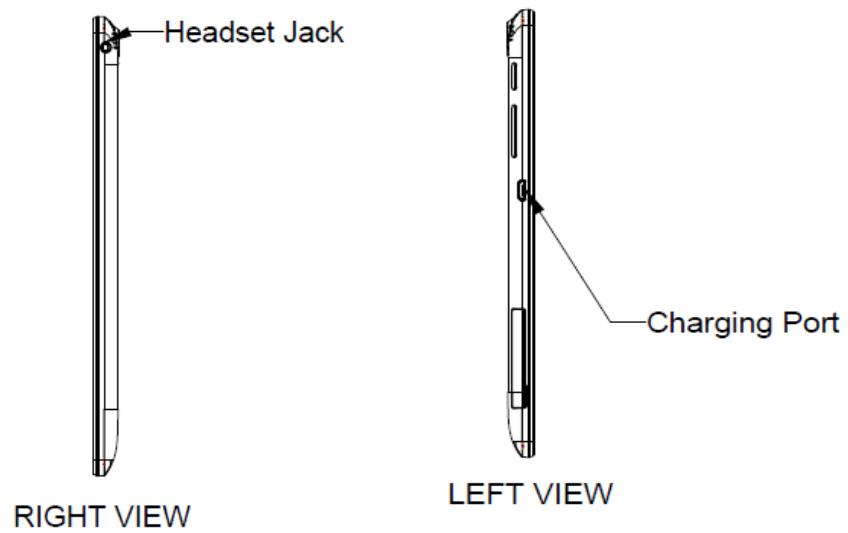


Figure 2.3-7 Right and Left View of Tablet

- SIM tray cosmetic area
- Logos
- Battery cover/door
- Side keys/buttons
- USB port area
- Headset port area
- Audio mesh grill and microphone holes

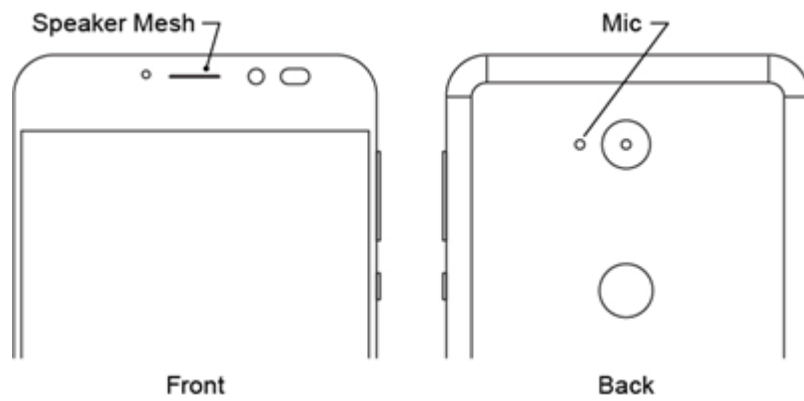


Figure 2.3-8 Audio Mesh Grill and Microphone Holes on Smartphone

- Screws (directly visible on any external surface area)
- Other cosmetic surfaces (bezels, antennas, stylus, etc.)

**“C” Surface** - Contacts/connections/under covers

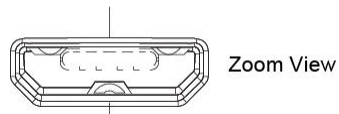


Figure 2.3-9 USB Connector



Figure 2.3-10 Lightning Connector &amp; USB-C Connector

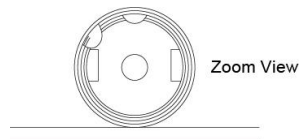


Figure 2.3-11 Headset Connector

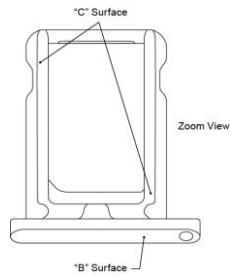


Figure 2.3-12 SIM Tray Inside Surface

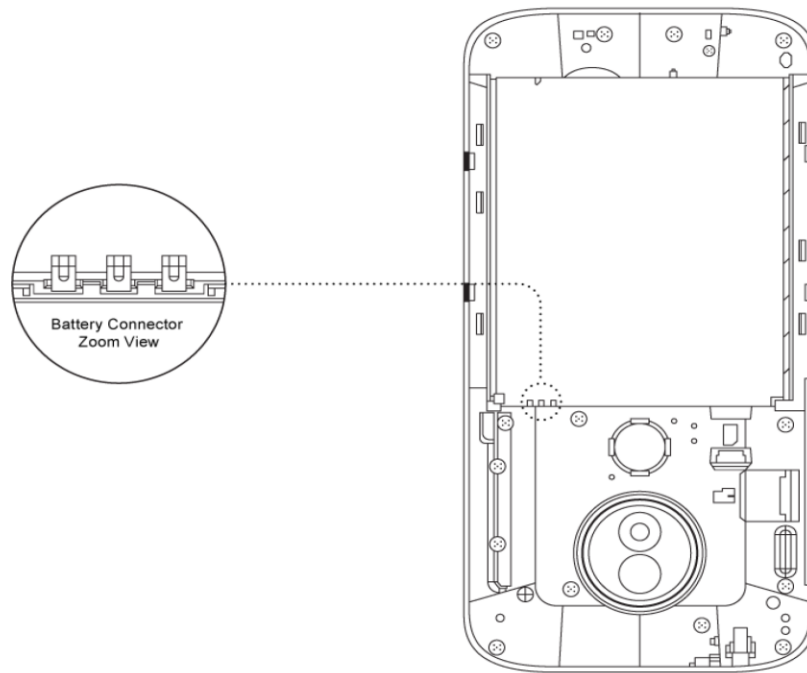


Figure 2.3-13 Battery Contacts for Customer Removable Battery

- Internal labels and logos (under a customer removable cover/door)
- Surfaces covered by the customer removable battery cover
- Screws covered by the customer removable battery cover
- External battery (user replaceable)



## 2.4 Defect Definitions Surface

**“AA” Surface:** Main display(s) and all camera(s) lenses

- Scratch and Dots: Elongated and/or round marks on the surface of the device
- Crack: A physical fracture in the surface of the material; glass that has broken or is starting to break
- Fingerprints under glass/lens: Skin oils or impressions from handling the lens and display during the repair/refurbishment process
- Foreign Material: Dust or other matter inside main, camera or flash lens
- Pressure Spot: Permanent damage in screen that display as Shadows on the screen, bruises or discoloration spots
- Lint: Hair and fibers found behind main, camera or flash lens
- Smudge: Permanent stain or blotch on the main, camera or flash lens
- Alignment: Display to lens viewing area is aligned and centered
- Air Bubble: Air entrapment within and between the display and lens
- Lifted lens: Lens to housing dimension out of spec. (de-lamination or separation gaps)

**“A” Surface:** Front of device

- Scratch and Dots: Elongated and/or round marks on the surface of the device
- Crack: A physical fracture in the surface of the material; glass that has broken or is starting to break
- Lifted lens: Lens to housing dimension out of spec. (de-lamination or separation gaps)
- Discoloration: Any change from original color and inconsistent gloss
- Dent: Indentation or nick that can be felt to the touch
- Shiny Blemish: A smoothness in the texture of the plastic, usually wide and cannot be felt
- Stains: Foreign colorant, corrosion, rust or oxidation
- Warp: Deformation of plastic housing by bowing across flat plane
- Gaps: Gaps between surfaces within specs

**“B” Surface:** Back and side of housing

- Includes all defects as defined above from “A” Surface Area
- Burr: Rough edges and sharp corners
- Dusted Mesh: Dust or other matter inside mesh or microphone port
- Screw Defect: Missing, wrong type, stripped head and loose

**“C” Surface:** Connectors and undercovers

- Contaminated Connector: Foreign material inside the connector
- Damage Connector: Missing, bent, corrosion and excessive wear and tear
- Battery Damage (customer removable): Warped, burned, punctured, swelled, wrinkle and missing labels
- SIM Tray Damage: Bent and loose (cannot hold SIM or SD card)
- Glue: Residue left after removing or peeling off labels
- Damage Labels: Peeling, missing. Must be fully legible.

**2.5 Viewing and Inspection**

1. Visual inspection is performed at arm's length with slight bend in elbow (18 inches from face to device) with normal 20/20 vision (or corrected to 20/20 vision).
2. The unit should be viewed straight on and without having to rotate the unit to determine a defect.
3. Inspection is performed in lighting typically found in a factory environment. The type and degree of lighting is technically described as a cool, white fluorescent light source.
4. Each surface of part shall be scanned once without dwelling on any single surface (4 seconds for each surface area and 6 seconds for “AA”). Magnification is allowed only for verification of defect size. Use of tools/gauges is encouraged to aid in acceptance decisions.
5. “AA” surface should be tilted back 45 degrees to help identify all cracks/scratches in the surface.





## 2.6 Defect Levels for Scratch and Dots

Table 2.6-1 Defect Levels

	Length in Millimeters	Width in Millimeters	Length in Inches	Width in Inches
LEVEL 1	$\leq 0.5\text{mm}$	$\leq 0.05\text{mm}$	$\leq 0.02\text{ inch}$	$\leq 0.002\text{ inch}$
LEVEL 2	$\leq 1.5\text{mm}$	$\leq 0.5\text{mm}$	$\leq 0.06\text{ inch}$	$\leq 0.02\text{ inch}$
LEVEL 3	$\leq 2.0\text{mm}$	$\leq 0.5\text{mm}$	$\leq 0.08\text{ inch}$	$\leq 0.02\text{ inch}$

Note: Any defect greater than the measurements defined as a Level 3 Defect is classified to a Grade D or below.

Table 2.6-2 Dot Creation and Inspection

Dot Criteria		Dot Inspection
Max Dot Size	1 Dot $\leq 0.5\text{mm}$ each	Imperfections of various shapes  Inspection Dot   <b>Pass:</b> Imperfection is smaller than the inspection dot  <b>Fail:</b> Imperfection is larger than the inspection dot <b>Note:</b> Dots are not to scale
Cumulative Dots Rule	2 Dots $\leq 0.4\text{mm}$ each	
Max Cumulative Dots	1 Dot + 1 Dot $\leq 0.8\text{mm}$	
Marginal/Questionable	Use Magnification	

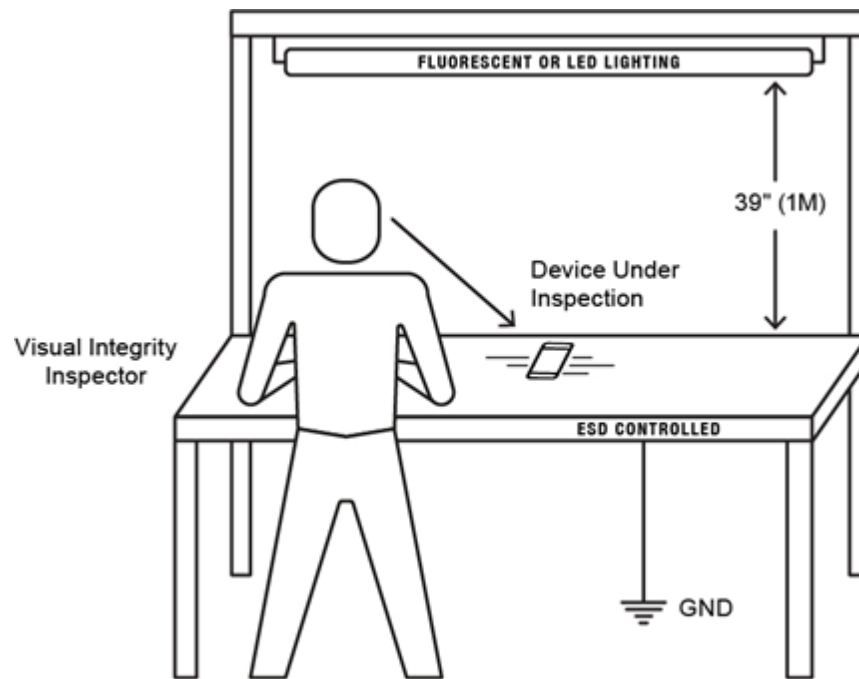


Figure 2.6-1 Viewing and Inspection

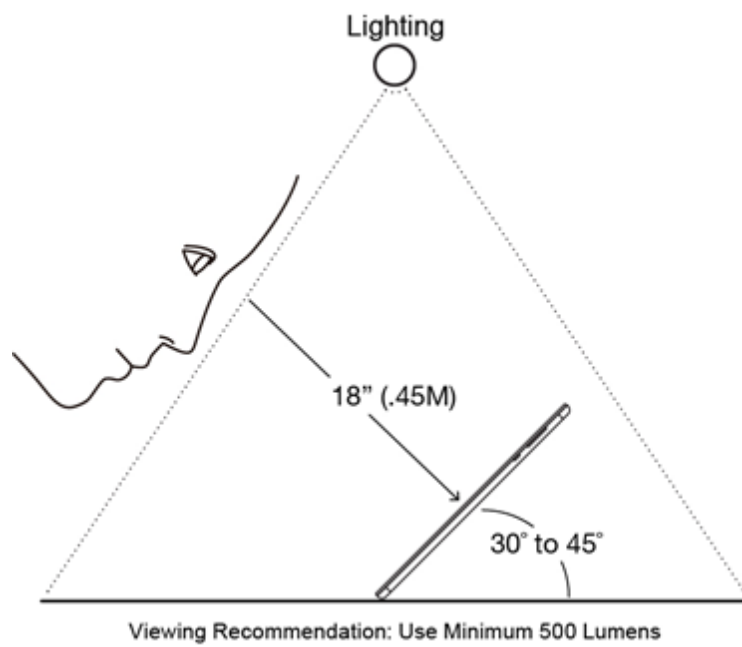


Figure 2.6-2 Lighting

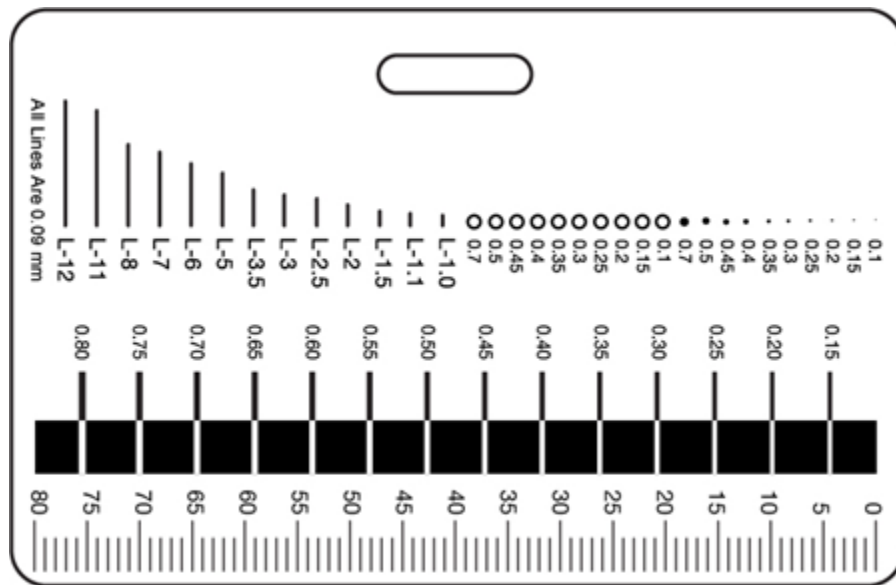


Figure 2.6-3 Measurement Tool

Figure 2.6-3 is an example of a generic standard measurement tool to be used in evaluating damage marks on devices.

## 2.7 Cosmetic Surface Area Classification

Table 2.7-1 Cosmetic Grading Scales: Defect by Surface Area Table

Grade	Allowable Cosmetic Defect Levels as Defined in Section 2.6	General Surface Area Descriptions:			
		Surface Area "AA" Main Display & All Camera Lenses	Surface Area "A" Front of Device	Surface Area "B" Back & Side Housing	Survey Area "C" Connectors & Undercovers
Grade A	Level 1 Defect Allow #	0	3	4	N/A
	Level 2 Defect Allow #	0	2	3	N/A
	Level 3 Defect Allow #	0	0	1	N/A
	Automatic Defect Failures* that Downgrade Device to Next Grade	All	All	All	All
Grade B	Level 1 Defect Allow #	5	10	20	N/A
	Level 2 Defect Allow #	2	5	10	N/A
	Level 3 Defect Allow #	2	3	5	N/A
	Automatic Defect Failures* that Downgrade Device to Next Grade	Cover Lens Cracks Camera Lens Cracks Display Damage Display Alignment Pressure Spots Air Bubbles Lifted Lens or Foreign Material Under Lens	Discoloration Gaps Cover Lens Cracks Lifted Lens	Rear Lens Cracks Cracked Back Surface Battery Damage Burr Discoloration Warp or Dent Gaps Screw Defect	Damage Connector SIM Tray Damage Missing Parts
Grade C	Level 1 Defect Allow #	Unlimited	Unlimited	Unlimited	N/A
	Level 2 Defect Allow #	20	Unlimited	Unlimited	N/A
	Level 3 Defect Allow #	10	20	Unlimited	N/A
	Automatic Defect Failures* that Downgrade Device to Next Grade	Cover Lens Cracks Display Damage Display Alignment Pressure Spots Air Bubbles Lifted Lens or Foreign Material Under Lens	Discoloration Cover Lens Cracks Lifted Lens	Battery Damage Warp	Damage Connector Missing Parts
Grade D	Level 1 Defect Allow #	Unlimited	Unlimited	Unlimited	N/A
	Level 2 Defect Allow #	Unlimited	Unlimited	Unlimited	N/A
	Level 3 Defect Allow #	Unlimited	Unlimited	Unlimited	N/A
	Automatic Defect Failures* that Downgrade Device to Next Grade	Display Damage	Warp	Battery Damage Warp	Damage Connector
Grade E	Level 1 Defect Allow #	Unlimited	Unlimited	Unlimited	N/A
	Level 2 Defect Allow #	Unlimited	Unlimited	Unlimited	N/A
	Level 3 Defect Allow #	Unlimited	Unlimited	Unlimited	N/A
	Defects Included	All	All	All	All

(\*) Automatic Defect Failures are any damage measuring greater than Level 3 as defined by DEFECT LEVELS in Table 2-2 and/or the automatic defect failure descriptions identified in this table.

## 2.8 Functional Classifications

Examples of minor and major common failures as referenced in [Table 2.8-2](#) above.

Table 2.8-1 General Descriptions of Common Failures

Degree of Failure	Display Failure	Other Failure
Minor	<ul style="list-style-type: none"> <li>Missing pixels but no more than three</li> <li>Burn-in image on bar or menu areas</li> <li>Touch failure for product in which the touch panel is part of the cover lens</li> </ul>	<ul style="list-style-type: none"> <li>Side keys</li> <li>Front camera and flash</li> <li>Proximity and light sensor</li> <li>Speakers or microphones</li> <li>Headset jack</li> <li>Vibrator</li> <li>Finger print sensor if not linked to the main board</li> <li>Battery health</li> </ul>
Major	<ul style="list-style-type: none"> <li>Missing pixels, more than three</li> <li>Burn-in image in center area</li> <li>Missing or discolor lines</li> <li>Touch failure for product in which the touch panel is part of the display</li> <li>Dark, white and discoloration spots</li> <li>Backlight brightness</li> </ul>	<ul style="list-style-type: none"> <li>Rear camera</li> <li>Dead battery</li> <li>Finger print sensor if linked to the main board</li> <li>Cannot detect SIM or SD card</li> <li>Does not charge</li> <li>Cannot connect to PC</li> <li>Wi-Fi, Bluetooth, GPS</li> </ul>

Table 2.8-2 defines Functional Classification for grading scales criteria as referenced in [Table 2.1-1](#).

Table 2.8-2 Functional Classifications

Type	Power On	Battery Health <sup>2</sup> ≥ 70%	Display Failure <sup>1</sup>	Other Failure
0= Fully Functional	Yes	Yes	No	No
1	Yes	No	No	No
2	Yes	No	Minor	No
3	Yes	No	Minor	Minor
4	Yes	No	Minor	Major
5	Yes	No	Major	Minor
6	Yes	No	Major	Major
7	Yes	No	Inoperable	Unverified
8	No	No	Unverified	Unverified
9	Not Tested or Functionality Unverified			
Note 1: For type 0-6, the display was verified to power up.				
Note 2: Recommended battery health threshold should be equal to or greater than 70% for fully functional classification.				

## 2.9 Lock Status

Table 2.9-1 Customer Lock Status

Type	Cleared Customer Content/Data Wipe	Customer Locked <a href="#">Table 1.3-1</a>
1	Yes	No
2	Yes	Yes
3	No	No
4	No	Yes
5	Unverified	Unverified

[Table 2.9-1](#) further defines Customer Lock Status for grading scales criteria as referenced in [Table 2.1-1](#).



Table 2.9-2 Enterprise and Operator Lock Status

Type	Enterprise Locked	Operator Locked
1	No	No
2	No	Yes
3	Yes	No
4	Yes	Yes
5	Unverified	Unverified

Table 2.9-2 further defines Enterprise and Operator Lock Status for grading scales criteria as referenced in Table 2.1-1.

## 2.10 RF Grading Scale

Table 2.10-1 RF Test Grading Scale

Type	Test Details
1	No RF test was conducted
2	Passed RF test conducted by making a live call
3	Failed RF test conducted by making a live call
4	Passed RF test conducted using an RF shielded box
5	Failed RF test conducted using an RF shielded box

Table 2.10-1 Further defines RF Test Grading Scale for grading scales criteria as referenced in Table 2.1-1.

## 2.11 Kit Configuration

Table 2.11-1 Kit Configuration

Type	Kit Configuration Details
1	Kitted with OEM charger (block and cord)
2	Fully kitted with OEM charger (block and cord) and headset
3	Kitted with aftermarket charger
4	Fully kitted with aftermarket charger and headset
5	Bulk device, not kitted with any accessories
6	Transceiver only (No battery or back cover if designed to be customer removable parts)

Table 2.11-1 further defines Kit Configuration for grading scales criteria as referenced in Table 2.1-1.

## Section 3      Grading Scales Matrix: Cosmetic Grading Scales Cross Reference with Functional Classification

### 3.1      Cosmetic Grading Scales Cross Reference with Functional Classification

Table 3.1-1 below is a general example of how to create a cosmetic and functional classification matrix. Any combination or cross reference can be utilized to fit multiple business requirements as needed.

Table 3.1-1 Example Grading Scale Matrix

Primary Grade	Cosmetic	Functional	Customer Lock Status	Enterprise and Operator Lock Status	RF Test <sup>1</sup>	Field Usage
A+	A	0 or 1	1	1	2 or 3	0-15 days
A	A	0 or 1	1	1	2 or 3	Any
B+	B	0 or 1	1	1	2 or 3	Any
B	B	0, 1, 2 or 3	1, 2 or 3	1, 2 or 3	1, 2 or 3	Any
C+	C	0 or 1	1	1	2 or 3	Any
C	C	0, 1, 2 or 3	1, 2 or 3	1, 2 or 3	1, 2 or 3	Any
D+	D	0, 1, 2 or 3	1	1	Any	Any
D	D	0, 1, 2, 3 or 4	1, 2, 3 or 4	1, 2, 3 or 4	Any	Any
E+	E	0, 1, 2, 3, 4, 5 or 9	1, 2, 3 or 4	1, 2, 3 or 4	Any	Any
E	E	Any	Any	Any	Any	Any

Note 1: RF not applicable for Wi-Fi only devices.

Any deviations from the grading scale criteria and definitions shall be disclosed to the customer in order to prevent confusion with the standards defined herein.

## Appendix A Revision History

Date	Version	Description
December 2018	1.0	Initial release of document
December 2019	1.1	<ul style="list-style-type: none"> <li>Revised Figure 2-2: Top to Bottom Side View</li> <li>Added introduction to Section 2.3: Surface Area Definitions</li> <li>Added Pressure Spot definition to Section 2.4: Defect Definitions Surface</li> <li>Revised Figure 2-12: Battery Contacts for Customer Removable Battery</li> <li>Added note to Table 2-2: Defect Levels</li> <li>Revised Table 2-4: Cosmetic Grading Scales: Defect By Surface Area Table</li> </ul>
September 2021	2.0	<ul style="list-style-type: none"> <li>Updated Table 1.3 1 Definitions to include “operator lock” and “enterprise lock”</li> <li>Updated figure titles in Section 2</li> <li>Added illustrations of defined tablet surface areas to Section 2</li> <li>Streamlined Table 2.8 1 Functional Classifications definitions</li> <li>Split lock status tables into Table 2.9 1 and Table 2.9 2</li> <li>Added “Enterprise Lock” column in Table 2.9 2</li> <li>Streamlined functional classifications in Table 3.1 1 Example Grading Scale Matrix and added in Enterprise Lock detail</li> <li>Added footnotes to Table 3.1 1</li> </ul>