Wireless Device Grading Scales Criteria and Definitions

Version 5.0

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Section 1 Introduction

1.1 Purpose

This document defines a common lexicon and process for grading wireless devices. Any deviations from these grading scale criteria and definitions shall be disclosed to the customer 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
Basic RF Functionality Check	Simple circuit network detection and antenna housing conductivity inspection
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, wearables, fitness trackers
Encumbrance	Any legitimate, non-physical impediment that prevents a device from being activated for service by a new user as it enters its next lifecycle.
Enterprise Lock	Device is locked by security services commonly needed for security management of mobile devices as defined in NIST Guidelines for Managing the Security of Mobile Devices in the Enterprise.
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

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1.4 References

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

[2] European Commission, Annexes to the Commission Regulation, laying down ecodesign requirements for mobile phones, cordless phones, and tablets pursuant to Directive 2009/125/EC of the European Parliament and of the Council, August 2022

[3] R2: The Sustainable Electronics Reuse and Recycling (R2) Standard, Sustainable Electronics Recycling International (SERI), Version 3.0 or later

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Section 2 Grading Scales

2.1 Schema

An industry Grading Scales schema is defined 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	Table 2.7-1	A, B, C, D, E or N
Functional Classification	Table 2.8-3	1, 2, 3, 4, 5, 6, 7, 8 or 9
Customer Lock Status (As Applicable)	Table 2.9-1	1, 2, 3, 4, or 5
Enterprise Lock Status (As Applicable)	Table 2.9-2	1, 2, or 3
Operator Lock Status (As Applicable)	Table 2.9-3	1, 2, or 3
RF Test Grading Scale (As Applicable)	Table 2.9-4	1, 2, 3, 4, 5, 6, or 7
Kit Configuration	Table 2.10-1	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.

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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

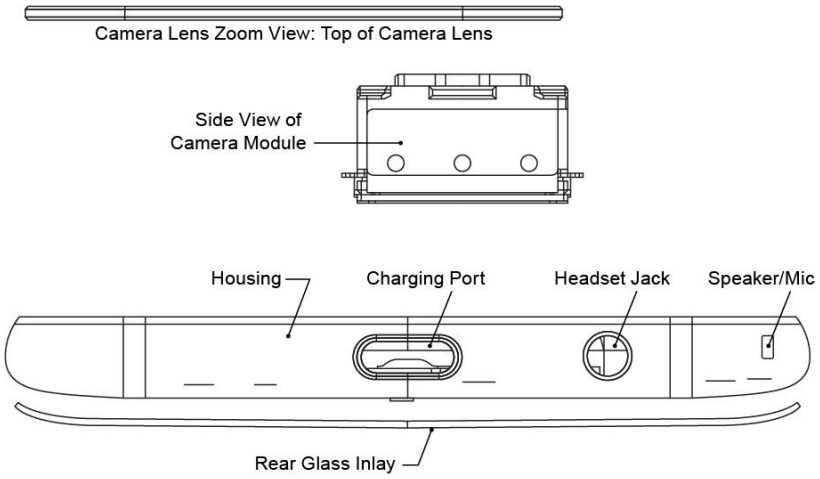

Figure 2.2-1 Camera Lens Zoom View

- 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, fingerprint sensor, speakers, flexes, front camera, daughter boards, camera/flash lens and internal mechanical parts (Display, PCBA, Main/Rear Camera, Housing and Battery not considered 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.

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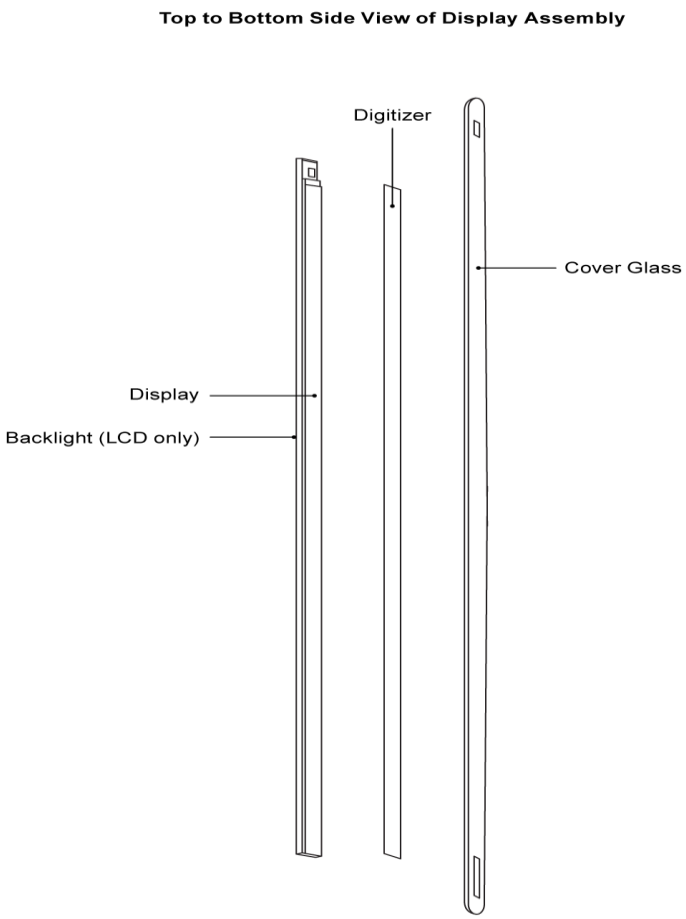

Figure 2.2-2 Top to Bottom Side View of Display Assembly

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 understand the industry defined surface areas and external, internal and connecting components of a device. These external surface areas are defined in this section:

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“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

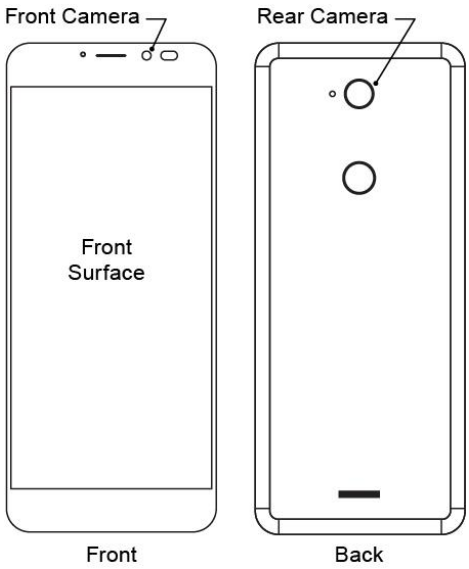

Figure 2.3-1 “AA” Surface Camera Example for Smartphones

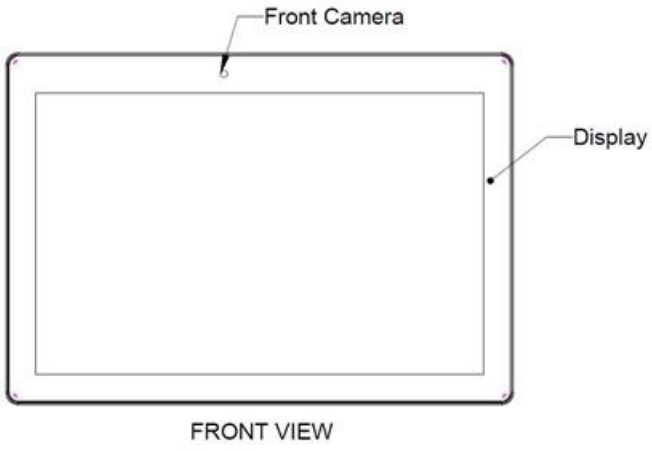

Figure 2.3-2 “AA” Surface Camera Example for Tablets

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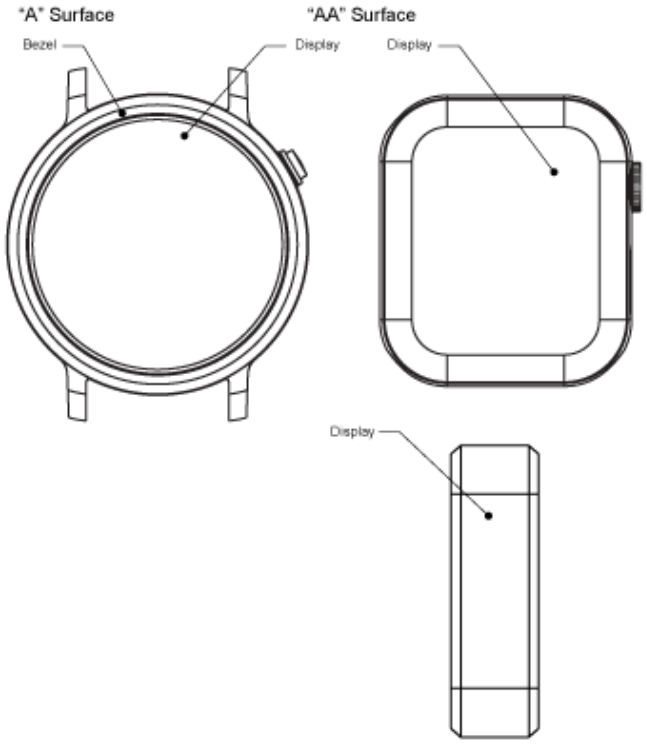

Figure 2.3-3 "AA" Surface Example for Wearables

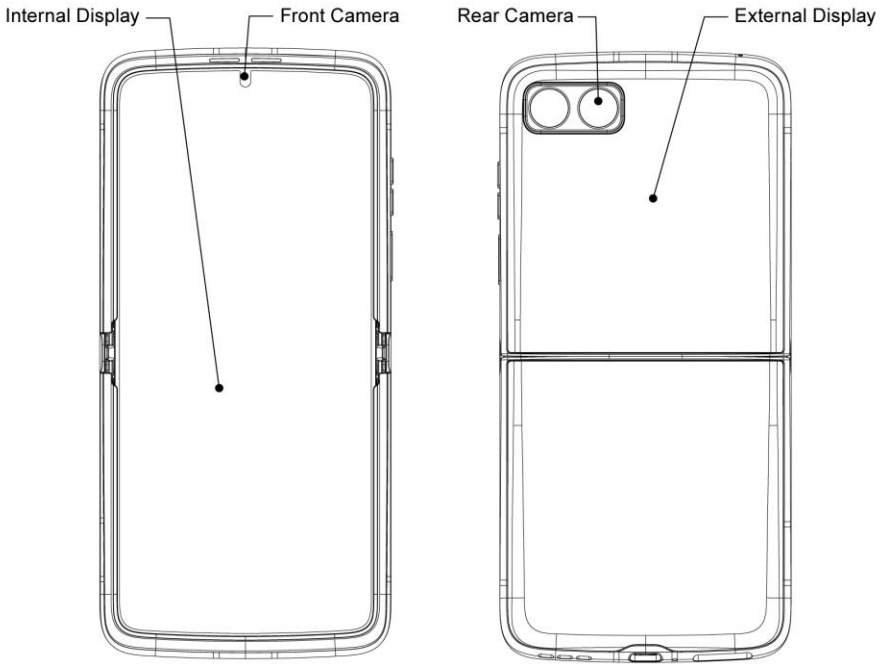

Figure 2.3-4 "AA" Surface Example for Foldable Devices

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Note: *Internal displays with replaceable screen protectors applied by the manufacture can be reclassified as "B" surface if the dents and scratches do not propagate to the internal displays.*

"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

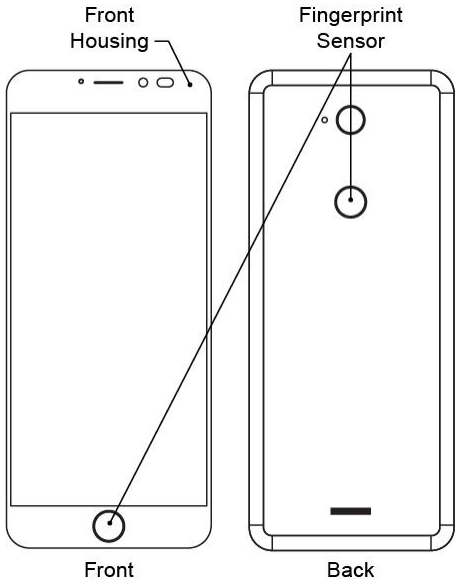

Figure 2.3-5 "A" Surface Example for Smartphones and Tablets

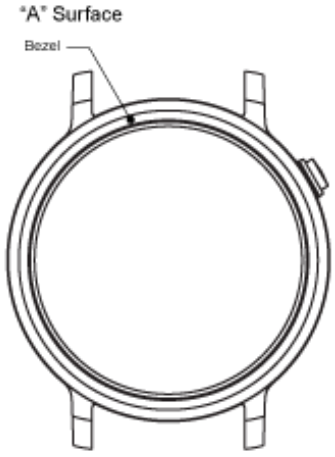

Figure 2.3-6 "A" Surface Example for Wearables

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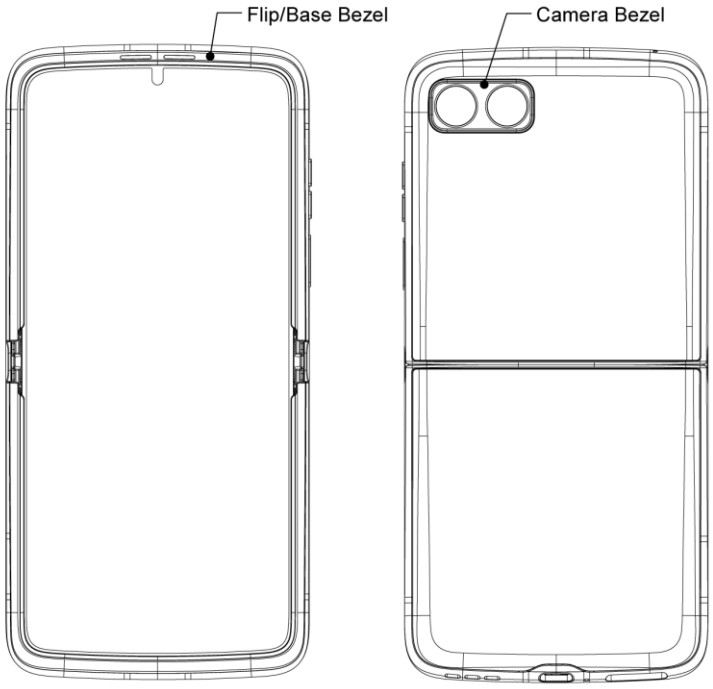

Figure 2.3-7:"A" Surface Example for Foldable Devices

"B" Surface - Sides and back of housing

Note: *"V" Surface is for wearables backside.*

- Housing – sides/edges/corners/back
- SIM tray cosmetic area
- Logos
- Battery cover/door
- Side keys/buttons
- USB port area
- Headset port area
- Audio mesh grill and microphone holes
- Screws (directly visible on any external surface area)
- Other cosmetic surfaces (bezels, antennas, stylus, etc.)

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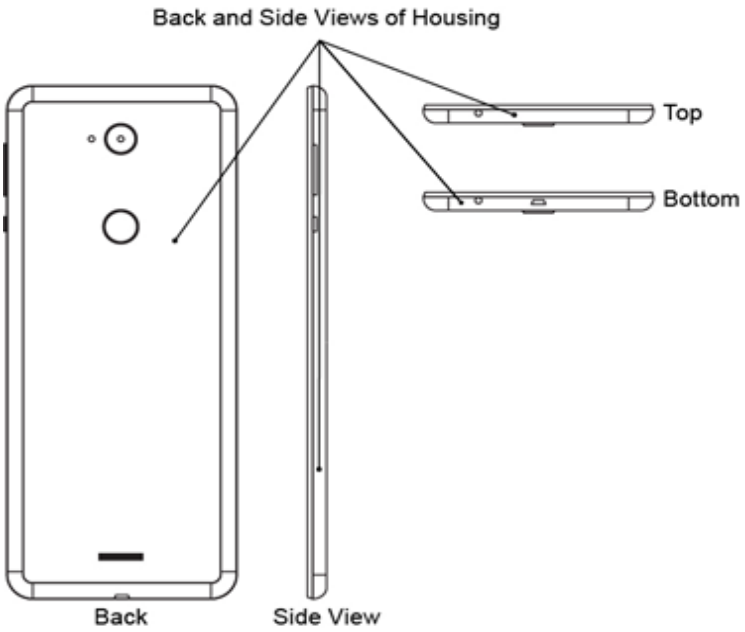

Figure 2.3-8 "B" Surface Example for Smartphones

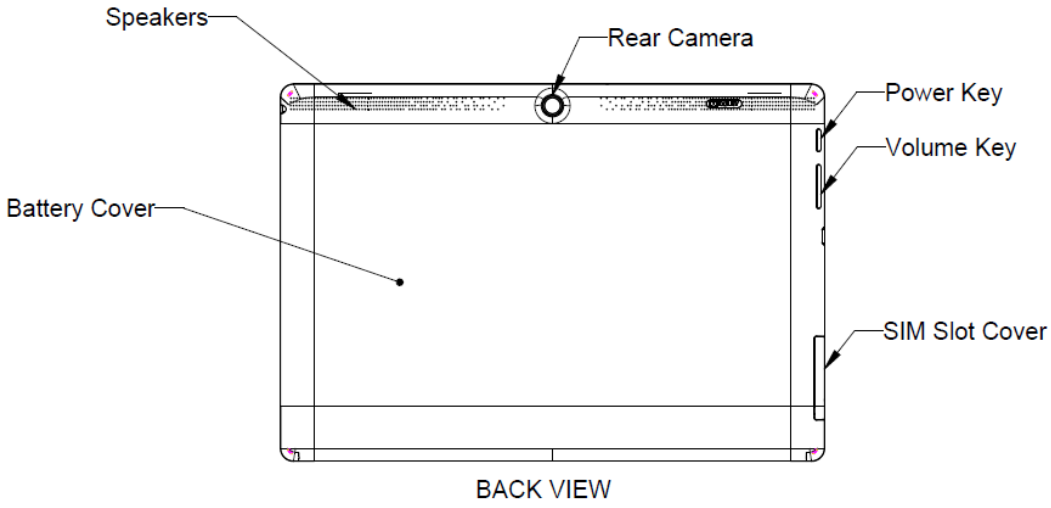

Figure 2.3-9 "B" Surface Example for Tablets

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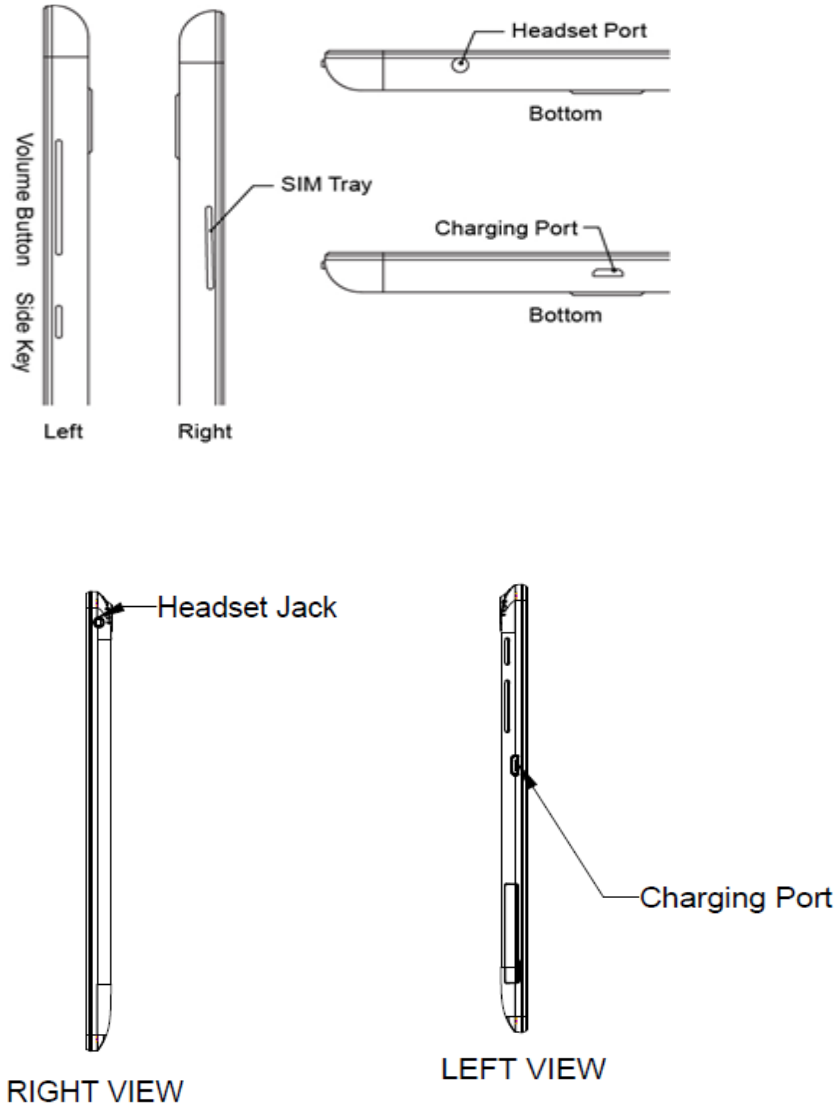

Figure 2.3-10 Side View of Tablets

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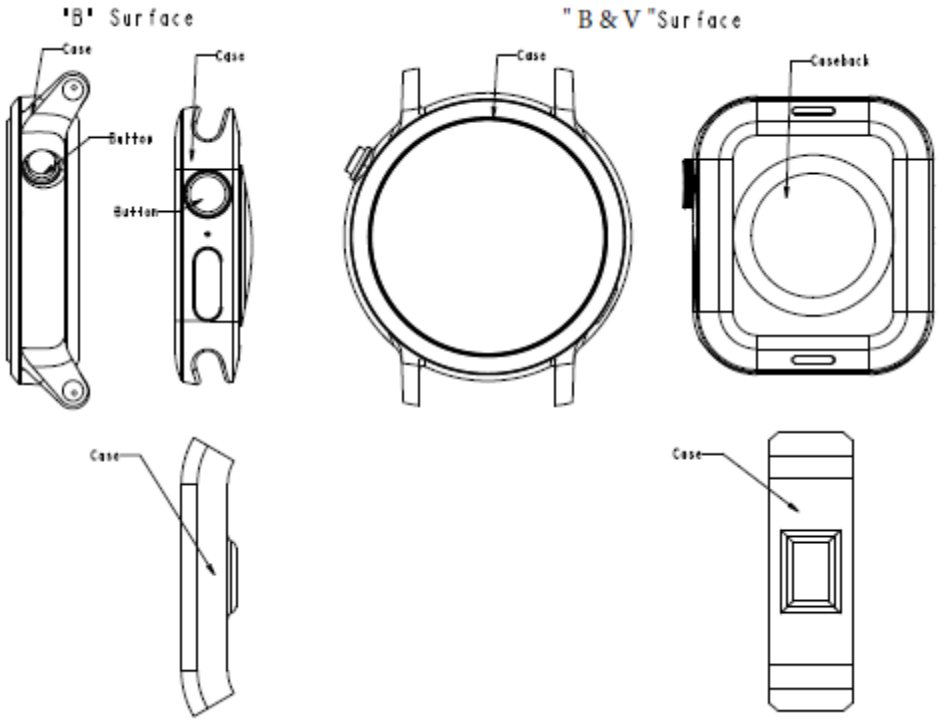

Figure 2.3-11 “B and V” Surface Example for Wearables

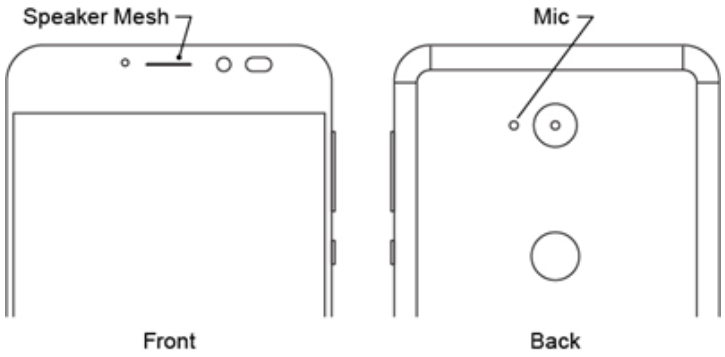

Figure 2.3-12 Audio Mesh Grill and Microphone Holes on Smartphone

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Figure 2.3-13 "B" Surface Example for Foldable Devices

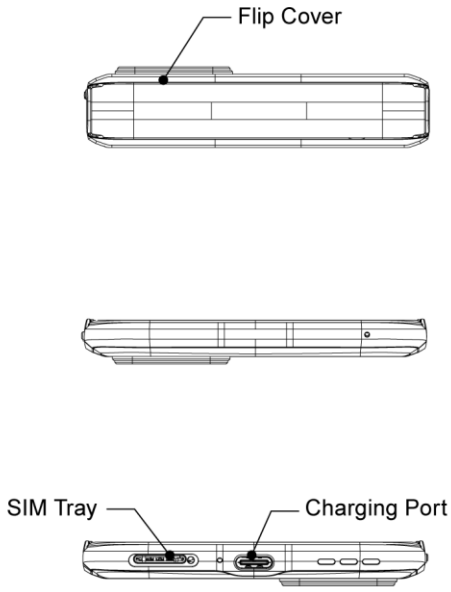

Figure 2.3-14 Flip View and Side View of Foldable Devices

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“C” Surface - Contacts/connections/under covers

- 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)

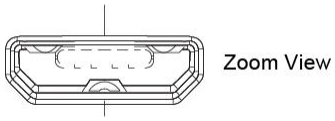

Figure 2.3-15 USB Connector

Figure 2.3-16 Lightning Connector & USB-C Connector

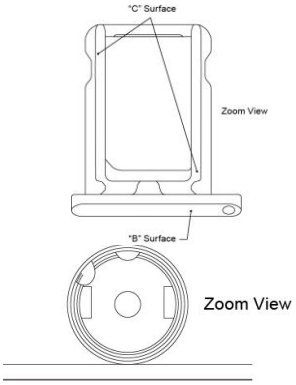

Figure 2.3-17 Headset Connector

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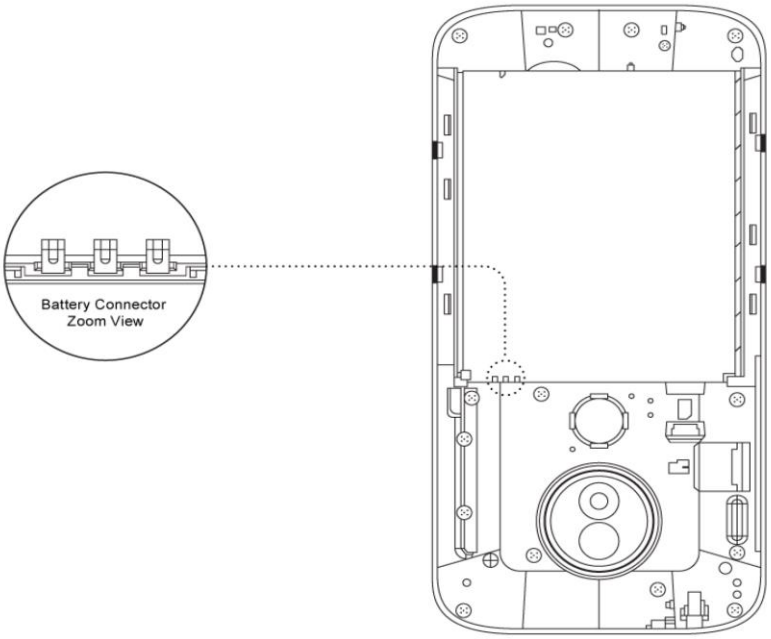

Figure 2.3-18 Battery Contacts for Customer Removable Battery

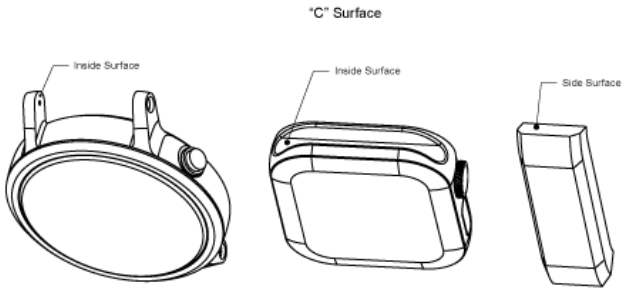

Figure 2.3-19 "C" Surface Example for Wearables

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

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- 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)
- Air Entrapment in Foldable Devices: Bubbles between the internal display and housing
- Stretch marks in the internal display for foldable devices
- Internal display delamination or bleeding

***Note**:* Any imperfection with the screen protector *(installed by the manufacturer)* or waves in the folding area is not considered a defect.

"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

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“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
- Defects on the replaceable screen protectors (applied by the manufacturer)
- Missing replaceable screen protectors
- Hinge can’t fully close or open for foldable devices
- Loose hinge or overextended hinge for foldable devices
- Contamination in the hinge of foldable devices that prevents a smooth opening or closing
- Excessively noisy hinge for foldable devices

“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. A minimum of 500 lumens is recommended.
[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.

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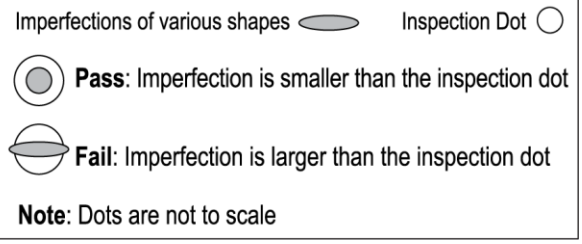
2.6 Defect Levels for Scratch and Dots

Table 2.6-1 Defect Levels

LEVEL	Length in Millimeters	Width in Millimeters	Length in Inches	Width in Inches	Depth description
LEVEL 1	≤ 0.5mm	≤ 0.05mm	≤ 0.02 inch	≤ 0.002 inch	It is not easily visible from the front, but it is slightly visible from other angles
	0.5mm → 20.0mm		0.02 inch → 0.80 inch		
	> 20.0mm		> 0.80 inch		
LEVEL 2	≤ 1.5mm	≤ 0.5mm	≤ 0.06 inch	≤ 0.02 inch	It is visible from any angle. There is no feel with fingernail (tool: 0.25mm gauge)
	1.5mm → 20.0mm		0.06 inch → 0.80 inch		
	> 20.0mm		> 0.80 inch		
LEVEL 3	≤ 2.0mm	≤ 0.5mm	≤ 0.08 inch	≤ 0.02 inch	There is a feel with fingernail (tool: 0.25mm gauge). It does not stop
	2.0mm → 20.0mm		0.08 inch → 0.80 inch		
	> 20.0mm		> 0.80 inch		
LEVEL 4	≤ 2.0mm	> 0.5mm	≤ 0.08 inch	> 0.02 inch	There is a feel with fingernail (tool: 0.25mm gauge). It does stop
	2.0mm → 20.0mm		0.08 inch → 0.80 inch		
	> 20.0mm		> 0.80 inch		

Note: A cluster of scratches is considered a Level 4.

Table 2.6-2 Dot Creation and Inspection

Dot Criteria		Dot Inspection
Max Dot Size	1 Dot ≤ 0.5mm each	
Cumulative Dots Rule	2 Dots ≤ 0.4mm each	
Max Cumulative Dots	1 Dot + 1 Dot ≤ 0.8mm	
Marginal/Questionable	Use Magnification	

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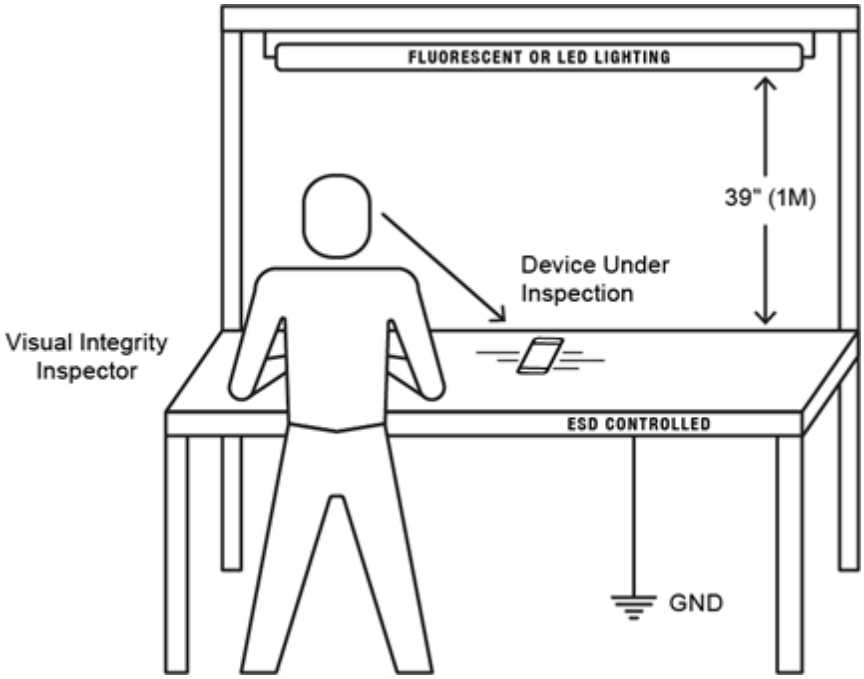

Figure 2.6-1 Viewing and Inspection

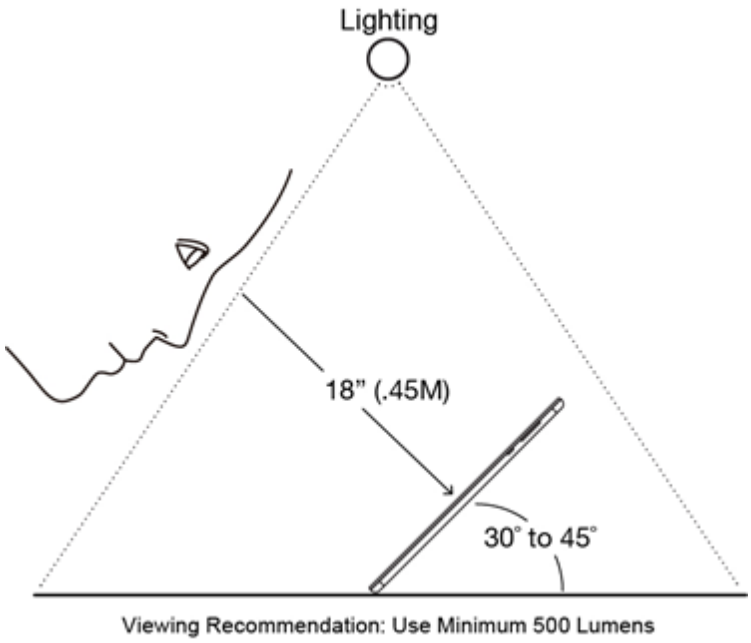

Figure 2.6-2 Lighting

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

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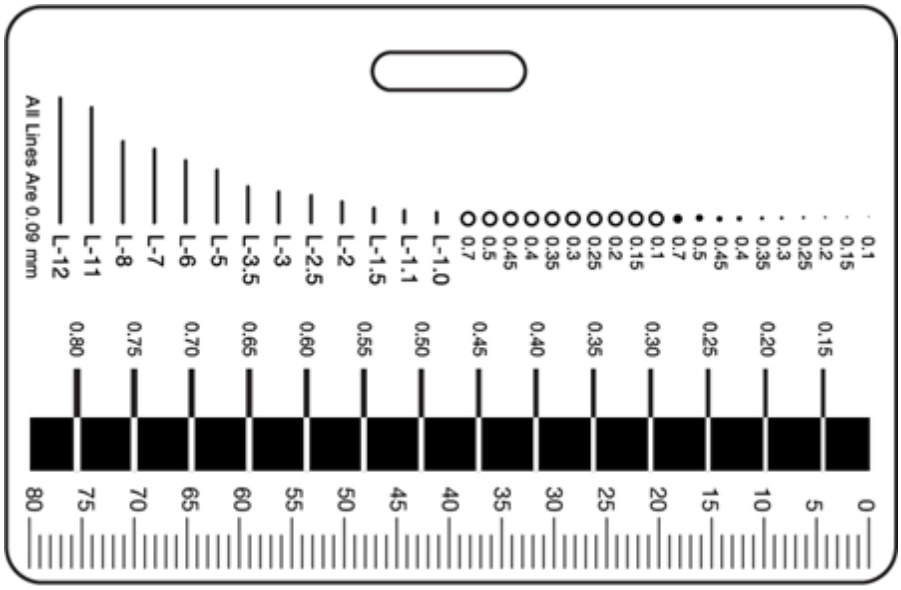

Note: Not to Scale. Representative of a Standard Overlay Measurement Tool.

Figure 2.6-3 Measurement Tool

Figure 2.6-4 is the 0.25mm gage tool to check scratches depth.

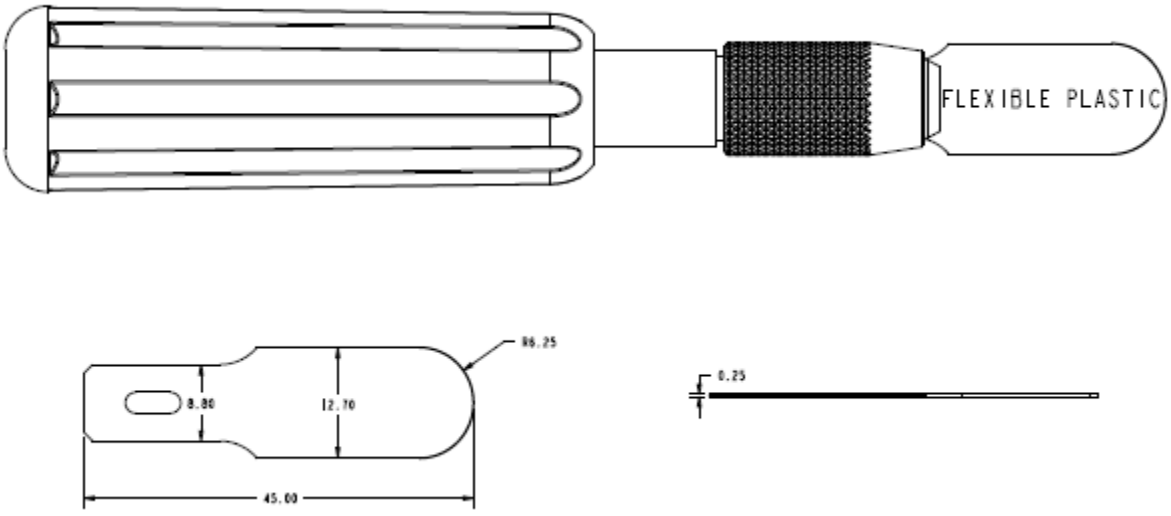

Figure 2.6-4 0.25mm Gage Tool

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2.7 Cosmetic Surface Area Classification

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

Grade	Allowable Cosmetic Defect Levels	General Surface Area Descriptions:								
							Acceptable Defects Types by Surface			
		Length	Width	"AA" Main Display Camera Lenses	"A" Front of Device	"B" Back & Side Housing	"AA"	"A"	"B"	"C"
Grade A	**Level 1 Defect Allow #** It is not easily visible from the front, but it is slightly visible from other angles	**≦ 0.5mm**	**≦ 0.05mm**	0	**3**	**4**	None	None	None	None
		0.5mm → 20.0mm		0	0	**1**				
		> 20.0mm		0	0	0				
	Level 2 Defect Allow # It is visible from any angle. There is no feel with fingernail (tool: 0.25mm gauge)	**≦ 1.5mm**	**≦ 0.25mm**	0	**2**	**3**				
		1.5mm → 20.0mm		0	0	**1**				
		> 20.0mm		0	0	0				
	Level 3 Defect Allow # There is a feel with fingernail (tool: 0.25mm gauge). It does not stop	**≦ 2.0mm**	**≦ 0.5mm**	0	0	**1**				
		2.0mm → 20.0mm		0	0	0				
		> 20.0mm		0	0	0				
	Level 4 Defect Allow # There is a feel with fingernail (tool: 0.25mm gauge). It does stop	**≦ 2.0mm**	**> 0.5mm**	0	0	0				
		2.0mm → 20.0mm		0	0	0				
		> 20.0mm		0	0	0				
Grade B	**Level 1 Defect Allow #** It is not easily visible from the front, but it is slightly visible from other angles	**≦ 0.5mm**	**≦ 0.05mm**	**15**	**20**	**50**	• Air Entrapment (Foldable)	• Shiny Blemish • Stains	• Stains • Dusted Mesh • Replaceable screen protectors	• SIM Tray Damage
		0.5mm → 20.0mm		**7**	**10**	**30**				
		> 20.0mm		**3**	**5**	**20**				
	Level 2 Defect Allow # It is visible from any angle. There is no feel with fingernail (tool: 0.25mm gauge)	**≦ 1.5mm**	**≦ 0.25mm**	**7**	**15**	**30**				
		1.5mm → 20.0mm		**3**	**7**	**20**				
		> 20.0mm		**1**	**3**	**10**				
	Level 3 Defect Allow # There is a feel with fingernail (tool: 0.25mm gauge). It does not stop	**≦ 2.0mm**	**≦ 0.5mm**	**3**	**5**	**15**				
		2.0mm → 20.0mm		**1**	**3**	**7**				
		> 20.0mm		0	0	**3**				
	Level 4 Defect Allow # There is a feel with fingernail (tool: 0.25mm gauge). It does stop	**≦ 2.0mm**	**> 0.5mm**	**1**	**3**	**4**				
		2.0mm < ≦ 20.0mm		0	**1**	**2**				
		> 20.0mm		0	0	0				

Grade	Allowable Cosmetic Defect Levels	General Surface Area Descriptions: Length	Width	"AA" Main Display Camera Lenses	"A" Front of Device	"B" Back & Side Housing	Acceptable Defects Types by Surface "AA"	"A"	"B"	"C"
Grade C	**Level 1 Defect Allow #** It is not easily visible from the front, but it is slightly visible from other angles	≦ 0.5mm 0.5mm → 20.0mm > 20.0mm	≦ 0.05mm	Unlimited	Unlimited	Unlimited	Same as above • Lint • Smudge	Same as above • Dent • Gaps	Same as above • Crack • Lifted lens • Discoloration • Dent • Gaps • Burr Screw Defect	Same as above • Glue Residue Damage • Labels • Contaminated Port
	Level 2 Defect Allow # It is visible from any angle. There is no feel with fingernail (tool: 0.25mm gauge)	≦ 1.5mm 1.5mm → 20.0mm > 20.0mm	≦ 0.25mm	Unlimited	Unlimited	Unlimited				
	Level 3 Defect Allow # There is a feel with fingernail (tool: 0.25mm gauge). It does not stop	≦ 2.0mm 2.0mm → 20.0mm > 20.0mm	≦ 0.5mm	60 40 20	Unlimited	Unlimited				
	Level 4 Defect Allow # There is a feel with fingernail (tool: 0.25mm gauge). It does stop	≦ 2.0mm 2.0mm → 20.0mm > 20.0mm	> 0.5mm	30 15 7	40 20 10	70 50 30				
Grade D	**Level 1 Defect Allow #** It is not easily visible from the front, but it is slightly visible from other angles	≦ 0.5mm 0.5mm → 20.0mm > 20.0mm	≦ 0.05mm	Unlimited	Unlimited	Unlimited	Same as above • Crack • Foreign Material • Pressure Spot Alignment • Air Bubble Lifted lens • Stretch marks (Foldables)	Same as above • Crack • Lifted lens • Discoloration	Same as above • Crack • Hinge (Foldables)	Same as above • Damage
	Level 2 Defect Allow # It is visible from any angle. There is no feel with fingernail (tool: 0.25mm gauge)	≦ 1.5mm 1.5mm → 20.0mm > 20.0mm	≦ 0.25mm	Unlimited	Unlimited	Unlimited				
	Level 3 Defect Allow # There is a feel with fingernail (tool: 0.25mm gauge). It does not stop	≦ 2.0mm 2.0mm → 20.0mm > 20.0mm	≦ 0.5mm	Unlimited	Unlimited	Unlimited				
	Level 4 Defect Allow # There is a feel with fingernail (tool: 0.25mm gauge). It does stop	≦ 2.0mm 2.0mm → 20.0mm > 20.0mm	> 0.5mm	Unlimited	Unlimited	Unlimited				

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Grade	Allowable Cosmetic Defect Levels	General Surface Area Descriptions:								
		Length	Width	"AA" Main Display Camera Lenses	"A" Front of Device	"B" Back & Side Housing	Acceptable Defects Types by Surface			
							"AA"	"A"	"B"	"C"
Grade E	**Level 1 Defect Allow #** It is not easily visible from the front, but it is slightly visible from other angles	**≦ 0.5mm** **0.5mm < ≦ 20.0mm** **> 20.0mm**	**≦ 0.05mm**	Unlimited	Unlimited	Unlimited	All	All	All	All
	Level 2 Defect Allow # It is visible from any angle. There is no feel with fingernail (tool: 0.25mm gauge)	**≦ 1.5mm** **1.5mm → 20.0mm** **> 20.0mm**	**≦ 0.25mm**	Unlimited	Unlimited	Unlimited				
	Level 3 Defect Allow # There is a feel with fingernail (tool: 0.25mm gauge). It does not stop	**≦ 2.0mm** **2.0mm → 20.0mm** **> 20.0mm**	**≦ 0.5mm**	Unlimited	Unlimited	Unlimited				
	Level 4 Defect Allow # There is a feel with fingernail (tool: 0.25mm gauge). It does stop	**≦ 2.0mm** **2.0mm → 20.0mm** **> 20.0mm**	**> 0.5mm**	Unlimited	Unlimited	Unlimited				

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Table 2.7-2 Wearable Surface View and Classification

Grade	Allowable Cosmetic Defect Levels	General Surface Area Descriptions:						Acceptable Defects Types by Surface				
		Length	Width	"AA" Display	"A" Bezel	"B" Case, Button	"V" Caseback	"AA"	"A"	"V"	"B Band"	"C"
Grade A	**Level 1 Defect Allow #** It is not easily visible from the front, but it is slightly visible from other angles	≦ 0.5mm	≦ 0.05mm	2	3	4	6	None	None	None	Like New	None
		0.5mm → 20.0mm		0	0	1	1					
		> 20.0mm		0	0	0	0					
	Level 2 Defect Allow # It is visible from any angle. There is no feel with fingernail (tool: 0.25mm gauge)	≦ 1.5mm	≦ 0.25mm	1	2	3	5					
		1.5mm → 20.0mm		0	0	1	1					
		> 20.0mm		0	0	0	0					
	Level 3 Defect Allow # There is a feel with fingernail (tool: 0.25mm gauge). It does not stop	≦ 2.0mm	≦ 0.5mm	0	0	1	2					
		2.0mm → 20.0mm		0	0	0	0					
		> 20.0mm		0	0	0	0					
	Level 4 Defect Allow # There is a feel with fingernail (tool: 0.25mm gauge). It does stop	≦ 2.0mm	>0.5mm	0	0	0	0					
		2.0mm → 20.0mm		0	0	0	0					
		> 20.0mm		0	0	0	0					
Grade B	**Level 1 Defect Allow #** It is not easily visible from the front, but it is slightly visible from other angles	≦ 0.5mm	≦ 0.05mm	5	10	12	20	None	Shiny Blemish Stains	Stains Discolor ation	Lite wear and tear	Heavy wear and tear on the pin hole Stains Discoloration Dent
		0.5mm → 20.0mm		2	3	5	7					
		> 20.0mm		0	0	0	0					
	Level 2 Defect Allow # It is visible from any angle. There is no feel with fingernail (tool: 0.25mm gauge)	≦ 1.5mm	≦ 0.25mm	2	5	10	12					
		1.5mm → 20.0mm		0	1	1	2					
		> 20.0mm		0	0	0	0					
	Level 3 Defect Allow # There is a feel with fingernail (tool: 0.25mm gauge). It does not stop	≦ 2.0mm	≦ 0.5mm	2	3	5	6					
		2.0mm → 20.0mm		0	1	1	2					
		> 20.0mm		0	0	0	0					
	Level 4 Defect Allow # There is a feel with fingernail (tool: 0.25mm gauge). It does stop	≦ 2.0mm	>0.5mm	0	0	0	0					
		2.0mm → 20.0mm		0	0	0	0					
		> 20.0mm		0	0	0	0					

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Grade	Allowable Cosmetic Defect Levels	General Surface Area Descriptions:						Acceptable Defects Types by Surface				
		Length	Width	"AA" Display	"A" Bezel	"B" Case, Button	"V" Caseback	"AA"	"A"	"V"	"B Band"	"C"
Grade C	**Level 1 Defect Allow #** It is not easily visible from the front, but it is slightly visible from other angles	≦ 0.5mm	≦ 0.05mm	Unlimited	Unlimited	Unlimited	Unlimited	Same as above Lint Smudge	Same as above Dent Gaps	Same as above Dent Burr	Same as above Heavy wear and tear	Same as above Damage pin hole
		0.5mm → 20.0mm										
		> 20.0mm										
	Level 2 Defect Allow # It is visible from any angle. There is no feel with fingernail (tool: 0.25mm gauge)	≦ 1.5mm	≦ 0.25mm	20	Unlimited	Unlimited	Unlimited					
		1.5mm → 20.0mm		5								
		> 20.0mm		2								
	Level 3 Defect Allow # There is a feel with fingernail (tool: 0.25mm gauge). It does not stop	≦ 2.0mm	≦ 0.5mm	10	20	Unlimited	Unlimited					
		2.0mm → 20.0mm		3	5							
		> 20.0mm		1	2							
	Level 4 Defect Allow # There is a feel with fingernail (tool: 0.25mm gauge). It does stop	≦ 2.0mm	>0.5mm	1	2	Unlimited	Unlimited					
		2.0mm → 20.0mm		0	1							
		> 20.0mm		0	0							
Grade D	**Level 1 Defect Allow #** It is not easily visible from the front, but it is slightly visible from other angles	≦ 0.5mm	≦ 0.05mm	Unlimited	Unlimited	Unlimited	Unlimited	Same as above Foreign Material Pressure Spot Alignment Air Bubble Lifted lens	Same as above Crack	Same as above Hinge foldables Gaps Cracks	Same as above Severe damage Misssing	Same as above
		0.5mm → 20.0mm										
		> 20.0mm										
	Level 2 Defect Allow # It is visible from any angle. There is no feel with fingernail (tool: 0.25mm gauge)	≦ 1.5mm	≦ 0.25mm	Unlimited	Unlimited	Unlimited	Unlimited					
		1.5mm → 20.0mm										
		> 20.0mm										
	Level 3 Defect Allow # There is a feel with fingernail (tool: 0.25mm gauge). It does not stop	≦ 2.0mm	≦ 0.5mm	Unlimited	Unlimited	Unlimited	Unlimited					
		2.0mm → 20.0mm										
		> 20.0mm										
	Level 4 Defect Allow # There is a feel with fingernail (tool: 0.25mm gauge). It does stop	≦ 2.0mm	>0.5mm	Unlimited	Unlimited	Unlimited	Unlimited					
		2.0mm → 20.0mm										
		> 20.0mm										

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Grade	Allowable Cosmetic Defect Levels	General Surface Area Descriptions:										
								Acceptable Defects Types by Surface				
		Length	Width	"AA" Display	"A" Bezel	"B" Case, Button	"V" Caseback	"AA"	"A"	"V"	"B Band"	"C"
Grade E	**Level 1 Defect Allow #** It is not easily visible from the front, but it is slightly visible from other angles	≦ 0.5mm 0.5mm → 20.0mm > 20.0mm	≦ 0.05mm	Unlimited	Unlimited	Unlimited	Unlimited	All	All	All	All	All
	Level 2 Defect Allow # It is visible from any angle. There is no feel with fingernail (tool: 0.25mm gauge)	≦ 1.5mm 1.5mm → 20.0mm > 20.0mm	≦ 0.25mm	Unlimited	Unlimited	Unlimited	Unlimited					
	Level 3 Defect Allow # There is a feel with fingernail (tool: 0.25mm gauge). It does not stop	≦ 2.0mm 2.0mm → 20.0mm > 20.0mm	≦ 0.5mm	Unlimited	Unlimited	Unlimited	Unlimited					
	Level 4 Defect Allow # There is a feel with fingernail (tool: 0.25mm gauge). It does stop	≦ 2.0mm 2.0mm → 20.0mm > 20.0mm	0.5mm <	Unlimited	Unlimited	Unlimited	Unlimited					

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2.8 Functional Classifications

Table 2.8-1 contains examples and general descriptions of minor and major common failures.

Table 2.8-1 General Descriptions of Common Failures

Degree of Failure	Display Failure	Other Failure
Minor	• Missing pixels (less than or equal to 3) • Burn-in image on bar or menu areas • Touch failure for product in which the touch panel is part of the cover lens • All external display defects except cracks	• Flash • Proximity and light sensor • Headset jack • Vibrator • Fingerprint sensor if not linked to the main board • Flip sensor
Major	• Missing pixels (greater than 3) • Burn-in image in center area • Missing or discolored lines • Touch failure (for product in which the touch panel is part of the display) • Dark, white or discolored spots • Insufficient backlight brightness	• Rear camera • Front camera • Speakers or microphones • Side keys • Dead battery • Fingerprint sensor if linked to the main board • Cannot defect SIM or SD card • Does not charge • Cannot connect to PC • Wi-Fi, Bluetooth, GPS

Table 2.8-2 describes how the industry defines key or core functionality for the purpose of conforming to the R2 Equipment Categorization (REC) definition of F3-Key Functions Working.

Table 2.8-2 Key Functionality Definition

Required to work	Function*
Yes	• Fully power up and down with power key • Display turns on with color and brightness • Touch functions in all applicable areas • Detect SIM • Makes and receives calls • Functional earpiece and primary microphone • Charge and discharge • Battery health at 70% or higher

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Required to work	Function*
No	• Volume keys • Vibrator • Cameras and flash • Fingerprint sensor • Wi-Fi, Bluetooth, NFC, and GPS • SD card detections • Headset jack • Wireless charging • Proximity and light sensor • Connectivity to other devices • Backlight brightness
*As applicable	

Table 2.8-3 defines Functional Classification for grading scales criteria as referenced in Table 2.1-1.

Table 2.8-3 Functional Classifications

Type	Power On	Display Failure[1]	Other Failure
1= Fully Functional	Yes	No	No
2	Yes	Minor	No
3	Yes	Minor	Minor
4	Yes	Minor	Major
5	Yes	Major	Minor
6	Yes	Major	Major
7	Yes	Inoperable	Unverified
8	No	Unverified	Unverified
9	Not Tested or Functionality Unverified		
Note: For type 0-6, the display was verified to power up.			

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Table 2.8-4 defines Battery Health Thresholds for grading scales criteria.

Table 2.8-4 Battery Health Thresholds

Type	Battery Health
1	≥ 80%
2	70% - 79%
3	< 70%

Recommended battery health threshold should be equal to or greater than 70% for fully functional classification. For Europe, the recommended battery health threshold should be 80% for fully functional classification [2]. For battery health equal to Type 3, under the REC for Key Functions Working, the battery may or may not be considered functional. A wireless device should function as such that it can be used as a wireless device by an ordinary user for the expected amount of time one would use a wireless device without being plugged into a power source.

2.9 Lock Status

Table 2.9-1 further defines Customer Lock Status for grading scales criteria as referenced in Table 2.1-1.

Table 2.9-1 Customer Lock Status

Type	Cleared Customer Content/Data Wipe	Customer Locked Table 1.3-1
1	Yes	No
2	Yes	Yes
3	No	No
4	No	Yes
5	Unverified	Unverified
Note: Any device must have Type 1 Customer Locked status to be considered a functional device in accordance with the R2v3 REC.		

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Table 2.9-2 and Table 2.9-3 further define Enterprise and Operator Lock Status for grading scales criteria as referenced in Table 2.1-1.

Table 2.9-2 Enterprise Lock Status

Type	Enterprise Locked
1	No
2	Yes
3	Unverified
Note: Any device must have Type 1 or Type 2 Enterprise Locked status to be considered a functional device in accordance with the R2v3 REC.	

Table 2.9-3 Operator Lock Status

Type	Operator Locked
1	No
2	Yes
3	Unverified
Note: Any device must have Type 1 or Type 2 Enterprise Locked status to be considered a functional device in accordance with the R2v3 REC.	

Table 2.9-4 further defines Basic RF Functionality Check Grading Scale for grading scales criteria as referenced in Table 2.1-1.

Table 2.9-4 Basic RF Functionality Check Grading Scale

Type	Test Details
1	No functionality check was conducted
2	Passed functionality check conducted via network detection
3	Failed functionality check conducted via network detection
4	Passed functionality check conducted by making a live call
5	Failed functionality check conducted by making a live call
6	Passed functionality check conducted using an RF shielded box
7	Failed functionality check conducted using an RF shielded box

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2.10 Kit Configuration

Table 2.10-1 further defines Kit Configuration for grading scales criteria as referenced in Table 2.1-1.

Table 2.10-1 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)

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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 contains the cosmetic and functional classification Grading Scale Matrix.

Table 3.1-1 Grading Scale Matrix

Primary Grade	Cosmetic Grade Table 2.7-1	Functional Classification Table 2.8-3	Battery Health Table 2.8-4	Customer Lock Status Table 2.9-1	Enterprise Lock Status Table 2.9-2	Operator Lock Status Table 2.9-3	Basic RF Functionality Check Table 2.9-4
AA	A	1	1	1	1	1 or 2	6
A+	A	1	1	1	1	1 or 2	1, 2, 4, or 6
A	A	1 or 2	1	1	1	1 or 2	1, 2, 4, or 6
B+	B	1 or 2	1 or 2	1	1	1 or 2	1, 2, 4, or 6
B	B	1, 2 or 3	1 or 2	1	1	1 or 2	1, 2, 4, or 6
C+	C	1 or 2	1, 2, or 3	1	1	1, 2, or 3	1, 2, 4, or 6
C	C	1, 2 or 3	1, 2, or 3	1	1	1, 2, or 3	1, 2, 4, or 6
D+	D	1 or 2	1, 2, or 3	1	1	1, 2, or 3	Any
D	D	1, 2, 3, 4, 5, or 6	3	1	1	1, 2, or 3	Any
E	E	Any	3	Any	Any	Any	Any
Note 1: RF not applicable for Wi-Fi only devices.							

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

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Section 4 Simplified Cosmetic Grading Classification for Wearables

Table 4.1-1 contains an example of a simplified version of cosmetic grading for wearables. Any combination or cross reference can be utilized to fit multiple business requirements as needed.

Table 4.1-1 Example Wearable Simplified Cosmetic Grading

Surface => Grade	Display	Bezel	Case	Caseback	Band
A	≤ 2 L1 defects ≤ 1 L2 defects	≤ 3 L1 defects ≤ 2 L2 defects	≤ 4 L1 defects ≤ 3 L2 defects ≤ 1 L3 defects	≤ 6 L1 defects ≤ 5 L2 defects ≤ 2 L3 defects	Like new inbox condition
B	≤ 5 L1 defects ≤ 2 L2 defects ≤ 1 L3 defects	≤ 10 L1 defects ≤ 5 L2 defects ≤ 3 L3 defects	≤ 12 L1 defects ≤ 8 L2 defects ≤ 4 L3 defects	≤ 20 L1 defects ≤ 12 L2 defects ≤ 6 L3 defects	Refurbish or recondition
C	Unlimited L1 defects ≤ 20 L2 defects ≤ 10 L3 defects	Unlimited L1 & L2 defects ≤ 4 L3 defects Dent, Discoloration, Gaps	Unlimited L1, L2 & L3 defects Dent, Discoloration, Gaps	Unlimited L1, L2 & L3 defects Dent, Discoloration, Gaps	N/A

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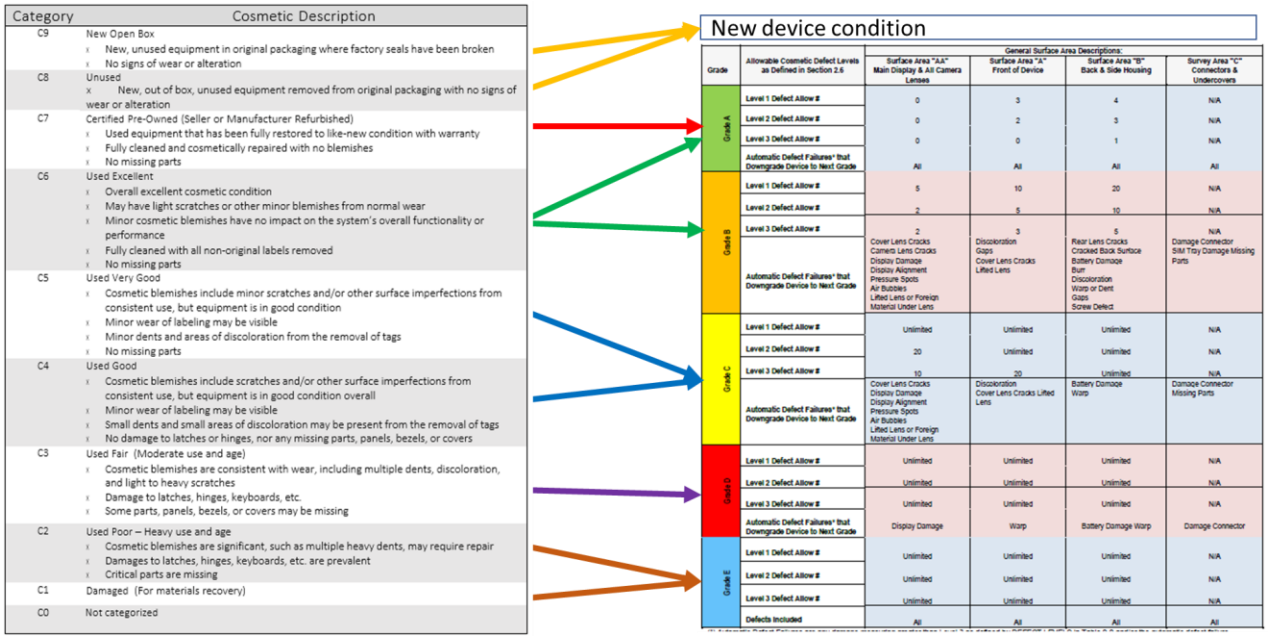
Appendix A Cross-reference analysis of R2v3 Functional Product Categories versus CTIA Wireless Device Grading Scales Definitions

The following provides a mapping illustration between the cosmetic description and functional product categories defined in the R2 Equipment Categorization (REC) and the CTIA functional and cosmetic grading scales. The intent of the mapping is to help identify correlations and alignment between the standards.

A.1 Cosmetic Mapping Illustration



Category	Cosmetic Description
C9	New Open Box x New, unused equipment in original packaging where factory seals have been broken x No signs of wear or alteration
C8	Unused x New, out of box, unused equipment removed from original packaging with no signs of wear or alteration
C7	Certified Pre-Owned (Seller or Manufacturer Refurbished) x Used equipment that has been fully restored to like-new condition with warranty x Fully cleaned and cosmetically repaired with no blemishes x No missing parts
C6	Used Excellent x Overall excellent cosmetic condition x May have light scratches or other minor blemishes from normal wear x Minor cosmetic blemishes have no impact on the system's overall functionality or performance x Fully cleaned with all non-original labels removed x No missing parts
C5	Used Very Good x Cosmetic blemishes include minor scratches and/or other surface imperfections from consistent use, but equipment is in good condition x Minor wear of labeling may be visible x Minor dents and areas of discoloration from the removal of tags x No missing parts
C4	Used Good x Cosmetic blemishes include scratches and/or other surface imperfections from consistent use, but equipment is in good condition overall x Minor wear of labeling may be visible x Small dents and small areas of discoloration may be present from the removal of tags x No damage to latches or hinges, nor any missing parts, panels, bezels, or covers
C3	Used Fair (Moderate use and age) x Cosmetic blemishes are consistent with wear, including multiple dents, discoloration, and light to heavy scratches x Damage to latches, hinges, keyboards, etc. x Some parts, panels, bezels, or covers may be missing
C2	Used Poor – Heavy use and age x Cosmetic blemishes are significant, such as multiple heavy dents, may require repair x Damages to latches, hinges, keyboards, etc. are prevalent x Critical parts are missing
C1	Damaged (For materials recovery)
C0	Not categorized

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 Burn 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 Ports
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

R2v3 Cosmetic Description Categories order was reversed for a better comparison.

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A.2 Cosmetic Mapping Detail

REC Cosmetic Category	CTIA Grade
C0	Grade N: Not Graded
C1	Grade E: Heavy cosmetic damage with display internal structure damage.
C2	Grade E: Heavy cosmetic damage with display internal structure damage.
C3	Grade D: Heavy cosmetic damage with cover lens cracks.
C4	Grade C: More aggressive wear and tear
C5	Grade C: More aggressive wear and tear
C6	Grade A: Like new condition Grade B: Light wear and tear
C7	Grade A: Like new condition
C8	Grade New: New Condition
C9	Grade New: New Condition

A.3 Functional Mapping Detail

REC Functional Category	CTIA Functional Classification
F1	Not applicable for wireless devices
F2	Not applicable for wireless devices
F3	Type 2
F4	Not applicable for wireless devices
F5	Type 1
F6	0= Fully Functional with cosmetic “A” Grade

R2v3 does not have functional categories for CTIA Functional Classifications 3, 4, 5, 6, 7, 8 and 9. Devices with CTIA functional classifications 3-9 are subject to R2 controlled streams as equipment/components for test & repair.

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A.4 Cross Reference Chart - Acceptable Functional and Cosmetic Categories Combined

R2V3 REC (Functional and Cosmetic)	CTIA Grading Scales (Functional and Cosmetic)
F6, C7	0, A
F5, C6	1, A-B
F3, C3-C6	2, A-D

Additional considerations for R2 Certified Facilities for functioning equipment and components not subject to downstream R2 control are as follows:

- **Data Sanitization Status**: Wireless devices must be logically sanitized with software in accordance with Appendix B [3]. When no software exists that fully automates, controls, and records the data sanitization results, wireless devices must be processed in accordance with R2v3 Formal Interpretation #1.0 [3].

- **Lock Status**: Wireless devices with encumbrances, of any type that prohibit the wireless device from being tested for functionality, cannot be classified as Functional. Therefore, these wireless devices are R2 Controlled Streams.

- **Battery Health**: For battery health equal to Type 3, under the REC for Key Functions Working [3] the battery may or may not be considered functional. A wireless device should function as such that it can be used as a wireless device by an ordinary user for the expected amount of time one would use a wireless device without being plugged into a power source.

- Wireless devices that do not meet the above requirements cannot be categorized as Functional Product no longer subject to downstream R2 control. Those wireless devices are R2 Controlled Streams subject to downstream vendor qualifications in accordance with Appendix A [3].

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Appendix B Revision History

Date	Version	Description
December 2018	1.0	Initial release of document
December 2019	1.1	• Revised Figure 2-2: Top to Bottom Side View • Added introduction to Section 2.3: Surface Area Definitions • Added Pressure Spot definition to Section 2.4: Defect Definitions Surface • Revised Figure 2-12: Battery Contacts for Customer Removable Battery • Added note to Table 2-2: Defect Levels • Revised Table 2-4: Cosmetic Grading Scales: Defect By Surface Area Table
September 2021	2.0	• Updated Table 1.3 1 Definitions to include “operator lock” and “enterprise lock” • Updated figure titles in Section 2 • Added illustrations of defined tablet surface areas to Section 2 • Streamlined Table 2.8 1 Functional Classifications definitions • Split lock status tables into Table 2.9 1 and Table 2.9 2 • Added “Enterprise Lock” column in Table 2.9 2 • Streamlined functional classifications in Table 3.1 1 Example Grading Scale Matrix and added in Enterprise Lock detail • Added footnotes to Table 3.1 1
September 2023	3.0	• Expanded the definition of “devices” in scope to include wearables and fitness trackers. • Added figure of “AA” Surface Example for Wearables • Added figure of “A” Surface Example for Wearables • Added figure of “B” Surface Example for Wearables • Added figure of “C” Surface Example for Wearables • Added table 2.7 2 Wearable Surface View and Classification • Added Section 4 Simplified Cosmetic Grading Classification for Wearables • Added recommended battery health threshold for Europe based on regulation released by the European Commission
March 2024	4.0	• Added encumbrance to Table 1.3-1 • Updated Section 1.4 • Added Table 2.8-2 Fully Functional Definition • Expanded notation under Table 3.1-1 Battery Health Thresholds. • Added notation on **Error! Reference source not found.** • Added Appendix A1, A2, A3 and A4

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Date	Version	Description
July 2025	5.0	• Added definition of “basic RF testing” to Table 1.3-1 • Modified Table 2.1-1 • Removed Figure 2.3-11 • Replaced Figure 2.3.12 with Figure 2.3-11 and retitled it “B and V” Surface Example for Wearables” • Updated Table 2.6-1 • Revised Battery Health criteria for all grades on Table 3.1-1 • Split Table 2.9-2 into two tables (2.9-2 and 2.9-3) and updated values. • Changed 2.10 Table Name to “Basic RF Functionality Check”. On the same table, between 1 and 2, add two more types supporting network detection/antennae performance. • Added in AA primary grade as the premier grade on Table 3.1-1 • Revised A+ to reflect cosmetic grade A and fully functional pass on Table 3.1-1 • Removed Field Usage as a qualifier for all grades on Table 3.1-1 • Moved ‘Side Keys’, ‘Front Camera’, and ‘speaker/microphone’ into Major Defect category on Table 2.8-1 • Modified scratch levels to emphasize depth for broader application as reflected in Table 2.7-1 • Separated Operator and Enterprise Lock Status on Table 3.9-4 for Enterprise Lock Status and Table 2.9-5 for Operator Lock Status, and updated grade criteria on Table 2.9-4. • Table 3.1-1 separated Operator Lock and Enterprise Lock. Revised Table 2.9-2. • Updated Table 2.7-1 to expand Grade C acceptance • Removed “0” from Table 3.1-1 to clarify that Functional = 0 and Functional = 1 were the same

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