



Wireless Device Triage Criteria and Definitions

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Section 1 Introduction

1.1 Purpose

This document defines the wireless industry common lexicon and process for triaging wireless devices. The intent is to provide a comprehensive list of device issues reported by customers, laboratories, repair and triage facilities, and front-line personnel. These issues are separated into general and sub-categories, each accompanied by a list of what a customer might identify as a problem. The list will be used by a variety of stakeholders across the wireless industry to improve field data reporting, map customer-facing issues with their ultimate cause, and enable better tracking for lab-identified issues.

1.2 Scope

The scope of this document is limited to smartphones, feature phones, tablets, and smartwatches. This data will be collected, shared, and reviewed by the industry working group to improve design validation testing prior to the launch of a new product with the intent of improving the consumer's experience with their devices and therefore providing a more sustainable product.

1.3 Reference Documents

[1] CTIA Certification Device Hardware Reliability Test Plan,
<https://ctiacertification.org/test-plans/>

[2] CTIA Certification Wireless Device Grading Scales Criteria and Definitions,
<https://ctiacertification.org/reverse-logistics-and-service-quality/>

1.4 Acronyms and Definitions

Table 1.4-1 Acronyms and Definitions

Acronym	Definition
DHR	Device Hardware Reliability
GPS	Global Positioning System
LDI	Liquid Damage Indicator
LED	Light-Emitting Diode
NFC	Near-field communication
PCBA	Printed Circuit Board Assembly
RF	Radio Frequency
SD Card	Secure Digital Card

Acronym	Definition
SIM	Subscriber Identity Module
SW	Software
UI	User Interface
USB	Universal Serial Bus

Section 2 Symptomatic Issues

Table 2-1 shows examples of how a consumer might describe an issue that they are having with their device and how a support technician would validate it. The data collection process begins by capturing the customer expressed issue when a consumer reaches out to their original equipment manufacturer (OEM), or 3rd-party repair provider for support. The recommended common data collection system should have the group and item fields available for additional subcategorization.

Table 2-1 Symptomatic Issues

Group	Item	Customer Expressed Issue	Additional Specific Definitions
Power	Function	Device will not turn on and does not vibrate, make sounds, etc. when buttons are pressed or it is plugged into a charger	Device does not report when plugged into a PC in addition to the symptoms listed
	Wired Charging	The battery indicator does not show the device is charging when it is put on a charger	No measured current draw by the device
	Wired Fast Charging	The device indicates it is charging slowly when plugged into a fast charger	Low measured current draw from external power
	Wireless Charging	The device does not charge when placed on a wireless charger	No recognition of wireless charger when using the OEM-identified wireless charging protocol
Battery	Low Charging Speed	The battery does not seem to charge as quickly as it should	Normal current draw from external power, charging cycle is x% slower than OEM specification
	Fast Discharge	The battery runs down very quickly and the device gets hotter than normal The battery indicator shows sudden drops in charge level	Excess current draw from battery as compared with normal use profile
	Poor Capacity/Will Not Hold Charge	The battery does not last very long when used normally	% of rated capacity
	Physical Damage or Distortion	The device looks like it has a gap between the frame and back cover The back cover of the device seems to be bulging outward The device lit on fire and/or produced smoke and sparks	Clear distension of back cover, or gap between back cover and frame clearly caused by inflated pack
Display	Dead Pixels	The screen has small black or colored dots	Any number of dead or stuck pixels. May be intermittent.
	Bruising	The screen appears to have ripples There are darker or lighter spots on the screen There are large, discolored spots on the screen	Localized variations of color or brightness of the display when a pure white display is viewed from oblique angles

Group	Item	Customer Expressed Issue	Additional Specific Definitions
	Lines	The screen has horizontal or vertical lines that are black or colored	Any number of dead or stuck lines. May be intermittent
	Operation	The device powers on, but nothing is shown on the screen	Device appears to function normally, but nothing displayed on the screen
	Brightness	The screen is not bright enough or is too bright	%lumens of reference device
	Color	The entire screen has a distinct colored tint	Color balance off compared with reference device
	Lift	There is a gap between the screen and side of the phone	Gap of 0.4mm or more measured with feeler gauge
	Bendable Screen Damage	There are gouges, ripples or peeling damage to the bendable displays	
	Foreign Material	There appears to be dust or other debris under the screen glass	
	Black Spots	There are large black spots on the screen	Multi-pixel black spots with smooth edges on lit display
	Light Bleed	The edges of the display are washed out The edges of the display are noticeably brighter on a dark UI	
	Burn-In	There is a faint image on the screen that is always there	Rotate device to switch screen between portrait and landscape to determine if faint image stays in the sample place
Touchscreen	One Finger Tap	The device does not behave normally when tapped with one finger	
	Operation	The device does not respond to any taps, swipes, etc.	
	Double Tap	The device does not behave normally when tapped with one finger in quick succession	
	One Finger Hold	The device does not behave normally when tapped and held with one finger	
	One Finger Swipe	The device does not behave normally when swiped with one finger	
	One Finger Flick	The device does not behave normally when flicked with one finger	
	Two Finger Rotation	The device does not behave normally when two fingers are used to rotate an object	
	Two Finger Scale	The device does not behave normally when two fingers are used to zoom in or out on an object	
	3D Touch		

Group	Item	Customer Expressed Issue	Additional Specific Definitions
Mechanical	Power Key	<p>The power button is stuck</p> <p>The power button is damaged or missing</p> <p>Device will not power on or off when the power button is pressed</p> <p>The power button does not feel like it clicks when pressed</p> <p>Device can only be powered up using other controls</p>	
	Volume Keys	<p>Volume does not increase or decrease when the volume buttons are pressed</p> <p>The volume button(s) are/is stuck</p> <p>A volume button is damaged or missing</p> <p>A volume button does not feel like it clicks when pressed</p> <p>Volume can only be adjusted using other controls</p> <p>Powers up outside of Home screen</p>	
	Utility Keys/Switches/Buttons	<p>A button or switch is damaged, stuck or missing</p> <p>The device does not respond normally when a button or switch is used</p> <p>A button or switch does not feel like it clicks when used</p>	
	Audio Plug Insertion	<p>Cannot insert the headphone plug completely</p> <p>Headphone plugs fall out, or move easily when plugged in</p> <p>Audio can only be heard on headphones when the plug is pressed on</p>	
	Data Connector Insertion	<p>Cannot insert the charging/data plug completely</p> <p>Debris or object stuck inside the charging port</p> <p>Device only charges or connects to a PC when the plug is pressed on</p>	
	Stylus	<p>The stylus falls out of the device on its own</p> <p>The stylus body, buttons, or tip is damaged</p> <p>Cannot insert the stylus completely</p> <p>The device does not respond to the stylus being used on the screen</p>	

Group	Item	Customer Expressed Issue	Additional Specific Definitions
	SIM Tray/Slot	<p>The SIM tray does not fully seat in the SIM tray slot</p> <p>The SIM card does not click into place</p> <p>The SIM card falls out of the SIM tray</p> <p>The device does not recognize a SIM card when it is inserted</p> <p>The SIM tray is damaged</p>	Check for gasket damage
	External Storage Tray/Slot	<p>The storage card tray does not fully seat in the SIM tray slot</p> <p>The storage card does not click into place</p> <p>The storage card falls out of the tray or slot</p> <p>The device does not recognize a storage card when it is inserted</p> <p>The storage card tray is damaged</p>	
	Slider	<p>The device slide does not work smoothly or gets stuck</p> <p>The slider makes noise when used</p>	
	Hinge	<p>The device does not flip open or close smoothly</p> <p>The device makes noise when flipped open or closed</p>	
Audio	Volume	<p>Volume up doesn't work</p> <p>Volume down doesn't work</p>	Compare with reference device
	Speaker Function	Speaker sound is muted or distorted	Compare with reference device or use on-device diagnostic app if available
	Speaker Quality	<p>Static/Tinny noise when listening to media</p> <p>Not loud enough when listening to media</p>	Compare with reference device or use on-device diagnostic app if available

Group	Item	Customer Expressed Issue	Additional Specific Definitions
	Headset Audio	<p>Crackling noise in the headphones, earbuds or external accessories when listening to media</p> <p>An object stuck in the headphone jack or debris inside</p> <p>No sound at all when plugged into headphones, earbuds, or external accessories</p> <p>Not loud enough when listening to media</p> <p>Caller can't hear me</p> <p>Can't hear caller</p> <p>Intermittent audio from caller or when listening to media</p> <p>Intermittent audio to caller or when listening to media</p>	Compare with reference device or use on-device diagnostic app if available
	Microphone Function	Microphone does not work or person you are speaking to does not hear you when on a call	Compare with reference device or use on-device diagnostic app if available
	Microphone Quality	<p>Static/Tinny noise to caller</p> <p>Not loud enough to caller</p> <p>Caller can't hear me</p> <p>Intermittent audio to caller</p>	Compare with reference device or use on-device diagnostic app if available
Sensors	Proximity	<p>Screen stays on during a call</p> <p>Screen stays dark during a call when not near the face</p>	Use on-device diagnostic app if available, else, compare behavior to reference device.
	Accelerometer Gyroscope	<p>Pictures do not rotate when device is turned</p> <p>Device doesn't respond to motion while playing game</p> <p>Shake to activate Google Assistant does not work</p> <p>Level apps do not work</p> <p>3D Background Effects do not work</p> <p>Steps are not be recorded</p>	Use on-device diagnostic app if available, else, compare behavior to reference device
	Barometer	<p>Elevation readings not captured</p> <p>GPS accuracy is poor</p>	Use on-device diagnostic app if available, else, compare behavior to reference device
	Lux Sensor	<p>Screen too bright/dark when on automatic brightness setting</p> <p>Screen stays dark</p>	Use on-device diagnostic app if available, else, compare behavior to reference device

Group	Item	Customer Expressed Issue	Additional Specific Definitions
	Fingerprint	Fingerprint sensor will not unlock device Fingerprint sensor works intermittently	Use on-device diagnostic app if available, else, compare behavior to reference device
Camera	Front Camera Function	Camera app will not open	Take image and video to confirm symptoms
	Front Camera Quality	Camera app crashes Cracks or scratches on the lens	Take image and video to confirm symptoms
	Rear Camera Function	Debris on the lens	Take image and video to confirm symptoms
	Rear Camera Quality	Camera is not showing correct colors No function at all No flash Can't zoom Image unsteady Dark image Blurry image (Can't focus) Panoramic/portrait/other features don't work Mechanical zoom noisy No preview	Take image and video to confirm symptoms
Calls	Audio Call Placement	Calls don't go through (Can't initiate call)	If available, use RF Test box to place call. If not, use live network and check for call quality vs. a reference device. If possible, capture SW log. Unit sustain a minimum call duration of 30 seconds.
	Audio Call Reception	Calls get dropped Can't receive call	
	Call Audio Quality	Static/Tinny noise when on a call Not loud enough when on a call Caller can't hear me when on a call Can't hear caller when on a call Intermittent audio from caller when on a call Intermittent audio to caller when on a call	
	Video Call Function	Can't initiate video call/ receive video call	

Group	Item	Customer Expressed Issue	Additional Specific Definitions
	Call Video Quality	<p>Static/Tinny noise</p> <p>Not loud enough</p> <p>Caller can't hear me</p> <p>Can't hear caller</p> <p>Intermittent audio from caller</p> <p>Intermittent audio to caller</p> <p>Choppy image</p> <p>Poor resolution video</p> <p>Can't see caller</p> <p>Caller can't see me</p> <p>Unsteady image</p>	
Connectivity	Cellular Data Function	Device does not work when roaming	
	Cellular Data Speed	Slow download speeds	If available, check with "speed test" app and compare results to the reference device
	WiFi	<p>The device will not connect to Wi-Fi</p> <p>Device drops from Wi-Fi</p> <p>Poor range/signal strength</p> <p>Can't make Wi-Fi calls</p> <p>Wi-Fi slow data speeds</p> <p>Wi-Fi compatibility 2G/5G</p>	If available, use RF Test box to place call. If not, use live network and check for call quality vs. a reference device using an agreed upon 3rd party WiFi calling app. If possible, capture sw log. If available, check with "speed test" app and compare results to the reference device.
	GPS	<p>Location service doesn't work</p> <p>Location is inaccurate when navigating</p>	In navigation app, select two locations and search for directions. Compare to the reference device and look for deviations.
	Bluetooth	<p>Bluetooth does not connect/pair</p> <p>Cannot recognize particular device</p> <p>Bluetooth connection intermittently drops</p> <p>Poor audio when on Bluetooth</p> <p>Can't share files</p>	Use agreed upon Bluetooth audio device, pair, and check for audio quality difference between the reference device. If a connection is made, assume that the Bluetooth is functional; i.e., that the data is also functional.

Group	Item	Customer Expressed Issue	Additional Specific Definitions
	NFC	<p>Pay with device doesn't work</p> <p>Cannot recognize security peripherals</p> <p>Can't share my files with other devices</p>	<p>Use agreed upon NFC tag with a prepopulated web address. Compare results to the reference device.</p>
	Wired Data Connection	<p>Can't communicate with my device from host device</p>	<p>Connect to a host pc with the OEM approved USB Cable. Compare performance to the reference device and the OEM advertised specification.</p>
	RF Performance	<p>Drops calls</p> <p>Can't make or receive calls</p> <p>Cannot send/receive messages</p> <p>Static noise during call</p> <p>Can't access desired coverage 2/3/4/5G</p> <p>Poor signal strength in known good area</p> <p>Can't access desired carrier</p> <p>Can't send or received SMS</p>	<p>If available, use RF Test box to place call. If not, use live network and check for call quality vs. a reference device. If possible, capture software log. If available, check with "Speed test" app and compare results to the reference device.</p>
Vibration	Vibration Function	<p>Device doesn't vibrate</p> <p>Device weak vibration</p> <p>Does behave as expected</p> <p>Doesn't stop vibrating</p> <p>Excessive noise during vibration</p> <p>Does not stop vibrating</p>	<p>Use on-device diagnostic app if available, else set to vibrate and send call/message</p>
Stylus	Stylus Function	<p>Stylus unresponsive</p> <p>Buttons do not work</p> <p>Does not detect soft/hard touch</p> <p>Skips or is intermittent</p> <p>Phone does not detect insertion</p> <p>Cannot be reinserted</p> <p>Does not charge</p> <p>Stylus is physically broken</p>	<p>Simple functional test</p>

Group	Item	Customer Expressed Issue	Additional Specific Definitions
External Storage	Storage Media Function	Will not recognize SD Card Can't save or open files Can't format external memory	Test with pre-approved SD Card and compare to the reference device
SIM	SIM Card Recognized	Device doesn't register to the cellular network Detects wrong network Will only make emergency call Not recognized by phone	Check with known-good card
LED	Notification LED	LED doesn't turn on LED does not change color from red to green or green to red LED dim	Use on-device diagnostic app if available. Else, plug in charging cable. Check the LED color. It should change from red to green when fully charged.
Flashlight	Flashlight Function	Flashlight doesn't turn on Flashlight will not turn off Flashlight dim	
Physical Damage	Display Glass Cracking	Display is cracked but still works Display is cracked and doesn't work	
	Back Cover Damage	Back cover cracked Back cover separated from housing Markings absent/not legible	
	Housing Gap	Noticeable gaps between housings Uneven gaps along peripheral	'Moderate Gap' in [1] is defined as admitting a 0.4 mm feeler gauge.
	Damage SIM Tray	Unable to insert or remove SIM tray	
	Bent Device	Device is not flat	Place device face-down on a flat surface. Gap of more than 1 mm as measured with a feeler gauge is a fail.
	Loose Part Inside	Rattling noise inside	
	Flip Hinge	Over bent flip Flip will not open/close	

Group	Item	Customer Expressed Issue	Additional Specific Definitions
	Camera Lens Cover Damage	Camera lens is cracked but still works Debris in Lens Camera Lens lifted/delaminated Camera Lens missing Camera lens is cracked and doesn't work	Take a picture using all cameras. Is the picture affected by the physical damage?
	Liquid Damaged	Device exposed to rain Device exposed to spill Device submerged in liquid Liquid in USB and/or Headset Jack Device unable to charge due to moisture detection in the charging port Condensation in Camera Lens	Check for visible signs of corrosion on the circuit boards
Software	Home Button/Gesture	Navigations soft keys not responding	Compare to reference device with the same SW version
	Back Button/Gesture		
	Software Update	Device does not get updates Does not function after update Functionality changed after update	
	Custom Bootloader	Device does not perform as expected	
	App Crashing	Device slows down, freezes, or turns off unexpectedly	Compare to reference device with the same SW version
	Will Not Boot	Upon power up it gets stuck at Android icon Will not boot to Home Screen Stuck in Factory Mode	

Group	Item	Customer Expressed Issue	Additional Specific Definitions
	UI Speed	Device Sluggish/Unresponsive	Use on-device diagnostic app if available. Else, compare behavior to reference device. Check memory capacity to determine if the lack of available storage is affecting the unit.

Section 3 Failure Found Issues

Table 3-1 shows typical examples of failures found by a support technician after validating the consumer's issue. The data collection process begins when a support technician validates the customer expressed issue. The recommended common data collection system should have the group and item fields available for additional subcategorization.

Table 3-1 Failure Found Issues

Group	Item	Technician Failure Found	Notes
Power	Function/ No Turn On	Defective PCBA Defective Battery Defective Power Key Intermittent Connection - unseated connector	
	Device Resets Intermittently	Defective PCBA Defective Battery	
	Wired Charging	Defective PCBA Defective wired charger	
	Wired Fast Charging	Defective PCBA Defective wired charger Wrong wired charger	
	Wireless Charging	Defective wireless antenna Defective PCBA Defective wireless charger	
Battery	Low Charging Speed	Defective battery Defective PCBA Wrong Charger	
	Fast Discharge	Defective battery Defective PCBA	
	Poor Capacity/Will Not Hold Charge	Defective battery Defective PCBA	

Group	Item	Technician Failure Found	Notes
	Physical Damage or Distortion	Physical damage of the battery Swollen battery	
Safety	Fire/Sparks	Physical damage Swollen battery Damaged/Corroded USB Connector Wrong charger Liquid damage	
	Shock	Physical damage PCBA Malfunction Charger Malfunction Wrong Charger	
	Excessive Heat	PCBA Malfunction Damaged/corroded USB Connector Damaged/missing heat spreader	
Display	Dead Pixels	Defective display	
	Bruising	Defective display	
	Lines	Defective display	
	Operation	Defective display Intermittent Connection - Unseated connector	
	Brightness	Defective display	
	Color	Defective display	
	Lift	Defective display bond to enclosure	
	Bendable Screen Damage	There are gouges, ripples or peeling damage to the bendable displays	
	Foreign Material	Defective display Defective display bond to enclosure Missing/damaged seals	
	Black Spots	Defective display	
	Light Bleed	Defective display	
Burn-In	Defective display		

Group	Item	Technician Failure Found	Notes
Touchscreen	One Finger Tap	Defective display Software malfunction - app, firmware	
	Operation	Defective display Intermittent Connection - unseated connector Software malfunction - app, firmware	
	Double Tap	Defective display Software malfunction - app, firmware	
	One Finger Hold	Defective display Software malfunction - app, firmware	
	One Finger Swipe	Defective display Software malfunction - app, firmware	
	One Finger Flick	Defective display Software malfunction - app, firmware	
	Two Finger Rotation	Defective display Software malfunction - app, firmware	
	Two Finger Scale	Defective display Software malfunction - app, firmware	
	3D Touch	Defective display Software malfunction - app, firmware	
Mechanical	Power Key	Defective switch/flexible circuit Intermittent Connection - unseated connector Defective PCBA	

Group	Item	Technician Failure Found	Notes
	Volume Keys	Defective switch flexible circuit Intermittent Connection - unseated connector Defective PCBA	
	Utility Keys/Switches/Buttons	Defective switch/flexible circuit Intermittent Connection - unseated connector Defective PCBA	
	Audio Plug Insertion	Defective PCBA Damaged Headset Connector	
	Data connector Insertion	Damaged USB Connector Defective PCBA Defective USB Cable Wrong USB Cable	
	Stylus	Defective Stylus Defective PCBA - Active Stylus only Software malfunction	
	SIM Tray/Slot	Defective/damaged SIM/SD Card Tray Defective damaged SIM Connector Defective SIM Card	
	External Storage Tray/Slot	Defective damaged SD Connector Defective SD Card	
	Slider	Defective Slider	
	Hinge	Defective Hinge	
Audio	Volume	Defective Speaker Defective Earpiece Defective PCBA	

Group	Item	Technician Failure Found	Notes
	Speaker Function	Defective Speaker Contaminated Port - Foreign material blocking Defective Earpiece Defective PCBA	
	Speaker Quality	Defective Speaker Contaminated Port - Foreign material blocking Defective Earpiece Defective PCBA	
	Headset Audio	Defective Headset Jack Contaminated Port - Foreign material blocking Defective PCBA	
	Microphone Function	Defective Mic Defective PCBA Contaminated Port - Foreign material blocking	
	Microphone Quality	Defective Mic Defective PCBA	
Sensors	Proximity	Defective/Missing/Misassembled Grommet Defective Sensor Defective PCBA	
	Accelerometer Gyroscope	Defective Sensor Defective PCBA	
	Barometer	Defective Sensor Defective PCBA	Not consumer detectable
	Lux Sensor	Defective/Missing/Misassembled Grommet Defective Sensor Defective PCBA	

Group	Item	Technician Failure Found	Notes
	Fingerprint	Defective Sensor Defective PCBA Unseated/Misaligned Connector	
Camera	Front Camera Function	Defective Camera	
	Front Camera Quality	Unseated/Misaligned Connector	
	Rear Camera Function	Contamination	
	Rear Camera Quality		
Calls	Audio Call Placement	Defective Housing Defective PCBA	
	Audio Call Reception	Defective Housing Defective PCBA	
	Call Audio Quality	Defective Housing Defective PCBA	
	Video Call Function	Defective Housing Defective PCBA	
	Call Video Quality	Defective Housing Defective PCBA	
Connectivity	Cellular Data Function	Defective Housing Defective PCBA	
	Cellular Data Speed	Defective Housing Defective PCBA	
	WiFi	Defective Housing Defective PCBA	
	GPS	Defective Housing Defective PCBA	
	Bluetooth	Defective Housing Defective PCBA	
	NFC	Defective Sensor Defective PCBA Unseated/Misaligned Connector	

Group	Item	Technician Failure Found	Notes
	RF Performance	Defective Housing - Ground Contacts, Antenna Defective PCBA Unseated/damaged Coaxial Cable	
Vibration	Vibration Function	Defective Vibrator Defective PCBA Unseated/Misaligned Connector	
Stylus	Stylus Function	Defective Stylus Defective PCBA Defective Touch Screen	
External Storage	Storage Media Function	Defective SD Card Defective SD/SIM Tray Defective PCBA Damaged Connector	
SIM	SIM Card Recognized	Defective SIM Card Defective SIM Tray Defective PCBA Damaged Connector	
LED	Notification LED	Defective PCBA Defective/Missing Lightpipe Defective LED	
Flashlight	Flashlight Function	Defective PCBA Defective Flash	
Physical Damage	Display Glass Cracking	Cover Glass Damage Display Glass Damaged	
	Back Cover Damage	Back Cover Damage	
	Housing Gap	Housing Gap	
	Damage SIM Tray	Damaged SIM Tray	
	Bent Device	Bent Device	
	Loose Part Inside	Loose Part Inside	
	Flip Hinge	Flip Hinge	

Group	Item	Technician Failure Found	Notes
	Connector Damage	Connector Pins bent or missing; USB, Headset Jack, SIM Card, External Storage	
	Camera Lens Cover Damage	Camera Lens Cover Damage	
	Liquid Damaged	Liquid Damaged - Corrosion evident in one or more components Device unable to charge due to moisture detection in the charging port Failed barometric test Damage to Housing snaps/external seal compromised	
	Unauthorized Repair	Improper assembly, unauthorized components, missing parts, damaged parts	
	LDI Tripped	LDI Tripped	Not a consumer complaint
	LDI Missing	LDI Missing/Tampered with	Not a consumer complaint
	Software	Home Button/Gesture	Outdated Software
Back Button/Gesture			
Software Update			
Custom Bootloader		Unlocked/Rooted Bootloader	What is the problem? Can't unlock Bootloader?
App Crashing		Outdated Software 3rd Party App Failure	
Will Not Boot		Corrupted Software Defective PCBA	
UI Speed		Outdated Software 3rd Party App Failure	
No Trouble Found	All	Passes all tests and inspections Could not duplicate customer reported issue Didn't meet customer expectations No complaint documented	

Appendix A Revision History

Date	Version	Description
April 2022	1.0	Initial release