

JBL Charge 6

Software Requirement Document

Revision 2.1

Jul 11, 2024

Title:	JBL Charge 6 SRD	Revision:	2.1
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Table of Revisions:

Revision	Description	Date	Author	Approval
1	Initial draft	2023-11-17	Chloe Mai	Phoebe Lang
1.1	1. Add AAC support 2. Add BT5.4 support 3. Remove Partyboost mode support 4. Modify Auracast Audio delay to 330ms 5. Set Unicast/Long Lasting Stereo to OTA stage	2024-3-18	Chloe Mai	Phoebe Lang
2	1. Modify Power state 2. Modify to 9 SKU 3. Specify reconnection in BT_003, BT_013 4. Remove partyboost 5. Update the audio delay for SBC and AAC	2024-4-26	Chloe Mai	Phoebe Lang
2.1	1. Update FP_006, BT_010 2. Add power tone for critical low battery (TON_001) 3. BT_008, Multi-Points 4. PWR_007, Standby Mode	2024-7-11	Chloe Mai	Phoebe Lang

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1 Scope

The scope of this document is to describe the product software requirements. Specific model names are *JBL Charge 6*.

1.1 Requirements Language

Requirements in this document are defined with one of the following terms:

- **Mandatory** – These are essential to the target market's customer requirements, consumer expectations and the anticipated competitive products. These features are deemed essential to meeting sales goals for this product.
- **Highly Desirable** – These are not essential to achieving the sales forecast, but their inclusion represents potential upside to the sales forecast as they are meant to provide additional value and/or differentiation from competitive products. Every reasonable effort should be made to include them.
- **Optional** – These have a lesser impact to the sales forecast and should only be included if there is no significant impact to the cost or development schedule of the product.
- **Unsupported** – These are not support on the product and are filled with the **Yellow** color.

1.2 Reference Documents

- PRD JBL Charge 6 v0.8.docx
- JBL Charge 5 SRD_V0.5.docx
- JBL Charge 6 BLOCK DIAGRAM V2.0
- EE/ME/AE/CMF Spec (TBD)

1.3 Terms & Abbreviations

SBC	Sub Band Coding
AAC	Advanced Audio Coding
LC3	Low Complexity Communications Codec
PCM	Pulse Code Modulation
Apt-X	Audio Processing Technology
A2DP	Advanced Audio Distribution Profile
AVRCP	Audio/Video Remote Control Profile
AVDTP	Audio Video Distribution Transport Protocol
HFP	Hands-Free Profile
HSP	Headset Profile
BT	Bluetooth
PA	Public Address (PA) system
TBC	To Be Confirmed
TBD	To Be Defined
GFPS	Google Fast Pair Service

Table 1 Terms& abbreviations

2 Overview

The JBL Charge 6 is *the next gen of Charge Series*.

Following is the overview feature list:

No.	Features	Requirement
1	Bluetooth 5.4 with LE	Mandatory
	General requirement	Mandatory
	Multi-points (up to 2 connections)	Mandatory
	Auto Reconnection	Mandatory
	Device ID Profile	Mandatory
	A2DP profile v1.4	Mandatory
	SBC codec	Mandatory
	AAC codec	Mandatory
	APT-X codec	No
	LC3 codec	Mandatory
	AVRCP profile v1.6	Mandatory
	Volume Sync	Mandatory
	Hands Free Profile v1.6	No
	Echo Cancellation	No
	Battery Indicator	No
	BT App Support	Mandatory
	Device Rename	Mandatory
	BLE / GATT for iOS and Android	Mandatory
	OTA Upgrade	Mandatory
	BT LE Audio	Mandatory
	Multi Stream Audio	Mandatory
	Broadcast Audio	Mandatory
	Source	Mandatory
	Sink	Mandatory
2	JBL PartyBoost mode	No
3	JBL Auracast mode	Mandatory
4	Built-in detachable rechargeable battery	Mandatory
5	Charge in&out: 1x USB C PD	Mandatory
6	3.5mm Aux input	No
7	Demo mode	Mandatory
8	JBL App (JBL Portable)	Mandatory
9	Software Upgrade (factory)	Mandatory
10	Google Fast Pair V3.1	Mandatory
11	Basic features	Mandatory

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12	Initial pairing	Mandatory
13	Sub-sequential pairing	Mandatory
14	Extension features	Mandatory
15	Retroactive pairing	Mandatory
16	Personalized name	Mandatory
17	Battery notifications	NO
18	Find my devices	NO
19	Device Data Analysis	Mandatory
20	Support Harman AI Sound Boost	Mandatory
21	USB-HID automation test	Mandatory
22	Hi-Res Audio playback through BT and Demo mode	No
23	AMP boost control in SOC	No
24	Long lasting stereo group by Auracast	Mandatory (OTA)

Table 2 Product Features

3 User Interaction

3.1 Buttons & LEDs

Button Pattern	Action	Indicator
Volume + & Bluetooth	Press and hold <u>to power on</u>	Enter HID DFU mode in off Mode
Volume + & Play/Pause	Long press > 2s	Reset to factory default in On Mode.
Bluetooth & Volume - & Volume +	Very long press > 10s	Enter to ATS (auto exit when unit turn off)
Volume - & Bluetooth	Long press > 10s	Enter/ Exit by-pass mode Remark: before PV, use simple way to long press this combination key to enter/exit by-pass mode. After PV, by default this function is disabled and it needs to enter the ATS mode to enable it through commands (For details, pls check the guide). by-pass works in normal and demo mode if by-pass flag has been enabled.

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Volume - & Auracast	Long press > 2s	Show SW and PD version in On Mode.
Bluetooth & Play/Pause	Long press >10s	Enter Demo mode in On Mode.
Bluetooth & Volume - & Auracast	Long press >10s	Enter PD/MCU upgrade. Report 0, 0 when upgrade fail Report 0, 1 when upgrade success Report 0, 2 when in latest version

Remark: all combination function shall be triggered by long pressing in ON mode.

Table 3 Combination button for debug and factory test

UI_001	There are 6 buttons on the unit: <ul style="list-style-type: none"> Power, Bluetooth, Auracast, Vol+, Vol-, Play/Pause For the functions of those buttons, refer to device UIS.	Mandatory
UI_002	The buttons shall have 3 kinds of actions: <ul style="list-style-type: none"> Short press: The button is released after pressing less than 2s(>0.3s and <=2s). The relative action shall be triggered immediately after released. Double press: The button is pressed twice with each <0.5s. The relative action shall be triggered immediately after release. Long press: The button is pressed, the action is taken after certain time period without releasing of the button, pls refer to UIS Remark: Volume buttons have its own behaviors, refer to UIS.	Mandatory
UI_003	The unit shall have 12 LEDs : <ul style="list-style-type: none"> Power LED: 1 color x2, White. Bluetooth LED: 1 color x2, White Auracast LED: 1 color x2, White. 5 Battery LEDs: 1 color x5, White; 1 color x1, Red. 	Mandatory
UI_004	There are some debug and test feature shall be triggered by combination buttons. All the functions shall be only triggered in On mode, except enter to DFU mode.	Mandatory
UI_005	The power LED shall light at On / Standby mode. Bluetooth, Auracast LEDs shall only light at On mode.	Mandatory
UI_006	Battery LEDs shall light on (according to Battery capacity) for 10 Seconds on any button pressing event in On mode, then return to previous status	Mandatory
UI_007	When the DC adapter is plugging in	Mandatory

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	<ol style="list-style-type: none"> 1. If charging in, the Battery LEDs shall light up according to Battery capacity (refer to UIS) in all power state mode. 2. If no charging or full charged, Battery LEDs shall keep in off mode. <p>When in Battery mode:</p> <ol style="list-style-type: none"> 1. When battery is low (<15%), the LED shall always show Red, and regular flash (Left 1st led only) without charging. 	
UI_008	<p>When entering DFU, Bypass mode or factory resetting, all LEDs shall light on for 2 seconds.</p> <p>When factory resetting, the unit shall power off automatically with powered off tone after all LEDs light on.</p> <p>When factory resetting, the unit shall power off automatically with powered off tone after all LEDs light on.</p>	Mandatory

3.2 Sound Prompt

TON_001	<p>The unit shall support the sound prompt for following case:</p> <ul style="list-style-type: none"> • Manually power on (not in auto-wake up by music break in). • Manually power off (not in auto-power off after timeout). • Power off caused by critical low battery in On mode. • Bluetooth connected (excluding link lost reconnection). • Bluetooth pairing mode(Auto/Manual/Force Pairing). • Max volume. • Enter JBL Auracast mode. • Exit JBL Auracast mode. 	Mandatory
TON_002	The sound prompt shall always sound in default volume level.	Mandatory
TON_003	<p>The sound prompt shall only be played when no audio is playing, except max volume tone.</p> <p>Remark: power off sound shall be played if press power button when playing.</p>	Mandatory
TON_004	The sound prompt shall only be played in On mode.	Mandatory
TON_005	The Unit shall support Enable/Disable feedback tone from JBL Portable APP	Mandatory

4 Power

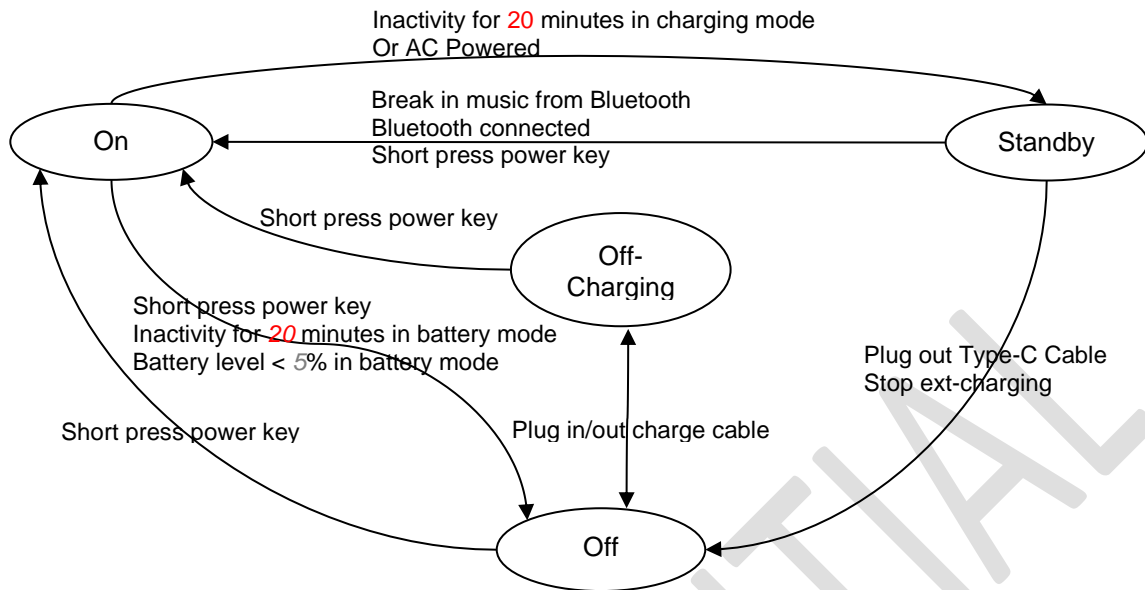


Figure 1 Power Transition

PWR_001	<p>The system shall have the following 4 power modes:</p> <ul style="list-style-type: none"> On mode. Off-Charging mode. Standby mode. Off mode. <p>For detailed transition among these 4 modes, refer to Figure 1.</p>	Mandatory
PWR_002	The unit shall have a power LED to indicate the power mode.	Mandatory
PWR_003	The unit shall enter On mode from Standby mode within 1s.	Mandatory
PWR_004	The unit shall enter On mode from Off mode within 3s.	Mandatory
PWR_005	The unit shall enter Off mode if battery is less than 5%.	Mandatory
PWR_006	<p>User shall be able to press Power button to enter Off mode in On mode.</p> <p>The unit shall also enter Off mode automatically after 20 minutes inactive if <i>USB Cable</i> is not plugged and no ext-charging.</p> <p>In Off mode, all function LEDs shall be off, except battery LEDs. The battery LEDs shall be light if <i>USB Cable</i> is plugged or ext-charging.</p> <p>Bluetooth function shall be off in this mode. The unit shall be neither connectable nor discoverable.</p>	Mandatory

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PWR_007	<p>The unit shall enter Standby mode automatically after 20 minutes inactive (no music playback and no any user interaction) if Unit is in charging-in mode or the unit is charging another device.</p> <p>The Unit shall enter Standby mode either in standalone or Auracast on mode.</p> <p>If enter standby mode when Auracast is on, Auracast becomes off automatically. When wake up from standby mode, Auracast cannot come back to be on automatically.</p> <p>When the battery is full in charge-in side and with AC adapter powered, will keep in Standby mode.</p> <p>When the battery is full in ext-charge side and with AC adapter powered, the unit will auto off.</p> <p>In Standby mode, Power LED shall be very slow flash and press power button will turn on the unit. Battery LEDs shall always light to show battery status. All other LEDs shall be off and other buttons shall be disabled.</p> <p>Bluetooth function shall be still work in this status. Any audio break in shall wake up the unit.</p>	Mandatory
PWR_008	If <i>USB Cable</i> is unplugged and ext-charging stopped in Standby mode, the unit shall be off automatically.	Mandatory
PWR_009	When in Off mode, if <i>USB Cable</i> is plugged and start to charge, the unit shall keep in Off mode, but the battery LEDs shall light on.	Mandatory

4.1 Battery Control

BC_001	The unit shall have an embedded rechargeable battery with Harman specific ID, DUT should not boot up if no ID or Wrong ID detected.	Mandatory								
BC_002	The battery can be charged through <i>USB Cable</i> . Even in Off mode, the unit shall show the battery indicator when charging.	Mandatory								
BC_003	Charging in will be functionally disabled while: <ul style="list-style-type: none">Charging >= 12 Hours Remark: LED will still show charging state if charge cable is plugged.	Mandatory								
BC_004	The unit is not allowed to power on if battery drop under critical level [5%]. In this case if user try to power on the unit, it shall render low battery indication LED without power on behavior. It shall power off automatically if battery lower than critical level in battery mode. This is only required under battery mode.	Mandatory								
BC_005	DUT should read out Battery ID, Battery Voltage, Capacity, cycle times, healthy status(remain capacity/Design capacity), and send to APP for display, those parameters should be store in Gauge IC in battery pack encrypted. <table><tr><th>Key</th><th>ID</th><th>Value Length</th><th>Value</th></tr><tr><td>Battery ID</td><td>0x01</td><td>Max to 16 bytes</td><td>ASCII.</td></tr></table>	Key	ID	Value Length	Value	Battery ID	0x01	Max to 16 bytes	ASCII.	Mandatory
Key	ID	Value Length	Value							
Battery ID	0x01	Max to 16 bytes	ASCII.							

Remaining playtime	0x02	2 bytes	0 ~ 65535 minutes
Temperature Max	0x03	2 bytes	Celsius degree X 10
Remaining Capacity	0x04	2 bytes	0 ~ 65536 mAh
Full Charge Capacity	0x05	2 bytes	0 ~ 65536 mAh
Design Capacity	0x06	2 bytes	0 ~ 65536 mAh
Cycle Count	0x07	2 bytes	0 ~ 65536 cycles
State of Health	0x08	2 bytes	0 ~ 100 %
Charging Status	0x09	1 byte	0x01: AC charging. 0x02: DC. 0x03: full charged. 0x04: full depleted.
...			...

4.2 USB Charger

CHR_001	<p>The unit shall have USB port support following function.</p> <ul style="list-style-type: none"> USB Type C <ol style="list-style-type: none"> Internal Charging USB Audio(Demo mode) External Charging HID test mode UART debug <p>Refer to the EE spec for details.</p>	Mandatory
CHR_002	<p>The unit shall start charging other device via USB port in On / Standby mode once the cable is plugged.</p> <p>In Off mode, if USB cable is plugged, the unit does not need to start charging immediately. But it shall start charging after user press power button to power on.</p>	Mandatory
CHR_003	<p>The unit shall keep on charging other device until fully charged after power off either manually or automatically.</p>	Mandatory
CHR_004	<p>The charge in behavior(refer to EE spec): DUT is power off/on: Charge current is 3A in the 1st 10mins and Battery is less than 30%, then 2.4A</p>	Mandatory
CHR_005	<p>Charging out will be functionally disabled while: In Battery mode and Battery level < 15%.</p> <p>At the meanwhile battery LED should be regular flashing in RED.</p>	Mandatory
CHR_006	<p>Type-C charge out should support PD/PPS protocol</p>	Mandatory

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CHR_007	The external charge behavior: DUT is power off: Support PPS 18W (5V/3A, 9V/2A, 5-11V/2A) DUT is power on: 1. Not playing music: charge out 5V/1A(5W) 2. Playing music: charge out 5V/1A(5W)	Mandatory
CHR_008	Charge behavior: ➤ DUT should charge out to cellphone. ➤ DUT should not charge to power bank.	Highly Desirable

4.3 Charger Protection

4.3.1 Temperature

TEP_001	When the NTC detect the temperature of battery higher than 60 °C, then unit should be automatic turned off.	Mandatory
TEP_002	When the NTC detect the temperature of battery lower than -18 °C, then unit should be automatic turned off.	Mandatory
TEP_003	When the device is in charging mode and the NTC detect the temperature of battery lower than 1 °C or higher than 44 °C, battery will be protected. Please refer to the EE spec for details.	Mandatory
TEP_004	When the NTC detection temperature of the USB port is greater than or equal to 70 °C, the device should immediately stop charging and continually annoying warning tone, also shutdown within 5 seconds if device is in ON mode without charging cable inserted. If device is charging-in in Off mode, should boot up to ON mode, and continue the alarm.	Mandatory

4.3.2 Charging warning

WRN_001	The water detection warning should happen in below 2 situations: 1. users try to charge the device (either DUT in power on mode or power off mode). 2. DUT is out charging to external devices(phones)	Mandatory
WRN_002	No warning required even Type C is with water if DUT is not in charging in or charging out mode, which means we still allow DUT to work normally for the case above.	Mandatory
WRN_003	If DUT is already in power on mode, when water detection warning mechanism triggered, DUT will behave as below until users unplug charging cable: 1, continuously warning tone	Mandatory

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	2, all LED quick flashing together	
WRN_004	<p>If DUT is in power off mode and charging in for internal batteren, when warning mechanism triggered, DUT will behave as below until users unplug charging cable:</p> <p>1, DUT will partially boot up in 2 seconds with all LED quick flashing together</p> <p>2, then DUT will fully boot up with continuously warning tone within additional 3 seconds</p>	Mandatory
WRN_005	When water detection warning triggered, all button features shall be disabled, when warning stop device shall be back to normal.	Mandatory
WRN_006	The water detection warning should be disabled if users clean and dry the Type C port.	Mandatory
WRN_007	Regarding water warning information will be shown up as notification in JBL Portable app. For details, please refer to "JBL Portable Protocol Specification v2.8.docx".	Optional
WRN_008	<p>Type-c socket High temperature warning will be triggered once the temperature over than the threshold immediately with below exception:</p> <p>➤ Device is in OFF mode, and there's no charge in/out on going</p>	Mandatory
WRN_009	<p>If Type-c socket High temperature triggered in off-charging mode, Device should boot up and keep in alarm state(all button disabled/all LED flash/sound alarm tone) until charge in cable being removed, then Device keep alarm for 5 seconds and auto power off. User can manually power off the device during these 5 seconds by power button too.</p> <p>Note: If end user takes no action and temperature drop below the alarm threshold, DUT should stop the alarm, and auto power off.</p>	Mandatory
WRN_010	<p>If Type-c socket High temperature triggered in ON mode, Device should enter alarm state immediately (all button disabled/all LED flash/sound alarm tone) and:</p> <ol style="list-style-type: none"> If charge cable/cellphone is connected, keep the alarm until cable removed. Then go to b. If no cable connected, Device keep alarm for 5 seconds and auto power off. User can manually power off the device during these 5 seconds by power button too. <p>Note: In step a, if temperature drop back below alarm threshold, DUT should stop alarm and power off.</p>	Mandatory

5 Audio requirement

AUD_001	The unit shall have following audio input sources: <ul style="list-style-type: none"> Bluetooth USB audio (In Demo mode) 	Mandatory
AUD_002	The unit shall have 33 (0-[32]), 0 means mute) steps volumes.	Mandatory
AUD_003	The factory default volume setting shall be 15	Mandatory
AUD_004	If first time to sync with a new device after connection is established, the unit shall: <ul style="list-style-type: none"> Apply the volume value of source in the product. The unit shall retain the last volume settings after power on	Mandatory
AUD_005	If connected Bluetooth device supports AVRCP 1.6 or above, the unit shall keep synchronizing with connected device. It means: <ul style="list-style-type: none"> When volume changes in the unit by volume button pressing, it shall send new volume value to remote device via AVRCP command. When it receives volume change event from remote devices, it shall change its volume settings accordingly. 	Mandatory
AUD_006	If 2 devices are connected at the same time, the unit shall ONLY synchronize volume settings with playing device. If not playing, the unit shall keep volume synchronized with last connected or played device.	Mandatory
AUD_07	The DUT audio delay of Bluetooth is acceptable less than: <p>Single BT playback:</p> <ul style="list-style-type: none"> SBC 280ms AAC 360ms <p>Auracast mode:</p> <ul style="list-style-type: none"> SBC 330ms AAC 410ms <p>The play / pause / next track shall be response within 2 seconds.</p>	Mandatory
AUD_08	The unit shall support Harman's proprietary acoustic algorithm AI Sound Boost . Porting AI Sound Boost requires the chip to have a certain DSP MIPS, details check with ADSP team, after porting shall be verified by Harman acoustics team. IC chip FAE shall be always support porting work with Harman team. Remark: AI Sound Boost is confidential and cannot be used for non-Harman project development.	Mandatory
AUD_010	The unit shall toggle between by-pass mode and normal mode after entering ATS mode by sending command.	Mandatory
AUD_011	All noise of the unit shall be less than 30db.	Mandatory
AUD_012	The Unit shall support Hi-Res audio playback by BT(LC3/LC3+) and Demo mode (UAC), support 96KHz/24bit content at least. For other SR, should re-sample to	NO

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	96KHz output to DSP and AMP.	
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6 Bluetooth

Following are the supported Bluetooth features on *JBL Charge 6*.

BT_001	The Bluetooth and BLE name shall be " <i>JBL Charge 6</i> ".	Mandatory
BT_002	If multi-points feature is enabled, when the unit is playing A2DP, it should ignore Bluetooth audio break-in from another device except if it receives an AVRCP "play" command. Because if it doesn't receive such an AVRCP command it means the audio coming from the cell phone could be something which is not music. New streaming can break in the last audio and pause the last playing device.	Mandatory
BT_003	When link loss or power cycle, the unit shall try to reconnect the last BT connected device or the last music playback device for 3 minutes. Enter idle state if reconnect fail. Remark: In Standby mode, the unit MAY not be able to reconnect due to limitation of power consumption.	Mandatory
BT_004	Pairing mode shall have 3 minutes timeout.	Mandatory
BT_005	The unit shall remember last 8 paired devices.	Mandatory
BT_006	The unit should enter BT Idle mode by following case: <ul style="list-style-type: none"> • Disconnect from connected phone • Enter pairing mode, 3 mins time out • Link loss 	Mandatory
BT_007	The SBC audio codec format shall be supported: <ul style="list-style-type: none"> • Sample rate: 44.1kHz / 48kHz • Channel mode: Mono / Dual Channel / Stereo / Joint Stereo • Bit pool range: 2 to 53 • Block length: 4 / 8 / 12 / 16 • Allocation method: SNR / Loudness • Sub bands: 4 / 8 	Mandatory
BT_008	In multi-points, <ol style="list-style-type: none"> 1. When power cycle, will reconnect to the last active (playing music) device after power cycle in 3 mins. If the last active device is not available, reconnect to the other BT connected device in 3 mins. 2. When link loss, the unit shall try to reconnect to the 2 BT connected devices for 3 mins. 	Mandatory

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	If no device has ever paired before, the product shall enter pairing mode automatically.	
BT_009	When maximum connections exists, the new connection shall be rejected, the unit shall NOT be discoverable and connectable. If user press BT button on DUT, should disconnect one connection and enter pairing mode <ul style="list-style-type: none"> If one connection is active, disconnect the idle one. If both idle, keep the last connected one. 	Mandatory
BT_010	The unit shall support LE audio. <ul style="list-style-type: none"> Support LC3 audio codec. Multi - Stream Broadcast Remark: Lower power / Higher quality / Lower audio latency	Mandatory
BT_011	BLE address shall be randomly rotated at minimum every 15 minutes while the devices is actively advertising	Mandatory
BT_012	If the unit in Bluetooth pairing mode already when long press the Bluetooth button again need to reset the pairing time and pairing sound. If the unit in Bluetooth pairing mode already when short press the Bluetooth button again, should replay the pairing tone but do not reset the pairing timer.	Mandatory
BT_013	There shall be exactly one Bluetooth audio source output at same time.	Mandatory
BT_014	If one audio source start streaming (either A2DP status change or AVRCP playback status change) where there is already another A2DP source is streaming, the unit shall switch to the last stream automatically.	Mandatory
BT_016	LE Audio requirement pls refer to "Master FRS LE Audio v2.2.xlsx"	Mandatory
BT_017	DUT should support LE audio connection to Cellphone in Unicast mode and should support transmit to Auracast broadcasting as Primary of the party.	Mandatory(by OTA)
BT_018	DUT should support LEA /Classic BT use one connection working in Dual mode, switch between LEA and EDR according to cellphone capacity	Mandatory
BT_019	DUT should support AAC code, bitrate up to 320kbps	Mandatory

6.1 Device ID Profile

BT_015	The unit shall support the Bluetooth Device ID Profile, version 1.3 or higher.	Mandatory
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BT_016	The unit shall use the company identifier from the Assigned Numbers document assigned by the Bluetooth SIG as its Vendor ID value.	Mandatory
BT_017	<p>The unit shall:</p> <ul style="list-style-type: none"> • Use Specification ID: 0x0103 • Use VendorID (VID): 0x0ECB • Use a ProductID (PID) <ul style="list-style-type: none"> ◦ JBL Charge 6: 0x20e3 • Use a Version value that uniquely identifies the software version. The value shall be provided by Bluetooth module supplier. • Use Primary Record: True. • Use VendorID Source: 0x0001. • Bluetooth GAP Service UUID: FDDF (GAP: 0000fddf-0000-1000-8000-00805f9b34fb) 	Mandatory
BT_018	Product color should support at least 9 colors: Blue/Black/Camouflage/Red/Purple/Pink/White/Sand/Funky Black	Mandatory

7 Smart Control

SC_001	The unit shall support intelligent volume and light adjustment for safer and more stable long-term work.	Mandatory
SC_002	<p>For smart control code shall have a switch can be easy to turn on/off the smart control logic.</p> <p>Remark: for play time test need to turn off this logic.</p>	Mandatory
SC_003	<p>When the NTC detection temperature of the projection light is greater than or equal to 45 °C, the power of the projection light should be turned off immediately.</p> <p>Smart control: When the temperature is greater than or equal to 43 °C, check the current temperature every minutes (test version can be 30 seconds). If the current temperature is greater than previous temperature and reduce the brightness of the projection light by 10-30%, the brightness of the projection light can only be reduced by 20-60% at most. (the reduced brightness shall confirm by UI team TBD)</p>	Optional
SC_004	<p>The DUT should check the Bluetooth module temperature, if the temperature of Bluetooth module is less than 80°C and larger than or equal to 75°C, start smart control, if the temperature of Bluetooth module is less than 75°C stop smart control, greater than or equal to 80°C the system shuts down automatically.</p> <p>Smart control: When the temperature is greater than or equal to 75 °C, check the current temperature every minutes(test version can be 30 seconds). If the current temperature is greater than previous temperature and reduce the brightness of the lightshow (all LED excluding button charging indicator) by 10-40%, the brightness of all LED can only be reduced by 20-80% at most. If the temperature has risen when the brightness is lowest 80%, enable smart volume control. See SC_005. (the reduced brightness shall confirm by UI team TBD)</p>	Optional

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SC_005	<p>The unit shall support smart volume control for temperature protection. If the temperature of battery is less than 60 and larger than 52, start smart control, less than 52 stop protection, greater than 60 degrees to shut down.</p> <p>Start smart control:</p> <ul style="list-style-type: none"> ➤ Check every five minutes, ➤ check whether the temperature has increased each time, if the temperature this time is higher than the temperature of the last detection, ➤ the volume will be reduced: <ul style="list-style-type: none"> 52 <= temperature < 54, 1 bar 54 <= temperature < 56, 2 bars 56 <= temperature < 58, 3 bars 58 <= temperature, 4 bars <p>Note: Minimum volume is 13, should not drop below 13.</p> <ul style="list-style-type: none"> ➤ The minimum volume is 13, if current volume is lower than or equal to 13, volume will not be decreased. <p>Remark: for Vimicro 9638C it has -20, 0, 52, 54, 56, 58, 60 degrees.</p>	Mandatory
SC_006	<p>For Adjust the SLC level according to battery voltage, SOC need to sync battery voltage to DSP chipset every 5 seconds</p>	Mandatory

8 JBL Party Mode (Auracast)

PB_001	<p>The unit shall support JBL Auracast feature, JBL Auracast is the feature that can link multiple devices to play same music and setup the Stereo and Party via app. Thousands of devices can be formed within an effective distance.</p>	Mandatory
PB_002	<p>The unit shall support higher encoding streams, and multiple channels. More flexible compatible with LE audio.</p>	Mandatory
PB_003	<p>Auracast modes:</p> <ul style="list-style-type: none"> • Normal • Primary • Secondary <p>Mode transition shall be seamless, no audio stop or glitch.</p>	Mandatory
PB_004	<p>If there is more than one Primary in a group, it's randomly when Secondary choose a Primary to listen to. If there is only one Primary, all the Secondary shall listen to it.</p>	Mandatory
PB_005	<p>The Primary only transmit audio raw data but not voice.</p>	Mandatory
PB_006	<p>There shall be a dedicate Auracast button on JBL Auracast speakers. Once user pressing this button, the speakers shall start grouping:</p> <ul style="list-style-type: none"> • Primary - Start CSB streaming and advertising or Auracast broadcasting. • Secondary - Start scanning Primary and receive CSB steaming. Or Auracast broadcasting. <p>If all the speakers are in range, the group should be setup within 10 seconds.</p> <p>Remark: Both Primary and Secondary have no timeout.</p>	Mandatory

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PB_007	If the product is already joined the Auracast group, pressing Auracast button shall quit current group and become Normal mode.	Mandatory
PB_008	The speakers shall be able to enter pairing mode and linking mode at any time except reach maximum connections. When Unit is Auracast on, then press BT, Auracast becomes off automatically and cannot come back to be on after BT pair.	Mandatory
PB_009	After power cycle, the speakers shall be in Normal mode.	Mandatory
PB_010	All the grouped speakers shall play same audio stream at any time. The audio shall be able to stream from any Bluetooth source or line in source connected to any grouped speakers in the system.	Mandatory
PB_011	The audio output shall be synchronized. The maximum latency between Primary and Secondary shall be no more than 10 milliseconds (prefer to 5 milliseconds).	Mandatory
PB_012	All the JBL Auracast speakers in a group shall start playing within 10 seconds (prefer to 5 seconds) after audio source start to streaming.	Mandatory
PB_013	In a JBL Auracast group, Primary and Secondary can dynamically change. See UIS for detailed dynamically mode change flow.	Mandatory
PB_014	Due to DSP limitation, Auracast speakers shall support dynamic EQ switch according to different modes.	Mandatory
PB_015	If changing the volume on the Primary, the volume of all the Secondary should be synchronized automatically. If changing the volume on the Secondary only the exact DUT should be changed.	Mandatory
PB_016	The JBL Auracast speakers shall be configurable via the APP: 1. Channel: Left/Right/Stereo 2. Switch working mode to be Auracast Remark: The speakers should remember these configurations when switching on and off.	Mandatory
PB_017	The JBL Auracast speakers shall allow APP communication via: • BLE/GATT	Mandatory
PB_018	The JBL Auracast speakers shall only be able to establish APP connection with the source device which connected A2DP to it already.	Mandatory
PB_019	The JBL Auracast speakers shall only support one APP connection at the same time. If one connection is established, the product shall be non-discoverable and non-connectable to other APP.	Mandatory
PB_020	All the settings shall be restored after device power cycle.	Mandatory
PB_021	Dut should support long-lasting Stereo Auracast Group, Duts in stereo group should connecting to each other in operation mode by BLE(TBD), for Volume/Control/EQ synchronization	Mandatory(By OTA)

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PB_022	<p>Dut in Auracast stereo group should work in single mode before found each other, and auto link back to stereo mode when found, and auto switch to single mode when the other one is missing:</p> <p>Single Mode:</p> <ol style="list-style-type: none"> 1. In single mode, DUT works as normal Bluetooth speaker, and should always keep searching for the other one. 2. In single mode, turn on Auracast will join the party to be Primary/Secondary with both Music channel playback, <p>Stereo Mode:</p> <ol style="list-style-type: none"> 1. When link back, if any of the DUTs is playing BT music, Group should auto turn on Auracast, and working in stereo mode by Auracast. ("Primary DUT" marked when create the stereo will have the priority to be the Primary) 2. When link back, if none is playing music and Auracast is turned one on either of them, group should both enter Auracast mode, and receive the same Auracast broadcaster, output L or R music accordingly. 	Mandatory(By OTA)
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9 Fast Pairing

FP_001	Need to apply for Model ID/ Public Key/ Private Key set for each SKU.	Mandatory
FP_002	Need to pass the fast-pairing V3.1 test of Google side.	Mandatory
FP_003	<p>Fast pairing V3.1 host requirement:</p> <p>Android:</p> <ol style="list-style-type: none"> 3. Android 6.0 or higher 4. Google Play services: notification/ nearby has to be enabled 5. Network has to be enabled for Google connection 	Mandatory
FP_004	<p>Features of fast pairing V3.1 include:</p> <ol style="list-style-type: none"> 1. Initial pairing notification pop up 2. Sub-sequential pairing notification pop on devices with same Google account 3. Rename 4. Retroactive pairing <p>* Fast pair notification UIS and flows refer to separate google documents.</p>	Mandatory
FP_005	If the unit in pairing mode state, it needs to broadcast BLE advertisement with model ID. On the phone side, it will appear initial pairing notification after receiving BLE advertisement, and then the user taps the initial pairing notification to complete pairing.	Mandatory
FP_006	<p>If the unit is not in pairing mode state, it needs to broadcast BLE advertisement with account list. On the phone side, it will appear subsequent pairing notification after receiving BLE advertisement, and then the user taps the subsequent pairing notification to complete pairing.</p> <p>*If it supports multi-point, unit shall be easily connect to the second phone, if already max connection it shall be follow the multi-point behavior (When maximum connections exists, the new connection shall be rejected, the unit shall NOT be discoverable and connectable. If user press BT button on DUT, should disconnect one cellphone and enter pairing mode</p>	Mandatory

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	<ul style="list-style-type: none"> • If one phone is active, disconnect the idle one. • If both idle, keep the last connected one). <p>*If not support multi-point, unit is already connected to previous phone, it shall be able to disconnect first and then connect to the later phone user clicked.</p>	
FP_007	If the unit has its companion app, when you see "Device connected" notification which has description about getting companion app from Play Store, tapping the notification will take you to Play Store to download the app.	Mandatory
FP_008	Retroactive pairing: unit shall support normal BT pairing and convert to fast pairing and save paired device in the system.	Mandatory
FP_009	Personalized Name: unit shall support rename by user.	Mandatory

10 JBL Portable App

APP_001	<p>The unit shall be able to communicate with JBL Portable App to get control of:</p> <ul style="list-style-type: none"> • Bluetooth renaming. • JBL Auracast configuration. • OTA Upgrade • L/R channel assignemnt in Auracast setup • App EQ Setting (Equalizer base on three items: Bass, Mid, Treble) • Audio Feedback Sounds ON/OFF When select "ON", all tones are enabled (* "ON" is default setting) When select "OFF", all tones are disabled. <p>The detail requirements refer to "JBL Portable App UIS".</p>	Mandatory
APP_002	<p>The unit shall support JBL Portable App in both iOS and Android platform via:</p> <ul style="list-style-type: none"> • GATT over BR/EDR and BLE broadcast (iOS / Android), 	Mandatory
APP_003	<p>The unit should follow the latest "JBL Portable Protocol Specification" Protocol to communicate with app.</p> <p>For details, please check with Harman app team.</p>	Mandatory
APP_004	<p>APP should display current Battery status info include SN, Voltage, current Capacity, cycle times, max temperature in life time and healthy status(SOH), remind user to replace the battery if cycle times > 500(TBD) or healthy < 80(remain capacity/design capacity) (TBD)</p>	Optional
APP_005	<p>APP should show accumulated power on time and playback time, pls refer to "JBL Portable App UIS" for details.</p>	Mandatory

11 Device Data Analysis

DA_001	<p>The unit shall support Data Analytics and send this data to app when app connect with unit.</p> <p>For the details, please refer “JBL Portable Analytics Metrics Design.xlsx”.</p>	Mandatory
DA_002	<p>The unit shall support Data Analytics of total playback time and total power on time, these data should be stored in DUT and should not be lost in any cases like firmware upgrade, factory reset, system exception.</p> <ul style="list-style-type: none"> ➤ Statistics should be in unit of minute. ➤ Suggest using 3 bytes for each parameter storage. <p>Remark: The data can only be cleared by the ATS command, details see ATS command document.</p>	Mandatory

12 Demo Mode

DEM_001	<p>The unit shall integrate demo mode with normal mode. Triggered between demo mode and normal by the same combination buttons. For the combination buttons, please refer to Table3.</p> <p>Both normal mode and demo mode shall use the same SW build.</p>	Mandatory
DEM_002	In demo version, all Bluetooth features shall be disabled. The unit shall not be discovered or connected.	Mandatory
DEM_003	In demo version, the unit shall enter operational mode once <i>USB Cable</i> is plugged; and turn off after the cable unplugged.	Mandatory
DEM_004	<p>In demo version, all buttons' features shall be disabled except HW Reset/Demo mode toggle. All LED indicators shall be disabled except power LED and battery indicator.</p> <p>Remark: Can enter DFU mode in Demo mode</p>	Mandatory
DEM_005	In demo version, the unit shall only allow <i>USB source</i> input and always play audio in MAX volume.	Mandatory
DEM_006	<p>The USB warning function is enabled.</p> <p>The NTC & Smart control are enabled.</p> <p>The 12 hours charging limitation of charging IC is disabled.</p>	Mandatory

13 Software Upgrade

SR_001	The unit shall support a driverless DFU (firmware upgrade) via USB port by engineering tool, the upgrade shall not be interrupted by any key pressing or other	Mandatory
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	actions. Remark1: the PC software is provided by Harman (For Service Center). Remark2: the DFU do not need any additional USB drivers. Remark 3: the PC upgrade tools shall support the Windows 10.	
SR_002	The unit shall support upgrade firmware from JBL Portable App <ul style="list-style-type: none"> When start OTA, if any playback(Bluetooth/Auracast/PartyBoost/USB etc.) on going, DUT should stop the playback then start OTA procedure. 	Mandatory
SR_003	The unit shall support "fail-safe" mechanism. If upgrade is failed by any accident, the unit shall be able to upgrade again. Remark: App upgrade must be "fail-safe"	Mandatory
SR_004	All user settings and preferences shall be retained after the upgrade is finished.	Mandatory
SR_005	The unit shall check the upgrade image for PID/VID/Model ID, to make sure it's for JBL Charge 6 project	Mandatory
SR_006	The unit shall verify the upgrade image for fidelity by CRC or MD5	Mandatory
SR_007	After factory settings restored, the unit shall be powered off with power off tone automatically. Follow settings shall be restored: <ul style="list-style-type: none"> Volume, Bluetooth pair list, Bluetooth name, and JBL Portable configurations 	Mandatory

14 Factory Test Mode

UHA_001	The unit shall be able to enter ATS mode via combination button. For the combination buttons, please refer to Table 3. Auto exit ATS mode when unit is turned off. The default FW ATS test mode is turned OFF.	Mandatory
FTM_002	The ATS software is in the ATS mode by default and cannot be exited through the combination button. It needs a production line command to exit the ATS mode after all functions are tested in the factory.	Mandatory
UHA_003	The unit supports serial number write and read via ATS mode. Remark: the serial number also can read in app.	Mandatory
FTM_004	The unit support Google fast pairing Model ID write and read via ATS mode.	Mandatory
FTM_005	The unit support Color ID write and read via ATS mode.	Mandatory

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FTM_006	The details requirement shall follow the document of ATS test communication protocol command.	Mandatory
FTM_007	The unit supports reset the lifetime accumulated playback time and power on time to 0 before packaging (exit factory) via ATS mode	Mandatory

15 Compliance and Certification

CER_001	Bluetooth v5.4, A2DP v1.4, AVRCP v1.6, GATT	Mandatory
CER_002	Google Fast Pairing V3.1	Mandatory