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format and wirelessly communicates this data to remote devices. Firmware facilitates seamless audio communication with wireless audio devices and human interface devices as ULL Clients, acting as remote data input and output devices. Firmware should support Critical functions of the ULL Server, including:

- ULL Tx Link and RX Link
- Streaming start/stop state notifications
- Multiple connection support
- Multiple profile support
- Wireless audio device functionality
- Wireless human interface device functionality
- LE connection with ULL Client
- Firmware updates via air (FOTA)

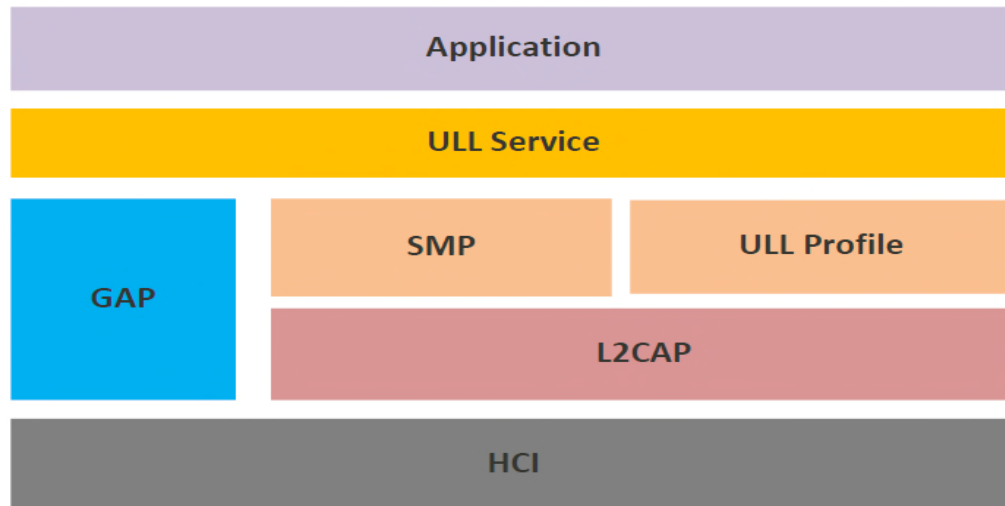
ULL Protocol Spec

Spec	ULL V2.0		ULL V2.1	ULL V2.2
			For Hi-Res	For 3 in 1 Audio/HID
Wireless Type	ULL Proprietary		mHDT Proprietary	mHDT Proprietary
Downlink Audio Quality	48k/24bits	48k/16bits	48k/24bits	48k/24bits
(Sampling Rate/Bits)	96k/24bits		96k/24bits	
Downlink Latency	20ms	20ms	20ms	20ms
Codec	LC3plus	IP Provider in-house	LC3plus	LC3plus
Uplink Voice Quality	32k/16bits	16k/16bits	32k/16bits	16k/16bits
(Sampling Rate/Bits)				

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6.3.3 ULL Protocol In Firmware Framework

The HCI, L2CAP, GAP, SMP, and ULL Profile protocols are described in the table:



6.3 MAC ADDRESS

IEEE 6-byte MAC addresses shall be supplied to the OEMs by the chipset vendor or module manufacturer to generate Security keys. The vendor will provide security keys consisting of concatenating a vendor-supplied MAC Address and random pseudo code generated based on the MAC Address. The Security Key must be stored in NVRAM (Non-Volatile Random Access Memory) or EEPROM to ensure it is retained when power is turned off or connected to a constant power source such as a battery. Security keys will be installed in the modules, although some stacks may not use the keys.

6.4 PERIPHERAL SPECIFICATION REQUIREMENT SUPPORT

6.5.1 Wireless Audio Devices

The firmware on the chip must meet the specifications to comply with the requirements of wireless audio devices. The features of the audio are listed in the following sections. The audio codec part includes the uplink path and side-tone filter.

- Three uplink paths with analog microphone input mode. The maximum sample rate is 192KHz, and data precision is 24-bit
- Side-tone filter

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- Two-channel asynchronous sample rate converters
- 16/32-bit input/output data formats
- 16/24-bit data addressing format
- Mono or stereo data transactions
- Maximum sample rate 192KHz

Codecs are encoding and decoding algorithms that compress audio into manageable data packets for wireless headset support. A Bluetooth Audio Codec is crucial in ensuring high-quality, low-latency sound reproduction. The codec specification requirement is the following:

Low Complexity Communication Codec Plus (LC3plus)

The LC3plus codec can operate in highly flexible modes. For regular operation mode, the codec supports speech and audio coding for several audio bandwidths, using the sampling frequencies 8 kHz, 16 kHz, 24 kHz, 32 kHz, or 48 kHz. It supports encoding and decoding using a 2.5 ms, 5 ms, or 10 ms frame duration. Many compressed frame sizes can be configured from 20 to 400 bytes.

Feature	Support Range
Frame Duration	2.5 ms / 5 ms / 10 ms
Look Ahead Delay	2.5 ms
Total Algorithmic Delay	Frame duration + Look ahead delay = 5 ms / 7.5 ms / 12.5 ms
Supported Sampling Rates	8 / 16 / 24 / 32 / 48 kHz
Audio Bandwidth	Max. 20 kHz for 48 kHz
Supported Bit Rate	Depends on frame duration: • 20 to 400 bytes per frame and channel for 10 ms • 20 to 200 bytes per frame and channel for 5 ms • 20 to 100 bytes per frame and channel for 2.5 ms LC3plus decoder shall accept up to 400 bytes per

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	frame independent of frame duration.
Supported Bits Per Audio Sample	16 24 / 32 bit

6.5.2 Human Interface Device

The firmware on the chip must meet the specifications to comply with the requirements of wireless HIDs. The relevant provisions are as follows:

Items	Criteria	Description
Scan Rate	0.25 ms	Interval time to scan each button
Maximum Key Latency Time for DPI/Forward/Backward/Mid	6 ms	
Maximum Latency Time for Left btn/ Right btn MAKE	0.75 ms	Latency Time for MAKE.
Maximum Latency Time for Left btn/ Right btn BREAK	0.75 ms	Latency Time for BREAK.
Supported Report Rate	0.25ms / 0.5ms / 1ms / 2ms / 4ms / 8ms	The latency between getting the signal from the press button to sending the scan code via USB interface.
Polling Rate	4000 Hz / 2000 Hz / 1000 Hz / 500 Hz / 250 Hz / 125 Hz	

6.6 POWER MANAGEMENT

Firmware shall provide a method for the chipset to reduce power consumption. The chipset power is integral to the operating system power consumption performance for All the power states and changes, including Sleep, Modern Standby, Restricted Standby, Hibernation, Resume, and Boot Up. The chipset installed with the firmware must facilitate low-power states to meet all power state requirements of the operating system.

6.7 FIRMWARE SECURITY

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All device firmware must have built-in security features, such as digital signature, to prevent any usage of unauthorized or tampered firmware images in products. The firmware management interface shall authenticate the images and detect any unauthorized changes. At a minimum, all device firmware shall comply with security requirements as specified in the HP Inc. Firmware Security Requirements document provided in Appendix B.

6.8 DIAGNOSTIC LOGGING TOOL

A Diagnostic tool is required to provide a mechanism to test basic functionality and to provide a tool to troubleshoot the components. The diagnostic tool must be a Microsoft Windows-based tool that the Windows 10/11 Operating System supports. For this section, logging refers to all forms of debug information capture, including log files, tracing, debug-out, console prints, etc. The tool must comply with HP's Privacy policy, where data and information related to Personally Identifiable Information (PII) must not be logged, even in debug builds. The tool shall provide the following features as a minimum:

- Log files
- RF Tx Rx Tracing
- Debugging output
- RSSI (Relative Signal Strength Indicator)
- Read BD_ADDR
- Hardware Version
- HCI Version
- HCI LMP Version
- HCI Reset
- Sniffer log
- DSP dump

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6.9 FIRMWARE UPGRADE

An application that enables firmware upgrades on chipsets via the USB port shall be provided. The chipset manufacturer must provide a Device Firmware Update (DFU). The firmware upgrade utility shall support firmware upgrades in Windows. Firmware upgrades must also be made possible using a USB DFU driver supplied by the vendor. The end user shall not be required to uninstall and re-install any USB drivers to flash upgrade the module. The module vendor shall provide firmware updates which meet the following requirements:

- The USB device IDs of modules and DFU shall be used as specified by the vendor
- Flash utility must flash module based on HP VID only
- Mechanisms must be put in place to prevent corruption of module
- Based on Universal Serial Bus Device Class Specification for Device Firmware Upgrade 1.1 or above

6.10 FIRMWARE PRIVACY

All software and firmware must comply with the following privacy statement:

6.10.1 HP US Privacy Statement

<https://www.hp.com/us-en/privacy/privacy.html>

6.10.2 General Data Protection Regulation (GDPR)

The EU's General Data Protection Regulation (GDPR) replaces the 20-year-old Data Protection Directive 95/46/EC and is the largest modification to EU privacy laws and practices on data protection. GDPR will update and harmonize privacy and data protection requirements across EU member states.

6.10.3 California Consumer Privacy Act (CCPA)

Published in 2018, the California Consumer Privacy Act (CCPA) is the first in the United States to offer consumer privacy protections around data sharing. In particular, the CCPA

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introduces new rights for individuals to opt out of companies selling their data.

The CCPA is an example of a new wave of privacy and data protection in the United States. Since the publication of the CCPA, other States, like Nevada, have strengthened their personal data privacy laws, and the US Federal government is considering the same.

6.10.4 China Personal Data Protection

The construction of the privacy legal framework in China started in 2017 with the enactment of the China Cyber Security Law (CSL), which defines high-level general principles of information security and personal data protection for network operators.

In 2020, the Specifications for Personal Information Security (SPIS) were published under reference GB/T 35273-2020. The principles define the policies and rules considered as best practices to be implemented by operators.

In 2021, the Personal Information Protection Law (PIPL) will consolidate the construction of a comprehensive legal framework for data protection. It clarifies the various texts and defines enforcement and liability rules.

China Cyber Security Law was promulgated in November 2016, effective in June 2017

Specifications for Personal Information Security was issued in March 2020, effective in October 2020

Personal Information Protection Law was promulgated in August 2021, effective in November 2021

6.10.5 Health Insurance Portability and Accountability Act (HIPAA)

The Health Insurance Portability and Accountability Act of 1996 (HIPAA) is a US federal law that created privacy and security rules to protect personal health information. The HIPAA Privacy Rule includes requirements concerning privacy notices, authorizations for use and disclosure of PHI, limits on use and disclosure to the minimum necessary, individual access and accounting rights, security safeguards, and accountability through administrative requirements and enforcement. The Security Rule aims to protect the privacy of individuals' health information.

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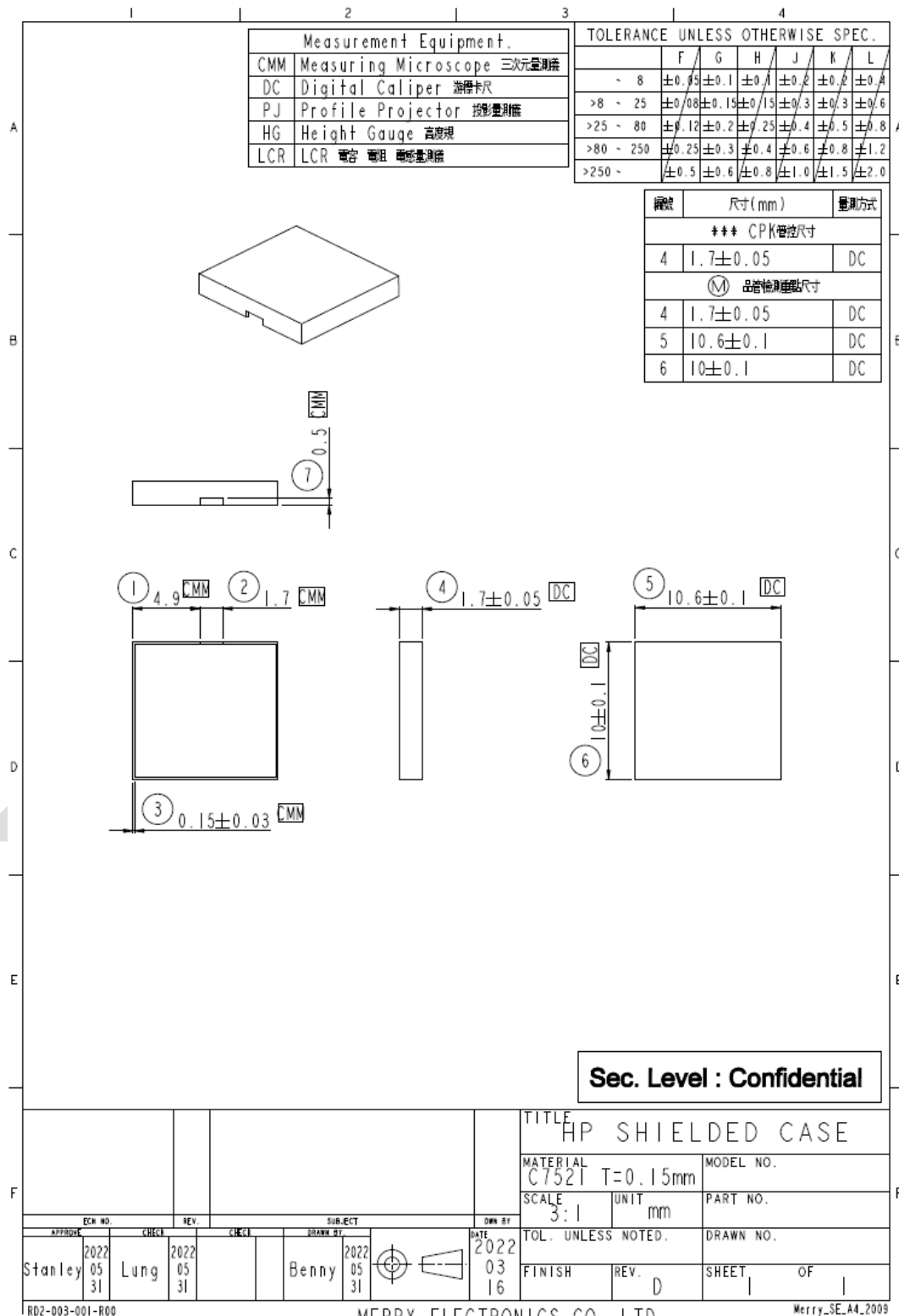
HIPAA applies to US commercial and governmental entities that process health information (e.g., hospitals, doctors, pharmacies, health insurers) and those they contract with (called Business Associates) that use or disclose health information on their behalf.

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7 MECHANICAL

7.1 Shielded case drawing



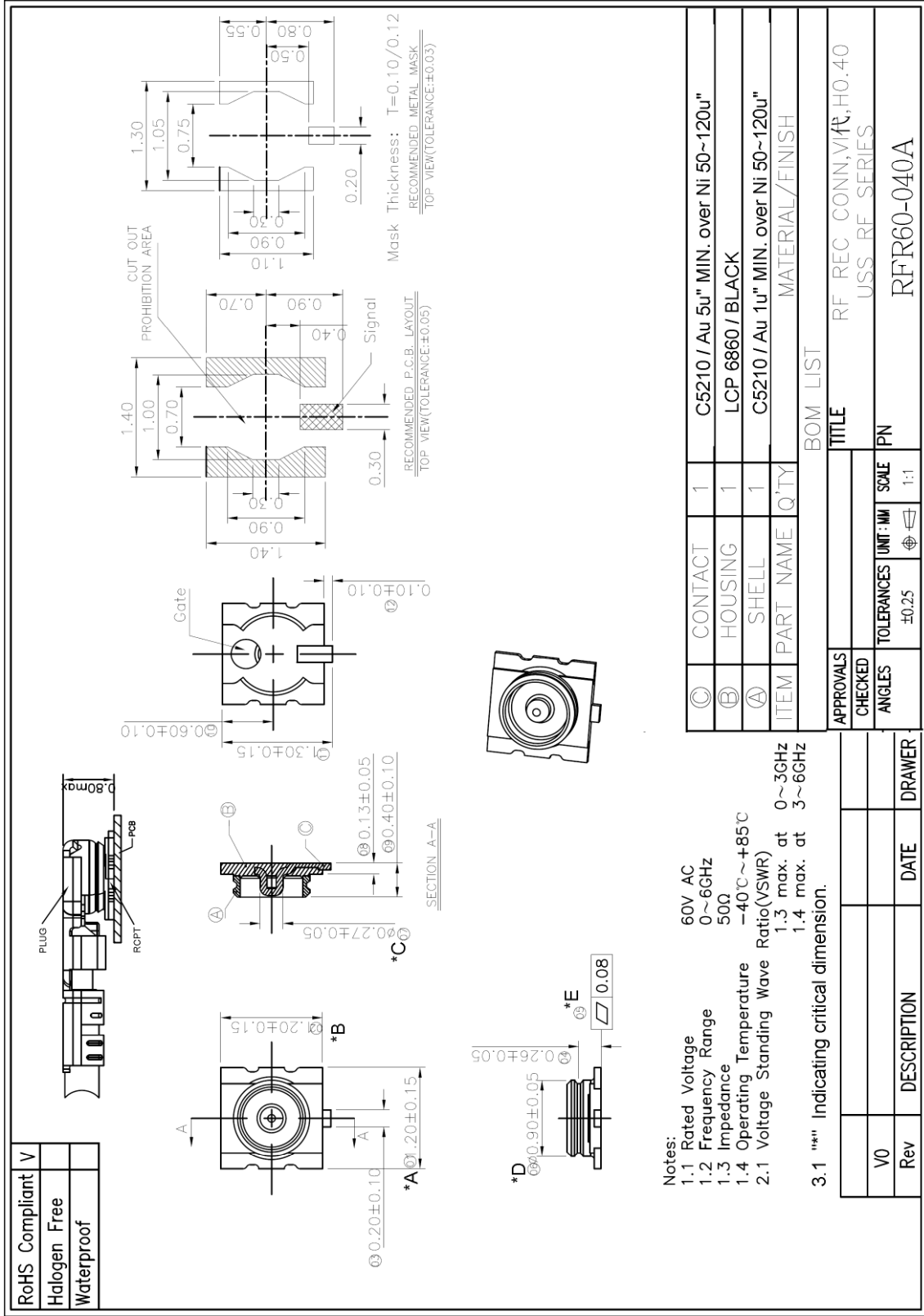
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7.2 Antenna connector detail



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8 ACCEPTANCE CRITERIAL

8.1 定義(Definition)

- 8.1.1 Cr.類缺陷：產品的主要特性無法滿足質量要求且對人的人身安全 and 健康產生潛在危害
Defect of Cr.: the main features of products can't meet the quality requirement and have potential hazard on human safety and health.
- 8.1.2 Ma.類缺陷:產品的主要特性無法滿足質量要求,不能正常使用
Defect of Ma.: the main features of products can't meet the quality requirement and can't work normally.
- 8.1.3 Mi.類缺陷:產品的一般特性無法滿足質量要求,但不影響正常使用
Defect of Mi.: the general features of products can't meet the quality requirement and it doesn't affect the normal operation.

8.2 判斷依據(Judging basis)

- 8.2.1 抽樣計劃:出貨檢驗依 MIL-STD-1916 C = 0 (一般抽樣水準單次抽樣計劃),正常檢驗抽樣計劃為 0.4 ;
- 8.2.2 Sampling plan: Outgoing inspection follows MIL-STD-1916 C = 0 (Single sampling plan for general sampling level), Normal test sampling plan: 0.4
- 8.2.3 允收水準(AQL): 出貨檢驗 : AQL 0.4, CR&MA 為 0; MI 為 1 收 2 退
- 8.2.4 Acceptance level (AQL): Outgoing inspection : AQL 0.4, CR&MA=0; MI=1 accept, 2 reject.

8.3 判斷依據(Judging basis)

- 8.3.1 檢驗規範(Inspection specification)
- 8.3.2 依據品質異常處理作業辦法,文件編號 QA2-043
According to the procedure of quality of exception handling operation (document number:QA2-043).

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9 RELIABILITY AND QUALITY REQUIREMENT

ID	Test Items	Test condition	Pass/Fail Criteria
9.1 PCBA			
9.1.1	Thermal Shock Test (Non Operating)	1) Temperature : -40°C for 15 min and 85°C for 15 min 2) Transition Time : ≤5 min 3) Duration : 100 cycles (35min for 1 cycle)	1.The PCBAs shall exhibit no cosmetic or physical degradation. 2.The PCBAs should pass the production line test station before and after this testing
9.1.2	Temperature Storage (Non Operating)	1)Temperature: -40°C for 48hrs & 85°C/ 85%RH for 48hrs 2)Duration : 96hrs	1.The PCBAs shall exhibit no cosmetic or physical degradation. 2.The PCBAs should pass the production line test station before and after this testing
9.1.3	Temperature Operation	1)Temperature:-10°C for 24hrs & 85°C/ 60%RH for 24hrs 2)Duration : 48 hours	1.Functionality should be normal during the test. 2.The PCBAs should pass the production line test station before and after this testing
9.2 Package			
9.2.1	Follow ISTA 1A 1. Vibration Test	Vibration Test System with 1 in(25mm) fixed or controlled displacement complying with Method A1 or A2 of the apparatus section of ASTM D999-01. Rotary or vertical liner motion of the platform is acceptable. Metal shim 0.06 in(1.5mm), thick approximately 2 in(50mm) wide and at convenient length.	1.The PCBAs shall exhibit no cosmetic or physical degradation. 2.The PCBAs should pass the production line test station before and after this testing

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2. Drop Test

Tachometer or suitable indicator for determining vibration frequency in cycles per second(Hz) or cycles per minute(CPM).

Automatic timer or stopwatch.

Test Duration in Minutes = $\frac{14,200 \text{ Vibratory Impacts}}{\text{Cycles Per Minute (CPM) or [Cycles Per Second (Hz) x 60]}}$

Drop Height: As below

Drop orientations: 1 corner/3 edge/6 face

Drop surface: Steel plate

Drop sequence:

Any one corner->3 edge which are close test corner->6 face

(Left-> Right-> Front-> Back-> Bottom->Top)

Packaged-Product Weight				Drop Height	
Equal to or greater than		But Less than		Free Fall	
lb	kg	lb	kg	in.	mm
0	0	21	10	30	760
21	10	41	19	24	610
41	19	61	28	18	460
61	28	100	45	12	310
100	45	150	68	8	200

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10 CERTIFICATE TEST PLAN

2.4GHz Module DB EMC/RF Pre-test plan				
Category	Test item	Follow standard	Test Condition	Note
General EMC test	Radiated Immunity Test (RS)	EN55035	1. Passed 80% AM 3V/m 2. Test frequency: 80MHz-6GHz	
	Radiated Emission Test (RE)	EN55032	Test Condition, with reference to FCC Part 15B, Class B Test frequency: 30MHz-1GHz/ Above 1GHz	
Regulatory-RF Transmitter	Bluetooth RF transmitter	FCC Part 15C	FCC 15C: Maximum Peak Output power FCC 15C: Conducted and Radiated Band Edge and Spurious Emission	
		EN 300328	EN300328: RF Output Power EN300328: Receiver Blocking EN300328 Transmitter and Receiver Spurious Emission	

Regulatory Requirements

Country	EMC Standards	Safety Standard	RoHS	Labeling
Australia	AS/NZS CISPR 32	-	-	
Canada	ICES-003	CSA 60950-1	-	CAN ICES-3 (B)/NMB-3(B) 
EU	EN 55024, EN 55032	IEC/EN 60950-1, IEC 62328-1	EN 50581	CE EU address See Note 1
Japan	VCCI-CISPR32	-	-	
Korea	KN 32, KN 35	-	-	 Cert #
Morocco	NM EN 55032, NM EN 55024	-	-	
New Zealand	AS/NZS CISPR 32	-	-	
Taiwan	CNS 13438	-	CNS 15663	

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Selling countries:

Certification Country List
United States
Canada
EU
France
Germany
Poland
Spain
United Kingdom
Australia/ New Zealand
China
Hong Kong
India
Indonesia
Japan
South Korea
Malaysia
Philippines
Singapore
Taiwan
Thailand

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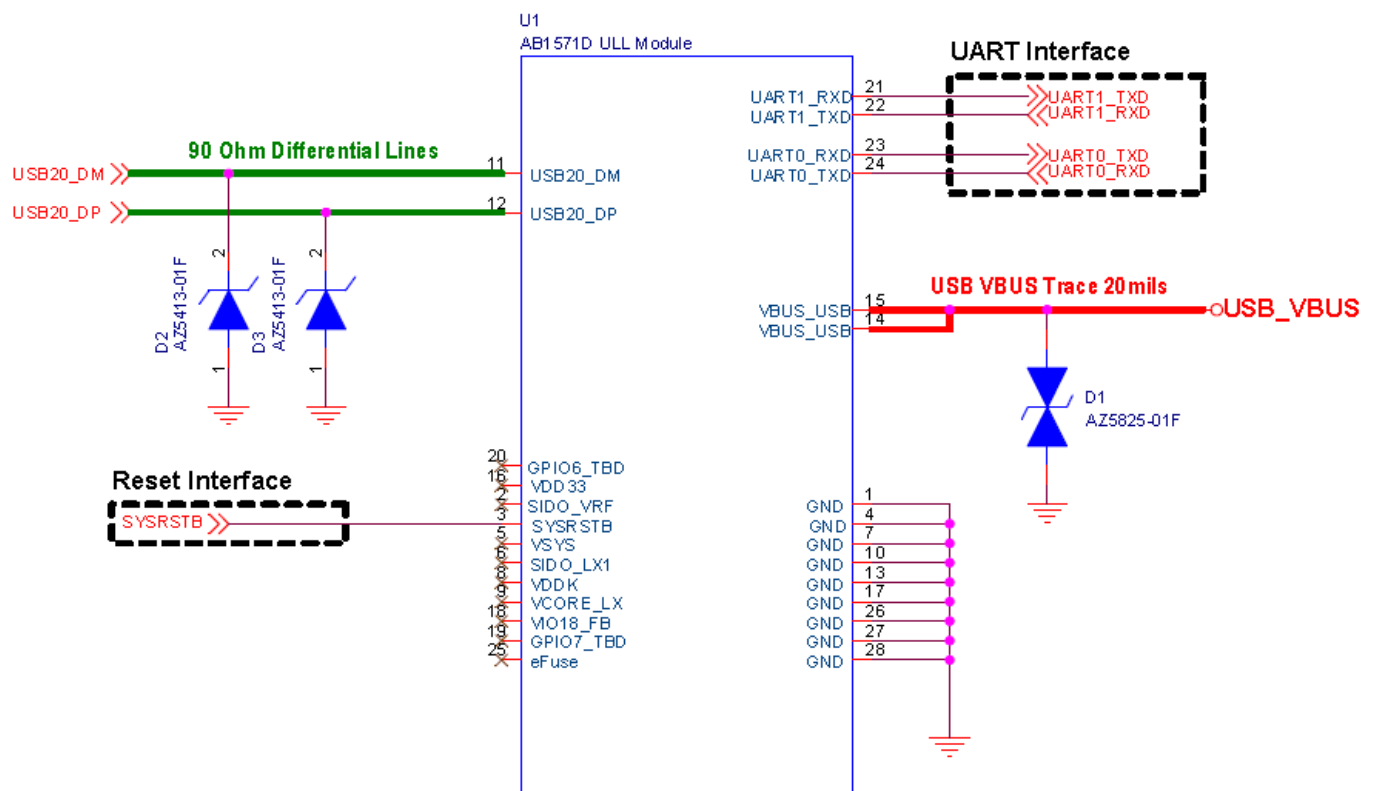
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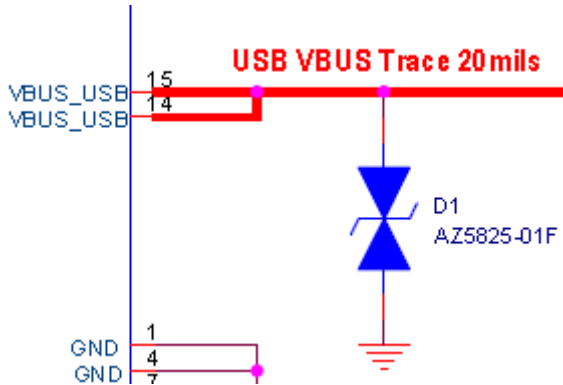
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11 MODULE DESIGN GUIDELINES

- The below diagram shows the typical schematic with VBUS/USB20/Reset/UART Host Interface.

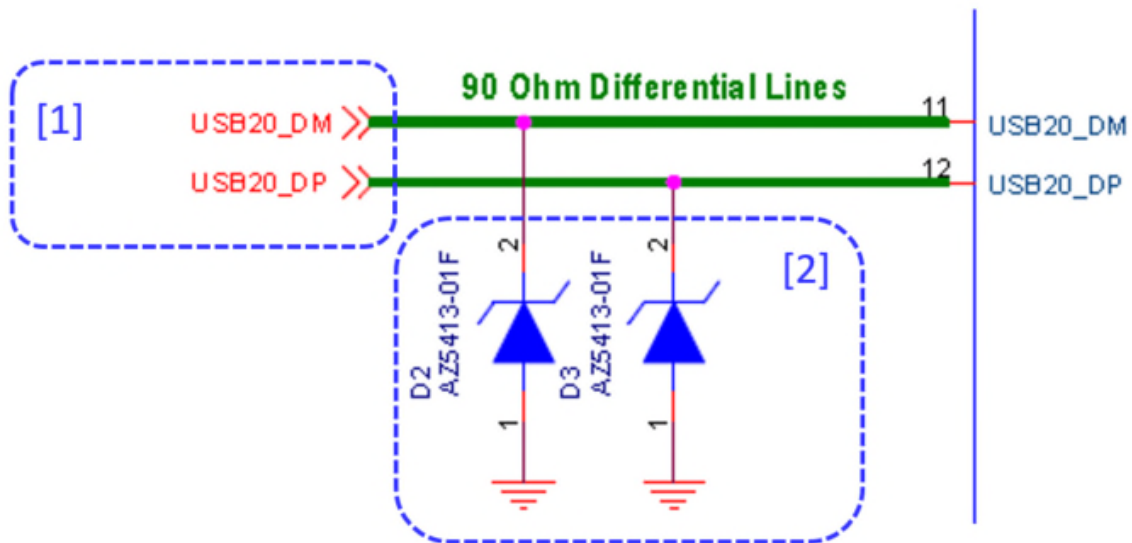


- VBUS AMR is 6.5V ,over voltage will cause EOS damage.
- Recommended use good power supply with short cable to reduce surge voltage during R&D and manufacture process.
- On the other hand, recommend add Zener Diode (or special TVS)on VBUS trace to enhance EOS protection capability. Also add Zener diode on the fixture to eliminate EOS risk in manufacture line.
- E.g. Reserve AZ5825-01F on VBUS trace for both EOS/ ESD protection.

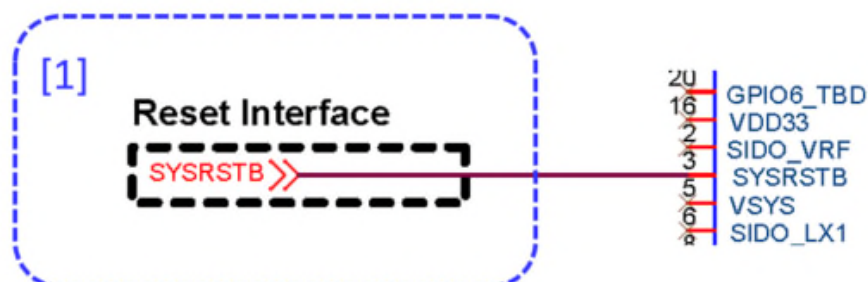


- Provide ESD protection for the protected line to IEC 61000-4-2 (ESD) $\pm 30\text{kV}$ (air), $\pm 30\text{kV}$ (contact)
IEC 61000-4-4 (EFT) 80A (5/50ns)
IEC 61000-4-5 (Lightning) 18A (8/20us)

- USB Differential pair: The 90-Ohm characteristic impedance must be implemented in PCB layout.
[1] – USB20_DM / USB20_DP
- Reserve ESD protection device for USB differential pair and VBUS. [2]
- The equivalent capacitance loading of ESD protection device should be less than 3pF.
[2]



- The SYSRSTB pin is by default weakly pull-high. When it is pressed (pull low) longer than the de-bounce time (5ms), the system will be cold reset. After SYSRSTB is released, system will be powered on again. [1] – SYSRSTB



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- SYSRSTB threshold.

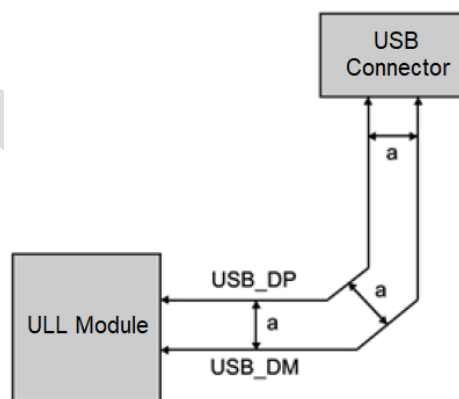
	SYSRSTB threshold (low active)
SYSRSTB high	SYSRSTB > 1.1V
SYSRSTB low	SYSRSTB < 0.53V

- SYSRSTB debounce time.
 - Low debounce time : 5ms
 - Accuracy : -25% ~ +25%

11.1 MODULE LAYOUT GUIDELINES

11.1.1 USB20_DP AND USB20_DM(P11/P12)

- Use signals can reach speeds of 480 Mbps. Guidelines for the differential signals USB_DP and USB_DM must be followed.
- Use an impedance of 90Ω only with a tolerance of 10%.
- It is highly recommended that the two USB differential signals (USB_DP and USB_DM) be routed in parallel with a spacing that achieves 90 Ω of differential impedances and 45 Ω for each trace.

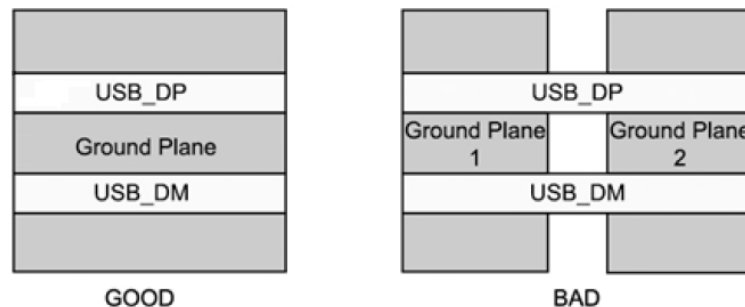


Spacing between USB_DP and USB_DM

- Do not route USB traces under crystals, oscillators, clock synthesizers, magnetic devices or ICs that use and/or duplicate clocks.
- To minimize crosstalk between the two USB differential signals (USB_DP and USB_DM) and other signal traces routed close to them.
- Use two 45°turns or an arc instead of making a single 90°turn.
- If the USB high-speed signals are routed on the Top layer, best results will be achieved if Layer 2 is a continuous GND plane. Furthermore, there must be only one ground plane under high-speed signals and avoid the high-speed signals crossing from GND plane to

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another GND plane.



USB Signals and the Ground Plane

- Do not route the USB differential lines close to edge of the board.

11.1.2 VBUS(P14/P15)

- The width of VBUS traces must be a minimum of 20 mils.
- Vbus Decoupling capacitor and module pin must be as short as possible.
-

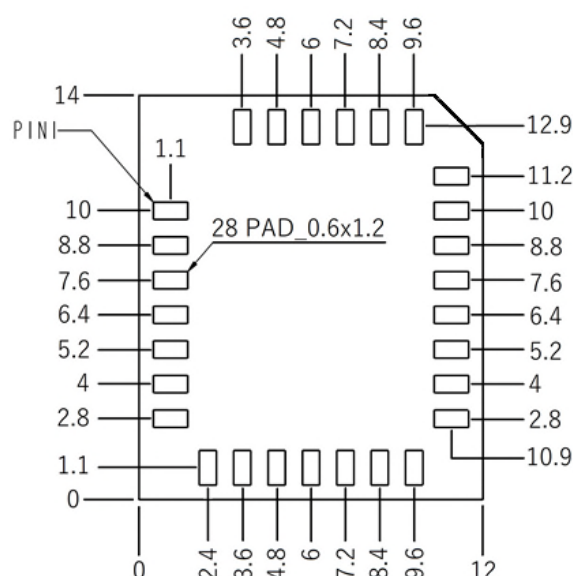
11.1.3 UART signals(UART0 P24/P23,UART1 P22/P21)

- The signals are UART0_TX/RX, UART1_TX/RX.
- Keep the UART signals away from noisy sources or other sensitive signals.
- UART signals can be routed with multiple vias. However, ensure return path is closer to the signals.

11.2 ESD protection

- The ESD protection should be close your I/O or test point.

11.3 PCBA Footprint



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12 SOLDER-REFLOW CONDITION

12.1 Reflow Condition

ULL Module can guarantee 3-time IR reflow based on the reflow profile (Figure 13.1-1).

- Average ramp-up rate (T_s to peak): 3 °C/sec maximum
- Preheat & Soak: Pb-Free 150~200 °C for 60~120 seconds
- Liquidous temperature maintained above Pb-Free 217 °C for 60~150 seconds
- Time within 5 °C of specified classification temperature: Pb-Free for 30 seconds

Note:

- Reflow profiles in this document are for classification/preconditioning and are not meant to specify board assembly profiles. Actual board assembly profiles should be developed based on specific process needs and board designs and should not exceed the parameters in Table 13.1-1.

For example, if T_c is 260 °C and time t_p is 30 seconds, this means the following for the supplier and user respectively.

For a supplier: The peak temperature must be at least 260°C. The time above 255°C must be at least 30 seconds.

For a user: The peak temperature must not exceed 260°C. The time above 255°C must not exceed 30 seconds.

- Time between reflows: 5 minutes minimum and 60 minutes maximum.

Table 13.1-1. Classification reflow profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-free assembly
Preheat/Soak Minimum Temperature (T_{smin})Maximum Temperature (T_{smax}) T_s = Time from T_{smin} to T_{smax}	100°C 150°C 60 – 120 seconds	150°C 200°C 60 – 120 seconds
Ramp-up rate (T_L to T_P)	3°C/sec maximum	3°C/sec maximum
Liquidous temperature (T_L) t_L : Time maintained above T_L	183°C 60 – 150 seconds	217°C 60 – 150 seconds
Peak package body temperature(T_P)	For users T_P must not exceed the classification in Table 13.1-2. For suppliers T_P must equal or exceed the classification in Table 13.1-2.	For users T_P must not exceed the classification in Table 13.1-3. For suppliers T_P must equal or exceed the classification in Table 13.1-3.
Time (t_p)* within 5°C of the specified classification temperature(T_c)	20 seconds	30 seconds
Ramp-down rate (T_P to T_L)	6°C/sec maximum	6°C/sec maximum
Time from 25°C to peak temperature	6 minutes maximum	8 minutes maximum

*Tolerance for peak profile temperature (TP) is defined as a supplier minimum and a user maximum

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Table 13.1-2. Sn-Pb Eutectic Process – Classification Temperature (TC)

Package thickness	Volume < 350 mm ³	Volume ≥ 350 mm ³
< 2.5 mm	235°C	220°C
≥ 2.5 mm	220°C	220°C

Table 13.1-3. Pb-free Process – Classification Temperature (TC)

Package thickness	Volume < 350 mm ³	2000 ≥ Volume ≥ 350 (mm ³)	Volume > 2000 mm ³
< 1.6 mm	260°C	260°C	260°C
1.6 - 2.5 mm	260°C	250°C	245°C
> 2.5 mm	250°C	245°C	245°C

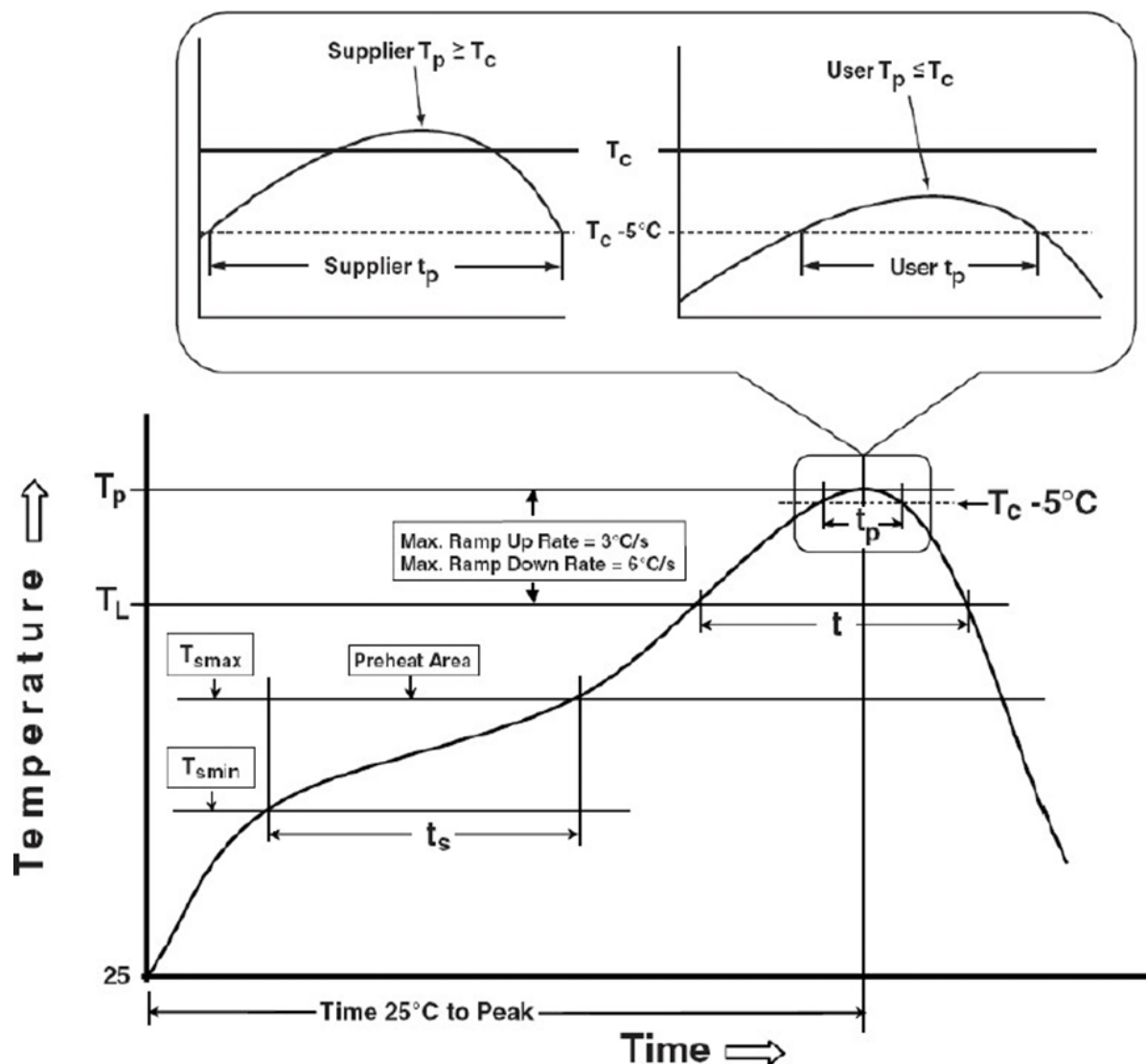


Figure 13.1-1. Classification profile

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12.2 Package Moisture Sensitivity Level (MSL), IPC/JEDEC J-STD-2

Module No.	Package	MSL
MX-131-001-01	QFN1214	MSL 3

12.2.1 Handling Guidelines

The detrimental effects of absorbed moisture in semiconductor packages during SMT assembly have been well documented in technical publications, manufacturers' literature and various industry standards. The purpose of this document is to identify areas of potential concern for end users and steps they should take to preclude problems.

12.2.2 MSL 3 Handling at PCB Assembly

ULL Module packages listed above are moisture sensitive and need to be handled within proper MSL 3 guidelines to avoid damage from moisture absorption and exposure to solder reflow temperatures that can result in yield and reliability degradation.

A) During PCB Assembly

1. Devices are baked and dry-packed before shipment from ULL Module factory. The packing uses a Moisture Barrier Bag (MBB). A Humidity Indicator Card (HIC) and drying desiccant are included inside the MBB. A MSL 3 label is attached to caution that the bag contains moisture sensitive devices.
2. Shelf life of devices in a sealed bag is 12 months at <40°C and <90% room humidity (RH).
3. Upon opening of MBB, the HIC should be checked immediately; devices require baking before board mounting if the HIC is >10% when read at 23°C ±5°C.
4. After MBB is opened, devices should go through reflow for board assembly within 120 hours at factory conditions of <30°C/60% RH, or stored at <10% RH. If both of these conditions are not met, baking is required before board mounting.
5. If baking is required, devices should be baked for a minimum of 4 hours at 125°C.

12.2.3 Handling Unused Modules

1. Any unused modules after the MBB has been open for more than 120 hours or not stored at <10% RH should be baked before any subsequent reflow and board assembly.
2. Re-baking should be done for a minimum of 4 hours at 125°C.
3. Unused modules can either be baked and dry-packed first before storage, or they can be baked just before the next assembly onto main board. It is recommended that the former be practiced as it helps to prevent operator error from re-using modules without first baking. In both cases, the repacked modules should follow the guidelines in section 3A.

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12.2.4 Reworking Modules on Main Board

1. Before a module is removed from the main board, the main board should first be baked.
2. Baking should be done for a minimum of 4 hours at 125°C.
3. It is recommended that during removal, localized heating be used, and the maximum body temperature of device should not exceed 200°C.
4. The replacement module should not have exceeded the specified floor life of 120 hours.

12.2.5 Reference

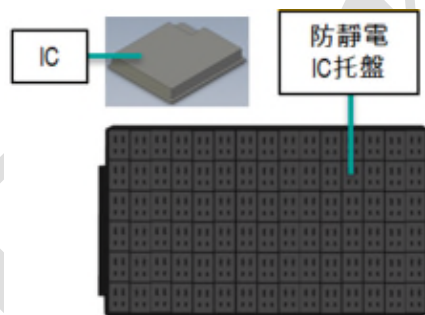
Customers may refer to following IPC/JEDEC standards for more details:

1. J-STD-033 Standard for Handling, Packing, Shipping and Use of Moisture/Reflow Sensitive Surface Mount Devices.
2. J-STD-020A Moisture/Reflow Sensitivity Classification for Non-hermetic Solid State Surface Mount Devices.

13 PACKAGE SPECIFICATION

13.1 PCBA 板 136PCS 裝入防靜電 IC 托盤內(圖示僅供參考)

136PCS PCBA put into anti-static IC tray (Picture for reference only)



13.2 5 層托盤合計裝入 680PCS 的 PCBA 板子

680PCS PCBA in total put into 5-layer tray.

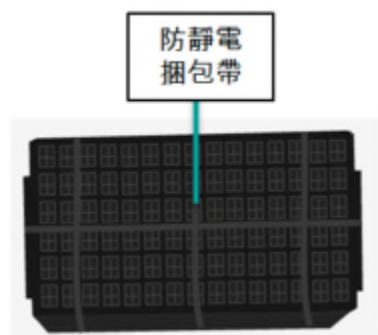
13.3 頂部放入 1 張空托盤防護

Put an empty tray on top for protection

13.4 使用防靜電捆包帶，依如下圖示捆扎

Use anti-static strapping to bundle it as below picture showed.

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13.5 二包干燥劑&濕度卡。(依下圖示擺放)

Prepare two bags of desiccant & one humidity card. (Place them as below picture showed.)

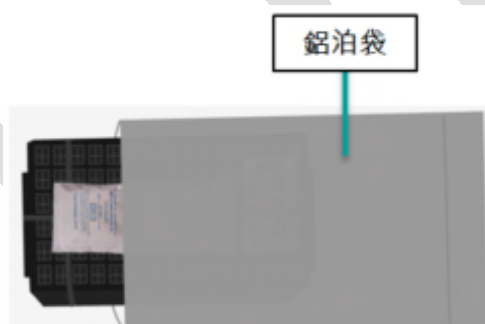


13.6 擺放完成品裝入鋁箔集袋內

Put final product into the aluminum container bag

13.7 依要求完成抽真空包裝

Complete vacuum packaging as required



13.8 鋁泊袋外依要求粘貼出貨標貼后裝入瓦楞盒（標貼圖示僅供參考）

Paste a shipping label on aluminum bag, then put it into the corrugated paper box. (Label info. TBD)

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13.9 瓦楞盒外依要求粘貼出貨標貼（標貼示意圖僅供參考）

Shipping labels are pasted on the corrugated paper box. (Label info. TBD)

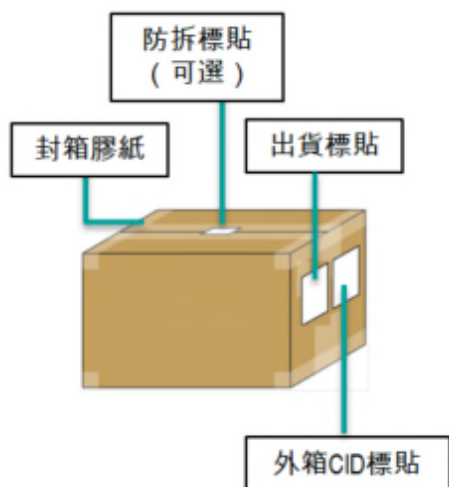
13.10 紙箱內并排放入 2PCS*2 層，合計 4PCS 瓦楞盒裝。

4PCS of corrugated paper box put into carton, 2PCS*2 layers placed side by side



13.11 紙箱外粘貼防拆標貼&外箱標貼（標貼內容圖示僅供參考）

Stick tamper sticker & carton label on the carton (label info. TBD)



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Compliance Information:

FCC ID of this device is FCC ID: B94-HNM01BTM

FCC

15.19

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

- 1) this device may not cause harmful interference and
- 2) this device must accept any interference received, including interference that may cause undesired operation.

15.105(b)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

15.21

You are cautioned that changes or modifications not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment."

FCC RF Radiation Exposure Statement:

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1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2. For portable operation, this device has been tested and meets FCC RF exposure guidelines. When used with an accessory that contains metal may not ensure compliance with FCC RF exposure guidelines.
3. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm /between the radiator and your body.

4. In the end product, the antenna(s) used with this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operation in conjunction with any other antenna or transmitter except in accordance with multi-transmitter product procedures. User and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying the RF exposure compliance.

ISED Model and certificate number of this device is HSN-M01BTM and IC: 466X-HNM01BTM

IC

"This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. l'appareil ne doit pas produire de brouillage, et
2. l'utilisateur de l'appareil doit accepter tout brouillage radioelectrique subi, meme si le brouillage est susceptible d'en compromettre le fonctionnement."

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"Caution: Exposure to Radio Frequency Radiation

1. To comply with the Canadian RF exposure compliance requirements, this device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter."
2. To comply with RSS 102 RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.

"Attention: exposition au rayonnement radiofréquence

1. Pour se conformer aux exigences de conformité RF canadienne l'exposition, cet appareil et son antenne ne doivent pas être co-localisés ou fonctionnant en conjonction avec une autre antenne ou transmetteur."
2. Pour se conformer aux exigences de conformité CNR 102 RF exposition, une distance de séparation d'au moins 20 cm /0 mm doit être maintenue entre l'antenne de cet appareil et toutes les personnes

Required End Product Labeling

Any device incorporating this module must include an external, visible, permanent marking or label which states:

"Contains FCC ID: B94-HNM01BTM" and "Contains IC : 466X-HNM01BTM"

Obligation d'étiquetage du produit final:

Tout dispositif intégrant ce module doit comporter un externe, visible, marquage permanent ou une étiquette qui dit: "Contient IC : 466X-HNM01BTM"

Additional testing, Part 15 Subpart B disclaimer

The modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification.

The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

FCC

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This module has been tested and found to comply with the following requirements for Modular Approval.

Part 15.247 - Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

Test Modes

This device uses various test mode programs for test set up which operate separate from production firmware. Host integrators should contact the grantee for assistance with test modes needed for module/host compliance test requirements.

Antennas

This radio transmitter has been approved by the FCC and ISED to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Antennes

Cet émetteur radio a été approuvé par la FCC et ISED pour fonctionner avec les types d'antennes répertoriés ci-dessous avec le gain maximal autorisé indiqué. Les types d'antennes non inclus dans cette liste, ayant un gain supérieur au gain maximum indiqué pour ce type, sont strictement interdits pour une utilisation avec cet appareil.

Radio	Antenna Type	Freq. (MHz)	Max. Peak Antenna Gain (dBi)
Bluetooth	PIFA	2402-2480	3.41

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as shown in User manual.

NCC

根據 NCC LP0002 低功率射頻器材技術規範_章節 3.8.2 :

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前述合法通信，指依電信管理法規定作業之無線電通信。

低功率射頻器材須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

此模組於取得認證後將依規定於模組本體標示審驗合格標籤，並要求平台廠商於平台上標示

『內含發射器模組：CCXXxxLPyyyZzW』

或相似含意的標示

ANTEL: XXXXX-YY-HHHHH

COO: China

[R] X-00000

Warning Brasil:

"Este equipamento não tem direito à proteção contra interferência prejudicial e não pode causar interferência em sistemas devidamente autorizados.