Taiwan Anjie

Product Specification

Model: **MCR822CE-P**

WLAN 802.11ac 2T2R + BT5.0

Half Mini Card

Revision: 1.5

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File name	Date	Released by
MCR822CE-P.pdf	10-Apr-2021	Kenny Chang

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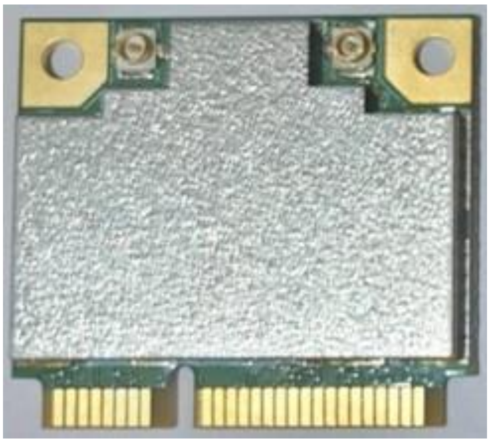
Revision History

Rev.	Change Note	Date
1.0	- First Release	10-Apr-2021
1.1	- Modify pin assignment - Update Power On Sequence - Modify packing & accessories	29-Jul-2021
1.2	- Mark RF connector 1 & 2	13-Dec-2021
1.3	- Update Top view Photo	11-Jan-2022
1.4	- Modify Top view Photo	5-Mar-2022
1.5	- Modify Operating temperature	11-Mar-2022
	-	

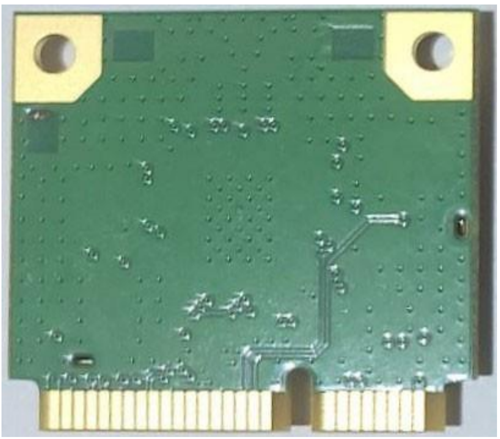
1. INTRODUCTION

1.1 Scope

The **MCR822CE-P** is a highly integrated single-chip that support 2-stream 802.11ac solutions with Multi-user MIMO (Multiple-Input, Multiple-Output) with Wireless LAN (WLAN) PCI Express network interface controller with integrated Bluetooth Smart Ready USB interface controller. It combines a WLAN MAC, a 2T2R capable WLAN baseband, and RF in single chip. The MCR822CE-P provides a complete solution for a high-performance integrated wireless and Bluetooth device.



Top View



Bottom View

1.2 Features

- Form factor: Half Mini Card type.
- IEEE 802.11a/b/g/n/ac draft 2.0 compatible WLAN.
- WLAN supports 2.4GHz and 5GHz channel.
- 2T2R MIMO technology for extended reception robustness and exceptional throughput.
- Bluetooth: BT 2.1/3.0/4.0/4.1/4.2/5.0
- Max. PHY data rate: 866.7Mpbs using 80MHz bandwidth.
- I/O: **WLAN:** PCIe1.1 **BT**: USB 2.0
- 2 x 50 Ohm RF connectors for 2.4G/5G diversity data transmission.
- Win10 OS supported
- RoHS compliant.

1.3 Model Define

	MCR822CE-P
RF Connector #	MHF Ⅰ * 2 Ant.1 Wi-Fi Ant.2 Wi-Fi + BT
Antenna design	Two Antenna for TX/RX, Diversity

2. SPECIFICATION

2.1 HARDWARE SPECIFICATION

2.1.1 General Specification

IEEE Wireless Networking Standard	IEEE 802.11 a/b/g/n/ac Wireless Local Area Networks
RF Frequency Range	2.4GHz / 5GHz ISM Dual Band
PHY Rate	173Mbps using 20MHz bandwidth. 300Mbps using 40MHz bandwidth 866.7Mpbs using 80MHz bandwidth.
MIMO Technology	2T2R
IEEE 802.11i security mechanisms	WPA, WPA2. Open, shared key, pairwise key authentication
Other IEEE standard	802.11e QoS Enhancement(WMM) 802.11h DFS, TPC, Spectrum measurement
Operating Voltage	+3.3V (±5%)
Interface	WLAN: PCIe 1.1 Bluetooth: USB2.0

2.1.1.1 Function specifications

Wi-Fi Function	
Data Rate	802.11a: 54, 48, 36, 24, 18, 12, 9, 6 Mbps 802.11b: 11, 5.5, 2, 1 Mbps

	802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps 802.11n: MCS 0 to 15 for HT20MHz MCS 0 to 15 for HT40MHz 802.11ac: MCS 0 to 8 for HT20MHz MCS 0 to 9 for HT40MHz MCS 0 to 9 for HT80MHz
Media Access Control	CSMA/CA with ACK
Modulation Techniques	802.11a: 64QAM, 16QAM, QPSK, BPSK 802.11b: CCK, DQPSK, DBPSK 802.11g: 64QAM, 16QAM, QPSK, BPSK 802.11n: 64QAM, 16QAM, QPSK, BPSK 802.11ac: 256QAM, 64QAM, 16QAM, QPSK, BPSK
Network Architecture	Ad-hoc mode (Peer-to-Peer) Infrastructure mode
Operation Channel	2.4GHz 11: (Ch. 1-11) – United States 13: (Ch. 1-13) – Europe 14: (Ch. 1-14) – Japan 5GHz 21: USA 19: EU 8: Japan
Frequency Range	802.11a/ac: 5.15~5.85 GHz 802.11bgn: 2.412 ~ 2.484 GHz
Transmit Output Power – 2x2 **(Tolerance: 2dBm)**	802.11a: 17 dBm@54Mbps 802.11b: 18 dBm@11Mbps 802.11g: 17 dBm@54Mbps 802.11n: 2.4G 20MHz: 16 dBm@MCS7 40MHz: 16 dBm@MCS7

	5G 20MHz: 16 dBm@MCS7 40MHz: 16 dBm@MCS7 802.11ac: 80MHz: 14 dBm@MCS9
Receiver Sensitivity	802.11a: -68dBm@54Mbps 802.11b: -85dBm@11Mbps 802.11g: -88dBm@6Mbps -74dBm@54Mbps 802.11n(2.4GHz): 20MHz: -88dBm@MCS0 -70dBm@MCS7 40MHz: -85dBm@MCS0 -67dBm@MCS7 802.11n(5GHz): 20MHz: -85dBm@MCS0 -67dBm@MCS7 40MHz: -82dBm@MCS0 -64dBm@MCS7 802.11ac: 20MHz: -62 dBm@MCS8 40MHz: -59 dBm@MCS9 80MHz: -54 dBm@MCS9
Security	WEP 64&128bit, WPA, WPA-PSK, WPA2, WPA2-PSK, WPS, IEEE 802.1X, IEEE 802.11i
Power Consumption (Average)	TX mode(VHT20,11ac): 260mA RX mode(VHT80,11ac): 130mA Non-Associated Idle: 130 Radio Disable: 28
BT Function	
Standard	Bluetooth V5.0, V4.2, V4.0LE, V3.0+HS, V2.1+EDR,
Data Rate	1 Mbps, 2Mbps and Up to 3Mbps
Modulation Scheme	GFSK, π/4-DQPSK and 8-DPSK
Frequency Range	2.402~2.480 GHz
Transmit Output Power	0 ≤ Output Power ≤ +6; Class I Device
Receiver Sensitivity	< 0.1% BER at -70dBm

2.1.2 Board Specification

WLAN Chip	Realtek RTL8822CE
BT Chip	Realtek RTL8822CE
Antenna	External antenna (not included)
RF connector	Dual MHF1 Antenna Connectors
Form Factor	Mini PCIE type

2.1.3 Environmental

Operating	Operating temperature: -40 to 85 degree C *Note[1] Relative Humidity : 5-90% (non-condensing)
Storage	Temperature: -40 to 85 degree C Relative Humidity : 5-95% (non-condensing)

* Note[1]: RF performance Will be reduced throughput @ < -20℃ and > +80℃.

2.1.4 PIN Define

PIN ASSIGNMENT

PIN	Definition	Remark
1	WAKE#	0:WiFi Wake up
3	COEX1	NU
5	COEX2	NU
7	CLKREQ#	Reference Clock Request signal
9	GND	GND
11	REFCLK-	PCIE Receive Differential Clock
13	REFCLK+	PCIE Receive Differential Clock
15	GND	GND
17	RESERVED	NU[1]
19	RESERVED	NU
21	GND	GND
23	PERn0	PCIE Transmit Differential Pair
25	PETp0	PCIE Transmit Differential Pair
27	GND	GND

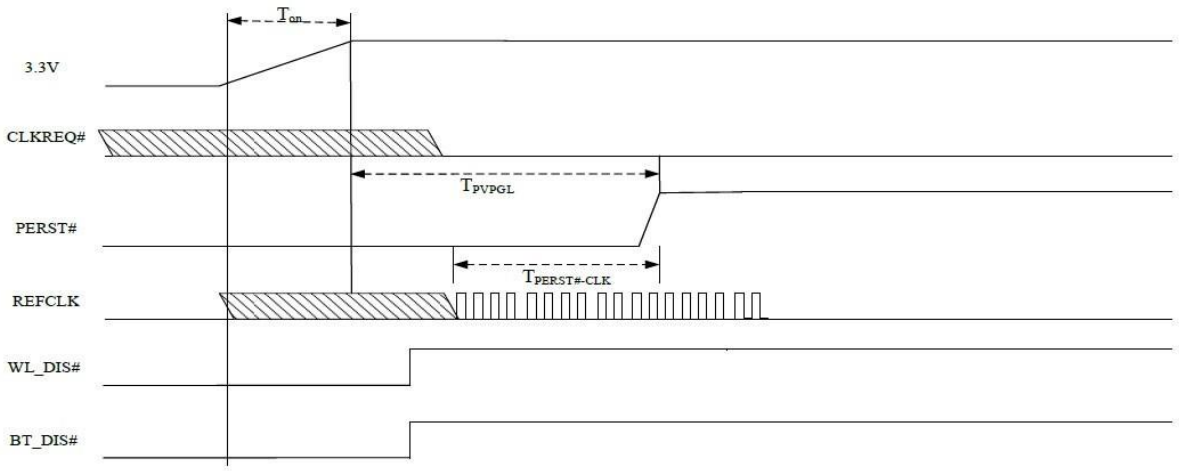
PIN	Definition	Remark
2	+3.3Vaux	+3.3V
4	GND	GND
6	+1.5V	NU
8	UIM_PWR	NU
10	UIM_DATA	NU
12	UIM_CLK	NU
14	UIM_RESET	NU
16	UIM_VPP	NU
18	GND	GND
20	W_DISABE1#	0: WiFi Radio OFF 1: WiFi Radio ON
22	PERST#	0:PCIE Reset
24	+3.3Vaux	NU
26	GND	GND
28	+1.5V	NU

29	GND	GND	30	SMB_CLK	NU
31	PETn0	PCIE Receive Differential Pair	32	SMB_DATA	NU
33	PETp0	PCIE Receive Differential Pair	34	GND	GND
35	GND	GND	36	USB_D-	PCIE Receive Differential Pair
37	GND	GND	38	USBD+	PCIE Receive Differential Pair
39	+3.3Vaux	+3.3V	40	NC	NU
41	+3.3Vaux	+3.3V	42	LED_WWAN#	NU
43	GND	GND	44	LED_WLAN#	LED for WiFi
45	RESERVED	NU	46	LED_WPAN#	LED for BT
47	RESERVED	NU	48	+1.5V	NU
49	RESERVED	NU	50	GND	GND
51	W_DISABLE2#	0:DISABLE BT	52	+3.3Vaux	+3.3V

[1] NU: Not used.

[2] "Power off" means the device is disabled, you cannot find it in Windows device manager

2.1.5 PCIe Bus during Power On Sequence



T_{on}: The main power ramp up duration

T_{PVPGL}: Power valid to PERST# input inactive

$T_{PERST\#-CLK}$: Reference clock stable before PERST# inactive

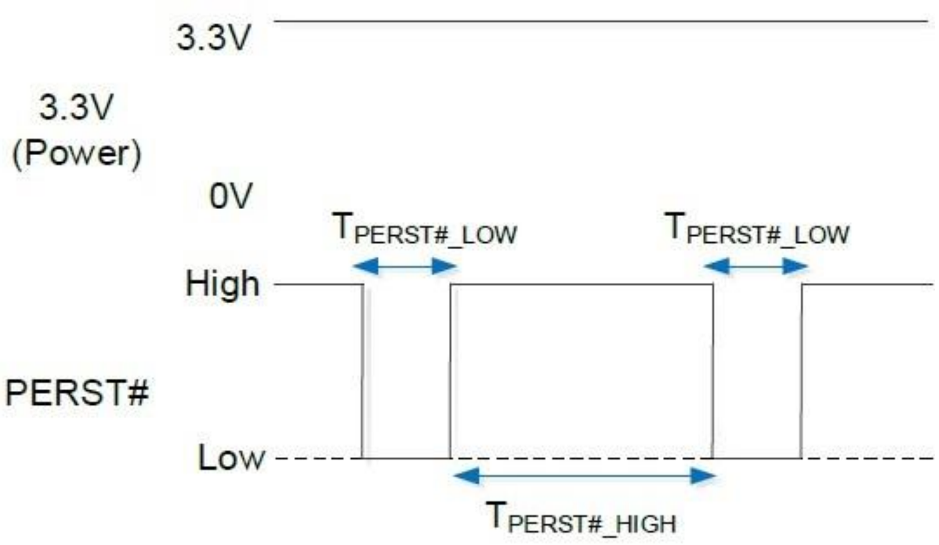
T_{attach}: The interval to turn on BT after PERST# de-asserted

$T_{k\text{-}state}$: the duration from resister attached to USB host starting card detection procedure

The typical timing range

	Unit	Min.	Typical	Max.
T_{on}	ms	0.5	1.5	5
T_{PVPGL}	ms	Implementation specific; recommended 50ms		--
$T_{PERST\#\text{-}CLK}$	us	100		--
T_{attach}	ms	0.5	2	5
$T_{k\text{-}state}$	ms	50	250	--

2.1.6 PCIe PERST# Timing Sequence


3.3V
3.3V
(Power)
0V
TPERST#_LOW
TPERST#_LOW
High
PERST#
Low
TPERST#_HIGH

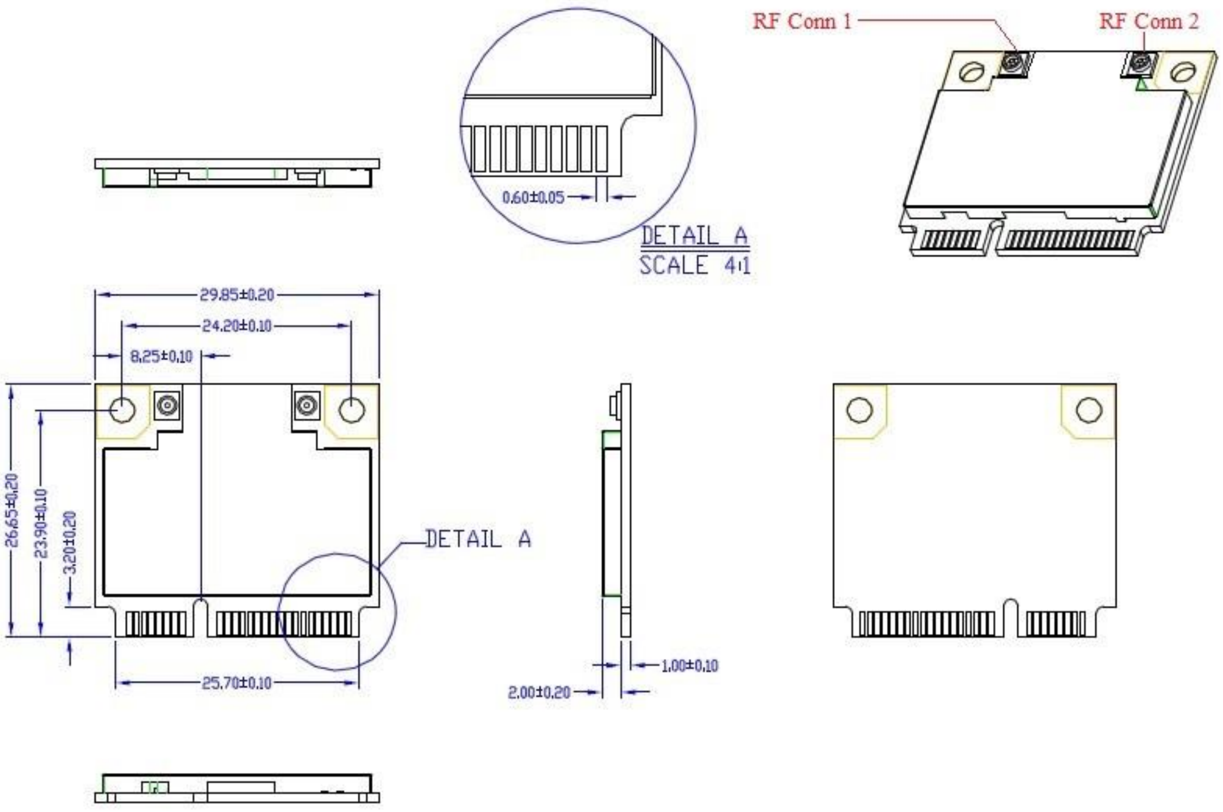
	Min.	Typical	Max.	Unit	Description
$T_{PERST\#\_LOW}$	6	10	X	ms	PERST# low duration
$T_{PERST\#\_HIGH}$	400	500	X	ms	PERST# high duration

2.2 MECHANICAL SPECIFICATION

2.2.1 Board Dimension

Form factor	Half Mini Card		
PCB Dimension	26.65L*29.85W mm		
PCB thickness	1mm (±0.1mm)		
SMD	Single side		
Max. height of components (from PCB)	Top side	Shielding case	3.0mm (±0.2mm)
	Bottom side	Shielding case	0mm (±0.2mm)

2.2.2 Mechanical Drawing


RF Conn 1
RF Conn 2
0.60±0.05
DETAIL A
SCALE 4:1
29.85±0.20
24.20±0.10
8.25±0.10
26.65±0.20
23.90±0.10
3.20±0.20
25.70±0.10
DETAIL A
1.00±0.10
2.00±0.20

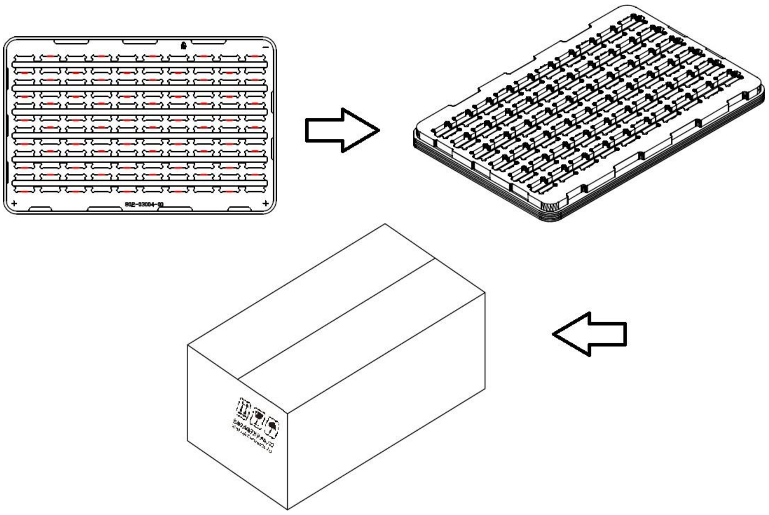
2.3 SOFTWARE SPECIFICATION

2.3.1 Operating system

- Windows10 Realtek WLAN driver ready.
- Support Linux.
- Support Android.

3. PACKING & ACCESSORIES

Contents	Unit	Remarks
MCR822CE-P	*1	Half mini card
Tray	*1	60pcs in one Tray.
Carton	*1	17+1 tray in one Carton. (1,000pcs)



FCC Statement

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.

FCC Caution:

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

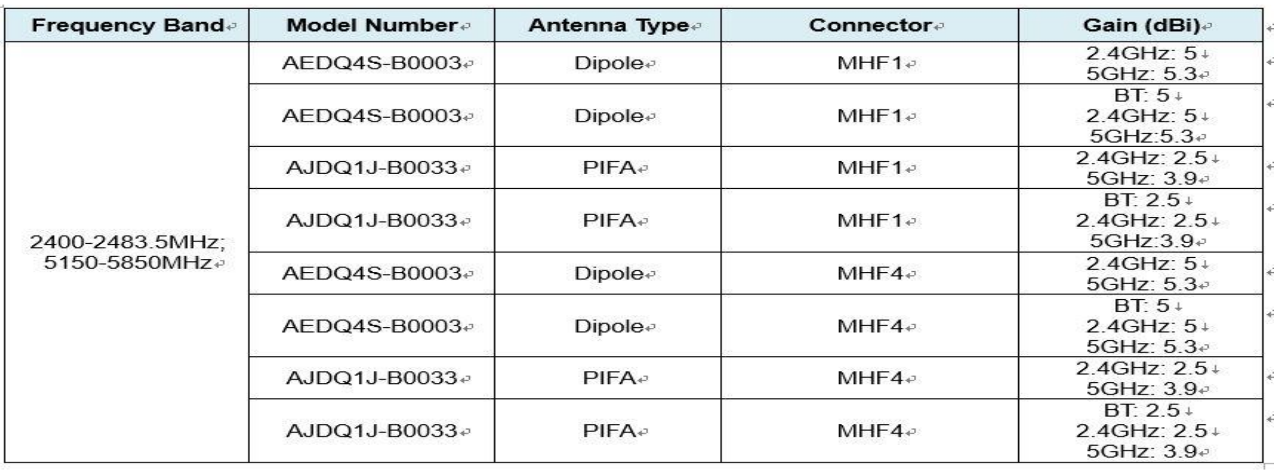
The OEM or integrator is obligated to adhere to these requirements and restrictions as a condition for using the module’s certification. The OEM or integrator is responsible to perform the required additional host regulatory testing and/or obtaining the required host approvals for compliance.

This module is intended for OEM integrators under the following conditions:

1. Ensure that the end-user has no manual instructions to remove or install module.

2. This module is certified pursuant to Part 15 rules section 15.247, 15.407.

3. This module has been approved to operate with the antenna types listed below, with the maximum permissible gain indicated.



Frequency Band	Model Number	Antenna Type	Connector	Gain (dBi)
2400-2483.5MHz; 5150-5850MHz	AEDQ4S-B0003	Dipole	MHF1	2.4GHz: 5 5GHz: 5.3
	AEDQ4S-B0003	Dipole	MHF1	BT: 5 2.4GHz: 5 5GHz:5.3
	AJDQ1J-B0033	PIFA	MHF1	2.4GHz: 2.5 5GHz: 3.9
	AJDQ1J-B0033	PIFA	MHF1	BT: 2.5 2.4GHz: 2.5 5GHz:3.9
	AEDQ4S-B0003	Dipole	MHF4	2.4GHz: 5 5GHz: 5.3
	AEDQ4S-B0003	Dipole	MHF4	BT: 5 2.4GHz: 5 5GHz: 5.3
	AJDQ1J-B0033	PIFA	MHF4	2.4GHz: 2.5 5GHz: 3.9
	AJDQ1J-B0033	PIFA	MHF4	BT: 2.5 2.4GHz: 2.5 5GHz: 3.9

4. Label and compliance information

Label of the end product:

The host product must be labeled in a visible area with the following " Contains FCC ID: 2AP85-MCR822CE ".

The end product shall bear the following 15.19 statement: 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.

5. Information on test modes and additional testing requirements

This module has been approved under stand-alone configuration.

OEM integrator has be limited the operation channels in channel 1-11 for 2.4GHz band.

The separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and different antenna configurations.

The information on how to configure test modes for host product evaluation for different operational conditions for a stand-alone modular transmitter in a host, versus with multiple, simultaneously transmitting modules or other transmitters in a host can be found at KDB Publication 996369 D04.

6. Additional testing, Part 15 Subpart B disclaimer

Appropriate measurements (e.g. Part 15 Subpart B compliance) and if applicable additional equipment authorizations (e.g. SDoC) of the host product to be addressed by the integrator/manufacturer.

This module is only FCC authorized for the specific rule parts 15.247, 15.407 listed on the grant, and the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host product as being Part 15 Subpart B compliant.

7. The user manual of the end product should include (information for OEMs):

The module must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

Information To Be Supplied to the End User by the OEM or Integrator

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons.

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.

The antenna(s) used for this transmitter must not transmit simultaneously with any other antenna or transmitter.

The end user manual shall include all required regulatory information/warning as shown in this document.

END OF THIS DOCUMENTATIO