

RLW_FCC Authentication _ Instructions for Use

Version 1.3

RALINWI

Ralinwi Nanjing

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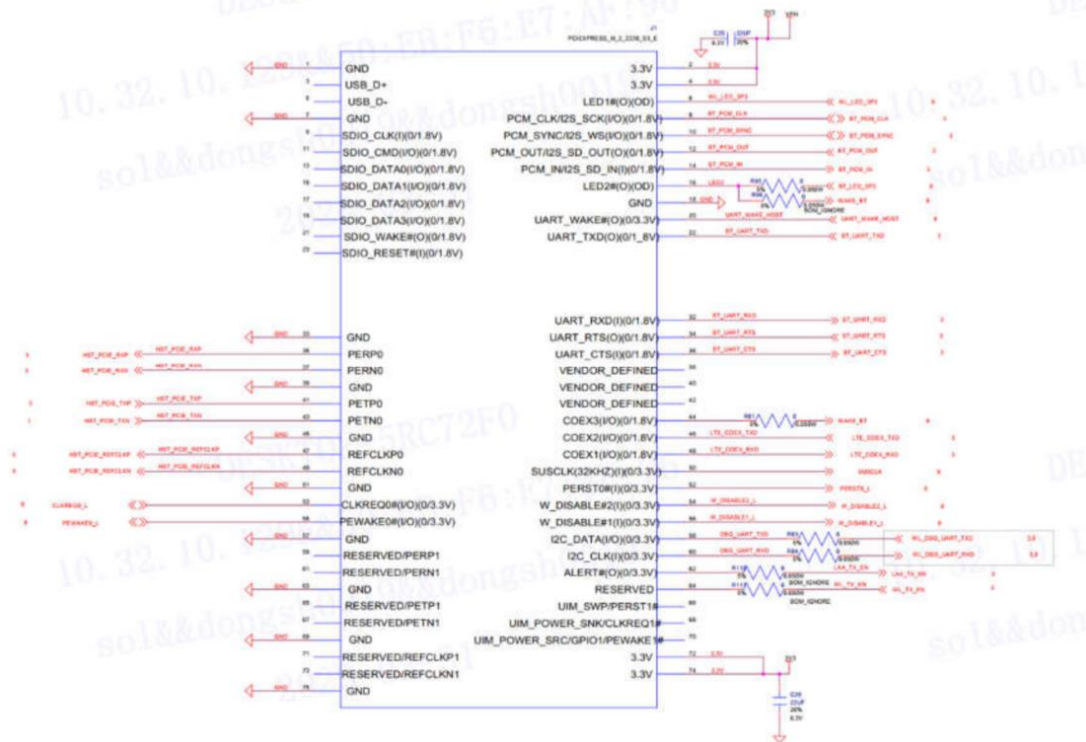
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1.1 Pin Outline



1.2 Pin Definition

1	GND1	-	Ground	
3	NC	-		
5	NC	-		
7	GND2	-	Ground	
9	NC	-		
11	NC	-		
13	NC	-		
15	NC	-		
17	NC	-		
19	NC	-		
21	NC	-		
23	NC	-		
33	GND3	-	Ground	
35	PERP0	I	PCIe RX differential	

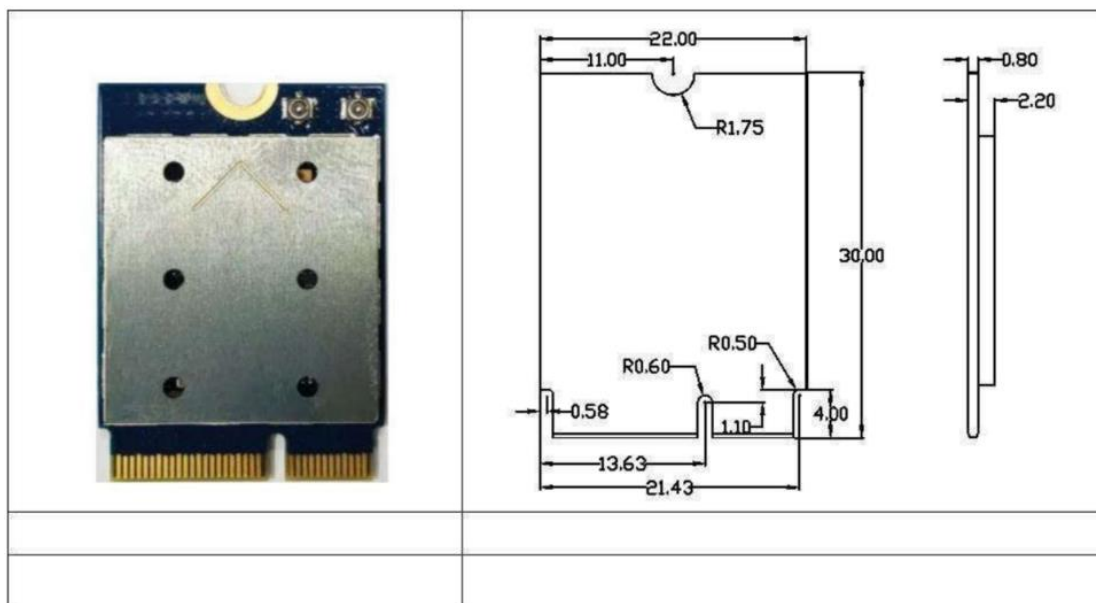
37	PERN0	I	signals	
39	GND4	-	Ground	
41	PETP0	O	PCIe TX differential signals	
43	PETN0	O		
45	GND5	-	Ground	
47	REFCLKP0	I	PCIe clock differential input signal	
49	REFCLKN0	I		
51	GND6		Ground	
53	CLKREQ0#(I/O)(0/3.3V)	O	PCIe reference clock request signal, open drain, active low	3.3V
55	PEWAKE0#(I/O)(0/3.3V)	O	PCIe wake up host, open drain, active low	3.3V
57	GND7	-	Ground	
59	RESERVED_PERP1	-	NC	
61	RESERVED_PERN1	-	NC	
63	GND8	-	Ground	
65	RESERVED_PETP1	-	NC	
67	RESERVED_PETN1	-	NC	67

69	GND9	-	Ground	69
71	RESERVED_REFCLKP1	-	NC	71
73	RESERVED_REFCLKN1	-	NC	73
75	GND10	-	Ground	
Bottom				
2	3_3V_1	P	Power supply	3.3V
4	3_3V_2	P	Power supply	3.3V
6	LED_1#(O)(OD)	O	WLAN LED signal	3.3V
8	PCM_CLK	-	BT PCM clock	1.8V
10	PCM_SYNC	-	BT PCM sync	1.8V
12	PCM_OUT	O	BT PCM data out	1.8V
14	PCM_IN	I	BT PCM data in	1.8V
16	LED_2#(O)(OD)	O	BT LED signal	3.3V
18	GND11	-		
20	UART_WAKE_N	O	BT wake up host signal	3.3V
22	UART_TXD(O)(0/1.8V)	O	BT UART interface	1.8V
32	UART_RXD(I)(0/1.8V)	I		1.8V
34	UART_RTS(O)(0/1.8V)	O	BT UART request to send	1.8V
36	UART_CTS(I)(0/1.8V)	I	BT UART clear to send	1.8V
38	NC	-		
40	NC	-		
42	NC	-		
44	WAKE_BT	I	Host wake up BT signal	3.3V
46	LTE_COEX_TXD	O	LTE coexistence UART TXD	1.8V
48	LTE_COEX_RXD	I	LTE coexistence UART RXD	1.8V
48	LTE_COEX_RXD	I	LTE coexistence UART RXD	1.8V
50	SUSCLK_32KHZ	I	Sleep clock input	3.3V
52	PERST0#(I)(0/3.3V)	I	PCIe reset module, internal weak pull down	3.3V
54	W_DISABLE2#(I)(0/3.3V)	I	Turn off BT RF analog. Active low	3.3V
56	W_DISABLE1#(I)(0/3.3V)	I	Turn-off WLAN RF analog	3.3V
58	I2C_DATA(I/O)(0/1.8V)	O	WLAN UART TXD for debug	1.8V
60	I2C_CLK(I/O)(0/1.8V)	I	WLAN UART RXD for debug	1.8V

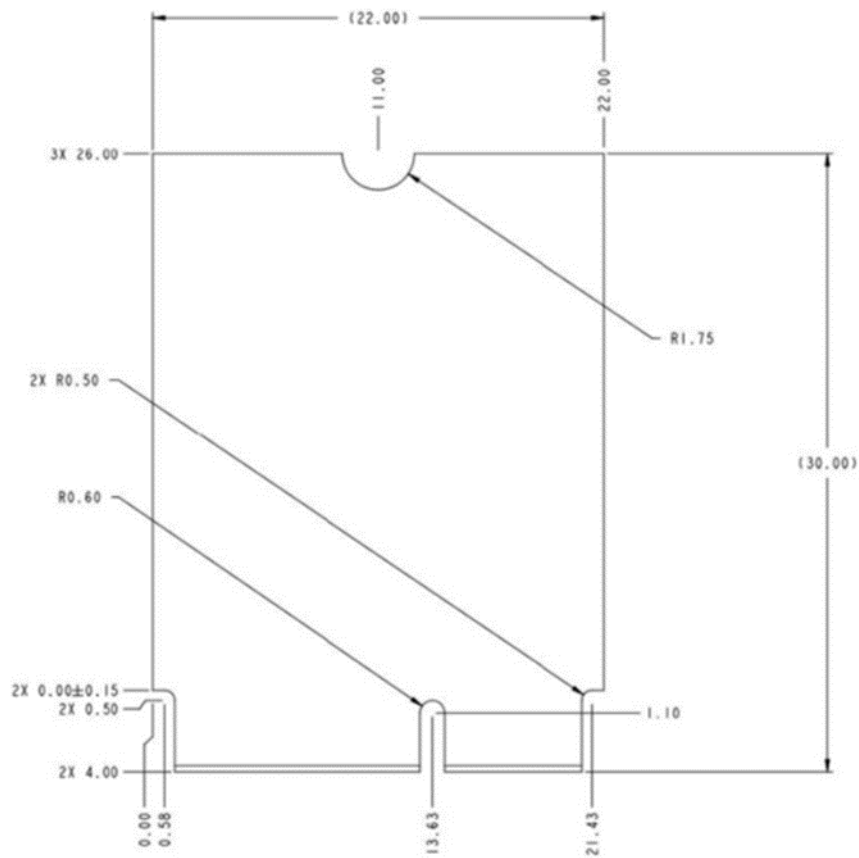
62	NC	-		
64	NC	-		
66	NC	-		
68	NC	-		
70	NC	-		
72	3_3V_3	P	Power supply	3.3V
74	3_3V_4	P	Power supply	3.3V

2 Dimensions

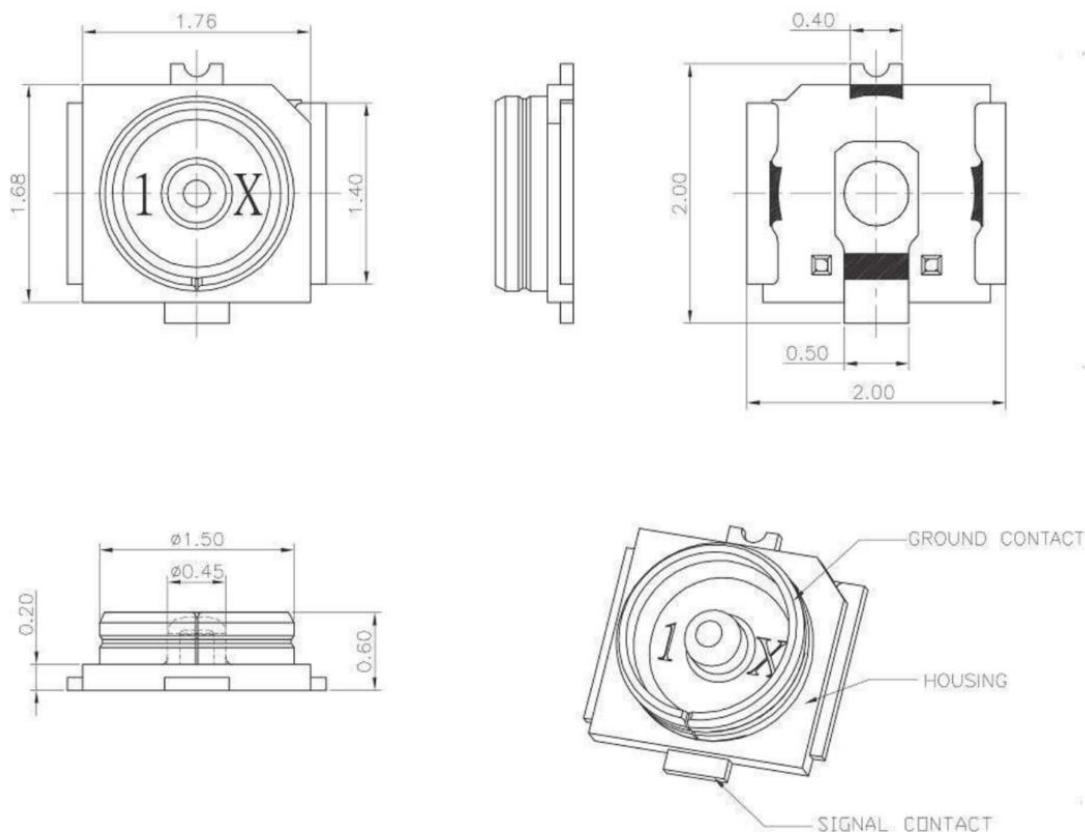
2.1 Module Picture



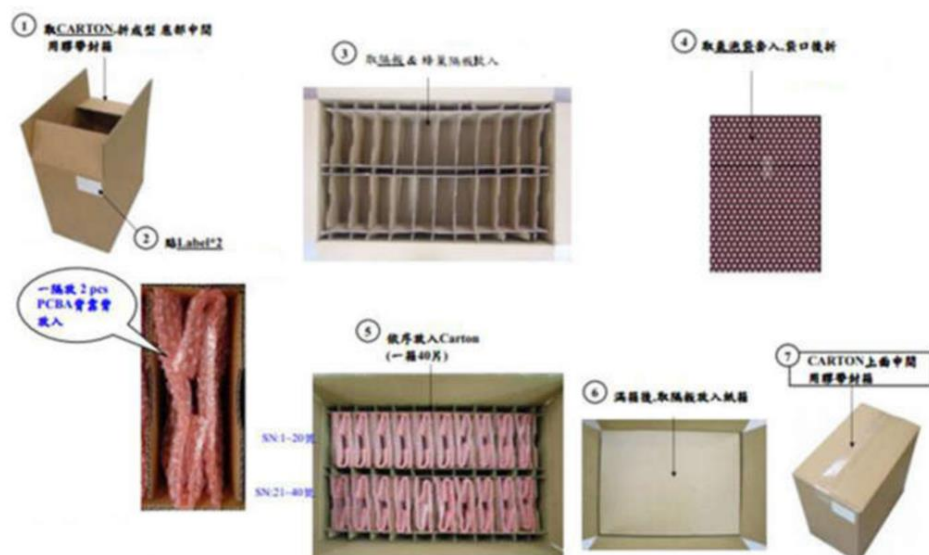
2.2 Module Physical Dimension



There are 2 gen 4 RF receptacle connectors on the module, for external dual band antenna. The RF receptacle connectors are complied with IPEX 4 standard.



3 Package Information



4 How to used

- 1) download ubuntu 18.04 release, and install linux host
- 2) Reboot the system and the system will find the related hardware
- 3) Start “scan” operation and then link to the specific Ap
- 4) Check the conditions of AP and its channels using the instruction “iw dev”

5) Switching between module channels for changing AP channel

Feature	Description		
WLAN Standard	IEEE 802.11b/g/n/ax Wi-Fi compliant		
Frequency Range	2.412 GHz ~ 2.462 GHz (2.4 GHz ISM Band)		
Number of Channels	2.4GHz: Ch1 ~ Ch11		
Item	Value	Standard Value	
Output Power	802.11b /1Mbps: 18dBm $\pm$ 2 dB	EVM $\leq$ -9dB	
	802.11b /11Mbps:18dBm $\pm$ 2 dB	EVM $\leq$ -9dB	
	802.11g /6Mbps: 18 dBm $\pm$ 2 dB	EVM $\leq$ -5dB	
	802.11g /54Mbps: 17 dBm $\pm$ 2 dB	EVM $\leq$ -25dB	
	802.11n HT20 /MCS0: 18 dBm $\pm$ 2 dB	EVM $\leq$ -5dB	
	802.11n HT20 /MCS7: 17dBm $\pm$ 2 dB	EVM $\leq$ -28dB	
	802.11n HT40 /MCS0: 19 dBm $\pm$ 2 dB	EVM $\leq$ -5dB	
	802.11n HT40 /MCS7: 17 dBm $\pm$ 2 dB	EVM $\leq$ -28dB	
	802.11ax HE20/MCS0: 18 dBm $\pm$ 2 dB	EVM $\leq$ -5dB	
	802.11ax HE20/MCS11: 14 dBm $\pm$ 2 dB	EVM $\leq$ -35dB	
	802.11ax HE40/MCS0: 18 dBm $\pm$ 2 dB	EVM $\leq$ -5dB	
	802.11ax/MCS11: 14 dBm $\pm$ 2 dB	EVM $\leq$ -35dB	
SISO Receive Sensitivity (11b,20MHz) @8% PER	1Mbps	$\leq$ -92 dBm	$\leq$ -83 dBm
	11Mbps	$\leq$ -85 dBm	$\leq$ -76 dBm
SISO Receive Sensitivity (11g,20MHz) @10% PER	6Mbps	$\leq$ -87 dBm	$\leq$ -85 dBm
	54Mbps	$\leq$ -71 dBm	$\leq$ -68 dBm
SISO Receive Sensitivity (11n,20MHz) @10% PER	MCS=0	$\leq$ -86 dBm	$\leq$ -85 dBm
	MCS=7	$\leq$ -68 dBm	$\leq$ -67 dBm
SISO Receive Sensitivity (11n,40MHz) @10% PER	MCS=0	$\leq$ -83 dBm	$\leq$ -82 dBm
SISO Receive Sensitivity (11ax,20MHz) @10% PER	MCS=0	$\leq$ -81 dBm	$\leq$ -74 dBm
	MCS=11	$\leq$ -55 dBm	$\leq$ -52 dBm
SISO Receive Sensitivity (11ax,40MHz) @10% PER	MCS=0	$\leq$ -74 dBm	$\leq$ -71 dBm
	MCS=11	$\leq$ -52 dBm	$\leq$ -49 dBm
Maximum Input Level	802.11b: -10 dBm		
	802.11g/n/ax: -10 dBm		
Feature	Description		
WLAN Standard	IEEE 802.11 a/n/ac/ax 2x2, Wi-Fi compliant		

Frequency Range	5.180 GHz ~ 5.240 GHz, 5.260 GHz ~ 5.320 GHz, 5.550 GHz ~ 5.700 GHz, 5.745 GHz ~ 5.825 GHz		
Number of Channels	5.0GHz: Please see the table1		
Item	Value	Standard Value	
Output Power	802.11a /6Mbps: 18 dBm ± 2 dB	EVM ≤ -5dB	
	802.11a /54Mbps: 16 dBm ± 2 dB	EVM ≤ -25dB	
	802.11n HT20 /MCS0: 19 dBm ± 2 dB	EVM ≤ -5dB	
	802.11n HT20 /MCS7: 16 dBm ± 2 dB	EVM ≤ -28dB	
	802.11n HT40 /MCS0: 18.5 dBm ± 2 dB	EVM ≤ -5dB	
	802.11n HT40 /MCS7: 16 dBm ± 2 dB	EVM ≤ -28dB	
	802.11ac vHT20/MCS0: 17 dBm ± 2 dB	EVM ≤ -5dB	
	802.11ac vHT20/MCS8: 15 dBm ± 2 dB	EVM ≤ -30dB	
	802.11ac vHT40/MCS0: 16 dBm ± 2 dB	EVM ≤ -5dB	
	802.11ac vHT40/MCS9: 15 dBm ± 2 dB	EVM ≤ -32dB	
	802.11ac vHT80/MCS0: 16 dBm ± 2 dB	EVM ≤ -5dB	
	802.11ac vHT80/MCS9: 14 dBm ± 2 dB	EVM ≤ -32dB	
	802.11ax HE20/MCS0: 19 dBm ± 2 dB	EVM ≤ -5dB	
	802.11ax HE20/MCS11: 14 dBm ± 2 dB	EVM ≤ -35dB	
	802.11ax HE40/MCS0: 16 dBm ± 2 dB	EVM ≤ -5dB	
	802.11ax HE40/MCS11: 14 dBm ± 2 dB	EVM ≤ -35dB	
	802.11ax HE80/MCS0: 16dBm ± 2 dB	EVM ≤ -5dB	
	802.11ax HE80/MCS11: 13 dBm ± 2 dB	EVM ≤ -35dB	
SISO Receive Sensitivity (11a,20MHz) @10% PER	6Mbps	≤ -87 dBm	≤-85
	54Mbps	≤ -71 dBm	≤-68
SISO Receive Sensitivity (11a,20MHz) @10% PER	MCS=0	≤ -86 dBm	≤-85
	MCS=7	≤ -68 dBm	≤-67
SISO Receive Sensitivity (11n,40MHz) @10% PER	MCS=0	≤ -83 dBm	≤-82
	MCS=7	≤ -65 dBm	≤-64
SISO Receive Sensitivity (11ac,20MHz) @10% PER	MCS=0, NSS1	≤ -83 dBm	≤-82
	MCS=8, NSS1	≤ -63 dBm	≤-60
(11ac,40MHz) @10% PER	MCS=0, NSS1	≤ -82 dBm	≤-79
	MCS=9, NSS1	≤ -60 dBm	≤-55
(11ac,80MHz)	MCS=0, NSS1	≤ -81 dBm	≤-79

@10% PER	MCS=9, NSS1	≤ -57 dBm	≤ -54
(11ax, 20MHz)	MCS=0	≤ -81 dBm	≤ -74
@10% PER	MCS=11	≤ -55 dBm	≤ -52
SISO Receive	MCS=0	≤ -74 dBm	≤ -71
Sensitivity	MCS=11	≤ -52 dBm	≤ -49
(11ax,40MHz)			
@10% PER			
SISO Receive	MCS=0	≤ -73 dBm	≤ -68
Sensitivity	MCS=11	≤ -51 dBm	≤ -46
(11ax,80MHz)			
@10% PER			
Maximum Input Level	802.11a/n/ac/ax : -10 dBm		
Antenna Reference	external antenna with 2dBi peak gain		

Band range	Operating Channel Numbers	Channel center frequencies (MHz)
5180MHz~5240MHz	36	5180
	40	5200
	44	5220
	48	5240
5260MHz~5320MHz	52	5260
	56	5280
	60	5300
	64	5320
5550MHz~5700MHz	100	5500
	104	5520
	108	5540
	112	5560
	116	5580
	120	5600
	124	5620
	128	5640
	132	5660
	136	5680
	140	5700
5745MHz~5825MHz	149	5745
	153	5765
	157	5785
	161	5805
	165	5825

5 FCC Certification Requirements

According to the definition of mobile and fixed device is described in Part 2.1091(b), this device is a mobile device.

And the following conditions must be met:

1) This Modular Approval is limited to OEM installation for mobile and fixed applications only. The antenna installation and operating configurations of this transmitter, including any applicable source-based time averaging duty factor, antenna gain, and cable loss must satisfy MPE categorical Exclusion Requirements of 2.1091.

2) The EUT is a mobile device; maintain at least a 20 cm separation between the EUT and the user's body and must not transmit simultaneously with any other antenna or transmitter.

3) A label with the following statements must be attached to the end product: This device contains Hicon6310, Nic3552e, Nic3562e FCC ID: 2ADGH-6311

4) This module must not transmit simultaneously with any other antenna or transmitter

5) The end product must include a user manual that clearly defines operating requirements and conditions that must be observed to ensure compliance with current FCC RF exposure guidelines.

The module is sold with a separate PCIE interface board. The design specifications such as PIN pins can only be used in the PC, and cannot be used in electronic products such as portable notebooks. If the integrator or final product manufacturer changes the design for use in portable products, they have the responsibility and obligation to apply for a new FCC ID authorization and add related tests such as SAR. In addition to the conditions 3 through 5 described above, a separate approval is required to satisfy the SAR requirements of FCC Part 2.1093.

If the device is used for other equipment that separate approval is required for all other operating configurations, including portable configurations with respect to 2.1093 and different antenna configurations.

For this device, OEM integrators must be provided with labeling instructions of finished products. Please refer to KDB784748 D01 v07, section 8. Page 6/7 last two paragraphs:

A certified modular has the option to use a permanently affixed label, or an electronic label. For a permanently affixed label, the module must be labeled with an FCC ID - Section 2.926 (see 2.2 Certification (labeling requirements) above). The OEM manual must provide clear instructions explaining to the OEM the labeling requirements, options and OEM user manual instructions that are required (see next paragraph).

Radiation Exposure Statement:

This module support WIFI(2412-2462MHz, 5180-5240, 5250-5350, 5470-5725 , 5745-5825MHz) which compliance with part 15.247 & 15.407 and apply for Limited Single Modular Approval.

The module is limited to OEM installation only.

The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.

OEM integrator shall equipped the antenna to compliance with antenna requirement part 15.203& 15.204 and must not be co-located or operating in conjunction with any other antenna or transmitters. And

OEM host shall implement a Class II Permissive Change (C2PC) or a new FCC ID to demonstrate complied with FCC standard.

The OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

The final end product must be labelled in a visible area with the following: “Contains FCC ID: 2ADGH-6311”

The modular transmitter is only FCC authorized for FCC Part 15 Subpart C 15.247 & 15.407 & 15.207 & 15.209 and that the product manufacturer is responsible for compliance to any other FCC rules that apply to the end product not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional radiator digital circuitry), then the grantee shall provide a notice stating that the final product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

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.

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

To ensure compliance with all non-transmitter functions the manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational.

Class B digital device

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.

Manual Information to the End User

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 show in this manual.

5.1 List of applicable FCC rules

CFR 47 FCC PART 15 SUBPART C(15.247&15.407) has been investigated. It is applicable to the modular transmitter

the internal antenna(s) that has been originally tested and certified with this module. The antenna must be either permanently attached or employ a unique antenna coupler.

As long as the conditions above are met, further transmitter test will not be required. However, the manufacturer is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.)

Important Note:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

5.6 Label and compliance information

The final end product must be labeled in a visible area with the following "Contains FCC ID: 2ADGH-6311".

5.7 Information on test modes and additional testing requirements

Manufacturer is strongly recommended to confirm compliance with FCC requirements for the transmitter when the module is installed in the end product.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines. This equipment should be installed and operated keeping the radiator at least 20cm or more away from person's body.

When the end product is a portable device, it is necessary to take a SAR test with your set mounting this module.

Class II permissive change application is necessary using the SAR report. Please contact Murata (Aftersaleservice12@outlook.com). And an application for a Class II permissive change from a Mobile equipment to a Portable equipment is also required.

Note) Portable equipment : Equipment for which the spaces between human body and antenna are used within 20cm. Mobile equipment : Equipment used at position in which the spaces between human body and antenna exceeded 20cm.

5.8 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 the end product manufacturer is responsible for compliance to any other FCC rules that apply to the end product not covered by the modular transmitter grant of certification.

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

Note EMI Considerations:

Note that a manufacture is recommended to use KDB 996369 D04 Module Integration Guide recommending as "best practice" RF design engineering testing and evaluation in case non-linear interactions generate additional non-compliant limits due to module placement to components or

properties.

For standalone mode, reference the guidance in D04 Module Integration Guide and for simultaneous mode⁷; see D02 Module Q&A Question 12, which permits the manufacturer to confirm compliance.

How to make changes:

When changing from the conditions of approval, please present technical documentation that it is equivalent to a Class I change.

For example, when adding or changing an antenna, the following technical documents are required.

- 1) The document indicating the same type as the original antenna
- 2) Technical document showing that the gain is the same with the gain at the time of the original approval. If the antenna gain is lower than the antenna gain value compared with the original approval, a class II permissive change should be followed.
- 3) Technical document showing that the radiated emissions level is no more than the worse value than when it was originally certified.

6 Appendix 1-Quick Installation Guide

6.1 Install Drivers

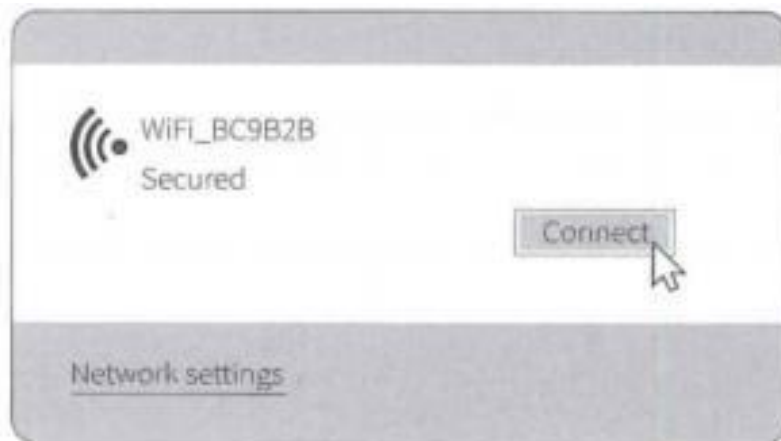
Insert the CD and open the directory.

Install the Wi-Fi drivers.

Wi-Fi: Click on the Wi-Fi driver directory. Select the corresponding driver file according to the adapter model and operating system. Follow the on-screen instructions to complete the installation.

6.2 Join a Wireless Network

Click the network icon on the taskbar, select your WiFi network and enter the password.



6.3 FAQ

Q1. What systems does this adapter support? A1: support Window10/Ubuntu18.04.

Q2. Is it suitable for other brands (Intel/AMD/NXP/NXP)?

A2: Yes, the adapter also could work well.

7 revision history

Date	Version	Release notes
2023.02.27	1.0	Initial version

