



WBUR56

IEEE 802.11 a/b/g/n/ac 2x2 + BT5 Combo Module

Product Specification 1.0

Approved:	Approved:	Prepared by:
Zeke Wu Manager	Ben Ho Supervisor	Wayne Chang Engineer

FOXCONN CONFIDENTIAL

This preliminary specification is subject to change without notice.
Copyright © 2017 Hon Hai Precision Ind Co., Ltd. All rights reserved

Revision History

Date	Number	Approver	Comments
2021/Sep/23	1.0	Cathy Kuo	Initial Released

RESTRICTED AND CONFIDENTIAL INFORMATION STATEMENT

All information contained in this document is the exclusive property of Foxconn Technology Inc. and its development partners. Any reproduction or disclosure of all or part of this document without the expressed written consent of Foxconn Technology Inc. is strictly prohibited.

CHAPTER 1. MODULE OVERVIEW

The Foxconn WBUR56 is a highly integrated module that support 2-stream 802.11ac solutions with Multi-user MIMO with WLAN USB2.0 network interface controller. It combines a WLAN MAC, a 2T2R capable WLAN baseband, and RF in a single module. The WBUR56 provides a complete solution for a high-performance integrated wireless and Bluetooth device.

For legacy compatibility, Direct Sequence Spread Spectrum (DSSS), Complementary Code Keying (CCK) and OFDM baseband processing are included to support all IEEE 802.11b, 802.11g and 802.11a data rates. Differential phase shift keying modulation schemes, DBPSK and DQPSK with data scrambling capability are available, and CCK provides support for legacy data rates, with long or short preamble. The high speed FFT/IFFT paths, combined with BPSK, QPSK, 16QAM, 64QAM and 256QAM modulation of the individual subcarriers, and rate compatible coding rate of 1/2, 2/3, 3/4, and 5/6, provide up to 866.7Mbps for IEEE 802.11ac MIMO OFDM.

1-1 Key Characteristic

- IEEE 802.11 a/b/g/n and 802.11ac draft compliant
- Support 20MHz, 40MHz, 80MHz in 5GHz band, and 20MHz, 40MHz bandwidth in 2.4GHz band
- Dual-band 2T2R mode with data rate up to 867Mbps
- Integrated LNA, PA
- Security support for WPA/WPA2/WAPI
- Complies with USB 2.0 for WLAN and BT controller

1-2 Pin definition



Figure 1 Pin Definitions (Module Top View)

Pin No	Name	Description
1	RESET	Reset Signal
2	WL_WAKE_HOST	Wake on WLAN Signal output
3	BT_WAKE_HOST	Wake on Bluetooth Signal output
4	GND	Ground
5	VCC_C	DC 3.3V
6	VCC_C	DC 3.3V
7	GND	Ground
8	HOST_WAKE_WL	Wake on WLAN Signal Input
9	DM	USB Data -
10	DP	USB Data +

Table 1 Pin Definitions

CHAPTER 2. ELECTRICAL AND RF SPECIFICATION

2-1 Recommended Operation Rating

Table 2 Operation Rating

Parameter	Condition	Min	Typ.	Max.	Unit
VDD	3.3V	3V	3.3V	3.6V	V
RF Interface	Zo		50		Ohm

2-2 Power Consumption

Power consumption is measured using current probe loop on the Power rails of the USB interface (Pins).

Table 3 Power Consumption

Description	Typical	Unit
IDLE	24	mA
2G_TX - N mode HT 40MHz MCS 7	283	mA
2G_TX - N mode HT 20MHz MCS 7	294	mA
2G_TX - G mode OFDM 54M	303	mA
2G_TX - B mode CCK 11M	406	mA
5G_TX - AC mode HT 80MHz MCS 9	289	mA
5G_TX - N mode HT 40MHz MCS 7	293	mA
5G_TX - N mode HT 20MHz MCS 7	316	mA
5G_TX - A mode OFDM 54M	327	mA
2G_RX - N mode HT 40MHz MCS 7	181	mA
2G_RX - N mode HT 20MHz MCS 7	178	mA
2G_RX - G mode OFDM 54M	178	mA
2G_RX - B mode CCK 11M	179	mA
5G_RX - AC mode HT 80MHz MCS 9	191	mA
5G_RX - N mode HT 40MHz MCS 7	184	mA
5G_RX - N mode HT 20MHz MCS 7	180	mA
5G_RX - A mode OFDM 54M	180	mA

2-3 WiFi RF Specification – TX

**Table 4 IEEE 802.11 b/g/n TX Average Maximum Output Power
North America(NA), Asia-Pacific(AP)**

Band@2.4GHz	Data Rate(Mbps)	Modulation	WLAN 0[dBm]	WLAN 1[dBm]	WLAN 0+1[dBm]
802.11b	1	DBPSK	13.5	13.5	16.5
	2	DQPSK			
	5.5	CCK			
	11	CCK			
802.11g	6	OFDM	12.5	12.5	15.5
	9	OFDM			
	12	OFDM			
	18	OFDM			
	24	OFDM			
	36	OFDM			
	48	OFDM			
	54	OFDM			
802.11n-HT20	MCS0	BPSK	11.5	11.5	14.5
	MCS1	BPSK			
	MCS2	QPSK			
	MCS3	QPSK			
	MCS4	16-QAM			
	MCS5	16-QAM			
	MCS6	64-QAM			
	MCS7	64-QAM			
802.11n-HT40	MCS0	BPSK	11.5	11.5	14.5
	MCS1	QPSK			
	MCS2	QPSK			
	MCS3	16-QAM			
	MCS4	16-QAM			
	MCS5	64-QAM			
	MCS6	64-QAM			
	MCS7	64-QAM			

**Table 5 IEEE 802.11 a/n/ac TX Average Maximum Output Power
North America(NA), Asia-Pacific(AP)**

Band@5GHz	Data Rate(Mbps)	Modulation	WLAN 0[dBm]	WLAN 1[dBm]	WLAN 0+1[dBm]
802.11a (5150-5725MHz) (5725-5850MHz)	6	OFDM	10.5 10(NA), 4(AP)	10.5 10(NA), 4(AP)	13.5 13(NA), 7(AP)
	9	OFDM			
	12	OFDM			
	18	OFDM			
	24	OFDM			
	36	OFDM			
	48	OFDM			
	54	OFDM			
802.11n-HT20 802.11ac-VHT20 (5150-5725MHz) (5725-5850MHz)	MCS0	BPSK	11 9.5(NA), 4(AP)	11 9.5(NA), 4(AP)	14 12.5(NA), 7(AP)
	MCS1	BPSK			
	MCS2	QPSK			
	MCS3	QPSK			
	MCS4	16-QAM			
	MCS5	16-QAM			
	MCS6	64-QAM			
	MCS7	64-QAM			
802.11n-HT40 802.11ac-VHT40 (5150-5725MHz) (5725-5850MHz)	MCS0	BPSK	11.5 11.5(NA),4(AP)	11.5 11.5(NA),4(AP)	14.5 14.5(NA), 7(AP)
	MCS1	QPSK			
	MCS2	QPSK			
	MCS3	16-QAM			
	MCS4	16-QAM			
	MCS5	64-QAM			
	MCS6	64-QAM			
	MCS7	64-QAM			
	MCS8	256-QAM			
	MCS9	256-QAM			
802.11ac-VHT80 (5150-5725MHz) (5725-5850MHz)	MCS0	BPSK	8.5 12(NA), 4(AP)	8.5 12(NA), 4(AP)	11.5 15(NA), 7(AP)
	MCS1	QPSK			
	MCS2	QPSK			
	MCS3	16-QAM			
	MCS4	16-QAM			
	MCS5	64-QAM			
	MCS6	64-QAM			
	MCS7	64-QAM			
	MCS8	256-QAM			
	MCS9	256-QAM			

2-4 WiFi RF Specification – RX

Table 6 IEEE 802.11 b/g/a/n/ac RX Sensitivity (WLAN0&WLAN1)

Data Rate (Mbps)	Modulation	Rx Sensitivity (dBm)		Data Rate (Mbps)	Modulation	Rx Sensitivity (dBm)	
		Max.	Typ.			Max.	Typ.
1	DBPSK	-88	-91	HT20-7.22	BPSK	-82	-87
2	DQPSK	-85	-88	HT20-14.44	QPSK	-79	-84
5.5	CCK	-82	-85	HT20-21.67	QPSK	-77	-82
11	CCK	-79	-82	HT20-28.89	16-QAM	-74	-79
6	OFDM	-82	-87	HT20-43.33	16-QAM	-70	-75
9	OFDM	-81	-86	HT20-57.78	64-QAM	-66	-71
12	OFDM	-79	-84	HT20-65	64-QAM	-65	-70
18	OFDM	-77	-82	HT20-72.22	64-QAM	-64	-69
24	OFDM	-74	-79	HT40-15	BPSK	-79	-84
36	OFDM	-70	-75	HT40-30	QPSK	-76	-81
48	OFDM	-66	-71	HT40-45	QPSK	-74	-79
54	OFDM	-65	-70	HT40-60	16-QAM	-71	-76
				HT40-90	16-QAM	-67	-72
				HT40-120	64-QAM	-63	-68
				HT40-135	64-QAM	-62	-67
				HT40-150	64-QAM	-61	-66

2-5 Bluetooth RF Specification

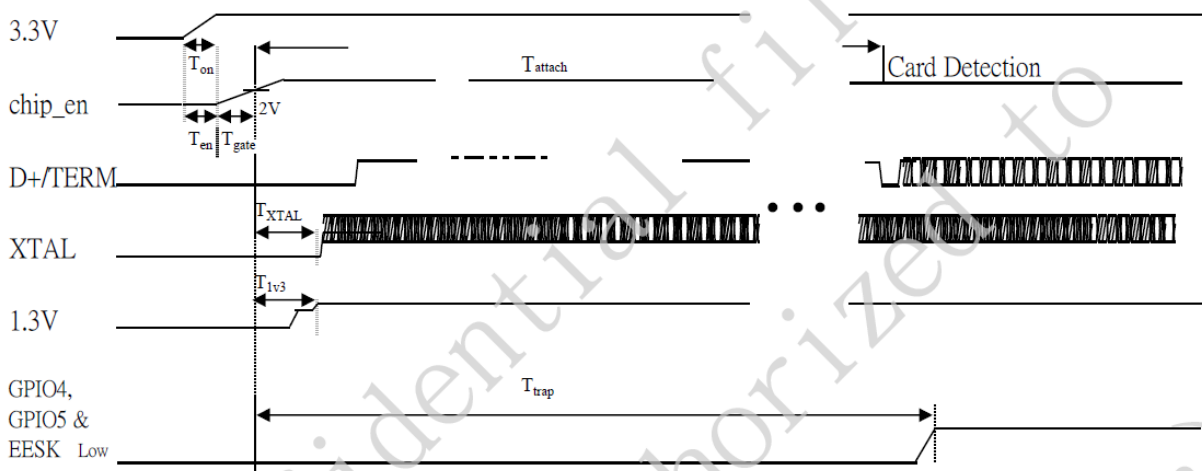
Parameter	Condition	Min.	Typ.	Max.	Unit
Basic Data Rate – Transmit Performance					
RF Transmit Power (TRM01)		0	2	4	dBm
Power Density (TRM02)	Per 100kHz	≤20			dBm
Power Control (TRM03)		2≤ step size ≤ 8			dB
TX Output Spectrum – Freq. Range (TRM04)	F(low)- CH0	> 2400			MHz
	F(high)-CH78	< 2483.5			
TX Output Spectrum – 20dB BW (TRM05)		f _H -f _L < 1000			MHz
TX Output Spectrum – Adjacent Channel Power (TRM06)	f-f ₀ = 2MHz	≤ -20			dBm
	f-f ₀ ≥ 3MHz	≤ -40			
TX Output Spectrum – Out of Band Spurious Emission	30MHz – 1GHz	≤ -36			dBm
	1GHz -12.75GHz	≤ -30			
	5.15GHz -5.35GHz	≤ -47			
	5.725GHz-5.825GHz	≤ -47			
Modulation Characteristic (TRM07)	Delta f1 avg	140 ≤ Δf _{1avg} ≤ 175			kHz
	Delta f2 max	≥ 115 at 99.9%			
	Delta f2 avg/Delta f1 avg	≥ 0.8			
Initial Carrier Frequency Tolerance (TRM08)		≤± 75			kHz
Carrier Frequency Drift (TRM09)	DH1	≤± 25			kHz
	DH3	≤± 40			
	DH5	≤± 40			
Maximum Drift Rate (TRM09)		20 kHz/50 us			
Enhanced Data Rate – Transmit Performance					
RF Transmit Power	π/4 DQPSK	0	2	4	dBm
	8DPSK	0	2	4	
Relative Transmit Power (TRM10)	All pairs	(P _{GFSK} -4 dB)<P _{DPSK} <(P _{GFSK} +1 dB)			
Carrier Frequency Stability (TRM11)	All packets	-75 ≤ w _i ≤ 75			kHz
	All blocks	-75 ≤ (w ₀ +w _i) ≤ 75			
	All blocks	-10 ≤ w ₀ ≤ 10			
Modulation Accuracy – RMS DEVM (TRM11)	π/4 DQPSK	≤ 20			%
	8DPSK	≤ 13			
Modulation Accuracy – Peak DEVM (TRM11)	π/4 DQPSK	≤ 35			
	8DPSK	≤ 25			
Modulation Accuracy – 99% DEVM (TRM11)	π/4 DQPSK	≤ 30			
	8DPSK	≤ 20			
EDR Differential Phase Emissions (TRM12)		≥ 99			%
In-band Spurious Emission (TRM13)	f-f ₀ = 1MHz	≤ -26			dB
	f-f ₀ = 2MHz	≤ -20			dBm
	f-f ₀ ≥ 3MHz	≤ -40			

TX Output Spectrum – Out of Band Spurious Emission	30MHz – 1GHz	≤ -36	dBm
	1GHz -12.75GHz	≤ -30	
	5.15GHz -5.35GHz	≤ -47	
	5.725GHz-5.825GHz	≤ -47	
Enhanced power control (TRM14)	Step Size	2 ≤ Step Size ≤ 8	dB
	Difference. Btw. GFSK, π/4 DQPSK,&8DPSK	≤ 10	
Basic Data Rate – Receiver Performance			
Sensitivity at 0.1% BER (RCV01-02)		≤ -81	dBm
C/I Co-Channel interference (RCV03)		≤ 11	dB
C/I Adjacent CH interference (RCV03)	f-f ₀ = 1MHz	≤ 0	
	f-f ₀ = 2MHz	≤ -30	
	f-f ₀ ≥ 3MHz	≤ -40	
C/I Image CH interference (RCV03)	C/I _{image}	≤ -9	
	C/I _{image±1MHz}	≤ -20	
Out of band Blocking (RCV04)	30MHz – 2000 MHz	-10	dBm
	2003MHz – 2399MHz	-27	
	2484MHz – 2997MHz	-27	
	3000MHz – 12750MHz	-10	
Intermodulation Performance at ≤ 0.1% BER (RCV05)		-64	dBm
Maximum input power level		≥ -20	dBm
Spurious Emission	30MHz – 12.75GHz	≤ -57	dBm
Enhanced Data Rate – Receiver Performance			
Sensitivity at 0.1% BER (RCV07)	π/4 DQPSK	≤ -85	dBm
	8DPSK	≤ -77	
EDR BER Floor Performance at ≤ 0.0007% BER (RCV08)		-60	dBm
C/I Co-Channel interference (RCV09)	π/4 DQPSK	≤ +13	dB
	8DPSK	≤ +21	
C/I Adjacent Channel C/I f-f ₀ = 1MHz (RCV09)	π/4 DQPSK	≤ 0	
	8DPSK	≤ +5	
C/I Adjacent Channel C/I f-f ₀ = 2MHz (RCV09)	π/4 DQPSK	≤ -30	
	8DPSK	≤ -25	
C/I Adjacent Channel C/I f-f ₀ ≥3MHz (RCV09)	π/4 DQPSK	≤ -40	
	8DPSK	≤ -33	
C/I Image Channel C/I _{image} (RCV09)	π/4 DQPSK	≤ -7	
	8DPSK	≤ 0	
C/I Image Channel C/I _{image±1MHz} (RCV09)	π/4 DQPSK	≤ -20	
	8DPSK	≤ -13	
Maximum input power level (RCV10)		≥ -20	dBm
Spurious Emission	30MHz – 12.75GHz	≤ -57	Pass

2-6 Bluetooth Low Energy RF Specification

Parameter	Condition	Min.	Typ.	Max.	Unit
Transmit Performance					
RF Transmit Power (TRM-LE01,02)		0	2	4	dBm
In-Band Emission (TRM-LE03,04)	f-f ₀ = 2MHz	≤ -20			dBm
	f-f ₀ ≥ 3MHz	≤ -30			
TX Output Spectrum – Out of Band Spurious Emission	30MHz – 1GHz	≤ -36			dBm
	1GHz -12.75GHz	≤ -30			
	5.15GHz -5.35GHz	≤ -47			
	5.725GHz-5.825GHz	≤ -47			
Modulation Characteristic (TRM-LE05)	Delta f1 avg	225 ≤ Δf1 _{avg} ≤ 275			kHz
	Delta f2 max	≥ 185 at 99.9%			
	Delta f2 avg/Delta f1 avg	≥ 0.8			
Carrier Frequency Drift (TRM-LE06,07)	Center frequency	≤± 150			kHz
	During any packet	≤± 50			
Maximum Drift Rate (TRM-LE06,07)		20 Hz/50 us			
Receiver Performance					
Sensitivity at 30.8% PER(0.1%BER) (RCV-LE01,02)		≤ -81			dBm
C/I Co-Channel interference (RCV-LE03)	Co-channel	≤ 21			dB
C/I Adjacent CH interference (RCV-LE03)	f-f ₀ = 1MHz	≤ 15			
	f-f ₀ = 2MHz	≤ -17			
	f-f ₀ ≥ 3MHz	≤ -27			
C/I Image CH interference (RCV-LE03)	C/I _{image}	≤ -9			
	C/I _{image} ±1MHz	≤ -15			
Out of band Blocking (RCV-LE04)	30MHz – 2000 MHz	-30			dBm
	2003MHz – 2399MHz	-35			
	2484MHz – 2997MHz	-35			
	3000MHz – 12750MHz	-30			
Intermodulation Performance at ≤30.8% (≤ 0.1% BER) (RCV-LE05)		-64			dBm
Maximum input power level (RCV-LE06)		≥ -10			dBm
PER Report Integrity 50% ≤ PER ≤ 65.4% (RCV-LE07)		-30			dBm
Spurious Emission	30MHz – 12.75GHz	≤ -57			dBm

2-7 Power On Sequence



T_{on}: The main power ramp up duration

T_{en}: Interval between the rising point of 3.3V and chip_en

T_{gate}: Interval of 3.3V to be gated when chip_en voltage level < 2V

T_{attach}: USB attach state. The duration from resistor attached to USB host starting card detection procedure

T_{xtal}: XTAL starts

T_{trap}: Power on trap duration. In back of this duration if pull high GPIO4, GPIO5 and EESK are necessary.

Power on Flow Description

After the main 3.3V ramp up, the internal power on reset is released by the power ready detection circuit and the power management unit is enabled. The power management unit enables the internal regulator and clock circuits.

The power management unit also enables the USB circuits.

USB analog circuits attach resistors to indicate the insertion of the USB device.

	Unit	Min.	Typical	Max.
T _{on}	ms	-	1.5	5
T _{en}	ms	0	0	5
T _{gate}	ms	0	1.5	8
T _{attach}	ms	100	250	-
T _{xtal}	ms	-	1.5	8
T _{1v3}	ms	-	3	11
T _{trap}	ms	400	500	-

Figure 2 Power On Sequence

2-8 Antenna Specification Requirement

Nominal antenna port impedance specification is 50 ohms for the Foxconn WBUR56 hardware.

For regulatory requirements, it is assumed that the antenna gain are:

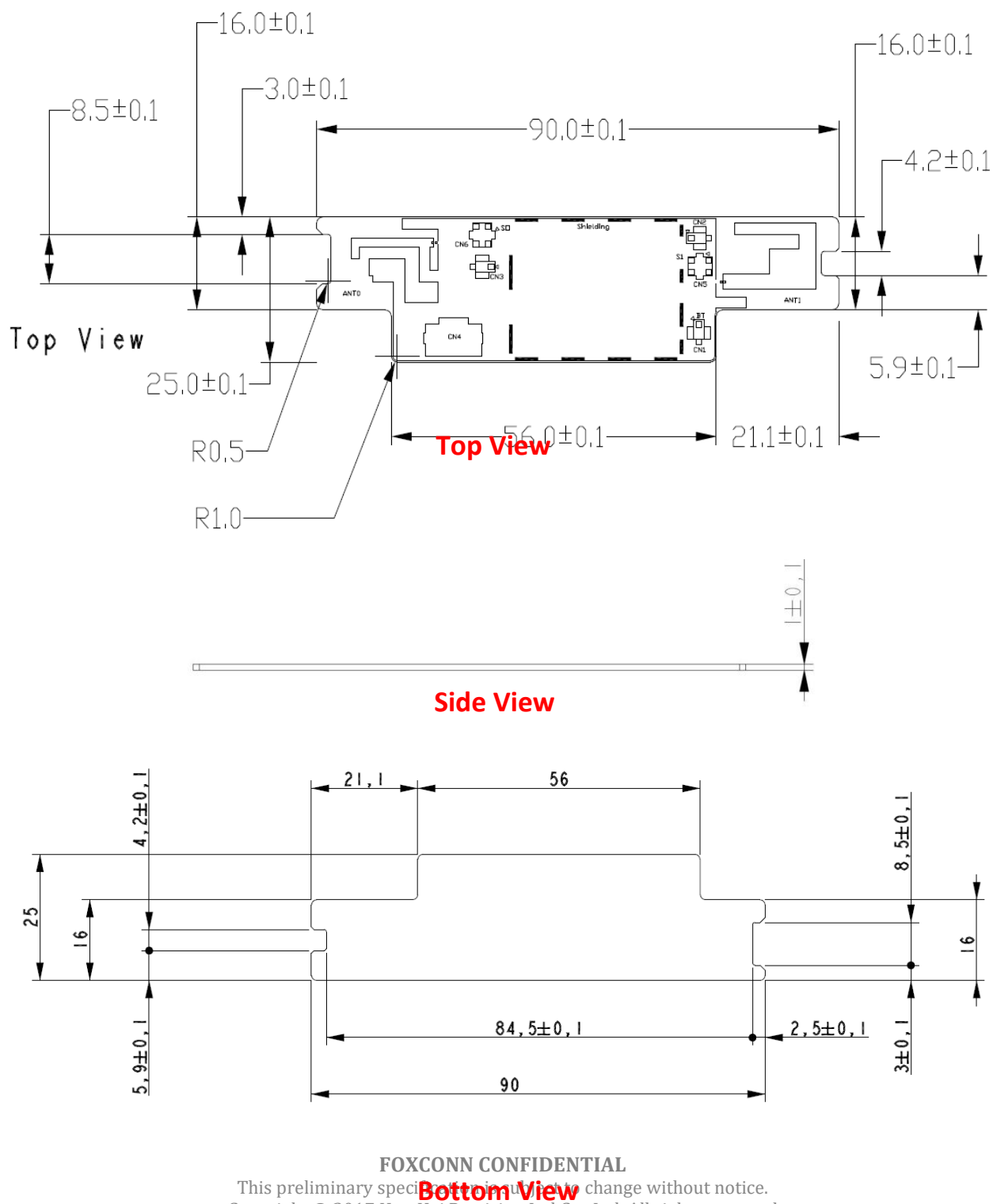
WLAN Type : PCB, Internal

BT Type : PIFA, External

Functionality	Model #	Cable Length	Frequencies			
			2400~2483.5MHz	5150~5350MHz	5470~5725MHz	5725~5850MHz
WLAN 0	-	-	-0.28 dBi	5.55 dBi	5.06 dBi	4.74 dBi
WLAN 1	-	-	3.18 dBi	3.29 dBi	3.37 dBi	2.75 dBi
BT	389-0001-944	200mm	-0.865 dBi	-	-	-
	350509N00-600-G	380mm	-1.431 dBi	-	-	-
	350509M00-600-G	400mm	-2.148 dBi	-	-	-
	390-0001-1679	260mm	2.22 dBi	-	-	-
	389-0001-1002	290mm	2.27 dBi	-	-	-

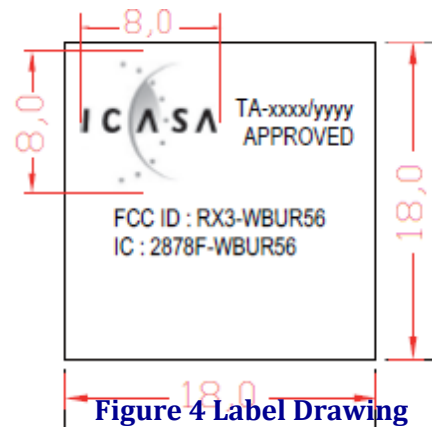
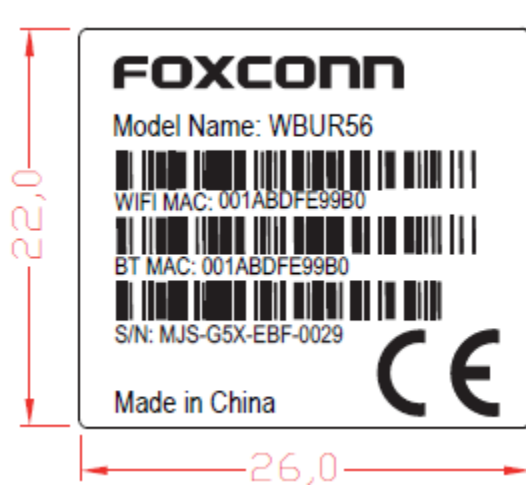
CHAPTER 3. MECHANICAL SPECIFICATION

3-1 Module Assembly Dimension



FOXCONN CONFIDENTIAL

This preliminary specification is subject to change without notice.
Copyright © 2017 Hon Hai Precision Ind Co., Ltd. All rights reserved

Figure 3 Mechanical Drawing**3-2 Label Specification**

CHAPTER 4. ADDITIONAL INFORMATION

4-1 EEPROM Information

Table 7 USB PID/VID Setting

WLAN Type	Mode	PID	VID
Realtek RTL8822CU Wireless LAN 802.11ac USB 2.0 Mass Production Network Adapter	AC	C82C	0BDA

4-2 Module Photo



Figure 5 Top Side Photo

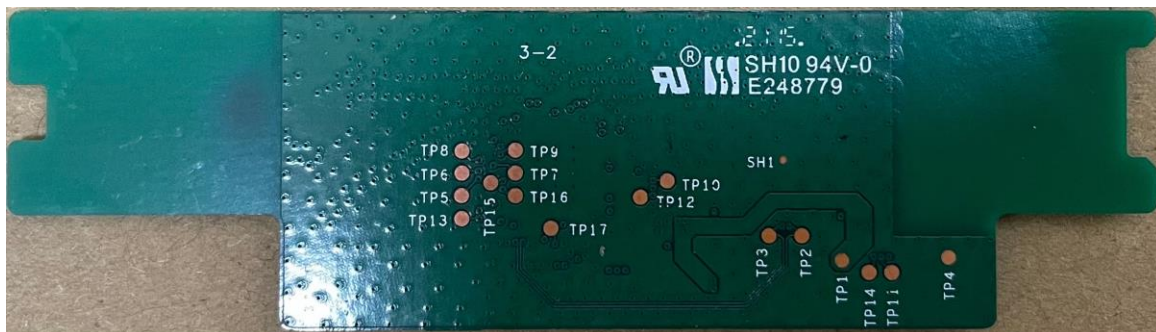


Figure 6 Bottom Side Photo

4-3 Environment Specification

Operation

Operation Temperature : 0~55 degree

Relevant Humidity: 5 ~ 90% (non-condensing)

Storage

Operation Temperature : 0~55 degree

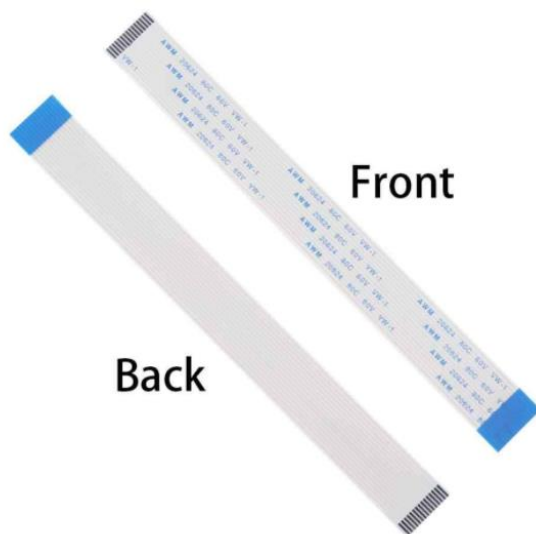
Relevant Humidity: 5 ~ 90% (non-condensing)

CHAPTER5: WIRELESS MODULE INSTALLATION PROCEDURE

1, Prepare wireless module and open connector as red part



2, Prepare a FFC(Flexible Flat Cable) to connect with wireless module connector and press



3, Another FFC site to connect with host main board and press

4, Module connection BT antenna as blue part



FOXCONN CONFIDENTIAL

This preliminary specification is subject to change without notice.
Copyright © 2017 Hon Hai Precision Ind Co., Ltd. All rights reserved

CHAPTER6: REGULATORY STATEMENT

FCC 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.

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 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 transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Operations in the 5.15-5.25GHz band are restricted to indoor usage only.

This device meets all the other requirements specified in Part 15E, Section 15.407 of the FCC Rules.

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.

This device is intended only for OEM integrators under the following conditions:

- 1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
- 2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed

IMPORTANT NOTE:

In the event that these conditions can not 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 can not be used on the final product. In these circumstances, the OEM integrator will be responsible for reevaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

The module is tested for standalone mobile RF exposure use condition. Any other usage conditions such as co-location with other transmitter(s) or being used in a portable condition will need a separate reassessment through a class II permissive change application or new certification.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID: RX3-WBUR56". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

Antennas

The following antennas have been certified for use with this module; antennas of the same type with equal or lower gain may also be used with this module. The antenna must be installed such that 20 cm can be maintained between the antenna and users.

WLAN Type : PCB, Internal

BT Type : PIFA, External

Functionality	Model #	Cable Length	Frequencies			
			2400~2483.5MHz	5150~5350MHz	5470~5725MHz	5725~5850MHz
WLAN 0	-	-	-0.28 dBi	5.55 dBi	5.06 dBi	4.74 dBi
WLAN 1	-	-	3.18 dBi	3.29 dBi	3.37 dBi	2.75 dBi
BT	389-0001-944	200mm	-0.865 dBi	-	-	-
	350509N00-600-G	380mm	-1.431 dBi	-	-	-
	350509M00-600-G	400mm	-2.148 dBi	-	-	-
	390-0001-1679	260mm	2.22 dBi	-	-	-
	389-0001-1002	290mm	2.27 dBi	-	-	-

Part 15 Subpart B disclaimer

This transmitter module is tested as a subsystem and its certification does not cover the FCC Part 15 Subpart B rule requirement applicable to the final host. The final host will still need to be reassessed for compliance to this portion of rule requirements if applicable.

As long as all conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

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.

The host integrator must follow the integration instructions provided in this document and ensure that the composite-system end product complies with the requirements by a technical assessment or evaluation to the rules and to KDB Publication 996369.

The host integrator installing this module into their product must ensure that the final composite product complies with the requirements by a technical assessment or evaluation to the rules, including the transmitter operation and should refer to guidance in KDB 996369.

OEM/Host manufacturer responsibilities

OEM/Host manufacturers are ultimately responsible for the compliance of the Host and Module. The final product must be reassessed against all the essential requirements of the FCC rule such as FCC Part 15 Subpart B before it can be placed on the US market. This includes reassessing the transmitter module for compliance with the Radio and EMF essential requirements of the FCC rules. This module must not be incorporated into any other device or system without retesting for compliance as multi-radio and combined equipment

ISED Statement:

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de classe B est conforme à la norme canadienne ICES-003.

This device complies with Industry Canada licence-exempt RSS standard(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.

Le présent appareil est conforme aux CNR d'Industrie 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 radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

RF Radiation Exposure Statement:

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

Operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems.

Déclaration d'exposition aux radiations:

Cet appareil est conforme aux limites d'exposition aux rayonnements définies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à une distance minimale de 20 centimètres entre le radiateur et votre corps.

Le fonctionnement dans la bande 5150-5250 MHz est uniquement destiné à une utilisation en intérieur afin de réduire le potentiel d'interférences nuisibles aux systèmes mobiles par satellite dans le même canal.

This device is intended only for OEM integrators under the following conditions:

The transmitter module may not be co-located with any other transmitter or antenna.

As long as above conditions is met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes:

Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

Tant que les 1 conditions ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

IMPORTANT NOTE:

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC ID can not 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 Canada authorization.

NOTE IMPORTANTE:

Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considérée comme valide et l'ID IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

Required end product labeling:

This transmitter module is authorized only for use in device where the antenna may be installed and operated with greater than 20cm between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains IC: 2878F-WBUR56".

Plaque signalétique du produit final

Ce module émetteur est autorisé uniquement pour une utilisation dans un appareil où l'antenne peut être installée et utilisée à plus de 20 cm entre l'antenne et les utilisateurs. Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: 2878F-WBUR56".

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.

Manuel d'information à l'utilisateur final

L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.

Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.

Antennas

The following antennas have been certified for use with this module; antennas of the same type with equal or lower gain may also be used with this module. The antenna must be installed such that 20 cm can be maintained between the antenna and users.

This radio transmitter [2878F-WBUR56] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

WLAN Type : PIFA, Internal

BT Type : PIFA, External

ANTENNE

Les antennes suivantes ont été certifiées pour une utilisation avec ce module; des antennes du même type à gain égal ou inférieur peuvent également être utilisées avec ce module. L'antenne doit être installée de telle sorte que 20 cm puissent être maintenus entre l'antenne et les utilisateurs.

Cet émetteur radio [2878F-WBUR56] a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous, avec le gain maximal autorisé indiqué. Les types d'antenne non inclus dans cette liste qui ont un gain supérieur au gain maximum indiqué pour tout type répertorié sont strictement interdits pour l'utilisation avec cet appareil.

Type de WLAN: PIFA, interne

Type de BT: PIFA, externe

			Frequencies			
Functionality	Model #	Cable Length	2400~2483.5MHz	5150~5350MHz	5470~5725MHz	5725~5850MHz
WLAN 0	-	-	-0.28 dBi	5.55 dBi	5.06 dBi	4.74 dBi
WLAN 1	-	-	3.18 dBi	3.29 dBi	3.37 dBi	2.75 dBi
BT	389-0001-944	200mm	-0.865 dBi	-	-	-
	350509N00-600-G	380mm	-1.431 dBi	-	-	-
	350509M00-600-G	400mm	-2.148 dBi	-	-	-
	390-0001-1679	260mm	2.22 dBi	-	-	-
	389-0001-1002	290mm	2.27 dBi	-	-	-