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**BCM4330 WLAN+BT Combo Module
(Foxconn T77H360.00)
Product Specification
Rev 1.9**

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1. Revision History

Date	Change Note	REV Note
2011-10-12	Initial release	1.0
2011-10-13	Update module mechanical 2D drawing in section 5	1.1
2011-11-25	<ol style="list-style-type: none"> 1. Update product specification 2. Add description for 5G enable and disable 3. FM is optional in this product. 	1.2
2011-11-30	<ol style="list-style-type: none"> 1. Update product specification to add product IDs 2. Add mother board and test jig reference schematic 3. Update Environmental Requirements and Specifications: <ol style="list-style-type: none"> 1) Add handling environment; 2) Add baking condition; 3) Add soldering and reflow condition 	1.3
2011-12-14	<ol style="list-style-type: none"> 1. Update mother board and test jig reference design schematic: Add remark on the schematic. 	1.4
2011-12-26	<ol style="list-style-type: none"> 1. Update section 3: product specification 	1.5
2012-02-11	<ol style="list-style-type: none"> 1. Update section 3.3, Current consumption 2. Update section 3.4, 11bg Tx emission result for EVT3 modules 3. Update section 3.5, complete Bluetooth specification 4. Update section 4, module mechanical drawing since shielding cover changed. 	1.6
2012-03-16	<ol style="list-style-type: none"> 1. Update section 3.4 for 2.4GHz TX emission for EVT4 modules 2. Update section 3.4 for add RX emission 3. Update section 3.4 for 11a/11an target power for middle and high band 4. Update section 3.4 for 11a/11an power limit 	1.7
2012-03-17	<ol style="list-style-type: none"> 1. Update 5GHz LO leakage level and RX SEN 2. Update module dimension 3. Update module block-diagram 4. Update section 4 for mechanical drawing 	1.8
2012-03-17	<ol style="list-style-type: none"> 1. Update 5GHz LO leakage level and RX SEN 2. Update module dimension 3. Update module block-diagram 4. Update section 4 for mechanical drawing 	1.8



2. Introduction

Project Name: 802.11abgn (1X1) + BT4.0 combo module

This documentation describes the product specification of the WLAN+BT combo Module. WLAN is Compliant with IEEE Std. 802.11b-1999, IEEE Std. 802.11g-2003 and IEEE Std. 802.11n-2009, Bluetooth is compliant with Bluetooth 4.0+HS. It is a confidential document of Foxconn.

* For b/g/n and a/b/g/n module, Foxconn HW/FW are the same, platform use different firmware and driver to enable or disable 5GHz

2.1 Scope

This combo Module combines WLAN, Bluetooth in one module, the WLAN is available in the 2.4GHz and 5GHz band, it is compatible with the IEEE 802.11 a/b/g standard and the 802.11n standard. It allow user to switch to different vendors' Access Points through the wireless networks and to prevent from eavesdropping. The 802.11 a/g data rate provides for 54, 48, 36, 24, 18, 12, 9, 6Mbps, 802.11b data rate provides for 11, 5.5, 2, 1 Mbps, it can also support 11n high data rate up to MCS7(HT20) with PHY data rate to 72Mbps. Bluetooth is compliant to Core Specification version 4.0

2.2 Function

- Single stream 802.11n support for 20MHz channels provide PHY layer rates up to 72Mbps.
- Bluetooth supports Class 1.5 and Class 2 output power.
- Provides a small form factor solution and ultra low power consumption to support low cost requirement.
- Host interface supports:
 - WLAN: SDIO;
 - BT data: UART
 - BT digital audio: PCM

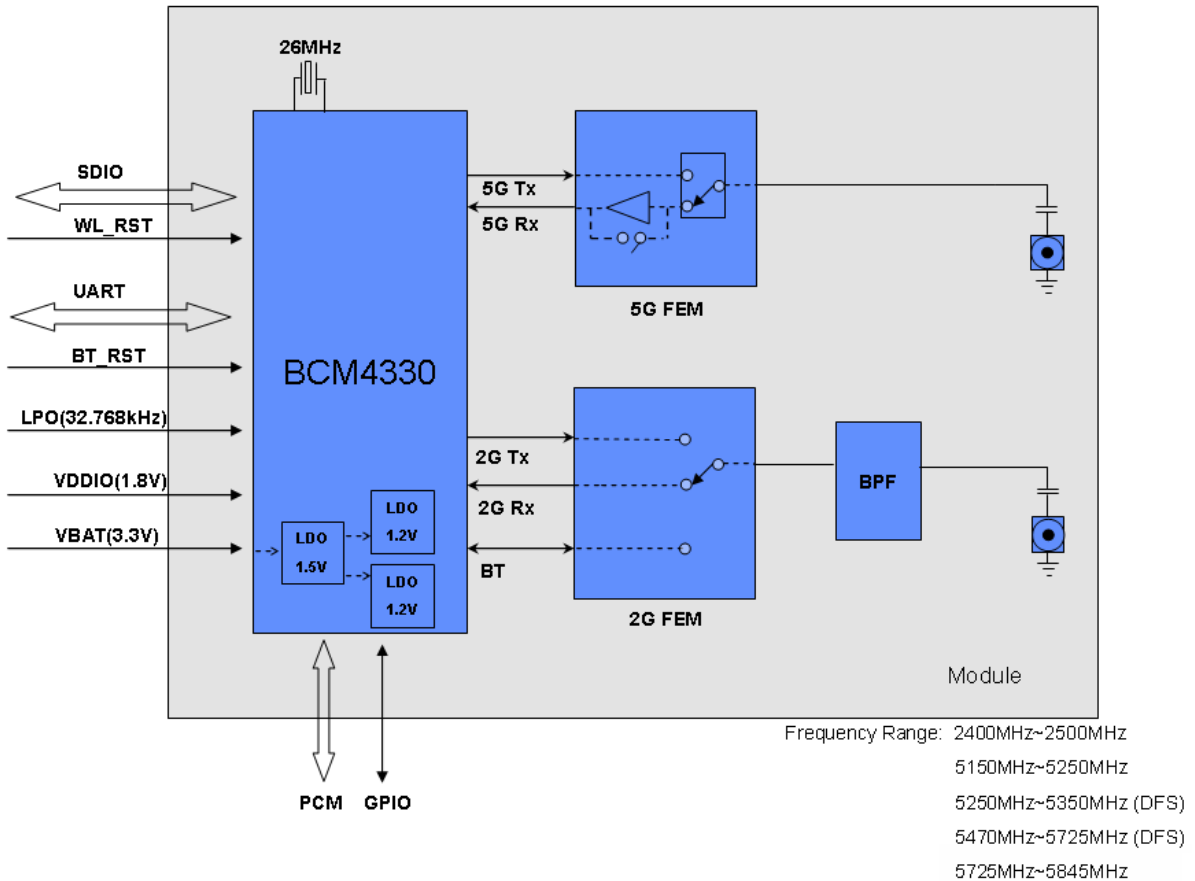
3. Product Specification

3.1 Hardware Characteristic

Form factor	14mmx13mm LGA
Host Interface	WLAN: SDIO BT: UART for data, PCM for Audio FM: UART for data, I2S for Audio
PCB	6-layer HDI design
RF connector	Two MHF RF connectors

3.2 Hardware Architecture

The WLAN+BT combo module is designed base on BROADCOM BCM4330 chip, the Broadcom BCM4330 is a highly integrated single chip solution for single stream dual-band WLAN and BT4.0, use two RF connector for 2.4GHz and 5GHz RF each, use a chip BPF for 2.4GHz and external LNA for 5GHz, a 26MHz crystal is used for reference clock generation, see the block diagram as below:



3.3 Electrical Specification

Absolute Maximum Ratings

These specification indicate levels where permanent damage to the device can occur. Functional operation is not guaranteed under these conditions. Operation at absolute maximum conditions for extended can adversely affect long-term reliability of the device.

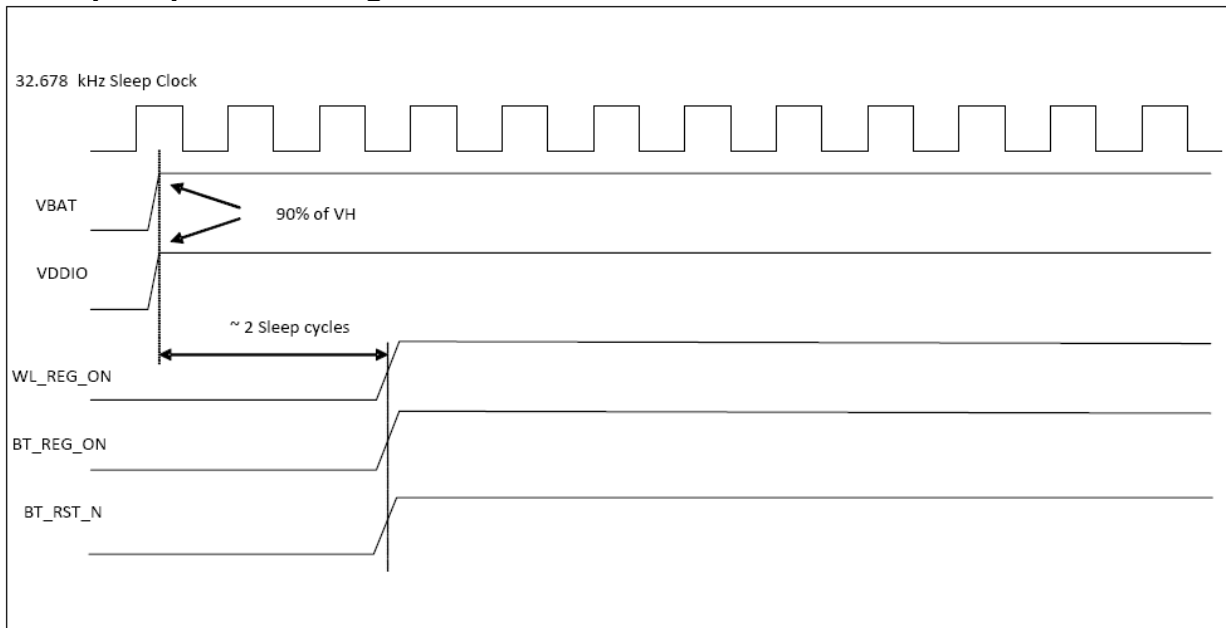
Rating	Symbol	Value	Unit
DC supply voltage for the device	VBAT_3.3V	-0.5 to +6.0	V
VDDIO	VIO	-0.5 to 2.98	V

Recommended Operating Condition

Element	Symbol	Value			Unit
		Minimum	Typical	Maximum	
DC supply voltage for the device	VBAT_3.3V	2.3	3.3	4.8	V
VDDIO for WL_VDDIO and BT_VDDIO	VIO_1.8V	1.2	1.8	2.9	V

Function operation is not guaranteed outside this limit, and operation outside this limit for extended periods can adversely affect long-term reliability of the device.

Power-Up Sequence Timing



WLAN = ON, Bluetooth = ON

Current Consumption

Active	Typical Current@3.3V	
	Mode	Rx
WLAN:	11b@15.5dBm	180mA
	11g @14.5dBm	150mA
	11n(2.4G)@13.5dBm	160mA
		105mA



	11a @13dBm	200mA	135mA
	11n(5G) @12dBm	220mA	138mA
	BT:	26mA @0dBm(CLASS II) 48mA @7dBm(CLASS1.5)	22mA
WiFi&BT Idle (RF on, WiFi no association; BT no inquiry, scan/page scan)			40mA
WiFi Associated with AP; BT Idle			90mA

Product ID Definition

Vendor ID: 0x14e4

Device ID: 0x4360

3.4 WLAN RF Characteristics

3.4.1 IEEE802.11b

Items	Contents			
Specification	IEEE802.11b			
Mode	DSSS / CCK			
Channel	CH1 to CH13,CH14			
Data rate	1, 2, 5.5, 11Mbps			
-TX Characteristics-	Min.	Typ.	Max.	Unit
1. Power Levels				
Target Power	13.5	15.5	16.5	dBm
2. Spectrum Mask @16.5dBm (Max.)				
1) $f_c-33\text{MHz} < f < f_c-22\text{MHz}$	-	-	-50	dBr
2) $f_c-22\text{MHz} < f < f_c-11\text{MHz}$	-	-	-30	dBr
3) $f_c+11\text{MHz} < f < f_c+22\text{MHz}$	-	-	-30	dBr
4) $f_c+22\text{MHz} < f < f_c+33\text{MHz}$	-	-	-50	dBr
3. Frequency Error	-15	-	+15	ppm
4 Modulation Accuracy(EVM)@16.5dBm (Max.)				
1) 1Mbps	-	-	-10	dB
2) 2Mbps	-	-	-10	dB
3) 5.5Mbps	-	-	-10	dB
4) 11Mbps	-	-	-10	dB
-RX Characteristics-	Min.	Typ.	Max.	Unit
5. Minimum Input Level Sensitivity				
1) 11Mbps (FER≤8%)	-	-86	-82	dBm
6. Maximum Input Level (FER≤8%)				
1) 1,2Mbps (FER≤8%)	-4	-	-	dBm
2) 5.5,11Mbps (FER≤8%)	-10	-	-	dBm
-Spurious Emission(TX)-	Min.	Typ.	Max.	Unit
(30MHz- 1GHz)	-	-	-41.3	dBm
(1GHz – 12.75GHz)	-	-46.5 *	-41.3	
-Spurious Emission(RX)-	Min.	Typ.	Max.	Unit
(30MHz- 1GHz)			-57	dBm

(1GHz – 12.75GHz)			-54
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*This spurious is 3rd harmonic, the worst case for 2.4G Tx, and the harmonic was degrade by add 0603 BPF and notch file when transmit max. output power on 16.5dBm (1Mbps).

3.4.2 IEEE802.11g

Items	Contents			
Specification	IEEE802.11g			
Mode	OFDM			
Channel	CH1 to CH13			
Data rate	6, 9, 12, 18, 24, 36, 48, 54Mbps			
- TX Characteristics -	Min.	Typ.	Max.	Unit
1. Power Levels				
1) Target Power@6Mbps	12.5	14.5	15.5	dBm
2) Target Power@9Mbps	12.5	14.5	15.5	dBm
3) Target Power@12Mbps	12.5	14.5	15.5	dBm
4) Target Power@18Mbps	12.5	14.5	15.5	dBm
5) Target Power@24Mbps	12.5	14.5	15.5	dBm
6) Target Power@36Mbps	12.5	14.5	15.5	dBm
7) Target Power@48Mbps	12.5	14.5	15.5	dBm
8) Target Power@54Mbps	12.5	14.5	15.5	dBm
2. Spectrum Mask @15.5dBm				
1) at fc +/- 11MHz	-	-	-20	dBr
2) at fc +/- 20MHz	-	-	-28	dBr
3) at fc > +/-30MHz	-	-	-40	dBr
3. Frequency Error	-15	-	+15	ppm
4. Constellation Error(EVM)@15.5dBm				
1) 6Mbps	-	-	-5	dB
2) 9Mbps	-	-	-8	dB
3) 12Mbps	-	-	-10	dB
4) 18Mbps	-	-	-13	dB
5) 24Mbps	-	-	-16	dB
6) 36Mbps	-	-	-19	dB
7) 48Mbps	-	-	-22	dB
8) 54Mbps	-	-	-25	dB
- RX Characteristics -	Min.	Typ.	Max.	Unit
5. Minimum Input Level Sensitivity				
1) 6Mbps (PER < 10%)	-	-89	-86	dBm
2) 9Mbps (PER < 10%)	-	-87	-83	dBm
3) 12Mbps (PER < 10%)	-	-85	-80	dBm
4) 18Mbps (PER < 10%)	-	-83	-78	dBm
5) 24Mbps (PER < 10%)	-	-80	-75	dBm
6) 36Mbps (PER < 10%)	-	-78	-73	dBm
7) 48Mbps (PER < 10%)	-	-76	-71	dBm
8) 54Mbps (PER < 10%)	-	-74	-69	dBm
6. Maximum Input Level (PER < 10%)	-15	-	-	dBm
-Spurious Emission(TX)-	Min.	Typ.	Max.	Unit
(30MHz- 1GHz)	-	-	-41.3	dBm
(1GHz – 12.75GHz)	-	-58	-41.3	dBm
-Spurious Emission(RX)-	Min.	Typ.	Max.	Unit
(30MHz- 1GHz)			-57	dBm
(1GHz – 12.75GHz)			-54	



3.4.3 IEEE802.11n HT20(2.4GHz)

Items	Contents			
Specification	IEEE802.11n HT20			
Mode	OFDM			
Channel	CH1 to CH13			
Data rate (MCS index)	MCS0~MCS7			
- TX Characteristics -	Min.	Typ.	Max.	Unit
1. PowerLevels				
1) Target Power@MCS0	11.5	13.5	14.5	dBm
2) Target Power@ MCS1	11.5	13.5	14.5	dBm
3) Target Power@ MCS2	11.5	13.5	14.5	dBm
4) Target Power@ MCS3	11.5	13.5	14.5	dBm
5) Target Power@ MCS4	11.5	13.5	14.5	dBm
6) Target Power@ MCS5	11.5	13.5	14.5	dBm
7) Target Power@ MCS6	11.5	13.5	14.5	dBm
8) Target Power@ MCS7	11.5	13.5	14.5	dBm
2. Spectrum Mask @14.5dBm				
1) at fc +/- 11MHz	-	-	-20	dBr
2) at fc +/- 20MHz	-	-	-28	dBr
3) at fc > +/-30MHz	-	-	-45	dBr
3. Frequency Error	-15	-	+15	ppm
4. Constellation Error(EVM)@14.5dBm				
1) MCS0	-	-	-5	dB
2) MCS1	-	-	-10	dB
3) MCS2	-	-	-13	dB
4) MCS3	-	-	-16	dB
5) MCS4	-	-	-19	dB
6) MCS5	-	-	-22	dB
7) MCS6	-	-	-25	dB
8) MCS7	-	-	-28	dB
- RX Characteristics -	Min.	Typ.	Max.	Unit
5. Minimum Input Level Sensitivity				
1) MCS0 (PER < 10%)	-	-88	-84	dBm
2) MCS1 (PER < 10%)	-	-85	-81	dBm
3) MCS2 (PER < 10%)	-	-83	-79	dBm
4) MCS3 (PER < 10%)	-	-80	-76	dBm
5) MCS4 (PER < 10%)	-	-78	-74	dBm
6) MCS5 (PER < 10%)	-	-76	-72	dBm
7) MCS6 (PER < 10%)	-	-74	-70	dBm
8) MCS7 (PER < 10%)	-	-71	-67	dBm
6. Maximum Input Level (PER < 10%)	-15	-	-	dBm
-Spurious Emission(TX)-	Min.	Typ.	Max.	Unit
FCC(30MHz- 1GHz)	-	-	-41.3	dBm
FCC Average(1GHz – 12.75GHz)	-	-60	-41.3	
-Spurious Emission(RX)-	Min.	Typ.	Max.	Unit
(30MHz- 1GHz)			-57	dBm
(1GHz – 12.75GHz)			-54	

3.4.4 IEEE802.11a

Items	Contents			
Specification	IEEE802.11a			
Mode	OFDM			
Channel	lower band:5.15GHz~5.35GHz middle band:5.500GHz~5.700GHz upper band:5.745GHz~5.825GHz			
Data rate	6, 9, 12, 18, 24, 36, 48, 54Mbps			
- TX Characteristics -	Min.	Typ.	Max.	Unit
1. Power Levels				
Low Band(5.15GHz~5.35GHz)	11	13	14	dBm
Middle Band(5.500GHz~5.700GHz)	11	13	14	dBm
Upper Band(5.745GHz~5.825GHz)	11	13	14	dBm
2. Spectrum Mask @ Type power@14dBm				
1) at fc +/- 11MHz	-	-	-20	dBr
2) at fc +/- 20MHz	-	-	-28	dBr
3) at fc > +/-30MHz	-	-	-40	dBr
3. Frequency Error	-15	-	+15	ppm
4. Constellation Error(EVM)@ Type power@14dBm				
1) 6Mbps	-	-	-5	dB
2) 9Mbps	-	-	-8	dB
3) 12Mbps	-	-	-10	dB
4) 18Mbps	-	-	-13	dB
5) 24Mbps	-	-	-16	dB
6) 36Mbps	-	-	-19	dB
7) 48Mbps	-	-	-22	dB
8) 54Mbps	-	-	-25	dB
- RX Characteristics -	Min.	Typ.	Max.	Unit
5. Minimum Input Level Sensitivity				
1) 6Mbps (PER < 10%)	-	-91	-87	dBm
2) 9Mbps (PER < 10%)	-	-89	-85	dBm
3) 12Mbps (PER < 10%)	-	-87	-83	dBm
4) 18Mbps (PER < 10%)	-	-85	-81	dBm
5) 24Mbps (PER < 10%)	-	-82	-78	dBm
6) 36Mbps (PER < 10%)	-	-80	-76	dBm
7) 48Mbps (PER < 10%)	-	-78	-74	dBm
8) 54Mbps (PER < 10%)	-	-76	-72	dBm
6. Maximum Input Level (PER < 10%)	-15	-	-	dBm
-Spurious Emission(TX)-	Min.	Typ.	Max.	Unit
FCC(30MHz- 1GHz)	-	-	-41.3	dBm
FCC Average(1GHz – 12.75GHz)	-	-	-41.3	dBm
-Spurious Emission(RX)-	Min.	Typ.	Max.	Unit
(30MHz- 1GHz)			-57	dBm
(1GHz – 12.75GHz)*		-58	-54	

* the LO leakage is decreased to under -54dBm since adding eLNA, can meet KCC regulatory limit.



3.4.5 IEEE802.11n HT20 (5GHz)

Items	Contents			
Specification	IEEE802.11n HT20			
Mode	OFDM			
Channel	lower band:5.15GHz~5.35GHz middle band:5.500GHz~5.700GHz upper band:5.745GHz~5.825GHz			
Data rate (MCS index)	MCS0~MCS7			
- TX Characteristics -	Min.	Typ.	Max.	Unit
1. Power Levels				
Low Band(5.15GHz~5.35GHz)	10	12	13	dBm
Middle Band(5.500GHz~5.700GHz)	10	12	13	dBm
Upper Band(5.745GHz~5.825GHz)	10	12	13	dBm
2. Spectrum Mask @Type power@13dBm				
1) at fc +/- 11MHz	-	-	-20	dBr
2) at fc +/- 20MHz	-	-	-28	dBr
3) at fc > +/-30MHz	-	-	-45	dBr
3. Frequency Error	-15	-	+15	ppm
4. Constellation Error(EVM)@Type power@13dBm				
1) MCS0	-	-	-5	dB
2) MCS1	-	-	-10	dB
3) MCS2	-	-	-13	dB
4) MCS3	-	-	-16	dB
5) MCS4	-	-	-19	dB
6) MCS5	-	-	-22	dB
7) MCS6	-	-	-25	dB
8) MCS7	-	-	-28	dB
- RX Characteristics -	Min.	Typ.	Max.	Unit
5. Minimum Input Level Sensitivity				
1) MCS0 (PER < 10%)	-	-91	-87	dBm
2) MCS1 (PER < 10%)	-	-88	-84	dBm
3) MCS2 (PER < 10%)	-	-85	-81	dBm
4) MCS3 (PER < 10%)	-	-82	-78	dBm
5) MCS4 (PER < 10%)	-	-79	-75	dBm
6) MCS5 (PER < 10%)	-	-77	-73	dBm
7) MCS6 (PER < 10%)	-	-75	-71	dBm
8) MCS7 (PER < 10%)	-	-73	-69	dBm
6. Maximum Input Level (PER < 10%)	-20	-	-	dBm
-Spurious Emission(TX)-	Min.	Typ.	Max.	Unit
FCC(30MHz- 1GHz)	-	-	-41.3	dBm
FCC Average(1GHz – 12.75GHz)	-	-	-41.3	dBm
-Spurious Emission(RX)-	Min.	Typ.	Max.	Unit
(30MHz- 1GHz)			-57	dBm
(1GHz – 12.75GHz)*		-58	-54	

* the LO leakage is decreased to under -54dBm since adding eLNA, can meet KCC regulatory limit.

3.5 Bluetooth Standard Specifications

Bluetooth Core Specification version 4.0:

Host interface: UART, baud rates up to 4Mbps

Support all Bluetooth 4.0+HS packet types.

Operating frequency range: 2400MHz ~2483.5MHz

Modulation type:

Basic rate 1Mbps: GFSK,

Enhanced data rate 2Mbps: DQPSK



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Enhanced data rate 3Mbps: 8DPSK

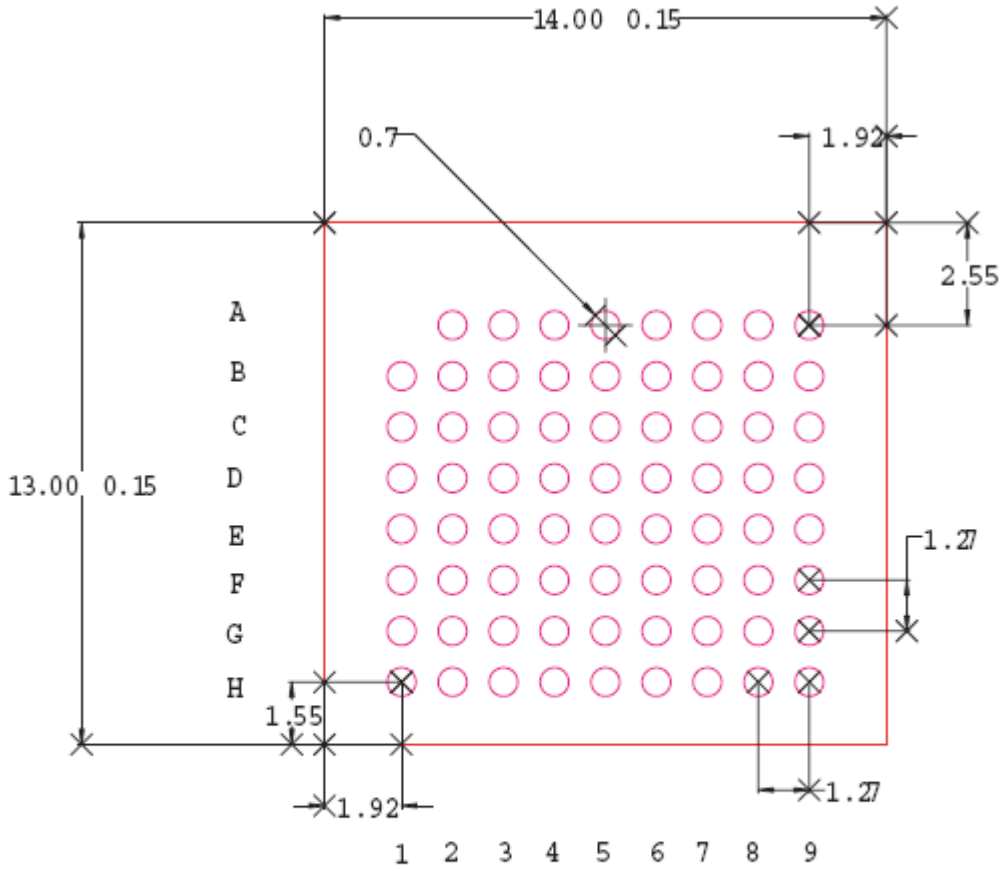
Items	Contents			
Specification	BT4.0+EDR			
Frequency range	2.4GHz~2.4835GHz			
Data rate	1Mbps, 2Mbps, 3Mbps			
- TX Characteristics -	Min.	Typ.	Max.	Unit
1. Power Levels				
BT Output Power	4	7	10	dBm
2. Initial Carrier Frequency Tolerance				
Average Offset	-75	6	75	kHz
3. Carrier Drift				
Drift Rate				
DH1	-20	3	20	kHz/50us
DH3	-20	-3	20	kHz/50us
DH5	-20	0	20	kHz/50us
Average Drift				
DH1	-25	-1	25	kHz
DH3	-40	0	40	kHz
DH5	-40	0	40	kHz
4. Modulation Characteristic				
F1avg	140	153	175	kHz
F2max	115	133		kHz
F1/F2 Ratio	0.8	0.93		
5. EDR Relative Transmit Power				
2Mbps: P[DQPSK]-P[GFSK]	-4	0.25	1	dB
3Mbps: P[8DPSK]-P[GFSK]	-4	0.25	1	dB
6. EDR Carrier Frequency Stability and Modulation Accuracy				
2Mbps: $\pi/4$ DQPSK				
Initial Frequency Error: ω_i	-75	5	75	kHz
Frequency Error: ω_0	-10	1	10	kHz
Block Frequency Error: $\omega_i + \omega_0$	-75	6	75	kHz
RMS DEVM	-	-	0.2	
Peak DEVM	-	-	0.35	
99% DEVM (% Symbols ≤ 0.3)	99%	100%		
3Mbps: 8DPSK				
Initial Frequency Error: ω_i	-75	6	75	kHz
Frequency Error: ω_0	-10	0.9	10	kHz
Block Frequency Error: $\omega_i + \omega_0$	-75	6.3	75	kHz
RMS DEVM	-	-	0.13	
Peak DEVM	-	-	0.25	
99% DEVM (% Symbols ≤ 0.13)	99%	100%		
7. Tx Spurious Emission				
30MHz- 1GHz	-	-	-41.3	dBm
1GHz - 12.75GHz	-	-51	-41.3	dBm



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Items	Contents			
Specification	BT4.0+EDR			
Frequency range	2.4GHz~2.4835GHz			
Data rate	1Mbps, 2Mbps, 3Mbps			
- RX Characteristics -	Min.	Typ.	Max.	Unit
1. Minimum Input Level Sensitivity				
GFSK (1Mbps)	-	-90	-83	dBm
$\pi/4$ DQPSK (2Mbps)	-	-92	-84	dBm
8DPSK (3Mbps)	-	-86	-77	dBm
2. Maximum Input Level				
GFSK (1Mbps)	-20	0		dBm
$\pi/4$ DQPSK (2Mbps)	-20	5		dBm
8DPSK (3Mbps)	-20	5		dBm
3. Rx Emission				
30MHz- 1GHz	-	-	-57	dBm
1GHz – 12.75GHz	-	-	-54	dBm

3.6 LGA Pin Definition



SCALE 4:1

TOP VIEW

TOP View

	1	2	3	4	5	6	7	8	9
A		GND	GND	GND	GND	GND	GND	GND	GND
B	RF_A_LGA	GND	GND	GND	GND	GND	GND	GND	RF_G_LGA
C	GND	GND	UART_CTS_N	UART_RTS_N	UART_RXD	UART_TXD	FM_AUDIO_L	FM_AUDIO_R	GND
D	GND	VBAT_3.3V_L	GND	GND	GND	BT_GPIO0_BTWAKE	BT_GPIO1_HOSTWAKE	BT_RST_N	FM_TX_LGA
E	GND	GND	GND	GND	GND	SDIO_SPI_SEL	LPO	BT_CLK_REQ_OUT	FM_RX_LGA
F	GND	GND	GND	GPIO0_WL_HOST_WAKE	GND	FM_I2S_DO	FM_I2S_DI	FM_I2S_SCK	FM_I2S_WS
G	GND	GND	BT_PCM_IN	BT_PCM_OUT	GND	SDIO_DATA3	BT_REG_ON	VBAT_3.3V_R	WL_REG_NO
H	GND	BT_PCM_CLK	BT_PCM_SYNC	VIO_1.8V	SDIO_DATA2	SDIO_DATA0	SDIO_CMD	SDIO_CLK	SDIO_DATA1

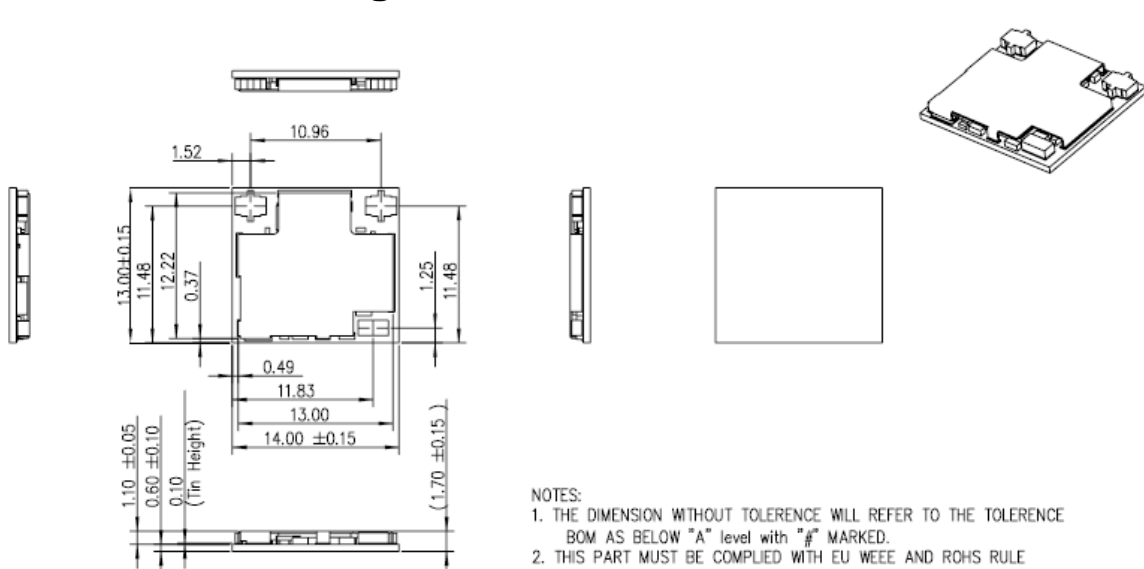


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Pin No.	Pin Name	Type	Description
B1	RF_A_LGA	I/O	5GHz RF pin (WLAN 5GHz Tx/Rx)
B9	RF_G_LGA	I/O	2.4GHz RF pin (for WLAN 2.4GHz Tx/Rx and BT Tx/Rx)
C3	UART_CTS_N	I	UART clear to Send, active low (for BT data)
C4	UART_RTS_N	O	UART request to Send, active low (for BT data)
C5	UART_RXD	I	UART signal input
C6	UART_TXD	O	UART signal output
C7	FM_AUDIO_L	O	FM analog audio output channel L (Not used)
C8	FM_AUDIO_R	O	FM analog audio output channel R (Not used)
D2	VBAT_3.3V_L	I	Main power supply for the module, (3.3V+/-10%, together with pin G8 to supply the module), please consider reserve for 300mA current consumption, need place a 4.7uF decoupling CAP close to this pin on main board.
G8	VBAT_3.3V_R	I	Main power supply for the module, (3.3V+/-10%, together with pin D2 to supply the module), please consider reserve for 300mA current consumption, need place a 4.7uF decoupling CAP close to this pin on main board.
D6	BT_GPIO0_BTWAKE	I	BT wake up, signal from the host to module to require BT device wake-up or remain awake
D7	BT_GPIO1_HOSTWAKE	O	Signal from module to host to require Host wake up
D8	BT_RST_N	I	External reset for BT, active low, please pull-up on host side (not left floating)
D9	FM_TX_LGA	O	FM Radio output (Not used)
E9	FM_RX_LGA	I	FM Radio input (Not used)
E6	SDIO_SPI_SEL	I	Host interface mode selection, internal pull down, work with SDIO_DATA_1 and SDIO_DATA_2 together to select the host interface
E7	LPO	I	32.768kHz LPO clock, need for device auto frequency detection
E8	BT_CLK_REQ_OUT	O	BT/WLAN reference clock request out, active high, need an external 100kohm pull-down resistor to ensure the signal is deasserted when BCM43330 powers up.
F4	GPIO0_WL_HOST_WAKE	O	Signal from WLAN device to awake the host.
F6	FM_I2S_DO	I/O	I2S data output
F7	FM_I2S_DI	I/O	I2S data input
F8	FM_I2S_SCK	I	I2S reference clock
F9	FM_I2S_WS	I/O	I2S word select
G3	BT_PCM_IN	I/O	PCM data input

G4	BT_PCM_OUT	I/O	PCM data output
H2	BT_PCM_CLK	I	PCM Clock
H3	BT_PCM_SYNC	I/O	PCM sync signal
G6	SDIO_DATA3	I/O	SDIO data line 3
H5	SDIO_DATA2	I/O	SDIO data line 2
H6	SDIO_DATA0	I/O	SDIO data line 0
H7	SDIO_CMD	I/O	SDIO command line
H8	SDIO_CLK	I	SDIO clock
G7	BT_REG_ON	I	Power up or power down BCM4330 internal regulators used for BT, Logic high level: 1.08V~3.6V Need pull-up via a 10Kohm resistor or less (internal 200K pull-down)
G9	WL_REG_ON	I	Power up or power down BCm4330 internal regulators used for WLAN, this pin is also a low active reset for WLAN only (not for BT) Logic high level: 1.08V~3.6V Need pull-up via a 10Kohm resistor or less (inertnal 200K pull-down)
H4	VIO_1.8V	I	VDDIO for BCM4330 I/O supply, range from 1.2V~2.9V, select 1.8V here, please consider reserve for 100mA current consumption
A2,A3,A4,A5,A6, A7,A8,A9,B2,B3, B4,B5,B6,B7,B8, C1,C2,C9,D1,D3 ,D4,D5,E1,E2,E3 ,E4,E5,F1,F2,F3, F5,G1,G2,G5,H1	GND		Ground

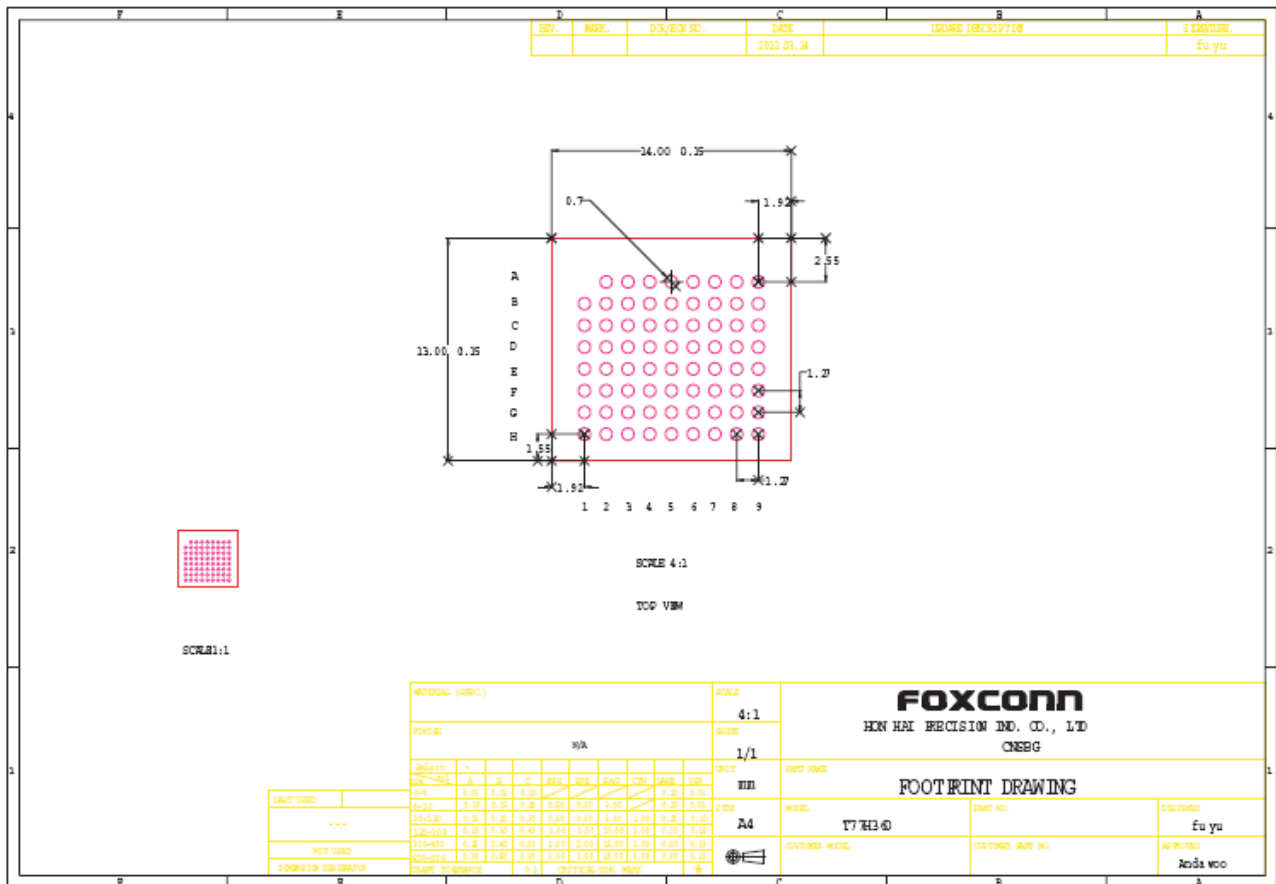
4. Mechanical Drawing



- NOTES:
1. THE DIMENSION WITHOUT TOLERANCE WILL REFER TO THE TOLERANCE BOM AS BELOW "A" level with "#" MARKED.
 2. THIS PART MUST BE COMPLIED WITH EU WEEE AND ROHS RULE

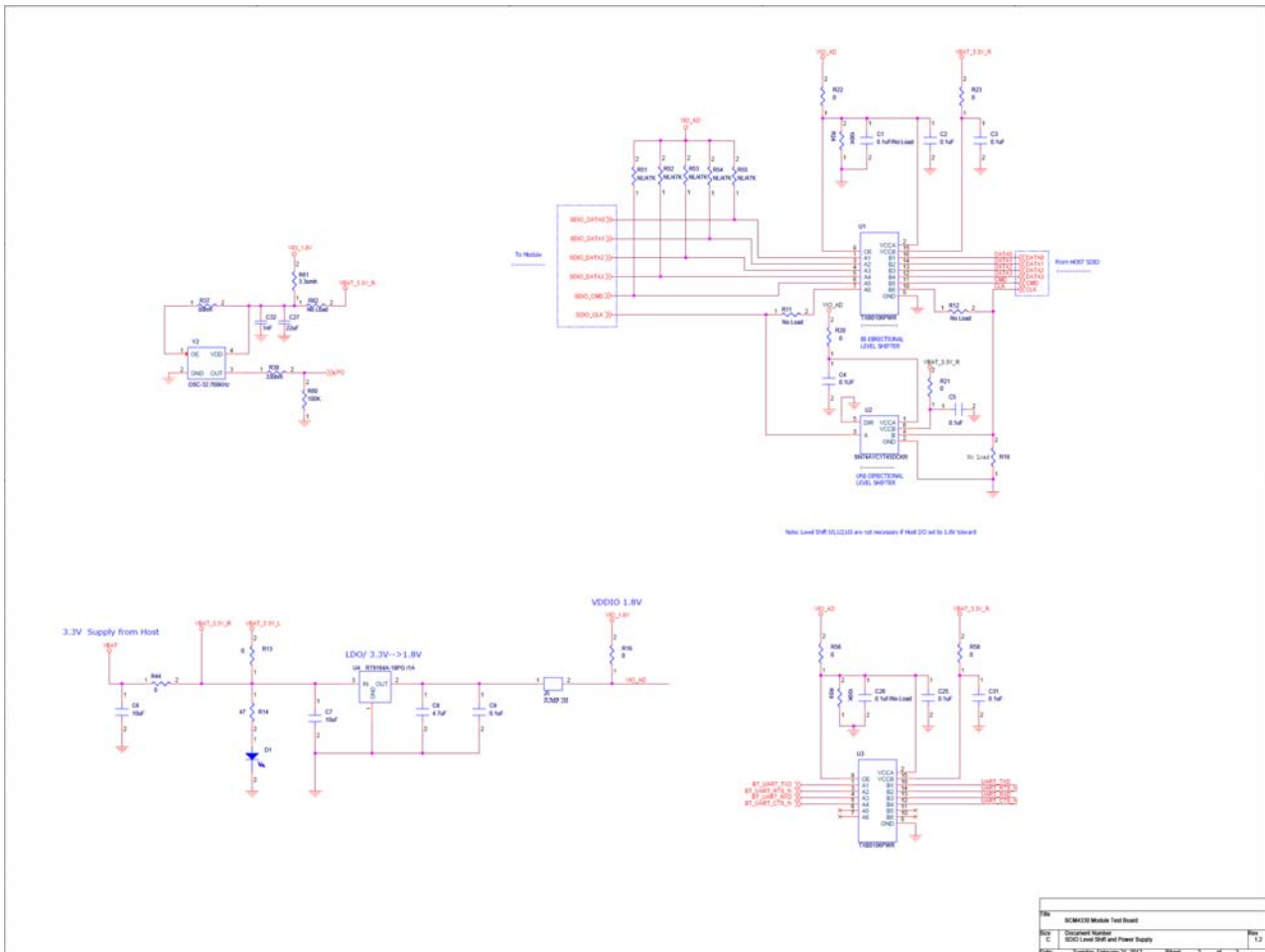
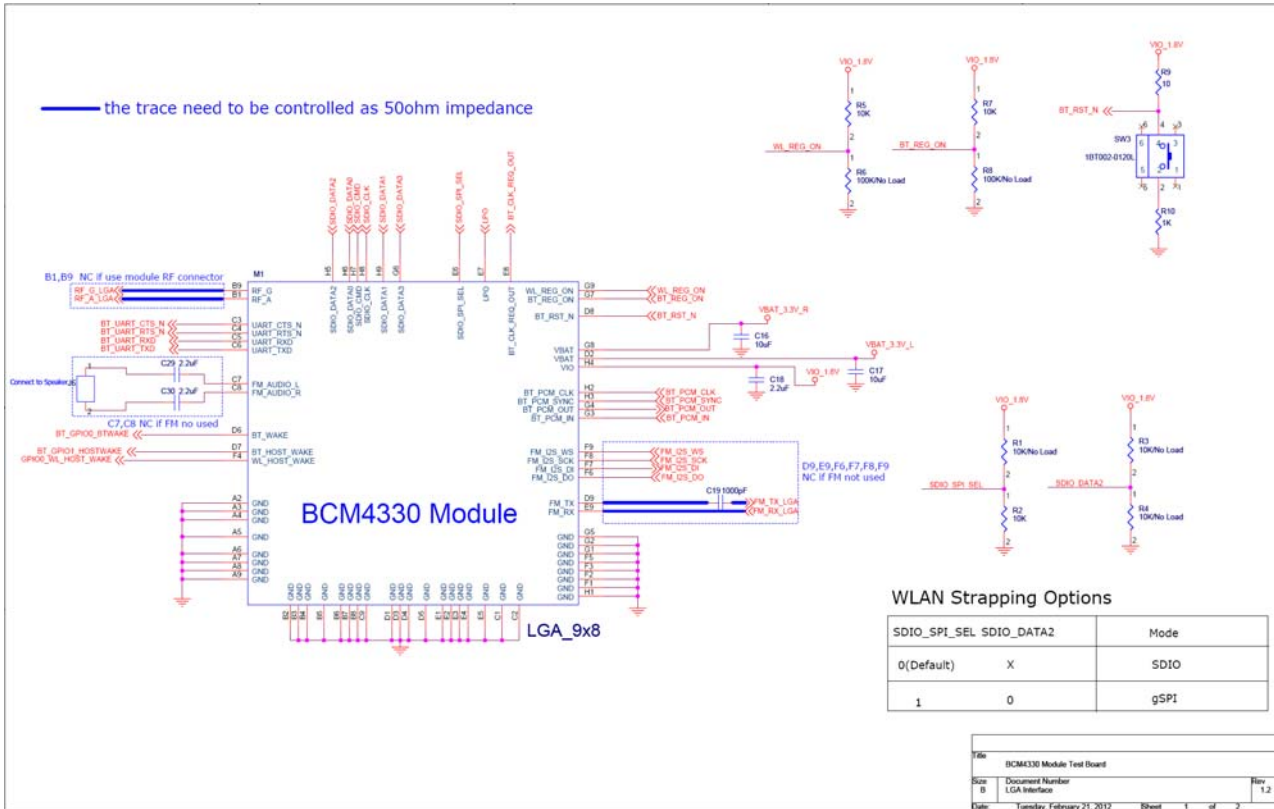
MATERIAL (SPEC.)		SCALE	FOXCONN		
FINISH		1:1	HON HAI PRECISION IND. CO., LTD		
		SHEET	CNSBG		
		1/1	PART NAME		
		UNIT	PCB ME drawing		
		mm	SIZE		
		A4	MODEL	PART NO.	DESIGNED
			T77H.360.00(REV.055)		Qing-yin Du
			CUSTOMER MODEL	CUSTOMER PART NO.	APPROVED
					Anda Woo

* The on board RF connector and plug mating height would be 1.2mm max.



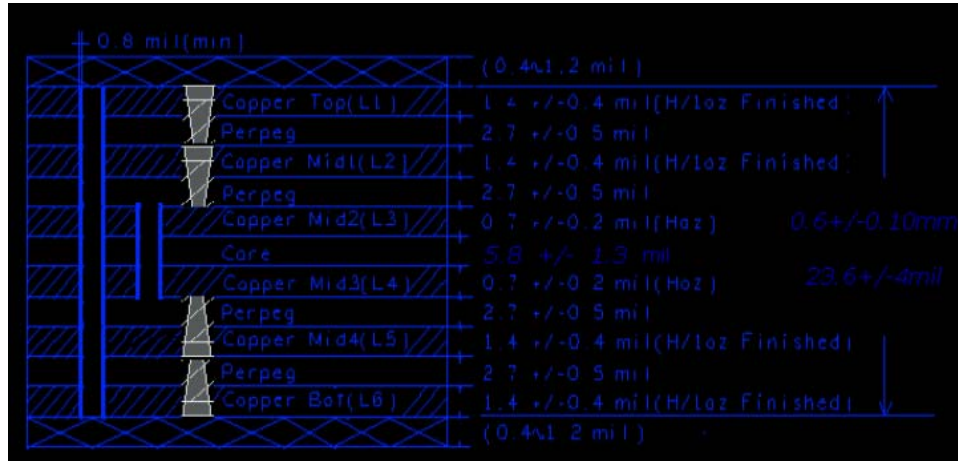
* The holes represent the LGA pins on bottom side of the module.

5. Peripheral Schematic Reference Design



6. PCB Layout

6-layer, 2 order HDI FR-4 (Halogen Free) design, total thickness 0.6+/-0.1mm



Stack-up

7. Software Requirement

- Nvram file for RF parameters configuration.
- If use dual-band WLAN, platform need to load dual-band firmware and install dual-band driver.
- If use single-band WLAN, platform need to load single-band firmware and install single-band driver.

8. Regulatory

TBD

9. Environmental Requirements and Specifications

9.1 Temperature

9.1.1 Operating Temperature Conditions

The product shall be capable of continuous reliable operation when operating in ambient temperature of 0°C to +70°C.

9.1.2 Non-Operating Temperature Conditions

Neither subassemblies shall be damaged nor shall the operational performance be degraded when restored to the operating temperature when exposed to storage temperature in the range of -10°C to +85°C.

9.2 PCB bending

The PCB bending spec shall be keep planeness under 0.1mm for both Foxconn and end assembly customer.



9.3 Handling environment

9.3.1. ESD

The product ESD immunity is HBM \geq +/- 450 (V), MM \geq +/- 100 (V). Please handle it under ESD protection environment.

Note: HBM: Human Body Model/MM: Mechanical Model

This device is ESD sensitive device, it must be protected at all times from ESD, industry-standard ESD precautions should be used at all times.

9.3.2. Terminals

The product is mounted with motherboard through Land Grid Array. In order to prevent poor soldering, please do not touch LGA portion by hand.

9.3.3. Falling

It will cause damage on the mounted components when the product is falling or receiving drop shock. It may cause the product mal-function.

9.4 Storage Condition

9.4.1 Moisture barrier bag before opened

Moisture barrier bag must be stored under 30 degree C, humidity under 85% RH. The calculated shelf life for the dry packed product shall be a 12 months from the bag seal date.

9.4.2. Moisture barrier bag open

Humidity indicator cards must be blue, <30%.

9.5 Baking Condition

Products require baking before mounting if

- a) humidity indicator cards reads >30%
- b) temp <30 degree C, humidity < 70% RH, over 96 hours

Baking condition: 90 degree C, 12-22 hours

Baking times: 1 time

9.6 Soldering and reflow condition

1) Heating method

Conventional Convection or IR/convection

2) Temperature measurement

Thermocouple d=0.1mm ~ 0.2mm CA (K) or CC (T) at soldering portion or equivalent method.

3) Solder paste composition

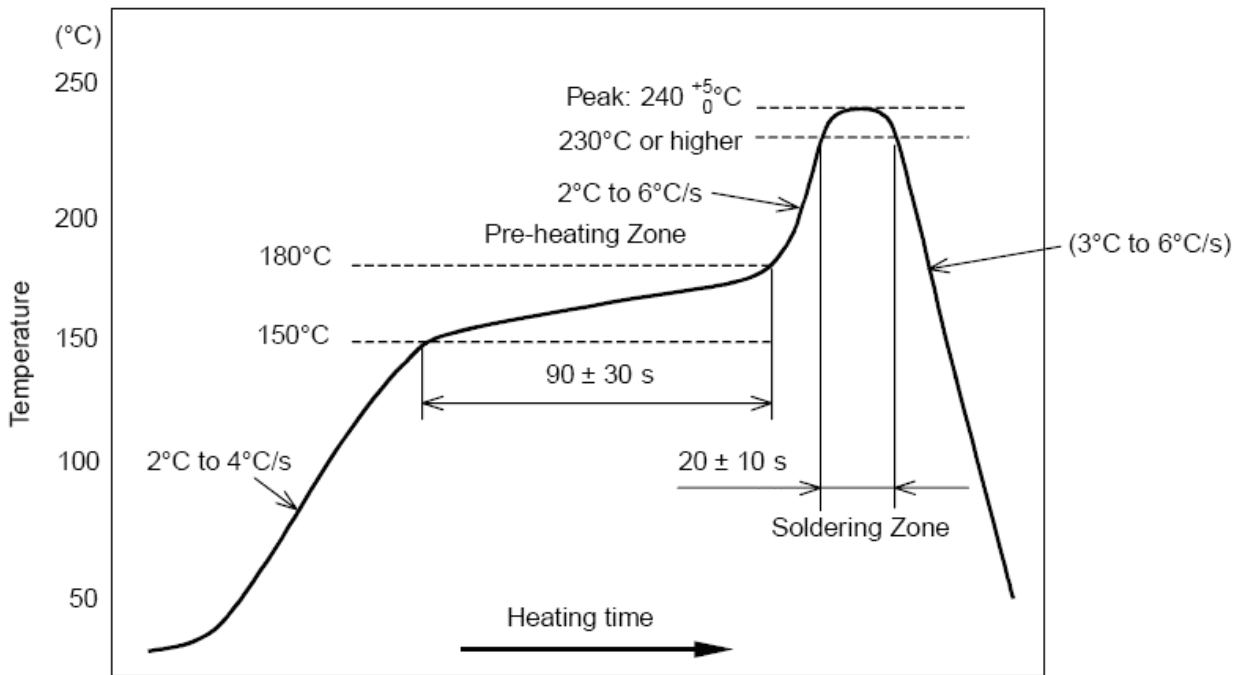
Sn/3.0Ag/0.5Cu

4) Allowable reflow soldering times: 2 times based on the below reflow soldering profile

5) Temperature profile

Reflow soldering shall be done according to the below temperature profile.

6) Peak temp: 245 degree C



Temperature profile for evaluation of solder heat resistance of a component (at solder joint)