Harman International
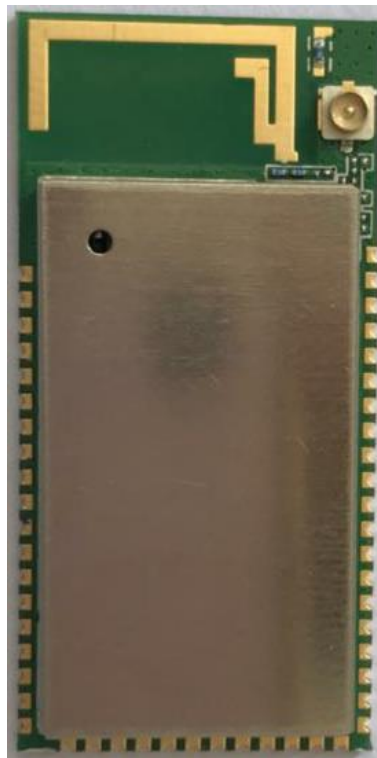# EON-WIFI Module

PRODUCT SPECIFICATION AND User's Guide

IEEE 802.11 b/g/n 2.4GHz and BLE Module

WFM-M697

(MT7697) Combo Module

Data Sheet V1.4 (2017/10/31)

Table of Contents

Document History

Revision	Date	Description
V1.0	2016/09/26	Initial version
V1.1	2017/08/18	Add RF Ant switch note
V1.2	2017/09/20	Increased packaging design and Labeling
V1.3	2017/10/10	Modify the Interface Specifications dimension accuracy
V1.4	2017/10/31	Modify the Product Overview

1. Product Overview

MT7697 is a highly integrated single chip which features an application processor, a low power 1x1 11n single-band Wi-Fi subsystem, a Bluetooth subsystem, and a Power Management Unit. The application processor subsystem contains an ARM Cortex-M4 with Floating point MCU. It also includes many peripherals, including UART, I2C, SPI, I2S, PWM, IrDA, and auxiliary ADC. It also includes embedded SRAM/ROM.

The Wi-Fi subsystem contains the 802.11b/g/n radio, baseband, and MAC that are designed to meet both the low power and high throughput application. It also contains a 32-bit RISC CPU that could fully offload the application processor.

The Bluetooth subsystem contains the Bluetooth radio, baseband, link controller. It also uses the same 32-bit RISC CPU for the Bluetooth protocols.

2. Module Parameter

2.1 Basic Parameter

Feature	Detailed Description
Antenna Type	IPEX compatible antenna or PCB antenna
Main chip	MT7697
Frequency range	Wi-Fi : 2.412GHz-2.484GHz BT:2.402GHz-2.480GHz
CPU clock	192MHz
Memory capacity	ILM ROM 832KB ILM RAM 320KB
Flash size	SOIC-8
PCB stack	4 layers
Operating Voltage	DC 3.3V +/-10%
Form factor	Card size 37X18X1.0mm
Other Interface	UART、PWM、I2C、I2S、SPI、IrDA

2.2 Current Consumption

Power domain	3.3V IC Total (mA)
WIFI 2.4GHz TX 23dBm, chip out (CCK1M)	293
WIFI 2.4GHz TX 23dBm, chip out (CCK11M)	299
WIFI 2.4GHz TX 20.7dBm, chip out (OFDM 6M)	259
WIFI 2.4GHz TX 20.1dBm, chip out (OFDM 54M)	248
WIFI 2.4GHz TX 19.8dBm, chip out (HT20 MCS0 MM)	250
WIFI 2.4GHz TX 19.6dBm, chip out (HT20 MCS7 MM)	243
WIFI 2.4GHz TX 19.8dBm, chip out (HT40 MCS0 MM)	250
WIFI 2.4GHz TX 19.6dBm, chip out (HT40 MCS7 MM)	240
WIFI 2.4GHz RX 20MHz (CCK 1M)	80
WIFI 2.4GHz RX 20MHz (CCK 11M)	80
WIFI 2.4GHz RX 20MHz (OFDM 6M)	81
WIFI 2.4GHz RX 20MHz (OFDM 54M)	83
WIFI 2.4GHz RX 20MHz (HT20 MCS0 MM)	81
WIFI 2.4GHz RX 20MHz (HT20 MCS7 MM)	84
WIFI 2.4GHz RX 40MHz (HT20 MCS0 MM)	87
WIFI 2.4GHz RX 40MHz (HT20 MCS7 MM)	91

Operation Mode	Int.32K	Ext.32K
Tx max power	93	93
RX@UHG	33	33
Sleep	0.87	0.38
Standard 2.56s Inquiry Scan	1.027	0.571
Standard 1.28s Paging Scan	1.248	0.750
2.56s Inquiry Scan & 1.28s Page Scan	1.405	0.909
500ms Sniff (Master)	1.275	0.739
500ms Sniff (Slave)	1.202	0.705
HV3 + 500ms Sniff + 2.56s Inquiry Scan & 1.28s Page Scan (Master)	23.355	22.227
2-EV3 (Tesco = 12) + 500ms Sniff + 2.56s Inquiry Scan & 1.28s Page Scan (Master)	21.895	21.184
500ms (3TX+3RX) Undirected connectable advertise / ADV_IND	1.215	0.688
1280ms (3TX+3RX) Undirected connectable advertise / ADV_IND	0.988	0.479
300ms (11.25ms RX window) passive scan	2.445	1.903
1.28sec connection interval (MASTER) (1T+1R)	0.944	0.444
1.28sec connection interval (SLAVE) (1T+1R)	0.972	0.45

*mA

3.DVT Report

Mode:11b-HT			Tranceiver:A				Bandwidth:20MHz				Data Rate:11Mbps			
Channel	1	2	3	4	5	6	7	8	9	10	11	12	13	Crt.
Pass/Fail	V	V	V	V	V	V	V	V	V	V	V	V	V	
Gain Stage(Dec)	20	20	20	20	20	20	20	20	20	20	20	20	20	
Output Power(dBm)	18.6	18.4	18.2	18.8	18.4	18.5	19	18.3	18.5	18.3	19.1	18.4	18.2	> 18
EVM(%)	3.7	3.7	3.7	3.6	3.5	3.7	3.4	3.6	3.4	3.7	4.2	3.6	4.5	<8
Freq.Offset(ppm)	0.83	0.83	0.83	0.83	0.82	0.83	0.82	0.82	0.85	0.81	0.82	0.84	0.86	±25
Mask	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	

Mode:11g-HT			Tranceiver:A				Bandwidth:20MHz				Data Rate:54Mbps			
Channel	1	2	3	4	5	6	7	8	9	10	11	12	13	Crt.
Pass/Fail	V	V	V	V	V	V	V	V	V	V	V	V	V	
Gain Stage(Dec)	20	20	20	1F	1F	1F	1F	1F	1F	1F	1F	1F	1F	
Output Power(dBm)	15.4	15.7	15.9	15.3	15.2	15.3	15.5	15.6	15.2	15.8	15.4	15.1	15.2	>15
EVM(dB)	-29.7	-29.9	-29.3	-30	-30.6	-30.5	-30.7	-31.2	-30.6	-31	-32	-30.5	-30.4	<-28
Freq.Offset(ppm)	0.71	0.73	0.8	1	0.82	1.02	1.1	0.65	0.63	0.68	0.62	0.68	0.65	±25
Mask	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	

Mode:11n-HT			Tranceiver:A				Bandwidth:20MHz				Data Rate:MCS7			
Channel	1	2	3	4	5	6	7	8	9	10	11	12	13	Crt.
Pass/Fail	V	V	V	V	V	V	V	V	V	V	V	V	V	
Gain Stage(Dec)	20	20	20	20	20	20	20	20	20	20	20	20	20	
Output Power(dBm)	14.6	14.4	14.5	14.5	14.6	14.5	15.5	15.4	14.3	15.3	15.3	14.1	15.2	> 13
EVM(dB)	-31.7	-31.6	-31.7	-31	-31	-31.3	-31.9	-32	-32	-31.8	-31.6	-31.1	-31.3	<-30
Freq.Offset(ppm)	0.86	0.82	0.86	0.75	0.82	0.68	0.96	0.91	0.93	1	0.93	-0.94	0.9	±25
Mask	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	

Mode:11n-HT		Tranceiver:A			Bandwidth:40MHz			Data Rate:MCS7		
Channel	3	4	5	6	7	8	9	10	11	Crt.
Pass/Fail	V	V	V	V	V	V	V	V	V	
Gain Stage(Dec)	21	21	21	21	21	21	21	21	21	
Output Power(dBm)	14.37	14.50	14.30	14.80	14.67	14.53	14.58	14.58	15.10	> 13
EVM(dB)	-30.6	-31	-31.4	31.54	-31.5	-31.2	-31.73	-31.73	-31.23	<-30
Freq.Offset(ppm)	0.68	0.80	0.67	0.76	0.70	0.90	0.72	0.76	0.73	±25
Mask	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	

Mode:11b-HT			Receiver:A				Bandwidth:20MHz						
Channel	1	2	3	4	5	6	7	8	9	10	11	12	13	Crt.
11M	-87	-87	-87	-87	-87	-87	-87	-87	-87	-87	-87	-87	-87	≤-80
5.5M	-93	-93	-93	-93	-93	-93	-93	-93	-93	-93	-93	-93	-93	≤-79
2M	-95	-95	-95	-95	-95	-95	-95	-95	-95	-95	-95	-95	-95	≤-80
1M	-95	-95	-95	-95	-95	-95	-95	-95	-95	-95	-95	-95	-95	≤-83

Mode:11g-HT			Receiver:A				Bandwidth:20MHz						
Channel	1	2	3	4	5	6	7	8	9	10	11	12	13	Crt.
54M	-75.5	-75.5	-75.5	-75.5	-75.5	-75.5	-75.5	-75.5	-75.5	-75.5	-75.5	-75.5	-75.5	≤-65
48M	-77	-77	-77	-77	-77	-77	-77	-77	-77	-77	-77	-77	-77	≤-66
36M	-82	-82	-82	-82	-82	-82	-82	-82	-82	-82	-82	-82	-82	≤-70
24M	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	≤-74
18M	-88	-88	-88	-88	-88	-88	-88	-88	-88	-88	-88	-88	-88	≤-77
12M	-91	-91	-91	-91	-91	-91	-91	-91	-91	-91	-91	-91	-91	≤-79
9M	-92	-92	-92	-92	-92	-92	-92	-92	-92	-92	-92	-92	-92	≤-81
6M	-93	-93	-93	-93	-93	-93	-93	-93	-93	-93	-93	-93	-93	≤-82

Mode:11n-HT			Receiver:A				Bandwidth:20MHz						
Channel	1	2	3	4	5	6	7	8	9	10	11	12	13	Crt.
MCS7	-72.5	-72.5	-72.5	-72.5	-72.5	-72.5	-72.5	-72.5	-72.5	-72.5	-72.5	-72.5	-72.5	≤-64
MCS6	-73	-73	-73	-73	-73	-73	-73	-73	-73	-73	-73	-73	-73	≤-65
MCS5	-79	-79	-79	-79	-79	-79	-79	-79	-79	-79	-79	-79	-79	≤-66
MCS4	-80	-80	-80	-80	-80	-80	-80	-80	-80	-80	-80	-80	-80	≤-70
MCS3	-82	-82	-82	-82	-82	-82	-82	-82	-82	-82	-82	-82	-82	≤-74
MCS2	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	≤-77
MCS1	-87	-87	-87	-87	-87	-87	-87	-87	-87	-87	-87	-87	-87	≤-79
MCS0	-91	-91	-91	-91	-91	-91	-91	-91	-91	-91	-91	-91	-91	≤-82

Mode:11n-HT Receiver:A Bandwidth:40MHz									
Channel	3	4	5	6	7	8	9	10	11	Crt.
MCS7	-67.5	-67.5	-67.5	-67.5	-67.5	-67.5	-67.5	-67.5	-67.5	≤-64
MCS6	-71	-71	-71	-71	-71	-71	-71	-71	-71	≤-65
MCS5	-71.5	-71.5	-71.5	-71.5	-71.5	-71.5	-71.5	-71.5	-71.5	≤-66
MCS4	-76	-76	-76	-76	-76	-76	-76	-76	-76	≤-69
MCS3	-80	-80	-80	-80	-80	-80	-80	-80	-80	≤-72
MCS2	-83	-83	-83	-83	-83	-83	-83	-83	-83	≤-76
MCS1	-86	-86	-86	-86	-86	-86	-86	-86	-86	≤-78
MCS0	-88	-88	-88	-88	-88	-88	-88	-88	-88	≤-80

TRM-LE/CA/01/C	Criterion Limit			Test Channel			
Test Item	Min.	Max.	Unit	CH0	CH18	CH39	P / F
Average Power	-20.0	10.0	dBm	8.18	8.49	8.45	Pass
Difference (Peak - Avg)		3	dB	0.53	0.49	0.48	Pass

TRM-LE/CA/05/C	Criterion Limit			Test Channel			
Test Item	Min.	Max.	Unit	CH0	CH18	CH39	P / F
Δf1 AVG	225.0	275.0	kHz	250.4	250.3	250.9	Pass
Δf2 AVG / Δf1 AVG	0.8			0.88	0.88	0.88	Pass
Δf2 Max	99.9		%	100.00	100.00	100.00	Pass

TRM-LE/CA/06/C	Criterion Limit			Test Channel			
Test Item	Min.	Max.	Unit	CH0	CH18	CH39	P / F
Frequency Offset	-150.0	150.0	kHz	-3.3	-3.4	-2.9	Pass
Frequency Drift	-50.0	50.0	kHz	3.9	4.9	4.3	Pass
Max. Drift Rate / 50us	-20.0	20.0	kHz	-4	-4.1	-3.9	Pass

RCV-LE/CA/01/C	Criterion Limit			Test Channel			
Test Item	Min.	Max.	Unit	CH0	CH18	CH39	P / F
Correct Packets				1495	1495	1495	Pass
PER		30.8	%	0.35	0.36	0.37	Pass

RCV-LE/CA/06/C	Criterion Limit			Test Channel			
Test Item	Min.	Max.	Unit	CH0	CH18	CH39	P / F
Correct Packets				1499	1499	1499	Pass
PER		30.8	%	0.05	0.05	0.05	Pass

RCV-LE/CA/07/C	Criterion Limit			Test Channel			
Test Item	Min.	Max.	Unit	CH0	CH18	CH39	P / F
PER	50.0	65.4	%	51	51	51	Pass

4. Block Diagram
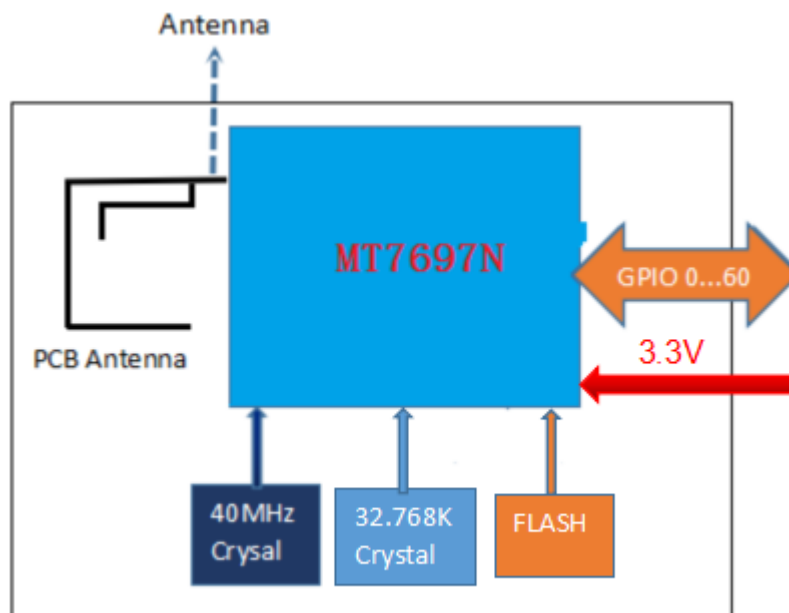
5. Pin Assignment on module

Left side (external — pin — module):

- GND — 1 — GND
- 2 — WR1
- 3 — WR2
- GPIO2 — 4 — WR3
- GPIO3 — 5 — WR4
- 6 — WR5
- GPIO57 — 7 — M_GPIO_01
- GPIO37 — 8 — UART_TX
- GPIO36 — 9 — UART_RX
- 10 — GND
- GPIO58 — 11 — M_GPIO_02
- GPIO59 — 12 — M_GPIO_03
- GPIO3 — 13 — UART_TX_D
- GPIO2 — 14 — UART_RX_D
- GPIO0 — 15 — M_GPIO_04
- GPIO6 — 16 — M_GPIO_05
- GPIO33 — 17 — M_GPIO_06
- GPIO1 — 18 — M_GPIO_07
- 19 — GND

Bottom side (pin — module — external):

- 20 — M_GPIO_08 — GPIO60
- 21 — Wi-Fi_RESET — SYS_RST_N
- 22 — M_GPIO_09 — GPIO29_I2S
- 23 — M_GPIO_10 — GPIO30_I2S
- 24 — M_GPIO_11 — GPIO31_I2S
- 25 — M_GPIO_12 — GPIO32_I2S
- 26 — GND
- 27 — M_GPIO_13 — GPIO32_M
- 28 — M_GPIO_14 — GPIO31_M
- 29 — M_GPIO_15 — GPIO30_M
- 30 — M_GPIO_16 — GPIO29_M
- 31 — M_GPIO_17 — GPIO35

Right side (module — pin — external):

- Ext_Ant — 51 — Ext_Ant
- GND — 50
- M_GPIO_27 — 49
- M_GPIO_26 — 48 — GPIO27
- M_GPIO_25 — 47 — GPIO28
- M_GPIO_24 — 46
- CS/BOOT — 45 — GPIO37
- LPW — 44 — LPW
- GND — 43
- M_GPIO_23 — 42
- M_GPIO_22 — 41
- M_GPIO_21 — 40
- M_GPIO_20 — 39
- M_GPIO_19 — 38 — GPIO34
- M_GPIO_18 — 37 — GPIO38
- GND — 36
- VDD33 — 35
- VDD33 — 34 — 3V3
- VDD33 — 33
- GND — 32

1

19

20

31

32

51

Abbreviations in used:

I: Input AI: Analog Input   O: Output   AO: Analog Output

IO: Bi-Directional Input/Output   AI/O: Analog Bi-Directional Input/Output

P: Digital Power G: Digital Ground

PIN	NAME	TYPE	PIN	NAME	TYPE
1	GND	G	28	M_GPIO_14	IO
2	WR1	NC	29	M_GPIO_15	IO
3	WR2	NC	30	M_GPIO_16	IO
4	WR3	IO	31	M_GPIO_17	IO
5	WR4	IO	32	GND	G
6	WR5	NC	33	VDD33	P
7	M_GPIO_01	IO	34	VDD33	P
8	UART_TX	IO	35	VDD33	P
9	UART_RX	IO	36	GND	G
10	GND	G	37	M_GPIO_18	IO
11	M_GPIO_02	IO	38	M_GPIO_19	IO
12	M_GPIO_03	IO	39	M_GPIO_20	NC
13	UART_TX_D	IO	40	M_GPIO_21	NC
14	UART_RX_D	IO	41	M_GPIO_22	NC
15	M_GPIO_04	IO	42	M_GPIO_23	NC
16	M_GPIO_05	IO	43	GND	GND
17	M_GPIO_06	IO	44	LPW	O
18	M_GPIO_07	IO	45	CS/BOOT	IO
19	GND	G	46	M_GPIO_24	GND
20	M_GPIO_08	IO	47	M_GPIO_25	IO
21	Wi-Fi_RESET	I	48	M_GPIO_26	IO
22	M_GPIO_09	IO	49	M_GPIO_27	IO
23	M_GPIO_10	IO	50	GND	G
24	M_GPIO_11	IO	51	Ext_Ant	RF
25	M_GPIO_12	IO			
26	GND	G			
27	M_GPIO_13	IO			

※Pin configurable function group summary table

Pin	Pin alias	APGIO/ GPIO	Name	Dir	Default dir	Default PU/PD	Description	Pinx_pinmux_aon_sel Address	Pinx_pinmux_aon_sel Value	Pinx_pinmux_off_sel Value
5	GPIO0	AGPIO	MCU_JTCK	I	I	PD	N9 JTAG debug port	0x8102_3020[3:0]	0	0
			ANTSEL[0]	O			RF control		-	1
			UART0_RTS_CM4	O			UART0 RTS (CM4)		7	3
			GPIO_TOPOFF[0]	I/O			General purpose input output			5
			GPIO_TOPAON[0]	O			General purpose input output		8	-
			PWM[0]	I/O			Pulse-width-modulated output		9	-
			EINT[0]	I			External interrupt		3	-
6	GPIO1	AGPIO	MCU_JTMS	I	I	PD	N9 JTAG debug port	0x8102_3020[7:4]	0	0
			ANTSEL[1]	O			RF control		-	1
			UART0_CTS_CM4	I			UART0 CTS (CM4)		7	3
			GPIO_TOPOFF[1]	I/O			General purpose input output		-	5
			GPIO_TOPAON[1]	I/O			General purpose input output		8	-
			PWM[1]	O			Pulse-width-modulated output		9	-
			EINT[1]	I			External interrupt		3	-
7	GPIO2	AGPIO	MCU_JTDI	I	I	PD	N9 JTAG debug port	0x8102_3020[11:8]	0	0
			ANTSEL[2]	O			RF control		-	1
			MCU_AICE_TMSC	I/O			N9 debug		-	2
			UART0_RX_CM4	I			UART0 RX (CM4)		7	3
			SWD_CLK	O			CM4 SWD debug port		4	4
			GPIO_TOPOFF[2]	I/O			General purpose input output		-	5
			GPIO_TOPAON[2]	I/O			General purpose input output		8	-
			PWM[23]	O			Pulse-width-modulated output		9	-
			WIC[0]	I			External interrupt		3	-
8	GPIO3	AGPIO	MCU_JTRST_B	I	I	PD	N9 JTAG debug port	0x8102_3020[15:12]	0	0
			ANTSEL[3]	O			RF control		-	1
			[Reserved]	I			[Reserved]		-	2
			UART0_TX_CM4	O			UART0 TX (CM4)		7	3
			SWD_DIO	I/O			CM4 SWD debug port		4	4
			GPIO_TOPOFF[3]	I/O			General purpose input output		-	5
			GPIO_TOPAON[3]	I/O			General purpose input output		8	-
			PWM[24]	O			Pulse-width-modulated output		9	-
			EINT[2]	I			External interrupt		3	-
			PULSE_CNT	I			Pulse counter		2	-
9	GPIO4	GPIO	MCU_DBGIN	I	I	PD	N9 JTAG debug port	0x8102_3020[19:16]	0	0
			ANTSEL[4]	O			RF control		-	1
			MCU_AICE_TCKC	I			N9 debug		-	-
			SPI_DATA0_EXT *	I/O			External flash interface		7	3
			GPIO_TOPOFF[4]	I/O			General purpose input output		-	5
			GPIO_TOPAON[4]	I/O			General purpose input output		8	-
			PWM[2]	O			Pulse-width-modulated output		9	-
			EINT[3]	I			External interrupt		3	-
10	GPIO5	GPIO	[Debug flag]	O	O(Low)		Debug monitor pin	0x8102_3020[23:20]	0	0
			ANTSEL[5]	O			RF control		-	1
			SPI_DATA1_EXT *	O			External flash interface		7	3
			GPIO_TOPOFF[5]	I/O	I		General purpose input output		-	5
			GPIO_TOPAON[5]	I/O			General purpose input output		8	-
			PWM[3]	O			Pulse-width-modulated output		9	-
			EINT[4]	I			External interrupt		3	-
11	GPIO6	GPIO	MCU_DBGACKN	O	O		N9 JTAG debug port	0x8102_3020[27:24]	0	0
			ANTSEL[6]	O			RF control		-	1
			SPI_CS_1_M_CM4	O			SPI master chip select 1		7	3

The off_sel addresses are: 0x8002_5100[3:0] (0x8102_3020[3:0]=0); 0x8002_5100[7:4] (0x8102_3020[7:4]=0); 0x8002_5100[11:8] (0x8102_3020[11:8]=0); 0x8002_5100[15:12] (0x8102_3020[15:12]=0); 0x8002_5100[19:16] (0x8102_3020[19:16]=0); 0x8002_5100[23:20] (0x8102_3020[23:20]=0); 0x8002_5100[27:24] (0x8102_3020[27:24]=0).

Pin	Pin alias	APGIO GPIO	Name	Dir	Default dir	Default PWPD	Description	Pinx_pinmux_xon_sel		Pinx_pinmux_off_sel	
			ANTSEL[x]	O			RF control		-	0x3102_3020[27:24]=0	1
			SPI_CS_1_M_CN4	O			SPI master chip select 1		7		3
			GPIO_TOPOFF[6]	I/O			General purpose input output		-		5
			GPIO_TOPAON[6]	I/O			General purpose input output		8		-
			PWM[4]	O			Pulse-width-modulated output		9		-
			EINT[5]	I			External interrupt		3		-
12	GPIO7	GPIO	MCU_JTDO	O	O(Low)		NS JTAG debug port	0x8102_3020[31:28]	0	0x3102_5130[31:28] 0x3102_3020[31:28]=0	0
			ANTSEL[1]	O			RF control		-		1
			SPI_CS_0_M_CN4	O			SPI master chip select 0		6		2
			SPI_CS_EXT*	O			External flash interface		7		3
			GPIO_TOPOFF[7]	I/O			General purpose input output		-		5
			GPIO_TOPAON[7]				General purpose input output		8		-
			PWM[5]	O			Pulse-width-modulated output		9		-
			EINT[6]	I			External interrupt		3		-
16	GPIO24	GPIO	[Reserved]				[Reserved]	0x8102_302C[3:0]	-	0x8002_510C[3:0] (0x8102_302C[2:0]=0)	0
			UART_DSN_TXD_N9	O			UART_DSN TX (N9)		-		1
			SPI_MOSI_M_CN4	O			SPI master MOSI		6		2
			SPI_DATA3_EXT*	I/O			External flash interface		7		3
			I2C1_CLK	I/O			I2C1 CLK		4		4
			GPIO_TOPOFF[24]	I/O			General purpose input output		-		5
			GPIO_TOPAON[24]	I/O			General purpose input output		8		-
			PWM[26]	O			Pulse width modulation		9		-
			[Reserved]	I	I	PU	[Reserved]		1		-
			[Reserved]	O			[Reserved]		2		-
18	GPIO25	GPIO	[Reserved]				[Reserved]	0x8102_302C[7:4]	-	0x8002_510C[7:4] (0x8102_302C[7:4]=0)	0
			SPI_MISO_M_CN4	I			SPI master MISO		-		2
			SPI_DATA2_EXT*	I/O			External flash interface		7		3
			I2C1_DATA	I/O			I2C1 DATA		4		4
			GPIO_TOPOFF[25]	I/O			General purpose input output		-		5
			GPIO_TOPAON[25]	I/O			General purpose input output		8		-
			PWM[26]	O			Pulse width modulation		9		-
			[Reserved]	I/O	D	PU	Default: Low		1		-
			FRAME_SYNC*	I			3DD synchronization		2		-
			WIO[1]	I			External interrupt		3		-
19	GPIO26	GPIO	[Reserved]				[Reserved]	0x8102_302C[11:8]	-	0x8002_510C[11:8] (0x8102_302C[11:8]=0)	0
			SPI_SCK_M_CN4	O			SPI master SCK		6		2
			SR_CLK_EXT*	O			External flash interface		7		3
			I2C0_TX	O			I2C master TX		4		4
			GPIO_TOPOFF[26]	I/O			General purpose input output		-		5
			GPIO_TOPAON[26]	I/O			General purpose input output		8		-
			PWM[27]	O			Pulse width modulation		9		-
			[Reserved]	I/O	D	PU	Default: Low		1		-
26	GPIO27	GPIO	SWD_DIO	I/O			DM4 SWD debug port	0x8102_302C[15:12]	5	0x8002_510C[15:12] (0x8102_302C[15:12]=0)	1
			I2C0_CLK	O			I2C0 CLK		7		3
			GPIO_TOPOFF[27]	I/O			General purpose input output		-		5
			GPIO_TOPAON[27]	I/O			General purpose input output		8		-
			PWM[28]	O			Pulse width modulation		9		-
			[Reserved]	I	I		[Reserved]		1		-
			PULSE_CNT	I			Pulse counter input		2		-
			WIO[2]	I			External interrupt		3		-
28	GPIO28	GPIO	SWD_CLK	I			DM4 SWD debug port	0x8102_302C[19:16]	5	0x8002_510C[19:16] (0x8102_302C[19:16]=0)	1
			SPI_INT_S_N9	O			SPI		-		2
			I2C1_DATA	O			I2C1 DATA		4		3

Pin	Pin alias	APGIO/GPIO	Name	Dir	Default dir	Default PU/PD	Description	Pinx_pinmux_aon_sel		Pinx_pinmux_off_sel	
			GPIO_TOPOFF[28]	I/O			General purpose input output		0		5
			GPIO_TOPAON[28]	I/O			General purpose input output		8		-
			PWM[29]	O			Pulse width modulation		9		-
			[Reserved]	I/O	I		[Reserved]		1		-
29	GPIO29	GPIO	I2S_MCLK_S	O			I2S MCLK slave		-		0
			SPI_MOSI_S_CM4	I			SPI slave MOSI (CM4)		6		1
			SPI_MOSI_S_N9	I			SPI slave MOSI (N9)		-		2
			SPI_MOSI_M_CM4	O			SPI master MOSI		7		3
			I2S_MCLK	O			I2S MCLK master		4		4
			GPIO_TOPOFF[29]	I/O			General purpose input output	0x8102_302C[23:20]	-	0x8002_510C[23:20] (0x8102_302C[23:20]=0)	5
			GPIO_TOPAON[29]	I/O			General purpose input output		8		-
			PWM[30]	O			Pulse width modulation		9		-
			[Reserved]	I/O	I		[Reserved]		1		-
			HOST_ACK	O					2		-
			WIC[3]	I			External interrupt		3		-
27	GPIO30	GPIO	I2S_FS_M	O			I2S FS master		5		0
			SPI_MISO_S_CM4	O			SPI slave MISO (CM4)		6		1
			SPI_MISO_S_N9	O			SPI slave MISO (N9)		0		2
			SPI_MISO_M_CM4	I			SPI master MISO		7		3
			I2S_FS	I			I2S slave FS		4		4
			GPIO_TOPOFF[30]	I/O			General purpose input output	0x8102_302C[27:24]	0	0x8002_5108[27:24] (0x8102_302C[27:24]=0)	5
			GPIO_TOPAON[30]	I/O			General purpose input output		8		-
			PWM[31]	O			Pulse width modulation		9		-
			[Reserved]	I/O	I		[Reserved]		1		-
			HOST_EINT_B	I					2		-
25	GPIO31	GPIO	I2S_TX	O			I2S TX		5		0
			SPI_SCK_S_CM4	I			SPI slave SCK (CM4)		6		1
			SPI_SCK_S_N9	I			SPI slave SCK (N9)		-		2
			SPI_SCK_M	O			SPI master SCK		7		3
			I2S_RX	I			I2S slave RX		4		4
			GPIO_TOPOFF[31]	I/O			General purpose input output	0x8102_302C[31:28]	-	0x8002_510C[31:28] (0x8102_302C[31:28]=0)	5
			GPIO_TOPAON[31]	I/O			General purpose input output		8		-
			PWM[32]	O			Pulse width modulation		9		-
			[Reserved]	I/O	I		[Reserved]		1		-
24	GPIO32	GPIO	I2S_BCLK_M	O			I2S slave BCLK		5		0
			SPI_CS_0_S_CM4	I			SPI slave CS (CM4)		6		1
			SPI_CS_0_S_N9	I			SPI slave CS (N9)		-		2
			SPI_CS_0_M	O			SPI master CS		7		3
			I2S_BCLK	I			I2S BCLK slave		4		4
			GPIO_TOPOFF[32]	I/O			General purpose input output	0x8102_3030[3:0]	-	0x8002_5110 [3:0] (0x8102_3030[3:0]=0)	5
			GPIO_TOPAON[32]	I/O			General purpose input output		8		-
			PWM[33]	O			Pulse width modulation		9		-
			[Reserved]	I/O	I		[Reserved]		1		-
			WIC[4]	I			External interrupt		3		-
57	GPIO33	AGPIO	WIFI_INT_B	I/O	O	PU	External interrupt		0		0
			ALL_INT_B	I/O			External interrupt		-		1
			SWD_DIO	I/O			CM4 SWD debug port		6		2
			IR_TX	O			IrDA TX		7		3
			ANTSEL[5]	O			RF control	0x8102_3030 [7:4]	4	0x8002_5110 [7:4] (0x8102_3030 [7:4]=0)	4
			GPIO_TOPOFF[33]	I/O			General purpose input output		-		5
			GPIO_TOPAON[33]	I/O			General purpose input output		8		-
			PWM[34]	O			Pulse width modulation		9		-
			PULSE_CNT	I			Pulse counter		1		-

Pin	Pin alias	APGIO/GPIO	Name	Dir	Default dir	Default PUPD	Description	Pinx_pinmux_acn_sel		Pinx_pinmux_off_sel	
			WF_LED_B	O			LED output		2		-
			WIC[5]	I			External interrupt		3		-
55	GPIO21	AGPIO	MISC_INT_B	I/O	O	PU	External interrupt		0		0
			ALL_INT_B	I/O					-		1
			SWD_CLK	I			CM4 SWD debug port		5		2
			IR_RX	I			IrDA RX		7		3
			ANTSEL[6]	O			RF control		4		4
			GPIO_TOPOFF[34]	I/O			General purpose input output	0x8102_2030 [11:8]	-	0x8002_5110 [11:8] (0x8102_3030 [11:8]=0)	5
			GPIO_TOPADN[34]	I/O			General purpose input output		8		-
			PWM[35]	O			Pulse width modulation		9		-
			FRAME_SYNC *	I			3DD synchronization		1		-
			MISC_LED_B	I/O			LED output		2		-
			WIC[6]	I			External interrupt		3		-
55	GPIO35	GPIO	UART_DSN_TXD_N9	O	O	PD	UART DSN TX (N9)		0		0
			UART_DBG_CM4	O			UART DBG TX (CM4)		7		3
			GPIO_TOPOFF[35]	I/O			General purpose input output	0x8102_2030[15:12]	-	0x8002_5110 [15:12] (0x8102_3030 [15:12]=0)	5
			GPIO_TOPADN[35]	I/O			General purpose input output		8		-
			PWM[13]	O			Pulse-width-modulated output		9		-
54	GPIO36	GPIO	[Reserved]				[Reserved]		-		0
			S2A_SPI_IN	I			SPI input		-		1
			UART1_RX_CM4	I			UART1 RX (CM4)		7		3
			GPIO_TOPOFF[36]	I/O			General purpose input output	0x8102_3030[19:16]	-	0x8002_5110 [19:16] (0x8102_3030 [19:16]=0)	5
			GPIO_TOPADN[36]	I/O			General purpose input output		8		-
			PWM[13]	O			Pulse width modulated output		9		-
			UART_RXD_N9	I	I	PU	UART RX (N9)		1		-
			WIC[7]	I			External interrupt		3		-
53	GPIO37	GPIO	UART_TXD_N9	O	O	PD	UART TX (N9)		0		0
			UART1_TX_CM4	O			UART1 TX (CM4)		7		3
			GPIO_TOPOFF[37]	I/O			General purpose input output	0x8102_3030[23:20]	-	0x8002_5110 [23:20] (0x8102_3030 [23:20]=0)	5
			GPIO_TOPADN[37]	I/O			General purpose input output		8		-
			PWM[23]	O			Pulse-width-modulated output		9		-
			EINT[20]	I			External interrupt		3		-
52	GPIO38	GPIO	UART_RTS_N9	O	O	PD	UART RTS (N9)		0		0
			PTA_EINT_B	I			Packet traffic arbitration		-		1
			IDC_DATA_OUT	O			UART IDC TX (N9)		-		2
			UART1_RTS_CM4	O			UART1 RTS (CM4)		7		3
			GPIO_TOPOFF[38]	I/O			General purpose input output	0x8102_3030[27:24]	-	0x8002_5110 [27:24] (0x8102_3030 26:24]=0)	5
			GPIO_TOPADN[38]	I/O			General purpose input output		8		-
			PWM[21]	O			Pulse-width-modulated output		9		-
			WF_LED_B	I/O			LED output		2		-
			EINT[21]	I			External interrupt		3		-
			SWD_DIO	I/O			CM4 SWD debug port		6		-
50	GPIO39	GPIO	UART_CTS_N9	I	I	PU	UART CTS (N9)		0		0
			PTA_EINT_B	I			Packet traffic arbitration		-		1
			IDC_DATA_IN	I			UART IDC RX (N9)		-		2
			UART1_CTS_CM4	O			UART1 CTS (CM4)		7		3
			[Reserved]				[Reserved]		-		4
			GPIO_TOPOFF[39]	I/O			General purpose input output	0x8102_3030[31:28]	-	0x8002_5110 [31:28] (0x8102_3030 [31:28]=0)	5
			GPIO_TOPADN[39]	I/O			General purpose input output		8		-
			PWM[22]	O			Pulse-width-modulated output		9		-
			PULSE_COUNT *	I			Pulse counter		1		-
			MISC_LED_B	I/O			LED output		2		-
			EINT[22]	I			External interrupt		3		-

Pin	Pin alias	APGIO/GPIO	Name	Dir	Default dir	Default PU/PD	Description	Pinx_pinmux_aon_sel		Pinx_pinmux_off_sel	
			SWD_CLK	I			CM4 SWD debug port		6		-
47	GPIO57	AGPIO	[Reserved]	I/O			[Reserved]	0x8102_303C [7:4] (0x8102_300C[6]=0)	-	0x8002_511C [7:4] (0x8102_303C [7:4]=0, 0x8102_300C[6]=0)	0
			S2A_SPI_CK	I					-		1
			MCU_AICE_TCKC	I			N9 debug		-		2
			GPIO_TOPOFF[57]	I/O			General purpose input output		-		5
			GPIO_TOPAON[57]	I/O			General purpose input output		8		-
			PWM[36]	O			Pulse-width-modulated output		9		-
			[Reserved]	I	I	PU	[Reserved]		1		-
			WIC[8]	I			External Interrupt		3		-
			ADC_IN0	I			Auxiliary ADC Input	0x8102_300C[6]	1		-
46	GPIO58	AGPIO	[Reserved]	I/O			[Reserved]	0x8102_303C[11:8]=0 (0x8102_300C[7]=0)	-	0x8002_511C [11:8] (0x8102_303C[11:8]=0, 0x8102_300C[7]=0)	0
			S2A_SPI_OUT	O					-		1
			MCU_AICE_TMSC	I/O			N9 debug		-		2
			GPIO_TOPOFF[58]	I/O			General purpose input output		-		5
			GPIO_TOPAON[58]	I/O			General purpose input output		8		-
			PWM[37]	O			Pulse-width-modulated output		9		-
			[Reserved]	I	I	PU	[Reserved]		1		-
			WIC[9]	I			External Interrupt		3		-
			ADC_IN1	I			Auxiliary ADC Input	0x8102_300C[7]	1		-
45	GPIO59	AGPIO	[Reserved]	O			[Reserved]	0x8102_303C [15:12] (0x8102_300C[8]=0)	-	0x8002_511C [15:12] (0x8102_303C [15:12]=0, 0x8102_300C[8]=0)	0
			UART_DSN_TXD_N9	O			UART DSN TX (N9)		-		1
			SWD_DIO	I/O	I		CM4 debug port		6		2
			GPIO_TOPOFF[59]	I/O			General purpose input output		-		5
			GPIO_TOPAON[59]	I/O			General purpose input output		8		-
			PWM[38]	O			Pulse-width-modulated output		9		-
			WF_LED_B	I/O			LED output		1		-
			WIC[10]	I			External Interrupt		3		-
			ADC_IN2	I			Auxiliary ADC Input	0x8102_300C[8]	1		-
44	GPIO60	AGPIO	[Reserved]	I			[Reserved]	0x8102_303C [19:16]=0 (0x8102_300C[9]=0)	-	0x8002_511C [19:16] (0x8102_303C [19:16]=0, 0x8102_300C[9]=0)	0
			SWD_CLK	I	I		CM4 SWD debug port		6		2
			GPIO_TOPOFF[60]	I/O			General purpose input output		-		5
			GPIO_TOPAON[60]	I/O			General purpose input output		8		-
			PWM[39]	O			Pulse-width-modulated output		9		-
			MISC_LED_B	I/O			LED output		1		-
			PULSE_CNT	I			Pulse counter Input		2		-
			WIC[11]	I			External Interrupt		3		-
			ADC_IN3	I			Auxiliary ADC Input	0x8102_300C[9]	1		-

6. Interface Specifications

18.00mm

1.30mm

0.8mm

37.00mm

0.47mm

0.94mm

1.27mm

2.13mm

1.10mm

20
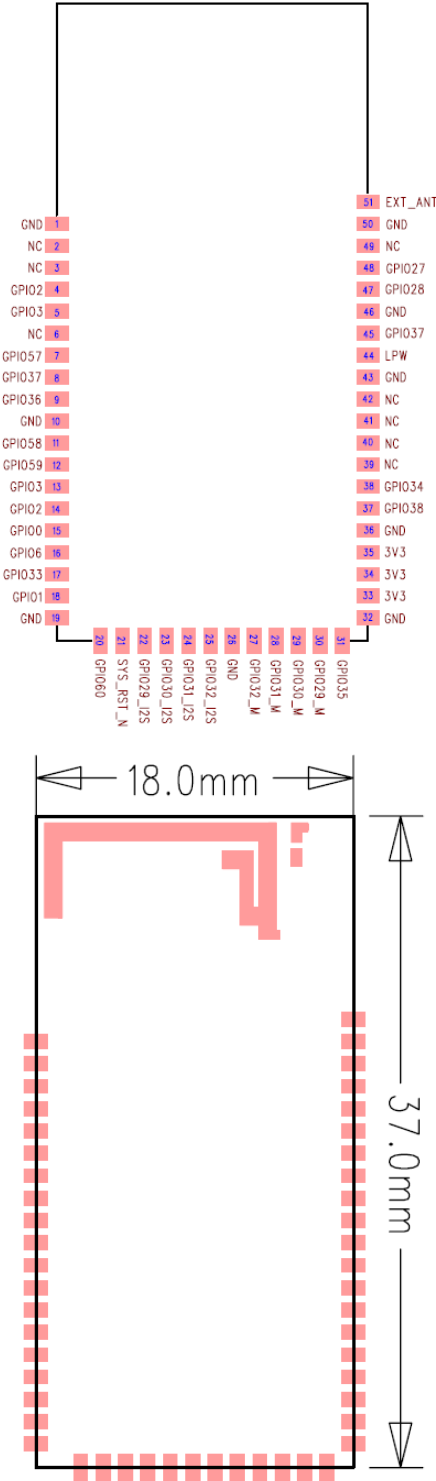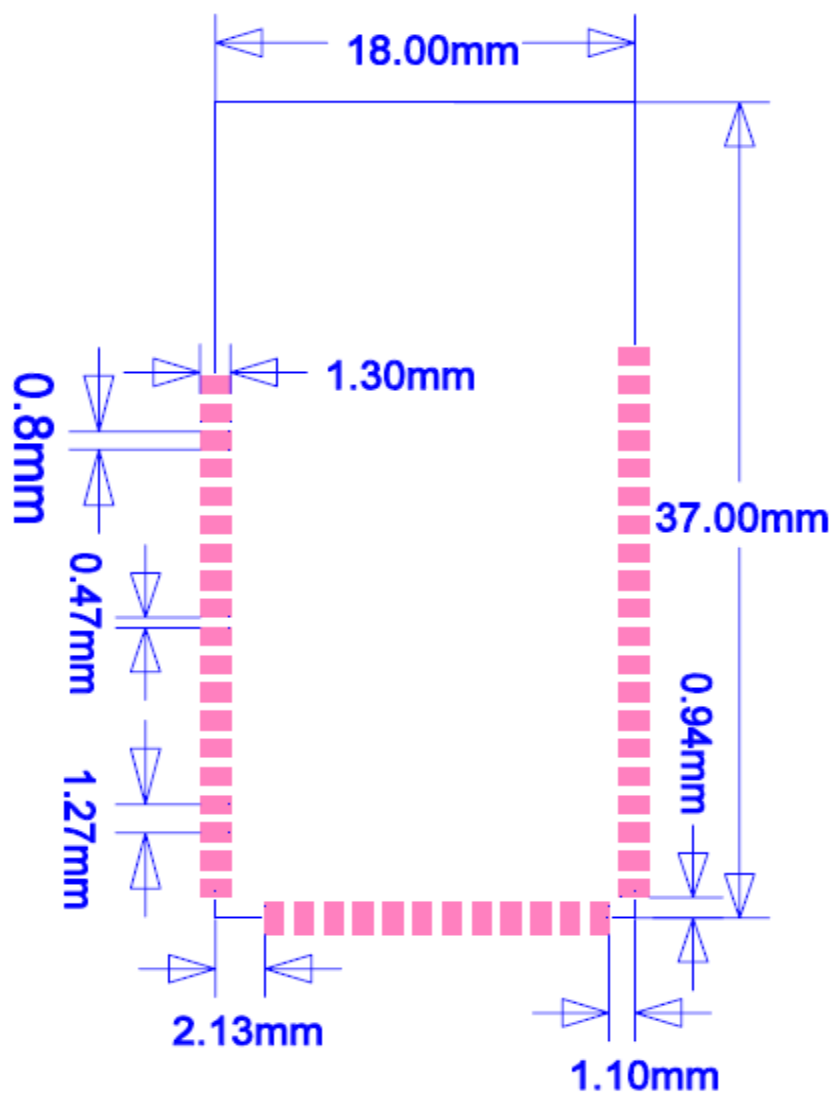
7. Shield cover outline drawing
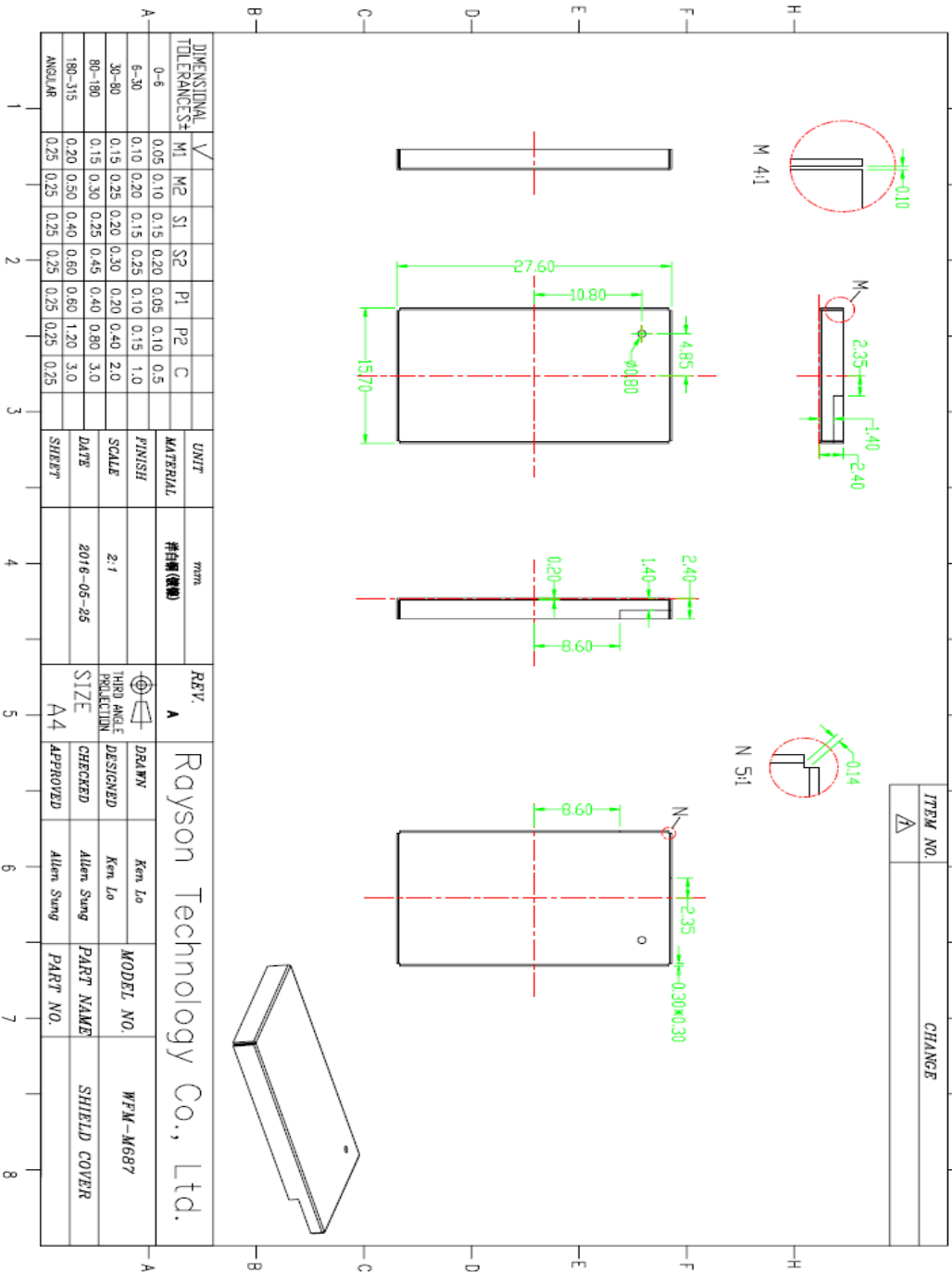
λ = u / v (u is the speed of light 3 * 108 m / s, v is the highest use frequency of EUT 2.48 * 109 Hz), so the wavelength λ = 121 mm, so λ / 20 = 6.05 mm, the shield cover all open holes The length, width, and diagonal of the slot are less than 6.05 mm, so the holes and slots in the shield cover ensure that the RF signal is not coupled to the host.

8.RF Connector

Ground Contact

φ 2.0 ±0.05

φ 0.5 ±0.05

0.2 +0.05 -0.1

0.35 ±0.15

1.25

Housing

Contact

Sect.X-X S=20/1

Cut out prohibition area

1 ±0.05

1.05 ±0.05

4 ±0.05

1.9 ±0.05

1 ±0.05

2.2 ±0.05

MATING	
Plug P/N 20278-*R-** 20351-***R-37**	
4 ±0.4 at 20278-***R-08, 13, 32 4.7±0.4 at 20278-***R-18 4.7±0.4 at 20351-***R-37	Plug
Coaxial cable	Receptacle

2.5 MAX. at 20278-***R-08, 13, 32
2.5 MAX. at 20351-***R-37
2.7 MAX. at 20278-***R-18

Plug P/N 20311-*R-****	
3.8 ±0.3	Plug
Coaxial cable	Receptacle

2.0 ±0.1

9. Reference Circuit

Power Supply

DC_DC_3V3

+5V

U13
ITE7811
- 4 VIN LX/SW 3
- 5 FB GND 2
- EN 1

L1
ZADR-252012MEH-4R7M

VSW2 1 — 2

DC_DC_3V3

C156
C/4.7/uF/0603

EN1
R31
R/0/Ohm/0402

R33
NI/R/0/Ohm/0402

C180
C/10/uF/0805

C158
C/4.7/uF/0603

C101
C/0.1/uF/0402

3V3_FB

C162 NI/0402

C163 C/220/pF/0402

R34 R/24.3K/Ohm/0402

R35 R/110K/Ohm/0402

2xAA Battery

R30 NI/0603

Q11 SI2323DS-T1-GE3

J21
HEADER 2

1 V_2AA

2

AA

V_2AA_B_I

1V_2AA_MM

R29
R/0/Ohm/0402

Reverse
voltage
protection

U30
RT6150AGQW

V_2AA_B_I

- 5 VIN VOUT 1
- 8 VINA
- 6 EN FB 10
- 7 PS LX2 2
- LX1 4

V_2AA_O_3V3

C153
C/10/uF/0603

EXT_PMU_EN
V_B_PS

R94 NI/4.7K/Ohm/0402

R95 R/4.7K/Ohm/0402

V_B_FB

L2
ZADM-252012MEH-2R2M
V_B_1

V_B_21

GND 3
GND 9
GND 11

R92
R/487K/Ohm/0402

C178
C/22/uF/0805

R93
R/86.6K/Ohm/0402

Conversion circuit

Buffer for SWD input/output
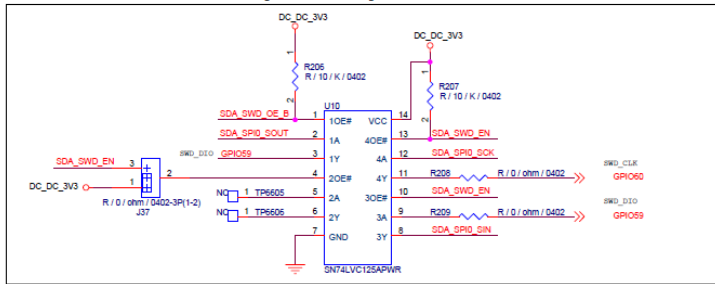
MK20 JTAG connector
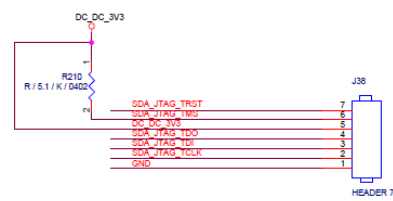
Button Circuit

RTC INTERRUPT
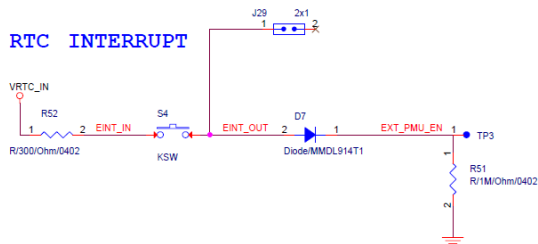
EINT(GPIO)
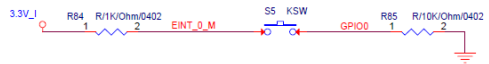
Reset Botton
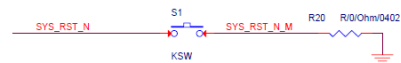
LED Circuit

USER LED
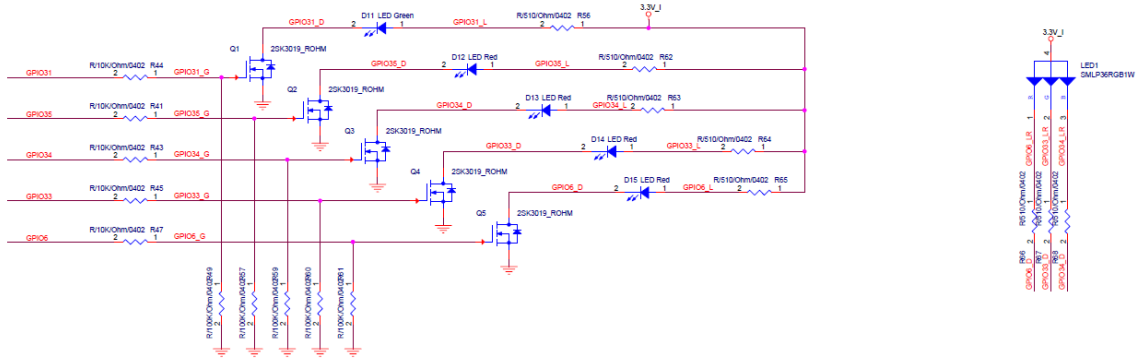
UART1 LED
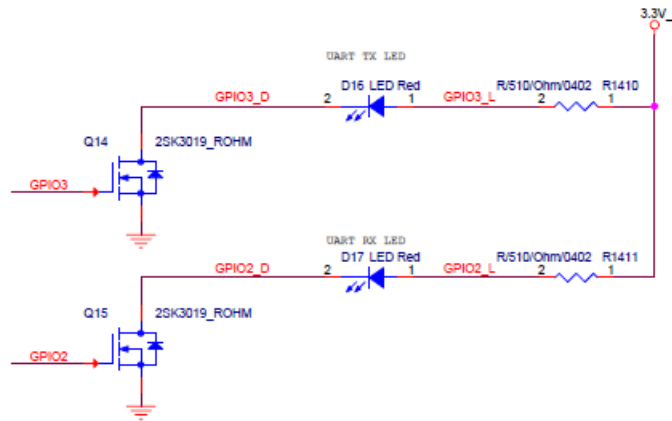
Module RF ANT SWITCH
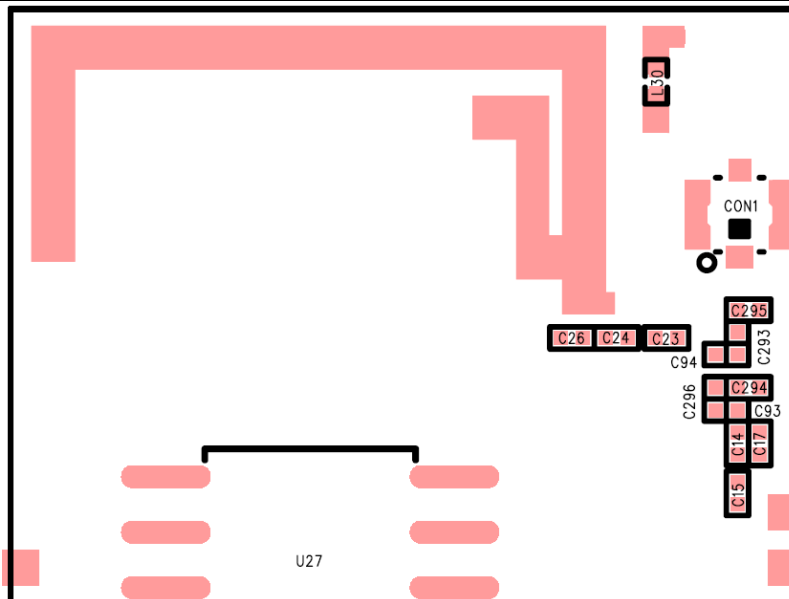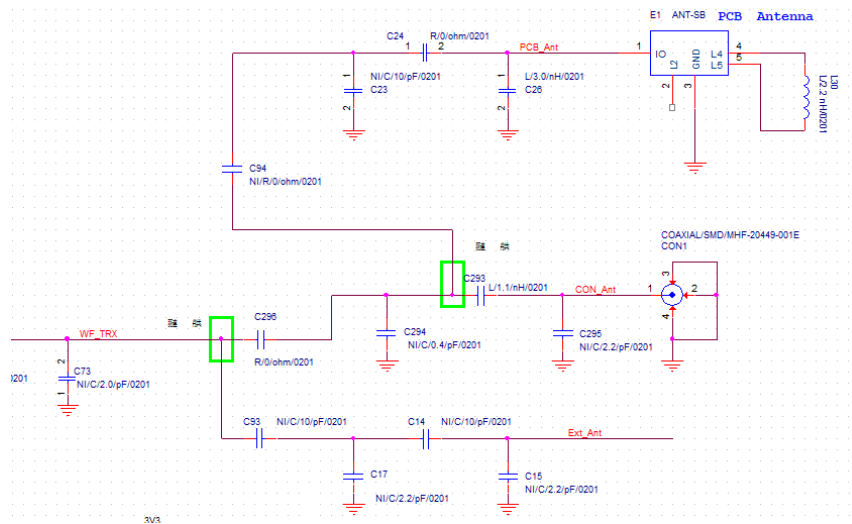
Note:
For PCB_Ant use C94
For CON_Ant use C293
For Ext_Ant use C93
Note: BT and WIFI are not working at the same time principle.

10. Layout Guide

You should avoid to put metals or conductive materials close to the antenna. It interferes with the radio emission from the antenna, and the communication distance might be decreased remarkably.
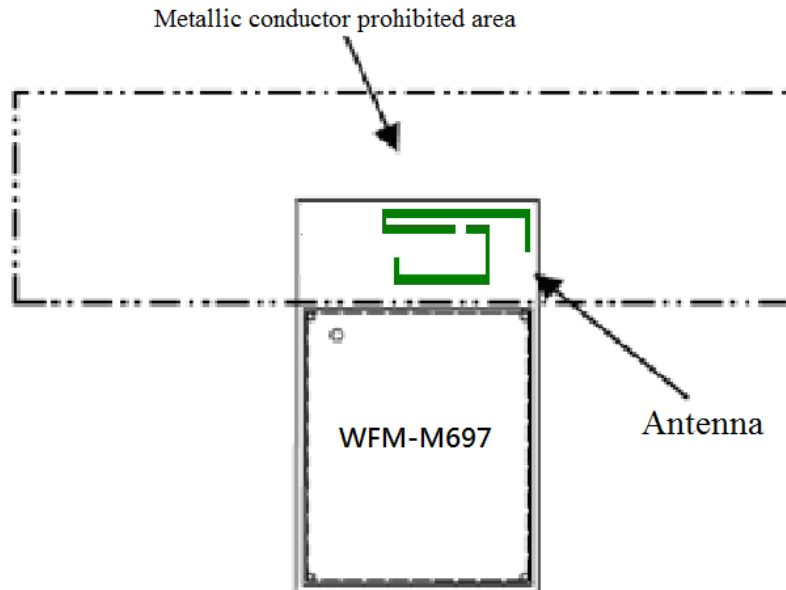
The module layout on your PCB should be designed according to the following guidelines.
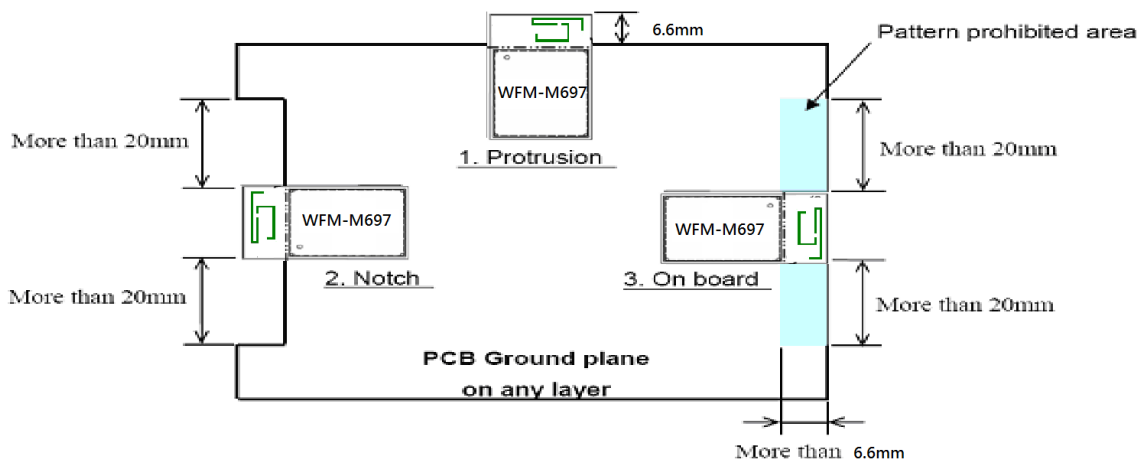
11. Furnace temperature curve

Reflow profile requirements		
Parameter Specification	**Reference**	**Specification**
Average temperature gradient in preheating		1~2.5°C/s to 175°C equilibrium.
Soak time	T_{soak}	120~180 seconds
Time above 217°C (T_1)	t_1	45~90 seconds
Peak temperature in reflow	T_2	250°C (−0/+5°C)
Time at peak temperature	t_2	6 seconds
Temperature gradient in cooling		6°C/second max.
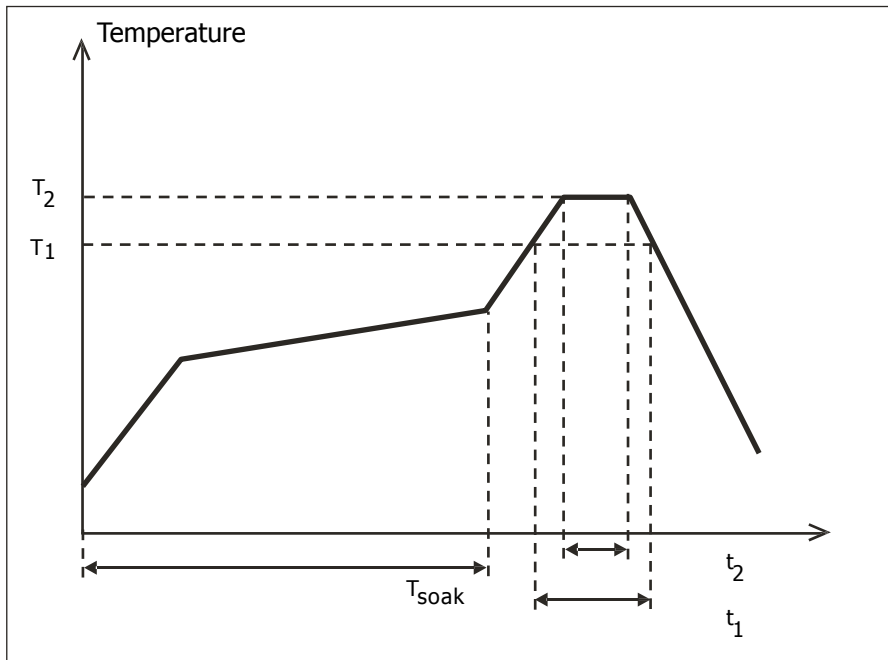
12. Packing diagram and Label

1:1

雷松科技（深圳）有限公司
Model:WFM-M697
Made in China

WLAN MAC:00126FXXXXXX

BT MAC:00126FXXXXXX

23

15

3:1

雷松科技（深圳）有限公司
Model:WFM-M697
Made in China

WLAN MAC:00126FXXXXXX

BT MAC:00126FXXXXXX

(由業務提供)WIFI代表WiFi，
扫描内容为12位，

(由業務提供)BT代表蓝牙，
扫描内容为12位，

WFM-M687-M697-M697D 包裝示意圖
WFM-M687-M697-M697D Packing diagram
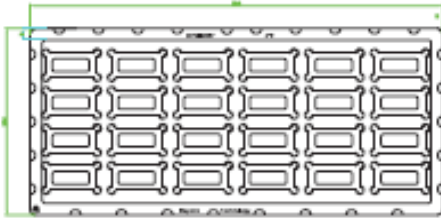
托盤一盤可裝24PCS
Each tray contains 24 pcs of module
314*140*7.5mm (L*W*H)
托盤共計11層,最上層不放模組(24*10=240pcs)
Total 11 trays are stacked up with a empty tary on the top
24*10=240pcs

防燥劑
drying agent

防靜電鋁箔袋
Anti-static aluminum foil bag
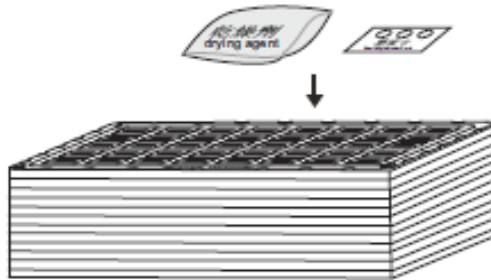
將裝入模組的拖盤放入防靜電鋁箔袋中進行真空
The stacked trays are loaded into a antistatic vacuum bag
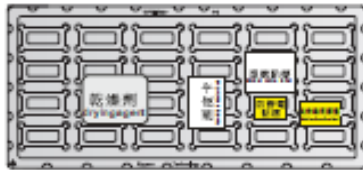
一個鋁箔袋放一個內盒
The vacuum bag will be placed in the box
在盒外正面加貼型號黏標
Stick the model name lable at the front side of the box
四個內盒裝一個外箱
Each carton contains four boxes

防燥劑
drying agent

型號黏標
Model name label

在鋁箔袋外,貼型號黏標及防靜電黏標,烘烤說明標籤
Stick the antistaic label and model name label and Moisture Sensitive Label on the vacuum bag

內　盒
box

外　箱
carton

內　盒
box

外箱黏標
carton label
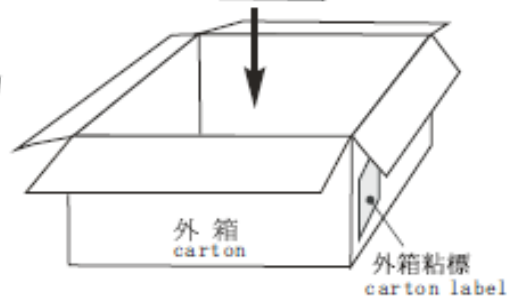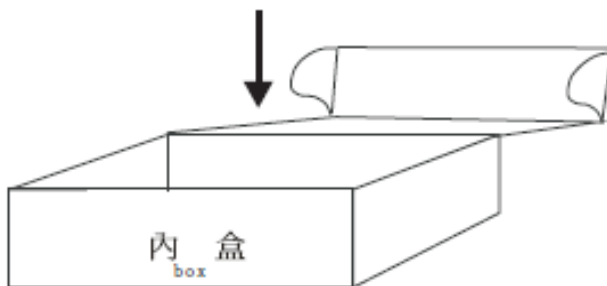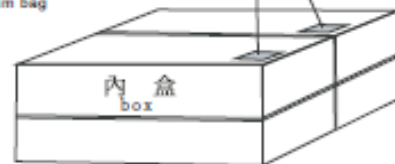
外箱黏標貼於外箱側嘜
Stick carton label at the side

設計 楊虹明	機型 WFM-M687-M697-M697D	品名 裝箱示意圖	版本 00	比例	Rayson
核准:	料號:	檔名	日期 20170911	單位	雷松科技

13. FCC and IC warning signs

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 Radiation Exposure Statement

This device complies with FCC radiation exposure limits set forth for an uncontrolled environment and it also complies with Part 15 of the FCC RF Rules.

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.

Caution!

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

Canada Statement

This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:
(1) This device may not cause interference;
(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;
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

The device meets the exemption from the routine evaluation limits in section 2.5 of RSS 102 and compliance with RSS-102 RF exposure, users can obtain Canadian information on RF exposure and compliance.

Le dispositif rencontre l'exemption des limites courantes d'évaluation dans la section 2.5 de RSS 102 et la conformité à l'exposition de RSS-102 rf, utilisateurs peut obtenir l'information canadienne sur l'exposition et la conformité de rf.
This device is intended only for OEM integrators under the following conditions:

1) The antenna must be installed such that 20cm is maintained between the antenna and users, and
2) The transmitter module may not be co-located with any other transmitter or antenna,
3) For all products market in US, OEM has to limit the operation channels in CH1 to CH11 for 2.4Gband by supplied firmware programming tool. OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change.

As long as 3 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 re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labelling
The final end product must be labelled in a visible area with the following:
 "Contains FCC ID: 2AHGS-WFM-M697.

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.

14. OEM statement

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

1) The antenna must be installed such that 20cm is maintained between the antenna and users, and
2) The transmitter module may not be co-located with any other transmitter or antenna,
3) For all products market in Industry Canada, OEM has to limit the operation channels in CH1 to CH11 for 2.4Gband by supplied firmware programming tool. OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change.

As long as 3 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.

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

1) L'antenne doit être installé de telle sorte que 20 cm est maintenue entre l'antenne et les utilisateurs, et
2) Le module émetteur peut pas être co-localisé avec un autre émetteur ou antenne,
3) Pour tout marché des produits d'Industrie Canada, OEM doit limiter les canaux de coopération dans CH1 à CH11 pour 2.4Gband par l'outil de programmation du firmware fourni. OEM ne doit pas fournir un outil ou d'information à l'utilisateur final en ce qui concerne le changement de domaine réglementaire.

Tant que 3 conditions ci-dessus sont remplies, autre test de l'émetteur ne sera

pas nécessaire. Cependant, l'intégrateur OEM est toujours responsable de tester leur produit final pour toutes les exigences de conformité supplémentaires nécessaires avec 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 IC 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 IC authorization.

Dans le cas où ces conditions ne peuvent être remplies (par exemple certaines configurations d'ordinateurs portables ou de co-localisation avec un autre émetteur), puis l'autorisation IC est plus considéré 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 IC séparée.

End Product Labelling
This transmitter module is authorized only for use in device where the antenna may be installed such that 20cm may be maintained between the antenna and users. The final end product must be labelled in a visible area with the following:
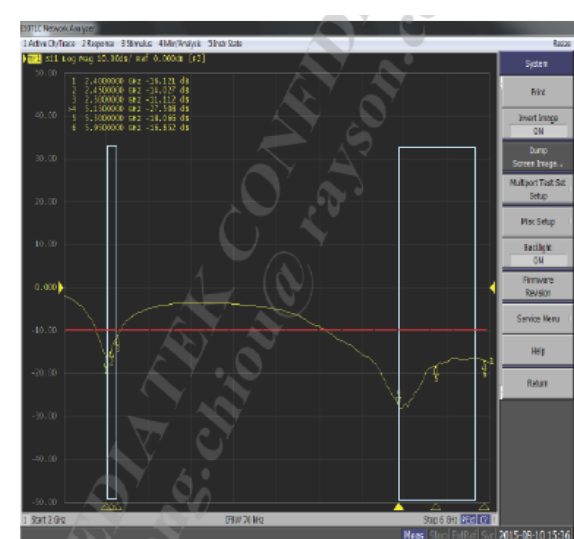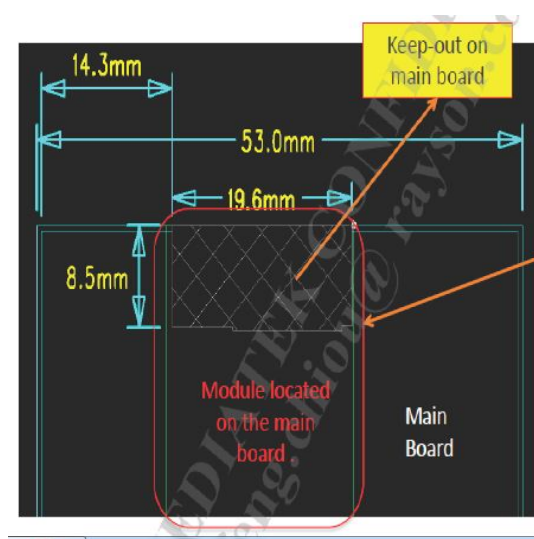　"Contains IC: 21501-WFM697"
Ce module émetteur est autorisé uniquement pour une utilisation dans le dispositif où l'antenne peut être installé de telle sorte que 20cm peut être maintenue entre l'antenne et les utilisateurs. Le produit final doit être étiqueté dans un endroit visible par le texte suivant:
"Contient IC: 21501-WFM697"

15. PCB Antenna

	Test Result	
Freq. bands	2.4GHz	5GHz
Efficiency (%)	73-76%	80-89%
Peak Gain (dBi)	2.3	3.8
Average gain (dBi) XY plane	-2.6	-1.3
YZ plane	-0.1	-0.6
ZX plane	-3	-2.9

Gain Table

Unit in dBi	XY-plane Peak	XY-plane Avg.	XZ-plane Peak	XZ-plane Avg.	YZ-plane Peak	YZ-plane Avg.	Efficiency
2400MHz	-0.3	-2.4	1.5	-2.9	2.3	0.1	76.0%
2450MHz	-0.6	-2.6	1.0	-3.0	2.1	-0.1	76.0%
2500MHz	-0.5	-2.7	0.1	-3.2	1.7	-0.5	73.0%
5150MHz	2.1	-1.2	3.4	-2.7	2.6	0.3	87.0%
5350MHz	2.2	-0.8	2.6	-2.2	3.8	0.2	89.0%
5500MHz	2.2	-1.3	1.7	-2.9	1.7	-0.6	80.0%
5750MHz	1.9	-0.8	3.4	-2.2	1.4	-0.6	88.0%
5850MHz	2.0	-0.8	2.4	-2.3	1.0	-0.9	82.0%

2.45GHz

5.5GHz

Antenna Pattern

Horizontal:

Vertical:

Max: 0
Min: -30
Scale: 5/div

Max: 0
Min: -45
Scale: 5/div
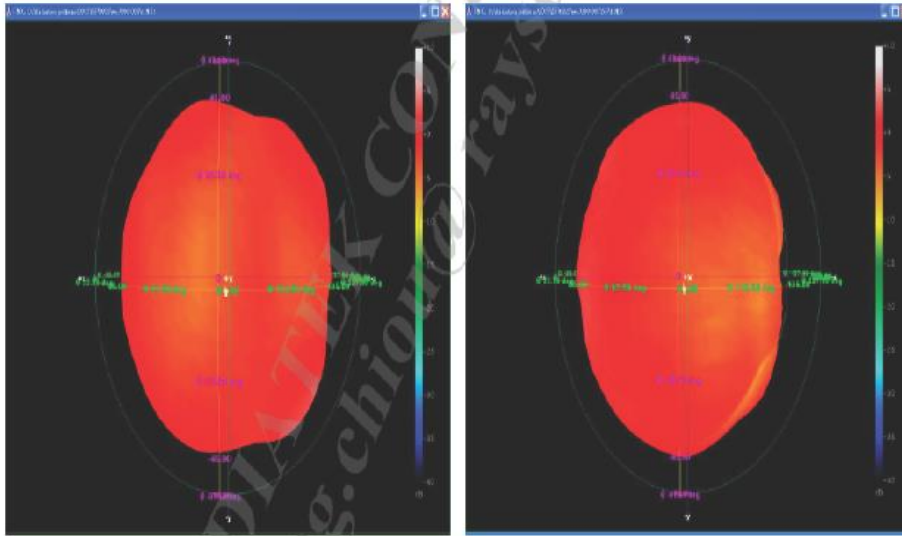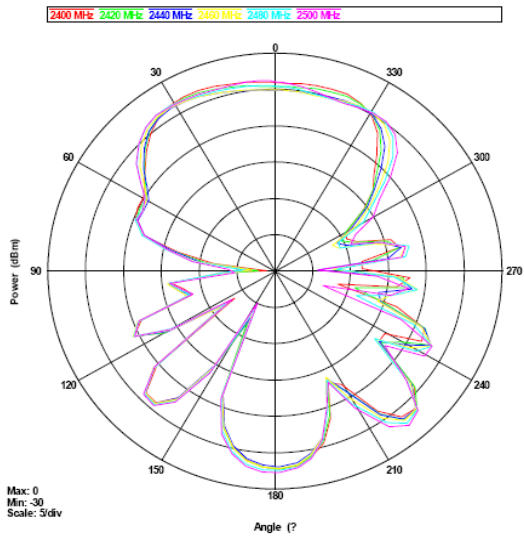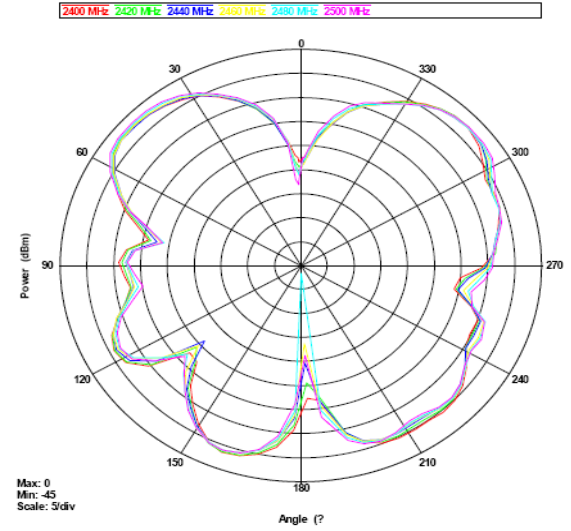
16. NCC Manual no warnings

低功率射頻電機警語：（低功率射頻電機適用）

經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率
或變更設計之特性之功能。

低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前項合法通信，指依電信法規定作業之無線電通信。低功率射頻電機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。

本模組於取得認證後，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「本產品內含射頻模組 CC XX xx YY yyy Z zW 字樣，詳細資料請參考標籤。

End of Datasheet

Company Name: Harman Professional Inc.
Representative:Susan L Whitfield
Address: 1718 W Mishawaka RD Elkhart IN 46517 USA
Contact Number:574-294-8289

Manufacturer's message
====================
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