Bluetooth Low Energy Module Datasheet
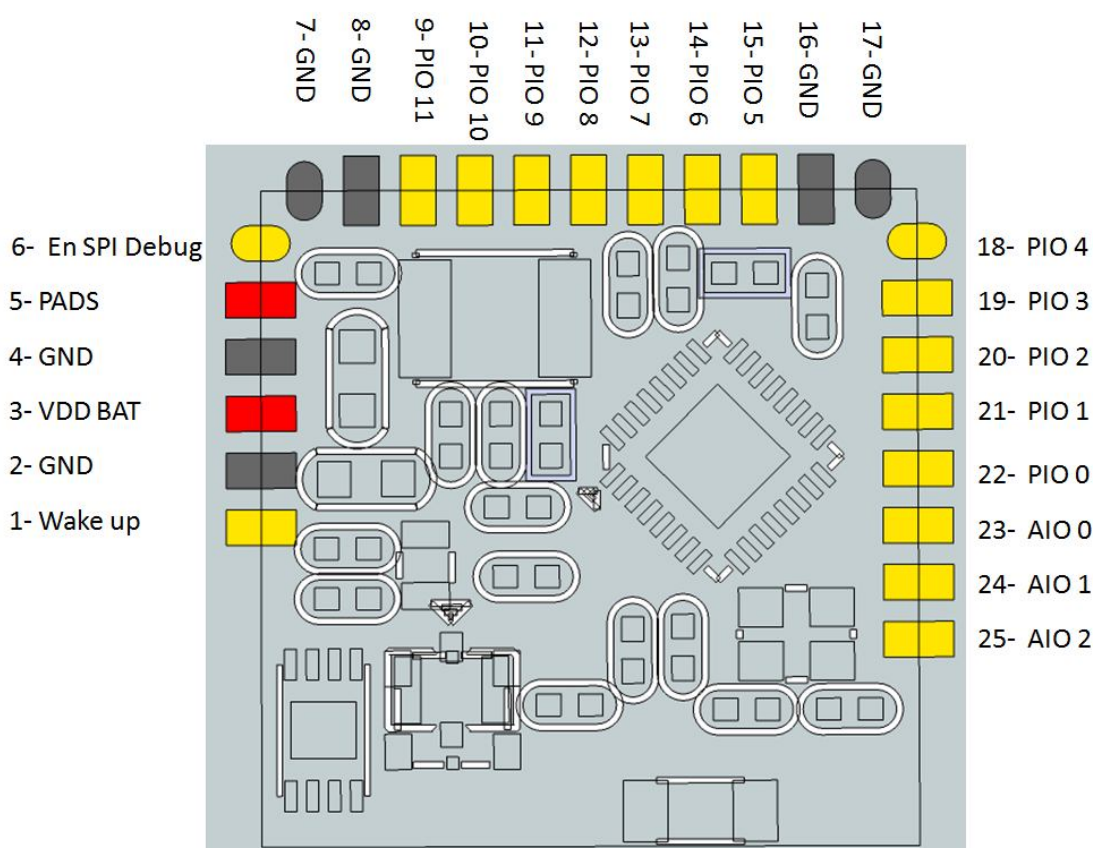
客戶名稱（Customer Name）：　_____

產品名稱(product Name)：　BLE Module

產品型號(product P/N)：　MK-OTH-GA1

日 期（Date）：　April － 2015


WebSite：http://www.minaik.com.tw

Tel：+886-2-8200-1008

1. Device Features：

- Bluetooth V4.1 compliant
- Bluetooth Low Energy model
- Ultra-low power consumption
- Microampere level operating current
- Ultra low voltage power supply, use the 3V Coin Cell Battery

- **EEPROM with built-in 512K byte**
- **PIO/UART/SPI/AIO/I²C interface**
- **Monitor clock function**
- **Minimal surface mount package: 15 x 15 x 2.5 mm**
- **RoHS compliant**
- **AIO x 3**
- **PIO x 11 (Could be configured by I²C, SPI & UART)**
- **Supply Voltage – 2.7 V ~ 3.6 V**
- **Package Dimension : 15 x 15 x 2.8 mm**

2. Functional Block
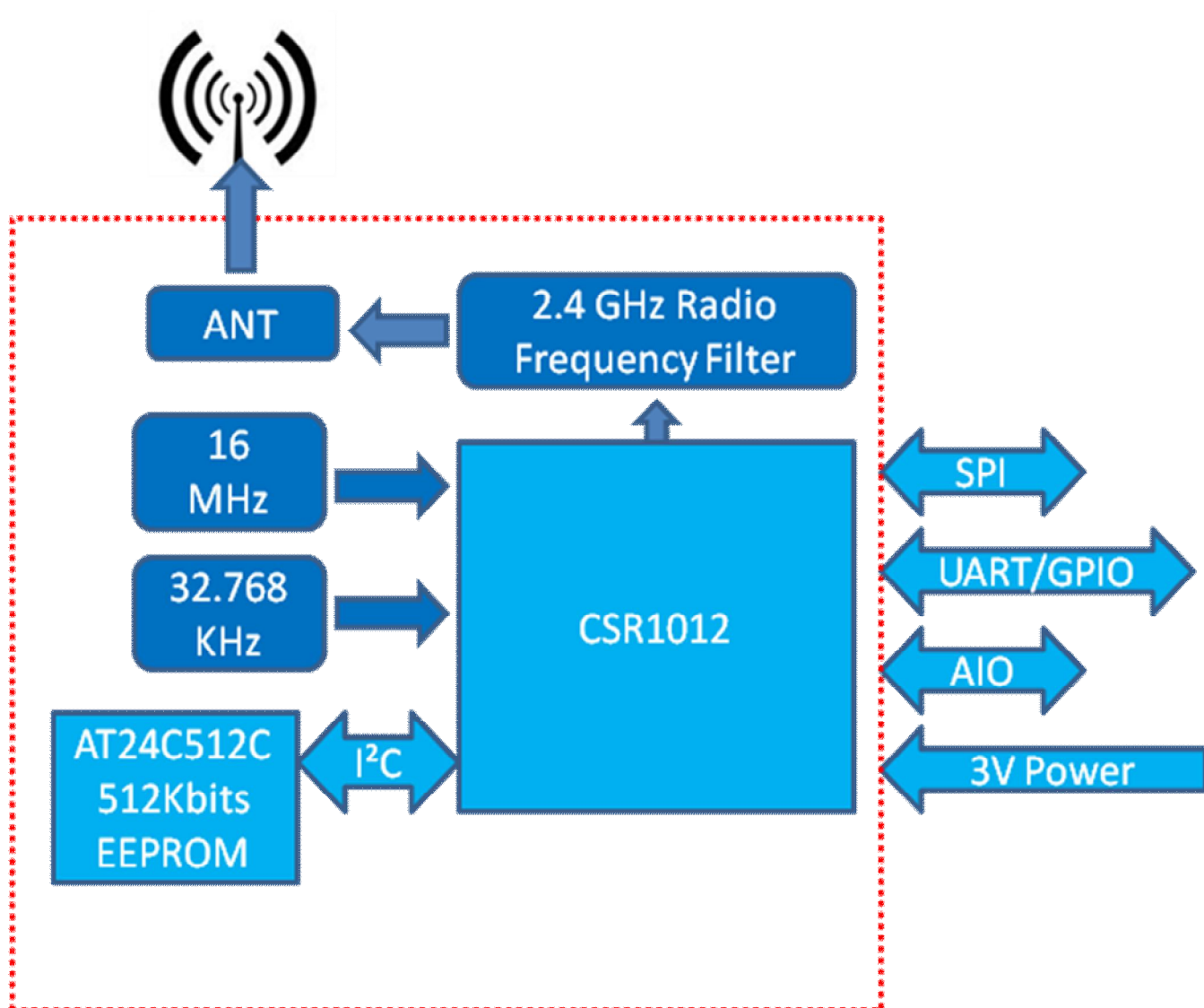
3. Electrical Characteristic

3.1 Absolute Maximum ratings

Rating	Minimum	Maximum
Store temperature	-40℃	+85℃
Operation temperature	-30℃	+85℃
Power Supply (VDD)	1.8V	+3.6V
I / O interface voltage	-0.4V	+3.6V

3.2 Recommend operation conditions

Rating	Minimum	Type	Maximum
Store temperature	-30℃	+20℃	+85℃
Operation temperature	-20℃	+20℃	+85℃
Power Supply (VDD)	+1.8V	+3.0V	+3.6V
I / O interface voltage	+1.2V	+3.0V	+3.6V

4. Radio Characteristics

Radio Characteristics

Rating	Frequency (GHz)	MIN	TYP	MAX	BT Spec	Unit
Sensitivity at 0.1%BER	2.402	≤-92	-85	-		
	2.441	≤-92	-85	-	<= -70	
	2.480	≤-92	-85	-		dBm
RF Transmit Power	2.402	0	3	7.5		
	2.441	0	3	7.5	<= 4	
	2.480	0	3	7.5		

5. Mechanical Specification:

6. Pin Definition :

Pin	Name	Type	Descriptions
1	Wake	I	Input to wake CSR1012 QFN from hibernate or dormant.
2	GND1	GND	Ground
3	VBATT	PWR	
4	GND2	GND	Ground
5	PADS	PWR	
6	SPIPion	I	Selects SPI debug on **PIO[8:5]**.
7	GND 3	GND	Ground
8	GND 4	GND	Ground
9	PIO 11	I/O	Bidirectional Programmable I/O line with programmable strength internal pullup/ down
10	PIO 10	I/O	Bidirectional Programmable I/O line with programmable strength internal pullup/ down
11	PIO 9	I/O	Bidirectional Programmable I/O line with programmable strength internal pullup/ down
12	**PIO 8**	I/O	Programmable I/O line or debug **SPI MISO** selected by SPI_PIO#. **Same voltage level as VDD_PADS.**
13	**PIO 7**	I/O	Programmable I/O line or debug **SPI MOSI** selected by SPI_PIO#. **Same voltage level as VDD_PADS.**
14	**PIO 6**	I/O	Programmable I/O line or debug **SPI chip select (CS#)** selected by SPI_PIO#. **Same voltage level as VDD_PADS.**
15	**PIO 5**	I/O	Programmable I/O line or debug **SPI CLK** selected by SPI_PIO#. **Same voltage level as VDD_PADS.**
16	GND 5	GND	Ground
17	GND 6	GND	Ground
18	PIO 4	I/O	Bidirectional Programmable I/O line with programmable strength internal pullup/ down
19	PIO 3	I/O	Bidirectional Programmable I/O line with programmable strength internal pullup/ down
20	PIO 2	I/O	Bidirectional Programmable I/O line with programmable strength internal pullup/ down
21	PIO 1	I/O	Bidirectional Programmable I/O line with programmable strength internal pullup/ down
22	PIO 0	I/O	Bidirectional Programmable I/O line with programmable strength internal pullup/ down
23	AIO 0	I/O	Analogue programmable I/O line 0.
24	AIO 1	I/O	Analogue programmable I/O line 1.
25	AIO 2	I/O	Analogue programmable I/O line 2.

6. Reference Schematics:

7. Reflow information:

228 – 250℃ **Peak Temp**
Target 235℃ +/- 5

200℃

170℃

Time Above
Liquidus temperature

Soak
< 100
Sec

Target 40 ~ 90
Seconds,
120 max

Slope < 3.0℃ / sec
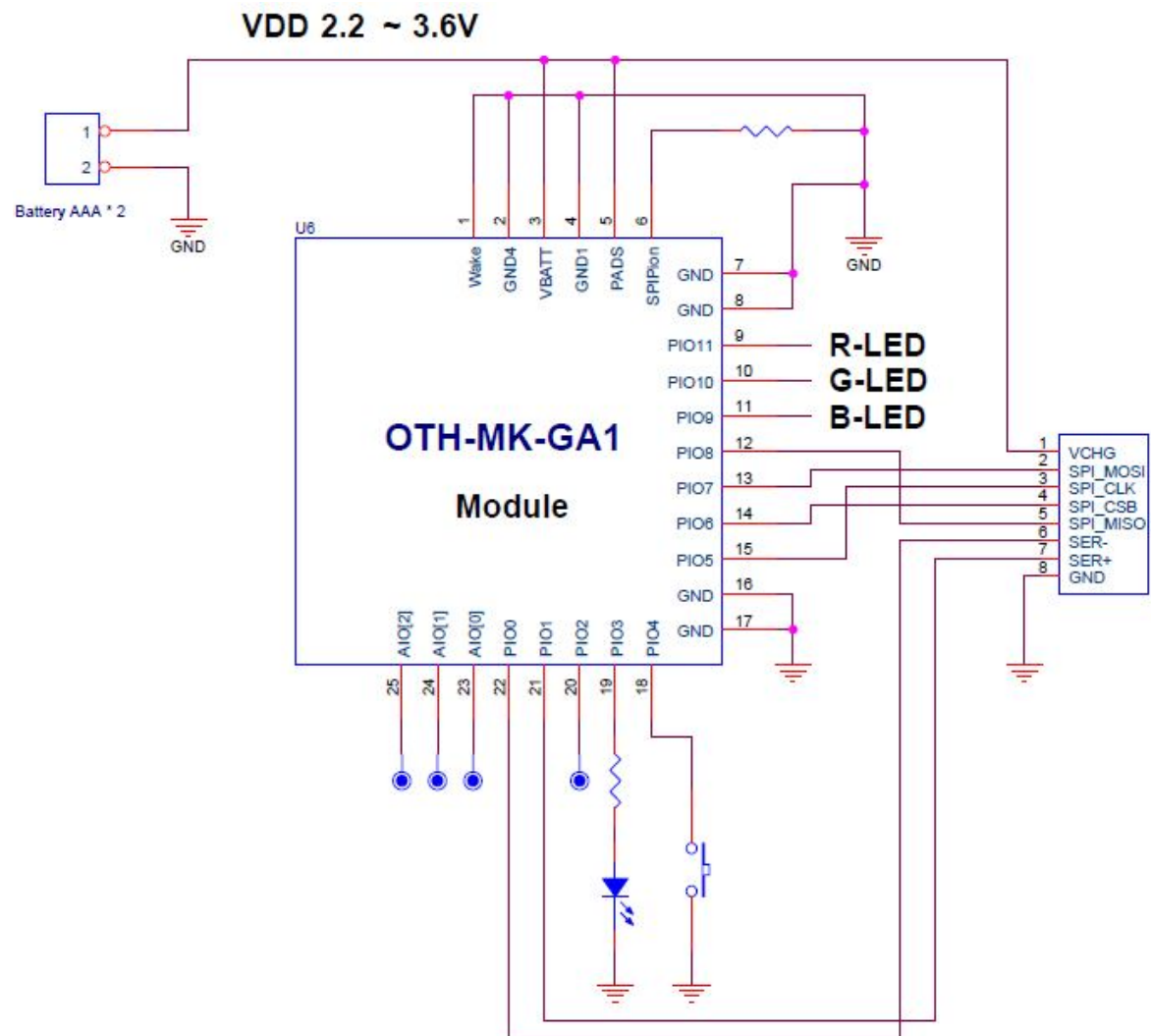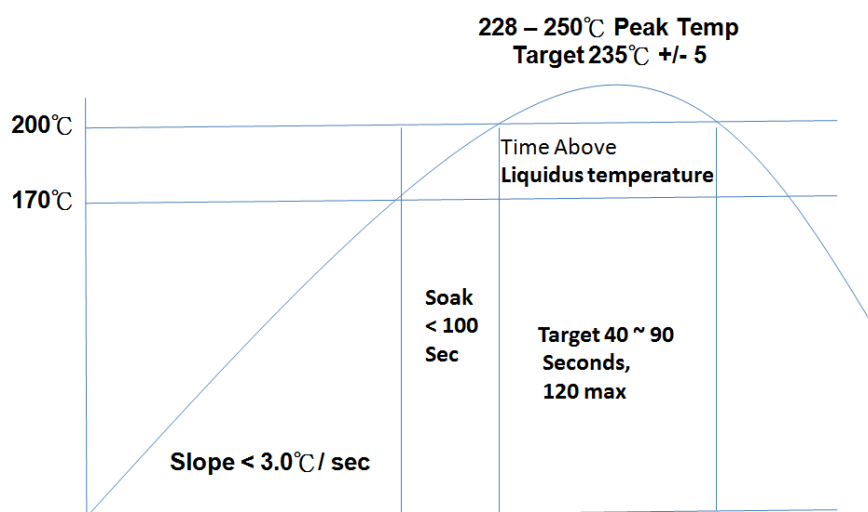
8. Related recommended:

● **Full metal shell will greatly shorten the Bluetooth transmission distance**
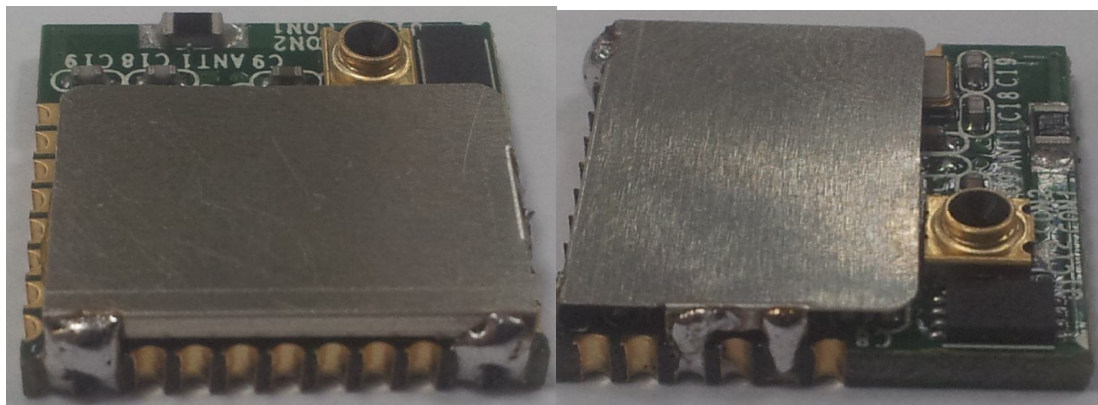● **Bluetooth antenna below PCB plate not copper**

9. Document History:

Revision	Date	History
V.1.0	2014/8/1	First Release
V.2.0	2015/3/31	First Modification

10. INFORMATION FOR TEST EQUIPMENT

Test Hardware and Software states in the table below.

Device Name	Type	Version	Serial Number	Manufacturer	Calibration Data of Start	Next Calibration Data
ABTS	Allion Bluetooth Test Suite	V1.0.0	BQTF3900001	TRC	N/A	N/A
Bluetooth Tests	MT8852B-042	4.16.001	10219901600	Anritsu	2014/01/09	2016/01/09
Signal Generator	MT8852B-042	4.16.001	10219901601	Anritsu	2014/01/09	2016/01/09
Signal Generator	MG3692C	N/A	10219901713	Anritsu	2014/01/07	2016/01/07
Spectrum Analyzer	FSL6	2.00	BQTF9900006	R & S	2014/01/08	2016/01/08
Temperature Chamber	MCP-1-TR	N/A	BQTF9900004	YEOW LONG	2013/05/21	2015/05/21
Switching Unit	N/A	N/A	BQTF3100001	TRC	N/A	N/A

11. APPENDIX

12. FCC ID Label Location: