XRBH-1 User Manual

(V0.4)
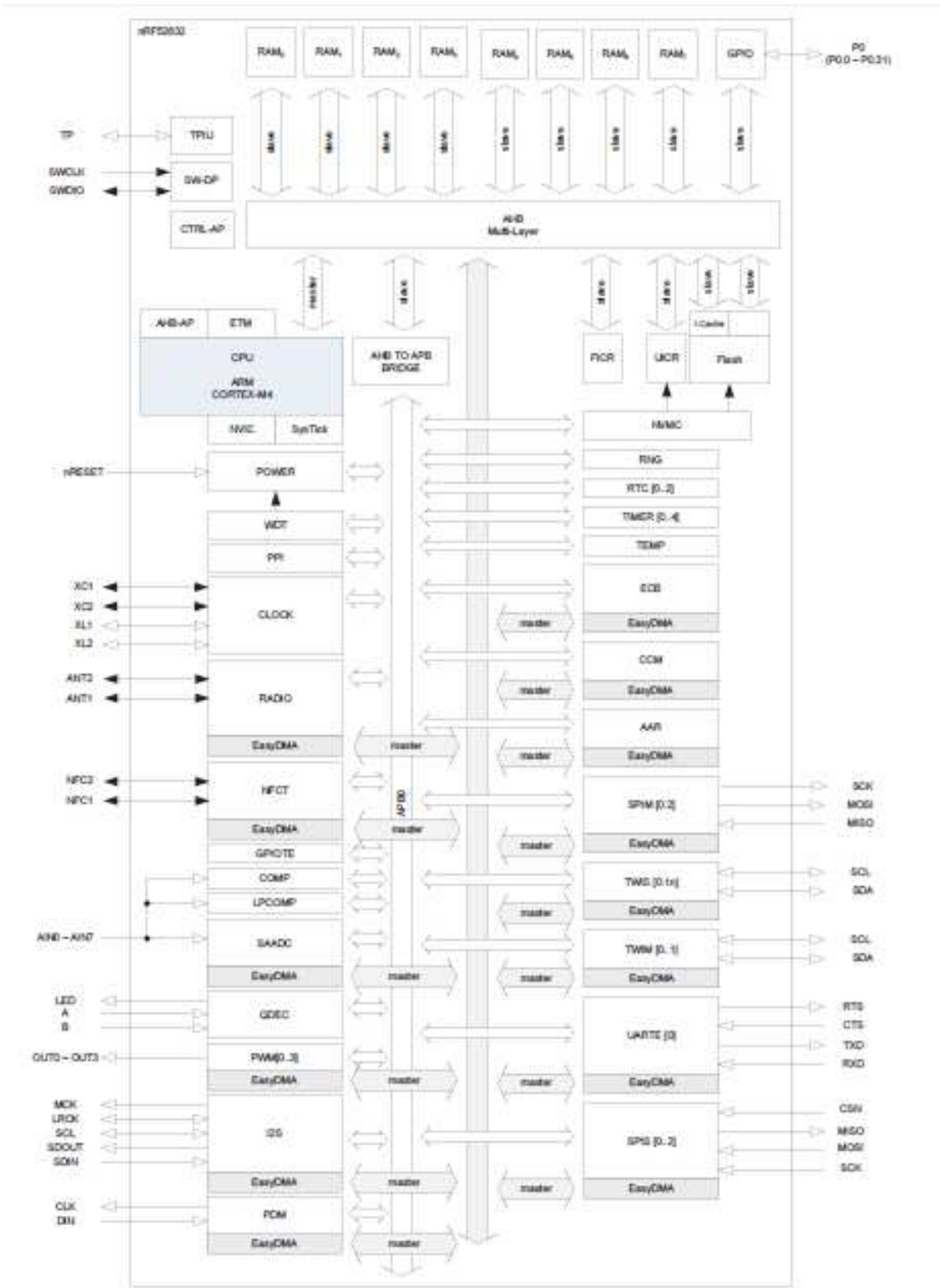
Model Name: **XRBH-1 BLE MODULE**
Description: **BLE module compatible**

Revision History

Edition #	Reason for revision	Issue date
V0.1	Initial Document (Draft version)	2017/04/06
V0.2	Add Module Dimension	2017/04/11
V0.3	Modify FCC Warning Message	2017/04/12
V0.4	Modify Max Transmit Power	2017/05/08

NRF52832 Block Diagram

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Specification

| CATEGORIES	FEATURE	
Wireless Specificiation	Bluetooth®	V4.2 (Single Mode/Bluetooth Smart)
	Frequency	2.402 - 2.480 GHz
	Max Transmit Power	4dBm +/- 1.0 dBm
	Receive Sensitivity	-96dBm (Low power mode)
	Raw Data Rates	1 Mbps (over the air)
Host Interfaces	Total	30 lines – multi function
	UART	TX, RX
		Default 115200, N, ,8, 1
		From 1,200 to 115,200bps
	GPIOs	30
	SPI	3 lines
	I2C	2 lines
	ADC	8 lines (plus ADC reference)
Encryption	AES	128 bit using AES encryption
Memory	Flash	512KB
	RAM	64KB
Physical	Dimensions	14mm x 9.8mm x 2.3mm
Clock Management	RF	32MHz crystal embedded
	RTC	32.768KHz crystal embedded
Environmental	Operating Temperature	-10° to +65° C
	Storage Temperature	-10 ˚C to +65 ˚C
Miscellaneous	Lead Free	Lead-free and RoHS compliant

Electrical characteristics

DC/DC mode

Symbol	Minimum	Typical	Maximum	Unit
VCC	1.8	3	3.6	V

Power consumption

Symbol	Description	Typical	Unit
I_{OFF}	System off current consumption	0.7	uA
I_{IDLE}	3V ON, all blocks idle	1.9	uA

Mechanical Dimension
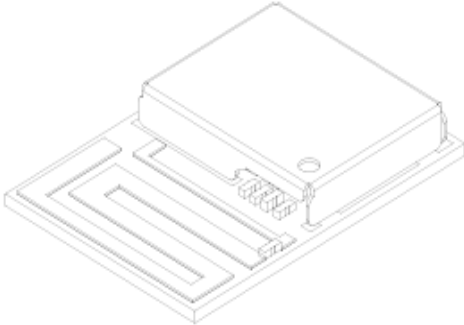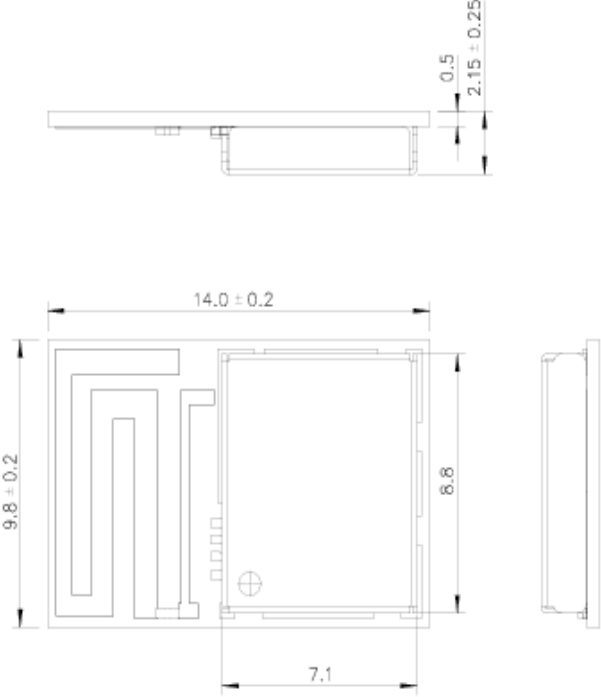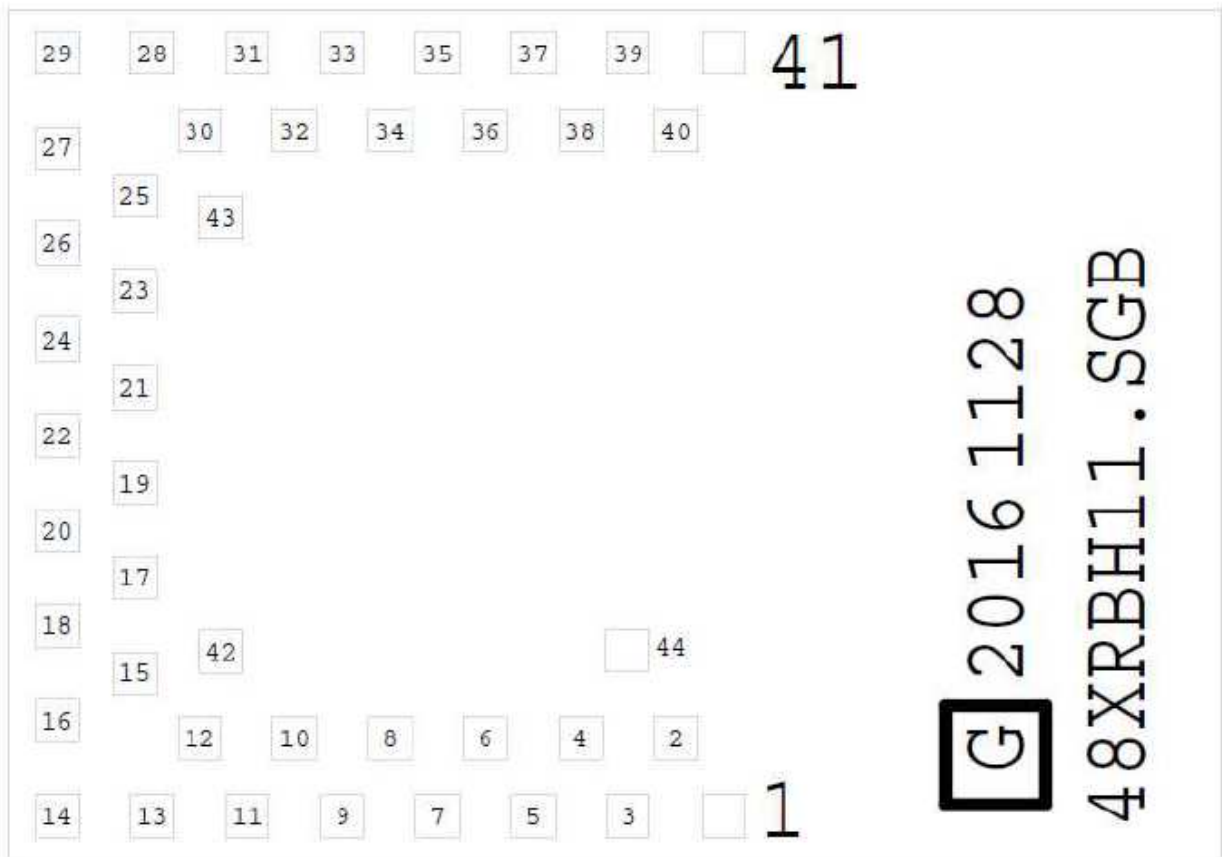
Recommend Land Pattern
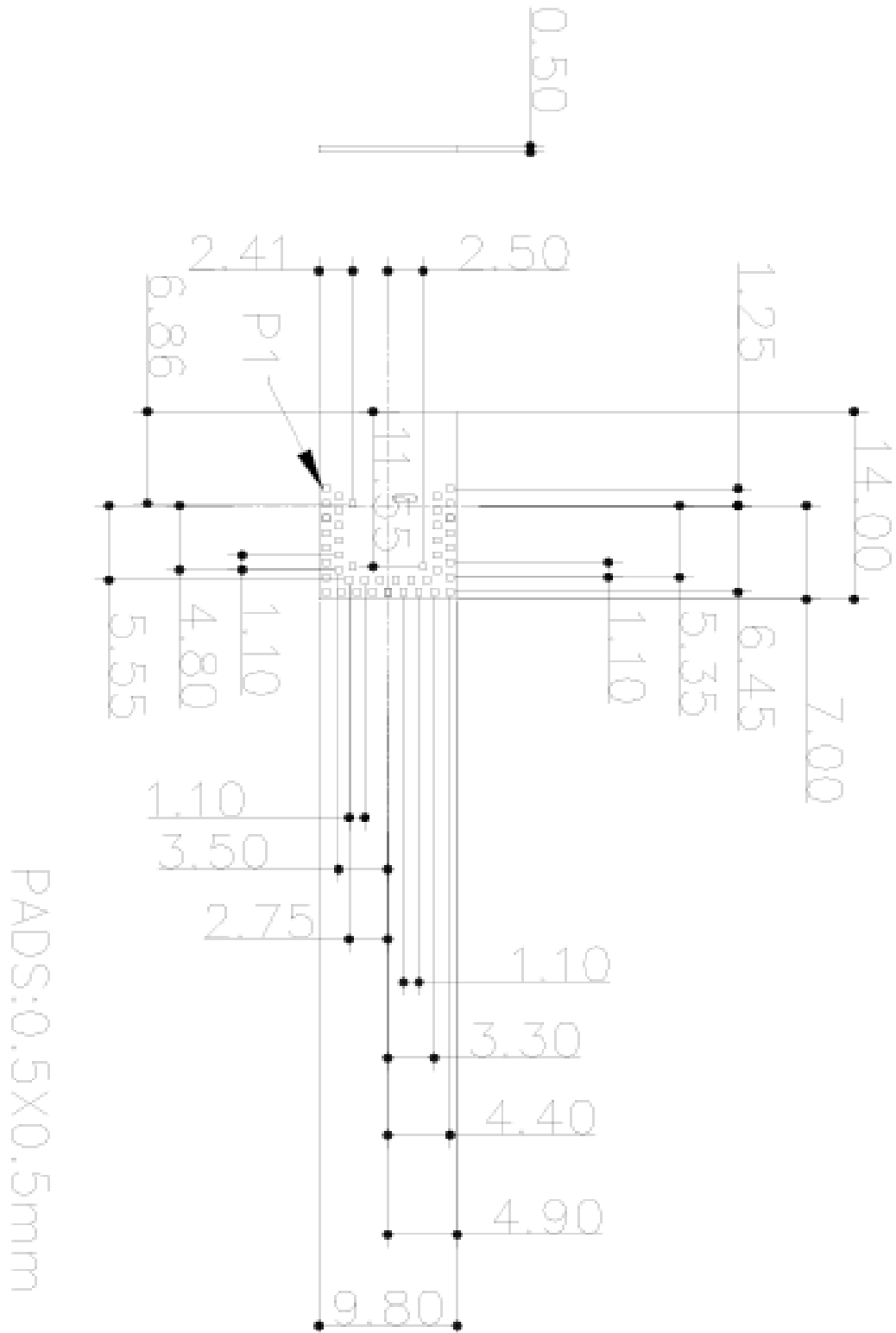
PIN Define

| Pin number	Name	Function	Description
2	SWCLK	Digital input	Serial Wire Debug clock input for debug and programming.
3	SWDIO	Digital I/O	Serial Wire Debug I/O for debug and programming.
4	P0.21/RESET	Digital I/O	General purpose I/O pin. Configurable as pin reset.
5	P0.22	Digital I/O	General purpose I/O pin.
6	P0.20/ TRACECLK	Digital I/O	General purpose I/O pin. Trace port clock output.
7	P0.18/ TRACEDATA[0]	Digital I/O	General purpose I/O pin. Trace port output. Single Wire Output.
8	P0.19	Digital I/O	General purpose I/O pin.
9	P0.17	Digital I/O	General purpose I/O pin.
10	P0.16/ TRACEDATA[1]	Digital I/O	General purpose I/O pin. Trace port output.
11	P0.11	Digital I/O	General purpose I/O pin
12	P0.13	Digital I/O	General purpose I/O pin
13	P0.15/ TRACEDATA[2]	Digital I/O	General purpose I/O pin. Trace port output.
14	NFC2/P0.10	NFC input Digital I/O	NFC antenna connection. General purpose I/O pin
15	P0.14/ TRACEDATA[3]	Digital I/O	General purpose I/O pin. Trace port output.
16	P0.12	Digital I/O	General purpose I/O pin
18	NFC1/P0.09	NFC input Digital I/O	NFC antenna connection. General purpose I/O pin
20	P0.07	Digital I/O	General purpose I/O pin

22	P0.08	Digital I/O	General purpose I/O pin
24	P0.06	Digital I/O	General purpose I/O pin
25	P0.04/AIN2	Digital I/O Analog input	General purpose I/O pin SAADC/COMP/LPCOMP input.
26	P0.05/AIN3	Digital I/O Analog input	General purpose I/O pin. SAADC/COMP/LPCOMP input.
27	P0.03/AIN1	Digital I/O Analog input	General purpose I/O pin SAADC/COMP/LPCOMP input.
29	P0.02/AIN0	Digital I/O Analog input	General purpose I/O pin SAADC/COMP/LPCOMP input.
31	P0.31/AIN7	Digital I/O Analog input	General purpose I/O pin SAADC/COMP/LPCOMP input.
32	P0.30/AIN6	Digital I/O Analog input	General purpose I/O pin SAADC/COMP/LPCOMP input.
33	P0.29/AIN5	Digital I/O Analog input	General purpose I/O pin SAADC/COMP/LPCOMP input.
35	P0.26	Digital I/O	General purpose I/O pin
36	P0.27	Digital I/O	General purpose I/O pin
37	P0.28/AIN4	Digital I/O Analog input	General purpose I/O pin SAADC/COMP/LPCOMP input.
38	P0.25	Digital I/O	General purpose I/O pin
39	P0.23	Digital I/O	General purpose I/O pin.
40	P0.24	Digital I/O	General purpose I/O pin.
1, 17, 19, 21, 23, 34,41,42,43	GND	Ground	Ground
28,30	VCC	Power input	+1.7V to +3.6V

Antenna Type

Antenna Vendor	WNC
Antenna Type	PCB ANTENNA

Antenna Specification
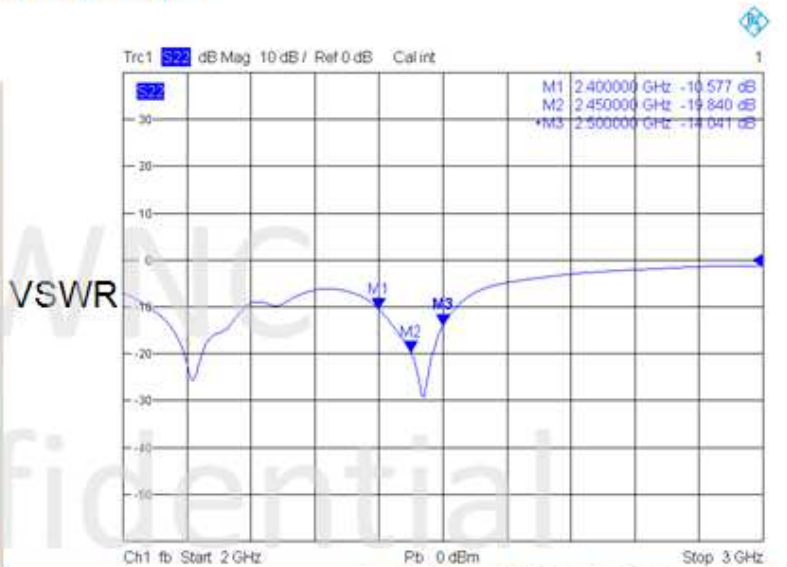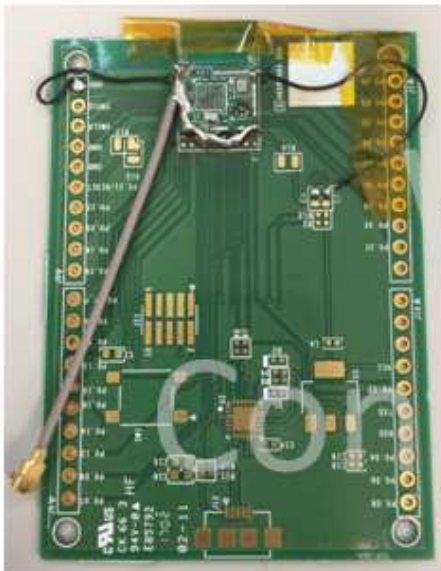
		2400	2450	2500	Avg.
UHF ANT	Eff.	48%	51%	51%	50%
	Avg. Gain	-3.19	-2.92	-2.91	
	Peak Gain	1.13	1.21	1.02	

Test condition

[Direction Definition]
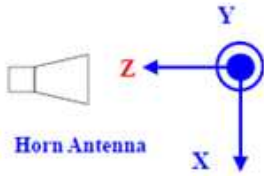
[Testing Environment]
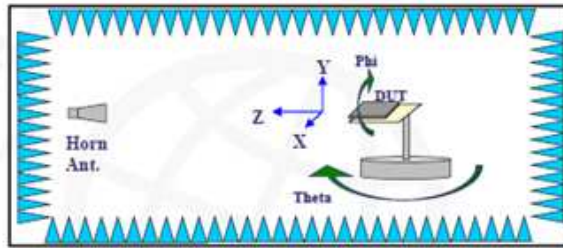
UHF antenna radiation pattern

2450 MHz Radiation Pattern

XRBH-1
carrier board
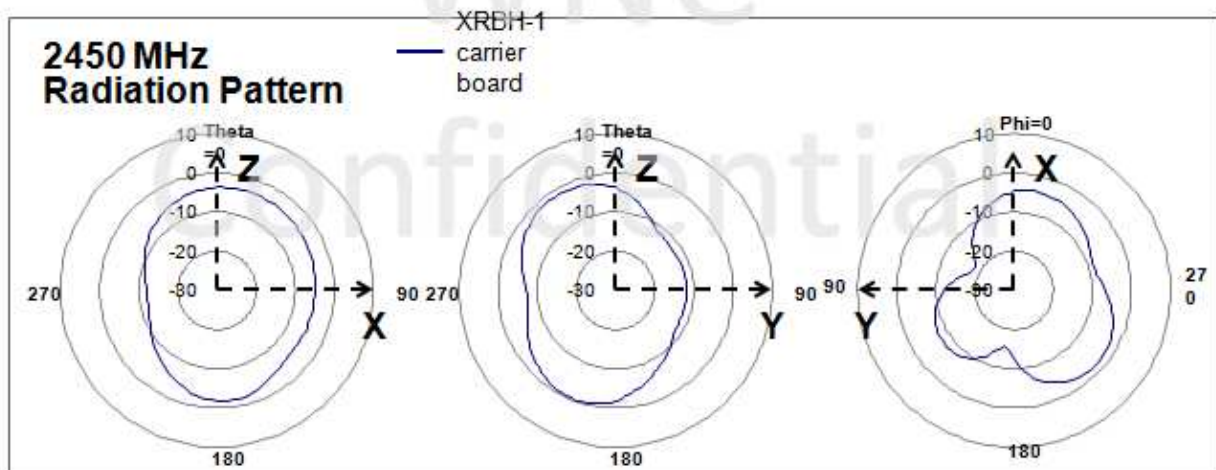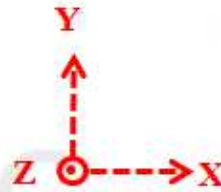
Unit : Avg. Gain(dBi), Peak Gain(dBi)

Summary

- **Antenna spec. as Measured result**

    - **VSWR < 2**

    - **Efficiency**

        - ✓ 50% for BT Antenna

Test Item	Unit	UHF Antenna
Return Loss (Min)	dB	18dB
Peak gain (Max)	dBi	1.21
Efficiency (Min)	dB	50%

FCC Compliance Statement

(1)	**FCC Label Compliance 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.**
(2)	**FEDERAL COMMUNICATIONS COMMISSION INTERFERENCE 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.**
(3)	**End Product Labeling:** **The final end product must be labeled in a visible area with the following: "Contains FCC ID: NKR-XRBH-1". The grantee's FCC ID can be used only when all FCC compliance requirements are met.**

(4)	**Radiation Exposure Statement** **This device is intended only for OEM integrators under the following conditions:** **1) this equipment complies with FCC radiation exposure limits set forth for uncontrolled equipment and meets the FCC RF exposure guidelines in Supplement C to DET 65 RF exposure rules. This equipment has very low levels of RF energy that are deemed to comply without testing of specific absorption ration (SAR), 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 re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.**
(5)	**Radiation Exposure Statement:** **1) Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.** **2) This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.**
(6)	**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**

本產品符合低功率電波輻射性電機管理辦法

第十二條

※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、加大功率或變更原設計之特性及功能。

第十四條

※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。

此模組若安裝於其他平台時，該平台標籤需標明：

此平台內建無線模組