Bluetooth™ Module Application Note

Module Features

-Bluetooth™ V1.1 Compliant
-Transmit Power +4dBm(Class2)
-2.7V to 3.6V Operation
-Full Bluetooth data rate over UART and USB
-Four low power modes : Park, Sniff, Hold and Deep Sleep
-Support for up to seven slaves

ABM-200

Class2 Bluetooth Module

Production Information Data Sheet

ID : ABM-200-2XXX

Dec.2002

General Description

ABM-200-2XXX is a Class 2 surface mountable Bluetooth™ Module for Mobile Phone, PDA, Notebook PC, Desktop PC, applications. It provides fully compliant Bluetooth system for data and voice communications. Physical interface to host (UART, USB) can support full Bluetooth data rate 723.2k/57.6kbps.
A-Law, u-Law,13bit or 16bit linear PCM, 8k sample/sec synchronous bidirectional audio interface is also available.

Application

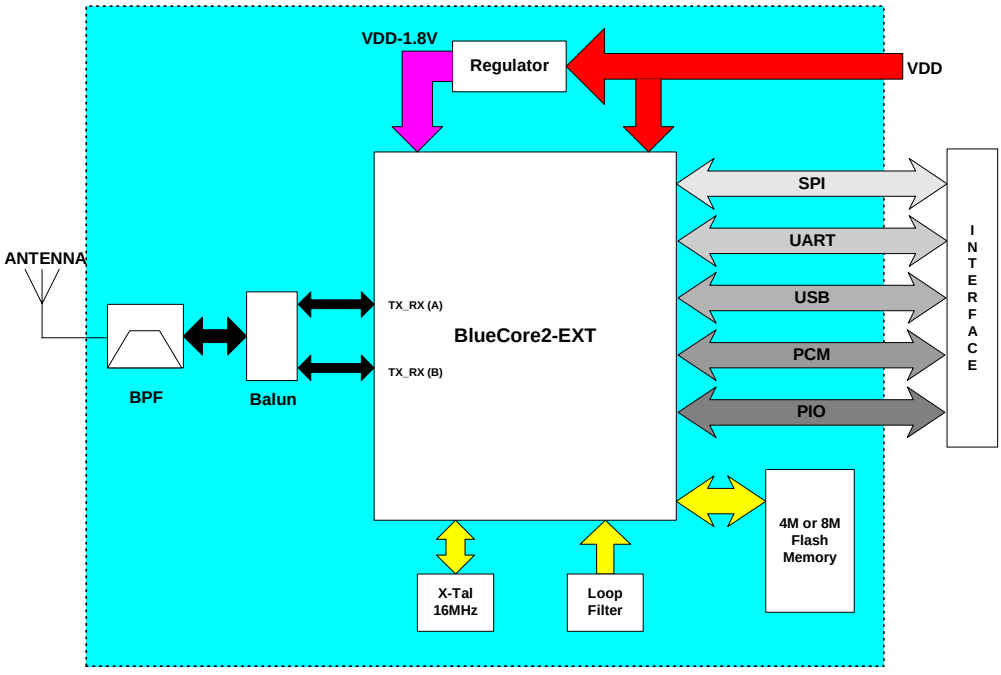
Laptop and Desktop PCs
Mobile Phones
Cordless Headsets
Personal Digital Assistants (PDAs)
Digital Camera & Printer
Domestic and Industrial Applications

Features

-Size(18.0 X 14.0 X 2.0mm)
-Class2 Support(+4dBm)
-Surface Mountable
-Single 3.3V Power Supply
-Support PCM interface for SCO

Specification

-Operating Conditions
Support Voltage……..…... 2.7V ~3.6V
Temperature Range…….…. -20~+70°C
-Power Consumption
ACL Data (UART/115.2kbps) ……. 18mA
Voice Only (HV3 Packet) …… 28mA
-Radio Characteristics
Receiver Sensitivity … -84dBm
Transmitter Power ….. +2.0dBm(Typical)



Electrical Characteristics

Absolute Maximum Ratings			
Parameter	**Min**	**Max**	**Unit**
Storage Temperature	-40	+85	℃
Supply Voltage	2.7	3.6	DCV
Other Pin Voltage	V_{ss}-0.4	V_{DD}+0.4	DCV

Recommended Operating Conditions			
Parameter	**Min**	**Max**	**Unit**
Temperature	-20	+70	℃
Supply Voltage for UART	3.0	3.6	DCV
Supply Voltage USB	3.1	3.6	DCV

Power Consumption			
Mode	**Average**	**Peak**	**Unit**
SCO connection HV3(1s interval sniff mode)(Slave)	28		mA
SCO connection HV3(1s interval sniff mode)(Master)	28		mA
SCO connection HV1(Slave)	62		mA
SCO connection HV1(Master)	62		mA
ACL Data transfer, 115.2kbps UART (Master)	18		mA
ACL Data transfer, 720kbps USB (Slave)	62		mA
ACL Data transfer, 720kbps USB (Master)	62		mA
Deep Sleep Mode, Initial	1.5		mA
ACL connection, Sniff Mode 40ms interval, 57.6kbps UART	4		mA
ACL connection, Sniff Mode 1.28s interval, 38.4kbps UART	0.8		mA
Park Mode	0.6		mA

RF Specification

Transmitter Performance					
Parameter	**Condition**	**Min**	**Typ**	**Max**	**Unit**
Output Power	Normal/extreme test	-6	2	4	dBm
Power Density	Normal/extreme test	-	-	20	dBm
Power Control	Normal/extreme test	2dB ≤ Step size ≤ 8dB			
Frequency Range	Normal/extreme test	2402	-	2480	MHz
20dB Bandwidth	Normal/extreme test	-	850	1000	KHz
Adjacent channel power	±2MHz	-	-	-20	dBm
	±3MHz	-	-	-40	dBm
	±4MHz	-	-	-40	dBm
Modulation Characteristics	$\Delta F1_{avg}$	140	-	175	KHz
	$\Delta F2_{max}$	115	-	-	KHz
	$\Delta F2_{avg} / \Delta F1_{avg}$	-	-	80	%
Initial Carrier Frequency Tolerance		-75	-	75	KHz
Carrier Frequency Drift	One slot packet(DH1)	-25	-	25	KHz
	Three slot packet(DH3)	-40	-	40	KHz
	five slot packet(DH5)	-40	-	40	KHz

Transceiver Performance					
Parameter	**Condition**	**Min**	**Typ**	**Max**	**Unit**
Out-of-Band Spurious Emissions	30MHz-1GHz	-	-	-36	dBm
	1GHz-12.75GHz	-	-	-30	dBm
	1.8GHz-5.3GHz	-	-	-47	dBm
	5.1GHz-5.3GHz	-	-	-47	dBm

Receiver Performance					
Parameter	**Condition**	**Min**	**Typ**	**Max**	**Unit**
Sensitivity level	Single slot packets	-70	-80	-	dBm
Sensitivity level	Multi slot packets	-70	-	-	dBm
C/I performance	C/I co-channel	-	9	11	dB
	C/I1MHz (Adjacent channel selectivity)	-	-2	0	dB
	C/I2MHz (2nd Adjacent channel selectivity)	-	-34	-30	dB
	C/I≥3MHz (3rd Adjacent channel selectivity)	-	-43	-40	dB
Blocking performance	30MHz-2000MHz	-10	-	-	dBm
	2000MHz-2400MHz	-27	-	-	dBm
	2500MHz-3000MHz	-27	-	-	dBm
	3000MHz-12.75MHz	-10	-	-	dBm
Intermodulation Performance	n=5	-39	-	-	dBm
Maximun Input Level		-20	-5	-	dBm

Pin Description

Pin No.	Pin Name	Description
1	PIO(6)	Programmable I/O terminal or CLK_REQ
2	PIO(1)	TX Enable
3	PIO(0)	RX Enable
4	AIO(0)	Programmable I/O terminal
5	PIO(7)	Programmable I/O terminal
6	AIO(1)	Programmable I/O terminal
7	RESET_IN	Module Reset INPUT
8	GND	Common Ground
9	UART_RX	UART Data in
10	UART_TX	UART Data out
11	UART_RTS	UART ready to send
12	UART_CTS	UART clear to send
13	SPI_CLK	Serial Peripheral Interface clock
14	SPI_MISO	Serial Peripheral Interface data output
15	VCC	+3.3V Power Supply
16	PCM_SYNC	Synchronous data strobe
17	PCM_IN	Synchronous $8Kss^{-1}$ data input
18	PCM_OUT	Synchronous $8Kss^{-1}$ data output
19	PCM_CLK	Synchronous data clock
20	USB DP	USB Data plus
21	USB DN	USB Data minus
22	SPI_MOSI	Serial Peripheral Interface data input
23	GND	Common Ground
24	SPI_CSB	Chip select for Synchronous Serial Interface active low
25	PIO(5)	Programmable I/O terminal or USB_DETACH
26	PIO(2)	Programmable I/O terminal or USB_PULL_UP
27	PIO(3)	Programmable I/O terminal or USB_WAKE_UP
28	PIO(4)	Programmable I/O terminal or USB_ON
29	GND	Common Ground
30	RF-IN_OUT	Connect to Antenna

Ordering information

ABM-200 – 2XXX

2	Class2

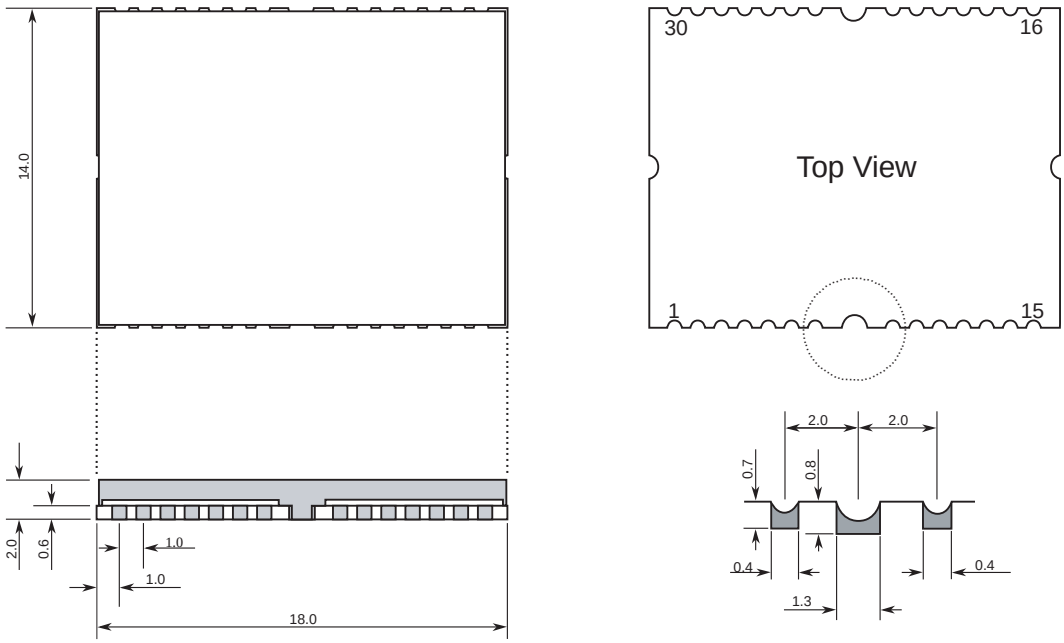
Flash Memory Size	
4	4 Mbit
8	8 Mbit

Interface	
UA	UART
US	USB
BC	BCSP

Baud Rate	
A	4800
B	9600
C	14400
D	38400
E	57600
F	115200
G	230400
H	460800
I	912600
J	1382400

Dimensions

Unit : mm



Packing : Tape & Reel(MOQ : 1000EA)

Specifications Sheet

Object	Internal Antenna	**Page**	1 of 7
Customer	JCOM	**Date**	July 2, 2004
System	Bluetooth	**Rev.**	IR
Model Name	W4I−BF−19	**Written by**	W. I. KWAK

Electrical Specifications

Frequency Range (MHz)	2400 ∽ 2483.5
Band Width (MHz)	83.5
V.S.W.R (Min)	1.9 : 1
Gain (Max)	3.4 ± 1 (dBi)
Input Impedance	50 (Ω)
Polarization	Linear

Mechanical Specifications

Antenna Size (Width x Length x Height)	11 × 5 × 1.2 mm
Weight	N / A
Radiator Material	Copper
Operation Temperature	− 30 ∽ 90 (℃)
Operation Humidity	10 ∽ 90 (%)

Option	
Remarks	

WINiZEN Co., Ltd.

Fig 1. Return Loss (Agilent E8357A 300KHz～6GHz PNA Series Network Analyzer)

Fig 2. V.S.W.R (Agilent E8357A 300KHz～6GHz PNA Series Network Analyzer)

Fig 3. Smith Chart (Agilent E8357A 300KHz～6GHz PNA Series Network Analyzer)

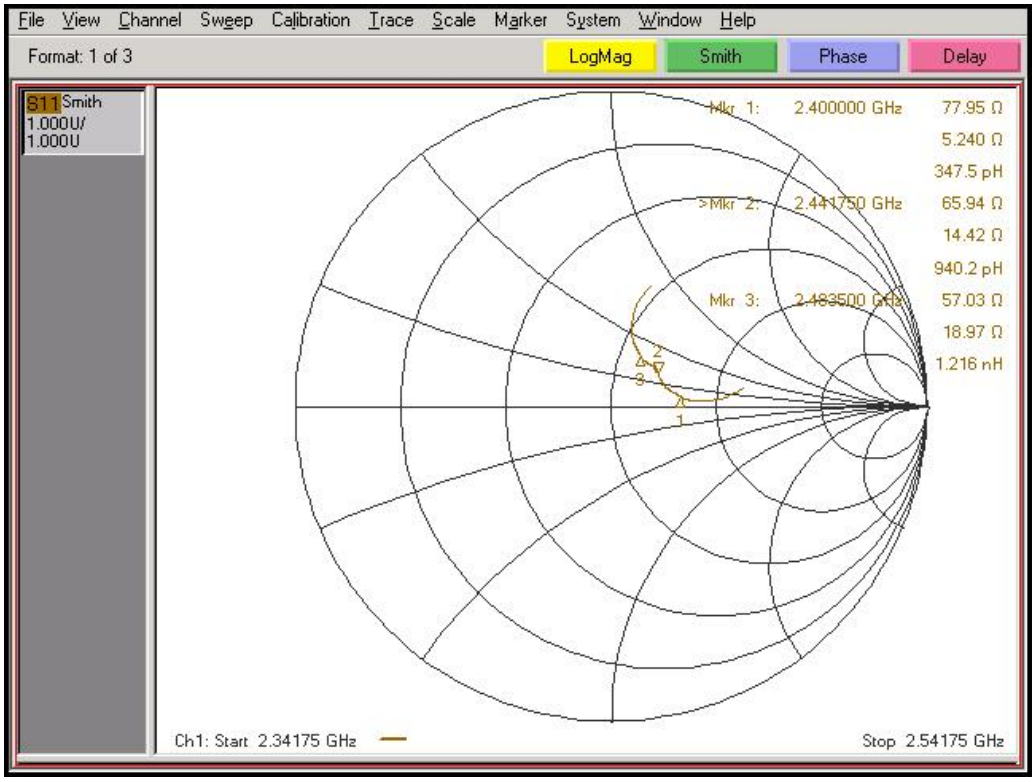
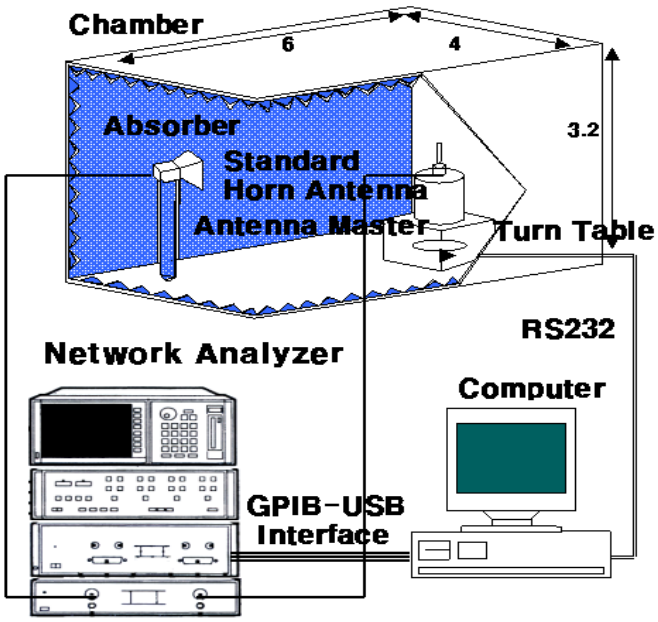
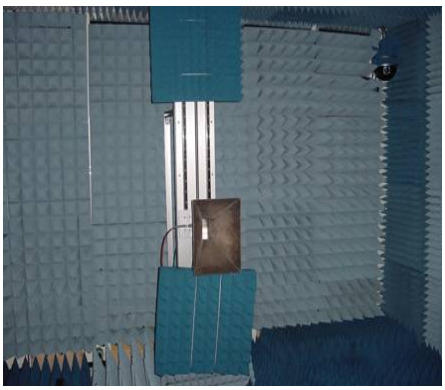


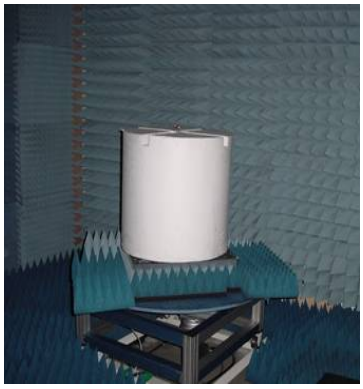
Fig 4. Measurement Configuration

(Hewlett Packard 8722ES 50 MHz～40 GHz S-Parameter Network Analyzer)



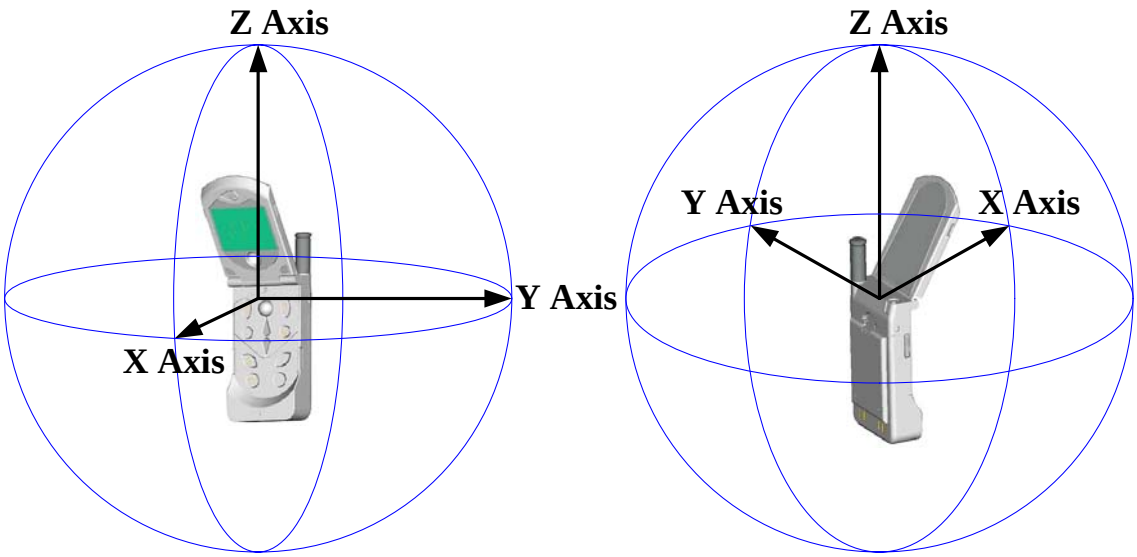


Standard Horn



Turn Table

Fig 5. Axis Definitions (Antenna Center)



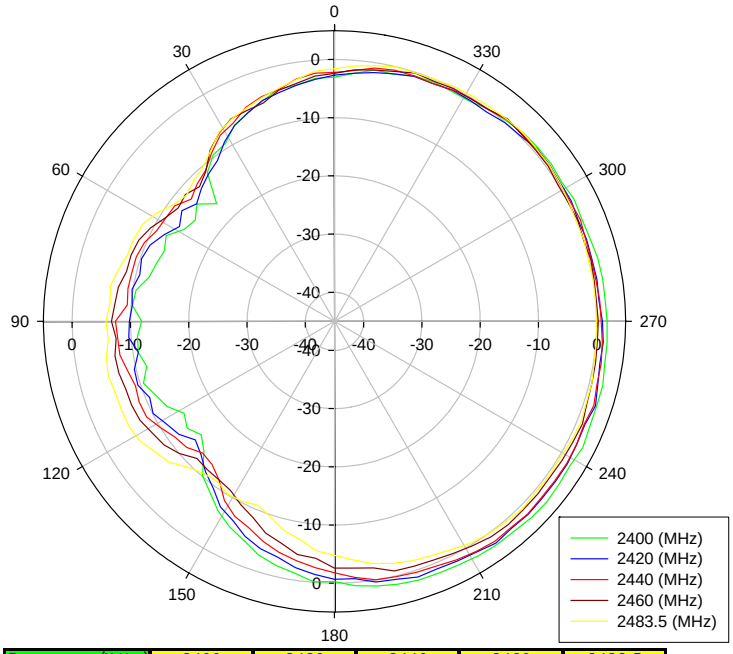
a. Azimuth Pattern (Co-pol) : XY Plane ; Horn Antenna Polarization : Vertical

b. Elevation Pattern (Co-pol) : XZ Plane ; Horn Antenna Polarization : Horizontal

c. Elevation Side Pattern (Co-pol) : YZ Plane ; Horn Antenna Polarization : Horizontal

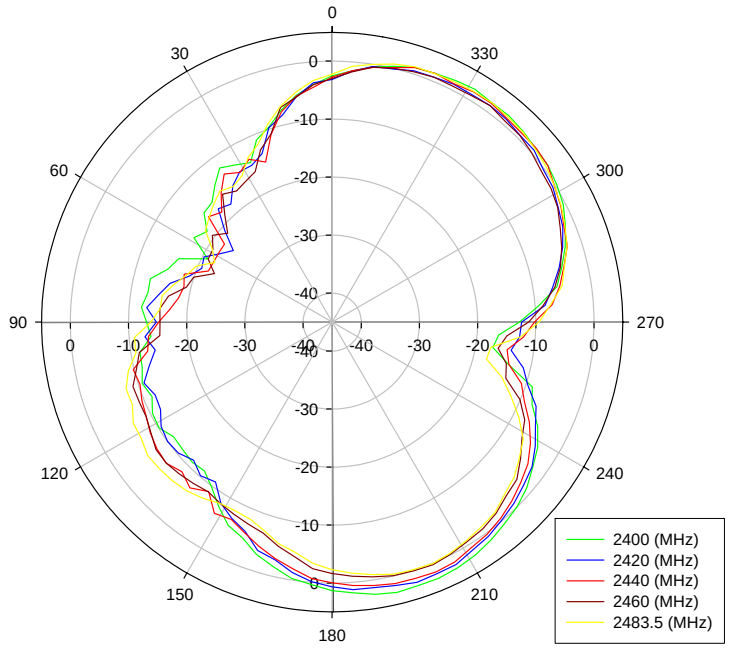
Fig 6. Gain Patterns

a. Azimuth Pattern



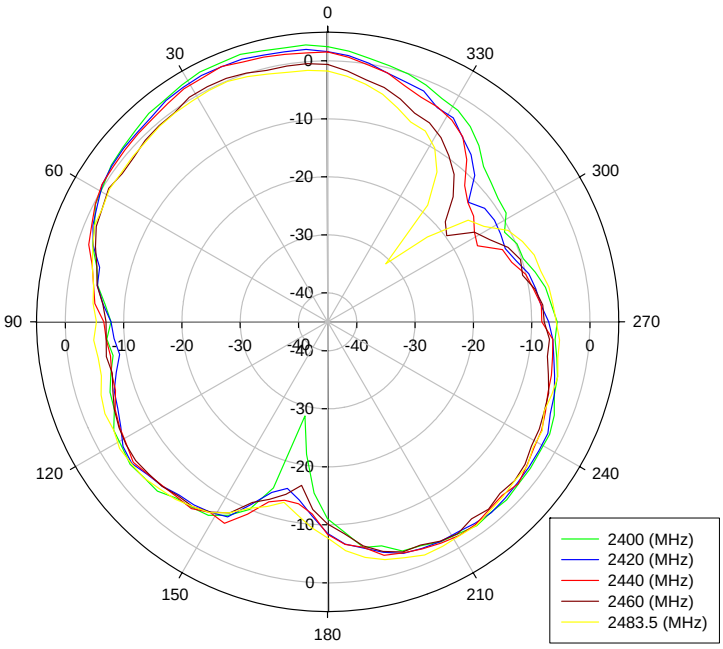
Frequency (MHz)	2400	2420	2440	2460	2483.5
Max Gain	2.83562	2.08857	1.8557	1.02797	0.77783
Average Gain	-4.1078428	-4.107421	-3.8069011	-3.971617	-3.7486316

b. Elevation Pattern



Frequency (MHz)	2400	2420	2440	2460	2483.5
Max Gain	2.92987	2.18355	1.614	1.13072	1.72875
Average Gain	-6.2439341	-7.0921881	-6.8650526	-7.6185837	-6.9627149

c. Elevation Side Pattern



Frequency (MHz)	2400	2420	2440	2460	2483.5
Max Gain	3.45457	2.66453	2.61007	0.46676	-0.15776
Average Gain	-4.1819968	-4.520582	-4.6743774	-5.8137127	-5.4244683

Fig 7. Antenna Mounting

Fig 8. Antenna Mechanical

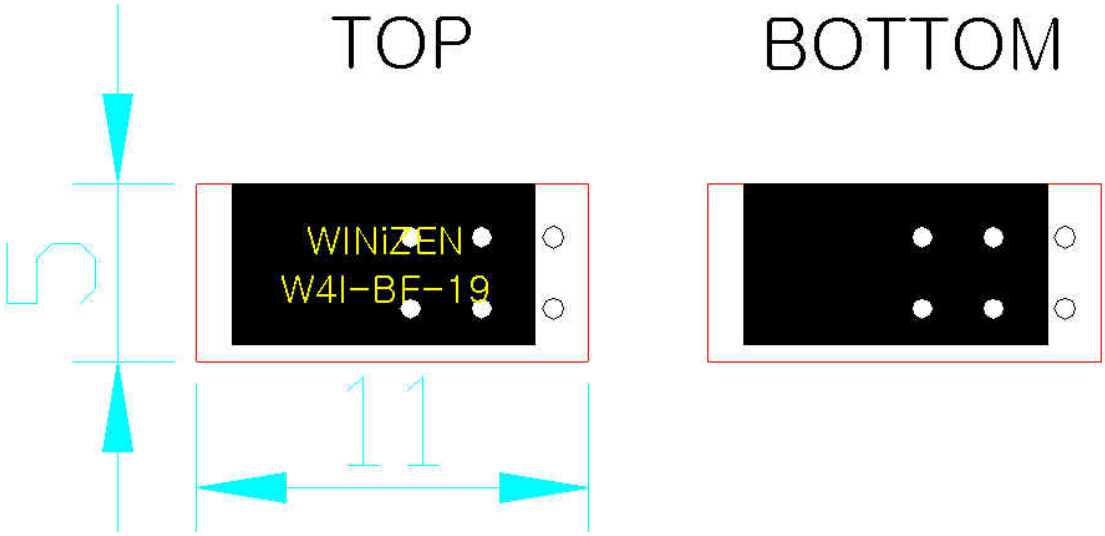


Fig 9. Printed Circuit Board Mechanical