



Technical drawing of a mechanical part with dimensions. The drawing shows a profile with a total length of 57.74. Key dimensions include a vertical offset of 3.65, a horizontal offset of 2.05, a vertical offset of 0.60, a horizontal offset of 1.60, a horizontal offset of 44.10, a vertical offset of 0.55, a horizontal offset of 0.50, a vertical offset of 7.65, and a horizontal offset of 0.50. The drawing is labeled with '0.50' at the bottom right.

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Revision History

Rev. No	Data	Title	Contents	Page
0	2022. 07. 12		New Published	
1	2022. 08. 12		Changed PCB Pattern	

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1. Specifications

1.1 Electrical Specifications

No	Item	Spec	Remark
1	Frequency Range [MHz]	433.92	
2	VSWR	Max 2.0:1	
3	Directional	Omni directional	
4	Impedance [Ω]	Nominal 50	

1.2 Mechanical Specification

No	Item	Spec	Remark
1	Dimensions	56.15*7.65mm	

1.3 Appearance and Material

No	Item	Spec	Remark
1	Antenna	PCB Pattern	*. 1)PCB Stack-up *. 2)CCL Datasheet

*. 1) PCB Layer Stack-up

No	Material	Thickness	Material
	SILK	0.015	TAIYO S200W
	PSR	0.015	OTC R500MK
	Plating	0.020	
Layer 1	Copper	0.018	
	CCL	0.200	DOOSAN DS-7409SN
Layer 2	Copper+Plating	0.018	
	Plating	0.020	
	PSR	0.015	OTC R500MK
	Total	0.306	

*. 2) CCL datasheet

DS-7409S(N)

(ANSI: FR-4) Excellent Heat Resistance

Features

- High Tg (above 170°C)
- Excellent thermal performance
- Good moisture resistance
- CAF resistant
- Suitable for lead-free soldering process

Applications

- High layer count boards
- High density multi-layer boards
- Servers, advanced computers, workstations and automotives

General Properties

● Multiple Thermal Excursion Test Result



- Test Condition
 - 20L PCB
 - Thickness 2.3mm
 - 6 Times @288°C/10sec
 - Drill Hole Size 250mic
 - Pitch 39.4mil
- Test Result
 - No Crack
 - No Delamination

● Thermal Shock Test Result after Moisture Treatment

Test Condition (1.0T)	DS-7409S(N)	Standard Tg
PCT 1hr + Solder Dipping 288°C/10sec	○ ○ ○	○ ○ ×
PCT 2hr + Solder Dipping 288°C/10sec	○ ○ ○	○ × ×
PCT 3hr + Solder Dipping 288°C/10sec	○ ○ ○	× × ×

○ : No Abnormality × : Measing or Delamination

Property	Unit	Test Condition	Typical Value	Test Method
Tg	℃	DSC	170	IPC-TM-650.2.4.25c
		TMA	165	IPC-TM-650.2.4.24c
CTE Z-axis	ppm/℃	Ambient to Tg	50	IPC-TM-650.2.4.41
Z-axis Expansion	%	50℃ to 260℃	3.2	IPC-TM-650.2.4.41
Decomposition Temperature (5% wt loss)	℃	TGA	350	IPC-TM-650.2.3.40
T-260	min	TMA	120	IPC-TM-650.2.4.24.1
T-288	min	TMA	10	IPC-TM-650.2.4.24.1
Dielectric Constant (Resin Content 50%)		C-24/23/50 (1GHz)	4.3	IPC-TM-650.2.5.5.9
Dissipation Factor (Resin Content 50%)		C-24/23/50 (1GHz)	0.016	IPC-TM-650.2.5.5.9
Peel Strength (Standard profile 1oz)		Condition A	1.7	IPC-TM-650.2.4.8
Water Absorption		E-24/50+D-24/23	0.15	IPC-TM-650.2.6.2.1

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2. PCB Design

2.1 Board Dimension

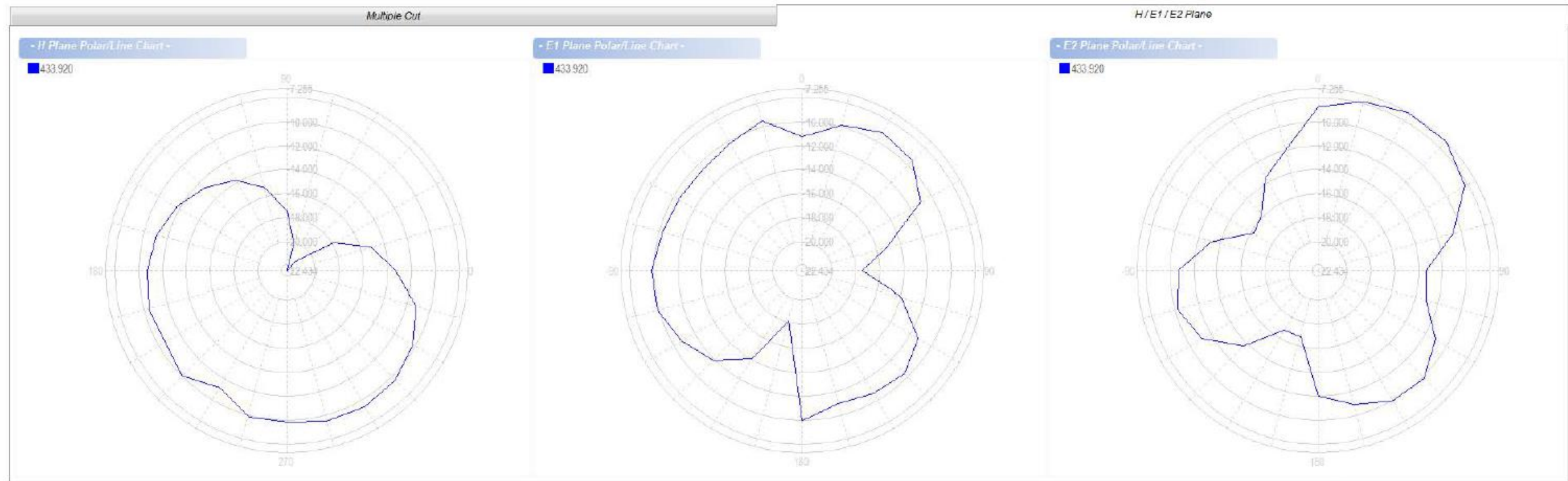
3.1 Measured Antenna Gain

[illegible]

Capture

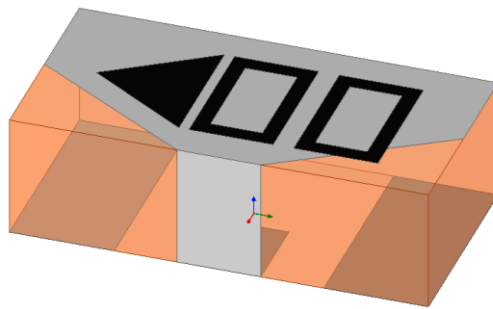
3. Measurement Results

3.2 Measured Radiation Patterns



Document	Datasheet
Type	Chip Antenna
Application	Ultra Wide Band
Part No.	AMAN402012ST02
Revision	3.0

DATASHEET



Application

UWB (Ultra Wide Band, 6200~8250MHz)

Features

- Monopole Structure
- Size (4.0*2.0*1.2mm³)
- Performance Optimizing
with external lumped matching components
- SMT Available under Pb-free Condition
- RoHS Compliant

AMOTECH

Notes

The contents of this datasheet are subject to change without notice. Please confirm the specifications and delivery conditions when placing your order.

Revision History

Rev. No	Date	Title	Contents	Page
0	2018. 09. 10		New Published	
1	2019. 09. 05		Added dimension of bottom pattern	
2	2020. 11. 05		Added dimension of antenna bottom pattern	
			Changed PCB design guide	
3	2021. 07. 26		Changed Frequency range and measured results	

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1. Specifications

1.1 Electrical Specifications

No	Item	Spec.	Remark
1	Frequency Range [MHz]	6200 ~ 8250	
2	VSWR	Max 2.0:1	
3	Polarization	Linear	
4	Impedance [Ω]	Nominal 50	

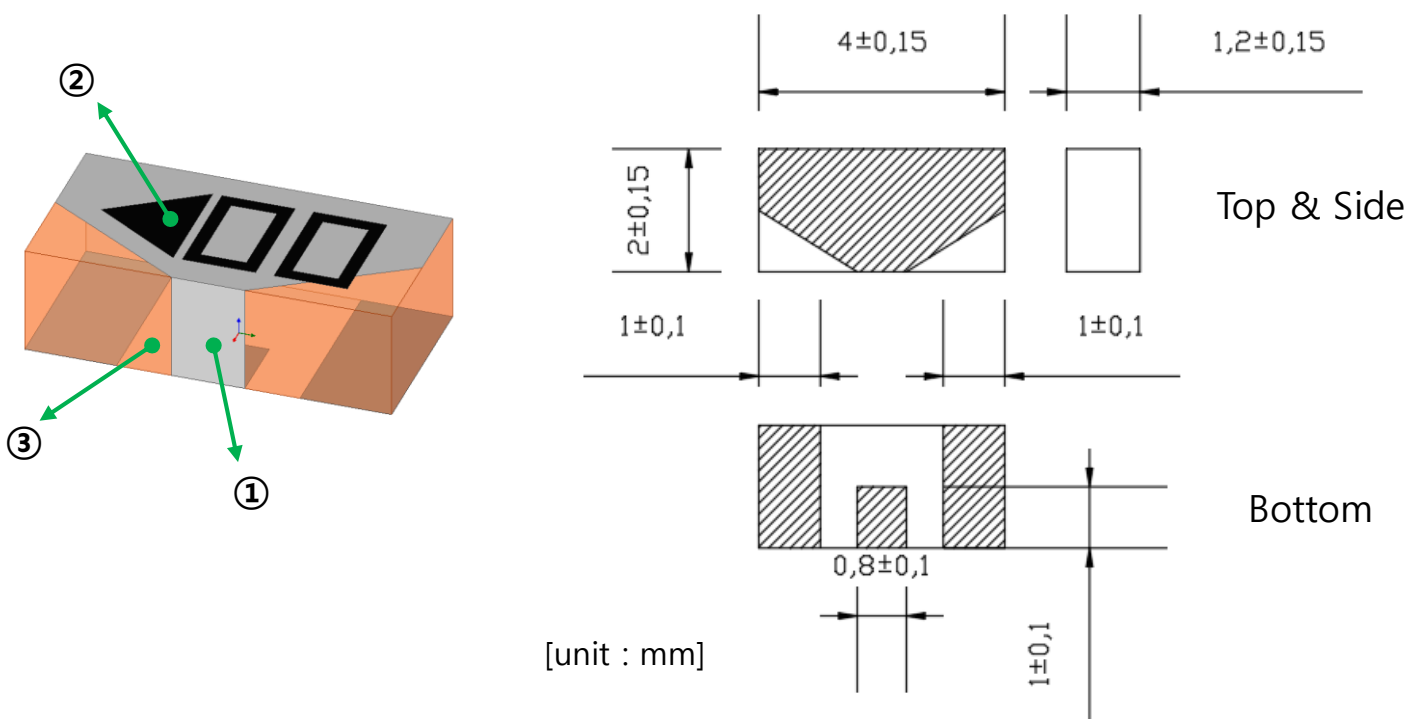
✓ The results are measured on the 30 * 20mm² evaluation board(EVB).

1.2 Mechanical Specifications

No	Item	Spec.	Remark
1	Dimensions (L*W*H)	4.0 * 2.0 * 1.2 mm ³	
2	Unit Weight	typ. 35 mg	
3	Operating Temperature	-40 ~ 125 °C	

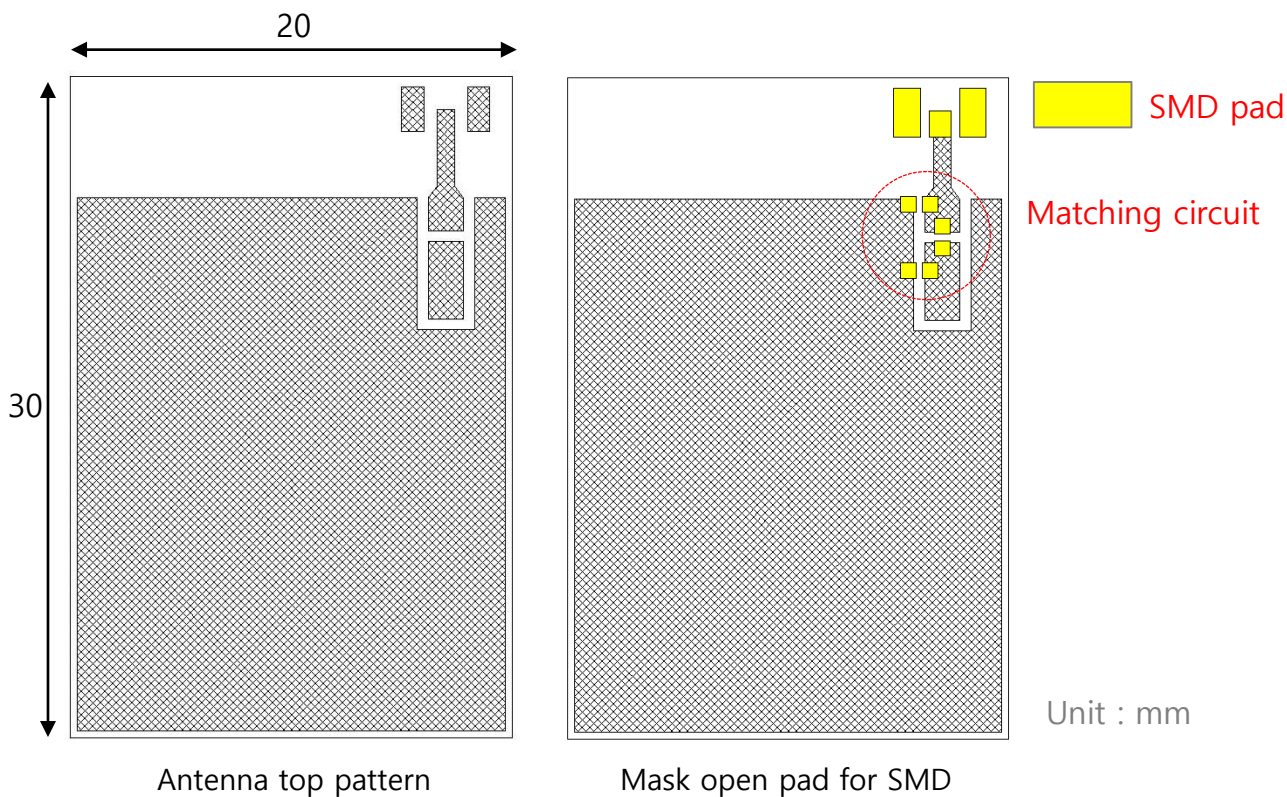
1.3 Appearance & Material

No	Name	Function	Material
1	Electrode	Radiation Element	Ag
2	Marking	Identification Mark	Ink
3	Ceramic Body	-	Ceramic

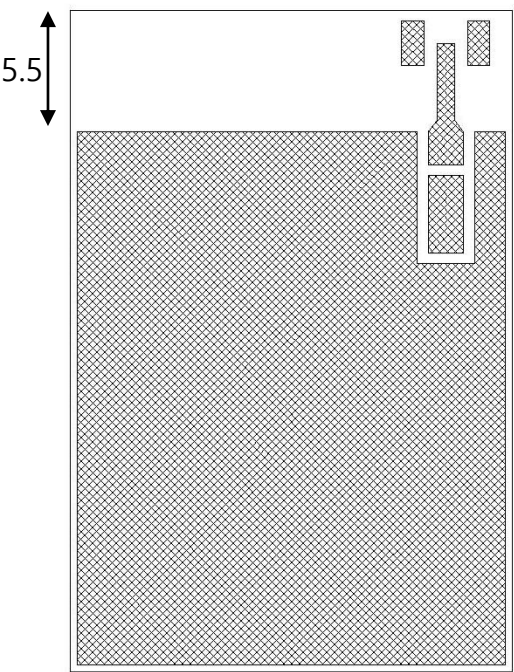


2. PCB Design for Test

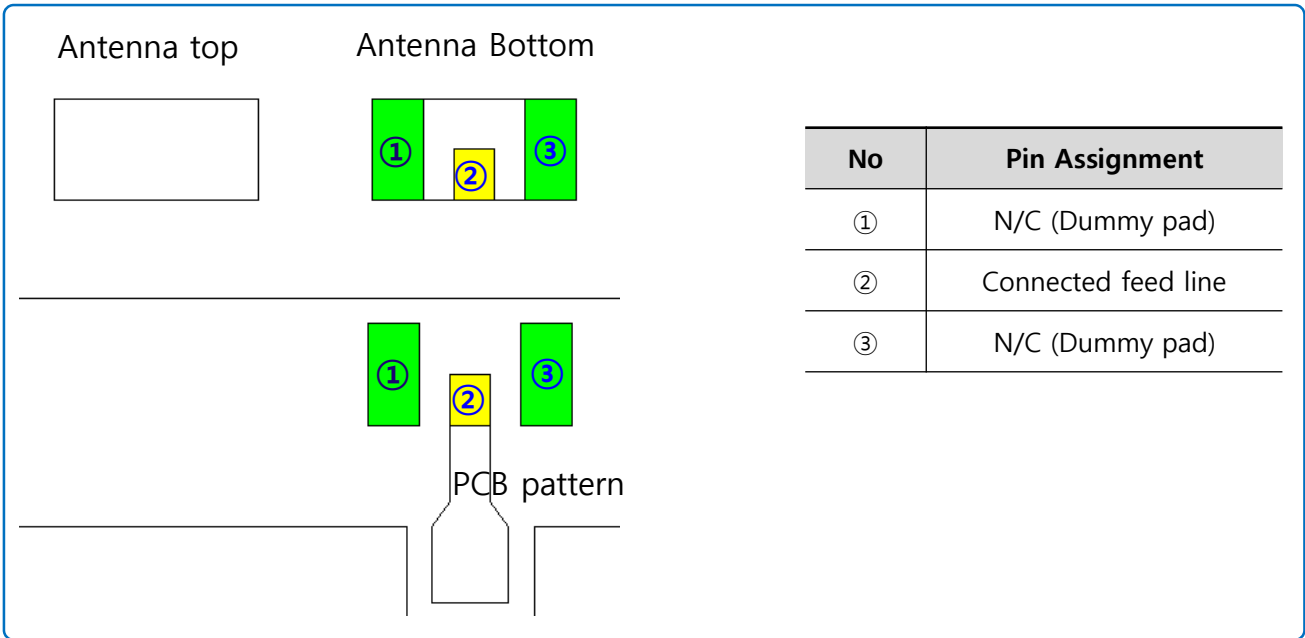
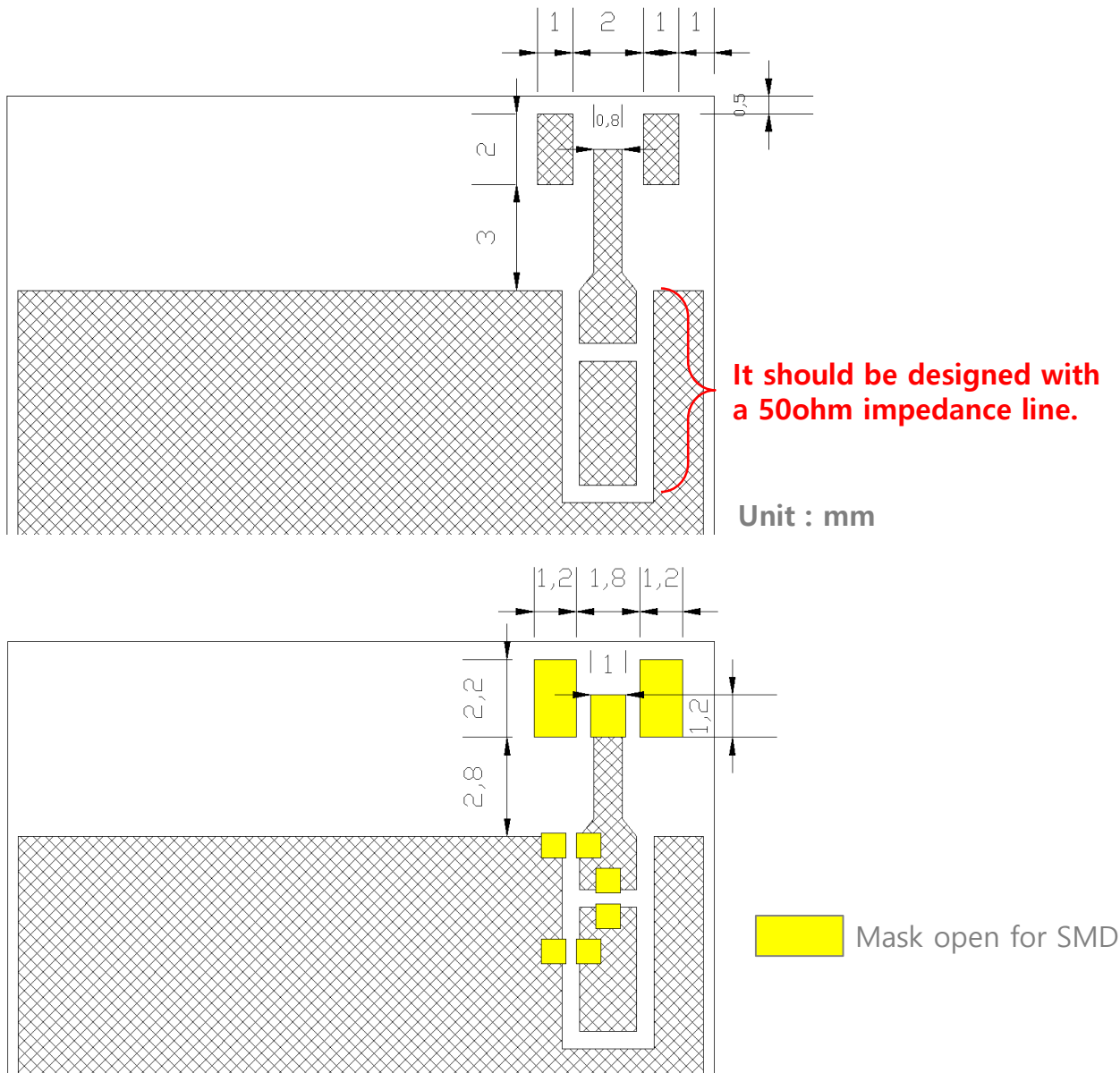
2.1 Evaluation Board Dimension



2.2 GND Fill Cut Area Dimension

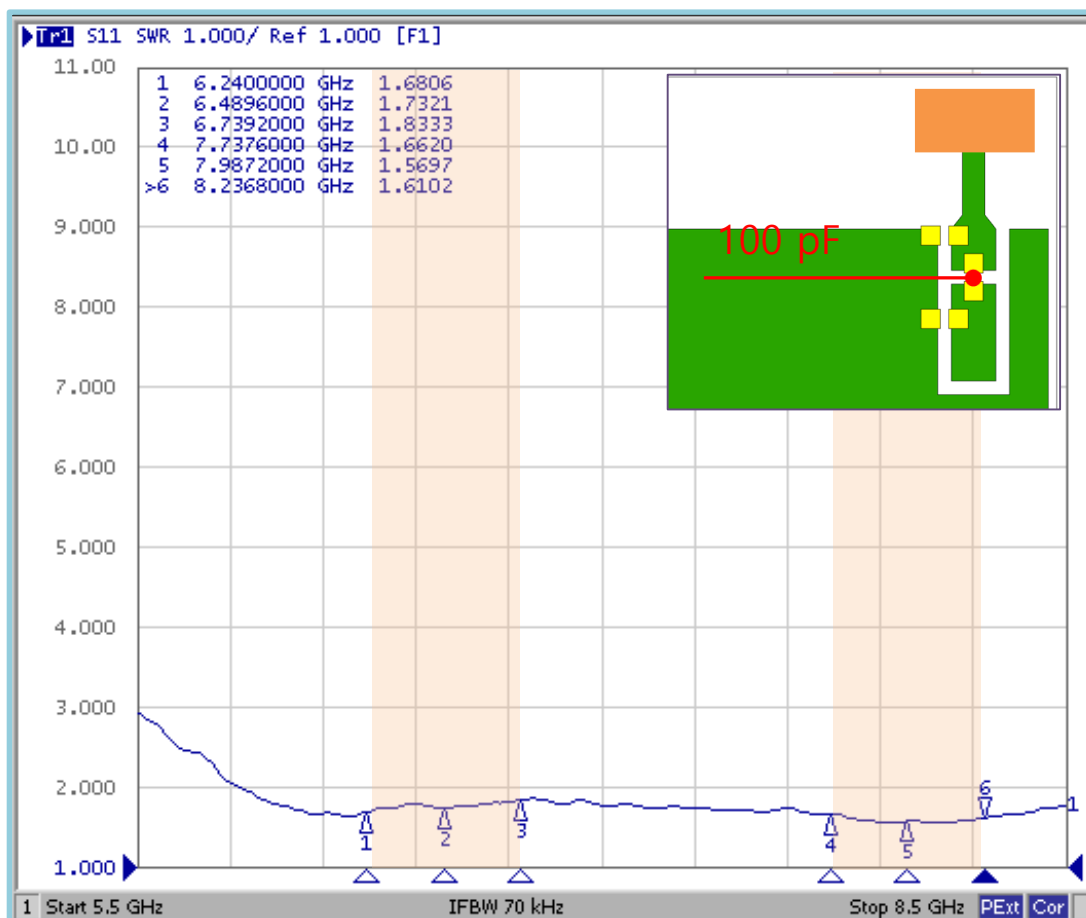


2.3 PCB Design Guide



3. Measurement Result

3.1 Typical Measurement Result (VSWR & Return-loss)



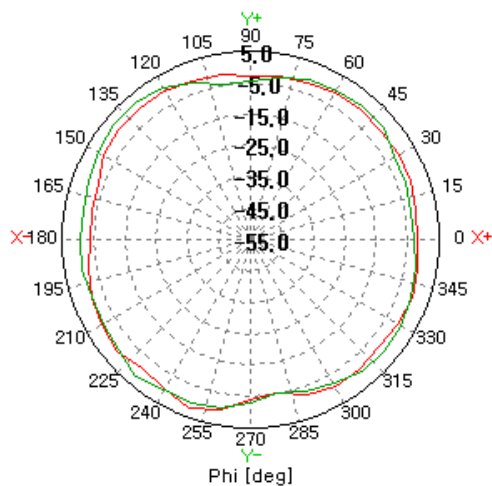
Measured VSWR of AMAN402012ST02 EVB

3.2 Measured Antenna Gain

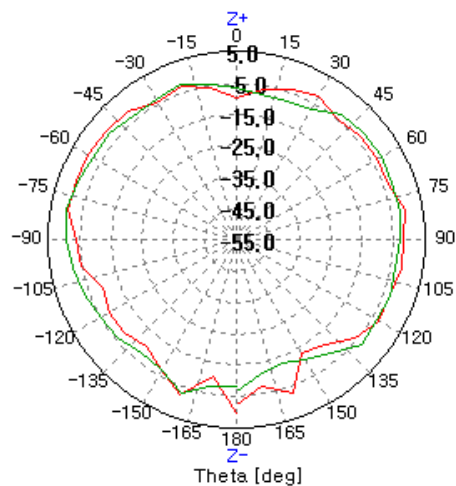
Freq. [MHz]	Peak Gain [dBi]	Avg. Gain [dBi]	Efficiency [%]	Remark
6200	1.48	-3.49	44.8	
6246	2.28	-2.81	52.4	
6490	2.70	-1.96	63.4	CH5
6740	3.57	-1.32	73.8	
7738	3.36	-1.12	77.3	
7987	2.58	-2.21	60.1	CH9
8237	1.80	-3.00	50.0	
8250	1.89	-3.17	48.1	

3.3 Measured Radiation Patterns

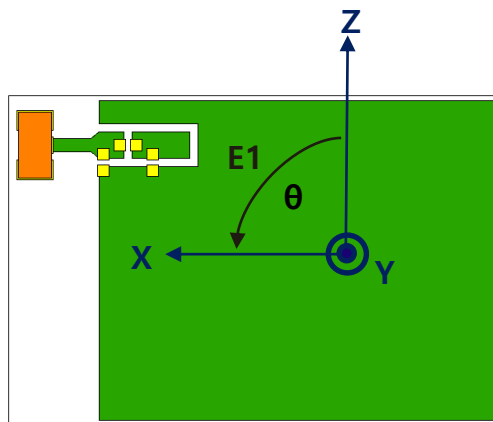
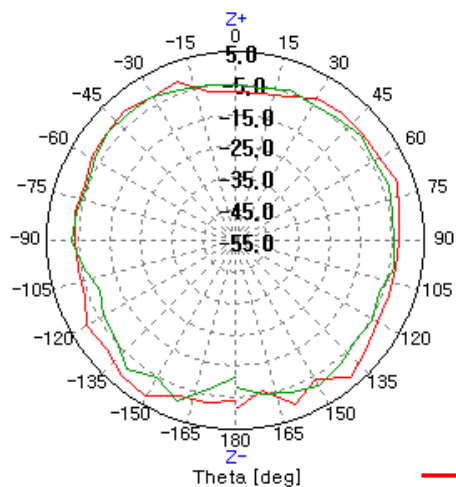
2D H-Cut [$\theta=90$, XY plane]



2D E1-Cut [$\varphi=0$, ZX plane]

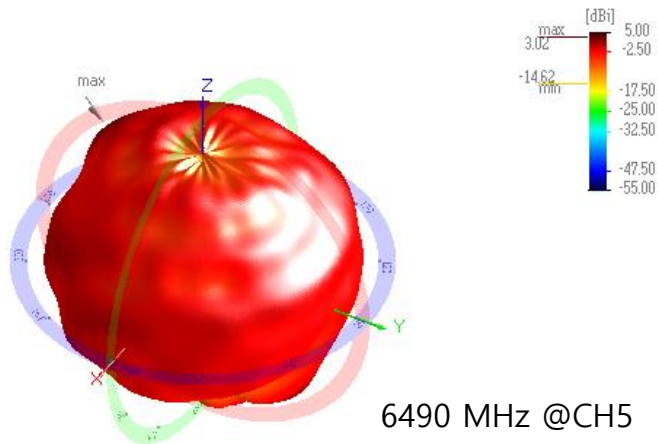


2D E2-Cut [$\varphi=90$, YZ plane]

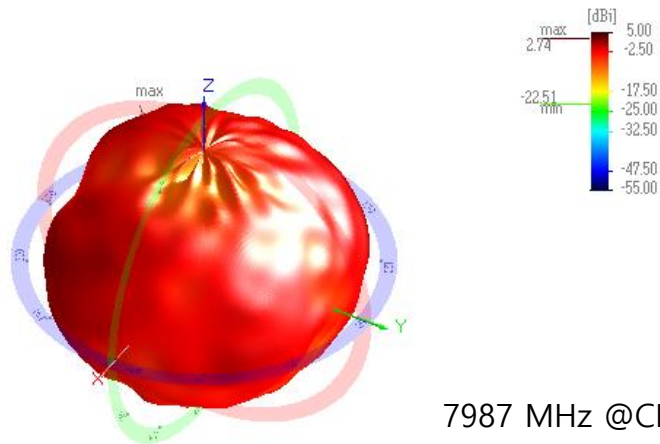


— 6490 MHz — 7987 MHz

3D radiation pattern

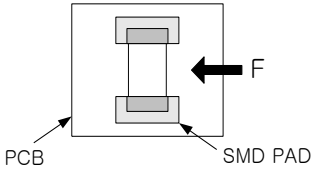


6490 MHz @CH5



7987 MHz @CH9

4. Reliability

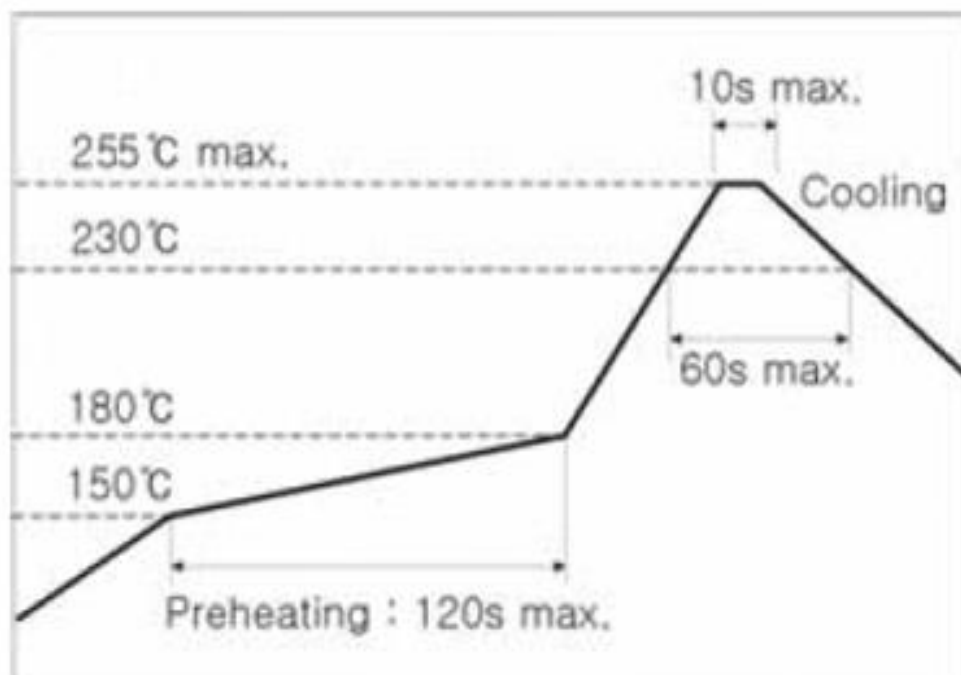
No	Item	Test Condition	Test Requirements
1	Adhesive Strength of Termination	Apply force on SMT chip till detached from PCB.  PCB SMD PAD	1. The chip shouldn't be detached from PCB within force (F) 5 kgf. 2. The force (F) when the chip is detached from PCB is should be greater than 5 kgf.
2	Thermal Shock (Cycle)	1. Step 1 : $-40 \pm 3^{\circ}\text{C}$, 30 min Step 2 : $+85 \pm 3^{\circ}\text{C}$, 30 min 2. Number of cycle : 30	1. No visual damage 2. Within electric specification (VSWR)
3	High Temperature Resistance	1. Temperature : $+85 \pm 5^{\circ}\text{C}$ 2. Time : $96 \pm \text{hrs.}$	1. No visual damage 2. Within electric specification (VSWR)
4	Humidity	1. Humidity : 85 % RH Temperature : $+85 \pm 3^{\circ}\text{C}$ 2. Time : $96 \pm \text{hrs.}$	1. No visual damage 2. Within electric specification (VSWR)
5	Vibration	1. 10-2000Hz, Amp 1.5mm, 5g 2. Time : 20 minutes, 3. 12 cycles each of 3 orientations	1. No visual damage 2. Within electric specification (VSWR)

✓ Condition of reliability would be changed by customer's request.

5. Cautions (Recommendations)

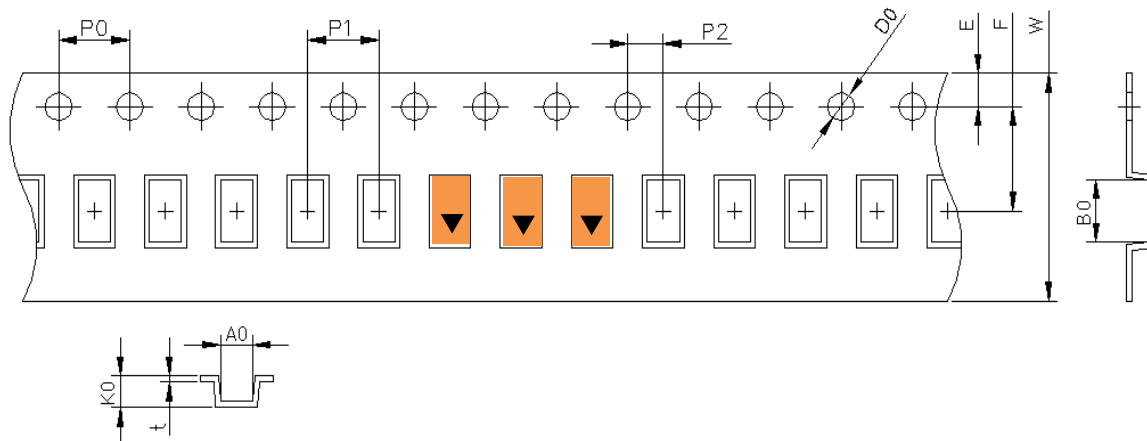
- ✓ Storage environment of parts must be at ambient temperatures of 5 to 40°C and maximum 60%RH humidity
- ✓ The parts should be used within 6 months from the time of delivery. If stored for over 6 months, check for solder ability before use.

6. Soldering Reflow Profile



7. Packaging

7.1 Carrier Tape Dimension



Item	Spec.	Item	Spec.	Item	Spec.
A0	2.20 ±0.10	P0	4.00 ±0.10	E	1.75 ±0.10
B0	4.30 ±0.10	P1	4.00 ±0.10	F	7.50 ±0.10
K0	1.60 ±0.10	P2	2.00 ±0.10	W	12.00 ±0.30
D0	1.55 ±0.05	-	-	t	0.30 ±0.05

7.2 Packaging Quantity

Item	Quantity	Dimension
Reel	2,000ea	Φ7" * 16mm
Inner Box	6,000 ea (3 reel)	183 * 70 * 185 (mm ³)
Outer Box1	30,000 ea (5 Inner Box)	375 * 200 * 205 (mm ³)
Outer Box2	60,000 ea (10 Inner Box)	390 * 375 * 205 (mm ³)

7.3 Packaging Label

AMOTECH Co., Ltd.

5BL-1Lot, 617, Namchon-Dong, Namdong-Gu, Incheon, Korea

Dielectric Chip Antenna

P/N : AMAN402012ST02

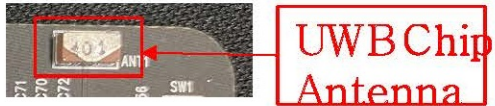
Lot No :

Quantity : 2,000 pcs Date : 2018/07/11

UWB Antenna

1. UWB Chip Antenna

- Ultra Wide Band, 6200~8250MHz
- Monopole Structure
- Size (4.0*2.0*1.2mm³)



UWB Antenna

2. UWB antenna radiation diagram

Frequency Range	Antenna Gain
below 1.6 GHz	-20.66 dBi
1.6 GHz ~2.7 GHz	-12.46 dBi
2.7 GHz~3.735 GHz	-7.16 dBi
3.735 GHz~4.8 GHz	-1.72 dBi
4.8 Ghz~6.0 GHz	-0.24 dBi
6.0 Ghz~8.0 GHz	2.45 dBi
8.0 GHz~10.2 GHz	4.02 dBi
above 10.2 GHz	1.33 dBi

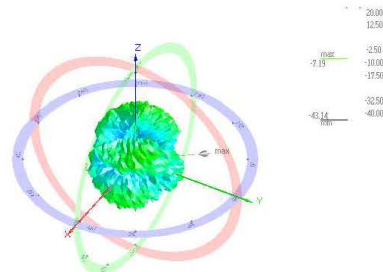
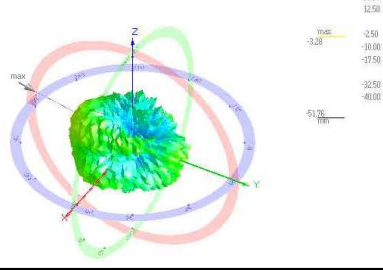
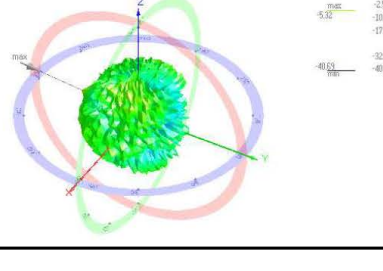
UWB Antenna

No.	Freq.[GHz]	Eff.[%]	Avg.[dBi]	Peak[dBi]	
1	0.8	0.04	-33.87	-26.39	0.800GHz
2	1.6	0.21	-26.71	-20.66	1.600GHz
3	2.15	1.33	-18.76	-12.46	2.150GHz

UWB Antenna

No.	Freq.[GHz]	Eff.[%]	Avg.[dBi]	Peak[dBi]	
4	2.7	0.41	-23.92	-15.21	2.700GHz
5	3.22	1.98	-17.03	-10.81	3.220GHz
6	3.735	4.15	-13.82	-7.16	3.735GHz

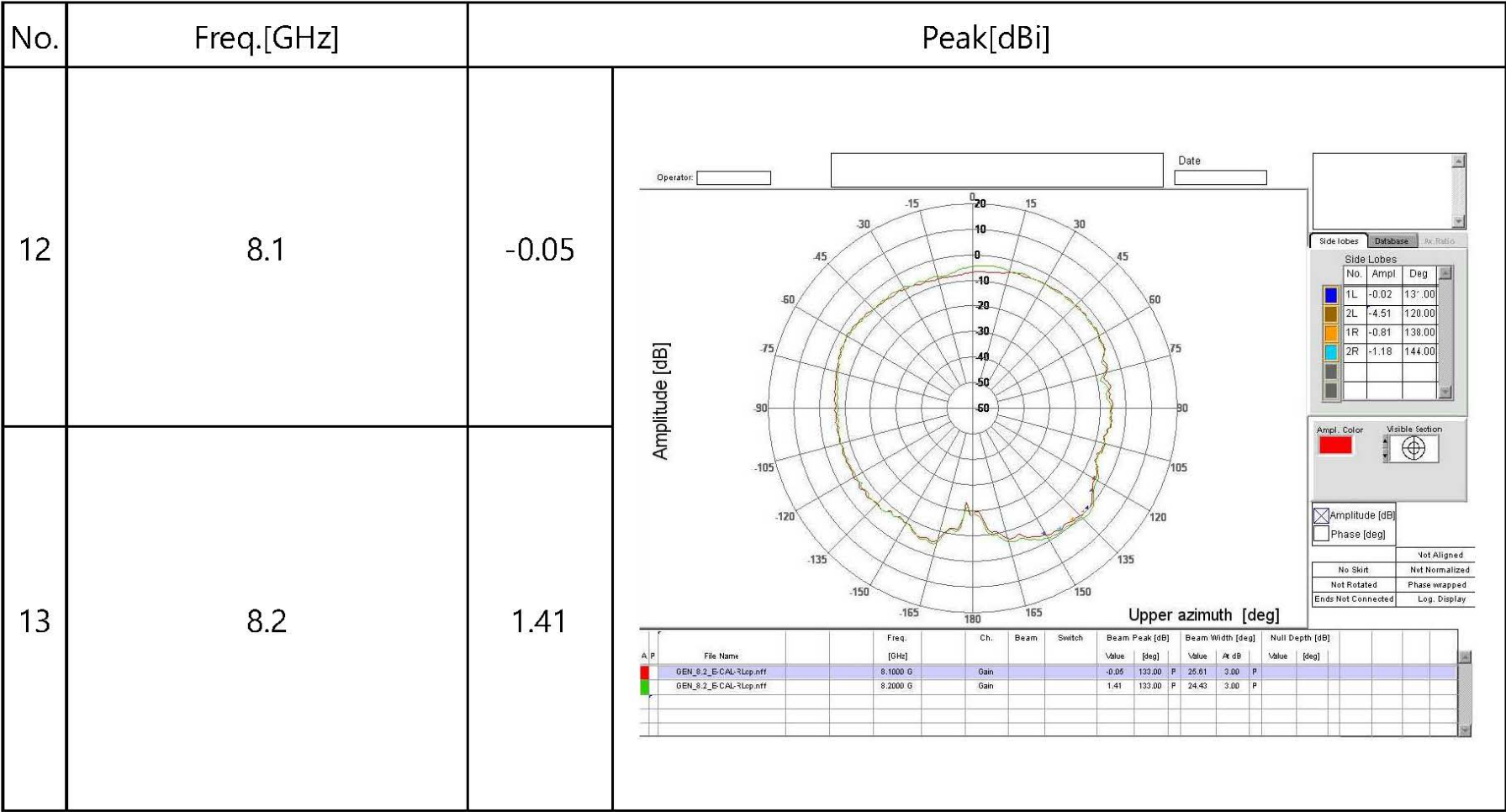
UWB Antenna

No.	Freq.[GHz]	Eff.[%]	Avg.[dBi]	Peak[dBi]	
7	4.27	7.11	-11.48	-6.22	4.270GHz 
8	4.8	12.07	-9.18	-1.72	4.800GHz 
9	5.4	11.41	-9.43	-2.66	5.400GHz 

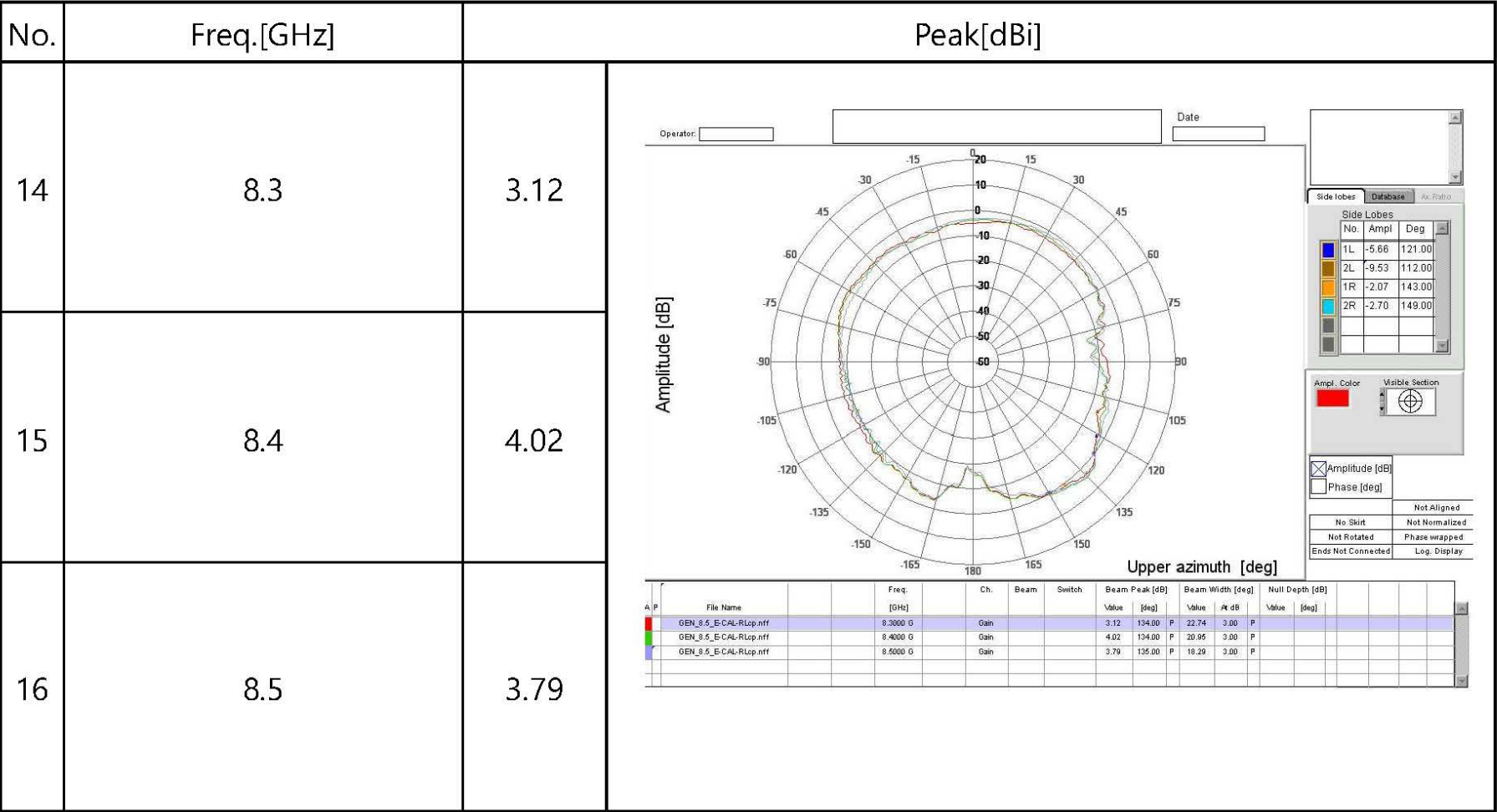
UWB Antenna

No.	Freq.[GHz]	Eff.[%]	Avg.[dBi]	Peak[dBi]	
10	6	19.29	-7.15	-0.24	6.000GHz
11	6.5	29.15	-5.35	2.45	6.500GHz

UWB Antenna



UWB Antenna



UWB Antenna

