GNSS (GPS/GLONASS/BEIDOU/Galileo) + SDARS Stacked Ceramic Patch Antenna



APAKM4012-C2G3D

40.0 x 40.0 x 12.2 mm
RoHS/RoHS II Compliant
MSL = N/A: Not Applicable

Features

- Stacked ceramic patch antenna
- Multiband GNSS GPS/GLONASS/Beidou/Galileo + SDARS
- RHCP polarization for GNSS
- LHCP polarization for SDARS

Applications

- GPS/GLONASS/Galileo/Beidou/SDAR applications
- IoT
- Satellite radio
- Remote technology monitoring
- Surveying and mapping systems
- Logistics

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Electrical Specifications

Parameters	GNSS			SDARS			Units	Notes
	Min.	Typ.	Max.	Min.	Typ.	Max.		
Operating Frequency		1561			2320		MHz	
		1575			2332			
		1589			2345			
		1602						
Return Loss	-20	1561 MHz		-15	2320 MHz		dB	
	-6	1575 MHz			2332 MHz			
	-6	1589 MHz			2345 MHz			
	-30	1602 MHz						
Gain		2.7			4.0		dBi	20° ≤ φ ≤ 0°
		2.3			3.9			40° ≤ φ ≤ 20°
		1.8			3.5			60° ≤ φ ≤ 40°
		0.6			2.4			65° ≤ φ ≤ 60°
		-0.3			2.0			70° ≤ φ ≤ 65°
Polarization		RHCP			LHCP			

*Above mentioned values are for the ground plane size of 50 x 50 mm

Environmental Specifications

Parameters	Description
Operating Temperature	-40 °C to +85 °C
Storage Temperature	-40 °C to +105 °C
Frequency Temperature Coefficient	20ppm/deg. °C
Humidity	90 % ~ 95 % R.H.

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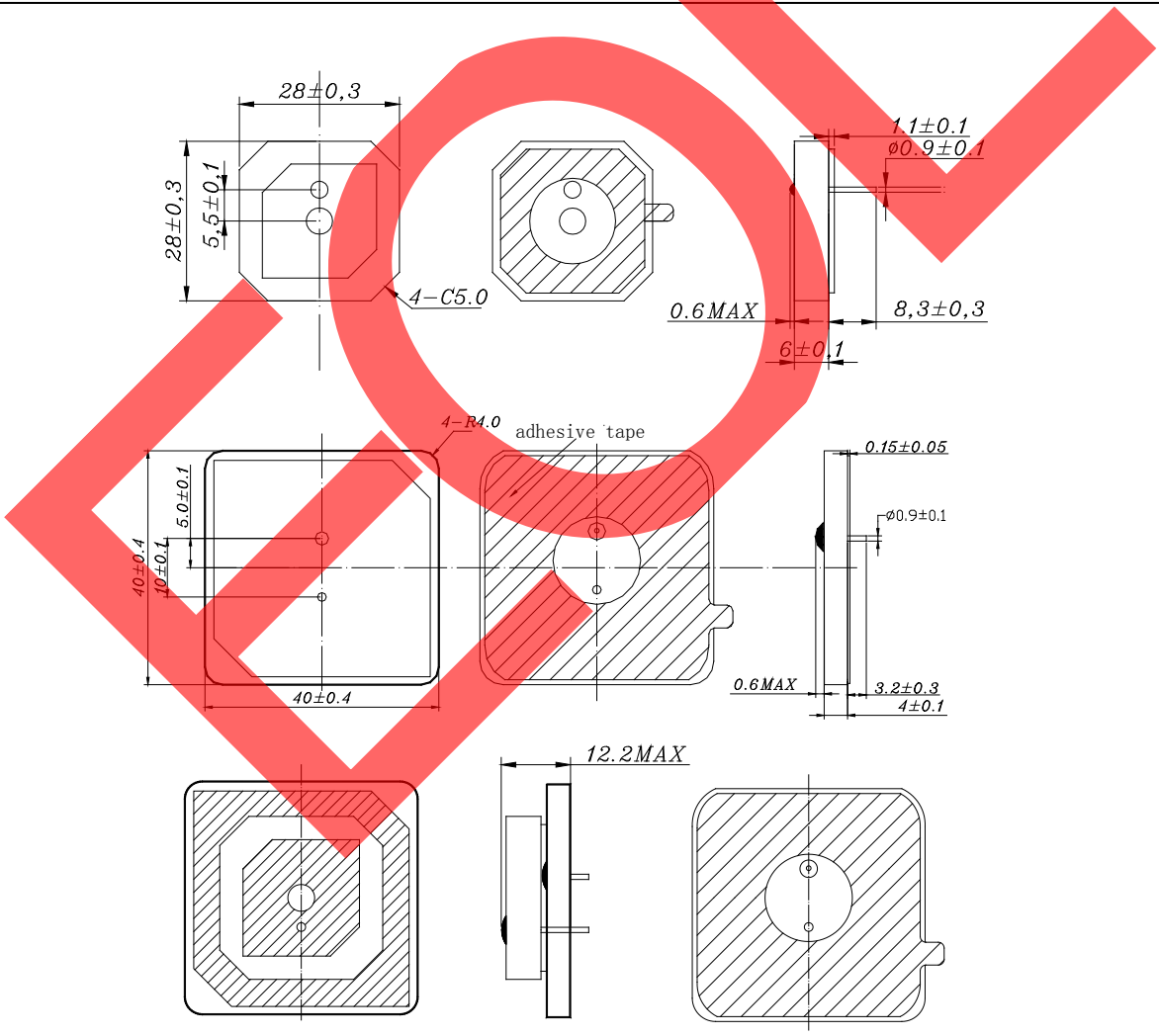
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Product Image



Product Dimensions



(Unit : mm)

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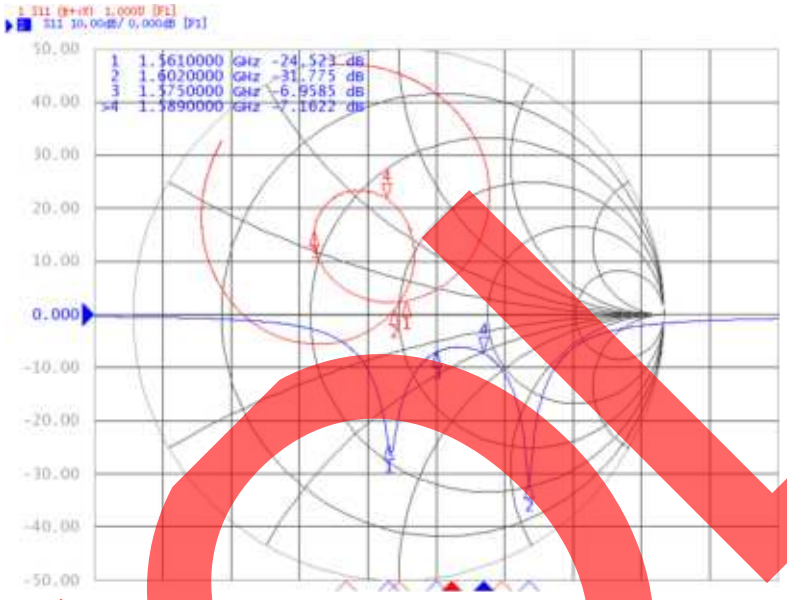
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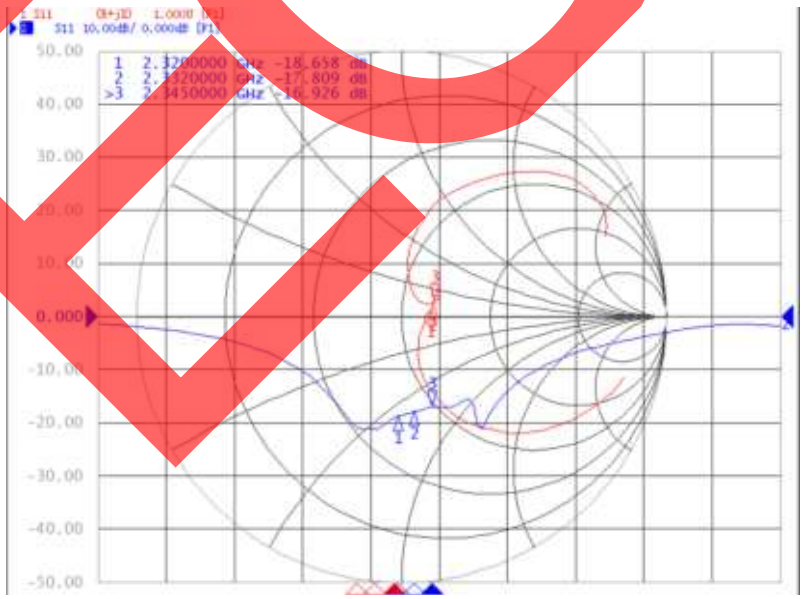


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Return Loss and Impedance Characteristics





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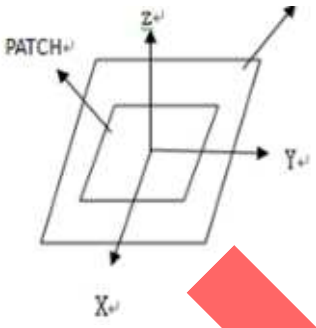
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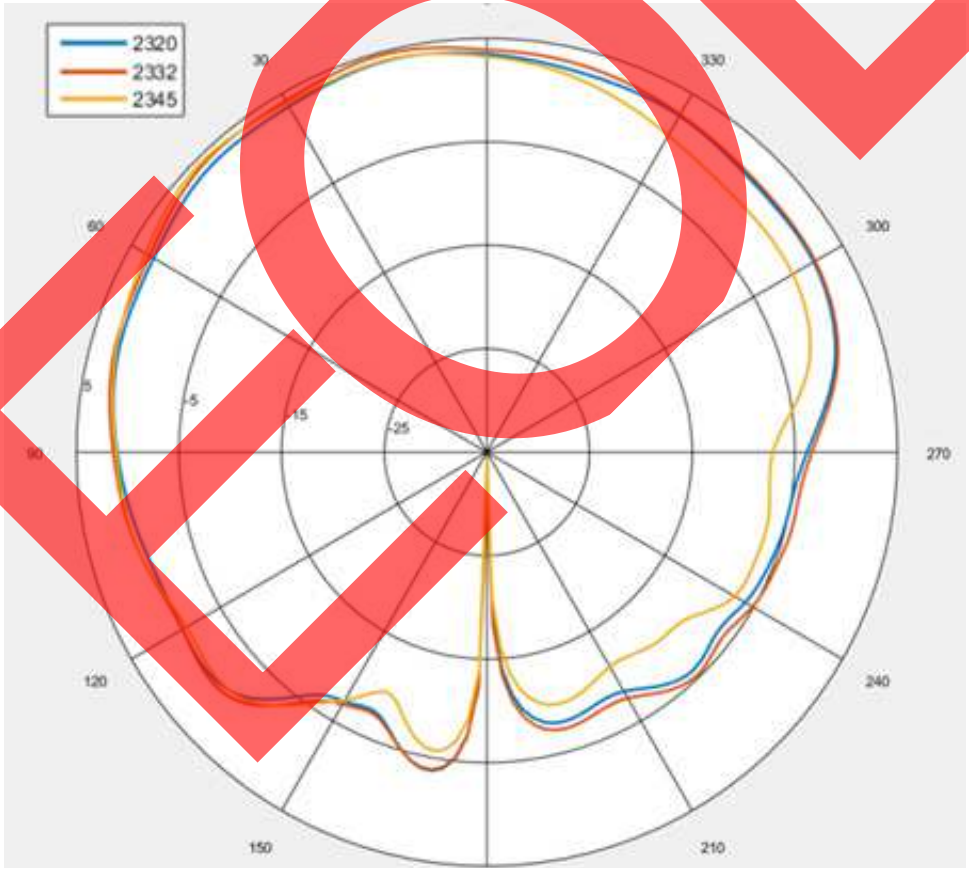
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Radiation Pattern - Gain



XZ – Plane



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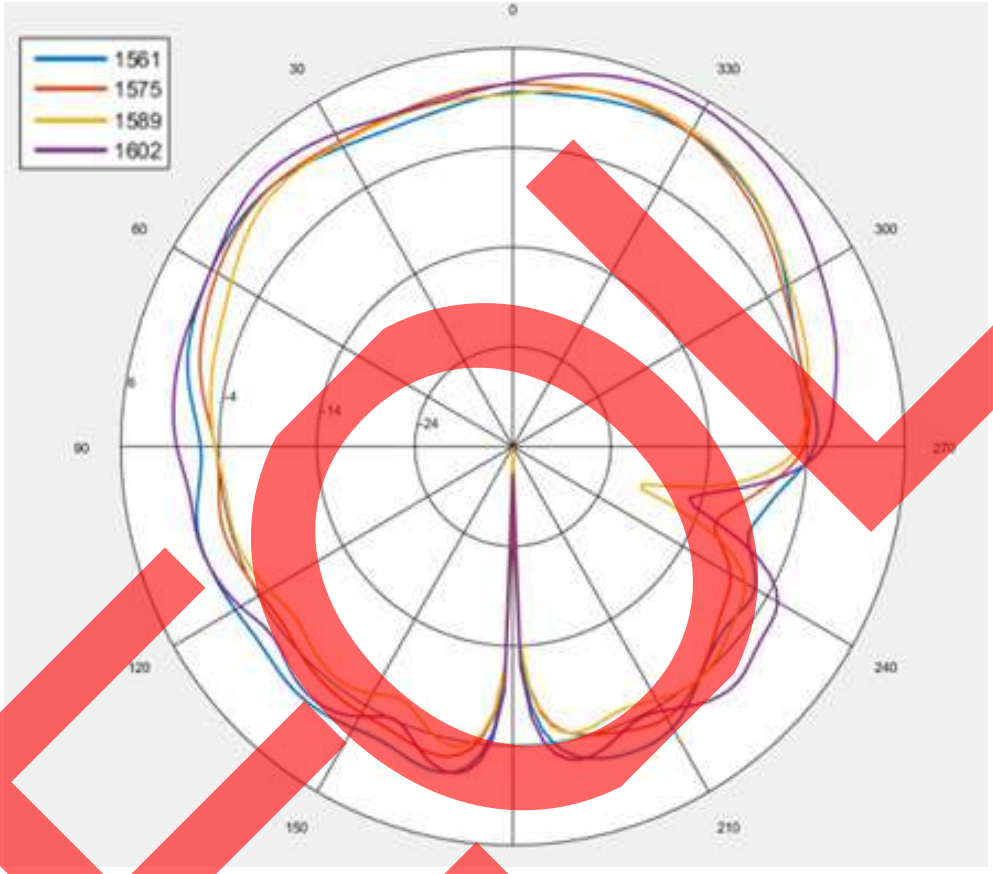


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YZ – Plane



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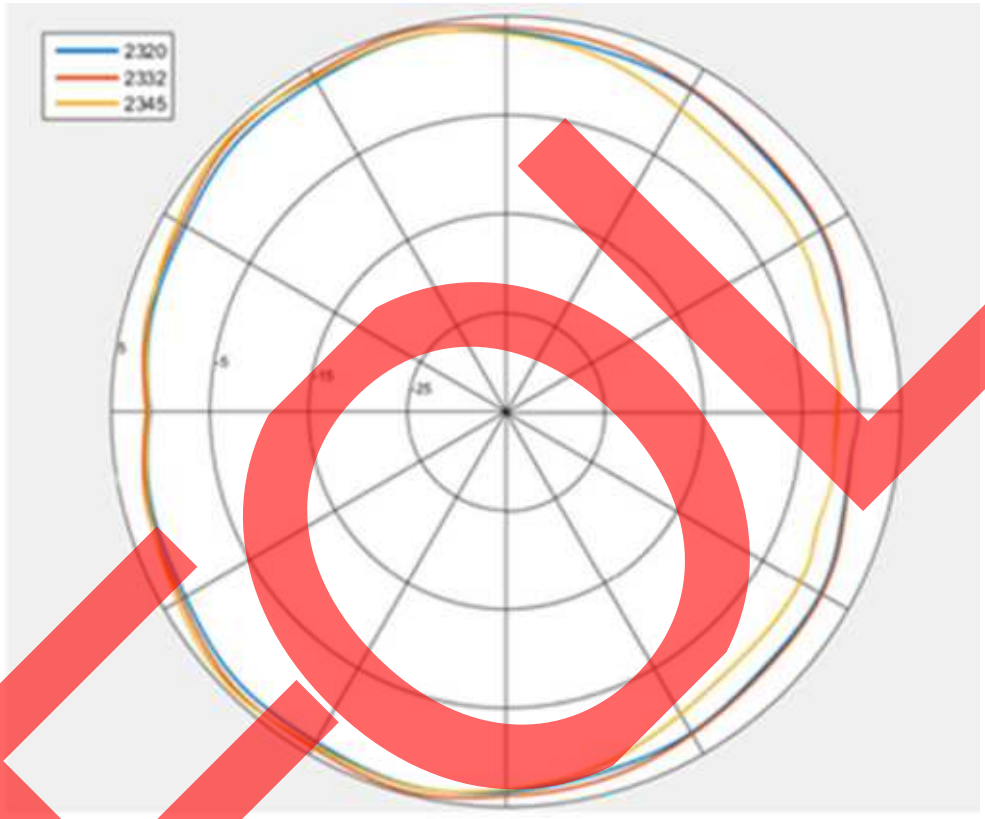


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XY – Plane



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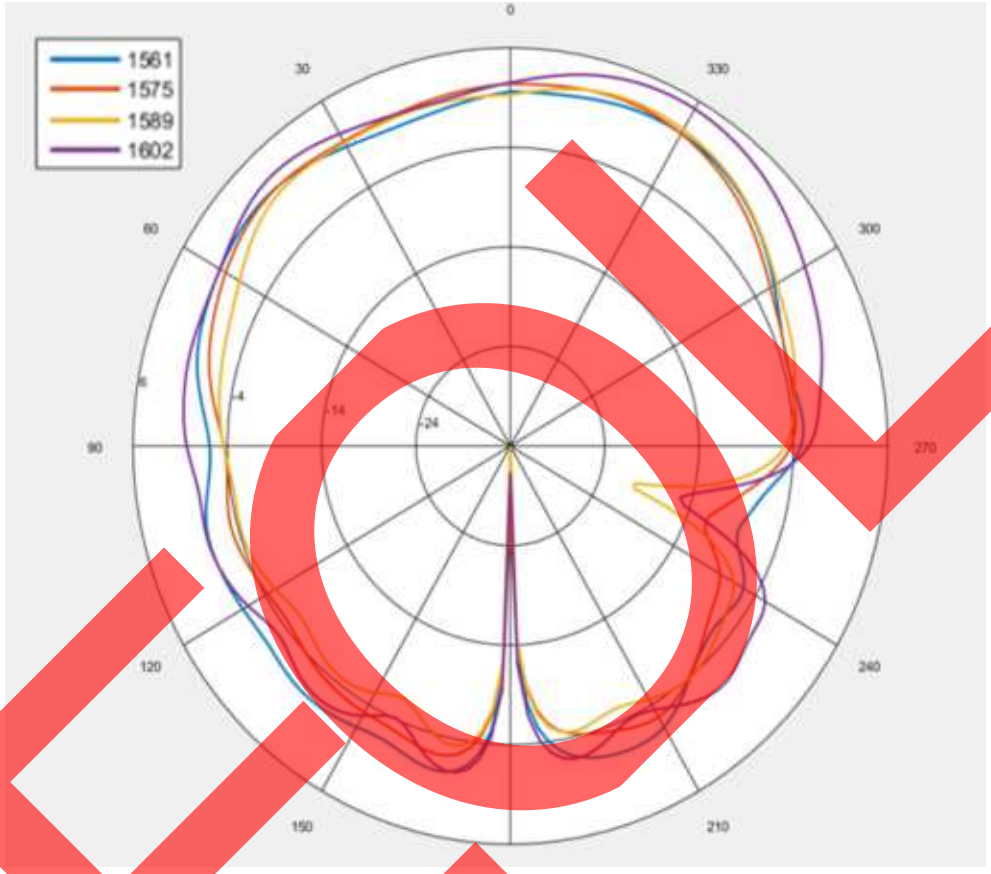


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Radiation Pattern - GNSS

XZ – Plane



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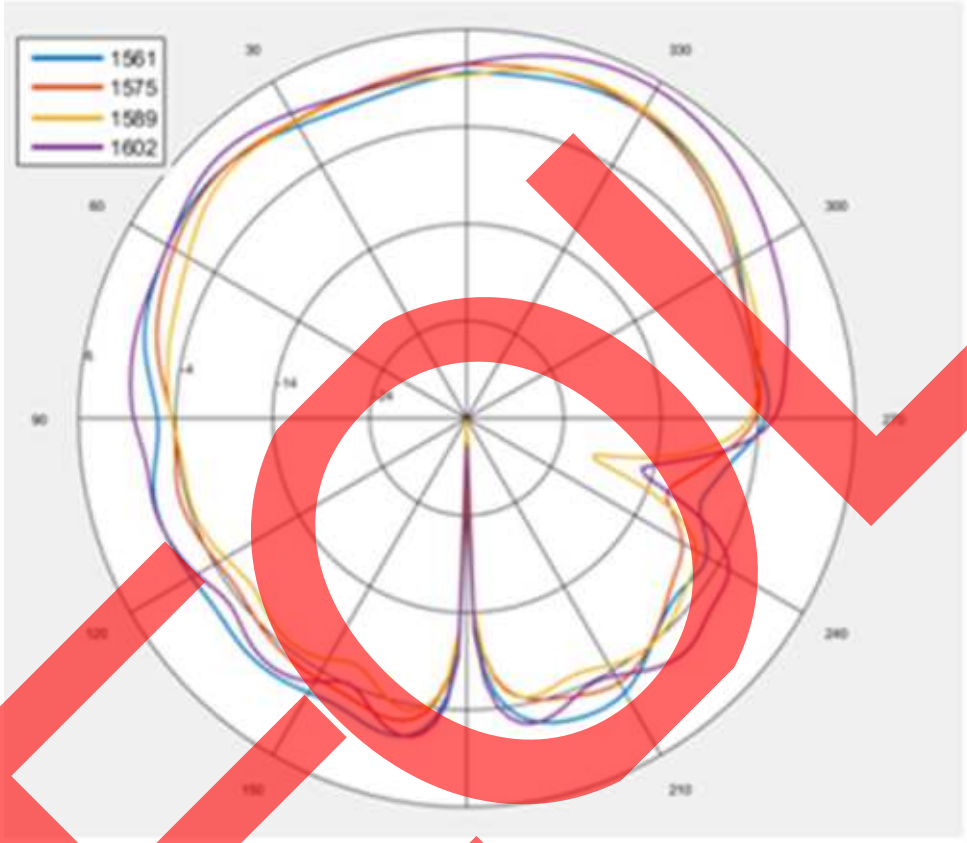


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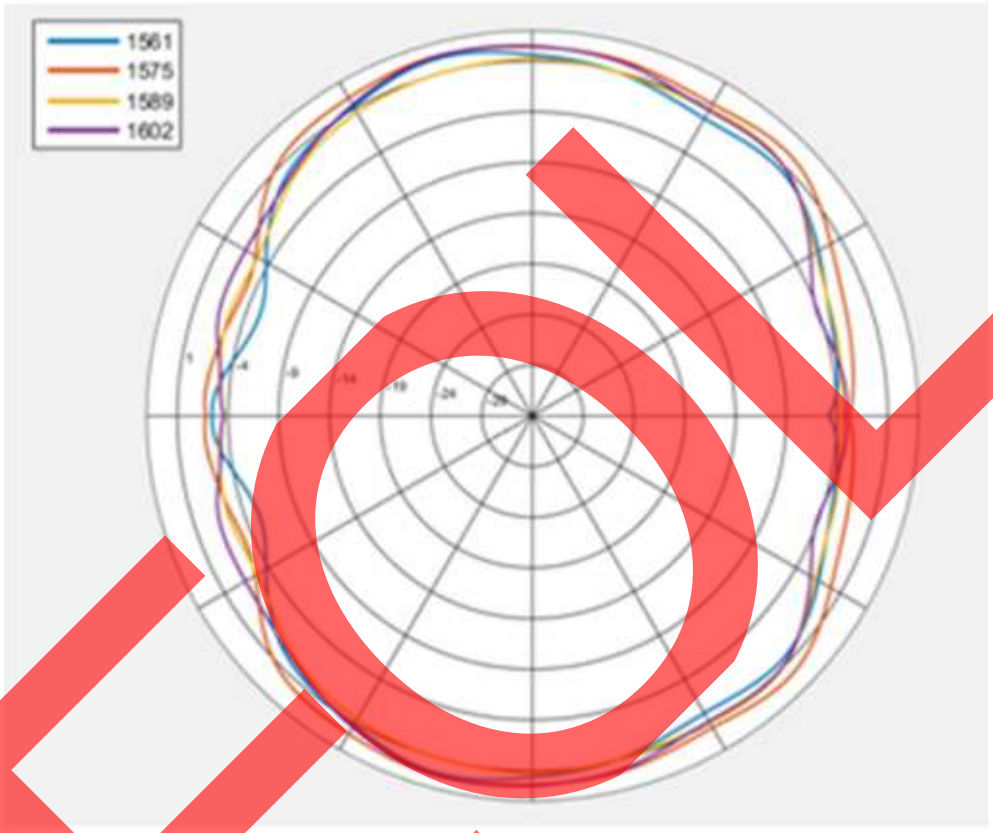


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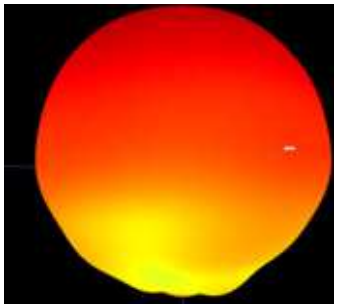


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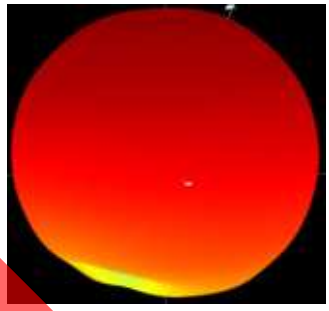
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Radiation Pattern - 3D Patterns

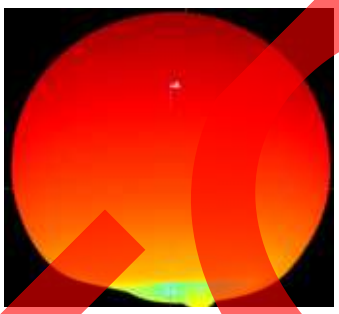
1561 MHz



1575 MHz



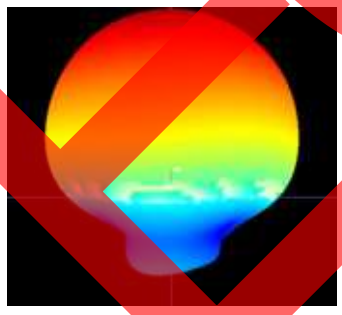
1589 MHz



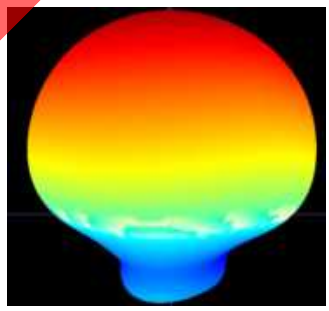
1602 MHz



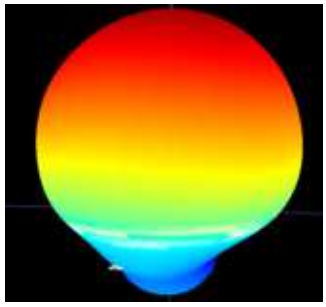
2320 MHz



2332 MHz



2345 MHz



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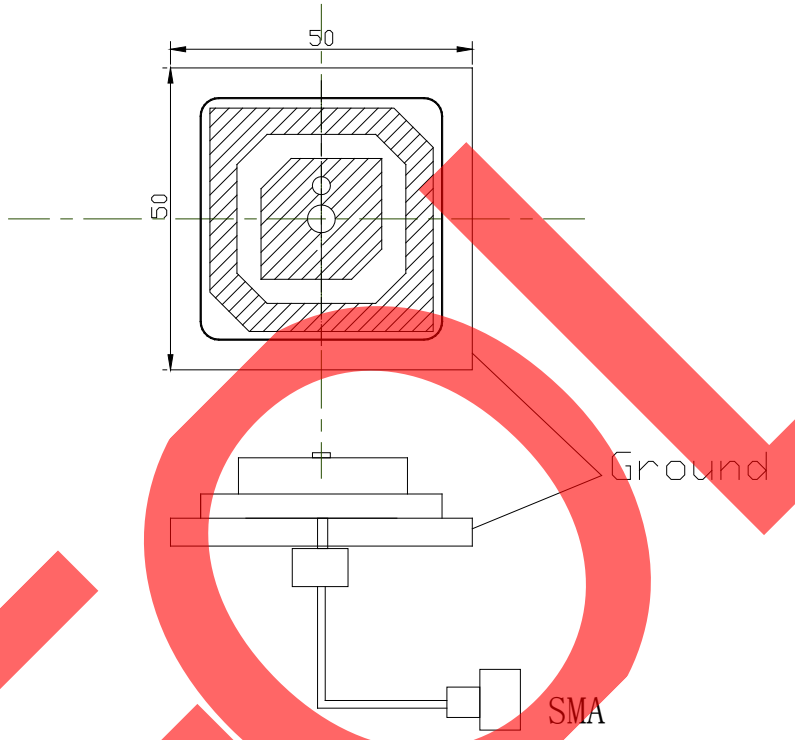
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Test Jig



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Reliability Test

Item	Test Condition	Remark
Humidity Test	The device is subjected to 90% to 95% relative humidity 60°C ± 3°C for 96 h to 98 h, then dry out at 25 °C ± 5°C and less than 65% relative humidity for 2 h to 4 h. After drying out, the device shall satisfy the specification in Table.1.	It shall fulfill the specifications in Table.1.
High Temperature Exposure	The device shall satisfy the specification in Table.1. after leaving at 105°C for 96 h to 98 h, provided it would be measured after 2 h to 4 h leaving in 25°C ± 5°C and less than 65% relative humidity.	It shall fulfill the specifications in Table.1.
Low Temperature Exposure	The device shall satisfy the specification in Table.1. after leaving at -40°C for 96 h to 98 h, provided it would be measured after 2 h to 4 h leaving in 25°C ± 5°C and less than 65% relative humidity.	It shall fulfill the specifications in Table.1.
Temperature Cycle	Subject the device to -40°C for 30 min followed by a high temperature of 105°C for 30 min cycling shall be repeated 5 times. At the room temperature for 1 h prior to the measurement.	It shall fulfill the specifications in Table.1.
Vibration	Subject the device to vibration for 2 h each in x, y and z axis with the amplitude of 1.5 mm, the frequency shall be varied uniformly between the limits of 10 Hz to 55 Hz.	It shall fulfill the specifications in Table.1.
Soldering Test	Lead terminals are heated up to 350°C ± 10°C for 5 ± 0.5 s with brand iron and then element shall be measured after being placed in natural conditions for 1 h. No visible damage and it shall fulfill the specifications in Table.1.	It shall fulfill the specifications in Table.1.
Solder ability	Lead terminals are immersed in soldering bath of 260°C to 290°C for 3 ± 0.5 s . More than 95% of the terminal surface of the device shall be covered with fresh solder.	The terminals shall be at least 95% covered by solder.
Terminal Pressure Strength	A force of 2 kg is applied to each lead in axial direction for 10 ± 1 s (see drawing). No visible damage and it shall fulfill the specifications in Fig.1.	Mechanical damage such as breaks shall not occur.

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Fig. 1

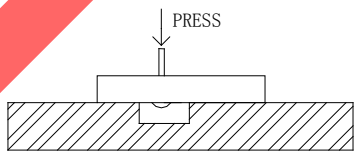


Table 1

Item	Specification After Test (MHz)
Center Frequency change	±2.0



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Packaging

A package has 80 antenna elements.

Package Type	Quantity
1 Package base	10 Antennas
1 Vacuum bag	2 Package bases
1 Inner box	1 Vacuum bag
1 Package	4 Inner boxes

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