

Multiband GNSS Ceramic Patch Antenna



APAGM3606-SG3



36.0 x 36.0 x 6.0 mm
RoHS/RoHS II Compliant
MSL = Not Applicable

Features

- Multiband GNSS patch with GPS/GLONASS/BeiDou/Galileo
- Low VSWR of 1.5
- RHCP polarization
- Gain of 4.0 dBi
- Maximum efficiency of 94.6%
- Adhesive mounting

Applications

- GPS/GLONASS/BeiDou/Galileo applications
- IoT
- M2M
- Remote technology monitoring
- Geofencing
- Navigation
- Surveying and mapping systems
- Logistics
- Automotive

Electrical Specifications

Parameters	Min.	Typ.	Max.	Units	Note
Frequency Range		BeiDou: 1561 ± 2 GPS: 1575 ± 2 GLONASS: 1602 ± 5		MHz	Post Environmental Tolerance : ± 2.5 MHz
Center Frequency		1578		MHz	Post Environmental Tolerance : ± 3.0 MHz
Bandwidth	20			MHz	Return loss ≤ -10dB
VSWR			1.5		@ CF
Polarization	RHCP				Right Hand Circular Polarization
Impedance		50		Ω	
Gain		4		dBi	Zenith
Axial Ratio			5	dB	
Frequency Temperature Coefficient		0±10		ppm/°C	

Environmental Characteristics

Parameters	Description
Operating temperature range	-40°C to +85°C
Storage temperature range	-40°C to +110°C
Relative Humidity range	55 ~ 75 % RH
Temperature range	25 ± 3°C

Structure and Material

Description	Material
Antenna Substrate	Dielectric Ceramics
Pin	Copper and tinplated
Electrode	Ag Plated
Ground Base	Ag Plated
Adhesive Type	NITTO 5000NS

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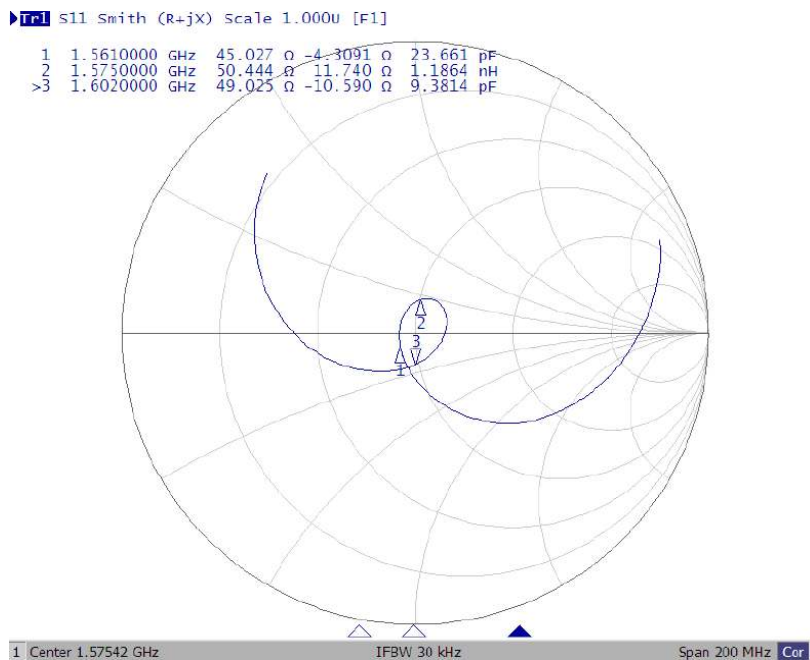


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Return Loss Characteristics



Smith Chart



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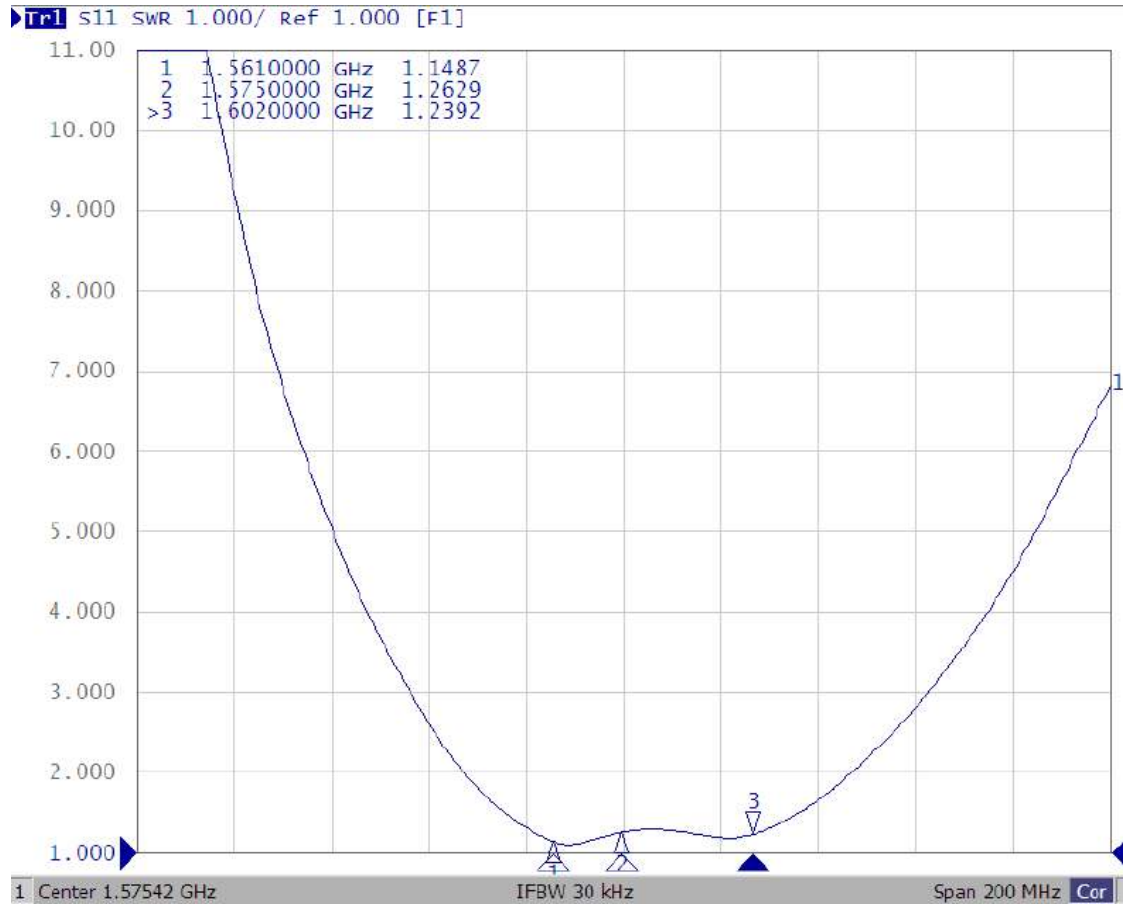


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VSWR



Frequency	Return Loss	Impedance	VSWR
1561 MHz	-23.2dB	45-j4.3Ω	1.15
1575 MHz	-18.7dB	50+j11.7Ω	1.26
1602 MHz	-19.4dB	49-j10.6Ω	1.24

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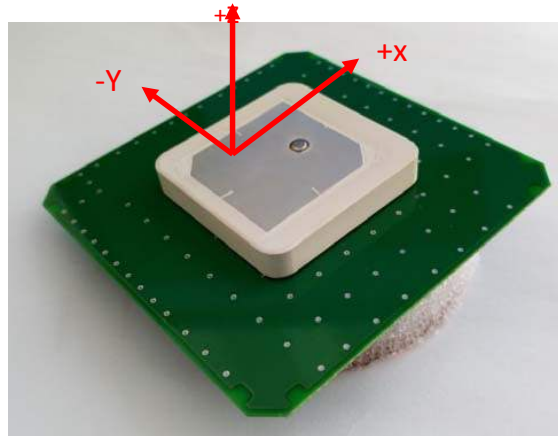


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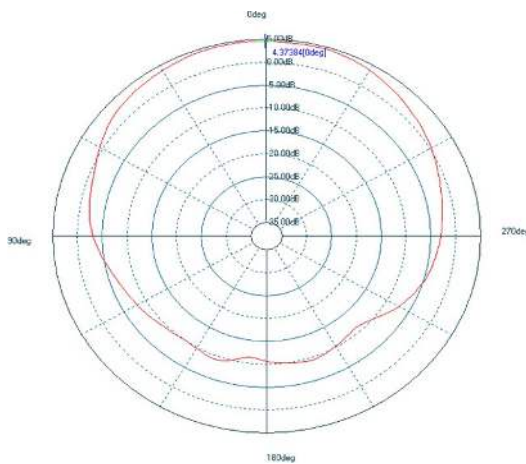
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Radiation Pattern:

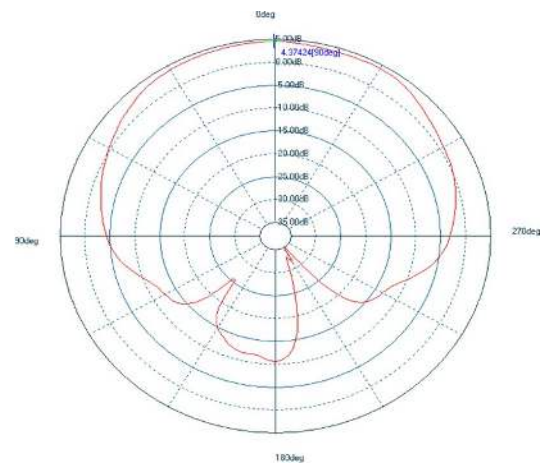


Gain Pattern – 1561 MHz

XZ Plane (Phi = 0 °)



YZ Plane (Phi = 90 °)



1561 MHz (RHCP)	Peak Gain (dBic)	Zenith Gain (dBic)
XZ	4.44	4.37
YZ	4.39	4.37

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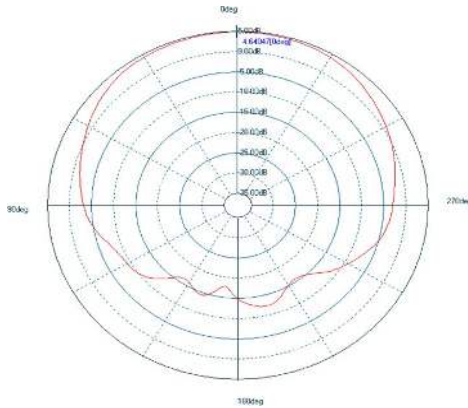
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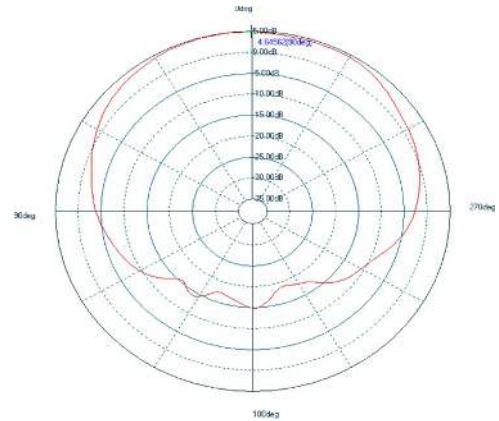
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Gain Pattern – 1575.42 MHz

XZ Plane (Phi = 0 °)



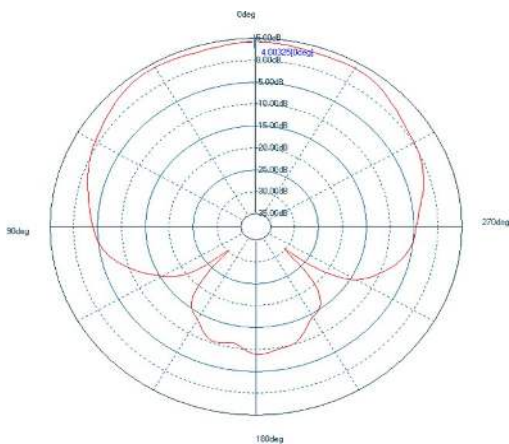
YZ Plane (Phi = 90 °)



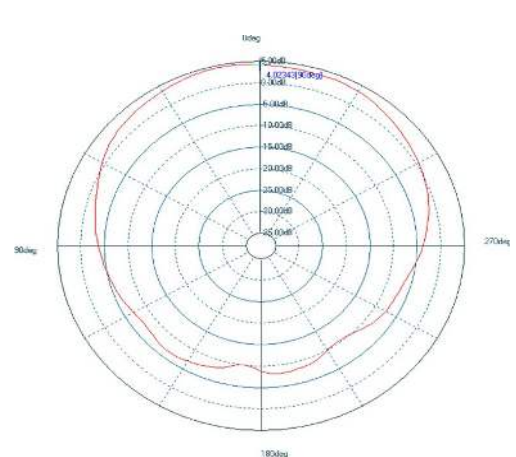
1575.42 MHz (RHCP)	Peak Gain (dBic)	Zenith Gain (dBic)
XZ	4.65	4.65
YZ	4.75	4.65

Gain Pattern – 1602 MHz

XZ Plane (Phi = 0 °)



YZ Plane (Phi = 90 °)



1602 MHz (RHCP)	Peak Gain (dBic)	Zenith Gain (dBic)
XZ	4.01	4.00
YZ	4.02	4.02

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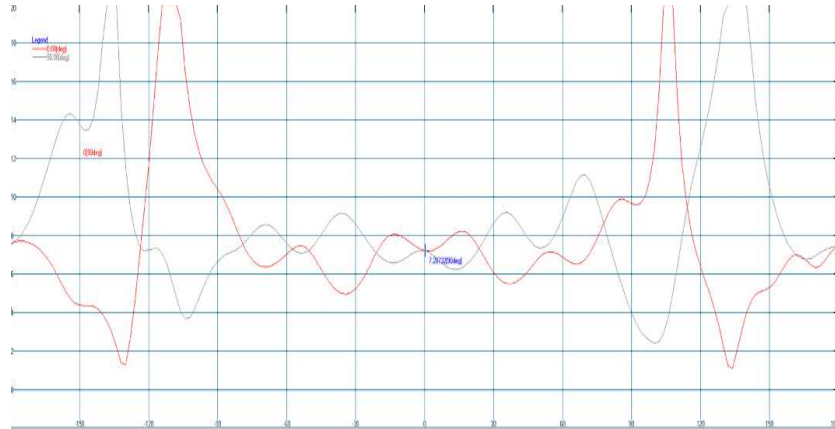
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Axial Ratio Pattern

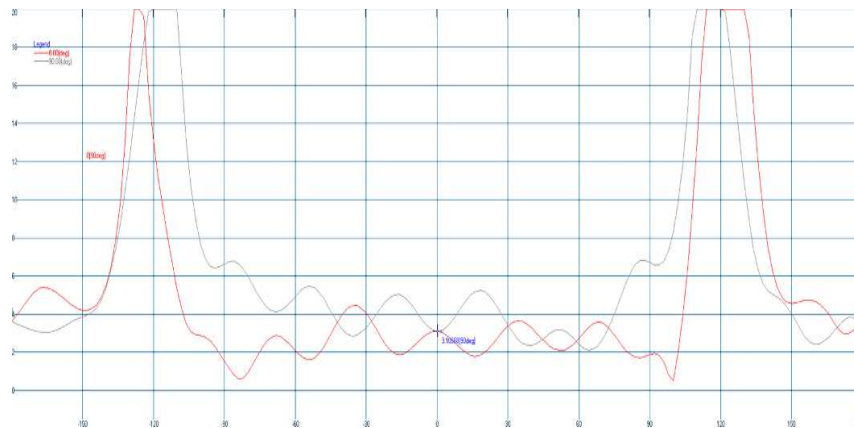
1561 MHz



XZ Plane (Phi = 0 °, Theta = -180 ° ~ 180 °) | YZ Plane (Phi = 90 °, Theta = -180 ° ~ 180 °)

1561 MHz	Axial Ratio
XZ / zenith	7.21 dB

1575.42 MHz



XZ Plane (Phi = 0 °, Theta = -180 ° ~ 180 °) | YZ Plane (Phi = 90 °, Theta = -180 ° ~ 180 °)

1575.42 MHz	Axial Ratio
XZ / zenith	3.10 dB

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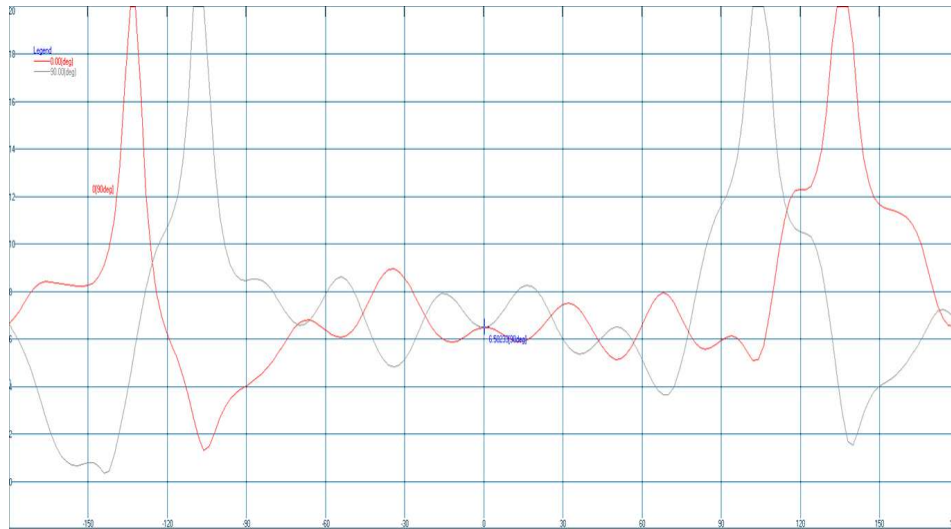
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Axial Ratio Pattern

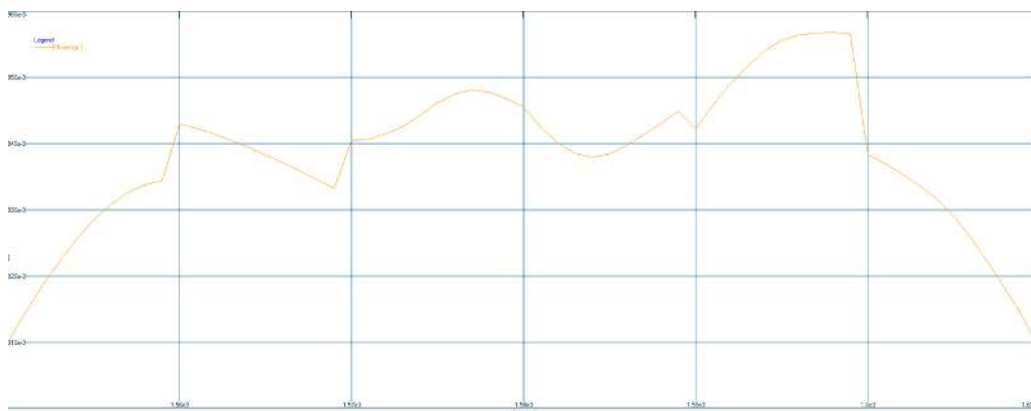
1602 MHz



XZ Plane (Phi = 0 °, Theta = -180 ° ~ 180 °) | YZ Plane (Phi = 90 °, Theta = -180 ° ~ 180 °)

1602 MHz	Axial Ratio
XZ / zenith	6.50 dB

Efficiency



1561MHz	1575MHz	1602MHz
94.2%	94.6%	92.7%

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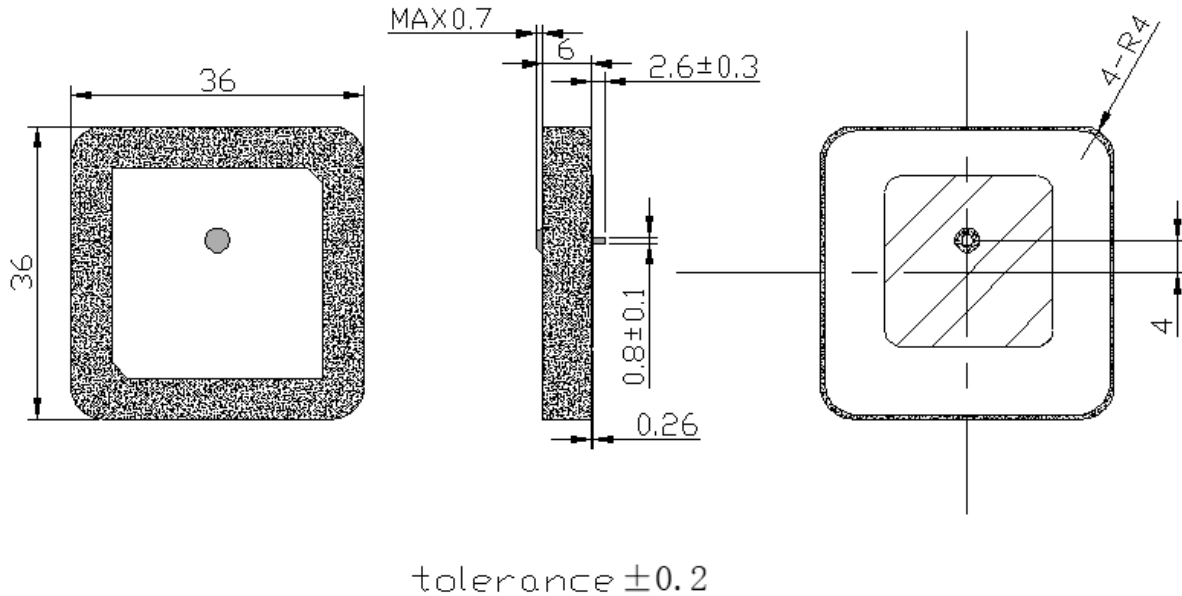


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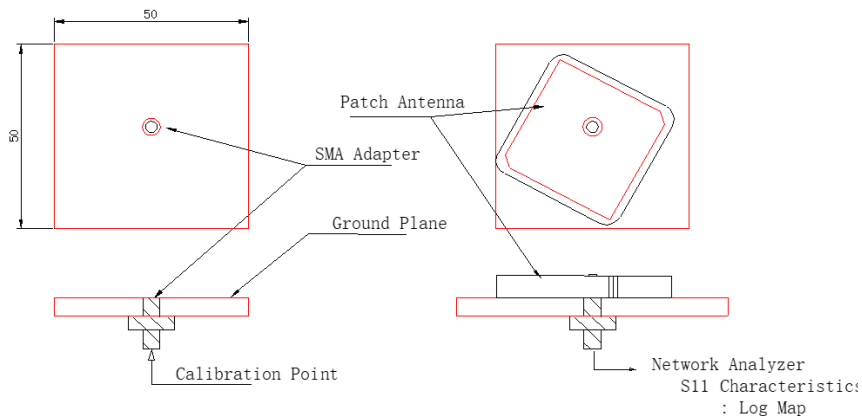


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Dimensions (mm)



Test Environment



Packaging

Each tray contains 25 pcs of antenna with 200 pieces per tray in the inner box and 400 pieces per tray on the outer box.

Package Type	Quantity
Tray	25 pcs/tray
Inner Box	200 pcs/tray
Outer Box	400 pcs/tray

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Reliability Tests

- i. **Moisture Proof:** The device should satisfy the Electrical Specifications table after exposed to the temperature $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and the relative humidity 90~95% RH for 96 hours and 1~2-hour recovery time under normal condition.
- ii. **Vibration Resist:** The device should satisfy the Electrical Specifications table after applied to the vibration of 10 to 55 Hz with amplitude of 1.5 mm for 2 hours each in X, Y and Z direction.
- iii. **Drop Shock:** The device should satisfy the Electrical Specifications table after dropping onto the hard wooden board from the height of 300 mm for 3 times each facet of the 3 dimensions of the device.
- iv. **High Temperature Endurance:** The device should satisfy the Electrical Specifications table after exposed to temperature $80^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for 24 ± 2 hours and 1~2-hour recovery time under normal temperature.
- v. **Low Temperature Endurance:** The device should also satisfy the Electrical Specifications table after exposed to the temperature $-40^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for 24 ± 2 hours and to 2-hour recovery time under normal temperature.
- vi. **Adhesion Strength of Soldering:** Force of 2 kg is applied to each lead in axial direction for 10 ± 1 s (see drawing). No visible damage and the device should also satisfy the Electrical Specifications table.

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