

Metal Stamping Antenna

BTMA Series

| Prepared: Chris Chai | | Approved: Adam Chen | |
|----------------------|------------------|---------------------|----------|
| Checked: Feidi Pei | | Customer: | |
| Version | Changed Reason | Changed by | Date |
| 01 | Original version | Chris | 20191108 |
| | | | |
| | | | |

Address (India): H-601, Officer City2, Rajnagar Extension, Ghaziabad

Address (TW): 2F., NO 3, Gongye 4th RD., Hukou Shiang Hsinchu County 303-51, Taiwan

BTMA Series



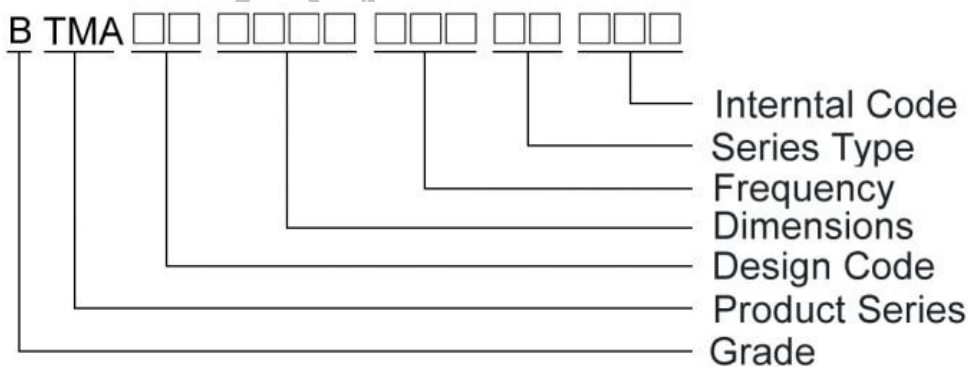
Features

- Small size low-profile, low cost and lightweight type
- Wide bandwidth and Omni-directional
- Supported with Dip-type, SMD, and Co-axial cable connecting
- Customized

Applications

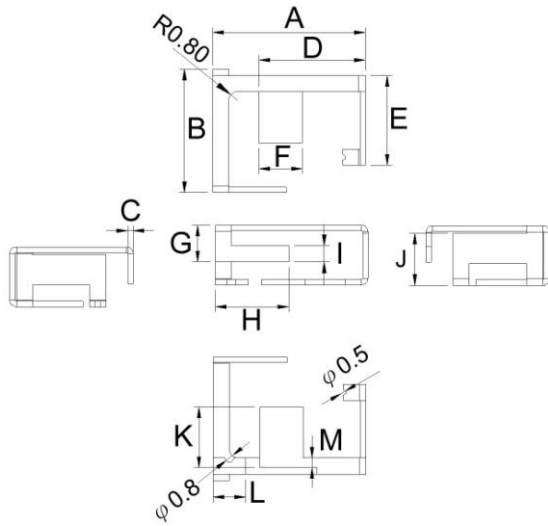
- Bluetooth, Wireless Router, Set Top Box and Home digital
- ISM band, Lora, Sigfox, LTE, NB-IOT, GPS, WiFi and Car use.

Product Identification

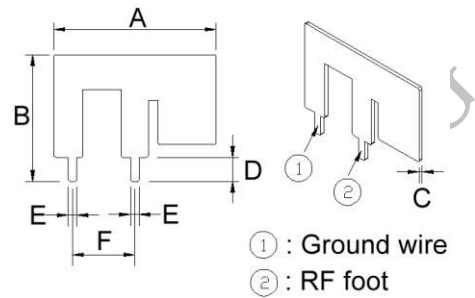


Shape and Dimensions

BTMA0014082G4D1A01



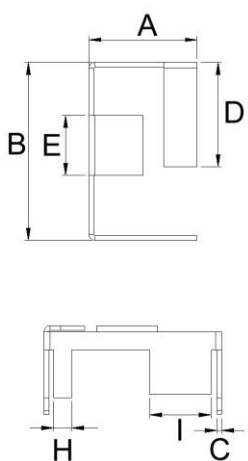
BTMA0014115G0D1A01



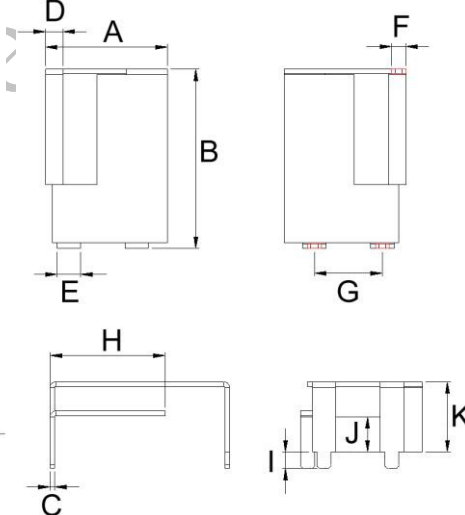
Dimensions in mm

| TYPE | A | B | C | D | E | F | G | H | I | J | K | L | M |
|--------------------|-------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|-----|
| BTMA0014082G4D1A01 | 14.10 | 11.4 | 0.5 | 9.8 | 8.3 | 4.0 | 3.4 | 6.8 | 1.5 | 4.8 | 5.6 | 3 | 0.9 |
| BTMA0014115G0D1A01 | 14.85 | 11.6 | 0.4 | 2.2 | 0.8 | 5.7 | - | - | - | - | - | - | - |

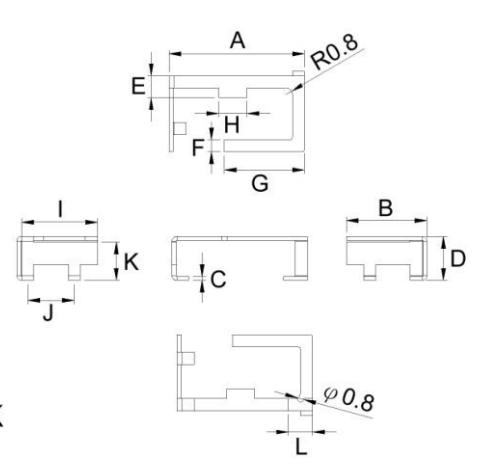
BTMA00150925GD1A01



BTMA00151025GD1A02



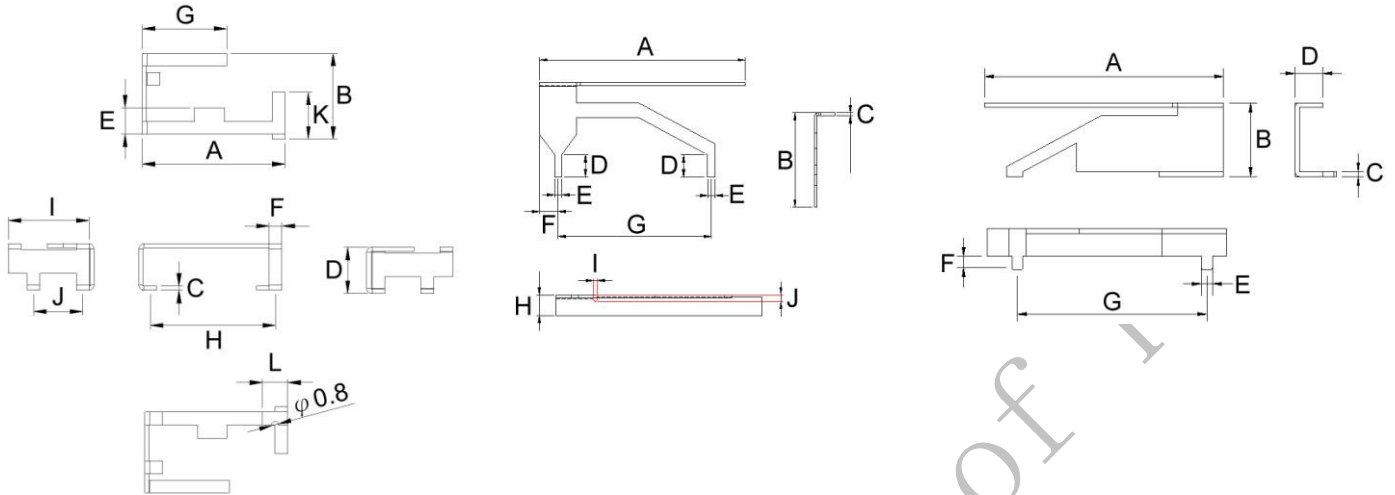
BTMA0017102G4D1A01



BTMA0017102G4D1A02

BTMA0027152G4C1A04

BTMA00290825GD1A02



Dimensions in mm

| TYPE | A | B | C | D | E | F | G | H | I | J | K | L |
|--------------------|------|-------|-----|-----|-----|-------|-------|------|------|------|------|-----|
| BTMA00150925GD1A01 | 9.0 | 14.8 | 0.4 | 8.7 | 5 | 3-1.2 | 5.8 | 1.5 | 5.1 | 6.0 | 1.4 | 2.0 |
| BTMA00151025GD1A02 | 10.4 | 15.35 | 0.4 | 1.5 | 2.0 | 3-1.2 | 5.8 | 9.85 | 1.4 | 3.0 | 6.0 | - |
| BTMA0017102G4D1A01 | 16.9 | 10.05 | 0.5 | 5.5 | 2.7 | 1.5 | 10.0 | 3.5 | 9.45 | 5.8 | 4.8 | 3.0 |
| BTMA0017102G4D1A02 | 16.9 | 10.15 | 0.5 | 5.5 | 3.1 | 1.5 | 10.0 | 14.8 | 9.55 | 5.8 | 5.55 | 3.0 |
| BTMA0027152G4C1A04 | 27.7 | 12.76 | 0.4 | 3.0 | 1.0 | 2.5 | 20.61 | 2.76 | 0.5 | 0.85 | - | - |
| BTMA00290825GD1A02 | 26.0 | 8.0 | 0.5 | 3.0 | 1.2 | 1.5 | 20.6 | - | - | - | - | - |

Electrical Characteristics

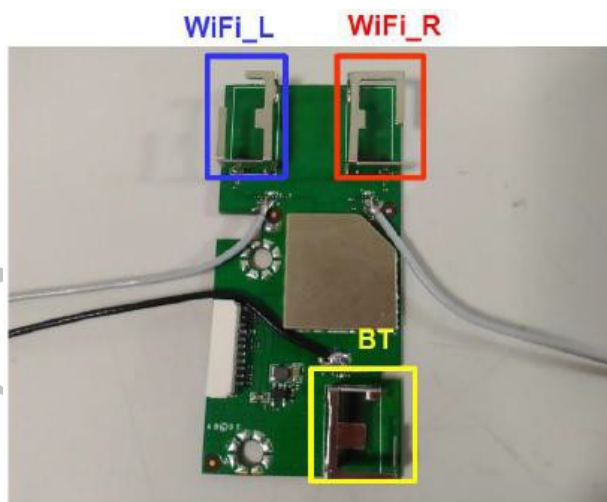
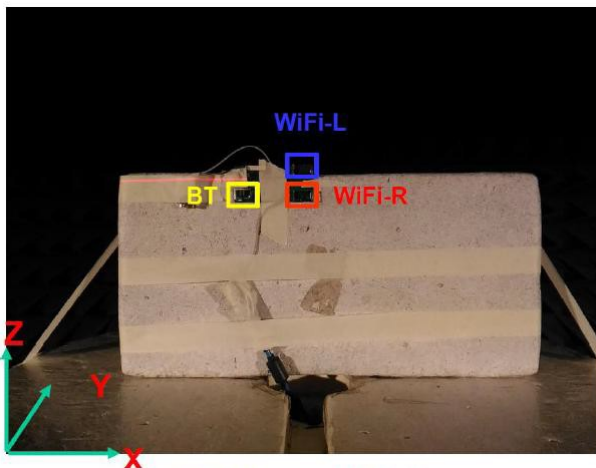
| Part Number | Frequency Range (GHz) | Impedance (Ω) | Return Loss dB(Max) | Radiation | Peak Gain (dBi) | Polarization |
|--------------------|-----------------------|------------------------|---------------------|------------------|-----------------|-----------------|
| BTMA0014082G4D1A01 | 2.4-2.5 | 50 | -7 | Omni-directional | 0.29 | Linear Vertical |
| BTMA0014115G0D1A01 | 5.15-5.85 | 50 | -10 | Omni-directional | 2.90 | Linear Vertical |
| BTMA00150925GD1A01 | 2.4-2.5 5.15-5.85 | 50 | -7 | Omni-directional | 2.64 4.75 | Linear Vertical |
| BTMA00151025GD1A02 | 2.4-2.5 5.15-5.85 | 50 | -6 | Omni-directional | 2.64 4.23 | Linear Vertical |
| BTMA0017102G4D1A01 | 2.4-2.5 5.15-5.85 | 50 | -5 | Omni-directional | 2.88 3.17 | Linear Vertical |
| BTMA0017102G4D1A02 | 2.4-2.5 5.15-5.85 | 50 | -4 | Omni-directional | 4.14 3.43 | Linear Vertical |
| BTMA0027152G4C1A04 | 2.4-2.5 | 50 | -10 | Directional | 3.19 | Linear Vertical |
| BTMA00290825GD1A02 | 2.4-2.5 5.15-5.85 | 50 | -10 | Omni-directional | 2.71 3.02 | Linear Vertical |

Physical Properties

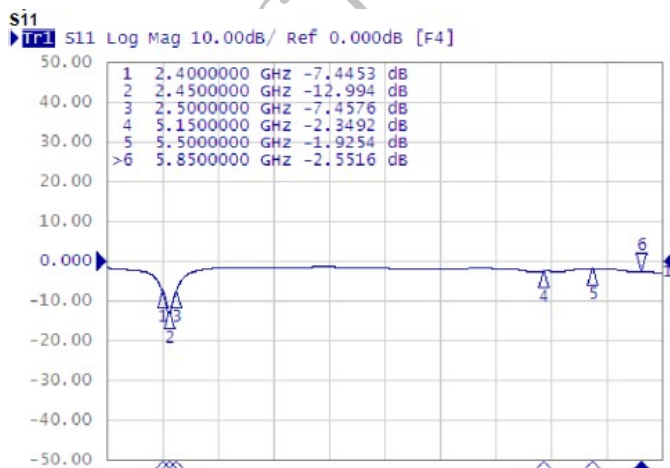
| Part Number | Antenna Material | Operating temperature range | Storage temperature range |
|--------------------|-------------------------------|-----------------------------|---------------------------|
| BTMA0014082G4D1A01 | SUS430 (First nickel plating) | - 20 ~ +65 ~ | - 30 ~ +75 ~ |
| BTMA0014115G0D1A01 | SUS430 (First nickel plating) | - 20 ~ +65 ~ | - 30 ~ +75 ~ |
| BTMA00150925GD1A01 | SUS430 (Nickel plating-Sn) | - 20 ~ +65 ~ | - 30 ~ +75 ~ |
| BTMA00151025GD1A02 | SUS430 (Nickel plating-Sn) | - 20 ~ +65 ~ | - 30 ~ +75 ~ |
| BTMA0017102G4D1A01 | SUS430 (First nickel plating) | - 20 ~ +65 ~ | - 30 ~ +75 ~ |
| BTMA0017102G4D1A02 | SUS430 (First nickel plating) | - 20 ~ +65 ~ | - 30 ~ +75 ~ |
| BTMA0027152G4C1A04 | SUS430 (First nickel plating) | - 20 ~ +65 ~ | - 30 ~ +75 ~ |
| BTMA00290825GD1A02 | SUS430 (First nickel plating) | - 20 ~ +65 ~ | - 30 ~ +75 ~ |

- BTMA0014082G4D1A01

Experimental Setup



Return Loss S11



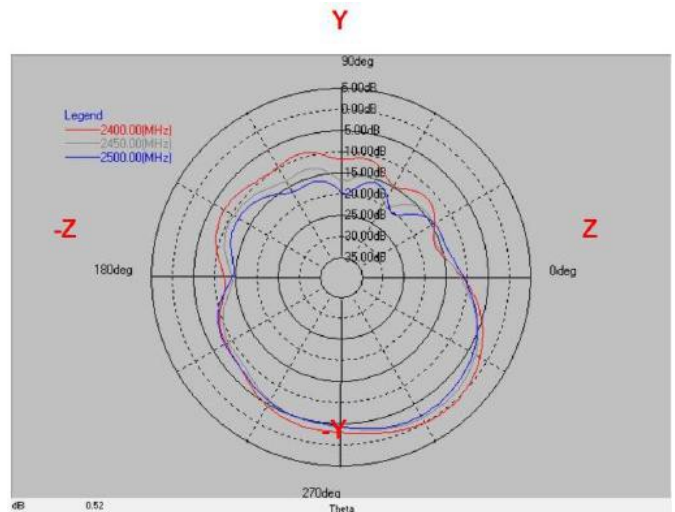
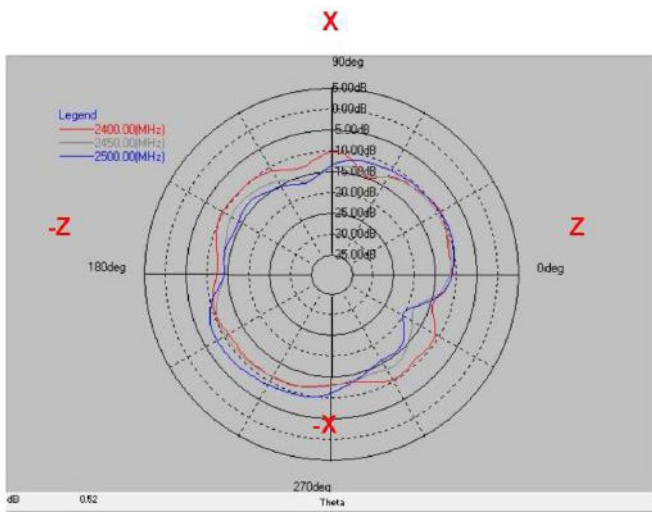
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Frequency(MHz) : 2400~2500. Pattern Field : Z-X plane

Frequency(MHz) : 2400~2500. Pattern Field : Z-Y plane

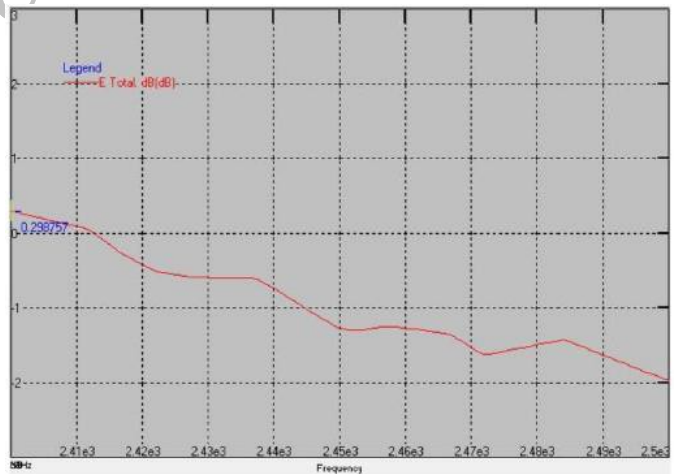
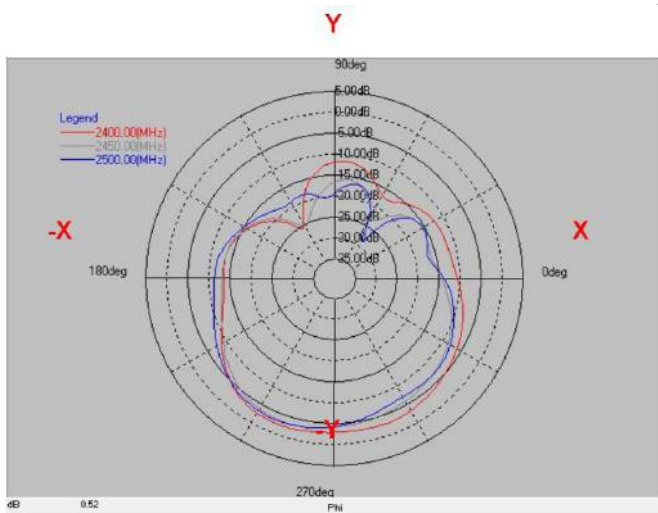


| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|-----------|
| 2400(MHz) | -9.68 dB | -15.14 dB | -11.46 dB |
| 2450(MHz) | -10.37 dB | -18.50 dB | -12.67 dB |
| 2500(MHz) | -8.17 dB | -20.24 dB | -11.79 dB |

| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 2400(MHz) | 0.30 dB | -16.47 dB | -5.83 dB |
| 2450(MHz) | -1.28 dB | -20.09 dB | -7.28 dB |
| 2500(MHz) | -1.98 dB | -20.67 dB | -7.65 dB |

Frequency(MHz) : 2400~2500. Pattern Field : X-Y plane

Peak Gain

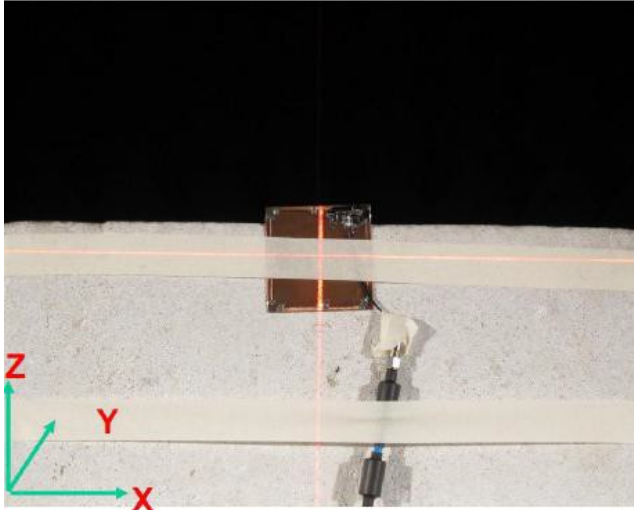


Peak Gain : Max 0.29 dBi

| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 2400(MHz) | -2.52 dB | -25.81 dB | -7.49 dB |
| 2450(MHz) | -3.56 dB | -25.65 dB | -9.21 dB |
| 2500(MHz) | -3.27 dB | -28.86 dB | -8.96 dB |

- BTMA0014115G0D1A01

Experimental Setup

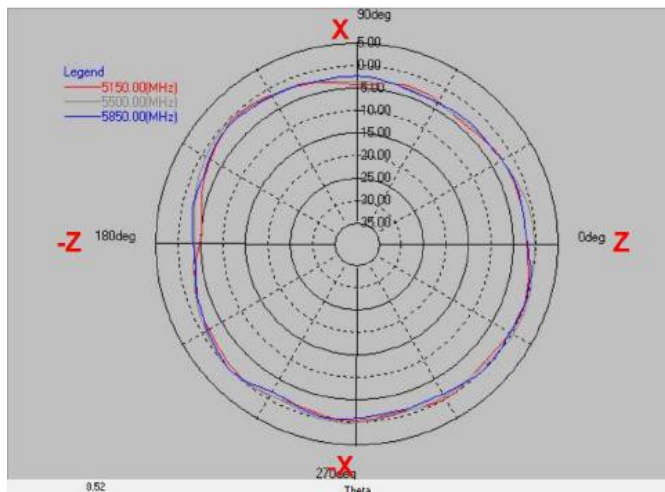


Frequency(MHz) : 5150~5850. Pattern Field : Z-X plane

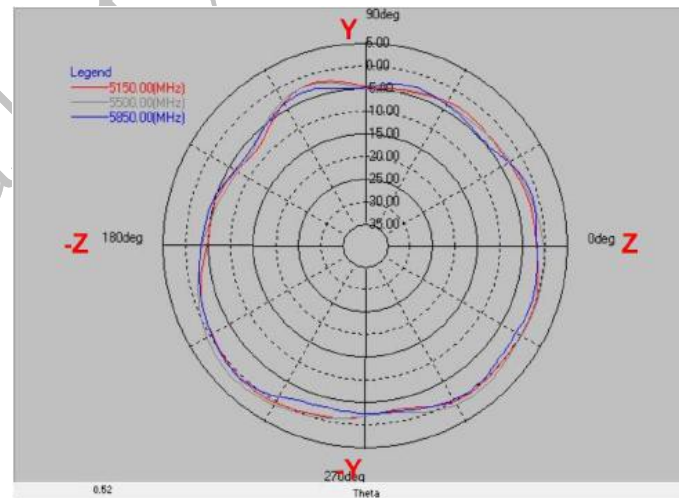
Return Loss S11



Frequency(MHz) : 5150~5850. Pattern Field : Z-Y plane



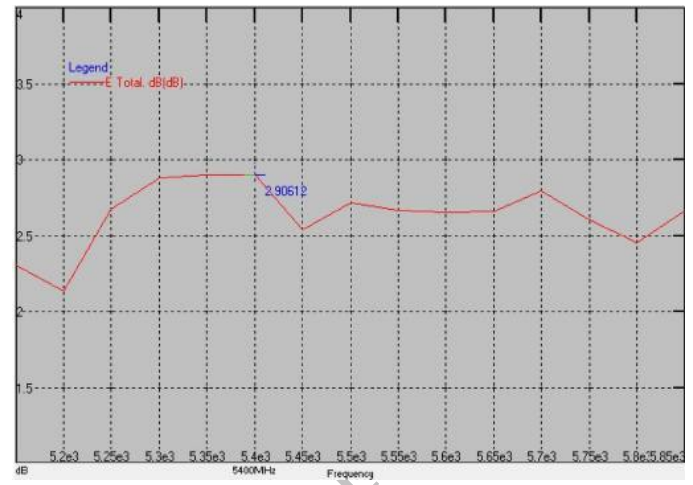
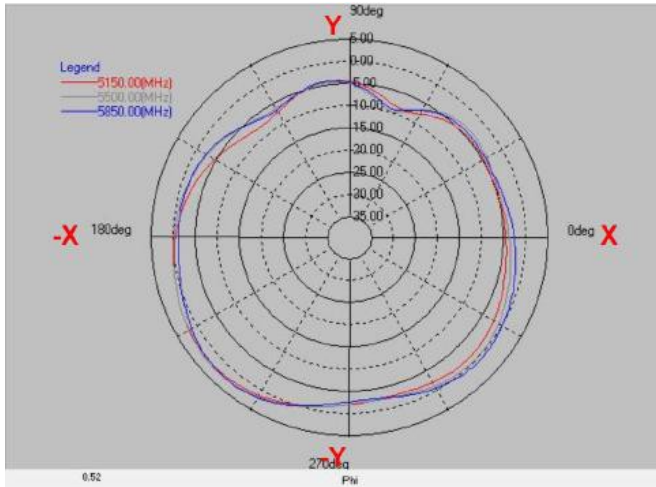
| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 5150(MHz) | -0.05 dB | -5.06 dB | -1.86 dB |
| 5500(MHz) | 0.51 dB | -3.81 dB | -1.34 dB |
| 5850(MHz) | 0.03 dB | -3.84 dB | -1.72 dB |



| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 5150(MHz) | 0.61 dB | -7.89 dB | 2.06 dB |
| 5500(MHz) | 1.60 dB | -7.46 dB | -1.51 dB |
| 5850(MHz) | 0.55 dB | -6.93 dB | -2.39 dB |

Frequency(MHz) : 5150~5850. Pattern Field : X-Y plane

Peak Gain

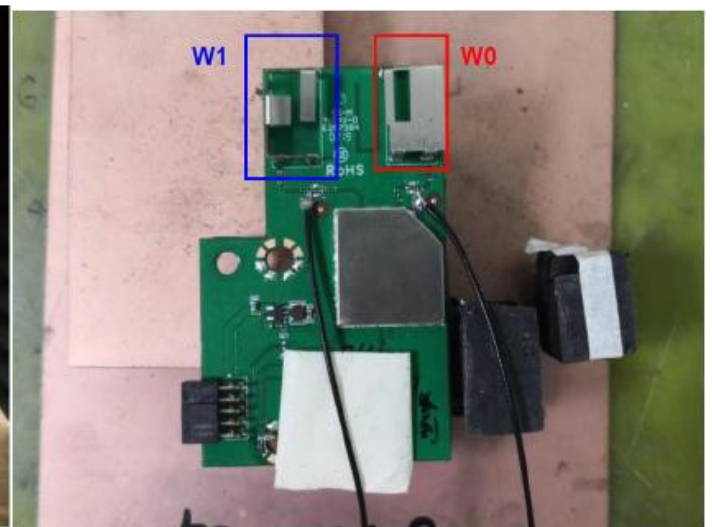
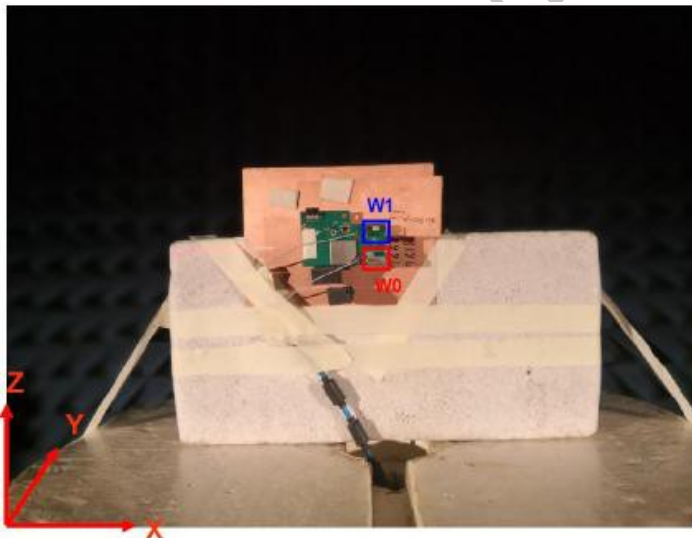


| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 5150(MHz) | 2.31 dB | -8.83 dB | -2.14 dB |
| 5500(MHz) | 2.66 dB | -10.15 dB | -1.58 dB |
| 5850(MHz) | 2.51 dB | -9.38 dB | -1.60 dB |

Peak Gain Max 2.90 dBi

- BTMA00150925GD1A01

Experimental Setup



Return Loss S22

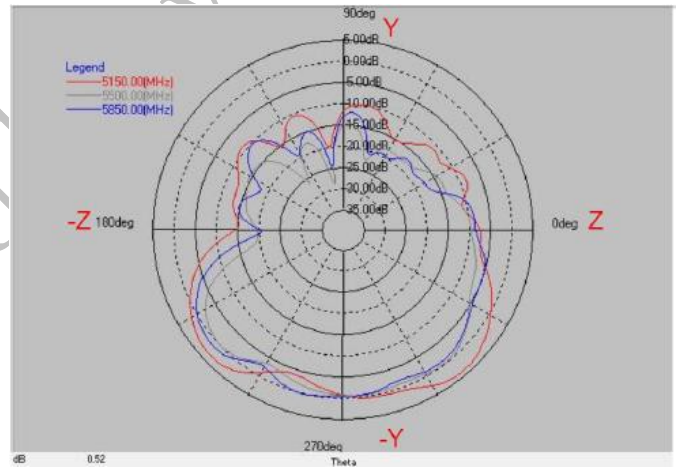
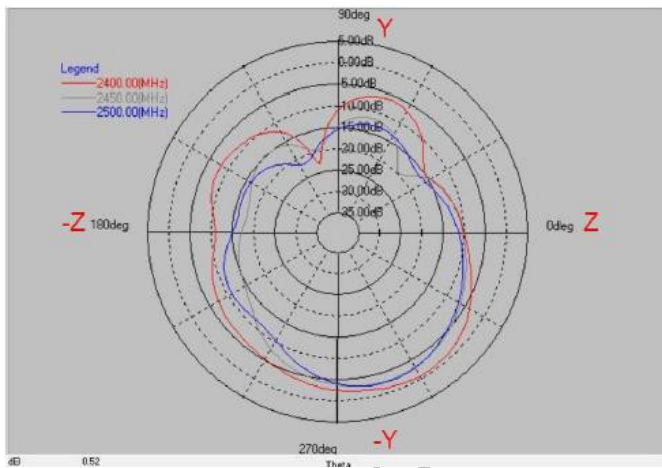
S22

Tr2 S22 Log Mag 10.00dB/ Ref 0.000dB [F4]



Frequency(MHz) : 2400~2500. Pattern Field : Z-X plane

Frequency(MHz) : 5150~5850. Pattern Field : Z-X plane



| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|-----------|
| 2400(MHz) | -2.86 dB | -14.14 dB | -7.63 dB |
| 2450(MHz) | -7.05 dB | -21.75 dB | -11.17 dB |
| 2400(MHz) | -10.20 dB | -27.18 dB | -13.38 dB |

| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 5150(MHz) | -1.19 dB | -14.72 dB | -4.27 dB |
| 5500(MHz) | -3.75 dB | -20.07 dB | -7.69 dB |
| 5850(MHz) | -4.43 dB | -21.96 dB | -7.58 dB |

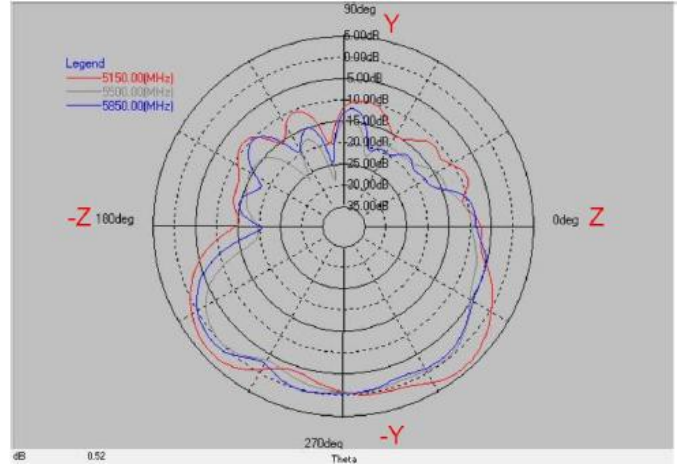
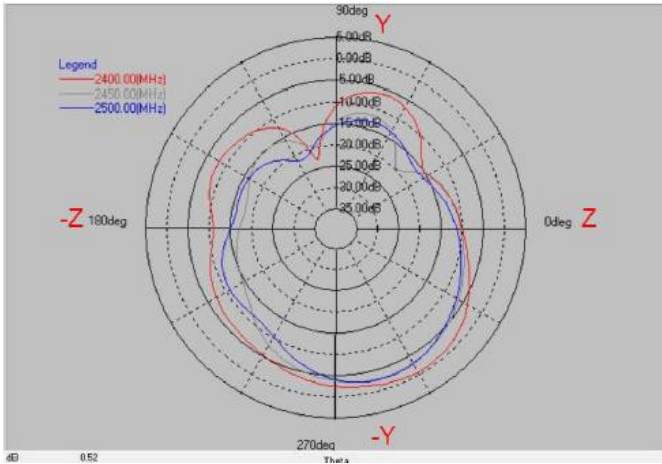
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Frequency(MHz) : 2400~2500. Pattern Field : Z-Y plane

Frequency(MHz) : 5150~5850. Pattern Field : Z-Y plane

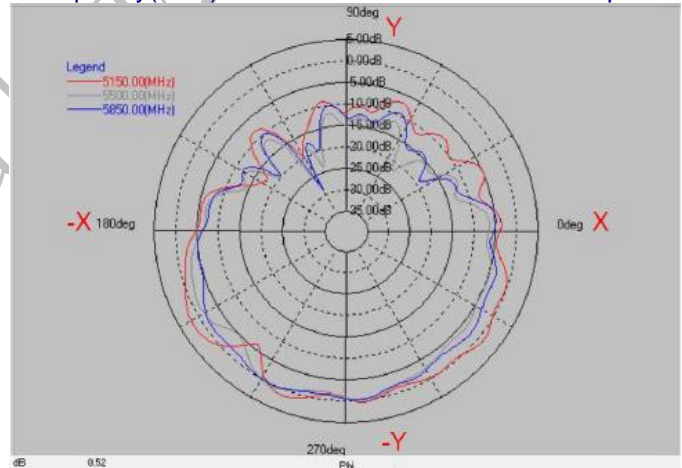
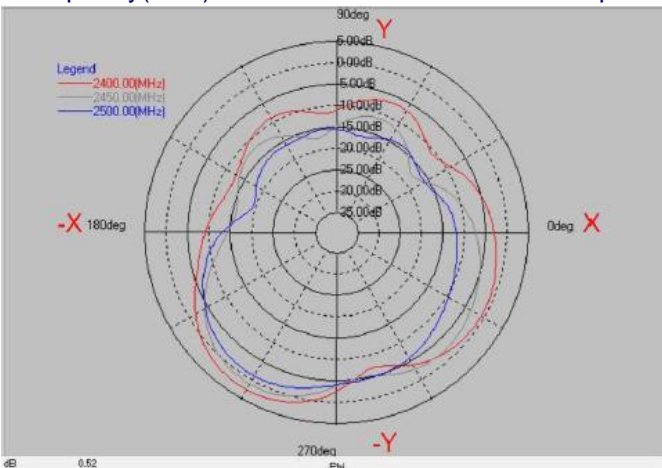


| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 2400(MHz) | -0.79 dB | -23.38 dB | -6.13 dB |
| 2450(MHz) | -2.97 dB | -19.97 dB | -8.86 dB |
| 2400(MHz) | -2.79 dB | -22.09 dB | -9.15 dB |

| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 5150(MHz) | 3.91 dB | -20.30 dB | -2.51 dB |
| 5500(MHz) | -0.15 dB | -28.99 dB | -5.54 dB |
| 5850(MHz) | 1.26 dB | -25.01 dB | -4.77 dB |

Frequency(MHz) : 2400~2500. Pattern Field : X-Y plane

Frequency(MHz) : 5150~5850. Pattern Field : X-Y plane



| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 2400(MHz) | 2.60 dB | -13.00 dB | -3.43dB |
| 2450(MHz) | 0.96 dB | -17.80 dB | -5.47 dB |
| 2500(MHz) | -1.16 dB | -19.46 dB | -7.55 dB |

| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 5150(MHz) | 2.05 dB | -19.74 dB | -2.89 dB |
| 5500(MHz) | 0.31 dB | -26.05 dB | -5.10 dB |
| 5850(MHz) | -0.01 dB | -29.00 dB | -4.68 dB |

Peak Gain

2G

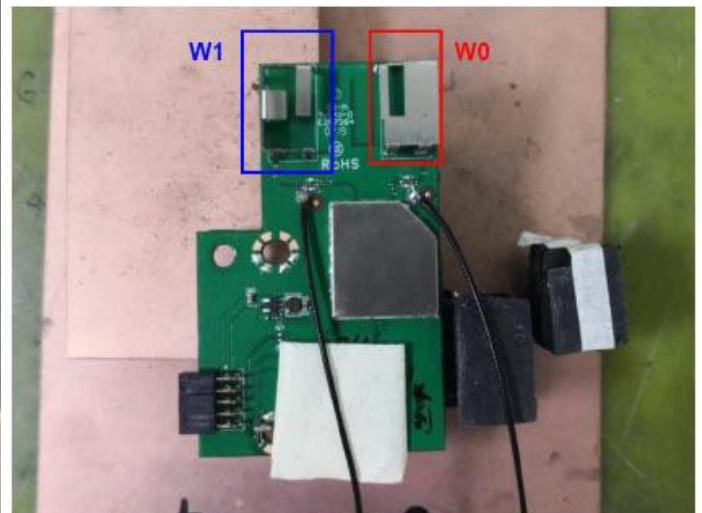
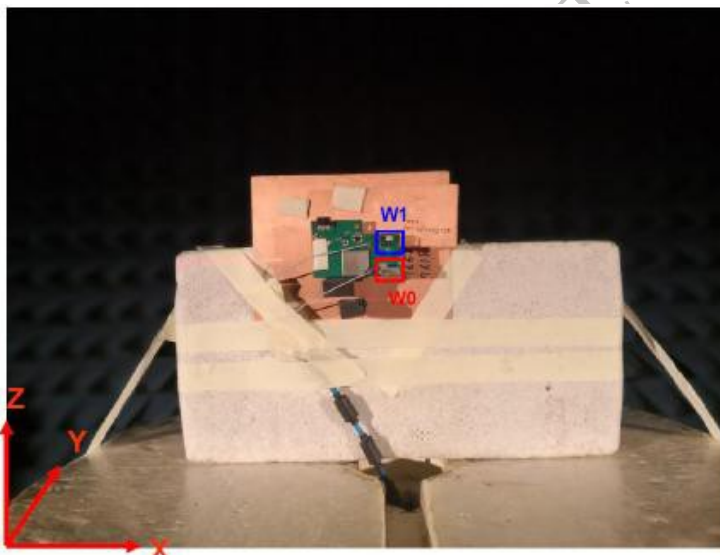
5G

| Frequency (MHz) | Peak Gain (dBi) |
|-----------------|-----------------|
| 2400 | 2.64 |
| 2410 | 2.22 |
| 2420 | 1.84 |
| 2430 | 1.85 |
| 2440 | 1.39 |
| 2450 | 1.15 |
| 2460 | 0.60 |
| 2470 | 0.07 |
| 2480 | -0.18 |
| 2490 | -0.67 |
| 2500 | -0.56 |

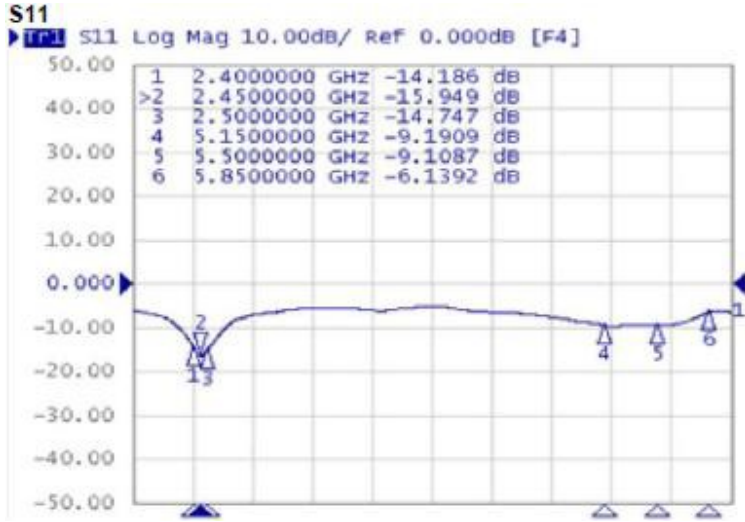
| Frequency (MHz) | Peak Gain (dBi) | Frequency (MHz) | Peak Gain (dBi) |
|-----------------|-----------------|-----------------|-----------------|
| 5150 | 4.75 | 5700 | 1.02 |
| 5200 | 4.65 | 5750 | 1.21 |
| 5250 | 3.95 | 5800 | 1.76 |
| 5300 | 4.44 | 5850 | 1.47 |
| 5350 | 3.79 | | |
| 5400 | 3.08 | | |
| 5450 | 1.86 | | |
| 5500 | 1.42 | | |
| 5550 | 1.02 | | |
| 5600 | 0.81 | | |
| 5650 | 1.15 | | |

- BTMA00151025GD1A02

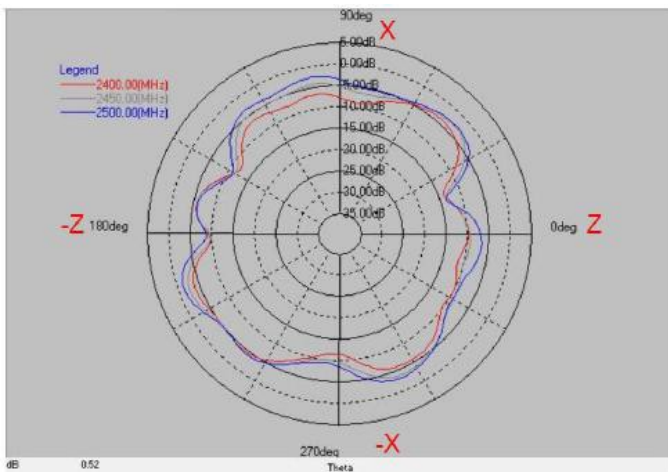
Experimental Setup



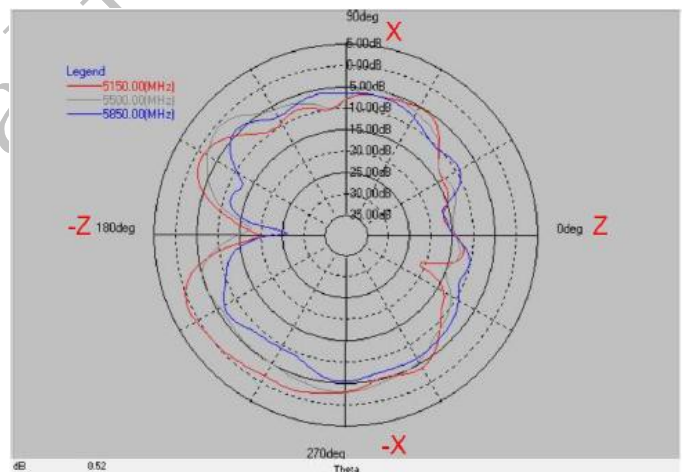
Return Loss S11



Frequency(MHz): 2400~2500. Pattern Field: Z-X plane Frequency(MHz): 5150~5850. Pattern Field: Z-X plane

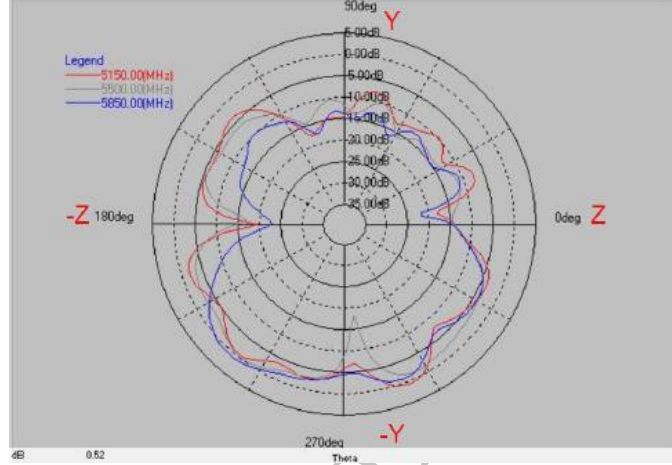
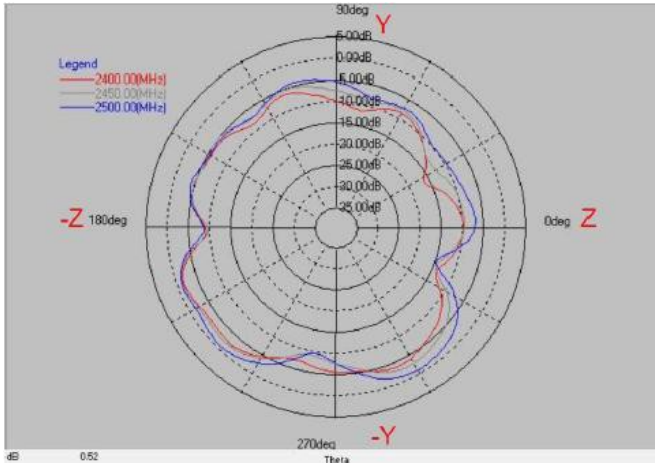


| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 2400(MHz) | -3.84 dB | -13.97 dB | -7.26 dB |
| 2450(MHz) | -2.47 dB | -13.35 dB | -6.04 dB |
| 2400(MHz) | -1.35 dB | -13.67 dB | -5.24 dB |



| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 5150(MHz) | 0.83 dB | -21.25 dB | -5.01 dB |
| 5500(MHz) | -0.91 dB | -17.69 dB | -6.29 dB |
| 5850(MHz) | -4.37 dB | -26.43 dB | -8.33 dB |

Frequency(MHz): 2400~2500. Pattern Field: Z-Y plane Frequency(MHz): 5150~5850. Pattern Field: Z-Y plane

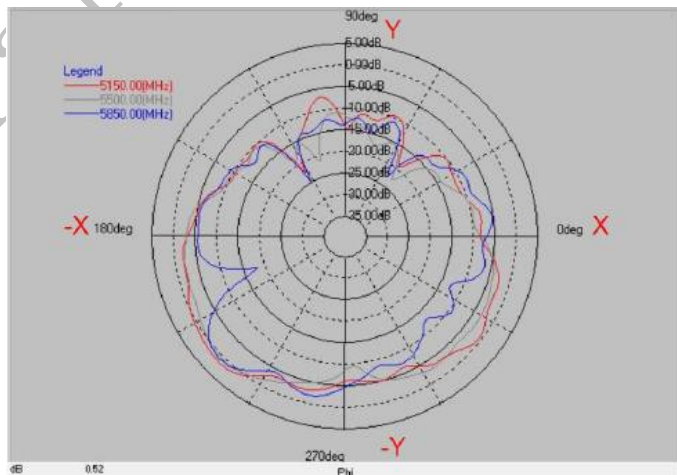
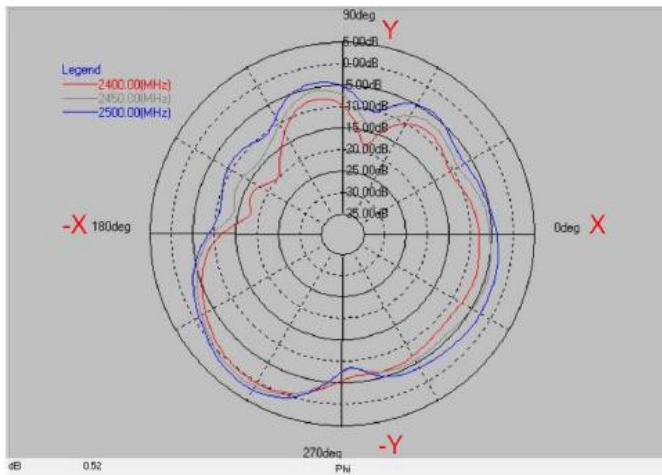


| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 2400(MHz) | -1.67 dB | -16.44 dB | -6.59 dB |
| 2450(MHz) | -1.29 dB | -14.55 dB | -5.98 dB |
| 2500(MHz) | -0.83 dB | -14.85 dB | -4.86 dB |

| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 5150(MHz) | 0.52 dB | -19.78 dB | -5.44 dB |
| 5500(MHz) | -0.30 dB | -18.34 dB | -5.76 dB |
| 5850(MHz) | 0.73 dB | -23.02 dB | -6.04 dB |

Frequency(MHz) : 2400~2500. Pattern Field : X-Y plane

Frequency(MHz) : 5150~5850. Pattern Field : X-Y plane



| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 2400(MHz) | 0.29 dB | -20.04 dB | -6.33 dB |
| 2450(MHz) | 1.22 dB | -14.26 dB | -5.10 dB |
| 2500(MHz) | 2.17 dB | -10.99 dB | -3.75 dB |

| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 5150(MHz) | 1.56 dB | -22.61 dB | -4.49 dB |
| 5500(MHz) | 0.53 dB | -22.96 dB | -5.27 dB |
| 5850(MHz) | 0.92 dB | -25.04 dB | -6.77 dB |

Peak Gain

2G

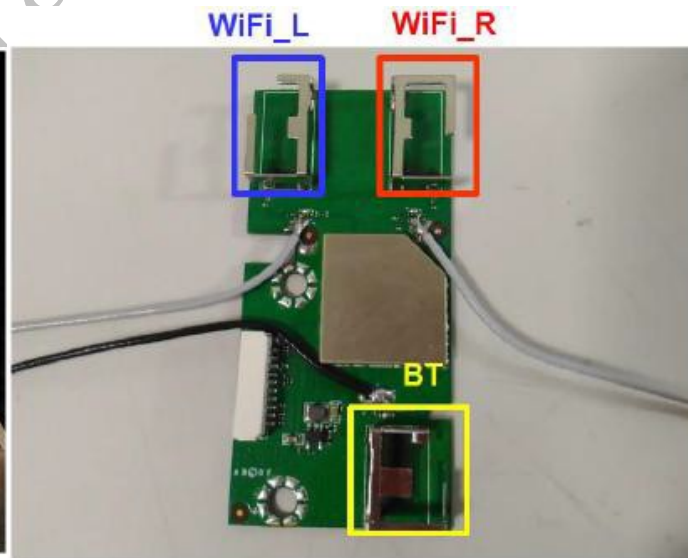
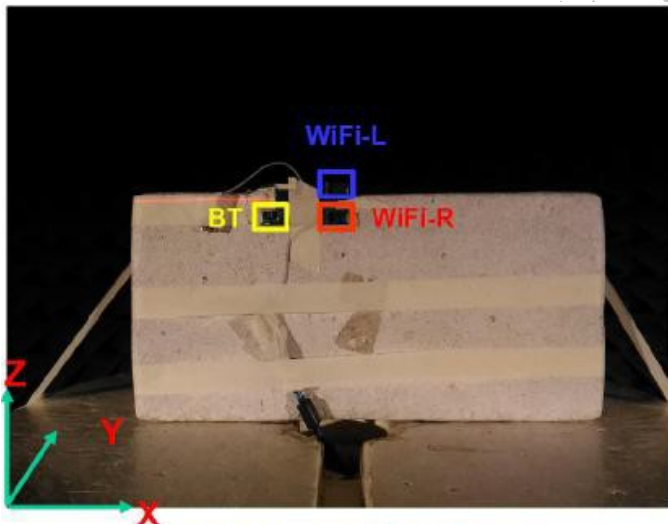
| Frequency (MHz) | Peak Gain (dBi) |
|-----------------|-----------------|
| 2400 | 1.55 |
| 2410 | 1.60 |
| 2420 | 1.58 |
| 2430 | 2.01 |
| 2440 | 2.04 |
| 2450 | 2.05 |
| 2460 | 2.42 |
| 2470 | 2.61 |
| 2480 | 2.61 |
| 2490 | 2.63 |
| 2500 | 2.64 |

5G

| Frequency (MHz) | Peak Gain (dBi) | Frequency (MHz) | Peak Gain (dBi) |
|-----------------|-----------------|-----------------|-----------------|
| 5150 | 4.23 | 5700 | 2.13 |
| 5200 | 3.90 | 5750 | 1.89 |
| 5250 | 3.88 | 5800 | 1.52 |
| 5300 | 3.97 | 5850 | 1.44 |
| 5350 | 3.74 | | |
| 5400 | 1.87 | | |
| 5450 | 1.70 | | |
| 5500 | 1.83 | | |
| 5550 | 2.40 | | |
| 5600 | 2.57 | | |
| 5650 | 2.83 | | |

• BTMA0017102G4D1A01

Experimental Setup

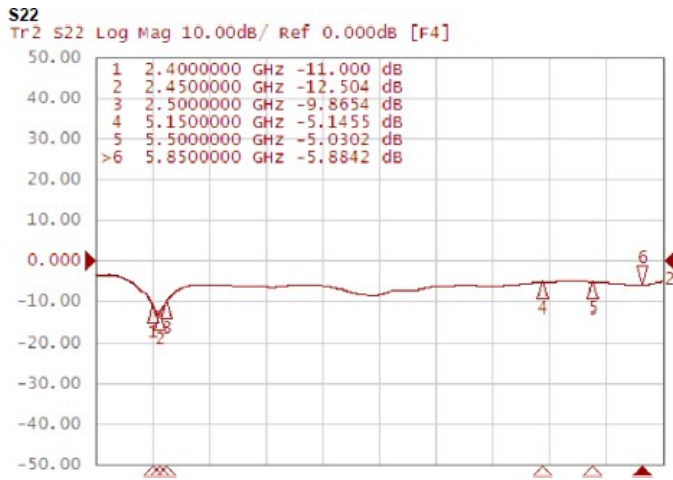


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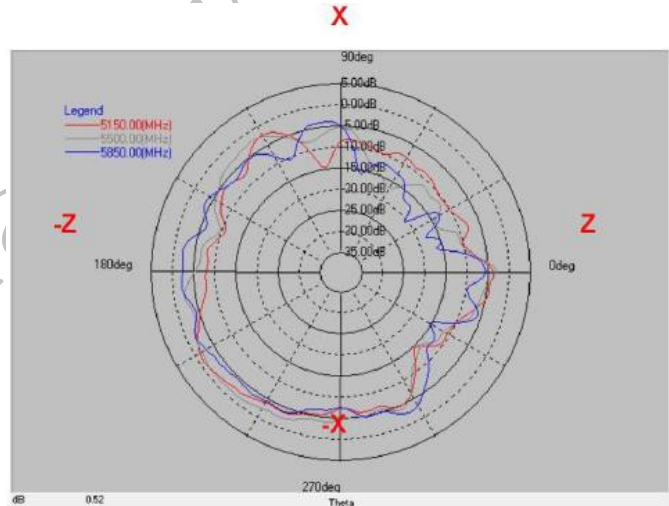
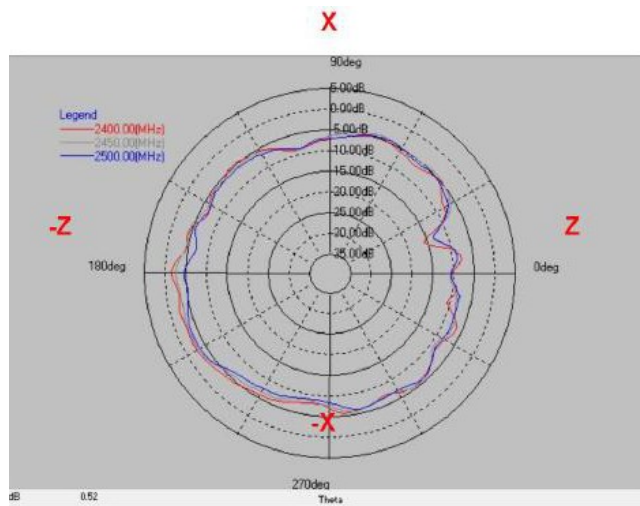
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Return Loss S11



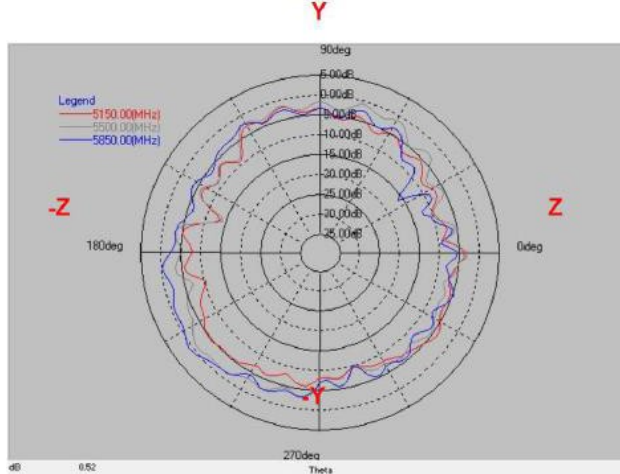
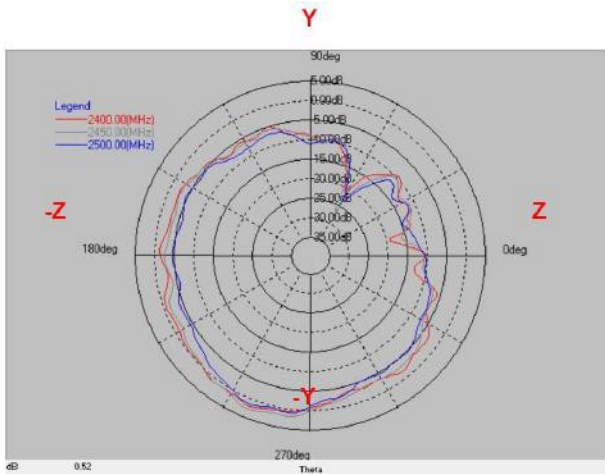
Frequency(MHz): 2400~2500. Pattern Field: Z-X plane Frequency(MHz): 5150~5850. Pattern Field: Z-X plane



| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 2400(MHz) | -1.36 dB | -15.89 dB | -5.81 dB |
| 2450(MHz) | -2.52 dB | -13.39 dB | -5.91 dB |
| 2400(MHz) | -3.50 dB | -13.23 dB | -6.54 dB |

| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 5150(MHz) | -1.08 dB | -14.89 dB | -6.26 dB |
| 5500(MHz) | -1.40 dB | -16.84 dB | -5.41 dB |
| 5850(MHz) | -2.02 dB | -20.60 dB | -6.03 dB |

Frequency(MHz): 2400~2500. Pattern Field: Z-Y plane Frequency(MHz): 5150~5850. Pattern Field: Z-Y plane

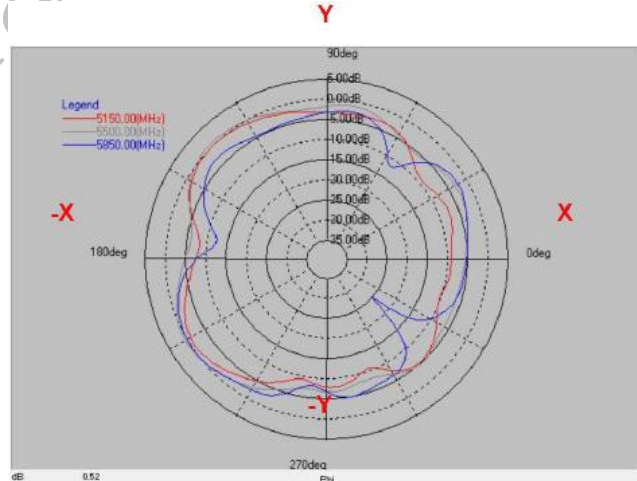
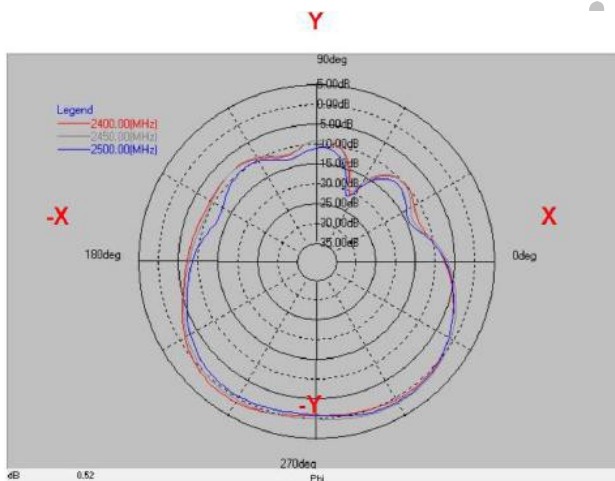


| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 2400(MHz) | 1.74 dB | -20.97 dB | -3.49 dB |
| 2450(MHz) | 2.68 dB | -27.16 dB | -3.51 dB |
| 2500(MHz) | 1.21 dB | -23.67 dB | -4.97 dB |

| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 5150(MHz) | -2.12 dB | -13.58 dB | -6.20 dB |
| 5500(MHz) | -1.04 dB | -14.34 dB | -4.49 dB |
| 5850(MHz) | 0.77 dB | -16.24 dB | -4.18 dB |

Frequency(MHz) : 2400~2500. Pattern Field : X-Y plane

Frequency(MHz) : 5150~5850. Pattern Field : X-Y plane

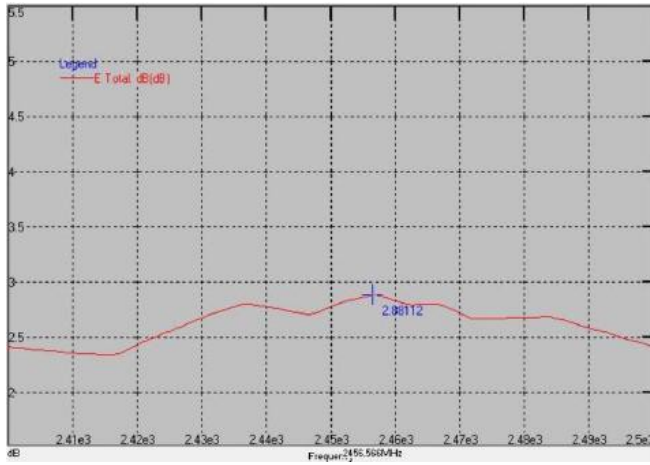


| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 2400(MHz) | 1.19 dB | -21.06 dB | -3.46 dB |
| 2450(MHz) | 1.42 dB | -20.22 dB | -3.21 dB |
| 2500(MHz) | 1.14 dB | -21.85 dB | -4.01 dB |

| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 5150(MHz) | -0.15 dB | -10.92 dB | -4.44 dB |
| 5500(MHz) | 0.60 dB | -8.28 dB | -2.98 dB |
| 5850(MHz) | 0.05 dB | -25.42 dB | -4.39 dB |

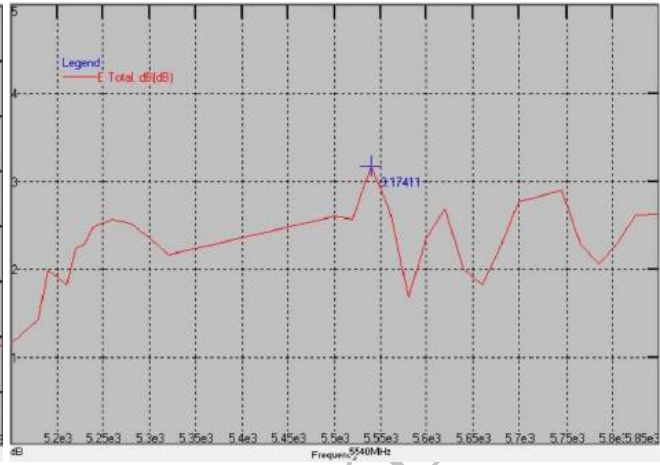
Peak Gain

2G



Peak Gain : Max 2.88 dBi

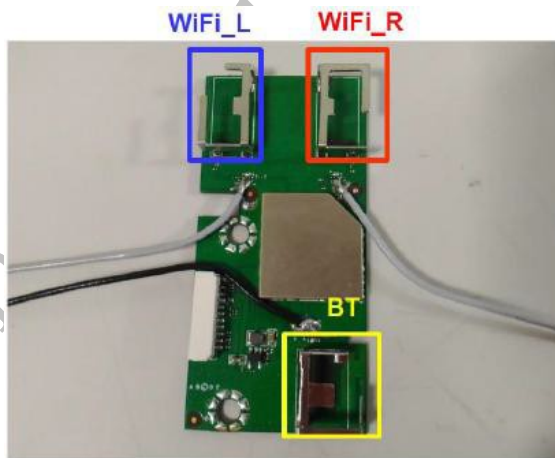
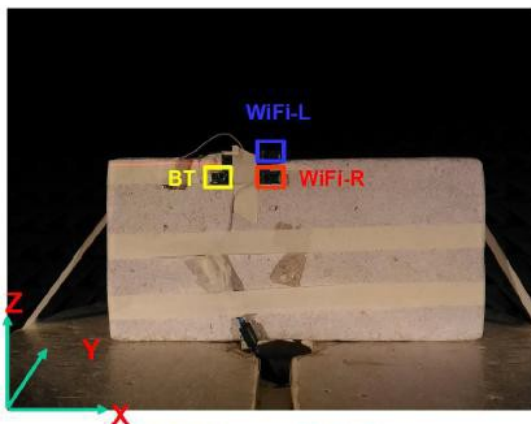
5G



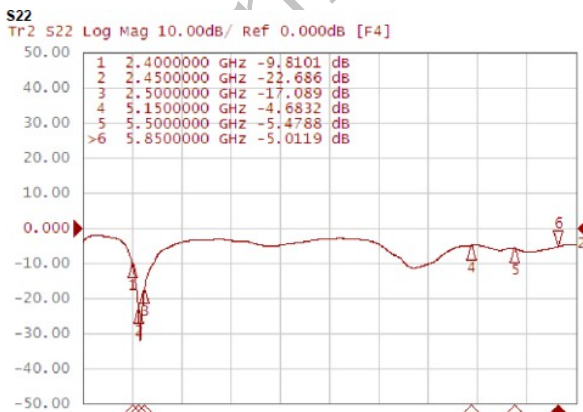
Peak Gain : Max 3.17 dBi

- BTMA0017102G4D1A02

Experimental Setup



Return Loss S22



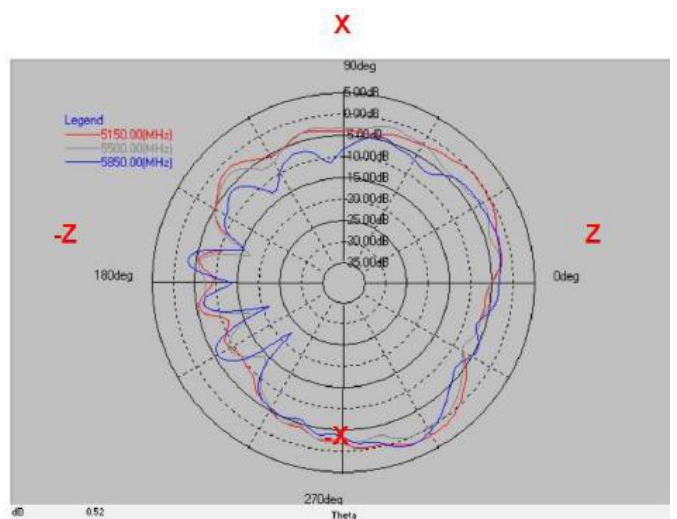
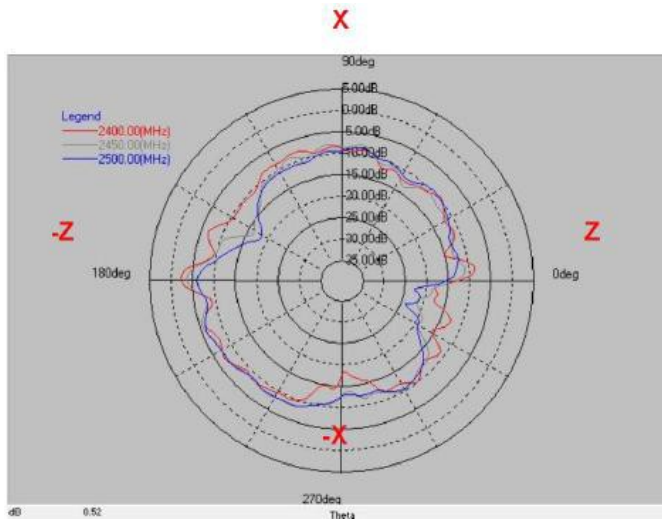
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Frequency(MHz) : 2400~2500. Pattern Field : Z-X plane

Frequency(MHz) : 5150~5850. Pattern Field : Z-X plane

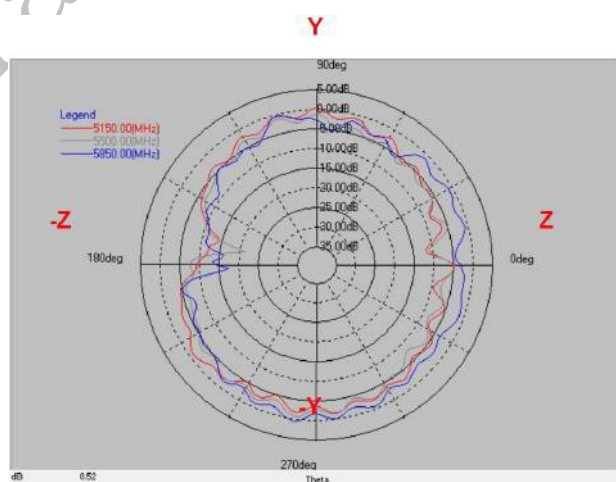
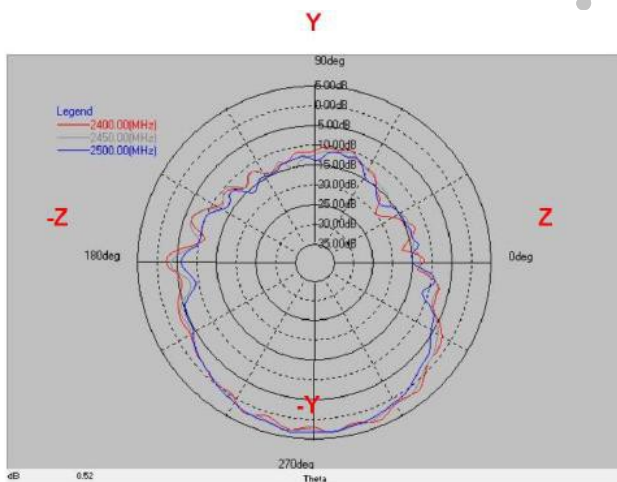


| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|-----------|
| 2400(MHz) | -2.23 dB | -18.66 dB | -9.68 dB |
| 2450(MHz) | -3.51 dB | -21.67 dB | -9.99 dB |
| 2400(MHz) | -6.01 dB | -24.11 dB | -10.54 dB |

| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 5150(MHz) | 1.61 dB | -15.19 dB | -3.16 dB |
| 5500(MHz) | -0.19 dB | -17.15 dB | -4.14 dB |
| 5850(MHz) | 1.72 dB | -22.93 dB | -4.75 dB |

Frequency(MHz) : 2400~2500. Pattern Field : Z-Y plane

Frequency(MHz) : 5150~5850. Pattern Field : Z-Y plane

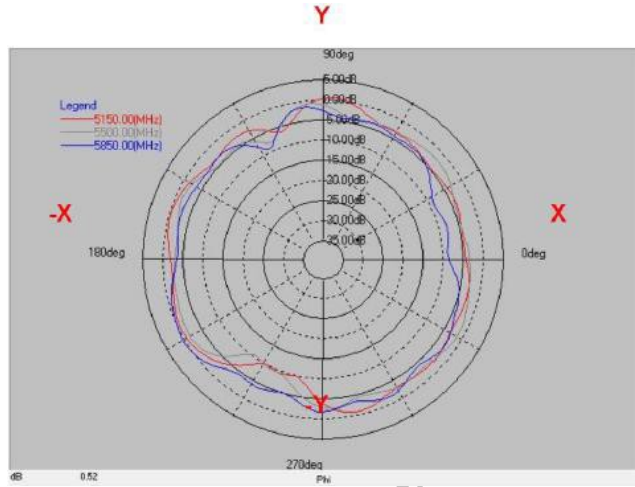
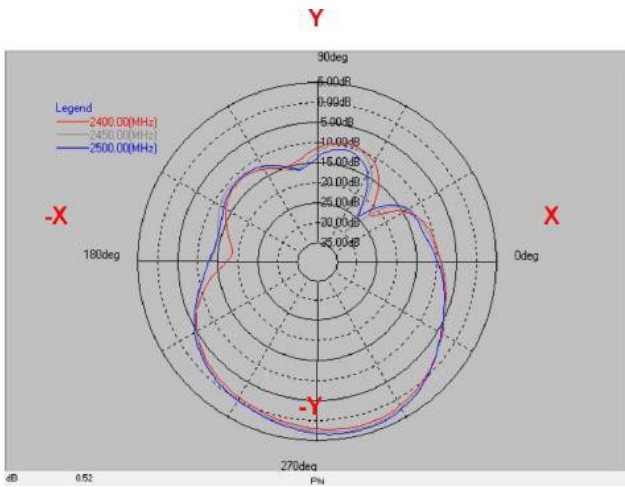


| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 2400(MHz) | 3.36 dB | -20.21 dB | -2.86 dB |
| 2450(MHz) | 3.14 dB | -15.73 dB | -2.94 dB |
| 2400(MHz) | 3.39 dB | -17.57 dB | -3.19 dB |

| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 5150(MHz) | 0.09 dB | -14.59 dB | -4.02 dB |
| 5500(MHz) | -0.76 dB | -21.21 dB | -4.87 dB |
| 5850(MHz) | 0.44 dB | -17.49 dB | -3.22 dB |

Frequency(MHz) : 2400~2500. Pattern Field : X-Y plane

Frequency(MHz) : 5150~5850. Pattern Field : X-Y plane

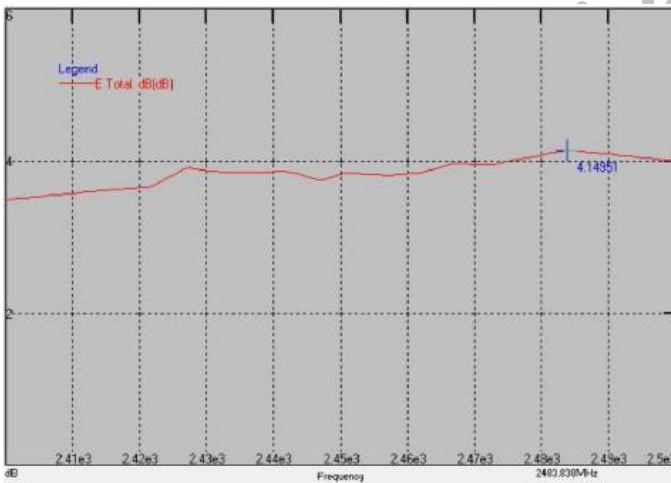


| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 2400(MHz) | 2.46 dB | -22.31 dB | -3.81 dB |
| 2450(MHz) | 3.20 dB | -29.93 dB | -3.30 dB |
| 2500(MHz) | 3.64 dB | -24.60 dB | -3.05 dB |

| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 5150(MHz) | 0.31 dB | -10.17 dB | -2.80 dB |
| 5500(MHz) | 0.96 dB | -10.79 dB | -3.36 dB |
| 5850(MHz) | 0.33 dB | -9.41 dB | -3.55 dB |

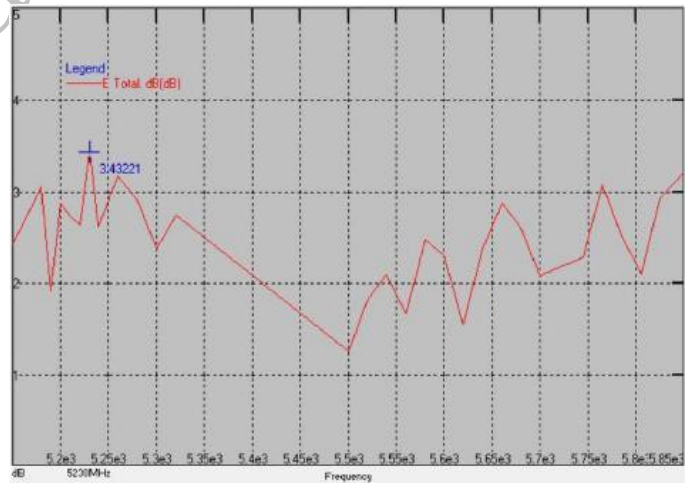
Peak Gain

2G



Peak Gain : Max 4.14 dB

5G



Peak Gain : Max 3.43 dB

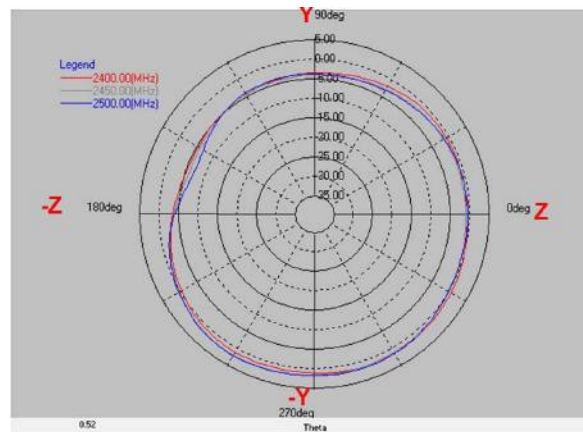
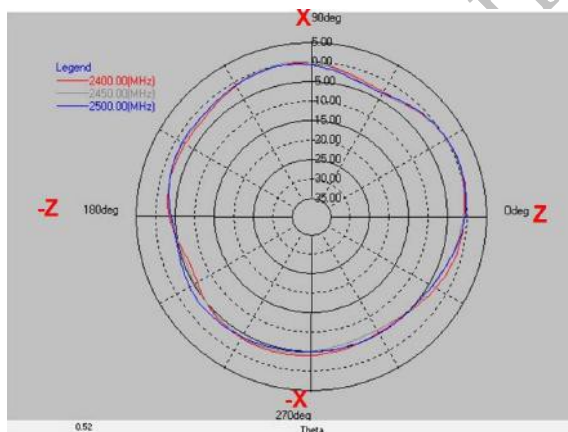
• BTMA0027152G4C1A04

Return Loss S11 : 2G Ant 1 → 25G Ant 2



Frequency(MHz) : 2400~2500. Z-X Plane

Frequency(MHz) : 2400~2500. Z-Y Plane

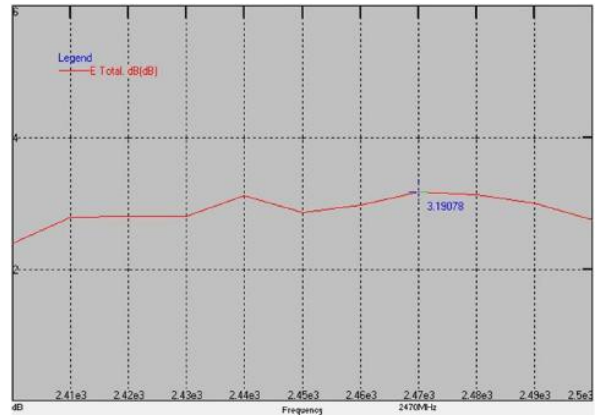
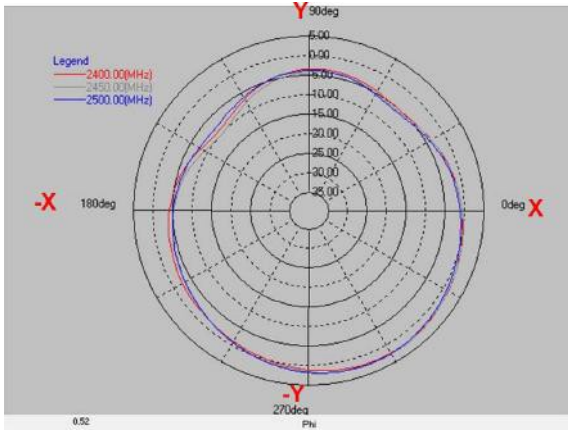


| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 2400(MHz) | 0.31 dB | -6.50 dB | -2.43 dB |
| 2450(MHz) | 0.22 dB | -6.28 dB | -2.59 dB |
| 2500(MHz) | 0.48 dB | -5.27 dB | -2.44 dB |

| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 2400(MHz) | 1.34 dB | -5.51 dB | -0.89 dB |
| 2450(MHz) | 1.91 dB | -6.13 dB | -0.92 dB |
| 2500(MHz) | 2.07 dB | -7.38 dB | -0.80 dB |

Frequency(MHz) : 2400~2500. X-Y Plane

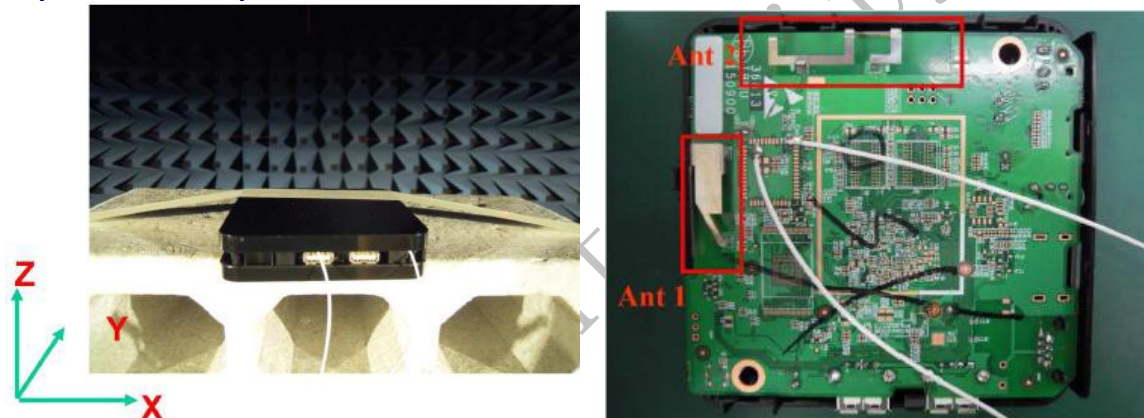
Peak Gain



| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 2400(MHz) | 2.27 dB | -9.20 dB | -1.54 dB |
| 2450(MHz) | 2.60 dB | -10.29 dB | -1.50 dB |
| 2500(MHz) | 2.40 dB | -8.04 dB | -1.62 dB |

• BTMA00290825GD1A02

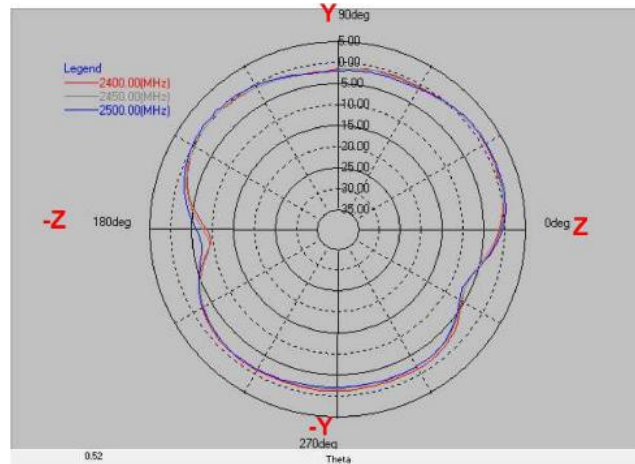
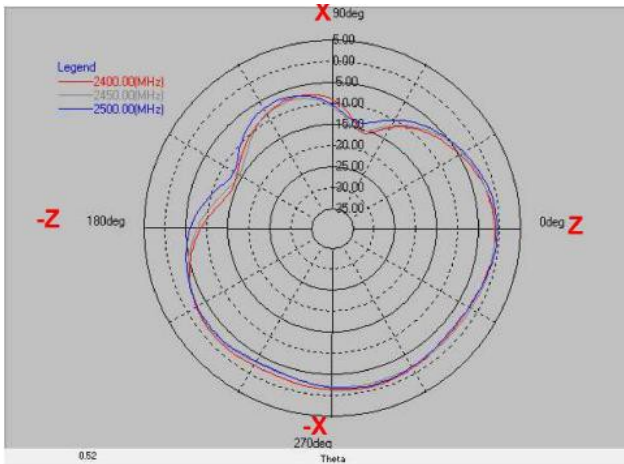
Experimental Setup



Return Loss Ant 1 → Ant 2



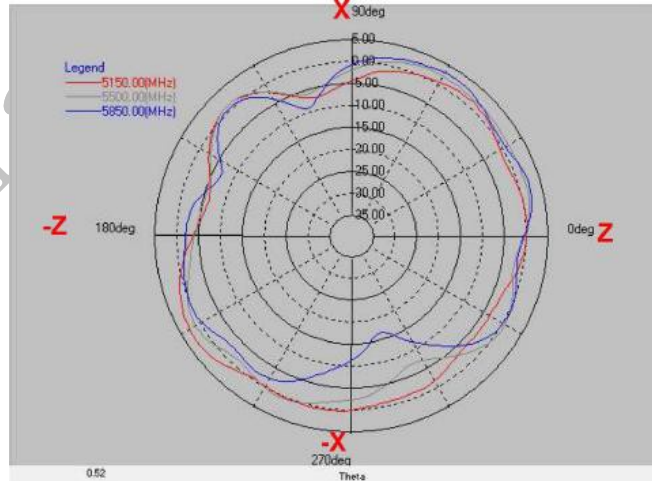
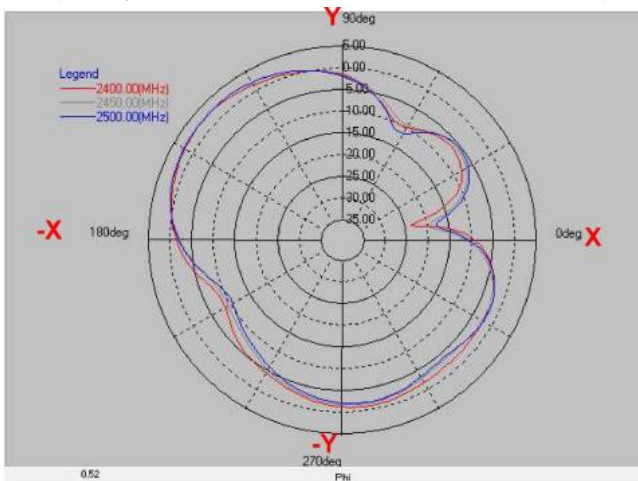
Frequency(MHz) : 2400~2500. Pattern Field : X-Z plane Frequency(MHz) : 2400~2500. Pattern Field : Y-Z plane



| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 2400(MHz) | -0.89 dB | -16.13 dB | -3.98 dB |
| 2450(MHz) | -1.06 dB | -15.91 dB | -4.19 dB |
| 2500(MHz) | -0.51 dB | -11.13 dB | -3.95 dB |

| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 2400(MHz) | 0.76 dB | -9.47 dB | -1.56 dB |
| 2450(MHz) | 0.94 dB | -9.03 dB | -1.73 dB |
| 2500(MHz) | 1.04 dB | -7.20 dB | -1.56 dB |

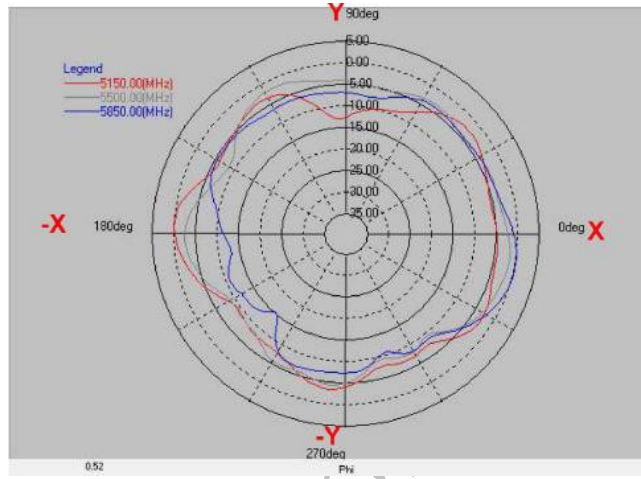
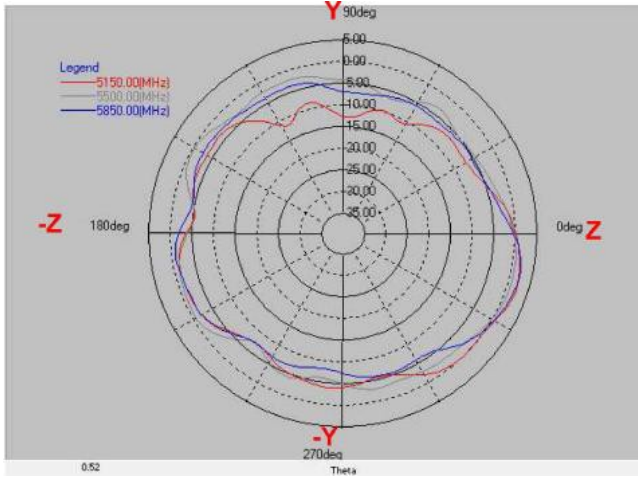
Frequency(MHz):2400~2500.Pattern Field:X-Y plan Frequency(MHz):5150~5850. Pattern Field:Z-X plane



| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 2400(MHz) | 2.47 dB | -23.81 dB | -2.21 dB |
| 2450(MHz) | 2.71 dB | -19.78 dB | -2.28 dB |
| 2500(MHz) | 2.55 dB | -17.95 dB | -2.40 dB |

| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 5150(MHz) | 2.83 dB | -7.47 dB | -0.79 dB |
| 5500(MHz) | 2.08 dB | -7.55 dB | -0.73 dB |
| 5850(MHz) | 3.02 dB | -16.98 dB | -1.22 dB |

Frequency(MHz):2400~2500.Pattern Field:Z-Y plan Frequency(MHz):5150~5850. Pattern Field:X-Y plane



| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 5150(MHz) | 2.33 dB | -13.06 dB | -3.37 dB |
| 5500(MHz) | 0.82 dB | -7.57 dB | -2.62 dB |
| 5850(MHz) | 2.27 dB | -8.44 dB | -3.28 dB |

| Layer | Max value | Min value | Average |
|-----------|-----------|-----------|----------|
| 5150(MHz) | -0.04 dB | -13.16 dB | -4.88 dB |
| 5500(MHz) | -1.42 dB | -9.61 dB | -4.62 dB |
| 5850(MHz) | 0.25 dB | -15.48 dB | -5.55 dB |

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