

emplus

EWS276-FIT **Antenna design proposal**

V1.3
Tim Chao
2023/07/31

Agenda

- History
- Antenna Placement
- Antenna information
- Return loss & Isolation
- Gain table
- 2D Radiation Pattern
- Combine Pattern

History

| Date | Description | Version |
|-----------|--------------------------------------|---------|
| 2023/4/19 | | V1.0 |
| 2023/4/26 | | V1.1 |
| 2023/5/9 | Add manufactory info and Part number | V1.2 |
| 2023/7/31 | Remove DUT photo | V1.3 |
| | | |
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| | | |
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| | | |

Antenna Placement

- EWS276-FIT have total eight antennas as below :
- 2.45GHz * 4
- 5GHz * 4

- Design criteria :
- Installation: Indoor/Wall mount
- Peak Gain: 2.4G:3.5dBi, 5G:4.5dBi
- Return loss: $\leq -10\text{dB}$
- Isolation: $\leq -20\text{dB}$
- Efficiency: $\geq 60\%$

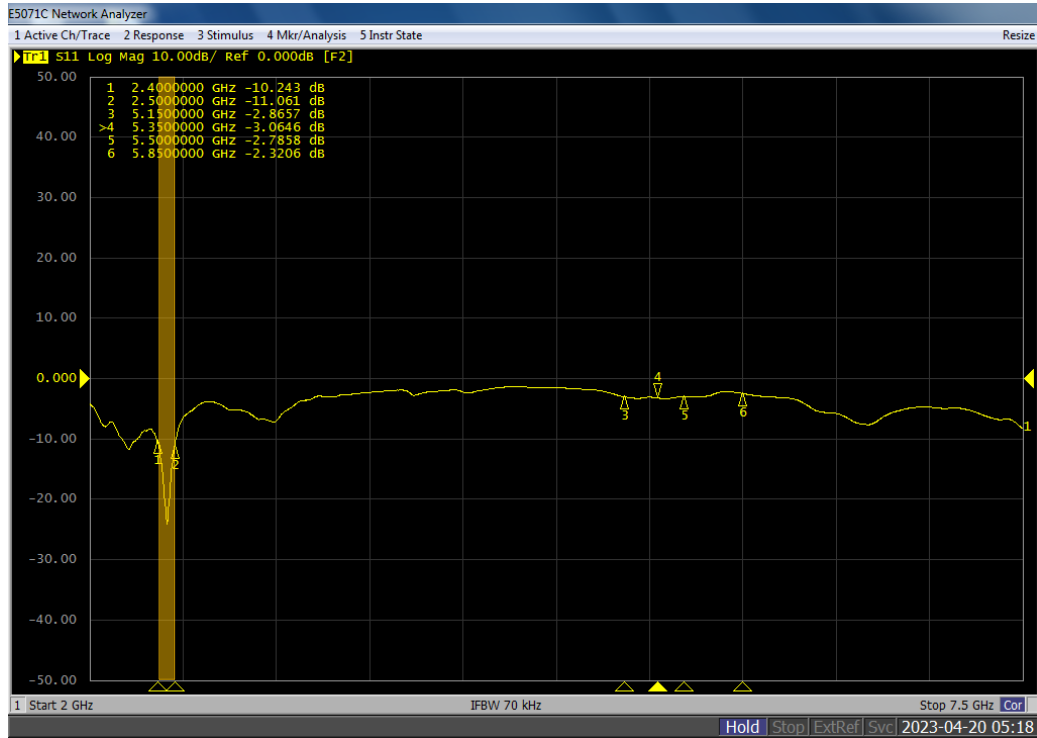
Antenna Information

Manufactory : Advanced wireless & antenna inc.

Add. : B2-F,No.207-1,Sec.3,Beixin Rd.,Xindian Dist.,New Taipei City,231,Taiwan

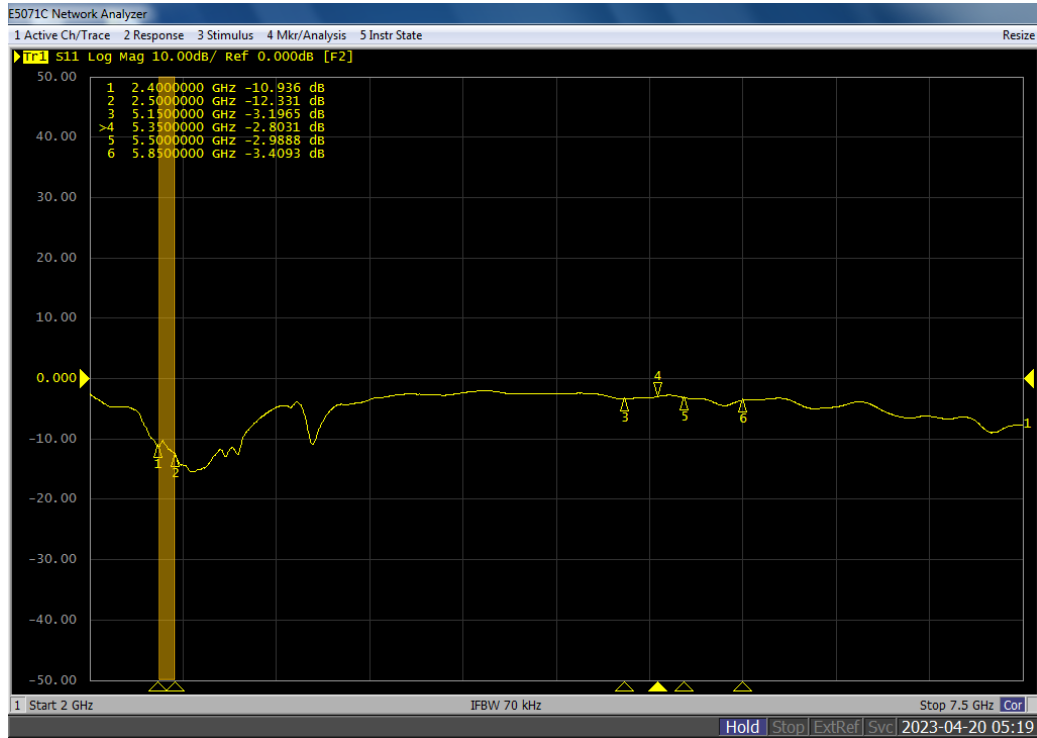
| | Size(mm) | Material | Model Number | Type |
|------|--------------|----------|--------------|--------|
| 2G-1 | 29x10x7 | Metal | 7102A0631000 | PIFA |
| 2G-2 | 32x9.9x5.3 | Metal | 7102A0632000 | PIFA |
| 2G-3 | 38.6x12x0.4 | FR4 | 7102A0630000 | Dipole |
| 2G-4 | 35x18.22x0.8 | FR4 | 7102A0633000 | Dipole |
| 5G-1 | 22x9.9x5.3 | Metal | 7102A0634000 | PIFA |
| 5G-2 | 22x9.9x5.3 | Metal | 7102A0627000 | PIFA |
| 5G-3 | 22x10x5 | Metal | 7102A0628000 | PIFA |
| 5G-4 | 22x9.9x5.3 | Metal | 7102A0629000 | PIFA |

Return Loss : 2G-1



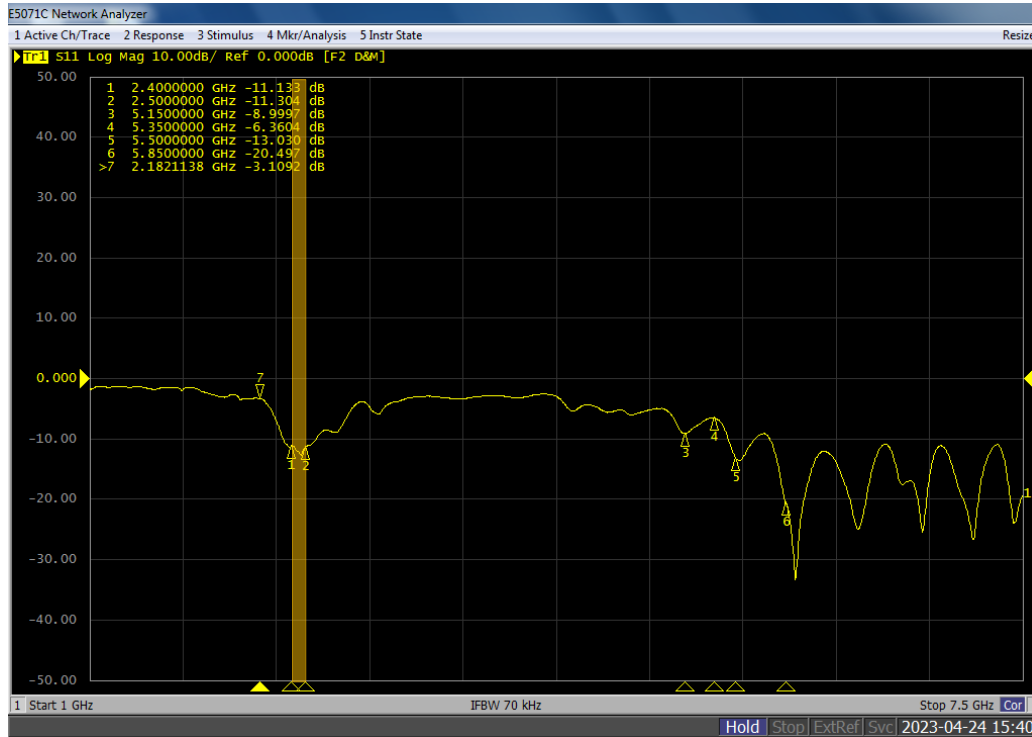
Criteria : $\leq -10\text{dB}$

Return Loss : 2G-2



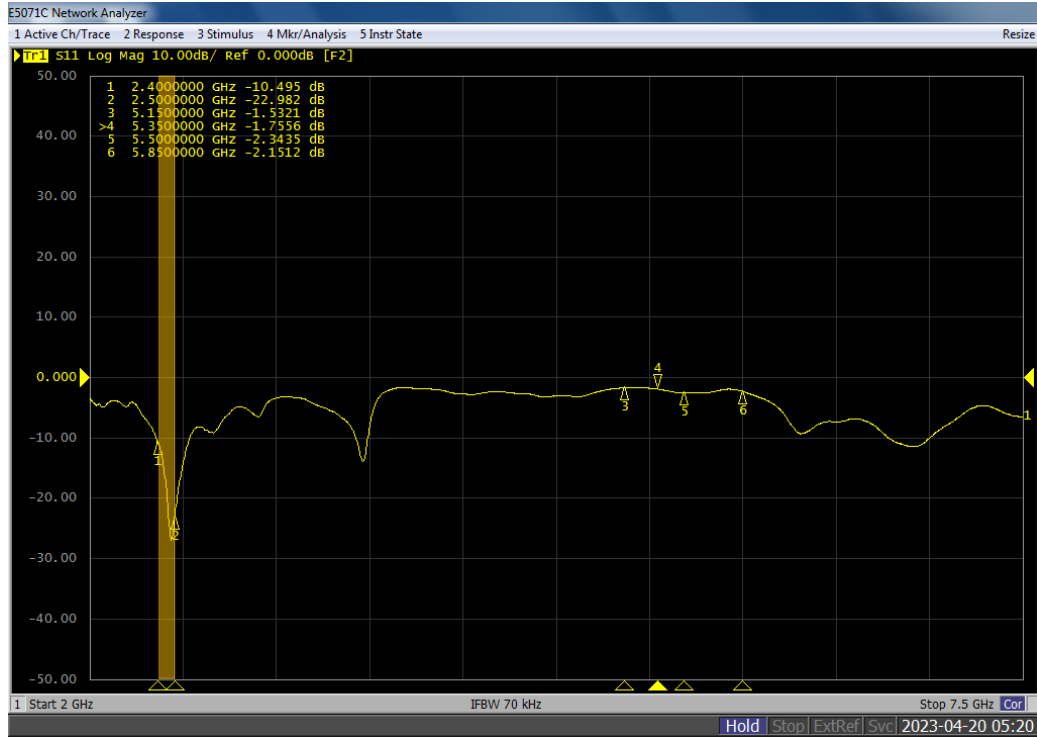
Criteria : $\leq -10\text{dB}$

Return Loss : 2G-3



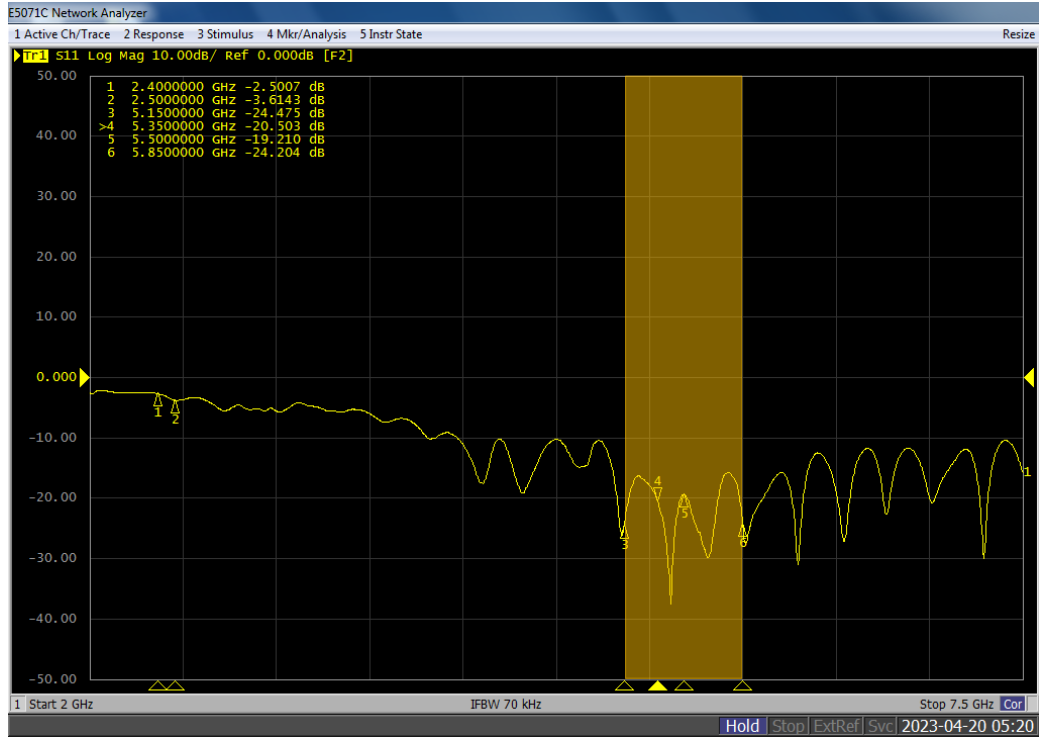
Criteria : $\leq -10\text{dB}$

Return Loss : 2G-4



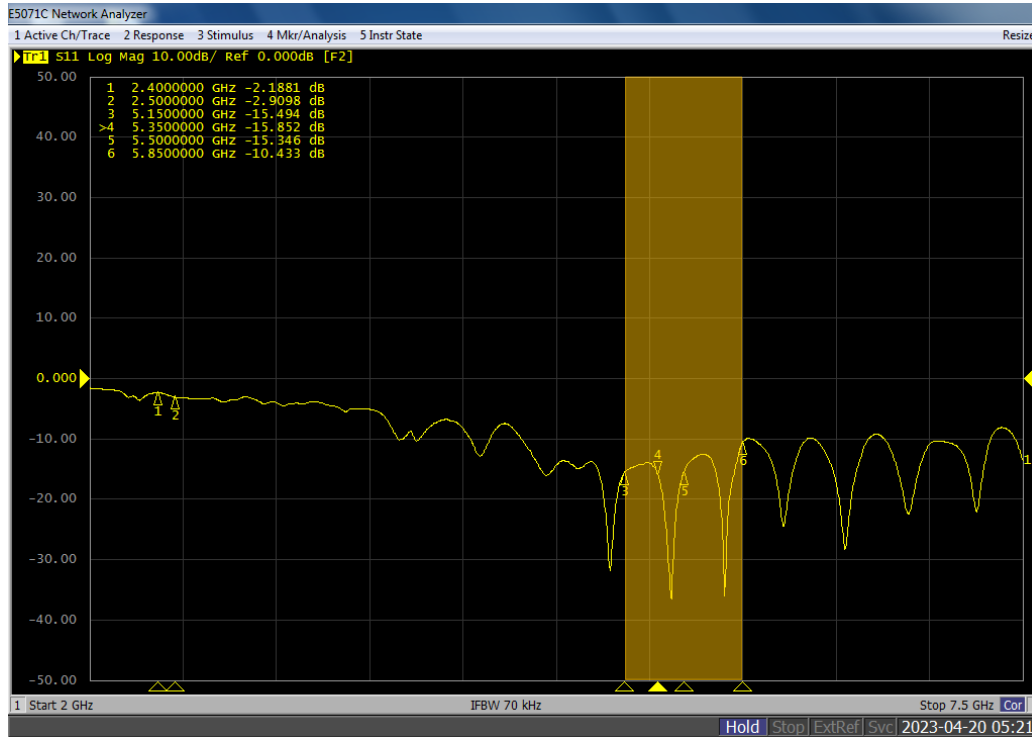
Criteria : $\leq -10\text{dB}$

Return Loss : 5G-1



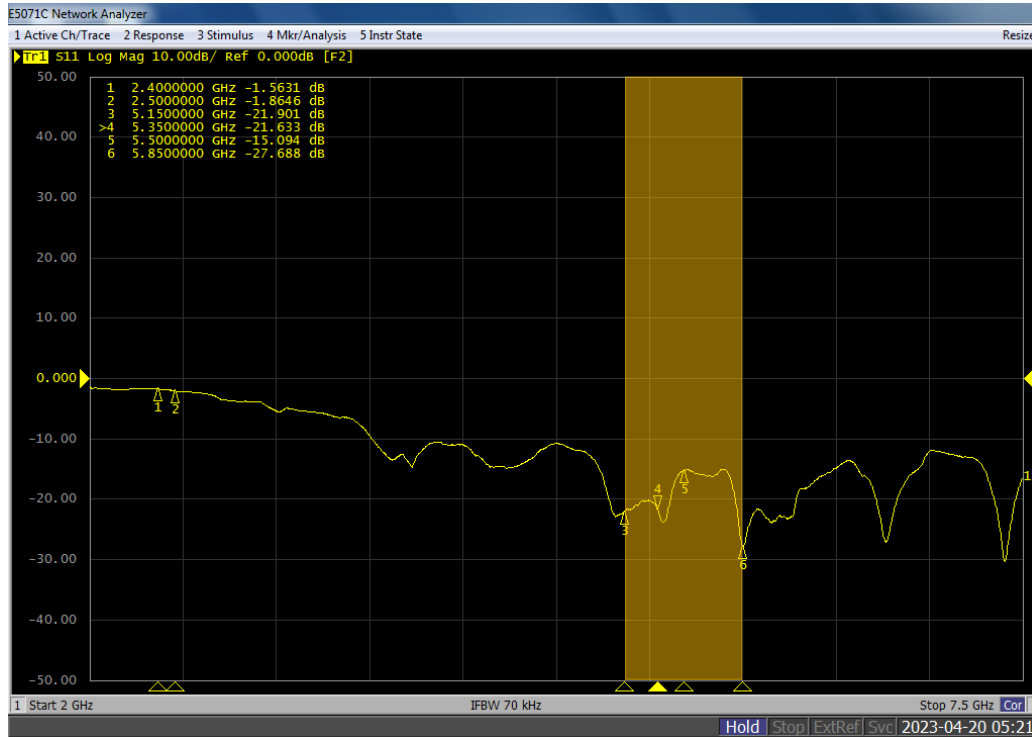
Criteria : $\leq -10\text{dB}$

Return Loss : 5G-2



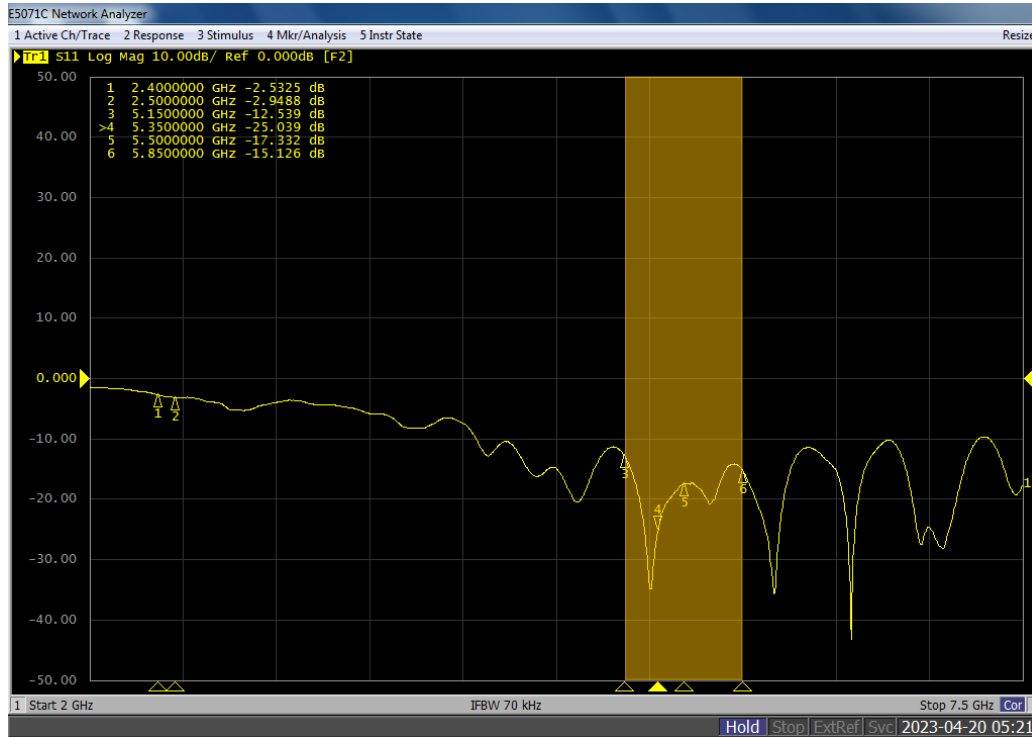
Criteria : $\leq -10\text{dB}$

Return Loss : 5G-3



Criteria : $\leq -10\text{dB}$

Return Loss : 5G-4



Criteria : $\leq -10\text{dB}$

Return loss table

| S11(dB) | 2.4GHz | 2.5GHz | 5.15GHz | 5.35GHz | 5.5GHz | 5.85GHz |
|---------|--------|--------|---------|---------|--------|---------|
| 2G-1 | -10 | -11 | | | | |
| 2G-2 | -10 | -12 | | | | |
| 2G-3 | -11 | -11 | | | | |
| 2G-4 | -10 | -22 | | | | |
| 5G-1 | | | -24 | -20 | -19 | -24 |
| 5G-2 | | | -15 | -15 | -15 | -10 |
| 5G-3 | | | -21 | -21 | -15 | -27 |
| 5G-4 | | | -12 | -25 | -17 | -15 |

Criteria :
S11 < -10dB
Result : PASS

Isolation at 2.45GHz

| | 2G-1 | 2G-2 | 2G-3 | 2G-4 | 5G-1 | 5G-2 | 5G-3 | 5G-4 |
|------|------|------|------|------|------|------|------|------|
| 2G-1 | NA | -22 | -26 | -24 | -20 | -24 | -30 | -24 |
| 2G-2 | NA | NA | -20 | -20 | -23 | -23 | -21 | -27 |
| 2G-3 | NA | NA | NA | -21 | -38 | -34 | -20 | -31 |
| 2G-4 | NA | NA | NA | NA | -20 | -32 | -21 | -31 |

Criteria : $\leq -20\text{dB}$ Result : Pass

Isolation at 5.5GHz

| | 5G-1 | 5G-2 | 5G-3 | 5G-4 | 2G-1 | 2G-2 | 2G-3 | 2G-4 |
|------|------|------|------|------|------|------|------|------|
| 5G-1 | NA | -27 | -32 | -36 | -20 | -28 | -36 | -32 |
| 5G-2 | NA | NA | -26 | -30 | -36 | -27 | -29 | -37 |
| 5G-3 | NA | NA | NA | -20 | -35 | -37 | -22 | -43 |
| 5G-4 | NA | NA | NA | NA | -39 | -40 | -22 | -49 |

Criteria : $\leq -20\text{dB}$ Result : Pass

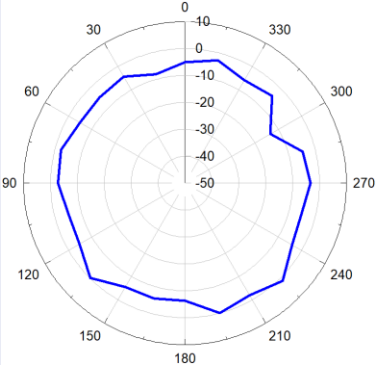
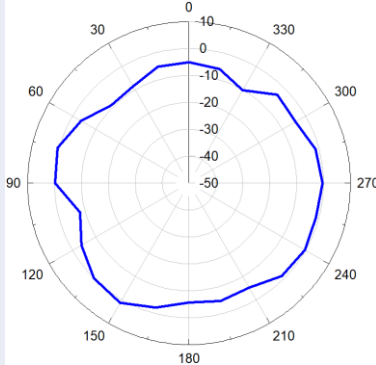
Gain table

| Gain / Efficiency | Antenna | 2.45GHz | 5.15GHz | 5.35GHz | 5.5GHz | 5.85GHz |
|-------------------|---------|---------|---------|---------|--------|---------|
| 2.45GHz | 2G-1 | 3.5/65 | | | | |
| | 2G-2 | 3.8/64 | | | | |
| | 2G-3 | 4.3/63 | | | | |
| | 2G-4 | 4.4/67 | | | | |
| 5GHz | 5G-1 | | 4/63 | 3.8/65 | 5.2/64 | 4.6/66 |
| | 5G-2 | | 4.2/64 | 3.3/60 | 3.8/60 | 5/60 |
| | 5G-3 | | 5/68 | 4.9/65 | 5.2/68 | 6.7/72 |
| | 5G-4 | | 3/61 | 4.6/70 | 5.2/70 | 4.6/72 |

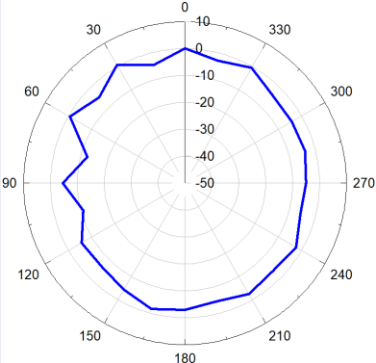
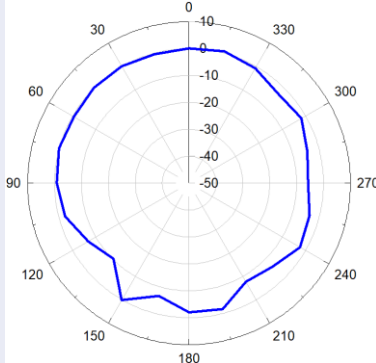
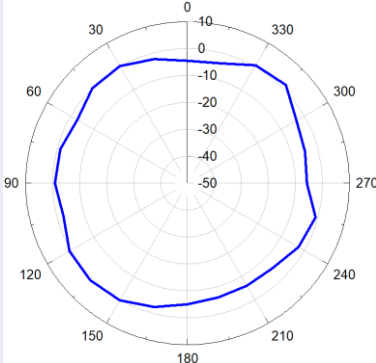
Criteria : Peak gain : 2.45G>3.5dBi ; 5G>4.5dBi
Efficiency : >60%

Result : PASS

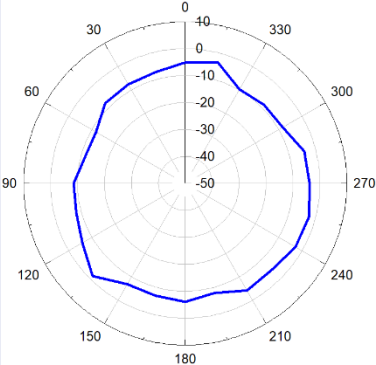
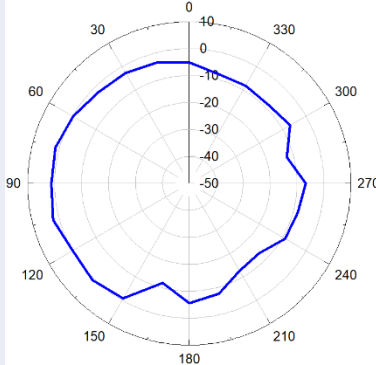
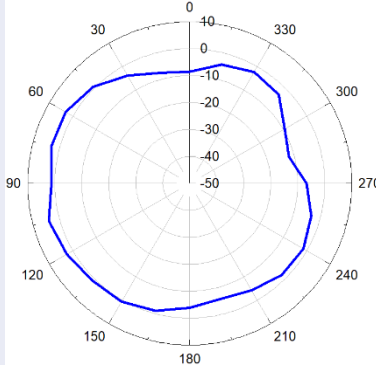
2D pattern : 2G-1

| Frequency | XZ Plane | YZ Plane | XY Plane |
|-----------|--|---|--|
| 2.45GHz |  |  |  |

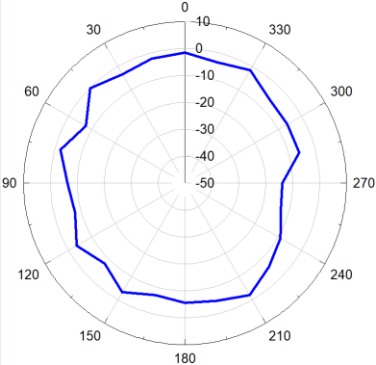
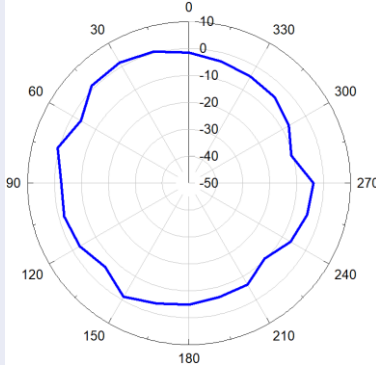
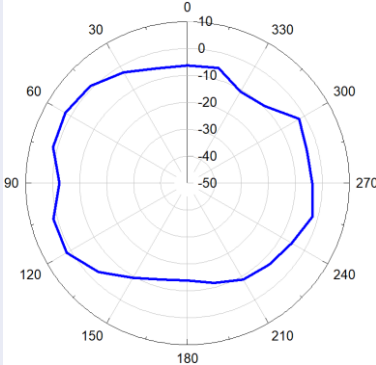
2D pattern : 2G-2

| Frequency | XZ Plane | YZ Plane | XY Plane |
|-----------|--|---|--|
| 2.45GHz |  |  |  |

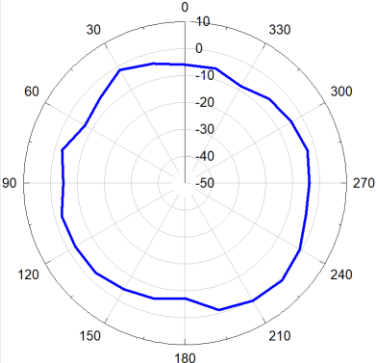
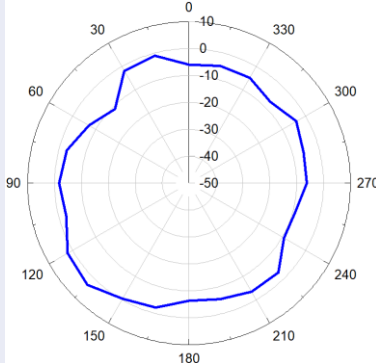
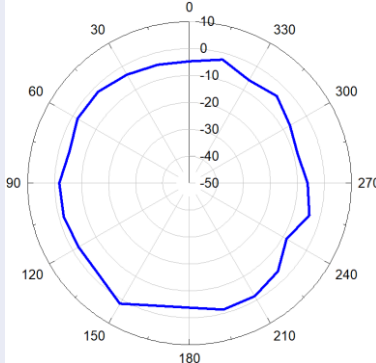
2D pattern : 2G-3

| Frequency | XZ Plane | YZ Plane | XY Plane |
|-----------|--|---|--|
| 2.45GHz |  |  |  |

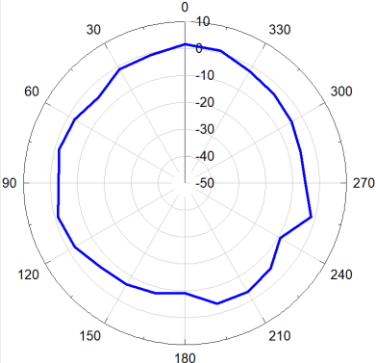
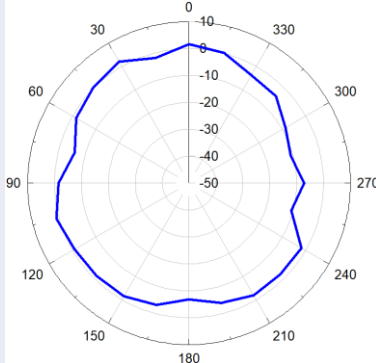
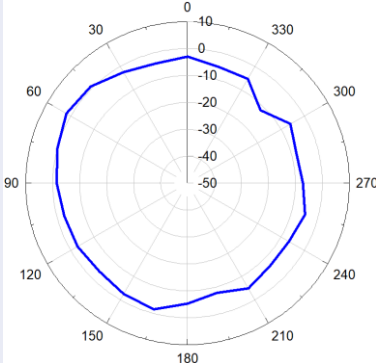
2D pattern : 2G-4

| Frequency | XZ Plane | YZ Plane | XY Plane |
|-----------|--|---|--|
| 2.45GHz |  |  |  |

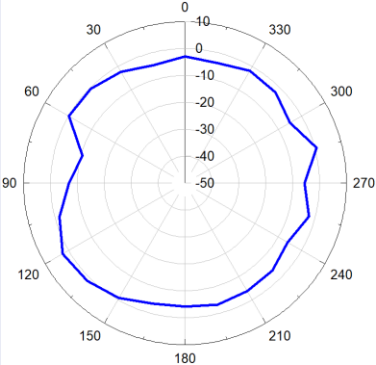
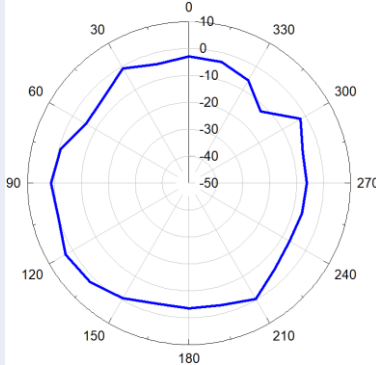
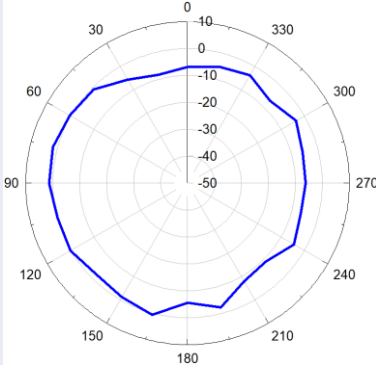
2D pattern : 5G-1

| Frequency | XZ Plane | YZ Plane | XY Plane |
|-----------|--|---|--|
| 5.5GHz |  |  |  |

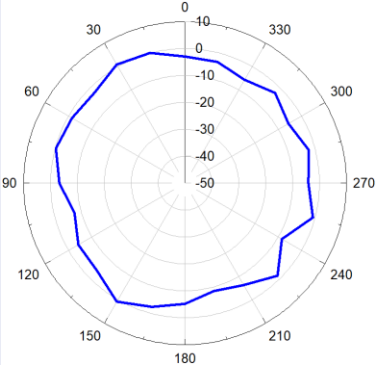
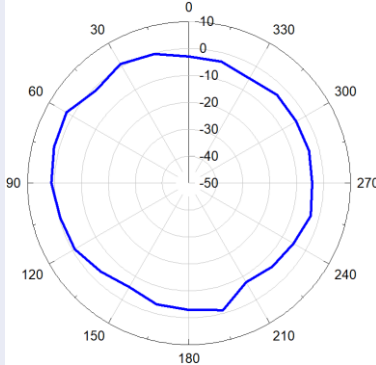
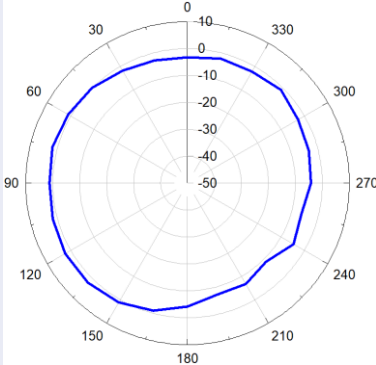
2D pattern : 5G-2

| Frequency | XZ Plane | YZ Plane | XY Plane |
|-----------|--|---|--|
| 5.5GHz |  |  |  |

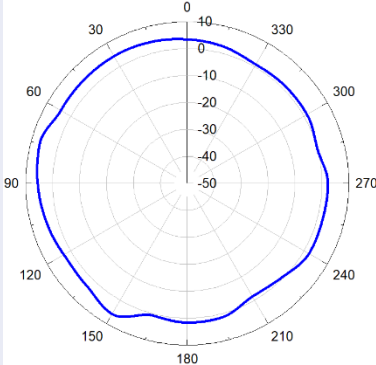
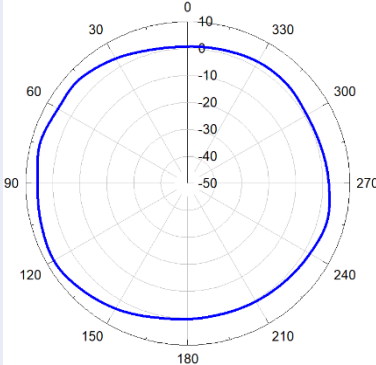
2D pattern : 5G-3

| Frequency | XZ Plane | YZ Plane | XY Plane |
|-----------|--|---|--|
| 5.5GHz |  |  |  |

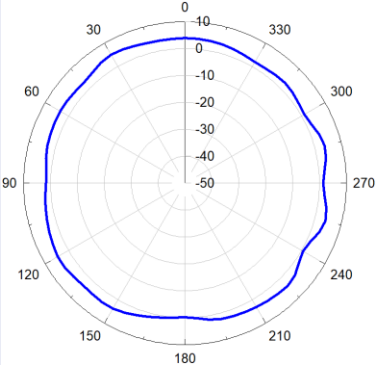
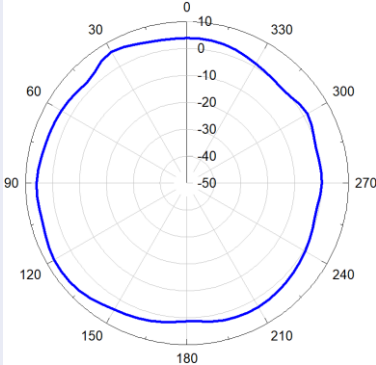
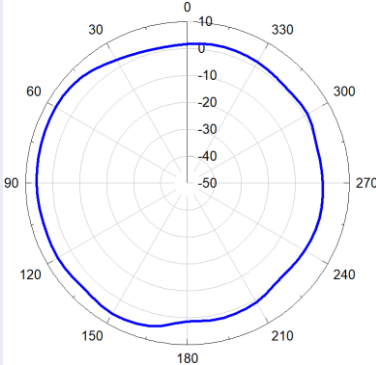
2D pattern : 5G-4

| Frequency | XZ Plane | YZ Plane | XY Plane |
|-----------|--|---|--|
| 5.5GHz |  |  |  |

Combine pattern : 2.4GHz

| Frequency | XZ Plane | YZ Plane | XY Plane |
|-----------|---|--|---|
| 2.45GHz |  <p>A polar plot showing the radiation pattern in the XZ plane at 2.45GHz. The plot is circular with concentric grid lines representing gain levels from 0 to -50 dB. The angular scale is marked from 0 to 330 degrees in 30-degree increments. The radiation pattern is a solid blue line that is roughly circular, indicating a well-balanced omnidirectional pattern.</p> |  <p>A polar plot showing the radiation pattern in the YZ plane at 2.45GHz. The plot is circular with concentric grid lines representing gain levels from 0 to -50 dB. The angular scale is marked from 0 to 330 degrees in 30-degree increments. The radiation pattern is a solid blue line that is roughly circular, indicating a well-balanced omnidirectional pattern.</p> |  <p>A polar plot showing the radiation pattern in the XY plane at 2.45GHz. The plot is circular with concentric grid lines representing gain levels from 0 to -50 dB. The angular scale is marked from 0 to 330 degrees in 30-degree increments. The radiation pattern is a solid blue line that is roughly circular, indicating a well-balanced omnidirectional pattern.</p> |

Combine pattern : 5GHz

| Frequency | XZ Plane | YZ Plane | XY Plane |
|-----------|--|---|--|
| 5.5GHz |  <p>A polar plot showing the radiation pattern in the XZ plane at 5.5GHz. The plot is circular with concentric grid lines representing gain levels from 0 to -50 dB. The angular scale is marked from 0 to 330 degrees in 30-degree increments. A blue curve represents the radiation pattern, which is roughly circular with a slight dip at 180 degrees and a small peak at 240 degrees.</p> |  <p>A polar plot showing the radiation pattern in the YZ plane at 5.5GHz. The plot is circular with concentric grid lines representing gain levels from 0 to -50 dB. The angular scale is marked from 0 to 330 degrees in 30-degree increments. A blue curve represents the radiation pattern, which is roughly circular with a slight dip at 180 degrees and a small peak at 240 degrees.</p> |  <p>A polar plot showing the radiation pattern in the XY plane at 5.5GHz. The plot is circular with concentric grid lines representing gain levels from 0 to -50 dB. The angular scale is marked from 0 to 330 degrees in 30-degree increments. A blue curve represents the radiation pattern, which is roughly circular with a slight dip at 180 degrees and a small peak at 240 degrees.</p> |

The logo for 'emplus' is centered in the image. It features the word 'emplus' in a lowercase, sans-serif font. The 'e' and 'm' are a medium blue, while the 'p' and 'l' are a darker blue, and the 'u' and 's' are a light blue. The background is a large, abstract graphic of overlapping, semi-transparent blue circles and polygons, creating a low-poly, crystalline effect. The overall color palette is various shades of blue, from light cyan to deep navy, set against a white background with scattered blue dots.

Dependable, Accountable, and always Available

We are your best partner!