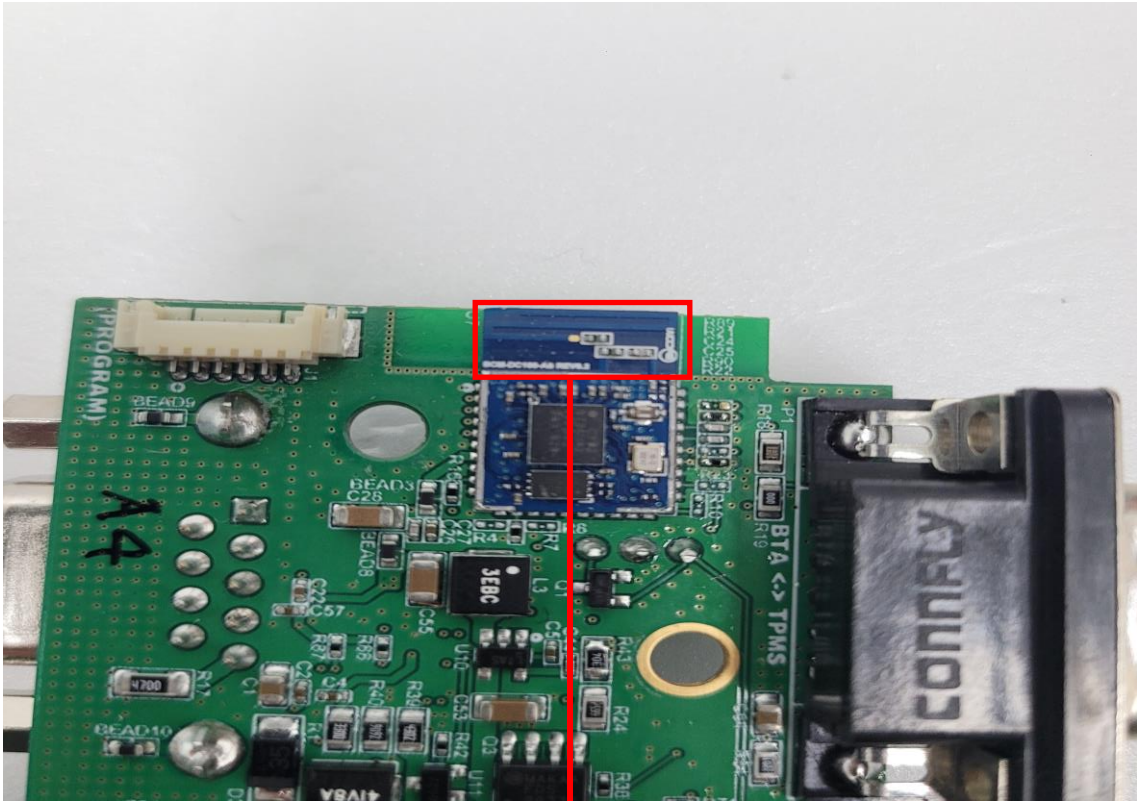


Antenna Information

| Item | Contents |
|---------------------------|--------------------------------|
| Antenna Type | PCB Pattern Antenna |
| Antenna peak gain | 1.33 dB i |
| Manufacturer / Model name | BnCOM Co., Ltd. / BCM-DC100-AS |
| Test laboratory | RADINA. Co., Ltd |



PCB
Pattern Antenna

2021.05.18

RA-N2105-59

APPROVAL SHEET

MODEL :
BCM-DC100-AS
Antenna layout

| Review | Consent | Approval |
|--------|---------|----------|
| | | |
| | | |

Messrs. BnCOM Co.,Ltd



RadiNa Co. ,Ltd

TEL:+82-2-463-0373

FAX:+82-2-463-0374



| | | | | | | |
|---|------------------------|---------------------|---------------|-----|------|--------|
|  | PRODUCT APPROVAL SHEET | | GRBC21052BT58 | | | |
| | MODEL NAME | BCM-DC100-AS | REV. | 1.0 | Page | 2 / 10 |


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 - 5.4 2D-GAIN
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7. Measurement Process

| | | | | | | |
|---|------------------------|---------------------|---------------|-----|------|--------|
|  | PRODUCT APPROVAL SHEET | | GRBC21052BT58 | | | |
| | MODEL NAME | BCM-DC100-AS | REV. | 1.0 | Page | 3 / 10 |

1. Revision History

| NO. | Before | After | Reason | Date |
|-----|--------|-------|--------|------|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | | | | |
| 11 | | | | |
| 12 | | | | |
| 13 | | | | |

| | | | | | | |
|---|------------------------|--------------|---------------|-----|------|--------|
|  | PRODUCT APPROVAL SHEET | | GRBC21052BT58 | | | |
| | MODEL NAME | BCM-DC100-AS | REV. | 1.0 | Page | 4 / 10 |

2. Product Information

2.1 General Features


| | |
|--------------|---------------------|
| PART NUMBER | GradiANT |
| ANTENNA TYPE | PCB Pattern Antenna |
| APPLICATIONS | Bluetooth |

2.2 Electrical Specifications

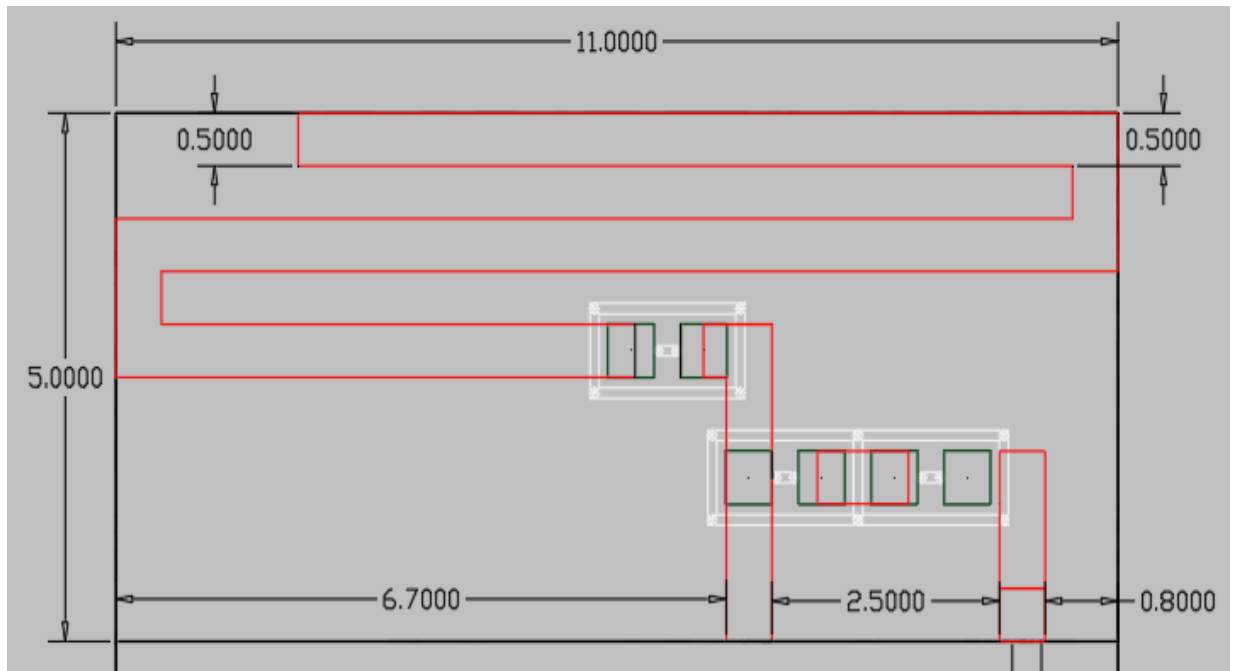
| | | | |
|-----------------------|----|------------------|---------|
| Frequency Range1 (TX) | | 2400MHz~2485MHz | |
| Frequency Range1 (RX) | | 2400MHz~2485MHz | |
| IMPEDANCE | | 50 Ω | |
| V.S.W.R | TX | 2400MHz | 2485MHz |
| | | 5 ↓ | 5 ↓ |
| | RX | 2400MHz | 2485MHz |
| | | 5 ↓ | 5 ↓ |
| RADIATION PATTERN | | Omni-directional | |
| POLARIZATION | | Linear | |

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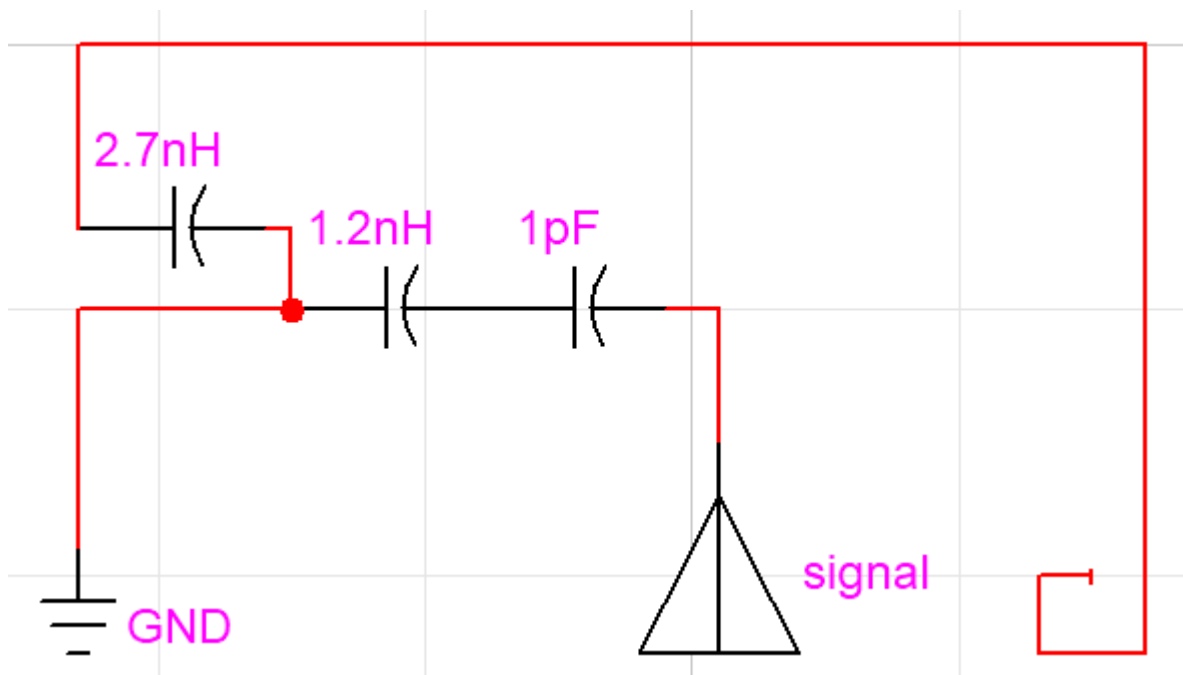
| | | | | | | |
|---|------------------------|--------------|---------------|-----|------|--------|
|  | PRODUCT APPROVAL SHEET | | GRBC21052BT58 | | | |
| | MODEL NAME | BCM-DC100-AS | REV. | 1.0 | Page | 5 / 10 |

3. Pattern Specifications



4. Matching Network

Capacitor value can be changed depending on different situation



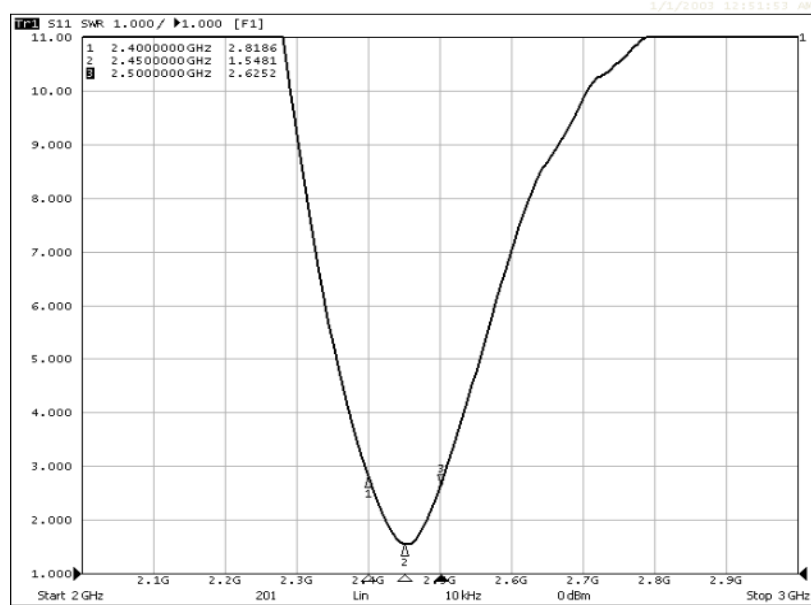
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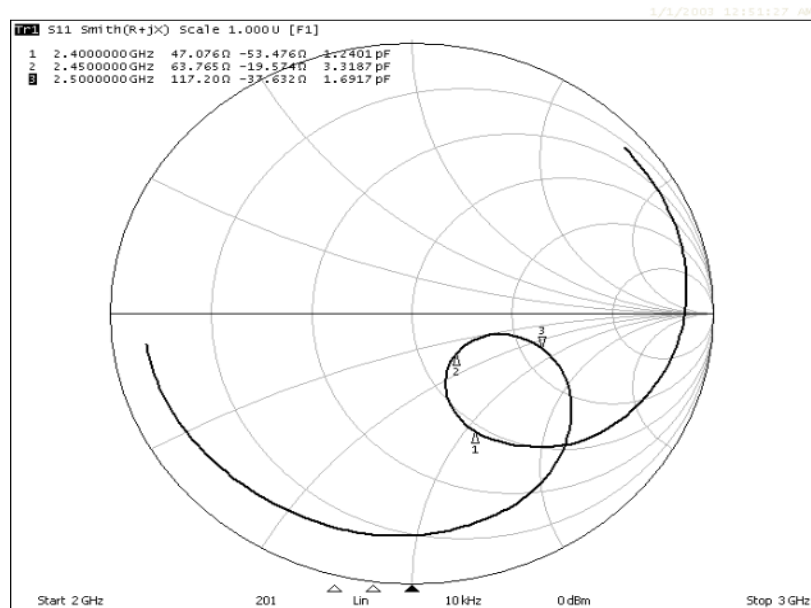


5. Electrical Characteristics

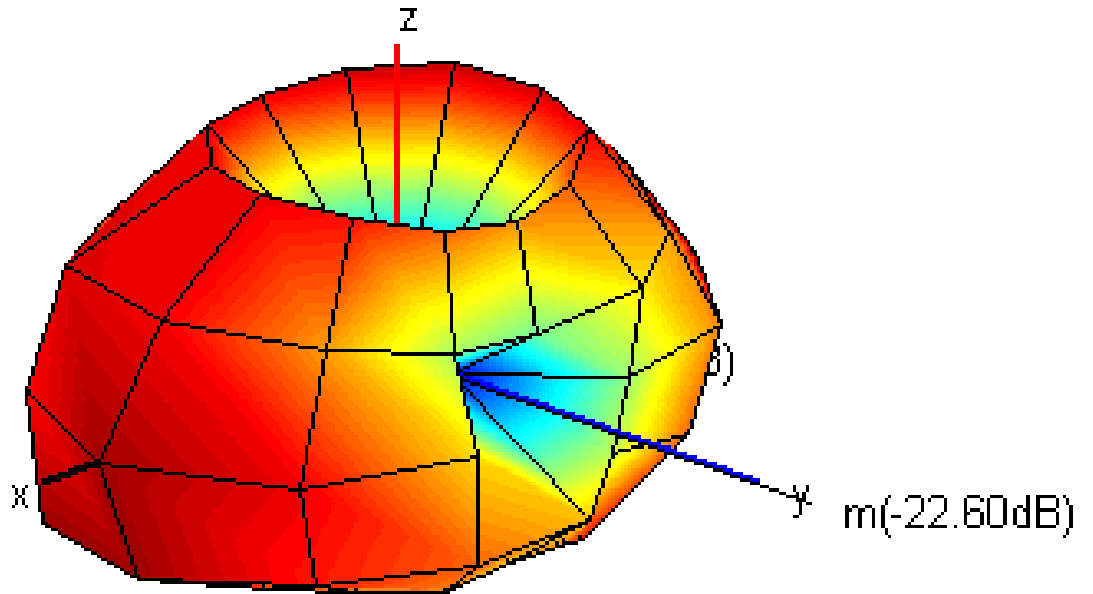
5.1 VSWR



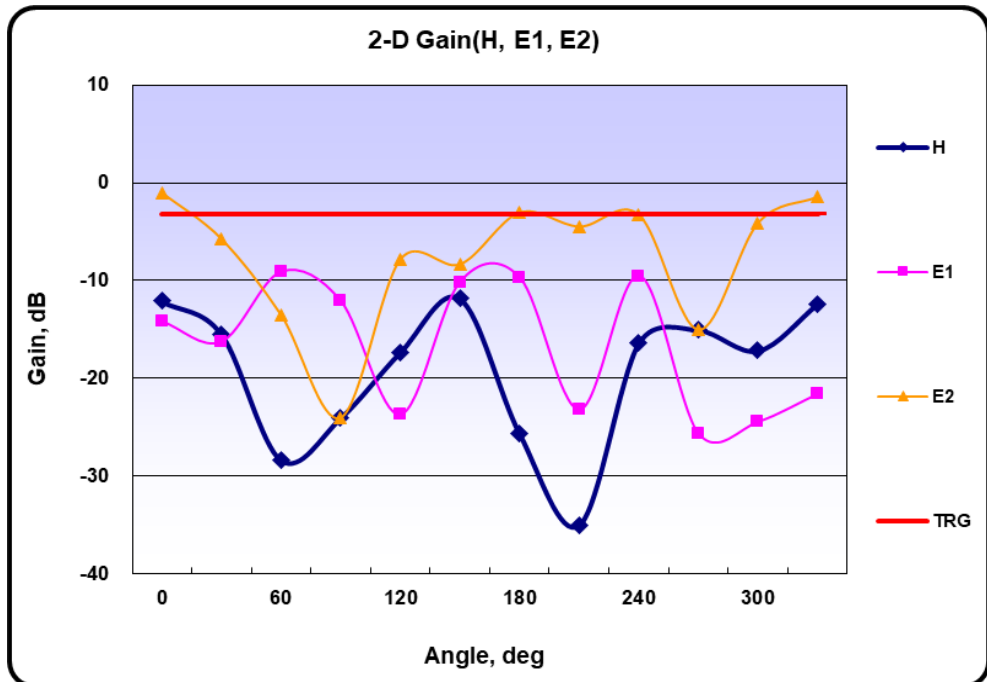
5.2 SMITH CHART




5.3 3D-PLOTs



5.4 2D-GAIN



| | | | | | | |
|---|------------------------|--------------|---------------|-----|------|--------|
|  | PRODUCT APPROVAL SHEET | | GRBC21052BT58 | | | |
| | MODEL NAME | BCM-DC100-AS | REV. | 1.0 | Page | 8 / 10 |

6. Passive Measurement


| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Frequency(MHz) | 2400 | 2405 | 2410 | 2415 | 2420 | 2425 | 2430 | 2435 | 2440 | 2445 |
| Efficiency(dB) | -4.37 | -4.34 | -4.04 | -3.73 | -3.61 | -3.58 | -3.50 | -3.40 | -3.26 | -3.15 |
| Efficiency(%) | 36.60 | 36.78 | 39.47 | 42.36 | 43.60 | 43.84 | 44.70 | 45.73 | 47.23 | 48.38 |
| TRG(dB) | -4.37 | -4.34 | -4.04 | -3.73 | -3.61 | -3.58 | -3.50 | -3.40 | -3.26 | -3.15 |
| TRG _{Theta} (dB) | -10.13 | -10.09 | -9.75 | -9.42 | -9.30 | -9.48 | -9.13 | -9.06 | -8.93 | -8.77 |
| TRG _{Phi} (dB) | -5.70 | -5.69 | -5.39 | -5.09 | -4.97 | -4.87 | -4.88 | -4.77 | -4.63 | -4.54 |
| UHRG(dB) | -7.53 | -7.43 | -7.21 | -6.88 | -6.80 | -6.86 | -6.72 | -6.71 | -6.57 | -6.44 |
| UHRG/TRG(%) | 48.28 | 49.11 | 48.16 | 48.42 | 47.91 | 47.05 | 47.56 | 46.66 | 46.65 | 46.88 |
| H-Plane | -17.25 | -17.89 | -17.33 | -17.18 | -16.89 | -16.80 | -16.66 | -17.32 | -15.66 | -15.82 |
| E1-Plane, AVG(dB) | -14.99 | -14.90 | -14.46 | -14.25 | -14.00 | -13.79 | -13.43 | -13.72 | -12.96 | -13.14 |
| E2-Plane, AVG(dB) | -6.74 | -6.24 | -5.04 | -5.66 | -5.68 | -5.31 | -4.99 | -5.51 | -5.23 | -4.93 |
| Peak Gain(dB) | 0.15 | 0.24 | 0.25 | 0.73 | 0.81 | 1.13 | 0.84 | 0.90 | 1.33 | 1.23 |
| Directivity(dB) | 4.51 | 4.58 | 4.28 | 4.46 | 4.41 | 4.71 | 4.34 | 4.30 | 4.58 | 4.38 |
| Minimum Gain(dB) | -16.49 | -18.30 | -16.41 | -17.87 | -21.08 | -18.41 | -20.95 | -18.14 | -22.59 | -22.60 |

| | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Frequency(MHz) | 2450 | 2455 | 2460 | 2465 | 2470 | 2475 | 2480 | 2485 | 2490 | 2497 |
| Efficiency(dB) | -3.30 | -3.39 | -3.28 | -3.35 | -3.45 | -3.43 | -3.76 | -4.16 | -4.35 | -4.52 |
| Efficiency(%) | 46.82 | 45.82 | 47.01 | 46.24 | 45.20 | 45.35 | 42.11 | 38.40 | 36.74 | 35.32 |
| TRG(dB) | -3.30 | -3.39 | -3.28 | -3.35 | -3.45 | -3.43 | -3.76 | -4.16 | -4.35 | -4.52 |
| TRG _{Theta} (dB) | -8.87 | -8.87 | -8.77 | -8.78 | -8.72 | -8.70 | -9.17 | -9.47 | -9.61 | -9.92 |
| TRG _{Phi} (dB) | -4.71 | -4.83 | -4.72 | -4.82 | -4.98 | -4.97 | -5.23 | -5.67 | -5.88 | -6.00 |
| UHRG(dB) | -6.54 | -6.74 | -6.55 | -6.68 | -6.81 | -6.81 | -7.15 | -7.56 | -7.69 | -7.90 |
| UHRG/TRG(%) | 47.37 | 46.18 | 47.13 | 46.49 | 46.10 | 46.00 | 45.78 | 45.65 | 46.37 | 45.88 |
| H-Plane | -16.71 | -16.24 | -16.09 | -15.85 | -16.39 | -16.04 | -16.31 | -16.87 | -16.62 | -17.65 |
| E1-Plane, AVG(dB) | -13.24 | -12.82 | -12.87 | -13.18 | -13.26 | -13.11 | -13.63 | -14.10 | -13.89 | -14.22 |
| E2-Plane, AVG(dB) | -4.99 | -5.38 | -5.29 | -4.86 | -4.77 | -5.41 | -5.62 | -4.76 | -5.93 | -6.05 |
| Peak Gain(dB) | 1.08 | 0.81 | 1.00 | 0.94 | 0.83 | 0.79 | 0.53 | 0.04 | 0.05 | -0.22 |
| Directivity(dB) | 4.38 | 4.20 | 4.28 | 4.29 | 4.28 | 4.22 | 4.28 | 4.20 | 4.40 | 4.30 |
| Minimum Gain(dB) | -21.31 | -18.20 | -20.12 | -17.89 | -16.26 | -15.25 | -15.80 | -16.77 | -18.15 | -18.79 |

| | | |
|---------------------------|------------------|---------------|
| Average Efficiency | -3.68dBi, | 42.89% |
| Peak Gain | 1.33dBi, | |


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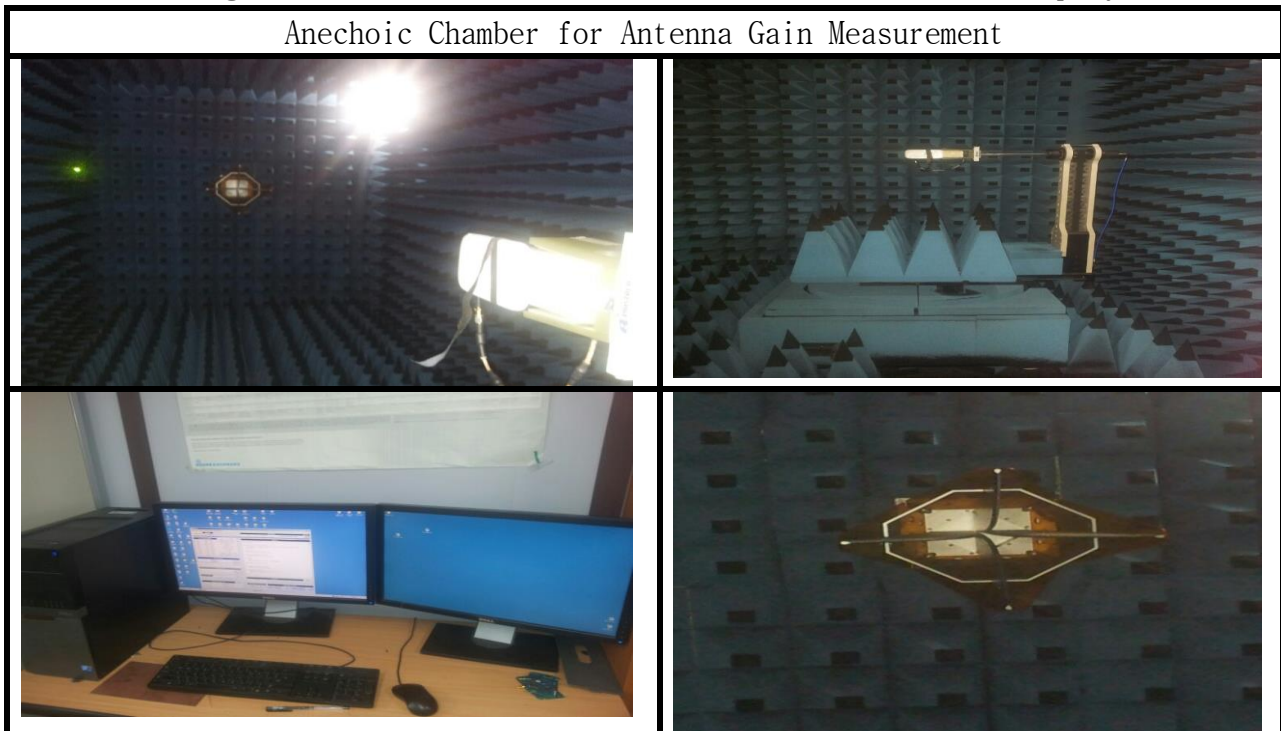
7. Measurement Process

7.1 SWR / Return loss

| | |
|------------------|---|
| | Set Condition |
| Network Analyzer | Agilent 8753ES |
| Cable | Semi-rigid (40mm, 60mm) |
| Test condition |  |

7.2 Gain

Antenna gain is measured in the anechoic chamber of this company.



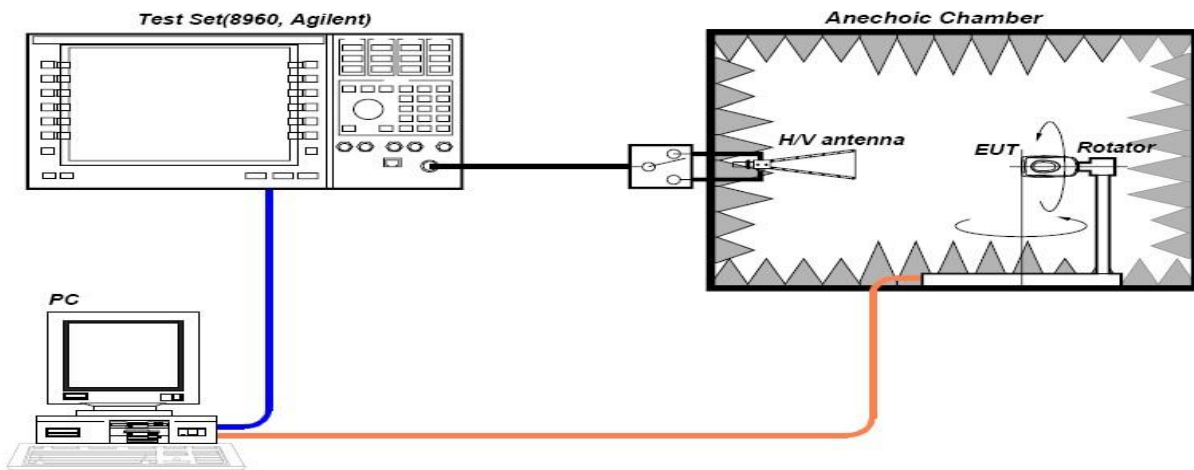
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7.3 Gain test block diagram

Active test System

- TRP, NHPRP, UHRP
- TIS, NHPIS, UHIS
- Relative Sensitivity



Passive test System

- Efficiency
- Peak Gain, Avg, Gain
- Min, Max PWR

