



## APPENDIX J

### : ANTENNA SPECIFICATION

# ANTENNA SPECIFICATIONS

|              |             |
|--------------|-------------|
| Product Name | BLE Antenna |
| Model Name   | G91 Antenna |

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## 1. Features

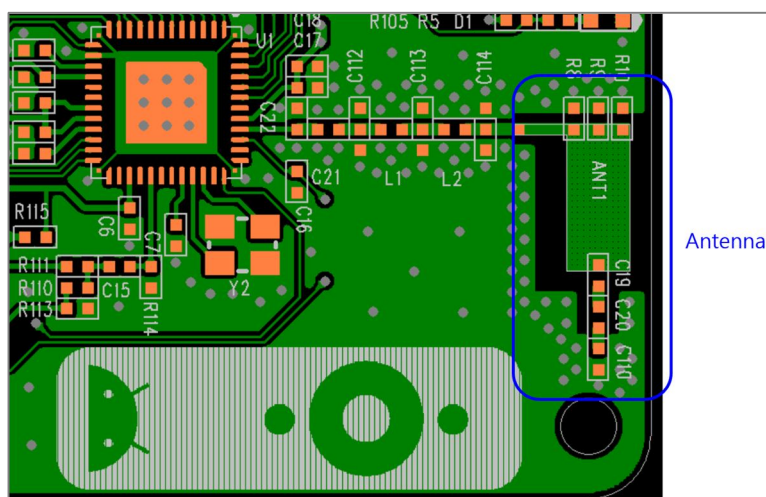
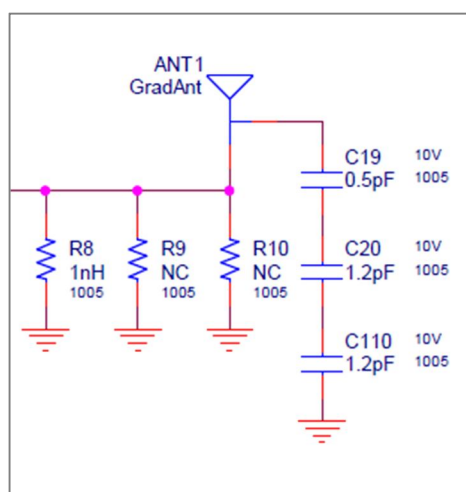
- BLE Antenna
- Frequency range : 2.4GHz ~ 2.5GHz
- PCB Pattern Antenna

## 2. Antenna Characteristics

### 2.1 Antenna Performance

| Parameter       | Min. | Typ    | Max. | Unit  |
|-----------------|------|--------|------|-------|
| Frequency Range | 2400 | 2450   | 2500 | MHz   |
| Directivity     |      | Omni   |      | -     |
| Polarization    |      | Linear |      | -     |
| VSWR            | 3:1  |        |      | Under |
| Impedance       |      | 50     |      | Ohm   |
| Peak gain       | 1.91 |        | 2.38 | dB    |

### 2.2 Antenna circuit, layout



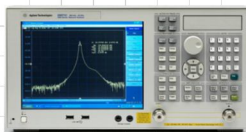
## 2.3 Network analyzer data

# ANTENNA Measurement

Gongdan 1-dong, Gumi-si, Gyeongbuk, Korea TEL : 054)468-7130 , FAX : 054)461-8368

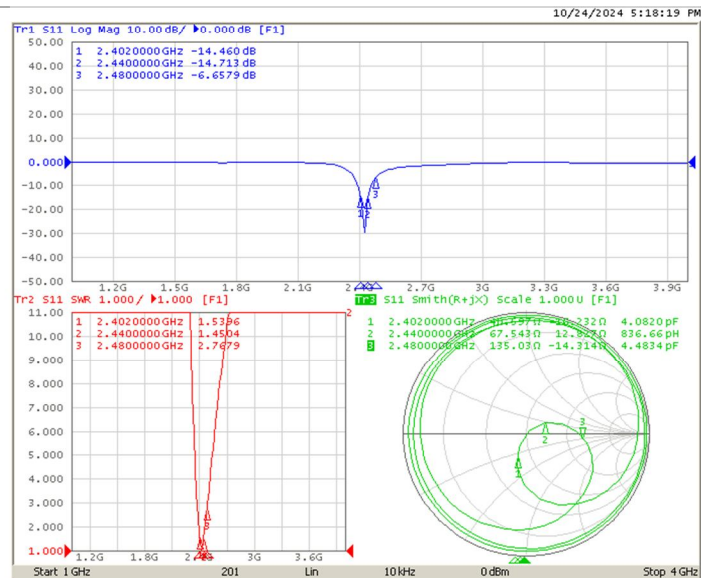
|                   |             |                     |                 |
|-------------------|-------------|---------------------|-----------------|
| Report No         | -           | Testing person      | KOO YEON KYEONG |
| Product name      | G91         | PCB P/No , REV.     | PLCFA1658A      |
| Measurement date  | 2024-10-10  | Case on/off         | off             |
| Measurement sites | Shield room | Connect the product | -               |

### Used equipment - RF Network Analyzer(Agilent E5071B)



- 300KHz ~ 8.5GHz
- More than 125dB dynamic range

### S-PARAMETER



### ANTENNA TUNING DATA

| Date  | 담당사  | RF Matching Location No. |    |     |       |       |       |    | Return loss |         |         | Result |  |
|-------|------|--------------------------|----|-----|-------|-------|-------|----|-------------|---------|---------|--------|--|
|       |      | R8                       | R9 | R10 | C19   | C20   | C110  | 기타 | 2402MHz     | 2440MHz | 2480MHz | Limit  |  |
| 10/10 | Koo. | 1nH                      | NC | NC  | 0.5pF | 1.2pF | 1.2pF |    | -14.46      | -14.71  | -6.66   |        |  |
|       |      |                          |    |     |       |       |       |    |             |         |         |        |  |
|       |      |                          |    |     |       |       |       |    |             |         |         |        |  |
|       |      |                          |    |     |       |       |       |    |             |         |         |        |  |
|       |      |                          |    |     |       |       |       |    |             |         |         |        |  |
|       |      |                          |    |     |       |       |       |    |             |         |         |        |  |
|       |      |                          |    |     |       |       |       |    |             |         |         |        |  |
|       |      |                          |    |     |       |       |       |    |             |         |         |        |  |
|       |      |                          |    |     |       |       |       |    |             |         |         |        |  |
|       |      |                          |    |     |       |       |       |    |             |         |         |        |  |

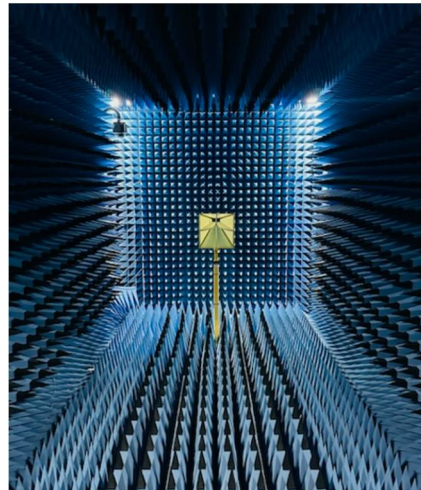
A4(210x297mm)

## 2.4 Efficiency

|                    | 1        | 2      | 3       | 4      | 5      | 6      | 7      | 8      | 9                   | 10     | 11     | 12     | 13     | 14     | 15     | 16     | 17     | 18     |
|--------------------|----------|--------|---------|--------|--------|--------|--------|--------|---------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Frequency [MHz]    | 2400     | 2405   | 2410    | 2415   | 2420   | 2425   | 2430   | 2435   | 2440                | 2445   | 2450   | 2455   | 2460   | 2465   | 2470   | 2475   | 2480   | 2485   |
| Efficiency [dB]    | -3.22    | -3.19  | -3.20   | -3.31  | -3.31  | -3.48  | -3.15  | -2.90  | -2.89               | -2.83  | -2.98  | -3.06  | -3.12  | -3.08  | -3.08  | -3.19  | -3.33  | -3.95  |
| Efficiency [%]     | 47.6     | 48.0   | 47.9    | 46.7   | 46.7   | 44.9   | 48.4   | 51.3   | 51.5                | 52.1   | 50.3   | 49.4   | 48.8   | 49.2   | 49.2   | 48.0   | 46.5   | 40.2   |
| TRG $\theta$ [dB]  | -4.04    | -4.02  | -4.06   | -4.18  | -4.20  | -4.39  | -4.07  | -3.83  | -3.87               | -3.86  | -4.01  | -4.09  | -4.24  | -4.21  | -4.20  | -4.34  | -4.48  | -5.20  |
| TRG $\phi$ [dB]    | -10.86   | -10.74 | -10.68  | -10.70 | -10.65 | -10.73 | -10.35 | -10.03 | -9.79               | -9.58  | -9.76  | -9.83  | -9.56  | -9.46  | -9.52  | -9.51  | -9.66  | -9.98  |
| UHRG [dB]          | -7.91    | -7.78  | -7.75   | -7.88  | -7.84  | -7.92  | -7.54  | -7.29  | -7.23               | -7.02  | -7.21  | -7.30  | -7.35  | -7.23  | -7.23  | -7.30  | -7.54  | -8.12  |
| UHRG/TRG [%]       | 34.0     | 34.7   | 35.1    | 34.9   | 35.2   | 36.0   | 36.4   | 36.4   | 36.8                | 38.1   | 37.8   | 37.7   | 37.8   | 38.4   | 38.5   | 38.8   | 37.9   | 38.3   |
| H-Plane            | -6.55    | -6.56  | -6.53   | -6.51  | -6.35  | -6.43  | -6.23  | -5.70  | -5.73               | -5.79  | -5.74  | -6.06  | -6.18  | -6.10  | -6.02  | -6.10  | -6.42  | -7.05  |
| E1-Plane, AVG [dB] | -4.53    | -4.60  | -4.64   | -4.70  | -4.62  | -5.00  | -4.57  | -4.38  | -4.36               | -4.44  | -4.72  | -4.58  | -4.78  | -4.86  | -4.76  | -4.91  | -4.88  | -5.39  |
| E2-Plane, AVG [dB] | -3.29    | -3.24  | -3.26   | -3.50  | -3.57  | -3.59  | -3.24  | -3.03  | -2.81               | -2.92  | -3.02  | -3.13  | -3.34  | -3.18  | -2.99  | -3.25  | -3.33  | -4.12  |
| Peak Gain [dB]     | 2.35     | 2.37   | 2.10    | 2.16   | 2.21   | 2.22   | 2.38   | 2.27   | 2.19                | 2.37   | 2.31   | 2.24   | 2.36   | 2.25   | 2.37   | 2.23   | 2.27   | 1.91   |
| Directivity [dB]   | 5.57     | 5.56   | 5.30    | 5.47   | 5.52   | 5.70   | 5.53   | 5.17   | 5.08                | 5.20   | 5.29   | 5.30   | 5.48   | 5.33   | 5.45   | 5.42   | 5.59   | 5.86   |
| Minimum Gain [dB]  | -12.49   | -13.43 | -14.21  | -14.68 | -14.16 | -14.20 | -15.80 | -14.99 | -14.93              | -14.95 | -14.71 | -15.59 | -17.85 | -16.74 | -16.20 | -17.36 | -16.80 | -22.17 |
| Average Efficiency | -3.25 dB |        | 47.34 % |        |        |        |        |        | Peak Gain : 2.38dBi |        |        |        |        |        |        |        |        |        |

## 3. Antenna Test Condition

- CTIA OTA Test Chamber : 6.0 x 3.0 x 3.0 m



- Passive Test System

