

2021.07.07

RA-N2106-07

# APPROVAL SHEET

**MODEL : ICON**  
**Antenna layout**

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

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|                                                                                   |                        |      |               |     |      |        |
|-----------------------------------------------------------------------------------|------------------------|------|---------------|-----|------|--------|
|  | PRODUCT APPROVAL SHEET |      | GRSN22077MS11 |     |      |        |
|                                                                                   | MODEL NAME             | ICON | REV.          | 1.0 | Page | 2 / 10 |

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## 1. Revision History

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

|                                                                                   |                        |      |               |     |      |        |
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## 2.Product Information

### 2.1 General Features

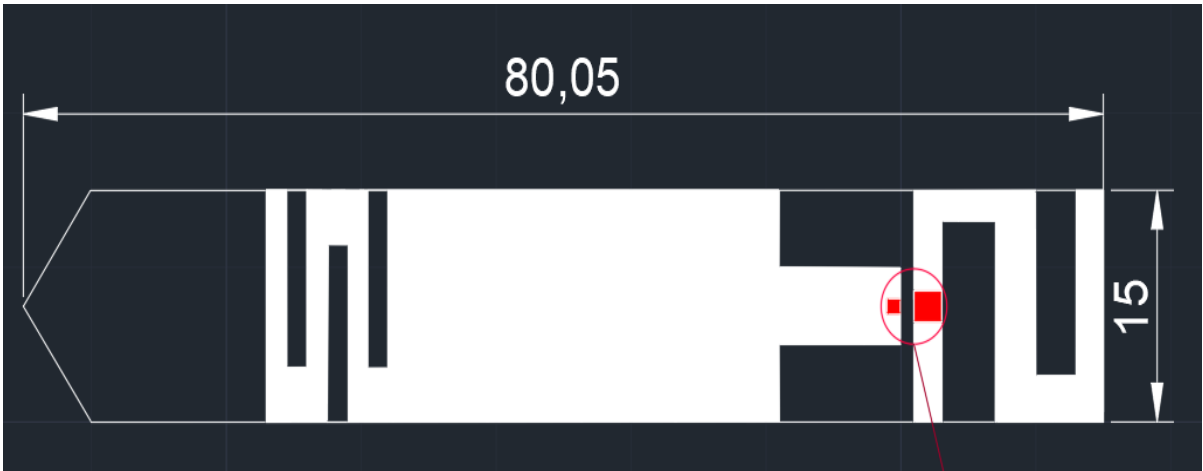
|              |                     |
|--------------|---------------------|
| PART NUMBER  | GradiANT            |
| ANTENNA TYPE | PCB Pattern Antenna |
| APPLICATIONS | Bluetooth           |

### 2.2 Electrical Specifications

|                       |    |                  |         |
|-----------------------|----|------------------|---------|
| Frequency Range1 (TX) |    | 2400MHz~2485MHz  |         |
| Frequency Range1 (RX) |    | 2400MHz~2485MHz  |         |
| IMPEDANCE             |    | 50 Ω             |         |
| V.S.W.R               | TX | 2400MHz          | 2485MHz |
|                       |    | 3 ↓              | 3 ↓     |
|                       | RX | 2400MHz          | 2485MHz |
|                       |    | 3 ↓              | 3 ↓     |
| RADIATION PATTERN     |    | Omni-directional |         |
| POLARIZATION          |    | Linear           |         |

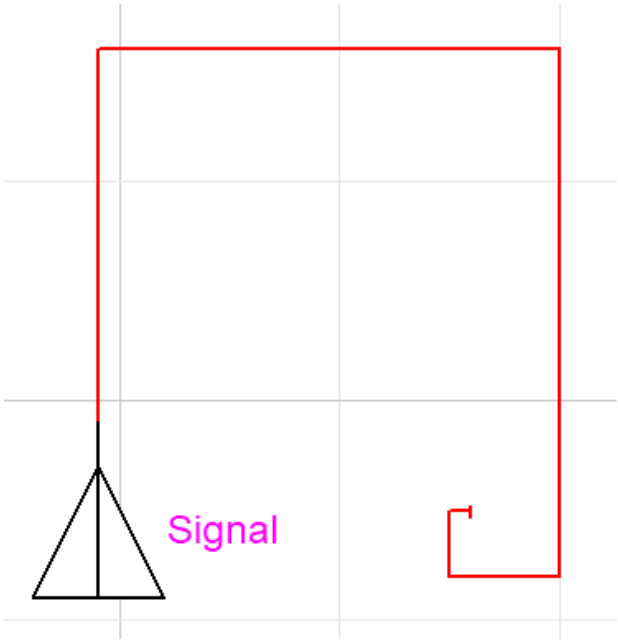
|                                                                                   |                        |      |               |     |      |        |
|-----------------------------------------------------------------------------------|------------------------|------|---------------|-----|------|--------|
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3. Pattern Specifications



4. Matching Network

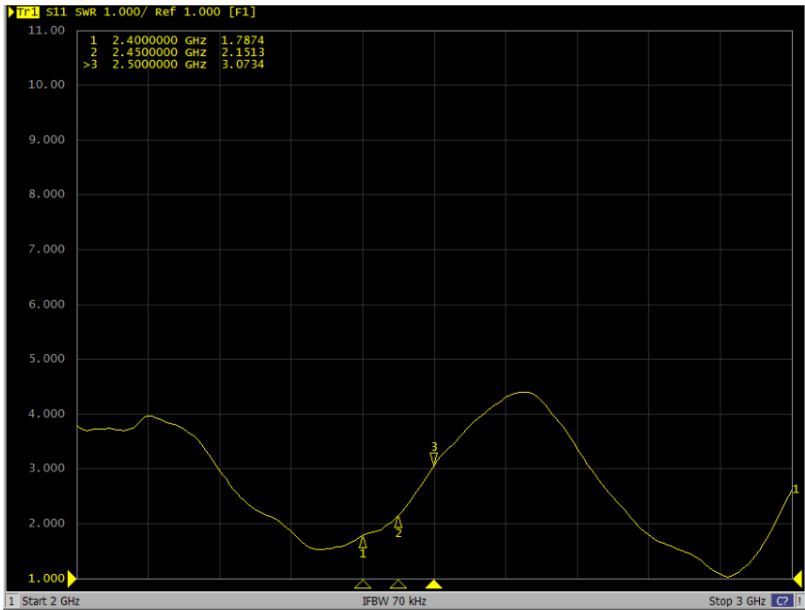
Capacitor value can be changed depending on different situation



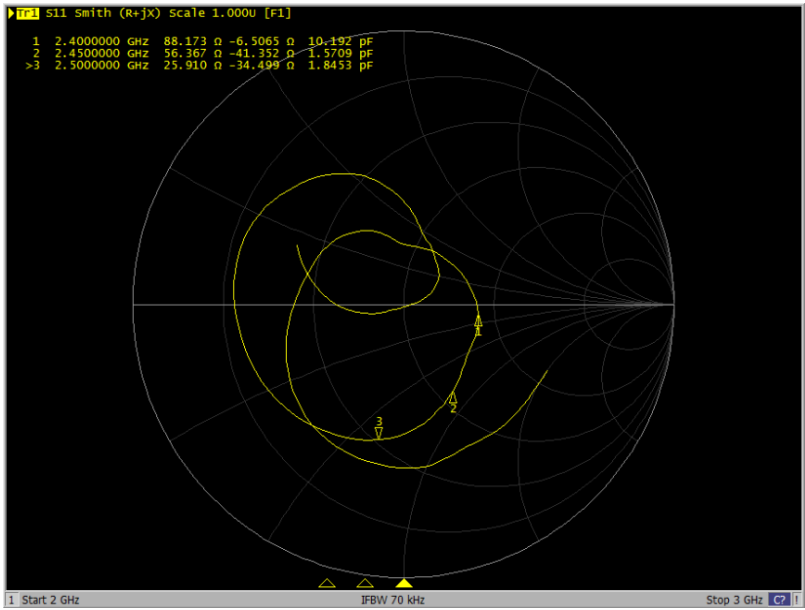
|                                                                                   |                        |      |               |     |      |        |
|-----------------------------------------------------------------------------------|------------------------|------|---------------|-----|------|--------|
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5. Electrical Characterristics

5.1 VSWR

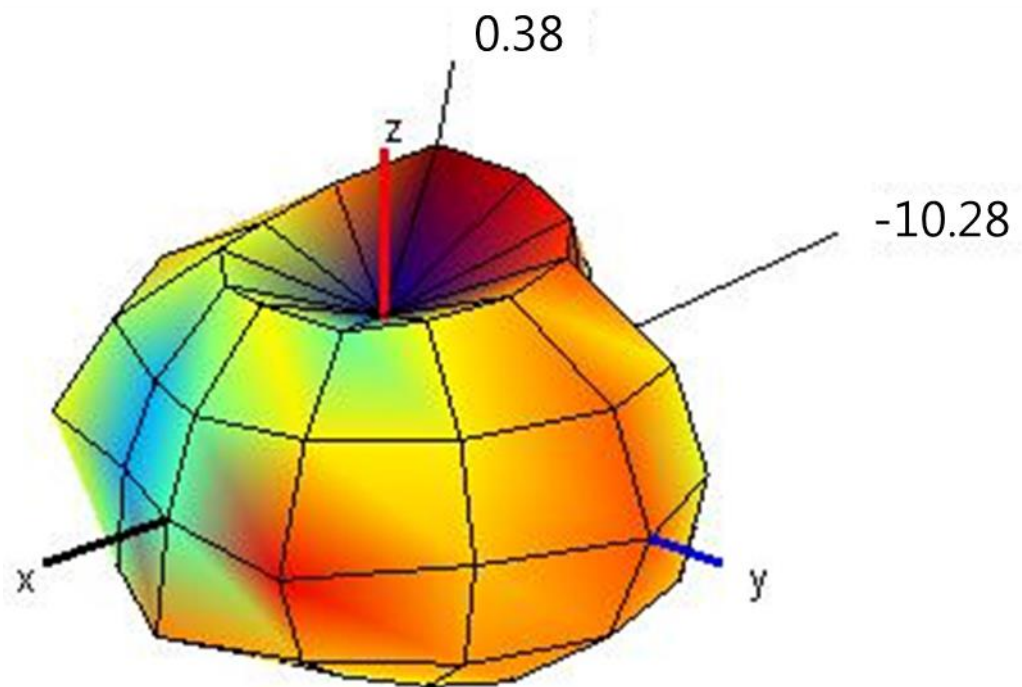


5.2 SMITH CHART

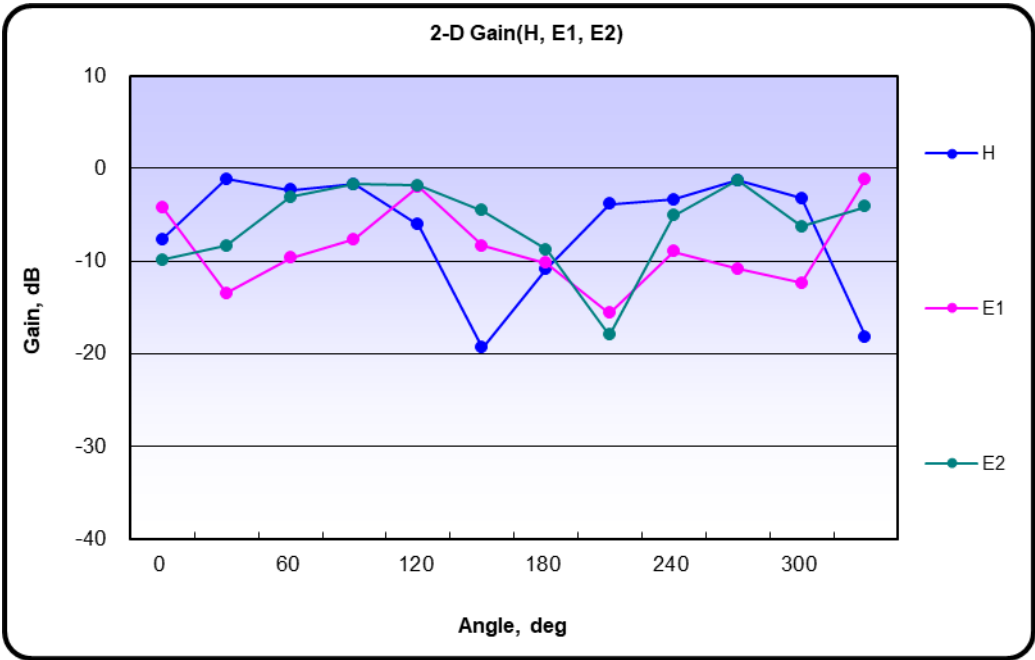


|                                                                                   |                        |      |               |     |      |        |
|-----------------------------------------------------------------------------------|------------------------|------|---------------|-----|------|--------|
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5.3 3D-PLOTs



5.4 2D-GAIN



|                                                                                   |                        |      |  |  |               |     |      |        |
|-----------------------------------------------------------------------------------|------------------------|------|--|--|---------------|-----|------|--------|
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## 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]             | -2.45  | -2.48  | -2.58  | -2.66  | -2.71  | -2.63  | -2.37  | -2.23  | -2.27  | -2.47  |
| Efficiency [%]              | 56.8   | 56.5   | 55.2   | 54.2   | 53.6   | 54.6   | 58.0   | 59.9   | 59.3   | 56.6   |
|                             |        |        |        |        |        |        |        |        |        |        |
| TRG <sub>θ</sub> [dB]       | -4.90  | -4.95  | -5.05  | -5.18  | -5.23  | -5.22  | -4.90  | -4.72  | -4.84  | -5.06  |
| Gain <sub>θ Peak</sub> [dB] | 0.56   | 0.33   | 0.19   | -0.01  | -0.22  | -0.17  | 0.08   | 0.45   | 0.19   | 0.06   |
| Gain <sub>θ Min</sub> [dB]  | -27.42 | -26.85 | -25.17 | -24.45 | -22.89 | -22.74 | -21.53 | -19.74 | -19.45 | -19.54 |
| TRG <sub>φ</sub> [dB]       | -6.11  | -6.11  | -6.21  | -6.22  | -6.27  | -6.10  | -5.92  | -5.83  | -5.76  | -5.95  |
| Gain <sub>φ Peak</sub> [dB] | 0.33   | 0.24   | 0.17   | 0.14   | 0.25   | 0.59   | 0.71   | 0.88   | 0.89   | 0.66   |
| Gain <sub>φ Min</sub> [dB]  | -18.97 | -16.98 | -15.05 | -15.15 | -14.60 | -14.91 | -14.77 | -15.68 | -15.75 | -17.33 |
| UHRG [dB]                   | -5.33  | -5.35  | -5.42  | -5.47  | -5.49  | -5.39  | -5.10  | -4.94  | -4.97  | -5.15  |
| UHRG/TRG [%]                | 51.6   | 51.6   | 52.0   | 52.4   | 52.7   | 53.0   | 53.3   | 53.6   | 53.6   | 54.0   |
| H-Plane                     | -3.83  | -3.94  | -4.13  | -4.23  | -4.26  | -4.26  | -3.97  | -3.83  | -3.98  | -4.12  |
| E1-Plane, AVG [dB]          | -6.47  | -6.35  | -6.38  | -6.56  | -6.55  | -6.63  | -6.27  | -6.14  | -6.22  | -6.59  |
| E2-Plane, AVG [dB]          | -4.45  | -4.44  | -4.51  | -4.55  | -4.65  | -4.61  | -4.24  | -4.16  | -4.30  | -4.52  |
| Peak Gain [dB]              | 0.46   | 0.30   | 0.19   | 0.08   | 0.02   | 0.24   | 0.42   | 0.68   | 0.56   | 0.38   |
| Directivity [dB]            | 2.91   | 2.77   | 2.77   | 2.74   | 2.73   | 2.87   | 2.79   | 2.91   | 2.83   | 2.85   |
| Minimum Gain [dB]           | -10.96 | -10.30 | -10.49 | -10.81 | -10.38 | -10.23 | -9.80  | -9.92  | -9.70  | -10.28 |

|                             | 11     | 12     | 13     | 14     | 15     | 16     | 17     | 18     | 19     | 20     |
|-----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Frequency [MHz]             | 2450   | 2455   | 2460   | 2465   | 2470   | 2475   | 2480   | 2485   | 2490   | 2497   |
| Efficiency [dB]             | -2.85  | -3.02  | -3.03  | -3.08  | -3.05  | -3.39  | -3.80  | -4.44  | -4.61  | -4.64  |
| Efficiency [%]              | 51.9   | 49.9   | 49.7   | 49.1   | 49.5   | 45.8   | 41.7   | 36.0   | 34.6   | 34.4   |
|                             |        |        |        |        |        |        |        |        |        |        |
| TRG <sub>θ</sub> [dB]       | -5.46  | -5.61  | -5.70  | -5.81  | -5.75  | -6.12  | -6.48  | -7.23  | -7.42  | -7.37  |
| Gain <sub>θ Peak</sub> [dB] | -0.19  | -0.16  | -0.37  | -0.29  | -0.15  | -0.48  | -0.79  | -1.36  | -1.45  | -1.17  |
| Gain <sub>θ Min</sub> [dB]  | -19.63 | -22.64 | -22.60 | -23.36 | -25.65 | -27.01 | -29.02 | -34.75 | -29.36 | -25.07 |
| TRG <sub>φ</sub> [dB]       | -6.30  | -6.50  | -6.41  | -6.40  | -6.40  | -6.71  | -7.17  | -7.68  | -7.83  | -7.95  |
| Gain <sub>φ Peak</sub> [dB] | 0.32   | 0.23   | 0.30   | 0.20   | 0.08   | -0.14  | -0.61  | -1.34  | -1.53  | -1.70  |
| Gain <sub>φ Min</sub> [dB]  | -17.22 | -19.02 | -19.12 | -18.49 | -18.83 | -20.84 | -20.55 | -21.91 | -23.47 | -27.77 |
| UHRG [dB]                   | -5.53  | -5.69  | -5.69  | -5.72  | -5.66  | -5.97  | -6.37  | -6.99  | -7.16  | -7.16  |
| UHRG/TRG [%]                | 53.9   | 54.1   | 54.3   | 54.6   | 54.9   | 55.2   | 55.3   | 55.5   | 55.6   | 56.0   |
| H-Plane                     | -4.56  | -4.79  | -4.91  | -4.99  | -5.01  | -5.42  | -5.82  | -6.57  | -6.82  | -6.91  |
| E1-Plane, AVG [dB]          | -6.97  | -7.01  | -7.10  | -7.21  | -7.02  | -7.40  | -7.67  | -8.41  | -8.48  | -8.32  |
| E2-Plane, AVG [dB]          | -4.97  | -5.06  | -5.18  | -5.30  | -5.25  | -5.64  | -6.00  | -6.73  | -6.88  | -6.85  |
| Peak Gain [dB]              | 0.08   | 0.05   | -0.01  | -0.03  | -0.02  | -0.30  | -0.69  | -1.34  | -1.48  | -1.42  |
| Directivity [dB]            | 2.93   | 3.07   | 3.02   | 3.06   | 3.03   | 3.09   | 3.11   | 3.10   | 3.13   | 3.22   |
| Minimum Gain [dB]           | -10.95 | -11.42 | -11.58 | -12.42 | -12.65 | -13.98 | -14.28 | -15.21 | -15.46 | -17.21 |

|                    |          |        |
|--------------------|----------|--------|
| Average Efficiency | -2.98dBi | 50.37% |
| Peak Gain          | 0.68dBi  |        |

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