

2018.04.24

RA-N0211-16

# APPROVAL SHEET

**MODEL: SENA\_10A**  
**Antenna layout**

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

**Messrs. SENA Technology Co.,Ltd**



**RadiNa Co. ,Ltd**

TEL:+82-2-463-0373

FAX:+82-2-463-0374

|                                                                                   |                        |  |             |     |      |        |
|-----------------------------------------------------------------------------------|------------------------|--|-------------|-----|------|--------|
|  | PRODUCT APPROVAL SHEET |  | FPSNT004DB7 |     |      |        |
|                                                                                   | MODEL NAME             |  | REV.        | 1.0 | Page | 2 / 11 |

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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 | Dipole Antenna |
| APPLICATIONS | Bluetooth      |

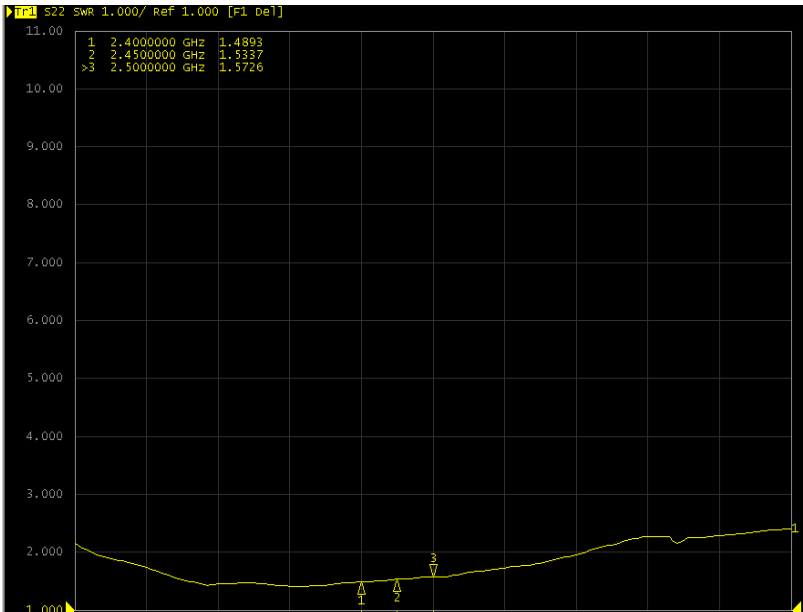
### 2.2 Electrical Specifications

|                       |    |                  |         |
|-----------------------|----|------------------|---------|
| 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           |         |

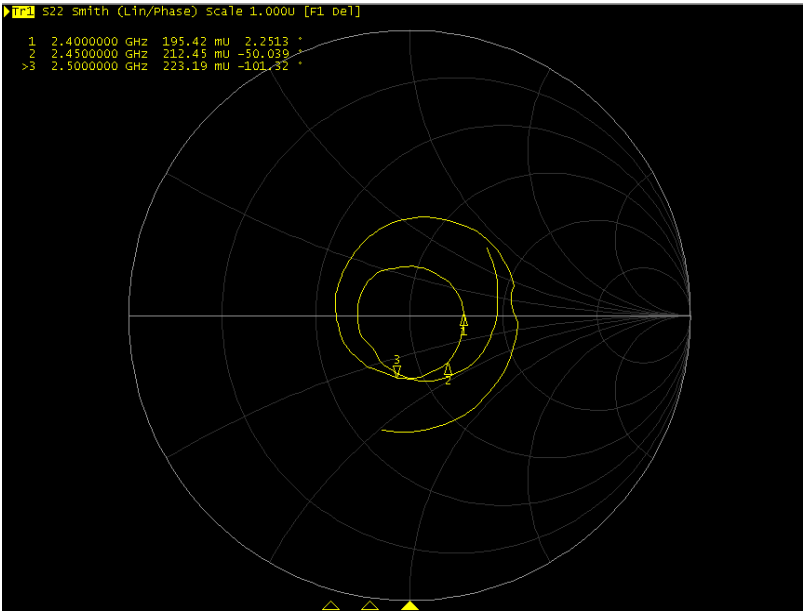
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|-----------------------------------------------------------------------------------|------------------------|--|-------------|-----|------|--------|
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3. Electrical Characterristics

3.1 VSWR



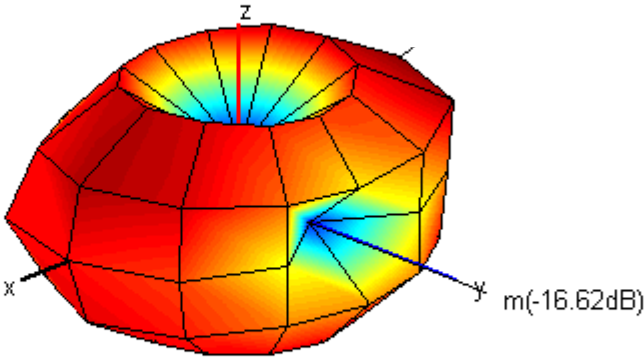
3.2 SMITH CHART



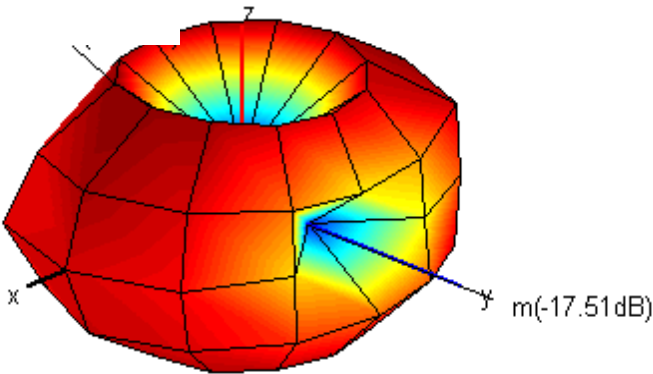
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|-----------------------------------------------------------------------------------|------------------------|--|-------------|-----|------|--------|
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3.3 3D-PLOTs

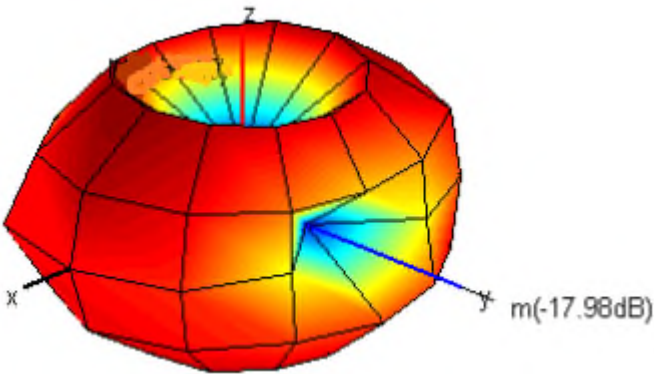
2400MHZ



2445MHZ



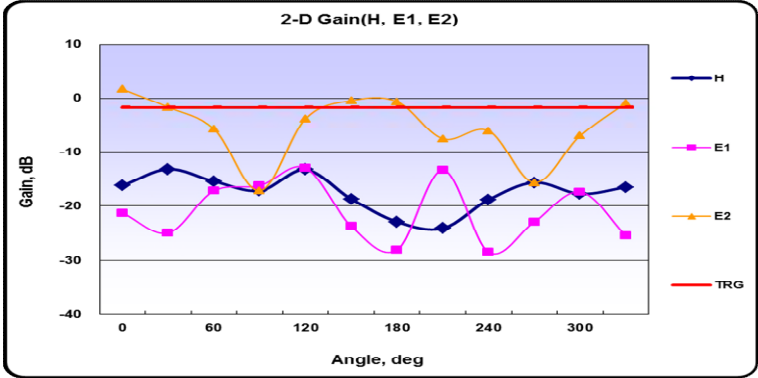
2485MHZ



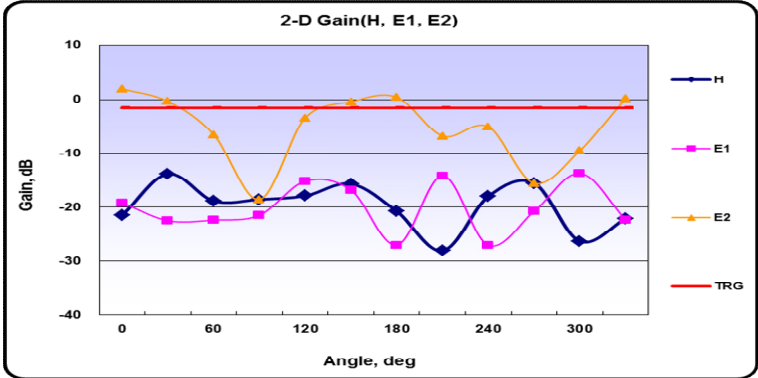
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|-----------------------------------------------------------------------------------|------------------------|--|-------------|-----|------|--------|
|  | PRODUCT APPROVAL SHEET |  | FPSNT004DB7 |     |      |        |
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3.4 2D-GAIN

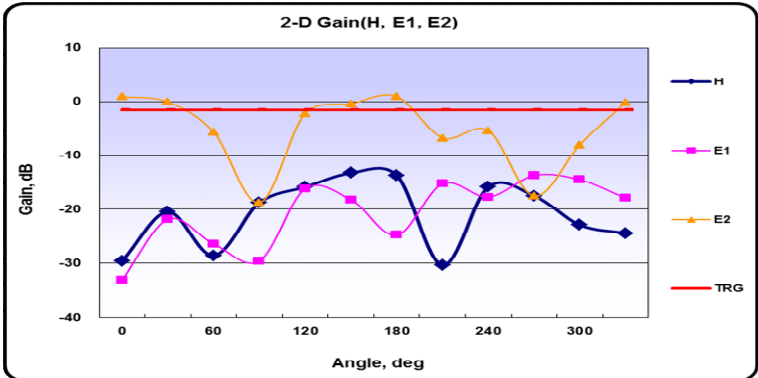
2400MHZ



2445MHZ



2485MHZ



|                                                                                   |                        |  |             |     |      |        |
|-----------------------------------------------------------------------------------|------------------------|--|-------------|-----|------|--------|
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## 4 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)            | -1.68  | -1.80  | -1.94  | -1.86  | -1.90  | -1.74  | -1.75  | -1.73  | -1.75  | -1.59  |
| Efficiency(%)             | 67.89  | 66.09  | 64.01  | 65.12  | 64.64  | 66.94  | 66.82  | 67.21  | 66.85  | 69.31  |
| TRG(dB)                   | -1.68  | -1.80  | -1.94  | -1.86  | -1.90  | -1.74  | -1.75  | -1.73  | -1.75  | -1.59  |
| TRG <sub>Theta</sub> (dB) | -7.75  | -7.86  | -7.96  | -7.93  | -7.94  | -7.74  | -7.63  | -7.59  | -7.55  | -7.37  |
| TRG <sub>Phi</sub> (dB)   | -2.92  | -3.04  | -3.19  | -3.10  | -3.14  | -3.00  | -3.05  | -3.03  | -3.07  | -2.92  |
| UHRG(dB)                  | -4.25  | -4.42  | -4.61  | -4.57  | -4.66  | -4.54  | -4.56  | -4.58  | -4.58  | -4.40  |
| UHRG/TRG(%)               | 55.36  | 54.66  | 54.08  | 53.61  | 52.92  | 52.47  | 52.32  | 51.77  | 52.16  | 52.41  |
| H-Plane                   | -16.43 | -16.82 | -17.16 | -16.92 | -17.80 | -17.65 | -17.12 | -18.21 | -17.86 | -18.24 |
| E1-Plane, AVG(dB)         | -18.08 | -18.72 | -18.99 | -18.12 | -18.40 | -17.95 | -17.92 | -18.05 | -17.95 | -18.26 |
| E2-Plane, AVG(dB)         | -2.94  | -3.13  | -3.04  | -3.08  | -3.02  | -2.80  | -2.64  | -2.60  | -2.69  | -2.43  |
| Peak Gain(dB)             | 0.56   | 0.48   | 0.35   | 0.35   | 0.32   | 0.38   | 0.27   | 0.21   | 0.25   | 0.22   |
| Directivity(dB)           | 3.78   | 3.62   | 3.44   | 3.37   | 3.36   | 3.30   | 3.02   | 2.86   | 3.02   | 2.94   |
| Minimum Gain(dB)          | -16.63 | -16.38 | -17.22 | -17.64 | -16.71 | -17.63 | -18.36 | -20.13 | -19.16 | -17.51 |

|                           |  | 11     | 12     | 13        | 14     | 15     | 16     | 17     | 18     | 19     | 20     |
|---------------------------|--|--------|--------|-----------|--------|--------|--------|--------|--------|--------|--------|
| Frequency(MHz)            |  | 2450   | 2455   | 2460      | 2465   | 2470   | 2475   | 2480   | 2485   | 2490   | 2497   |
|                           |  |        |        |           |        |        |        |        |        |        |        |
| Efficiency(dB)            |  | -1.63  | -1.53  | -1.53     | -1.53  | -1.56  | -1.45  | -1.55  | -1.57  | -1.49  | -1.41  |
| Efficiency(%)             |  | 68.78  | 70.31  | 70.38     | 70.38  | 69.75  | 71.57  | 69.94  | 69.67  | 71.03  | 72.22  |
| TRG(dB)                   |  | -1.63  | -1.53  | -1.53     | -1.53  | -1.56  | -1.45  | -1.55  | -1.57  | -1.49  | -1.41  |
| TRG <sub>Theta</sub> (dB) |  | -7.31  | -7.16  | -7.20     | -7.11  | -7.04  | -6.96  | -7.15  | -7.13  | -6.95  | -6.87  |
| TRG <sub>Phi</sub> (dB)   |  | -2.99  | -2.92  | -2.90     | -2.93  | -3.01  | -2.89  | -2.95  | -2.98  | -2.94  | -2.87  |
| UHRG(dB)                  |  | -4.44  | -4.30  | -4.33     | -4.30  | -4.31  | -4.18  | -4.23  | -4.24  | -4.12  | -3.99  |
| UHRG/TRG(%)               |  | 52.31  | 52.85  | 52.42     | 52.78  | 53.12  | 53.38  | 53.95  | 54.09  | 54.51  | 55.19  |
| H-Plane                   |  | -17.93 | -18.53 | -17.86    | -17.91 | -18.29 | -17.68 | -18.03 | -17.86 | -18.38 | -17.21 |
| E1-Plane, AVG(dB)         |  | -17.62 | -17.53 | -17.37    | -17.48 | -17.12 | -17.14 | -17.82 | -17.86 | -17.59 | -17.27 |
| E2-Plane, AVG(dB)         |  | -2.34  | -2.18  | -2.27     | -2.29  | -2.24  | -2.18  | -2.31  | -2.44  | -2.33  | -2.27  |
| Peak Gain(dB)             |  | 0.29   | 0.35   | 0.34      | 0.39   | 0.32   | 0.41   | 0.38   | 0.42   | 0.49   | 0.54   |
| Directivity(dB)           |  | 3.12   | 3.17   | 3.13      | 3.33   | 3.21   | 3.31   | 3.32   | 3.46   | 3.48   | 3.62   |
| Minimum Gain(dB)          |  | -21.04 | -20.55 | -19.59    | -18.15 | -18.18 | -19.91 | -19.49 | -17.99 | -19.05 | -16.16 |
| Average Efficiency        |  |        |        | -1.65dBi, |        |        |        | 68.44% |        |        |        |
| Peak Gain                 |  |        |        | 0.56dBi   |        |        |        |        |        |        |        |