

2018.04.24

RA-N0211-16

# APPROVAL SHEET

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


Review	Consent	Approval

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



**RadiNa Co. ,Ltd**

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### 1. Revision History

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

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## 2. Product Information

### 2.1 General Features

PART NUMBER	GradiANT
ANTENNA TYPE	PCB Antenna
APPLICATIONS	Bluetooth

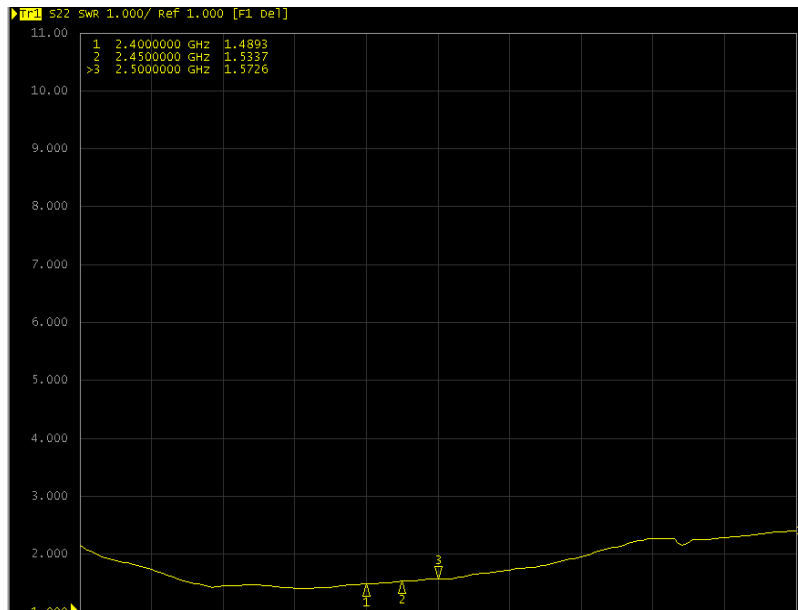
### 2.2 Electrical Specifications

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	

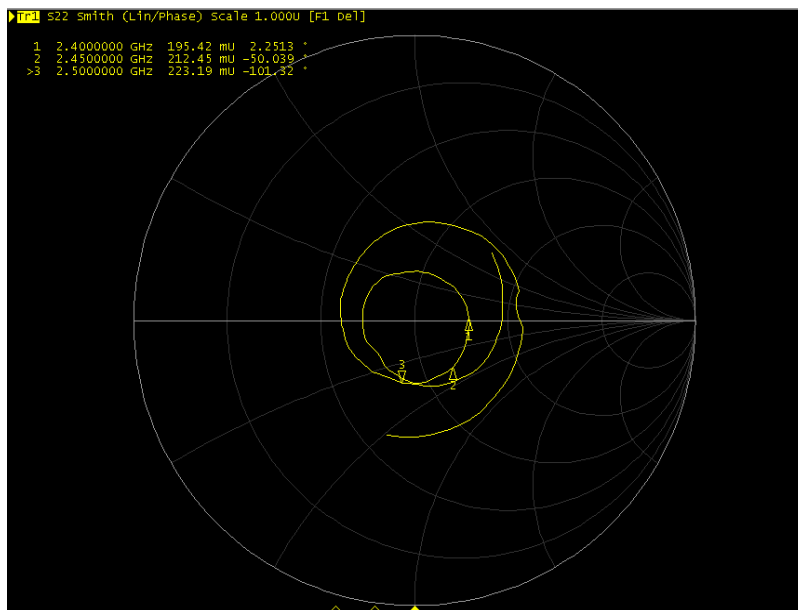
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## 4. Electrical Characteristics

### 4.1 VSWR

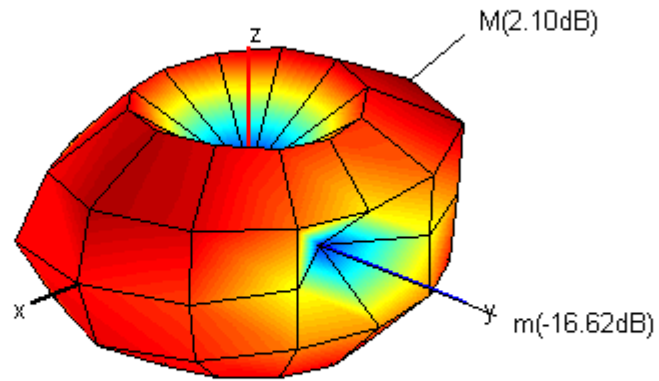


### 4.2 SMITH CHART

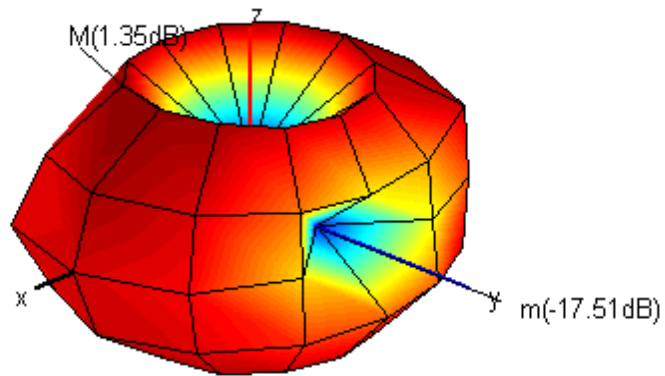


## 4.3 3D-PLOTs

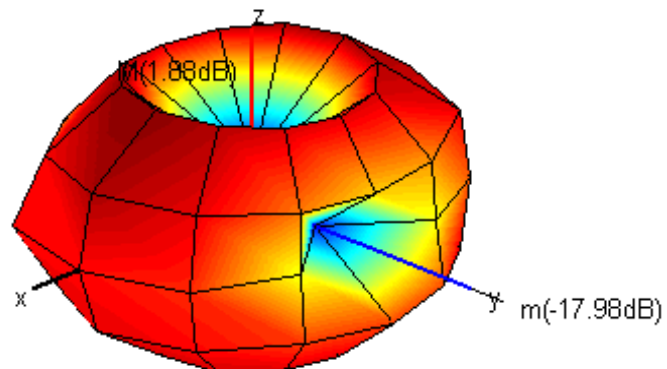
2400MHZ



2445MHZ



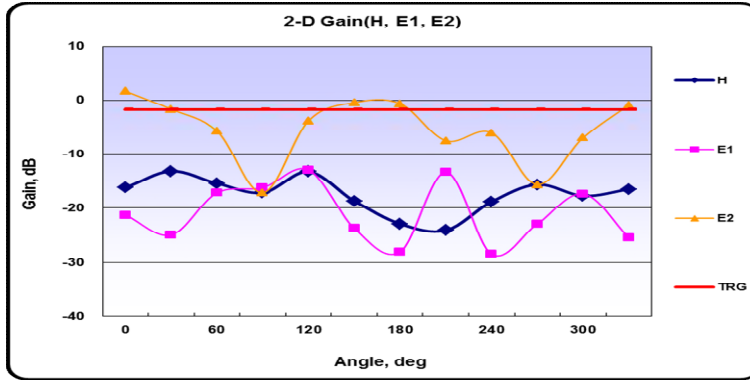
2485MHZ



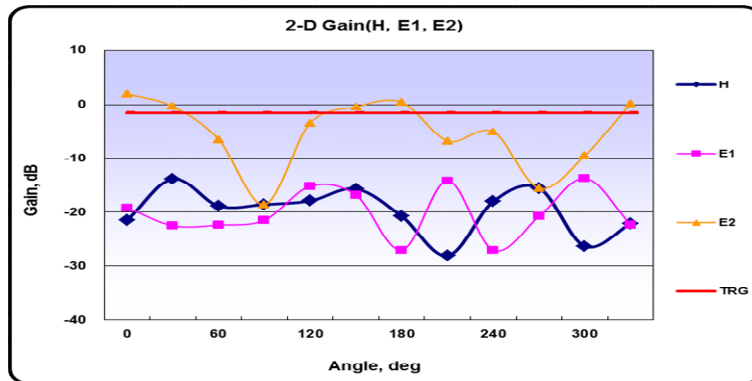


4.4 2D-GAIN

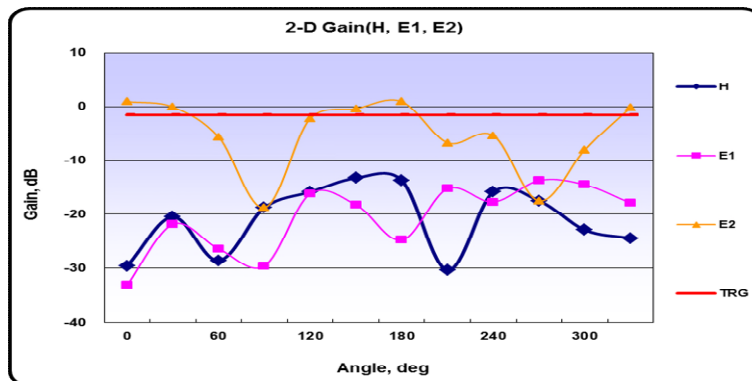
2400MHZ




2445MHZ



2485MHZ



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## 5. 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)	2.10	1.82	1.51	1.51	1.47	1.56	1.27	1.13	1.27	1.35
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)	1.49	1.64	1.61	1.81	1.65	1.86	1.76	1.89	1.99	2.20
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
<b>Average Efficiency</b>			<b>-1.65dBi,</b>				<b>68.44%</b>			
<b>Peak Gain</b>			<b>2.10dBi</b>							