



APPENDIX J

: ANTENNA SPECIFICATION

ANTENNA SPECIFICATIONS

Product Name	BLE Antenna
Model Name	C502 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	0.25		1.02	dB

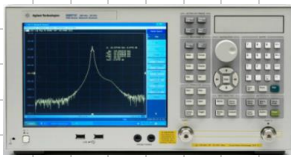
2.2 Network analyzer data

ANTENNA Measurement

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

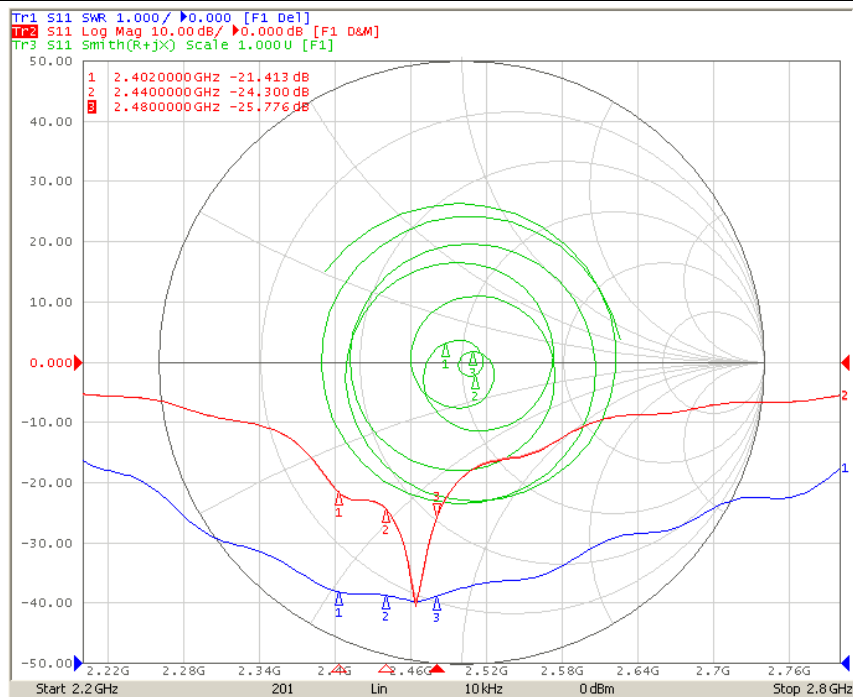
Report No	-	Testing person	KIM KYEONG SIK
Product name	C502	PCB P/No , REV.	PMCCA1677A_REV01
Measurement date	2025-02-17	Case on/off	ON
Measurement sites	Shield Room	Connect the product	-

Used equipment - RF Network Analyzer(Agilent E5071B)



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

S-PARAMETER



ANTENNA TUNING DATA

Return loss

Result

Date	담당자	RF Matching Location No.								2402MHz	2440MHz	2480MHz	Result	
		R4	R5	R6	R7	C19	C20	C21	기타					
2/17	배대영	NC	0R	NC	NC	0.5pF	1.8pF	0.5pF		-5.00dB	-10.00dB	-5.00dB	Limit	
										-21.41dB	-24.30dB	-25.77dB	PASS	

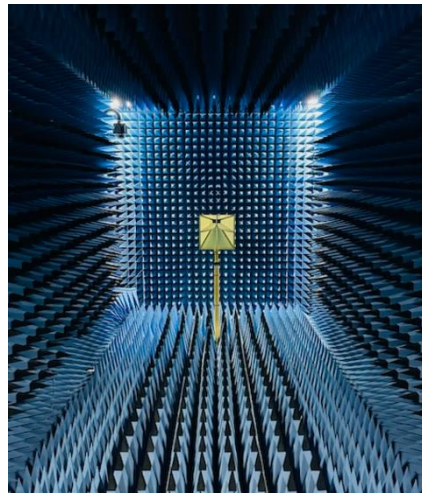
A4(210x297mm)

2.3 Efficiency

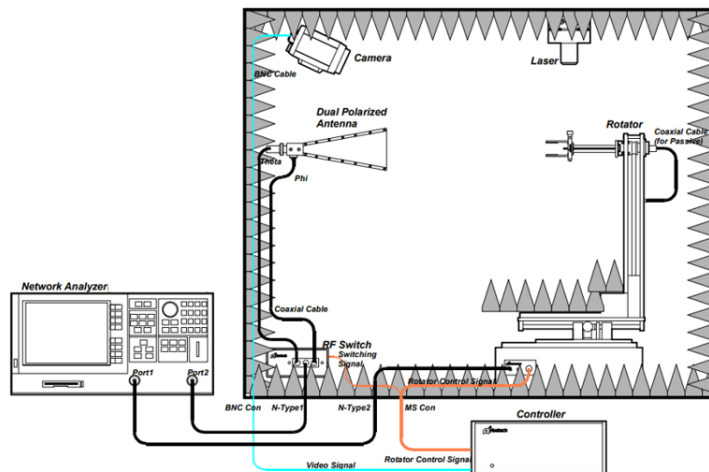
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Frequency [MHz]	2400	2405	2410	2415	2420	2425	2430	2435	2440	2445	2450	2455	2460	2465	2470	2475	2480	2485	2490	2500
Efficiency [dB]	-4.36	-4.38	-4.41	-4.43	-4.42	-4.48	-4.50	-4.46	-4.45	-4.59	-4.44	-4.62	-4.54	-4.52	-4.55	-4.68	-4.79	-4.88	-4.92	-4.93
Efficiency [%]	36.45	36.49	36.27	36.09	36.17	35.70	35.51	35.89	35.93	34.77	35.97	34.51	35.15	35.30	35.04	34.02	33.14	33.48	33.79	33.77
TRC _θ [dB]	-6.77	-6.83	-6.90	-6.83	-6.80	-6.78	-6.95	-6.94	-6.84	-7.08	-6.83	-7.09	-6.88	-6.89	-6.89	-7.22	-7.36	-7.50	-7.59	-7.66
TRC _φ [dB]	-8.12	-8.03	-8.00	-8.15	-8.16	-8.32	-8.15	-8.05	-8.17	-8.18	-8.18	-8.25	-8.34	-8.28	-8.37	-8.23	-8.30	-8.33	-8.42	-8.65
UHRG [dB]	-6.40	-6.40	-6.43	-6.45	-6.43	-6.49	-6.51	-6.48	-6.45	-6.61	-6.46	-6.65	-6.54	-6.53	-6.55	-6.71	-6.82	-6.92	-7.01	-7.15
UHRG/TRG [%]	62.80	62.75	62.71	62.78	62.89	62.91	62.91	62.70	62.97	62.76	62.84	62.69	63.14	62.98	63.17	62.65	62.76	62.51	62.66	62.61
H-Plane	-5.72	-5.78	-5.85	-5.78	-5.75	-5.74	-5.87	-5.88	-5.82	-6.02	-5.79	-6.03	-5.84	-5.87	-5.85	-6.13	-6.25	-6.37	-6.43	-6.43
E1-Plane, AVG [dB]	-5.14	-5.19	-5.23	-5.17	-5.15	-5.12	-5.32	-5.29	-5.20	-5.42	-5.19	-5.44	-5.26	-5.24	-5.27	-5.53	-5.67	-5.81	-5.90	-5.93
E2-Plane, AVG [dB]	-10.65	-10.71	-10.86	-10.75	-10.68	-10.68	-10.90	-10.85	-10.71	-11.03	-10.64	-11.05	-10.68	-10.64	-10.65	-11.13	-11.27	-11.37	-11.53	-11.62
Peak Gain [dB]	1.04	1.03	1.01	1.00	1.00	0.99	0.99	0.98	0.94	0.91	0.90	0.86	0.83	0.81	0.76	0.74	0.64	0.44	0.42	0.36
Directivity [dB]	6.41	6.40	6.40	6.42	6.40	6.45	6.47	6.42	6.37	6.49	6.33	6.47	6.36	6.32	6.30	6.41	6.43	6.32	6.39	6.37
Minimum Gain [dB]	-16.13	-15.94	-16.01	-16.01	-16.43	-16.81	-16.19	-16.18	-17.44	-16.37	-17.18	-16.40	-17.35	-17.54	-16.99	-16.33	-16.24	-15.95	-15.55	-14.84
Test Condition	FS																			
Antenna Type																				
FS=Free Space, BHR=Beside Head Right Side, BHL=Beside Head Left Side, HR=Hand Right, HL=Hand Left, BHHR=Beside Head and Hand Right Side, BHHL=Beside Head and Hand Left Side, NB=Notebook																				
Average Efficiency	-4.57 dB, 35.17 %																			

3. Antenna Test Condition

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



- Passive Test System



- Active Test System

