



Aruba AP-654 Antenna Test Report

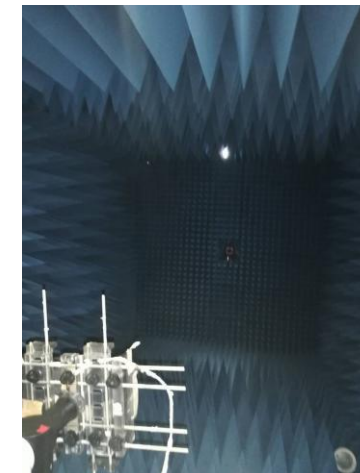
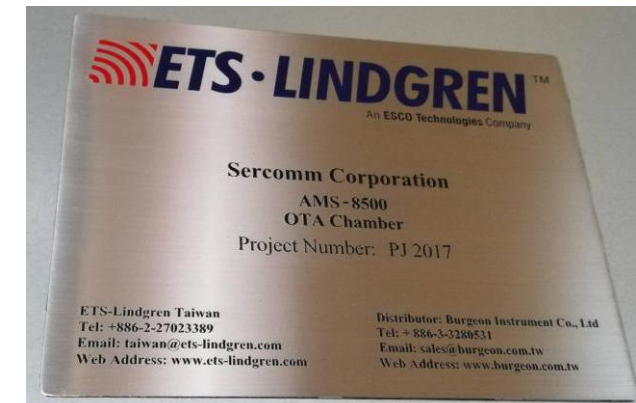
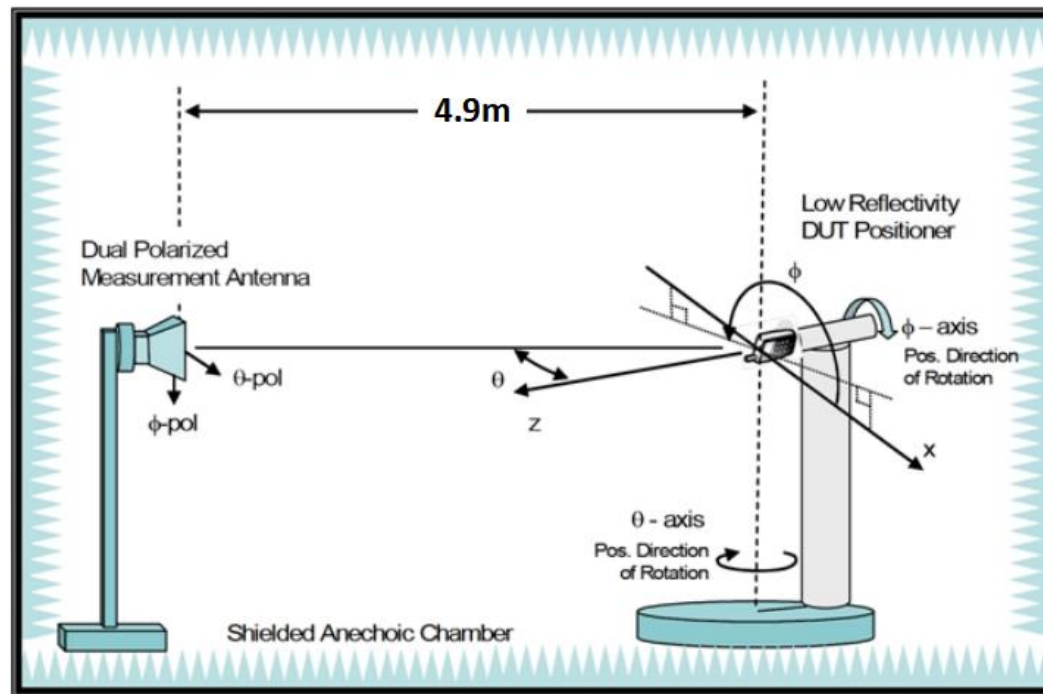
Date : Aug. 21, 2023
Prepared by Jerry Ko

Test Information

Item	Description
Brand Name	Aruba
Equipment	Wi-Fi 11ax Tri-Band Access Point
Test Location	8F, No. 3-1, YuanQu St. Taipei, Taiwan 115 R.O.C.
Test Condition	Radiation
Test Engineer	Jerry Ko, Sercomm
Test Environment	ETS-Lindgren AMS-8500 Antenna Measurement Chamber
Test Date	Aug. 14, 2023 ~ Aug. 21, 2023

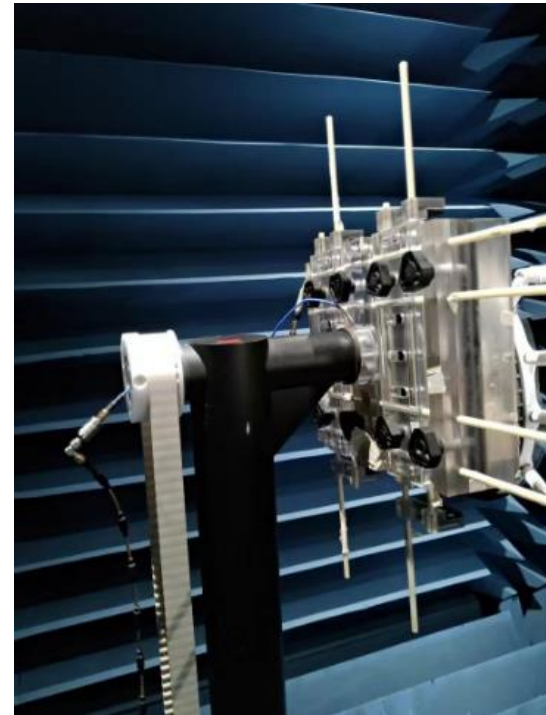
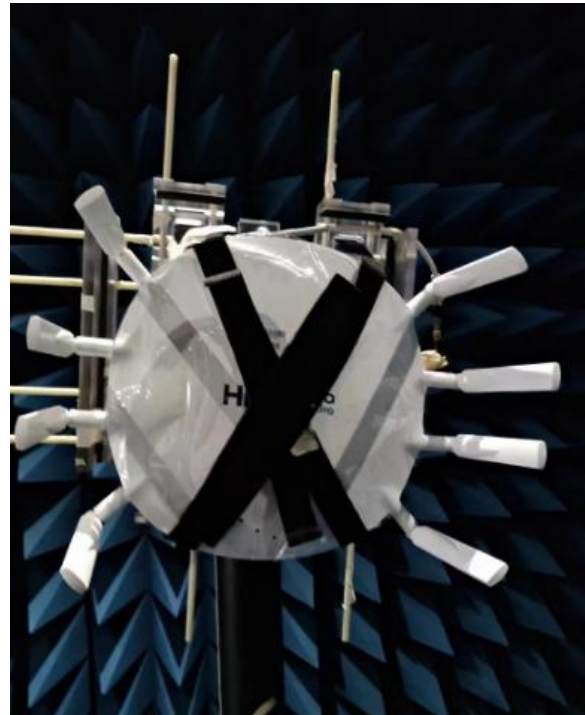
Test Configuration

ETS-Lindgren AMS-8500 antenna measurement system with a size of $7.32(L) \times 3.66(W) \times 3.66(H)$ m³ is used for antenna performance test, which is based on the great-circle test method defined by CTIA. The multi-axis positioning system (MAPS) rotates the DUT around two orthogonal axes for full spherical coverage.



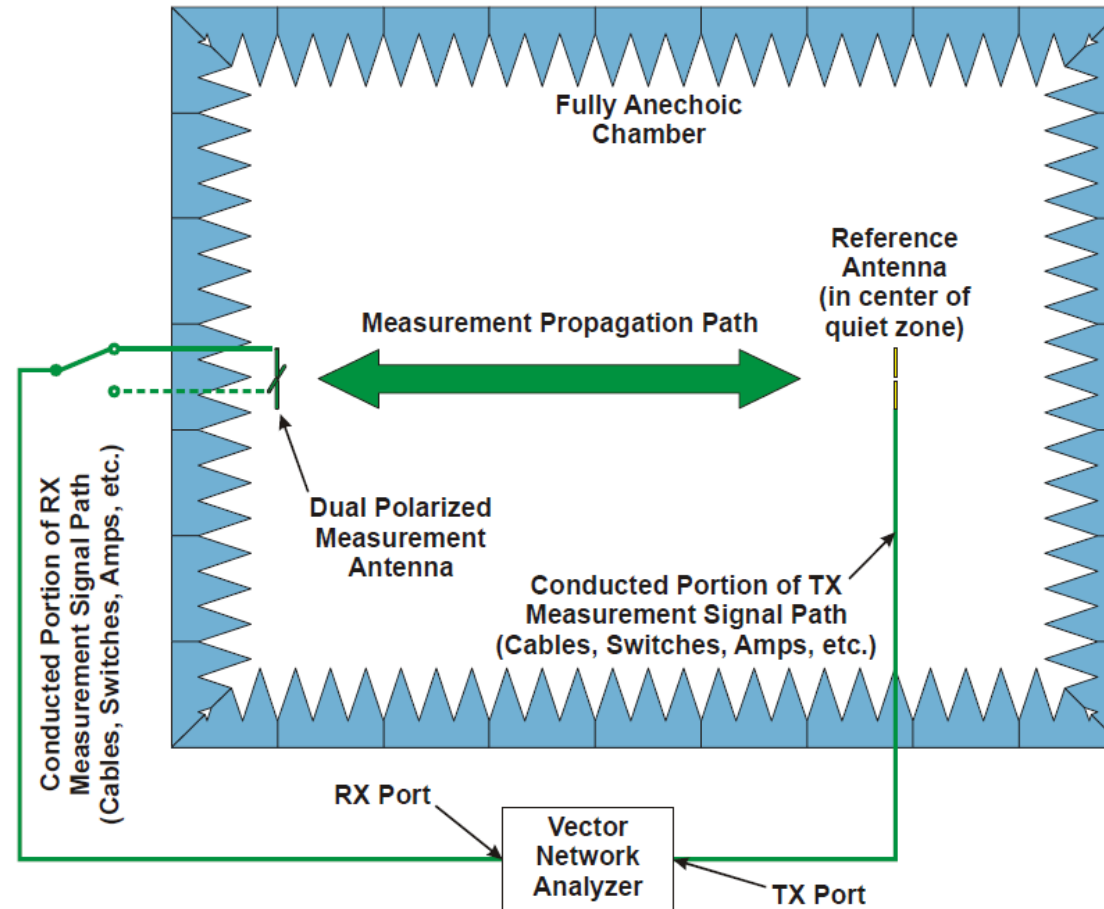
Test Setup & Procedure

1. Fix the DUT on the dielectric support structure and connect the feeding cable to the antenna used for test
2. Set measurement parameters such as frequency range and sampling angle
3. Perform test and then get far-field data (radiation pattern, gain, efficiency)
4. Repeat test procedure for other antennas



Test Equipment & Calibration

Network analyzer and reference antennas are used for calibration. Path loss and cable loss for different frequency bands can be checked and calculated.



Test Equipment & Calibration

Instrument	Brand	Characteristics	Model No.	Serial No.	Calibration Due Date
Precision Sleeve Dipole	ETS-Lindgren	700 MHz ~ 900 MHz	3126-700	00169715	May 21, 2024
Precision Sleeve Dipole	ETS-Lindgren	900 MHz ~ 1000 MHz	3126-900	00169592	May 21, 2024
Precision Sleeve Dipole	ETS-Lindgren	1400 MHz ~ 1700 MHz	3126-1550	00164599	May 21, 2024
Precision Sleeve Dipole	ETS-Lindgren	1700 MHz ~ 2000 MHz	3126-1850	00169588	May 21, 2024
Precision Sleeve Dipole	ETS-Lindgren	2000 MHz ~ 2300 MHz	3126-2150	00169593	May 21, 2024
Precision Sleeve Dipole	ETS-Lindgren	2300 MHz ~ 2700 MHz	3126-2500	00169597	May 21, 2024
Precision Sleeve Dipole	ETS-Lindgren	5000 MHz ~ 6000 MHz	3126-5500	00169728	May 21, 2024
Horn Antenna	SCHWARZBECK	1 GHz ~ 18 GHz	BBHA 9120D	BBHA 9120D-1294	Apr. 7, 2024
EMQuest Antenna Measurement Software	ETS-Lindgren	Control chamber system	EMQ-100	1437	Non-Calibration Required

Antenna Information

Ant No.	Operating Band	Type	Material	Feeding	Polarization
BLE (Ant 0)	2400 MHz ~ 2500 MHz	PIFA	Metal	Cable	Linear
GPS (Ant 1)	1575.42 MHz	PIFA	Metal	Cable	Linear

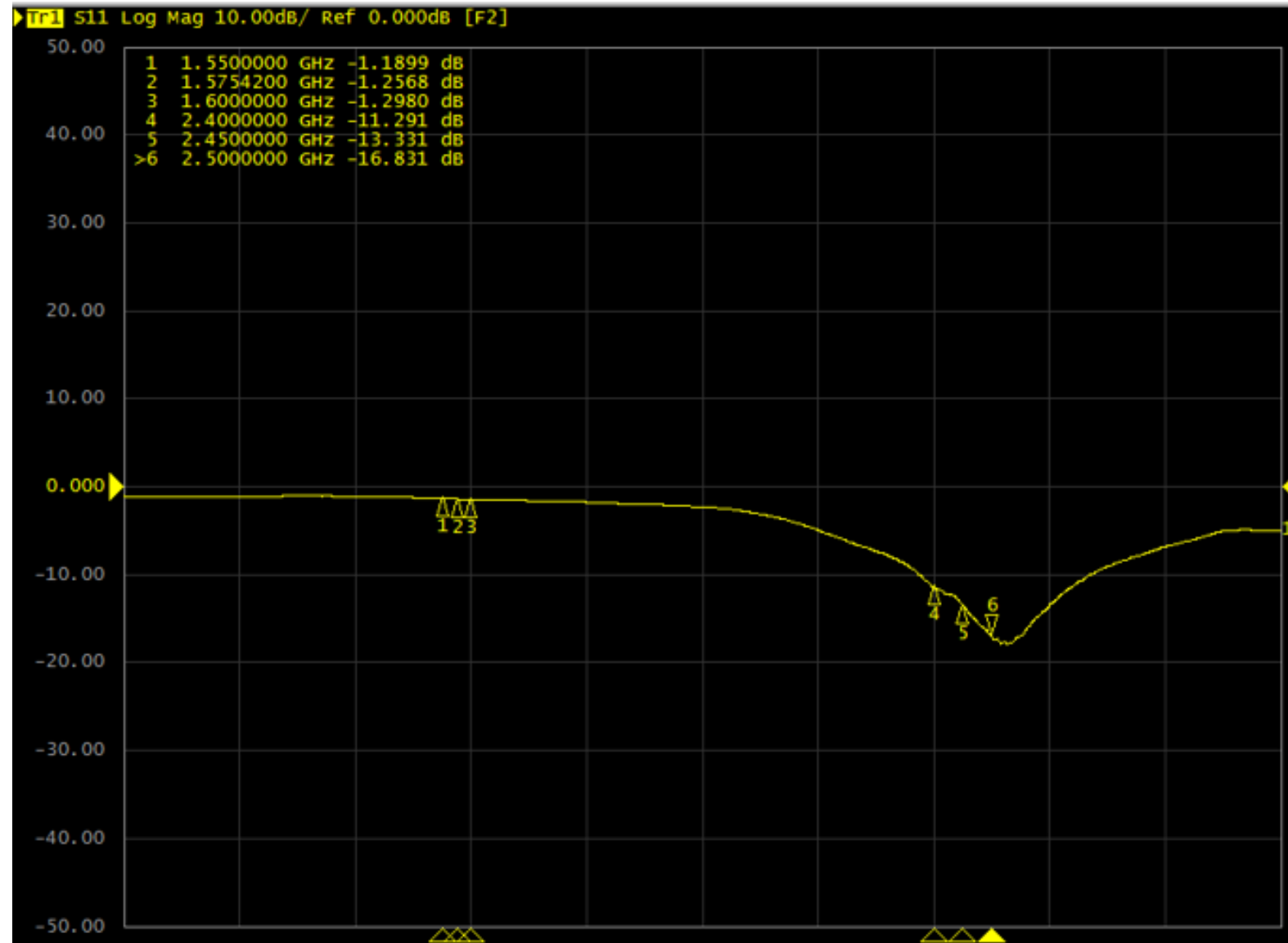
Result Summary - Gain & Efficiency Table

BLE_ANT0		
Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
2400	3.3	66
2450	3.8	74
2500	3.5	70

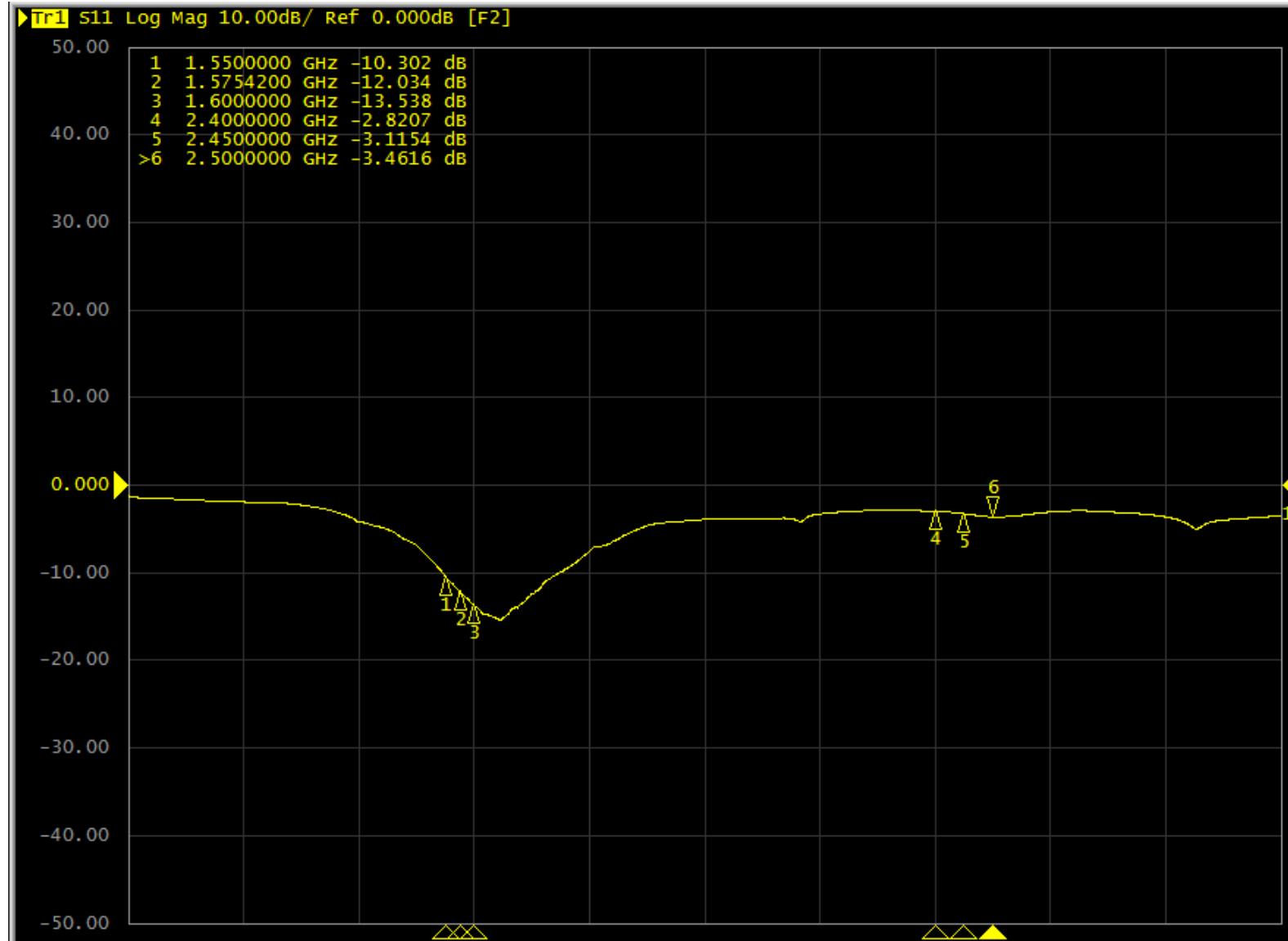
GPS_ANT1		
Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
1575.42	2.9	68

Appendix

Return Loss – BLE_ANT0

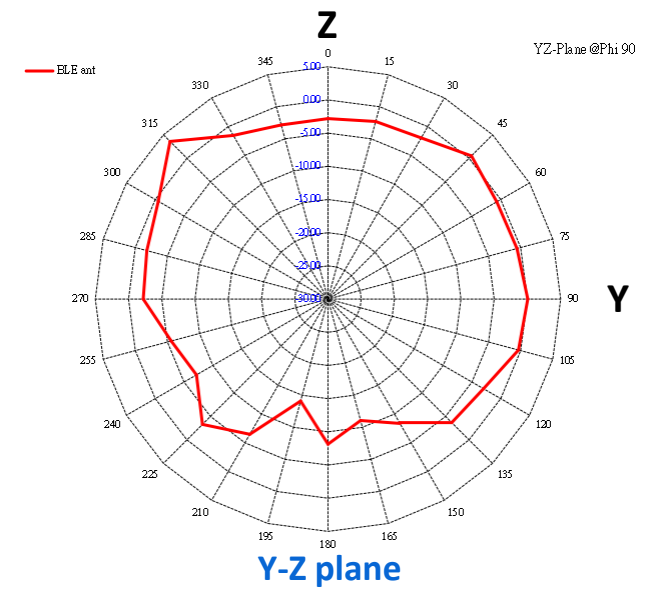
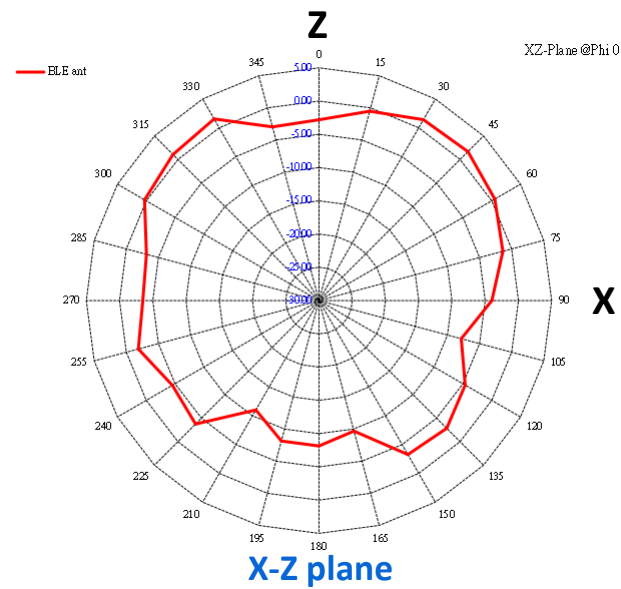
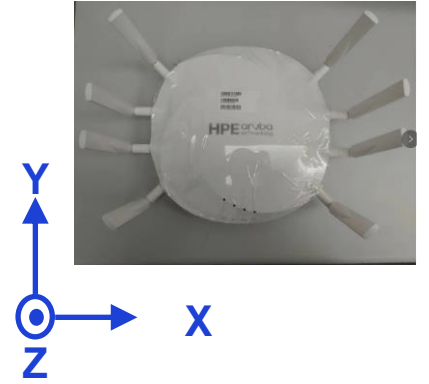
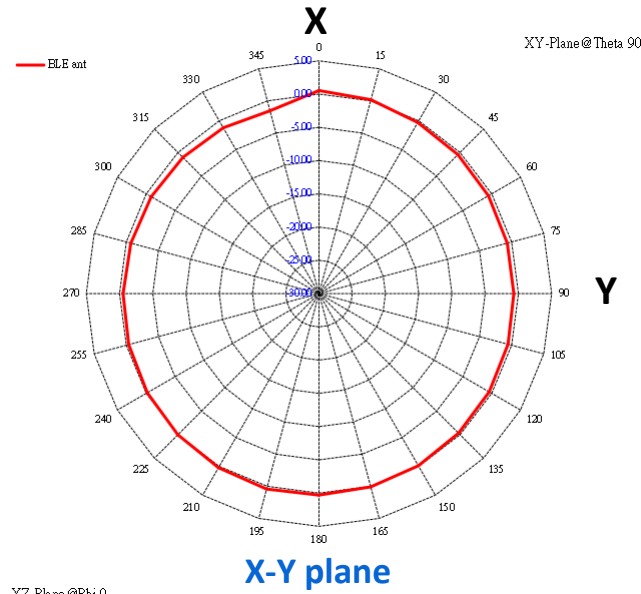


Return Loss – GPS_ANT1



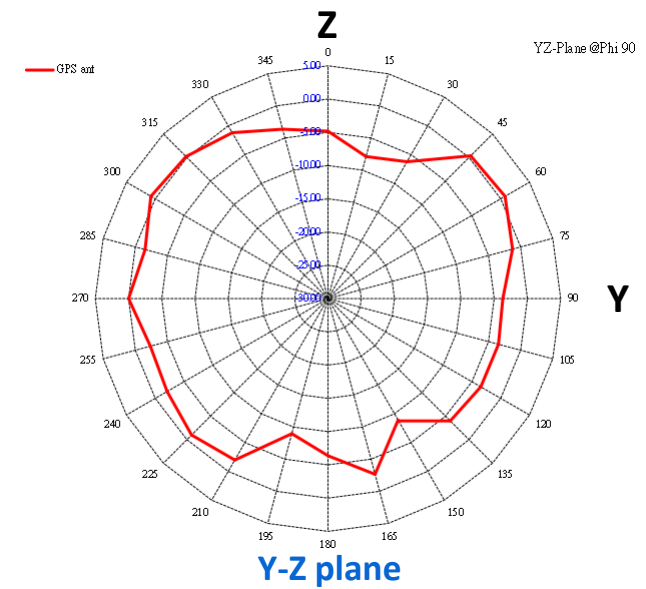
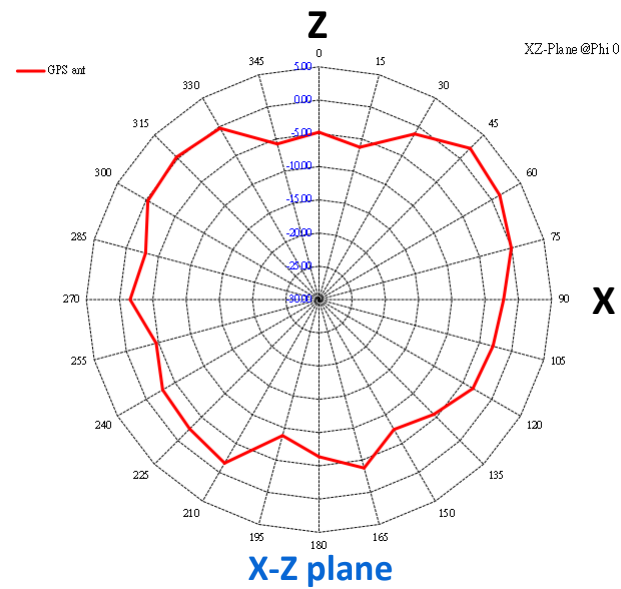
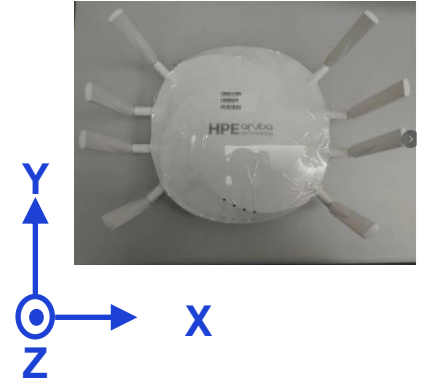
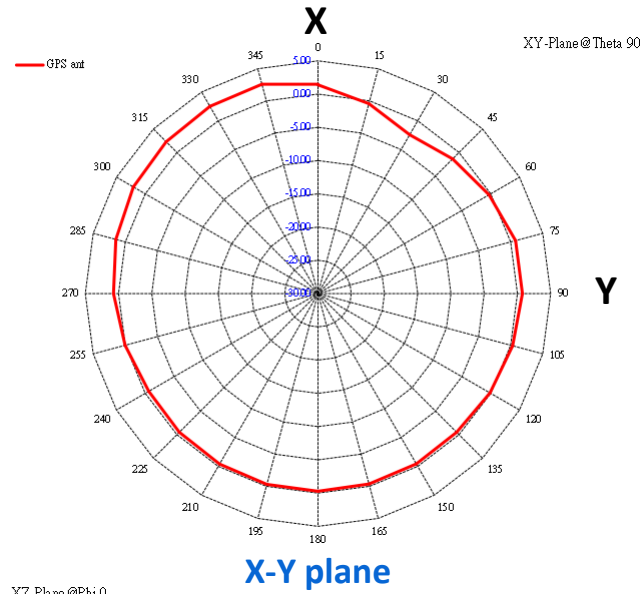
2D Radiation Pattern – BLE_ANT

X-Y plane	
Gain Flatness (dB)	3



2D Radiation Pattern – GPS_ANT

X-Y plane	
Gain Flatness (dB)	5



Raw Data - BLE_ANT (1/2)

Theta Angle (-)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180					
Phi Angle (-)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)
0	-2.81	-2.05	-1.28	-0.52	0.12	0.76	1.41	1.5	1.59	1.68	1.3	0.91	0.53	-0.1	-0.74	-1.37	-2.25	-3.12	-4	-5.28	-6.56	-7.85	-6.77	-5.69	-4.61	-4.02	-3.43	-2.84	-2.99	-3.13	-3.27	-5.41	-7.55	-9.69	-9.17	-8.65	-8.14					
5	-2.81	-2.11	-1.41	-0.71	-0.06	0.6	1.25	1.3	1.35	1.39	1.09	0.79	0.49	-0.24	-0.97	-1.7	-2.46	-3.21	-3.97	-5.28	-6.59	-7.89	-6.73	-5.57	-4.41	-3.95	-3.49	-3.03	-3.11	-3.19	-3.27	-5.49	-7.71	-9.93	-9.33	-8.73	-8.14					
10	-2.81	-2.17	-1.54	-0.91	-0.28	0.34	0.96	1.01	1.05	1.1	0.85	0.59	0.34	-0.45	-1.25	-2.04	-2.43	-2.82	-3.21	-4.78	-6.36	-7.94	-6.55	-5.17	-3.79	-3.6	-3.41	-3.22	-3.24	-3.27	-3.29	-5.59	-7.88	-10.18	-9.5	-8.82	-8.14					
15	-2.81	-2.23	-1.65	-1.06	-0.49	0.09	0.66	0.69	0.72	0.74	0.56	0.37	0.18	-0.54	-1.25	-1.97	-2.13	-2.29	-2.44	-4.01	-5.57	-7.13	-5.81	-4.49	-3.17	-3.2	-3.22	-3.25	-3.27	-3.29	-3.31	-5.7	-8.1	-10.49	-9.71	-8.92	-8.14					
20	-2.81	-2.28	-1.75	-1.21	-0.69	-0.16	0.37	0.36	0.36	0.35	0.24	0.13	0.02	-0.59	-1.2	-1.82	-1.77	-1.73	-1.68	-3.17	-4.65	-6.14	-4.94	-3.75	-2.55	-2.77	-3	-3.22	-3.26	-3.29	-3.33	-5.84	-8.35	-10.86	-9.95	-9.04	-8.14					
25	-2.81	-2.33	-1.85	-1.36	-0.88	-0.4	0.08	0.04	0	-0.04	-0.07	-0.1	-0.13	-0.64	-1.15	-1.67	-1.42	-1.17	-0.92	-2.33	-3.74	-5.15	-4.08	-3	-1.93	-2.35	-2.77	-3.19	-3.24	-3.3	-3.35	-5.97	-8.6	-11.22	-10.19	-9.16	-8.14					
30	-2.81	-2.38	-1.95	-1.51	-1.08	-0.65	-0.22	-0.29	-0.36	-0.43	-0.38	-0.33	-0.29	-0.7	-1.11	-1.52	-1.06	-0.61	-0.15	-1.49	-2.82	-4.16	-3.21	-2.26	-1.31	-1.92	-2.54	-3.15	-3.27	-3.38	-3.49	-6.19	-8.89	-11.59	-10.44	-9.29	-8.14					
35	-2.81	-2.43	-2.05	-1.66	-1.26	-0.86	-0.46	-0.58	-0.7	-0.82	-0.67	-0.53	-0.38	-0.71	-1.04	-1.37	-0.82	-0.28	0.27	-0.88	-2.02	-3.17	-2.47	-1.78	-1.09	-1.76	-2.44	-3.12	-3.39	-3.67	-3.94	-6.61	-9.28	-11.95	-10.68	-9.41	-8.14					
40	-2.81	-2.48	-2.15	-1.81	-1.43	-1.05	-0.66	-0.85	-1.03	-1.21	-0.94	-0.68	-0.42	-0.68	-0.95	-1.21	-0.72	-0.22	0.27	-0.54	-1.36	-2.18	-1.86	-1.55	-1.23	-1.85	-2.47	-3.09	-3.52	-3.95	-4.38	-7.03	-9.67	-12.32	-10.92	-9.53	-8.14					
45	-2.81	-2.53	-2.25	-1.96	-1.6	-1.23	-0.87	-1.11	-1.36	-1.6	-1.22	-0.84	-0.45	-0.66	-0.86	-1.06	-0.62	-0.17	0.28	-0.21	-0.7	-1.19	-1.25	-1.31	-1.38	-1.94	-2.5	-3.06	-3.65	-4.24	-4.83	-7.45	-10.06	-12.68	-11.17	-9.65	-8.14					
50	-2.81	-2.55	-2.29	-2.04	-1.72	-1.4	-1.08	-1.27	-1.47	-1.66	-1.27	-0.88	-0.49	-0.65	-0.82	-0.98	-0.56	-0.14	0.28	-0.12	-0.52	-0.93	-1.13	-1.32	-1.52	-2.04	-2.55	-3.06	-3.8	-4.54	-5.28	-7.86	-10.45	-13.04	-11.41	-9.77	-8.14					
55	-2.81	-2.56	-2.32	-2.07	-1.81	-1.54	-1.28	-1.32	-1.36	-1.39	-1.1	-0.82	-0.53	-0.66	-0.79	-0.93	-0.52	-0.12	0.29	-0.09	-0.47	-0.86	-1.13	-1.4	-1.66	-2.16	-2.65	-3.14	-4	-4.86	-5.72	-8.28	-10.85	-13.41	-11.65	-9.89	-8.13					
60	-2.81	-2.57	-2.34	-2.1	-1.9	-1.69	-1.49	-1.36	-1.24	-1.12	-0.94	-0.75	-0.57	-0.67	-0.77	-0.88	-0.49	-0.09	0.3	-0.06	-0.42	-0.78	-1.12	-1.47	-1.81	-2.28	-2.75	-3.22	-4.2	-5.18	-6.17	-8.56	-10.96	-13.36	-11.62	-9.88	-8.13					
65	-2.81	-2.58	-2.36	-2.14	-1.99	-1.84	-1.69	-1.41	-1.13	-0.85	-0.77	-0.69	-0.6	-0.68	-0.75	-0.83	-0.45	-0.07	0.3	-0.04	-0.37	-0.71	-1.12	-1.54	-1.95	-2.4	-2.85	-3.29	-4.4	-5.51	-6.61	-8.73	-10.86	-12.98	-11.36	-9.75	-8.13					
70	-2.81	-2.6	-2.38	-2.17	-2.08	-1.99	-1.9	-1.46	-1.02	-0.58	-0.6	-0.62	-0.64	-0.69	-0.73	-0.77	-0.41	-0.05	0.31	-0.01	-0.32	-0.64	-1.12	-1.61	-2.1	-2.52	-2.95	-3.37	-4.6	-5.83	-7.06	-8.9	-10.75	-12.6	-11.11	-9.62	-8.14					
75	-2.81	-2.61	-2.4	-2.2	-2.17	-2.14	-2.1	-1.5	-0.9	-0.3	-0.43	-0.55	-0.68	-0.69	-0.71	-0.72	-0.38	-0.03	0.31	0.02	-0.27	-0.56	-1.12	-1.68	-2.24	-2.64	-3.05	-3.45	-4.8	-6.15	-7.5	-9.07	-10.64	-12.21	-10.85	-9.49	-8.14					
80	-2.81	-2.62	-2.43	-2.23	-2.26	-2.28	-2.31	-1.55	-0.79	-0.03	-0.26	-0.49	-0.72	-0.7	-0.69	-0.67	-0.34	-0.01	0.32	0.05	-0.22	-0.49	-1.12	-1.76	-2.39	-2.77	-3.15	-3.52	-4.97	-6.42	-7.87	-9.19	-10.51	-11.83	-10.65	-9.37	-8.14					
85	-2.81	-2.63	-2.45	-2.27	-2.31	-2.36	-2.4	-1.52	-0.64	0.24	-0.08	-0.41	-0.73	-0.69	-0.66	-0.62	-0.32	-0.01	0.29	0.06	-0.18	-0.42	-1.14	-1.86	-2.58	-2.92	-3.26	-3.6	-5.11	-6.61	-8.12	-9.23	-10.34	-11.44	-10.34	-9.24	-8.14					
90	-2.81	-2.64	-2.47	-2.3	-2.18	-2.07	-1.96	-1.13	-0.31	0.51	0.11	-0.29	-0.69	-0.65	-0.61	-0.57	-0.36	-0.16	0.05	-0.08	-0.21	-0.34	-1.22	-2.1	-2.99	-3.22	-3.45	-3.68	-5.24	-6.81	-8.37	-9.27	-10.16	-11.06	-10.09	-9.11	-8.14					
95	-2.81	-2.65	-2.49	-2.33	-2.06	-1.78	-1.51	-0.74	0.02	0.78	0.31	-0.17	-0.65	-0.61	-0.56	-0.52	-0.41	-0.3	-0.19	-0.22	-0.24	-0.27	-1.31	-2.35	-3.39	-3.51	-3.63	-3.75	-5.38	-7	-8.62	-9.31	-9.99	-10.68	-9.83	-8.98	-8.14					
100	-2.81	-2.66	-2.51	-2.36	-1.93	-1.5	-1.06	-0.36	0.35	1.06	0.5	-0.05	-0.61	-0.56	-0.52	-0.47	-0.46	-0.45	-0.44	-0.36	-0.28	-0.2	-1.4	-2.6	-3.8	-3.81	-3.82	-3.83	-5.51	-7.19	-8.87	-9.34	-9.82	-10.29	-9.57	-8.85	-8.14					
105	-2.81	-2.67	-2.53	-2.39	-1.8	-1.2	-0.61	0.03	0.68	1.33	0.7	0.07	-0.56	-0.52	-0.48	-0.43	-0.52	-0.6	-0.68	-0.51	-0.35	-0.18	-1.52	-2.86	-4.2	-4.1	-4.01	-3.91	-5.64	-7.38	-9.12	-9.38	-9.65	-9.91	-9.32	-8.73	-8.14					
110	-2.81	-2.65	-2.49	-2.33	-1.61	-0.89	-0.17	0.34	0.84	1.34	0.72	0.1	-0.52	-0.53	-0.54	-0.55	-0.68	-0.8	-0.93	-0.74	-0.55	-0.36	-1.78	-3.19	-4.61	-4.34	-4.06	-3.79	-5.65	-7.51	-9.37	-9.42	-9.47	-9.53	-9.06	-8.6	-8.14					
115	-2.81	-2.63	-2.45	-2.27	-1.42	-0.57	0.28	0.63	0.98	1.33	0.73	0.12	-0.48	-0.54	-0.61	-0.67	-0.84	-1	-1.17	-0.96	-0.75	-0.54	-2.03	-3.52	-5.02	-4.55	-4.08	-3.62	-5.62	-7.62	-9.62	-9.46	-9.3	-9.14	-8.81	-8.47	-8.14					
120	-2.81	-2.61	-2.41	-2.21	-1.23	-0.25	0.73	0.93	1.12	1.32	0.73	0.14	-0.44	-0.56	-0.67	-0.78	-0.99	-1.21	-1.42	-1.18	-0.95	-0.72	-2.29	-3.86	-5.42	-4.76	-4.11	-3.45	-5.59	-7.73	-9.87	-9.55	-9.23	-8.91	-8.81	-8.65	-8.39	-8.14				
125	-2.81	-2.59	-2.37	-2.15	-1.04	0.07	1.18	1.22	1.26	1.3	0.73	0.17	-0.4	-0.57	-0.73	-0.9	-1.15	-1.41	-1.66	-1.41	-1.16	-0.9	-2.55	-4.19	-5.83	-4.98	-4.13	-3.28	-5.56	-7.84	-10.12	-9.65	-9.19	-8.72	-8.52	-8.33	-8.14					
130	-2.81	-2.57	-2.33	-2.09	-0.85	0.39	1.63	1.51	1.4	1.29	0.74	0.19	-0.36	-0.58	-0.8	-1.02	-1.31	-1.61	-1.9	-1.63	-1.36	-1.09	-2.8	-4.52	-6.23	-5.19	-4.15	-3.11	-5.52	-7.93	-10.33	-9.73	-9.13	-8.52	-8.39	-8.26	-8.14					
135	-2.81	-2.55	-2.29	-2.03	-0.66	0.71	2.07	1.81	1.54	1.27	0.74	0.21	-0.32	-0.59	-0.86	-1.13	-1.47	-1.81	-2.15	-1.86	-1.56	-1.27	-3.06	-4.85	-6.64	-5.41	-4.17	-2.94	-5.43	-7.91	-10.4	-9.71	-9.02	-8.33	-8.27	-8.2	-8.14					
140	-2.81	-2.53	-2.25	-1.97	-0.6	0.78	2.15	1.86	1.56	1.26	0.75	0.25	-0.25	-0.58	-0.92	-1.25	-1.61	-1.96	-2.32	-2.03	-1.74	-1.45	-3.15	-4.85	-6.56	-5.3	-4.03	-2.77	-5.34	-7.9	-10.47	-9.69	-8.91	-8.14	-8.14	-8.14	-8.14					
145	-2.81	-2.51	-2.21	-1.91	-0.58	0.75	2.08	1.8	1.52	1.24	0.77	0.29	-0.18	-0.58	-0.97	-1.37	-1.73	-2.1	-2.46	-2.19	-1.91	-1.63	-3.19	-4.75	-6.3	-5.07	-3.84	-2.6	-5.25	-7.89	-10.53	-9.67	-8.81	-7.94	-8.01	-8.07	-8.13					
150	-2.81	-2.49	-2.17	-1.85	-0.57	0.72	2	1.74	1.49	1.23	0.78	0.33	-0.11	-0.57	-1.03	-1.49	-1.86	-2.24	-2.61	-2.34	-2.08	-1.81	-3.22	-4.64	-6.05	-4.85	-3.64	-2.44	-5.16	-7.88	-10.6	-9.65	-8.7	-7.75	-7.88	-8.01	-8.13					
155	-2.81	-2.47	-2.13	-1.79	-0.55	0.68	1.92	1.69	1.45	1.21	0.79	0.37	-0.05	-0.56	-1.08	-1.6	-1.99	-2.37	-2.76	-2.5	-2.25	-1.99	-3.26	-4.53	-5.8	-4.62	-3.44	-2.27	-5.07	-7.87	-10.67	-9.63	-8.59	-7.55	-7.75	-7.94	-8.13					
160	-2.81	-2.45	-2.09	-1.73	-0.54	0.65	1.85	1.63	1.41	1.2	0.81	0.42	0.02	-0.56	-1.14	-1.72	-2.12	-2.51	-2.91	-2.66	-2.42	-2.17	-3.3	-4.42	-5.55	-4.4	-3.25	-2.1	-4.98	-7.86	-10.74	-9.61	-8.49	-7.36	-7.62	-7.88	-8.14					
165	-2.81	-2.47	-2.13	-1.79	-0.6	0.58	1.77	1.57	1.38	1.18	0.82	0.46	0.09	-0.58	-1.24	-1.91	-2.29	-2.67	-3.06	-2.79	-2.52	-2.25	-3.27	-4.28	-5.29	-4.17	-3.05	-1.93	-4.89	-7.84	-10.8	-9.59	-8.38	-7.17								

Raw Data - BLE_ANT (2/2)

Theta Angle (-)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180		
Phi Angle (-)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)
185	-2.81	-2.99	-3.17	-3.35	-1.74	-0.14	1.46	1.31	1.16	1.01	0.8	0.58	0.37	-0.94	-2.24	-3.54	-3.58	-3.61	-3.65	-3.01	-2.37	-1.74	-2.58	-3.43	-4.28	-4.31	-4.34	-4.37	-6.6	-8.84	-11.07	-10.24	-9.41	-8.58	-8.43	-8.28	-8.14		
190	-2.81	-3.12	-3.43	-3.74	-2.03	-0.32	1.38	1.25	1.11	0.97	0.79	0.61	0.44	-1.03	-2.49	-3.95	-3.9	-3.85	-3.8	-3.07	-2.34	-1.61	-2.41	-3.22	-4.03	-4.35	-4.67	-4.99	-6.87	-8.75	-10.64	-10.1	-9.57	-9.03	-8.73	-8.43	-8.14		
195	-2.81	-3.25	-3.69	-4.13	-2.36	-0.6	1.16	1.09	1.01	0.93	0.76	0.6	0.43	-1.16	-2.76	-4.35	-4.18	-4	-3.83	-3.04	-2.26	-1.48	-2.36	-3.24	-4.12	-4.62	-5.11	-5.61	-7.1	-8.59	-10.07	-9.87	-9.68	-9.48	-9.03	-8.58	-8.14		
200	-2.81	-3.38	-3.95	-4.52	-2.73	-0.94	0.85	0.86	0.87	0.88	0.71	0.54	0.37	-1.34	-3.05	-4.76	-4.44	-4.13	-3.81	-2.99	-2.17	-1.35	-2.34	-3.34	-4.33	-4.96	-5.6	-6.23	-7.32	-8.42	-9.51	-9.65	-9.79	-9.92	-9.33	-8.73	-8.14		
205	-2.81	-3.51	-4.21	-4.91	-3.09	-1.28	0.54	0.64	0.74	0.84	0.66	0.48	0.3	-1.53	-3.35	-5.17	-4.71	-4.25	-3.79	-2.93	-2.08	-1.22	-2.33	-3.43	-4.54	-5.31	-6.08	-6.85	-7.55	-8.25	-8.95	-9.42	-9.9	-10.37	-9.63	-8.88	-8.14		
210	-2.81	-3.64	-4.47	-5.3	-3.46	-1.61	0.23	0.42	0.61	0.8	0.61	0.42	0.23	-1.71	-3.64	-5.58	-4.98	-4.37	-3.77	-2.88	-1.99	-1.09	-2.31	-3.53	-4.75	-5.66	-6.56	-7.47	-7.78	-8.08	-8.39	-9.2	-10.01	-10.82	-9.92	-9.03	-8.14		
215	-2.81	-3.77	-4.73	-5.69	-3.82	-1.95	-0.09	0.19	0.47	0.75	0.56	0.36	0.16	-1.87	-3.91	-5.94	-5.21	-4.48	-3.75	-2.85	-1.94	-1.03	-2.34	-3.65	-4.96	-6	-7.05	-8.09	-8	-7.91	-7.82	-8.97	-10.12	-11.27	-10.22	-9.18	-8.14		
220	-2.81	-3.7	-4.59	-5.48	-3.79	-2.09	-0.4	0.04	0.48	0.93	0.65	0.37	0.09	-1.79	-3.68	-5.56	-4.95	-4.34	-3.73	-2.97	-2.21	-1.45	-2.69	-3.93	-5.17	-6.13	-7.08	-8.03	-7.78	-7.52	-7.26	-8.74	-10.23	-11.71	-10.52	-9.33	-8.14		
225	-2.81	-3.61	-4.41	-5.22	-3.72	-2.21	-0.71	-0.08	0.56	1.19	0.8	0.41	0.02	-1.71	-3.45	-5.18	-4.69	-4.2	-3.71	-3.1	-2.48	-1.86	-3.04	-4.21	-5.38	-6.11	-6.83	-7.56	-7.27	-6.99	-6.7	-8.52	-10.34	-12.16	-10.82	-9.48	-8.14		
230	-2.81	-3.52	-4.24	-4.95	-3.64	-2.33	-1.03	-0.2	0.63	1.46	0.96	0.46	-0.05	-1.63	-3.22	-4.81	-4.44	-4.07	-3.69	-3.22	-2.75	-2.28	-3.38	-4.49	-5.59	-6.09	-6.59	-7.09	-6.77	-6.45	-6.14	-8.24	-10.35	-12.45	-11.01	-9.57	-8.14		
235	-2.81	-3.44	-4.06	-4.69	-3.57	-2.46	-1.34	-0.32	0.7	1.72	1.11	0.5	-0.12	-1.55	-2.99	-4.43	-4.18	-3.93	-3.68	-3.35	-3.02	-2.69	-3.73	-4.77	-5.8	-6.07	-6.34	-6.61	-6.27	-5.92	-5.57	-7.94	-10.3	-12.66	-11.15	-9.64	-8.13		
240	-2.81	-3.35	-3.89	-4.42	-3.5	-2.58	-1.65	-0.44	0.78	1.99	1.27	0.54	-0.18	-1.47	-2.76	-4.05	-3.92	-3.79	-3.66	-3.47	-3.29	-3.1	-4.07	-5.04	-6.01	-6.05	-6.1	-6.14	-5.76	-5.39	-5.01	-7.63	-10.25	-12.86	-11.29	-9.71	-8.13		
245	-2.81	-3.26	-3.71	-4.16	-3.43	-2.7	-1.96	-0.56	0.85	2.26	1.42	0.58	-0.25	-1.39	-2.53	-3.67	-3.66	-3.65	-3.64	-3.6	-3.56	-3.52	-4.42	-5.32	-6.22	-6.04	-5.85	-5.67	-5.44	-5.21	-4.98	-7.68	-10.37	-13.07	-11.42	-9.78	-8.13		
250	-2.81	-3.17	-3.53	-3.9	-3.29	-2.69	-2.08	-0.55	0.99	2.52	1.58	0.63	-0.31	-1.31	-2.3	-3.3	-3.35	-3.41	-3.46	-3.62	-3.78	-3.93	-4.76	-5.59	-6.42	-6.01	-5.6	-5.19	-5.22	-5.25	-5.28	-7.95	-10.61	-13.27	-11.56	-9.85	-8.14		
255	-2.81	-3.08	-3.36	-3.63	-3.07	-2.51	-1.95	-0.37	1.21	2.79	1.74	0.68	-0.37	-1.22	-2.07	-2.92	-3	-3.07	-3.15	-3.55	-3.95	-4.35	-5.1	-5.85	-6.62	-5.98	-5.35	-4.72	-5.01	-5.29	-5.58	-8.21	-10.85	-13.48	-11.7	-9.92	-8.14		
260	-2.81	-3	-3.18	-3.37	-2.85	-2.33	-1.81	-0.19	1.44	3.06	1.9	0.74	-0.42	-1.13	-1.84	-2.54	-2.64	-2.74	-2.84	-3.48	-4.12	-4.76	-5.44	-6.11	-6.79	-5.94	-5.09	-4.25	-4.79	-5.34	-5.88	-8.48	-11.08	-13.69	-11.84	-9.99	-8.14		
265	-2.81	-2.91	-3.01	-3.1	-2.63	-2.15	-1.67	-0.01	1.66	3.32	2.06	0.79	-0.48	-1.04	-1.6	-2.17	-2.28	-2.4	-2.52	-3.41	-4.29	-5.18	-5.77	-6.37	-6.97	-5.91	-4.84	-3.77	-4.58	-5.38	-6.18	-8.75	-11.32	-13.89	-11.97	-10.05	-8.14		
270	-2.81	-2.82	-2.83	-2.84	-2.4	-1.97	-1.53	0.18	1.88	3.59	2.22	0.84	-0.53	-0.95	-1.37	-1.79	-1.93	-2.07	-2.21	-3.34	-4.46	-5.59	-6.11	-6.64	-7.16	-5.87	-4.59	-3.3	-4.36	-5.42	-6.48	-9.02	-11.56	-14.1	-12.11	-10.12	-8.14		
275	-2.81	-2.76	-2.71	-2.66	-2.24	-1.82	-1.39	0.36	2.11	3.86	2.37	0.89	-0.59	-0.9	-1.2	-1.51	-1.64	-1.77	-1.9	-3.23	-4.56	-5.89	-6.38	-6.86	-7.34	-5.84	-4.33	-2.83	-4.14	-5.46	-6.78	-9.28	-11.79	-14.3	-12.25	-10.19	-8.14		
280	-2.81	-2.78	-2.75	-2.71	-2.23	-1.74	-1.26	0.28	1.81	3.34	2.01	0.68	-0.64	-0.88	-1.12	-1.36	-1.43	-1.51	-1.59	-3.09	-4.59	-6.09	-6.57	-7.05	-7.53	-5.95	-4.38	-2.8	-4.22	-5.65	-7.07	-9.55	-12.03	-14.51	-12.38	-10.26	-8.14		
285	-2.81	-2.79	-2.78	-2.76	-2.22	-1.67	-1.12	0.16	1.45	2.73	1.59	0.44	-0.7	-0.87	-1.03	-1.2	-1.23	-1.25	-1.27	-2.94	-4.62	-6.29	-6.76	-7.24	-7.71	-6.09	-4.46	-2.83	-4.34	-5.86	-7.37	-9.82	-12.27	-14.71	-12.52	-10.33	-8.14		
290	-2.81	-2.81	-2.81	-2.81	-2.2	-1.59	-0.98	0.05	1.08	2.11	1.16	0.2	-0.75	-0.85	-0.95	-1.04	-1.02	-0.99	-0.96	-2.8	-4.64	-6.48	-6.96	-7.43	-7.9	-6.22	-4.54	-2.86	-4.47	-6.07	-7.67	-9.79	-11.9	-14.02	-12.06	-10.1	-8.14		
295	-2.81	-2.83	-2.85	-2.86	-2.19	-1.52	-0.84	-0.06	0.72	1.5	0.73	-0.04	-0.81	-0.83	-0.86	-0.89	-0.81	-0.73	-0.65	-2.66	-4.67	-6.68	-7.15	-7.62	-8.08	-6.35	-4.62	-2.89	-4.47	-6.04	-7.61	-9.48	-11.35	-13.22	-11.52	-9.83	-8.14		
300	-2.81	-2.84	-2.88	-2.91	-2.2	-1.48	-0.77	-0.21	0.34	0.89	0.3	-0.28	-0.86	-0.82	-0.78	-0.73	-0.67	-0.61	-0.55	-2.66	-4.77	-6.88	-7.28	-7.69	-8.09	-6.37	-4.65	-2.93	-4.37	-5.82	-7.27	-8.99	-10.7	-12.42	-10.99	-9.56	-8.14		
305	-2.81	-2.86	-2.91	-2.96	-2.29	-1.63	-0.96	-0.55	-0.14	0.27	-0.12	-0.52	-0.92	-0.81	-0.69	-0.58	-0.86	-1.15	-1.43	-3.31	-5.2	-7.08	-7.16	-7.25	-7.34	-5.88	-4.42	-2.96	-4.28	-5.61	-6.94	-8.5	-10.06	-11.62	-10.46	-9.3	-8.14		
310	-2.81	-2.88	-2.95	-3.01	-2.39	-1.77	-1.15	-0.88	-0.61	-0.34	-0.55	-0.77	-0.98	-0.79	-0.61	-0.42	-1.05	-1.68	-2.32	-3.97	-5.62	-7.27	-7.05	-6.82	-6.59	-5.39	-4.19	-2.99	-4.19	-5.4	-6.6	-8	-9.41	-10.81	-9.92	-9.03	-8.14		
315	-2.81	-2.89	-2.98	-3.06	-2.49	-1.91	-1.34	-1.21	-1.08	-0.95	-0.98	-1.01	-1.04	-0.78	-0.52	-0.26	-1.24	-2.22	-3.2	-4.62	-6.05	-7.47	-6.93	-6.38	-5.84	-4.9	-3.96	-3.02	-4.1	-5.18	-6.26	-7.51	-8.76	-10.01	-9.39	-8.76	-8.14		
320	-2.81	-2.91	-3.01	-3.11	-2.58	-2.06	-1.53	-1.54	-1.55	-1.56	-1.41	-1.25	-1.1	-0.77	-0.44	-0.11	-1.43	-2.76	-4.08	-5.28	-6.47	-7.67	-6.81	-5.95	-5.09	-4.41	-3.73	-3.05	-4.01	-4.97	-5.93	-7.02	-8.12	-9.21	-8.85	-8.49	-8.14		
325	-2.81	-2.92	-3.04	-3.15	-2.67	-2.19	-1.72	-1.87	-2.02	-2.18	-1.84	-1.5	-1.16	-0.8	-0.44	-0.08	-1.71	-3.34	-4.96	-5.86	-6.76	-7.66	-6.55	-5.44	-4.33	-3.92	-3.5	-3.08	-3.92	-4.76	-5.59	-6.53	-7.47	-8.41	-8.32	-8.23	-8.13		
330	-2.81	-2.85	-2.88	-2.92	-2.58	-2.24	-1.91	-2	-2.09	-2.18	-1.86	-1.53	-1.21	-1.25	-1.3	-1.34	-2.84	-4.34	-5.85	-6.14	-6.43	-6.72	-5.67	-4.63	-3.58	-3.54	-3.5	-3.46	-4.06	-4.66	-5.26	-6.13	-7.01	-7.89	-7.97	-8.05	-8.13		
335	-2.81	-2.77	-2.73	-2.69	-2.49	-2.29	-2.09	-2.05	-2.01	-1.97	-1.74	-1.51	-1.28	-1.72	-2.16	-2.59	-3.96	-5.33	-6.7	-6.39	-6.08	-5.77	-4.81	-3.85	-2.88	-3.25	-3.61	-3.97	-4.59	-5.21	-5.83	-6.47	-7.12	-7.76	-7.89	-8.01	-8.13		
340	-2.81	-2.69	-2.58	-2.46	-2.27	-2.09	-1.9	-1.85	-1.81	-1.76	-1.64	-1.53	-1.41	-2.22	-3.04	-3.85	-4.84	-5.83	-6.83	-6.16	-5.49	-4.82	-4.27	-3.72	-3.18	-3.61	-4.04	-4.47	-5.21	-5.96	-6.7	-7.01	-7.32	-7.64	-7.8	-7.97	-8.14		
345	-2.81	-2.63	-2.45	-2.27	-2.08	-1.89	-1.71	-1.65	-1.59	-1.53	-1.53	-1.53	-1.54	-2.68	-3.82	-4.97	-5.63	-6.29	-6.95	-5.96	-4.96	-3.97	-3.8	-3.63	-3.47	-3.99	-4.52	-5.04	-5.89	-6.73	-7.57	-7.5	-7.44	-7.37	-7.62	-7.88	-8.14		
350	-2.81	-2.44	-2.07	-1.71	-1.37	-1.03	-0.69	-0.62	-0.54	-0.47	-0.6	-0.73	-0.85	-1.82	-2.79	-3.76	-4.49	-5.23	-5.97	-5.73	-5.5	-5.26	-4.79	-4.32	-3.85	-4	-4.15	-4.31	-4.92	-5.52	-6.1								

Raw Data - GPS_ANT (1/2)

Theta Angle (°)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	
Phi Angle (°)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)	Response (dB)
0	-4.83	-4.9	-5.74	-6.28	-5.17	-2.98	-1.24	0.44	1.59	2.16	2.11	1.9	1.39	0.92	0.43	-0.05	-0.7	-1.56	-2.23	-2.49	-2.67	-2.91	-3.06	-3.22	-3.27	-3.59	-4.52	-5.59	-6.87	-7.46	-7.45	-6.3	-4.8	-3.78	-3.32	-3.72	-6.37	
5	-4.83	-5.41	-5.67	-6.78	-5.1	-3.07	-1.18	0.47	1.5	2.17	1.94	1.9	1.07	0.89	0.05	-0.09	-1.23	-1.59	-2.75	-2.52	-2.98	-2.94	-3.28	-3.32	-3.28	-3.68	-4.46	-5.36	-6.83	-6.87	-7.39	-6.04	-4.53	-3.89	-3.15	-3.92	-6.37	
10	-4.83	-5.92	-5.65	-7.29	-5.56	-3.16	-1.55	0.49	1.01	2.17	1.34	1.9	0.32	0.84	-1.07	-0.12	-2.72	-1.61	-3.86	-2.55	-3.41	-2.97	-3.53	-3.41	-3.24	-3.78	-4.24	-5.12	-6.38	-6.28	-7.19	-5.78	-4.24	-4	-2.78	-4.12	-6.37	
15	-4.83	-5.91	-5.64	-7.91	-6.02	-3.81	-1.93	0.08	0.52	1.71	0.74	1.48	-0.43	0.11	-2.19	-1	-4.2	-2.59	-4.98	-2.95	-3.83	-3.26	-3.78	-3.5	-3.2	-3.69	-4.03	-4.86	-5.93	-6.1	-7	-5.93	-3.95	-3.91	-2.41	-4.04	-6.37	
20	-4.83	-5.75	-5.63	-8.53	-6.48	-4.45	-2.3	-0.34	0.02	1.25	0.15	0.98	-1.18	-0.62	-3.31	-2.09	-5.69	-3.63	-6.09	-3.45	-4.25	-3.59	-4.02	-3.59	-3.17	-3.54	-3.82	-4.59	-5.48	-6.12	-6.8	-6.14	-3.65	-3.73	-2.04	-3.94	-6.37	
25	-4.83	-5.58	-5.62	-9.15	-6.94	-5.1	-2.68	-0.77	-0.47	0.79	-0.45	0.48	-1.93	-1.35	-4.43	-3.18	-7.17	-4.67	-7.21	-3.95	-4.68	-3.92	-4.26	-3.68	-3.13	-3.38	-3.6	-4.32	-5.03	-6.15	-6.61	-6.35	-3.36	-3.56	-1.67	-3.83	-6.37	
30	-4.83	-5.42	-5.61	-9.77	-7.4	-5.74	-3.07	-1.2	-0.96	0.33	-0.97	-0.02	-2.42	-2.08	-5.28	-4.27	-8.49	-5.71	-8.08	-4.45	-5.1	-4.25	-4.06	-3.78	-3.09	-3.23	-3.44	-4.06	-4.73	-6.17	-6.54	-6.56	-3.58	-3.38	-1.81	-3.73	-6.37	
35	-4.83	-5.26	-5.76	-10.39	-8.19	-6.39	-3.47	-1.62	-1.15	-0.12	-0.83	-0.52	-2.07	-2.81	-4.7	-5.36	-7.84	-6.75	-7.63	-4.95	-5.12	-4.58	-3.86	-3.87	-3.1	-3.08	-3.35	-3.79	-4.71	-6.2	-6.82	-6.77	-4.15	-3.2	-2.16	-3.62	-6.37	
40	-4.83	-5.1	-6	-11.01	-9.07	-7.04	-3.87	-2.05	-1.24	-0.58	-0.69	-1.02	-1.71	-3.53	-4.12	-6.45	-7.2	-7.79	-7.19	-5.45	-4.99	-4.91	-3.67	-3.96	-3.13	-2.93	-3.26	-3.52	-4.69	-6.22	-7.11	-6.98	-4.73	-3.02	-2.52	-3.52	-6.37	
45	-4.83	-4.93	-6.23	-11.63	-9.95	-7.68	-4.27	-2.48	-1.33	-1.04	-0.55	-1.52	-1.36	-4.26	-3.53	-7.54	-6.56	-8.83	-6.74	-5.95	-4.85	-5.23	-3.47	-4.05	-3.15	-2.78	-3.18	-3.25	-4.67	-6.25	-7.39	-7.19	-5.83	-2.84	-2.87	-3.41	-6.37	
50	-4.83	-4.8	-6.46	-11.54	-10.83	-7.73	-4.67	-2.59	-1.42	-0.94	-0.42	-1.66	-1	-4.01	-2.95	-8.42	-5.92	-8.7	-6.3	-6.27	-4.71	-5.24	-3.47	-4.08	-3.18	-2.64	-3.09	-3.05	-4.65	-6.27	-7.68	-7.22	-5.57	-2.84	-2.66	-3.23	-3.32	-6.37
55	-4.83	-4.79	-6.69	-11.09	-11.71	-7.64	-5.07	-2.56	-1.52	-0.78	-0.28	-1.34	-0.65	-3.46	-2.37	-7.52	-5.28	-7.94	-5.85	-5.88	-4.58	-5.02	-3.07	-3.97	-3.2	-2.7	-3	-3.17	-4.63	-6.22	-7.97	-7	-6.45	-2.65	-3.58	-3.27	-6.37	
60	-4.83	-4.78	-6.92	-10.63	-12.59	-7.56	-5.47	-2.53	-1.61	-0.61	-0.14	-1.01	-0.29	-2.91	-1.79	-6.63	-4.64	-7.17	-5.41	-5.49	-4.44	-4.8	-2.87	-3.86	-3.22	-2.76	-2.91	-3.29	-4.61	-6.17	-8.25	-6.78	-7.02	-2.65	-3.94	-3.21	-6.37	
65	-4.83	-4.78	-7.15	-10.17	-13.48	-7.47	-5.88	-2.5	-1.7	-0.45	0	-0.68	0.06	-2.36	-1.2	-5.73	-4	-6.41	-4.96	-5.11	-4.3	-4.57	-2.67	-3.74	-3.25	-2.82	-2.83	-3.4	-4.59	-6.13	-8.54	-6.56	-7.59	-2.65	-4.29	-3.15	-6.37	
70	-4.83	-4.77	-7.38	-9.72	-14.36	-7.38	-6.28	-2.47	-1.8	-0.29	0.14	-0.36	0.41	-1.81	-0.62	-4.84	-3.36	-5.64	-4.52	-4.72	-4.17	-4.35	-2.48	-3.63	-3.27	-2.88	-2.74	-3.52	-4.57	-6.08	-8.82	-6.35	-8.17	-2.65	-4.65	-3.1	-6.37	
75	-4.83	-4.76	-7.61	-9.26	-15.24	-7.29	-6.68	-2.44	-1.89	-0.12	0.28	-0.03	0.77	-1.26	-0.04	-3.95	-2.72	-4.88	-4.07	-4.34	-4.03	-4.12	-2.35	-3.52	-3.29	-2.94	-2.65	-3.64	-4.55	-6.03	-9.11	-6.13	-8.74	-2.65	-5	-3.04	-6.37	
80	-4.83	-4.75	-7.85	-8.8	-16.12	-7.2	-7.06	-2.41	-1.98	0.04	0.41	0.3	1.05	-0.72	0.5	-3.05	-2.07	-4.11	-3.72	-3.95	-3.89	-3.9	-2.46	-3.4	-3.32	-3	-2.63	-3.75	-4.57	-5.99	-9.39	-5.91	-8.74	-2.65	-5.05	-2.98	-6.37	
85	-4.83	-4.75	-7.88	-8.35	-16.04	-7.11	-6.65	-2.38	-1.98	0.2	0.41	0.63	0.9	-0.17	0.29	-2.16	-2.12	-3.35	-3.71	-3.56	-3.84	-3.68	-2.57	-3.29	-3.36	-3.06	-2.73	-3.87	-4.64	-5.94	-9.16	-5.69	-8.39	-2.65	-4.94	-2.93	-6.37	
90	-4.83	-4.74	-7.71	-7.89	-14.96	-7.02	-6.24	-2.35	-1.82	0.36	0.39	0.95	0.75	0.38	0.09	-1.26	-2.23	-2.59	-3.7	-3.18	-3.98	-3.45	-2.67	-3.18	-3.46	-3.12	-2.84	-3.99	-4.72	-5.89	-8.91	-5.47	-8.05	-2.65	-4.83	-2.87	-6.37	
95	-4.83	-4.73	-7.54	-7.43	-13.87	-6.93	-5.84	-2.32	-1.66	0.53	0.37	1.28	0.61	0.93	-0.12	-0.37	-2.33	-1.82	-3.69	-2.79	-4.12	-3.23	-2.78	-3.06	-3.56	-3.18	-2.95	-4.1	-4.79	-5.84	-8.66	-5.25	-7.71	-2.65	-4.72	-2.81	-6.37	
100	-4.83	-4.72	-7.37	-6.98	-12.79	-6.85	-5.43	-2.29	-1.5	0.68	0.35	1.61	0.46	1.48	-0.32	0.52	-2.44	-1.06	-3.68	-2.41	-4.26	-3.01	-2.89	-2.95	-3.66	-3.24	-3.06	-4.22	-4.86	-5.8	-8.41	-5.03	-7.36	-2.65	-4.6	-2.76	-6.37	
105	-4.83	-4.83	-7.2	-6.88	-11.71	-6.61	-5.02	-2.21	-1.34	0.61	0.33	1.65	0.31	1.24	-0.52	1.2	-2.55	-1.16	-3.67	-2.26	-4.4	-3.15	-2.99	-3.01	-3.76	-3.32	-3.17	-4.28	-4.93	-5.75	-8.15	-5.17	-7.02	-2.65	-4.49	-2.82	-6.37	
110	-4.83	-5.09	-7.03	-6.89	-10.62	-6.37	-4.62	-2.14	-1.18	0.53	0.31	1.44	0.17	0.91	-0.73	0.69	-2.65	-1.57	-3.66	-2.66	-4.54	-3.47	-3.1	-3.43	-3.86	-3.46	-3.27	-4.17	-5.01	-5.69	-7.9	-5.65	-6.67	-3.17	-4.38	-3.01	-6.37	
115	-4.83	-5.36	-6.86	-6.91	-9.54	-6.13	-4.21	-2.06	-1.03	0.46	0.29	1.22	0.02	0.57	-0.93	0.19	-2.76	-1.97	-3.65	-3.06	-4.68	-3.79	-3.2	-3.85	-3.96	-3.59	-3.38	-4.07	-5.08	-5.63	-7.65	-6.12	-6.33	-3.69	-4.27	-3.21	-6.37	
120	-4.83	-5.63	-6.69	-6.92	-8.45	-5.89	-3.81	-1.98	-0.87	0.39	0.27	1.01	-0.13	0.24	-1.13	-0.31	-2.87	-2.38	-3.64	-3.46	-4.82	-4.1	-3.31	-4.27	-4.06	-3.73	-3.49	-3.96	-5.15	-5.57	-7.39	-6.59	-5.99	-4.21	-4.15	-3.4	-6.37	
125	-4.83	-5.89	-6.52	-6.93	-7.37	-5.66	-3.4	-1.9	-0.71	0.31	0.25	0.79	-0.27	-0.1	-1.34	-0.81	-2.97	-2.78	-3.63	-3.85	-4.96	-4.42	-3.42	-4.69	-4.16	-3.87	-3.6	-3.86	-5.23	-5.51	-7.14	-7.06	-5.64	-4.73	-4.04	-3.6	-6.37	
130	-4.83	-6.16	-6.35	-6.95	-6.29	-5.42	-2.99	-1.83	-0.55	0.24	0.23	0.57	-0.42	-0.43	-1.54	-1.31	-3.08	-3.19	-3.62	-4.25	-5.1	-4.74	-3.46	-5.11	-4.26	-4	-3.7	-3.75	-5.3	-5.45	-6.89	-7.53	-5.3	-5.25	-3.93	-3.79	-6.37	
135	-4.83	-6.43	-6.18	-6.96	-5.2	-5.18	-2.59	-1.75	-0.39	0.17	0.21	0.36	-0.51	-0.77	-1.74	-1.81	-3.19	-3.59	-3.57	-4.65	-5.23	-5.06	-3.34	-5.53	-4.36	-4.14	-3.77	-3.65	-5.08	-5.4	-6.64	-8	-5.17	-5.77	-4.03	-3.99	-6.37	
140	-4.83	-6.69	-6.02	-6.97	-4.56	-4.94	-2.32	-1.67	-0.25	0.1	0.2	0.14	-0.48	-1.1	-1.64	-2.32	-3	-4	-3.35	-5.05	-5.21	-5.38	-3.21	-5.95	-4.4	-4.27	-3.64	-3.54	-4.58	-5.34	-6.11	-8.47	-5.29	-6.29	-4.23	-4.18	-6.37	
145	-4.83	-6.96	-5.86	-6.99	-4.31	-4.7	-2.06	-1.59	-0.15	0.02	0.19	-0.07	-0.46	-1.44	-1.54	-2.82	-2.8	-4.41	-3.13	-5.44	-4.8	-5.7	-3.09	-6.37	-4.21	-4.41	-3.51	-3.44	-4.07	-5.28	-5.55	-8.95	-5.4	-6.81	-4.44	-4.37	-6.37	
150	-4.83	-7.23	-5.71	-7	-4.07	-4.46	-1.8	-1.52	-0.06	-0.05	0.18	-0.29	-0.43	-1.77	-1.43	-3.32	-2.59	-4.81	-2.91	-5.84	-4.39	-6.02	-2.97	-6.79	-4.02	-4.54	-3.38	-3.33	-3.57	-5.22	-4.99	-9.42	-5.52	-7.33	-4.64	-4.57	-6.37	
155	-4.83	-7.49	-5.55	-7	-3.82	-4.22	-1.55	-1.44	0.04	-0.11	0.17	-0.5	-0.41	-2.11	-1.33	-3.82	-2.38	-5.22	-2.69	-6.24	-3.98	-6.34	-2.84	-7.2	-3.82	-4.68	-3.25	-3.23	-3.07	-5.16	-4.43	-9.89	-5.63	-7.85	-4.85	-4.76	-6.37	
160	-4.83	-7.4	-5.39	-6.75	-3.58	-3.92	-1.29	-1.3	0.14	-0.02	0.16	-0.55	-0.38	-2	-1.23	-3.97	-2.17	-5.01	-2.47	-6.34	-3.56	-6.16	-2.72	-7.04	-3.63	-4.66	-3.12	-3.11	-2.57	-4.96	-3.86	-9.8	-5.75	-8.35	-5.05	-4.87	-6.37	
165	-4.83	-7.18	-5.23	-6.51	-3.33	-3.62	-1.03	-1.14	0.23	0.06	0.16	-0.49	-0.36	-1.87	-1.13	-3.73	-1.97	-4.63	-2.25	-5.97	-3.15	-5.78	-2.59	-6.54	-3.43	-4.57	-2.99	-2.96	-2.06	-4.59	-3.3	-9.26	-5.86	-8.47	-5.26	-4.92	-6.37	
170	-4.83	-6.96	-5.07	-6.26																																		

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