



## AT-325 Antenna Specification

### SmartLink and Sidewalk FSK operating in 868MHz band

(Proprietary sub-GHz protocol, SRD multi-band radio,)

**Type of antenna:** shared fixed internal antenna;

**Antenna gain:** 1.63 dBi

### SmartLink and Sidewalk FSK operating in 915MHz band

(Proprietary sub-GHz protocol, SRD multi-band radio,)

**Type of antenna:** shared fixed internal antenna;

**Antenna gain:** 2.15 dBi

### Bluetooth operating in 2440MHz band

**Type of antenna:** shared fixed internal antenna;

**Antenna gain:** 4.58 dBi

Device	AT-325		
	2440 MHz	868 MHz	915 MHz
Total Radiated Power	2.94 dBm	12.00 dBm	10.15 dBm
Peak EIRP	9.08 dBm	14.43 dBm	14.05 dBm
Antenna directivity	6.13 dB	2.43 dB	3.90 dB
Antenna efficiency	-1.56 dB	-0.80 dB	-1.75 dB
Antenna gain	4.58 dBi	1.63 dBi	2.15 dBi
2nd Harmonic	-42.96 dBm	-35.08 dBm	-35.86 dBm
3rd Harmonic	Noise floor of EMC chamber	-41.27 dBm	-38.79 dBm
4th Harmonic	Noise floor of EMC chamber	Noise floor of EMC chamber	Noise floor of EMC chamber

Test Setup Photos

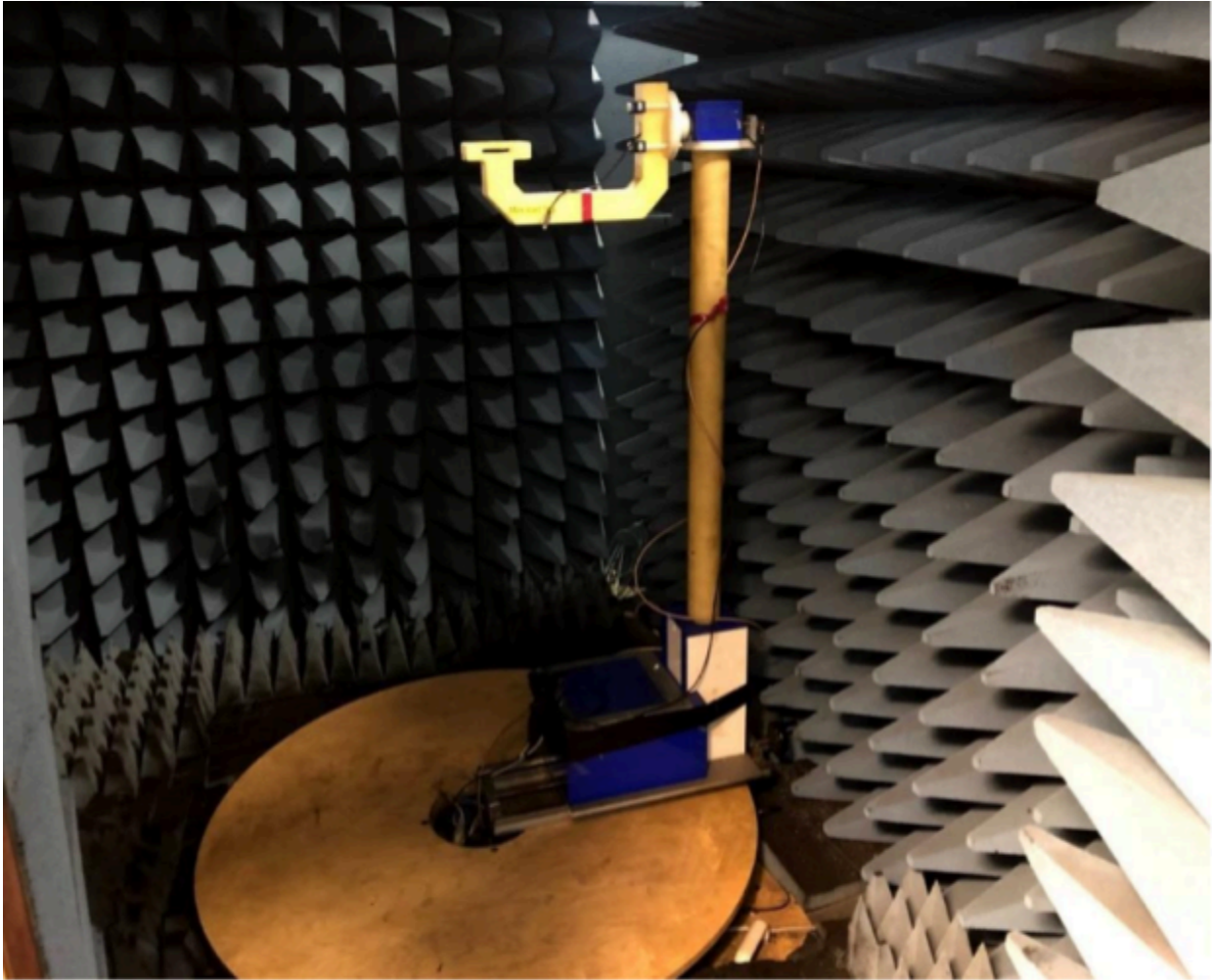


Image 1. Turn arm in chamber

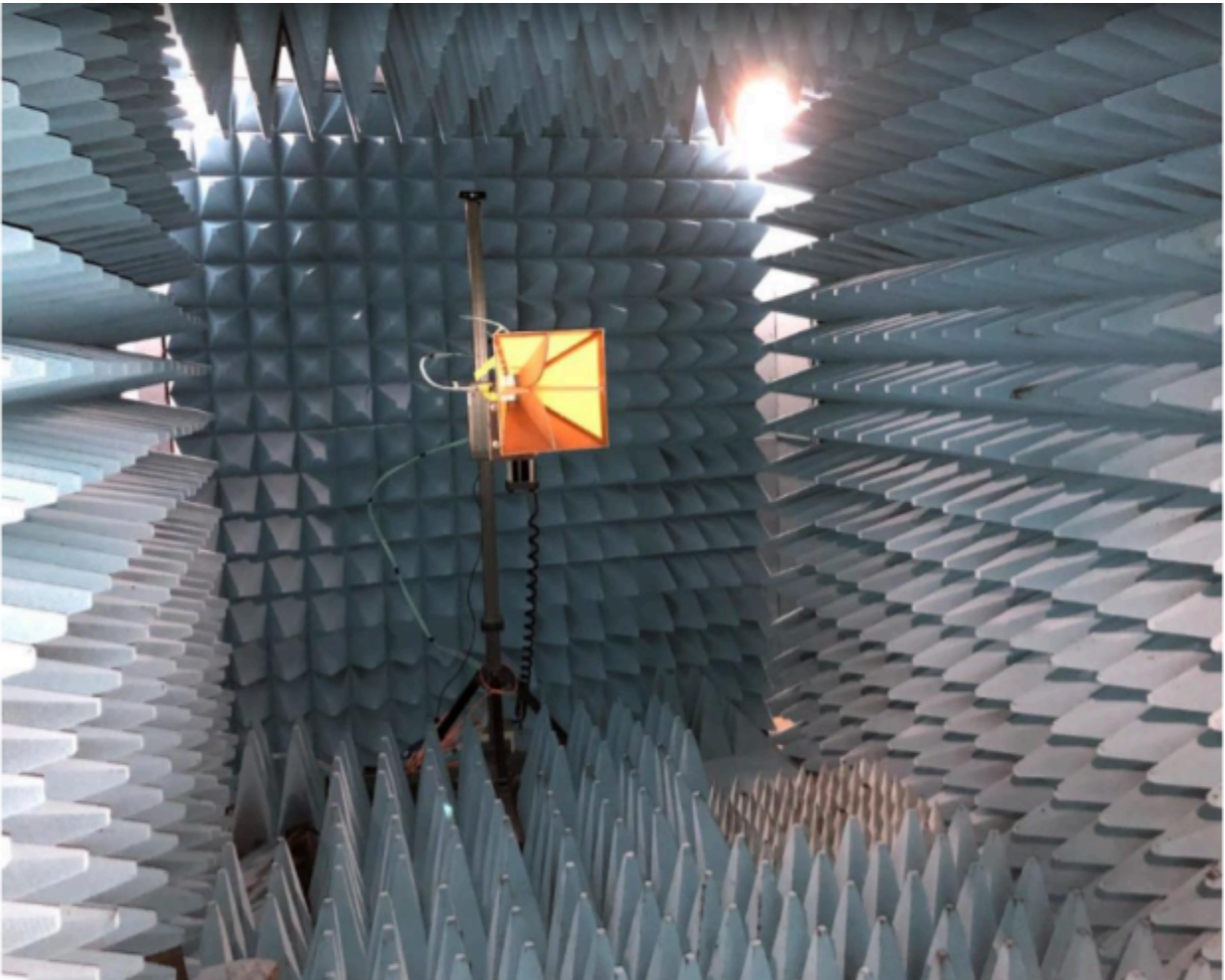
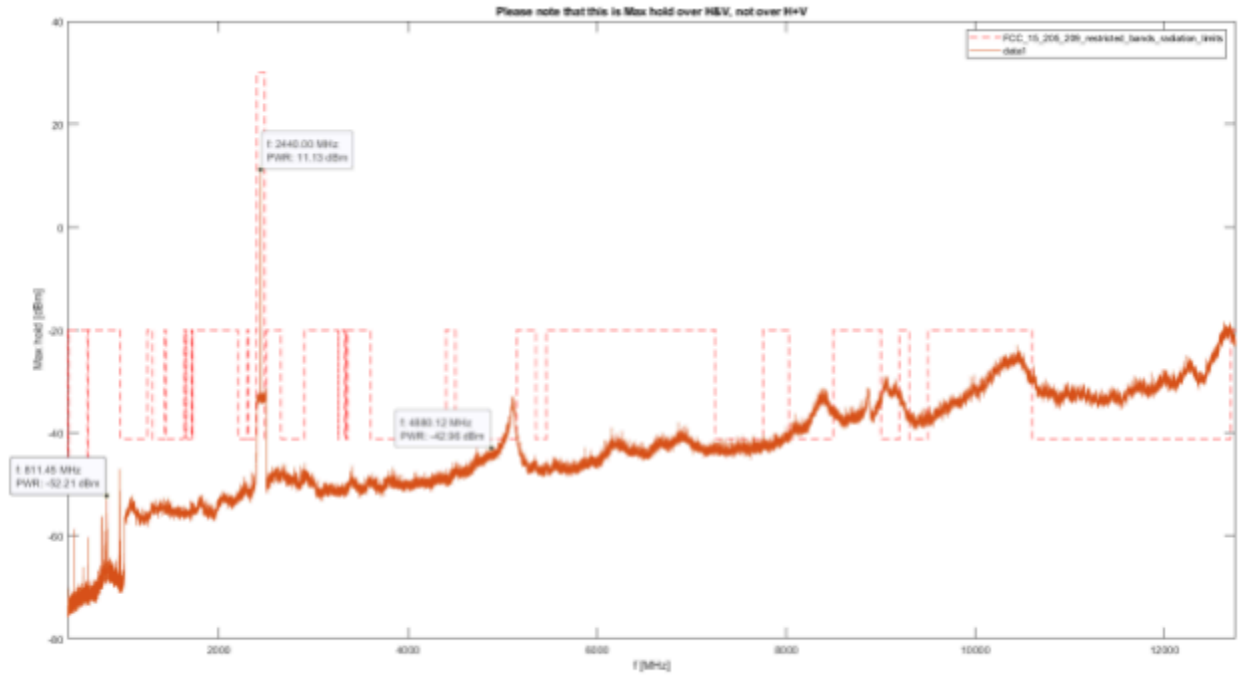


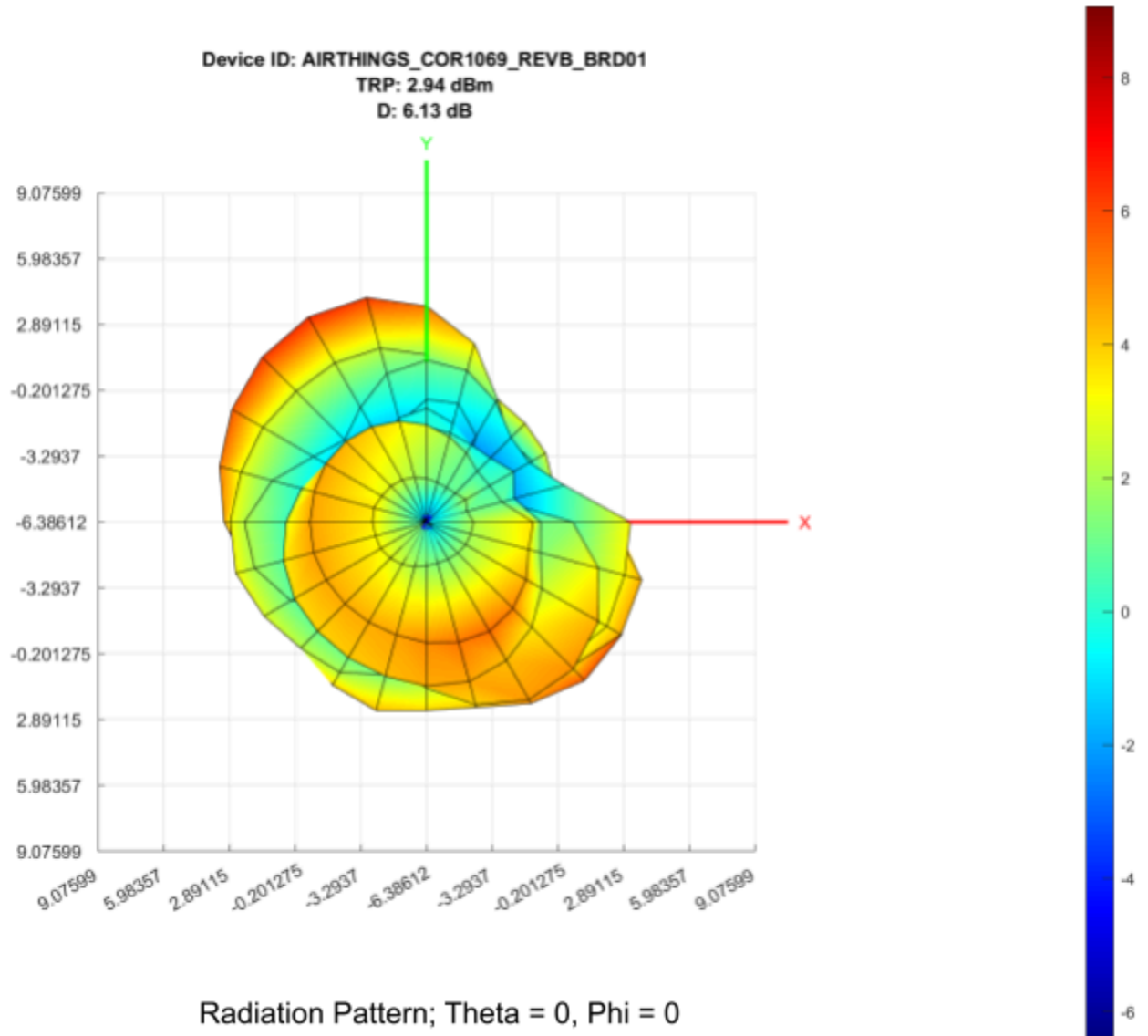
Figure 2: Receiving antenna in chamber

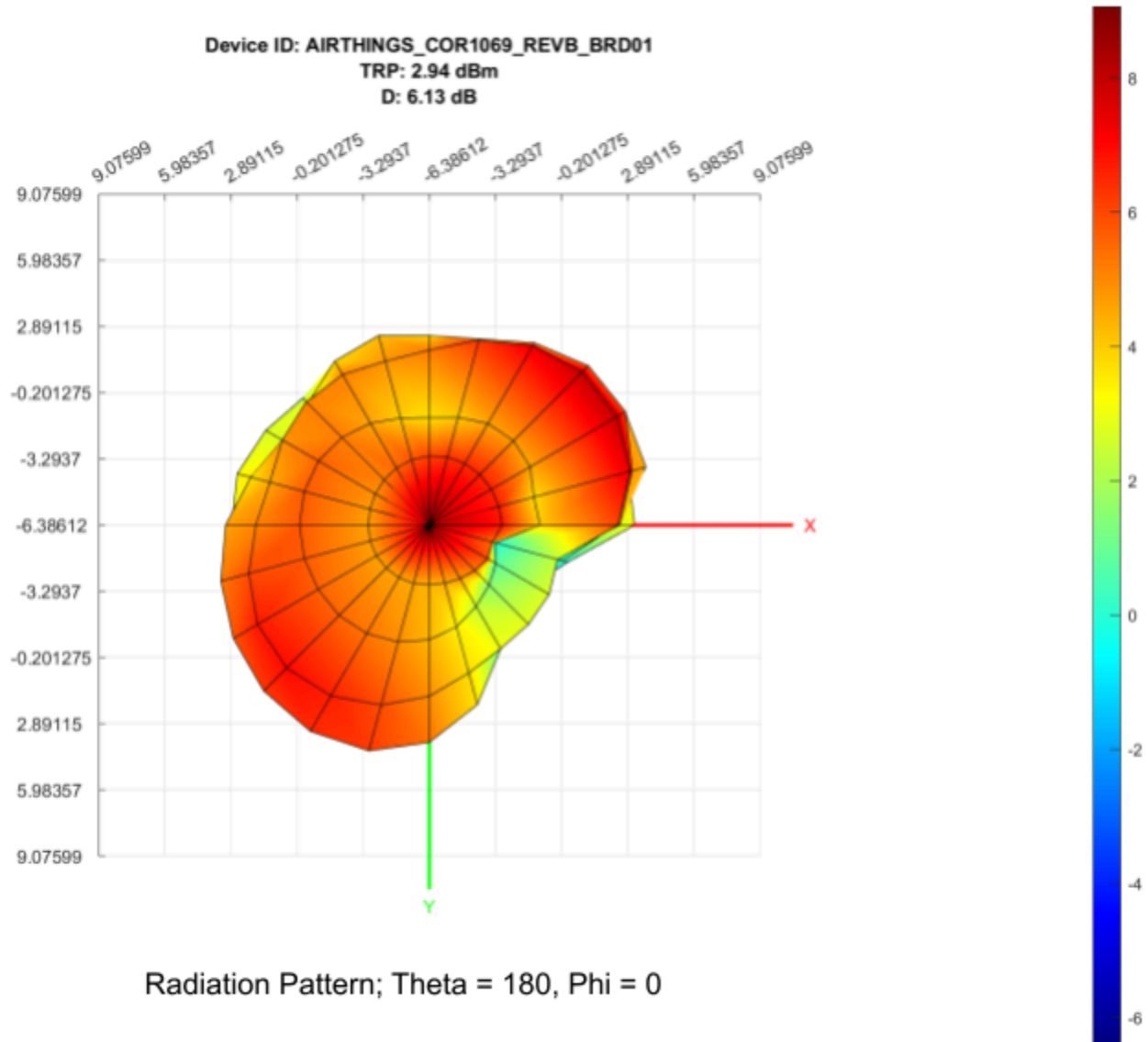


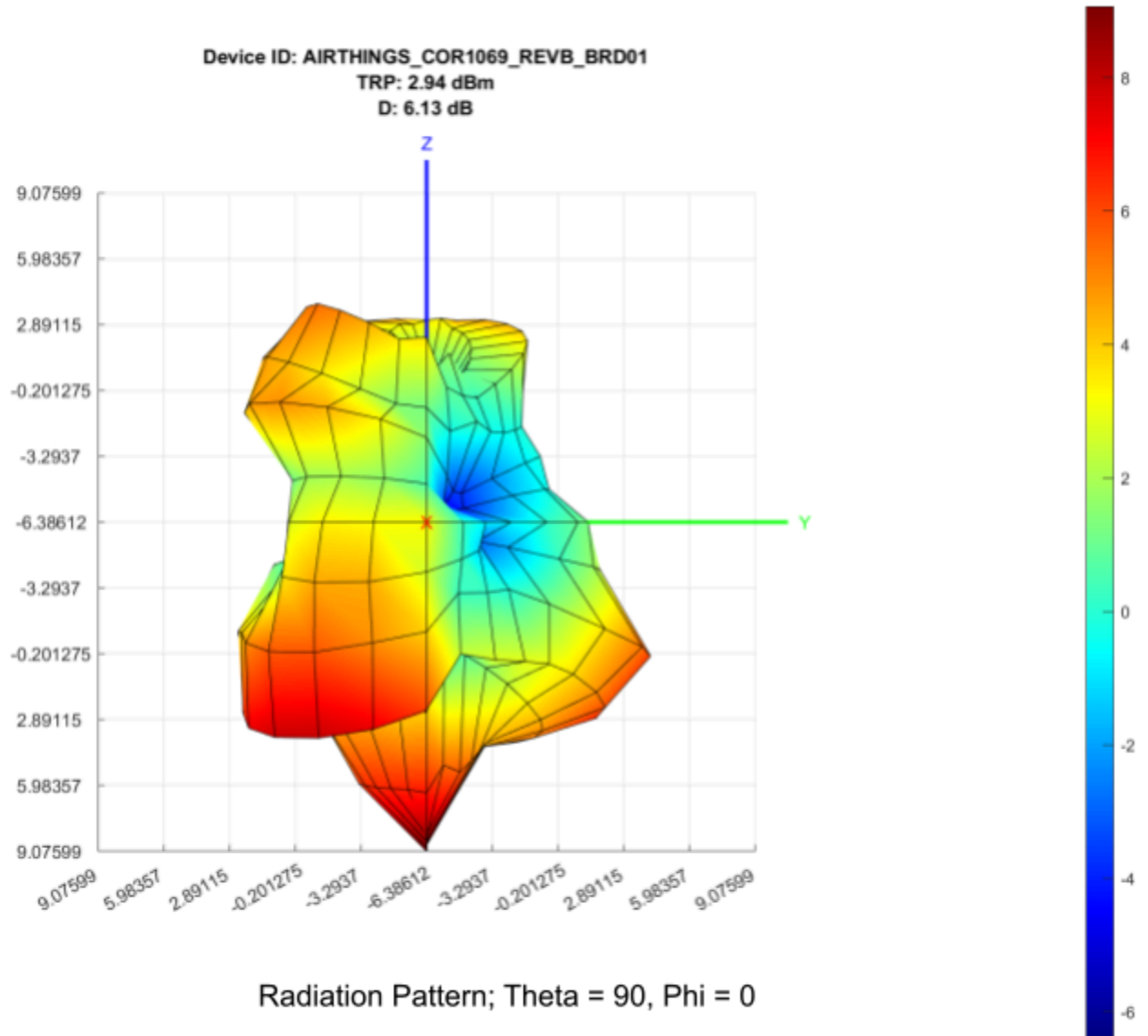
## 2440 MHz Measured Data

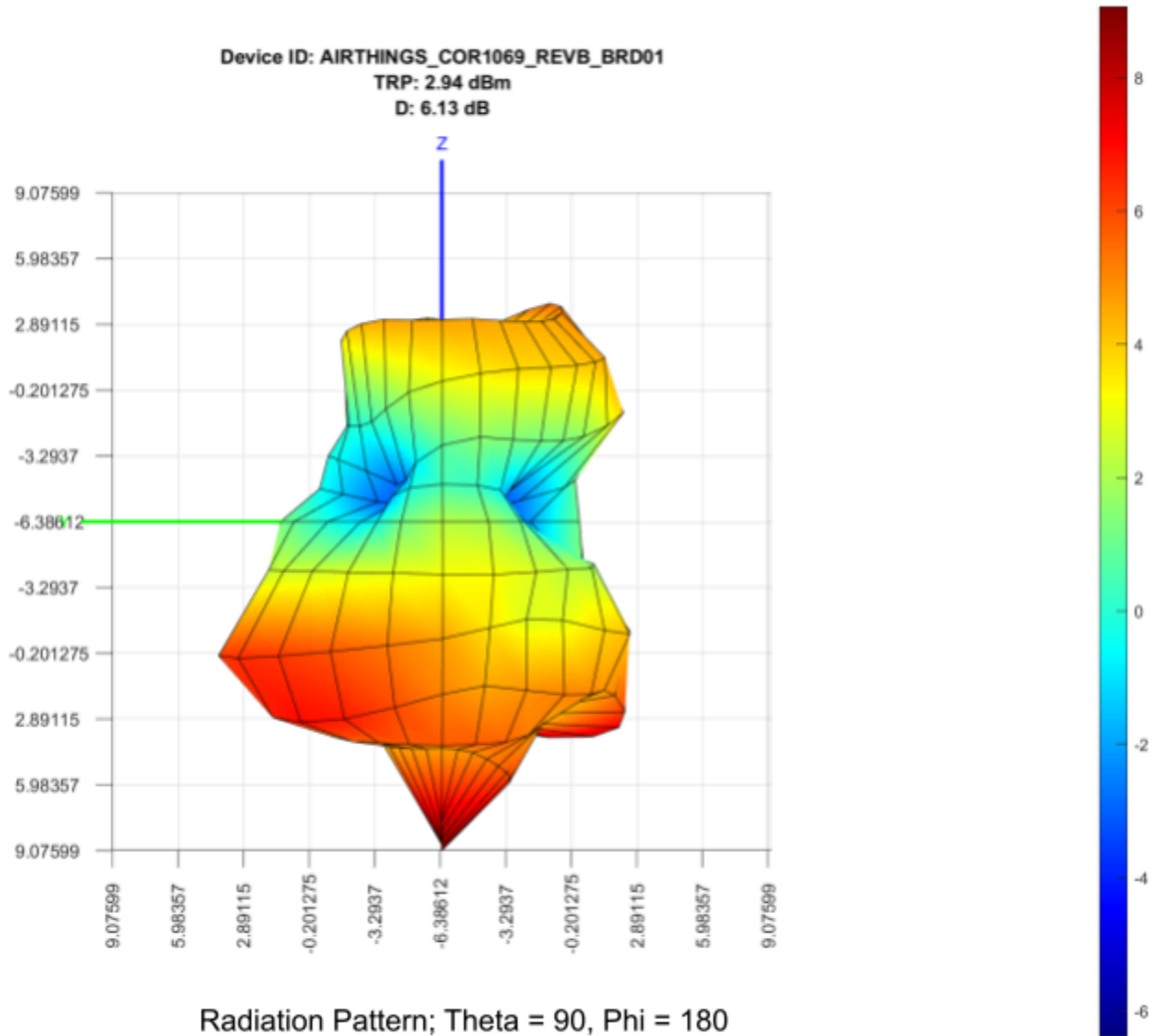


Radiated Spurious Emissions (RSE) Plot

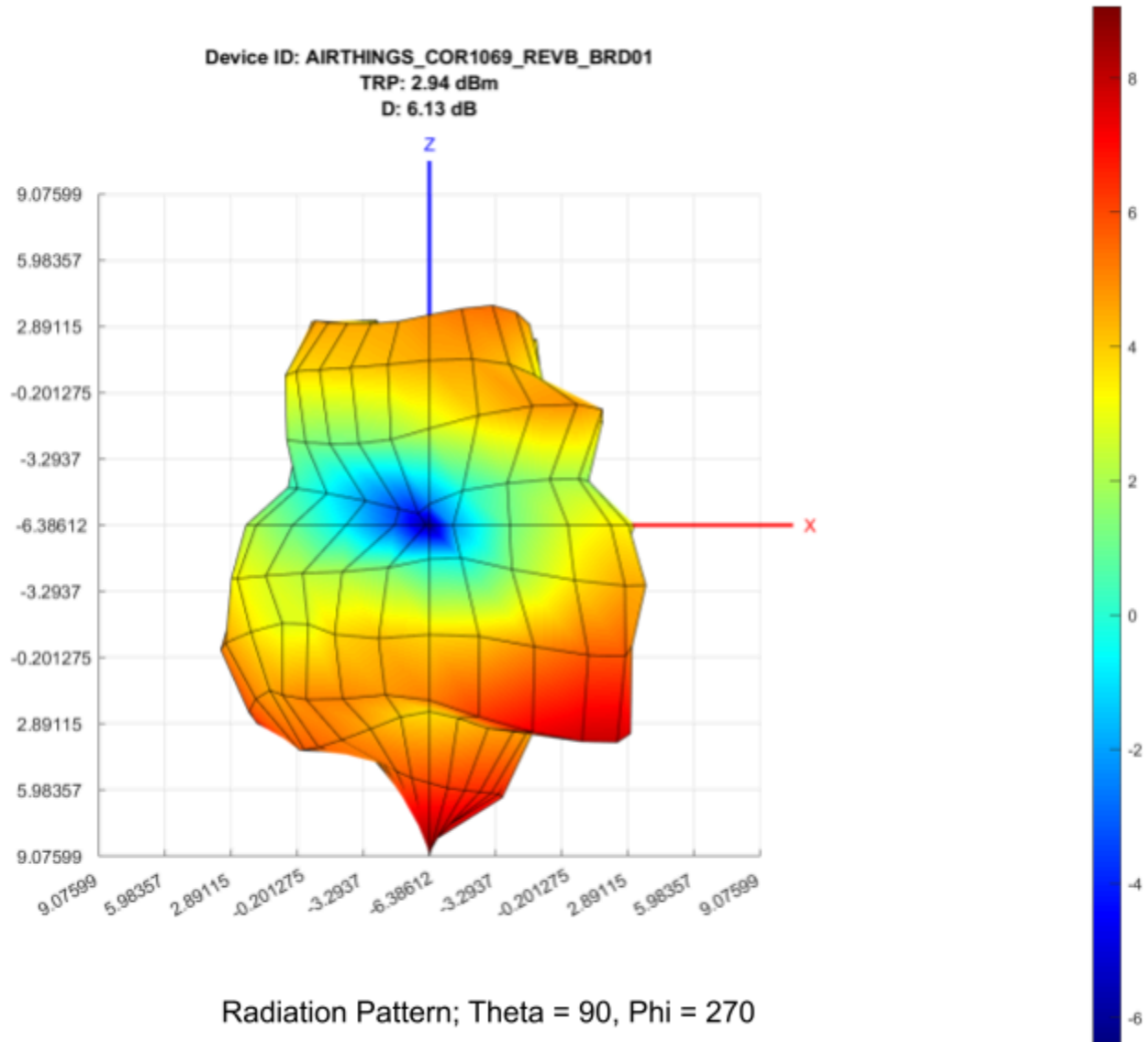


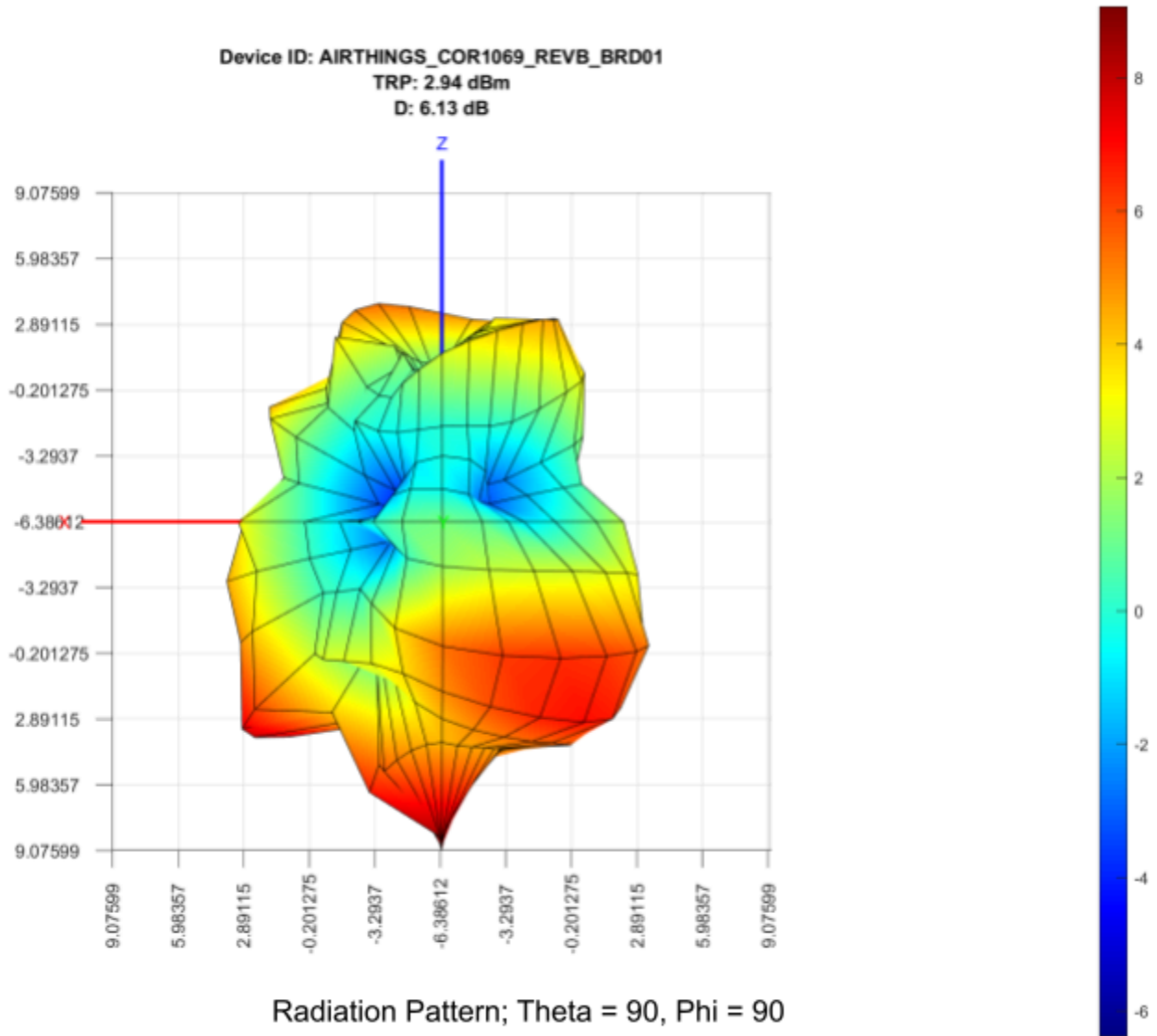














		$\phi$ (degrees)												
		0	15	30	45	60	75	90	105	120	135	150	165	180
$\theta$ (degrees)	0	-3.9772	-7.5767	-3.8007	-0.8805	-2.6750	-11.1926	-2.0140	-0.6872	-0.4349	-1.3662	-8.5382	2.1271	3.3353
	15	-3.2314	-17.2044	-4.9869	-0.5172	-0.0676	-11.0209	-5.5611	0.6971	1.0824	-0.5216	-18.2437	-1.6242	-0.7168
	30	-2.6126	-9.6457	-3.1358	1.1135	2.1653	-5.3648	-12.5233	0.1647	1.9643	1.2903	-8.8176	-4.2443	-5.7351
	45	-2.3962	-4.5899	-0.3804	2.7190	3.5489	-1.8126	-15.5976	-0.8391	2.2530	2.6774	-3.5470	-2.2604	-2.0155
	60	-2.2220	-1.7514	1.6481	3.7207	4.0863	-0.3180	-11.3890	-1.8097	2.0838	3.4659	-0.6178	0.8798	2.5866
	75	-2.3742	-0.1095	2.7406	4.0852	3.6861	-0.5518	-13.5581	-2.0465	1.8291	3.5498	1.0148	3.2031	5.4106
	90	-2.5377	0.7435	3.2426	3.9060	2.5643	-2.6354	-16.3969	-0.6743	2.3621	3.3476	2.1924	4.5034	7.0960
	105	-2.6281	1.1697	3.3677	3.4733	1.1891	-4.7931	-7.2201	1.1544	3.2722	3.7197	3.4277	5.2339	8.0200
	120	-2.5488	1.3967	3.5188	3.2104	0.3712	-4.2904	-3.4727	1.9895	3.3190	4.4987	4.3783	5.3515	8.3239
	135	-2.2663	1.5290	3.7015	3.2092	0.1567	-2.7408	-1.0551	2.2484	2.5892	4.5933	4.8437	5.0227	8.0780
	150	-1.8121	1.6031	3.8095	3.3435	0.4257	-1.1872	0.7725	2.7071	2.3486	3.7505	4.6769	4.1846	7.2353
	165	-1.3655	1.6179	3.7436	3.2692	0.9218	-0.0604	1.6561	3.0643	2.4613	2.4083	3.8159	2.8281	5.7064
	180	-2.1176	1.6581	3.2930	2.8676	0.2089	0.0955	1.6533	2.7967	2.2240	1.0689	2.3086	0.7443	3.0699
	195	-2.1876	1.6430	2.7427	2.1230	-1.2623	-0.8752	0.3096	1.7457	0.6476	-0.8606	-0.0409	-2.4821	-1.3629
	210	-2.3506	0.8795	2.1389	0.9848	-3.1992	-3.1736	-2.4040	-0.2568	-2.5457	-3.5062	-3.6702	-8.6533	-7.4635
	225	-2.7074	0.7855	1.5097	0.1147	-4.3094	-8.3671	-7.6107	-4.5267	-9.0364	-10.4801	-7.6601	-12.7979	-3.5290
	240	-3.2118	0.7190	0.8615	-0.3034	-3.6103	-21.7175	-17.7018	-12.9040	-20.1571	-14.9988	-5.6382	-4.5984	1.5631
	255	-3.9045	0.6220	0.3509	-0.4368	-2.8269	-12.0231	-13.0460	-13.9882	-6.7899	-5.3090	-1.7633	-0.4646	4.7165
270	-4.6049	0.5035	0.0310	-0.6481	-2.6085	-7.5008	-8.0597	-8.0976	-3.1603	-1.3097	0.8170	2.0536	6.7053	
285	-5.4637	0.2606	-0.0024	-0.8647	-3.1181	-5.5752	-5.1449	-5.7922	-1.9578	1.0124	2.0710	3.6833	7.9242	
300	-6.1846	-0.0458	0.0629	-1.0171	-4.2709	-4.9649	-3.2056	-4.8113	-1.3807	2.3330	2.1000	4.6533	8.4851	
315	-5.8132	-0.5413	-0.3154	-0.9916	-5.1919	-5.4285	-1.7953	-3.3934	-0.5445	2.4539	1.2690	5.0626	8.4711	
330	-5.8133	-1.4899	-0.5763	-0.6999	-5.9322	-6.5287	-0.8633	-1.3373	-0.8767	1.4700	-0.5958	4.9846	7.7821	
345	-7.4558	-4.0222	-2.2987	-1.5377	-7.3637	-7.1345	-0.5202	-0.0749	-2.4064	-0.4073	-5.7413	4.1085	7.0081	
360	-3.9772	-7.5767	-3.8007	-0.8805	-2.6750	-11.1926	-2.0140	-0.6872	-0.4349	-1.3662	-8.5382	2.1271	3.3353	

Table 1. Horizontal Power (dBm)



		$\phi$ (degrees)												
		0	15	30	45	60	75	90	105	120	135	150	165	180
$\theta$ (degrees)	0	-4.2664	1.6679	2.7683	-2.9398	-0.5038	0.2830	1.6601	-0.0708	1.9058	5.2360	3.7061	4.9648	6.8733
	15	-4.9648	1.8700	2.8937	-2.8639	0.5831	1.3388	2.6388	2.0957	2.6401	6.6121	3.7128	5.9142	7.5643
	30	-6.1658	1.4975	3.5974	-3.2527	0.4725	1.0596	3.2968	2.5889	3.5576	6.9031	4.2923	6.1958	8.1421
	45	-7.2842	0.4225	3.6571	-4.3407	-0.8780	-0.5817	2.7234	1.6065	3.1921	6.3586	4.0459	5.8992	8.2162
	60	-7.6148	-1.5238	3.1118	-5.3646	-3.8567	-4.2340	0.8869	-1.0560	1.8183	4.9701	3.0024	5.0176	7.7273
	75	-6.6245	-4.1842	1.7501	-5.1439	-10.0994	-10.9981	-2.3761	-5.6525	-0.0352	2.9386	1.0037	3.4244	6.6348
	90	-4.9525	-6.1238	0.0443	-4.4499	-15.3732	-23.1552	-6.8425	-10.8269	-1.5711	0.5256	-1.7507	0.8938	4.7094
	105	-3.5948	-5.5440	-1.4750	-3.8389	-8.8216	-14.2103	-11.2839	-13.9938	-2.9636	-1.6785	-5.4544	-3.0448	1.4151
	120	-2.7420	-4.0704	-2.5529	-3.7006	-6.1710	-11.2740	-14.4126	-16.0983	-5.7525	-3.8920	-8.4572	-8.8814	-4.5562
	135	-2.3363	-2.7278	-3.3976	-4.6270	-5.4808	-10.3080	-14.8327	-18.3407	-9.0434	-4.2671	-5.9697	-9.7263	-11.8936
	150	-2.4769	-1.7630	-3.6805	-6.4973	-5.9402	-10.2368	-12.0541	-16.4399	-7.4533	-1.7399	-1.6452	-3.6112	-1.8445
	165	-3.0206	-1.8993	-2.7177	-8.8594	-6.9478	-11.9230	-9.2867	-10.9806	-2.8399	0.3945	1.2163	0.1613	2.9839
	180	-3.7611	-1.2898	-1.3089	-13.7302	-8.0306	-10.6803	-7.2341	-7.5015	0.8795	2.8904	3.1302	2.3564	5.6541
	195	-4.4883	-1.0299	-0.1367	-13.9334	-10.9189	-8.9268	-6.4792	-3.1281	3.4251	4.9531	4.3780	3.7400	7.2340
	210	-5.8100	-1.0760	0.9394	-14.1828	-10.5074	-6.8007	-4.2946	-0.1194	5.1495	6.2995	5.0751	4.4535	8.1778
	225	-6.0797	-1.4620	1.1723	-14.9065	-8.4702	-4.6618	-1.9877	1.6665	6.1281	6.8836	5.3384	4.5347	8.2600
	240	-6.1493	-2.3325	1.0494	-12.4862	-6.0433	-2.8410	-0.2438	2.4282	6.4463	6.6032	4.9450	4.0198	7.7590
	255	-5.9373	-3.5121	0.4939	-9.9492	-4.4253	-1.7793	0.6539	2.2651	5.9866	5.5790	3.8681	2.8510	6.5775
270	-5.4976	-5.1308	-0.5643	-8.9766	-3.9961	-1.3712	0.6699	1.2781	4.6630	3.7305	1.7621	0.5123	4.5956	
285	-5.1322	-6.7793	-2.6134	-9.2269	-4.7177	-1.9951	-0.2365	-0.9095	2.2330	0.3765	-2.2650	-3.4206	1.2130	
300	-4.7974	-6.3877	-5.6166	-9.5852	-6.6833	-4.2143	-2.5626	-4.8344	-2.0266	-5.1685	-9.6674	-12.0578	-4.6856	
315	-4.3713	-4.2386	-8.1094	-9.1236	-9.0512	-9.0825	-7.5354	-12.4052	-9.9085	-7.3914	-10.9607	-9.5876	-8.9609	
330	-4.3754	-0.9167	-6.2496	-6.5554	-7.1621	-11.0797	-19.6480	-18.4839	-6.2127	-3.1122	-4.7970	-2.0779	-1.2081	
345	-2.9994	-0.3690	-1.8831	-6.5543	-3.5708	-5.4692	-7.3181	-10.5550	-3.0455	-0.8443	-1.3519	-0.3603	2.9619	
360	-4.2664	1.6679	2.7683	-2.9398	-0.5038	0.2830	1.6601	-0.0708	1.9058	5.2360	3.7061	4.9648	6.8733	

Table 2. Vertical Power (dBm)



**Total Power (dBm):**  $P_{dBm} = 10\log(10P_{hor}/10 + 10P_{ver}/10)$

		$\phi$ (degrees)												
		0	15	30	45	60	75	90	105	120	135	150	165	180
θ (degrees)	0	-1.1091	2.1562	3.6331	1.2211	1.5552	0.5817	3.2108	2.6422	3.9016	6.0948	3.9577	6.7840	8.4653
	15	-1.0019	1.9234	3.5491	1.4763	3.2803	1.5840	3.2509	4.4628	4.9410	7.3803	3.7404	6.6193	8.1658
	30	-1.0252	1.8191	4.4330	2.4677	4.4112	1.9509	3.4090	4.5541	5.8439	7.9569	4.4995	6.5715	8.3164
	45	-1.1757	1.6128	5.1019	3.4992	4.8869	1.8566	2.7869	3.5639	5.7582	7.9072	4.7428	6.5166	8.6096
	60	-1.1199	1.3742	5.4516	4.2262	4.7330	1.1615	1.1367	1.5938	4.9634	7.2931	4.5694	6.4342	8.8872
	75	-0.9886	1.3248	5.2838	4.5752	3.8641	-0.1766	-2.0573	-0.4753	4.0065	6.2653	4.0195	6.3255	9.0760
	90	-0.5691	1.5560	4.9418	4.4979	2.6336	-2.5971	-6.3861	-0.2741	3.8366	5.1722	3.6641	6.0736	9.0749
	105	-0.0743	2.0087	4.5993	4.2130	1.6020	-4.3228	-5.7828	1.2851	4.1991	4.8206	3.9560	5.8358	8.8784
	120	0.3660	2.4822	4.4777	4.0154	1.2409	-3.4976	-3.1363	2.0564	3.8260	5.0862	4.5986	5.5124	8.5421
	135	0.7091	2.9128	4.4752	3.8709	1.2052	-2.0401	-0.8768	2.2862	2.8777	5.1241	5.1897	5.1658	8.1215
	150	0.8785	3.2486	4.5218	3.7721	1.3279	-0.6777	0.9933	2.7596	2.7809	4.8309	5.5874	4.8521	7.7415
	165	0.8956	3.2163	4.6280	3.4756	1.5788	0.2136	1.9923	3.2321	3.5841	4.5274	5.7181	4.7066	7.5654
	180	0.1482	3.4399	4.5853	2.9616	0.8158	0.4443	2.1810	3.1843	4.6139	5.0848	5.7491	4.6351	7.5617
	195	-0.1771	3.5193	4.5477	2.2294	-0.8160	-0.2433	1.1356	2.9697	5.2650	5.9644	5.7182	4.6695	7.7960
	210	-0.7343	3.0212	4.5907	1.1150	-2.4589	-1.6087	-0.2369	2.8227	5.8314	6.7315	5.6193	4.6609	8.2947
	225	-1.0638	2.8159	4.3546	0.2492	-2.8992	-3.1204	-0.9361	2.6016	6.2584	6.9626	5.5508	4.6142	8.5385
	240	-1.4265	2.4662	3.9668	-0.0483	-1.6484	-2.7851	-0.1665	2.5536	6.4558	6.6332	5.3090	4.5792	8.6936
	255	-1.7927	2.0397	3.4333	0.0238	-0.5427	-1.3870	0.8353	2.3668	6.2110	5.9193	4.9179	4.5125	8.7562
270	-2.0181	1.5527	2.7539	-0.0527	-0.2114	-0.4237	1.2160	1.7526	5.3265	4.9141	4.3255	4.3612	8.7876	
285	-2.2845	1.0441	1.8958	-0.2735	-0.8344	-0.4159	0.9790	0.3123	3.6350	3.7164	3.4333	4.4563	8.7637	
300	-2.4256	0.8609	1.1024	-0.4517	-2.3014	-1.5631	0.1381	-1.8125	1.3187	3.0436	2.3799	4.7449	8.6895	
315	-2.0224	1.0025	0.3532	-0.3705	-3.4960	-3.8717	-0.7687	-2.8797	-0.0688	2.8821	1.5214	5.2089	8.5489	
330	-2.0248	1.8165	0.4645	0.3027	-3.4935	-5.2232	-0.8062	-1.2543	0.2382	2.7674	0.8033	5.7643	8.2982	
345	-1.6692	1.1881	0.9243	-0.3484	-2.0554	-3.2122	0.3042	0.2975	0.2961	2.3900	-0.0038	5.4355	8.4504	
360	-1.1091	2.1562	3.6331	1.2211	1.5552	0.5817	3.2108	2.6422	3.9016	6.0948	3.9577	6.7840	8.4653	

Table 3. Total Power (dBm)



Total Power (mW):  $P_{mW} = 10P_{dBm}/10$

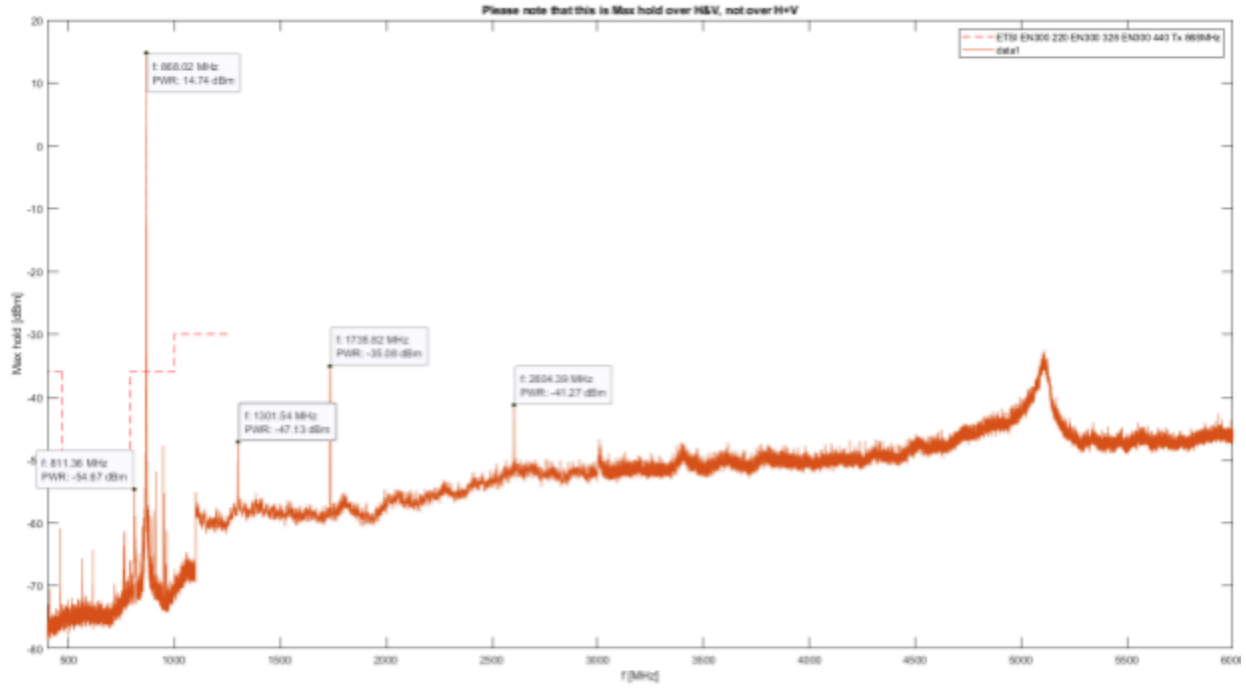
		$\varphi$ (degrees)												
		0	15	30	45	60	75	90	105	120	135	150	165	180
θ (degrees)	0	0.7746	1.6429	2.3084	1.3247	1.4306	1.1433	2.0945	1.8375	2.4556	4.0689	2.4876	4.7687	7.0232
	15	0.7940	1.5572	2.2642	1.4049	2.1283	1.4401	2.1139	2.7943	3.1196	5.4705	2.3662	4.5912	6.5551
	30	0.7897	1.5202	2.7752	1.7651	2.7613	1.5671	2.1923	2.8537	3.8406	6.2472	2.8181	4.5410	6.7864
	45	0.7628	1.4497	3.2374	2.2383	3.0810	1.5334	1.8997	2.2719	3.7054	6.1762	2.9805	4.4840	7.2604
	60	0.7727	1.3722	3.5088	2.6462	2.9737	1.3066	1.2992	1.4434	3.1357	5.3618	2.8638	4.3997	7.7396
	75	0.7964	1.3567	3.3758	2.8676	2.4345	0.9602	0.6227	0.8963	2.5157	4.2318	2.5232	4.2909	8.0834
	90	0.8772	1.4309	3.1202	2.8170	1.8338	0.5499	0.2298	0.9388	2.4191	3.2902	2.3249	4.0491	8.0815
	105	0.9830	1.5881	2.8836	2.6382	1.4461	0.3896	0.2641	1.3444	2.6297	3.0343	2.4866	3.8333	7.7239
	120	1.0879	1.7710	2.8039	2.5208	1.3307	0.4469	0.4857	1.6056	2.4132	3.2257	2.8831	3.5583	7.1484
	135	1.1774	1.9556	2.8024	2.4383	1.3198	0.6252	0.8172	1.6928	1.9398	3.2540	3.3034	3.2853	6.4886
	150	1.2242	2.1128	2.8326	2.3835	1.3577	0.8555	1.2570	1.8878	1.8971	3.0415	3.6202	3.0564	5.9449
	165	1.2290	2.0972	2.9027	2.2262	1.4384	1.0504	1.5821	2.1048	2.2825	2.8362	3.7309	2.9557	5.7087
	180	1.0347	2.2079	2.8743	1.9777	1.2067	1.1877	1.6523	2.0818	2.8933	3.2246	3.7576	2.9074	5.7039
	195	0.9600	2.2487	2.8495	1.6708	0.8287	0.9455	1.2988	1.9814	3.3612	3.9486	3.7309	2.9306	6.0200
	210	0.8444	2.0050	2.8779	1.2927	0.5677	0.6904	0.9469	1.9155	3.8295	4.7114	3.6470	2.9247	6.7526
	225	0.7827	1.9124	2.7256	1.0591	0.5130	0.4875	0.8061	1.8204	4.2251	4.9689	3.5899	2.8935	7.1425
	240	0.7200	1.7645	2.4927	0.9889	0.6842	0.5266	0.9624	1.8004	4.4216	4.6059	3.3955	2.8702	7.4021
	255	0.6618	1.5994	2.2046	1.0055	0.8825	0.7266	1.2121	1.7246	4.1792	3.9078	3.1030	2.8265	7.5097
270	0.6283	1.4298	1.8853	0.9879	0.9525	0.9071	1.3231	1.4971	3.4092	3.1004	2.7074	2.7297	7.5642	
285	0.5909	1.2718	1.5473	0.9390	0.8252	0.9087	1.2528	1.0746	2.3094	2.3531	2.2046	2.7902	7.5226	
300	0.5721	1.2193	1.2890	0.9012	0.5887	0.6977	1.0323	0.6588	1.3548	2.0154	1.7298	2.9819	7.3952	
315	0.6277	1.2596	1.0847	0.9182	0.4270	0.4100	0.8378	0.5153	0.9843	1.9418	1.4195	3.3181	7.1596	
330	0.6274	1.5193	1.1129	1.0722	0.4474	0.3004	0.8306	0.7491	1.0564	1.8912	1.2032	3.7708	6.7580	
345	0.6809	1.3146	1.2372	0.9229	0.6230	0.4773	1.0726	1.0709	1.0706	1.7338	0.9991	3.4958	6.9991	
360	0.7746	1.6429	2.3084	1.3247	1.4306	1.1433	2.0945	1.8375	2.4556	4.0689	2.4876	4.7687	7.0232	

Table 4. Total Power (dBm)

**Measured Conducted Output:  $P_{cond} = 4.5 \text{ dBm}$**



# 868MHz Measured Data



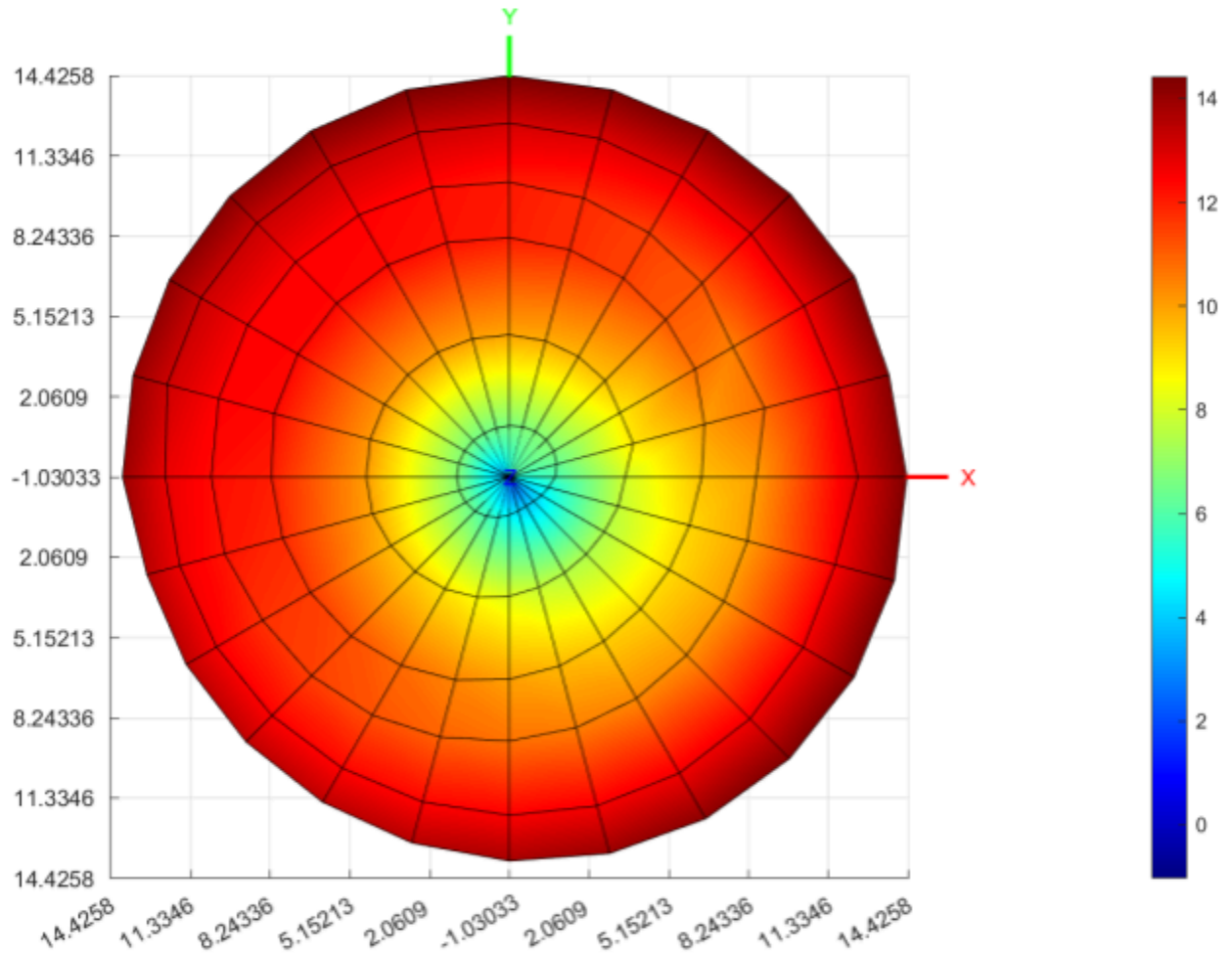
Radiated Spurious Emissions (RSE) Plot



Device ID: AIRTHINGS\_COR1069\_REVB\_BRD01

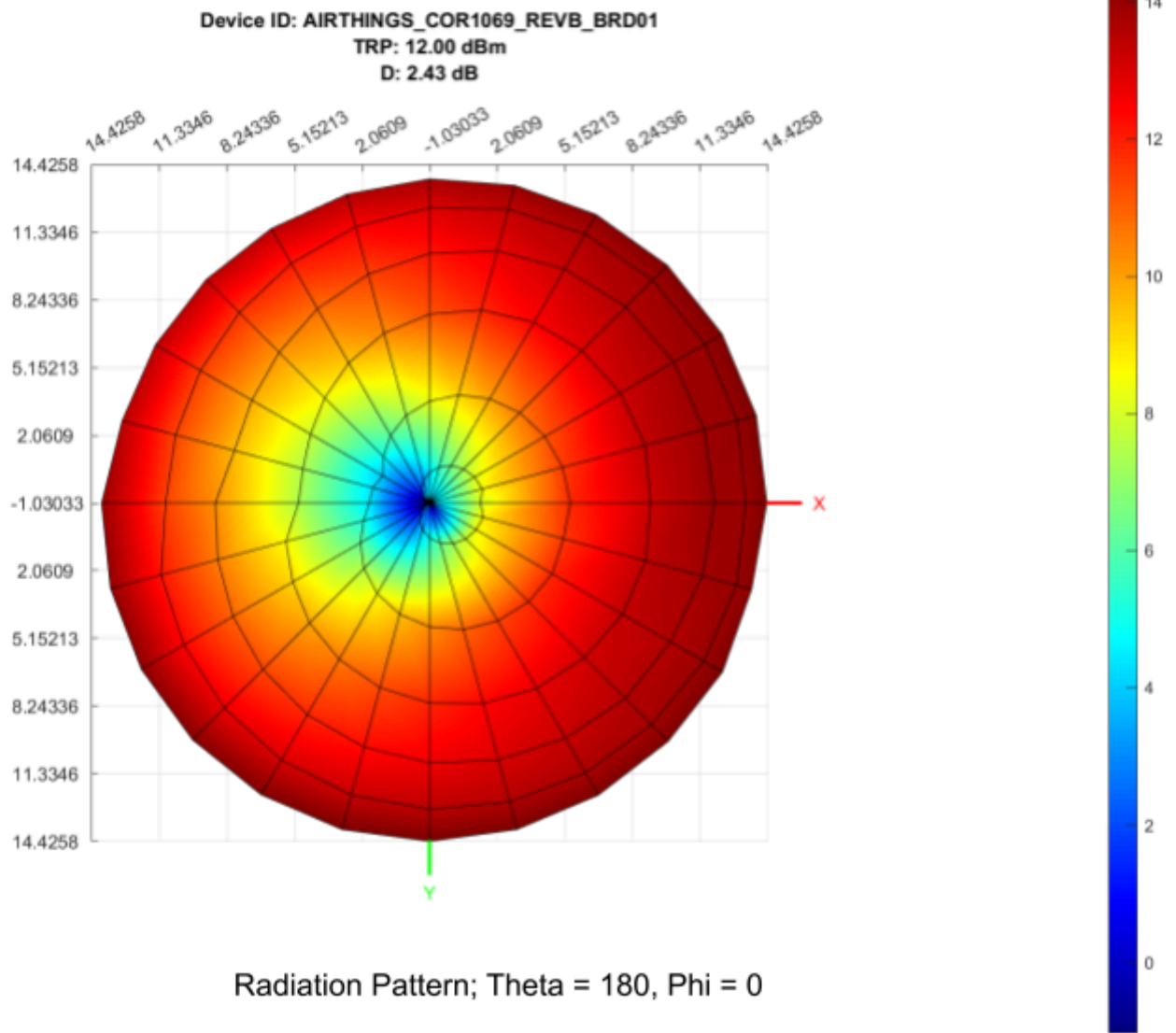
TRP: 12.00 dBm

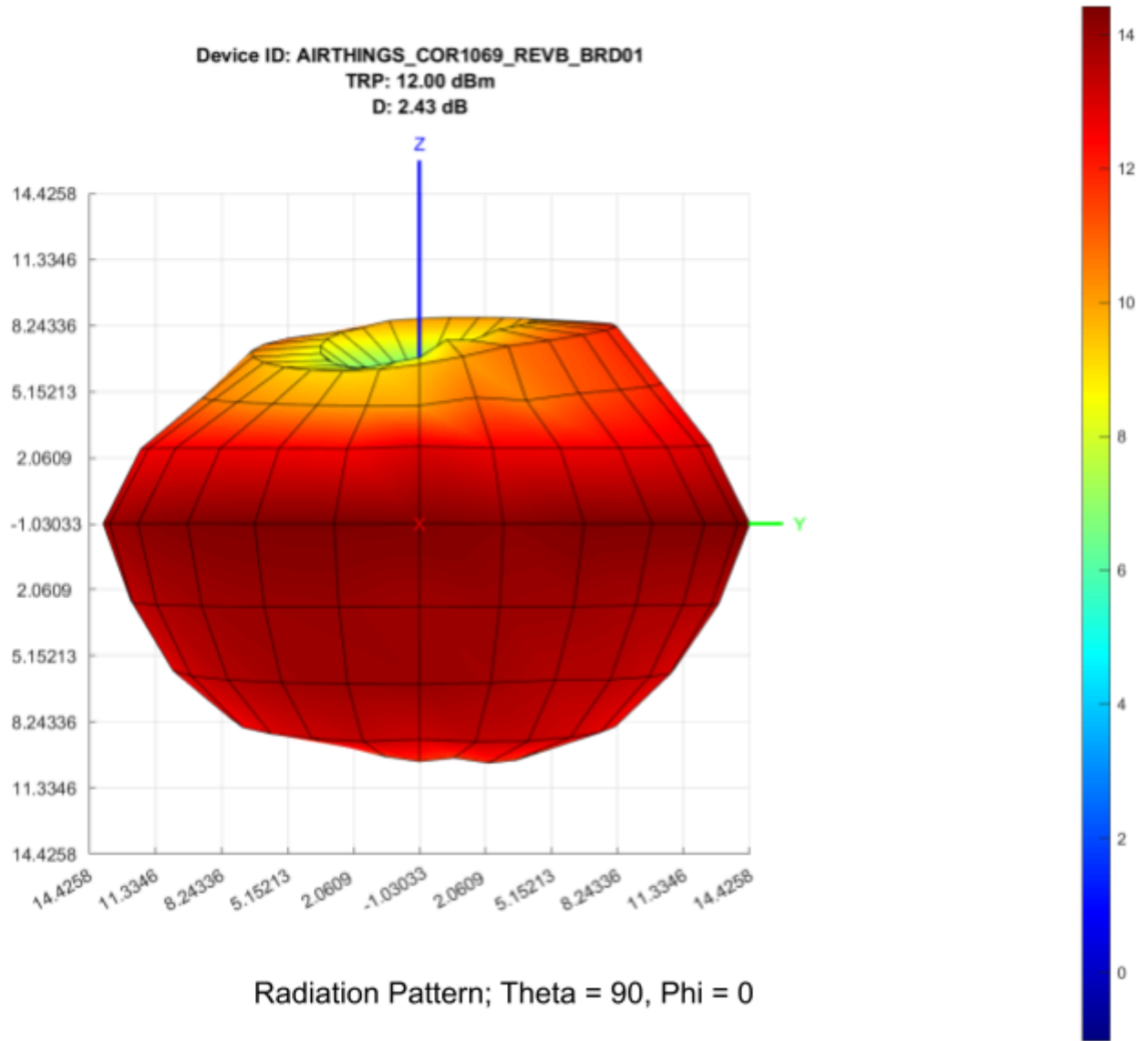
D: 2.43 dB



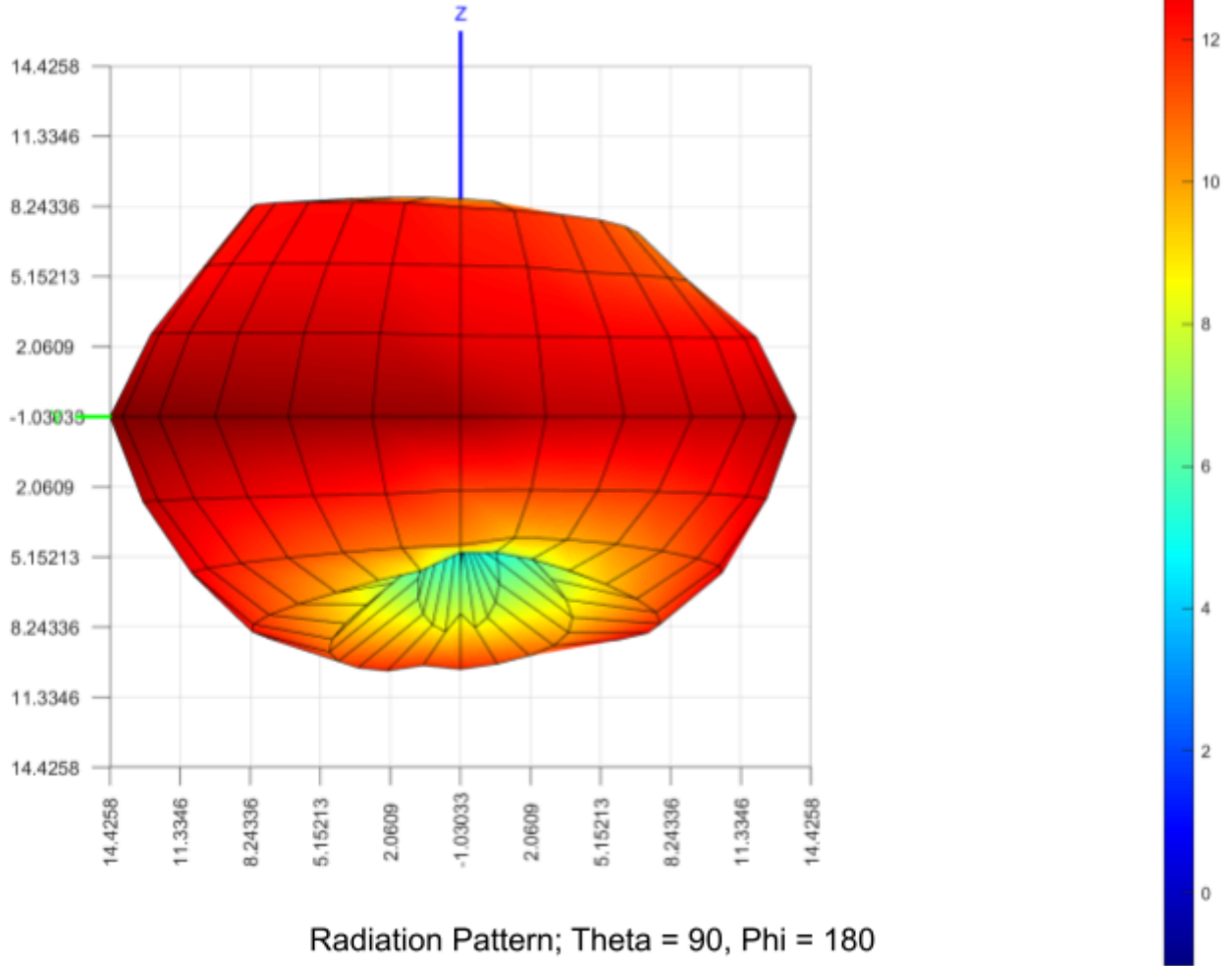
Radiation Pattern; Theta = 0, Phi = 0

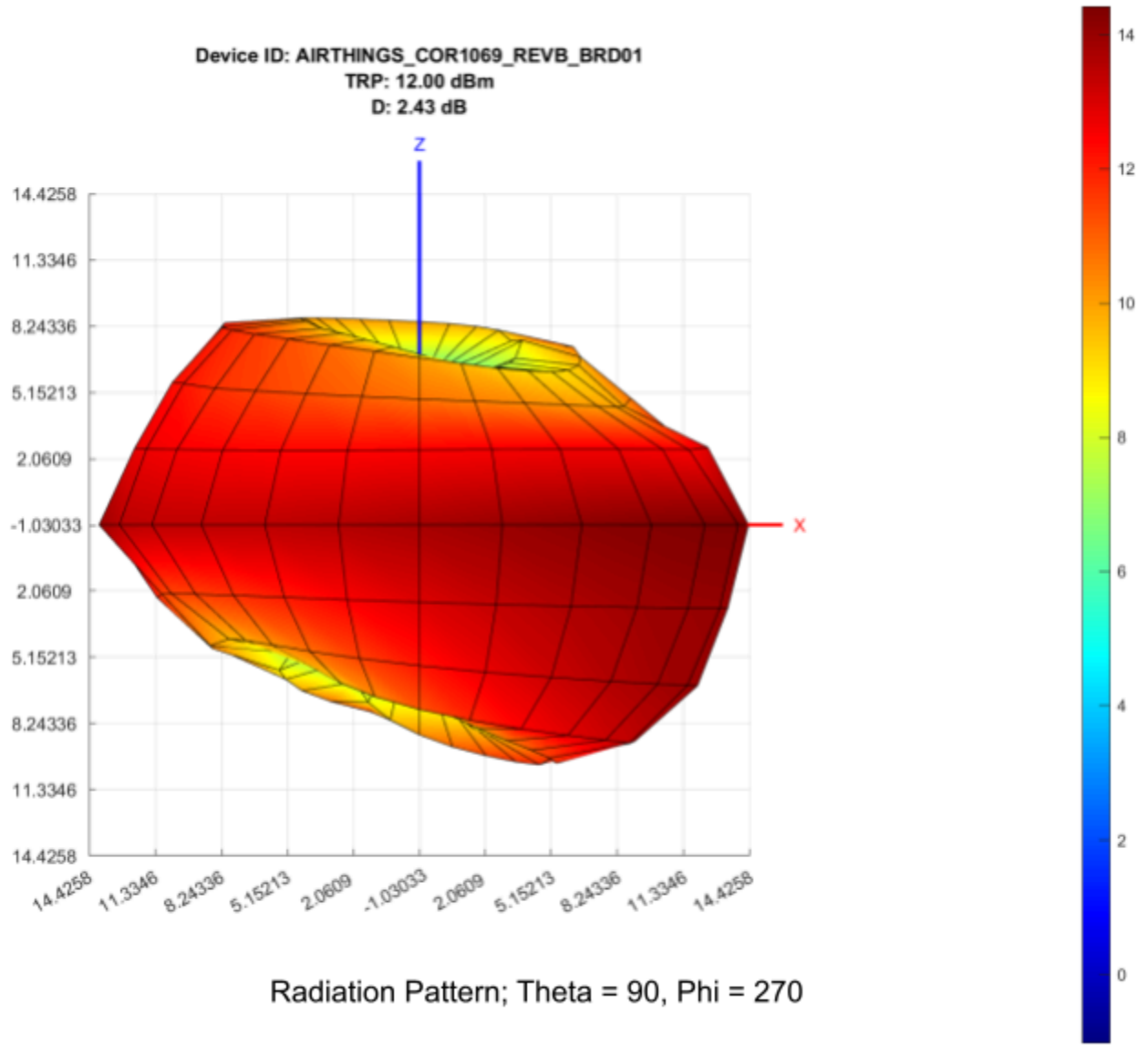




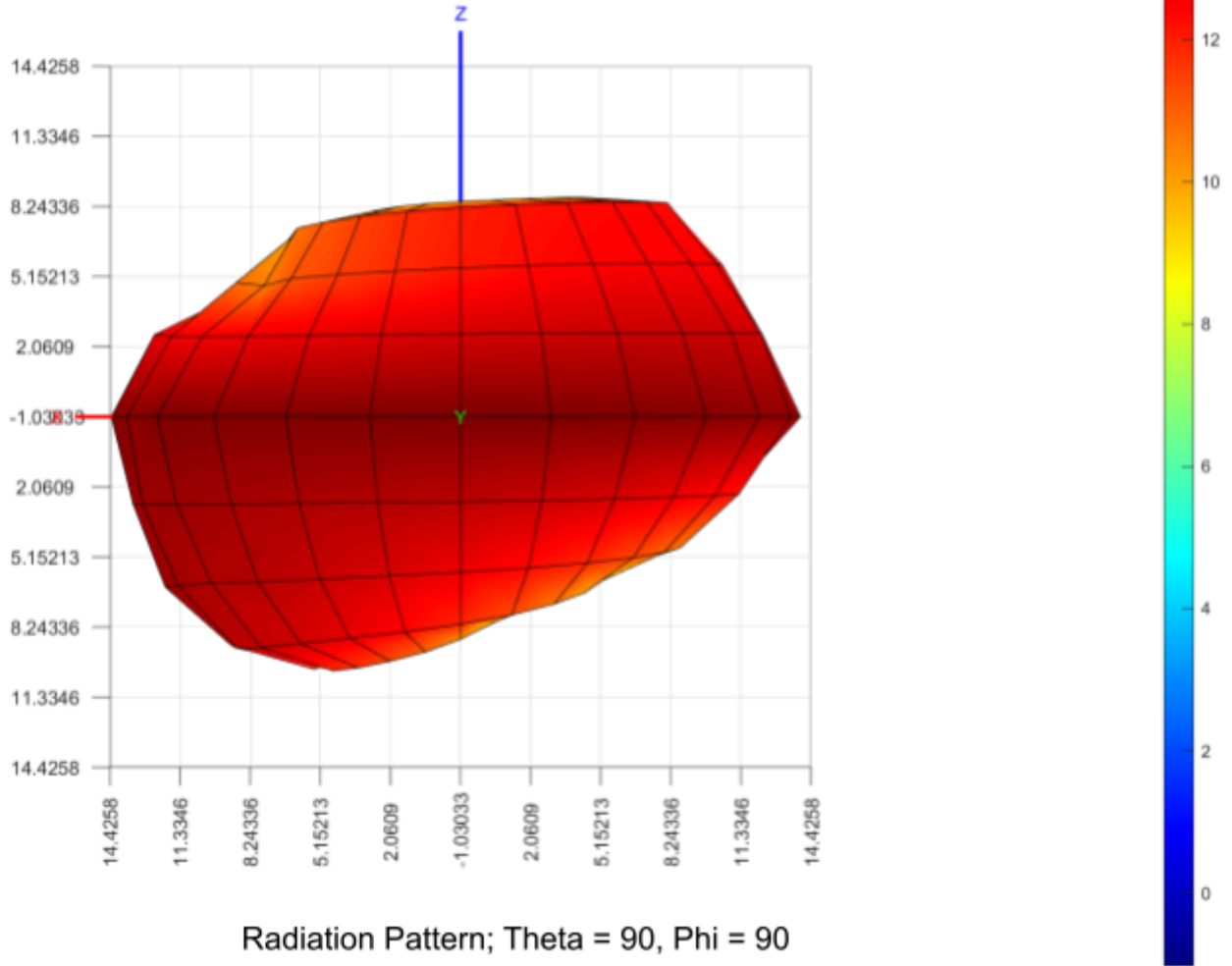


Device ID: AIRTHINGS\_COR1069\_REVB\_BRD01  
TRP: 12.00 dBm  
D: 2.43 dB





Device ID: AIRTHINGS\_COR1069\_REVB\_BRD01  
TRP: 12.00 dBm  
D: 2.43 dB





		$\phi$ (degrees)												
		0	15	30	45	60	75	90	105	120	135	150	165	180
$\theta$ (degrees)	0	2.3927	4.4944	7.1039	8.9577	9.7687	12.9261	14.3599	13.8464	13.8861	13.0604	11.5468	7.0679	1.0667
	15	0.9033	3.3640	6.8452	8.8360	9.9089	12.4892	14.4034	13.9924	13.8587	13.1486	11.1410	7.5072	-0.6263
	30	-1.5451	2.4786	6.6811	8.8916	10.0422	12.5540	14.3848	13.9679	13.7195	12.8805	10.5645	6.5407	-3.4124
	45	-5.1215	1.7918	6.6922	9.0286	10.1609	12.5659	14.2959	13.8317	13.4635	12.4756	9.8558	5.2251	-7.0172
	60	-9.2836	1.7106	6.9095	9.2350	10.2816	12.5203	14.1276	13.5928	13.0690	11.9534	8.9558	3.6652	-7.0748
	75	-7.1914	2.3657	7.3228	9.5708	10.4065	12.4131	13.8964	13.2430	12.5743	11.2915	7.9456	1.7818	-2.9336
	90	-2.9653	3.3932	7.8581	9.9537	10.5740	12.2784	13.6306	12.7907	11.9515	10.5300	6.8257	-0.0724	0.3414
	105	-0.0184	4.5216	8.3925	10.4004	10.7995	12.1615	13.3889	12.3040	11.2846	9.6988	5.7081	-1.3598	2.6130
	120	1.8126	5.4478	8.8836	10.8163	11.0662	12.1203	13.2317	11.8443	10.6477	8.8845	4.6552	-1.7132	4.0682
	135	2.9636	6.1459	9.2811	11.2070	11.3330	12.1651	13.1918	11.5093	10.0866	8.1802	3.7947	-1.5290	4.9380
	150	3.5245	6.5462	9.5465	11.4998	11.5584	12.2664	13.2428	11.3391	9.7280	7.6593	3.1888	-1.5142	5.2991
	165	3.2983	6.7000	9.8850	11.6955	11.9791	12.4050	13.3670	11.3342	9.5940	7.3841	4.0308	-2.0762	5.0363
	180	2.6861	6.6343	9.9330	11.8044	12.0868	12.5354	13.8710	11.4308	10.2515	7.3848	4.2594	-3.4342	4.4330
	195	2.0324	6.4347	9.8886	12.0253	12.1431	12.9916	14.0123	12.1063	10.5041	8.4442	4.9335	-4.1794	3.2246
	210	0.8800	6.0779	9.7879	11.9799	12.1321	13.0841	14.1445	12.3696	10.8761	8.9445	5.9025	-4.6278	1.3966
	225	-0.3552	5.6883	9.6435	11.8705	12.0540	13.1324	14.2592	12.6461	11.3048	9.6400	7.0596	-2.7151	-1.5374
	240	-1.0154	5.3855	9.4859	11.6964	11.9020	13.1269	14.3453	12.9166	11.7534	10.3379	8.1989	0.1527	-6.3899
	255	-0.6887	5.1935	9.2938	11.4504	11.6663	13.0587	14.3967	13.1474	12.1837	11.0544	9.2442	2.6817	-18.8721
	270	0.4108	5.1818	9.1036	11.1371	11.3483	12.9497	14.4049	13.3169	12.5655	11.8910	10.1138	4.6441	-10.9298
	285	1.6300	5.2764	8.8920	10.7883	11.0054	12.8063	14.3773	13.4486	12.8993	12.2363	10.8293	6.1393	-4.2851
300	2.6896	5.4011	8.6730	10.4102	10.6443	12.6637	14.3446	13.5458	13.1964	12.6756	11.3445	7.2010	-1.1769	
315	3.2731	5.4892	8.4392	10.0196	10.3479	12.5559	14.3375	13.6537	13.4683	13.0248	11.8883	7.9143	0.5954	
330	3.5598	5.4088	7.7636	9.7216	9.7819	12.5088	14.3829	13.7981	13.5302	13.2611	11.8238	8.3072	1.9139	
345	3.4108	4.8954	7.9504	9.0454	10.2851	12.5398	14.1626	13.8846	13.7896	13.3017	11.4734	8.5086	2.0904	
360	2.3927	4.4944	7.1039	8.9577	9.7687	12.9261	14.3599	13.8464	13.8861	13.0604	11.5468	7.0679	1.0667	

Table 5. Horizontal Power (dBm)



		$\phi$ (degrees)												
		0	15	30	45	60	75	90	105	120	135	150	165	180
$\theta$ (degrees)	0	1.9845	0.0870	0.4129	0.2619	-2.4740	-12.1952	-14.7445	-4.5445	-2.0691	-0.6421	-0.2834	0.6323	0.0435
	15	2.0681	0.0867	0.2351	-2.0176	-7.2337	-17.6325	-15.6762	-6.3932	-2.1808	0.5661	1.0250	2.0582	1.5477
	30	2.1584	0.2132	-0.3817	-4.6227	-14.9831	-11.4577	-13.8199	-7.2263	-1.8168	1.6022	1.9589	2.9532	2.6784
	45	2.1366	0.2539	-0.8586	-6.7618	-13.1142	-7.0029	-8.8360	-6.1634	-1.5847	2.3602	2.6734	3.4294	3.3149
	60	1.8700	0.0783	-1.3940	-8.0948	-7.9195	-4.2134	-5.2901	-4.3021	-1.4438	2.8037	3.0729	3.5004	3.5004
	75	1.3616	-0.4377	-2.2060	-8.8412	-5.3386	-2.4541	-2.9580	-2.7746	-1.4855	2.8729	3.1199	3.1762	3.2922
	90	0.4523	-1.4726	-3.4938	-10.2027	-4.1937	-1.2134	-1.3593	-1.7580	-1.8315	2.5002	2.7885	2.4418	2.6996
	105	-1.0612	-3.1180	-5.6015	-12.2639	-3.6934	-0.4318	-0.4076	-1.2247	-2.5909	1.5964	1.9843	1.1723	1.8952
	120	-3.3674	-5.8454	-8.9841	-13.2021	-3.5405	0.0553	0.0924	-1.2115	-3.8280	0.0693	0.6113	-0.6245	0.4656
	135	-6.8839	-10.6210	-14.1133	-10.5324	-3.1898	0.2972	0.1068	-1.8842	-5.6630	-2.2775	-1.3894	-3.1103	-0.8620
	150	-11.5798	-23.5769	-14.3274	-6.9389	-2.6303	0.2695	-0.4583	-3.2612	-8.2008	-5.7181	-4.2360	-5.5941	-1.6742
	165	-10.7712	-13.1226	-8.9438	-3.4321	-1.8241	0.0920	-1.5920	-6.5328	-11.7836	-11.6188	-7.4058	-6.5080	-1.3813
	180	-5.9329	-7.2411	-5.4063	-1.3883	-0.8207	-0.1834	-3.3010	-11.0697	-14.2698	-11.7072	-8.4579	-4.7457	-0.4138
	195	-2.5540	-4.0027	-2.6323	0.2467	0.4778	-0.5765	-5.7024	-15.5645	-11.4687	-6.8319	-7.0242	-2.9292	0.5137
	210	-0.5158	-1.9933	-1.0685	1.5129	1.4183	-1.0107	-8.0097	-10.9448	-7.7200	-3.7043	-4.7245	-1.7621	1.2806
	225	0.8274	-0.6440	0.0999	2.5878	2.3076	-1.4201	-9.9878	-6.7691	-5.3403	-1.9429	-3.3210	-1.2810	1.6036
	240	1.6393	0.1614	1.0021	3.4288	3.0268	-1.7064	-10.7817	-4.0782	-3.9269	-1.0622	-2.7459	-1.4598	1.4811
	255	2.1490	0.7399	1.7360	4.1453	3.6228	-1.9423	-10.1117	-2.4344	-3.2132	-0.9002	-2.8820	-2.3221	0.7983
270	2.3683	1.0476	2.2560	4.6289	4.0000	-2.0437	-8.7571	-1.3789	-3.0192	-1.3338	-3.6908	-4.1258	-0.5589	
285	2.3946	1.1632	2.6419	4.8705	4.1295	-2.1715	-7.5464	-0.8196	-3.0834	-2.2368	-5.0373	-7.1163	-2.8249	
300	2.3085	1.1316	2.7775	4.8332	3.9880	-2.3740	-6.8353	-0.7249	-3.2466	-3.2273	-6.4980	-11.4297	-6.9629	
315	2.1906	0.9369	2.6968	4.4672	3.4926	-2.9036	-6.6869	-1.0262	-3.3490	-4.0658	-6.9366	-11.2386	-16.5812	
330	2.0836	0.6891	2.3840	3.8564	2.5563	-3.8428	-7.3221	-1.1543	-3.2126	-3.5300	-5.5024	-6.0691	-14.3006	
345	1.9407	0.6929	1.9013	3.1100	1.2179	-3.7335	-7.4812	-2.2295	-2.9325	-3.1526	-3.0725	-3.3634	-5.4279	
360	1.9845	0.0870	0.4129	0.2619	-2.4740	-12.1952	-14.7445	-4.5445	-2.0691	-0.6421	-0.2834	0.6323	0.0435	

Table 6. Vertical Power (dBm)



**Total Power (dBm):**  $P_{dBm} = 10\log(10P_{hor}/10 + 10P_{ver}/10)$

		$\phi$ (degrees)												
		0	15	30	45	60	75	90	105	120	135	150	165	180
<b><math>\theta</math> (degrees)</b>	<b>0</b>	5.2037	5.8376	7.9470	9.5078	10.0204	12.9394	14.3653	13.9089	13.9950	13.2417	11.8228	7.9571	3.5955
	<b>15</b>	4.5349	5.0377	7.7026	9.1789	9.9920	12.4934	14.4076	14.0319	13.9654	13.3819	11.5445	8.5968	3.6056
	<b>30</b>	3.7003	4.5023	7.4608	9.0808	10.0558	12.5712	14.3914	14.0008	13.8392	13.1926	11.1254	8.1176	3.6335
	<b>45</b>	2.8848	4.1009	7.3954	9.1416	10.1812	12.6136	14.3169	13.8750	13.5972	12.8792	10.6161	7.4297	3.6997
	<b>60</b>	2.1909	3.9810	7.5082	9.3146	10.3469	12.6115	14.1770	13.6627	13.2200	12.4519	9.9528	6.5939	3.8706
	<b>75</b>	1.9289	4.1967	7.7818	9.6330	10.5207	12.5524	13.9851	13.3503	12.7416	11.8755	9.1815	5.5450	4.2210
	<b>90</b>	2.0817	4.6191	8.1651	9.9953	10.7165	12.4685	13.7661	12.9404	12.1296	11.1649	8.2705	4.3745	4.6889
	<b>105</b>	2.5017	5.2116	8.5623	10.4238	10.9512	12.3942	13.5664	12.4925	11.4590	10.3239	7.2439	3.0986	5.1886
	<b>120</b>	2.9634	5.7588	8.9540	10.8335	11.2140	12.3822	13.4375	12.0540	10.8000	9.4206	6.0981	1.8754	5.6405
	<b>135</b>	3.3916	6.2363	9.3010	11.2360	11.4836	12.4388	13.4001	11.7037	10.2006	8.5545	4.9445	0.7622	5.9506
	<b>150</b>	3.6565	6.5505	9.5643	11.5616	11.7208	12.5323	13.4242	11.4872	9.7974	7.8544	3.9111	-0.0814	6.0936
	<b>165</b>	3.4652	6.7450	9.9416	11.8268	12.1563	12.6528	13.5035	11.4046	9.6255	7.4384	4.3321	-0.7394	5.9288
	<b>180</b>	3.4217	6.8087	10.0582	12.0077	12.3036	12.7616	13.9535	11.4552	10.2668	7.4380	4.4857	-1.0303	5.6637
	<b>195</b>	3.3287	6.8106	10.1251	12.3045	12.4294	13.1785	14.0584	12.1157	10.5316	8.5712	5.2017	-0.4991	5.0876
	<b>210</b>	3.2482	6.7071	10.1305	12.3534	12.4858	13.2500	14.1708	12.3898	10.9357	9.1743	6.2630	0.0476	4.3492
	<b>225</b>	3.2865	6.5968	10.1009	12.3547	12.4916	13.2820	14.2755	12.6955	11.3978	9.9316	7.4402	1.0712	3.3214
	<b>240</b>	3.5220	6.5107	10.0618	12.2997	12.4311	13.2673	14.3586	13.0025	11.8693	10.6416	8.5349	2.4311	2.1379
	<b>255</b>	3.9682	6.5245	9.9959	12.1912	12.2993	13.1939	14.4120	13.2659	12.3072	11.3228	9.5026	3.8741	0.8449
<b>270</b>	4.5092	6.5995	9.9195	12.0129	12.0823	13.0851	14.4258	13.4618	12.6839	11.9022	10.2910	5.1854	-0.1774	
<b>285</b>	5.0394	6.6998	9.8162	11.7781	11.8164	12.9422	14.4051	13.6082	13.0075	12.3886	10.9403	6.3398	-0.4836	
<b>300</b>	5.5031	6.7814	9.6674	11.4717	11.4935	12.7977	14.3776	13.7053	13.2938	12.7857	11.4153	7.2602	-0.1599	
<b>315</b>	5.7758	6.7795	9.4654	11.0865	11.1624	12.6777	14.3717	13.7991	13.5578	13.1089	11.7475	7.9667	0.6778	
<b>330</b>	5.8944	6.6711	8.8687	10.7222	10.5185	12.6083	14.4121	13.9347	13.6212	13.3511	11.9034	8.4629	2.0165	
<b>345</b>	5.7479	6.2941	8.9138	10.0317	10.7926	12.6410	14.1823	13.9895	13.8614	13.3988	11.6233	8.7820	2.7985	
<b>360</b>	5.2037	5.8376	7.9470	9.5078	10.0204	12.9394	14.3653	13.9089	13.9950	13.2417	11.8228	7.9571	3.5955	

Table 7. Total Power (dBm)





Total Power (mW):  $P_{mW} = 10P_{dBm}/10$

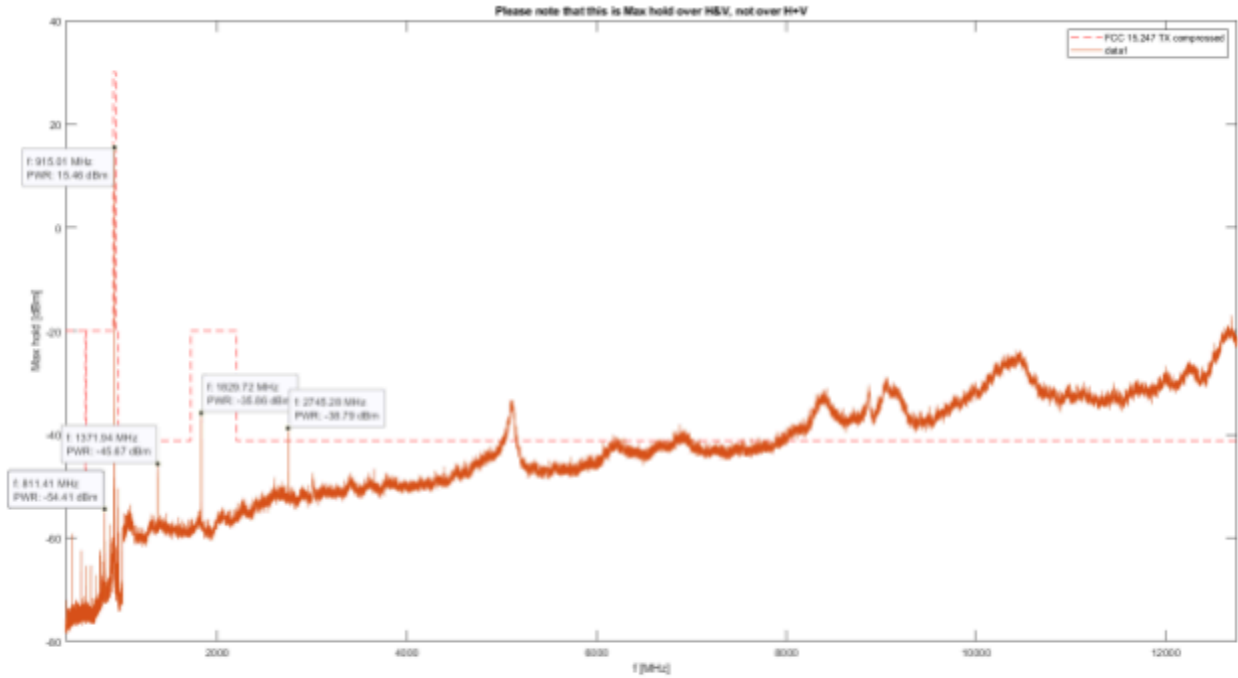
		$\phi$ (degrees)												
		0	15	30	45	60	75	90	105	120	135	150	165	180
$\theta$ (degrees)	0	3.3141	3.8350	6.2330	8.9284	10.0470	19.6763	27.3229	24.5972	25.0898	21.0944	15.2152	6.2475	2.2885
	15	2.8411	3.1899	5.8920	8.2773	9.9815	17.7558	27.5907	25.3042	24.9198	21.7866	14.2709	7.2390	2.2938
	30	2.3444	2.8199	5.5729	8.0924	10.1294	18.0766	27.4878	25.1233	24.2058	20.8575	12.9581	6.4827	2.3086
	45	1.9430	2.5709	5.4895	8.2065	10.4261	18.2541	27.0205	24.4061	22.8939	19.4051	11.5240	5.5332	2.3440
	60	1.6561	2.5009	5.6340	8.5401	10.8314	18.2453	26.1636	23.2419	20.9895	17.5868	9.8919	4.5645	2.4381
	75	1.5592	2.6283	6.0004	9.1897	11.2737	17.9988	25.0329	21.6288	18.8000	15.4010	8.2822	3.5851	2.6430
	90	1.6150	2.8968	6.5541	9.9893	11.7937	17.6545	23.8019	19.6808	16.3289	13.0764	6.7151	2.7381	2.9437
	105	1.7790	3.3202	7.1817	11.0251	12.4486	17.3546	22.7323	17.7522	13.9926	10.7742	5.3014	2.0411	3.3026
	120	1.9785	3.7660	7.8596	12.1157	13.2251	17.3069	22.0674	16.0473	12.0226	8.7509	4.0721	1.5401	3.6648
	135	2.1836	4.2037	8.5133	13.2923	14.0723	17.5340	21.8783	14.8038	10.4728	7.1688	3.1221	1.1918	3.9360
	150	2.3209	4.5190	9.0454	14.3271	14.8622	17.9157	21.9998	14.0837	9.5442	6.1016	2.4610	0.9814	4.0678
	165	2.2208	4.7261	9.8663	15.2295	16.4298	18.4195	22.4050	13.8183	9.1739	5.5442	2.7115	0.8434	3.9164
	180	2.1987	4.7959	10.1349	15.8772	16.9967	18.8870	24.8513	13.9803	10.6337	5.5438	2.8091	0.7888	3.6844
	195	2.1521	4.7980	10.2922	17.0002	17.4961	20.7898	25.4588	16.2768	11.3022	7.1965	3.3126	0.8914	3.2267
	210	2.1126	4.6850	10.3051	17.1925	17.7247	21.1351	26.1266	17.3373	12.4041	8.2687	4.2296	1.0110	2.7222
	225	2.1313	4.5675	10.2351	17.1978	17.7483	21.2913	26.7640	18.6016	13.7968	9.8438	5.5466	1.2797	2.1485
	240	2.2501	4.4778	10.1432	16.9811	17.5030	21.2194	27.2810	19.9640	15.3791	11.5921	7.1366	1.7503	1.6360
	255	2.4936	4.4821	9.9906	16.5624	16.9795	20.8637	27.8188	21.2123	17.0107	13.5607	8.9178	2.4401	1.2148
270	2.8244	4.5703	9.8163	15.8962	16.1522	20.3473	27.7064	22.1911	18.5518	15.4961	10.6929	3.3002	0.9600	
285	3.1911	4.6772	9.5856	15.0596	15.1929	19.6888	27.5749	22.9517	19.9870	17.3325	12.4174	4.3051	0.8946	
300	3.5507	4.7859	9.2627	14.0336	14.1043	19.0447	27.4003	23.4708	21.3490	18.9920	13.8524	5.3213	0.9639	
315	3.7808	4.7638	8.8416	12.8425	13.0690	18.5257	27.3633	23.9834	22.6870	20.4591	14.9538	6.2614	1.1689	
330	3.8854	4.6463	7.7067	11.8092	11.2680	18.2318	27.6193	24.7442	23.0206	21.6328	15.5004	7.0193	1.5909	
345	3.7566	4.2600	7.7872	10.0733	12.0023	18.3696	26.2560	25.0584	24.3301	21.8718	14.5320	7.5544	1.9048	
360	3.3141	3.8350	6.2330	8.9284	10.0470	19.6763	27.3229	24.5972	25.0898	21.0944	15.2152	6.2475	2.2885	

Table 8. Total Power (mW)

Measured Conducted Output Power (dBm):  $P_{cond} = 12.8 \text{ dBm}$

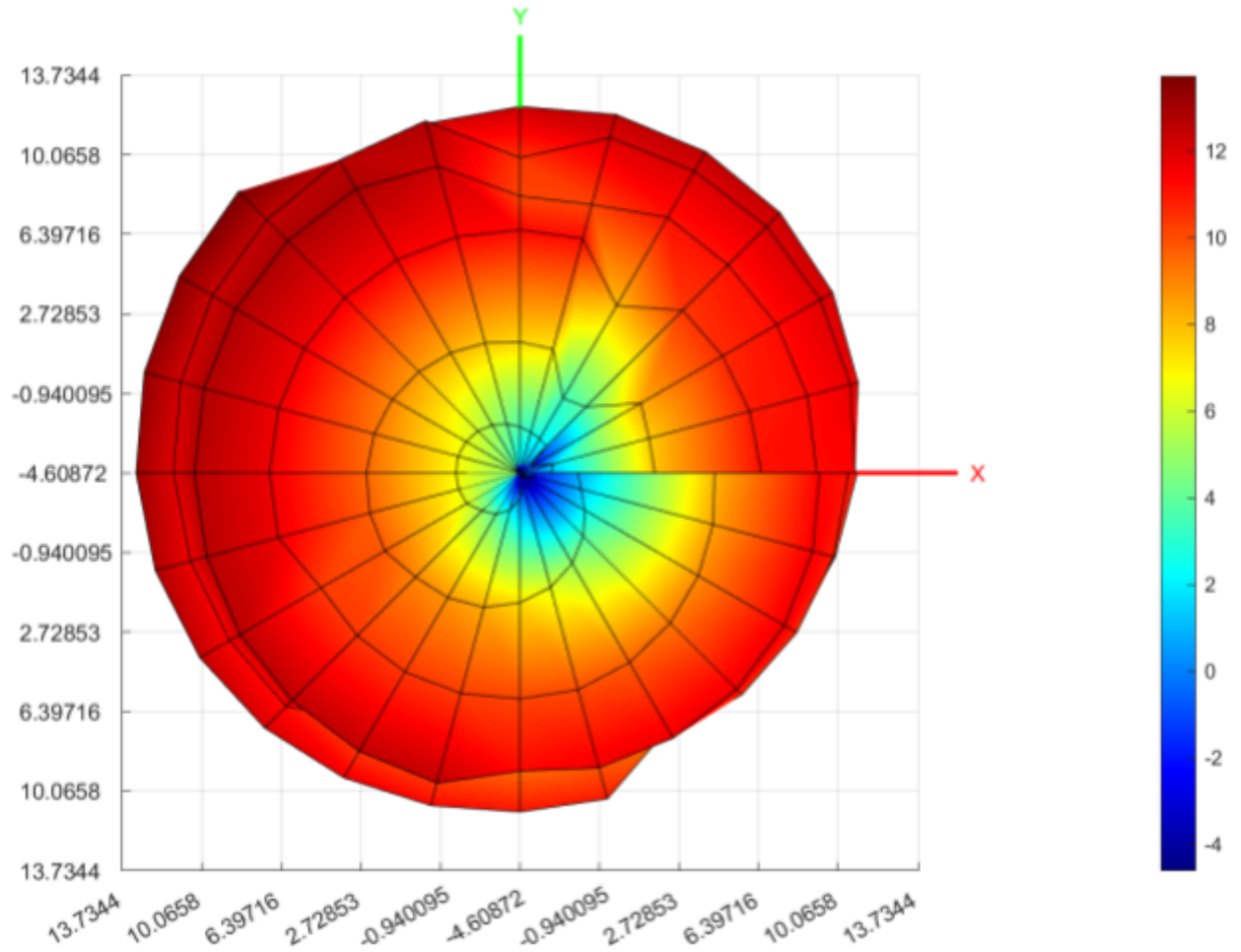


# 915MHz Measured Data



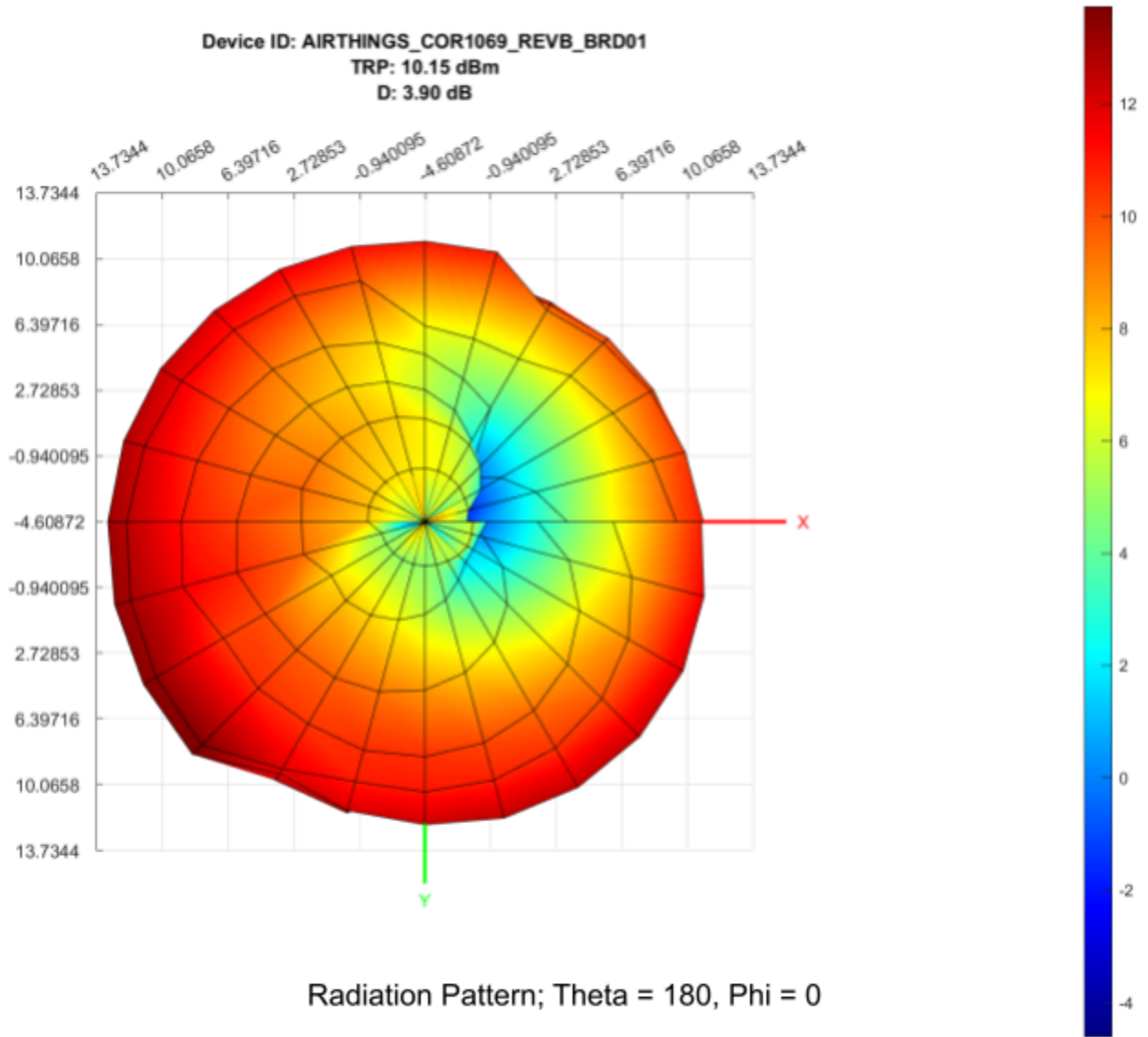
Radiated Spurious Emissions (RSE) Plot

Device ID: AIRTHINGS\_COR1069\_REVB\_BRD01  
TRP: 10.15 dBm  
D: 3.90 dB

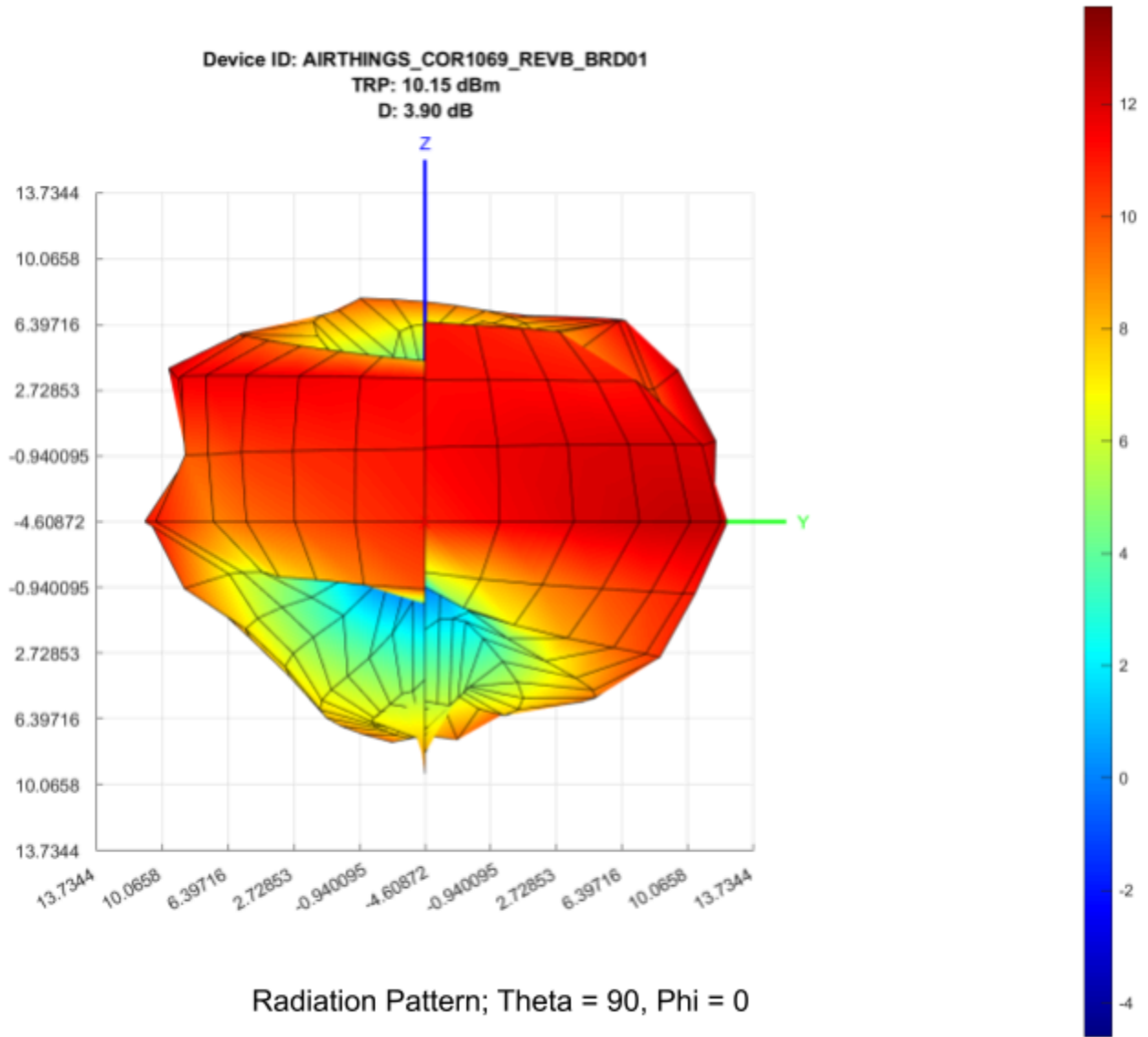


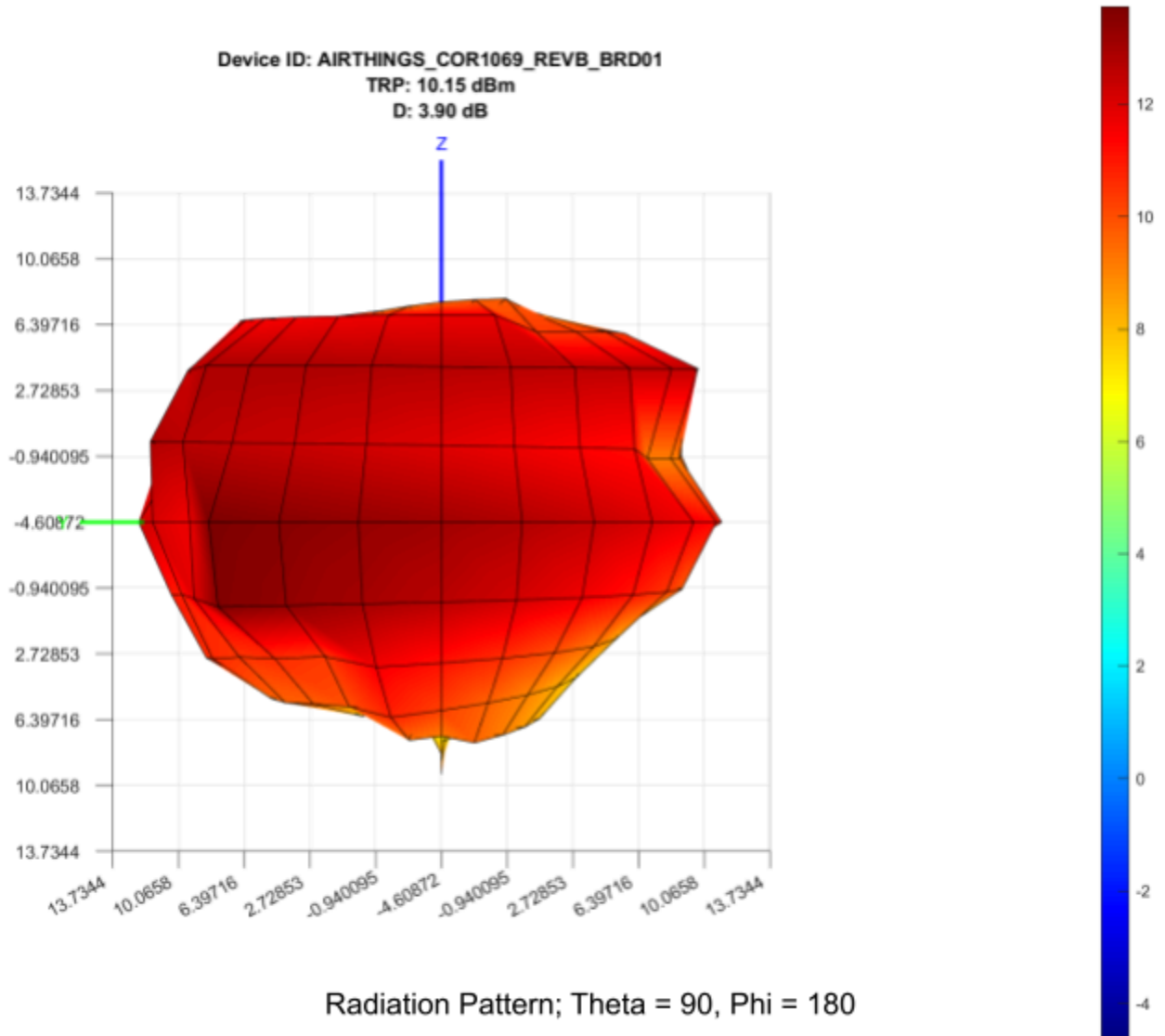
Radiation Pattern; Theta = 0, Phi = 0

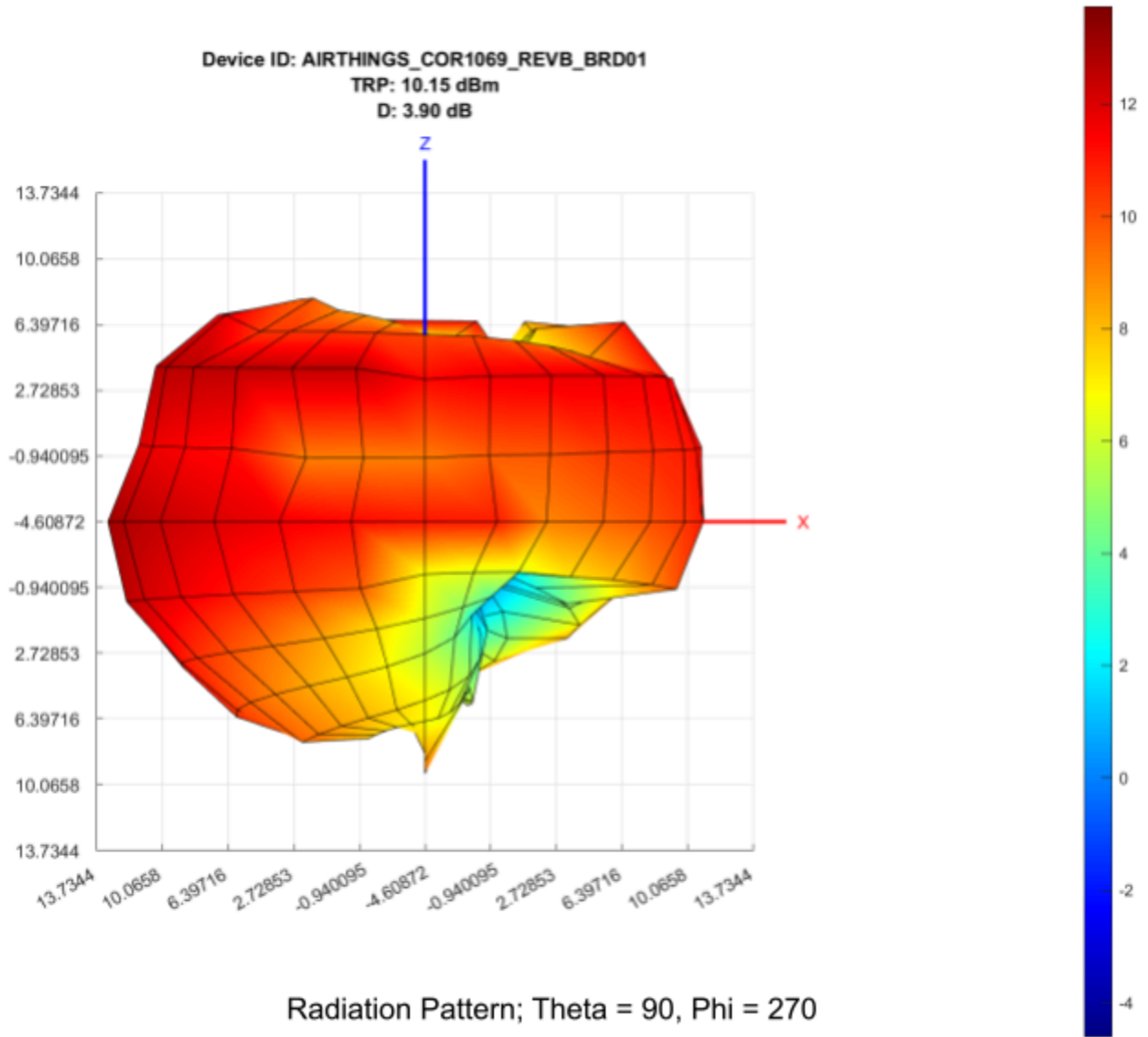
Device ID: AIRTHINGS\_COR1069\_REVB\_BRD01  
TRP: 10.15 dBm  
D: 3.90 dB

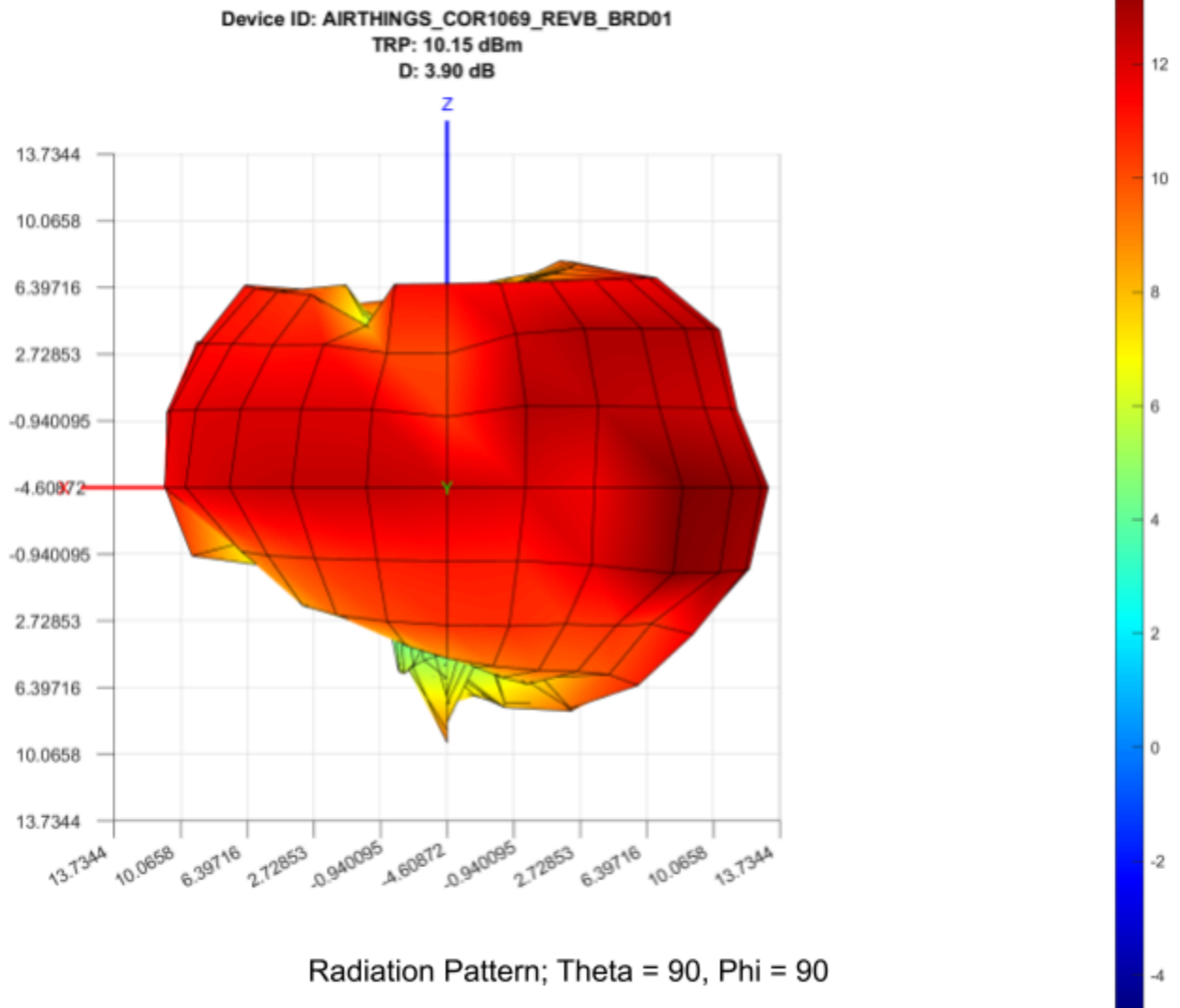


Radiation Pattern; Theta = 180, Phi = 0













		$\phi$ (degrees)												
		0	15	30	45	60	75	90	105	120	135	150	165	180
$\theta$ (degrees)	0	1.3206	-3.7387	1.0520	7.7989	9.7142	10.8240	11.8470	11.9313	10.7833	9.9165	9.0788	6.1553	3.3346
	15	1.1839	-3.8964	0.7511	6.9716	9.6562	10.6300	11.7957	11.9398	10.6313	9.8541	8.5205	5.9903	1.5047
	30	0.5131	-5.6771	0.7243	6.8975	9.6224	10.6236	11.6663	11.7143	10.2645	9.4551	7.5913	4.5116	-1.7326
	45	-0.8594	-8.9603	1.1941	6.9735	9.6439	10.5300	11.4338	11.3482	9.6811	8.7807	6.2611	2.3020	-7.3495
	60	-2.9686	-11.7511	2.1753	7.2051	9.6922	10.3546	11.0780	10.8282	8.8472	7.8426	4.3397	-1.0739	-15.1725
	75	-5.9400	-7.7752	3.4707	7.5838	9.7812	10.1019	10.6137	10.1413	7.7592	6.5428	1.6810	-7.0167	-5.4129
	90	-9.0388	-3.3869	4.7819	8.0334	9.8988	9.8041	10.0680	9.3113	6.3745	4.8076	-2.2111	-22.4983	-0.5911
	105	-8.2352	-0.1537	5.9776	8.5487	10.0489	9.4999	9.5067	8.3467	4.6789	2.6450	-8.7318	-7.4913	2.2464
	120	-4.9824	1.9928	6.9228	9.0218	10.2265	9.2498	9.0119	7.4531	2.8487	-0.0064	-20.9093	-2.5723	3.8916
	135	-2.3738	3.4741	7.6840	9.4491	10.4203	9.0729	8.6857	6.7048	0.9993	-3.4683	-9.7356	-0.0070	4.8543
	150	-0.6765	4.4751	8.1921	9.8016	10.5902	8.9967	8.4878	6.2575	-0.3952	-7.2150	-5.9930	1.1500	5.1497
	165	0.3424	5.0895	8.5028	10.0636	12.3530	8.9698	10.8428	6.1028	-0.9876	-11.0715	-13.6107	1.3927	4.3385
	180	1.4635	5.3254	9.4424	10.2196	12.4554	9.0085	11.0021	6.2106	3.4151	-12.9782	-13.9723	0.7113	3.2292
	195	0.9313	5.2671	9.3933	10.2970	12.5239	9.0980	11.2621	6.5438	4.1399	-2.1063	-11.1286	-3.9269	1.2589
	210	-0.2180	5.0668	9.2163	11.6573	12.5899	11.1441	11.5844	9.6251	5.1547	-0.0574	-5.8907	-8.4709	-1.8636
	225	-2.1340	4.4368	8.9228	11.6413	12.6456	11.3372	11.9321	10.2114	6.2950	1.9254	-1.5827	-7.9281	-7.9574
	240	-5.1943	3.5570	8.5822	11.5913	12.7005	11.5707	12.3002	10.8022	7.4604	3.8319	1.6945	-2.8393	-16.8868
	255	-10.3879	2.5397	8.1880	11.5397	12.7590	11.8020	12.6476	11.4082	8.5480	5.5705	4.2688	0.8602	-5.8672
270	-15.3199	1.5423	7.8357	11.4816	12.8055	12.0255	12.9627	11.9728	9.4914	7.0509	6.2043	3.5023	-0.9746	
285	-8.9021	0.8798	7.5289	11.4066	12.8206	12.2262	13.2305	12.4884	10.3275	8.3467	7.6798	5.3880	1.8144	
300	-4.3464	0.6139	7.2834	11.3275	12.8212	12.4066	13.4860	12.9210	11.0079	9.3860	8.7717	6.6537	3.4551	
315	-1.6811	0.8025	7.0604	11.2363	12.2472	12.5974	13.7283	13.3052	11.5578	10.1862	9.5318	7.4792	4.2957	
330	-0.6267	1.1099	2.2515	11.1283	10.0057	12.7871	11.5918	13.6281	10.3215	10.7659	9.0287	7.8708	4.8346	
345	-0.1166	-3.7859	2.9744	7.5771	9.9637	10.4174	11.8921	11.8502	10.3570	9.7860	9.0599	7.4701	4.8026	
360	1.3206	-3.7387	1.0520	7.7989	9.7142	10.8240	11.8470	11.9313	10.7833	9.9165	9.0788	6.1553	3.3346	

Table 9. Horizontal Power (dBm)



		$\phi$ (degrees)												
		0	15	30	45	60	75	90	105	120	135	150	165	180
$\theta$ (degrees)	0	-1.9763	-0.6183	0.3636	-0.7089	-1.0425	-2.4720	-4.9029	-5.1964	-8.6651	-11.1931	-4.3505	0.3589	1.6022
	15	-0.5598	0.9343	0.9165	-1.5085	-3.4986	-5.9994	-7.7758	-11.9711	-10.2002	-6.4753	-1.0334	2.4687	3.2439
	30	0.8822	2.0523	1.5404	-1.8080	-6.9897	-12.0402	-12.4392	-16.2287	-7.8920	-2.8751	1.1086	4.0330	4.7876
	45	1.9322	2.7716	2.0166	-1.7499	-8.3546	-26.1878	-11.5650	-8.3048	-4.9140	-0.6456	2.6263	4.9861	5.7613
	60	2.5433	3.0977	2.2606	-1.5579	-6.8421	-14.7699	-7.8811	-4.6505	-2.8460	0.7027	3.4854	5.4108	6.2225
	75	2.7880	3.0408	2.2322	-1.6317	-5.5650	-10.1119	-5.0475	-2.7910	-1.6309	1.2332	3.7703	5.3288	6.2134
	90	2.6516	2.6339	1.8933	-2.1061	-5.3940	-7.7883	-3.7104	-2.1183	-1.1284	1.0519	3.4554	4.7071	5.6711
	105	2.0633	1.7924	1.2619	-3.0829	-6.6779	-6.9864	-3.2212	-2.4871	-1.3729	0.0341	2.4124	3.3834	4.5516
	120	1.0329	0.5552	0.2906	-4.5751	-9.8098	-6.8042	-3.6471	-3.9137	-2.4358	-2.0230	0.5038	1.2001	2.7051
	135	-0.6487	-1.2358	-1.0332	-6.4446	-18.3407	-7.2518	-5.2049	-7.1479	-4.6375	-5.9977	-2.9181	-2.4823	-0.1949
	150	-3.0142	-3.7043	-2.6762	-7.5743	-15.1477	-7.5028	-8.8353	-14.7877	-8.6782	-15.8254	-9.6285	-9.2976	-5.1574
	165	-6.9465	-7.0642	-4.9303	-3.2591	-6.6622	-5.4053	-18.8181	-13.0193	-16.7005	-8.1237	-14.9342	-6.1805	-12.5227
	180	-14.0443	-6.3244	-7.6857	-2.8513	-2.5212	-2.9841	-13.6794	-1.9730	-10.2346	-2.3897	-4.5614	-1.5495	-6.1387
	195	-8.7252	-7.0166	-7.9075	-1.6973	1.9468	-0.9516	-3.7316	1.2173	-4.0730	0.8334	0.9961	1.5126	0.2202
	210	-5.8031	-5.9359	-12.8179	-0.4300	3.6709	0.6155	-0.8597	3.2880	-0.0253	2.7963	3.1005	3.3385	2.5296
	225	-3.6640	-4.8158	-21.1353	0.6800	4.8983	1.9373	1.0691	4.6375	1.6697	3.9200	4.3853	4.3876	3.9605
	240	-2.4534	-4.3239	-20.6228	1.5935	5.7533	2.8915	2.3061	5.4526	2.6970	4.3829	4.9758	4.8221	4.6872
	255	-2.2416	-4.7589	-14.2461	2.2542	6.3303	3.5952	3.0563	5.8416	2.9927	4.3217	5.0208	4.7092	4.8584
270	-2.8602	-6.3185	-10.4667	2.7519	6.6924	4.0655	3.4313	5.8467	2.8103	3.7710	4.5698	4.0705	4.4880	
285	-4.4348	-9.5848	-7.5351	3.0962	6.7988	4.2757	3.4806	5.4836	2.1666	2.7484	3.5675	2.9021	3.5922	
300	-7.0795	-13.9459	-5.0139	3.2288	6.6677	4.2442	3.2157	4.7868	1.1230	1.2635	2.1385	1.2840	2.1902	
315	-9.9228	-10.4484	-2.8082	3.1870	6.2682	3.9084	2.6250	3.7511	-0.2975	-0.7583	0.1416	-0.4406	0.6020	
330	-8.0805	-6.1157	-0.9007	1.7497	5.5641	1.9152	1.7370	1.8044	-1.9255	-2.9624	-2.0182	-3.2674	-0.3753	
345	-5.5993	-4.9014	-0.9648	0.4413	2.8923	1.6305	-0.4727	0.5641	-4.4426	-6.3137	-5.2317	-3.8343	-2.1253	
360	-1.9763	-0.6183	0.3636	-0.7089	-1.0425	-2.4720	-4.9029	-5.1964	-8.6651	-11.1931	-4.3505	0.3589	1.6022	

Table 10. Vertical Power (dBm)



**Total Power (dBm):**  $P_{dBm} = 10\log(10P_{hor}/10 + 10P_{ver}/10)$

		$\phi$ (degrees)												
		0	15	30	45	60	75	90	105	120	135	150	165	180
$\theta$ (degrees)	0	2.9880	1.1062	3.7317	8.3718	10.0645	11.0227	11.9378	12.0147	10.8323	9.9500	9.2716	7.1702	5.5646
	15	3.4093	2.1689	3.8449	7.5479	9.8613	10.7233	11.8434	11.9574	10.6671	9.9541	8.9769	7.5873	5.4711
	30	3.7119	2.7293	4.1618	7.4464	9.7161	10.6470	11.6831	11.7212	10.3304	9.7019	8.4718	7.2892	5.6613
	45	3.7672	3.0537	4.6351	7.5203	9.7123	10.5310	11.4555	11.3950	9.8293	9.2500	7.8237	6.8585	5.9685
	60	3.6190	3.2376	5.2285	7.7472	9.7876	10.3679	11.1354	10.9495	9.1317	8.6097	6.9438	6.2909	6.2539
	75	3.3343	3.3866	5.9058	8.0752	9.8062	10.1430	10.7300	10.3569	8.2322	7.6637	5.8604	5.5747	6.5022
	90	2.9363	3.6030	6.5837	8.4348	10.0253	9.8791	10.2463	9.6130	7.0649	6.3340	4.4977	4.7153	6.5929
	105	2.4510	3.9378	7.2410	8.8372	10.1402	9.5963	9.7325	8.6911	5.6401	4.5432	2.7339	3.7247	6.5605
	120	2.0031	4.3435	7.7763	9.2075	10.2694	9.3562	9.2412	7.7591	3.9754	2.1116	0.5350	2.7216	6.3490
	135	1.5841	4.7389	8.2315	9.5594	10.4260	9.1730	8.8595	6.8800	2.0480	-1.5411	-2.0971	1.9396	6.0358
	150	1.3204	5.0899	8.5339	9.8803	10.6017	9.0928	8.5675	6.2915	0.2061	-6.6547	-4.4306	1.5251	5.5366
	165	1.0857	5.3462	8.6955	10.2611	12.4072	9.1256	10.8475	6.1556	-0.8726	-6.3418	-11.2119	2.0926	4.4271
	180	1.5840	5.6128	9.5257	10.4286	12.5913	9.2747	11.0188	6.8248	3.5986	-2.0261	-4.0905	2.7366	3.7046
	195	1.3776	5.5165	9.4734	10.5631	12.8884	9.5075	11.3975	7.6609	4.7503	2.6180	1.2546	2.6043	3.7808
	210	0.8417	5.3985	9.2434	11.9179	13.1140	11.5125	11.8250	10.5327	6.3054	4.6100	3.6165	3.6157	3.8766
	225	0.1763	4.9242	8.9271	11.9761	13.3200	11.8092	12.2742	11.2736	7.5814	6.0465	5.3649	4.6353	4.2311
	240	-0.6008	4.2124	8.5875	12.0054	13.4994	12.1228	12.7147	11.9141	8.7118	7.1264	6.6482	5.5089	4.7174
	255	-1.6224	3.2816	8.2127	12.0237	13.6495	12.4132	13.1003	12.4720	9.6143	8.0011	7.6714	6.2081	5.2111
	270	-2.6204	2.2005	7.8995	12.0276	13.7562	12.6699	13.4214	12.9210	10.3362	8.7238	8.4738	6.8060	5.5746
	285	-3.1074	1.2535	7.6621	12.0043	13.7895	12.8719	13.6677	13.2777	10.9448	9.4036	9.1035	7.3308	5.8039
300	-2.4911	0.7632	7.5321	11.9531	13.7641	13.0237	13.8760	13.5418	11.4324	10.0083	9.6250	7.7610	5.8789	
315	-1.0745	1.1165	7.4864	11.8685	13.2246	13.1483	14.0528	13.7616	11.8323	10.5222	10.0049	8.1292	5.8406	
330	0.0911	1.8632	3.9656	11.6025	11.3399	13.1286	12.0191	13.9044	10.5730	10.9462	9.3573	8.1928	5.9784	
345	0.9655	-1.2976	4.4472	8.3449	10.7420	10.9568	12.1370	12.1617	10.4985	9.8913	9.2187	7.7804	5.6048	
360	2.9880	1.1062	3.7317	8.3718	10.0645	11.0227	11.9378	12.0147	10.8323	9.9500	9.2716	7.1702	5.5646	

Table 11. Total Power (dBm)



Total Power (mW):  $P_{mW} = 10PdBm/10$

		$\varphi$ (degrees)												
		0	15	30	45	60	75	90	105	120	135	150	165	180
$\theta$ (degrees)	0	1.9898	1.2901	2.3614	6.8735	10.1496	12.6552	15.6235	15.9025	12.1124	9.8856	8.4559	5.2122	3.6013
	15	2.1924	1.6477	2.4237	5.6858	9.6857	11.8123	15.2676	15.6943	11.6602	9.8949	7.9012	5.7376	3.5246
	30	2.3507	1.8747	2.6072	5.5544	9.3672	11.6065	14.7337	14.8636	10.7904	9.3367	7.0336	5.3569	3.6824
	45	2.3808	2.0201	2.9074	5.6498	9.3589	11.3005	13.9814	13.7879	9.6145	8.4140	6.0585	4.8512	3.9523
	60	2.3009	2.1075	3.3331	5.9528	9.5227	10.8841	12.9880	12.4436	8.1879	7.2606	4.9475	4.2569	4.2208
	75	2.1549	2.1810	3.8956	6.4198	9.7863	10.3348	11.8305	10.8565	6.6561	5.8395	3.8551	3.6097	4.4691
	90	1.9662	2.2924	4.5538	6.9740	10.0585	9.7254	10.5834	9.1475	5.1108	4.2993	2.8169	2.9616	4.5634
	105	1.7583	2.4761	5.2978	7.6510	10.3281	9.1124	9.4025	7.3979	3.6645	2.8465	1.8767	2.3576	4.5295
	120	1.5860	2.7186	5.9927	8.3321	10.6399	8.6222	8.3969	5.9691	2.4977	1.6262	1.1311	1.8714	4.3142
	135	1.4402	2.9778	6.6551	9.0353	11.0307	8.2661	7.6904	4.8753	1.6025	0.7013	0.6170	1.5630	4.0140
	150	1.3553	3.2285	7.1349	9.7282	11.4861	8.1149	7.1903	4.2574	1.0486	0.2160	0.3605	1.4207	3.5781
	165	1.2840	3.4247	7.4053	10.6197	17.4067	8.1763	12.1548	4.1263	0.8180	0.2322	0.0757	1.6190	2.7715
	180	1.4401	3.6415	8.9655	11.0372	18.1806	8.4619	12.6381	4.8137	2.2901	0.6272	0.3899	1.8779	2.3467
	195	1.3733	3.5616	8.8582	11.3844	19.4465	8.9279	13.7959	5.8356	2.9856	1.8273	1.3349	1.8215	2.3883
	210	1.2139	3.4662	8.4012	15.5522	20.4834	14.1862	15.2230	11.3060	4.2711	2.8907	2.2996	2.2992	2.4415
	225	1.0419	3.1076	7.8111	15.7619	21.4783	15.1678	16.8820	13.4078	5.7298	4.0239	3.4395	2.9075	2.6492
	240	0.8708	2.6378	7.2235	15.8687	22.3840	16.3033	18.6838	15.5384	7.4332	5.1599	4.6219	3.5554	2.9630
	255	0.6883	2.1289	6.6263	15.9355	23.1713	17.4309	20.4189	17.6684	9.1501	6.3112	5.8498	4.1765	3.3198
	270	0.5470	1.6598	6.1652	15.9500	23.7478	18.4922	21.9856	19.5930	10.8048	7.4538	7.0369	4.7929	3.6096
	285	0.4889	1.3346	5.6373	15.8647	23.9304	19.3726	23.2687	21.2703	12.4301	8.7169	8.1349	5.4086	3.8053
300	0.5635	1.1921	5.6651	15.6785	23.7907	20.0618	24.4118	22.6035	13.9071	10.0192	9.1727	5.9718	3.8716	
315	0.7808	1.2932	5.6059	15.3762	21.0117	20.6455	25.4259	23.7771	15.2485	11.2778	10.0112	6.5001	3.8376	
330	1.0212	1.5358	2.4921	14.4627	13.6140	20.5525	15.9187	24.5722	11.4103	12.4342	8.6243	6.5959	3.9613	
345	1.2490	0.7417	2.7843	6.8311	11.8631	12.4645	16.3568	16.4501	11.2164	9.7529	8.3535	5.9985	3.6348	
360	1.9898	1.2901	2.3614	6.8735	10.1496	12.6552	15.6235	15.9025	12.1124	9.8856	8.4559	5.2122	3.6013	

Table 12. Total Power (mW)

Measured Conducted Output Power (dBm):  $P_{cond} = 11.9 \text{ dBm}$