Customer Name & Project: CCO_WIFI7 with LTE Ver14.0

Prepared By: Jeffrey

Date: 10th February 2025

Airgain Project Code:

Airgain,Inc.
3611 Valley Centre Drive, Ste. 150, San Diego, CA 92130 USA
+1 760 579 0200
+1 760 579 0892

Introduction

- Airgain proposes an embedded antenna solution for Askey_CCO_WIFI7 with LTE
  - **The antenna solution is updated based upon the latest 3D machine by September 6th, 2024；**
- The solution for this device is as follows:
  - **1 pcs IOT Antennas**
    - **ANT1（2400MHz-2500MHz）**
  - **4 pcs 2.4G+5G dual band Antennas**
    - **ANT2（2400MHz-2500MHz，5150MHz-5850MHz）**
    - **ANT3（2400MHz-2500MHz，5150MHz-5850MHz）**
    - **ANT4（2400MHz-2500MHz，5150MHz-5850MHz）**
    - **ANT5（2400MHz-2500MHz，5150MHz-5850MHz）**
  - **4 pcs 6G signal band Antennas**
    - **ANT6（ 5925MHz-7125MHz ）**
    - **ANT7（ 5925MHz-7125MHz ）**
    - **ANT8（ 5925MHz-7125MHz ）**
    - **ANT9（ 5925MHz-7125MHz ）**
  - **4 pcs LTE Antennas**
    - **ANT10（ 617MHz-894MHz，1695MHz-2690MHz，3300MHz-4200MHz ）**
    - **ANT11（ 617MHz-894MHz，1559MHz-1607MHz，1695MHz-2690MHz，3300MHz-4200MHz ）**
    - **ANT12（ 1695MHz-2690MHz，3300MHz-4200MHz ）**
    - **ANT13（ 1695MHz-2690MHz，3300MHz-4200MHz ）**
- Measurements taken every 3˚

Antenna Specification

Antenna (total 13 pcs)

- NR:n2/5/12/14/25/30/41/48/70/66/71/77
- LTE :B2/4/5/12/13/14/29/30/66/71/41/48

- LTE/5G NR antenna (4 pcs, ANT 10~13) include GPS antenna (combine with ANT 11)
  - Return loss LB < -4dB ,MB &CB < -7dB
  - Total radiated efficiency : (low band (<1G)> 40% , other band(1G~7G)>50%)
  - Envelope correlation coefficient between antennas < 0.3 on low Rx bands (up to 1500 MHz) and < 0.25 on high Rx bands (over 1500 MHz)
  - Isolation between LTE LB antennas <- 7 dB
  - Isolation between LTE MB antennas <- 13 dB
  - Isolation between LTE CB antennas <- 20 dB
- IOT antenna (1pcs, ANT 1)
  - Return loss 2.4G < -10dB
  - Total radiated efficiency : >50%
  - Isolation between antennas > 20dB
- WiFi 2G&5G antenna (4 pcs, dual band, ANT2 ~5)
  - Return loss 2.4G < -10dB ,5G <-12dB
  - Total radiated efficiency : >70%)
  - Envelope correlation coefficient between antennas < 0.25
  - Isolation between 2.4G antennas > 20dB , 5G antennas > 25dB
- WiFi 6G antenna (4 pcs, dual band, ANT6 ~9)
  - Return loss 6G <-12dB
  - Total radiated efficiency : >65%)
  - Envelope correlation coefficient between antennas < 0.25
  - Isolation between antennas > 25dB

Band group	Frequency range
LB	600 MHz – 1 GHz
MLB	1.4 GHz – 1.6 GHz
MB	1.7 GHz – 2.2 GHz
HB	2.3 GHz – 2.7 GHz
UHB	3.4 GHz – 3.8 GHz
LAA	5.1 GHz – 5.9 GHz

	Frequency (MHz)	Band Support
ANT 6	5925~7125	C1-C233
ANT 7	5925~7125	C1-C233
ANT 8	5925~7125	C1-C233
ANT 9	5925~7125	C1-C233

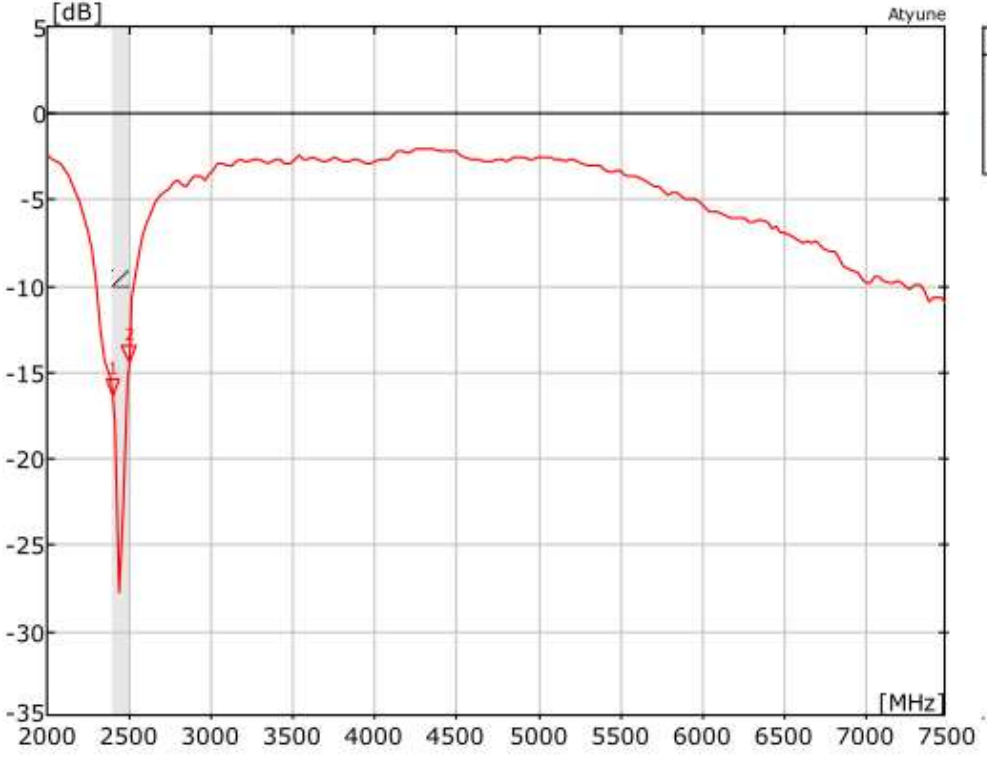
	Frequency (MHz)	Band Support
ANT 1	2400~2500	(IOT)
ANT 2	2400~2500	C1~C11
	5150~5850	C36~C165
ANT 3	2400~2500	C1~C11
	5150~5850	C36~C165
ANT 4	2400~2500	C1~C11
	5150~5850	C36~C165
ANT 5	2400~2500	C1~C11
	5150~5850	C36~C165

	frequency (MHz)	Bands support
ANT 10	617~894	LB Main TX/ PRX B5/B12/B13/B14/B29/B71 n5/n12/n14/n71
	1695~2690	MLB MB HB Main TX/ PRX B2/B4/B30/B66/B41 n2/n25/n30/n66/n70/n41
	3300~4200	UHB Secondary TX / DRX B48 n48/n77
ANT 11	617~894	LB DRX B5/B12/B13/B14/B29/B71 n5/n12/n14/n71
	1695~2690	MLB MB HB MIMO PRX B2/B4/B30/B66/B41 n2/n25/n30/n66/n70/n41
	3300~4200	UHB MIMO DRX B48 n48/n77
	1559~1606	GNSS L1
ANT 12	1695~2690	MLB MB HB DRX B2/B4/B30/B66/B41 n2/n25/n30/n66/n70/n41
	3300~4200	UHB MIMO PRX B48 n48/n77
ANT 13	1695~2690	MLB MB HB Secondary TX / MIMO DRX B2/B4/B30/B66/B41 n2/n25/n30/n66/n70/n41
	3300~4200	UHB Main TX / PRX B48 n48/n77

S-Parameters

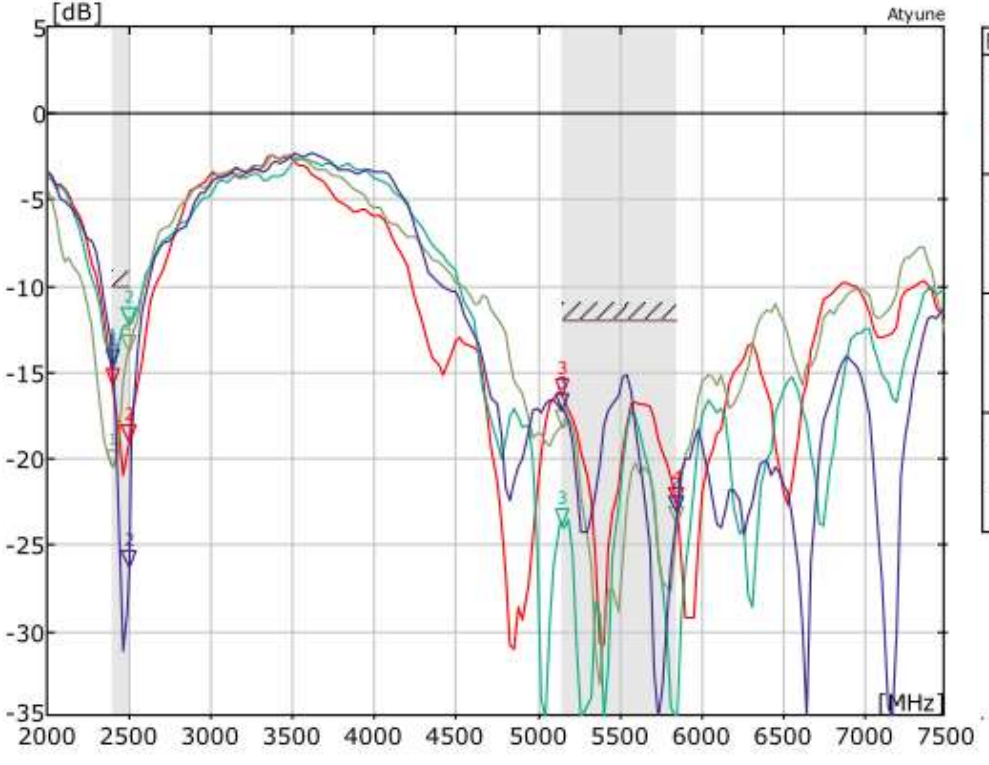
Antenna #	Part Number	Type
ANT1_IOT	N01AKCGA-PK1-LB150U	FR4, Cable fed
ANT2_Dual-band	N03AKCGB-PK1-LE150U	FR4, Cable fed
ANT3_Dual-band	N03AKCGC-PK1-LG210U	FR4, Cable fed
ANT4_Dual-band	N03AKCGD-PK1-LB210U	FR4, Cable fed
ANT5_Dual-band	N03AKCGE-PK1-LW180U	FR4, Cable fed
ANT6_6GHz	N06AKCGF-PK1-LK90U	FR4, Cable fed
ANT7_6GHz	N06AKCGG-PK1-LA70U	FR4, Cable fed
ANT8_6GHz	N06AKCGH-PK1-LY180U	FR4, Cable fed
ANT9_6GHz	N06AKCGJ-PK1-LR180U	FR4, Cable fed
ANT10_LTE	N66AKCGK-PK1-GD-LW170U4LI	FR4, Cable fed
ANT11_LTE	N66AKCGM-PK1-GD-LB210U4LI	FR4, Cable fed
ANT12_LTE	N66AKCGN-PK1-LE100U4LI	FR4, Cable fed
ANT13_LTE	N66AKCGP-PK1-LP160U4LI	FR4, Cable fed

S-Parameter – Return Loss for IOT Antenna



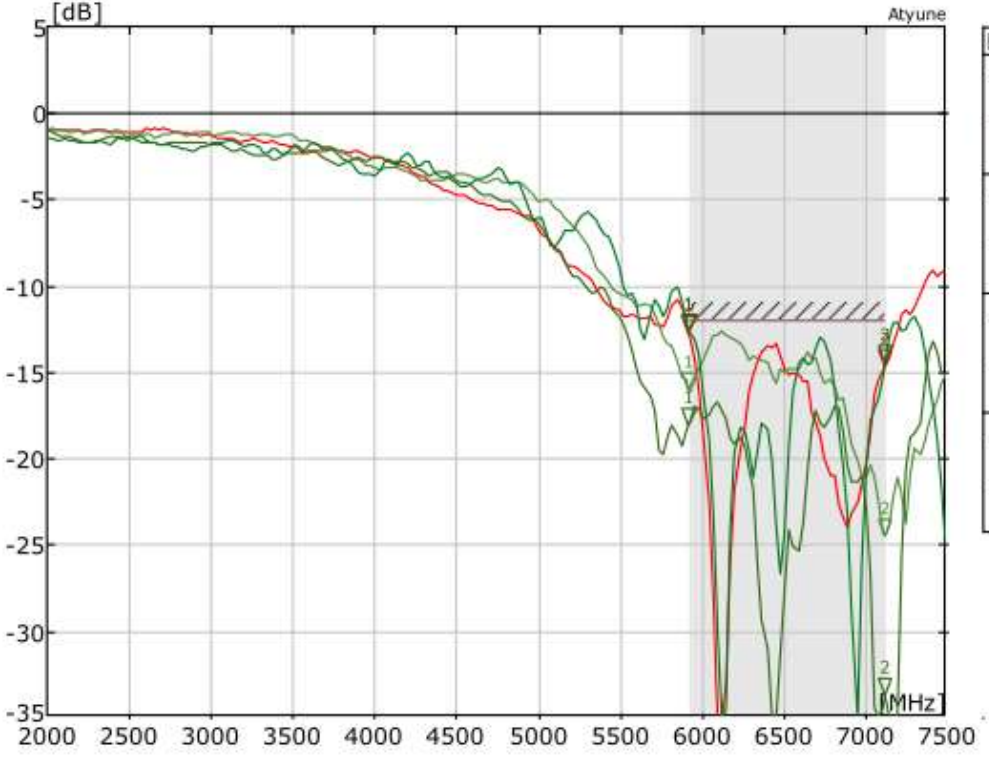
MARKERS:	MHz	dB
A1.S1P - S11		
1:	2400	-16.27
2:	2500	-14.33

S-Parameter – Return Loss for Dual-band Antennas



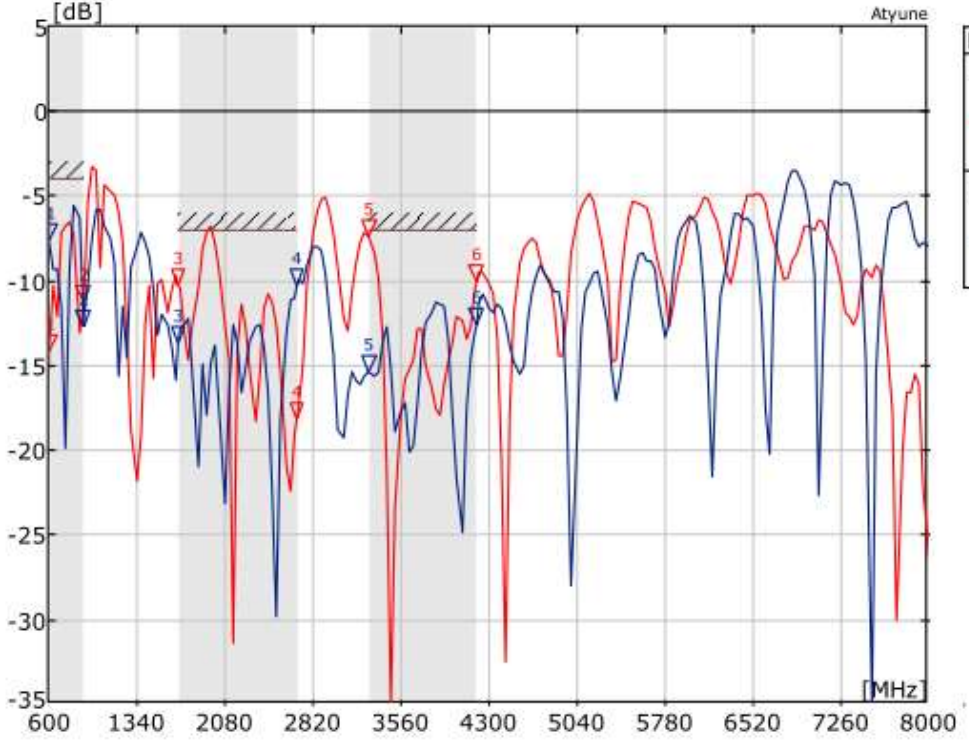
MARKERS:	MHz	dB	MHz	dB
A2.S1P - S11				
	1: 2400	-15.68	3: 5150	-16.27
	2: 2500	-18.99	4: 5850	-22.61
A3.S1P - S11				
	1: 2400	-14.39	3: 5150	-23.75
	2: 2500	-12.12	4: 5850	-39.22
A4.S1P - S11				
	1: 2400	-20.36	3: 5150	-18.11
	2: 2500	-13.68	4: 5850	-23.71
A5.S1P - S11				
	1: 2400	-14.63	3: 5150	-17.12
	2: 2500	-26.22	4: 5850	-23.03

S-Parameter – Return Loss for 6GHz Antennas



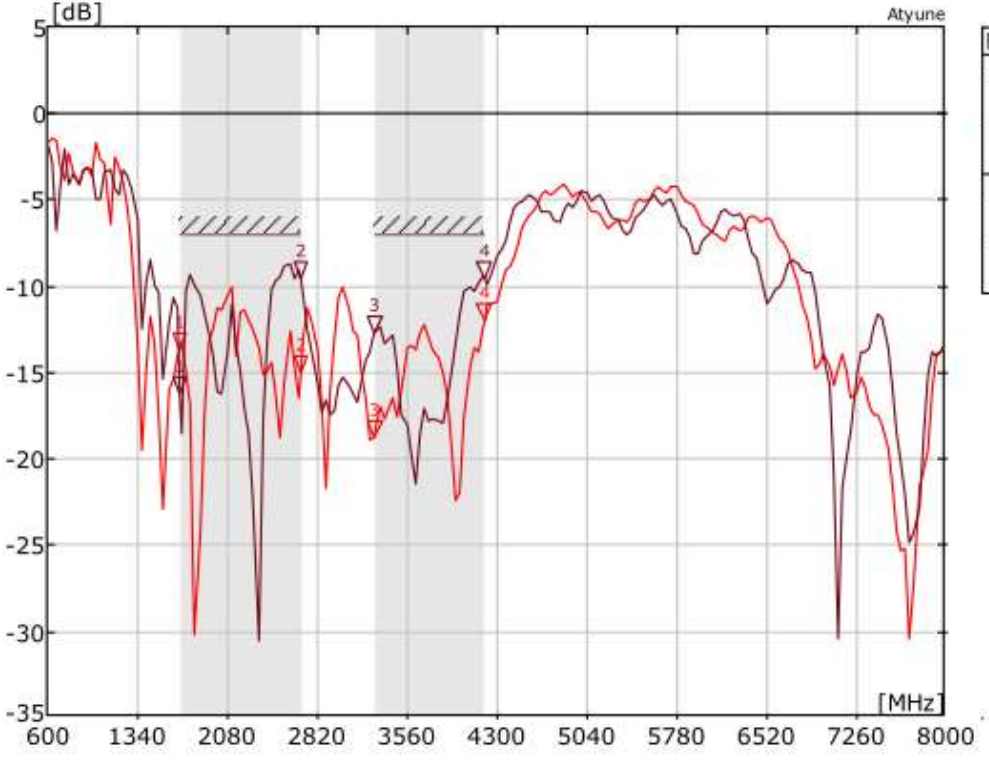
MARKERS:	MHz	dB
A6-A7-A8-A9.S4P - S11		
	1: 5925	-12.64
	2: 7125	-14.59
A6-A7-A8-A9.S4P - S22		
	1: 5925	-15.95
	2: 7125	-24.33
A6-A7-A8-A9.S4P - S33		
	1: 5925	-12.47
	2: 7125	-14.30
A6-A7-A8-A9.S4P - S44		
	1: 5925	-17.93
	2: 7125	-33.63

S-Parameter – Return Loss for LTE Antennas



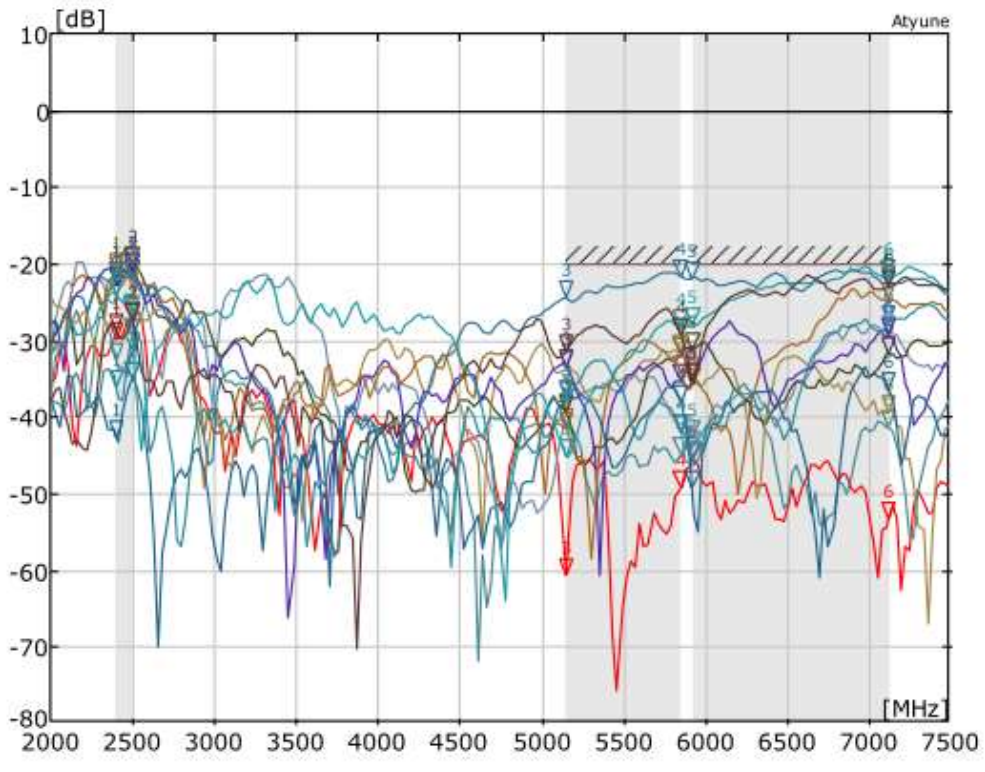
MARKERS:	MHz	dB	MHz	dB	MHz	dB
A10.S1P - S11						
	1: 617	-14.10	3: 1695	-10.19	5: 3300	-7.29
	2: 894	-11.15	4: 2690	-18.07	6: 4200	-9.98
A11.S1P - S11						
	1: 617	-7.58	3: 1695	-13.66	5: 3300	-15.30
	2: 894	-12.64	4: 2690	-10.22	6: 4200	-12.49

S-Parameter – Return Loss for LTE Antennas



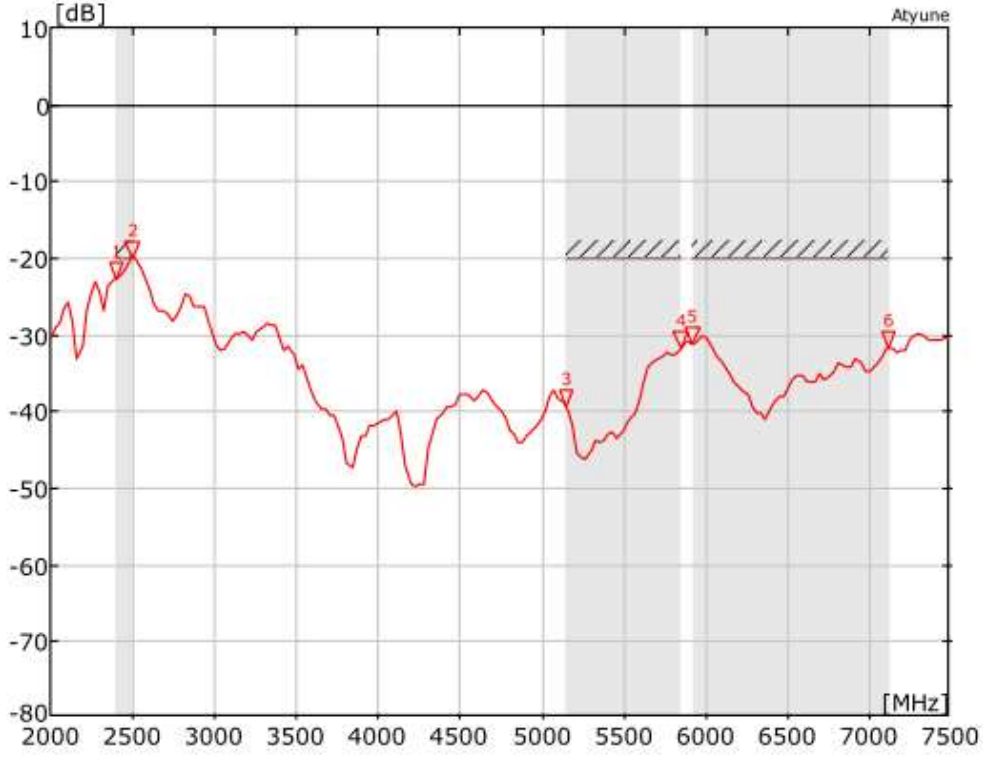
MARKERS:	MHz	dB	MHz	dB
A12.S1P - S11				
	1: 1695	-13.57	3: 3300	-18.66
	2: 2690	-14.90	4: 4200	-11.92
A13.S1P - S11				
	1: 1695	-16.13	3: 3300	-12.65
	2: 2690	-9.43	4: 4200	-9.47

S-Parameter – Isolation for IOT to other Antennas



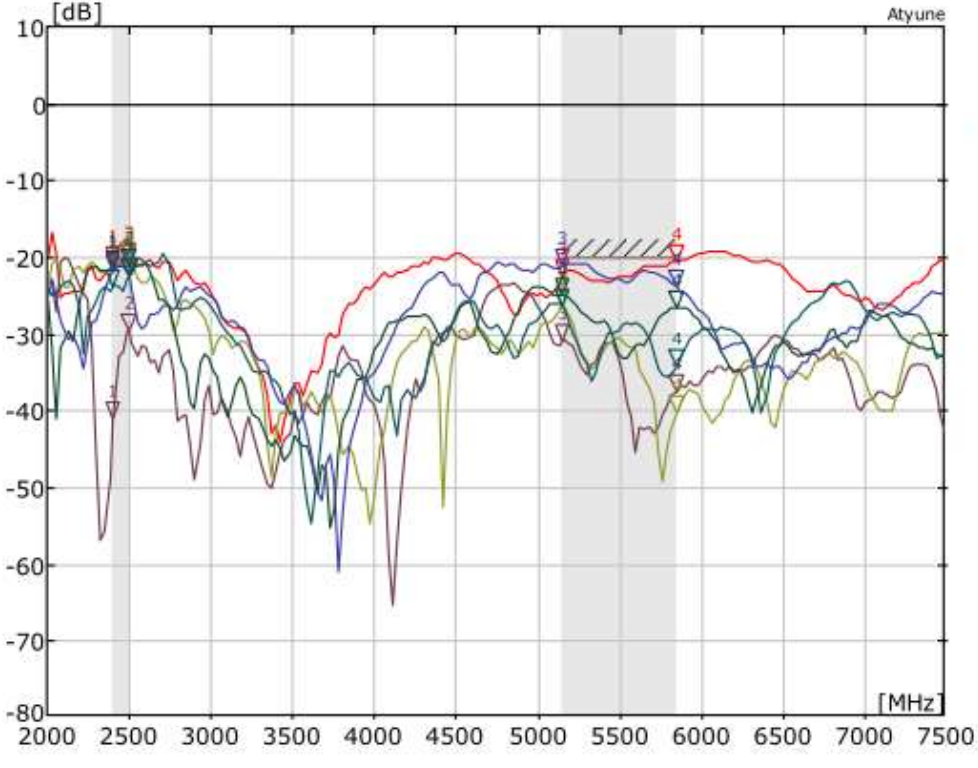
MARKERS:	MHz	dB	MHz	dB	MHz	dB
A1-A10.S2P - S21						
	1: 2400	-29.56	3: 5150	-60.57	5: 5925	-45.56
	2: 2500	-26.83	4: 5850	-48.96	6: 7125	-53.20
A1-A11.S2P - S21						
	1: 2400	-32.51	3: 5150	-40.79	5: 5925	-42.55
	2: 2500	-30.97	4: 5850	-44.74	6: 7125	-41.22
A1-A12.S2P - S21						
	1: 2400	-23.88	3: 5150	-39.02	5: 5925	-43.95
	2: 2500	-20.72	4: 5850	-41.93	6: 7125	-28.73
A1-A13.S2P - S21						
	1: 2400	-22.56	3: 5150	-39.28	5: 5925	-31.06
	2: 2500	-19.83	4: 5850	-31.73	6: 7125	-31.53
A1-A2.S2P - S21						
	1: 2400	-21.14	3: 5150	-33.44	5: 5925	-34.19
	2: 2500	-22.66	4: 5850	-31.26	6: 7125	-39.15
A1-A3.S2P - S21						
	1: 2400	-21.65	3: 5150	-33.15	5: 5925	-34.78
	2: 2500	-20.69	4: 5850	-35.24	6: 7125	-29.16
A1-A4.S2P - S21						
	1: 2400	-20.57	3: 5150	-41.33	5: 5925	-35.78
	2: 2500	-21.87	4: 5850	-34.08	6: 7125	-24.40
A1-A5.S2P - S21						
	1: 2400	-21.87	3: 5150	-24.32	5: 5925	-21.64
	2: 2500	-21.48	4: 5850	-21.54	6: 7125	-22.35
A1-A6.S2P - S21						
	1: 2400	-42.50	3: 5150	-37.45	5: 5925	-48.92
	2: 2500	-34.97	4: 5850	-37.85	6: 7125	-36.15
A1-A7.S2P - S21						
	1: 2400	-35.85	3: 5150	-37.25	5: 5925	-45.14
	2: 2500	-29.26	4: 5850	-41.70	6: 7125	-27.56
A1-A8.S2P - S21						
	1: 2400	-23.88	3: 5150	-45.05	5: 5925	-27.80
	2: 2500	-26.15	4: 5850	-28.13	6: 7125	-21.46
A1-A9.S2P - S21						
	1: 2400	-28.57	3: 5150	-31.19	5: 5925	-35.07
	2: 2500	-27.20	4: 5850	-29.19	6: 7125	-22.80

S-Parameter – Isolation for IOT to other Antennas(The Worst)



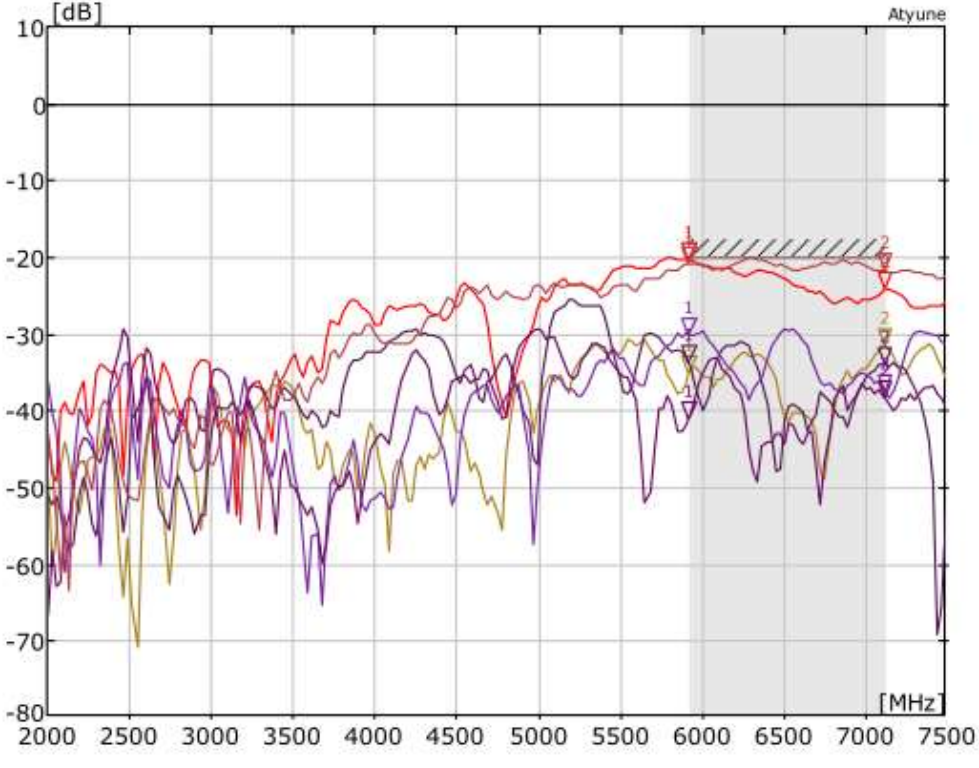
MARKERS:	MHz	dB	MHz	dB	MHz	dB
A1-A13.S2P - S21						
	1: 2400	-22.56	3: 5150	-39.28	5: 5925	-31.06
	2: 2500	-19.83	4: 5850	-31.73	6: 7125	-31.53

S-Parameter – Isolation for Dual-band Antennas



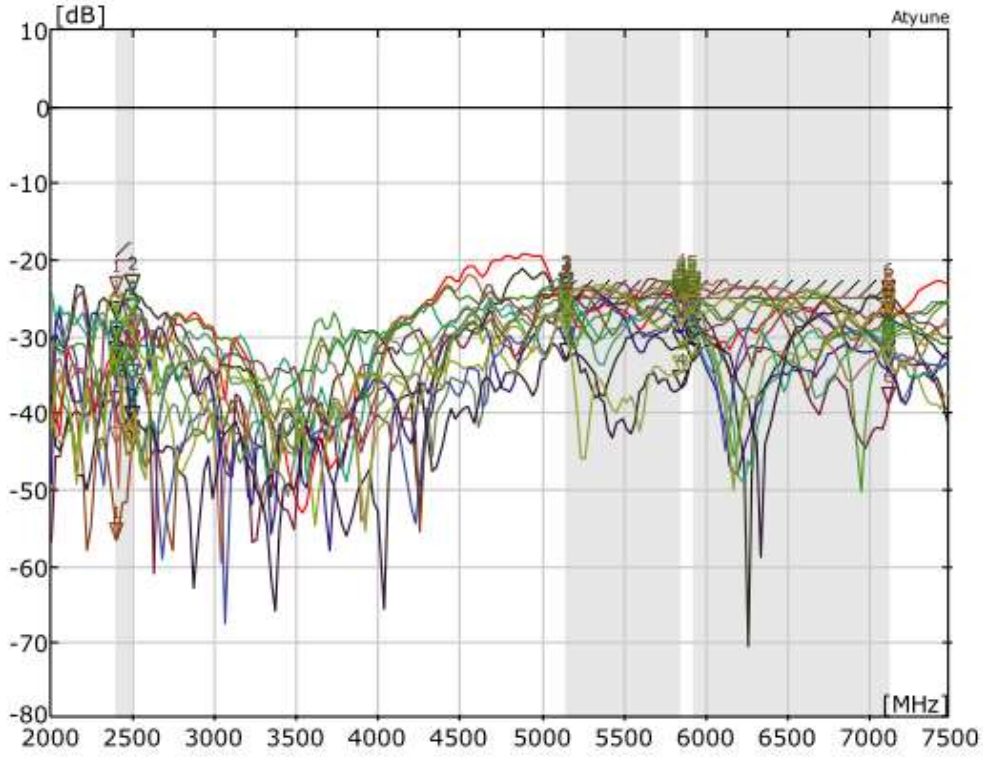
MARKERS:	MHz	dB	MHz	dB
A2-A3.S2P - S21				
	1: 2400	-20.74	3: 5150	-22.30
	2: 2500	-20.47	4: 5850	-20.39
A2-A4.S2P - S21				
	1: 2400	-40.75	3: 5150	-30.73
	2: 2500	-29.47	4: 5850	-37.40
A2-A5.S2P - S21				
	1: 2400	-21.82	3: 5150	-26.37
	2: 2500	-20.17	4: 5850	-40.12
A3-A4.S2P - S21				
	1: 2400	-21.22	3: 5150	-24.71
	2: 2500	-20.93	4: 5850	-26.50
A3-A5.S2P - S21				
	1: 2400	-21.56	3: 5150	-20.86
	2: 2500	-22.00	4: 5850	-23.79
A4-A5.S2P - S21				
	1: 2400	-23.78	3: 5150	-26.07
	2: 2500	-22.31	4: 5850	-34.18

S-Parameter – Isolation for 6GHz Antennas



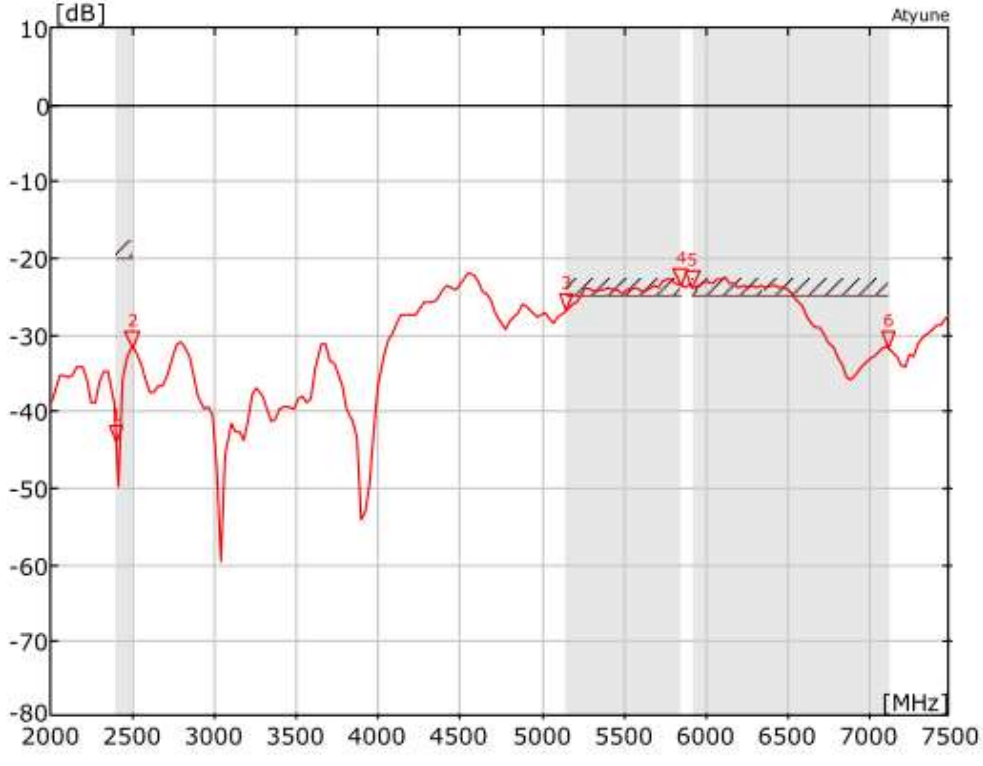
MARKERS:	MHz	dB
A6-A7.S2P - S21		
	1: 5925	-20.14
	2: 7125	-24.09
A6-A8.S2P - S21		
	1: 5925	-34.93
	2: 7125	-31.43
A6-A9.S2P - S21		
	1: 5925	-33.58
	2: 7125	-33.84
A7-A8.S2P - S21		
	1: 5925	-29.93
	2: 7125	-37.45
A7-A9.S2P - S21		
	1: 5925	-40.87
	2: 7125	-38.22
A8-A9.S2P - S21		
	1: 5925	-20.70
	2: 7125	-21.58

S-Parameter – Isolation for Dual-band to 6GHz Antennas



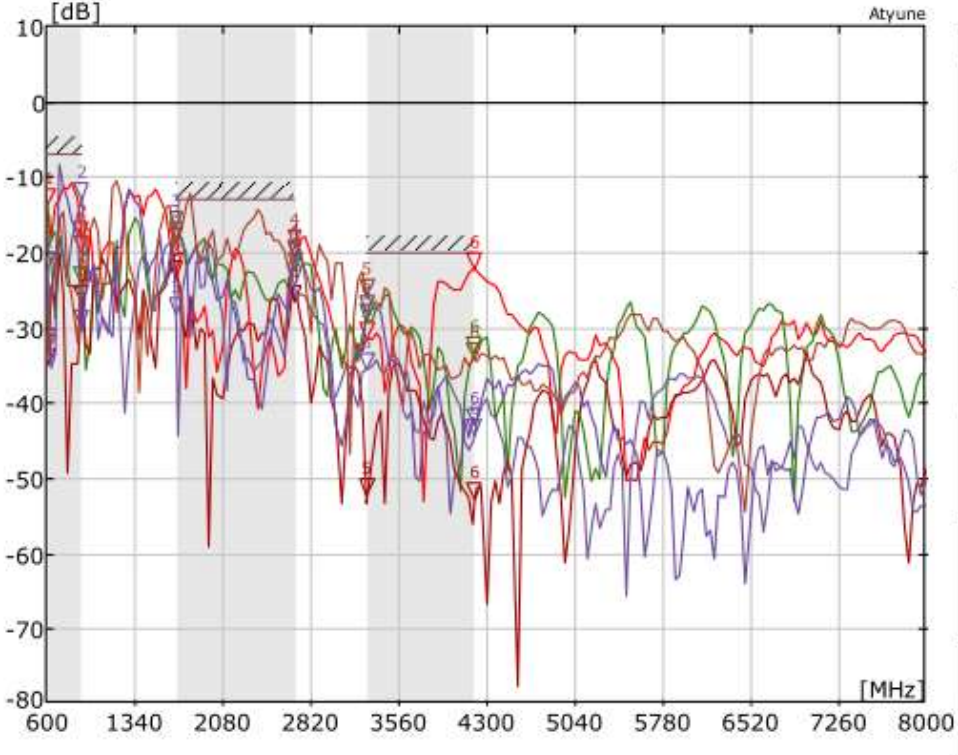
MARKERS:	MHz	dB	MHz	dB	MHz	dB
A2-A6.S2P - S21						
	1: 2400	-30.71	3: 5150	-25.17	5: 5925	-27.17
	2: 2500	-31.41	4: 5850	-24.62	6: 7125	-25.77
A2-A7.S2P - S21						
	1: 2400	-27.40	3: 5150	-26.16	5: 5925	-29.70
	2: 2500	-23.84	4: 5850	-31.35	6: 7125	-24.80
A2-A8.S2P - S21						
	1: 2400	-34.36	3: 5150	-27.46	5: 5925	-24.66
	2: 2500	-35.58	4: 5850	-24.51	6: 7125	-32.59
A2-A9.S2P - S21						
	1: 2400	-39.23	3: 5150	-23.94	5: 5925	-26.28
	2: 2500	-43.13	4: 5850	-25.44	6: 7125	-38.69
A3-A6.S2P - S21						
	1: 2400	-56.39	3: 5150	-23.80	5: 5925	-23.68
	2: 2500	-44.47	4: 5850	-24.05	6: 7125	-27.44
A3-A7.S2P - S21						
	1: 2400	-30.64	3: 5150	-25.12	5: 5925	-30.84
	2: 2500	-27.20	4: 5850	-29.37	6: 7125	-34.23
A3-A8.S2P - S21						
	1: 2400	-30.14	3: 5150	-23.87	5: 5925	-28.42
	2: 2500	-29.50	4: 5850	-26.84	6: 7125	-30.75
A3-A9.S2P - S21						
	1: 2400	-35.75	3: 5150	-30.66	5: 5925	-27.78
	2: 2500	-35.69	4: 5850	-27.32	6: 7125	-32.39
A4-A6.S2P - S21						
	1: 2400	-43.84	3: 5150	-26.78	5: 5925	-23.59
	2: 2500	-31.54	4: 5850	-23.50	6: 7125	-31.54
A4-A7.S2P - S21						
	1: 2400	-33.88	3: 5150	-25.32	5: 5925	-27.07
	2: 2500	-38.73	4: 5850	-26.89	6: 7125	-29.11
A4-A8.S2P - S21						
	1: 2400	-32.66	3: 5150	-32.85	5: 5925	-33.00
	2: 2500	-41.02	4: 5850	-36.62	6: 7125	-27.50
A4-A9.S2P - S21						
	1: 2400	-30.03	3: 5150	-28.42	5: 5925	-25.05
	2: 2500	-26.83	4: 5850	-23.95	6: 7125	-30.38
A5-A6.S2P - S21						
	1: 2400	-34.39	3: 5150	-23.87	5: 5925	-24.13
	2: 2500	-33.23	4: 5850	-24.76	6: 7125	-29.84
A5-A7.S2P - S21						
	1: 2400	-24.32	3: 5150	-23.99	5: 5925	-26.83
	2: 2500	-31.33	4: 5850	-27.16	6: 7125	-27.44
A5-A8.S2P - S21						
	1: 2400	-26.55	3: 5150	-29.66	5: 5925	-32.39
	2: 2500	-29.38	4: 5850	-34.50	6: 7125	-33.51
A5-A9.S2P - S21						
	1: 2400	-33.58	3: 5150	-26.02	5: 5925	-26.61
	2: 2500	-43.83	4: 5850	-28.23	6: 7125	-26.54

S-Parameter – Isolation for Dual-band to 6GHz Antennas (The Worst)



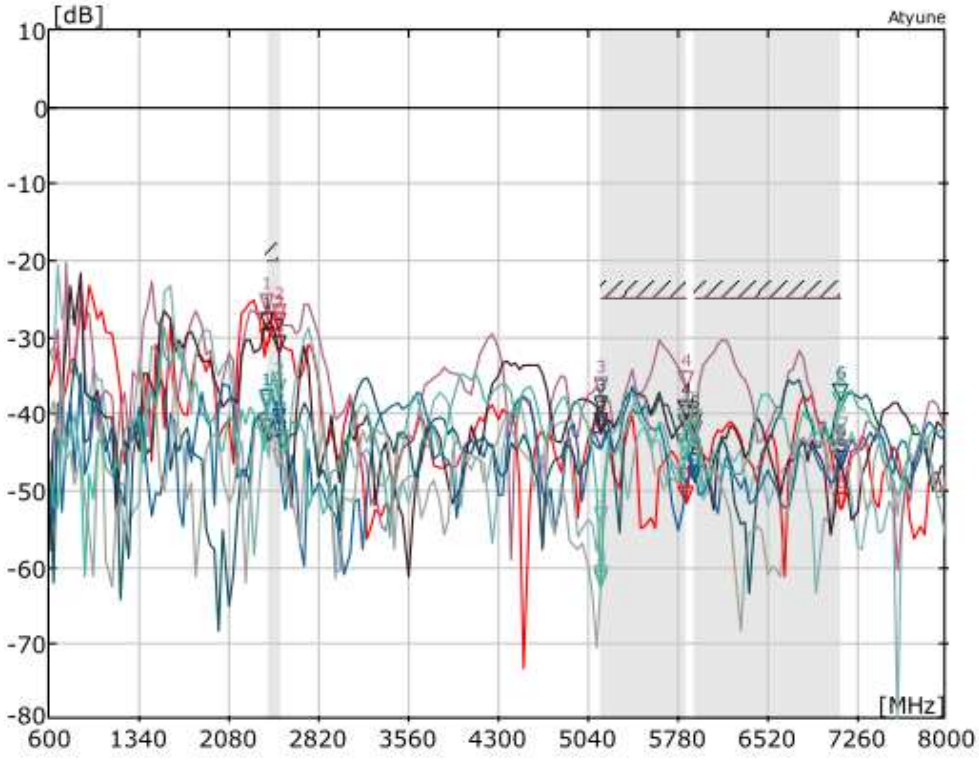
MARKERS:	MHz	dB	MHz	dB	MHz	dB
A4-A6.S2P - S21						
	1: 2400	-43.84	3: 5150	-26.78	5: 5925	-23.59
	2: 2500	-31.54	4: 5850	-23.50	6: 7125	-31.54

S-Parameter – Isolation for LTE Antennas



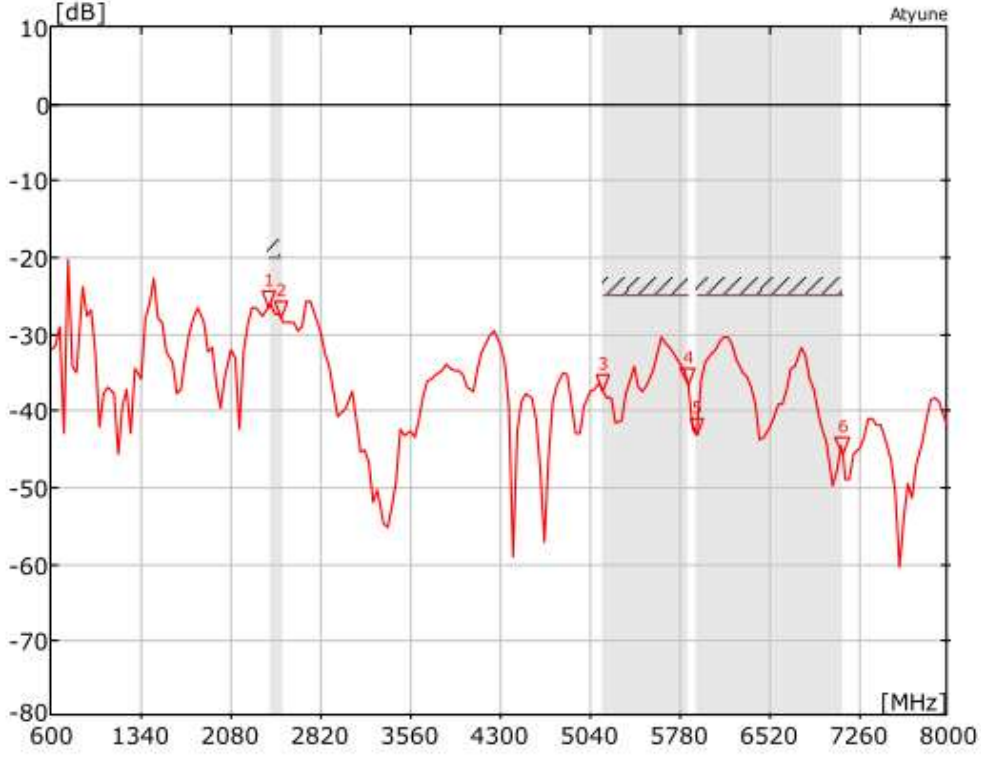
MARKERS:	MHz	dB	MHz	dB	MHz	dB
A10-A11-A12-A13.S4P - S12						
	1: 617	-13.71	3: 1695	-22.07	5: 3300	-31.29
	2: 894	-17.94	4: 2690	-20.46	6: 4200	-22.16
A10-A11-A12-A13.S4P - S13						
	1: 617	-19.19	3: 1695	-17.82	5: 3300	-28.93
	2: 894	-23.91	4: 2690	-21.97	6: 4200	-33.23
A10-A11-A12-A13.S4P - S14						
	1: 617	-34.92	3: 1695	-23.24	5: 3300	-52.18
	2: 894	-26.46	4: 2690	-26.30	6: 4200	-52.61
A10-A11-A12-A13.S4P - S23						
	1: 617	-22.02	3: 1695	-16.47	5: 3300	-27.89
	2: 894	-29.57	4: 2690	-20.70	6: 4200	-42.65
A10-A11-A12-A13.S4P - S24						
	1: 617	-32.08	3: 1695	-28.15	5: 3300	-35.47
	2: 894	-12.77	4: 2690	-24.32	6: 4200	-44.01
A10-A11-A12-A13.S4P - S34						
	1: 617	-33.01	3: 1695	-18.85	5: 3300	-25.57
	2: 894	-19.73	4: 2690	-19.14	6: 4200	-33.97

S-Parameter – Isolation for ANT10 to Wi-Fi Antennas



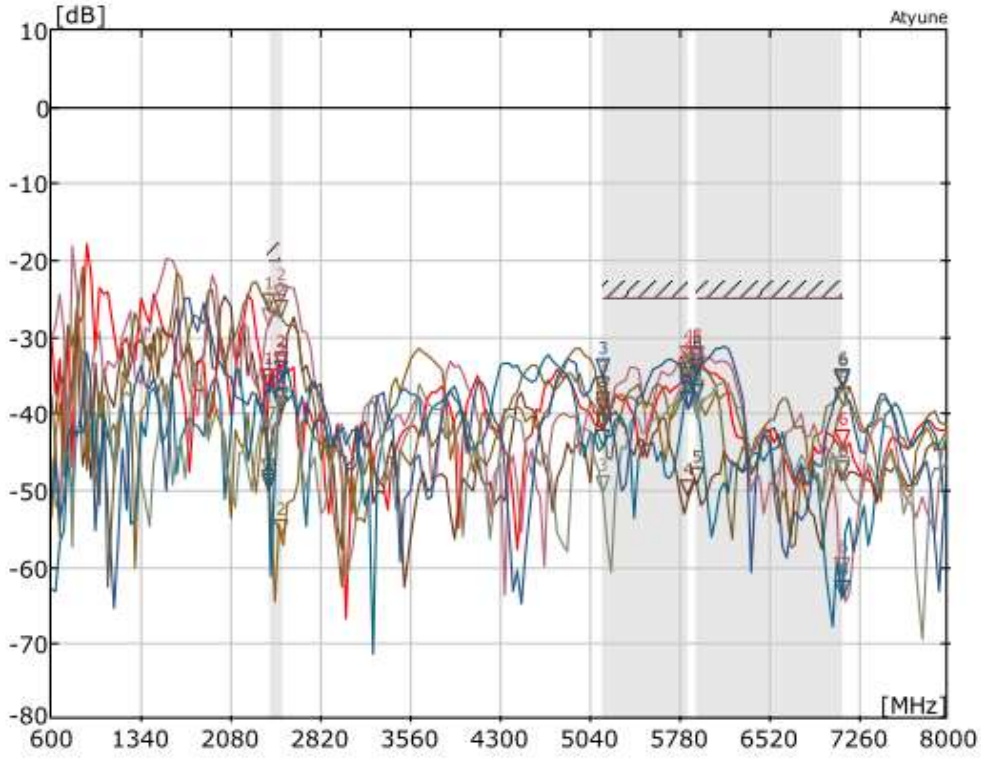
MARKERS:	MHz	dB	MHz	dB	MHz	dB
A10-A1-A2-A3.S4P - S13						
	1: 2400	-31.01	3: 5150	-42.40	5: 5925	-43.09
	2: 2500	-28.75	4: 5850	-51.46	6: 7125	-52.28
A10-A1-A2-A3.S4P - S14						
	1: 2400	-43.65	3: 5150	-54.33	5: 5925	-47.28
	2: 2500	-40.70	4: 5850	-44.71	6: 7125	-46.75
A10-A4-A5-A6.S4P - S12						
	1: 2400	-26.44	3: 5150	-37.34	5: 5925	-43.16
	2: 2500	-27.77	4: 5850	-36.40	6: 7125	-45.55
A10-A4-A5-A6.S4P - S13						
	1: 2400	-28.86	3: 5150	-41.90	5: 5925	-42.02
	2: 2500	-31.76	4: 5850	-40.42	6: 7125	-46.90
A10-A4-A5-A6.S4P - S14						
	1: 2400	-42.76	3: 5150	-39.76	5: 5925	-48.67
	2: 2500	-43.04	4: 5850	-42.35	6: 7125	-38.03
A10-A7-A8-A9.S4P - S12						
	1: 2400	-38.88	3: 5150	-44.46	5: 5925	-47.26
	2: 2500	-41.46	4: 5850	-49.02	6: 7125	-45.78
A10-A7-A8-A9.S4P - S13						
	1: 2400	-42.28	3: 5150	-61.93	5: 5925	-41.49
	2: 2500	-46.68	4: 5850	-41.52	6: 7125	-42.62
A10-A7-A8-A9.S4P - S14						
	1: 2400	-39.60	3: 5150	-62.35	5: 5925	-43.18
	2: 2500	-37.70	4: 5850	-45.45	6: 7125	-39.18

S-Parameter – Isolation for ANT10 to Wi-Fi Antennas (The Worst)



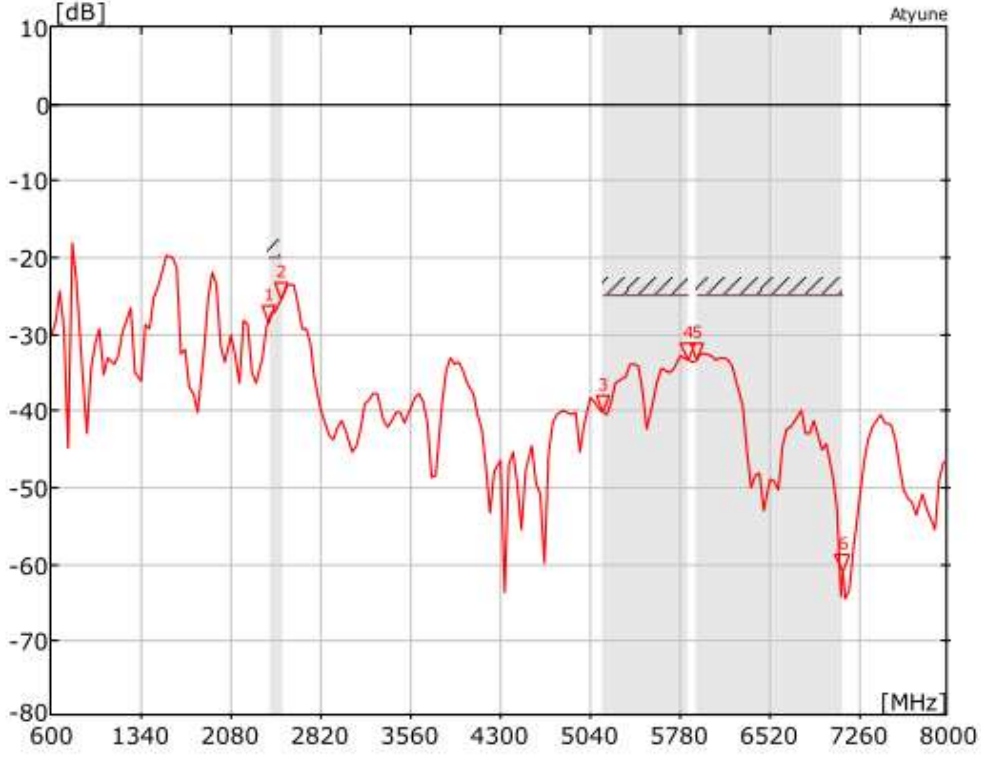
MARKERS:	MHz	dB	MHz	dB	MHz	dB
A10-A4-A5-A6.S4P - S12						
	1: 2400	-26.44	3: 5150	-37.34	5: 5925	-43.16
	2: 2500	-27.77	4: 5850	-36.40	6: 7125	-45.55

S-Parameter – Isolation for ANT11 to Wi-Fi Antennas



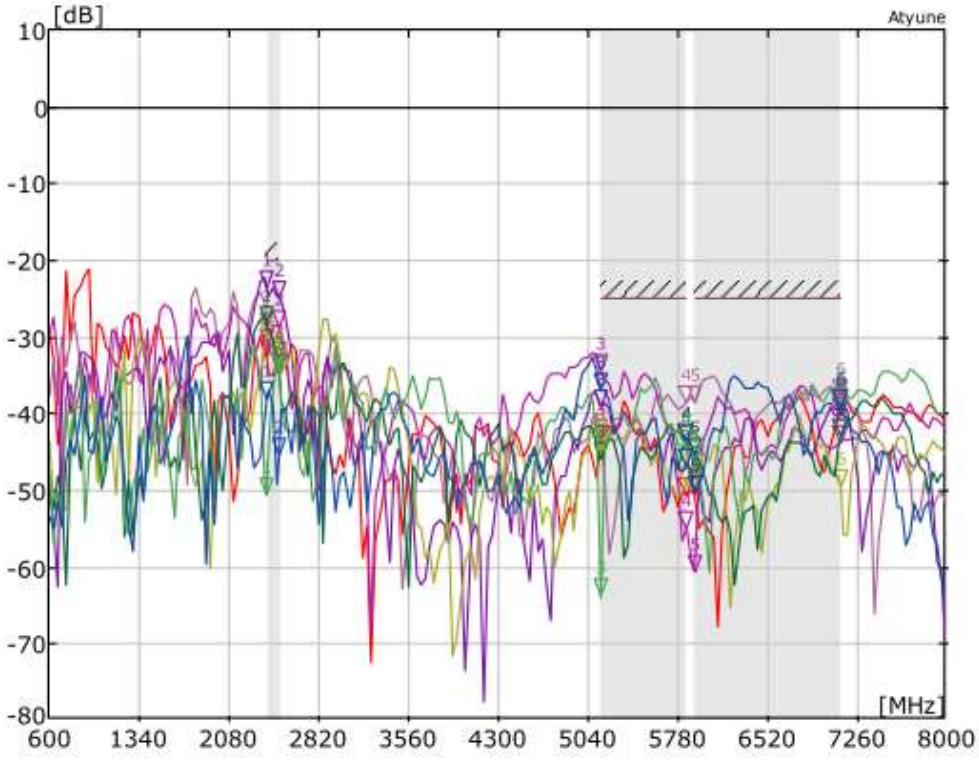
MARKERS:	MHz	dB	MHz	dB	MHz	dB
A11-A1-A2-A3.S4P - S13						
	1: 2400	-36.34	3: 5150	-41.88	5: 5925	-33.38
	2: 2500	-33.94	4: 5850	-34.59	6: 7125	-44.24
A11-A1-A2-A3.S4P - S14						
	1: 2400	-49.92	3: 5150	-39.14	5: 5925	-48.99
	2: 2500	-39.69	4: 5850	-50.59	6: 7125	-48.26
A11-A4-A5-A6.S4P - S12						
	1: 2400	-28.19	3: 5150	-40.00	5: 5925	-33.10
	2: 2500	-25.36	4: 5850	-33.28	6: 7125	-60.73
A11-A4-A5-A6.S4P - S13						
	1: 2400	-26.42	3: 5150	-39.98	5: 5925	-34.45
	2: 2500	-27.16	4: 5850	-35.49	6: 7125	-38.79
A11-A4-A5-A6.S4P - S14						
	1: 2400	-47.86	3: 5150	-37.39	5: 5925	-37.67
	2: 2500	-55.86	4: 5850	-35.91	6: 7125	-36.52
A11-A7-A8-A9.S4P - S12						
	1: 2400	-49.19	3: 5150	-44.26	5: 5925	-38.26
	2: 2500	-38.58	4: 5850	-36.99	6: 7125	-63.85
A11-A7-A8-A9.S4P - S13						
	1: 2400	-41.01	3: 5150	-50.06	5: 5925	-40.05
	2: 2500	-38.35	4: 5850	-36.46	6: 7125	-47.80
A11-A7-A8-A9.S4P - S14						
	1: 2400	-37.12	3: 5150	-34.90	5: 5925	-34.83
	2: 2500	-35.02	4: 5850	-39.22	6: 7125	-36.25

S-Parameter – Isolation for ANT11 to Wi-Fi Antennas (The Worst)



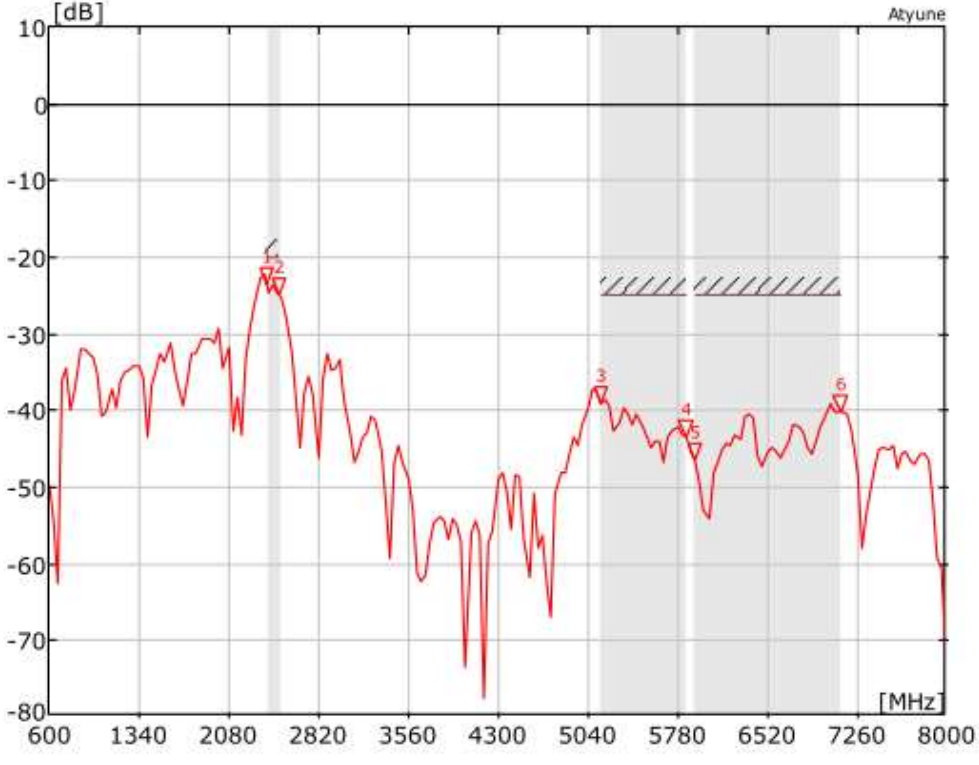
MARKERS:	MHz	dB	MHz	dB	MHz	dB
A11-A4-A5-A6.S4P - S12						
	1: 2400	-28.19	3: 5150	-40.00	5: 5925	-33.10
	2: 2500	-25.36	4: 5850	-33.28	6: 7125	-60.73

S-Parameter – Isolation for ANT12 to Wi-Fi Antennas



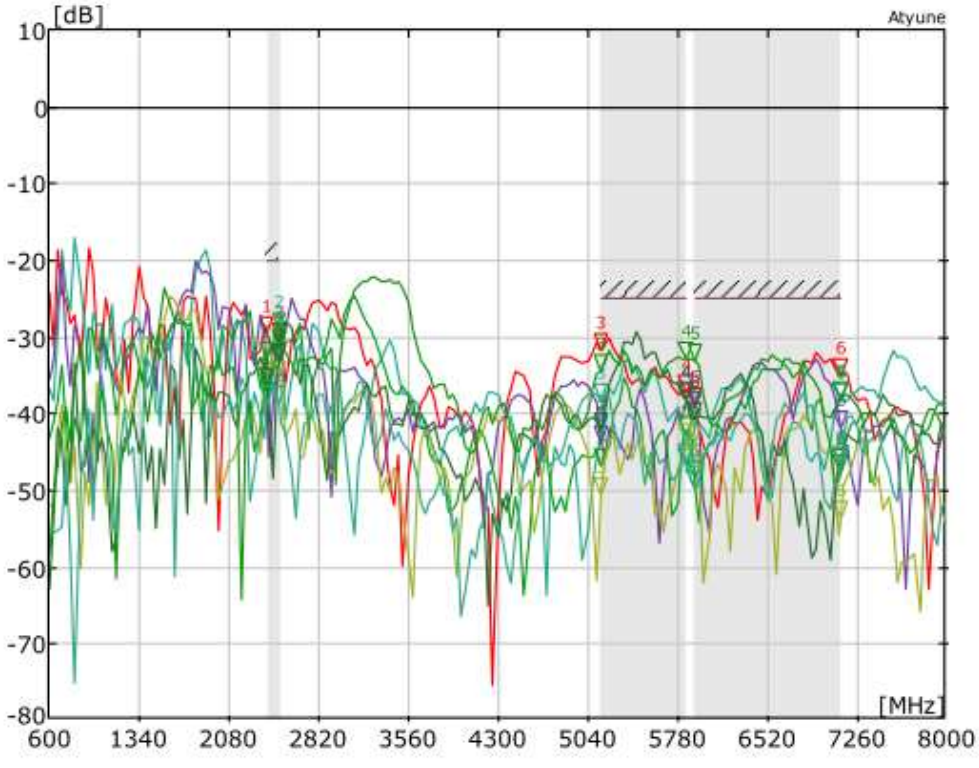
MARKERS:	MHz	dB	MHz	dB	MHz	dB
A12-A1-A2-A3.S4P - S13						
	1: 2400	-32.39	3: 5150	-43.54	5: 5925	-50.49
	2: 2500	-32.71	4: 5850	-50.51	6: 7125	-39.52
A12-A1-A2-A3.S4P - S14						
	1: 2400	-28.76	3: 5150	-42.65	5: 5925	-38.36
	2: 2500	-33.44	4: 5850	-38.41	6: 7125	-37.68
A12-A4-A5-A6.S4P - S12						
	1: 2400	-31.03	3: 5150	-34.23	5: 5925	-60.40
	2: 2500	-28.62	4: 5850	-54.69	6: 7125	-43.52
A12-A4-A5-A6.S4P - S13						
	1: 2400	-23.32	3: 5150	-38.83	5: 5925	-46.21
	2: 2500	-24.77	4: 5850	-43.37	6: 7125	-40.13
A12-A4-A5-A6.S4P - S14						
	1: 2400	-30.02	3: 5150	-44.91	5: 5925	-49.79
	2: 2500	-33.63	4: 5850	-49.09	6: 7125	-49.26
A12-A7-A8-A9.S4P - S12						
	1: 2400	-28.18	3: 5150	-45.77	5: 5925	-45.21
	2: 2500	-34.41	4: 5850	-43.72	6: 7125	-42.81
A12-A7-A8-A9.S4P - S13						
	1: 2400	-50.43	3: 5150	-63.57	5: 5925	-46.30
	2: 2500	-34.44	4: 5850	-44.21	6: 7125	-38.58
A12-A7-A8-A9.S4P - S14						
	1: 2400	-37.77	3: 5150	-36.70	5: 5925	-50.02
	2: 2500	-45.28	4: 5850	-46.50	6: 7125	-38.89

S-Parameter – Isolation for ANT12 to Wi-Fi Antennas (The Worst)



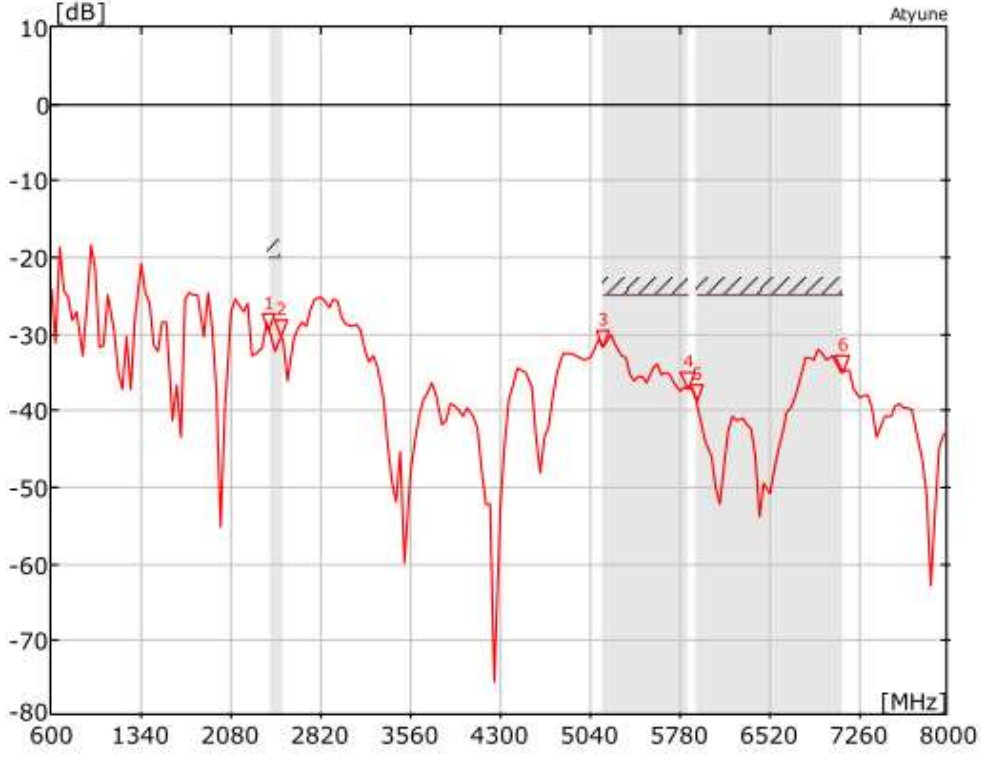
MARKERS:	MHz	dB	MHz	dB	MHz	dB
A12-A4-A5-A6.S4P - S13						
	1: 2400	-23.32	3: 5150	-38.83	5: 5925	-46.21
	2: 2500	-24.77	4: 5850	-43.37	6: 7125	-40.13

S-Parameter – Isolation for ANT13 to Wi-Fi Antennas



MARKERS:	MHz	dB	MHz	dB	MHz	dB
A13-A1-A2-A3.S4P - S13						
	1: 2400	-29.34	3: 5150	-31.48	5: 5925	-38.73
	2: 2500	-30.11	4: 5850	-36.93	6: 7125	-34.86
A13-A1-A2-A3.S4P - S14						
	1: 2400	-37.88	3: 5150	-42.58	5: 5925	-41.51
	2: 2500	-28.75	4: 5850	-46.66	6: 7125	-38.14
A13-A4-A5-A6.S4P - S12						
	1: 2400	-35.99	3: 5150	-43.54	5: 5925	-39.20
	2: 2500	-33.25	4: 5850	-38.25	6: 7125	-41.72
A13-A4-A5-A6.S4P - S13						
	1: 2400	-32.79	3: 5150	-46.62	5: 5925	-48.26
	2: 2500	-31.23	4: 5850	-42.52	6: 7125	-37.92
A13-A4-A5-A6.S4P - S14						
	1: 2400	-35.01	3: 5150	-50.49	5: 5925	-43.48
	2: 2500	-35.01	4: 5850	-43.29	6: 7125	-53.33
A13-A7-A8-A9.S4P - S12						
	1: 2400	-36.35	3: 5150	-41.90	5: 5925	-40.62
	2: 2500	-33.03	4: 5850	-37.89	6: 7125	-46.71
A13-A7-A8-A9.S4P - S13						
	1: 2400	-36.85	3: 5150	-34.43	5: 5925	-32.91
	2: 2500	-30.94	4: 5850	-32.71	6: 7125	-47.37
A13-A7-A8-A9.S4P - S14						
	1: 2400	-38.52	3: 5150	-38.20	5: 5925	-49.66
	2: 2500	-38.28	4: 5850	-45.98	6: 7125	-46.28

S-Parameter – Isolation for ANT13 to Wi-Fi Antennas (The Worst)



MARKERS:	MHz	dB	MHz	dB	MHz	dB
A13-A1-A2-A3.S4P - S13						
	1: 2400	-29.34	3: 5150	-31.48	5: 5925	-38.73
	2: 2500	-30.11	4: 5850	-36.93	6: 7125	-34.86

Summary Table for Antenna Return Loss

Frequency (MHz)	Max (dB)
IOT A1_2G	-14.33
Dual Band A2 - A5_2G	-12.12
Dual Band A2 - A5_5G	-15.13
6G Antenna A6 - A9_6G	-12.47
LTE A10 & A11_LB	-5.44
LTE A10 - A13_MB	-6.96
LTE A10 - A13_HB	-10.16
LTE A10 - A13_UHB	-7.29
LTE A11_GNSS L1	-11.88

Summary Table for Antenna Isolation

Frequency (MHz)	Max (dB)
IOT A1 & Dual Band A2-A5_2G	-20.57
IOT A1 & Dual Band A2-A5_5G	-20.97
IOT A1 & 6G Antenna A6-A9_6G	-20.24
Dual Band A2 - A5_2G	-20.17
Dual Band A2 - A5_5G	-20.39
6G Antenna A6 - A9_6G	-20.14
Dual Band A2 - A5 & 6G Antenna A6 - A9_5G&6G	-23.01
LTE A10 - A13_LB	-9.01
LTE A10 - A13_MB	-12.36
LTE A10 - A13_HB	-14.18
LTE A10 - A13_UHB	-22.13
Dual Band A2-A5 & LTE A10-A13_2G	-22.78
Dual Band A2-A5 & LTE A10-A13_5G	-33.28
IOT A1 & LTE A10 - A13	-19.83
6G Antenna A6 - A9 & LTE A10 - A13	-28.87

Radiated Measurements

All the test including cable loss and the typical cable loss list as follow

Attenuation (dB/1meter)	1GHz	≤1.6
	2GHz	≤2.1
	3GHz	≤2.6
	4GHz	≤3.0
	5GHz	≤3.4
	6GHz	≤3.7

Antenna Peak Gain & Efficiency– 2.4 GHz IOT Antenna

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
2400	2.4	67.1
2410	2.4	67.2
2420	2.0	66.6
2430	2.1	67.3
2440	2.1	68.0
2450	2.5	68.6
2460	2.0	68.1
2470	2.5	68.9
2480	2.2	69.0
2490	2.2	68.6
2500	2.2	67.3
Average	-	67.9

Antenna Realized Efficiency (%) – 2.4 GHz Wi-Fi Antennas

Frequency (MHz)	Ant2_2G4 (%)	Ant3_2G4 (%)	Ant4_2G4 (%)	Ant5_2G4 (%)
2400	67.2	69.8	72.6	73.5
2410	68.9	70.1	72.2	74.1
2420	68.9	69.8	70.7	72.5
2430	70.2	69.5	71.0	72.2
2440	72.2	70.5	71.5	72.6
2450	71.9	70.7	71.0	71.3
2460	71.4	70.4	70.6	70.7
2470	73.1	70.9	70.3	71.8
2480	72.6	71.0	69.9	71.0
2490	73.1	71.0	69.7	71.1
2500	72.4	71.1	69.1	71.5
Average	71.1	70.4	70.8	72.0

Antenna Realized Efficiency (%) – 5 GHz Wi-Fi Antennas

Frequency (MHz)	Ant2_5G (%)	Ant3_5G (%)	Ant4_5G (%)	Ant5_5G (%)
5150	70.9	70.5	71.2	71.2
5200	72.1	72.4	73.5	72.5
5300	71.3	70.6	72.5	72.3
5400	72.0	70.7	72.8	71.4
5500	73.6	70.9	72.1	69.8
5600	72.4	68.6	69.4	71.5
5700	72.5	68.8	68.9	71.8
5800	72.9	70.4	70.2	73.2
5850	72.3	70.1	69.2	72.2
Average	72.2	70.3	71.1	71.8

Antenna Realized Efficiency (%) – 6 GHz Wi-Fi Antennas

Frequency (MHz)	Ant6_6G (%)	Ant7_6G (%)	Ant8_6G (%)	Ant9_6G (%)
5925	65.2	70.1	68.5	64.2
6000	67.3	70.2	70.0	67.2
6100	68.5	72.4	69.6	69.7
6200	69.6	71.0	70.2	70.1
6300	69.0	71.9	69.7	68.7
6400	69.8	71.0	70.7	69.5
6500	70.5	70.5	70.2	70.3
6600	69.7	69.3	70.0	70.0
6700	70.2	68.6	68.0	67.8
6800	71.1	69.5	68.8	69.7
6900	70.6	70.3	68.6	71.0
7125	65.9	72.5	68.0	66.9
Average	68.9	70.6	69.4	68.8

Antenna Peak Realized Gain – 2.4 GHz Wi-Fi Antennas

Frequency (MHz)	Ant2_2G4 (dBi)	Ant3_2G4 (dBi)	Ant4_2G4 (dBi)	Ant5_2G4 (dBi)
2400	2.2	3.1	5.1	4.2
2410	2.4	3.3	5.0	4.4
2420	2.4	3.3	5.0	3.8
2430	2.5	3.3	5.1	4.0
2440	2.8	3.4	5.1	3.9
2450	2.7	3.5	5.2	3.5
2460	2.9	3.6	5.2	3.1
2470	3.0	3.7	5.2	3.2
2480	3.2	3.7	5.1	2.7
2490	3.3	3.7	4.9	2.8
2500	3.4	3.6	4.7	2.8

Antenna Peak Realized Gain – 5 GHz Wi-Fi Antennas

Frequency (MHz)	Ant2_5G (dBi)	Ant3_5G (dBi)	Ant4_5G (dBi)	Ant5_5G (dBi)
5150	3.8	4.0	5.3	3.6
5200	3.9	4.9	5.2	4.2
5300	4.0	5.2	4.8	4.9
5400	4.0	4.6	4.3	4.4
5500	4.0	4.2	5.3	3.9
5600	4.1	4.6	5.5	4.6
5700	4.1	4.9	5.7	4.4
5800	4.0	5.5	5.9	4.4
5850	4.2	5.4	5.8	4.5

Antenna Peak Realized Gain – 6 GHz Wi-Fi Antennas

Frequency (MHz)	Ant6_6G (dBi)	Ant7_6G (dBi)	Ant8_6G (dBi)	Ant9_6G (dBi)
5925	4.0	4.8	4.2	5.7
6000	4.6	4.7	4.2	5.8
6100	4.8	4.9	4.1	5.5
6200	4.4	4.5	3.8	5.2
6300	4.8	4.8	3.8	4.5
6400	4.8	4.6	4.0	4.7
6500	5.0	5.1	4.3	4.8
6600	4.8	4.6	4.6	4.8
6700	4.7	4.7	4.5	4.9
6800	4.8	4.6	3.7	5.0
6900	4.6	4.7	4.1	5.1
7125	5.3	5.0	5.4	5.0

Antenna Realized Efficiency & Peak Gain – Additional LTE Antennas

Frequency (MHz)	Ant10_LTE (%)	Ant11_LTE (%)
617	55.1	36.2
650	53.8	38.9
700	55.4	56.8
720	48.3	59.6
750	47.6	58.2
800	37.2	38.1
820	38.4	35.9
850	43.4	39.7
894	39.4	41.5
Average	46.2	45.0

Frequency (MHz)	Ant10_LTE (dBi)	Ant11_LTE (dBi)
617	0.9	-1.7
650	1.3	-0.9
700	1.7	0.9
720	1.3	1.1
750	1.1	1.7
800	-2.1	0.0
820	-2.1	-2.3
850	0.4	-0.2
894	0.0	0.4

Antenna Realized Efficiency (%) – Additional LTE Antennas

Frequency (MHz)	Ant10_LTE (%)	Ant11_LTE (%)	Ant12_LTE (%)	Ant13_LTE (%)
1695	60.4	59.0	57.4	63.4
1710	59.6	60.0	57.8	63.8
1750	58.7	63.7	58.8	61.1
1800	54.5	63.3	56.7	61.5
1850	54.5	58.6	54.1	60.3
1900	49.4	52.8	51.9	59.5
1950	46.3	57.4	49.5	61.4
2000	45.3	65.0	51.5	65.9
2050	48.3	64.7	50.3	61.5
2100	49.5	56.0	43.3	55.9
2150	45.9	51.5	44.5	51.5
2170	45.6	52.3	50.2	55.3
2300	54.8	52.4	55.1	60.3
2350	54.2	55.0	59.1	61.7
2400	50.3	57.7	61.1	62.7
2450	48.8	59.1	62.5	61.0
2500	52.3	58.7	64.9	56.7
2550	53.4	55.6	63.6	52.8
2600	58.1	52.5	63.6	59.6
2650	58.7	47.0	63.8	63.6
2690	57.0	44.3	66.0	65.8
Average	52.6	56.5	56.5	60.3

Antenna Realized Efficiency (%) – Additional LTE Antennas

Frequency (MHz)	Ant10_LTE (%)	Ant11_LTE (%)	Ant12_LTE (%)	Ant13_LTE (%)
3300	44.4	59.2	68.5	60.9
3400	49.8	56.6	68.5	64.0
3500	60.4	60.3	68.9	68.1
3600	58.0	56.9	65.5	69.3
3700	53.6	55.0	65.4	69.5
3800	55.9	47.2	69.4	70.5
3900	60.5	51.8	73.2	69.4
4000	56.3	53.5	70.0	66.4
4100	55.8	50.9	68.6	65.0
4200	52.9	49.5	63.7	62.8
Average	54.7	54.1	68.2	66.6

Antenna Peak Realized Gain – Additional LTE Antennas

Frequency (MHz)	Ant10_LTE (dBi)	Ant11_LTE (dBi)	Ant12_LTE (dBi)	Ant13_LTE (dBi)
1695	2.0	5.3	2.3	4.0
1710	2.2	5.3	2.6	3.9
1750	3.4	5.0	2.4	3.1
1800	3.3	5.0	2.9	3.4
1850	3.3	4.3	2.5	3.9
1900	3.7	3.2	3.4	3.6
1950	3.5	3.9	3.8	4.2
2000	3.4	6.3	4.0	3.7
2050	4.0	6.6	3.1	4.5
2100	4.7	5.5	2.5	4.6
2150	3.9	4.3	2.7	3.7
2170	3.4	3.6	2.8	3.4
2300	4.8	4.9	3.0	4.0
2350	5.4	5.5	3.4	3.7
2400	4.8	5.5	3.8	4.0
2450	5.0	5.1	4.0	3.6
2500	5.6	4.6	4.4	3.6
2550	5.2	3.9	4.3	4.5
2600	5.5	3.7	4.7	4.7
2650	5.4	2.5	4.9	4.3
2690	5.2	1.6	4.6	4.4

Antenna Peak Realized Gain – Additional LTE Antennas

Frequency (MHz)	Ant10_LTE (dBi)	Ant11_LTE (dBi)	Ant12_LTE (dBi)	Ant13_LTE (dBi)
3300	2.2	4.3	6.3	6.1
3400	3.5	3.7	5.6	5.5
3500	4.1	4.6	6.4	5.8
3600	3.7	4.3	5.4	5.8
3700	2.8	4.2	5.7	5.7
3800	3.9	3.3	5.5	6.2
3900	4.4	2.9	5.5	6.1
4000	4.6	2.6	4.9	5.8
4100	4.8	4.1	4.7	5.9
4200	4.6	3.5	4.8	5.5

Antenna Peak Gain & Efficiency– GNSS Antenna

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
1559	3.5	58.9
1575	4.5	66.8
1580	4.5	65.8
1590	4.6	65.7
1607	4.6	64.9
Average	-	64.4

Summary Antenna Efficiency & Peak Gain – Wi-Fi Antennas

Band Group	Min (%)	Max (%)	Avg (%)
Ant1_IOT	66.6	69.0	67.9
Ant2_2G4	67.2	73.1	71.1
Ant3_2G4	69.5	71.1	70.4
Ant4_2G4	69.1	72.6	70.8
Ant5_2G4	70.7	74.1	72.0
Ant2_5G	70.9	73.6	72.2
Ant3_5G	68.6	72.4	70.3
Ant4_5G	68.9	73.5	71.1
Ant5_5G	69.8	73.2	71.8
Ant6_6G	65.2	71.1	68.9
Ant7_6G	68.6	72.5	70.6
Ant8_6G	68.0	70.7	69.4
Ant9_6G	64.2	71.0	68.8

Band Group	Peak Gain (dBi)
Ant1_IOT	2.5
Ant2_2G4	3.4
Ant3_2G4	3.7
Ant4_2G4	5.2
Ant5_2G4	4.4
Ant2_5G	4.2
Ant3_5G	5.5
Ant4_5G	5.9
Ant5_5G	4.9
Ant6_6G	5.3
Ant7_6G	5.1
Ant8_6G	5.4
Ant9_6G	5.8

Summary Antenna Efficiency & Peak Gain – LTE Antennas

Efficiency	Ant10_LTE			Ant11_LTE			Ant12_LTE			Ant13_LTE		
Band Group	Min (%)	Max (%)	Avg (%)	Min (%)	Max (%)	Avg (%)	Min (%)	Max (%)	Avg (%)	Min (%)	Max (%)	Avg (%)
LB	37.2	55.4	46.2	35.9	59.6	45.0	-	-	-	-	-	-
MLB	-	-	-	58.9	66.8	64.4	-	-	-	-	-	-
MB	45.3	60.4	51.5	51.5	65.0	58.7	43.3	58.8	52.2	51.5	65.9	60.1
HB	48.8	58.7	54.2	44.3	59.1	53.6	55.1	66.0	62.2	52.8	65.8	60.5
UHB	44.4	60.5	54.7	47.2	60.3	54.1	63.7	73.2	68.2	60.9	70.5	66.6

Peak Gain	Ant10_LTE (dBi)	Ant11_LTE (dBi)	Ant12_LTE (dBi)	Ant13_LTE (dBi)
LB	1.7	1.7	-	-
MLB	-	4.6	-	-
MB	4.7	6.6	4.0	4.6
HB	5.6	5.5	4.9	4.7
UHB	4.8	4.6	6.4	6.2

Antenna Front/Back Hemispheric Coverage Ratios

Frequency (MHz)	Ant2 (dB)	Ant3 (dB)	Ant4 (dB)	Ant5 (dB)
2400	-0.16	-0.99	3.88	0.41
2440	-0.10	-1.28	3.44	-0.03
2480	-0.88	-1.08	2.75	-0.75
5150	-0.51	-1.43	0.78	-1.17
5500	-1.10	-0.50	2.73	-1.93
5850	-1.07	-0.19	2.37	-1.40

Frequency (MHz)	Ant6 (dB)	Ant7 (dB)	Ant8 (dB)	Ant9 (dB)
5925	-0.26	3.05	0.74	-0.06
6500	-0.93	1.91	0.05	0.63
7125	-0.38	2.00	-0.36	0.28

Frequency (MHz)	Ant10 (dB)	Ant11 (dB)	Ant12 (dB)	Ant13 (dB)
650	3.90	1.07	-	-
800	1.27	3.66	-	-
894	3.24	0.73	-	-
1695	1.46	7.14	-0.78	-0.10
2000	6.36	5.06	-4.77	-3.42
2450	6.08	5.42	-5.82	-2.74
3800	4.65	5.07	-6.31	-7.36

Antenna Peak Realized Gain (Max-Min) – Wi-Fi Antennas

2440MHz	Uncorrelated	Ant2_2G4	Ant3_2G4	Ant4_2G4	Ant5_2G4
XY	4.90	9.58	12.87	11.69	16.63
XZ (S to S)	8.99	15.48	17.71	19.54	9.25
YZ (F to B)	8.30	17.67	15.37	17.86	14.42

5500MHz	Uncorrelated	Ant2_5G	Ant3_5G	Ant4_5G	Ant5_5G
XY	3.81	5.60	15.98	16.70	12.65
XZ (S to S)	11.05	23.61	15.32	16.39	15.75
YZ (F to B)	11.24	18.15	15.97	18.73	14.22

6500MHz	Uncorrelated	Ant6_6G	Ant7_6G	Ant8_6G	Ant9_6G
XY	5.71	12.28	16.30	11.85	13.22
XZ (S to S)	15.68	21.02	19.75	15.89	19.06
YZ (F to B)	16.81	23.38	23.26	18.58	20.20

Antenna Peak Realized Gain (Max-Min) – LTE Antennas

800MHz	Uncorrelated	Ant10_LTE	Ant11_LTE
XY	5.59	6.16	11.31
XZ (S to S)	5.30	7.40	9.25
YZ (F to B)	6.50	9.92	7.75

2600MHz	Uncorrelated	Ant10_LTE	Ant11_LTE	Ant12_LTE	Ant13_LTE
XY	4.35	17.75	9.64	18.27	8.15
XZ (S to S)	10.99	16.24	17.40	15.15	13.61
YZ (F to B)	13.35	21.97	19.66	19.51	21.78

3800MHz	Uncorrelated	Ant10_LTE	Ant11_LTE	Ant12_LTE	Ant13_LTE
XY	5.73	19.93	13.09	24.07	28.86
XZ (S to S)	16.40	22.48	15.45	25.65	22.33
YZ (F to B)	14.79	23.07	18.28	22.81	23.84

Envelope Correlation Coefficient – 2.4 & 5 GHz Wi-Fi Antennas

Frequency (MHz)	Ant2_Ant3	Ant2_Ant4	Ant2_Ant5	Ant3_Ant4	Ant3_Ant5	Ant4_Ant5
2400	0.043	0.125	0.060	0.156	0.056	0.071
2410	0.038	0.136	0.053	0.162	0.029	0.054
2420	0.033	0.097	0.049	0.171	0.043	0.030
2430	0.032	0.088	0.043	0.172	0.031	0.032
2440	0.032	0.086	0.041	0.166	0.040	0.033
2450	0.030	0.082	0.036	0.160	0.078	0.025
2460	0.027	0.059	0.025	0.150	0.067	0.013
2470	0.025	0.059	0.024	0.136	0.059	0.021
2480	0.023	0.045	0.018	0.129	0.065	0.011
2490	0.020	0.041	0.018	0.124	0.069	0.012
2500	0.020	0.038	0.018	0.124	0.066	0.015
5150	0.075	0.113	0.043	0.112	0.043	0.029
5200	0.080	0.098	0.042	0.108	0.050	0.028
5300	0.085	0.098	0.049	0.092	0.037	0.025
5400	0.080	0.091	0.036	0.098	0.058	0.023
5500	0.088	0.088	0.037	0.133	0.051	0.022
5600	0.082	0.099	0.037	0.132	0.040	0.021
5700	0.071	0.096	0.034	0.111	0.036	0.021
5800	0.075	0.103	0.031	0.092	0.045	0.028
5850	0.075	0.107	0.035	0.092	0.052	0.029

Envelope Correlation Coefficient – 6 GHz Wi-Fi Antennas

Frequency (MHz)	Ant6_Ant7	Ant6_Ant8	Ant6_Ant9	Ant7_Ant8	Ant7_Ant9	Ant8_Ant9
5925	0.061	0.082	0.064	0.071	0.133	0.019
6000	0.043	0.069	0.064	0.078	0.145	0.023
6100	0.033	0.069	0.053	0.074	0.142	0.027
6200	0.045	0.088	0.063	0.066	0.129	0.035
6300	0.042	0.077	0.072	0.055	0.124	0.033
6400	0.040	0.084	0.072	0.056	0.127	0.032
6500	0.037	0.077	0.074	0.058	0.123	0.033
6600	0.036	0.093	0.063	0.072	0.123	0.036
6700	0.041	0.088	0.055	0.072	0.130	0.031
6800	0.035	0.076	0.045	0.076	0.131	0.023
6900	0.032	0.069	0.047	0.105	0.124	0.022
7125	0.040	0.081	0.054	0.121	0.093	0.028

Envelope Correlation Coefficient – Additional LTE Antennas

Frequency (MHz)	Ant10_Ant11
617	0.316
650	0.178
700	0.359
720	0.105
750	0.173
800	0.197
820	0.083
850	0.211
894	0.162

Envelope Correlation Coefficient – Additional LTE Antennas

Frequency (MHz)	Ant10_Ant11	Ant10_Ant12	Ant10_Ant13	Ant11_Ant12	Ant11_Ant13	Ant12_Ant13
1695	0.097	0.088	0.112	0.021	0.062	0.261
1710	0.082	0.076	0.106	0.030	0.101	0.279
1750	0.086	0.049	0.086	0.051	0.124	0.237
1800	0.111	0.028	0.094	0.049	0.144	0.175
1850	0.110	0.020	0.217	0.048	0.158	0.111
1900	0.121	0.024	0.216	0.056	0.112	0.079
1950	0.128	0.044	0.177	0.039	0.059	0.123
2000	0.142	0.076	0.169	0.058	0.043	0.070
2050	0.146	0.090	0.181	0.059	0.048	0.063
2100	0.135	0.090	0.135	0.072	0.061	0.085
2150	0.090	0.089	0.095	0.041	0.093	0.211
2170	0.101	0.110	0.081	0.046	0.109	0.156
2300	0.136	0.098	0.066	0.026	0.038	0.133
2350	0.123	0.065	0.108	0.022	0.046	0.132
2400	0.171	0.050	0.162	0.020	0.059	0.104
2450	0.191	0.045	0.096	0.023	0.084	0.088
2500	0.179	0.057	0.085	0.023	0.097	0.125
2550	0.193	0.068	0.075	0.040	0.088	0.122
2600	0.186	0.061	0.040	0.066	0.104	0.132
2650	0.131	0.051	0.036	0.106	0.140	0.128
2690	0.146	0.076	0.031	0.096	0.163	0.139

Envelope Correlation Coefficient – Additional LTE Antennas

Frequency (MHz)	Ant10_Ant11	Ant10_Ant12	Ant10_Ant13	Ant11_Ant12	Ant11_Ant13	Ant12_Ant13
3300	0.250	0.101	0.079	0.046	0.133	0.084
3400	0.209	0.066	0.057	0.031	0.077	0.065
3500	0.224	0.090	0.049	0.035	0.105	0.027
3600	0.246	0.110	0.037	0.029	0.112	0.024
3700	0.225	0.143	0.039	0.036	0.136	0.017
3800	0.198	0.161	0.026	0.044	0.084	0.005
3900	0.200	0.122	0.028	0.033	0.119	0.002
4000	0.261	0.095	0.042	0.028	0.113	0.003
4100	0.223	0.088	0.056	0.030	0.137	0.006
4200	0.273	0.065	0.060	0.047	0.112	0.003

Antenna Uncorrelated Gain – Additional LTE Antennas

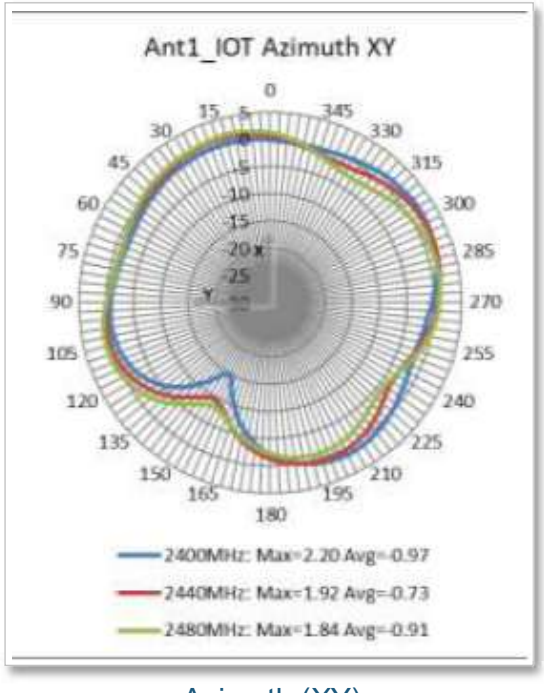
Frequency (MHz)	Uncorrelated Gain (dBi)
617	-0.3
650	0.2
700	1.3
720	0.8
750	0.3
800	-1.7
820	-2.8
850	-0.8
894	-1.0

Frequency (MHz)	Uncorrelated Gain (dBi)
1695	1.3
1710	1.3
1750	1.6
1800	1.2
1850	0.9
1900	1.0
1950	1.2
2000	1.5
2050	1.7
2100	0.9
2150	0.4
2170	0.4
2300	1.2
2350	1.8
2400	2.3
2450	1.9
2500	2.3
2550	2.0
2600	2.2
2650	1.5
2690	1.1

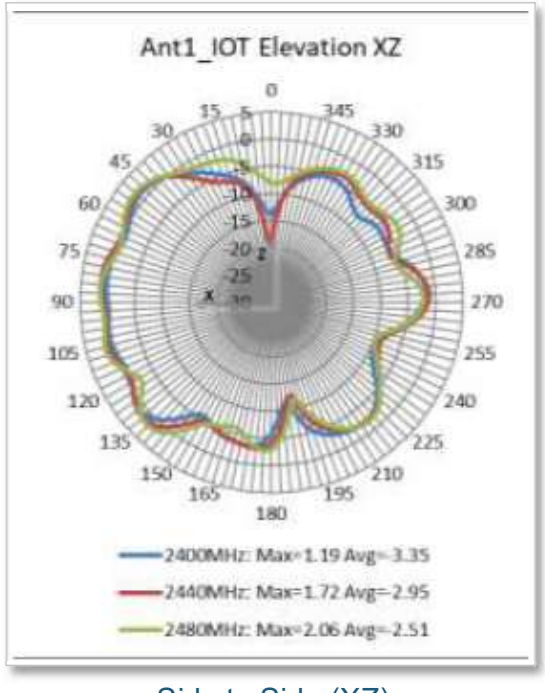
Frequency (MHz)	Uncorrelated Gain (dBi)
3300	2.0
3400	2.0
3500	3.2
3600	2.6
3700	2.1
3800	2.1
3900	1.8
4000	1.6
4100	1.5
4200	0.9

Radiation Patterns

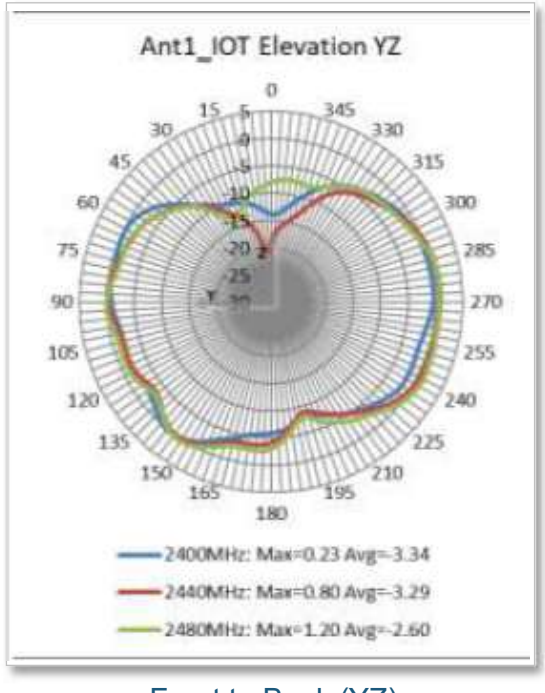
Total Gain Patterns: Ant1_IOT



Azimuth (XY)

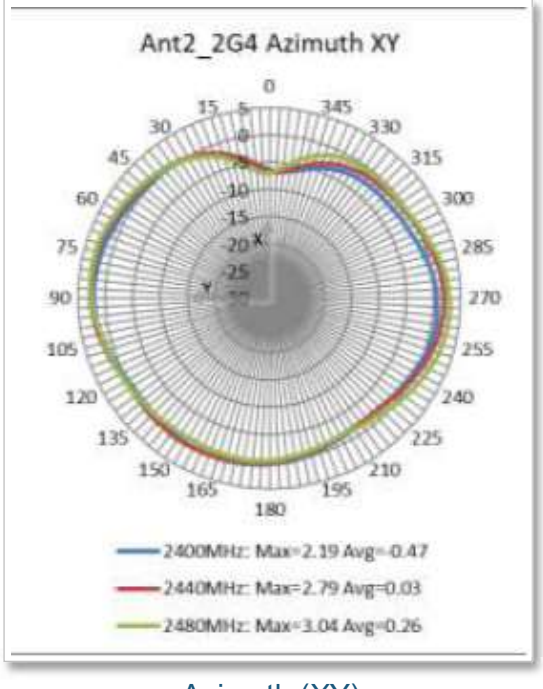


Side to Side (XZ)

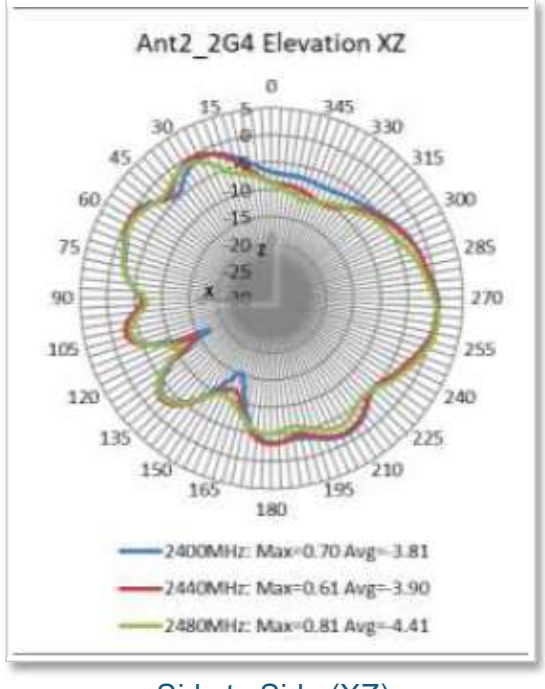


Front to Back (YZ)

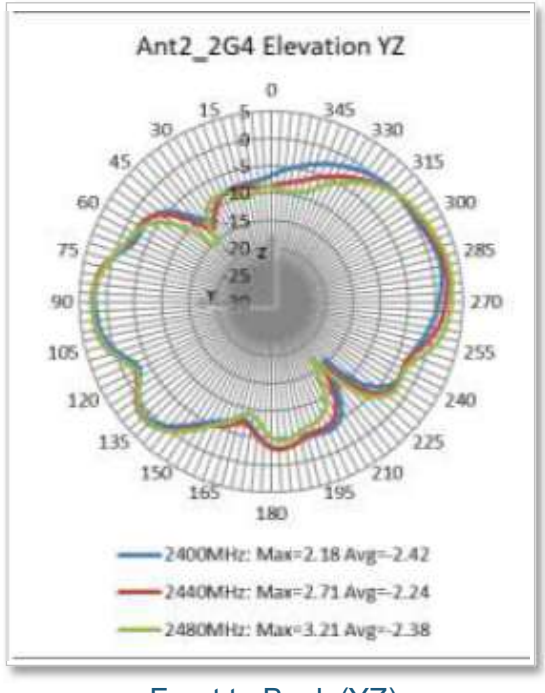
Total Gain Patterns: Ant2_2G4



Azimuth (XY)

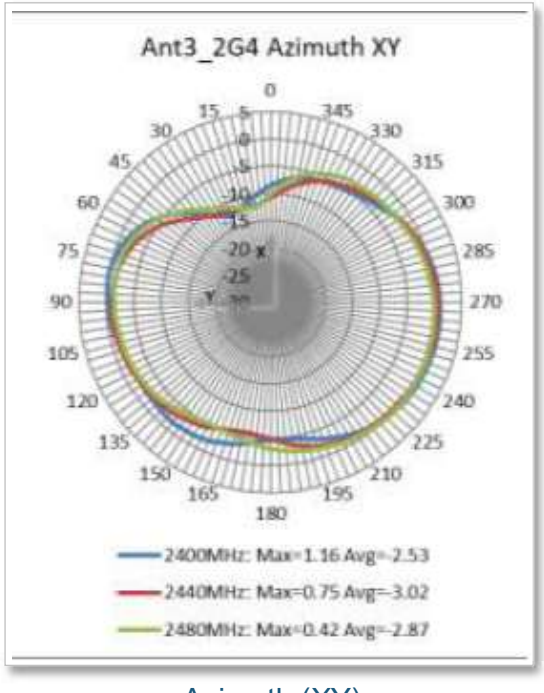


Side to Side (XZ)

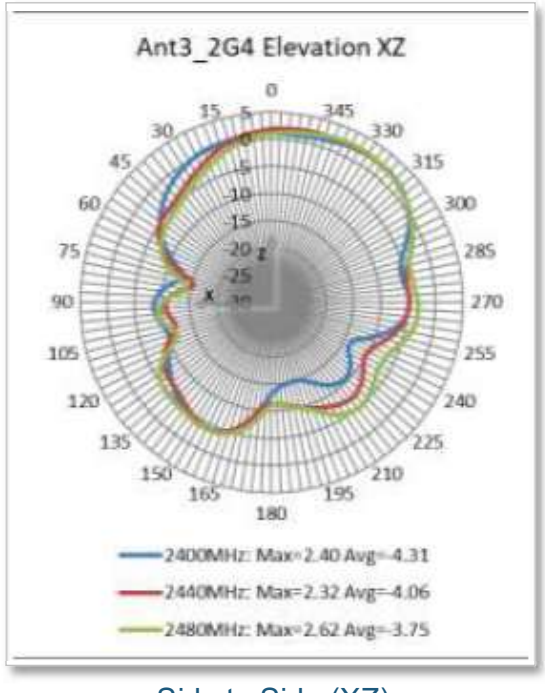


Front to Back (YZ)

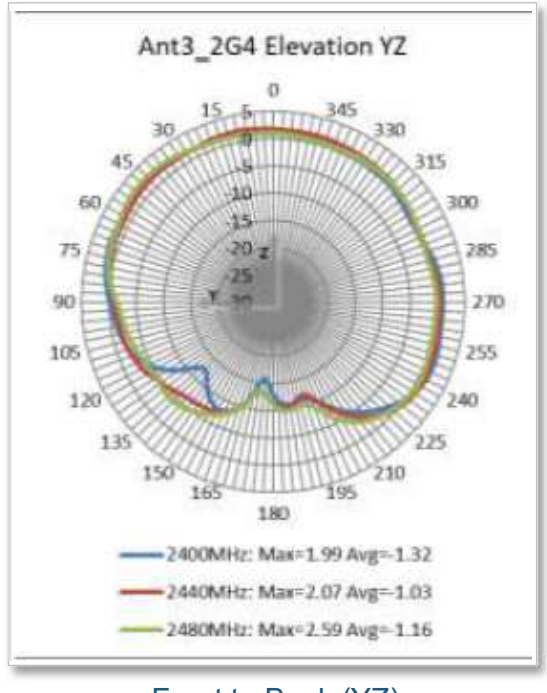
Total Gain Patterns: Ant3_2G4



Azimuth (XY)

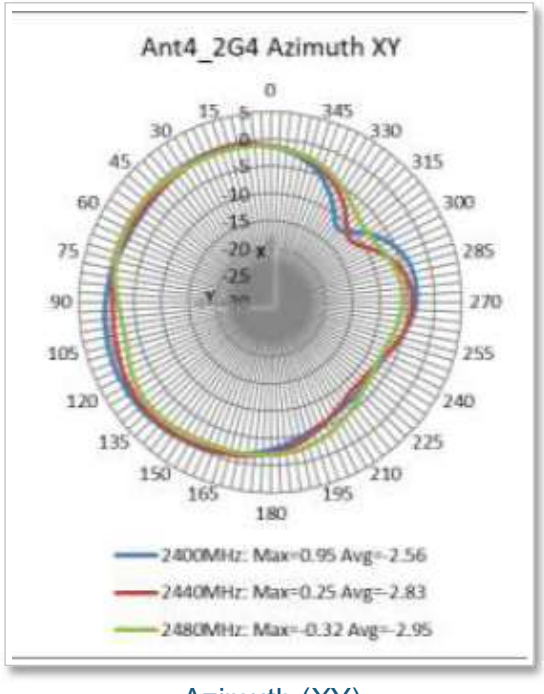


Side to Side (XZ)

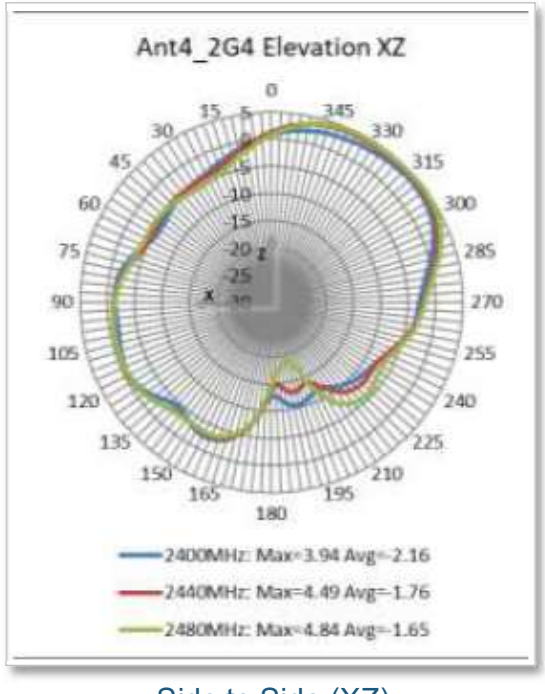


Front to Back (YZ)

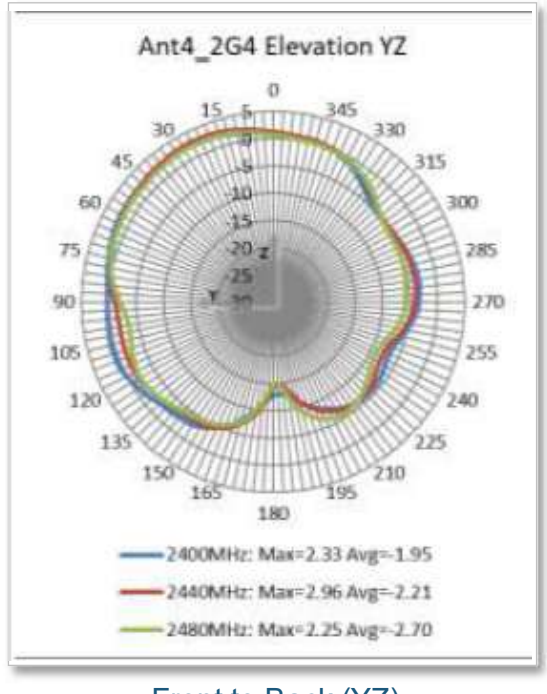
Total Gain Patterns: Ant4_2G4



Azimuth (XY)

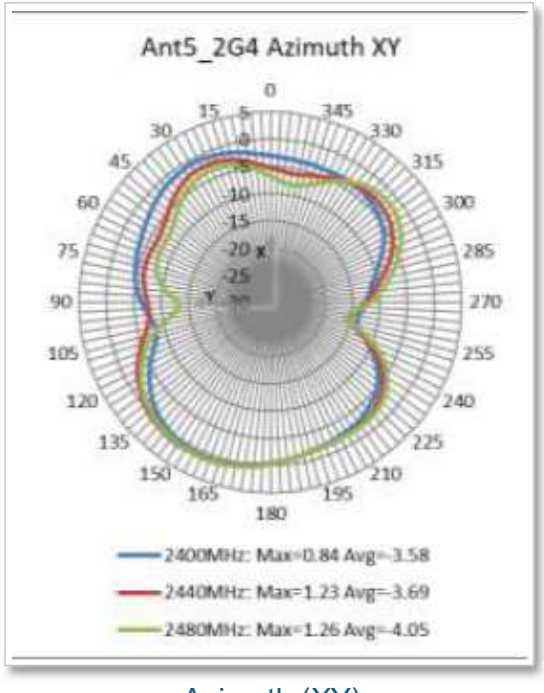


Side to Side (XZ)

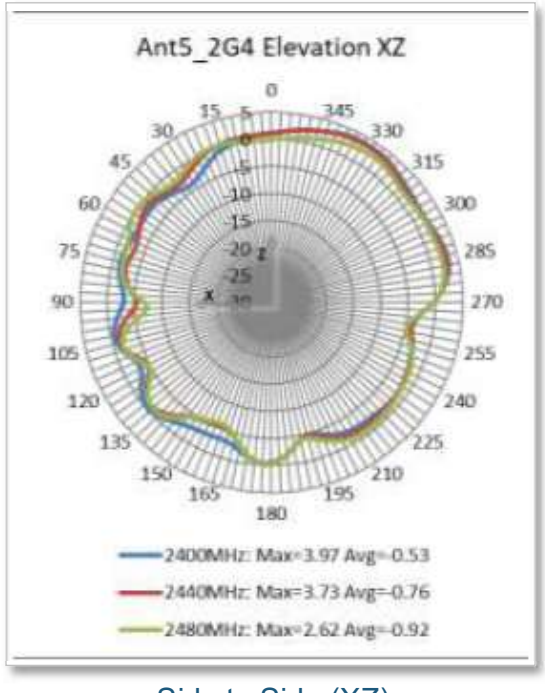


Front to Back (YZ)

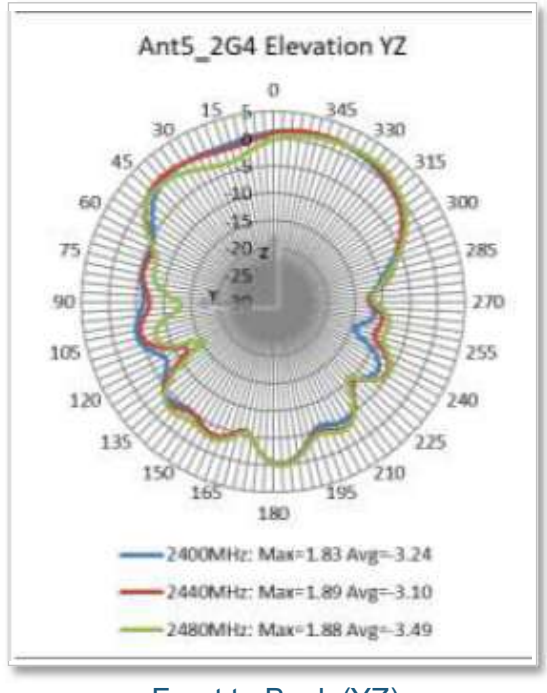
Total Gain Patterns: Ant5_2G4



Azimuth (XY)

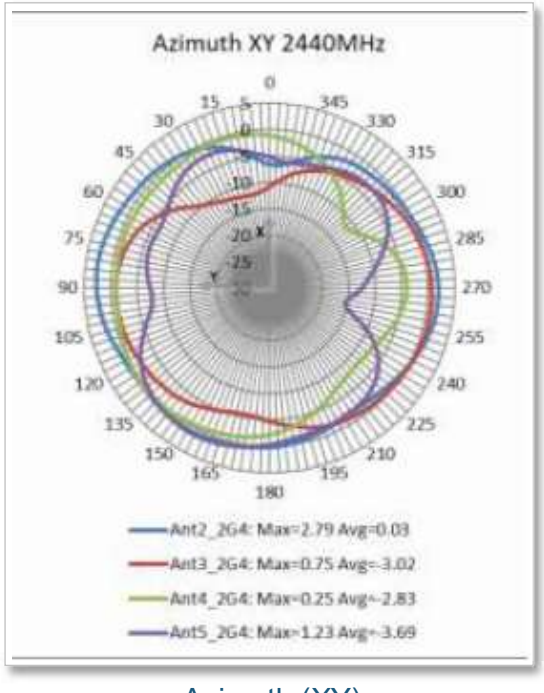


Side to Side (XZ)

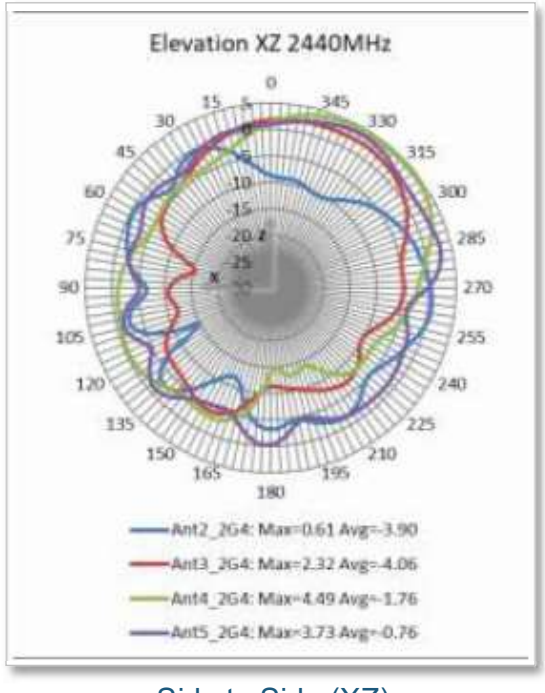


Front to Back (YZ)

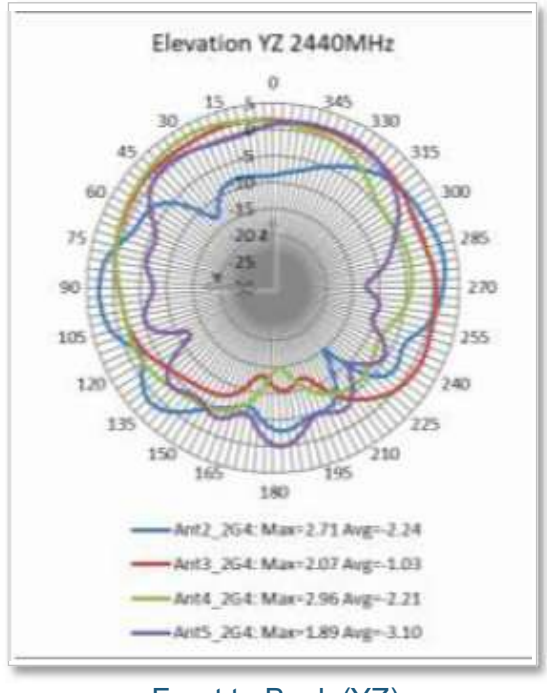
Coverage Total Gain Patterns: Wi-Fi Antennas at 2440MHz



Azimuth (XY)

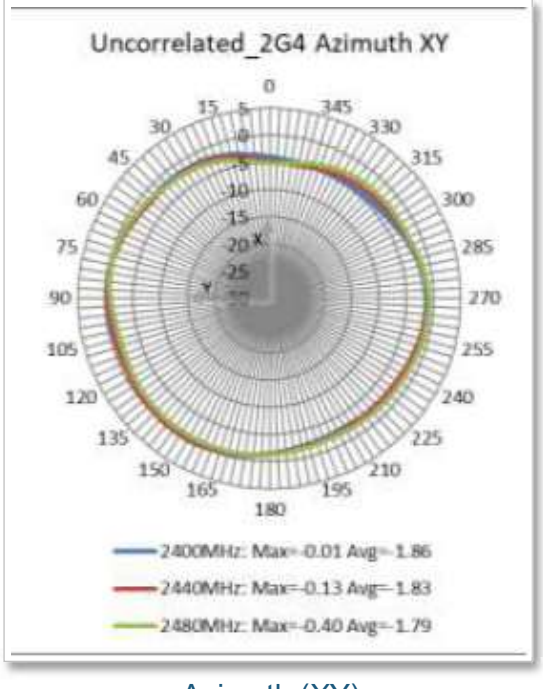


Side to Side (XZ)

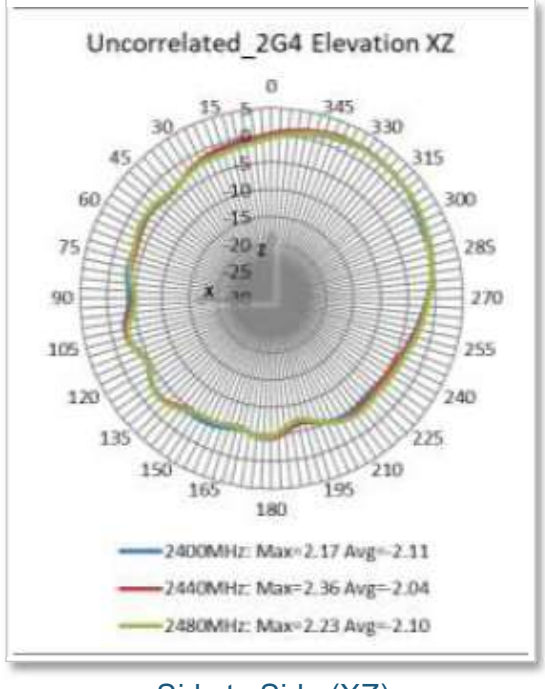


Front to Back (YZ)

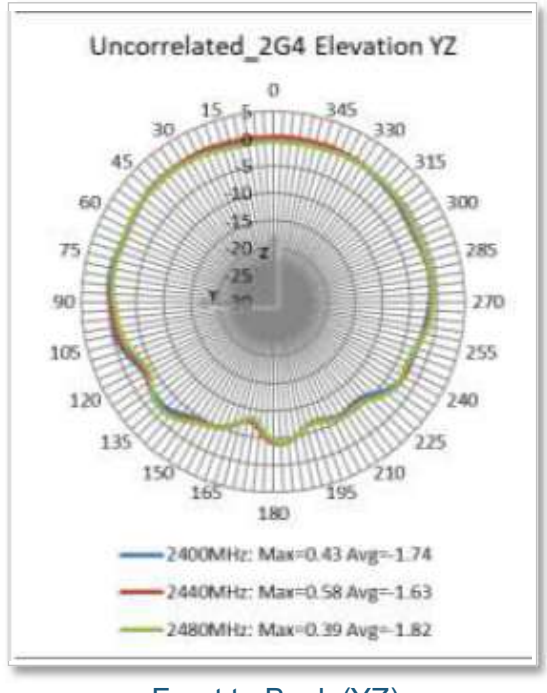
Uncorrelated Gain Patterns: Wi-Fi Antennas at 2G4



Azimuth (XY)

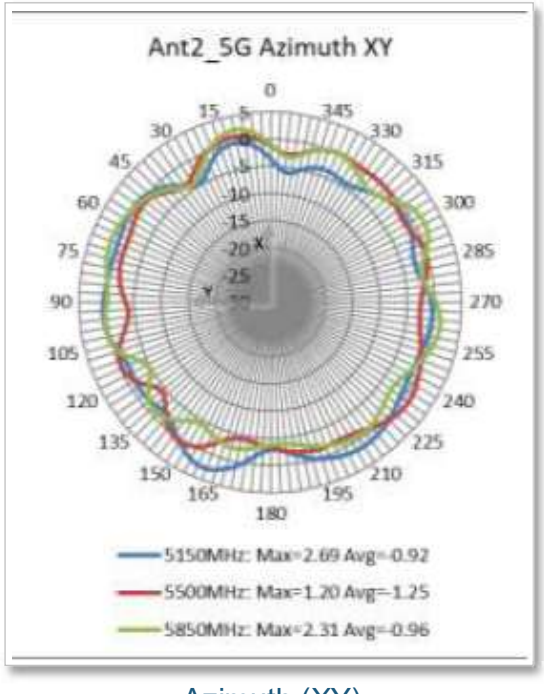


Side to Side (XZ)

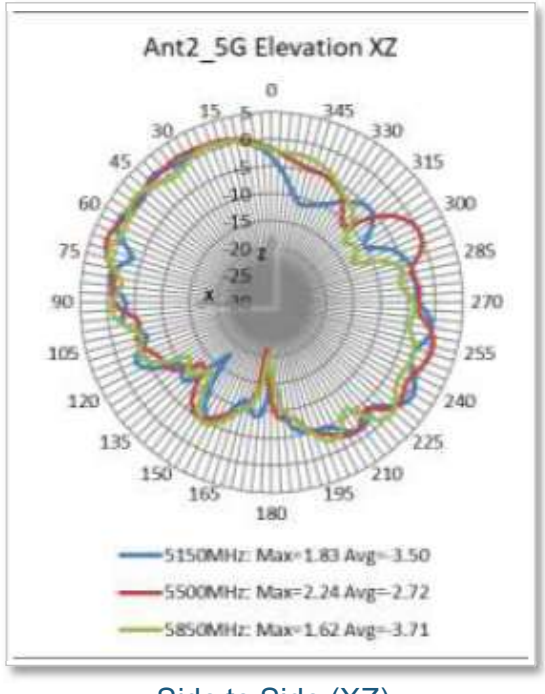


Front to Back (YZ)

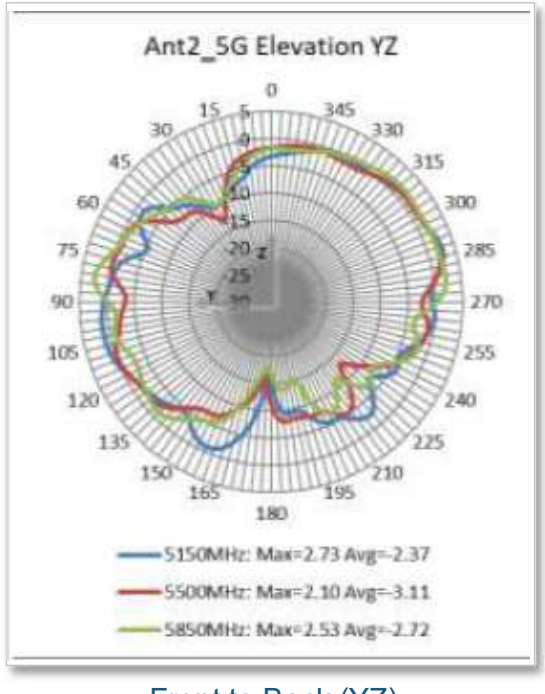
Total Gain Patterns: Ant2_5G



Azimuth (XY)

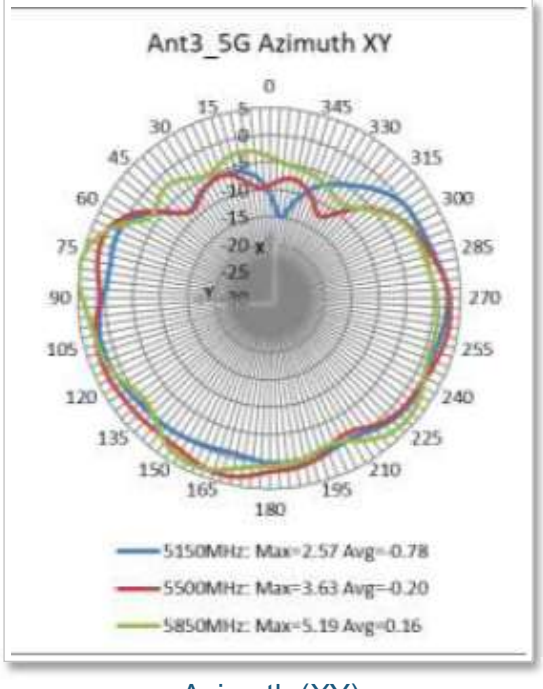


Side to Side (XZ)

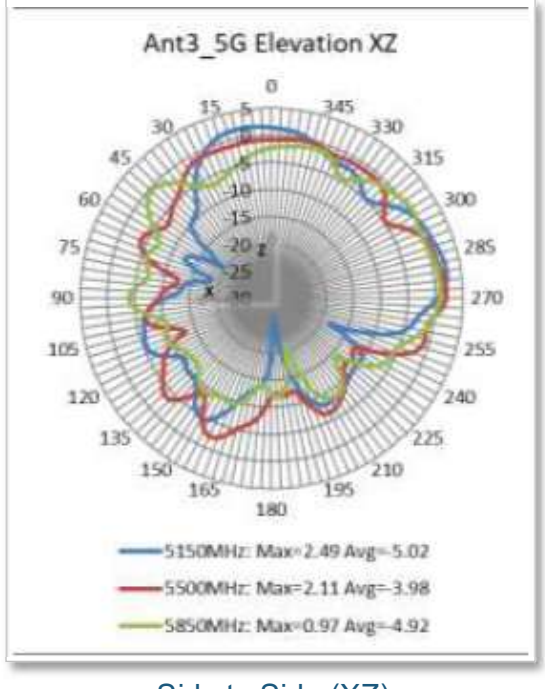


Front to Back (YZ)

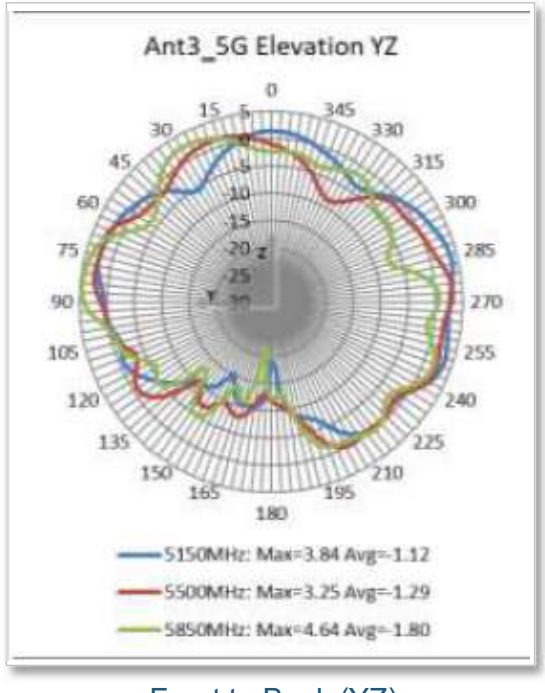
Total Gain Patterns: Ant3_5G



Azimuth (XY)

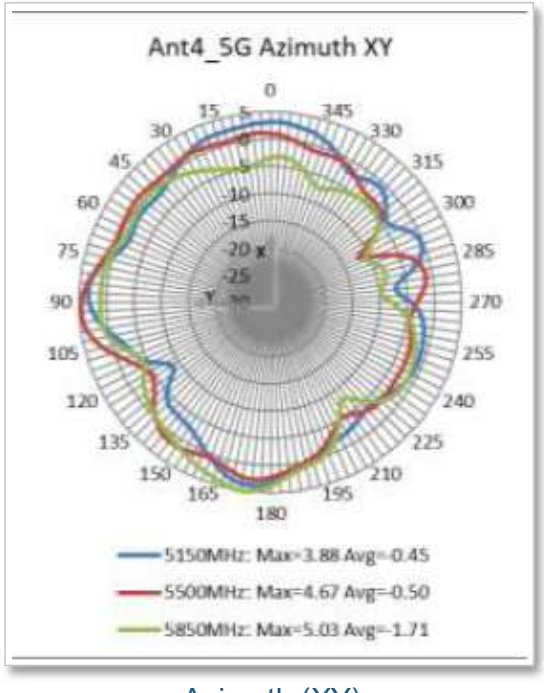


Side to Side (XZ)

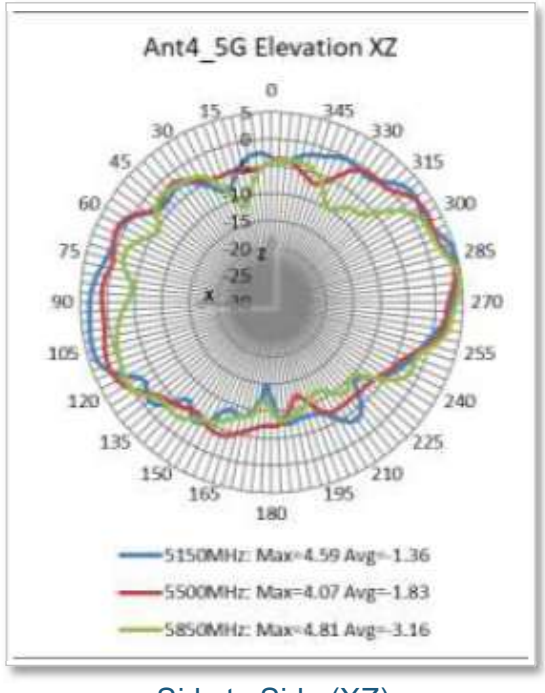


Front to Back (YZ)

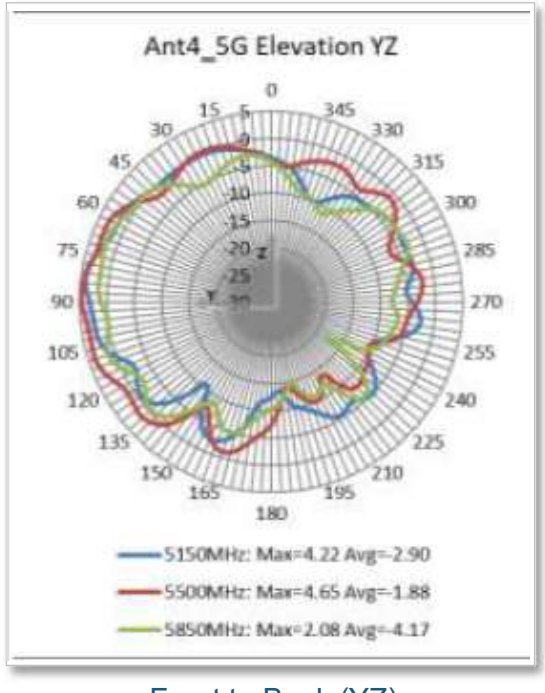
Total Gain Patterns: Ant4_5G



Azimuth (XY)

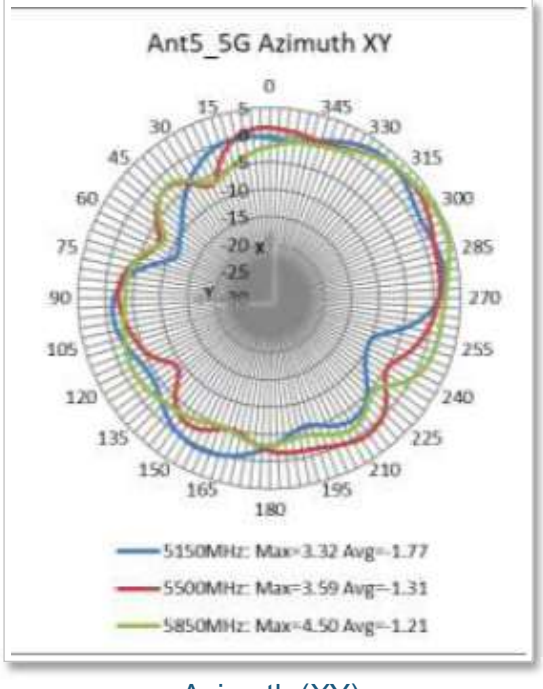


Side to Side (XZ)

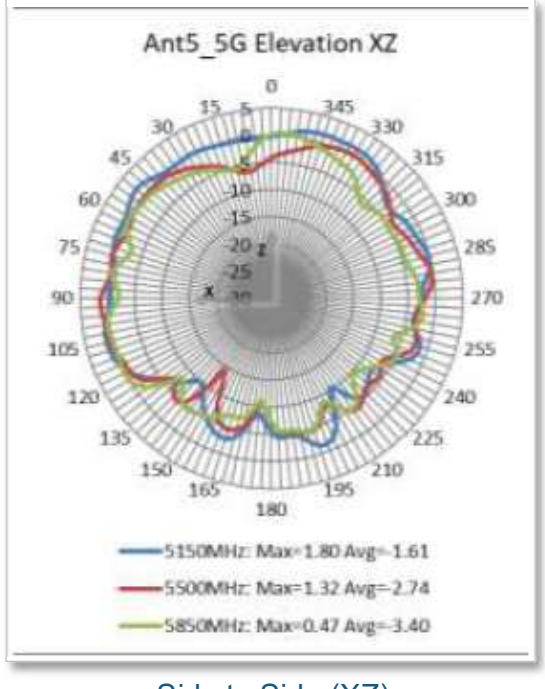


Front to Back (YZ)

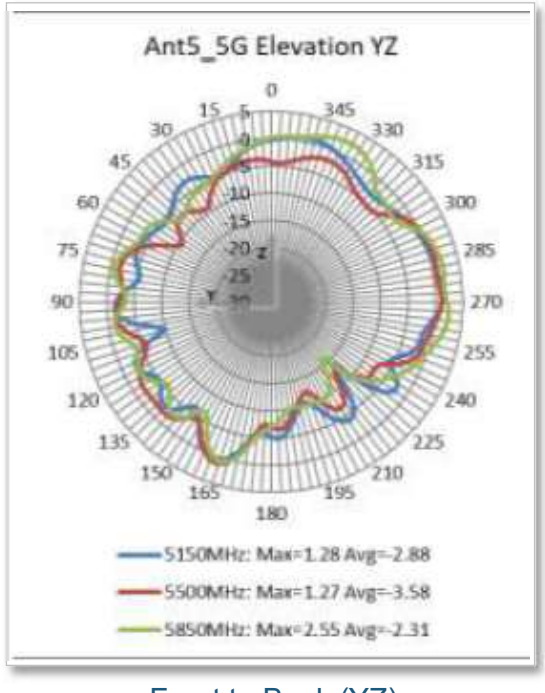
Total Gain Patterns: Ant5_5G



Azimuth (XY)

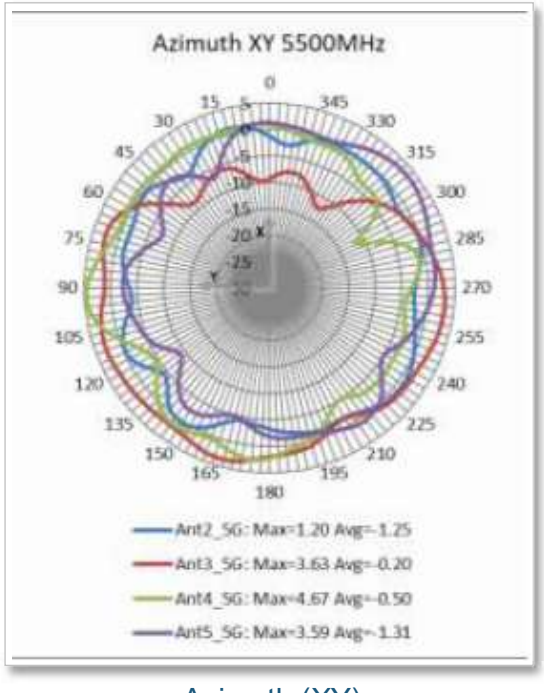


Side to Side (XZ)

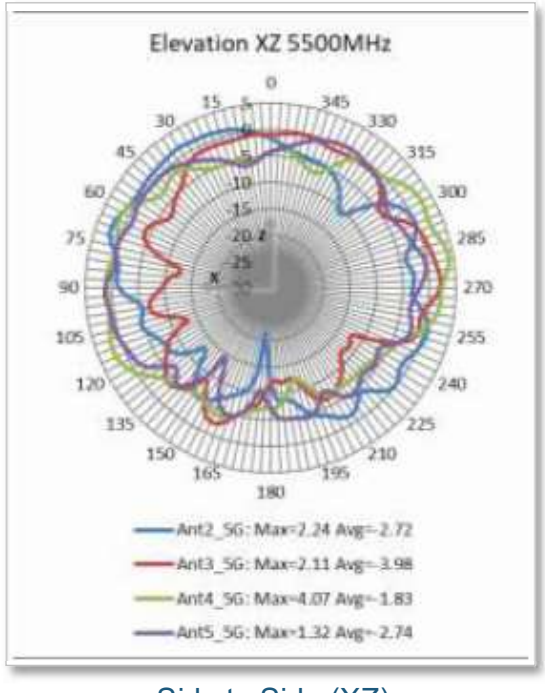


Front to Back (YZ)

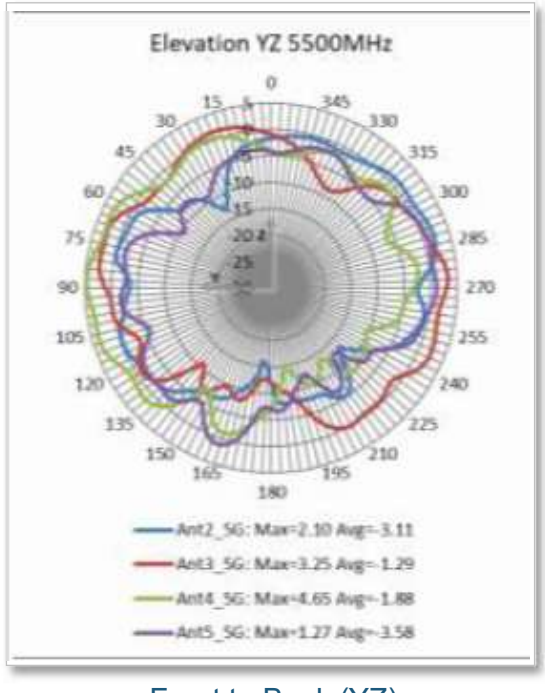
Coverage Total Gain Patterns: Wi-Fi Antennas at 5500MHz



Azimuth (XY)

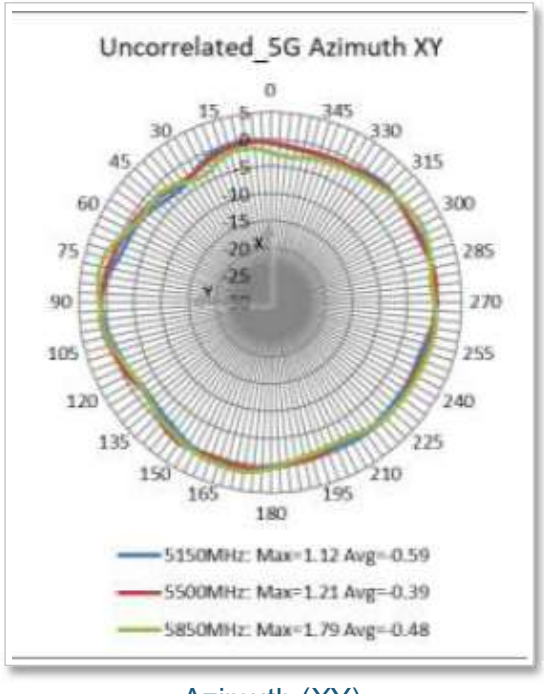


Side to Side (XZ)

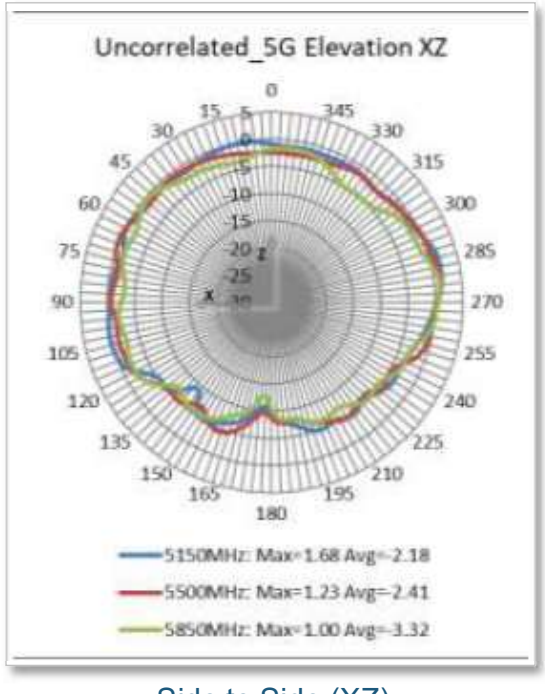


Front to Back (YZ)

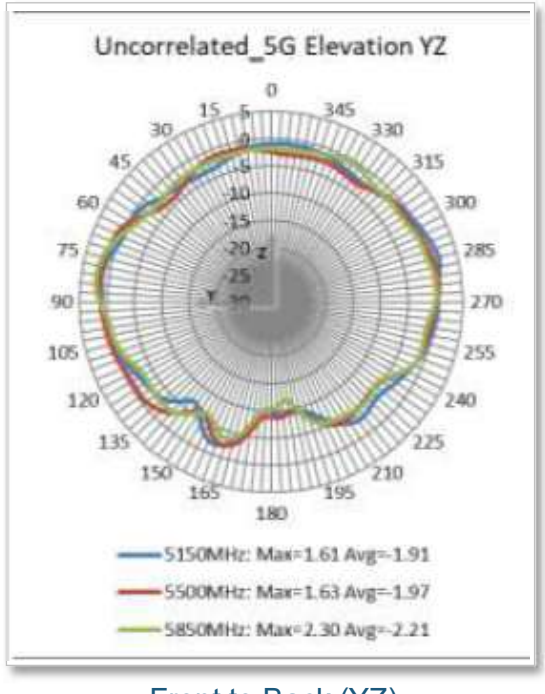
Uncorrelated Gain Patterns: Wi-Fi Antennas at 5G



Azimuth (XY)

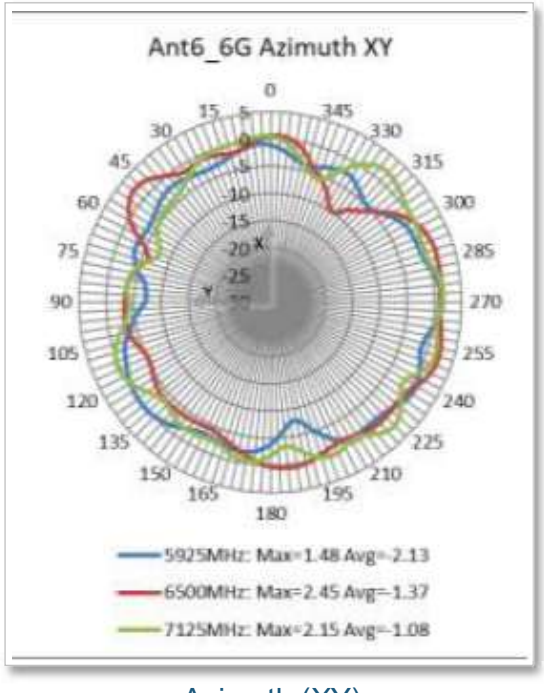


Side to Side (XZ)

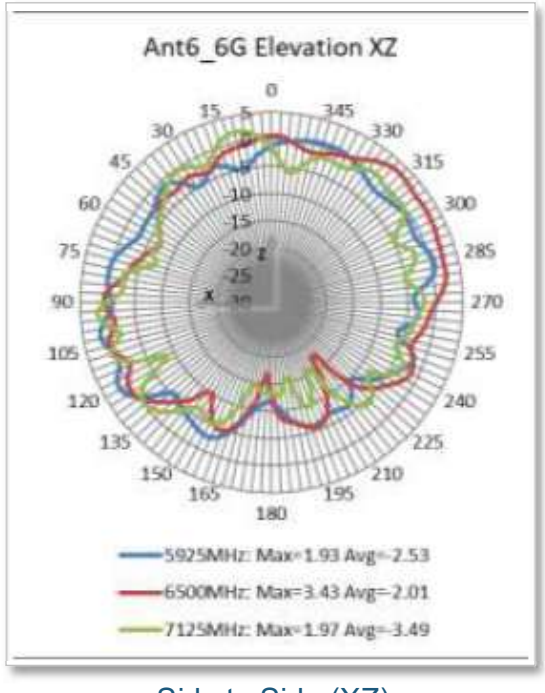


Front to Back (YZ)

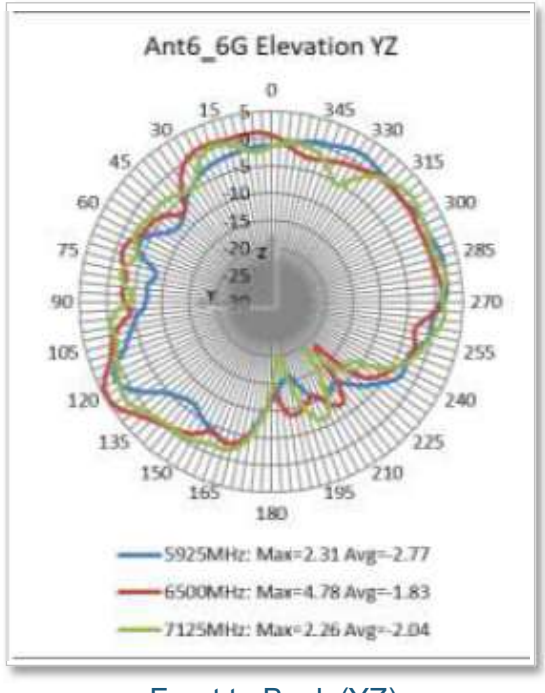
Total Gain Patterns: Ant6_6G



Azimuth (XY)

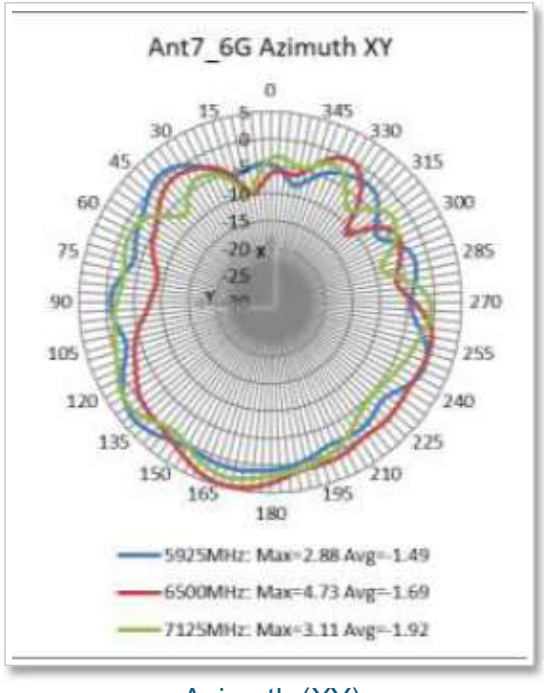


Side to Side (XZ)

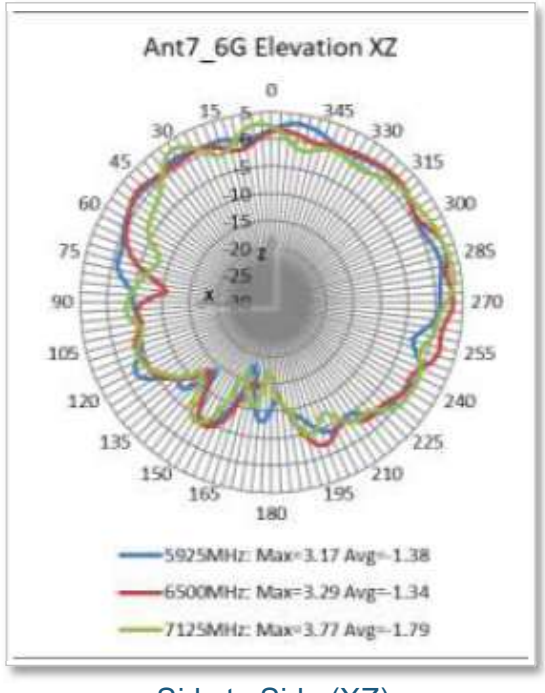


Front to Back (YZ)

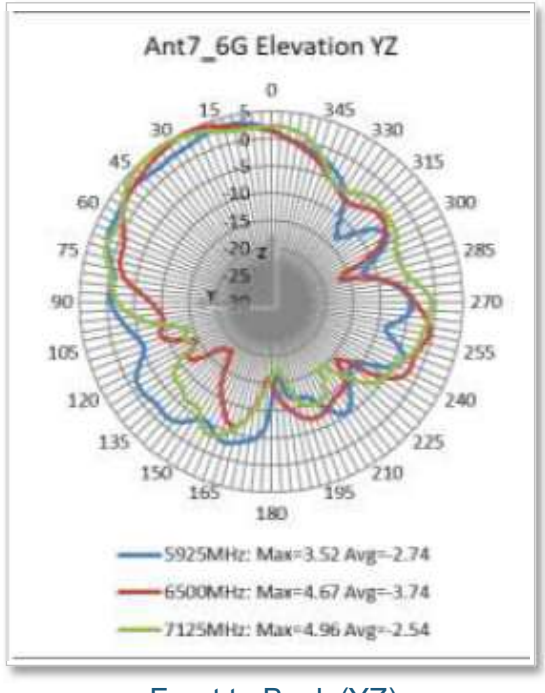
Total Gain Patterns: Ant7_6G



Azimuth (XY)

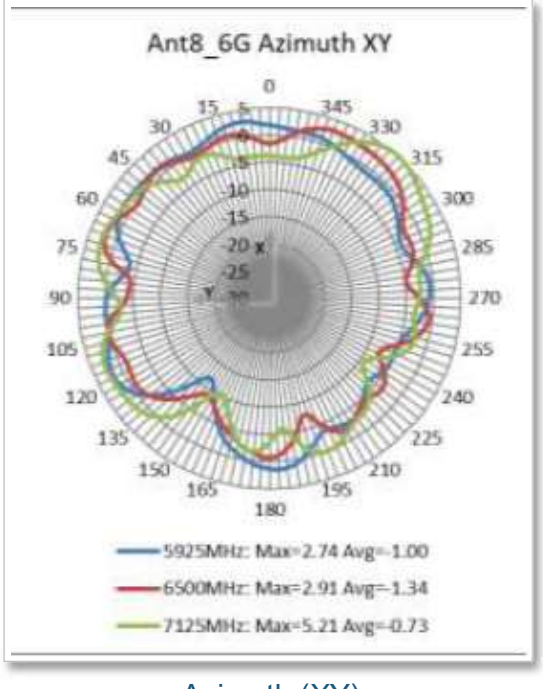


Side to Side (XZ)

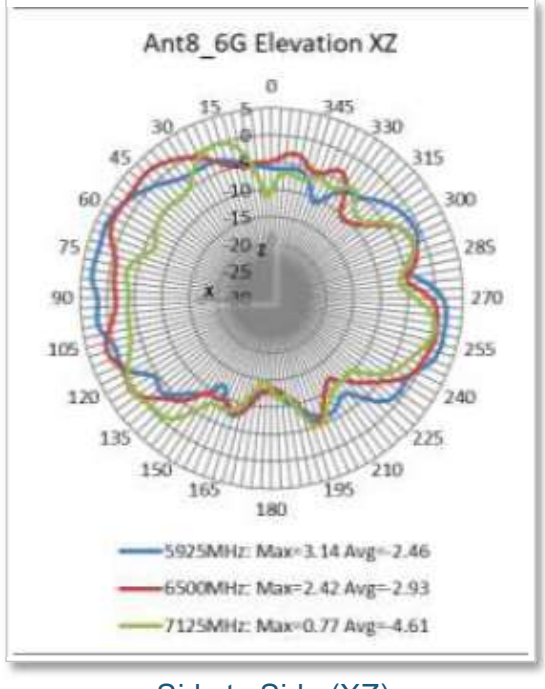


Front to Back (YZ)

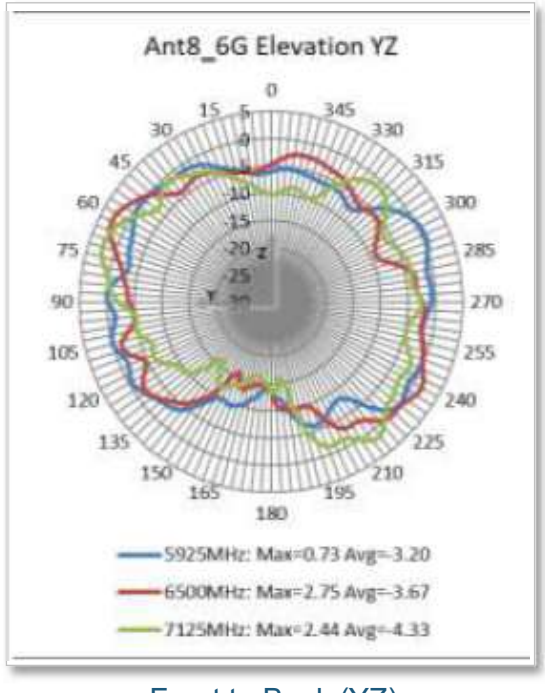
Total Gain Patterns: Ant8_6G



Azimuth (XY)

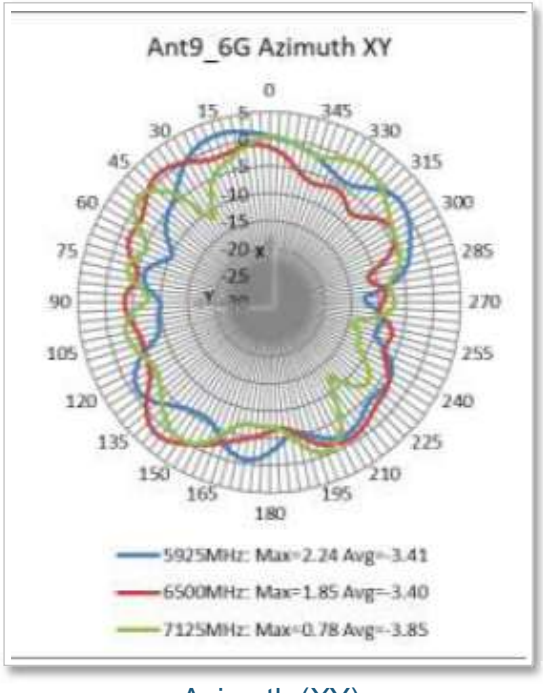


Side to Side (XZ)

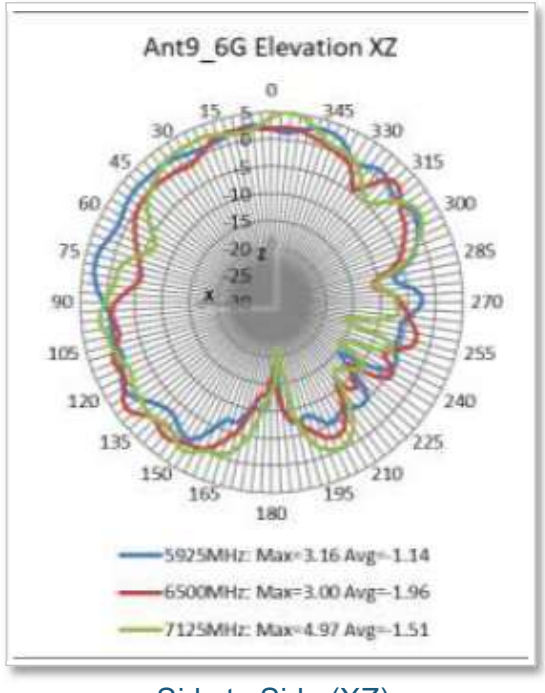


Front to Back (YZ)

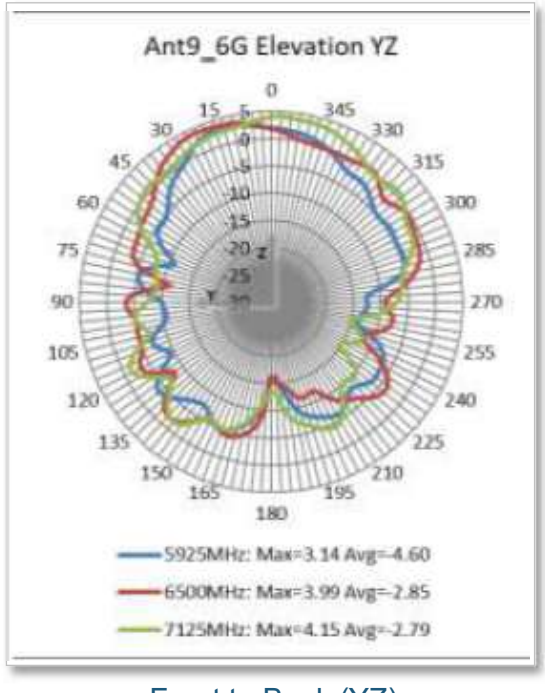
Total Gain Patterns: Ant9_6G



Azimuth (XY)

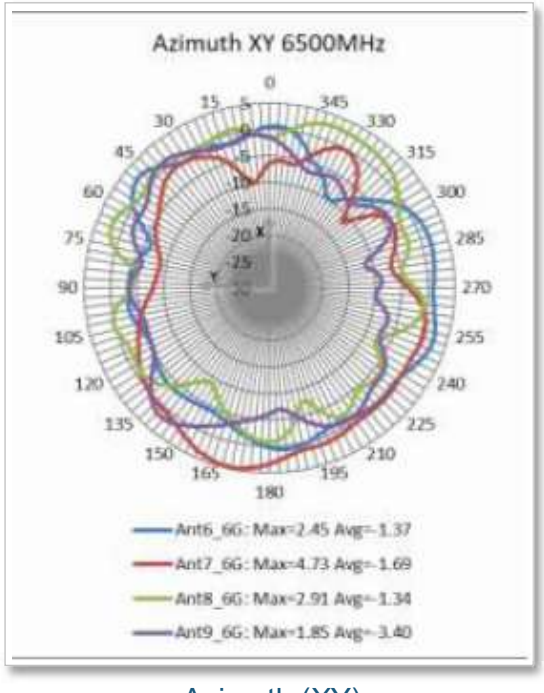


Side to Side (XZ)

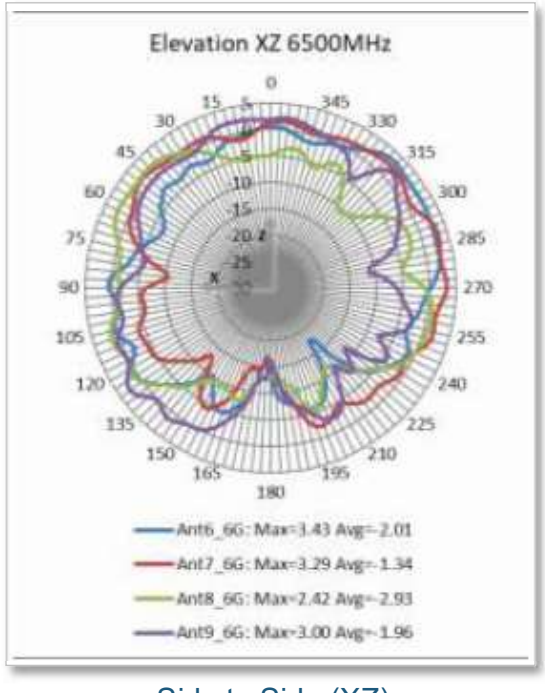


Front to Back (YZ)

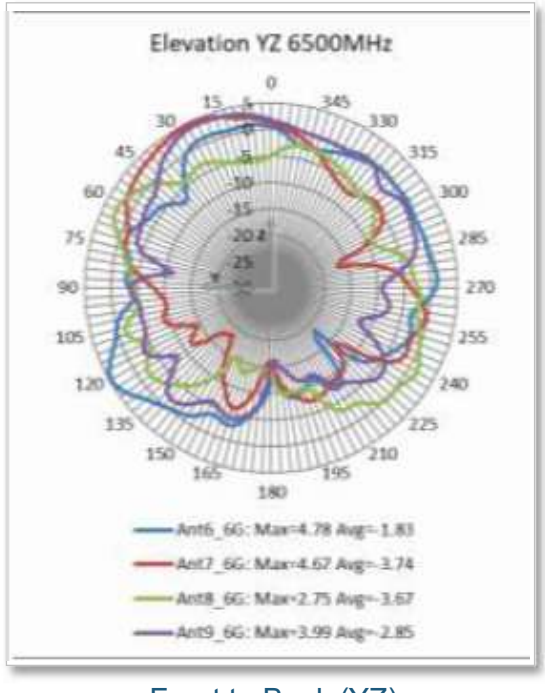
Coverage Total Gain Patterns: Wi-Fi Antennas at 6500MHz



Azimuth (XY)

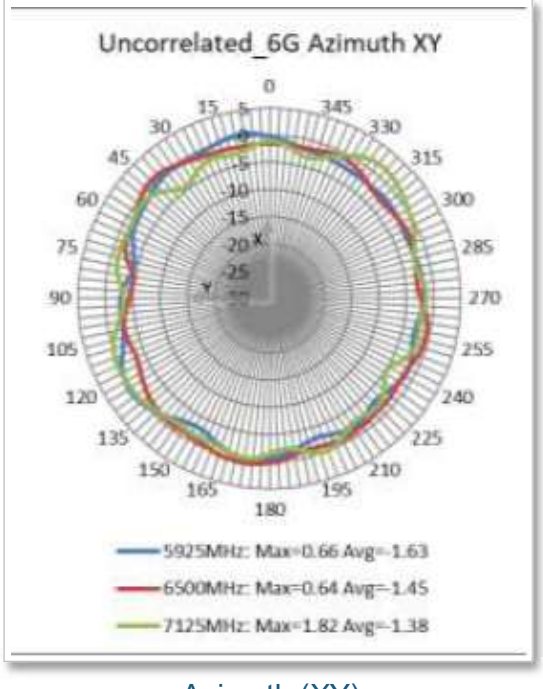


Side to Side (XZ)

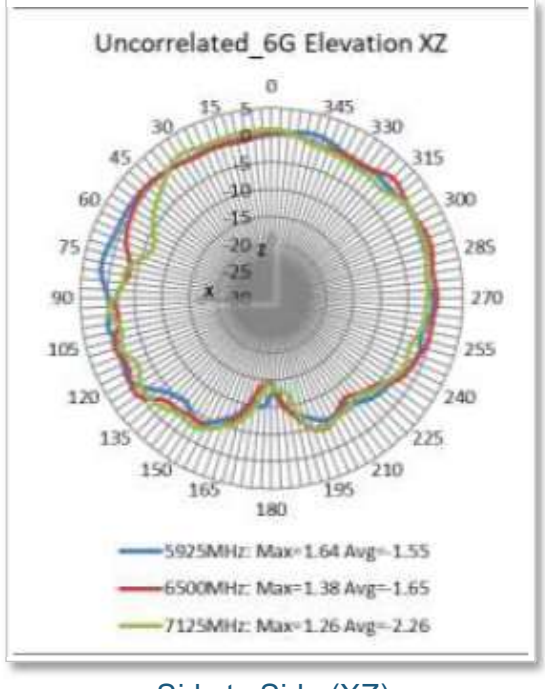


Front to Back (YZ)

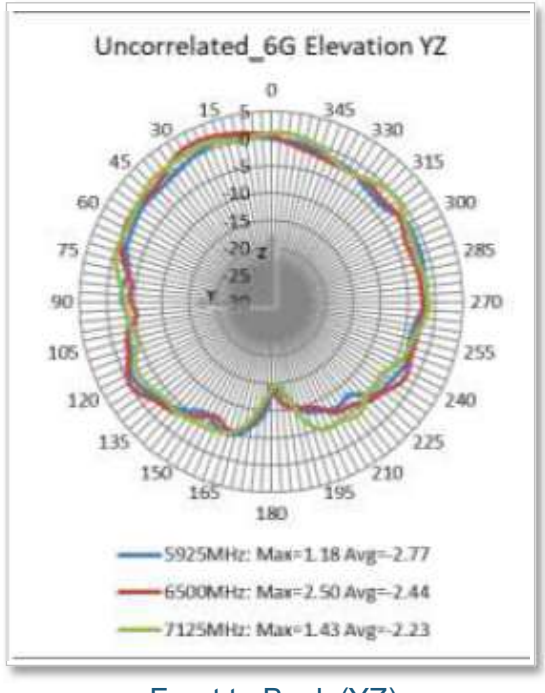
Uncorrelated Gain Patterns: Wi-Fi Antennas at 6G



Azimuth (XY)

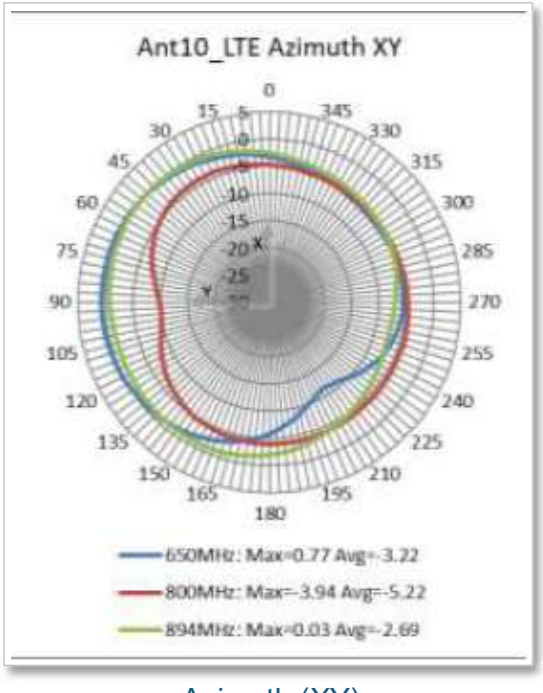


Side to Side (XZ)

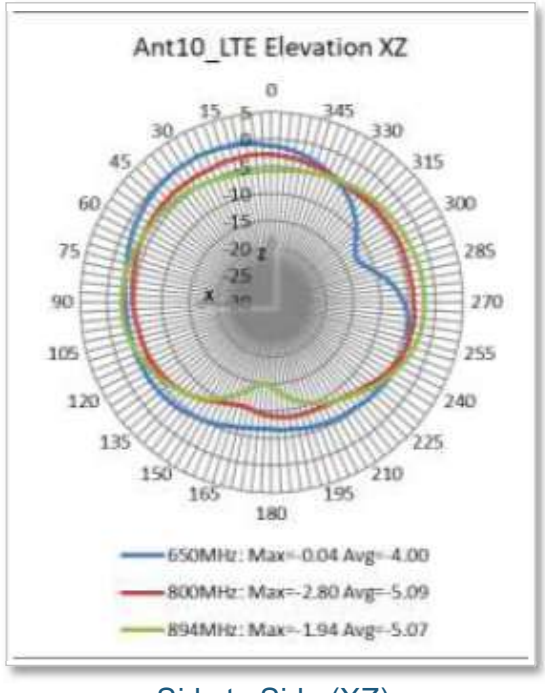


Front to Back (YZ)

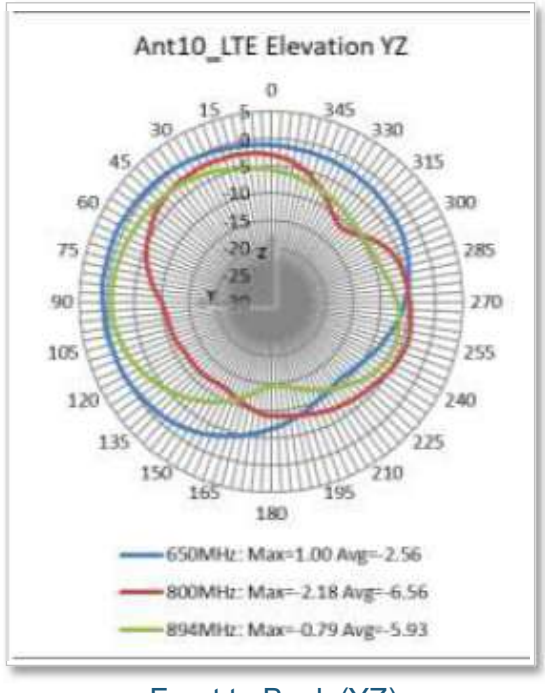
Total Gain Patterns: Ant10_LTE



Azimuth (XY)

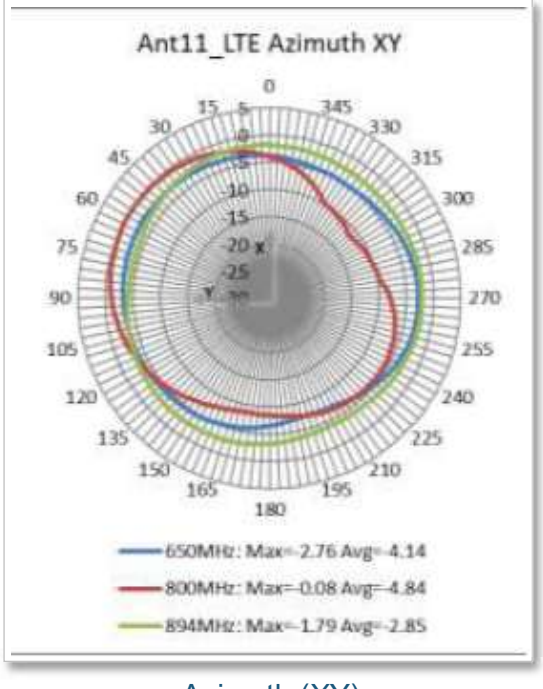


Side to Side (XZ)

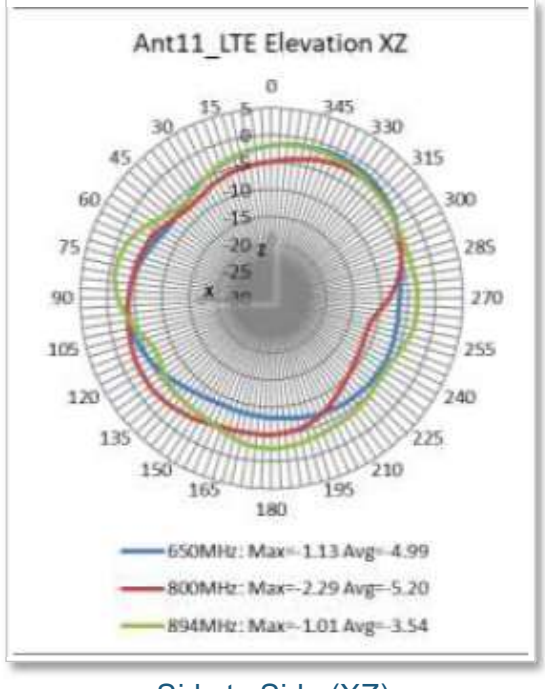


Front to Back (YZ)

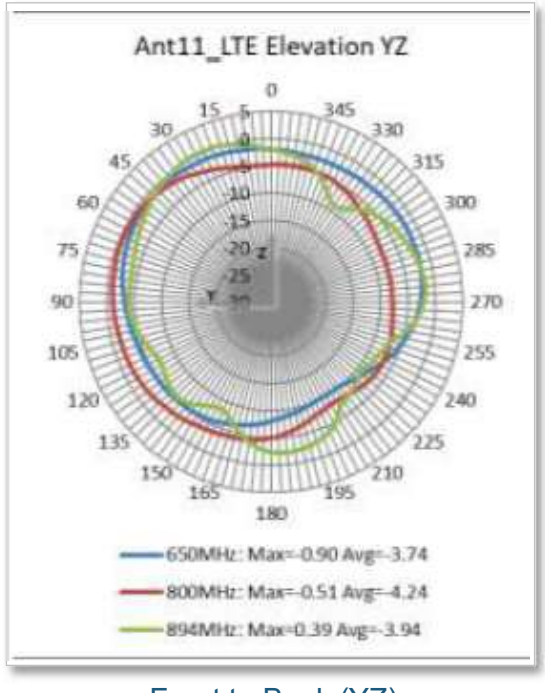
Total Gain Patterns: Ant11_LTE



Azimuth (XY)

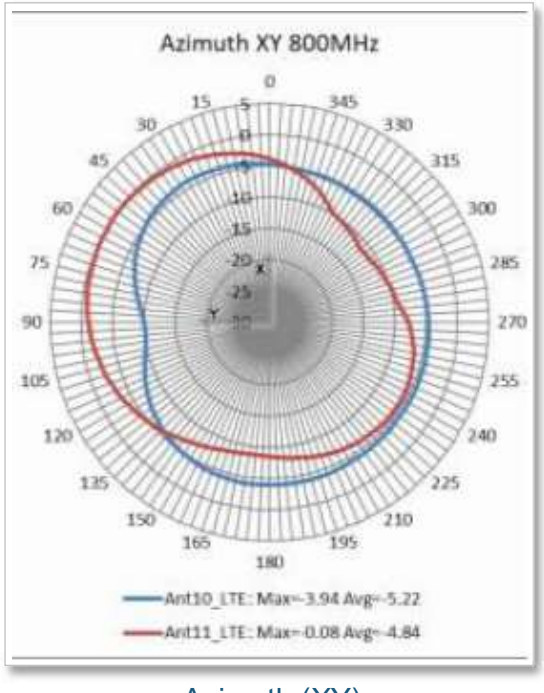


Side to Side (XZ)

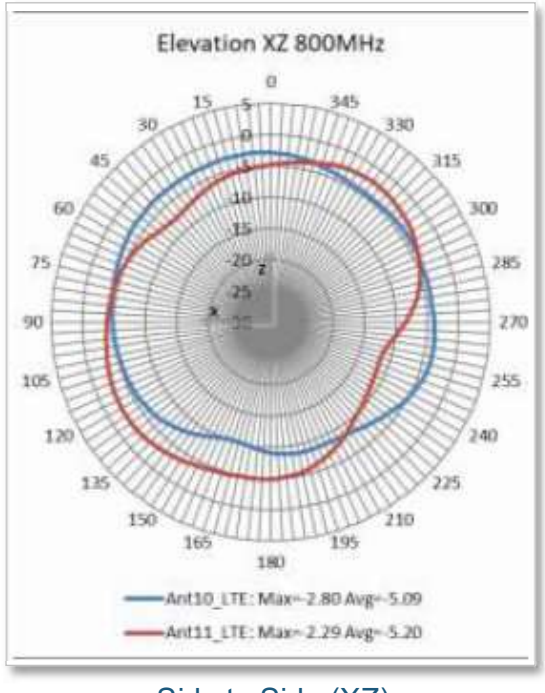


Front to Back (YZ)

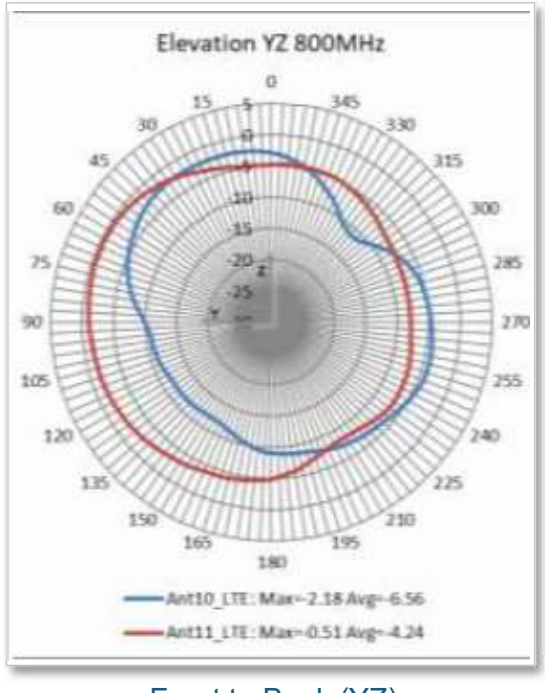
Coverage Total Gain Patterns: LTE Antennas at 800MHz



Azimuth (XY)

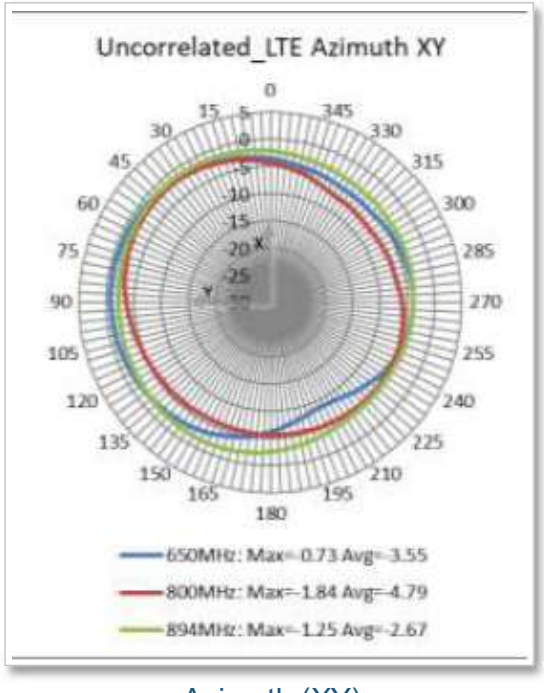


Side to Side (XZ)

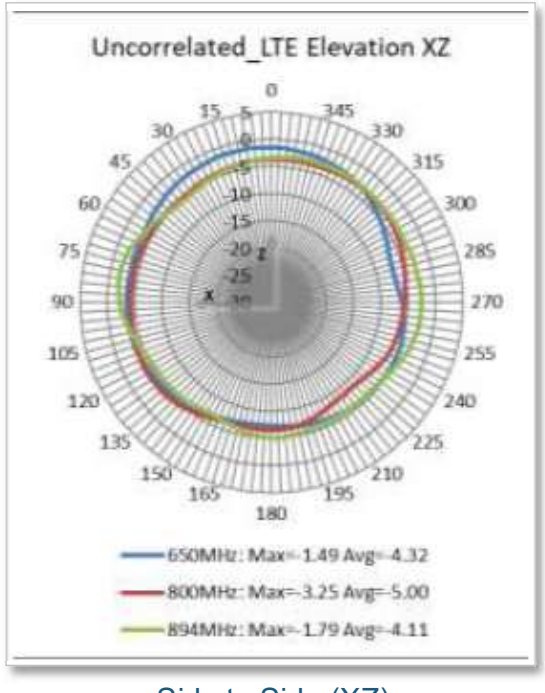


Front to Back (YZ)

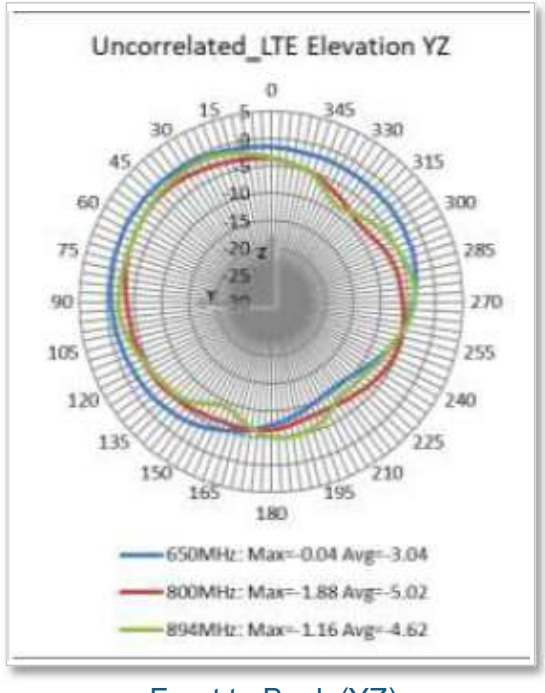
Uncorrelated Gain Patterns: LTE Antennas at LB



Azimuth (XY)

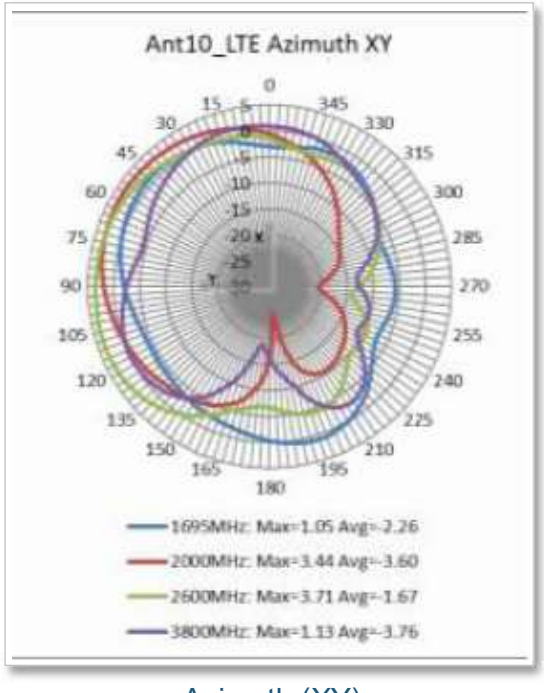


Side to Side (XZ)

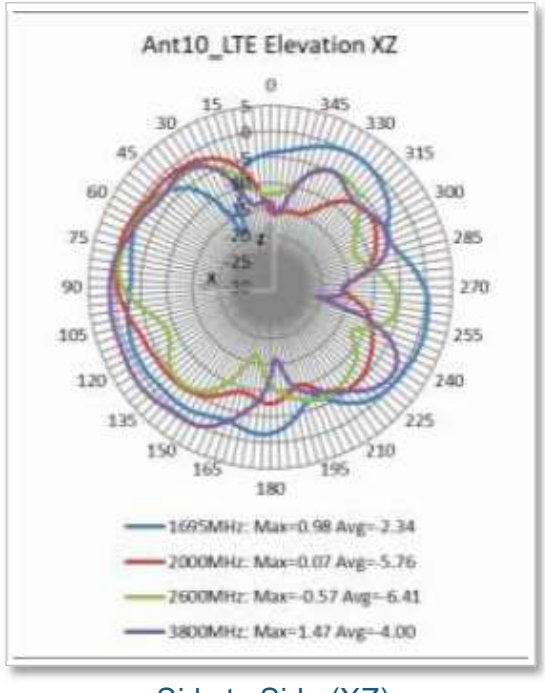


Front to Back (YZ)

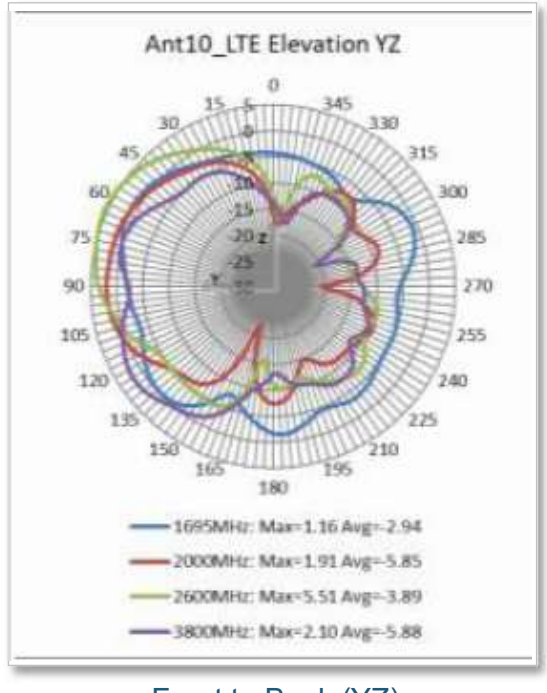
Total Gain Patterns: Ant10_LTE



Azimuth (XY)

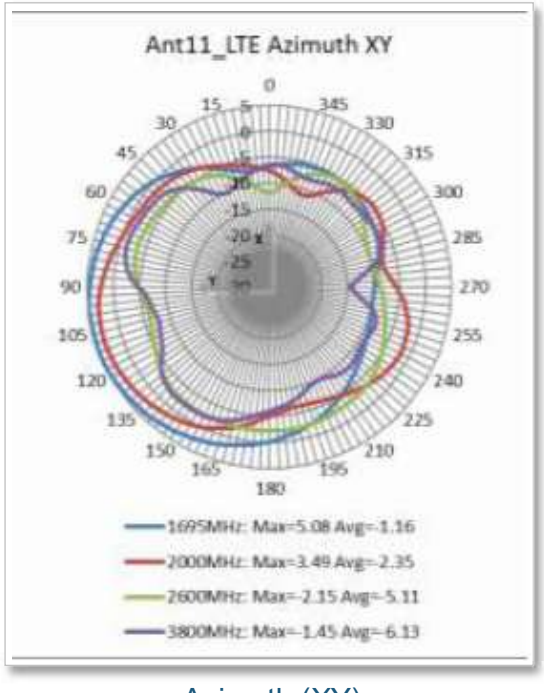


Side to Side (XZ)

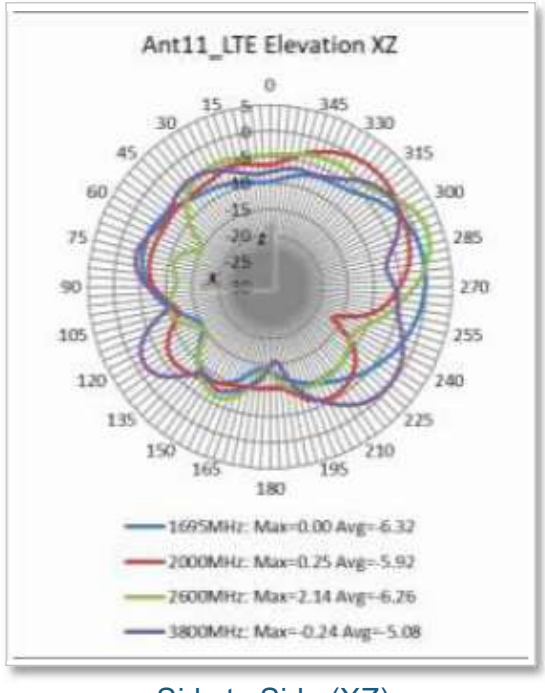


Front to Back (YZ)

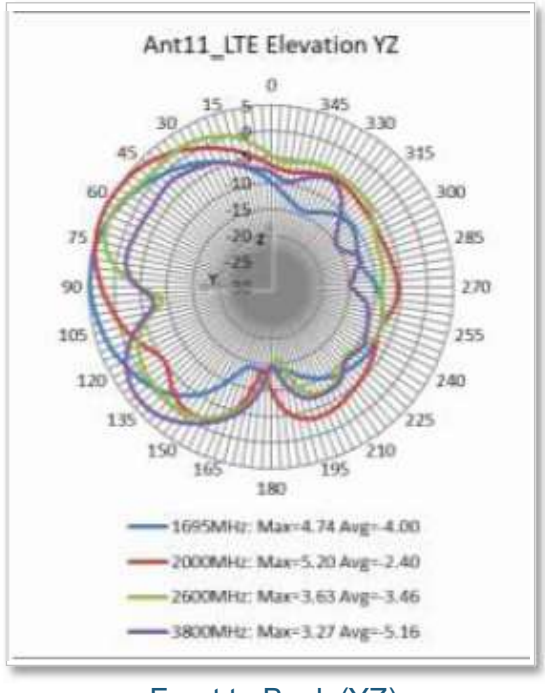
Total Gain Patterns: Ant11_LTE



Azimuth (XY)

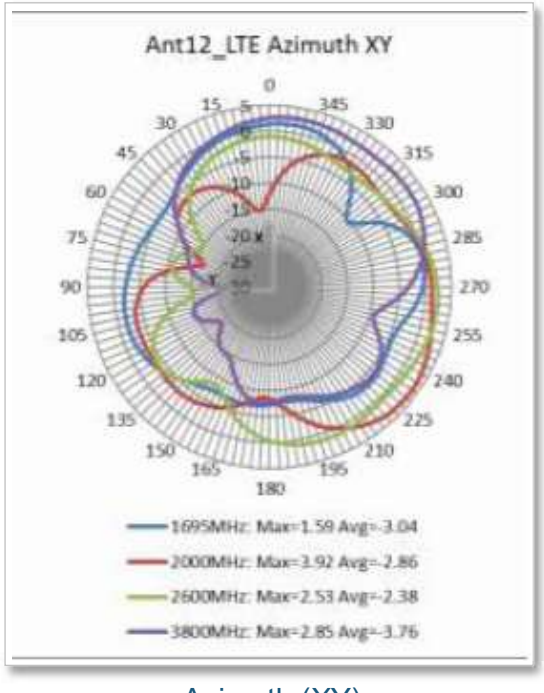


Side to Side (XZ)

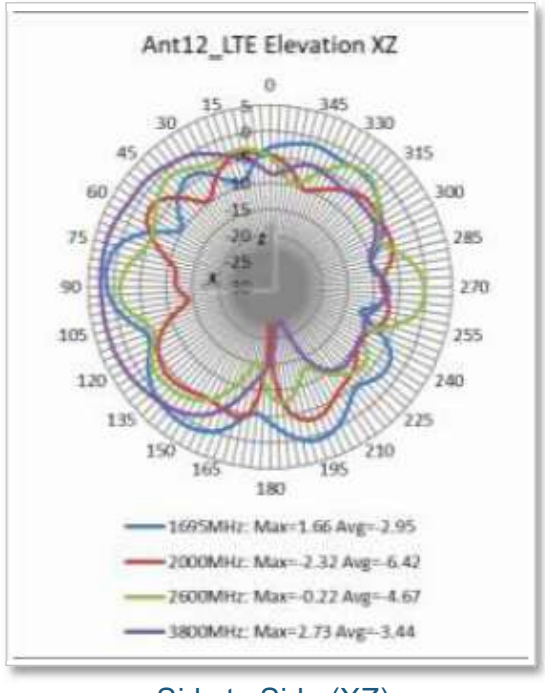


Front to Back (YZ)

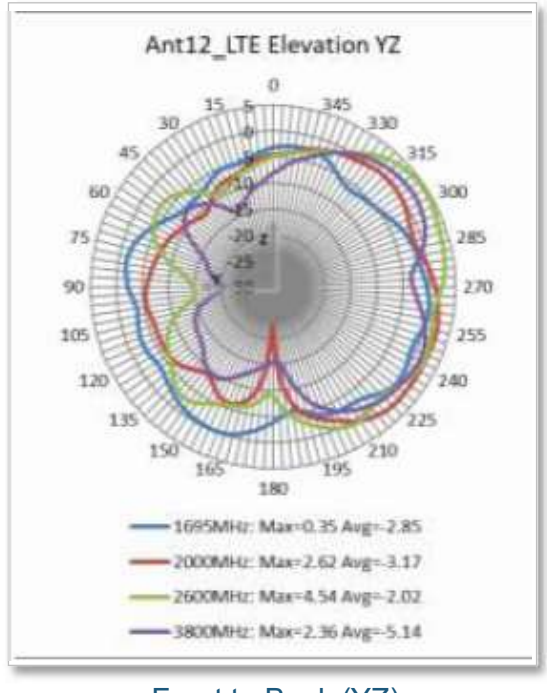
Total Gain Patterns: Ant12_LTE



Azimuth (XY)

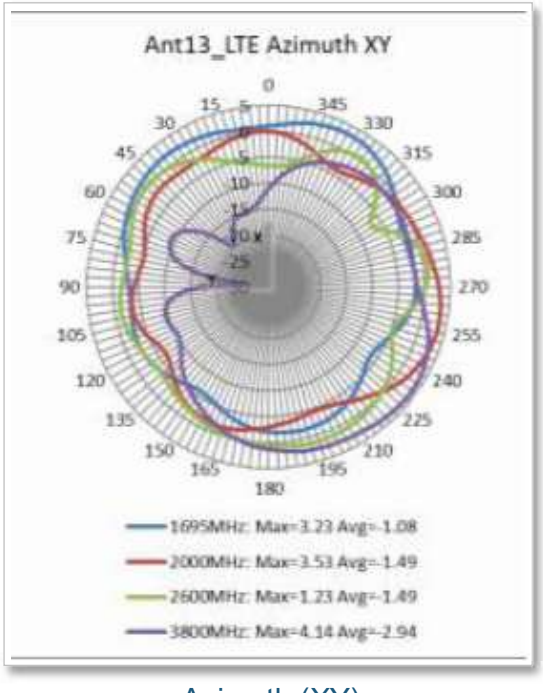


Side to Side (XZ)

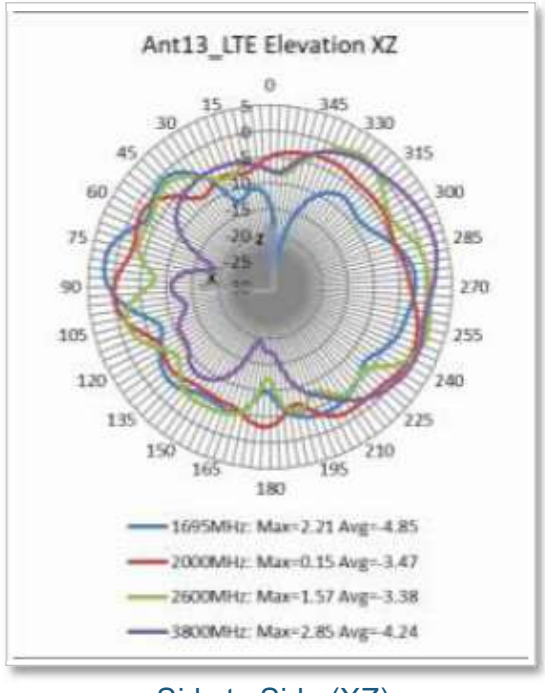


Front to Back (YZ)

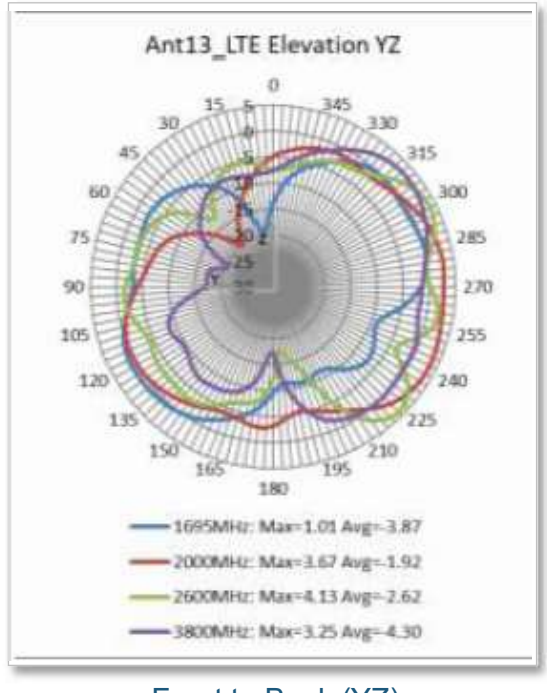
Total Gain Patterns: Ant13_LTE



Azimuth (XY)

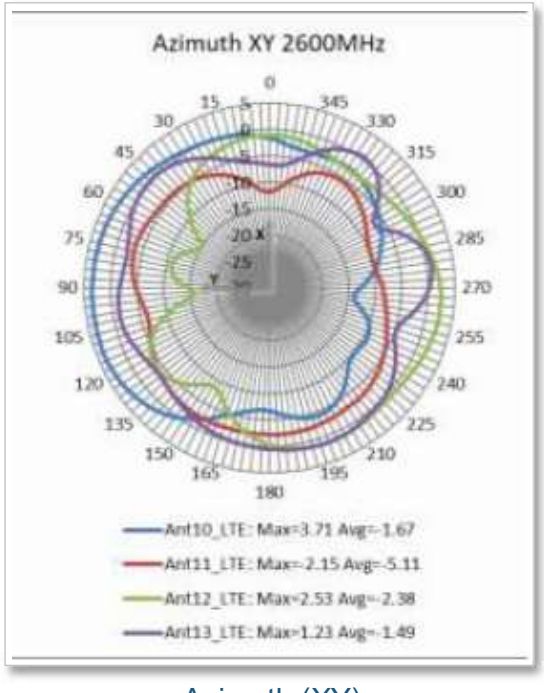


Side to Side (XZ)

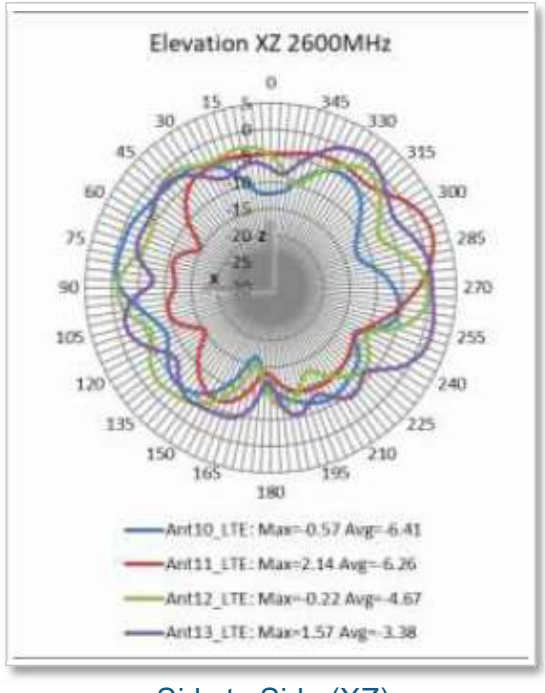


Front to Back (YZ)

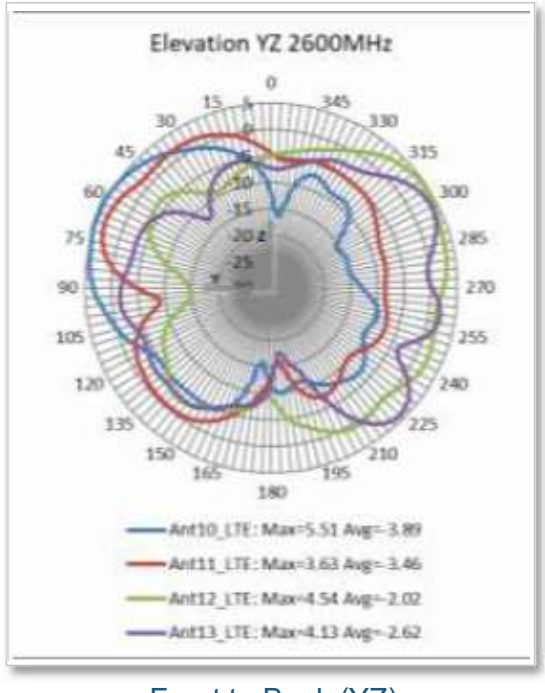
Coverage Total Gain Patterns: LTE Antennas at 2600MHz



Azimuth (XY)

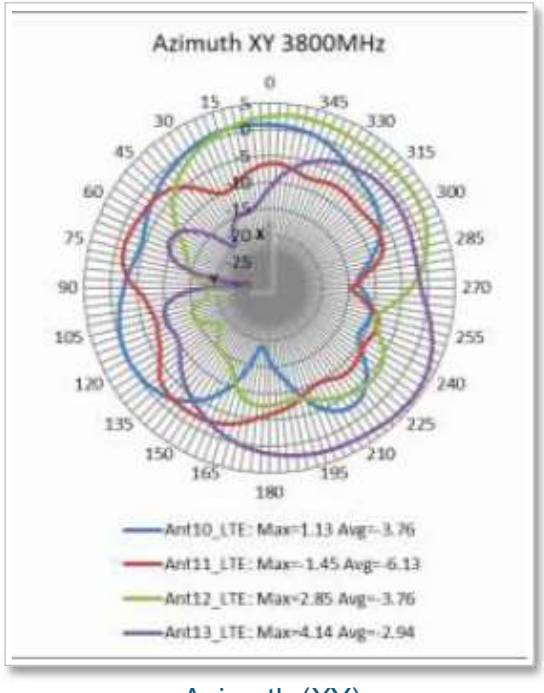


Side to Side (XZ)

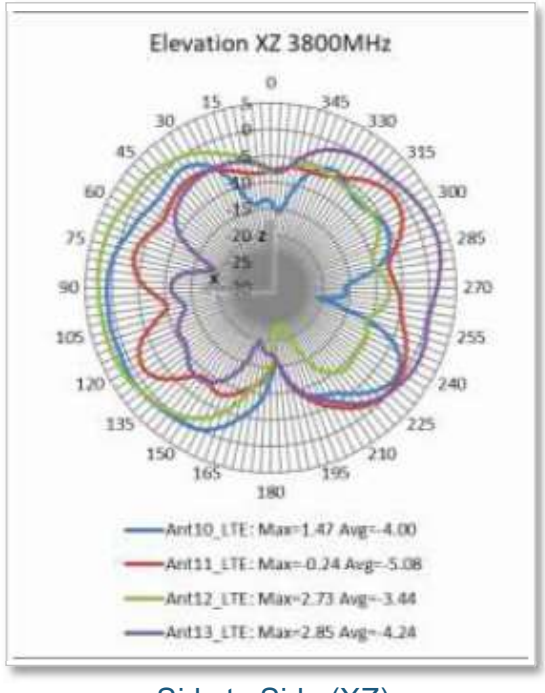


Front to Back (YZ)

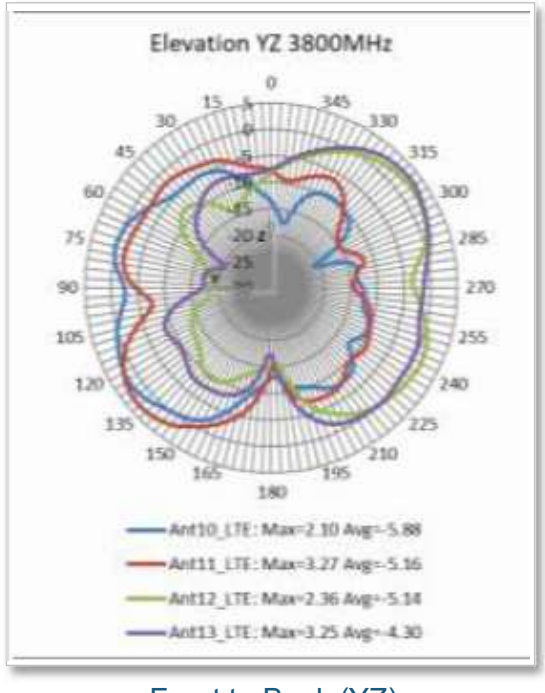
Coverage Total Gain Patterns: LTE Antennas at 3800MHz



Azimuth (XY)

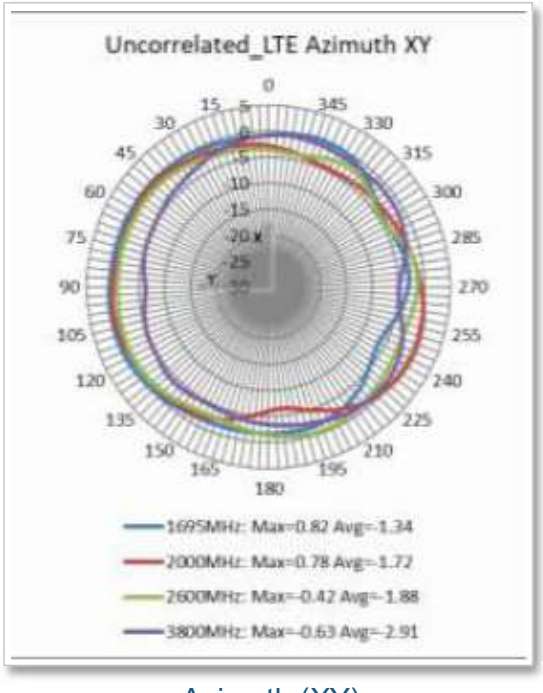


Side to Side (XZ)

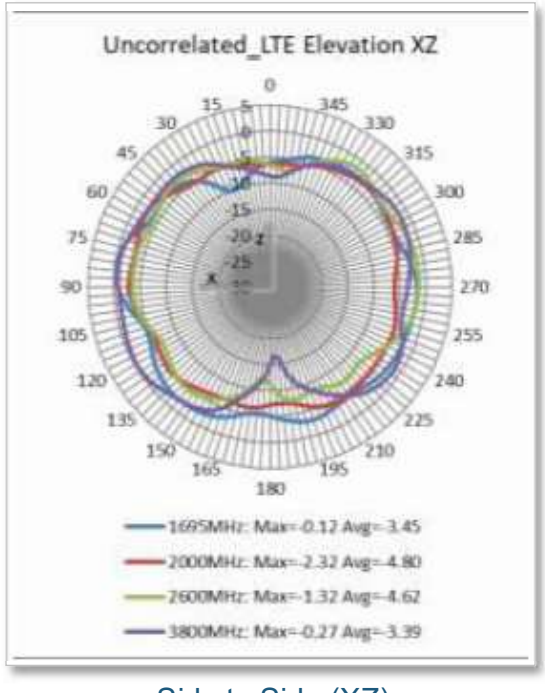


Front to Back (YZ)

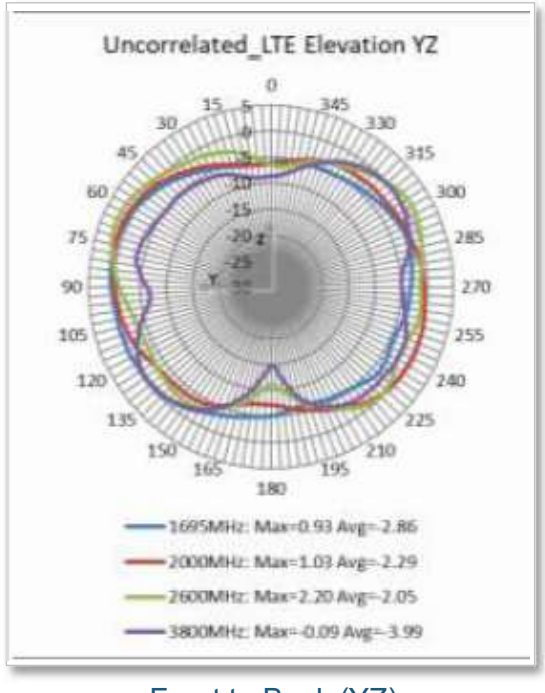
Uncorrelated Gain Patterns: LTE Antennas at MB to UHB



Azimuth (XY)

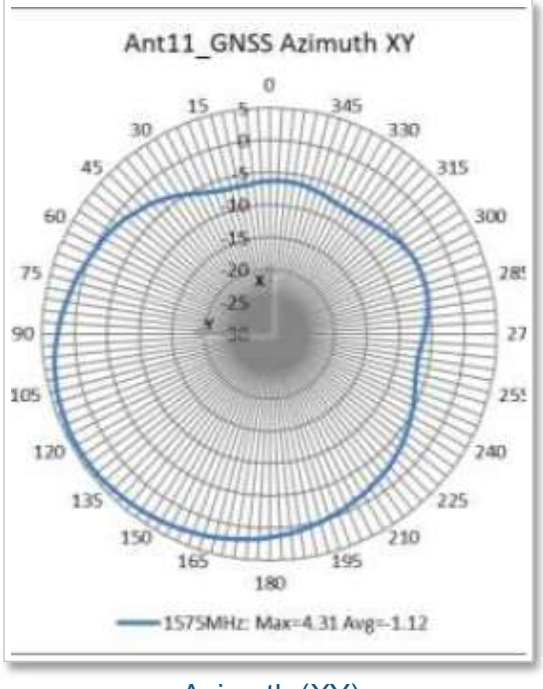


Side to Side (XZ)

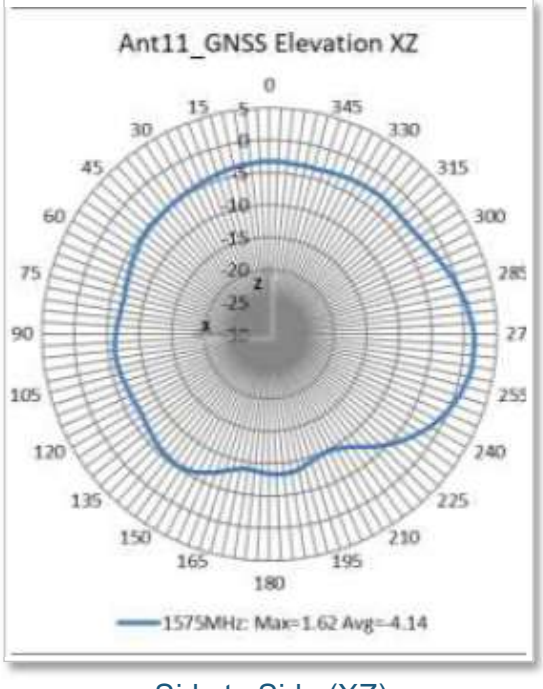


Front to Back (YZ)

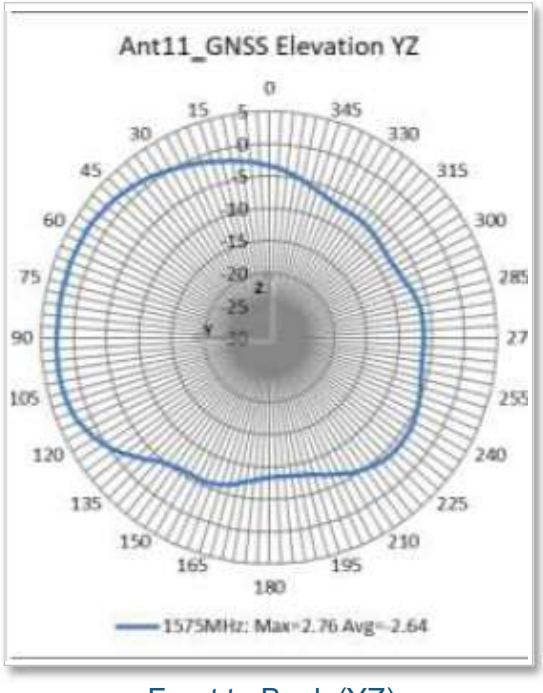
Total Gain Patterns: Ant11_GNSS



Azimuth (XY)

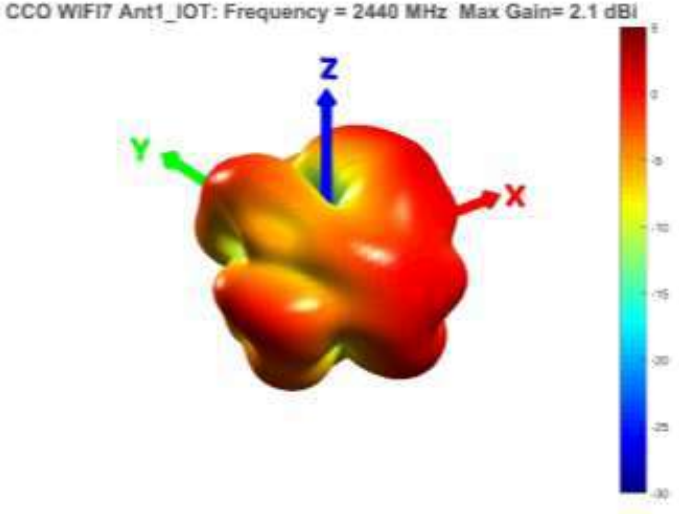


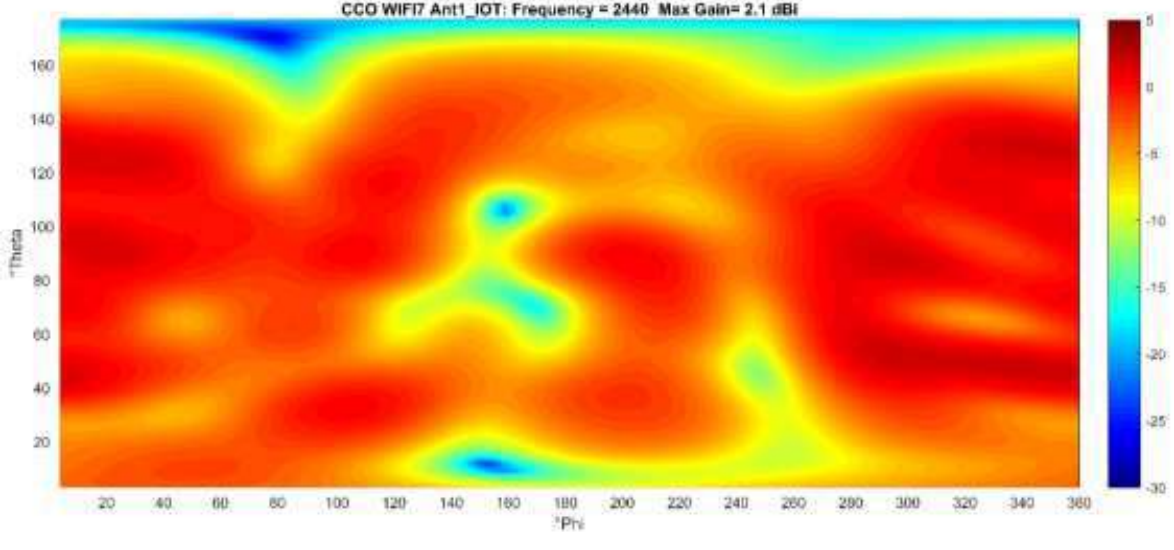
Side to Side (XZ)



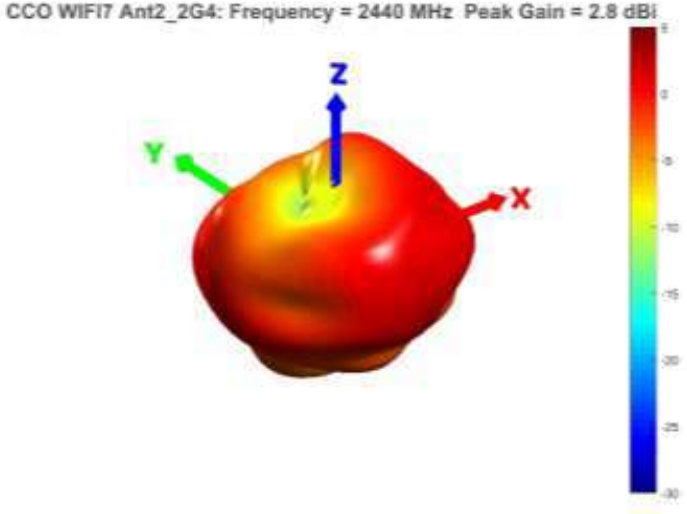
Front to Back (YZ)

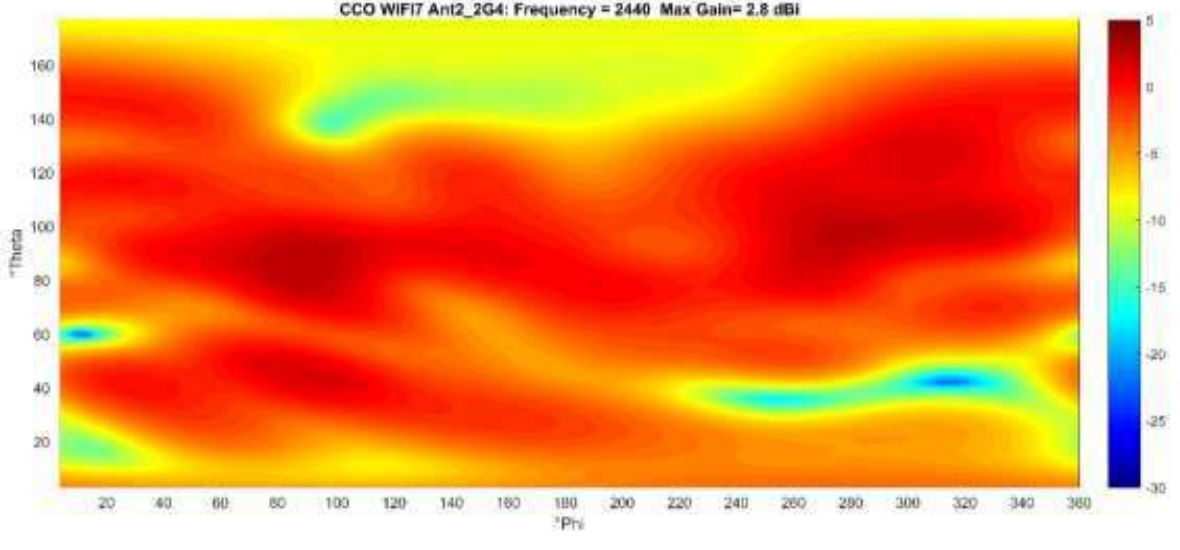
Total Gain 3D Pattern: Ant1_IOT at 2440MHz



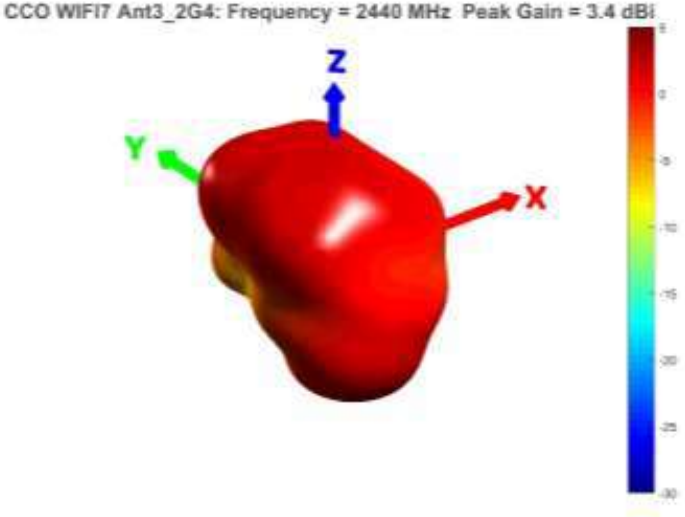


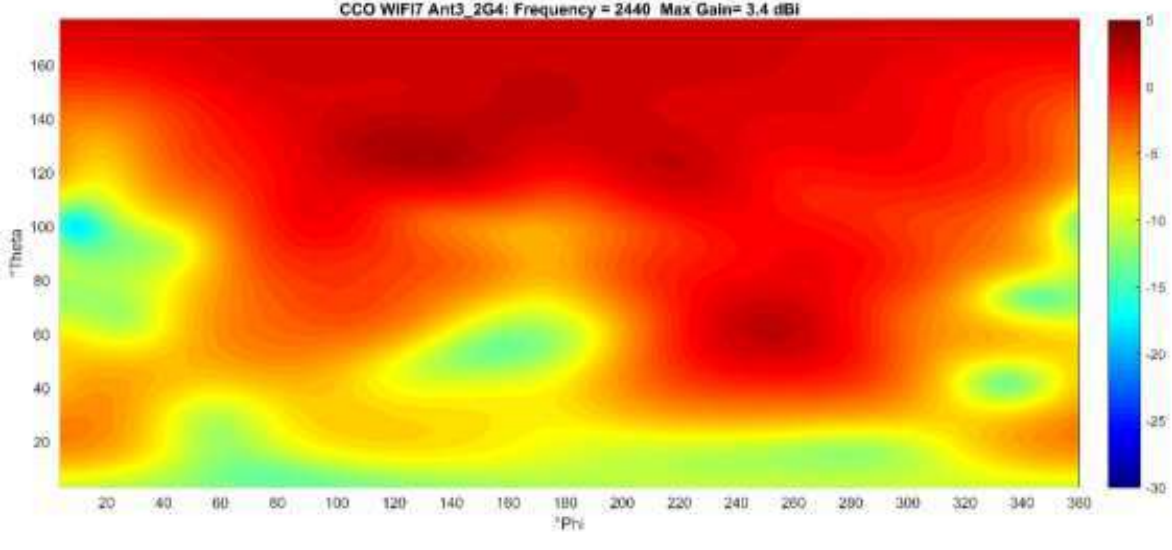
Total Gain 3D Pattern: Ant2_2G4 at 2440MHz



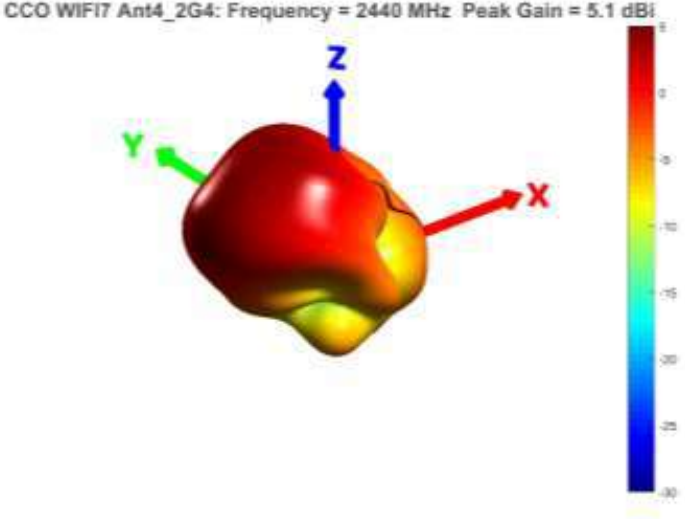


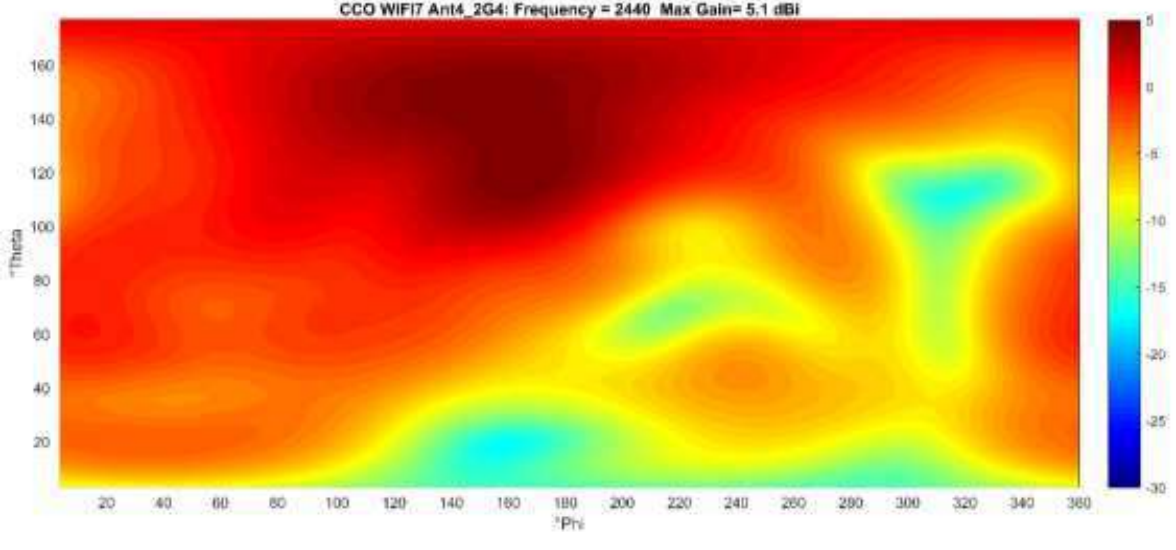
Total Gain 3D Pattern: Ant3_2G4 at 2440MHz



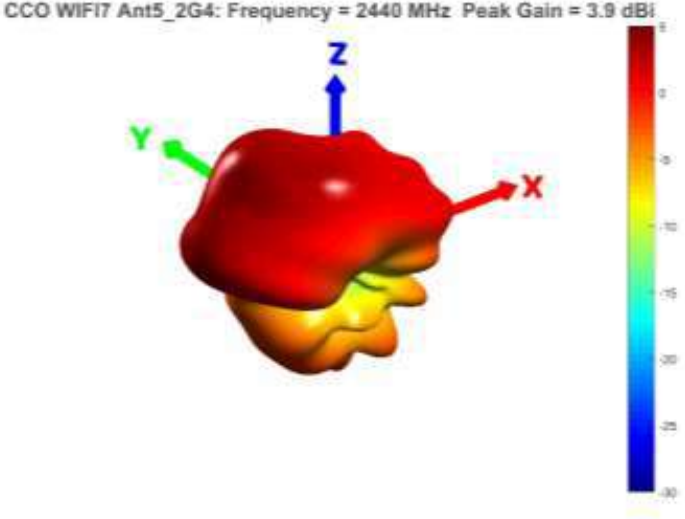


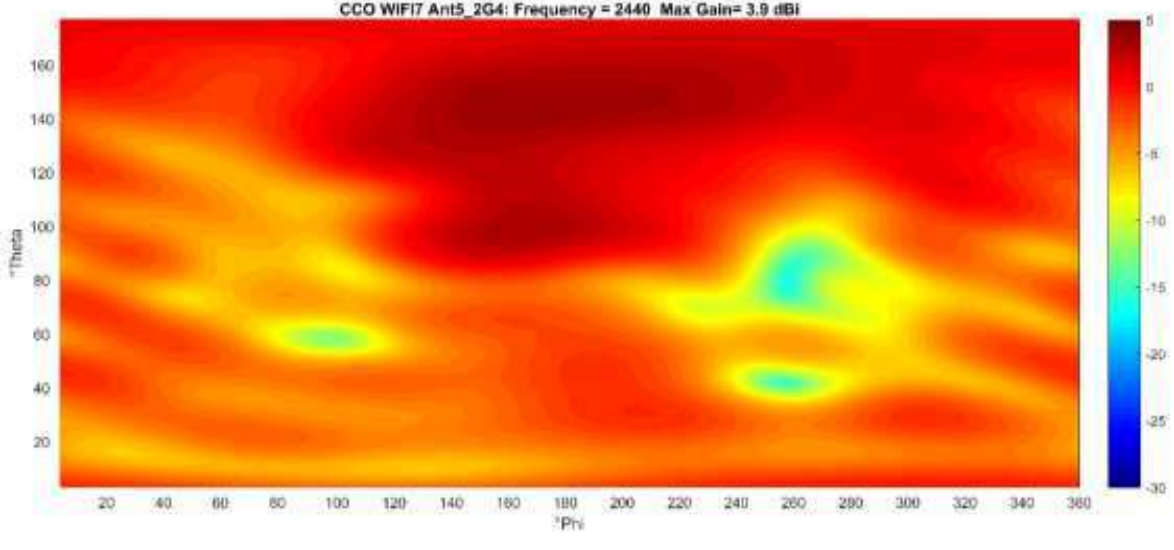
Total Gain 3D Pattern: Ant4_2G4 at 2440MHz



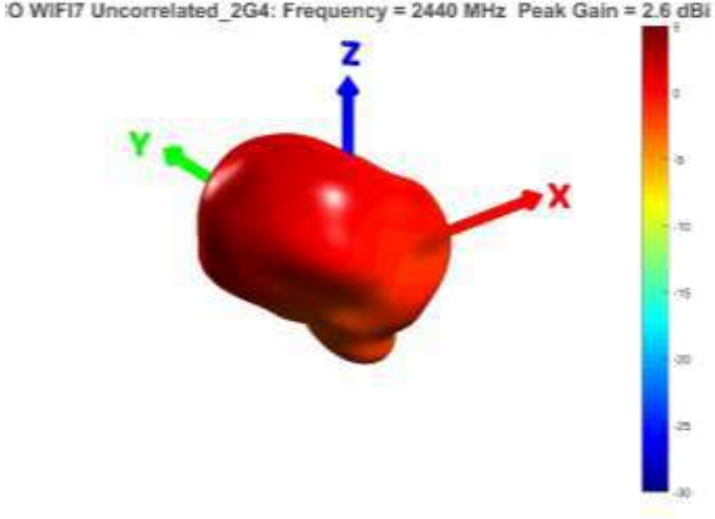


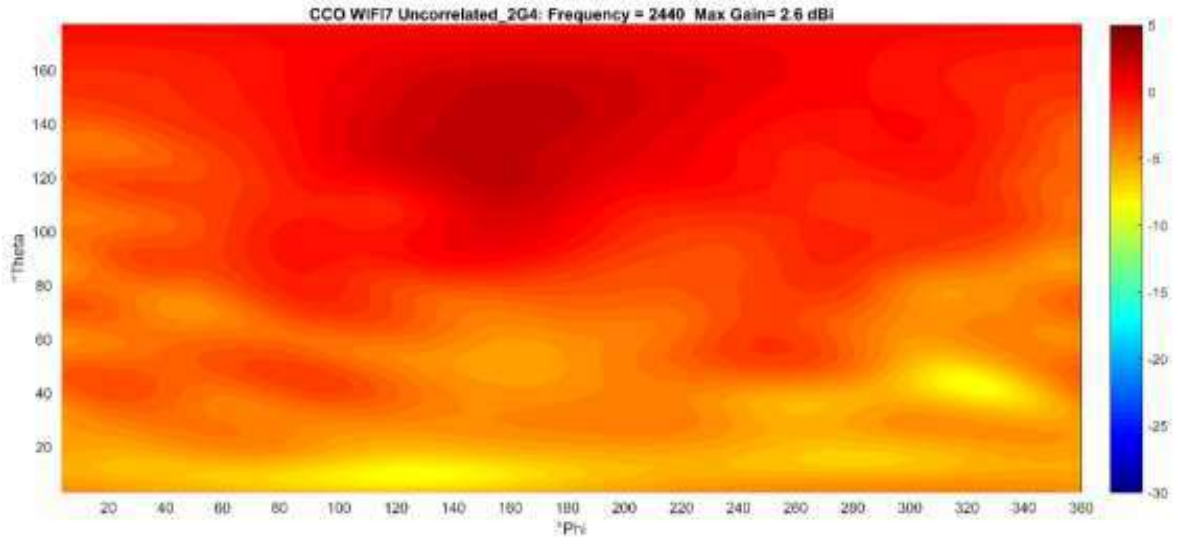
Total Gain 3D Pattern: Ant5_2G4 at 2440MHz



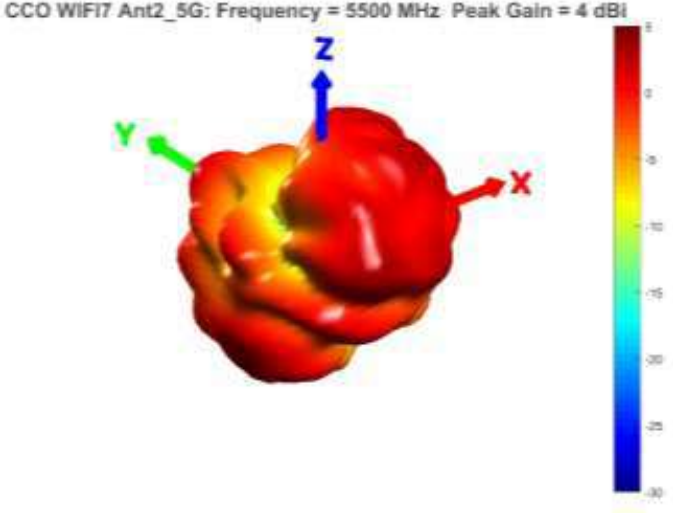


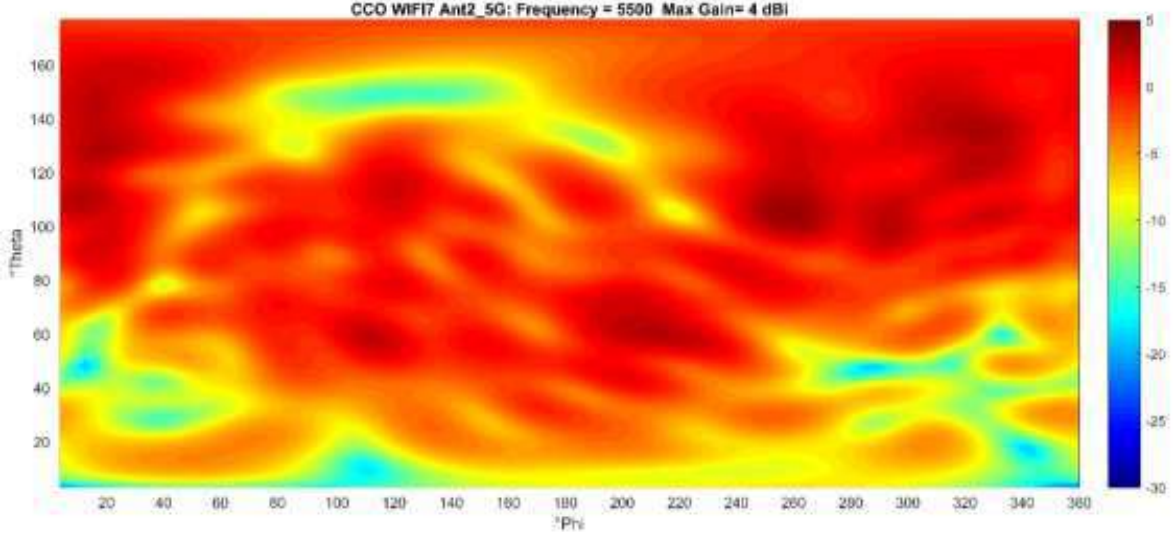
Uncorrelated Gain 3D Pattern at 2440MHz



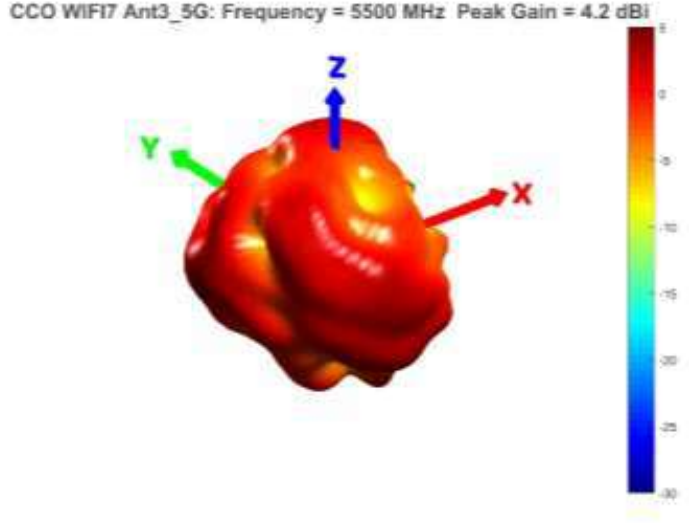


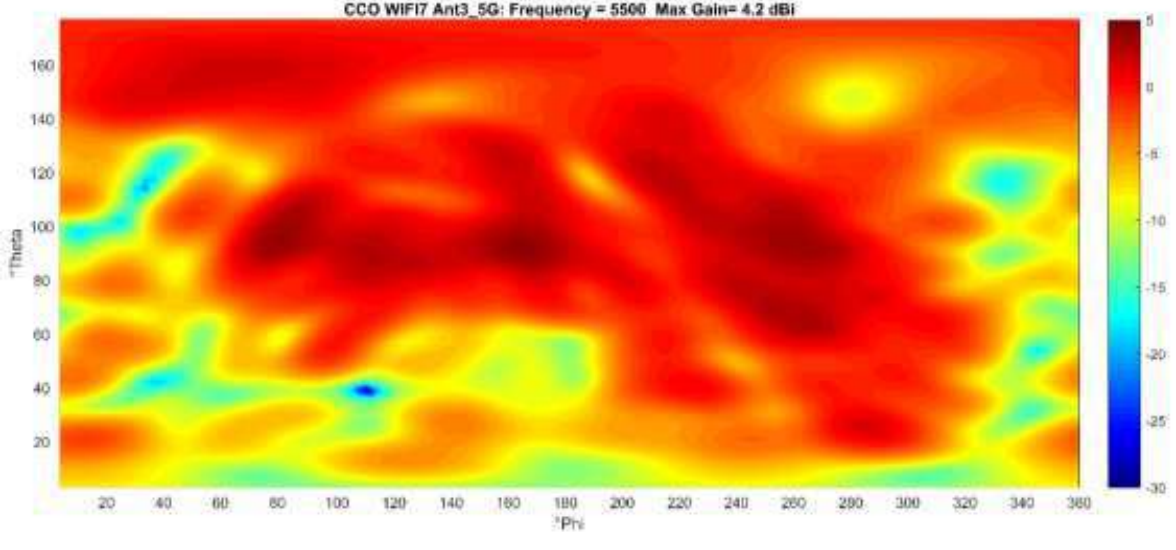
Total Gain 3D Pattern: Ant2_5G at 5500MHz



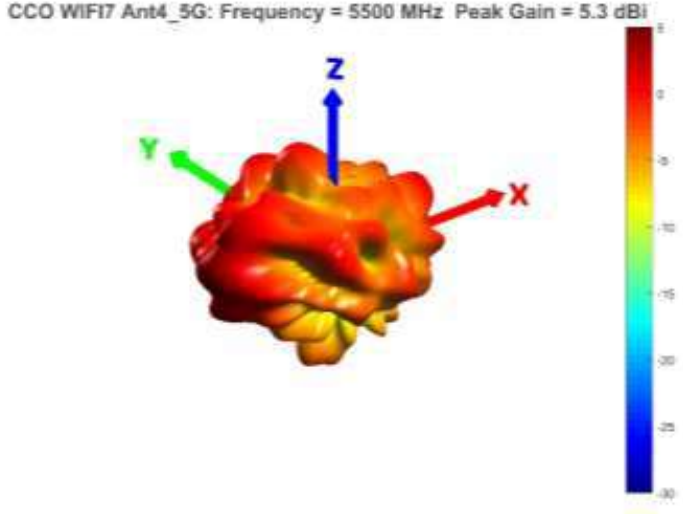


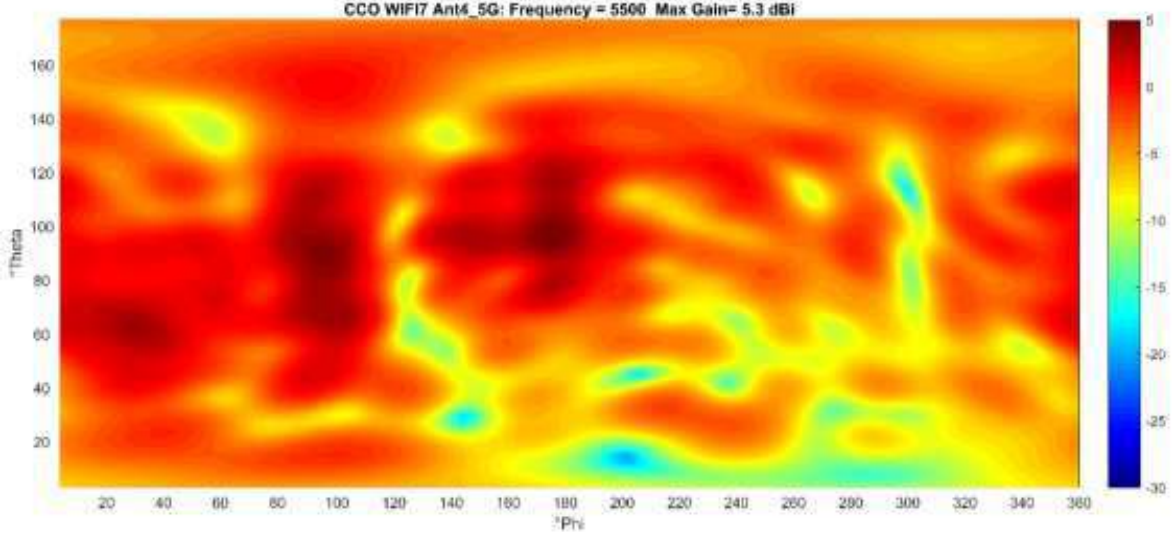
Total Gain 3D Pattern: Ant3_5G at 5500MHz



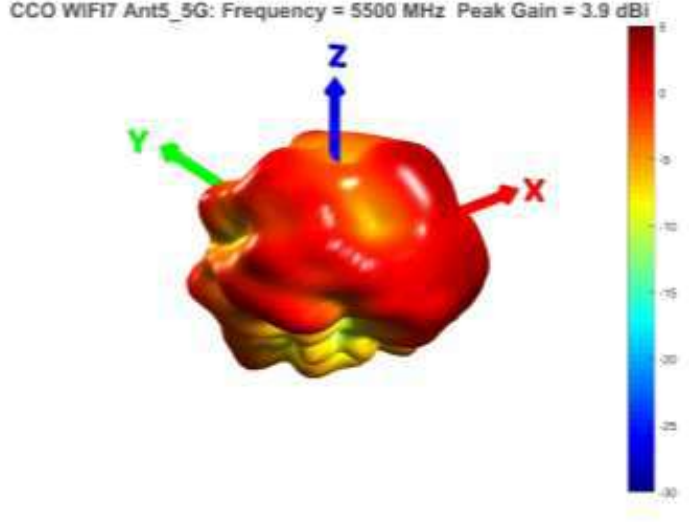


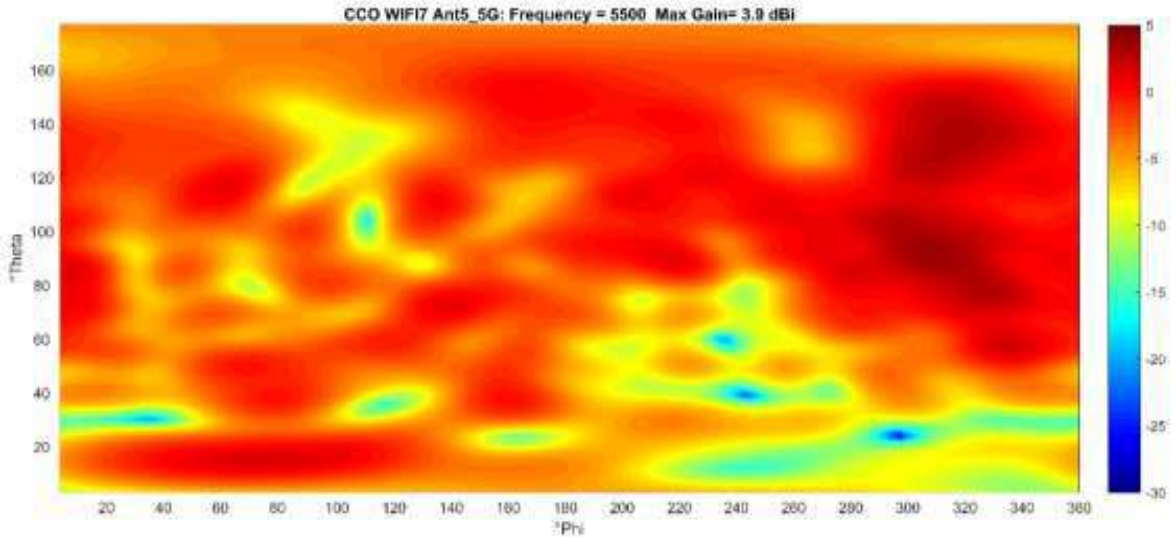
Total Gain 3D Pattern: Ant4_5G at 5500MHz



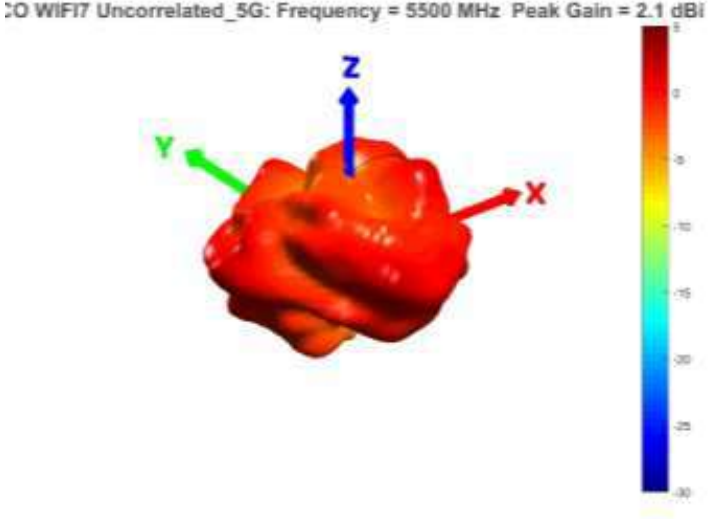


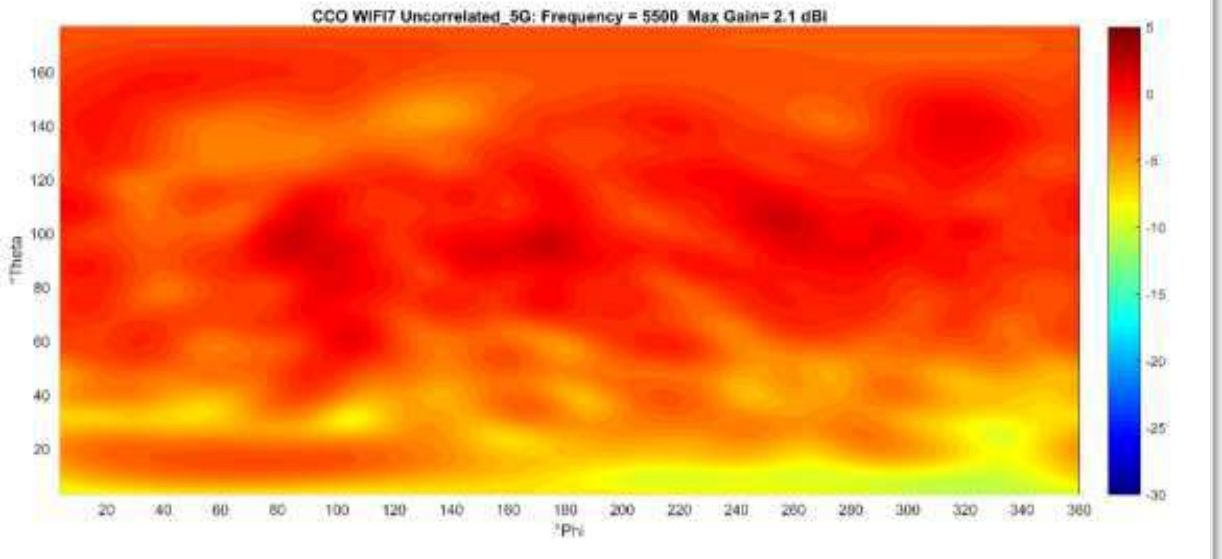
Total Gain 3D Pattern: Ant5_5G at 5500MHz



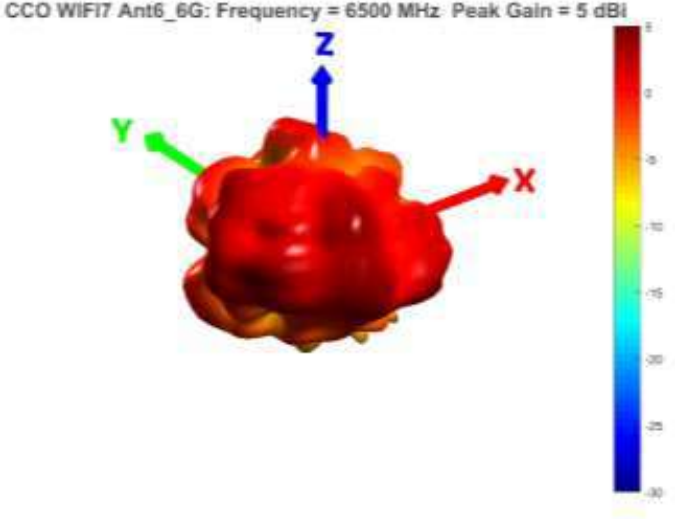


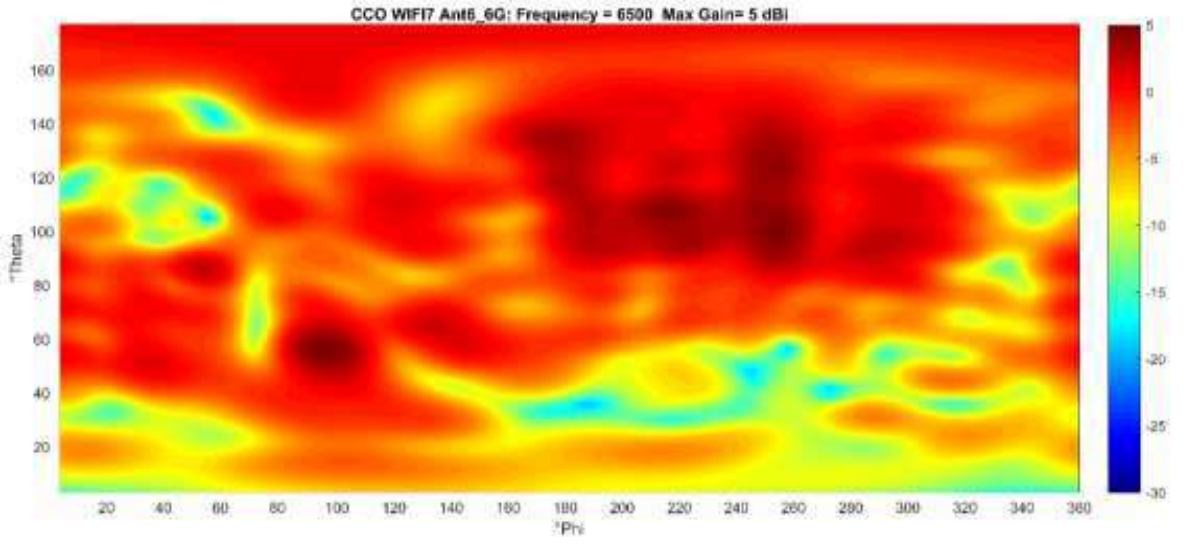
Uncorrelated Total Gain 3D Pattern at 5500MHz



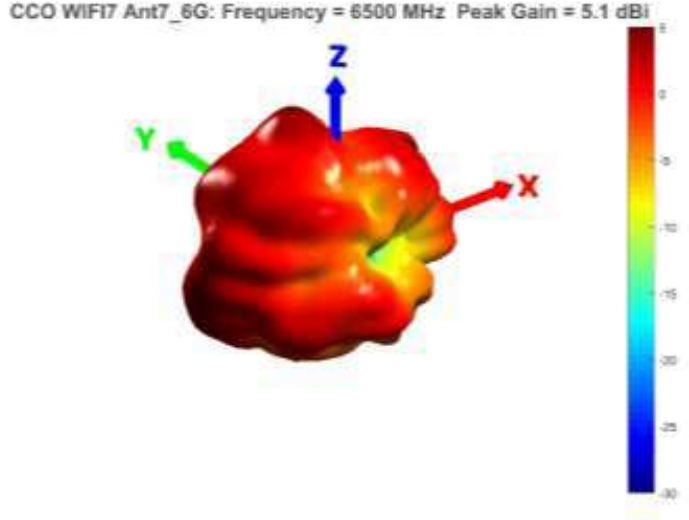


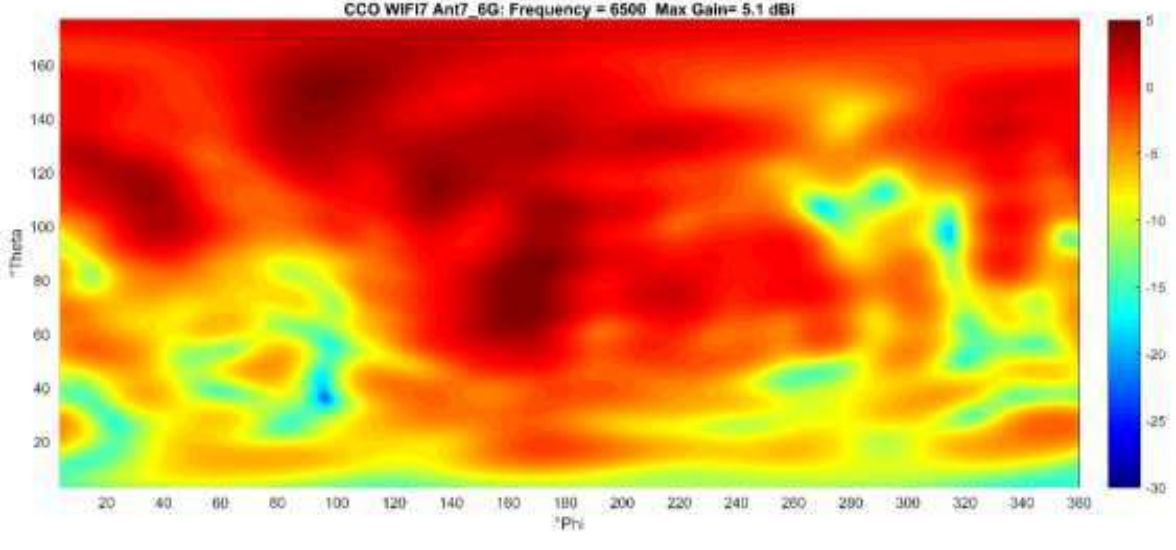
Total Gain 3D Pattern: Ant6_6G at 6500MHz



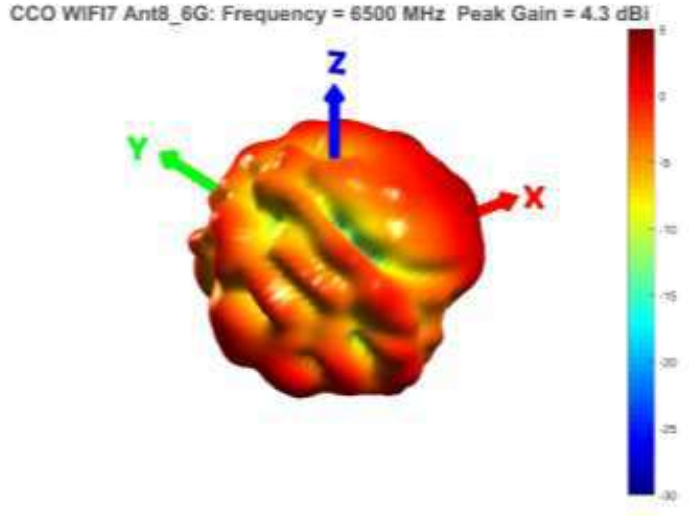


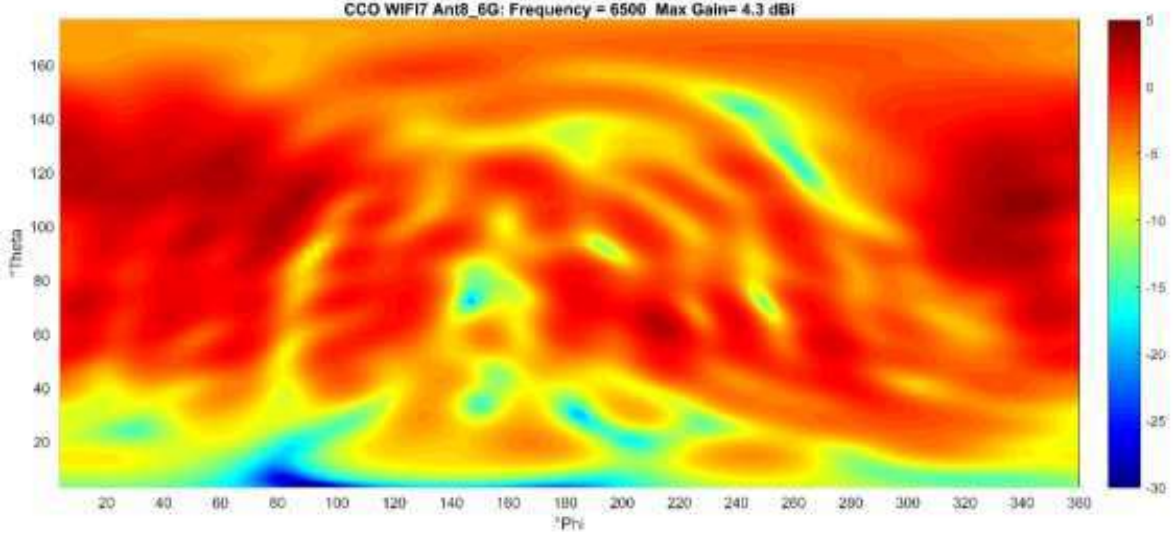
Total Gain 3D Pattern: Ant7_6G at 6500MHz



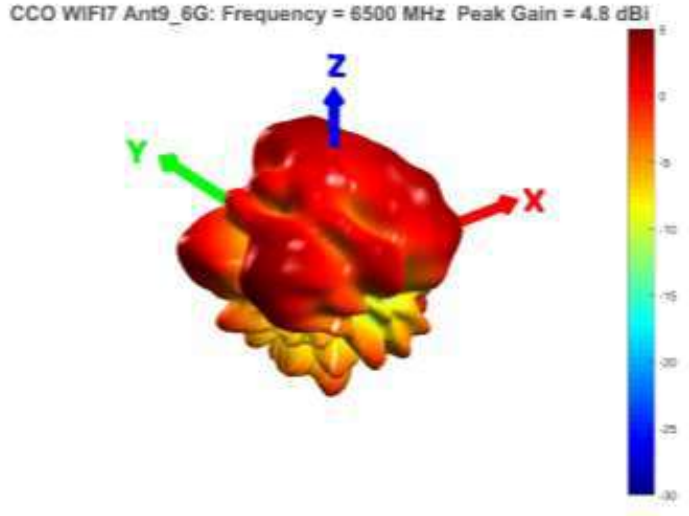


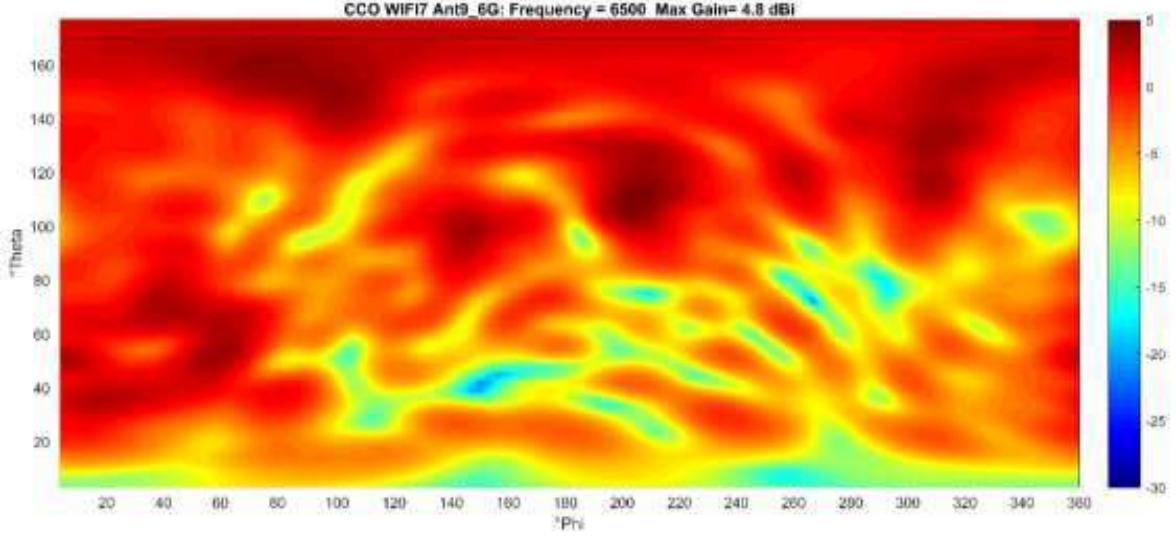
Total Gain 3D Pattern: Ant8_6G at 6500MHz



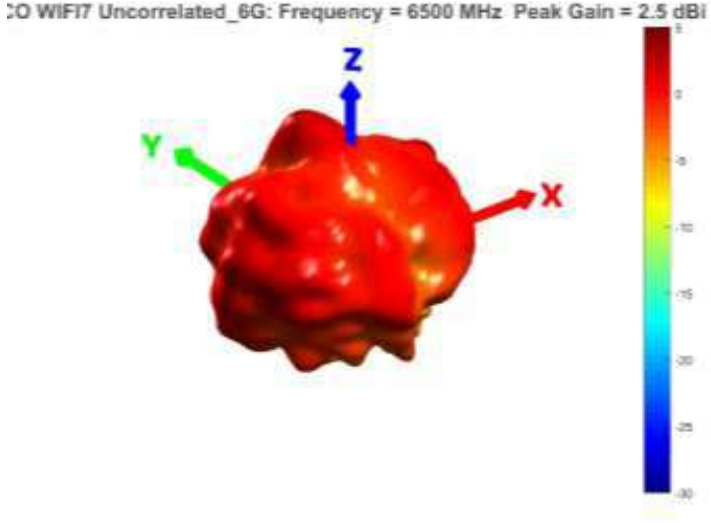


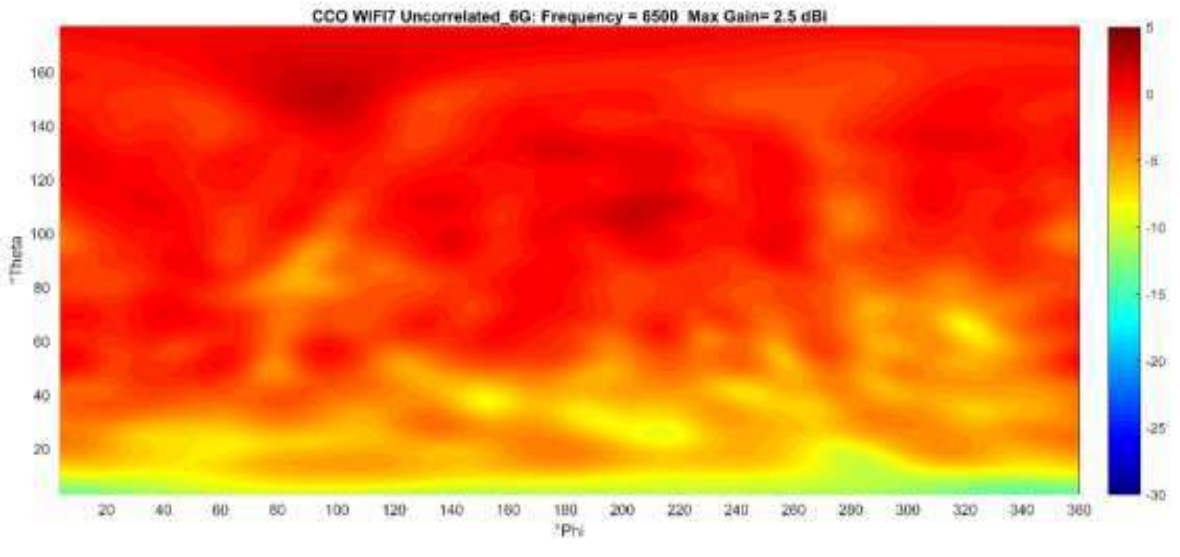
Total Gain 3D Pattern: Ant9_6G at 6500MHz



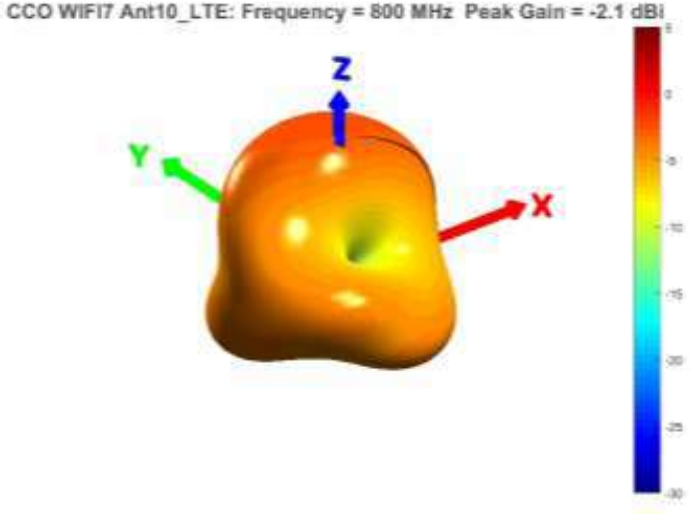


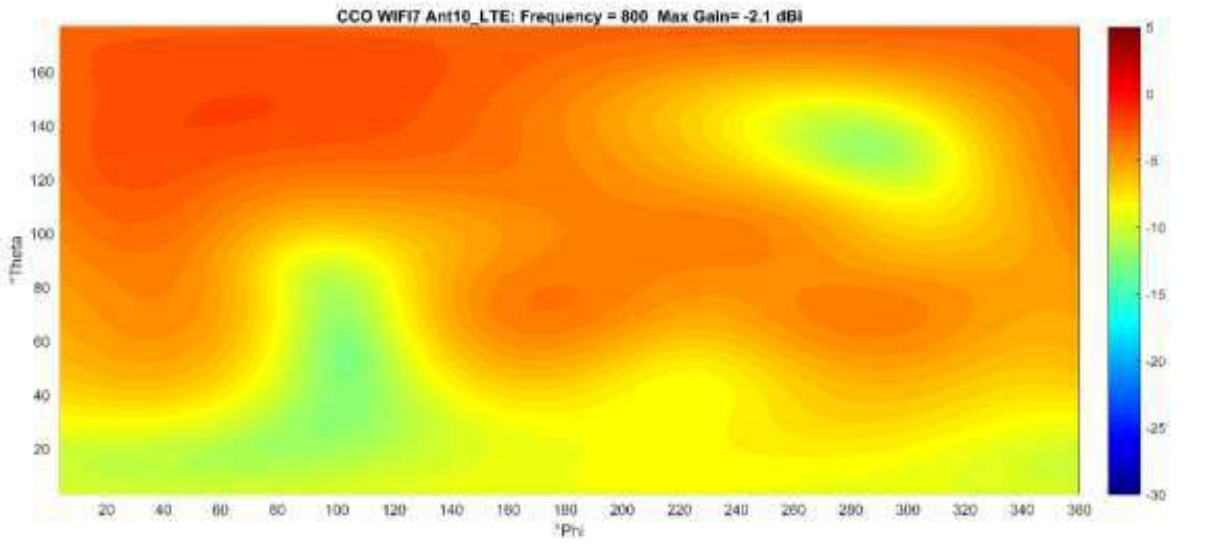
Uncorrelated Total Gain 3D Pattern at 6500MHz



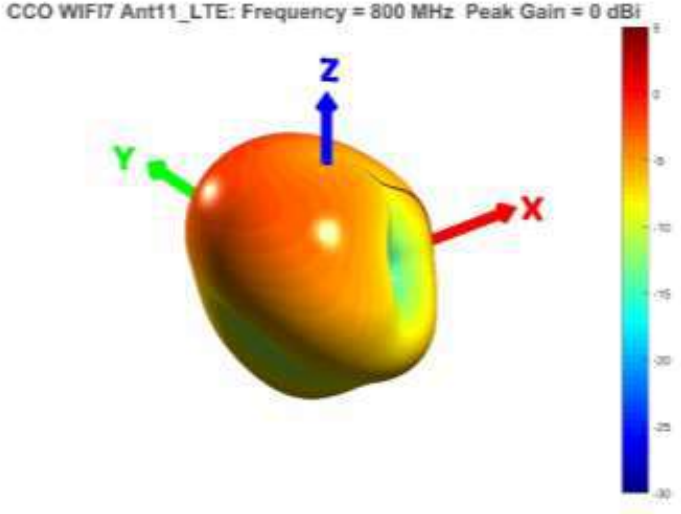


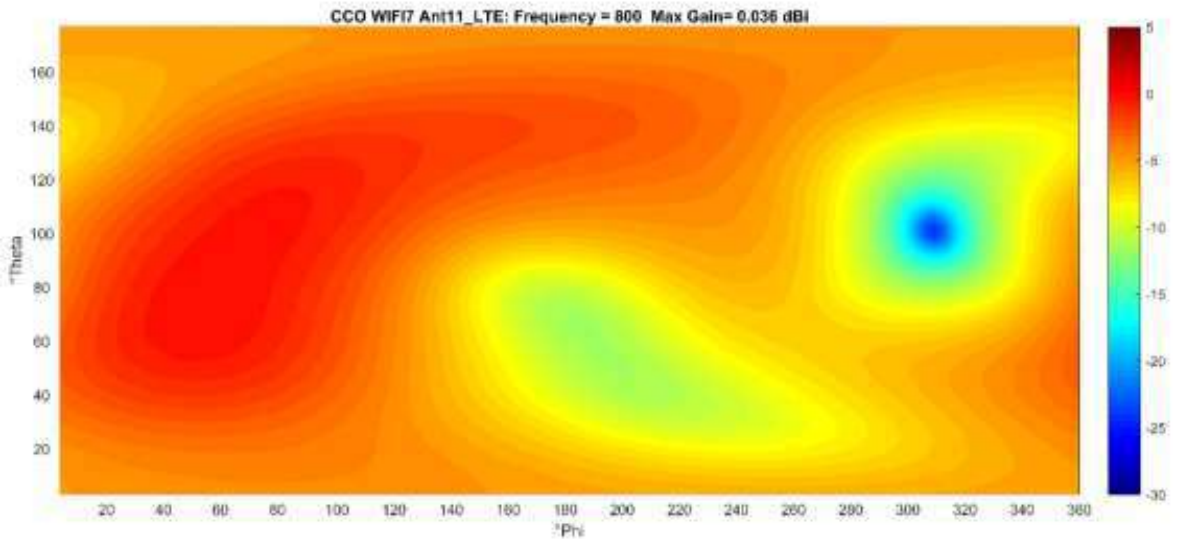
Total Gain 3D Pattern: Ant10_LTE at 800MHz



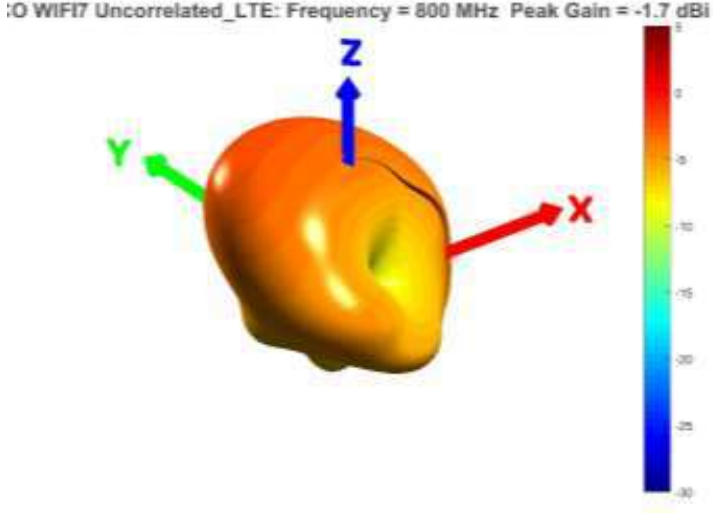


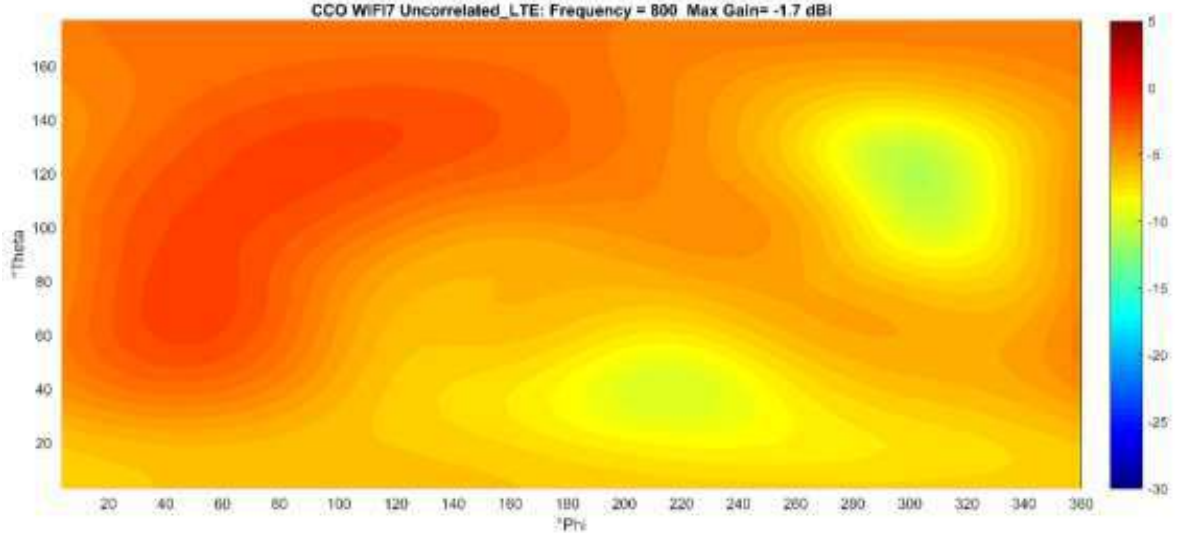
Total Gain 3D Pattern: Ant11_LTE at 800MHz



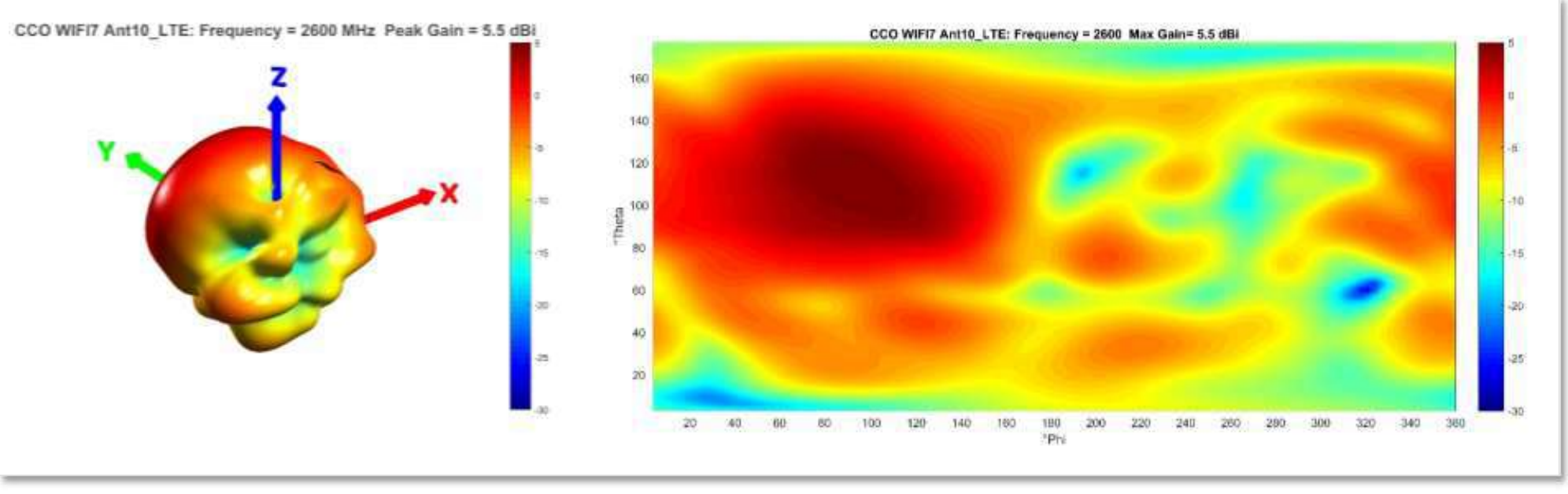


Uncorrelated Total Gain 3D Pattern at 800MHz

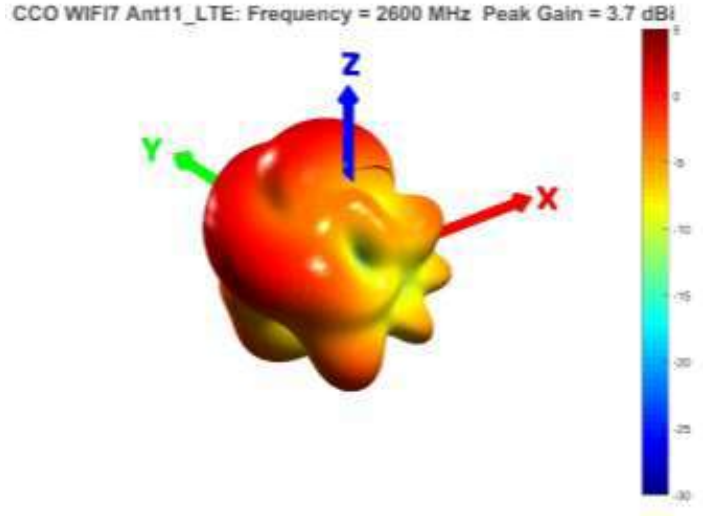


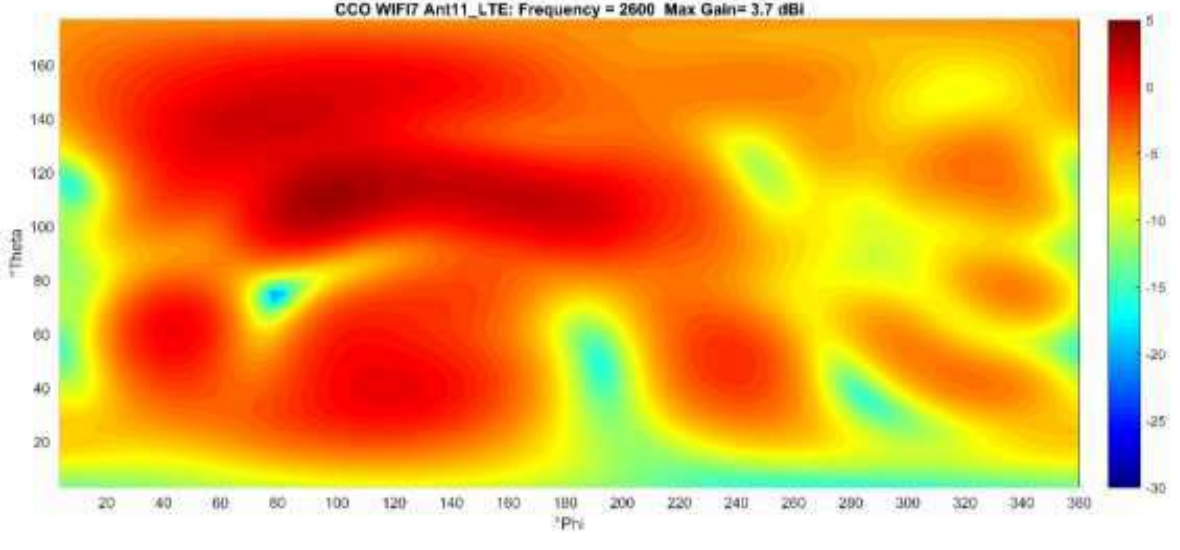


Total Gain 3D Pattern: Ant10_LTE at 2600MHz

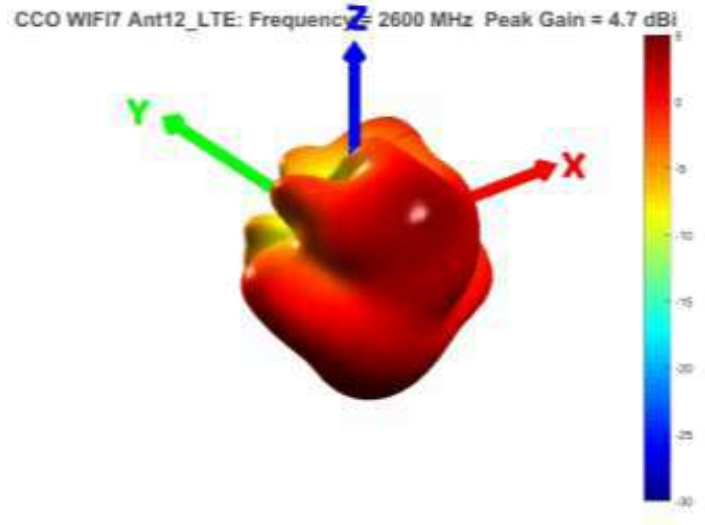


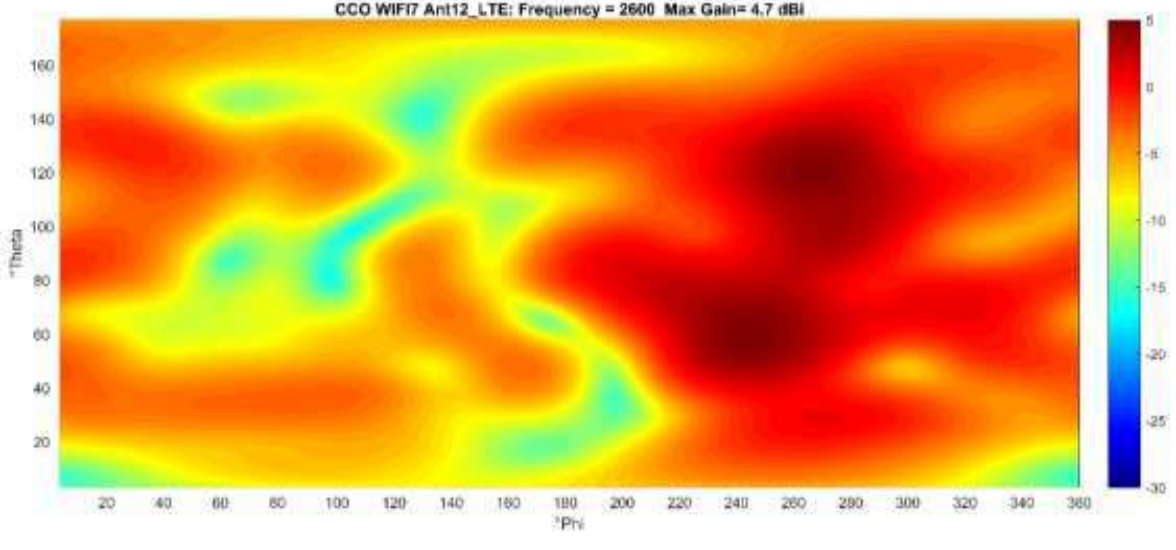
Total Gain 3D Pattern: Ant11_LTE at 2600MHz



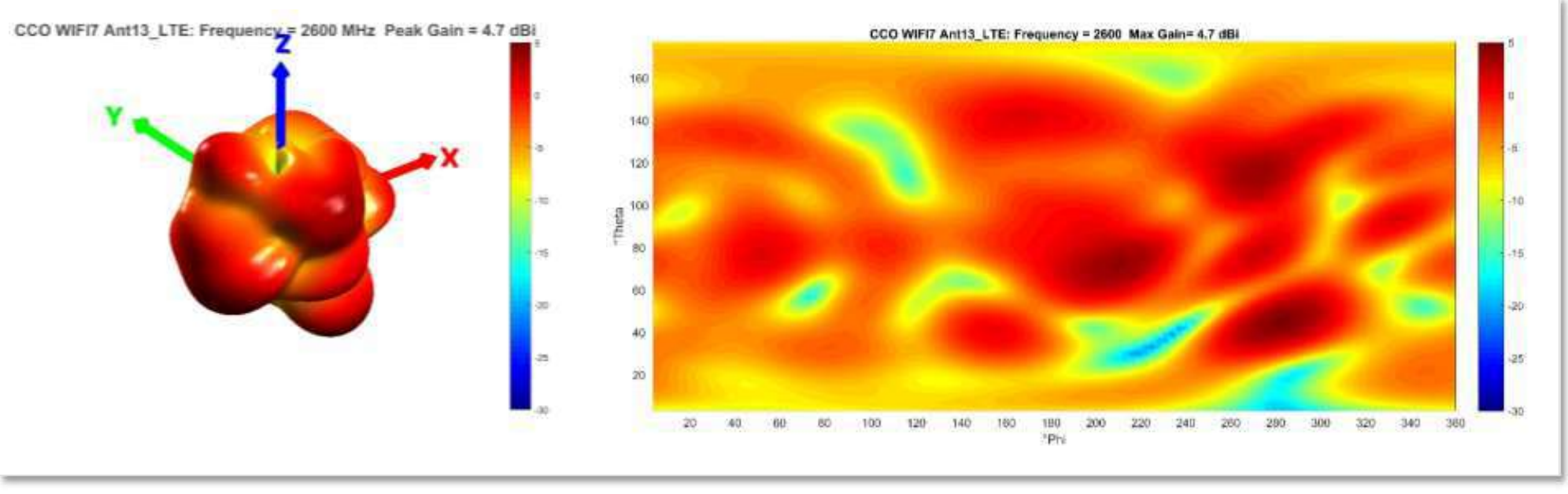


Total Gain 3D Pattern: Ant12_LTE at 2600MHz

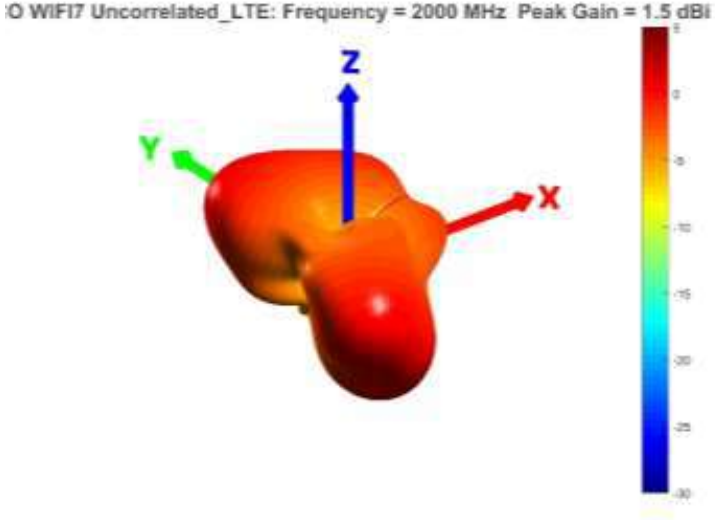


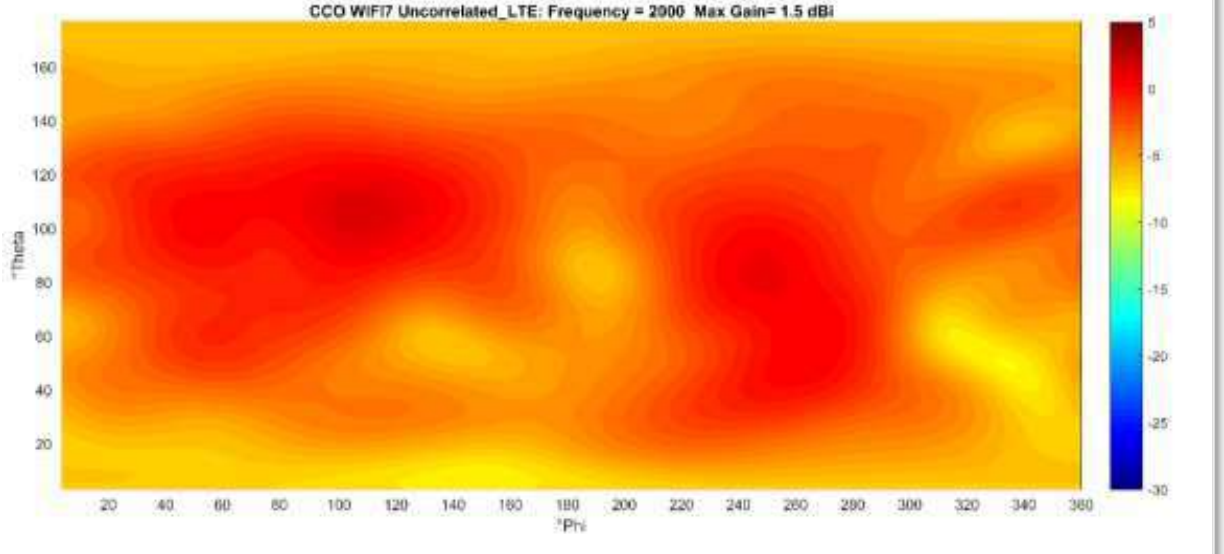


Total Gain 3D Pattern: Ant13_LTE at 2600MHz

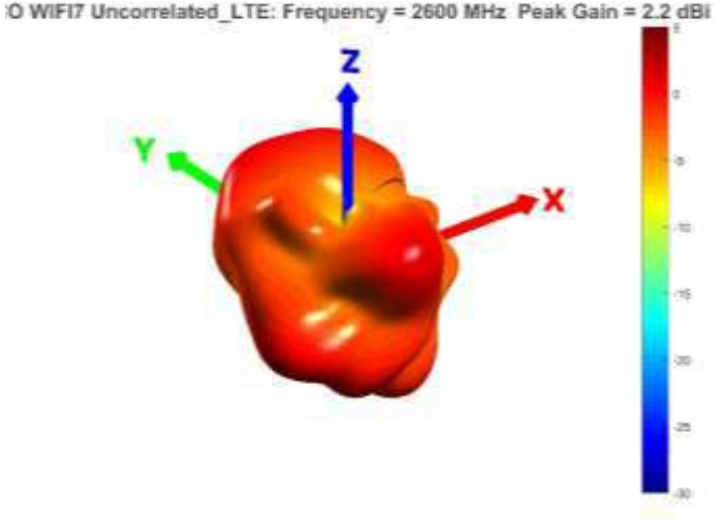


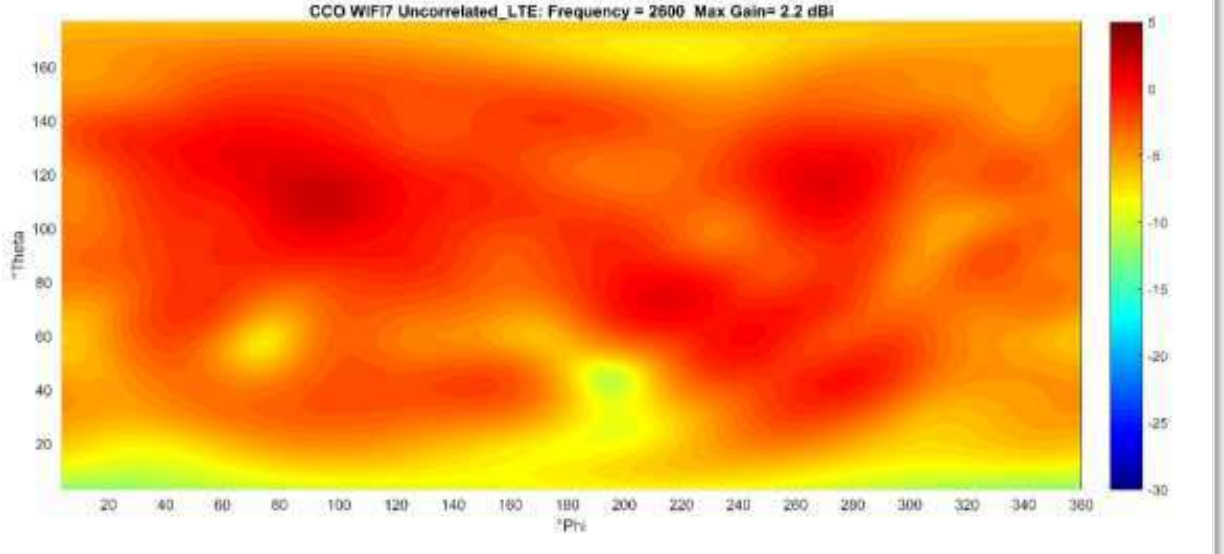
Uncorrelated Total Gain 3D Pattern at 2000MHz



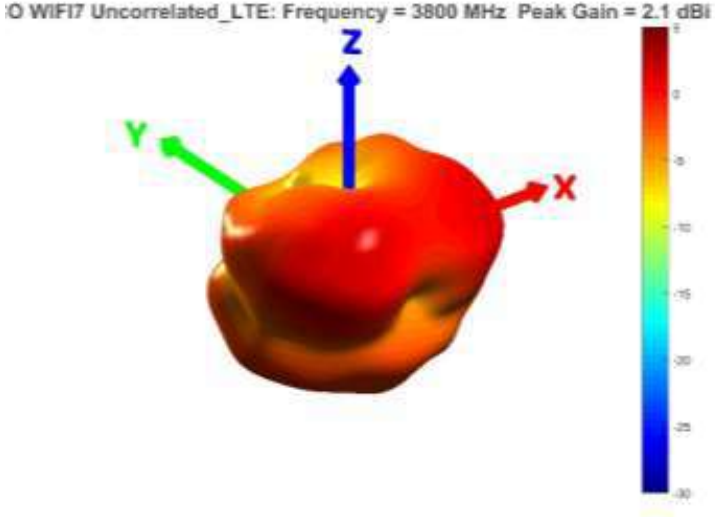


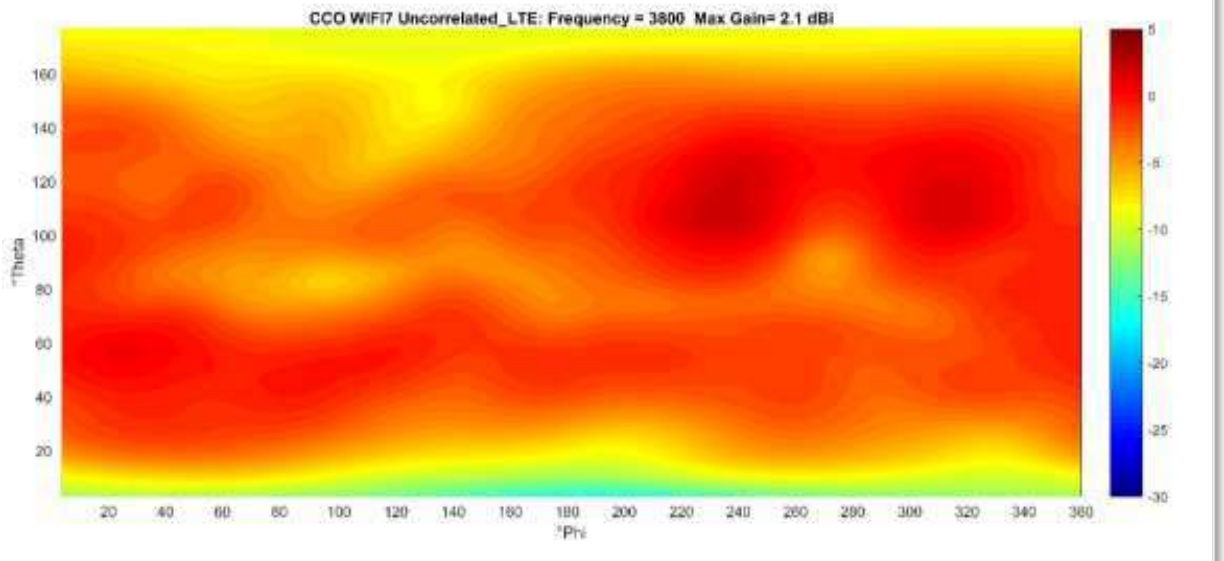
Uncorrelated Total Gain 3D Pattern at 2600MHz



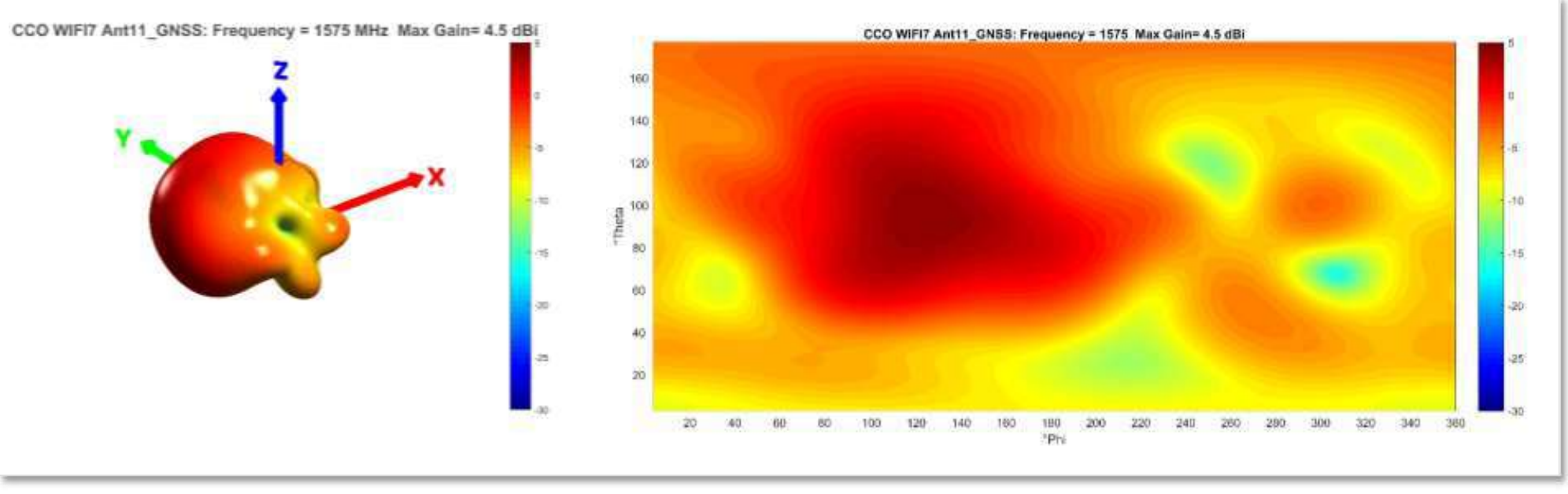


Uncorrelated Total Gain 3D Pattern at 3800MHz





Total Gain 3D Pattern: Ant11_GNSS at 1575MHz



Conclusions

- The test results for Ant10 have been updated, and the passive results look similar to before