

Regulatory WWAN Antenna Information

Platform	
Platform Owner	DELL
Brand Name	DELL
Model Name	P176G
ODM	Compal
Antenna	
Manufacturer	Hong-BO Co., Ltd.
Part Number	■ Tx1/Rx1/Rx2 Antenna WWAN Main/AUX_VECO : 350-24034 DC33002RR4L WWAN Main/Aux_FG : 350-24028 DC33002RR3L
	■ MIMO2/3 Antenna WWAN : 330-24029 DC33002RR2L
Module	
With WWAN Module	L860-GL-16 (4G LTE) / FM350-GL (5G NR)
(Check Box)	

Antenna Sample / Antenna Data

Requirements for worldwide regulatory approval

Section	Description of Required OEM / ODM Antenna Information	US / IC	EU	Japan	Taiwan	S.Korea
1A	Part Number for Antenna only	Required	Required	Required	Required	Required
1B	Antenna Manufacturer Name	Required	Required	Required	Required	Required
1C	Description of Antenna Type	Required	N/A	N/A	N/A	N/A
1D	Part number of Antenna Assembly / cable impedance, length & diameter.	Required	Desired	Desired	Desired	Desired
1E	Tx1, Tx2 & Tx3 antenna (Peak Gain W/ cable loss) *	Required	Required	Required	Required	Required
	1E OR 1F, 1G, 1H					
1F	Tx1, Tx2 & Tx3 antenna (Peak Gain only) *	Required	Required	Required	Required	Required
1G	VSWR of cable including connector	Required	Required	Required	Required	Required
1H	Tx1, Tx2 & Tx3 antenna (Cable loss W/ connector) *	Required	Required	Required	Required	Required
2	Dimensioned Photographs <u>and</u> Drawings of Tx1, Tx2, and Tx3 (or Rx3) antennas	Required	Required	Required	Required	Required
3	Radiation patterns of antennas loaded in the host platform.	Required	Desired	Required	N/A	Required
4	Platform model name / number - correlated to antenna manufacturer and antenna part number	Required	Required	Desired	Required	Desired
5	Photograph(s) or Drawings showing location of antennas in platform. <u>(S. Korea requires photographs of antennas for approval submission).</u> <u>Taiwan requires pictures of each antenna type shown in the system.</u>	Required	Required	Desired	<u>Required (Photos)</u>	<u>Required (Photos)</u>
6	Mech. drawings / photos with dimensions of antenna locations and distance from end-user (For evaluation of SAR testing requirement).	Required	N/A	N/A	N/A	N/A
7	Photograph(s) or Drawings showing the location of all antennas (WLAN, other) and distance between those transmitting antennas. Information will be used to evaluate whether co-location testing is required.	Required	N/A	N/A	N/A	N/A
8	Local representative contact information for LMA/ PARS process.	Required	N/A	N/A	N/A	N/A

Antenna Information

Section 1. Antenna Assembly Specifications

1A	1B	1C	1D	1E	1F	1G	1H
Antenna Part Number	Manufacture	Antenna Type	Cable Assembly Part Number and Information	*Peak Gain W/ Cable loss (dBi)	Peak Gain w/o Cable Loss (dBi)	VSWR	Cable Loss (dBi)
Tx/Rx1 Antenna Antenna P/N: 350-24034 350-24028 Compal P/N: DC33002RR4L DC33002RR3L	Hong-BO Co., Ltd.	Couple	MAIN Ipx 20565-001R-13 50 ohm SLL Coaxial Cable length: 173mm diameter: 1.13mm	617-698MHz dBi -0.12 (peak)	617-698MHz dBi 0.16 (peak)	617-698MHz 3.30 max	617-698MHz dBi 0.28 (peak)
				698-821MHz dBi 1.58 (peak)	698-821MHz dBi 1.86 (peak)	698-821MHz 3.30 max	698-821MHz dBi 0.28 (peak)
				824-960MHz dBi 0.47 (peak)	824-960MHz dBi 0.75 (peak)	824-960MHz 3.30 max	824-960MHz dBi 0.28 (peak)
				1425-1515MHz dBi 1.03 (peak)	1425-1515MHz dBi 1.41 (peak)	1425-1515MHz 3.30 max	1425-1515MHz dBi 0.38 (peak)
				1710-2200MHz dBi 1.24 (peak)	1710-2200MHz dBi 1.62 (peak)	1710-2200MHz 3.30 max	1710-2200MHz dBi 0.38 (peak)
				2300-2690MHz dBi 0.2 (peak)	2300-2690MHz dBi 0.65 (peak)	2300-2690MHz 3.30 max	2300-2690MHz dBi 0.45 (peak)
				3400-3800MHz dBi 1.18 (peak)	3400-3800MHz dBi 1.73 (peak)	3400-3800MHz 3.30 max	3400-3800MHz dBi 0.55 (peak)
				4200-4700MHz dBi 0.08 (peak)	4200-4700MHz dBi 0.7 (peak)	4200-4700MHz dBi 3.30 (peak)	4200-4700MHz dBi 0.62 (peak)
	Hong-BO Co., Ltd.	Couple	AUX Ipx 20565-001R-13 50 ohm SLL Coaxial Cable length: 504mm diameter: 1.13mm	5150-5925MHz dBi 1.39 (peak)	5150-5925MHz dBi 2.08 (peak)	5150-5925MHz 3.30 max	5150-5925MHz dBi 0.69 (peak)
				617-698MHz dBi -5.28 (peak)	617-698MHz dBi -4.47 (peak)	617-698MHz 3.30 max	617-698MHz dBi 0.81 (peak)
				698-821MHz dBi -0.28 (peak)	698-821MHz dBi 0.53 (peak)	698-821MHz 3.30 max	698-821MHz dBi 0.81 (peak)
				824-960MHz dBi 1.07 (peak)	824-960MHz dBi 1.88 (peak)	824-960MHz 3.30 max	824-960MHz dBi 0.81 (peak)
				1425-1515MHz dBi -0.8 (peak)	1425-1515MHz dBi 0.3 (peak)	1425-1515MHz 3.30 max	1425-1515MHz dBi 1.1 (peak)
				1557-1610 MHz dBi -0.82 (peak)	1557-1610 MHz dBi 0.28 (peak)	1557-1610 MHz 3.30 max	1557-1610 MHz dBi 1.1 (peak)
				1805-2200MHz dBi -0.96 (peak)	1805-2200MHz dBi 0.14 (peak)	1805-2200MHz 3.30 max	1805-2200MHz dBi 1.1 (peak)
				2300-2690MHzzz dBi -0.02 (peak)	2300-2690MHzzz dBi 1.31 (peak)	2300-2690MHzzz 3.30 max	2300-2690MHzzz dBi 1.33 (peak)
				3400-3800MHz	3400-3800MHz	3400-3800MHz	3400-3800MHz

				0.62 dBi (peak)	2.23 dBi (peak)	3.30 max	1.61 dBi (peak)
				4200-4700MHz -0.27 dBi (peak)	4200-4700MHz 1.55 dBi (peak)	4200-4700MHz 3.30 dBi (peak)	4200-4700MHz 1.82 dBi (peak)
				5150-5925MHz -3.07 dBi (peak)	5150-5925MHz -1.05 dBi (peak)	5150-5925MHz 3.30 max	5150-5925MHz 2.02 dBi (peak)

1A Antenna Part Number	1B Manufacture	1C Antenna Type	1D Cable Assembly Part Number and Information	1E *Peak Gain W/ Cable loss (dBi)	1F Peak Gain w/o Cable Loss (dBi)	1G VSWR	1H Cable Loss (dBi)
Antenna Antenna P/N: 330-24029 Compal P/N: DC33002RR2L	Hong-BO Co., Ltd.	Couple	Ipex 20565-001R-13 50 ohm SLL Coaxial Cable length: 147.5mm diameter: 1.13mm	1425-1515MHz -1.99 dBi (peak)	1425-1515MHz -1.67 dBi (peak)	1425-1515MHz 3.50 max	1425-1515MHz 0.32 dBi (peak)
				1710-2200MHz 1.61 dBi (peak)	1710-2200MHz 1.93 dBi (peak)	1710-2200MHz 3.50 max	1710-2200MHz 0.32 dBi (peak)
				2300-2690MHz 0.42 dBi (peak)	2300-2690MHz 0.81 dBi (peak)	2300-2690MHz 3.50 max	2300-2690MHz 0.39 dBi (peak)
				3400-3800MHz 0.48 dBi (peak)	3400-3800MHz 0.95 dBi (peak)	3400-3800MHz 3.50 max	3400-3800MHz 0.47 dBi (peak)
	Hong-BO Co., Ltd.	Couple	Ipex 20565-001R-13 50 ohm SLL Coaxial Cable length: 218mm diameter: 1.13mm	4200-5000MHz 1.28 dBi (peak)	4200-5000MHz 1.81 dBi (peak)	4200-5000MHz 3.50 max	4200-5000MHz 0.53 dBi (peak)
				1805-2200MHz 1.89 dBi (peak)	1805-2200MHz 2.36 dBi (peak)	1805-2200MHz 3.50 max	1805-2200MHz 0.47 dBi (peak)
				2300-2690MHz 1.7 dBi (peak)	2300-2690MHz 2.27 dBi (peak)	2300-2690MHz 3.50 max	2300-2690MHz 0.57 dBi (peak)
				3400-3800MHz 1.45 dBi (peak)	3400-3800MHz 2.14 dBi (peak)	3400-3800MHz 3.50 max	3400-3800MHz 0.69 dBi (peak)
				4200-5000MHz 0.61 dBi (peak)	4200-5000MHz 1.39 dBi (peak)	4200-5000MHz 3.50 max	4200-5000MHz 0.78 dBi (peak)

- Antenna Peak Gain required being test in system basis.
- 1E frame contend absolutely peak antenna gain include H/V

Antenna Peak Gain Table: Low and middle band

	TPx antenna		DRx antenna	
Frequency (MHz)	Horizontal	Vertical	Horizontal	Vertical
	(dBi)	(dBi)	(dBi)	(dBi)
617	-6.09	-5.41	-8.27	-6.84
634.5	-5.16	-4.79	-7.78	-5.92
652	-4.79	-4.29	-7.58	-5.28
663	-4.99	-4.52		
680.5	-5.08	-3.55		
698	-2.77	-0.12		
703	-2.77	0.80		
707.5	-2.33	0.96		
717	-2.33	1.28	-5.40	-2.37
725.5	-1.90	1.00	-4.99	-2.12
748	-1.22	0.50	-3.00	-0.28
756	-0.77	1.58	-2.33	-0.42
768	-0.74	1.41	-2.04	-0.52
777	-1.21	1.01	-1.96	-0.80
782	-1.35	1.42	-2.16	-1.30
787	-1.50	1.12	-2.36	-1.79
814	-3.20	0.34	-4.21	-2.50
824	-3.16	0.10	-3.30	-1.65
832	-2.40	0.47	-2.46	-1.10
836.5	-2.23	0.17	-2.09	-0.47
849	-1.42	0.45	-1.34	0.27
862	-0.43	0.29	-0.85	1.07
880	-0.32	-0.08	-1.61	0.71
897.5	-0.83	0.42	-1.95	0.77
915	-1.04	0.30	-1.26	0.46
925	-1.33	0.02	-1.30	0.15
960	-2.13	-0.97	-3.01	-1.79
1427.9	-2.09	1.03	-5.90	-4.75
1447.9	-2.03	0.81	-5.22	-3.23
1455.4	-2.17	0.84	-5.01	-2.64
1462.9	-2.29	0.67	-4.42	-2.34
1496	-0.81	0.13	-3.58	-0.84
1510.9	-1.18	-0.24	-3.74	-0.80
1557			-4.80	-0.82
1575			-4.74	-1.78
1610			-4.61	-1.94

High band

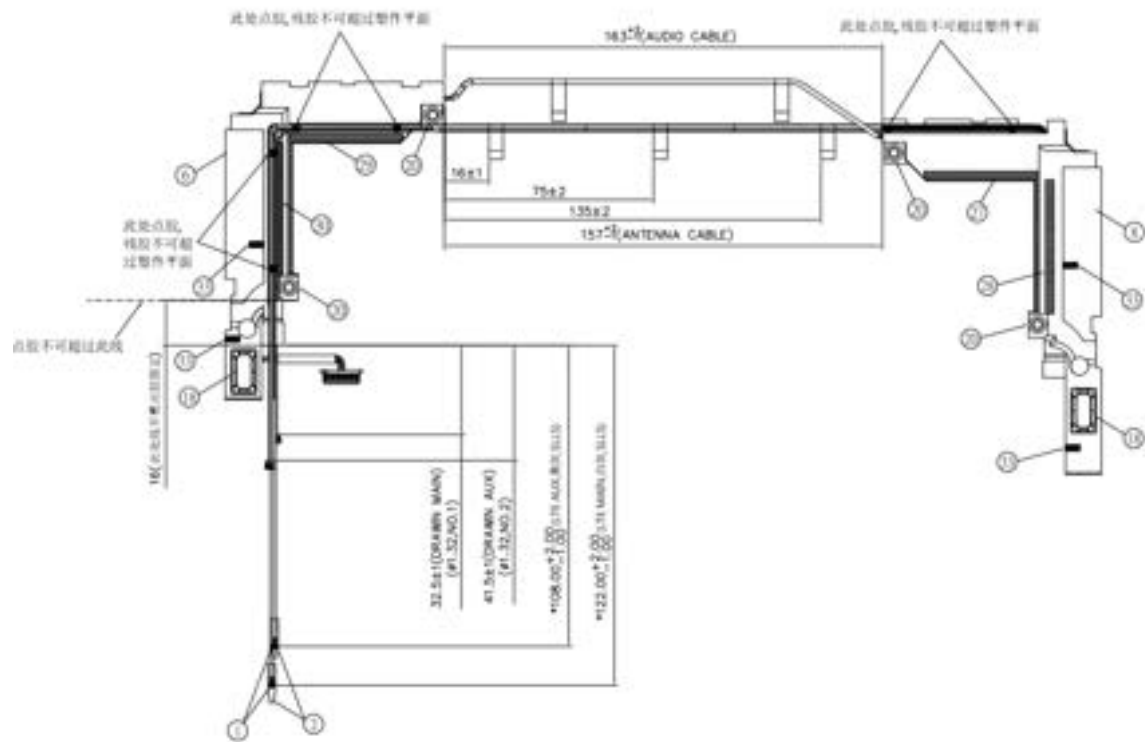
Frequency (MHz)	TPx antenna		DRx antenna	
	Horizontal (dBi)	Vertical (dBi)	Horizontal (dBi)	Vertical (dBi)
1710	1.24	-0.48		
1732.5	0.35	-0.48		
1747.5	-0.19	-0.52		
1755	-0.64	-0.65		
1785	-1.24	-1.38		
1805	-1.39	-1.48	-2.43	-3.02
1850	-2.07	-2.58	-1.94	-2.38
1880	0.00	-2.16	-2.20	-2.03
1910	1.12	-1.44	-2.18	-2.14
1920	1.17	-1.58	-2.18	-1.65
1950	0.54	-1.23	-2.71	-2.05
1980	-0.78	-1.24	-3.27	-2.88
2110	-0.82	-1.17	-2.95	-0.96
2200	-0.62	-0.43	-2.40	-2.21
2300	-0.15	-0.26	-0.47	-0.76
2305	-0.16	-0.44	-0.51	-0.57
2315	-0.36	-1.00	-0.72	-0.96
2350	-0.70	-0.76	-1.71	-1.57
2400	-1.07	-0.26	-1.24	-1.76
2500	-0.56	-0.31	-0.69	-0.83
2570	-0.39	-0.92	-0.64	-0.62
2595	-0.39	-0.83	-0.67	-0.52
2620	-0.33	-0.35	-1.26	-0.02
2690	0.20	-1.91	-0.76	-1.20
3400	-0.35	1.18	-1.26	0.13
3500	-1.12	0.46	-1.33	-1.79
3600	-2.02	-1.14	-2.89	-3.01
3700	-2.52	-2.75	-0.33	-0.60
3800	-3.99	-4.59	-0.14	0.62
4200	0.08	-1.36	-1.54	-0.27
4400	-1.39	-3.82	-3.53	-3.81
4700	-2.97	-5.52	-7.77	-7.31
5150	0.35	-1.31	-6.73	-6.11
5537.5	-0.19	1.39	-4.17	-3.07
5925	0.54	0.71	-5.08	-3.38

	DRx2 antenna		DRx1 antenna	
Frequency (MHz)	Horizontal	Vertical	Horizontal	Vertical
	(dBi)	(dBi)	(dBi)	(dBi)
1452	-1.99	-2.67		
1474	-3.34	-2.83		
1496	-3.84	-3.25		
1710	1.24	-2.91		
1732.5	1.59	-2.19		
1747.5	1.55	-2.07		
1755	1.16	-2.22		
1785	1.61	-2.75		
1805	1.18	-2.52	1.01	0.79
1850	-0.57	-1.41	1.31	0.25
1880	-0.32	-0.16	0.87	1.76
1910	0.38	0.18	1.27	0.82
1920	1.05	0.07	1.11	1.89
1950	0.03	1.06	0.68	1.63
1980	0.66	1.32	1.35	1.46
2110	0.54	0.28	1.70	0.32
2200	0.67	-2.92	1.10	-2.59
2300	0.42	-2.03	1.30	-2.77
2305	0.39	-1.95	0.93	-2.77
2315	0.40	-1.90	0.76	-2.30
2350	-0.29	-2.24	1.70	-2.40
2400	-0.15	-2.49	0.87	-2.52
2500	0.00	-4.05	0.52	-3.15
2570	-2.72	-4.08	0.38	-2.94
2595	-2.56	-3.90	-0.36	-3.33
2620	-2.32	-3.55	-1.12	-2.81
2690	-1.03	-3.45	0.42	-0.95
3400	0.32	-5.43	-0.04	-2.89
3500	0.09	-4.18	1.45	-2.96
3600	0.48	-3.16	-0.19	-2.65
3700	-0.35	-4.47	-1.26	-2.77
3800	0.02	-2.48	-1.75	-2.71
4200	1.28	-1.74	-3.16	-2.95
4400	-0.64	-3.25	-0.44	-1.74
4700	-3.44	-1.34	-0.44	-1.99
5000	0.65	-2.26	0.61	-0.50

Section 2. Dimensioned Photos or Drawings of Antennas

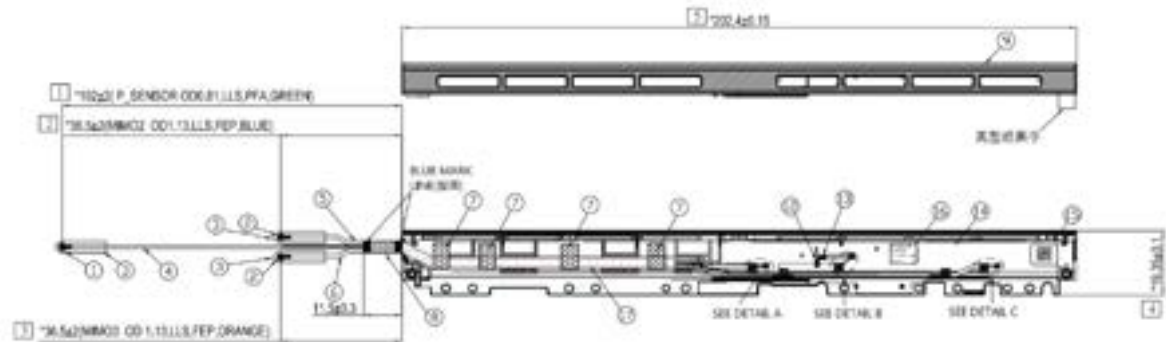
Include a dimensioned photo and dimensioned drawing of Main & Aux antenna here.

TPx/DRx Antenna Dimensioned Drawing:



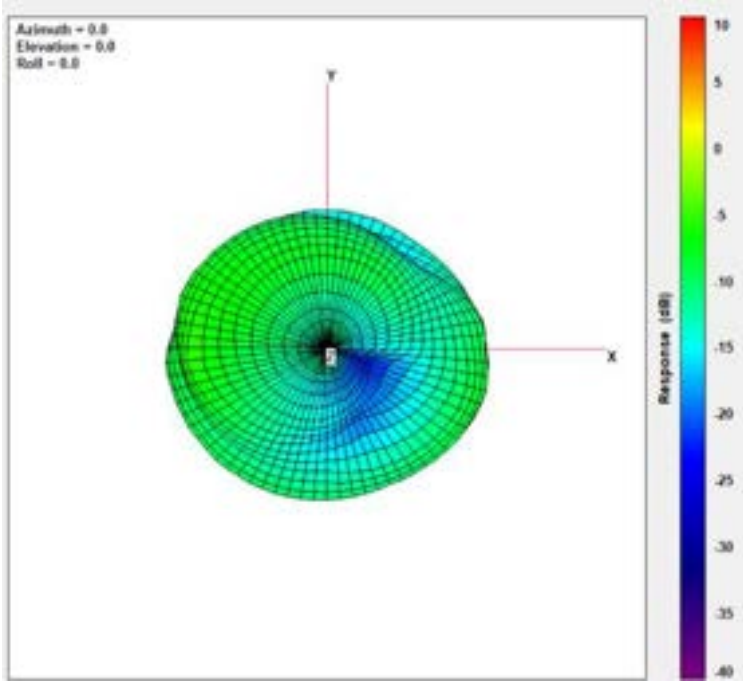
Include a dimensioned photo and dimensioned drawing of Aux antenna here.

DRx2/DRx1 Antenna Dimensioned Drawing:



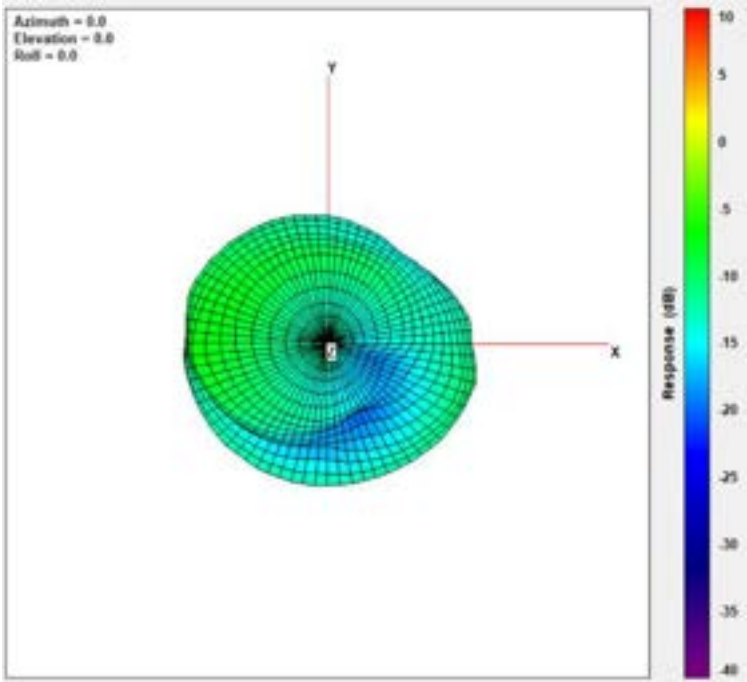
Section 3. Radiation characteristics of antennae Loaded in Host Platform
WWAN Main Antenna (TPx)

617MHz



Center Frequency	617 MHz
Horizontal (dBi) peak	-6.09
Vertical (dBi) peak	-5.41

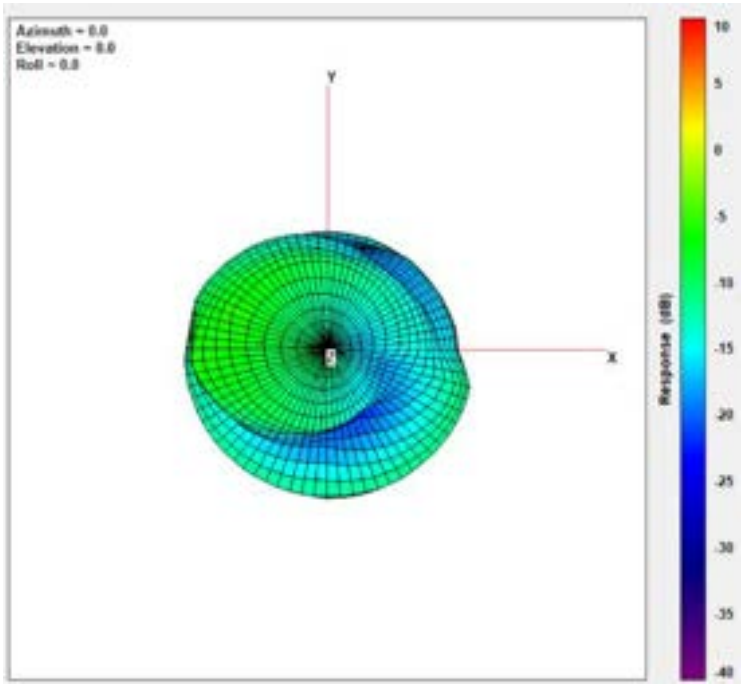
634.5MHz



Center Frequency	634.5MHz
------------------	----------

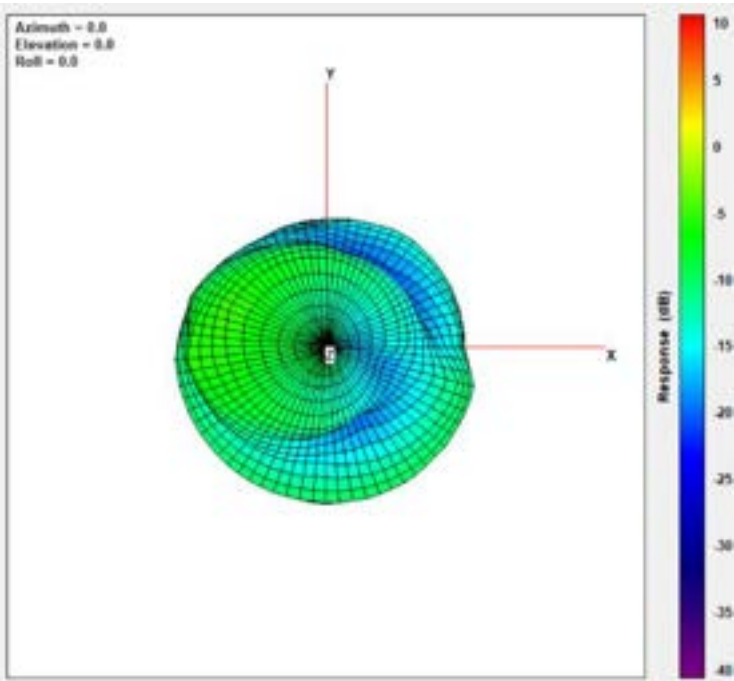
Horizontal (dBi) peak	-5.16
Vertical (dBi) peak	-4.79

652MHz



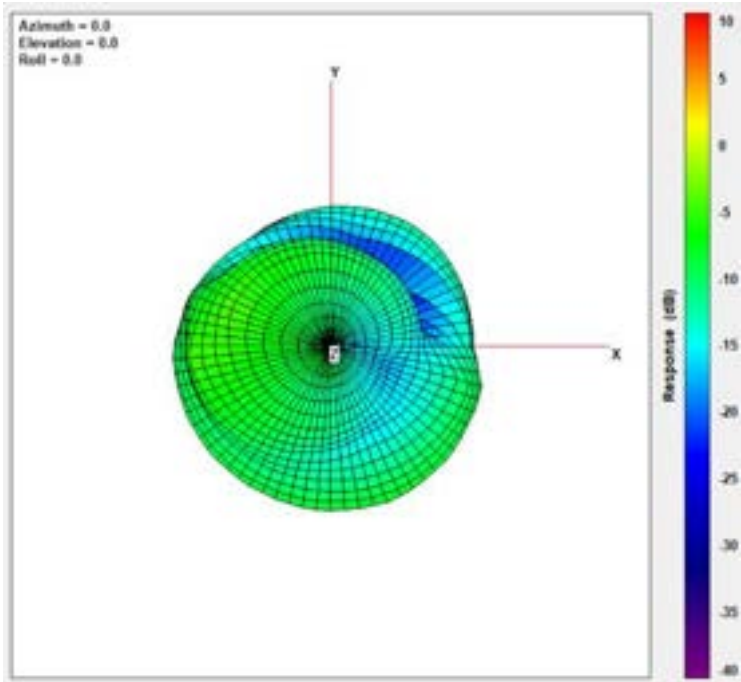
Center Frequency	652 MHz
Horizontal (dBi) peak	-4.79
Vertical (dBi) peak	-4.29

663MHz



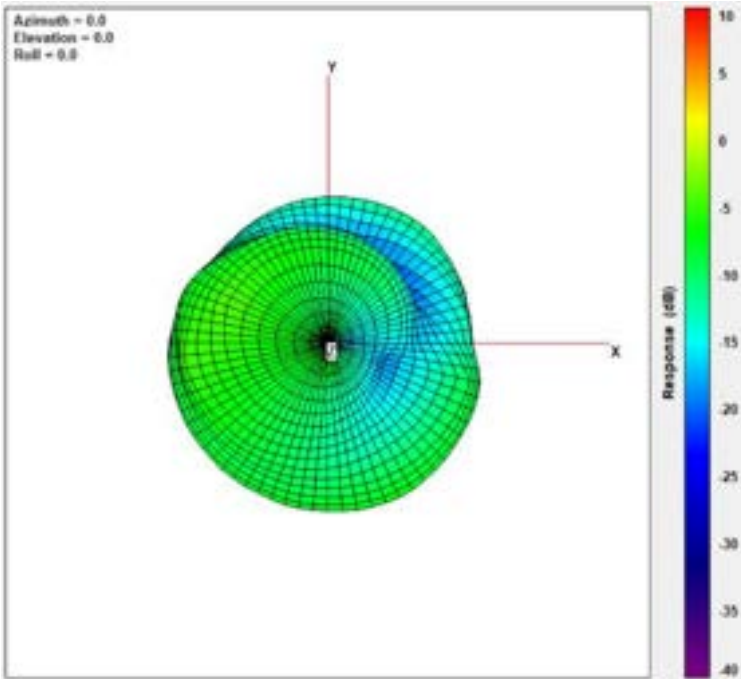
Center Frequency	663MHz
Horizontal (dBi) peak	-4.99
Vertical (dBi) peak	-4.52

680.5MHz



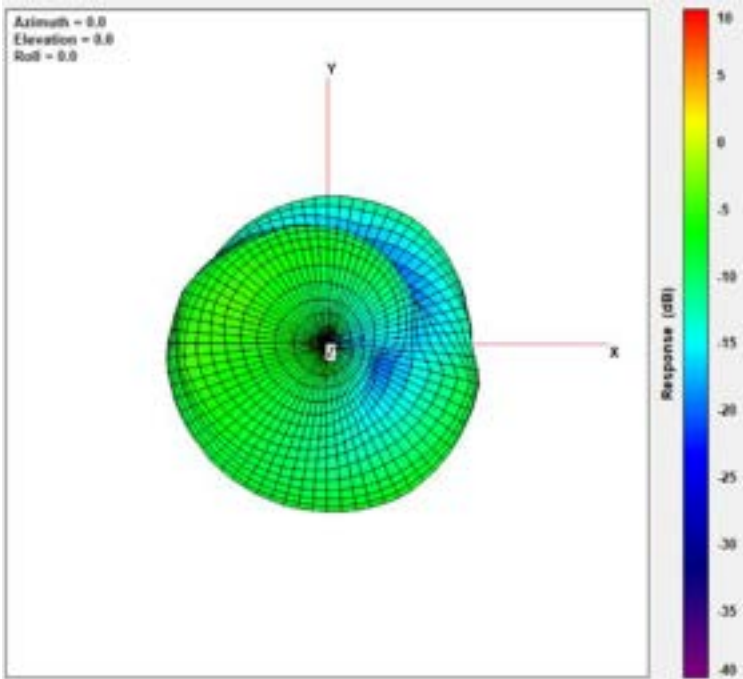
Center Frequency	680.5 MHz
Horizontal (dBi) peak	-5.08
Vertical (dBi) peak	-3.55

698MHz



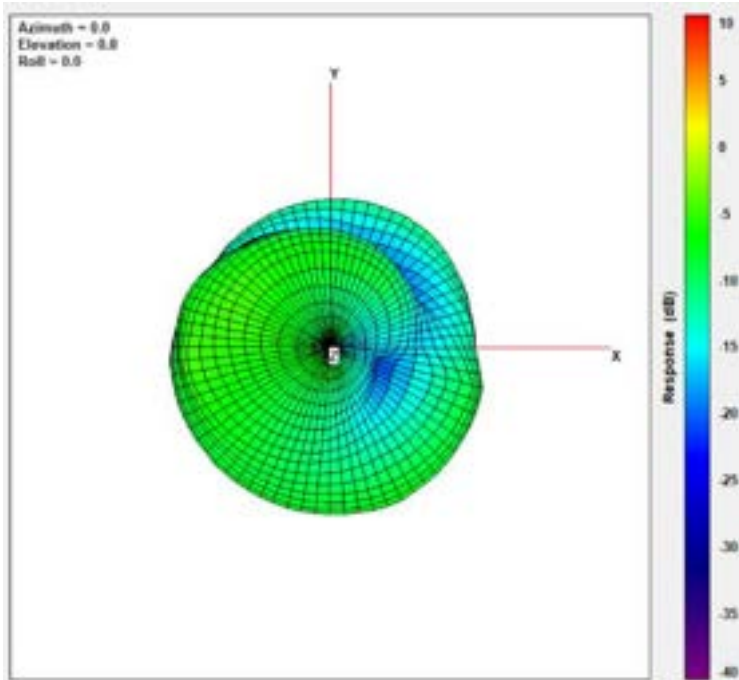
Center Frequency	698 MHz
Horizontal (dBi) peak	-2.77
Vertical (dBi) peak	-0.12

703MHz



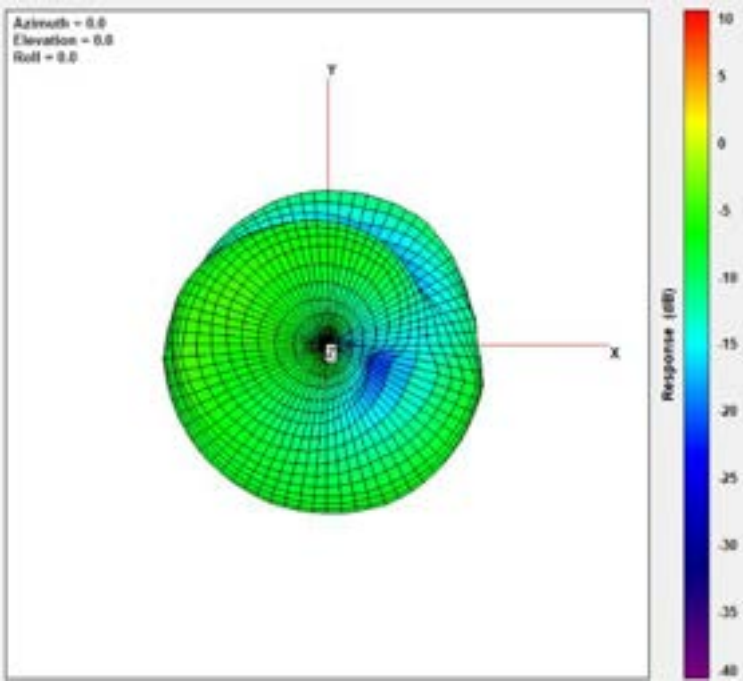
Center Frequency	703MHz
Horizontal (dBi) peak	-2.77
Vertical (dBi) peak	0.80

707.5MHz



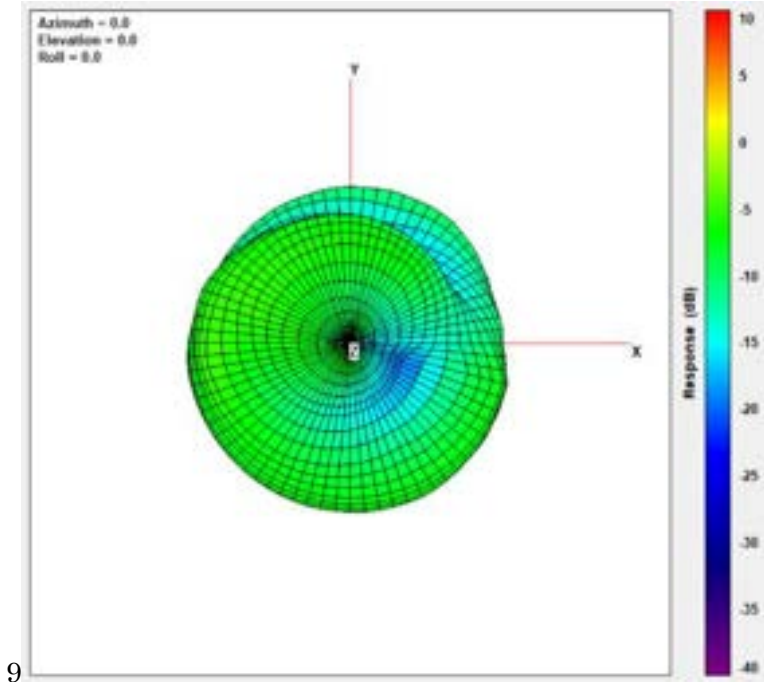
Center Frequency	707.5MHz
Horizontal (dBi) peak	-2.33
Vertical (dBi) peak	0.96

717MHz



Center Frequency	717MHz
Horizontal (dBi) peak	-2.33
Vertical (dBi) peak	1.28

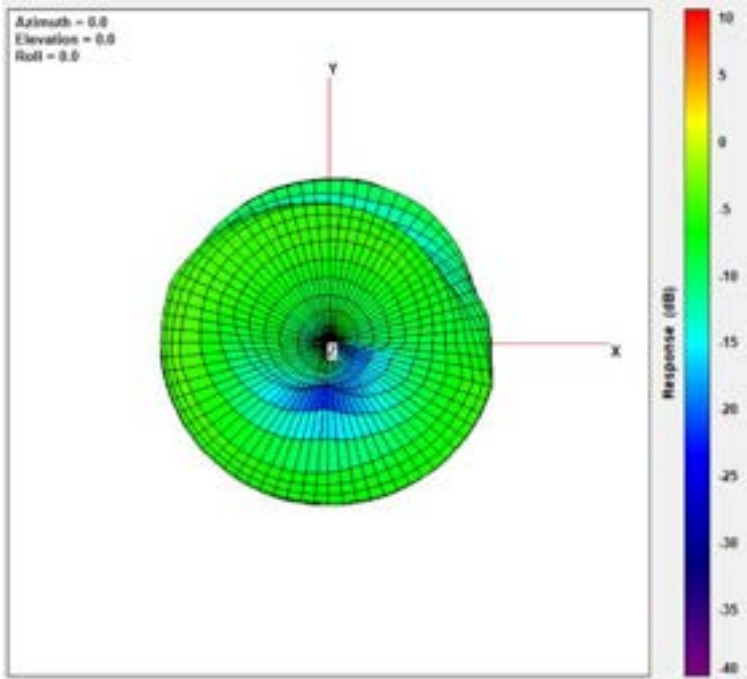
725.5MHz



9

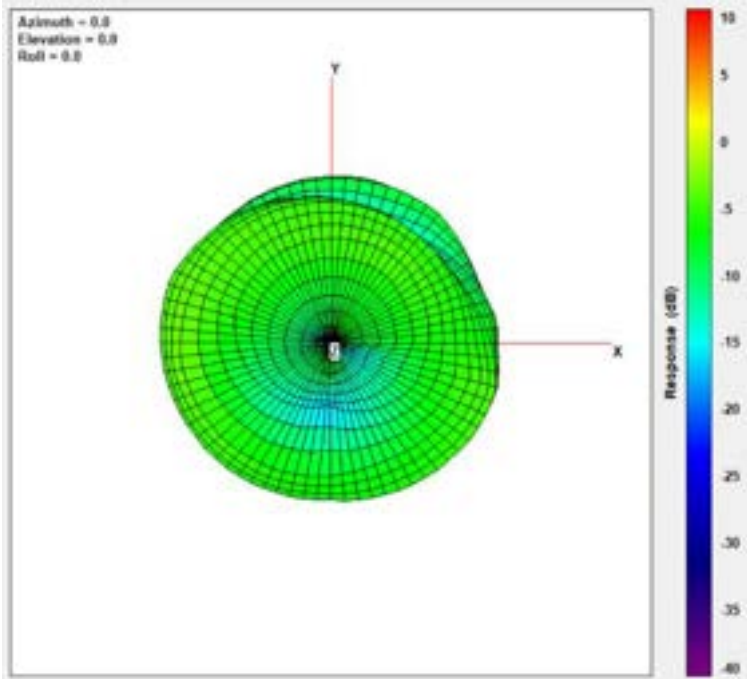
Center Frequency	725.5MHz
Horizontal (dBi) peak	-1.90
Vertical (dBi) peak	1.00

748MHz



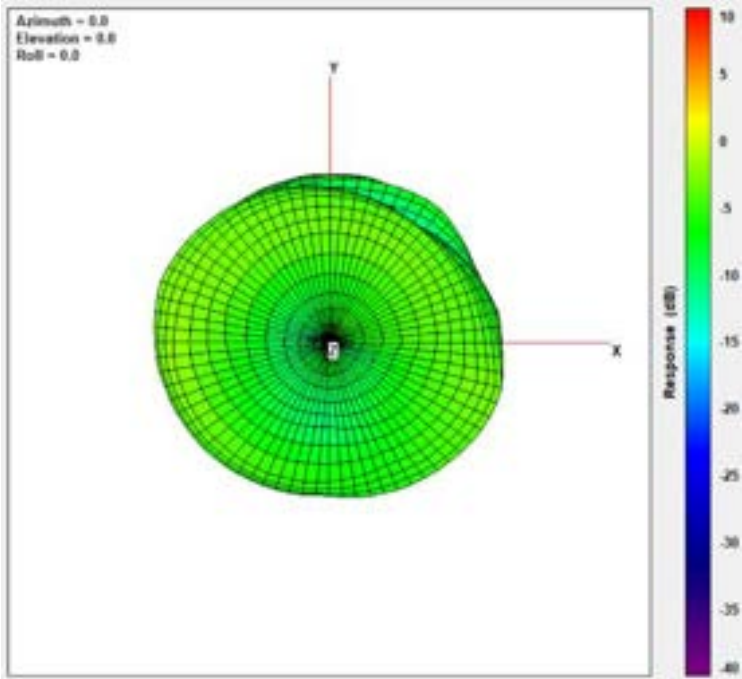
Center Frequency	748MHz
Horizontal (dBi) peak	-1.22
Vertical (dBi) peak	0.50

756MHz



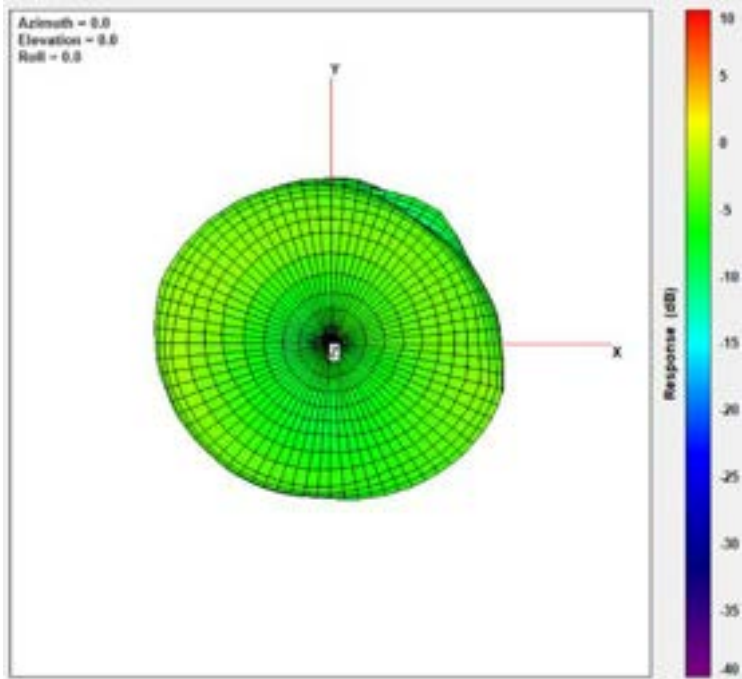
Center Frequency	756MHz
Horizontal (dBi) peak	-0.77
Vertical (dBi) peak	1.58

768MHz



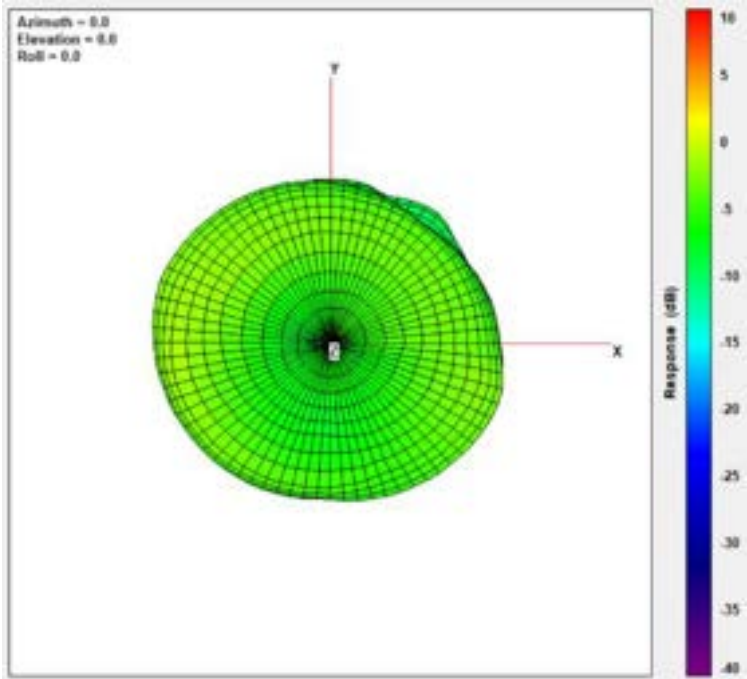
Center Frequency	768MHz
Horizontal (dBi) peak	-0.74
Vertical (dBi) peak	1.41

777MHz



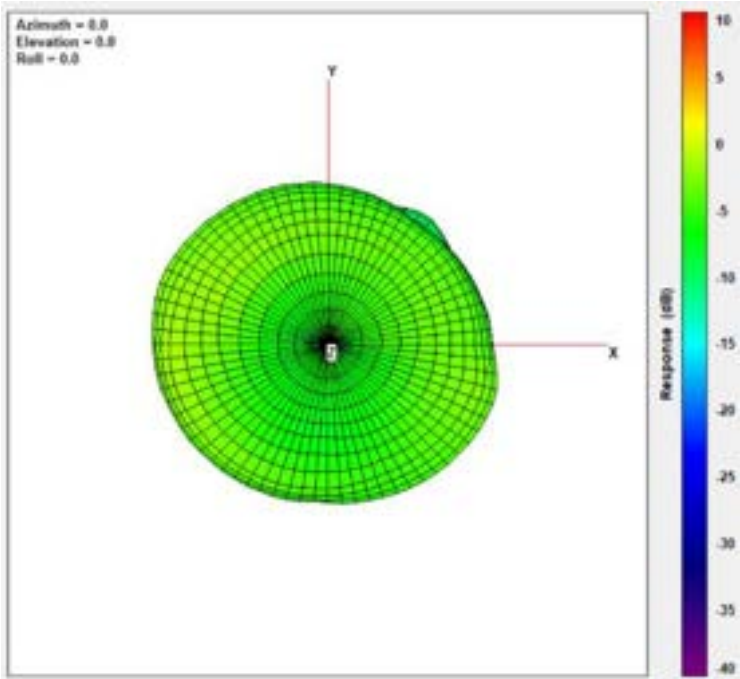
Center Frequency	777MHz
Horizontal (dBi) peak	-1.21
Vertical (dBi) peak	1.01

782MHz



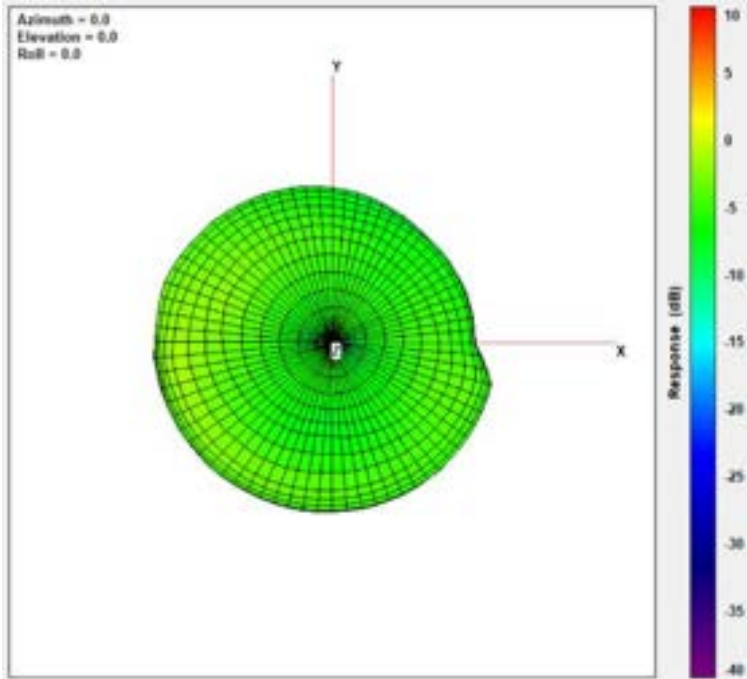
Center Frequency	782MHz
Horizontal (dBi) peak	-1.35
Vertical (dBi) peak	1.42

787MHz



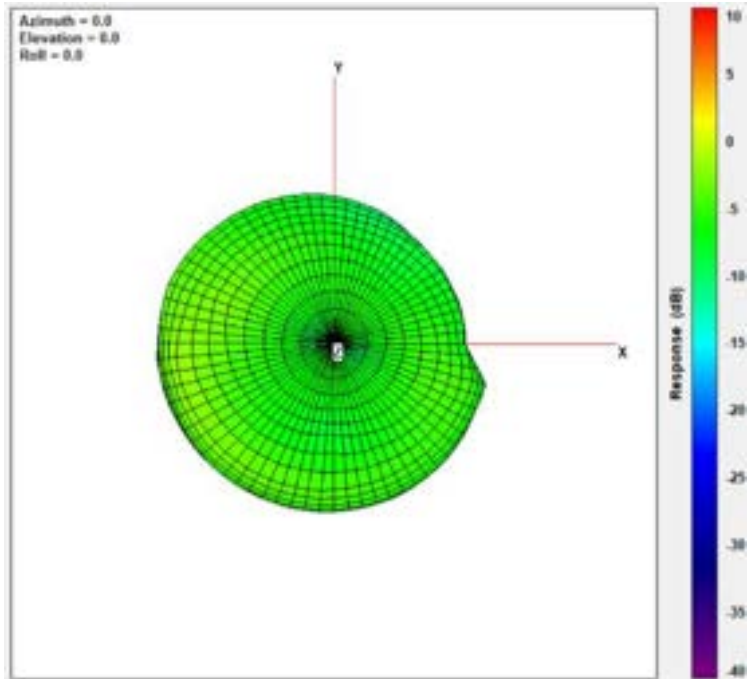
Center Frequency	787MHz
Horizontal (dBi) peak	-1.50
Vertical (dBi) peak	1.12

814MHz



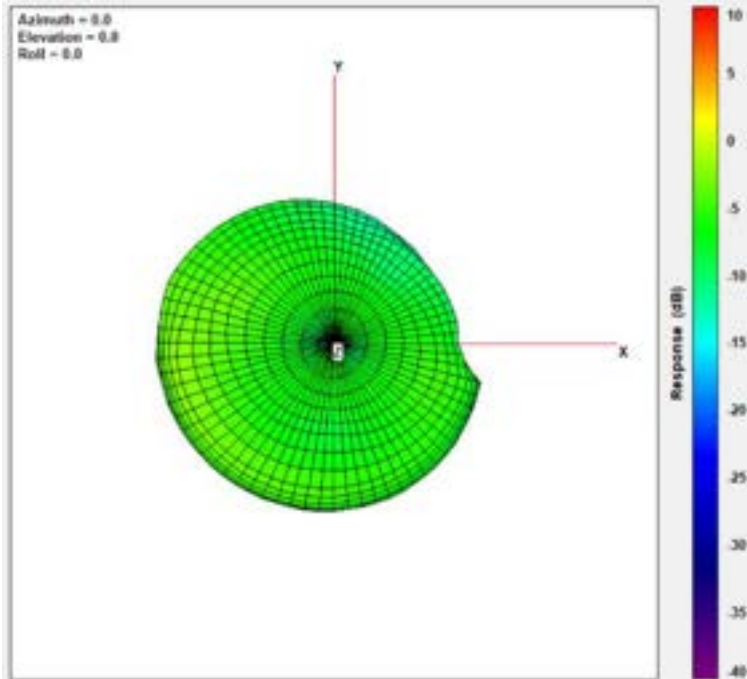
Center Frequency	814MHz
Horizontal (dBi) peak	-3.20
Vertical (dBi) peak	0.34

824MHz



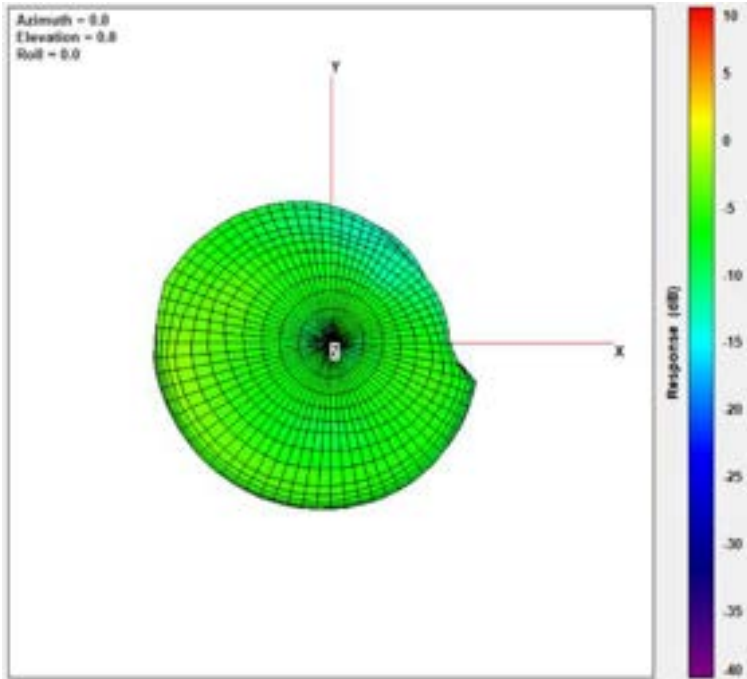
Center Frequency	824MHz
Horizontal (dBi) peak	-3.16
Vertical (dBi) peak	0.10

832MHz



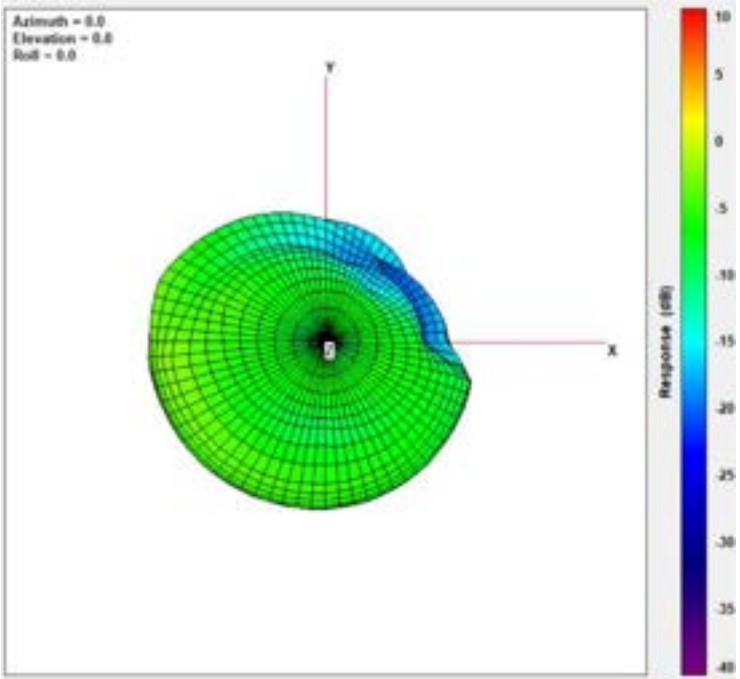
Center Frequency	832MHz
Horizontal (dBi) peak	-2.40
Vertical (dBi) peak	0.47

836.5MHz



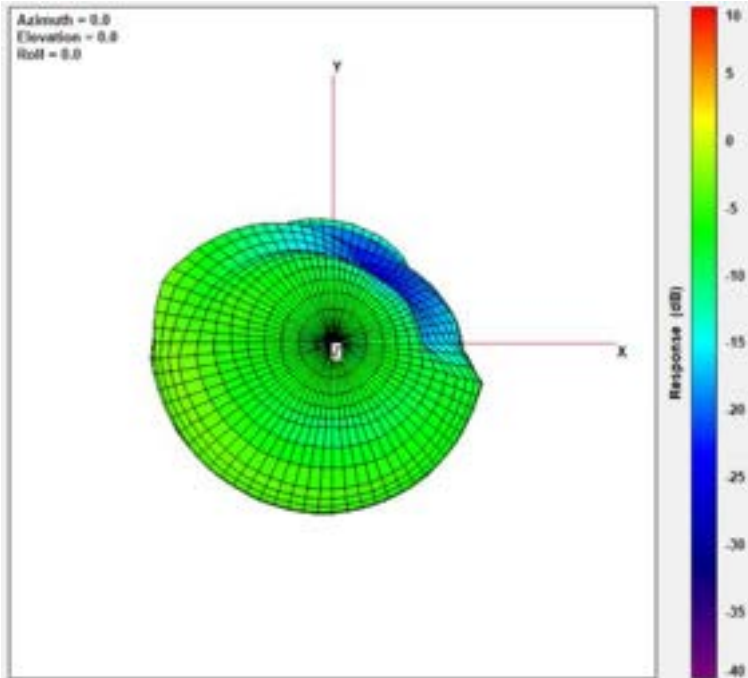
Center Frequency	836.5MHz
Horizontal (dBi) peak	-2.23
Vertical (dBi) peak	0.17

849MHz



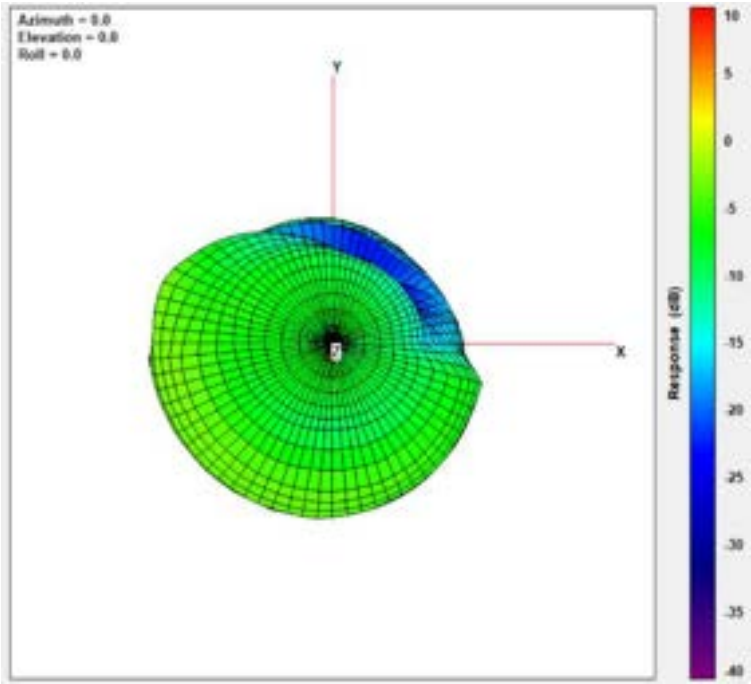
Center Frequency	849MHz
Horizontal (dBi) peak	-1.42
Vertical (dBi) peak	0.45

862MHz



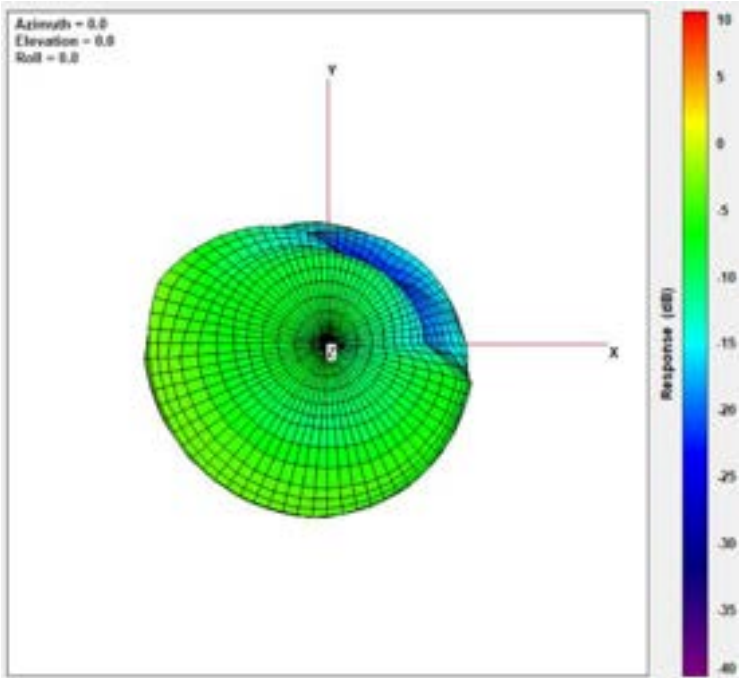
Center Frequency	862MHz
Horizontal (dBi) peak	-0.43
Vertical (dBi) peak	0.29

880MHz



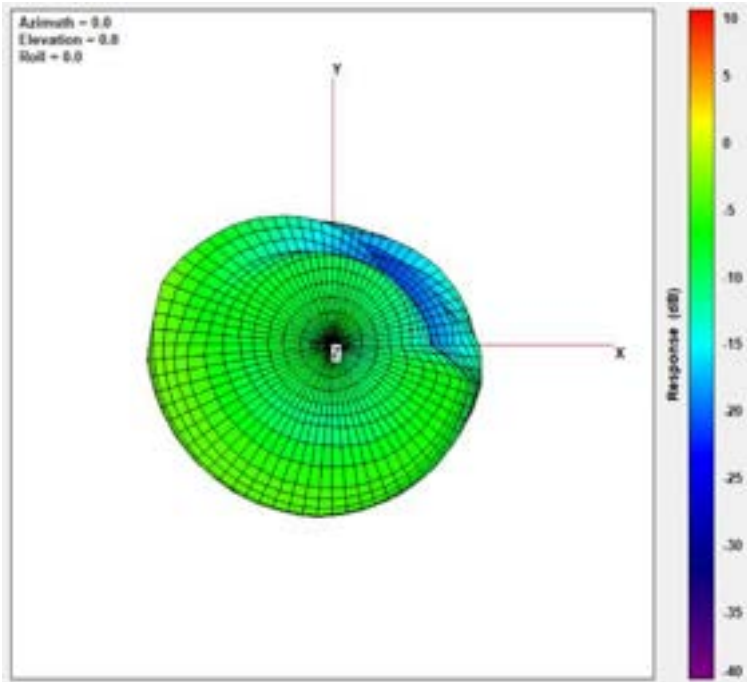
Center Frequency	880MHz
Horizontal (dBi) peak	-0.32
Vertical (dBi) peak	-0.08

897.5MHz



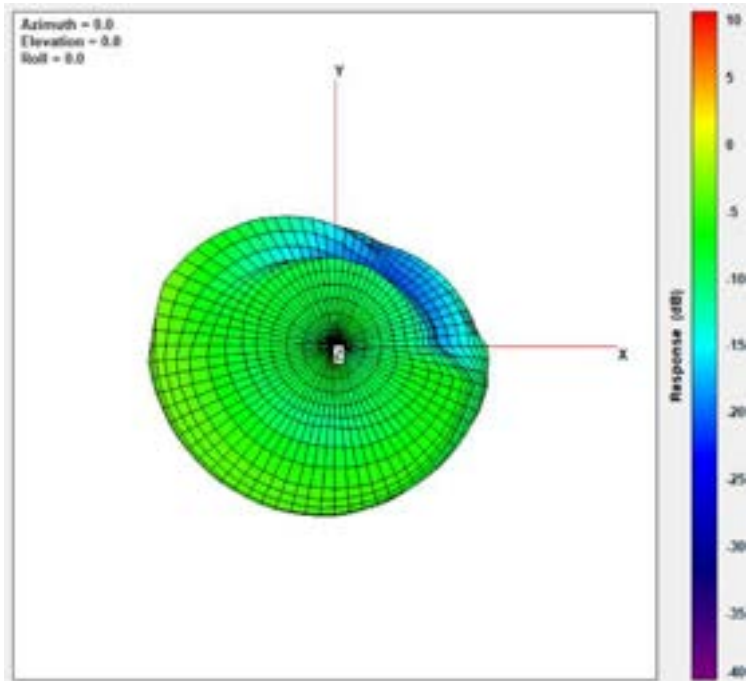
Center Frequency	897.5MHz
Horizontal (dBi) peak	-0.83
Vertical (dBi) peak	0.42

915MHz



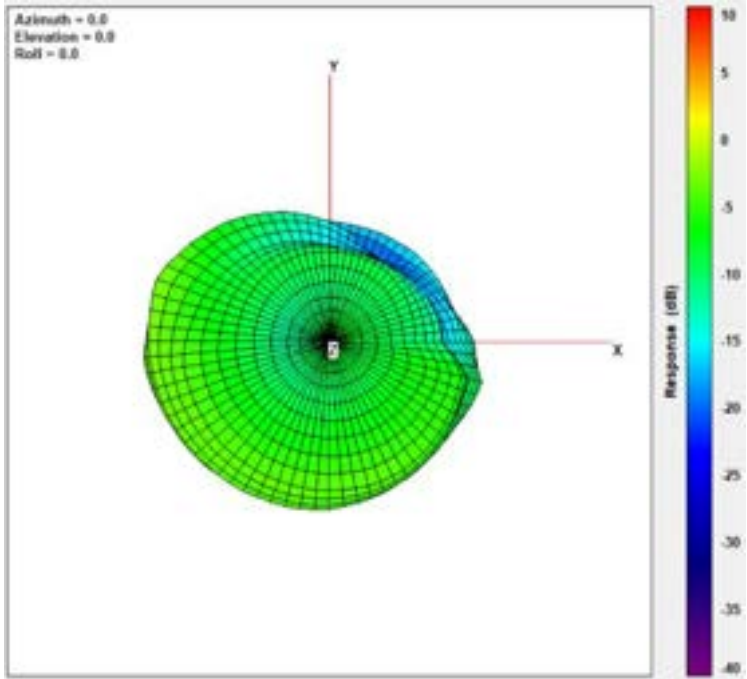
Center Frequency	915MHz
Horizontal (dBi) peak	-1.04
Vertical (dBi) peak	0.30

925MHz



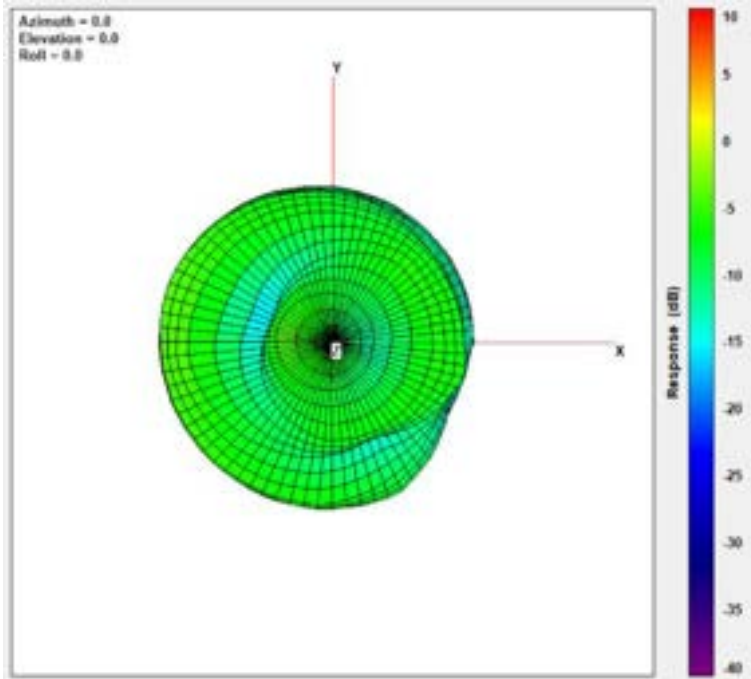
Center Frequency	925MHz
Horizontal (dBi) peak	-1.33
Vertical (dBi) peak	0.02

960MHz



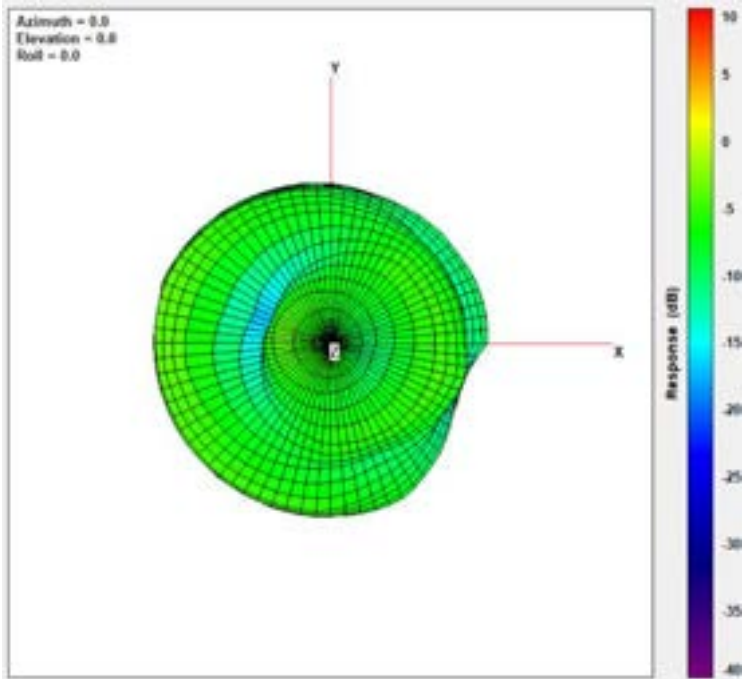
Center Frequency	960MHz
Horizontal (dBi) peak	-2.13
Vertical (dBi) peak	-0.97

1427.9MHz



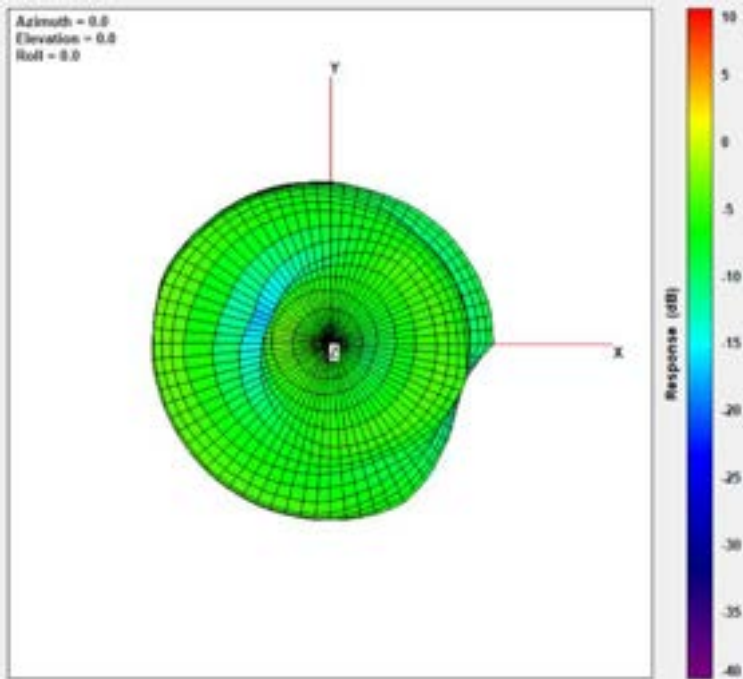
Center Frequency	1427.9MHz
Horizontal (dBi) peak	-2.09
Vertical (dBi) peak	1.03

1447.9MHz



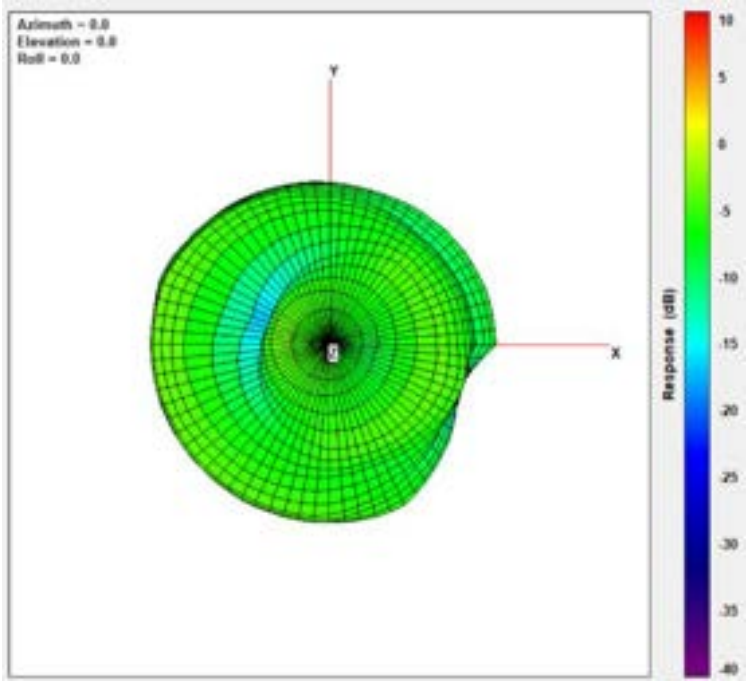
Center Frequency	1447.9MHz
Horizontal (dBi) peak	-2.03
Vertical (dBi) peak	0.81

1455.4MHz



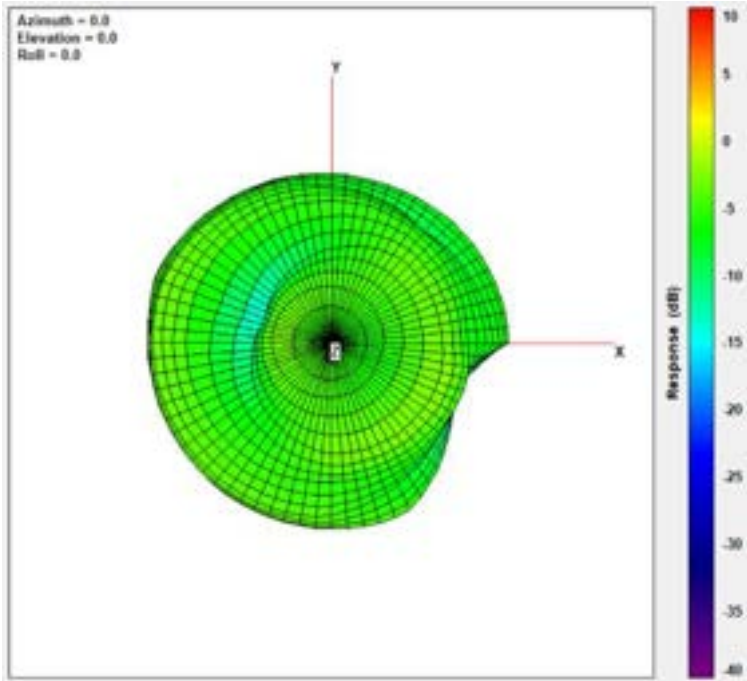
Center Frequency	1455.4MHz
Horizontal (dBi) peak	-2.17
Vertical (dBi) peak	0.84

1462.9MHz



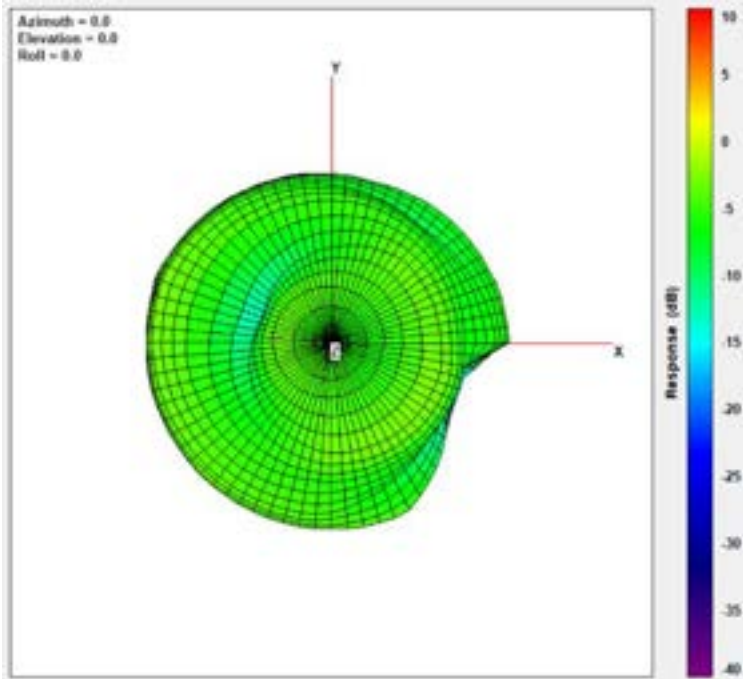
Center Frequency	1462.9MHz
Horizontal (dBi) peak	-2.29
Vertical (dBi) peak	0.67

1496MHz



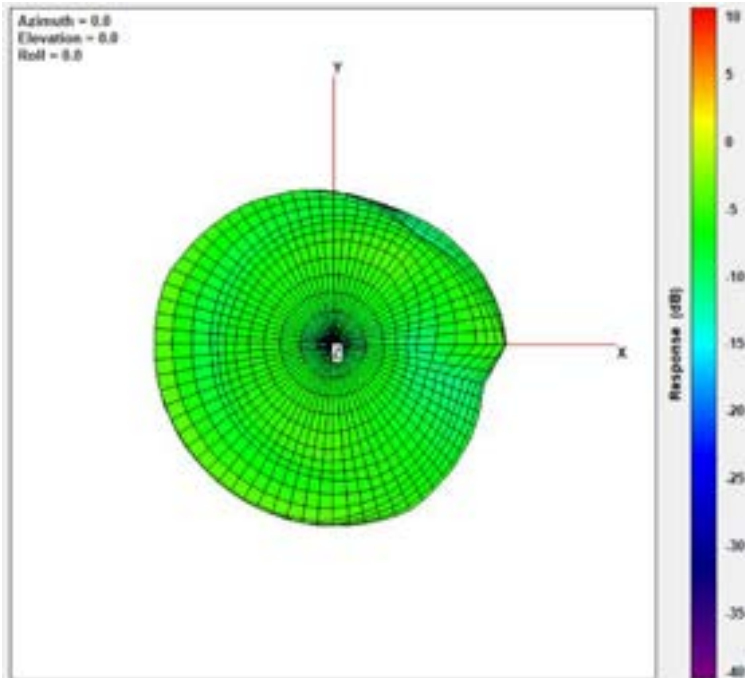
Center Frequency	1496MHz
Horizontal (dBi) peak	-0.81
Vertical (dBi) peak	0.13

1510.9 MHz



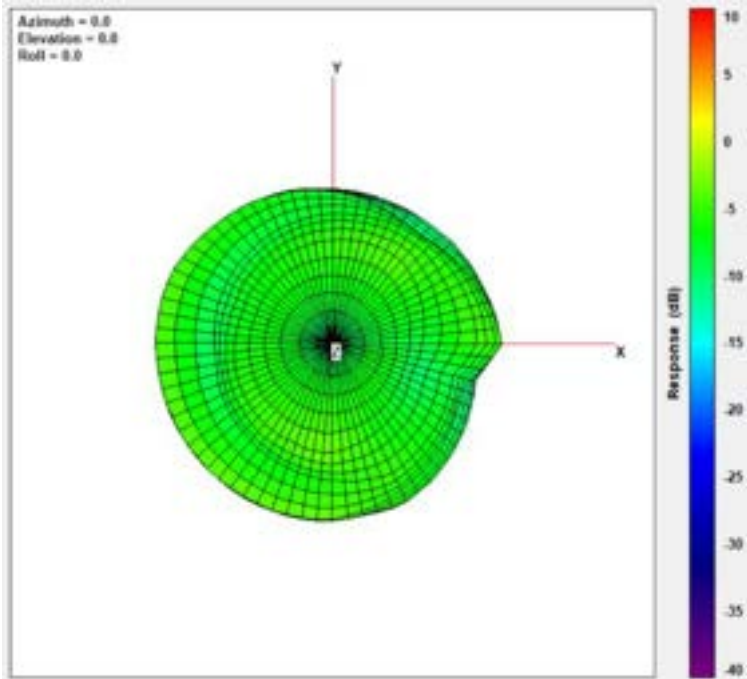
Center Frequency	1510.9 MHz
Horizontal (dBi) peak	-1.18
Vertical (dBi) peak	-0.24

1710 MHz



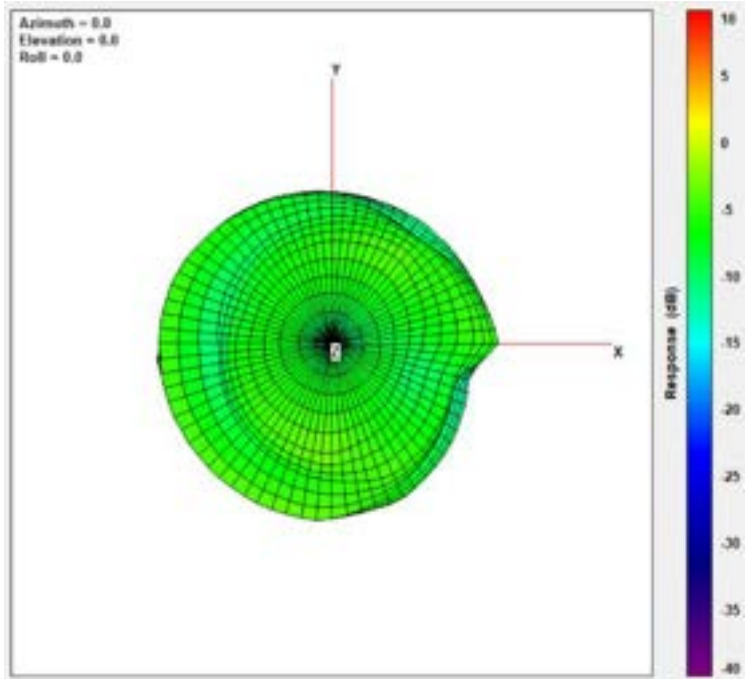
Center Frequency	1710 MHz
Horizontal (dBi) peak	1.24
Vertical (dBi) peak	-0.48

1732.5 MHz



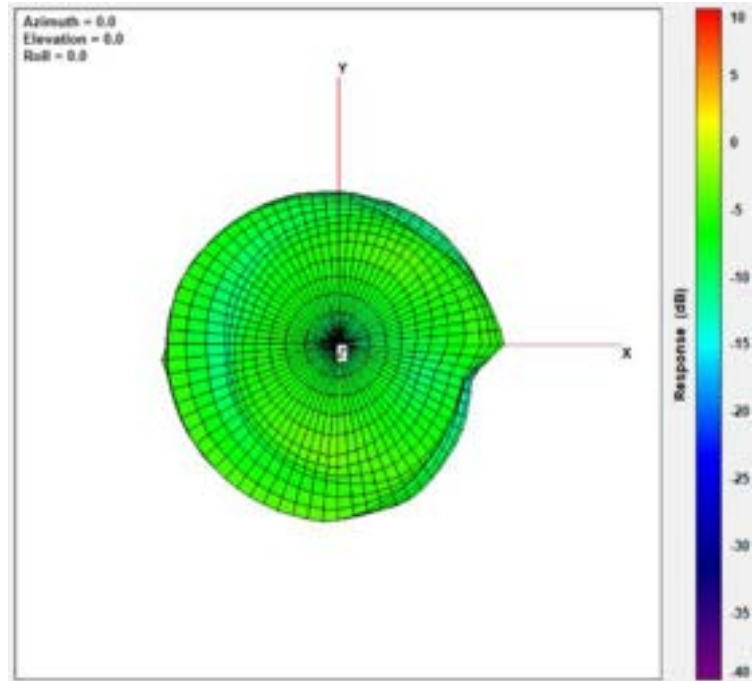
Center Frequency	1732.5 MHz
Horizontal (dBi) peak	0.35
Vertical (dBi) peak	-0.48

1747.5 MHz



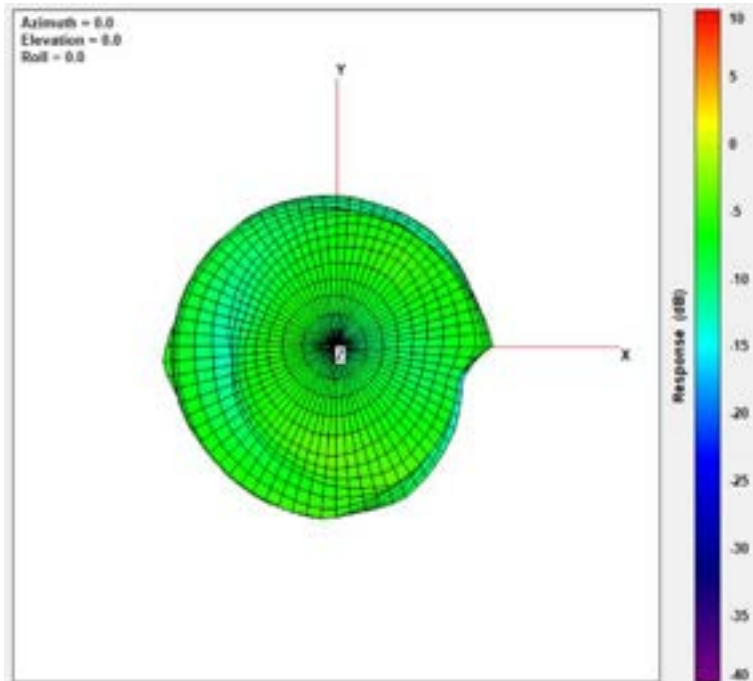
Center Frequency	1747.5 MHz
Horizontal (dBi) peak	-0.19
Vertical (dBi) peak	-0.52

1755 MHz



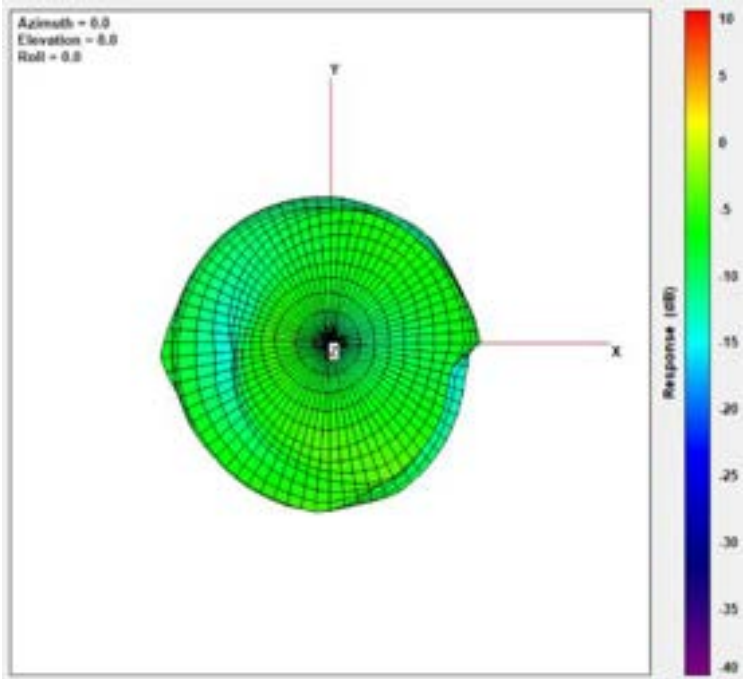
Center Frequency	1755 MHz
Horizontal (dBi) peak	-0.64
Vertical (dBi) peak	-0.65

1785 MHz



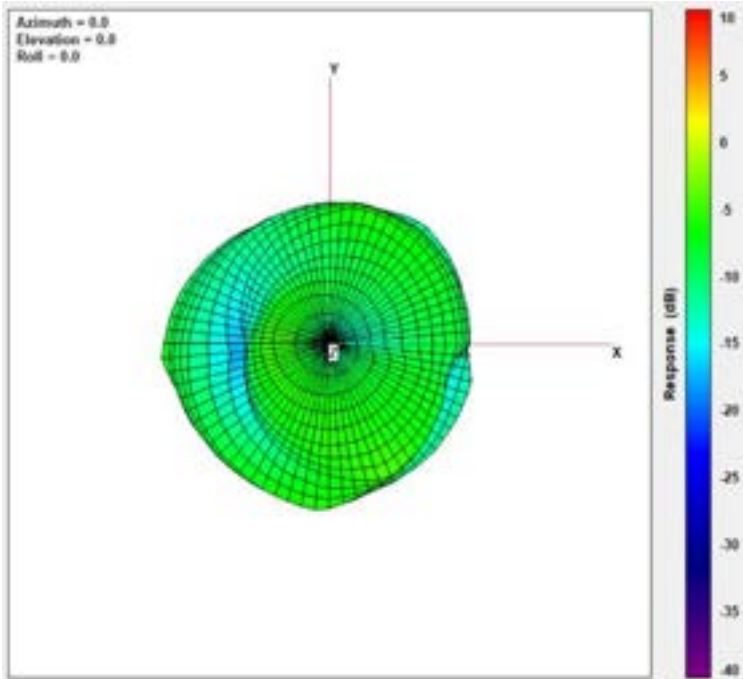
Center Frequency	1785 MHz
Horizontal (dBi) peak	-1.24
Vertical (dBi) peak	-1.38

1805 MHz



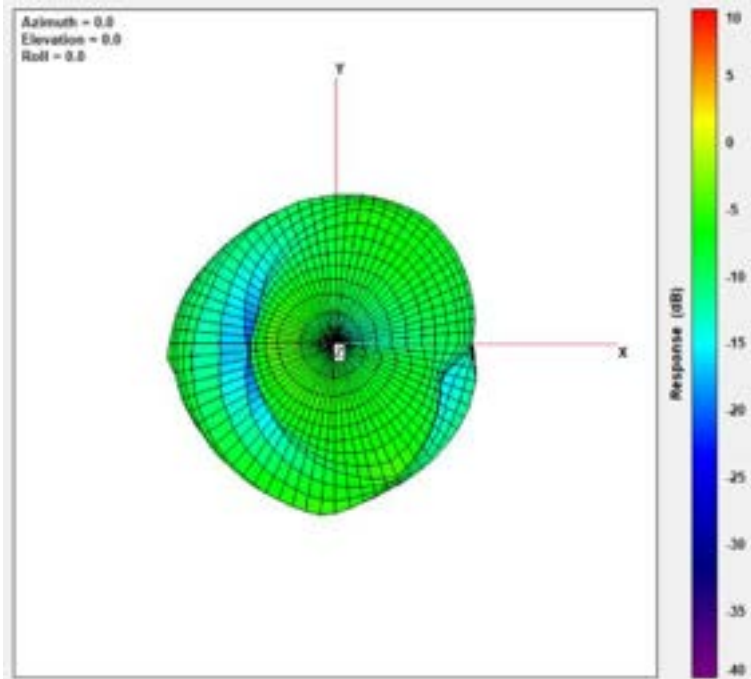
Center Frequency	1805 MHz
Horizontal (dBi) peak	-1.39
Vertical (dBi) peak	-1.48

1850 MHz



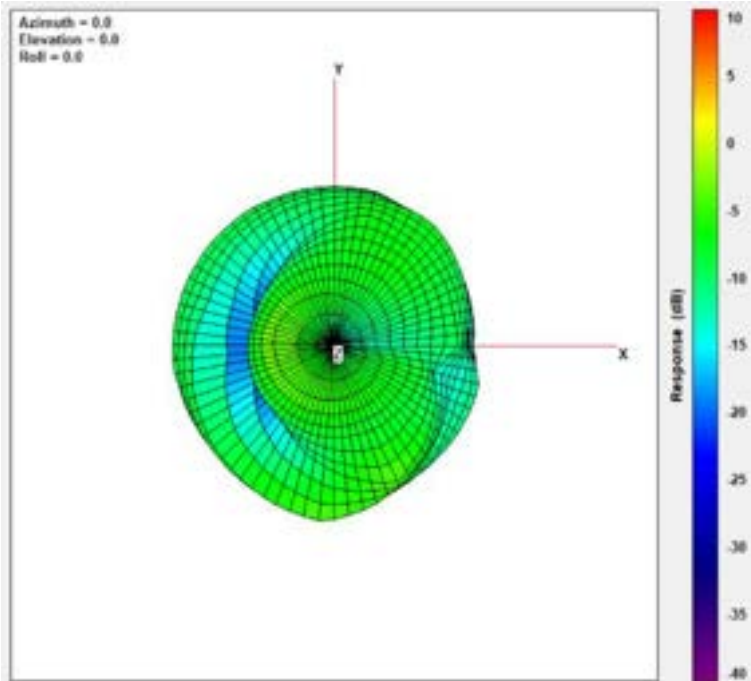
Center Frequency	1850 MHz
Horizontal (dBi) peak	-2.07
Vertical (dBi) peak	-2.58

1880 MHz



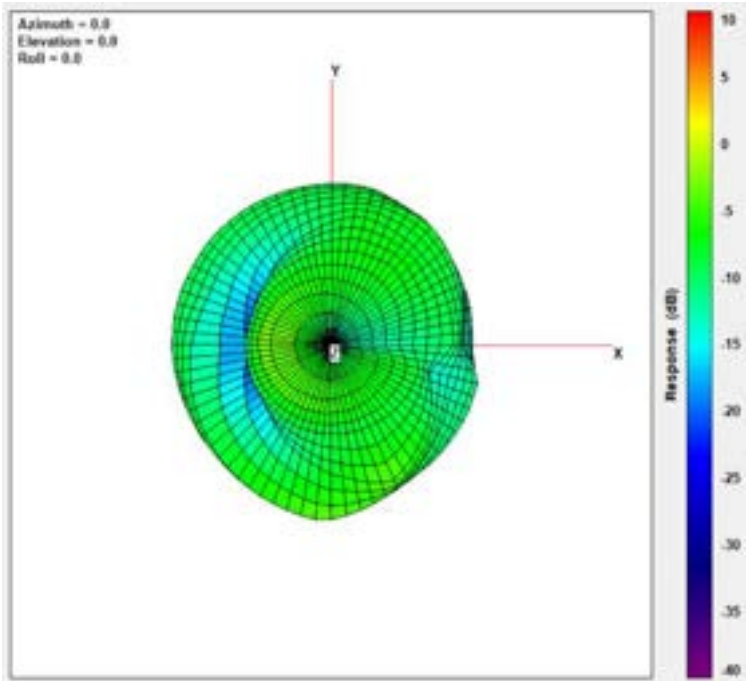
Center Frequency	1880 MHz
Horizontal (dBi) peak	0.00
Vertical (dBi) peak	-2.16

1910MHz



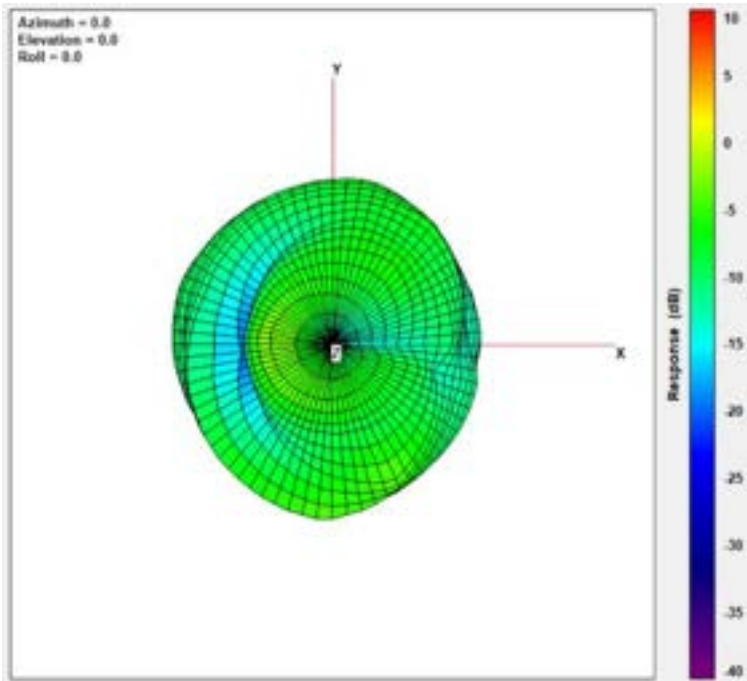
Center Frequency	1910MHz
Horizontal (dBi) peak	1.12
Vertical (dBi) peak	-1.44

1920MHz



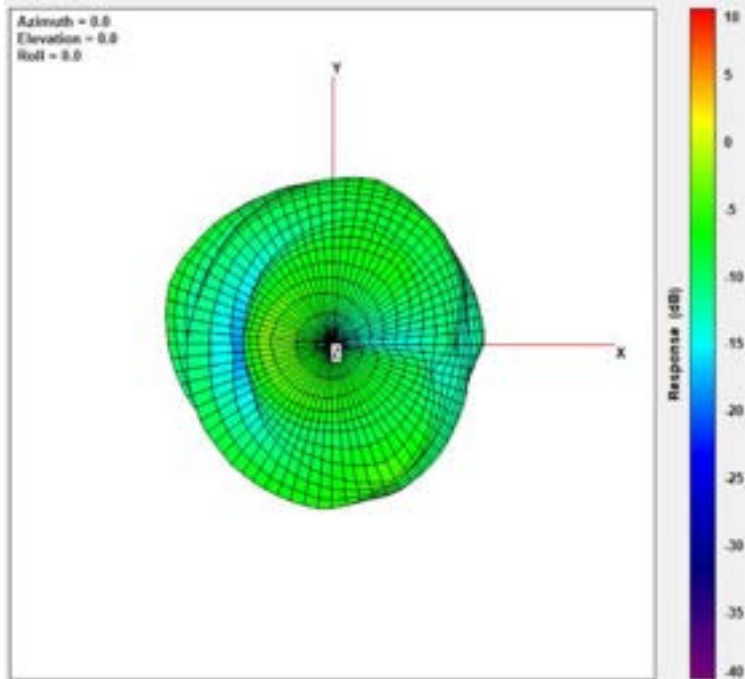
Center Frequency	1920MHz
Horizontal (dBi) peak	1.17
Vertical (dBi) peak	-1.58

1950MHz



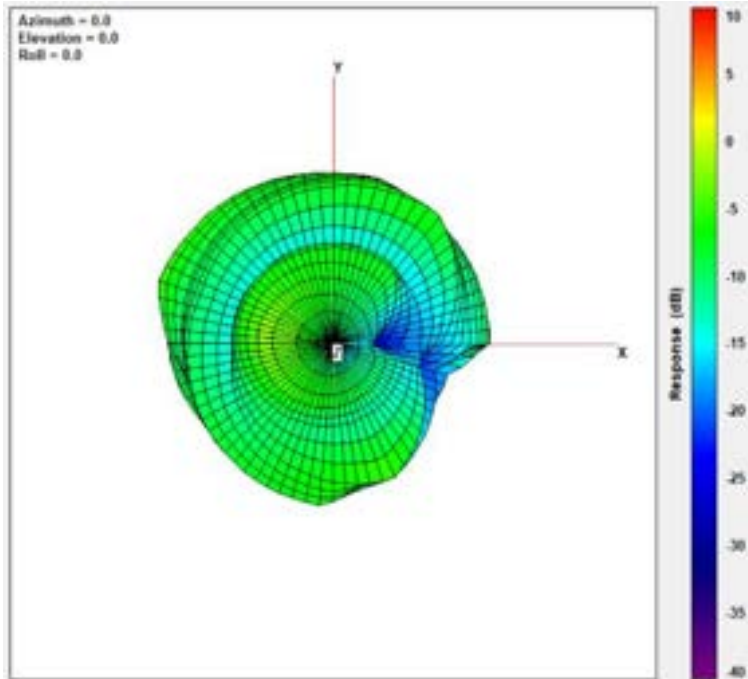
Center Frequency	1950MHz
Horizontal (dBi) peak	0.54
Vertical (dBi) peak	-1.23

1980MHz



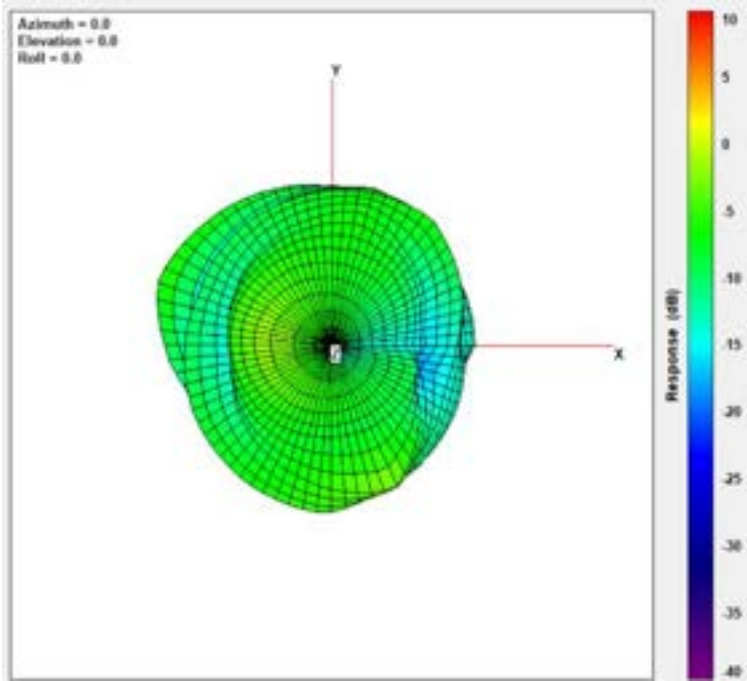
Center Frequency	1980MHz
Horizontal (dBi) peak	-0.78
Vertical (dBi) peak	-1.24

2110MHz



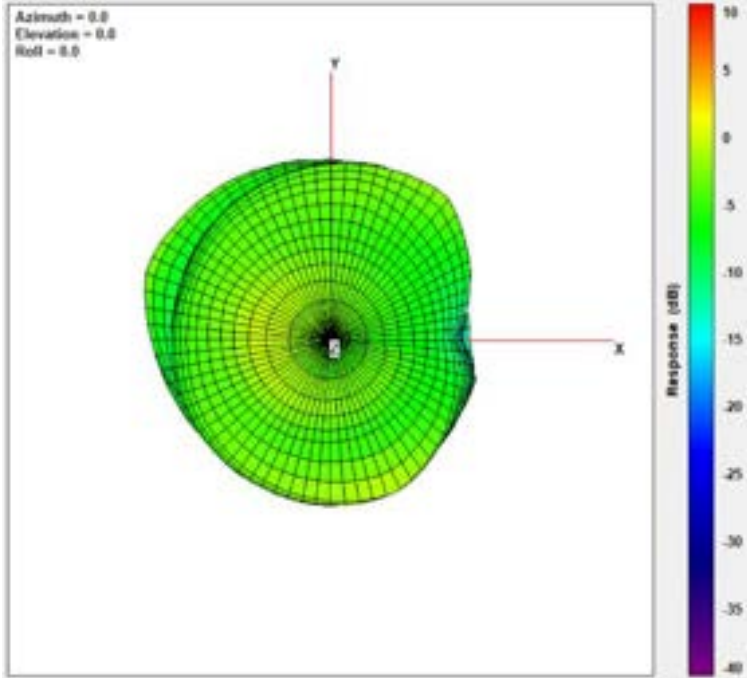
Center Frequency	2110MHz
Horizontal (dBi) peak	-0.82
Vertical (dBi) peak	-1.17

2200MHz



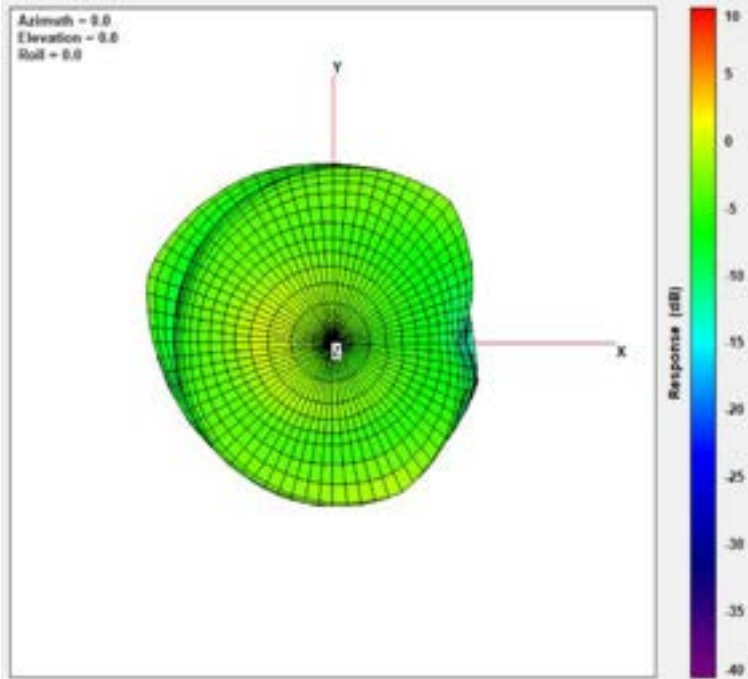
Center Frequency	2200MHz
Horizontal (dBi) peak	-0.62
Vertical (dBi) peak	-0.43

2300MHz



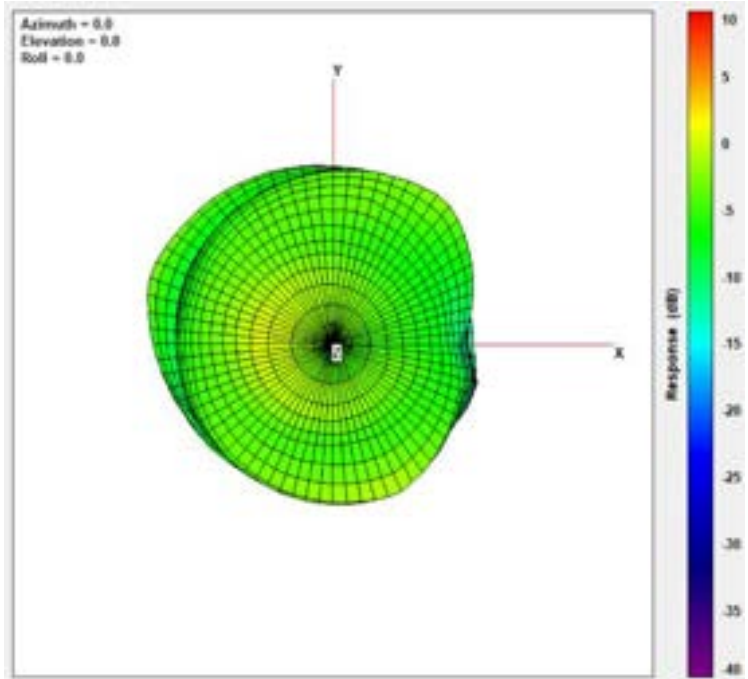
Center Frequency	2300MHz
Horizontal (dBi) peak	-0.15
Vertical (dBi) peak	-0.26

2305MHz



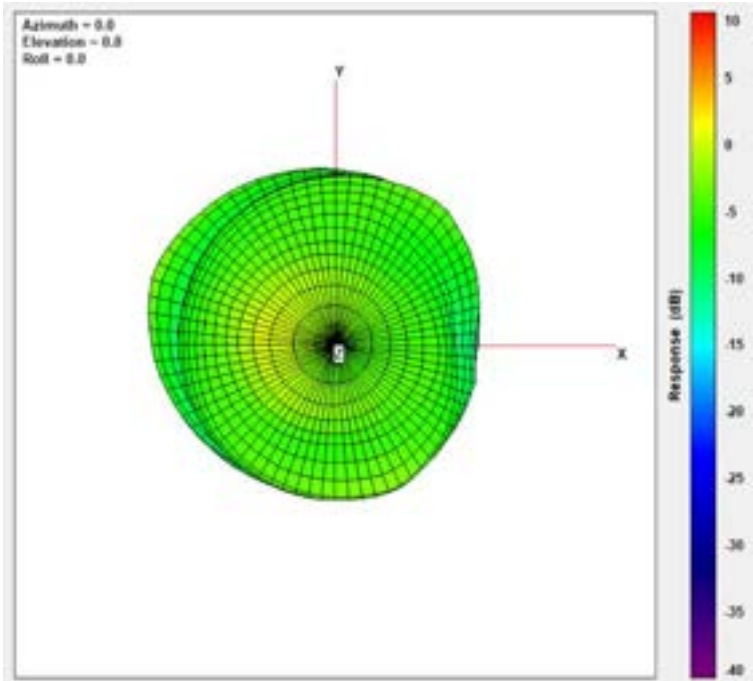
Center Frequency	2305MHz
Horizontal (dBi) peak	-0.16
Vertical (dBi) peak	-0.44

2315MHz



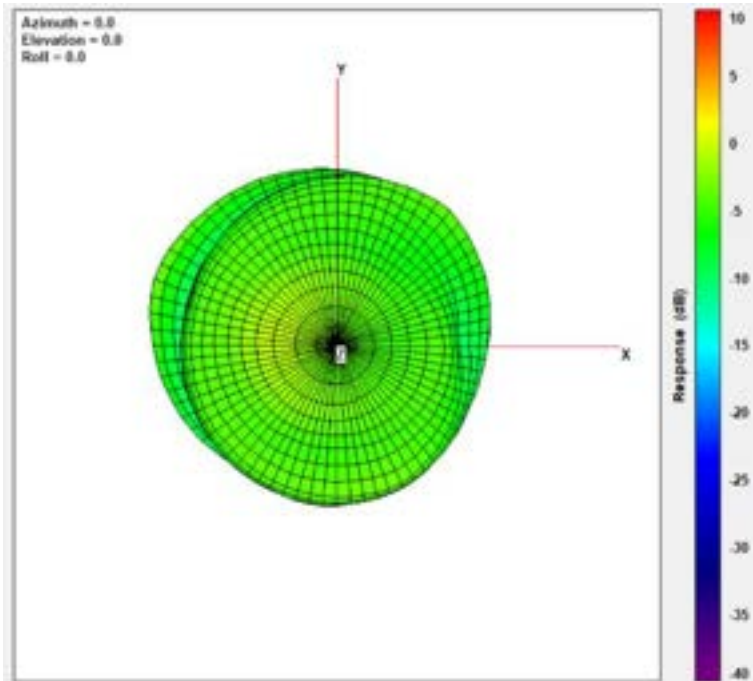
Center Frequency	2315MHz
Horizontal (dBi) peak	-0.36
Vertical (dBi) peak	-1.00

2350MHz



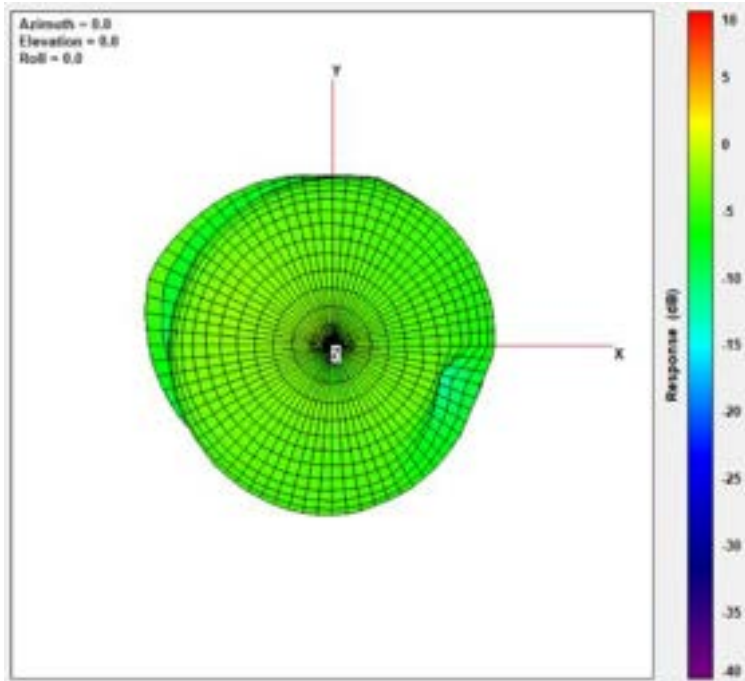
Center Frequency	2350MHz
Horizontal (dBi) peak	-0.70
Vertical (dBi) peak	-0.76

2400MHz



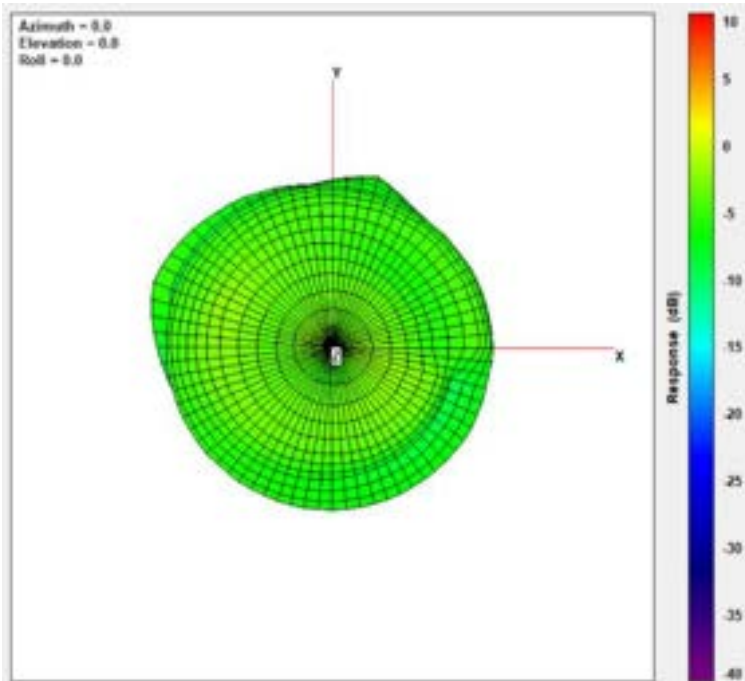
Center Frequency	2400MHz
Horizontal (dBi) peak	-1.07
Vertical (dBi) peak	-0.26

2500MHz



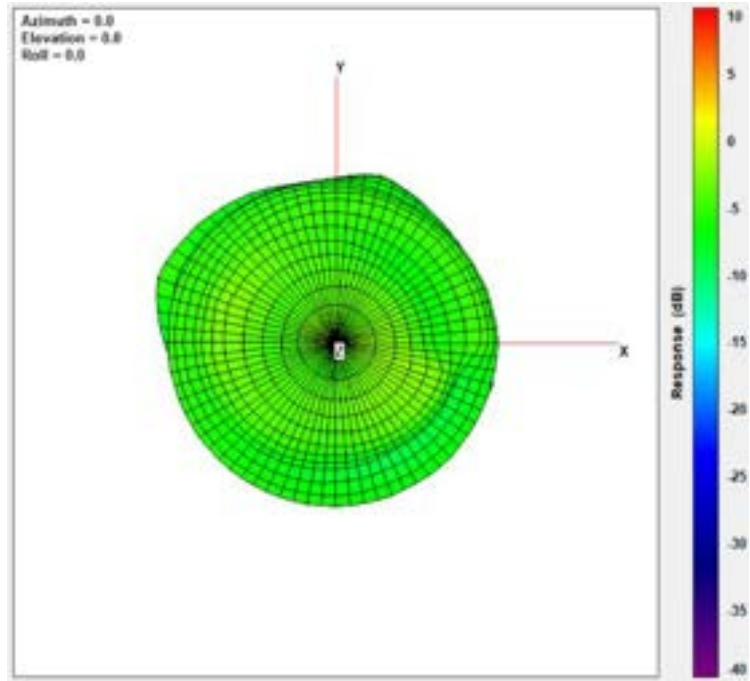
Center Frequency	2500MHz
Horizontal (dBi) peak	-0.56
Vertical (dBi) peak	-0.31

2570MHz



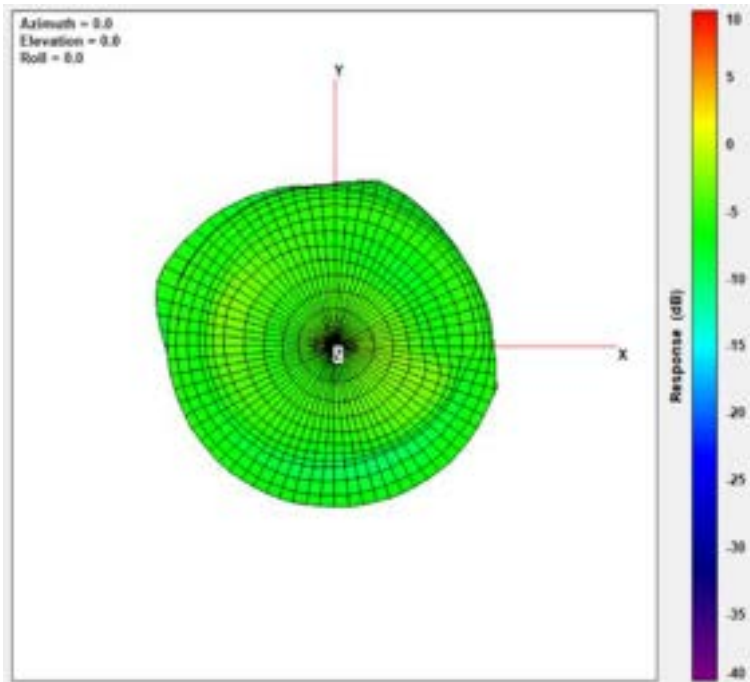
Center Frequency	2570MHz
Horizontal (dBi) peak	-0.39
Vertical (dBi) peak	-0.92

2595MHz



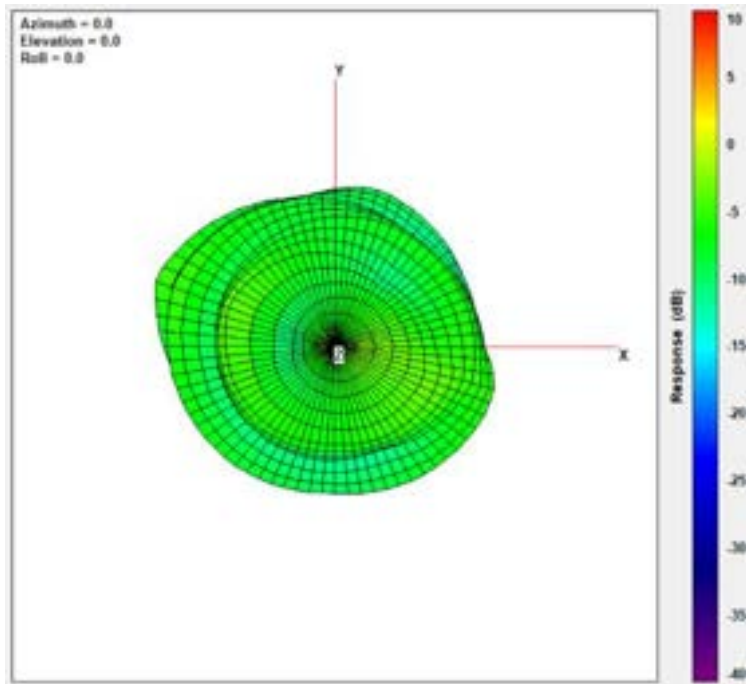
Center Frequency	2595MHz
Horizontal (dBi) peak	-0.39
Vertical (dBi) peak	-0.83

2620MHz



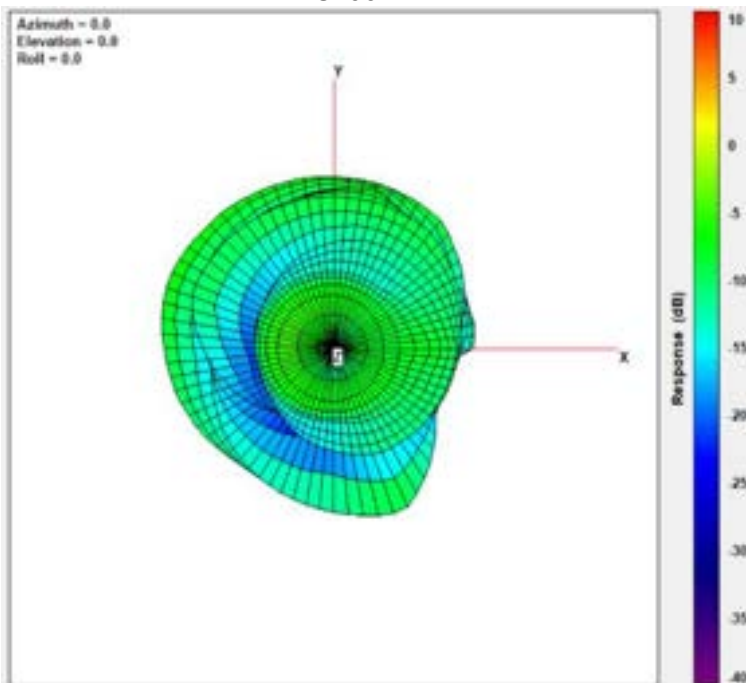
Center Frequency	2620MHz
Horizontal (dBi) peak	-0.33
Vertical (dBi) peak	-0.35

2690MHz



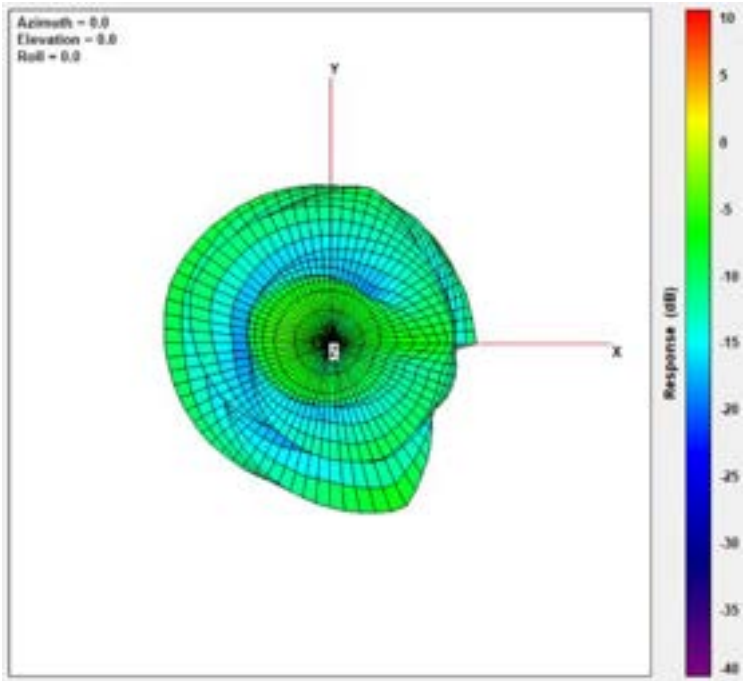
Center Frequency	2690MHz
Horizontal (dBi) peak	0.20
Vertical (dBi) peak	-1.91

3400MHz



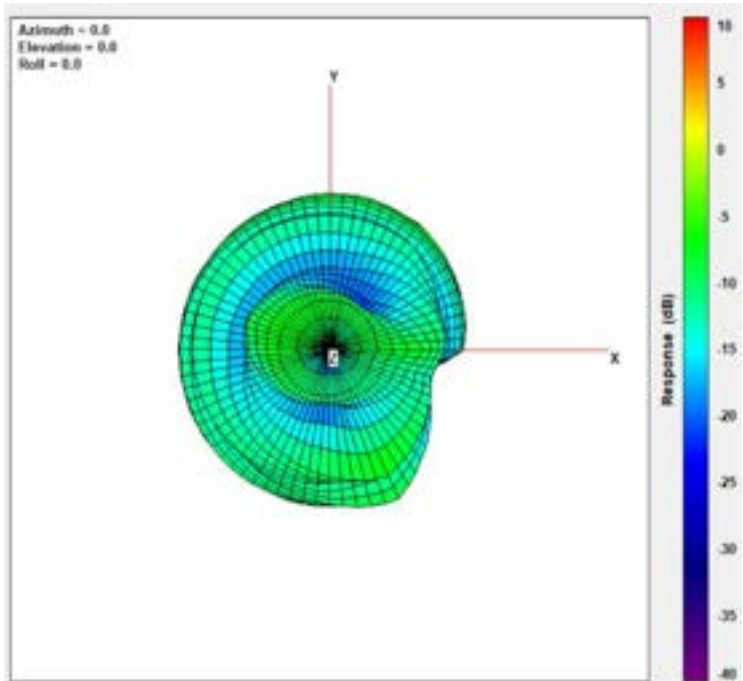
Center Frequency	3400MHz
Horizontal (dBi) peak	-0.35
Vertical (dBi) peak	1.18

3500MHz



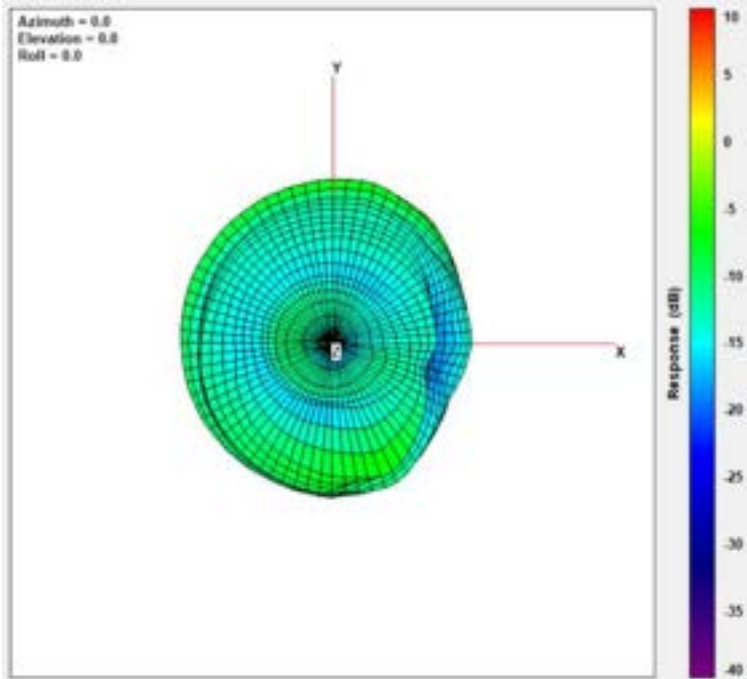
Center Frequency	3500MHz
Horizontal (dBi) peak	-1.12
Vertical (dBi) peak	0.46

3600MHz



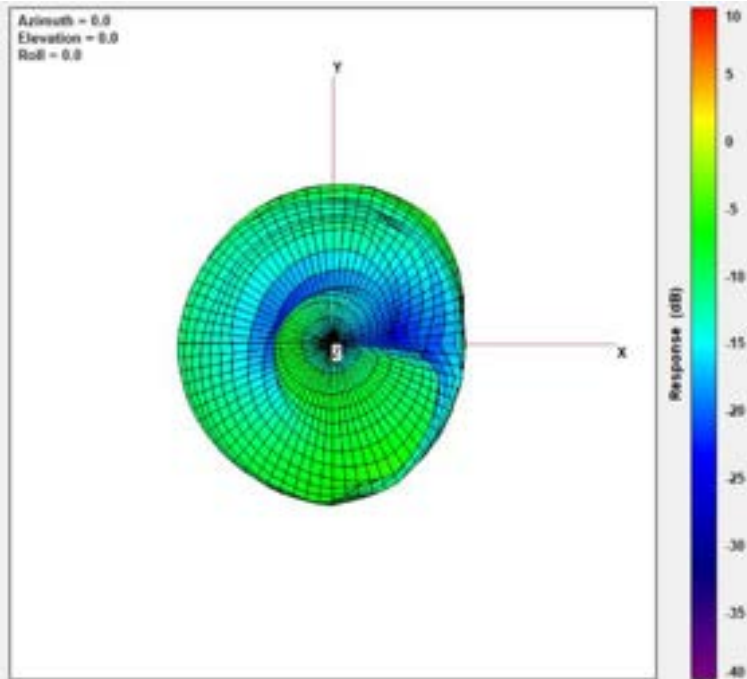
Center Frequency	3600MHz
Horizontal (dBi) peak	-2.02
Vertical (dBi) peak	-1.14

3700MHz



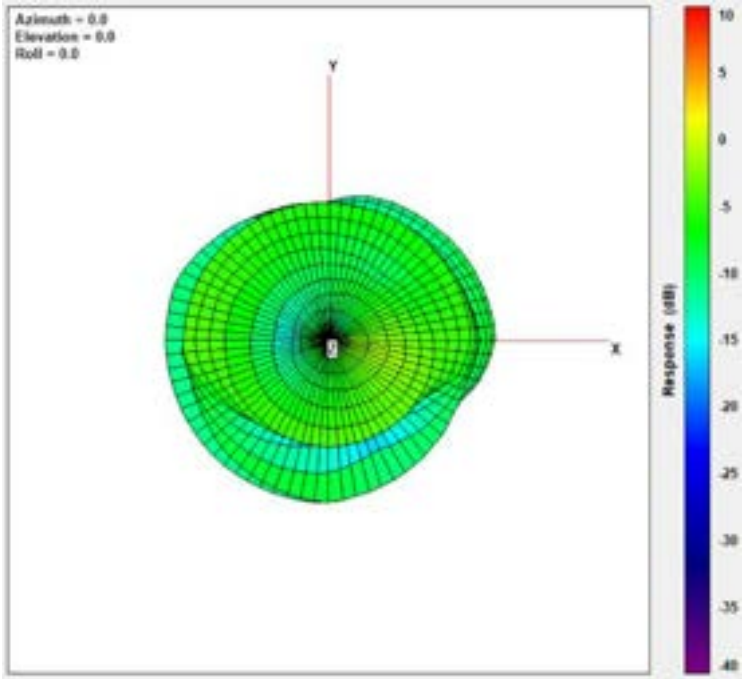
Center Frequency	3700MHz
Horizontal (dBi) peak	-2.52
Vertical (dBi) peak	-2.75

3800MHz



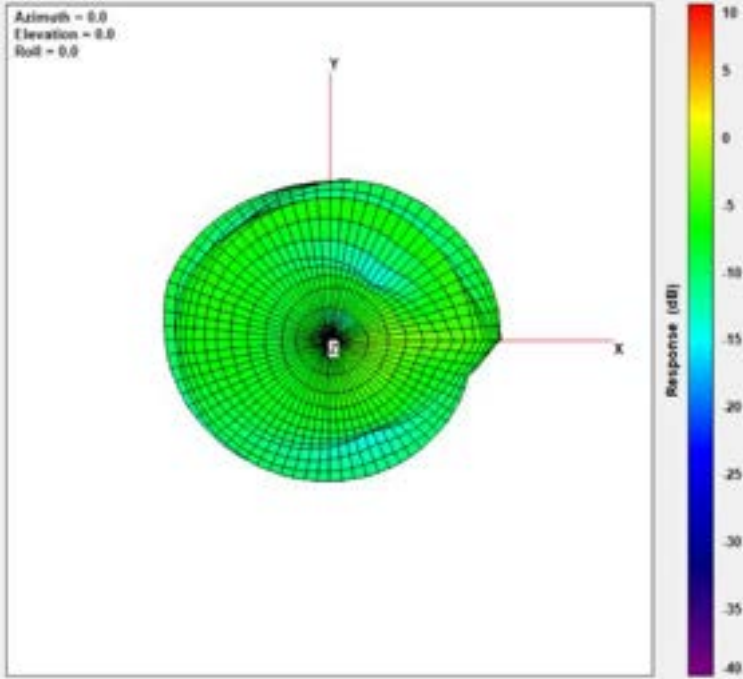
Center Frequency	3800MHz
Horizontal (dBi) peak	-3.99
Vertical (dBi) peak	-4.59

4200MHz



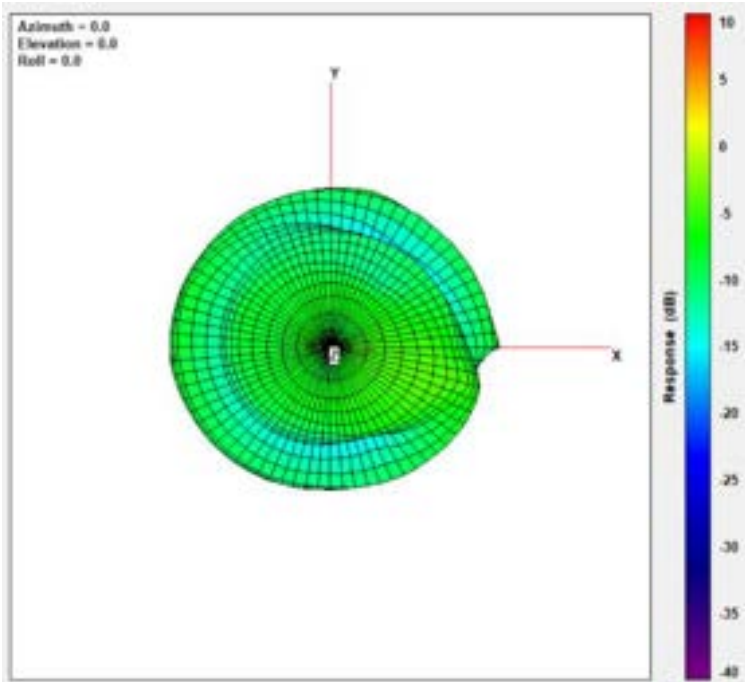
Center Frequency	4200MHz
Horizontal (dBi) peak	0.08
Vertical (dBi) peak	-1.36

4400MHz



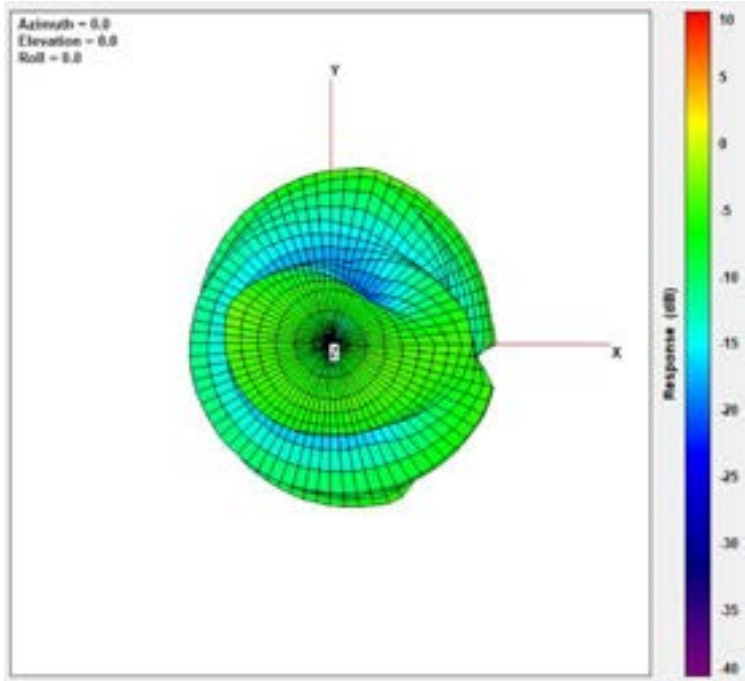
Center Frequency	4400MHz
Horizontal (dBi) peak	-1.39
Vertical (dBi) peak	-3.82

4700MHz



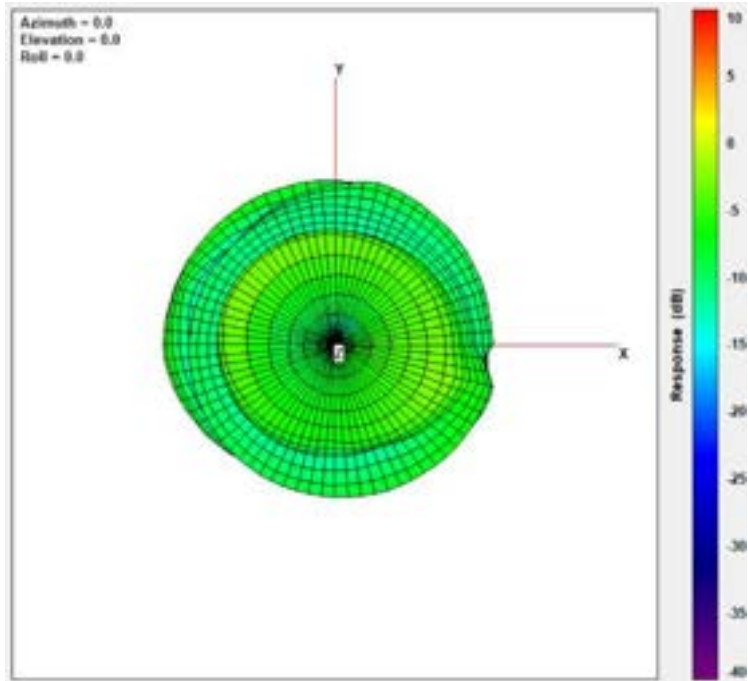
Center Frequency	4700MHz
Horizontal (dBi) peak	-2.97
Vertical (dBi) peak	-5.52

5150MHz



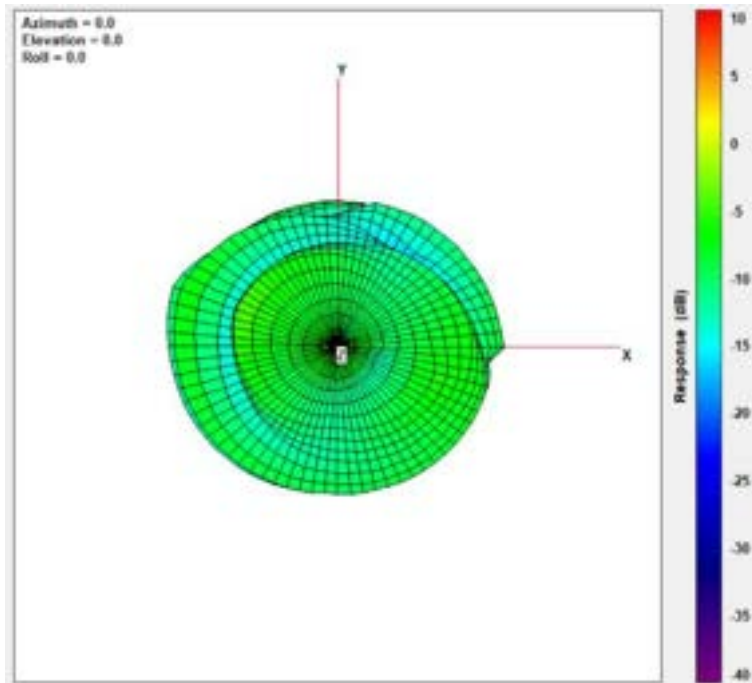
Center Frequency	5150MHz
Horizontal (dBi) peak	0.35
Vertical (dBi) peak	-1.31

5537.5MHz



Center Frequency	5537.5MHz
Horizontal (dBi) peak	-0.19
Vertical (dBi) peak	1.39

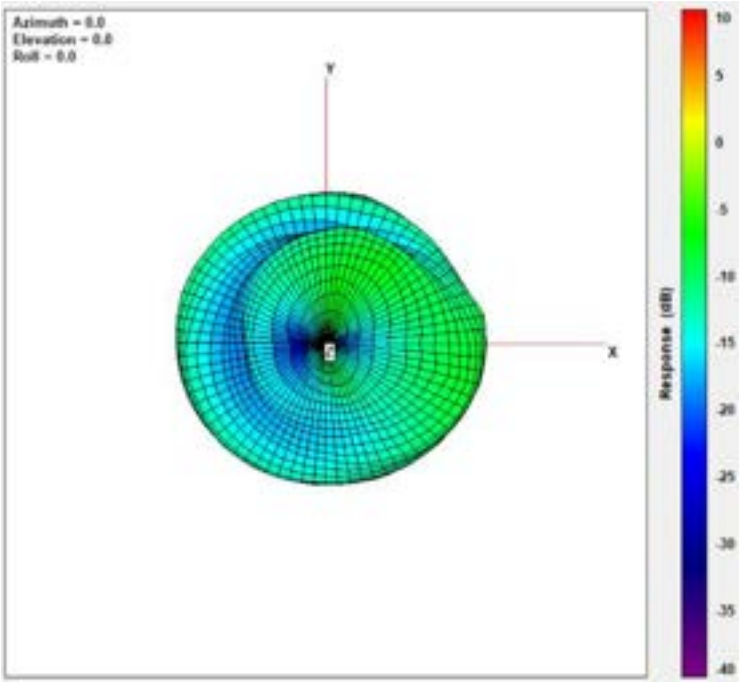
5925MHz



Center Frequency	5925MHz
Horizontal (dBi) peak	0.54
Vertical (dBi) peak	0.71

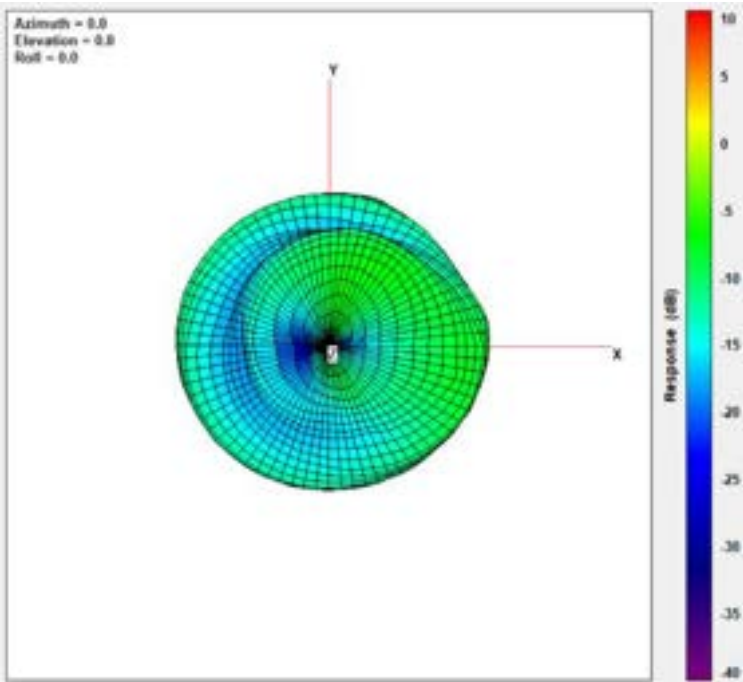
WWAN Aux Antenna (DRx)

617MHz



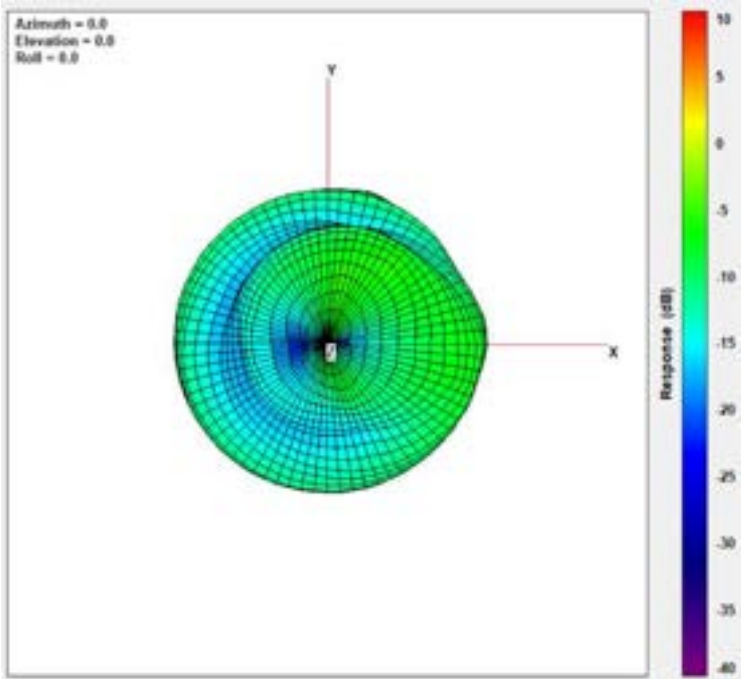
Center Frequency	617MHz
Horizontal (dBi) peak	-8.27
Vertical (dBi) peak	-6.84

634MHz



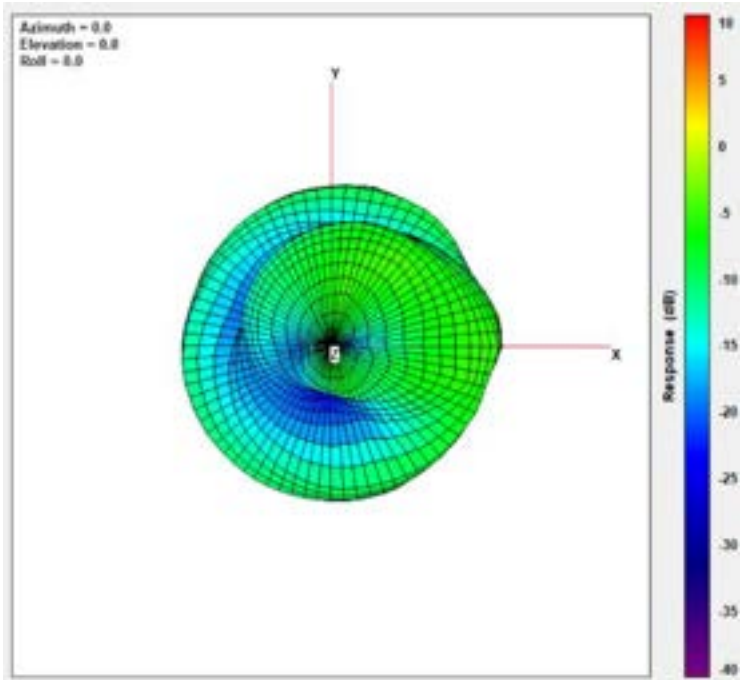
Center Frequency	634MHz
Horizontal (dBi) peak	-7.78
Vertical (dBi) peak	-5.92

652MHz



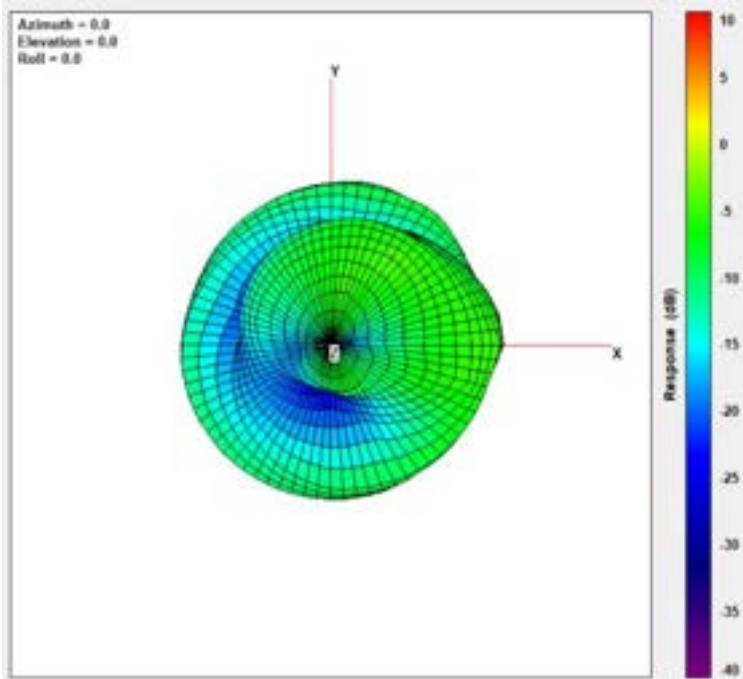
Center Frequency	652MHz
Horizontal (dBi) peak	-7.58
Vertical (dBi) peak	-5.28

717MHz



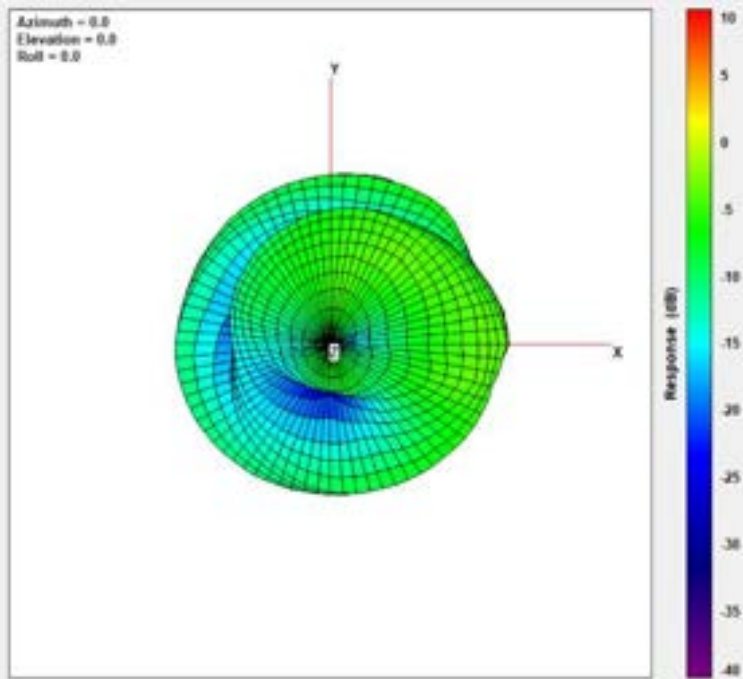
Center Frequency	717MHz
Horizontal (dBi) peak	-5.40
Vertical (dBi) peak	-2.37

725.5MHz



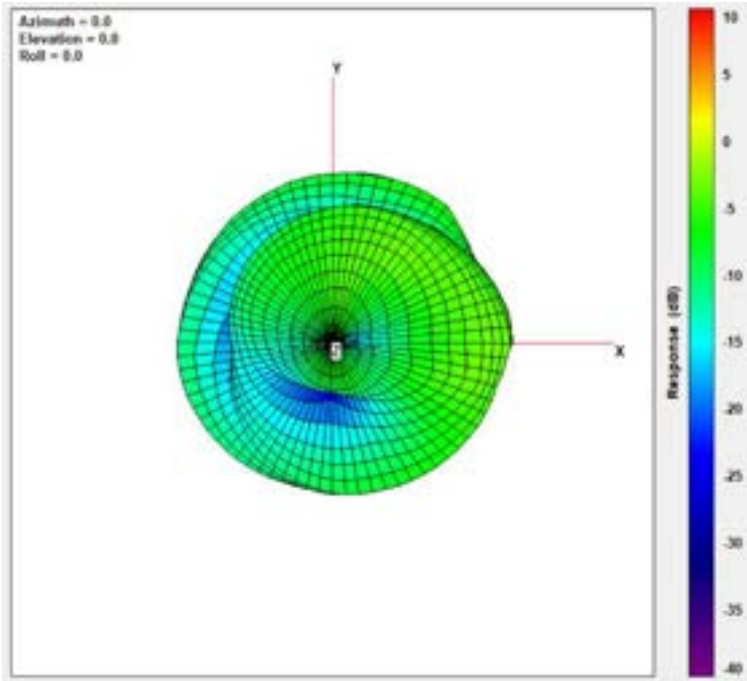
Center Frequency	725.5MHz
Horizontal (dBi) peak	-4.99
Vertical (dBi) peak	-2.12

748MHz



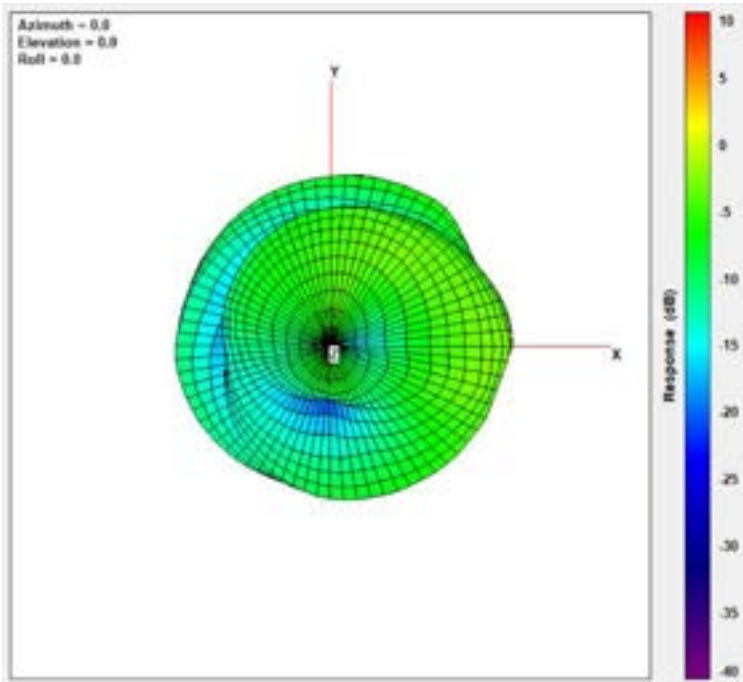
Center Frequency	748MHz
Horizontal (dBi) peak	-3.00
Vertical (dBi) peak	-0.28

756MHz



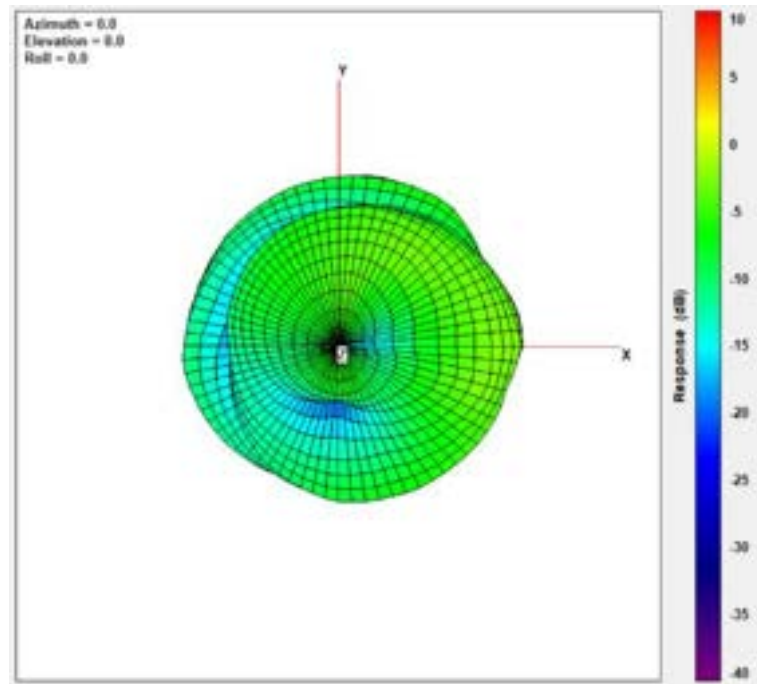
Center Frequency	756MHz
Horizontal (dBi) peak	-2.33
Vertical (dBi) peak	-0.42

768MHz



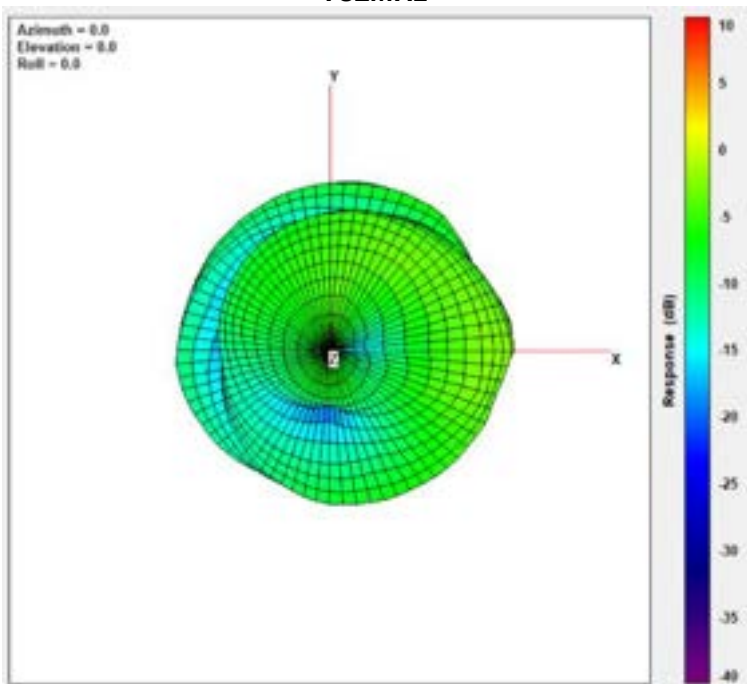
Center Frequency	768MHz
Horizontal (dBi) peak	-2.04
Vertical (dBi) peak	-0.52

777MHz



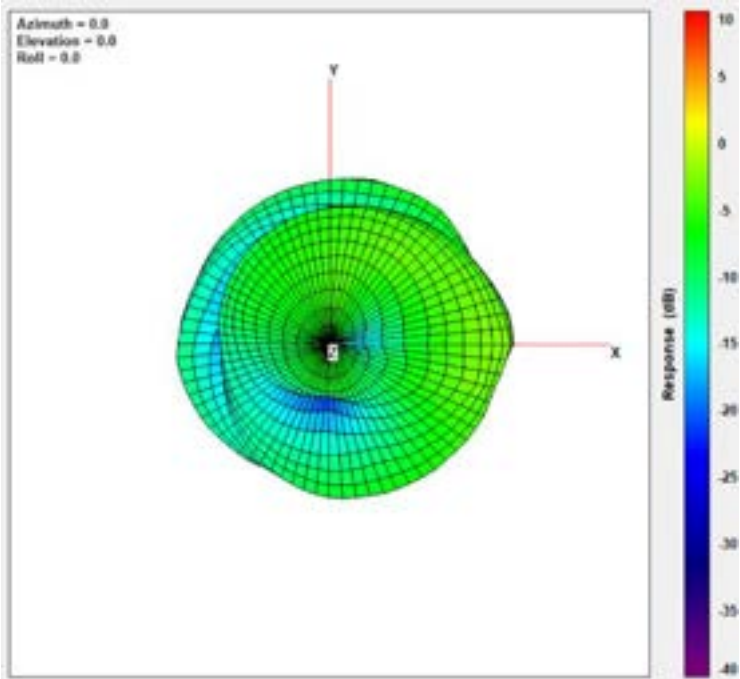
Center Frequency	777MHz
Horizontal (dBi) peak	-1.96
Vertical (dBi) peak	-0.80

782MHz



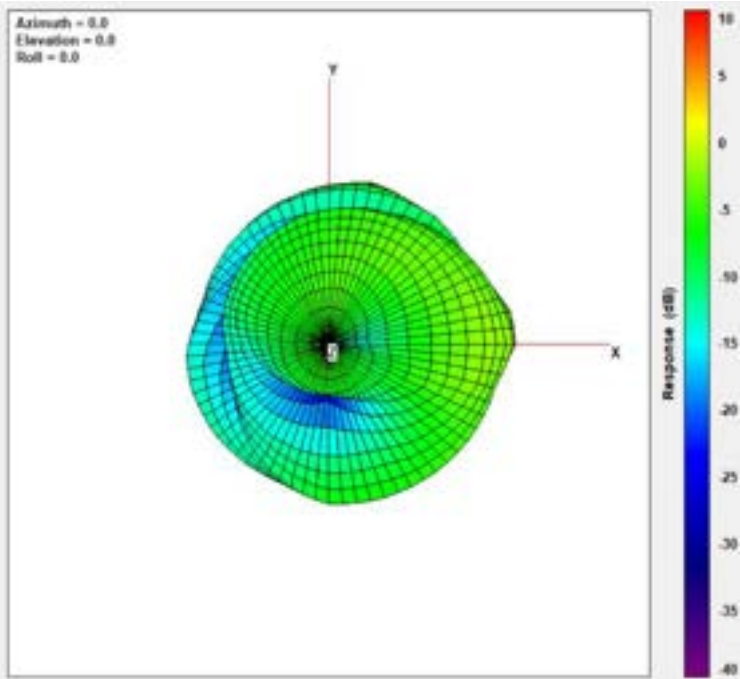
Center Frequency	782MHz
Horizontal (dBi) peak	-2.16
Vertical (dBi) peak	-1.30

787MHz



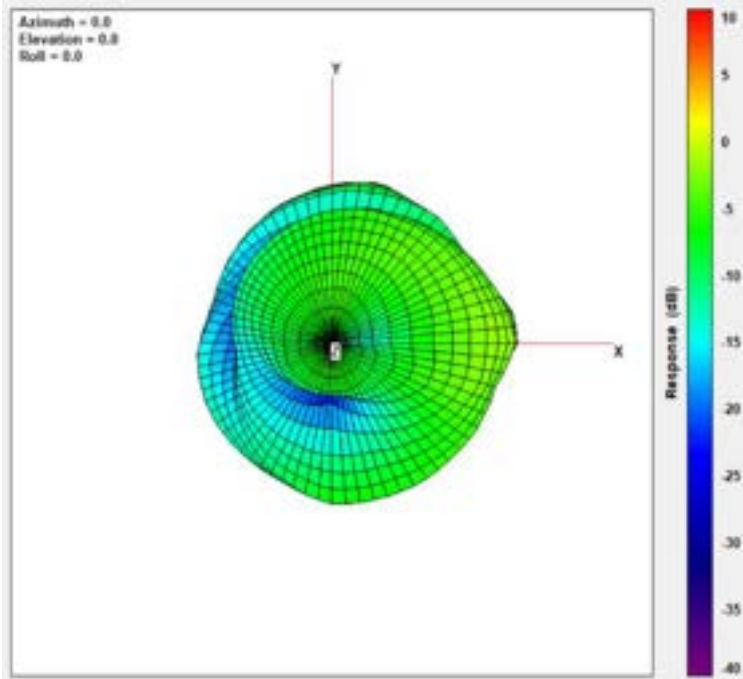
Center Frequency	787MHz
Horizontal (dBi) peak	-2.36
Vertical (dBi) peak	-1.79

814MHz



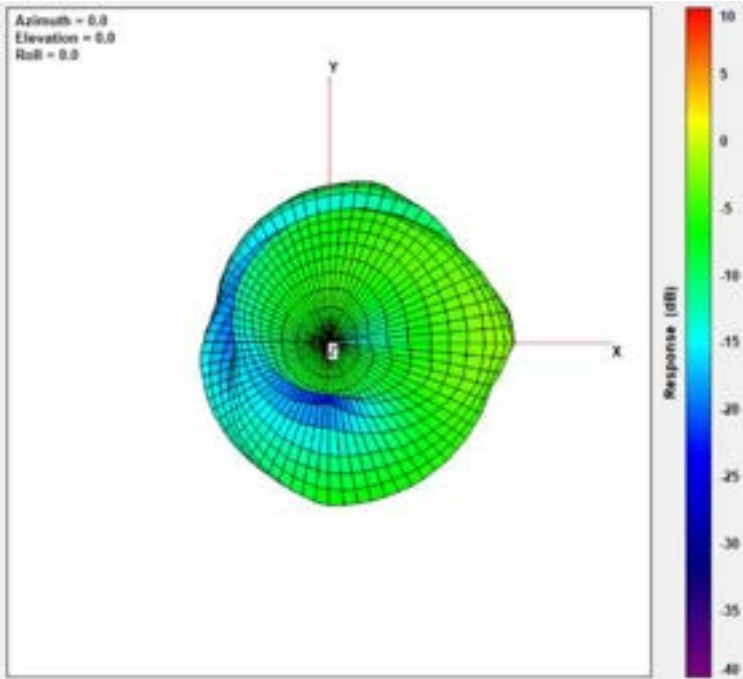
Center Frequency	814MHz
Horizontal (dBi) peak	-4.21
Vertical (dBi) peak	-2.50

824MHz



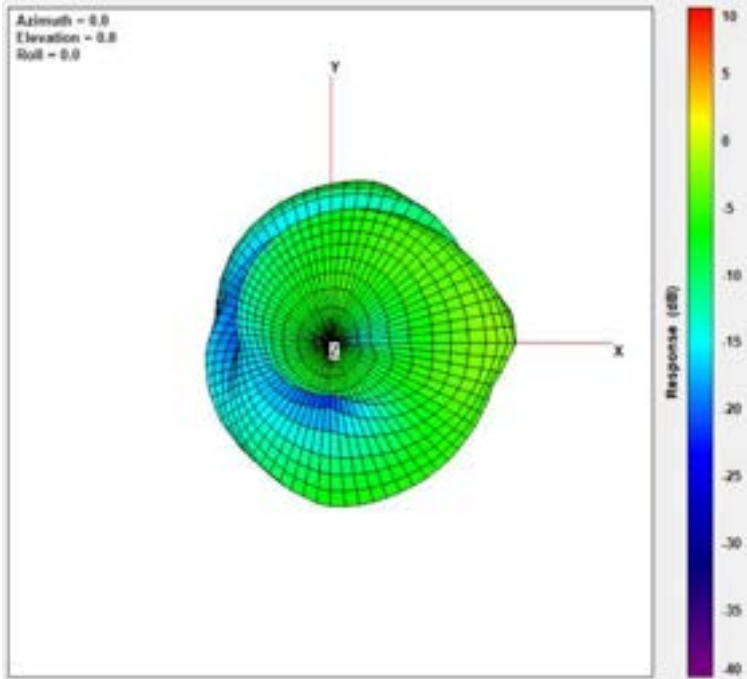
Center Frequency	824MHz
Horizontal (dBi) peak	-3.30
Vertical (dBi) peak	-1.65

832MHz



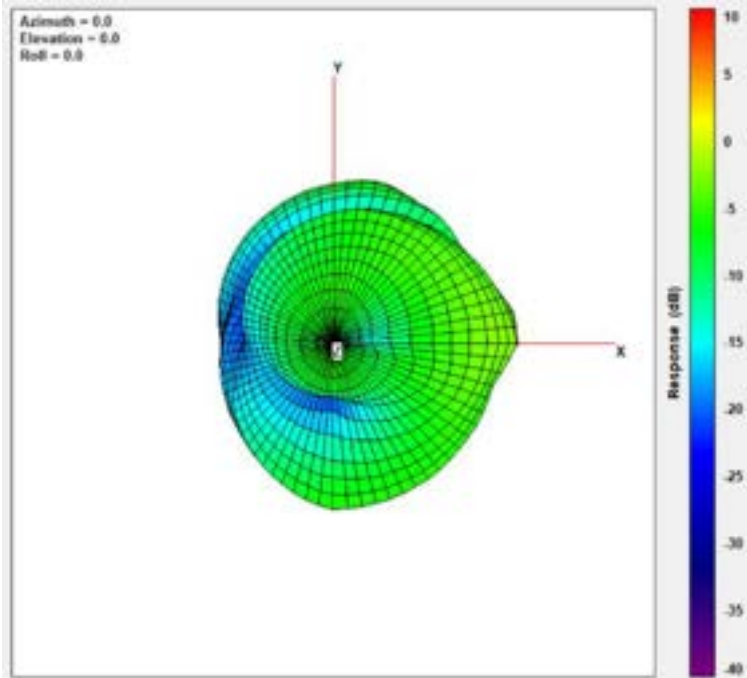
Center Frequency	832MHz
Horizontal (dBi) peak	-2.46
Vertical (dBi) peak	-1.10

836.5MHz



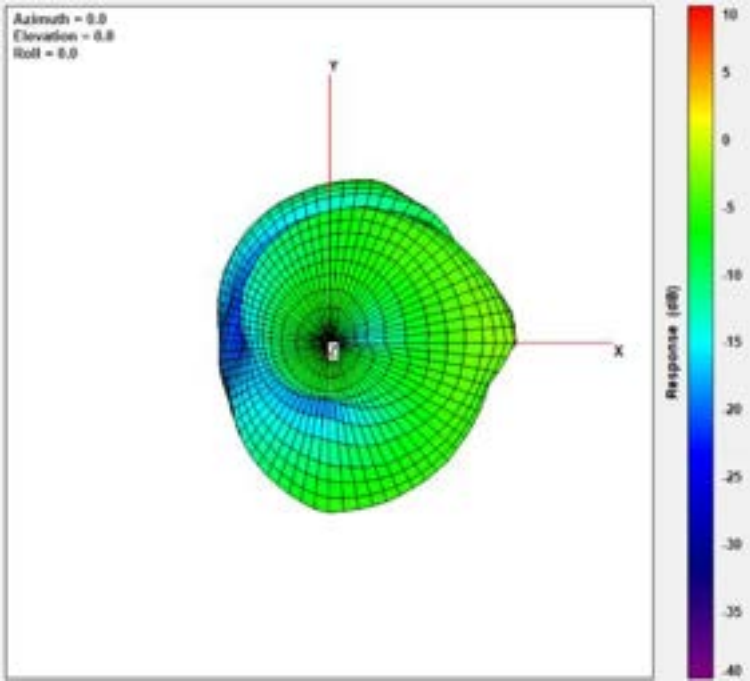
Center Frequency	836.5MHz
Horizontal (dBi) peak	-2.09
Vertical (dBi) peak	-0.47

849MHz



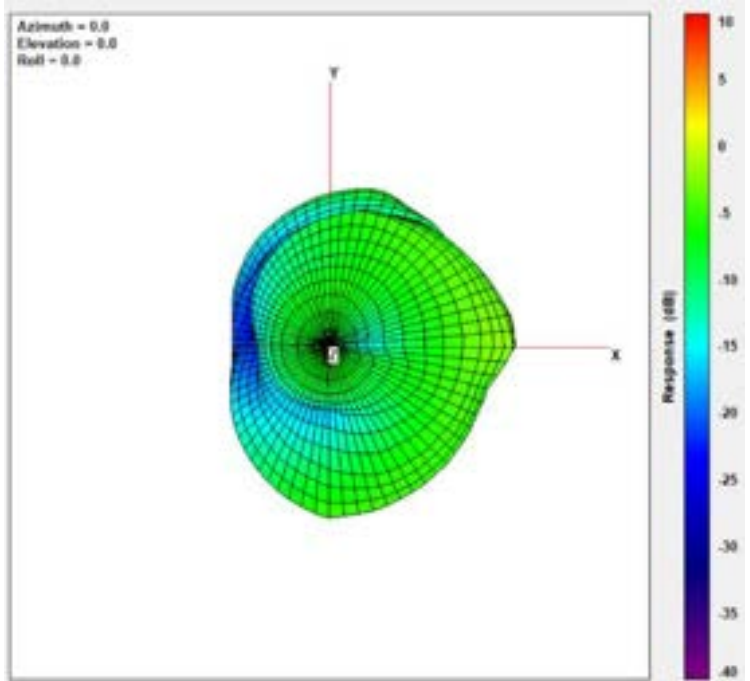
Center Frequency	849MHz
Horizontal (dBi) peak	-1.34
Vertical (dBi) peak	0.27

862MHz



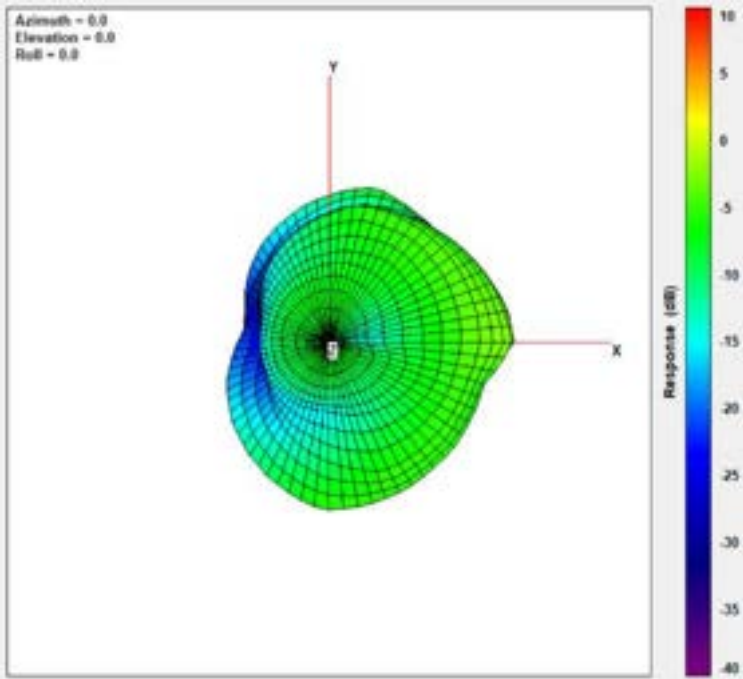
Center Frequency	862MHz
Horizontal (dBi) peak	-0.85
Vertical (dBi) peak	1.07

880MHz



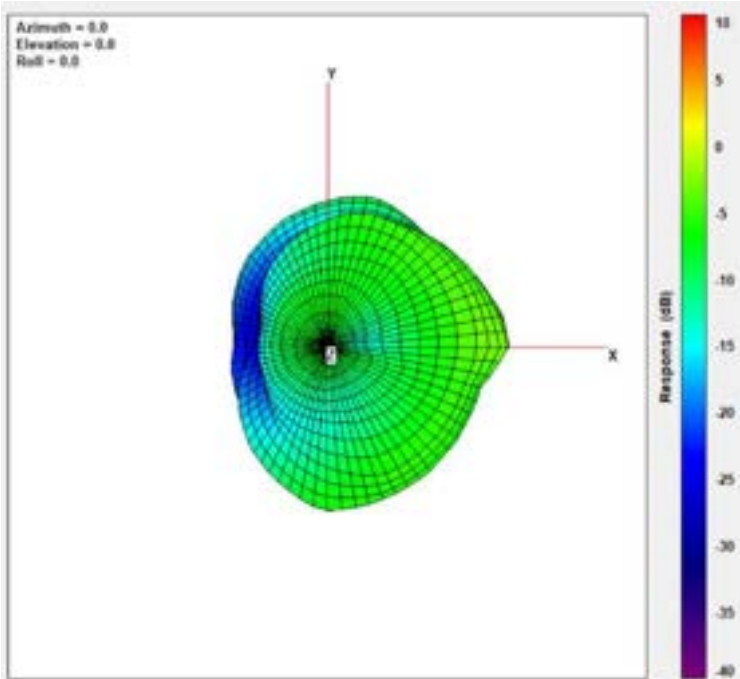
Center Frequency	880MHz
Horizontal (dBi) peak	-1.61
Vertical (dBi) peak	0.71

897.5MHz



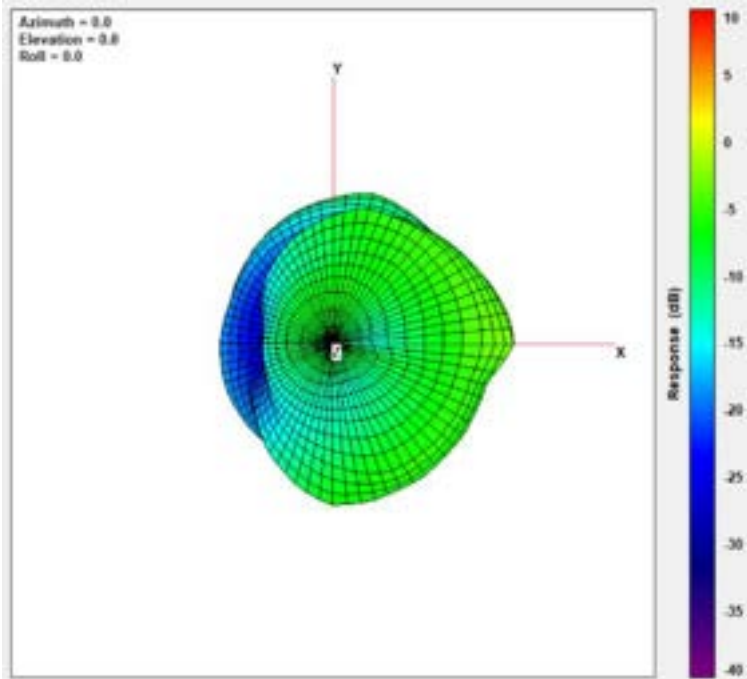
Center Frequency	897.5MHz
Horizontal (dBi) peak	-1.95
Vertical (dBi) peak	0.77

915MHz



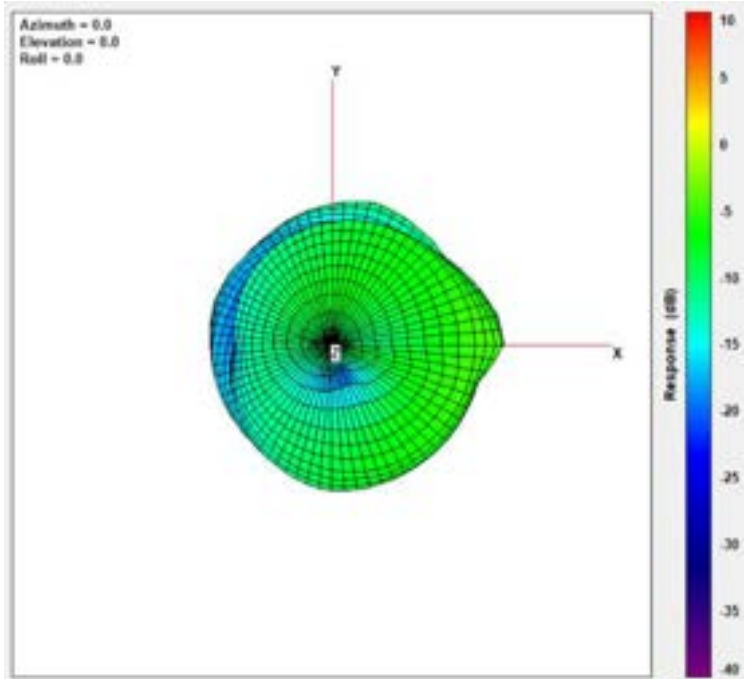
Center Frequency	915MHz
Horizontal (dBi) peak	-1.26
Vertical (dBi) peak	0.46

925MHz



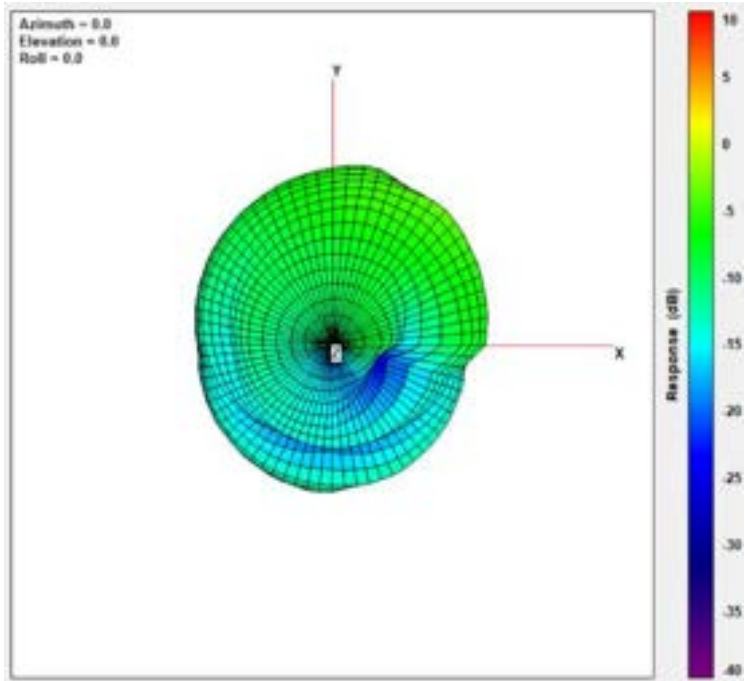
Center Frequency	925MHz
Horizontal (dBi) peak	-1.30
Vertical (dBi) peak	0.15

960MHz



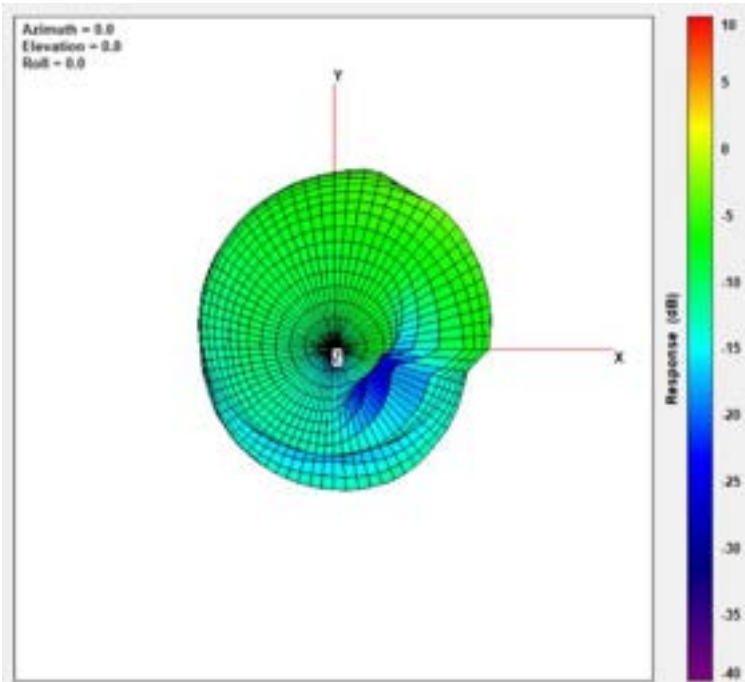
Center Frequency	960MHz
Horizontal (dBi) peak	-3.01
Vertical (dBi) peak	-1.79

1427.9MHz



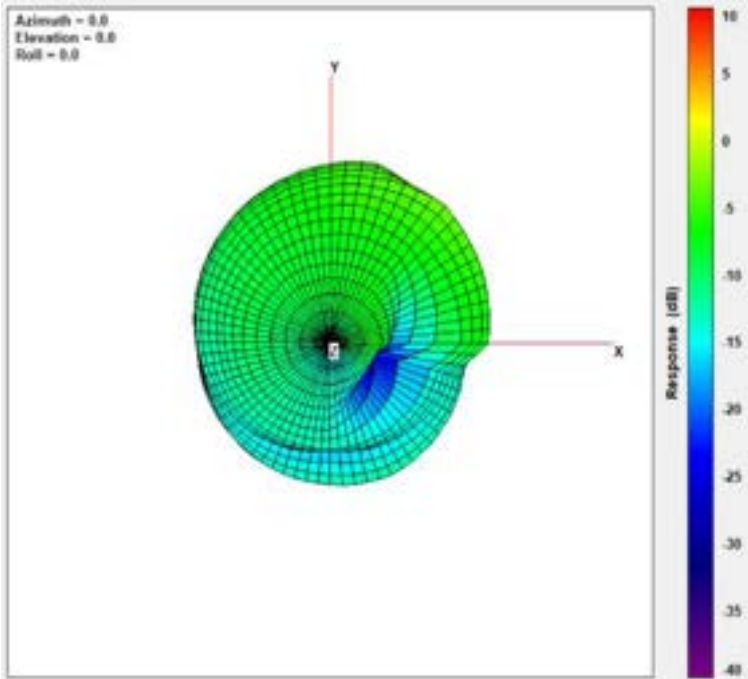
Center Frequency	1427.9MHz
Horizontal (dBi) peak	-5.90
Vertical (dBi) peak	-4.75

1447.9MHz



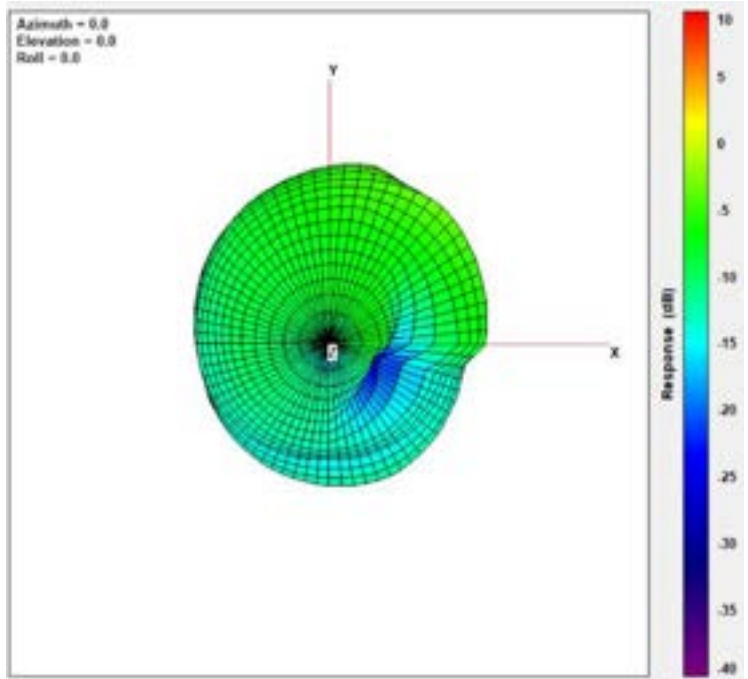
Center Frequency	1447.9MHz
Horizontal (dBi) peak	-5.22
Vertical (dBi) peak	-3.23

1455.4MHz



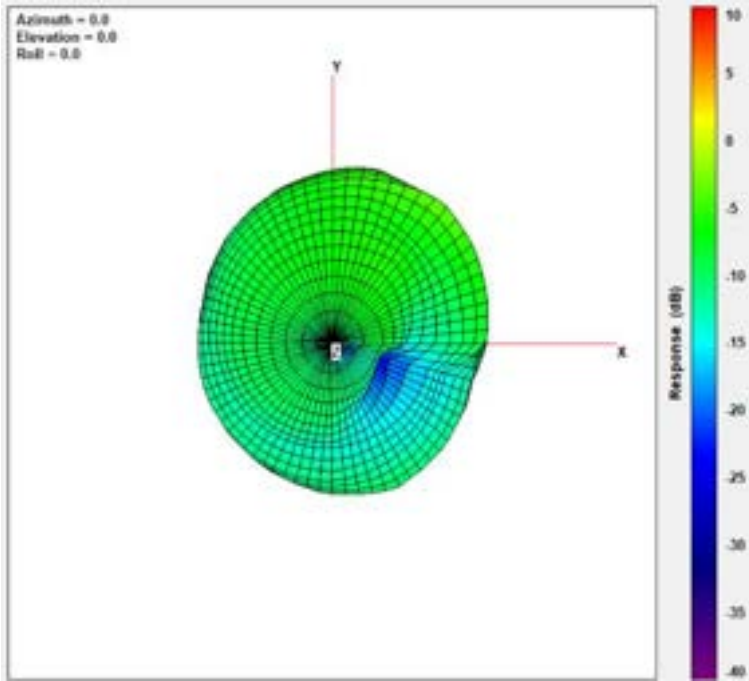
Center Frequency	1455.4MHz
Horizontal (dBi) peak	-5.01
Vertical (dBi) peak	-2.64

1462.9MHz



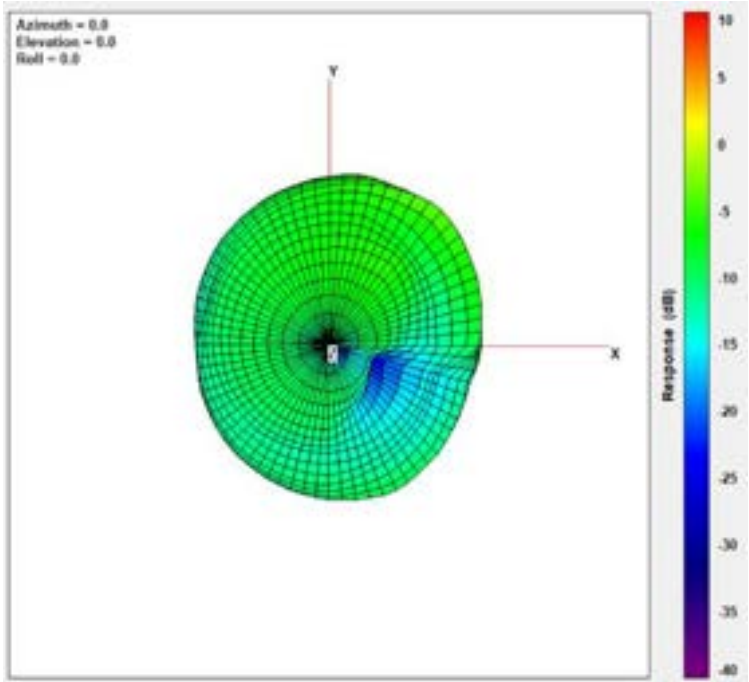
Center Frequency	1462.9MHz
Horizontal (dBi) peak	-4.42
Vertical (dBi) peak	-2.34

1496MHz



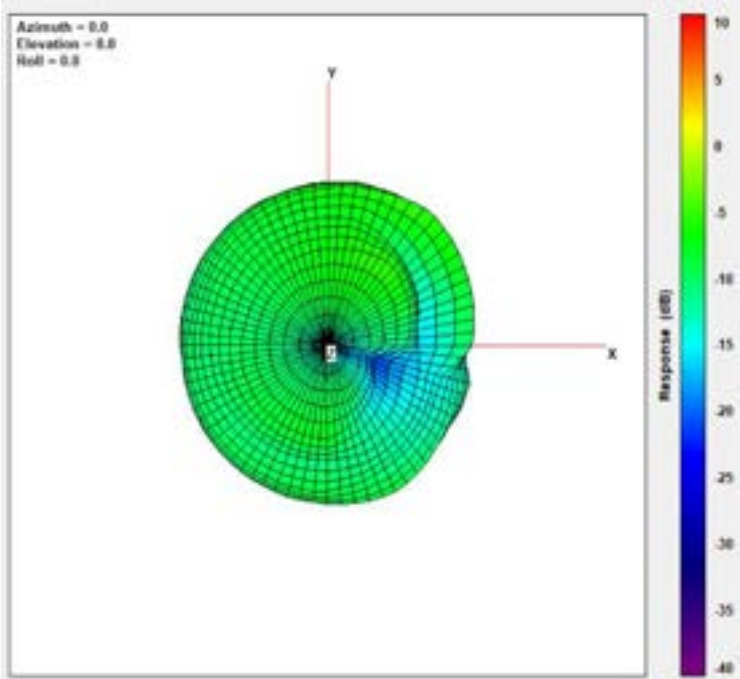
Center Frequency	1496MHz
Horizontal (dBi) peak	-3.58
Vertical (dBi) peak	-0.84

1510.9MHz



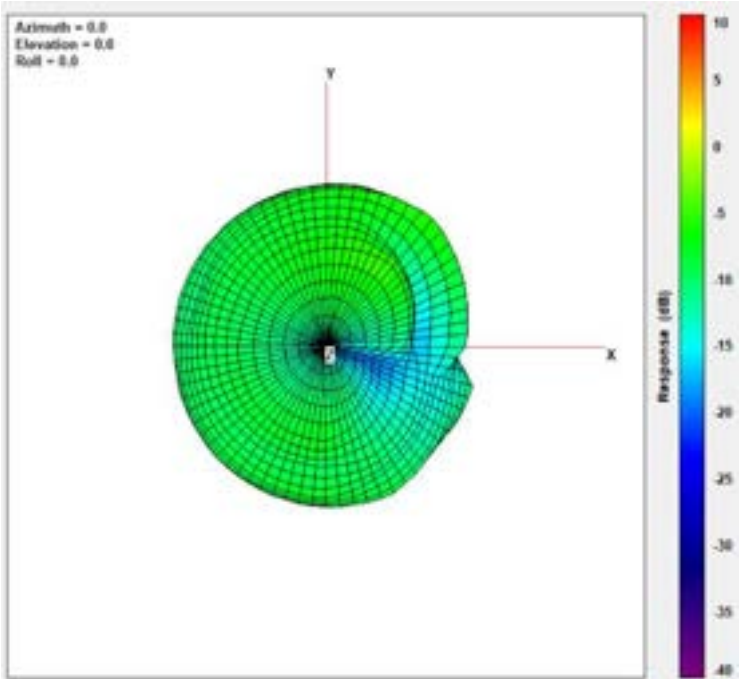
Center Frequency	1510.9MHz
Horizontal (dBi) peak	-3.74
Vertical (dBi) peak	-0.80

1557MHz



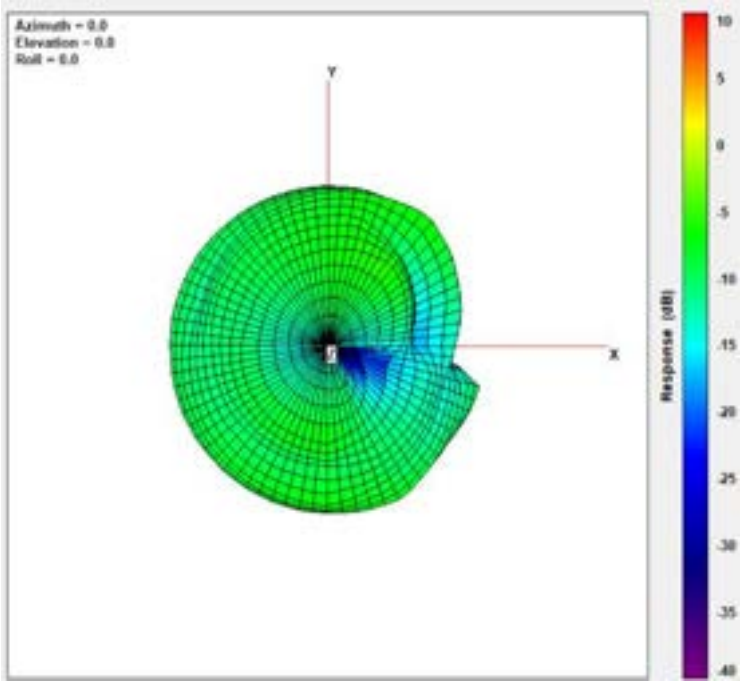
Center Frequency	1557MHz
Horizontal (dBi) peak	-4.80
Vertical (dBi) peak	-0.82

1575MHz



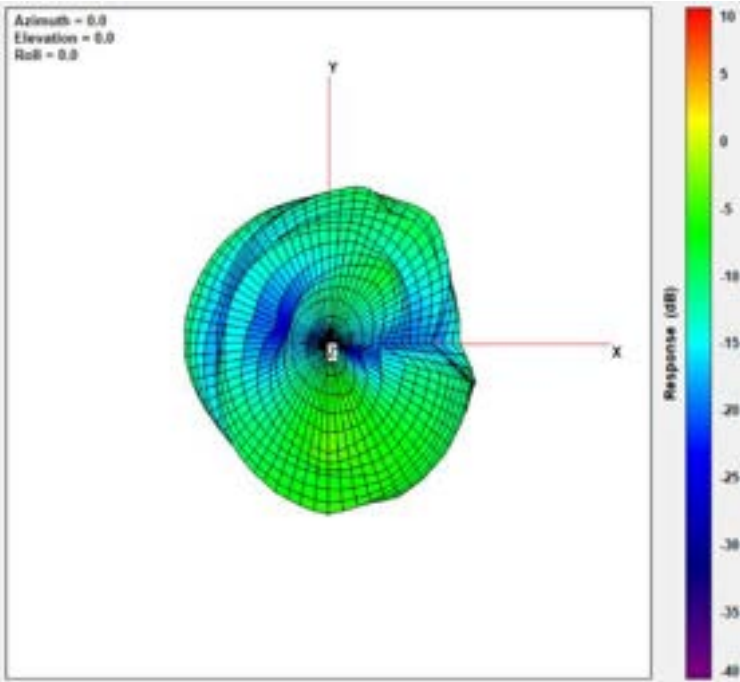
Center Frequency	1575MHz
Horizontal (dBi) peak	-4.74
Vertical (dBi) peak	-1.78

1610MHz



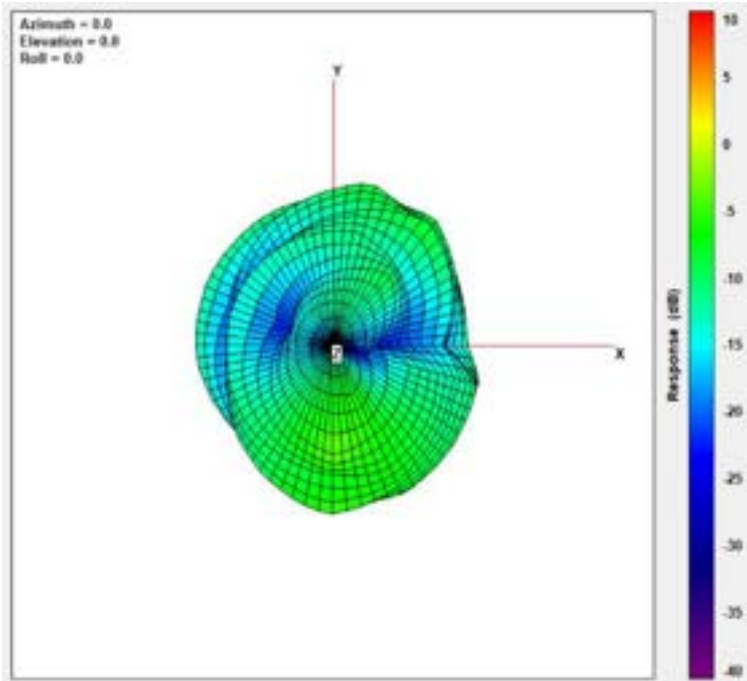
Center Frequency	1610MHz
Horizontal (dBi) peak	-4.61
Vertical (dBi) peak	-1.94

1805 MHz



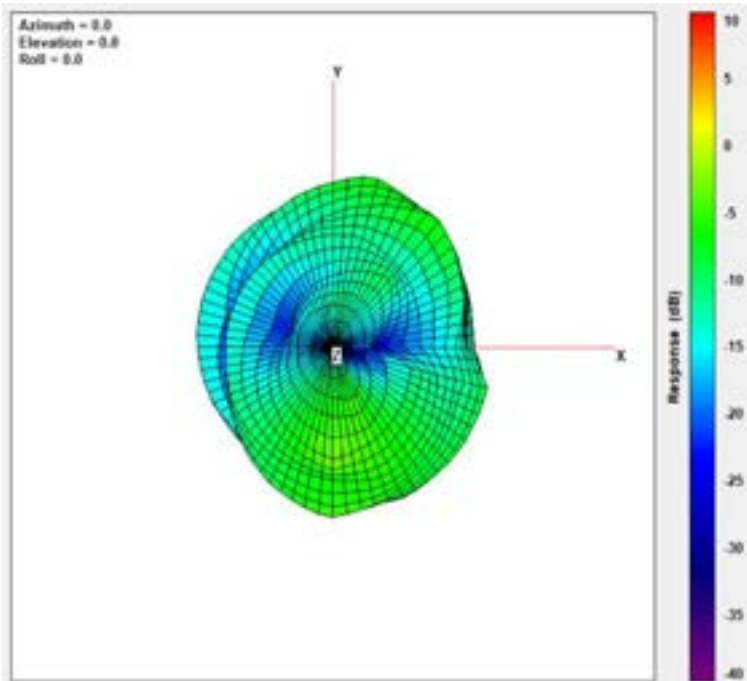
Center Frequency	1805 MHz
Horizontal (dBi) peak	-2.43
Vertical (dBi) peak	-3.02

1850 MHz



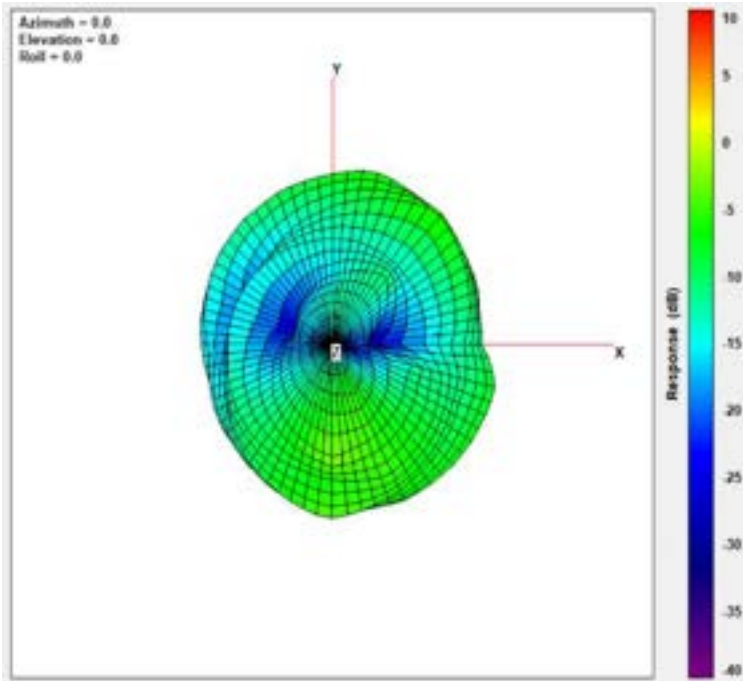
Center Frequency	1850 MHz
Horizontal (dBi) peak	-1.94
Vertical (dBi) peak	-2.38

1880 MHz



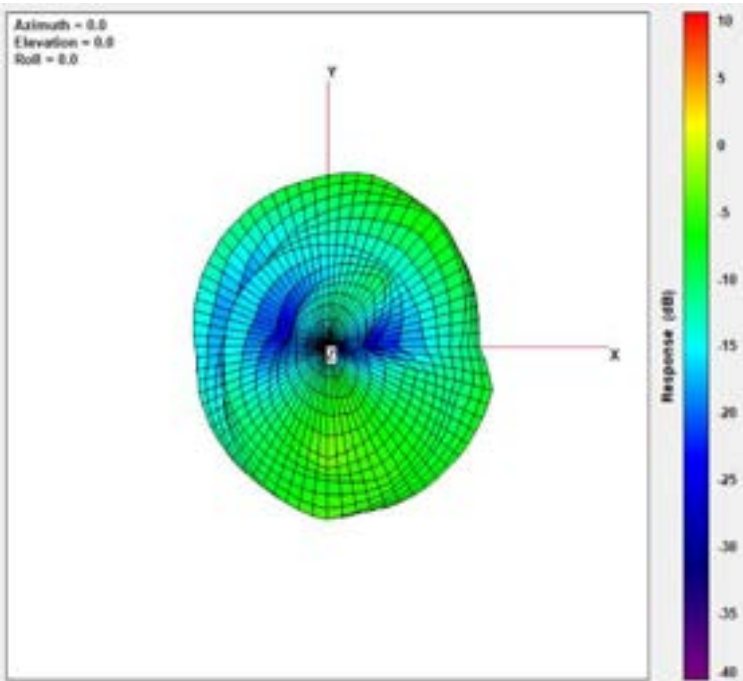
Center Frequency	1880 MHz
Horizontal (dBi) peak	-2.20
Vertical (dBi) peak	-2.03

1910MHz



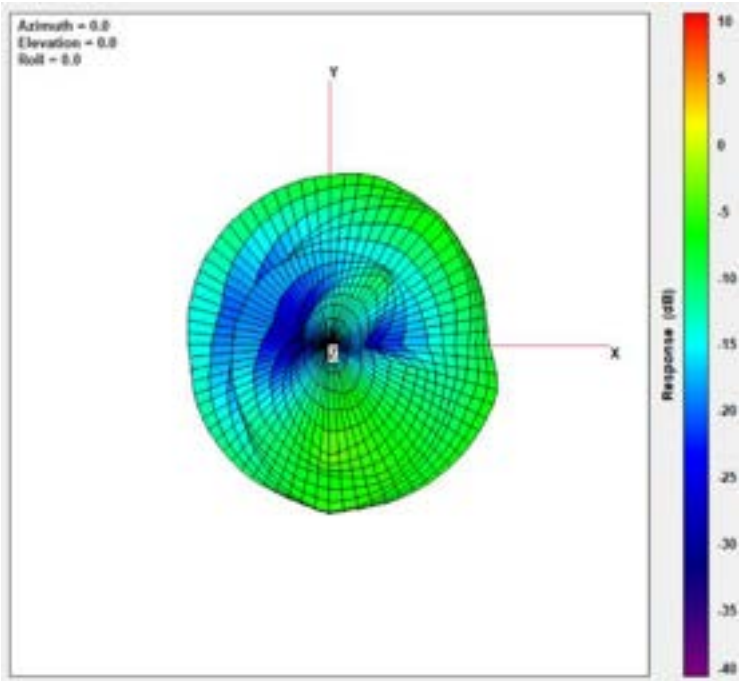
Center Frequency	1910MHz
Horizontal (dBi) peak	-2.18
Vertical (dBi) peak	-2.14

1920MHz



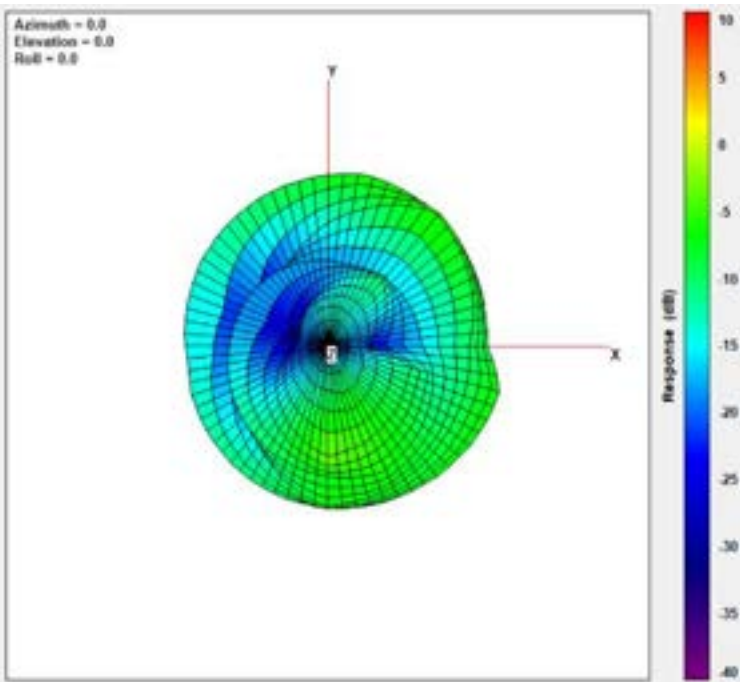
Center Frequency	1920MHz
Horizontal (dBi) peak	-2.18
Vertical (dBi) peak	-1.65

1950MHz



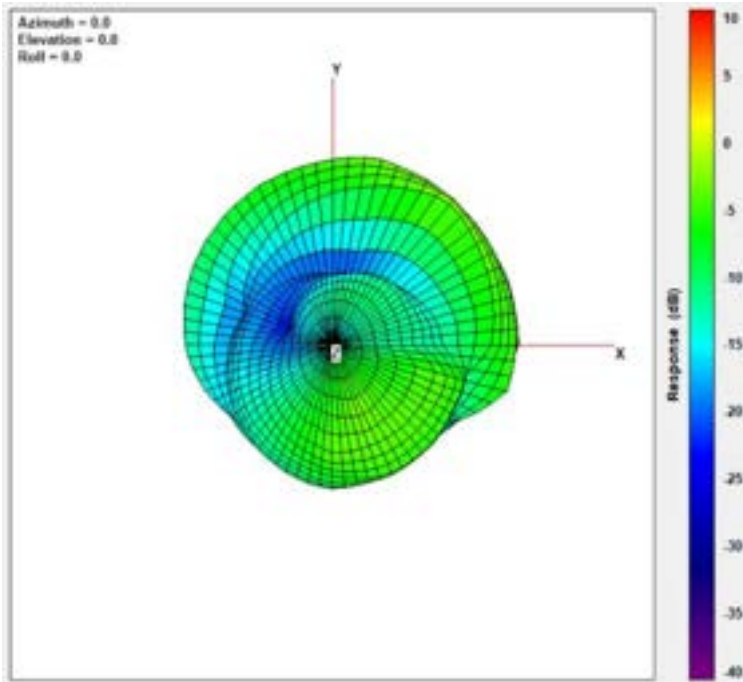
Center Frequency	1950MHz
Horizontal (dBi) peak	-2.71
Vertical (dBi) peak	-2.05

1980MHz



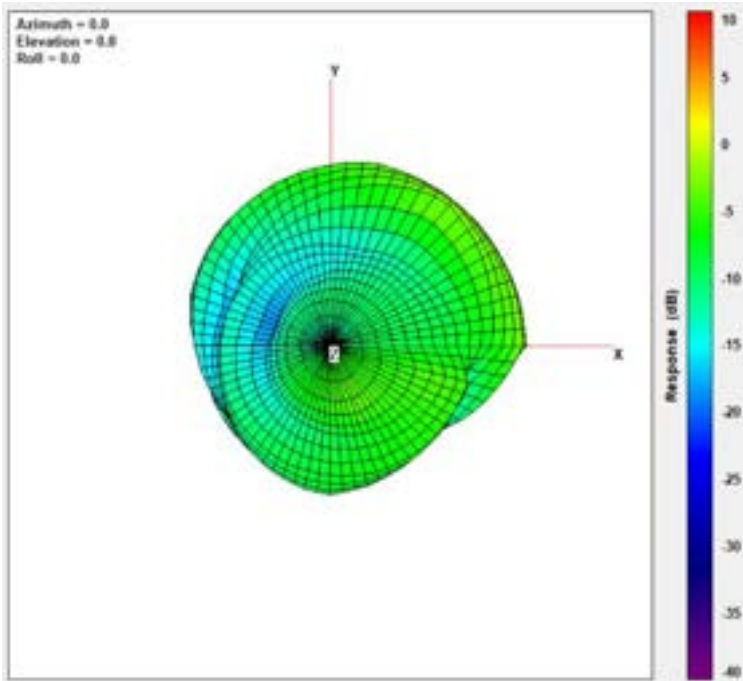
Center Frequency	1980MHz
Horizontal (dBi) peak	-3.27
Vertical (dBi) peak	-2.88

2110MHz



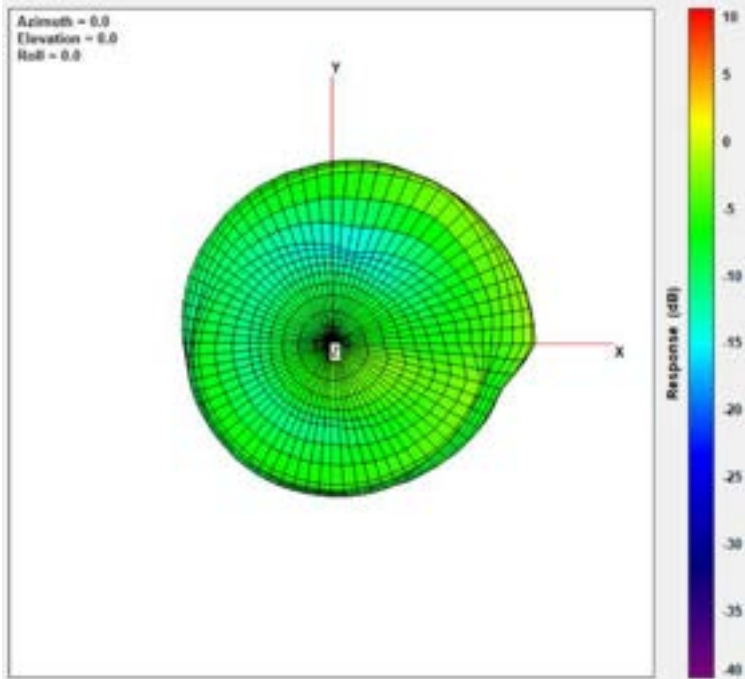
Center Frequency	2110MHz
Horizontal (dBi) peak	-2.95
Vertical (dBi) peak	-0.96

2200MHz



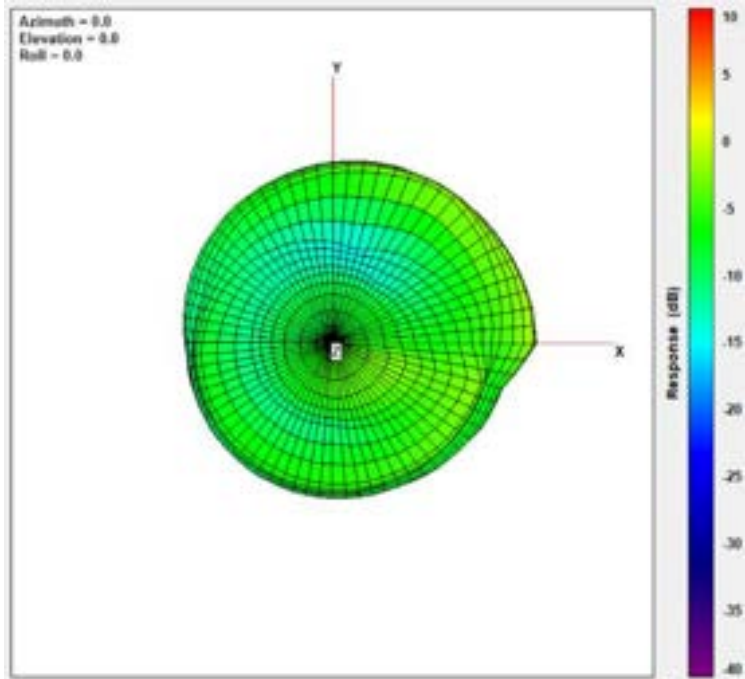
Center Frequency	2200MHz
Horizontal (dBi) peak	-2.40
Vertical (dBi) peak	-2.21

2300MHz



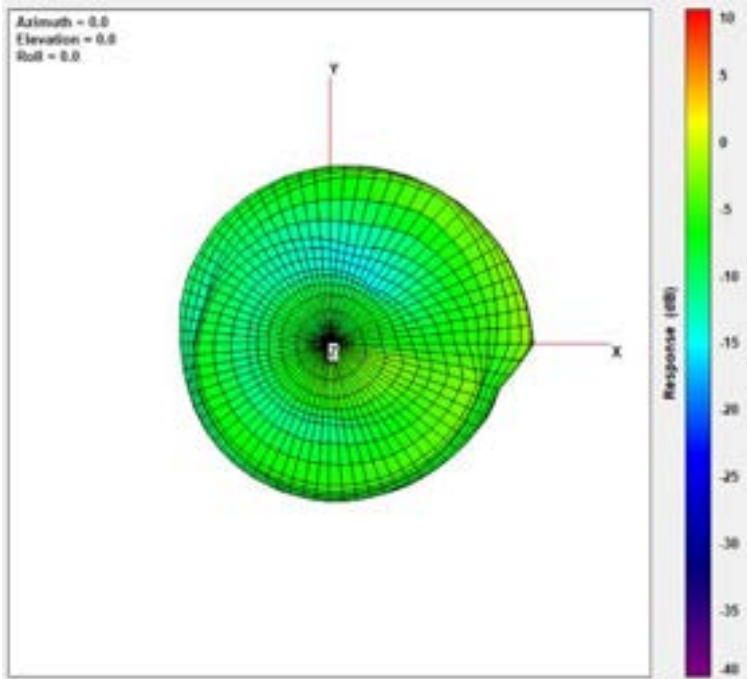
Center Frequency	2300MHz
Horizontal (dBi) peak	-0.47
Vertical (dBi) peak	-0.76

2305MHz



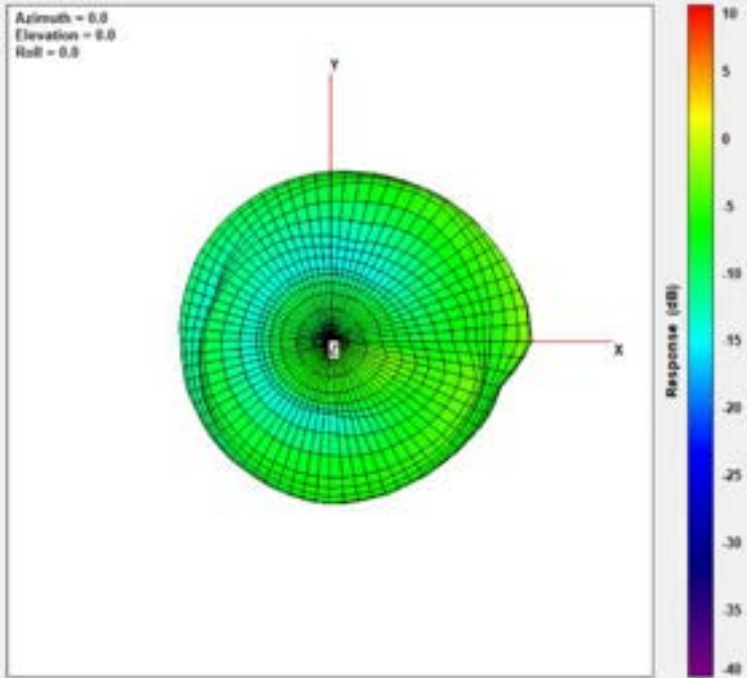
Center Frequency	2305MHz
Horizontal (dBi) peak	-0.51
Vertical (dBi) peak	-0.57

2315MHz



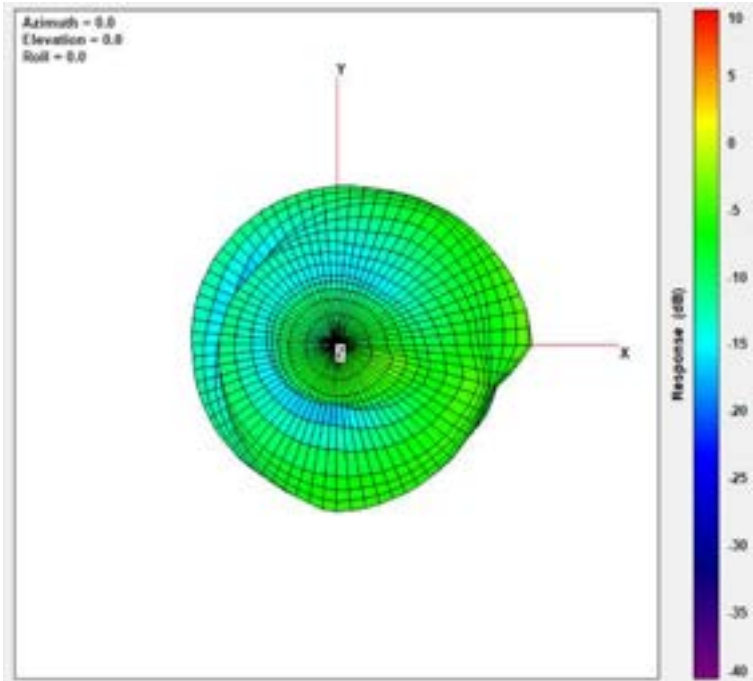
Center Frequency	2315MHz
Horizontal (dBi) peak	-0.72
Vertical (dBi) peak	-0.96

2350MHz



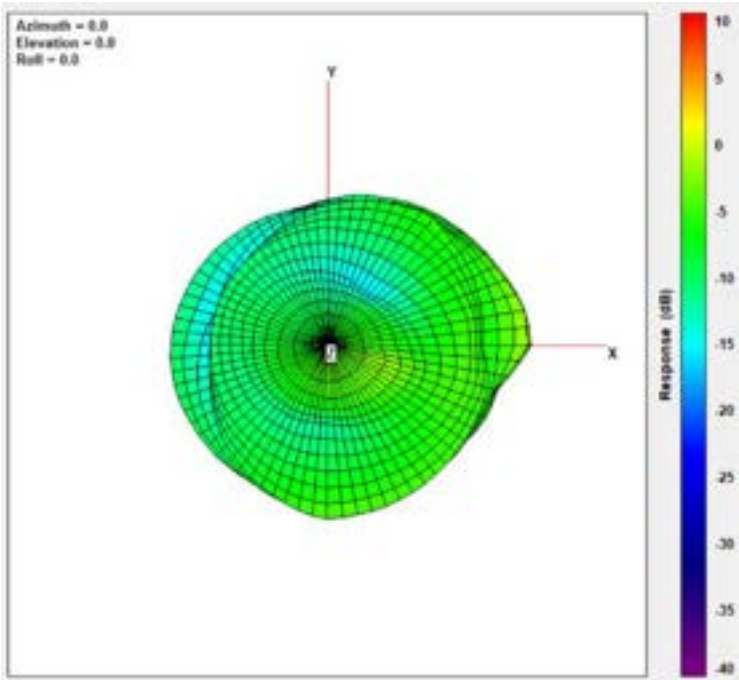
Center Frequency	2350MHz
Horizontal (dBi) peak	-1.71
Vertical (dBi) peak	-1.57

2400MHz



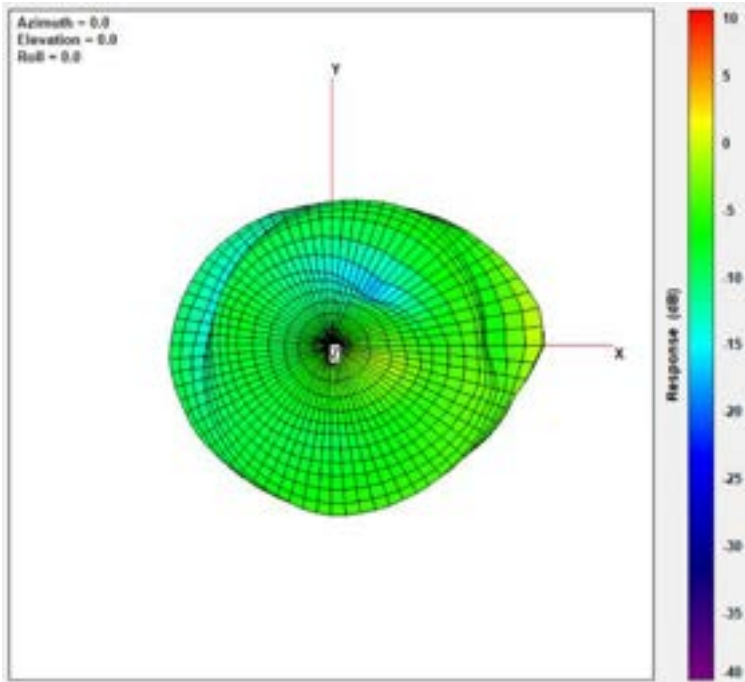
Center Frequency	2400MHz
Horizontal (dBi) peak	-1.24
Vertical (dBi) peak	-1.76

2500MHz



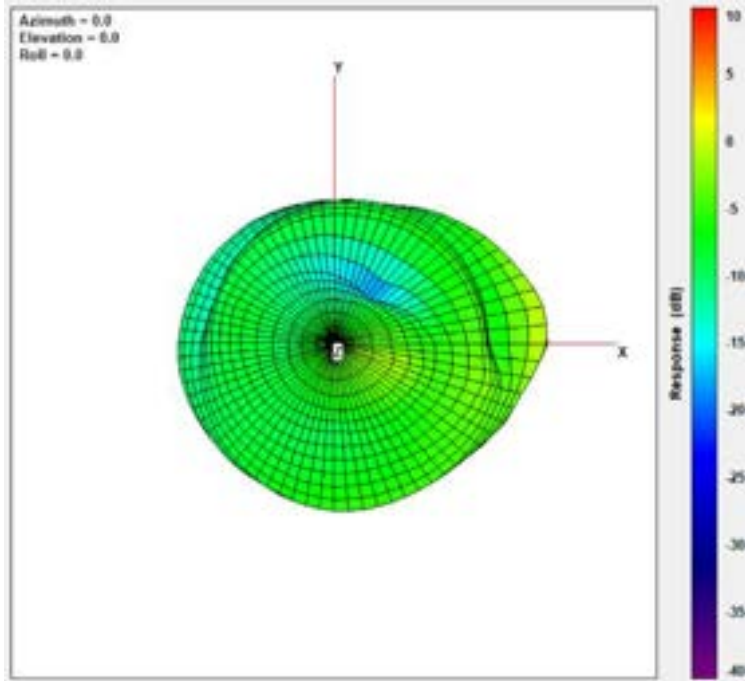
Center Frequency	2500MHz
Horizontal (dBi) peak	-0.69
Vertical (dBi) peak	-0.83

2570MHz



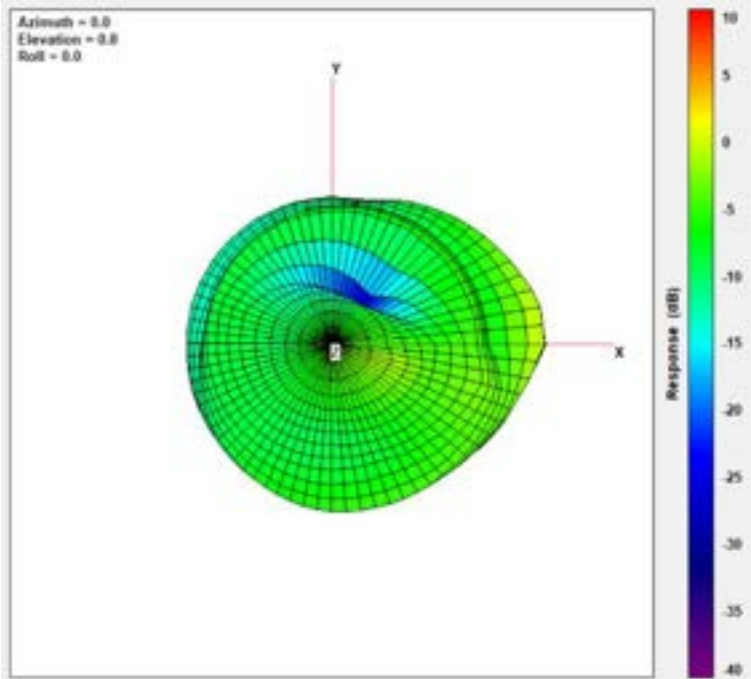
Center Frequency	2570MHz
Horizontal (dBi) peak	-0.64
Vertical (dBi) peak	-0.62

2595MHz



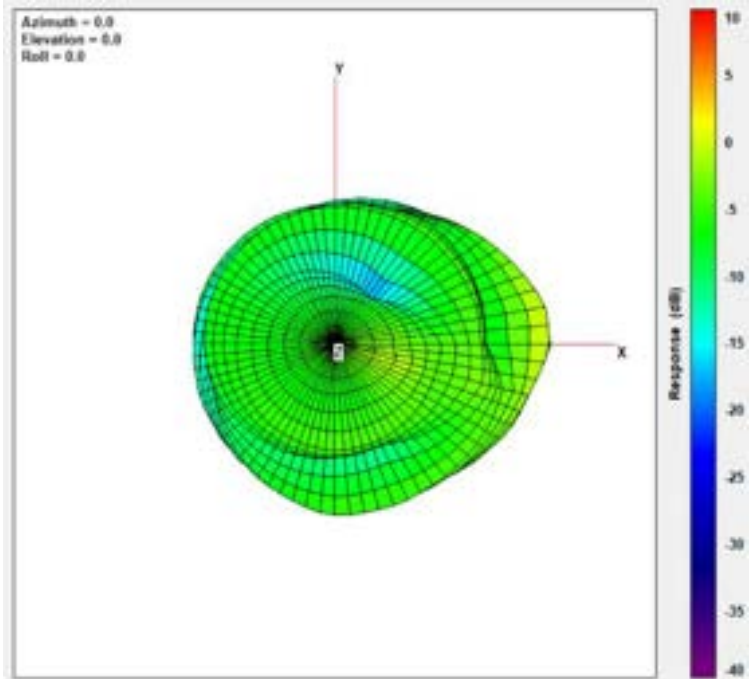
Center Frequency	2595MHz
Horizontal (dBi) peak	-0.67
Vertical (dBi) peak	-0.52

2620MHz



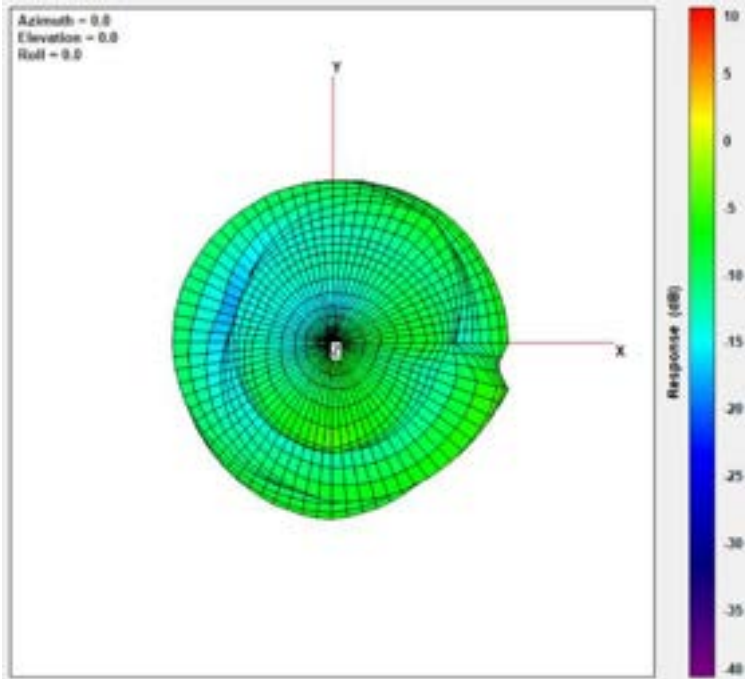
Center Frequency	2620MHz
Horizontal (dBi) peak	-1.26
Vertical (dBi) peak	-0.02

2690MHz



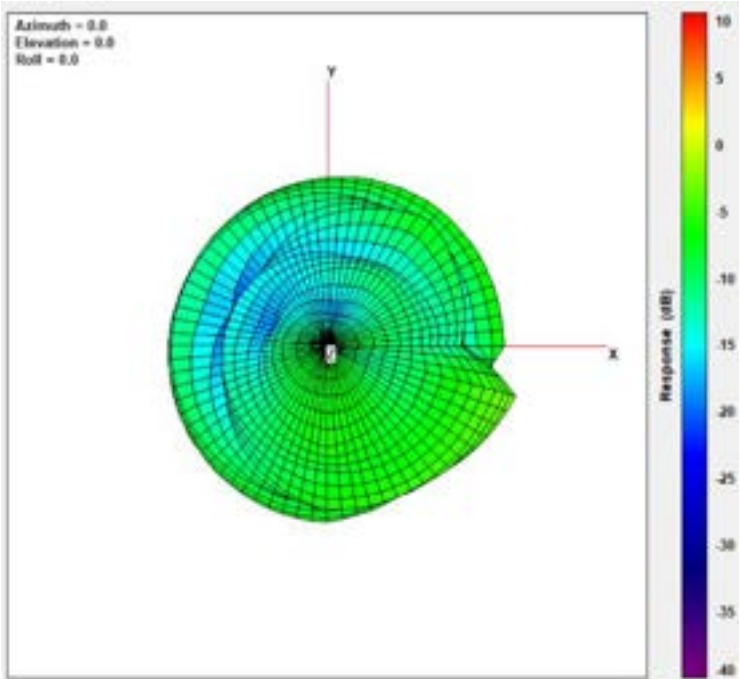
Center Frequency	2690MHz
Horizontal (dBi) peak	-0.76
Vertical (dBi) peak	-1.20

3400MHz



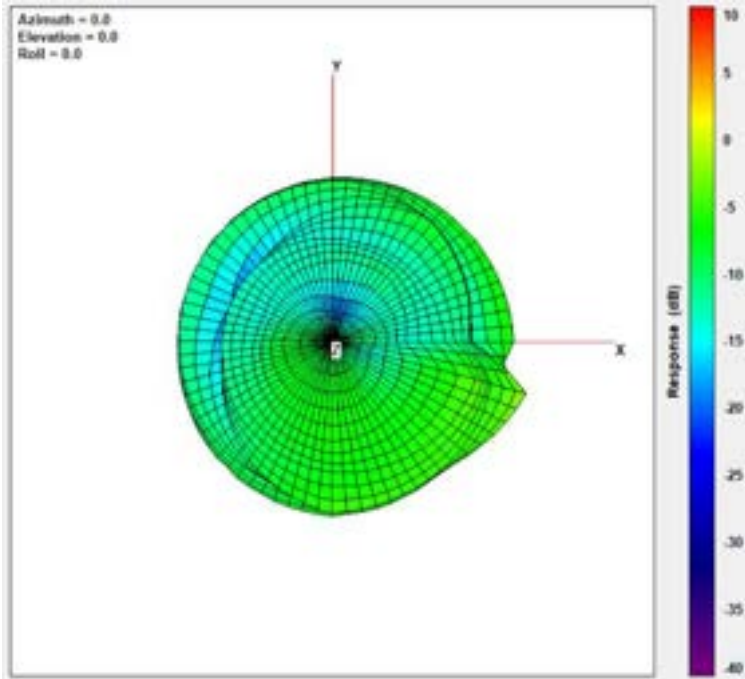
Center Frequency	3400MHz
Horizontal (dBi) peak	-1.26
Vertical (dBi) peak	0.13

3500MHz



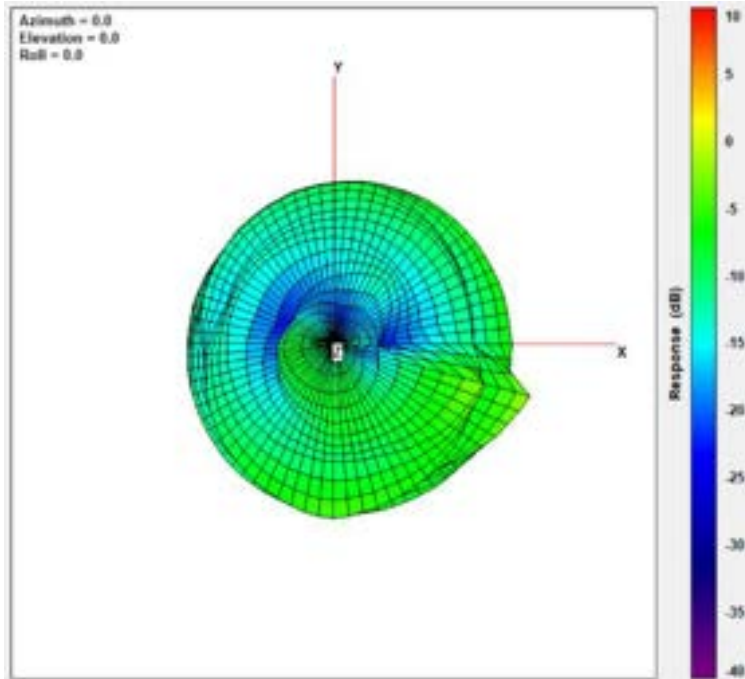
Center Frequency	3500MHz
Horizontal (dBi) peak	-1.33
Vertical (dBi) peak	-1.79

3600MHz



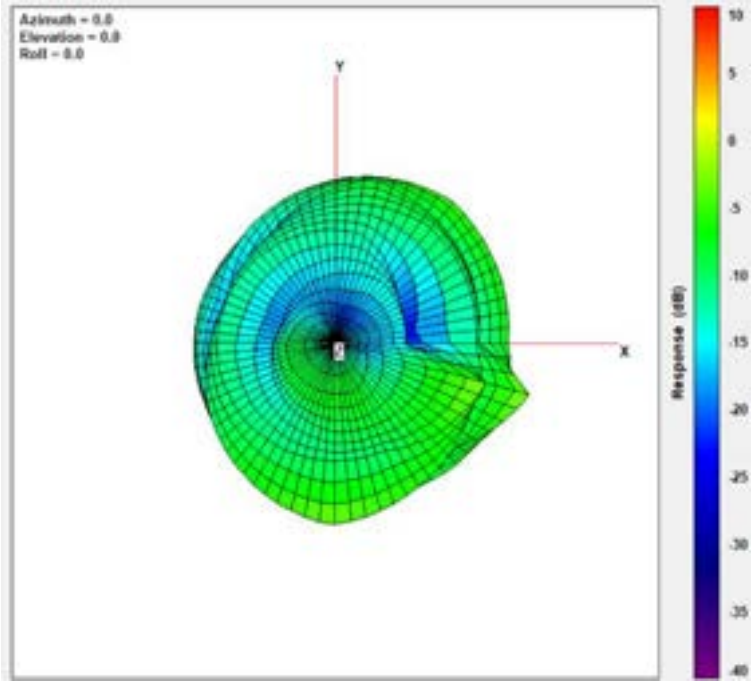
Center Frequency	3600MHz
Horizontal (dBi) peak	-2.89
Vertical (dBi) peak	-3.01

3700MHz



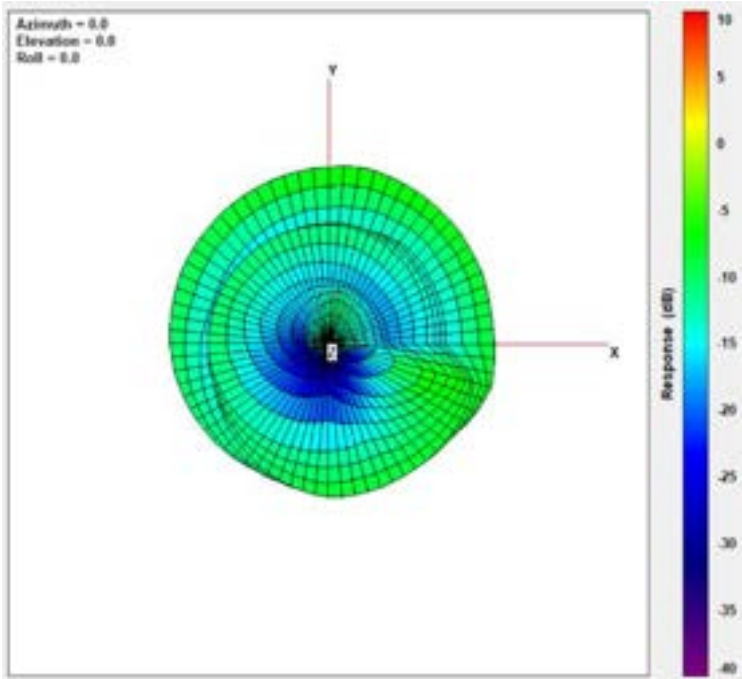
Center Frequency	3700MHz
Horizontal (dBi) peak	-0.33
Vertical (dBi) peak	-0.60

3800MHz



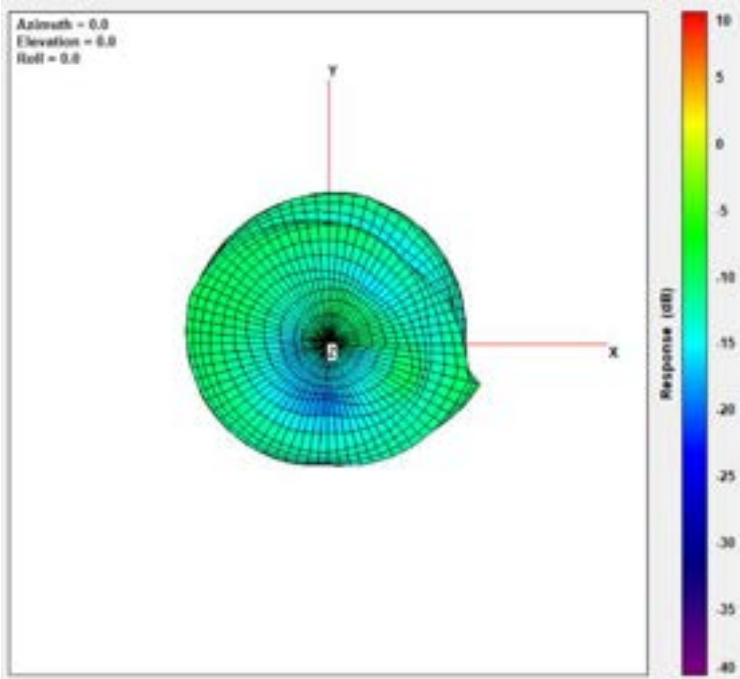
Center Frequency	3800MHz
Horizontal (dBi) peak	-0.14
Vertical (dBi) peak	0.62

4200MHz



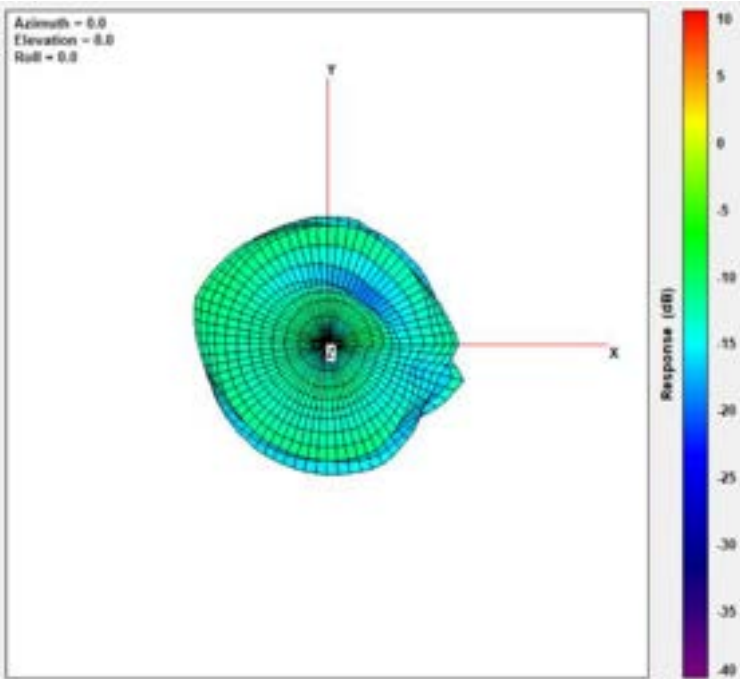
Center Frequency	4200MHz
Horizontal (dBi) peak	-1.54
Vertical (dBi) peak	-0.27

4400MHz



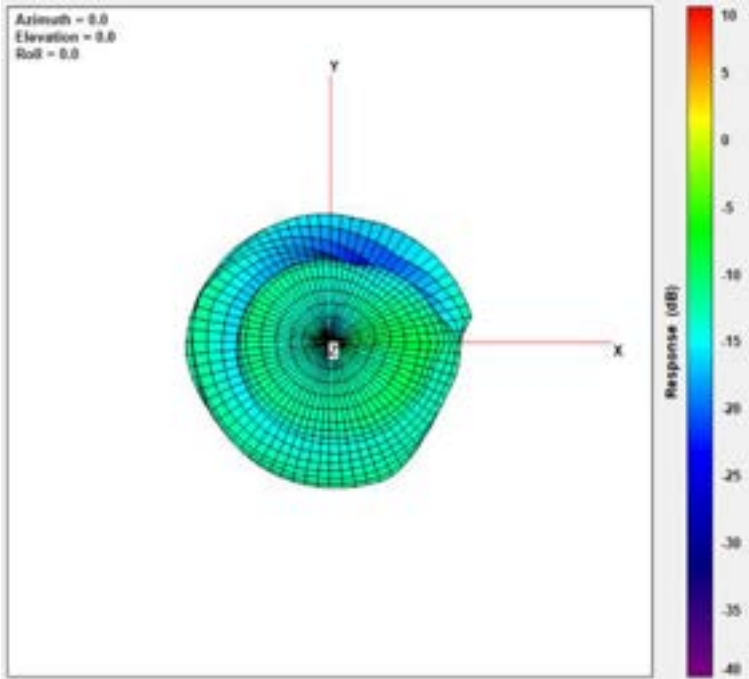
Center Frequency	4400MHz
Horizontal (dBi) peak	-3.53
Vertical (dBi) peak	-3.81

4700MHz



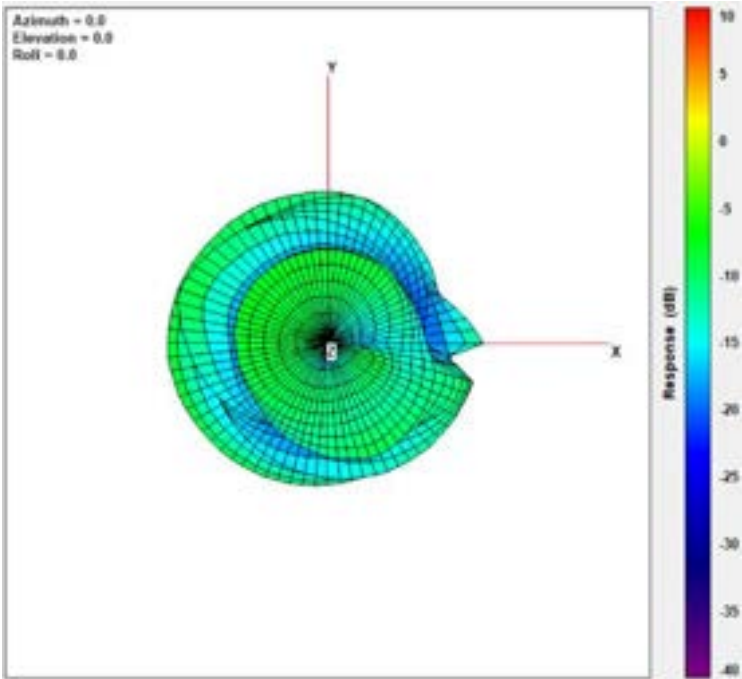
Center Frequency	4700MHz
Horizontal (dBi) peak	-7.77
Vertical (dBi) peak	-7.31

5150MHz



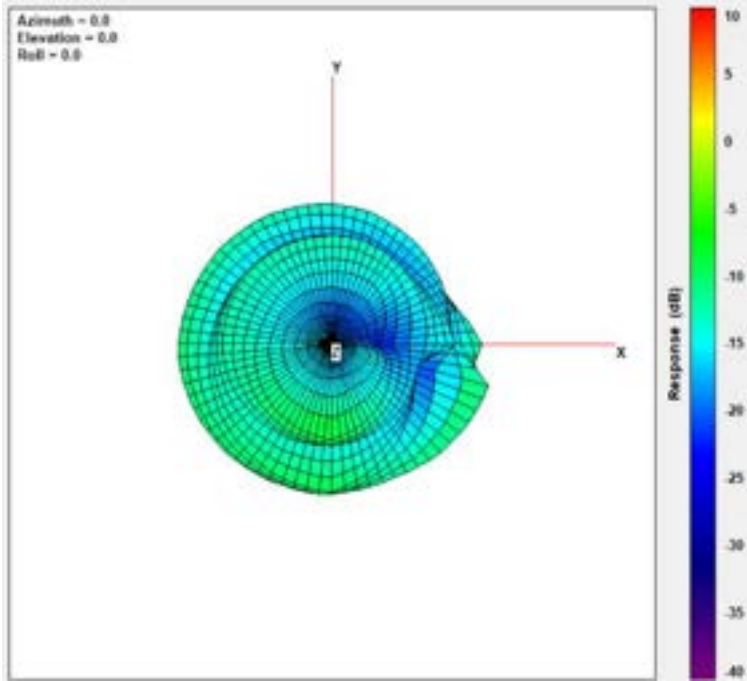
Center Frequency	5150MHz
Horizontal (dBi) peak	-6.73
Vertical (dBi) peak	-6.11

5537.5MHz



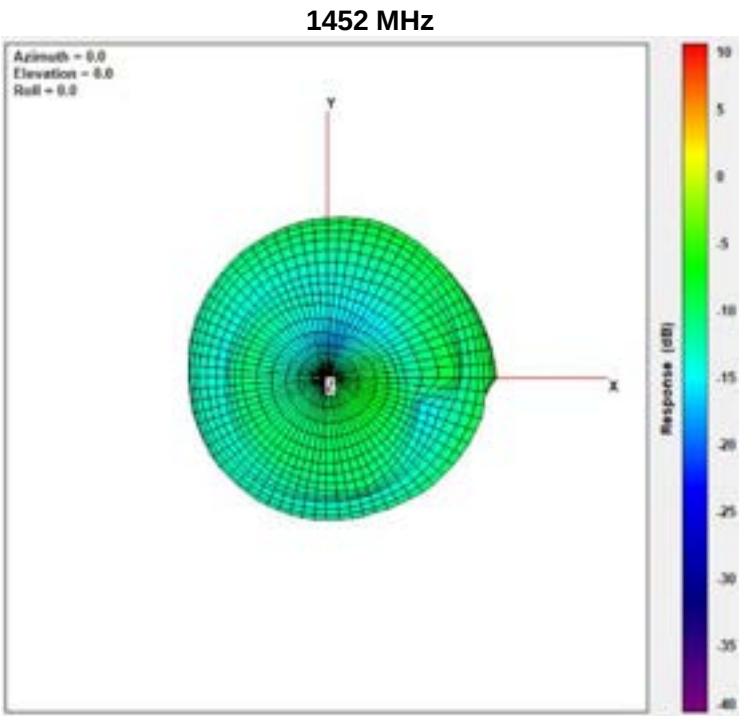
Center Frequency	5537.5MHz
Horizontal (dBi) peak	-4.17
Vertical (dBi) peak	-3.07

5925MHz

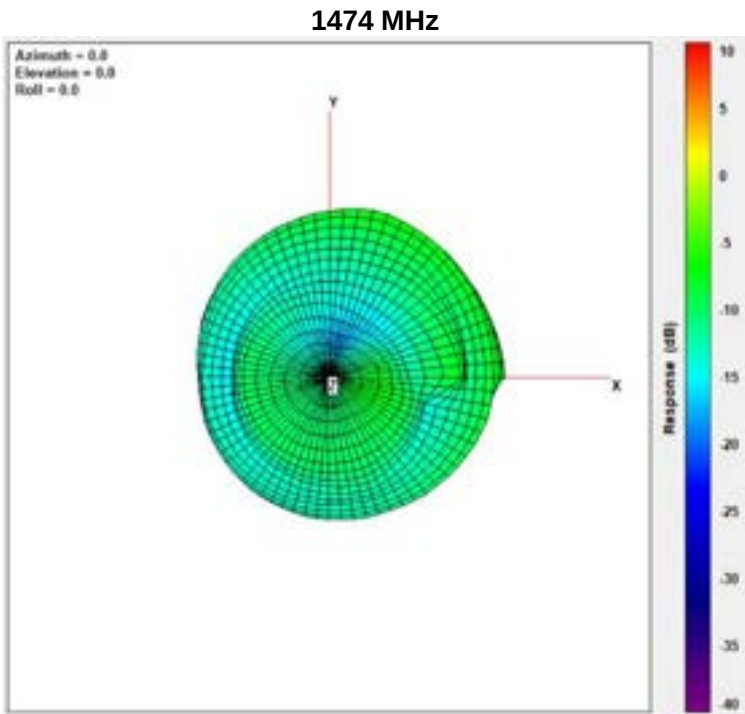


Center Frequency	5925MHz
Horizontal (dBi) peak	-5.08
Vertical (dBi) peak	-3.38



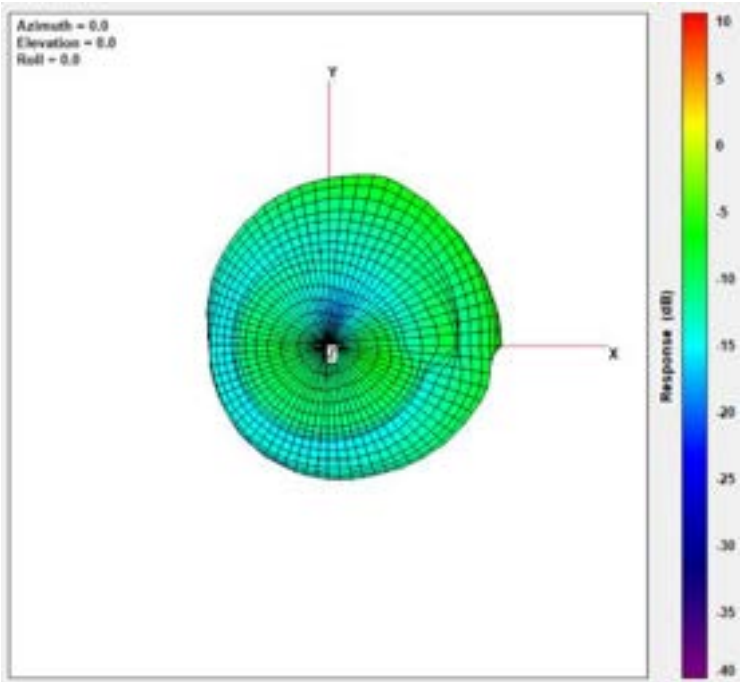


Center Frequency	1452 MHz
Horizontal (dBi) peak	-1.99
Vertical (dBi) peak	-2.67



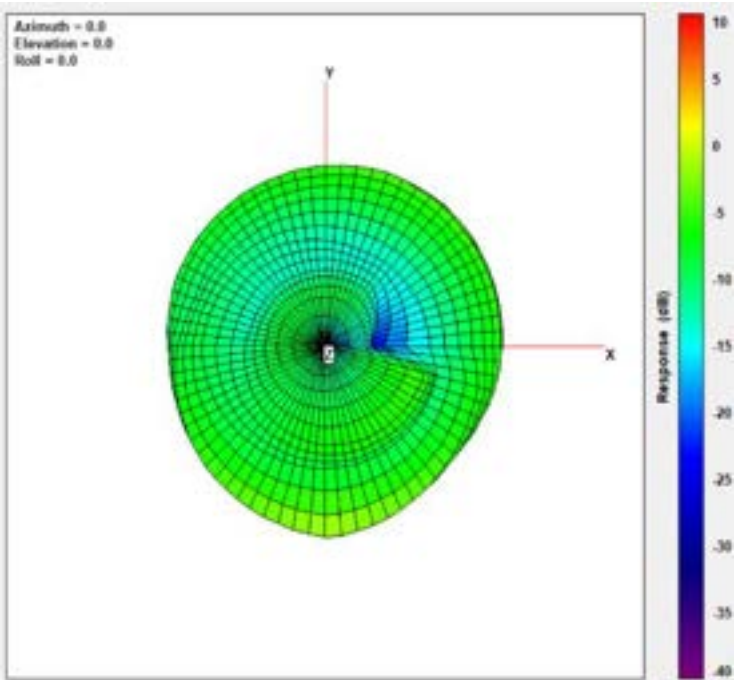
Center Frequency	1474 MHz
Horizontal (dBi) peak	-3.34
Vertical (dBi) peak	-2.83

1496 MHz



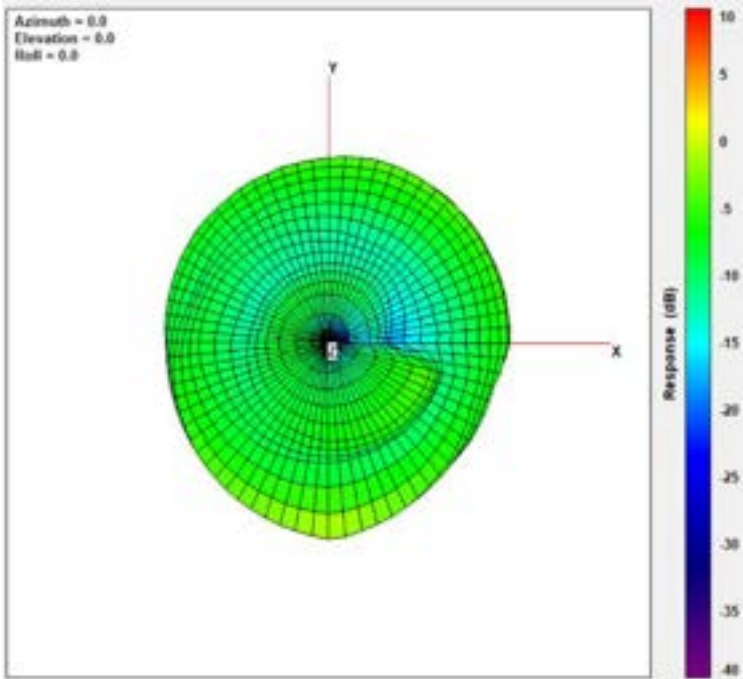
Center Frequency	1496 MHz
Horizontal (dBi) peak	-3.84
Vertical (dBi) peak	-3.25

1710 MHz



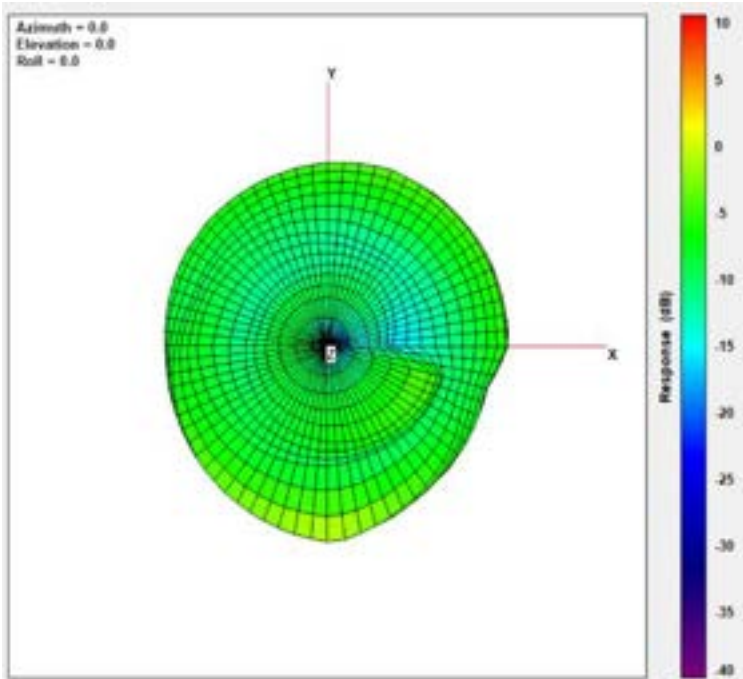
Center Frequency	1710 MHz
Horizontal (dBi) peak	1.24
Vertical (dBi) peak	-2.91

1732.5 MHz



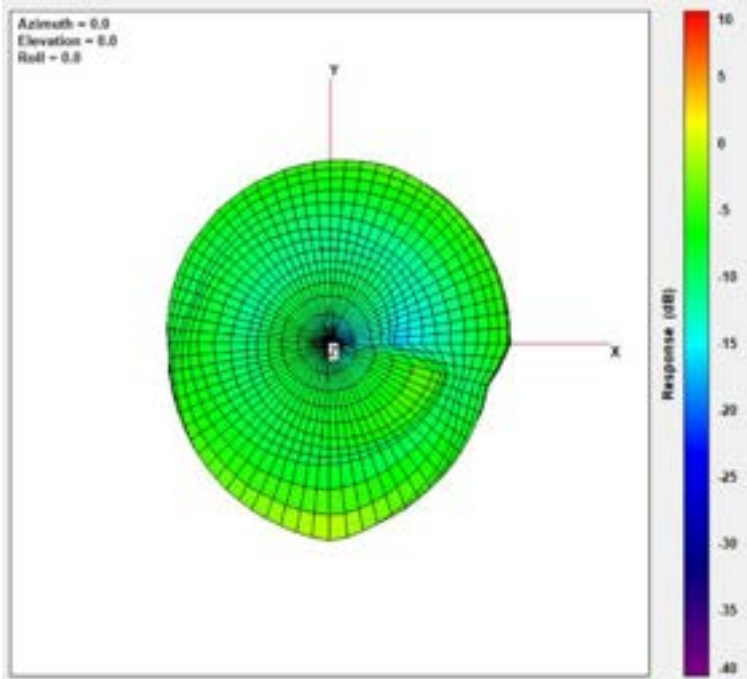
Center Frequency	1732.5 MHz
Horizontal (dBi) peak	1.59
Vertical (dBi) peak	-2.19

1747.5 MHz



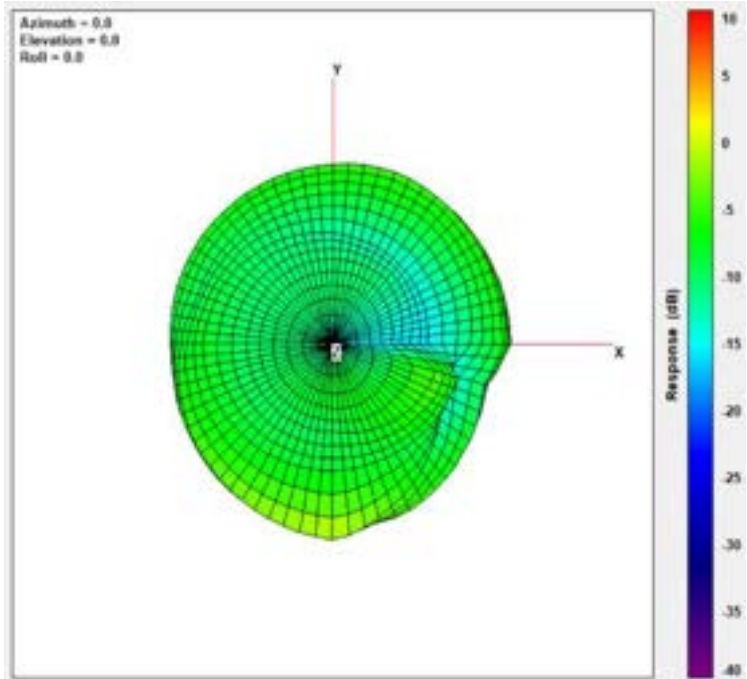
Center Frequency	1747.5 MHz
Horizontal (dBi) peak	1.55
Vertical (dBi) peak	-2.07

1755 MHz



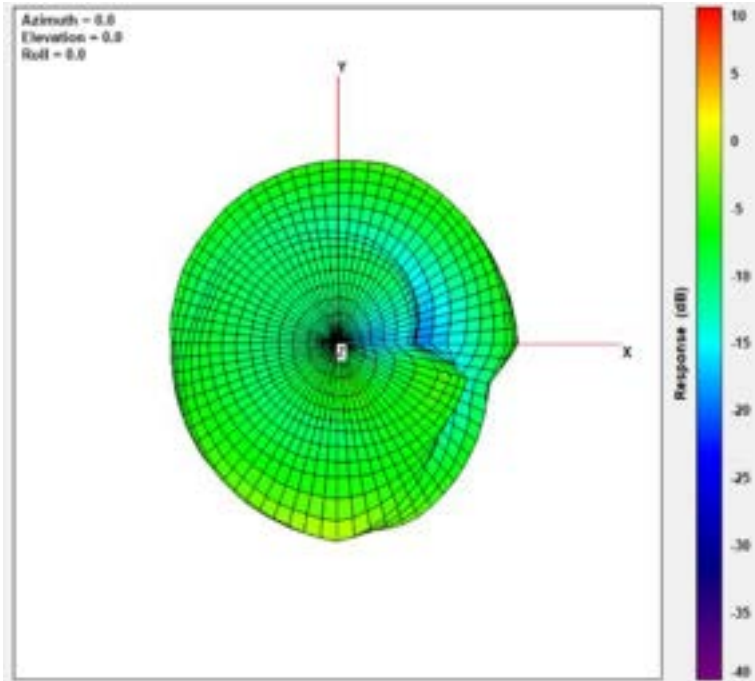
Center Frequency	1755 MHz
Horizontal (dBi) peak	1.16
Vertical (dBi) peak	-2.22

1785 MHz



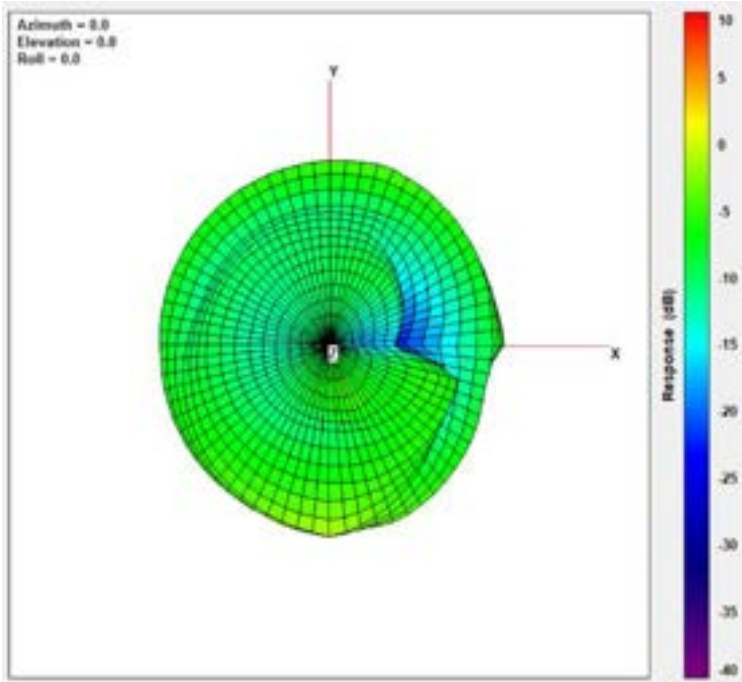
Center Frequency	1785 MHz
Horizontal (dBi) peak	1.61
Vertical (dBi) peak	-2.75

1805 MHz



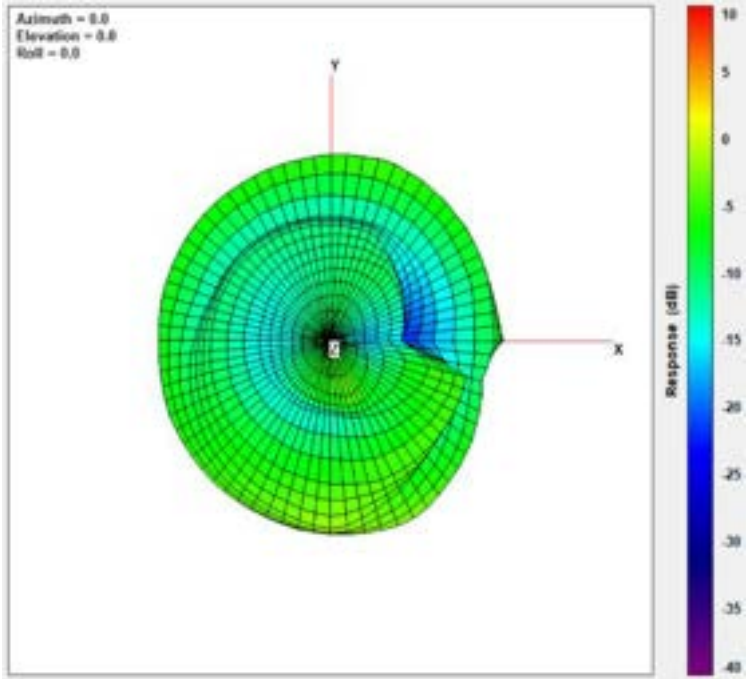
Center Frequency	1805 MHz
Horizontal (dBi) peak	1.18
Vertical (dBi) peak	-2.52

1850 MHz



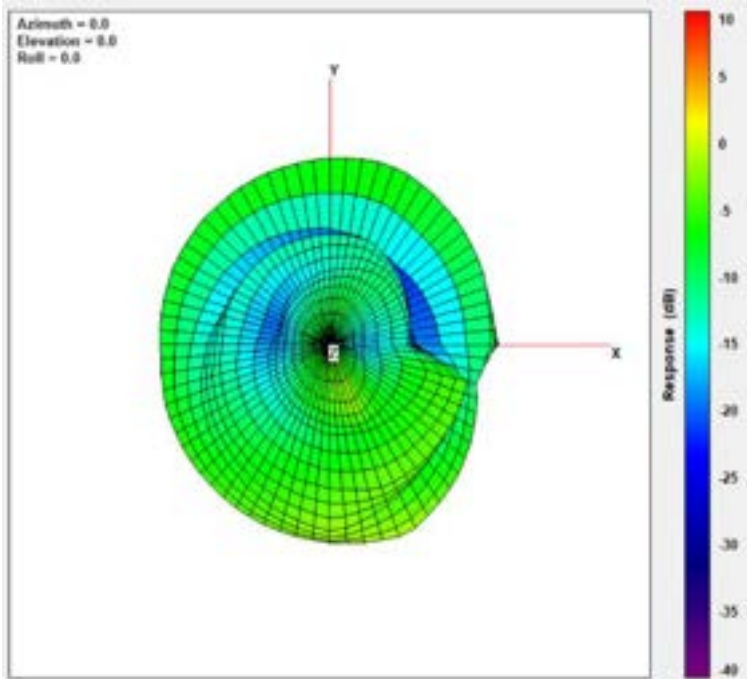
Center Frequency	1850 MHz
Horizontal (dBi) peak	-0.57
Vertical (dBi) peak	-1.41

1880 MHz



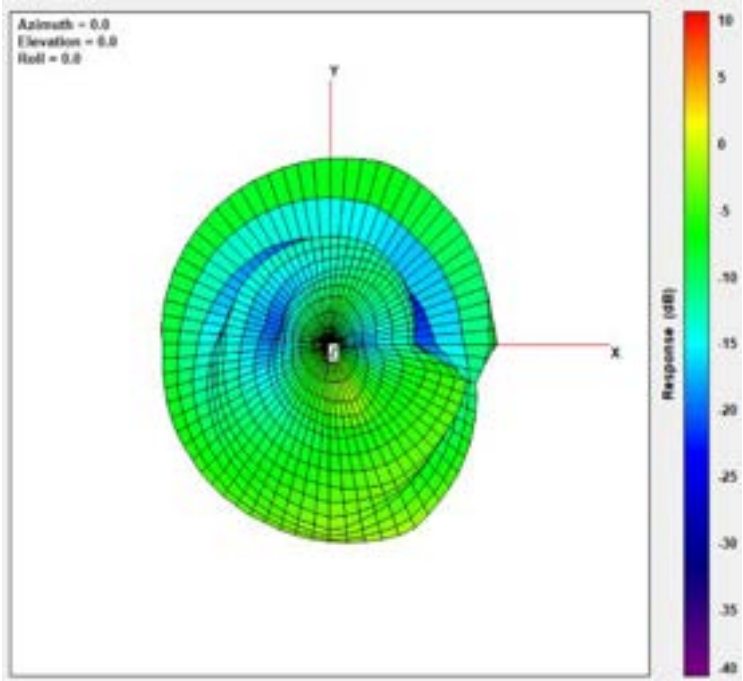
Center Frequency	1880 MHz
Horizontal (dBi) peak	-0.32
Vertical (dBi) peak	-0.16

1910MHz



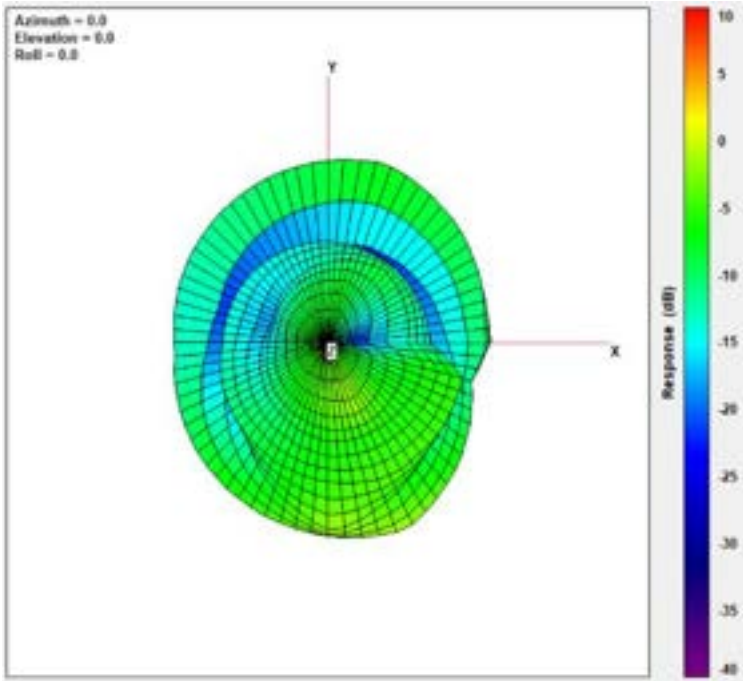
Center Frequency	1910MHz
Horizontal (dBi) peak	0.38
Vertical (dBi) peak	0.18

1920MHz



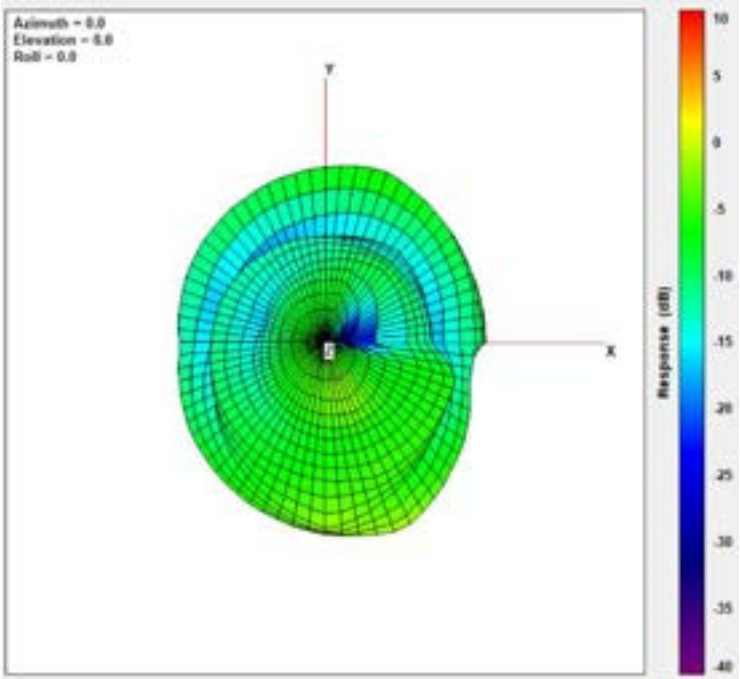
Center Frequency	1920MHz
Horizontal (dBi) peak	1.05
Vertical (dBi) peak	0.07

1950MHz



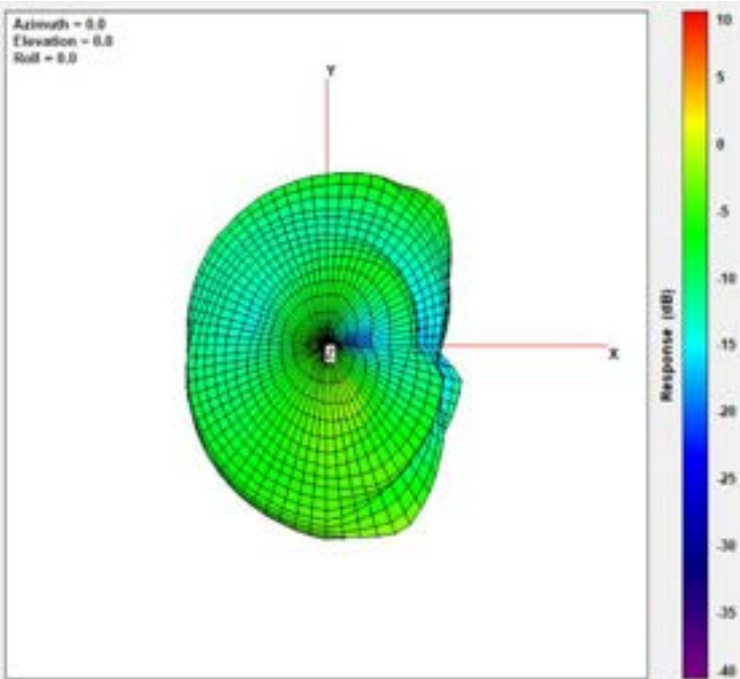
Center Frequency	1950MHz
Horizontal (dBi) peak	0.03
Vertical (dBi) peak	1.06

1980MHz



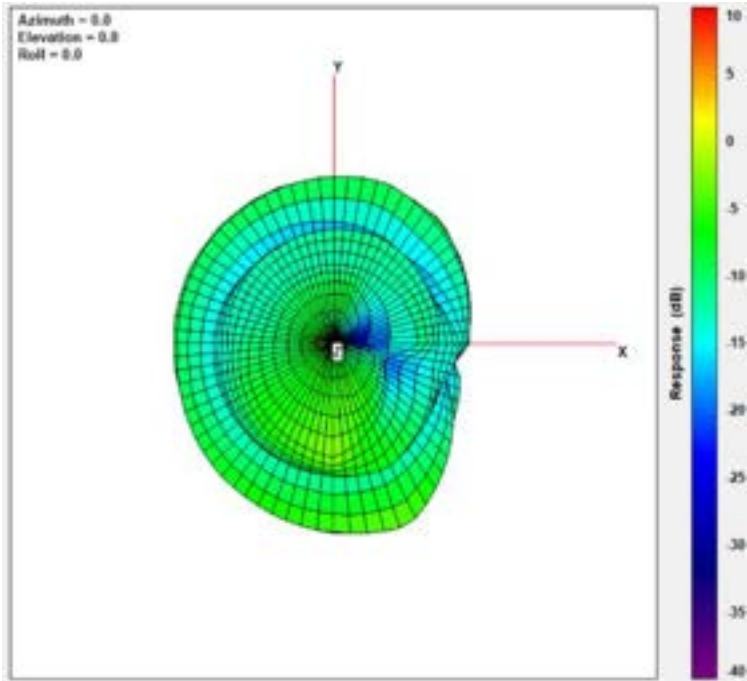
Center Frequency	1980MHz
Horizontal (dBi) peak	0.66
Vertical (dBi) peak	1.32

2110MHz



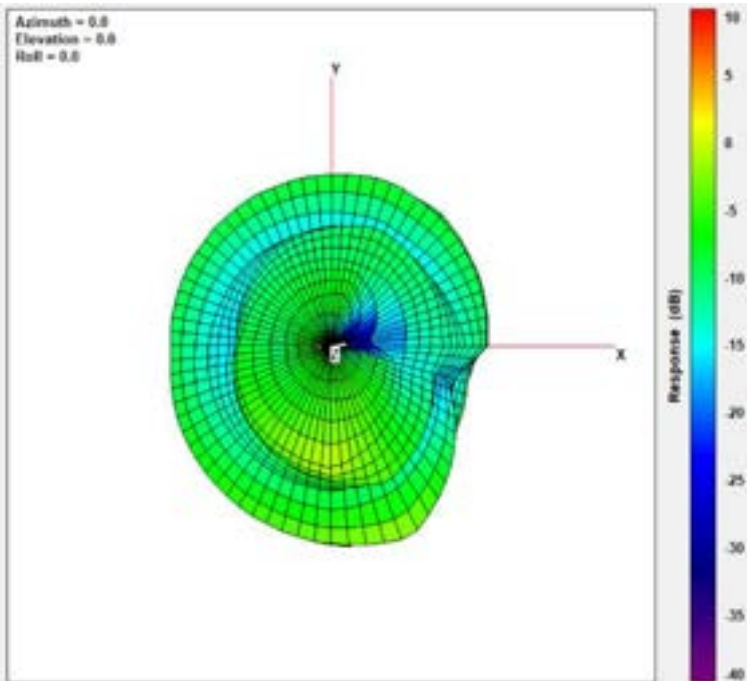
Center Frequency	2110MHz
Horizontal (dBi) peak	0.54
Vertical (dBi) peak	0.28

2200MHz



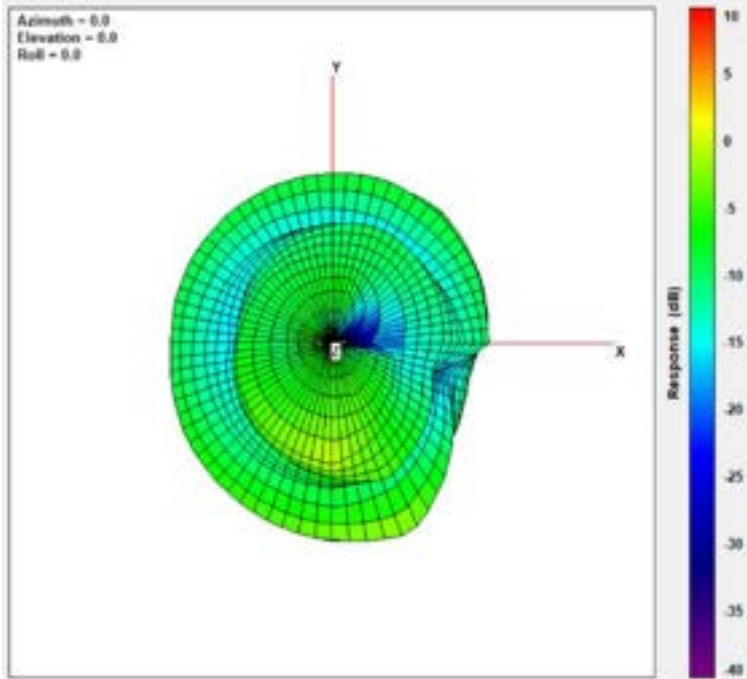
Center Frequency	2200MHz
Horizontal (dBi) peak	0.67
Vertical (dBi) peak	-2.92

2300MHz



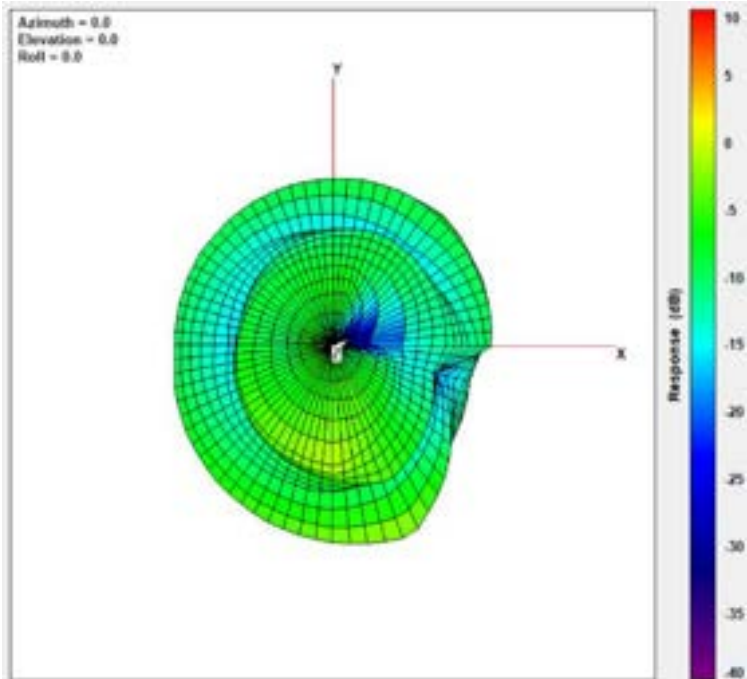
Center Frequency	2300MHz
Horizontal (dBi) peak	0.42
Vertical (dBi) peak	-2.03

2305MHz



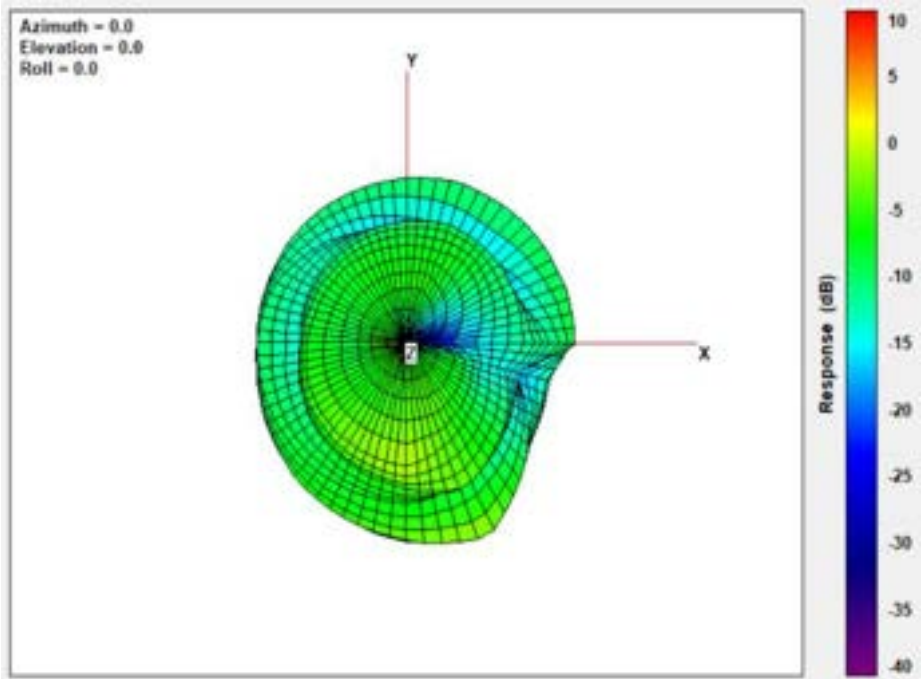
Center Frequency	2305MHz
Horizontal (dBi) peak	0.39
Vertical (dBi) peak	-1.95

2315MHz



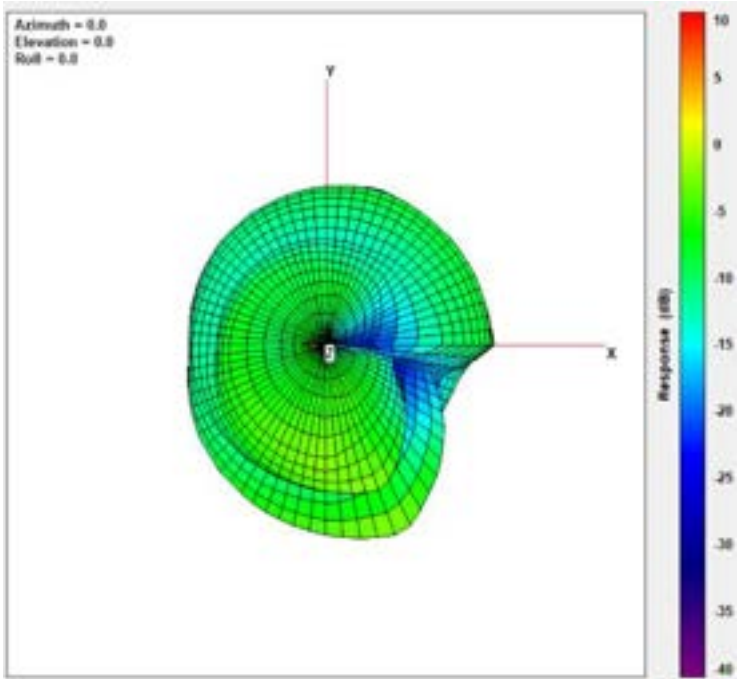
Center Frequency	2315MHz
Horizontal (dBi) peak	0.40
Vertical (dBi) peak	-1.90

2350MHz



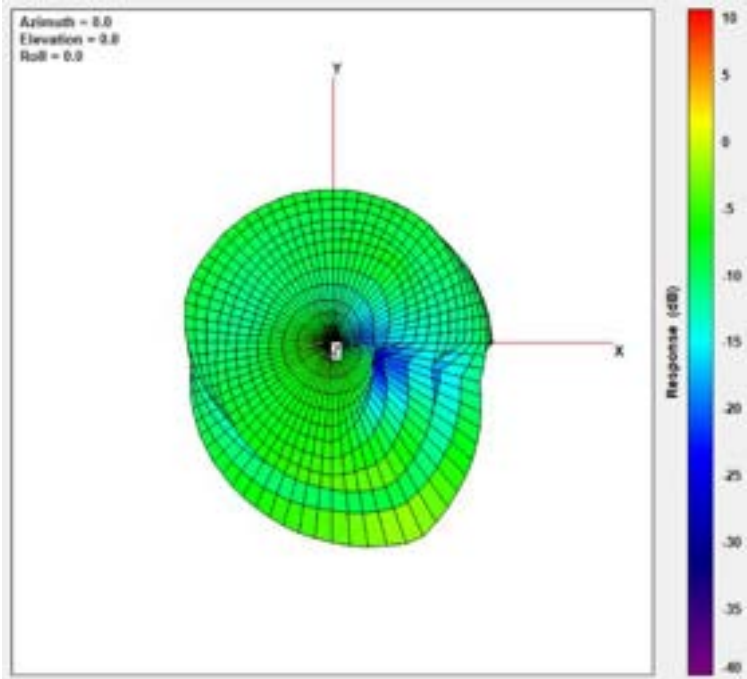
Center Frequency	2350MHz
Horizontal (dBi) peak	-0.29
Vertical (dBi) peak	-2.24

2400MHz



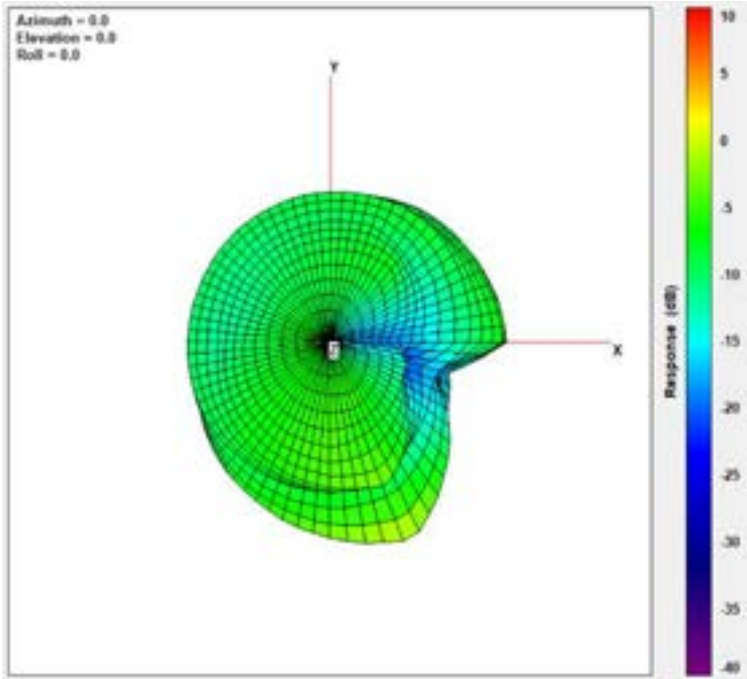
Center Frequency	2400MHz
Horizontal (dBi) peak	-0.15
Vertical (dBi) peak	-2.49

2500MHz



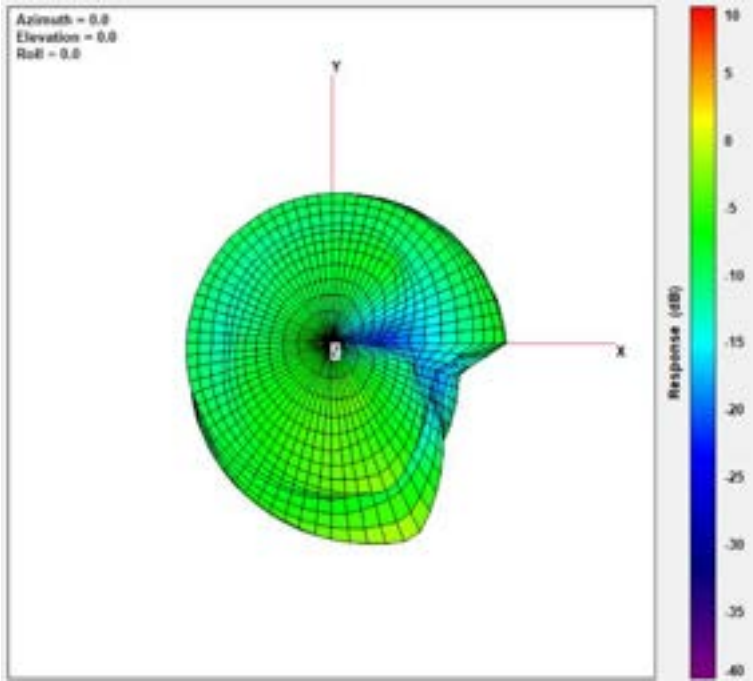
Center Frequency	2500MHz
Horizontal (dBi) peak	0.00
Vertical (dBi) peak	-4.05

2570MHz



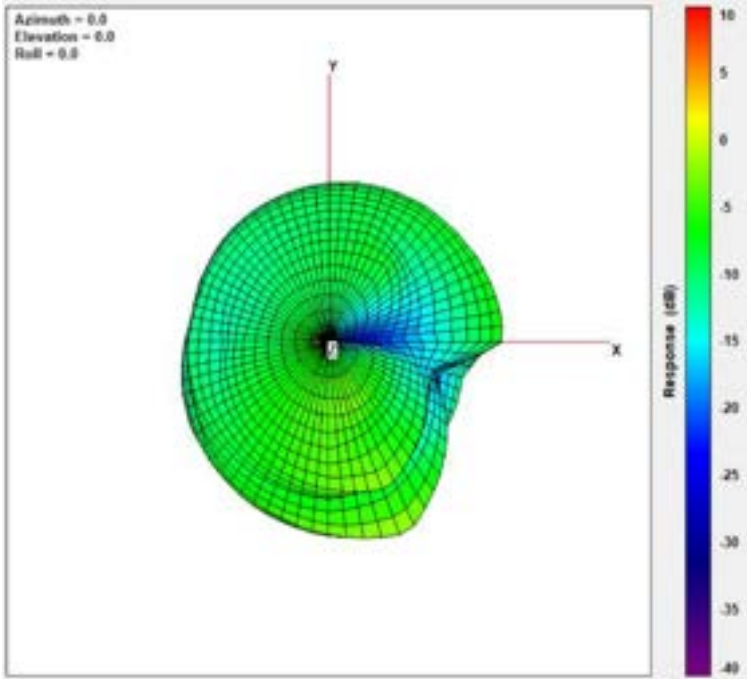
Center Frequency	2570MHz
Horizontal (dBi) peak	-2.72
Vertical (dBi) peak	-4.08

2595MHz



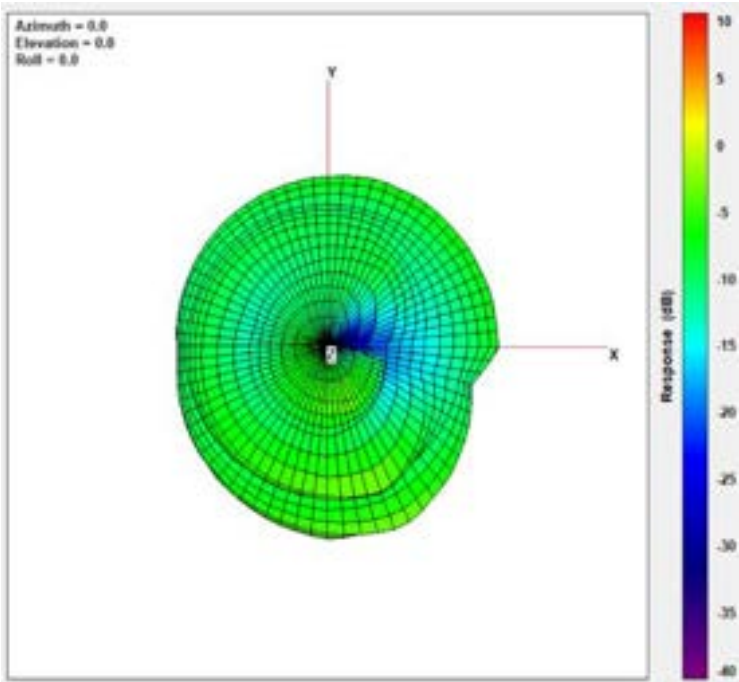
Center Frequency	2595MHz
Horizontal (dBi) peak	-2.56
Vertical (dBi) peak	-3.90

2620MHz



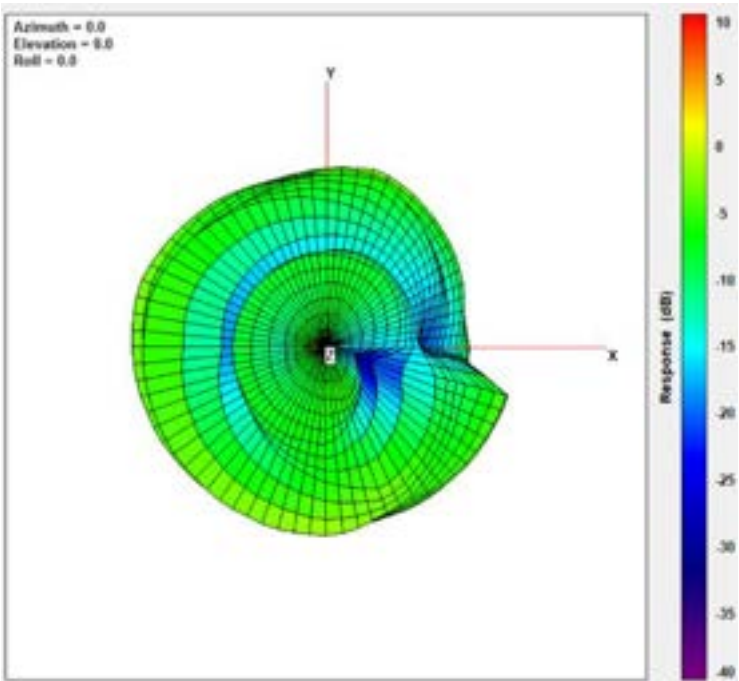
Center Frequency	2620MHz
Horizontal (dBi) peak	-2.32
Vertical (dBi) peak	-3.55

2690MHz



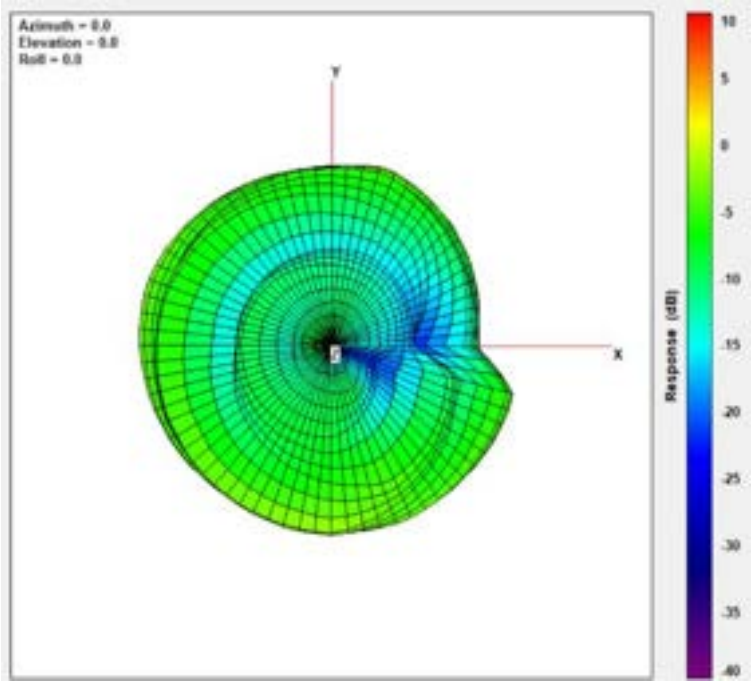
Center Frequency	2690MHz
Horizontal (dBi) peak	-1.03
Vertical (dBi) peak	-3.45

3400MHz



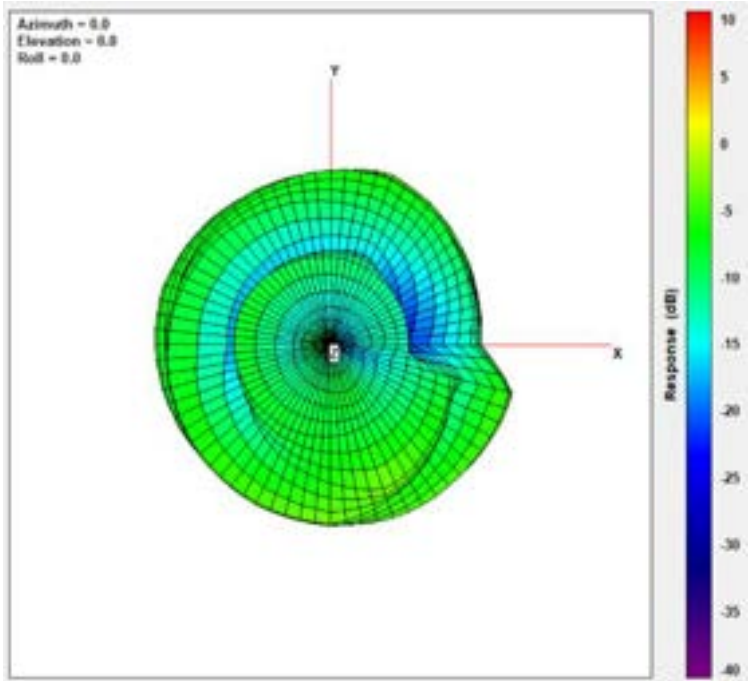
Center Frequency	3400MHz
Horizontal (dBi) peak	0.32
Vertical (dBi) peak	-5.43

3500MHz



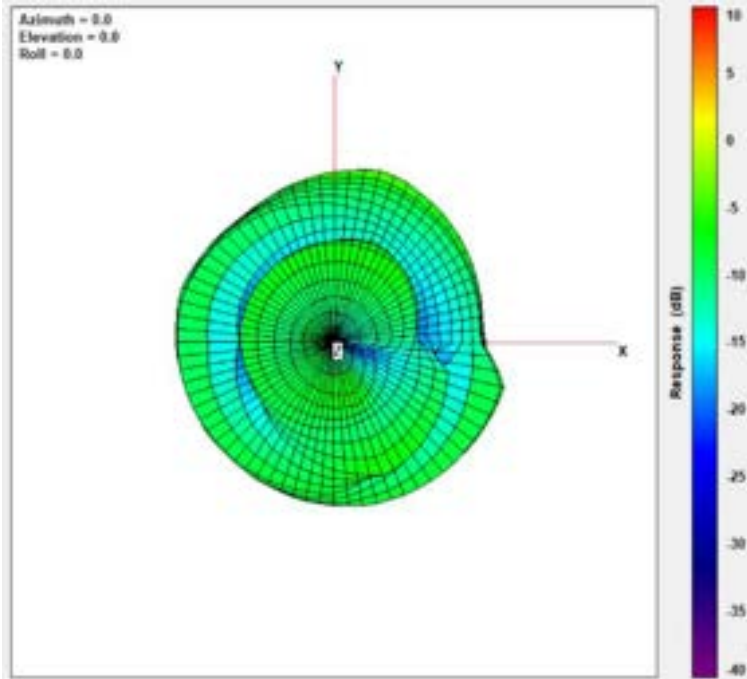
Center Frequency	3500MHz
Horizontal (dBi) peak	0.09
Vertical (dBi) peak	-4.18

3600MHz



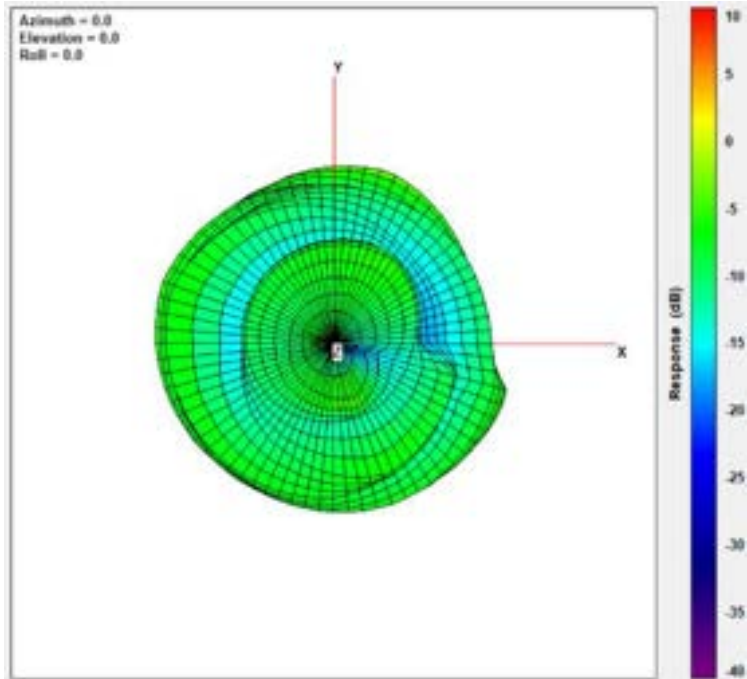
Center Frequency	3600MHz
Horizontal (dBi) peak	0.48
Vertical (dBi) peak	-3.16

3700MHz



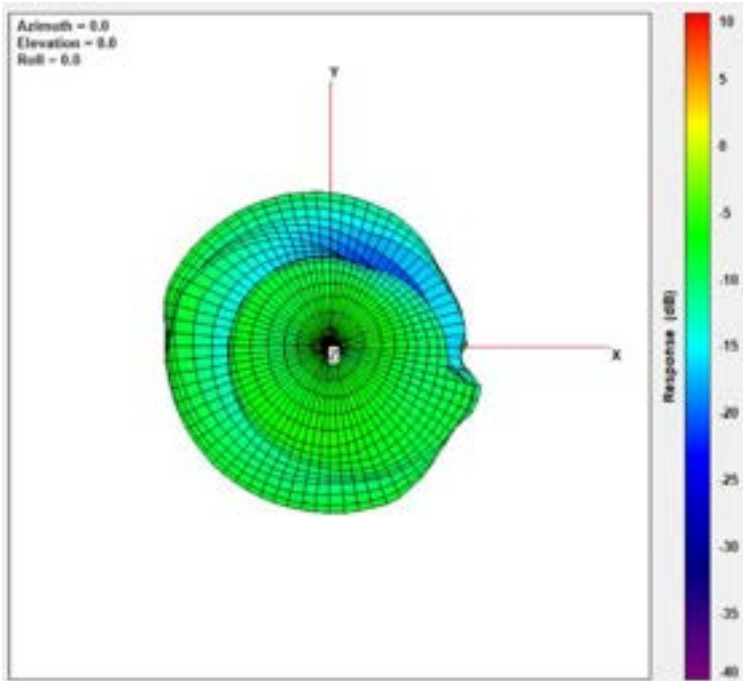
Center Frequency	3700MHz
Horizontal (dBi) peak	-0.35
Vertical (dBi) peak	-4.47

3800MHz



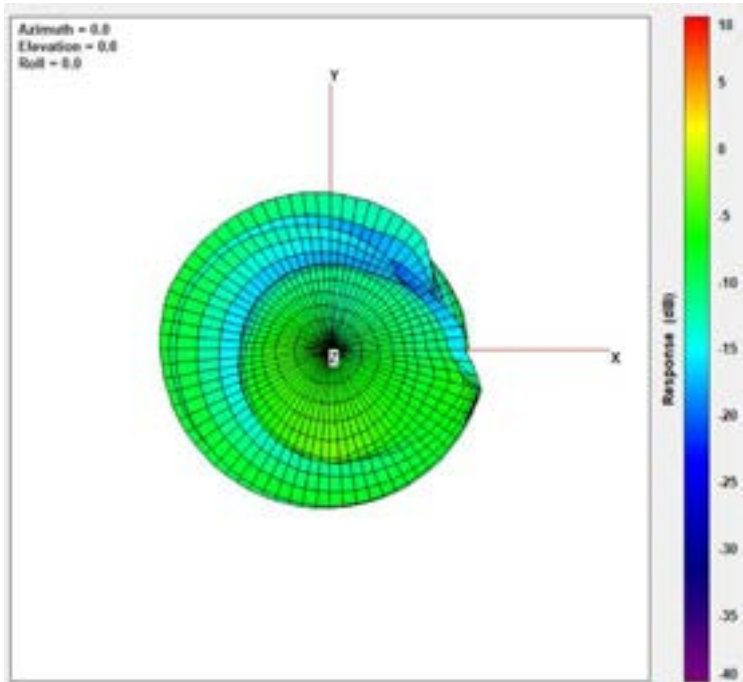
Center Frequency	3800MHz
Horizontal (dBi) peak	0.02
Vertical (dBi) peak	-2.48

4200MHz



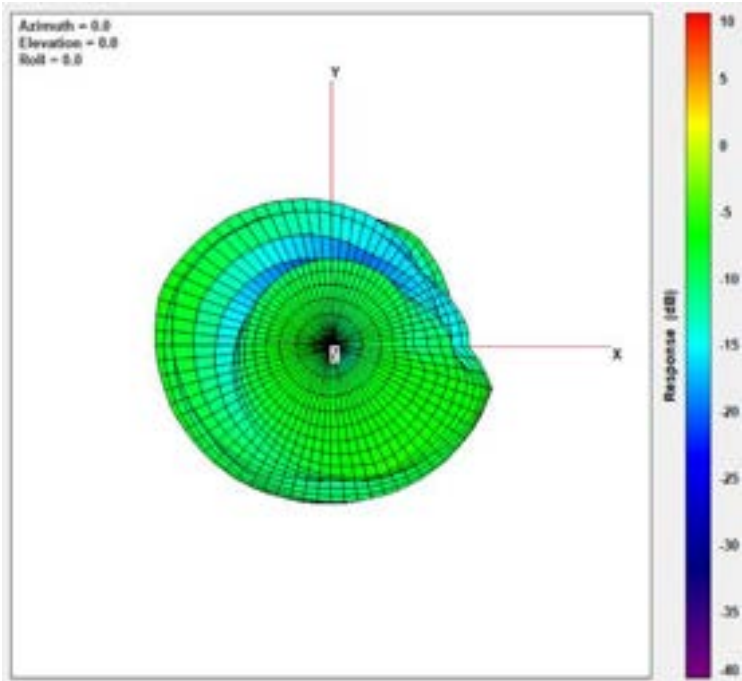
Center Frequency	4200MHz
Horizontal (dBi) peak	1.28
Vertical (dBi) peak	-1.74

4400MHz



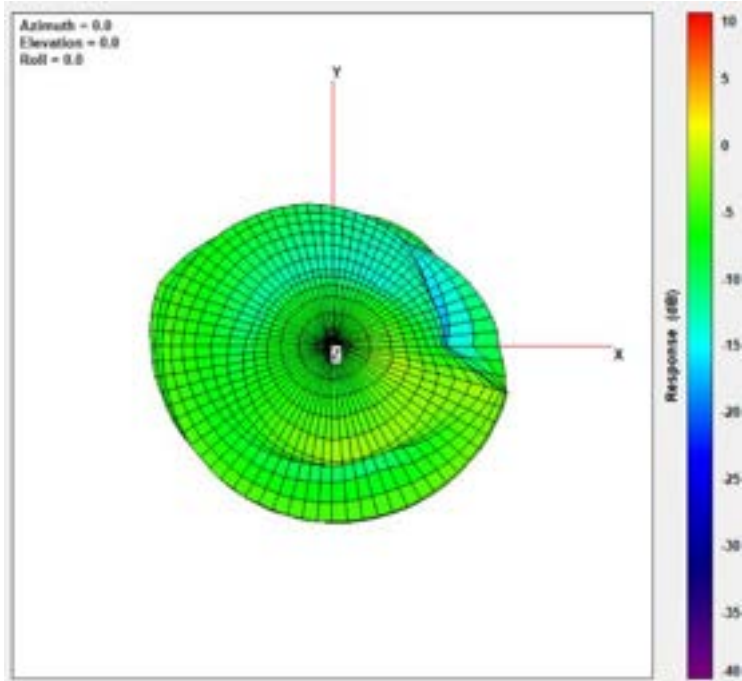
Center Frequency	4400MHz
Horizontal (dBi) peak	-0.64
Vertical (dBi) peak	-3.25

4700MHz



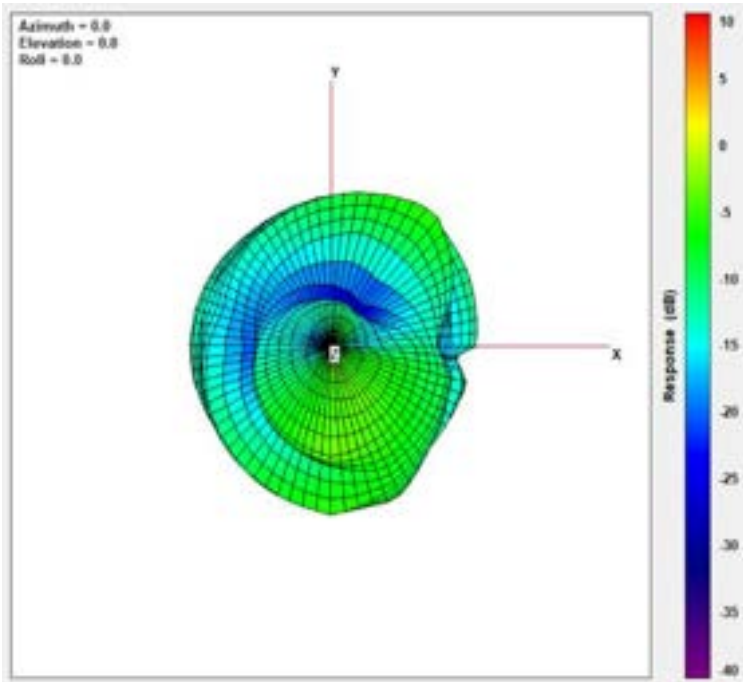
Center Frequency	4700MHz
Horizontal (dBi) peak	-3.44
Vertical (dBi) peak	-1.34

5000MHz



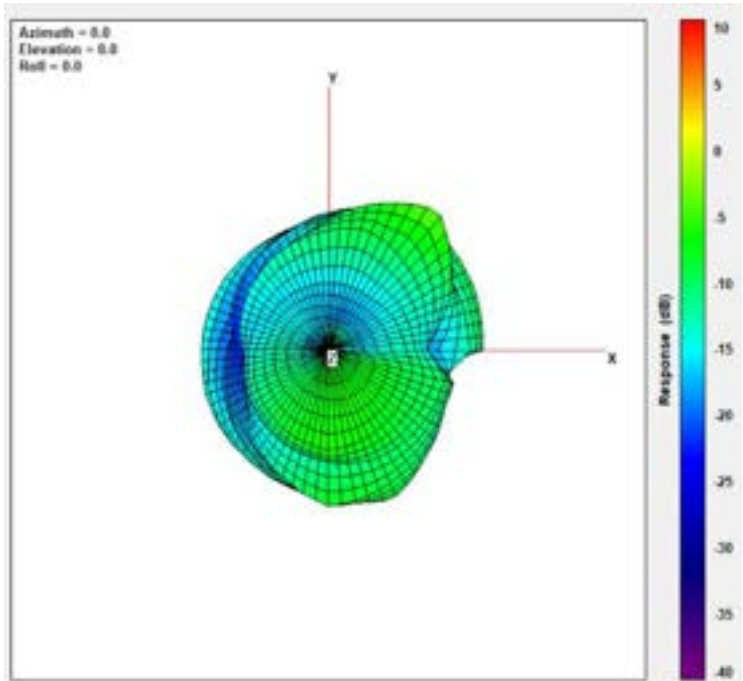
Center Frequency	5000MHz
Horizontal (dBi) peak	0.65
Vertical (dBi) peak	-2.26

1805 MHz



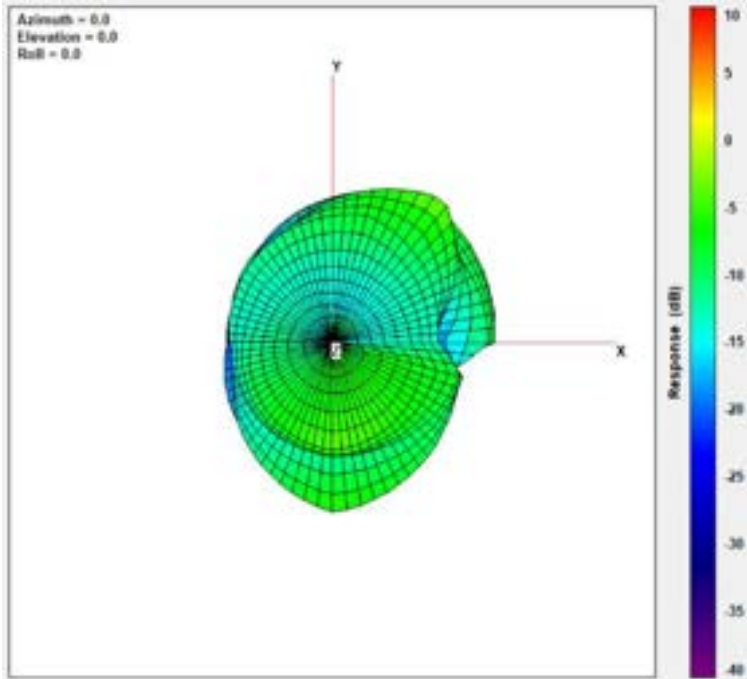
Center Frequency	1805 MHz
Horizontal (dBi) peak	1.01
Vertical (dBi) peak	0.79

1850 MHz



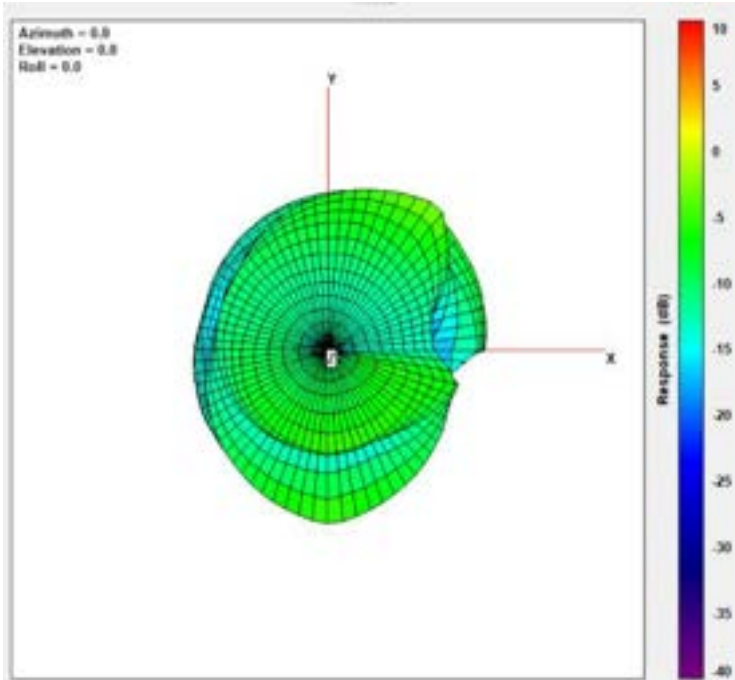
Center Frequency	1850 MHz
Horizontal (dBi) peak	1.31
Vertical (dBi) peak	0.25

1880 MHz



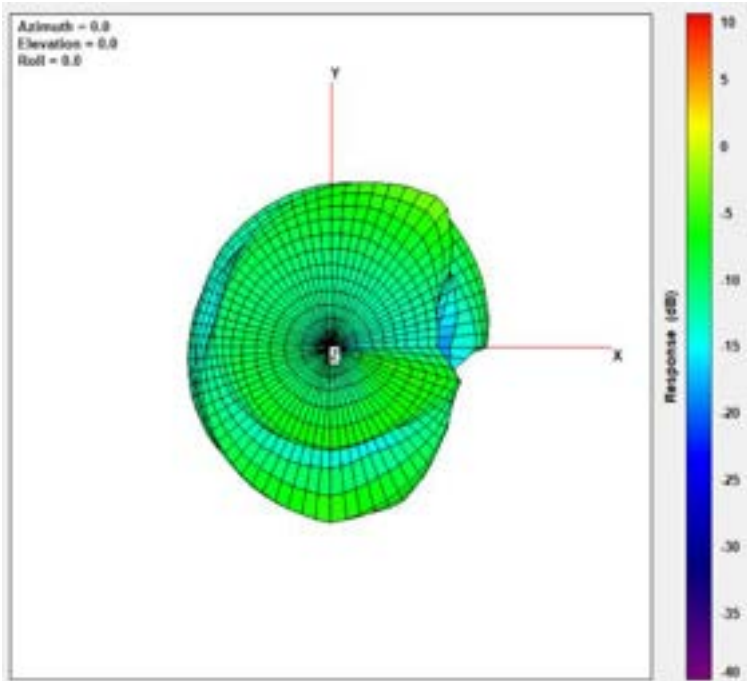
Center Frequency	1880 MHz
Horizontal (dBi) peak	0.87
Vertical (dBi) peak	1.76

1910MHz



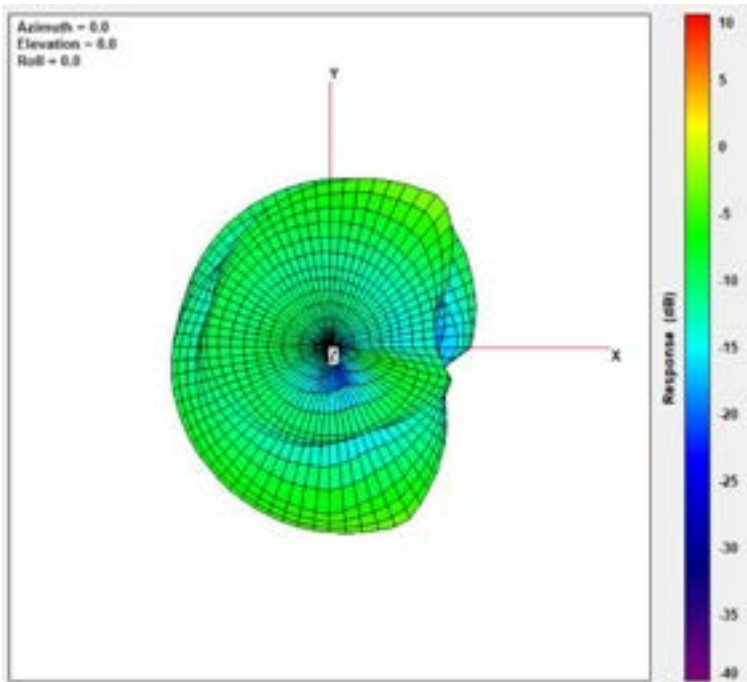
Center Frequency	1910MHz
Horizontal (dBi) peak	1.27
Vertical (dBi) peak	0.82

1920MHz



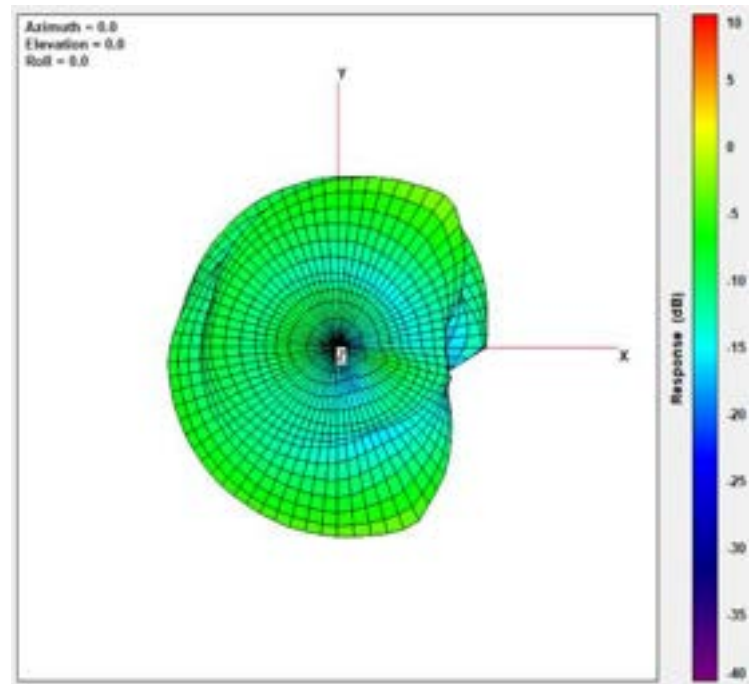
Center Frequency	1920MHz
Horizontal (dBi) peak	1.11
Vertical (dBi) peak	1.89

1950MHz



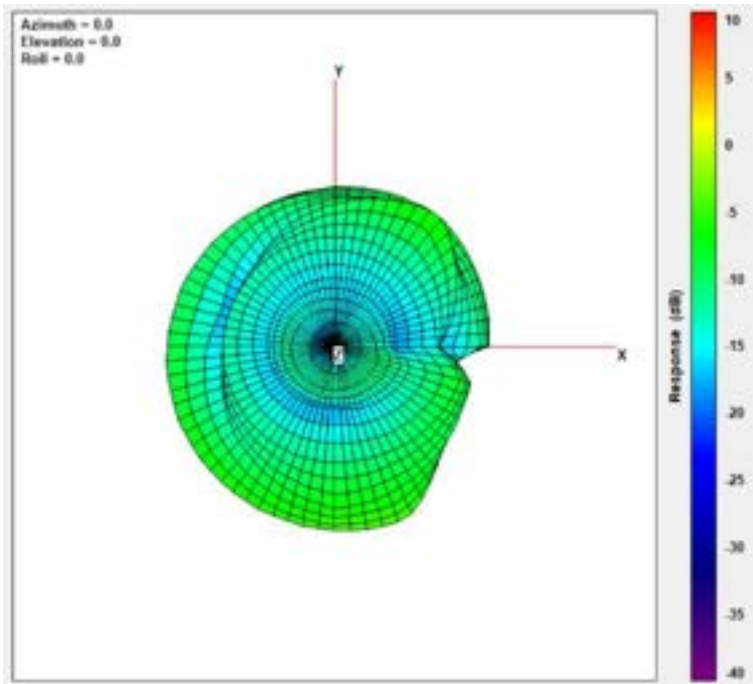
Center Frequency	1950MHz
Horizontal (dBi) peak	0.68
Vertical (dBi) peak	1.63

1980MHz



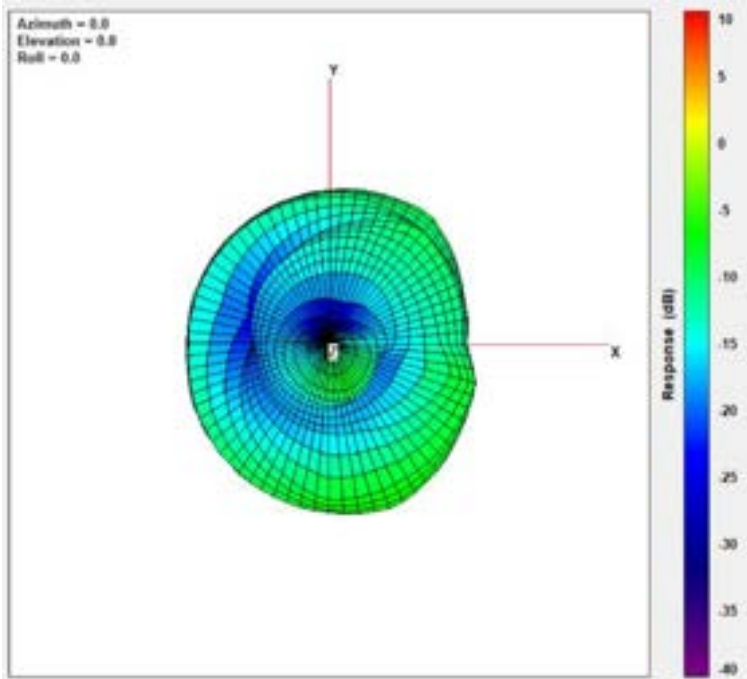
Center Frequency	1980MHz
Horizontal (dBi) peak	1.35
Vertical (dBi) peak	1.46

2110MHz



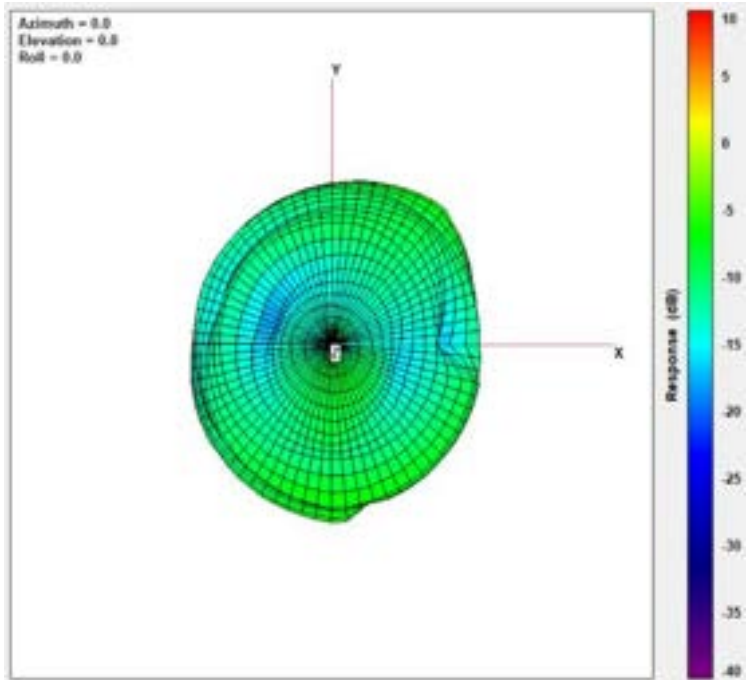
Center Frequency	2110MHz
Horizontal (dBi) peak	1.70
Vertical (dBi) peak	0.32

2200MHz



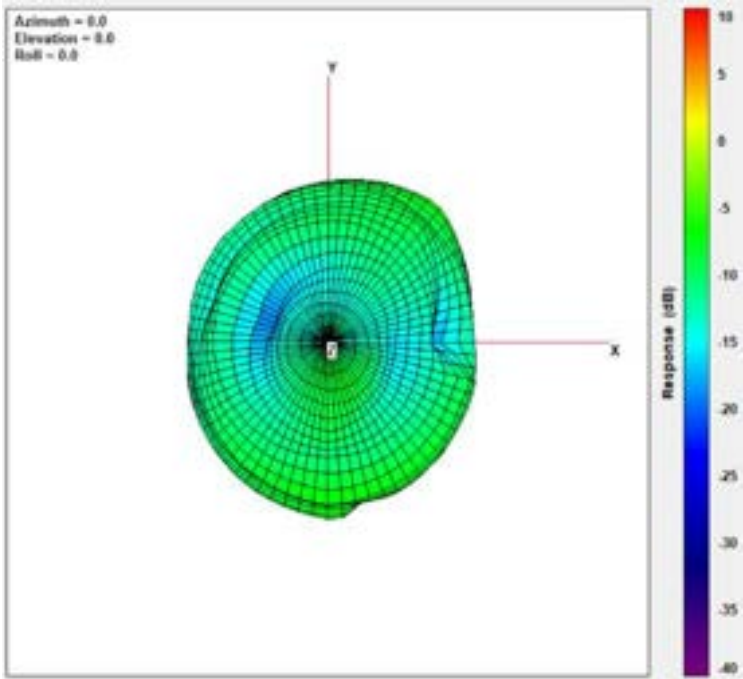
Center Frequency	2200MHz
Horizontal (dBi) peak	1.10
Vertical (dBi) peak	-2.59

2300MHz



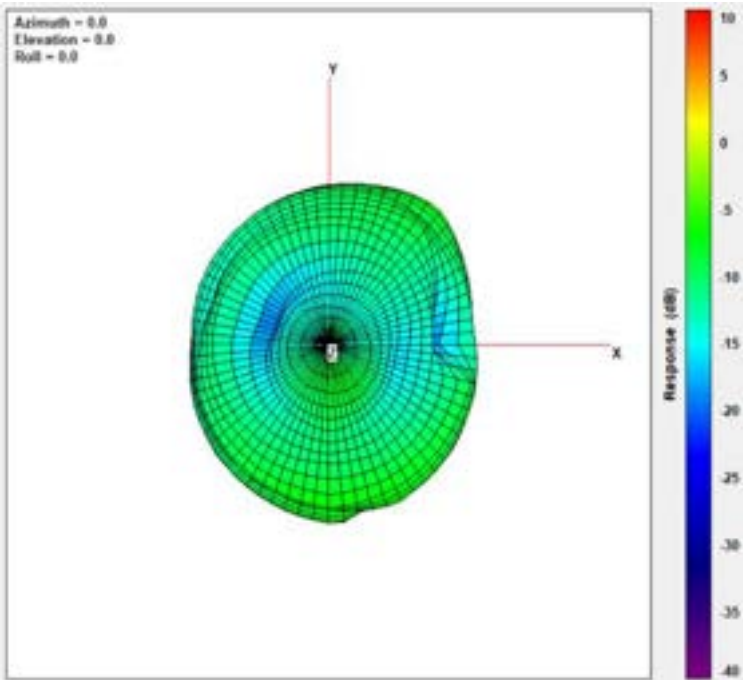
Center Frequency	2300MHz
Horizontal (dBi) peak	1.30
Vertical (dBi) peak	-2.77

2305MHz



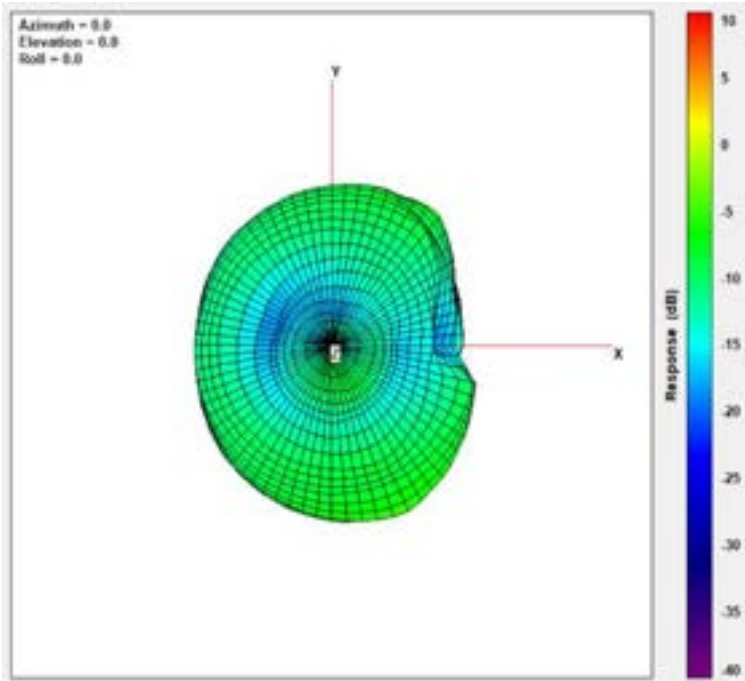
Center Frequency	2305MHz
Horizontal (dBi) peak	0.93
Vertical (dBi) peak	-2.77

2315MHz



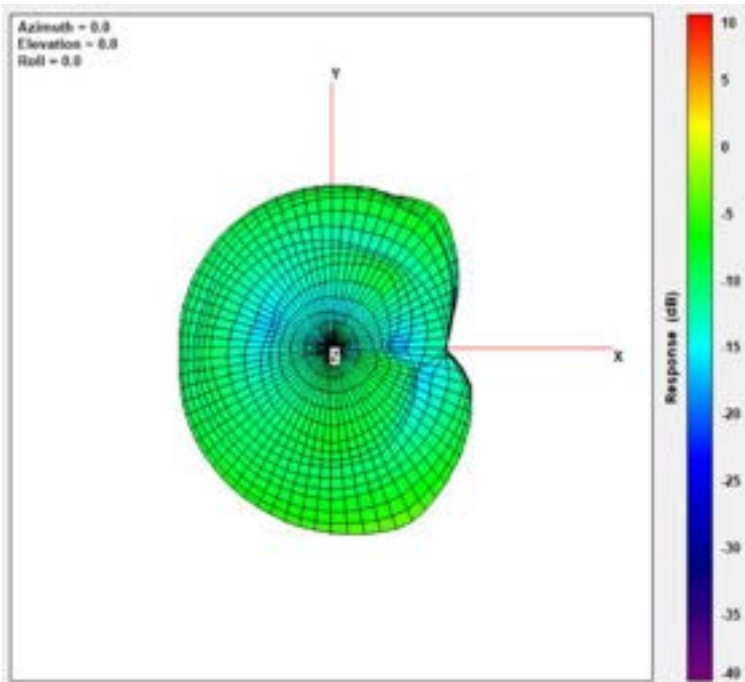
Center Frequency	2315MHz
Horizontal (dBi) peak	0.76
Vertical (dBi) peak	-2.30

2350MHz



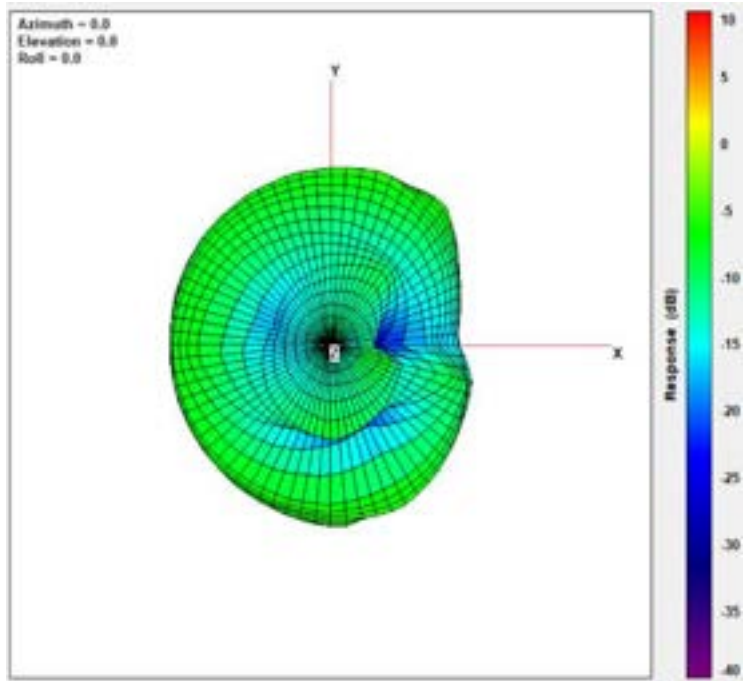
Center Frequency	2350MHz
Horizontal (dBi) peak	1.70
Vertical (dBi) peak	-2.40

2400MHz



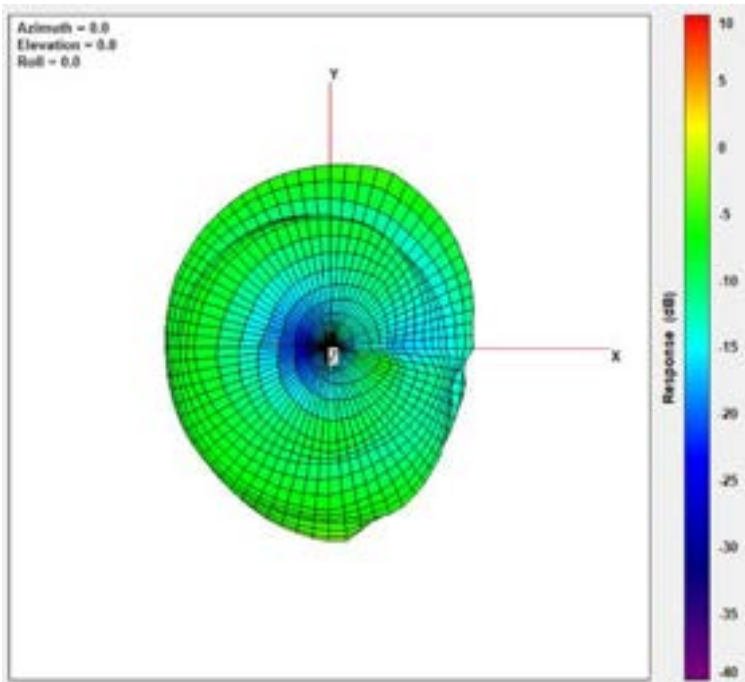
Center Frequency	2400MHz
Horizontal (dBi) peak	0.87
Vertical (dBi) peak	-2.52

2500MHz



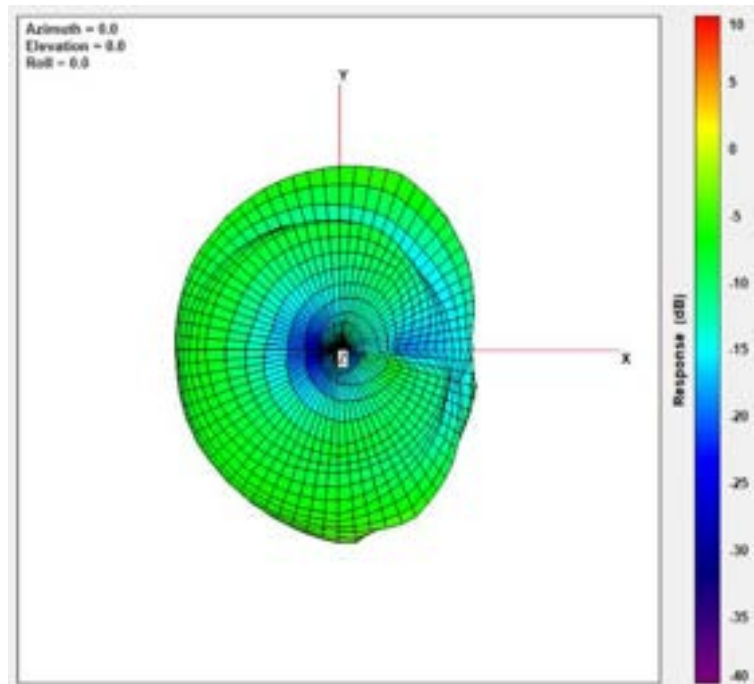
Center Frequency	2500MHz
Horizontal (dBi) peak	0.52
Vertical (dBi) peak	-3.15

2570MHz



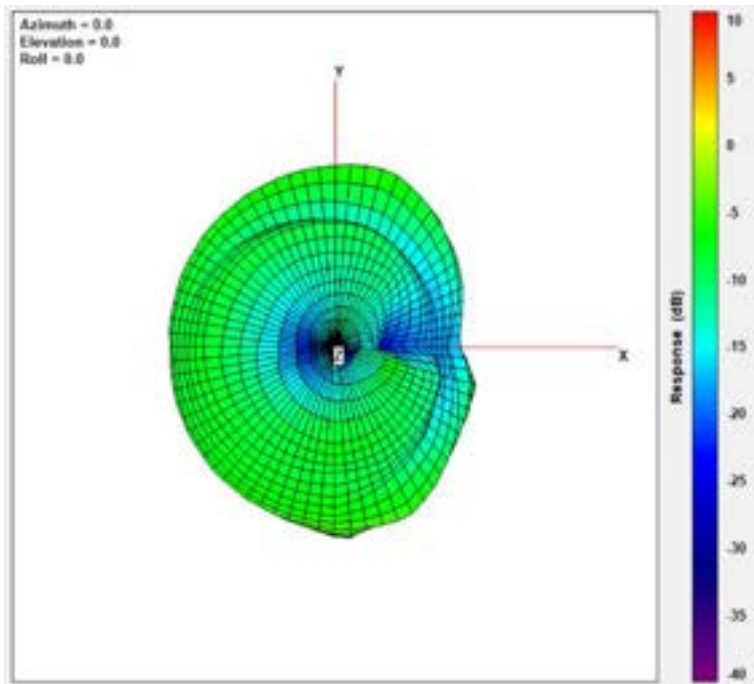
Center Frequency	2570MHz
Horizontal (dBi) peak	0.38
Vertical (dBi) peak	-2.94

2595MHz



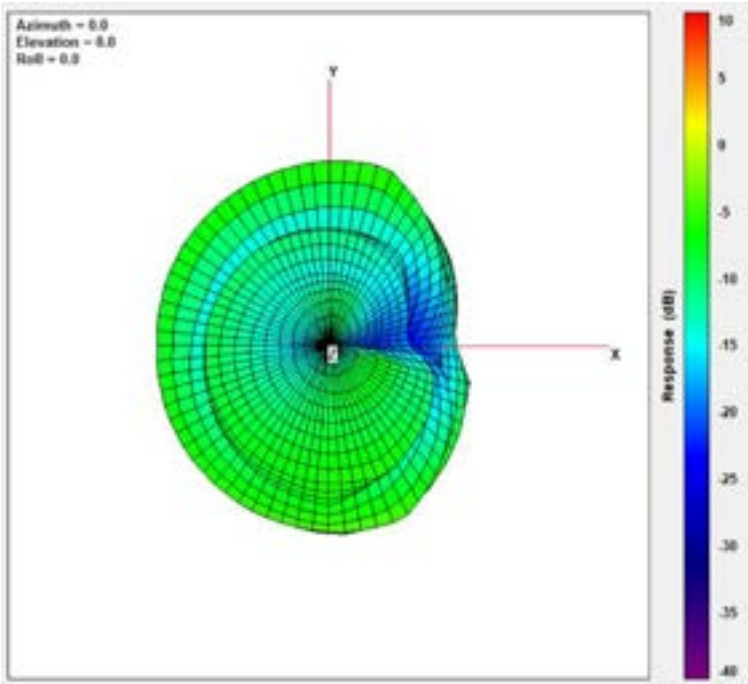
Center Frequency	2595MHz
Horizontal (dBi) peak	-0.36
Vertical (dBi) peak	-3.33

2620MHz



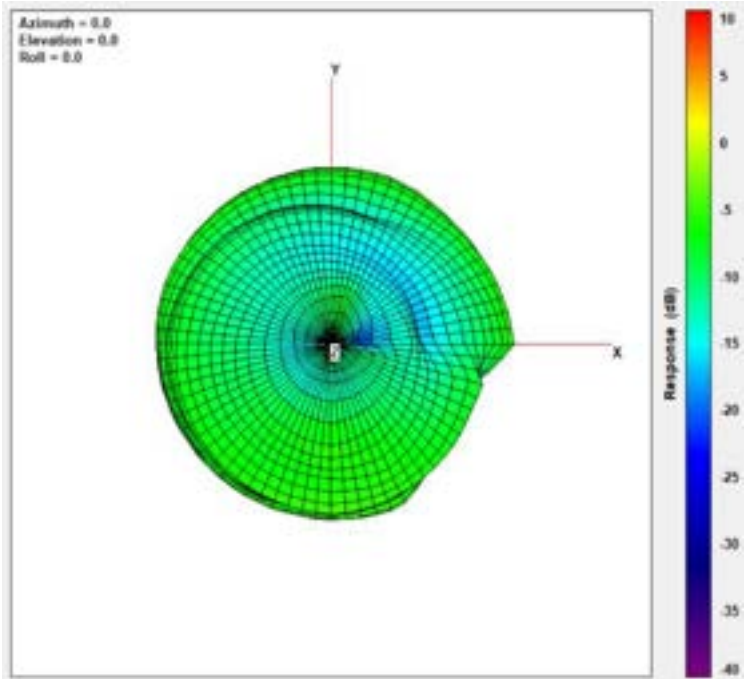
Center Frequency	2620MHz
Horizontal (dBi) peak	-1.12
Vertical (dBi) peak	-2.81

2690MHz



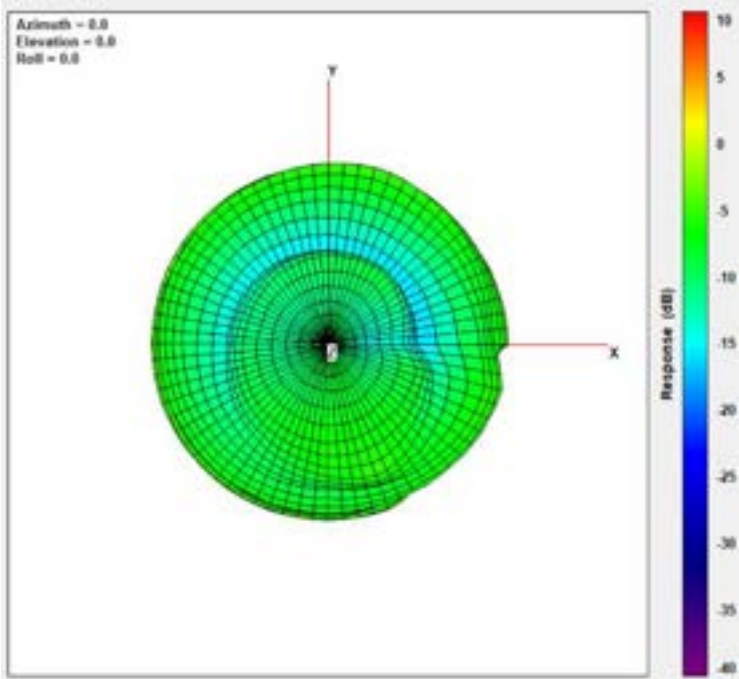
Center Frequency	2690MHz
Horizontal (dBi) peak	0.42
Vertical (dBi) peak	-0.95

3400MHz



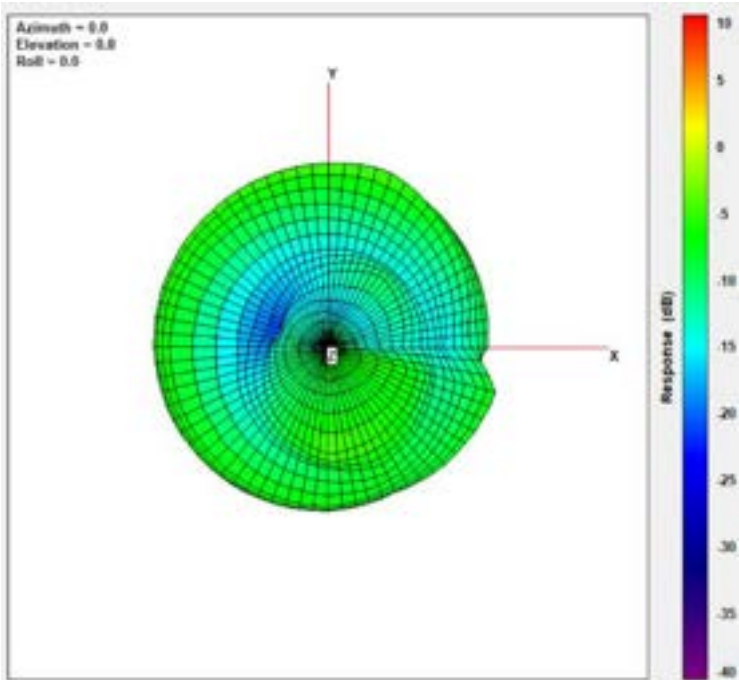
Center Frequency	3400MHz
Horizontal (dBi) peak	-0.04
Vertical (dBi) peak	-2.89

3500MHz



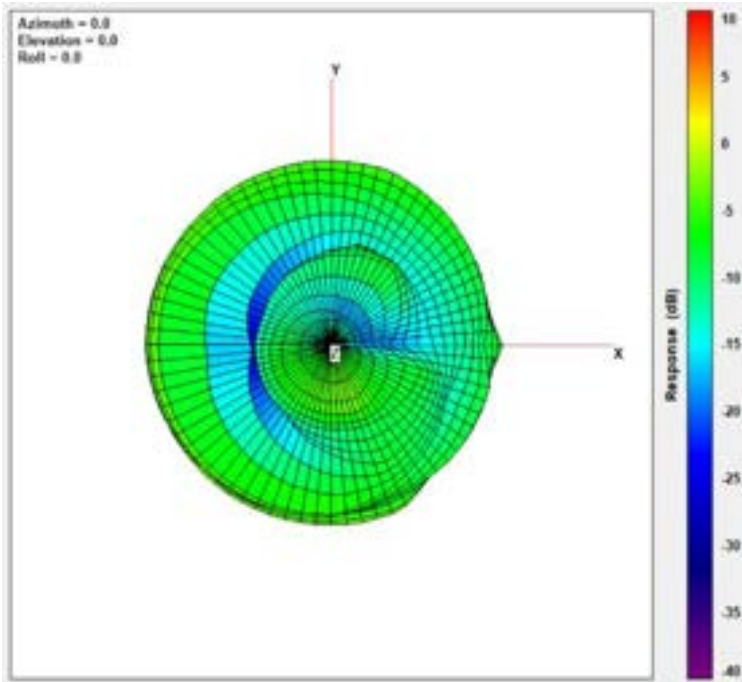
Center Frequency	3500MHz
Horizontal (dBi) peak	1.45
Vertical (dBi) peak	-2.96

3600MHz



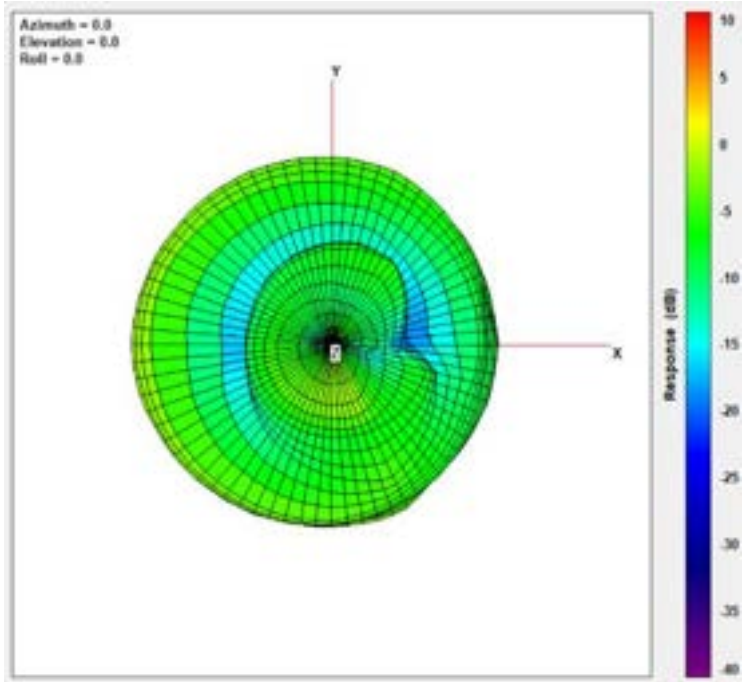
Center Frequency	3600MHz
Horizontal (dBi) peak	-0.19
Vertical (dBi) peak	-2.65

3700MHz



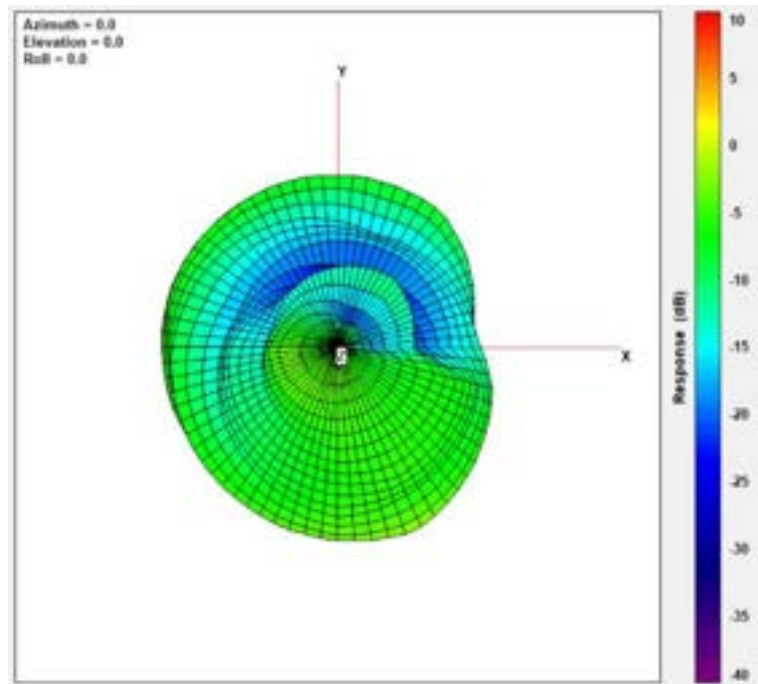
Center Frequency	3700MHz
Horizontal (dBi) peak	-1.26
Vertical (dBi) peak	-2.77

3800MHz



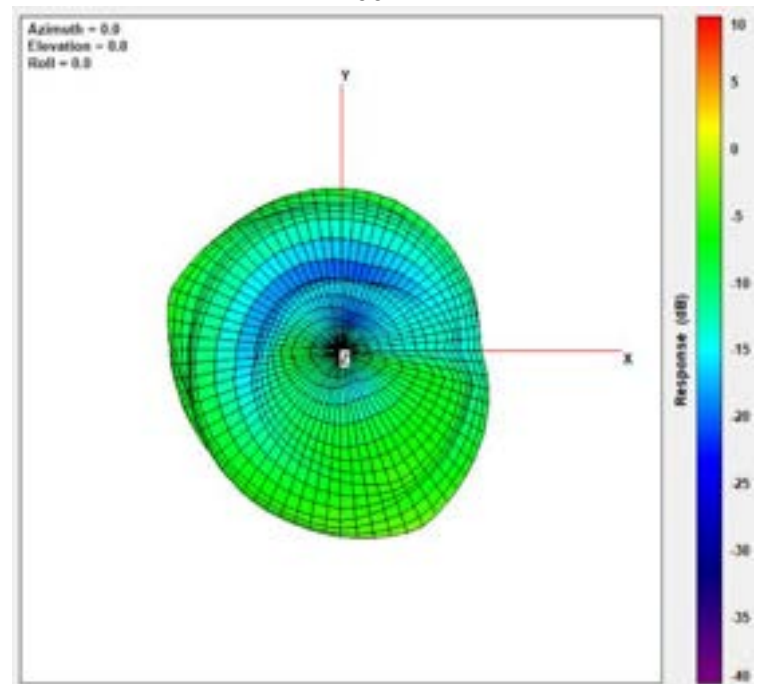
Center Frequency	3800MHz
Horizontal (dBi) peak	-1.75
Vertical (dBi) peak	-2.71

4200MHz



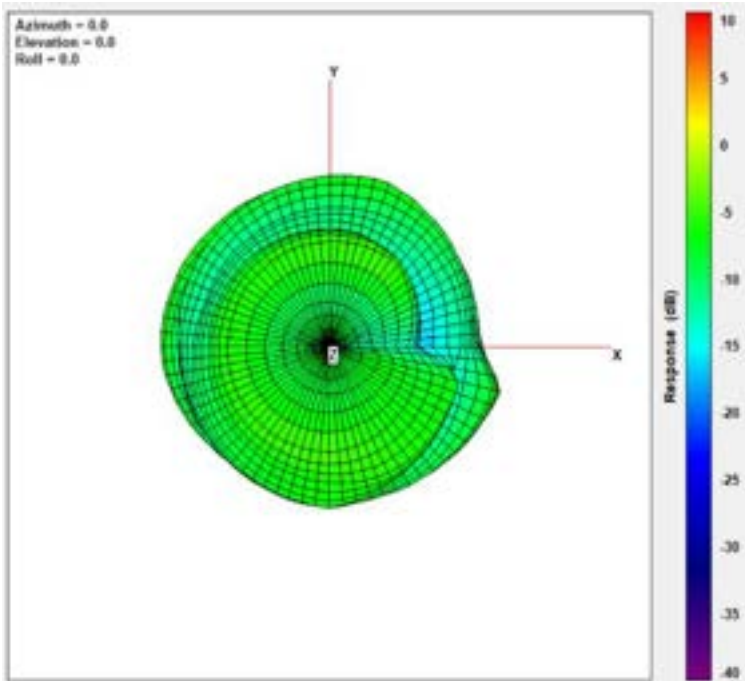
Center Frequency	4200MHz
Horizontal (dBi) peak	-3.16
Vertical (dBi) peak	-2.95

4400MHz



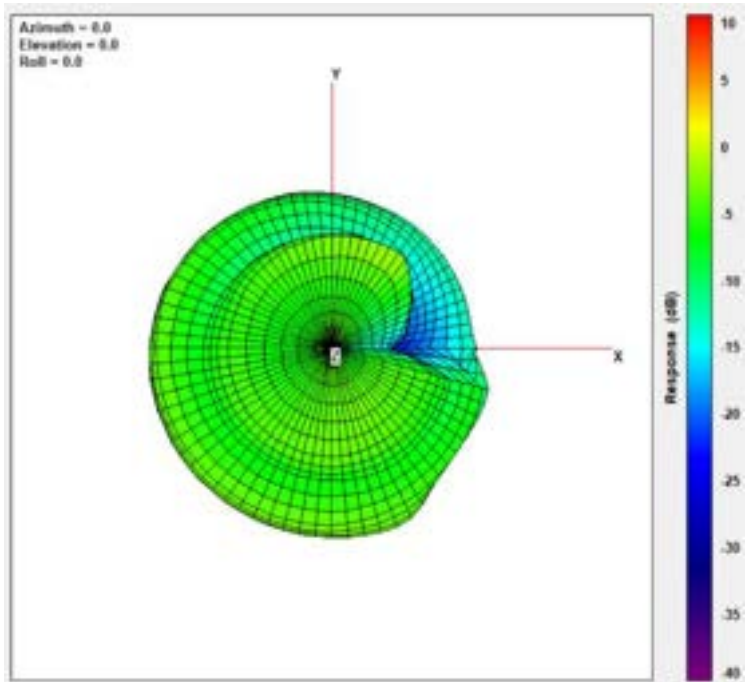
Center Frequency	4400MHz
Horizontal (dBi) peak	-0.44
Vertical (dBi) peak	-1.74

4700MHz



Center Frequency	4700MHz
Horizontal (dBi) peak	-0.44
Vertical (dBi) peak	-1.99

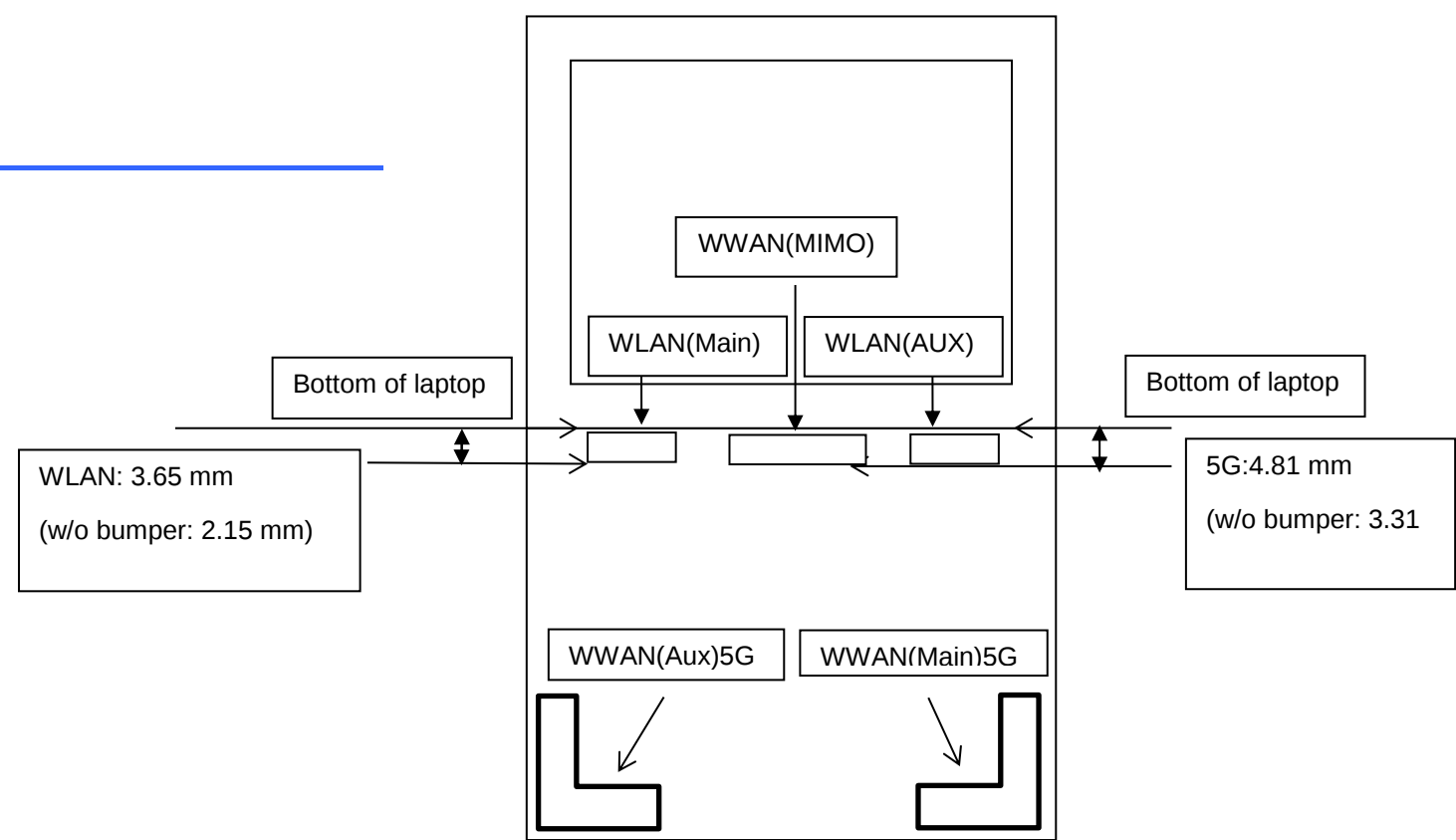
5000MHz



Center Frequency	5000MHz
Horizontal (dBi) peak	0.61
Vertical (dBi) peak	-0.50

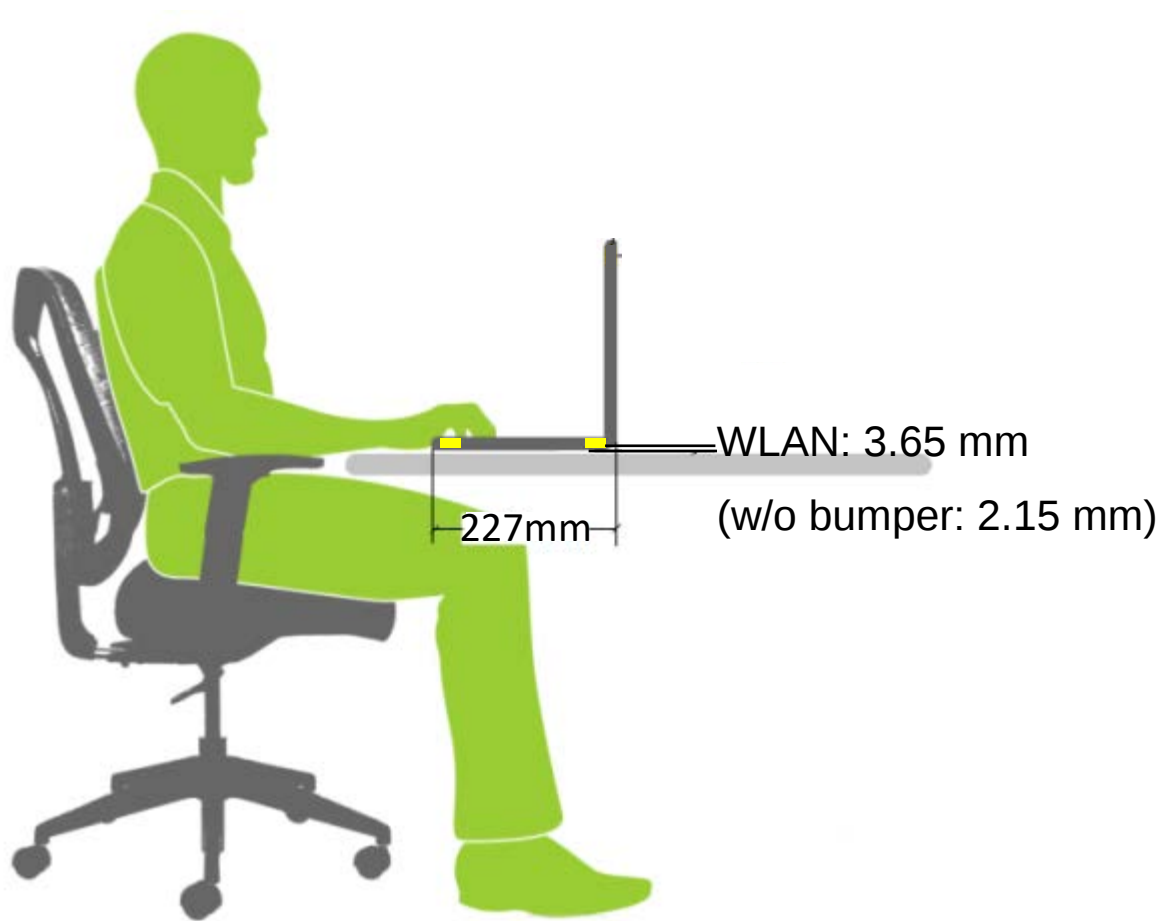
Section 4. Antenna Host Platform Location Information

Include a **dimensioned photo(s) or dimensioned drawing(s)** of Main and Aux antenna placements (measurements are not required for receive-only antenna). Any antenna that transmits must show dimensions to bottom of laptop. Provide a description of the materials that are used for supporting or surrounding transmit antennas; for example, non-conductive plastics vs. conductive coated plastic or metallic materials.



Section 5. Antenna dimensional information for SAR evaluation

Include a **dimensioned photo(s) or dimensioned drawing(s)** showing the distance (mm) between the transmit antennas and the user. For notebook/laptop hosts show lapheld position (example below). For tablet hosts show all orientations including lapheld, primary & secondary portrait, primary & secondary landscape positions. Include a description of any proximity sensors or power throttling implementations that limit or exclude use of any host orientation.



Section 6. Diagram Example of Co-Location Antenna Separation

Include a **dimensioned photo or dimensioned drawing** showing the distance (mm) between all WLAN transmit antennas and other co-located radiator transmit antenna such as Bluetooth, WWAN,..

(Note: Due to the evolving rules regarding co-location, each platform will need to be reviewed on a case by case basis)

