Regulatory WWAN Antenna Information

(English Language Required for Intel Regulatory Review / Approval)

**(OEM/ODM or antenna vendor is required to complete this document with platform antenna information.
Remove Intel references and make this your own document)**

Platform	
Platform Owner	DELL
Brand Name	DELL
Model Name	T06H
ODM	Compal Electronics, Inc.
Target Launch Date	2022/06/09
Antenna	
Manufacturer	Hong-BO Co., Ltd
Part Number	■ Tx1/Rx1 Antenna WWAN Main: 350-24023 (DC33002PC1L)
	■ Rx2 Antenna WWAN Aux: 350-24022 (DC33002PC2L)
	■Tx2/Rx3 Antenna MIMO2: 350-24022 (DC33002PC2L)
	■ Rx4 Antenna MIMO3: 350-24019 (DC33002PC8L)
Module	
With WWAN Module	Foxconn T99W175/T77W968
(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 and 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. (S. Korea requires photographs of antennas for approval submission). Taiwan requires pictures of each antenna type shown in the system.	Required	Required	Desired	Required (Photos)	Required (Photos)
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)
P/N: DC33002PC1L (350-24023) Tx1/ Rx1 Antenna	Hong-BO Co., Ltd	PIFA	50 ohm Coaxial length: 99mm diameter: 1.13SLLS	698-821MHz -1.31 dBi (peak)	698-821MHz -1.20 dBi (peak)	698-821MHz 3.0 max	698-821MHz 0.11 dBi (peak)
				824-960MHz -1.22 dBi (peak)	824-960MHz -1.09 dBi (peak)	824-960MHz 3.0 max	824-960MHz 0.13 dBi (peak)
				1425-1515MHz -0.93 dBi (peak)	1425-1515MHz -0.77 dBi (peak)	1425-1515MHz 3.0 max	1425-1515MHz 0.16 dBi (peak)
				1710-2200MHz 0.67 dBi (peak)	1710-2200MHz 0.85 dBi (peak)	1710-2200MHz 3.0 max	1710-2200MHz 0.18 dBi (peak)
				2300-2690MHz 0.04 dBi (peak)	2300-2690MHz 0.24 dBi (peak)	2300-2690MHz 3.0 max	2300-2690MHz 0.20 dBi (peak)
				3400-3800MHz -0.84 dBi (peak)	3400-3800MHz -0.57 dBi (peak)	3400-3800MHz 3.0 max	3400-3800MHz 0.27 dBi (peak)
				4200-4700MHz 0.16 dBi (peak)	4200-4700MHz 0.46 dBi (peak)	4200-4700MHz 3.0 max	4200-4700MHz 0.30 dBi (peak)
				5150-5925MHz 1.13 dBi (peak)	5150-5925MHz 1.47 dBi (peak)	5150-5925MHz 3.0 max	5150-5925MHz 0.34 dBi (peak)
P/N: DC33002PC2L (350-24022) Rx2 Antenna	Hong-BO Co., Ltd	PIFA	50 ohm Coaxial length: 237mm diameter: 1.13SLLS	717-821MHz -1.97 dBi (peak)	717-821MHz -1.69 dBi (peak)	717-821MHz 3.0 max	717-821MHz 0.28 dBi (peak)
				824-960MHz -1.36 dBi (peak)	824-960MHz -1.04 dBi (peak)	824-960MHz 3.0 max	824-960MHz 0.32 dBi (peak)
				1425-1515MHz 0.92 dBi (peak)	1425-1515MHz 1.29 dBi (peak)	1425-1515MHz 3.0 max	1425-1515MHz 0.37 dBi (peak)
				1557-1610 MHz -1.36 dBi (peak)	1557-1610 MHz -0.95 dBi (peak)	1557-1610 MHz 3.0 max	1557-1610 MHz 0.41 dBi (peak)
				1805-2200MHz -1.75 dBi (peak)	1805-2200MHz -1.33 dBi (peak)	1805-2200MHz 3.0 max	1805-2200MHz 0.42 dBi (peak)
				2300-2690MHzz -0.17 dBi (peak)	2300-2690MHzz 0.31 dBi (peak)	2300-2690MHzz 3.0 max	2300-2690MHzz 0.48 dBi (peak)
				3400-3800MHz -0.91 dBi (peak)	3400-3800MHz -0.27 dBi (peak)	3400-3800MHz 3.0 max	3400-3800MHz 0.64 dBi (peak)
				4200-4700MHz -2.41 dBi (peak)	4200-4700MHz -1.69 dBi (peak)	4200-4700MHz 3.0 max	4200-4700MHz 0.72 dBi (peak)
				5150-5925MHz 1.16 dBi (peak)	5150-5925MHz 1.98 dBi (peak)	5150-5925MHz 3.0 max	5150-5925MHz 0.82 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)
P/N: DC33002PC2L (350-24022) Tx2/ Rx3 Antenna	Hong-BO Co., Ltd	PIFA	50 ohm Coaxial length: 228mm diameter: 1.13SLLS	1710-2200MHz 2.61 dBi (peak)	1710-2200MHz 3.01 dBi (peak)	1710-2200MHz 3.0 dBi (peak)	1710-2200MHz 0.40 dBi (peak)
				2300-2690MHzz 1.39 dBi (peak)	2300-2690MHzz 1.85 dBi (peak)	2300-2690MHzz 3.0 dBi (peak)	2300-2690MHzz 0.46 dBi (peak)
				3400-3800MHz 0.32 dBi (peak)	3400-3800MHz 0.94 dBi (peak)	3400-3800MHz 3.0 dBi (peak)	3400-3800MHz 0.62 dBi (peak)
				4200-5000MHz 0.92 dBi (peak)	4200-5000MHz 1.61 dBi (peak)	4200-5000MHz 3.0 dBi (peak)	4200-5000MHz 0.69 dBi (peak)
P/N: DC33002PC8L (350-24019) Rx4 Antenna	Hong-BO Co., Ltd	PIFA	50 ohm Coaxial length: 318mm diameter: 1.13SLLS	1805-2200MHz 0.53 dBi (peak)	1805-2200MHz 1.09 dBi (peak)	1805-2200MHz 3.0 dBi (peak)	1805-2200MHz 0.56 dBi (peak)
				2300-2690MHzz -0.53 dBi (peak)	2300-2690MHzz 0.12 dBi (peak)	2300-2690MHzz 3.0 dBi (peak)	2300-2690MHzz 0.65 dBi (peak)
				3400-3800MHz 0.53 dBi (peak)	3400-3800MHz 1.39 dBi (peak)	3400-3800MHz 3.0 dBi (peak)	3400-3800MHz 0.86 dBi (peak)
				4200-5000MHz 1.55 dBi (peak)	4200-5000MHz 2.51 dBi (peak)	4200-5000MHz 3.0 dBi (peak)	4200-5000MHz 0.96 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

	Tx1 / Rx1 antenna		Rx2 antenna	
Frequency (MHz)	Horizontal (dBi)	Vertical (dBi)	Horizontal (dBi)	Vertical (dBi)
698	-2.84	-6.08		
703	-2.78	-5.88		
707.5	-2.83	-5.79		
717	-2.82	-5.43	-2.45	-4.88
725.5	-2.80	-5.32	-2.38	-4.98
748	-2.70	-4.62	-2.25	-4.86
756	-2.54	-4.47	-2.33	-4.83
768	-2.33	-4.11	-2.04	-4.51
777	-2.27	-3.99	-1.97	-4.51
782	-2.32	-4.00	-1.98	-4.54
787	-2.40	-3.95	-2.01	-4.56
814	-1.31	-3.43	-2.36	-3.57
824	-1.43	-3.15	-2.33	-3.53
832	-1.31	-3.29	-2.49	-3.70
836.5	-1.24	-3.34	-2.62	-3.79
849	-1.42	-3.20	-2.89	-4.02
862	-1.22	-3.06	-3.15	-4.19
880	-1.33	-3.01	-3.49	-4.61
897.5	-1.55	-2.98	-4.01	-5.31
915	-1.66	-3.13	-4.74	-6.28
925	-1.61	-3.26	-5.15	-6.82
960	-2.75	-4.94	-6.83	-8.58
1427.9	-3.15	-3.71	0.65	-2.04
1447.9	-2.15	-3.82	0.88	-2.03
1455.4	-1.65	-3.55	0.92	-2.09
1462.9	-0.93	-3.07	0.85	-2.04
1496	-4.34	-5.99	-0.55	-2.88
1510.9	-4.61	-5.93	-1.17	-3.52
1557			-1.36	-4.45
1575			-1.40	-4.48
1610			-1.55	-4.65

High band

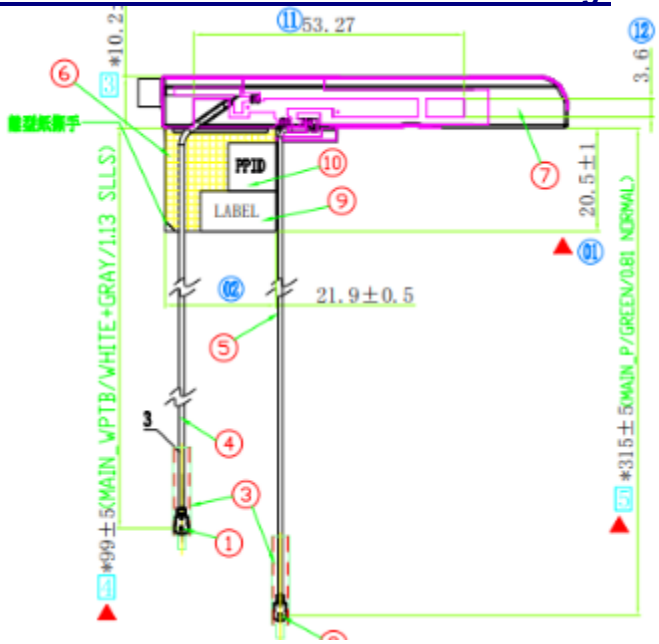
Frequency (MHz)	Tx1 / Rx1 antenna		Rx2 antenna	
	Horizontal (dBi)	Vertical (dBi)	Horizontal (dBi)	Vertical (dBi)
1710	-3.75	-3.10		
1732.5	-2.91	-2.81		
1747.5	-2.32	-2.46		
1755	-2.09	-2.32		
1785	-2.01	-2.04		
1805	-2.29	-1.86	-1.98	-2.32
1850	-1.90	-0.84	-2.32	-2.31
1880	-1.28	-0.36	-2.74	-2.60
1910	-0.78	-0.35	-2.36	-2.50
1920	-0.82	-0.46	-2.39	-2.60
1950	-0.50	-0.15	-2.10	-2.35
1980	-0.20	-0.48	-1.75	-2.82
2110	-0.53	-0.77	-3.25	-3.32
2200	0.45	0.67	-3.27	-5.44
2300	-0.55	0.04	-0.44	-6.32
2305	-0.63	-0.13	-0.44	-6.43
2315	-0.76	-0.47	-0.52	-6.37
2350	-0.81	-0.58	-1.18	-6.48
2400	-0.57	-0.10	-3.32	-4.50
2500	-1.34	-0.55	-1.13	-1.89
2570	-1.66	-1.79	-1.84	-0.76
2595	-2.11	-2.49	-2.66	-0.42
2620	-3.19	-3.02	-3.53	-0.17
2690	-6.54	-5.98	-3.79	-0.43
3400	-5.35	-3.34	-2.54	-6.38
3500	-3.95	-2.67	-1.78	-3.76
3600	-3.00	-3.70	-2.91	-0.91
3700	-2.69	-3.81	-1.39	-1.02
3800	-0.84	-2.33	-0.92	-1.81
4200	0.16	-2.59	-3.31	-4.76
4400	-2.04	-2.85	-3.22	-4.56
4700	-2.73	-4.29	-2.41	-3.13
5150	1.13	-1.03	-1.21	-2.76
5537.5	0.56	-0.59	-0.39	-0.28
5925	-1.94	-3.11	1.16	-1.10

	Tx2 / Rx3 antenna		Rx4 antenna	
Frequency (MHz)	Horizontal (dBi)	Vertical (dBi)	Horizontal (dBi)	Vertical (dBi)
1710	-0.35	-3.36		
1732.5	-0.85	-4.02		
1747.5	-1.28	-4.52		
1755	-1.51	-4.46		
1785	-2.24	-2.64		
1805	-1.77	-2.35	-0.76	-2.02
1850	-0.38	-1.53	-1.91	-3.51
1880	0.67	-1.26	-2.27	-4.20
1910	1.52	-0.65	-1.58	-3.88
1920	1.82	-0.50	-1.54	-3.76
1950	2.61	0.39	-1.34	-2.87
1980	2.35	0.50	-1.43	-2.31
2110	-0.09	-0.94	0.53	-0.02
2200	0.17	-0.89	-1.24	-2.75
2300	1.39	-1.09	-0.64	-2.10
2305	1.27	-1.45	-0.61	-2.20
2315	0.72	-1.88	-0.62	-2.12
2350	-1.23	-0.51	-0.78	-2.12
2400	-2.30	-0.53	-0.53	-2.65
2500	-1.00	-1.18	-1.79	-3.40
2570	-0.05	-0.94	-1.59	-2.98
2595	0.41	-0.54	-1.77	-2.49
2620	-0.28	-0.44	-2.11	-2.24
2690	-2.22	-0.77	-2.34	-2.24
3400	0.32	-2.44	-3.10	-4.08
3500	-0.81	-2.26	-2.22	-3.60
3600	-1.31	-0.74	-1.47	-2.58
3700	-1.45	-1.83	-2.89	-2.53
3800	-1.35	-1.64	0.53	-2.19
4200	-0.11	-1.16	1.55	-3.28
4400	-3.22	-5.44	-1.12	-2.50
4700	-1.83	-2.58	-1.85	-1.56
5000	0.92	-0.07	-0.21	0.29

Section 2. Dimensioned Photos or Drawings of Antennas

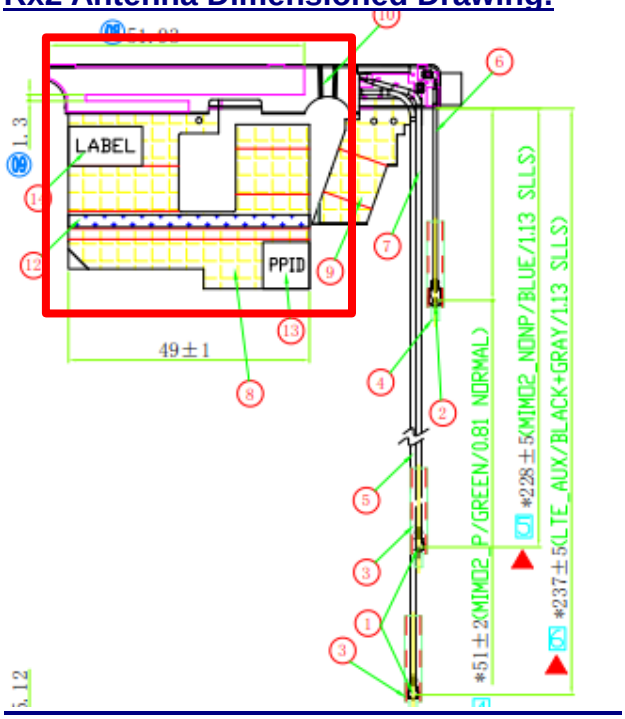
Include a dimensioned photo and dimensioned drawing of Main antenna here.

Tx1/ Rx1 Antenna Dimensioned Drawing:



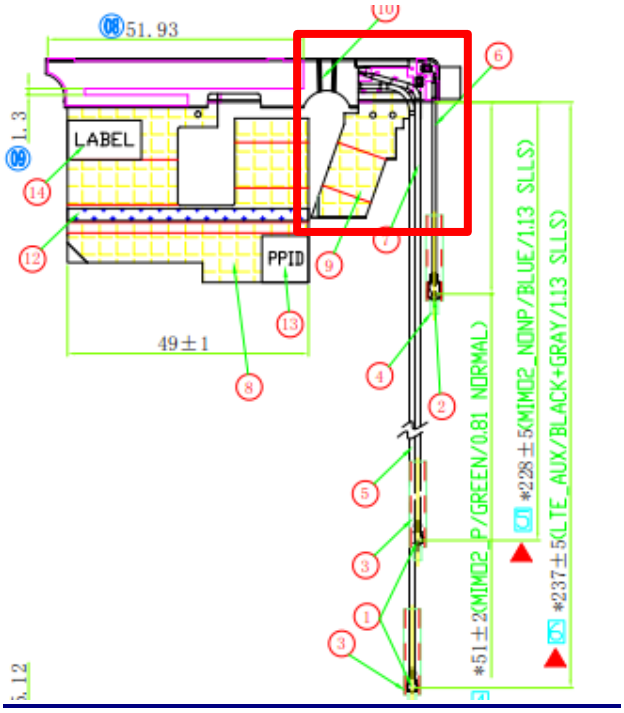
Include a dimensioned photo and dimensioned drawing of Aux antenna here.

Rx2 Antenna Dimensioned Drawing:



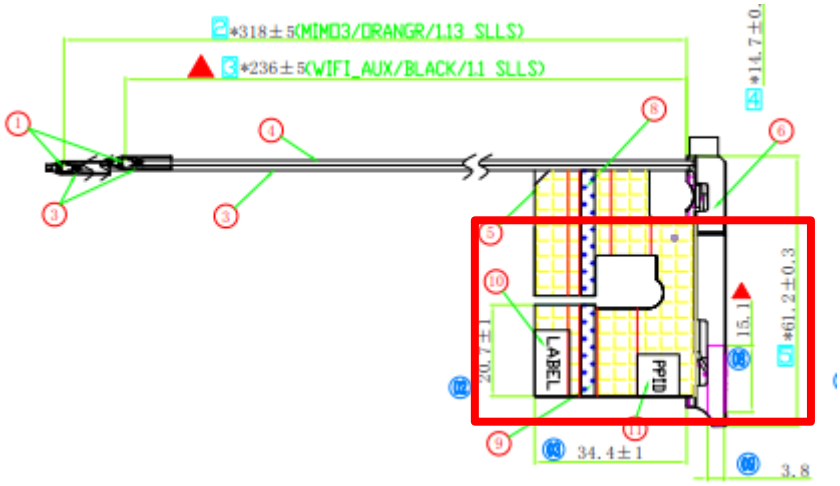
Include a dimensioned photo and dimensioned drawing of Aux antenna here.

Tx2/ Rx3 Antenna Dimensioned Drawing:



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

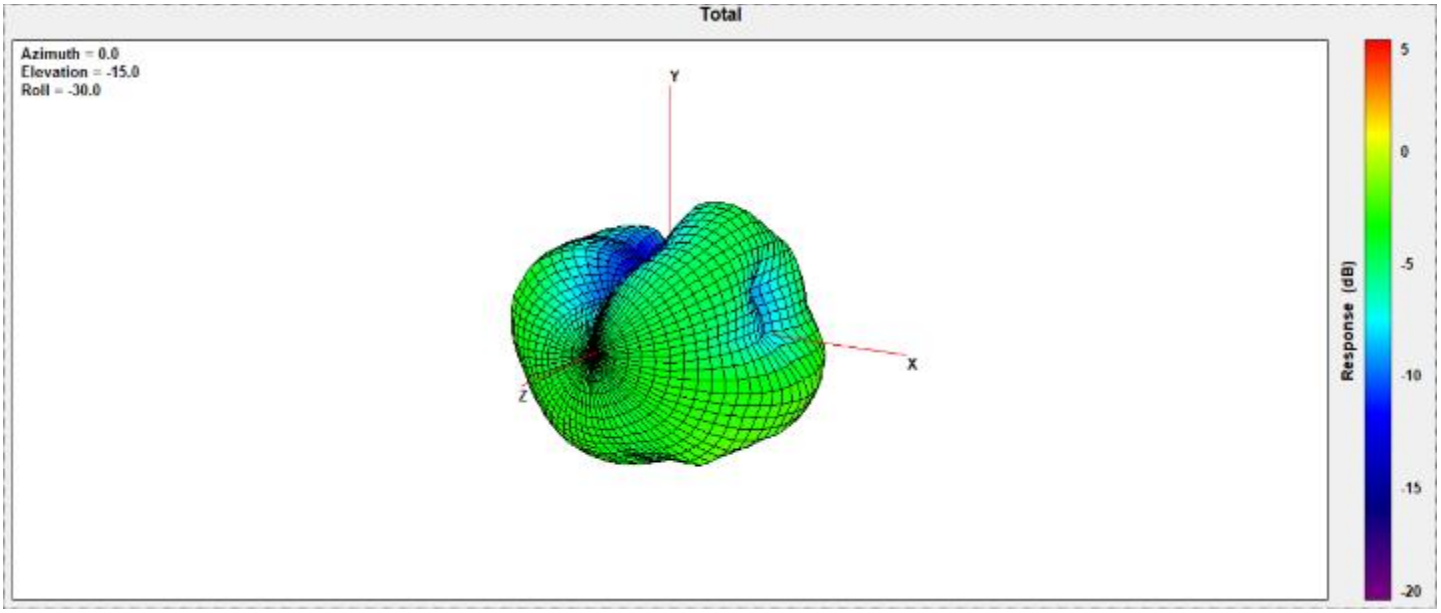
Rx4 Antenna Dimensioned Drawing:



Section 3. Radiation characteristics of antennae Loaded in Host Platform

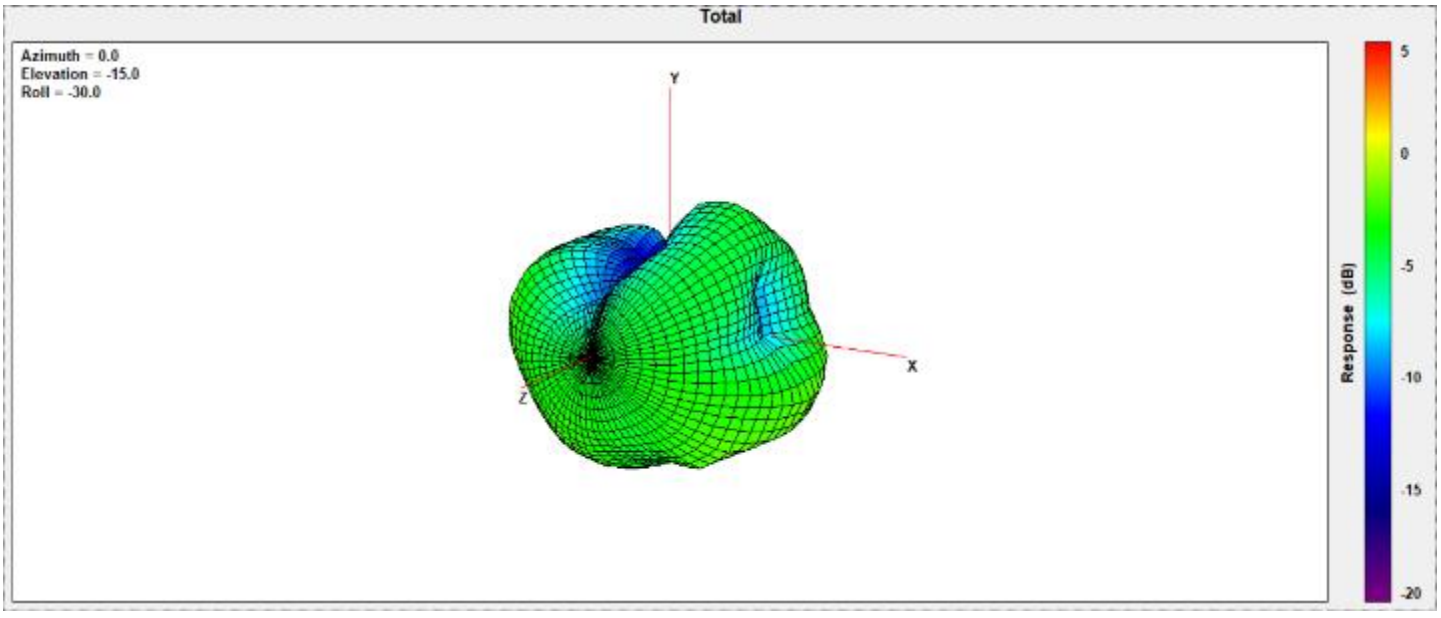
WWAN Main Antenna (TPx)

698MHz



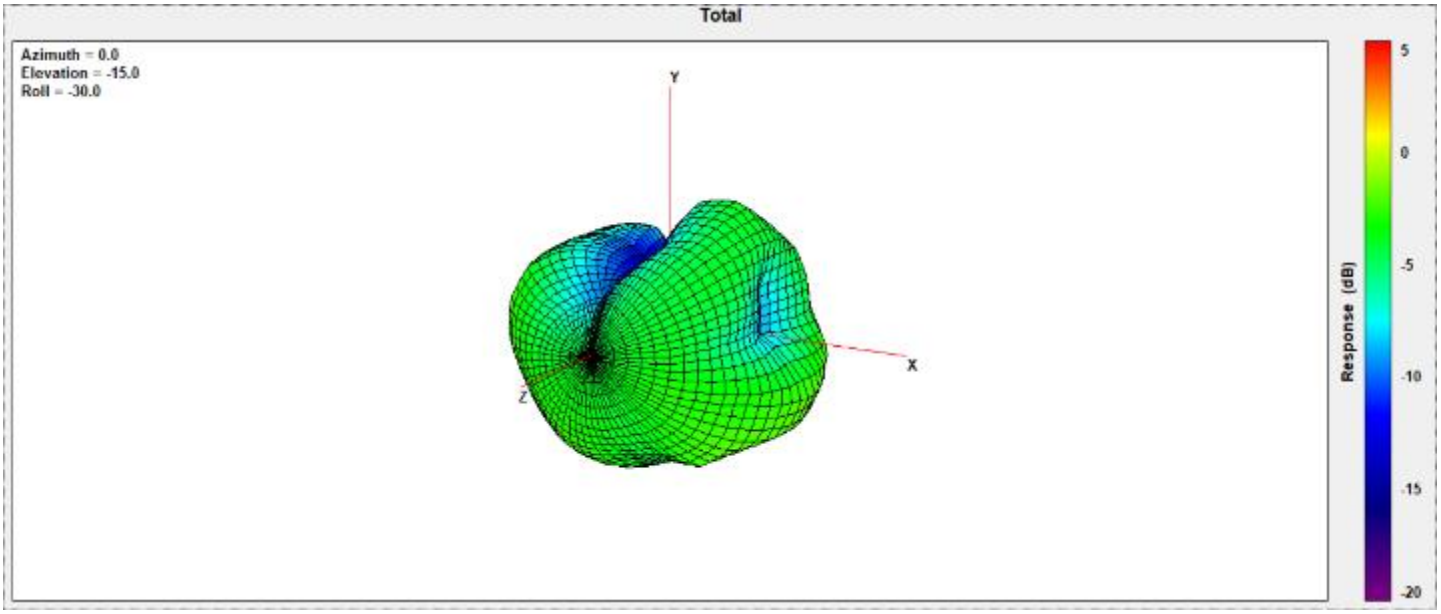
Center Frequency	**698 MHz**
Horizontal (dBi) peak	-2.84
Vertical (dBi) peak	-6.08

703MHz



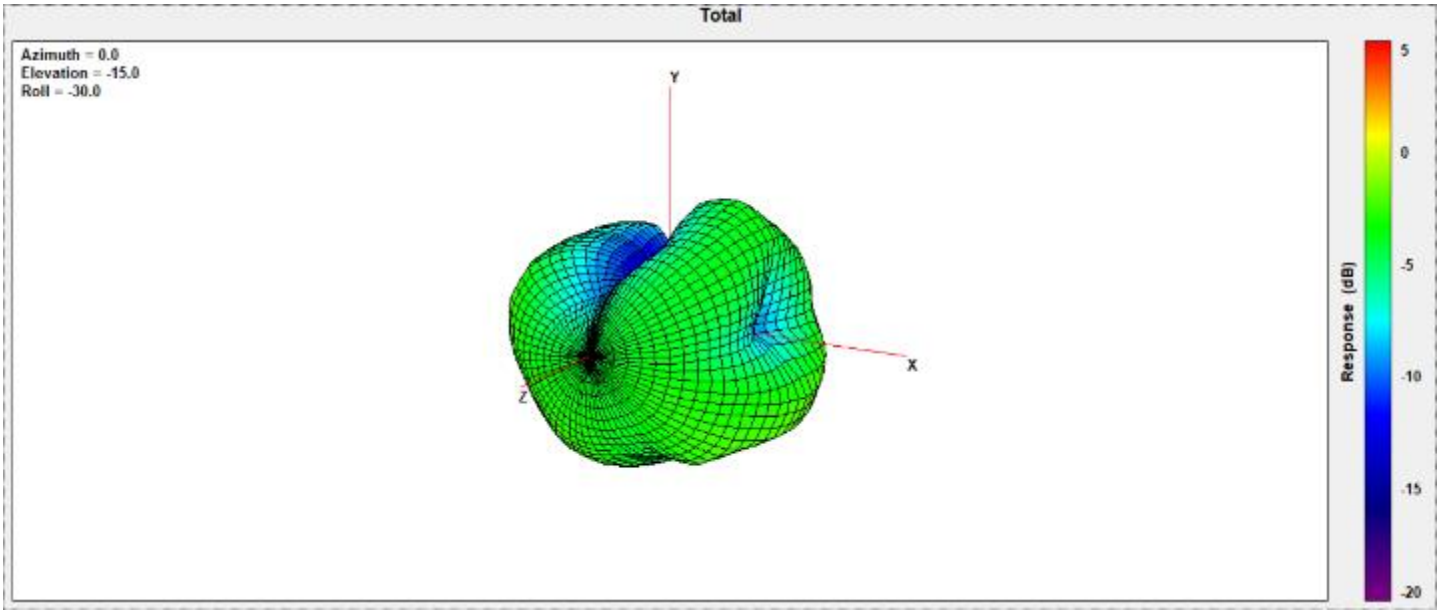
Center Frequency	**703MHz**
Horizontal (dBi) peak	-2.78
Vertical (dBi) peak	-5.88

707.5MHz



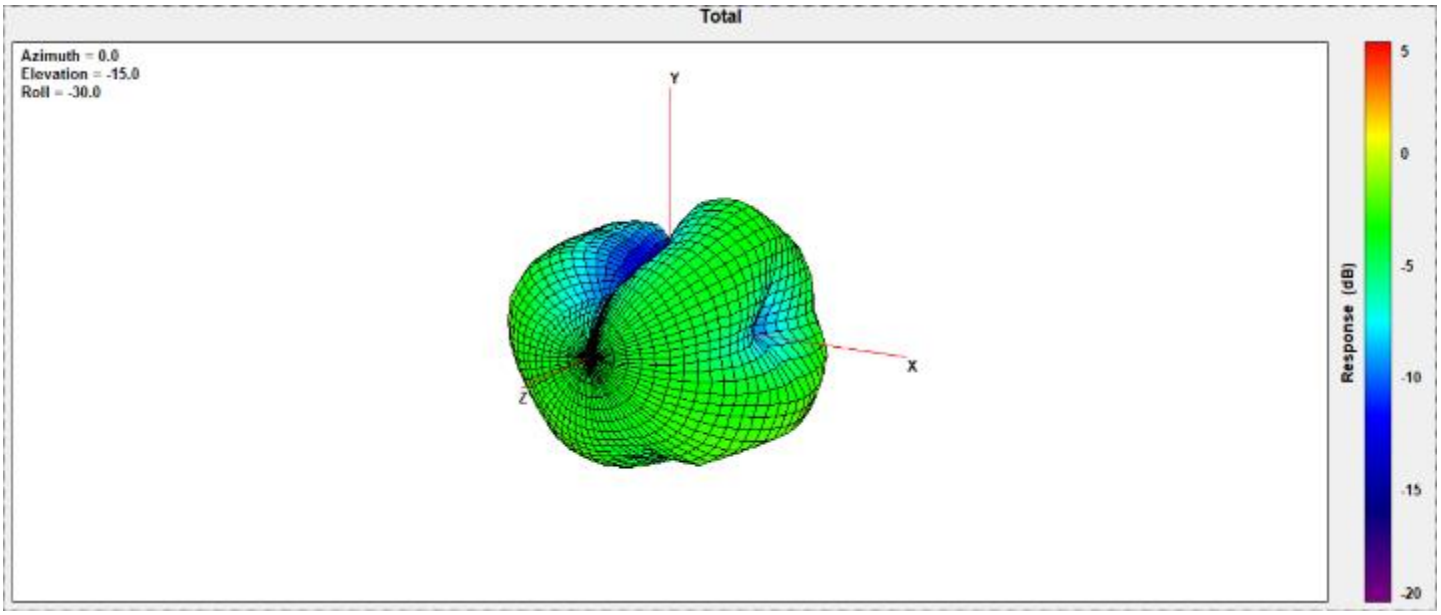
Center Frequency	**707.5MHz**
Horizontal (dBi) peak	-2.83
Vertical (dBi) peak	-5.79

717MHz



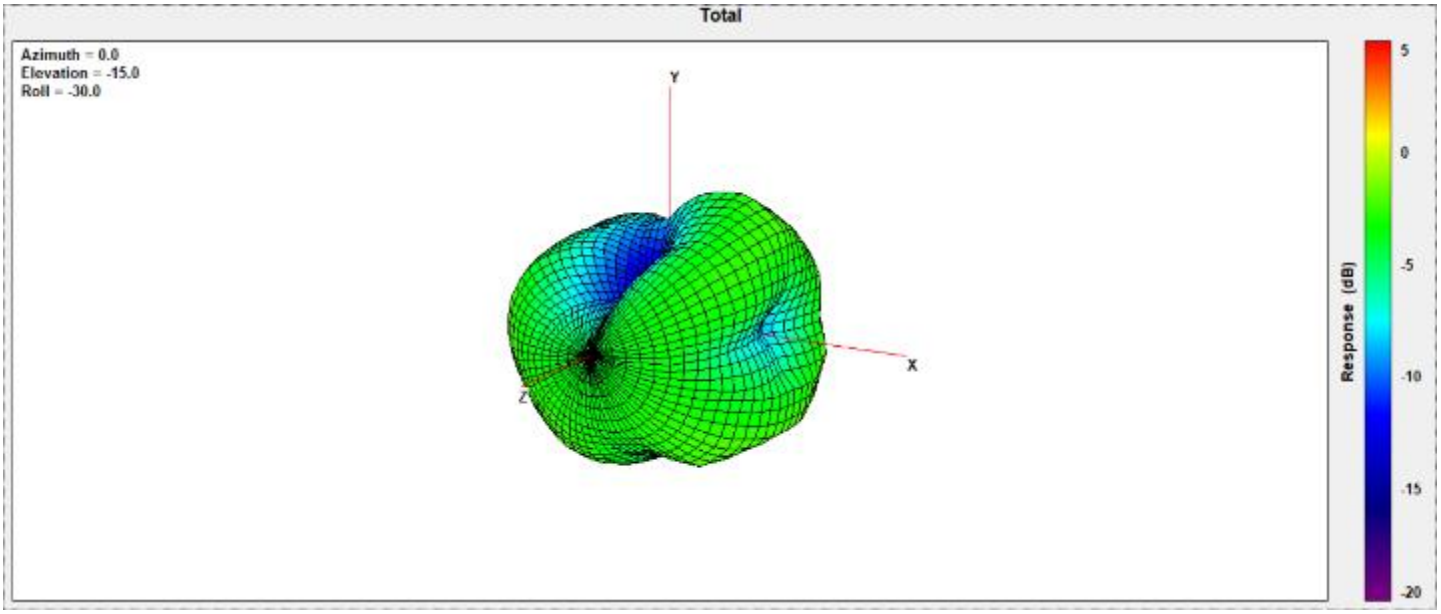
Center Frequency	**717MHz**
Horizontal (dBi) peak	-2.82
Vertical (dBi) peak	-5.43

725.5MHz



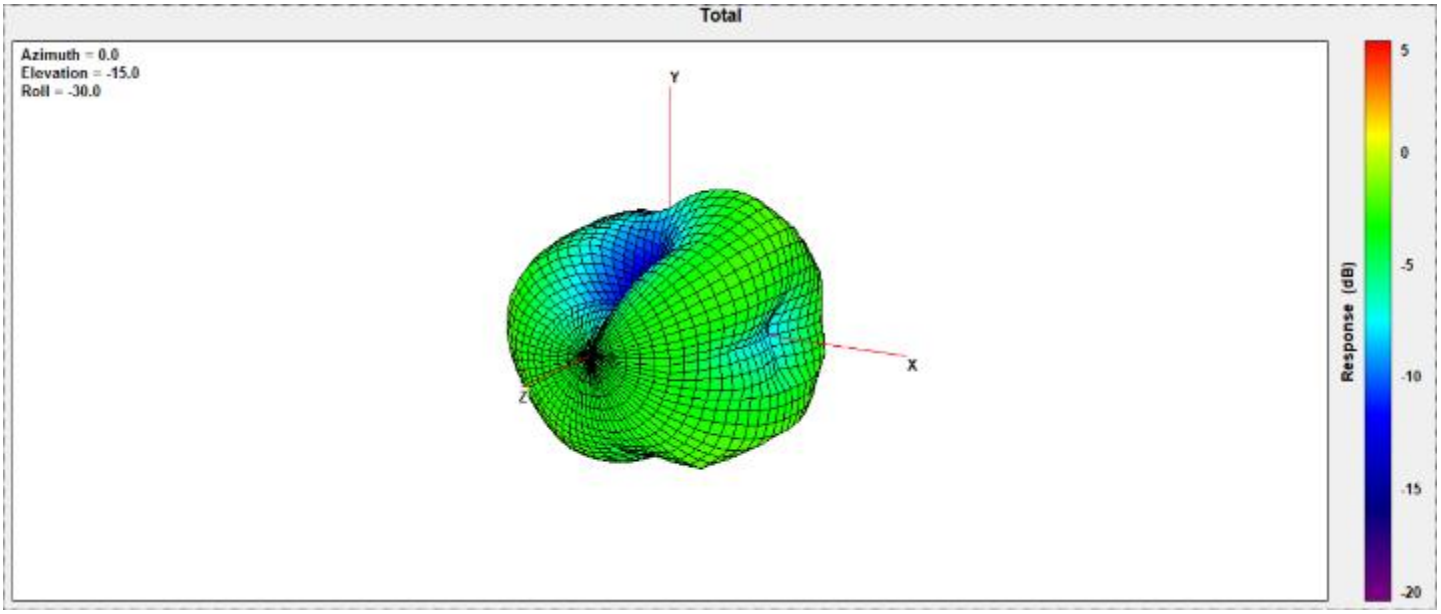
Center Frequency	**725.5MHz**
Horizontal (dBi) peak	-2.80
Vertical (dBi) peak	-5.32

748MHz



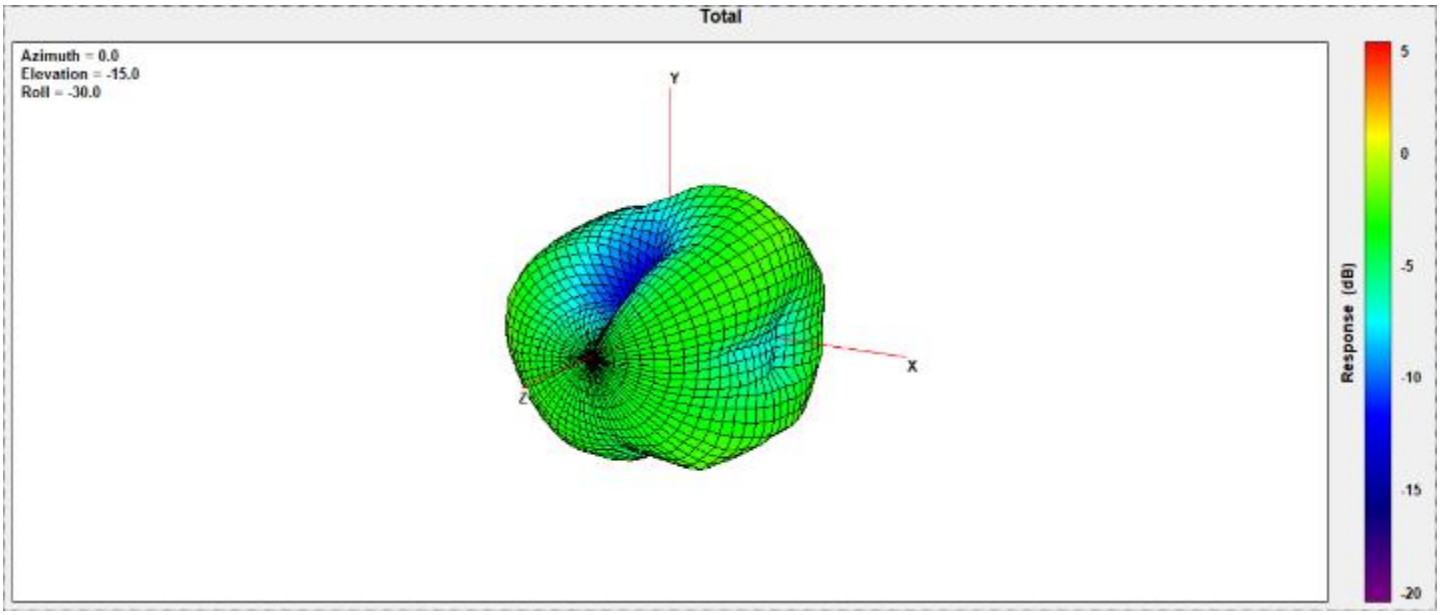
Center Frequency	**748MHz**
Horizontal (dBi) peak	-2.70
Vertical (dBi) peak	-4.62

756MHz



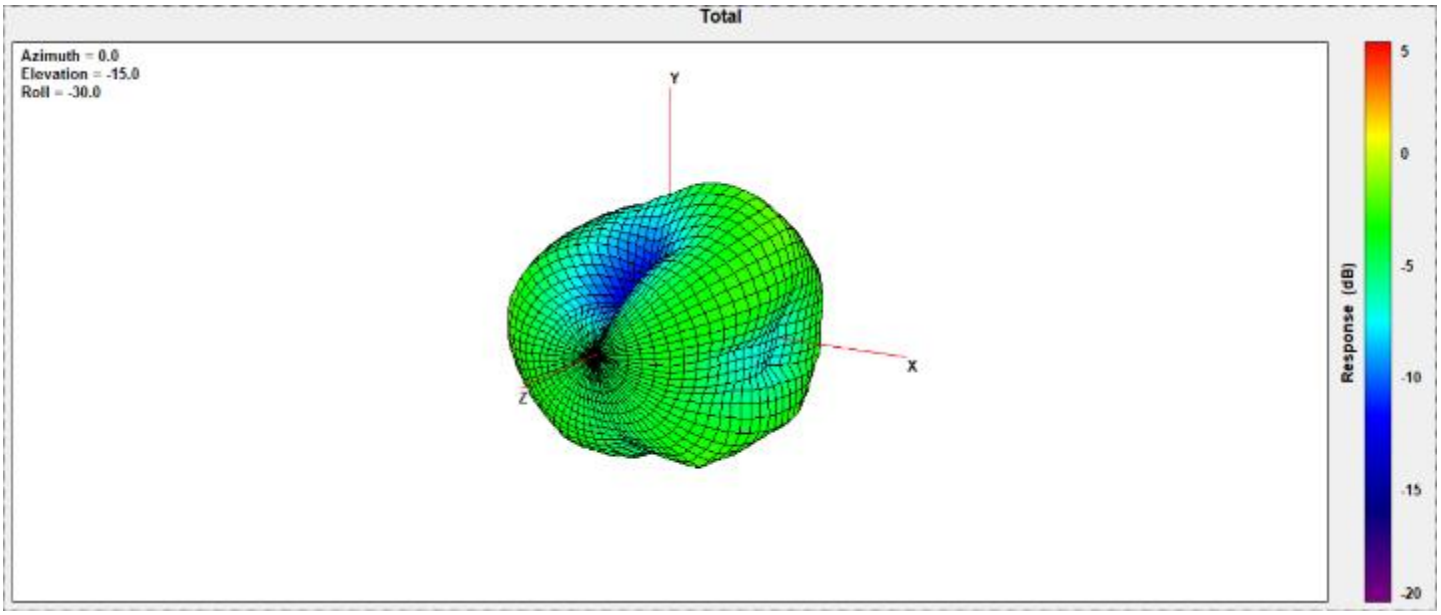
Center Frequency	**756MHz**
Horizontal (dBi) peak	-2.54
Vertical (dBi) peak	-4.47

768MHz



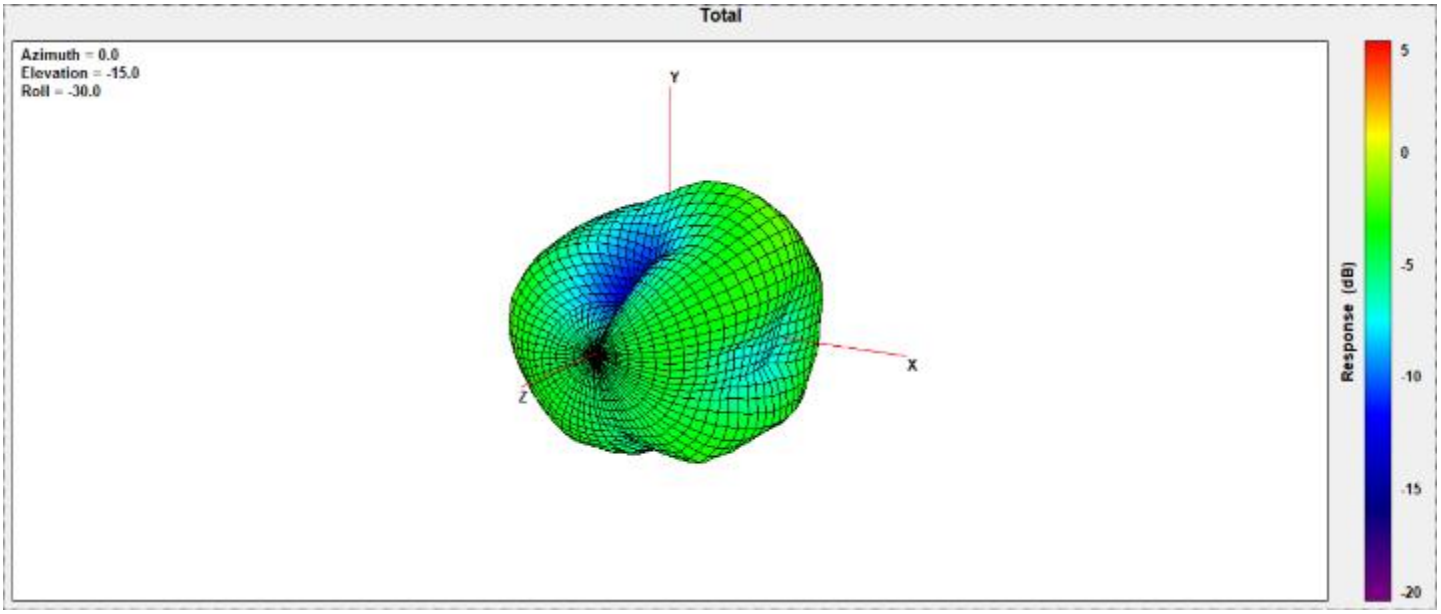
Center Frequency	**768MHz**
Horizontal (dBi) peak	-2.33
Vertical (dBi) peak	-4.11

777MHz



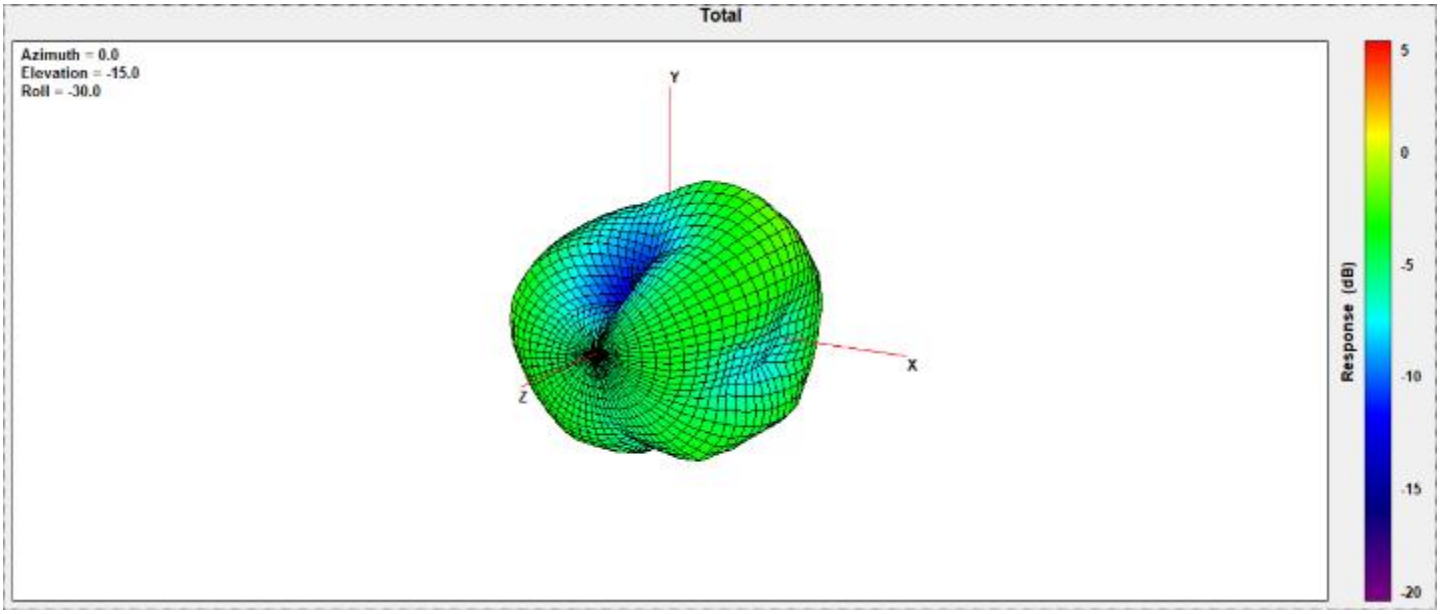
Center Frequency	**777MHz**
Horizontal (dBi) peak	-2.27
Vertical (dBi) peak	-3.99

782MHz



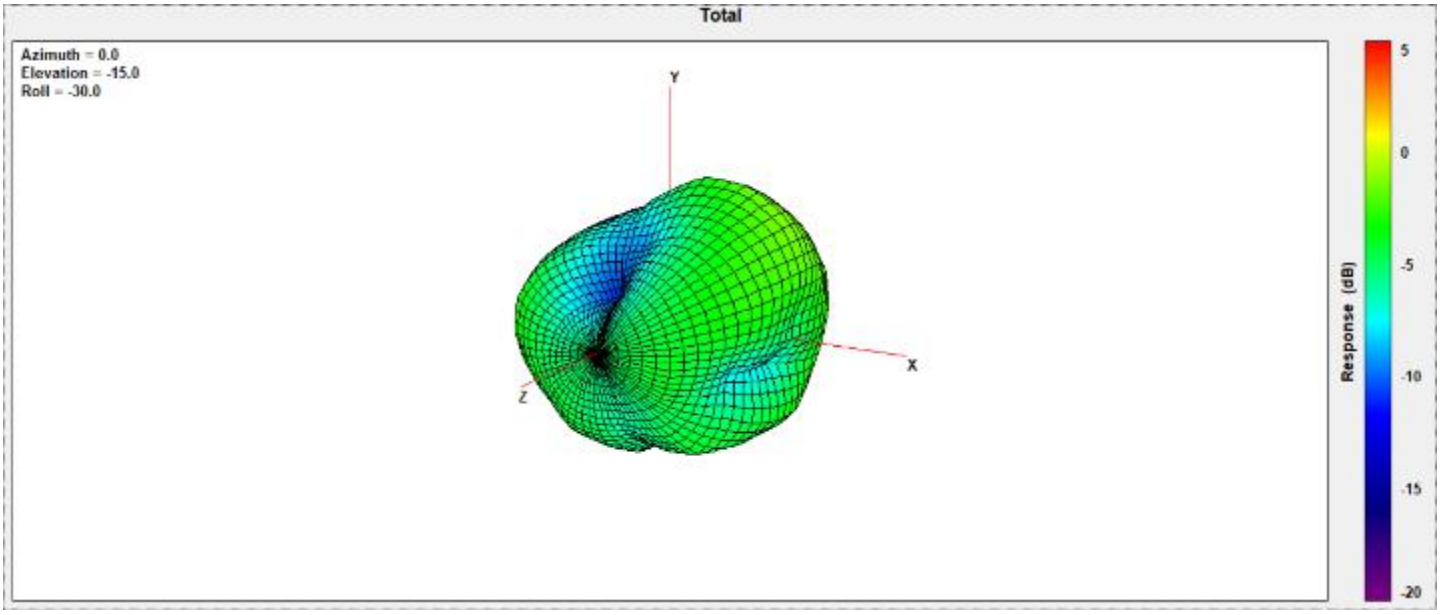
Center Frequency	**782MHz**
Horizontal (dBi) peak	-2.32
Vertical (dBi) peak	-4.00

787MHz



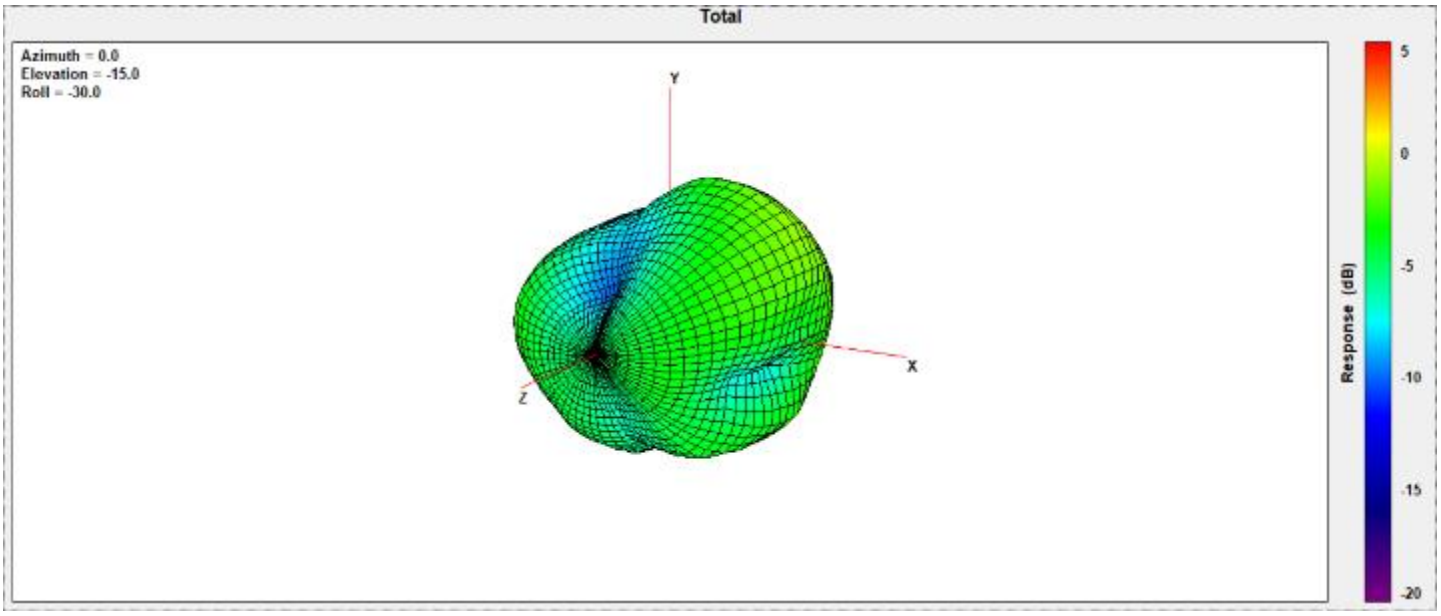
Center Frequency	**787MHz**
Horizontal (dBi) peak	-2.40
Vertical (dBi) peak	-3.95

814MHz



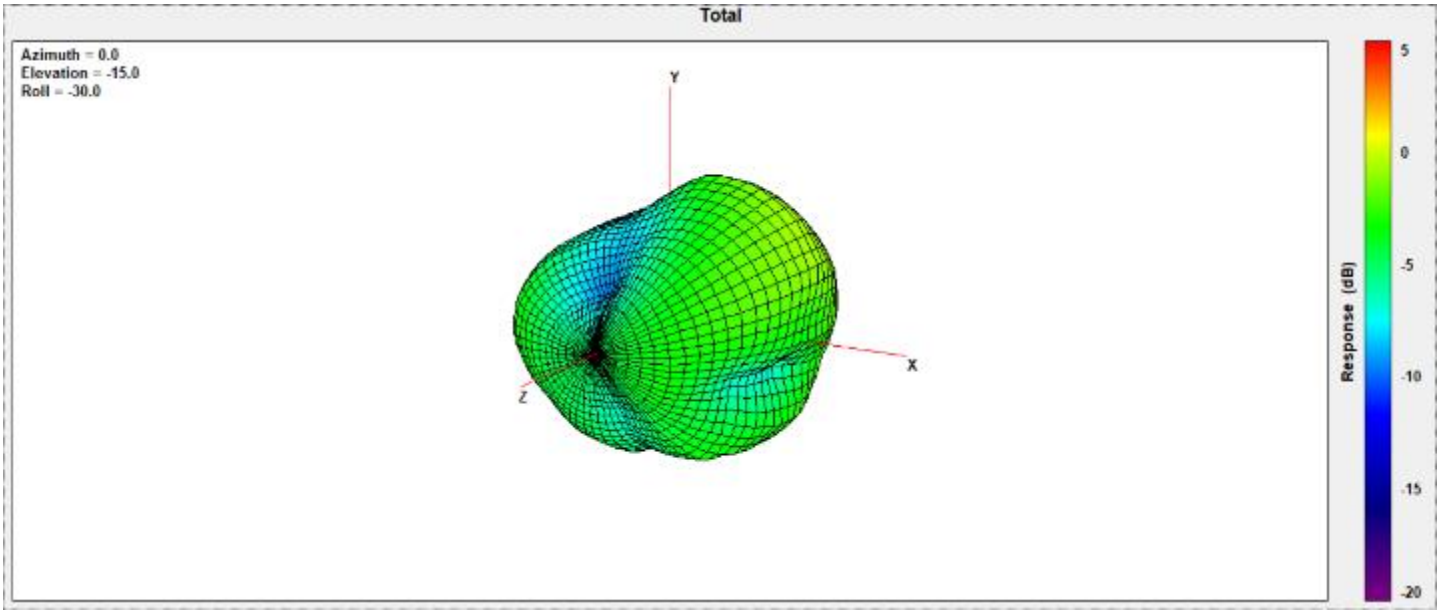
Center Frequency	**814MHz**
Horizontal (dBi) peak	-1.31
Vertical (dBi) peak	-3.43

824MHz



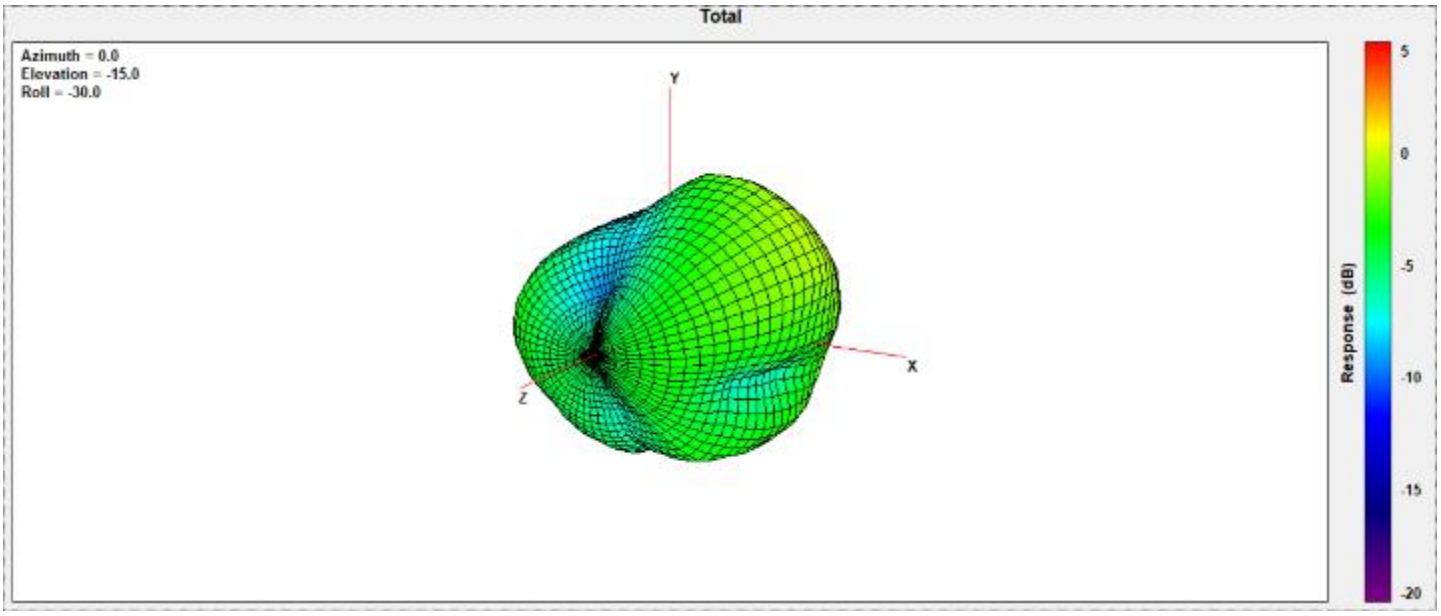
Center Frequency	**824MHz**
Horizontal (dBi) peak	-1.43
Vertical (dBi) peak	-3.15

832MHz



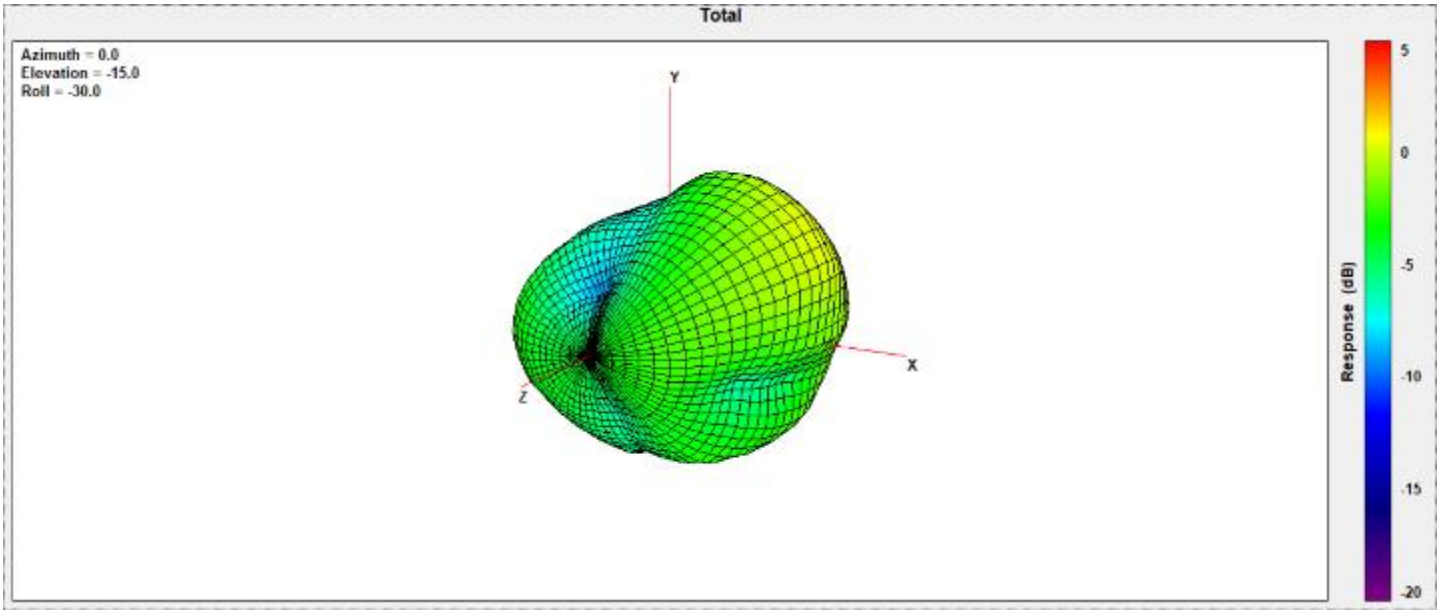
Center Frequency	**832MHz**
Horizontal (dBi) peak	-1.31
Vertical (dBi) peak	-3.29

836.5MHz



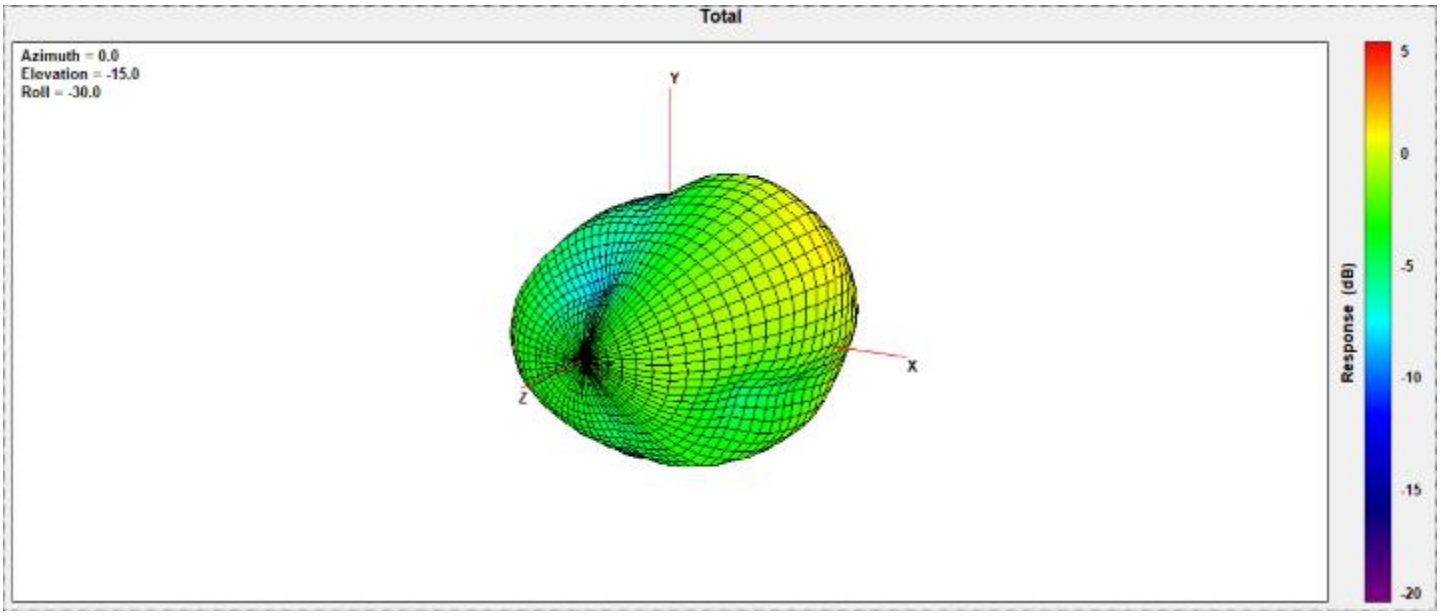
Center Frequency	**836.5MHz**
Horizontal (dBi) peak	-1.24
Vertical (dBi) peak	-3.34

849MHz



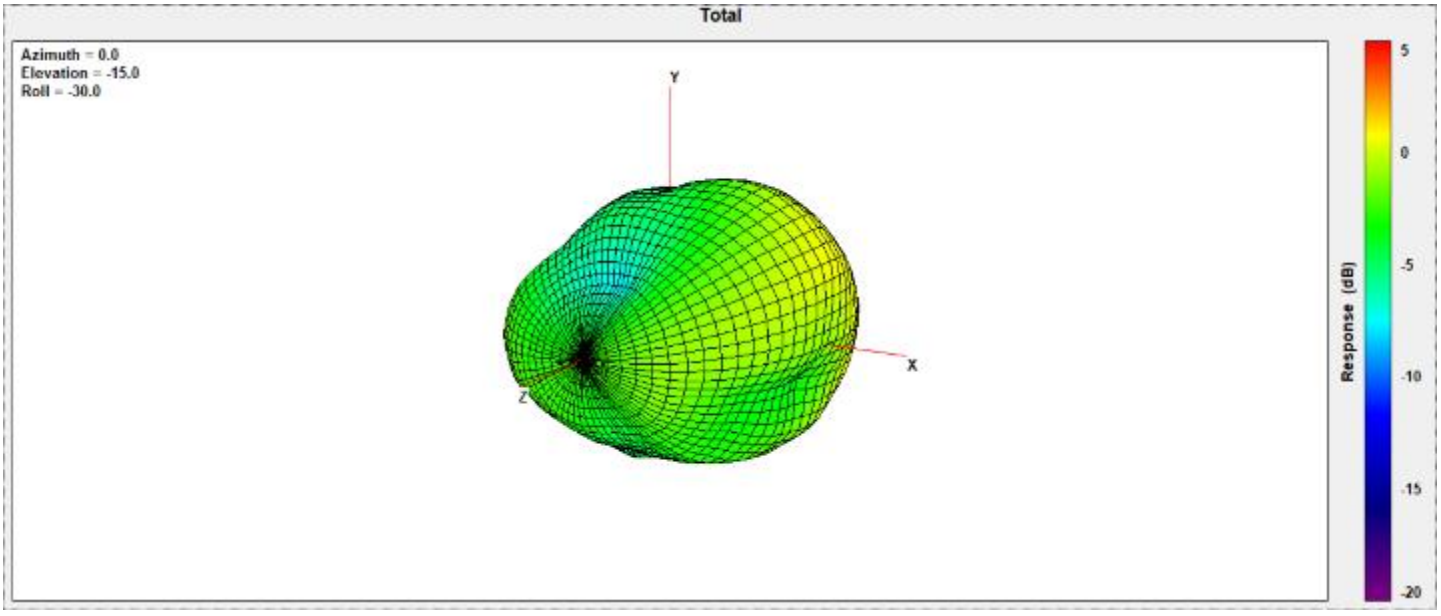
Center Frequency	**849MHz**
Horizontal (dBi) peak	-1.42
Vertical (dBi) peak	-3.20

862MHz



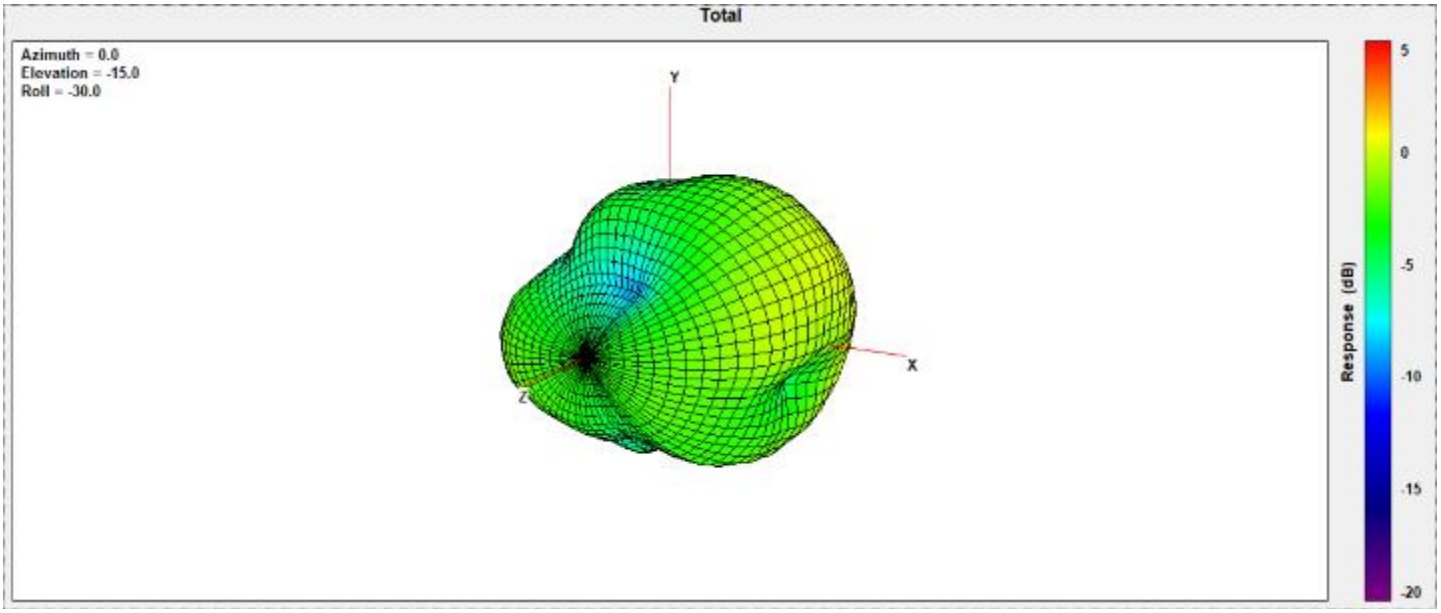
Center Frequency	**862MHz**
Horizontal (dBi) peak	-1.22
Vertical (dBi) peak	-3.06

880MHz



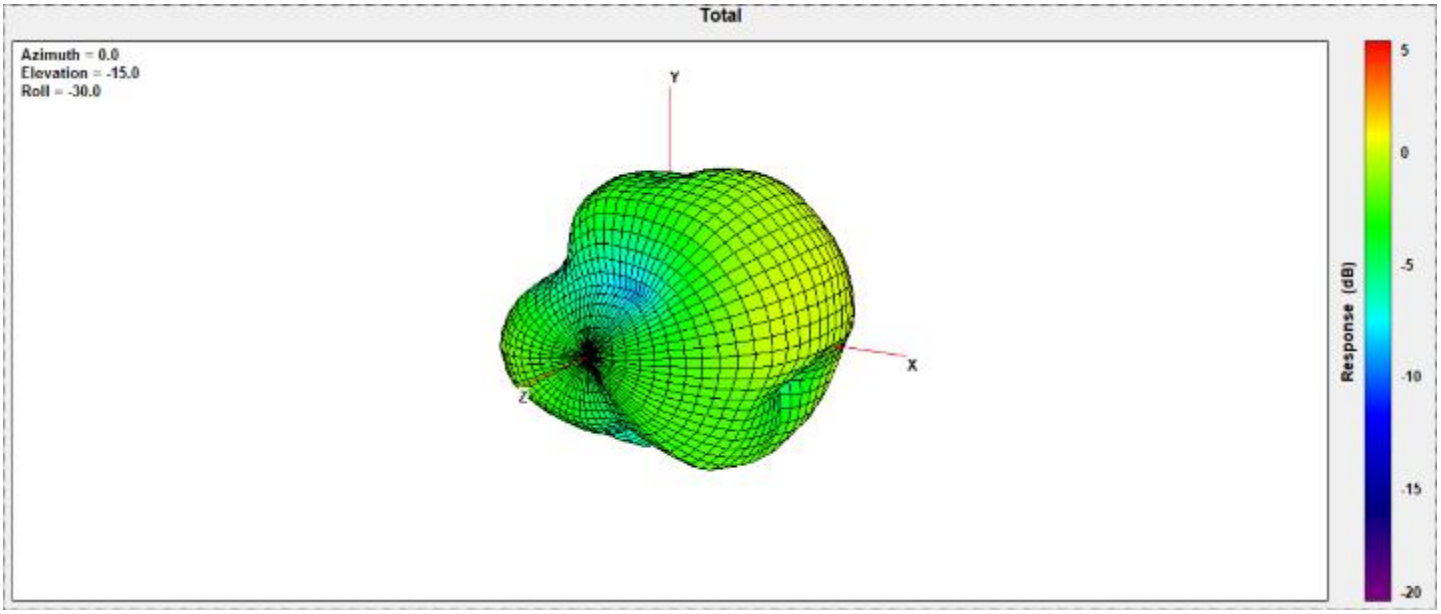
Center Frequency	**880MHz**
Horizontal (dBi) peak	-1.33
Vertical (dBi) peak	-3.01

897.5MHz



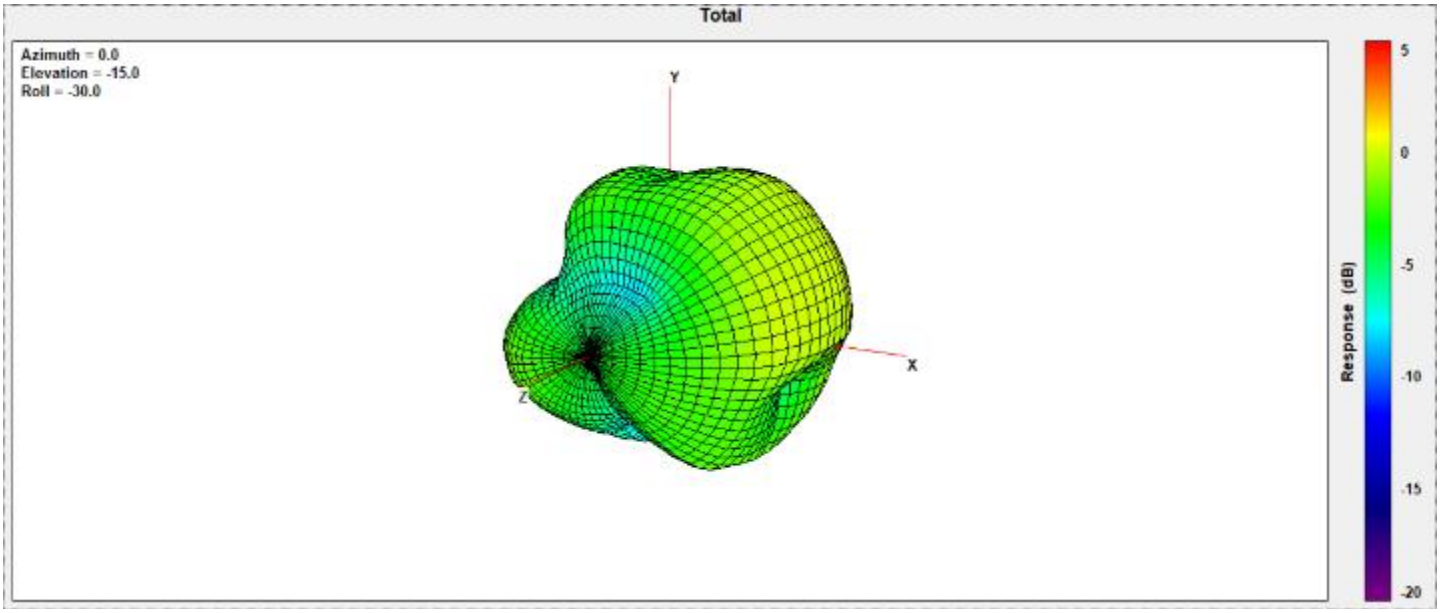
Center Frequency	**897.5MHz**
Horizontal (dBi) peak	-1.55
Vertical (dBi) peak	-2.98

915MHz



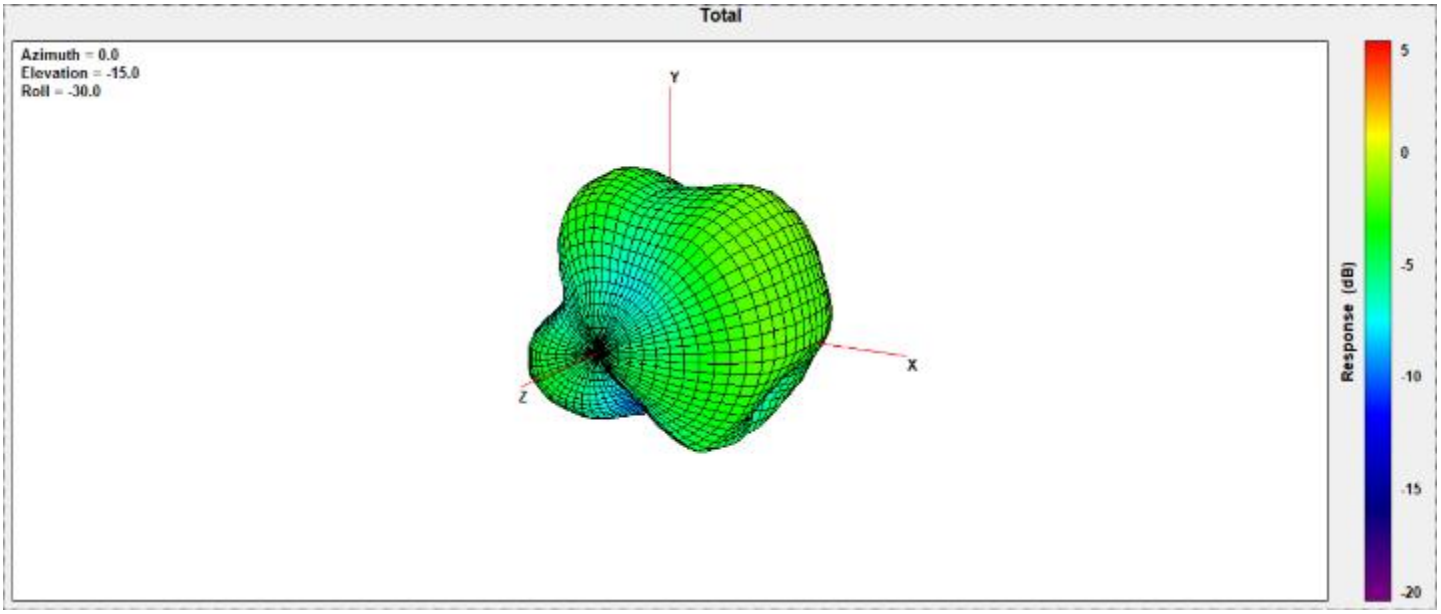
Center Frequency	**915MHz**
Horizontal (dBi) peak	-1.66
Vertical (dBi) peak	-3.13

925MHz



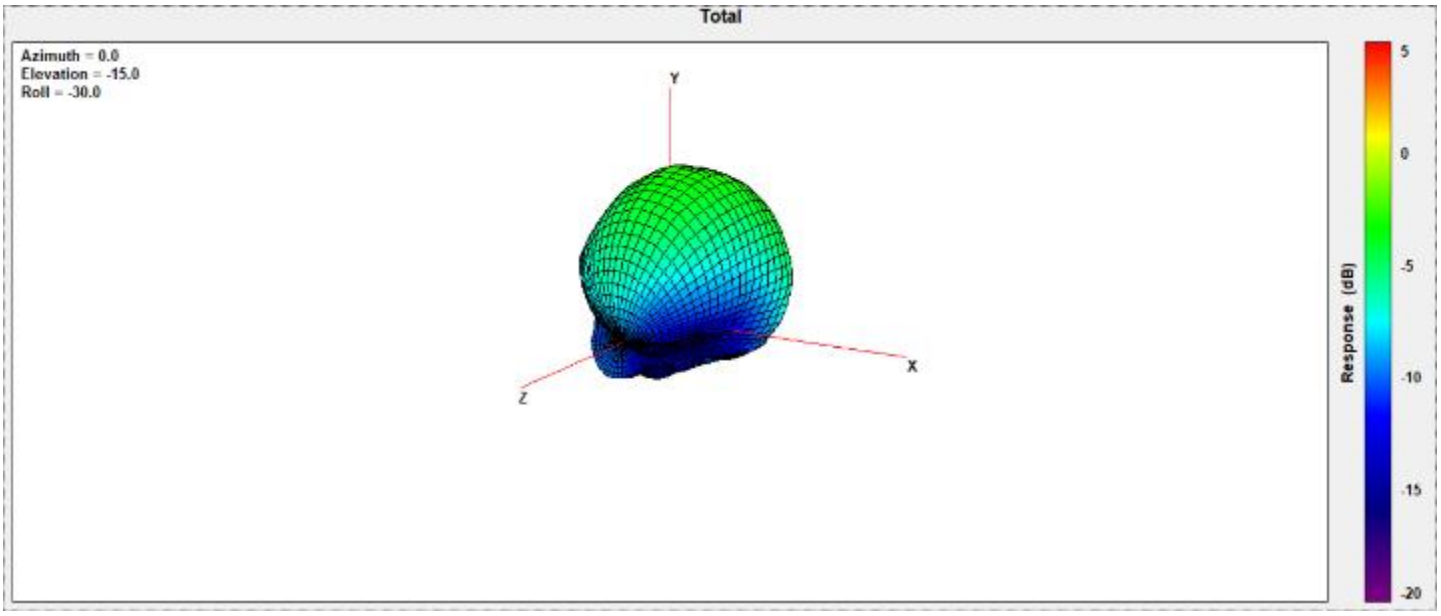
Center Frequency	**925MHz**
Horizontal (dBi) peak	-1.61
Vertical (dBi) peak	-3.26

960MHz



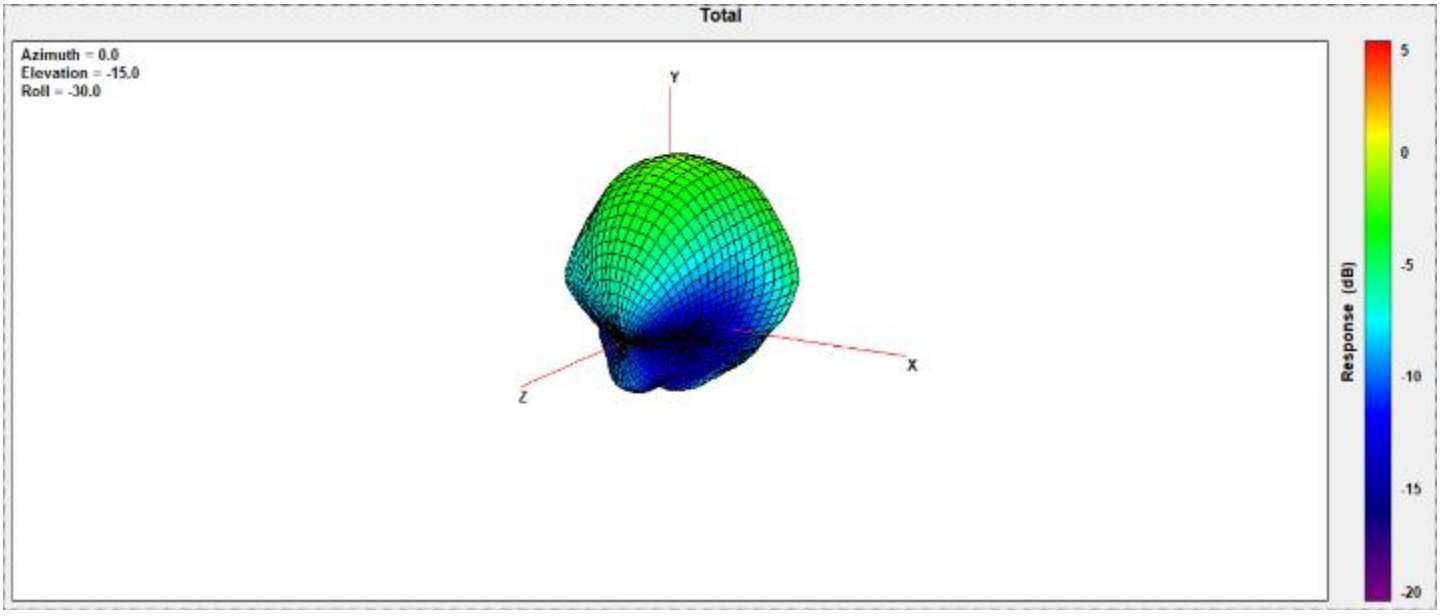
Center Frequency	**960MHz**
Horizontal (dBi) peak	-2.75
Vertical (dBi) peak	-4.94

1427.9MHz



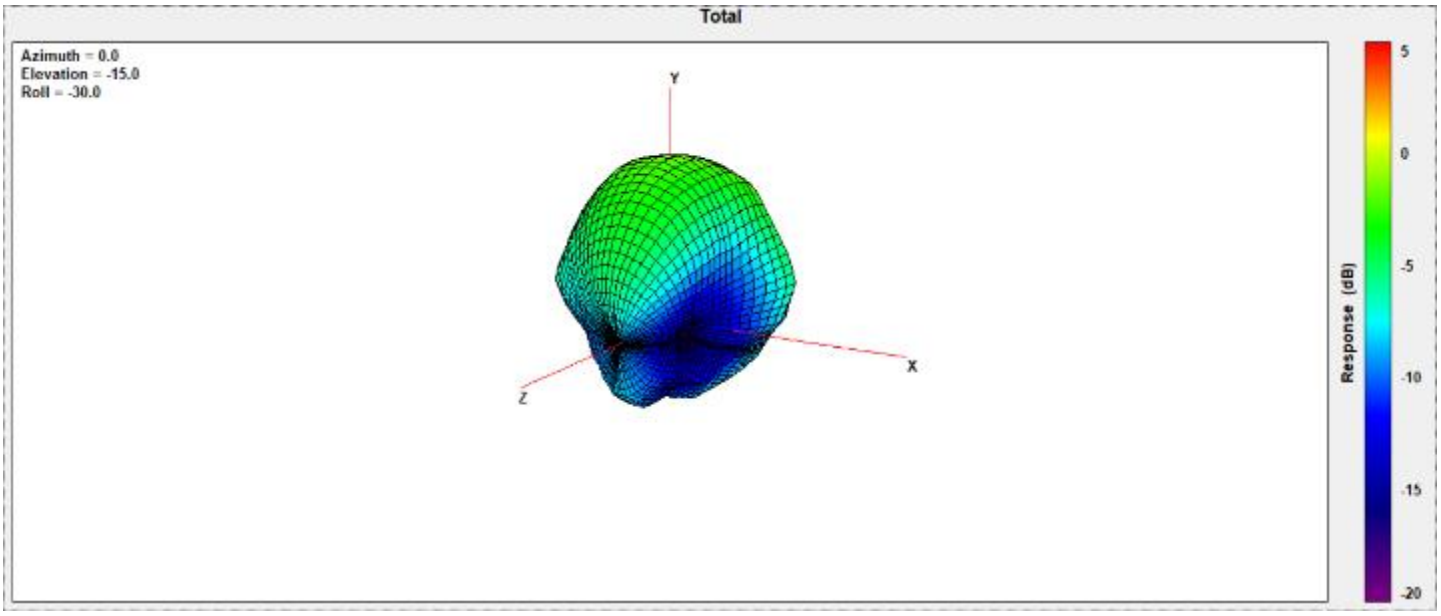
Center Frequency	**1427.9MHz**
Horizontal (dBi) peak	-3.15
Vertical (dBi) peak	-3.71

1447.9MHz



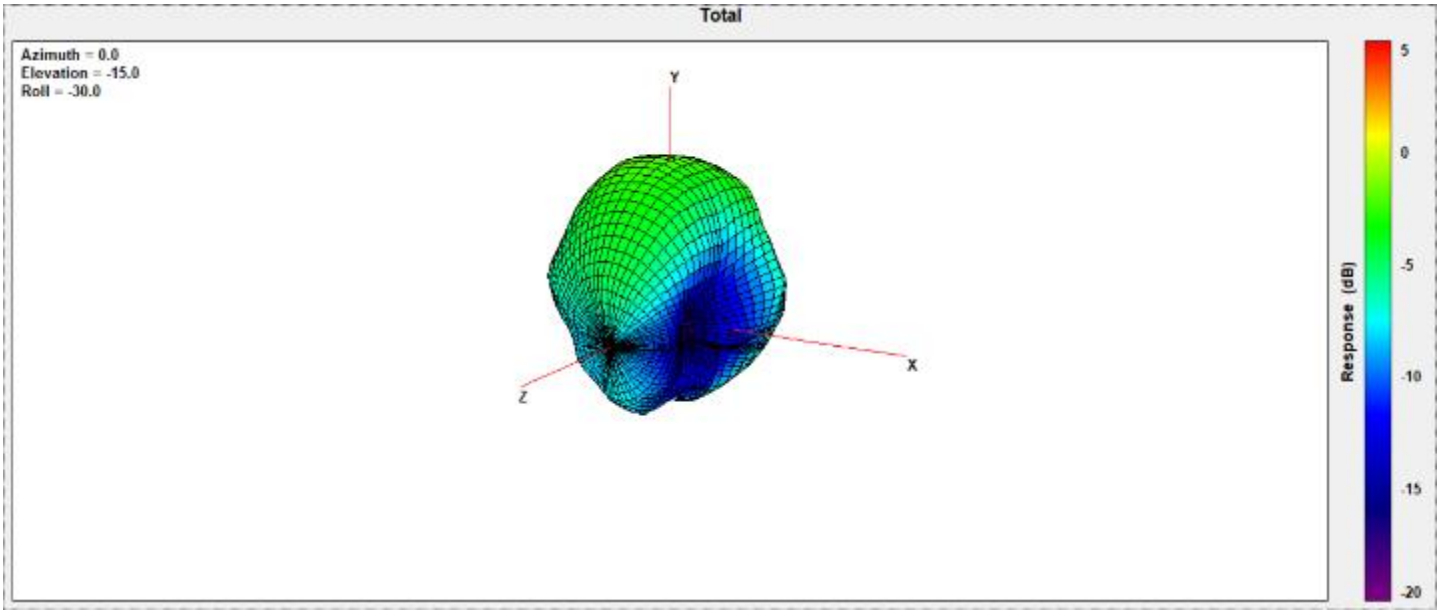
Center Frequency	**1447.9MHz**
Horizontal (dBi) peak	-2.15
Vertical (dBi) peak	-3.82

1455.4MHz



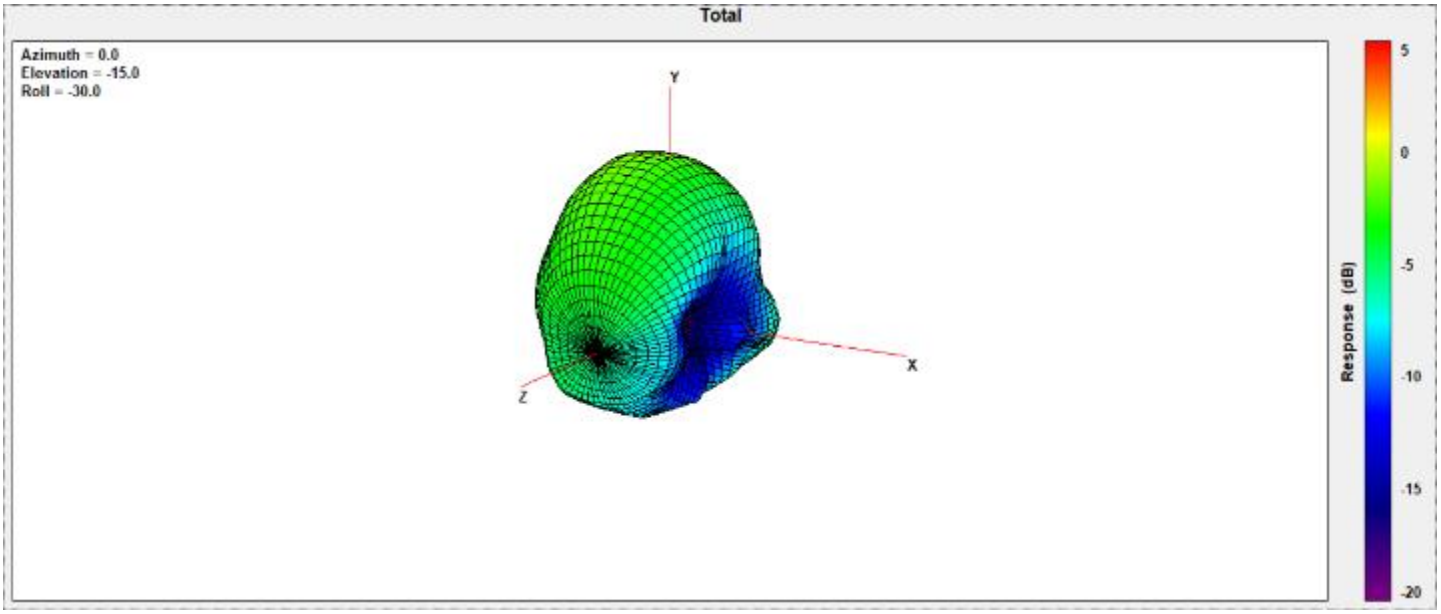
Center Frequency	**1455.4MHz**
Horizontal (dBi) peak	-1.65
Vertical (dBi) peak	-3.55

1462.9MHz



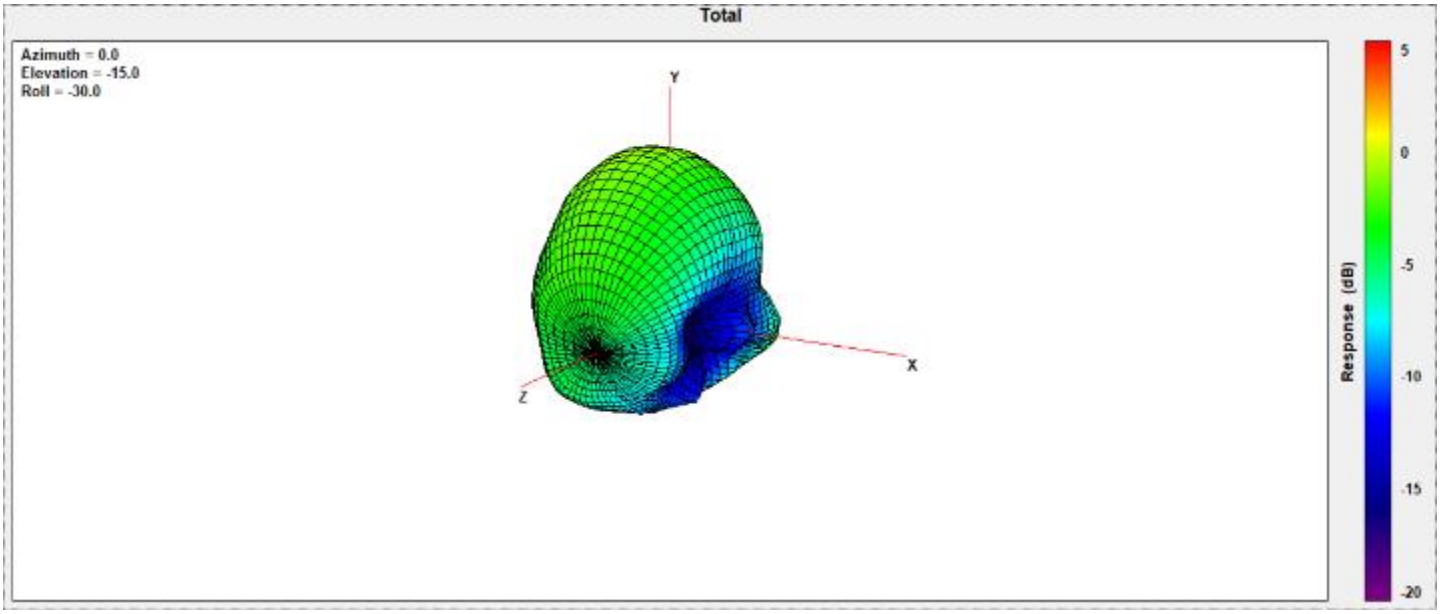
Center Frequency	**1462.9MHz**
Horizontal (dBi) peak	-0.93
Vertical (dBi) peak	-3.07

1496MHz



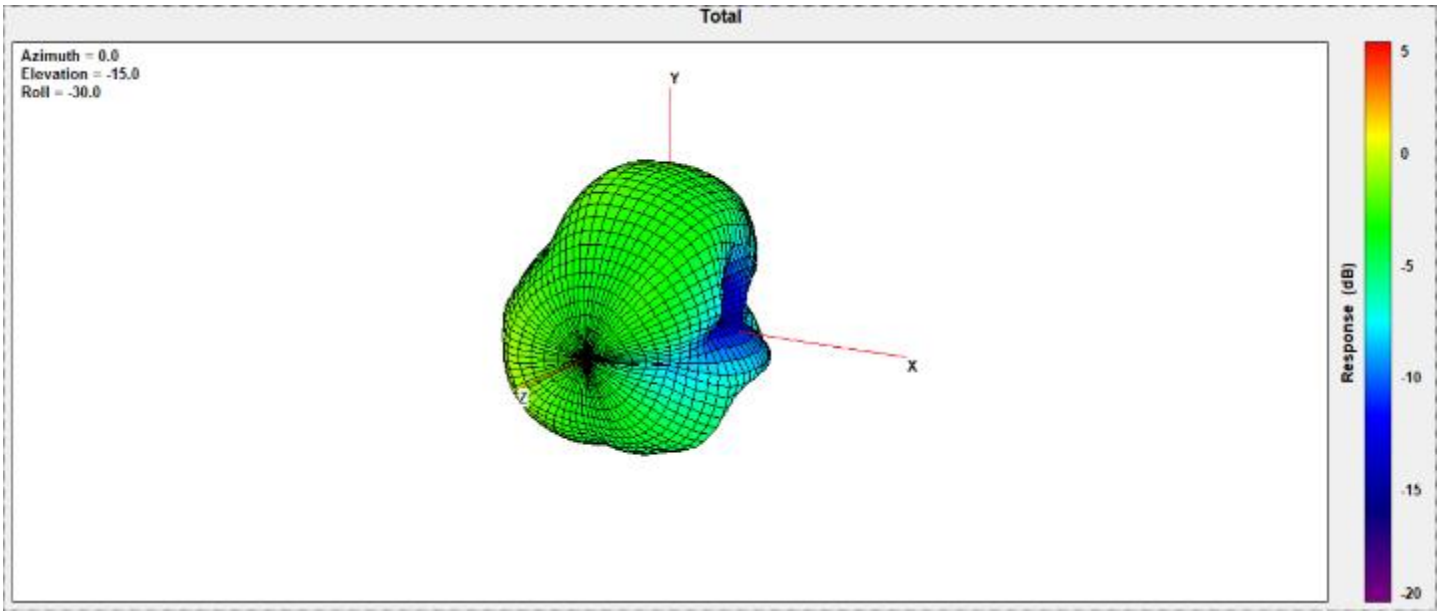
Center Frequency	**1496MHz**
Horizontal (dBi) peak	-4.34
Vertical (dBi) peak	-5.99

1510.9 MHz



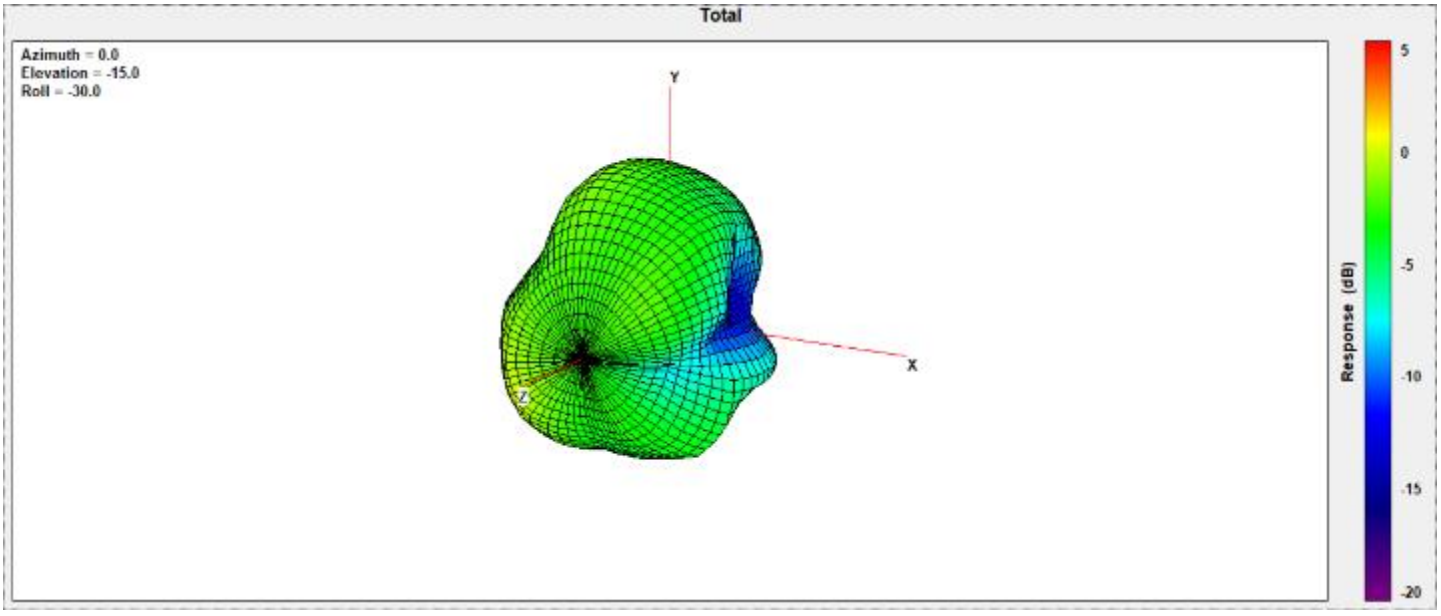
Center Frequency	**1510.9 MHz**
Horizontal (dBi) peak	-4.61
Vertical (dBi) peak	-5.93

1710 MHz



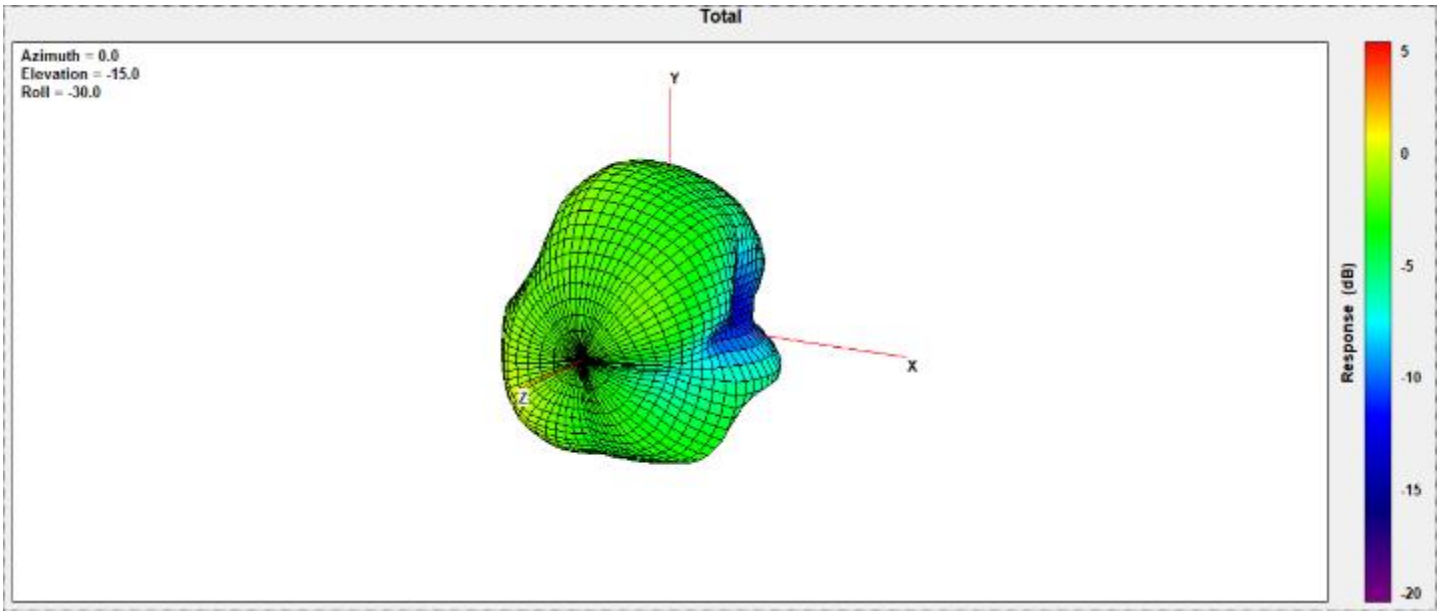
Center Frequency	**1710 MHz**
Horizontal (dBi) peak	-3.75
Vertical (dBi) peak	-3.10

1732.5 MHz



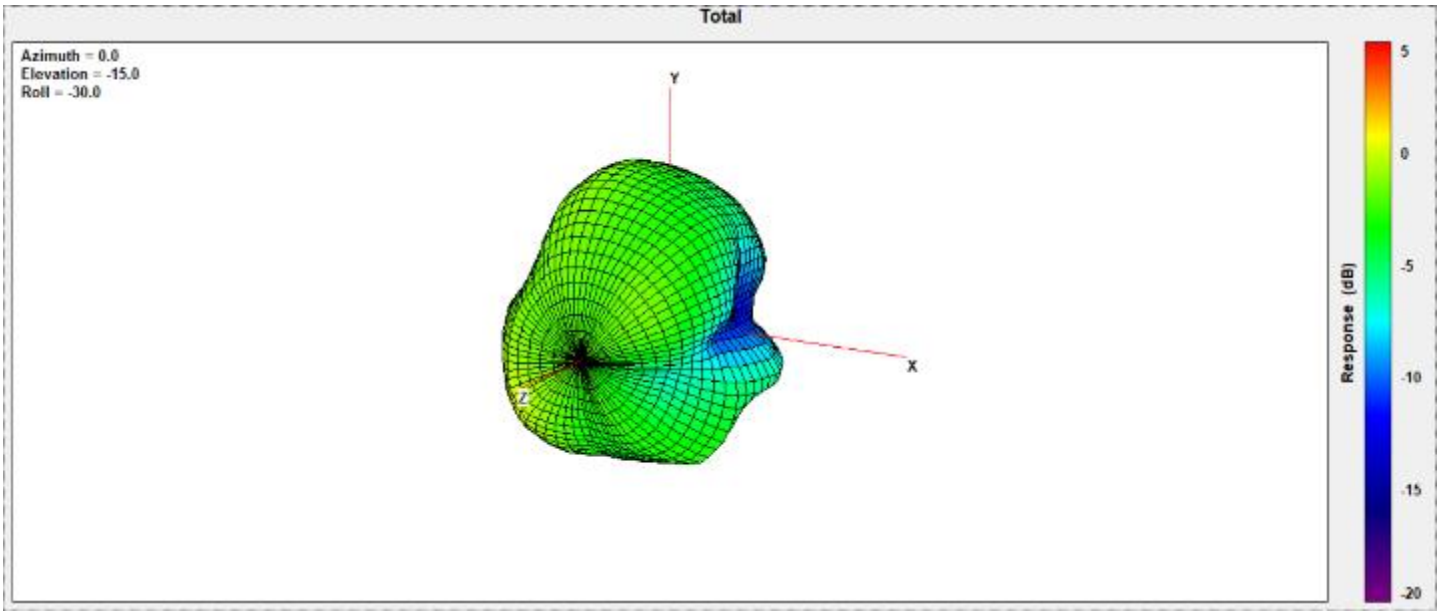
Center Frequency	**1732.5 MHz**
Horizontal (dBi) peak	-2.91
Vertical (dBi) peak	-2.81

1747.5 MHz



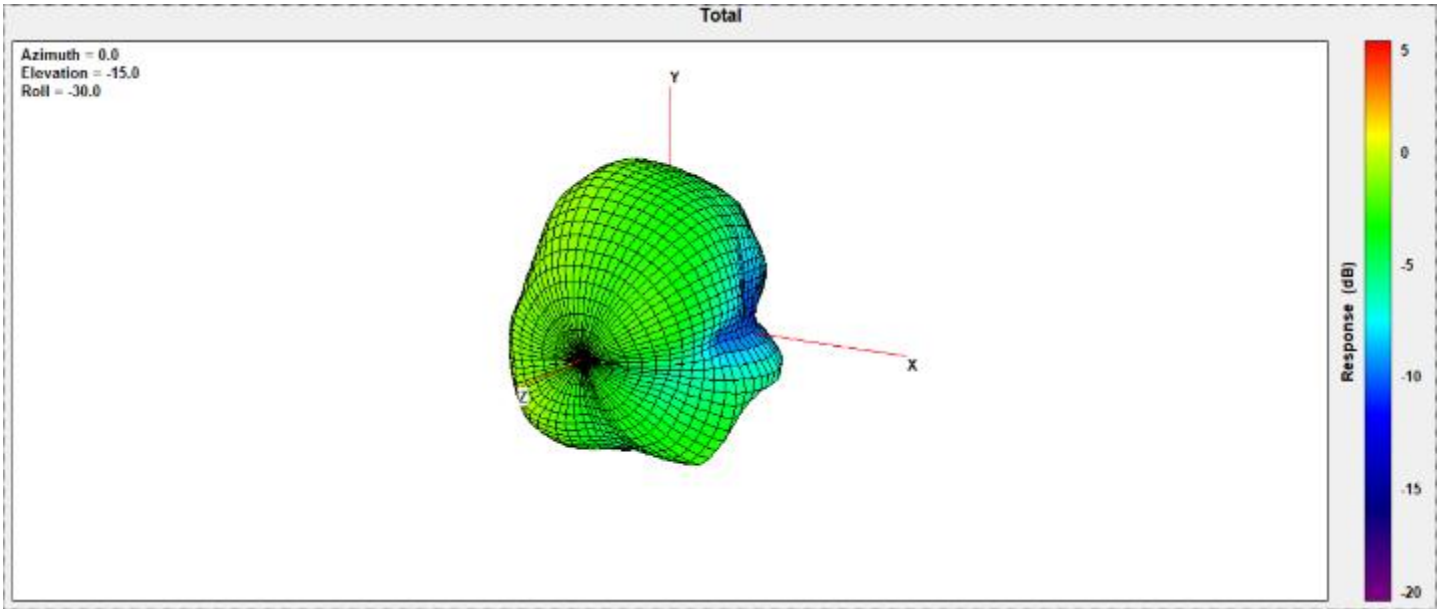
Center Frequency	**1747.5 MHz**
Horizontal (dBi) peak	-2.32
Vertical (dBi) peak	-2.46

1755 MHz



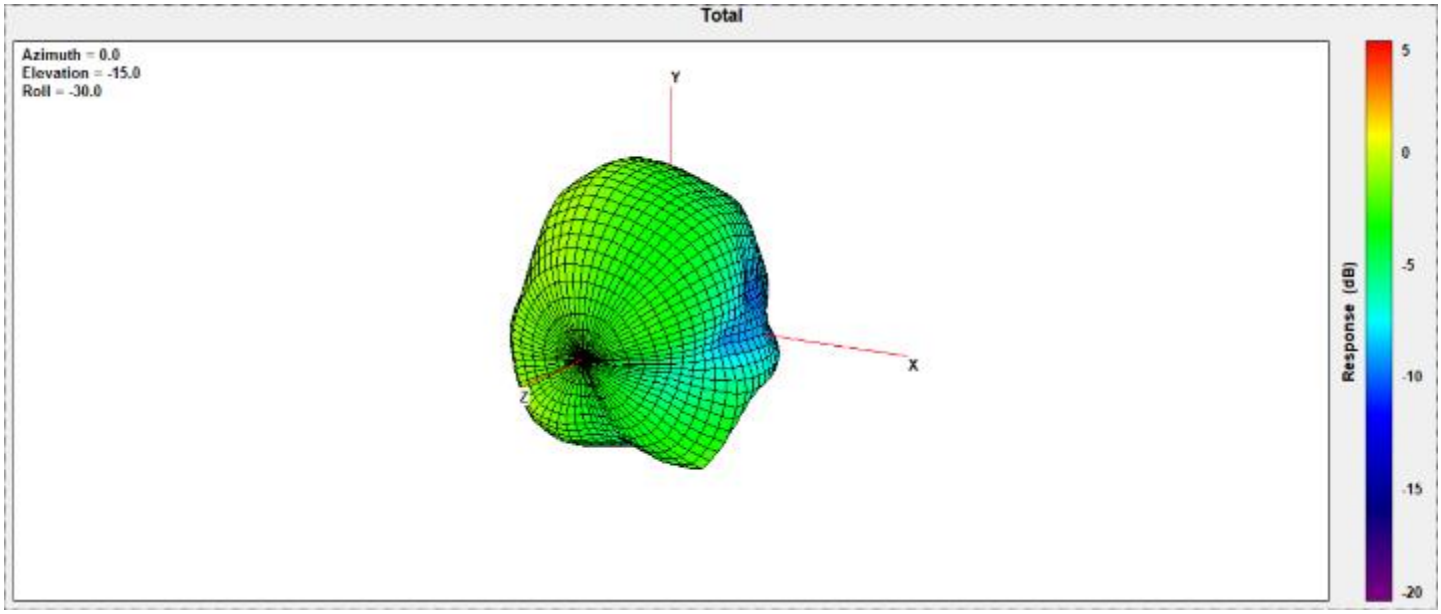
Center Frequency	**1755 MHz**
Horizontal (dBi) peak	-2.09
Vertical (dBi) peak	-2.32

1785 MHz



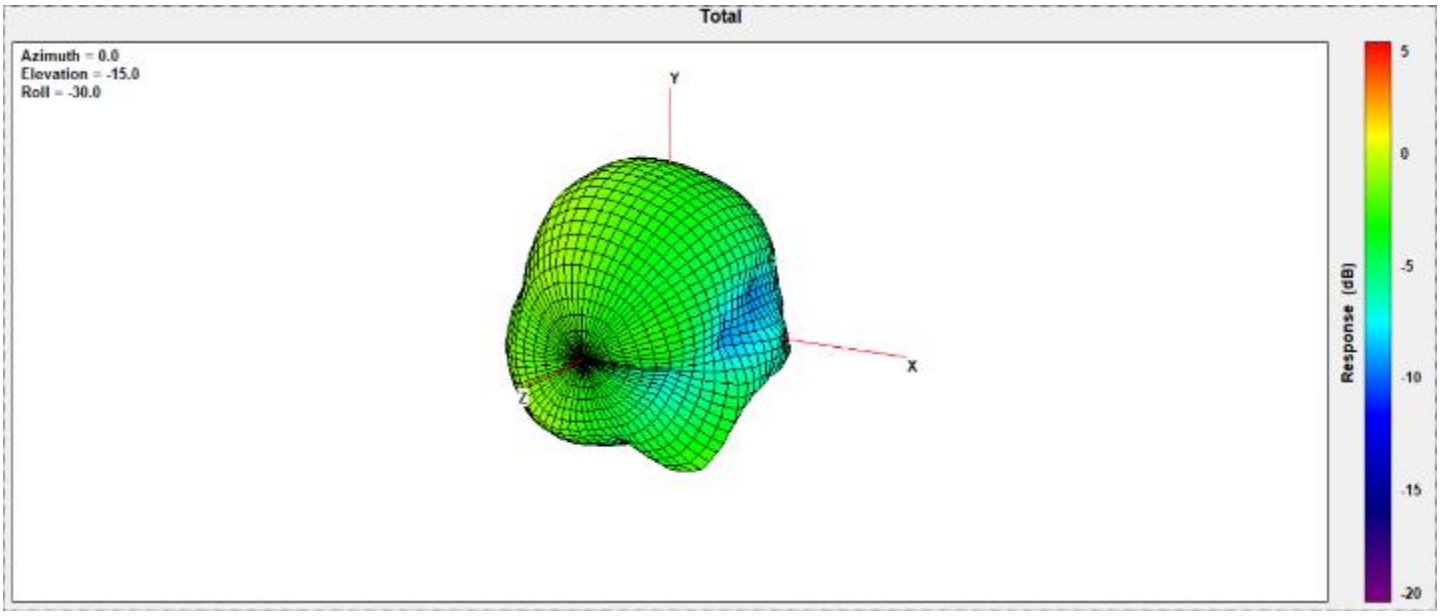
Center Frequency	**1785 MHz**
Horizontal (dBi) peak	-2.01
Vertical (dBi) peak	-2.04

1805 MHz



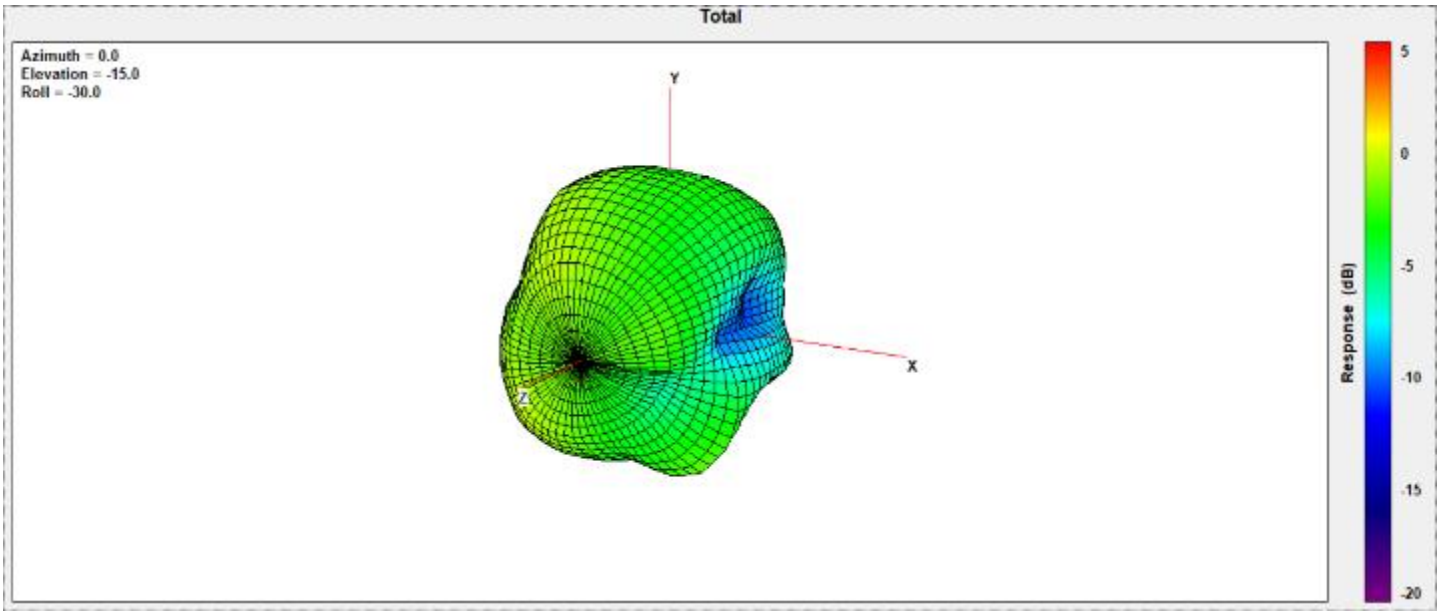
Center Frequency	**1805 MHz**
Horizontal (dBi) peak	-2.29
Vertical (dBi) peak	-1.86

1850 MHz



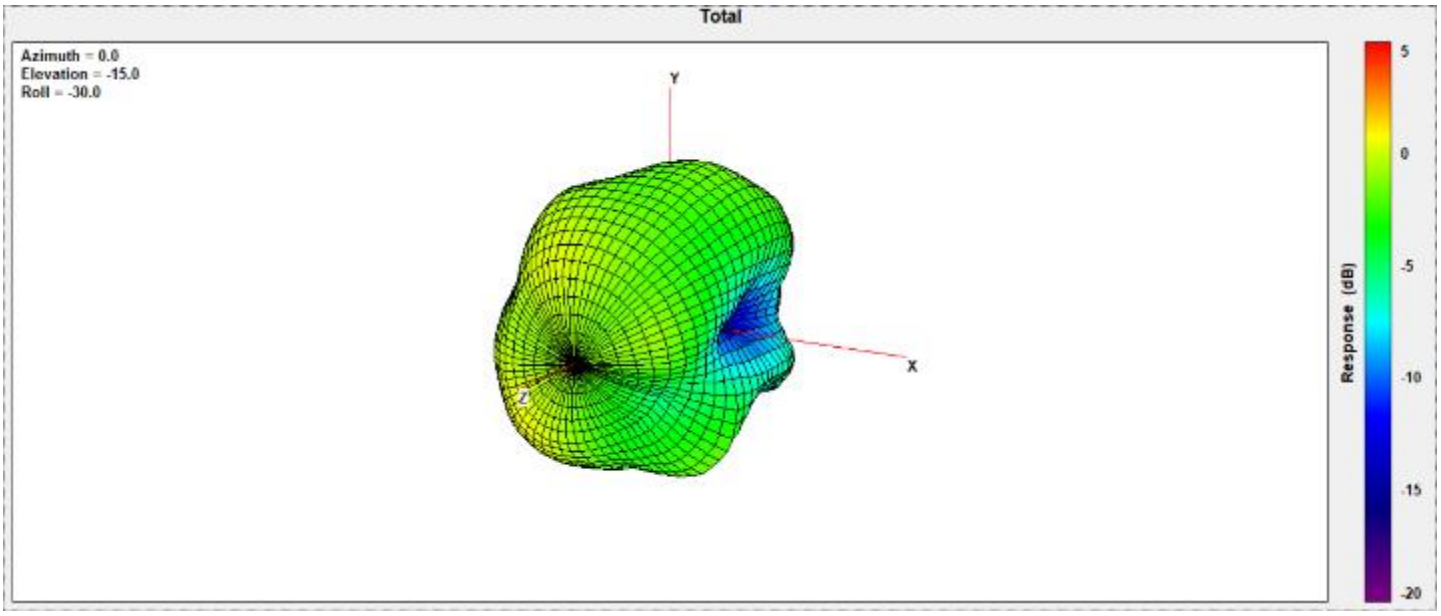
Center Frequency	**1850 MHz**
Horizontal (dBi) peak	-1.90
Vertical (dBi) peak	-0.84

1880 MHz



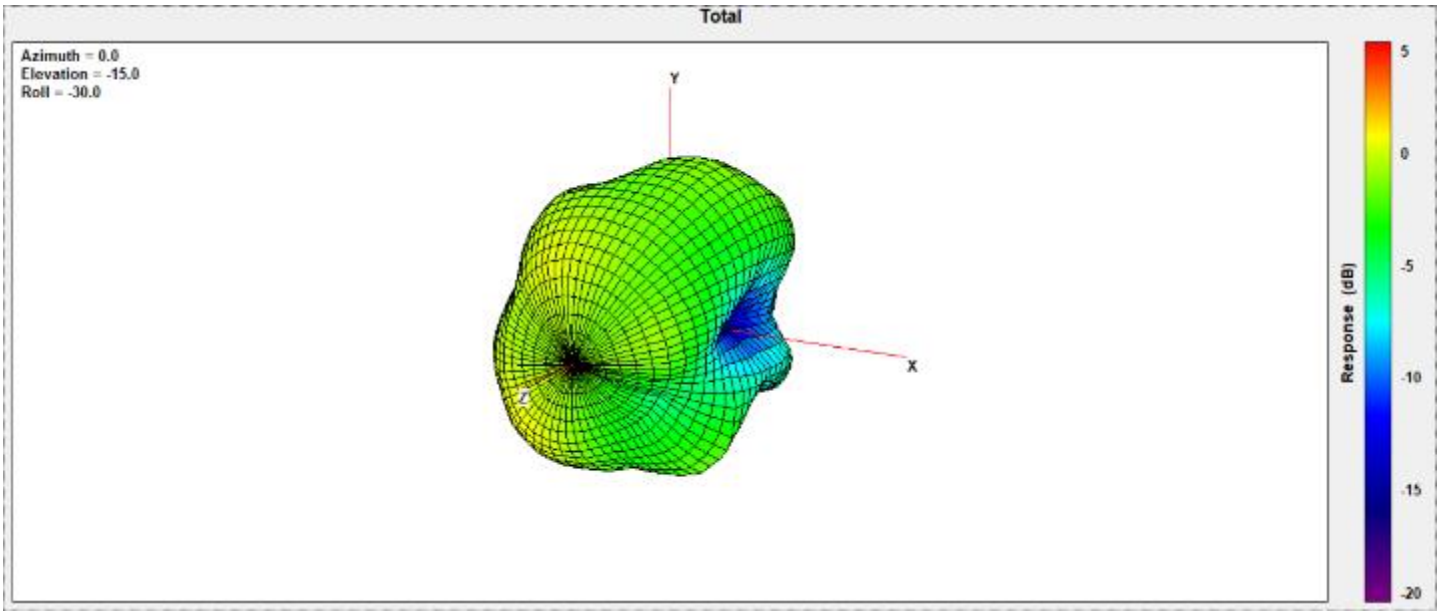
Center Frequency	**1880 MHz**
Horizontal (dBi) peak	-1.28
Vertical (dBi) peak	-0.36

1910MHz



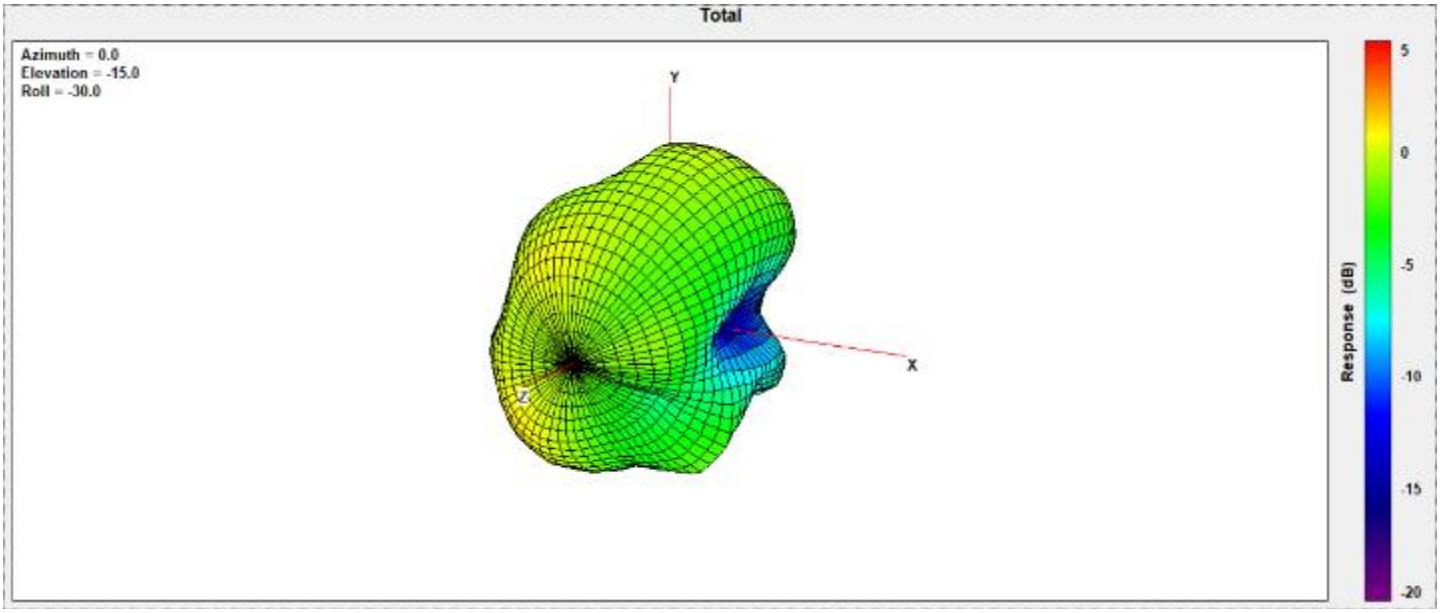
Center Frequency	**1910MHz**
Horizontal (dBi) peak	-0.78
Vertical (dBi) peak	-0.35

1920MHz



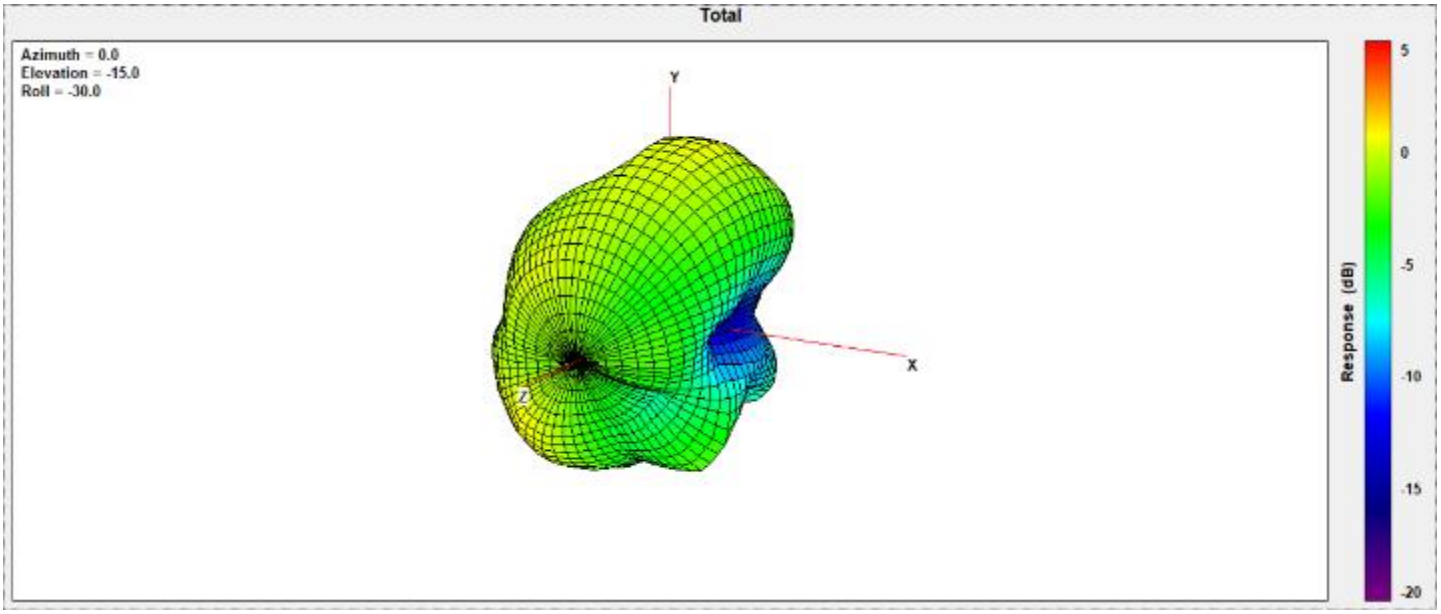
Center Frequency	**1920MHz**
Horizontal (dBi) peak	-0.82
Vertical (dBi) peak	-0.46

1950MHz



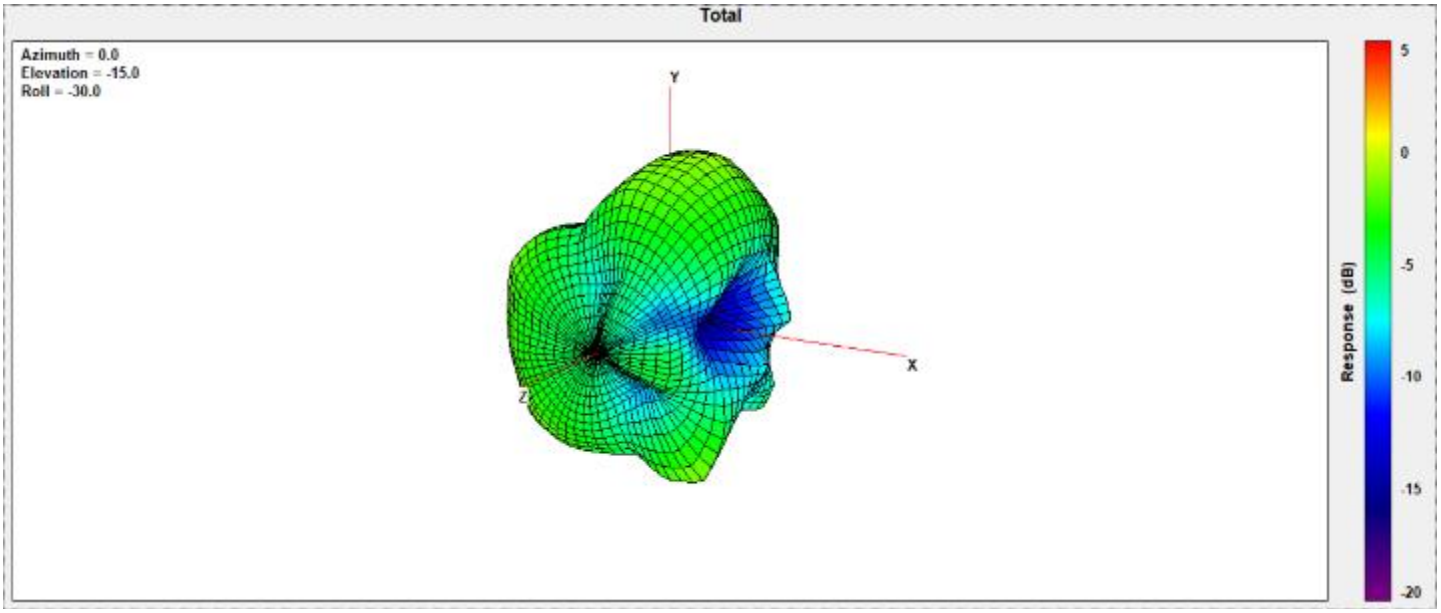
Center Frequency	**1950MHz**
Horizontal (dBi) peak	-0.50
Vertical (dBi) peak	-0.15

1980MHz



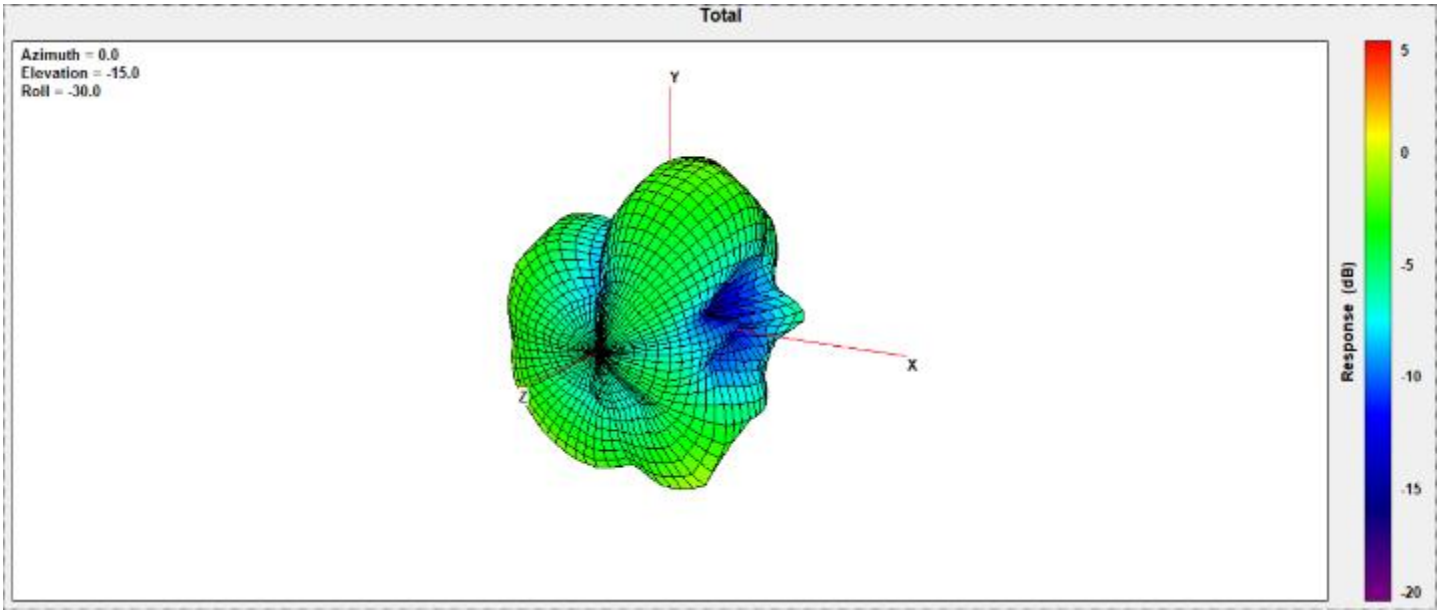
Center Frequency	**1980MHz**
Horizontal (dBi) peak	-0.20
Vertical (dBi) peak	-0.48

2110MHz



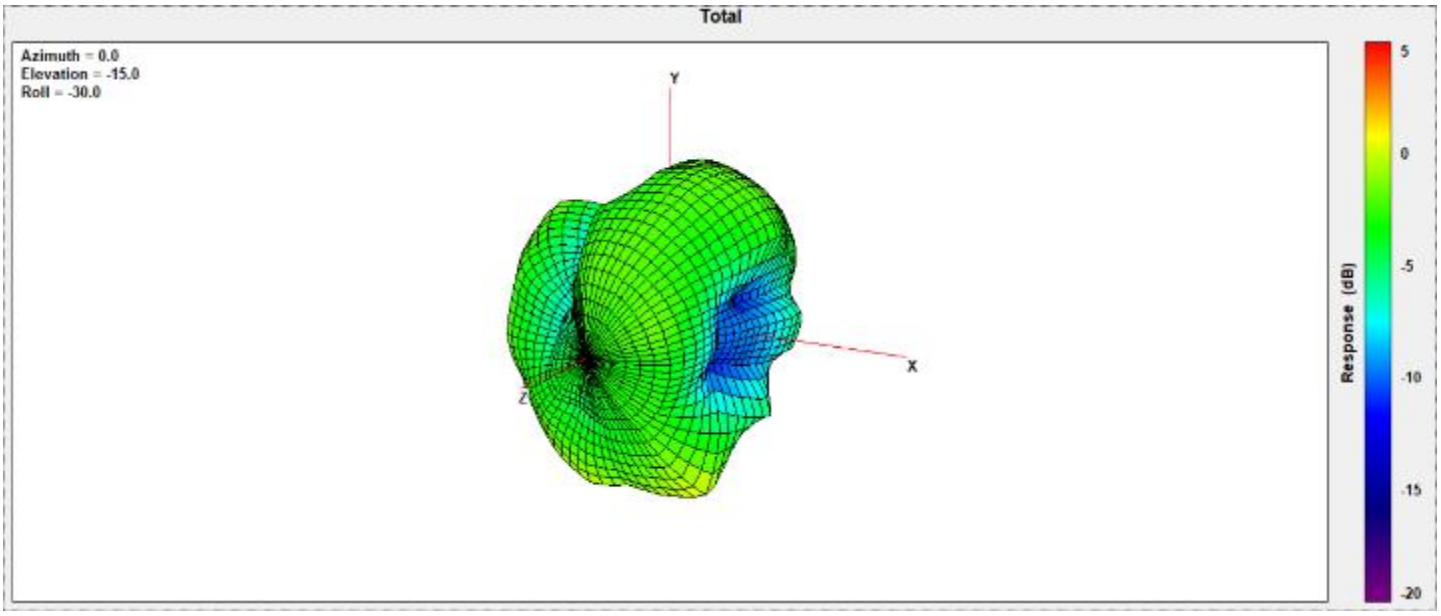
Center Frequency	**2110MHz**
Horizontal (dBi) peak	-0.53
Vertical (dBi) peak	-0.77

2200MHz



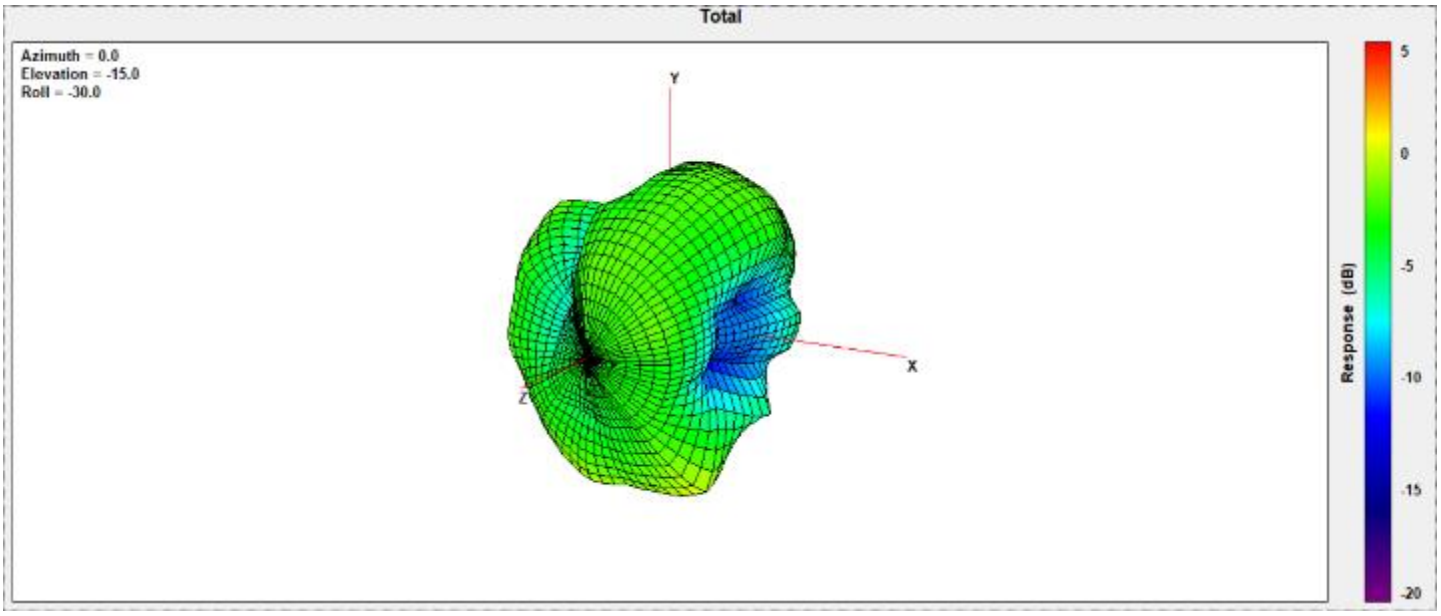
Center Frequency	**2200MHz**
Horizontal (dBi) peak	0.45
Vertical (dBi) peak	0.67

2300MHz



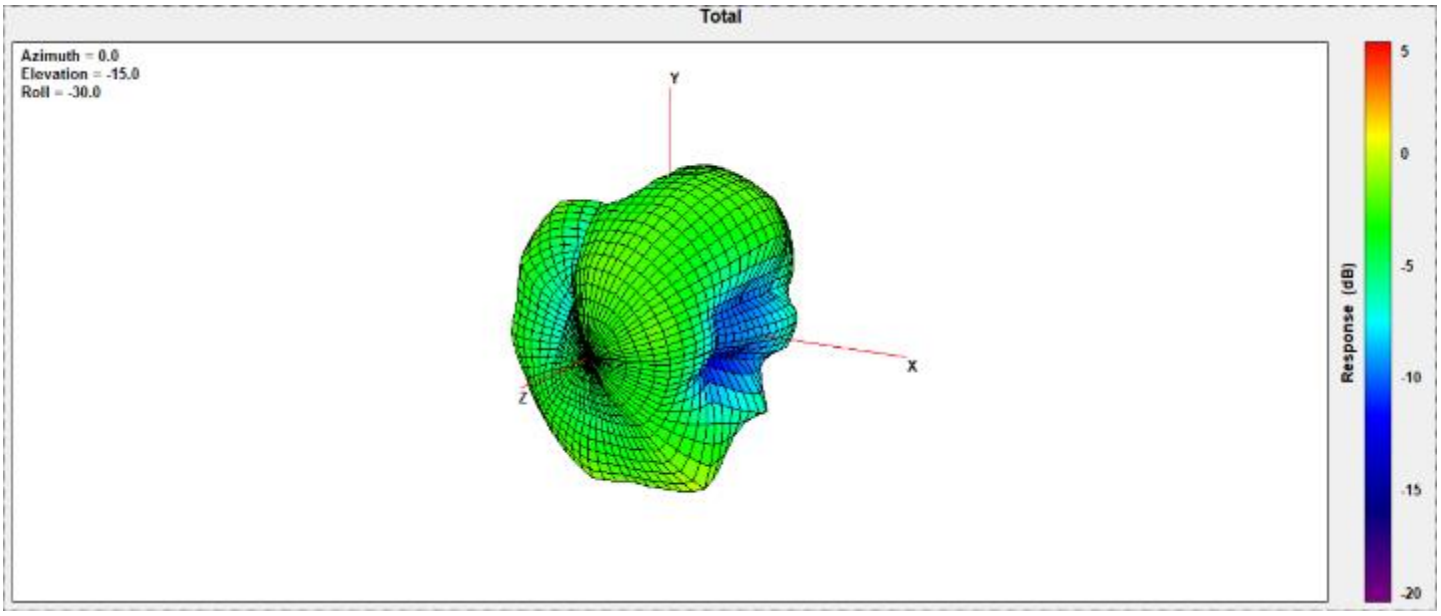
Center Frequency	**2300MHz**
Horizontal (dBi) peak	-0.55
Vertical (dBi) peak	0.04

2305MHz



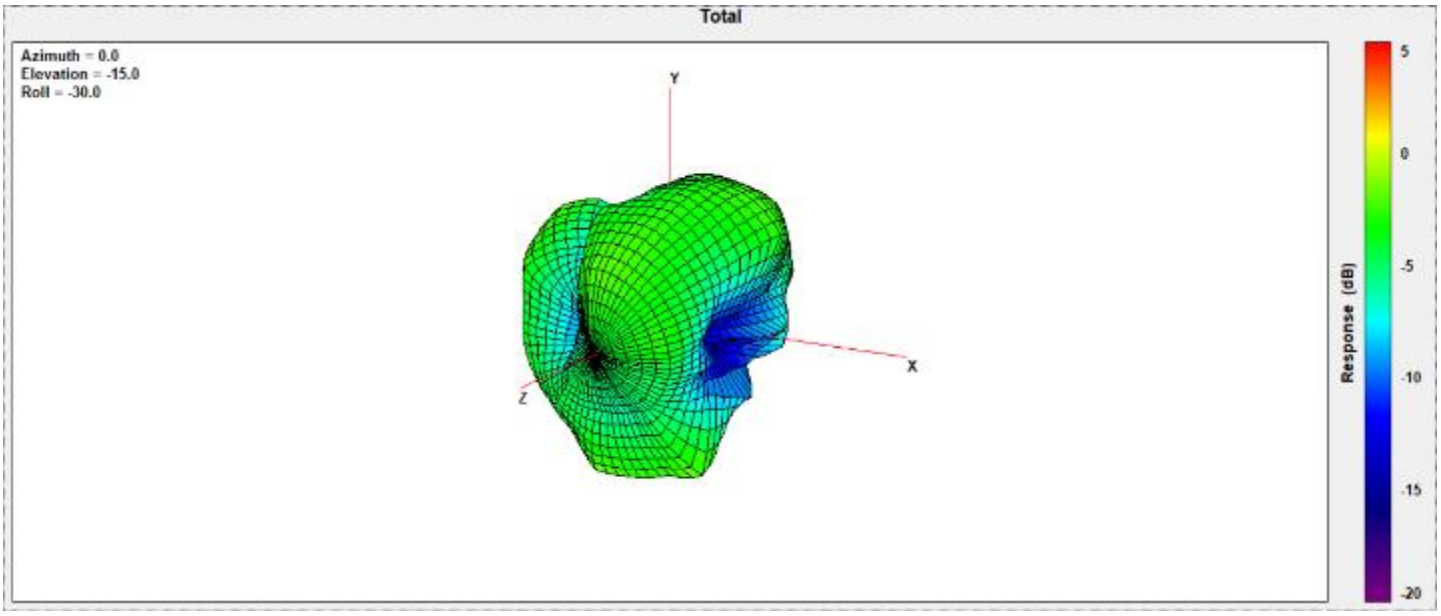
Center Frequency	**2305MHz**
Horizontal (dBi) peak	-0.63
Vertical (dBi) peak	-0.13

2315MHz



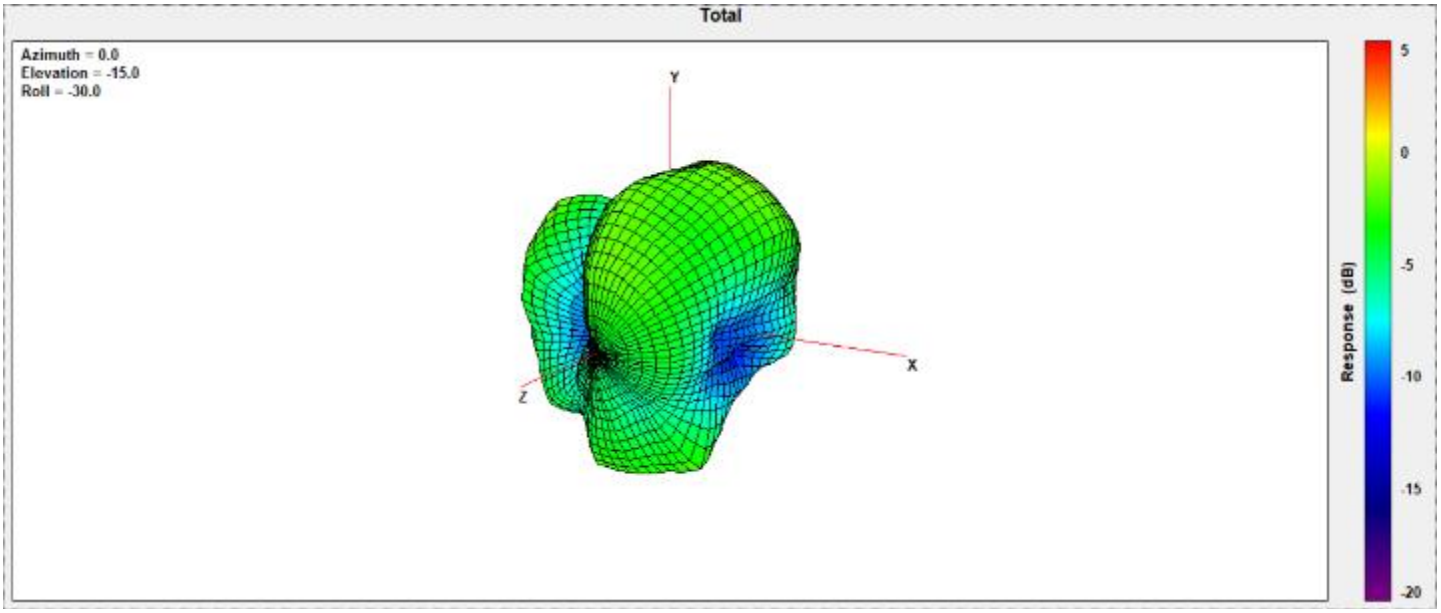
Center Frequency	**2315MHz**
Horizontal (dBi) peak	-0.76
Vertical (dBi) peak	-0.47

2350MHz



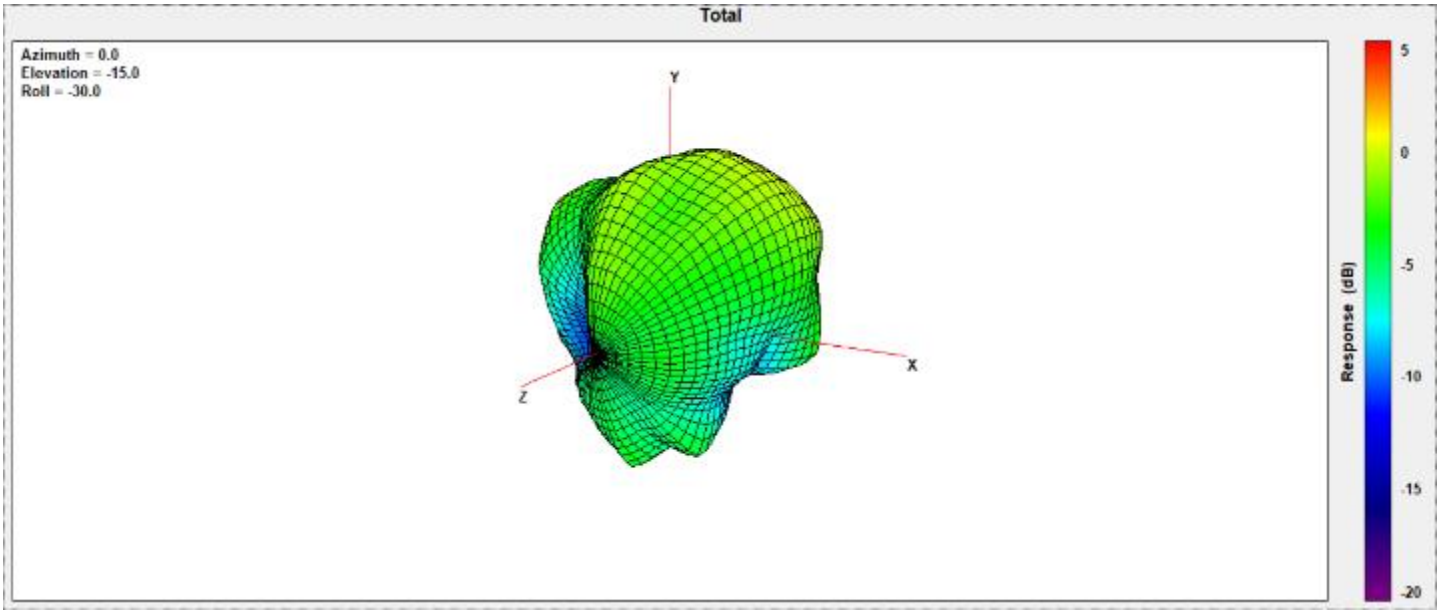
Center Frequency	**2350MHz**
Horizontal (dBi) peak	-0.81
Vertical (dBi) peak	-0.58

2400MHz



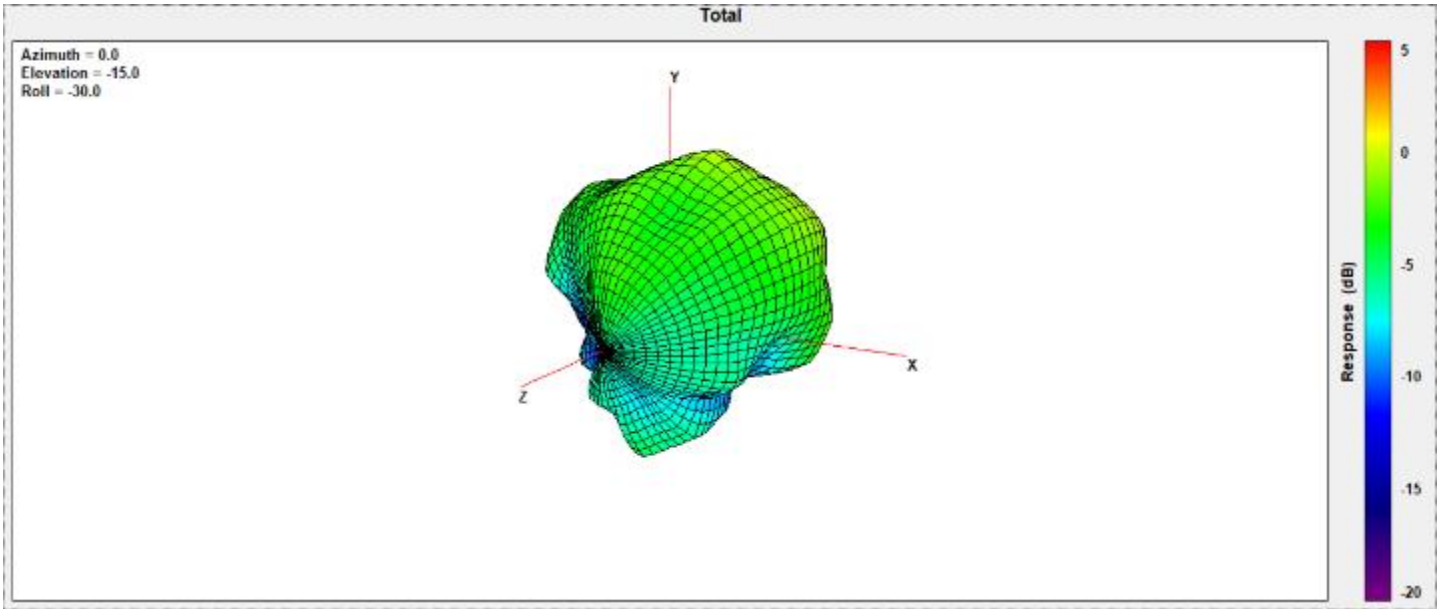
Center Frequency	**2400MHz**
Horizontal (dBi) peak	-0.57
Vertical (dBi) peak	-0.10

2500MHz



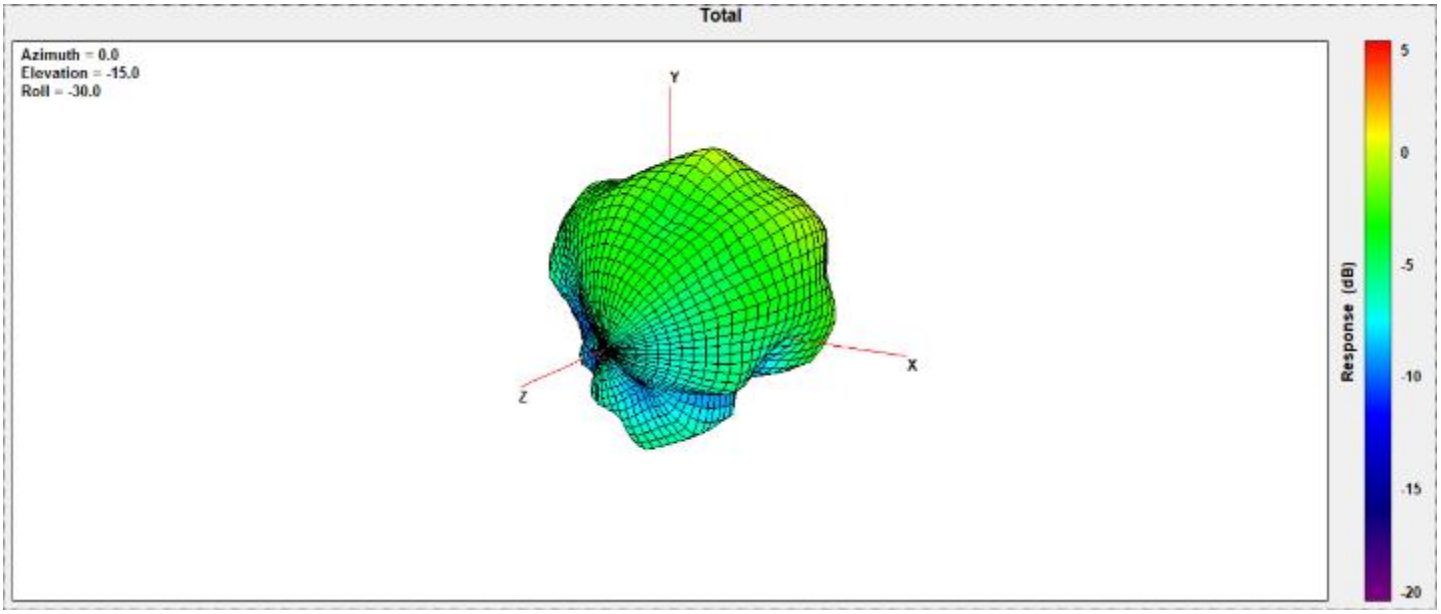
Center Frequency	**2500MHz**
Horizontal (dBi) peak	-1.34
Vertical (dBi) peak	-0.55

2570MHz



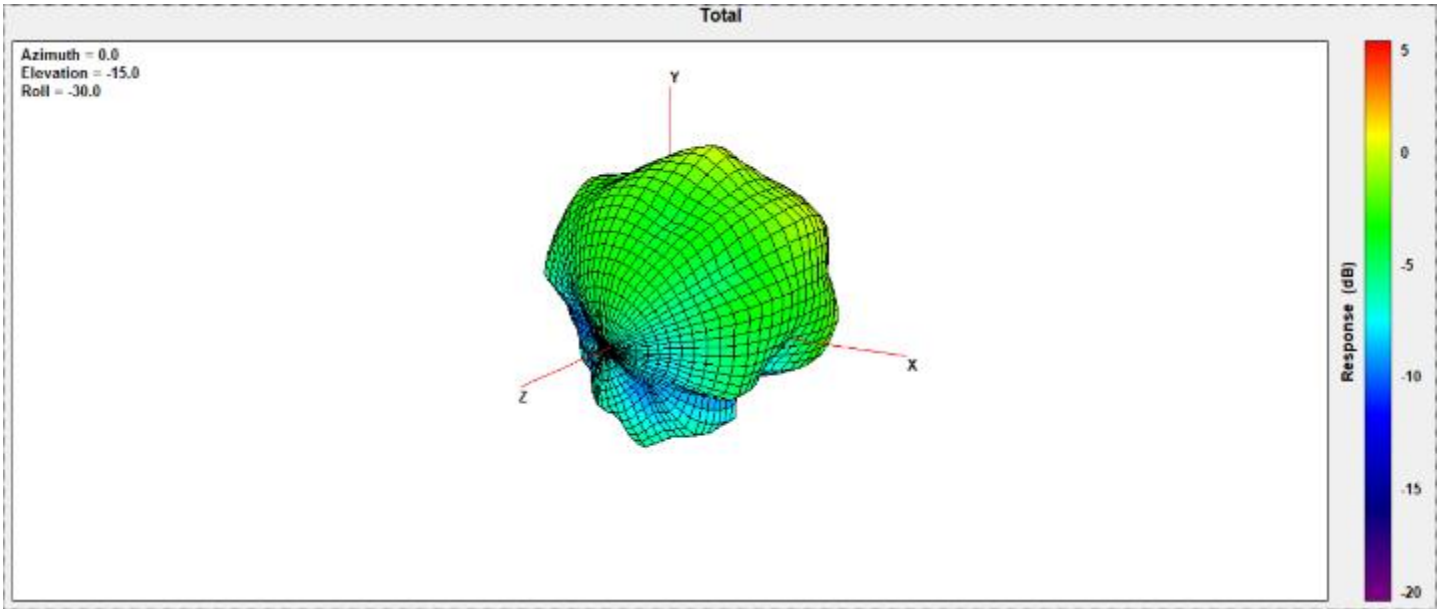
Center Frequency	**2570MHz**
Horizontal (dBi) peak	-1.66
Vertical (dBi) peak	-1.79

2595MHz



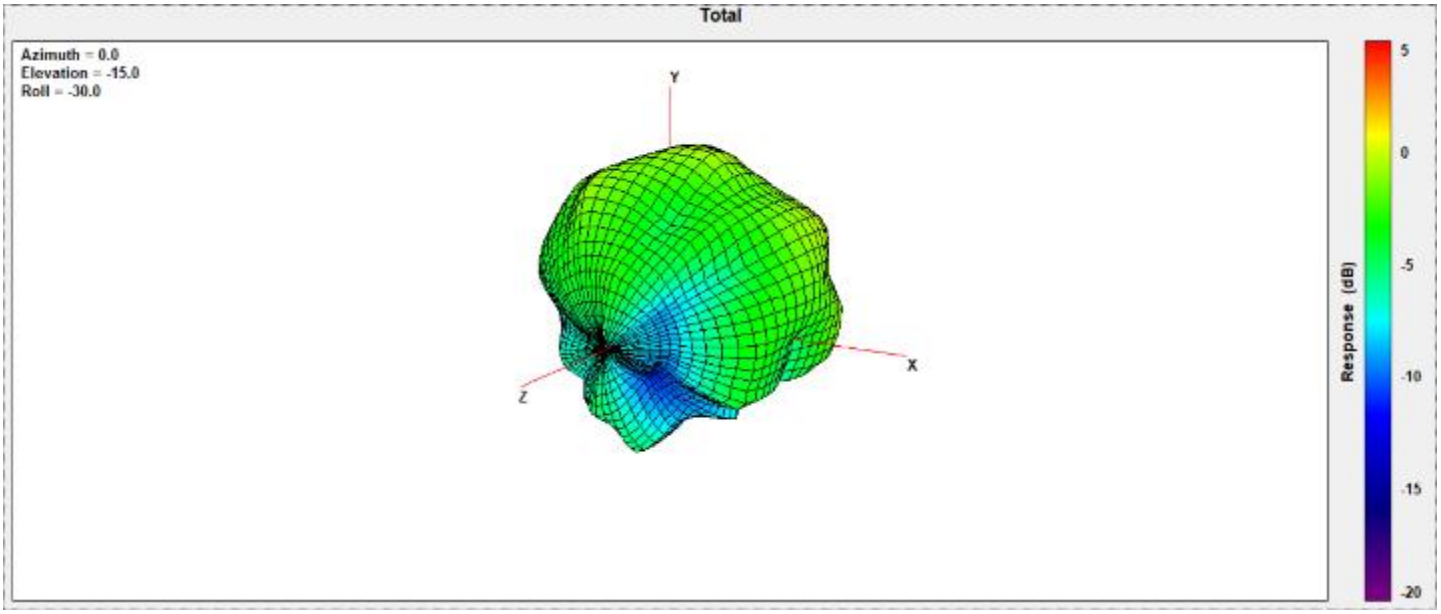
Center Frequency	**2595MHz**
Horizontal (dBi) peak	-2.11
Vertical (dBi) peak	-2.49

2620MHz



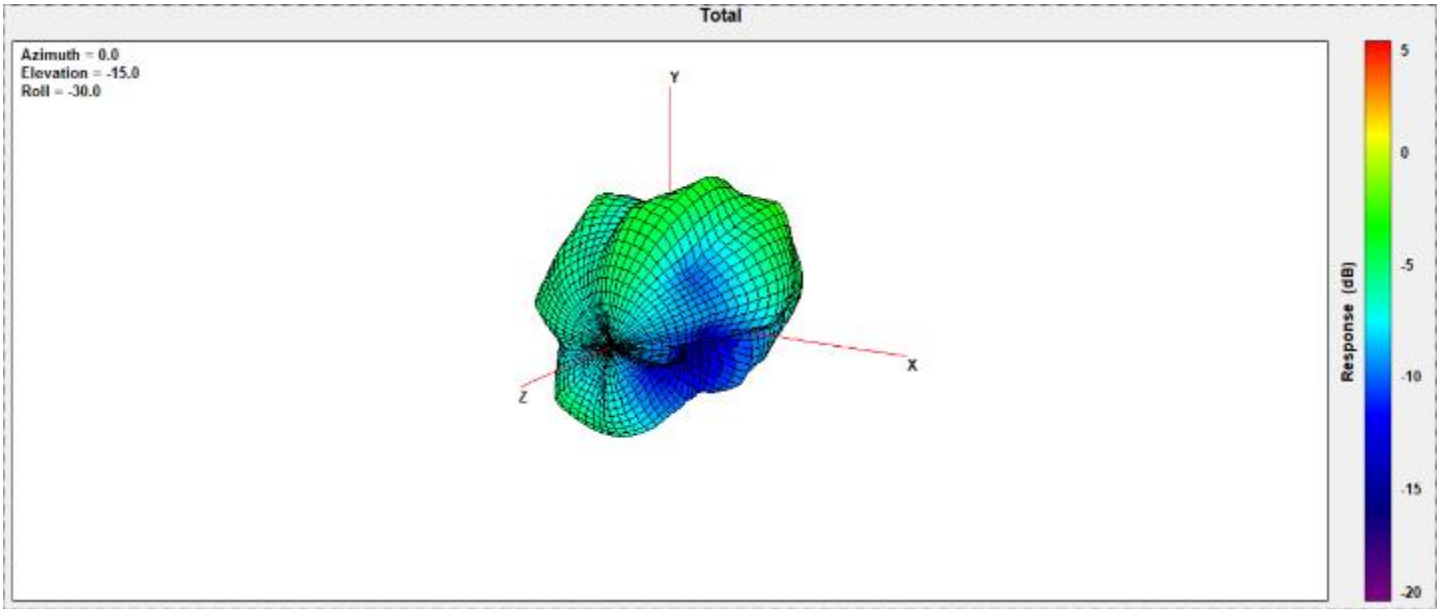
Center Frequency	**2620MHz**
Horizontal (dBi) peak	-3.19
Vertical (dBi) peak	-3.02

2690MHz



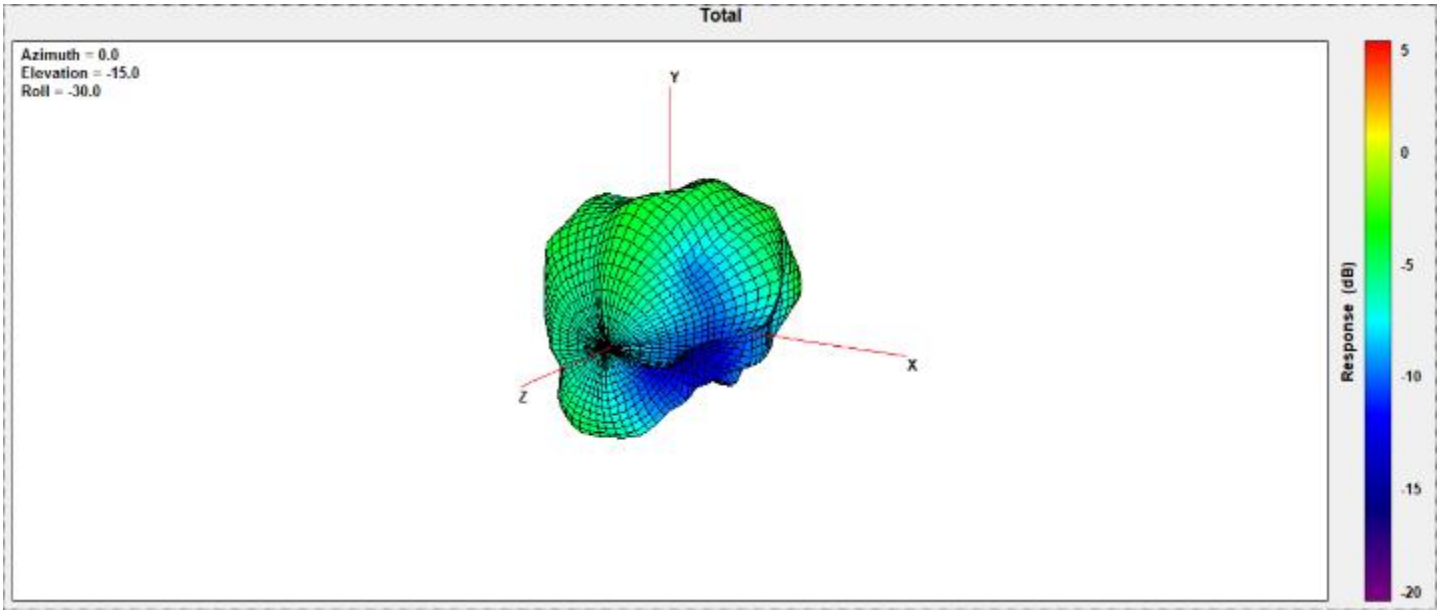
Center Frequency	**2690MHz**
Horizontal (dBi) peak	-6.54
Vertical (dBi) peak	-5.98

3400MHz



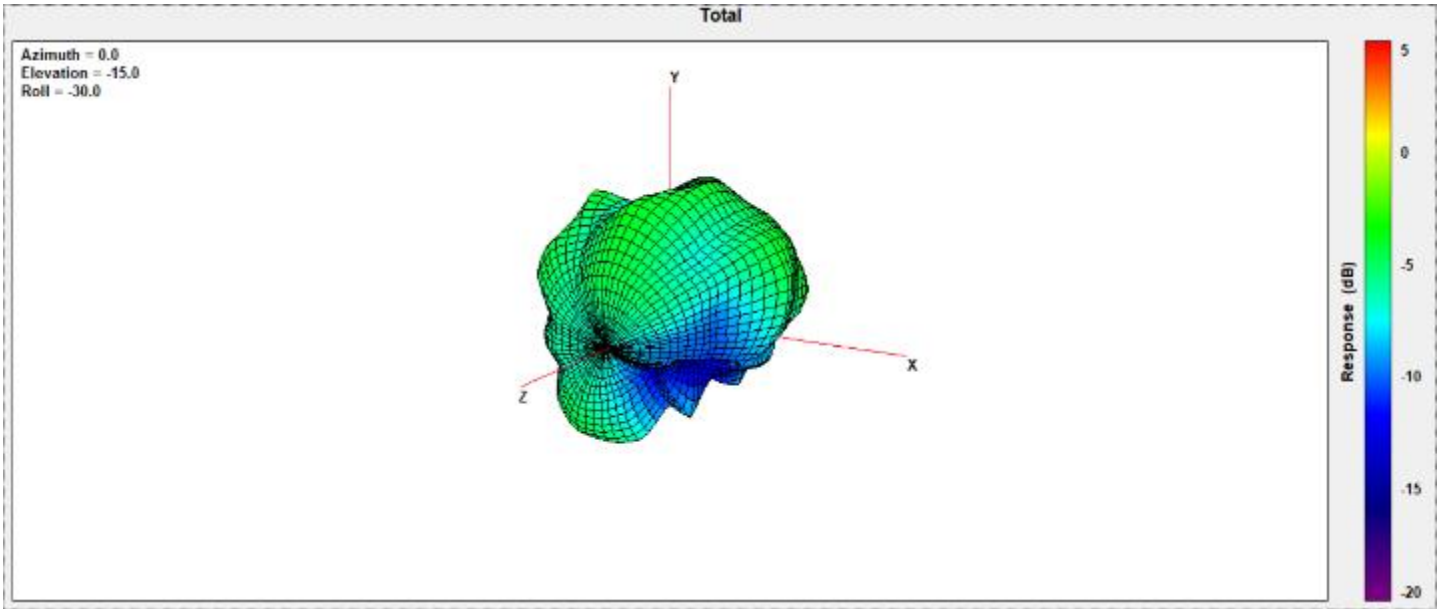
Center Frequency	**3400MHz**
Horizontal (dBi) peak	-5.35
Vertical (dBi) peak	-3.34

3500MHz



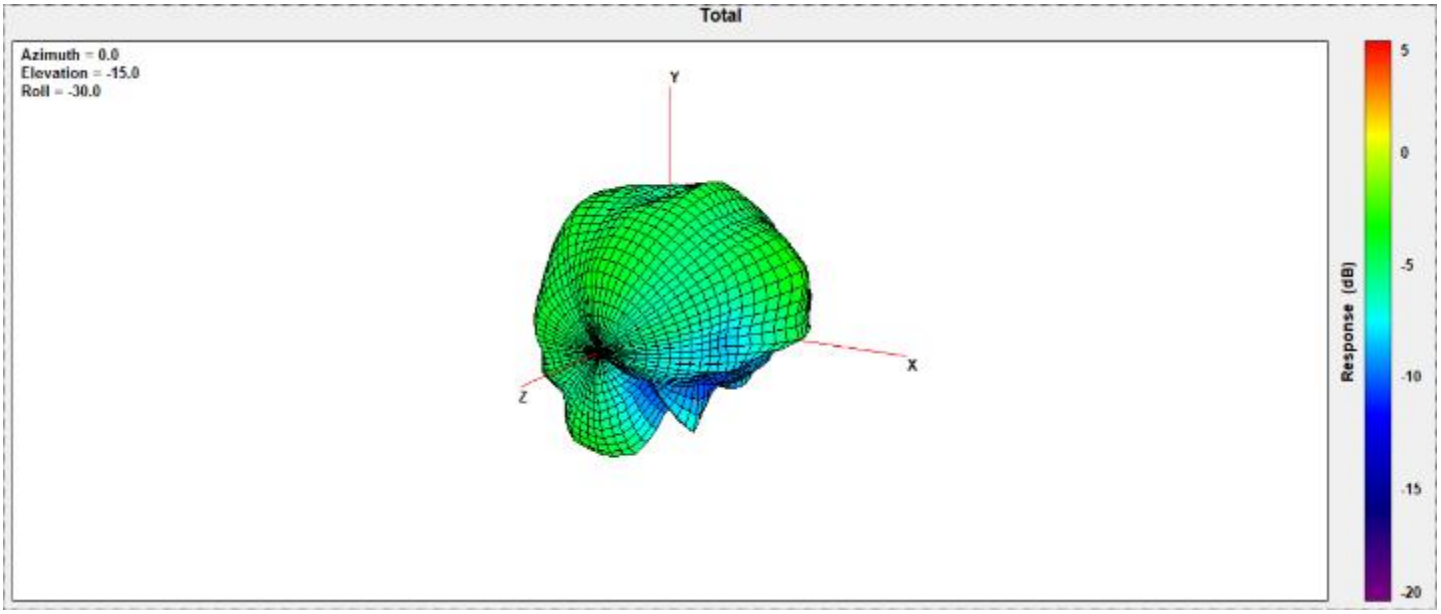
Center Frequency	**3500MHz**
Horizontal (dBi) peak	-3.95
Vertical (dBi) peak	-2.67

3600MHz



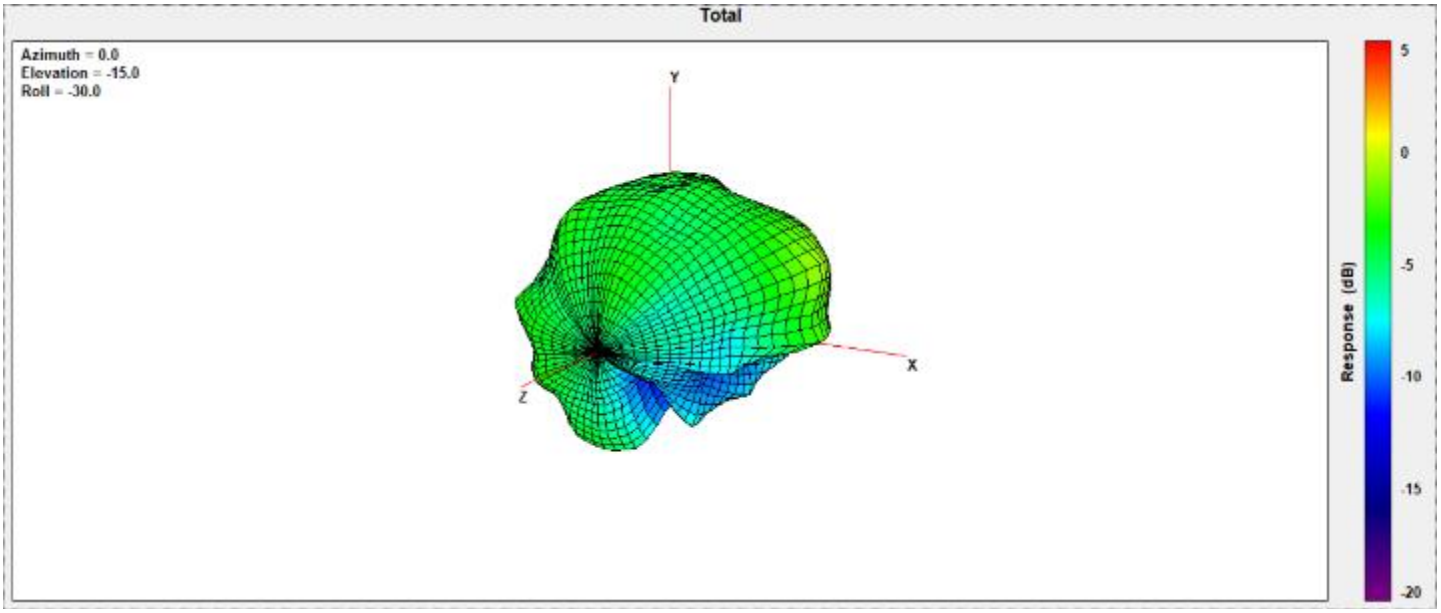
Center Frequency	**3600MHz**
Horizontal (dBi) peak	-3.00
Vertical (dBi) peak	-3.70

3700MHz



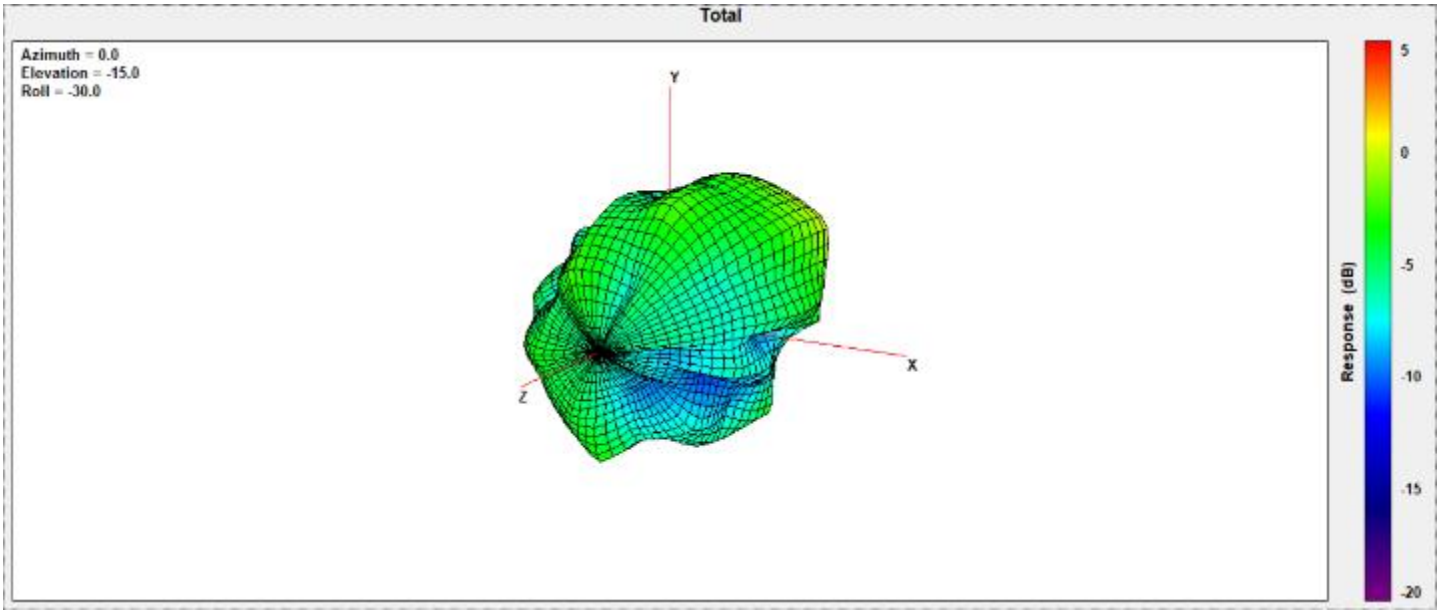
Center Frequency	**3700MHz**
Horizontal (dBi) peak	-2.69
Vertical (dBi) peak	-3.81

3800MHz



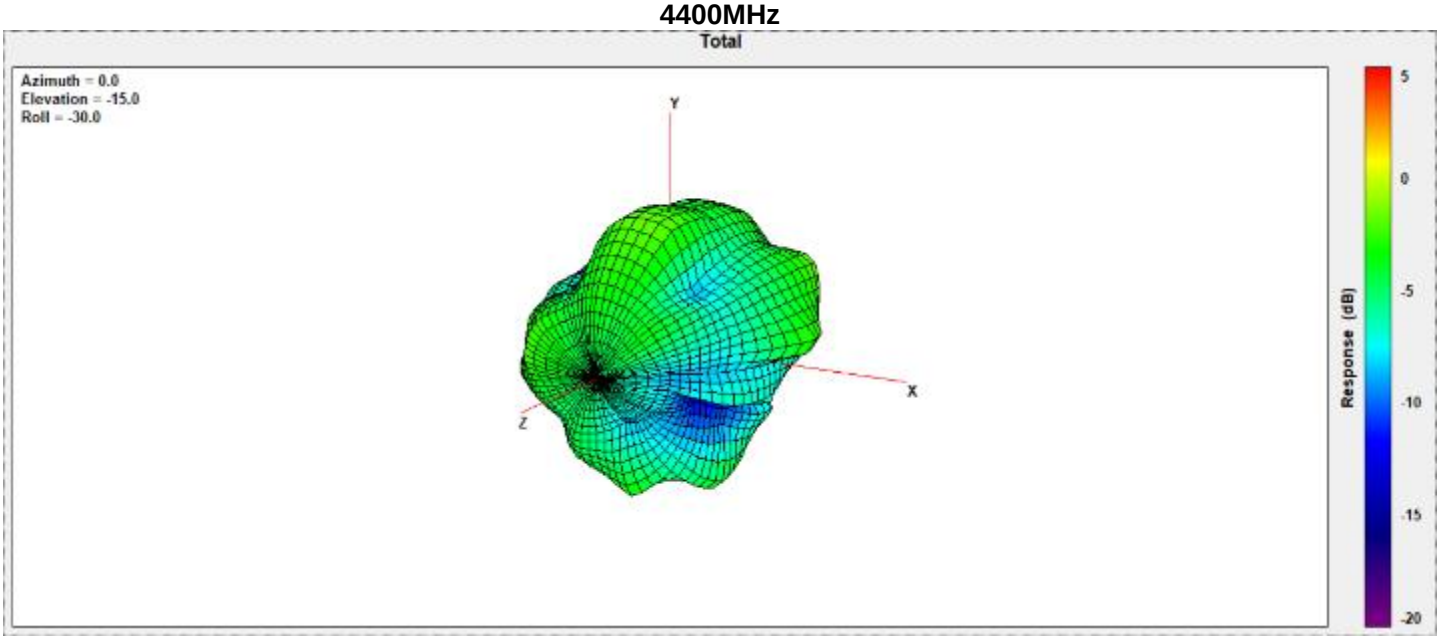
Center Frequency	**3800MHz**
Horizontal (dBi) peak	-0.84
Vertical (dBi) peak	-2.33

4200MHz



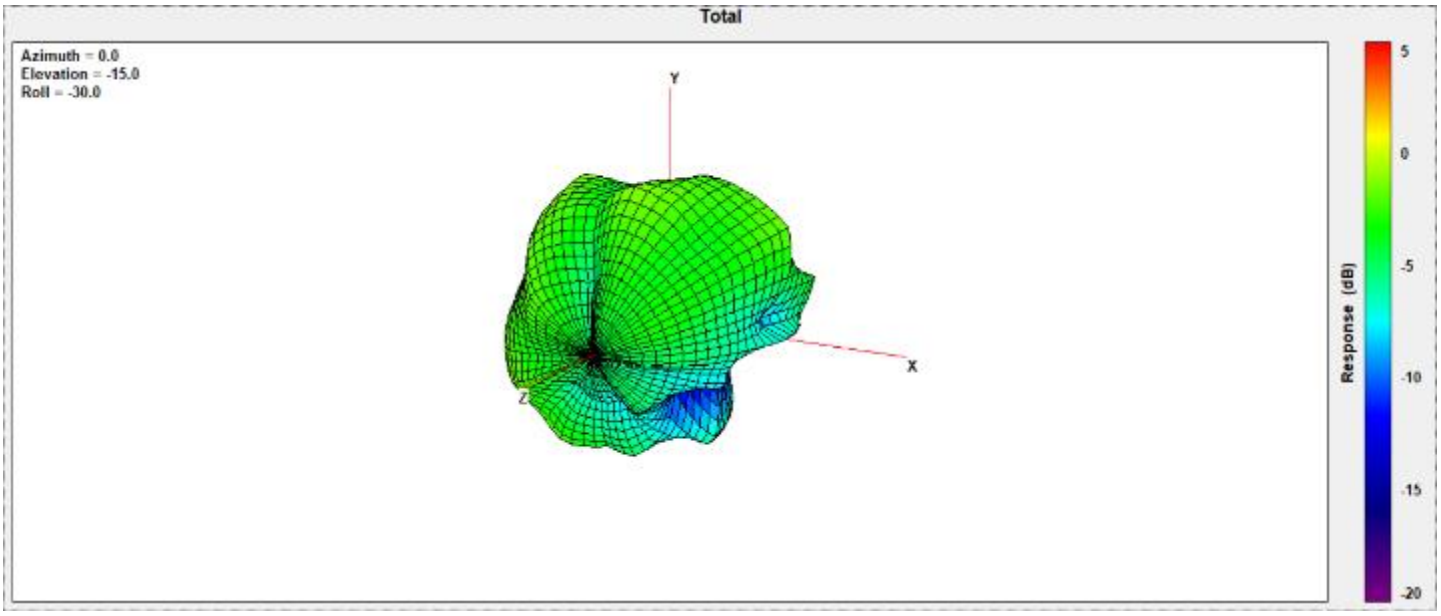
Center Frequency	**4200MHz**
Horizontal (dBi) peak	0.16
Vertical (dBi) peak	-2.59

4400MHz



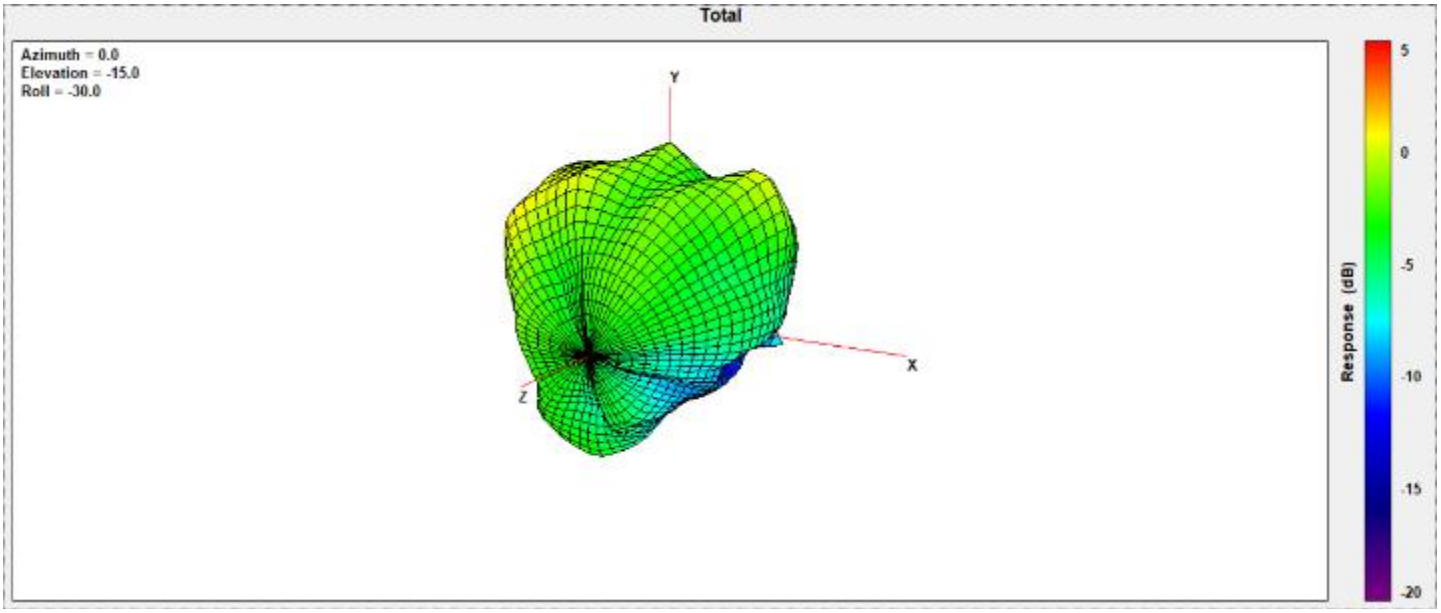
Center Frequency	**4400MHz**
Horizontal (dBi) peak	-2.04
Vertical (dBi) peak	-2.85

4700MHz



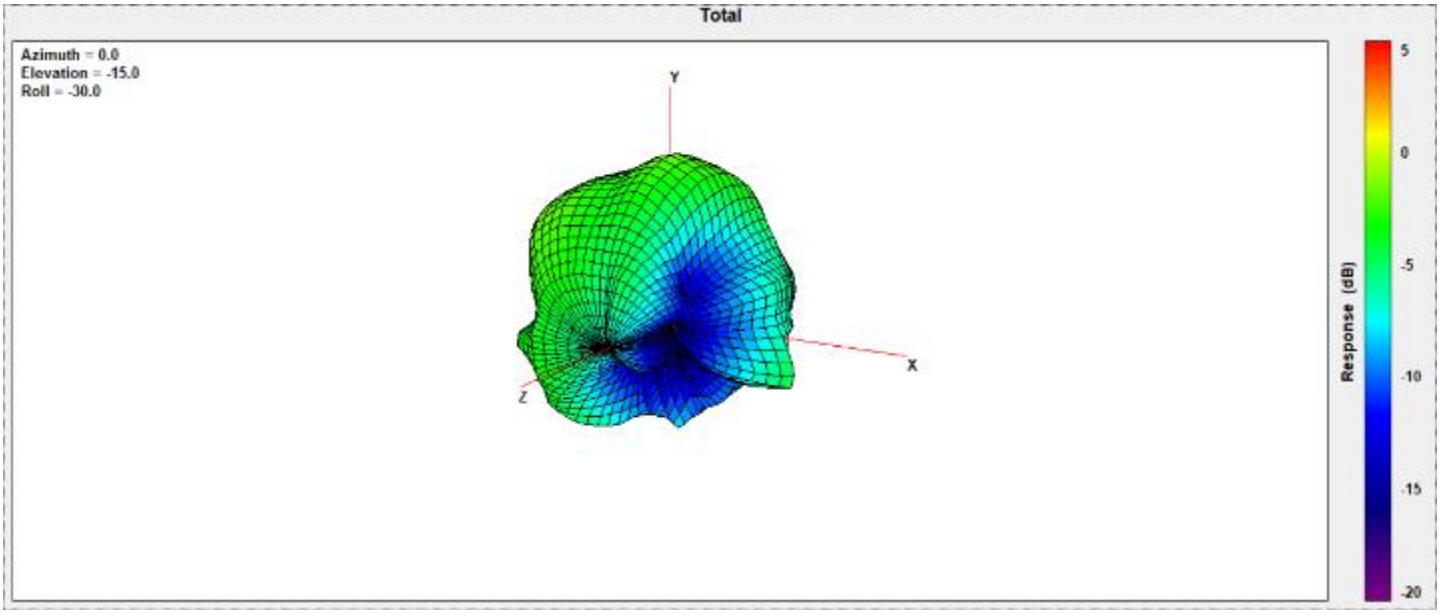
Center Frequency	**4700MHz**
Horizontal (dBi) peak	-2.73
Vertical (dBi) peak	-4.29

5150MHz



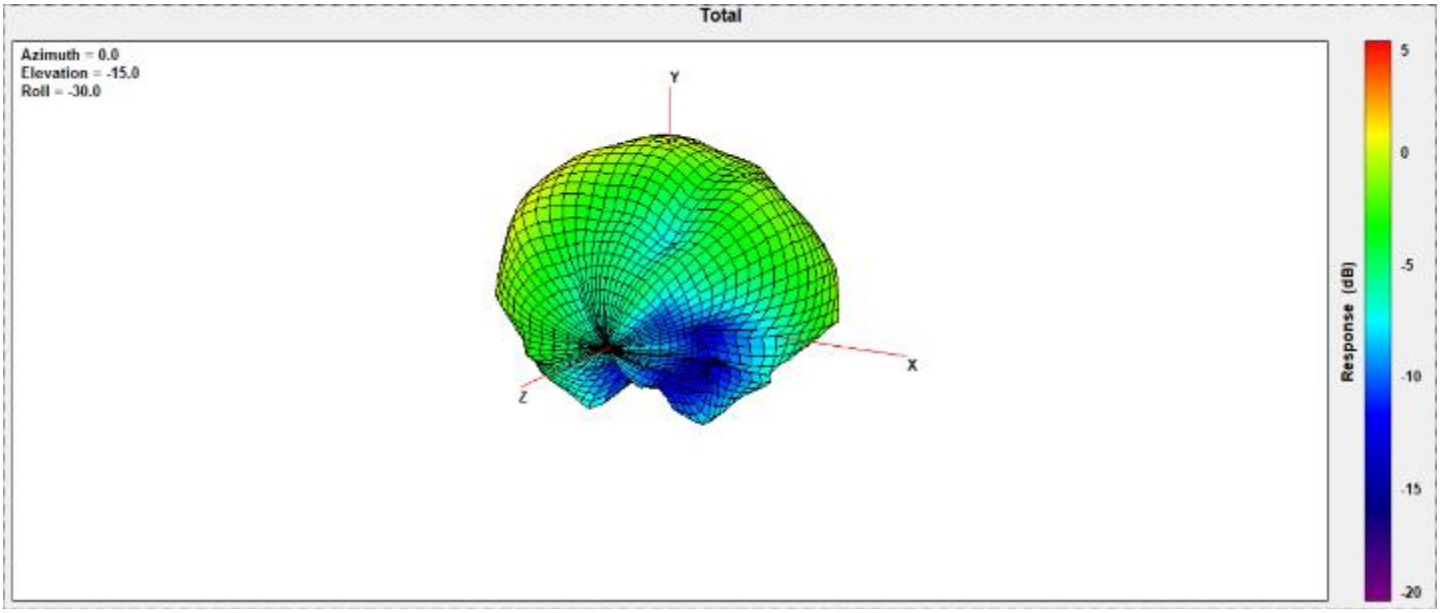
Center Frequency	**5150MHz**
Horizontal (dBi) peak	1.13
Vertical (dBi) peak	-1.03

5537.5MHz



Center Frequency	**5537.5MHz**
Horizontal (dBi) peak	0.56
Vertical (dBi) peak	-0.59

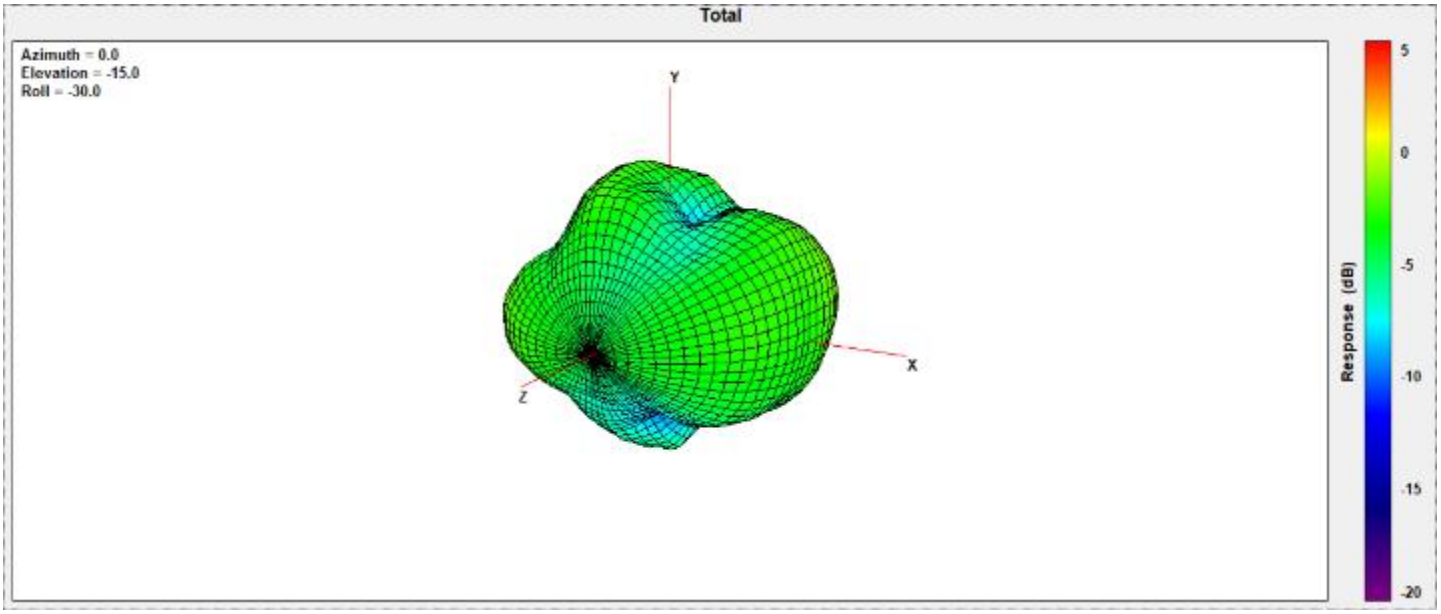
5925MHz



Center Frequency	**5925MHz**
Horizontal (dBi) peak	-1.94
Vertical (dBi) peak	-3.11

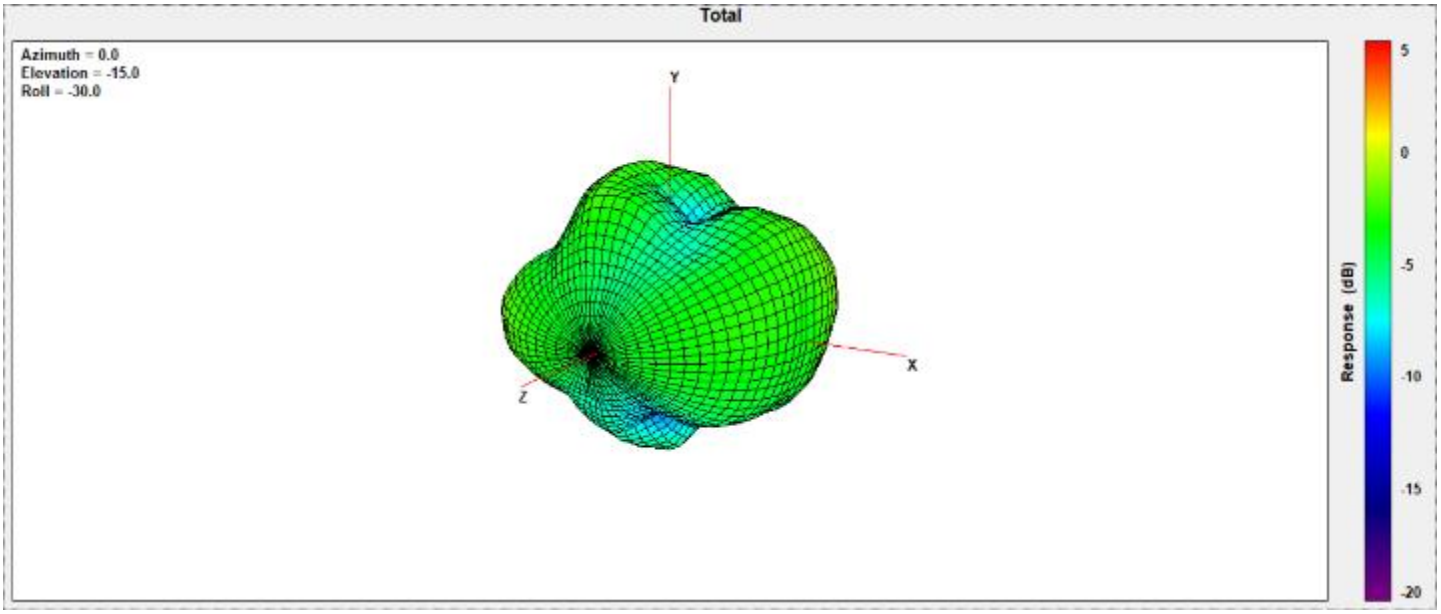
WWAN Aux Antenna (DRx)

717MHz



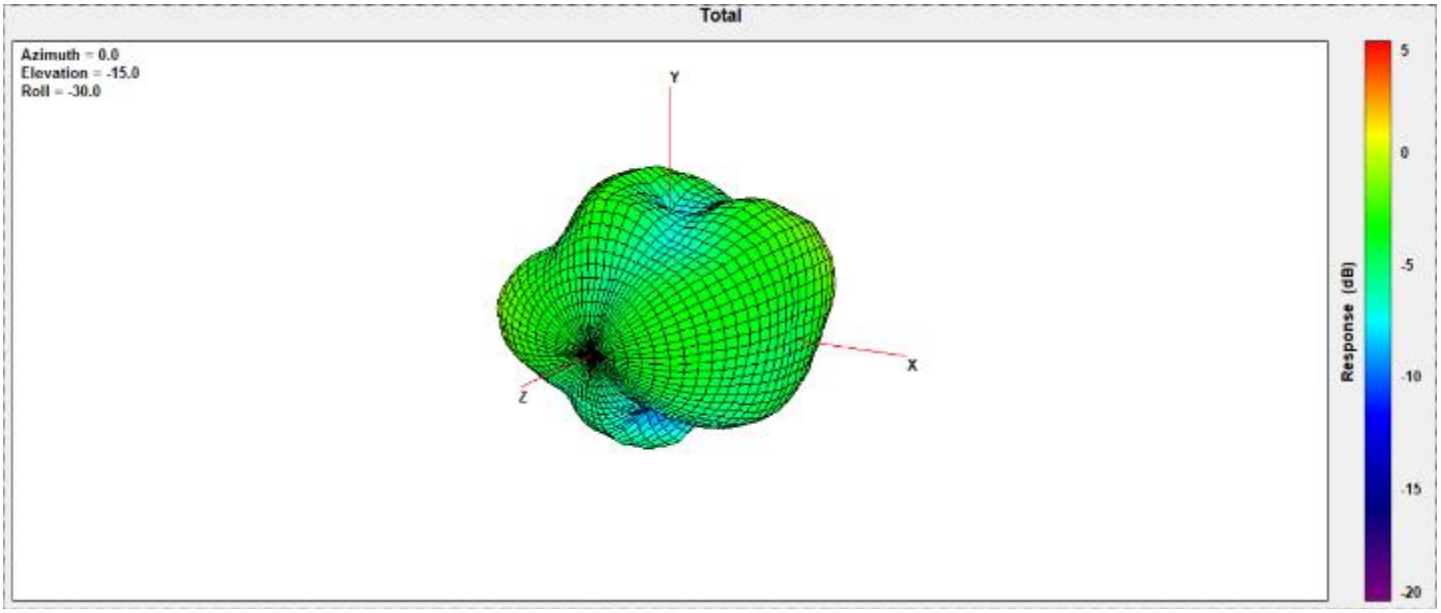
Center Frequency	**717MHz**
Horizontal (dBi) peak	-2.45
Vertical (dBi) peak	-4.88

725.5MHz



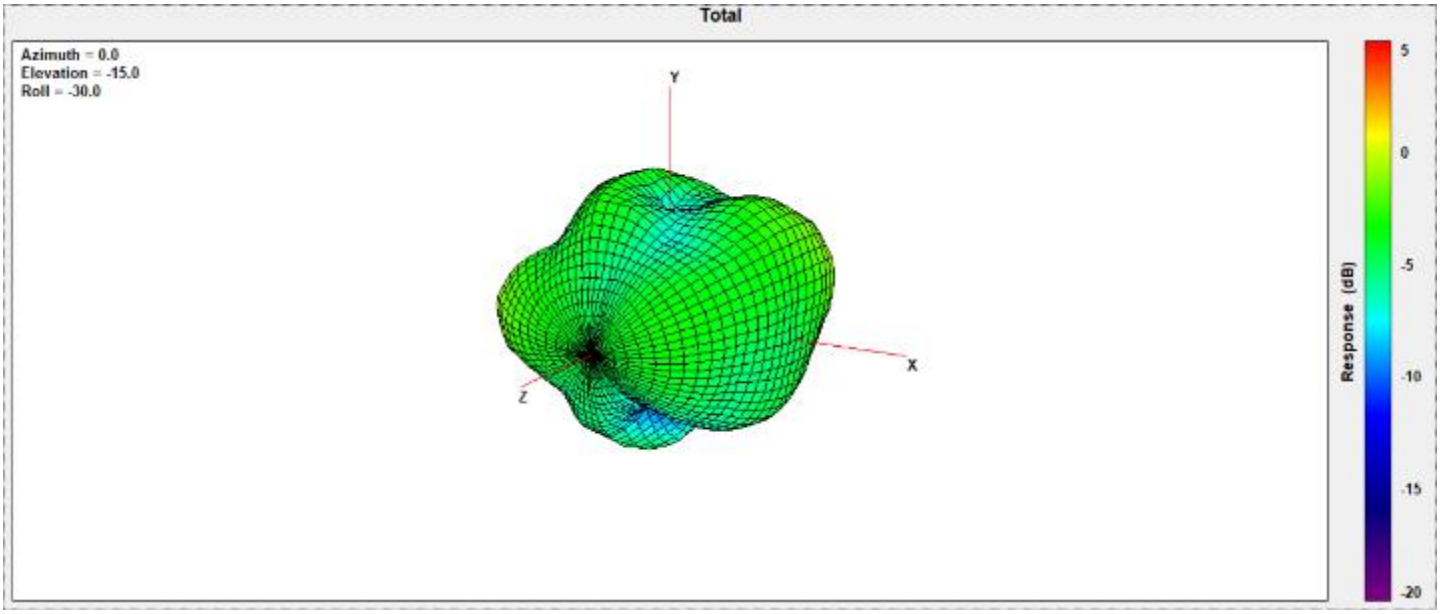
Center Frequency	**725.5MHz**
Horizontal (dBi) peak	-2.38
Vertical (dBi) peak	-4.98

748MHz



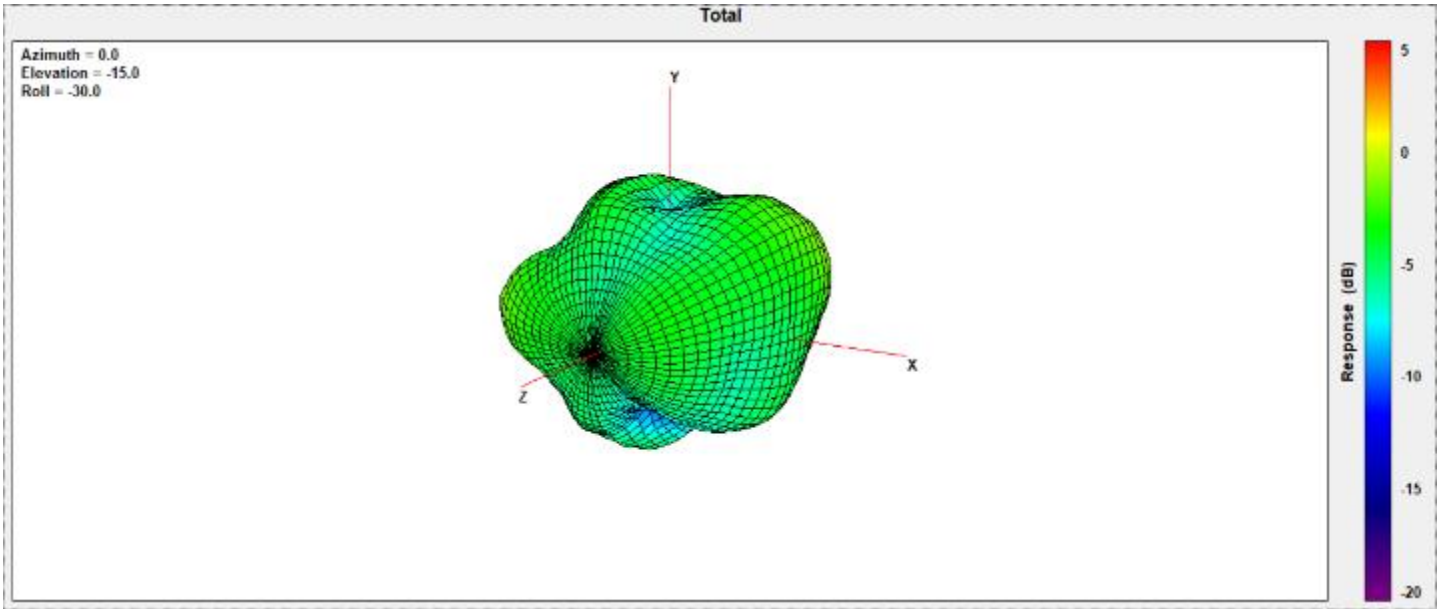
Center Frequency	**748MHz**
Horizontal (dBi) peak	-2.25
Vertical (dBi) peak	-4.86

756MHz



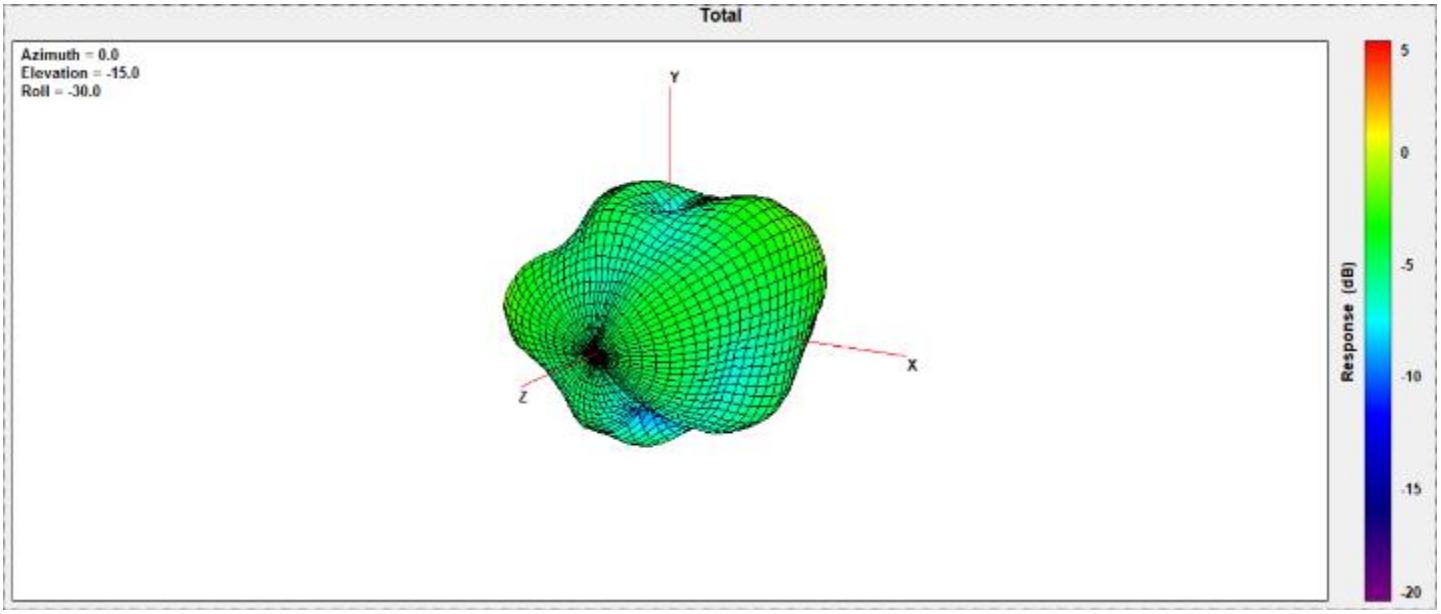
Center Frequency	**756MHz**
Horizontal (dBi) peak	-2.33
Vertical (dBi) peak	-4.83

768MHz



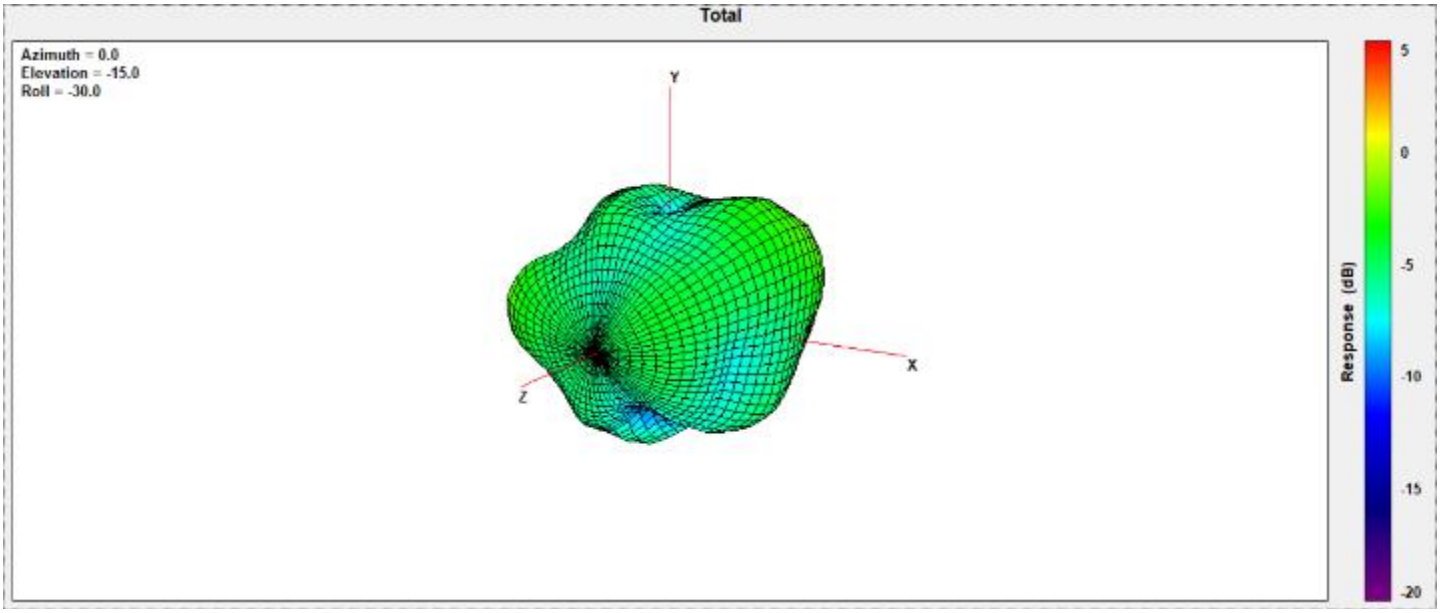
Center Frequency	**768MHz**
Horizontal (dBi) peak	-2.04
Vertical (dBi) peak	-4.51

777MHz



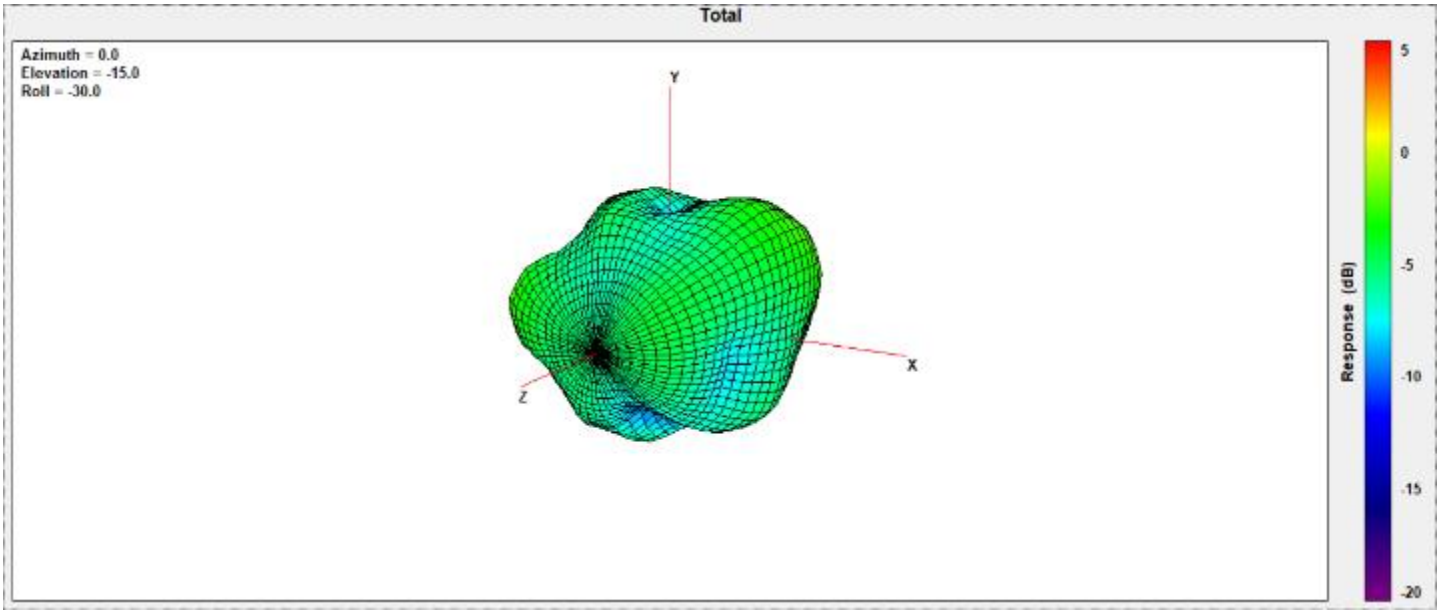
Center Frequency	**777MHz**
Horizontal (dBi) peak	-1.97
Vertical (dBi) peak	-4.51

782MHz



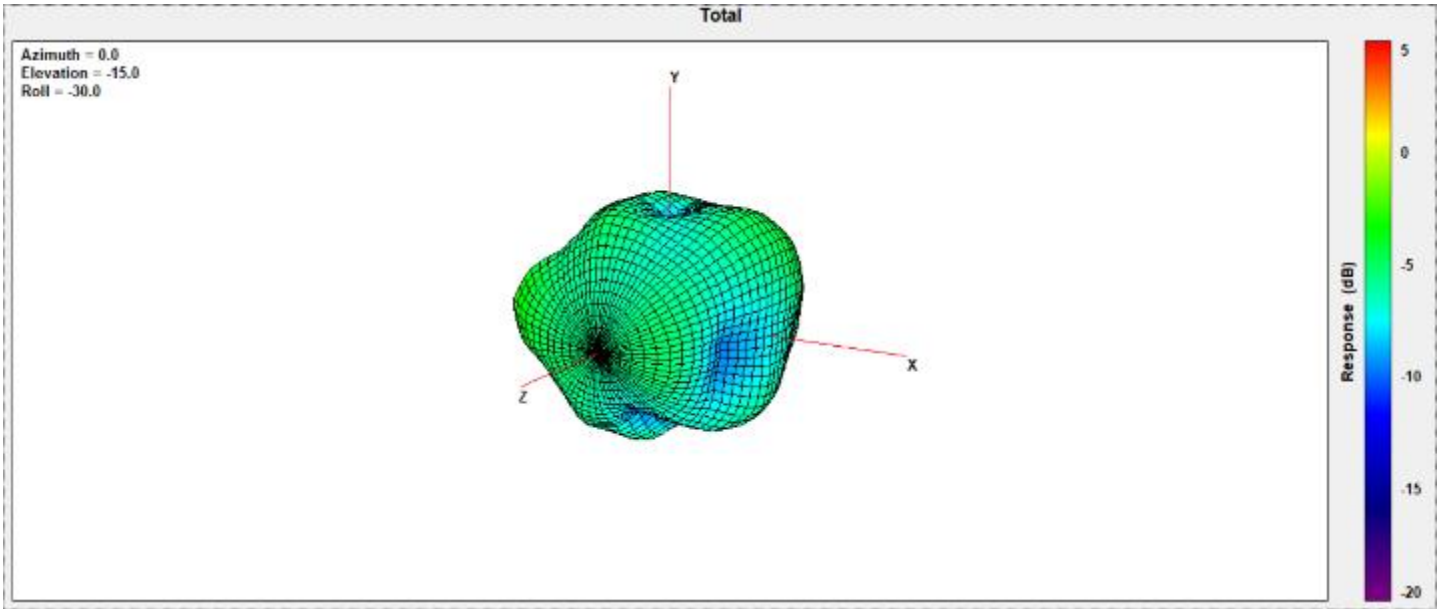
Center Frequency	**782MHz**
Horizontal (dBi) peak	-1.98
Vertical (dBi) peak	-4.54

787MHz



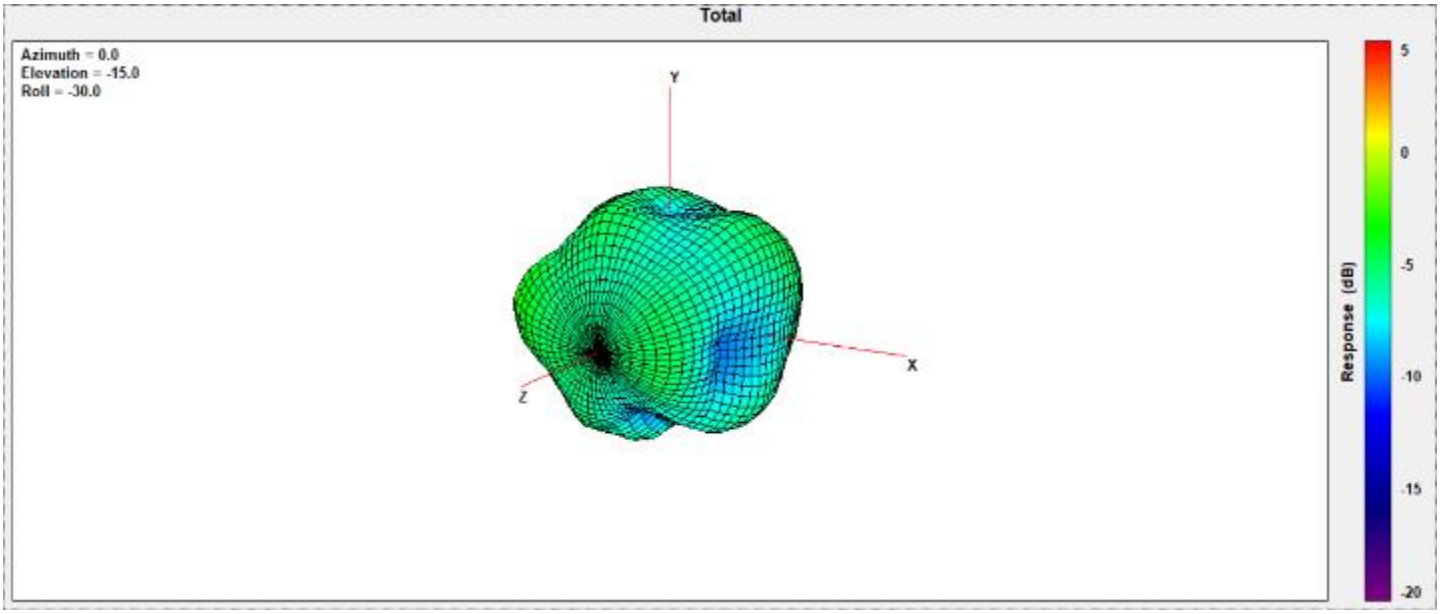
Center Frequency	**787MHz**
Horizontal (dBi) peak	-2.01
Vertical (dBi) peak	-4.56

814MHz



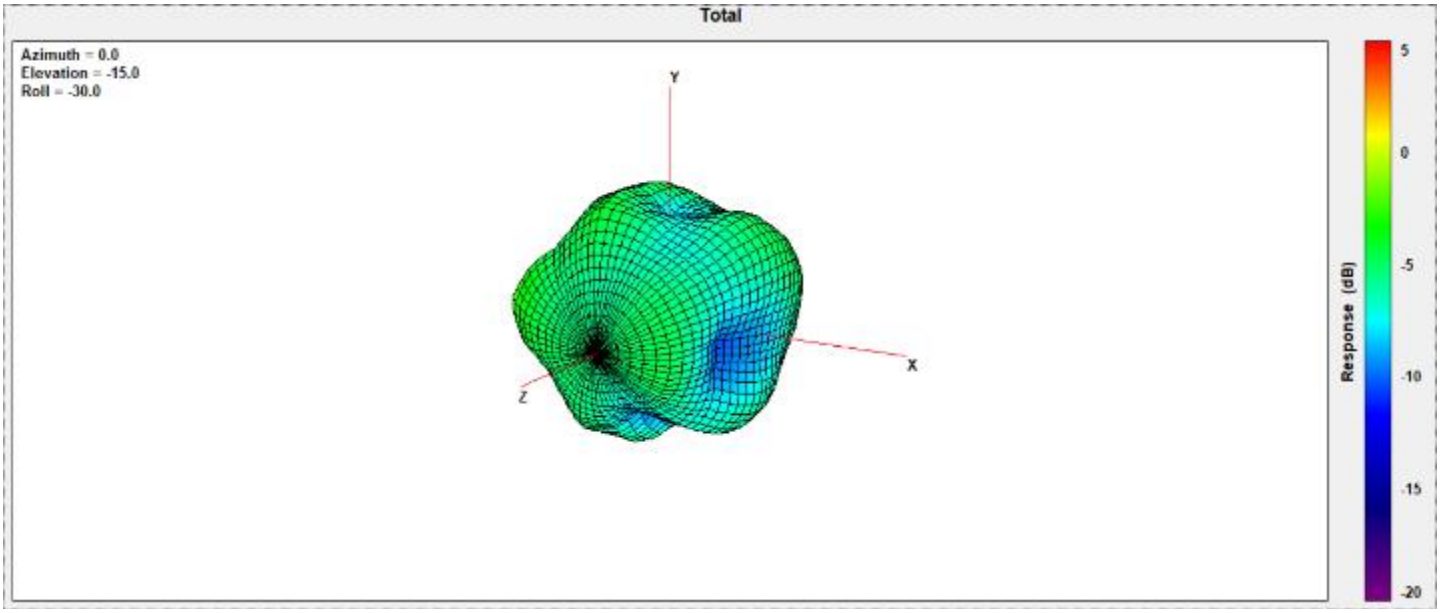
Center Frequency	**814MHz**
Horizontal (dBi) peak	-2.36
Vertical (dBi) peak	-3.57

824MHz



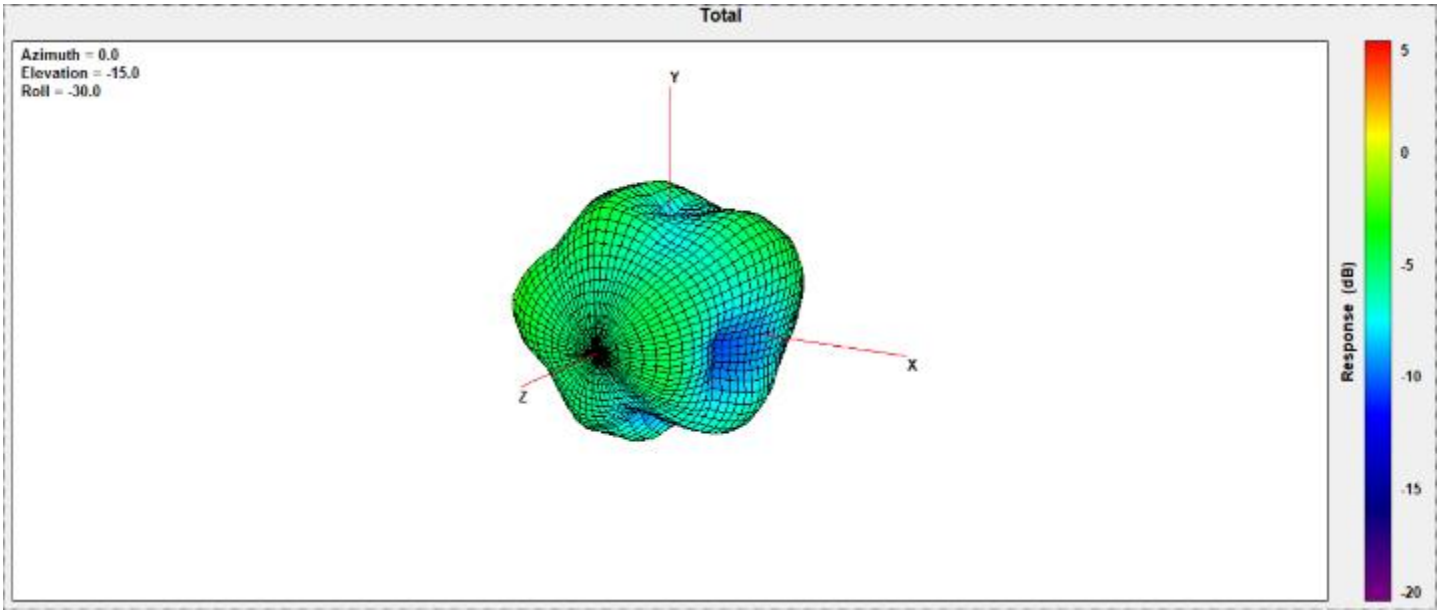
Center Frequency	**824MHz**
Horizontal (dBi) peak	-2.33
Vertical (dBi) peak	-3.53

832MHz



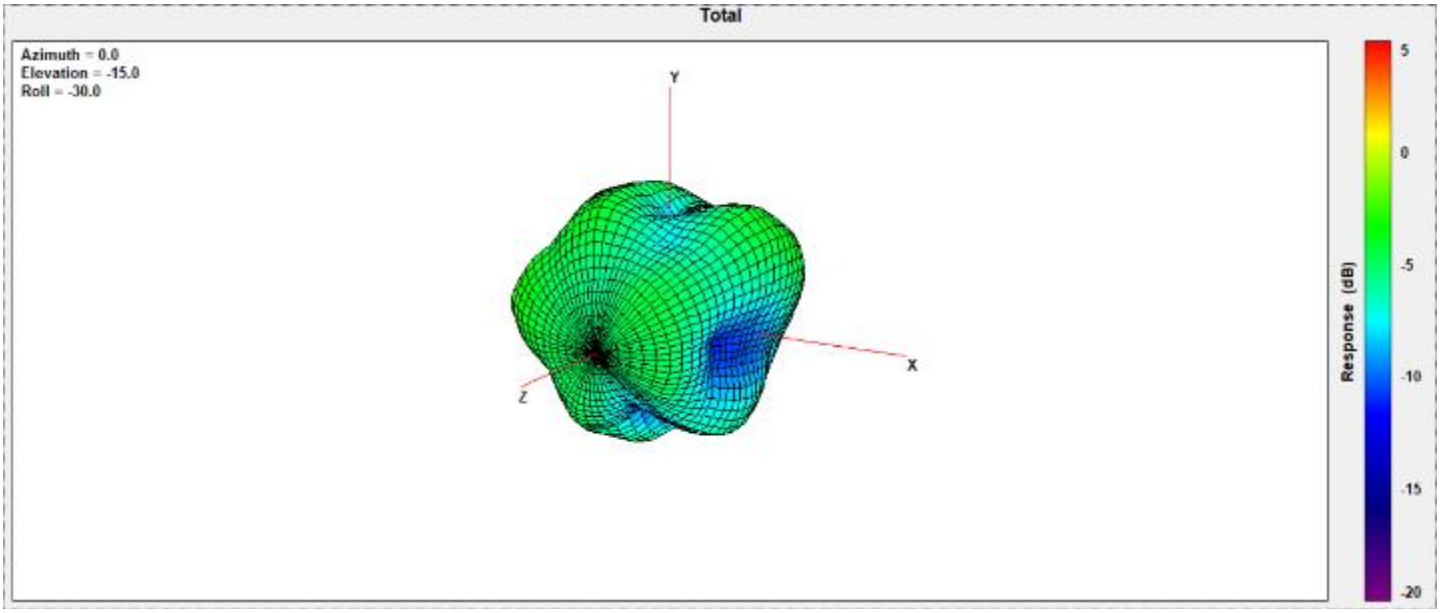
Center Frequency	**832MHz**
Horizontal (dBi) peak	-2.49
Vertical (dBi) peak	-3.70

836.5MHz



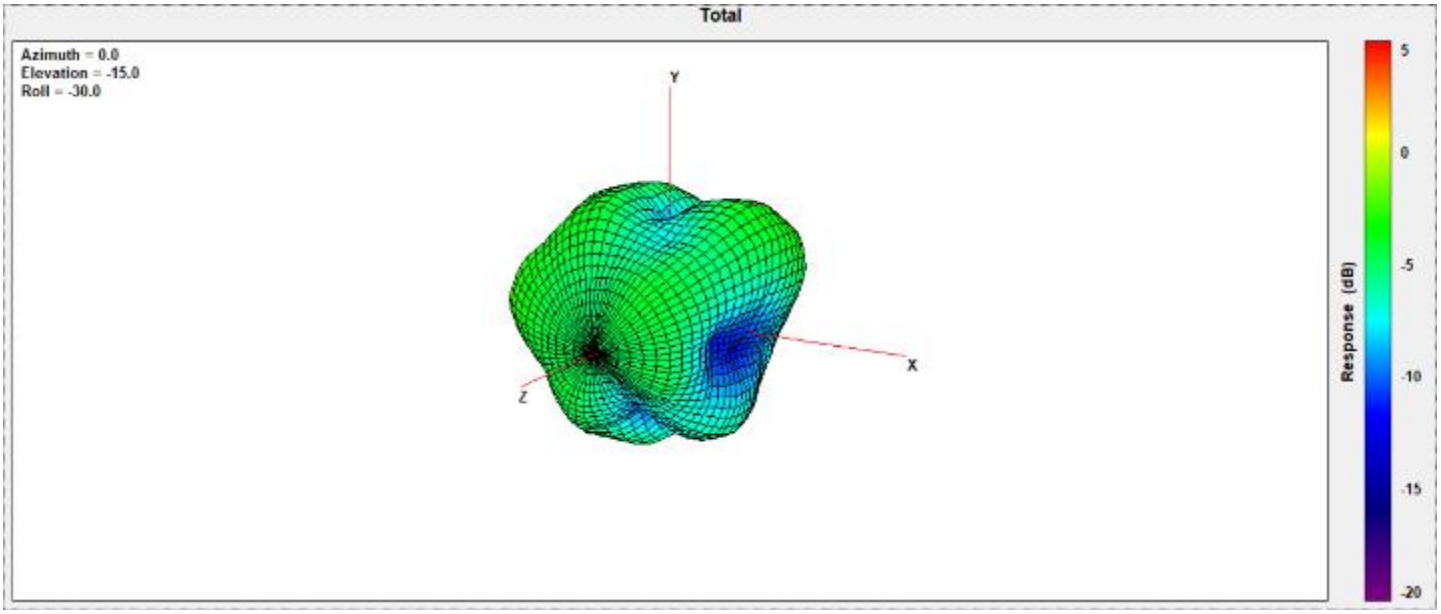
Center Frequency	**836.5MHz**
Horizontal (dBi) peak	-2.62
Vertical (dBi) peak	-3.79

849MHz



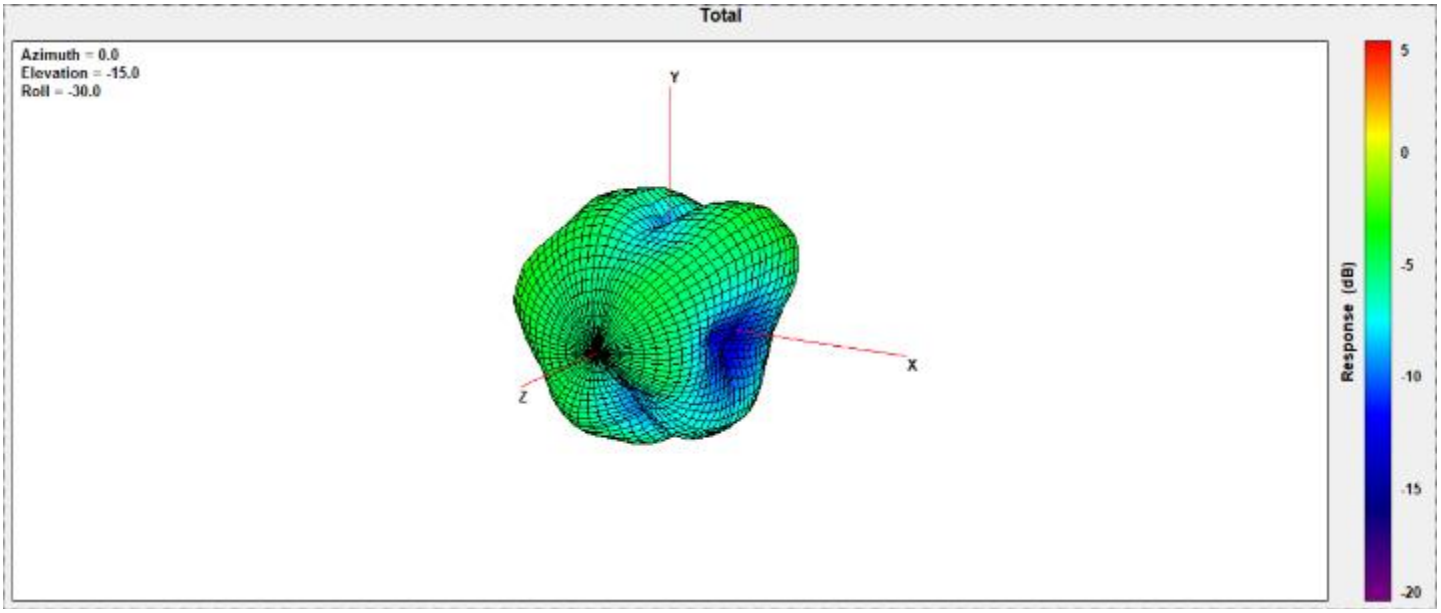
Center Frequency	**849MHz**
Horizontal (dBi) peak	-2.89
Vertical (dBi) peak	-4.02

862MHz



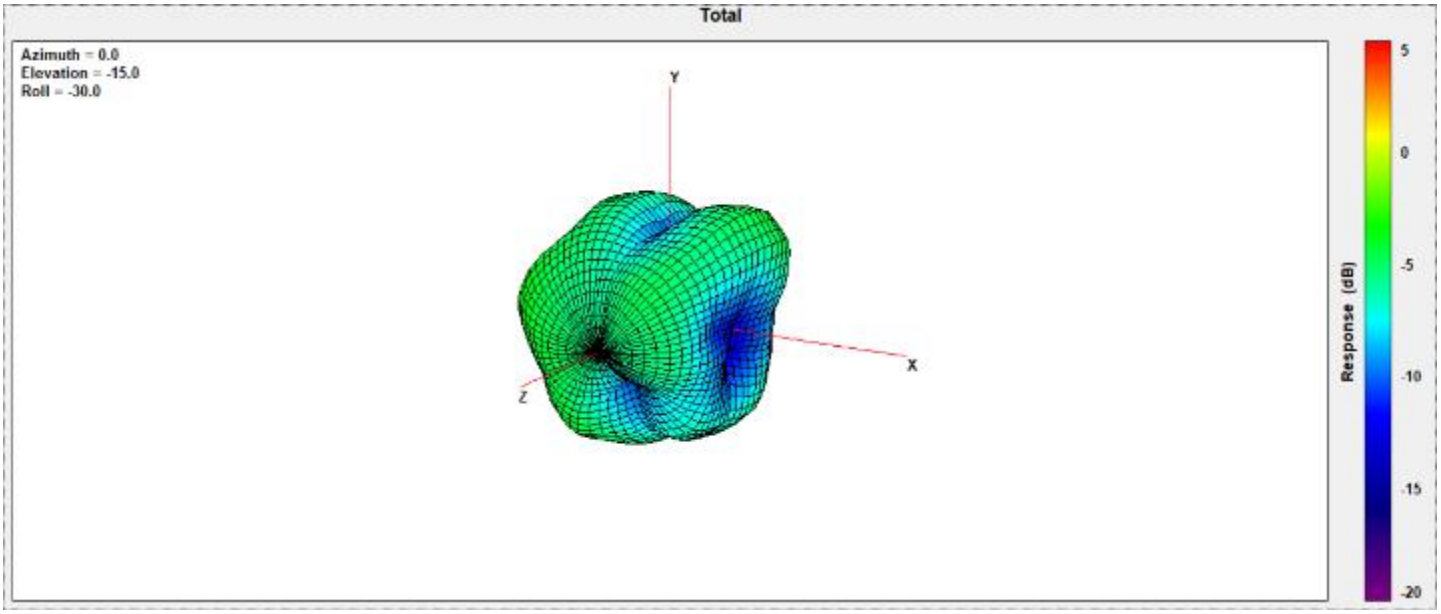
Center Frequency	**862MHz**
Horizontal (dBi) peak	-3.15
Vertical (dBi) peak	-4.19

880MHz



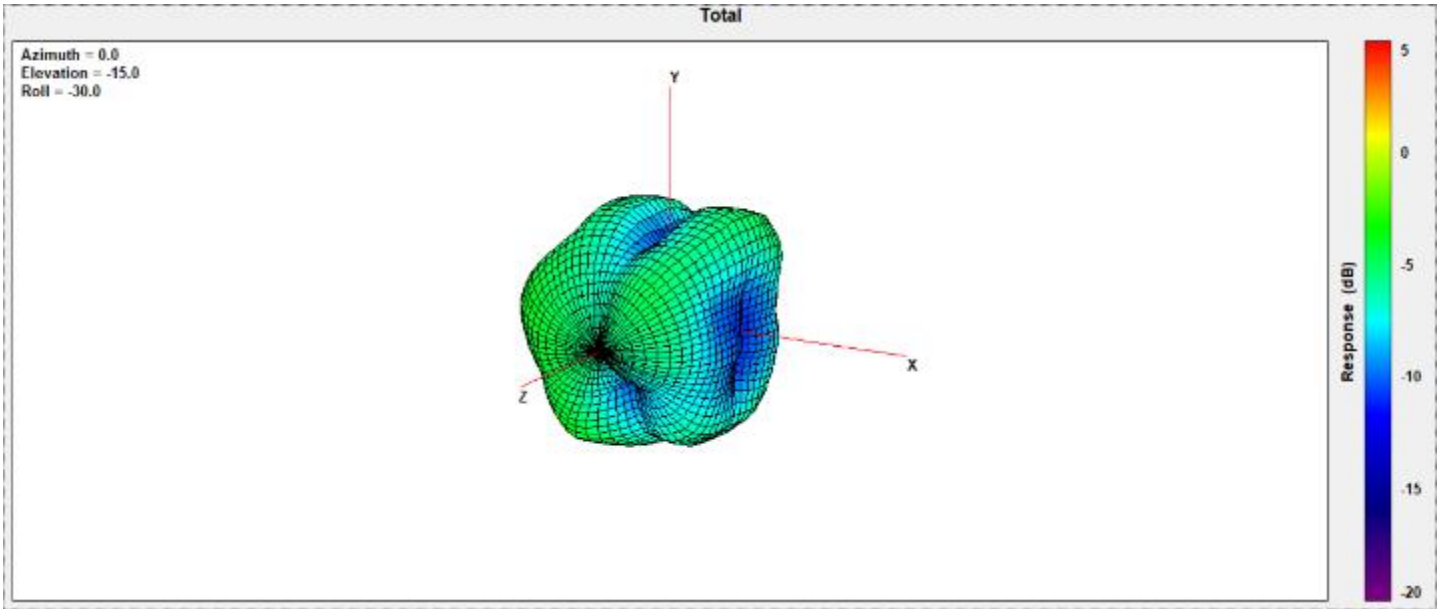
Center Frequency	**880MHz**
Horizontal (dBi) peak	-3.49
Vertical (dBi) peak	-4.61

897.5MHz



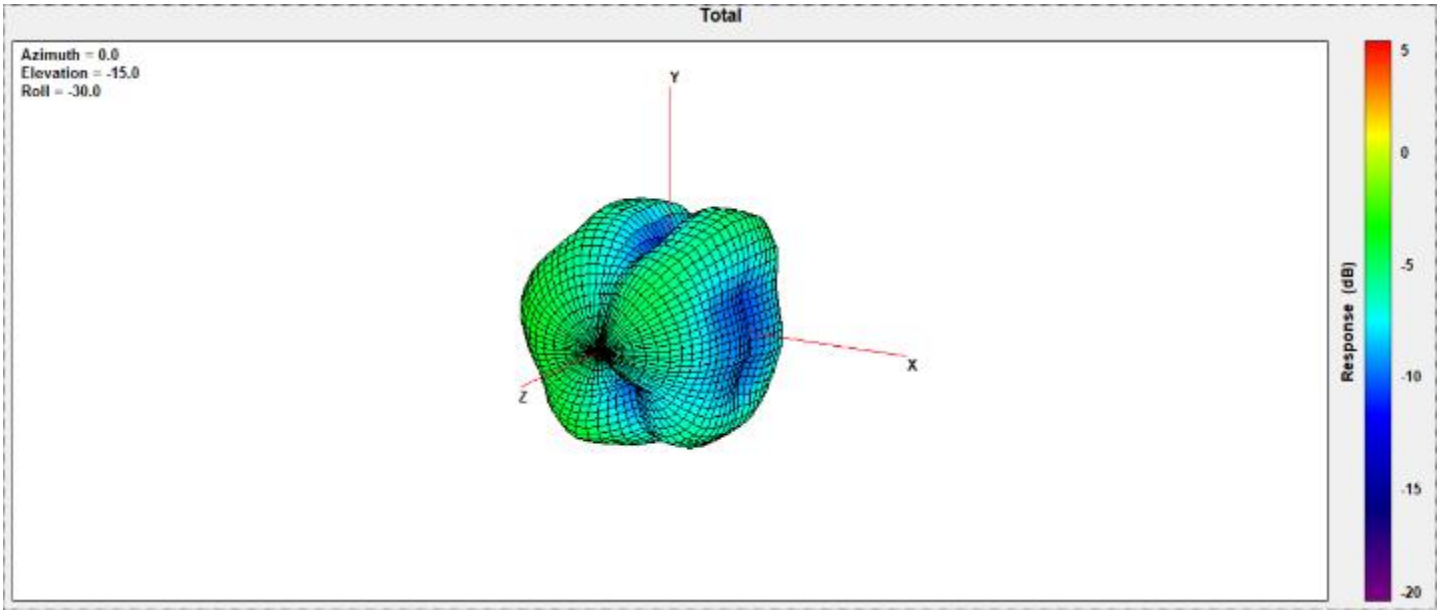
Center Frequency	**897.5MHz**
Horizontal (dBi) peak	-4.01
Vertical (dBi) peak	-5.31

915MHz



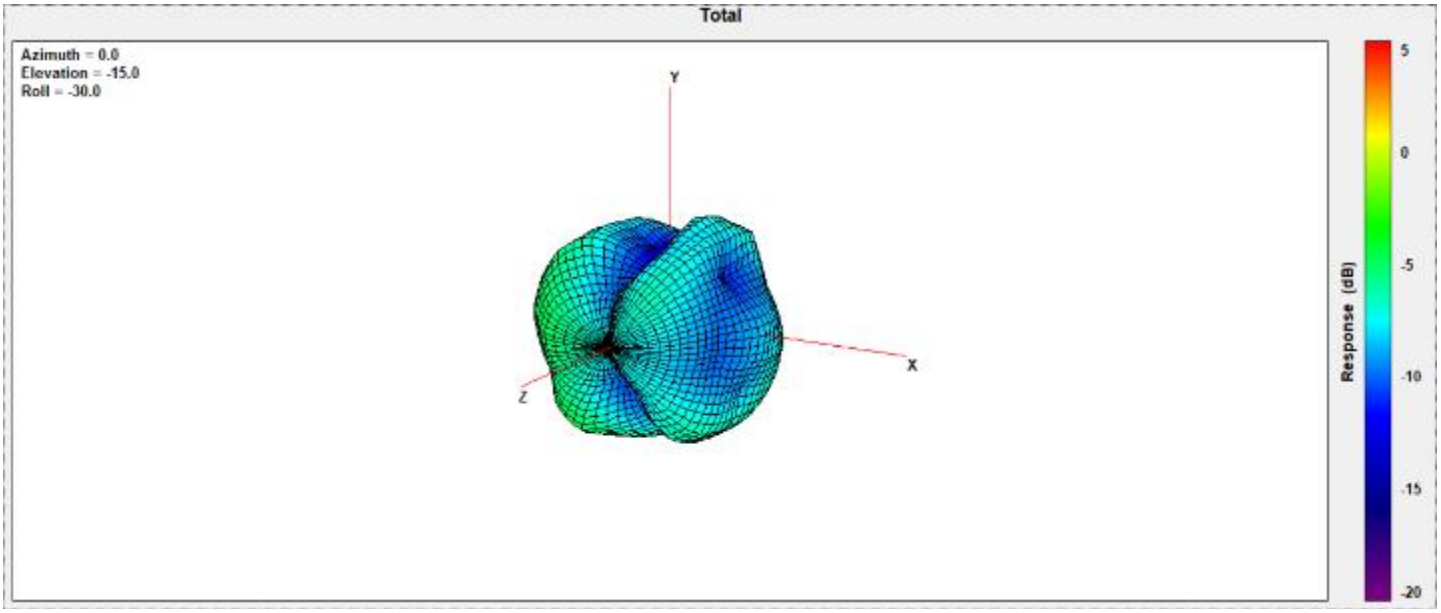
Center Frequency	**915MHz**
Horizontal (dBi) peak	-4.74
Vertical (dBi) peak	-6.28

925MHz



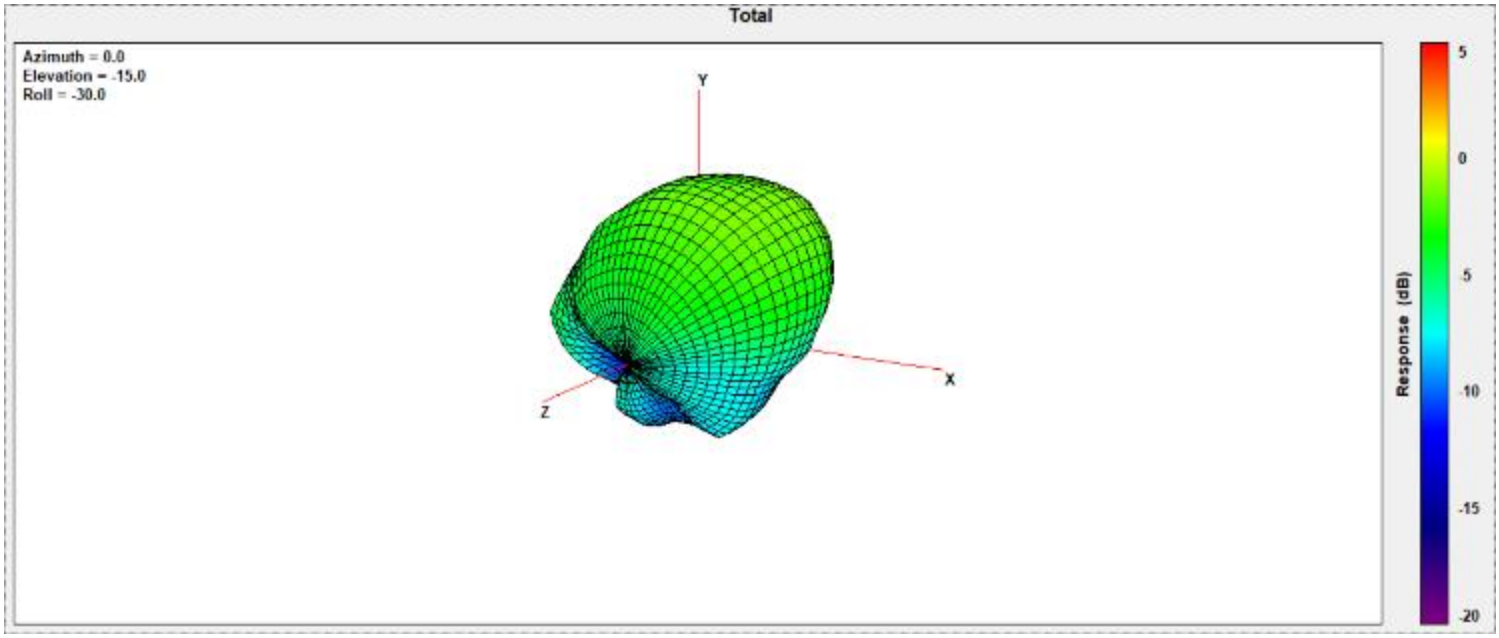
Center Frequency	**925MHz**
Horizontal (dBi) peak	-5.15
Vertical (dBi) peak	-6.82

960MHz



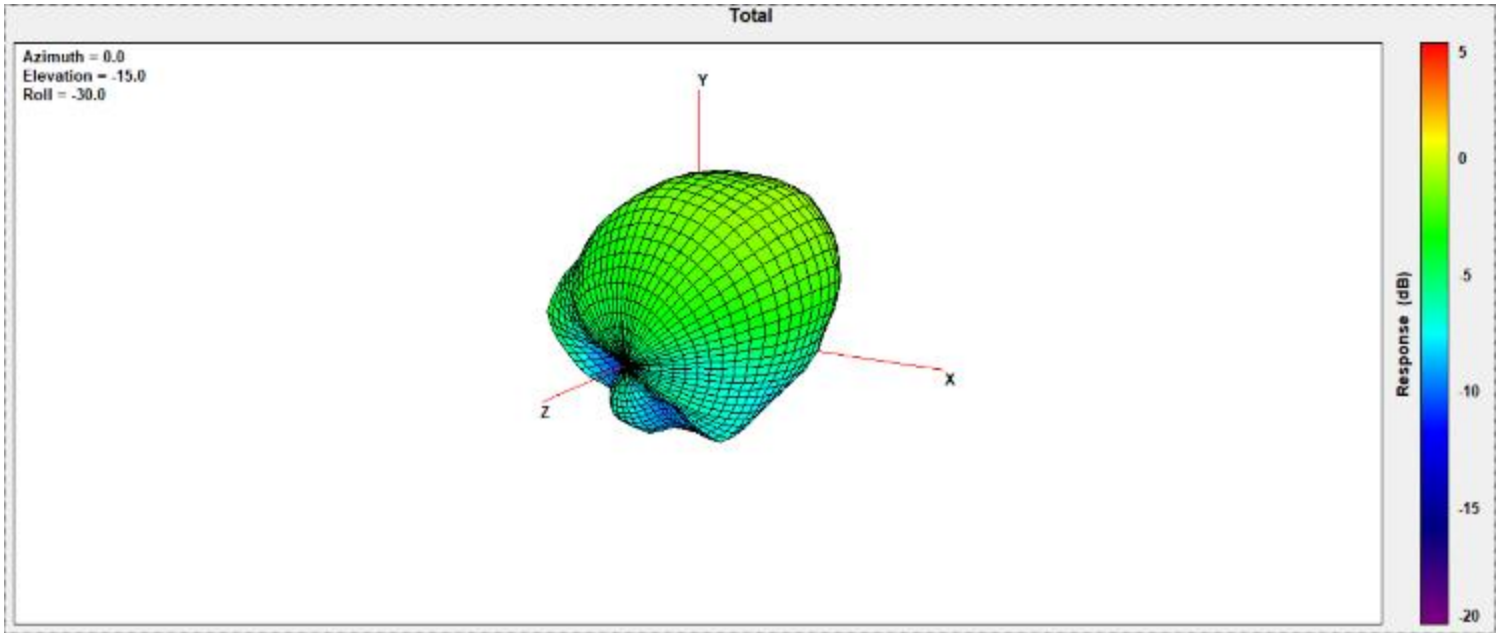
Center Frequency	**960MHz**
Horizontal (dBi) peak	-6.83
Vertical (dBi) peak	-8.58

1427.9MHz



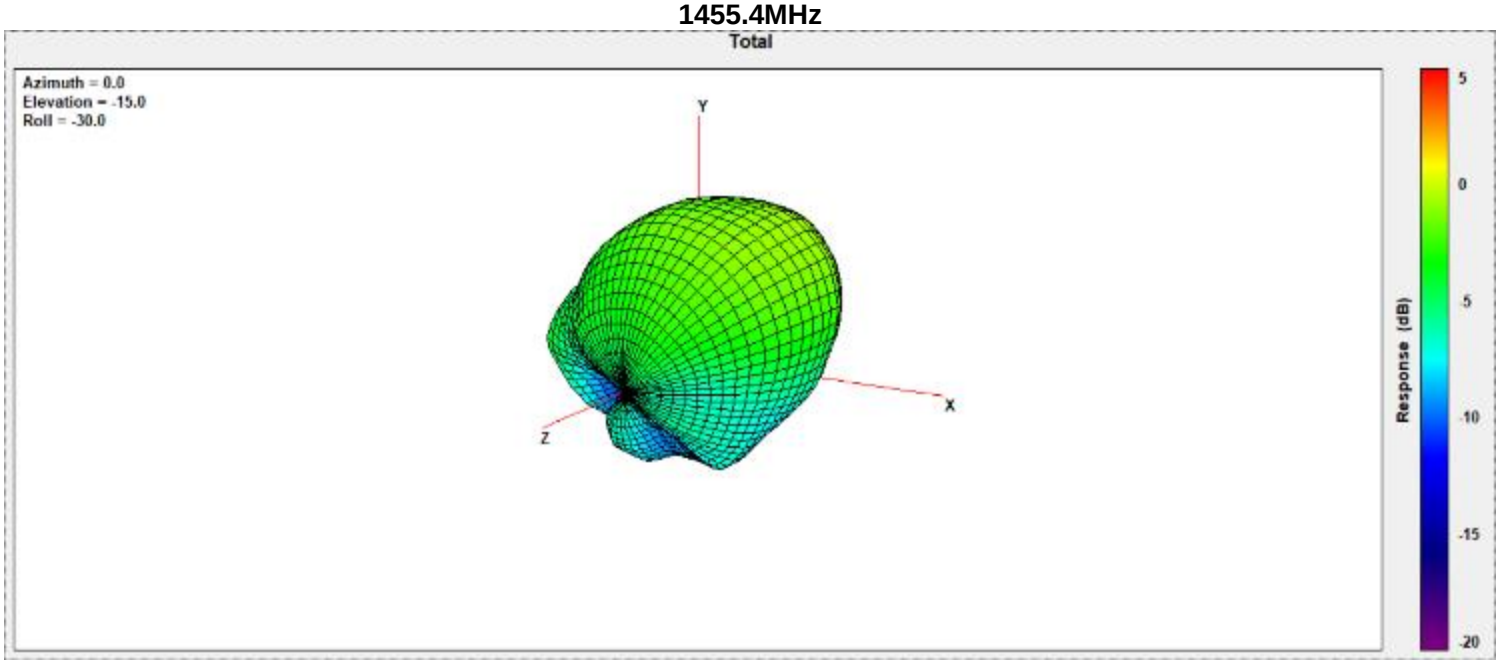
Center Frequency	**1427.9MHz**
Horizontal (dBi) peak	0.65
Vertical (dBi) peak	-2.04

1447.9MHz



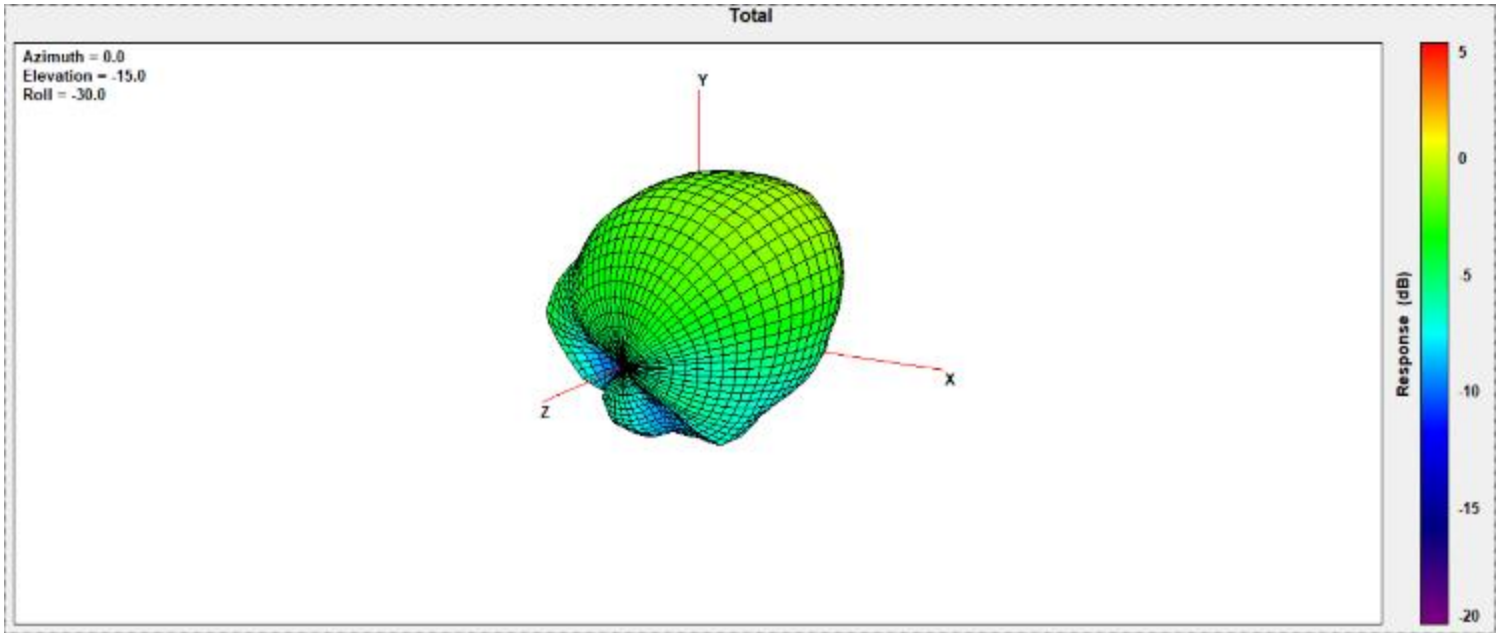
Center Frequency	**1447.9MHz**
Horizontal (dBi) peak	0.88
Vertical (dBi) peak	-2.03

1455.4MHz



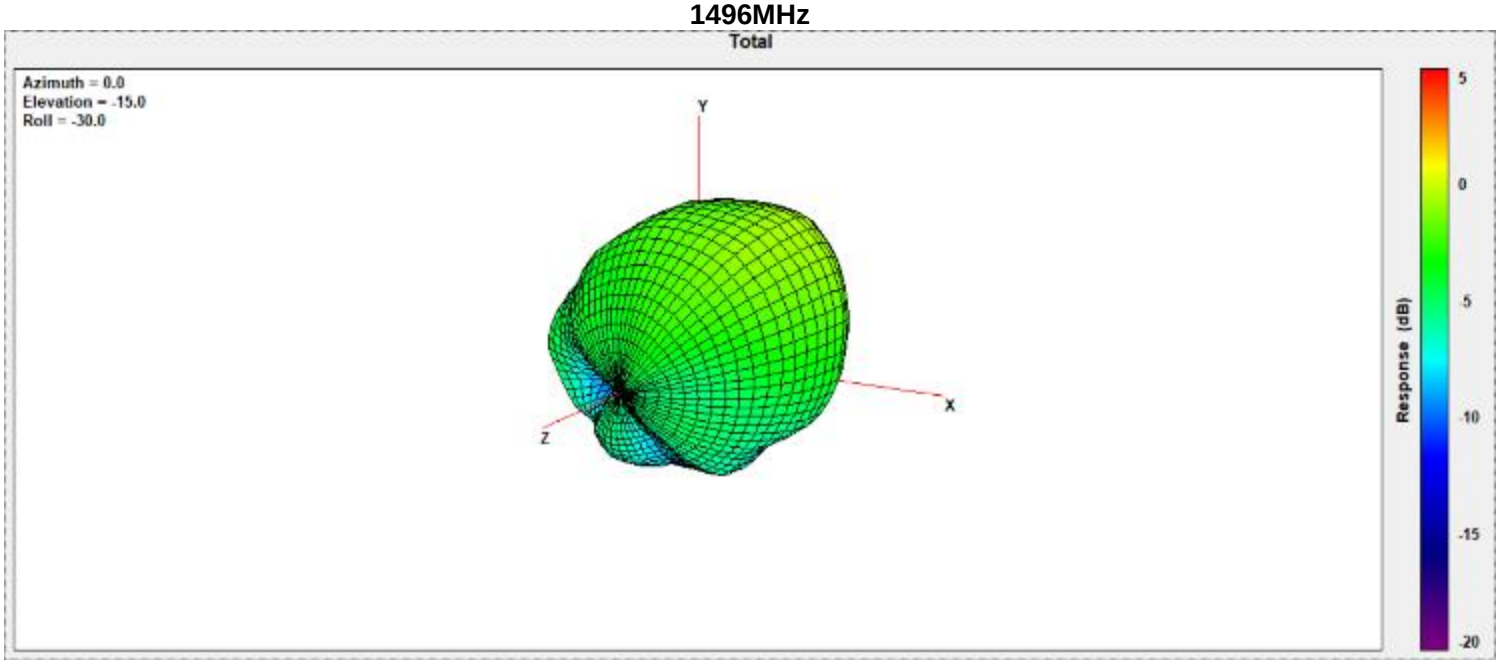
Center Frequency	**1455.4MHz**
Horizontal (dBi) peak	0.92
Vertical (dBi) peak	-2.09

1462.9MHz



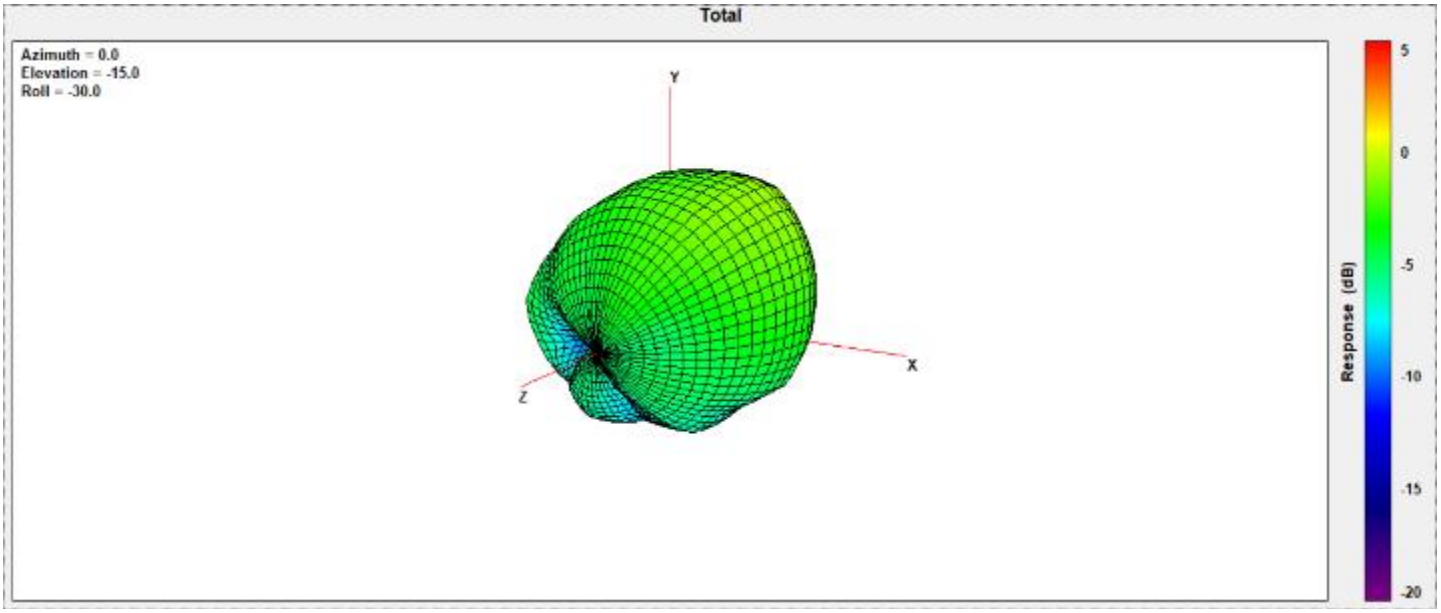
Center Frequency	**1462.9MHz**
Horizontal (dBi) peak	0.85
Vertical (dBi) peak	-2.04

1496MHz



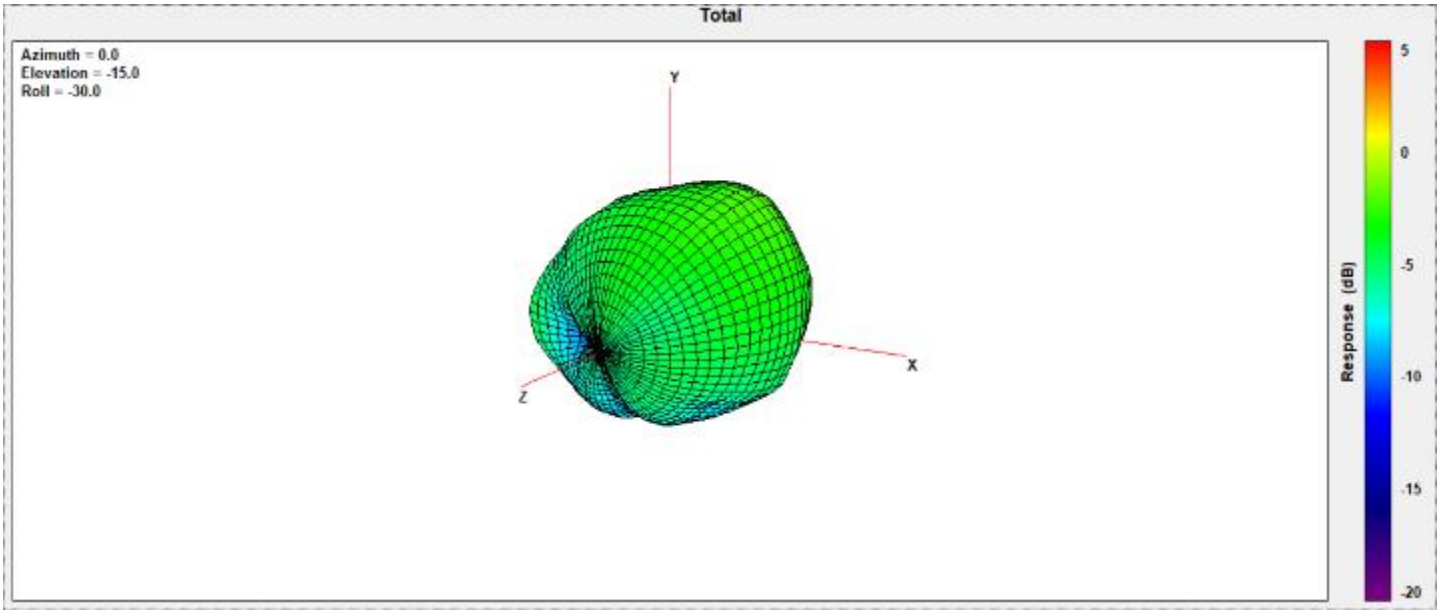
Center Frequency	**1496MHz**
Horizontal (dBi) peak	-0.55
Vertical (dBi) peak	-2.88

1510.9MHz



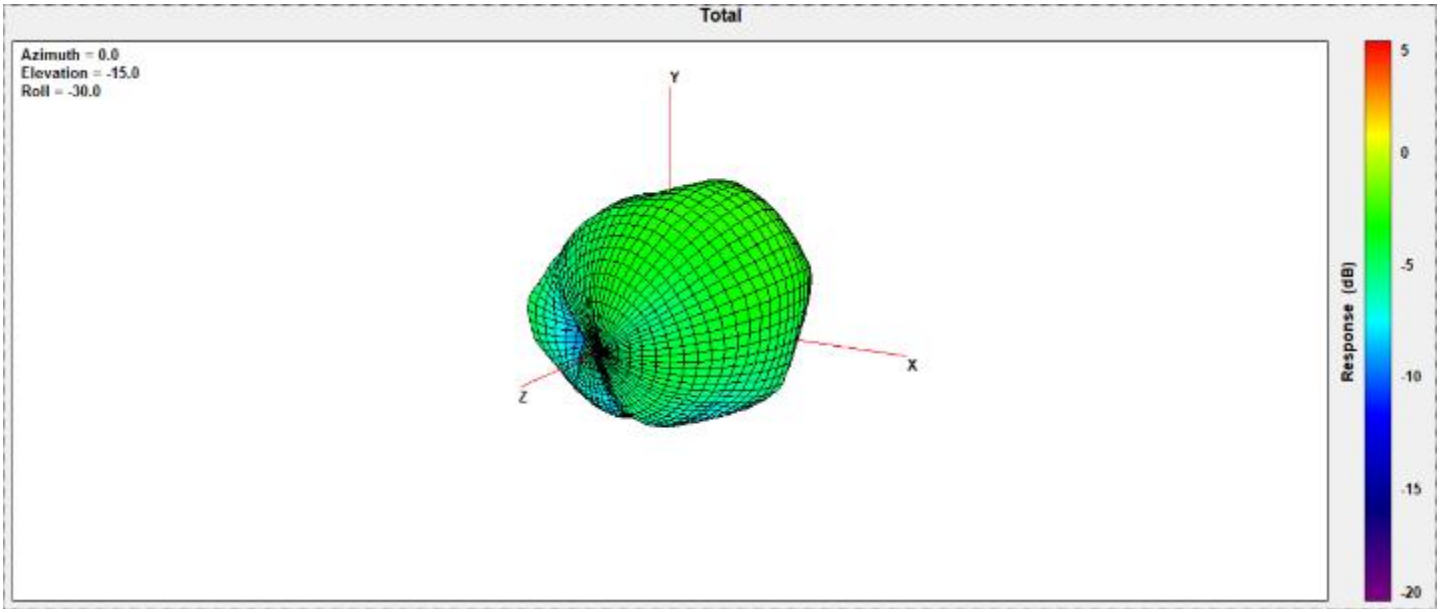
Center Frequency	**1510.9MHz**
Horizontal (dBi) peak	-1.17
Vertical (dBi) peak	-3.52

1557MHz



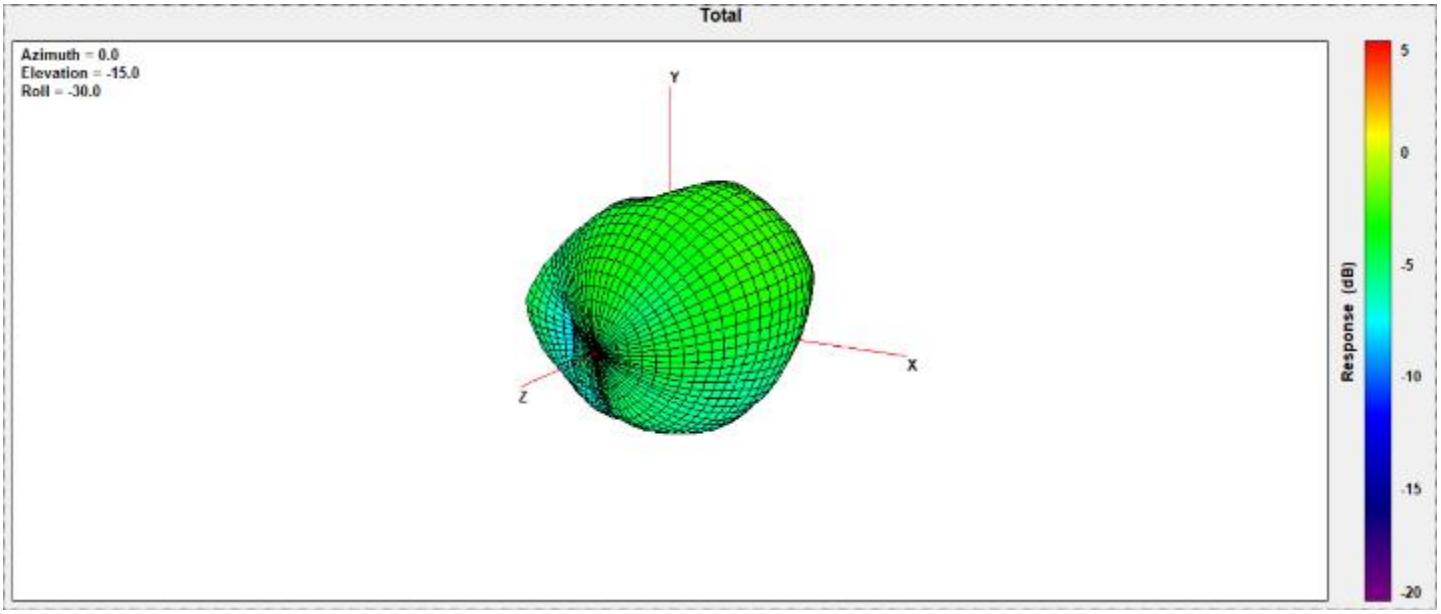
Center Frequency	**1557MHz**
Horizontal (dBi) peak	-1.36
Vertical (dBi) peak	-4.45

1575MHz



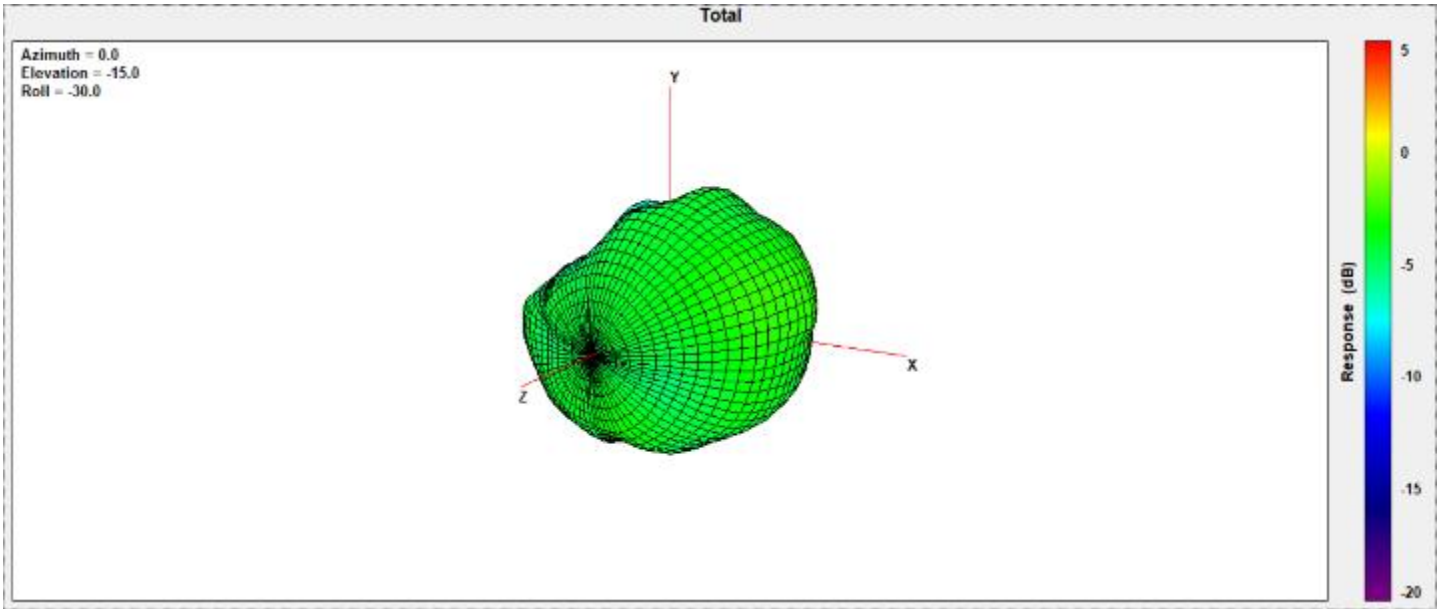
Center Frequency	**1575MHz**
Horizontal (dBi) peak	-1.40
Vertical (dBi) peak	-4.48

1610MHz



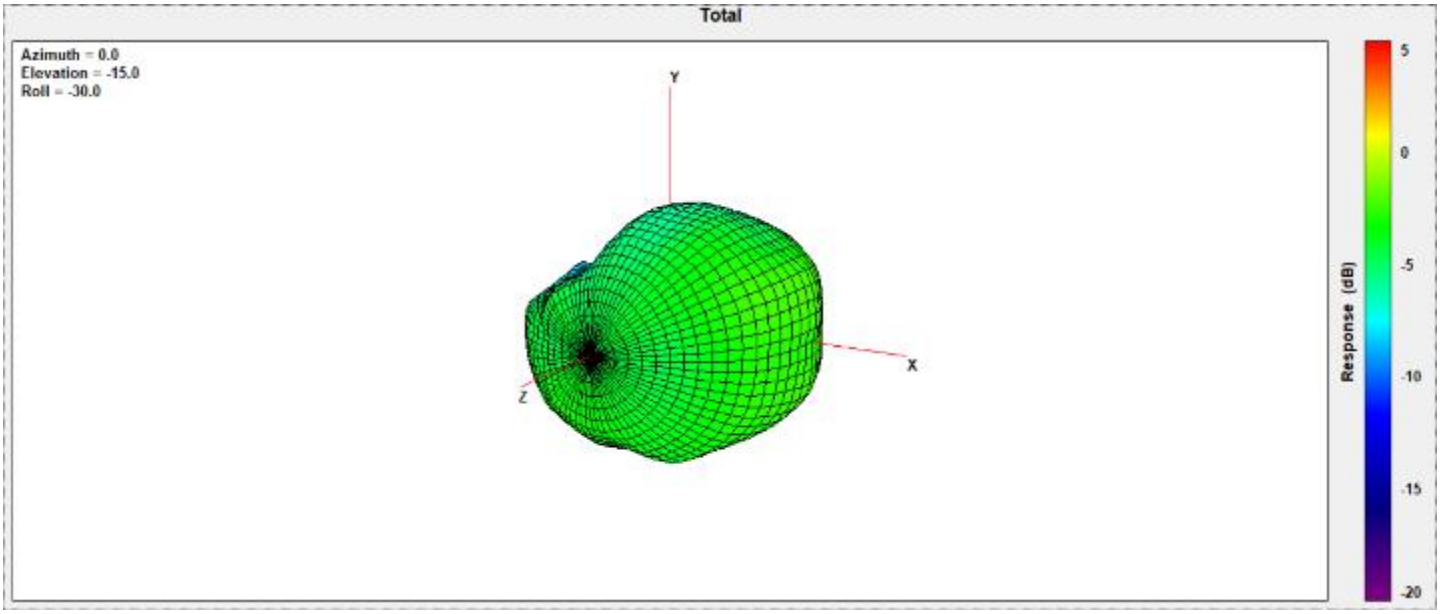
Center Frequency	**1610MHz**
Horizontal (dBi) peak	-1.55
Vertical (dBi) peak	-4.65

1805 MHz



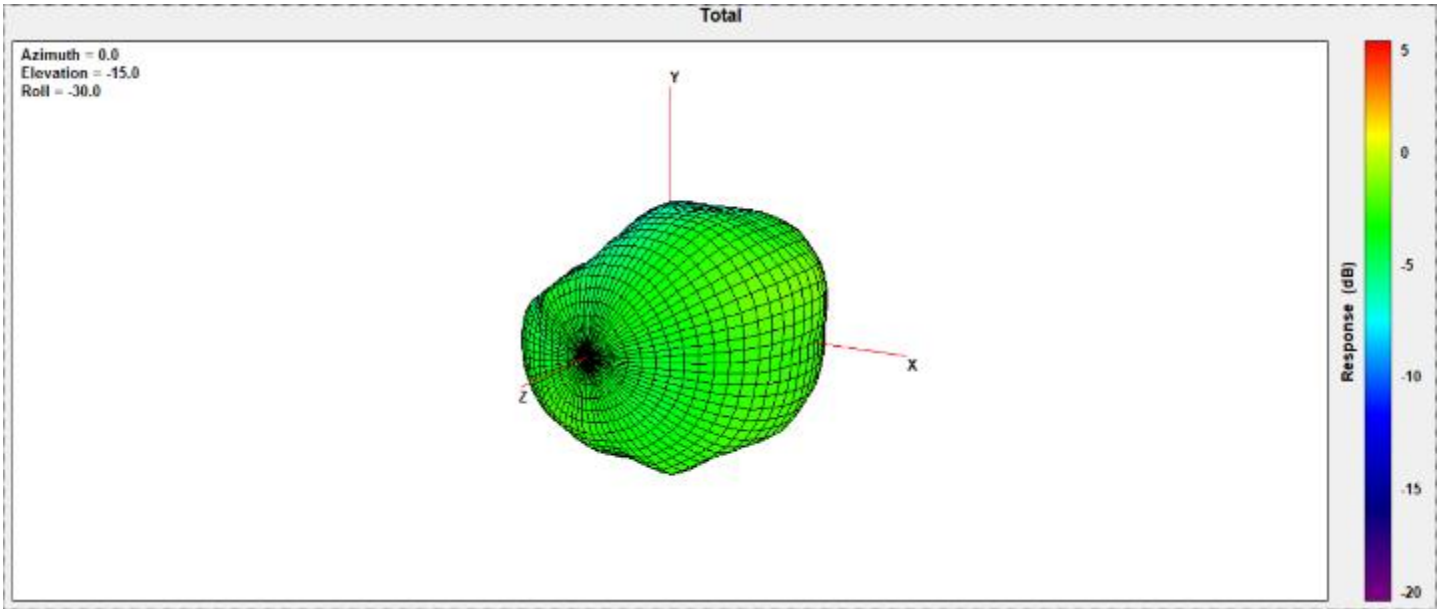
Center Frequency	**1805 MHz**
Horizontal (dBi) peak	-1.98
Vertical (dBi) peak	-2.32

1850 MHz



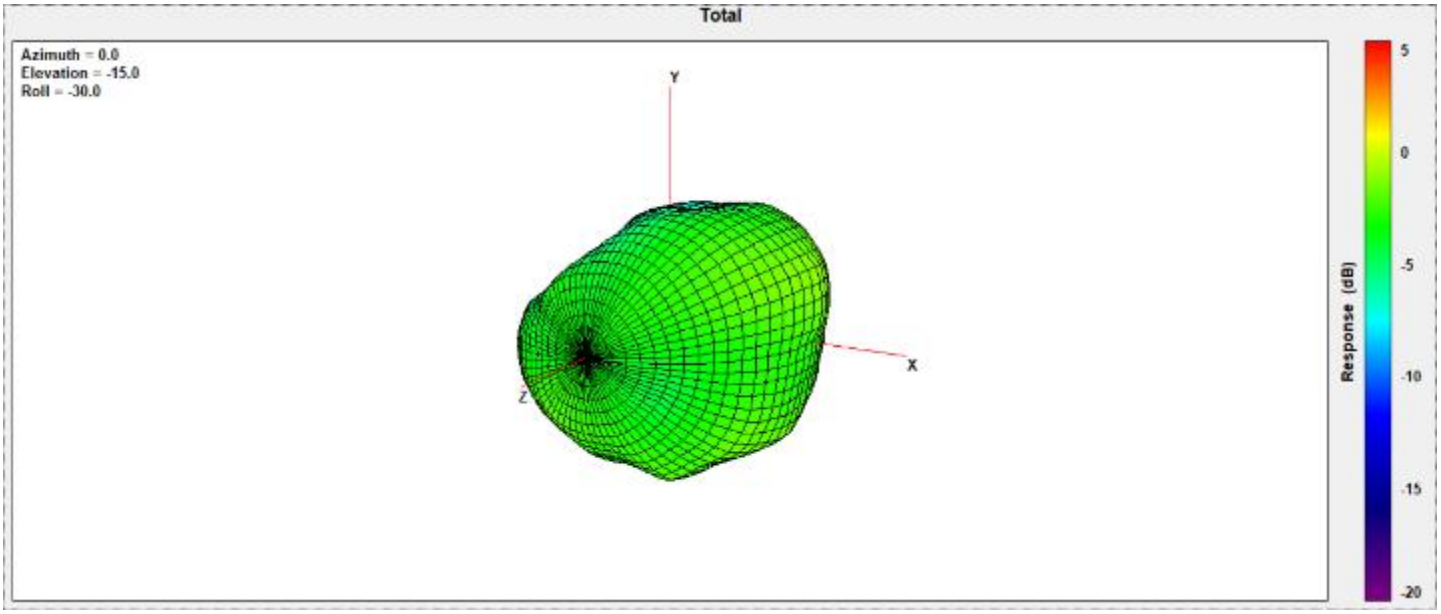
Center Frequency	**1850 MHz**
Horizontal (dBi) peak	-2.32
Vertical (dBi) peak	-2.31

1880 MHz



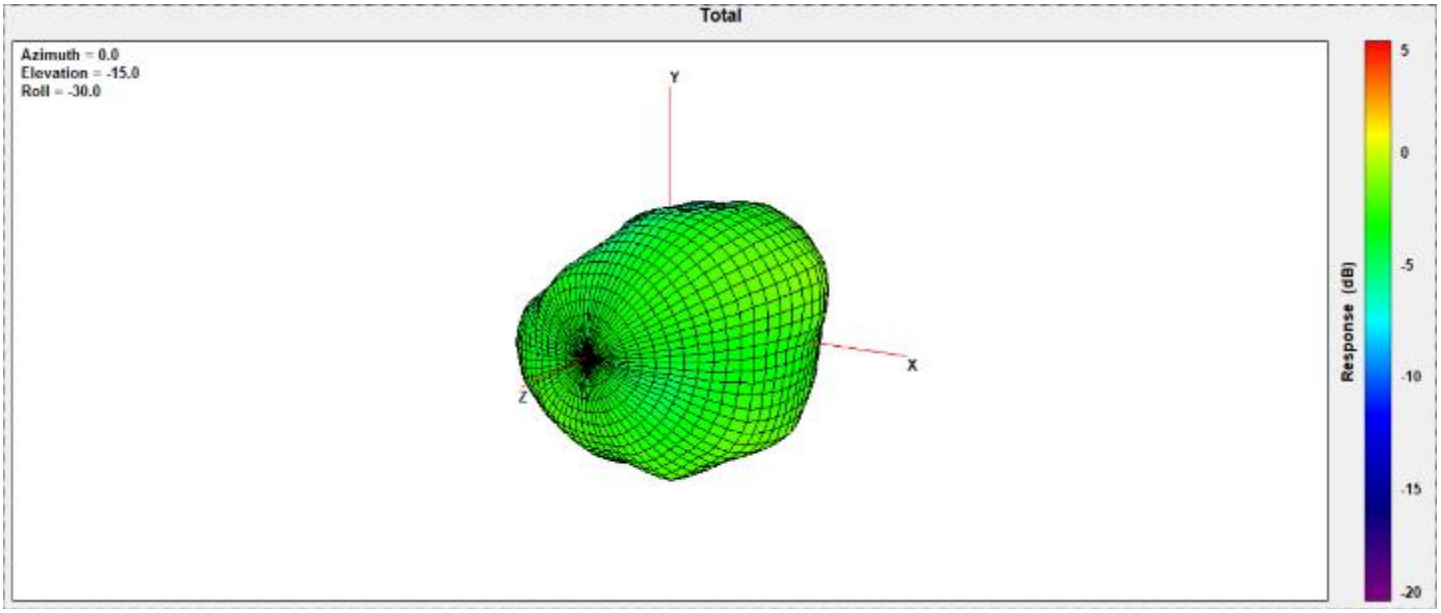
Center Frequency	**1880 MHz**
Horizontal (dBi) peak	-2.74
Vertical (dBi) peak	-2.60

1910MHz



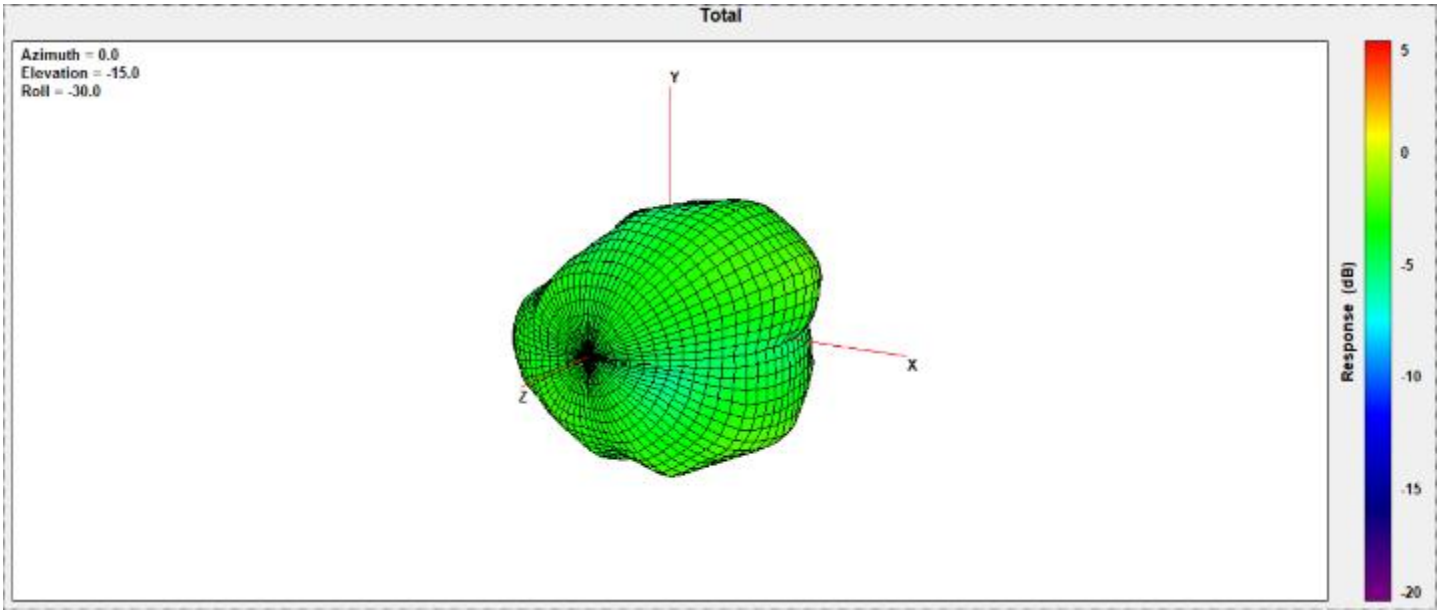
Center Frequency	**1910MHz**
Horizontal (dBi) peak	-2.36
Vertical (dBi) peak	-2.50

1920MHz



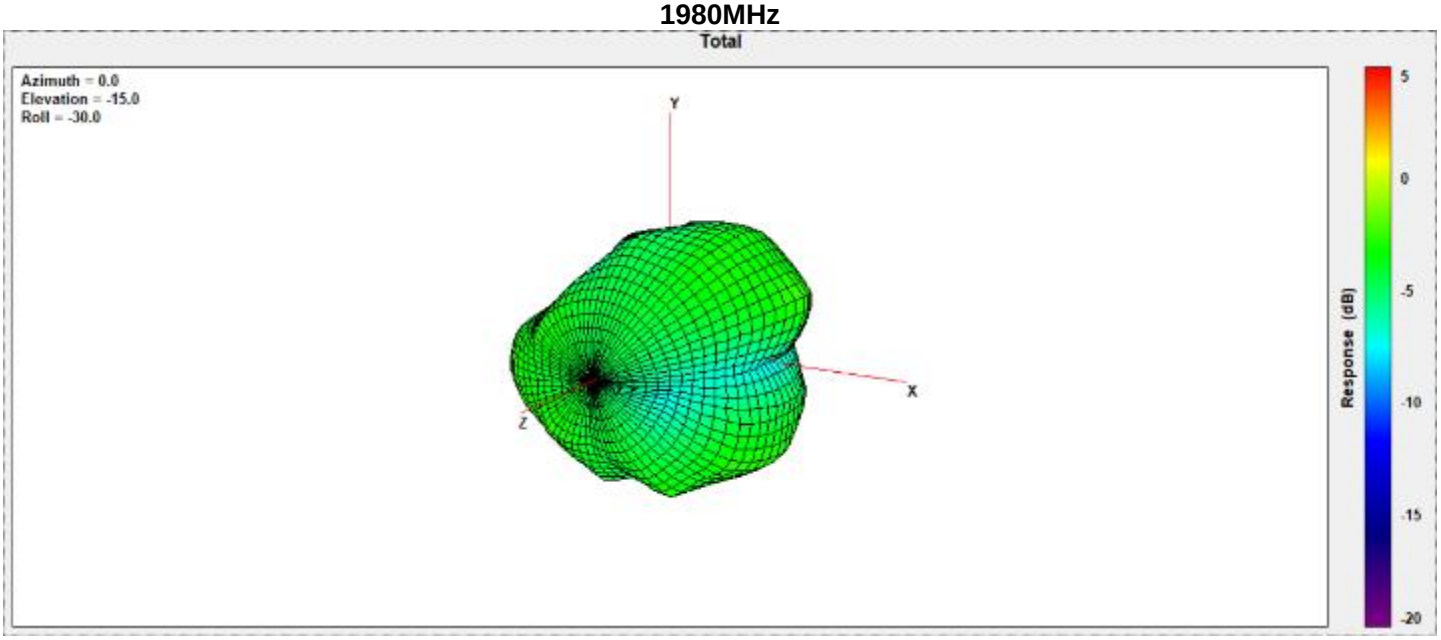
Center Frequency	**1920MHz**
Horizontal (dBi) peak	-2.39
Vertical (dBi) peak	-2.60

1950MHz



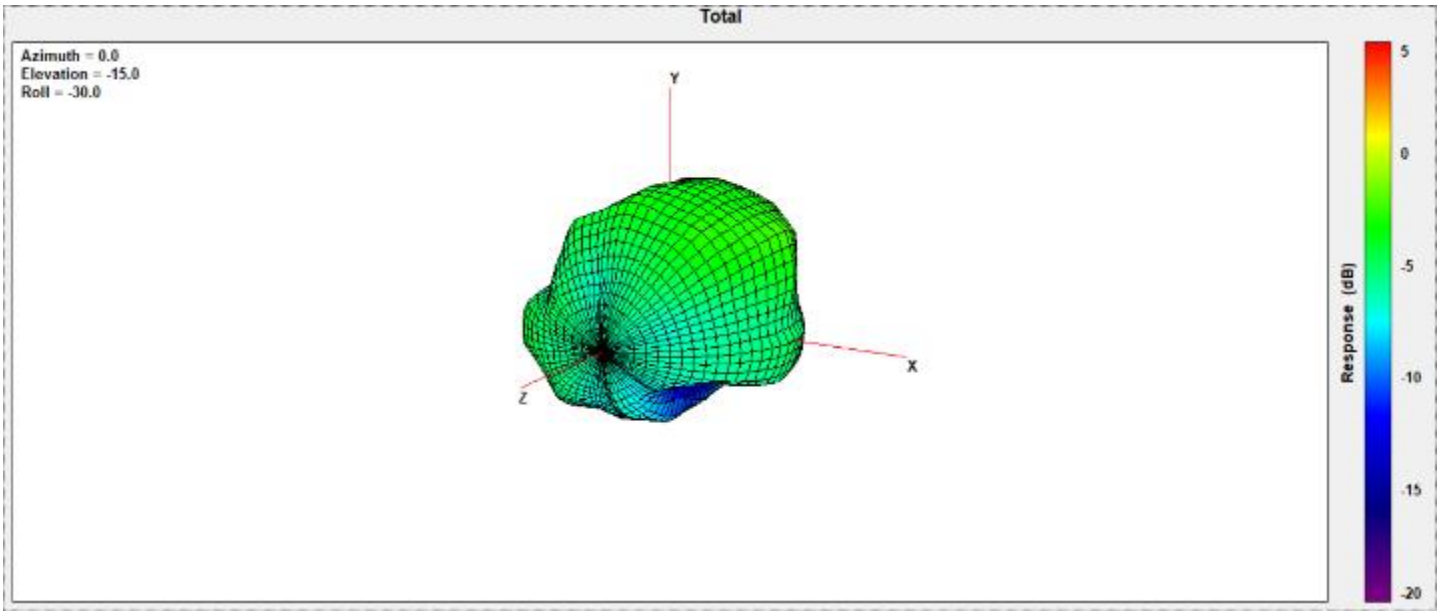
Center Frequency	**1950MHz**
Horizontal (dBi) peak	-2.10
Vertical (dBi) peak	-2.35

1980MHz



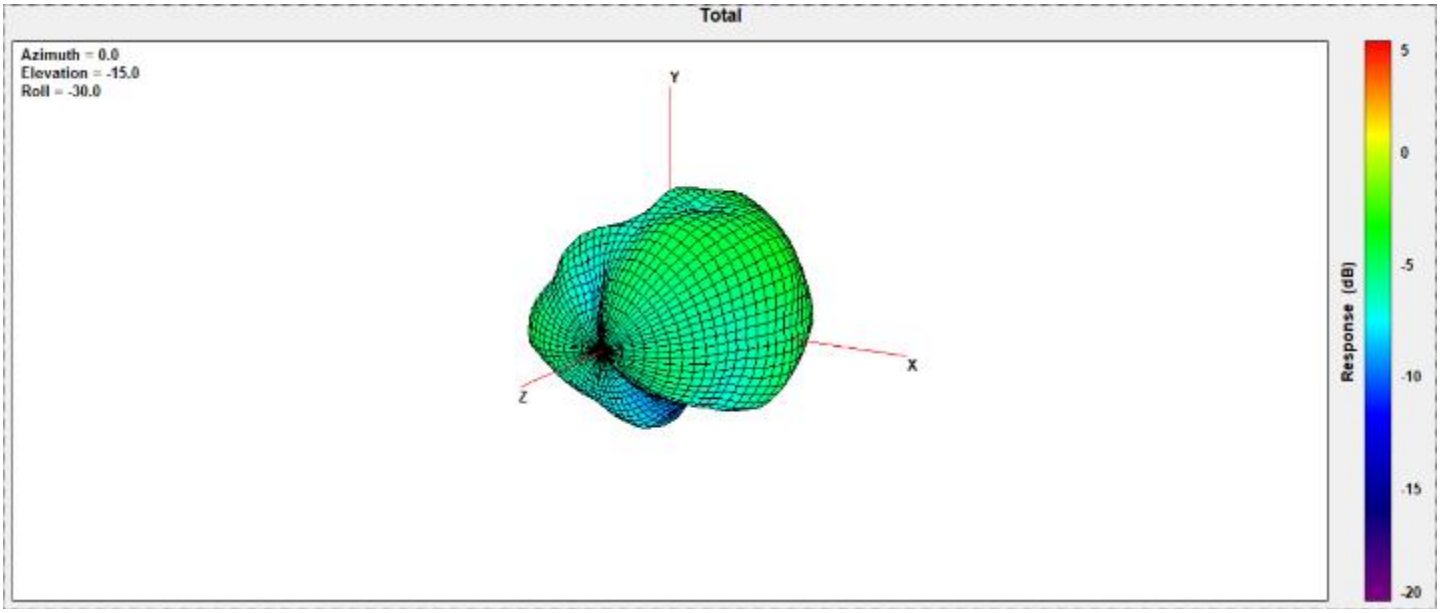
Center Frequency	**1980MHz**
Horizontal (dBi) peak	-1.75
Vertical (dBi) peak	-2.82

2110MHz



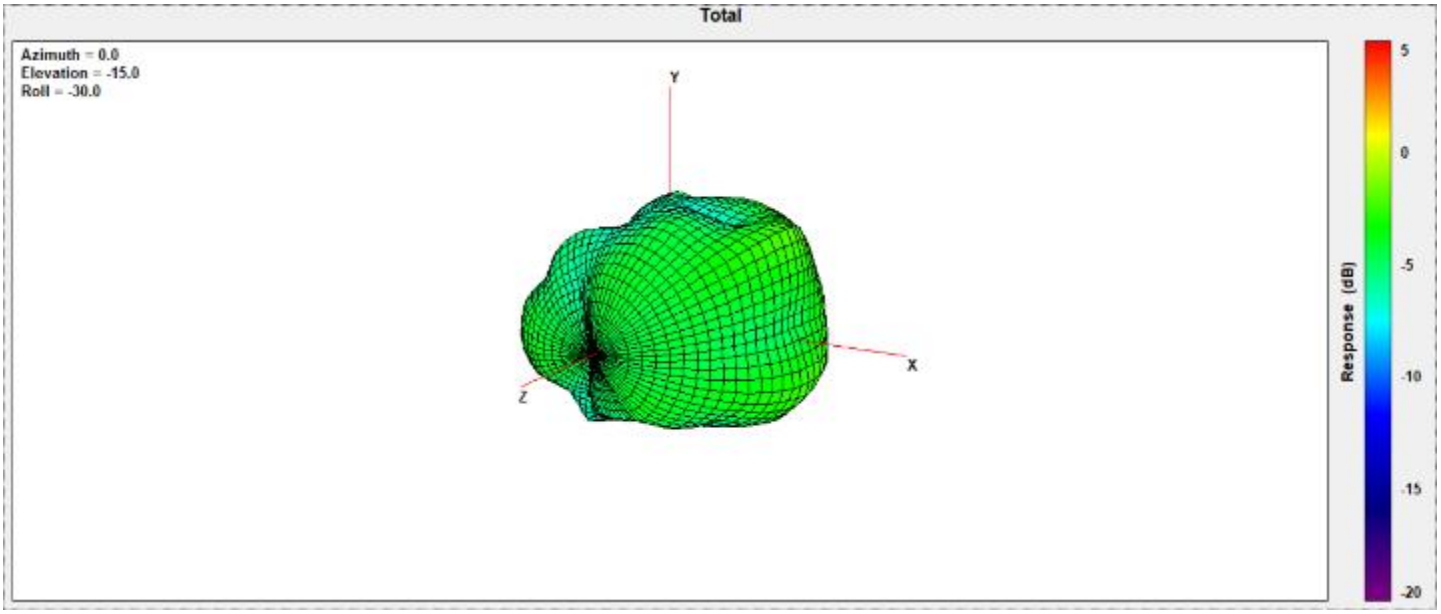
Center Frequency	**2110MHz**
Horizontal (dBi) peak	-3.25
Vertical (dBi) peak	-3.32

2200MHz



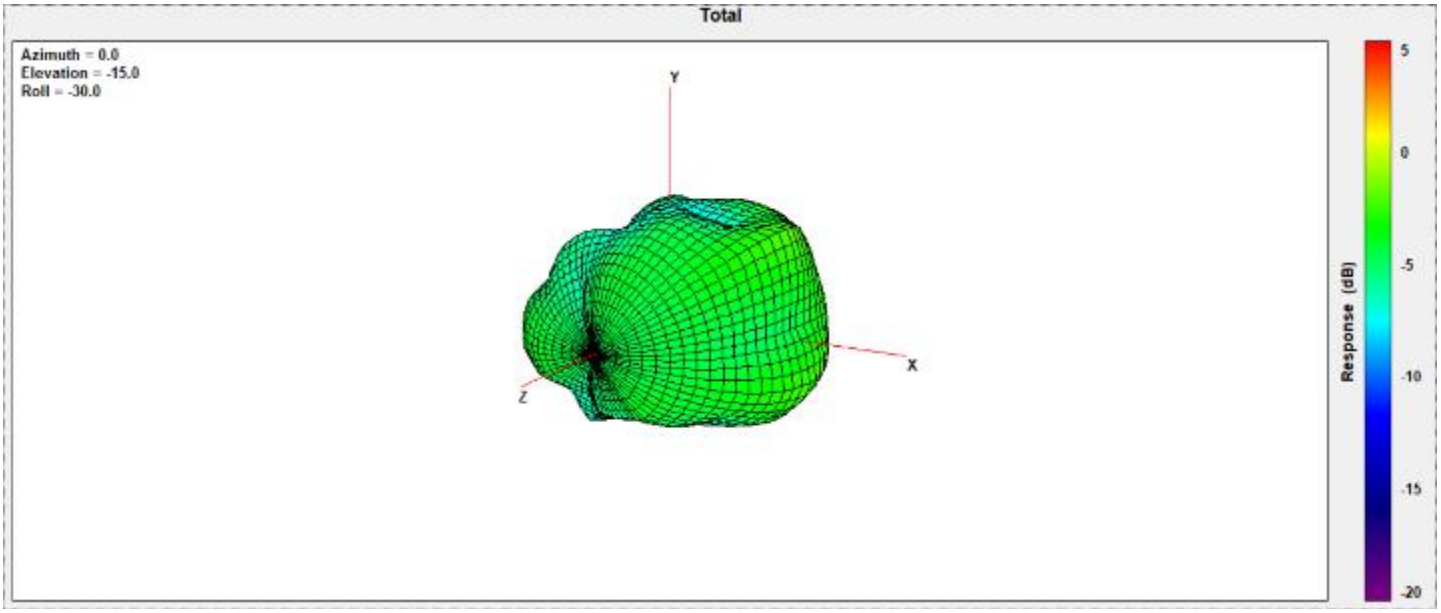
Center Frequency	**2200MHz**
Horizontal (dBi) peak	-3.27
Vertical (dBi) peak	-5.44

2300MHz



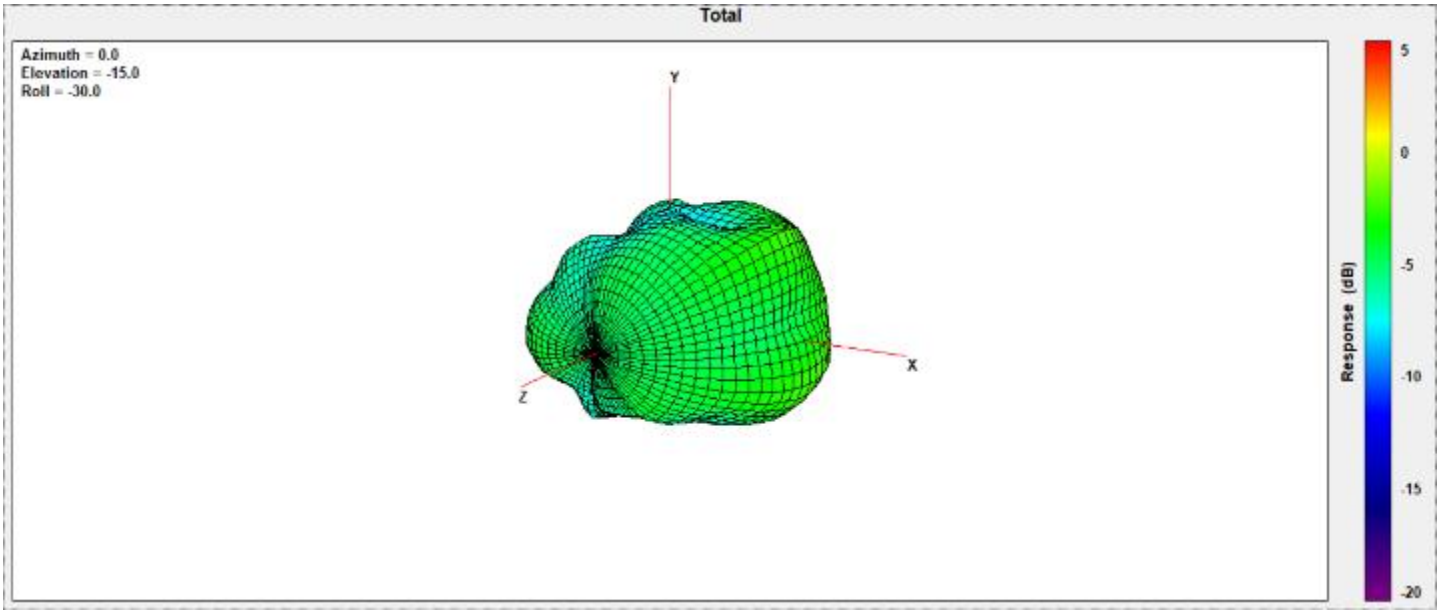
Center Frequency	**2300MHz**
Horizontal (dBi) peak	-0.44
Vertical (dBi) peak	-6.32

2305MHz



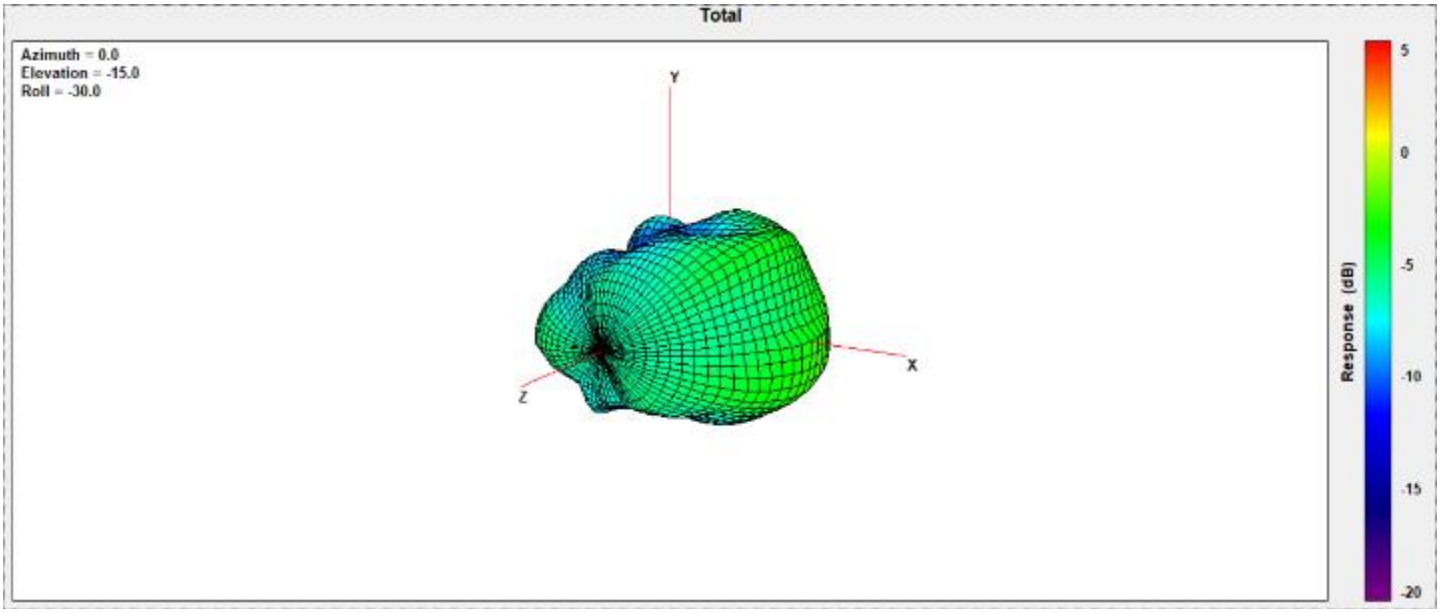
Center Frequency	**2305MHz**
Horizontal (dBi) peak	-0.44
Vertical (dBi) peak	-6.43

2315MHz



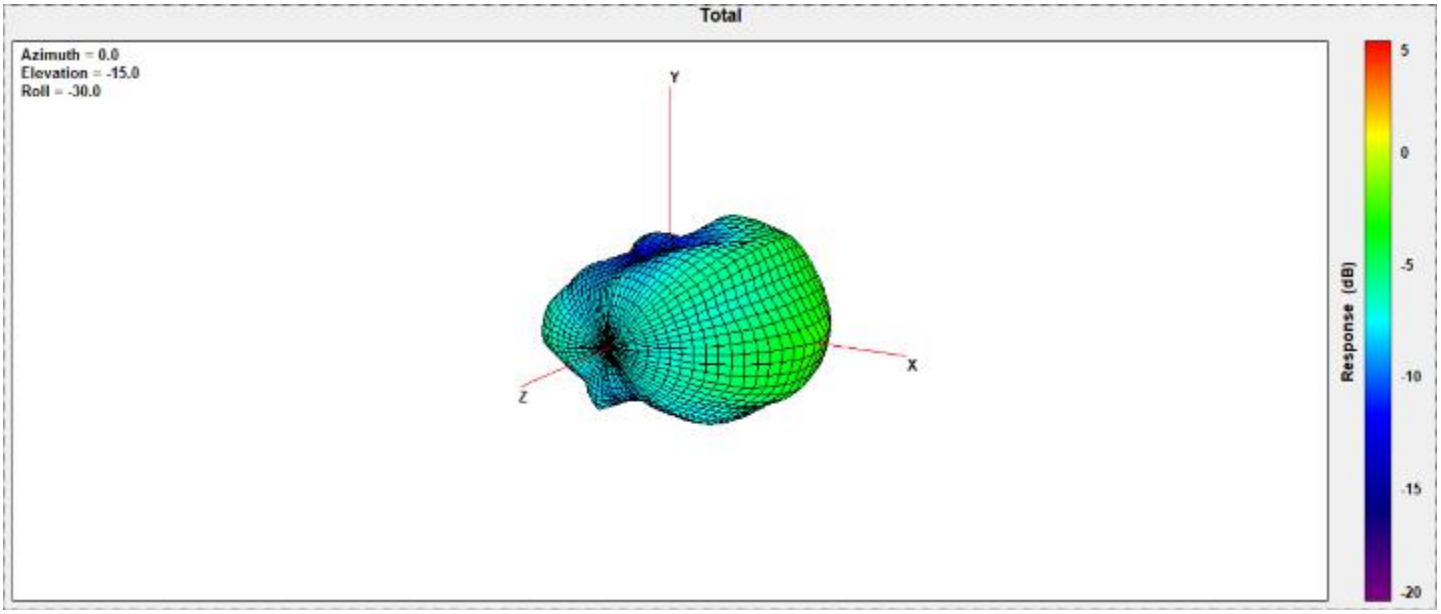
Center Frequency	**2315MHz**
Horizontal (dBi) peak	-0.52
Vertical (dBi) peak	-6.37

2350MHz



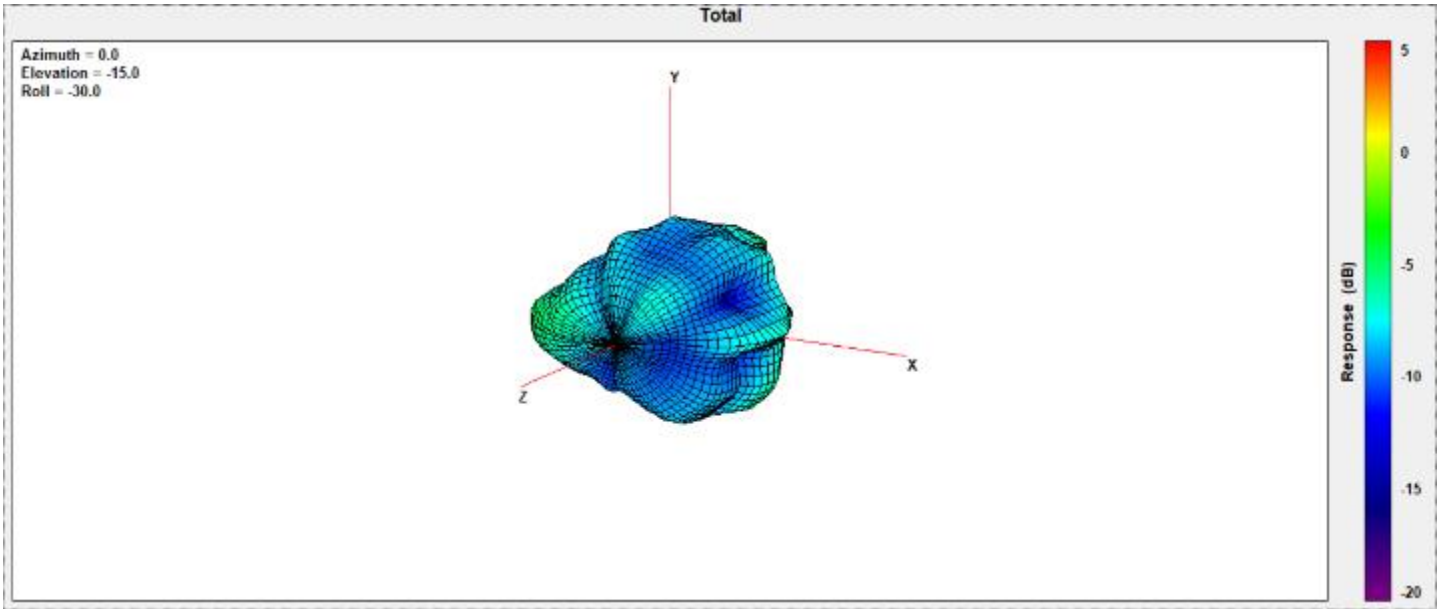
Center Frequency	**2350MHz**
Horizontal (dBi) peak	-1.18
Vertical (dBi) peak	-6.48

2400MHz



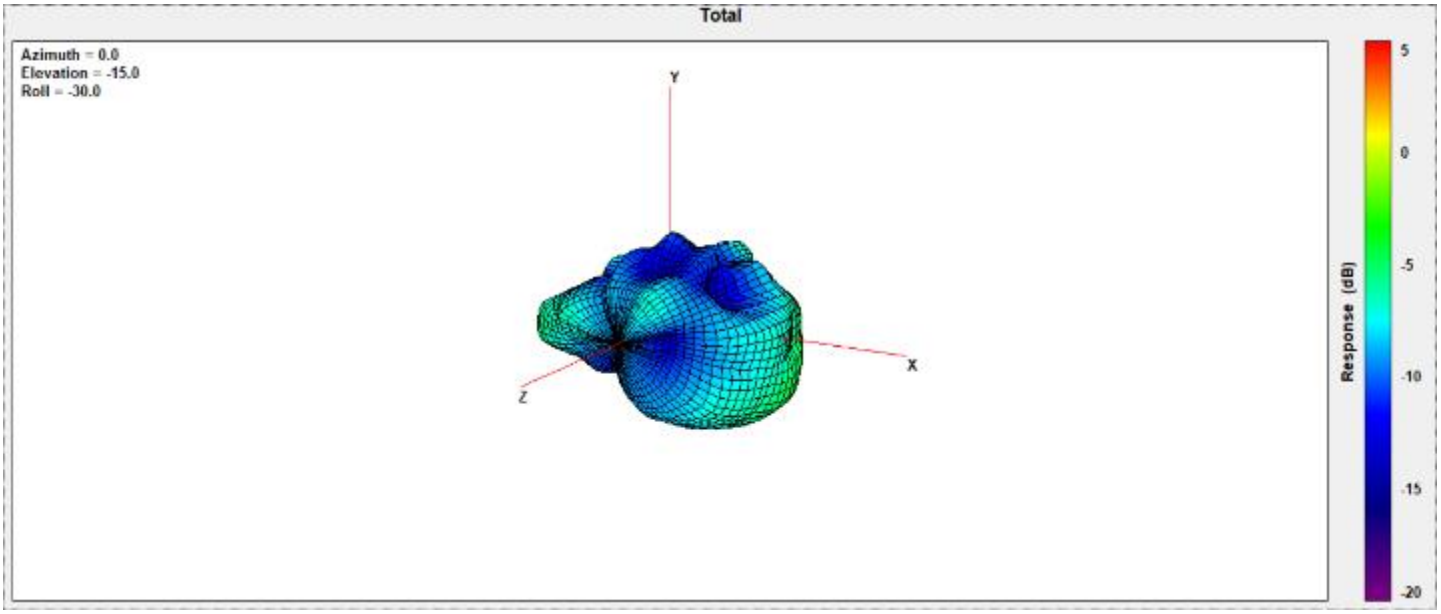
Center Frequency	**2400MHz**
Horizontal (dBi) peak	-3.32
Vertical (dBi) peak	-4.50

2500MHz



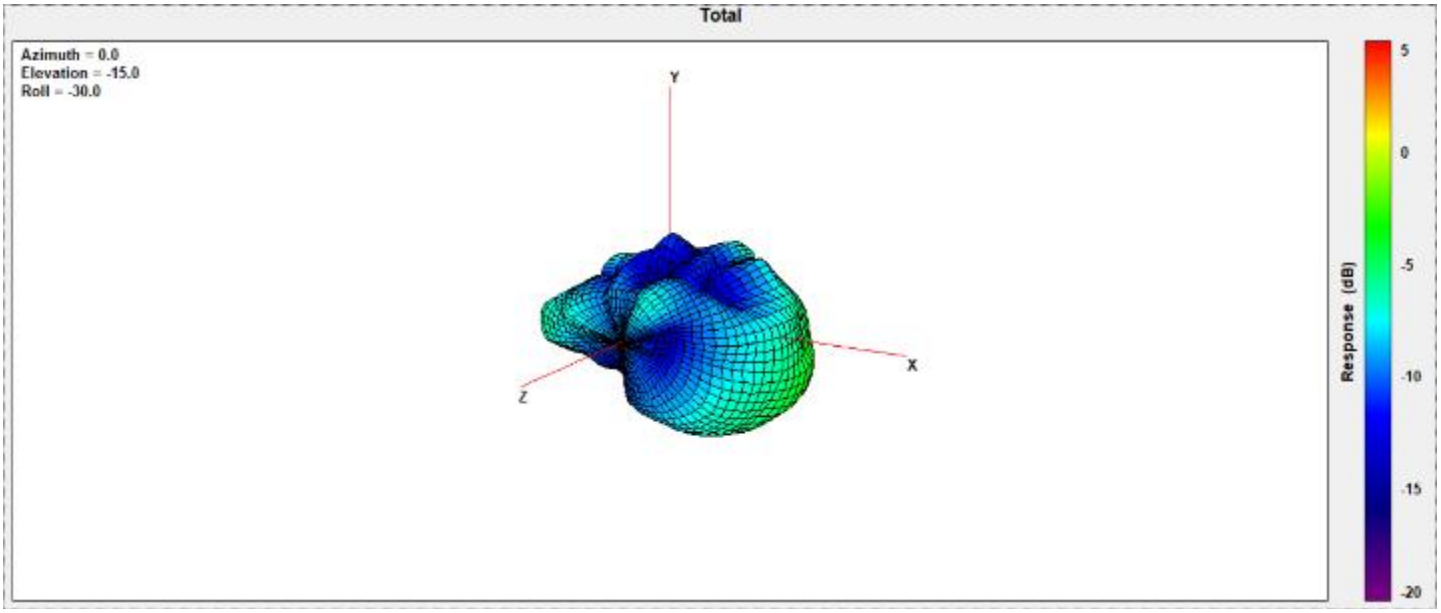
Center Frequency	**2500MHz**
Horizontal (dBi) peak	-1.13
Vertical (dBi) peak	-1.89

2570MHz



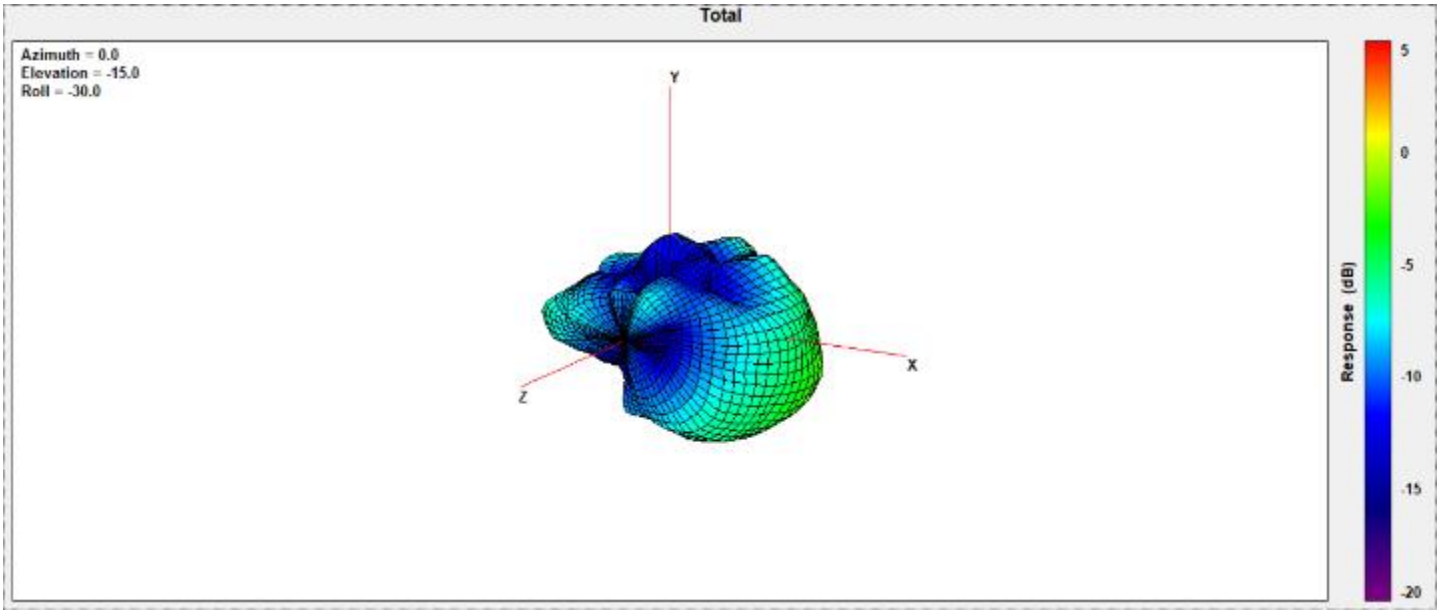
Center Frequency	**2570MHz**
Horizontal (dBi) peak	-1.84
Vertical (dBi) peak	-0.76

2595MHz



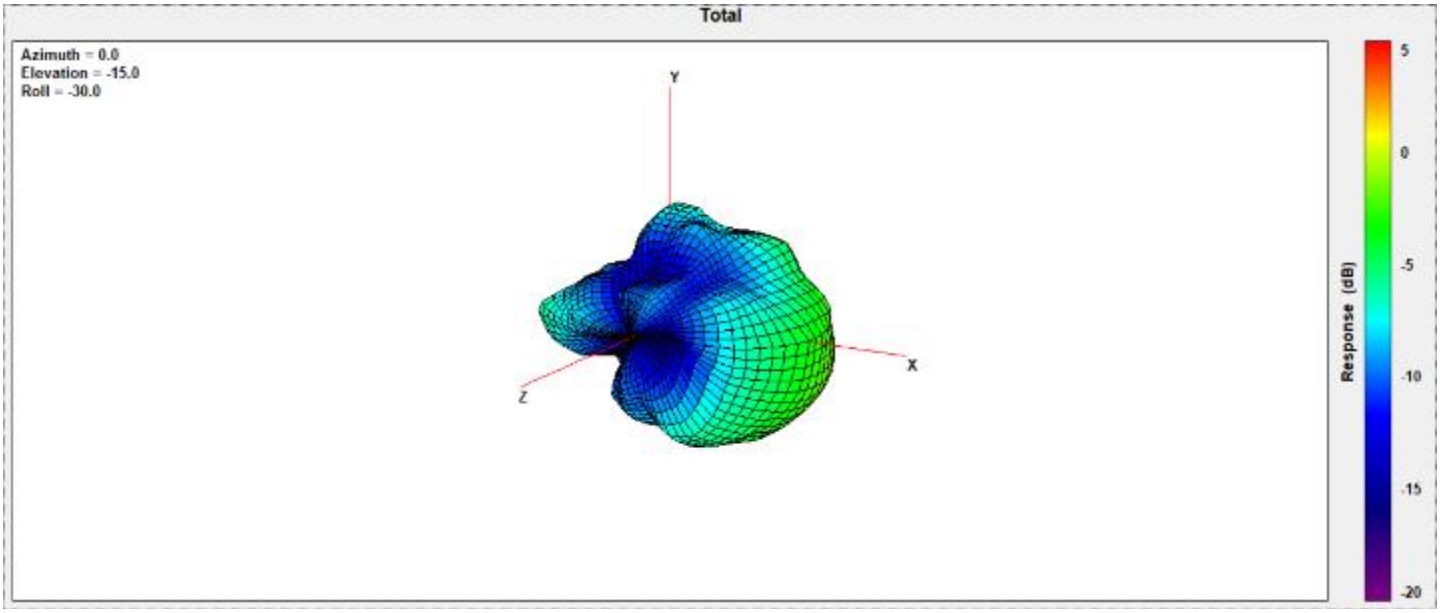
Center Frequency	**2595MHz**
Horizontal (dBi) peak	-2.66
Vertical (dBi) peak	-0.42

2620MHz



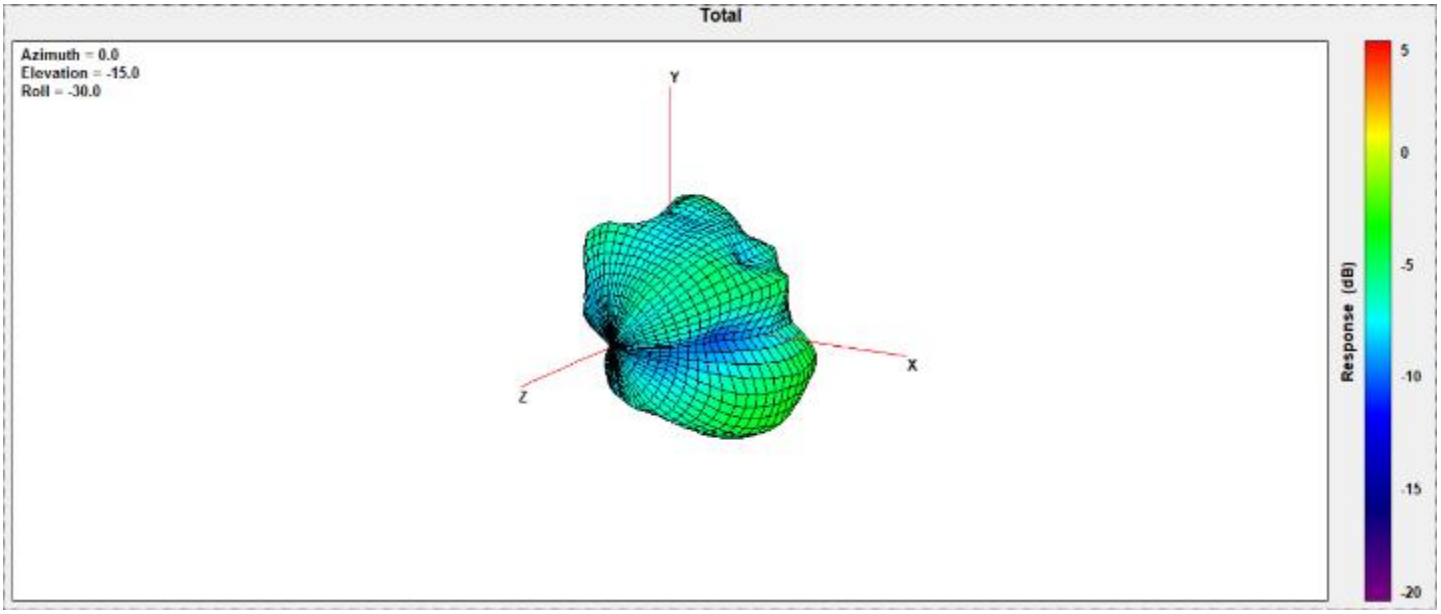
Center Frequency	**2620MHz**
Horizontal (dBi) peak	-3.53
Vertical (dBi) peak	-0.17

2690MHz



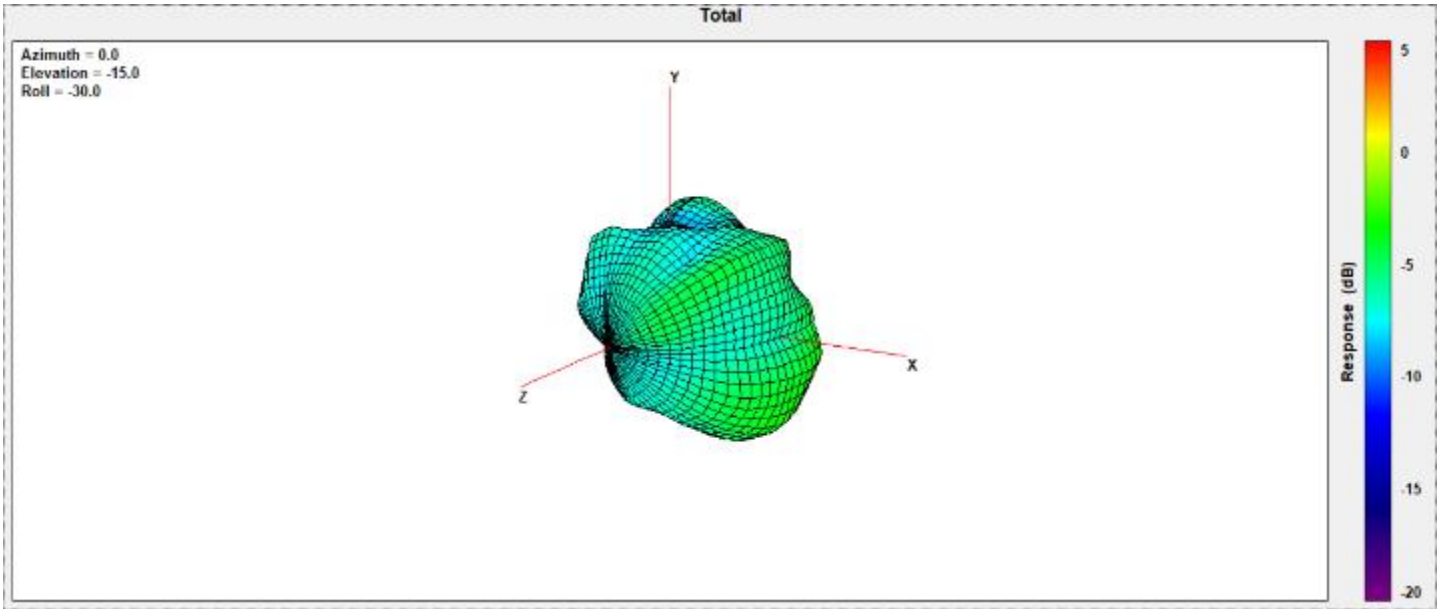
Center Frequency	**2690MHz**
Horizontal (dBi) peak	-3.79
Vertical (dBi) peak	-0.43

3400MHz



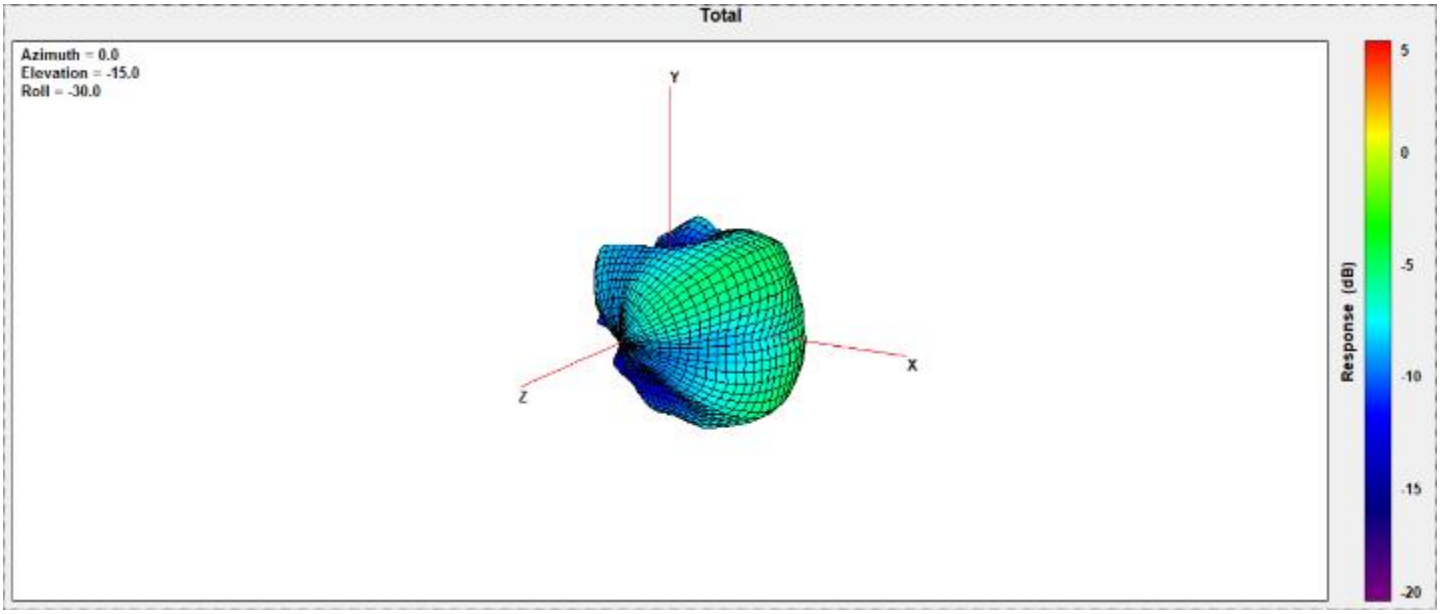
Center Frequency	**3400MHz**
Horizontal (dBi) peak	-2.54
Vertical (dBi) peak	-6.38

3500MHz



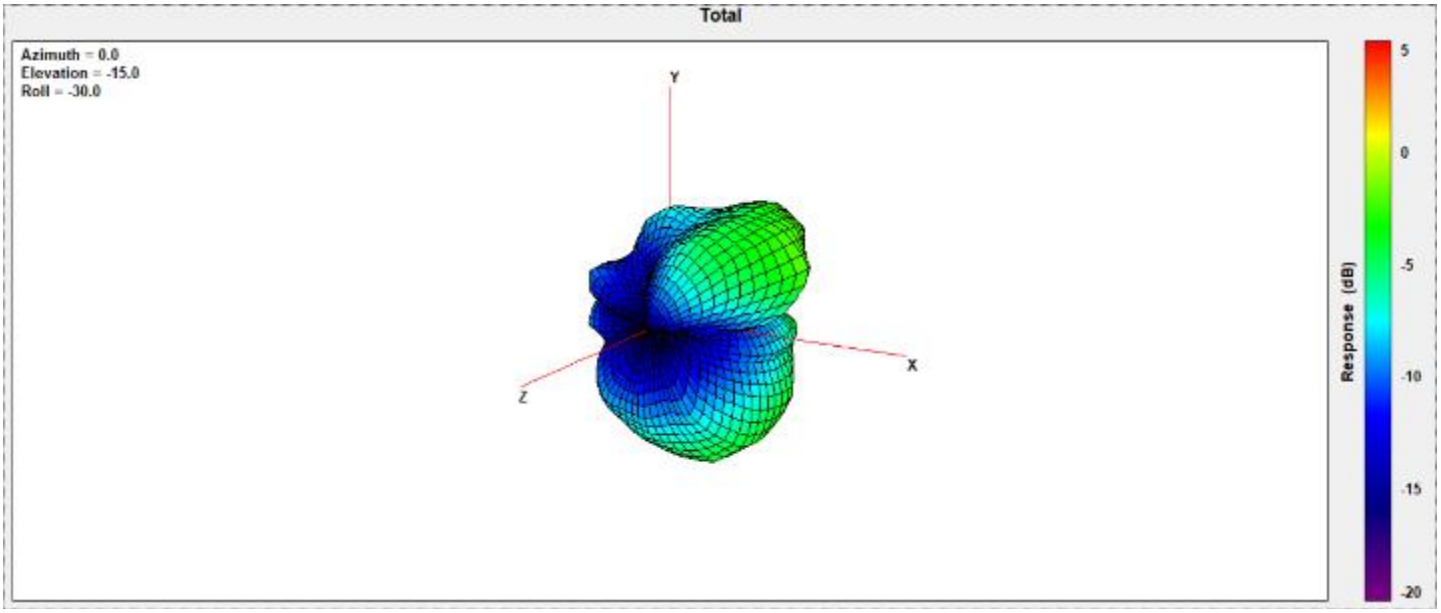
Center Frequency	**3500MHz**
Horizontal (dBi) peak	-1.78
Vertical (dBi) peak	-3.76

3600MHz



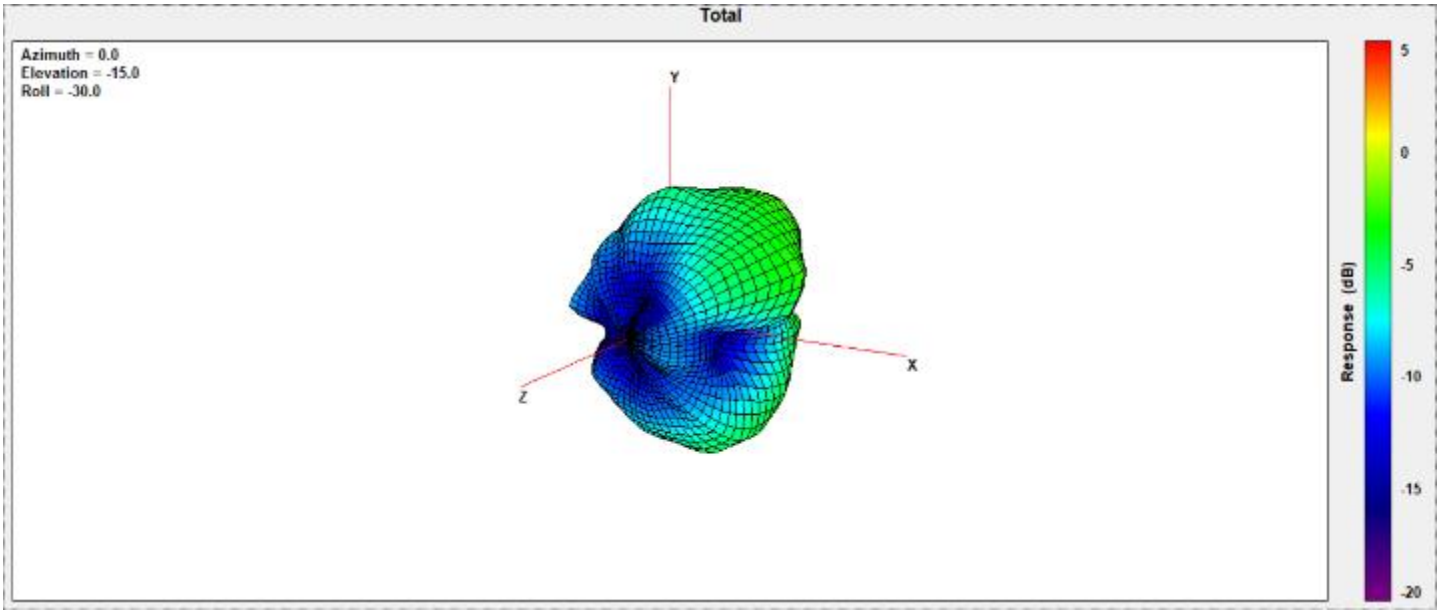
Center Frequency	**3600MHz**
Horizontal (dBi) peak	-2.91
Vertical (dBi) peak	-0.91

3700MHz



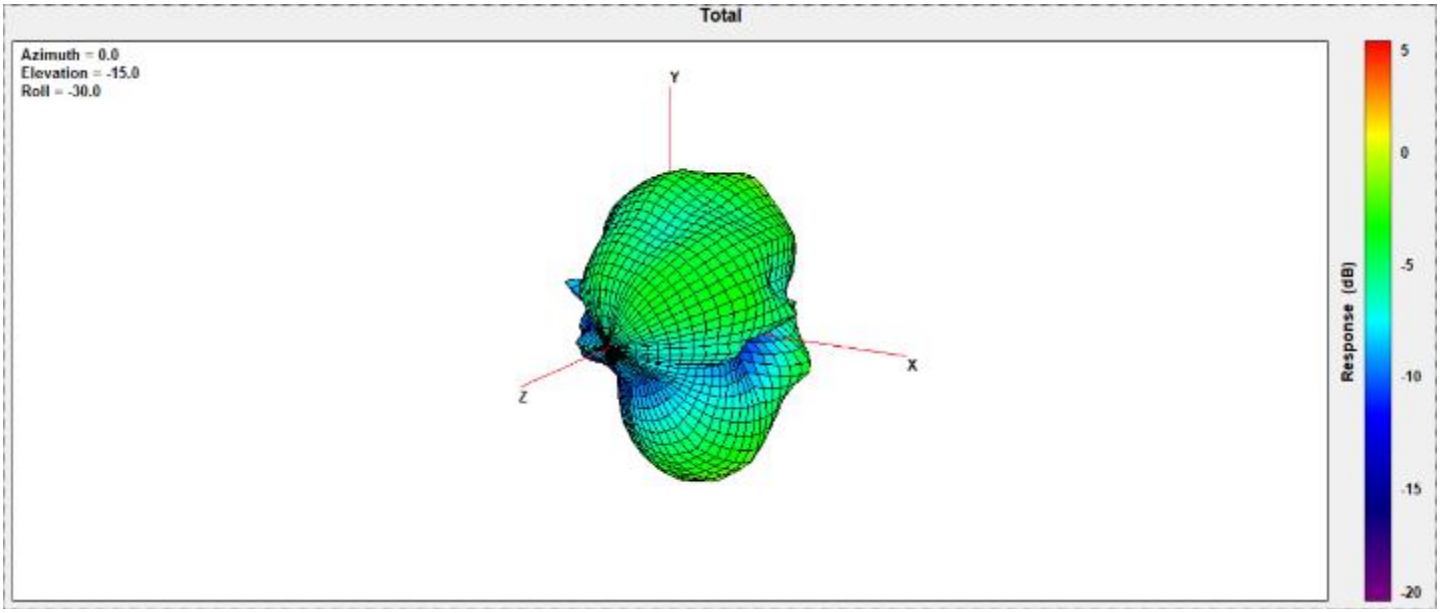
Center Frequency	**3700MHz**
Horizontal (dBi) peak	-1.39
Vertical (dBi) peak	-1.02

3800MHz



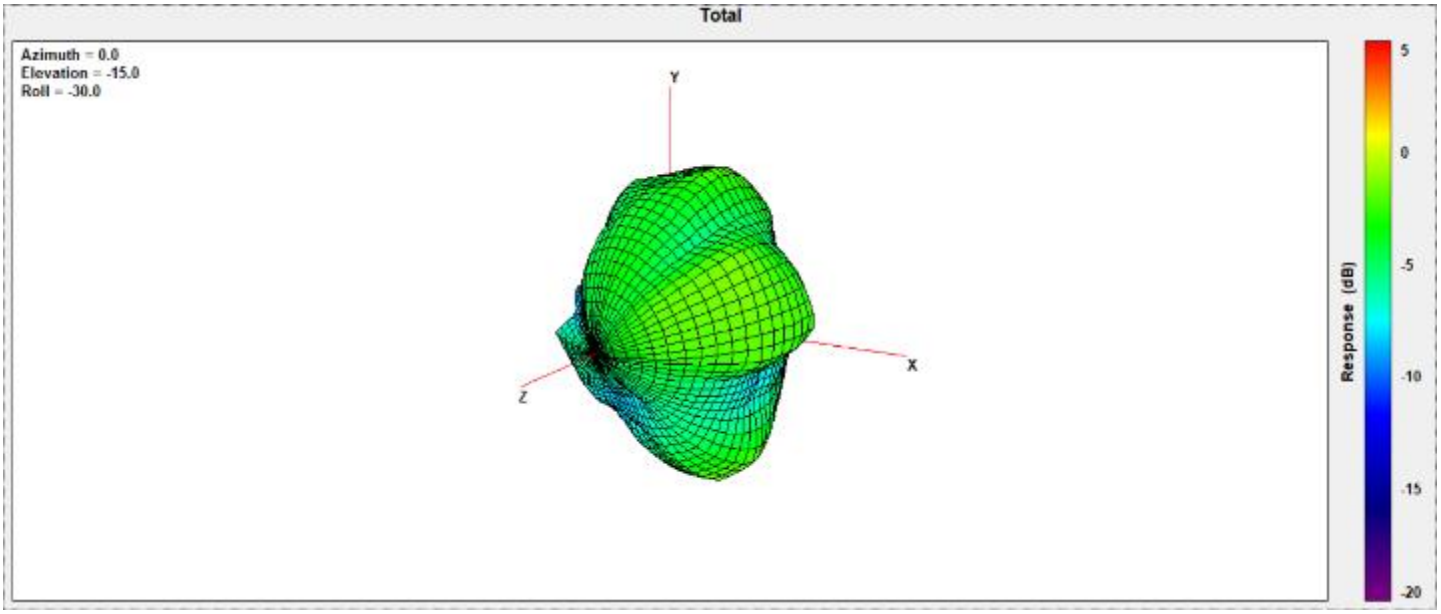
Center Frequency	**3800MHz**
Horizontal (dBi) peak	-0.92
Vertical (dBi) peak	-1.81

4200MHz



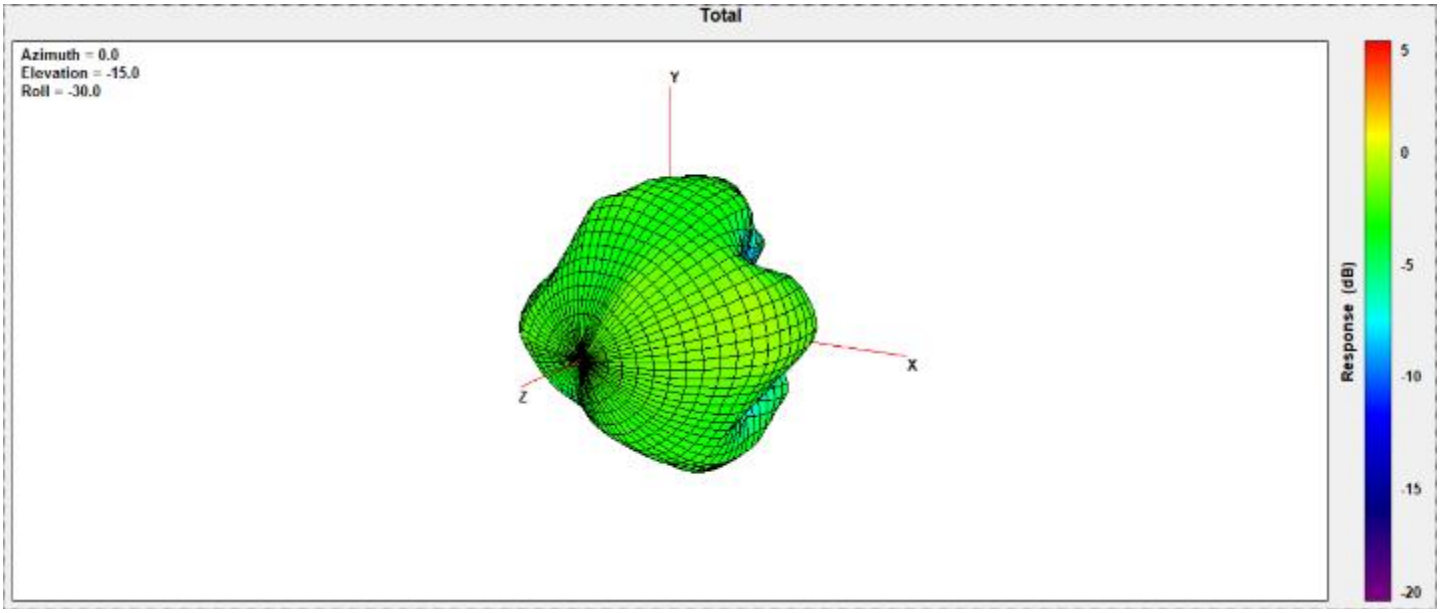
Center Frequency	**4200MHz**
Horizontal (dBi) peak	-3.31
Vertical (dBi) peak	-4.76

4400MHz



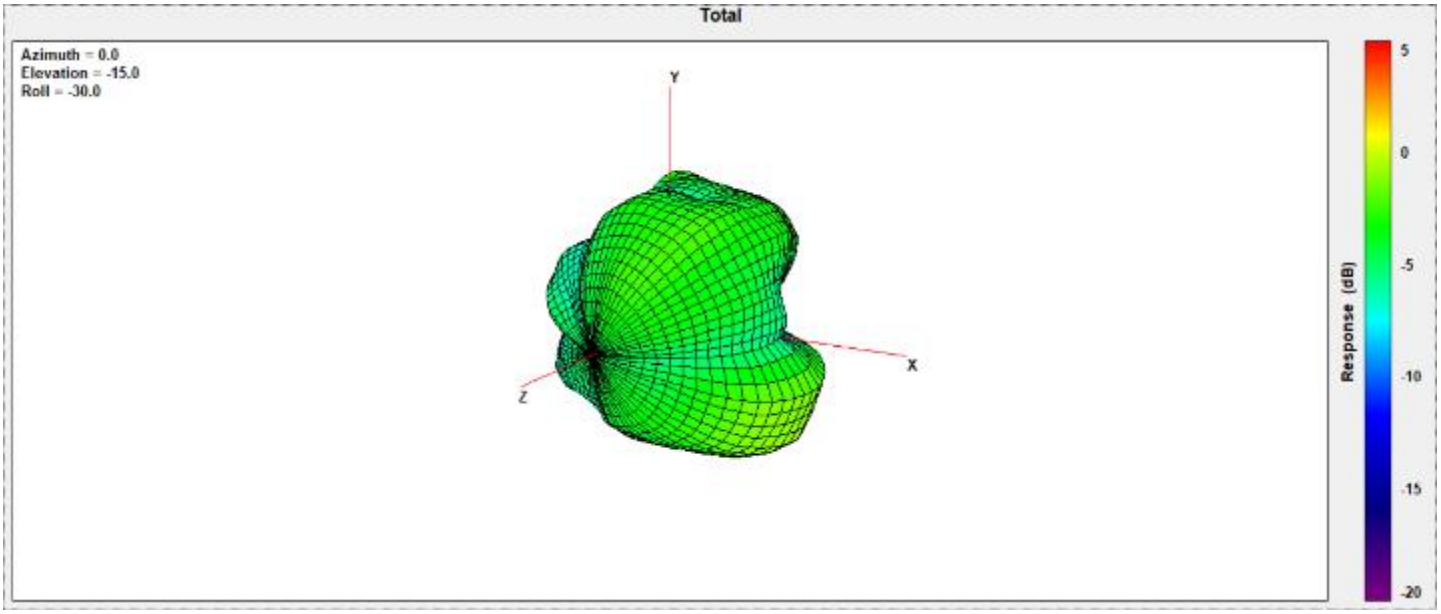
Center Frequency	**4400MHz**
Horizontal (dBi) peak	-3.22
Vertical (dBi) peak	-4.56

4700MHz



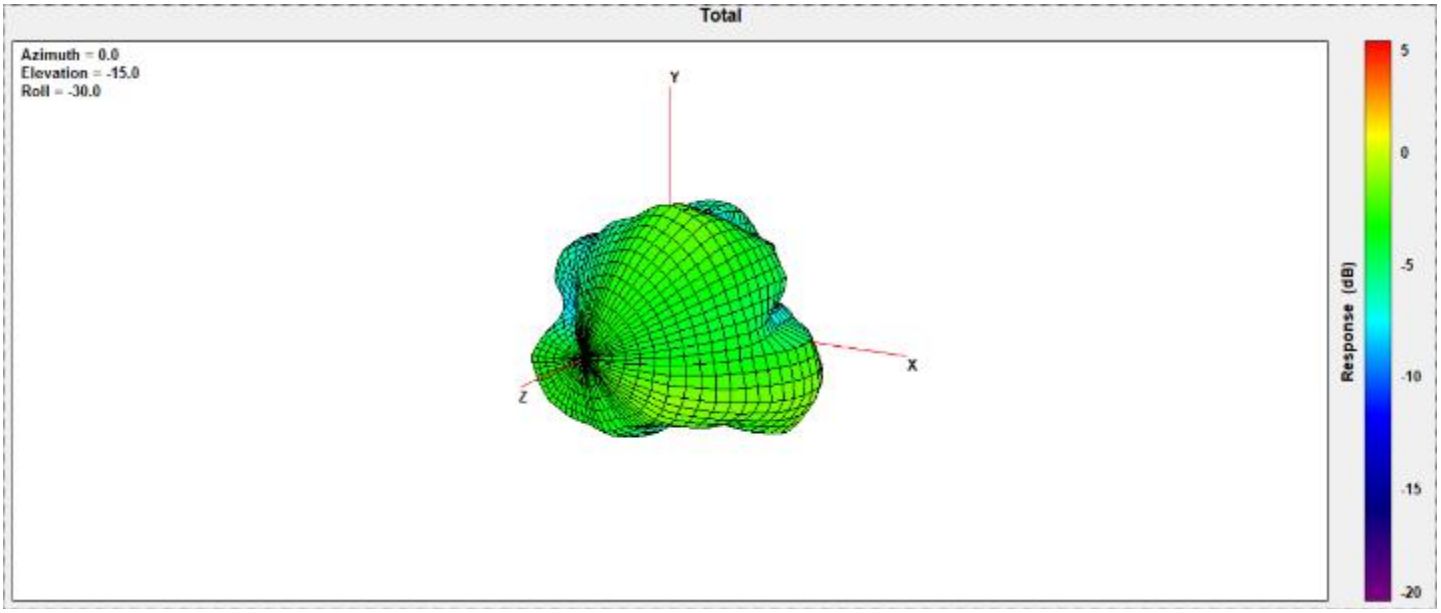
Center Frequency	**4700MHz**
Horizontal (dBi) peak	-2.41
Vertical (dBi) peak	-3.13

5150MHz



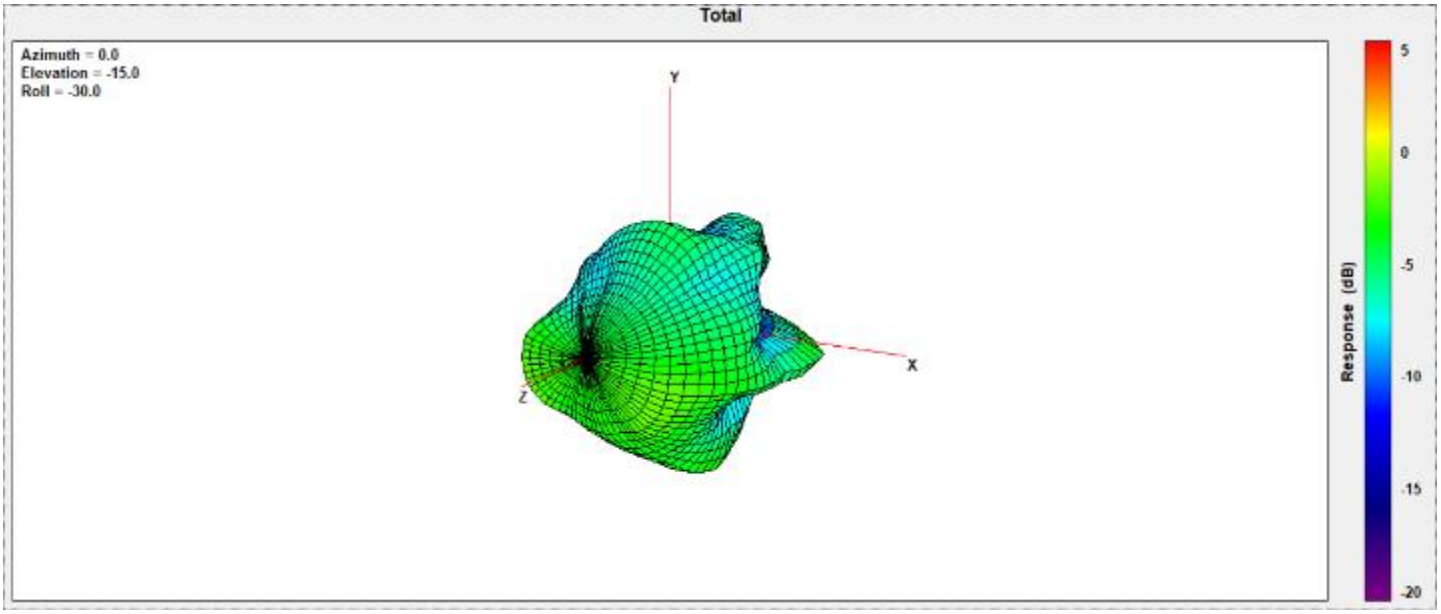
Center Frequency	**5150MHz**
Horizontal (dBi) peak	-1.21
Vertical (dBi) peak	-2.76

5537.5MHz



Center Frequency	**5537.5MHz**
Horizontal (dBi) peak	-0.39
Vertical (dBi) peak	-0.28

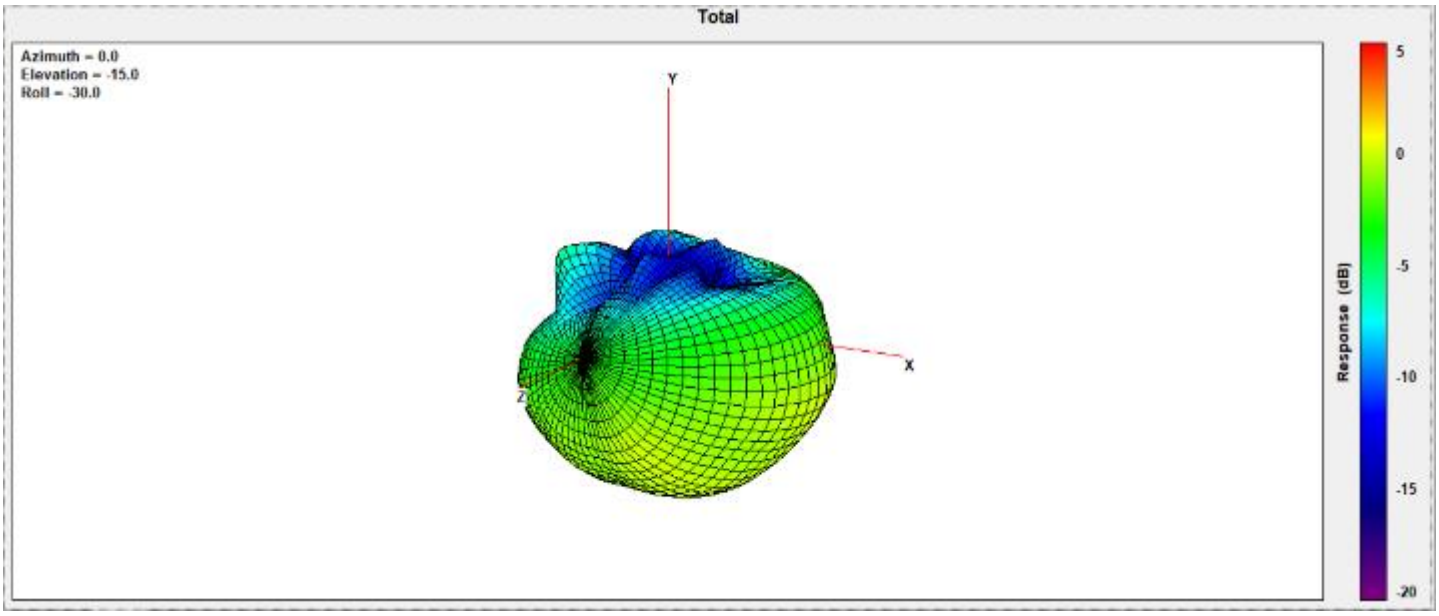
5925MHz



Center Frequency	**5925MHz**
Horizontal (dBi) peak	1.16
Vertical (dBi) peak	-1.10

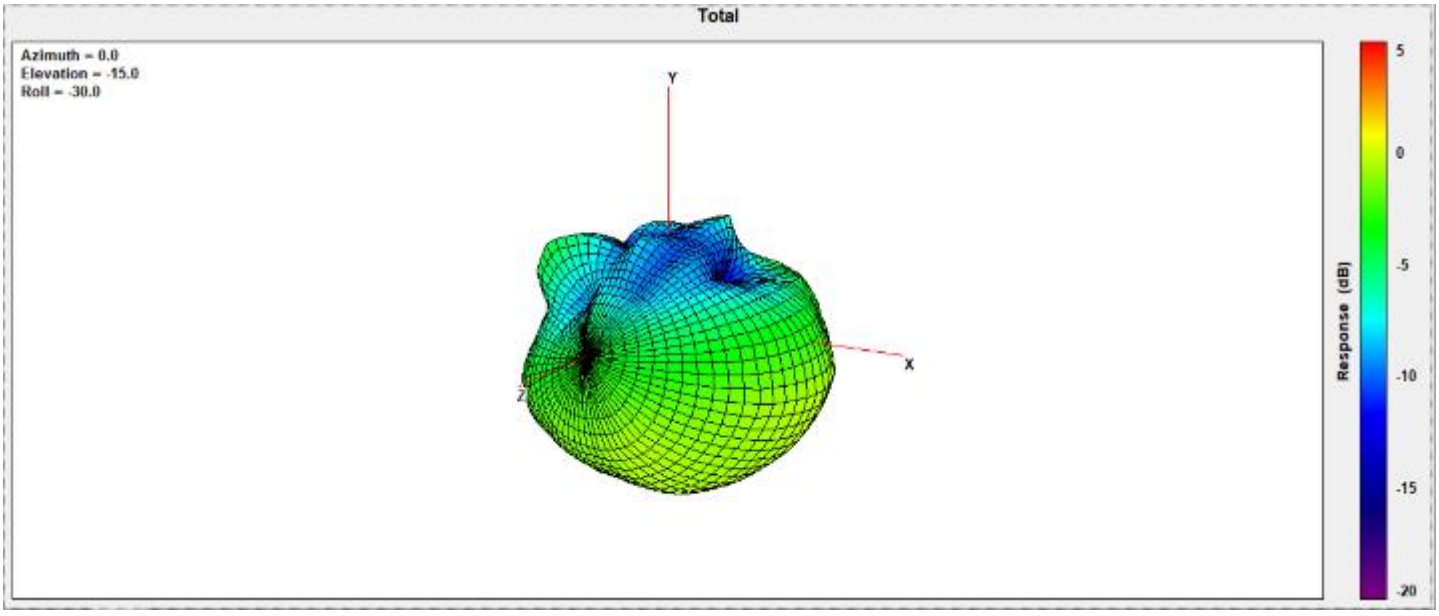
MIMO2 Antenna (DRx2)

1710 MHz



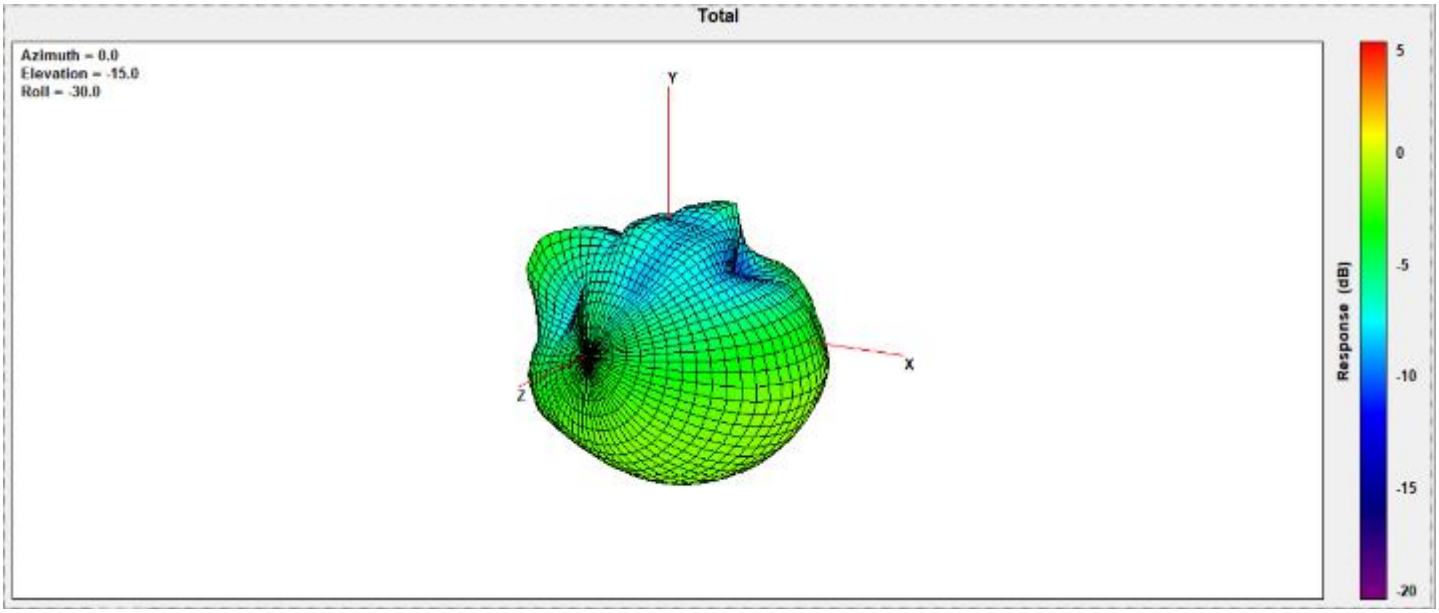
Center Frequency	**1710 MHz**
Horizontal (dBi) peak	-0.35
Vertical (dBi) peak	-3.36

1732.5 MHz



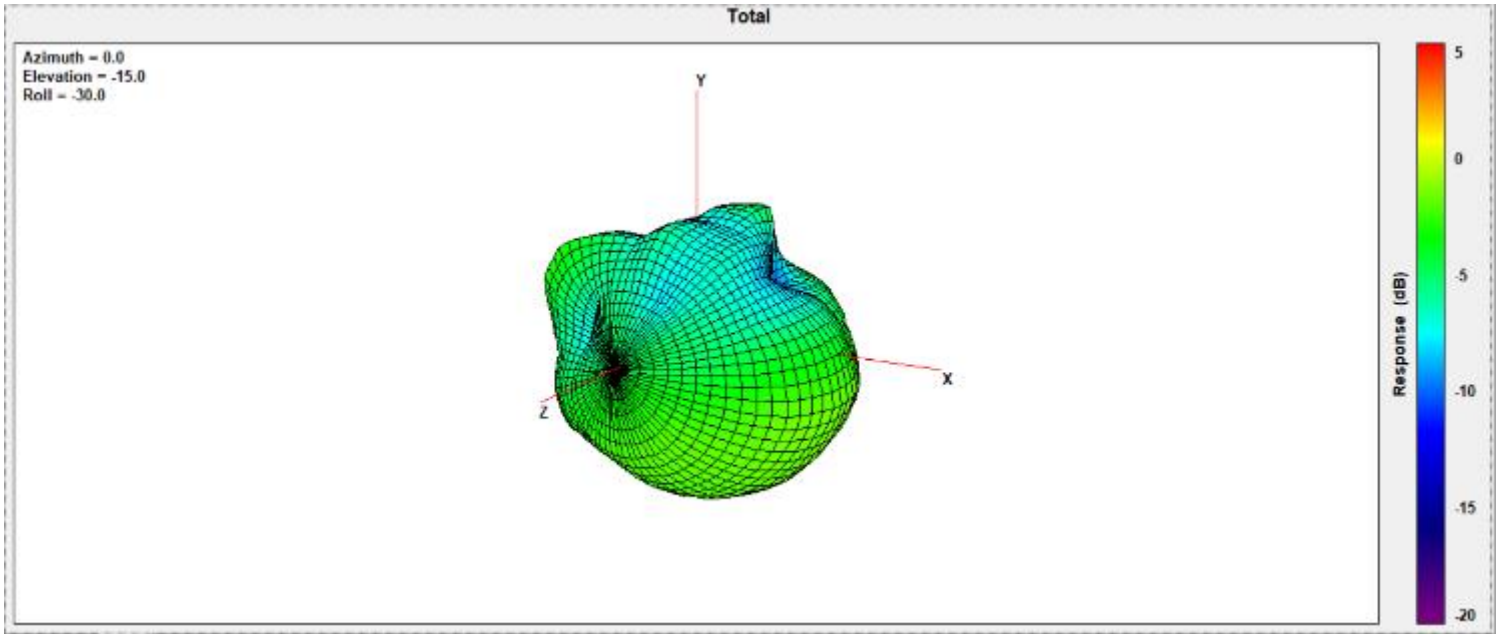
Center Frequency	**1732.5 MHz**
Horizontal (dBi) peak	-0.85
Vertical (dBi) peak	-4.02

1747.5 MHz



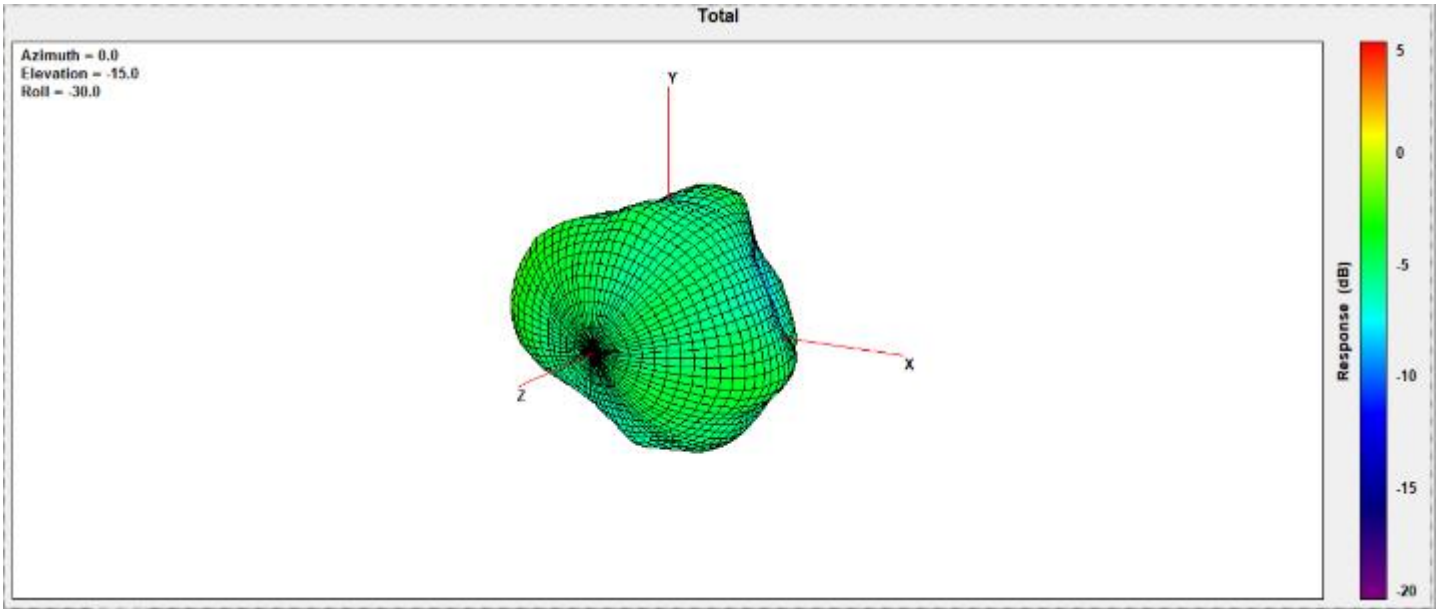
Center Frequency	**1747.5 MHz**
Horizontal (dBi) peak	-1.28
Vertical (dBi) peak	-4.52

1755 MHz



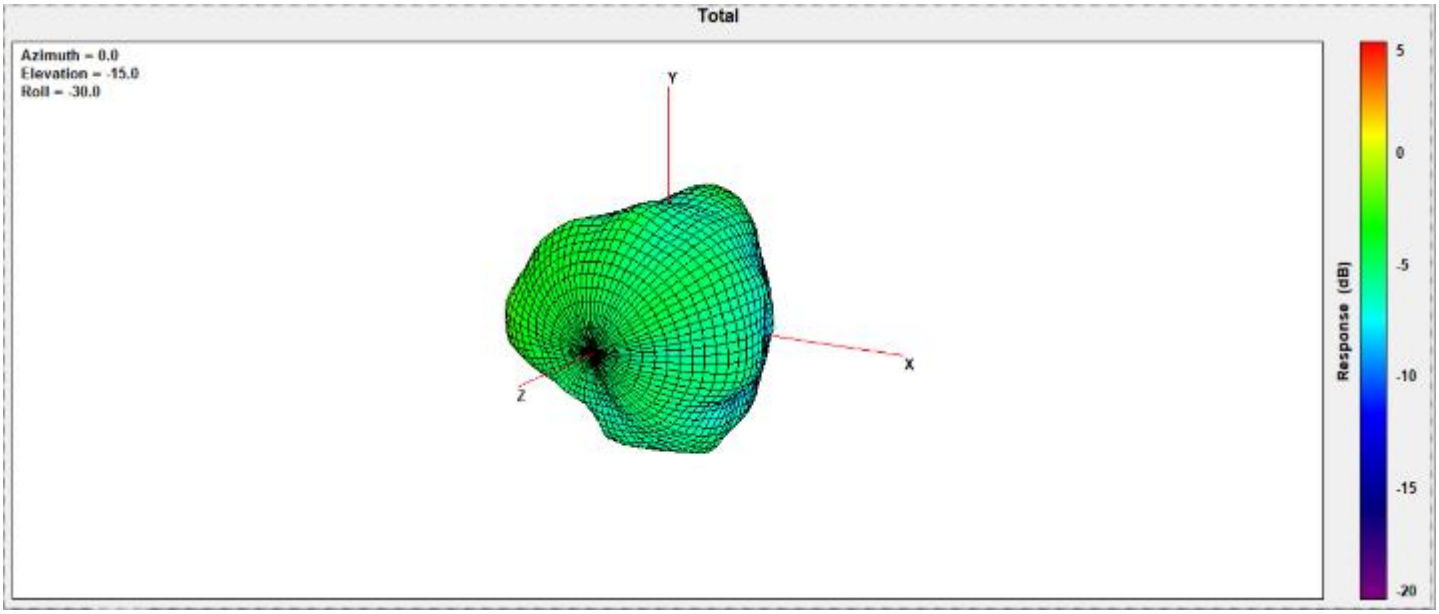
Center Frequency	**1755 MHz**
Horizontal (dBi) peak	-1.51
Vertical (dBi) peak	-4.46

1785 MHz



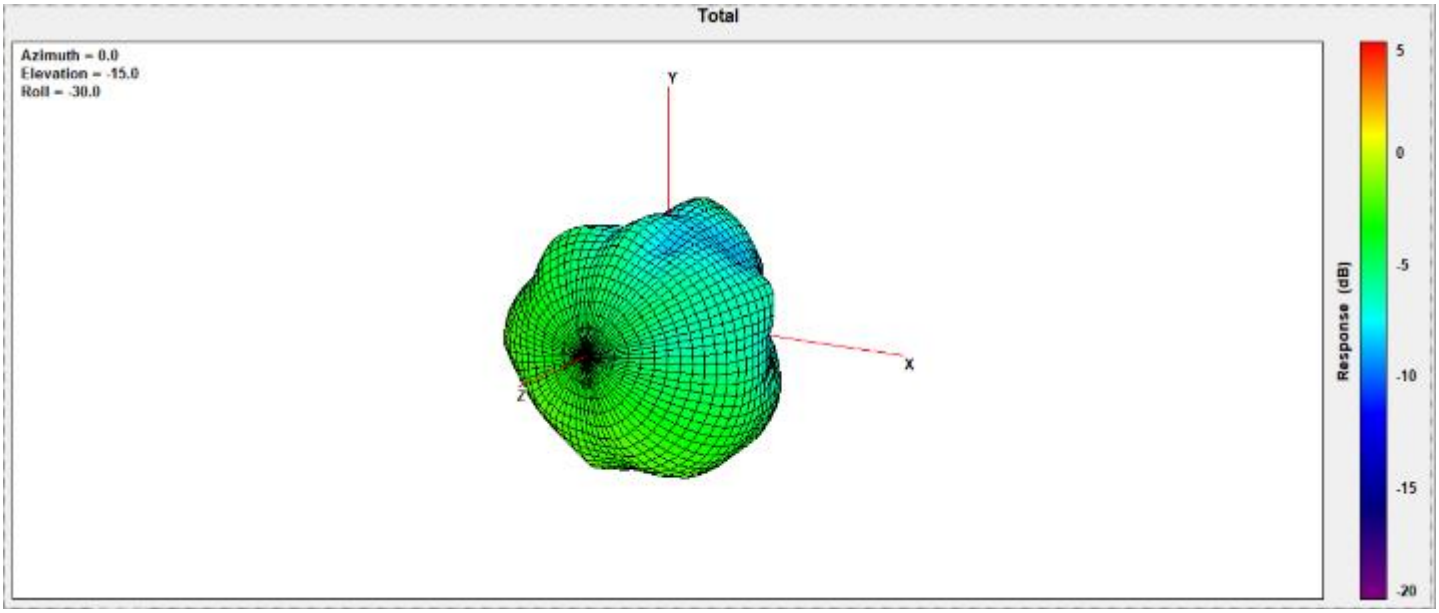
Center Frequency	**1785 MHz**
Horizontal (dBi) peak	-2.24
Vertical (dBi) peak	-2.64

1805 MHz



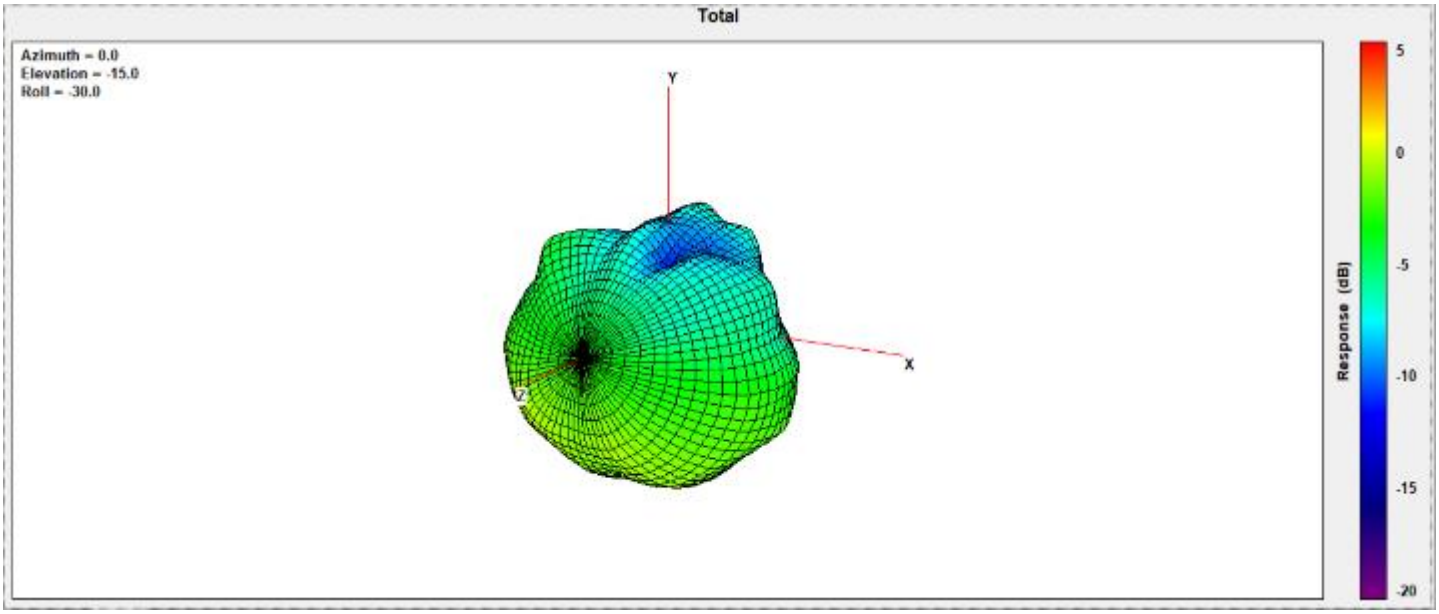
Center Frequency	**1805 MHz**
Horizontal (dBi) peak	-1.77
Vertical (dBi) peak	-2.35

1850 MHz



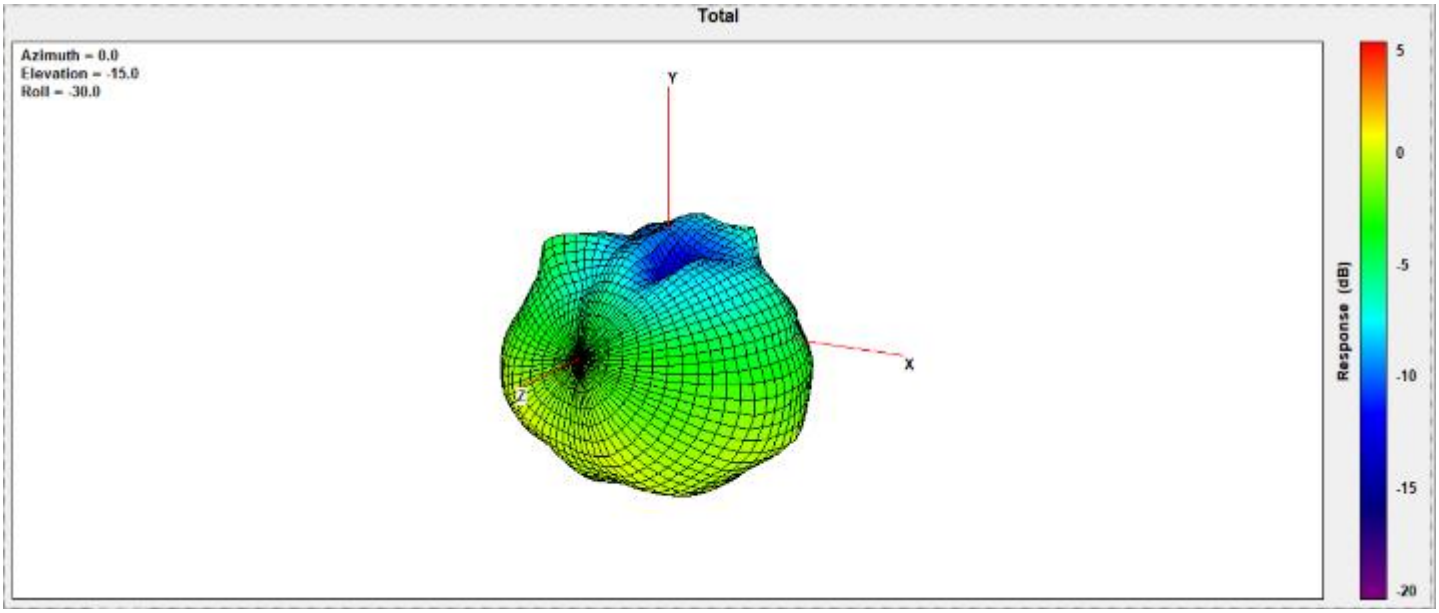
Center Frequency	**1850 MHz**
Horizontal (dBi) peak	-0.38
Vertical (dBi) peak	-1.53

1880 MHz



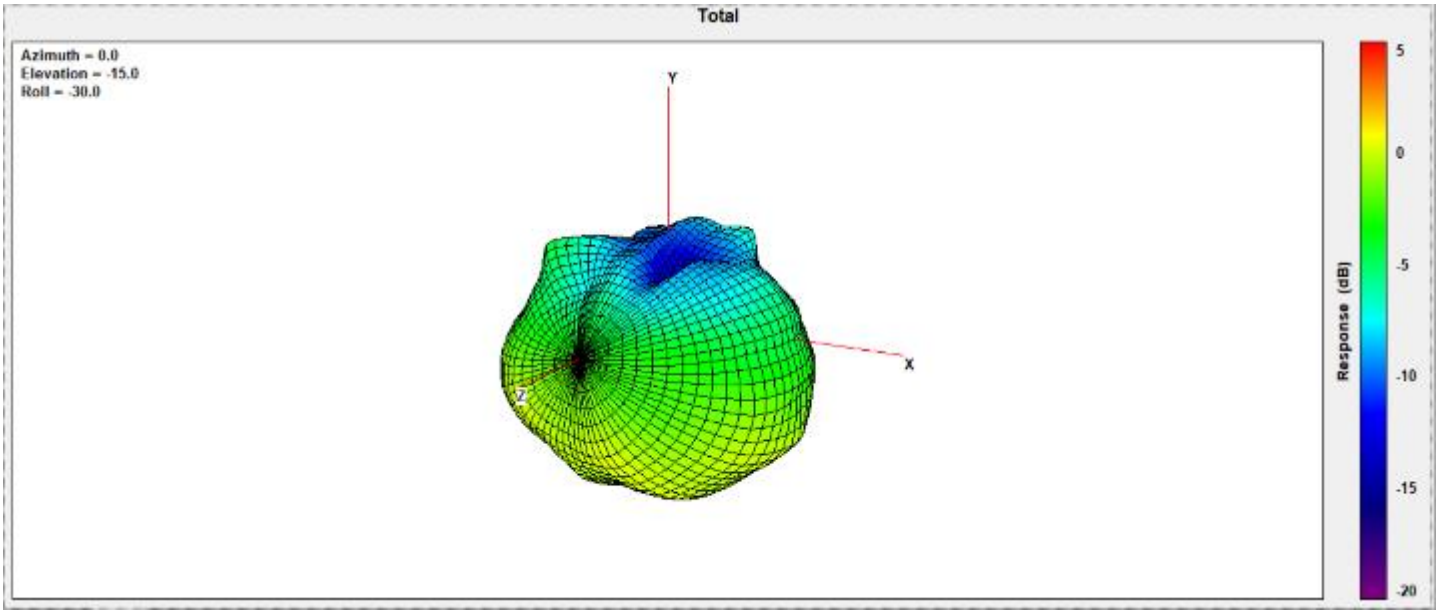
Center Frequency	**1880 MHz**
Horizontal (dBi) peak	0.67
Vertical (dBi) peak	-1.26

1910MHz



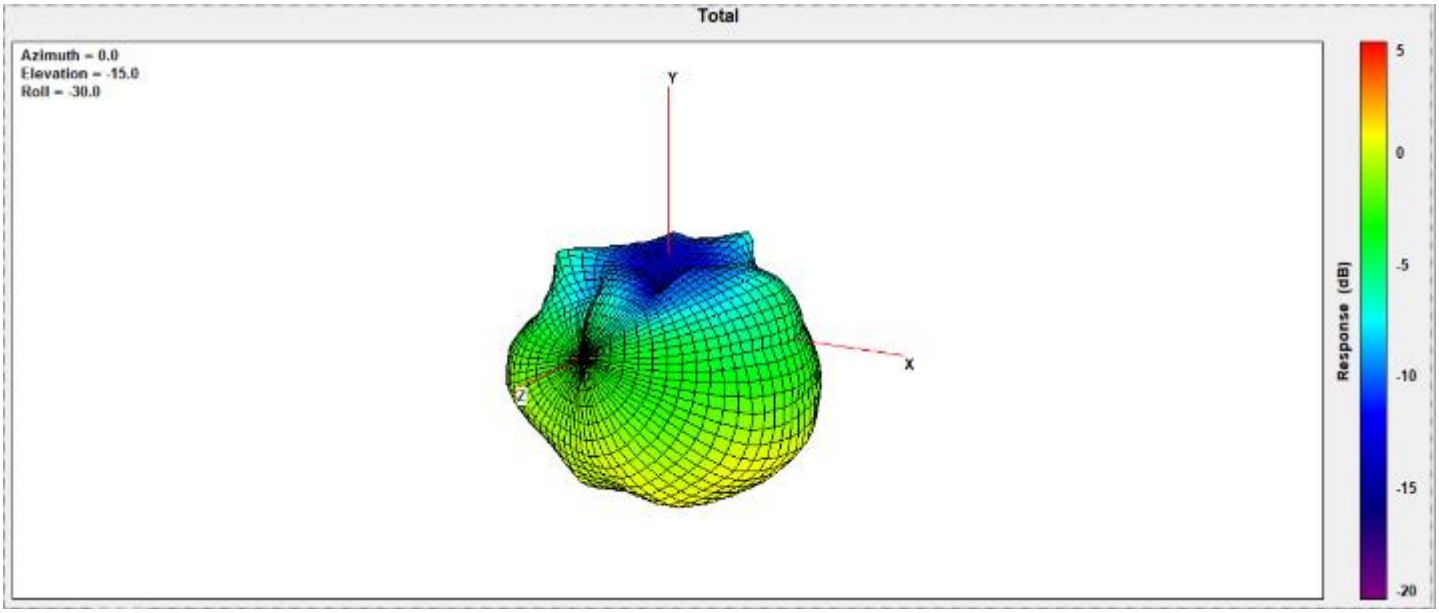
Center Frequency	**1910MHz**
Horizontal (dBi) peak	1.52
Vertical (dBi) peak	-0.65

1920MHz



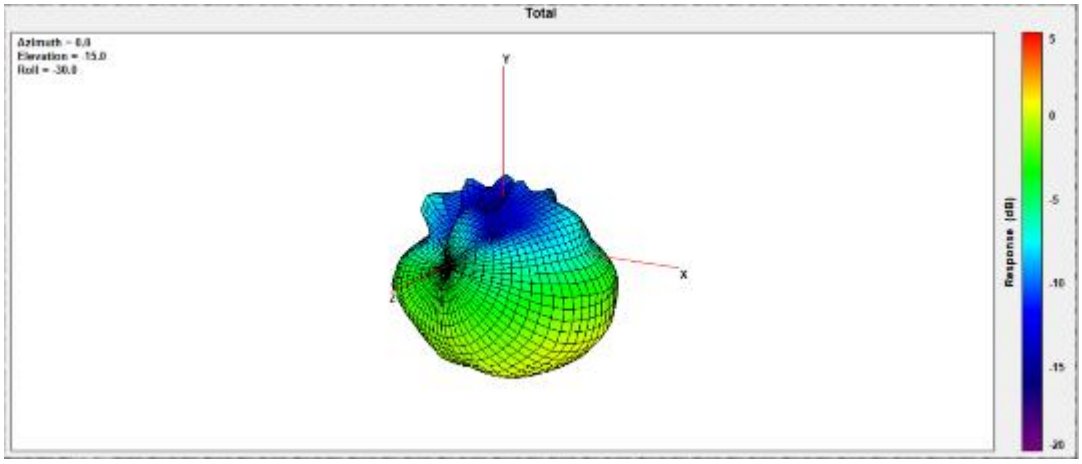
Center Frequency	**1920MHz**
Horizontal (dBi) peak	1.82
Vertical (dBi) peak	-0.50

1950MHz



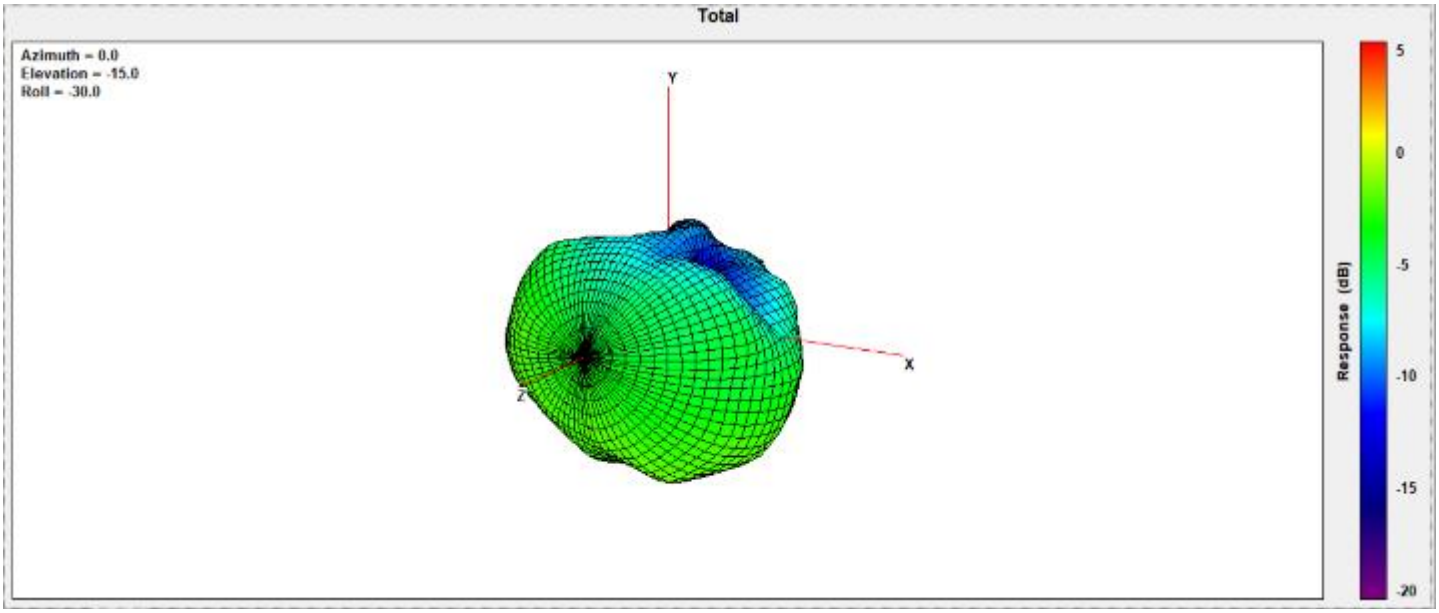
Center Frequency	**1950MHz**
Horizontal (dBi) peak	2.61
Vertical (dBi) peak	0.39

1980MHz



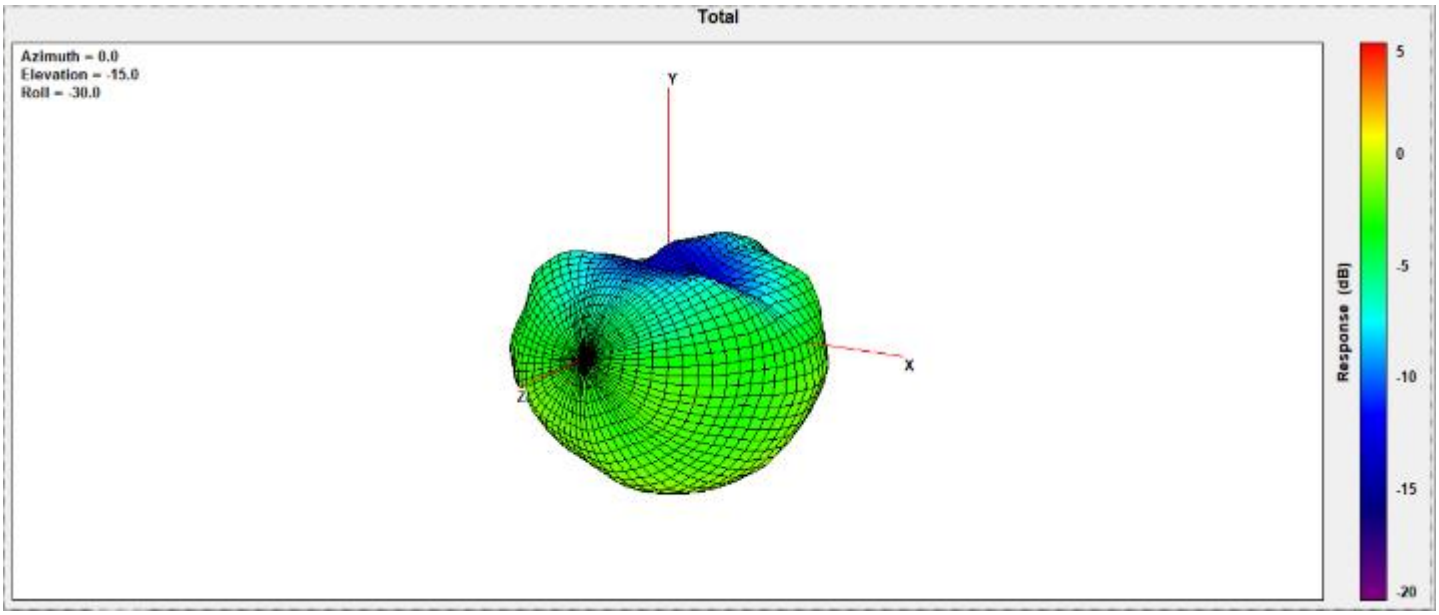
Center Frequency	**1980MHz**
Horizontal (dBi) peak	2.35
Vertical (dBi) peak	0.50

2110MHz



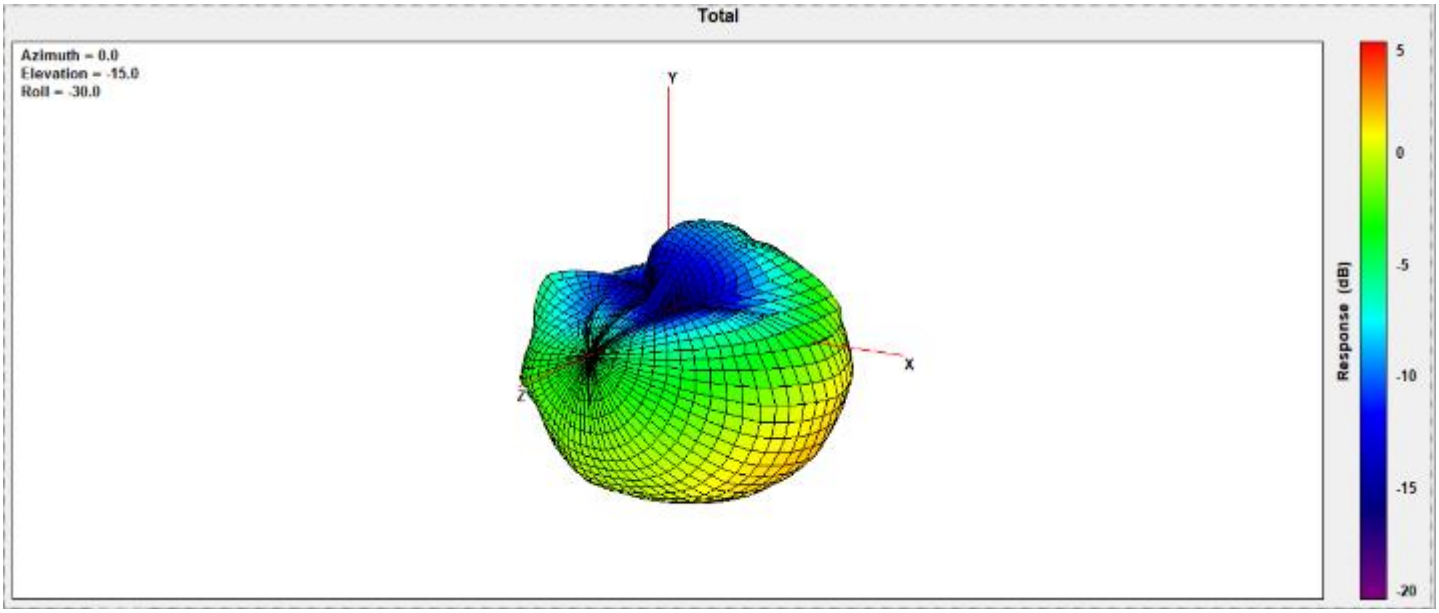
Center Frequency	**2110MHz**
Horizontal (dBi) peak	-0.09
Vertical (dBi) peak	-0.94

2200MHz



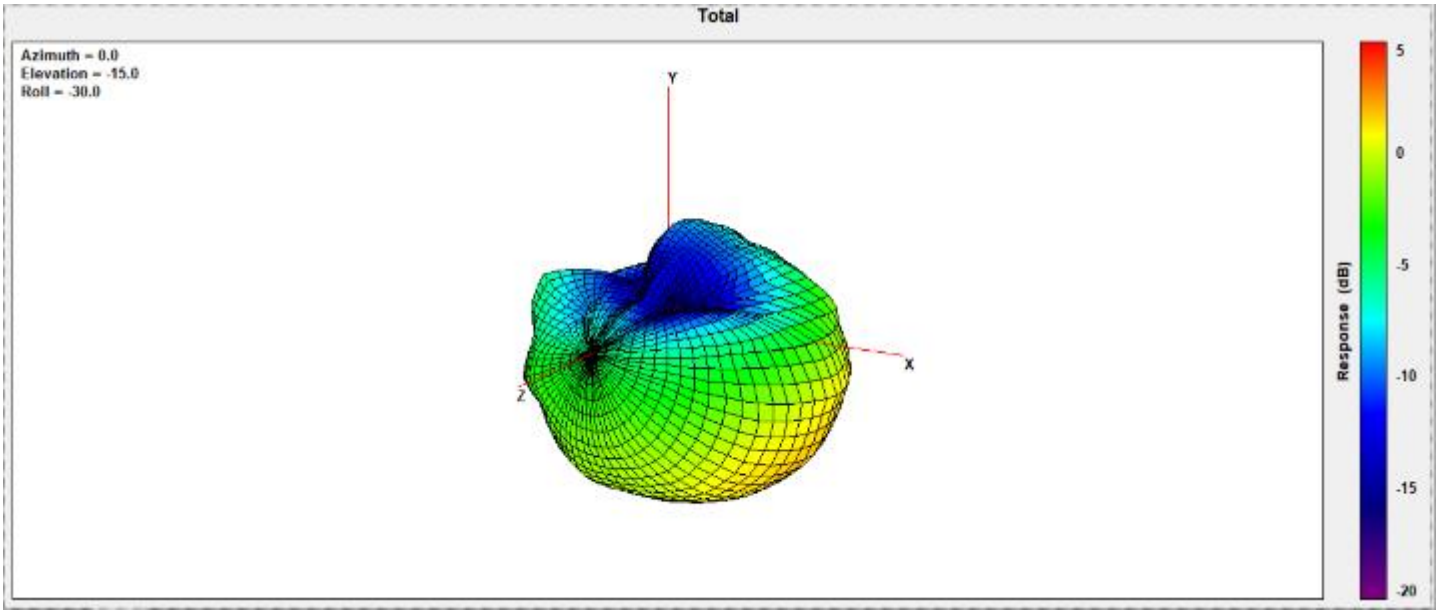
Center Frequency	**2200MHz**
Horizontal (dBi) peak	0.17
Vertical (dBi) peak	-0.89

2300MHz



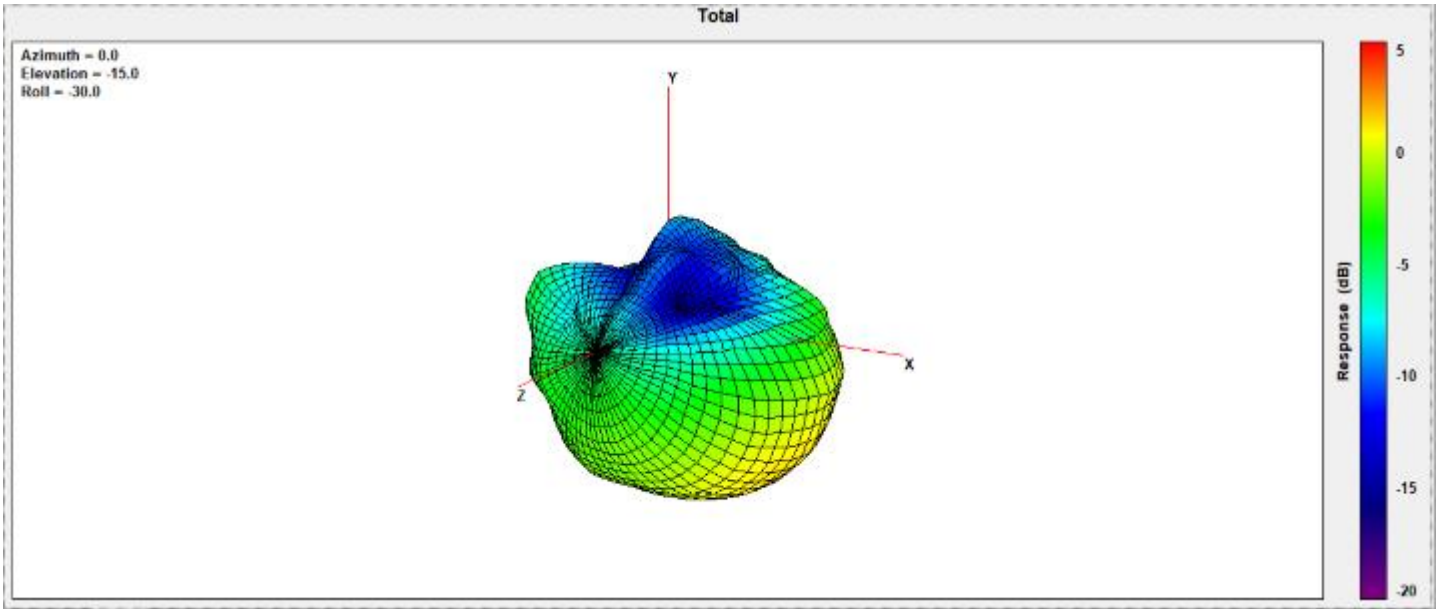
Center Frequency	**2300MHz**
Horizontal (dBi) peak	1.39
Vertical (dBi) peak	-1.09

2305MHz



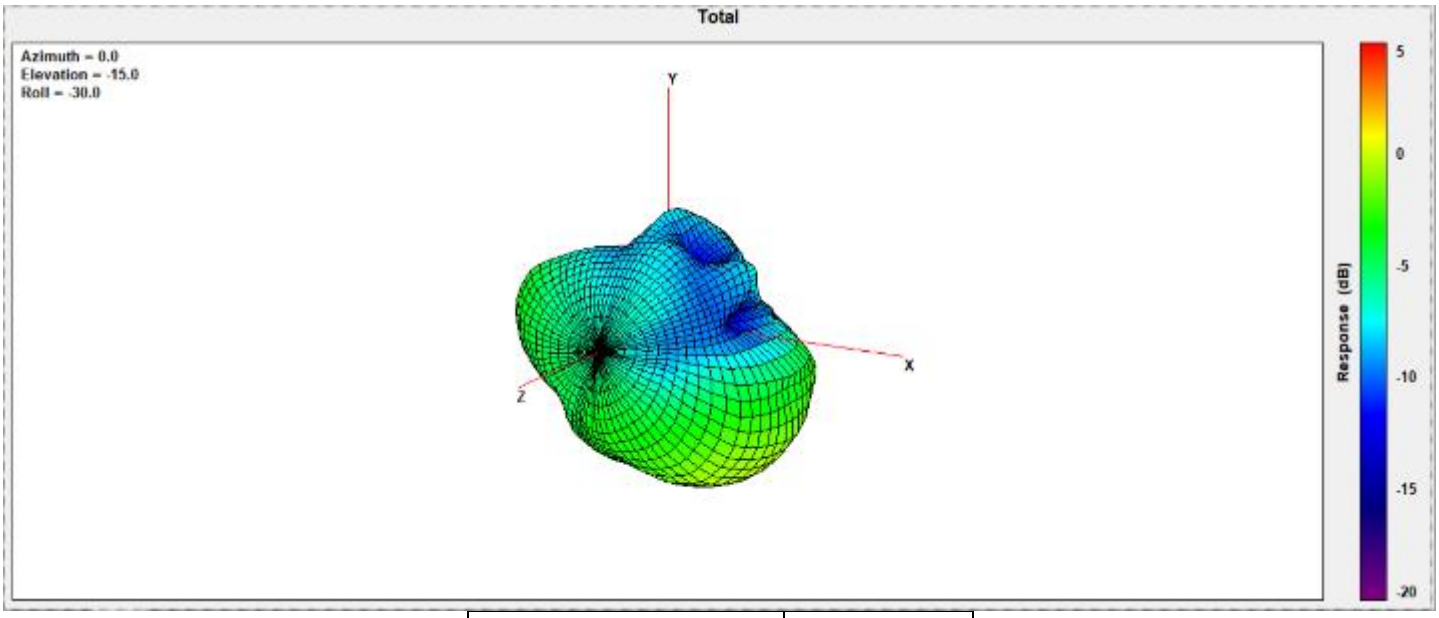
Center Frequency	**2305MHz**
Horizontal (dBi) peak	1.27
Vertical (dBi) peak	-1.45

2315MHz



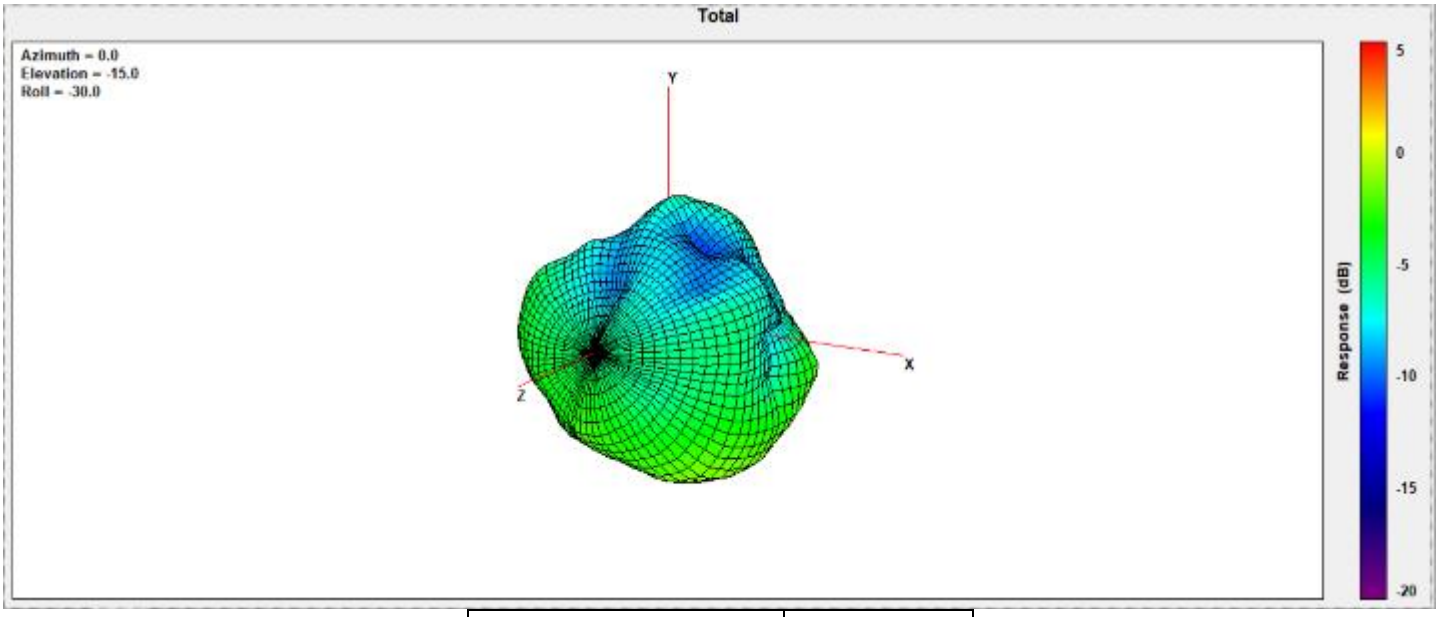
Center Frequency	**2315MHz**
Horizontal (dBi) peak	0.72
Vertical (dBi) peak	-1.88

2350MHz



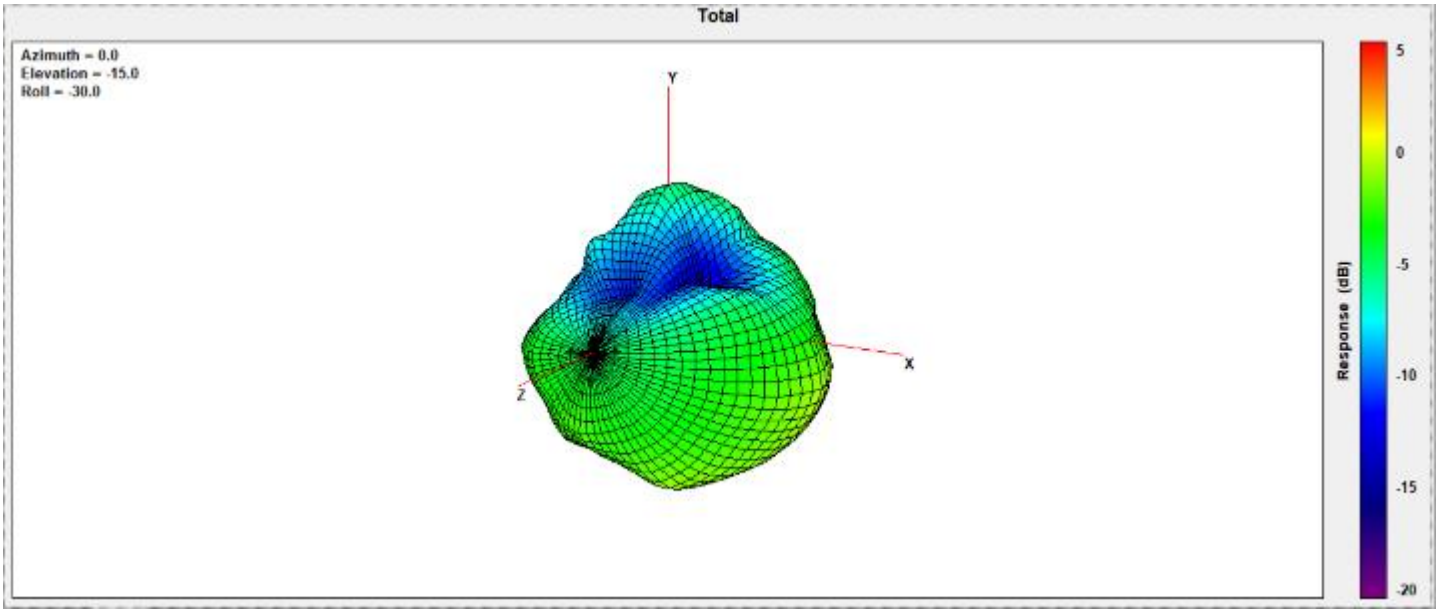
Center Frequency	**2350MHz**
Horizontal (dBi) peak	-1.23
Vertical (dBi) peak	-0.51

2400MHz



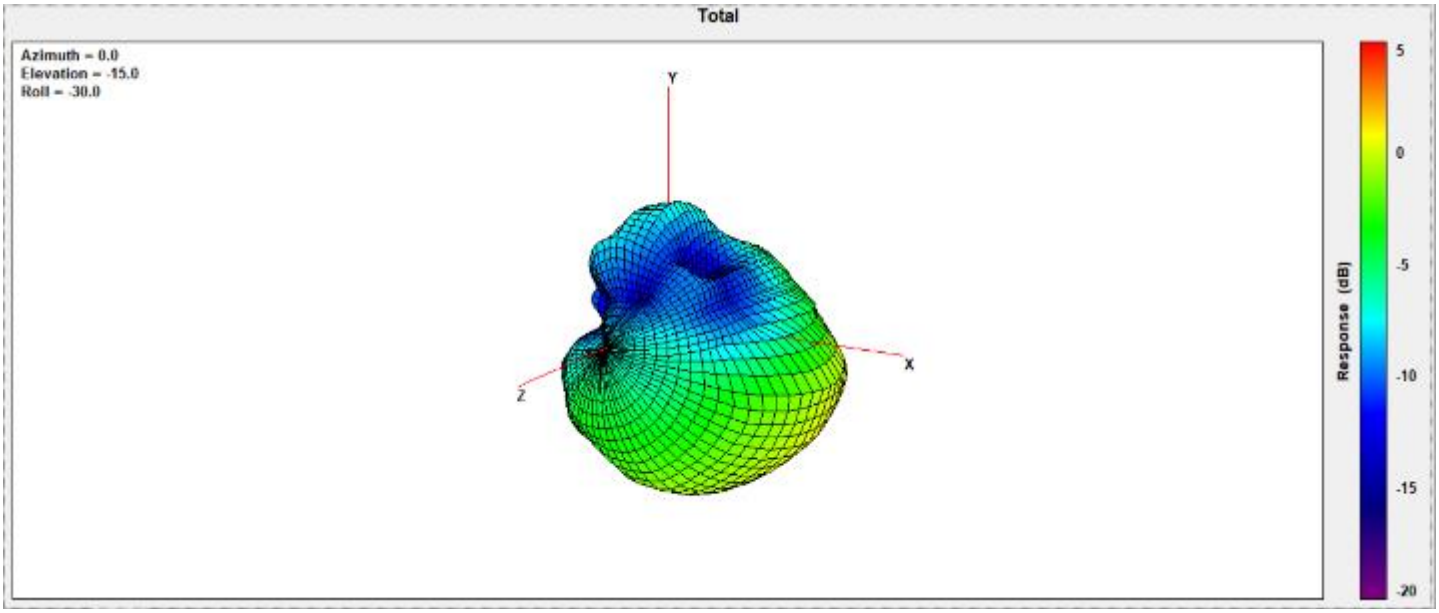
Center Frequency	**2400MHz**
Horizontal (dBi) peak	-2.30
Vertical (dBi) peak	-0.53

2500MHz



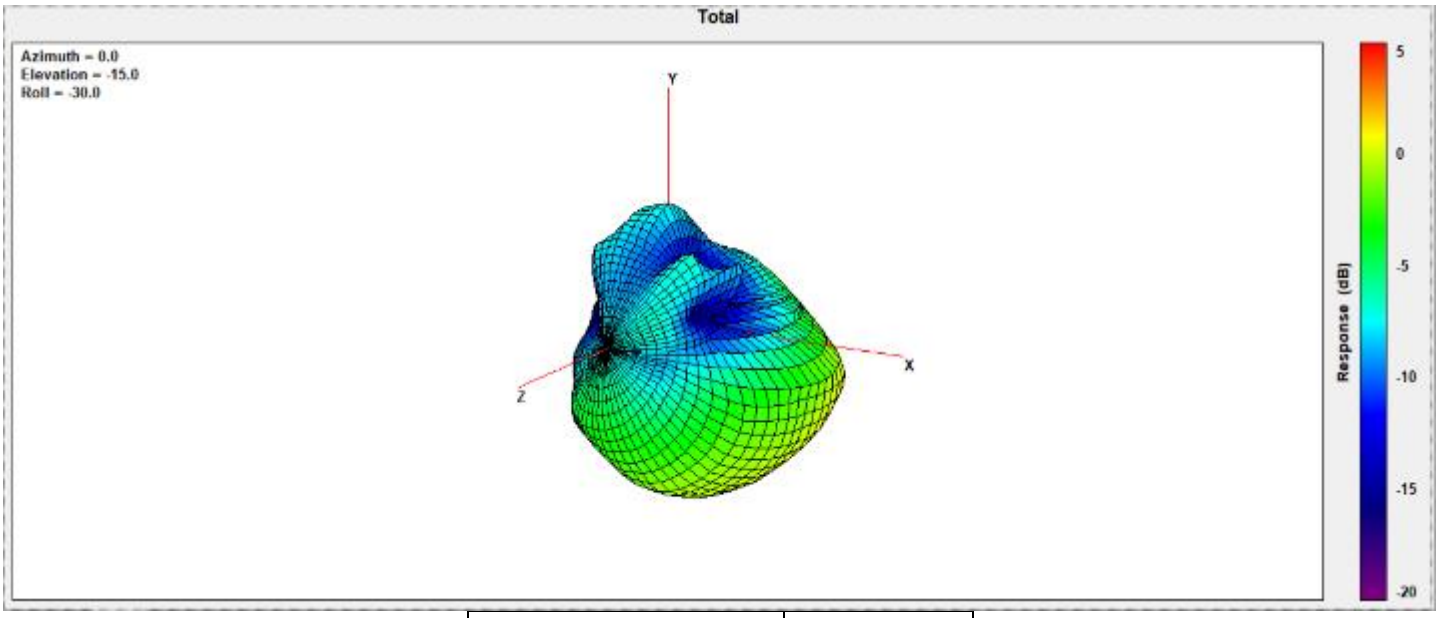
Center Frequency	**2500MHz**
Horizontal (dBi) peak	-1.00
Vertical (dBi) peak	-1.18

2570MHz



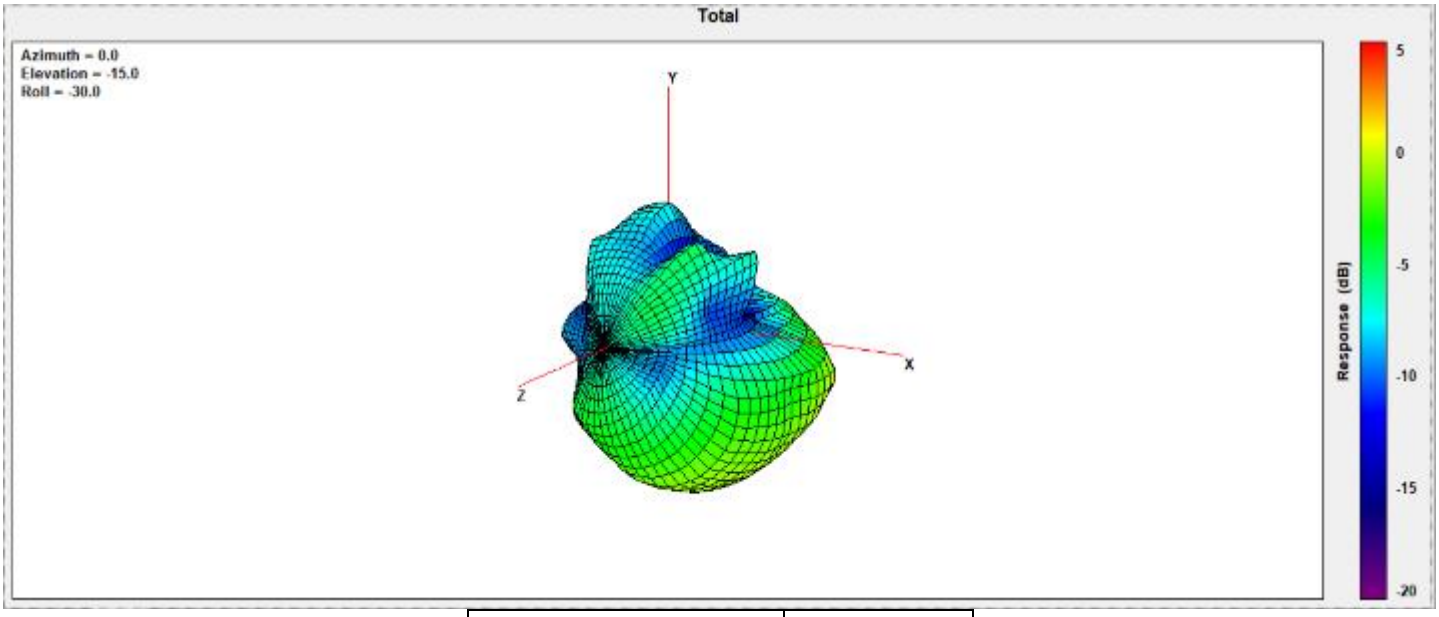
Center Frequency	**2570MHz**
Horizontal (dBi) peak	-0.05
Vertical (dBi) peak	-0.94

2595MHz



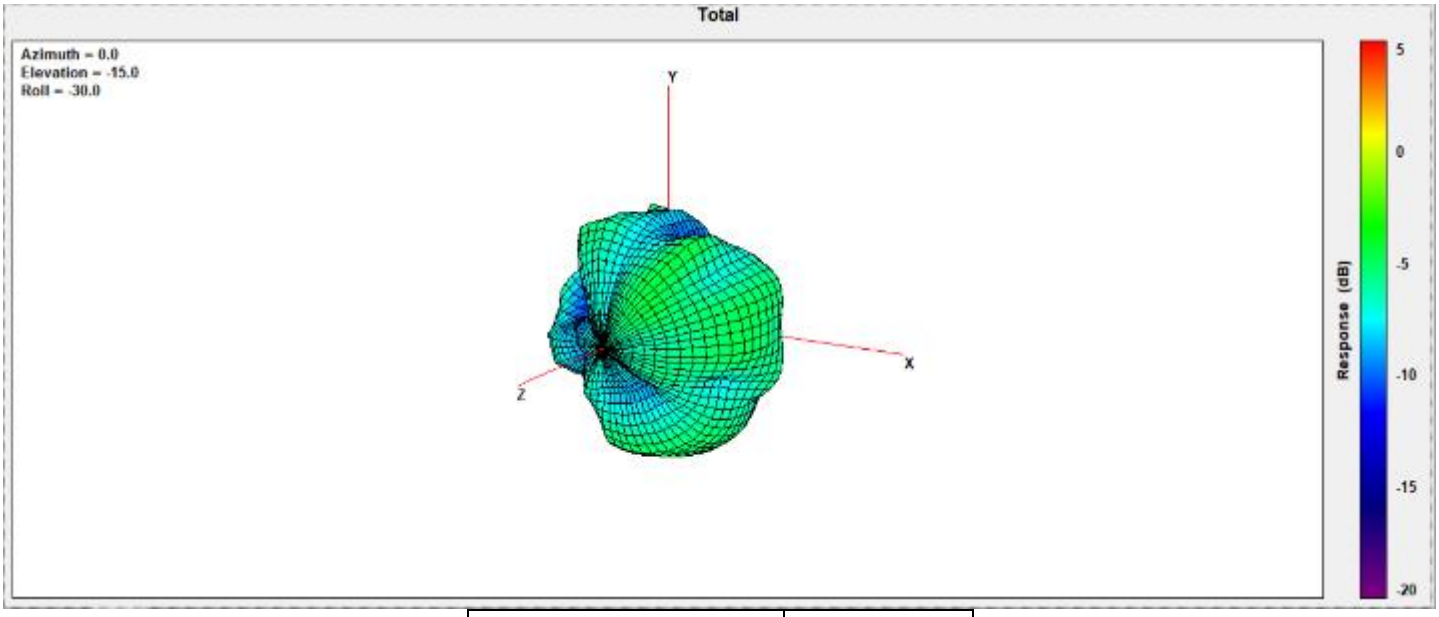
Center Frequency	**2595MHz**
Horizontal (dBi) peak	0.41
Vertical (dBi) peak	-0.54

2620MHz



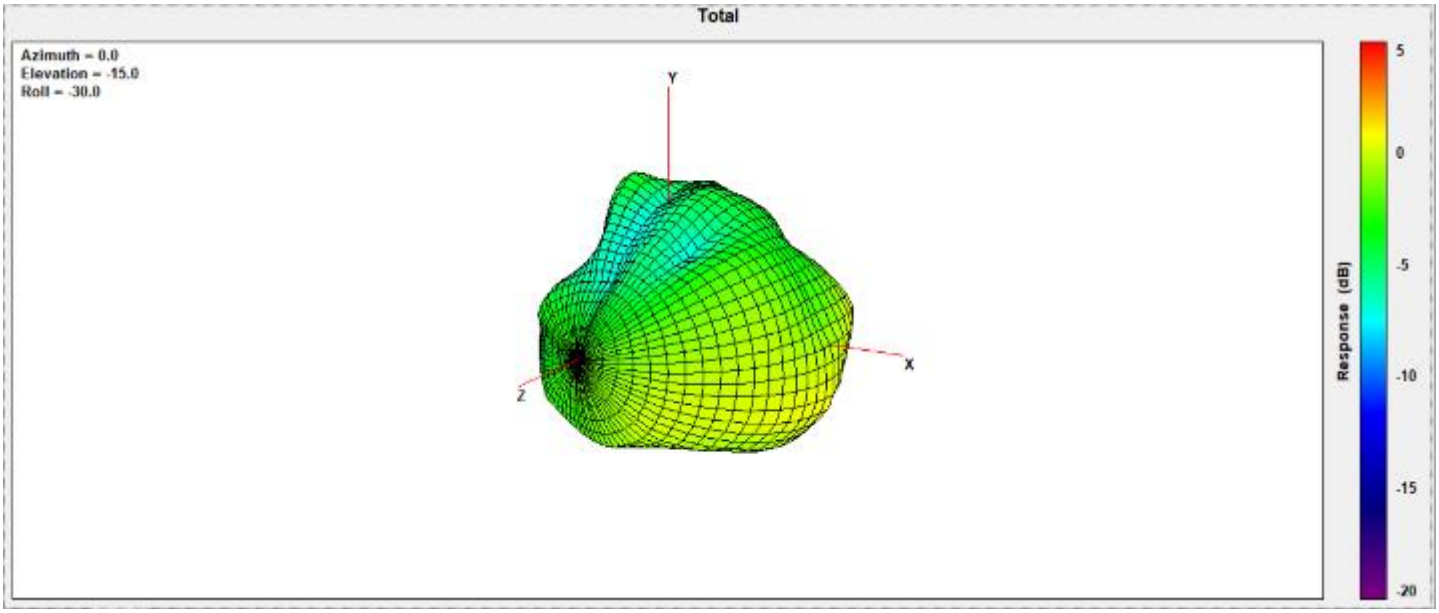
Center Frequency	**2620MHz**
Horizontal (dBi) peak	-0.28
Vertical (dBi) peak	-0.44

2690MHz



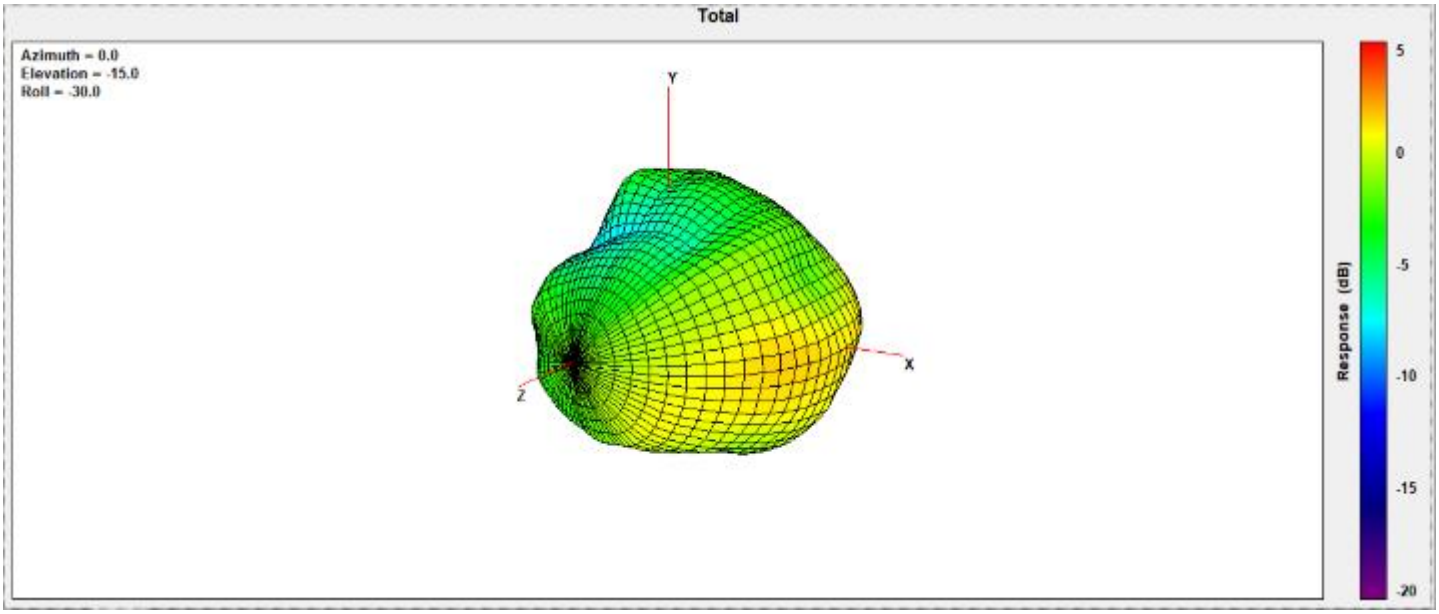
Center Frequency	**2690MHz**
Horizontal (dBi) peak	-2.22
Vertical (dBi) peak	-0.77

3400MHz



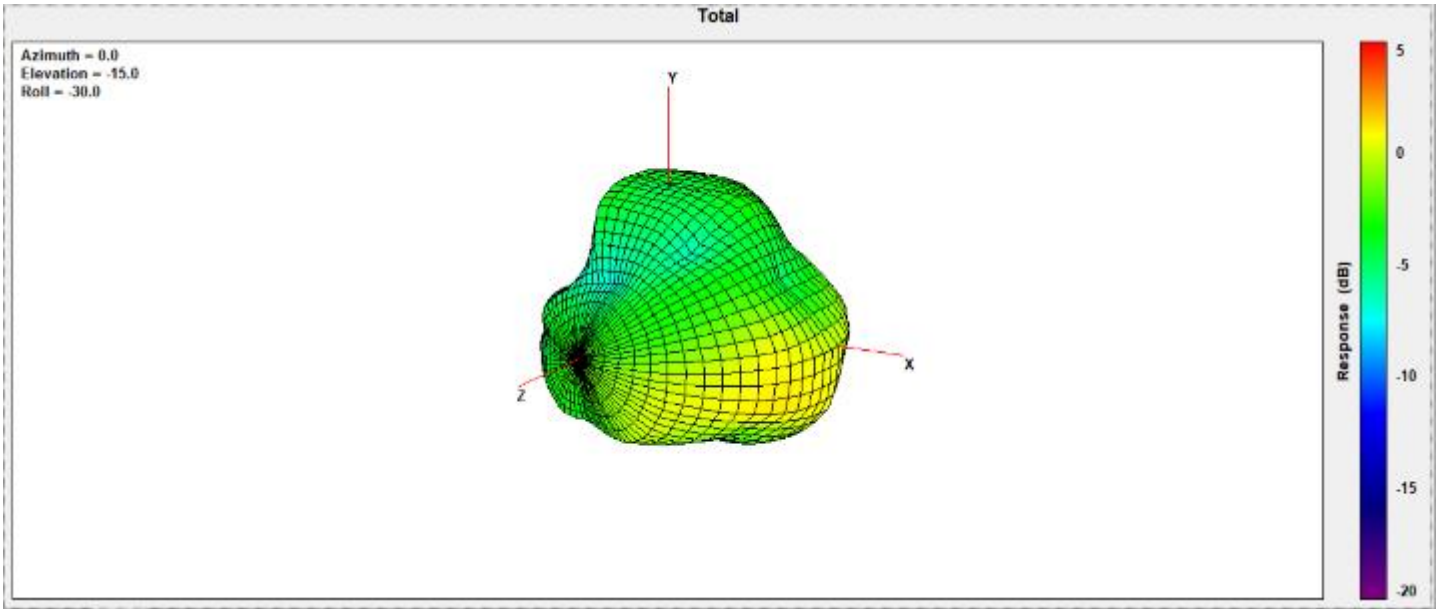
Center Frequency	**3400MHz**
Horizontal (dBi) peak	0.32
Vertical (dBi) peak	-2.44

3500MHz



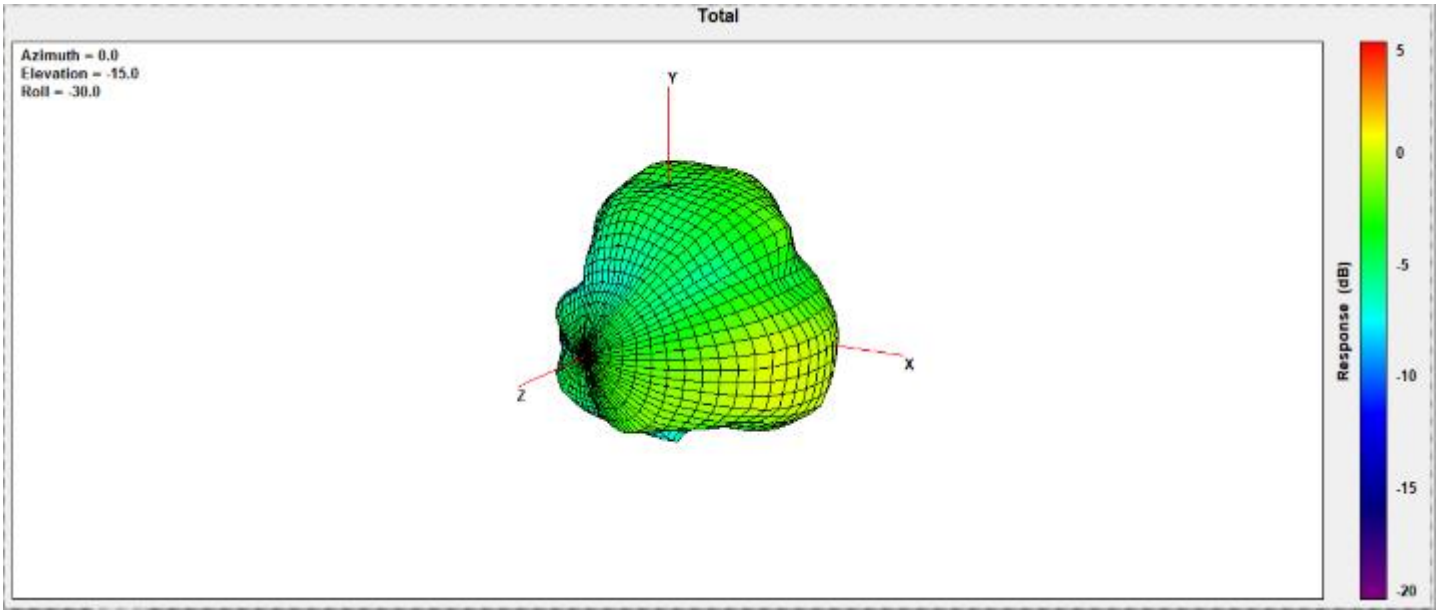
Center Frequency	**3500MHz**
Horizontal (dBi) peak	-0.81
Vertical (dBi) peak	-2.26

3600MHz



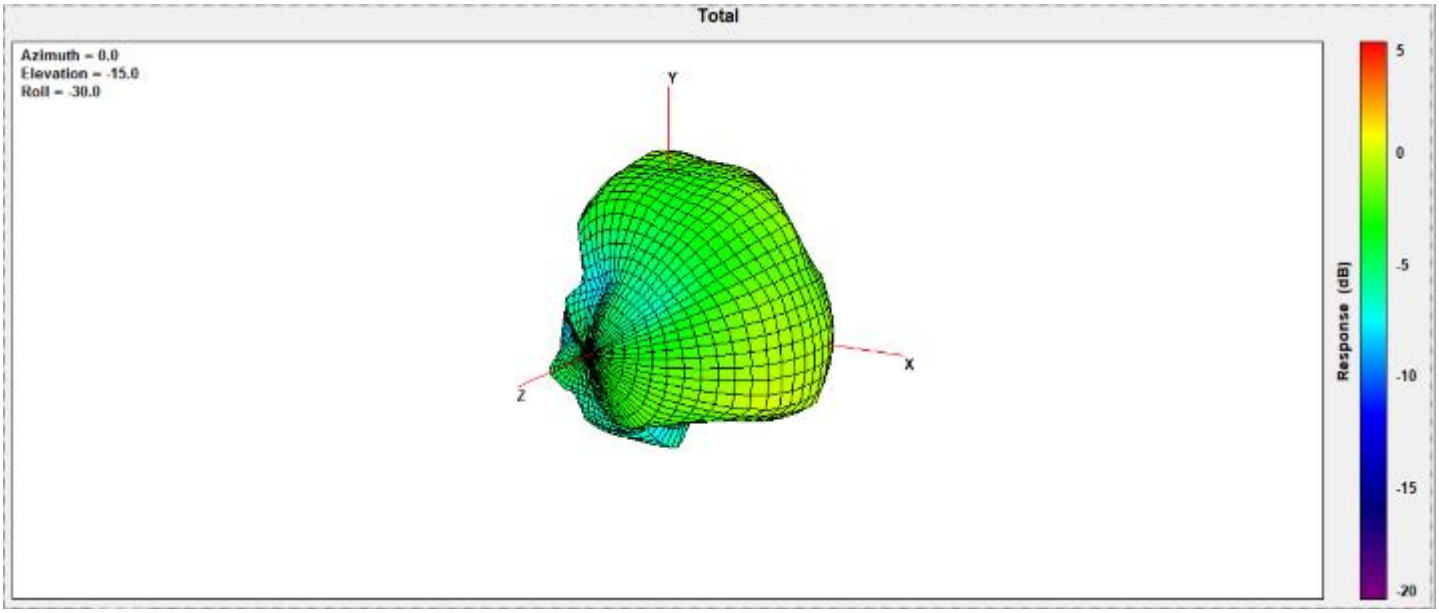
Center Frequency	**3600MHz**
Horizontal (dBi) peak	-1.31
Vertical (dBi) peak	-0.74

3700MHz



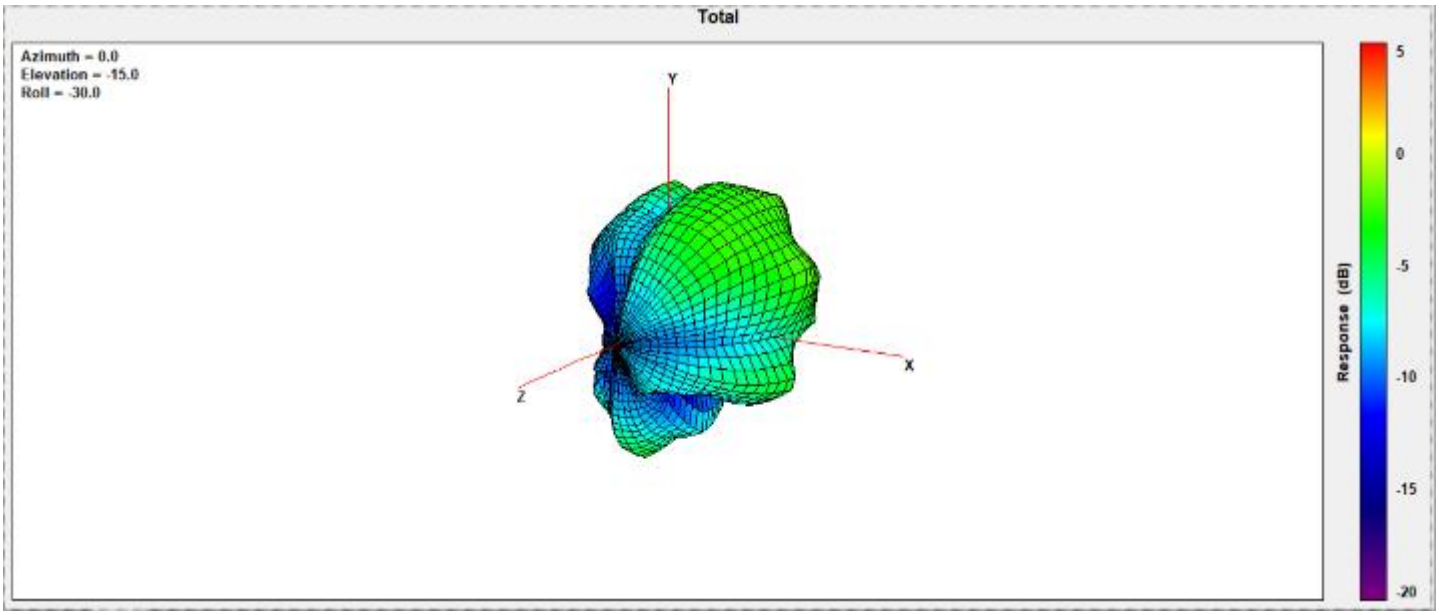
Center Frequency	**3700MHz**
Horizontal (dBi) peak	-1.45
Vertical (dBi) peak	-1.83

3800MHz



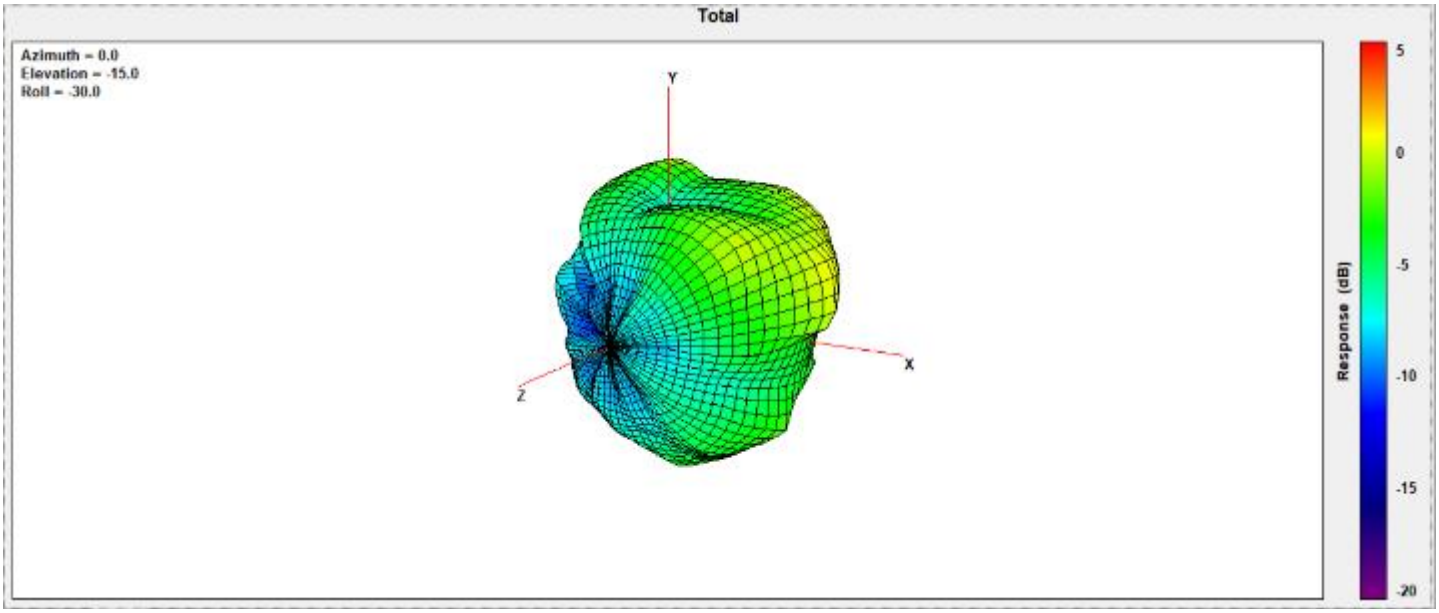
Center Frequency	**3800MHz**
Horizontal (dBi) peak	-1.35
Vertical (dBi) peak	-1.64

4200MHz



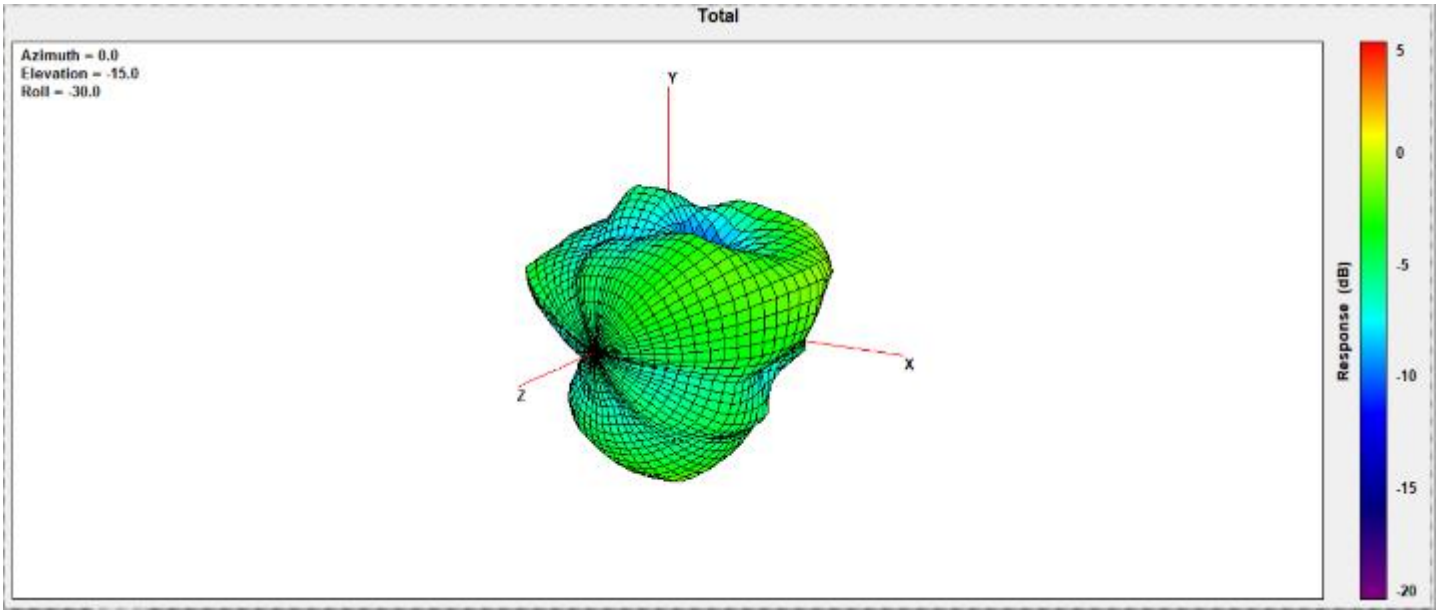
Center Frequency	**4200MHz**
Horizontal (dBi) peak	-0.11
Vertical (dBi) peak	-1.16

4400MHz



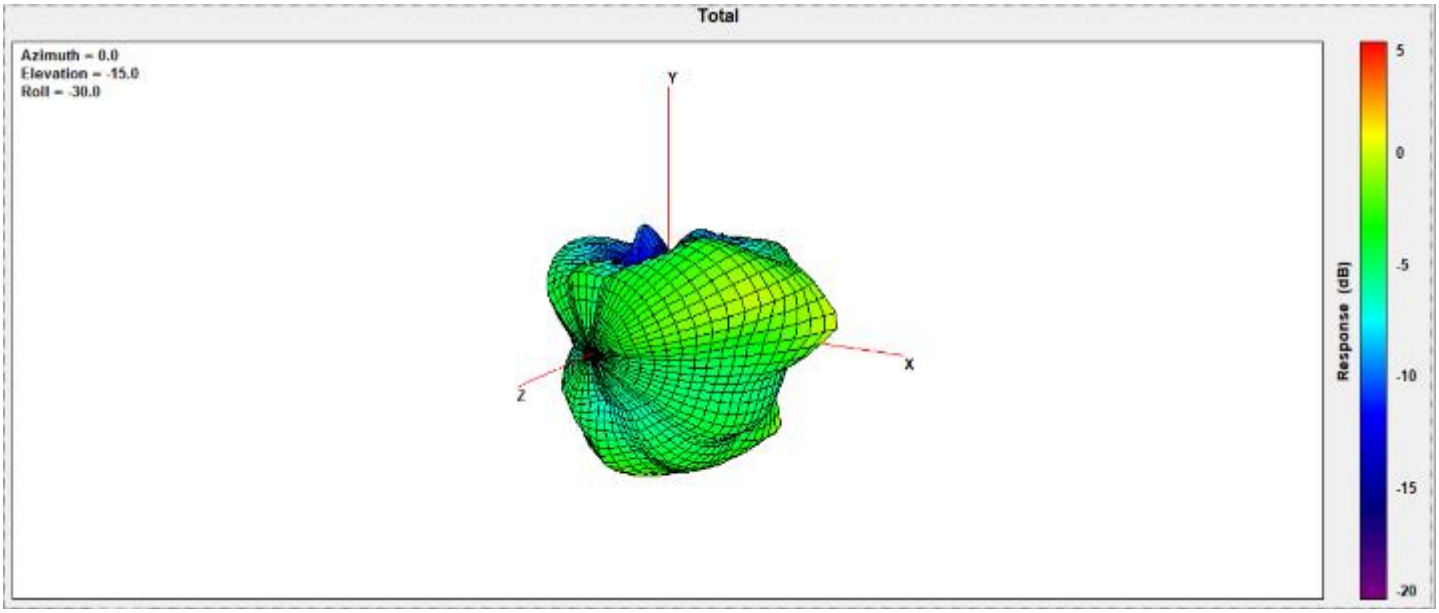
Center Frequency	**4400MHz**
Horizontal (dBi) peak	-3.22
Vertical (dBi) peak	-5.44

4700MHz



Center Frequency	**4700MHz**
Horizontal (dBi) peak	-1.83
Vertical (dBi) peak	-2.58

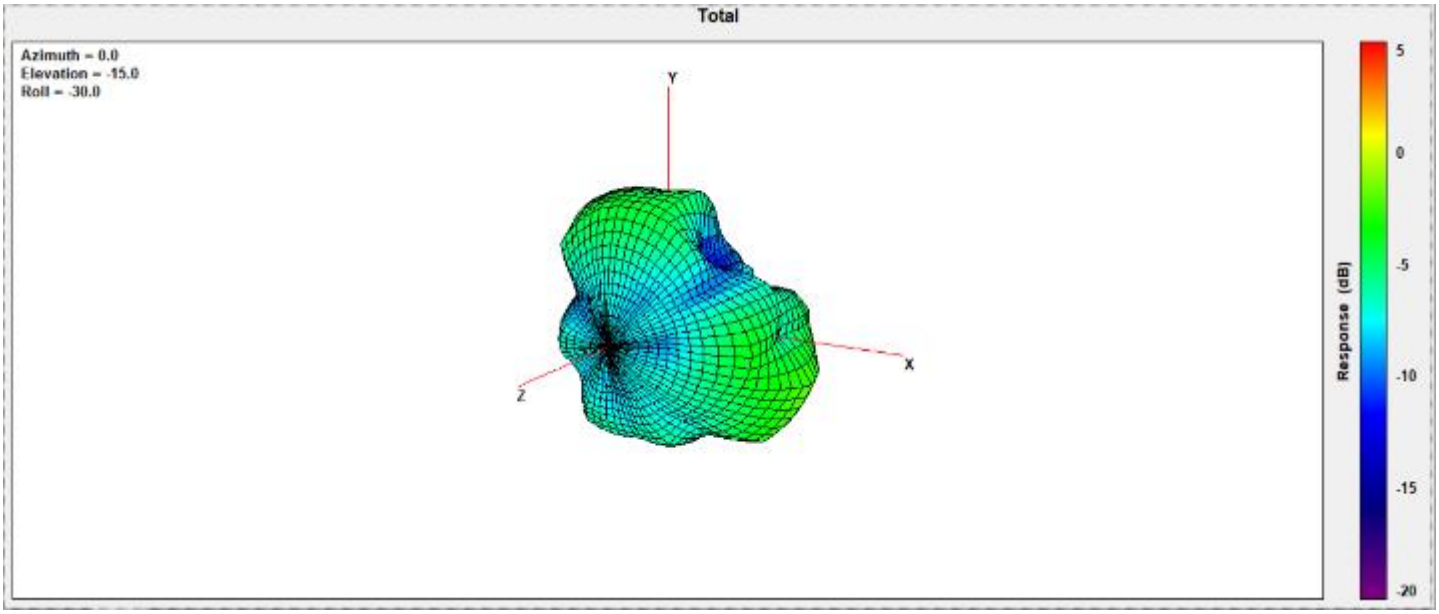
5000MHz



Center Frequency	**5000MHz**
Horizontal (dBi) peak	0.92
Vertical (dBi) peak	-0.07

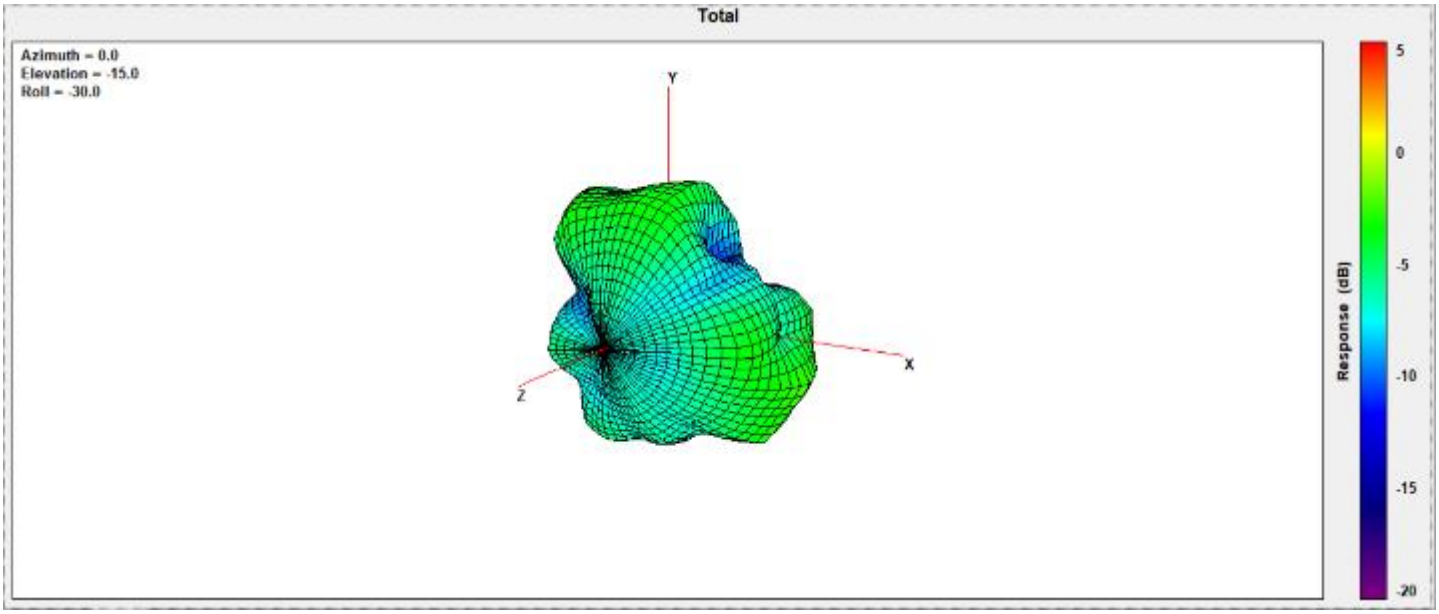
MIMO3 Antenna (DRx1)

1805 MHz



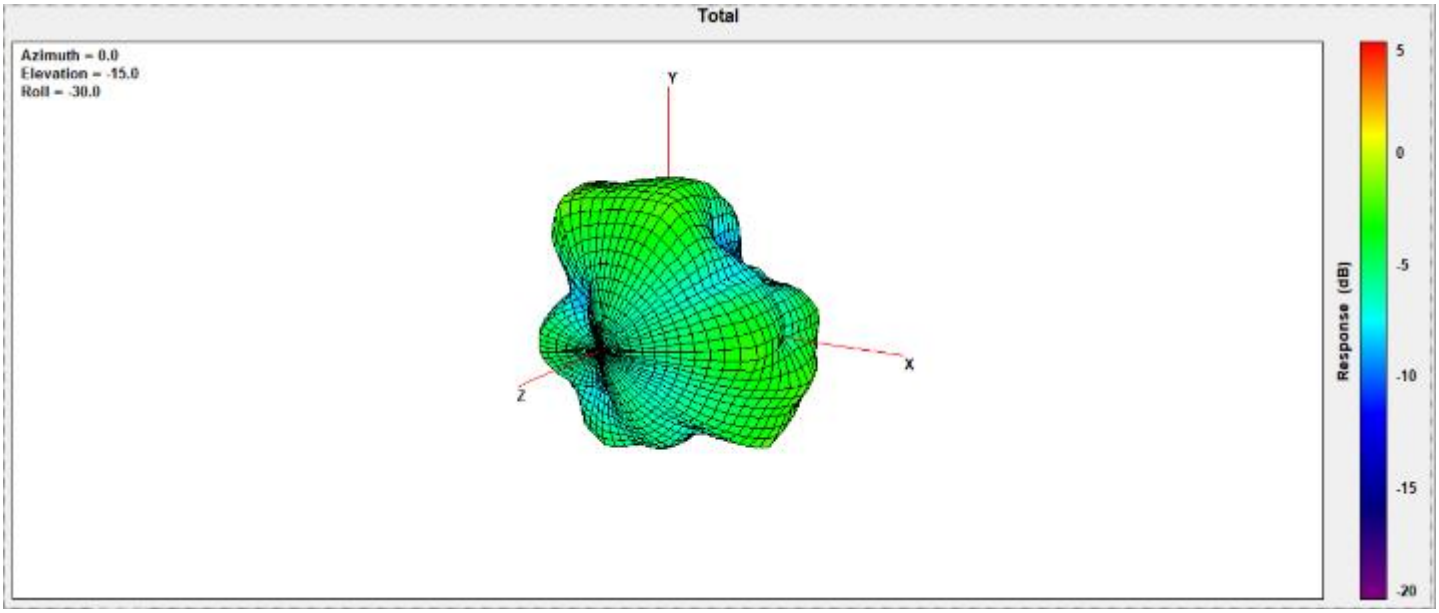
Center Frequency	**1805 MHz**
Horizontal (dBi) peak	-0.76
Vertical (dBi) peak	-2.02

1850 MHz



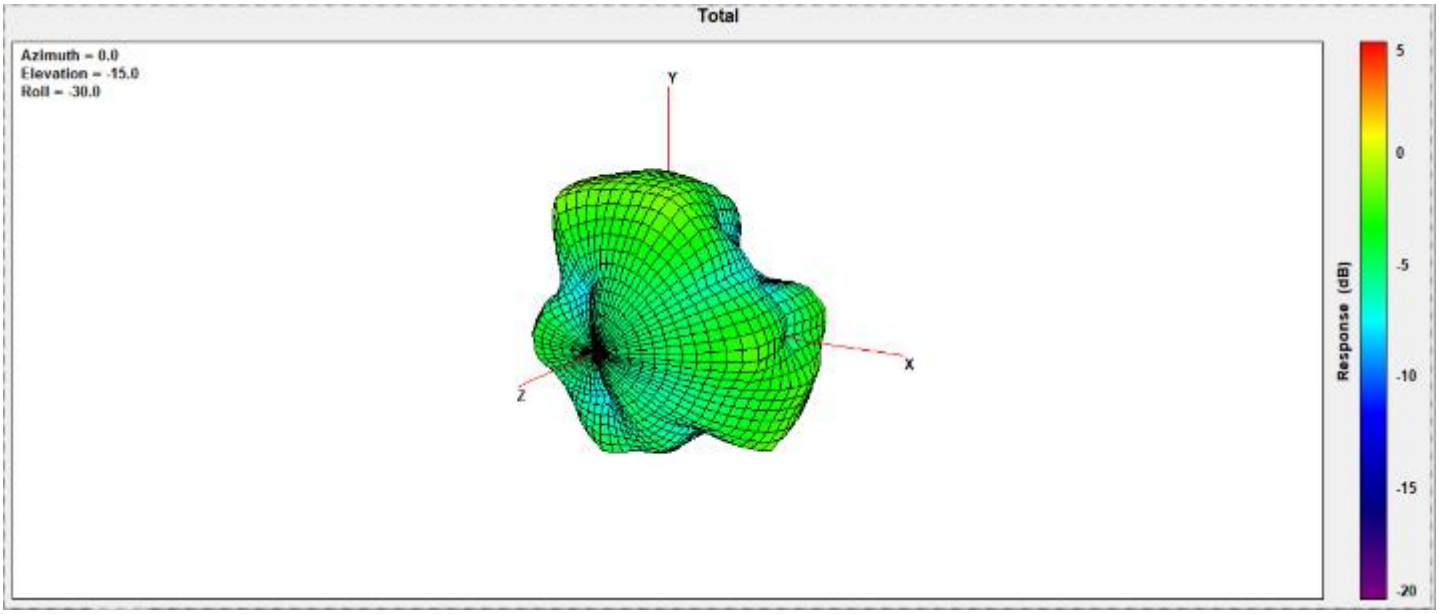
Center Frequency	**1850 MHz**
Horizontal (dBi) peak	-1.91
Vertical (dBi) peak	-3.51

1880 MHz



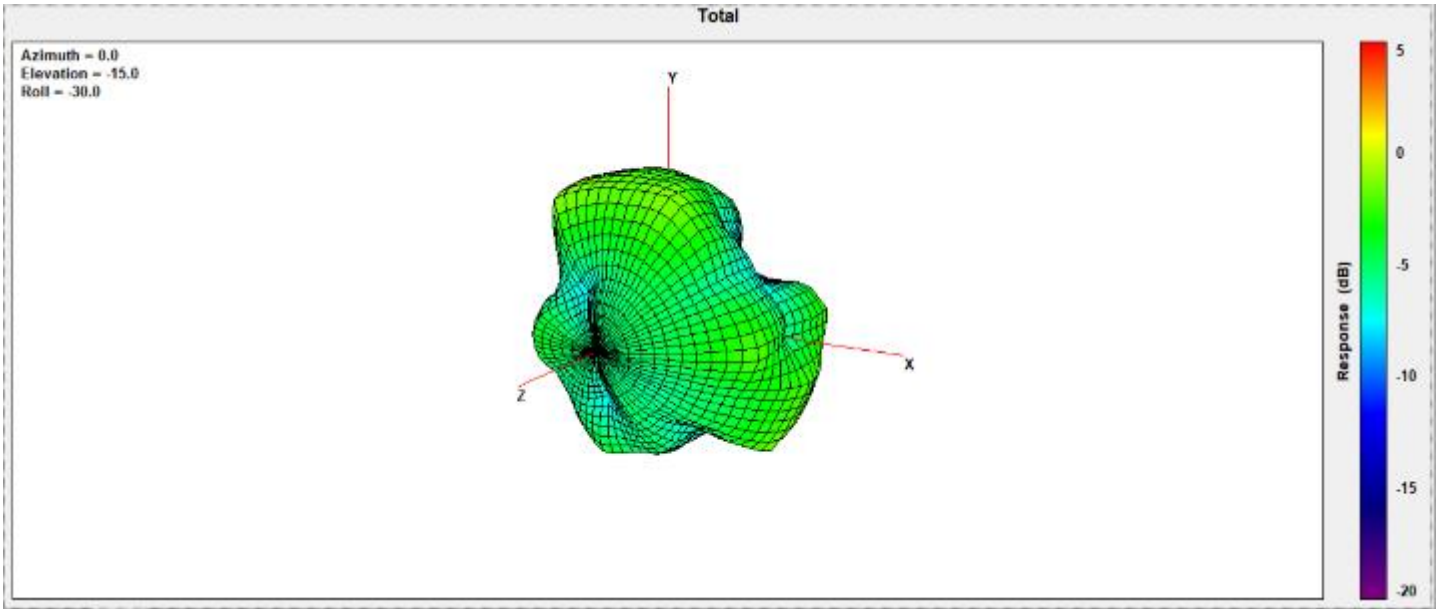
Center Frequency	**1880 MHz**
Horizontal (dBi) peak	-2.27
Vertical (dBi) peak	-4.20

1910MHz



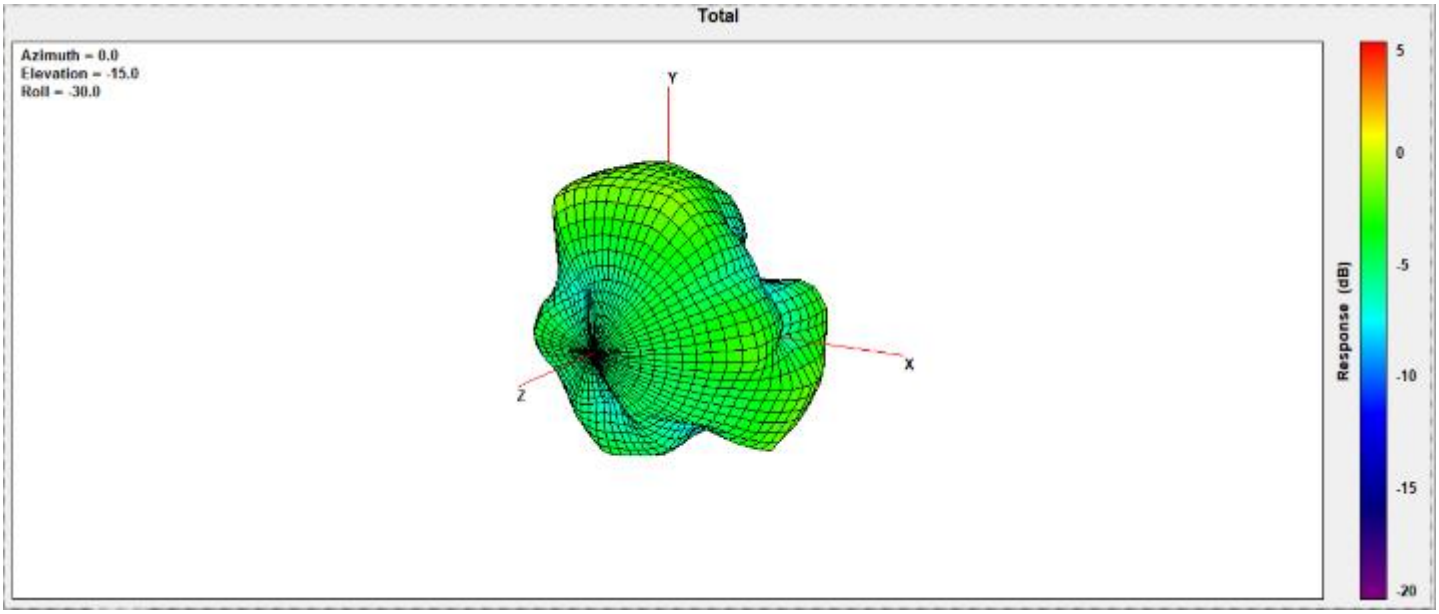
Center Frequency	**1910MHz**
Horizontal (dBi) peak	-1.58
Vertical (dBi) peak	-3.88

1920MHz



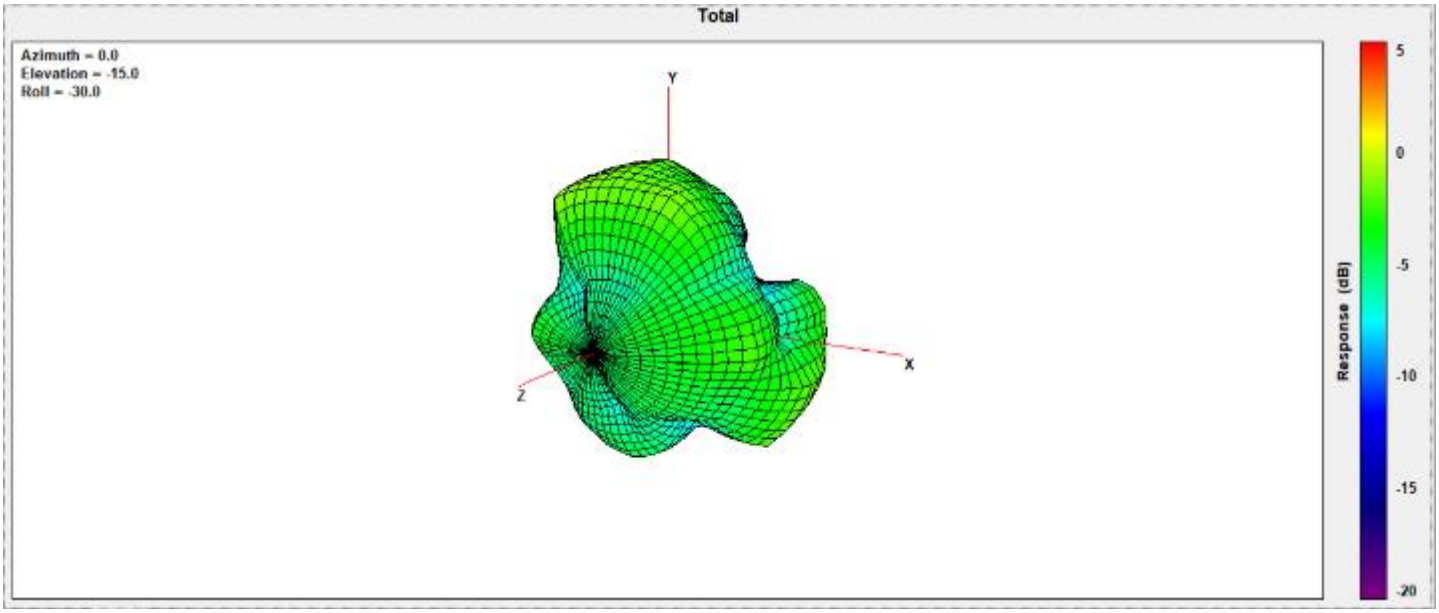
Center Frequency	**1920MHz**
Horizontal (dBi) peak	-1.54
Vertical (dBi) peak	-3.76

1950MHz



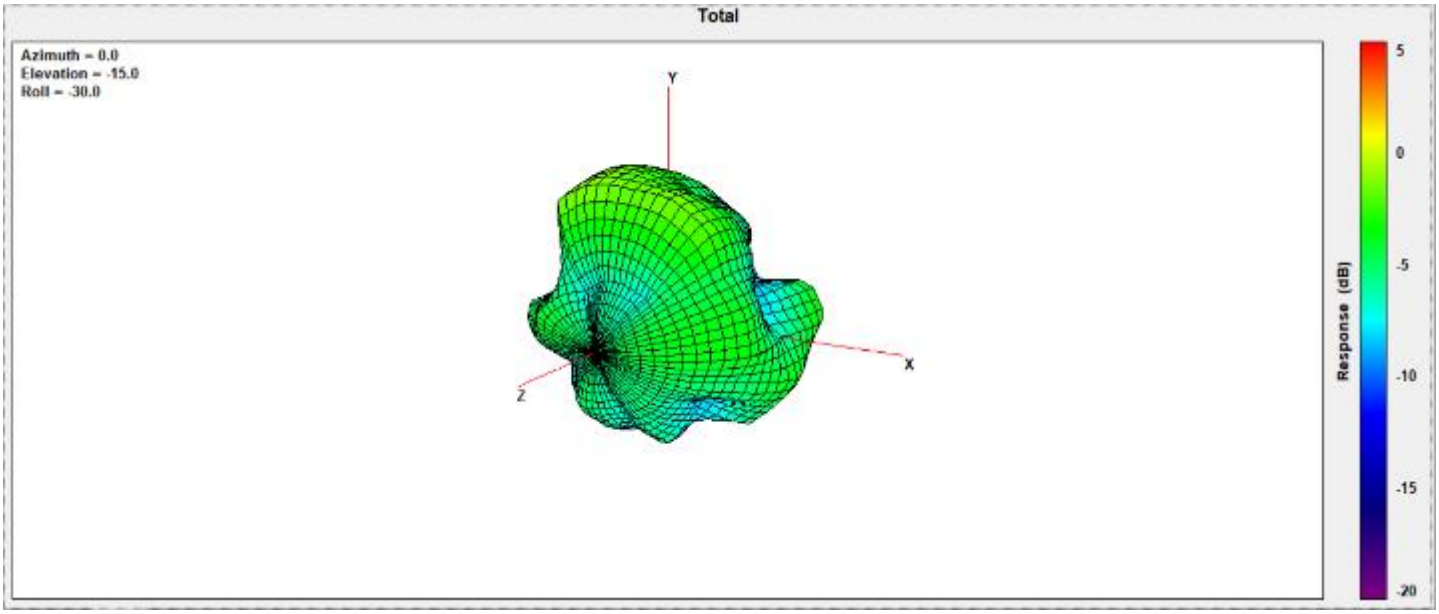
Center Frequency	**1950MHz**
Horizontal (dBi) peak	-1.34
Vertical (dBi) peak	-2.87

1980MHz



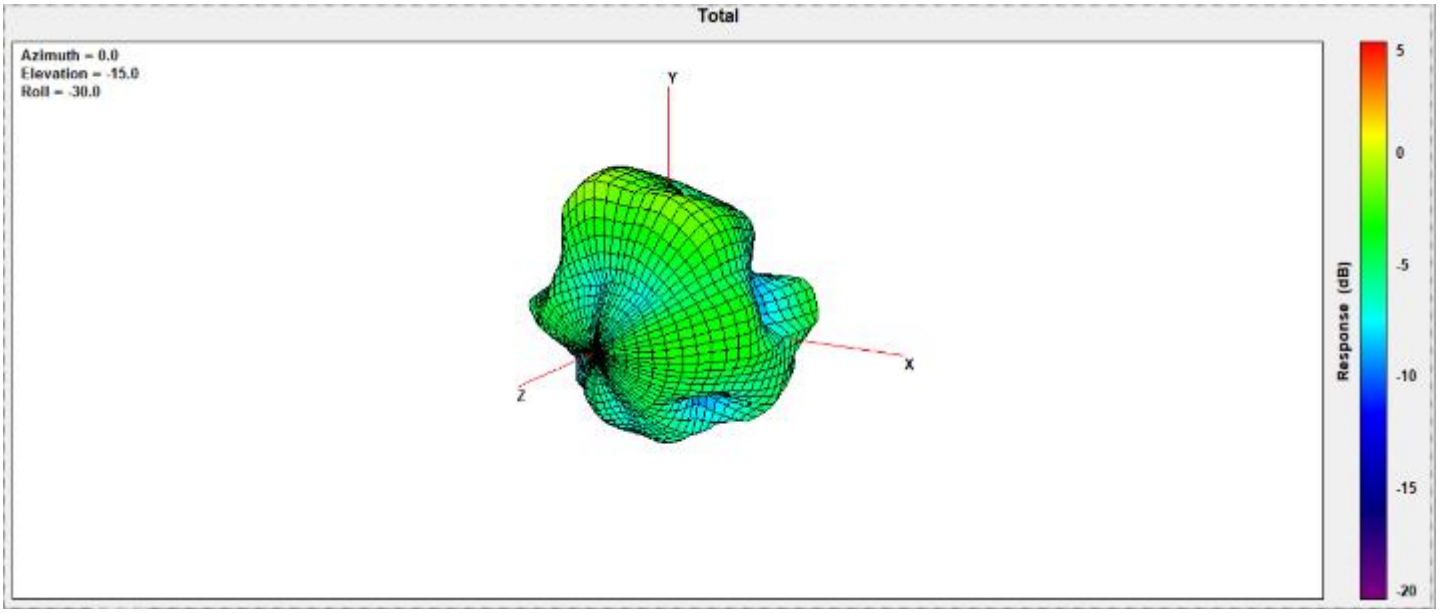
Center Frequency	**1980MHz**
Horizontal (dBi) peak	-1.43
Vertical (dBi) peak	-2.31

2110MHz



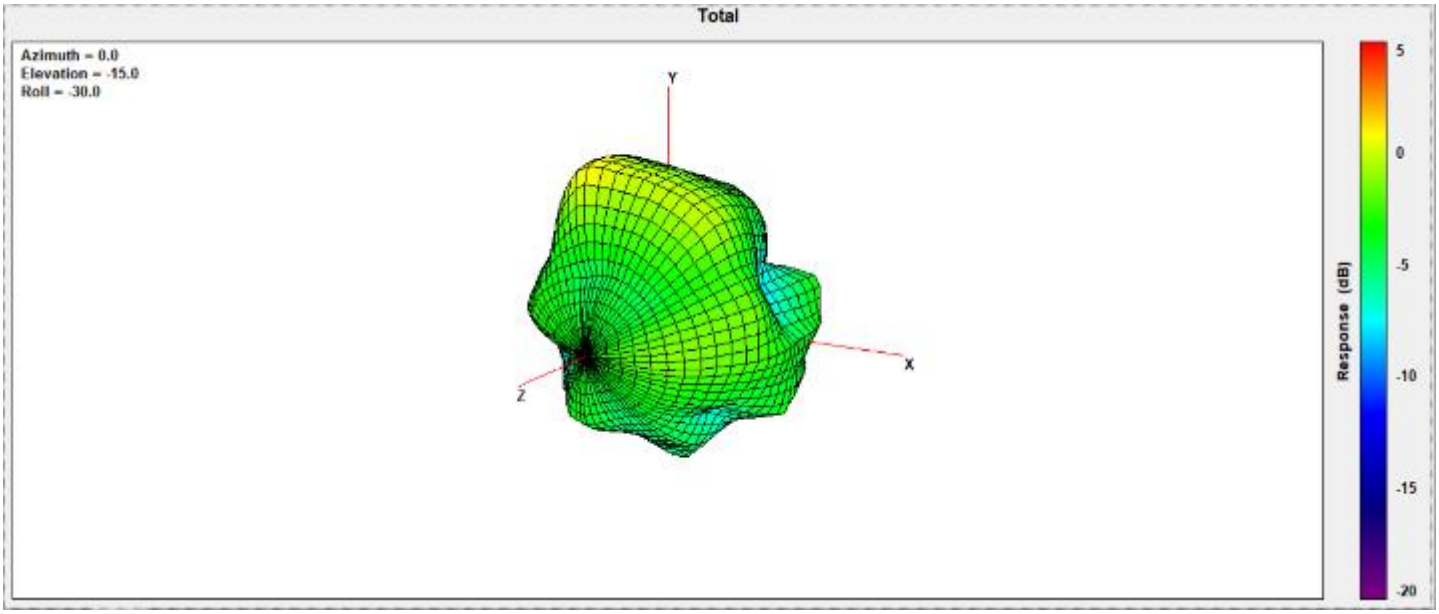
Center Frequency	**2110MHz**
Horizontal (dBi) peak	0.53
Vertical (dBi) peak	-0.02

2200MHz



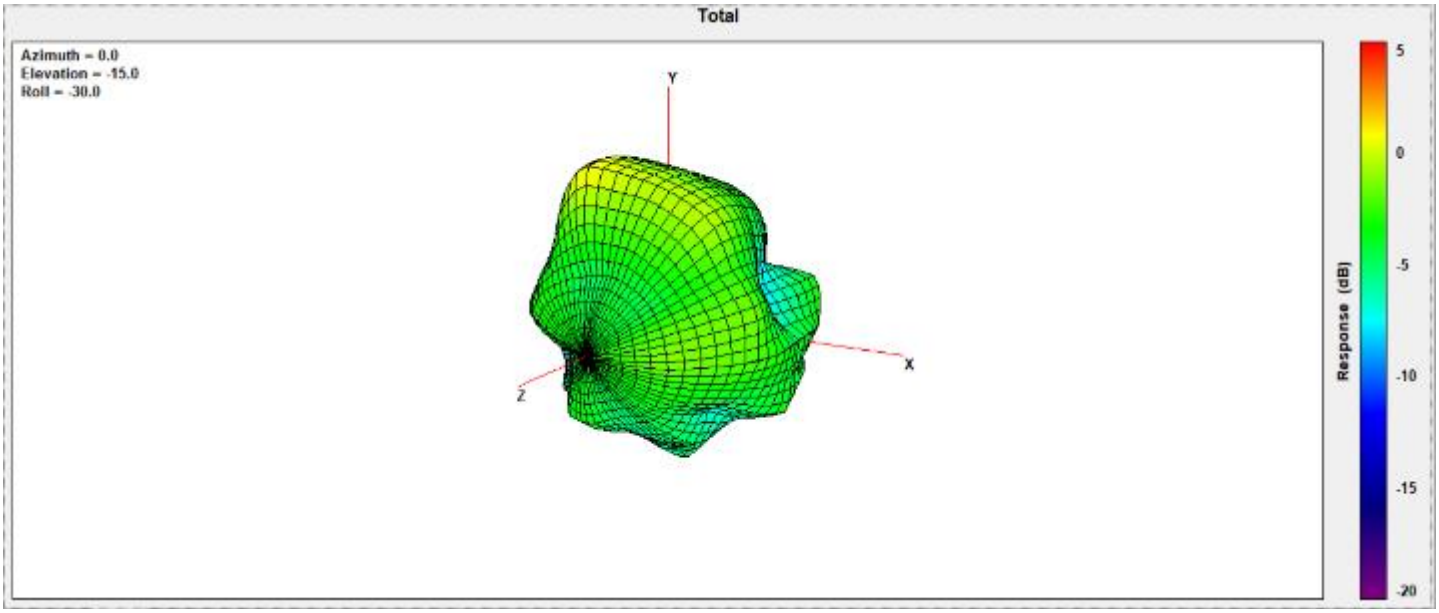
Center Frequency	**2200MHz**
Horizontal (dBi) peak	-1.24
Vertical (dBi) peak	-2.75

2300MHz



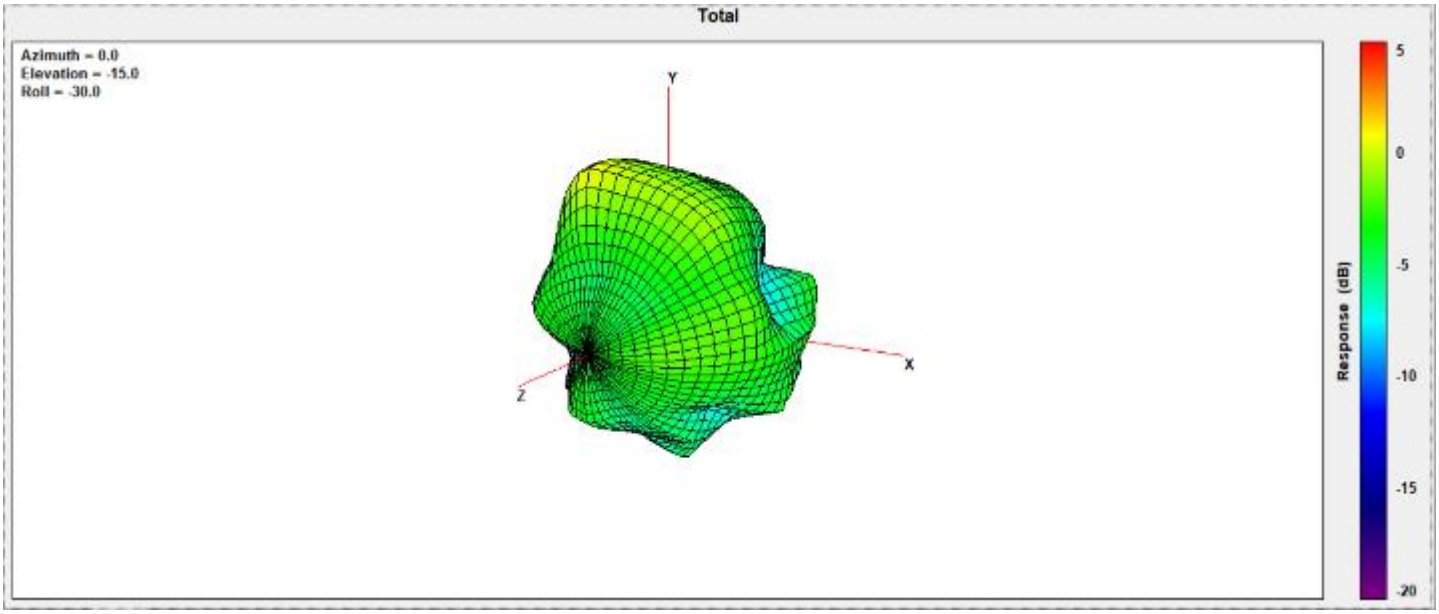
Center Frequency	**2300MHz**
Horizontal (dBi) peak	-0.64
Vertical (dBi) peak	-2.10

2305MHz



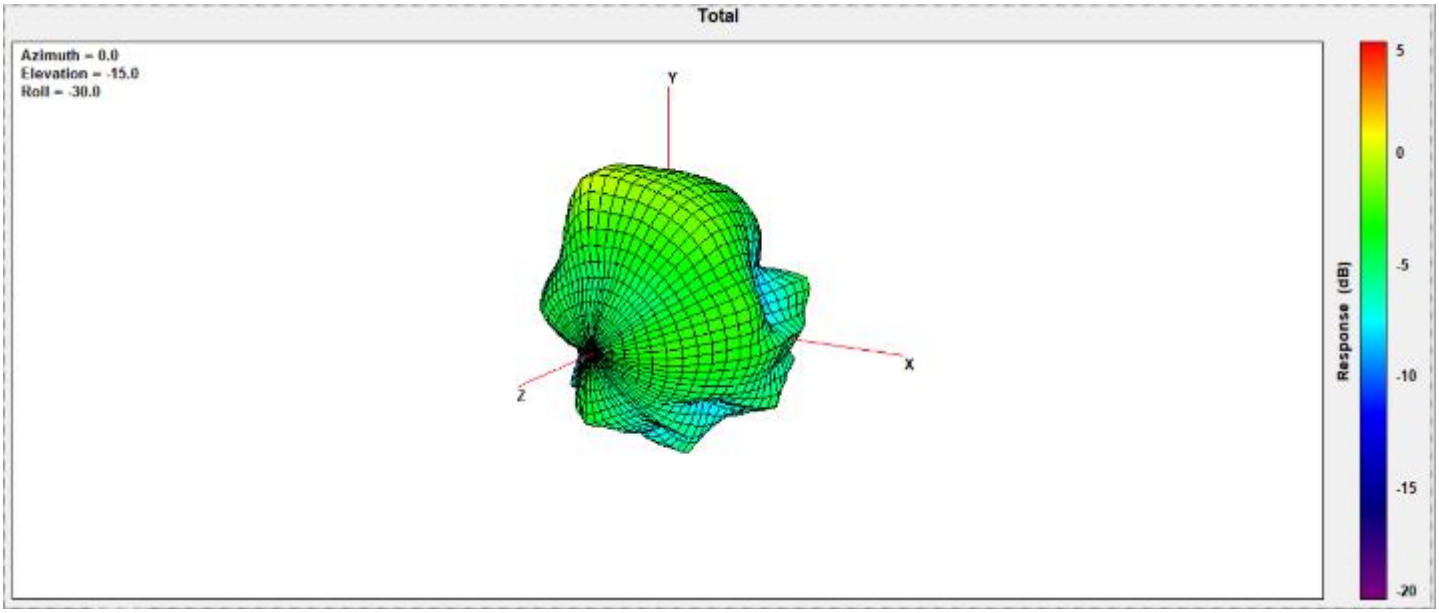
Center Frequency	**2305MHz**
Horizontal (dBi) peak	-0.61
Vertical (dBi) peak	-2.20

2315MHz



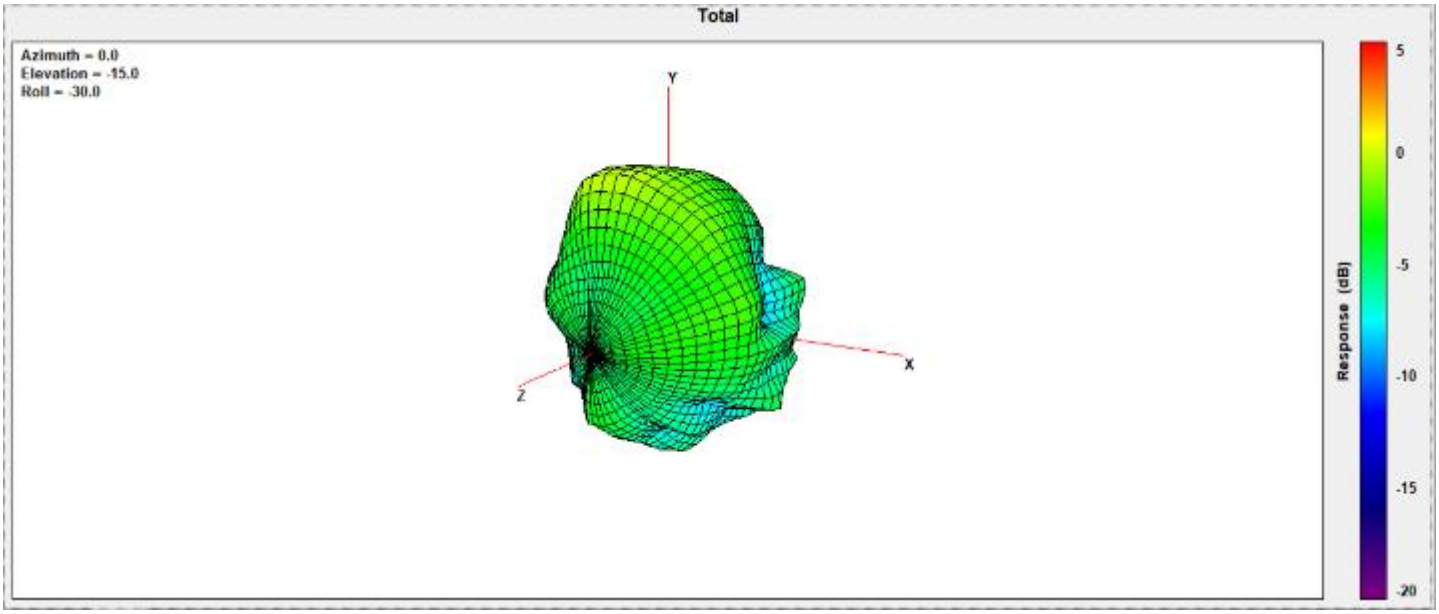
Center Frequency	**2315MHz**
Horizontal (dBi) peak	-0.62
Vertical (dBi) peak	-2.12

2350MHz



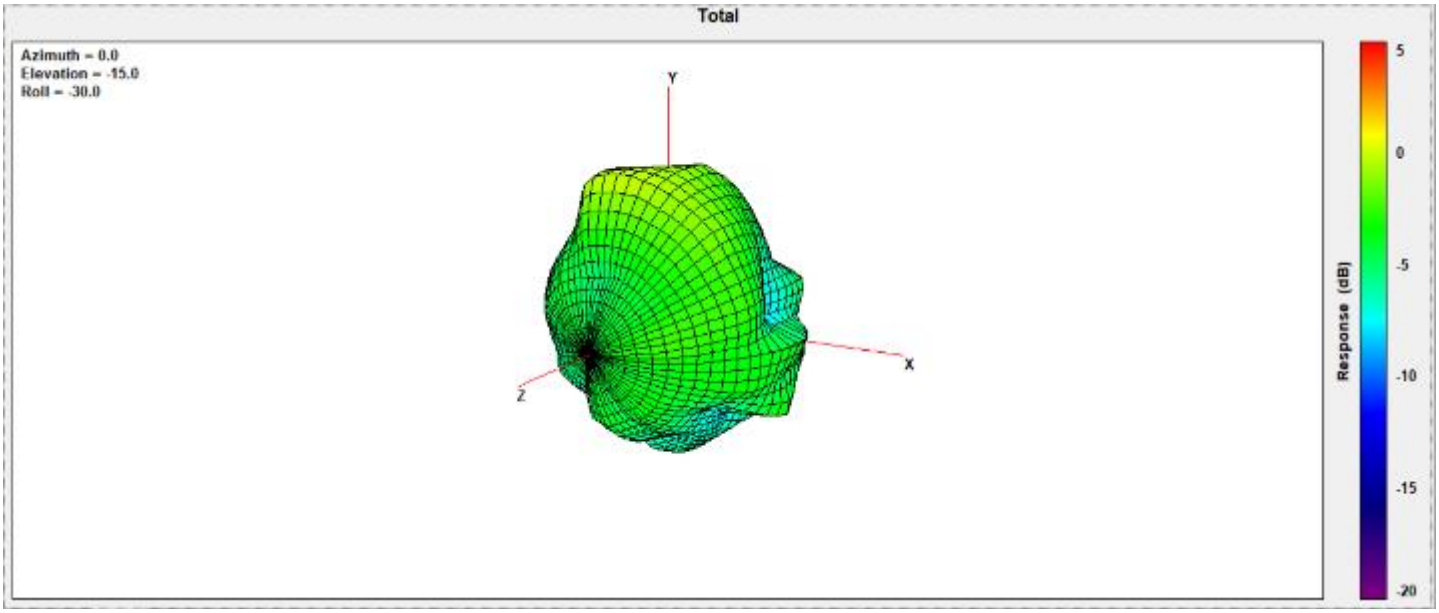
Center Frequency	**2350MHz**
Horizontal (dBi) peak	-0.78
Vertical (dBi) peak	-2.12

2400MHz



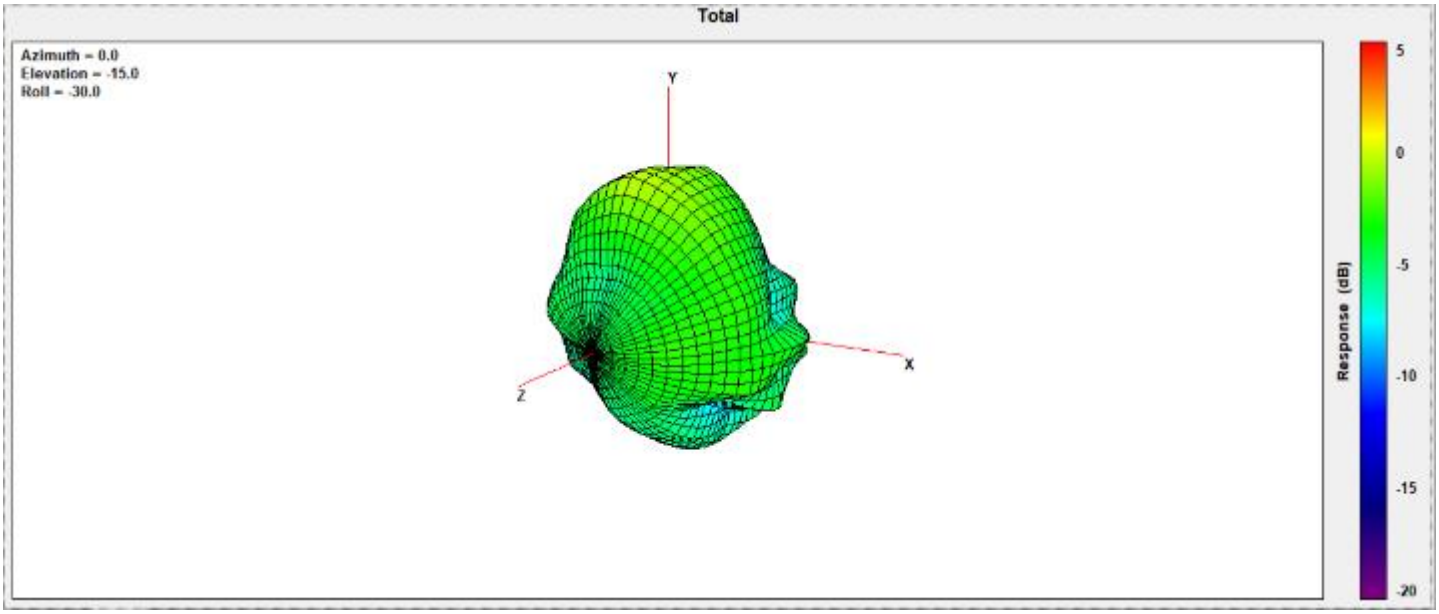
Center Frequency	**2400MHz**
Horizontal (dBi) peak	-0.53
Vertical (dBi) peak	-2.65

2500MHz



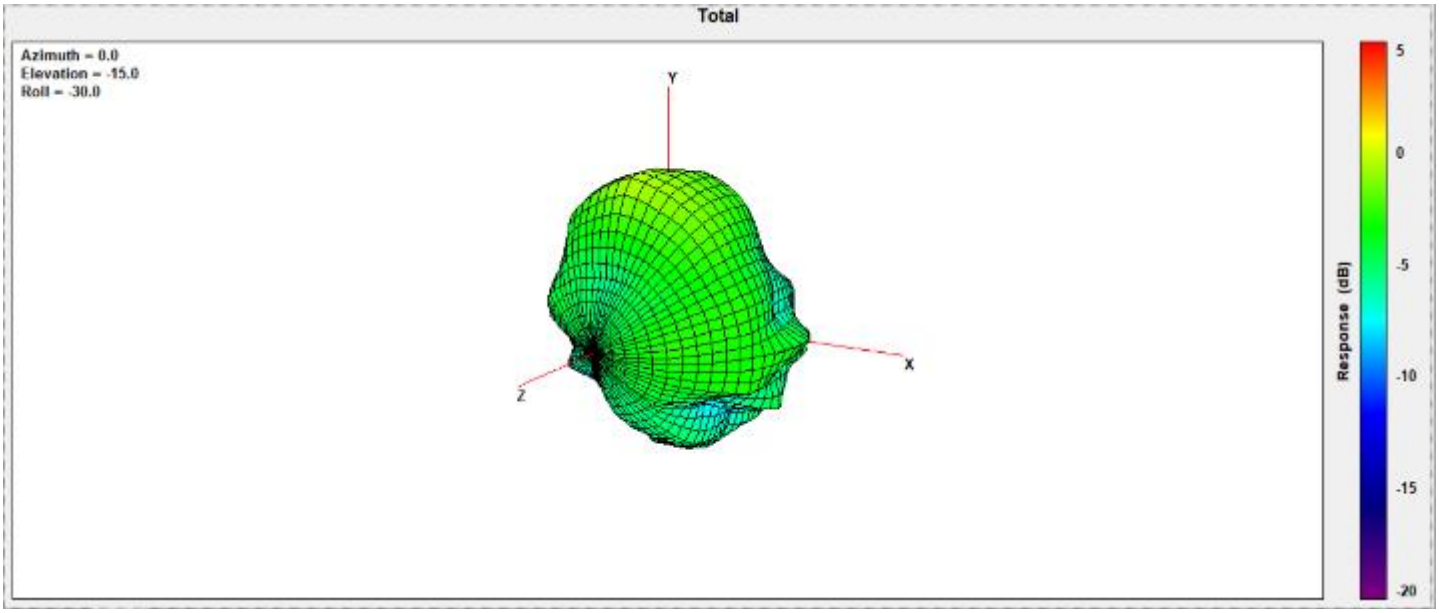
Center Frequency	**2500MHz**
Horizontal (dBi) peak	-1.79
Vertical (dBi) peak	-3.40

2570MHz



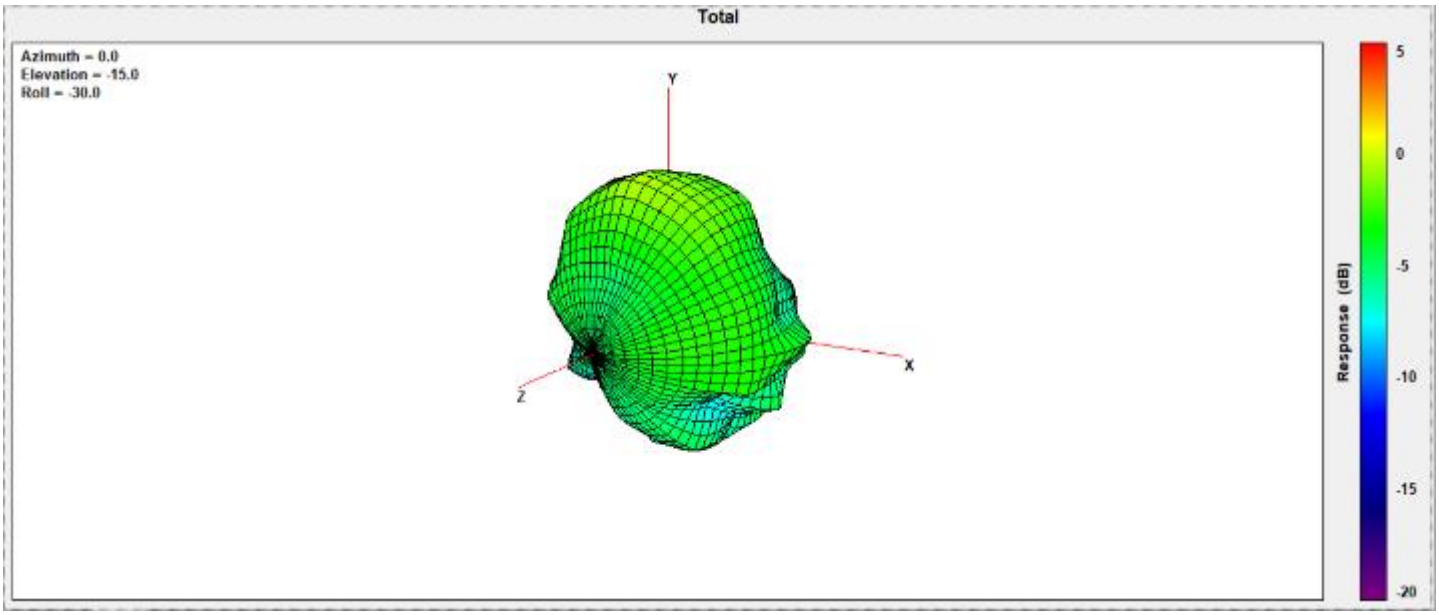
Center Frequency	**2570MHz**
Horizontal (dBi) peak	-1.59
Vertical (dBi) peak	-2.98

2595MHz



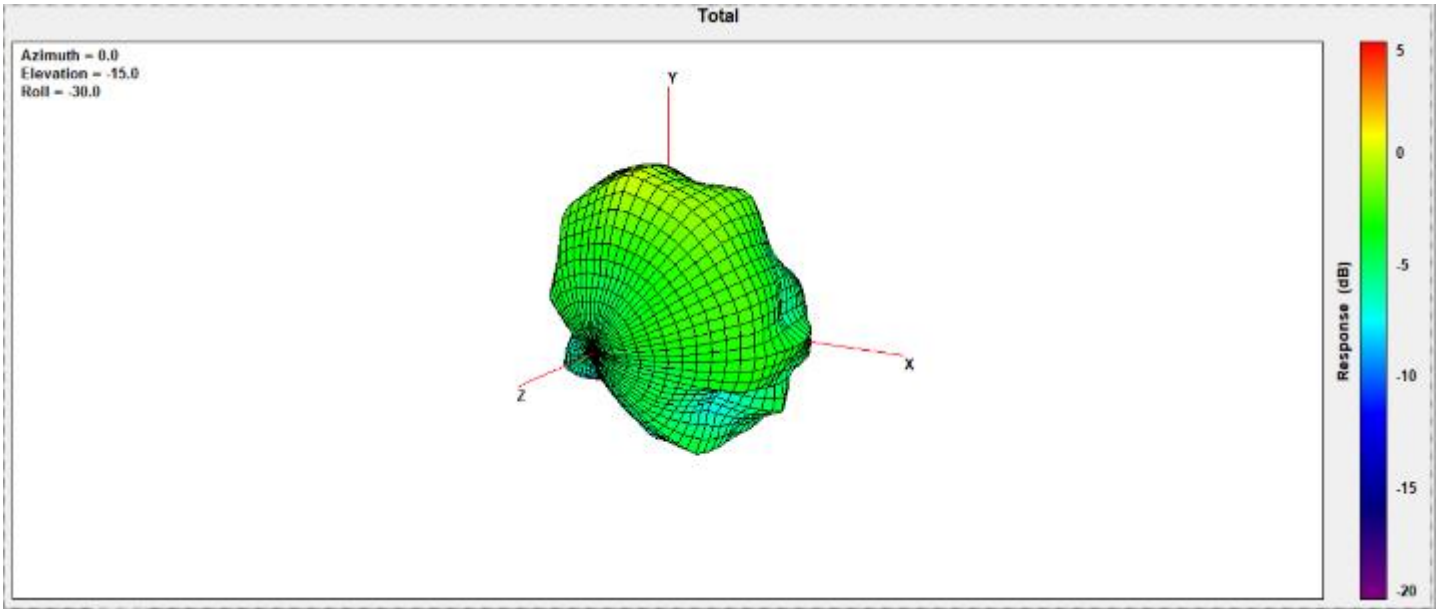
Center Frequency	**2595MHz**
Horizontal (dBi) peak	-1.77
Vertical (dBi) peak	-2.49

2620MHz



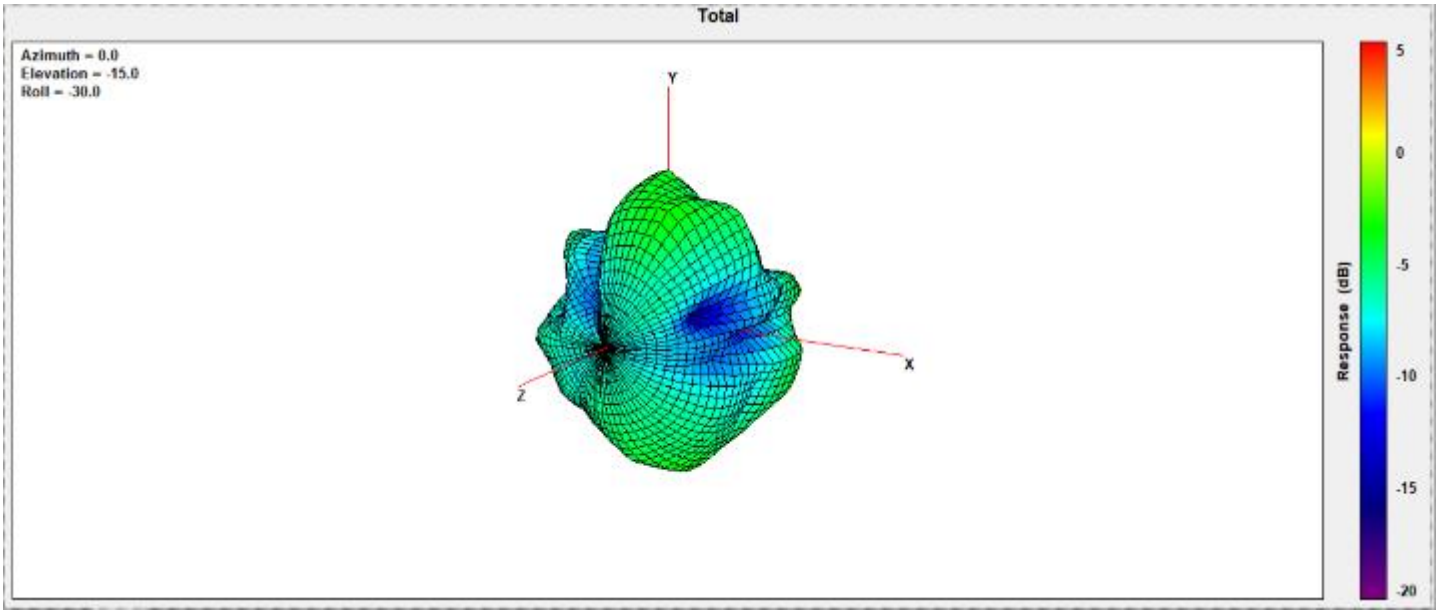
Center Frequency	**2620MHz**
Horizontal (dBi) peak	-2.11
Vertical (dBi) peak	-2.24

2690MHz



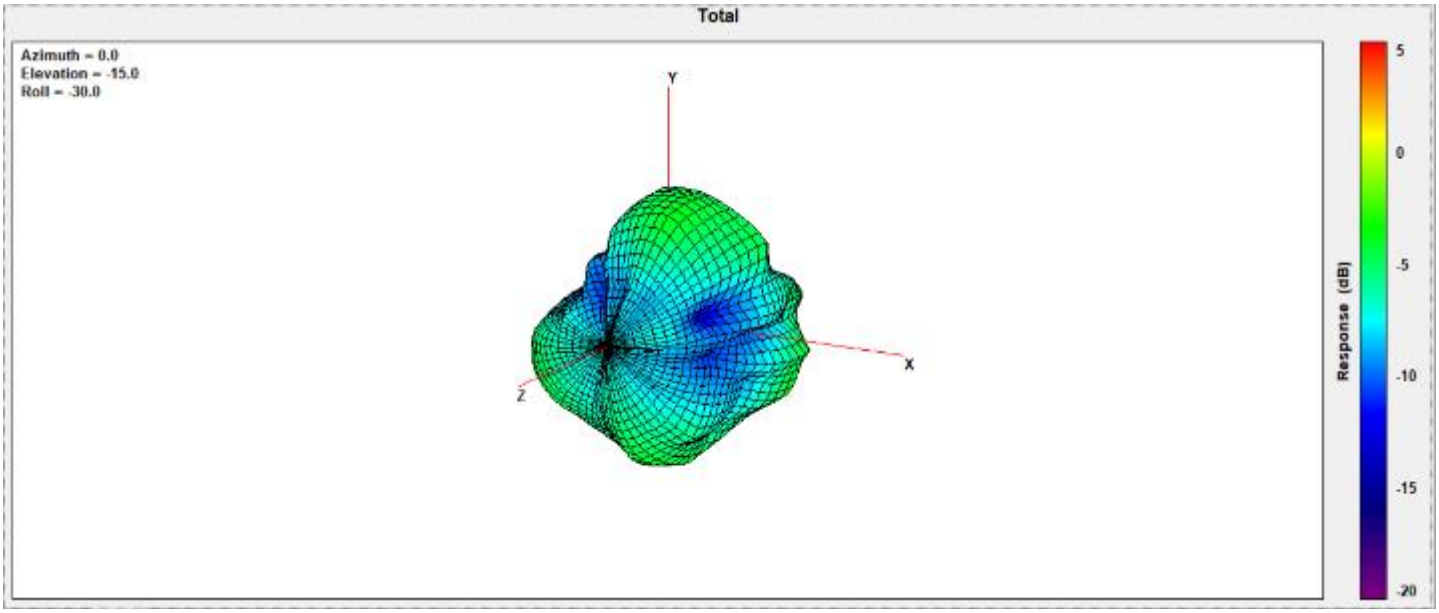
Center Frequency	**2690MHz**
Horizontal (dBi) peak	-2.34
Vertical (dBi) peak	-2.24

3400MHz



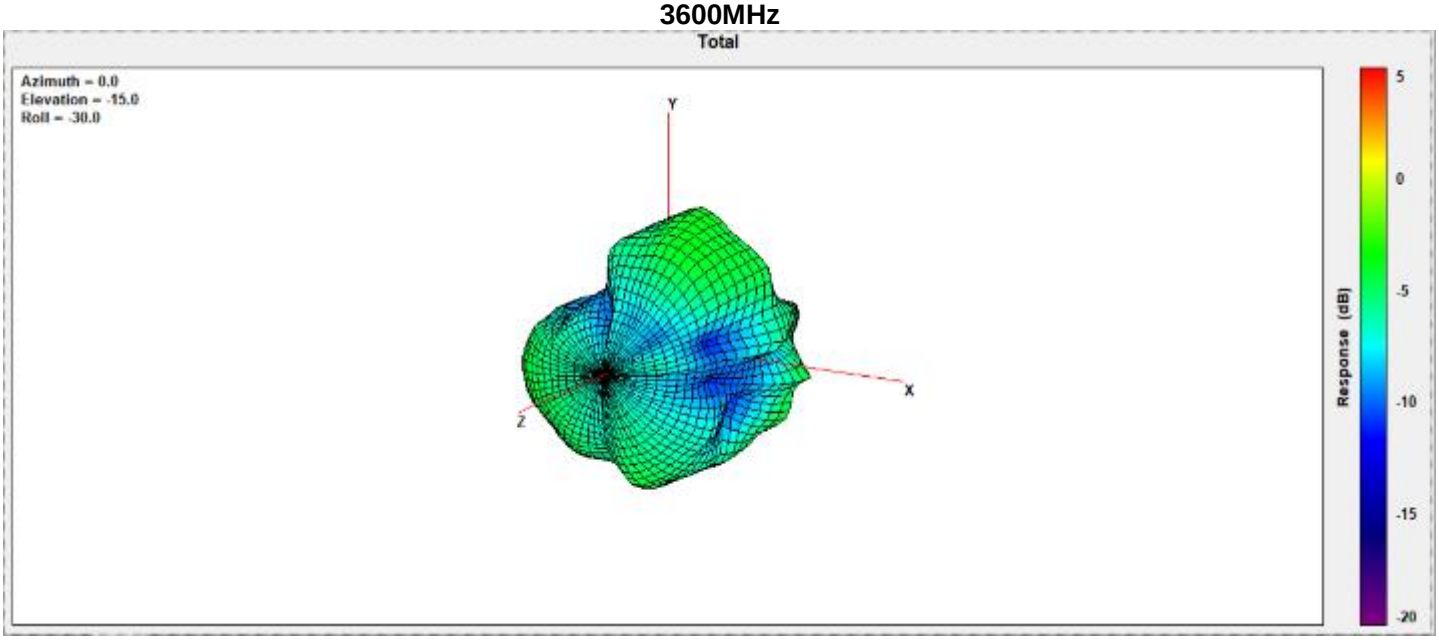
Center Frequency	**3400MHz**
Horizontal (dBi) peak	-3.10
Vertical (dBi) peak	-4.08

3500MHz



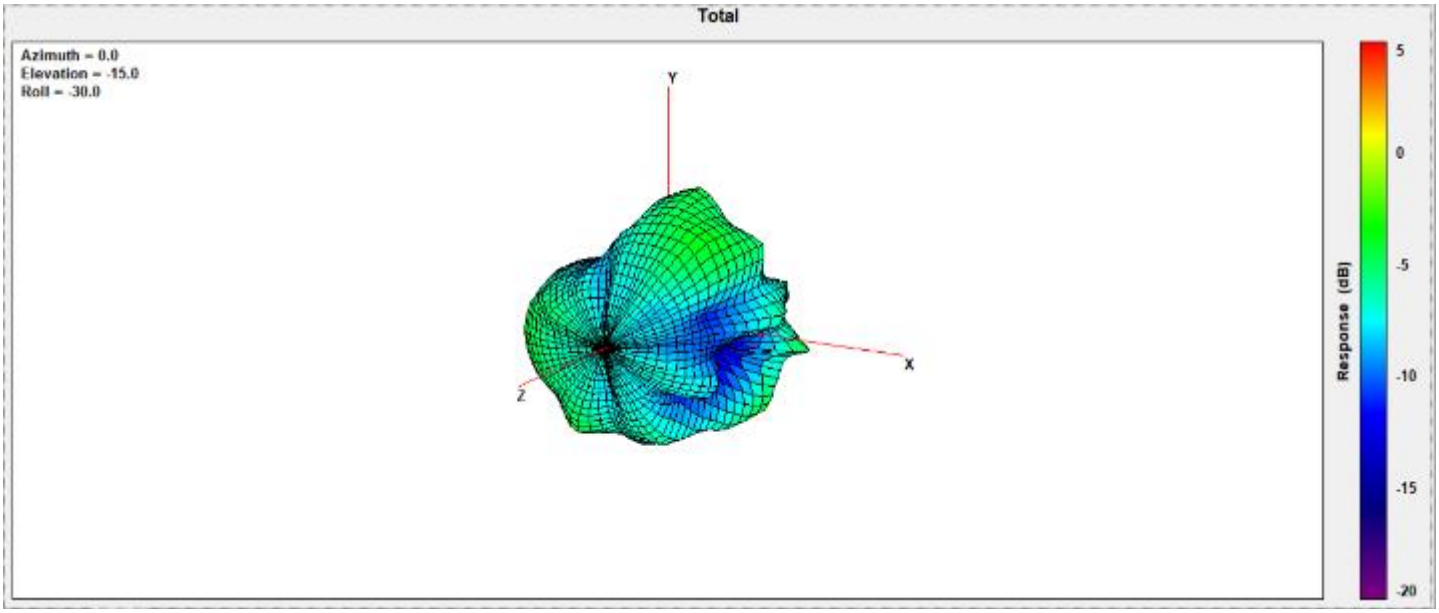
Center Frequency	**3500MHz**
Horizontal (dBi) peak	-2.22
Vertical (dBi) peak	-3.60

3600MHz



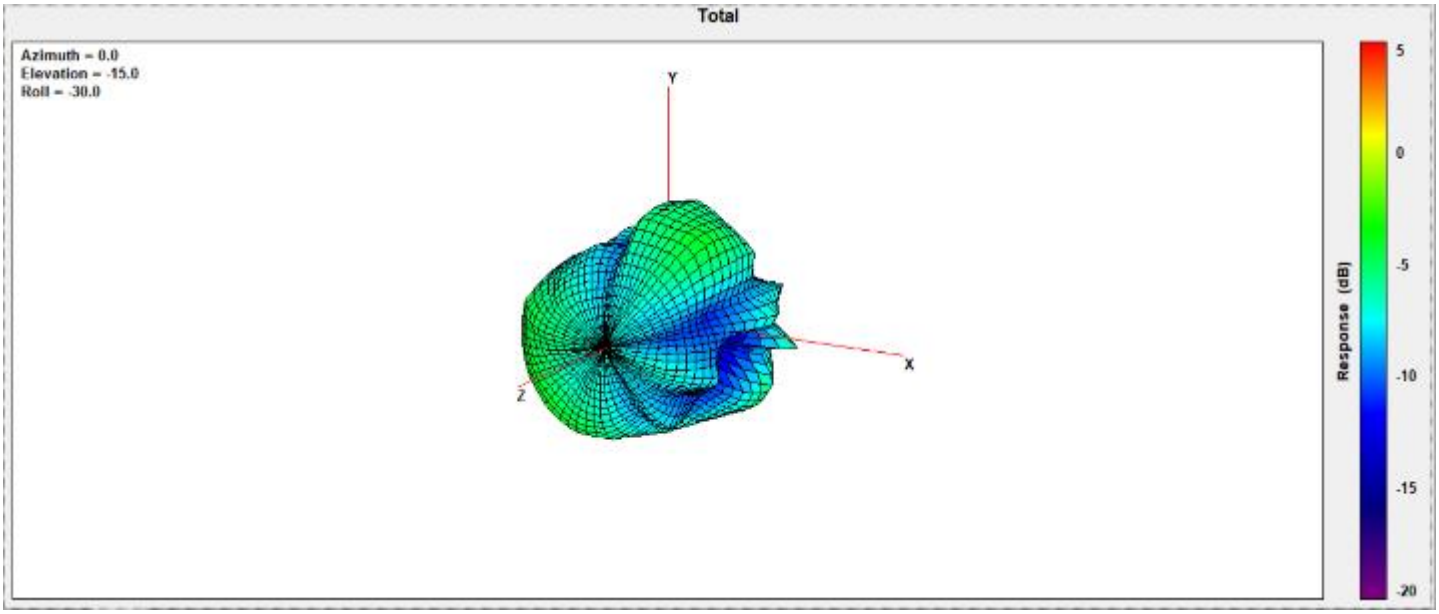
Center Frequency	**3600MHz**
Horizontal (dBi) peak	-1.47
Vertical (dBi) peak	-2.58

3700MHz



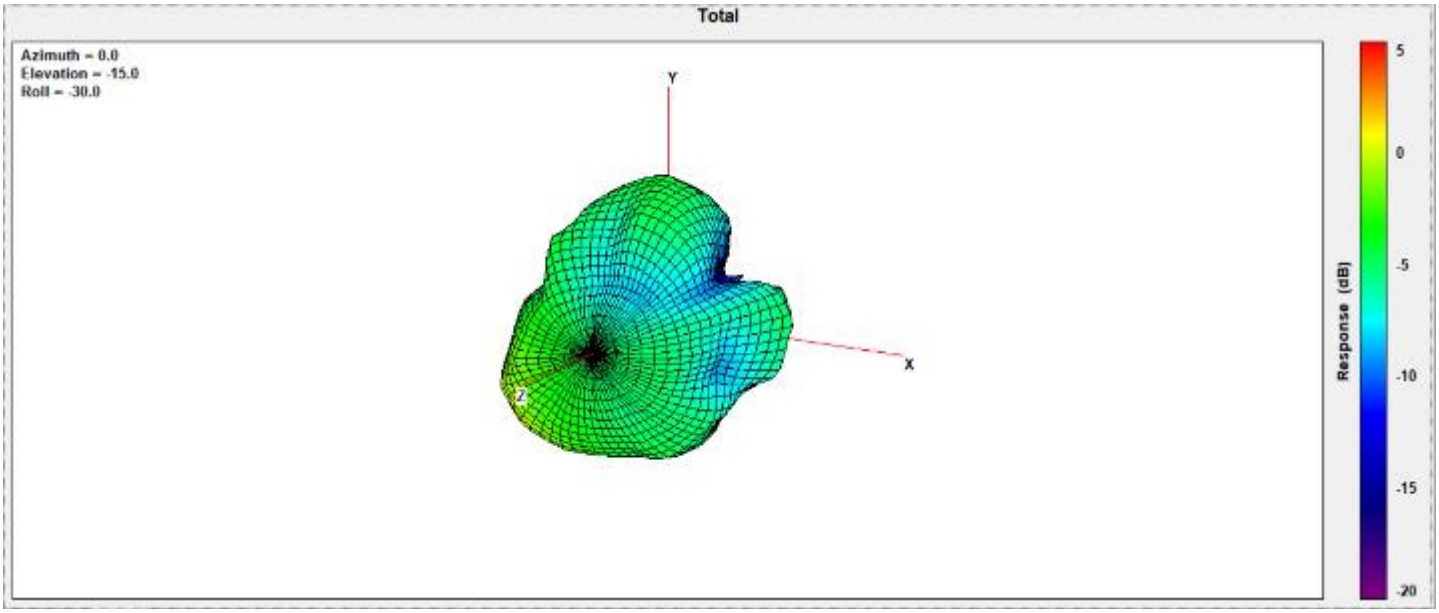
Center Frequency	**3700MHz**
Horizontal (dBi) peak	-2.89
Vertical (dBi) peak	-2.53

3800MHz



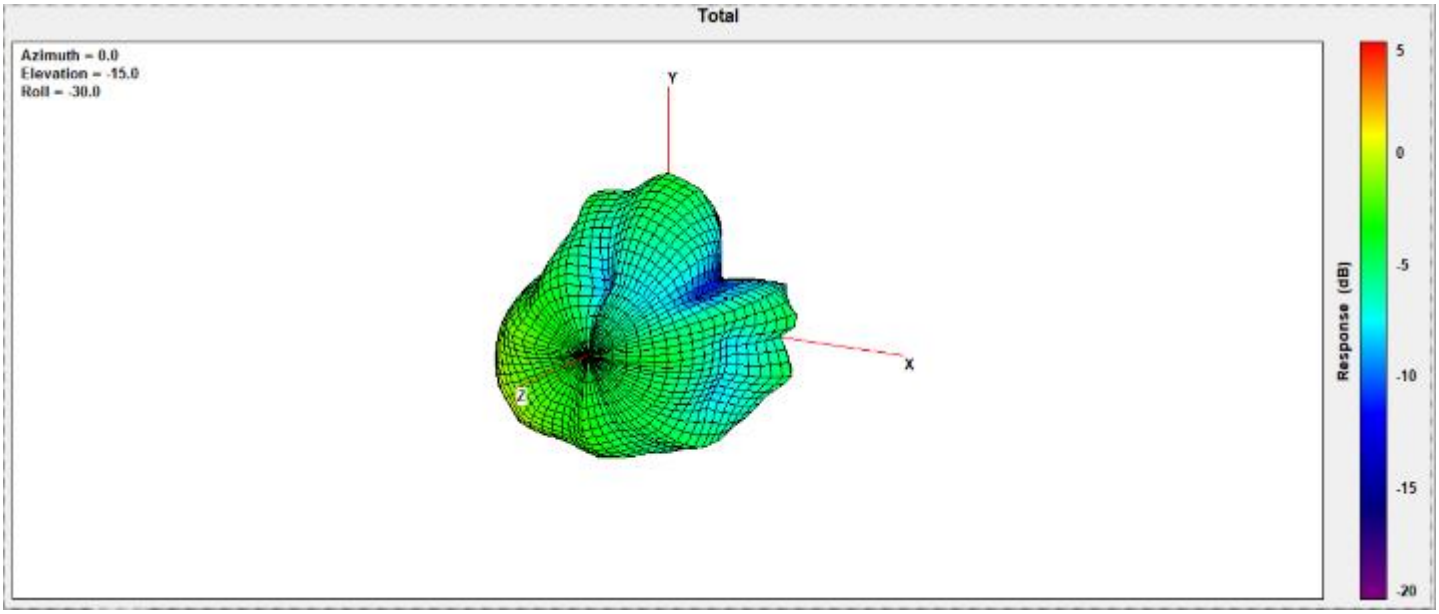
Center Frequency	**3800MHz**
Horizontal (dBi) peak	0.53
Vertical (dBi) peak	-2.19

4200MHz



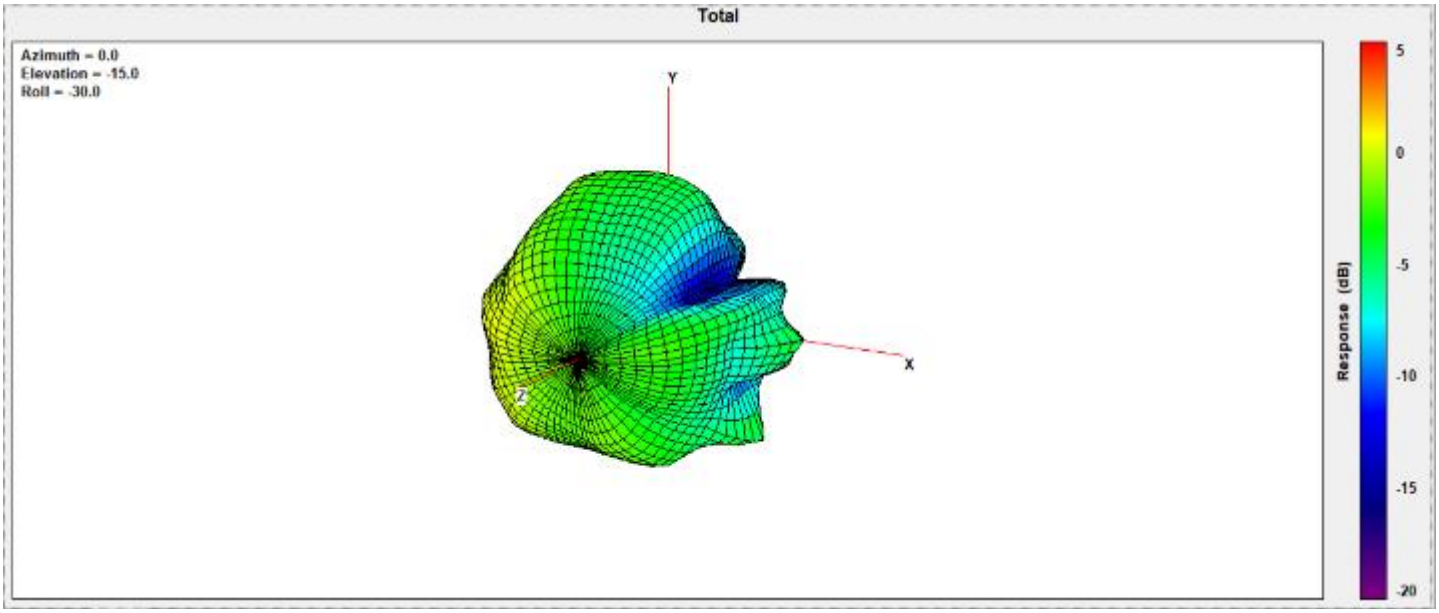
Center Frequency	**4200MHz**
Horizontal (dBi) peak	1.55
Vertical (dBi) peak	-3.28

4400MHz



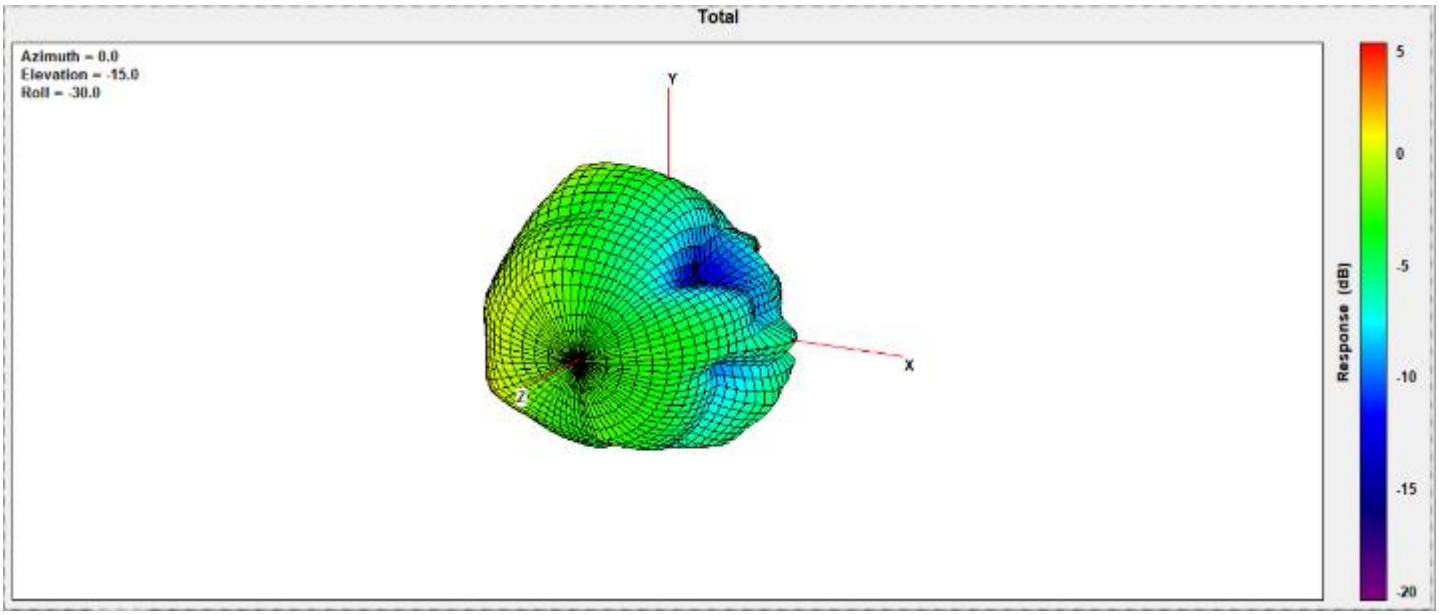
Center Frequency	**4400MHz**
Horizontal (dBi) peak	-1.12
Vertical (dBi) peak	-2.50

4700MHz



Center Frequency	**4700MHz**
Horizontal (dBi) peak	-1.85
Vertical (dBi) peak	-1.56

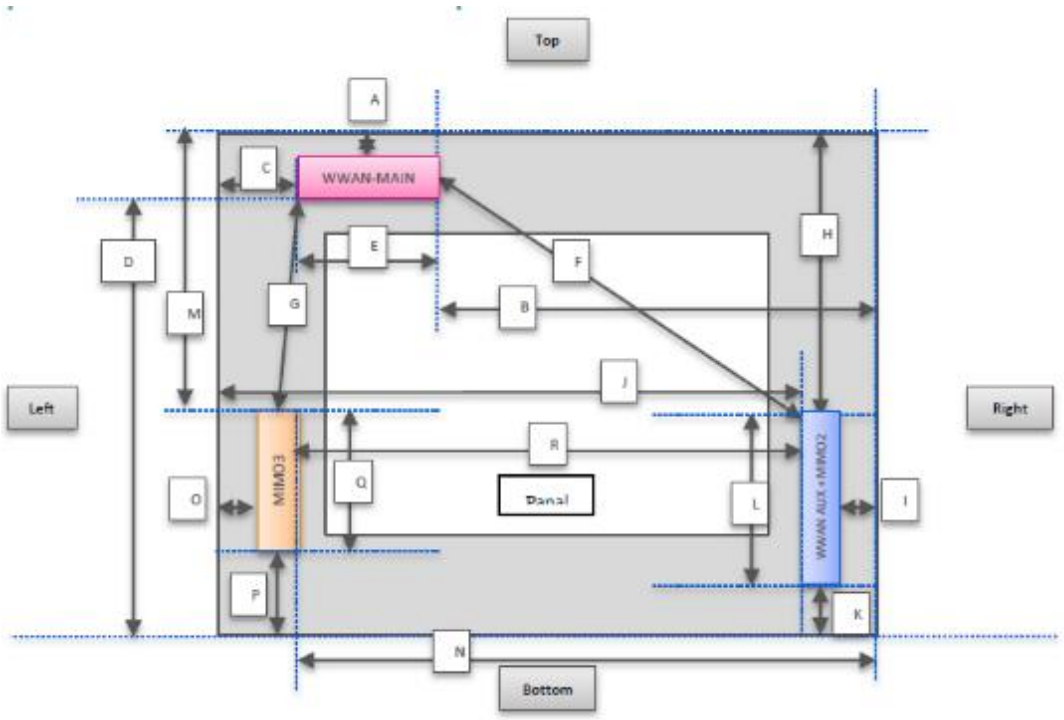
5000MHz



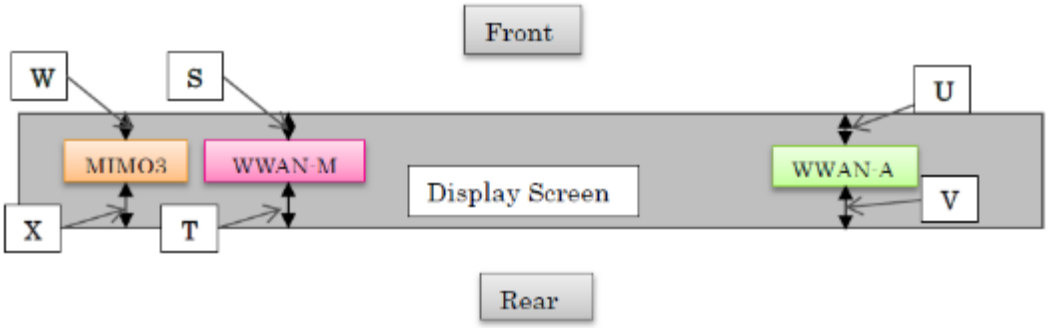
Center Frequency	**5000MHz**
Horizontal (dBi) peak	-0.21
Vertical (dBi) peak	0.29

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.



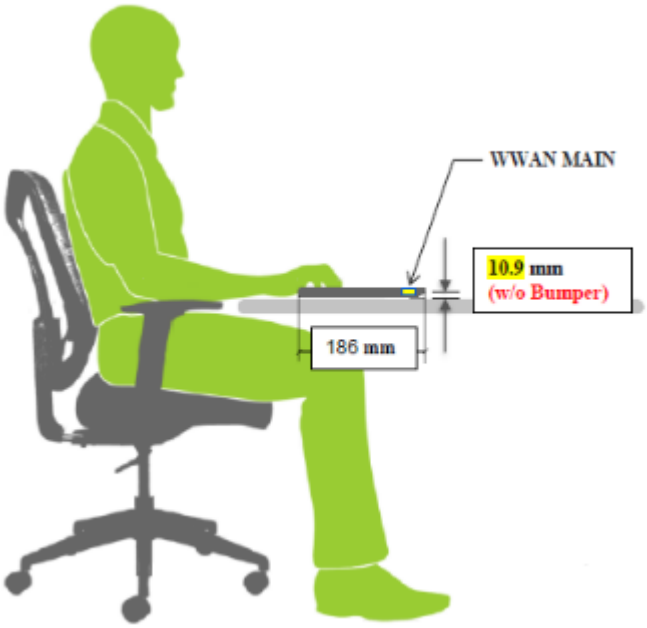
Minimum Separation Distance			
Item	Antenna	Position	Distance (mm)
A	WWAN-Main	to Top	2.1
B	WWAN-Main	to Right	191
C	WWAN-Main	to Left	24
D	WWAN-Main	to Bottom	190
E	WWAN-Main	Main Antenna Length	79
F	Main-Aux	Main to Aux	204
G	Main-MIMO3	Main-MIMO3	120
H	WWAN-AUX	to Top	113
I	WWAN-AUX	to Right	4.1
J	WWAN-AUX	to Left	281
K	WWAN-AUX	to Bottom	17
L	WWAN-AUX	Aux Antenna Length	74.6
M	WWAN-MIMO3	to Top	130
N	WWAN-MIMO3	to Right	284.5
O	WWAN-MIMO3	to Left	4.1
P	WWAN-MIMO3	to Bottom	16.8
Q	WWAN-MIMO3	MIMO3 Antenna Length	61.2



R	AUX-MIMO3	AUX-MIMO3	270
S	WWAN--Main	to Front	2.5
T	WWAN--Main	to Rear	6.9
U	WWAN--Aux	to Front	2.55
V	WWAN-Aux	to Rear	6.9
W	WWAN-MIMO3	to Front	2.55
X	WWAN-MIMO3	to Rear	6.9

Section 5. Antenna dimensional information for SAR evaluation

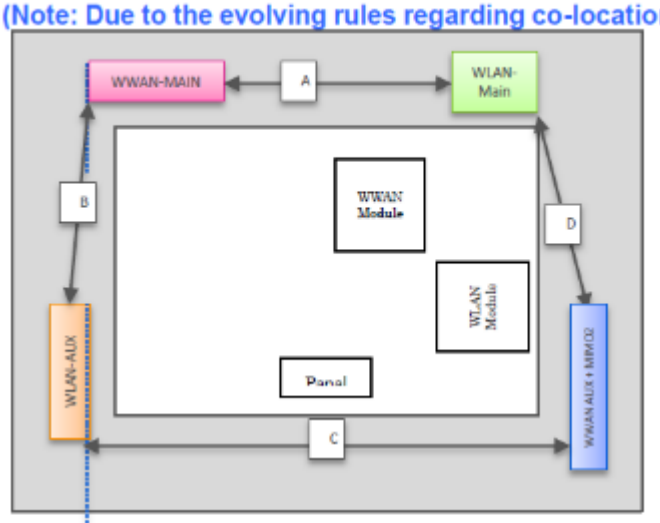
Include a **dimensioned photo(s) or dimensioned drawing(s)** showing the distance (mm) between the transmit antennas and the user. For notebook/laptop hosts show lapheld position (example below). For tablet hosts show all orientations including lapheld, primary & secondary portrait, primary & secondary 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)



Minimum Separation Distance			
Item	Antenna	between	Distance (mm)
A	WLAN-Main	WWAN MAIN	147
B	WWAN-Main	WLAN -AUX	116
C	WLAN-Aux	MIMO2	268
D	MIMO2	WLAN-Main	92