

Regulatory WWAN Antenna Information

Platform	
Platform Owner	DELL
Brand Name	DELL
Model Name	P174G
ODM	Compal
Antenna	
Manufacturer	WNC
Part Number	■ Tx1/Rx1 Antenna WWAN Main/AUX: 81ELA715.G27(DC33002RO1L)
	■ MIMO2/3 Antenna WWAN: 81ELA715.G35 (DC33002RO0L)
Module	
With WWAN Module	FM350-GL
(Check Box)	L860-GL-16

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. <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 WNC P/N: 81ELA715.G27 Customer P/N: DC33002RO1L	WNC	PIFA	Cable length: 306mm diameter: 1.13mm 50 ohm SLL Coaxial MAIN Connector: I-PEX PN:20565-001R-13	617-698MHz dBi -1.41 (peak)	617-698MHz dBi -0.92 (peak)	617-698MHz 3.50 max	617-698MHz dBi 0.49 (peak)
				698-821MHz dBi 0.15 (peak)	698-821MHz dBi 0.64 (peak)	698-821MHz 3.50 max	698-821MHz dBi 0.49 (peak)
				824-960MHz dBi -1.31 (peak)	824-960MHz dBi -0.64 (peak)	824-960MHz 3.50 max	824-960MHz dBi 0.67 (peak)
				1425-1515MHz dBi -1.18 (peak)	1425-1515MHz dBi -0.51 (peak)	1425-1515MHz 3.50 max	1425-1515MHz dBi 0.67 (peak)
				1710-2200MHz dBi 2 (peak)	1710-2200MHz dBi 2.67 (peak)	1710-2200MHz 3.50 max	1710-2200MHz dBi 0.67 (peak)
				2300-2690MHz dBi 2.69 (peak)	2300-2690MHz dBi 3.36 (peak)	2300-2690MHz 3.50 max	2300-2690MHz dBi 0.67 (peak)
				3400-3800MHz dBi -0.51 (peak)	3400-3800MHz dBi 0.3 (peak)	3400-3800MHz 3.50 max	3400-3800MHz dBi 0.81 (peak)
				4200-4700MHz dBi -0.37 (peak)	4200-4700MHz dBi 0.6 (peak)	4200-4700MHz dBi 3.50 (peak)	4200-4700MHz dBi 0.97 (peak)
	WNC	PIFA	Cable length: 500mm diameter: 1.13mm 50 ohm SLL Coaxial AUX Connector: I-PEX PN:20565-001R-13	5150-5925MHz dBi -1.84 (peak)	5150-5925MHz dBi -0.74 (peak)	5150-5925MHz 3.50 max	5150-5925MHz dBi 1.1 (peak)
				617-698MHz dBi -3.17 (peak)	617-698MHz dBi -2.36 (peak)	617-698MHz 3.50 max	617-698MHz dBi 0.81 (peak)
				698-821MHz dBi -0.13 (peak)	698-821MHz dBi 0.68 (peak)	698-821MHz 3.50 max	698-821MHz dBi 0.81 (peak)
				824-960MHz dBi -1.77 (peak)	824-960MHz dBi -0.96 (peak)	824-960MHz 3.50 max	824-960MHz dBi 0.81 (peak)
				1425-1515MHz dBi -1.27 (peak)	1425-1515MHz dBi -0.17 (peak)	1425-1515MHz 3.50 max	1425-1515MHz dBi 1.1 (peak)
				1557-1610 MHz dBi -1.09 (peak)	1557-1610 MHz dBi 0.01 (peak)	1557-1610 MHz 3.50 max	1557-1610 MHz dBi 1.1 (peak)
				1805-2200MHz dBi 1.99 (peak)	1805-2200MHz dBi 3.09 (peak)	1805-2200MHz 3.50 max	1805-2200MHz dBi 1.1 (peak)
				2300-2690MHz dBi 2.76 (peak)	2300-2690MHz dBi 4.09 (peak)	2300-2690MHz 3.50 max	2300-2690MHz dBi 1.33 (peak)
				3400-3800MHz	3400-3800MHz	3400-3800MHz	3400-3800MHz

				1.31 dBi (peak)	2.92 dBi (peak)	3.50 max	1.61 dBi (peak)
				4200-4700MHz -1.36 dBi (peak)	4200-4700MHz 0.46 dBi (peak)	4200-4700MHz 3.50 dBi (peak)	4200-4700MHz 1.82 dBi (peak)
				5150-5925MHz 0.76 dBi (peak)	5150-5925MHz 2.78 dBi (peak)	5150-5925MHz 3.50 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 WNC P/N: 81ELA715.G35 Customer P/N: DC33002ROOL	WNC	Coupled	Cable length: 147.5mm diameter: 1.13mm 50 ohm SLL Coaxial Connector: I-PEX PN:20565-001R-13	1425-1515MHz 0.09 dBi (peak)	1425-1515MHz 0.41 dBi (peak)	1425-1515MHz 3.5 max	1425-1515MHz 0.32 dBi (peak)
				1710-2200MHz 2.1 dBi (peak)	1710-2200MHz 2.42 dBi (peak)	1710-2200MHz 3.5 max	1710-2200MHz 0.32 dBi (peak)
				2300-2690MHz 2.05 dBi (peak)	2300-2690MHz 2.44 dBi (peak)	2300-2690MHz 3.5 max	2300-2690MHz 0.39 dBi (peak)
				3400-3800MHz 0.76 dBi (peak)	3400-3800MHz 1.23 dBi (peak)	3400-3800MHz 3.5 max	3400-3800MHz 0.47 dBi (peak)
				4200-5000MHz 1.43 dBi (peak)	4200-5000MHz 1.96 dBi (peak)	4200-5000MHz 3.5 max	4200-5000MHz 0.53 dBi (peak)
	WNC	Coupled	Cable length: 218mm diameter: 1.13mm 50 ohm SLL Coaxial Connector: I-PEX PN:20565-001R-13	1805-2200MHz 1.9 dBi (peak)	1805-2200MHz 2.37 dBi (peak)	1805-2200MHz 3.5 max	1805-2200MHz 0.47 dBi (peak)
				2300-2690MHz 2.62 dBi (peak)	2300-2690MHz 3.19 dBi (peak)	2300-2690MHz 3.5 max	2300-2690MHz 0.57 dBi (peak)
				3400-3800MHz 0.81 dBi (peak)	3400-3800MHz 1.5 dBi (peak)	3400-3800MHz 3.5 max	3400-3800MHz 0.69 dBi (peak)
				4200-5000MHz 0.57 dBi (peak)	4200-5000MHz 1.35 dBi (peak)	4200-5000MHz 3.5 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	-8.55	-8.69	-3.54	-4.71
634.5	-6.71	-5.72	-3.17	-4.25
652	-3.84	-4.15	-4.01	-4.62
663	-3.30	-3.44		
680.5	-3.48	-3.57		
698	-1.89	-1.41		
703	-5.02	-3.97		
707.5	-4.38	-3.34		
717	-3.13	-2.06	-2.29	-1.32
725.5	-1.94	-1.08	-1.51	-1.09
748	0.00	0.15	-0.54	-0.96
756	-0.08	-0.29	-0.13	-0.81
768	-1.38	-1.00	-0.32	-0.80
777	-2.90	-1.64	-0.90	-1.22
782	-3.25	-1.86	-1.44	-1.61
787	-3.06	-1.88	-2.18	-2.06
791			-6.39	-6.90
806			-5.37	-6.04
814	-6.85	-5.91	-5.33	-5.26
821			-5.51	-4.53
824	-5.72	-4.79	-5.54	-4.20
832	-4.99	-4.23	-5.45	-3.47
836.5	-4.57	-3.69	-5.31	-3.09
849	-3.51	-2.26	-4.64	-2.09
862	-3.37	-1.71	-5.11	-3.35
880	-5.21	-2.76	-4.74	-2.43
897.5	-4.28	-1.81	-4.20	-1.88
915	-3.82	-1.42	-3.95	-1.77
925	-3.92	-1.31	-3.95	-1.85
960	-4.50	-1.84	-4.07	-2.88
1427.9	-2.24	-4.19	-1.37	-2.21
1447.9	-1.33	-4.37	-1.27	-1.90
1455.4	-1.18	-4.84	-1.34	-1.91
1462.9	-1.19	-5.38	-1.29	-1.95
1496	-3.60	-6.36	-1.44	-3.18
1510.9	-4.23	-5.04	-2.26	-3.62
1557			-3.34	-1.92

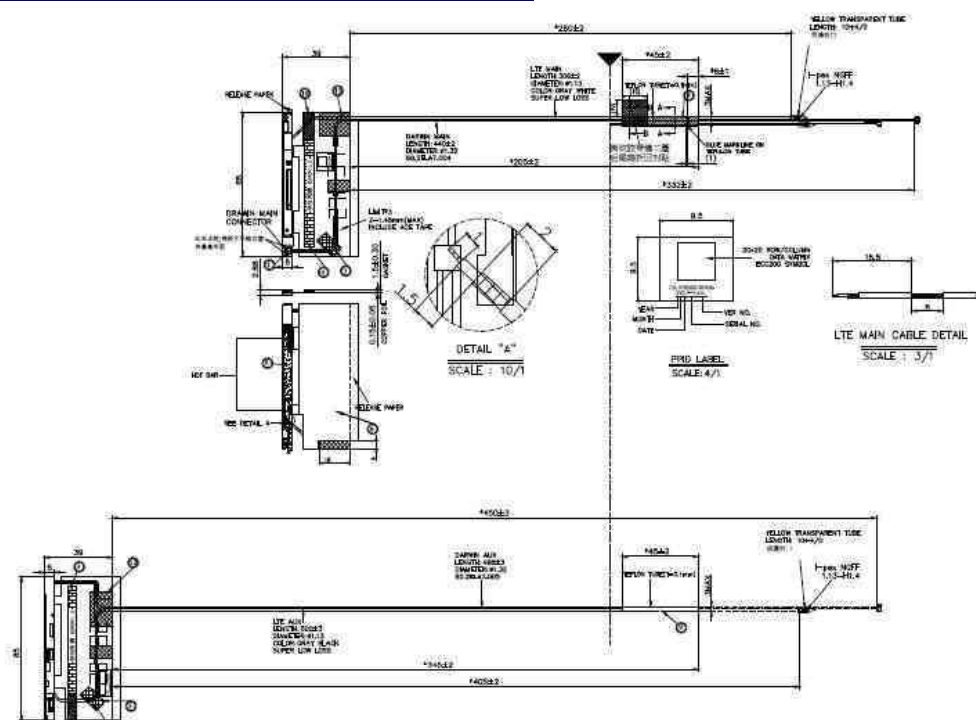
1575			-3.13	-1.88
1610			-2.69	-1.09

High band

Frequency (MHz)	TPx antenna		DRx antenna	
	Horizontal	Vertical	Horizontal	Vertical
	(dBi)	(dBi)	(dBi)	(dBi)
1710	0.00	0.01		
1732.5	0.31	0.24		
1747.5	0.34	0.12		
1755	0.35	-0.10		
1785	-0.08	-0.30		
1805	-0.33	-0.33	-1.30	0.98
1850	-1.21	-0.45	-1.12	0.25
1880	0.26	-0.08	-0.01	-0.79
1910	1.29	0.44	0.10	-2.58
1920	1.38	0.50	-0.14	-2.97
1950	1.86	0.53	-1.02	-3.44
1980	2.00	-0.24	-2.14	-1.83
2110	0.77	0.09	-1.65	1.07
2200	1.35	1.85	-0.48	1.99
2300	2.09	2.69	1.52	1.96
2305	0.89	0.64	0.42	0.99
2315	0.57	0.56	0.29	0.08
2350	0.31	0.70	0.76	0.82
2400	0.97	2.31	1.23	2.76
2500	1.25	2.52	1.77	2.64
2570	0.14	1.42	1.73	2.26
2595	0.42	1.74	1.47	2.14
2620	0.28	1.73	1.18	2.06
2690	-0.03	1.84	1.34	2.70
3400	-1.55	-2.54	0.55	1.31
3500	-2.51	-0.51	-0.30	-0.04
3600	-3.73	-2.30	-0.56	-0.12
3700	-2.26	-1.96	-0.45	-0.33
3800	-2.89	-1.69	-3.24	-2.46
4200	-1.84	-2.36	-5.07	-5.44
4400	-0.42	-0.66	-1.36	-2.07
4700	-0.37	-1.60	-4.09	-3.73
5150	-2.01	-2.60	-2.82	-0.63
5537.5	-2.20	-2.46	0.56	0.76
5925	-3.26	-1.84	-2.77	-2.63

	DRx2 antenna		DRx1 antenna	
Frequency (MHz)	Horizontal	Vertical	Horizontal	Vertical
	(dBi)	(dBi)	(dBi)	(dBi)
1452	-2.08	-0.04		
1474	-1.52	0.09		
1496	-0.59	-0.72		
1710	0.74	-1.00		
1732.5	0.64	-1.15		
1747.5	0.32	-1.38		
1755	-0.07	-1.60		
1785	-1.83	-2.26		
1805	-2.68	-2.13	0.00	-0.53
1850	-2.23	-2.01	-0.14	-0.01
1880	-1.41	-1.42	0.02	0.76
1910	-0.38	-0.78	-0.19	0.64
1920	0.21	-0.86	-0.34	0.36
1950	0.82	-0.13	0.16	-0.37
1980	0.62	0.31	0.64	-0.84
2110	0.96	0.75	0.87	-1.66
2200	2.10	0.22	1.90	-2.89
2300	1.73	0.53	1.99	-0.05
2305	0.68	0.83	0.77	0.10
2315	0.67	0.47	0.22	0.34
2350	0.43	0.54	0.72	-0.10
2400	2.05	0.29	0.49	-1.30
2500	0.43	-0.91	2.62	-1.22
2570	-0.98	-2.09	2.18	-1.40
2595	-0.72	-1.98	1.45	-1.86
2620	-0.75	-1.59	0.75	-1.38
2690	-0.30	-0.72	1.15	0.91
3400	-0.64	0.50	0.40	0.49
3500	-2.63	-1.88	0.26	-0.24
3600	-0.47	-1.10	0.81	-2.51
3700	0.09	-1.13	-0.67	-4.60
3800	0.76	-2.10	0.10	-3.01
4200	0.03	-3.05	-3.92	-3.60
4400	0.57	-0.88	-0.56	-2.57
4700	-0.99	-1.63	0.57	-3.38
5000	1.43	0.64	-0.22	-2.59

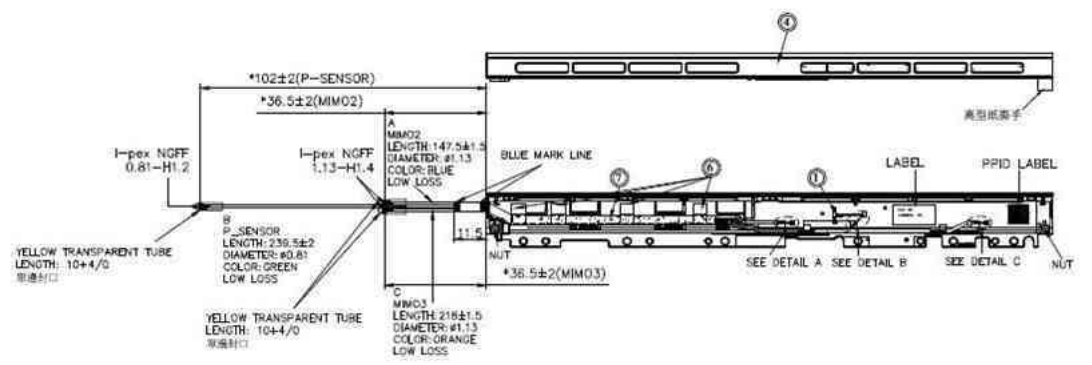
TPx Antenna Dimensioned Drawing:



[illegible]

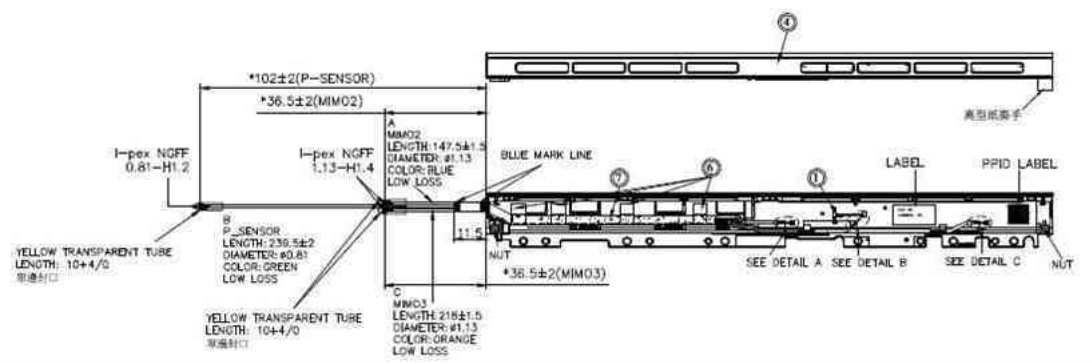
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DRx2 Antenna Dimensioned Drawing:



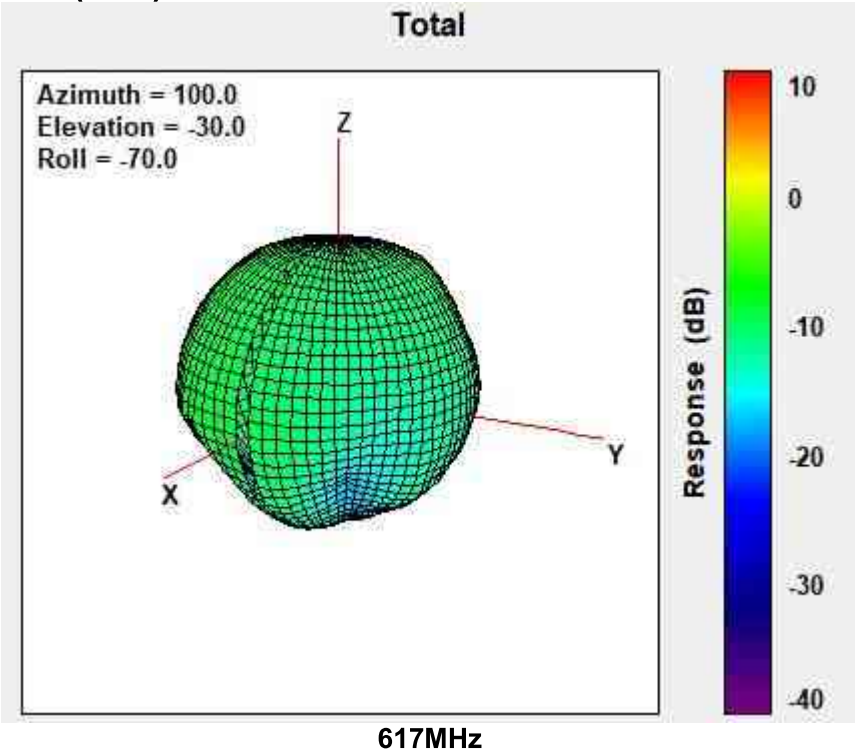
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DRx1 Antenna Dimensioned Drawing:

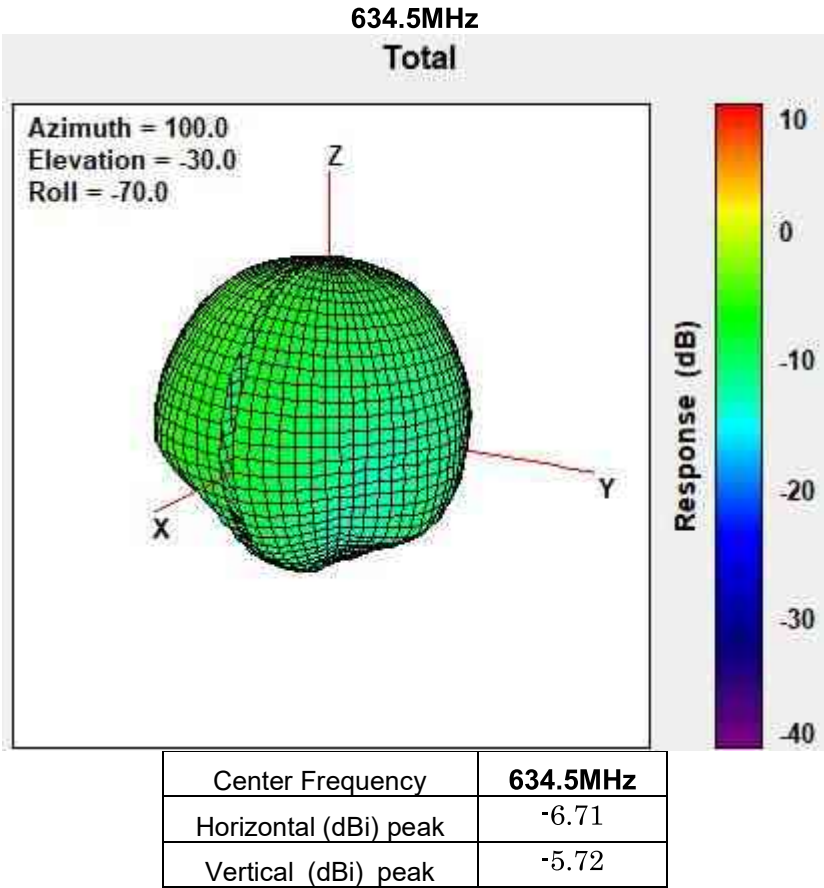


Section 3. Radiation characteristics of antennae Loaded in Host Platform

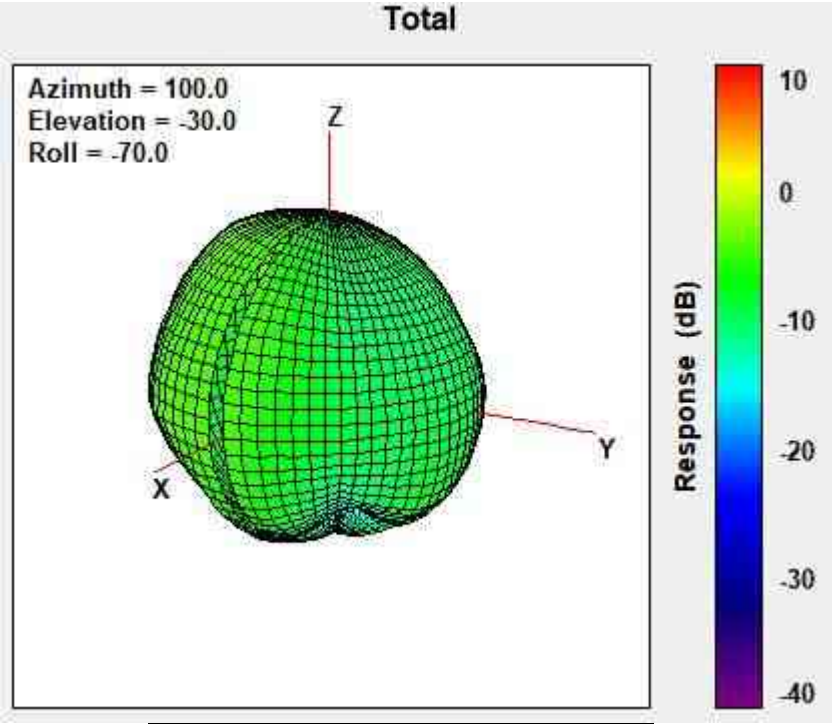
WWAN Main Antenna (TPx)



Center Frequency	617 MHz
Horizontal (dBi) peak	-8.55
Vertical (dBi) peak	-8.69

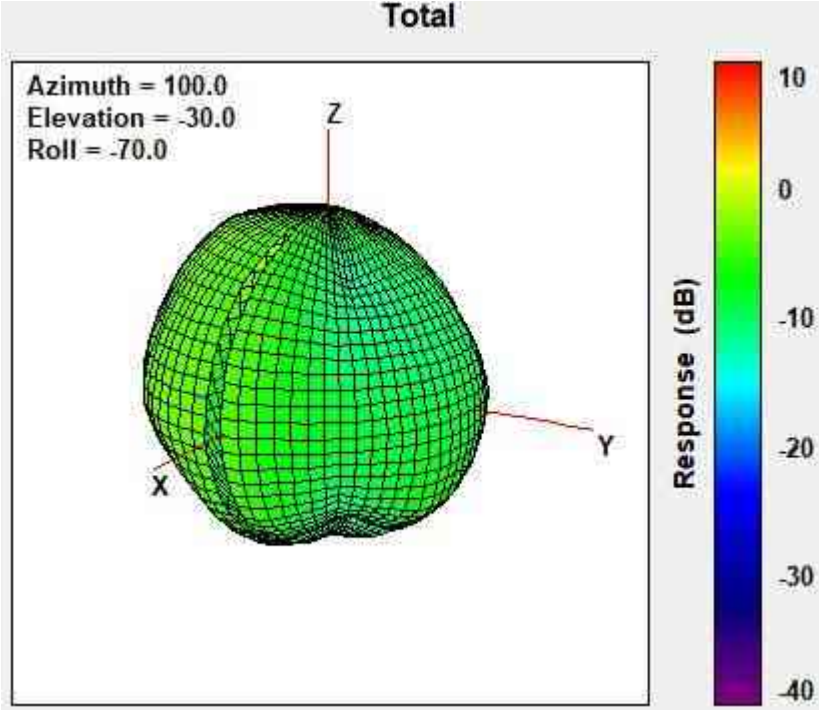


652MHz



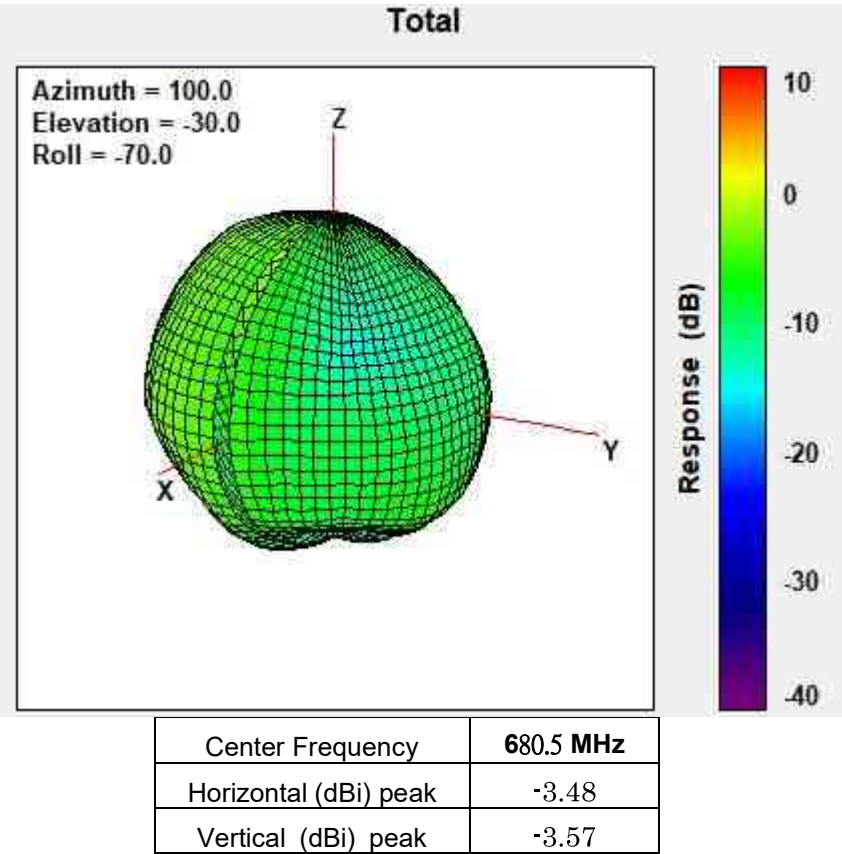
Center Frequency	652MHz
Horizontal (dBi) peak	-3.84
Vertical (dBi) peak	-4.15

663MHz

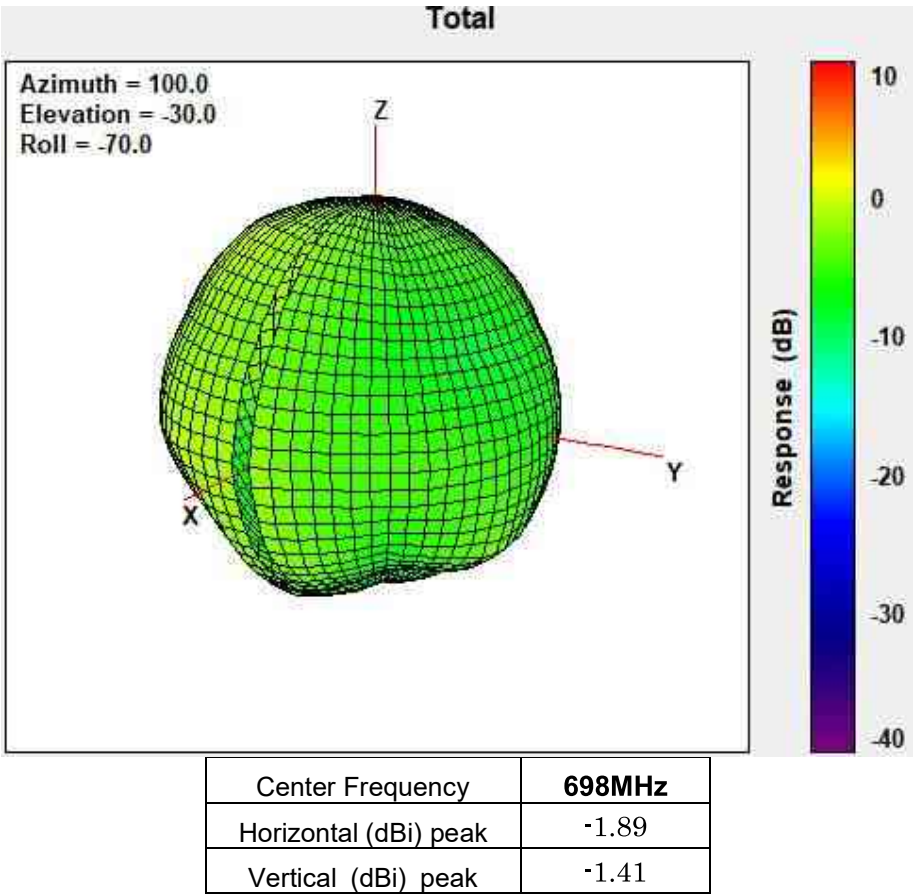


Center Frequency	663MHz
Horizontal (dBi) peak	-3.30
Vertical (dBi) peak	-3.44

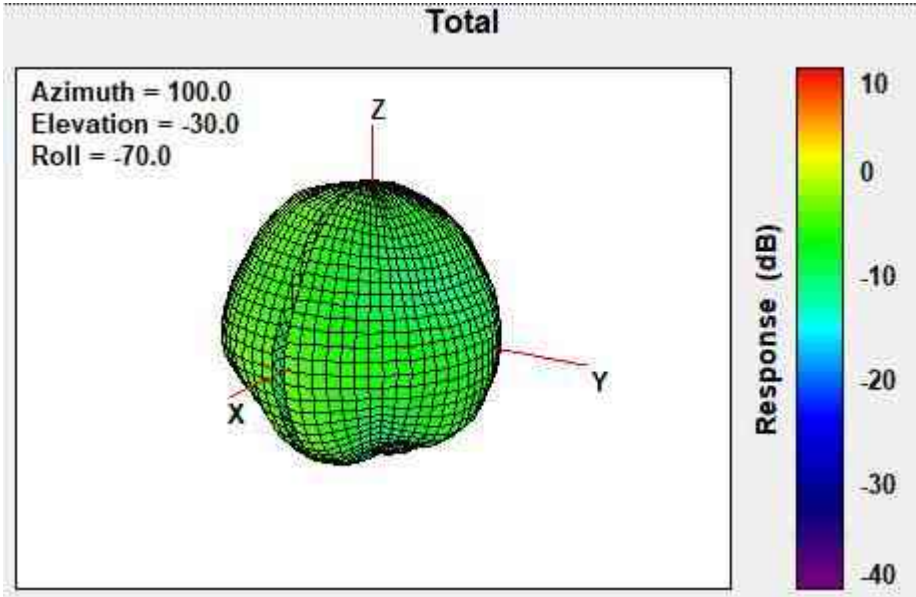
680.5MHz



698MHz

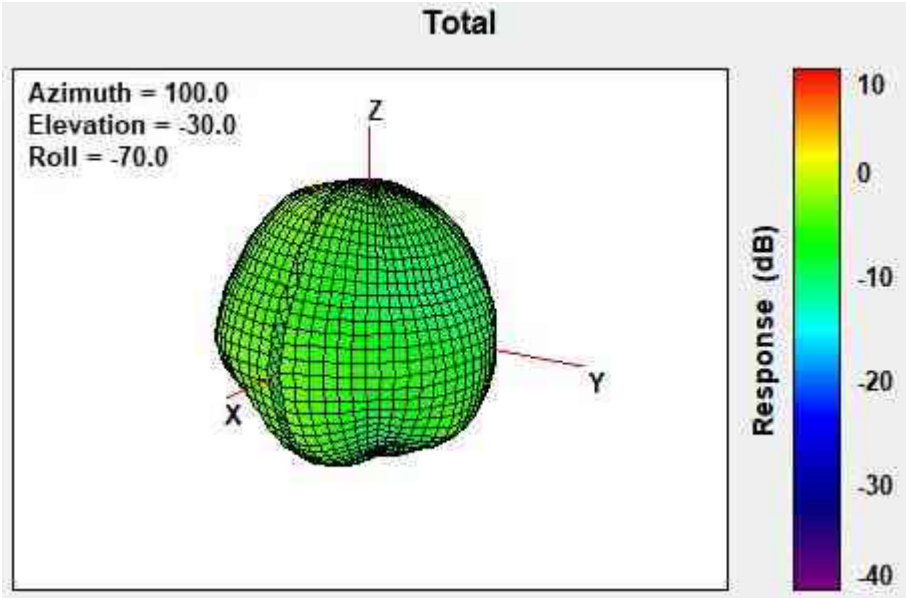


703MHz



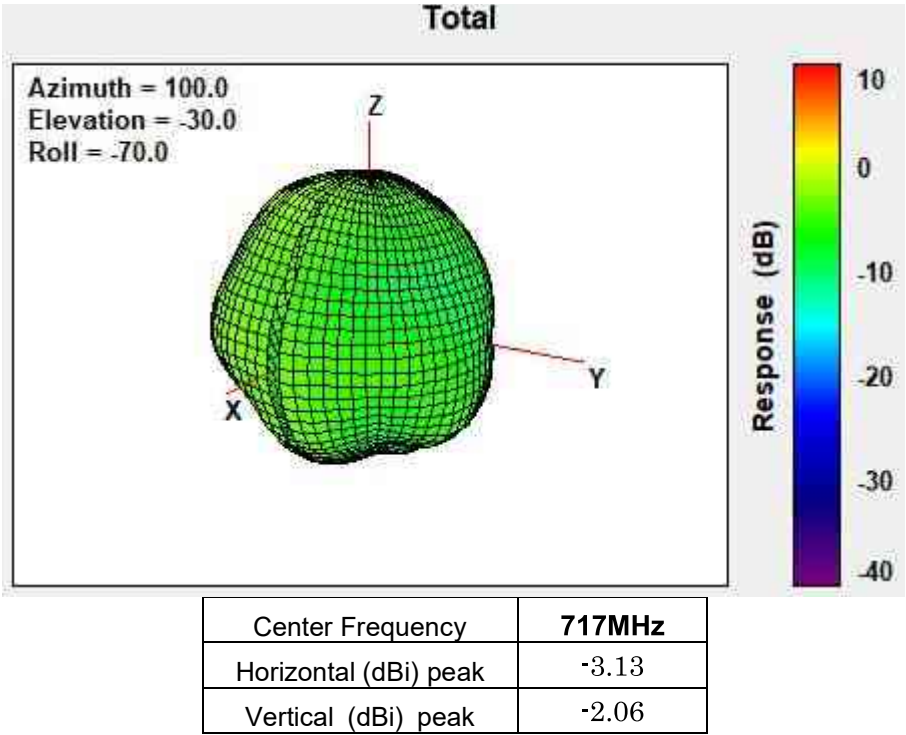
Center Frequency	703MHz
Horizontal (dBi) peak	-5.02
Vertical (dBi) peak	-3.97

707.5MHz

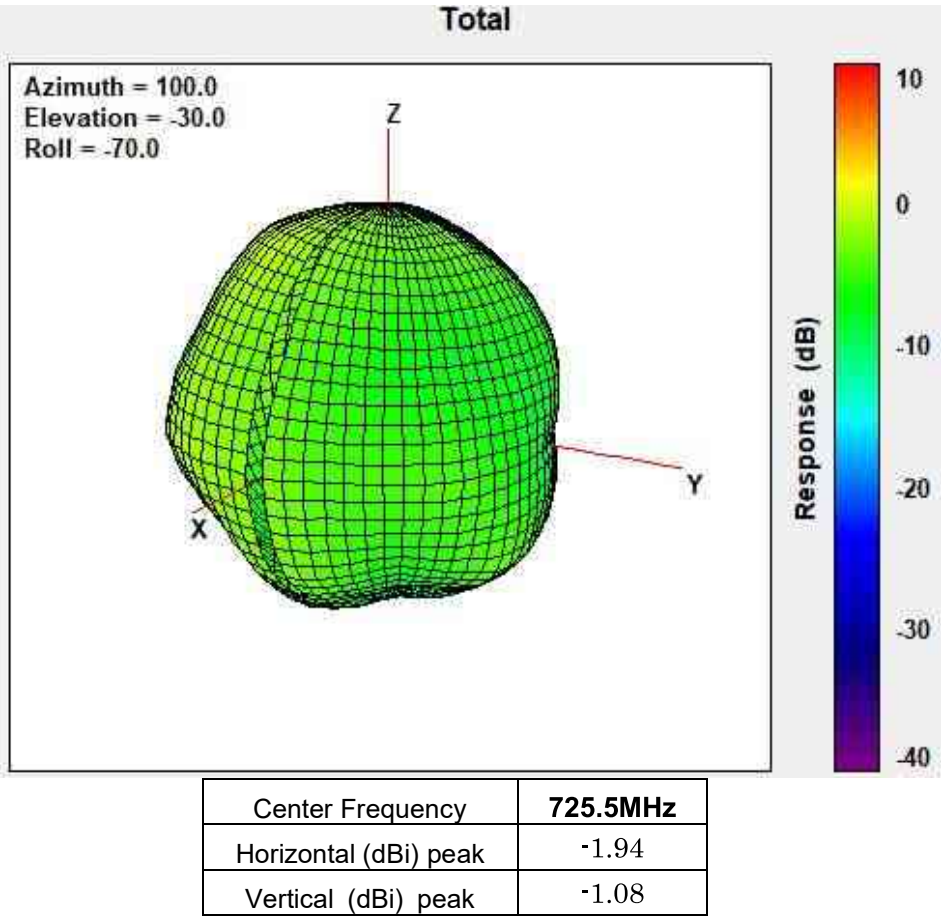


Center Frequency	707.5MHz
Horizontal (dBi) peak	-4.38
Vertical (dBi) peak	-3.34

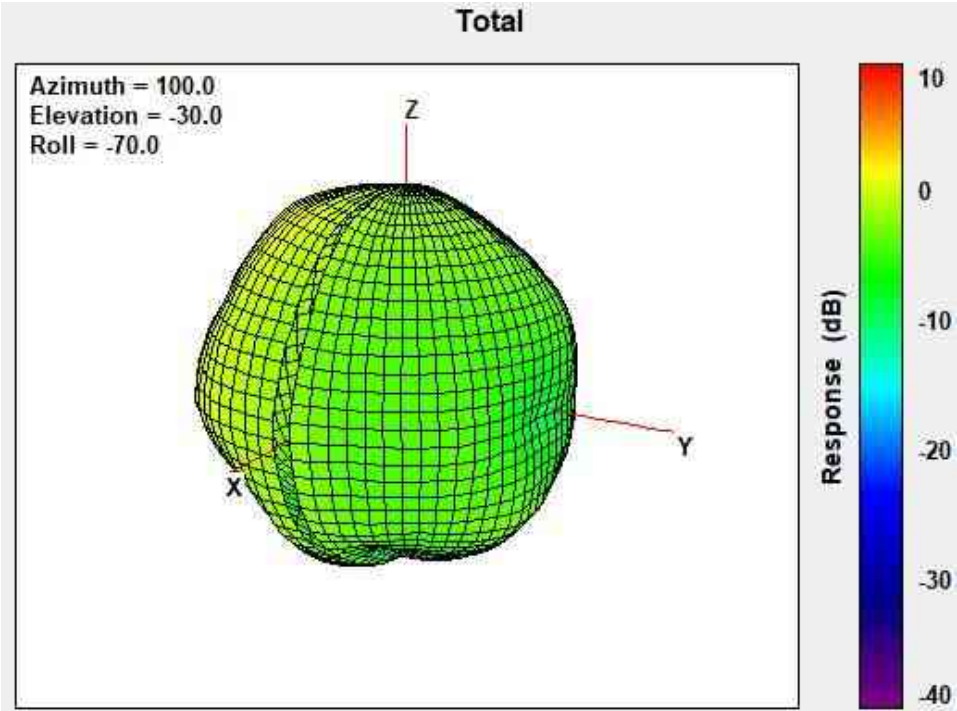
717MHz



725.5MHz

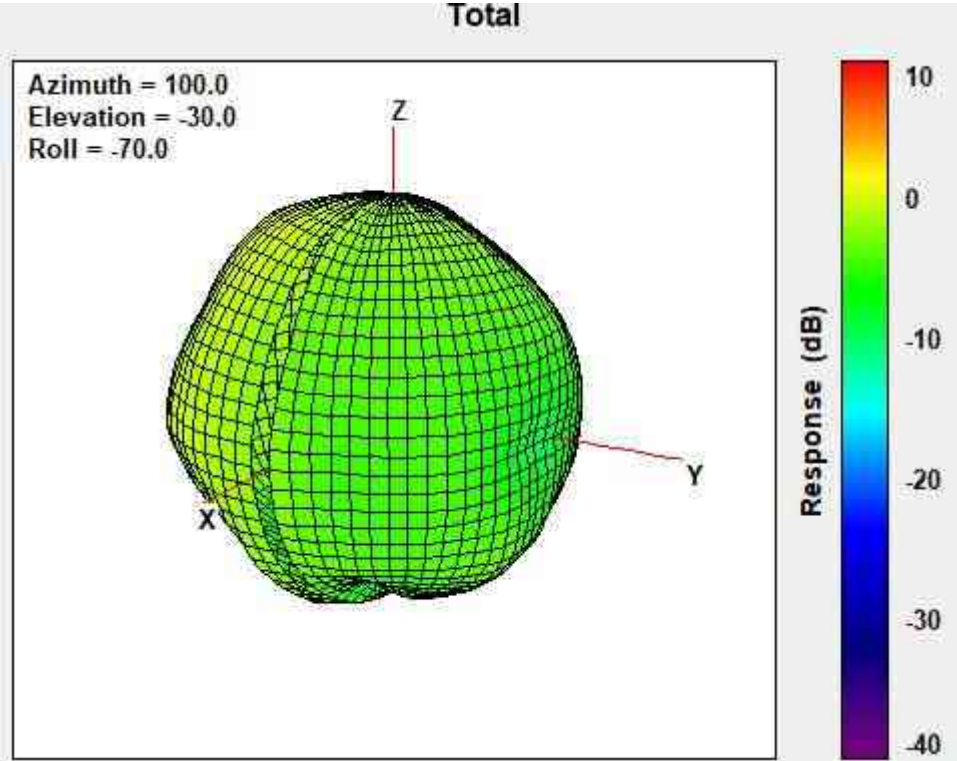


748MHz



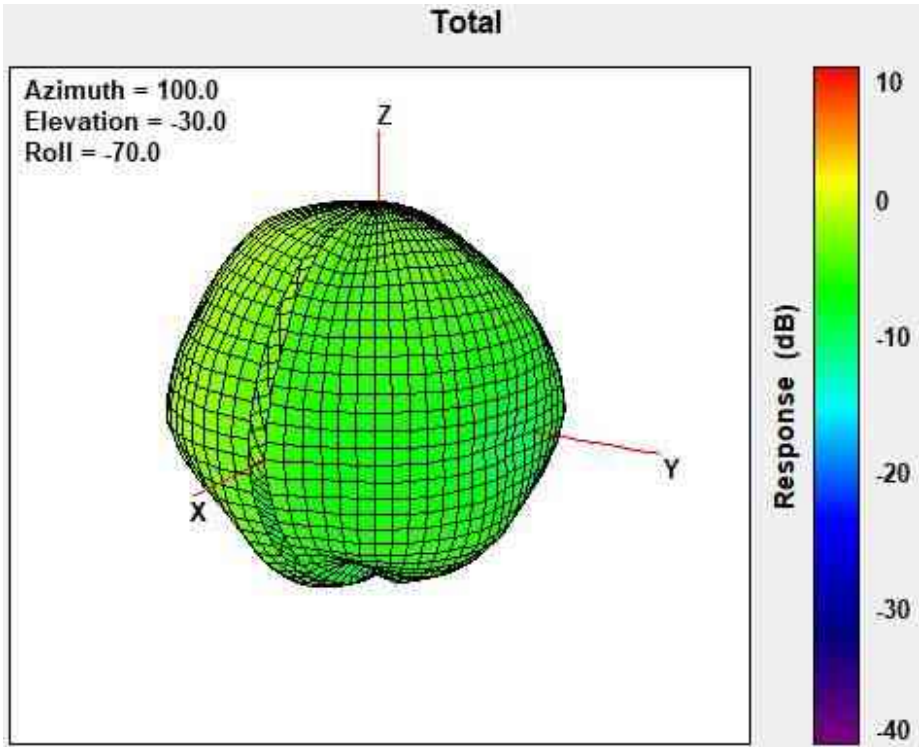
Center Frequency	748MHz
Horizontal (dBi) peak	0.00
Vertical (dBi) peak	0.15

756MHz



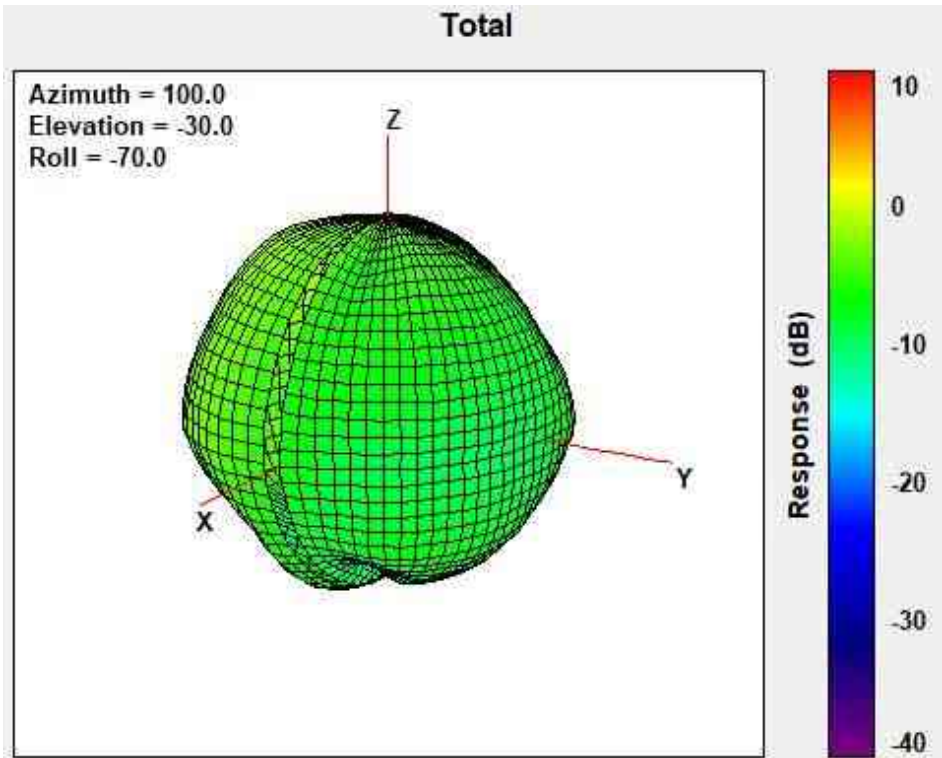
Center Frequency	756MHz
Horizontal (dBi) peak	-0.08
Vertical (dBi) peak	-0.29

768MHz



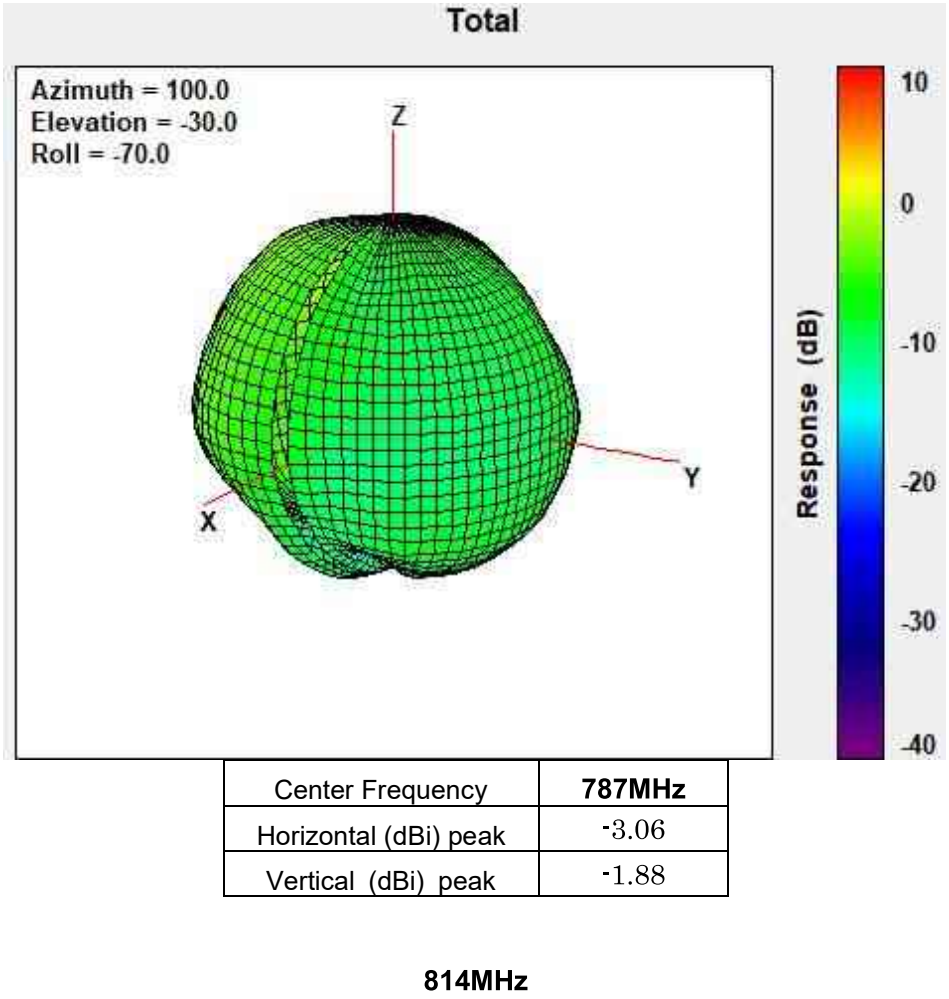
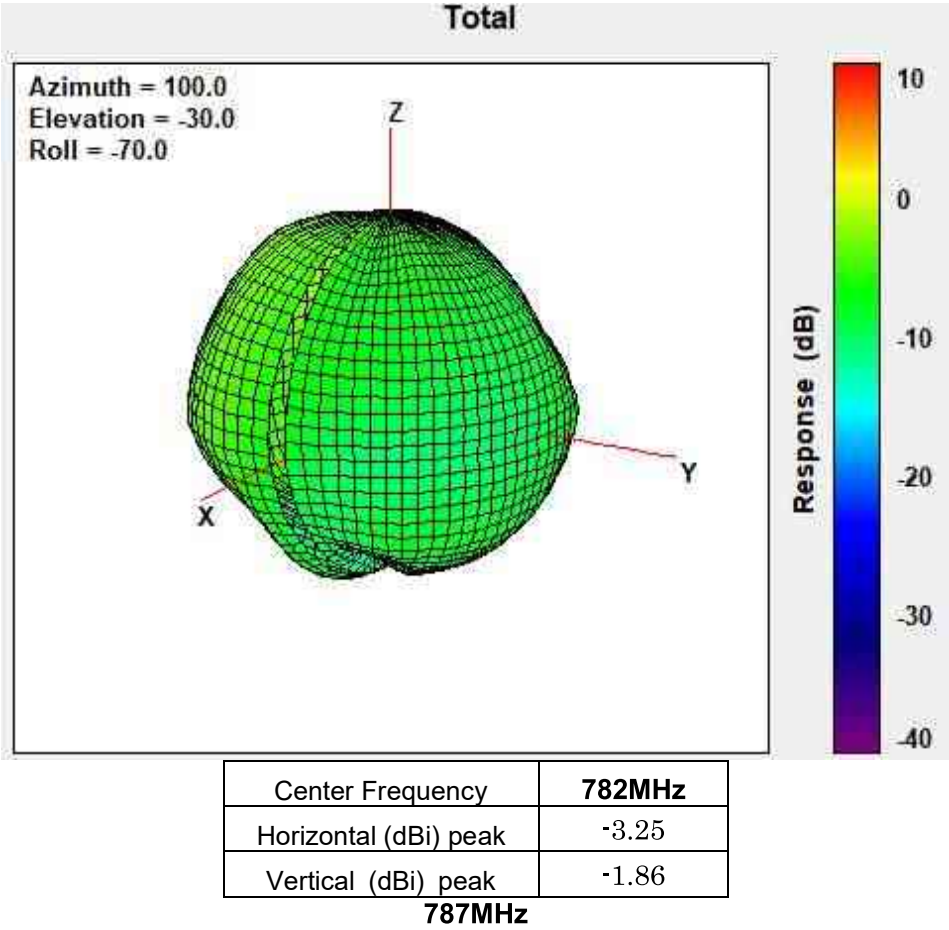
Center Frequency	768MHz
Horizontal (dBi) peak	-1.38
Vertical (dBi) peak	-1.00

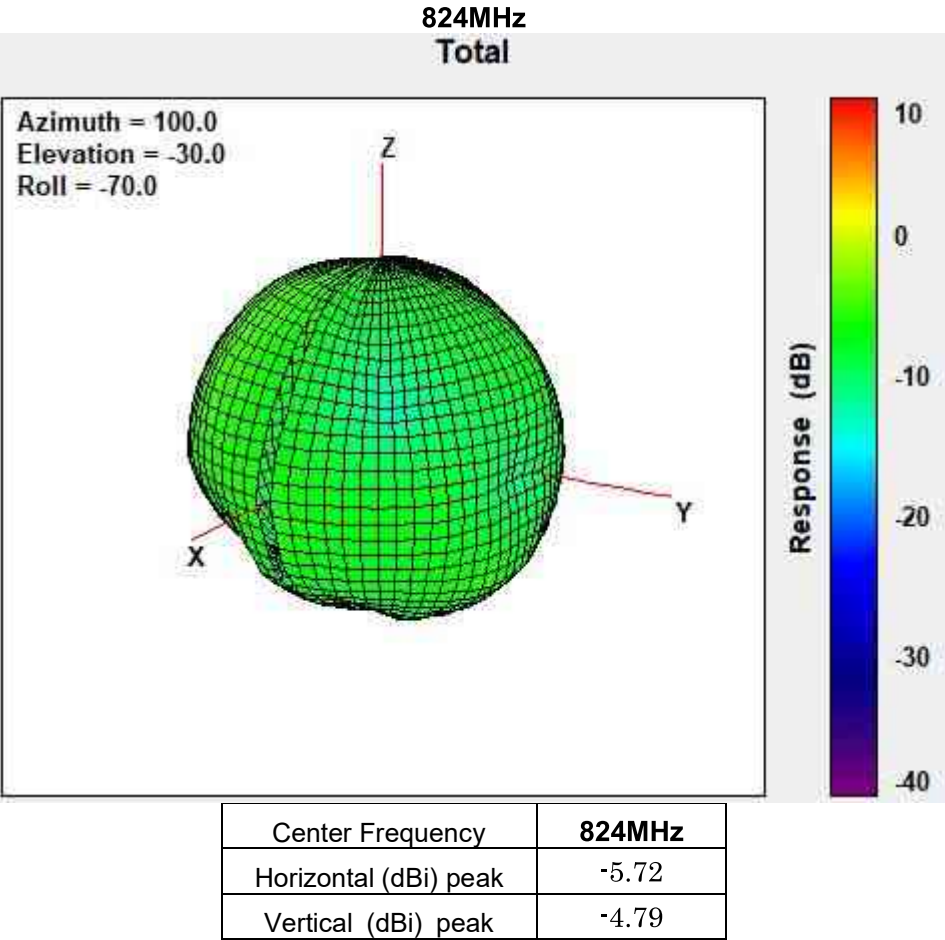
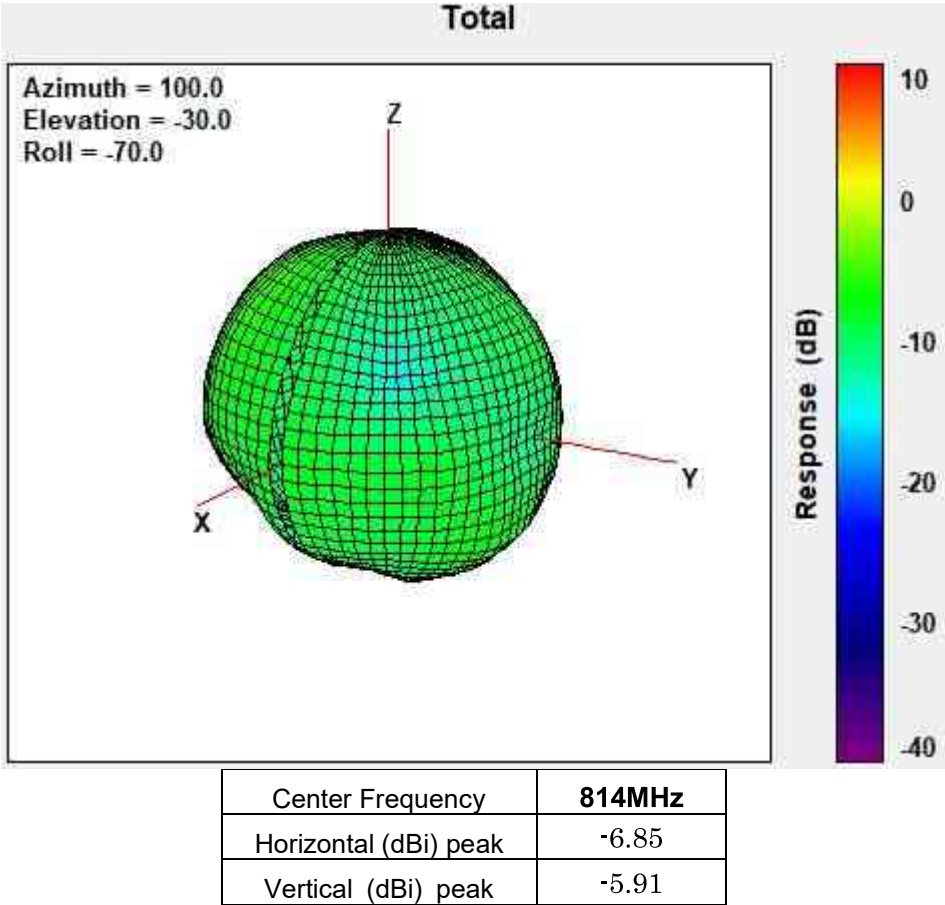
777MHz



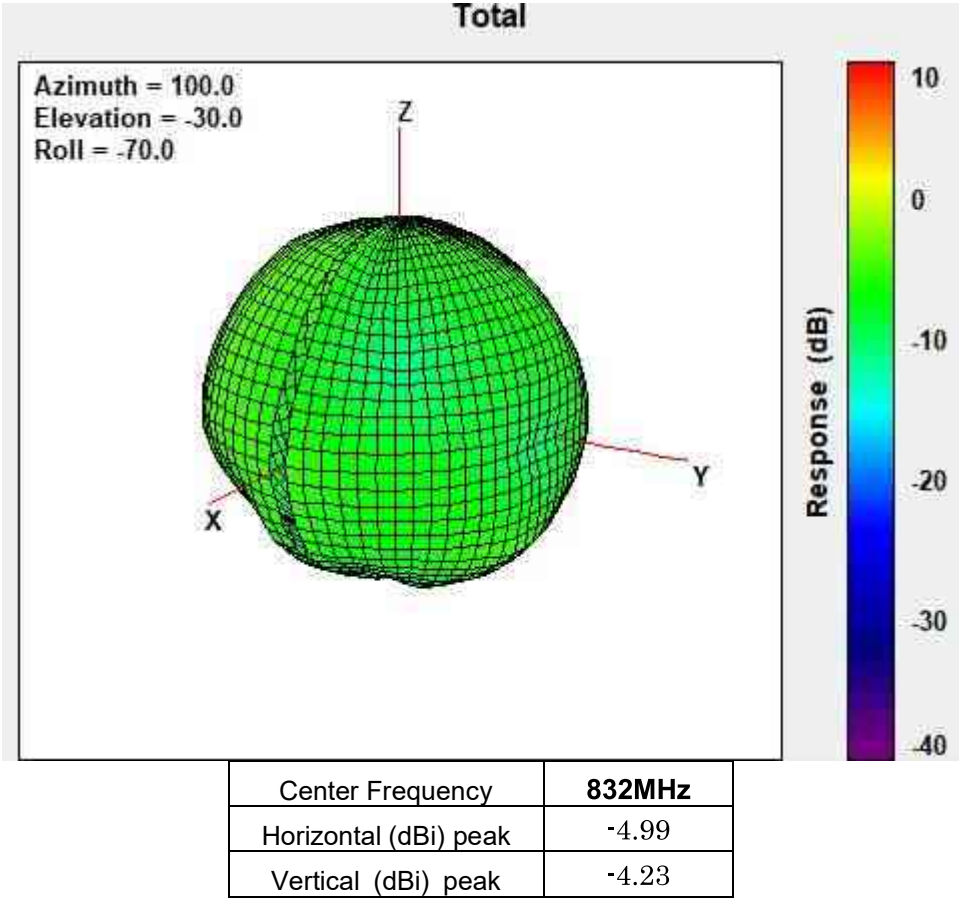
Center Frequency	777MHz
Horizontal (dBi) peak	-2.90
Vertical (dBi) peak	-1.64

782MHz

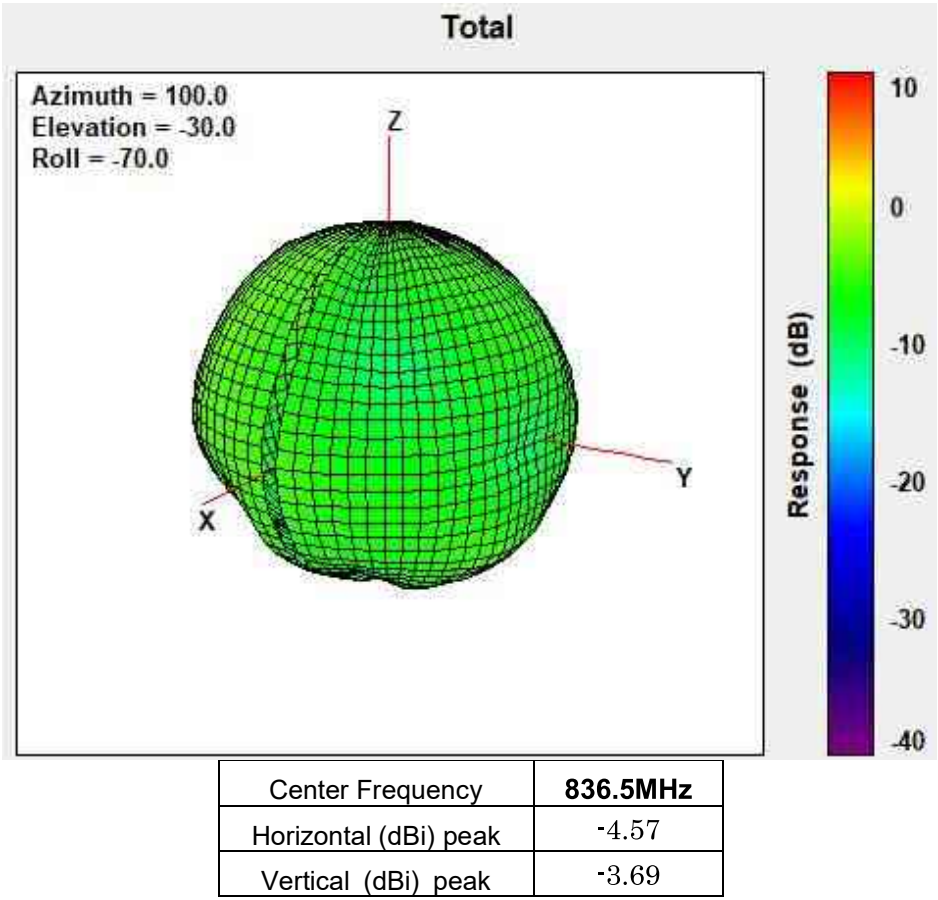




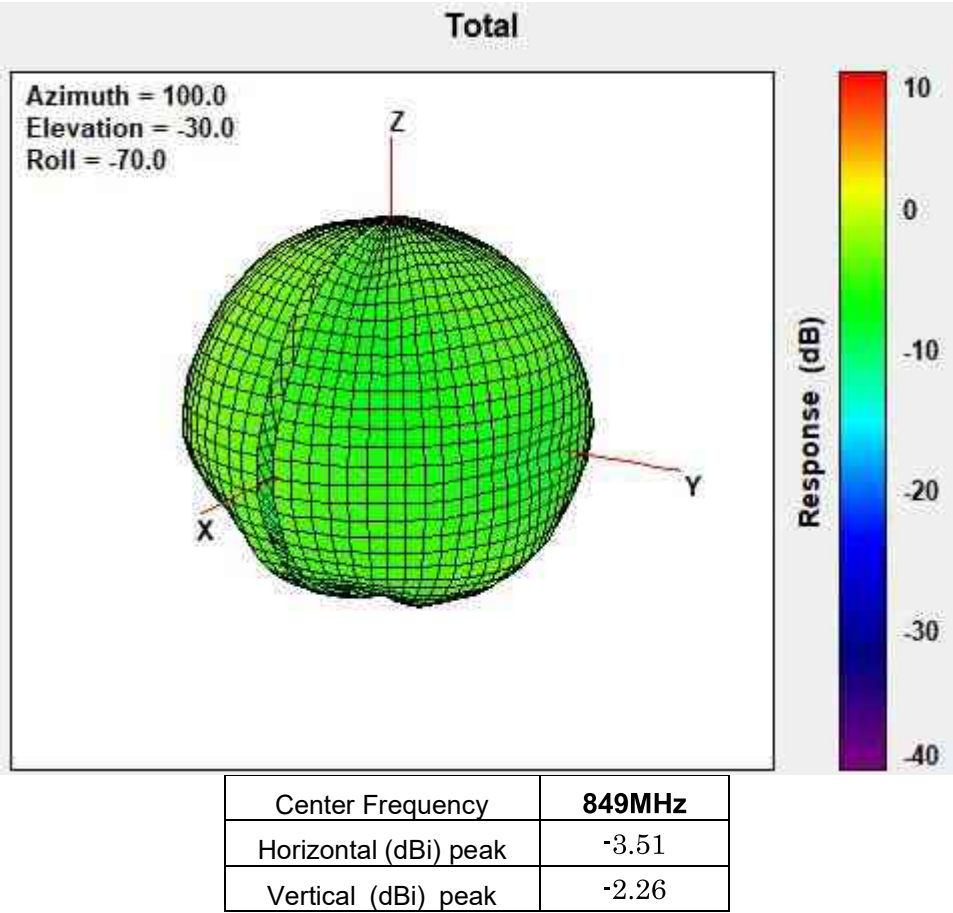
832MHz



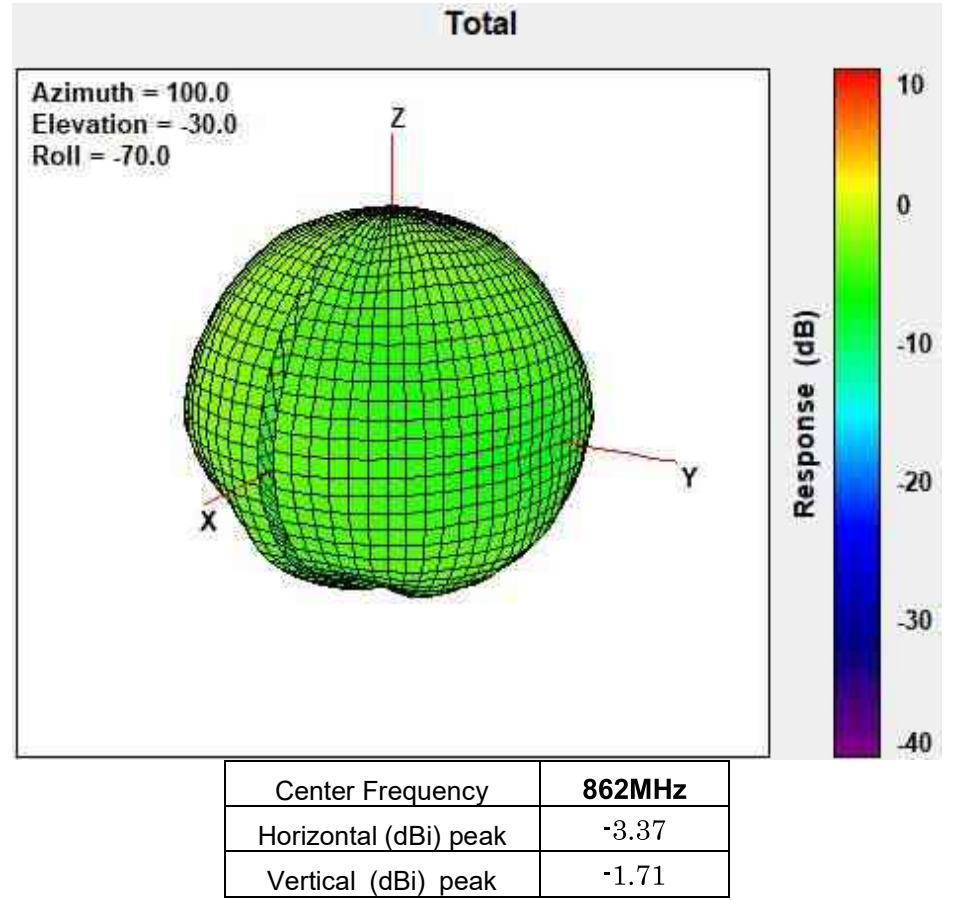
836.5MHz



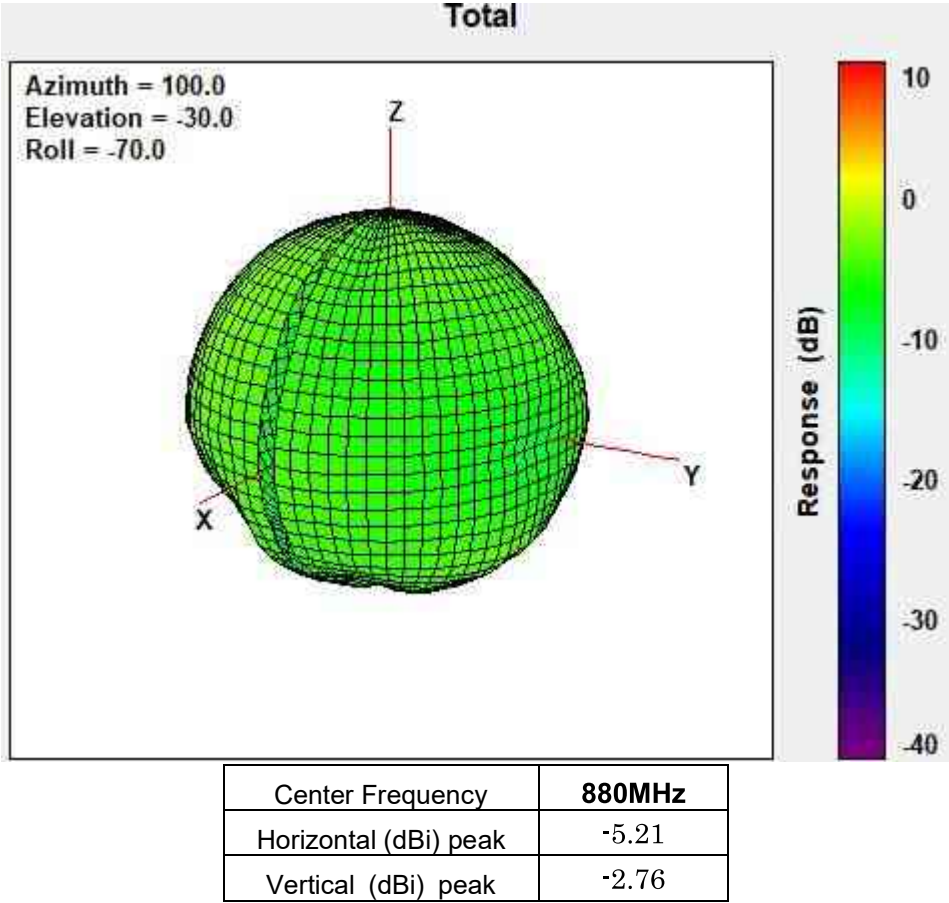
849MHz



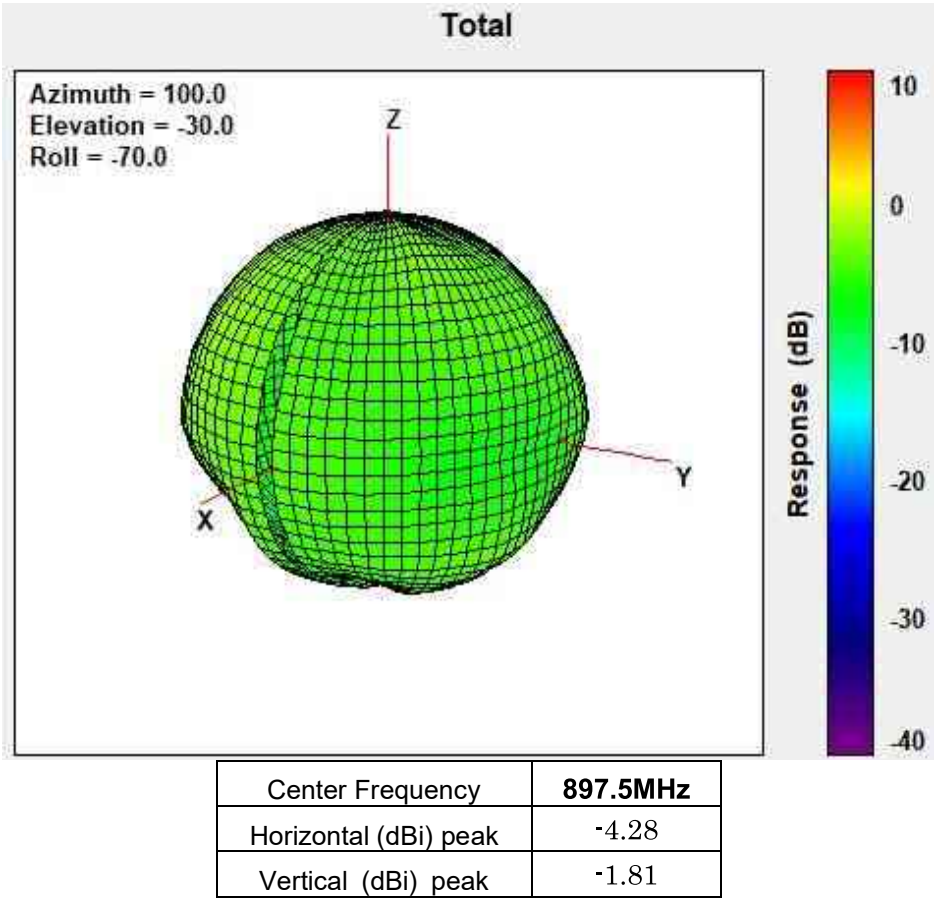
862MHz



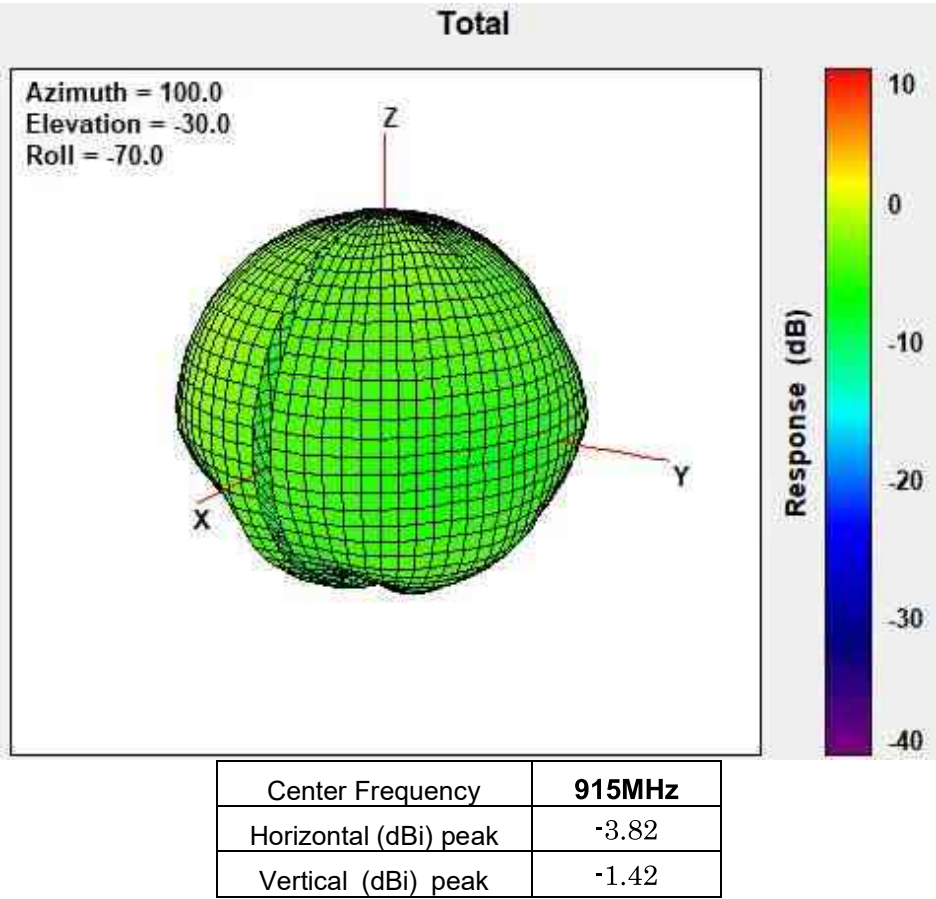
880MHz



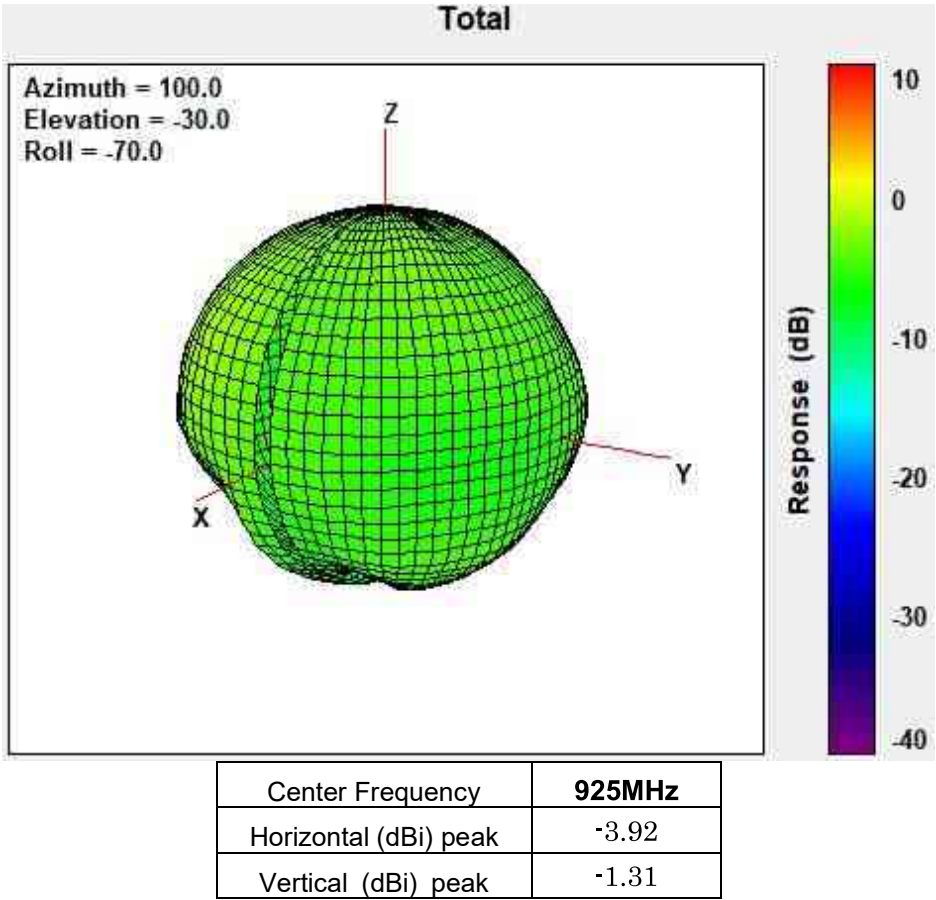
897.5MHz



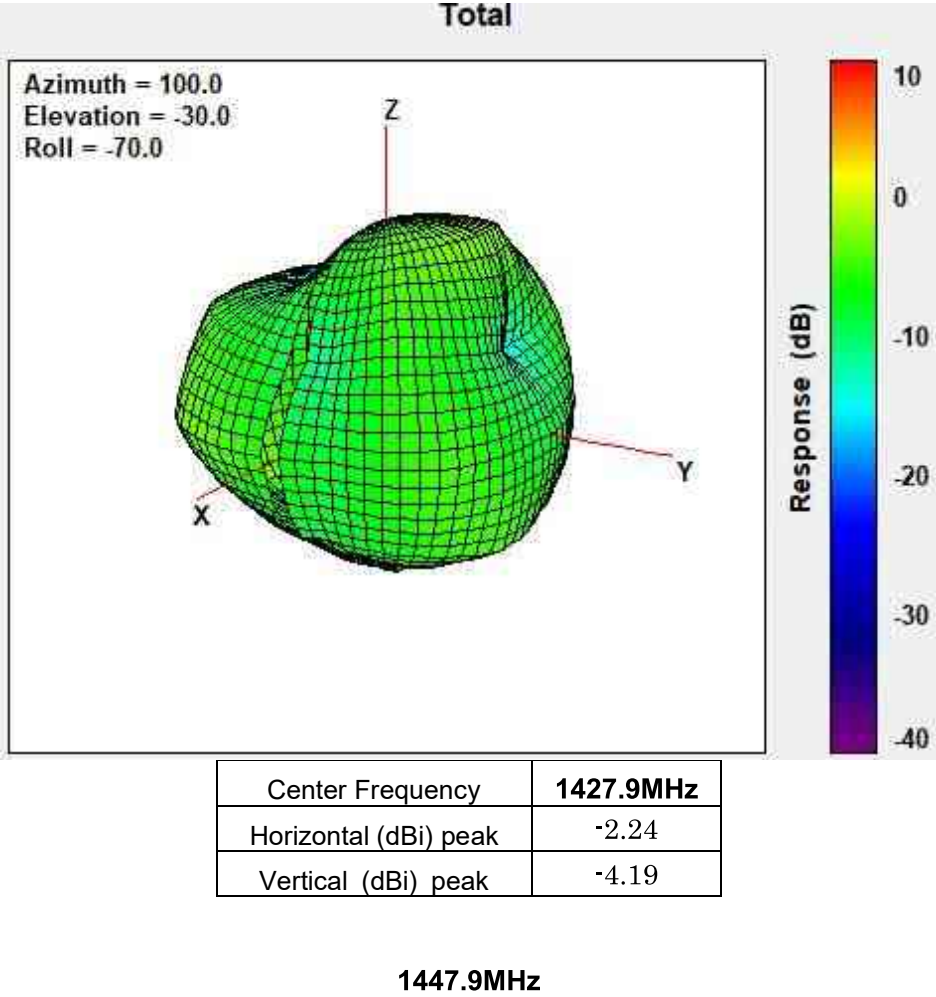
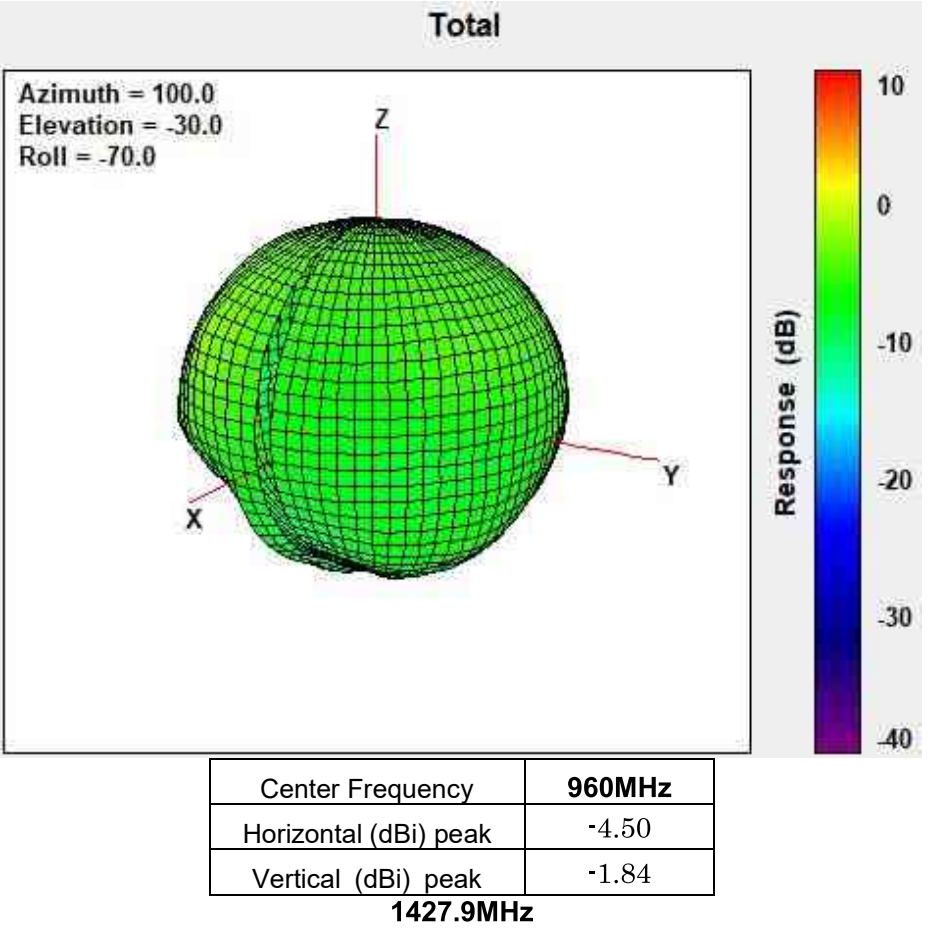
915MHz

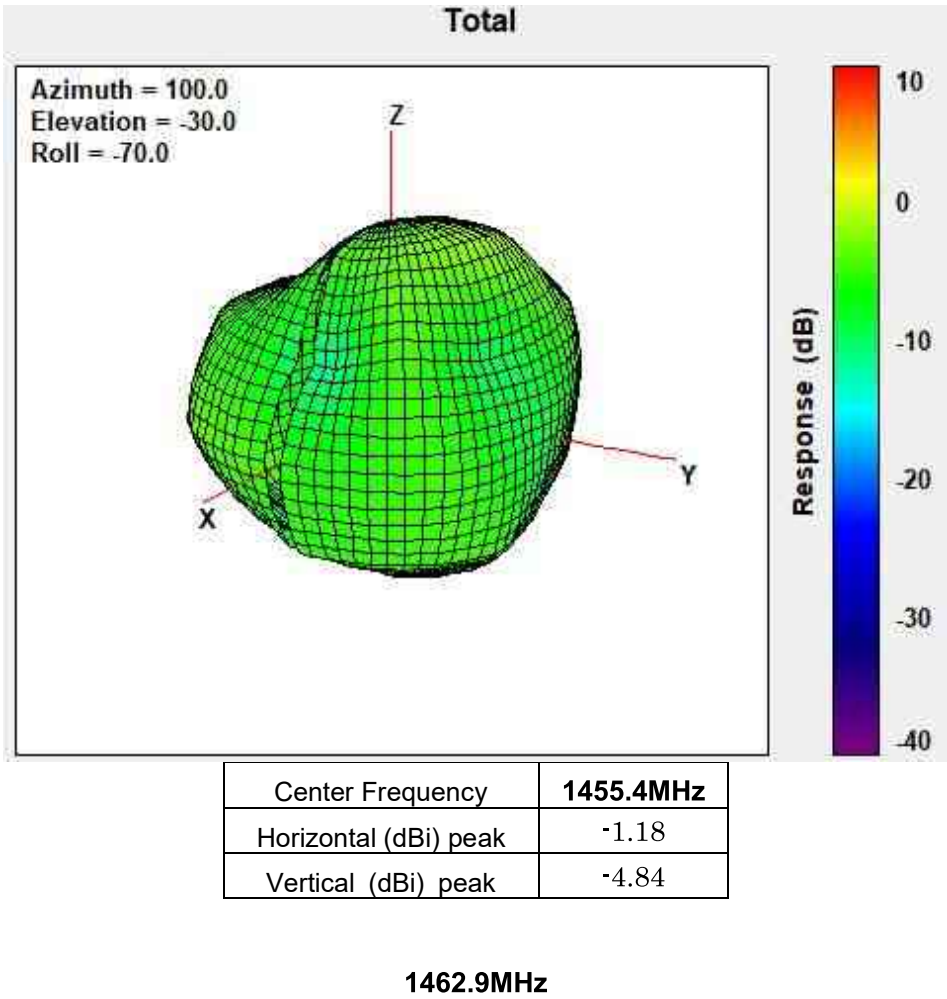
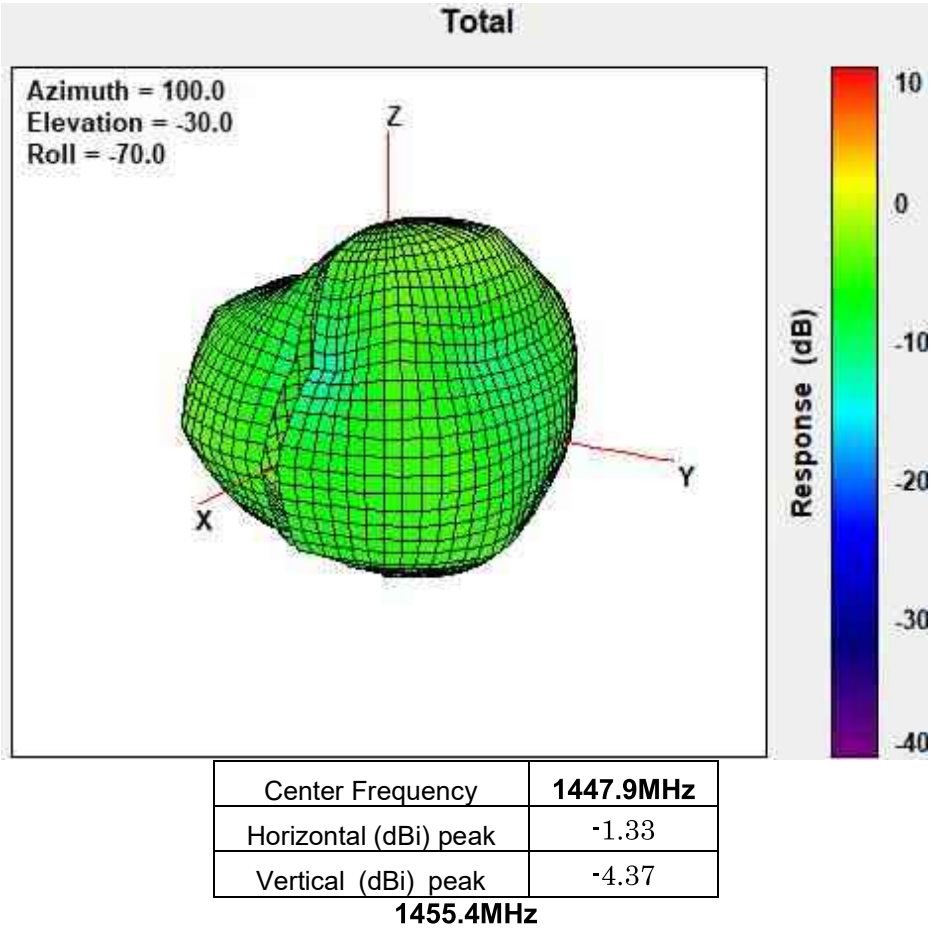


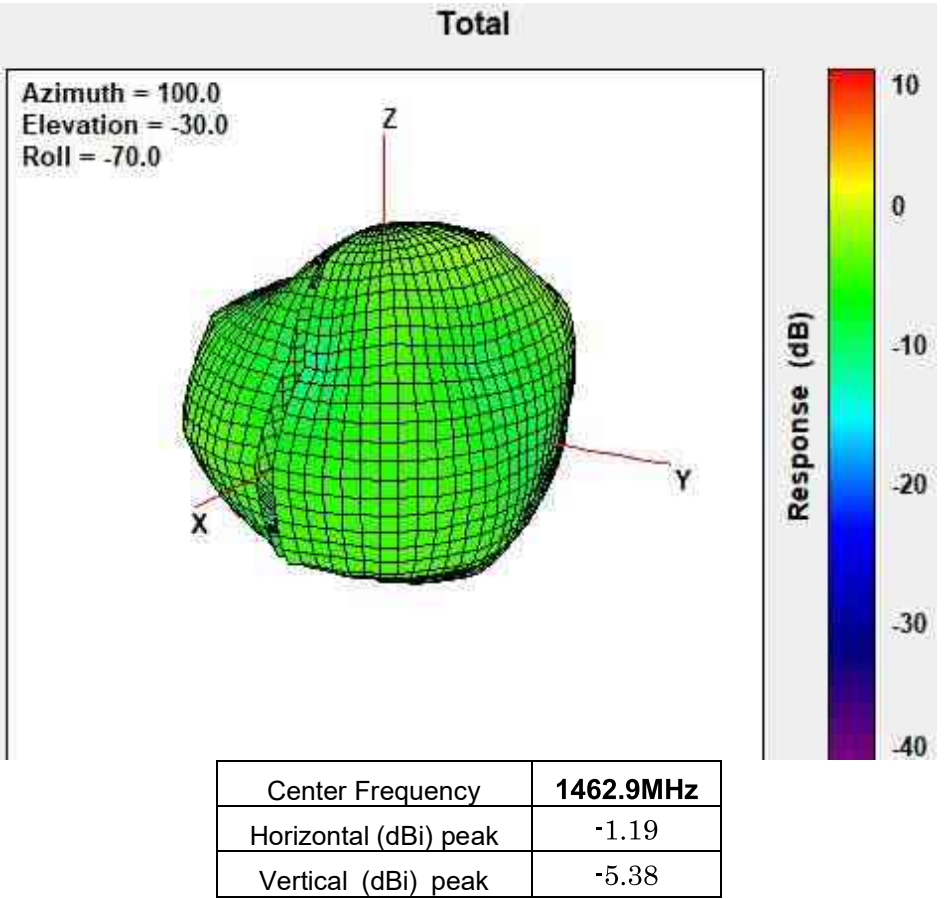
925MHz



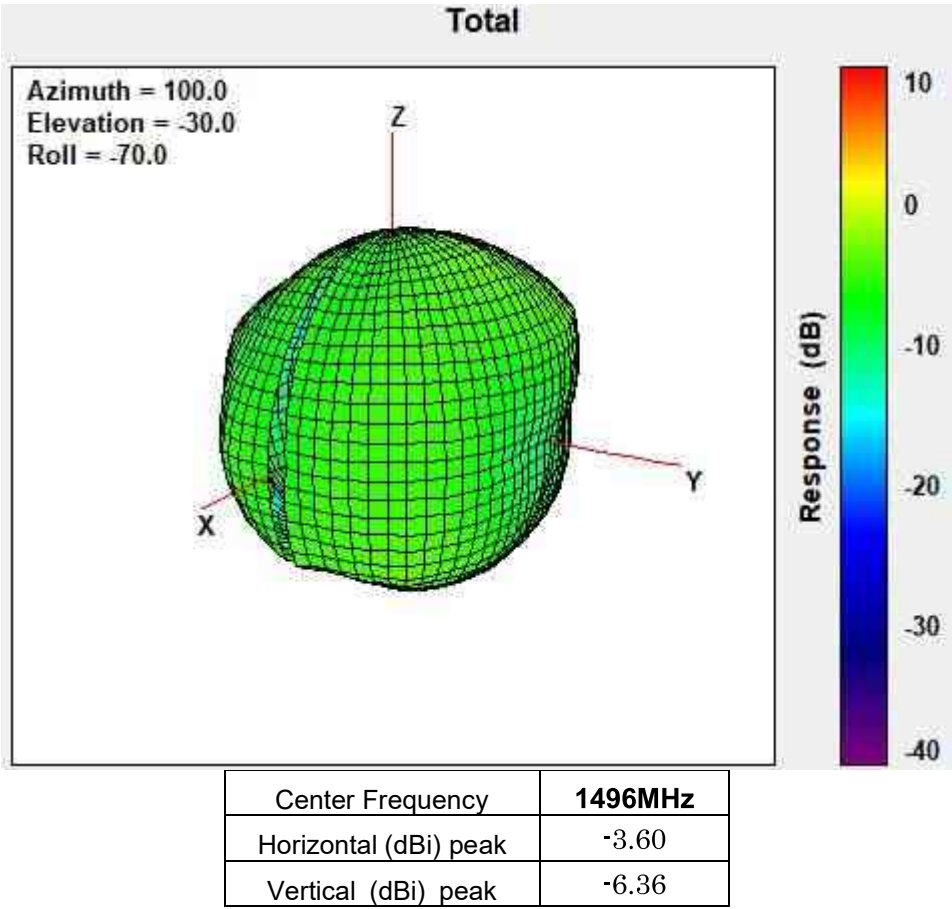
960MHz



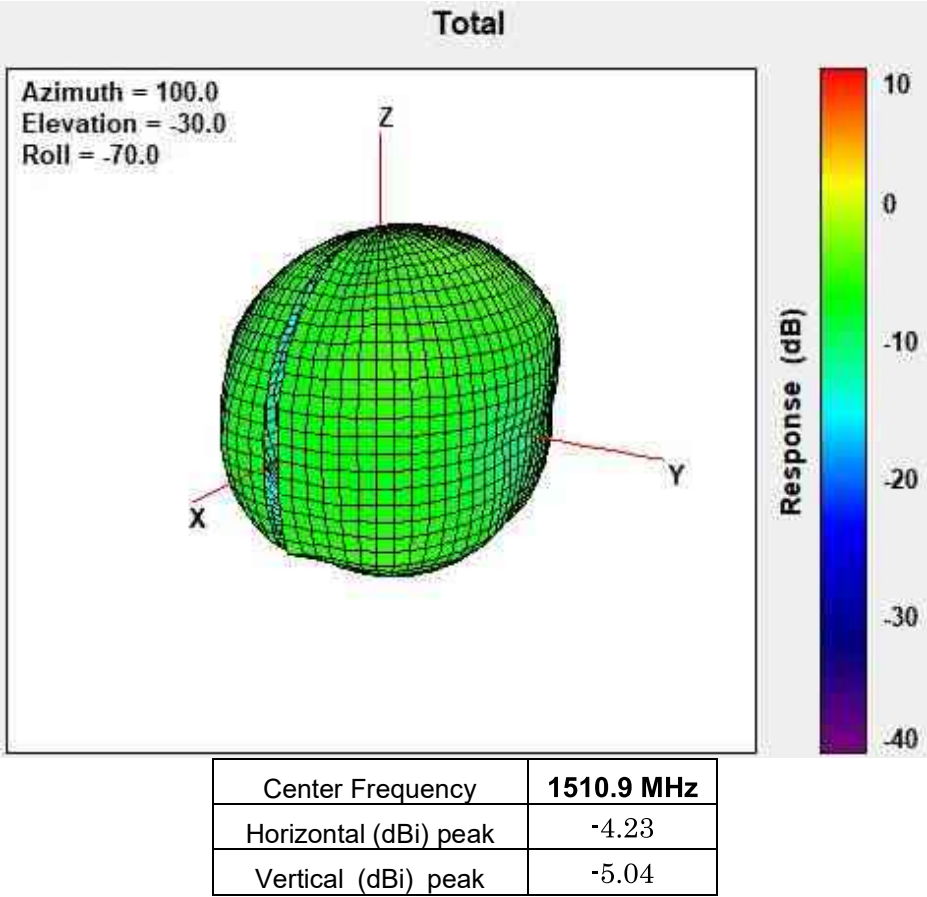




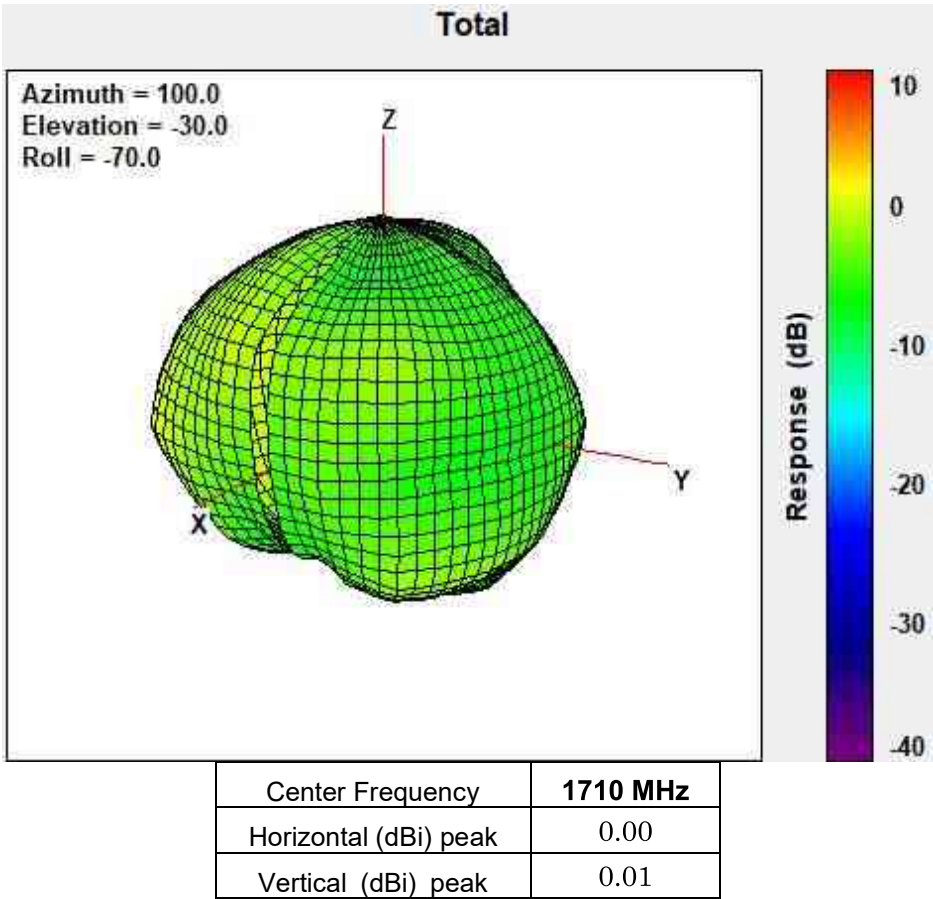
1496MHz



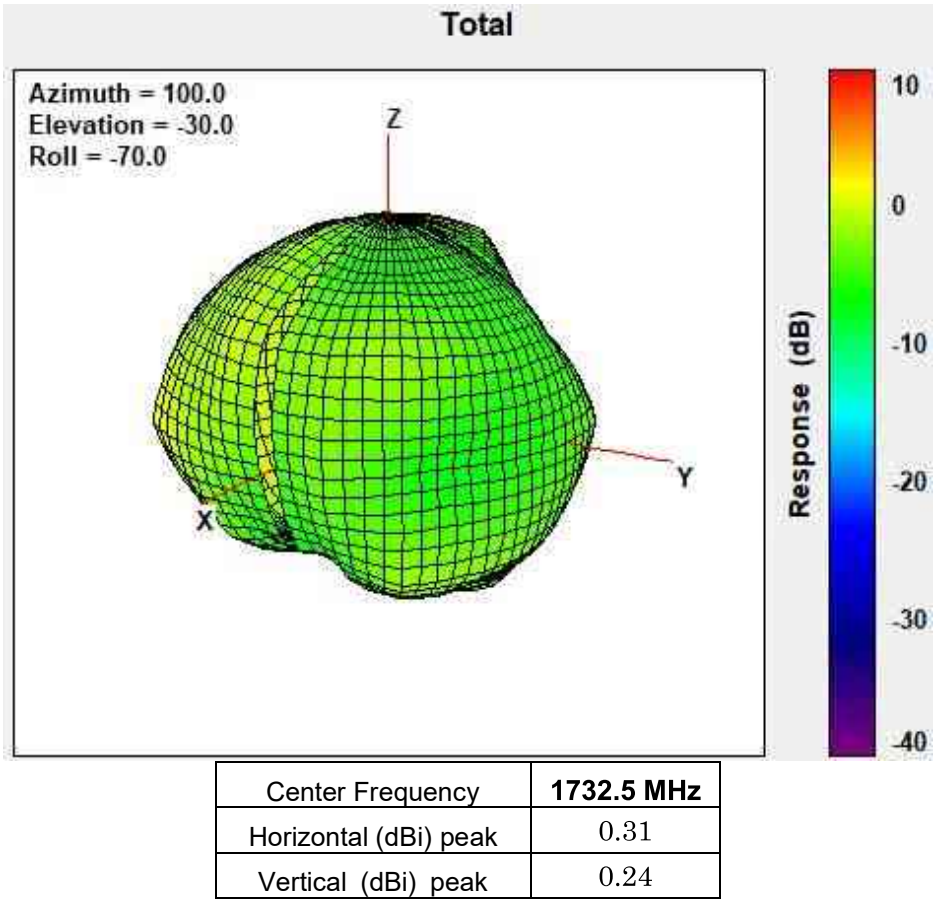
1510.9 MHz



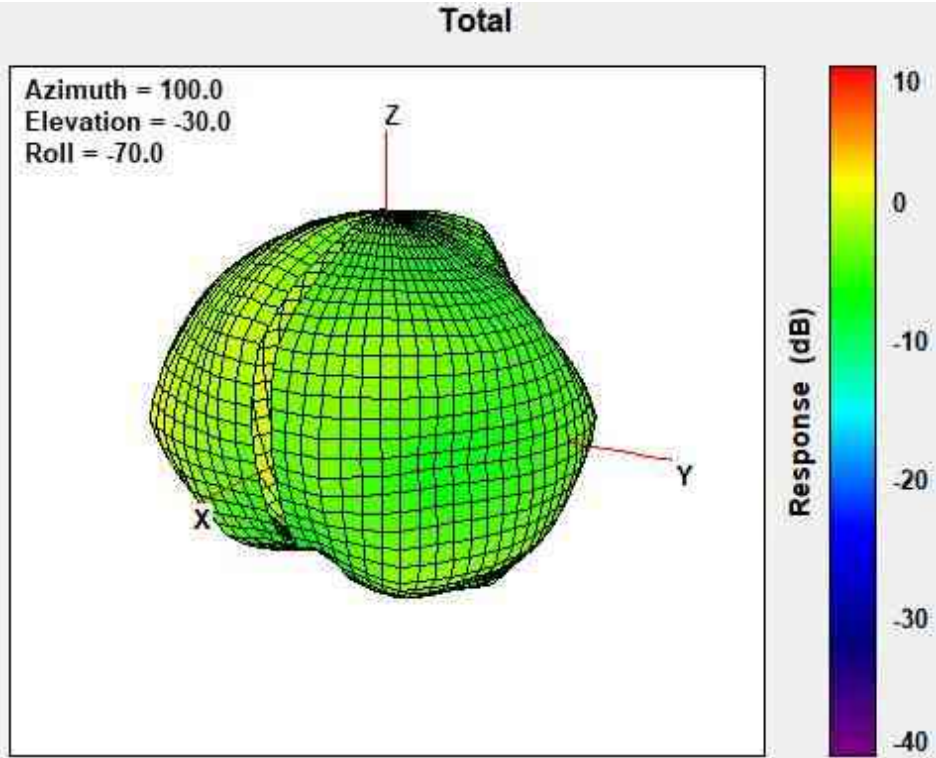
1710 MHz



1732.5 MHz

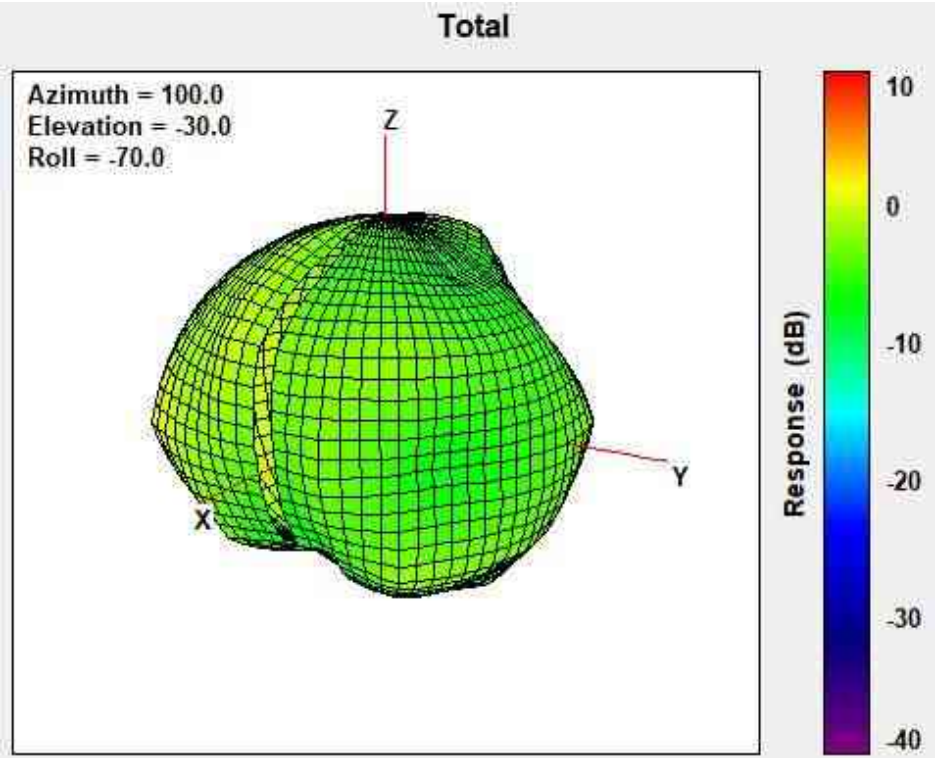


1747.5 MHz



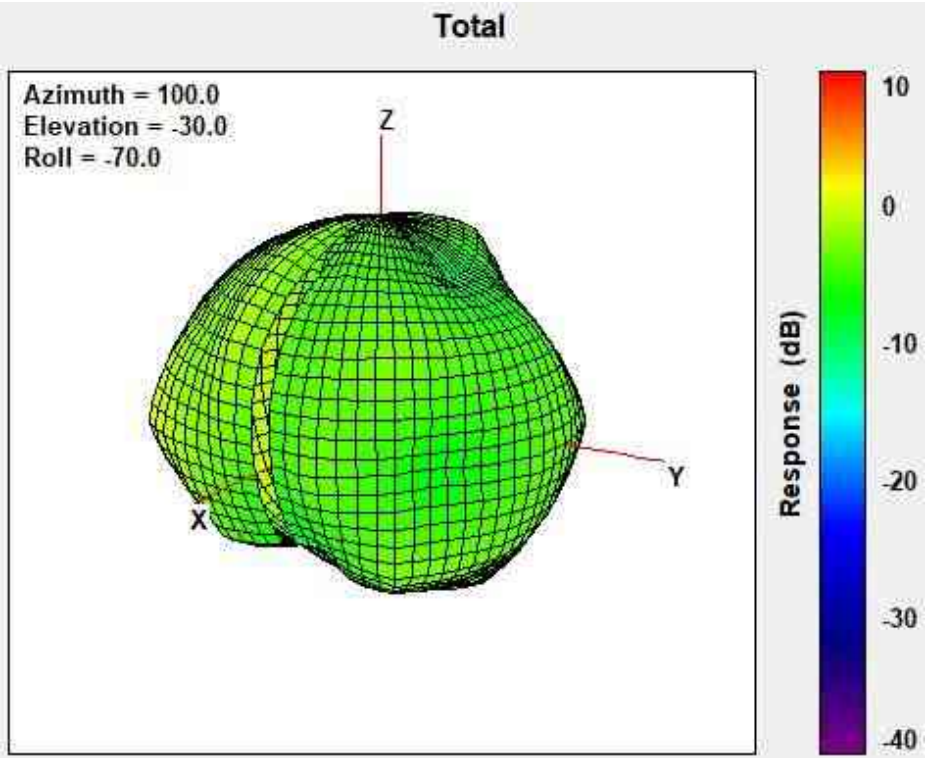
Center Frequency	1747.5 MHz
Horizontal (dBi) peak	0.34
Vertical (dBi) peak	0.12

1755 MHz



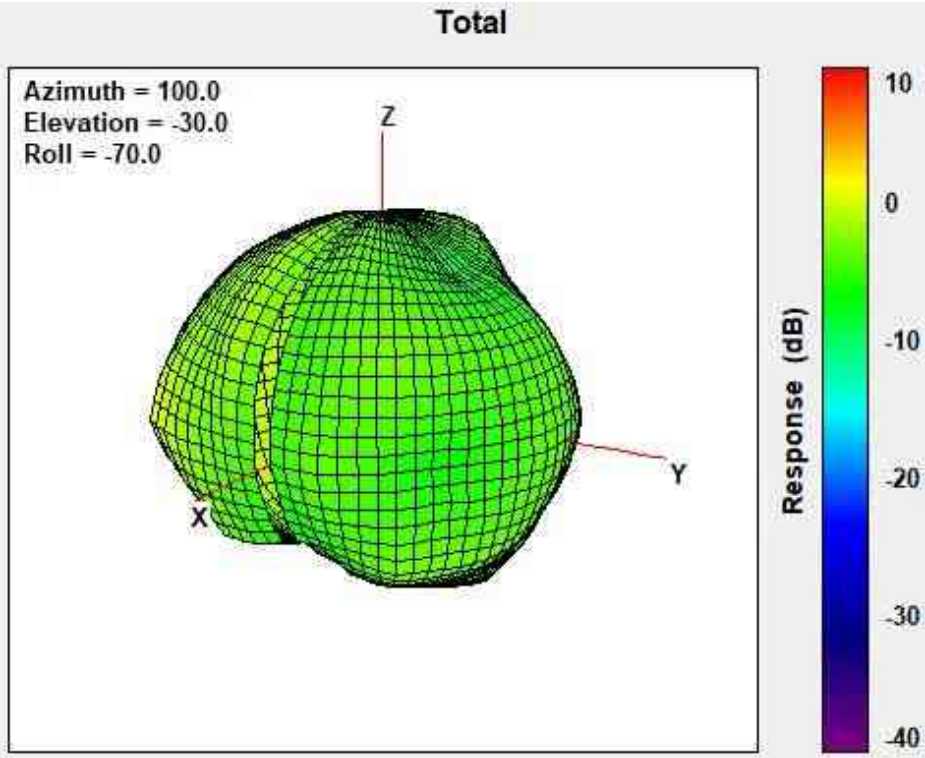
Center Frequency	1755 MHz
Horizontal (dBi) peak	0.35
Vertical (dBi) peak	-0.10

1785 MHz



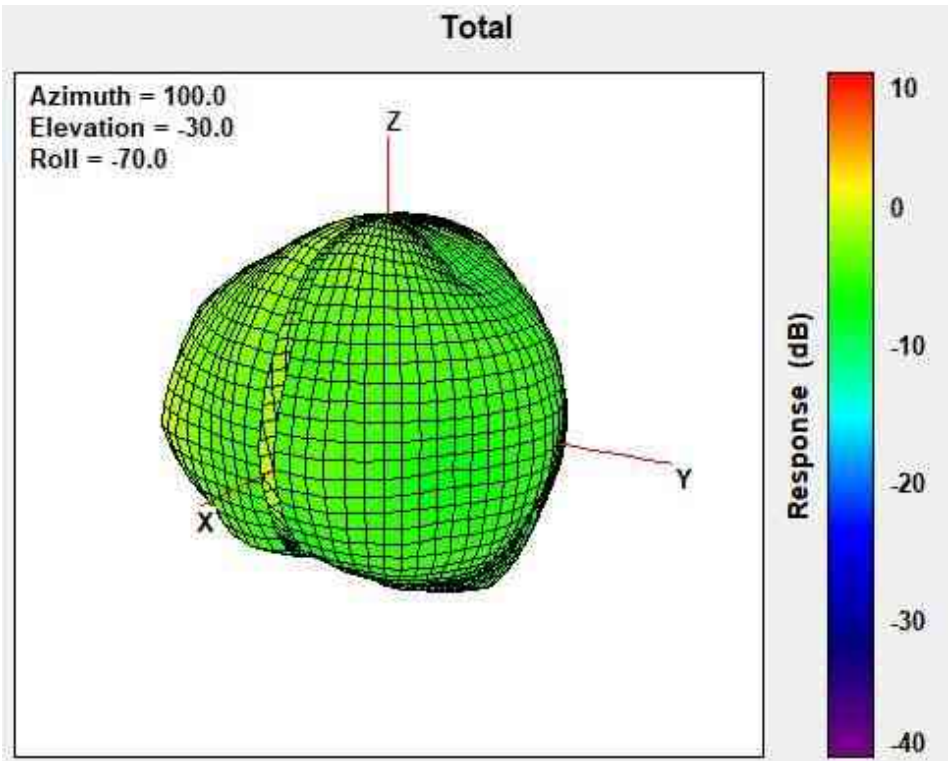
Center Frequency	1785 MHz
Horizontal (dBi) peak	-0.08
Vertical (dBi) peak	-0.30

1805 MHz



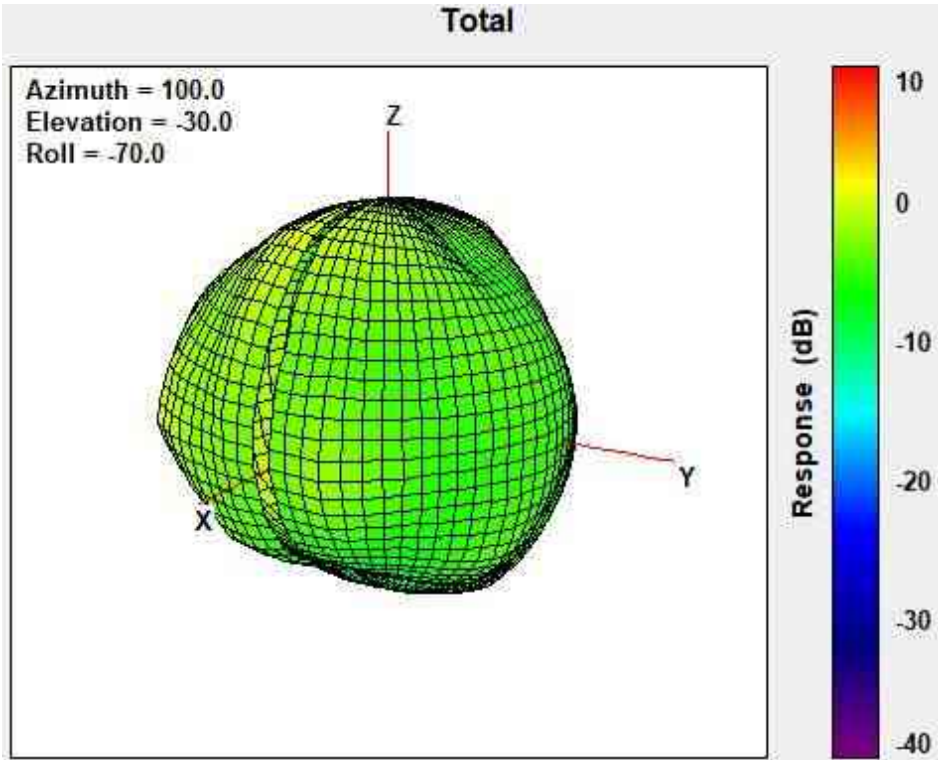
Center Frequency	1805 MHz
Horizontal (dBi) peak	-0.33
Vertical (dBi) peak	-0.33

1850 MHz



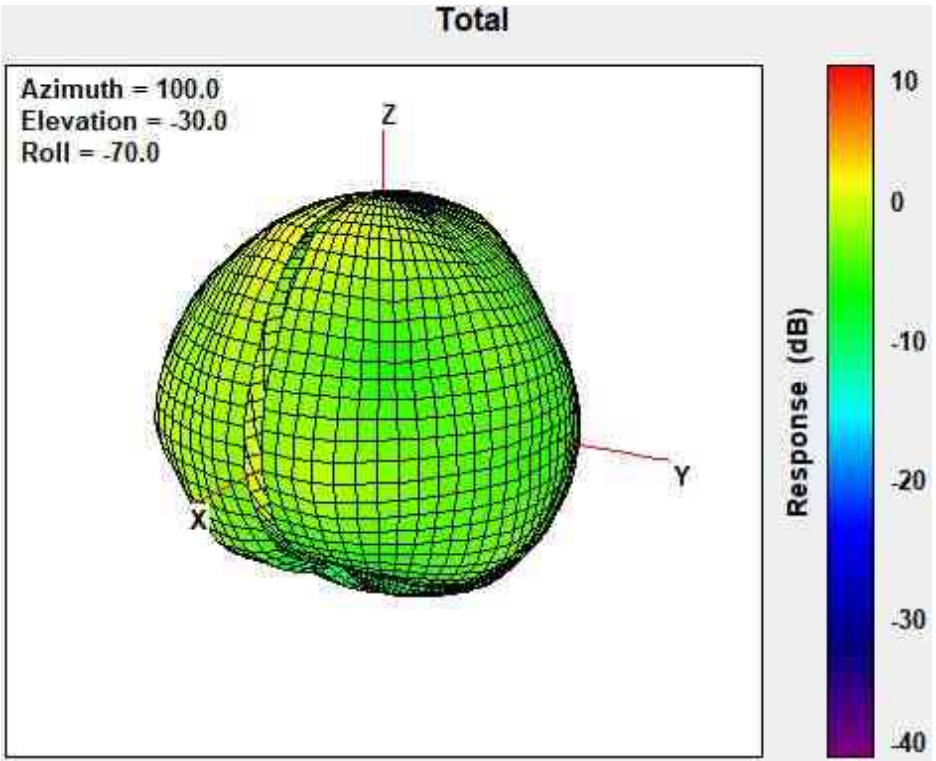
Center Frequency	1850 MHz
Horizontal (dBi) peak	-1.21
Vertical (dBi) peak	-0.45

1880 MHz



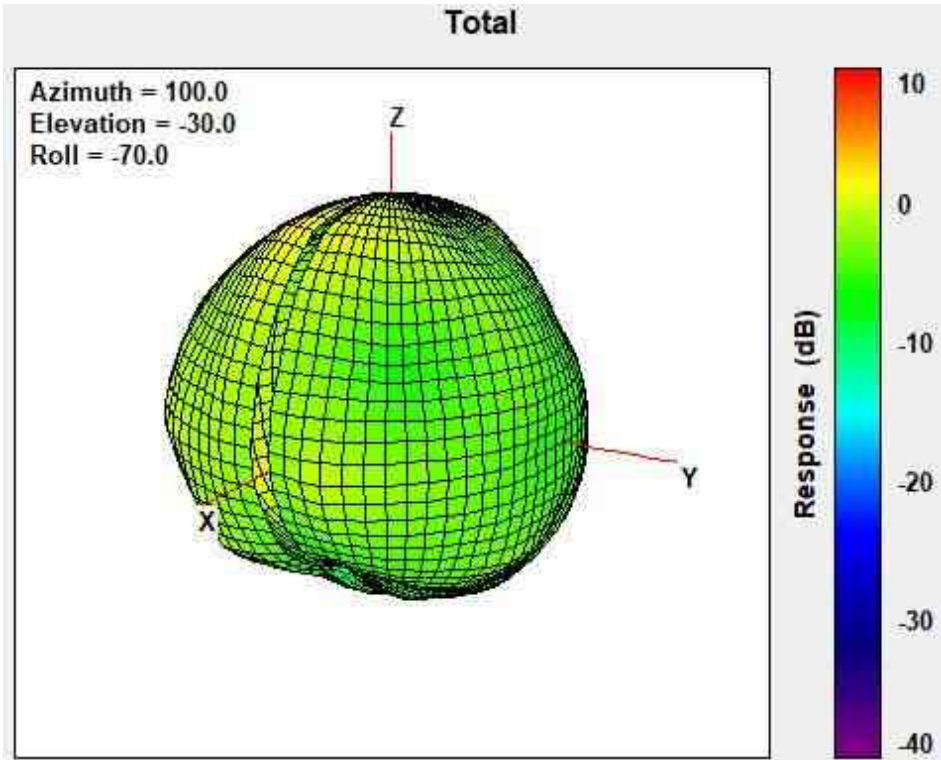
Center Frequency	1880 MHz
Horizontal (dBi) peak	0.26
Vertical (dBi) peak	-0.08

1910MHz



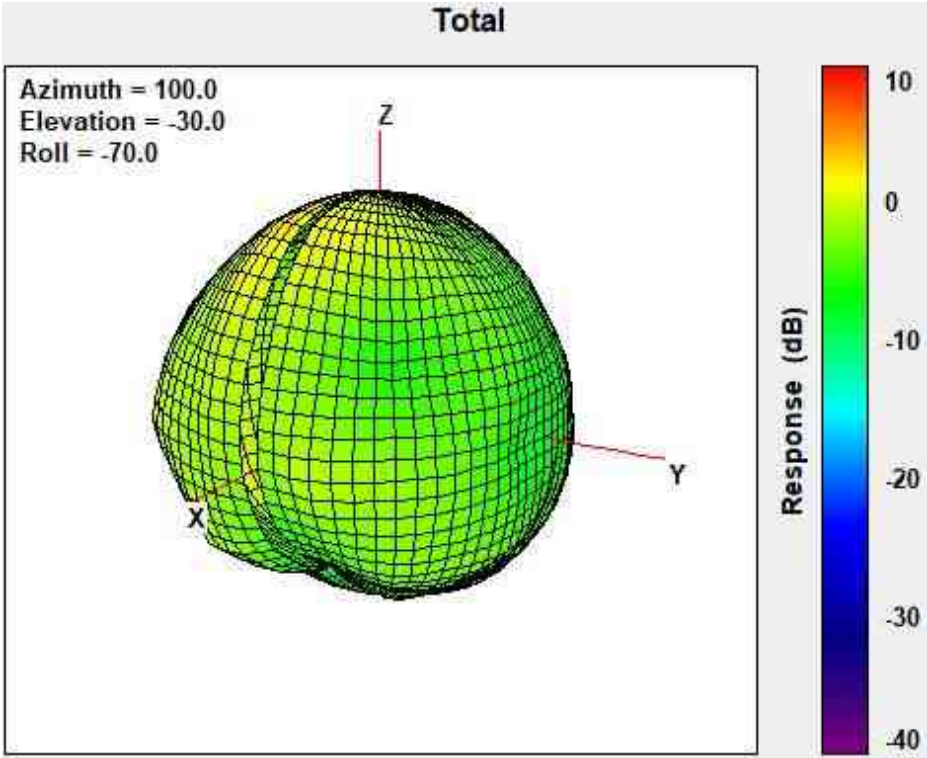
Center Frequency	1910MHz
Horizontal (dBi) peak	1.29
Vertical (dBi) peak	0.44

1920MHz



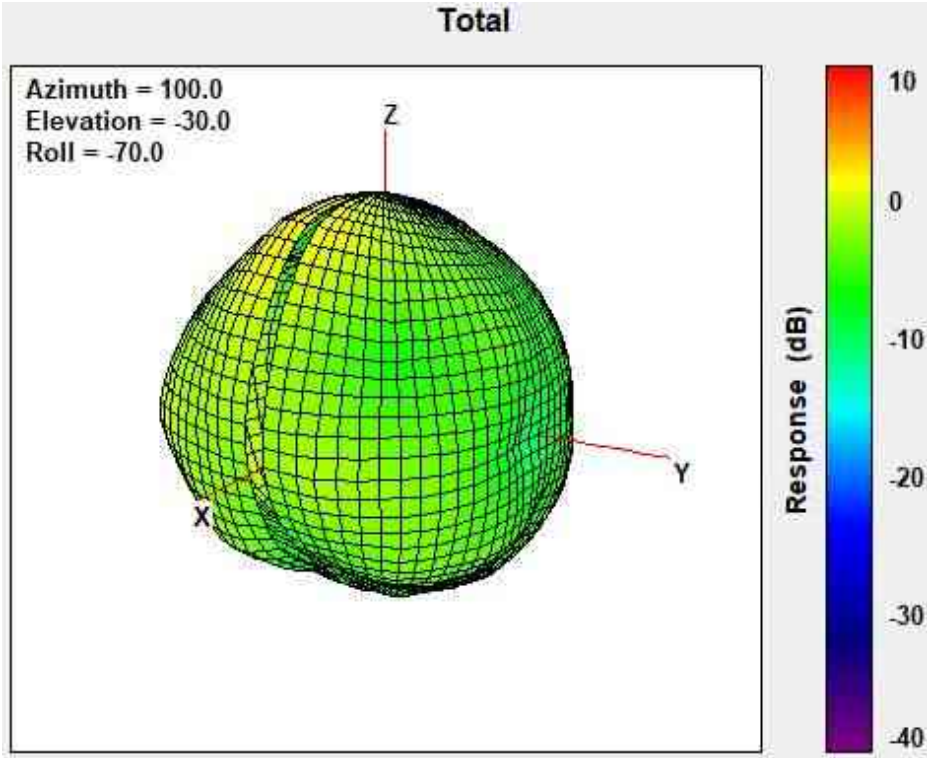
Center Frequency	1920MHz
Horizontal (dBi) peak	1.38
Vertical (dBi) peak	0.50

1950MHz



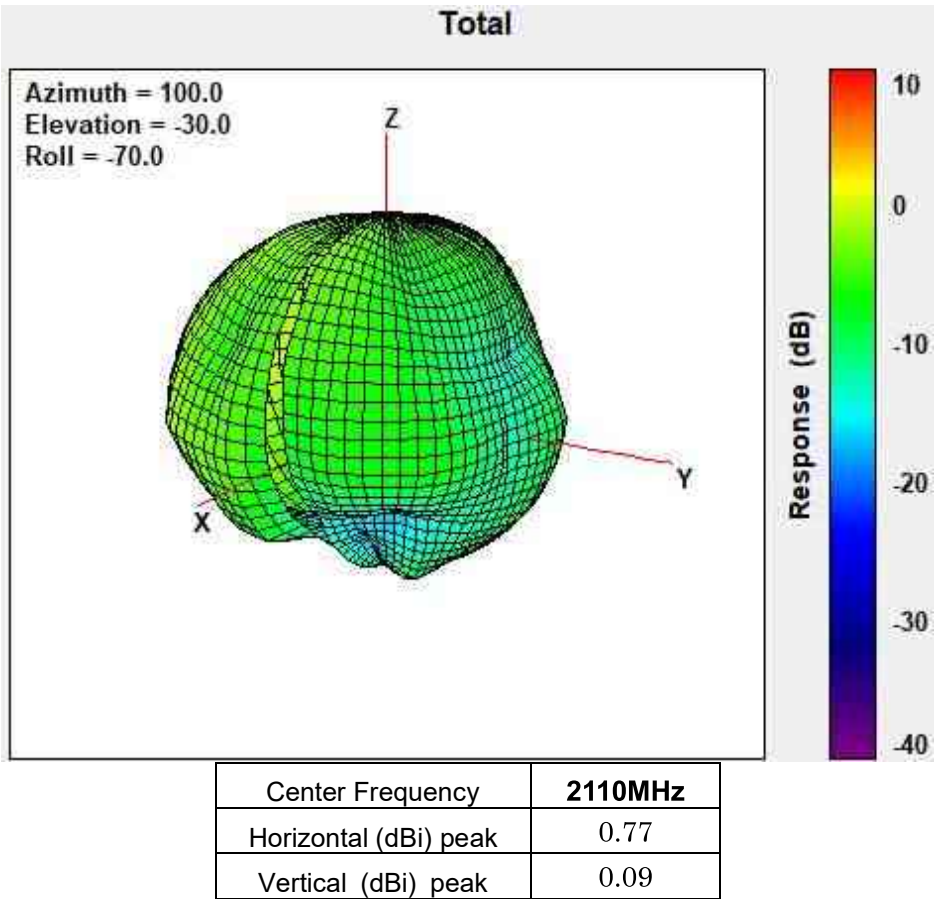
Center Frequency	1950MHz
Horizontal (dBi) peak	1.86
Vertical (dBi) peak	0.53

1980MHz

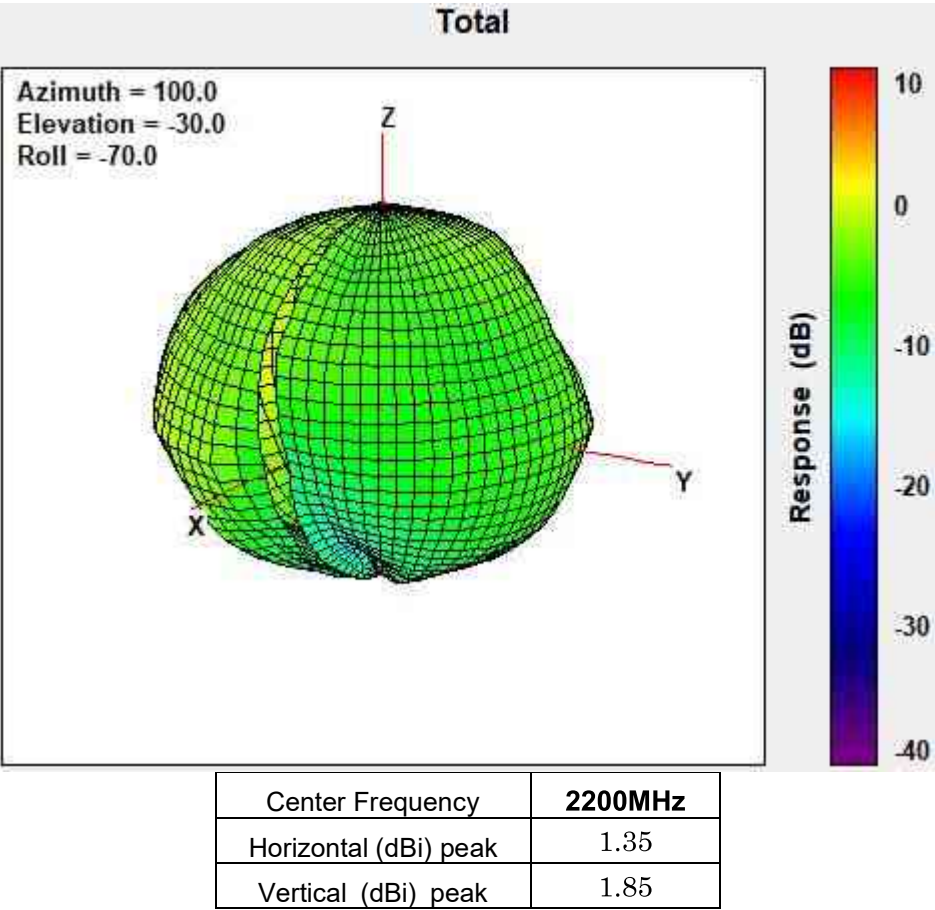


Center Frequency	1980MHz
Horizontal (dBi) peak	2.00
Vertical (dBi) peak	-0.24

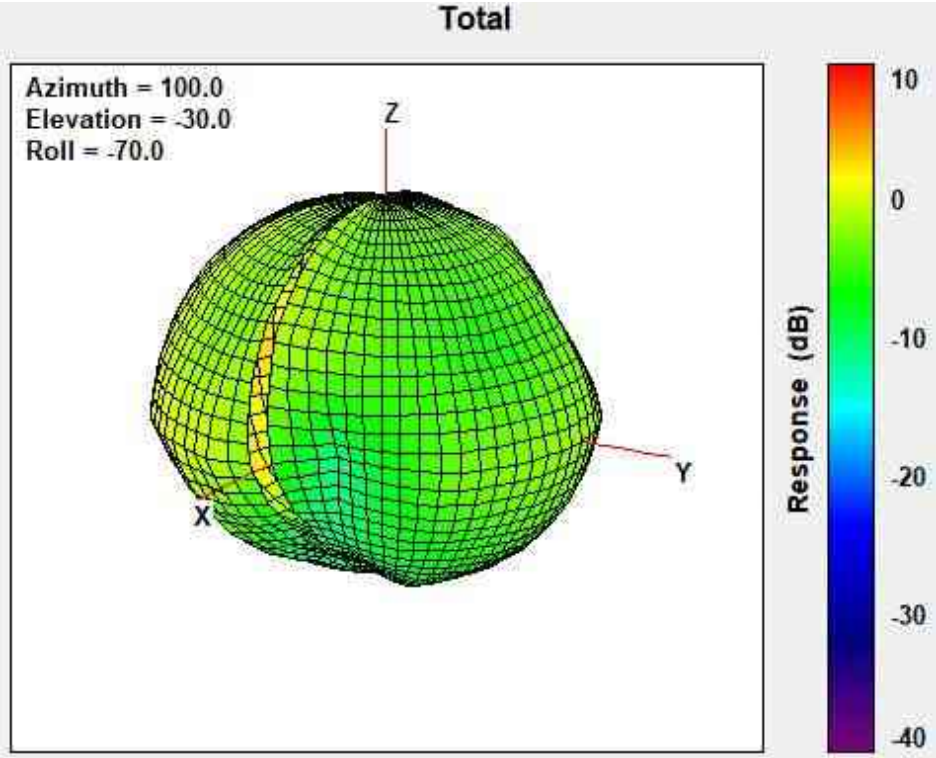
2110MHz



2200MHz

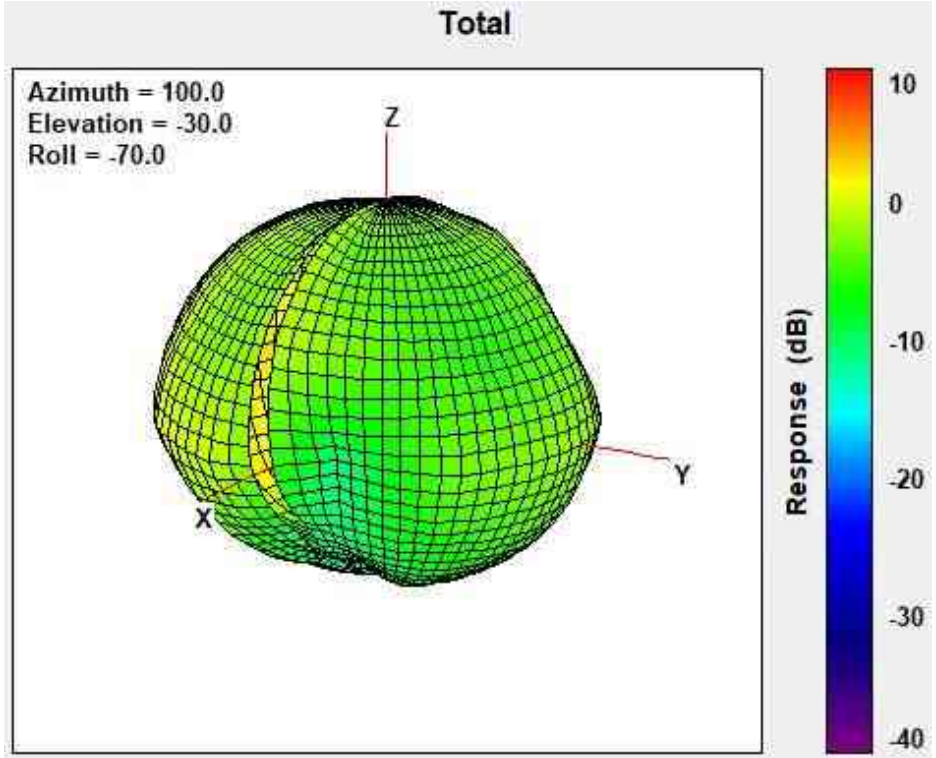


2300MHz



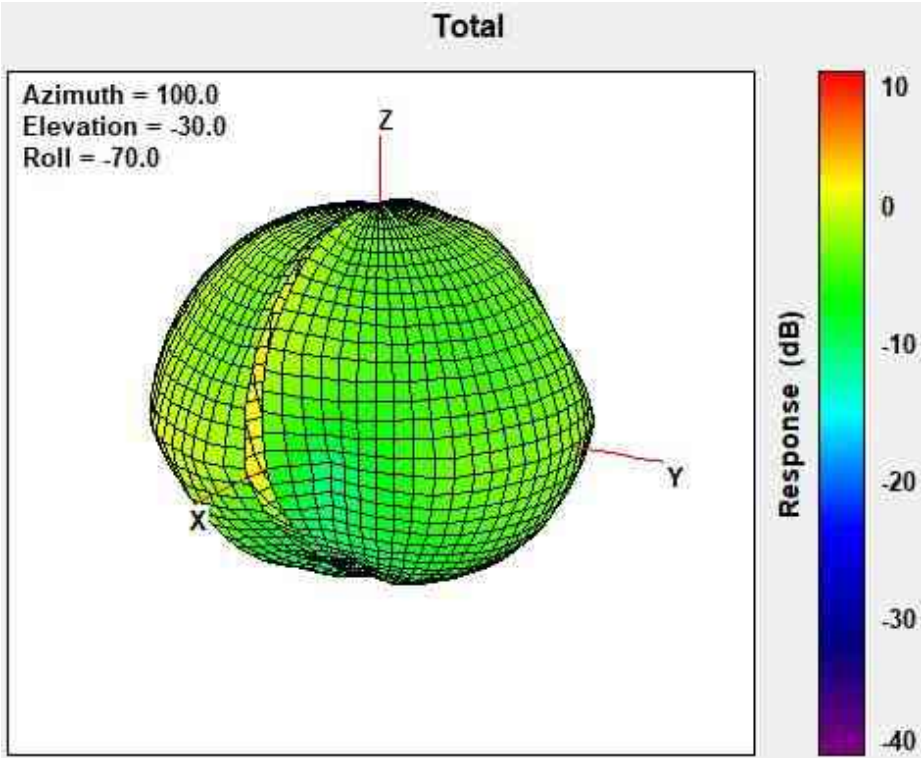
Center Frequency	2300MHz
Horizontal (dBi) peak	2.09
Vertical (dBi) peak	2.69

2305MHz



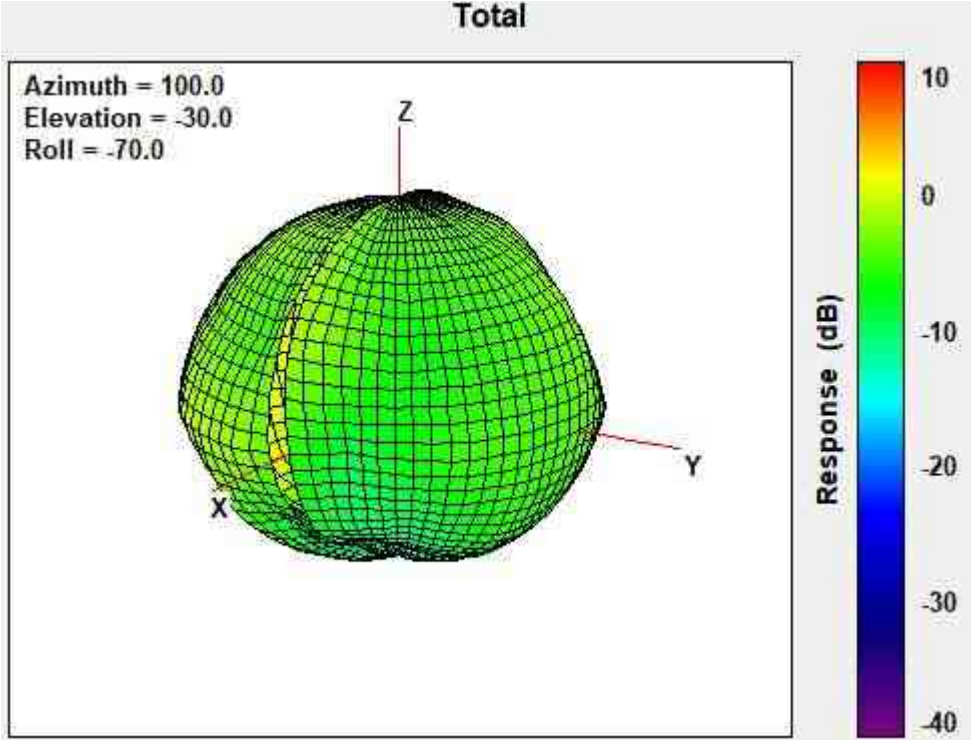
Center Frequency	2305MHz
Horizontal (dBi) peak	0.89
Vertical (dBi) peak	0.64

2315MHz



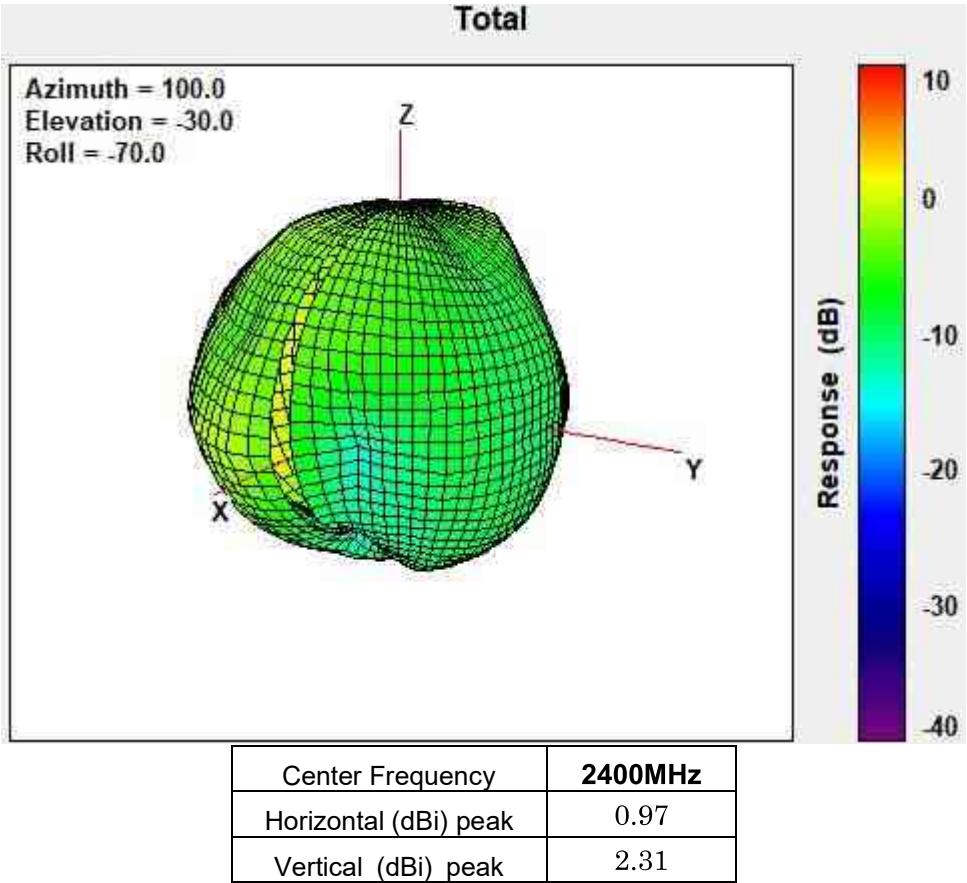
Center Frequency	2315MHz
Horizontal (dBi) peak	0.57
Vertical (dBi) peak	0.56

2350MHz

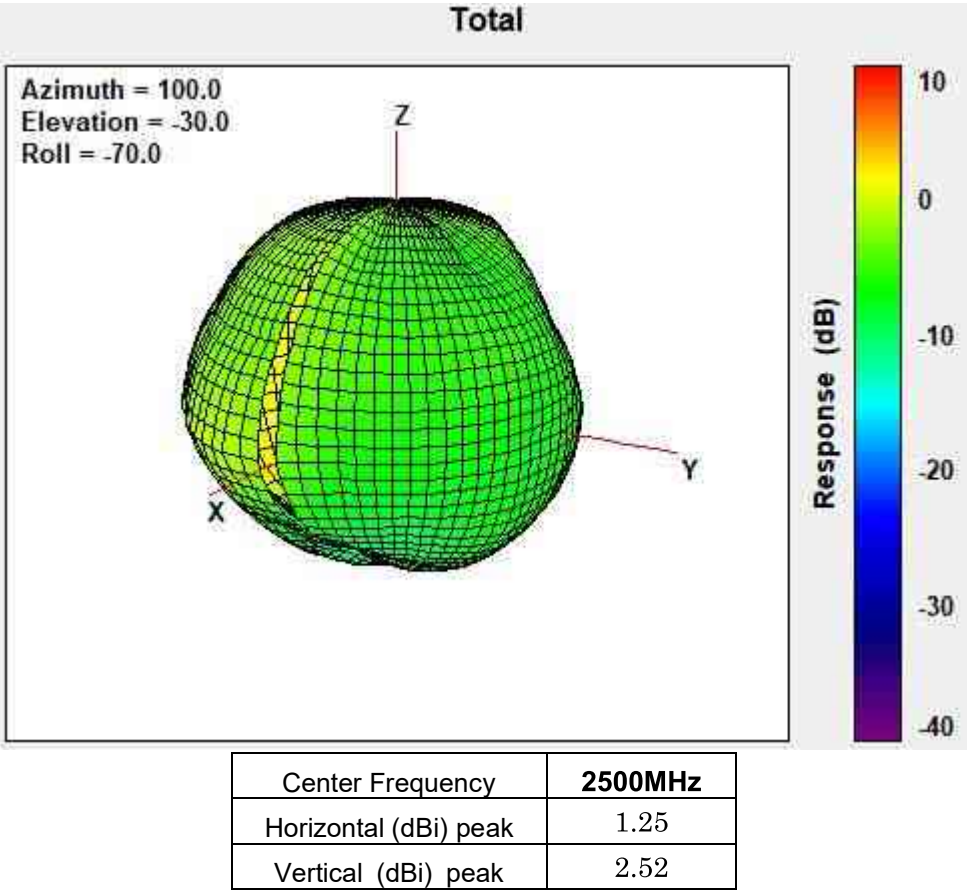


Center Frequency	2350MHz
Horizontal (dBi) peak	0.31
Vertical (dBi) peak	0.70

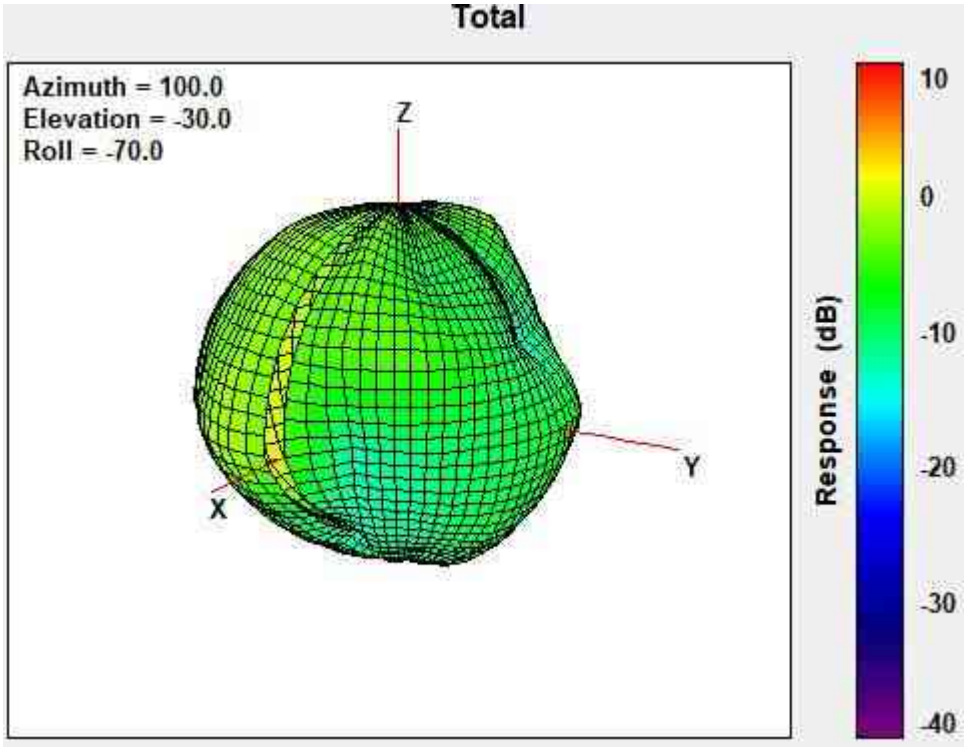
2400MHz



2500MHz

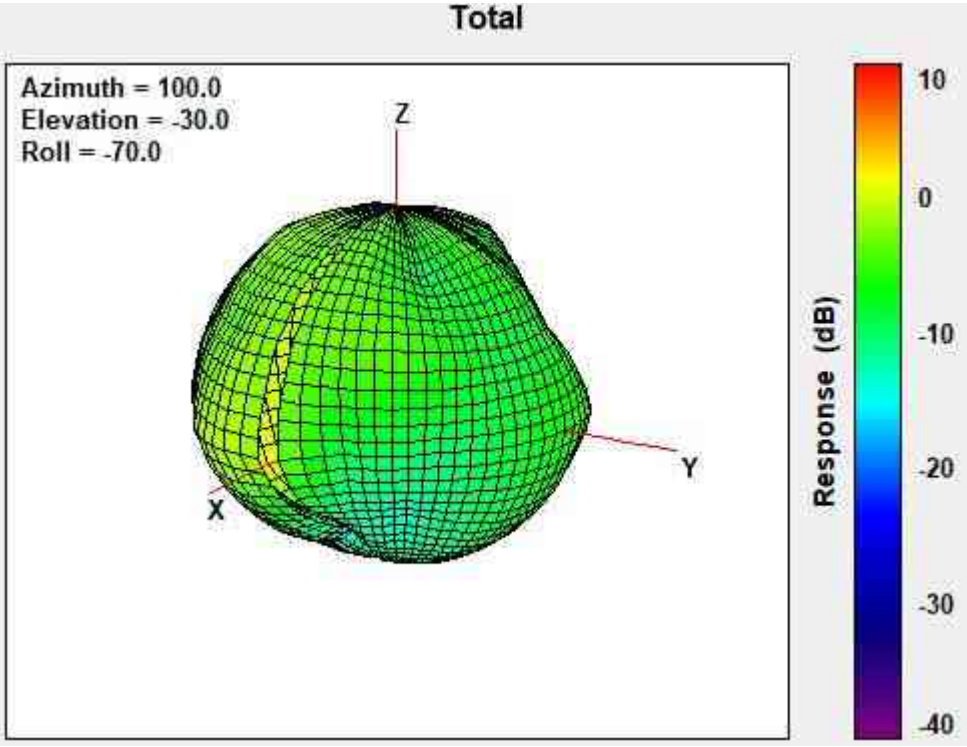


2570MHz



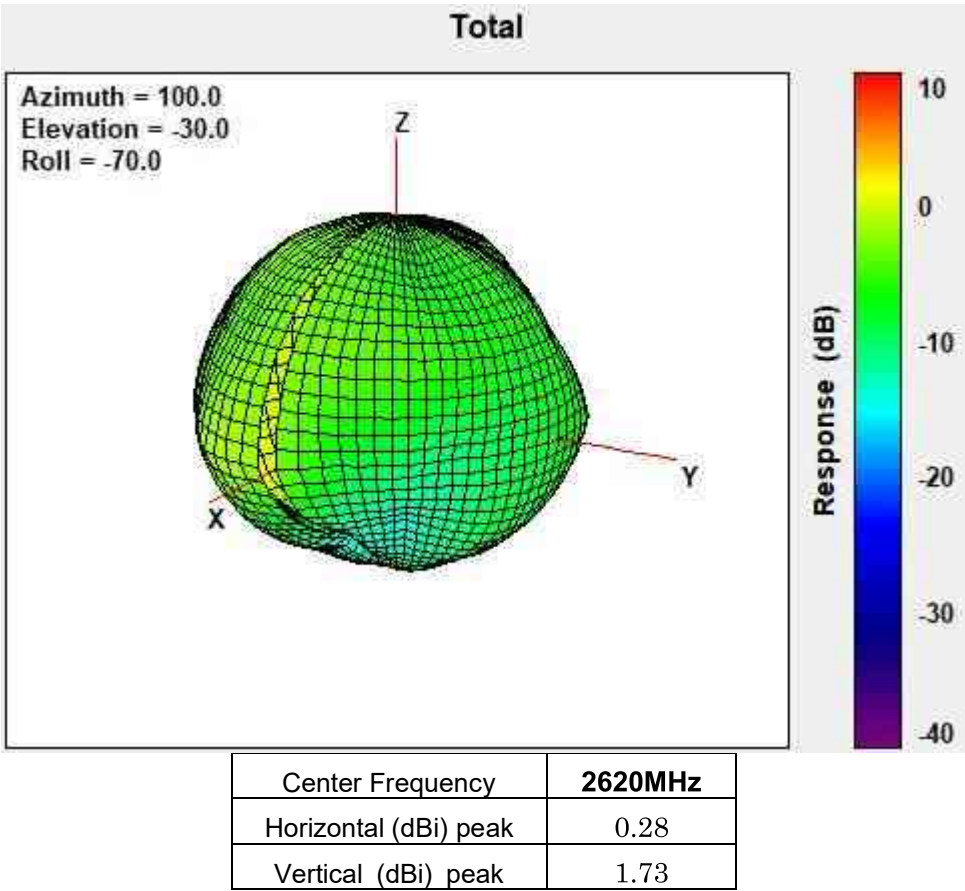
Center Frequency	2570MHz
Horizontal (dBi) peak	0.14
Vertical (dBi) peak	1.42

2595MHz

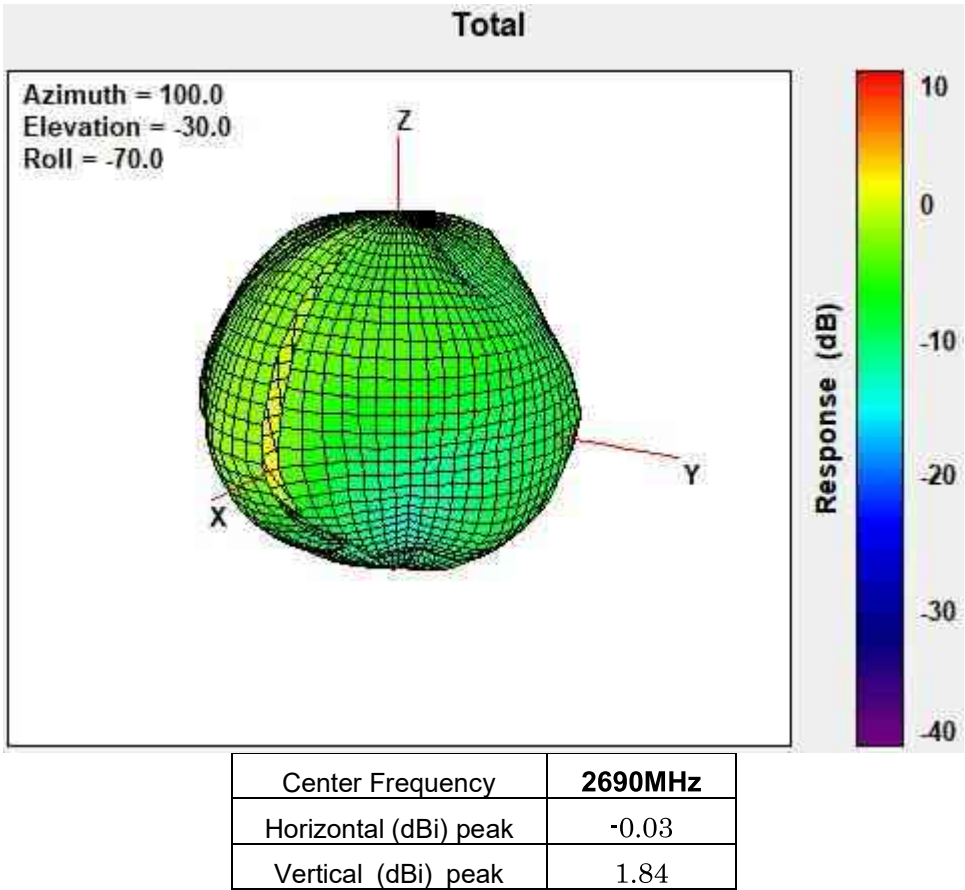


Center Frequency	2595MHz
Horizontal (dBi) peak	0.42
Vertical (dBi) peak	1.74

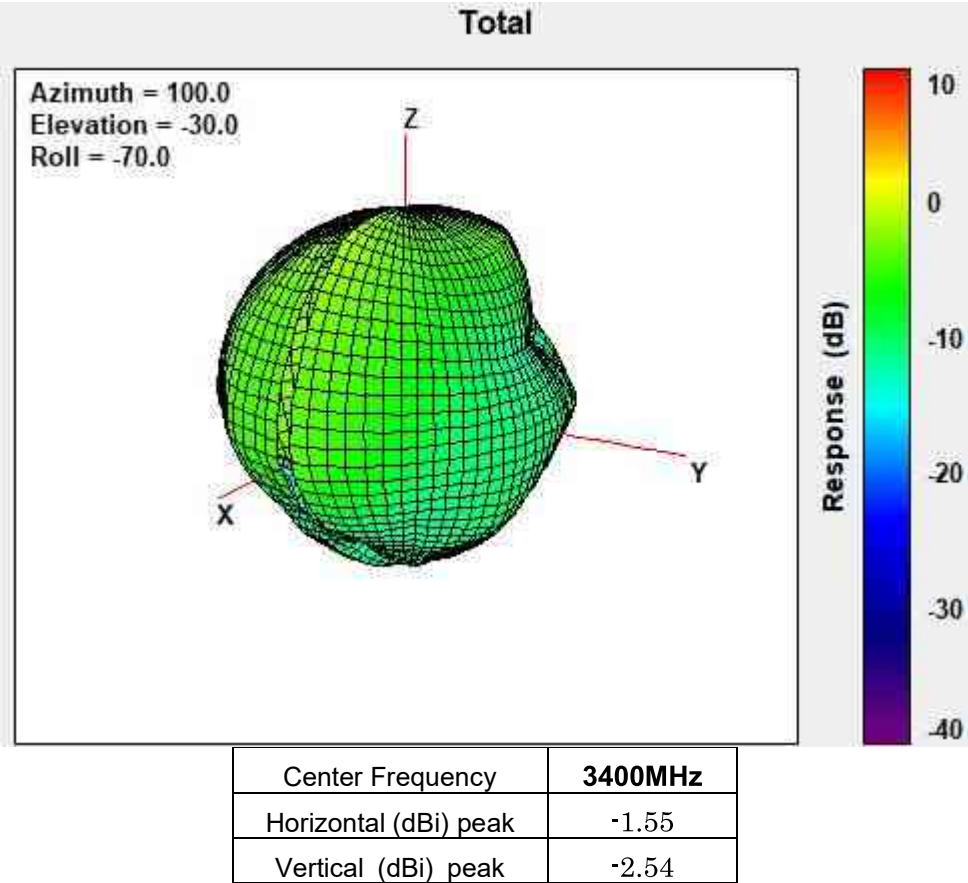
2620MHz



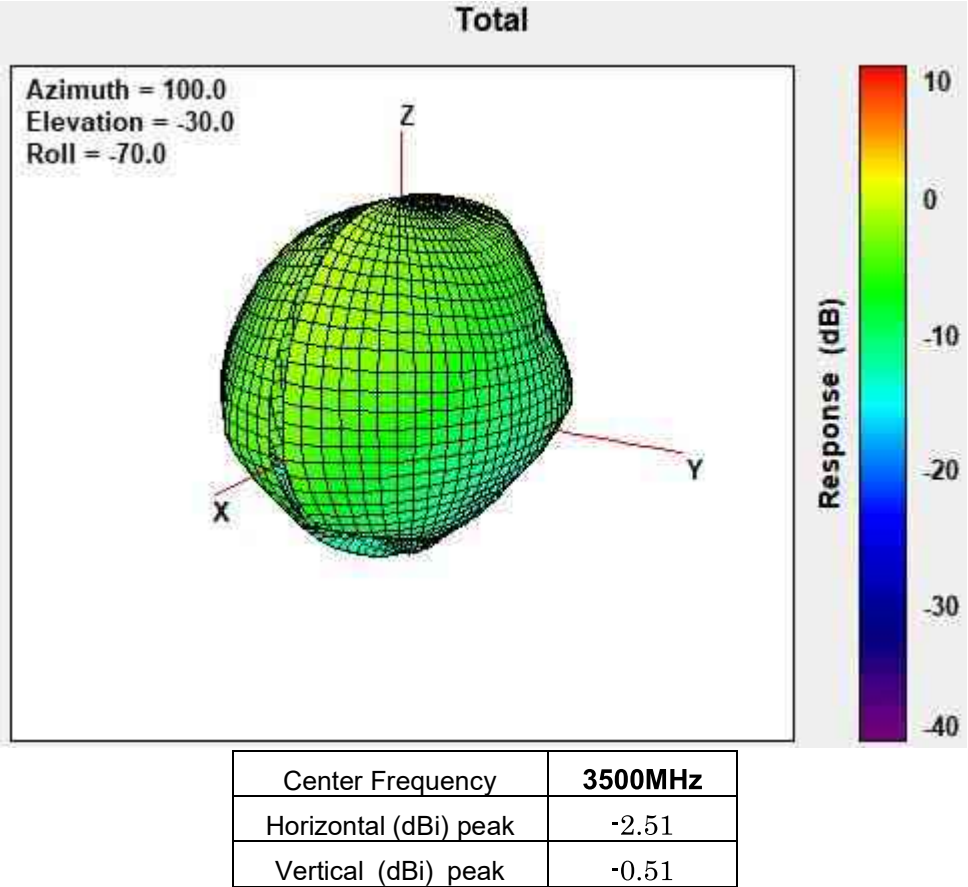
2690MHz



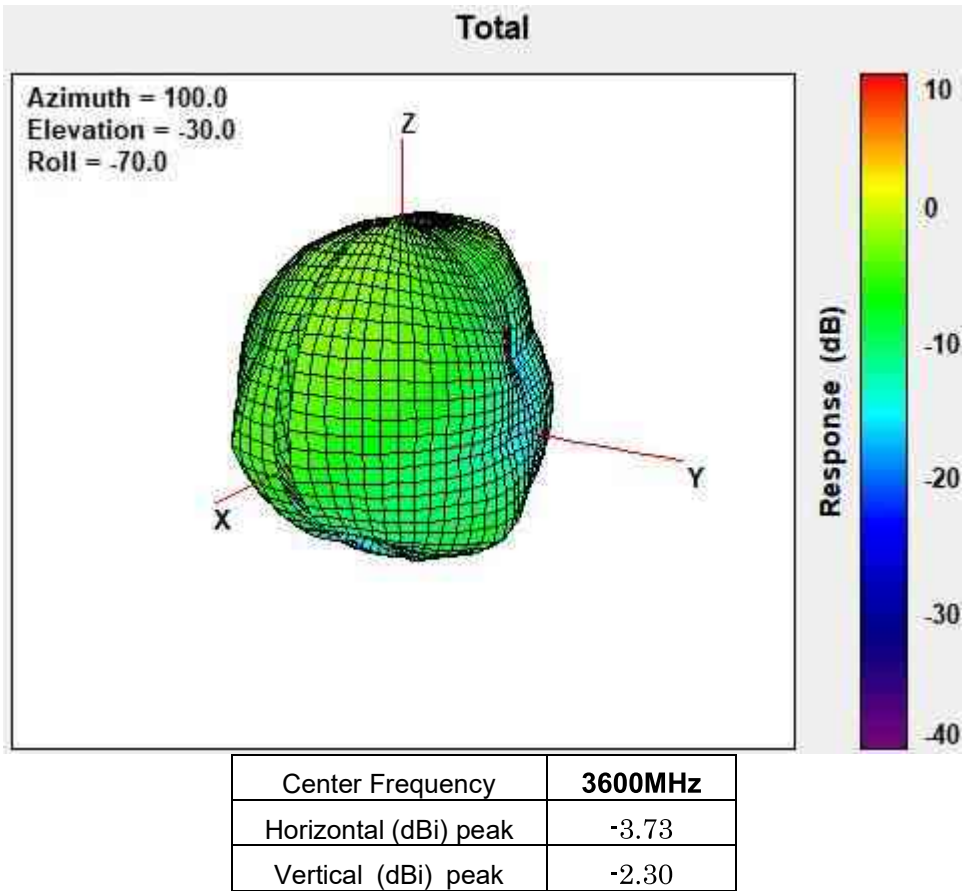
3400MHz



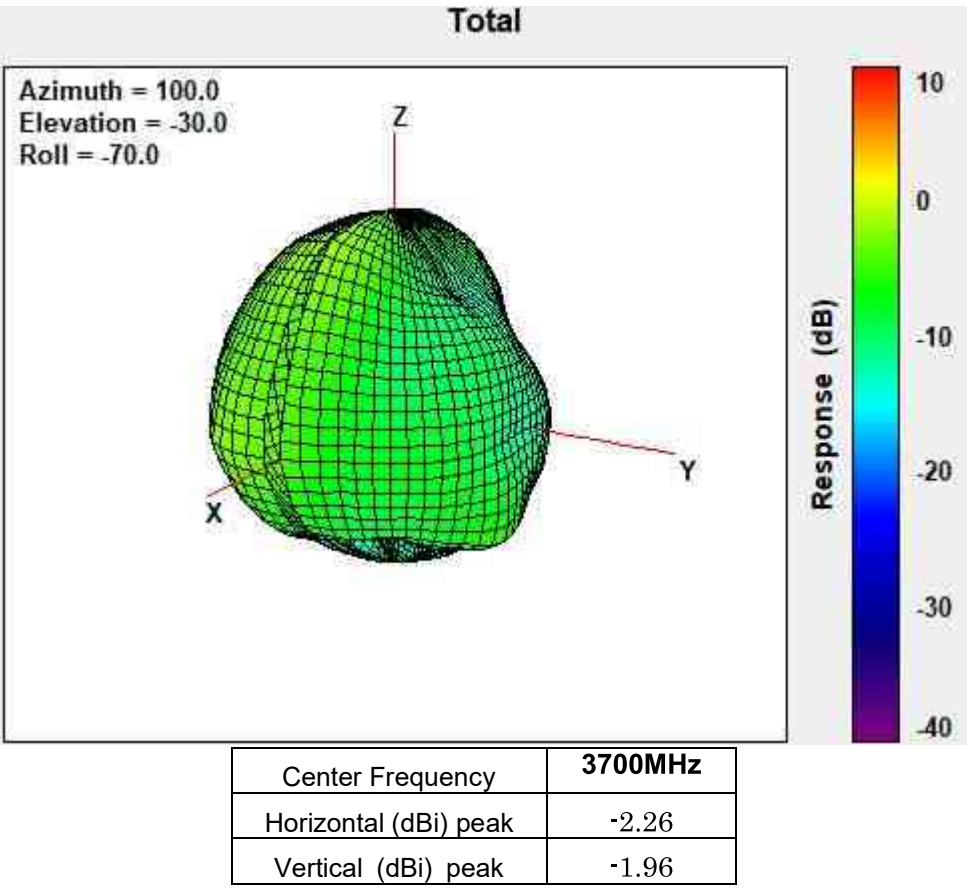
3500MHz



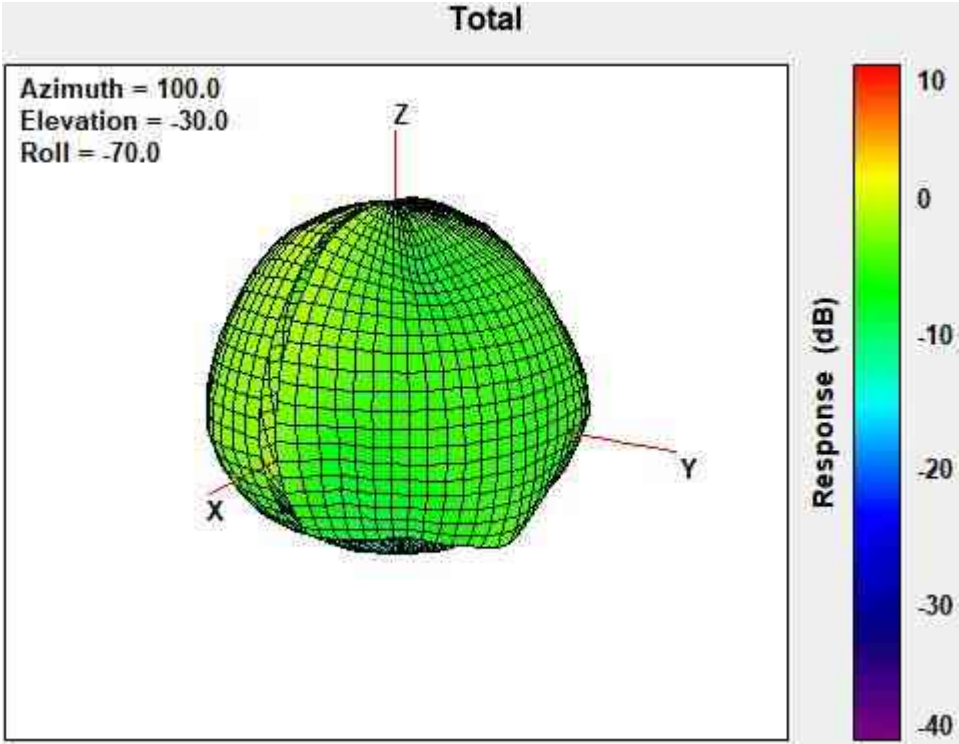
3600MHz



3700MHz

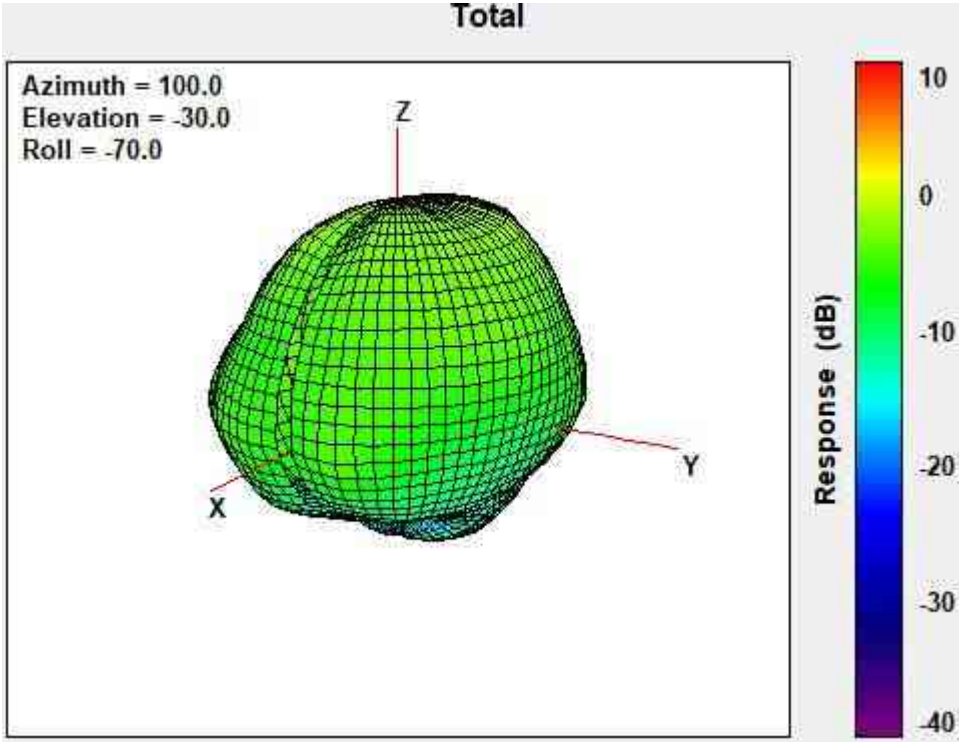


3800MHz



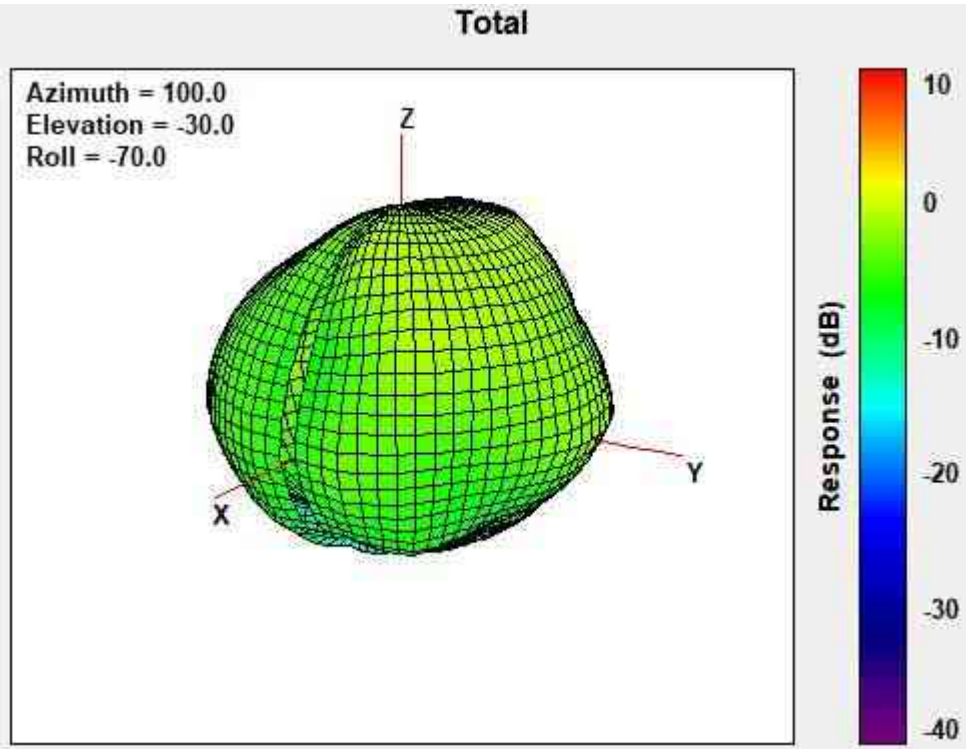
Center Frequency	3800MHz
Horizontal (dBi) peak	-2.89
Vertical (dBi) peak	-1.69

4200MHz



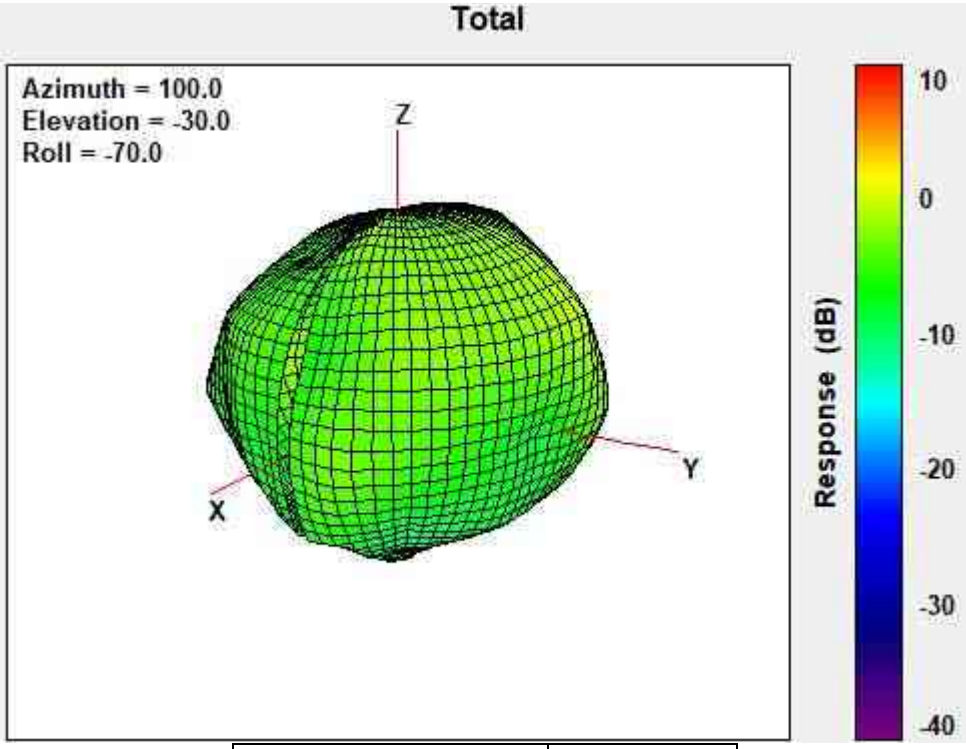
Center Frequency	4200MHz
Horizontal (dBi) peak	-1.84
Vertical (dBi) peak	-2.36

4400MHz



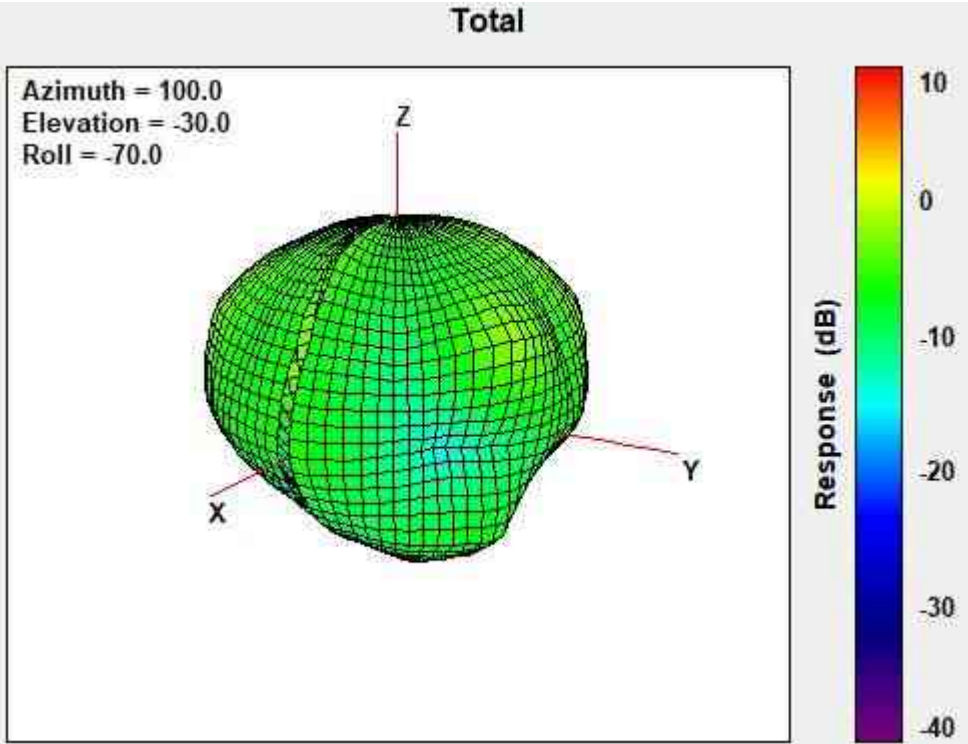
Center Frequency	4400MHz
Horizontal (dBi) peak	-0.42
Vertical (dBi) peak	-0.66

4700MHz



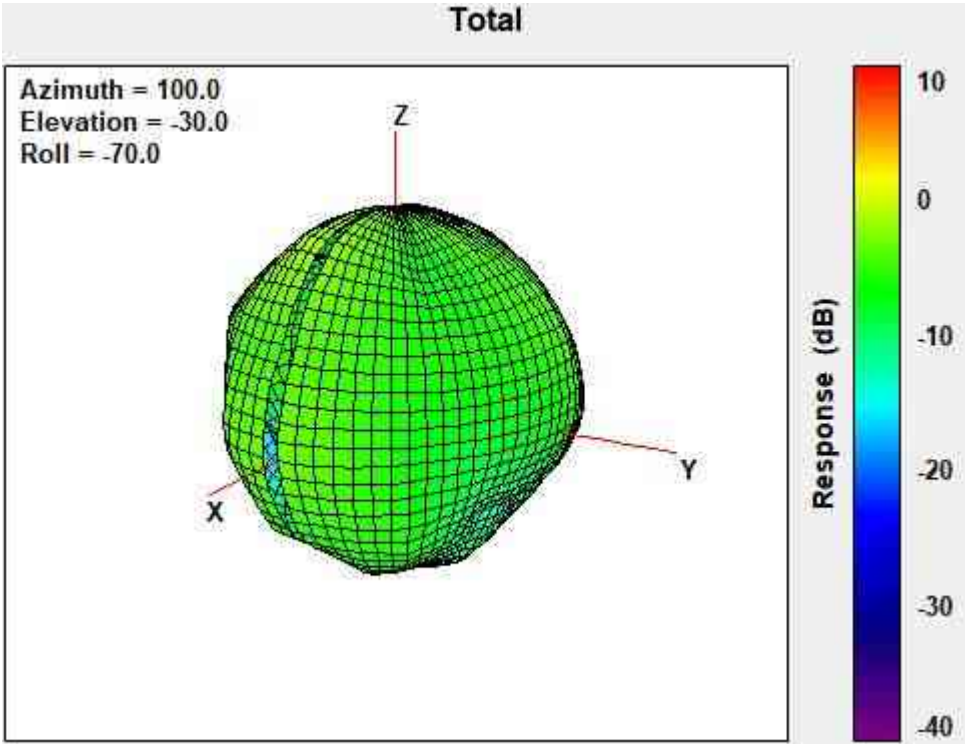
Center Frequency	4700MHz
Horizontal (dBi) peak	-0.37
Vertical (dBi) peak	-1.60

5150MHz



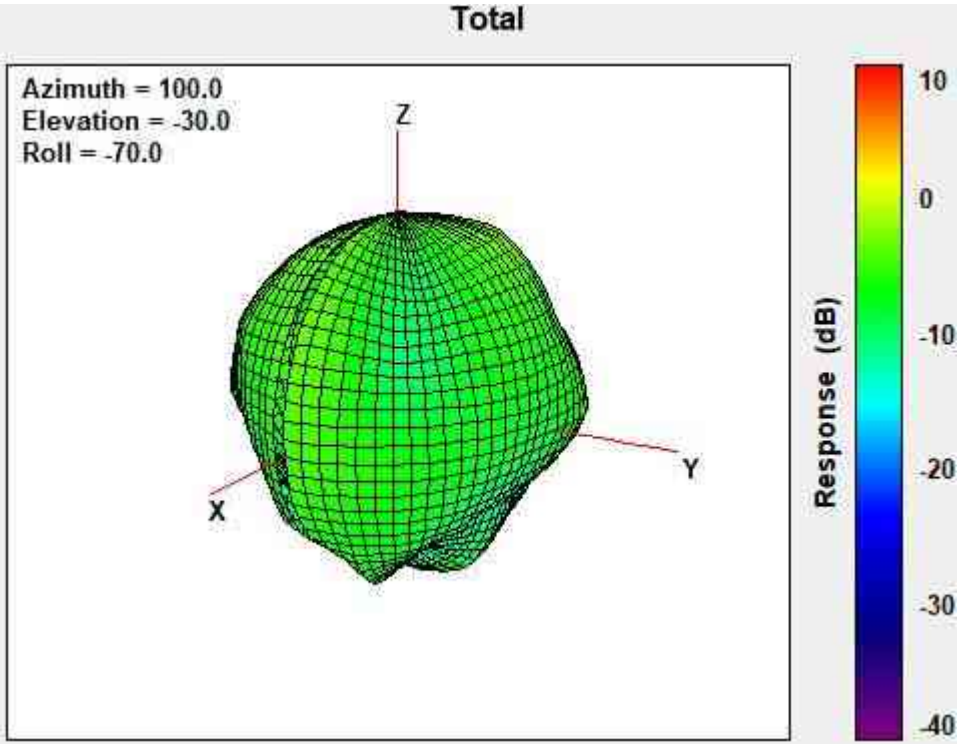
Center Frequency	5150MHz
Horizontal (dBi) peak	-2.01
Vertical (dBi) peak	-2.60

5537.5MHz



Center Frequency	5537.5MHz
Horizontal (dBi) peak	-2.20
Vertical (dBi) peak	-2.46

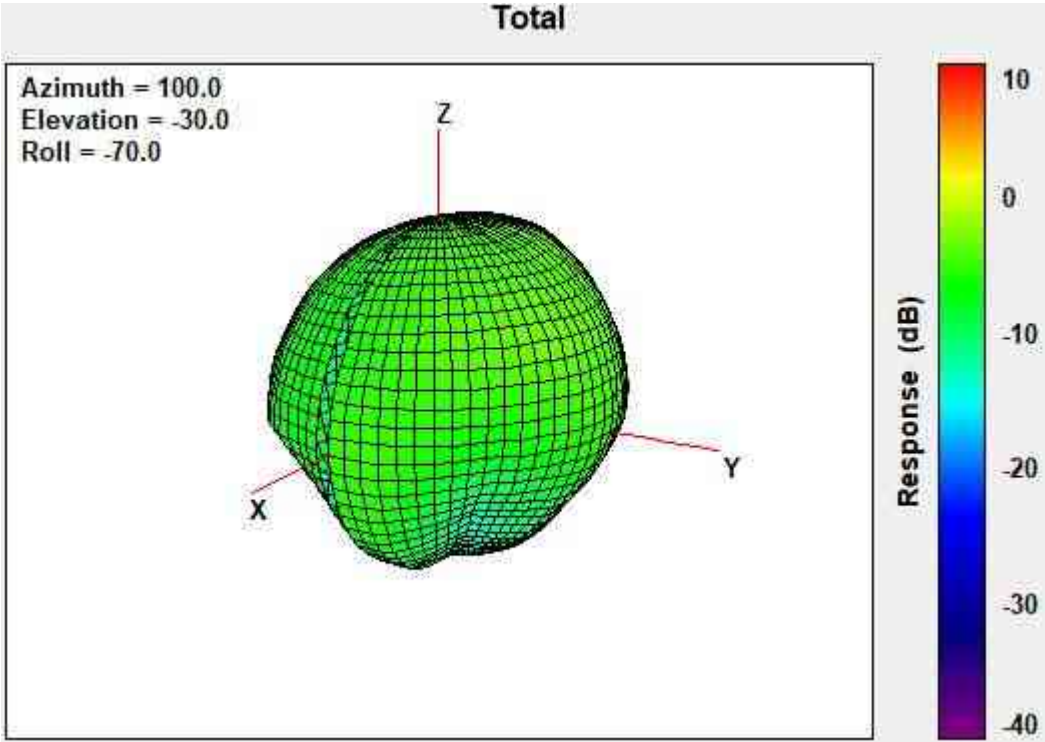
5925MHz



Center Frequency	5925MHz
Horizontal (dBi) peak	-3.26
Vertical (dBi) peak	-1.84

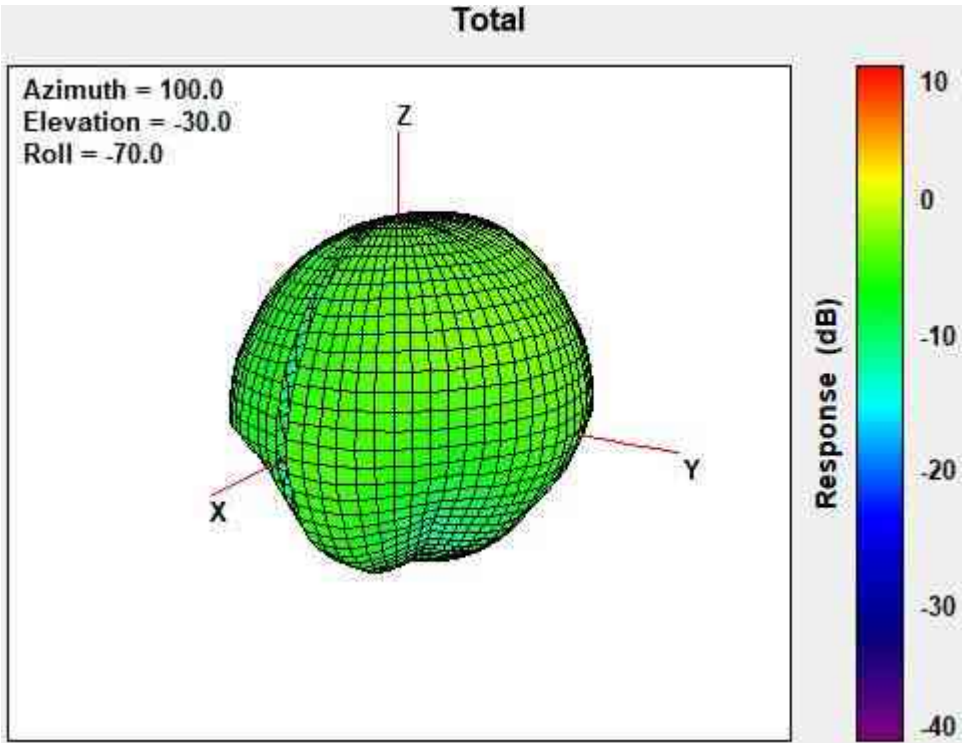
WWAN Aux Antenna (DRx)

617MHz



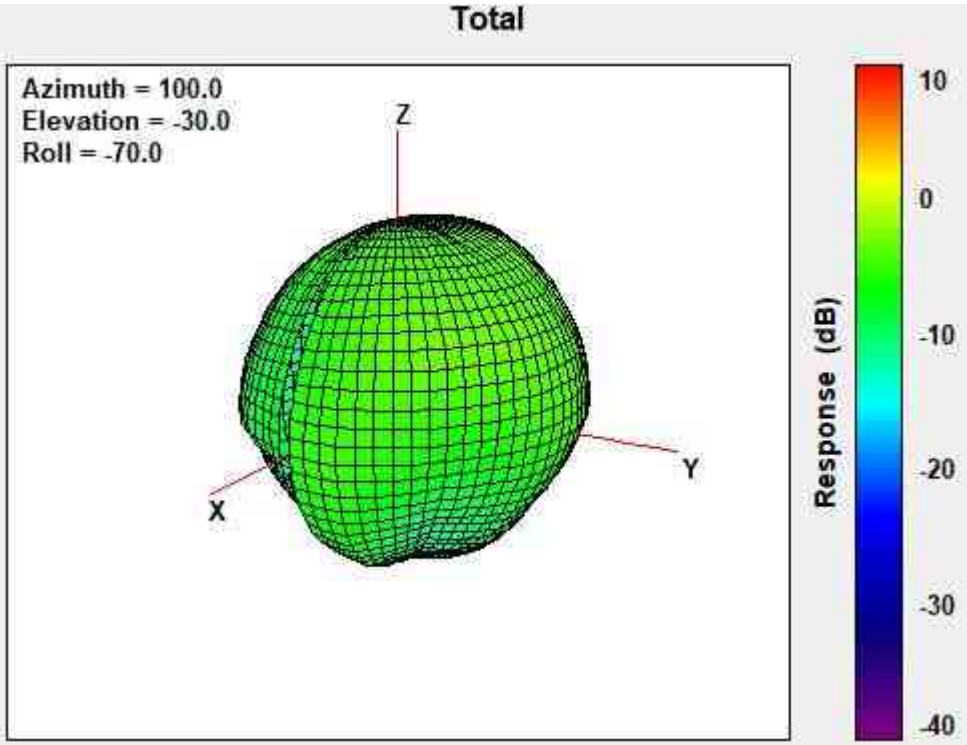
Center Frequency	617MHz
Horizontal (dBi) peak	-3.54
Vertical (dBi) peak	-4.71

634MHz
Total



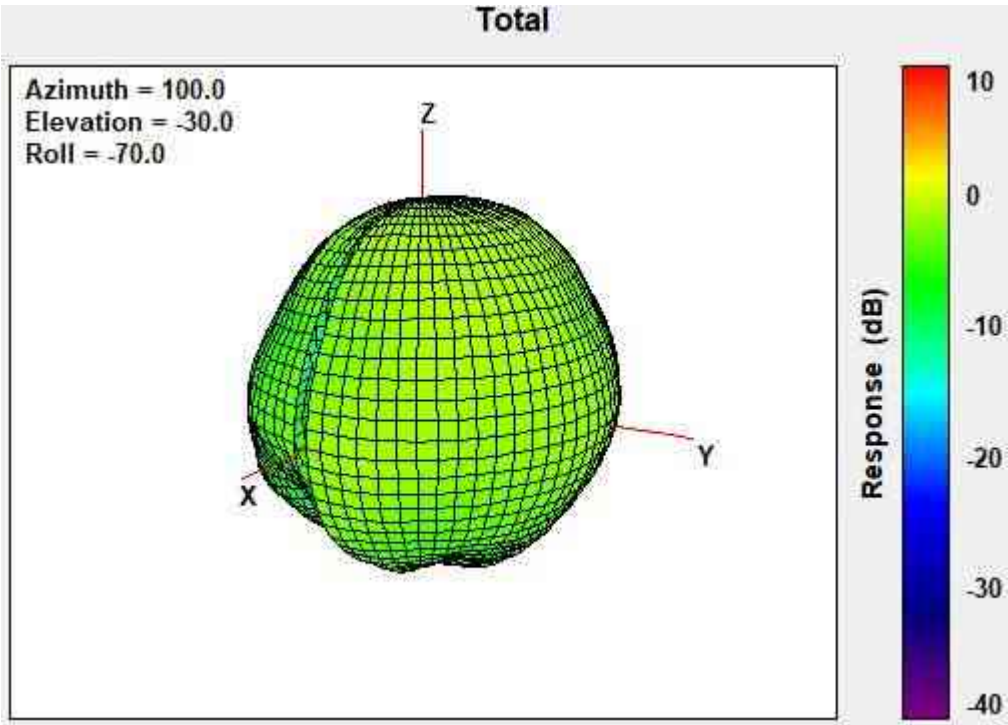
Center Frequency	634MHz
Horizontal (dBi) peak	-3.17
Vertical (dBi) peak	-4.25

652MHz



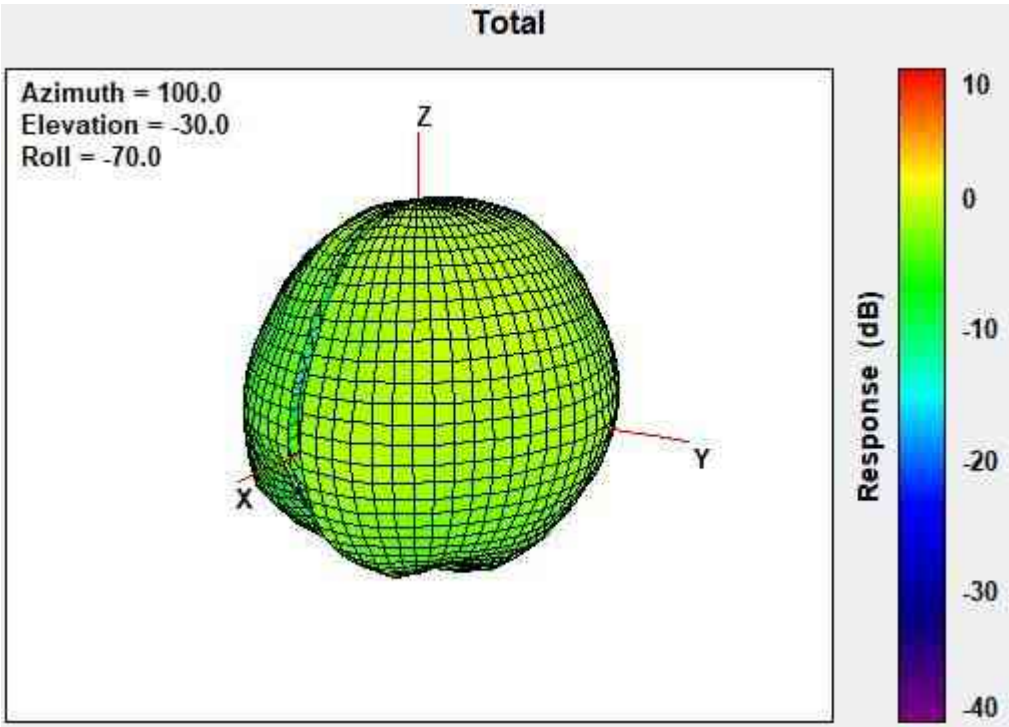
Center Frequency	652MHz
Horizontal (dBi) peak	-4.01
Vertical (dBi) peak	-4.62

717MHz



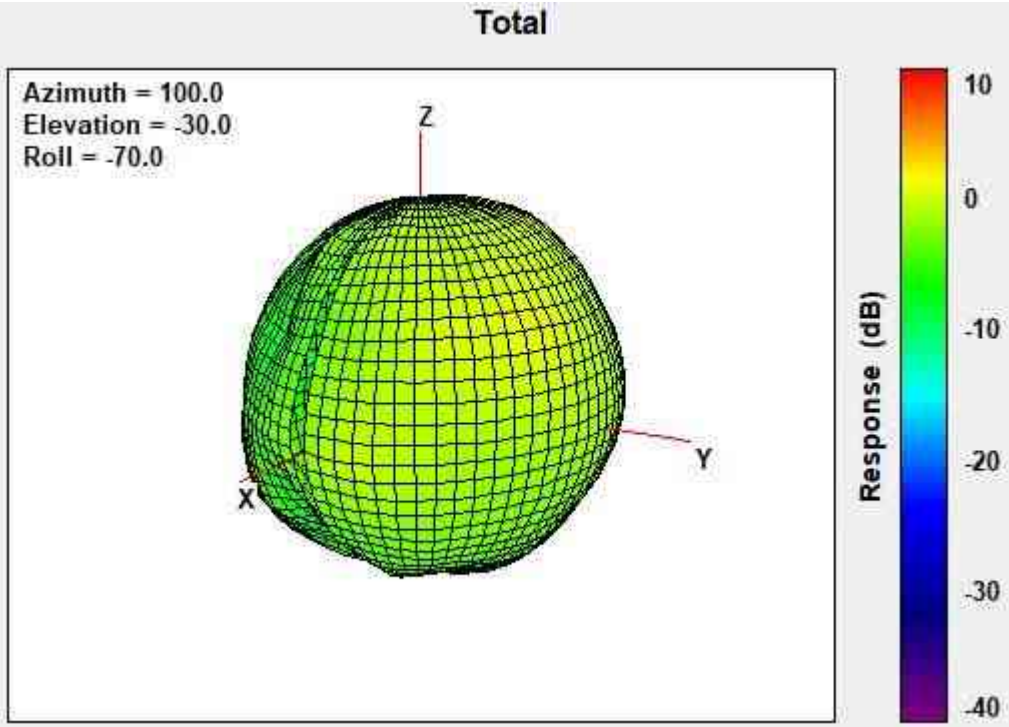
Center Frequency	717MHz
Horizontal (dBi) peak	-2.29
Vertical (dBi) peak	-1.32

725.5MHz



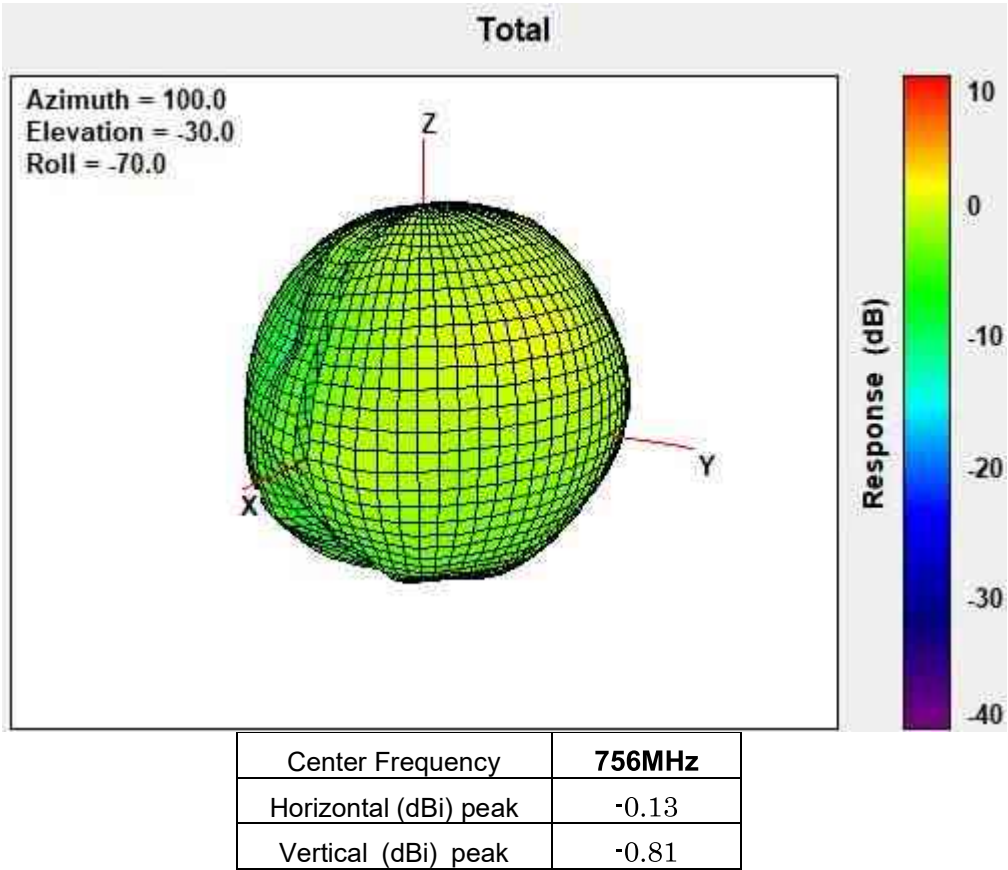
Center Frequency	725.5MHz
Horizontal (dBi) peak	-1.51
Vertical (dBi) peak	-1.09

748MHz

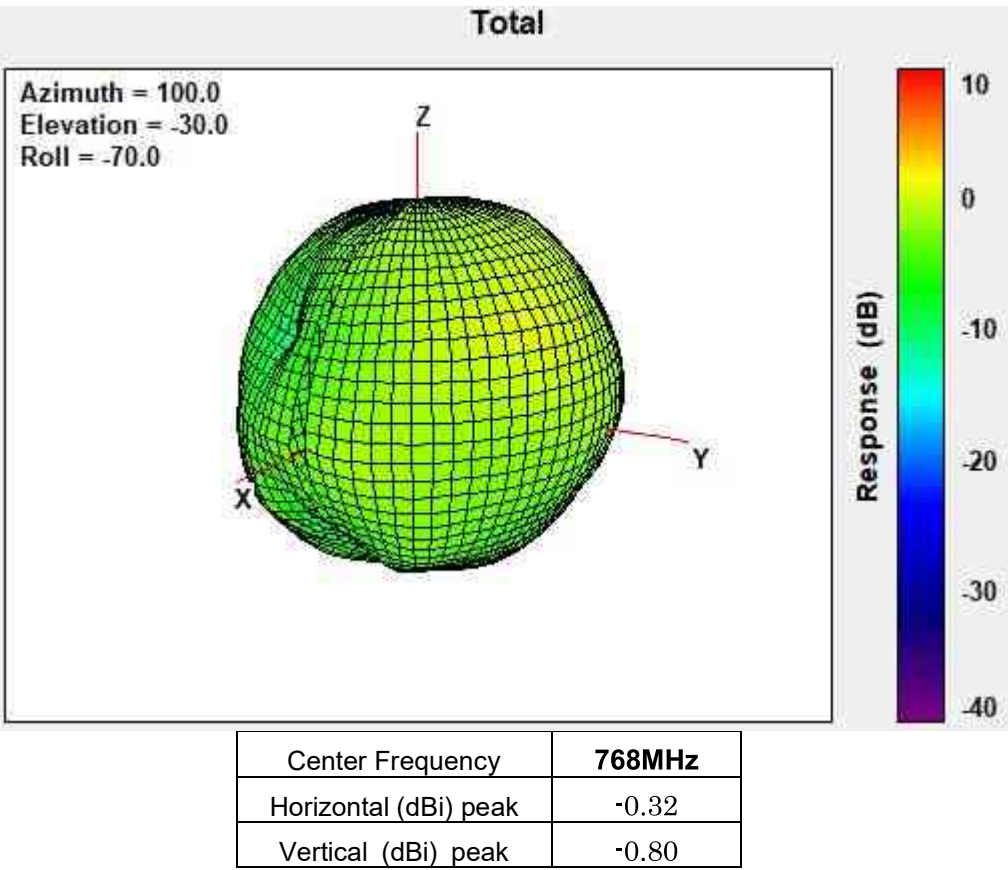


Center Frequency	748MHz
Horizontal (dBi) peak	-0.54
Vertical (dBi) peak	-0.96

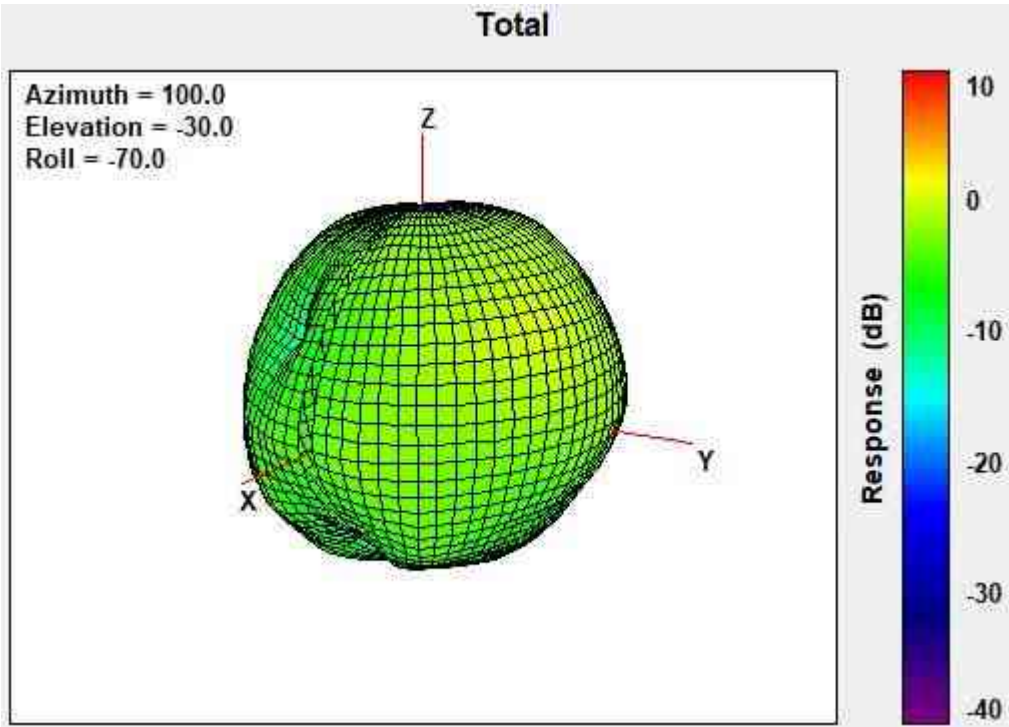
756MHz



768MHz

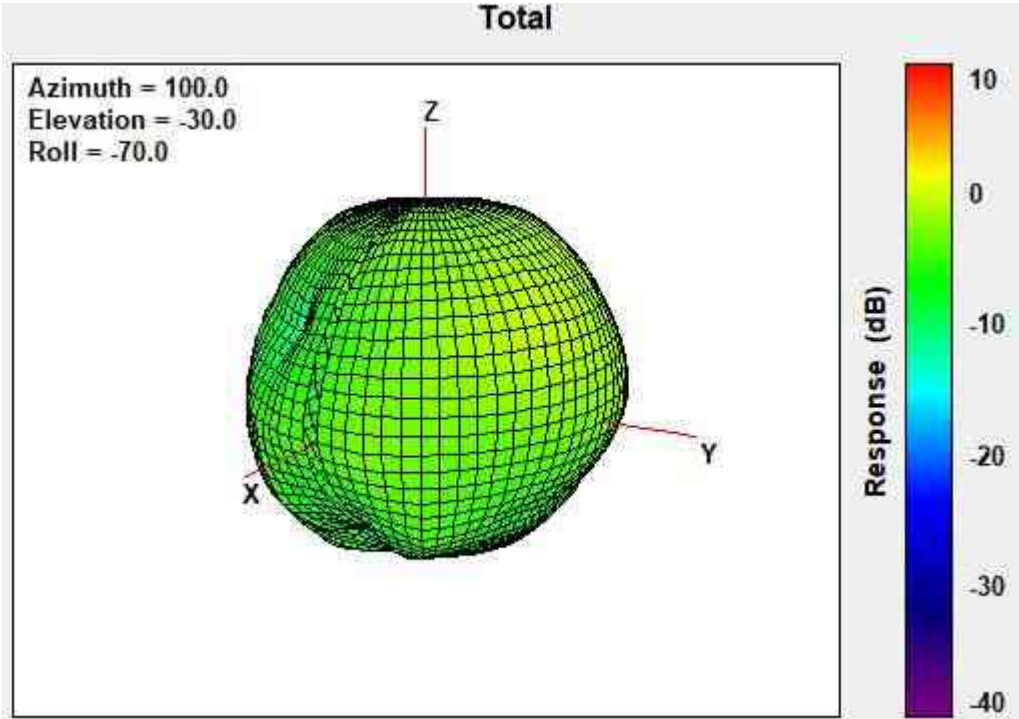


777MHz



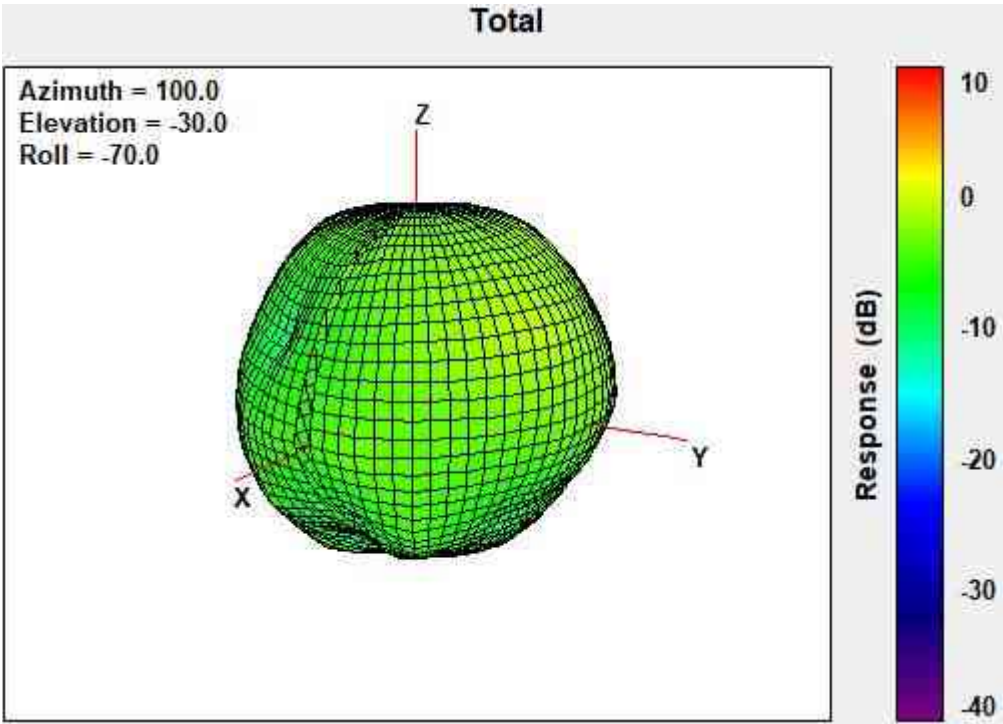
Center Frequency	777MHz
Horizontal (dBi) peak	-0.90
Vertical (dBi) peak	-1.22

782MHz



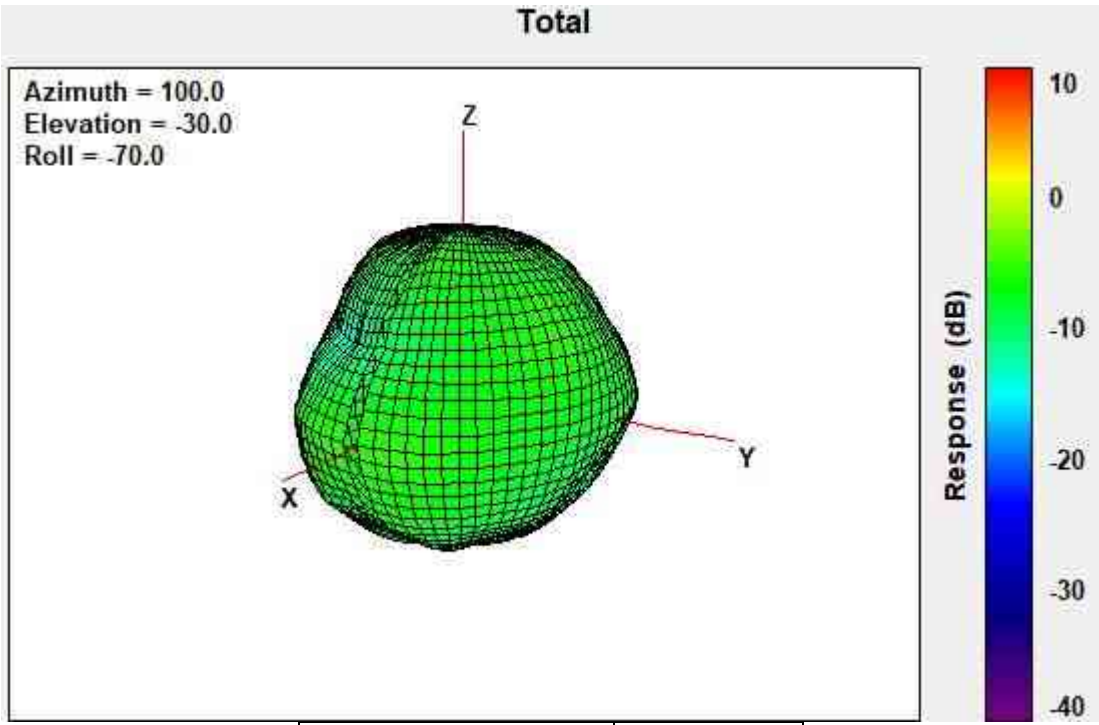
Center Frequency	782MHz
Horizontal (dBi) peak	-1.44
Vertical (dBi) peak	-1.61

787MHz



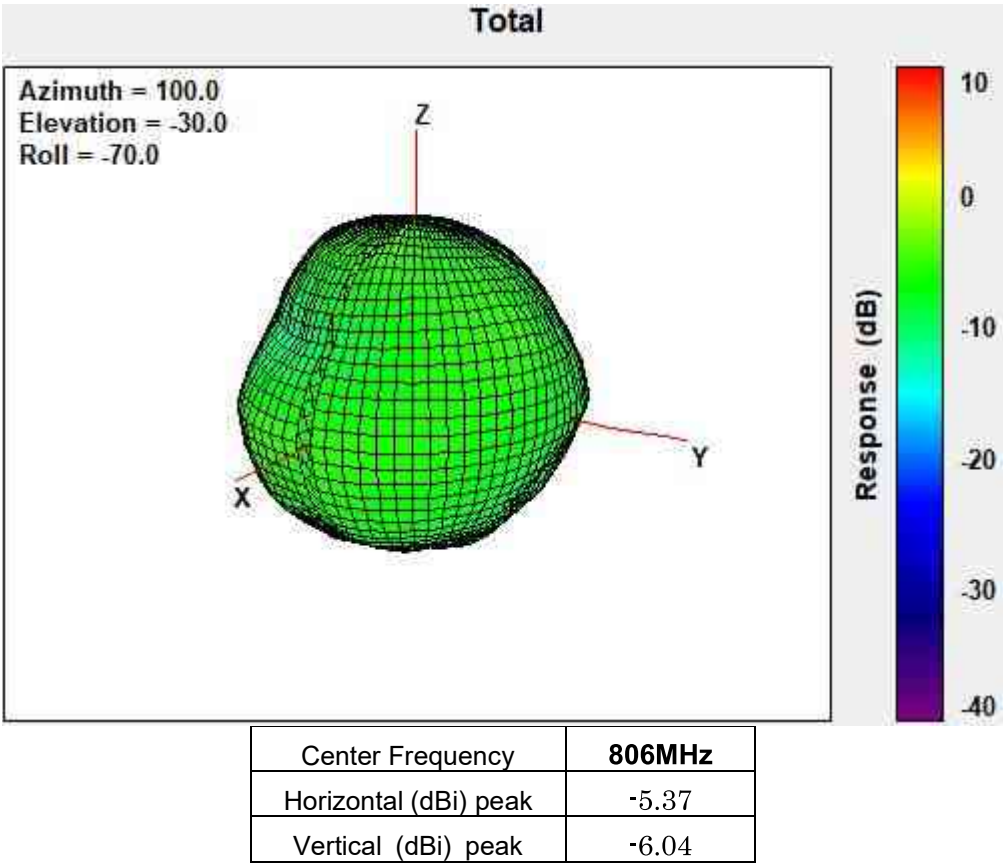
Center Frequency	787MHz
Horizontal (dBi) peak	-2.18
Vertical (dBi) peak	-2.06

791MHz

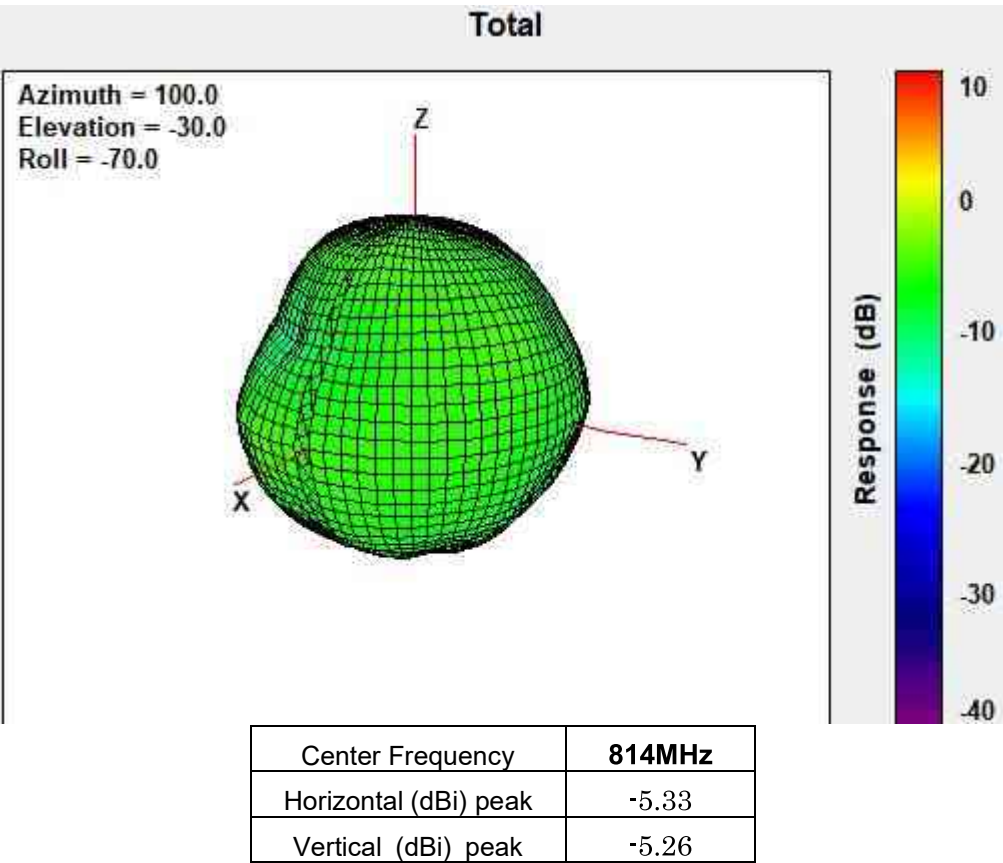


Center Frequency	791MHz
Horizontal (dBi) peak	-6.39
Vertical (dBi) peak	-6.90

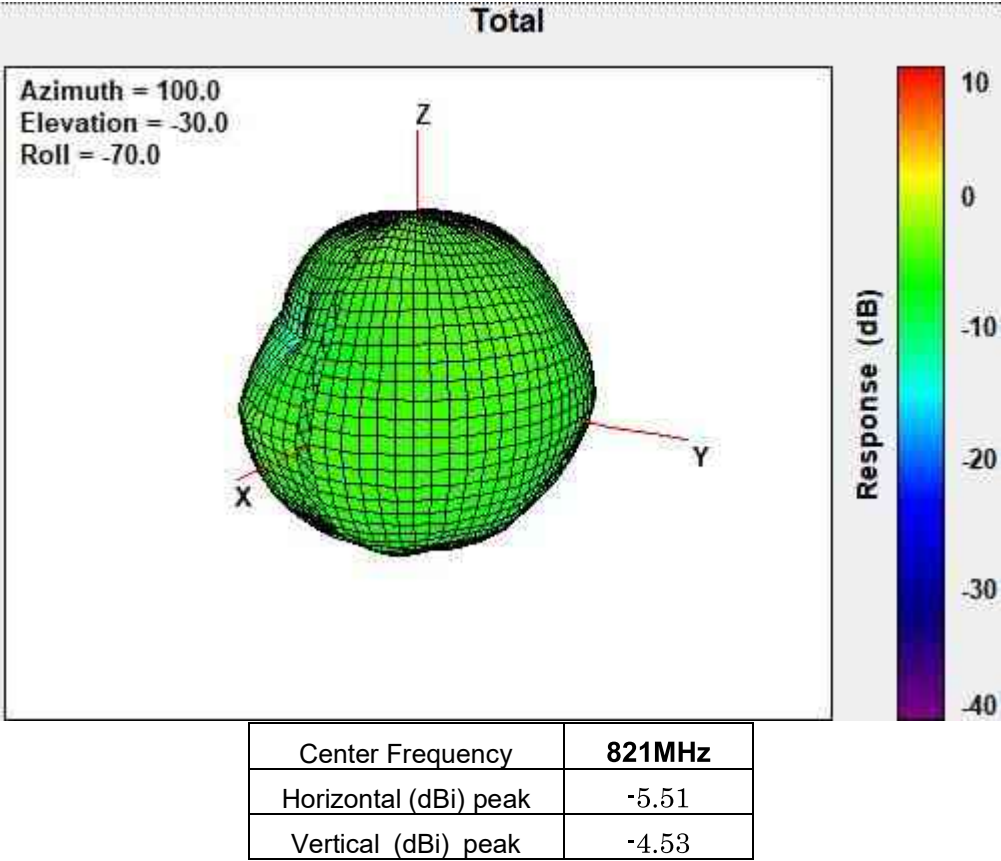
806MHz



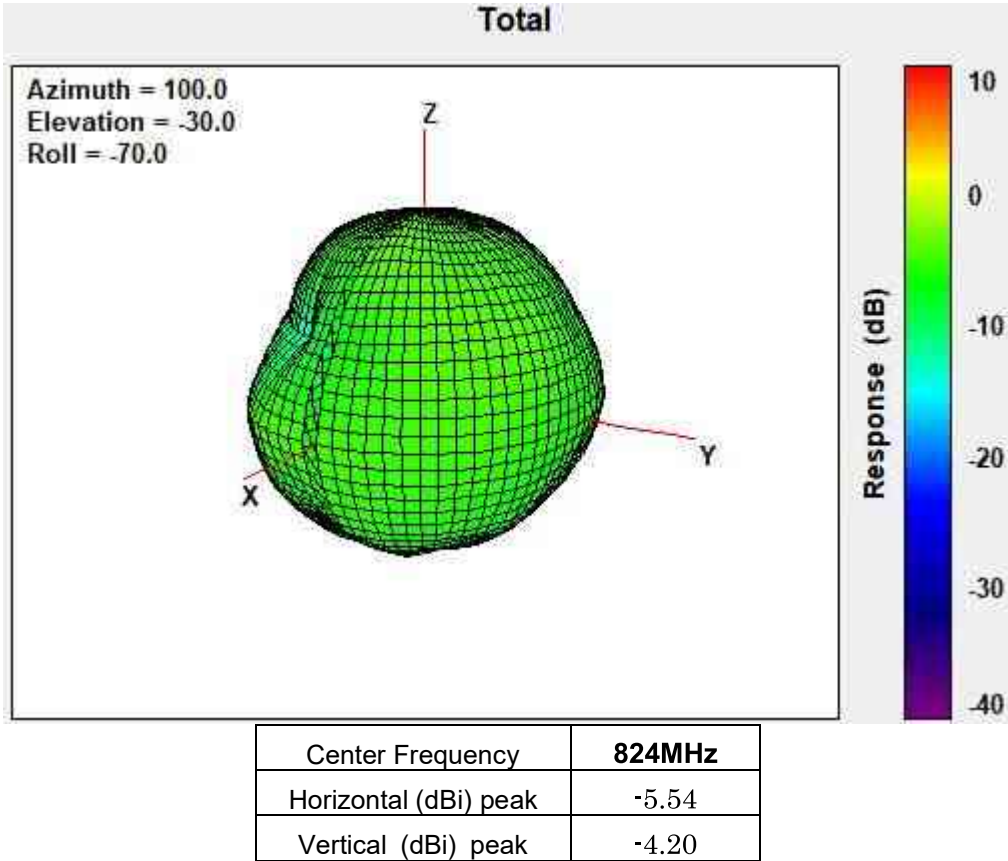
814MHz



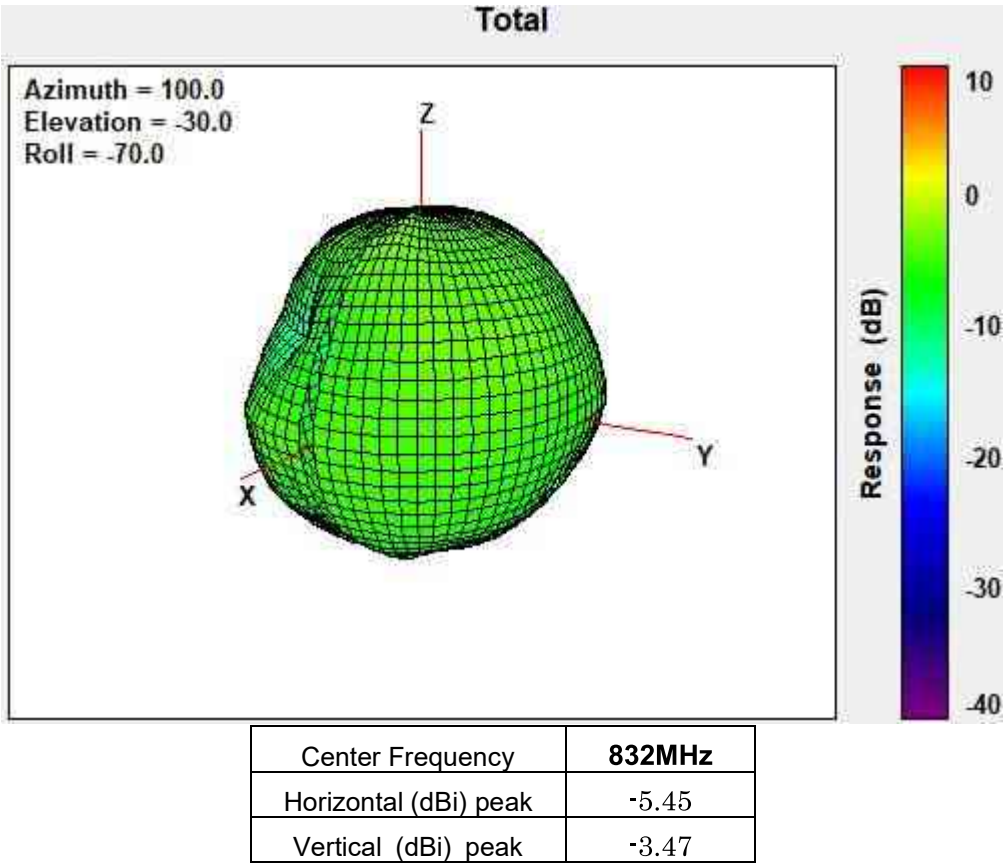
821MHz



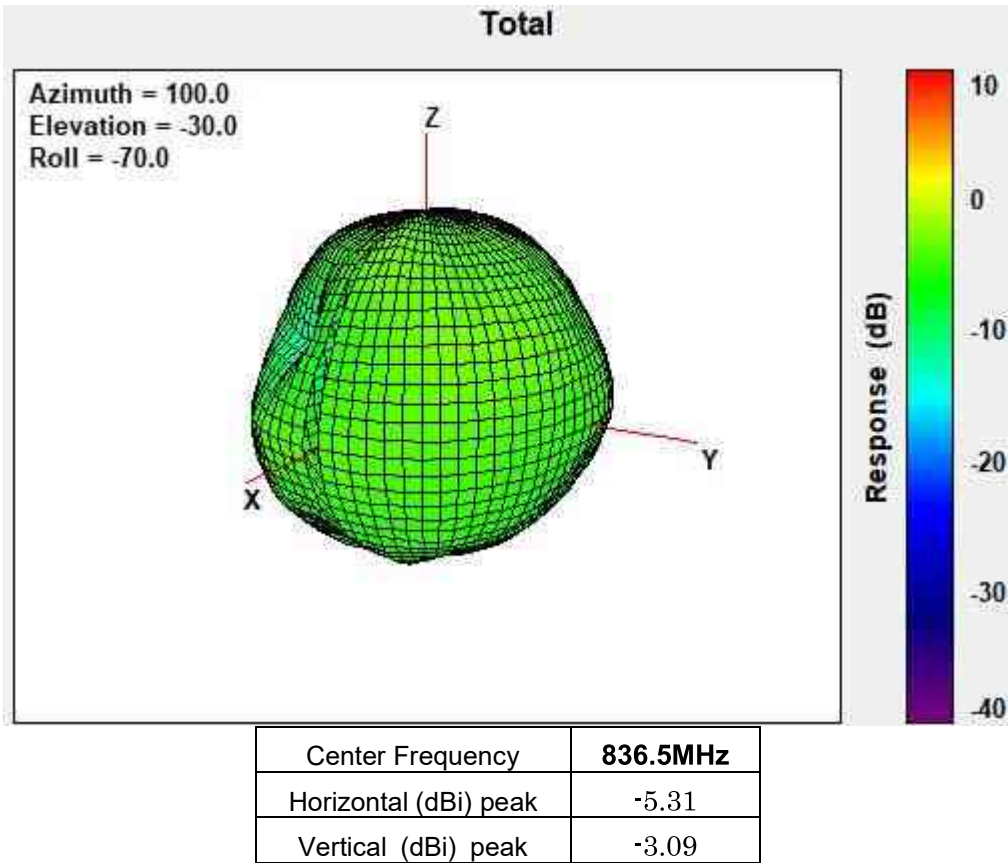
824MHz



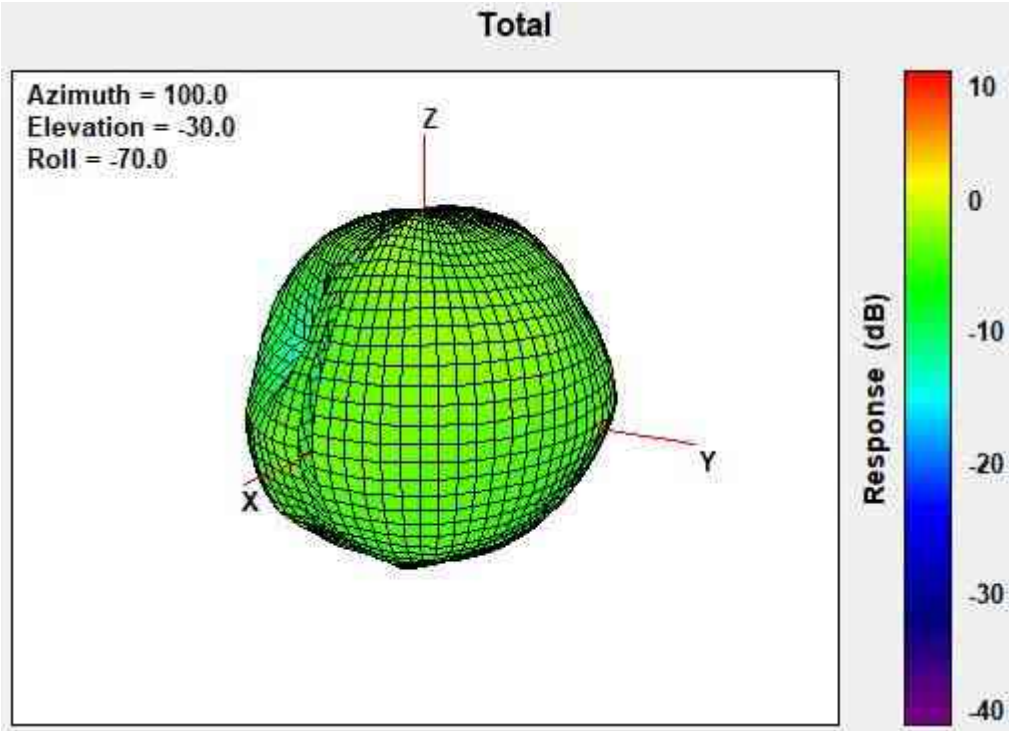
832MHz



836.5MHz

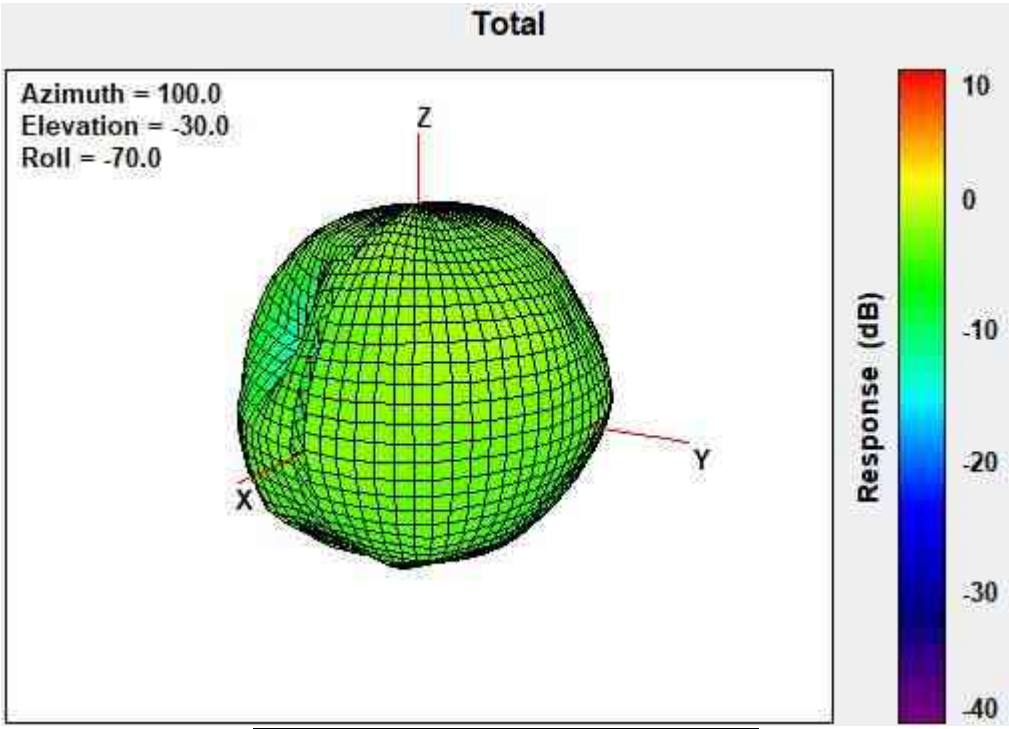


849MHz



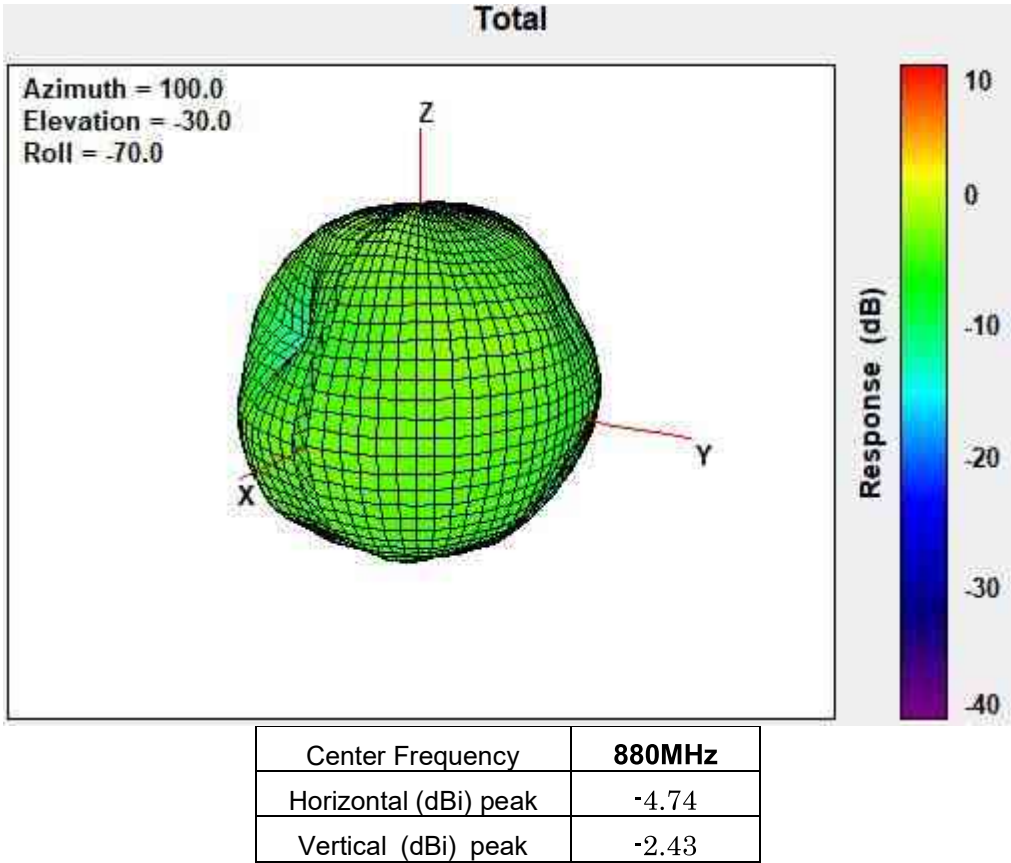
Center Frequency	849MHz
Horizontal (dBi) peak	-4.64
Vertical (dBi) peak	-2.09

862MHz

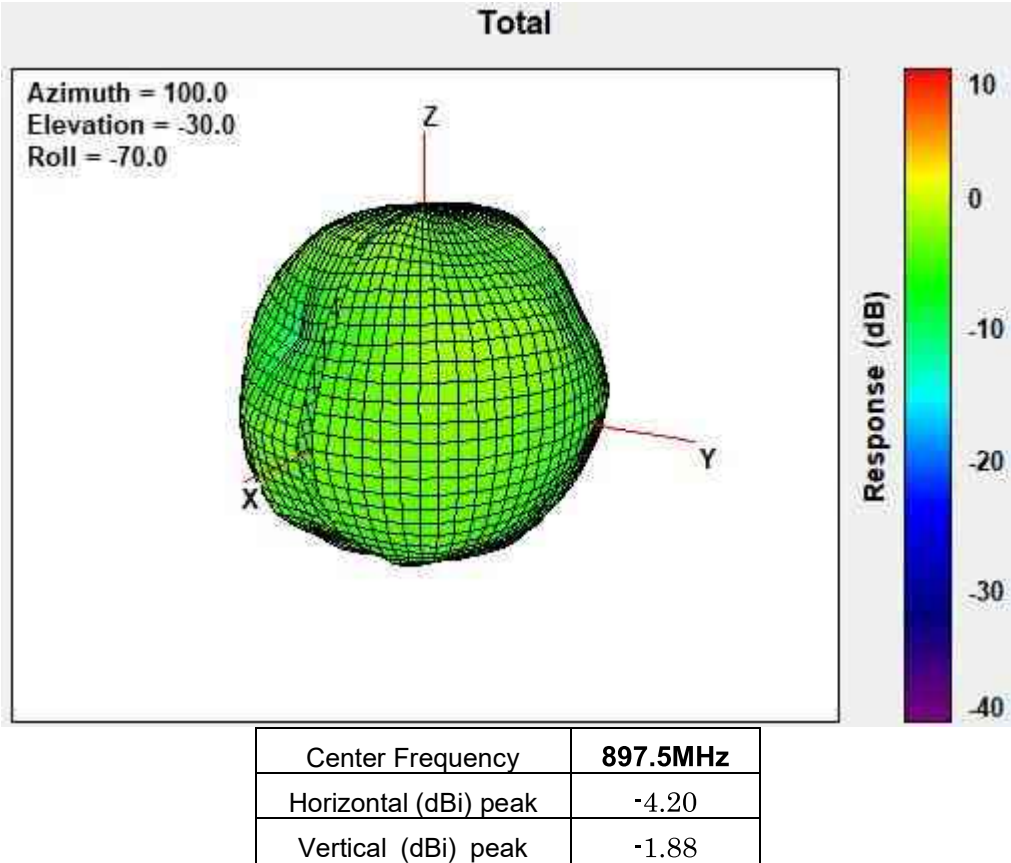


Center Frequency	862MHz
Horizontal (dBi) peak	-5.11
Vertical (dBi) peak	-3.35

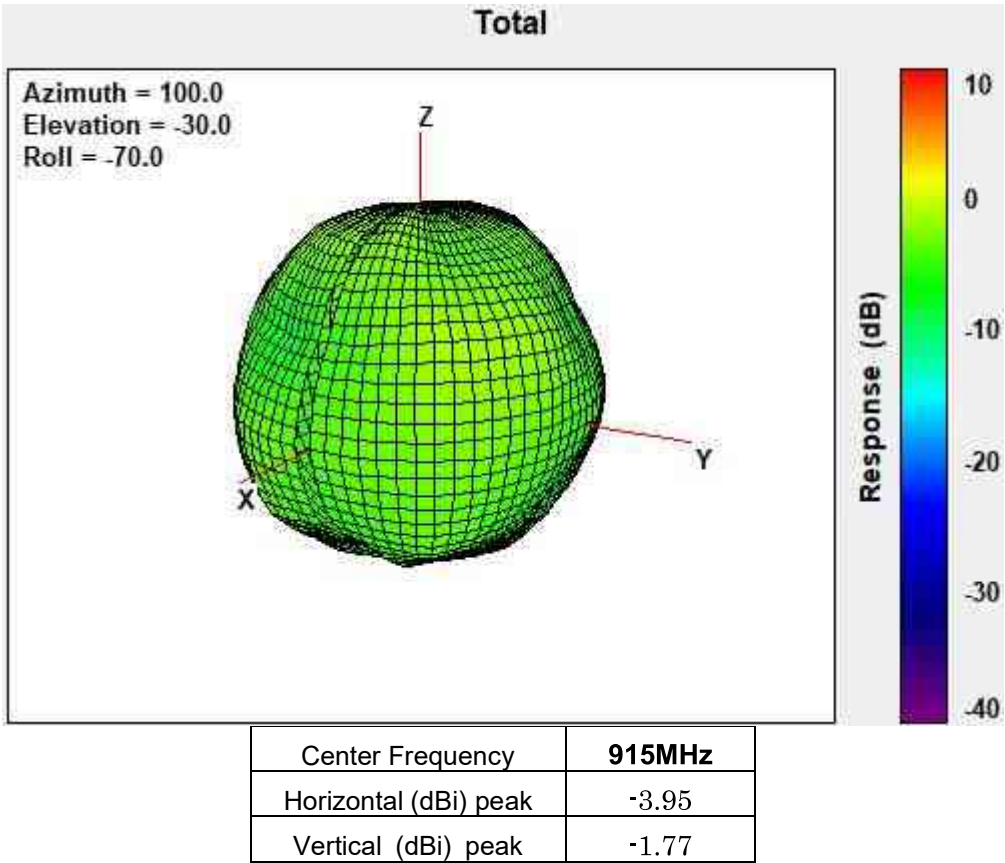
880MHz



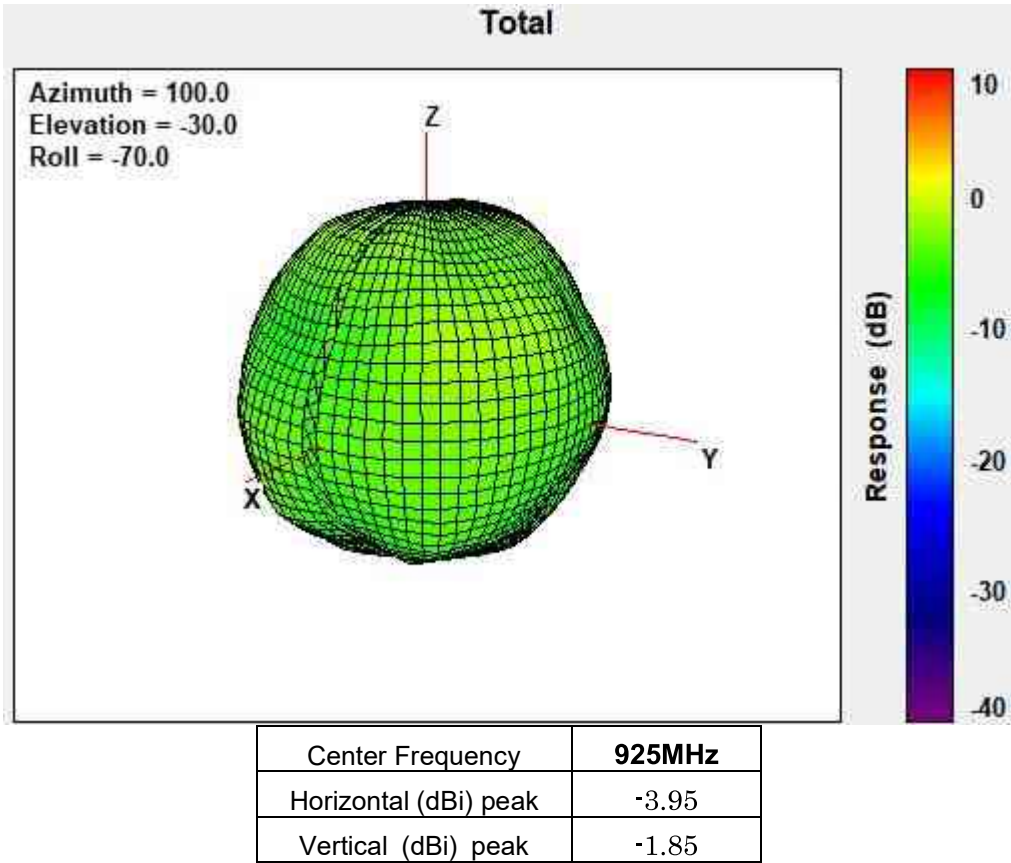
897.5MHz



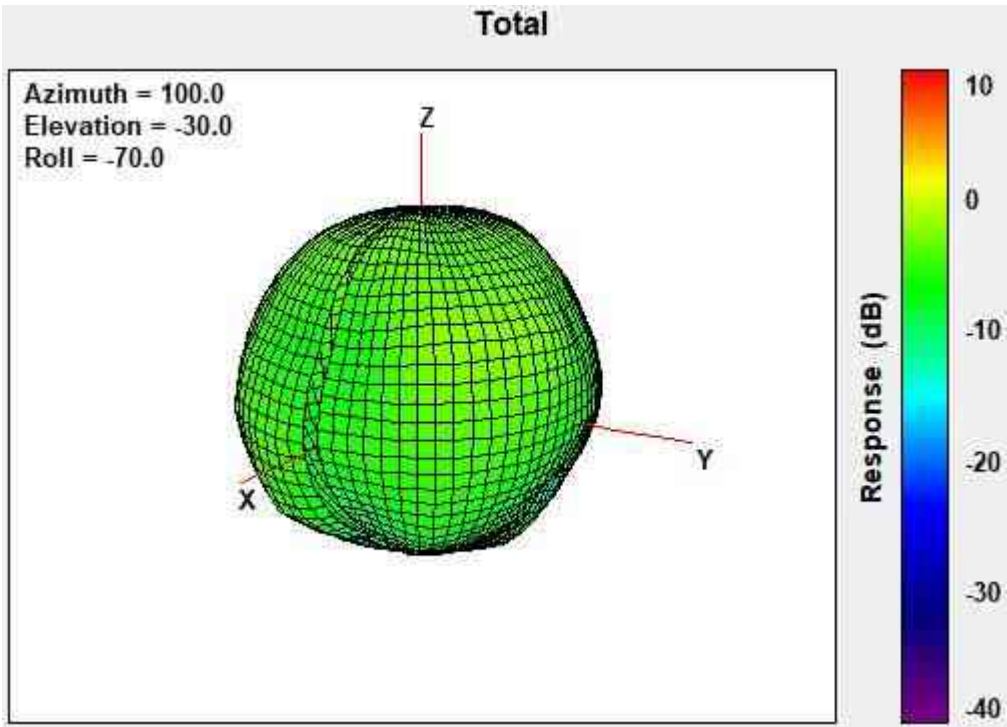
915MHz



925MHz

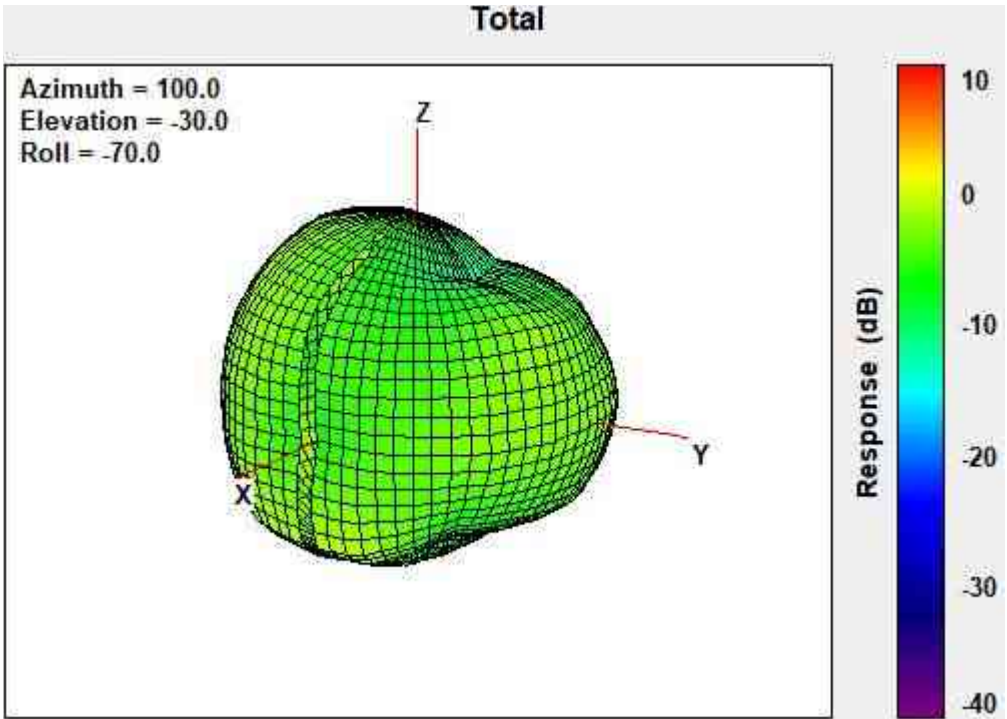


960MHz



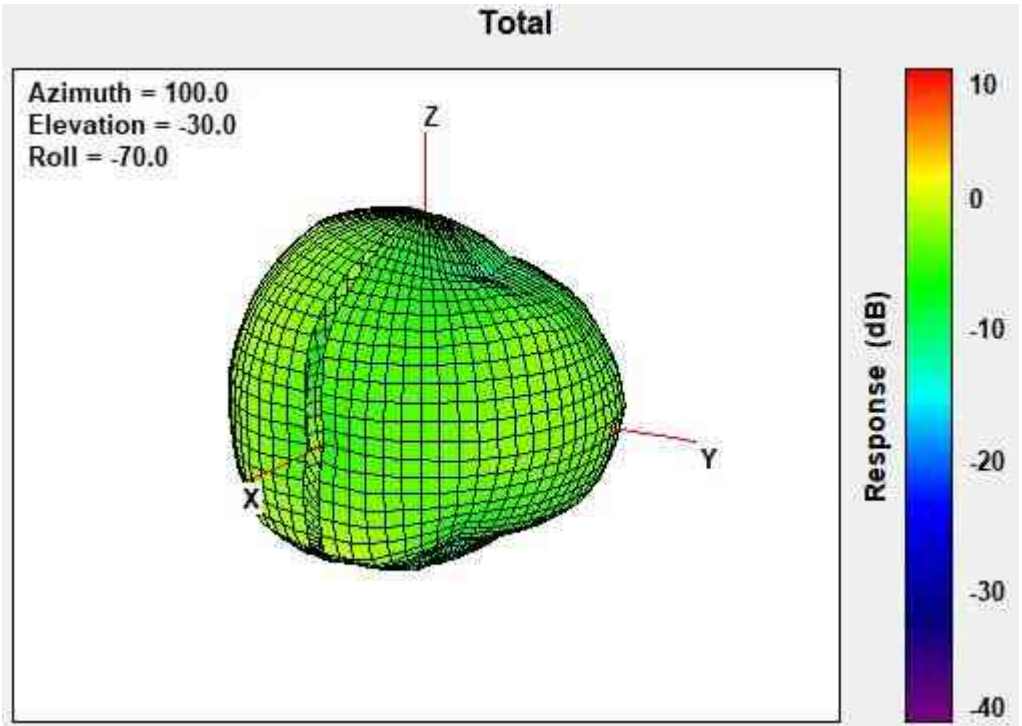
Center Frequency	960MHz
Horizontal (dBi) peak	-4.07
Vertical (dBi) peak	-2.88

1427.9MHz



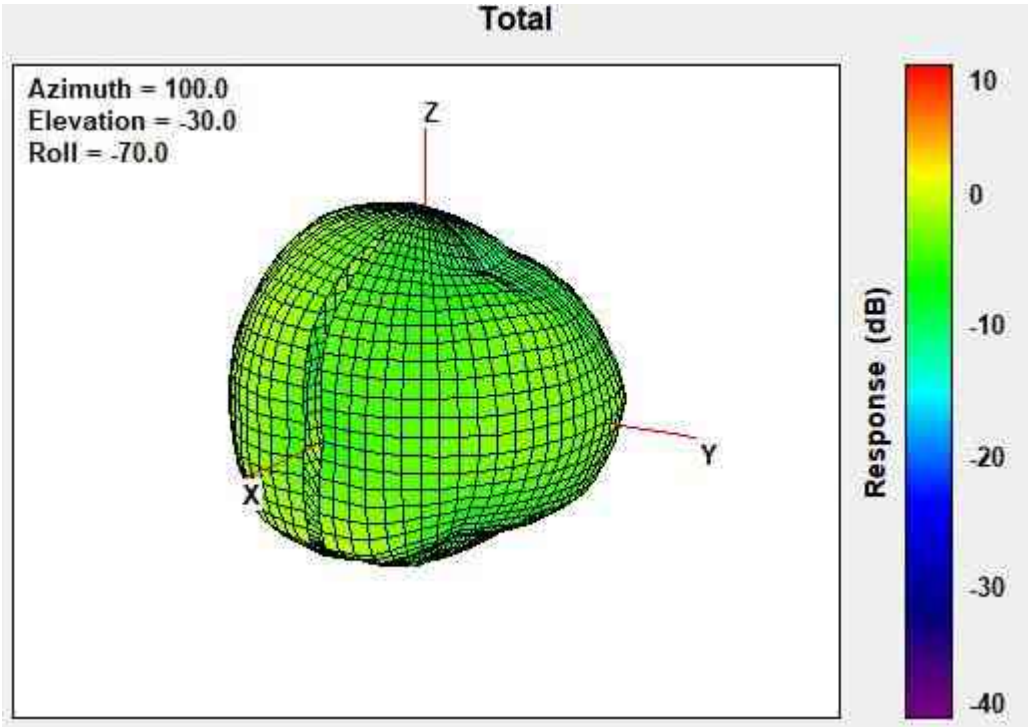
Center Frequency	1427.9MHz
Horizontal (dBi) peak	-1.37
Vertical (dBi) peak	-2.21

1447.9MHz



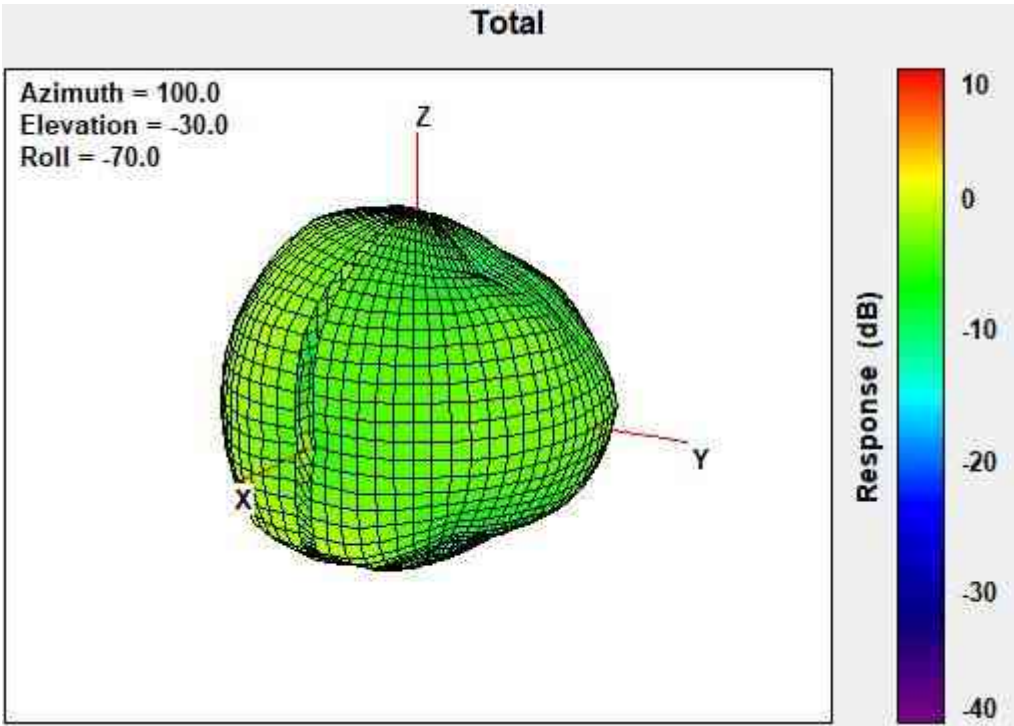
Center Frequency	1447.9MHz
Horizontal (dBi) peak	-1.27
Vertical (dBi) peak	-1.90

1455.4MHz



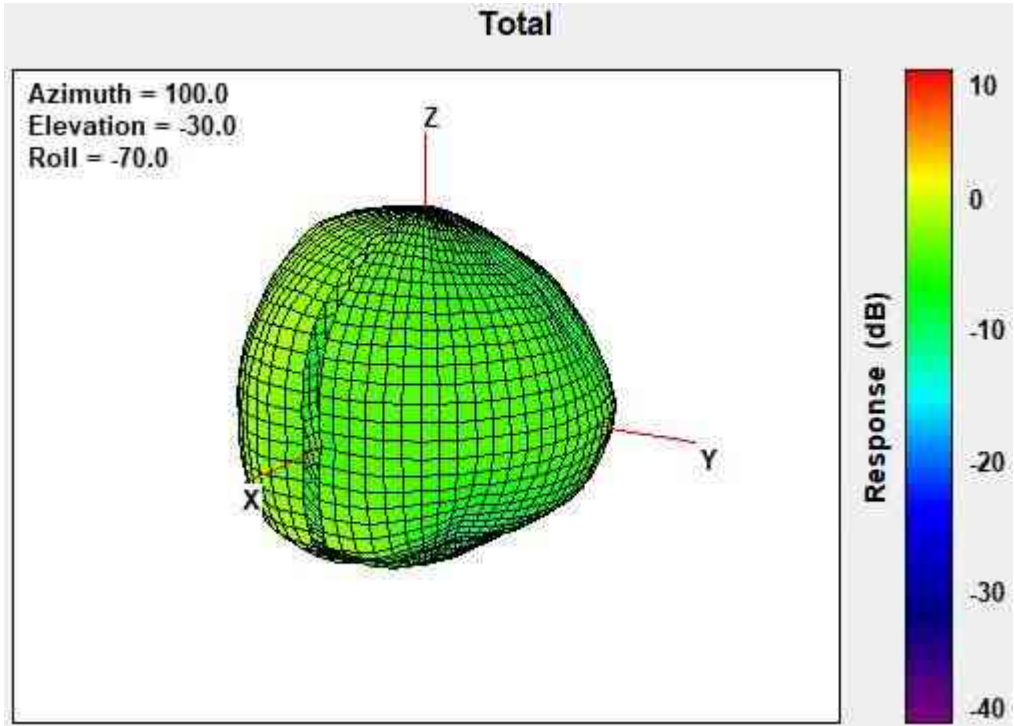
Center Frequency	1455.4MHz
Horizontal (dBi) peak	-1.34
Vertical (dBi) peak	-1.91

1462.9MHz



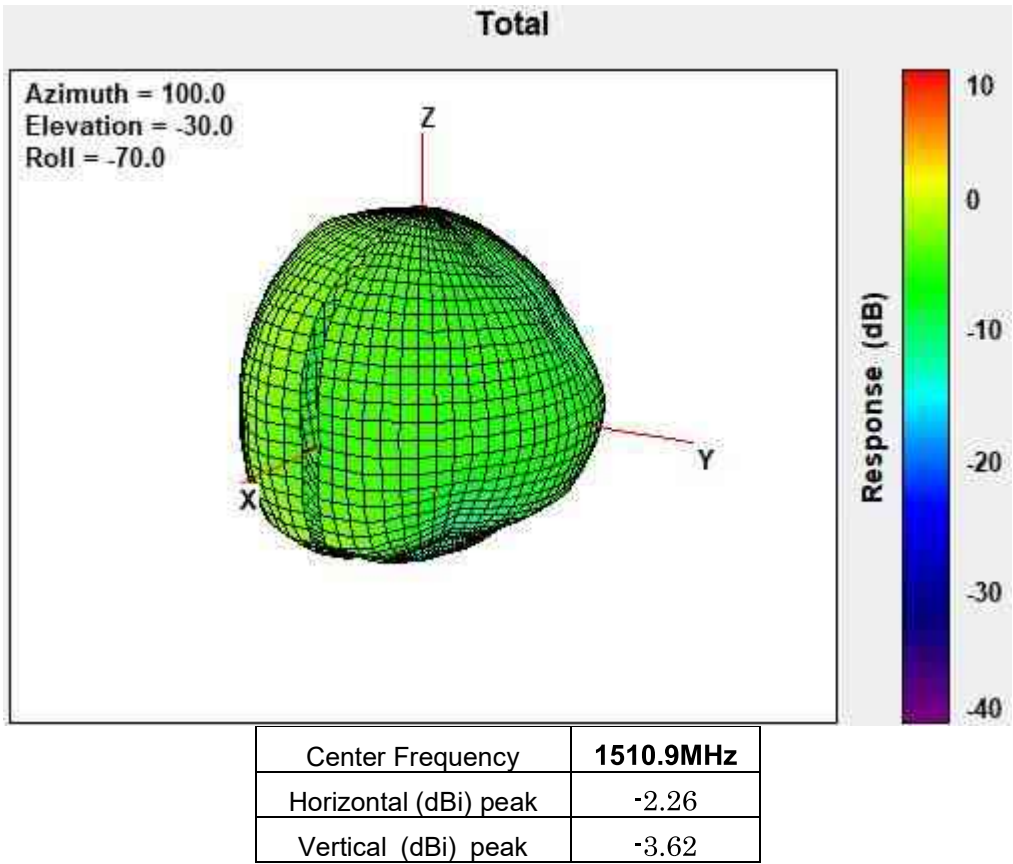
Center Frequency	1462.9MHz
Horizontal (dBi) peak	-1.29
Vertical (dBi) peak	-1.95

1496MHz

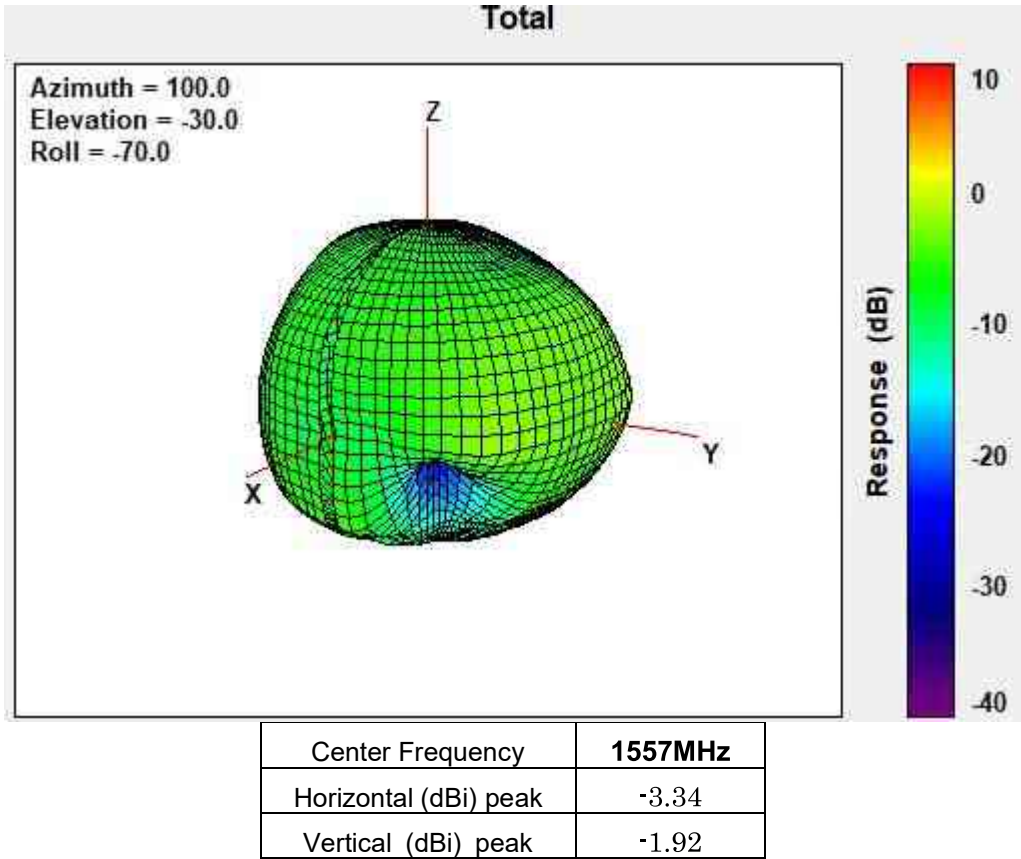


Center Frequency	1496MHz
Horizontal (dBi) peak	-1.44
Vertical (dBi) peak	-3.18

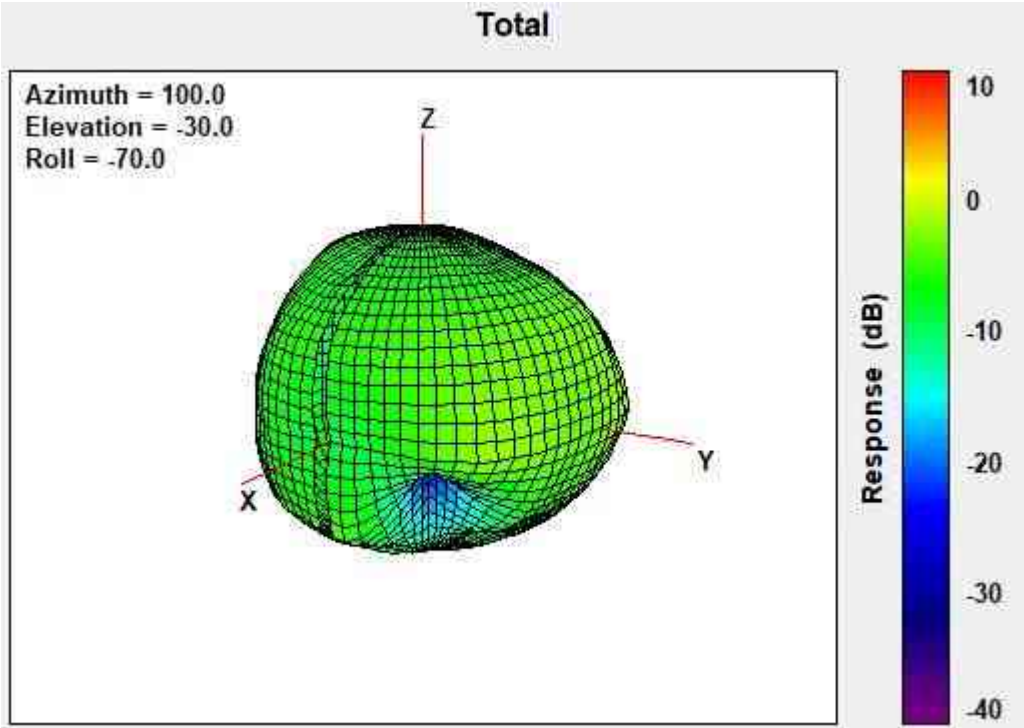
1510.9MHz



1557MHz

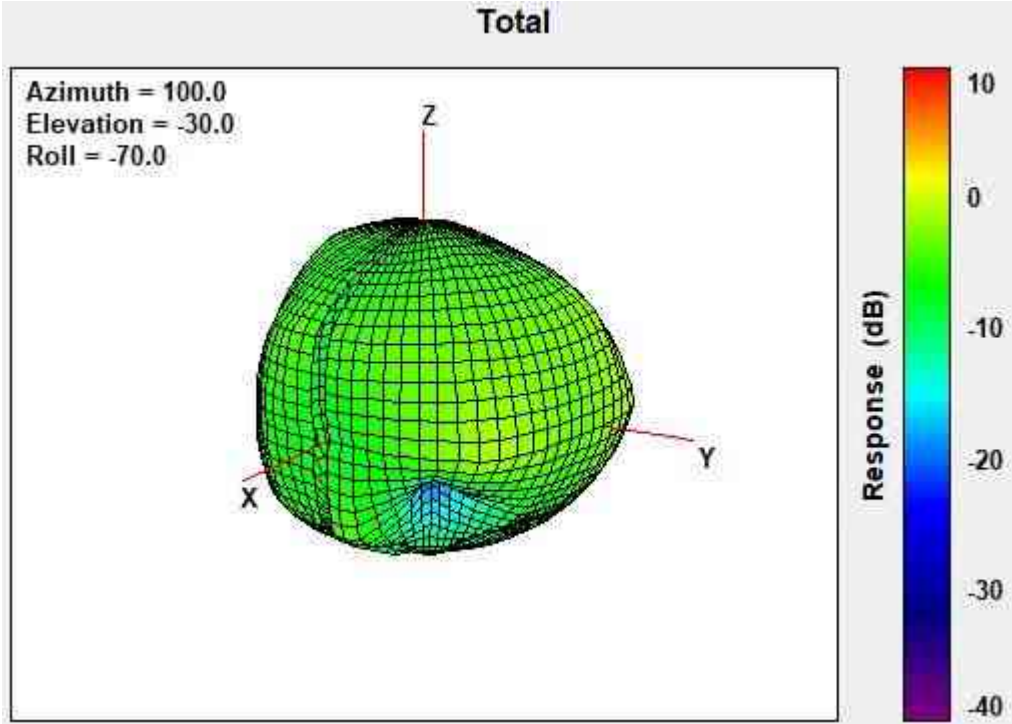


1575MHz



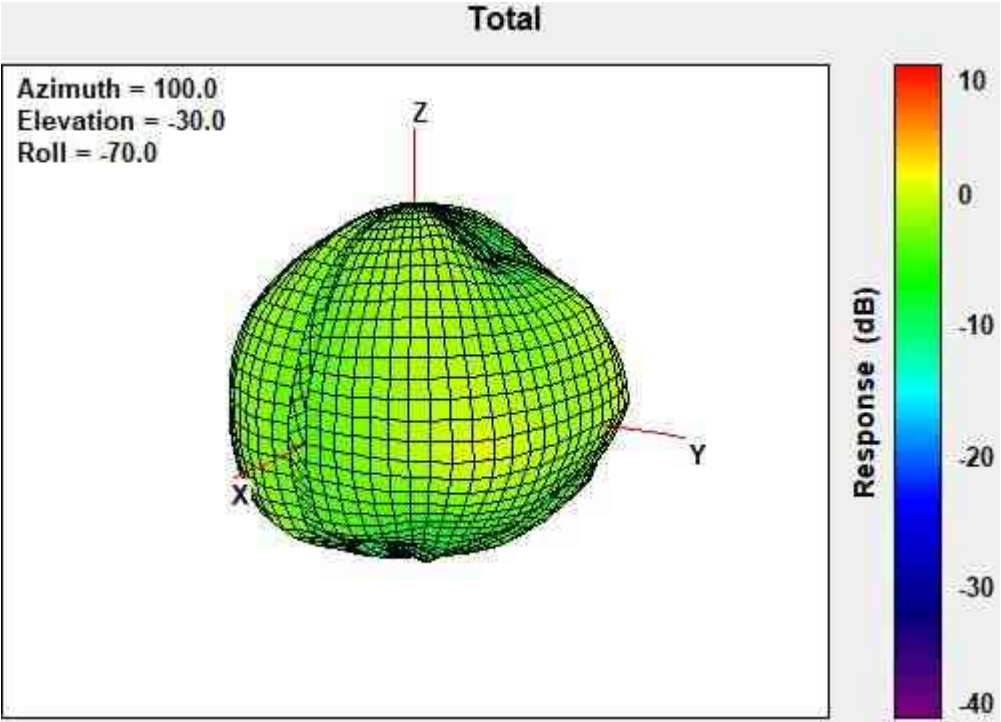
Center Frequency	1575MHz
Horizontal (dBi) peak	-3.13
Vertical (dBi) peak	-1.88

1610MHz



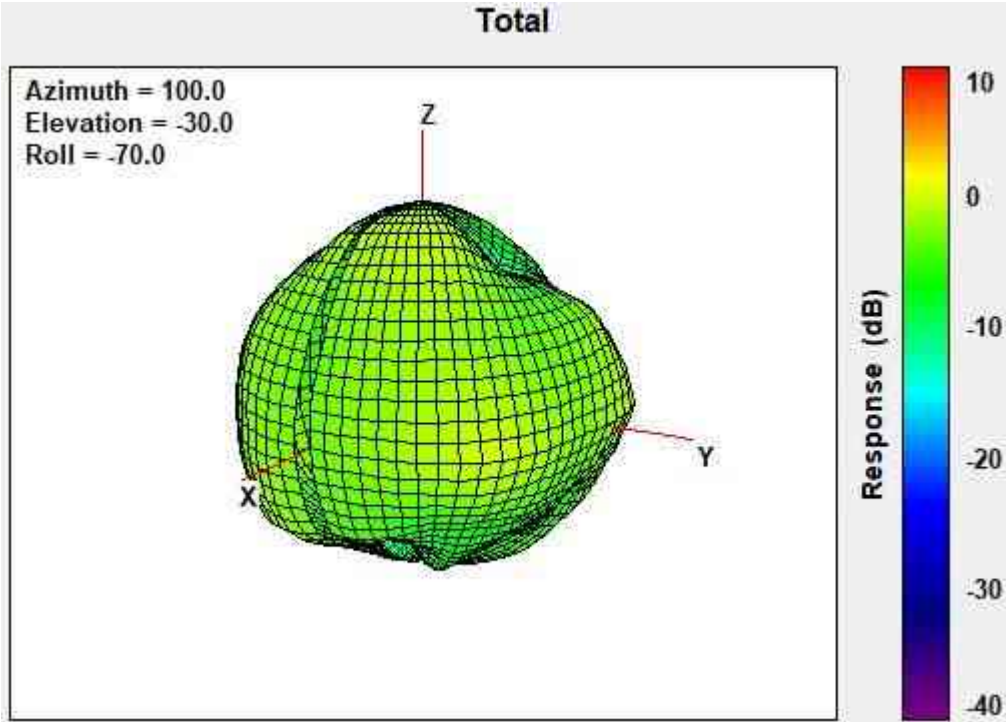
Center Frequency	1610MHz
Horizontal (dBi) peak	-2.69
Vertical (dBi) peak	-1.09

1805 MHz



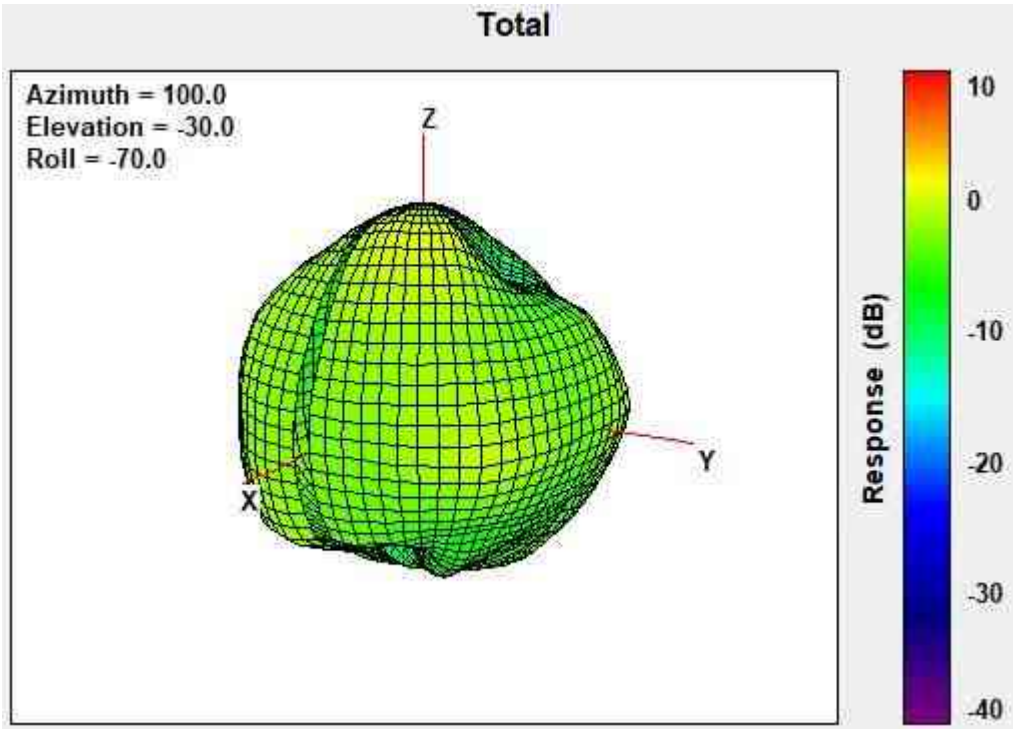
Center Frequency	1805 MHz
Horizontal (dBi) peak	-1.30
Vertical (dBi) peak	0.98

1850 MHz



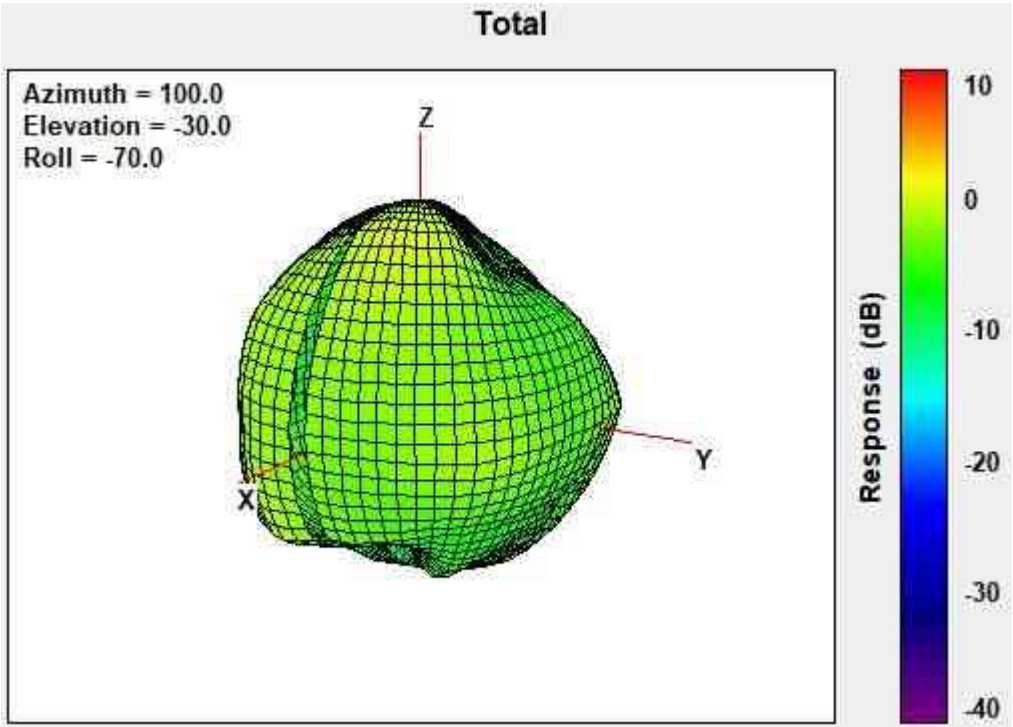
Center Frequency	1850 MHz
Horizontal (dBi) peak	-1.12
Vertical (dBi) peak	0.25

1880 MHz



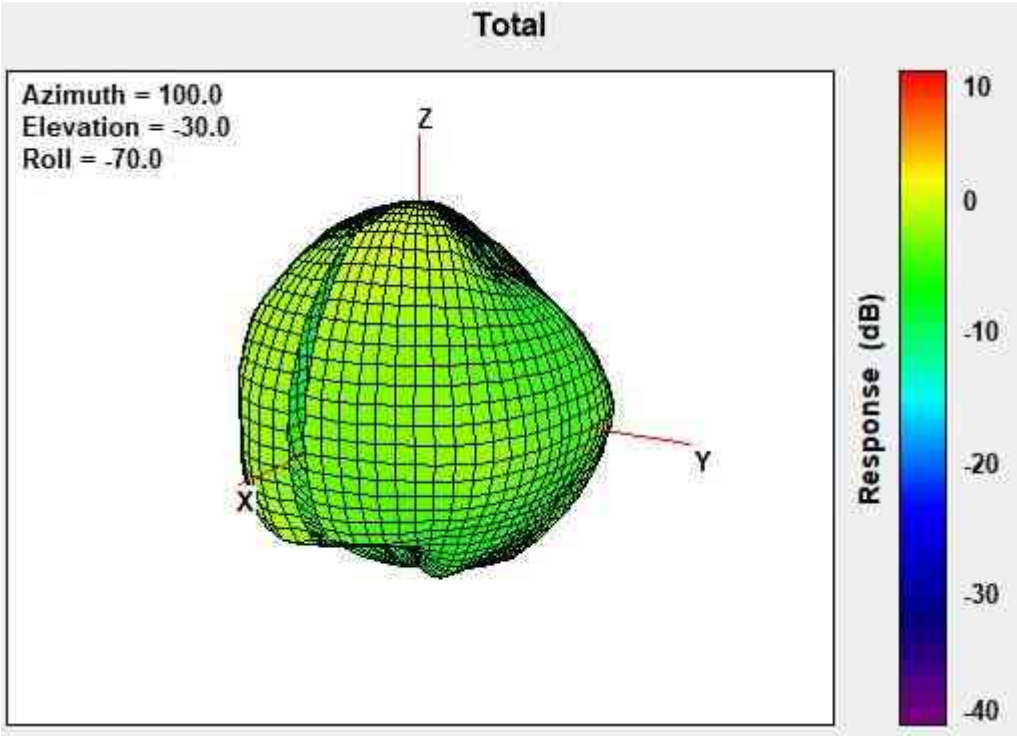
Center Frequency	1880 MHz
Horizontal (dBi) peak	-0.01
Vertical (dBi) peak	-0.79

1910MHz



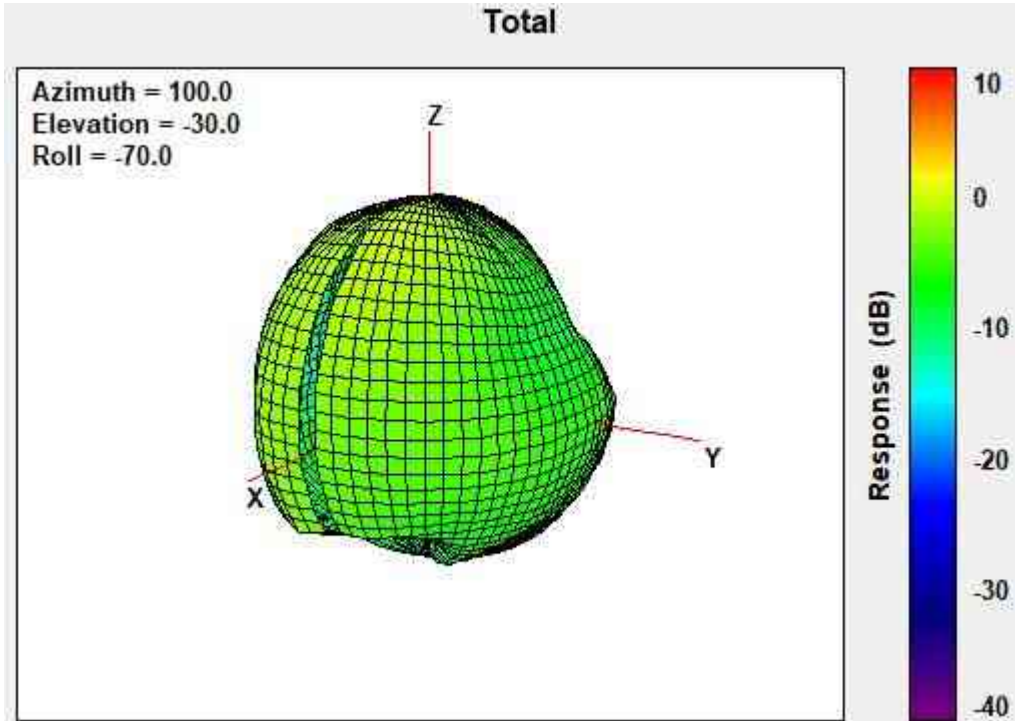
Center Frequency	1910MHz
Horizontal (dBi) peak	0.10
Vertical (dBi) peak	-2.58

1920MHz



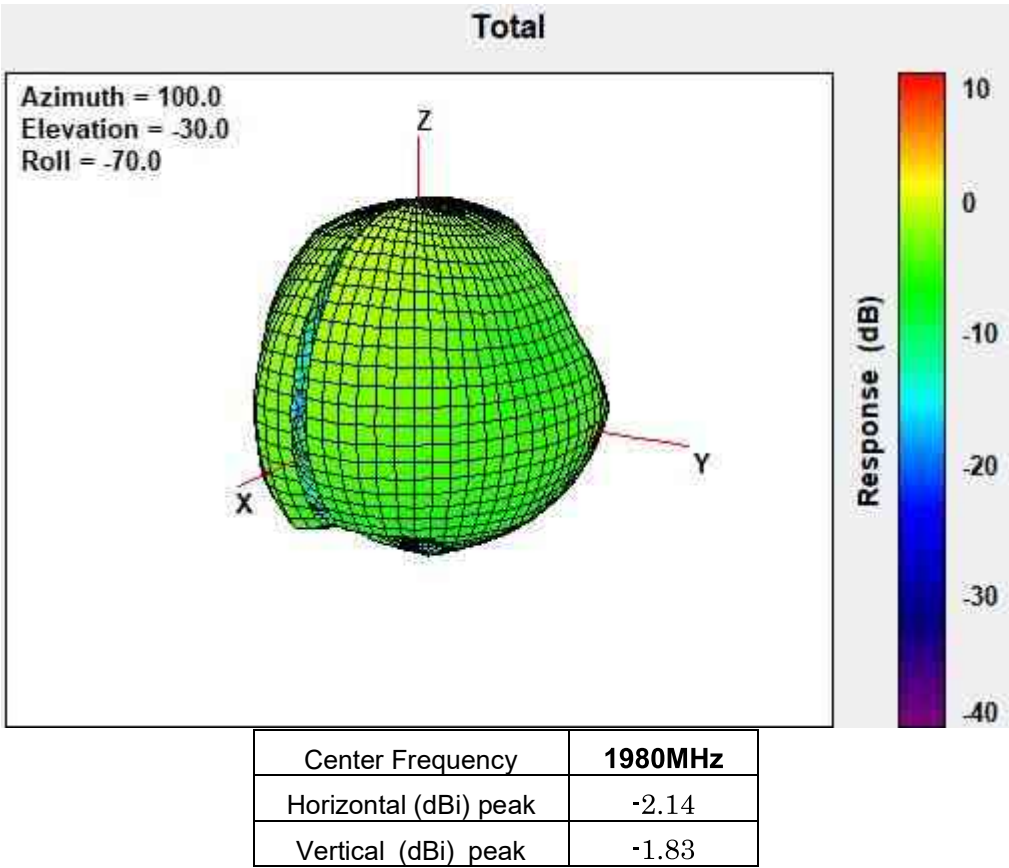
Center Frequency	1920MHz
Horizontal (dBi) peak	-0.14
Vertical (dBi) peak	-2.97

1950MHz

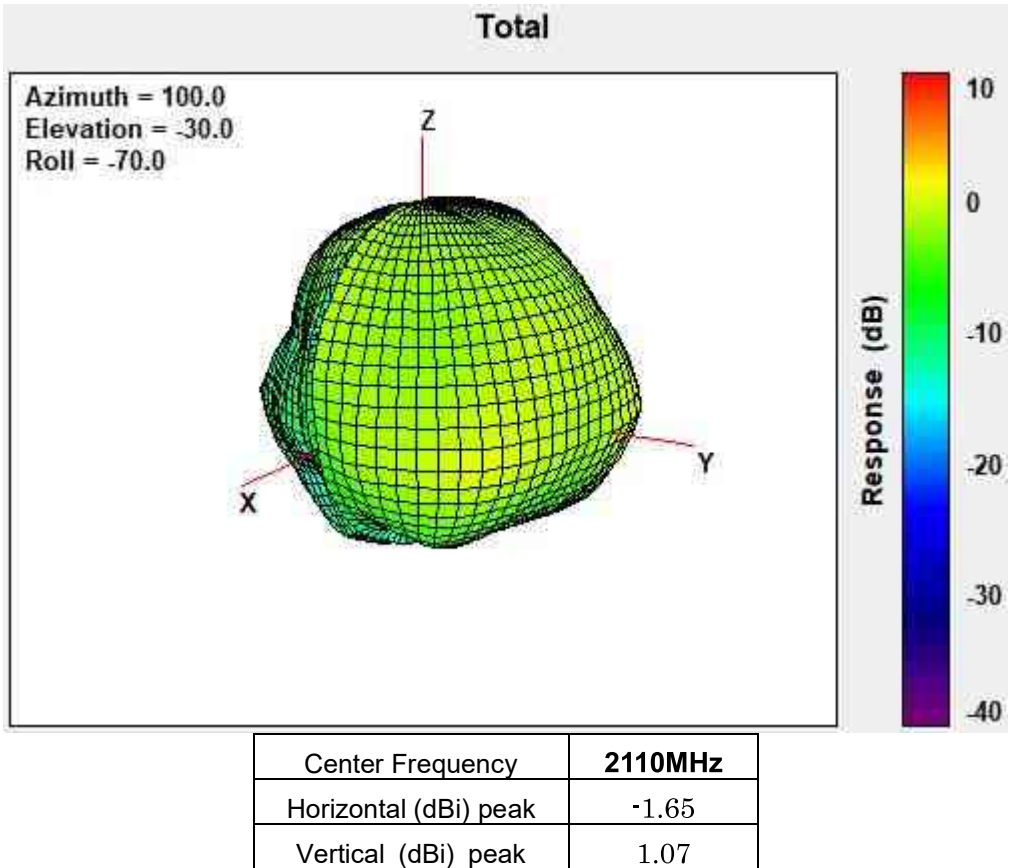


Center Frequency	1950MHz
Horizontal (dBi) peak	-1.02
Vertical (dBi) peak	-3.44

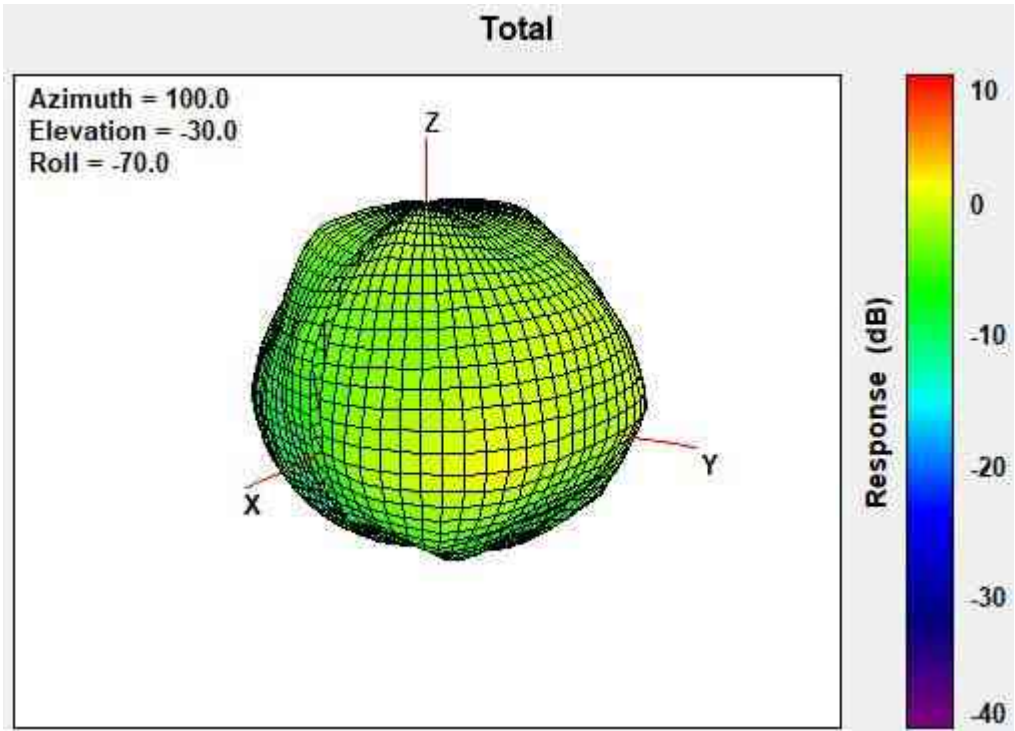
1980MHz



2110MHz

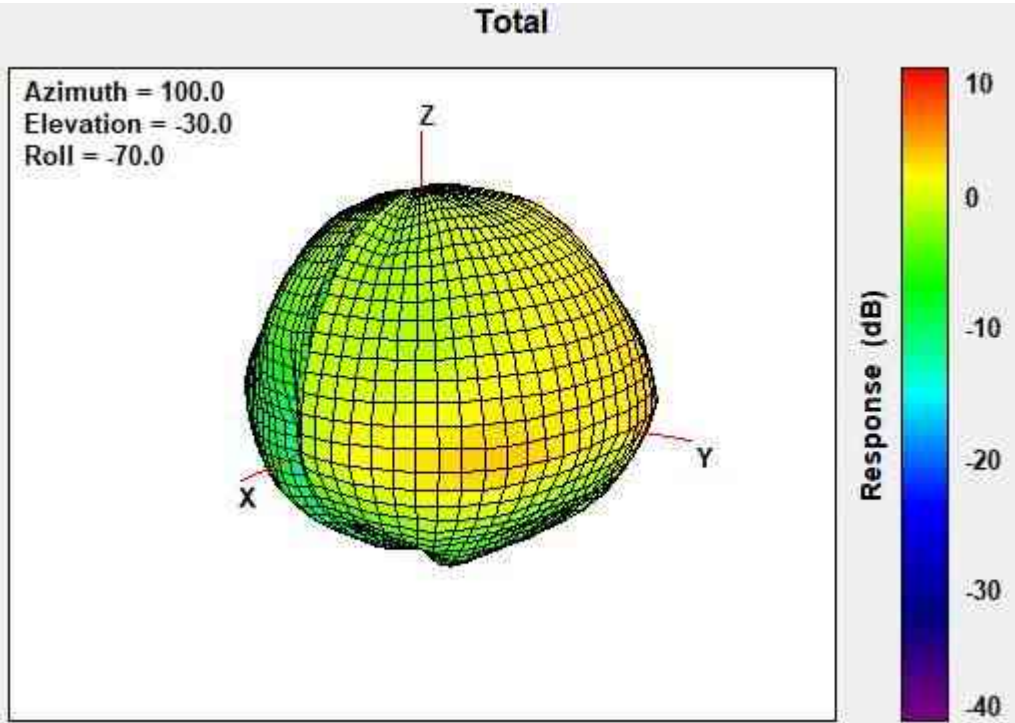


2200MHz



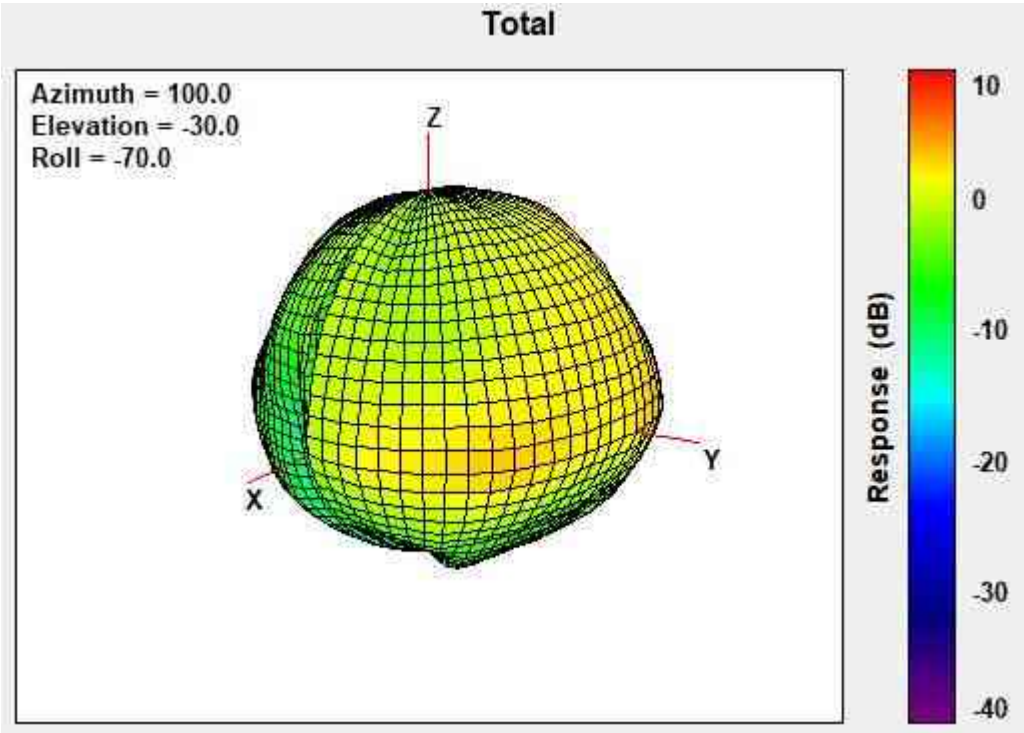
Center Frequency	2200MHz
Horizontal (dBi) peak	-0.48
Vertical (dBi) peak	1.99

2300MHz



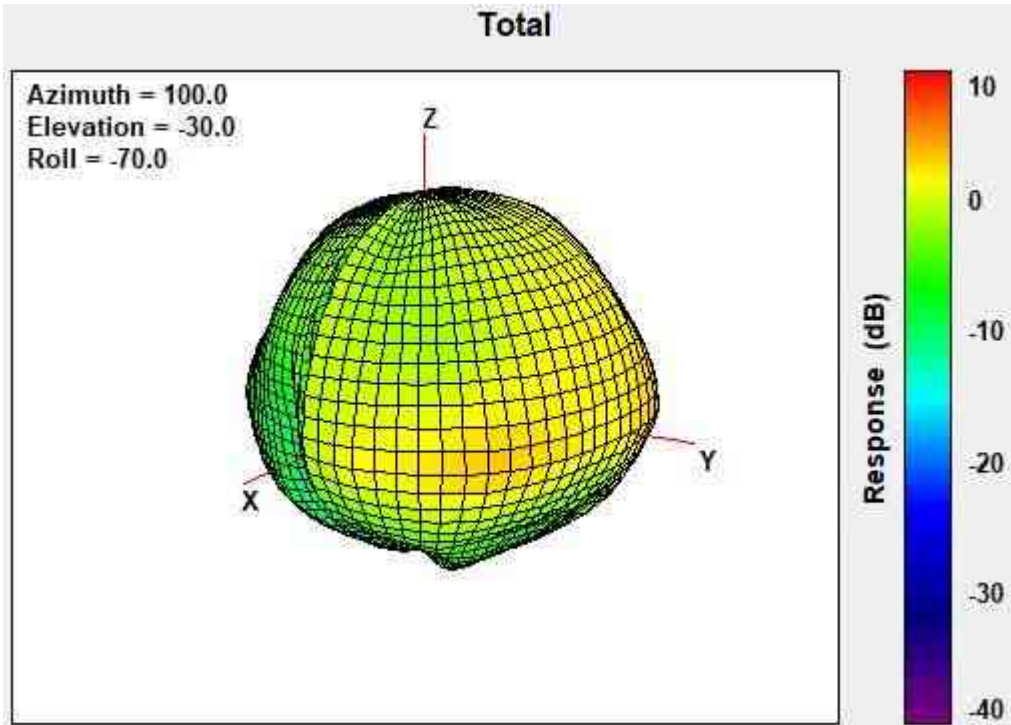
Center Frequency	2300MHz
Horizontal (dBi) peak	1.52
Vertical (dBi) peak	1.96

2305MHz



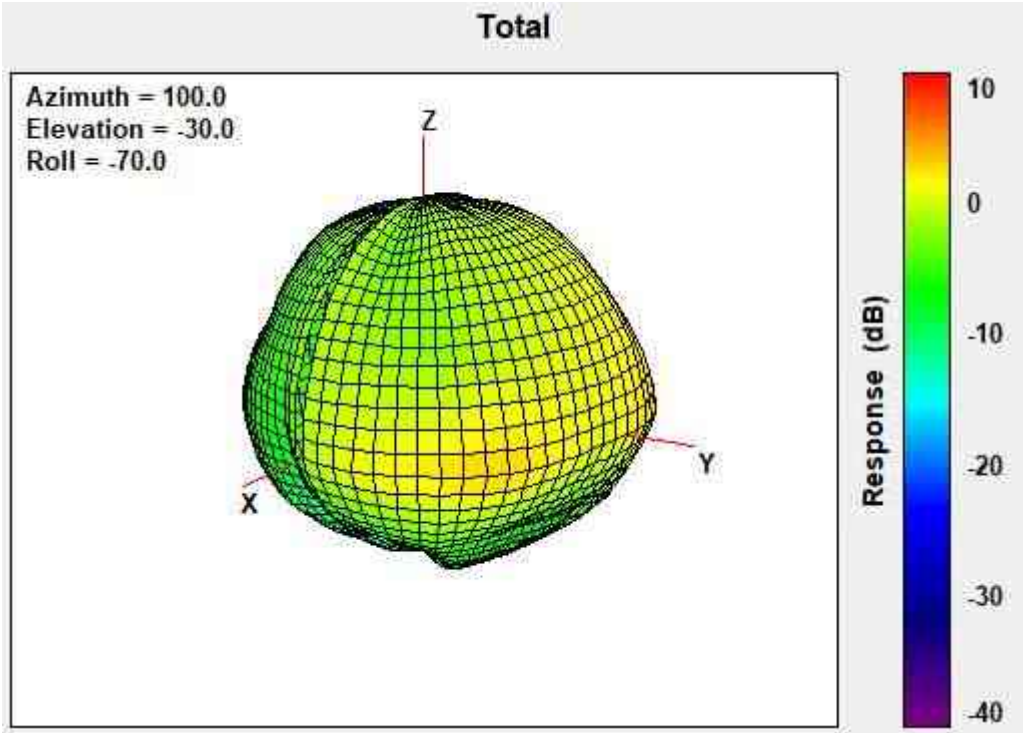
Center Frequency	2305MHz
Horizontal (dBi) peak	0.42
Vertical (dBi) peak	0.99

2315MHz



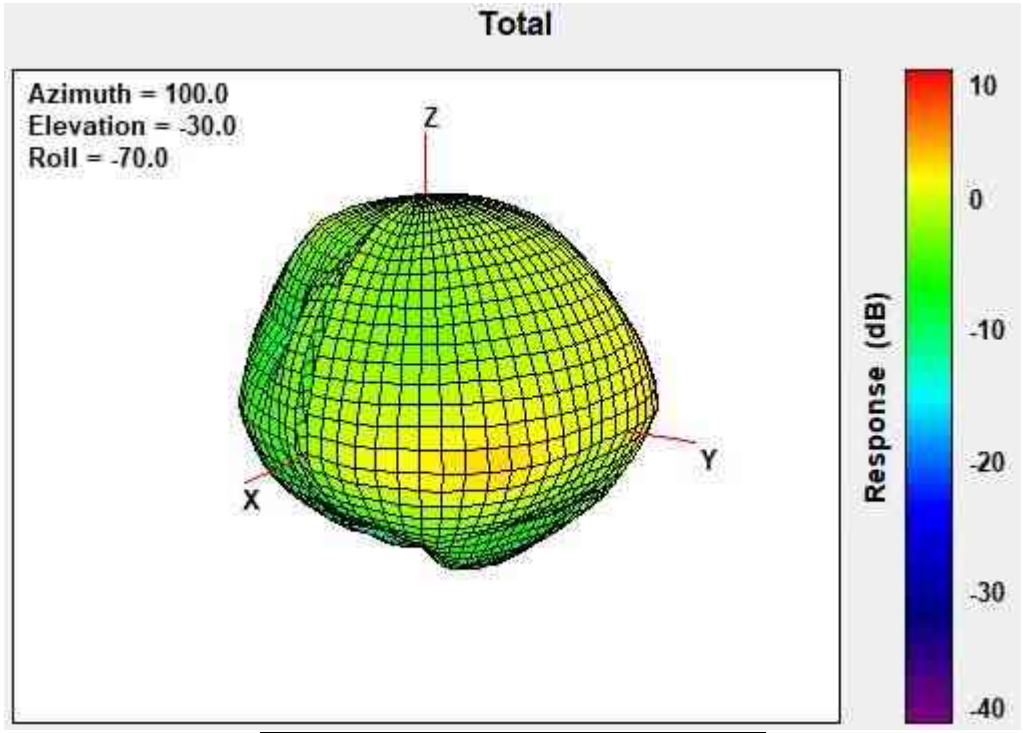
Center Frequency	2315MHz
Horizontal (dBi) peak	0.29
Vertical (dBi) peak	0.08

2350MHz



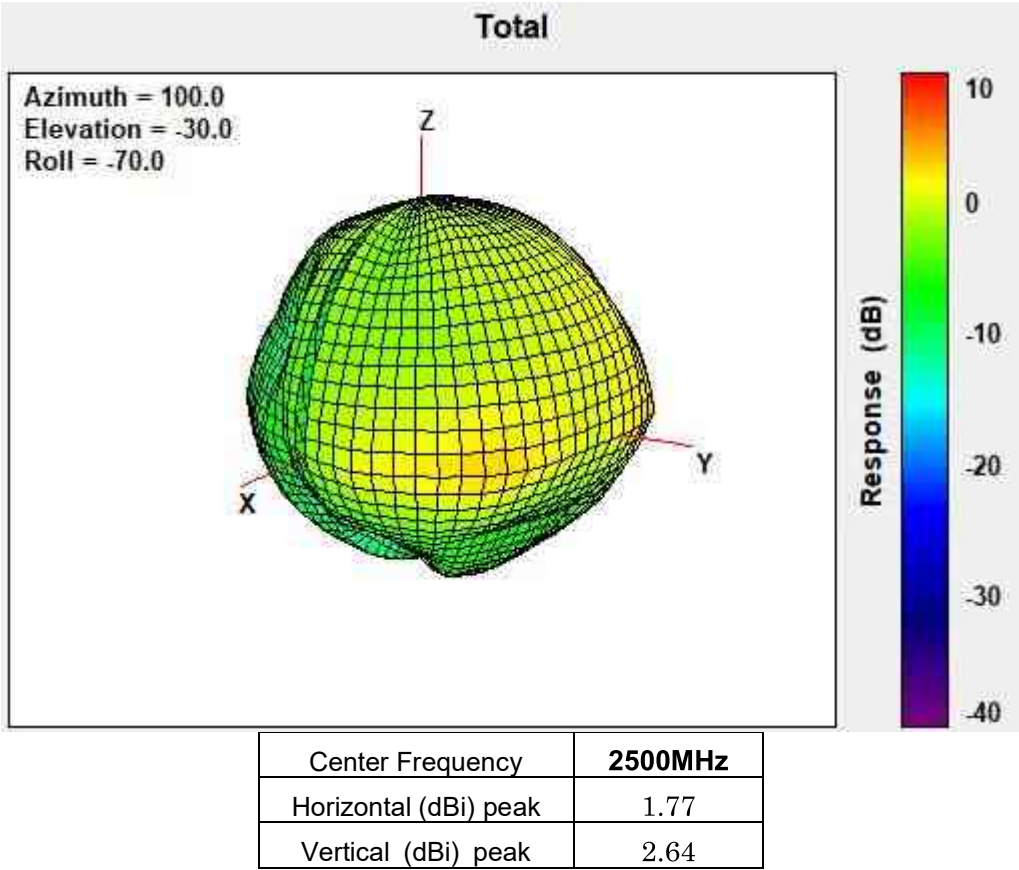
Center Frequency	2350MHz
Horizontal (dBi) peak	0.76
Vertical (dBi) peak	0.82

2400MHz

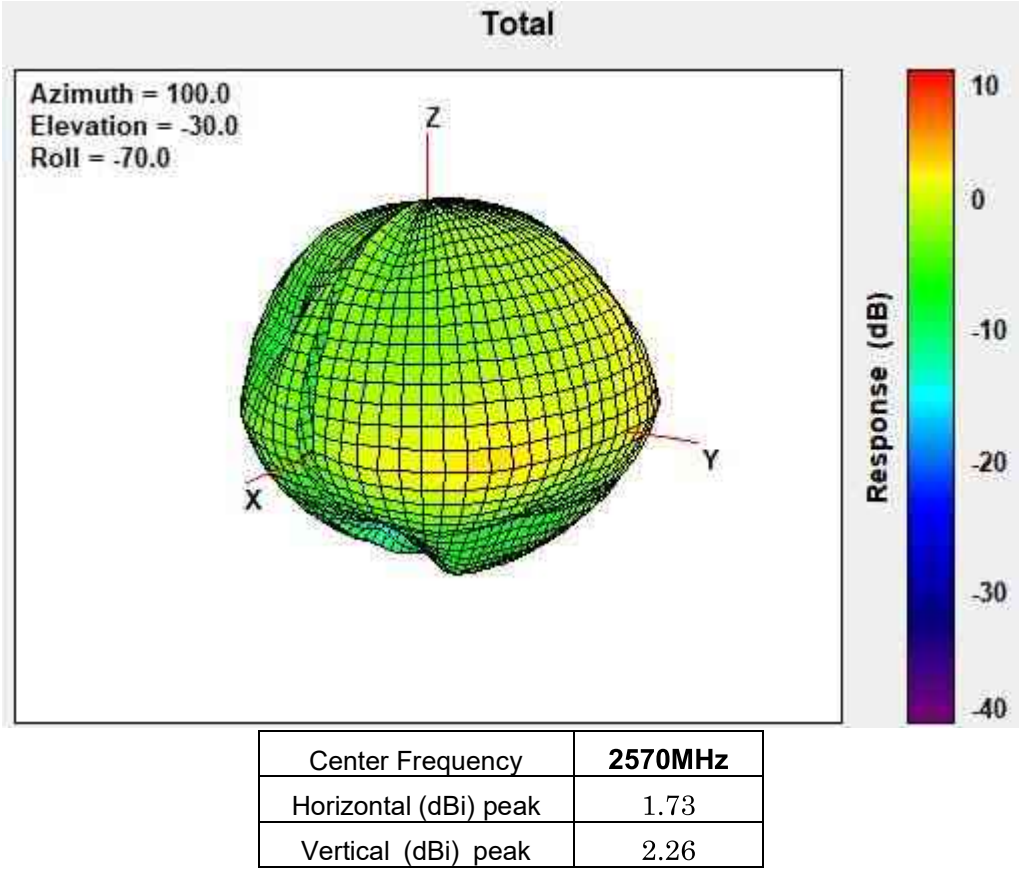


Center Frequency	2400MHz
Horizontal (dBi) peak	1.23
Vertical (dBi) peak	2.76

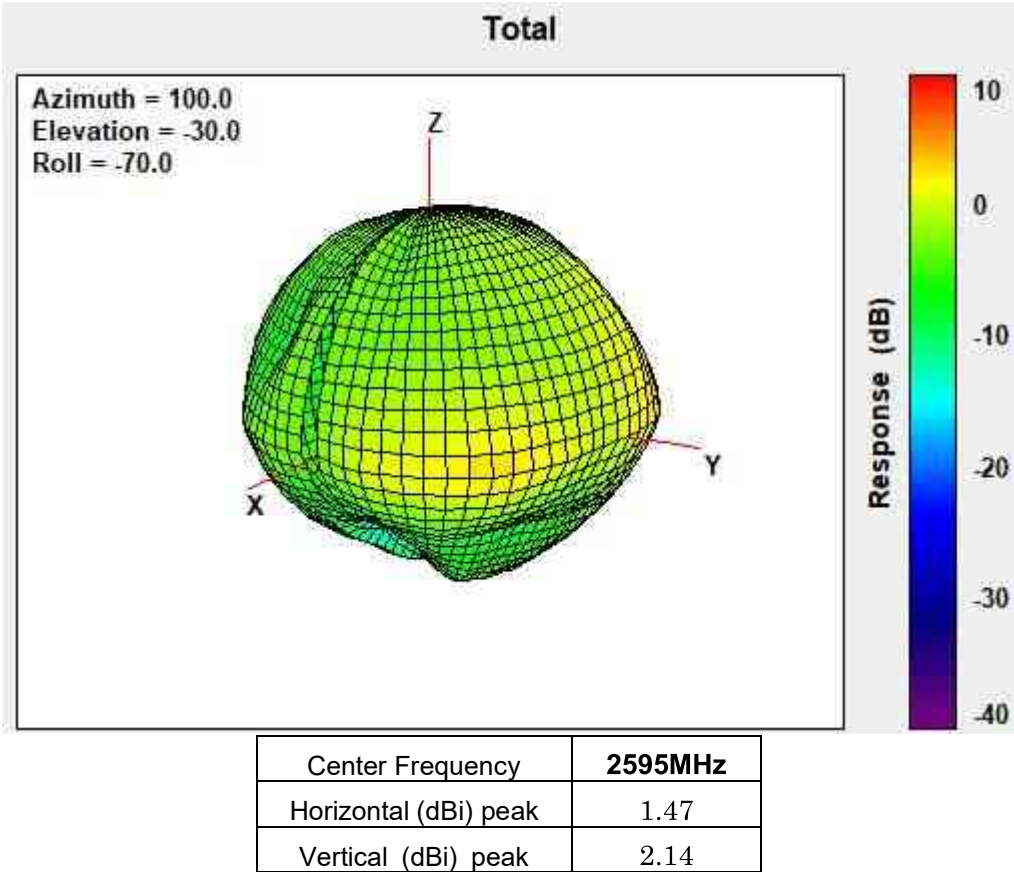
2500MHz



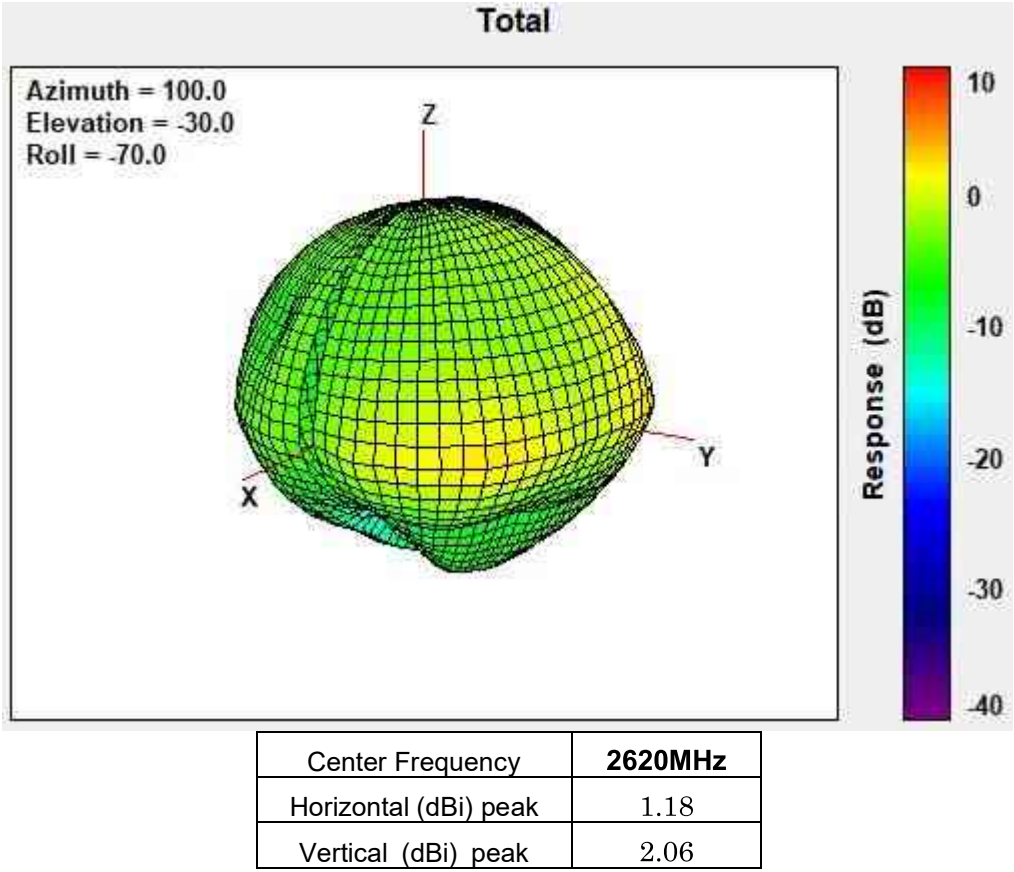
2570MHz



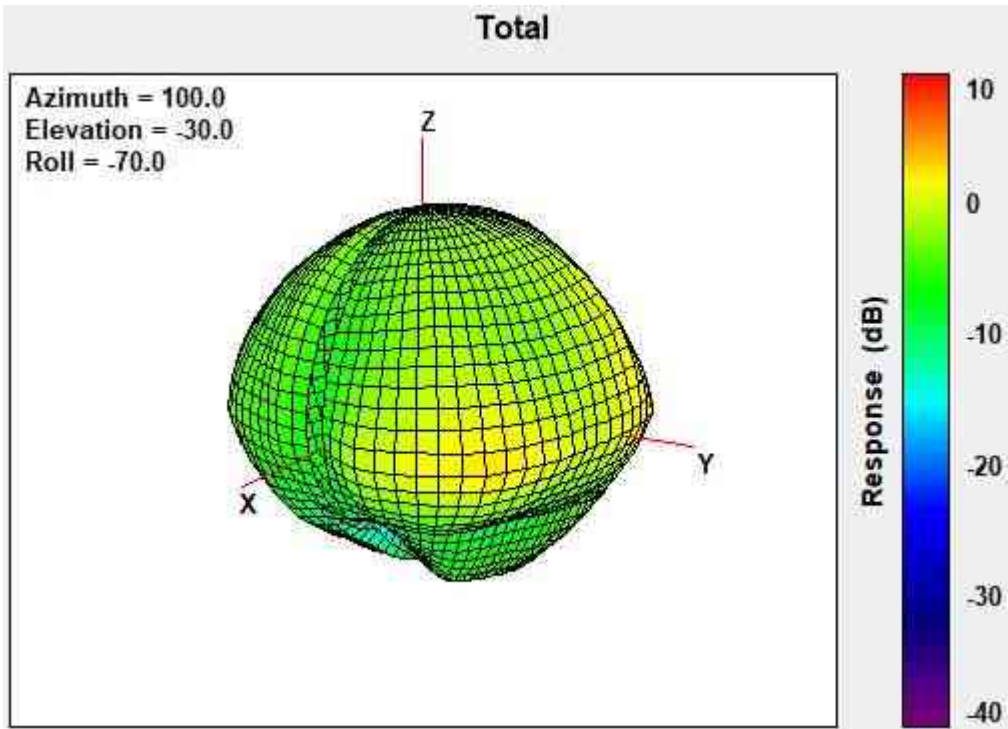
2595MHz



2620MHz

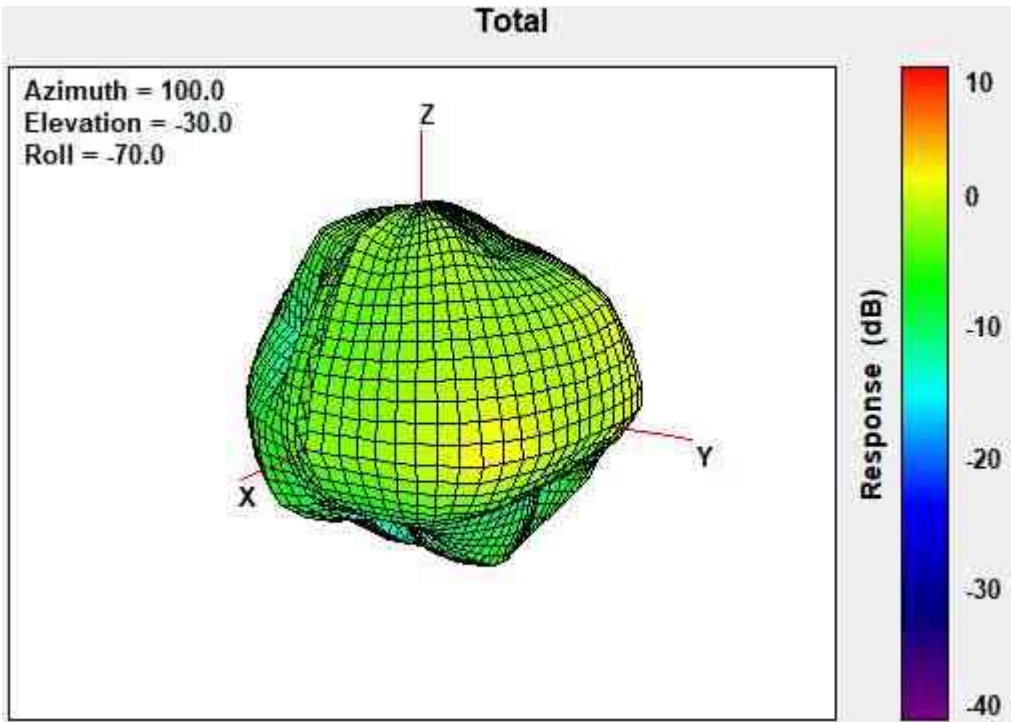


2690MHz



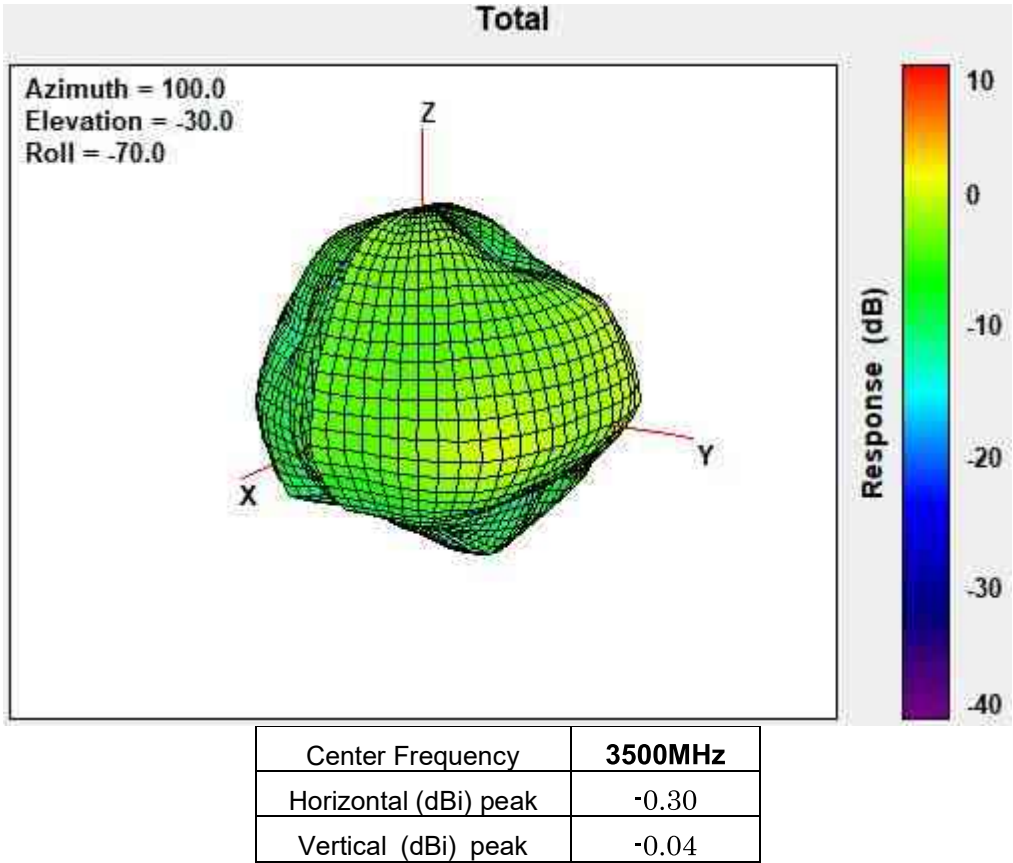
Center Frequency	2690MHz
Horizontal (dBi) peak	1.34
Vertical (dBi) peak	2.70

3400MHz

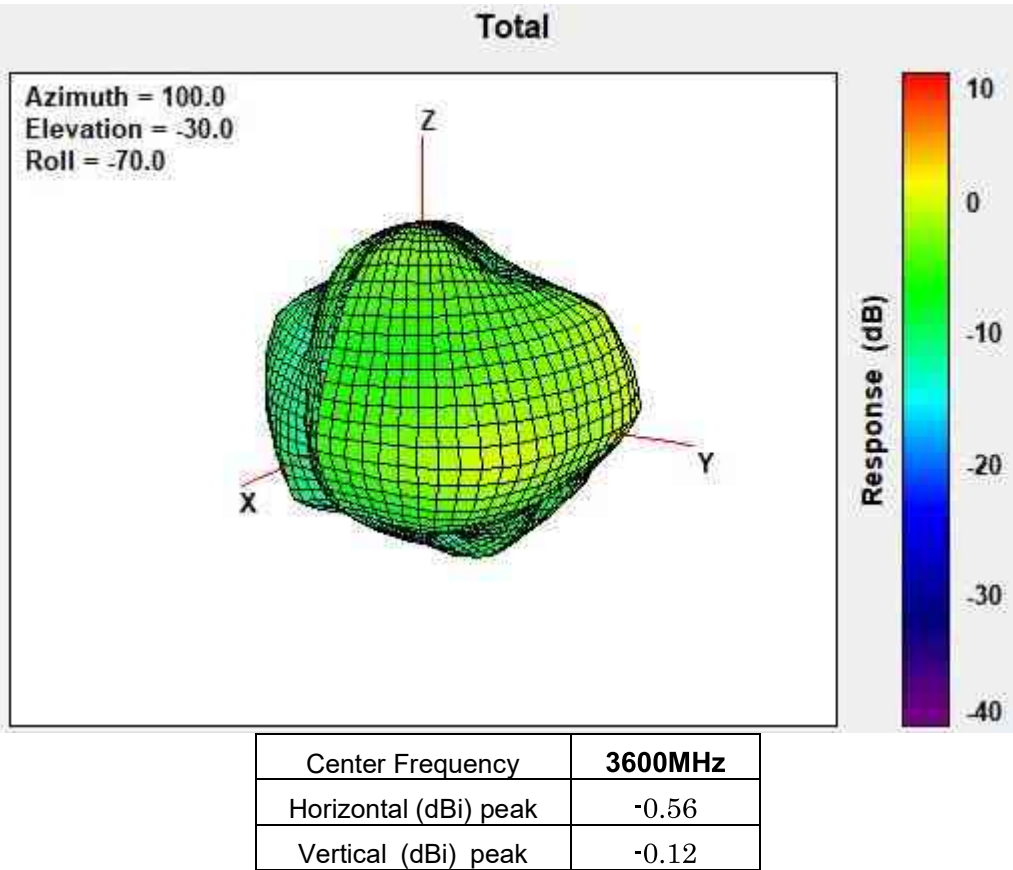


Center Frequency	3400MHz
Horizontal (dBi) peak	0.55
Vertical (dBi) peak	1.31

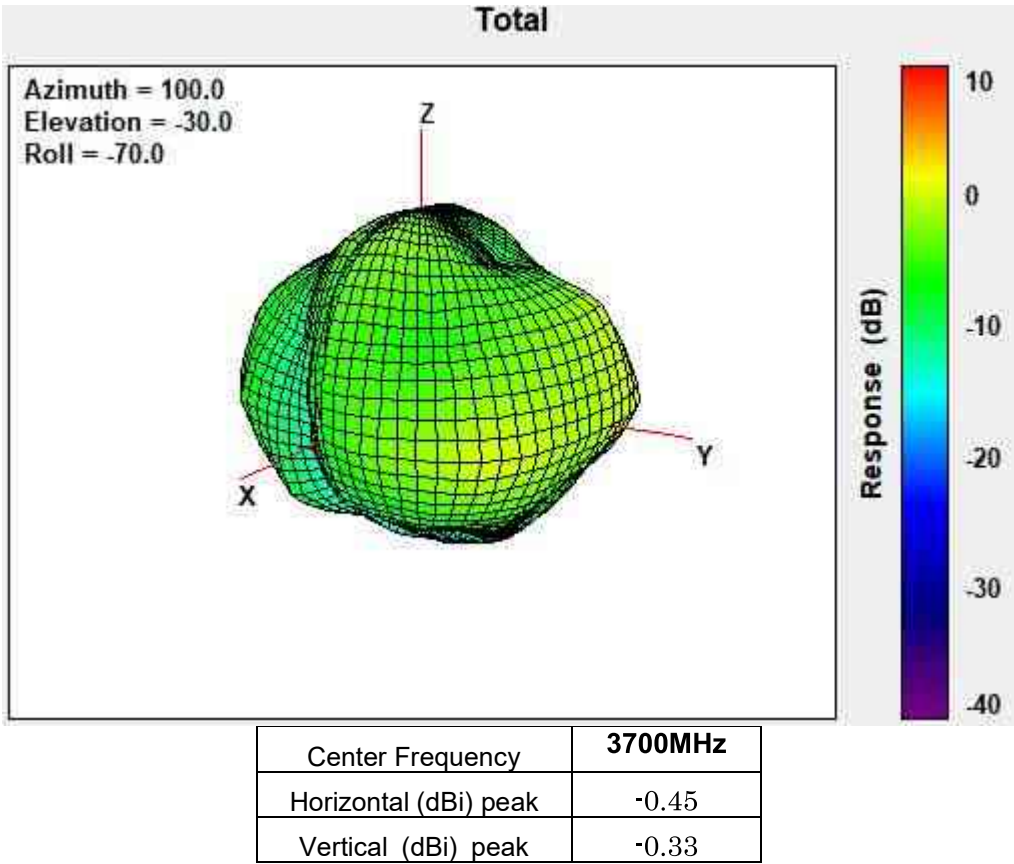
3500MHz



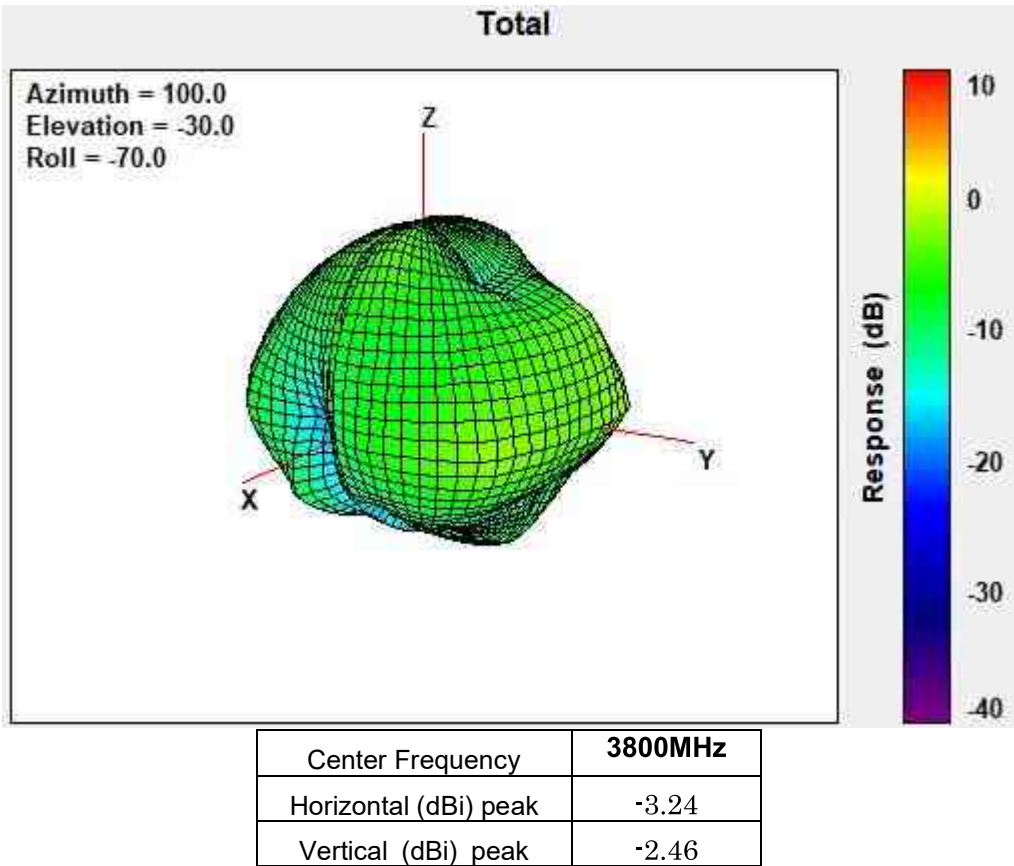
3600MHz



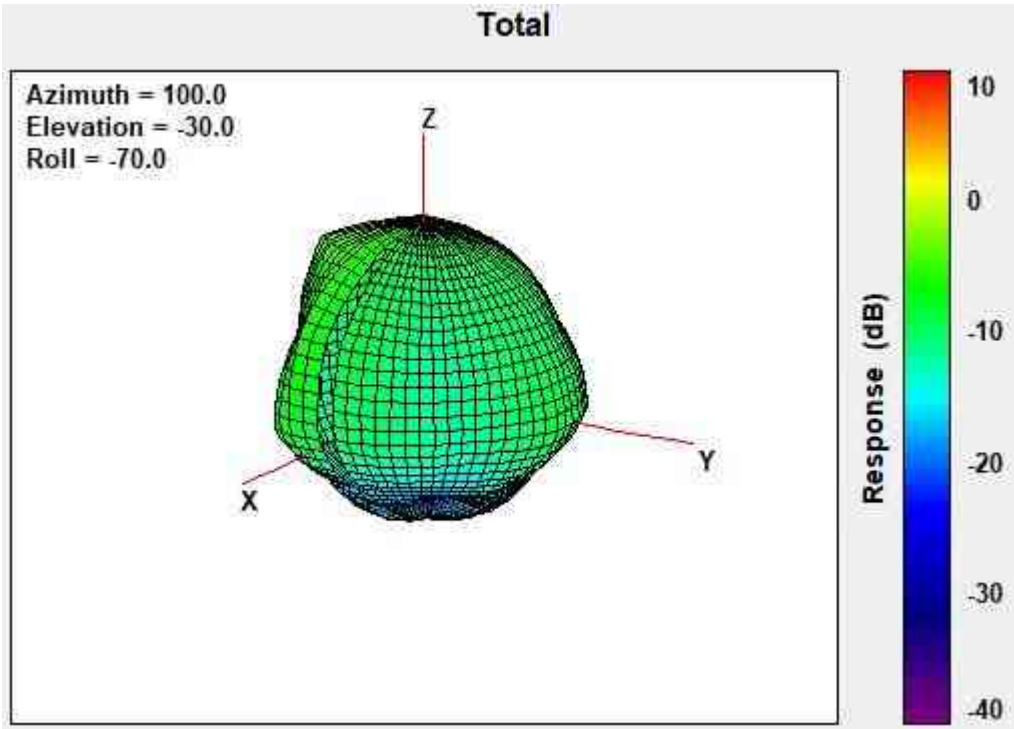
3700MHz



3800MHz

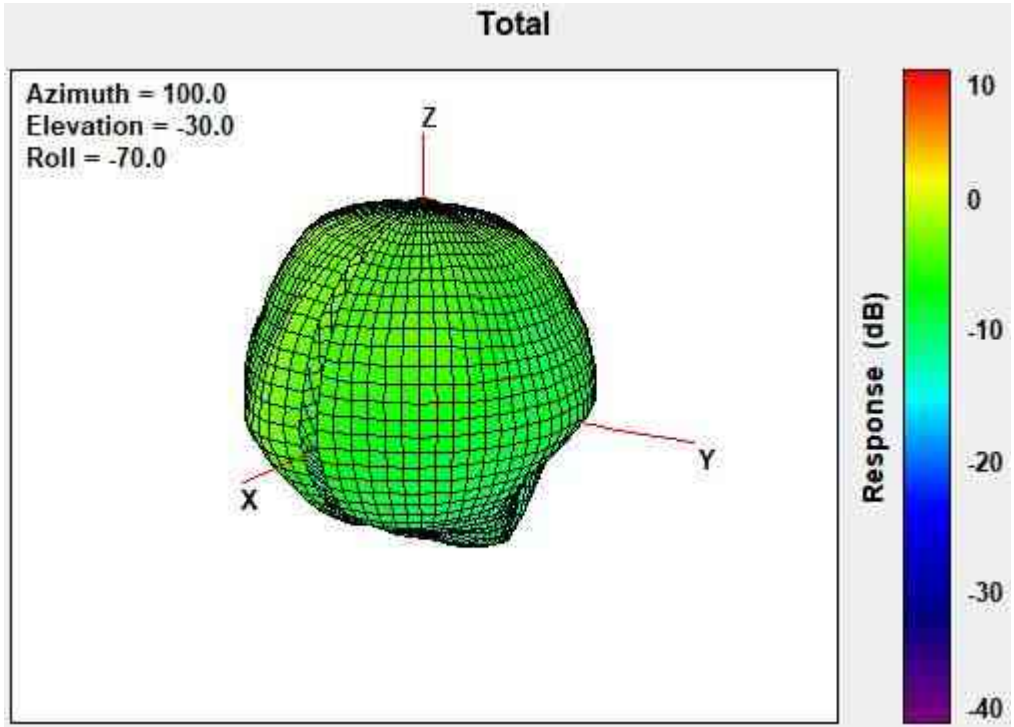


4200MHz



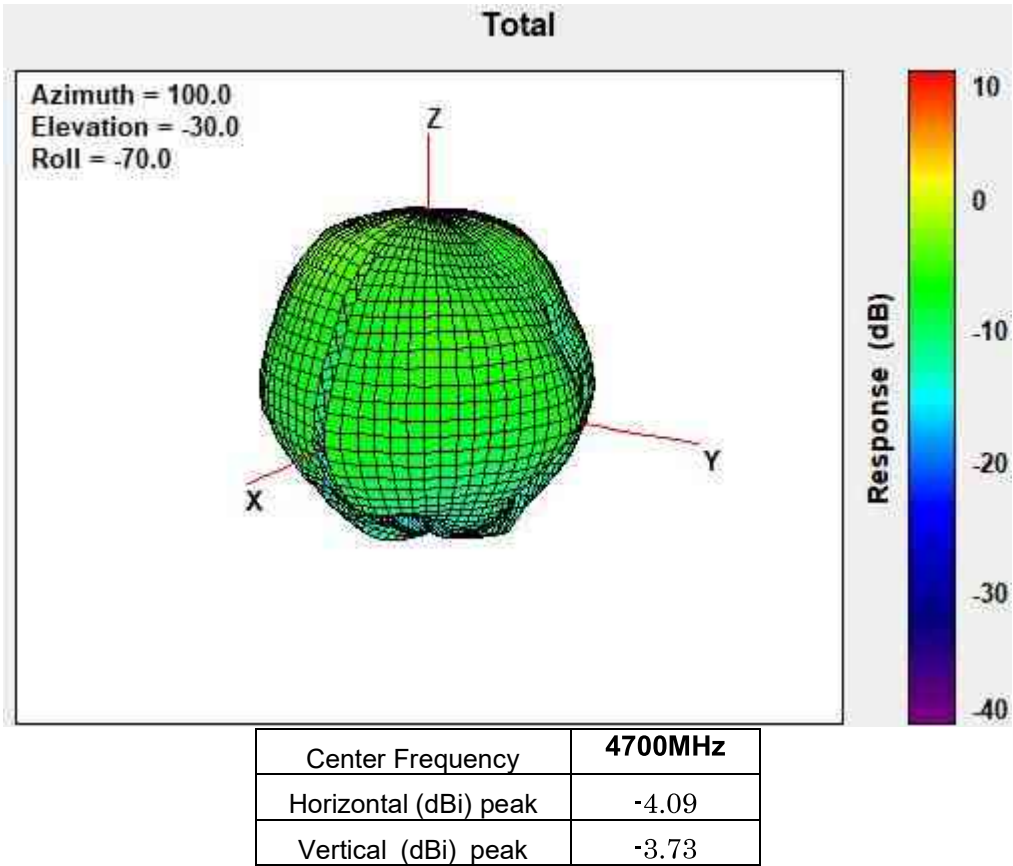
Center Frequency	4200MHz
Horizontal (dBi) peak	-5.07
Vertical (dBi) peak	-5.44

4400MHz

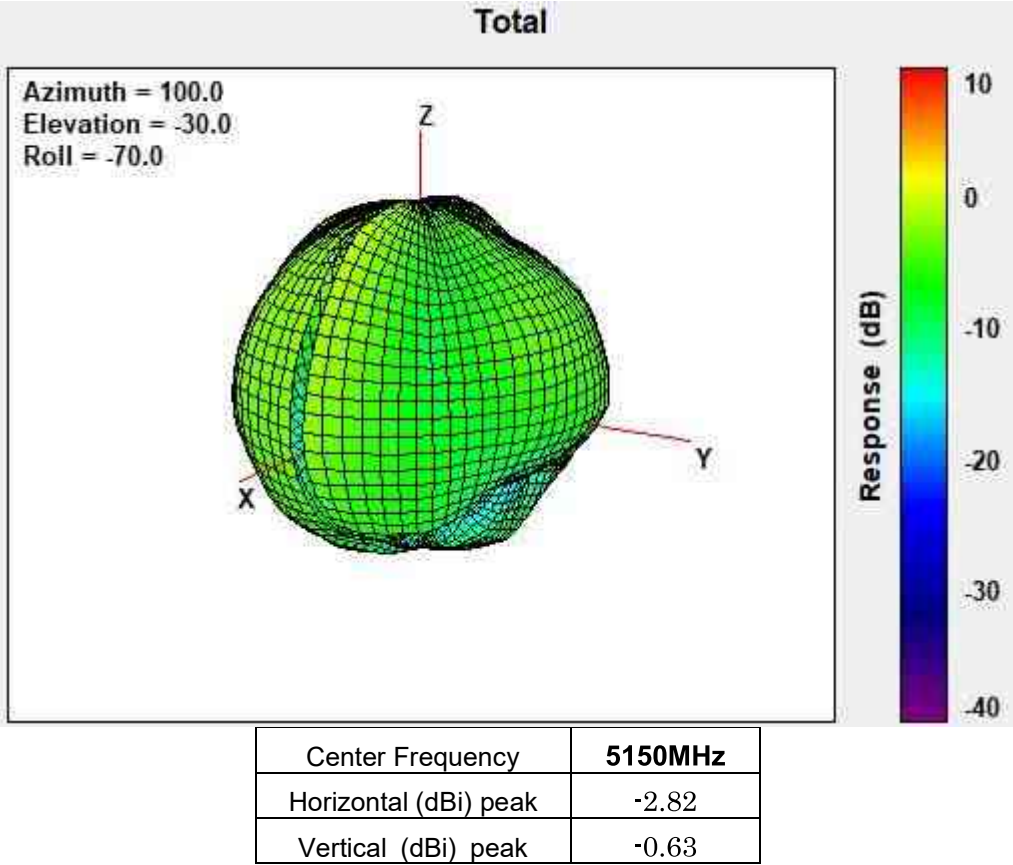


Center Frequency	4400MHz
Horizontal (dBi) peak	-1.36
Vertical (dBi) peak	-2.07

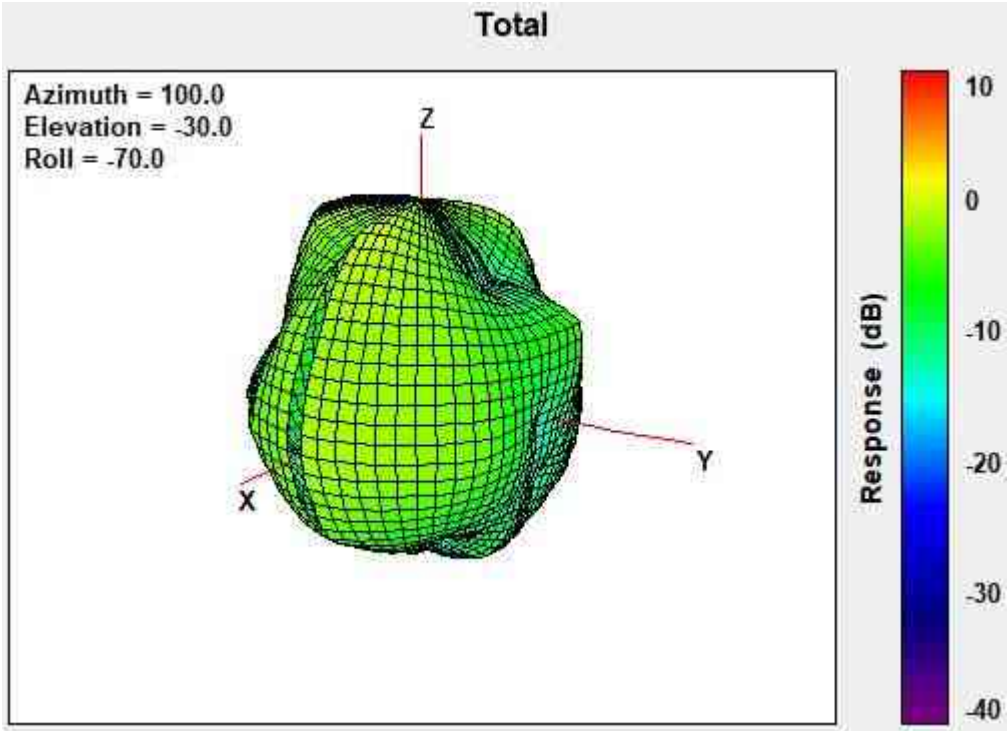
4700MHz



5150MHz

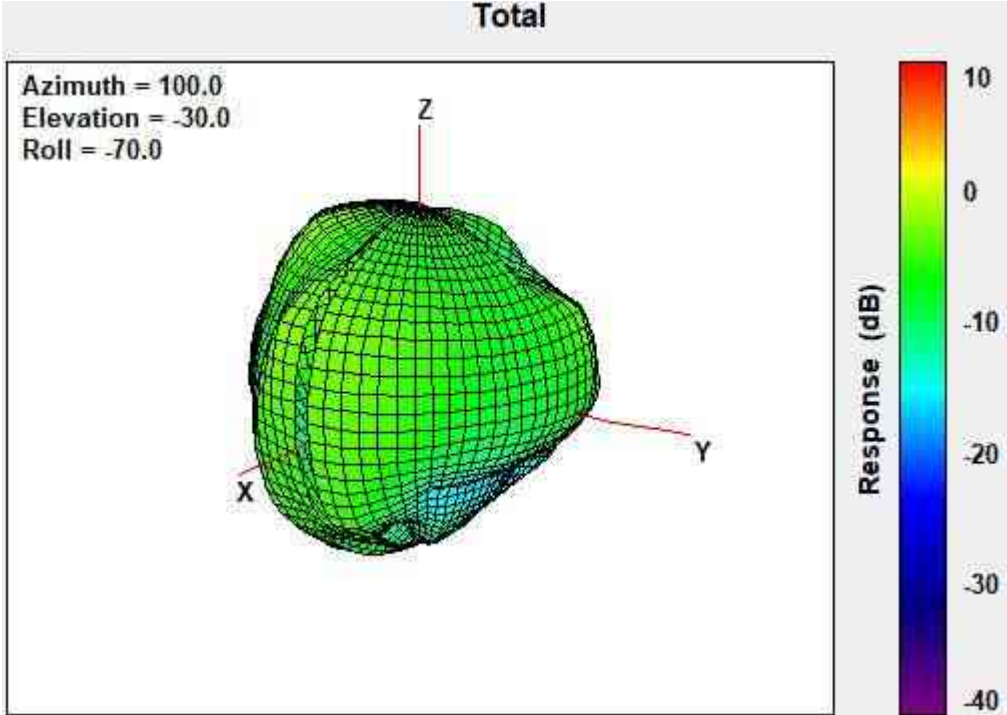


5537.5MHz



Center Frequency	5537.5MHz
Horizontal (dBi) peak	0.56
Vertical (dBi) peak	0.76

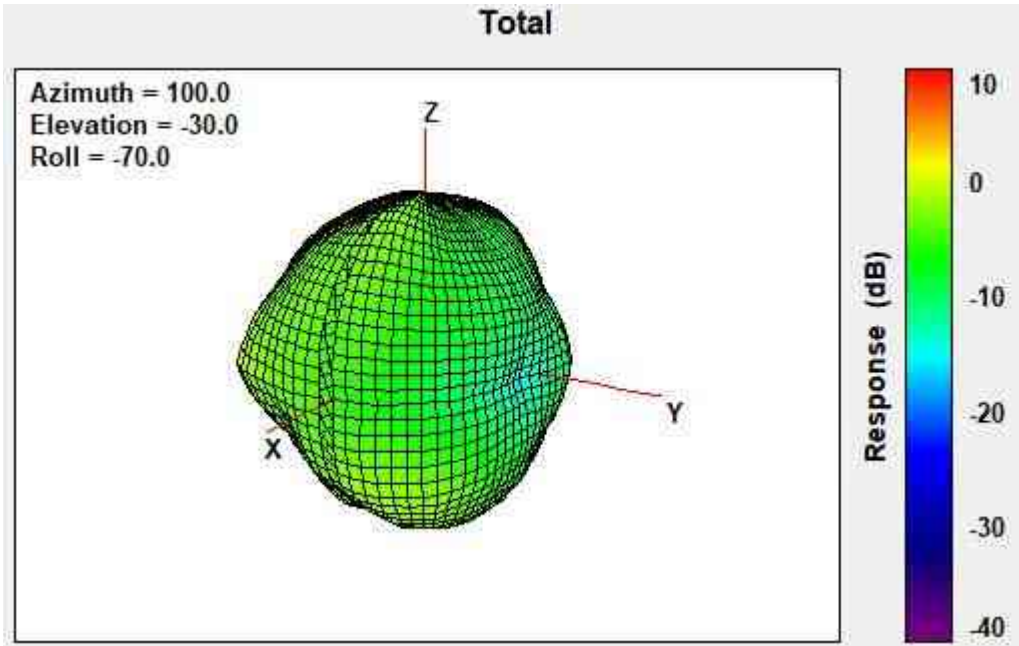
5925MHz



Center Frequency	5925MHz
Horizontal (dBi) peak	-2.77
Vertical (dBi) peak	-2.63

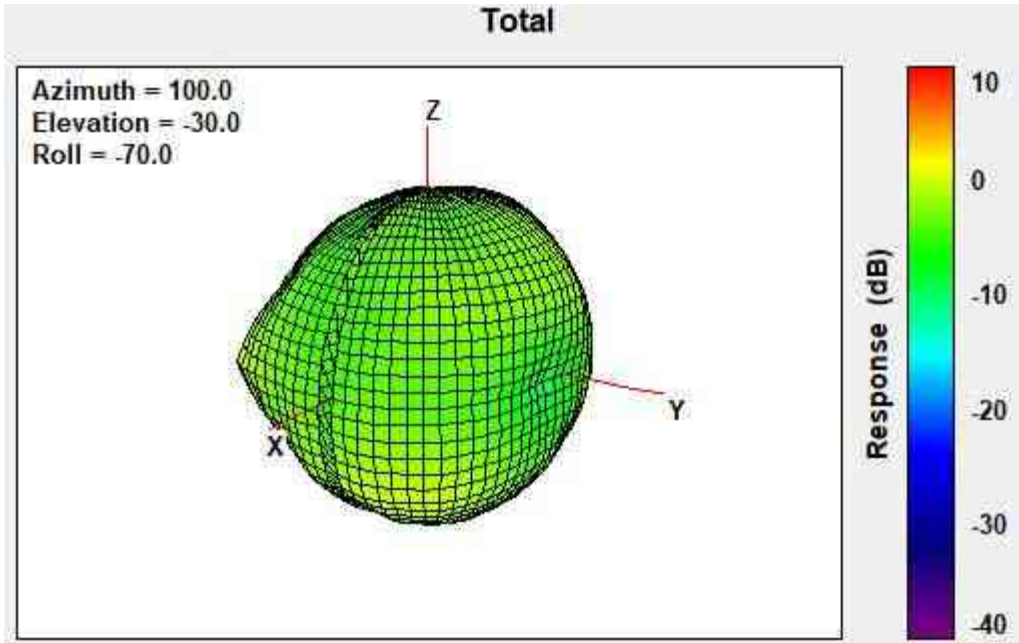
MIMO2 Antenna (DRx2)

1452 MHz



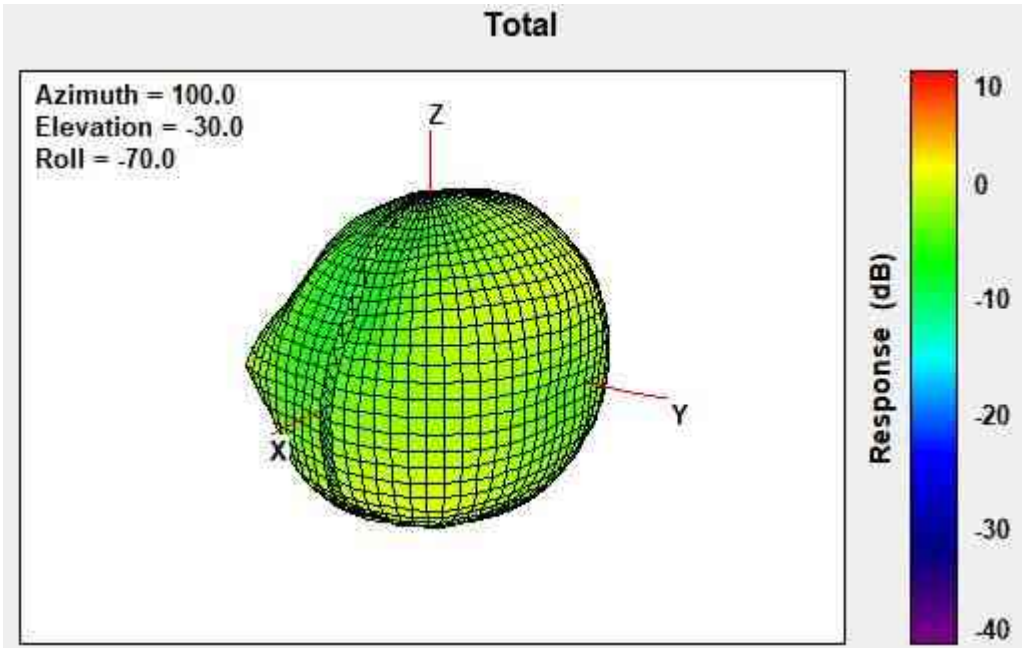
Center Frequency	1452 MHz
Horizontal (dBi) peak	-2.08
Vertical (dBi) peak	-0.04

1474 MHz



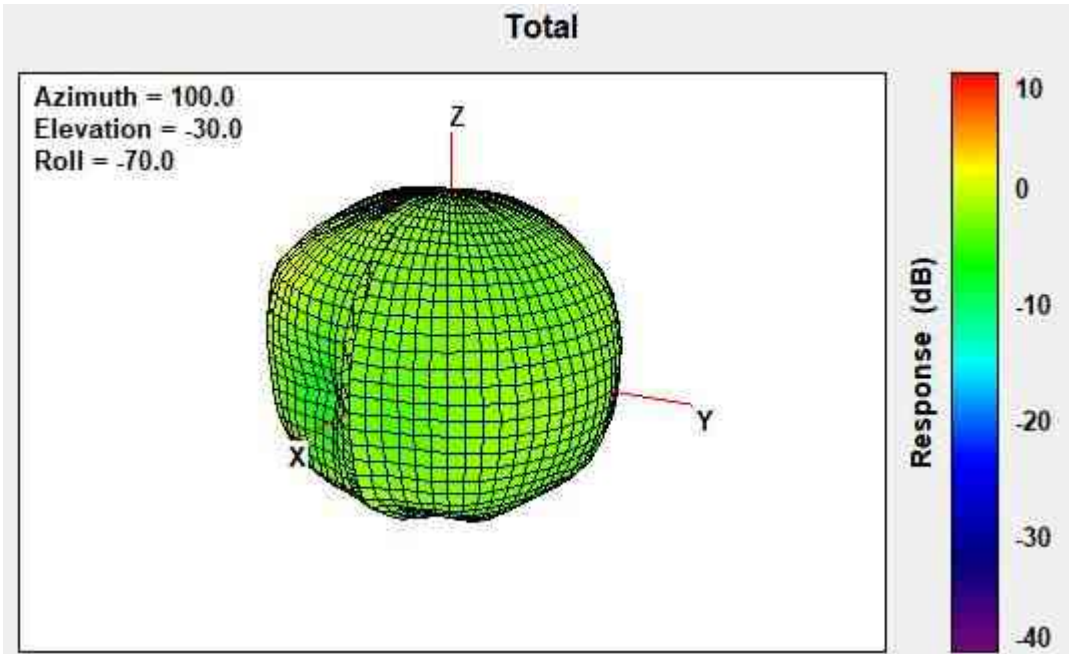
Center Frequency	1474 MHz
Horizontal (dBi) peak	-1.52
Vertical (dBi) peak	0.09

1496 MHz



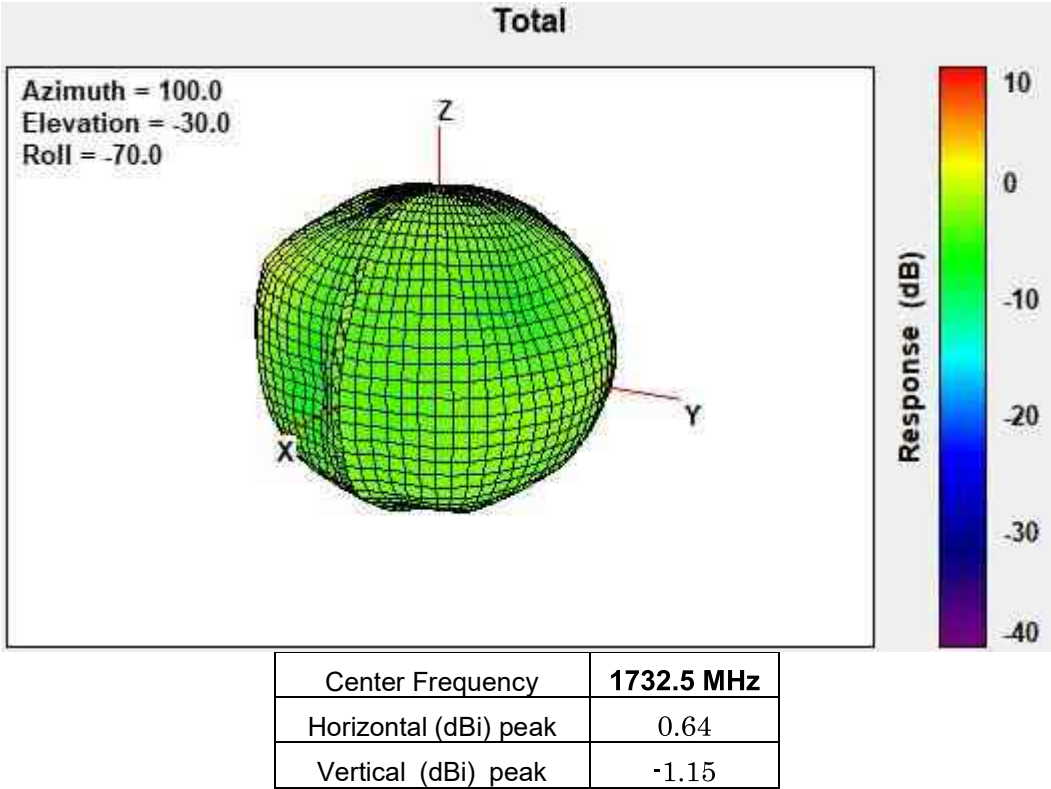
Center Frequency	1496 MHz
Horizontal (dBi) peak	-0.59
Vertical (dBi) peak	-0.72

1710 MHz

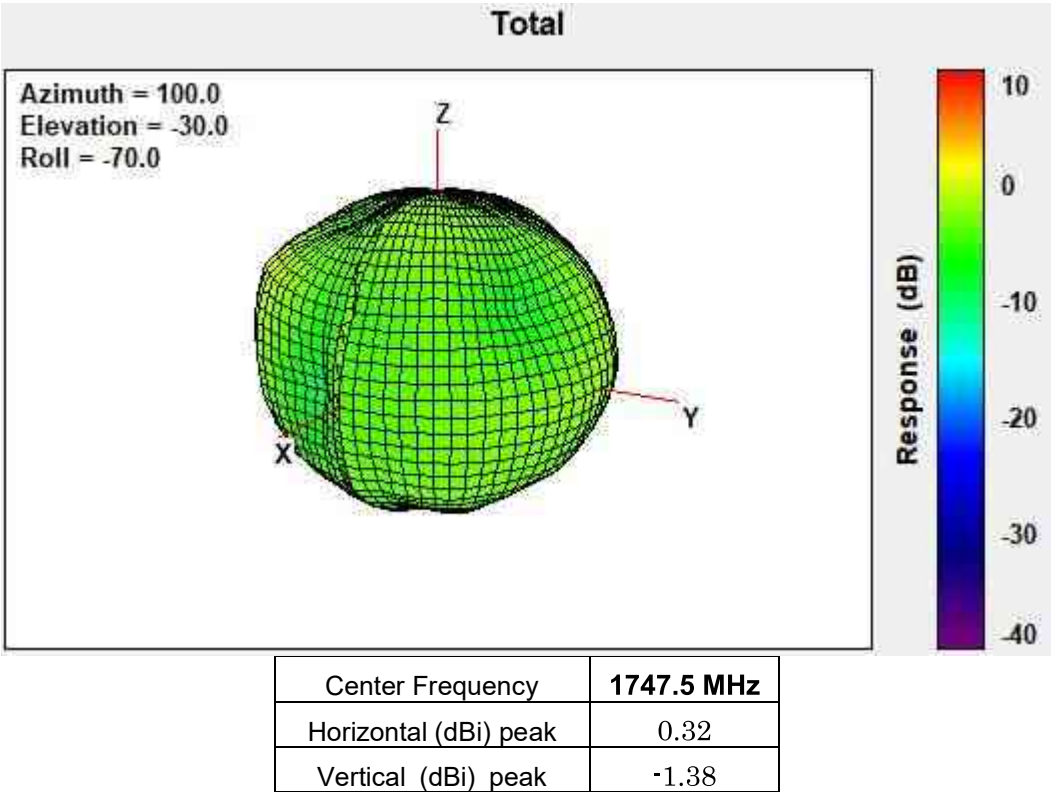


Center Frequency	1710 MHz
Horizontal (dBi) peak	0.74
Vertical (dBi) peak	-1.00

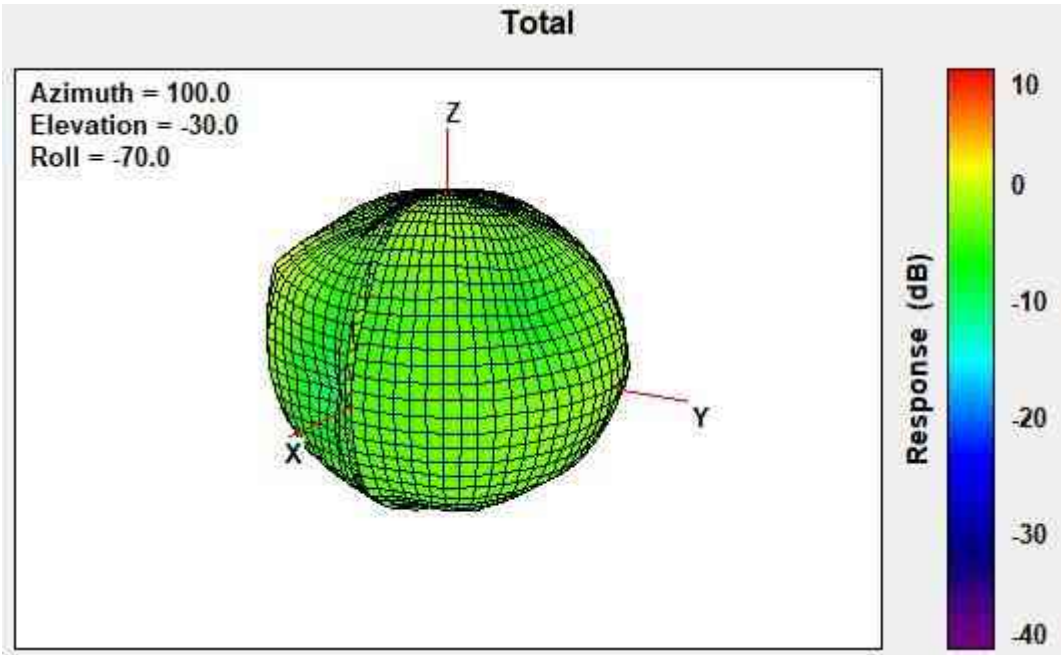
1732.5 MHz



1747.5 MHz

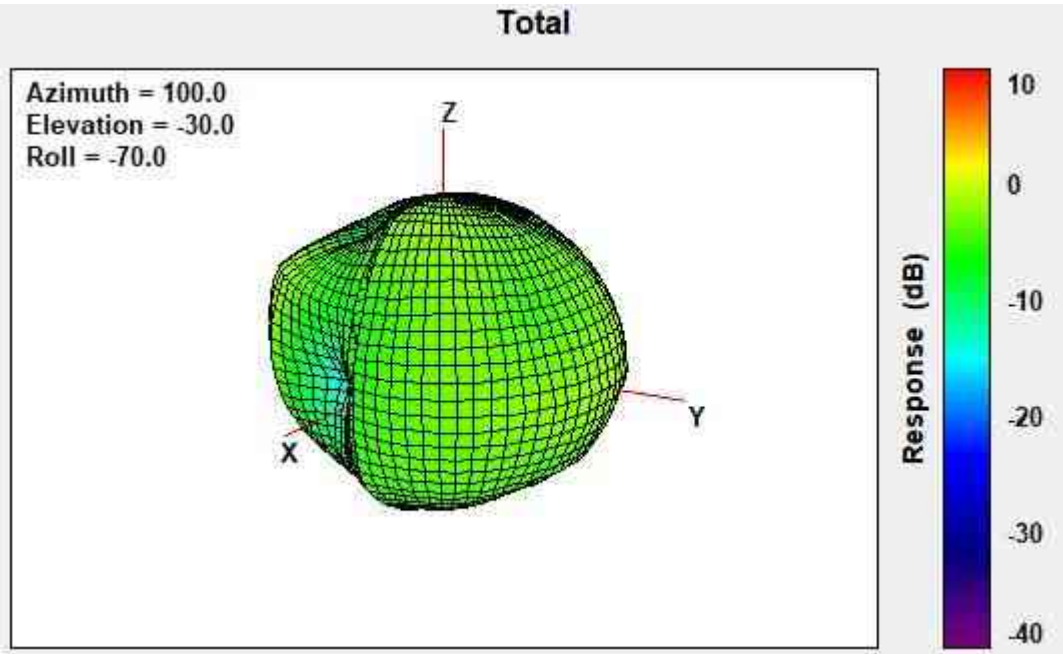


1755 MHz



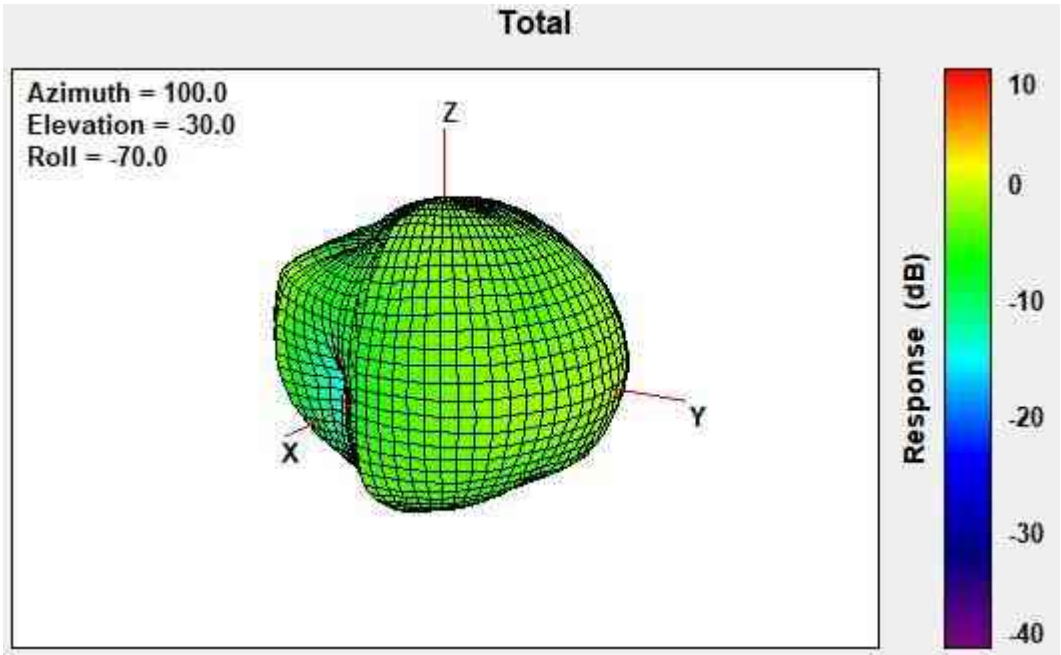
Center Frequency	1755 MHz
Horizontal (dBi) peak	-0.07
Vertical (dBi) peak	-1.60

1785 MHz



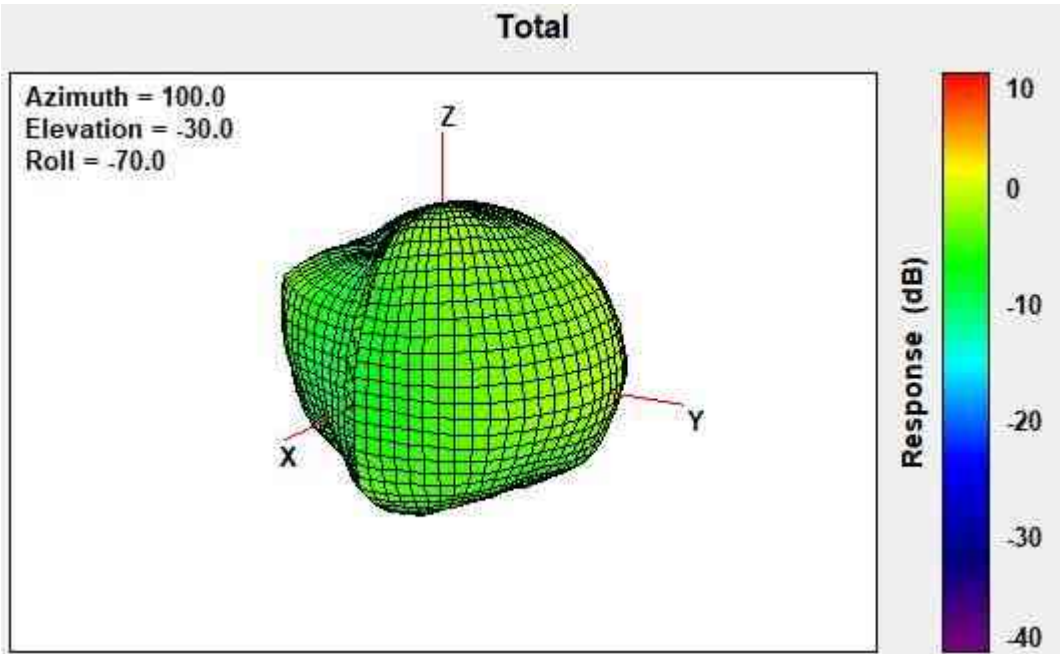
Center Frequency	1785 MHz
Horizontal (dBi) peak	-1.83
Vertical (dBi) peak	-2.26

1805 MHz



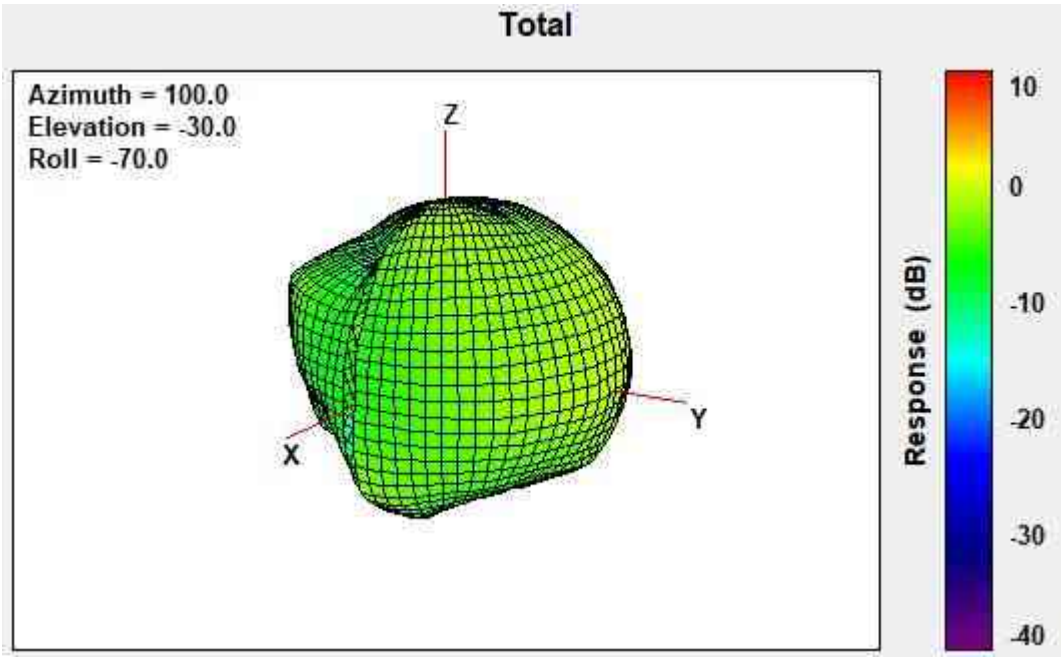
Center Frequency	1805 MHz
Horizontal (dBi) peak	-2.68
Vertical (dBi) peak	-2.13

1850 MHz



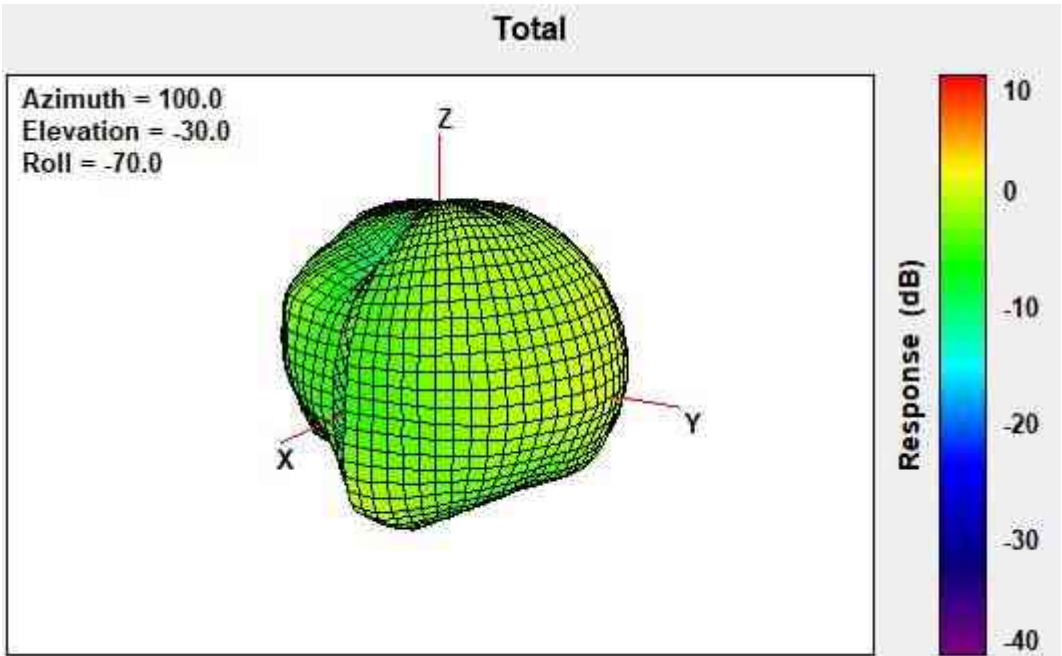
Center Frequency	1850 MHz
Horizontal (dBi) peak	-2.23
Vertical (dBi) peak	-2.01

1880 MHz



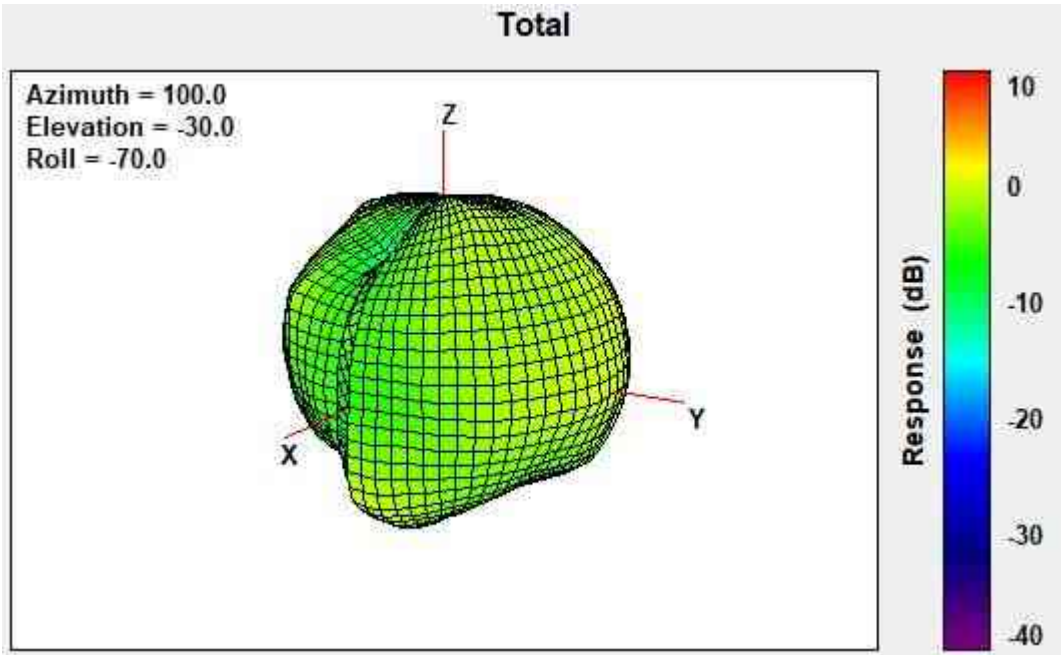
Center Frequency	1880 MHz
Horizontal (dBi) peak	-1.41
Vertical (dBi) peak	-1.42

1910MHz



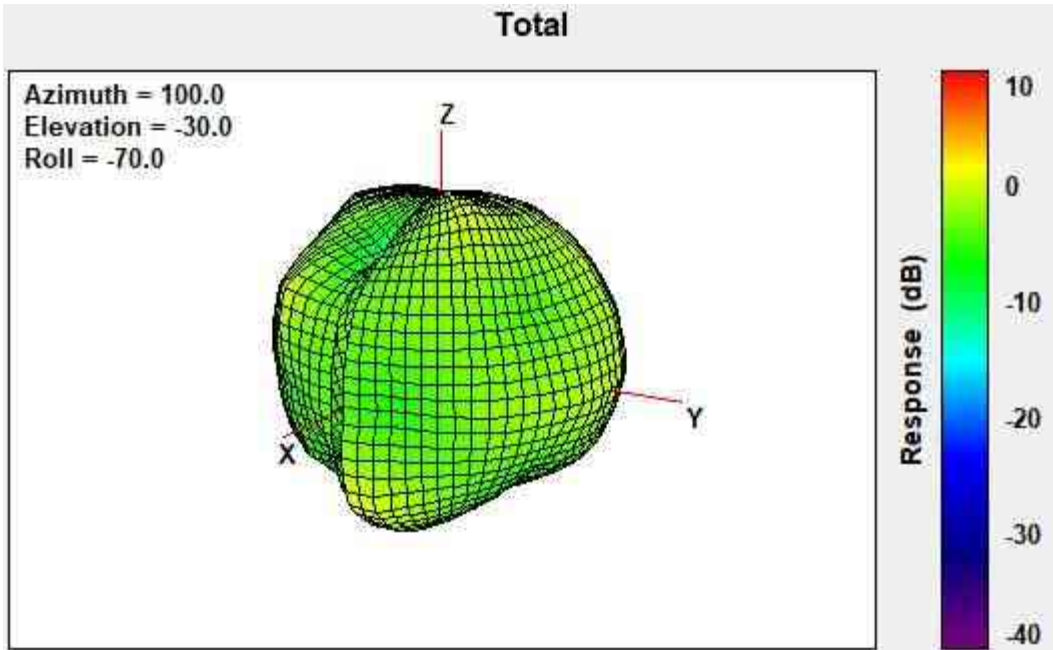
Center Frequency	1910MHz
Horizontal (dBi) peak	-0.38
Vertical (dBi) peak	-0.78

1920MHz



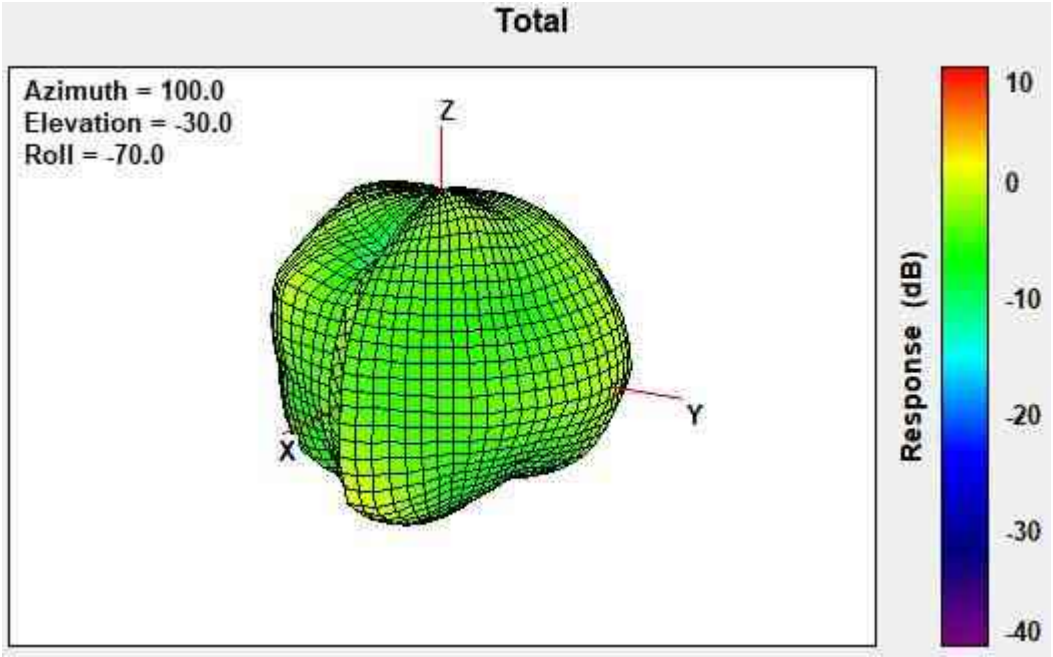
Center Frequency	1920MHz
Horizontal (dBi) peak	0.21
Vertical (dBi) peak	-0.86

1950MHz



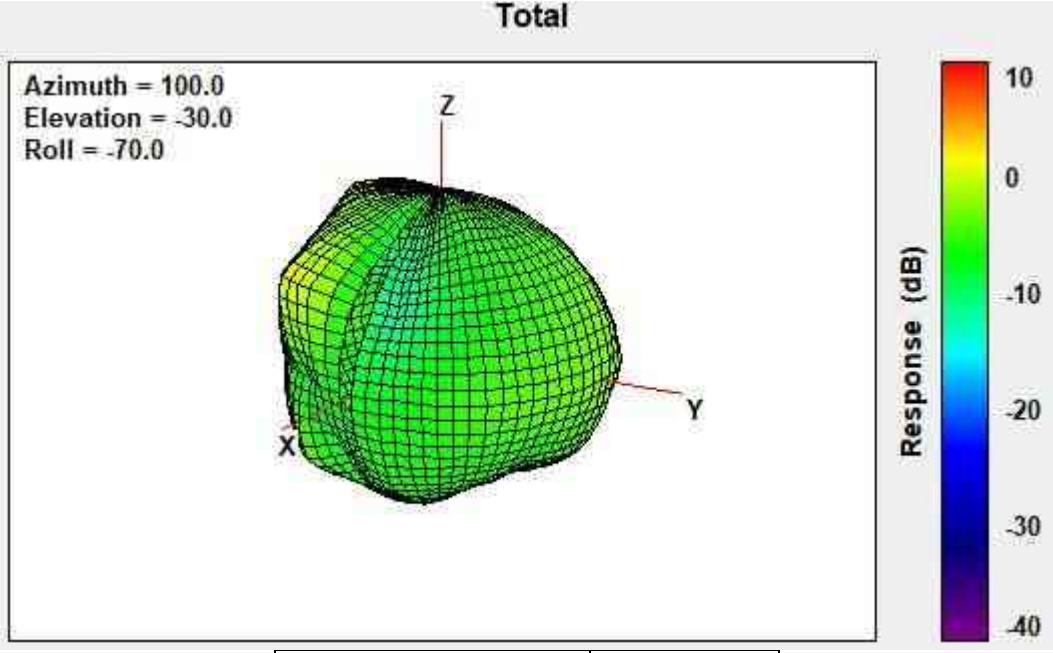
Center Frequency	1950MHz
Horizontal (dBi) peak	0.82
Vertical (dBi) peak	-0.13

1980MHz



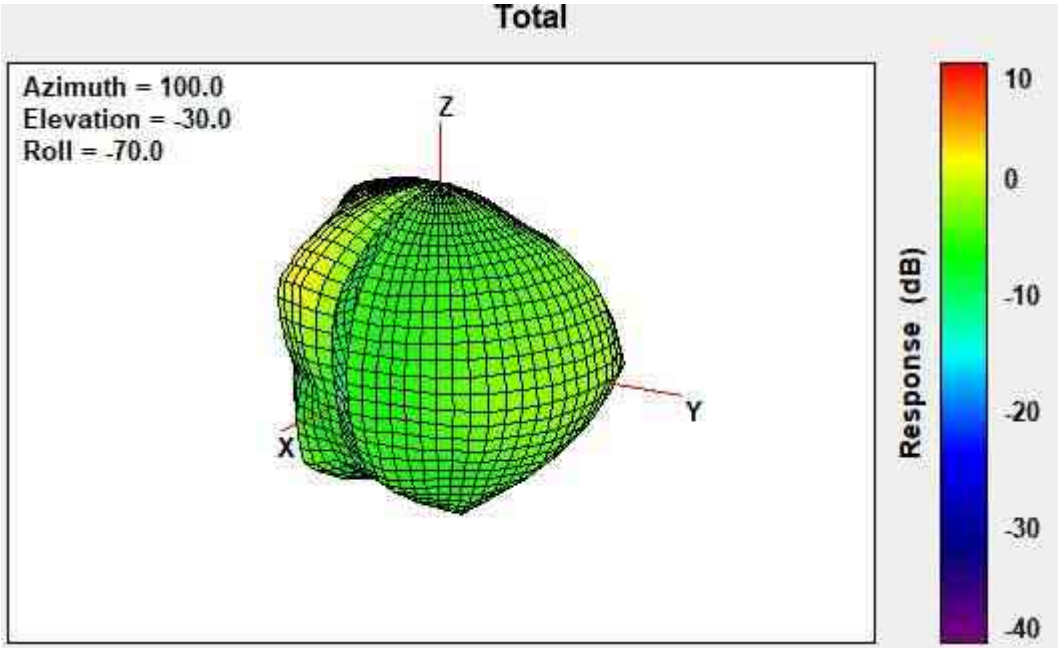
Center Frequency	1980MHz
Horizontal (dBi) peak	0.62
Vertical (dBi) peak	0.31

2110MHz



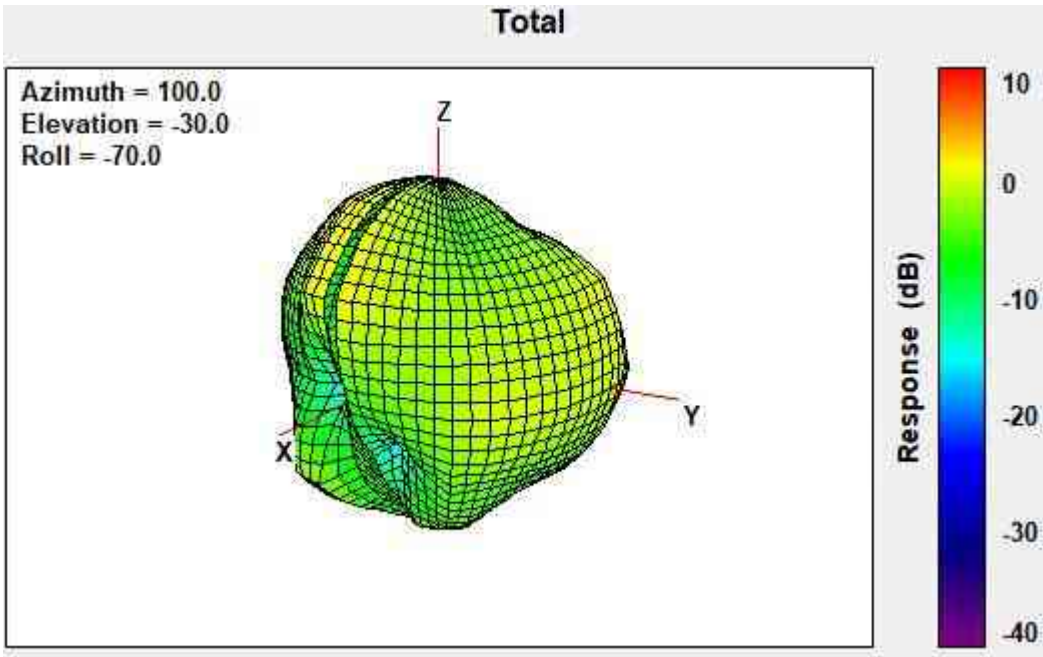
Center Frequency	2110MHz
Horizontal (dBi) peak	0.96
Vertical (dBi) peak	0.75

2200MHz



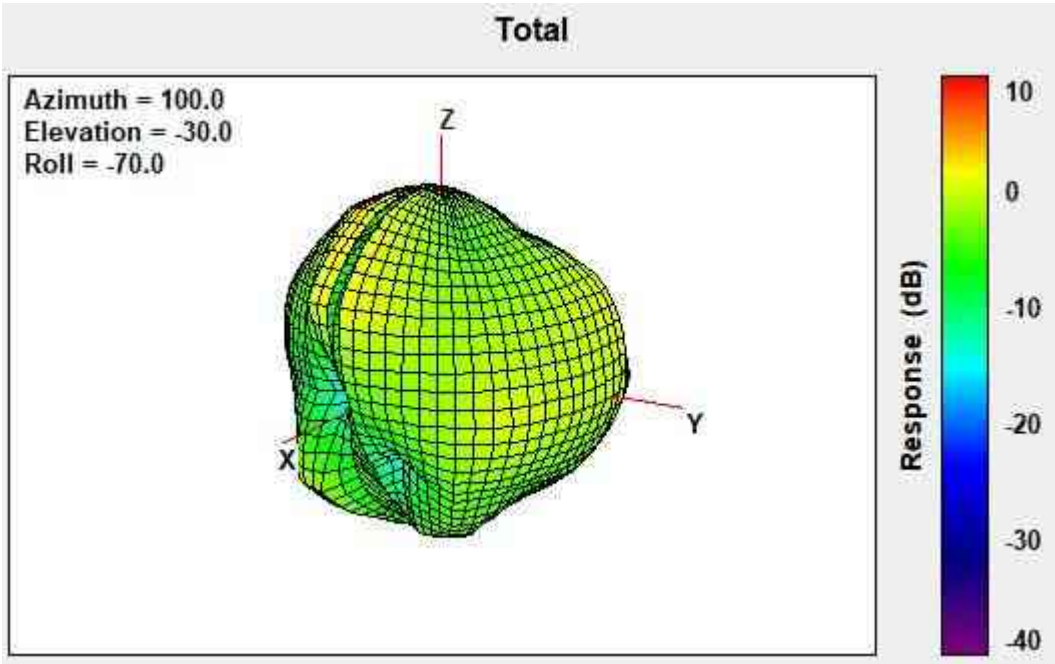
Center Frequency	2200MHz
Horizontal (dBi) peak	2.10
Vertical (dBi) peak	0.22

2300MHz



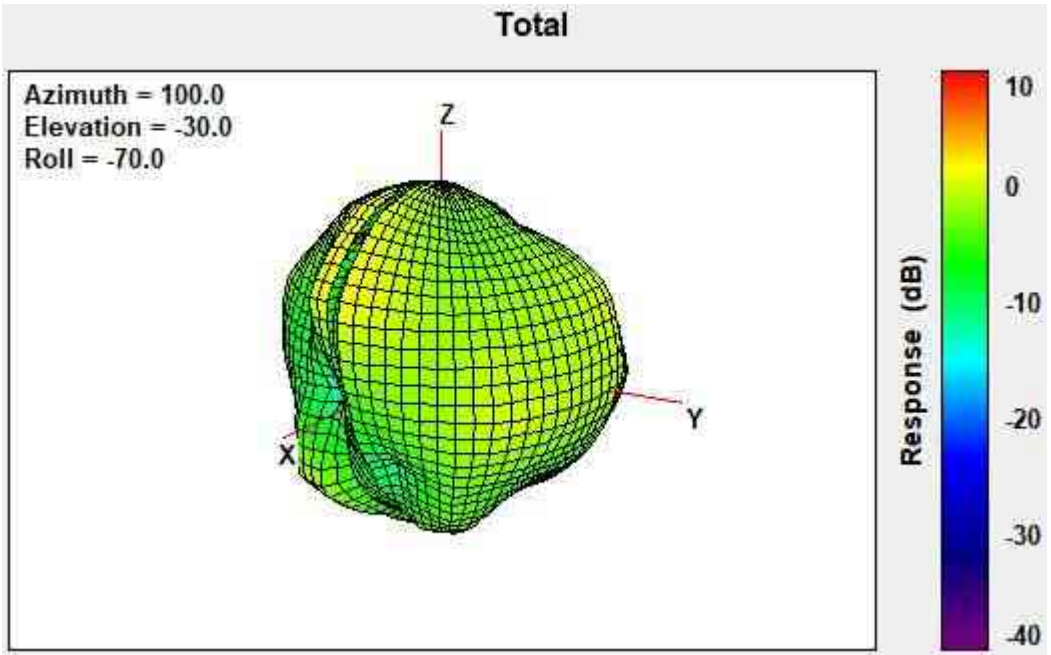
Center Frequency	2300MHz
Horizontal (dBi) peak	1.73
Vertical (dBi) peak	0.53

2305MHz

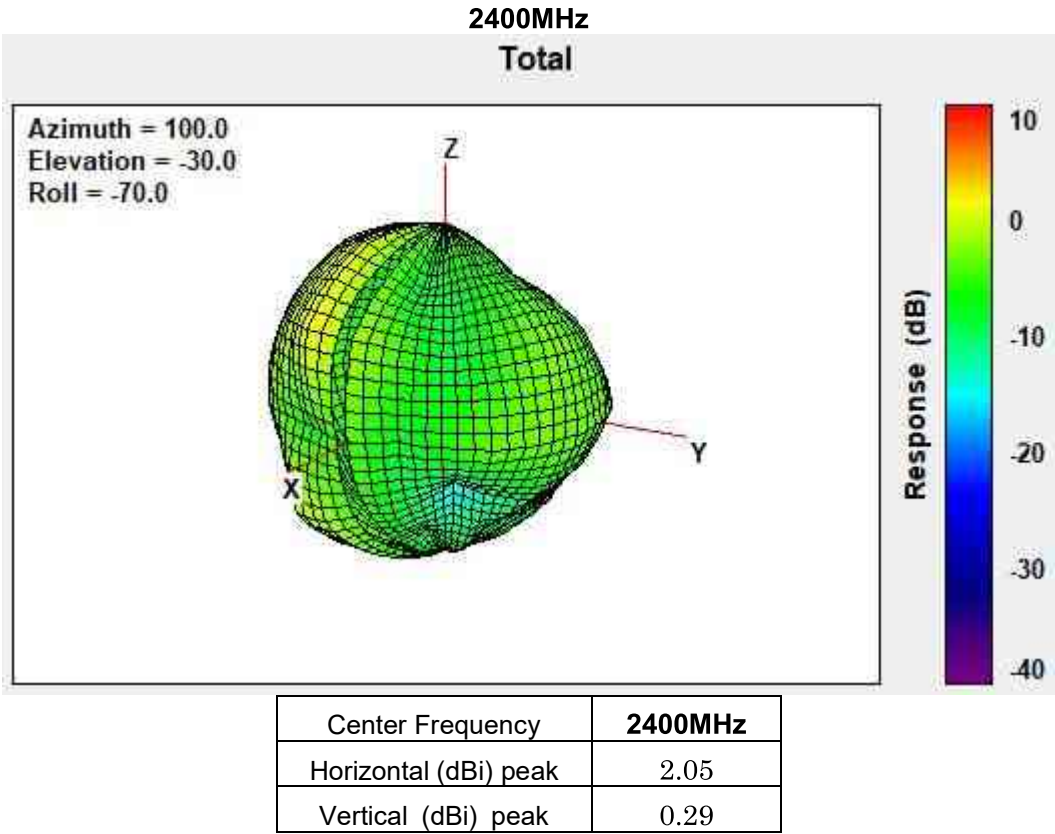
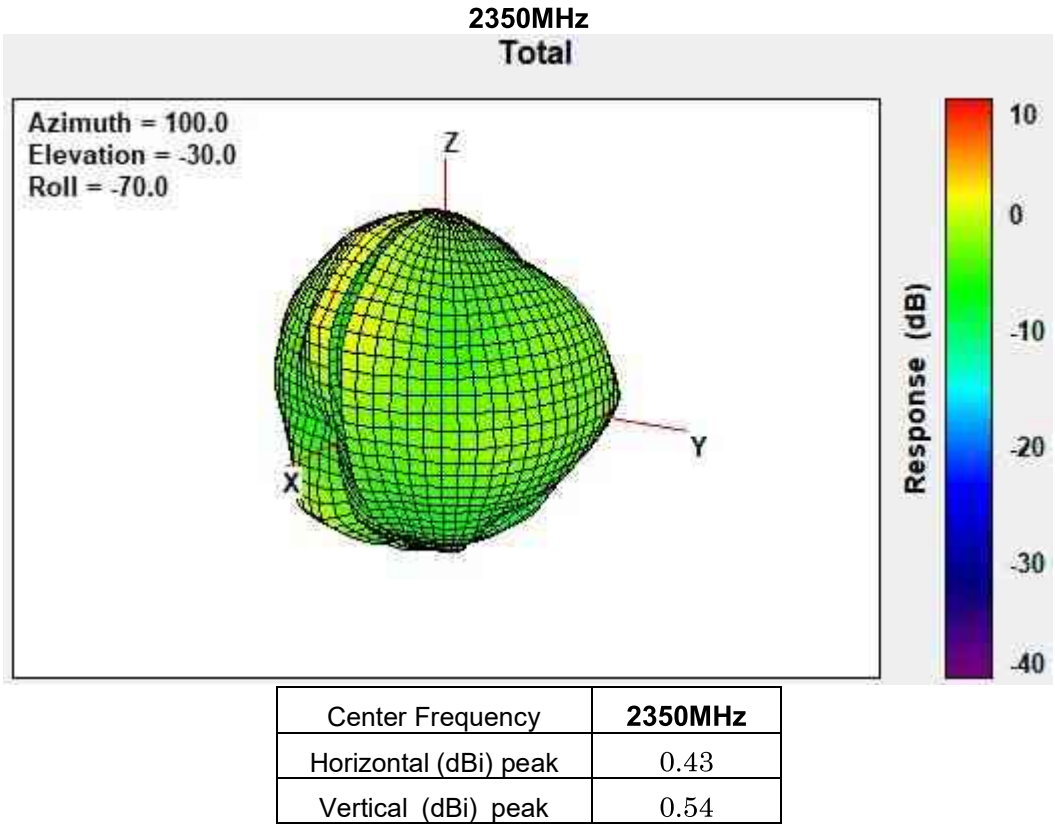


Center Frequency	2305MHz
Horizontal (dBi) peak	0.68
Vertical (dBi) peak	0.83

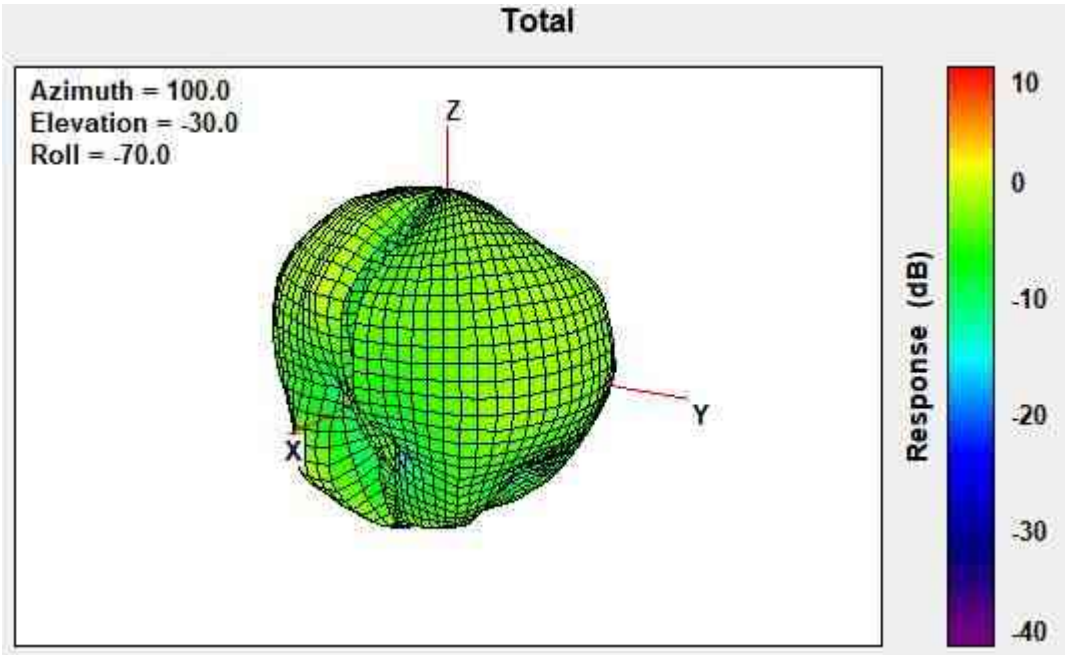
2315MHz



Center Frequency	2315MHz
Horizontal (dBi) peak	0.67
Vertical (dBi) peak	0.47

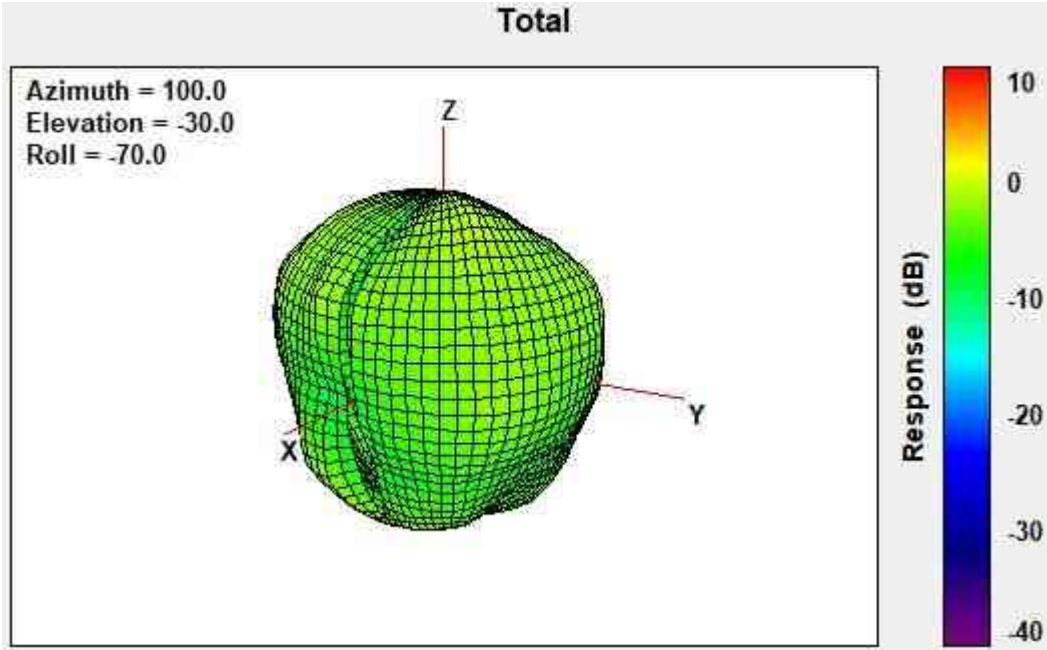


2500MHz

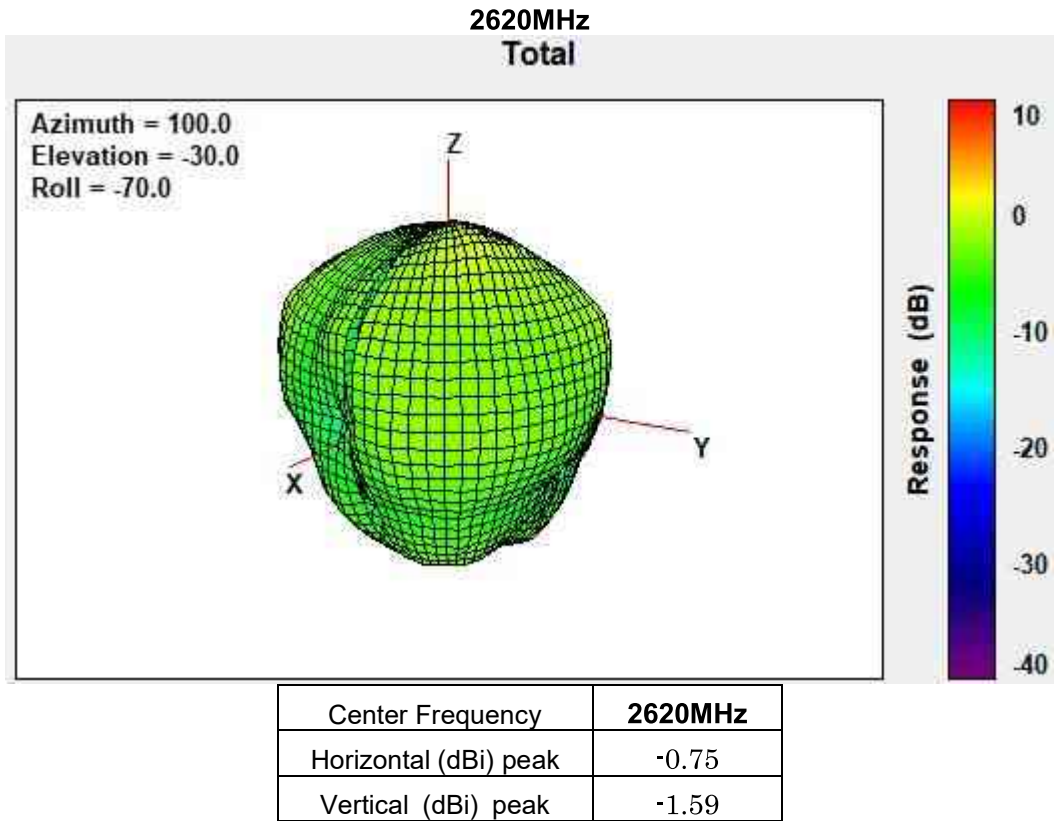
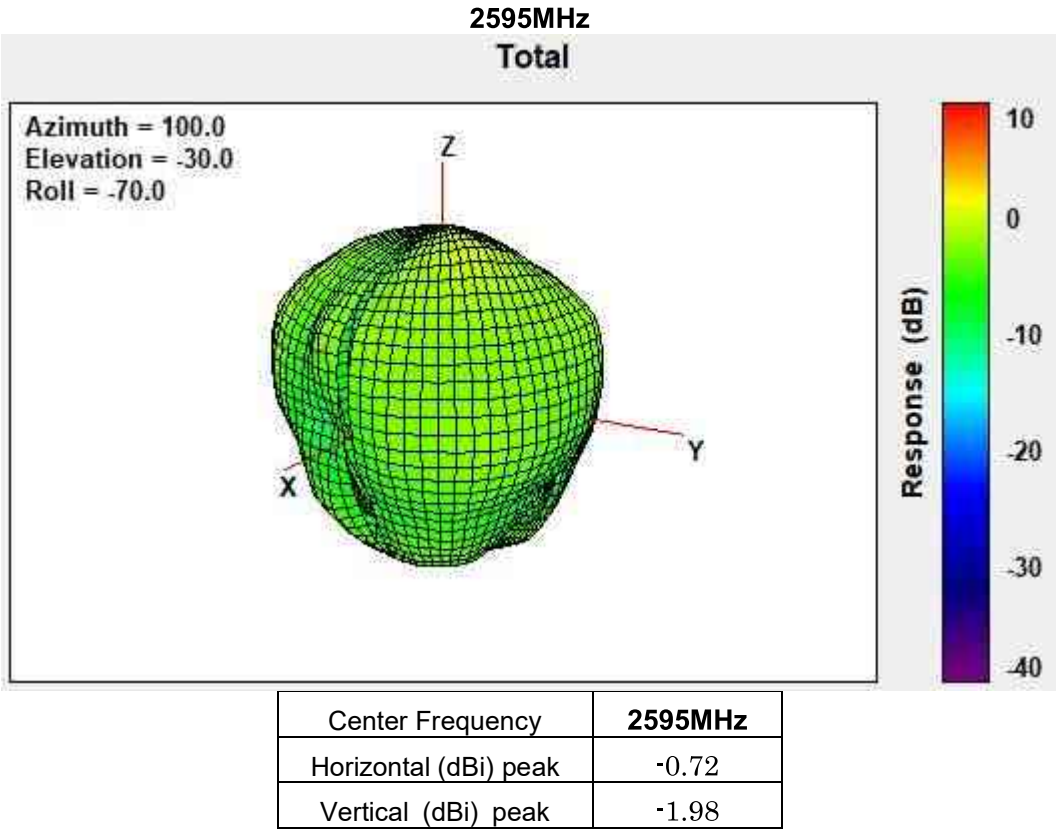


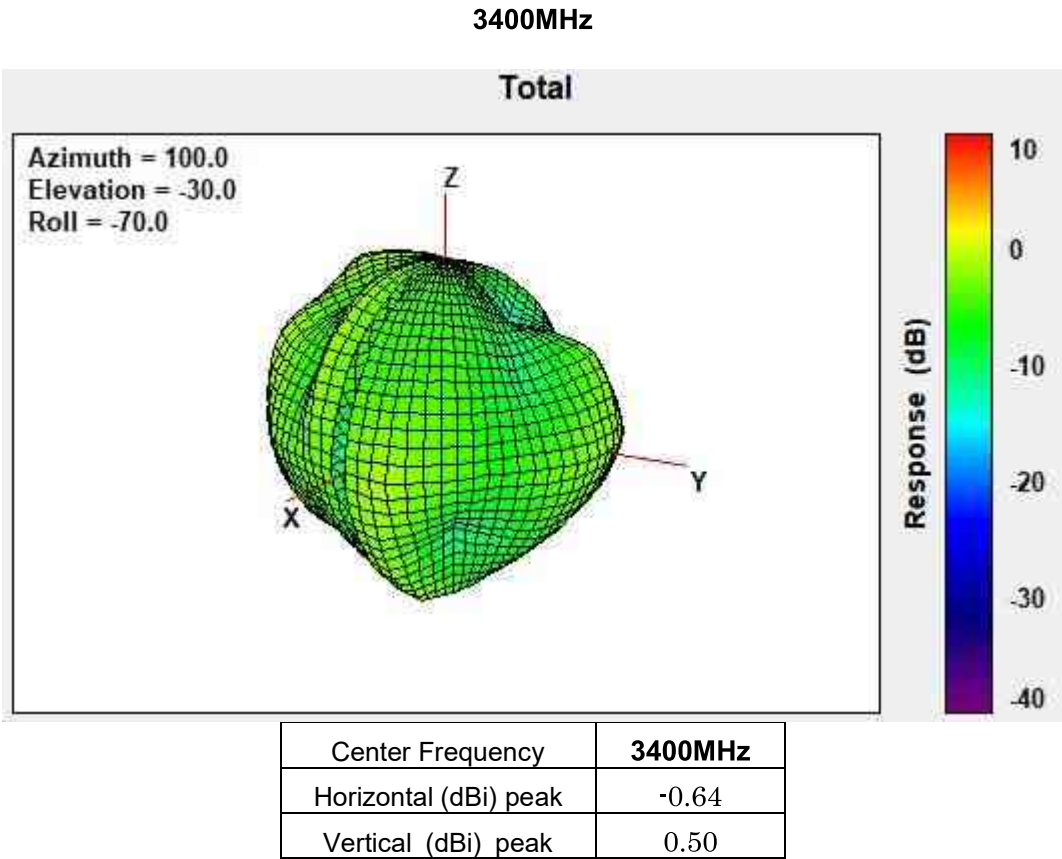
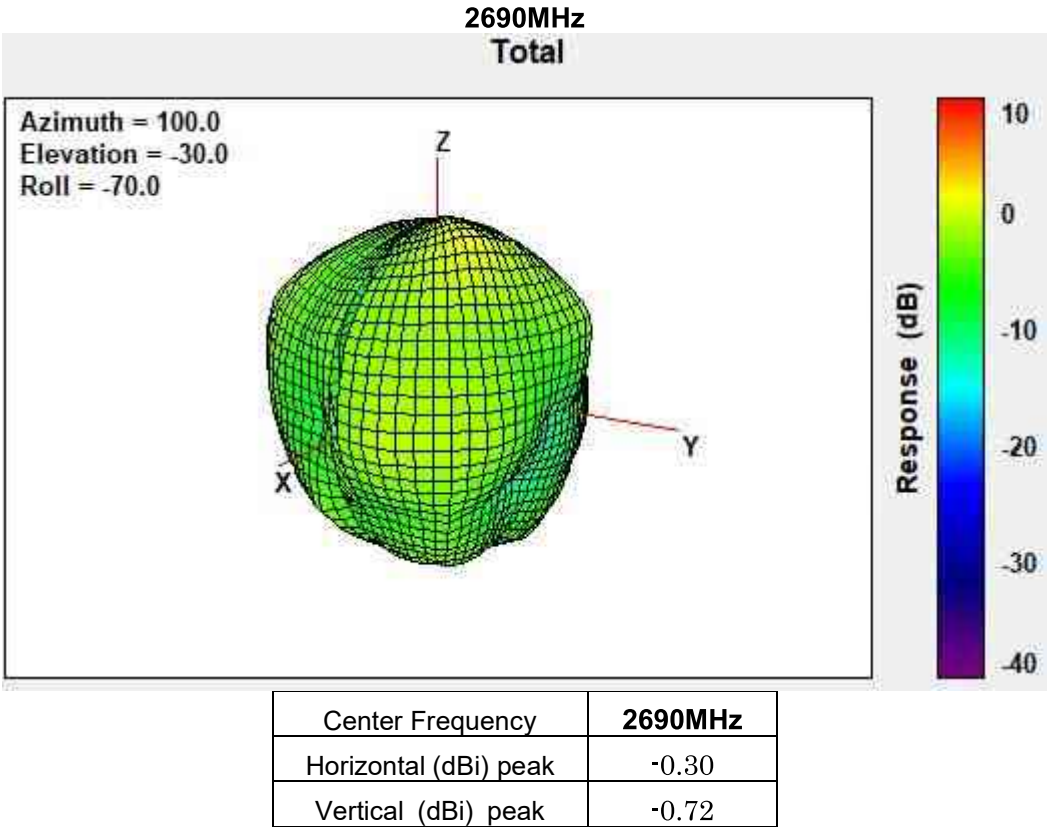
Center Frequency	2500MHz
Horizontal (dBi) peak	0.43
Vertical (dBi) peak	-0.91

2570MHz

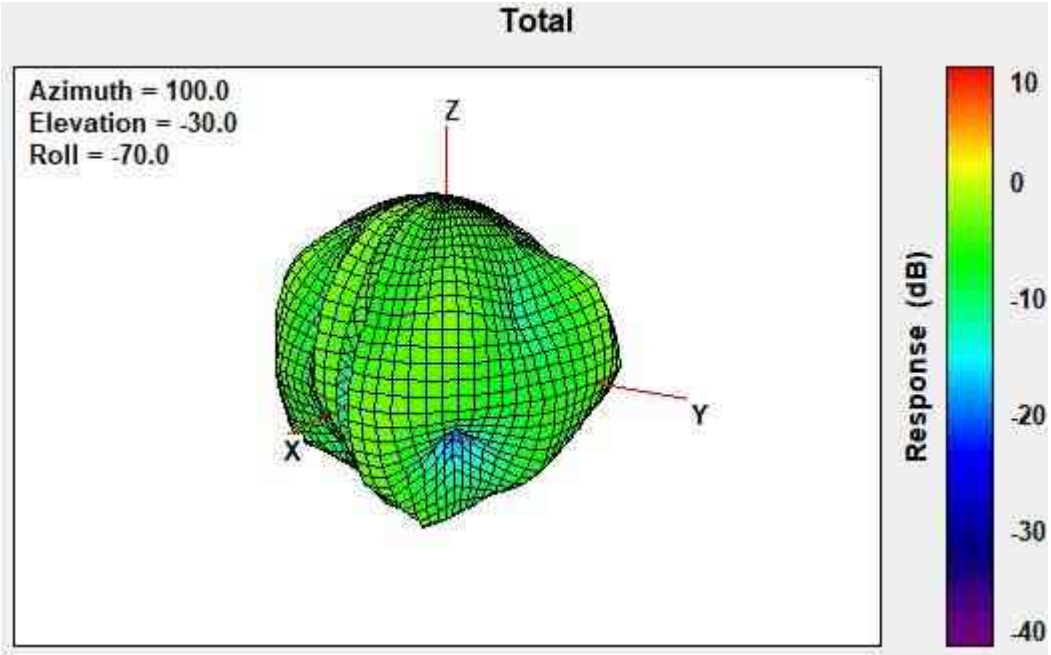


Center Frequency	2570MHz
Horizontal (dBi) peak	-0.98
Vertical (dBi) peak	-2.09



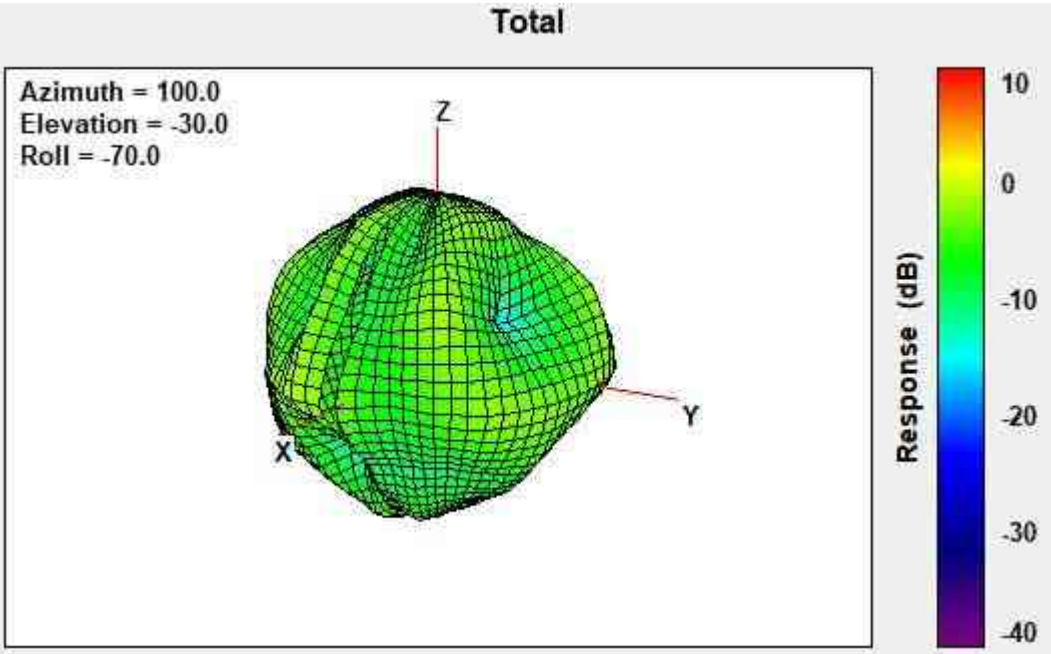


3500MHz



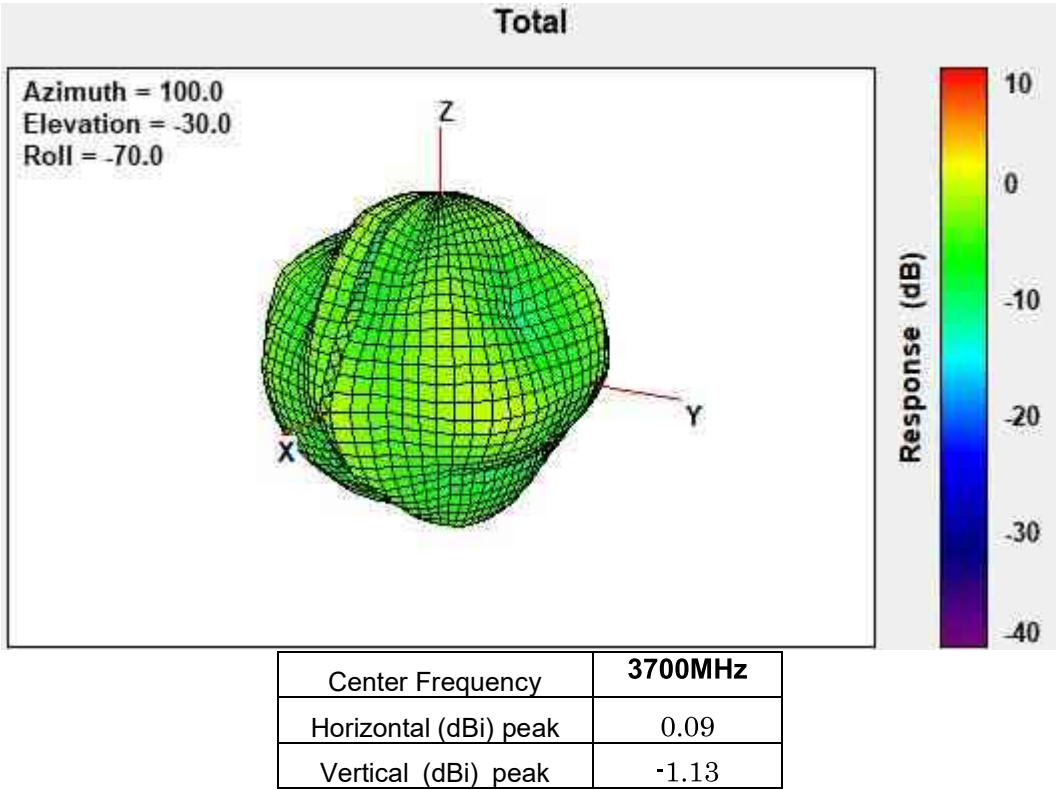
Center Frequency	3500MHz
Horizontal (dBi) peak	-2.63
Vertical (dBi) peak	-1.88

3600MHz

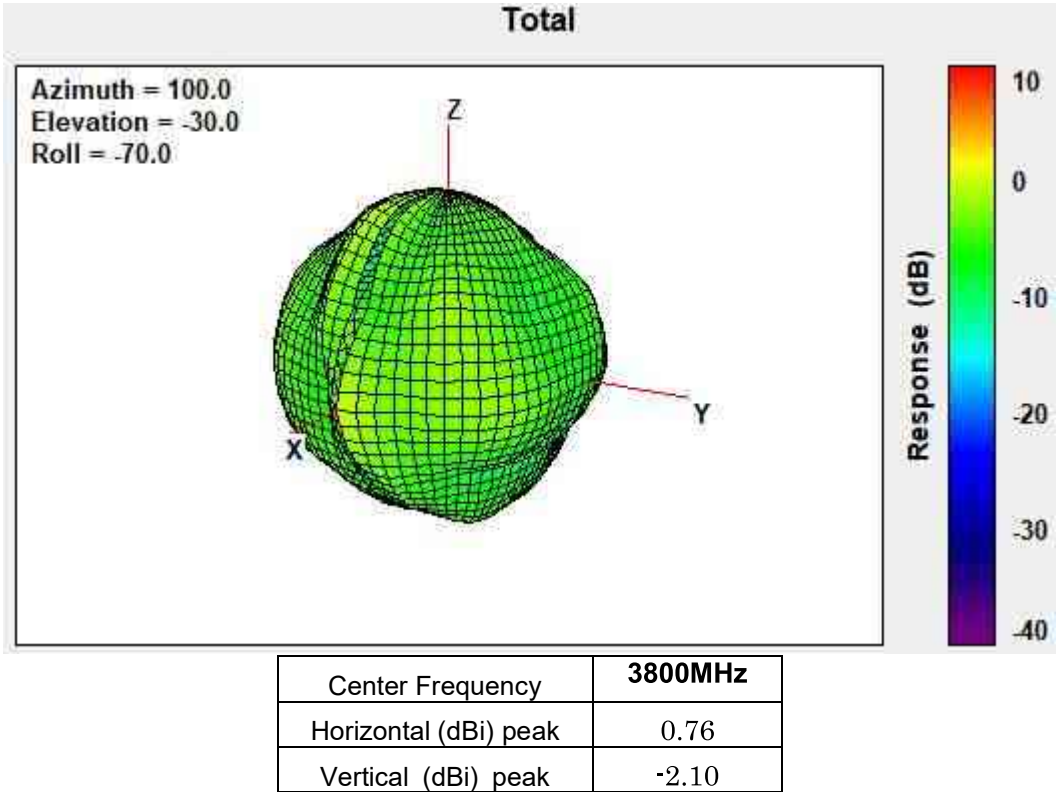


Center Frequency	3600MHz
Horizontal (dBi) peak	-0.47
Vertical (dBi) peak	-1.10

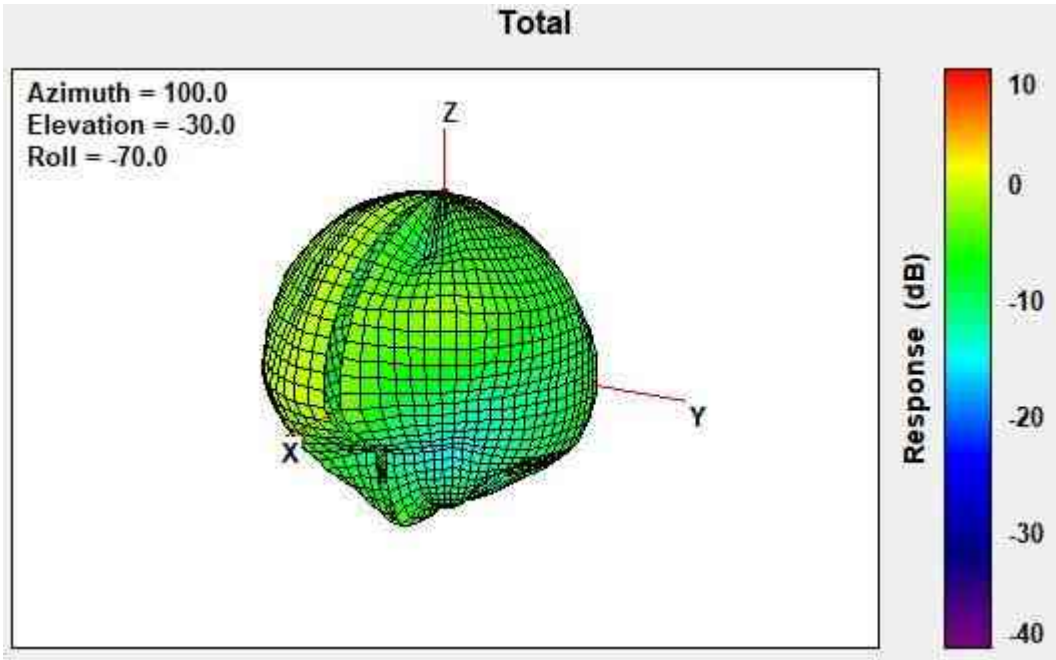
3700MHz



3800MHz

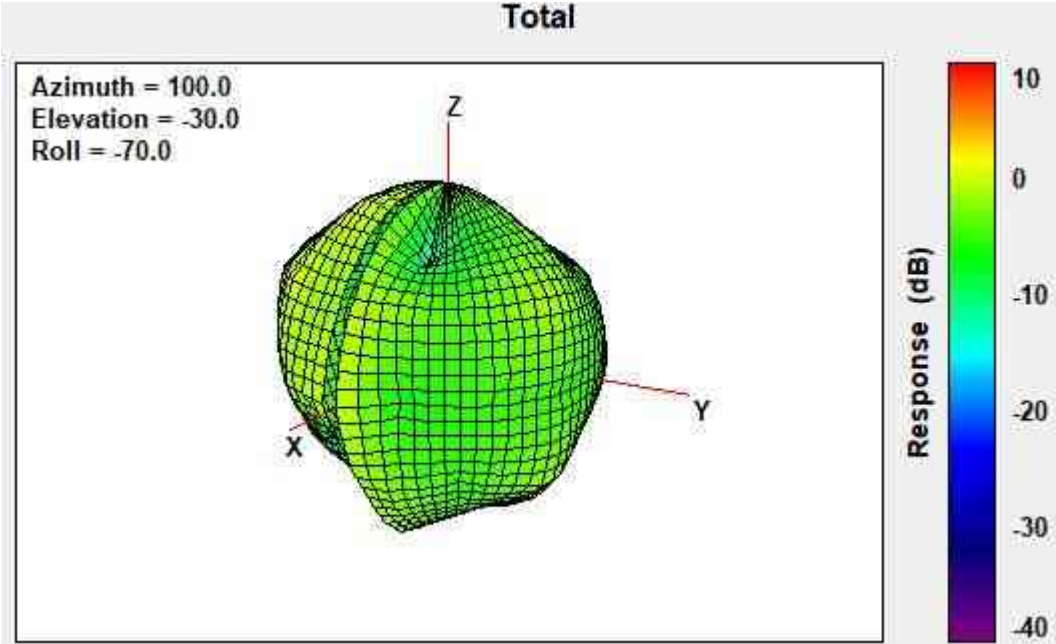


4200MHz



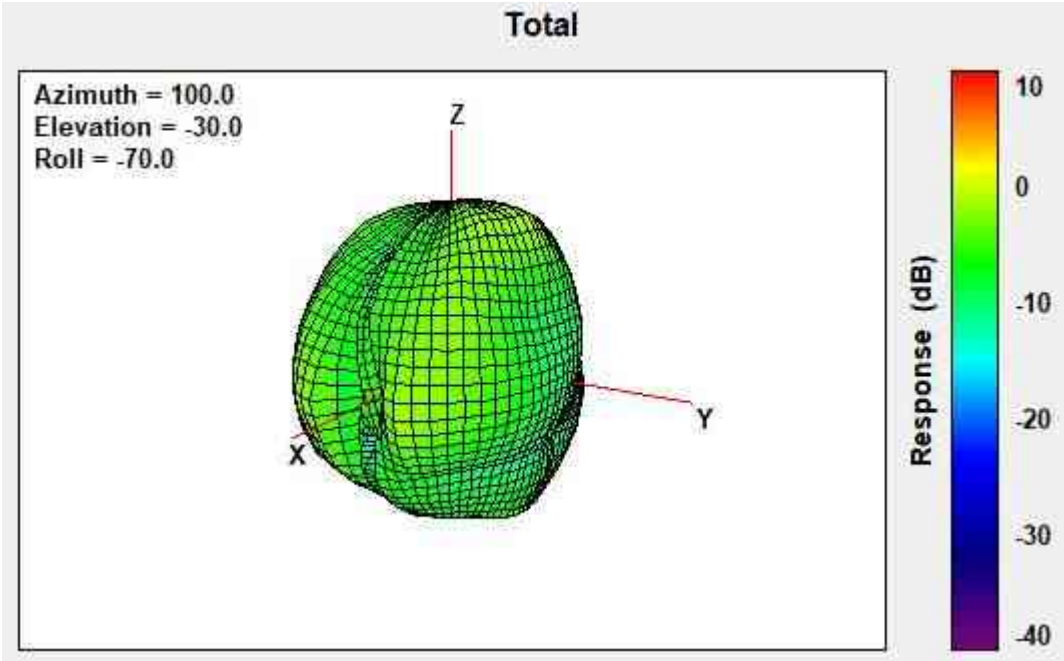
Center Frequency	4200MHz
Horizontal (dBi) peak	0.03
Vertical (dBi) peak	-3.05

4400MHz



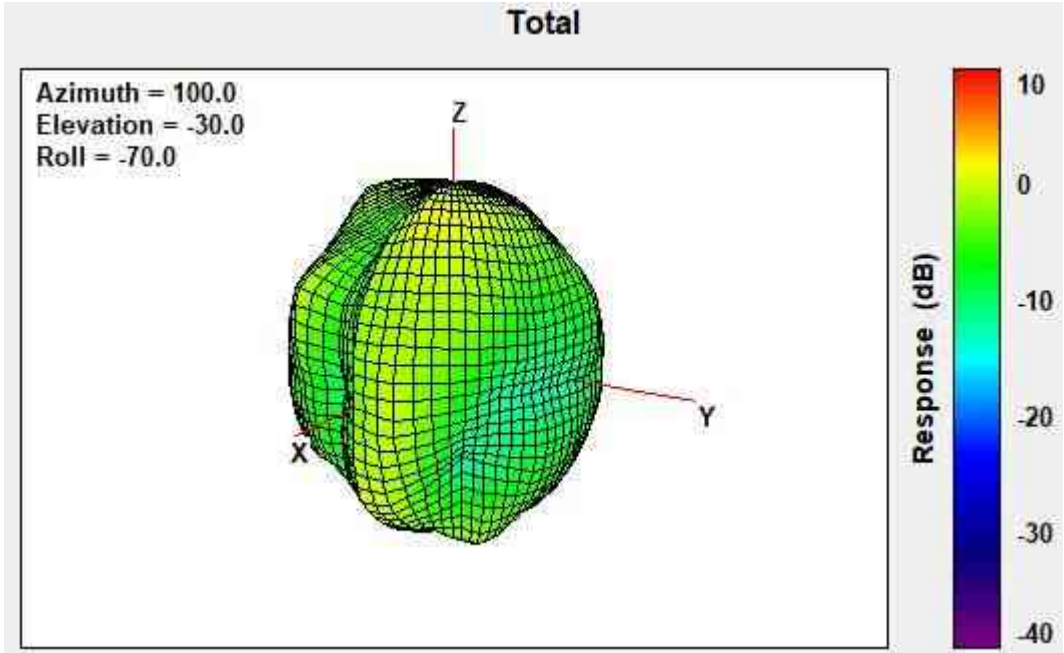
Center Frequency	4400MHz
Horizontal (dBi) peak	0.57
Vertical (dBi) peak	-0.88

4700MHz



Center Frequency	4700MHz
Horizontal (dBi) peak	-0.99
Vertical (dBi) peak	-1.63

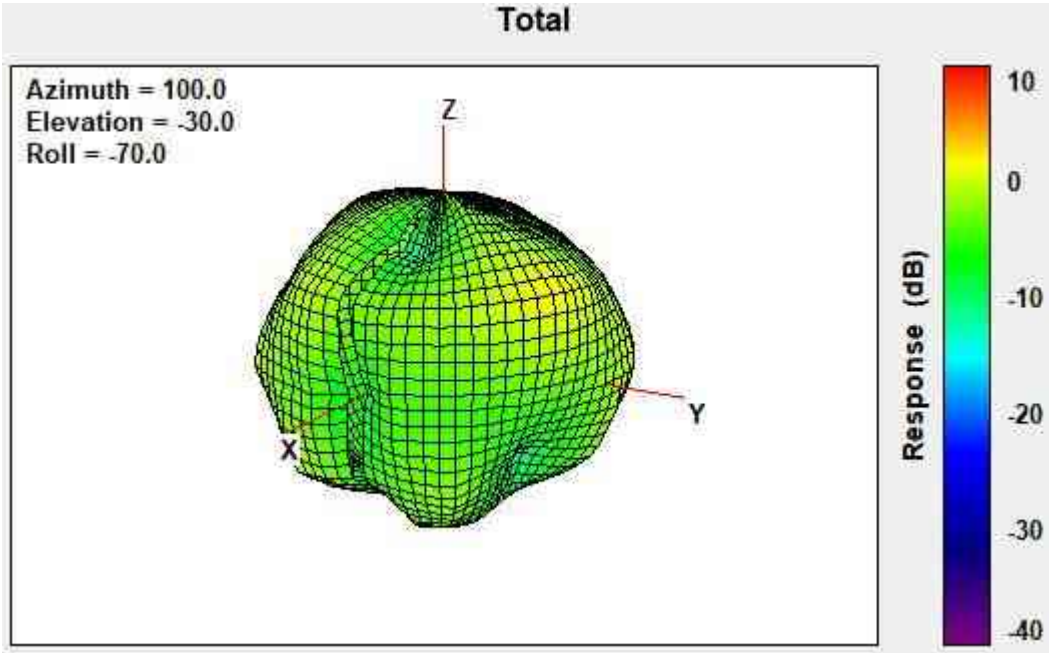
5000MHz



Center Frequency	5000MHz
Horizontal (dBi) peak	1.43
Vertical (dBi) peak	0.64

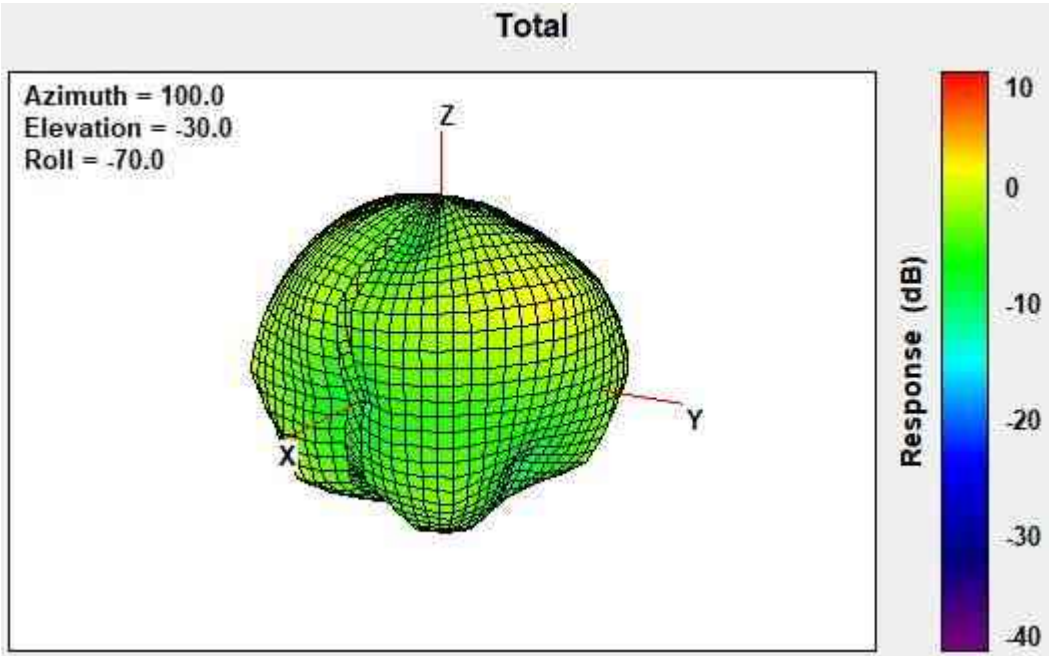
MIMO3 Antenna (DRx1)

1805 MHz



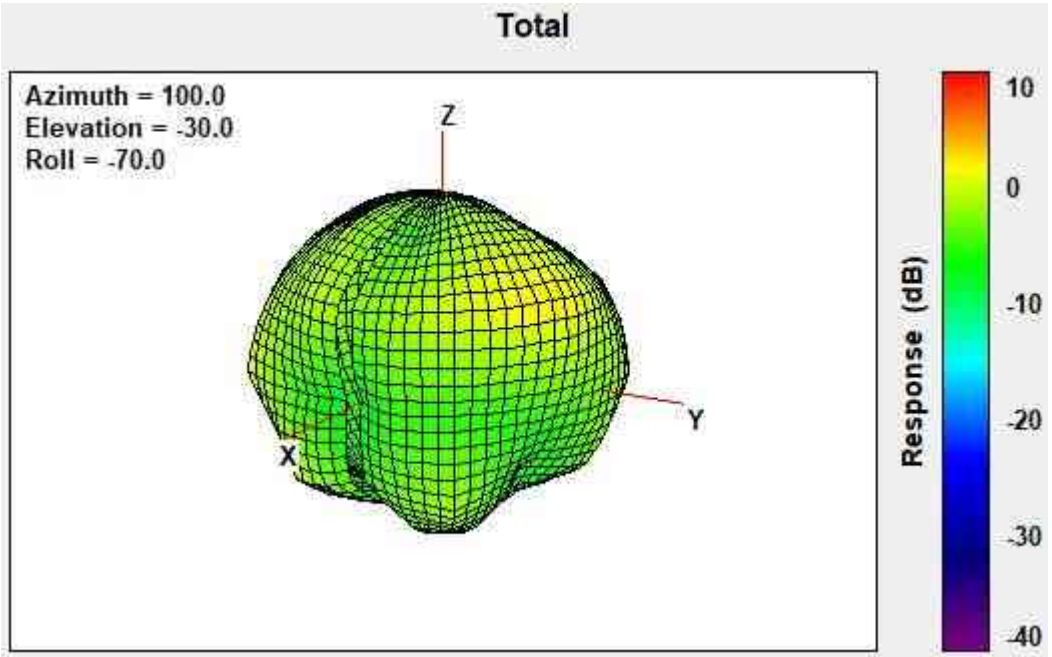
Center Frequency	1805 MHz
Horizontal (dBi) peak	0.00
Vertical (dBi) peak	-0.53

1850 MHz



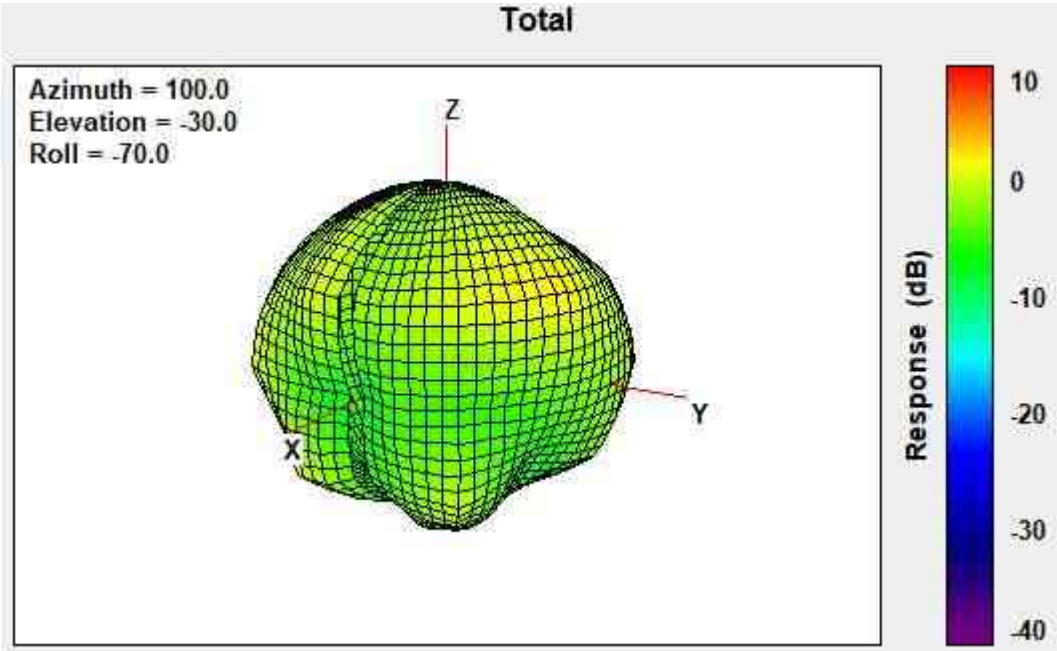
Center Frequency	1850 MHz
Horizontal (dBi) peak	-0.14
Vertical (dBi) peak	-0.01

1880 MHz



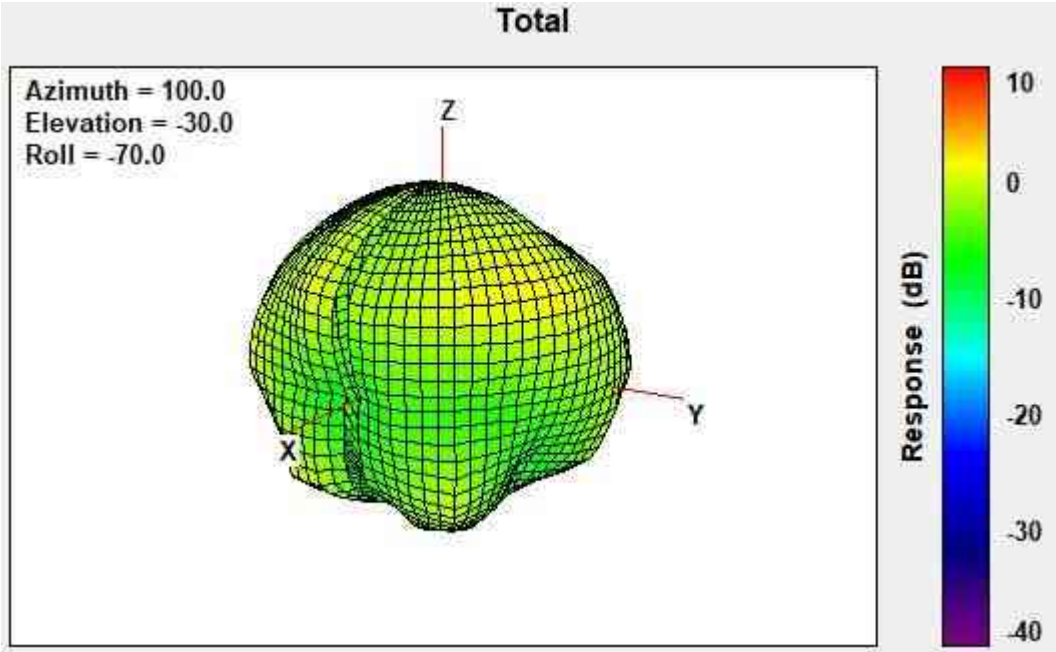
Center Frequency	1880 MHz
Horizontal (dBi) peak	0.02
Vertical (dBi) peak	0.76

1910MHz



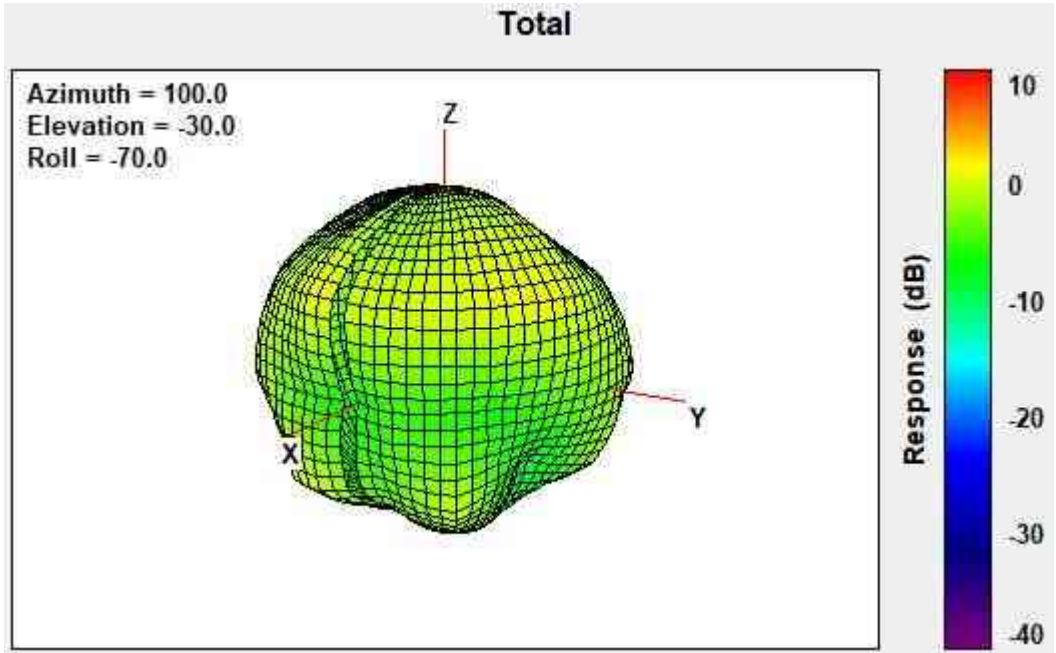
Center Frequency	1910MHz
Horizontal (dBi) peak	-0.19
Vertical (dBi) peak	0.64

1920MHz



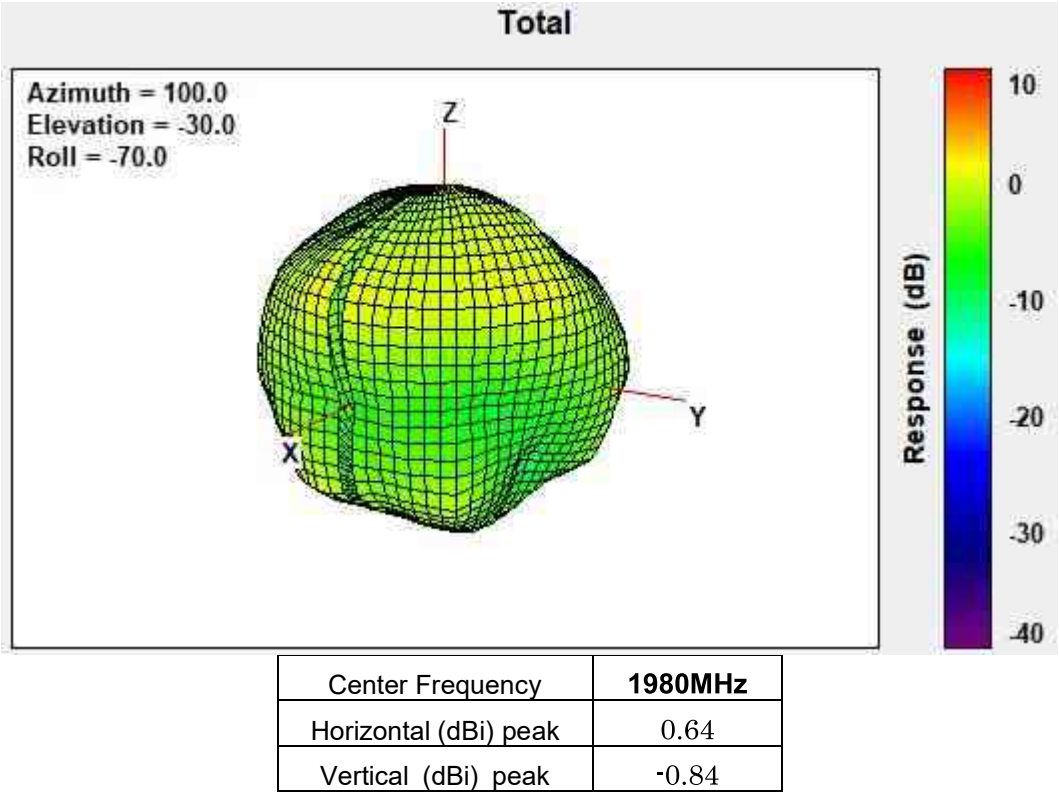
Center Frequency	1920MHz
Horizontal (dBi) peak	-0.34
Vertical (dBi) peak	0.36

1950MHz

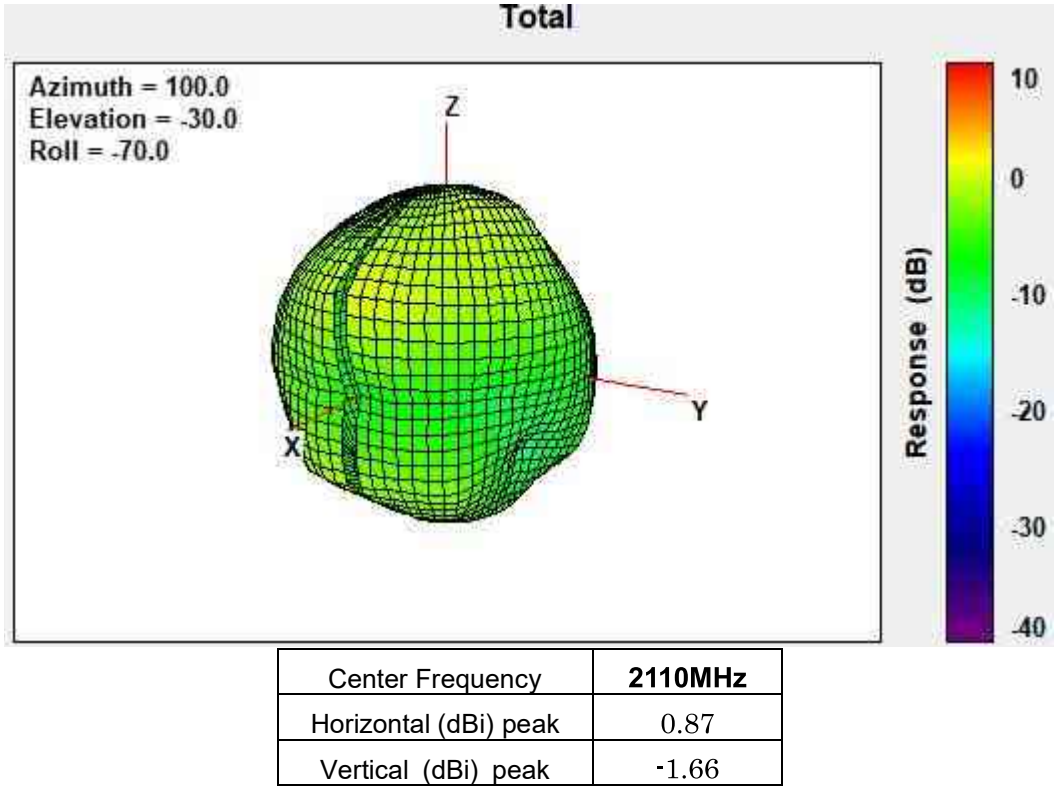


Center Frequency	1950MHz
Horizontal (dBi) peak	0.16
Vertical (dBi) peak	-0.37

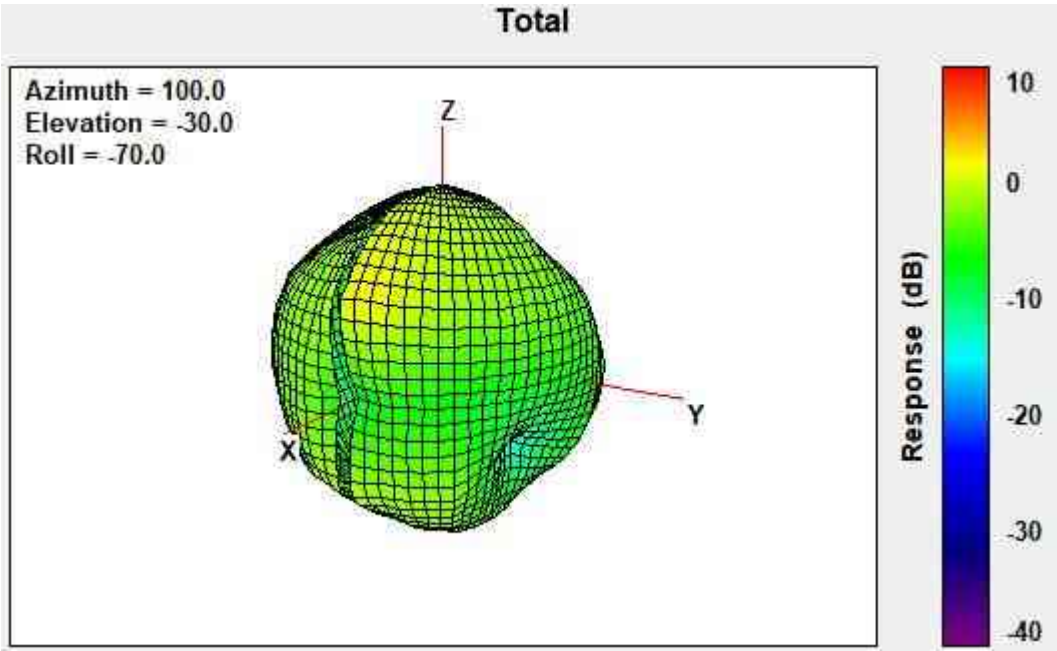
1980MHz



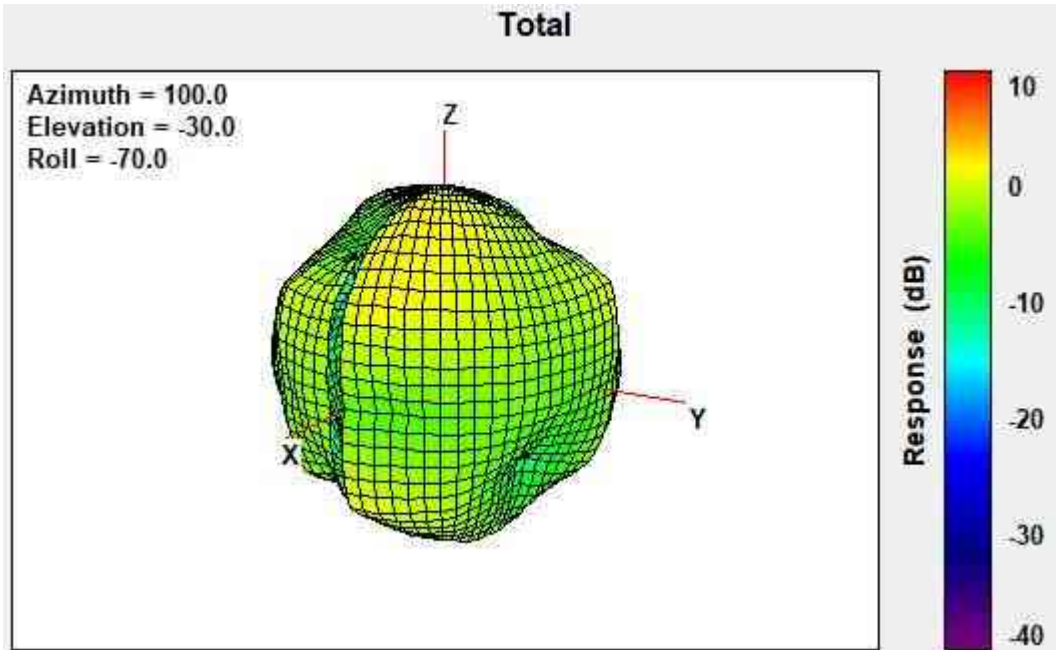
2110MHz



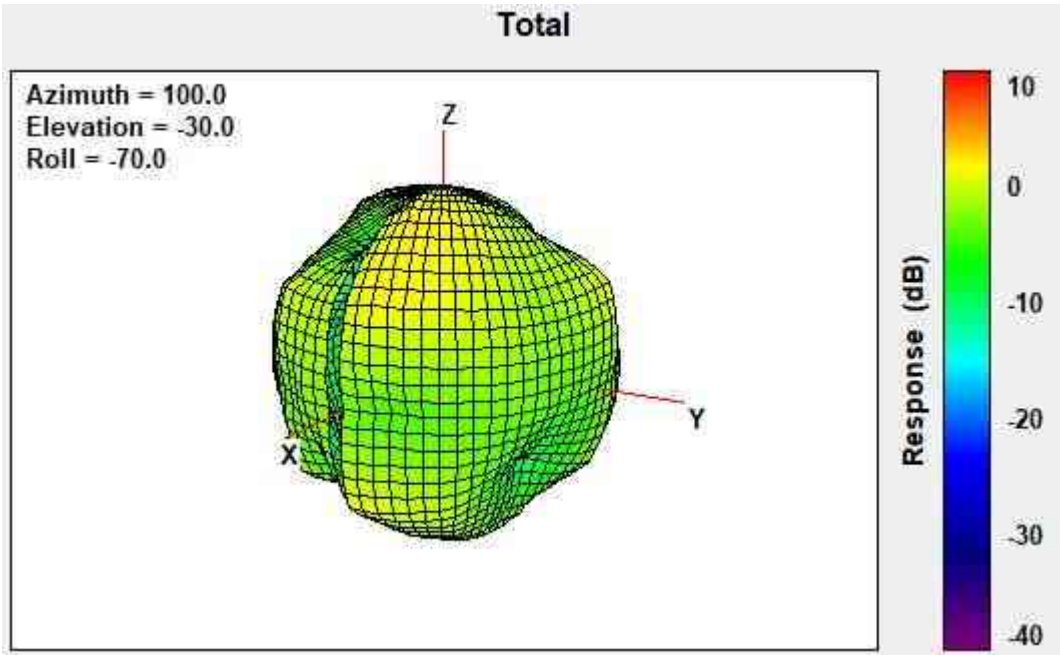
2200MHz



2300MHz

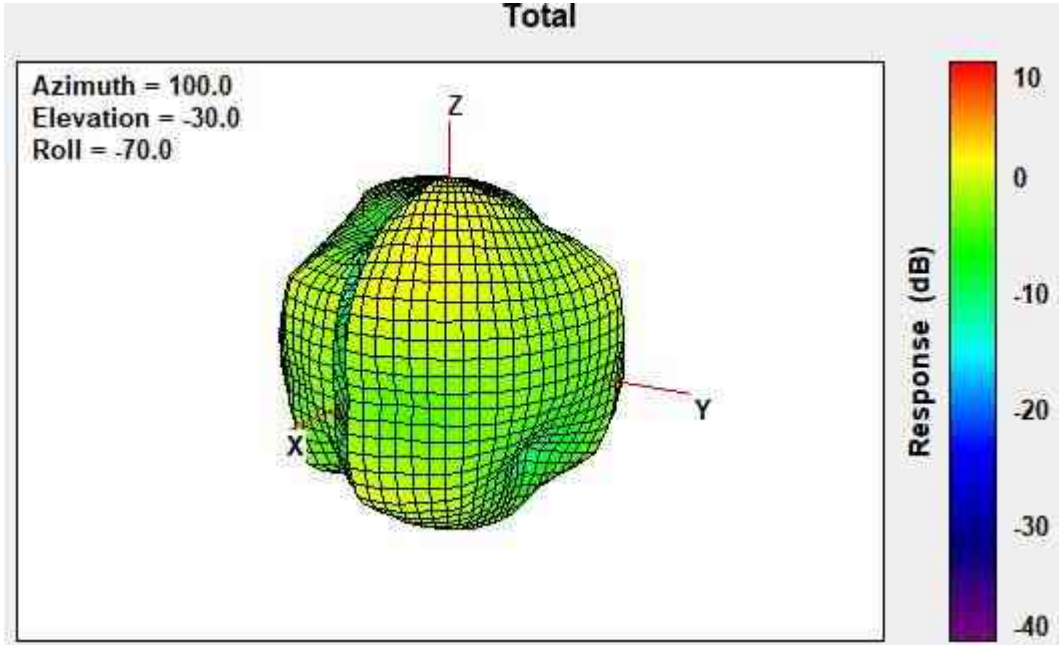


2305MHz



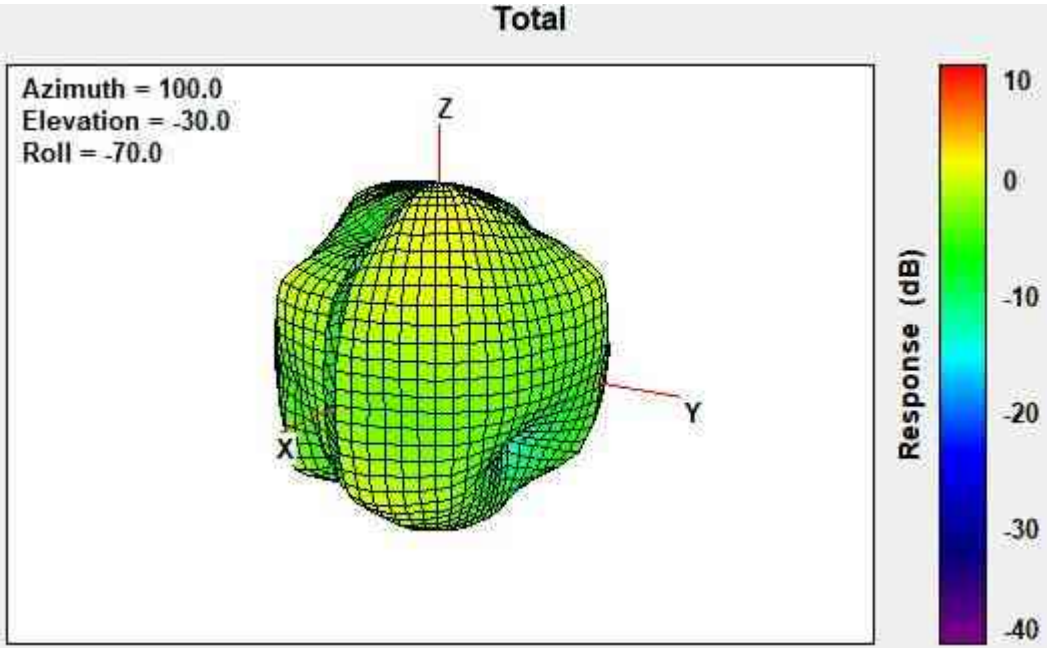
Center Frequency	2305MHz
Horizontal (dBi) peak	0.77
Vertical (dBi) peak	0.10

2315MHz



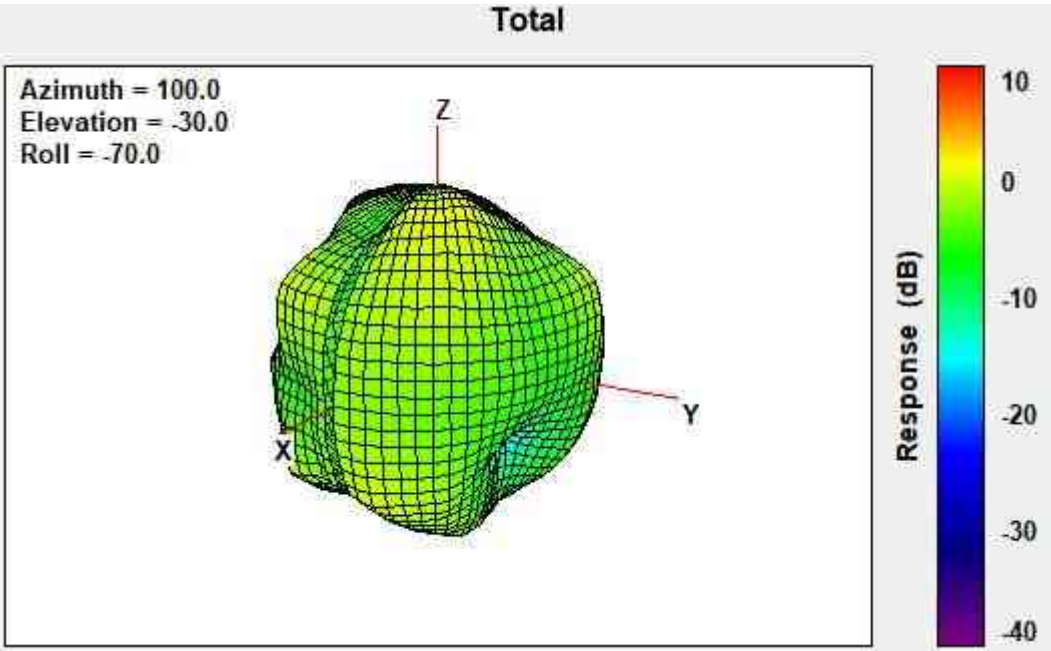
Center Frequency	2315MHz
Horizontal (dBi) peak	0.22
Vertical (dBi) peak	0.34

2350MHz



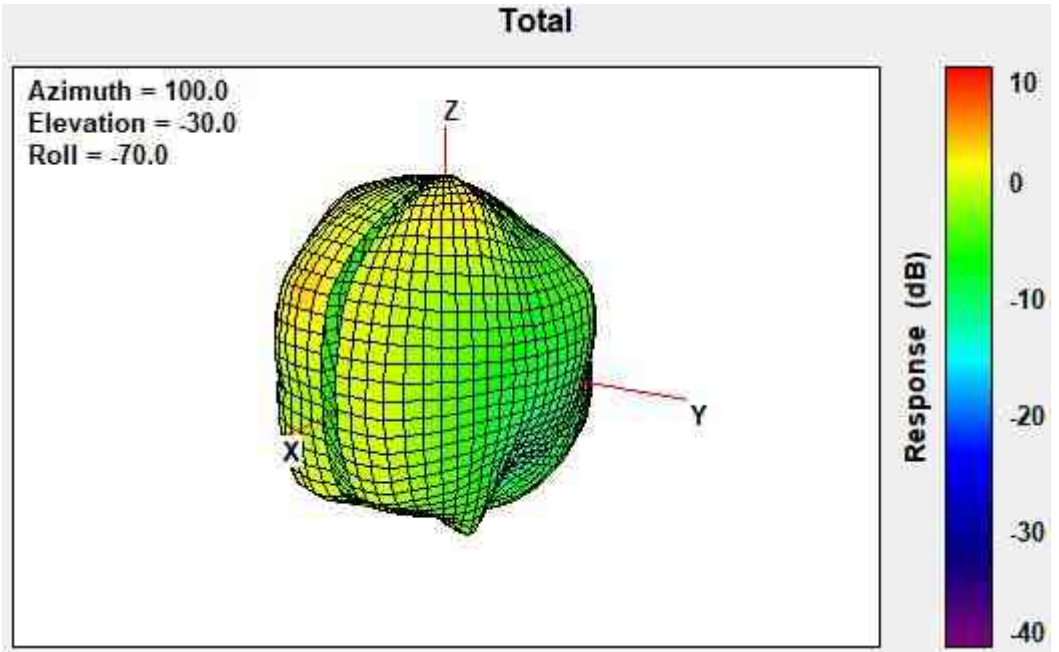
Center Frequency	2350MHz
Horizontal (dBi) peak	0.72
Vertical (dBi) peak	-0.10

2400MHz



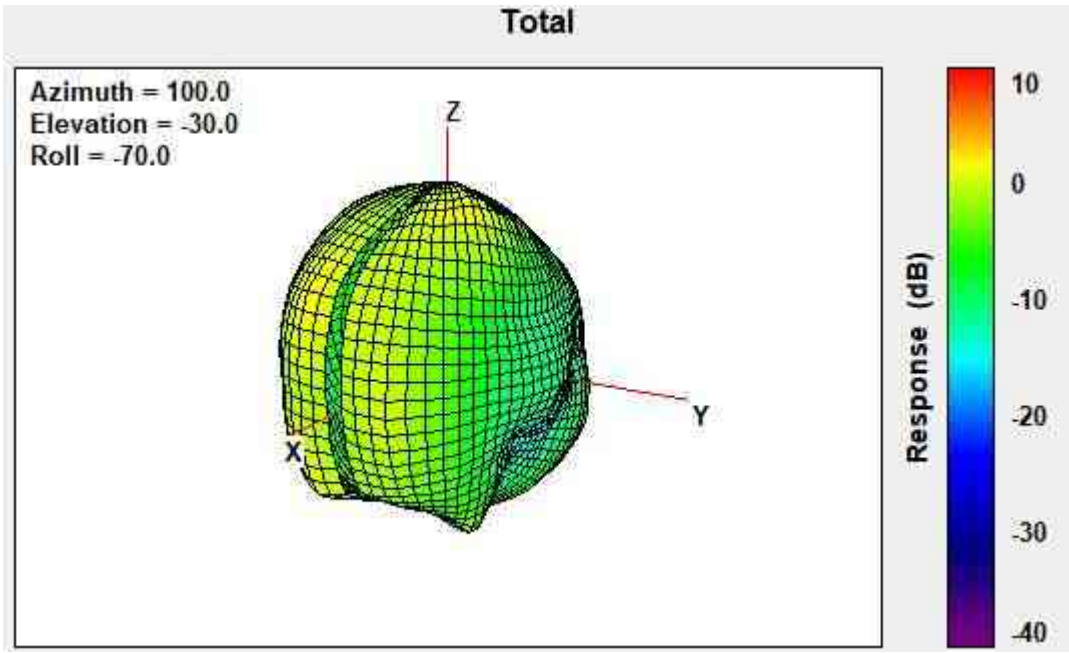
Center Frequency	2400MHz
Horizontal (dBi) peak	0.49
Vertical (dBi) peak	-1.30

2500MHz

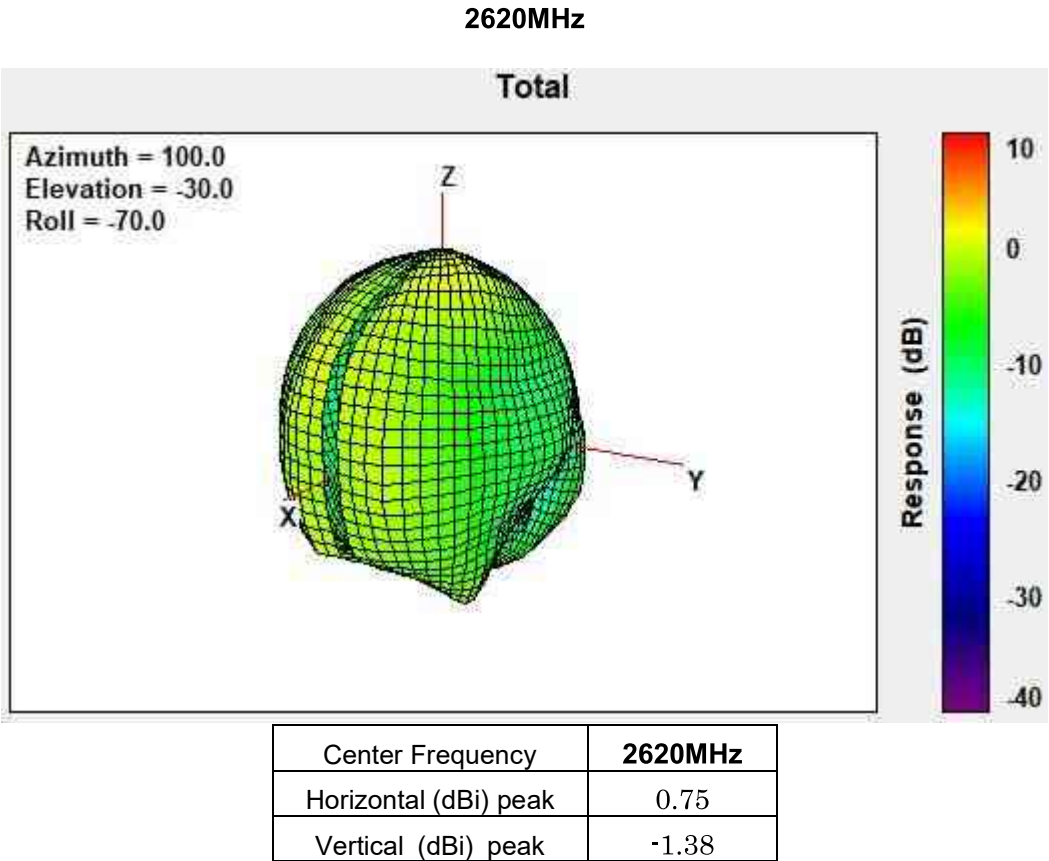
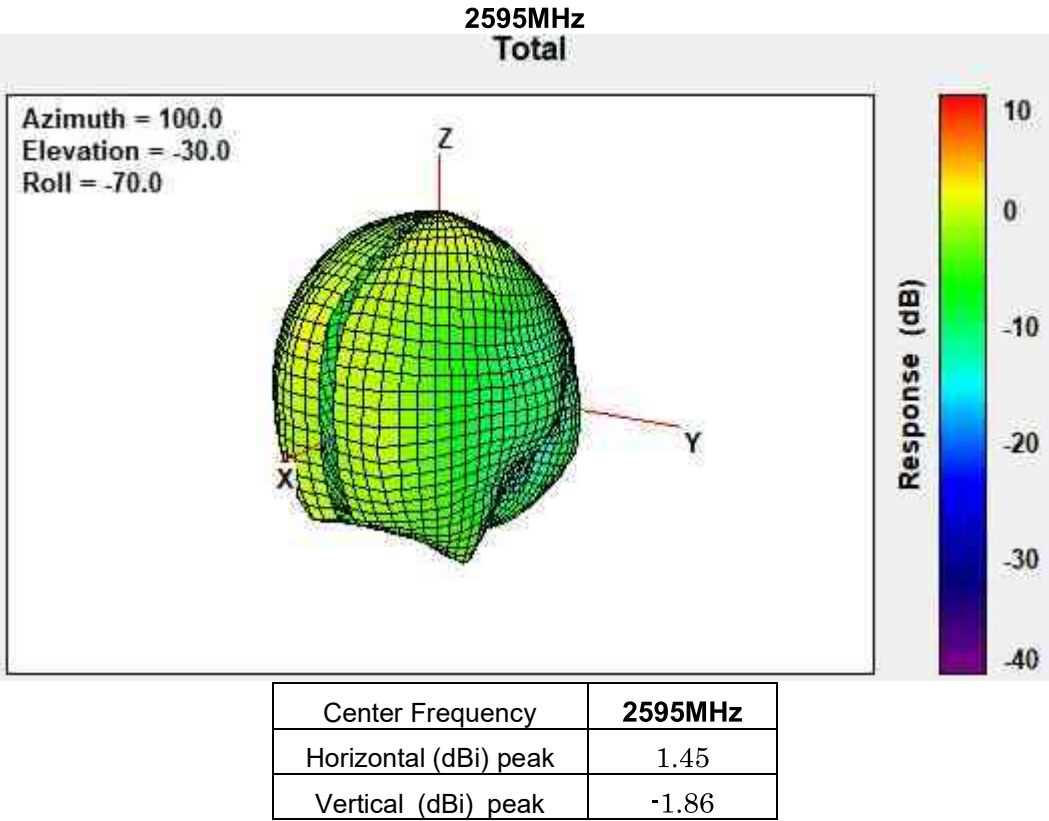


Center Frequency	2500MHz
Horizontal (dBi) peak	2.62
Vertical (dBi) peak	-1.22

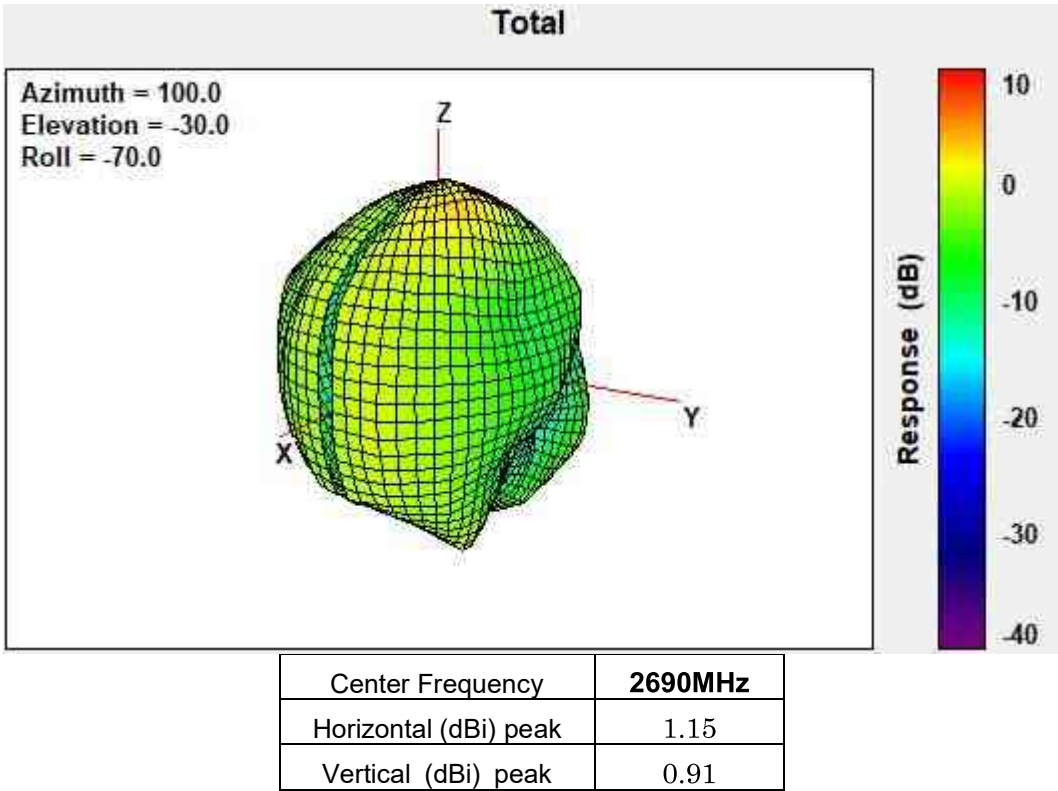
2570MHz



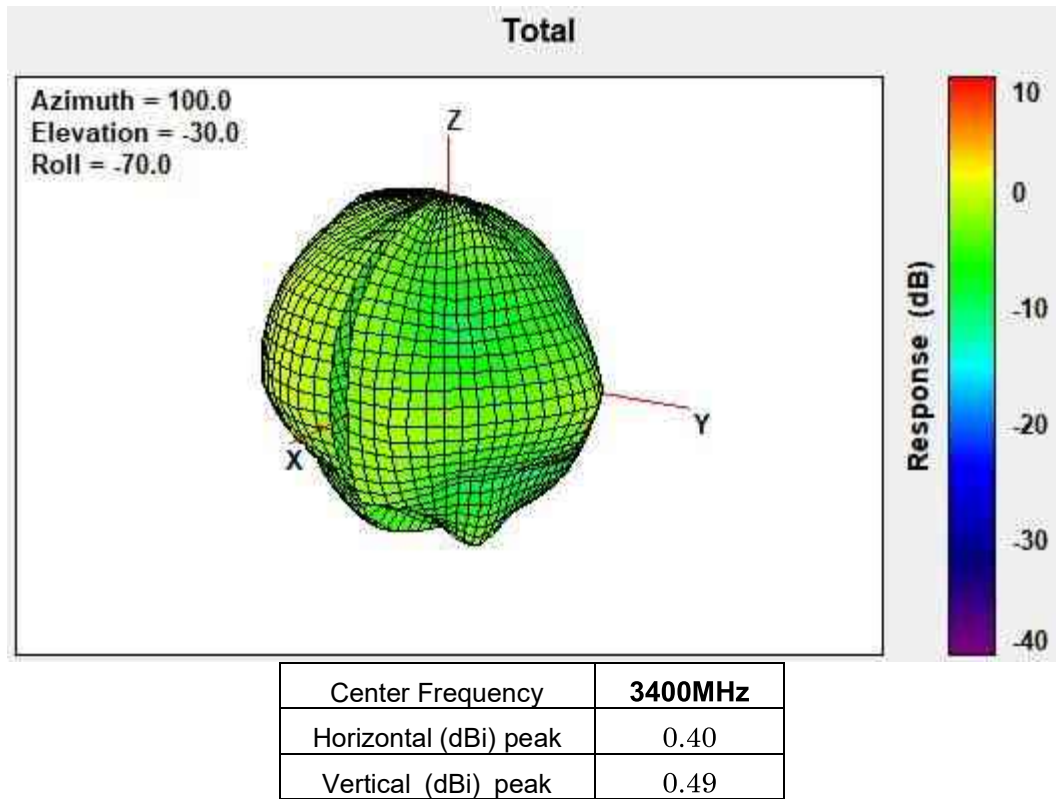
Center Frequency	2570MHz
Horizontal (dBi) peak	2.18
Vertical (dBi) peak	-1.40



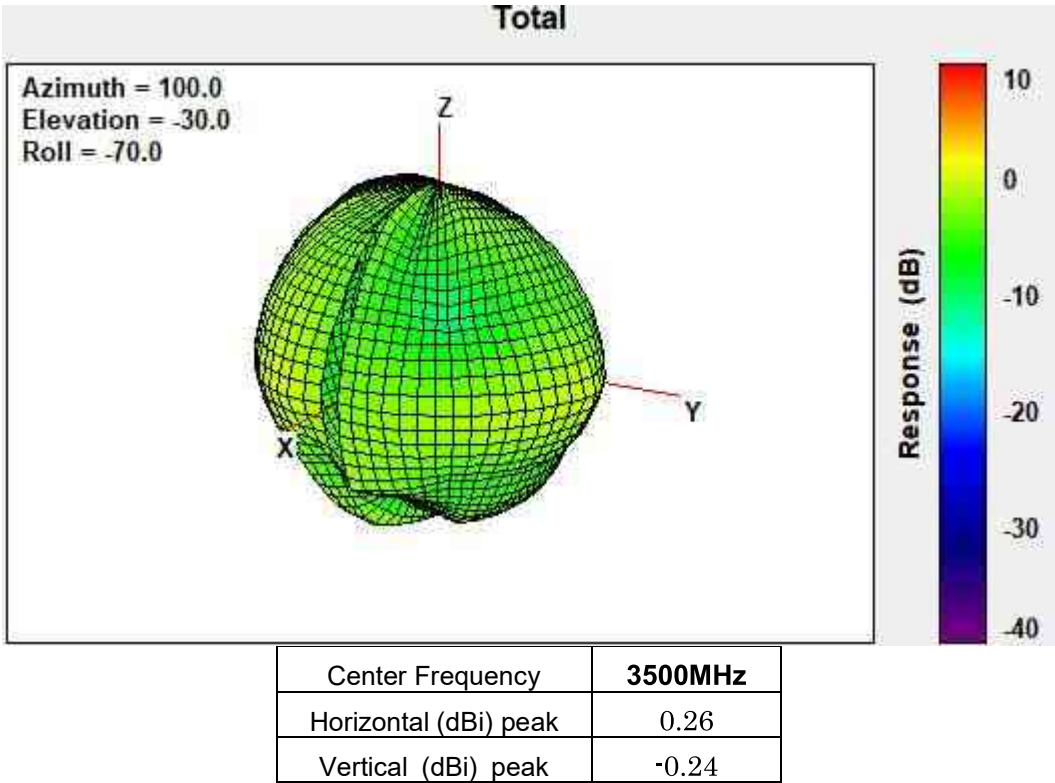
2690MHz



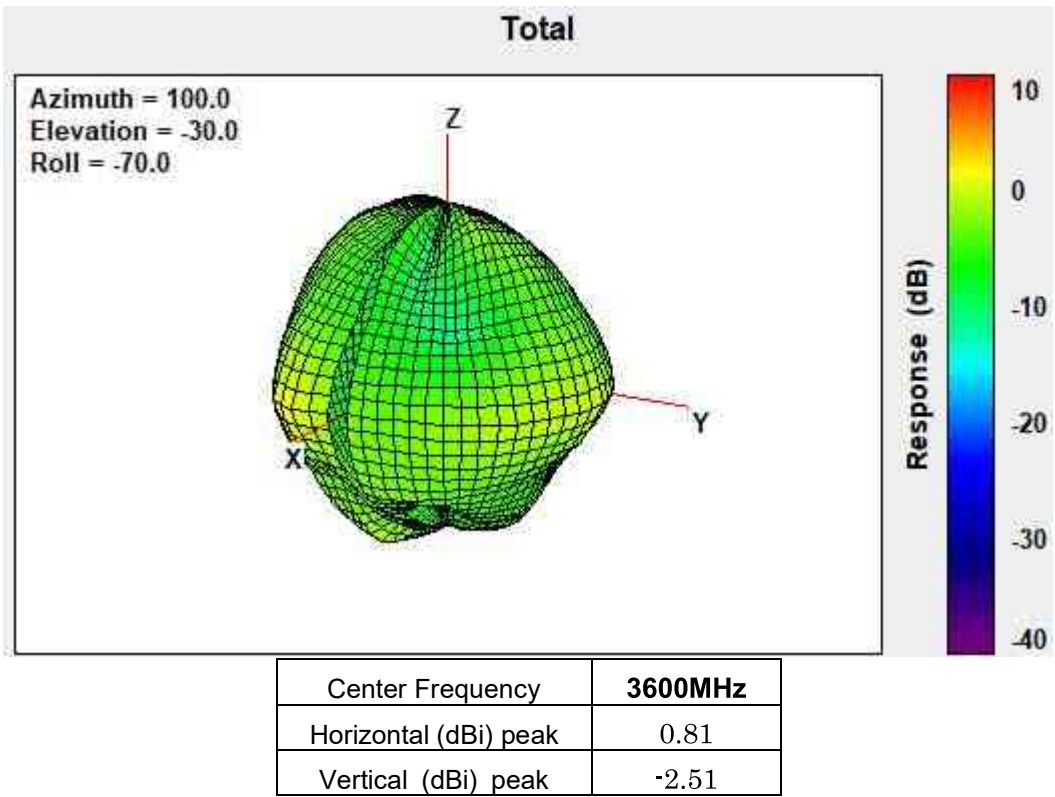
3400MHz



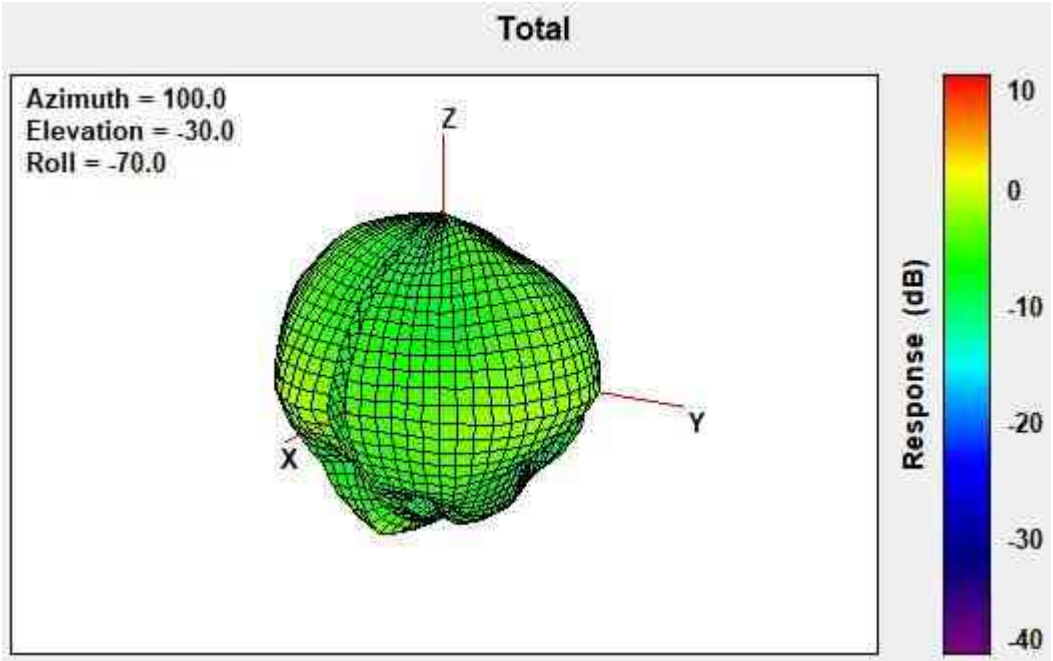
3500MHz



3600MHz

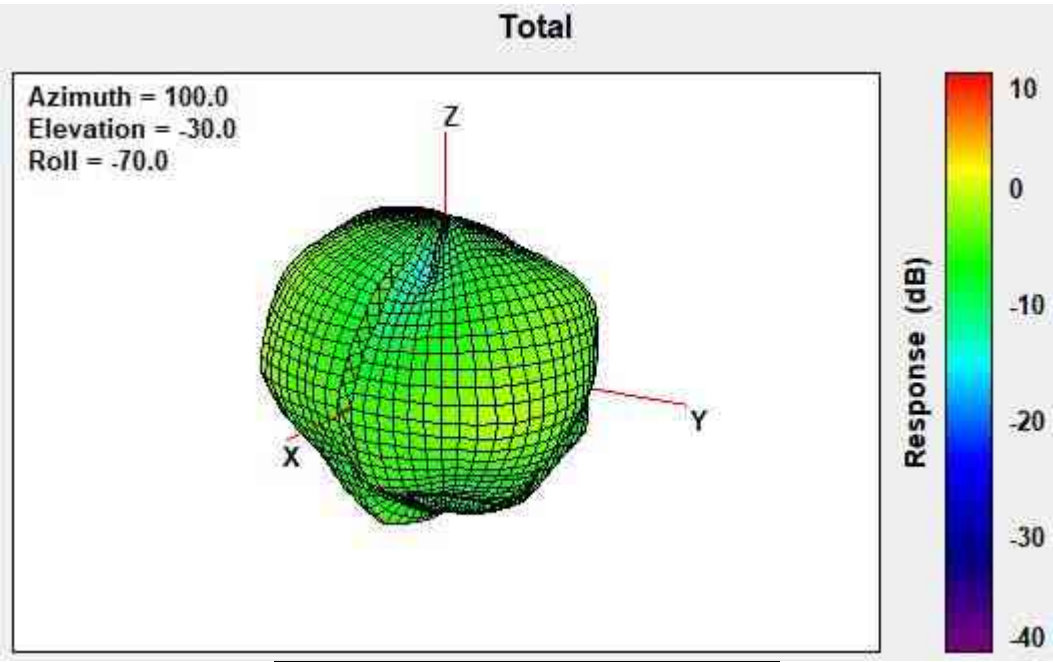


3700MHz



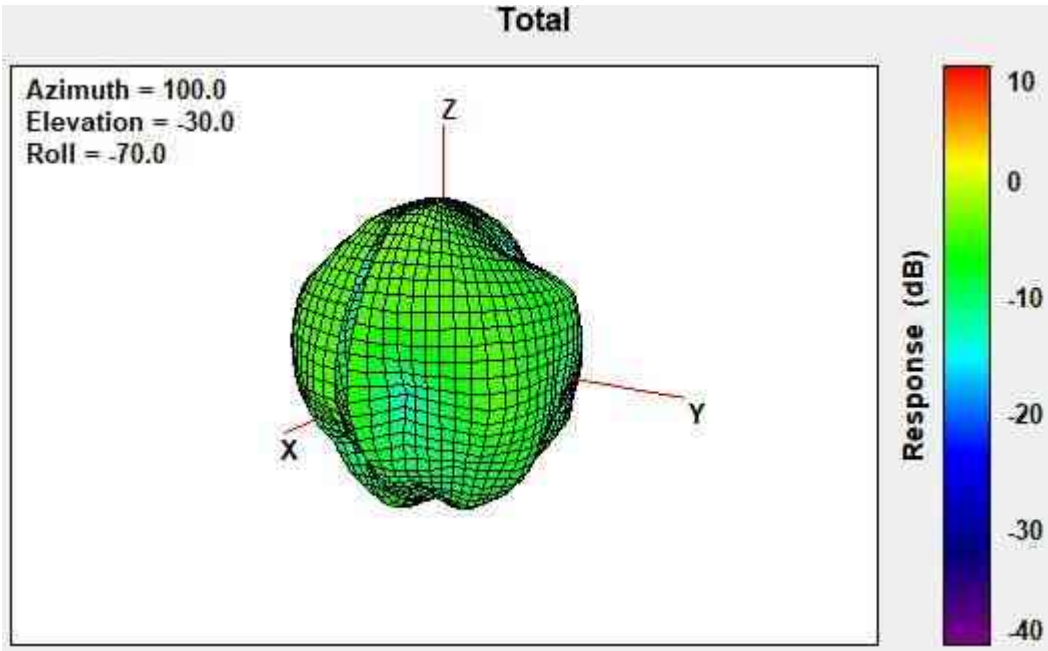
Center Frequency	3700MHz
Horizontal (dBi) peak	-0.67
Vertical (dBi) peak	-4.60

3800MHz



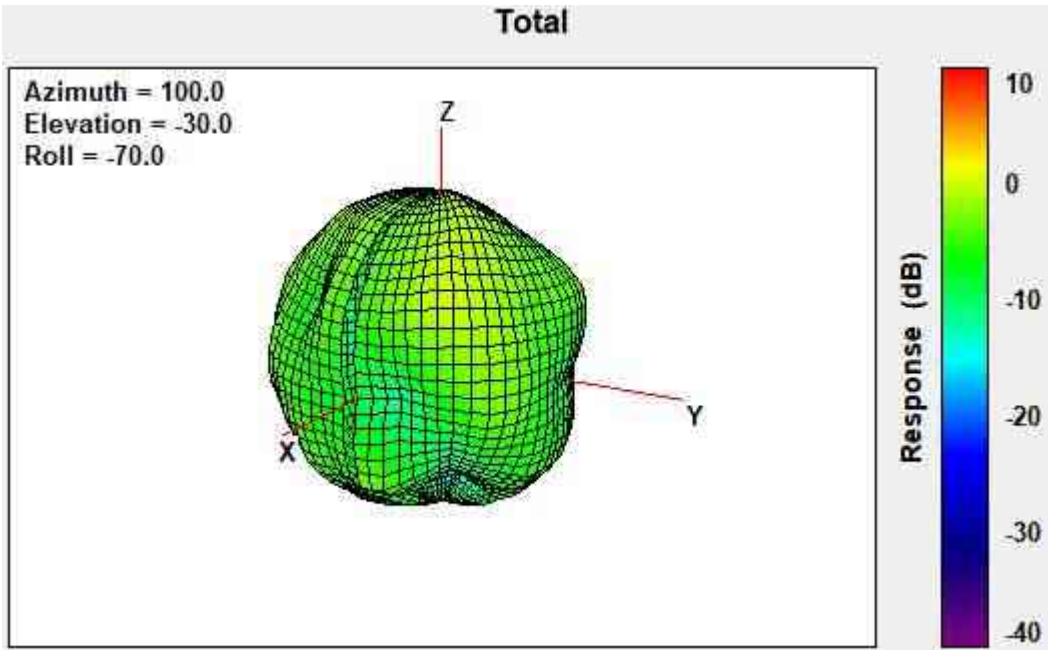
Center Frequency	3800MHz
Horizontal (dBi) peak	0.10
Vertical (dBi) peak	-3.01

4200MHz



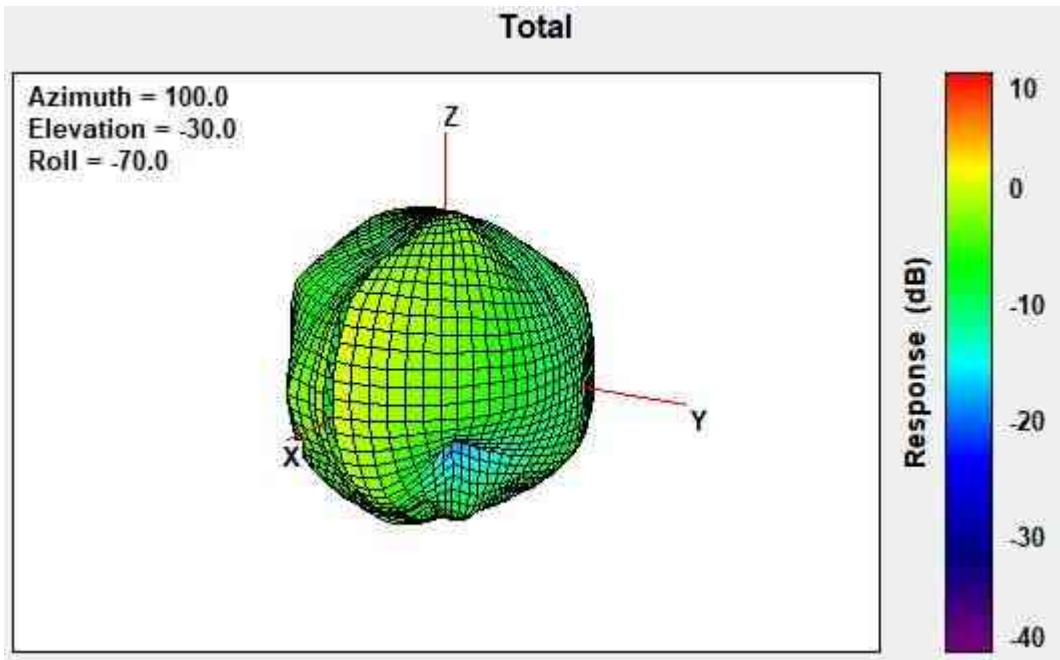
Center Frequency	4200MHz
Horizontal (dBi) peak	-3.92
Vertical (dBi) peak	-3.60

4400MHz



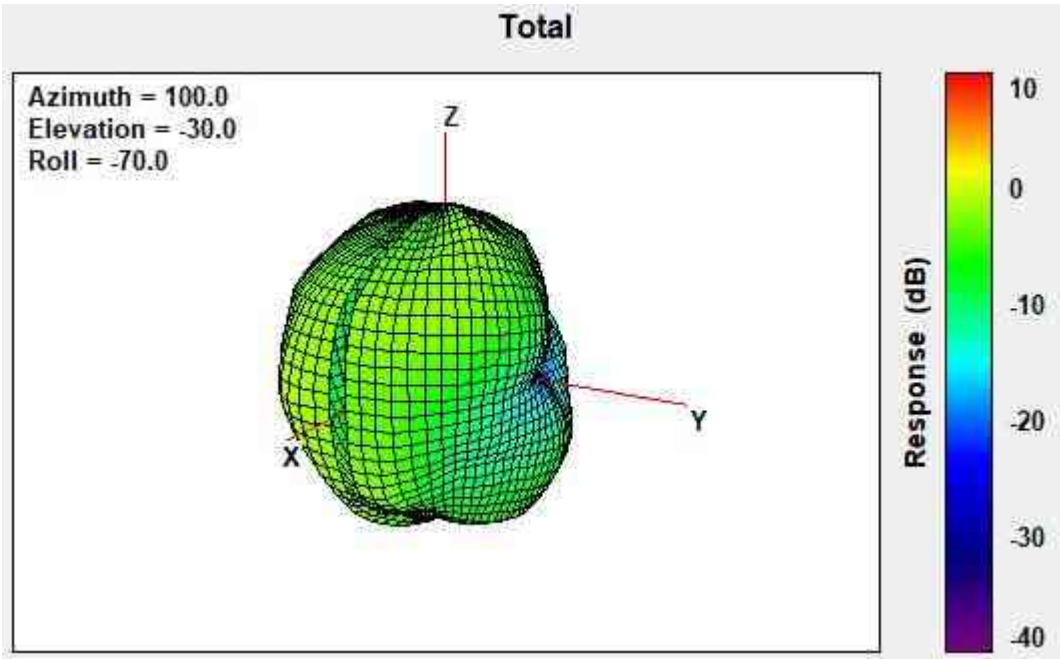
Center Frequency	4400MHz
Horizontal (dBi) peak	-0.56
Vertical (dBi) peak	-2.57

4700MHz



Center Frequency	4700MHz
Horizontal (dBi) peak	0.57
Vertical (dBi) peak	-3.38

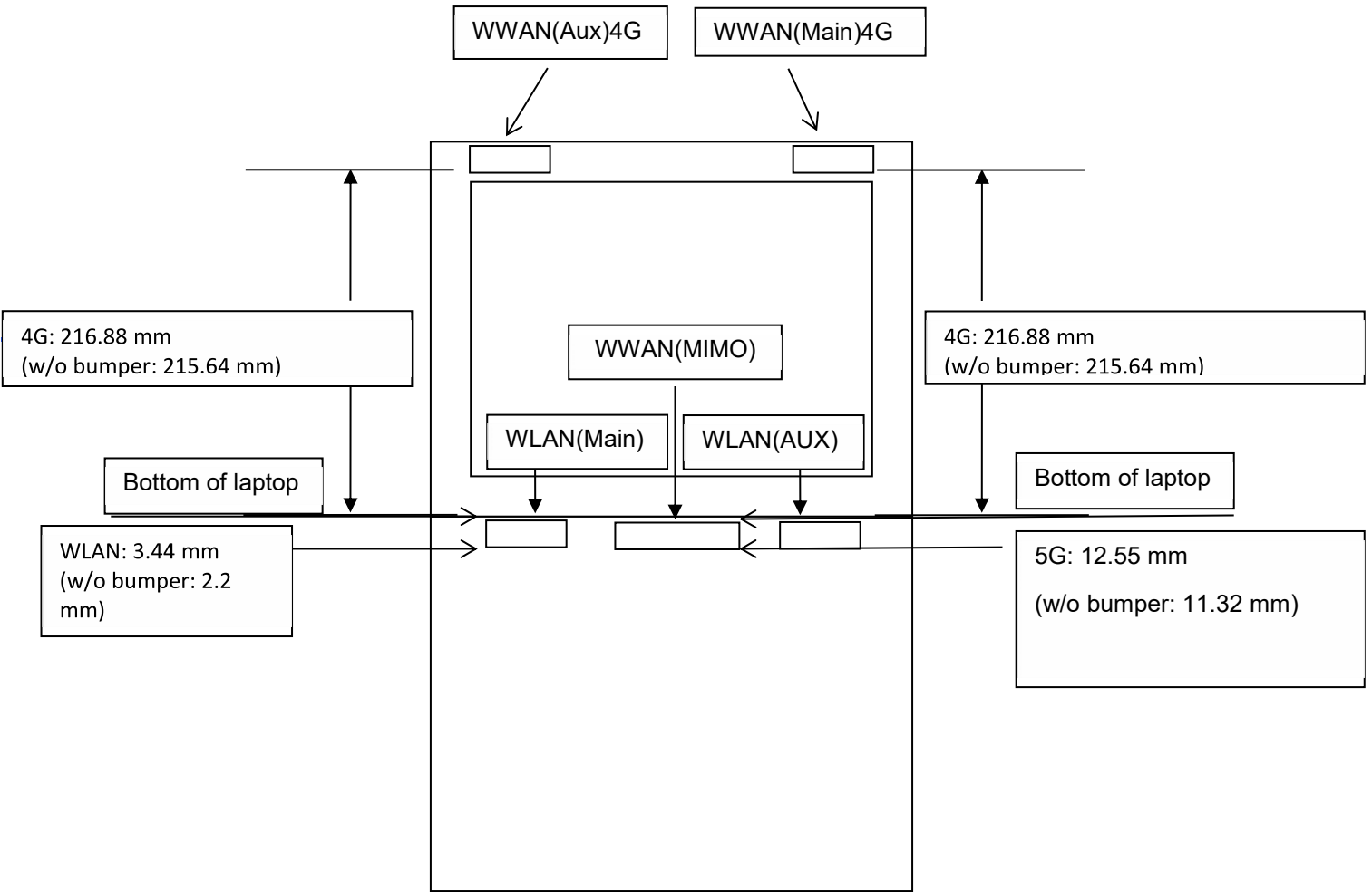
5000MHz



Center Frequency	5000MHz
Horizontal (dBi) peak	-0.22
Vertical (dBi) peak	-2.59

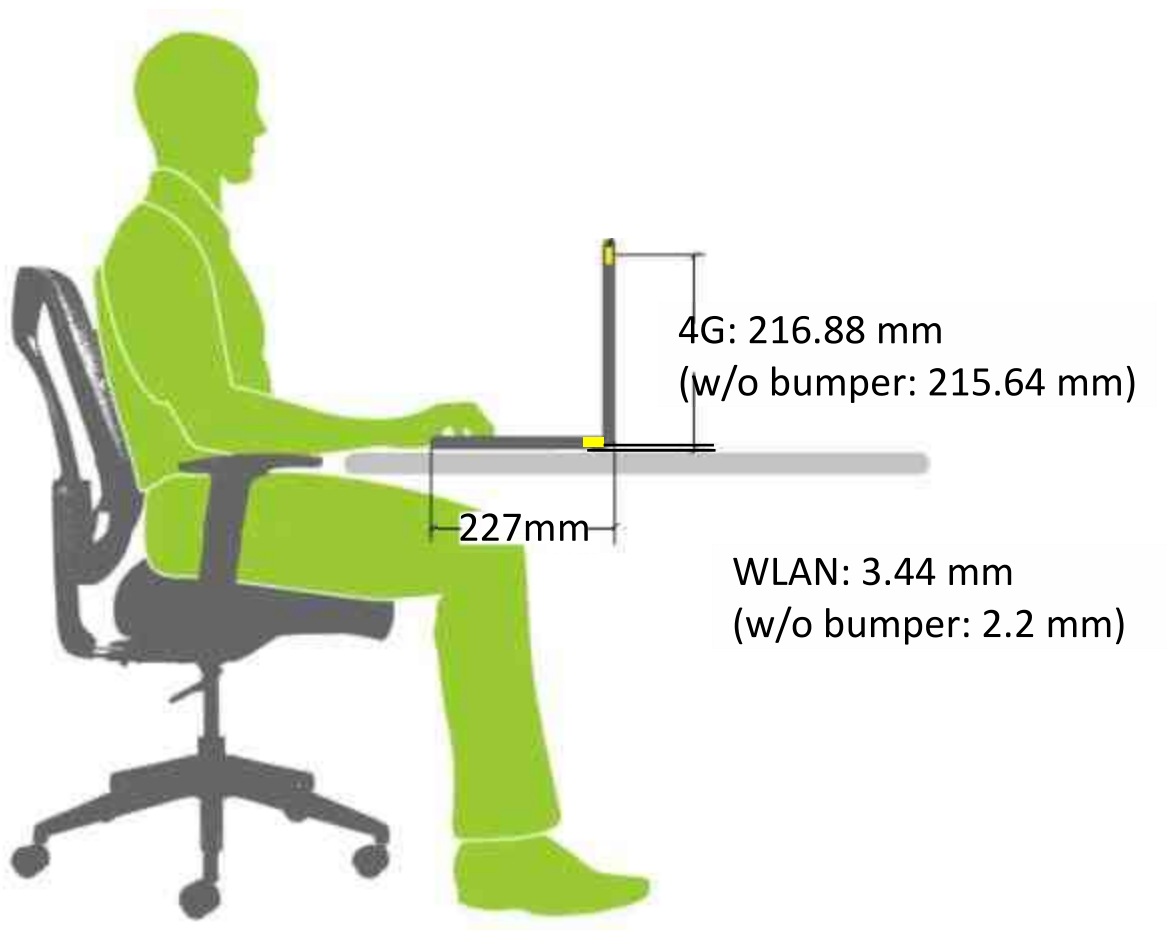
Section 4. Antenna Host Platform Location Information

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)

