

4X4 MiMo 4G/5G

Transit Antenna

TRNM[X]4-6-60-[X]

PANORAMA ANTENNAS



Low Profile Transit Antenna

4x4 MiMo 617-960/1427-6000MHz

Up to 4x4 MiMo WiFi 6e (Optional)

GPS/GNSS 26dB LNA (Optional)

Meets Railway Standards EN50155, EN45545-2 and EN50124-1*

The TRNM[X]4-6-60-[X] MiMo antenna series is designed for use on trains, trams and buses underground or over ground. Incorporating four wide band elements covering the frequency range 617MHz to 6000MHz, the TRNM[X]4-6-60-[X] series is versatile and future proof.

The TRNM[X]4-6-60-[X] series covers global 4G/5G frequencies with 4x4 MiMo, optional up to 4x4 MiMo Wifi 6e and optional GPS/GNSS.

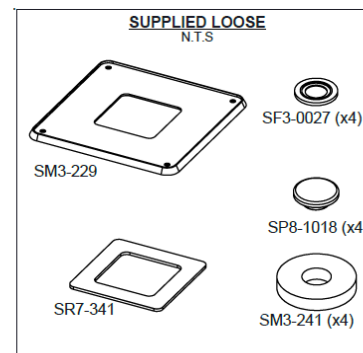
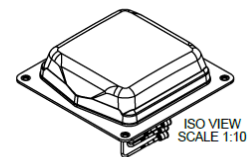
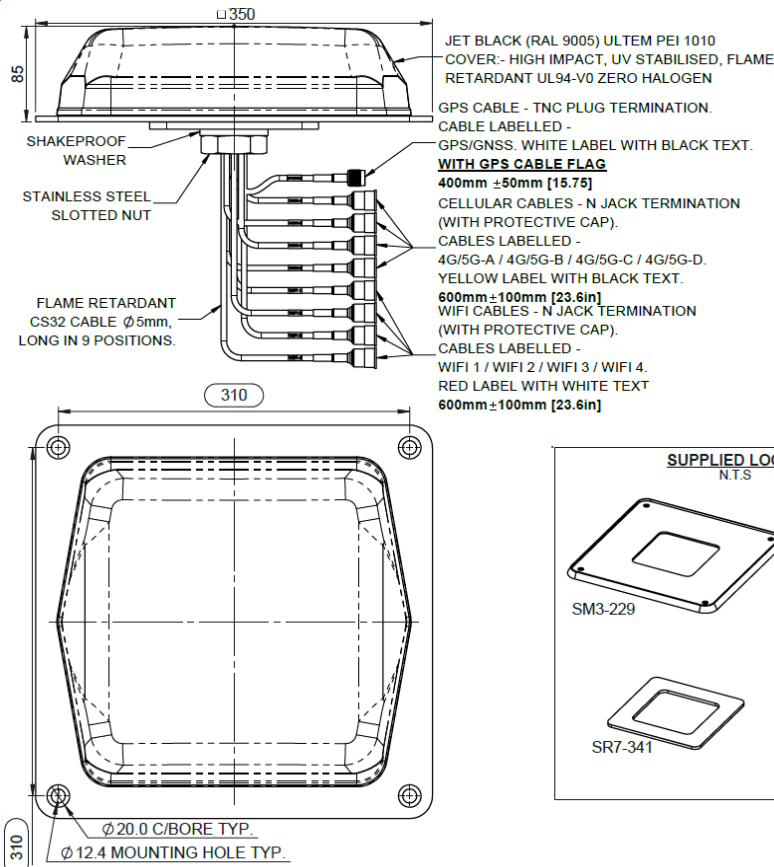
Housed in a high impact, flame retardant Ultem housing, the antenna is fully weatherproof ensuring a long service life with no compromise in performance.

The TRNM[X]4-6-60-[X] antenna meets stringent industry standards including EN50155, EN45545-2 (HL 1-3), EN50124-1* and is ingress protected to IP69k when correctly installed.

*Whole assembly compliant to 27.5 KV AC Insulation Test. Cell/LTE elements tested to 40KA AC Short Circuit Test.

Technical Drawing

TRNMG4-6-60-Q Shown

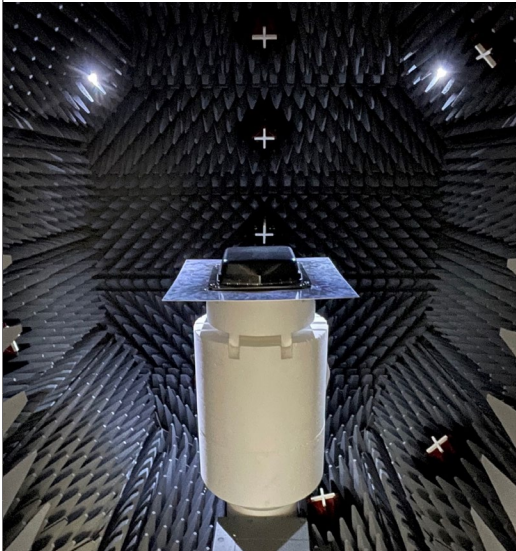


Product Data

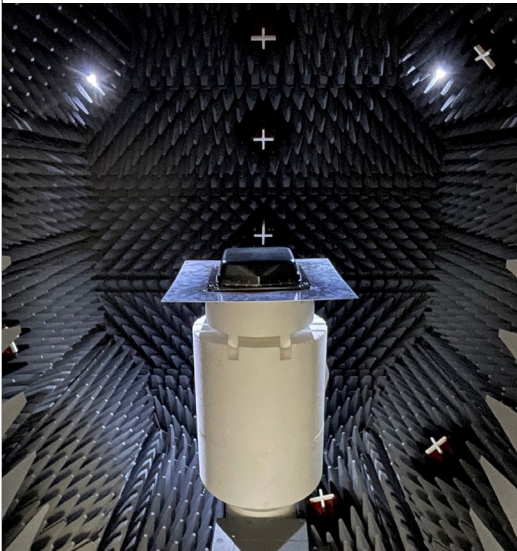
Part No.		TRNMG4-6-60-Q	TRNMG4-6-60-T	TRNMG4-6-60-D	TRNMG4-6-60	TRNM4-6-60	
Electrical Data							
Frequency Range (MHz)	Cell /LTE	4x 617-960 / 1427-6000					
	WiFi	4x 2396-7125	3x 2396-7125	2x 2396-7125	-	-	
	GPS/GNSS	1x 1562-1612					
Typical VSWR*	Cell Elements	< 2:1					
	WiFi Elements	< 2:1				-	-
Isolation**	Cell Elements	>14dB (617-960MHz) / >25dB (1427-6000MHz)					
	Wifi Elerments	>25dB (2.4-2.5GHz) / >30dB (5.150-7.125GHz)				-	-
Pattern				Omni-directional			
Impedance				50Ω			
Max Input Power (W)				60			
GPS/GNSS Data							
Frequency Range (MHz)				1559-1612			-
Impedance				50Ω			-
LNA Gain				26dB			-
Voltage / Current				3-5v 15ma Typical			-
Polarisation				Right Hand Circular			-
Mechanical Data							
Dimensions (mm)	Height	85 (3.34")					
	Width	350 (13.78")					
	Length	350 (13.78")					
Weight Excl. Packaging (kg)				≤ 5			
Environmental Specification							
Operating Temp (°C)				-40° / +85°C (-40° / +185°F)			
Radome Material				Ultem 1010			
Radome Flame Retardance Rating				V0 (UL 94)			
Base Material				Aluminium (corrosion protected & powder coated)			
Rail Industry Approvals							
Flammability				EN45545-2:2020 - HL3 External			
Environmental		EN50155:2021 -Low temperature, dry heat, salt mist, damp heat cyclic, shock, random vibration, long life random vibration					
EMC/EMI				EN 50121-3-2:2016 A1: 2019 - EMC / EMI			
Insulation / Short Circuit		EN 50124-1:2017 - Insulation Test - (27.5KV AC 50Hz 1 min) EN50388:2012 / EN50122-1:2022 - (40kA 50Hz AC 100ms) - Cell elements only					
Ingress Protection / Vandal Protection				ISO 20653: 2013 - IP69K EN 62262:2002 - IK07			
Mounting Data							
Fixing		4 × mounting holes to suit M12 bolts 1x M33 central mounting bush					
Termination Data							
Cable Type				C32 (Compliant to UN ECE R118 & EN45545-2)			
Cable Diameter (mm)				5 (0.2")			
Cable Length (m)				0.6m (20") [Cell] / 0.4m (16") [GPS/GNSS]			
Termination	4G/5G	4x N Socket (f)					
	WiFi	4x N Socket (f)	3x N Socket (f)	2x N Socket (f)	-	-	
	GPS/GNSS	1x TNC Plug (m)					-

*Across 90% of relevant bands when measured on a 600 x 600mm (2' x 2') ground plane with 0.5m (20") of CS32 cable **Worst case isolation measured with 0.5m (1.5') CS32 cable

Electrical Data- Cell

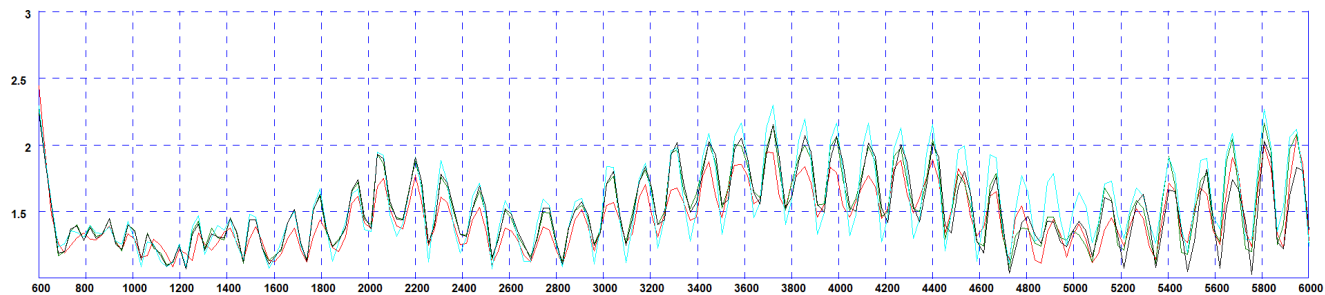
Measurement Conditions	4G/5G Antennas				
TRNMG4-6-60-Q measured on 600x600mm (2'x2') ground plane with 0.5m (20") CS32 Pigtails	Frequency Range (MHz)	LTE Bands	Antenna Element	Peak Gain (dBi)	Efficiency (%)
	617-698	71	Cell A	5.8	80
			Cell B	6.0	79
			Cell C	6.1	78
			Cell D	5.7	80
	699-798	12,13, 14 17,28	Cell A	6.9	82
			Cell B	6.9	82
			Cell C	7.0	82
			Cell D	6.7	81
	807- 862	5,19,20,26,27	Cell A	7.2	81
			Cell B	7.3	81
			Cell C	7.5	81
			Cell D	7.1	81
	880-960	8	Cell A	7.2	84
			Cell B	7.3	84
			Cell C	7.5	84
			Cell D	7.1	84
	1427-1518	11, 21, 74,75,76	Cell A	7.9	86
			Cell B	8.0	86
			Cell C	8.2	87
			Cell D	8.1	86
	1710-1920	2,3,4,9,25,35, 39,66	Cell A	7.3	76
			Cell B	7.1	77
			Cell C	7.1	77
			Cell D	7.1	77
	1920-2170	1,23	Cell A	8.1	76
			Cell B	8.6	77
			Cell C	8.8	77
			Cell D	8.2	77
	2300-2400	30,40	Cell A	9.1	80
			Cell B	9.2	81
			Cell C	9.5	81
			Cell D	9.1	82
	2496-2690	7,38,41	Cell A	8.4	82
			Cell B	8.4	83
			Cell C	8.5	83
			Cell D	8.7	84
	3300-4200	22,42,43,48,77, 78,79	Cell A	7.4	69
			Cell B	7.2	69
			Cell C	7.3	68
			Cell D	7.3	70
	4400-5000	79	Cell A	7.1	65
			Cell B	7.3	63
			Cell C	7.6	67
			Cell D	8.0	69

Electrical Data - WiFi

Measurement Conditions	WiFi Antennas				
TRNMG4-6-60-Q measured on 600x600mm (2'x2') ground plane with 0.5m (20") CS32 Pigtails	Frequency Range (MHz)	WiFi Bands	Antenna Element	Peak Gain (dBi)	Efficiency (%)
	2396-2485	2.5GHz	WiFi 1	8.2	71
			WiFi 2	8.3	70
			WiFi 3	7.8	71
			WiFi 4	7.9	71
	5150-5250	UNII-1	WiFi 1	7.8	70
			WiFi 2	7.0	68
			WiFi 3	8.0	68
			WiFi 4	7.0	69
	5250-5350	UNII-2A	WiFi 1	7.6	69
			WiFi 2	6.6	68
			WiFi 3	7.2	68
			WiFi 4	7.2	69
	5470-5725	UNII-2B	WiFi 1	7.9	64
			WiFi 2	7.1	62
			WiFi 3	7.7	64
			WiFi 4	7.3	61
	5725-5900	UNII-3	WiFi 1	8.4	62
			WiFi 2	7.7	58
			WiFi 3	8.5	60
			WiFi 4	8.1	59
	5845-5885	UNII-4	WiFi 1	8.2	60
			WiFi 2	7.5	56
			WiFi 3	8.3	58
			WiFi 4	7.8	57
	5935-6415	UNII-5	WiFi 1	9.0	66
			WiFi 2	9.0	58
			WiFi 3	9.1	61
			WiFi 4	9.2	59
	6435-6515	UNII-6	WiFi 1	7.6	69
			WiFi 2	7.6	58
			WiFi 3	7.5	62
			WiFi 4	7.9	60
	6535-6875	UNII-7	WiFi 1	8.1	71
			WiFi 2	7.0	61
			WiFi 3	8.3	65
			WiFi 4	7.4	62
	6875-7125	UNII-8	WiFi 1	8.3	69
			WiFi 2	7.8	62
			WiFi 3	8.3	66
			WiFi 4	7.7	61

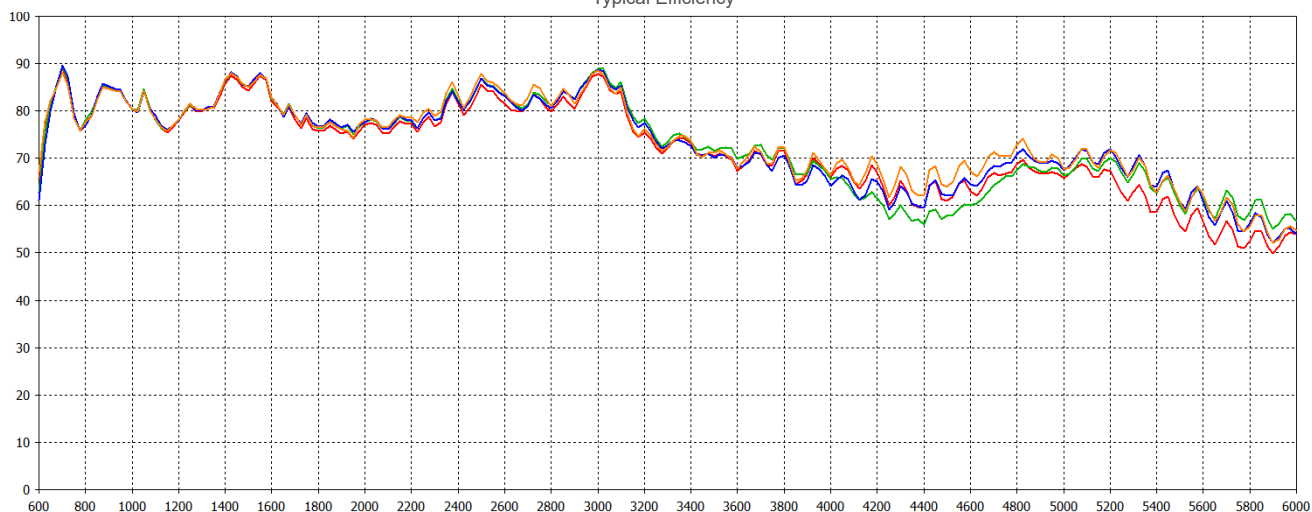
Electrical Data- Cell

Typical VSWR *



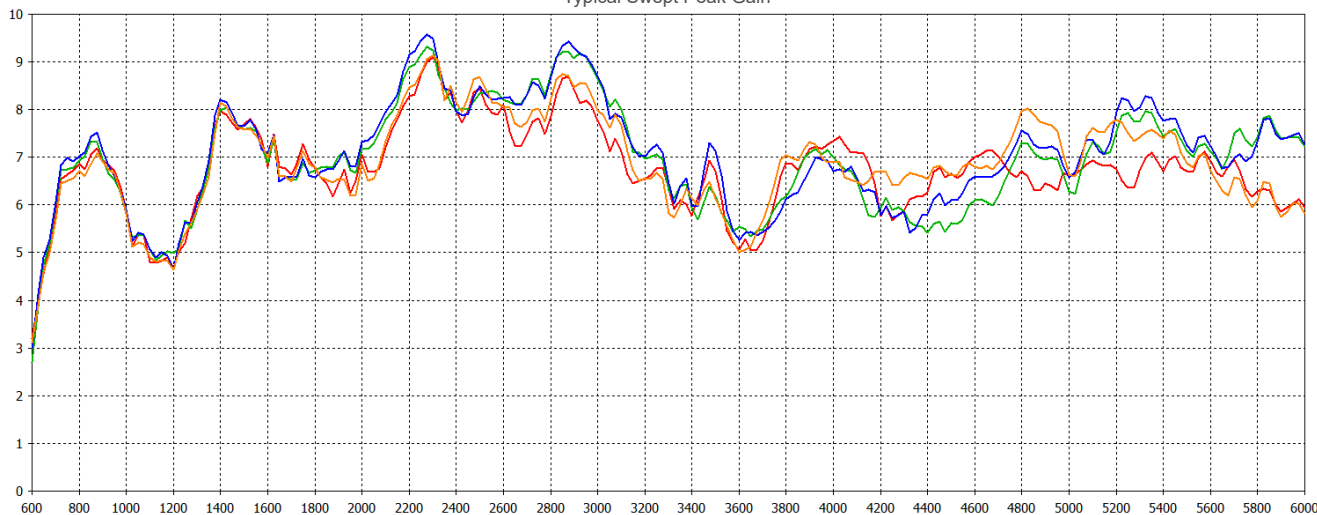
*VSWR measured with 0.5m (1.5') of CS32 cable

Typical Efficiency*



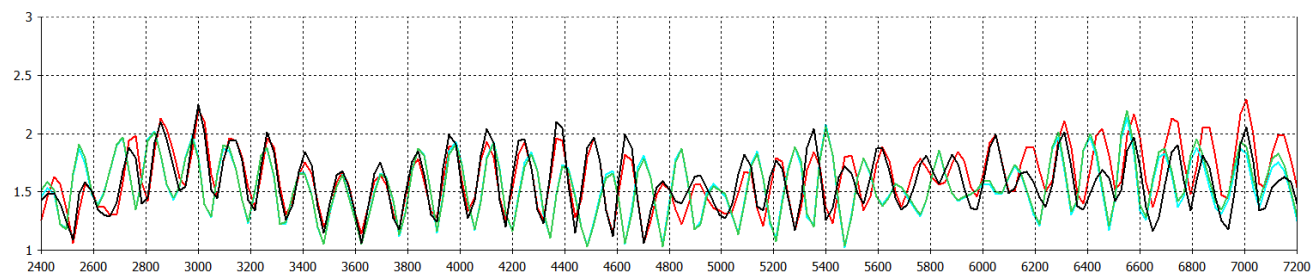
*Efficiency measured with 0.5m (1.5') of CS32 cable

Typical Swept Peak Gain*



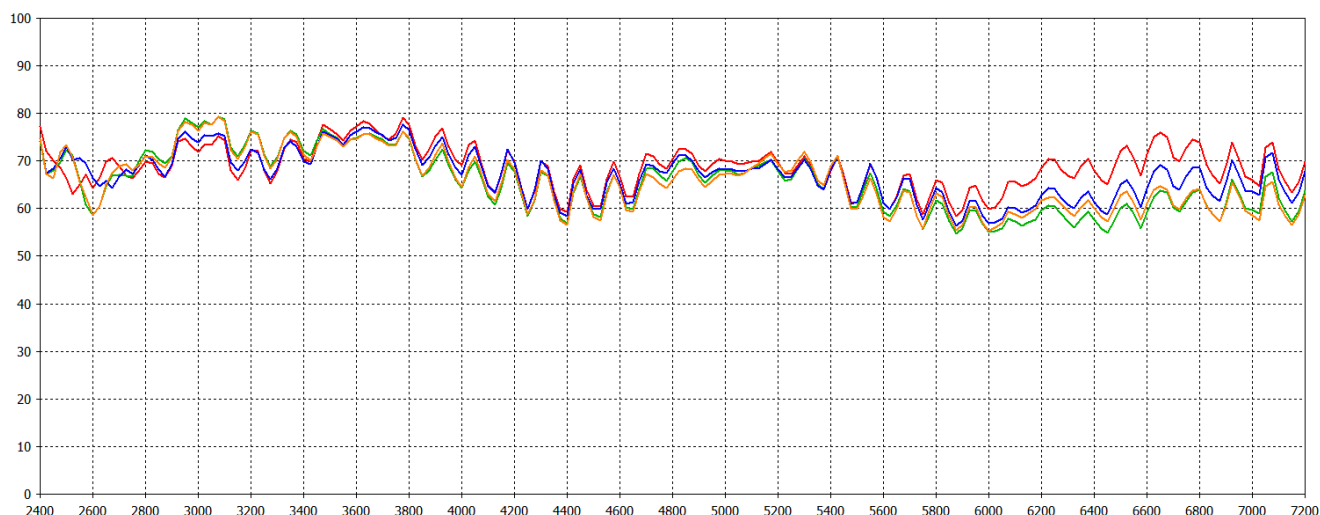
* Swept peak gain measured with 0.5m (1.5') of CS32 cable

Typical VSWR *



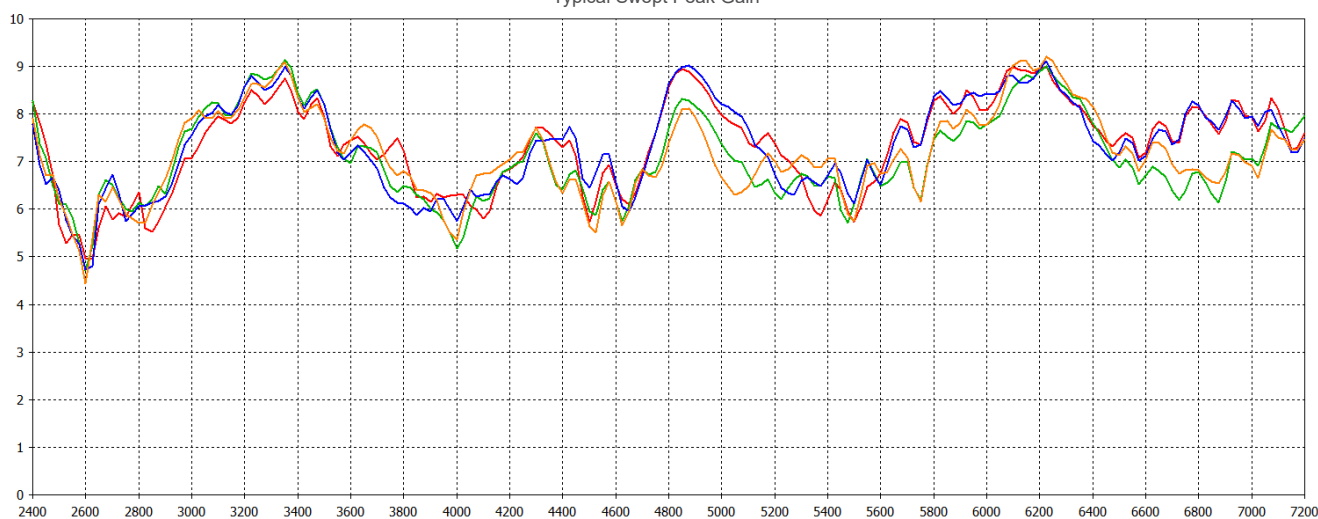
*VSWR measured with 0.5m (1.5') of CS32 cable

Typical Efficiency*



*Efficiency measured with 0.5m (1.5') of CS32 cable

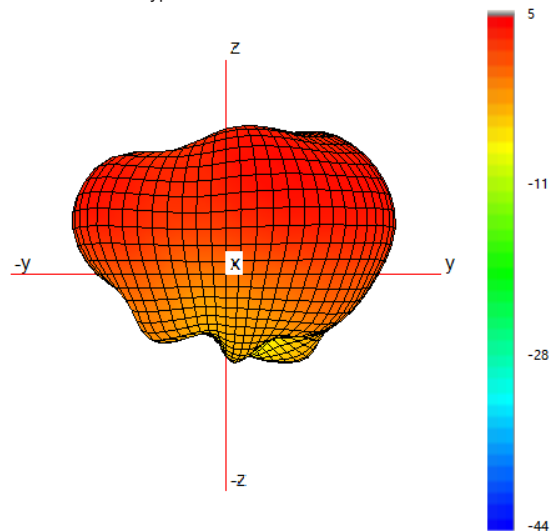
Typical Swept Peak Gain*



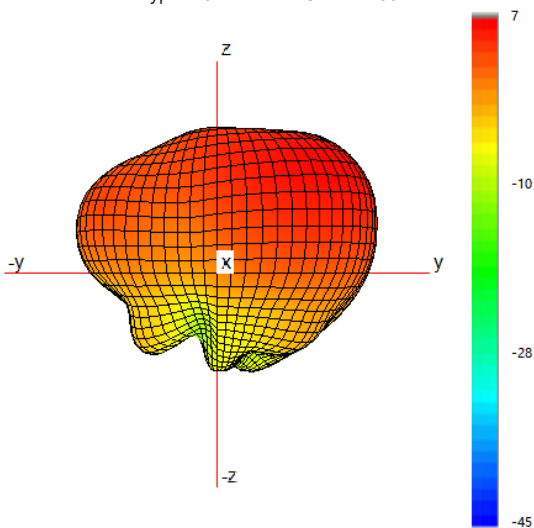
* Swept peak gain measured with 0.5m (1.5') of CS32 cable

3D Patterns -Cell A

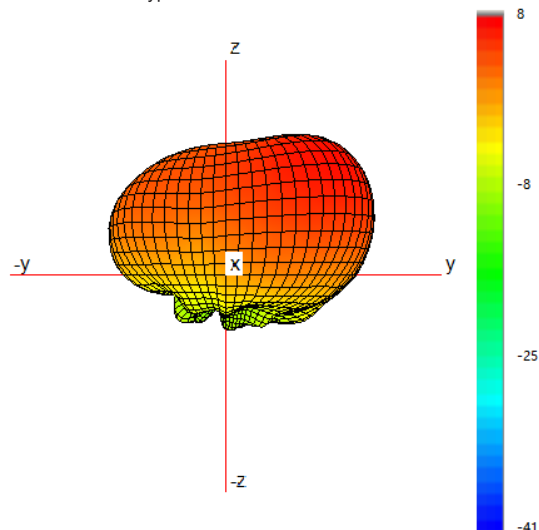
Typical 3D Pattern- Cell A - 650 MHz



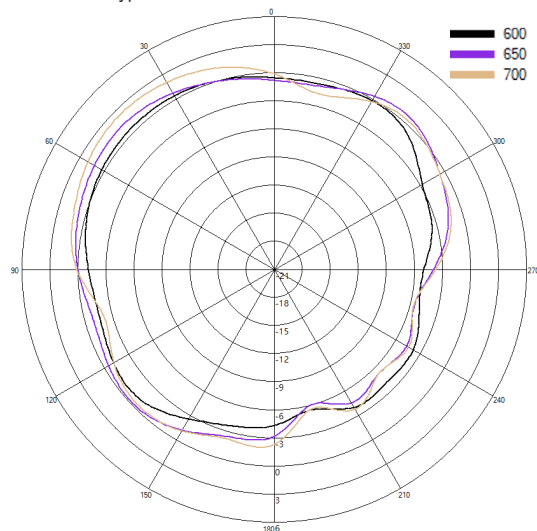
Typical 3D Pattern- Cell A - 750 MHz



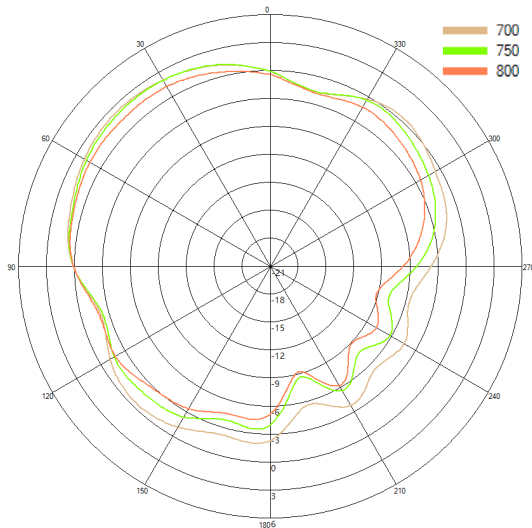
Typical 3D Pattern- Cell A - 850 MHz



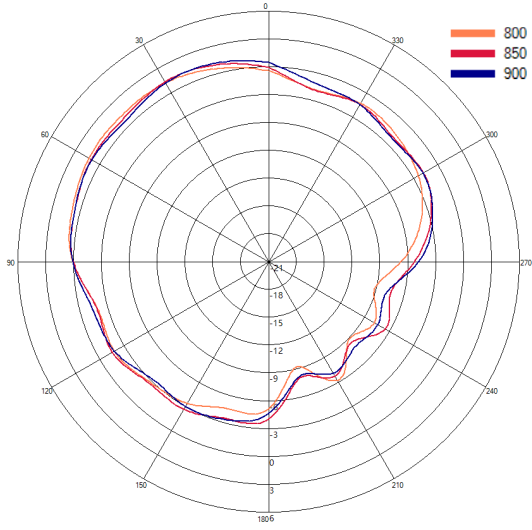
Typical H Plane- Cell A - Patterns- 600-700MHz



Typical H Plane- Cell A - Patterns- 700-800MHz

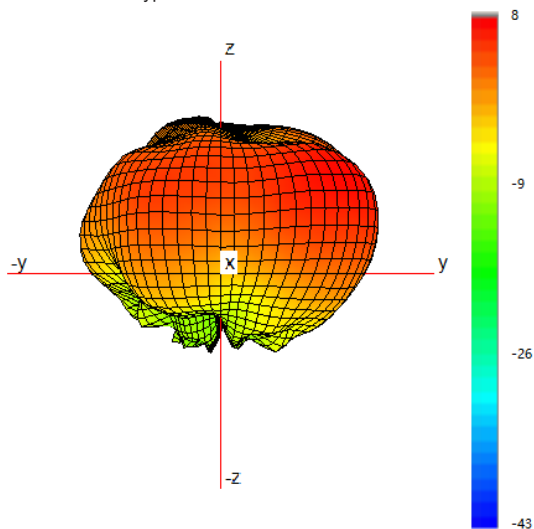


Typical H Plane- Cell A - Patterns- 800-900MHz

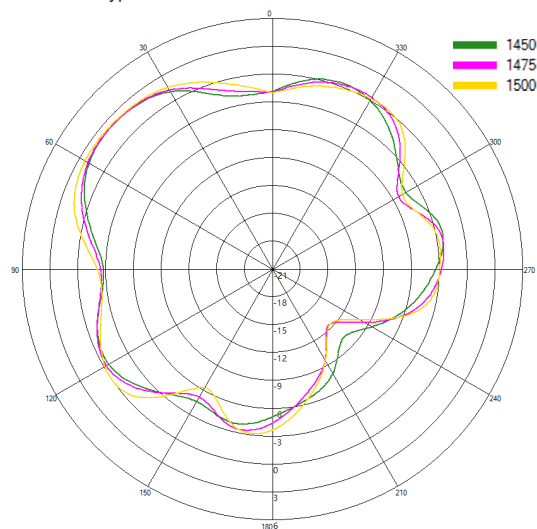


3D Patterns Cell A

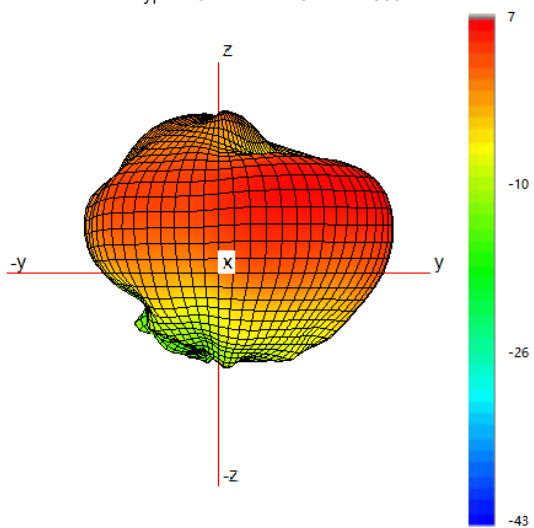
Typical 3D Pattern- Cell A - 1475 MHz



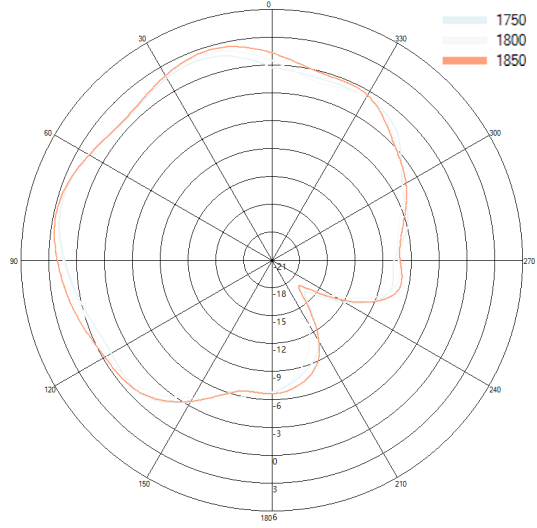
Typical H Plane- Cell A- Patterns- 1450-1500 MHz



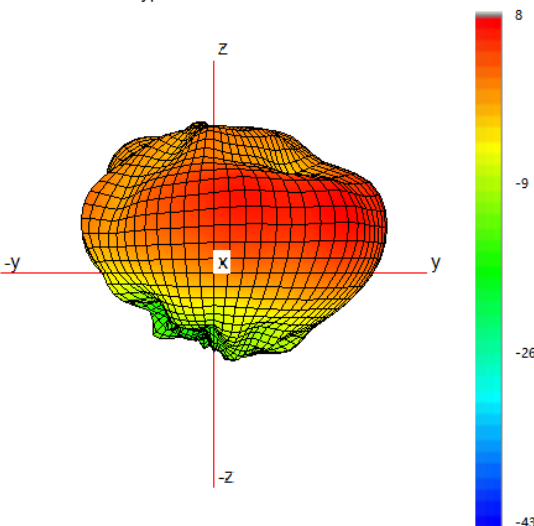
Typical 3D Pattern- Cell A - 1800 MHz



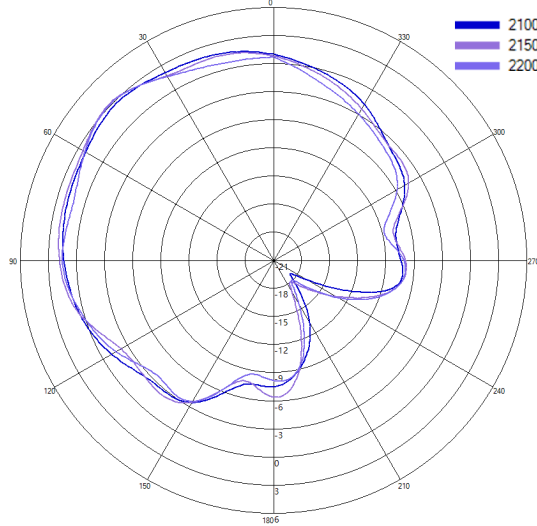
Typical H Plane- Cell A- Patterns- 1750-1850 MHz



Typical 3D Pattern- Cell A - 2150 MHz

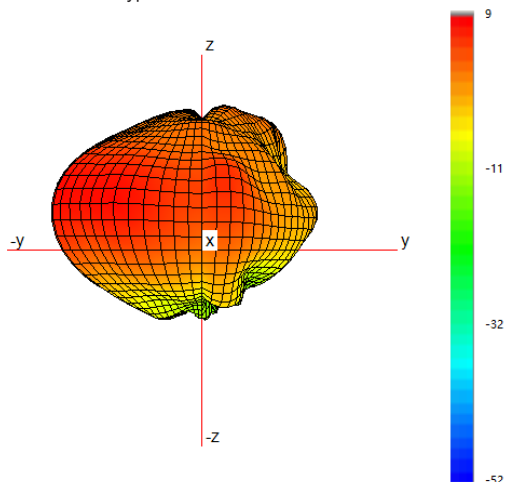


Typical H Plane- Cell A- Patterns- 2100-2200 MHz

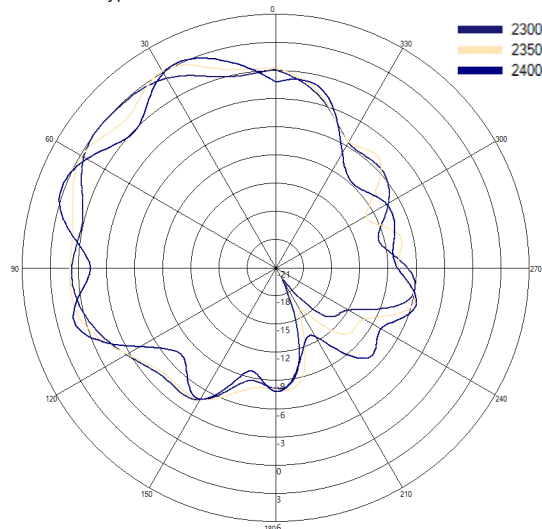


3D Patterns -Cell A

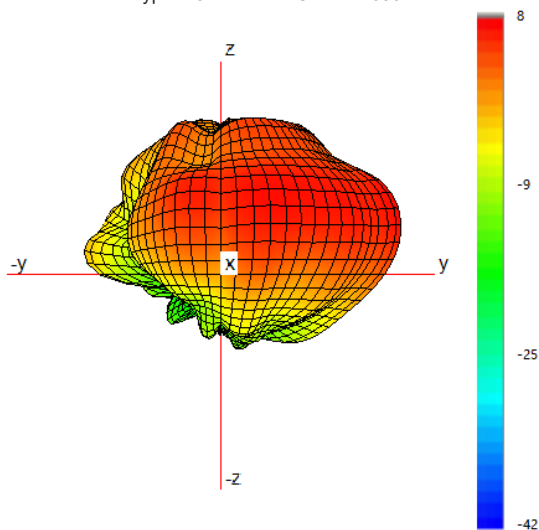
Typical 3D Pattern- Cell A - 2350 MHz



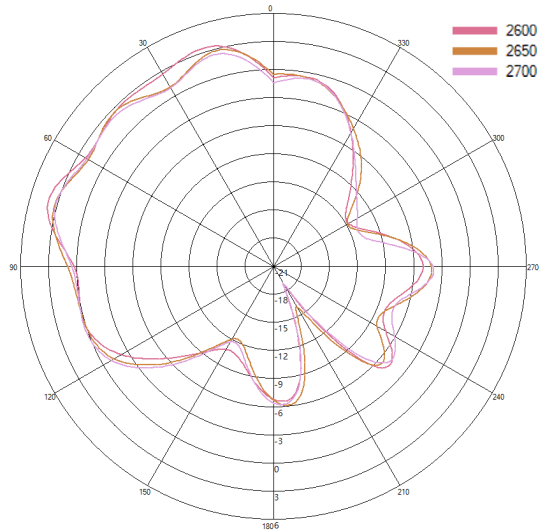
Typical H Plane- Cell A - Patterns- 2300-2400 MHz



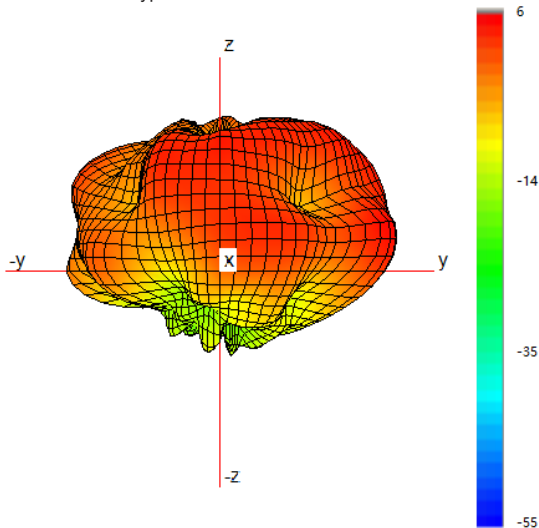
Typical 3D Pattern- Cell A - 2650 MHz



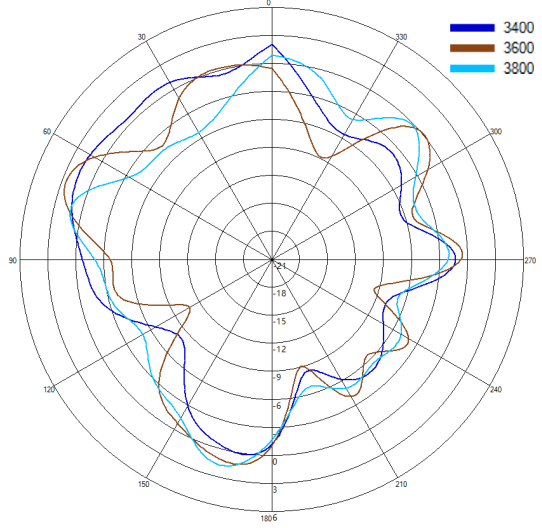
Typical H Plane- Cell A - Patterns- 2600-2700 MHz



Typical 3D Pattern- Cell A - 3600 MHz

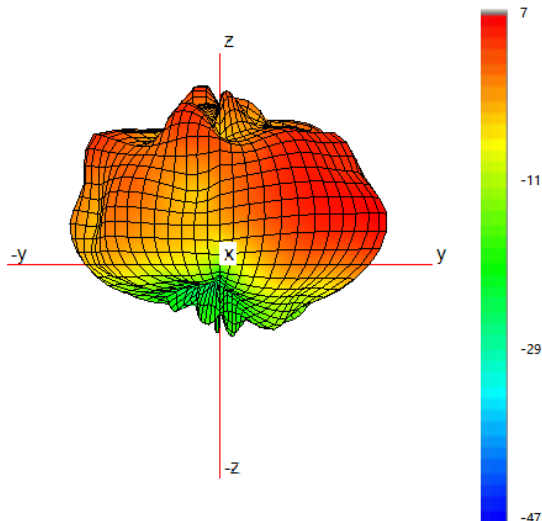


Typical H Plane- Cell A - Patterns- 3400-3800 MHz

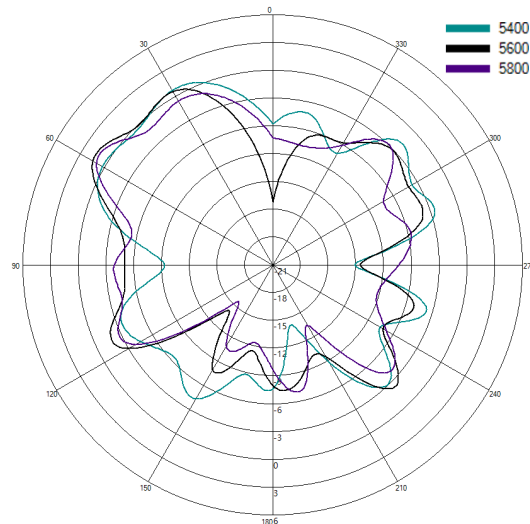


3D Patterns Cell A

Typical 3D Pattern- Cell A - 5600 MHz

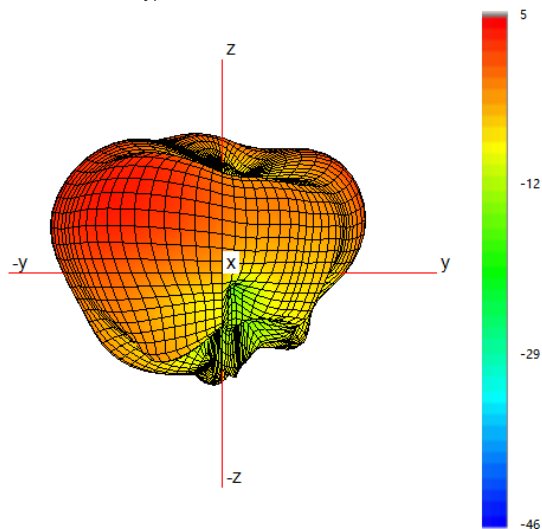


Typical H Plane- Cell A - Patterns- 5400-5800 MHz

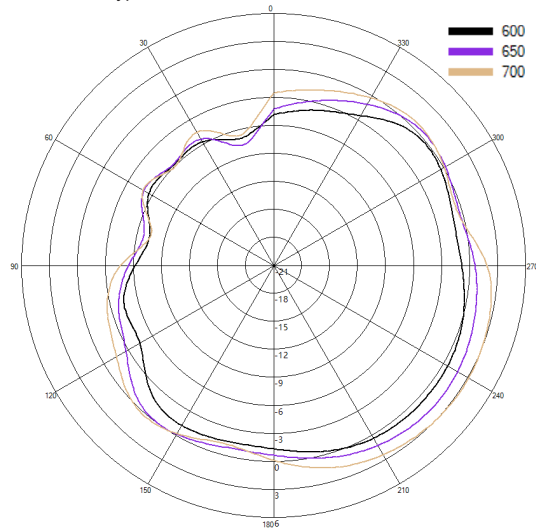


3D Patterns -Cell B

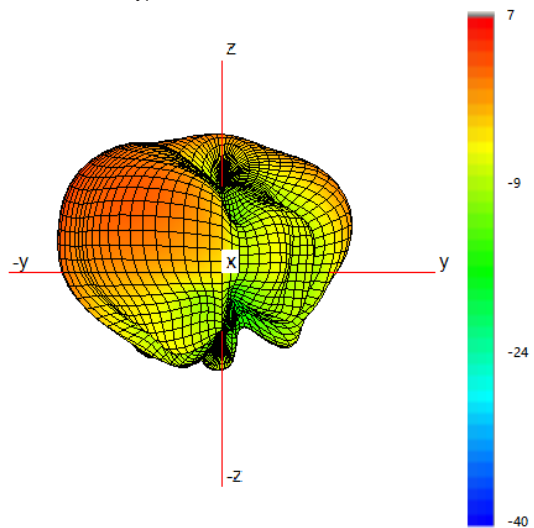
Typical 3D Pattern- Cell B - 650 MHz



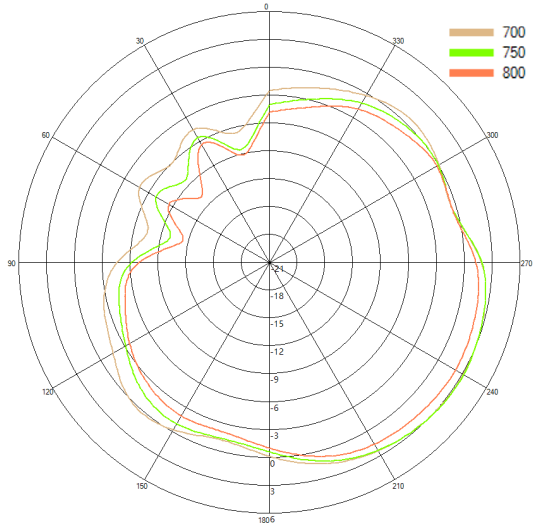
Typical H Plane- Cell B - Patterns- 600-700MHz



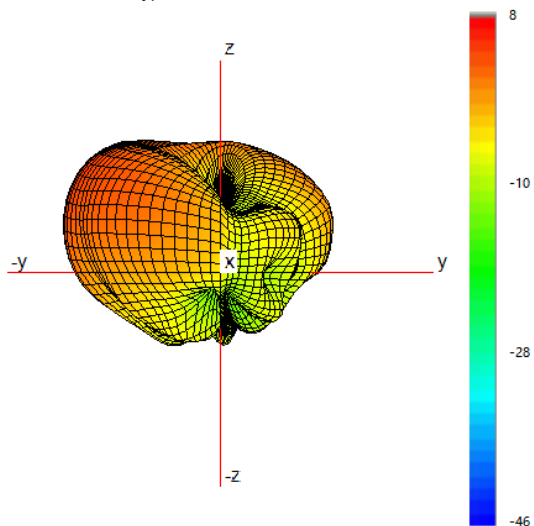
Typical 3D Pattern- Cell B - 750 MHz



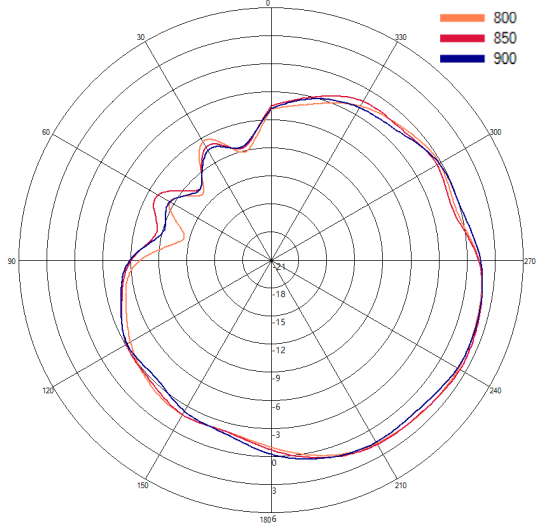
Typical H Plane- Cell B - Patterns- 700-800MHz



Typical 3D Pattern- Cell B - 850 MHz

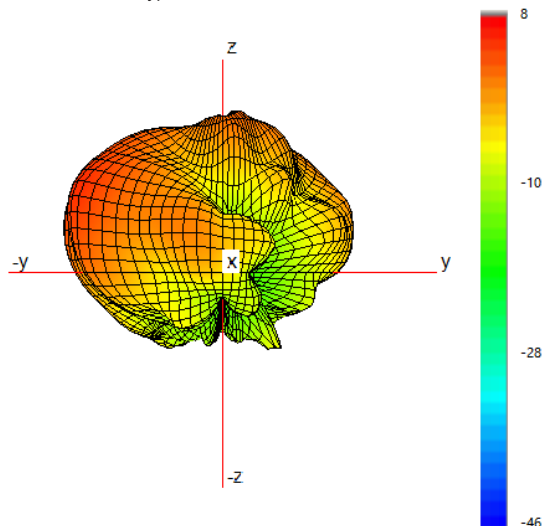


Typical H Plane- Cell B - Patterns- 800-900MHz

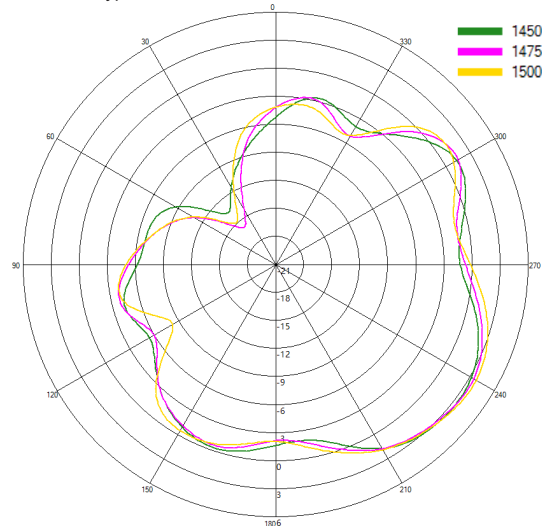


3D Patterns Cell B

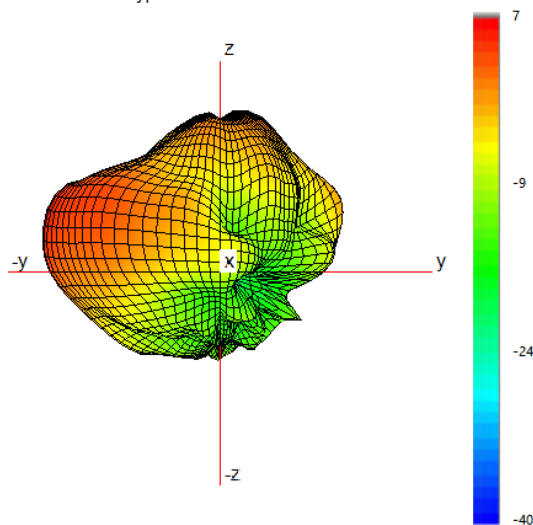
Typical 3D Pattern- Cell B - 1475 MHz



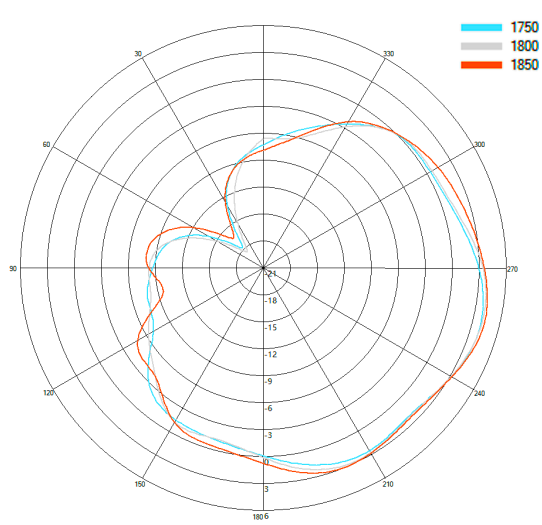
Typical H Plane- Cell B- Patterns- 1450-1500 MHz



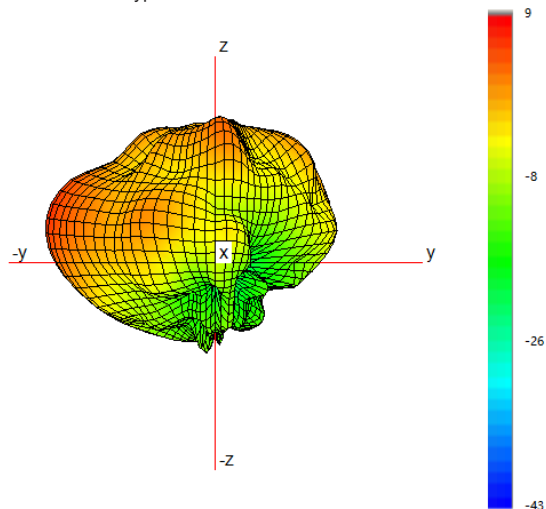
Typical 3D Pattern- Cell B - 1800 MHz



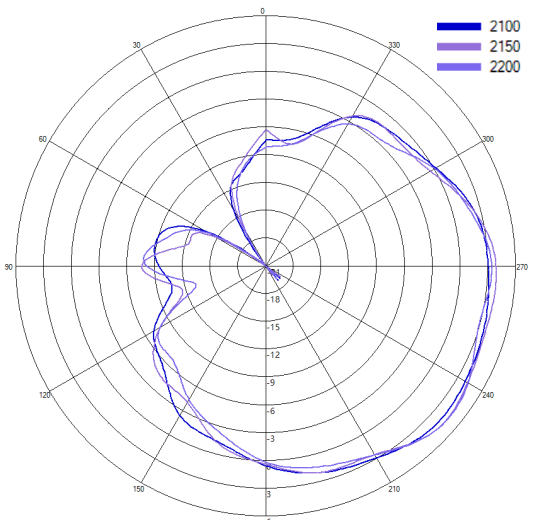
Typical H Plane- Cell B- Patterns- 1750-1850 MHz



Typical 3D Pattern- Cell B - 2150 MHz

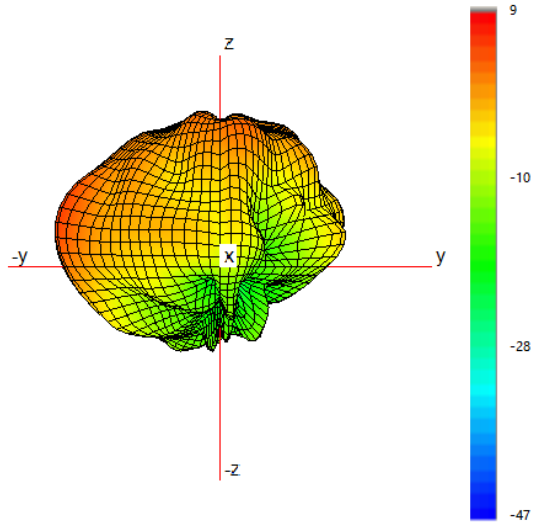


Typical H Plane- Cell B- Patterns- 2100-2200 MHz

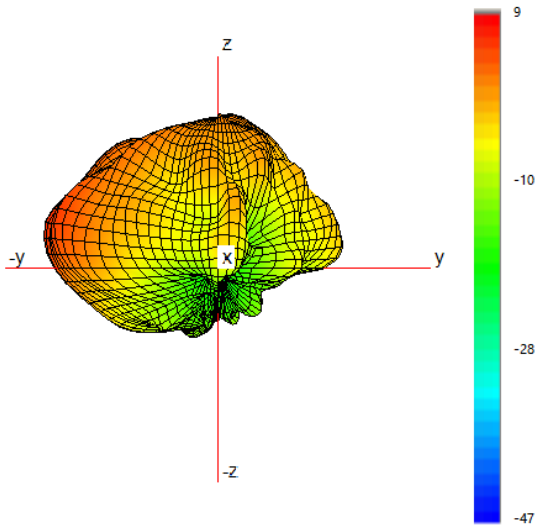


3D Patterns -Cell B

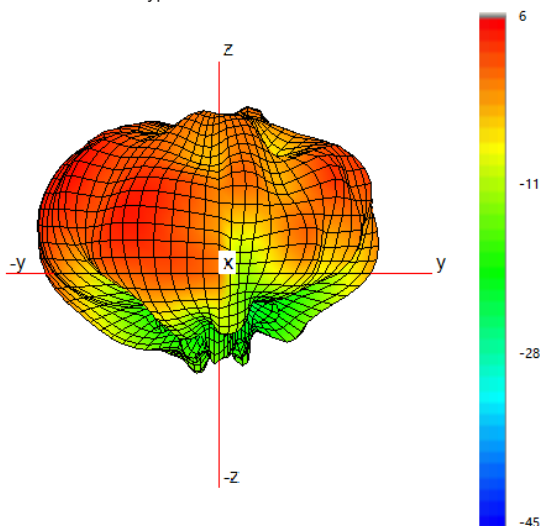
Typical 3D Pattern- Cell B - 2350 MHz



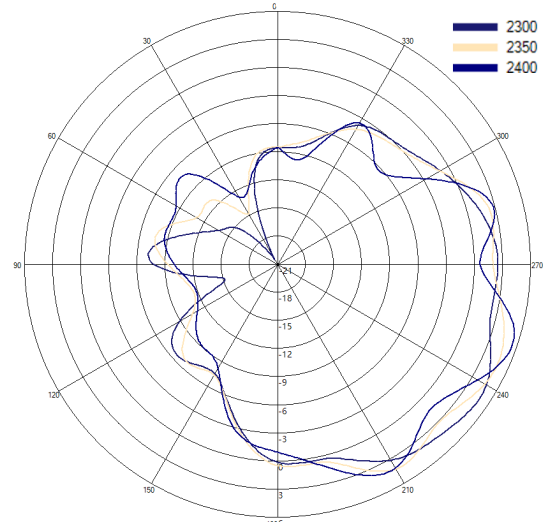
Typical 3D Pattern- Cell B - 2650 MHz



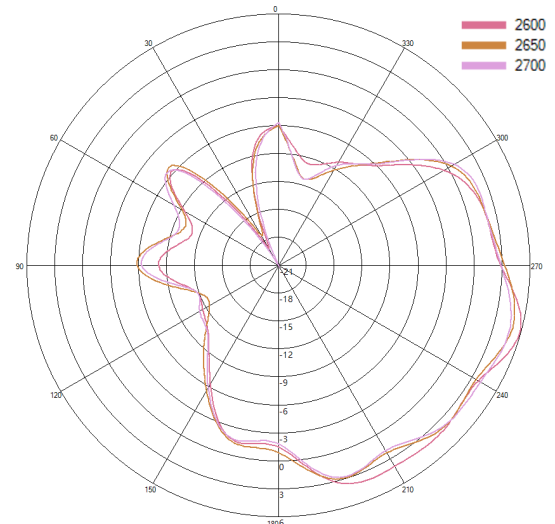
Typical 3D Pattern- Cell B - 3600 MHz



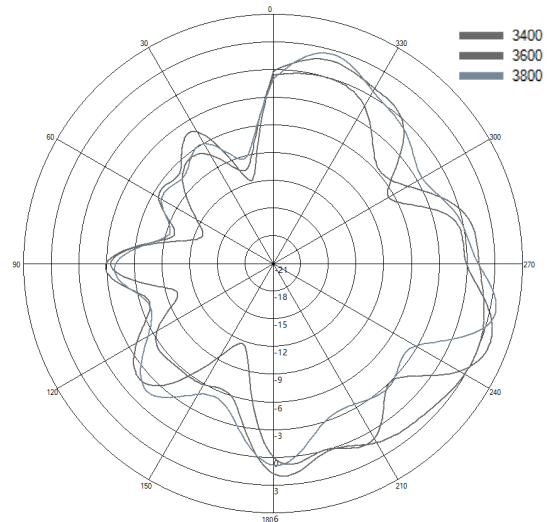
Typical H Plane- Cell B - Patterns- 2300-2400 MHz



Typical H Plane- Cell B - Patterns- 2600-2700 MHz

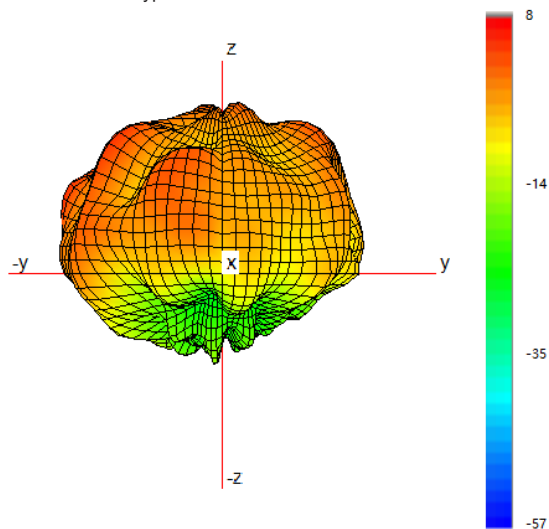


Typical H Plane- Cell B - Patterns- 3400-3800 MHz

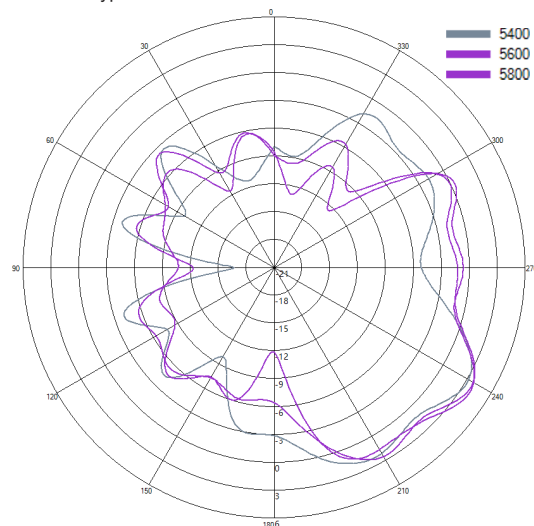


3D Patterns Cell B

Typical 3D Pattern- Cell B - 5600 MHz

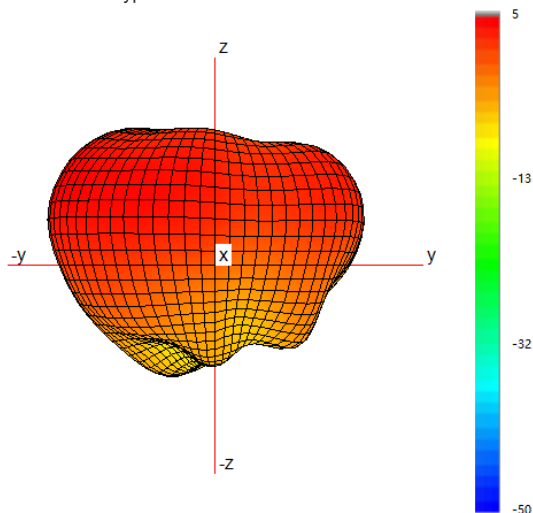


Typical H Plane- Cell B - Patterns- 5400-5800 MHz

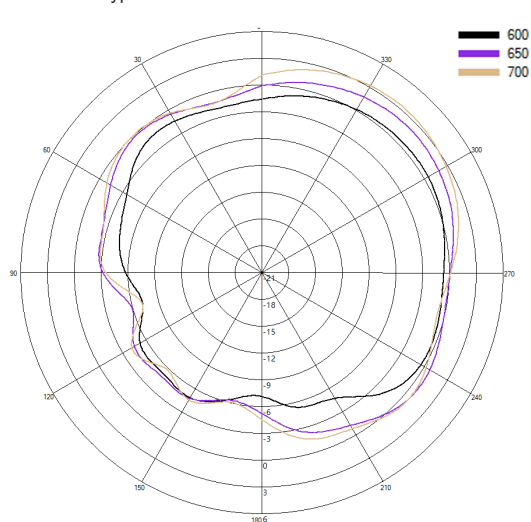


3D Patterns -Cell C

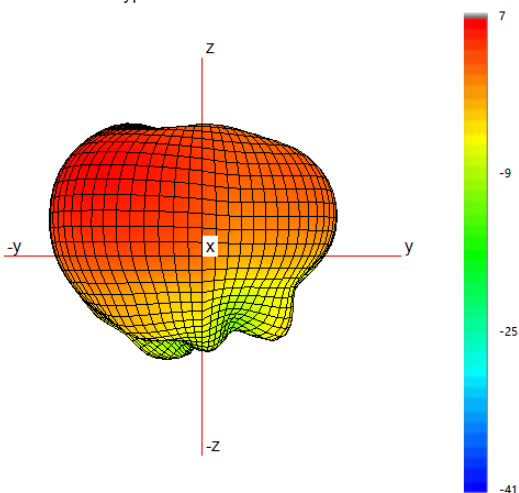
Typical 3D Pattern- Cell C - 650 MHz



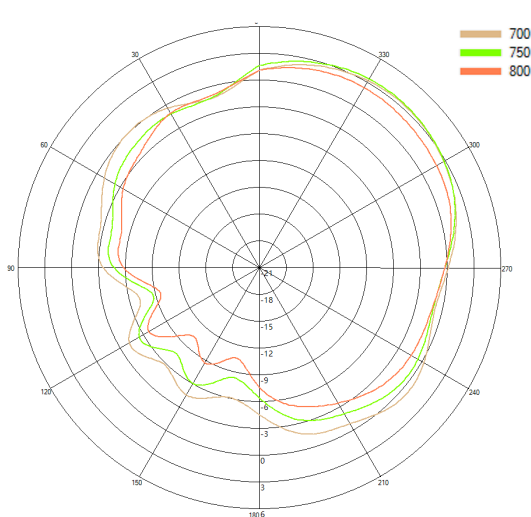
Typical H Plane- Cell C - Patterns- 600-700MHz



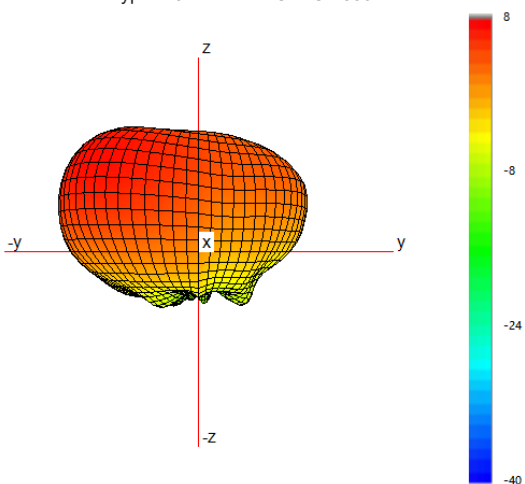
Typical 3D Pattern- Cell C - 750 MHz



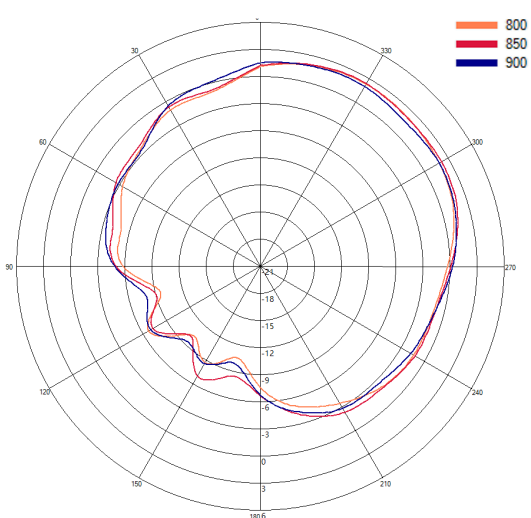
Typical H Plane- Cell C - Patterns- 700-800MHz



Typical 3D Pattern- Cell C - 850 MHz

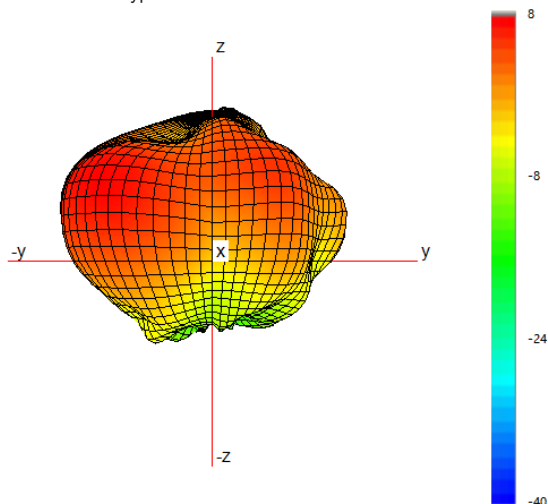


Typical H Plane- Cell C - Patterns- 800-900MHz

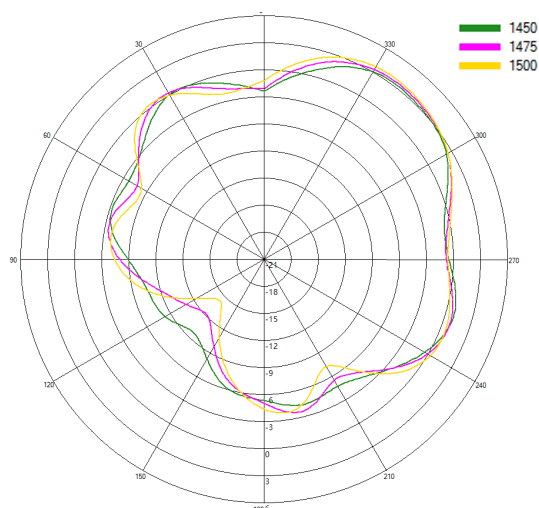


3D Patterns Cell C

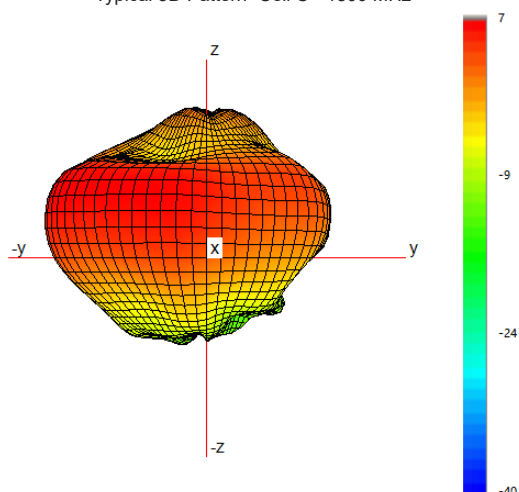
Typical 3D Pattern- Cell C - 1475 MHz



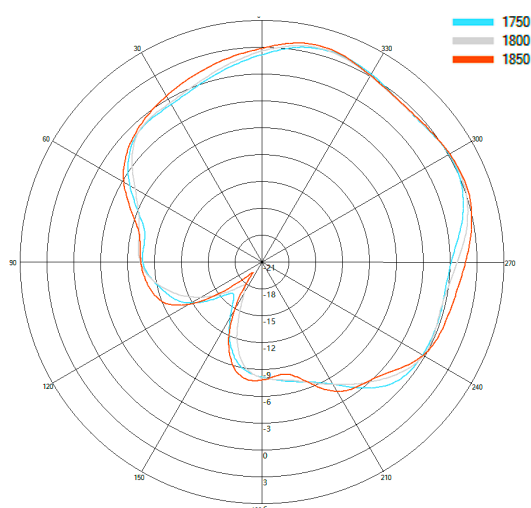
Typical H Plane- Cell C- Patterns- 1450-1500 MHz



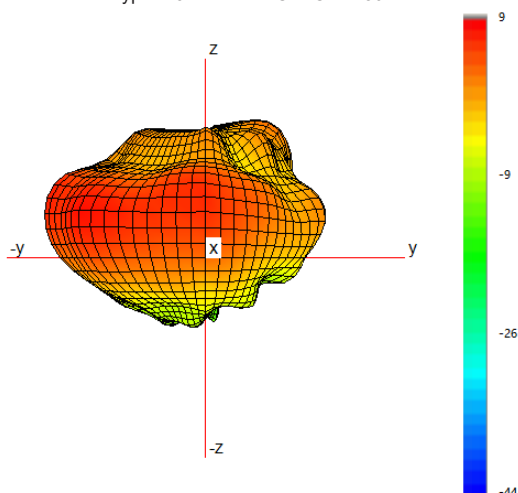
Typical 3D Pattern- Cell C - 1800 MHz



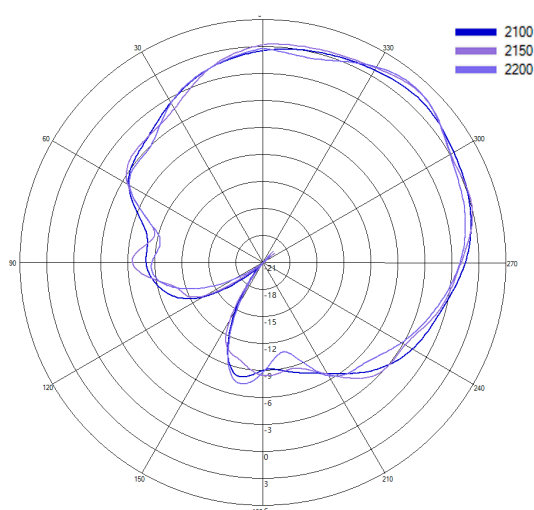
Typical H Plane- Cell C- Patterns- 1750-1850 MHz



Typical 3D Pattern- Cell C - 2150 MHz

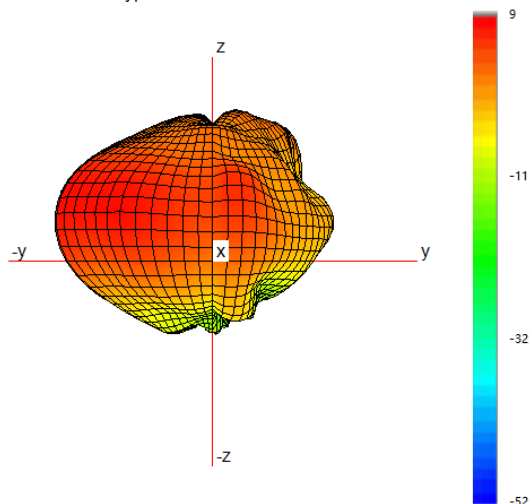


Typical H Plane- Cell C- Patterns- 2100-2200 MHz

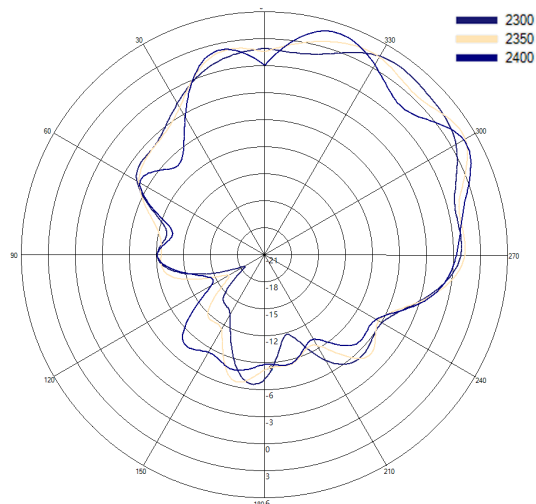


3D Patterns -Cell C

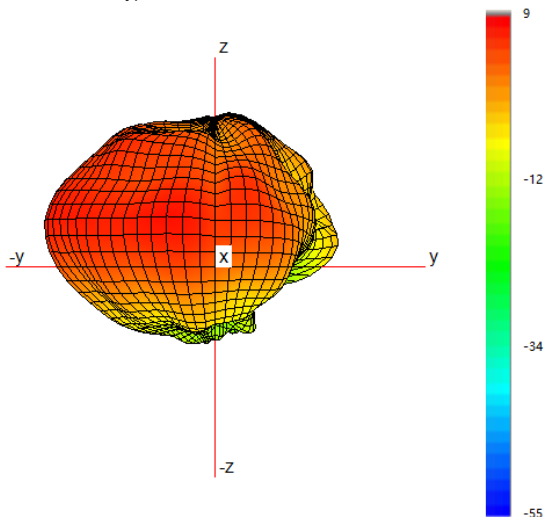
Typical 3D Pattern- Cell C - 2350 MHz



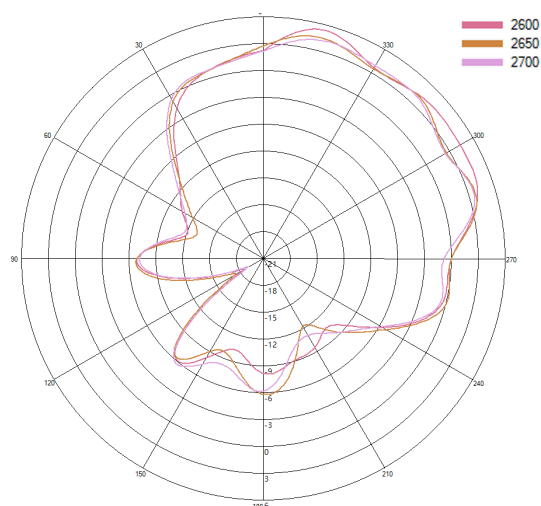
Typical H Plane- Cell C - Patterns- 2300-2400 MHz



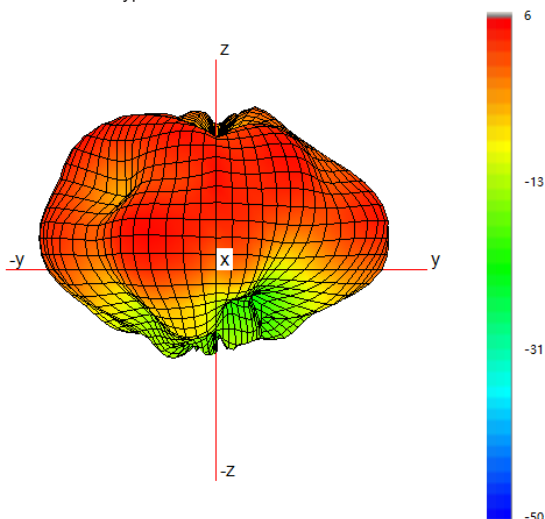
Typical 3D Pattern- Cell C - 2650 MHz



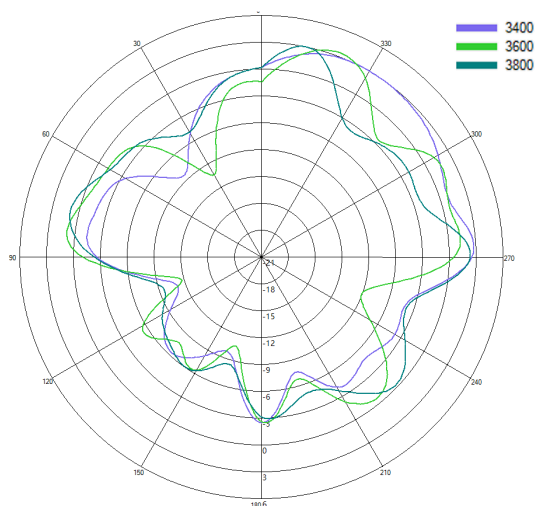
Typical H Plane- Cell C - Patterns- 2600-2700 MHz



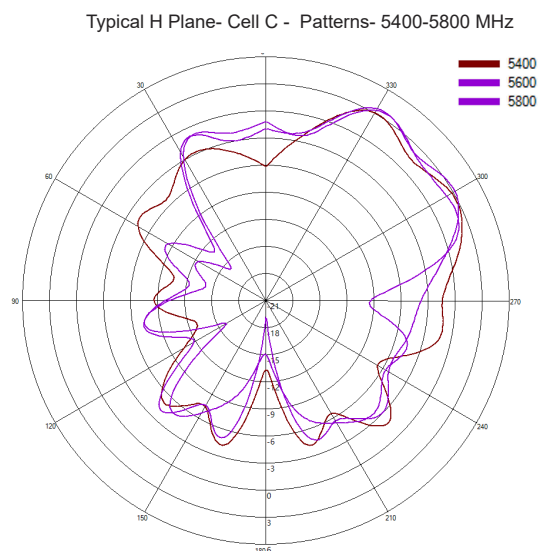
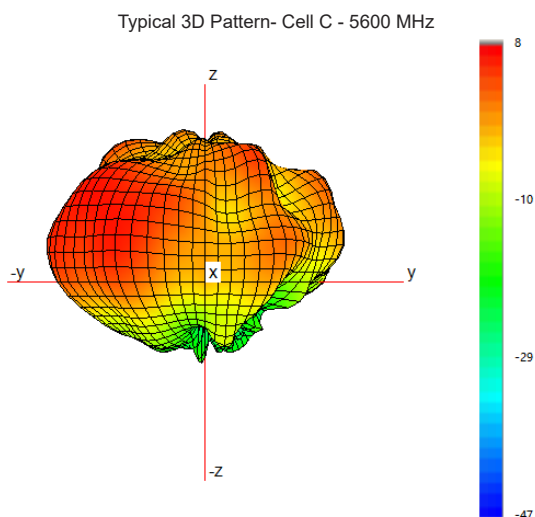
Typical 3D Pattern- Cell C - 3600 MHz



Typical H Plane- Cell C - Patterns- 3400-3800 MHz

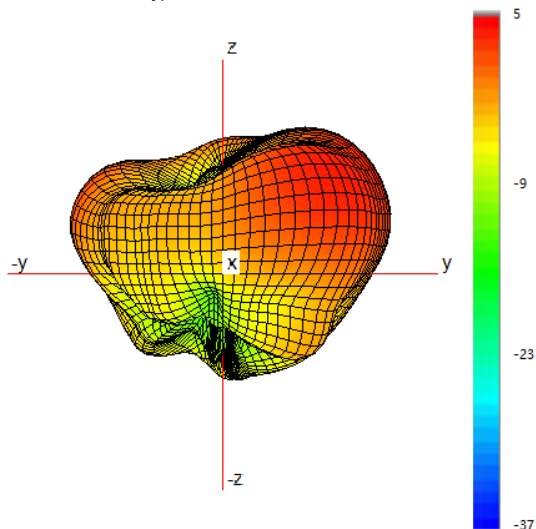


3D Patterns Cell C

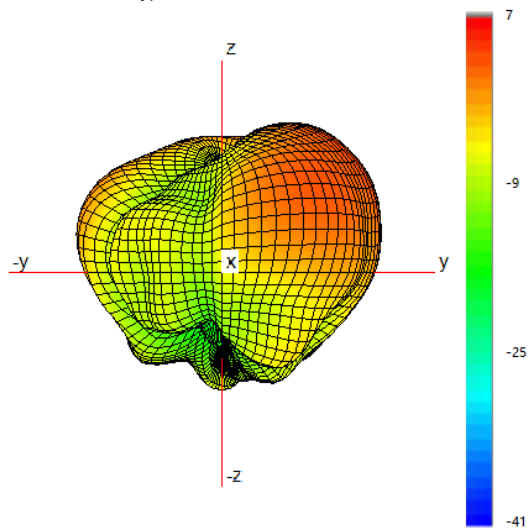


3D Patterns -Cell D

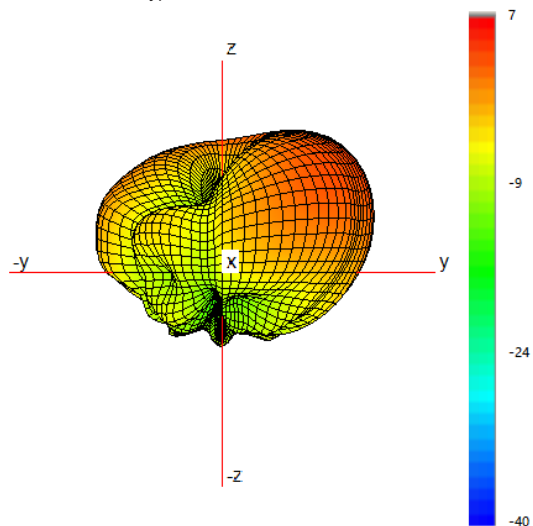
Typical 3D Pattern- Cell D - 650 MHz



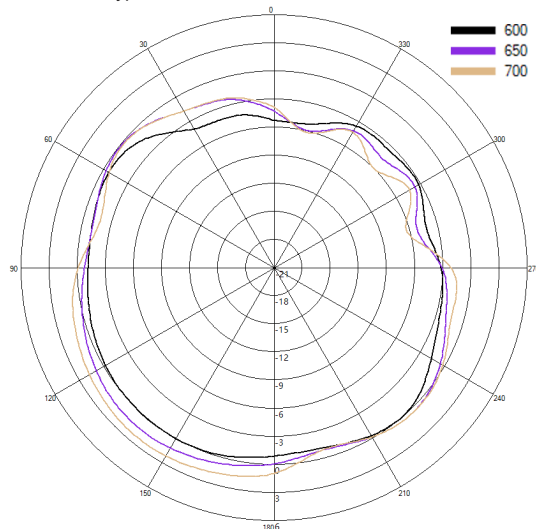
Typical 3D Pattern- Cell D - 750 MHz



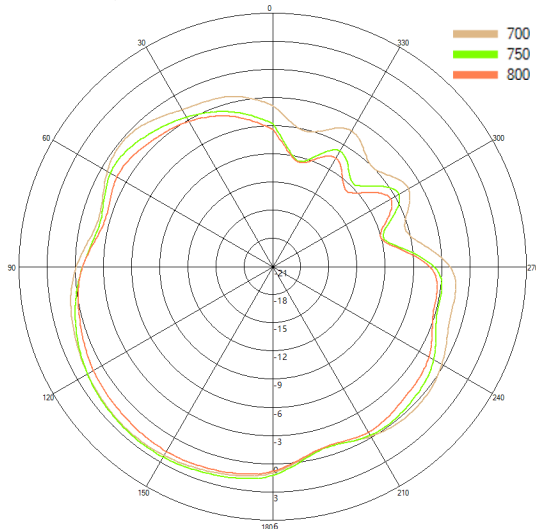
Typical 3D Pattern- Cell D - 850 MHz



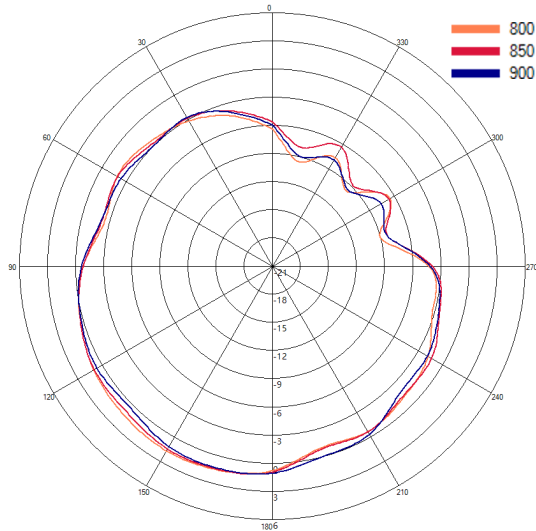
Typical H Plane- Cell D - Patterns- 600-700MHz



Typical H Plane- Cell D - Patterns- 700-800MHz

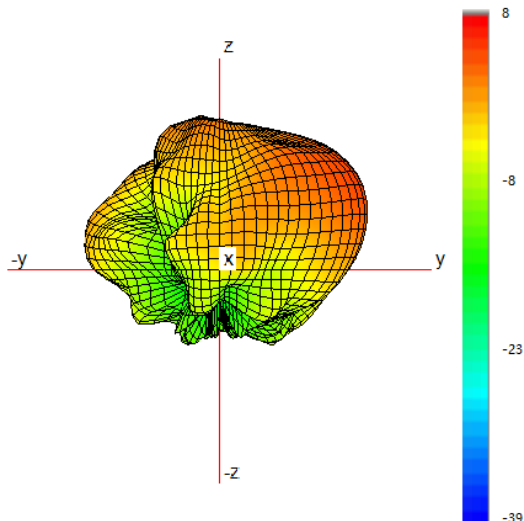


Typical H Plane- Cell D - Patterns- 800-900MHz

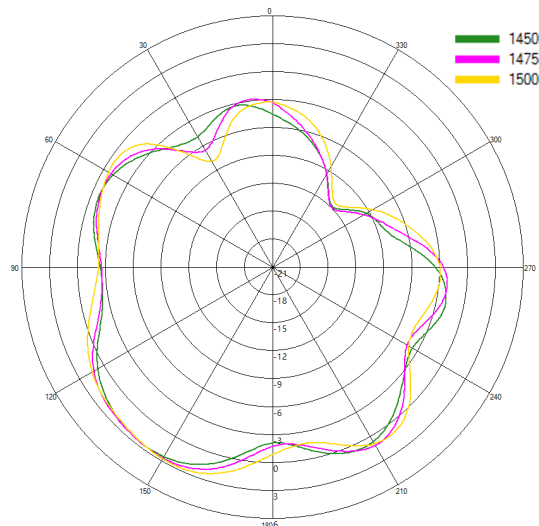


3D Patterns Cell D

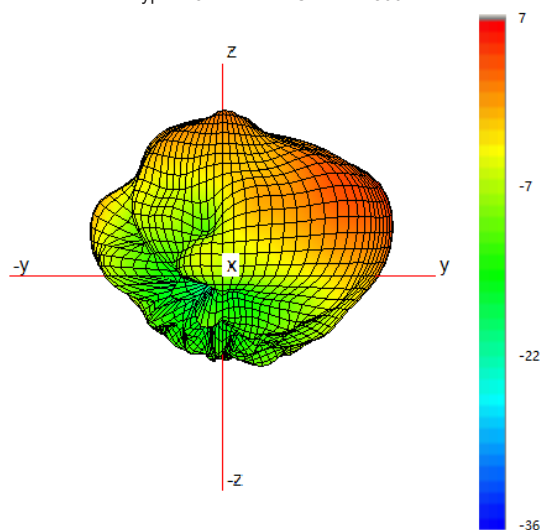
Typical 3D Pattern- Cell D - 1475 MHz



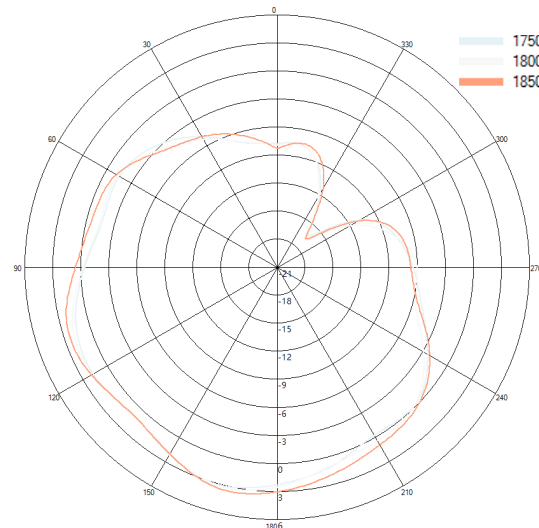
Typical H Plane- Cell D- Patterns- 1450-1500 MHz



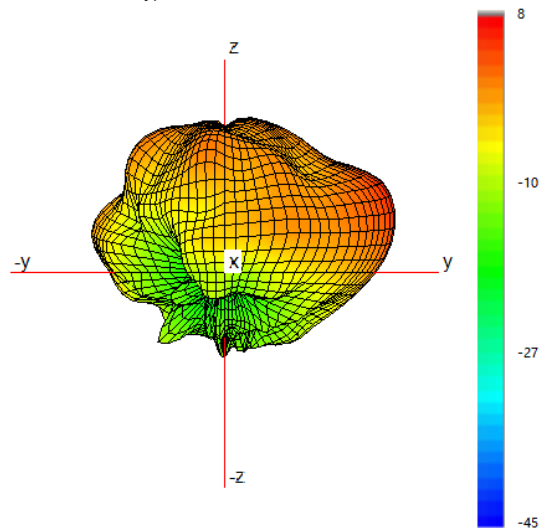
Typical 3D Pattern- Cell D - 1800 MHz



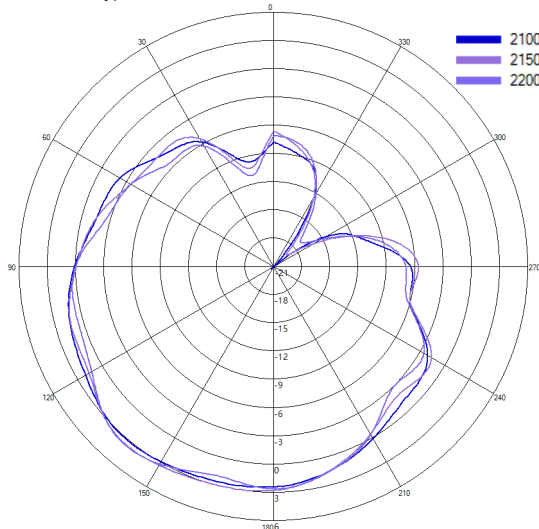
Typical H Plane- Cell D- Patterns- 1750-1850 MHz



Typical 3D Pattern- Cell D - 2150 MHz

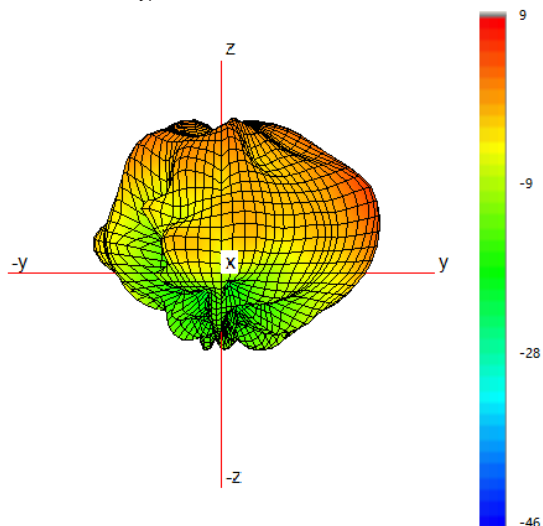


Typical H Plane- Cell D- Patterns- 2100-2200 MHz

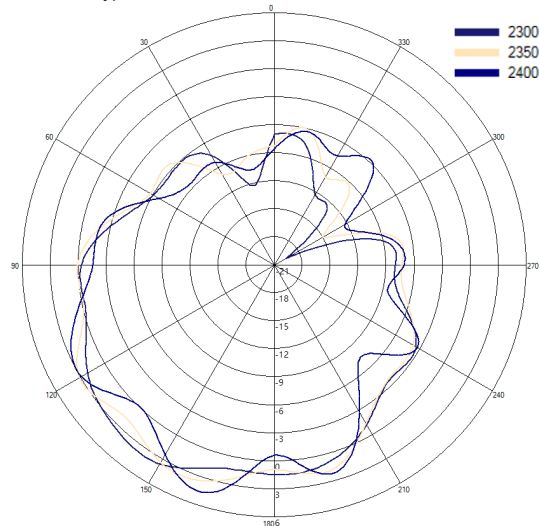


3D Patterns -Cell D

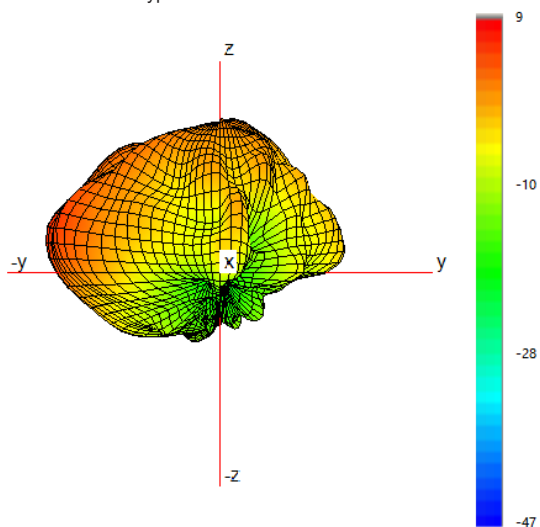
Typical 3D Pattern- Cell D - 2350 MHz



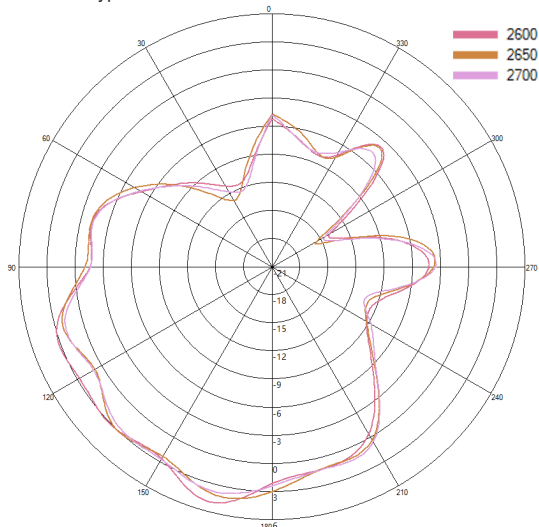
Typical H Plane- Cell D - Patterns- 2300-2400 MHz



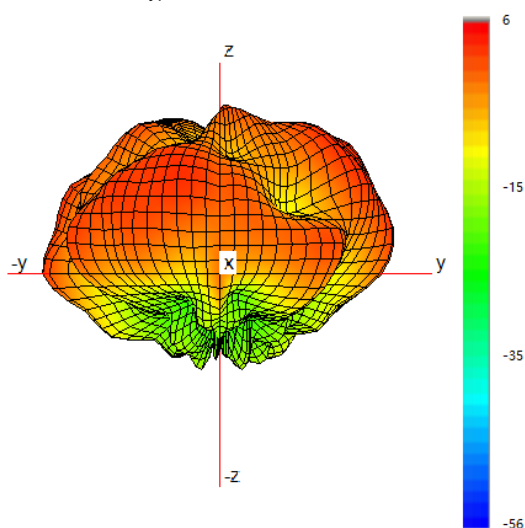
Typical 3D Pattern- Cell D - 2650 MHz



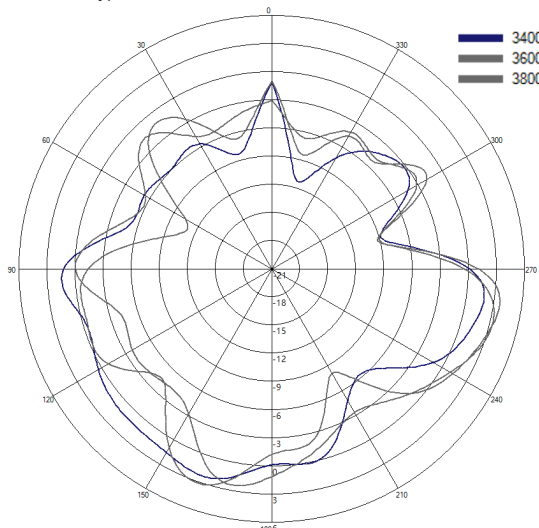
Typical H Plane- Cell D - Patterns- 2600-2700 MHz



Typical 3D Pattern- Cell D - 3600 MHz

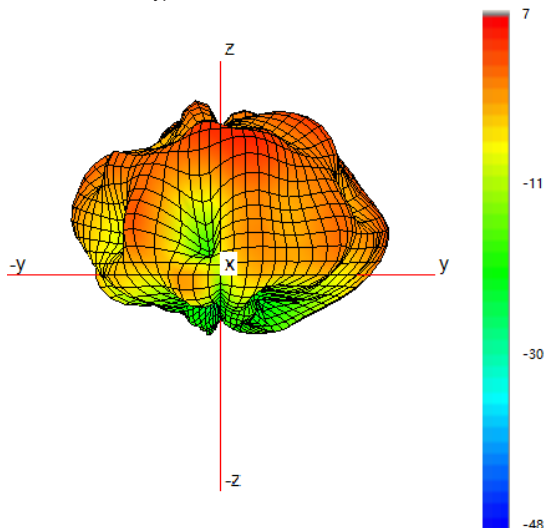


Typical H Plane- Cell D - Patterns- 3400-3800 MHz

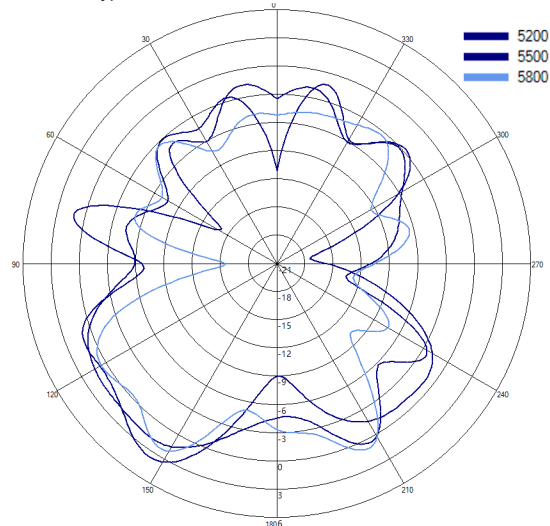


3D Patterns Cell D

Typical 3D Pattern- Cell D - 5600 MHz

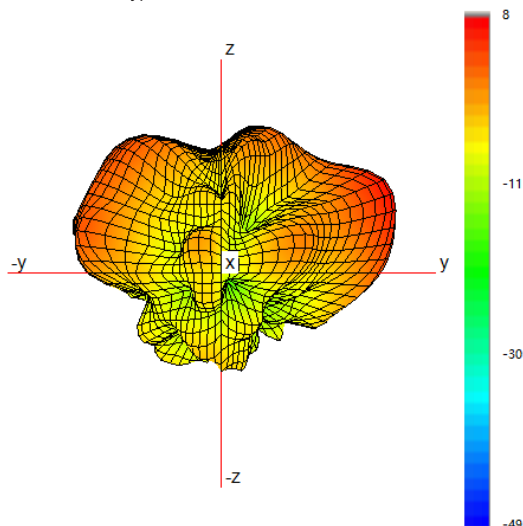


Typical H Plane- Cell D - Patterns- 5400-5800 MHz

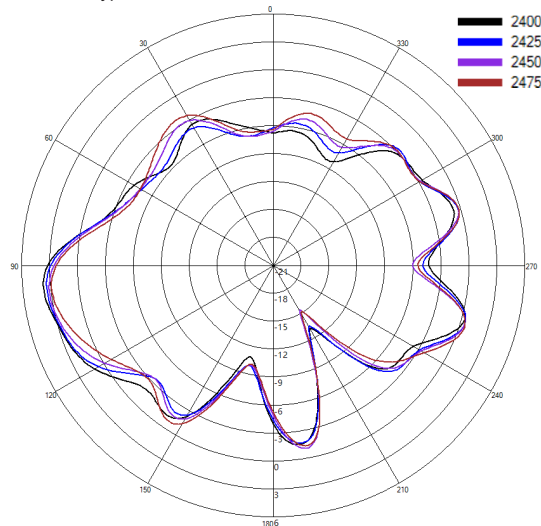


WiFi Patterns -WiFi -1

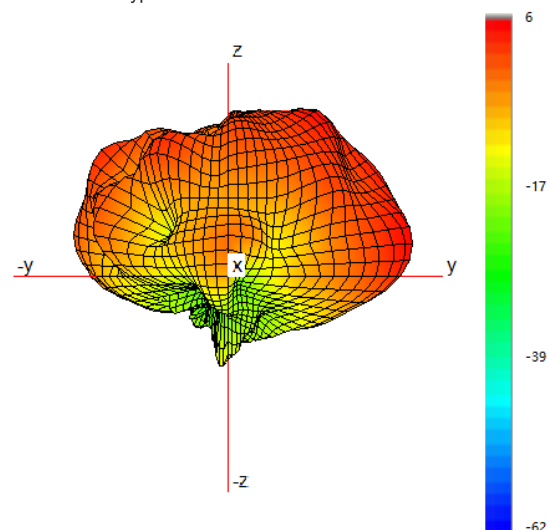
Typical 3D Pattern- WiFi - 1 - 2450 MHz



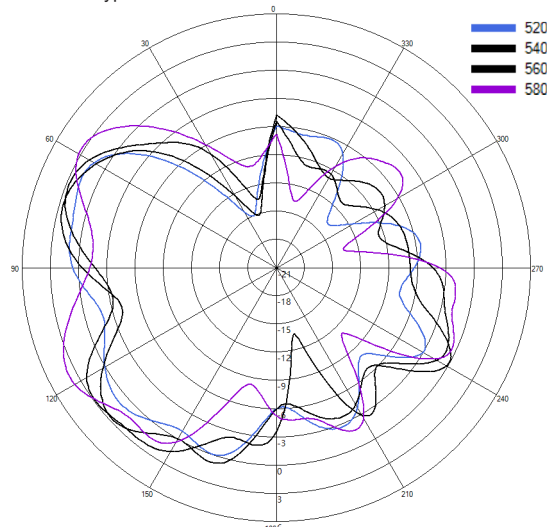
Typical H Plane- WiFi - 1 - Patterns- 2400-2475MHz



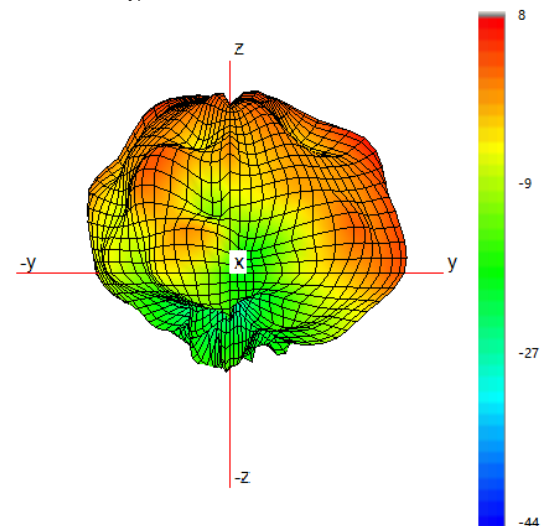
Typical 3D Pattern- WiFi - 1 - 5500 MHz



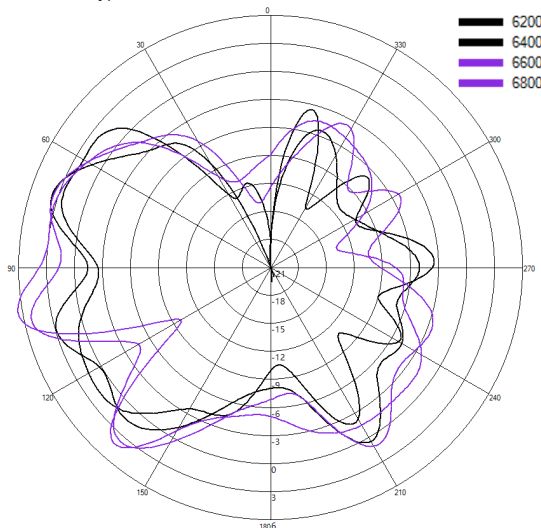
Typical H Plane- WiFi - 1 - Patterns- 5200-5800MHz



Typical 3D Pattern- WiFi - 1 - 6500 MHz

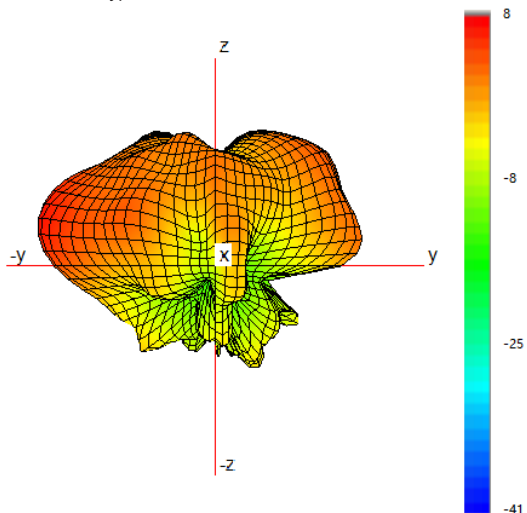


Typical H Plane- WiFi - 1 - Patterns- 6200-6800MHz

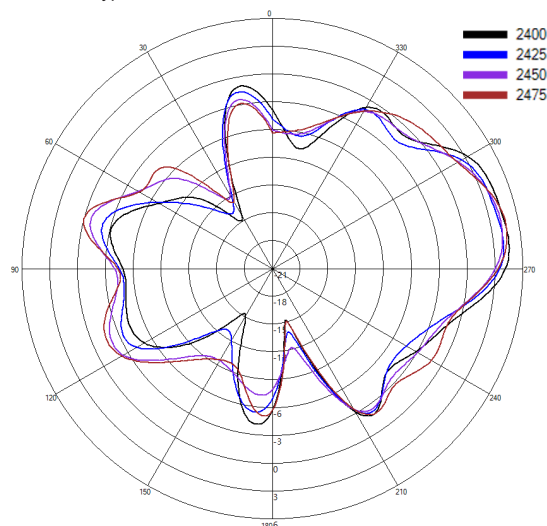


WiFi Patterns -WiFi -2

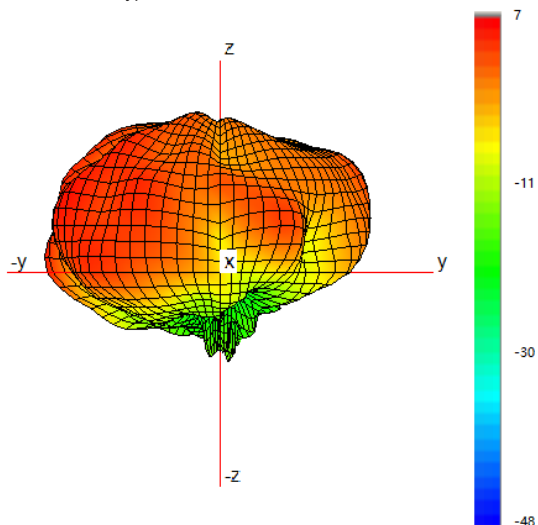
Typical 3D Pattern- WiFi - 2 - 2450 MHz



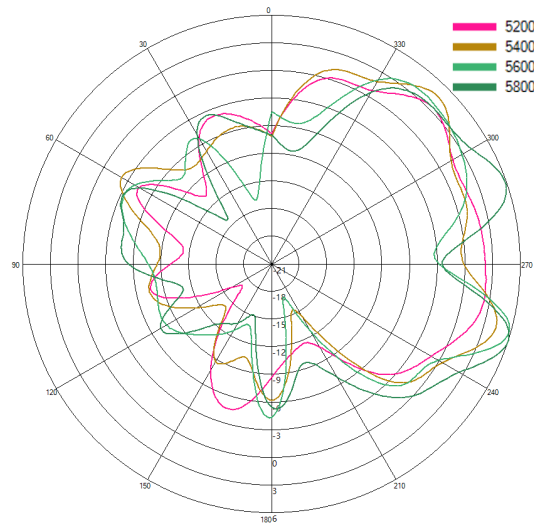
Typical H Plane- WiFi - 2 - Patterns- 2400-2475MHz



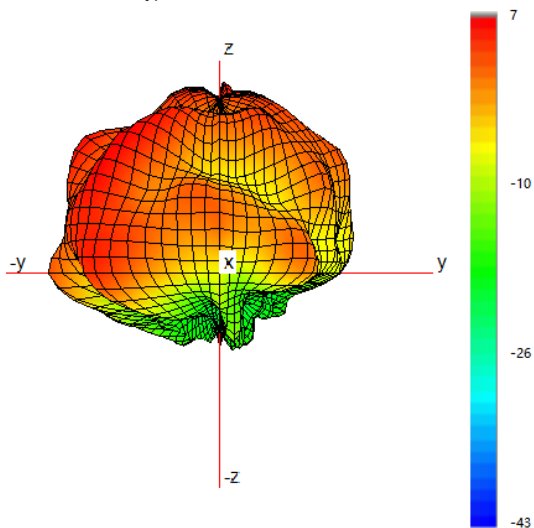
Typical 3D Pattern- WiFi - 2 - 5500 MHz



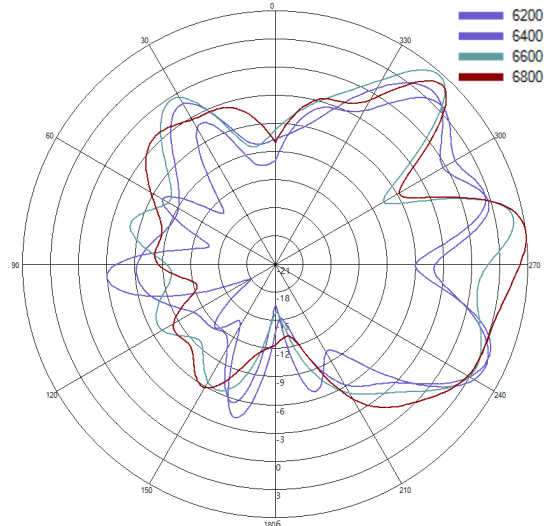
Typical H Plane- WiFi - 2 - Patterns- 5200-5800MHz



Typical 3D Pattern- WiFi - 2 - 6500 MHz

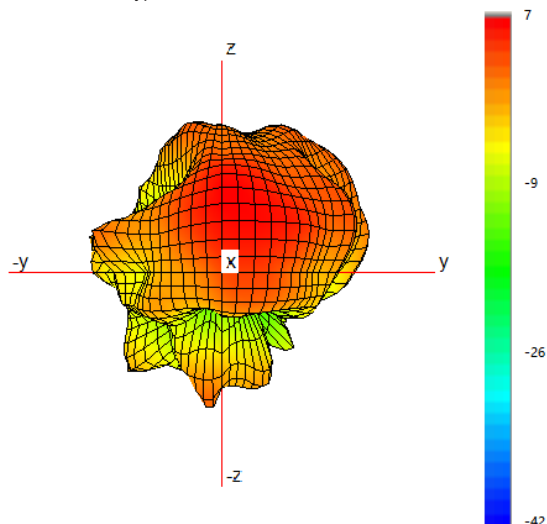


Typical H Plane- WiFi - 2 - Patterns- 6200-6800MHz

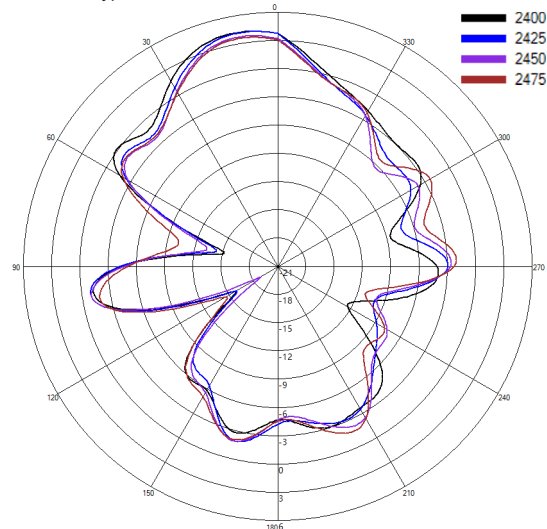


WiFi Patterns -WiFi -3

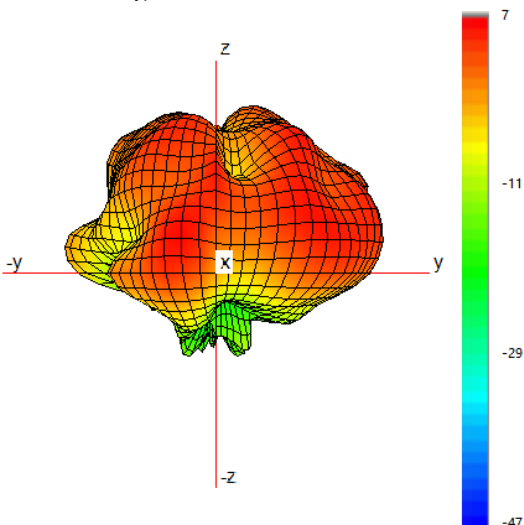
Typical 3D Pattern- WiFi - 3 - 2450 MHz



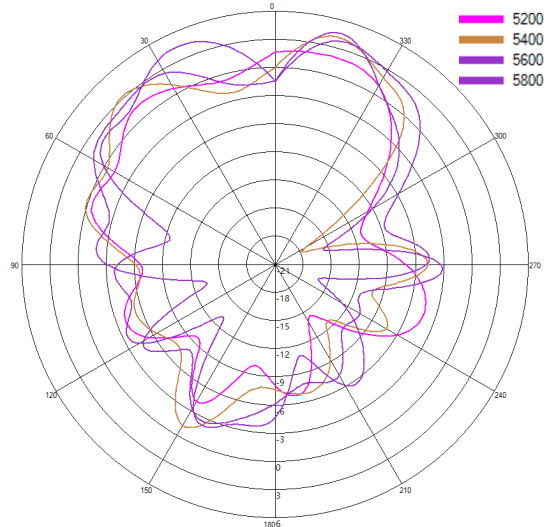
Typical H Plane- WiFi - 3 - Patterns- 2400-2475MHz



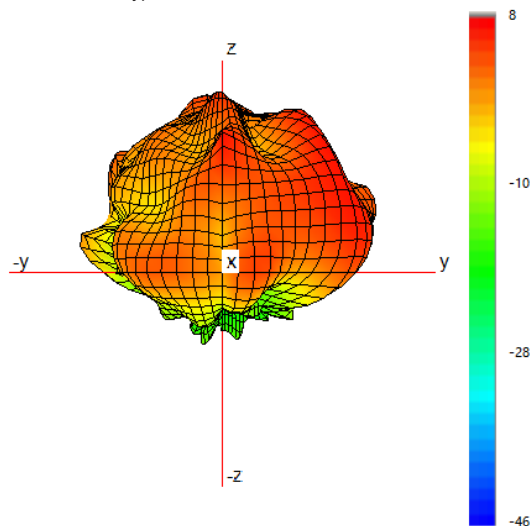
Typical 3D Pattern- WiFi - 3 - 5500 MHz



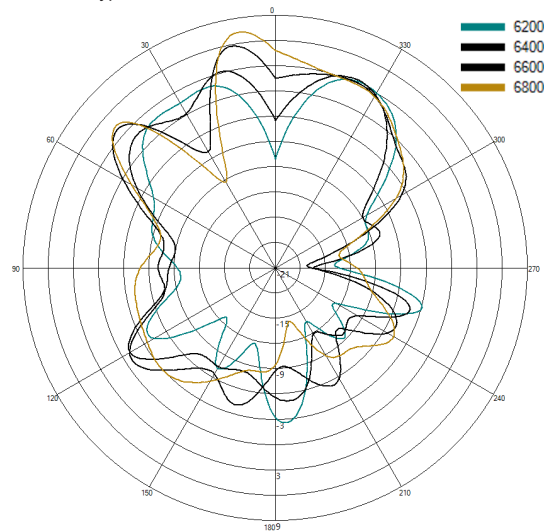
Typical H Plane- WiFi - 3 - Patterns- 5200-5800MHz



Typical 3D Pattern- WiFi - 3 - 6500 MHz

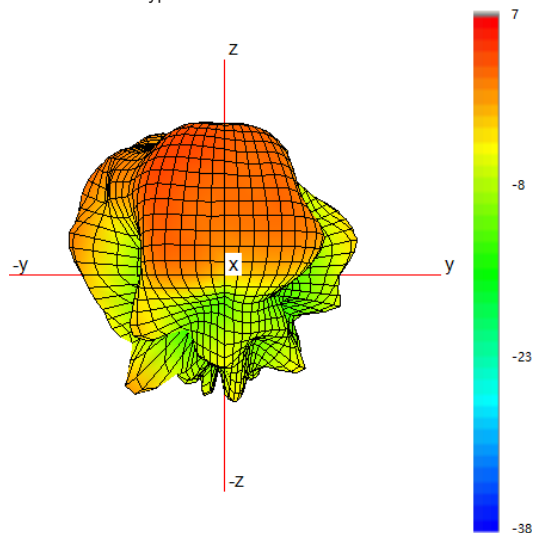


Typical H Plane- WiFi - 3 - Patterns- 6200-6800MHz

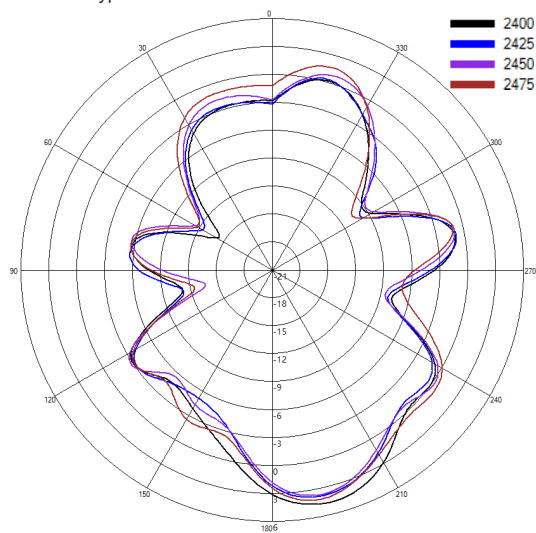


WiFi Patterns -WiFi -4

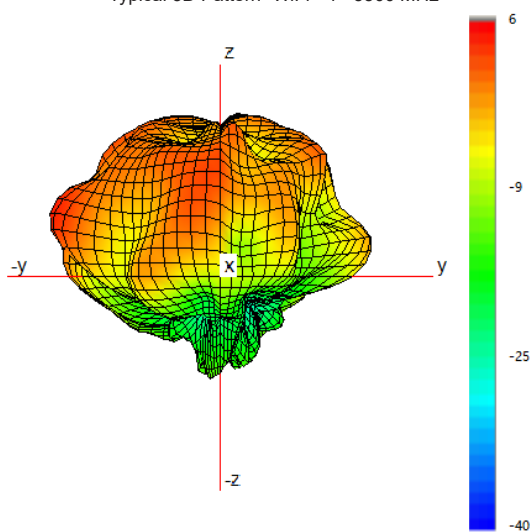
Typical 3D Pattern- WiFi - 4 - 2450 MHz



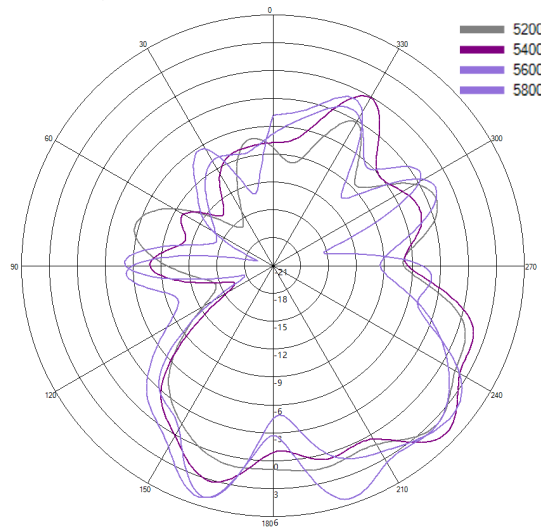
Typical H Plane- WiFi - 4 - Patterns- 2400-2475MHz



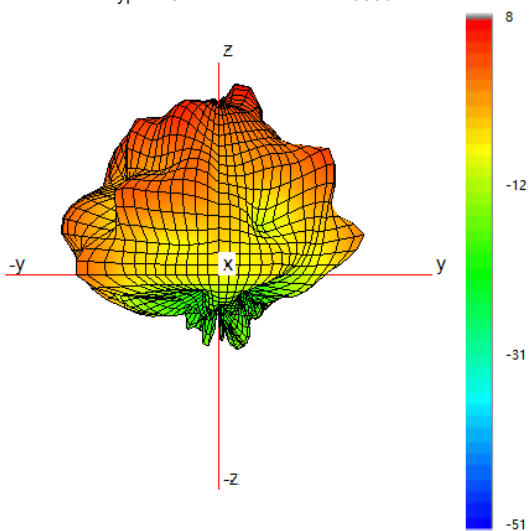
Typical 3D Pattern- WiFi - 4 - 5500 MHz



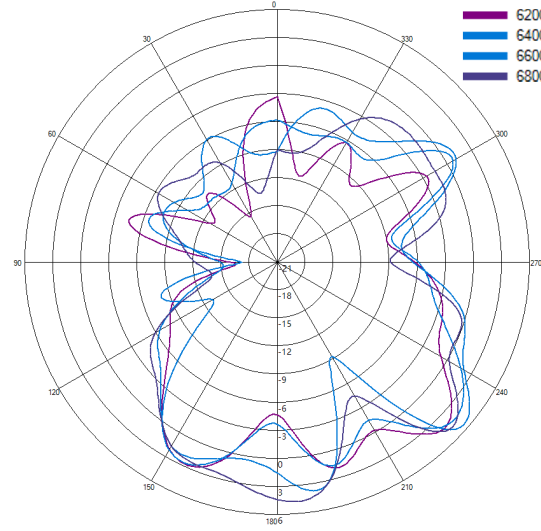
Typical H Plane- WiFi - 4 - Patterns- 5200-5800MHz



Typical 3D Pattern- WiFi - 4 - 6500 MHz



Typical H Plane- WiFi - 4 - Patterns- 6200-6800MHz

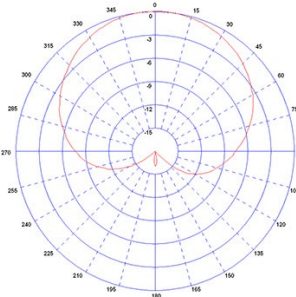


4X4 MiMo 4G/5G Transit Antenna

TRNM[X]4-6-60-[X]

E-Plane Patterns- GPS/GNSS

GPS 1575MHz Typical E Plane



GPS 1602MHz Typical E Plane

