4X4 MiMo 4G/5G Transit Antenna

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

- 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.

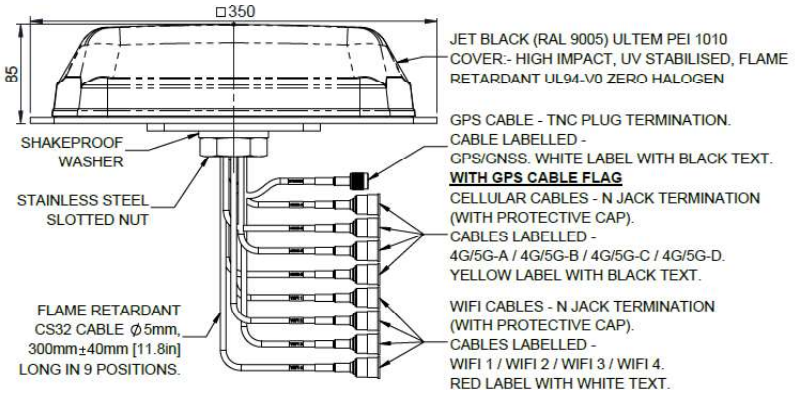
Housed in a high impact, flame retardant Ultem housing, the antenna is fully weatherproof ensuring a long service life with no compromise in performance.

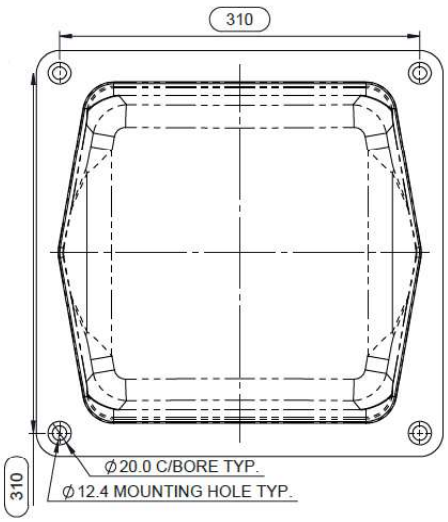
The TRNM[X]4-6-60-[X] antenna meets stringent industry standards including EN50155, EN45545-2 (HL 1-3), EN50124-1* and is ingress protected to IP69k when correctly installed.

*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





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

PANORAMA ANTENNAS

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)		0.5m (20")				
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

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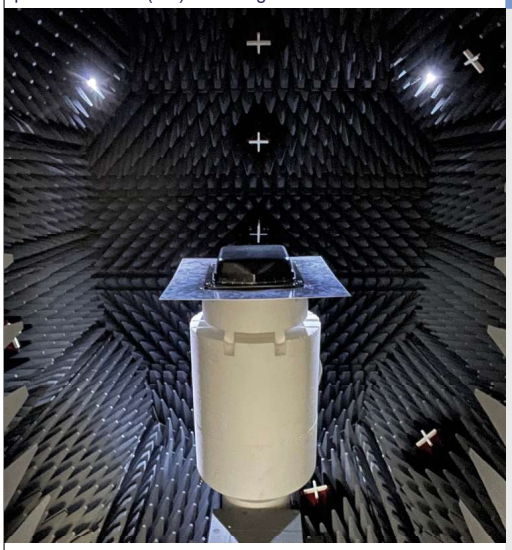
Electrical Data- Cell

Measurement Conditions

TRNMG4-6-60-Q measured on 600x600mm (2'x2') ground plane with 0.5m (20") CS32 Pigtails



4G/5G Antennas

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

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Measurement Conditions

TRNMG4-6-60-Q measured on 600x600mm (2'x2') ground plane with 0.5m (20") CS32 Pigtails

WiFi Antennas

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

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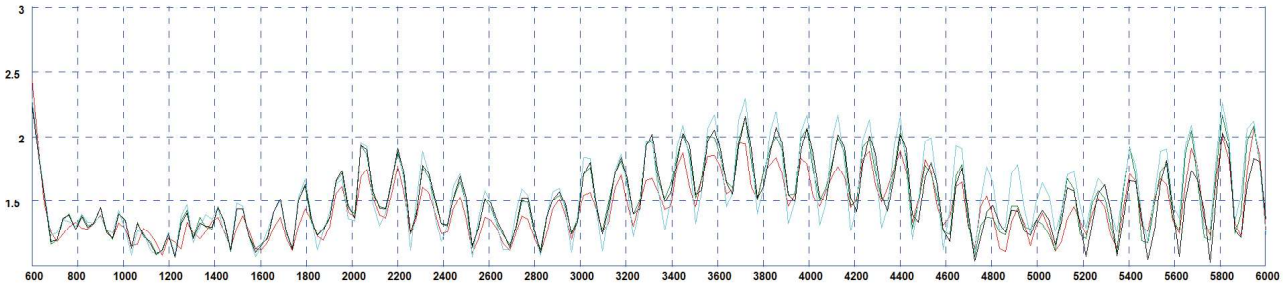
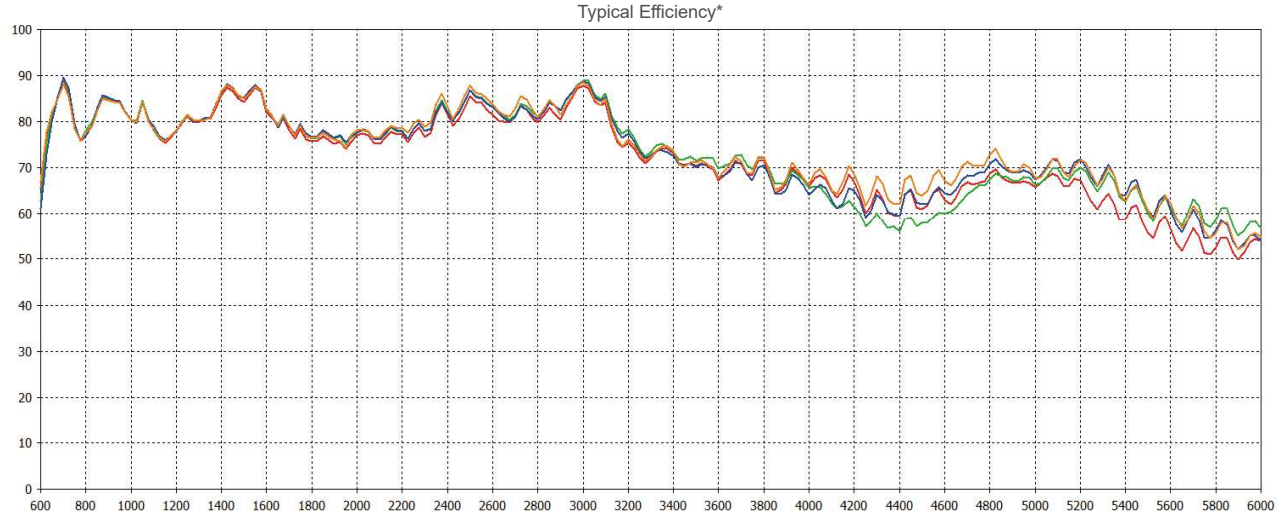
Electrical Data- Cell

Typical VSWR *



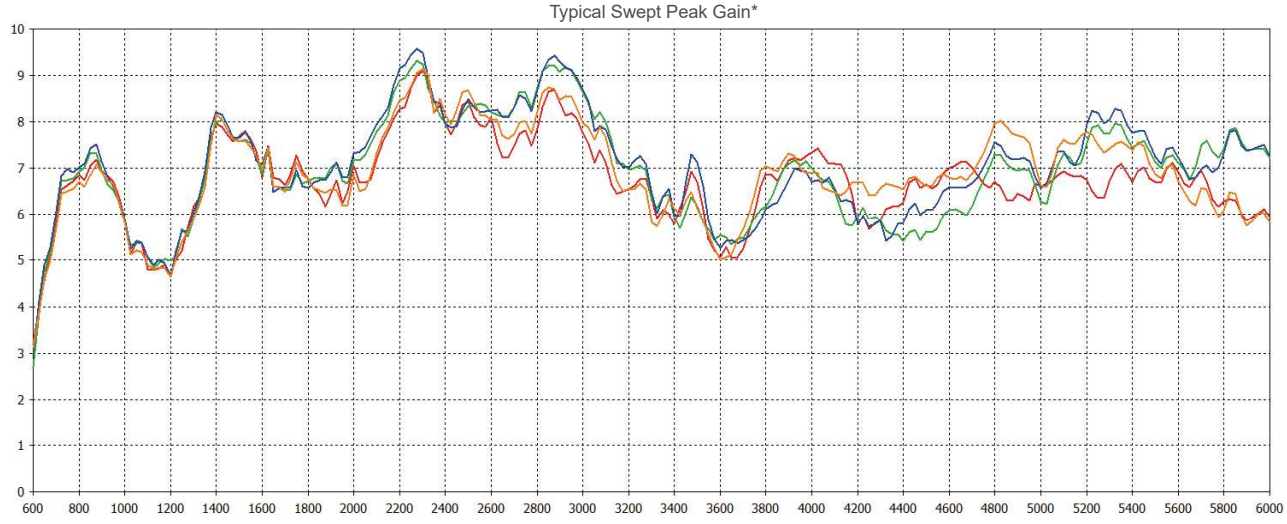
*VSWR measured with 0.5m (1.5') of CS32 cable

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

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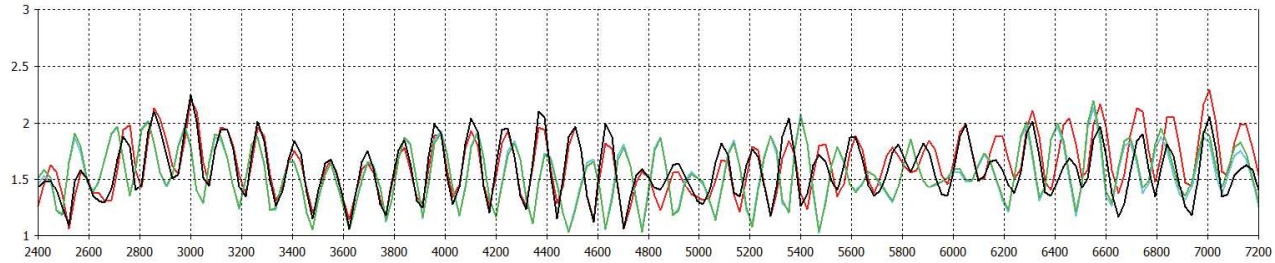
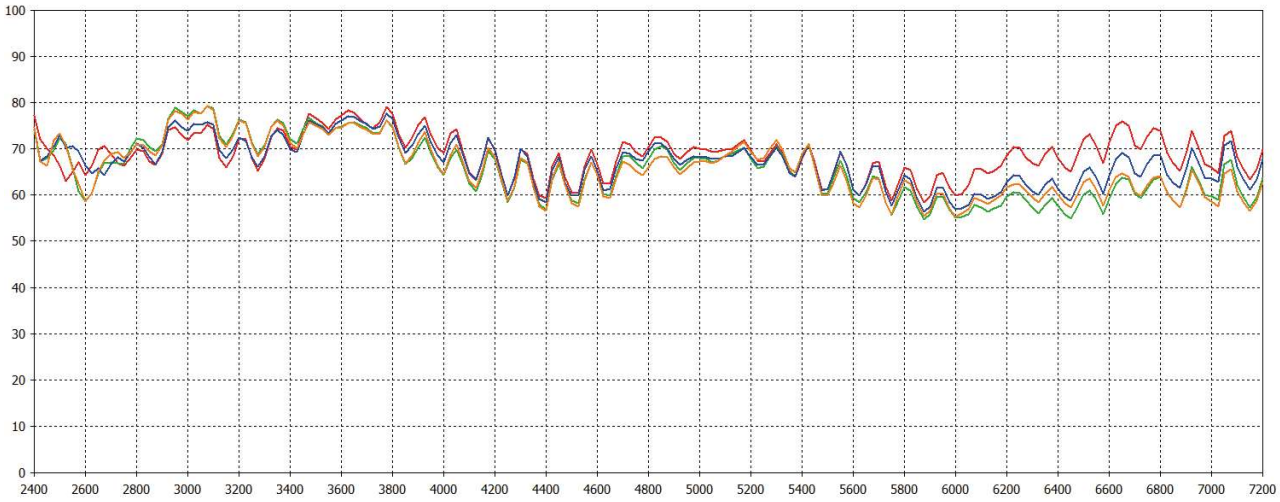
Typical VSWR *



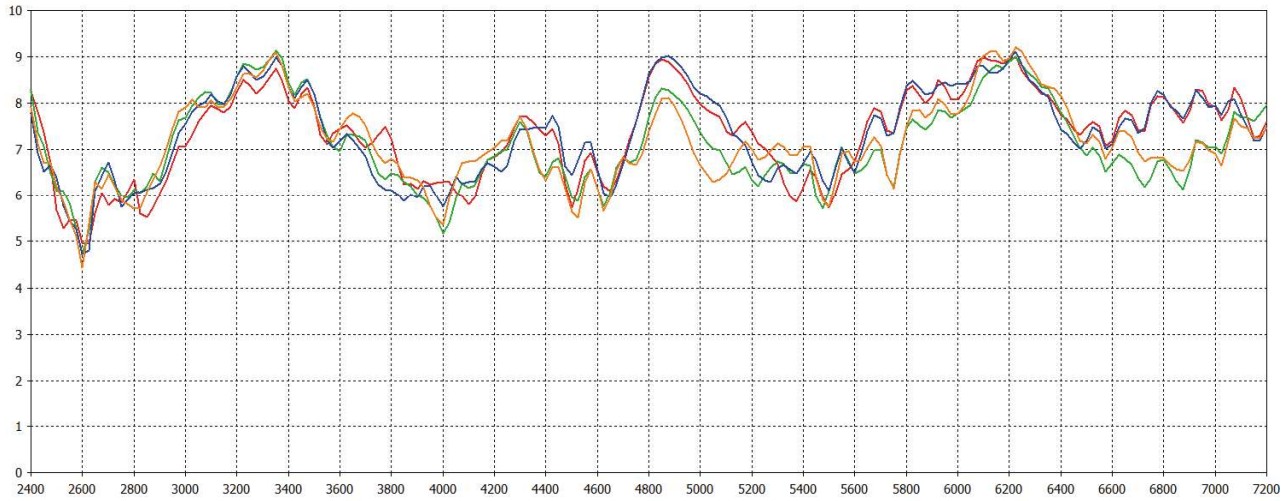
*VSWR measured with 0.5m (1.5') of CS32 cable

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

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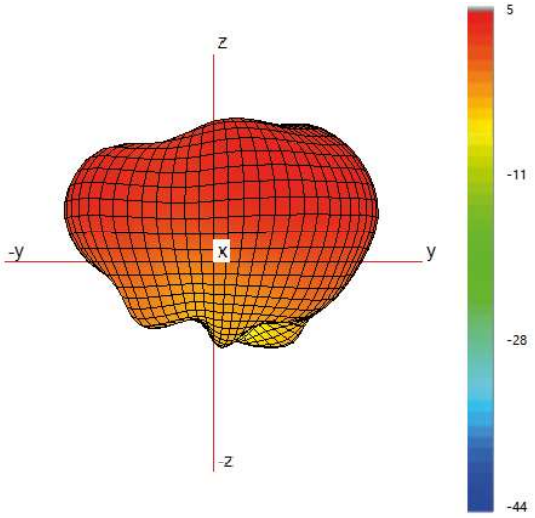
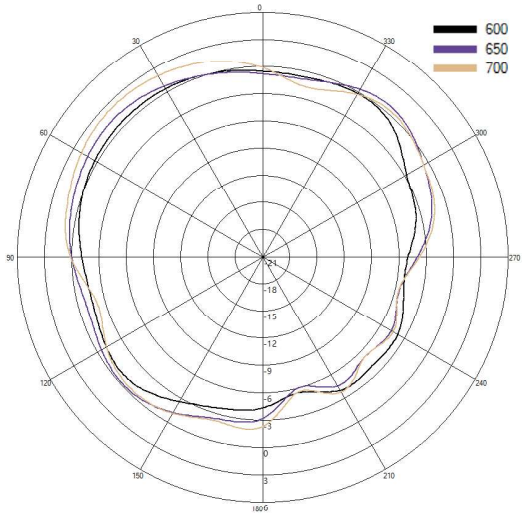
3D Patterns -Cell A

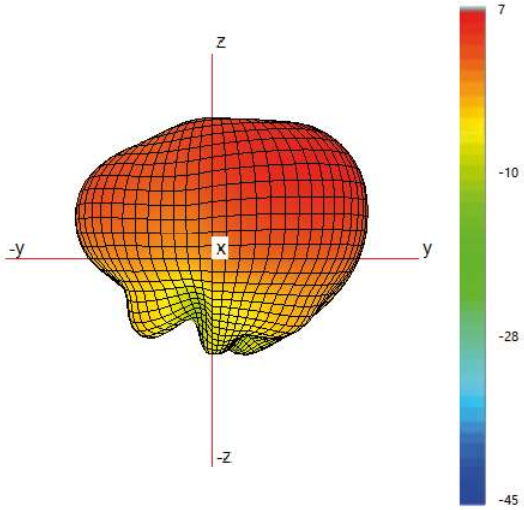
Typical 3D Pattern- Cell A - 650 MHz



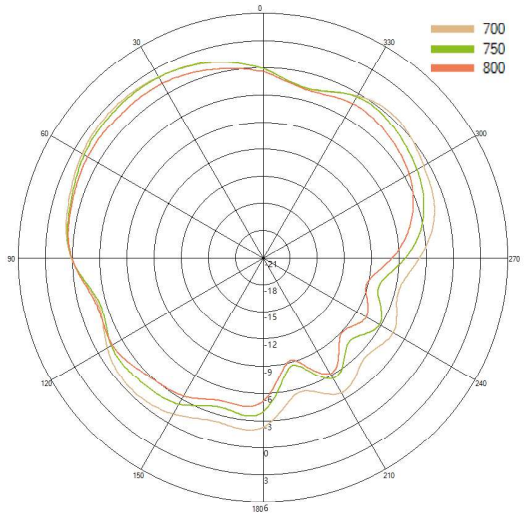
Typical H Plane- Cell A - Patterns- 600-700MHz



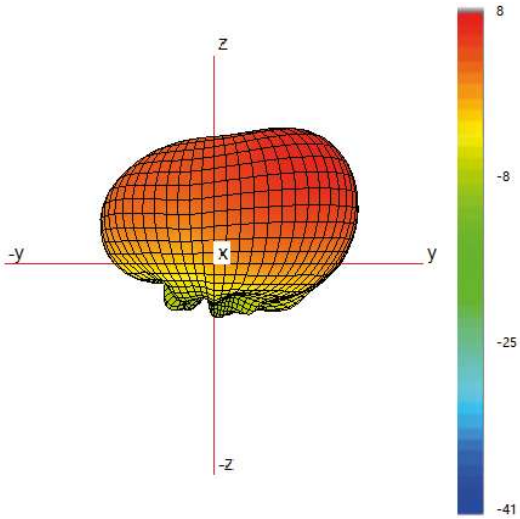
Typical 3D Pattern- Cell A - 750 MHz



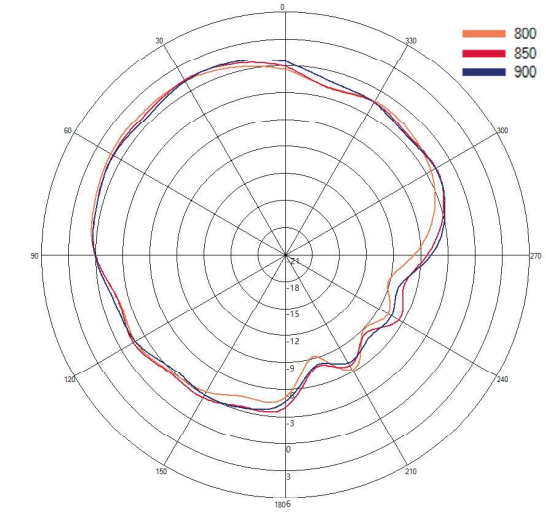
Typical H Plane- Cell A - Patterns- 700-800MHz



Typical 3D Pattern- Cell A - 850 MHz



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



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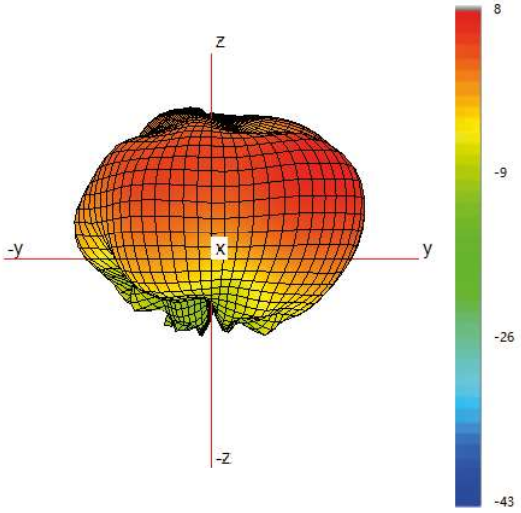
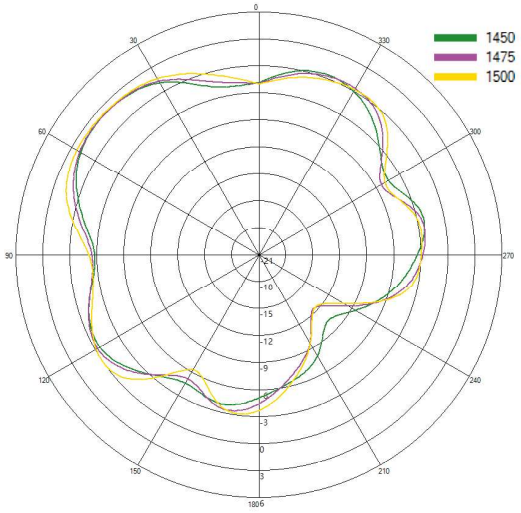
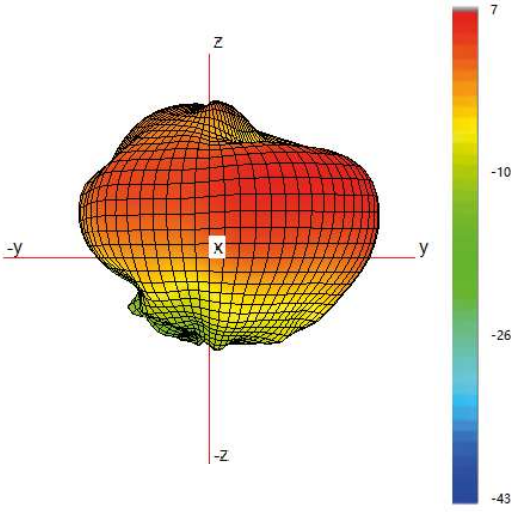
Typical 3D Pattern- Cell A - 1475 MHz



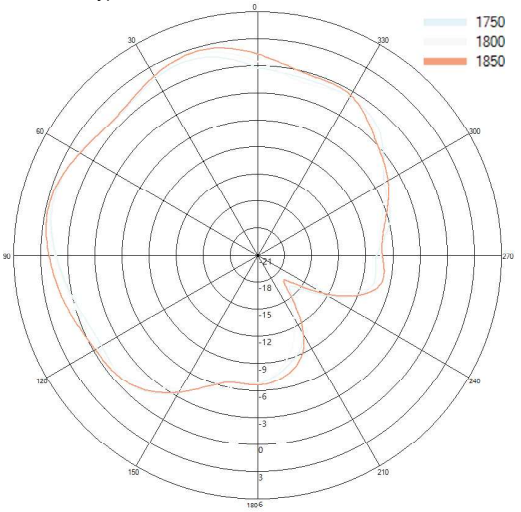
Typical H Plane- Cell A- Patterns- 1450-1500 MHz



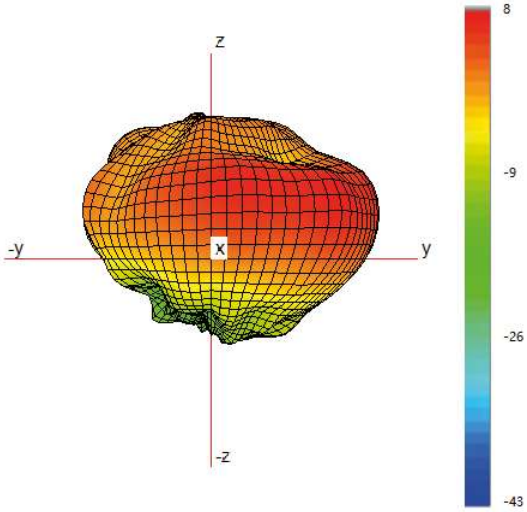
Typical 3D Pattern- Cell A - 1800 MHz



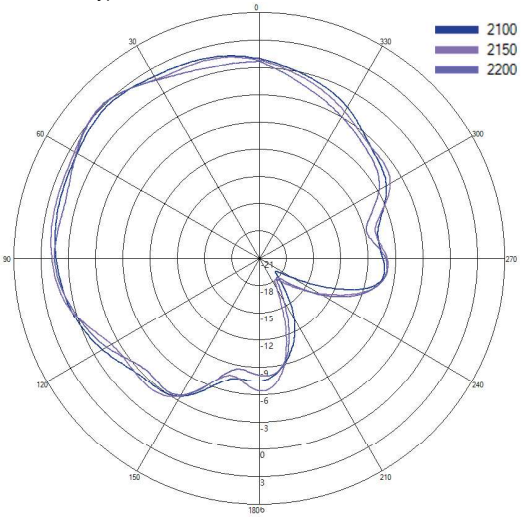
Typical H Plane- Cell A- Patterns- 1750-1850 MHz



Typical 3D Pattern- Cell A - 2150 MHz



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



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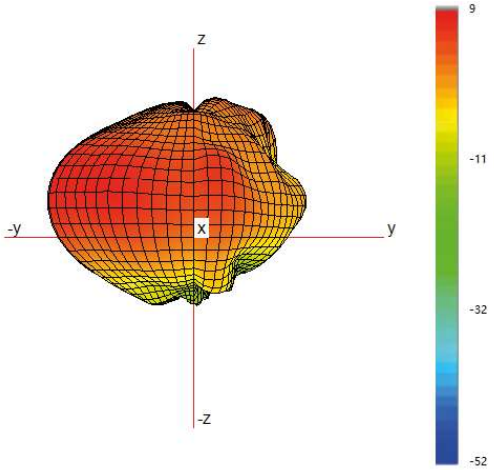
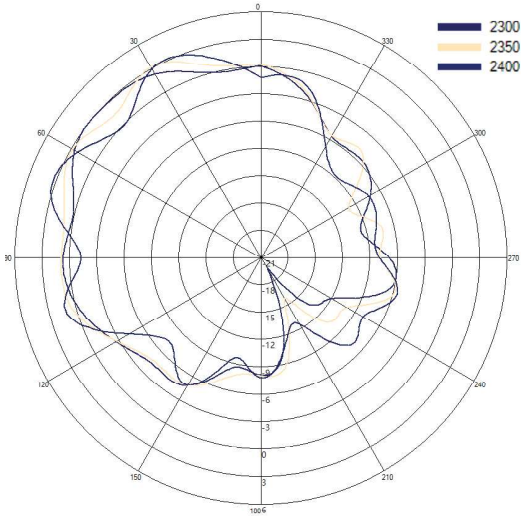
3D Patterns -Cell A

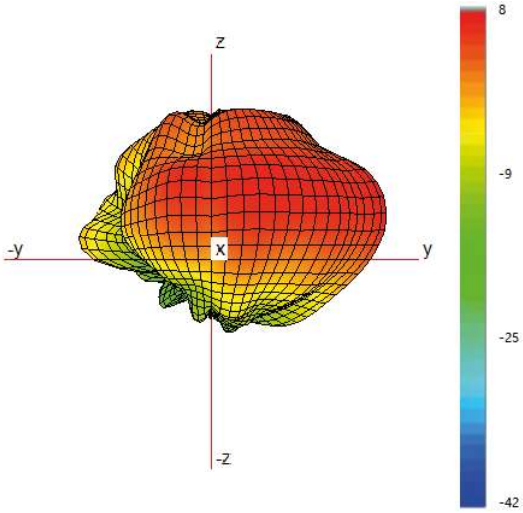
Typical 3D Pattern- Cell A - 2350 MHz



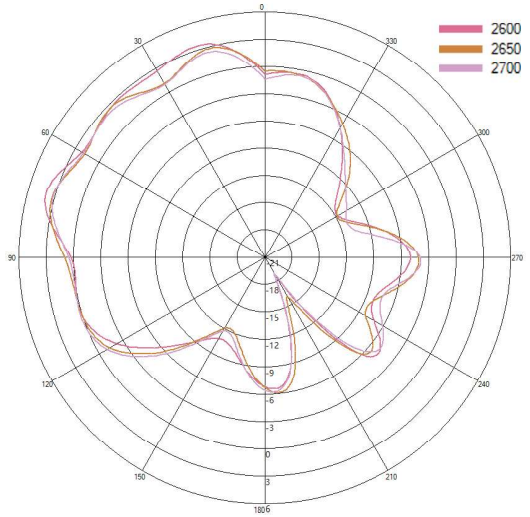
Typical H Plane- Cell A - Patterns- 2300-2400 MHz



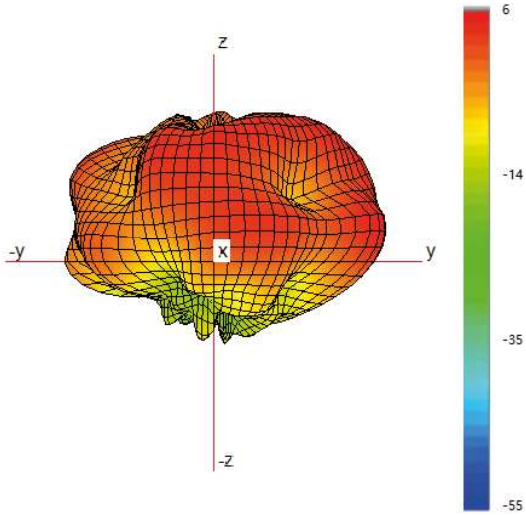
Typical 3D Pattern- Cell A - 2650 MHz



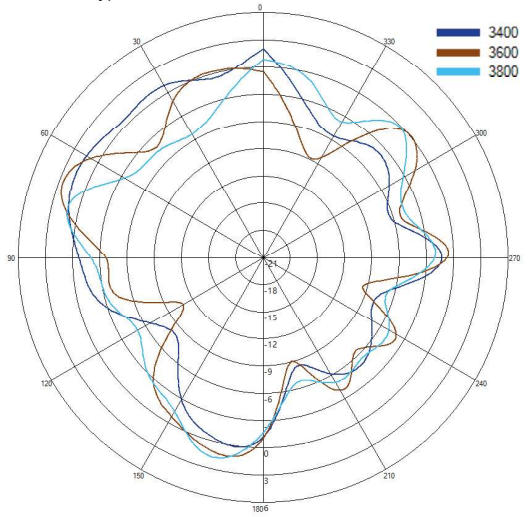
Typical H Plane- Cell A - Patterns- 2600-2700 MHz



Typical 3D Pattern- Cell A - 3600 MHz



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



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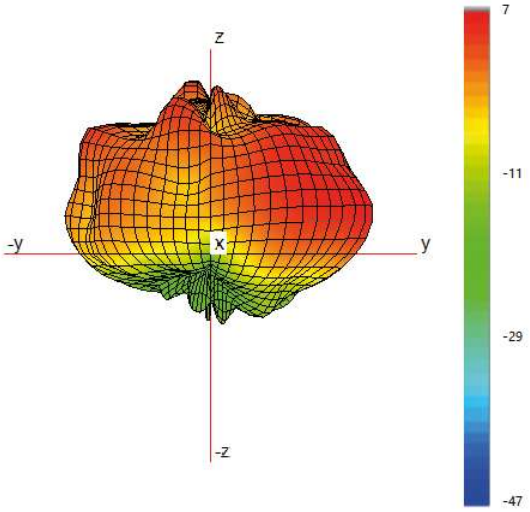
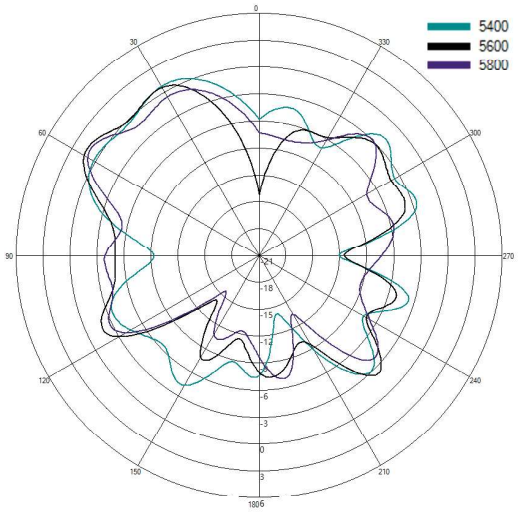
3D Patterns Cell A

Typical 3D Pattern- Cell A - 5600 MHz



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



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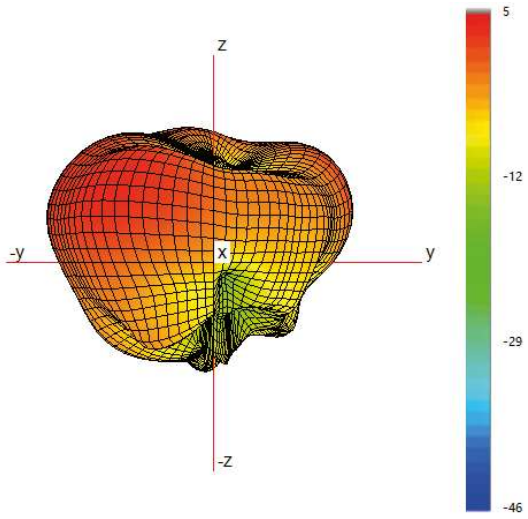
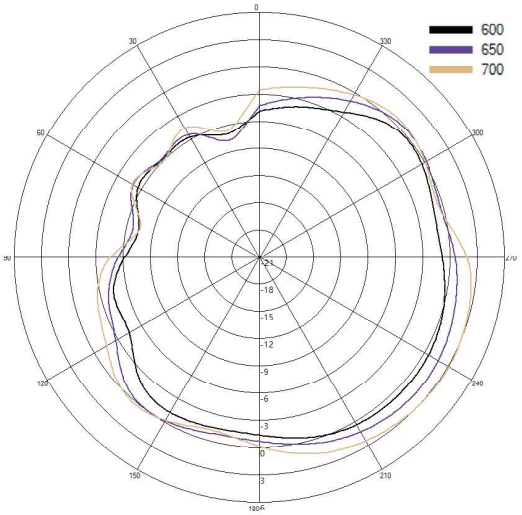
3D Patterns -Cell B

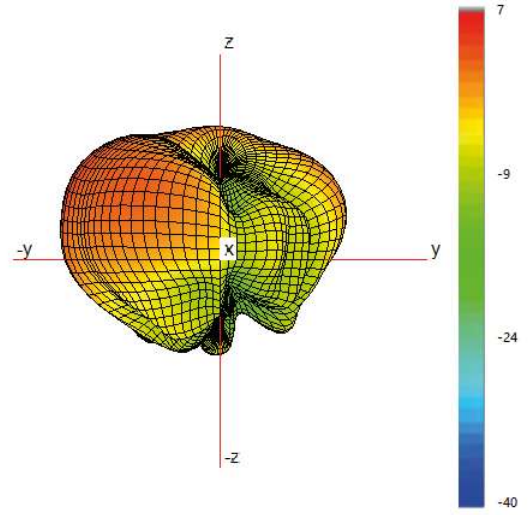
Typical 3D Pattern- Cell B - 650 MHz



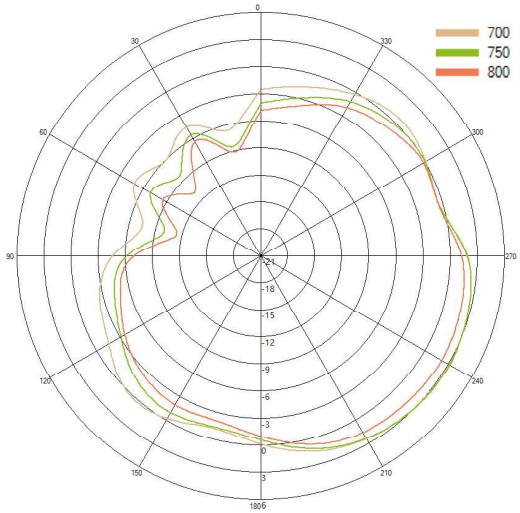
Typical H Plane- Cell B - Patterns- 600-700MHz



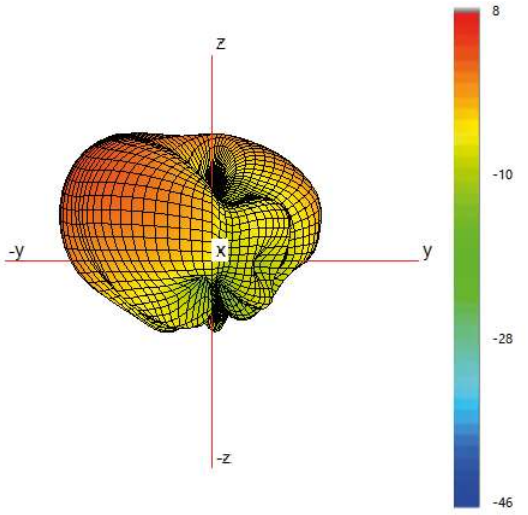
Typical 3D Pattern- Cell B - 750 MHz



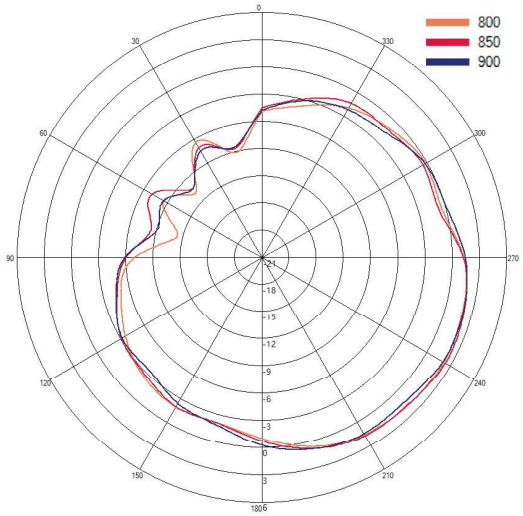
Typical H Plane- Cell B - Patterns- 700-800MHz



Typical 3D Pattern- Cell B - 850 MHz



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



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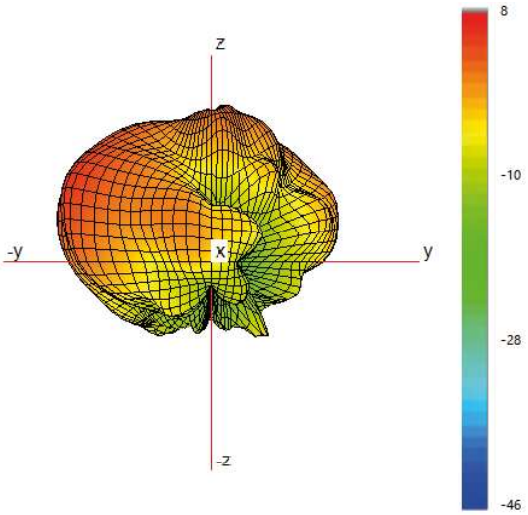
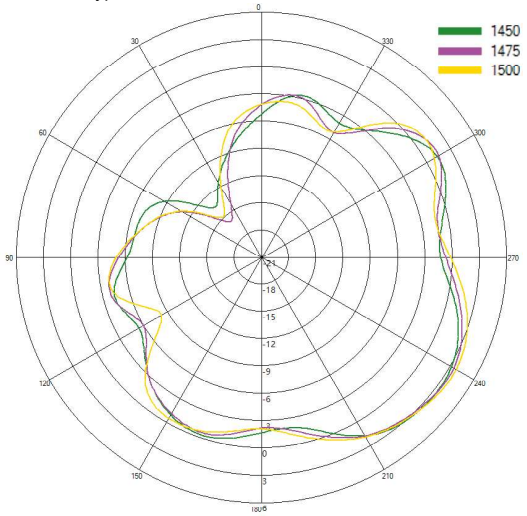
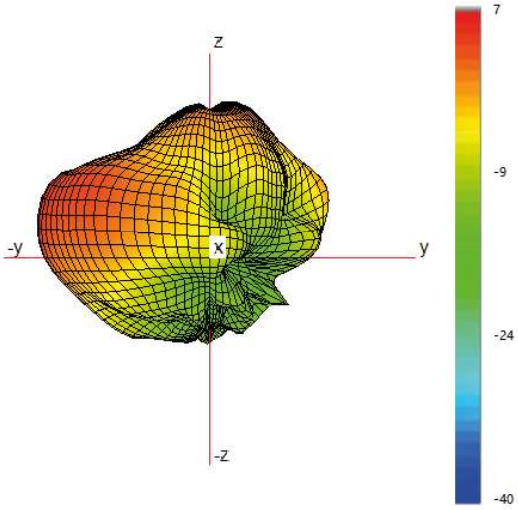
Typical 3D Pattern- Cell B - 1475 MHz



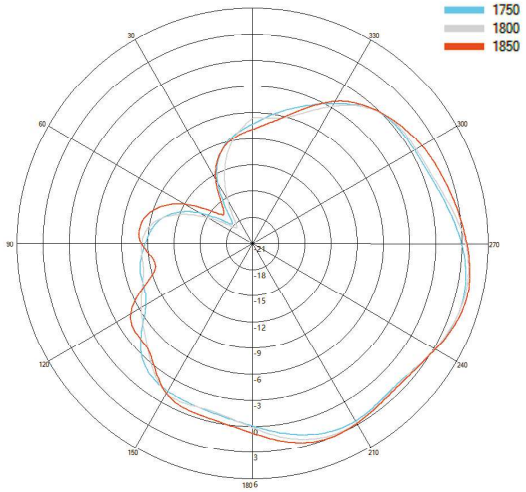
Typical H Plane- Cell B- Patterns- 1450-1500 MHz



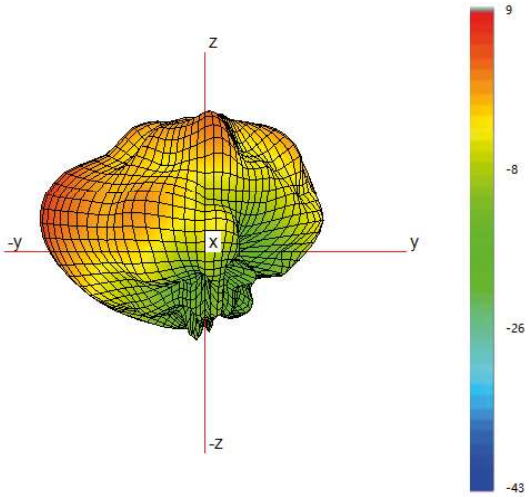
Typical 3D Pattern- Cell B - 1800 MHz



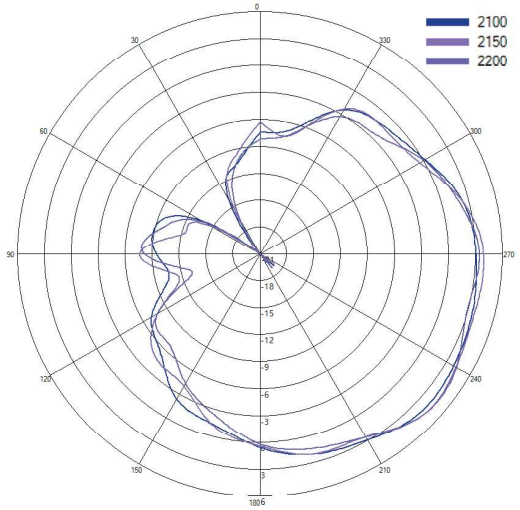
Typical H Plane- Cell B- Patterns- 1750-1850 MHz



Typical 3D Pattern- Cell B - 2150 MHz



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



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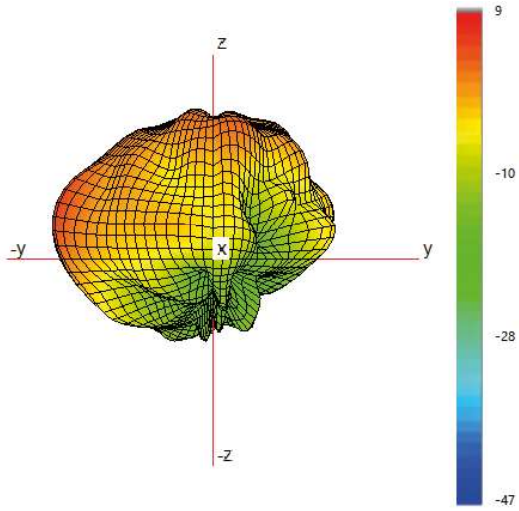
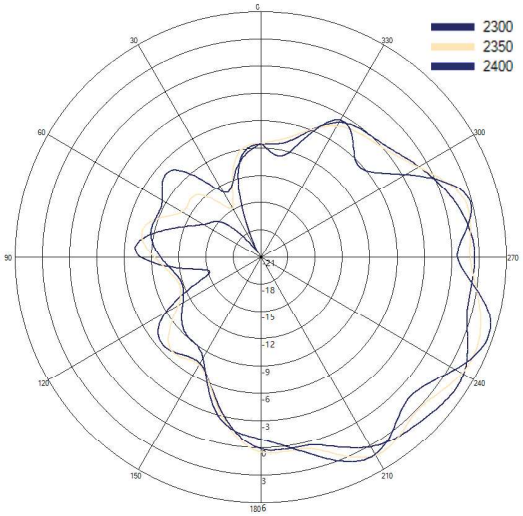
3D Patterns -Cell B

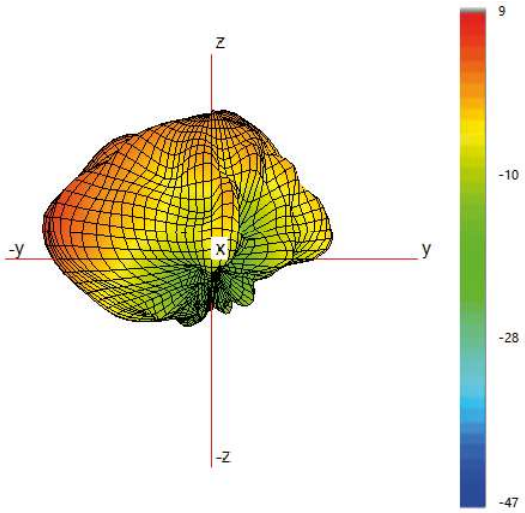
Typical 3D Pattern- Cell B - 2350 MHz



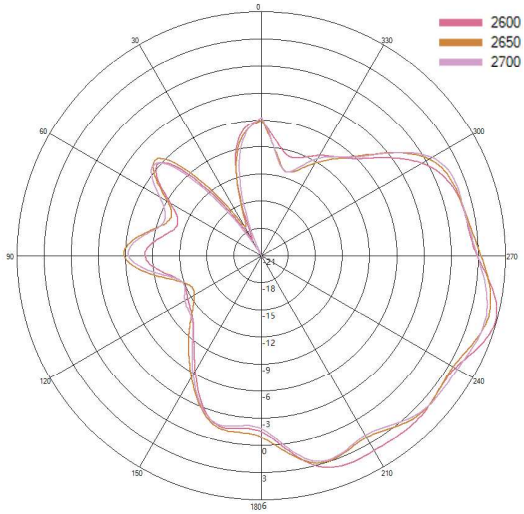
Typical H Plane- Cell B - Patterns- 2300-2400 MHz



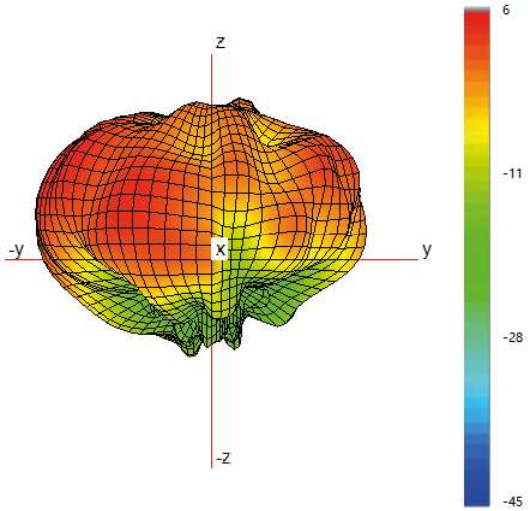
Typical 3D Pattern- Cell B - 2650 MHz



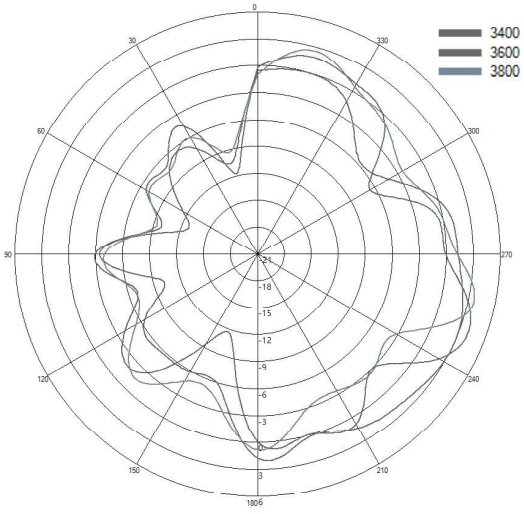
Typical H Plane- Cell B - Patterns- 2600-2700 MHz



Typical 3D Pattern- Cell B - 3600 MHz



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



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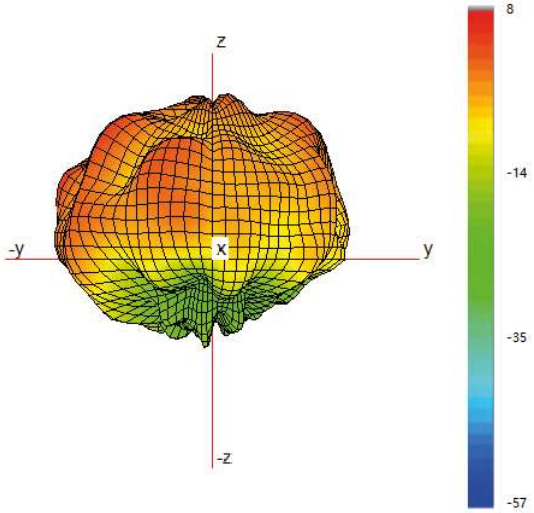
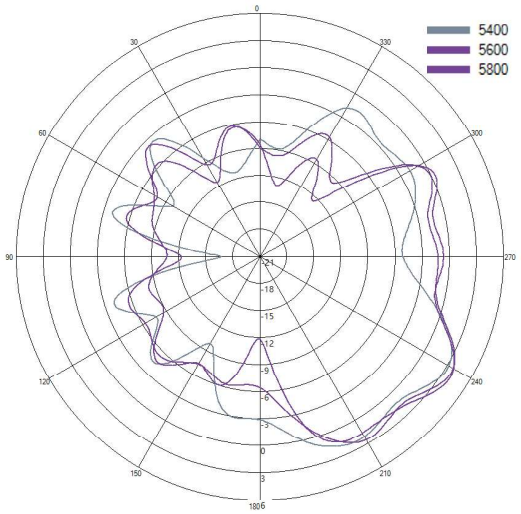
3D Patterns Cell B

Typical 3D Pattern- Cell B - 5600 MHz



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



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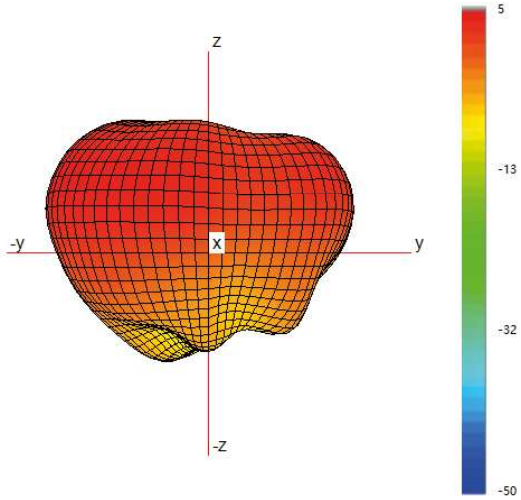
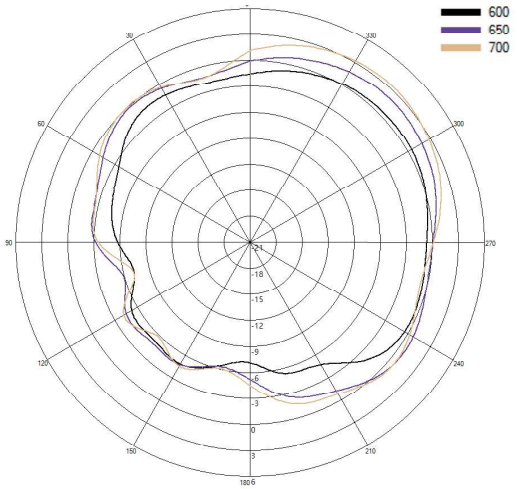
3D Patterns -Cell C

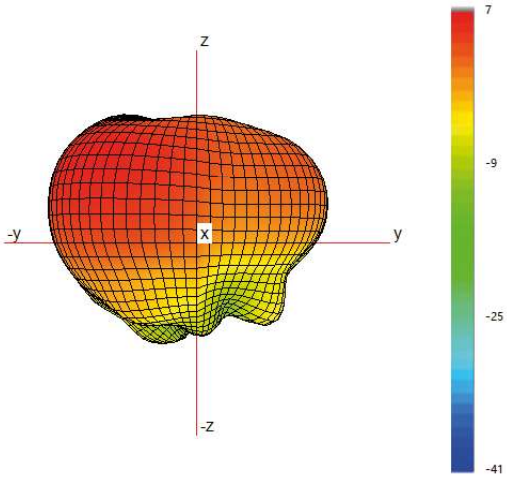
Typical 3D Pattern- Cell C - 650 MHz



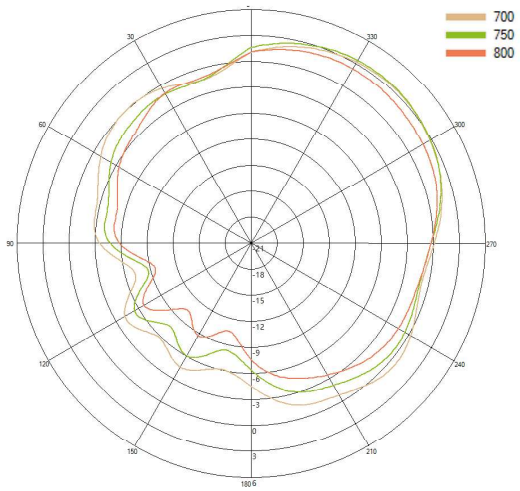
Typical H Plane- Cell C - Patterns- 600-700MHz



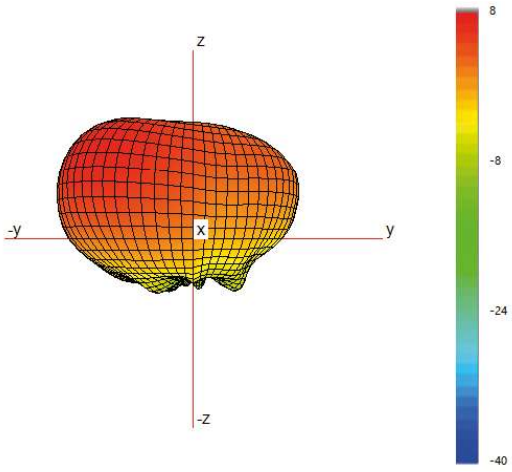
Typical 3D Pattern- Cell C - 750 MHz



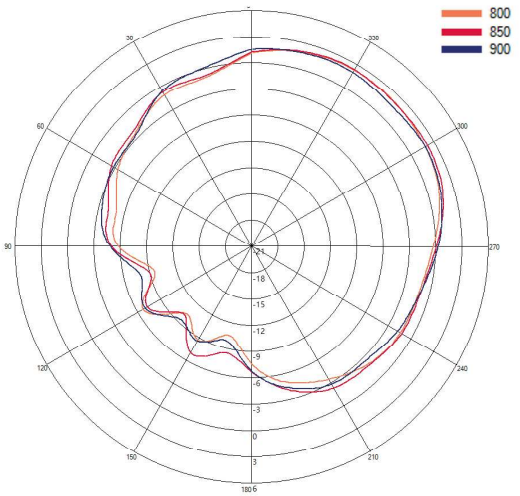
Typical H Plane- Cell C - Patterns- 700-800MHz



Typical 3D Pattern- Cell C - 850 MHz



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



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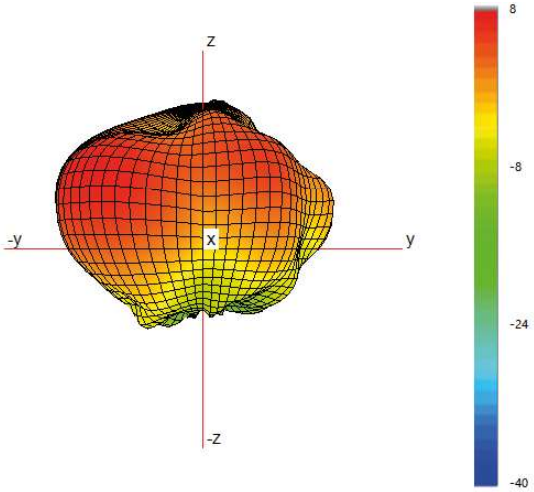
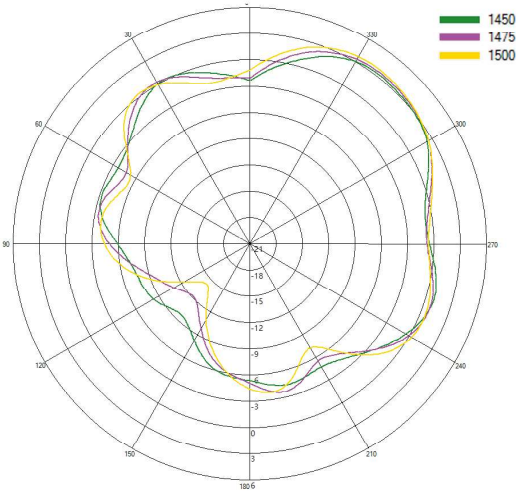
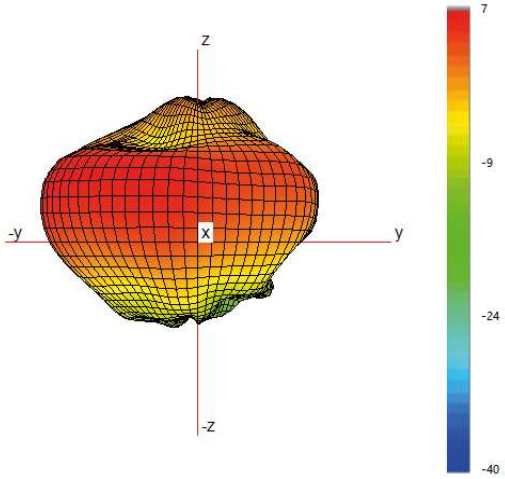
Typical 3D Pattern- Cell C - 1475 MHz



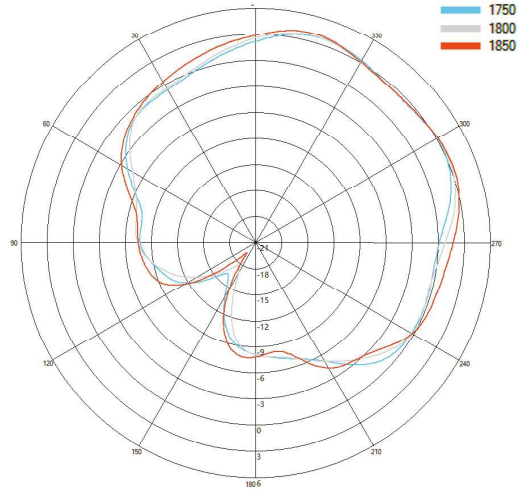
Typical H Plane- Cell C- Patterns- 1450-1500 MHz



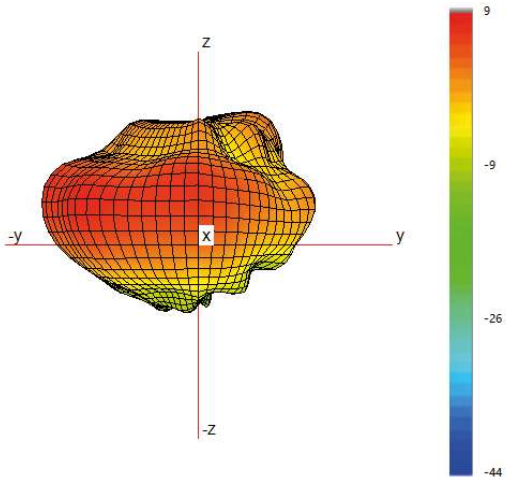
Typical 3D Pattern- Cell C - 1800 MHz



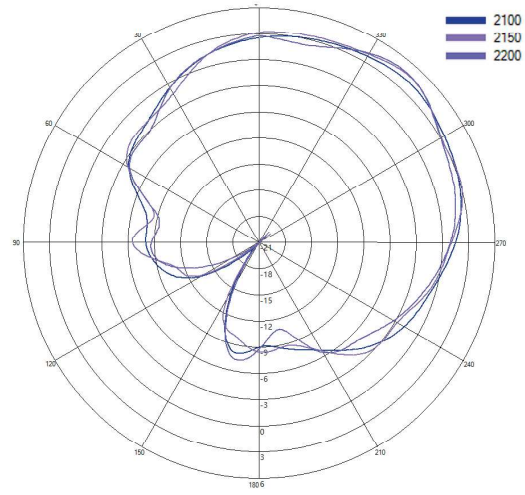
Typical H Plane- Cell C- Patterns- 1750-1850 MHz



Typical 3D Pattern- Cell C - 2150 MHz



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



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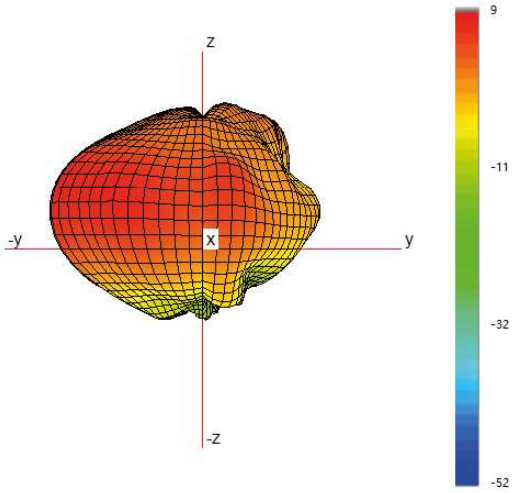
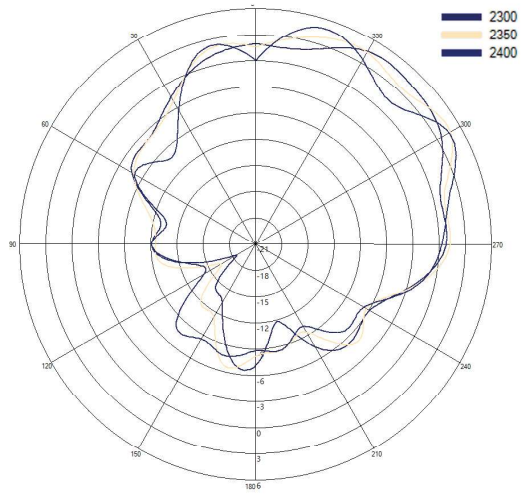
3D Patterns -Cell C

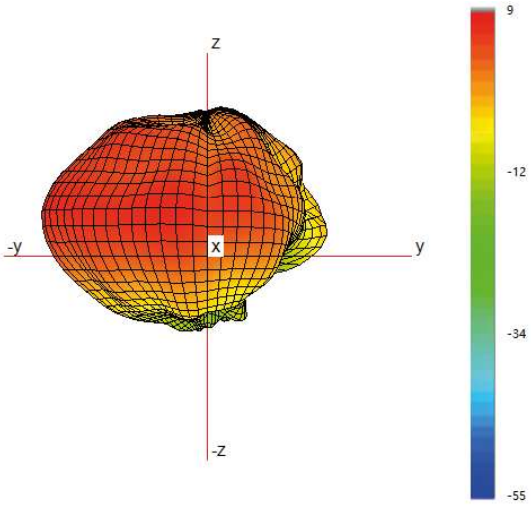
Typical 3D Pattern- Cell C - 2350 MHz



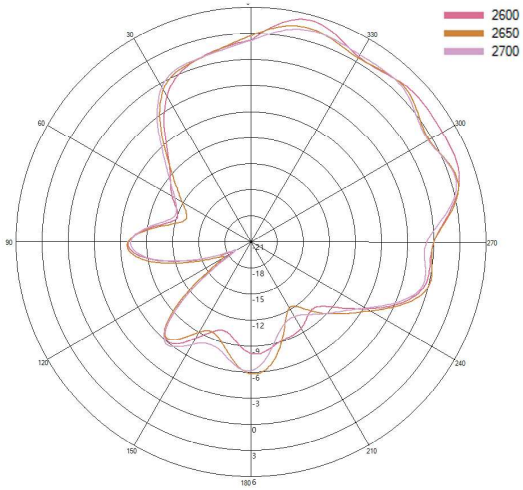
Typical H Plane- Cell C - Patterns- 2300-2400 MHz



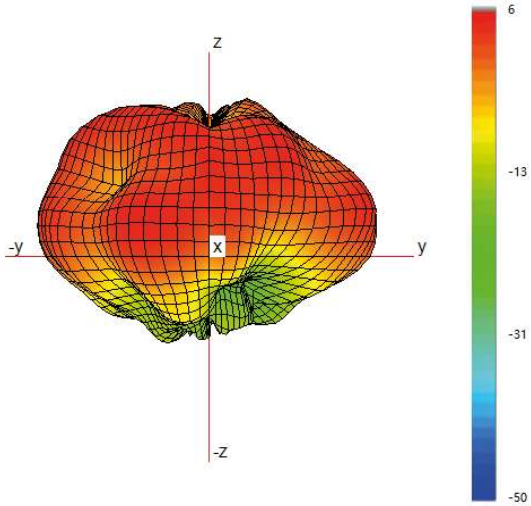
Typical 3D Pattern- Cell C - 2650 MHz



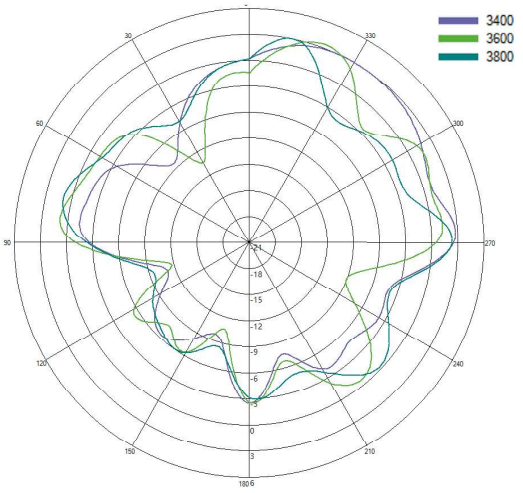
Typical H Plane- Cell C - Patterns- 2600-2700 MHz



Typical 3D Pattern- Cell C - 3600 MHz



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



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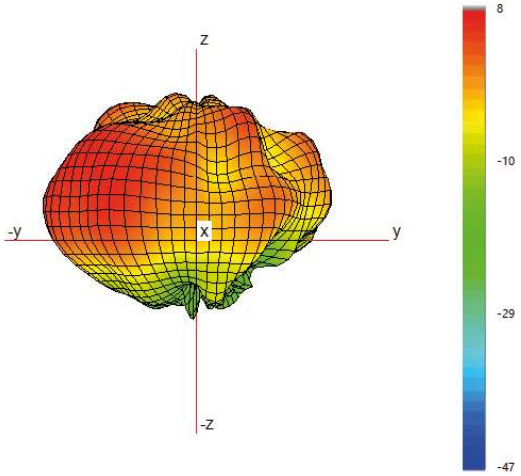
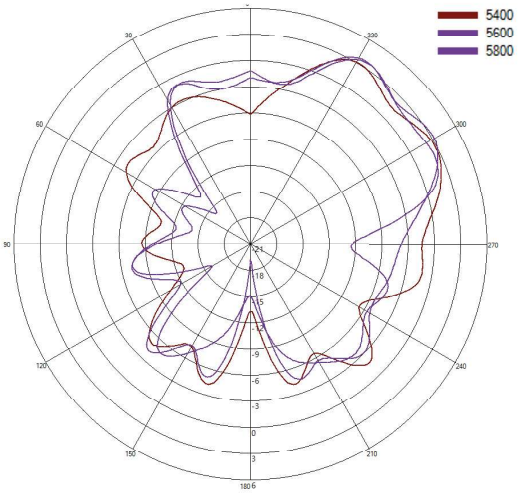
3D Patterns Cell C

Typical 3D Pattern- Cell C - 5600 MHz



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



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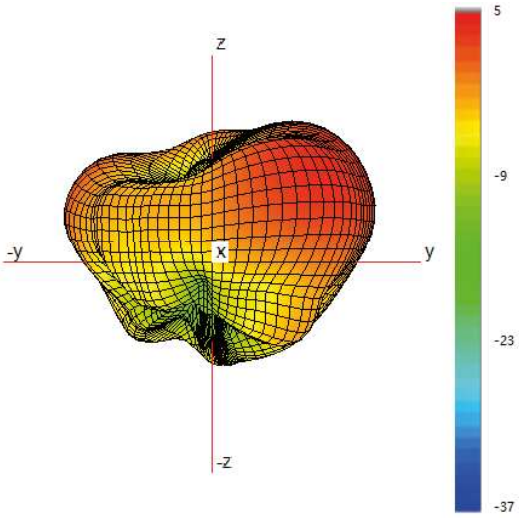
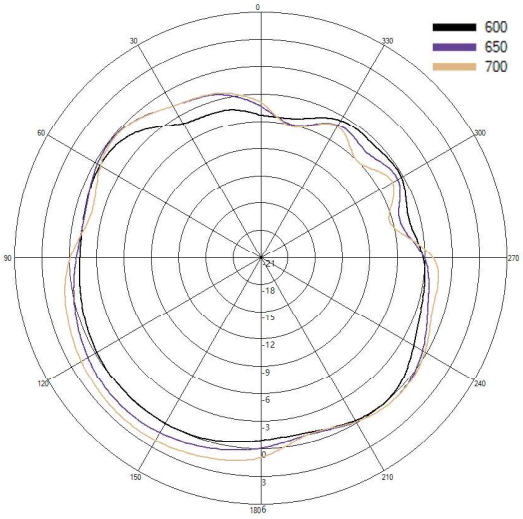
3D Patterns -Cell D

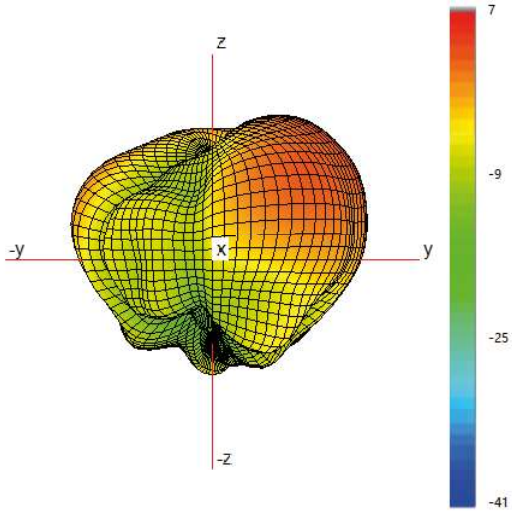
Typical 3D Pattern- Cell D - 650 MHz



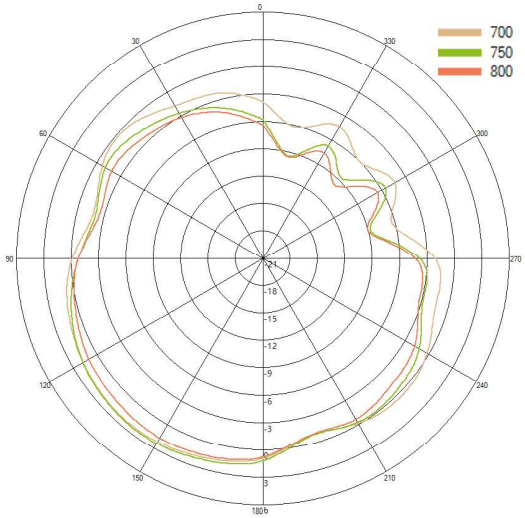
Typical H Plane- Cell D - Patterns- 600-700MHz



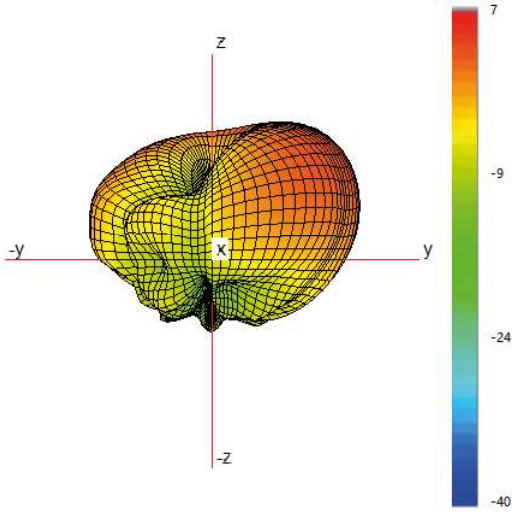
Typical 3D Pattern- Cell D - 750 MHz



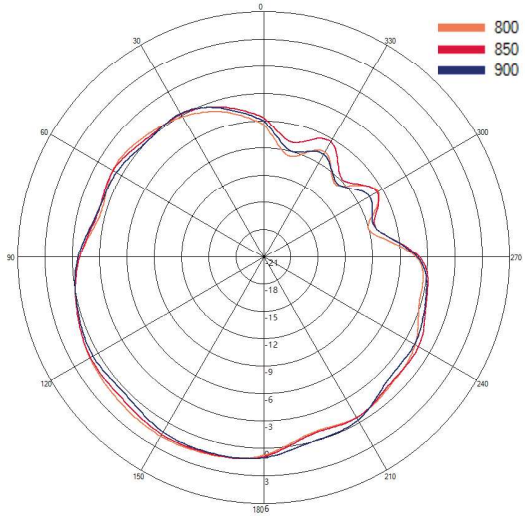
Typical H Plane- Cell D - Patterns- 700-800MHz



Typical 3D Pattern- Cell D - 850 MHz



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



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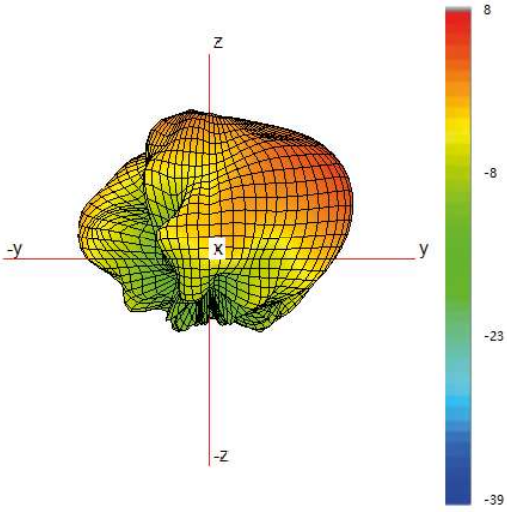
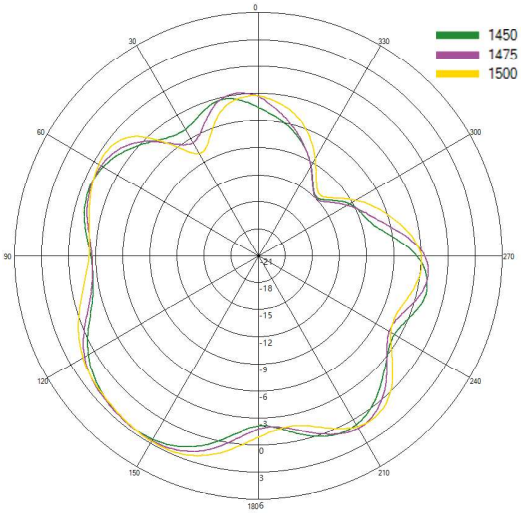
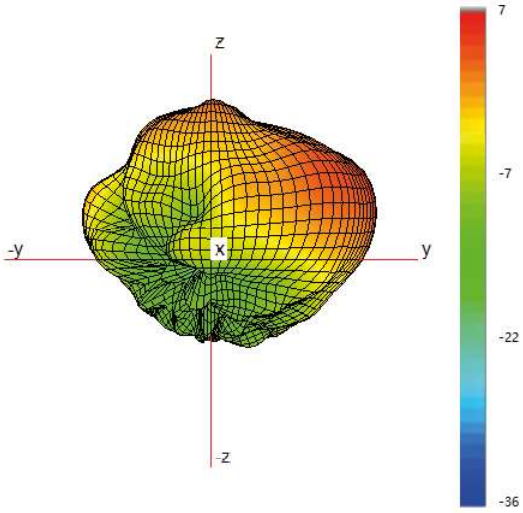
Typical 3D Pattern- Cell D - 1475 MHz



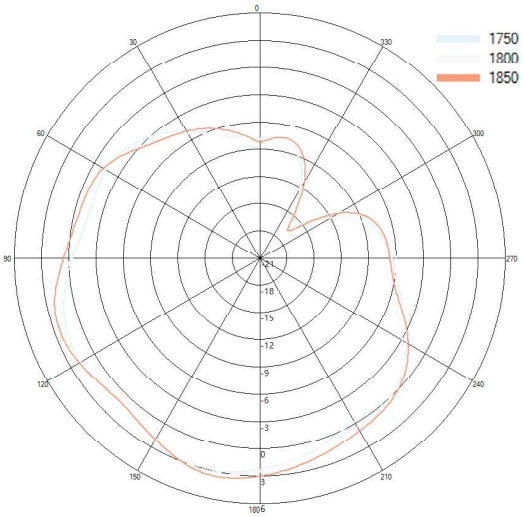
Typical H Plane- Cell D- Patterns- 1450-1500 MHz



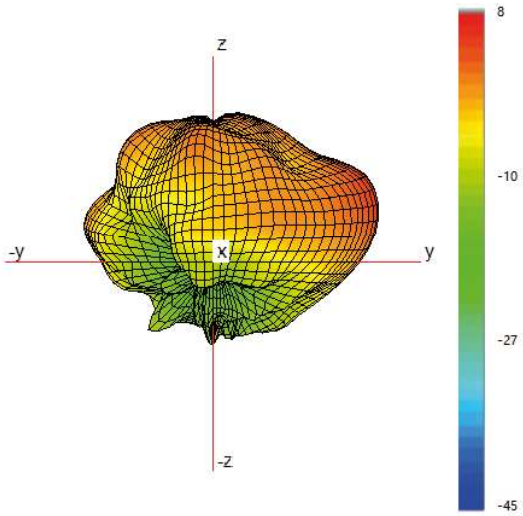
Typical 3D Pattern- Cell D - 1800 MHz



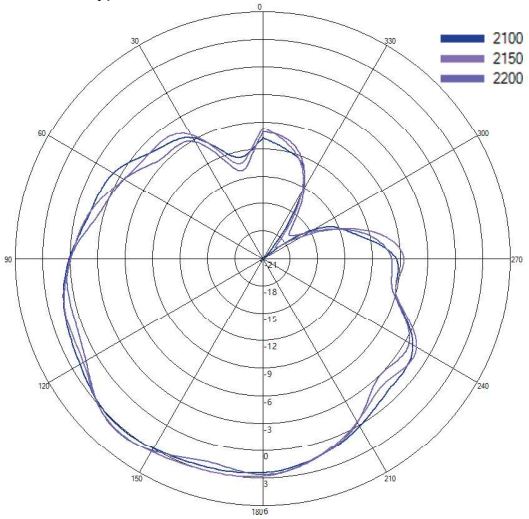
Typical H Plane- Cell D- Patterns- 1750-1850 MHz



Typical 3D Pattern- Cell D - 2150 MHz



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



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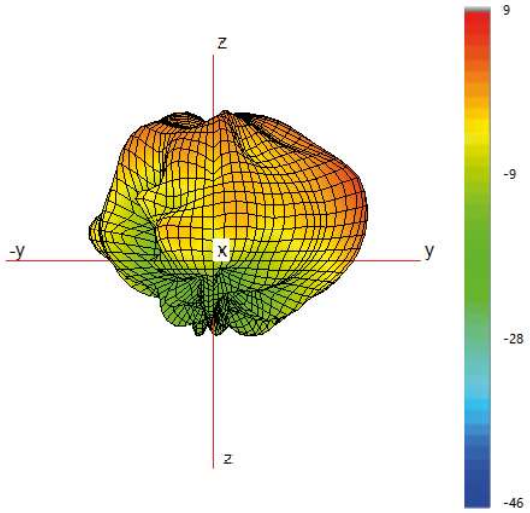
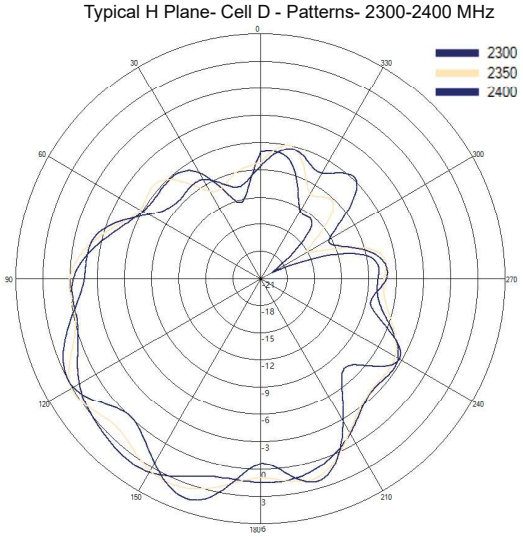
3D Patterns -Cell D

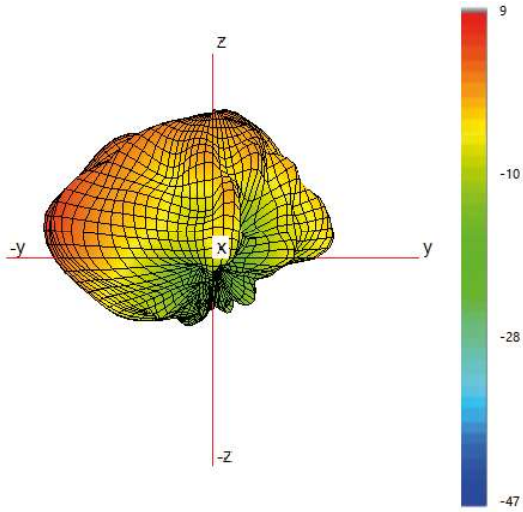
Typical 3D Pattern- Cell D - 2350 MHz



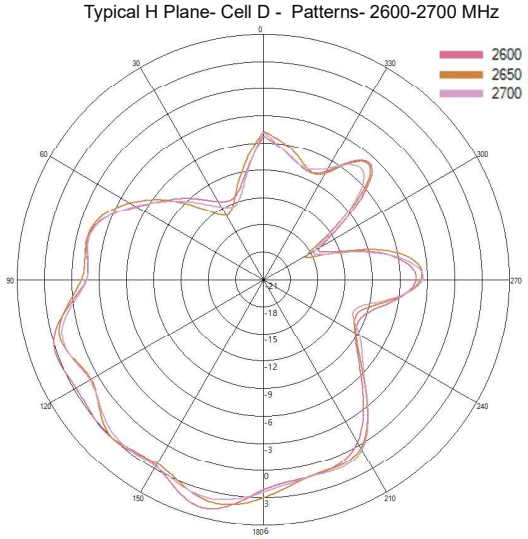
Typical H Plane- Cell D - Patterns- 2300-2400 MHz



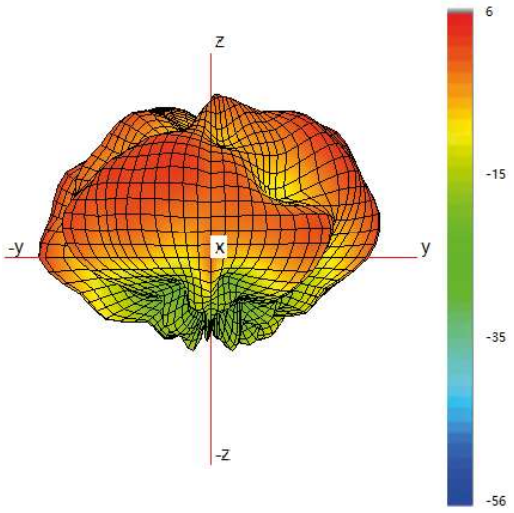
Typical 3D Pattern- Cell D - 2650 MHz



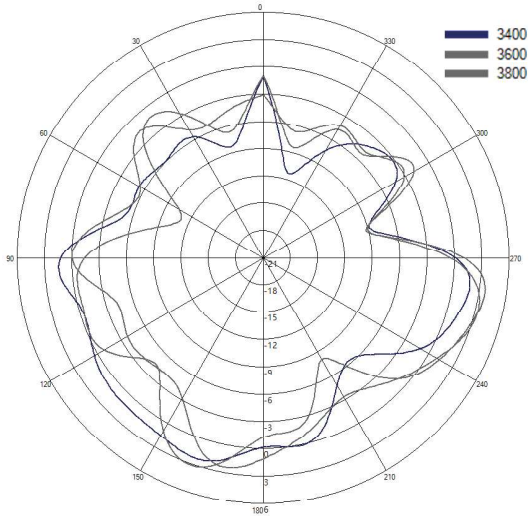
Typical H Plane- Cell D - Patterns- 2600-2700 MHz



Typical 3D Pattern- Cell D - 3600 MHz



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



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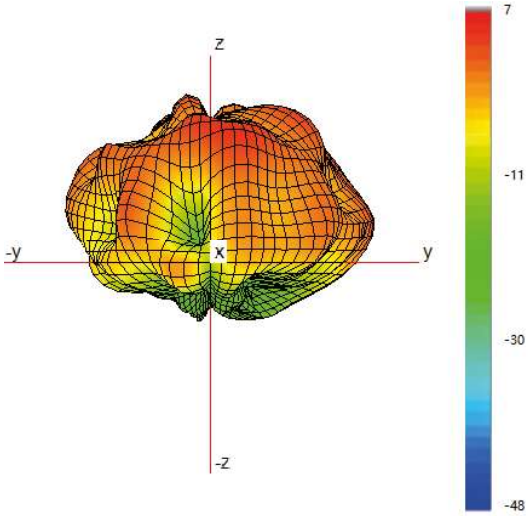
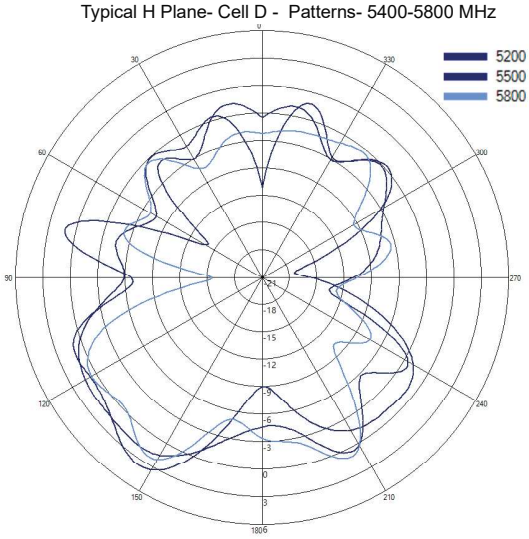
3D Patterns Cell D

Typical 3D Pattern- Cell D - 5600 MHz



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



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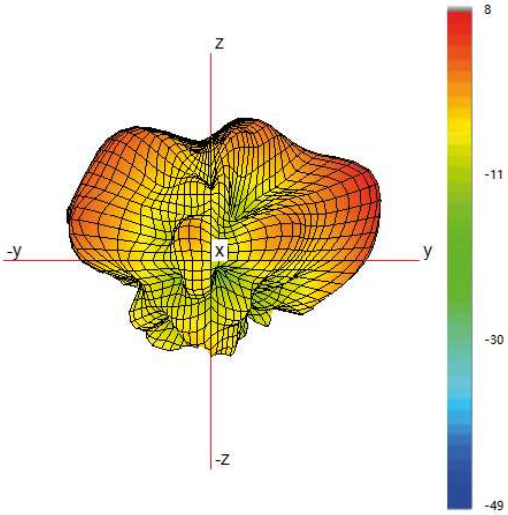
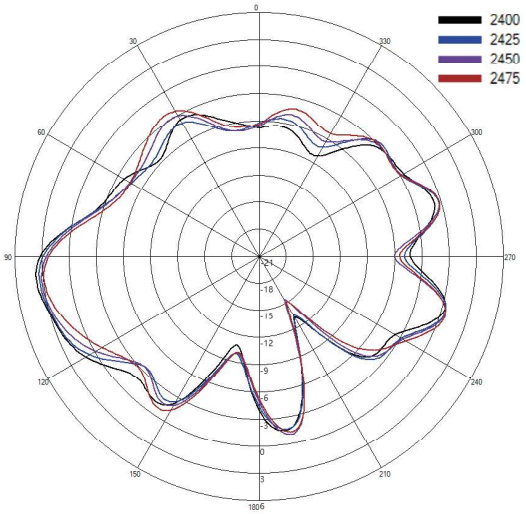
WiFi Patterns -WiFi -1

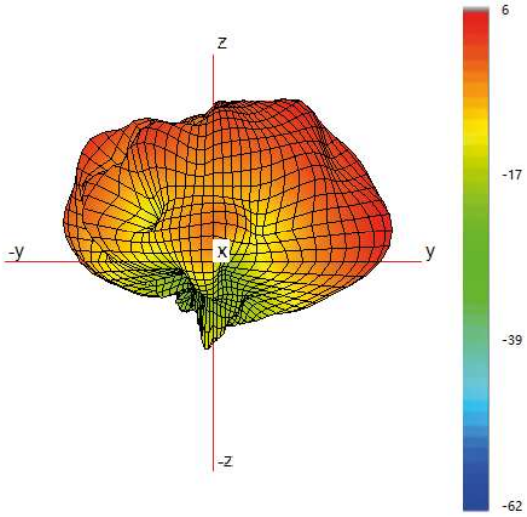
Typical 3D Pattern- WiFi - 1 - 2450 MHz



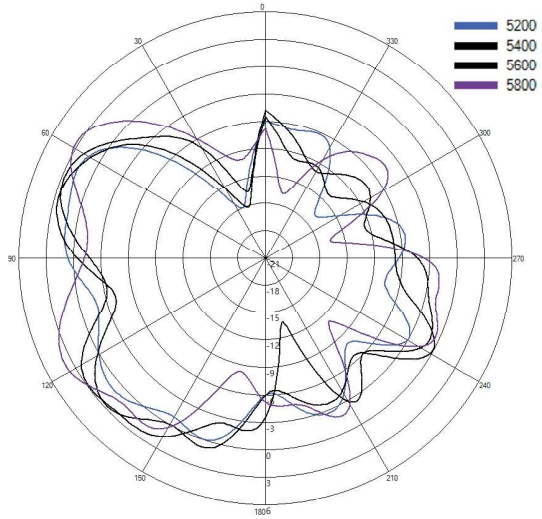
Typical H Plane- WiFi - 1 - Patterns- 2400-2475MHz



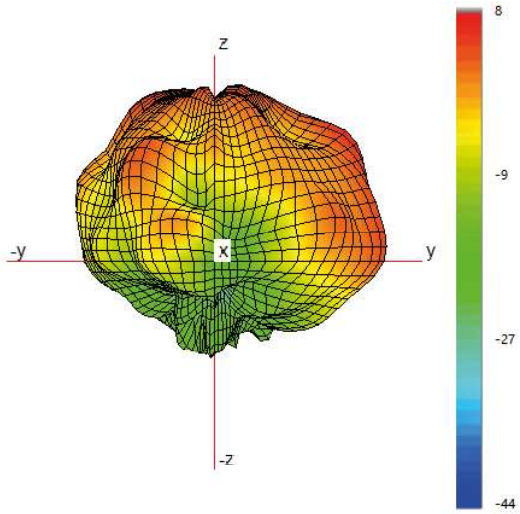
Typical 3D Pattern- WiFi - 1 - 5500 MHz



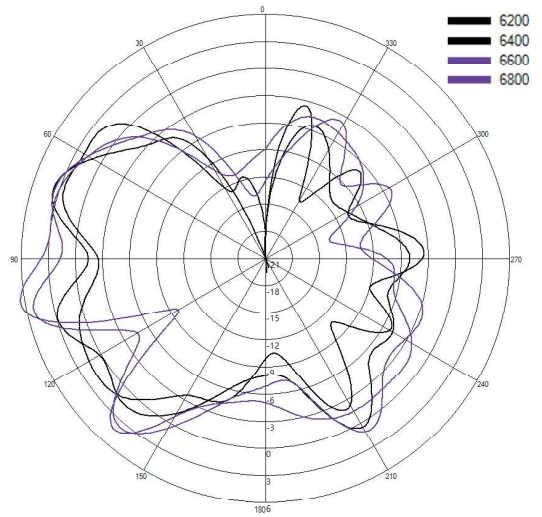
Typical H Plane- WiFi - 1 - Patterns- 5200-5800MHz



Typical 3D Pattern- WiFi - 1 - 6500 MHz



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



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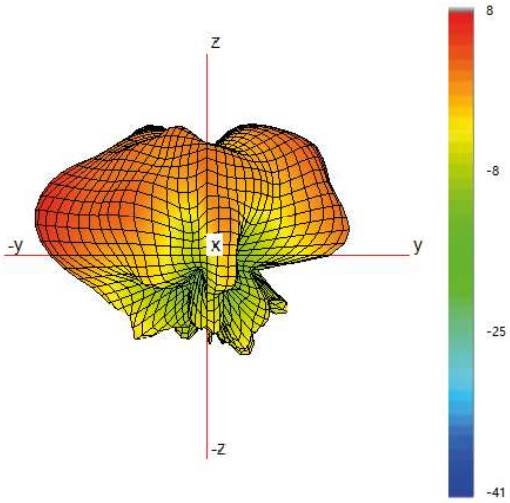
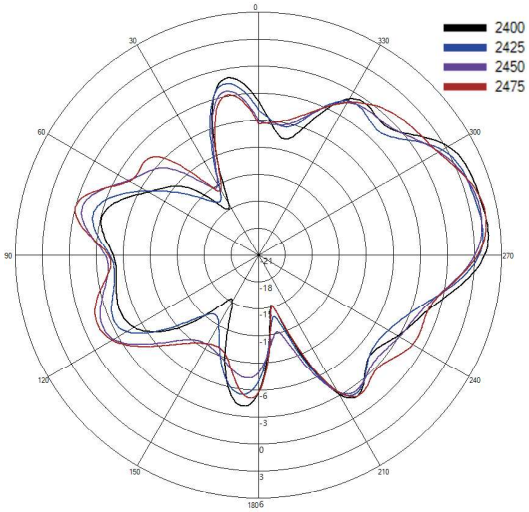
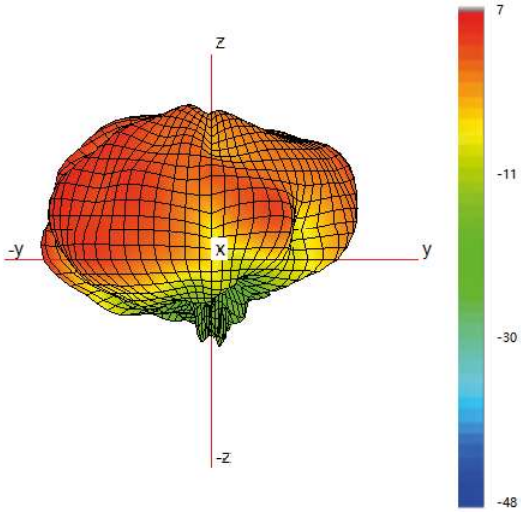
Typical 3D Pattern- WiFi - 2 - 2450 MHz



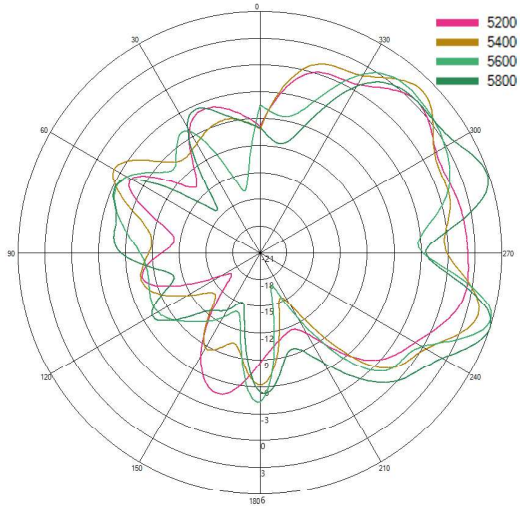
Typical H Plane- WiFi - 2 - Patterns- 2400-2475MHz



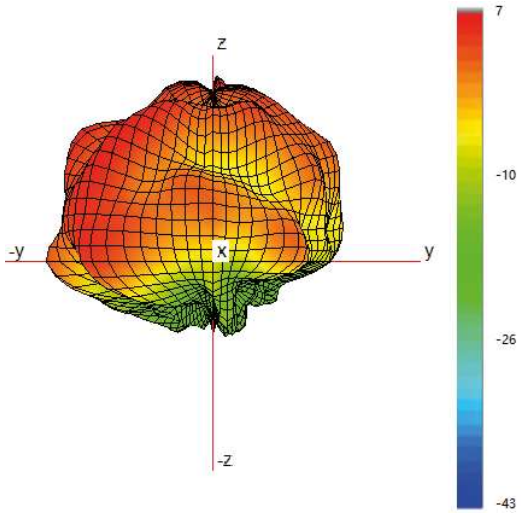
Typical 3D Pattern- WiFi - 2 - 5500 MHz



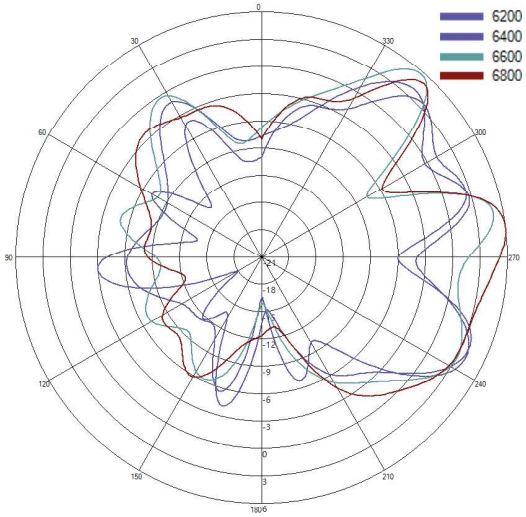
Typical H Plane- WiFi - 2 - Patterns- 5200-5800MHz



Typical 3D Pattern- WiFi - 2 - 6500 MHz



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



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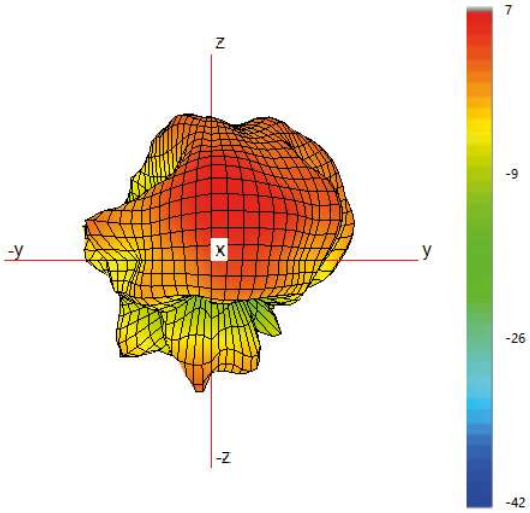
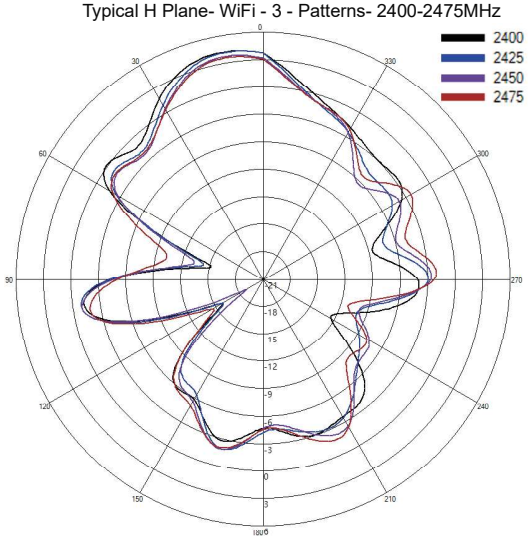
WiFi Patterns -WiFi -3

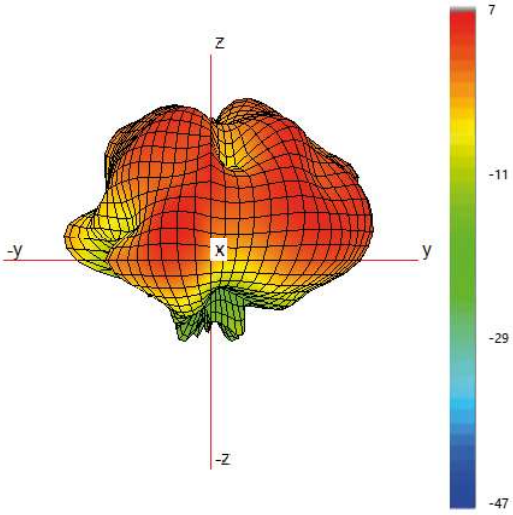
Typical 3D Pattern- WiFi - 3 - 2450 MHz



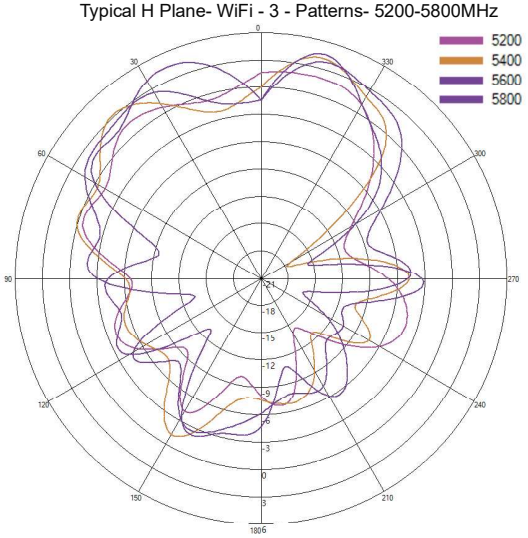
Typical H Plane- WiFi - 3 - Patterns- 2400-2475MHz



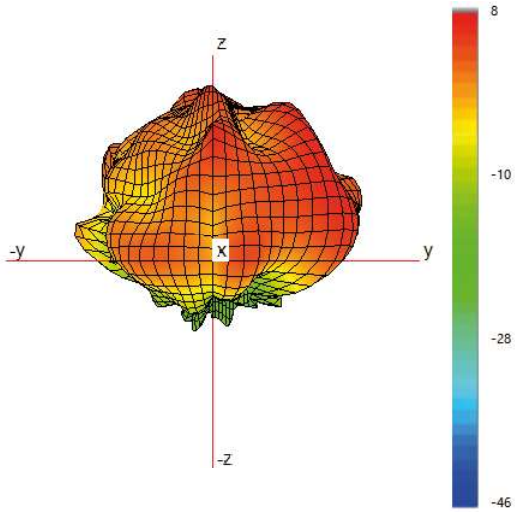
Typical 3D Pattern- WiFi - 3 - 5500 MHz



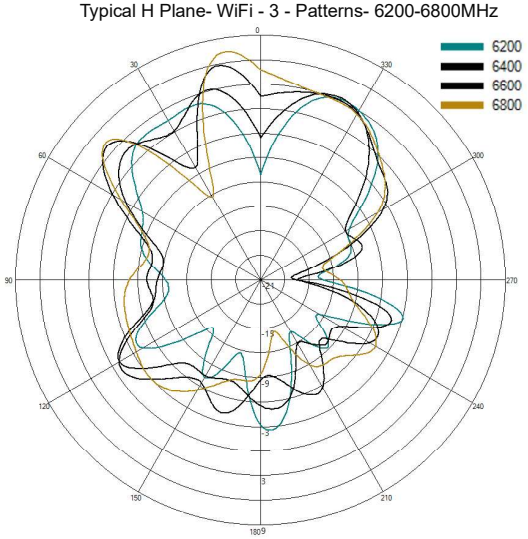
Typical H Plane- WiFi - 3 - Patterns- 5200-5800MHz



Typical 3D Pattern- WiFi - 3 - 6500 MHz



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



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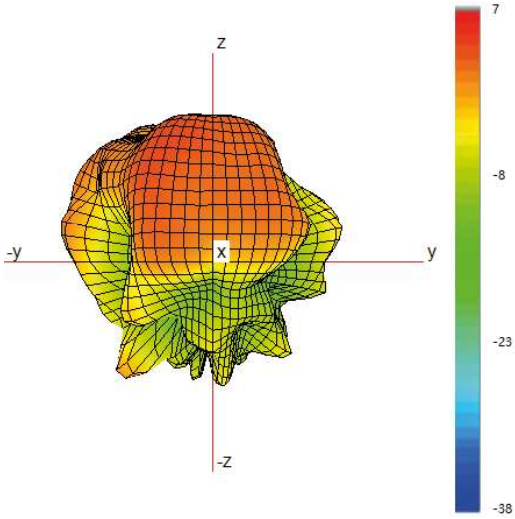
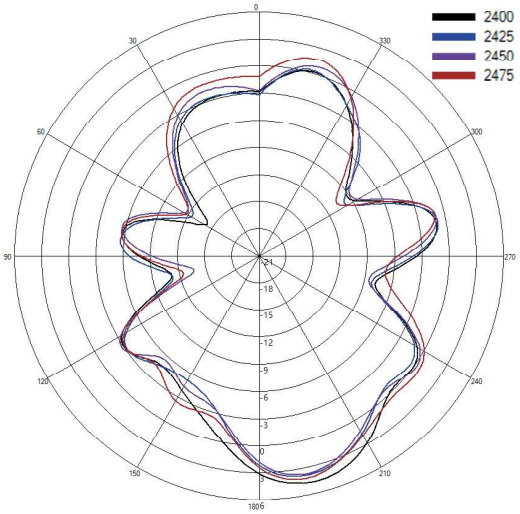
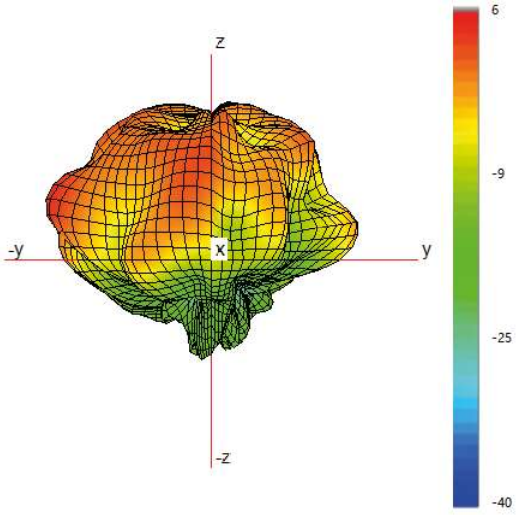
Typical 3D Pattern- WiFi - 4 - 2450 MHz



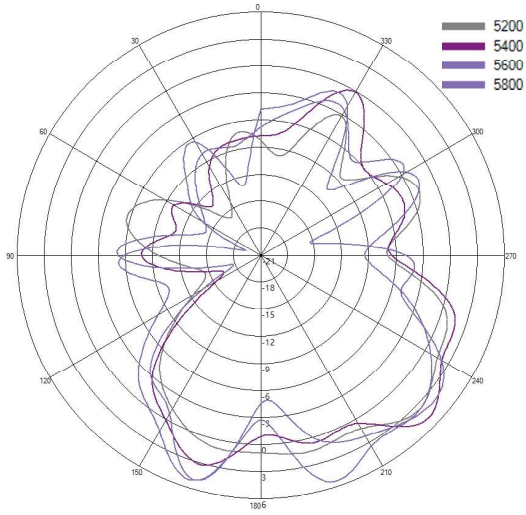
Typical H Plane- WiFi - 4 - Patterns- 2400-2475MHz



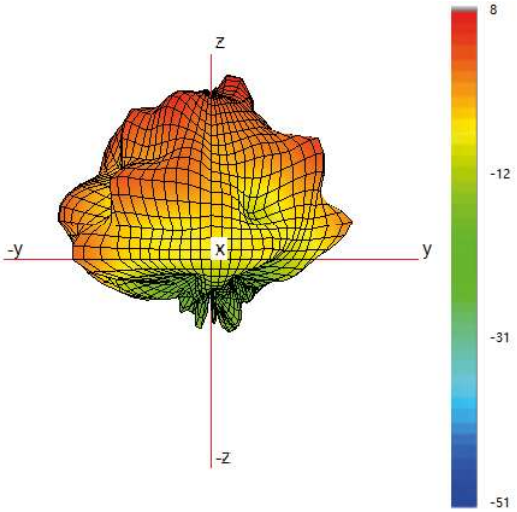
Typical 3D Pattern- WiFi - 4 - 5500 MHz



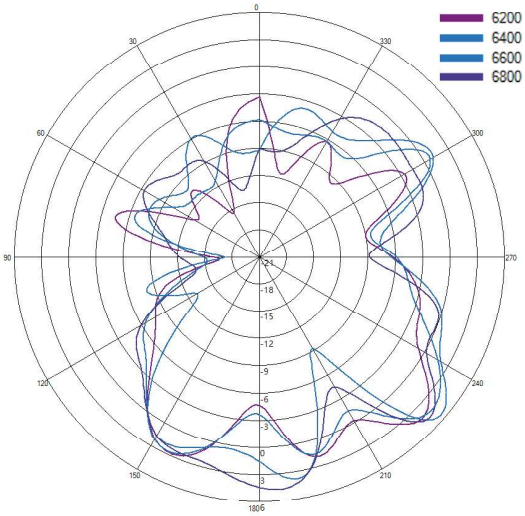
Typical H Plane- WiFi - 4 - Patterns- 5200-5800MHz



Typical 3D Pattern- WiFi - 4 - 6500 MHz



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



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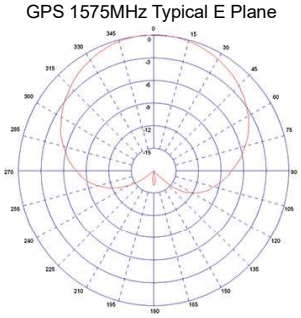
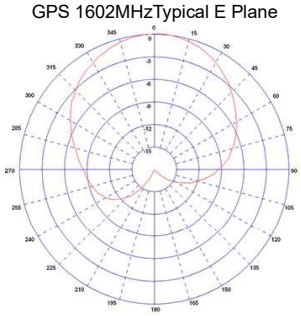
E-Plane Patterns- GPS/GNSS

GPS 1575MHz Typical E Plane



GPS 1602MHzTypical E Plane



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