WWAN Antenna Information
ThinkPad T16 Gen 4
[Luxshare-ICT antenna]

Platform		
Platform owner	Lenovo Japan LLC	
Platform name	ThinkPad T16 Gen 4, ThinkPad P16s Gen 4 AMD	
Regulatory Model name (Compliance ID)	TP00160C, TP00160B, TP00160CL, TP00160BL, TP00160D, TP00160DL	
ODM	LCFC	
Target Launch Date	2024/4/1	
Tx Antenna		
Brand name	Luxshare-ICT	
Parts Number 5G SKU	Main Antenna:	DC330022C00
	Auxiliary Antenna:	DC330022D00 (LTE B20/n20 TX)
	MIMO1 Antenna	DC330022C00 (Rx only)
	MIMO2 Antenna	DC330022D00
Parts Number 4G SKU	Main Antenna:	DC330022F20
	Auxiliary Antenna:	DC330022F20 (Rx only)
Transmitter Module		
WWAN Module	Model A: Quectel RM520N-GL	FCC ID: XMR2022RM520NGL IC: 10224A-022RM520NGL
	Model B: Quectel EM061K-GL	FCC ID: XMR2023EM061KGL IC: 10224A-23EM061KGL

Revision history

Revision number	Date	Description
1	2020/ 11/ 18	Initial release
2	2023/08/23	Update CS24 module

Section 1. Antenna Assembly Specifications

Module A = RM520N-GL
Module B = EM061K-GL
Module C = EM160R-GL
Module D = EM05-CN

Main Antenna

Antenna Part Number	Manufacturer	Antenna Type	Cable Assembly Part Number and Information	Frequency (MHz)		Cable Loss (dB)	Peak Gain (including cable loss)	
							Horizontal (dBi)	Vertical (dBi)
DC330022C00	Luxshare-ICT	PIFA	1. Cable P/N: Shenyu : SY113L/50-015 2. Diameter: 1.13mm 50 ohm coaxial cable 3.Cable length: 167.5 mm 4. Connector P/N: SPEEDTECH : C87P115-00002-H	UMTS/HSPA (**UMTS 2100, Band 1**) (**UE-UTRA, Band 1, n1**) **Module:A,B,C,D**	1920.00	0.34	-6.34	-2.69
					1950.00	0.34	-7.87	-2.46
					1980.00	0.34	-7.2	-3.65
				UMTS/HSPA/EVDO (**UMTS1900, Band 2**) (**UE-UTRA, Band 2, n2**) **Module:A,B,C,**	1850.00	0.33	-3.81	-4
					1880.00	0.33	-4.54	-3.69
					1910.00	0.34	-5.69	-2.96
				GSM/GPRS/EDGE (**GSM 1800, Band 3**) (**UE-UTRA, Band 3, n3**) **Module:A,B,C,D**	1710.00	0.32	-0.06	-2.73
					1747.50	0.32	-2.46	-2.93
					1785.00	0.33	-5.18	-3.2
				UMTS(AWS) / HSPA (**UMTS, Band 4**) (**UE-UTRA , Band 4**) **Module:A,B,C**	1710.00	0.32	-0.06	-2.73
					1732.50	0.32	-1.72	-3.25
					1755.00	0.32	-2.99	-3.11
				GSM/GPRS/EDGE (**GSM 850**) (**UMTS850, Band 5**) (**UE-UTRA, Band 5, n5**) **Module:A,B,C,D**	824.00	0.23	-1.96	-3.7
					836.50	0.24	-1.59	-3.07
					849.00	0.24	-2.09	-2.84
				(UMTS, Band 6) Module:B,C	830.00	0.23	-1.68	-3.21
					835.00	0.23	-1.6	-3.08
					840.00	0.24	-1.65	-3.01
				FCC Part 27 (UE-UTRA, Band 7, n7) Module:A,B,C	2500.00	0.39	-4.43	-2.97
					2535.00	0.39	-5.42	-3.07
					2570.00	0.39	-4.04	-3.81
				UMTS/HSPA (**UMTS 900, Band 8**) (**UE-UTRA, Band 8, n8**) **Module:A,B,C,D**	880.00	0.24	-3.52	-1.9
					897.50	0.24	-5.51	-1.89
					915.00	0.24	-6.31	-2.03
DC330022F20	Luxshare-ICT	PIFA	1. Cable P/N: Shenyu : SY113L/50-015 2. Diameter: 1.13mm 50 ohm coaxial cable 3.Cable length: 177.0 mm 4. Connector P/N: SPEEDTECH : C87P115-00002-H	~~**(WCDMA, Band 9)**~~	~~1844.9~~			
					~~1862.5~~			
					~~1879.9~~			
				(UE-UTRA , Band 12, n12) Module:A,B,C	699.00	0.22	-1	-2.82
					707.50	0.22	-1.54	-2.84
					716.00	0.22	-1.23	-2.81
				(UE-UTRA, Band 13) Module:A,B,C	777.00	0.23	-3.31	-3.76
					782.00	0.23	-3.62	-3.8
					787.00	0.23	-4	-3.95
				(UE-UTRA, Band 14) Module:A,B,C	788.00	0.23	-4.08	-3.93
					793.00	0.23	-4.44	-3.93
					798.00	0.23	-4.72	-3.98
				(UE-UTRA, Band 17) Module :A,B,C	704.00	0.22	-1.51	-2.84
					710.00	0.22	-1.47	-2.82
					716.00	0.22	-1.23	-2.81
				(UE-UTRA, Band 18) Module :A,B,C	815.00	0.23	-2.83	-4.29
					822.50	0.23	-2.04	-3.79
					830.00	0.23	-1.68	-3.21
				(UMTS, Band 19) (UE-UTRA, Band 19) Module :A,B,C	830.00	0.23	-1.68	-3.21
					837.50	0.24	-1.6	-3.06
					845.00	0.24	-1.77	-2.91

Antenna Part Number	Manufacturer	Antenna Type	Cable Assembly Part Number and Information	Frequency (MHz)		Cable Loss (dB)	Peak Gain (including cable loss)	
							Horizontal (dBi)	Vertical (dBi)
				(UE-UTRA, Band 20, n20 Module :A,B,C	832.00	0.23	-1.63	-3.11
					847.00	0.24	-1.93	-2.88
					862.00	0.24	-2.73	-2.48
				(UE-UTRA, Band 25, n25) Module:A,B,C	1850.00	0.33	-3.81	-4
					1882.50	0.33	-4.63	-3.54
					1915.00	0.34	-5.99	-2.88
				(UE-UTRA, Band 26) Module:A,B,C (CDMA2000 BC0) Module:D	814.00	0.23	-2.97	-4.32
					831.50	0.23	-1.64	-3.14
					849.00	0.24	-2.09	-2.84
				(UE-UTRA, Band 28, n28) Module:A,B,C	703.00	0.22	-1.48	-2.84
					725.50	0.22	-1.2	-2.66
					748.00	0.23	-1.35	-2.66
				(UE-UTRA, Band 29) * Down link only Module:A,B,C	717.00	0.22	-1.17	-2.77
					722.50	0.22	-1.17	-2.6
					728.00	0.22	-1.23	-2.73
				(UE-UTRA, Band 30, n30) Module:A,B,C	2305.00	0.37	0.73	-1.23
					2310.00	0.37	0.53	-1.15
					2315.00	0.37	0.37	-0.92
				(LTE, Band 32) * Down link only Module:A,B,C	1452.00	0.29	-2.73	-8.57
					1474.00	0.30	-2.27	-6.79
					1496.00	0.30	-1.95	-5.41
				(LTE Band 34) Module:A,B,D	2010.00	0.35	-4.61	-5.74
					2017.50	0.35	-3.94	-6.52
					2025.00	0.35	-3.41	-6.16
				(UE-UTRA, Band 38, n38) Module:A,B,C,D	2570.00	0.39	-4.04	-3.81
					2595.00	0.40	-3.39	-5.85
					2620.00	0.40	-3.71	-7.42
				(TD-SCDMA, Band 39) Module:A,B,C,D	1880.00	0.33	-4.54	-3.69
					1900.00	0.34	-5.06	-3.18
					1920.00	0.34	-6.34	-2.69
				(UE-UTRA, Band 40, n40) Module:A,B,C,D	2300.00	0.37	0.91	-1.46
					2350.00	0.38	-1.89	-1.36
					2400.00	0.38	-2.71	-3.27
				(UE-UTRA, Band 41, n41) Module:A,B,C,D	2496.00	0.39	-4.42	-2.79
					2593.00	0.40	-3.35	-5.74
					2690.00	0.40	-0.82	-3.18
				(LTE Band 42) Module:A,C	3400.00	0.46	0.86	-2.77
					3500.00	0.47	0.46	-1.44
					3600.00	0.48	0.95	-1.71
				(LTE Band 43) Module:A,C	3600.00	0.48	0.95	-1.71
					3700.00	0.49	-2	-4.33
					3800.00	0.49	-1.98	-4.48
				(LTE Band 46) TD Unlicensed, LAA RCV only Module:A,C	5150.00	0.58	-4.84	-8
					5537.00	0.60	-4.7	-3.87
					5925.00	0.61	-9.95	-9.64
				(LTE Band 48, n48) Module:A,C	3550.00	0.47	0.83	-0.25
					3625.00	0.48	0.81	-2.14
					3700.00	0.49	-2	-4.33
				(LTE, Band 66, n66) Module:A,B,C	1710.00	0.32	-0.06	-2.73
					1745.00	0.32	-2.31	-2.9
					1780.00	0.32	-5.23	-3.34
				(LTE Band 71, n71) Module:A,B	663.00	0.22	-1.12	-3.74
					680.50	0.22	-0.41	-2.8
					698.00	0.22	-0.93	-2.78

Antenna Part Number	Manufacturer	Antenna Type	Cable Assembly Part Number and Information	Frequency (MHz)		Cable Loss (dB)	Peak Gain (including cable loss)	
							Horizontal (dBi)	Vertical (dBi)
				(5G NR Band 75) RCV only Module:A	1432.0	0.29	-3.05	-8.99
					1474.5	0.30	-2.26	-6.76
					1517.0	0.30	-1.83	-4.34
				(5G NR Band 76) RCV only Module:A	1427	0.29	-3.10	-8.85
					1429.5	0.29	-3.08	-8.92
					1432	0.29	-3.05	-8.99
				(5G NR Band 77) Module:A	3300.00	0.45	-0.1	-1.79
					3750.00	0.49	-2.3	-4.04
					4200.00	0.52	-2.49	-5.84
				(5G NR Band 78) Module:A	3300.00	0.45	-0.1	-1.79
					3550.00	0.47	0.83	-0.25
					3800.00	0.49	-1.98	-4.48
				(5G NR Band 79) Module:A	4400.00	0.53	-3.91	-5.14
					4700.00	0.55	-2.40	-4.16
					5000.00	0.57	-6.95	-6.65
				5GNR mmWave n257	26500			
					28000			
					29500			
				5GNR mmWave n258	24250			
					25875			
					27500			
				5GNR mmWave n260	37000			
					38500			
					40000			
				5GNR mmWave n261	27500			
					27925			
					28350			
				Japan (UE-UTRA, Band 21)	1477.90			
					1455.40			
					1462.90			
				Japan J-CDMA	815.00			
					824.70			
					836.52			
					848.31			
					870.00			
					880.20			
					897.60			
					914.80			
					925.00			
					940.00			
				Japan J-CDMA	1922.40			
					1950.00			
					1977.60			

MIMO Antenna

Antenna Part Number	Manufacturer	Antenna Type	Cable Assembly Part Number and Information	Frequency (MHz)		Cable Loss (dB)	Peak Gain (including cable loss)	
							Horizontal (dBi)	Vertical (dBi)
DC330022D00	Luxshare-ICT	PIFA	1. Cable P/N: Shenyu : SY113L/50-005 2. Diameter: 1.13mm 50 ohm coaxial cable 3.Cable length: 271 mm 4. Connector P/N: SPEEDTECH : C87P115-00002-H	UMTS/HSPA (**UMTS 2100, Band 1**) **(UE-UTRA, Band 1, n1)** Module:A,B,C,D	1920.00	0.59	-0.04	1.99
					1950.00	0.59	-0.63	1.84
					1980.00	0.60	-0.68	1.75
				GSM/GPRS/EDGE (**GSM 1900**) UMTS/HSPA/EVDO (**UMTS1900, Band 2**) **(UE-UTRA, Band 2, n2) Module:A,B,C**	1850.00	0.58	-0.76	1.93
					1880.00	0.58	0.34	1.7
					1910.00	0.59	-0.15	1.67
				GSM/GPRS/EDGE **(GSM 1800, Band 3) (UE-UTRA, Band 3, n3) Module:A,B,C,D**	1710.00	0.56	1.04	1.81
					1747.50	0.56	0.03	1.72
					1785.00	0.57	-0.80	0.86
				UMTS(AWS) / HSPA (**UMTS, Band 4**) **(UE-UTRA , Band 4) Module:A,B,C**	1710.00	0.56	1.04	1.81
					1732.50	0.56	0.52	1.91
					1755.00	0.56	-0.27	1.54
				~~GSM/GPRS/EDGE (**GSM 850**) (**UMTS850, Band 5**) **(UE-UTRA, Band 5, n5) Module:A,B,C,D**~~	~~824.00~~			
					~~836.50~~			
					~~849.00~~			
				~~**(UMTS, Band 6) Module:B,C**~~	~~830.00~~			
					~~835.00~~			
					~~840.00~~			
				(UE-UTRA, Band 7, n7) Module:A,B,C	2500.00	0.68	-0.29	0.87
					2535.00	0.68	0.19	0.73
					2570.00	0.69	1.01	0.17
				~~UMTS/HSPA (**UMTS 900, Band 8**) **(UE-UTRA, Band 8, n8) Module:A,B,C,D**~~	~~880.00~~			
					~~897.50~~			
					~~915.00~~			
				~~**(WCDMA, Band 9)**~~	~~1844.9~~			
					~~1862.5~~			
					~~1879.9~~			
				~~**(UE-UTRA , Band 12, n12) Module:A,B,C**~~	~~699.00~~			
					~~707.50~~			
					~~716.00~~			
				~~**(UE-UTRA, Band 13) Module:A,B,C**~~	~~777.00~~			
					~~782.00~~			
					~~787.00~~			
				~~**(UE-UTRA, Band 14) Module:A,B,C**~~	~~788.00~~			
					~~793.00~~			
					~~798.00~~			
				~~**(UE-UTRA, Band 17) Module:A,B,C**~~	~~704.00~~			
					~~710.00~~			
					~~716.00~~			
				~~**(UE-UTRA, Band 18) Module:A,B,C**~~	~~815.00~~			
					~~822.50~~			
					~~830.00~~			
				~~**(UMTS, Band 19) (UE-UTRA, Band 19) Module:A,B,C**~~	~~830.00~~			
					~~837.50~~			
					~~845.00~~			
				~~**(UE-UTRA, Band 20, n20)**~~	~~832.00~~			
					~~847.00~~			

Antenna Part Number	Manufacturer	Antenna Type	Cable Assembly Part Number and Information	Frequency (MHz)		Cable Loss (dB)	Peak Gain (including cable loss)	
							Horizontal (dBi)	Vertical (dBi)
				~~Module:A,B,C~~	~~862.00~~			
				(UE-UTRA, Band 25, n25) Module:A,B,C	1850.00	0.58	-0.76	1.93
					1882.50	0.58	0.26	1.51
					1915.00	0.59	-0.09	1.87
				~~(UE-UTRA, Band 26) Module:A,B,C~~	~~814.00~~			
					~~831.50~~			
					~~849.00~~			
				~~(UE-UTRA, Band 28, n28) Module:A,B,C~~	~~703.00~~			
					~~725.50~~			
					~~748.00~~			
				~~(UE-UTRA, Band 29) * Down link only Module:A,B,C~~	~~717.00~~			
					~~722.50~~			
					~~728.00~~			
				(UE-UTRA, Band 30, n30) Module:A,B,C	2305.00	0.65	-0.86	0.13
					2310.00	0.65	-0.89	0.27
					2315.00	0.65	-0.87	0.41
				(LTE, Band 32) * Down link only Module:A,B,C	1452.00	0.51	2.36	0.51
					1474.00	0.52	2.59	0.43
					1496.00	0.52	2.34	0.21
				(LTE Band 34) Module:A,B,D	2010.00	0.60	-0.83	1.68
					2017.50	0.61	-1.02	1.46
					2025.00	0.61	-1.21	1.35
				(UE-UTRA, Band 38, n38) Module:A,B,C,D	2570.00	0.69	1.01	0.17
					2595.00	0.69	0.68	0.09
					2620.00	0.70	0.18	-0.6
				(TD-SCDMA, Band 39) Module:A,B,C,D	1880.00	0.58	0.34	1.7
					1900.00	0.59	-0.05	1.32
					1920.00	0.59	-0.04	1.99
				(UE-UTRA, Band 40, n40) Module:A,B,C,D	2300.00	0.65	-0.82	0
					2350.00	0.66	-0.75	0.54
					2400.00	0.66	-4.66	0.23
				(UE-UTRA, Band 41, n41) Module:A,B,C,D	2496.00	0.68	-0.47	0.87
					2593.00	0.69	0.72	0.12
					2690.00	0.71	-0.31	-0.49
				(LTE Band 42) Module:A,C	3400.00	0.81	0.43	-0.55
					3500.00	0.82	-0.27	0.51
					3600.00	0.84	-1.62	-0.36
				(LTE Band 43) Module:A,C	3600.00	0.84	-1.62	-0.36
					3700.00	0.85	0.22	-1.93
					3800.00	0.86	-0.31	-0.78
				(LTE Band 46) TD Unlicensed, LAA RCV only Module:A,C	5150.00	1.01	-1.77	-4.08
					5537.00	1.04	-2.55	-4.74
					5925.00	1.07	-2.83	-1.41
				(LTE Band 48, n48) Module:A,C	3550.00	0.83	-2.56	0.22
					3625.00	0.84	-0.60	-0.33
					3700.00	0.85	0.22	-1.93
				(LTE, Band 66, n66) Module:A,B,C	1710.00	0.56	1.04	1.81
					1745.00	0.56	0.13	1.77
					1780.00	0.57	-0.83	0.97
				~~(LTE Band 71, n71) Module:A,B~~	~~663.00~~			
					~~680.50~~			
					~~698.00~~			
				(5G NR Band 77) Module:A	3300.00	0.79	-0.22	-0.19
					3750.00	0.85	-1.46	-1.47

Antenna Part Number	Manufacturer	Antenna Type	Cable Assembly Part Number and Information	Frequency (MHz)		Cable Loss (dB)	Peak Gain (including cable loss)	
							Horizontal (dBi)	Vertical (dBi)
					4200.00	0.91	-0.44	-9.21
				(5G NR Band 78) Module:A	3300.00	0.79	-0.22	-0.19
					3550.00	0.83	-2.56	0.22
					3800.00	0.86	-0.31	-0.78
				(5G NR Band 79) Module:A	4400.00	0.93	-2.13	-6.31
					4700.00	0.97	-2.28	-1.45
					5000.00	1.00	0.44	-3.63
				Japan (UE-UTRA, Band 21)	~~1477.90~~			
					~~1455.40~~			
					~~1462.90~~			
				Japan J-CDMA	~~815.00~~			
					~~824.70~~			
					~~836.52~~			
					~~848.31~~			
					~~870.00~~			
					~~880.20~~			
					~~897.60~~			
					~~914.80~~			
					~~925.00~~			
					~~940.00~~			
				Japan J-CDMA	~~1922.40~~			
					~~1950.00~~			
					~~1977.60~~			

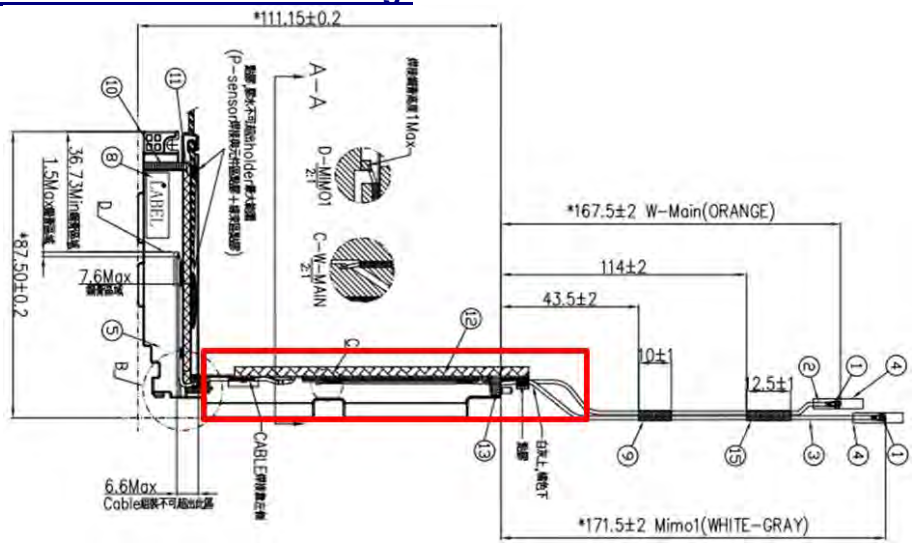
Auxiliary Antenna

Antenna Part Number	Manufacturer	Antenna Type	Cable Assembly Part Number and Information	Frequency (MHz)		Cable Loss (dB)	Peak Gain (including cable loss)	
							Horizontal (dBi)	Vertical (dBi)
DC330022D00	Luxshare-ICT	PIFA	1. Cable P/N: Shenyu : SY113L/50-008 2. Diameter: 1.13mm 50 ohm coaxial cable 3.Cable length: 276 mm 4. Connector P/N: SPEEDTECH : C87P115-00002-H	**LTE Band 20, 5G n20** Module:A	832	0.40	-1.94	-6.68
					847	0.40	-1.26	-5.87
					862	0.40	-0.96	-5.43

Section 2. Dimensioned Photos or Drawings of Antennas

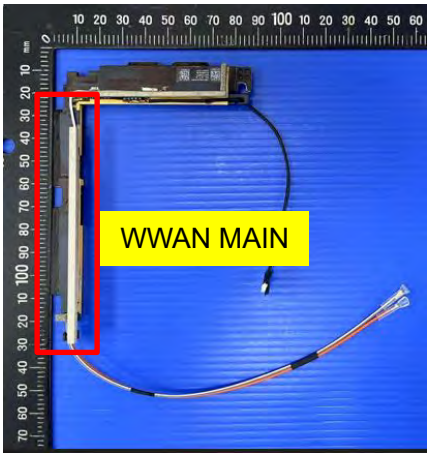
5G sku

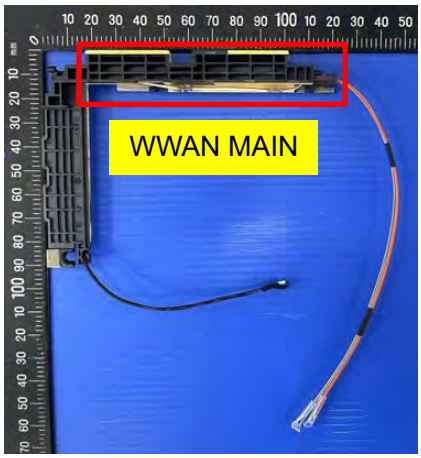
Main Antenna Dimensioned Drawing:



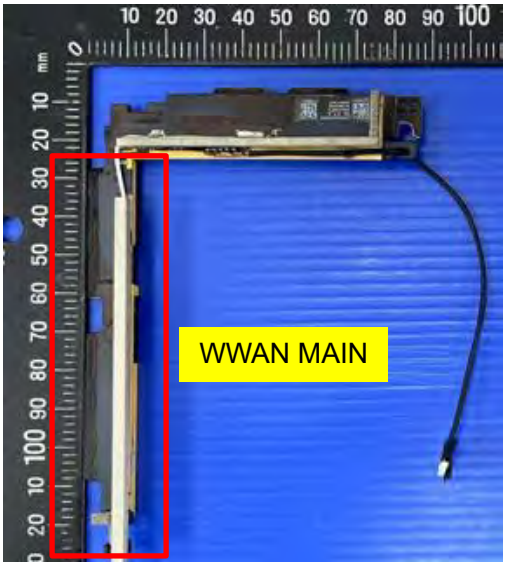
Main Antenna Photo:

Overall view

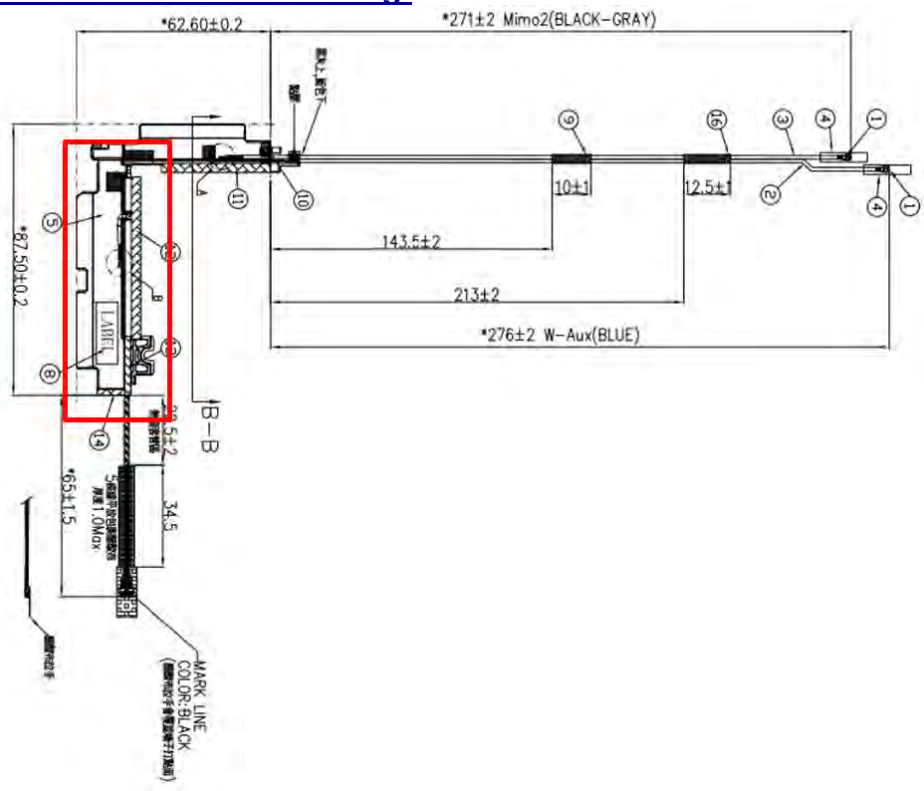




Close-up view

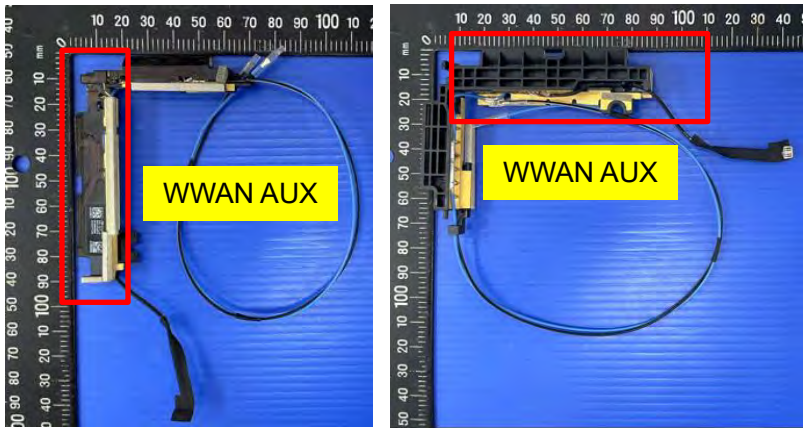


Aux Antenna Dimensioned Drawing:

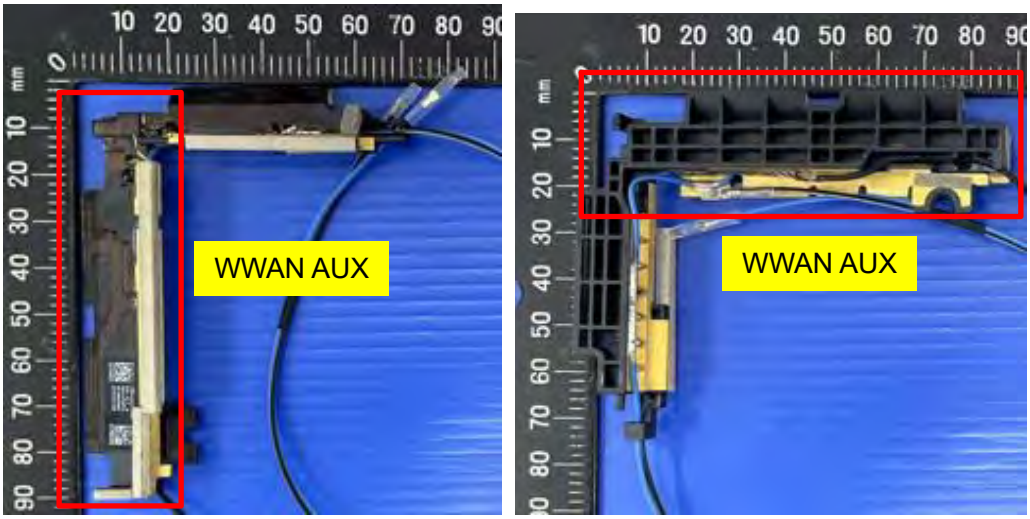


Aux Antenna Photo:

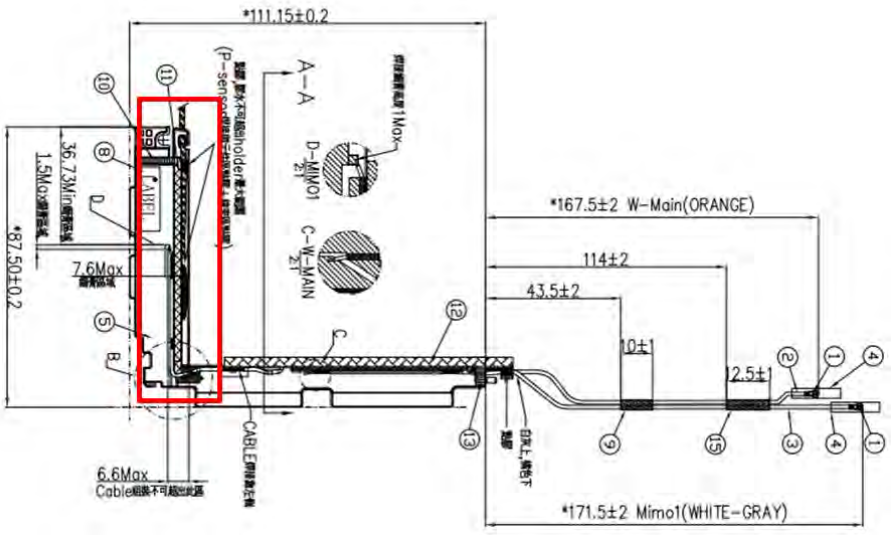
Overall view



Close-up view

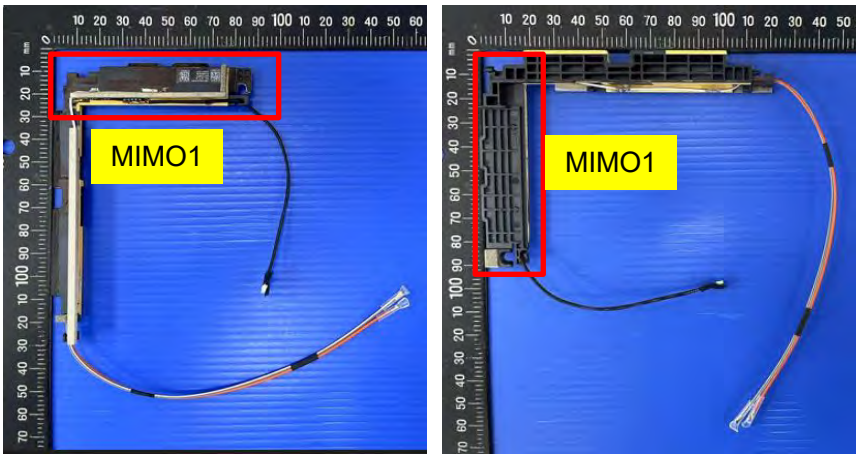


MIMO1 Antenna Dimensioned Drawing:

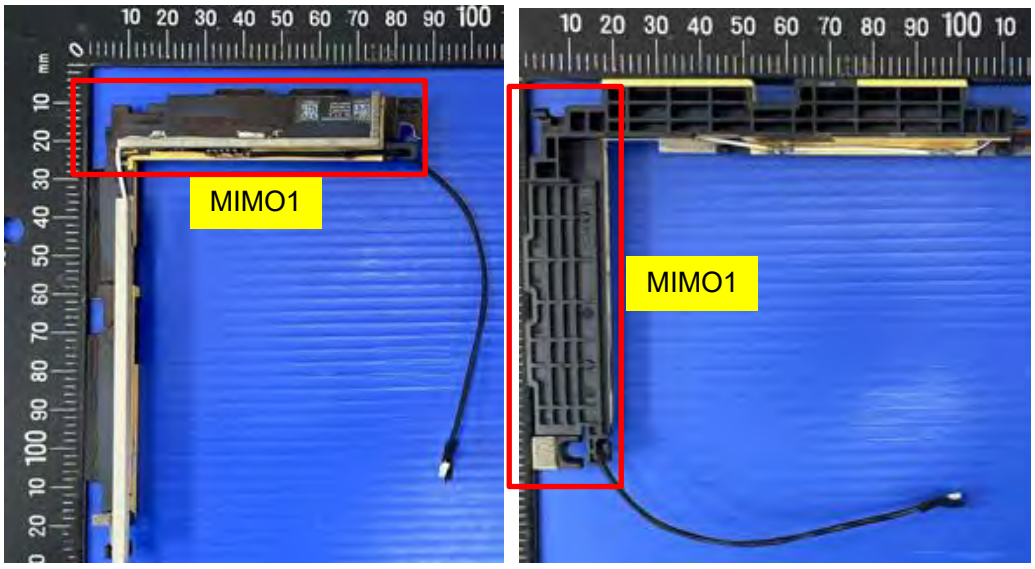


MIMO1 Antenna Photo:

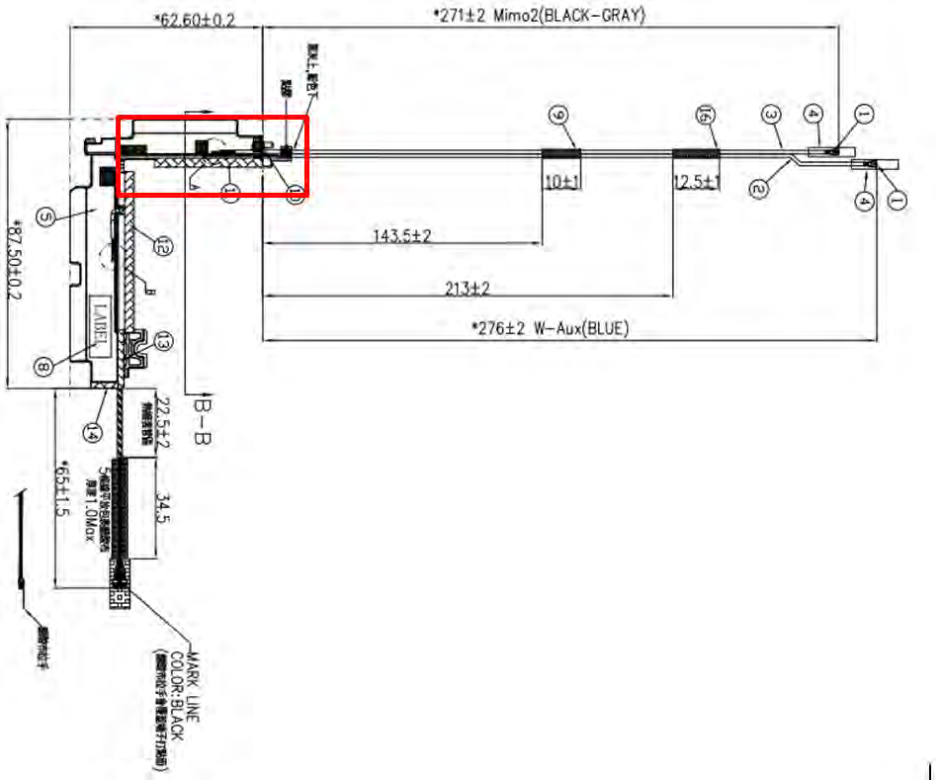
Overall view



Close-up view

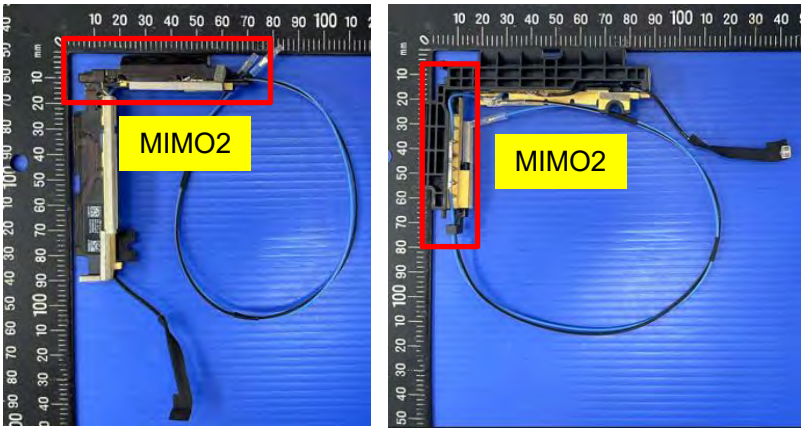


MIMO2 Antenna Dimensioned Drawing:

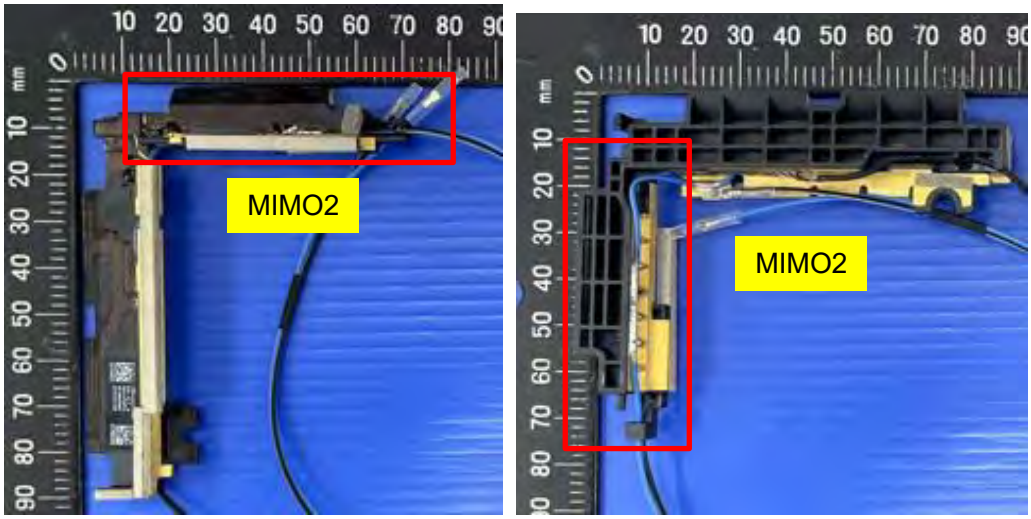


MIMO2 Antenna Photo:

Overall view

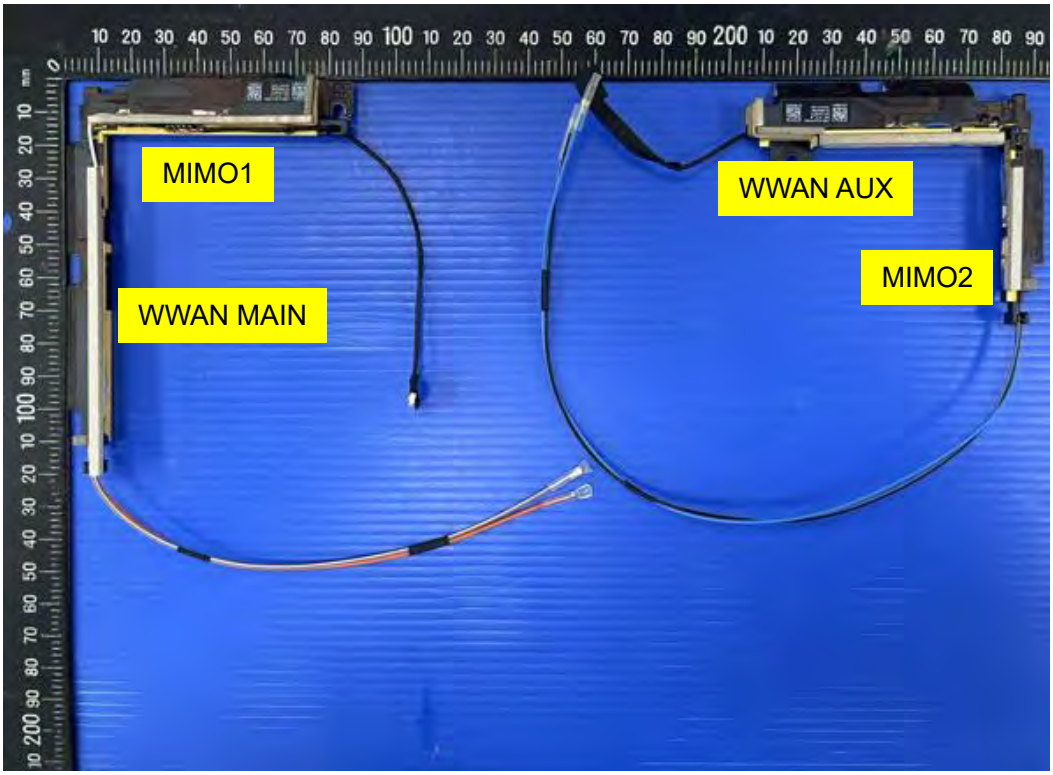


Close-up view



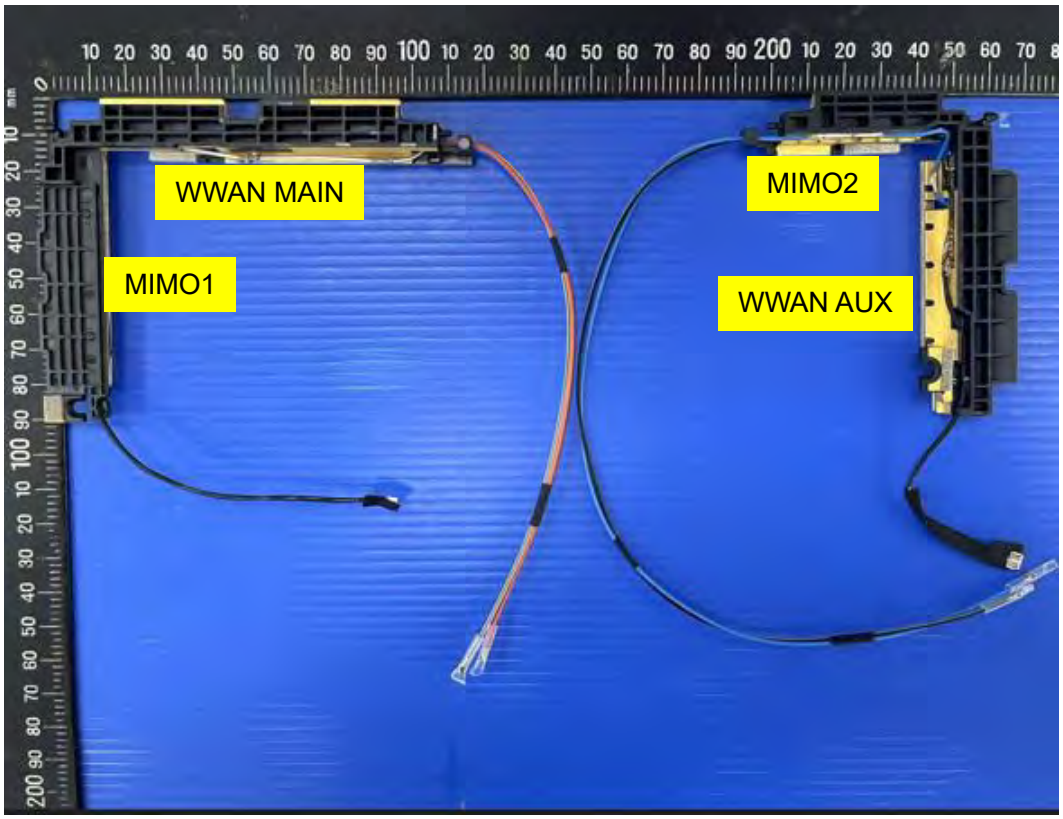
Trade Name: Luxshare-ICT
Model No.: DC330022C00 (WWAN MAIN / MIMO1) / DC330022D00 (WWAN AUX / MIMO2)

Front view



Trade Name: Luxshare-ICT
Model No.: DC3300222C00 (WWAN MAIN / MIMO1) / DC330022D00(WWAN AUX / MIMO2)

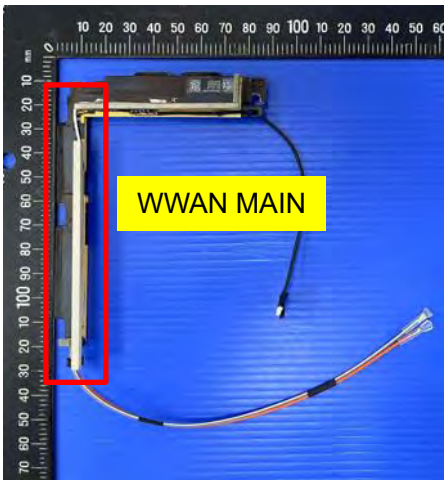
Back view



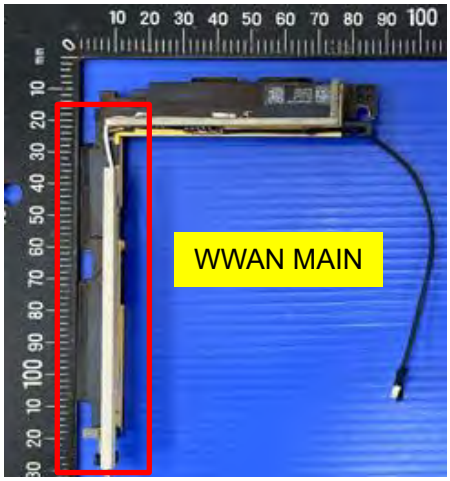
<Front View>

Trade Name: Luxshare-ICT
Model No.: DC330022C00

Front view – Far

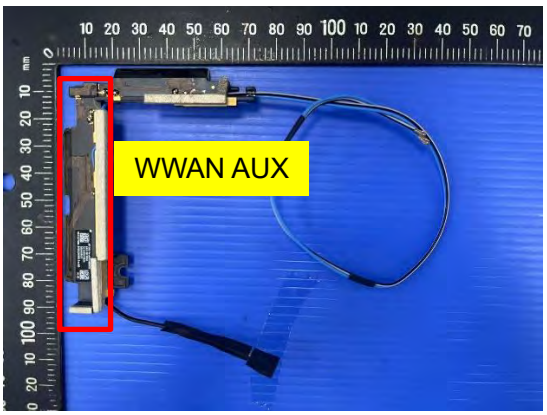


Front view – Near

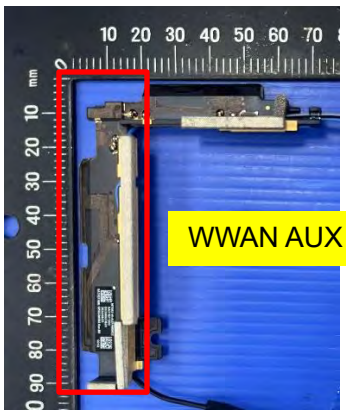


Model No.: DC330022D00

Front view – Far

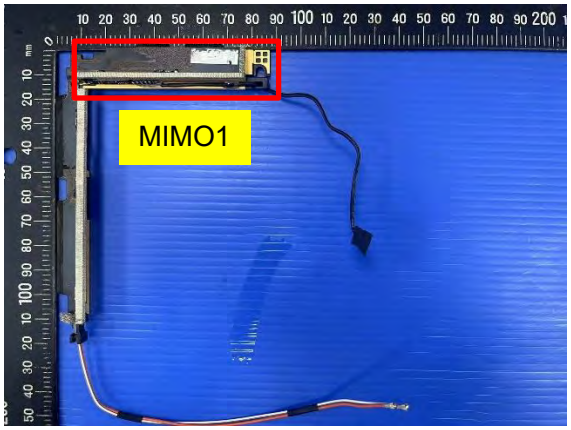


Front view – Near

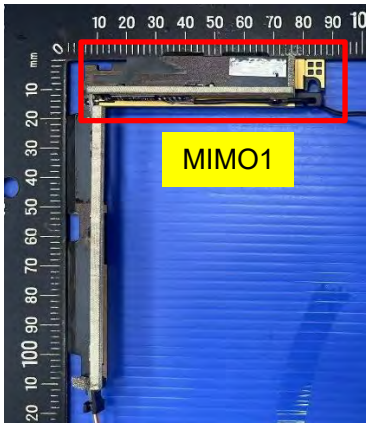


Trade Name: Luxshare-ICT
Model No.: DC330022C00

Front view – Far

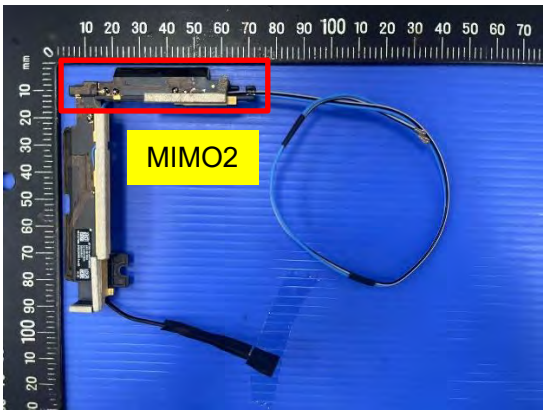


Front view – Near

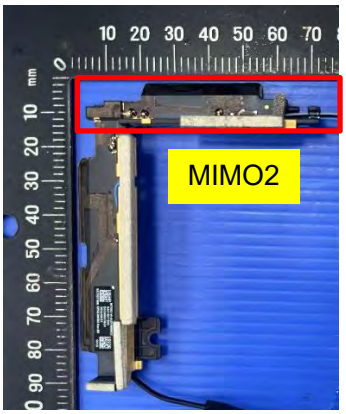


Model No.: DC330022D00

Front view – Far



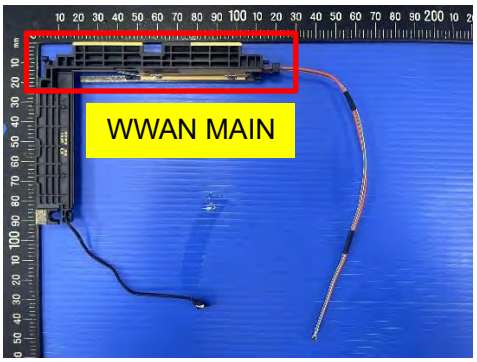
Front view – Near



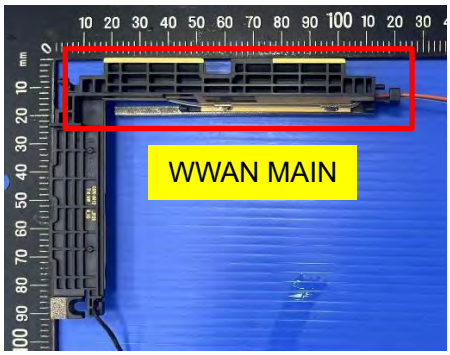
<Back View>

Trade Name: Luxshare-ICT
Model No.: DC330022C00

Back view – Far

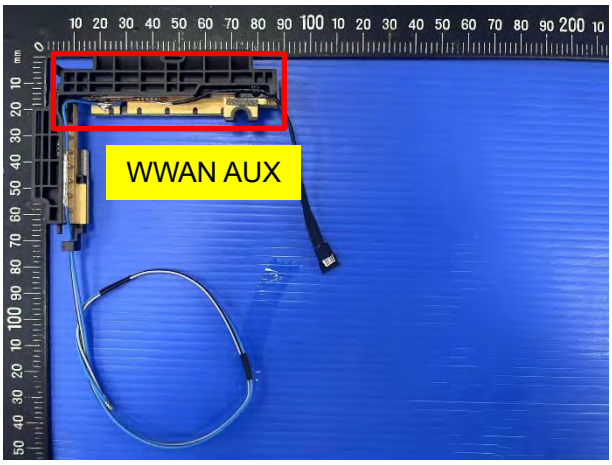


Back view – Near

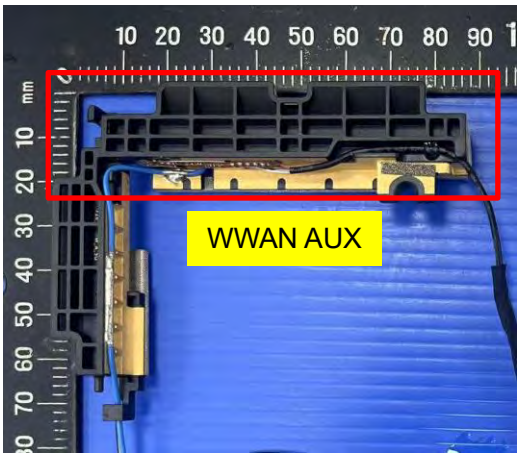


Model No.: DC330022D00

Back view – Far

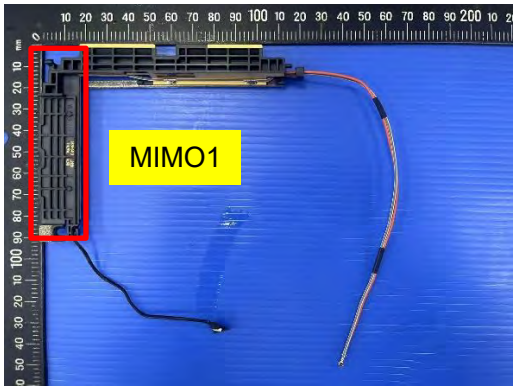


Back view – Near

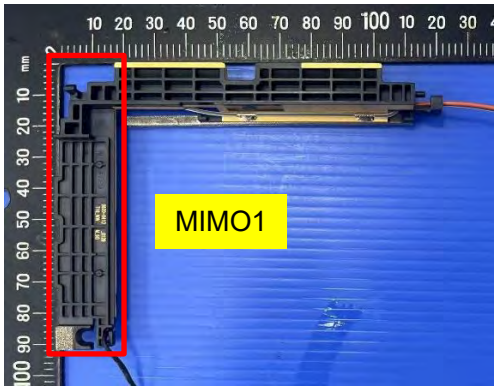


Trade Name: Luxshare-ICT
Model No.: DC330022C00

Back view – Far

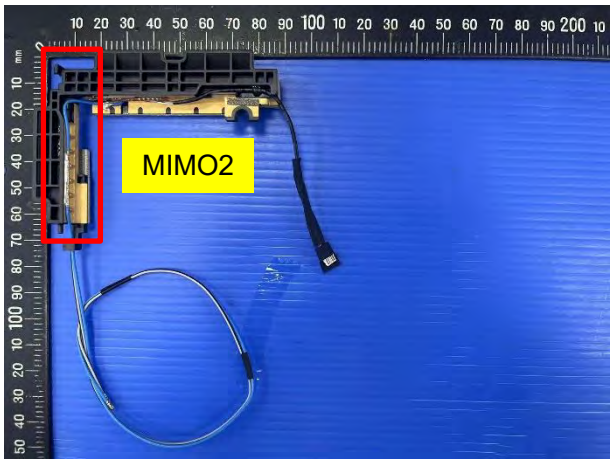


Back view – Near

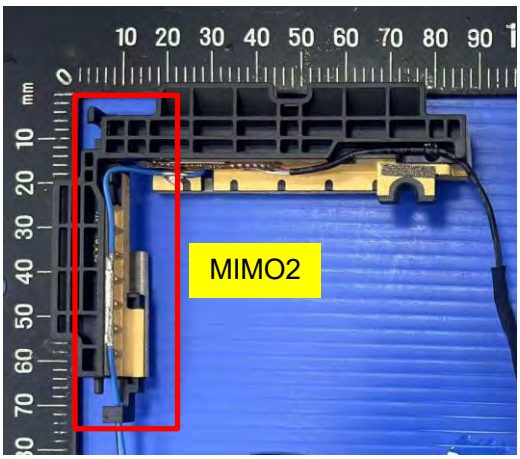


Model No.: DC330022D00

Back view – Far

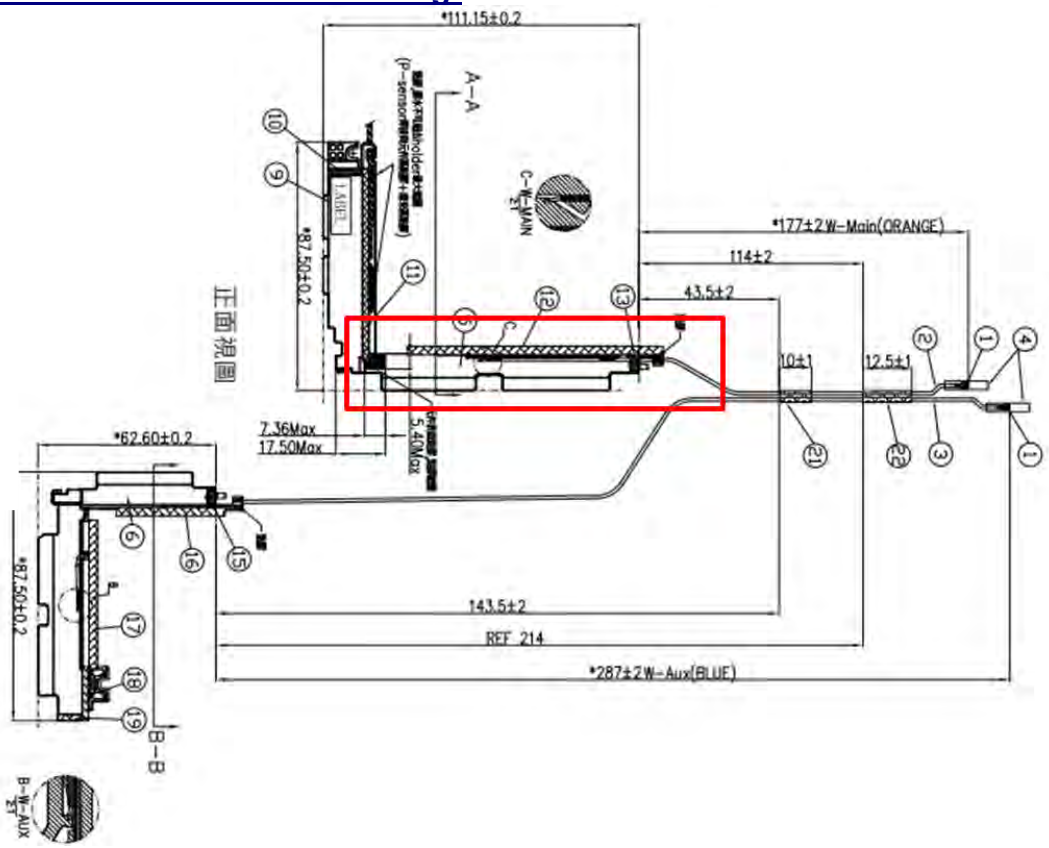


Back view – Near



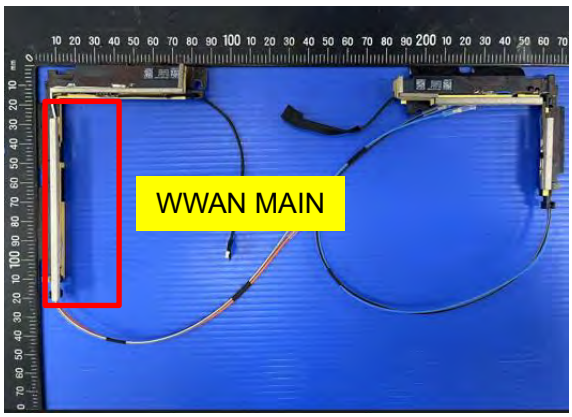
4G sku

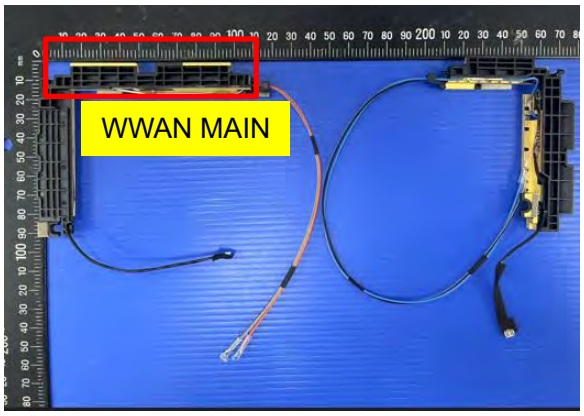
Main Antenna Dimensioned Drawing:



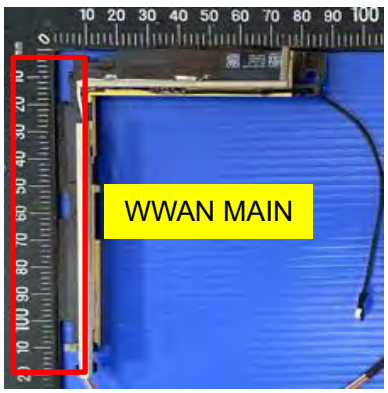
Main Antenna Photo:

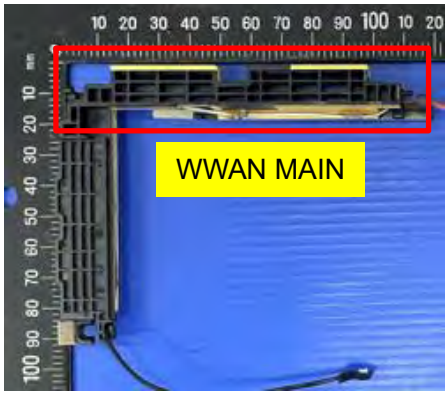
Overall view



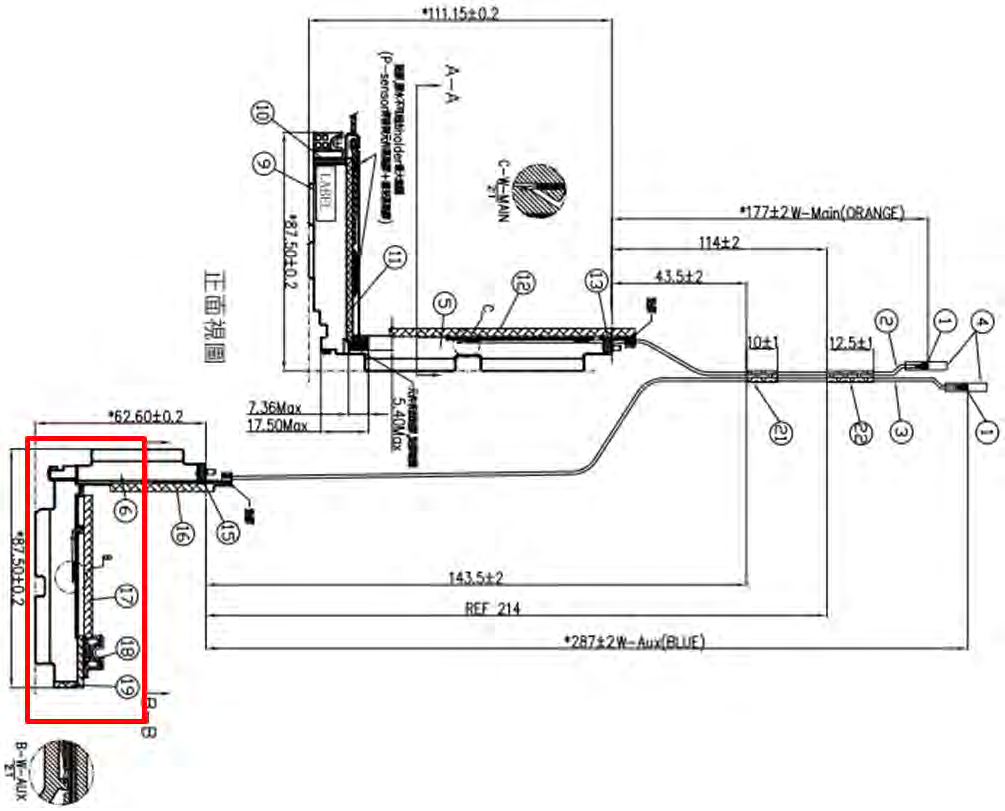


Close-up view



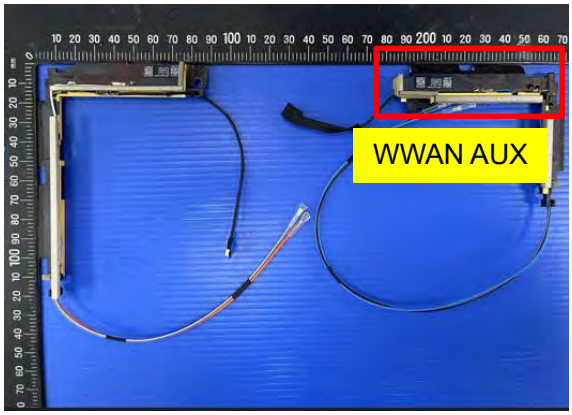


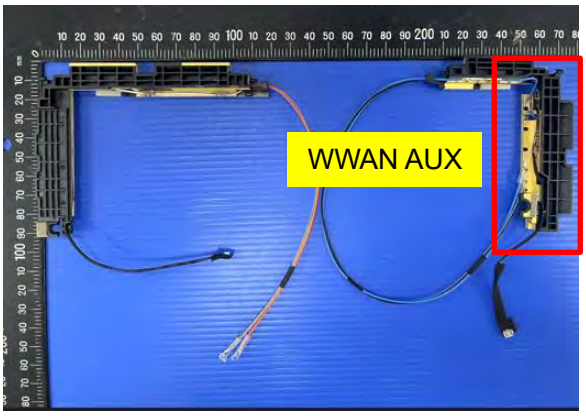
Aux Antenna Dimensioned Drawing:



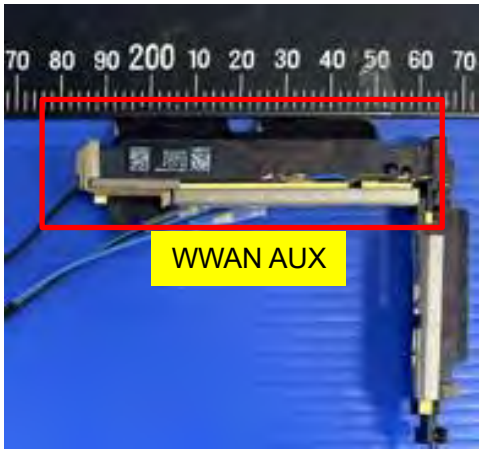
Aux Antenna Photo:

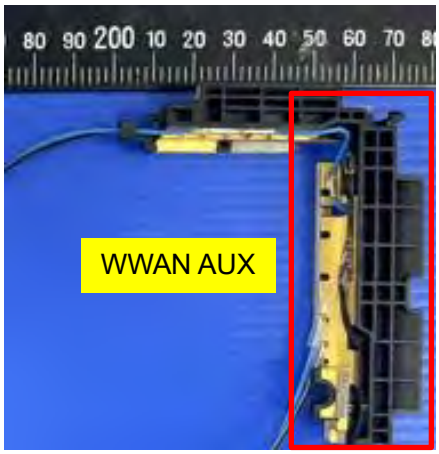
Overall view





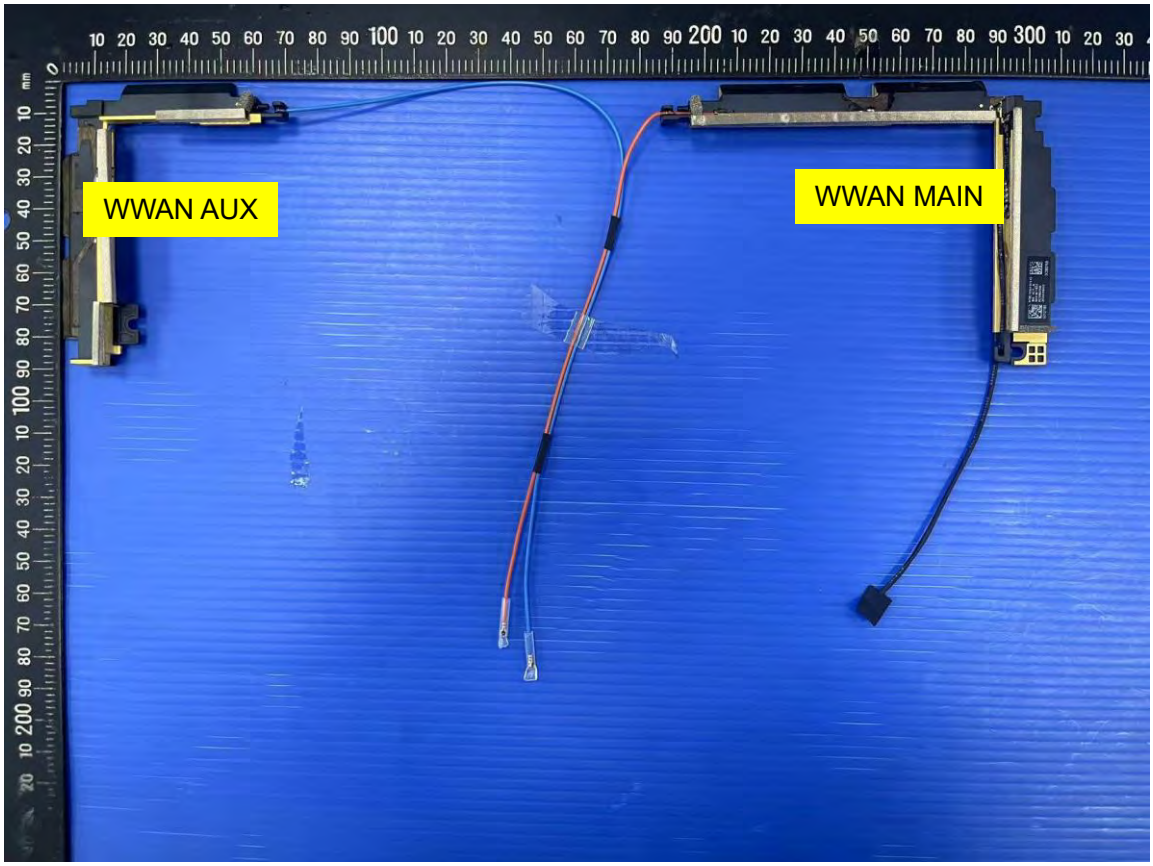
Close-up view





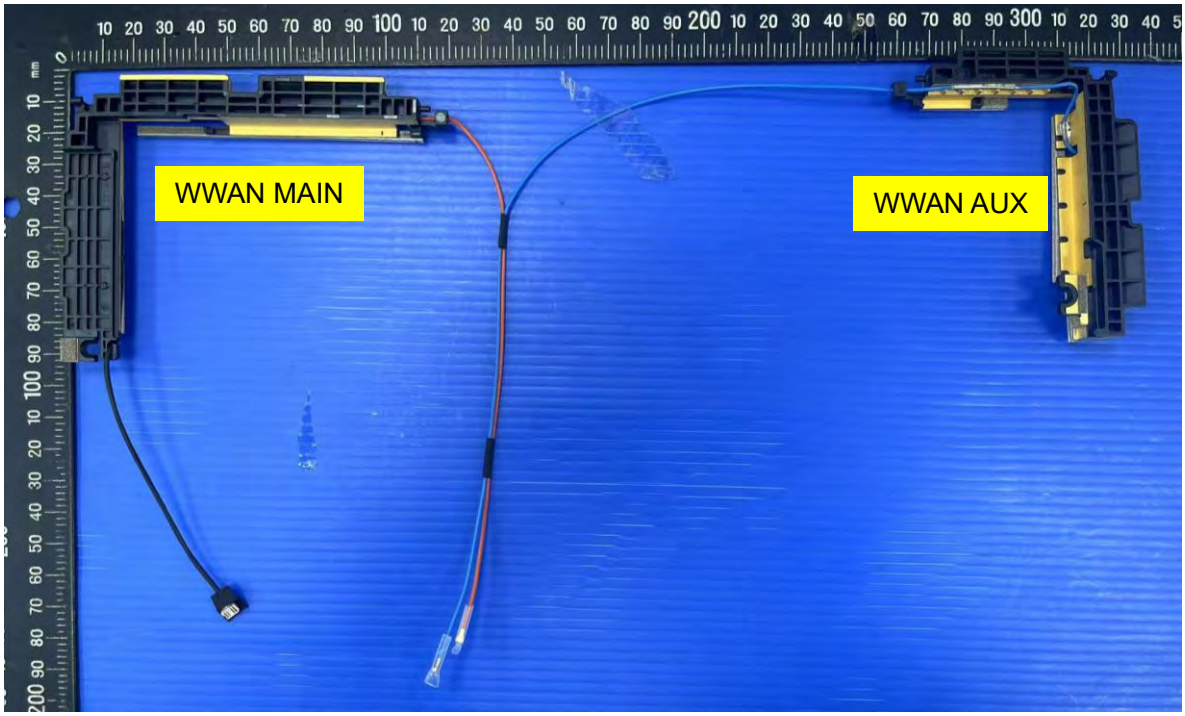
Trade Name: Luxshare-ICT
Model No.: DC330022F20

Front view



Trade Name: Luxshare-ICT
Model No.: DC330022F20

Back view

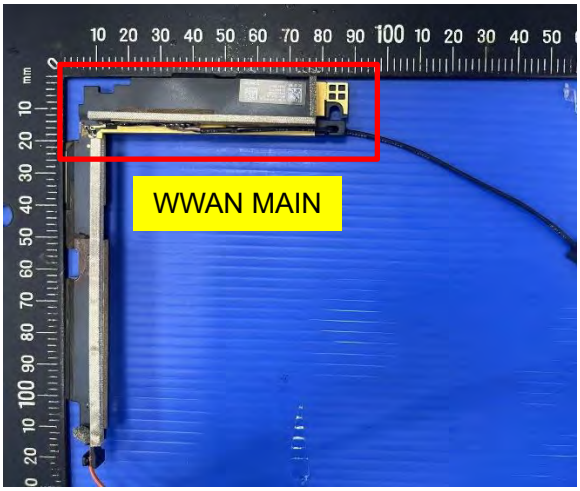


<Front View>

Trade Name: Luxshare-ICT
Model No.: DC330022F20

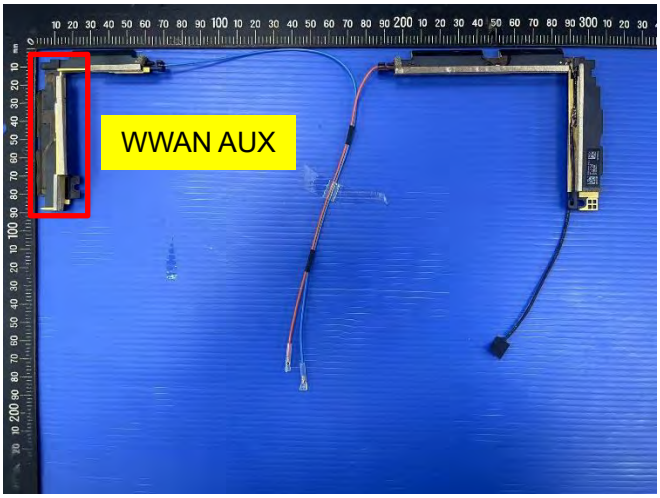
Front view – Far

Front view – Near

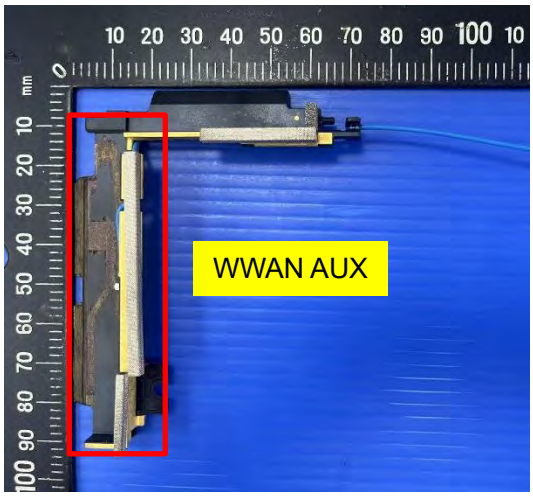


Model No.: DC330022F20

Front view – Far



Front view – Near

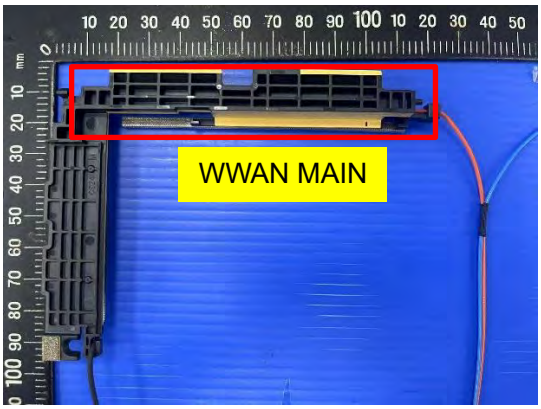


<Back View>

Trade Name: Luxshare-ICT
Model No.: DC330022F20

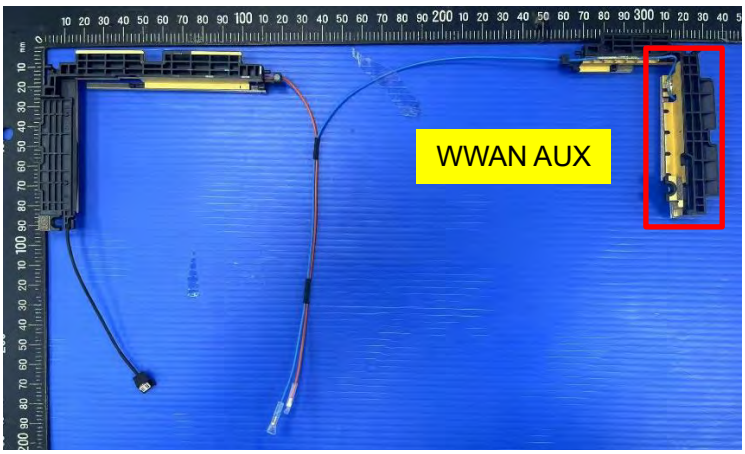
Back view – Far

Back view – Near

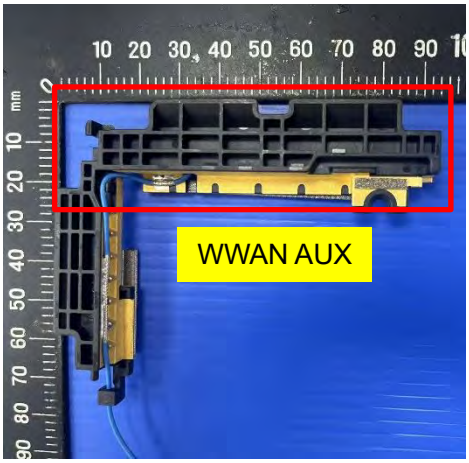


Model No.: DC330022F20

Back view – Far

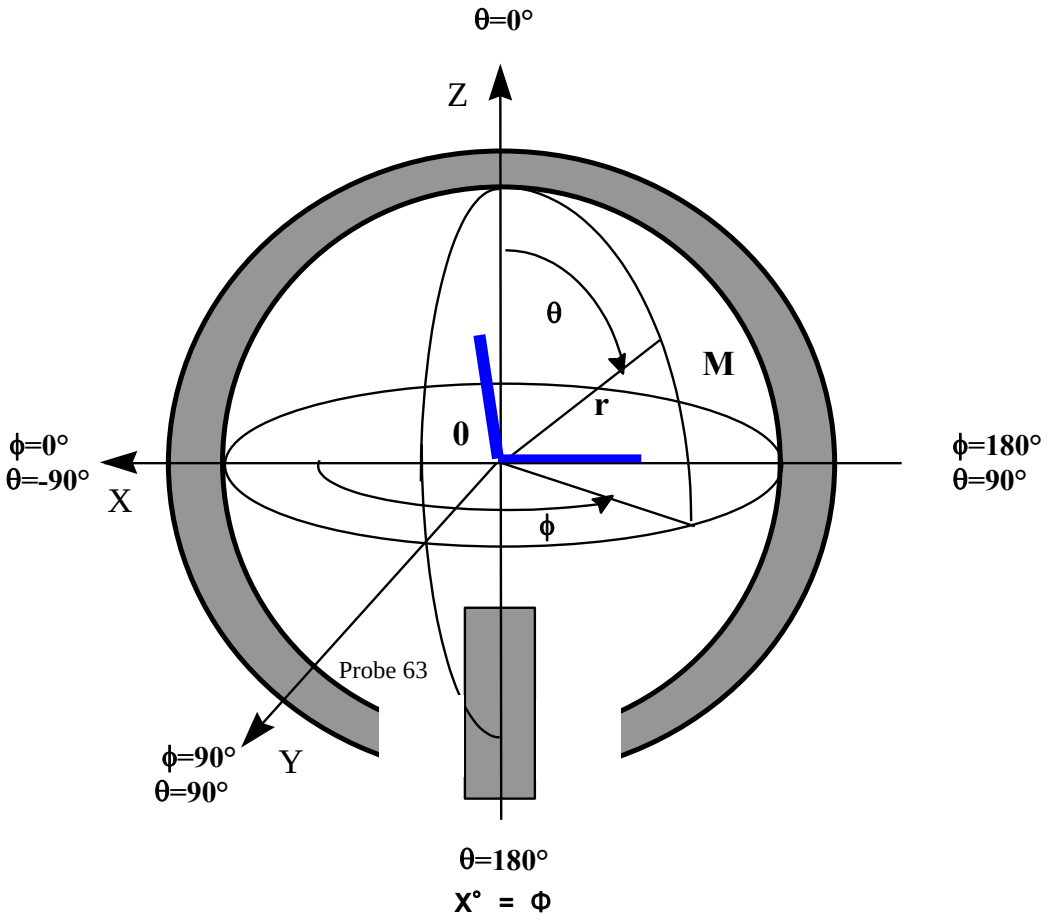


Back view – Near



Section 3. Radiation characteristics of antenna

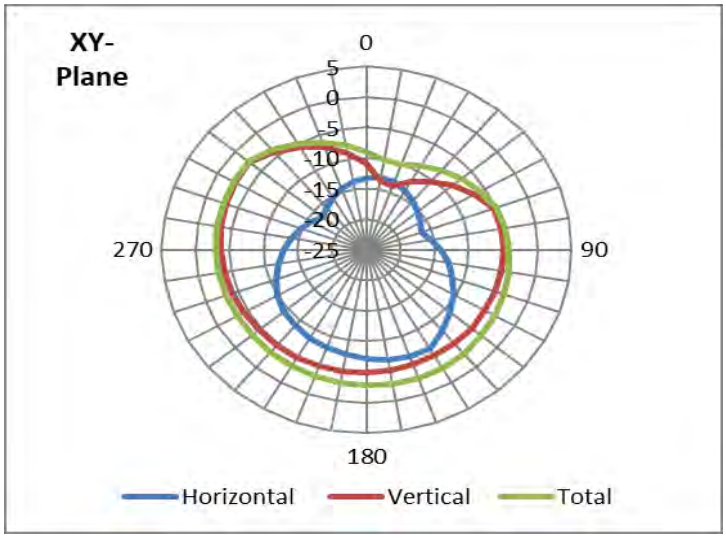
Antenna Gain and Radiation Pattern Measuring Structure Diagram



Radiation characteristic in 1920MHz ~ 1980MHz (UMTS/HSDPA, Band 1, n1)

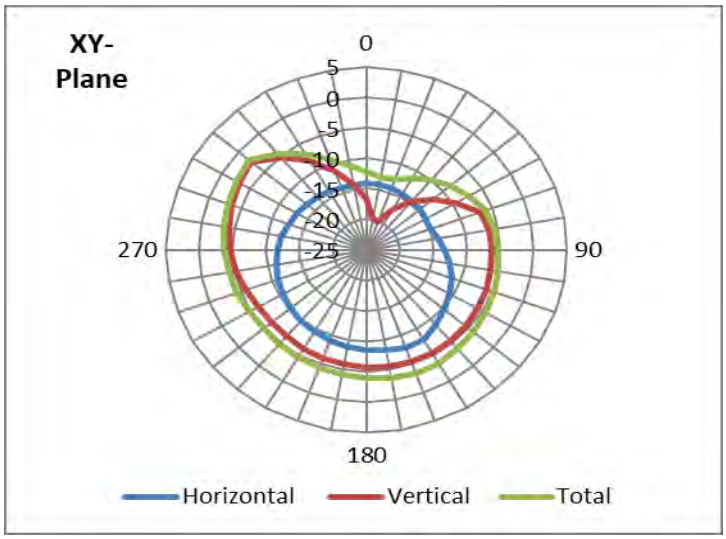
Main antenna: 1920.00 MHz

1920.00 MHz		
Horizontal Peak (dBi)	-6.34	150 deg
Vertical Peak(dBi)	-2.69	70 deg



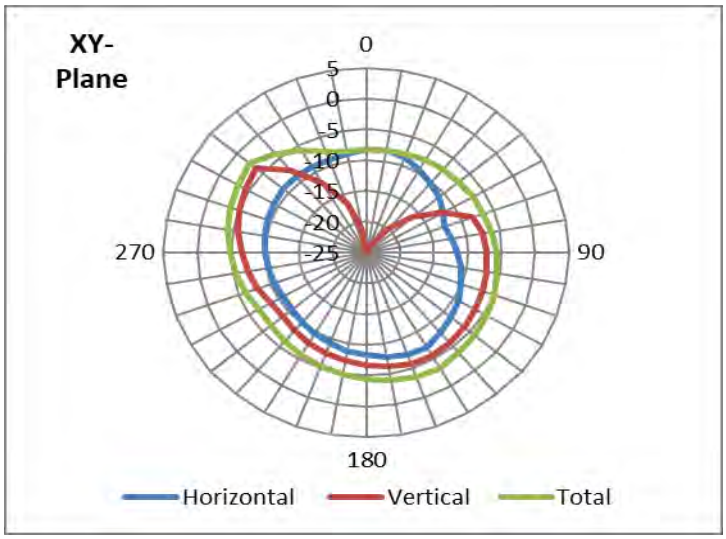
Main antenna: 1950.00 MHz

1950.00 MHz		
Horizontal Peak (dBi)	-7.87	150 deg
Vertical Peak(dBi)	-2.46	70 deg



Main antenna: 1980.00 MHz

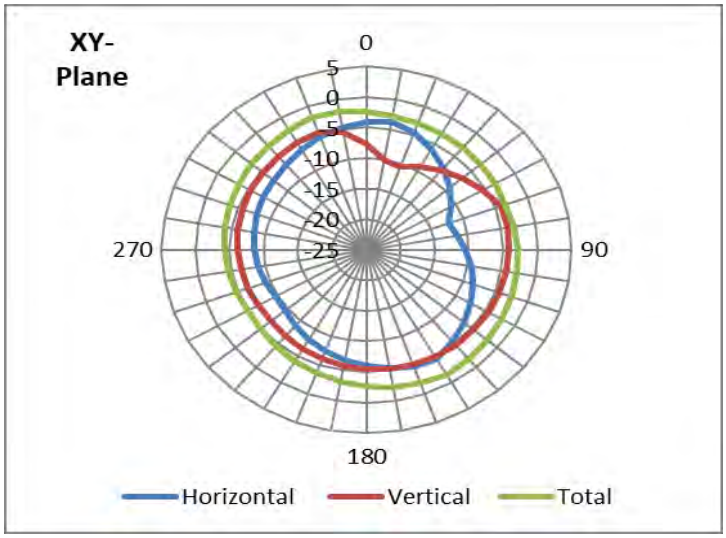
1980.00 MHz		
Horizontal Peak (dBi)	-7.2	10 deg
Vertical Peak(dBi)	-3.65	310 deg



Radiation characteristic in 1850MHz ~ 1910MHz (PCS, Band 2, n2)

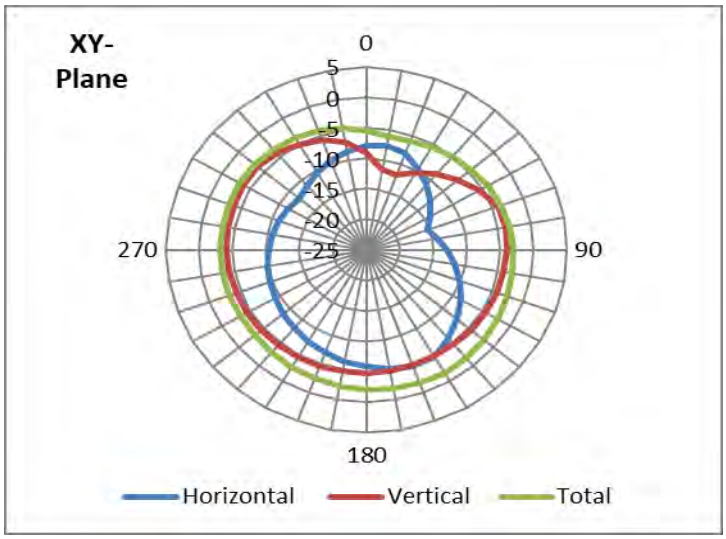
Main antenna: 1850.00 MHz

1850.00 MHz		
Horizontal Peak (dBi)	-3.81	150 deg
Vertical Peak(dBi)	-4	70 deg



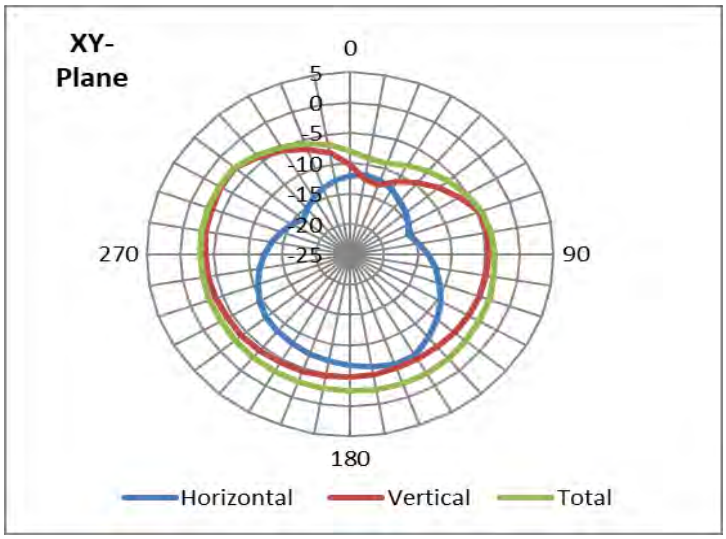
Main antenna: 1880.00 MHz

1880.00 MHz		
Horizontal Peak (dBi)	-4.54	150 deg
Vertical Peak(dBi)	-3.69	70 deg



Main antenna: 1910.00 MHz

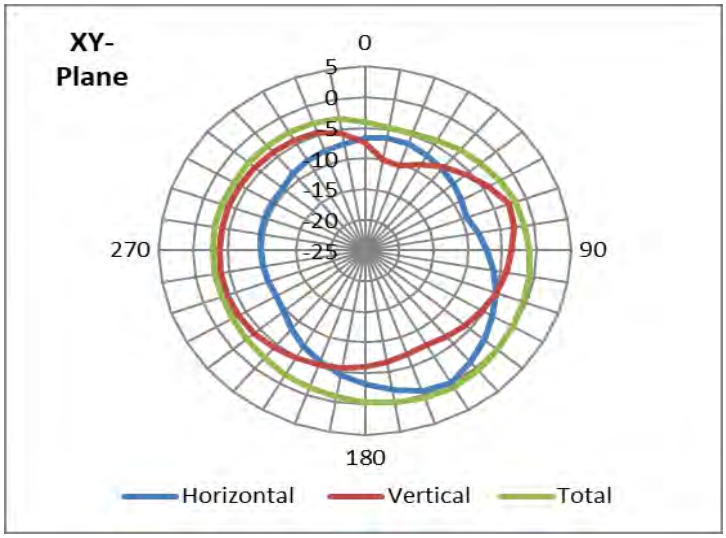
1910.00 MHz		
Horizontal Peak (dBi)	-5.69	150 deg
Vertical Peak(dBi)	-2.96	70 deg



Radiation characteristic in 1710MHz ~ 1785MHz (UE-UTRA, Band 3, n3)

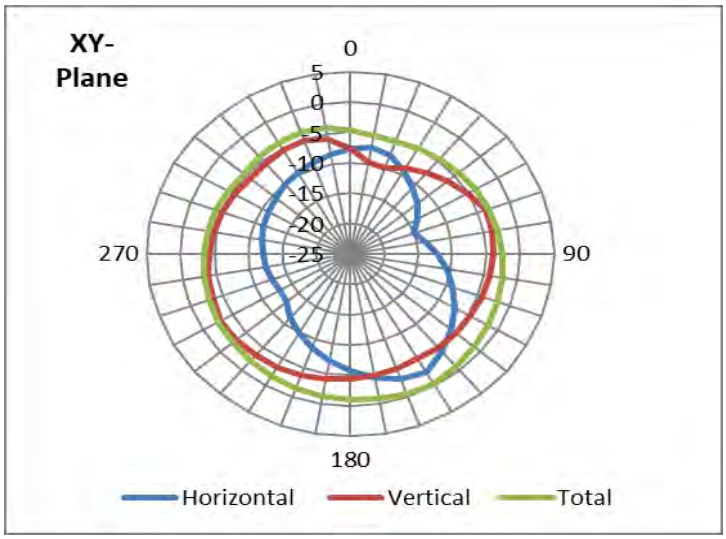
Main antenna: 1710.00 MHz

1710.00 MHz		
Horizontal Peak (dBi)	-0.06	150 deg
Vertical Peak(dBi)	-2.73	70 deg



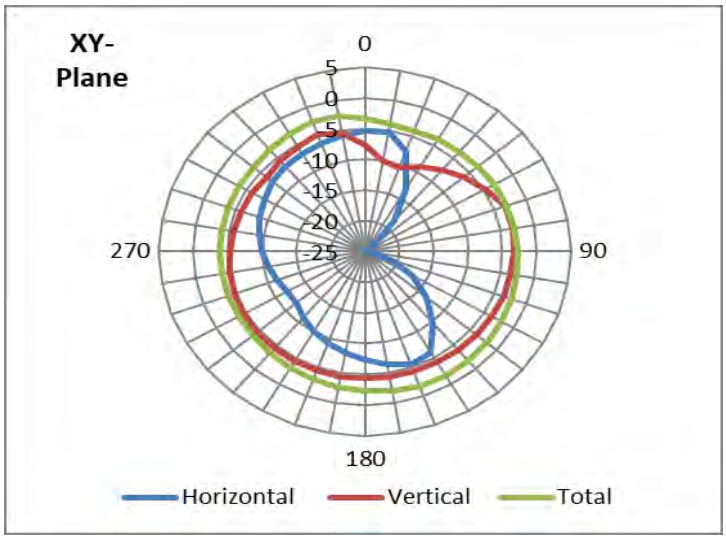
Main antenna: 1747.50 MHz

1747.50 MHz		
Horizontal Peak (dBi)	-2.46	150 deg
Vertical Peak(dBi)	-2.93	70 deg



Main antenna: 1785.00 MHz

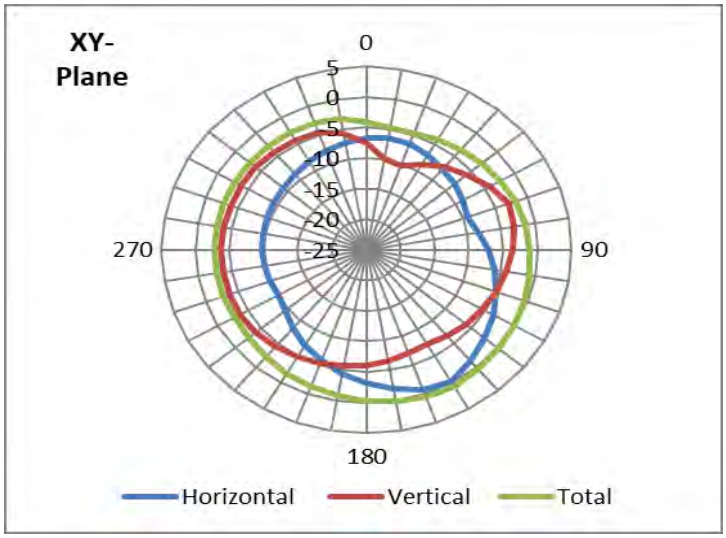
1785.00 MHz		
Horizontal Peak (dBi)	-5.18	150 deg
Vertical Peak(dBi)	-3.2	70 deg



Radiation characteristic in 1710MHz ~ 1755MHz (UMTS(AWS), Band 4)

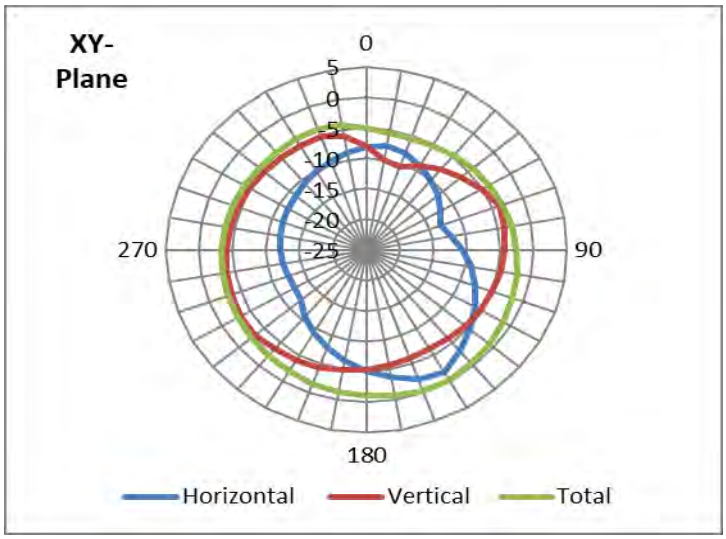
Main antenna: 1710.00 MHz

1710.00 MHz		
Horizontal Peak (dBi)	-0.06	150 deg
Vertical Peak(dBi)	-2.73	70 deg



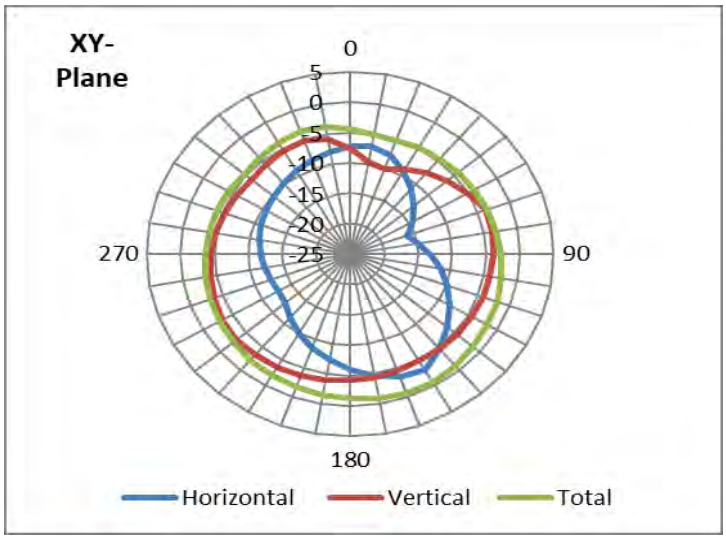
Main antenna: 1732.50 MHz

1732.50 MHz		
Horizontal Peak (dBi)	-1.72	150 deg
Vertical Peak(dBi)	-3.25	70 deg



Main antenna: 1755.00 MHz

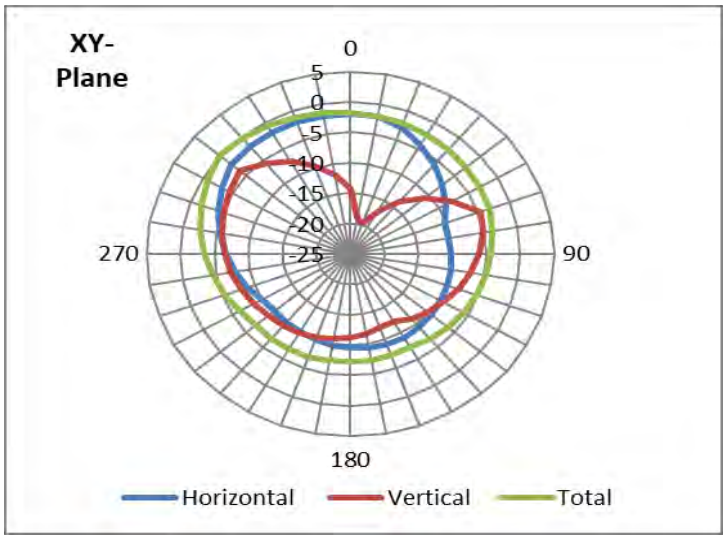
1755.00 MHz		
Horizontal Peak (dBi)	-2.99	150 deg
Vertical Peak(dBi)	-3.11	70 deg



Radiation characteristic in 824MHz ~ 849MHz (Cellular, Band 5, n5)

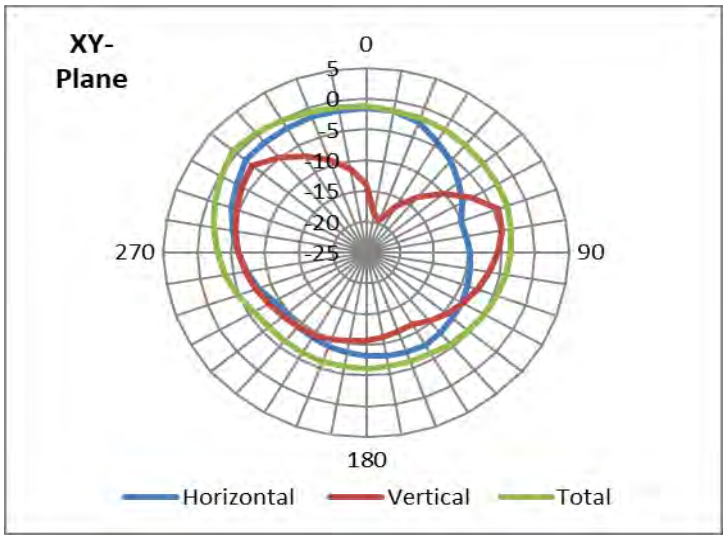
Main antenna: 824.00 MHz

824.00 MHz		
Horizontal Peak (dBi)	-1.96	350 deg
Vertical Peak(dBi)	-3.7	310 deg



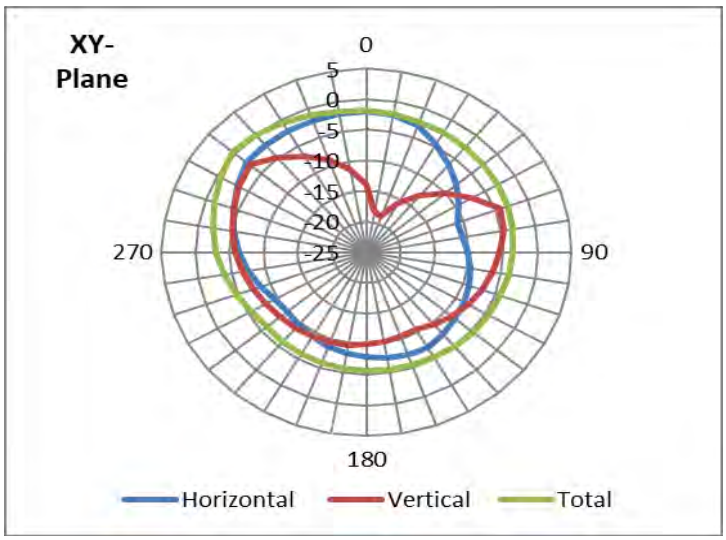
Main antenna: 836.50 MHz

836.50 MHz		
Horizontal Peak (dBi)	-1.59	350 deg
Vertical Peak(dBi)	-3.07	310 deg



Main antenna: 849.0 MHz

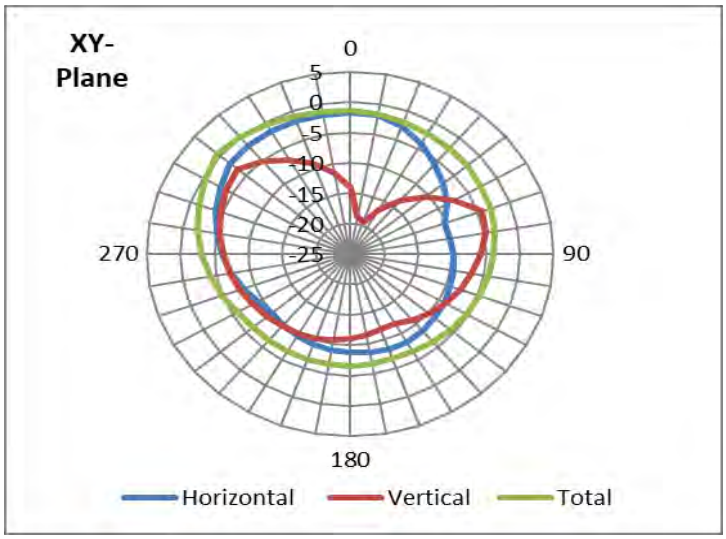
849.0 MHz		
Horizontal Peak (dBi)	-2.09	350 deg
Vertical Peak(dBi)	-2.84	310 deg



Radiation characteristic in 830MHz ~ 840MHz (Band 6)

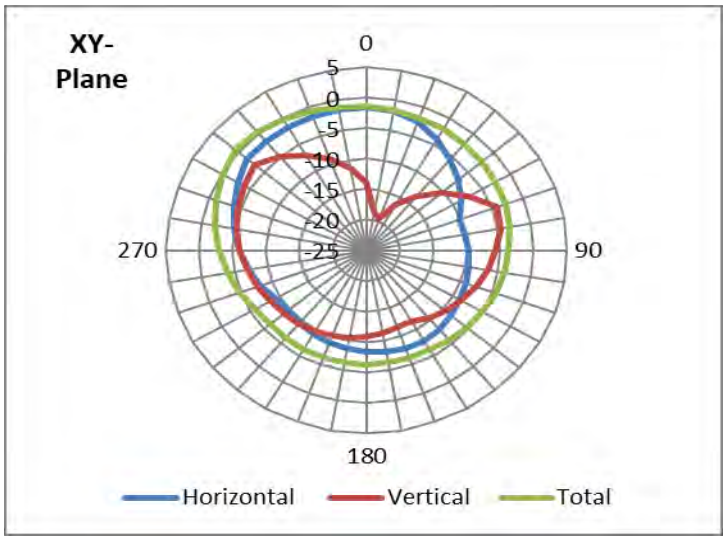
Main antenna: 830.00 MHz

830.00 MHz		
Horizontal Peak (dBi)	-1.68	350 deg
Vertical Peak(dBi)	-3.21	310 deg



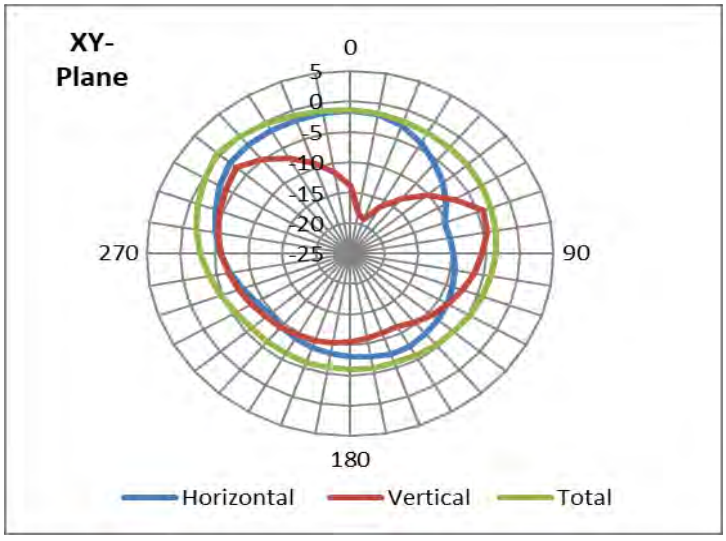
Main antenna: 835.00 MHz

835.00 MHz		
Horizontal Peak (dBi)	-1.6	350 deg
Vertical Peak(dBi)	-3.08	310 deg



Main antenna: 840.00 MHz

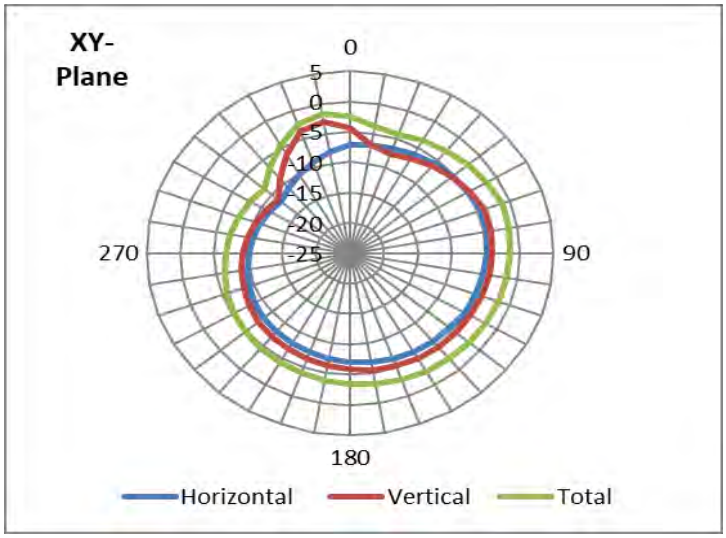
840.00 MHz		
Horizontal Peak (dBi)	-1.65	350 deg
Vertical Peak(dBi)	-3.01	310 deg



Radiation characteristic in 2500MHz ~ 2570MHz (UE-UTRA, Band 7, n7)

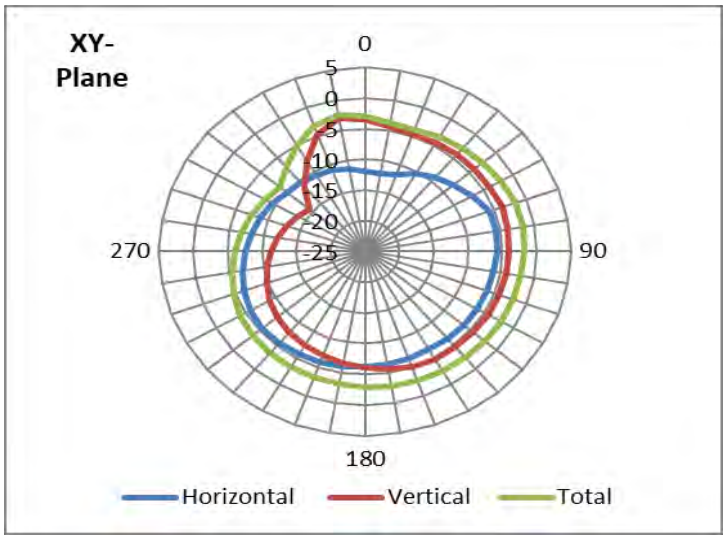
Main antenna: 2500.00 MHz

2500.00 MHz		
Horizontal Peak (dBi)	-4.43	50 deg
Vertical Peak(dBi)	-2.97	350 deg



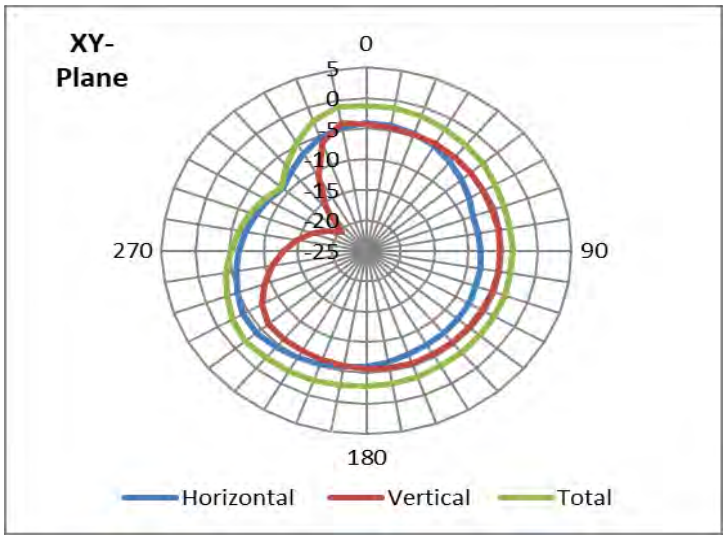
Main antenna: 2535.00 MHz

2535.00 MHz		
Horizontal Peak (dBi)	-5.42	200 deg
Vertical Peak(dBi)	-3.07	350 deg



Main antenna: 2570.00 MHz

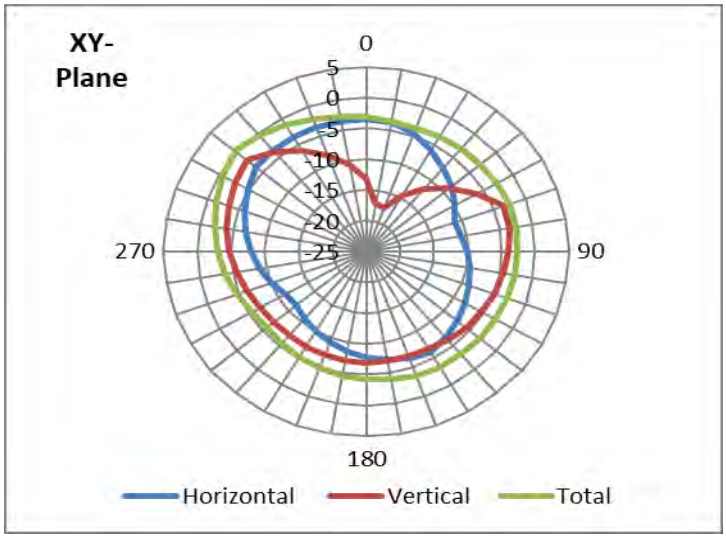
2570.00 MHz		
Horizontal Peak (dBi)	-4.04	200 deg
Vertical Peak(dBi)	-3.81	90 deg



Radiation characteristic in 880MHz ~ 915MHz (Band 8, n8)

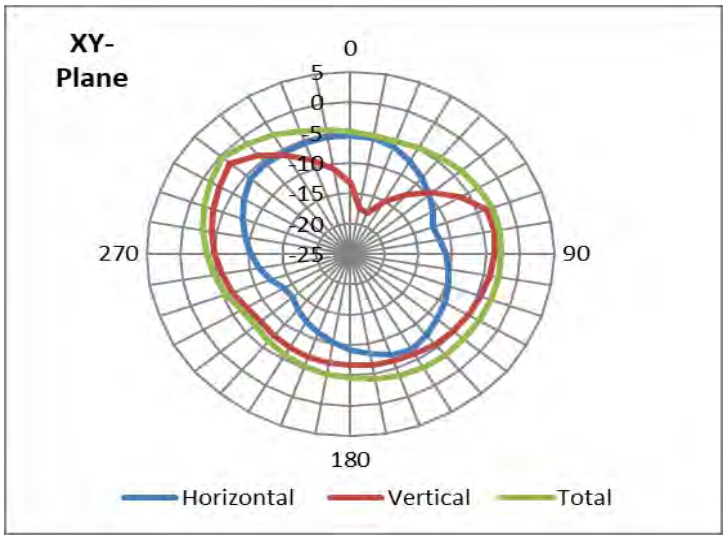
Main antenna: 880.00 MHz

880.00 MHz		
Horizontal Peak (dBi)	-3.52	350 deg
Vertical Peak(dBi)	-1.9	310 deg



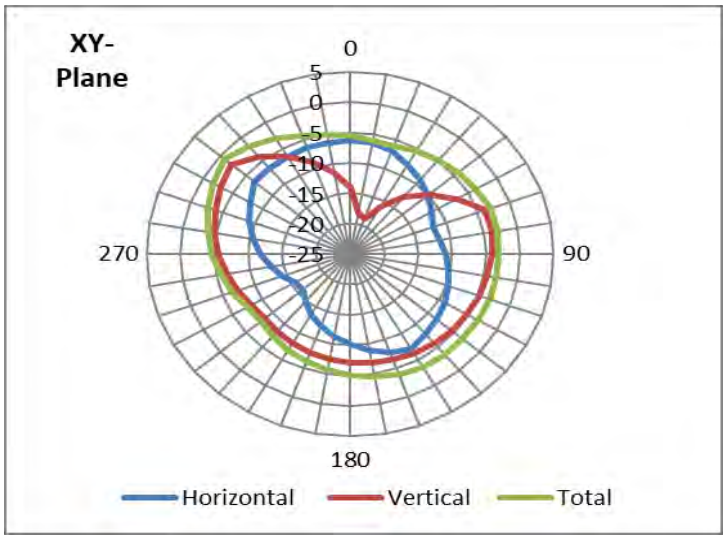
Main antenna: 897.50 MHz

897.50 MHz		
Horizontal Peak (dBi)	-5.51	350 deg
Vertical Peak(dBi)	-1.89	310 deg



Main antenna: 915.00 MHz

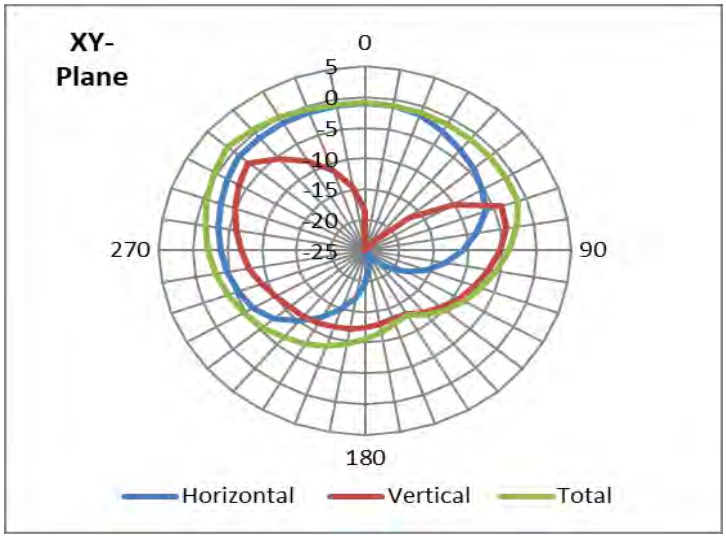
915.00 MHz		
Horizontal Peak (dBi)	-6.31	350 deg
Vertical Peak(dBi)	-2.03	310 deg



Radiation characteristic in 699MHz ~ 716MHz (UE-UTRA, Band 12, n12)

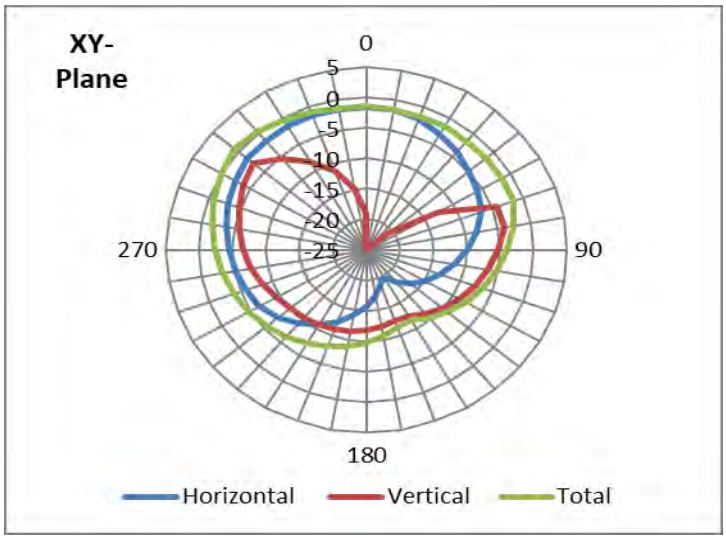
Main antenna: 699.00 MHz

699.00 MHz		
Horizontal Peak (dBi)	-1	350 deg
Vertical Peak(dBi)	-2.82	310 deg



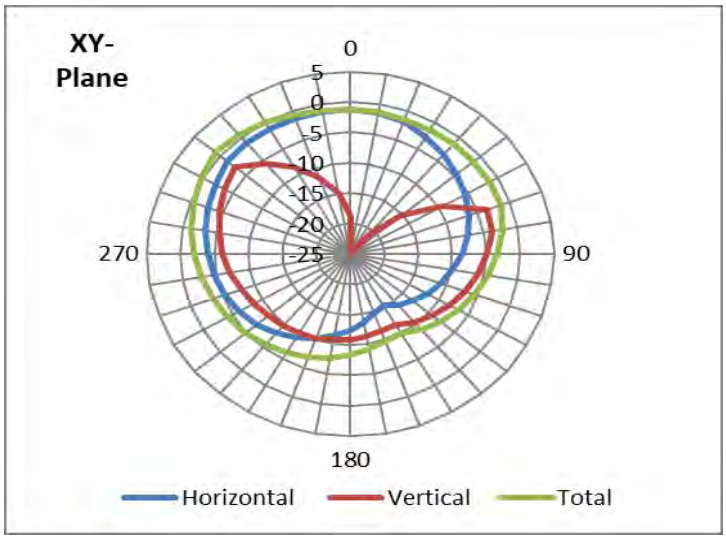
Main antenna: 707.50 MHz

707.50 MHz		
Horizontal Peak (dBi)	-1.54	350 deg
Vertical Peak(dBi)	-2.84	310 deg



Main antenna: 716.00 MHz

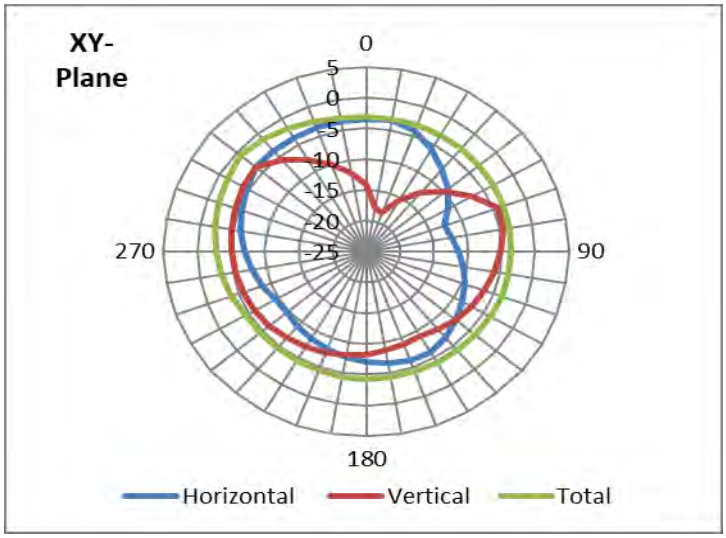
716.00 MHz		
Horizontal Peak (dBi)	-1.23	350 deg
Vertical Peak(dBi)	-2.81	310 deg



Radiation characteristic in 776MHz ~ 787MHz (UE-UTRA, Band 13)

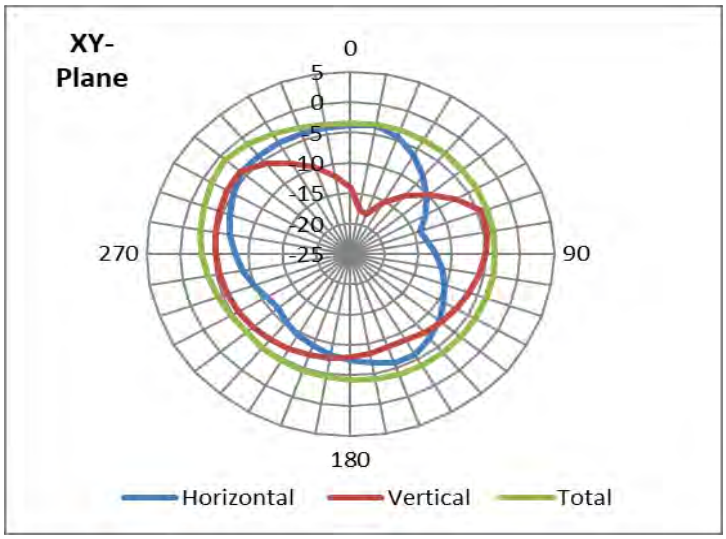
Main antenna: 777.00 MHz

777.00 MHz		
Horizontal Peak (dBi)	-3.31	350 deg
Vertical Peak(dBi)	-3.76	310 deg



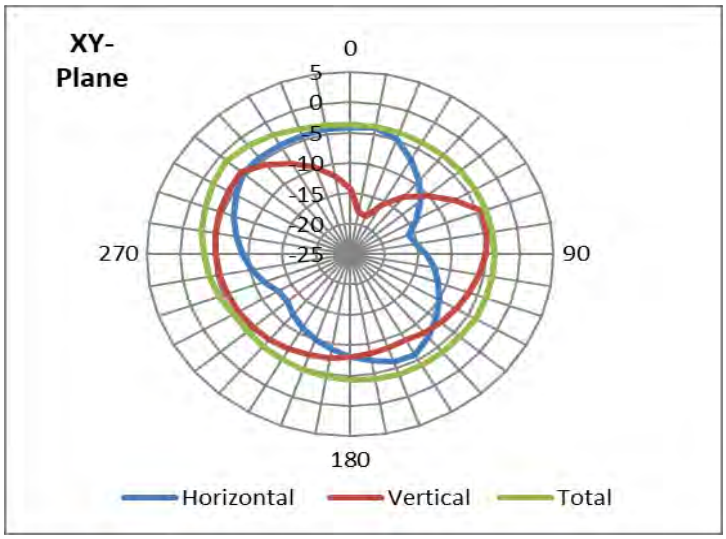
Main antenna: 782.00 MHz

782.00 MHz		
Horizontal Peak (dBi)	-3.62	350 deg
Vertical Peak(dBi)	-3.8	310 deg



Main antenna: 787.00 MHz

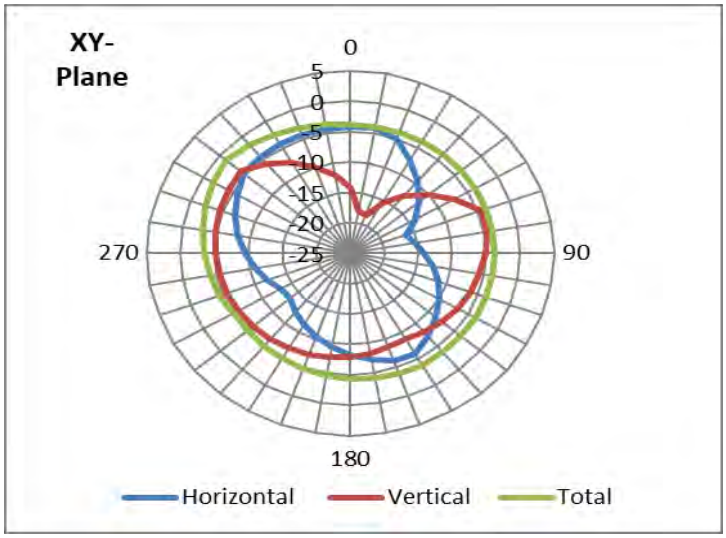
787.00 MHz		
Horizontal Peak (dBi)	-4	350 deg
Vertical Peak(dBi)	-3.95	310 deg



Radiation characteristic in 788MHz ~ 798MHz (UE-UTRA, Band 14)

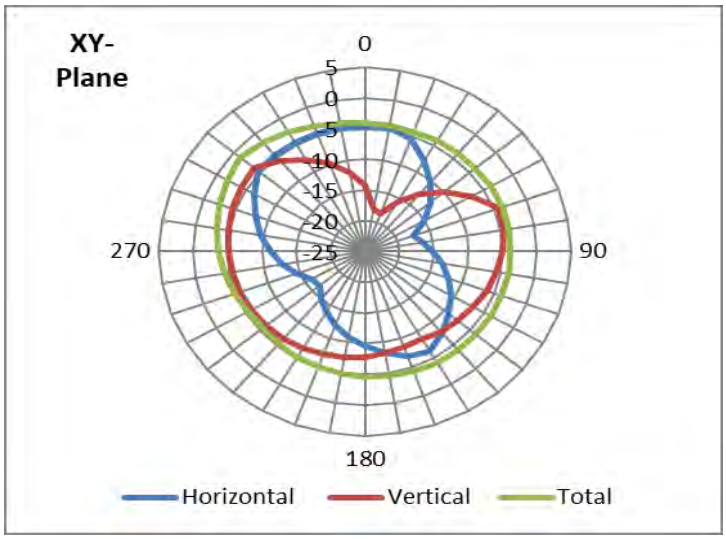
Main antenna: 788.00 MHz

788.00 MHz		
Horizontal Peak (dBi)	-4.08	350 deg
Vertical Peak(dBi)	-3.93	310 deg



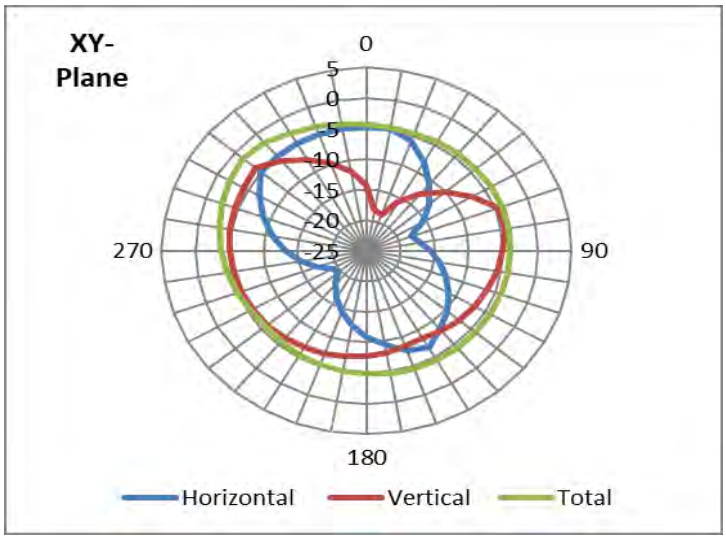
Main antenna: 793.00 MHz

793.00 MHz		
Horizontal Peak (dBi)	-4.44	350 deg
Vertical Peak(dBi)	-3.93	310 deg



Main antenna: 798.00 MHz

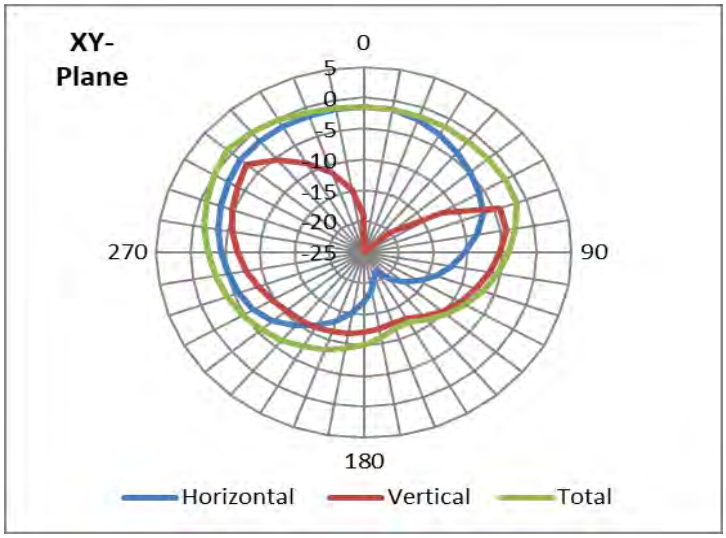
798.00 MHz		
Horizontal Peak (dBi)	-4.72	350 deg
Vertical Peak(dBi)	-3.98	310 deg



Radiation characteristic in 704MHz ~ 716MHz (UE-UTRA, Band 17)

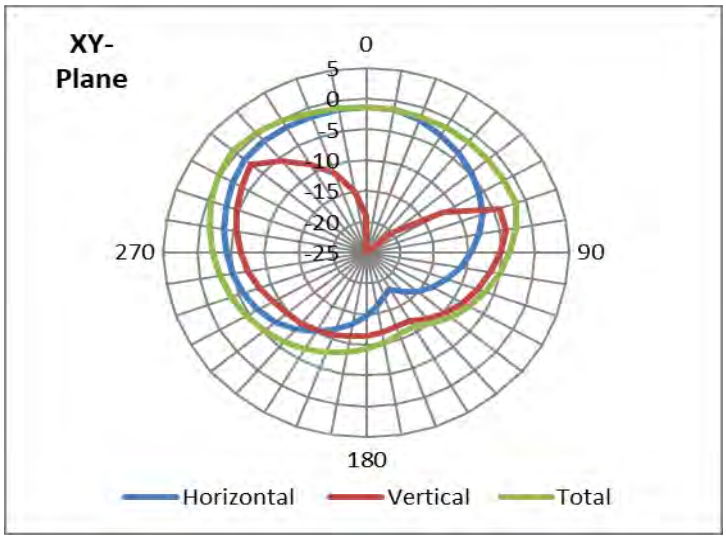
Main antenna: 704.00 MHz

704.00 MHz		
Horizontal Peak (dBi)	-1.51	350 deg
Vertical Peak(dBi)	-2.84	310 deg



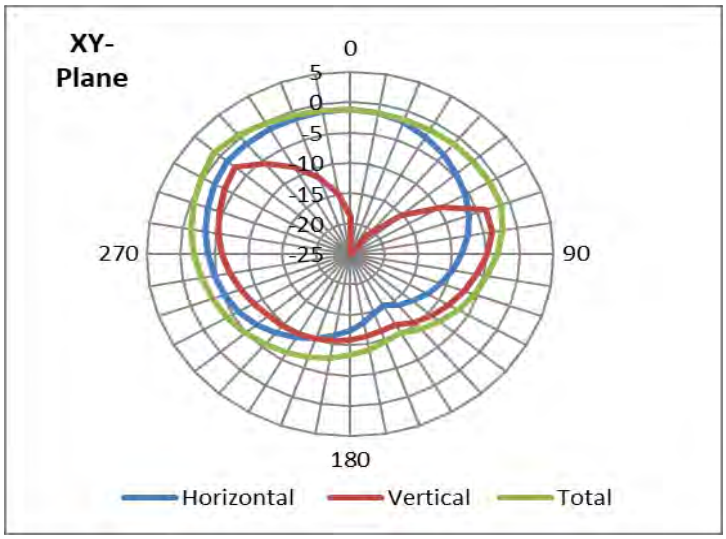
Main antenna: 710.00 MHz

710.00 MHz		
Horizontal Peak (dBi)	-1.47	350 deg
Vertical Peak(dBi)	-2.82	310 deg



Main antenna: 716.00 MHz

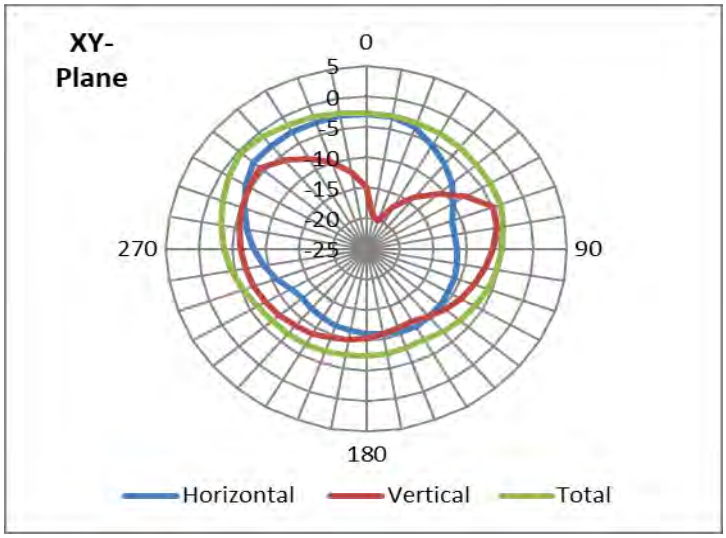
716.00 MHz		
Horizontal Peak (dBi)	-1.23	350 deg
Vertical Peak(dBi)	-2.81	310 deg



Radiation characteristic in 815MHz ~ 830MHz (Band 18)

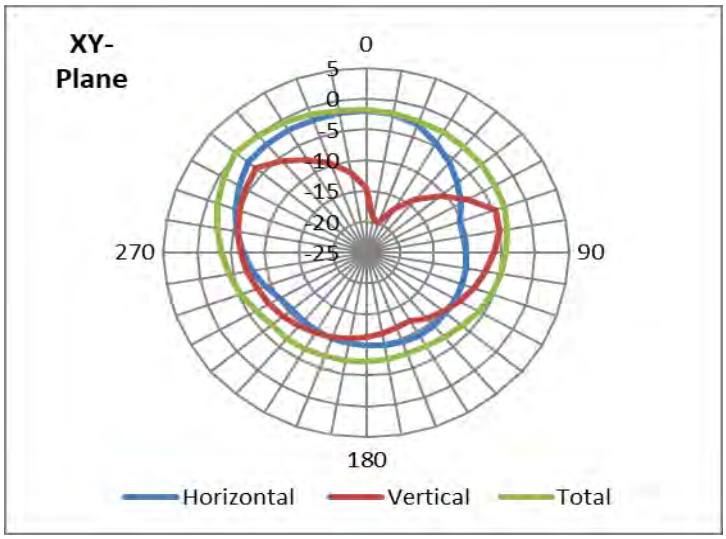
Main antenna: 815.00 MHz

815.00 MHz		
Horizontal Peak (dBi)	-2.83	350 deg
Vertical Peak(dBi)	-4.29	310 deg



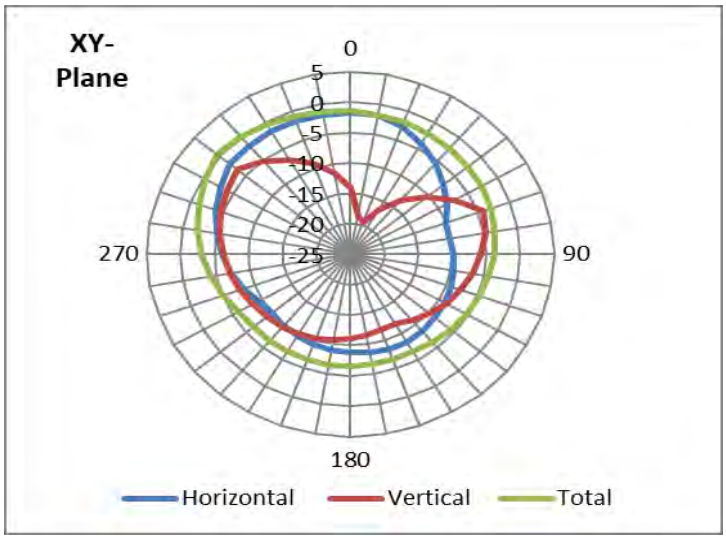
Main antenna: 822.50 MHz

822.50 MHz		
Horizontal Peak (dBi)	-2.04	350 deg
Vertical Peak(dBi)	-3.79	310 deg



Main antenna: 830.00 MHz

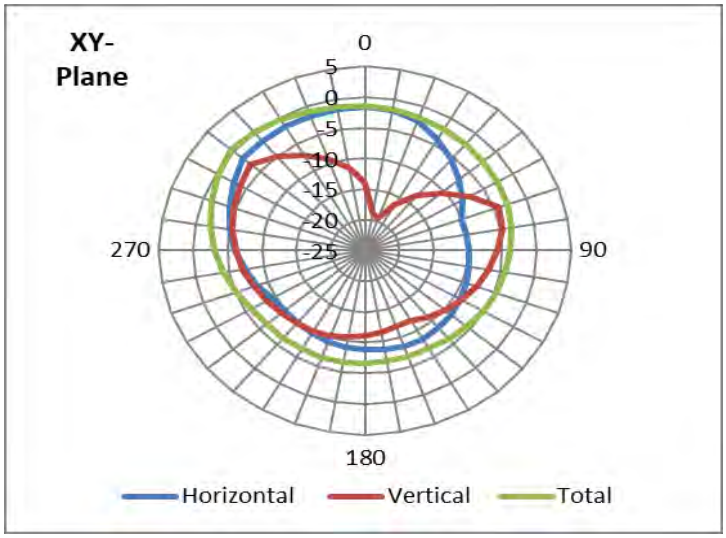
830.00 MHz		
Horizontal Peak (dBi)	-1.68	350 deg
Vertical Peak(dBi)	-3.21	310 deg



Radiation characteristic in 830MHz ~ 845MHz (Band 19)

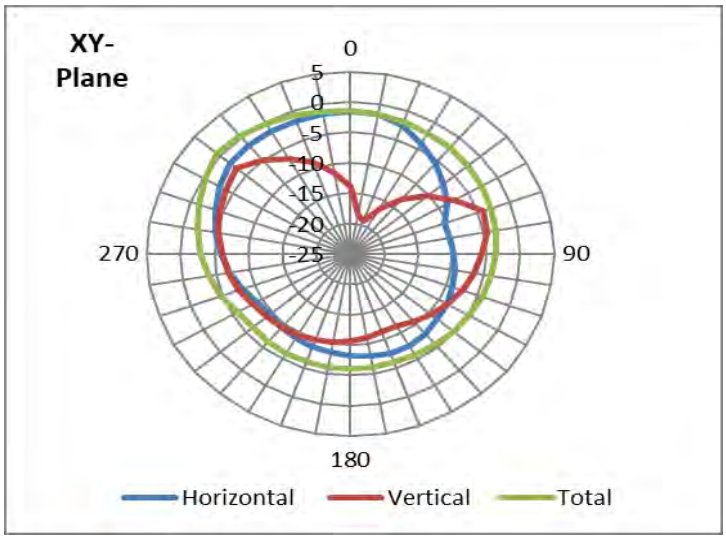
Main antenna: 830.00 MHz

830.00 MHz		
Horizontal Peak (dBi)	-1.68	350 deg
Vertical Peak(dBi)	-3.21	310 deg



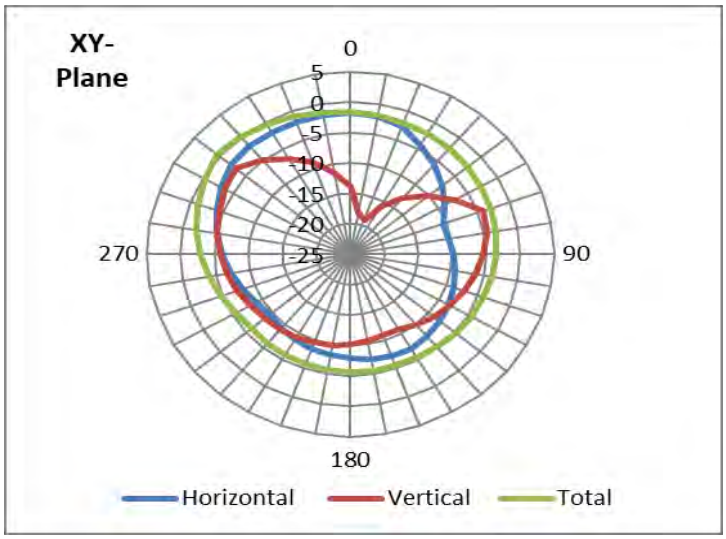
Main antenna: 837.50 MHz

837.50 MHz		
Horizontal Peak (dBi)	-1.6	350 deg
Vertical Peak(dBi)	-3.06	310 deg



Main antenna: 845.00 MHz

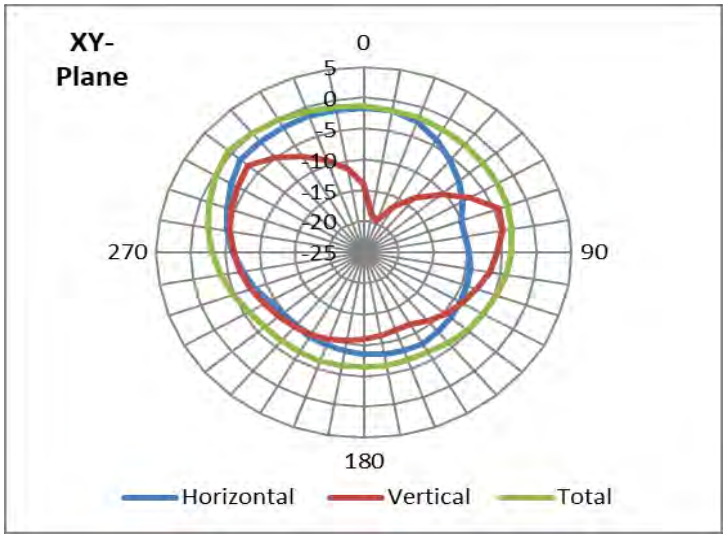
845.00 MHz		
Horizontal Peak (dBi)	-1.77	350 deg
Vertical Peak(dBi)	-2.91	310 deg



Radiation characteristic in 832MHz ~ 862MHz (UE-UTRA,Band 20, n20)

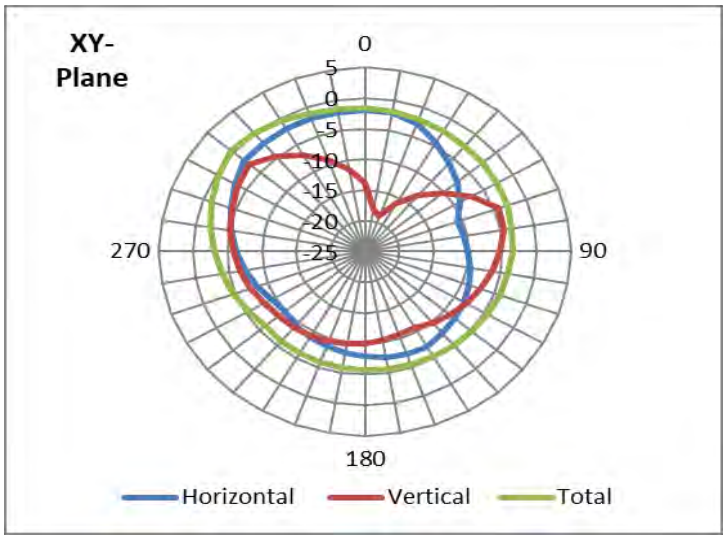
Main antenna: 832.00 MHz

832.00 MHz		
Horizontal Peak (dBi)	-1.63	350 deg
Vertical Peak(dBi)	-3.11	310 deg



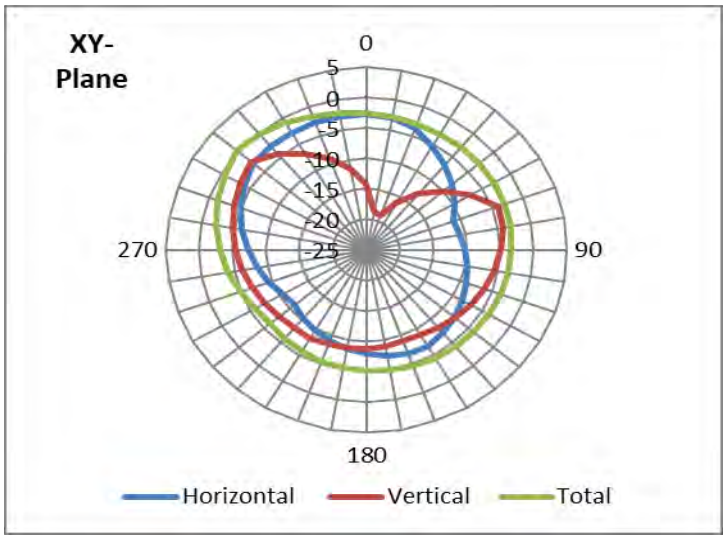
Main antenna: 847.00 MHz

847.00 MHz		
Horizontal Peak (dBi)	-1.93	350 deg
Vertical Peak(dBi)	-2.88	310 deg



Main antenna: 862.00 MHz

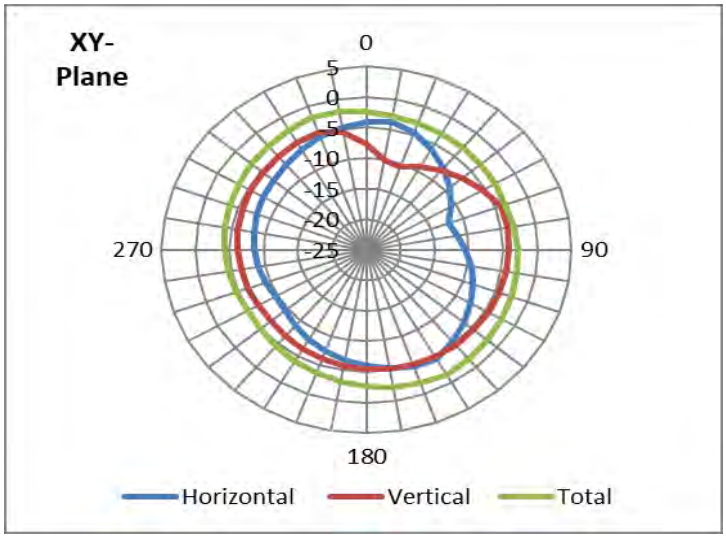
862.00 MHz		
Horizontal Peak (dBi)	-2.73	350 deg
Vertical Peak(dBi)	-2.48	310 deg



Radiation characteristic in 1850MHz ~ 1915MHz (UE-UTRA, Band 25)

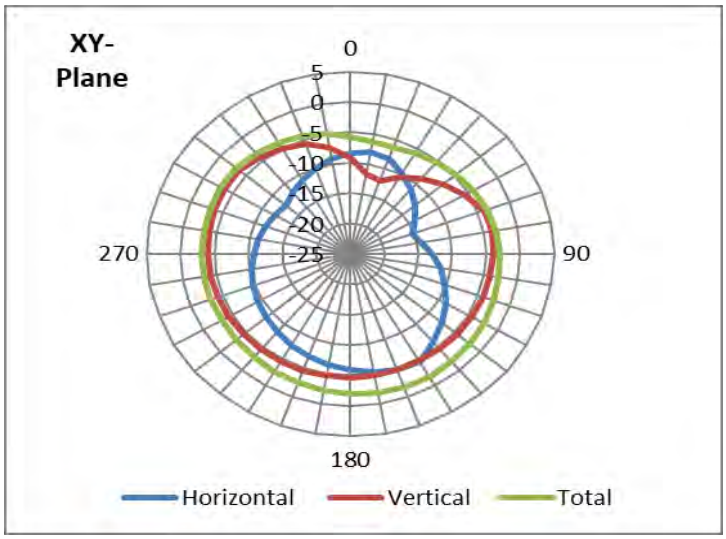
Main antenna: 1850.00 MHz

1850.00 MHz		
Horizontal Peak (dBi)	-3.81	150 deg
Vertical Peak(dBi)	-4	70 deg



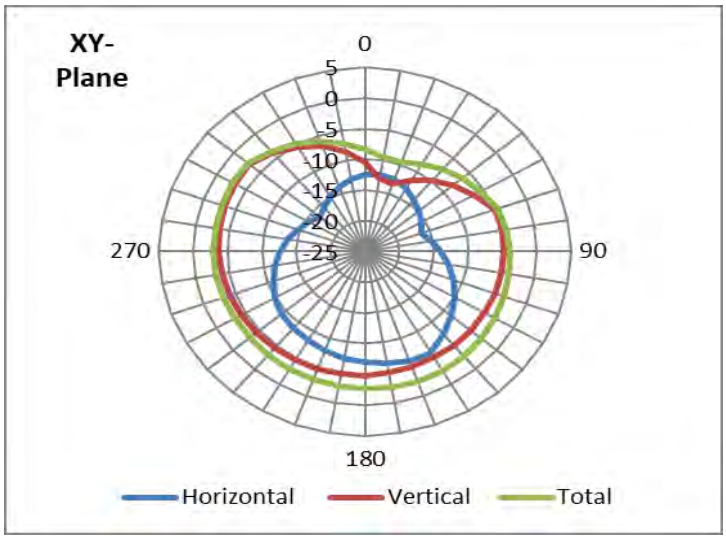
Main antenna: 1882.50 MHz

1882.50 MHz		
Horizontal Peak (dBi)	-4.63	150 deg
Vertical Peak(dBi)	-3.54	70 deg



Main antenna: 1915.00 MHz

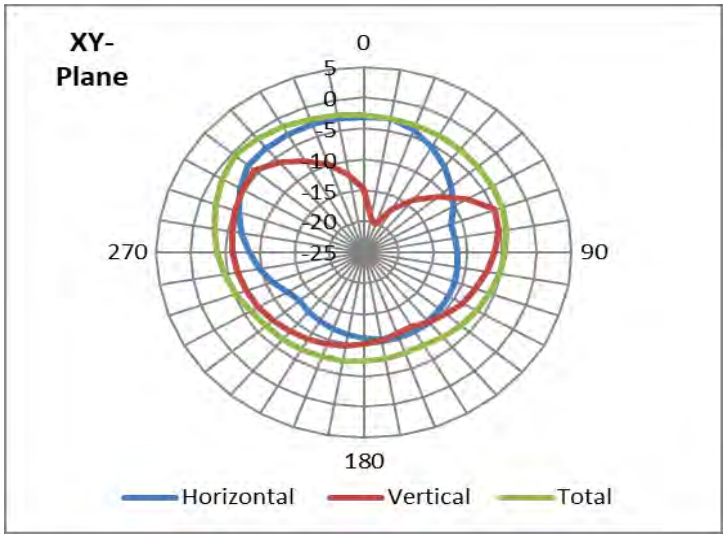
1915.00 MHz		
Horizontal Peak (dBi)	-5.99	150 deg
Vertical Peak(dBi)	-2.88	70 deg



Radiation characteristic in 814MHz ~ 849MHz (UE-UTRA, Band 26)

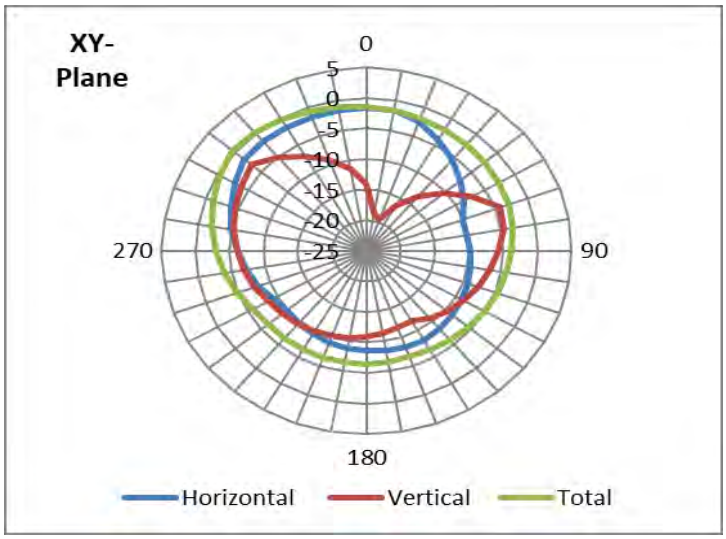
Main antenna: 814.00 MHz

814.00 MHz		
Horizontal Peak (dBi)	-2.97	350 deg
Vertical Peak(dBi)	-4.32	310 deg



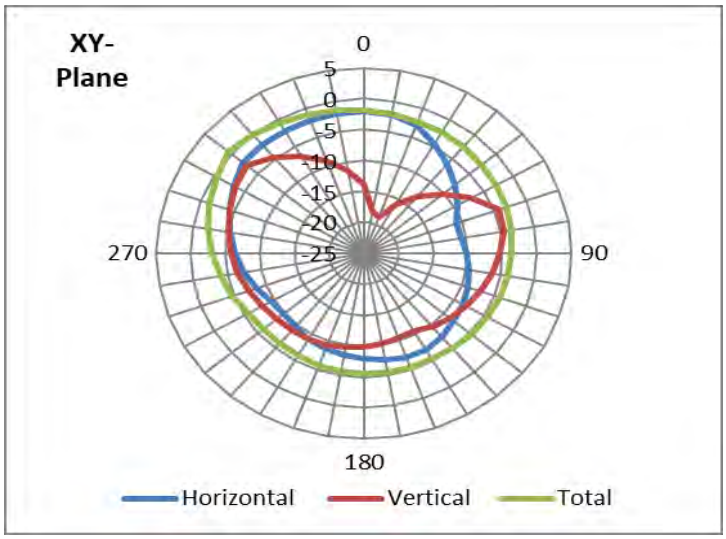
Main antenna: 831.50 MHz

831.50 MHz		
Horizontal Peak (dBi)	-1.64	350 deg
Vertical Peak(dBi)	-3.14	310 deg



Main antenna: 849.00 MHz

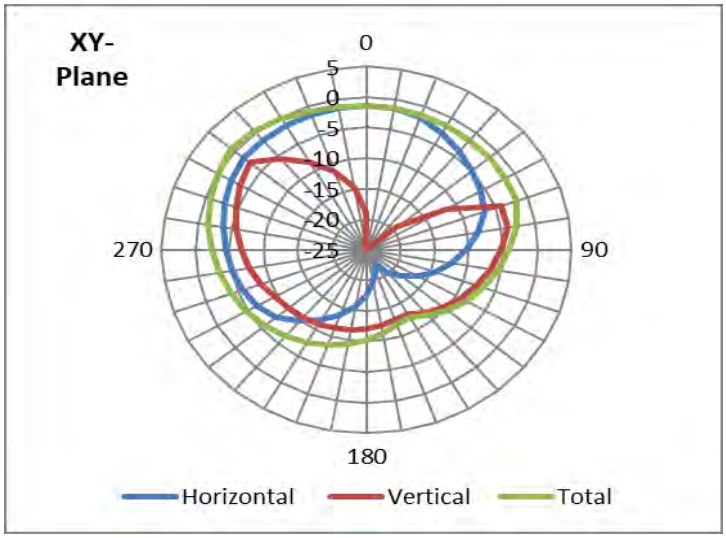
849.00 MHz		
Horizontal Peak (dBi)	-2.09	350 deg
Vertical Peak(dBi)	-2.84	310 deg



Radiation characteristic in 703MHz ~ 748MHz (UE-UTRA, Band 28, 28)

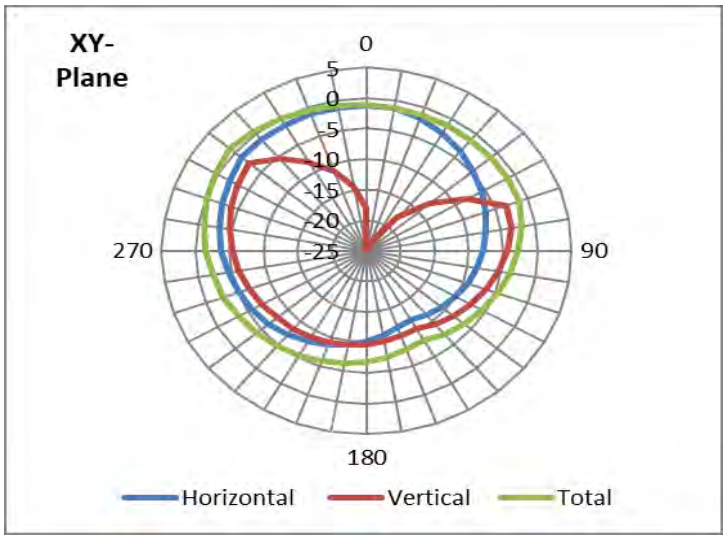
Main antenna: 703.00 MHz

703.00 MHz		
Horizontal Peak (dBi)	-1.48	350 deg
Vertical Peak(dBi)	-2.84	310 deg



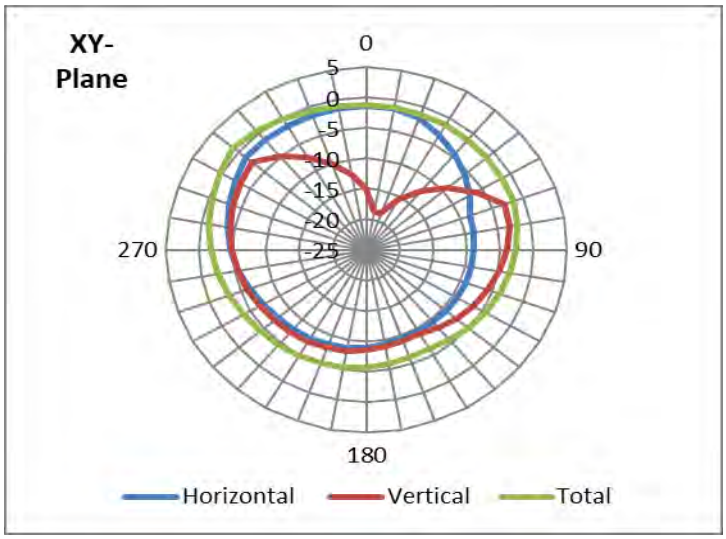
Main antenna: 725.50 MHz

725.50 MHz		
Horizontal Peak (dBi)	-1.2	350 deg
Vertical Peak(dBi)	-2.66	310 deg



Main antenna: 748.00 MHz

748.00 MHz		
Horizontal Peak (dBi)	-1.35	350 deg
Vertical Peak(dBi)	-2.66	310 deg

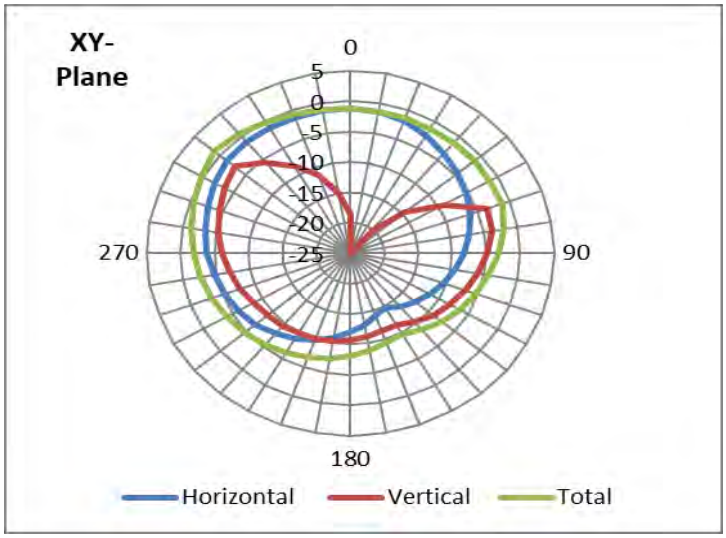


Radiation characteristic in 717MHz ~ 728MHz (UE-UTRA, Band 29)

*** Down link only**

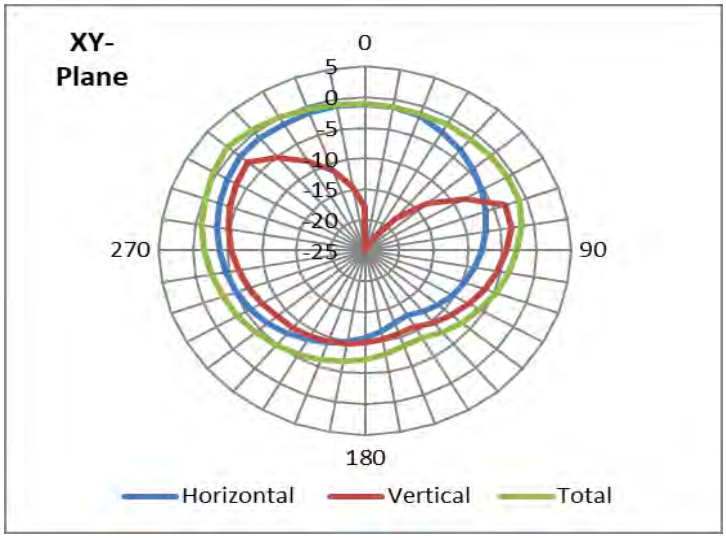
Main antenna: 717.00 MHz

717.00 MHz		
Horizontal Peak (dBi)	-1.17	350 deg
Vertical Peak(dBi)	-2.77	310 deg



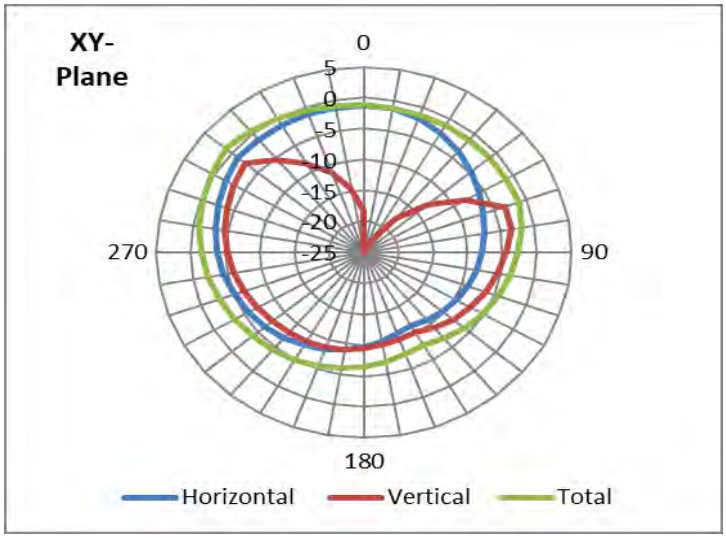
Main antenna: 722.50 MHz

722.50 MHz		
Horizontal Peak (dBi)	-1.17	350 deg
Vertical Peak(dBi)	-2.6	310 deg



Main antenna: 728.00 MHz

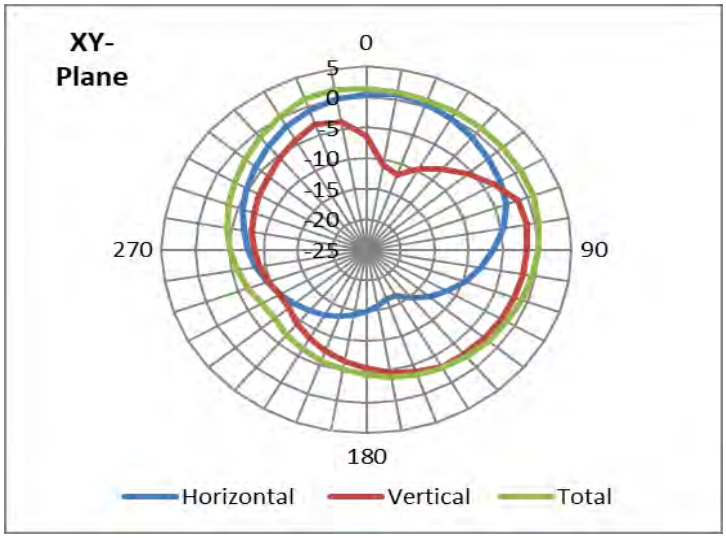
728.00 MHz		
Horizontal Peak (dBi)	-1.23	350 deg
Vertical Peak(dBi)	-2.73	310 deg



Radiation characteristic in 2305MHz ~ 2315MHz (UE-UTRA, Band 30)

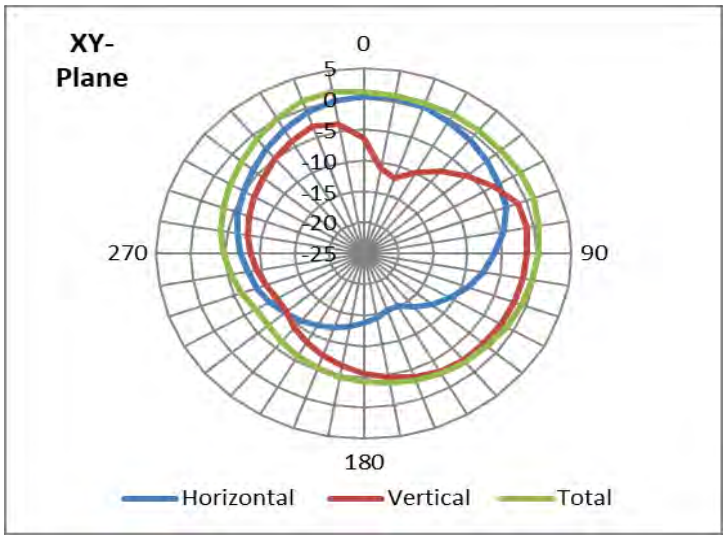
Main antenna: 2305.00 MHz

2305.00 MHz		
Horizontal Peak (dBi)	0.73	15 deg
Vertical Peak(dBi)	-1.23	110 deg



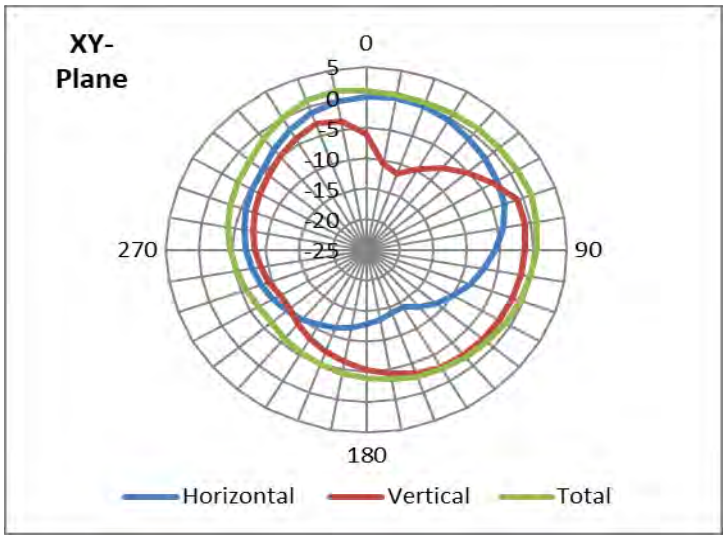
Main antenna: 2310.00 MHz

2310.00 MHz		
Horizontal Peak (dBi)	0.53	15 deg
Vertical Peak(dBi)	-1.15	110 deg



Main antenna: 2315.00 MHz

2315.00 MHz		
Horizontal Peak (dBi)	0.37	15 deg
Vertical Peak(dBi)	-0.92	110 deg

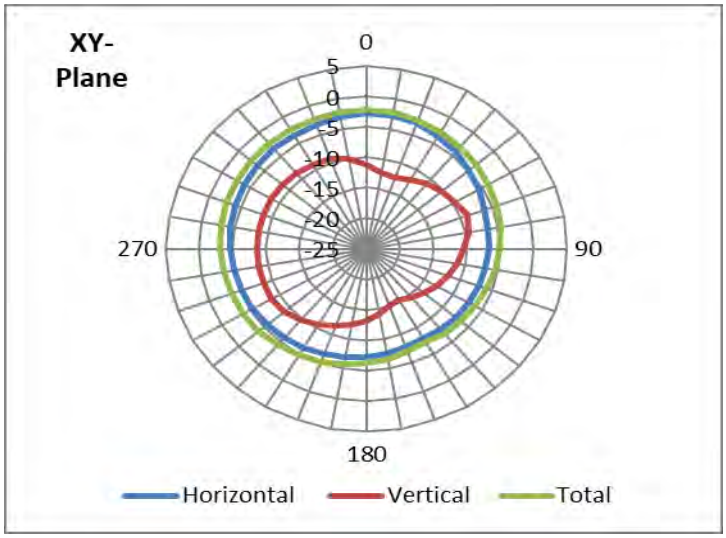


Radiation characteristic in 1452MHz ~ 1496MHz (LTE, Band 32)

*** Down link only**

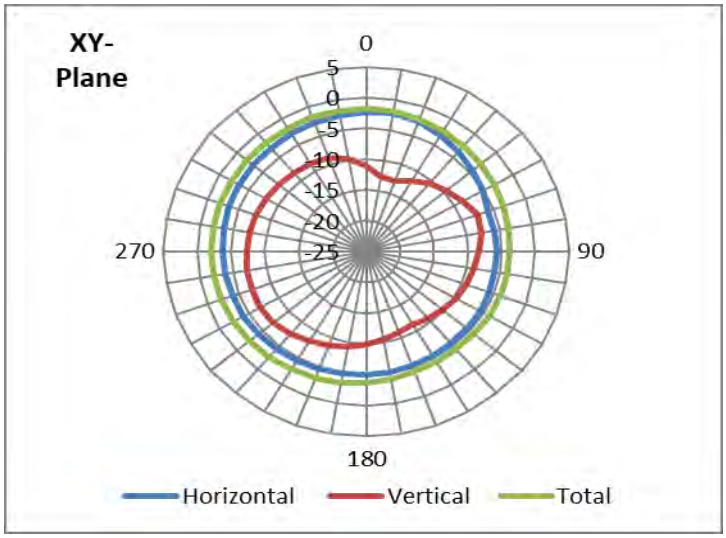
Main antenna: 1452.00 MHz

1452.00 MHz		
Horizontal Peak (dBi)	-2.73	10 deg
Vertical Peak(dBi)	-8.57	240 deg



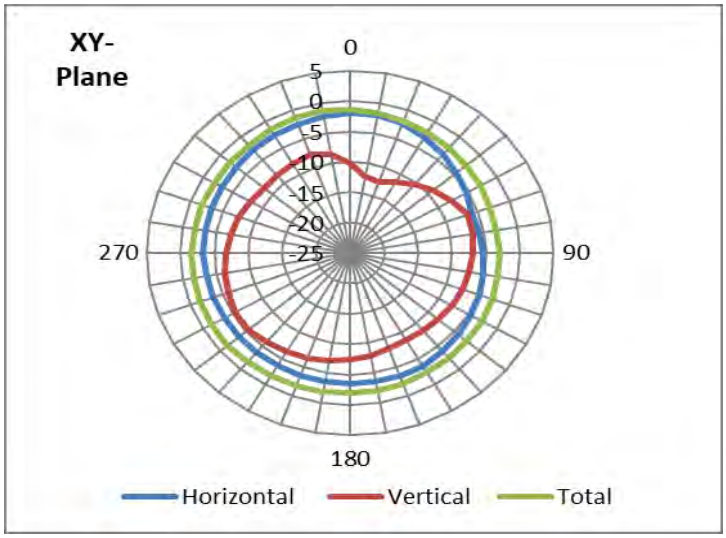
Main antenna: 1474.00 MHz

1474.00 MHz		
Horizontal Peak (dBi)	-2.27	10 deg
Vertical Peak(dBi)	-6.79	240 deg



Main antenna: 1496.00 MHz

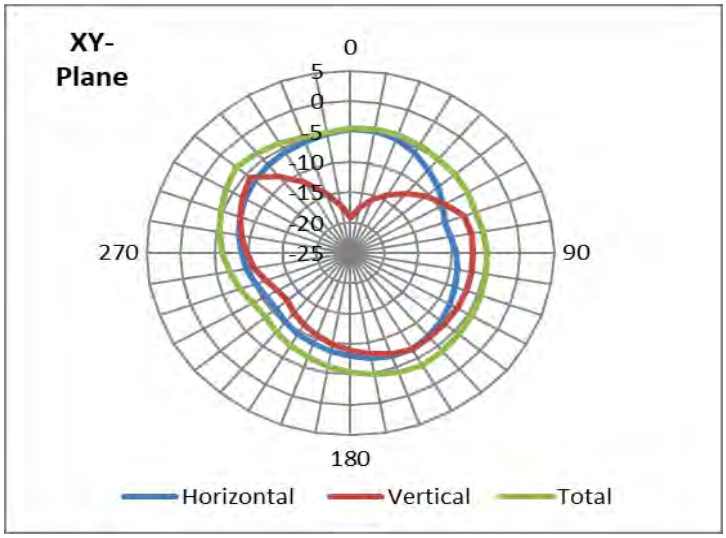
1496.00 MHz		
Horizontal Peak (dBi)	-1.95	10 deg
Vertical Peak(dBi)	-5.41	240 deg



Radiation characteristic in 2010MHz ~ 2025MHz (LTE, Band 34)

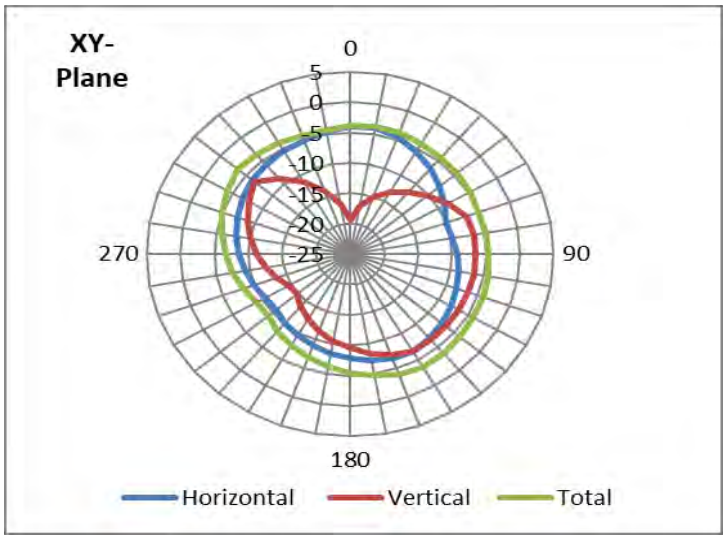
Main antenna: 2010.00 MHz

2010.00 MHz		
Horizontal Peak (dBi)	-4.61	10 deg
Vertical Peak(dBi)	-5.74	310 deg



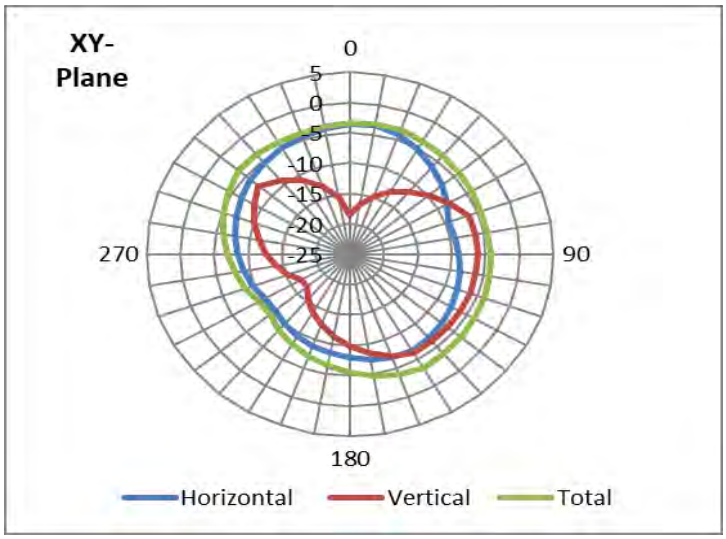
Main antenna: 2017.50 MHz

2017.50 MHz		
Horizontal Peak (dBi)	-3.94	10 deg
Vertical Peak(dBi)	-6.52	310 deg



Main antenna: 2025.00 MHz

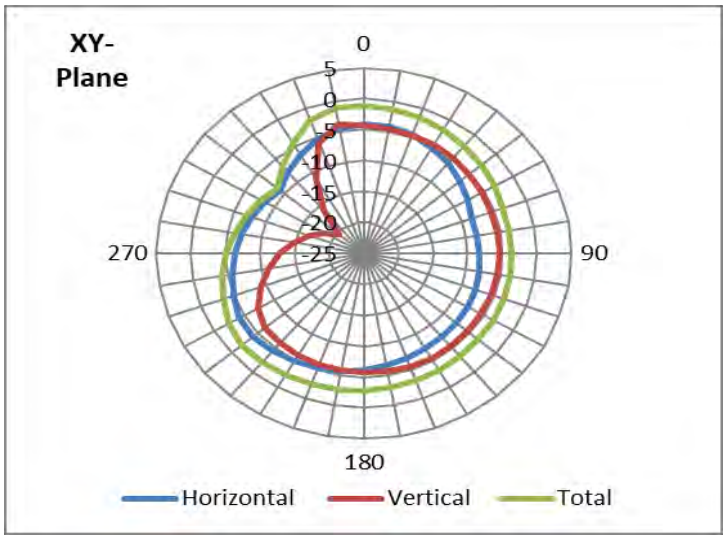
2025.00 MHz		
Horizontal Peak (dBi)	-3.41	10 deg
Vertical Peak(dBi)	-6.16	310 deg



Radiation characteristic in 2570MHz ~ 2620MHz (UE-UTRA, Band 38, n38)

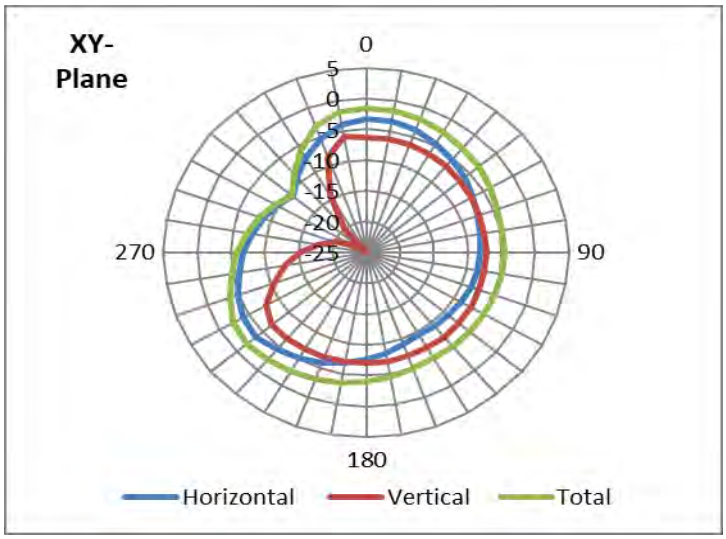
Main antenna: 2570.00 MHz

2570.00 MHz		
Horizontal Peak (dBi)	-4.04	200 deg
Vertical Peak(dBi)	-3.81	90 deg



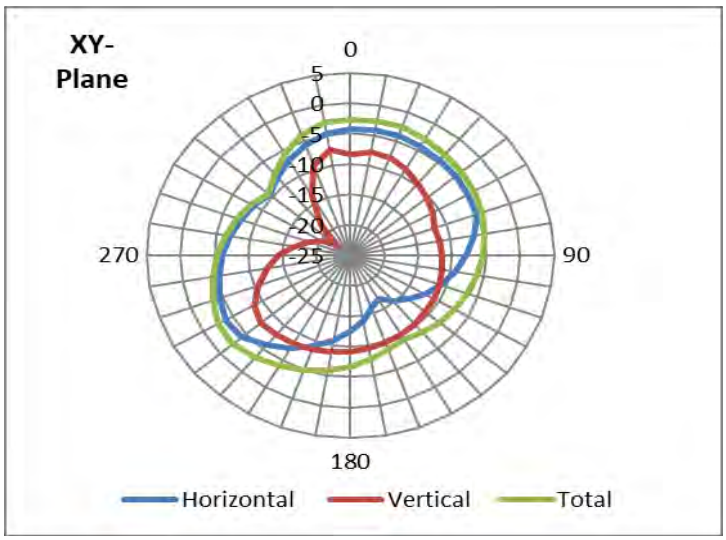
Main antenna: 2595.00 MHz

2595.00 MHz		
Horizontal Peak (dBi)	-3.39	10 deg
Vertical Peak(dBi)	-5.85	90 deg



Main antenna: 2620.00 MHz

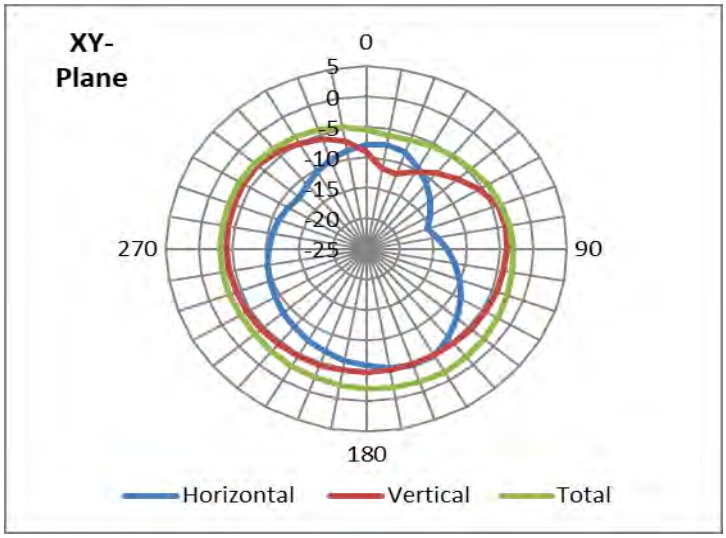
2620.00 MHz		
Horizontal Peak (dBi)	-3.71	230 deg
Vertical Peak(dBi)	-7.42	350 deg



Radiation characteristic in 1880MHz ~ 1920MHz (TD-SCDMA, Band 39)

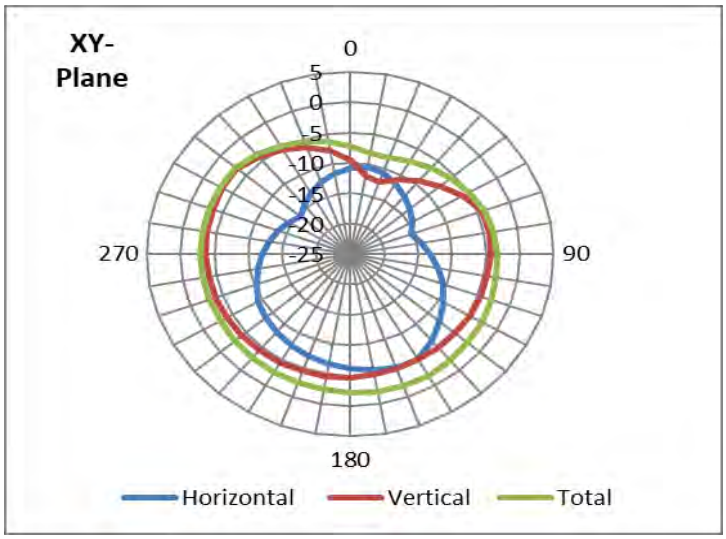
Main antenna: 1880.00 MHz

1880.00 MHz		
Horizontal Peak (dBi)	-4.54	150 deg
Vertical Peak(dBi)	-3.69	70 deg



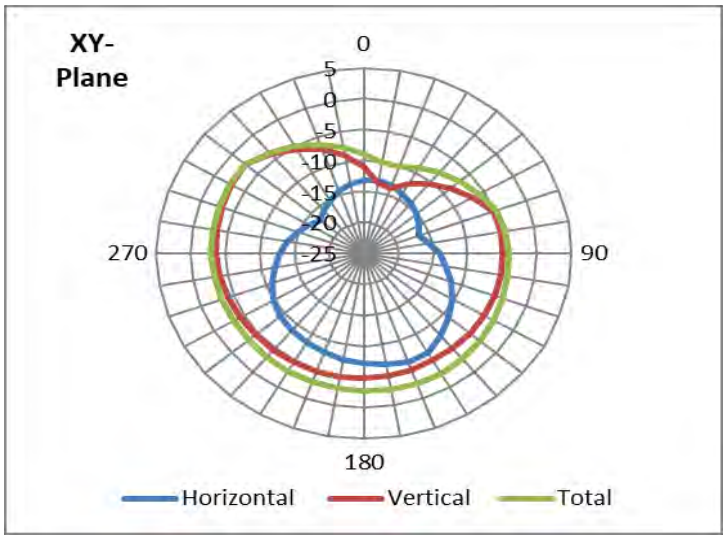
Main antenna: 1900.00 MHz

1900.00 MHz		
Horizontal Peak (dBi)	-5.06	150 deg
Vertical Peak(dBi)	-3.18	70 deg



Main antenna: 1920.00 MHz

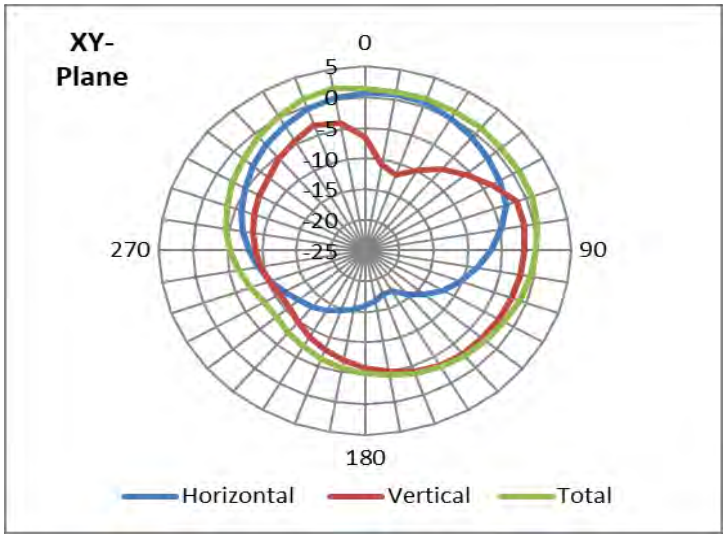
1920.00 MHz		
Horizontal Peak (dBi)	-6.34	150 deg
Vertical Peak(dBi)	-2.69	70 deg



Radiation characteristic in 2300MHz ~ 2400MHz (UE-UTRA, Band 40)

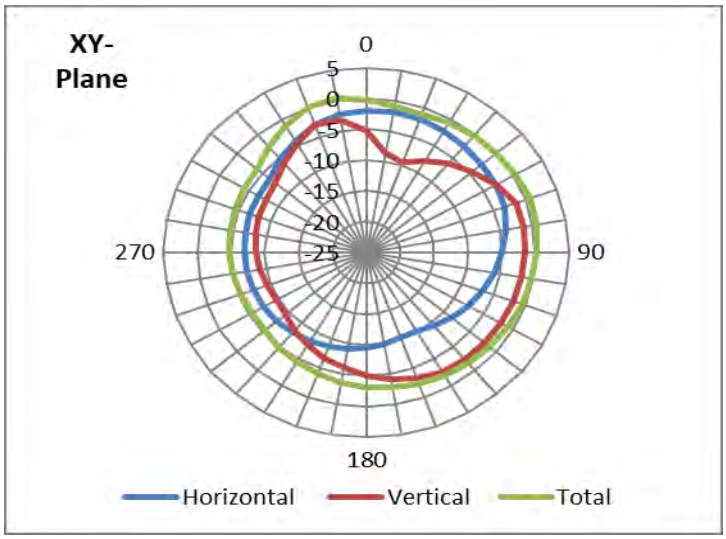
Main antenna: 2300.00 MHz

2300.00 MHz		
Horizontal Peak (dBi)	0.91	15 deg
Vertical Peak(dBi)	-1.46	110 deg



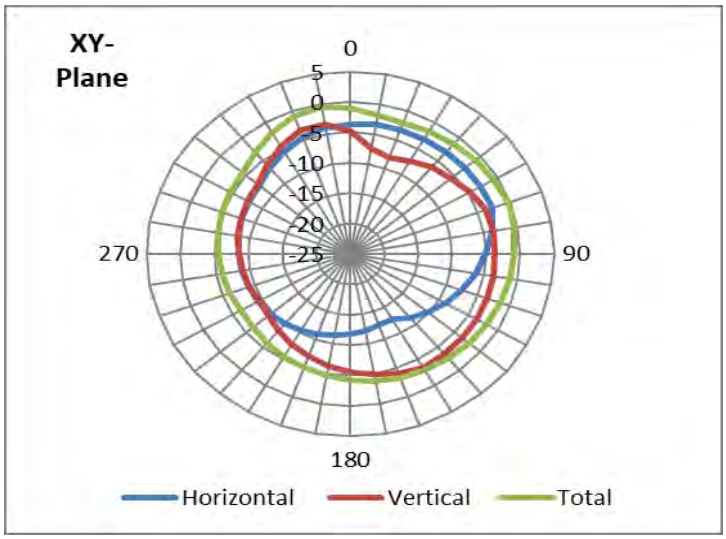
Main antenna: 2350.00 MHz

2350.00 MHz		
Horizontal Peak (dBi)	-1.89	15 deg
Vertical Peak(dBi)	-1.36	110 deg



Main antenna: 2400.00 MHz

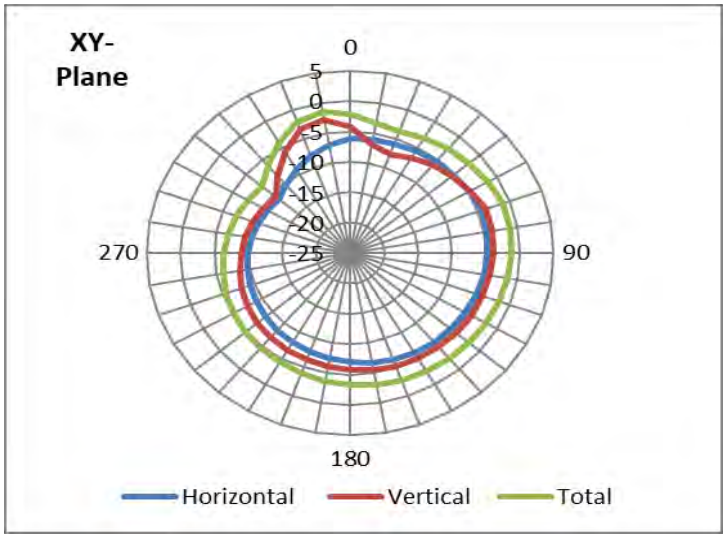
2400.00 MHz		
Horizontal Peak (dBi)	-2.71	15 deg
Vertical Peak(dBi)	-3.27	110 deg



Radiation characteristic in 2496MHz ~ 2690MHz (UE-UTRA, Band 41, n41)

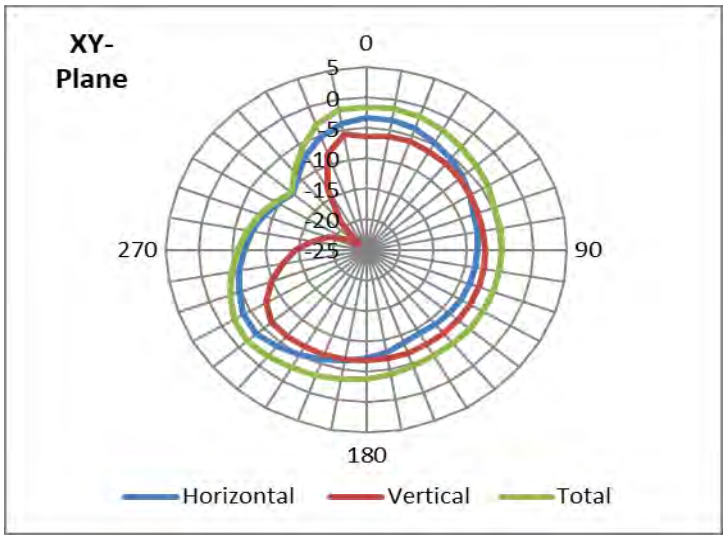
Main antenna: 2496.00 MHz

2496.00 MHz		
Horizontal Peak (dBi)	-4.42	50 deg
Vertical Peak(dBi)	-2.79	350 deg



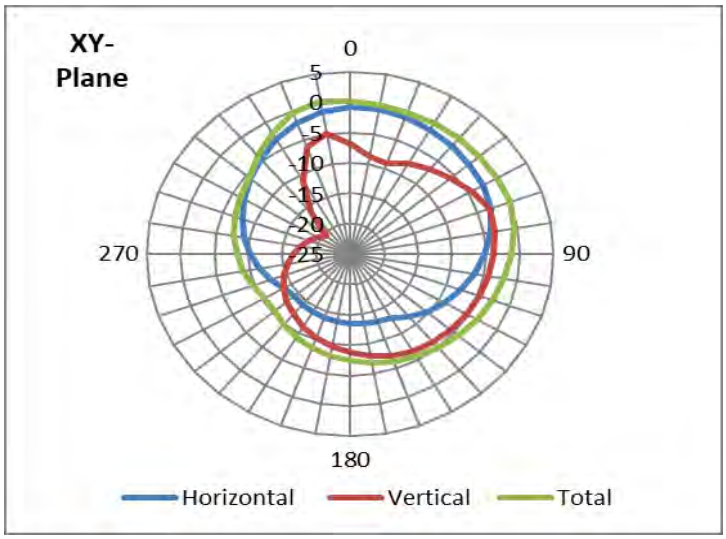
Main antenna: 2593.00 MHz

2593.00 MHz		
Horizontal Peak (dBi)	-3.35	10 deg
Vertical Peak(dBi)	-5.74	90 deg



Main antenna: 2690.00 MHz

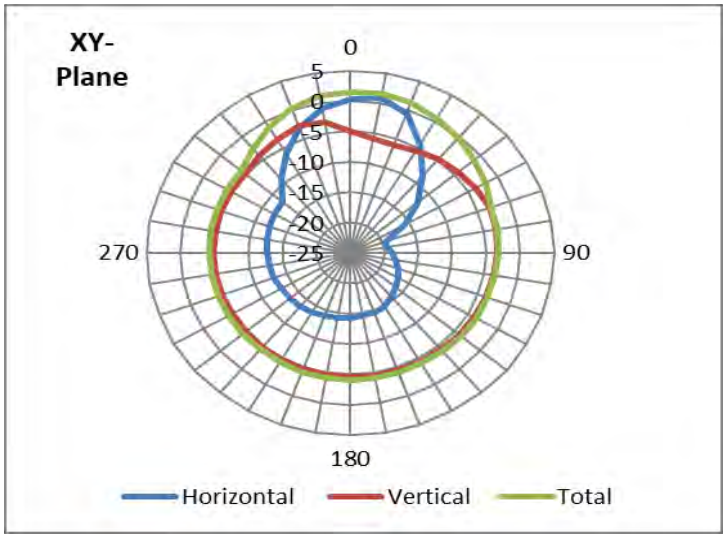
2690.00 MHz		
Horizontal Peak (dBi)	-0.82	20 deg
Vertical Peak(dBi)	-3.18	70 deg



Radiation characteristic in 3400MHz ~ 3600MHz (LTE Band 42)

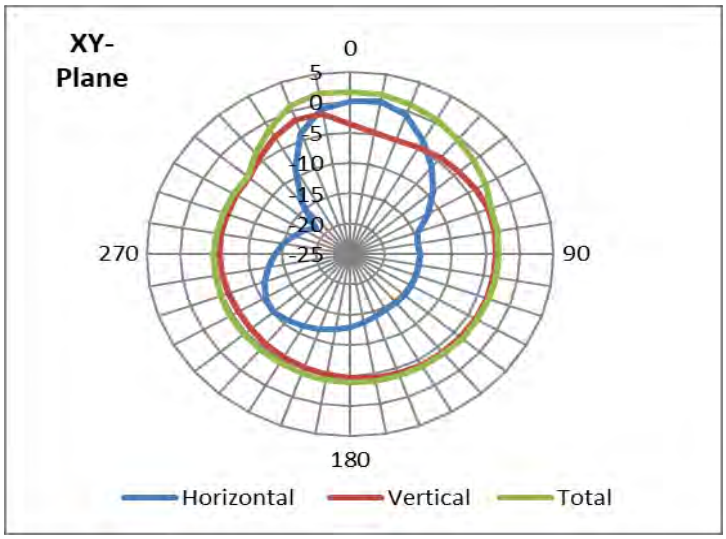
Main antenna: 3400.00 MHz

3400.00 MHz		
Horizontal Peak (dBi)	0.86	20 deg
Vertical Peak(dBi)	-2.77	350 deg



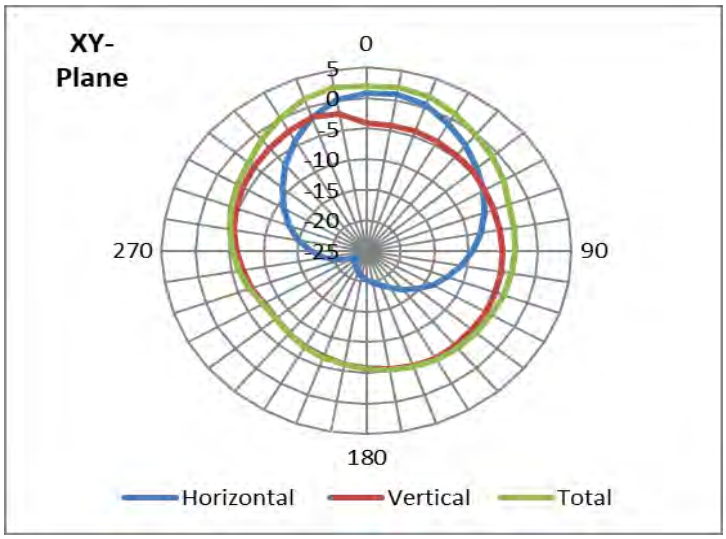
Main antenna: 3500.00 MHz

3500.00 MHz		
Horizontal Peak (dBi)	0.46	20 deg
Vertical Peak(dBi)	-1.44	350 deg



Main antenna: 3600.00 MHz

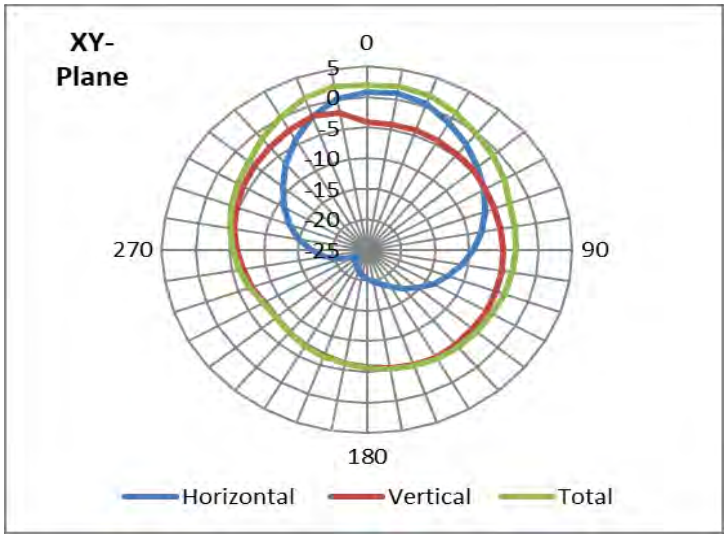
3600.00 MHz		
Horizontal Peak (dBi)	0.95	10 deg
Vertical Peak(dBi)	-1.71	350 deg



Radiation characteristic in 3600MHz ~ 3800MHz (LTE Band 43)

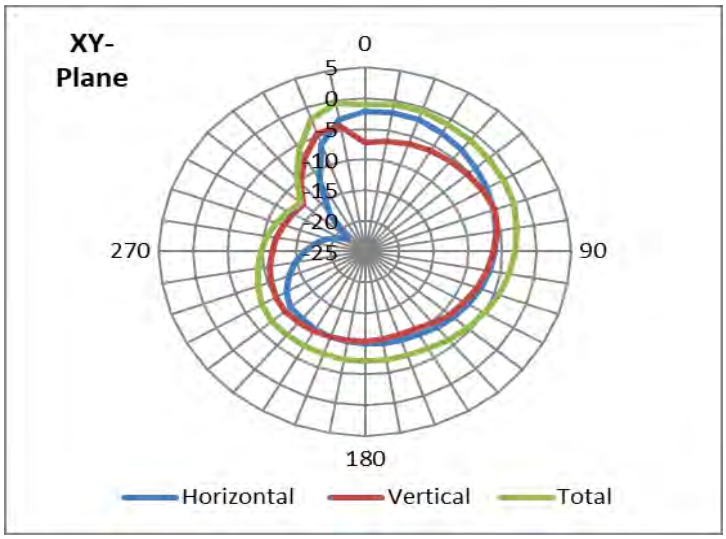
Main antenna: 3600.00 MHz

3600.00 MHz		
Horizontal Peak (dBi)	0.95	10 deg
Vertical Peak(dBi)	-1.71	350 deg



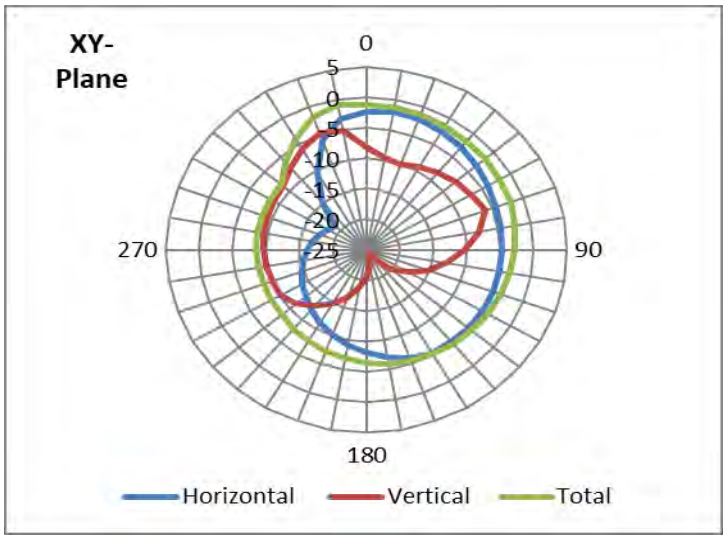
Main antenna: 3700.00 MHz

3700.00 MHz		
Horizontal Peak (dBi)	-2	20 deg
Vertical Peak(dBi)	-4.33	350 deg



Main antenna: 3800.00 MHz

3800.00 MHz		
Horizontal Peak (dBi)	-1.98	20 deg
Vertical Peak(dBi)	-4.48	350 deg

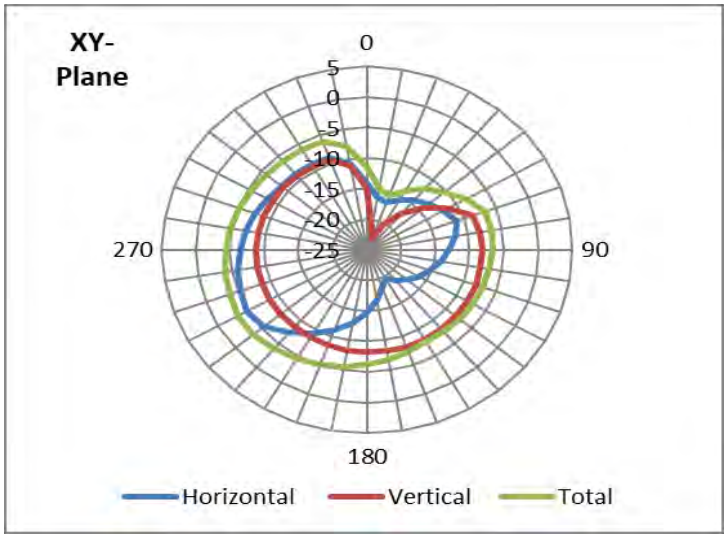


Radiation characteristic in 5150MHz ~ 5925MHz (LTE Band 46)

*** TD Unlicensed, LAA RCV only**

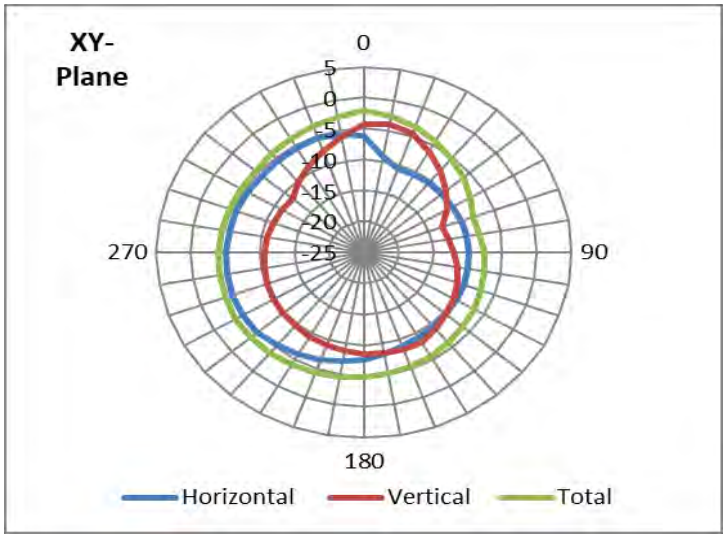
Main antenna: 5150.00 MHz

5150.00 MHz		
Horizontal Peak (dBi)	-4.84	250 deg
Vertical Peak(dBi)	-8	130 deg



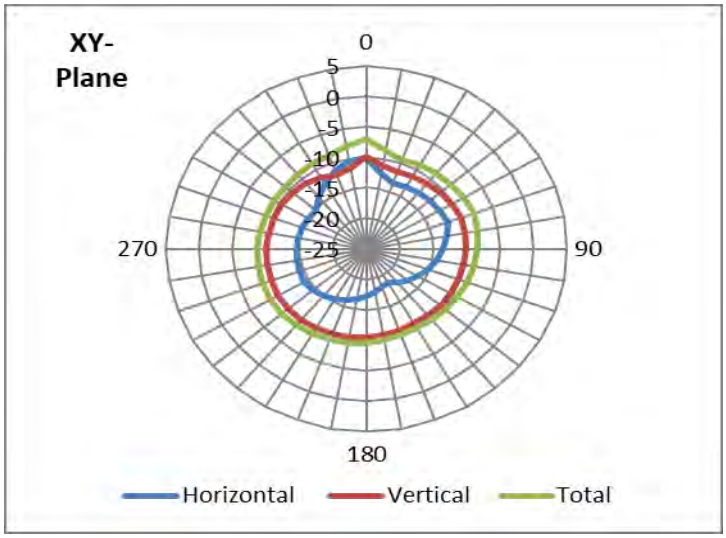
Main antenna: 5537.00 MHz

5537.00 MHz		
Horizontal Peak (dBi)	-4.7	260 deg
Vertical Peak(dBi)	-3.87	20 deg



Main antenna: 5925.00 MHz

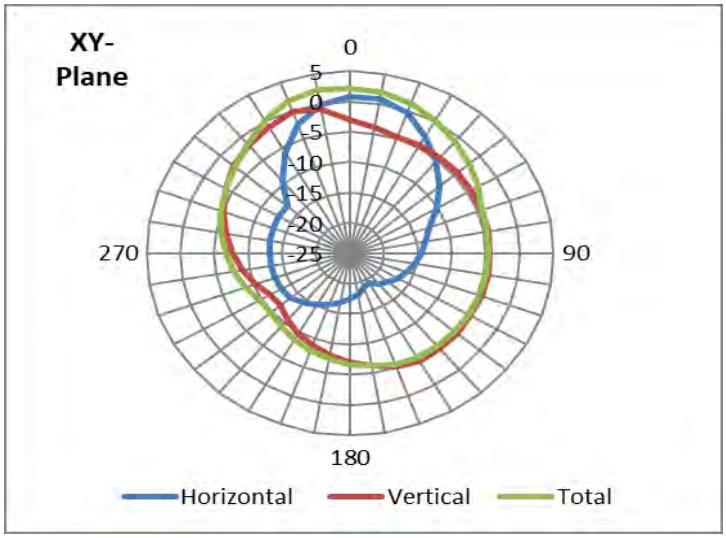
5925.00 MHz		
Horizontal Peak (dBi)	-9.95	350 deg
Vertical Peak(dBi)	-9.64	350 deg



Radiation characteristic in 3550MHz ~ 3700MHz (LTE Band 48)

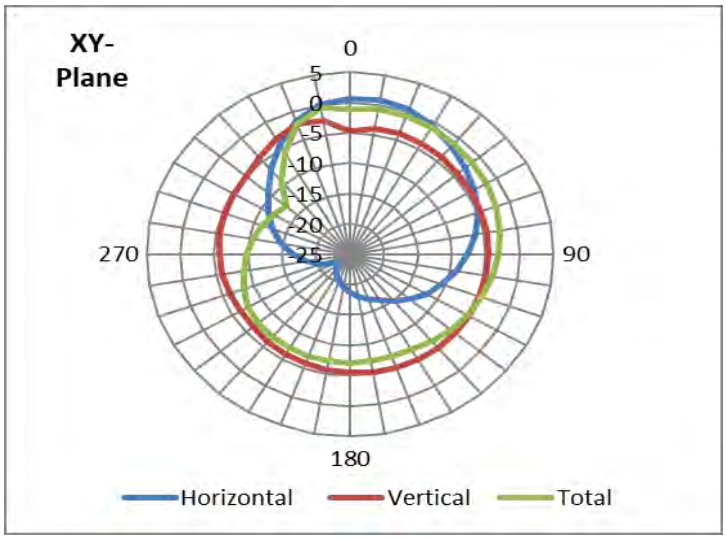
Main antenna: 3550.00 MHz

3550.00 MHz		
Horizontal Peak (dBi)	0.83	10 deg
Vertical Peak(dBi)	-0.25	340 deg



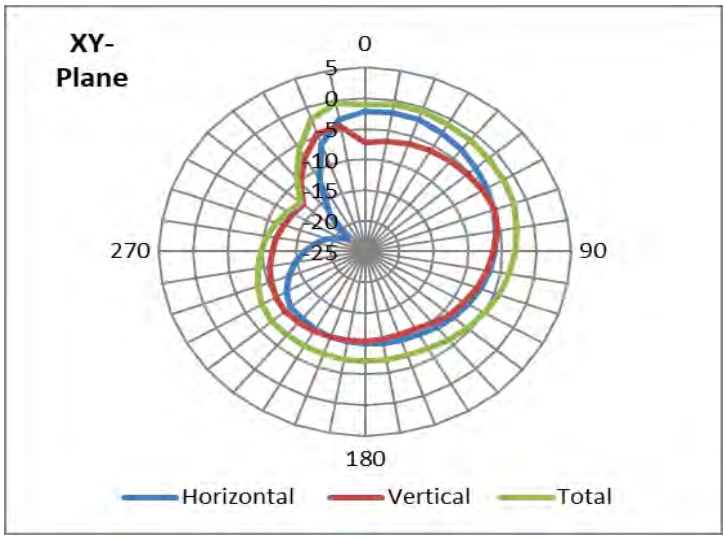
Main antenna: 3625.00 MHz

3625.00 MHz		
Horizontal Peak (dBi)	0.81	20 deg
Vertical Peak(dBi)	-2.14	350 deg



Main antenna: 3700.00 MHz

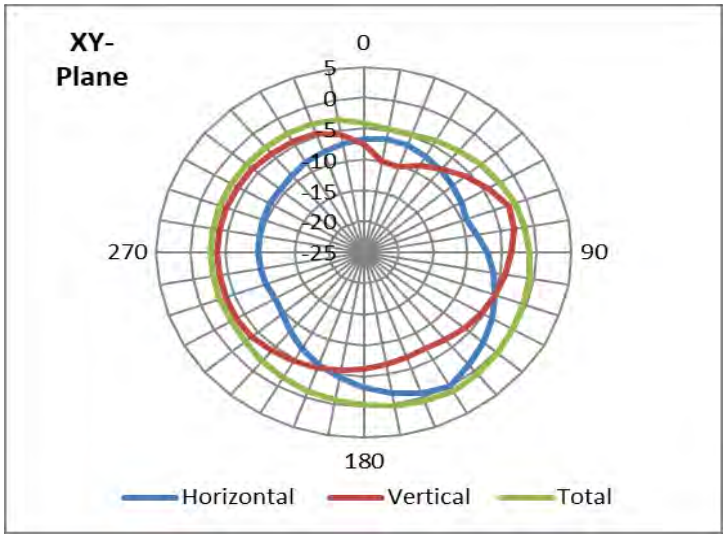
3700.00 MHz		
Horizontal Peak (dBi)	-2	20 deg
Vertical Peak(dBi)	-4.33	350 deg



Radiation characteristic in 1710MHz ~ 1780MHz (LTE, Band 66, n66)

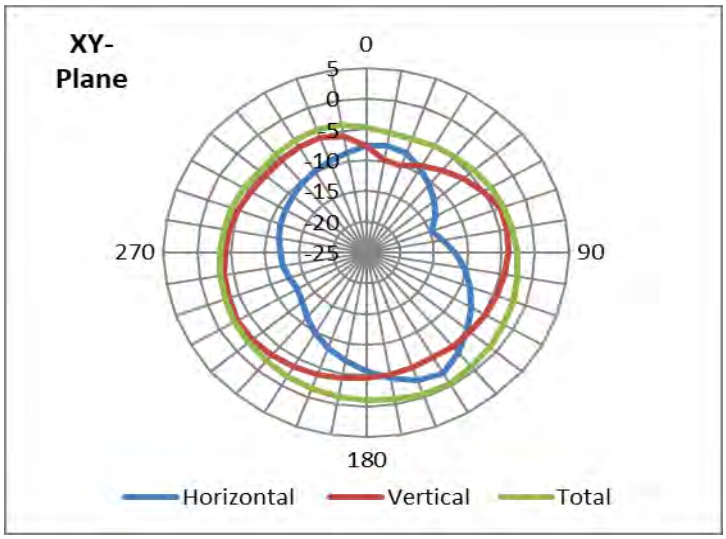
Main antenna: 1710.00 MHz

1710.00 MHz		
Horizontal Peak (dBi)	-0.06	150 deg
Vertical Peak(dBi)	-2.73	70 deg



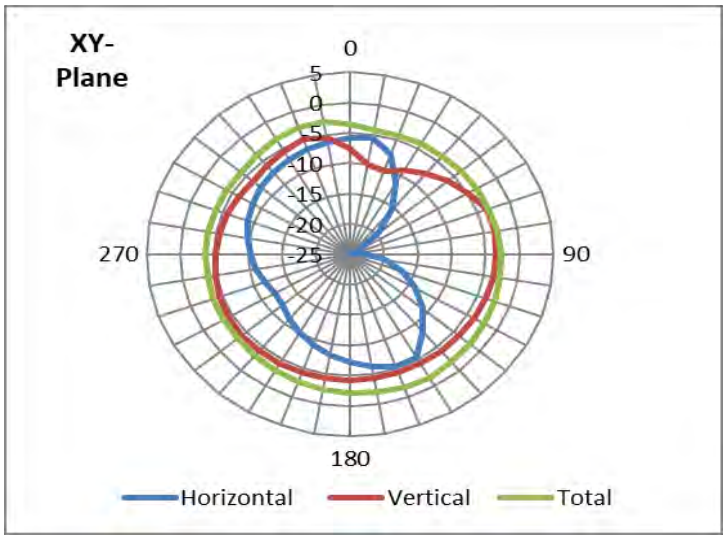
Main antenna: 1745.00 MHz

1745.00 MHz		
Horizontal Peak (dBi)	-2.31	150 deg
Vertical Peak(dBi)	-2.9	70 deg



Main antenna: 1780.00 MHz

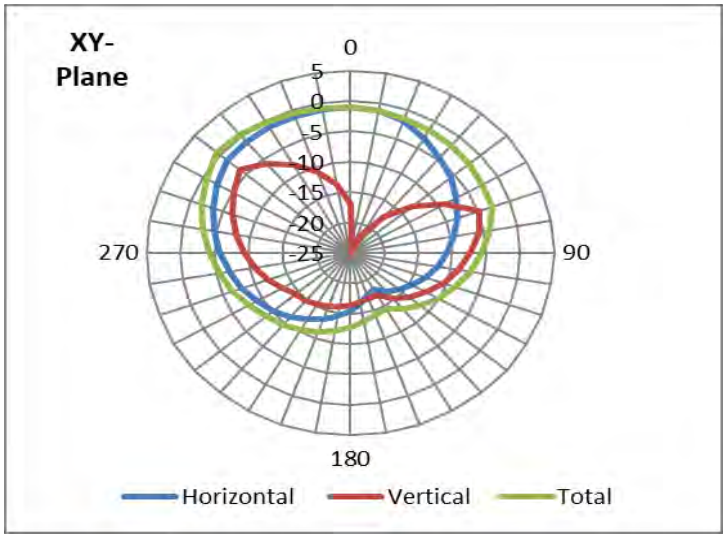
1780.00 MHz		
Horizontal Peak (dBi)	-5.23	150 deg
Vertical Peak(dBi)	-3.34	70 deg



Radiation characteristic in 663MHz ~ 698MHz (LTE, Band 71, n71)

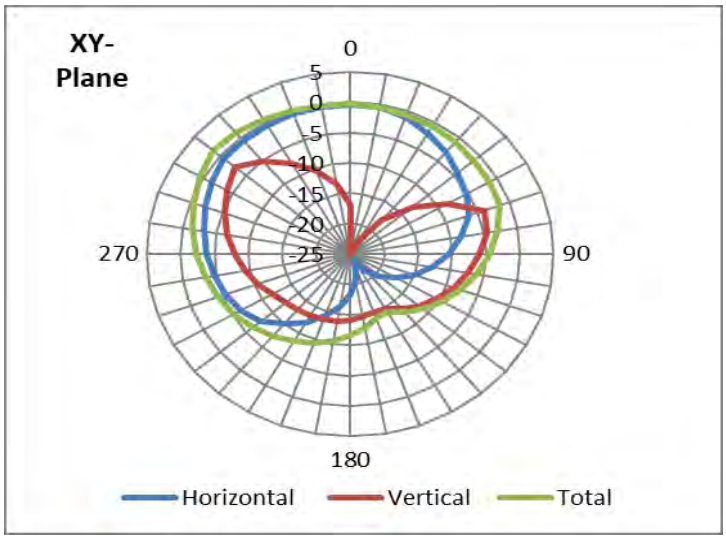
Main antenna: 663.00 MHz

663.00 MHz		
Horizontal Peak (dBi)	-1.12	350 deg
Vertical Peak(dBi)	-3.74	310 deg



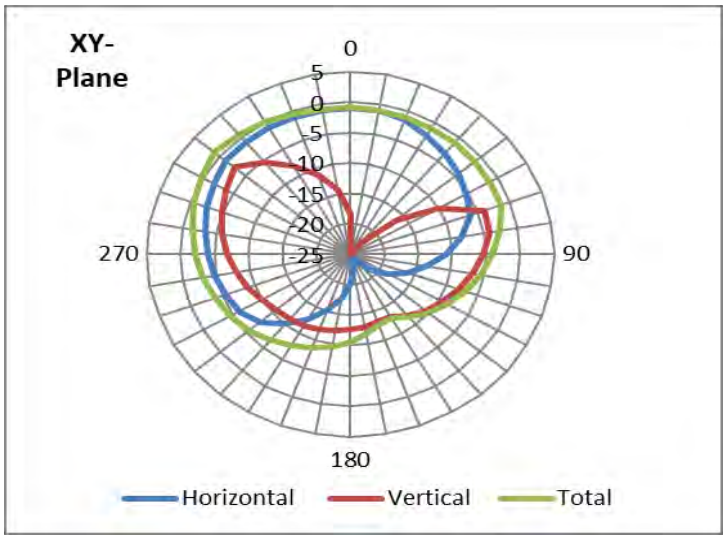
Main antenna: 680.50 MHz

680.50 MHz		
Horizontal Peak (dBi)	-0.41	355 deg
Vertical Peak(dBi)	-2.8	310 deg



Main antenna: 698.00 MHz

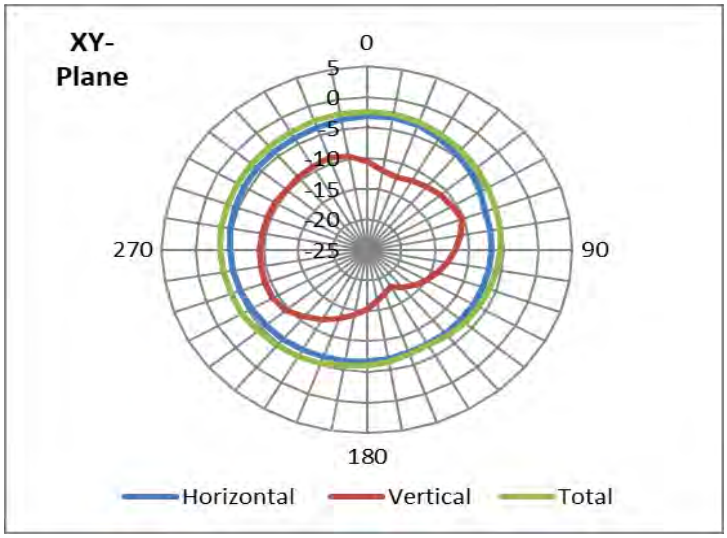
698.00 MHz		
Horizontal Peak (dBi)	-0.93	350 deg
Vertical Peak(dBi)	-2.78	310 deg



Radiation characteristic in 1432MHz ~ 1517MHz (LTE, Band 75, n75)

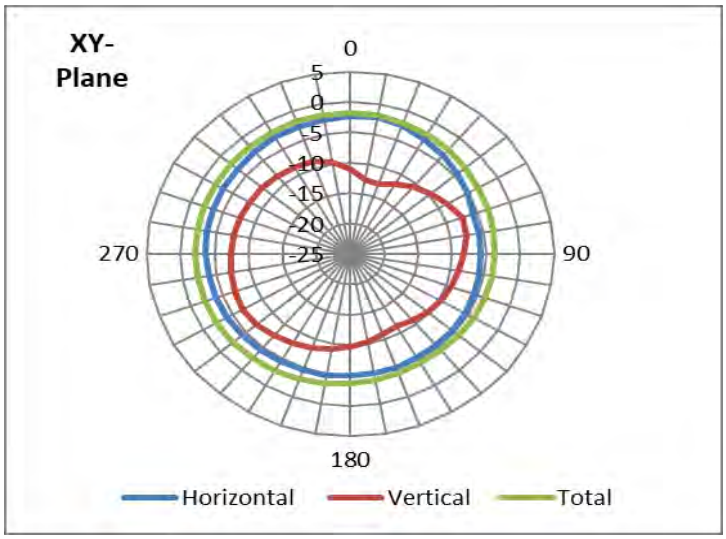
Main antenna: 1432.00 MHz

1432.00 MHz		
Horizontal Peak (dBi)	-3.05	10 deg
Vertical Peak(dBi)	-8.99	240 deg



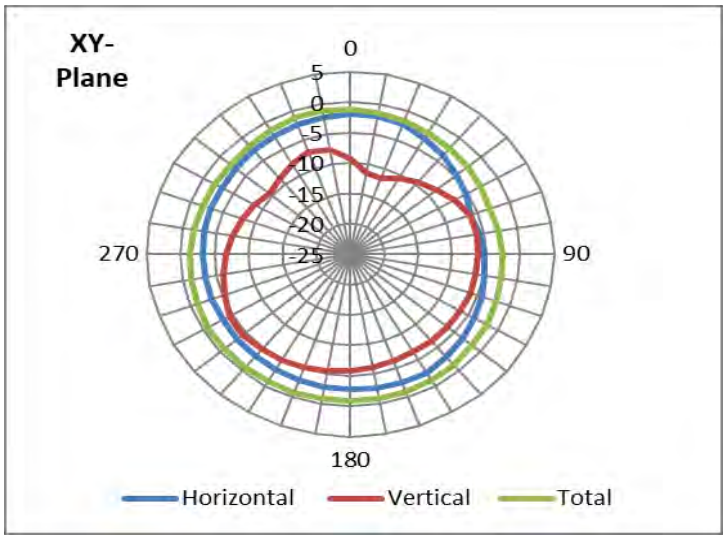
Main antenna: 1474.50 MHz

1474.50 MHz		
Horizontal Peak (dBi)	-2.26	10 deg
Vertical Peak(dBi)	-6.76	240 deg



Main antenna: 1517.00 MHz

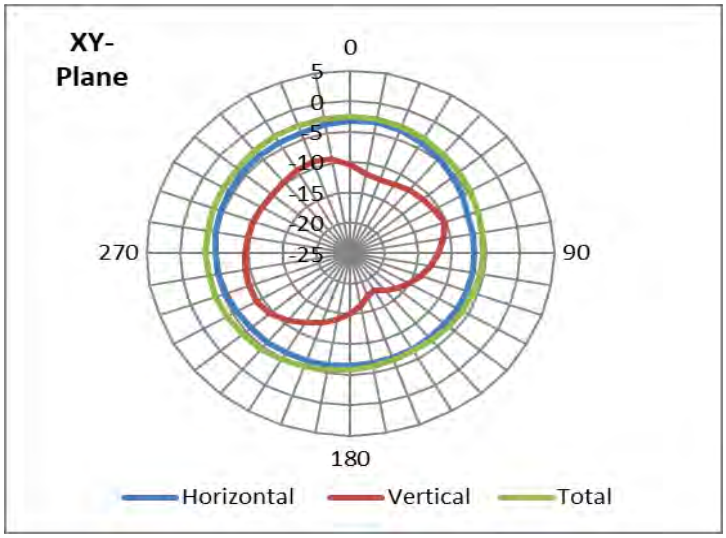
1517.00 MHz		
Horizontal Peak (dBi)	-1.83	10 deg
Vertical Peak(dBi)	-4.34	240 deg



Radiation characteristic in 1427MHz ~ 1432MHz (LTE, Band 76, n76)

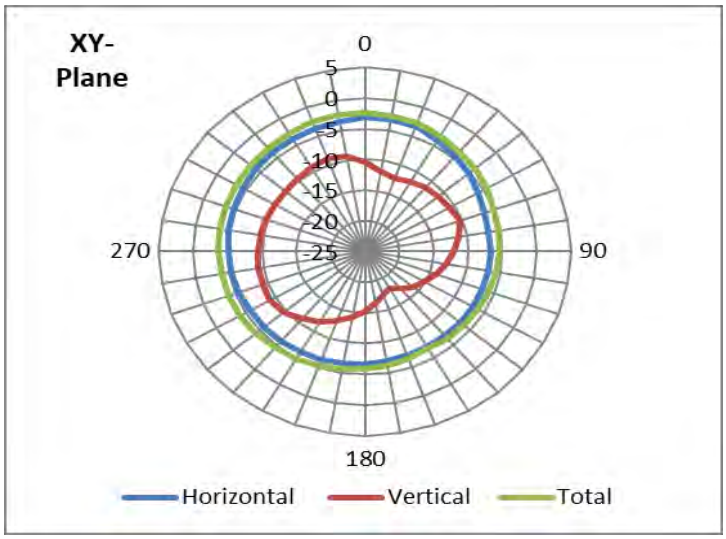
Main antenna: 1427.00 MHz

1427.00 MHz		
Horizontal Peak (dBi)	-3.10	10 deg
Vertical Peak(dBi)	-8.85	240 deg



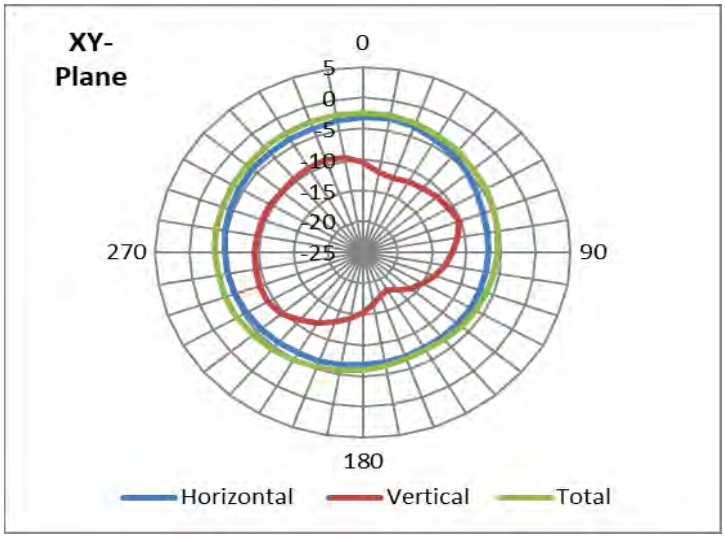
Main antenna: 1429.50 MHz

1429.50 MHz		
Horizontal Peak (dBi)	-3.08	10 deg
Vertical Peak(dBi)	-8.92	240 deg



Main antenna: 1432.00 MHz

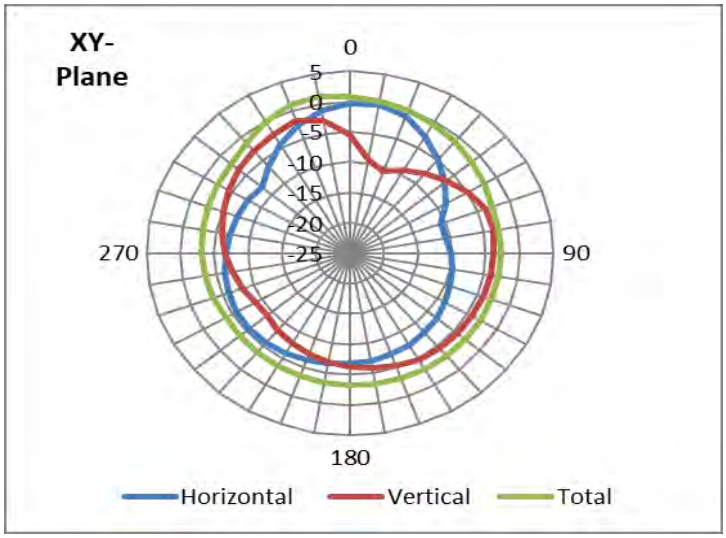
1432.00 MHz		
Horizontal Peak (dBi)	-3.05	10 deg
Vertical Peak(dBi)	-8.99	240 deg


XY-
Plane
0
5
0
-5
-10
-15
-20
-25
270
90
180
Horizontal
Vertical
Total

Radiation characteristic in 3300MHz ~ 4200MHz (5G NR Band 77)

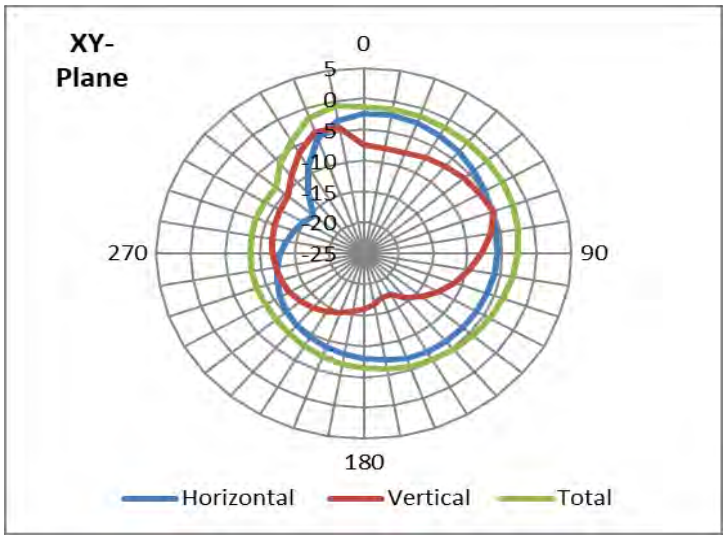
Main antenna: 3300.00 MHz

3300.00 MHz		
Horizontal Peak (dBi)	-0.1	20 deg
Vertical Peak(dBi)	-1.79	340 deg



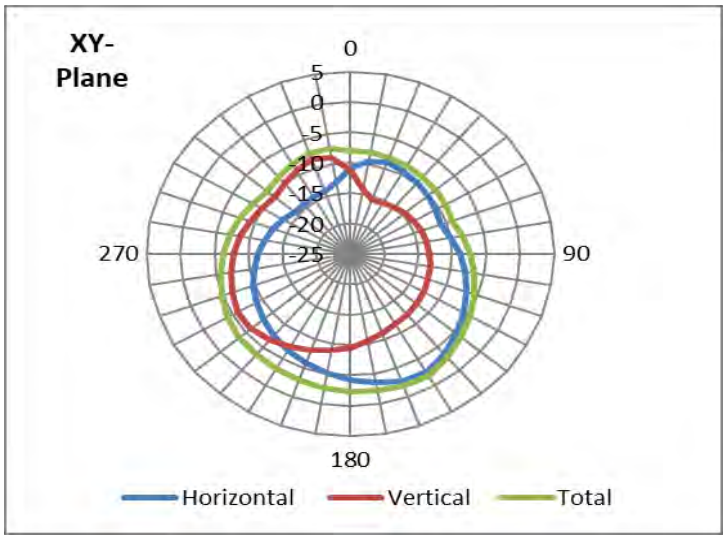
Main antenna: 3750.00 MHz

3750.00 MHz		
Horizontal Peak (dBi)	-2.3	20 deg
Vertical Peak(dBi)	-4.04	350 deg



Main antenna: 4200.00 MHz

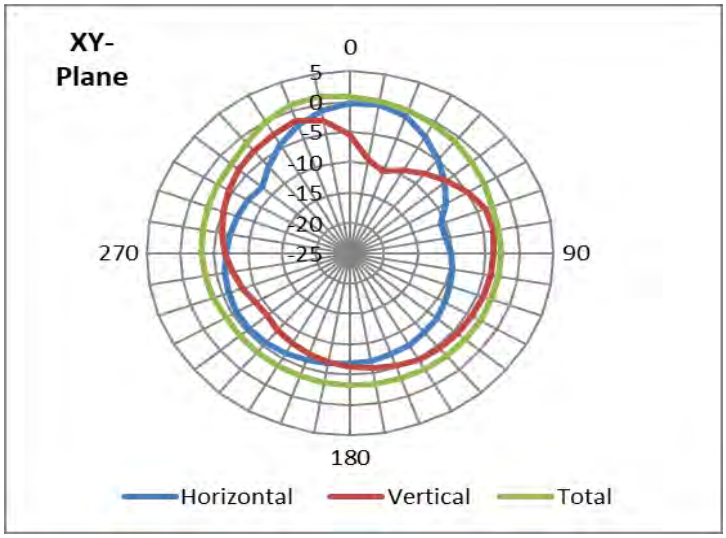
4200.00 MHz		
Horizontal Peak (dBi)	-2.49	150 deg
Vertical Peak(dBi)	-5.84	240 deg



Radiation characteristic in 3300MHz ~ 3800MHz (5G NR Band 78)

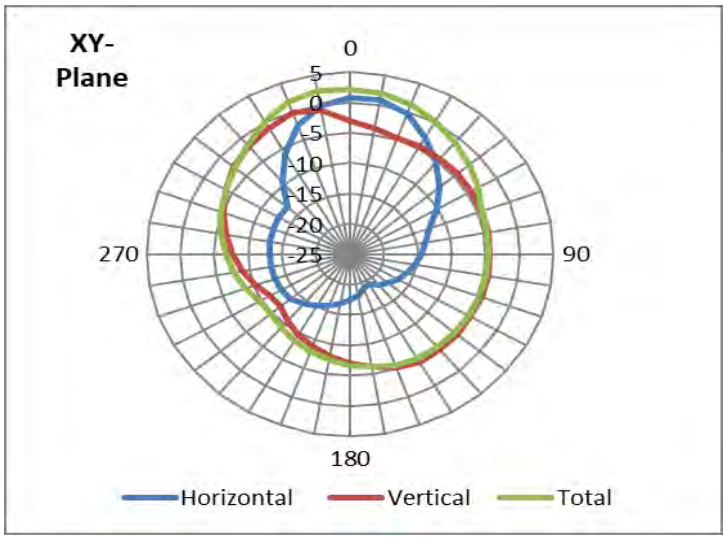
Main antenna: 3300.00 MHz

3300.00 MHz		
Horizontal Peak (dBi)	-0.1	20 deg
Vertical Peak(dBi)	-1.79	340 deg



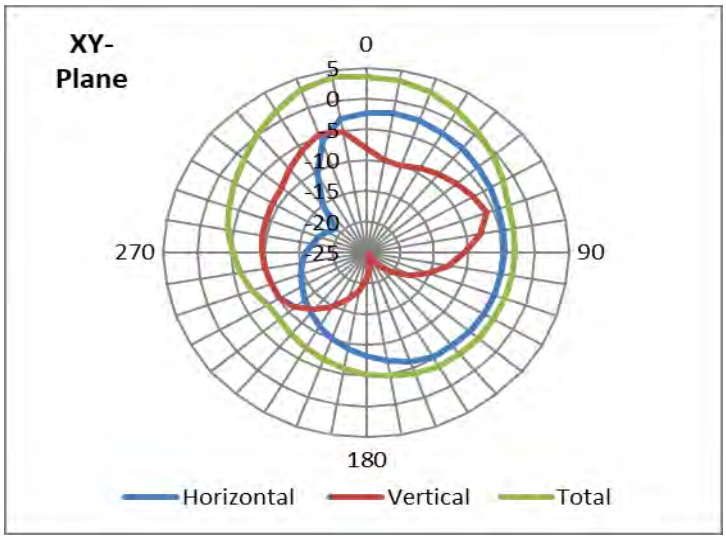
Main antenna: 3550.00 MHz

3550.00 MHz		
Horizontal Peak (dBi)	0.83	10 deg
Vertical Peak(dBi)	-0.25	340 deg



Main antenna: 3800.00 MHz

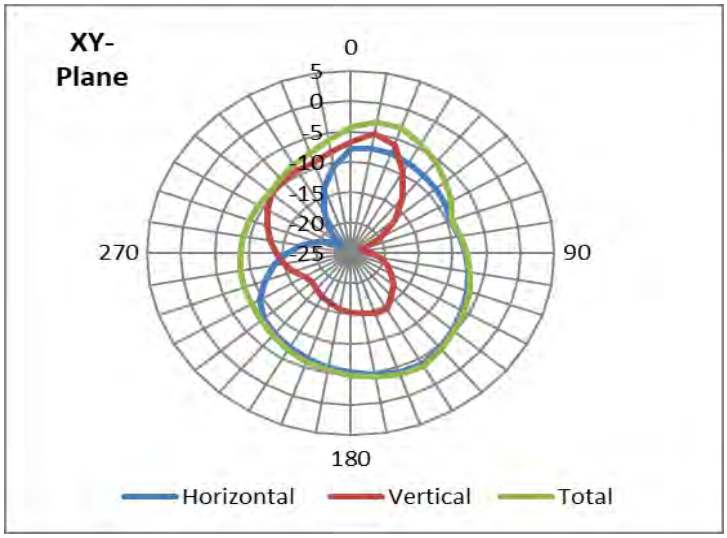
3800.00 MHz		
Horizontal Peak (dBi)	-1.98	20 deg
Vertical Peak(dBi)	-4.48	350 deg



Radiation characteristic in 4400MHz ~ 5000MHz (5G NR Band 79)

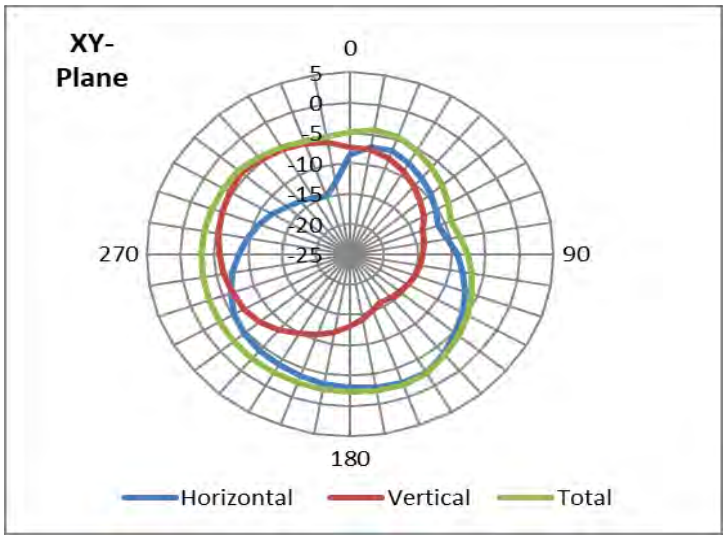
Main antenna: 4400.00 MHz

4400.00 MHz		
Horizontal Peak (dBi)	-3.91	150 deg
Vertical Peak(dBi)	-5.14	10 deg



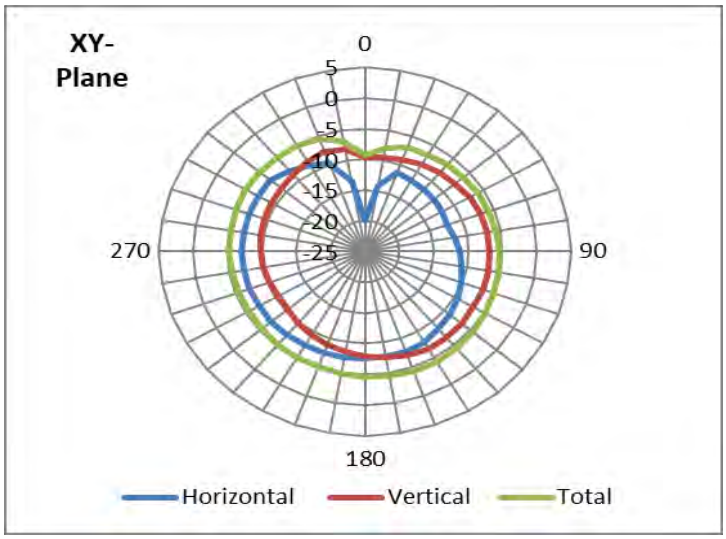
Main antenna: 4700.00 MHz

4700.00 MHz		
Horizontal Peak (dBi)	-2.40	150 deg
Vertical Peak(dBi)	-4.16	300 deg



Main antenna: 5000.00 MHz

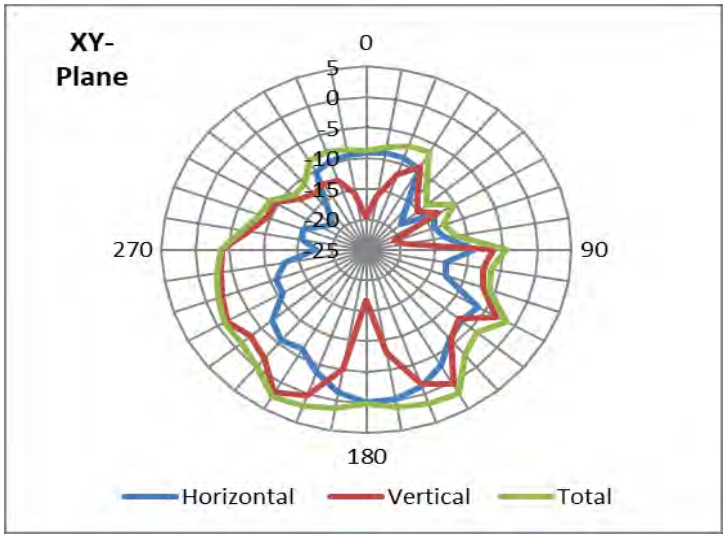
5000.00 MHz		
Horizontal Peak (dBi)	-6.95	260 deg
Vertical Peak(dBi)	-6.65	90 deg



Radiation characteristic in 1920MHz ~ 1980MHz (UMTS/HSDPA, Band 1, n1)

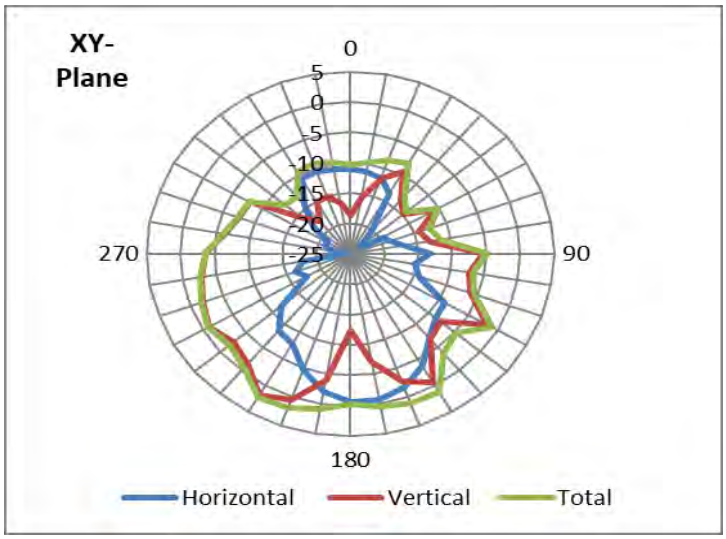
MIMO antenna: 1920.00 MHz

1920.00 MHz		
Horizontal Peak (dBi)	-0.04	180 deg
Vertical Peak(dBi)	1.99	210 deg



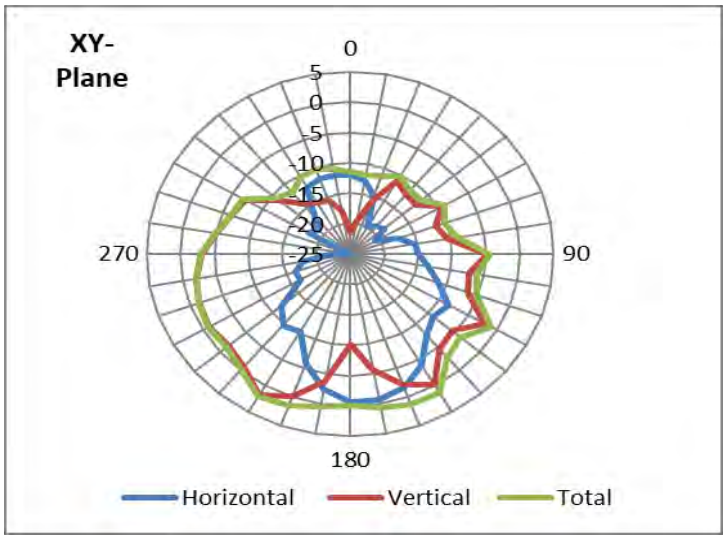
MIMO antenna: 1950.00 MHz

1950.00 MHz		
Horizontal Peak (dBi)	-0.63	180 deg
Vertical Peak(dBi)	1.84	210 deg



MIMO antenna: 1980.00 MHz

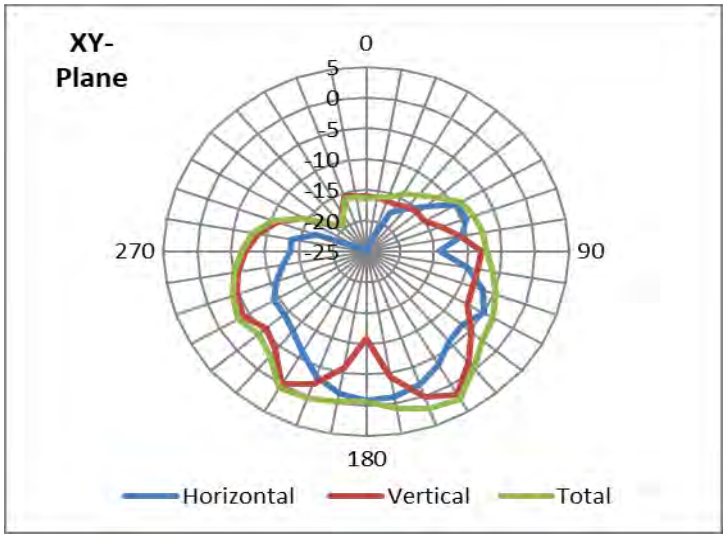
1980.00 MHz		
Horizontal Peak (dBi)	-0.68	180 deg
Vertical Peak(dBi)	1.75	210 deg



Radiation characteristic in 1850MHz ~ 1910MHz (PCS, Band 2, n2)

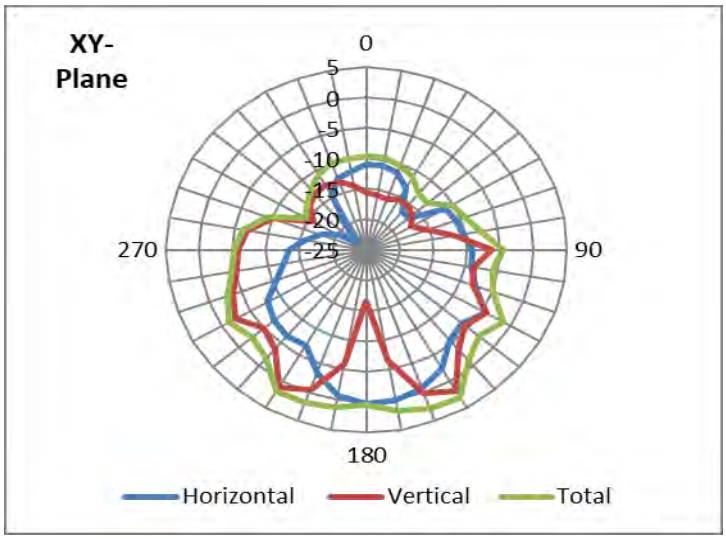
MIMO antenna: 1850.00 MHz

1850.00 MHz		
Horizontal Peak (dBi)	-0.76	180 deg
Vertical Peak(dBi)	1.93	150 deg



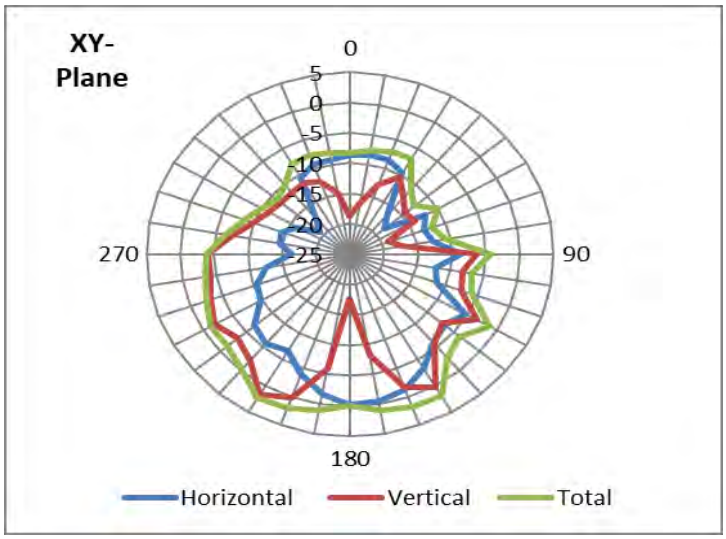
MIMO antenna: 1880.00 MHz

1880.00 MHz		
Horizontal Peak (dBi)	0.34	180 deg
Vertical Peak(dBi)	1.7	150 deg



MIMO antenna: 1910.00 MHz

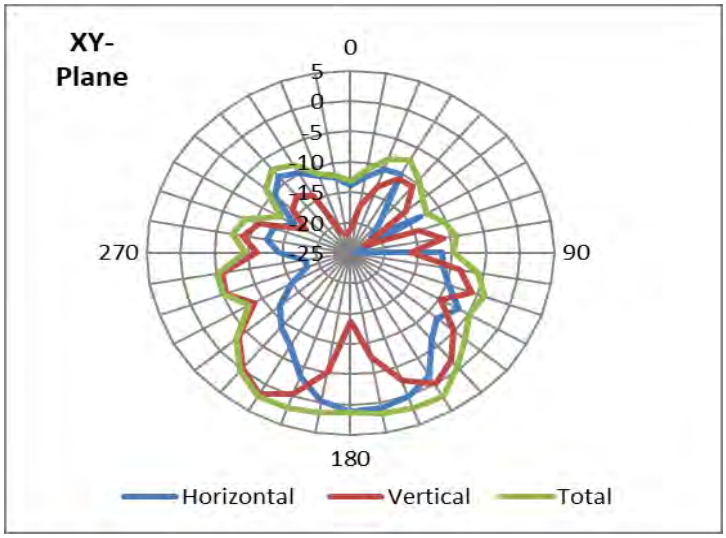
1910.00 MHz		
Horizontal Peak (dBi)	-0.15	180 deg
Vertical Peak(dBi)	1.67	210 deg



Radiation characteristic in 1710MHz ~ 1785MHz (UE-UTRA, Band 3, n3)

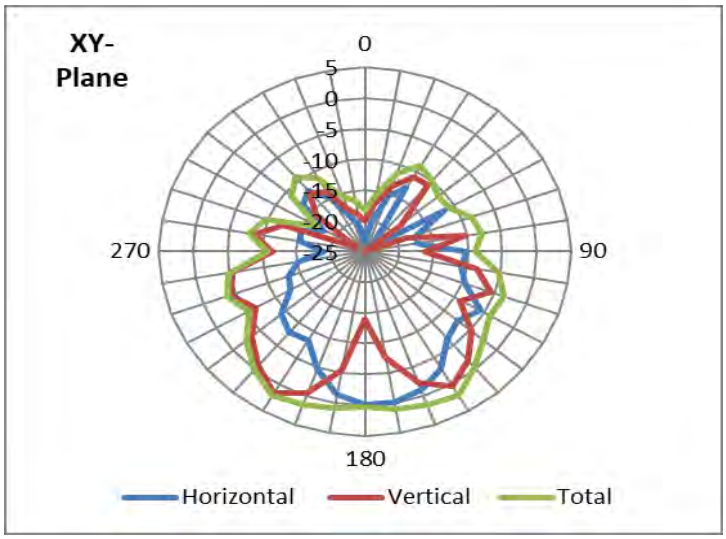
MIMO antenna: 1710.00 MHz

1710.00 MHz		
Horizontal Peak (dBi)	1.04	180 deg
Vertical Peak(dBi)	1.81	210 deg



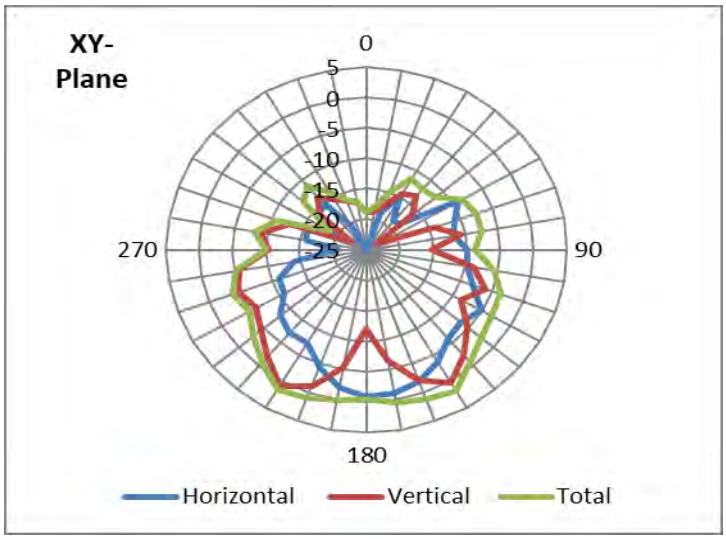
MIMO antenna: 1747.50 MHz

1747.50 MHz		
Horizontal Peak (dBi)	0.03	180 deg
Vertical Peak(dBi)	1.72	210 deg



MIMO antenna: 1785.00 MHz

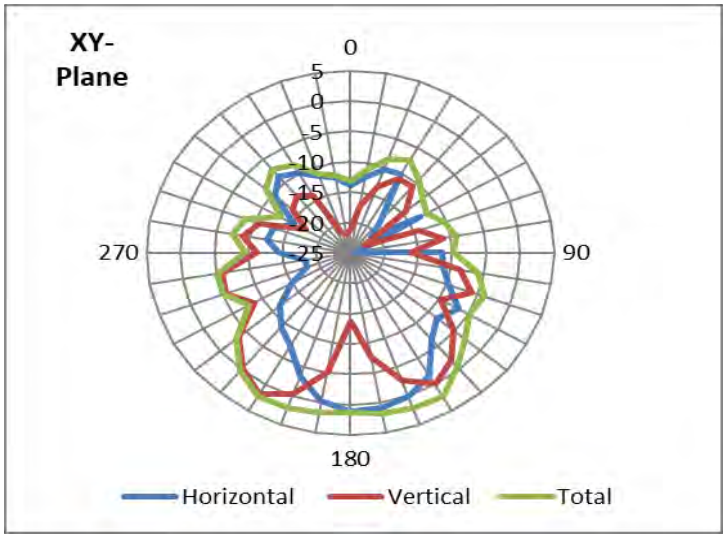
1785.00 MHz		
Horizontal Peak (dBi)	-0.80	180 deg
Vertical Peak(dBi)	0.86	210 deg



Radiation characteristic in 1710MHz ~ 1755MHz (UMTS(AWS), Band 4)

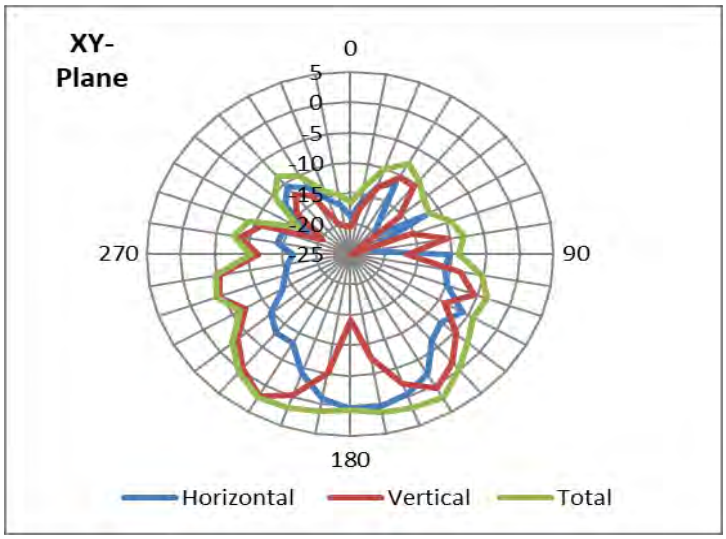
MIMO antenna: 1710.00 MHz

1710.00 MHz		
Horizontal Peak (dBi)	1.04	180 deg
Vertical Peak(dBi)	1.81	210 deg



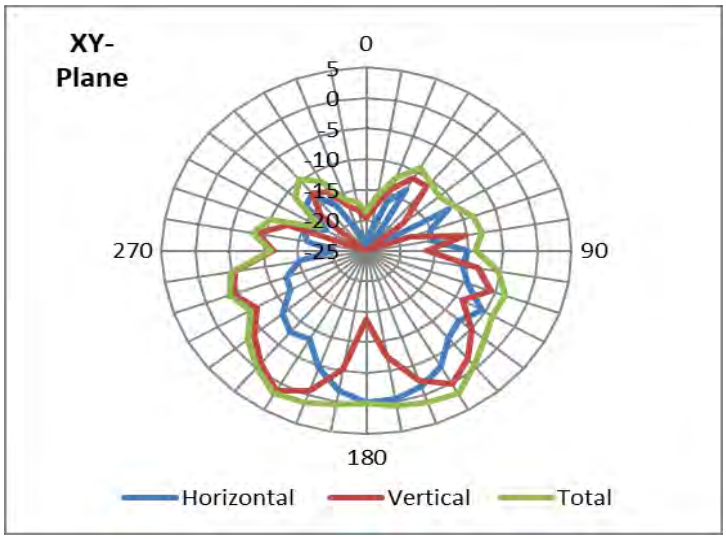
MIMO antenna: 1732.50 MHz

1732.50 MHz		
Horizontal Peak (dBi)	0.52	180 deg
Vertical Peak(dBi)	1.91	210 deg



MIMO antenna: 1755.00 MHz

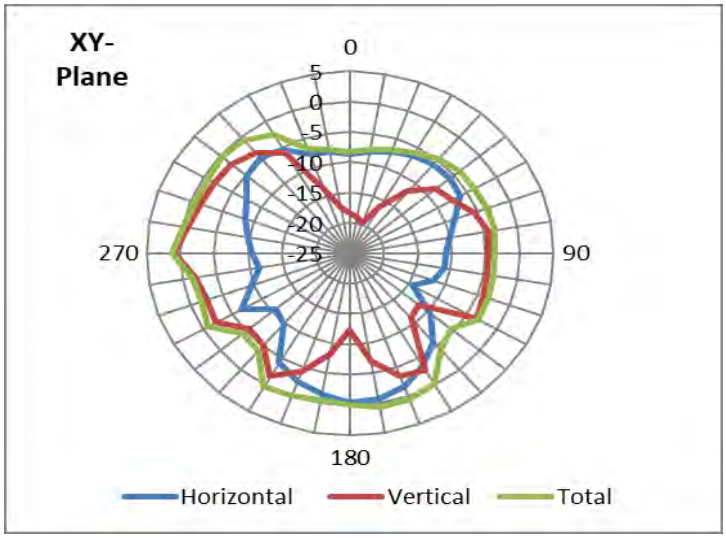
1755.00 MHz		
Horizontal Peak (dBi)	-0.27	180 deg
Vertical Peak(dBi)	1.54	210 deg



Radiation characteristic in 2500MHz ~ 2570MHz (UE-UTRA, Band 7, n7)

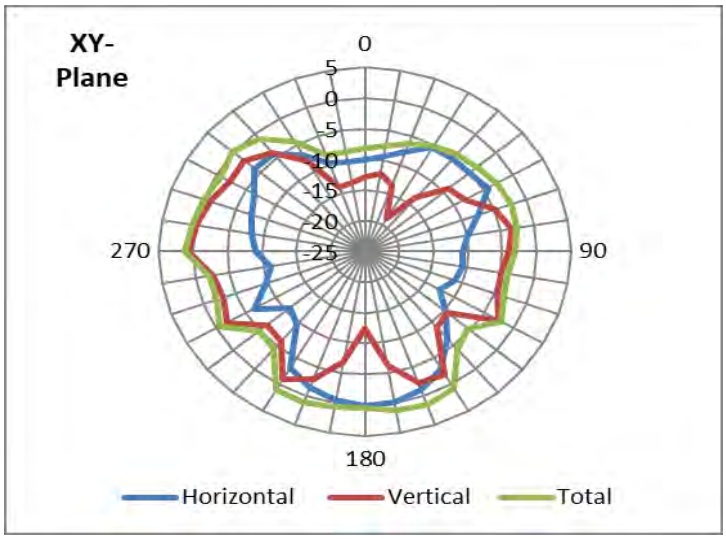
MIMO antenna: 2500.00 MHz

2500.00 MHz		
Horizontal Peak (dBi)	-0.29	180 deg
Vertical Peak(dBi)	0.87	270 deg



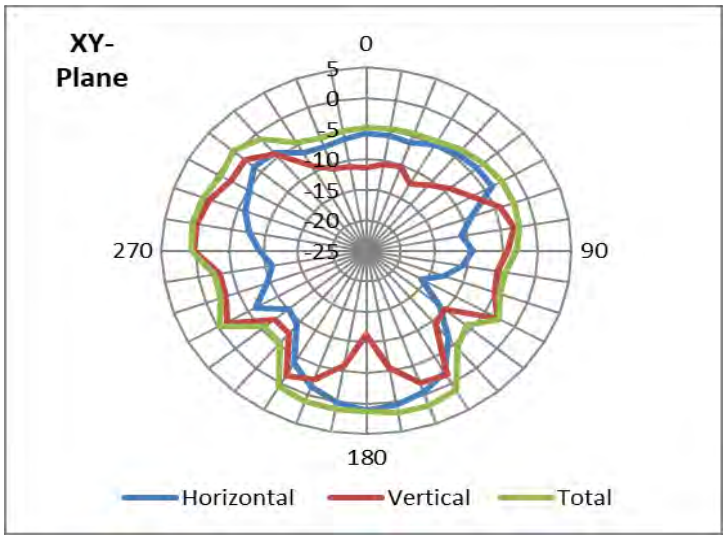
MIMO antenna: 2535.00 MHz

2535.00 MHz		
Horizontal Peak (dBi)	0.19	180 deg
Vertical Peak(dBi)	0.73	270 deg



MIMO antenna: 2570.00 MHz

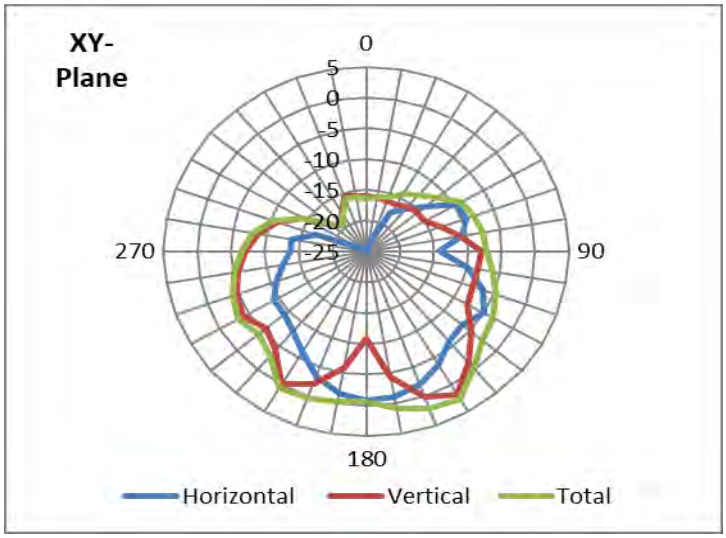
2570.00 MHz		
Horizontal Peak (dBi)	1.01	180 deg
Vertical Peak(dBi)	0.17	270 deg



Radiation characteristic in 1850MHz ~ 1915MHz (UE-UTRA, Band 25)

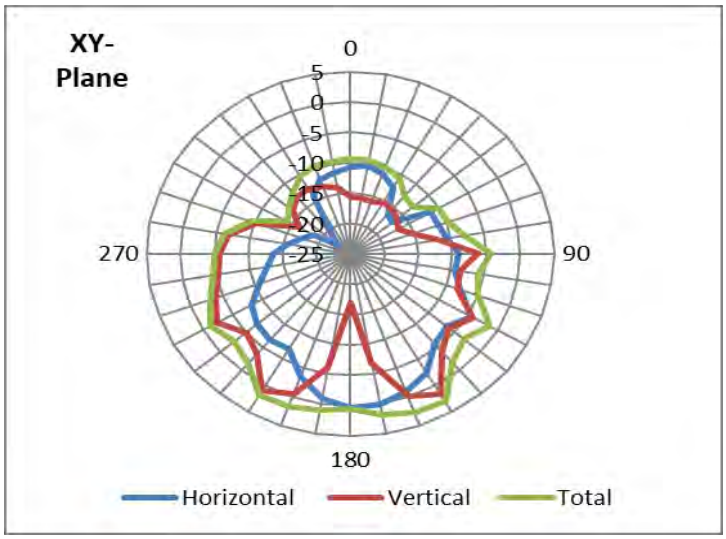
MIMO antenna: 1850.00 MHz

1850.00 MHz		
Horizontal Peak (dBi)	-0.76	180 deg
Vertical Peak(dBi)	1.93	150 deg



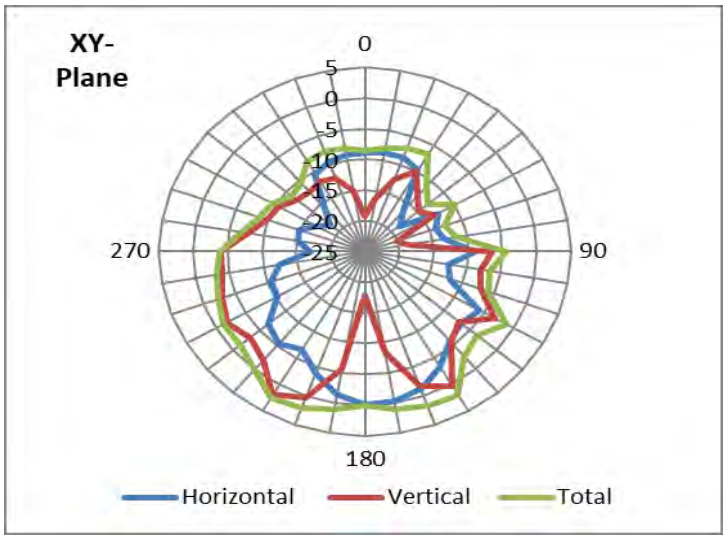
MIMO antenna: 1882.50 MHz

1882.50 MHz		
Horizontal Peak (dBi)	0.26	180 deg
Vertical Peak(dBi)	1.51	150 deg



MIMO antenna: 1915.00 MHz

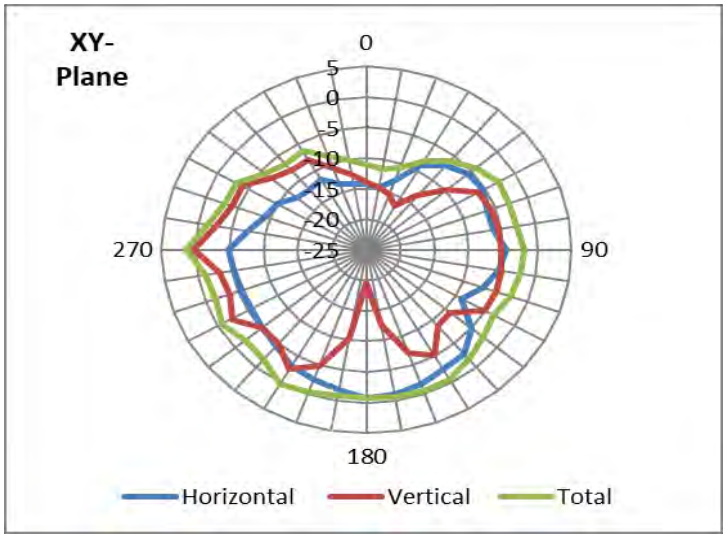
1915.00 MHz		
Horizontal Peak (dBi)	-0.09	180 deg
Vertical Peak(dBi)	1.87	210 deg



Radiation characteristic in 2305MHz ~ 2315MHz (UE-UTRA, Band 30)

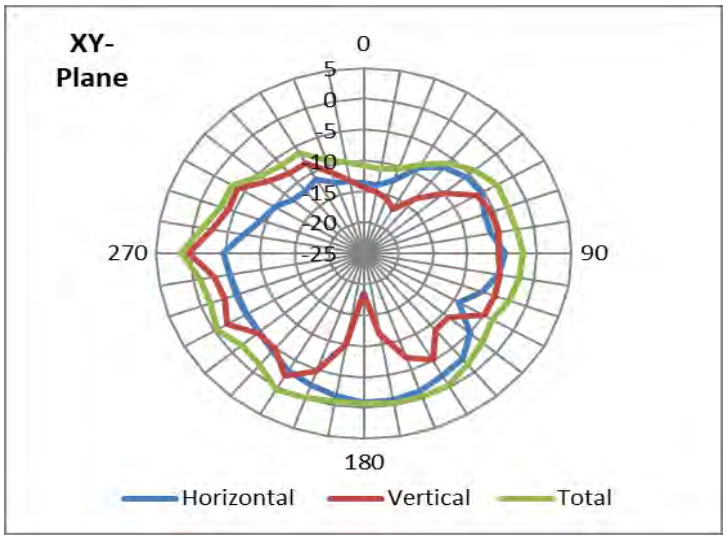
MIMO antenna: 2305.00 MHz

2305.00 MHz		
Horizontal Peak (dBi)	-0.86	180 deg
Vertical Peak(dBi)	0.13	270 deg



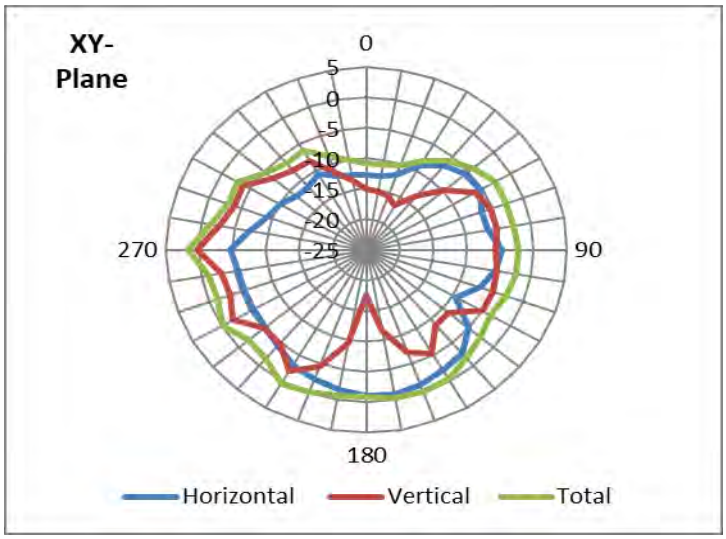
MIMO antenna: 2310.00 MHz

2310.00 MHz		
Horizontal Peak (dBi)	-0.89	180 deg
Vertical Peak(dBi)	0.27	270 deg



MIMO antenna: 2315.00 MHz

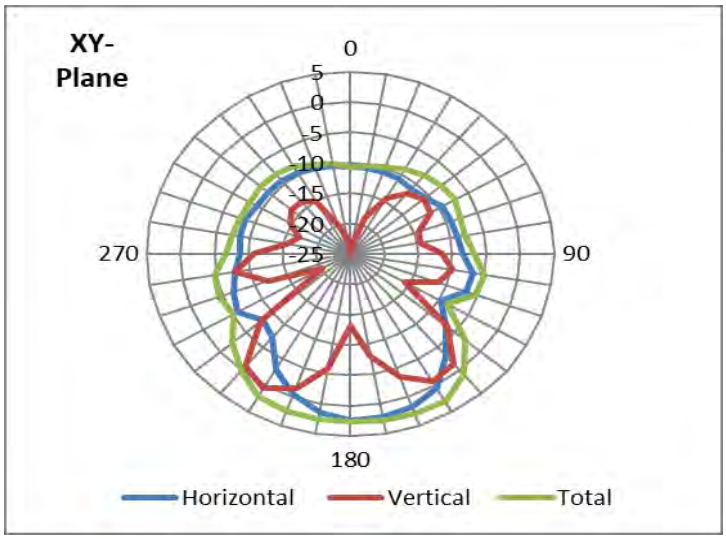
2315.00 MHz		
Horizontal Peak (dBi)	-0.87	180 deg
Vertical Peak(dBi)	0.41	270 deg



Radiation characteristic in 1452MHz ~ 1496MHz (UE-UTRA, Band 32)

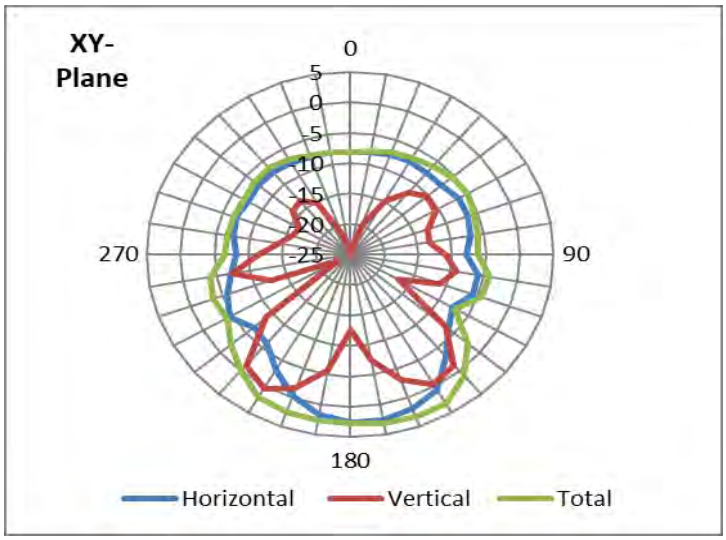
MIMO antenna: 1452.00 MHz

1452.00 MHz		
Horizontal Peak (dBi)	2.36	180 deg
Vertical Peak(dBi)	0.51	210 deg



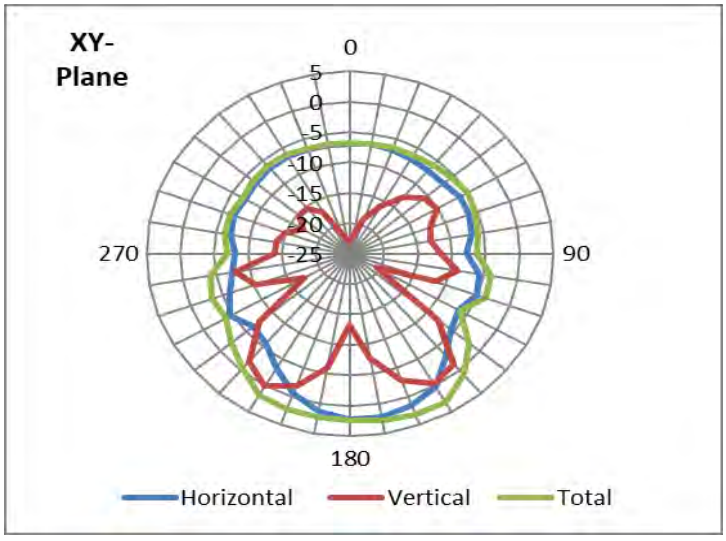
MIMO antenna: 1474.00 MHz

1474.00 MHz		
Horizontal Peak (dBi)	2.59	180 deg
Vertical Peak(dBi)	0.43	210 deg



MIMO antenna: 1496.00 MHz

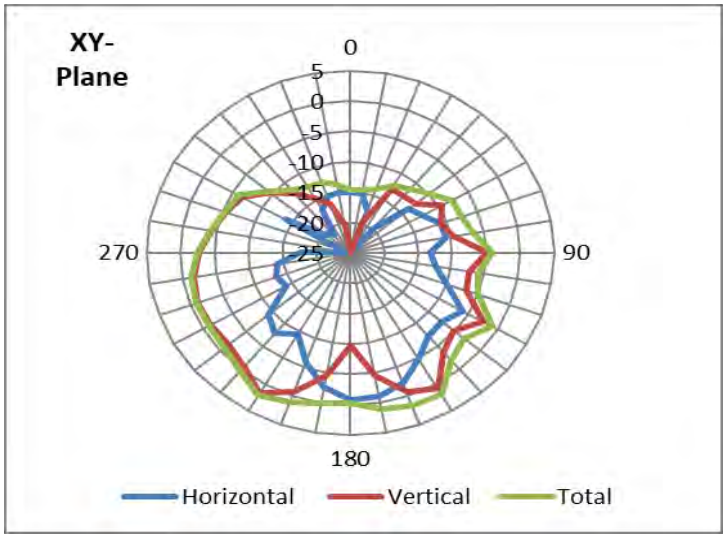
1496.00 MHz		
Horizontal Peak (dBi)	2.34	180 deg
Vertical Peak(dBi)	0.21	210 deg



Radiation characteristic in 2010MHz ~ 2025MHz (UE-UTRA, Band 34)

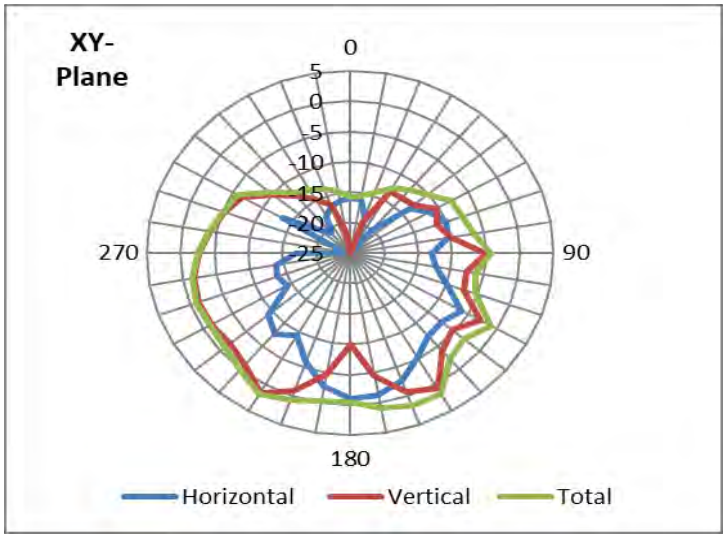
MIMO antenna: 2010.00 MHz

2010.00 MHz		
Horizontal Peak (dBi)	-0.83	180 deg
Vertical Peak(dBi)	1.68	210 deg



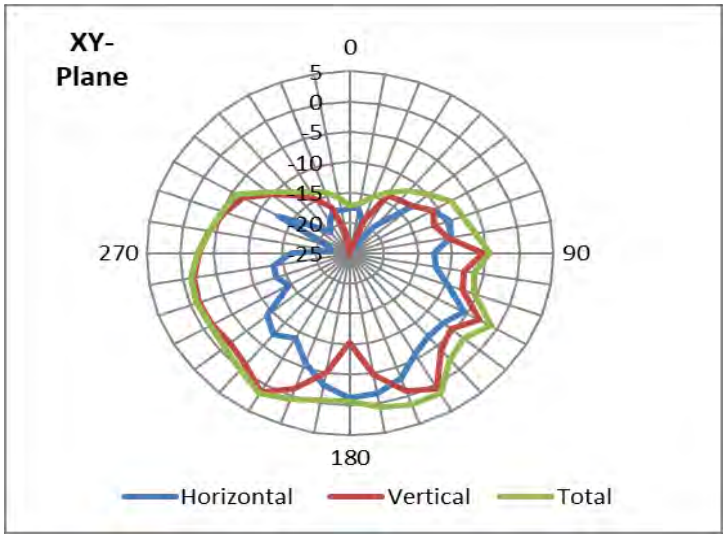
MIMO antenna: 2017.50 MHz

2017.50 MHz		
Horizontal Peak (dBi)	-1.02	180 deg
Vertical Peak(dBi)	1.46	210 deg



MIMO antenna: 2025.00 MHz

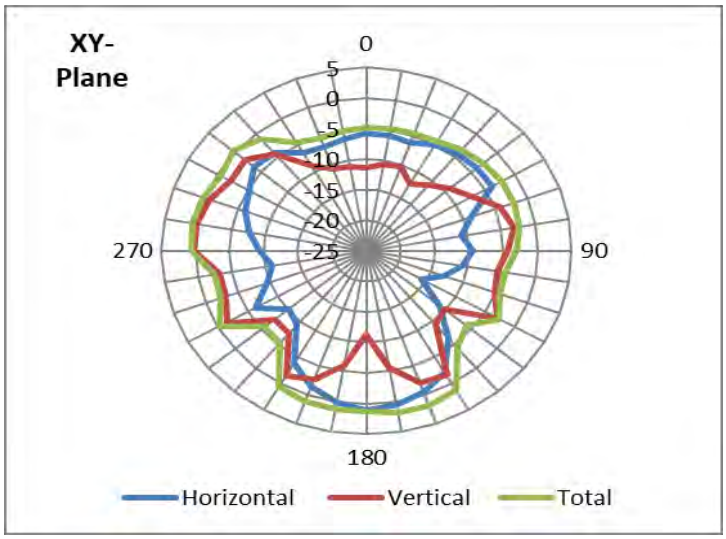
2025.00 MHz		
Horizontal Peak (dBi)	-1.21	180 deg
Vertical Peak(dBi)	1.35	210 deg



Radiation characteristic in 2570MHz ~ 2620MHz (UE-UTRA, Band 38, n38)

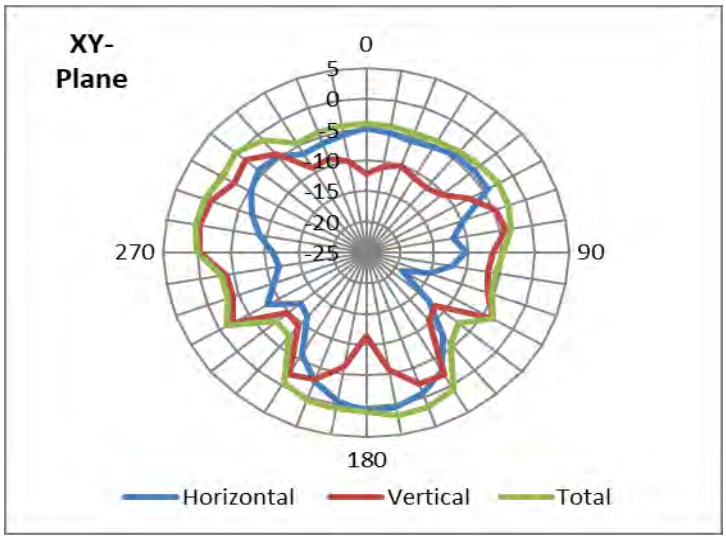
MIMO antenna: 2570.00 MHz

2570.00 MHz		
Horizontal Peak (dBi)	1.01	180 deg
Vertical Peak(dBi)	0.17	270 deg



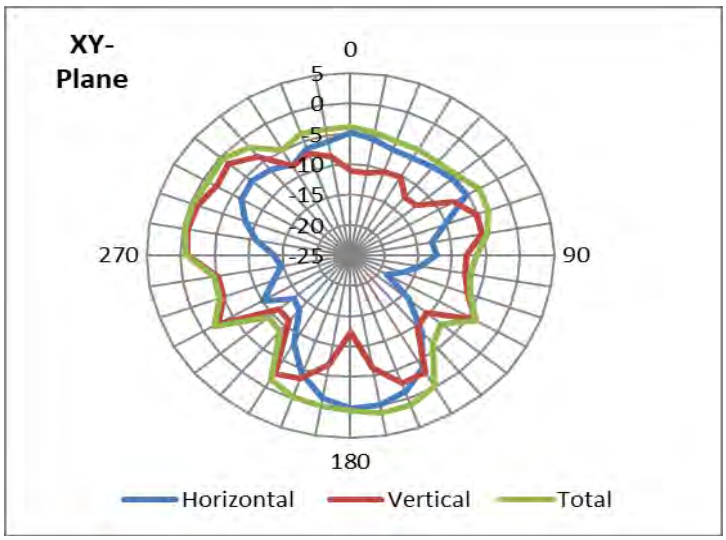
MIMO antenna: 2595.00 MHz

2595.00 MHz		
Horizontal Peak (dBi)	0.68	180 deg
Vertical Peak(dBi)	0.09	280 deg



MIMO antenna: 2620.00 MHz

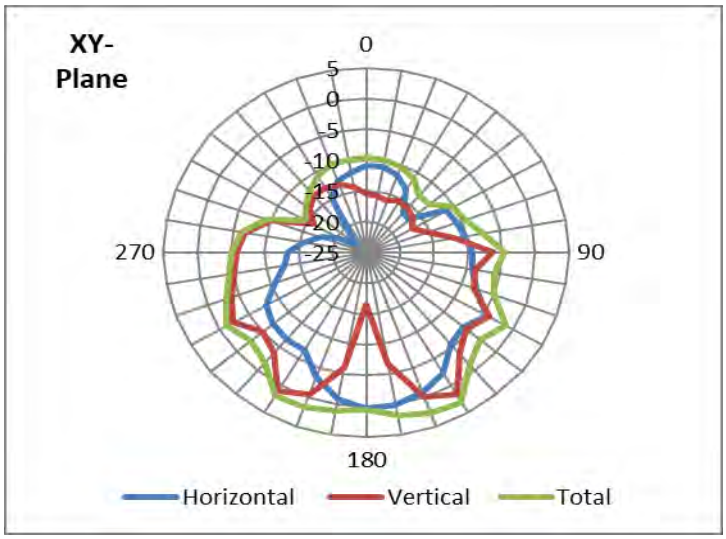
2620.00 MHz		
Horizontal Peak (dBi)	0.18	180 deg
Vertical Peak(dBi)	-0.6	280 deg



Radiation characteristic in 1880MHz ~ 1920MHz (UE-UTRA, Band 39, n39)

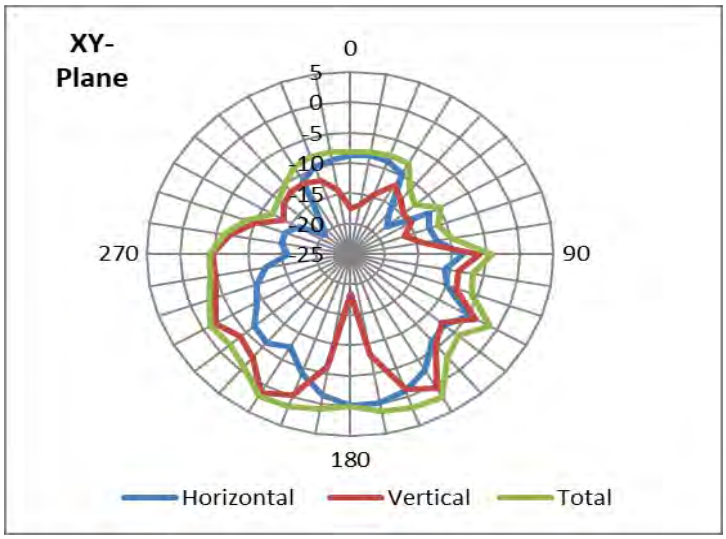
MIMO antenna: 1880.00 MHz

1880.00 MHz		
Horizontal Peak (dBi)	0.34	180 deg
Vertical Peak(dBi)	1.7	150 deg



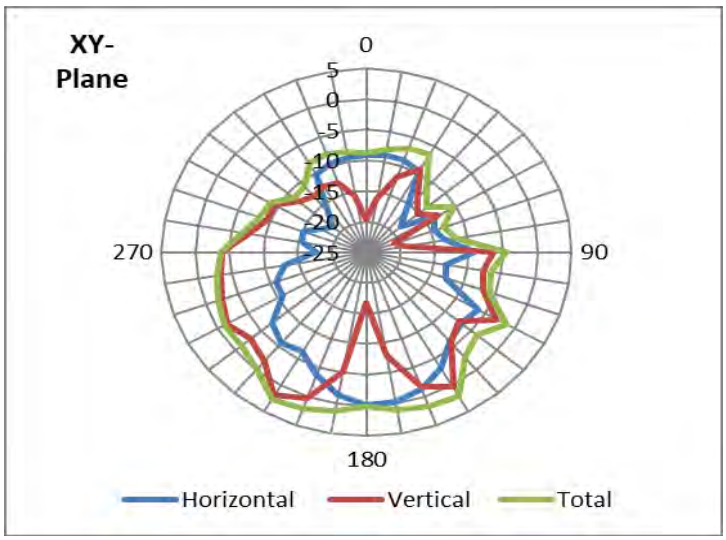
MIMO antenna: 1900.00 MHz

1900.00 MHz		
Horizontal Peak (dBi)	-0.05	180 deg
Vertical Peak(dBi)	1.32	210 deg



MIMO antenna: 1920.00 MHz

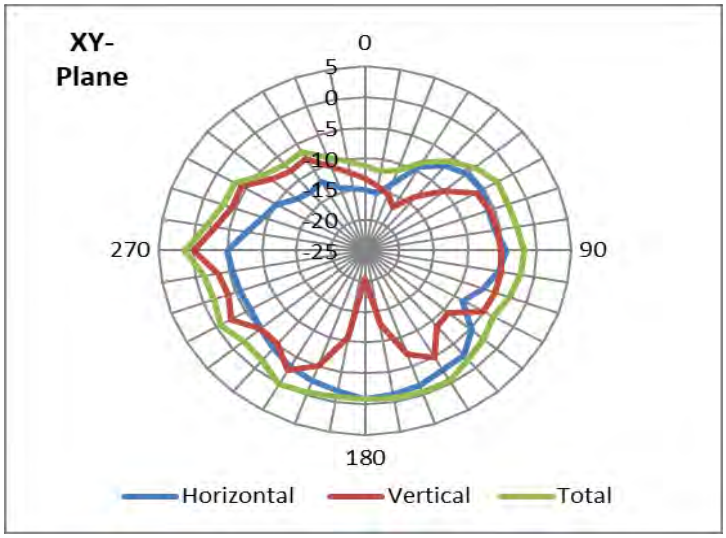
1920.00 MHz		
Horizontal Peak (dBi)	-0.04	180 deg
Vertical Peak(dBi)	1.99	210 deg



Radiation characteristic in 2300MHz ~ 2400MHz (UE-UTRA, Band 40)

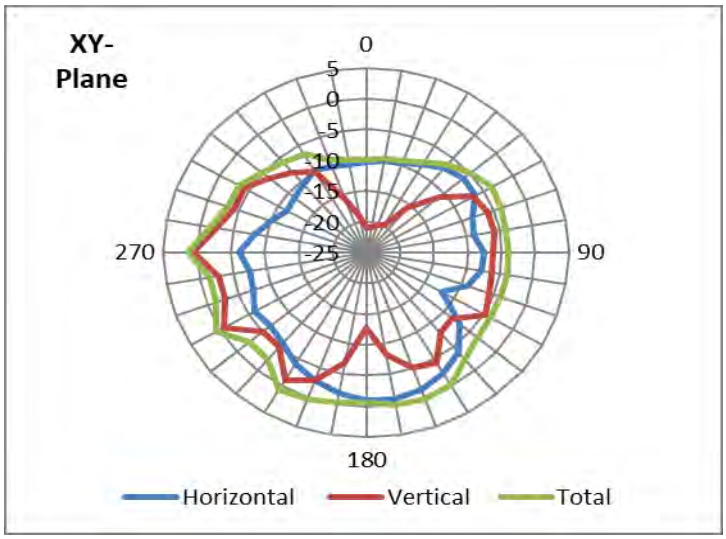
MIMO antenna: 2300.00 MHz

2300.00 MHz		
Horizontal Peak (dBi)	-0.82	180 deg
Vertical Peak(dBi)	0	270 deg



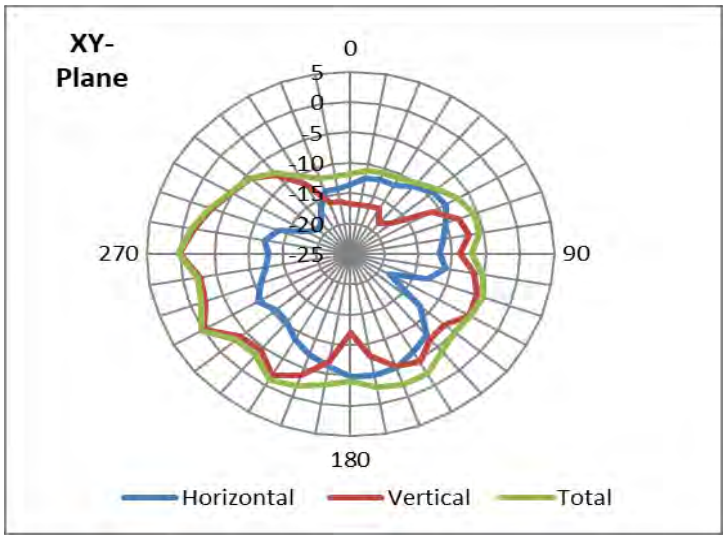
MIMO antenna: 2350.00 MHz

2350.00 MHz		
Horizontal Peak (dBi)	-0.75	180 deg
Vertical Peak(dBi)	0.54	270 deg



MIMO antenna: 2400.00 MHz

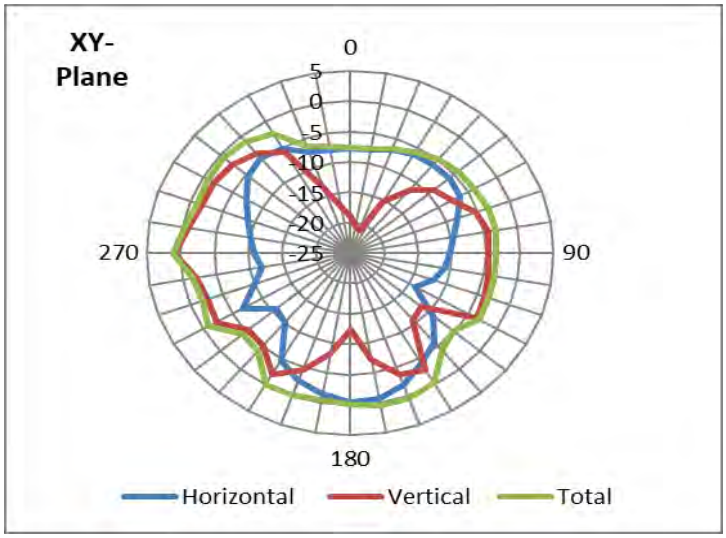
2400.00 MHz		
Horizontal Peak (dBi)	-4.66	180 deg
Vertical Peak(dBi)	0.23	270 deg



Radiation characteristic in 2496MHz ~ 2690MHz (UE-UTRA, Band 41, n41)

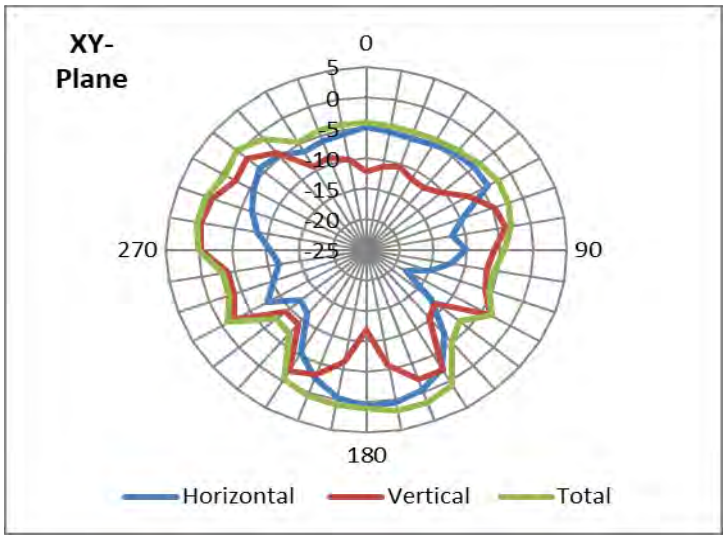
MIMO antenna: 2496.00 MHz

2496.00 MHz		
Horizontal Peak (dBi)	-0.47	180 deg
Vertical Peak(dBi)	0.87	270 deg



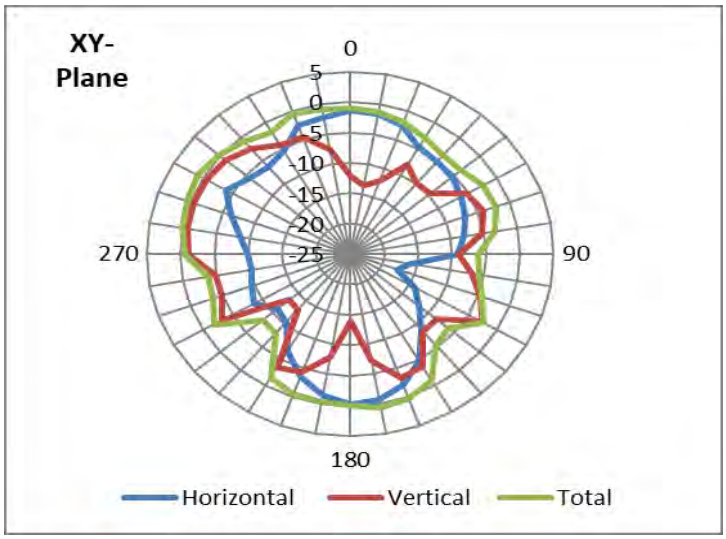
MIMO antenna: 2593.00 MHz

2593.00 MHz		
Horizontal Peak (dBi)	0.72	180 deg
Vertical Peak(dBi)	0.12	270 deg



MIMO antenna: 2690.00 MHz

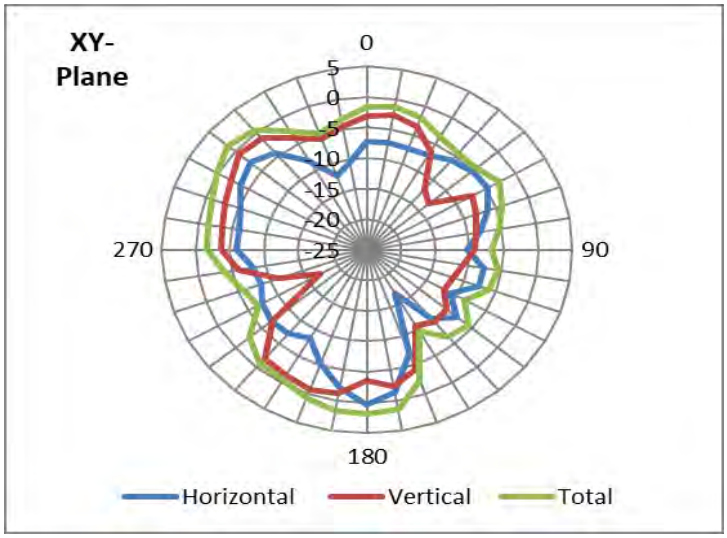
2690.00 MHz		
Horizontal Peak (dBi)	-0.31	180 deg
Vertical Peak(dBi)	-0.49	280 deg



Radiation characteristic in 3400MHz ~ 3600MHz (LTE Band 42)

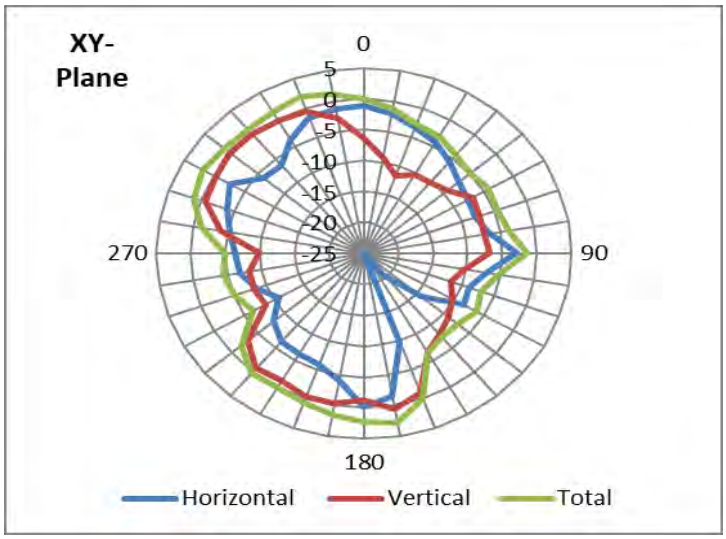
MIMO antenna: 3400.00 MHz

3400.00 MHz		
Horizontal Peak (dBi)	0.43	180 deg
Vertical Peak(dBi)	-0.55	320 deg



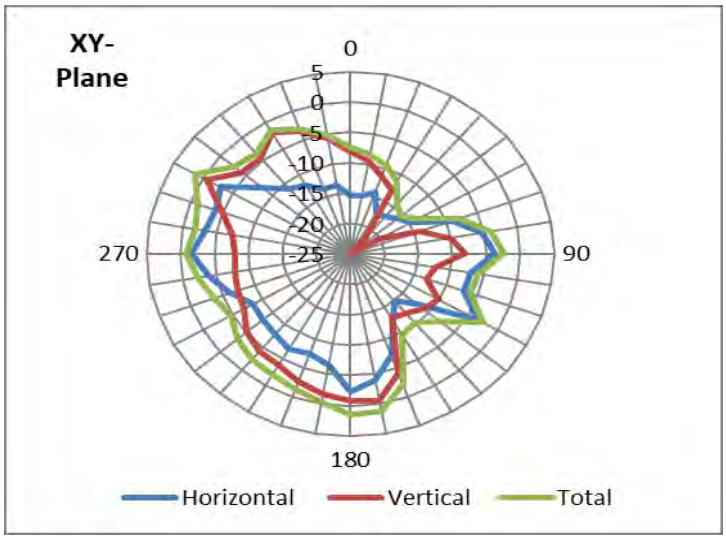
MIMO antenna: 3500.00 MHz

3500.00 MHz		
Horizontal Peak (dBi)	-0.27	180 deg
Vertical Peak(dBi)	0.51	320 deg



MIMO antenna: 3600.00 MHz

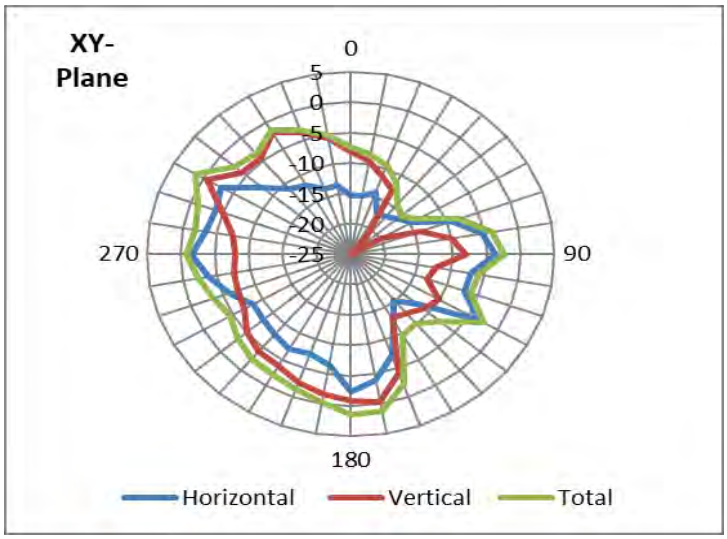
3600.00 MHz		
Horizontal Peak (dBi)	-1.62	270 deg
Vertical Peak(dBi)	-0.36	300 deg



Radiation characteristic in 3600MHz ~ 3800MHz (LTE Band 43)

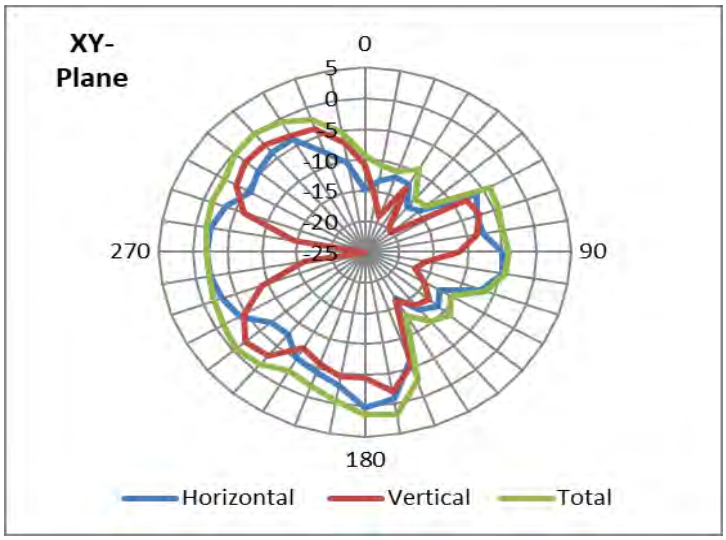
MIMO antenna: 3600.00 MHz

3600.00 MHz		
Horizontal Peak (dBi)	-1.62	270 deg
Vertical Peak(dBi)	-0.36	300 deg



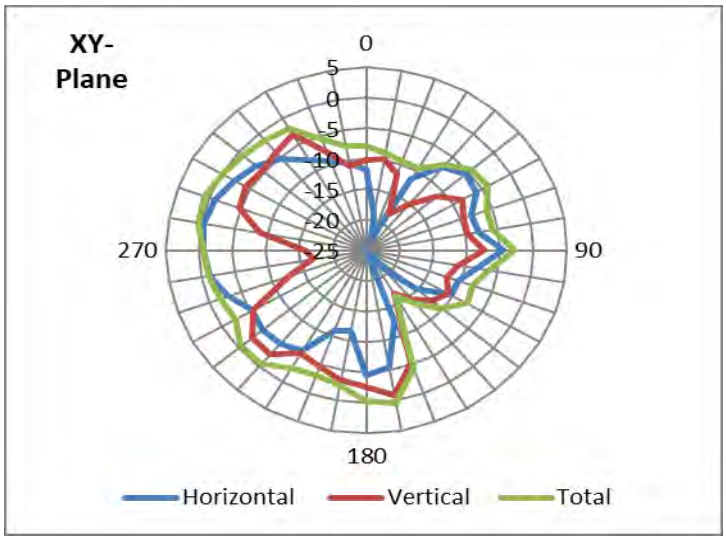
MIMO antenna: 3700.00 MHz

3700.00 MHz		
Horizontal Peak (dBi)	0.22	180 deg
Vertical Peak(dBi)	-1.93	230 deg



MIMO antenna: 3800.00 MHz

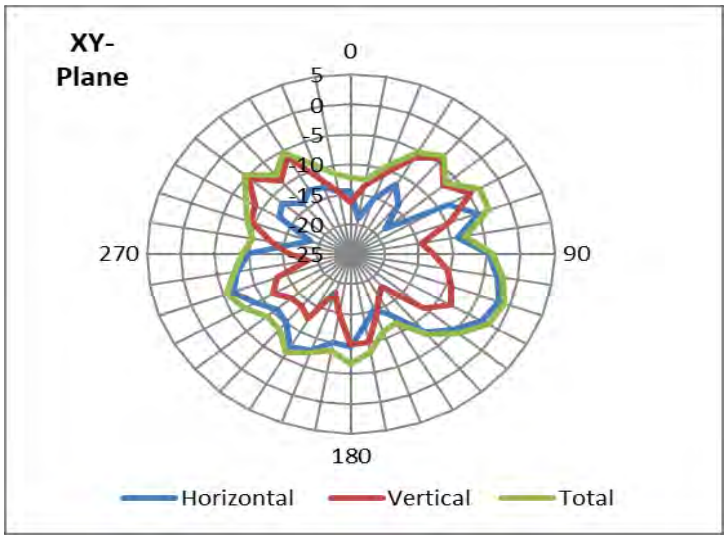
3800.00 MHz		
Horizontal Peak (dBi)	-0.31	270 deg
Vertical Peak(dBi)	-0.78	170 deg



Radiation characteristic in5150MHz ~ 5925MHz (LTE Band 46)

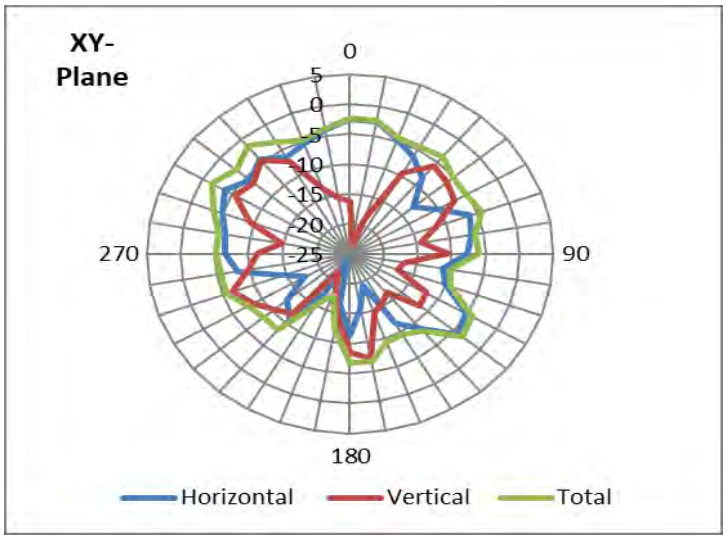
MIMO antenna: 5150.00 MHz

5150.00 MHz		
Horizontal Peak (dBi)	-1.77	110 deg
Vertical Peak(dBi)	-4.08	40 deg



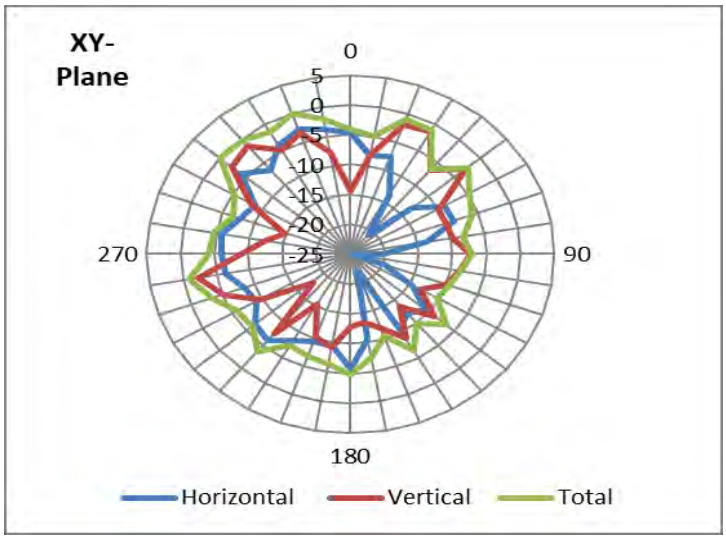
MIMO antenna: 5537.00 MHz

5537.00 MHz		
Horizontal Peak (dBi)	-2.55	10 deg
Vertical Peak(dBi)	-4.74	320 deg



MIMO antenna: 5925.00 MHz

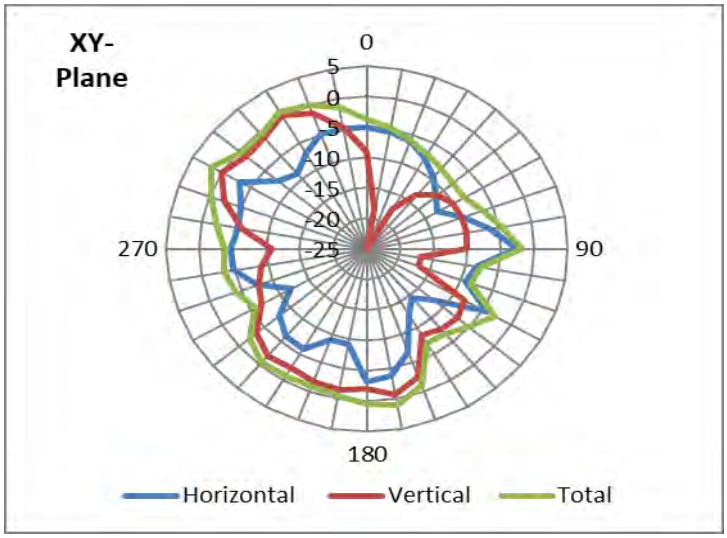
5925.00 MHz		
Horizontal Peak (dBi)	-2.83	340 deg
Vertical Peak(dBi)	-1.41	260 deg



Radiation characteristic in 3550MHz ~ 3700MHz (LTE Band 48)

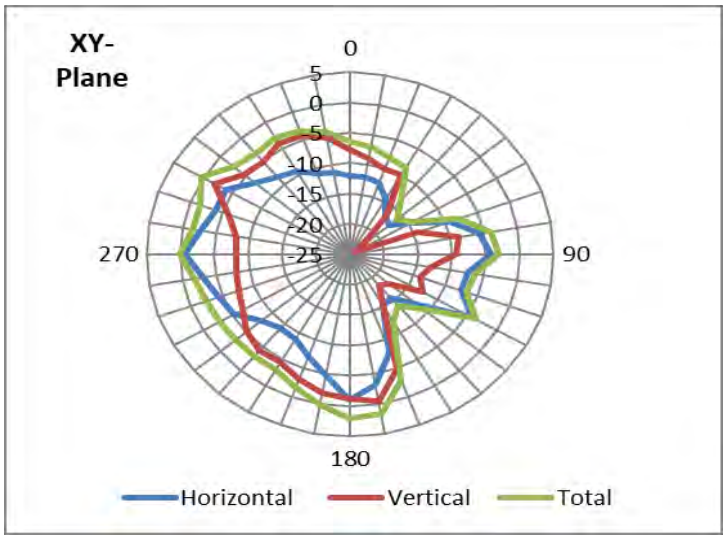
MIMO antenna: 3550.00 MHz

3550.00 MHz		
Horizontal Peak (dBi)	-2.56	180 deg
Vertical Peak(dBi)	0.22	320 deg



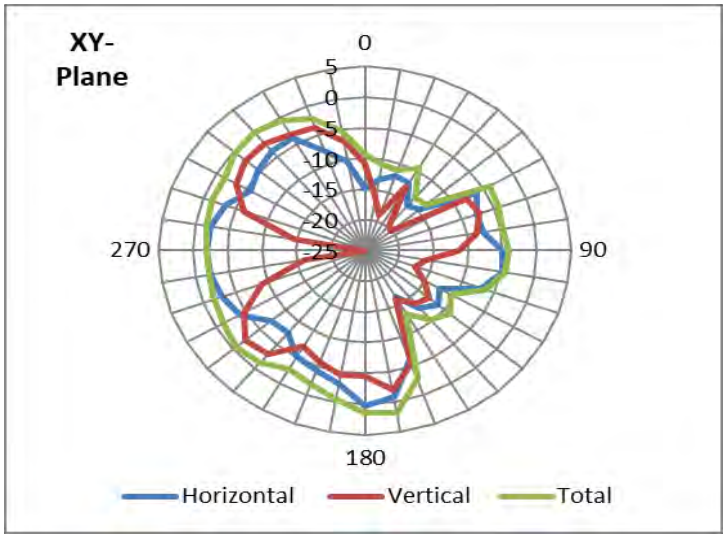
MIMO antenna: 3625.00 MHz

3625.00 MHz		
Horizontal Peak (dBi)	-0.60	270 deg
Vertical Peak(dBi)	-0.33	170 deg



MIMO antenna: 3700.00 MHz

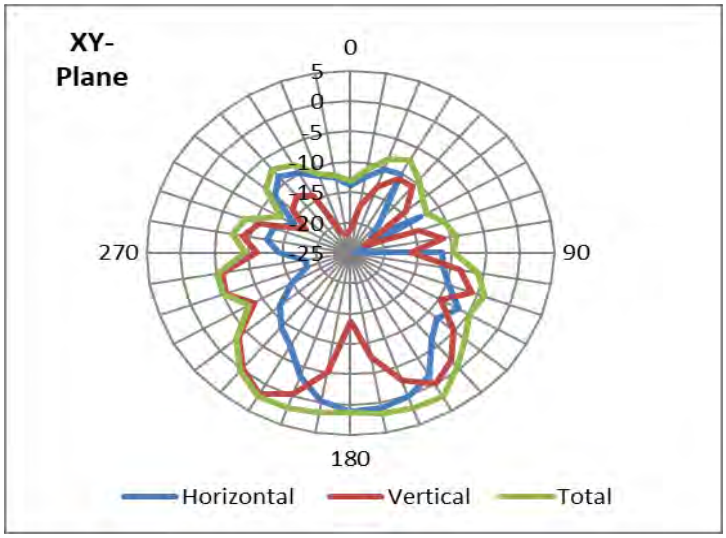
3700.00 MHz		
Horizontal Peak (dBi)	0.22	180 deg
Vertical Peak(dBi)	-1.93	230 deg



Radiation characteristic in 1710MHz ~ 1780MHz (Band 66, n66)

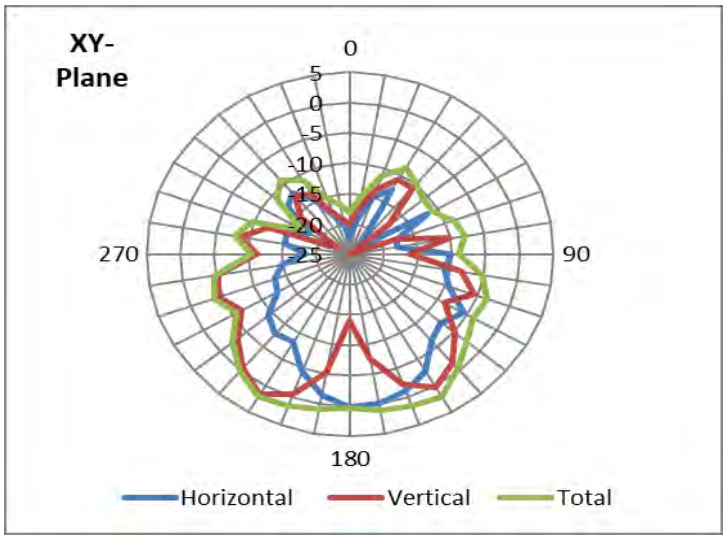
MIMO antenna: 1710.00 MHz

1710.00 MHz		
Horizontal Peak (dBi)	1.04	180 deg
Vertical Peak(dBi)	1.81	210 deg



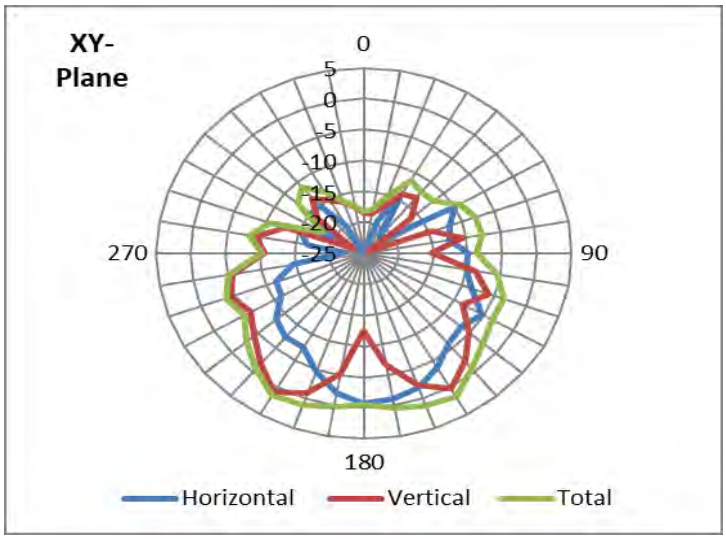
MIMO antenna: 1745.00 MHz

1745.00 MHz		
Horizontal Peak (dBi)	0.13	180 deg
Vertical Peak(dBi)	1.77	210 deg



MIMO antenna: 1780.00 MHz

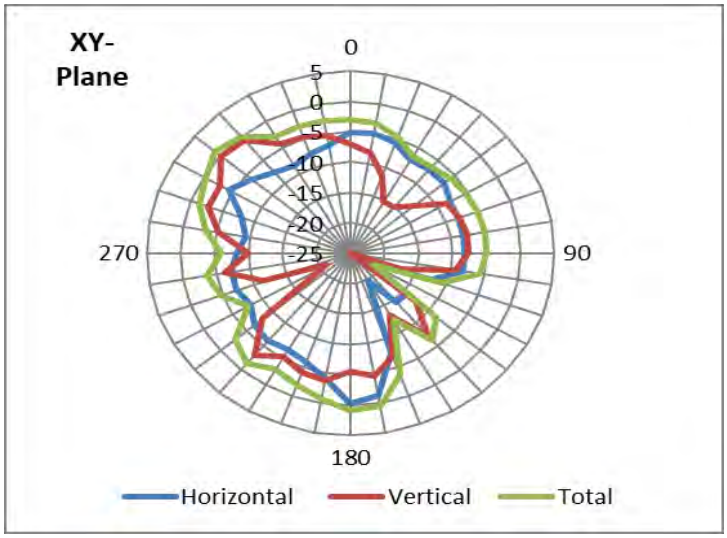
1780.00 MHz		
Horizontal Peak (dBi)	-0.83	180 deg
Vertical Peak(dBi)	0.97	210 deg



Radiation characteristic in 3300MHz ~ 4200MHz (5G NR Band 77)

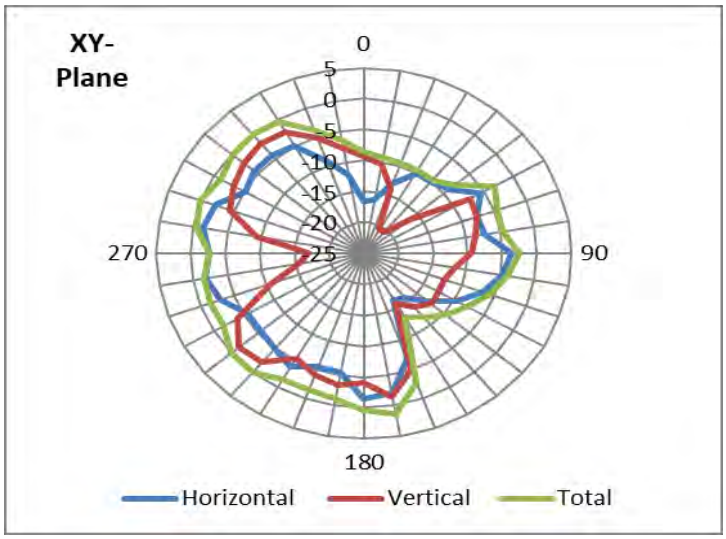
MIMO antenna: 3300.00 MHz

3300.00 MHz		
Horizontal Peak (dBi)	-0.22	180 deg
Vertical Peak(dBi)	-0.19	320 deg



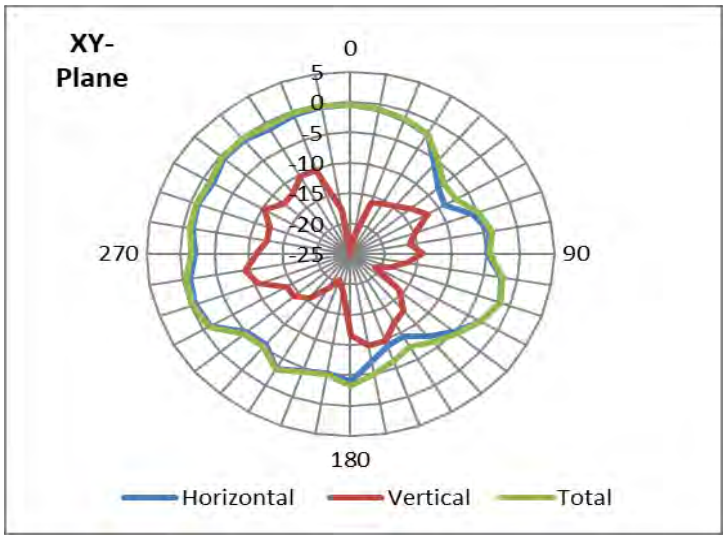
MIMO antenna: 3750.00 MHz

3750.00 MHz		
Horizontal Peak (dBi)	-1.46	180 deg
Vertical Peak(dBi)	-1.47	230 deg



MIMO antenna: 4200.00 MHz

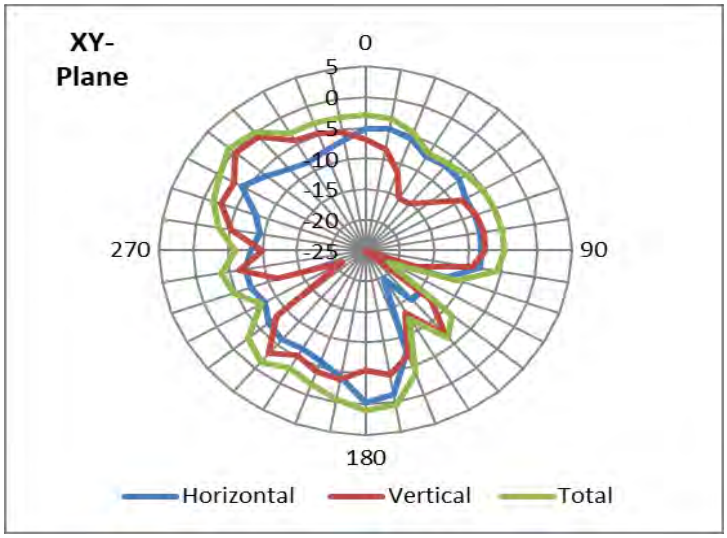
4200.00 MHz		
Horizontal Peak (dBi)	-0.44	310 deg
Vertical Peak(dBi)	-9.21	170 deg



Radiation characteristic in 3300MHz ~ 3800MHz (5G NR Band 78)

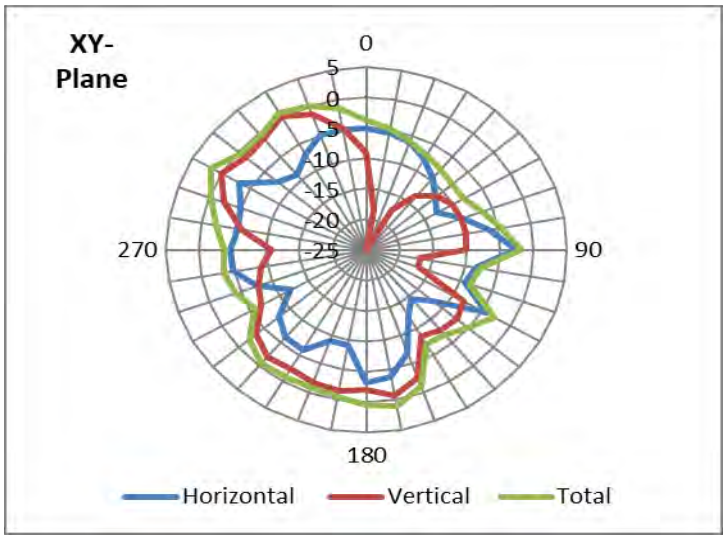
MIMO antenna: 3300.00 MHz

3300.00 MHz		
Horizontal Peak (dBi)	-0.22	180 deg
Vertical Peak(dBi)	-0.19	320 deg



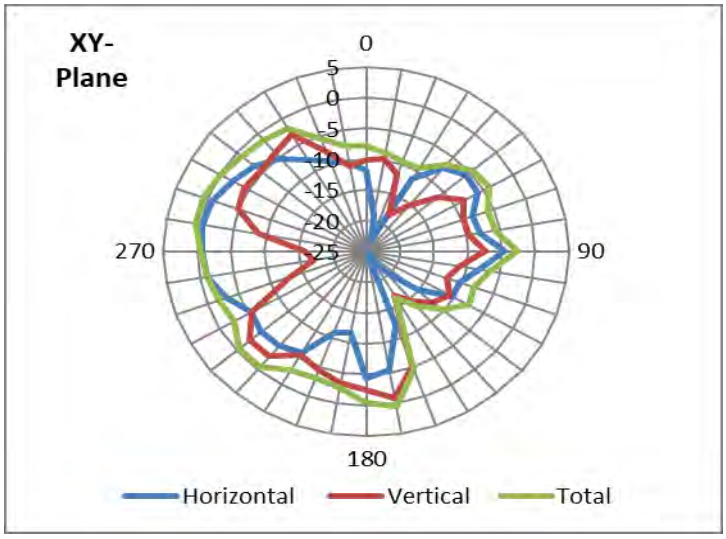
MIMO antenna: 3550.00 MHz

3550.00 MHz		
Horizontal Peak (dBi)	-2.56	180 deg
Vertical Peak(dBi)	0.22	320 deg



MIMO antenna: 3800.00 MHz

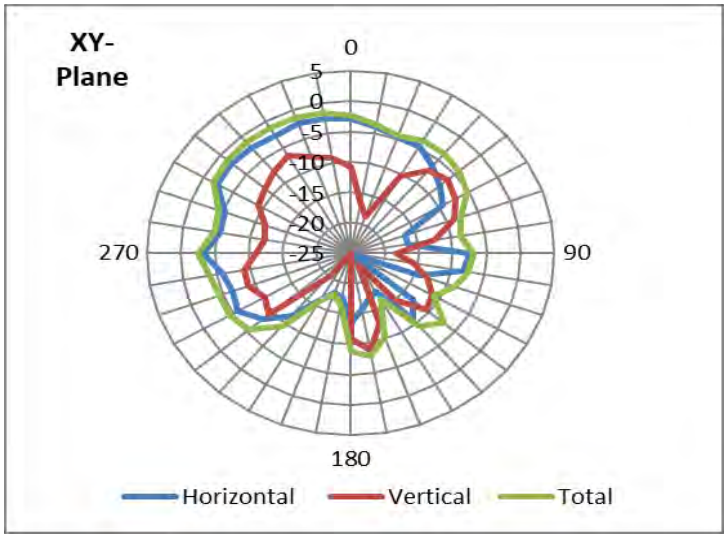
3800.00 MHz		
Horizontal Peak (dBi)	-0.31	270 deg
Vertical Peak(dBi)	-0.78	170 deg



Radiation characteristic in 4400MHz ~ 5000MHz (5G NR Band 79)

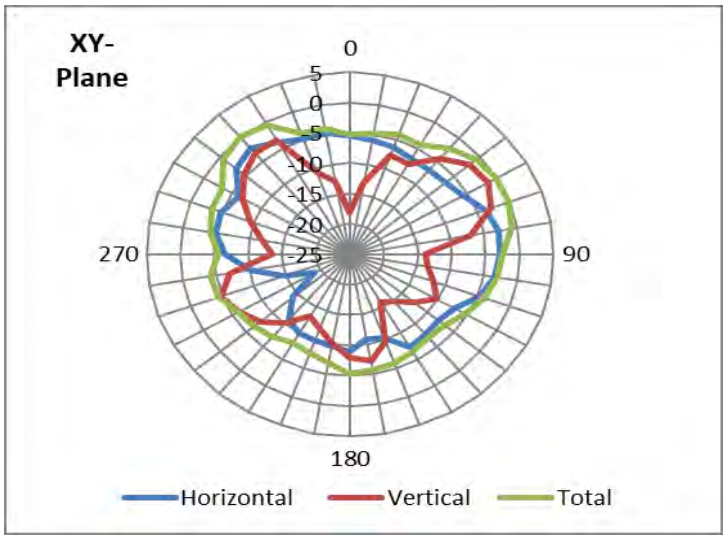
MIMO antenna: 4400.00 MHz

4400.00 MHz		
Horizontal Peak (dBi)	-2.13	310deg
Vertical Peak(dBi)	-6.31	50 deg



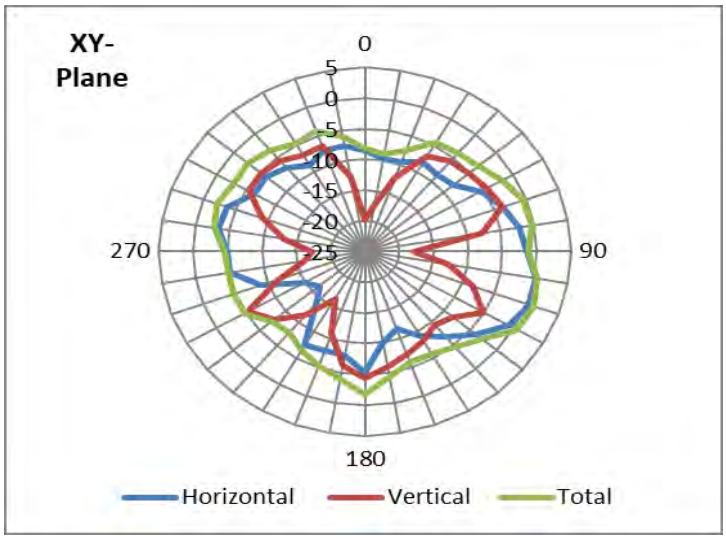
MIMO antenna: 4700.00 MHz

4700.00 MHz		
Horizontal Peak (dBi)	-2.28	90 deg
Vertical Peak(dBi)	-1.45	50 deg



MIMO antenna: 5000.00 MHz

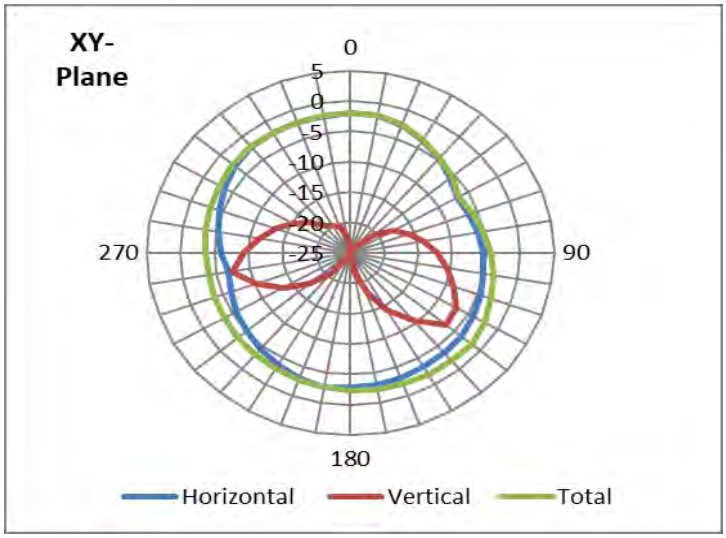
5000.00 MHz		
Horizontal Peak (dBi)	0.44	110 deg
Vertical Peak(dBi)	-3.63	70 deg



Radiation characteristic in 832MHz ~ 862MHz (UE-UTRA,Band 20, n20)

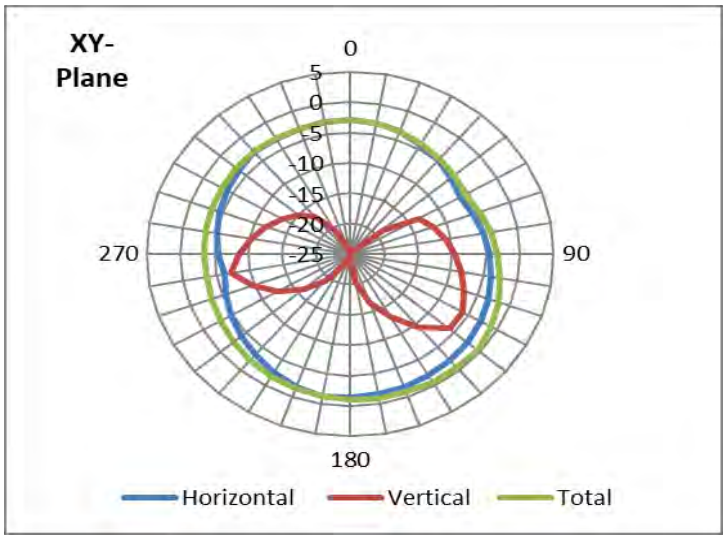
Auxiliary antenna: 832.00 MHz

832.00 MHz		
Horizontal Peak (dBi)	-1.94	360 deg
Vertical Peak(dBi)	-6.68	130 deg



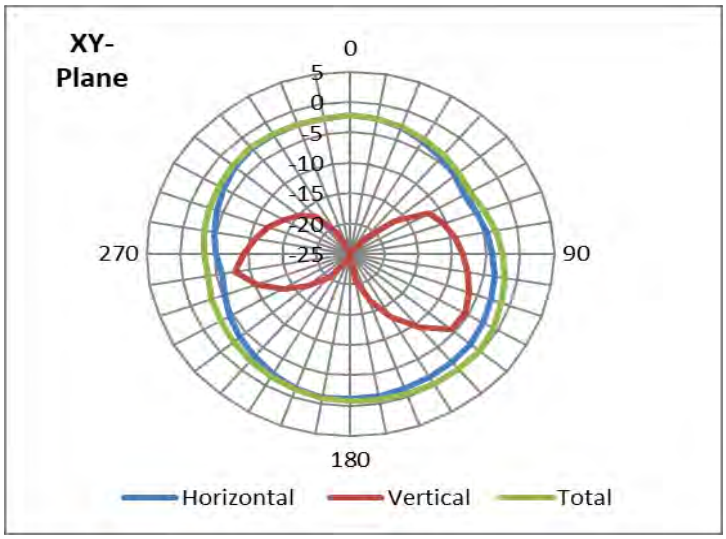
Auxiliary antenna: 847.00 MHz

847.00 MHz		
Horizontal Peak (dBi)	-1.26	190 deg
Vertical Peak(dBi)	-5.87	120 deg



Auxiliary antenna: 862.00 MHz

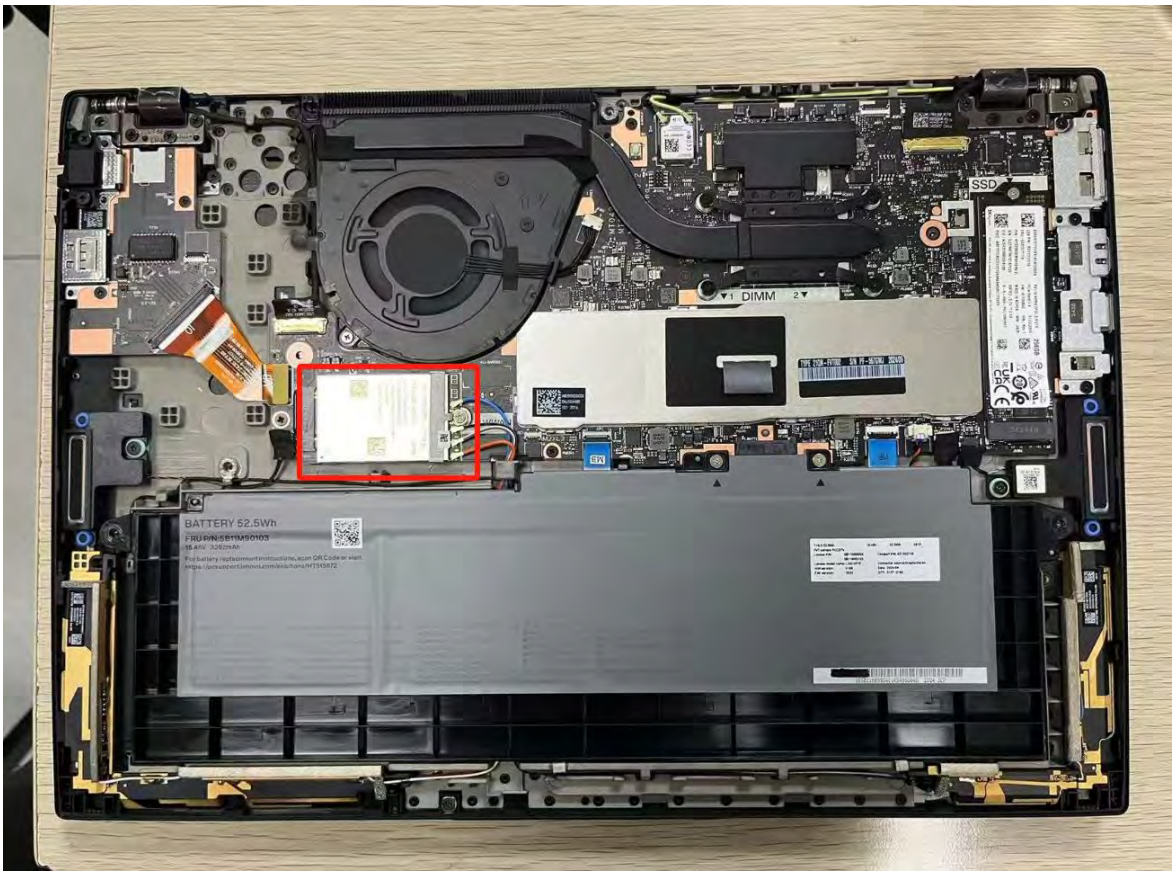
862.00 MHz		
Horizontal Peak (dBi)	-0.96	190 deg
Vertical Peak(dBi)	-5.43	120 deg



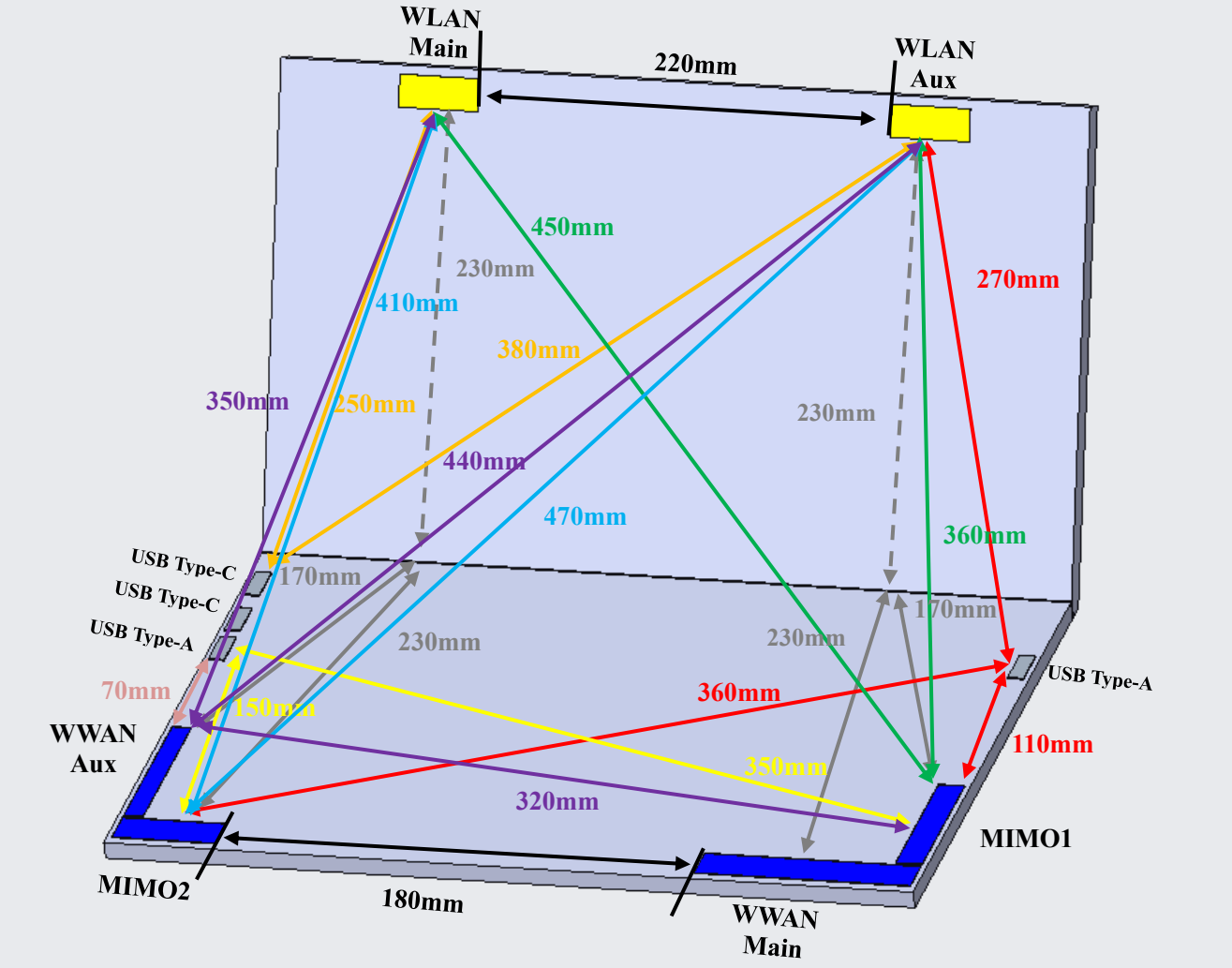
Section 4. Host Platform Information

WWAN Antenna Location

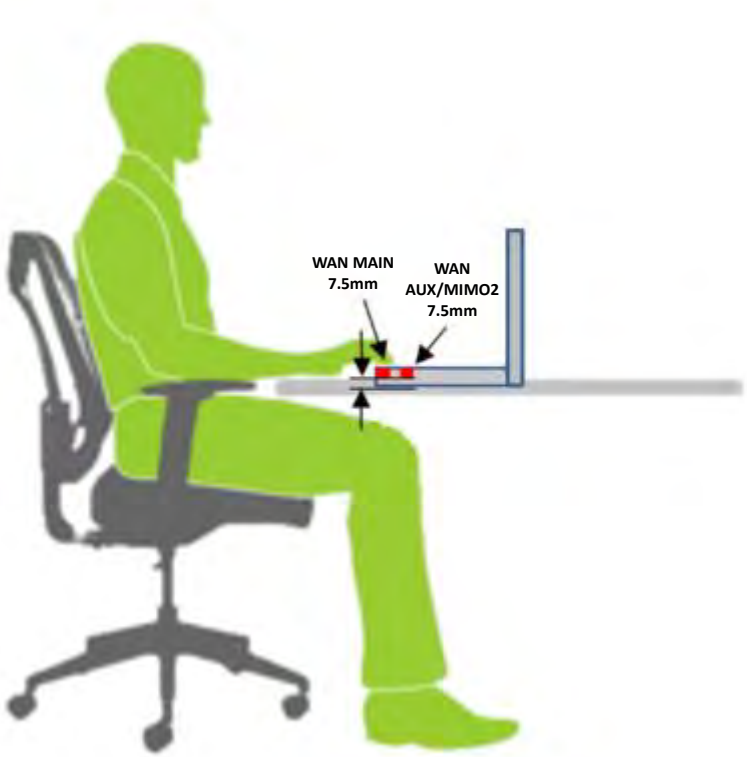
WWAN card Location



Section 5. Antenna Host Platform Location Information



Section 6. Antenna dimensional information for SAR evaluation



Section 7. Co-Location Antenna Separation

WWAN - Bluetooth:

The output power of Bluetooth device is 3.06mW (≤ 60/f(GHz)) and the antenna-to-antenna distance is ≥ 5 cm, so the Bluetooth device is not required SAR evaluation in accordance with Table-2 of KDB616217.

WWAN - USB:

The USB ports are located with more than 5cm of separation distance from the all WLAN/WiMAX and WWAN Tx antennas. Therefore these are compliant with the section 2) of “Supplement to FCC KDB 616217”.

WWAN - WLAN:

The WWAN main (Tx) antenna and WLAN (or WiMAX) antennas co-locate with at least 5.0 mm of separation distance, and both devices transmit RF simultaneously.
Any WWAN features (antenna and transmitter module) won’t be incorporated in the host PC system nor shipped associated with the applying WLAN transmitter device, unless the relevant certification process completes for the simultaneous transmission.

Section 8. Host PC labeling

Clamshell mode