

Regulatory MIMO Antenna Information

Platform	
Platform Owner	Lenovo Cooperation
Brand Name	Lenovo
Model Name	20003
ODM	Compal
Target Launch Date	(2008/ 04/ 22)
Antenna	
Brand Name	Smart Approach
Part Number	■ Tx1 Antenna:CPL07-230000
	■ Tx2 Antenna:CPL07-230000
	■ Tx3 Antenna:CPL07-230000
Module	
With WLAN Module	<input type="checkbox"/> WM3B2200BG
(Check Box)	<input type="checkbox"/> WM3B2915ABG
	<input type="checkbox"/> WM3945ABG
	<input type="checkbox"/> 4965AGN
	<input type="checkbox"/> 4965AG_
	■ 533ANX Family
	■ 512ANX Family
	■ 533AN Family
	■ 512AN Family

Antenna Sample / Antenna Data Requirements for worldwide regulatory approval

Section	Description of Required OEM / ODM Antenna Information	US / IC	EU	Japan	Taiwan	S.Korea
1A	Part Number for Antenna only	Required	Required	Required	Required	Required
1B	Antenna Manufacturer Name	Required	Required	Required	Required	Required
1C	Description of Antenna Type	Required	N/A	N/A	N/A	N/A
1D	Part number of Antenna Assembly / cable impedance, length & diameter.	Required	Desired	Desired	Desired	Desired
1E	Tx1, Tx2 & Tx3 antenna (Peak Gain W/ cable loss) *	Required	Required	Required	Required	Required
	1E OR 1F, 1G, 1H					
1F	Tx1, Tx2 & Tx3 antenna (Peak Gain only) *	Required	Required	Required	Required	Required
1G	VSWR of cable including connector	Required	Required	Required	Required	Required
1H	Tx1, Tx2 & Tx3 antenna (Cable loss W/ connector) *	Required	Required	Required	Required	Required
2	Dimensioned Photographs <u>and</u> Drawings of Tx1, Tx2, and Tx3 (or Rx3) antennas	Required	Required	Required	Required	Required
3	Radiation patterns of antennas loaded in the host platform.	Required	Desired	Required	N/A	Required
4	Platform model name / number - correlated to antenna manufacturer and antenna part number	Required	Required	Desired	Required	Desired
5	Photograph(s) or Drawings showing location of antennas in platform. <u>(S. Korea requires photographs of antennas for approval submission). Taiwan requires pictures of each antenna type shown in the system.</u>	Required	Required	Desired	<u>Required (Photos)</u>	<u>Required (Photos)</u>
6	Mech. drawings / photos with dimensions of antenna locations and distance from end-user (For evaluation of SAR testing requirement).	Required	N/A	N/A	N/A	N/A
7	Photograph(s) or Drawings showing the location of all antennas (WLAN, other) and distance between those transmitting antennas. Information will be used to evaluate whether co-location testing is required.	Required	N/A	N/A	N/A	N/A
8	Local representative contact information for LMA/ PARS process.	Required	N/A	N/A	N/A	N/A

NOTE:

(*) if 3rd antenna is Rx only (e.g. receive only for 4965AGN) then peak gain and cable loss not required

Antenna Information

Section 1. Antenna Assembly Specifications

Antenna Assembly Summary:

1A Antenna Part Number	1B Manufacture	1C Antenna Type	1D Cable Assembly Part Number and Information	1E *Peak Gain W/ Cable loss (dBi)	1F Peak Gain w/o Cable Loss (dBi)	1G VSWR	1H Cable Loss (dBi)
(P/N:CPL07-23 0000) Main antenna	SmartApproach Corporation	PIFA	50 ohm Coaxial. length: 87.0cm diameter: 1.37mm Connector: IPX (RHoS:Yes)	2400-2500MHz -0.65 dBi (peak)	2400-2500MHz 1.6 dBi (peak)	2400-2500MHz 1.36 max	2400-2500MHz 2.25 dBi (peak)
				2496-2690MHz -0.91 dBi (peak)	2496-2690MHz 1.34 dBi (peak)	2496-2690MHz 2.53 max	2496-2690MHz ___ dBi (peak)
				5150-5350MHz 0.88 dBi (peak)	5150-5350MHz 4.24 dBi (peak)	5150-5350MHz 1.56 max	5150-5350MHz 3.36 dBi (peak)
				5470-5725MHz 1.67 dBi (peak)	5470-5725MHz 5.11 dBi (peak)	5470-5725MHz 1.57 max	5470-5725MHz 3.44 dBi (peak)
				5725-5850MHz 1.65 dBi (peak)	5725-5850MHz 5.25 dBi (peak)	5725-5850MHz 1.69 max	5725-5850MHz 3.60 dBi (peak)
(P/N:CPL07-23 0000) AUX antenna	SmartApproach Corporation	PIFA	50 ohm Coaxial. length: 66.3cm diameter: 1.37mm Connector: IPX (RHoS:Yes)	2400-2500MHz 0.17 dBi (peak)	2400-2500MHz 2.1 dBi (peak)	2400-2500MHz 1.28 max	2400-2500MHz 1.93 dBi (peak)
				2496-2690MHz -0.60 dBi (peak)	2496-2690MHz 1.33 dBi (peak)	2496-2690MHz 2.64 max	2496-2690MHz ___ dBi (peak)
				5150-5350MHz 0.38 dBi (peak)	5150-5350MHz 3.26 dBi (peak)	5150-5350MHz 1.53 max	5150-5350MHz 2.88 dBi (peak)
				5470-5725MHz 0.36 dBi (peak)	5470-5725MHz 3.3 dBi (peak)	5470-5725MHz 1.45 max	5470-5725MHz 2.94 dBi (peak)
				5725-5850MHz 0.93 dBi (peak)	5725-5850MHz 4.02 dBi (peak)	5725-5850MHz 1.64 max	5725-5850MHz 3.09 dBi (peak)
(P/N:CPL07-23 0000) MIMO antenna	SmartApproach Corporation	PIFA	50 ohm Coaxial. length: 41.7cm diameter: 1.37mm Connector: IPX (RHoS:Yes)	2400-2500MHz -0.66 dBi (peak)	2400-2500MHz 0.49 dBi (peak)	2400-2500MHz 1.46 max	2400-2500MHz 1.15 dBi (peak)
				2496-2690MHz 2.02 dBi (peak)	2496-2690MHz 3.14 dBi (peak)	2496-2690MHz 2.56 max	2496-2690MHz ___ dBi (peak)
				5150-5350MHz -2.92 dBi (peak)	5150-5350MHz -1.27 dBi (peak)	5150-5350MHz 1.51 max	5150-5350MHz 1.65 dBi (peak)
				5470-5725MHz -2.68 dBi (peak)	5470-5725MHz -1.46 dBi (peak)	5470-5725MHz 1.35 max	5470-5725MHz 1.22 dBi (peak)
				5725-5850MHz -2.69 dBi (peak)	5725-5850MHz -0.89 dBi (peak)	5725-5850MHz 1.74max	5725-5850MHz 1.80dBi (peak)

NOTE:

(*) If Rx3 only (3rd antenna receives only, e.g. 4965AGN) then the information marked with * is not required

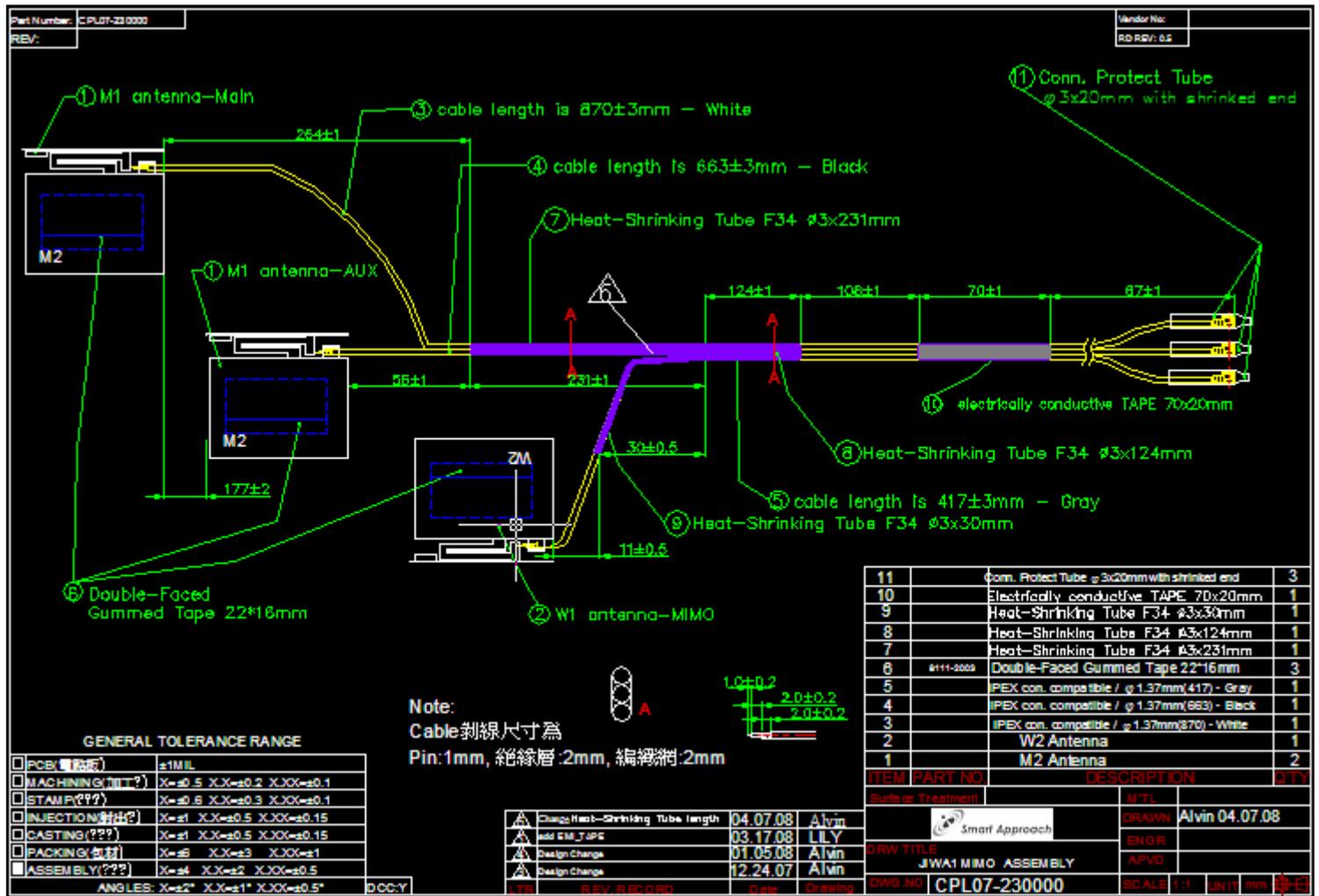
Antenna Peak Gain Table:

Frequency (MHz)	Main antenna		Aux Antenna		Mimo Antenna	
	Horizontal (dBi)	Vertical (dBi)	Horizontal (dBi)	Vertical (dBi)	Horizontal (dBi)	Vertical (dBi)
2400	1.92	-0.76	0.06	-1.14	-3.91	-2.15
2450	1.64	-1.17	2.92	0.78	-2.68	-2.09
2500	0.27	-2.94	1.41	-1.25	-3.94	-3.69
2501	1.86	-0.26	1.16	-0.67	-3.59	-1.80
2593	1.65	-0.66	2.43	0.65	-2.85	-1.65
2685	-3.46	-4.45	-0.47	-1.25	-6.16	-4.77
5150	0.94	1.78	2.46	-0.50	0.11	-0.84
5250	1.55	-2.53	3.01	-0.89	-0.65	0.91
5350	0.54	0.85	2.18	-1.65	-0.75	-2.26
5470	0.58	0.06	0.95	-2.86	-1.19	-3.16
5600	0.89	0.08	1.00	-2.26	-1.52	-3.40
5725	0.45	-0.38	-0.74	-1.39	-2.74	-2.00
5785	0.61	-0.38	-1.60	-1.39	-3.21	-2.00
5850	1.68	-0.39	-0.63	-2.39	-1.34	-2.88

- Antenna Peak Gain required being test in system basis.
- 1E frame contend absolutely peak antenna gain include H/V
- If Rx2 only (2nd antenna receives only, e.g. for 512 family) then the information is not required for Rx2.
- If Rx3 only (3rd antenna receives only, e.g. for 4965AGN) then the information is not required for Rx3.

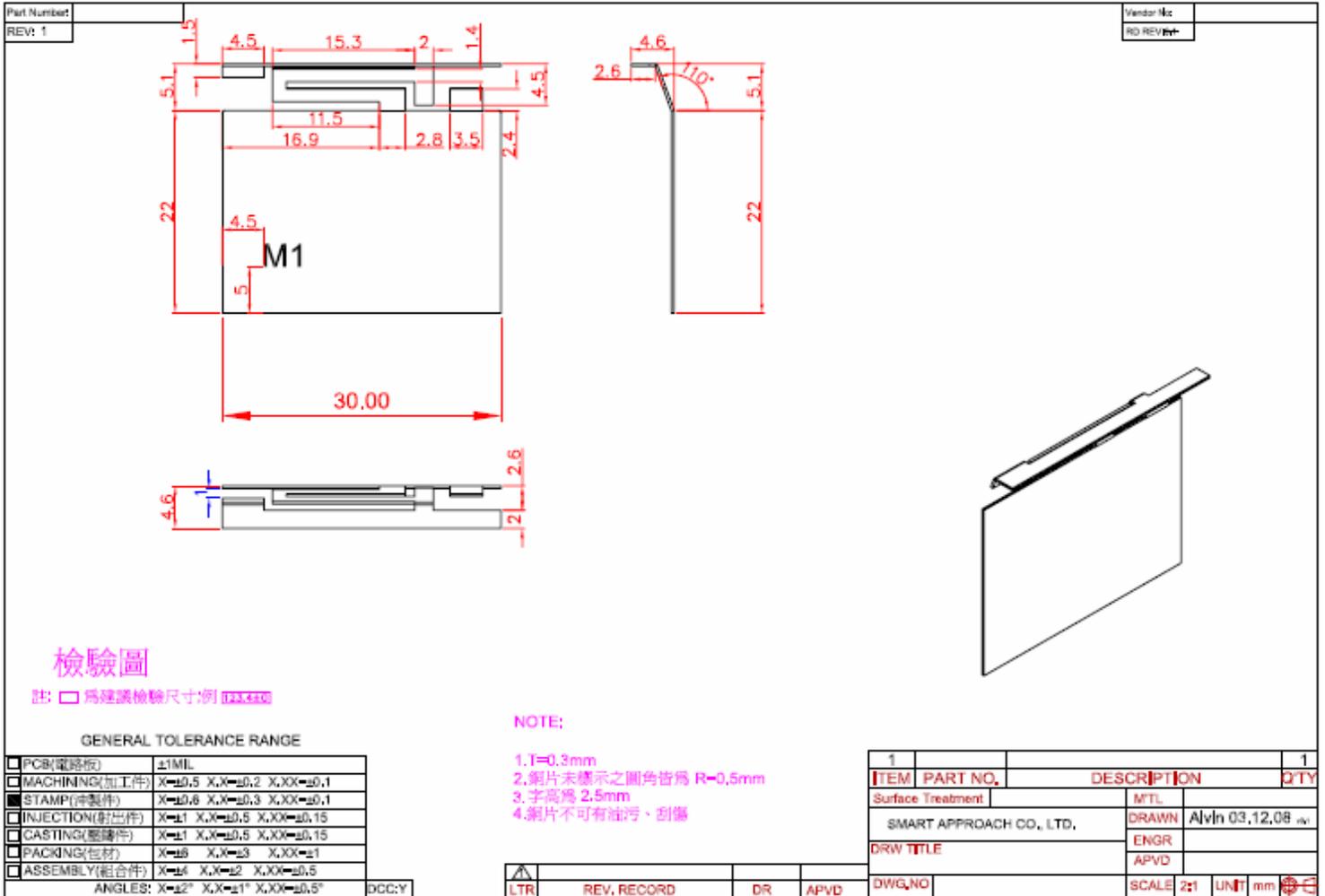
Section 2. Dimensioned Photos or Drawings of Antennas

dimensioned drawing of assembly.



Include a dimensioned photo or dimensioned drawing of Main and AUX antenna

here.



Include a dimensioned photo or dimensioned drawing of MIMO antenna here.

Part Number:		Vendor No:	
REV: 1		RD REV: 1	

檢驗圖

註: □ 為建議檢驗尺寸(例 0.2, 0.3, 0.5)

NOTE:

1. T=0.3mm
2. 銅片未標示之圓角皆為 R=0.5mm
3. 字高為 2.5mm
4. 銅片不可有油污、刮傷

GENERAL TOLERANCE RANGE	
□ PCB(電路板)	±1MIL
□ MACHINING(加工件)	X=±0.5 X,X=±0.2 X,XX=±0.1
■ STAMP(沖製件)	X=±0.8 X,X=±0.3 X,XX=±0.1
□ INJECTION(射出件)	X=±1 X,X=±0.5 X,XX=±0.15
□ CASTING(鑄造件)	X=±1 X,X=±0.5 X,XX=±0.15
□ PACKING(包材)	X=±0.5 X,X=±0.3 X,XX=±1
□ ASSEMBLY(組零件)	X=±0.5 X,X=±0.2 X,XX=±0.5

ANGLES: X=±2° X,X=±1° X,XX=±0.5°

	REV. RECORD	DR	APVD
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ITEM	PART NO.	DESCRIPTION	QTY
1			1
Surface Treatment		MTL	
SMART APPROACH CO., LTD.		DRAWN	Alvin 03.12.08 av
DRW TITLE		ENGR	
		APVD	
DWG. NO		SCALE	2:1 UNIT mm

2-2 **Resize the photograph file into 640x480 pix(JPG)**
The Photograph of main antenna.



The Photograph of aux. antenna.



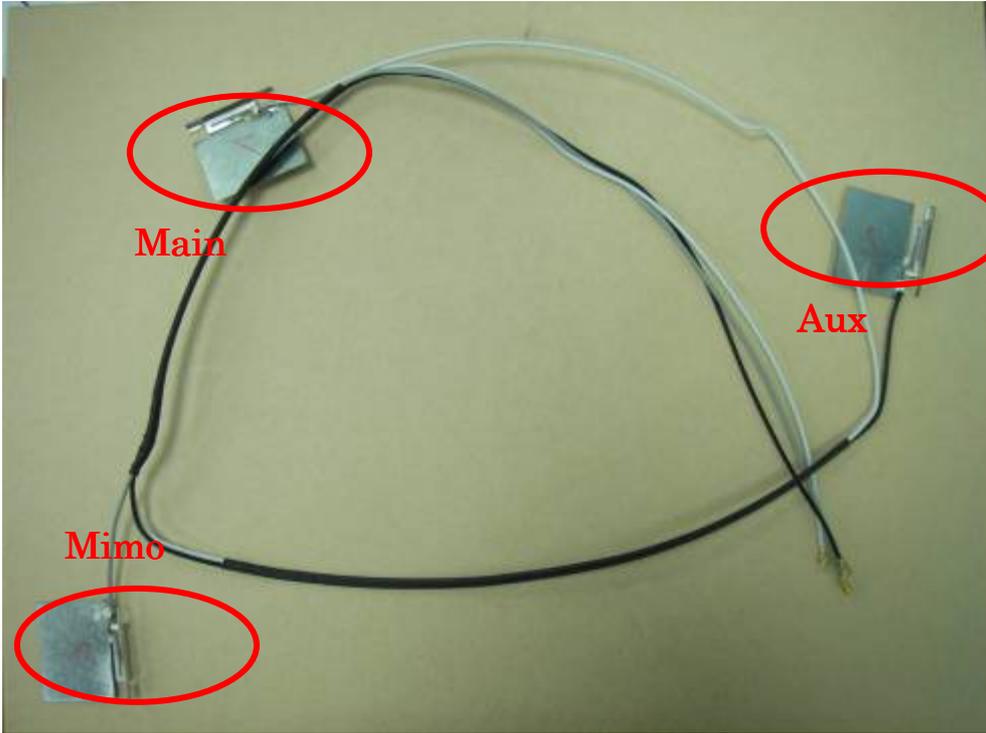
The Photograph of MIMO antenna.



Include front view photo of all 3 antennas here.

Antenna Manufacturer: Smart Approach

Antenna Part Number: P/N:CPL07-230000 (Tx1), P/N:CPL07-230000 (Tx2), P/N:CPL07-230000 (Tx3 or Rx3)



Include back view photo of all 3 antennas here.

Antenna Manufacturer: Smart Approach

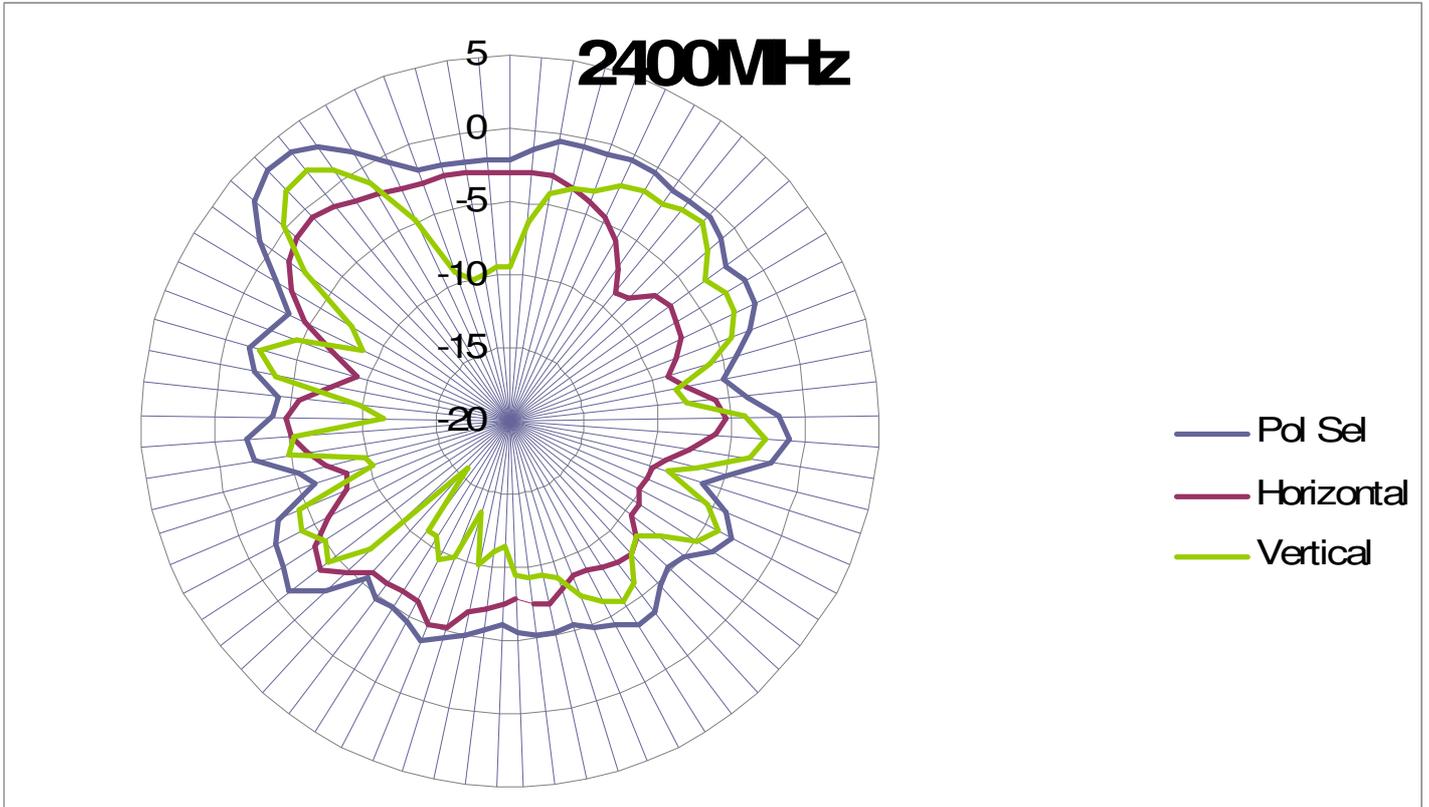
Antenna Part Number: P/N:CPL07-230000 (Main), P/N:CPL07-230000 (AUX), P/N:CPL07-230000 (MIMO)



Section 3. Radiation characteristics of antennas Loaded in Host Platform

2400-2500MHz radiation characteristic

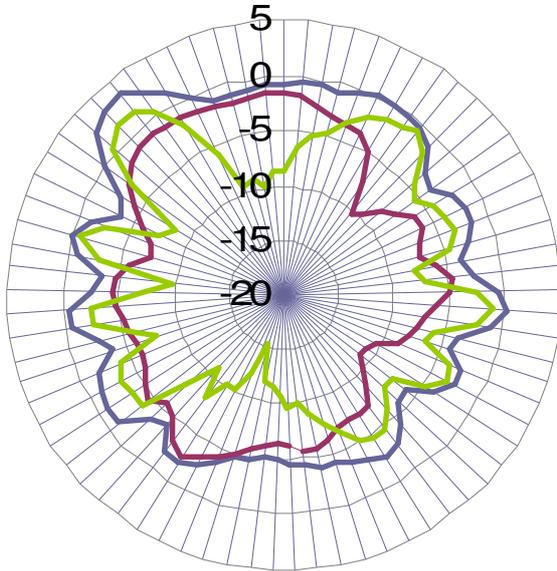
Main antenna: 2400 MHz



frequency	2400
Horizontal	1.92
Vertical	-0.76
E total	3.68

Main antenna: 2450 MHz

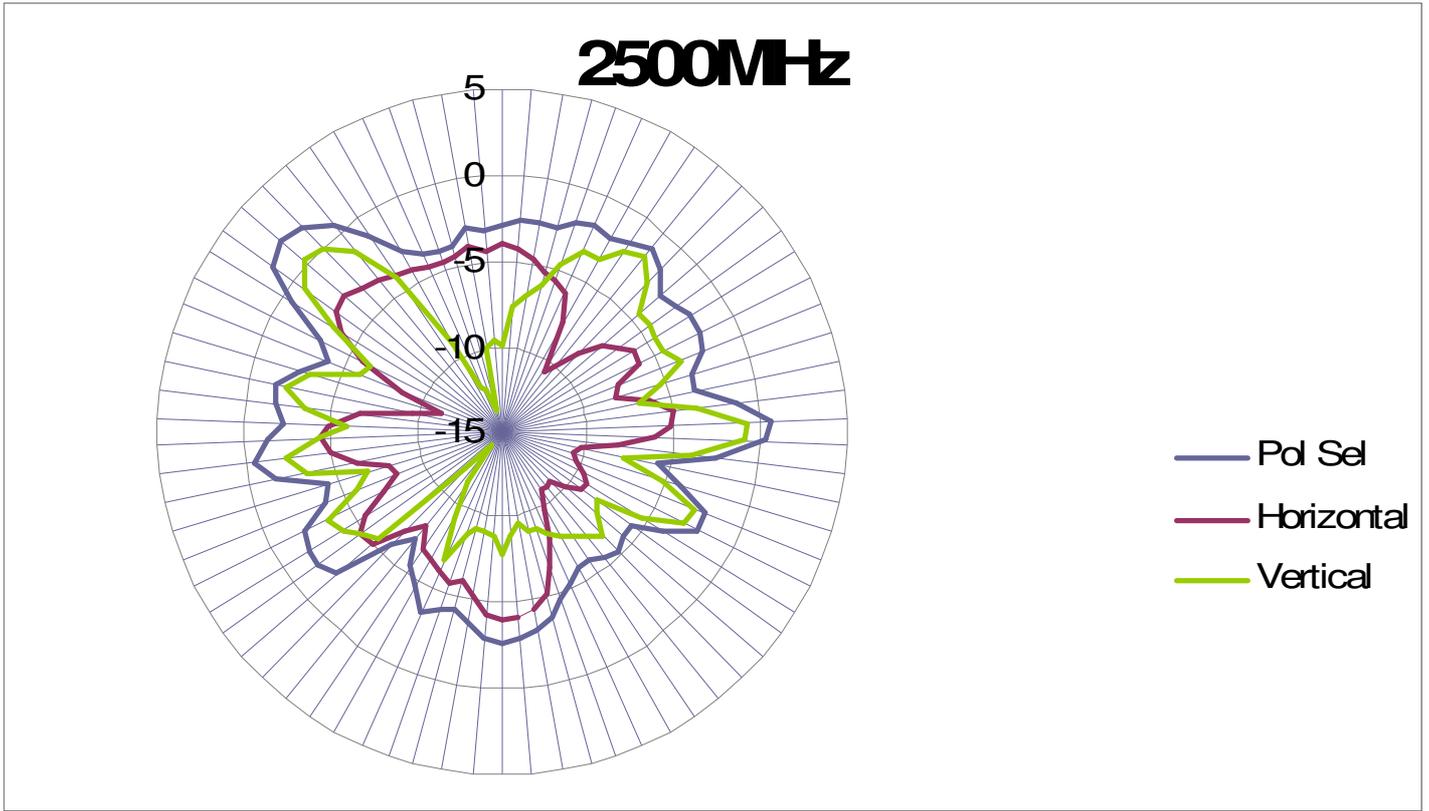
2450MHz



- Pol Sel
- Horizontal
- Vertical

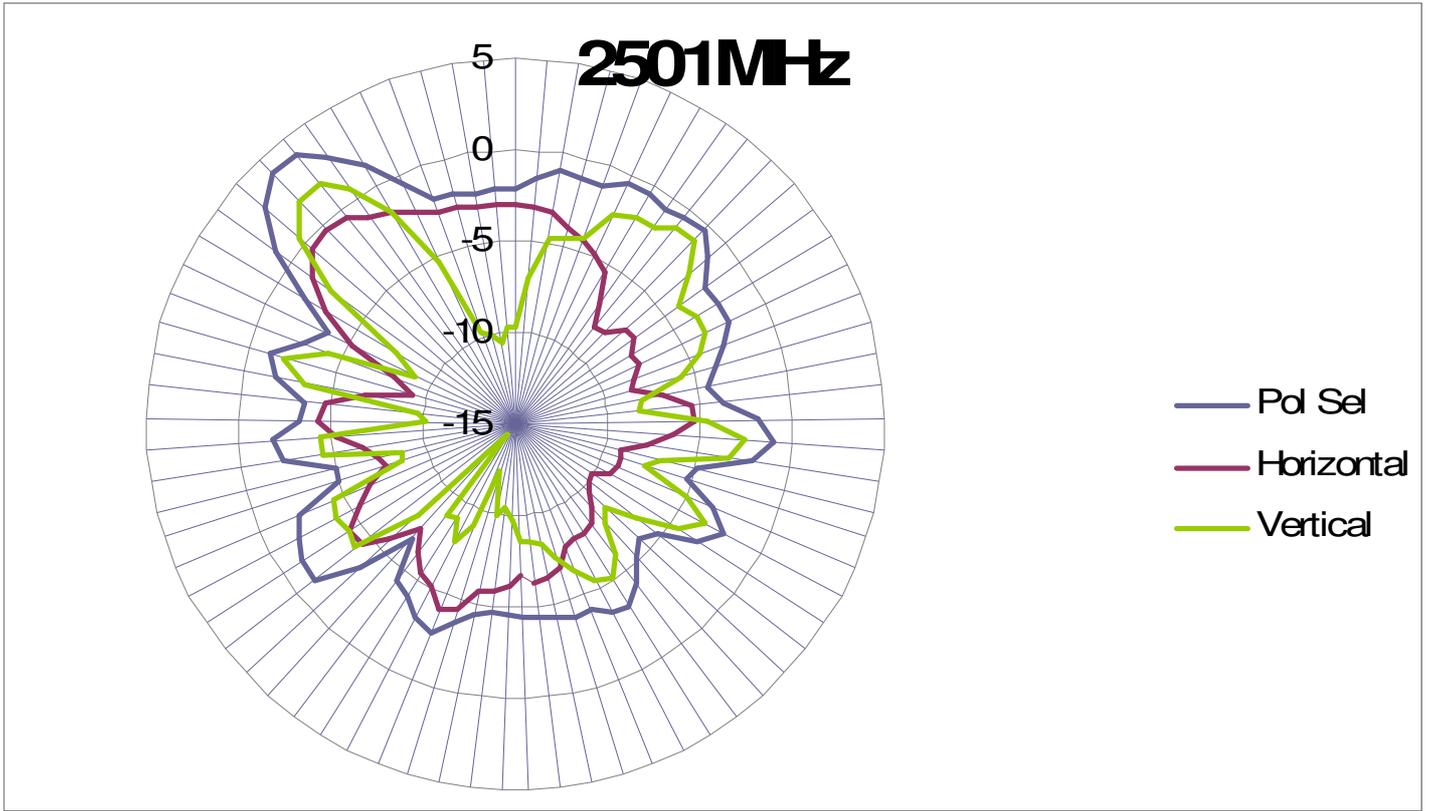
frequency	2450
Horizontal	1.64
Vertical	-1.17
E total	3.46

Main antenna: 2500 MHz



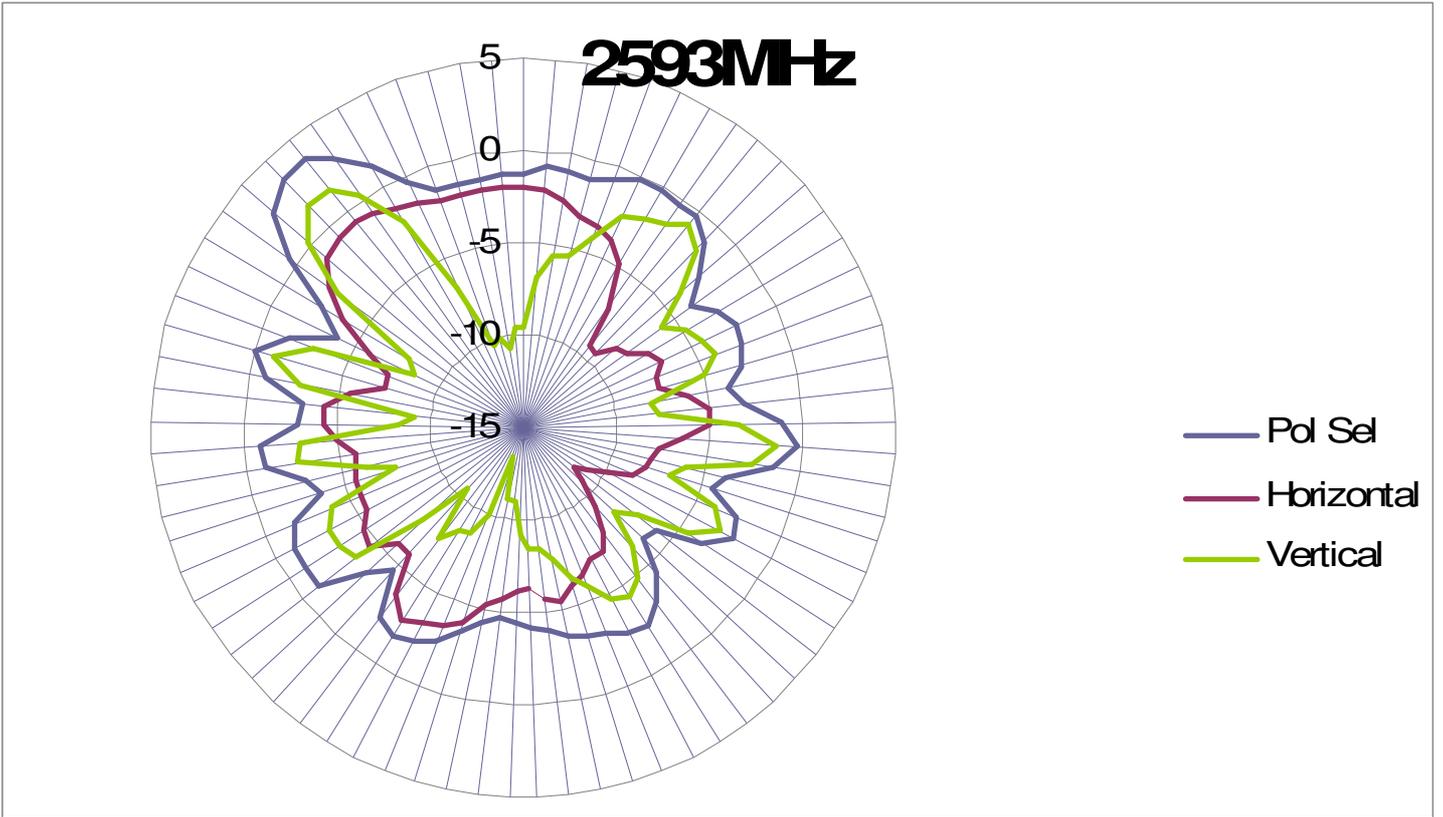
frequency	2500
Horizontal	0.27
Vertical	-2.94
E total	1.96

Main antenna: 2501 MHz



frequency	2501
Horizontal	1.86
Vertical	-0.26
E total	3.93

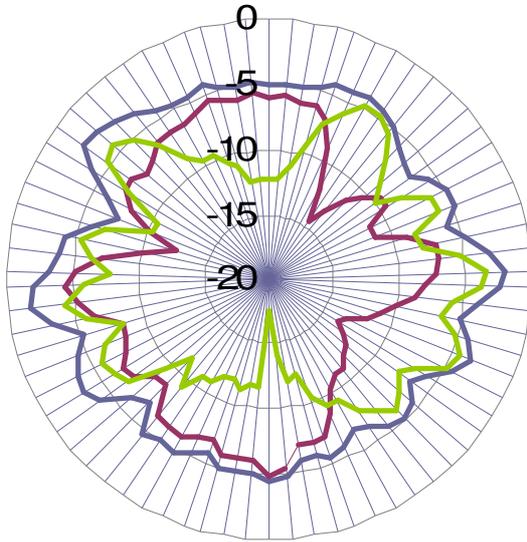
Main antenna: 2593 MHz



frequency	2593
Horizontal	1.65
Vertical	-0.66
E total	3.65

Main antenna: 2685 MHz

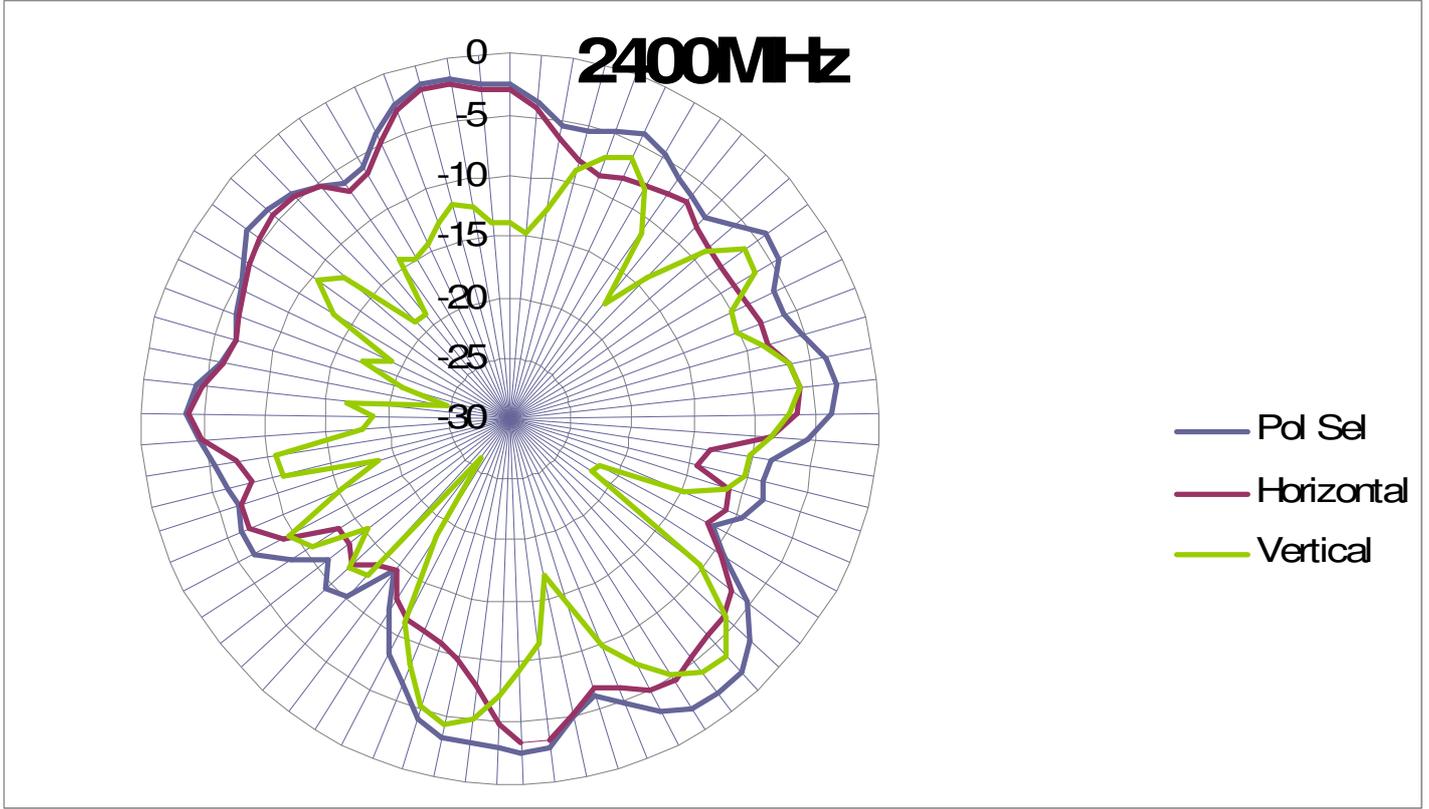
2685MHz



- Pd Sel
- HORIZONTAL
- Vertical

frequency	2685
Horizontal	-3.46
Vertical	-4.45
E total	-1.65

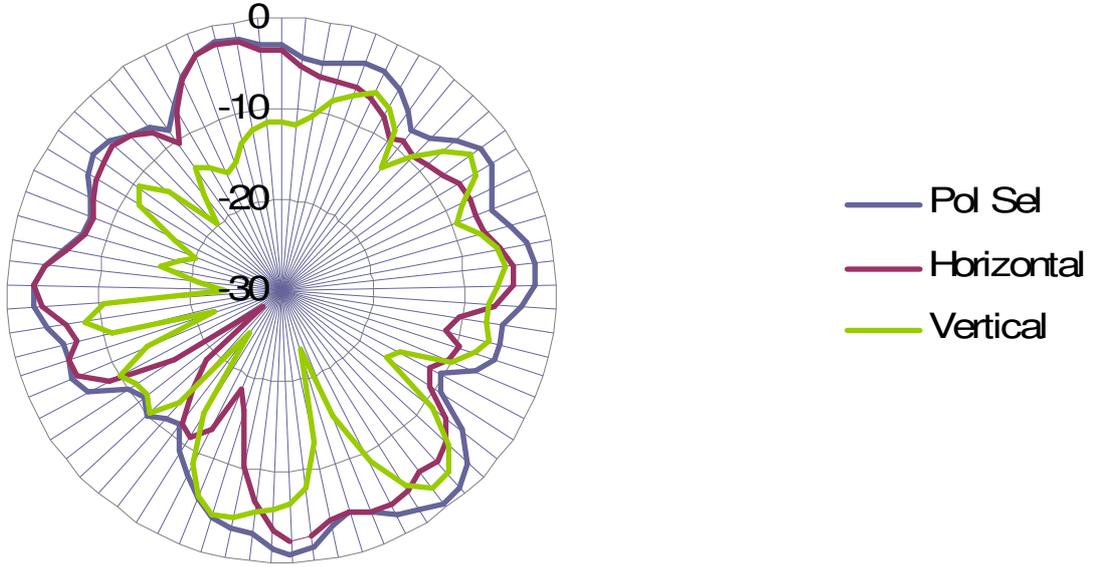
MIMO antenna: 2400 MHz



frequency	2400
Horizontal	-3.91
Vertical	-2.15
E total	-1.61

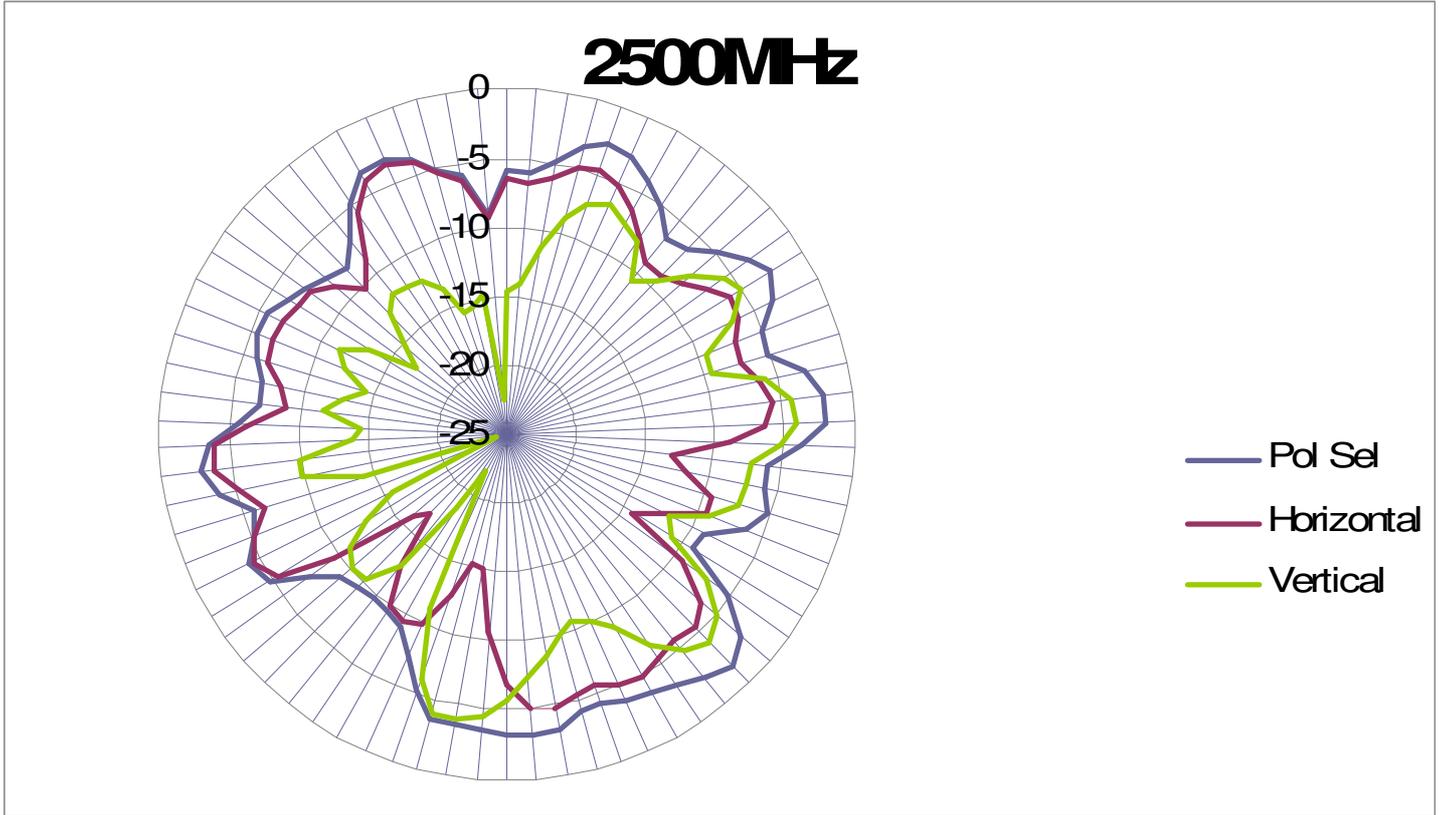
MIMO antenna: 2450 MHz

2450MHz



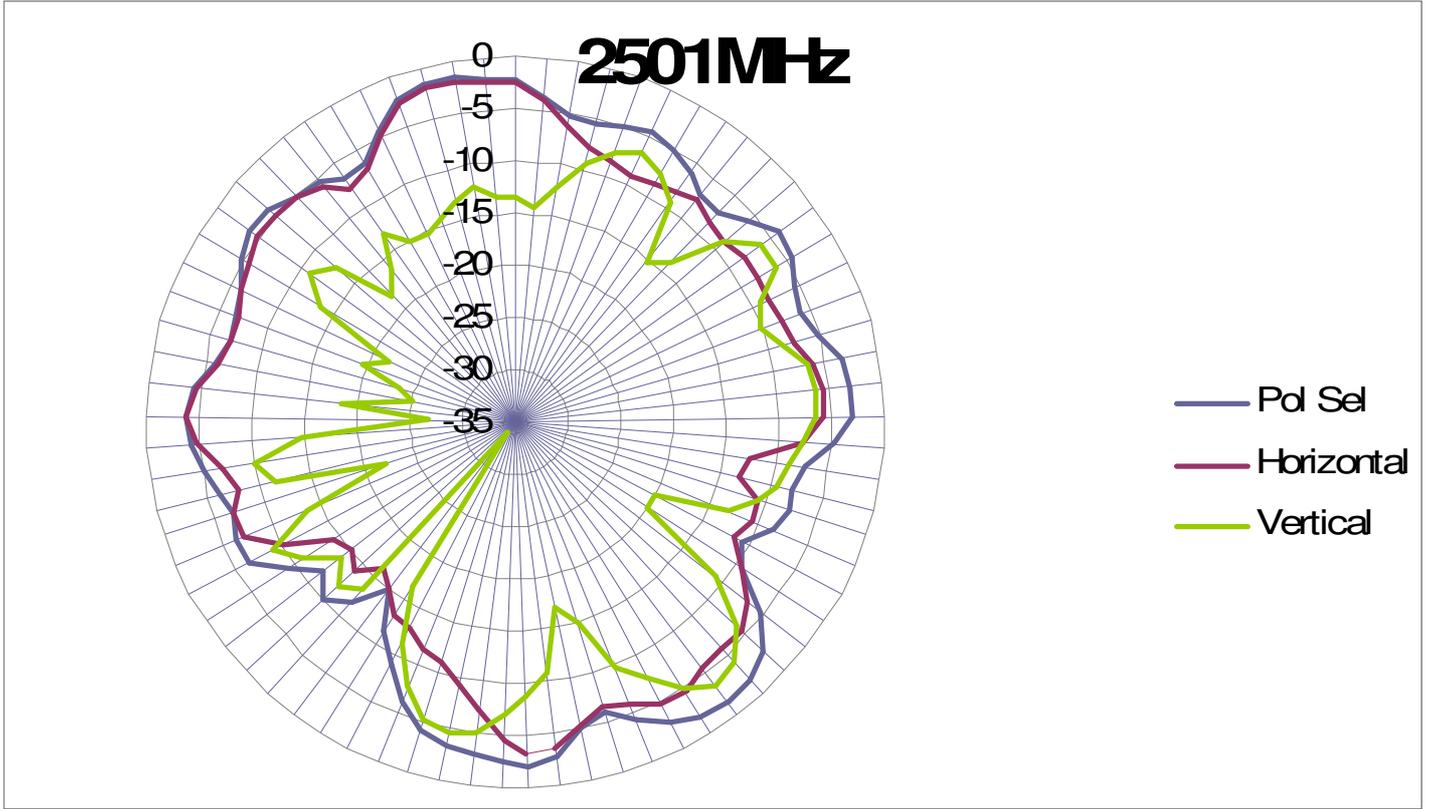
frequency	2450
Horizontal	-2.68
Vertical	-2.09
E total	-0.64

MIMO antenna: 2500 MHz



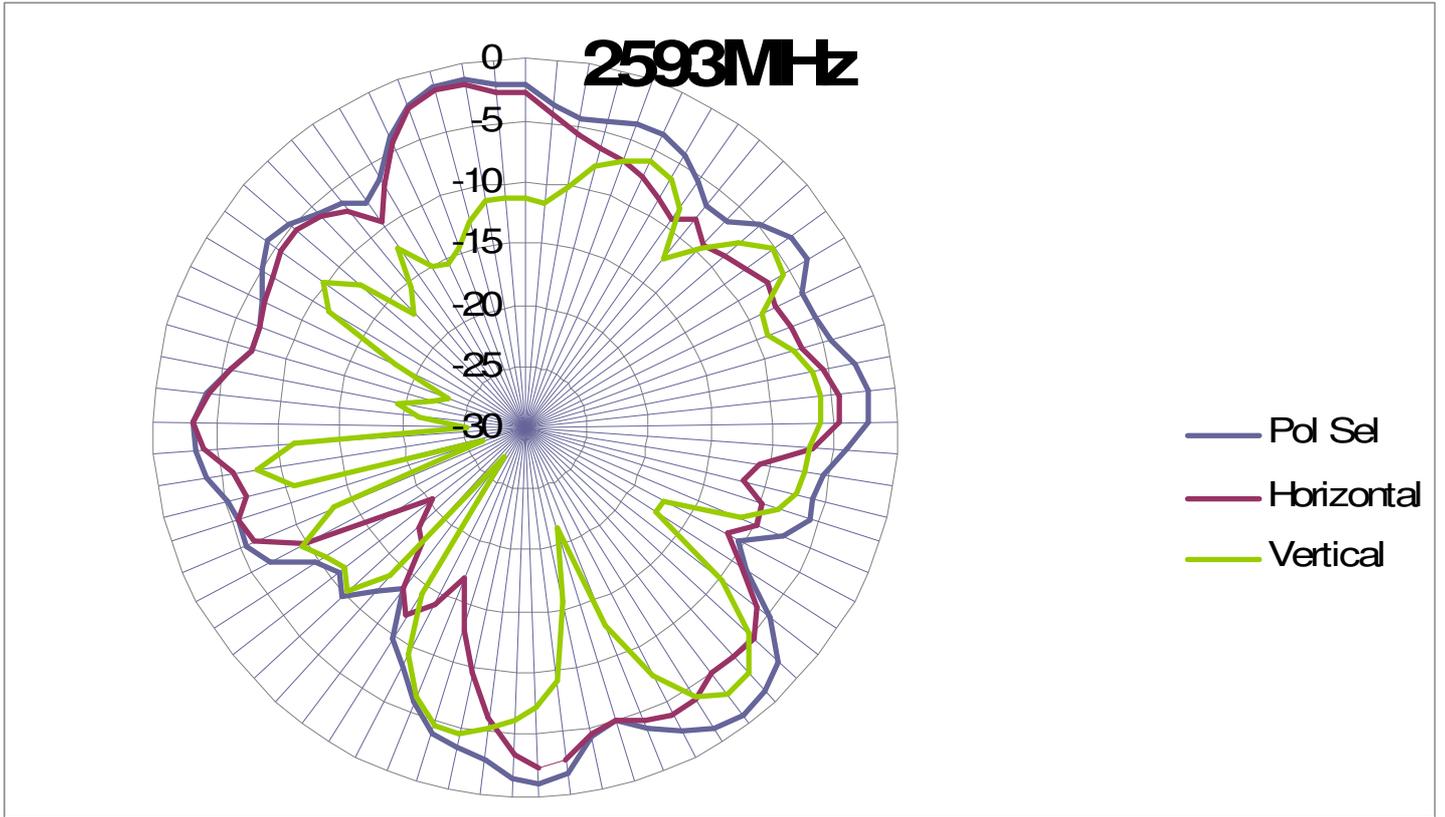
frequency	2500
Horizontal	-3.94
Vertical	-3.69
E total	-1.74

MIMO antenna: 2501 MHz



frequency	2501
Horizontal	-3.59
Vertical	-1.80
E total	-1.41

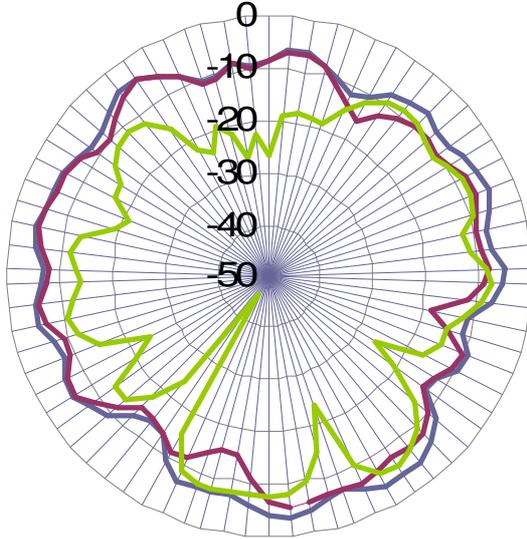
MIMO antenna: 2593 MHz



frequency	2593
Horizontal	-2.85
Vertical	-1.65
E total	-0.72

MIMO antenna: 2685 MHz

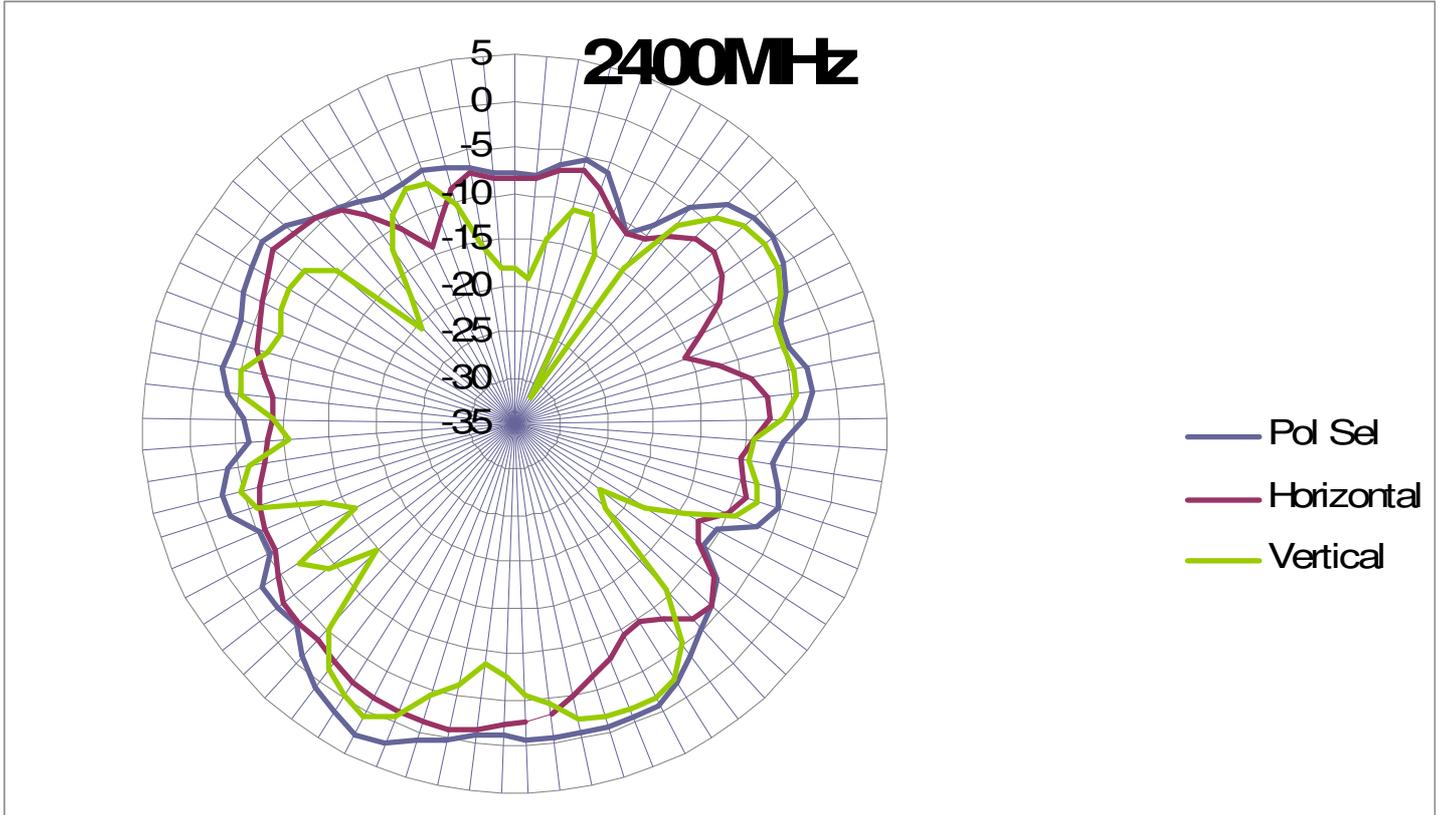
2685MHz



- Pd Sel
- HORIZONTAL
- Vertical

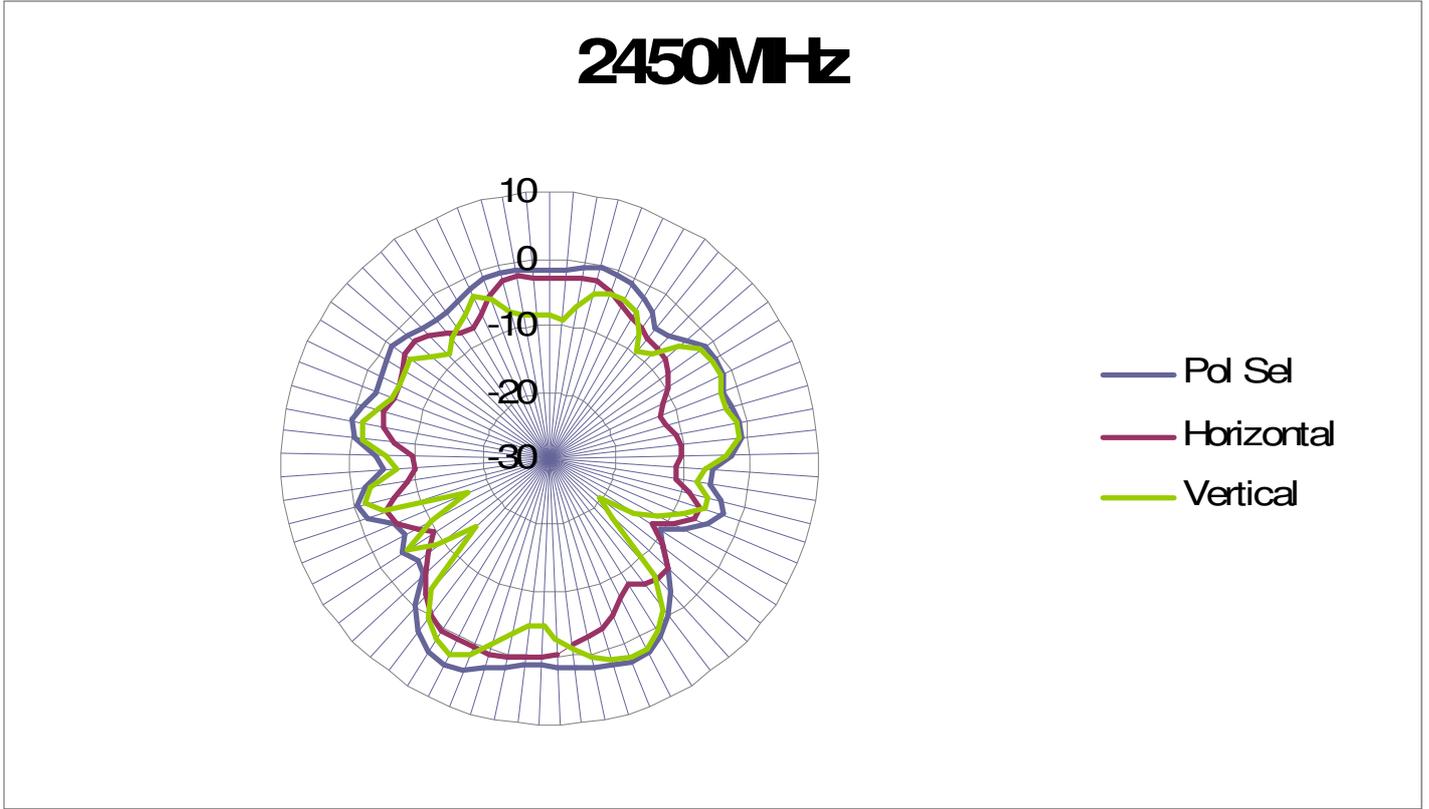
frequency	2685
Horizontal	-6.16
Vertical	-4.77
E total	-3.47

AUX antenna: 2400 MHz



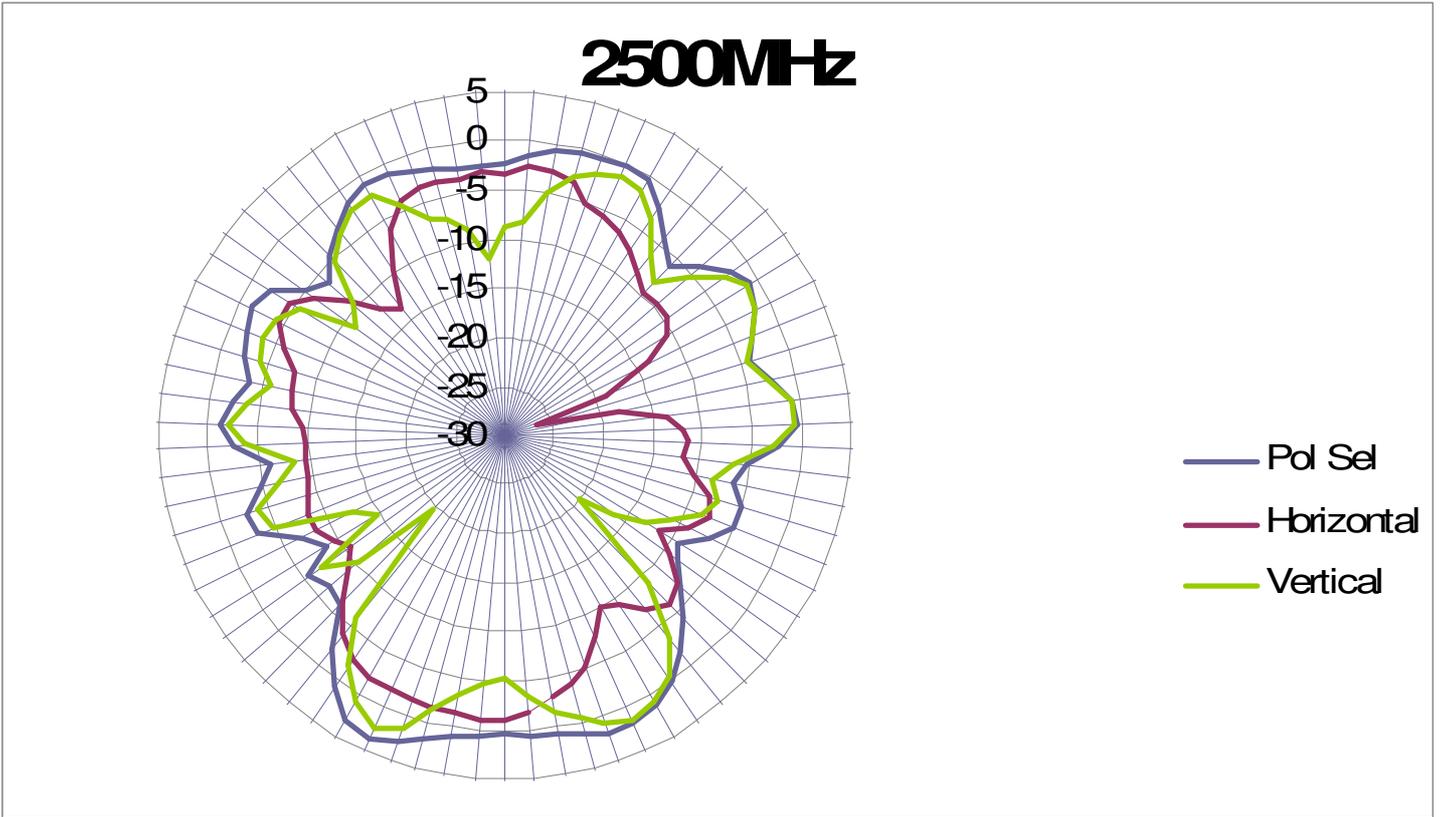
frequency	2400
Horizontal	0.66
Vertical	-1.14
E total	2.73

AUX antenna: 2450 MHz



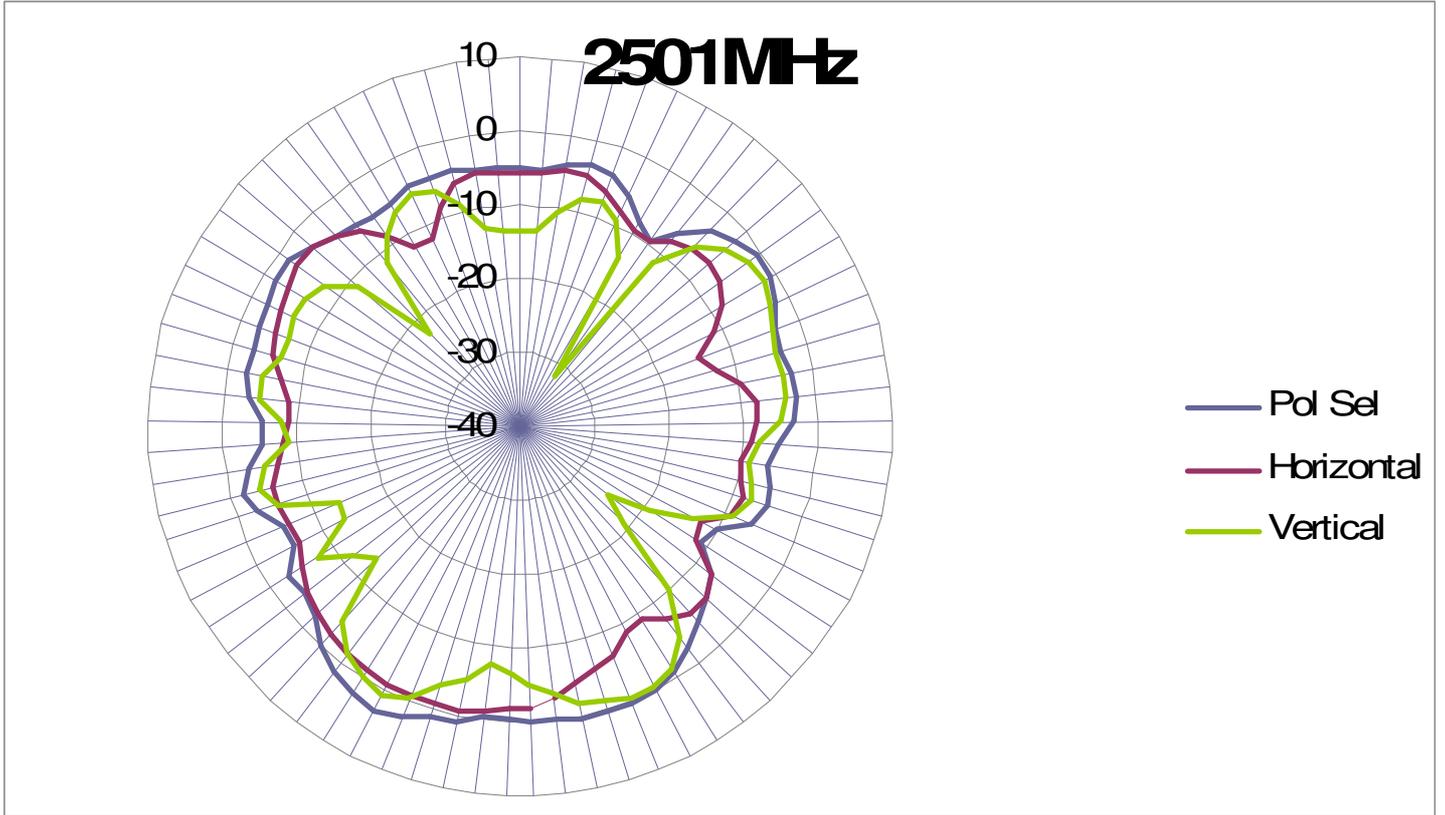
frequency	2450
Horizontal	2.92
Vertical	0.78
E total	4.92

AUX antenna: 2500 MHz



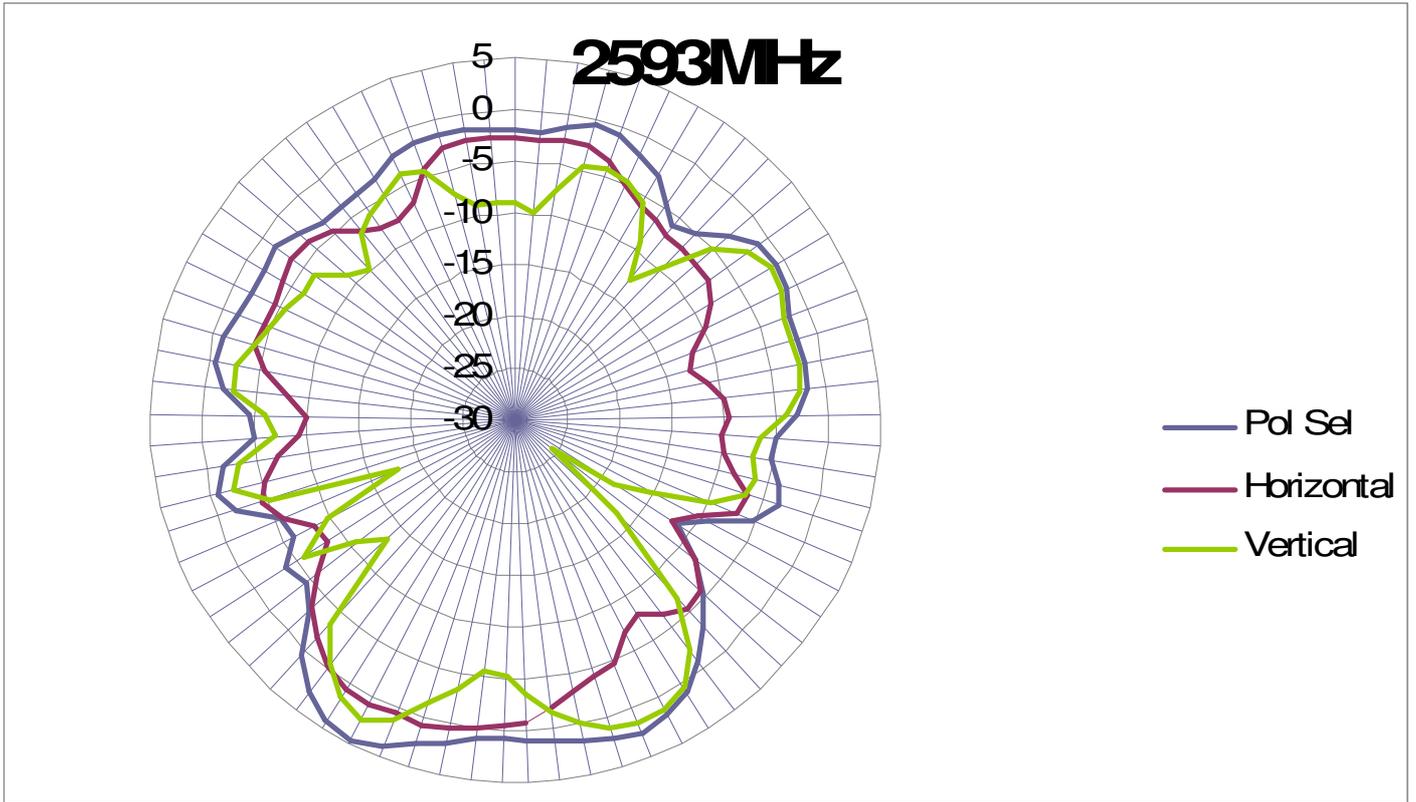
frequency	2500
Horizontal	2.41
Vertical	-1.25
E total	3.79

AUX antenna: 2501 MHz



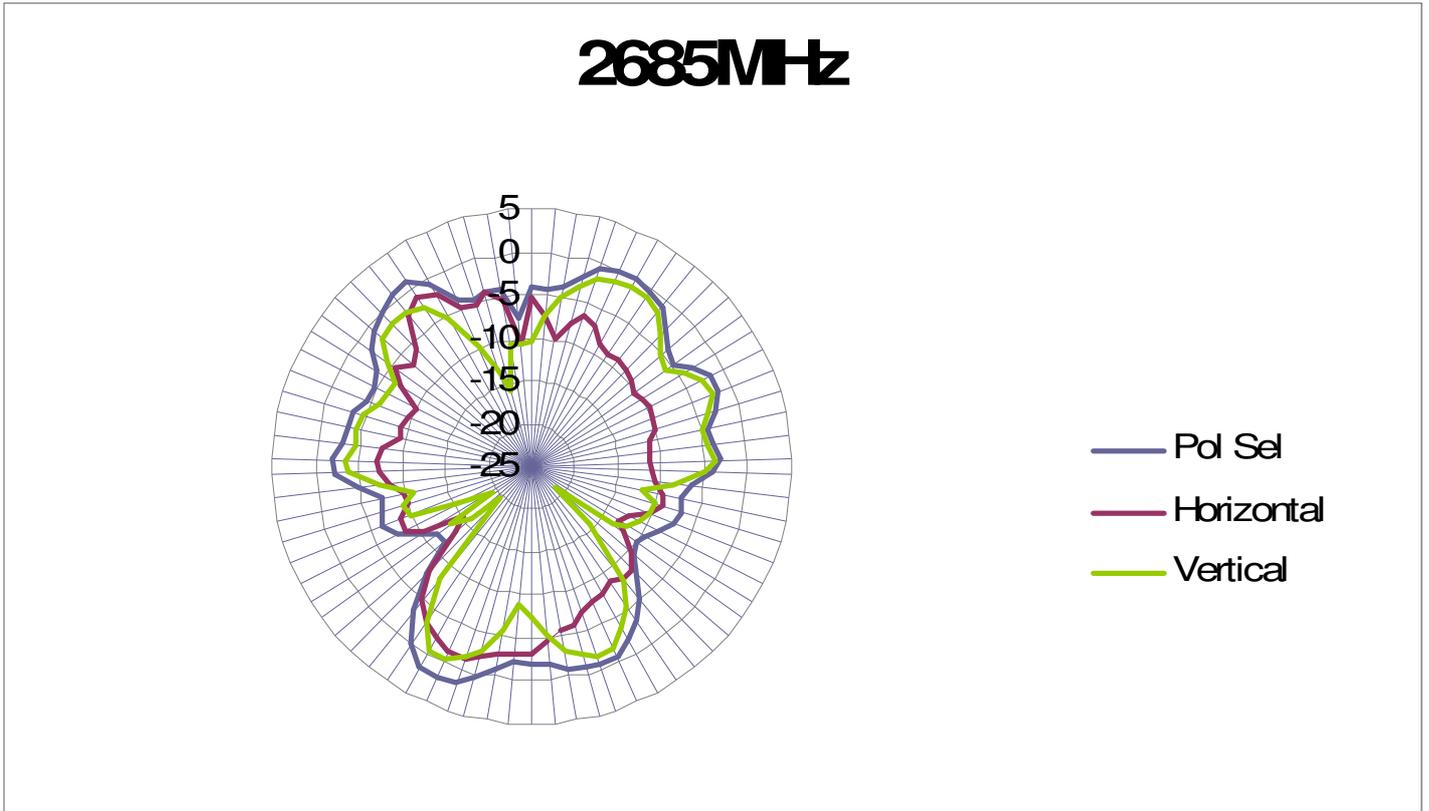
frequency	2501
Horizontal	1.16
Vertical	-0.67
E total	3.31

AUX antenna: 2593 MHz



frequency	2593
Horizontal	2.43
Vertical	0.65
E total	4.63

AUX antenna: 2685 MHz

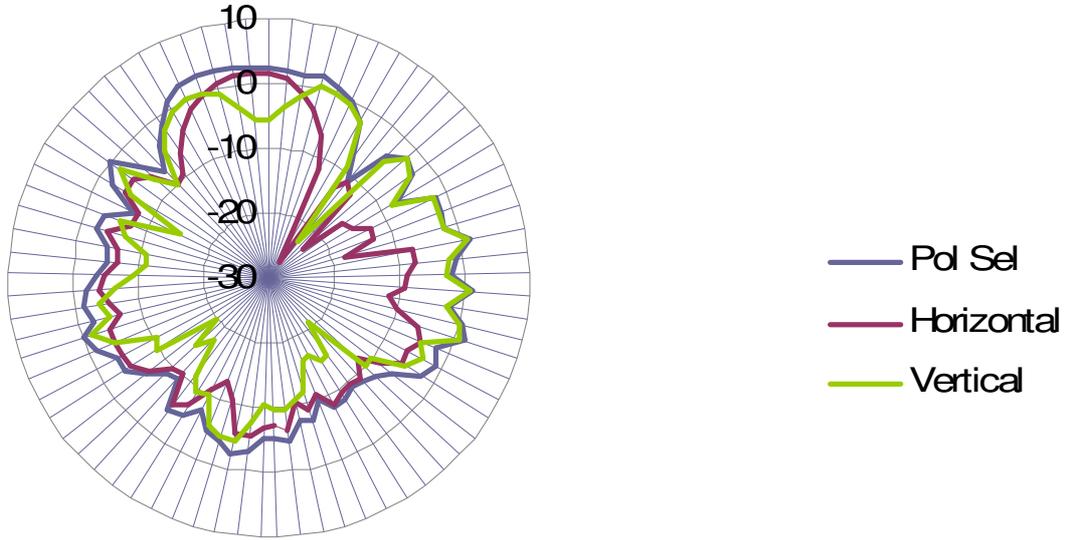


frequency	2685
Horizontal	-0.47
Vertical	-1.25
E total	2.07

5150-5350 MHz radiation characteristic

Main antenna: 5150 MHz

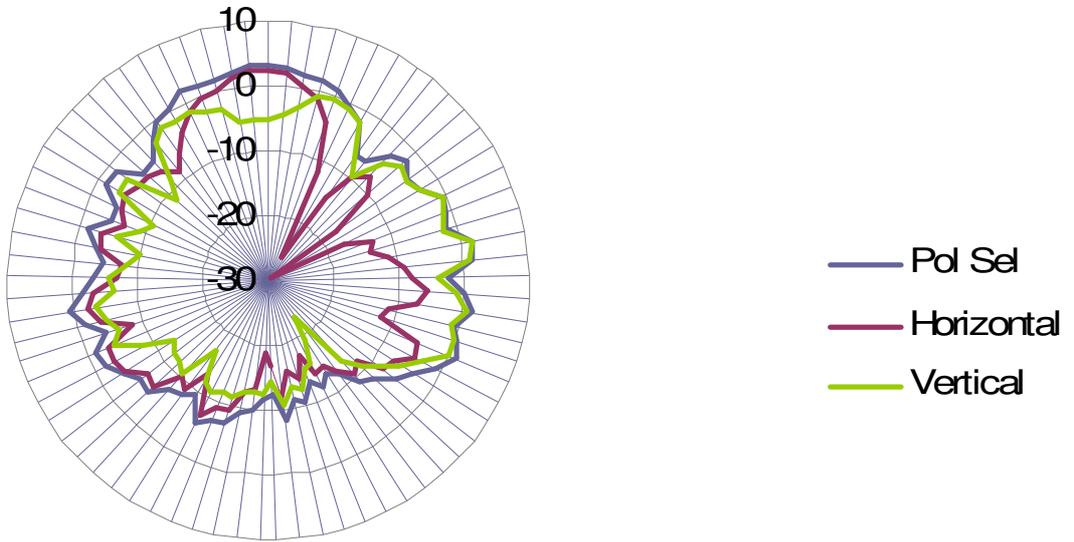
5150MHz



frequency	5150
Horizontal	0.94
Vertical	1.78
E total	3.30

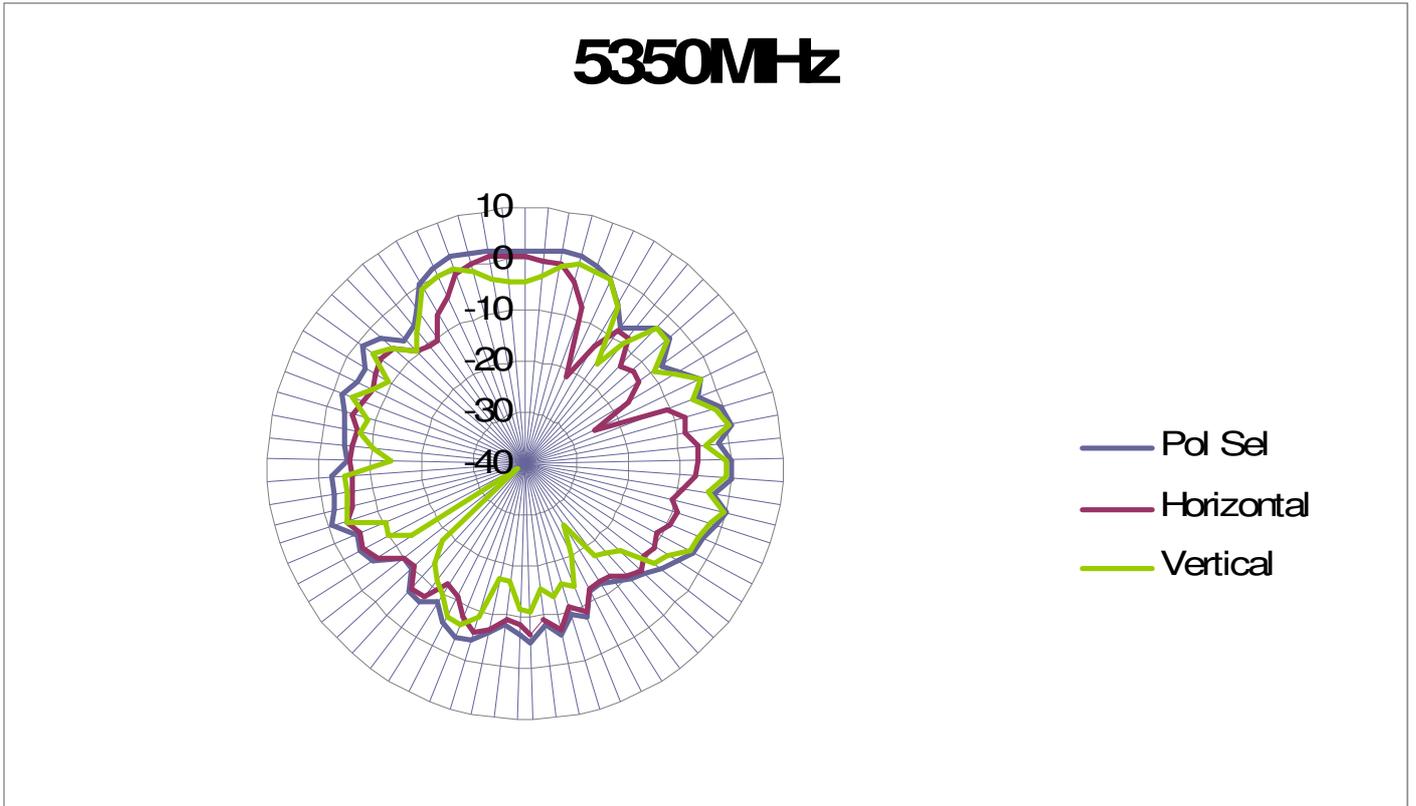
Main antenna: 5250 MHz

5250MHz



frequency	5250
Horizontal	1.55
Vertical	2.53
E total	3.19

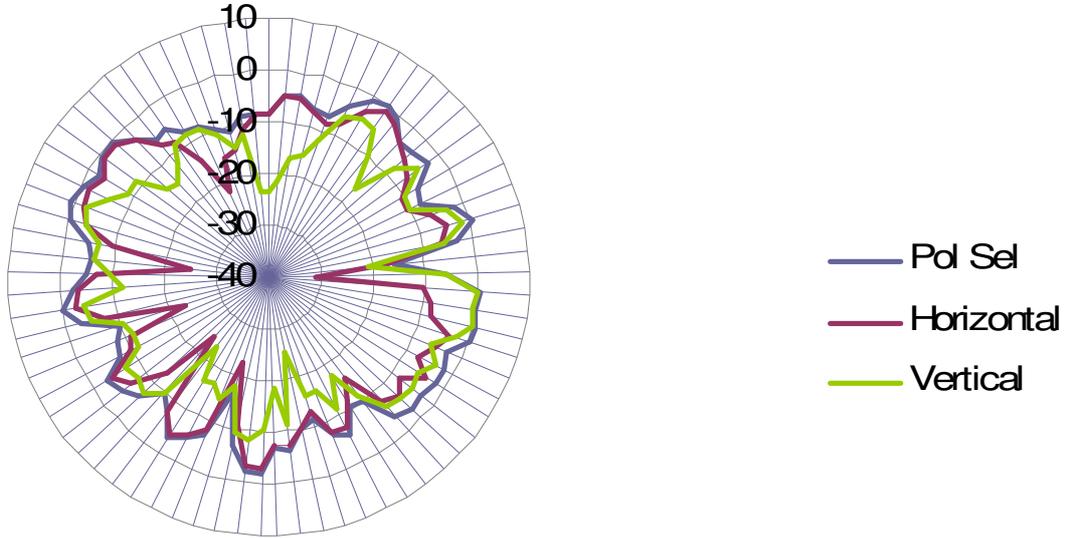
Main antenna: 5350 MHz



frequency	5350
Horizontal	0.54
Vertical	0.85
E total	3.03

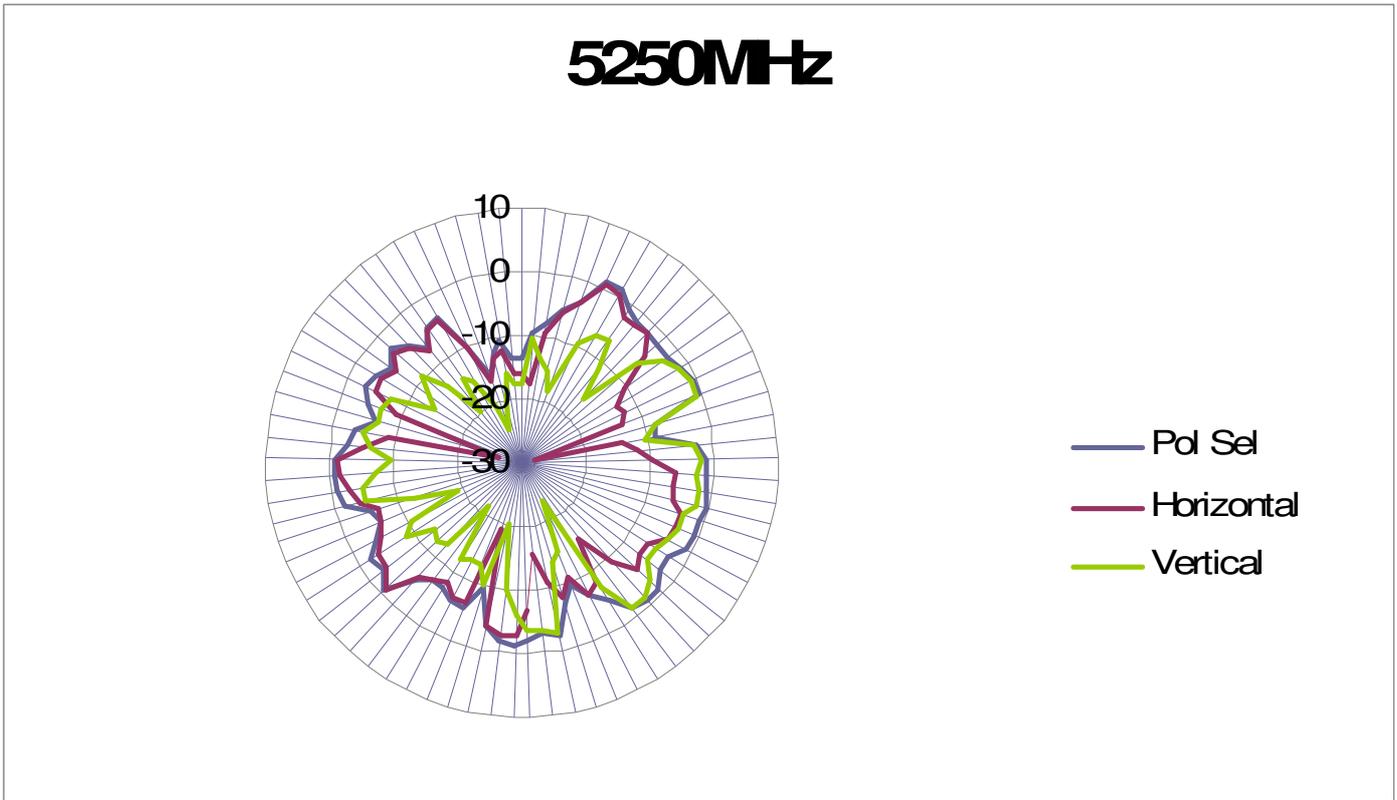
MIMO antenna: 5150 MHz

5150MHz



frequency	5150
Horizontal	0.11
Vertical	-0.84
E total	0.69

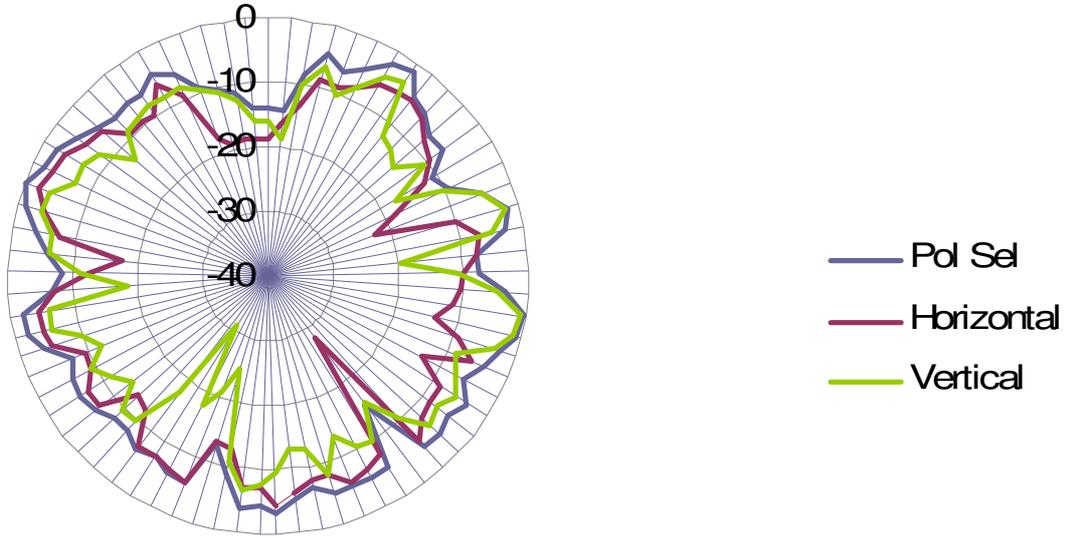
MIMO antenna: 5250 MHz



frequency	5250
Horizontal	-0.65
Vertical	0.91
E total	1.31

MIMO antenna: 5350 MHz

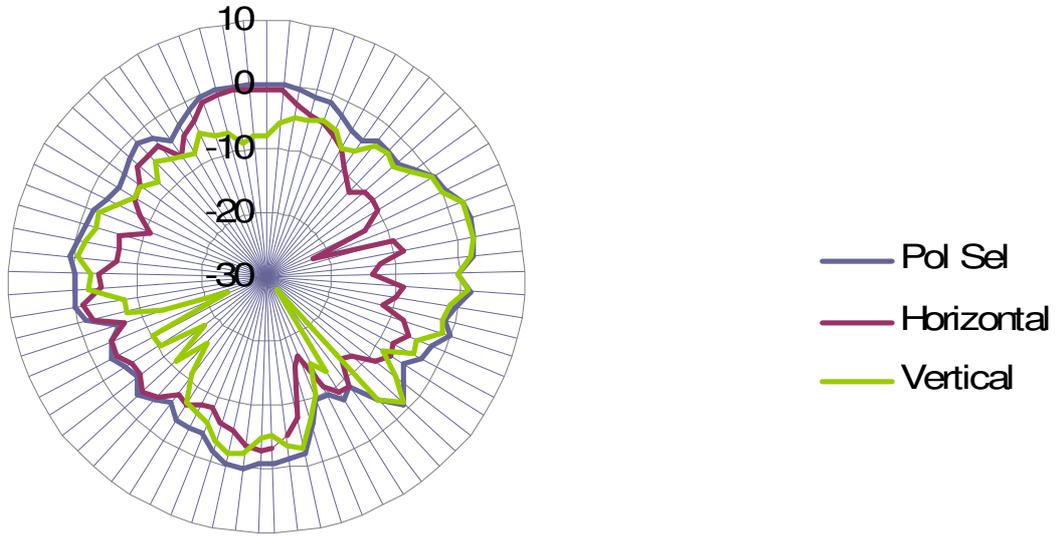
5350MHz



frequency	5350
Horizontal	-0.75
Vertical	-2.26
E total	-0.04

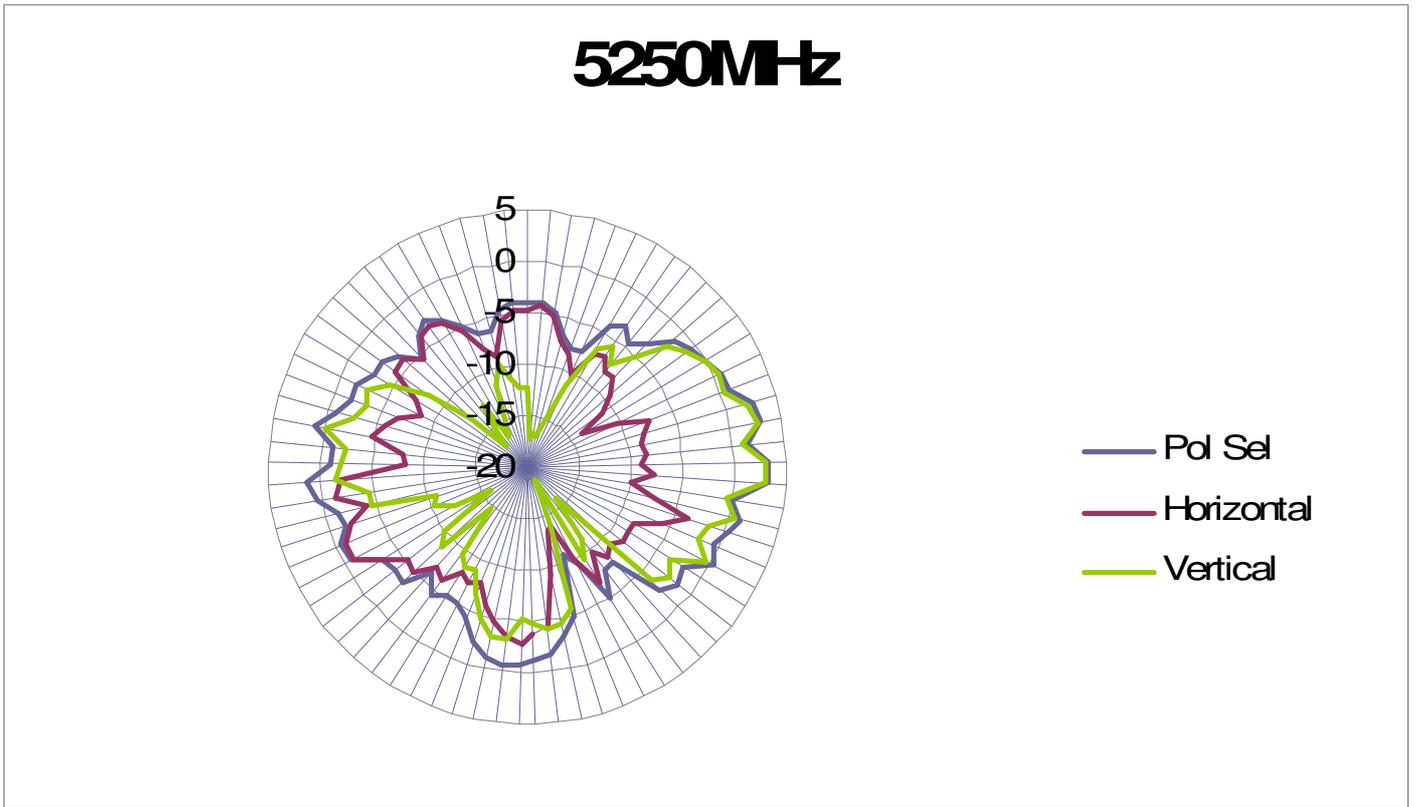
AUX antenna: 5150 MHz

5150MHz



frequency	5150
Horizontal	2.46
Vertical	-0.50
E total	2.77

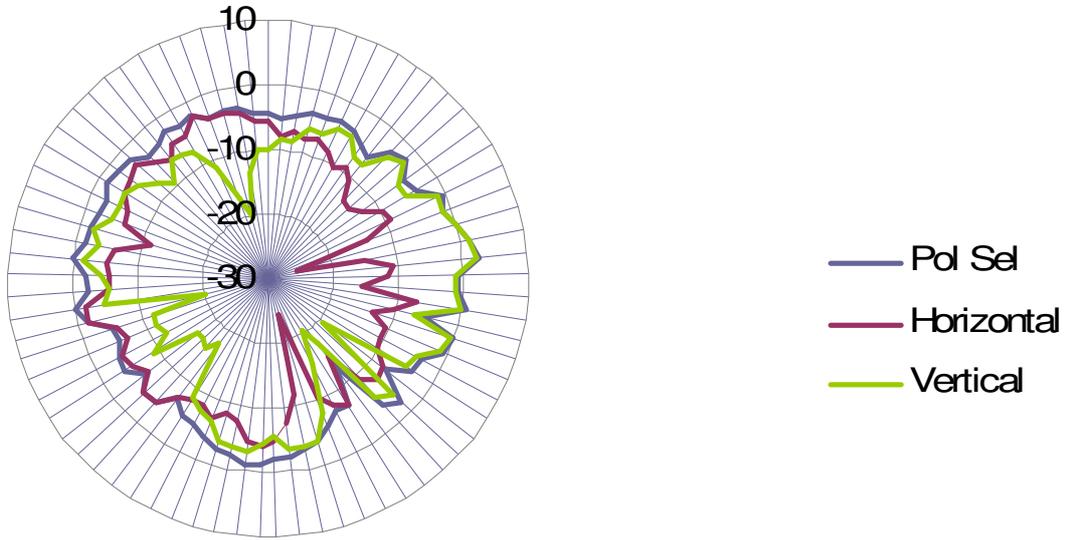
AUX antenna: 5250 MHz



frequency	5250
Horizontal	3.01
Vertical	-0.89
E total	3.32

AUX antenna: 5350 MHz

5350MHz

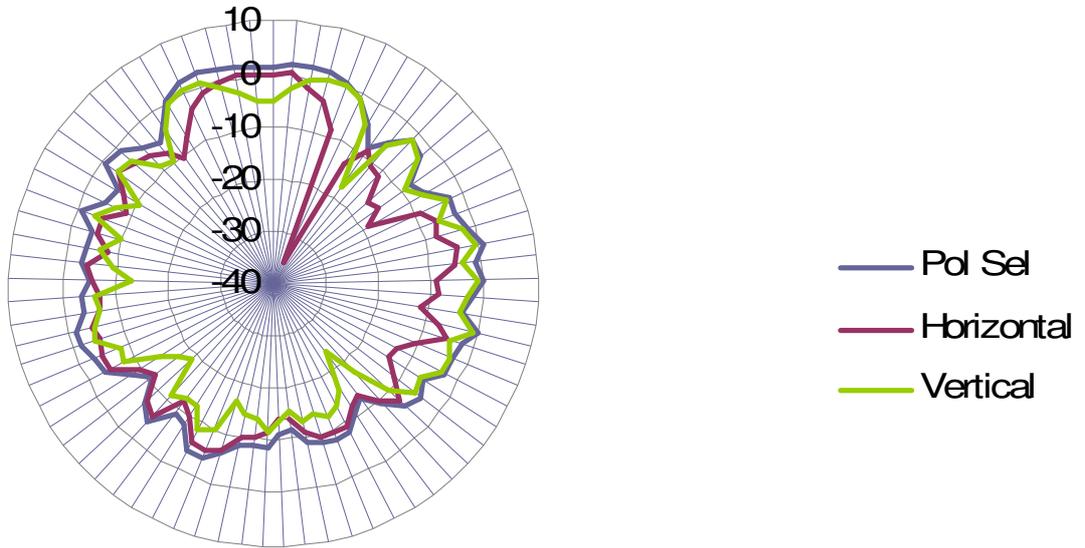


frequency	5350
Horizontal	2.18
Vertical	-1.65
E total	2.40

5470-5725MHz radiation characteristic

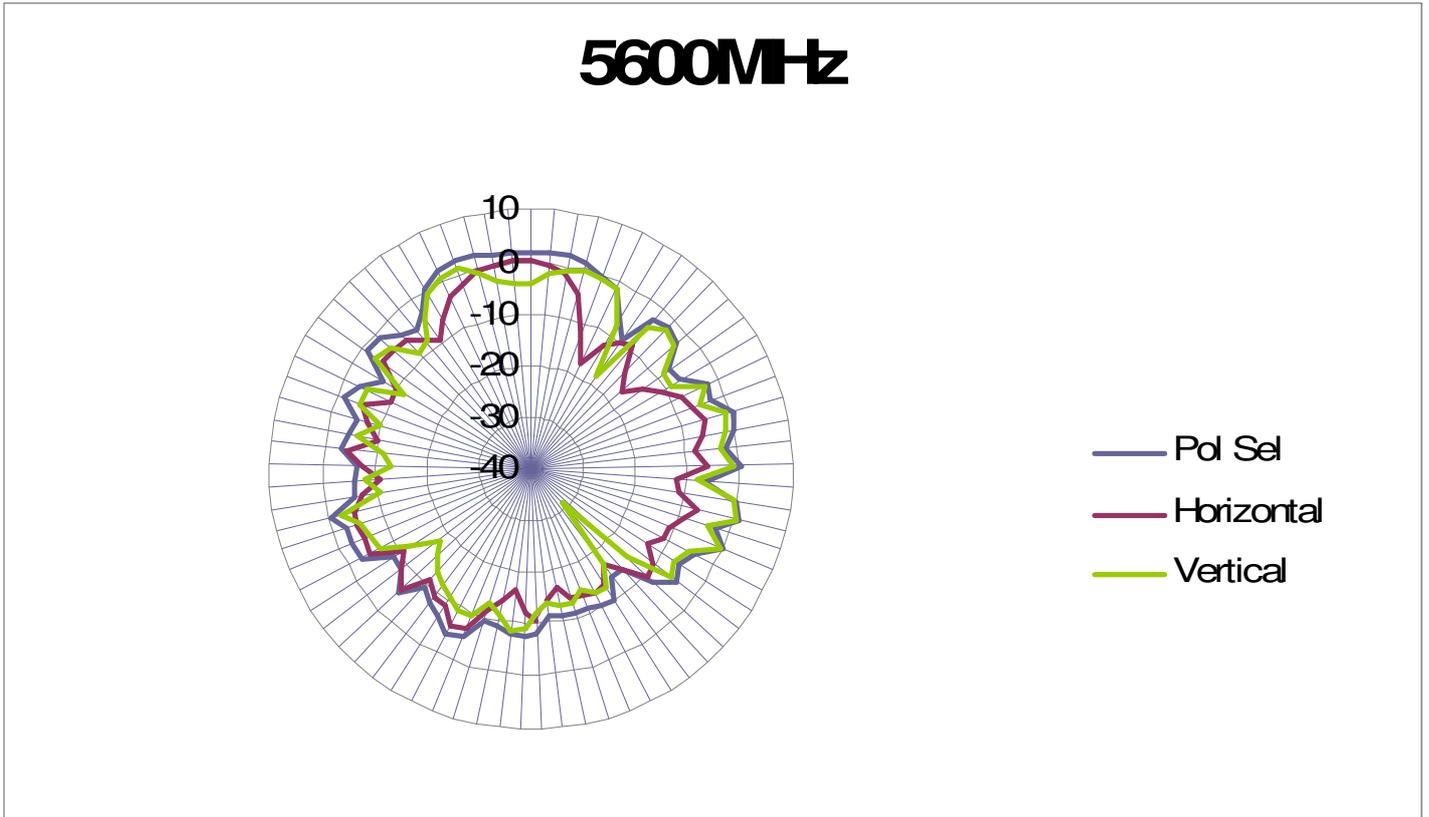
Main antenna: 5470MHz

5470MHz



frequency	5470
Horizontal	0.58
Vertical	0.06
E total	2.75

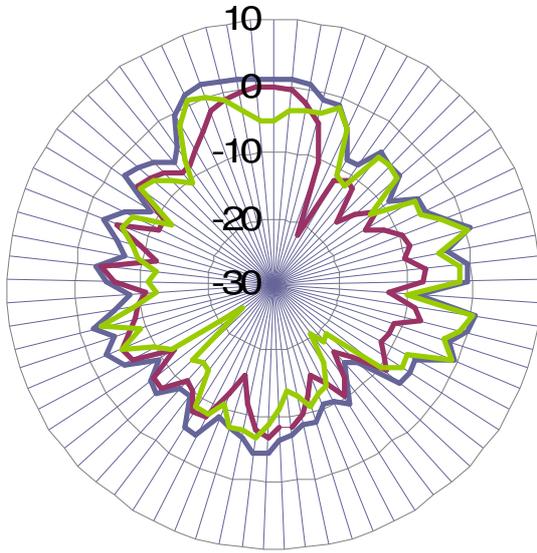
Main antenna: 5600 MHz



frequency	5600
Horizontal	0.89
Vertical	0.08
E total	2.75

Main antenna: 5725 MHz

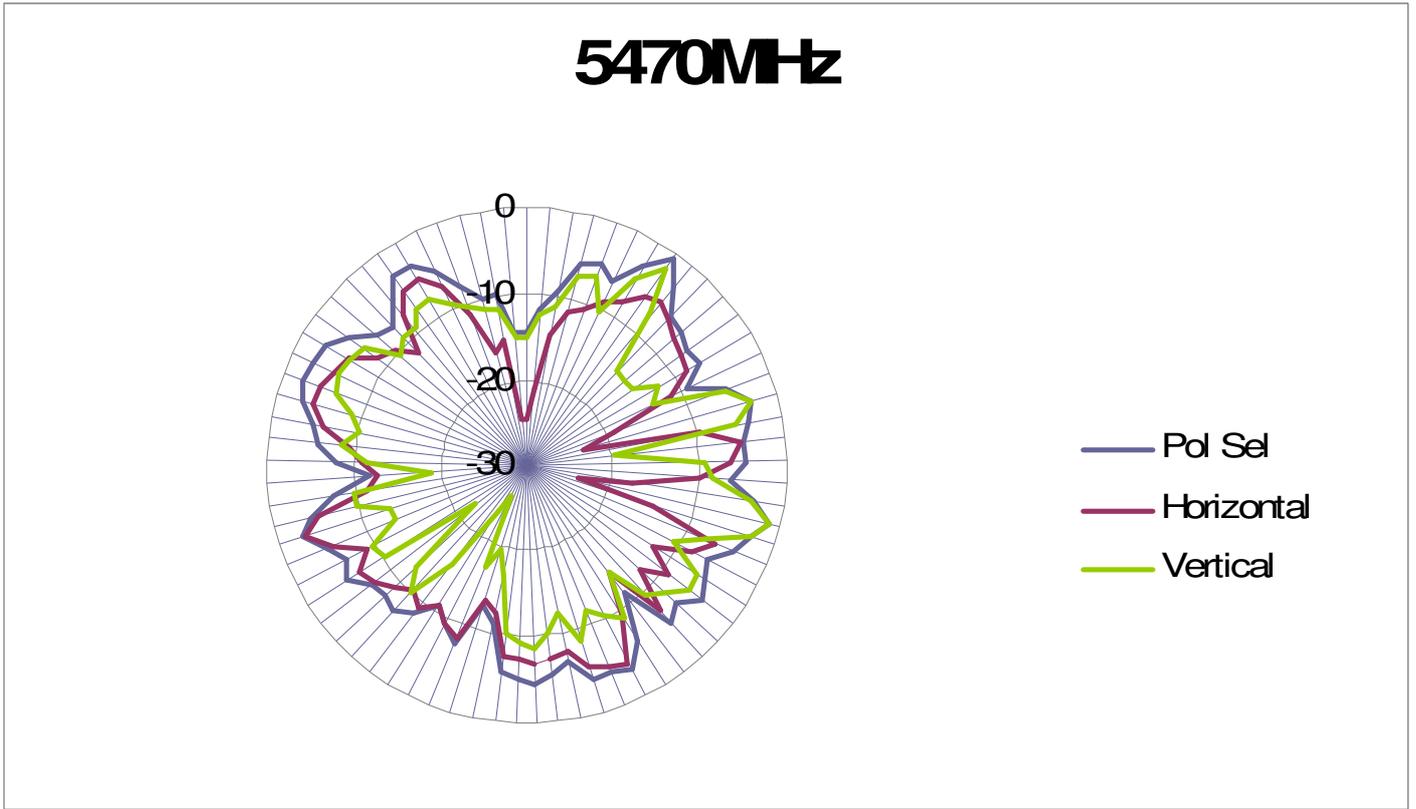
5725MHz



- Pd Sel
- Hbrizontal
- Vertical

frequency	5725
Horizontal	0.45
Vertical	-0.38
E total	2.23

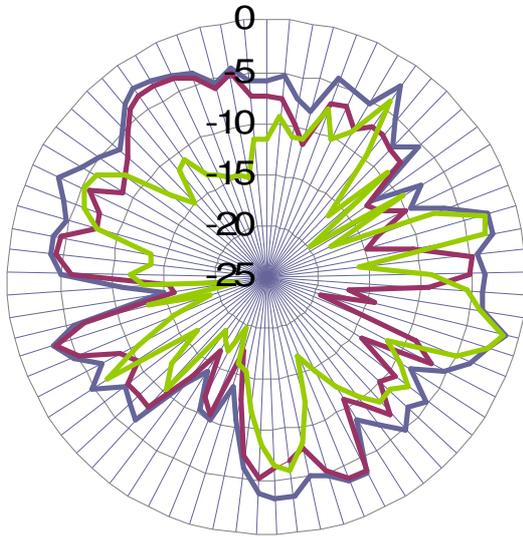
MIMO antenna: 5470MHz



frequency	5470
Horizontal	-1.19
Vertical	-3.16
E total	-0.59

MIMO antenna: 5600 MHz

5600MHz

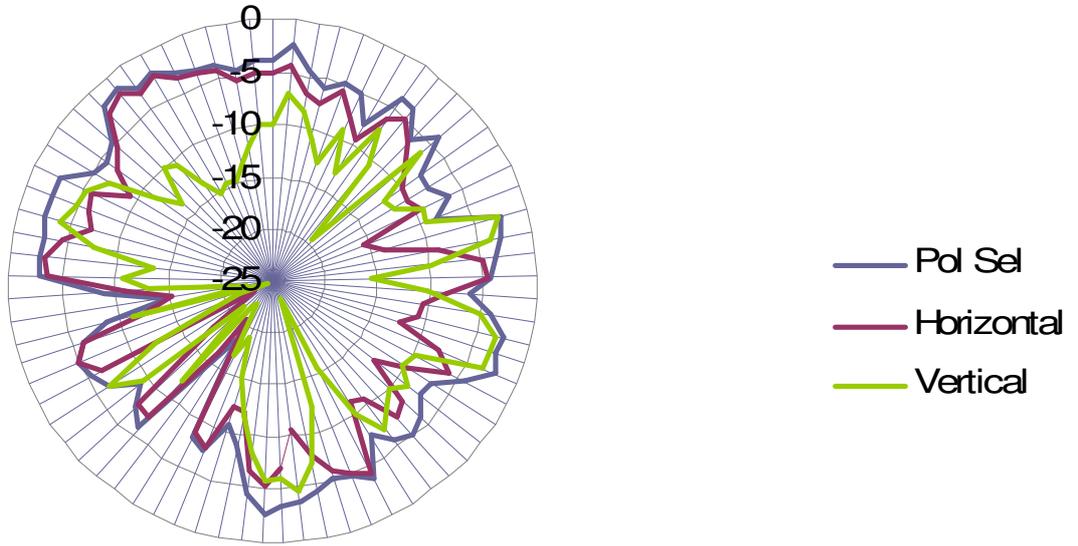


- Pol Sel
- Horizontal
- Vertical

frequency	5600
Horizontal	-1.52
Vertical	-3.40
E total	-1.30

MIMO antenna: 5725 MHz

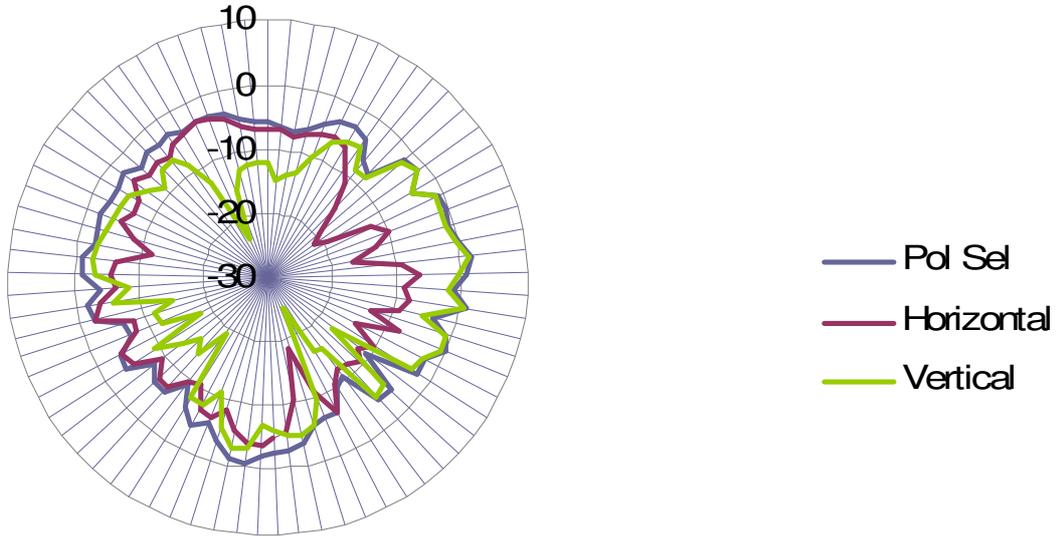
5725MHz



frequency	5725
Horizontal	-2.74
Vertical	-2.00
E total	-1.46

Auxiliary antenna: 5470MHz

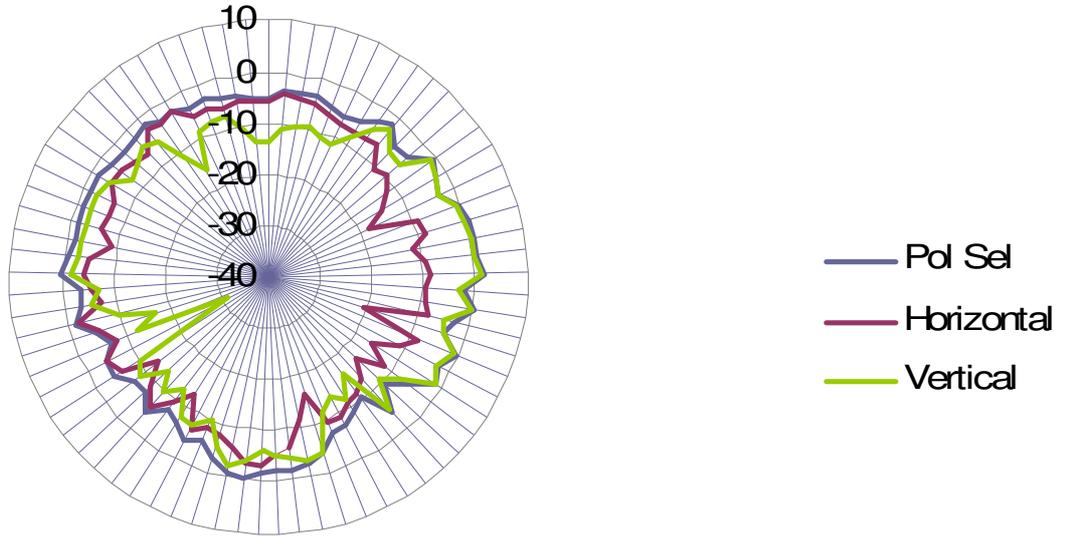
5470MHz



frequency	5470
Horizontal	0.95
Vertical	-2.86
E total	1.34

Auxiliary antenna: 5600 MHz

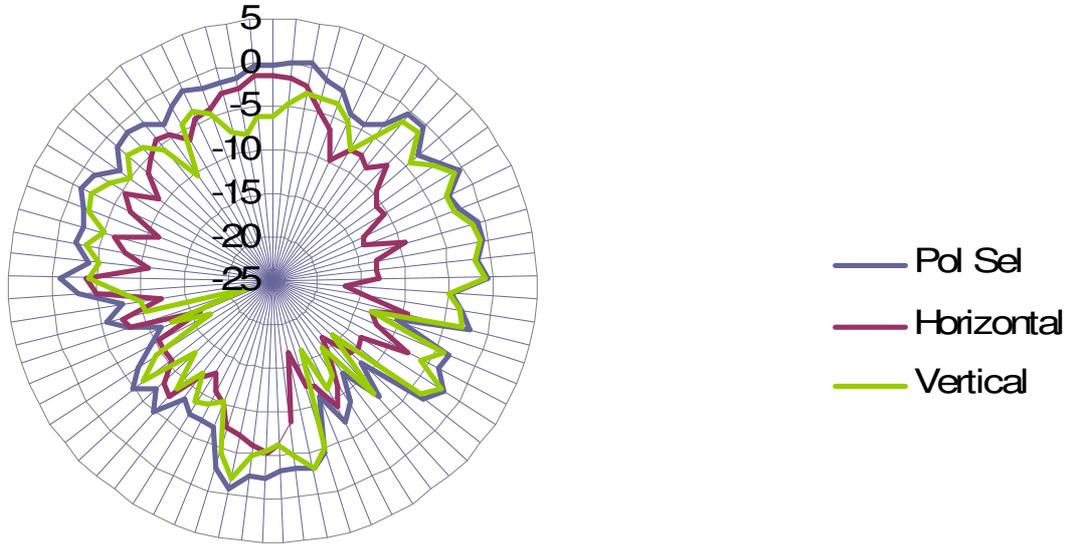
5600MHz



frequency	5600
Horizontal	1.00
Vertical	-2.26
E total	1.42

Auxiliary antenna: 5725 MHz

5725MHz

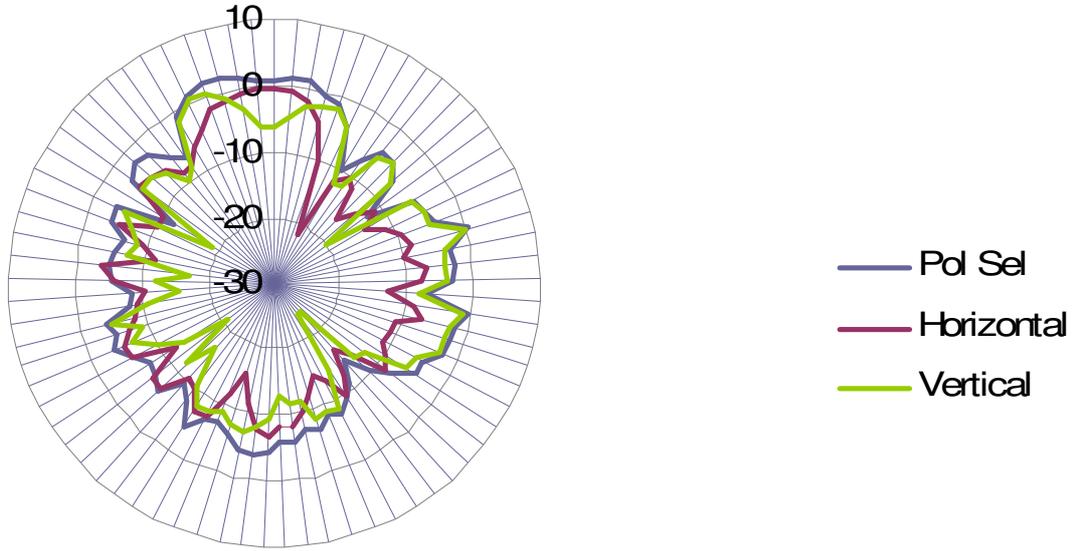


frequency	5725
Horizontal	-0.74
Vertical	-1.39
E total	0.31

5800-5875 MHz radiation characteristic

Main antenna: 5785MHz

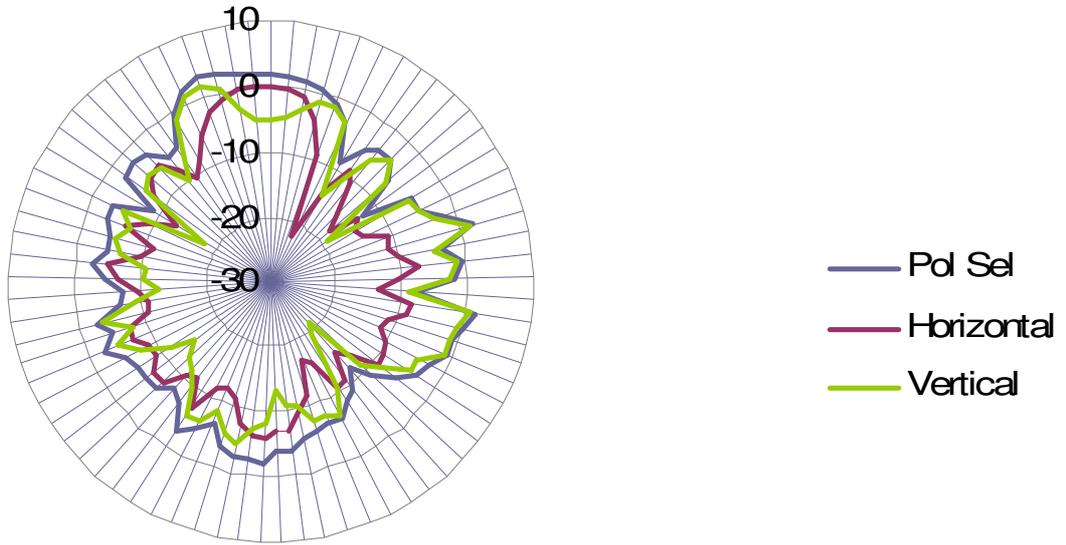
5785MHz



frequency	5785
Horizontal	0.61
Vertical	-0.38
E total	2.31

Main antenna: 5850MHz

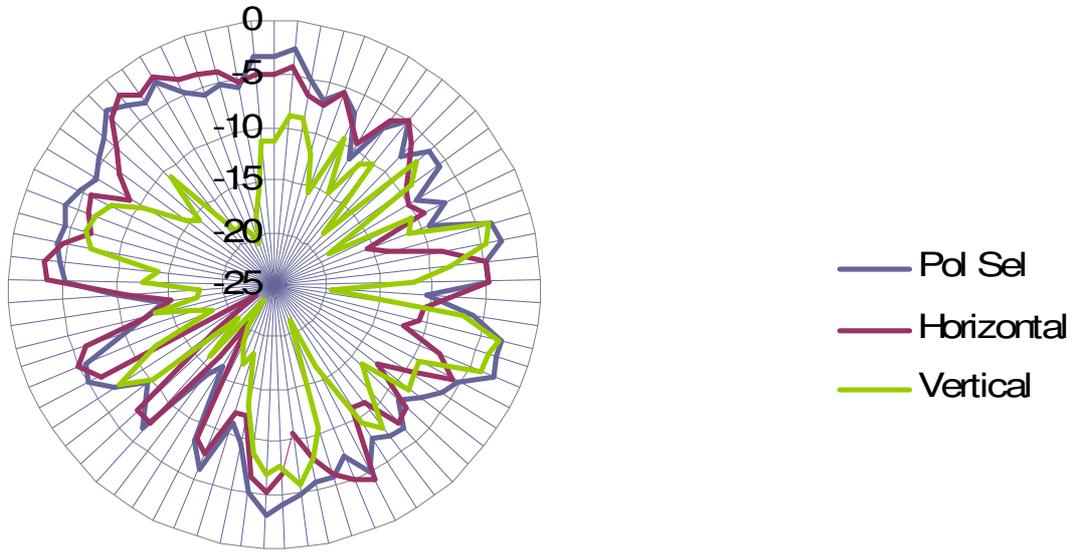
5850MHz



frequency	5850
Horizontal	1.68
Vertical	-0.06
E total	3.23

MIMO antenna: 5785z

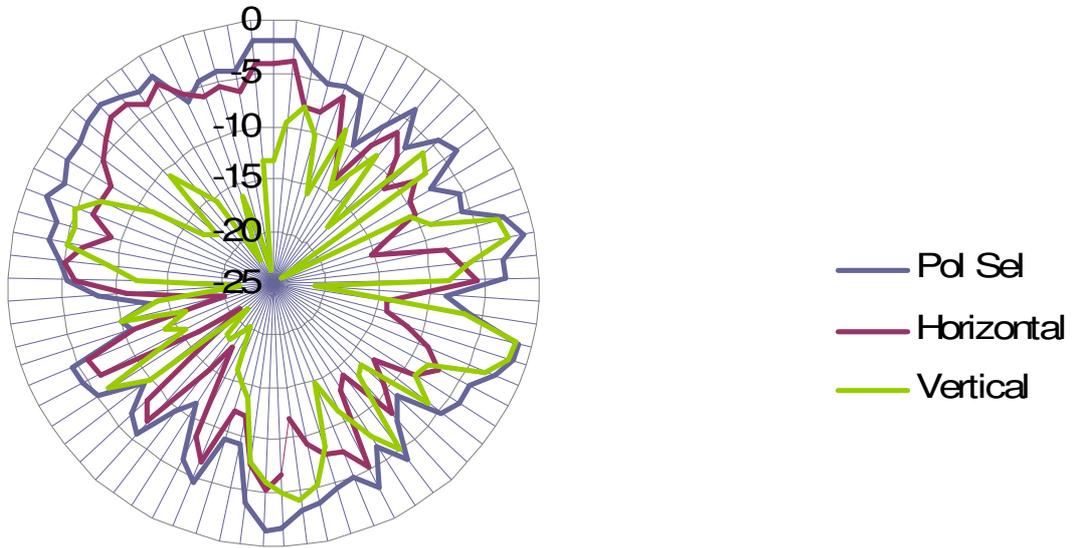
5785MHz



frequency	5785
Horizontal	-3.21
Vertical	-2.00
E total	-2.25

MIMO antenna: 5850MHz

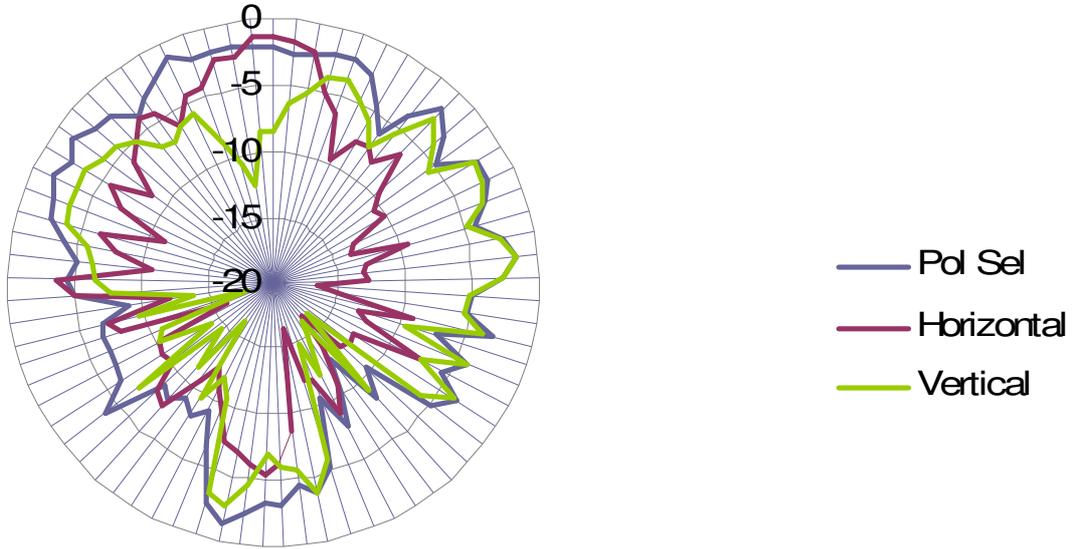
5850MHz



frequency	5850
Horizontal	-1.34
Vertical	-2.88
E total	-1.08

Auxiliary antenna: 5785 MHz

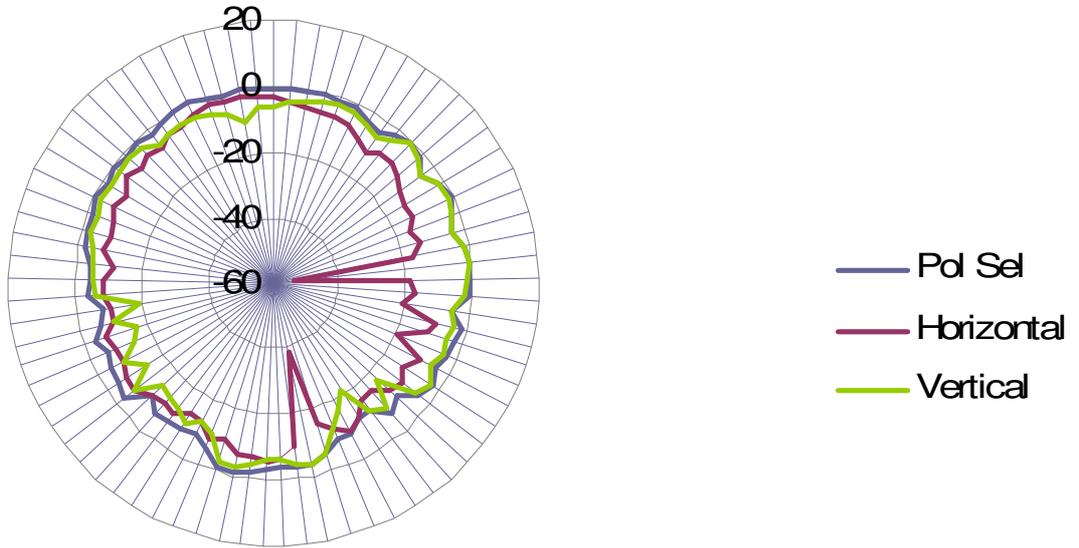
5785MHz



frequency	5785
Horizontal	-1.60
Vertical	-1.39
E total	-1.26

Auxiliary antenna: 5850MHz

5850MHz



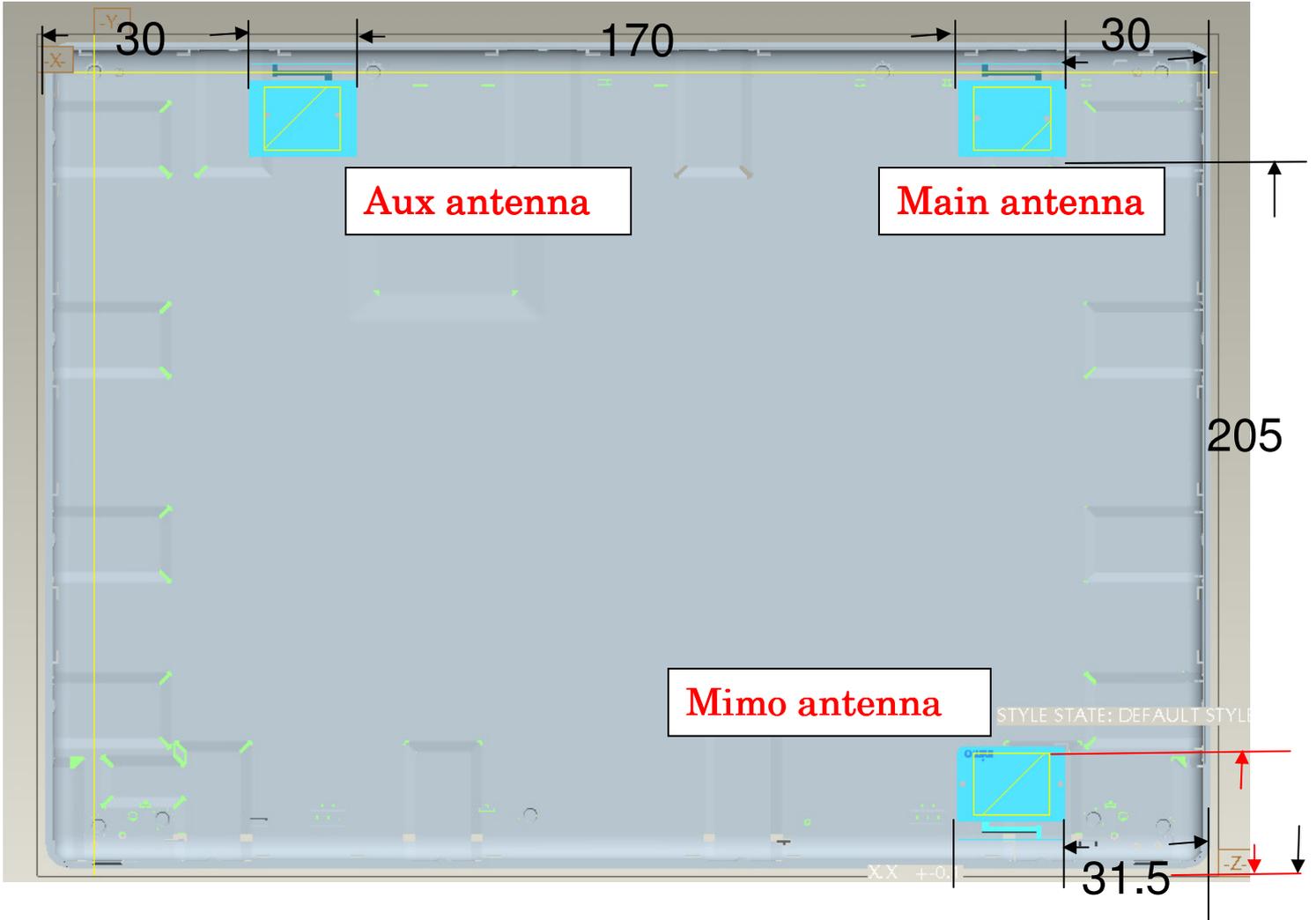
frequency	5850
Horizontal	-0.63
Vertical	-2.39
E total	0.29

Section 4. Host Platform Information

OEM / ODM Host platform: (XXXXXXX) platform correlated to antenna data
Rating Label Photo:

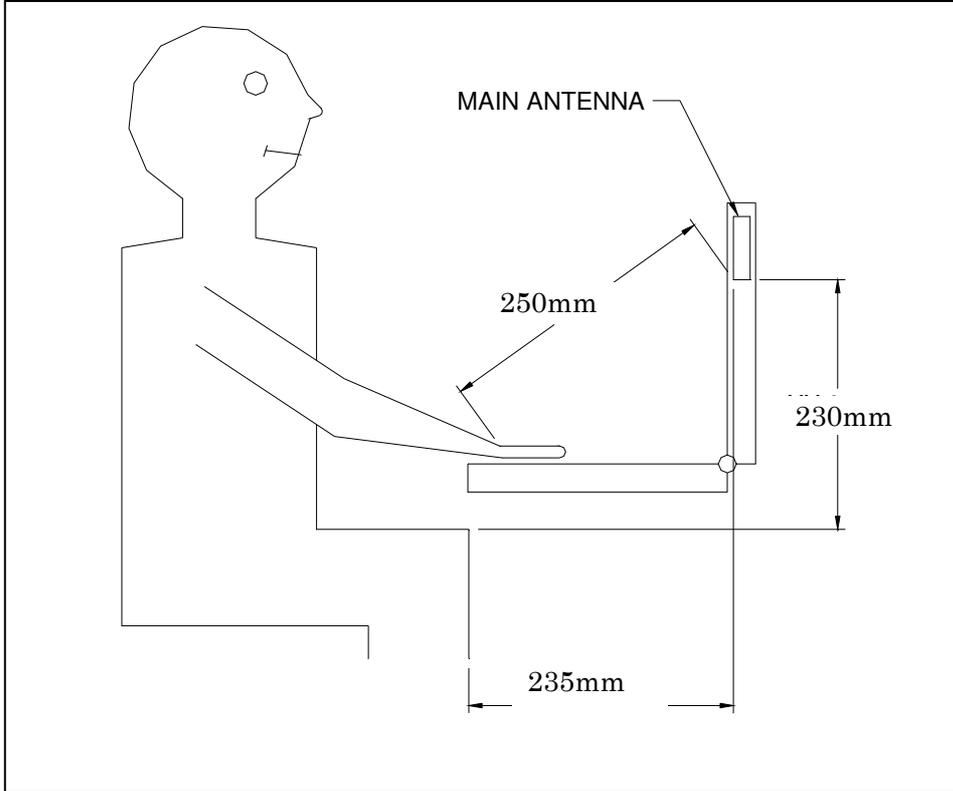
Section 5. Antenna Host Platform Location Information

Include a dimensioned photos or dimensioned drawings of main and auxiliary antenna placements. (measurements are not required for receive-only antenna). Any antenna that transmits must show dimensions to bottom of laptop.



Section 6. Antenna dimensional information for SAR evaluation

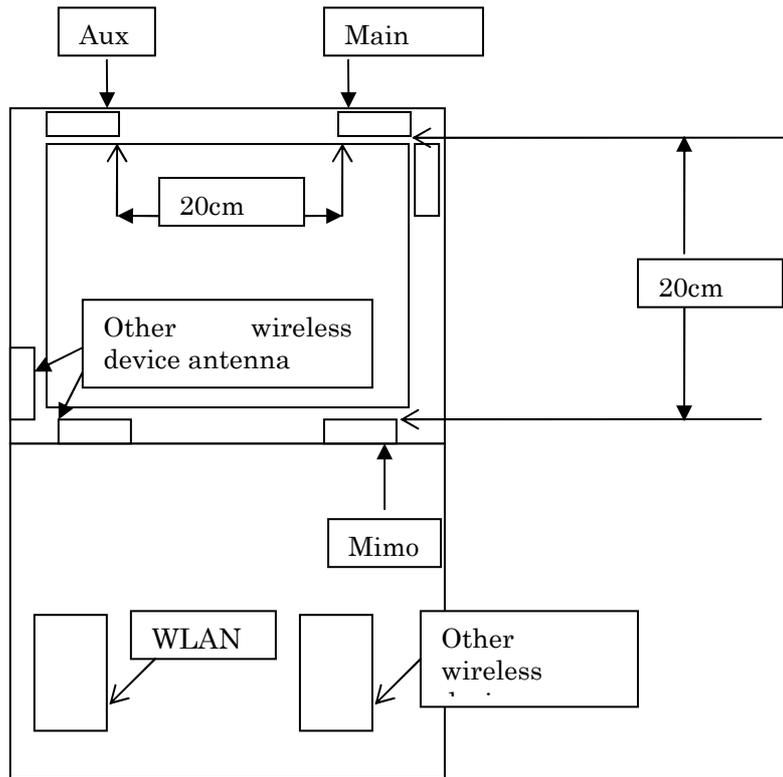
Include a **dimensioned photos or dimensioned drawings** showing the distance (mm) between the transmit antennas and the user (excluding hands, wrist, feet, lap/thigh, and ankle)



Section 7. Diagram Example of Co-Location Antenna Separation

Include a **dimensioned photo or dimensioned drawing** showing the distance (mm) between all WLAN transmit antennas and other co-located radiator transmit antenna such as Bluetooth, WWAN,...

(Note: Due to the evolving rules regarding co-location, each platform will need to be reviewed on a case by case basis)



Section 8. Local representative contact information

Local representative contact information is required for regulatory support for target countries below.

	Local company name	Contact name	Phone number	FAX Number	e-Mail Address	Notes
Argentina						
Brazil						
Indonesia						
Israel						
Malaysia						
Mexico						
Singapore						Telecommunication Equipment Dealer License Required
South Africa						
USA, Canada						