

# Regulatory WLAN Antenna Information

## 2.3/5GHz Dell Low Rider Series Multiple Band Antennas with Cable & Connector

(English Language Required for Intel Regulatory Review / Approval)

<b>Platform</b>	
Platform Owner	Dell
Brand Name	Dell
Model Name	Vostro 1220
ODM	Quanta
Target Launch Date	(2009/ 06/ 26)
<b>Antenna</b>	
Brand Name	Acon
Part Number	<input checked="" type="checkbox"/> Tx1 Antenna: Main –AMM8P-700007
	<input checked="" type="checkbox"/> Tx2 Antenna:Aux –AMM8P-700007
	<input checked="" type="checkbox"/> Tx2 Antenna:MIMO- AMM8P-700007
<b>Module</b>	
With WLAN Module	<input checked="" type="checkbox"/> Intel 5100 AN - 512AN
(Check Box)	<input checked="" type="checkbox"/> Intel 5300 AN – 533AN
	<input checked="" type="checkbox"/> Intel 5150 AN – 512ANX

## 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. (S. Korea requires <u>photographs of antennas for approval submission</u> ). <u>Taiwan requires pictures of each antenna type shown in the system.</u>	Required	Required	Desired	<u>Required (Photos)</u>	<u>Required (Photos)</u>
6	Mech. drawings / photos with dimensions of antenna locations and distance from end-user (For evaluation of SAR testing requirement).	Required	N/A	N/A	N/A	N/A
7	Photograph(s) or Drawings showing the location of all antennas (WLAN, other) and distance between those transmitting antennas. Information will be used to evaluate whether co-location testing is required.	Required	N/A	N/A	N/A	N/A
8	Local representative contact information for LMA/ PARS process.	Required	N/A	N/A	N/A	N/A

**NOTE:**

(\* ) if 3<sup>rd</sup> 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)
Tx1 Antenna <b>AMM8P-700007</b>  <b>Main White</b>	ACON Corporation	PIFA	1) cable p/n: /KURABE FWS5032 3831 M W /Sumitomo EW08-9100-0331 /GBE RF137WR4 /Hitachi 1RFX-SB30-137A -W Shen-Yu SY137-016 2) O.D. 1.37mm 50 ohm coaxial cable 3) length: 589mm 4) Connector P/N:I-PEX-MHF 20278-111R-3 /Hirose-MHF U.FL-L(P)-088	2300-2400MHz 2.37dBi (peak)	2300-2400MHz 3.71dBi (peak)	2300-2400MHz 3max	2300-2400MHz 1.34dBi (peak)
				2400-2500MHz 2.65dBi (peak)	2400-2500MHz 4.17dBi (peak)	2400-2500MHz 3 max	2400-2500MHz 1.52dBi (peak)
				2500-2700MHz 1.68dBi (peak)	2500-2700MHz 3.37dBi (peak)	2500-2700MHz 3max	2500-2700MHz 1.69dBi (peak)
				5150-5470MHz -2.13 dBi (peak)	5150-5470MHz 0.18dBi (peak)	5150-5470MHz 3 max	5150-5470MHz 2.31dBi (peak)
				5470-5875MHz -2.13 dBi (peak)	5470-5875MHz 0.3dBi (peak)	5470-5875MHz 3 max	5470-5875MHz 2.43dBi (peak)
Tx2 antenna <b>AMM8P-700007</b>  <b>Aux black</b>	ACON Corporation	PIFA	1) cable p/n: /KURABE FWS5032 3831 M B /Sumitomo EW08-9100-0328 /GBE RF137BR4 /Hitachi 1RFX-SB30-137A -k /Shen-Yu SY137-003 2) O.D. 1.37mm 50 ohm coaxial cable 3) length: 558mm 4) Connector P/N:I-PEX-MHF 20278-111R-3 /Hirose-MHF U.FL-L(P)-088	2300-2400MHz 0.11dBi (peak)	2300-2400MHz 1.35dBi (peak)	2300-2400MHz 3max	2300-2400MHz 1.24dBi (peak)
				2400-2500MHz -0.8 dBi (peak)	2400-2500MHz 0.61dBi (peak)	2400-2500MHz 3 max	2400-2500MHz 1.41dBi (peak)
				2500-2700MHz 0.39dBi (peak)	2500-2700MHz 1.96dBi (peak)	2500-2700MHz 3max	2500-2700MHz 1.57dBi (peak)
				5150-5470MHz -0.65 dBi (peak)	5150-5470MHz 1.49dBi (peak)	5150-5470MHz 3 max	5150-5470MHz 2.14dBi (peak)
				5470-5875MHz -0.72 dBi (peak)	5470-5875MHz 1.54dBi (peak)	5470-5875MHz 3 max	5470-5875MHz 2.26dBi (peak)
Tx3 antenna <b>AMM8P-700007</b>  <b>MIMO Gray</b>	ACON Corporation	PIFA	1) cable p/n: /KURABE FWS5032 3831 M H /Sumitomo EW08-9100-0332 /GBE RF137GR4 /Hitachi 1RFX-SB30-137A -H /Shen-Yu SY137-015 2) O.D. 1.37mm 50 ohm coaxial cable 3) length:331mm 4) Connector P/N:I-PEX-MHF 20278-111R-3 /Hirose-MHF U.FL-L(P)-088	2400-2500MHz 0.83dBi (peak)	2400-2500MHz 1.75dBi (peak)	2400-2500MHz 3 max	2400-2500MHz 0.92dBi (peak)
				5150-5470MHz 0.32dBi (peak)	5150-5470MHz 1.66dBi (peak)	5150-5470MHz 3 max	5150-5470MHz 1.34dBi (peak)
				5470-5875MHz -0.76dBi (peak)	5470-5875MHz 0.72dBi (peak)	5470-5875MHz 3 max	5470-5875MHz 1.48dBi (peak)

#### NOTE:

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

**Antenna Peak Gain Table:**

Freq. (MHz)	WLAN Antenna–White(MAIN)		WLAN Antenna–Black(AUX)		MIMO Antenna–Gray	
	H	V	H	V	H	V
	dBi	dBi	dBi	dBi	dBi	dBi
2300(3D)	1.0	2.37	0.66	-0.41	X	X
2350(3D)	0.71	1.05	-0.35	-0.63	X	X
2400(3D)	0.77	0.85	0.11	-0.51	X	X
2400	-2.6	0.84	-0.8	-1.29	-1.63	-3.73
2450	-0.09	2.65	-0.84	-1.35	0.83	-2.53
2500	-2.04	2.2	-1.62	-2.13	0.82	-2.97
2500(3D)	0.26	1.66	-0.46	0.39	X	X
2600(3D)	1.68	0.93	-1.53	-0.34	X	X
2700(3D)	-0.51	-0.42	-0.53	-0.46	X	X
5150	-5.69	-2.14	-2.6	-1.56	0.32	-0.93
5350	-5.61	-2.18	-3.28	-0.65	-2.22	-2.91
5470	-3.51	-2.13	-4.67	-0.72	-1.59	-3.23
5725	-5.3	-3.64	-4.1	-2.65	-1.13	-1.8
5825	-5.72	-3.82	-4.7	-2.12	-1.29	-1.15
5875	-4.83	-3.07	-4.64	-1.94	-0.81	-0.76

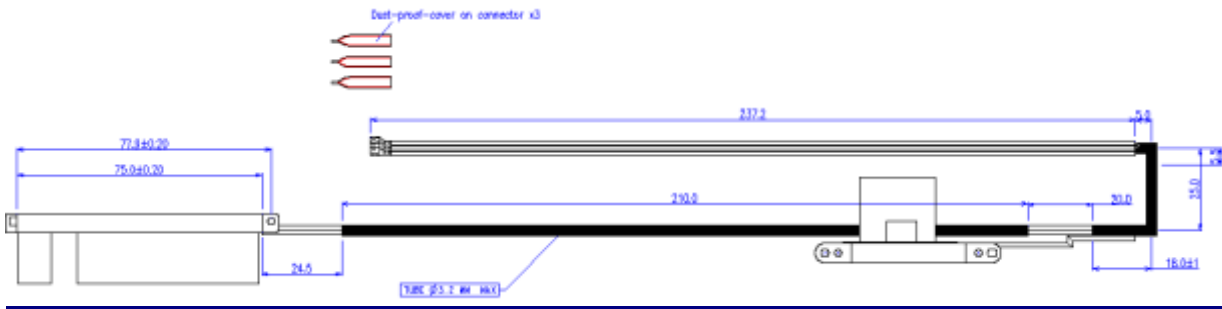
Antenna Peak Gain required being test in system basis.

- 1E frame contend absolutely peak antenna gain include H/V
- If Rx3 only (3<sup>rd</sup> antenna receives only, e.g. for 4965AGN) then the information is not required for Rx3.

## Section 2. Dimensioned Photos or Drawings of Antennas

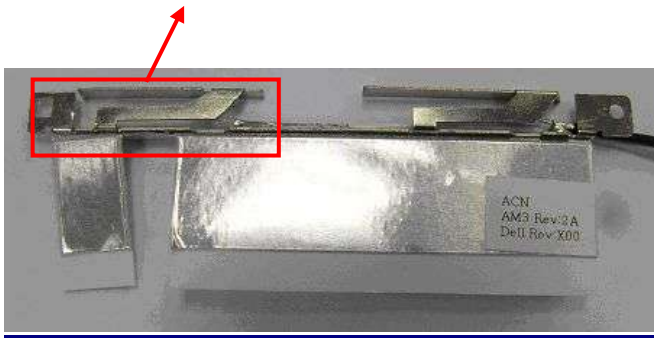
Include a dimensioned photo and dimensioned drawing of Tx1 antenna here.

### Tx1 Antenna Dimensioned Drawing:



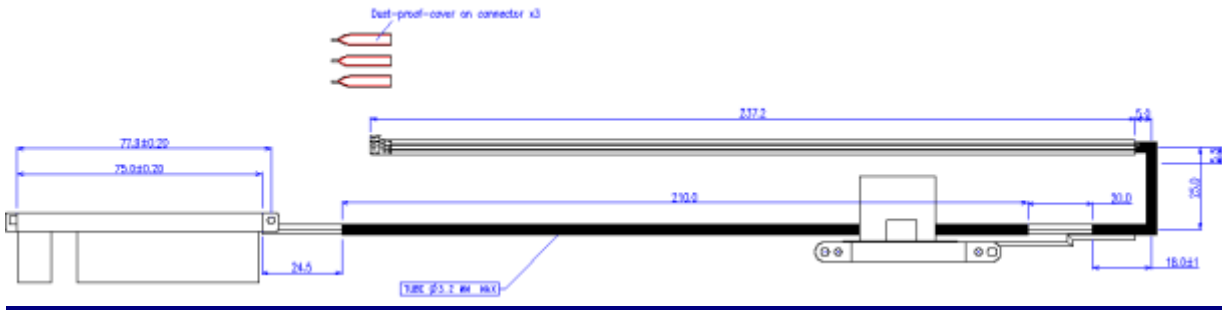
### Tx1 Antenna Photo:-MAIN

Tx1 Antenna



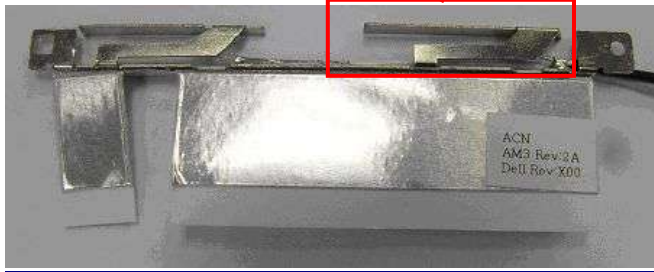
**Include a dimensioned photo and dimensioned drawing of Tx2 (or Rx2) antenna here.**

**Tx2(or Rx2) Antenna Dimensioned Drawing:**



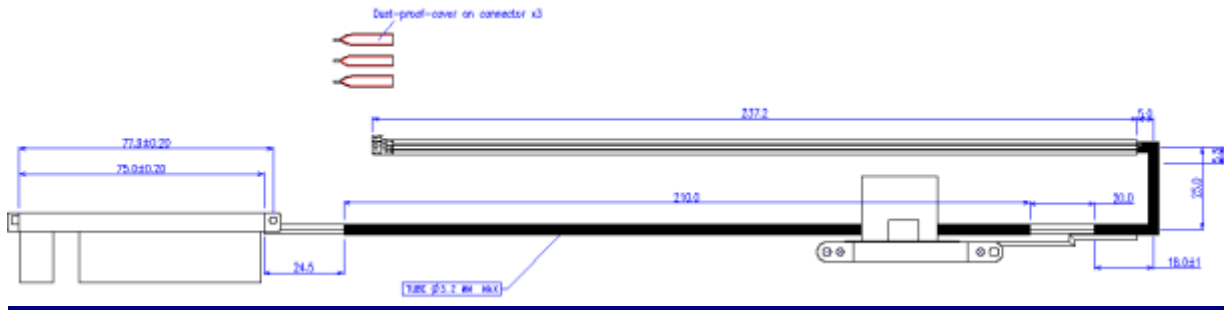
**Tx2(or Rx2) Antenna Photo: AUX**

**Tx2 (or Rx2) Antenna**



**Include a dimensioned photo and dimensioned drawing of Tx3 (or Rx3) antenna here.**

**Tx3(or Rx3) Antenna Dimensioned Drawing:**



**Tx3(or Rx3) Antenna Photo: MIMO**



Include front view photo of all 2 antennas here.



Include back view photo of all 2 antennas here.

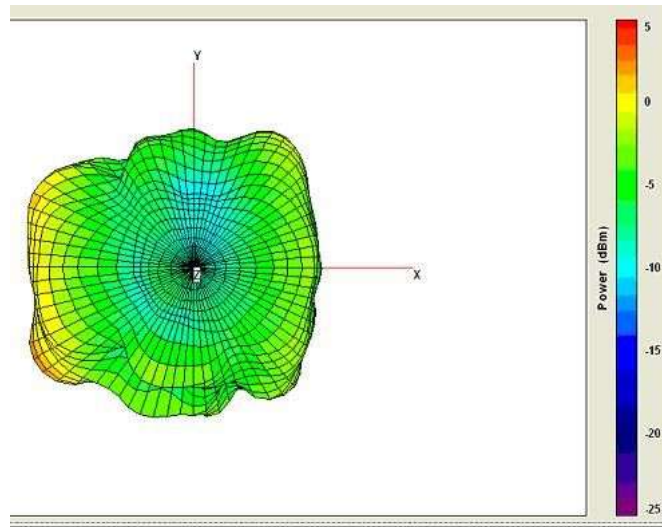




## Section 3. Radiation characteristics of antennae Loaded in Host Platform

### 2300-2400MHz radiation characteristic

#### MAIN antenna: 2300 MHz - (3D)

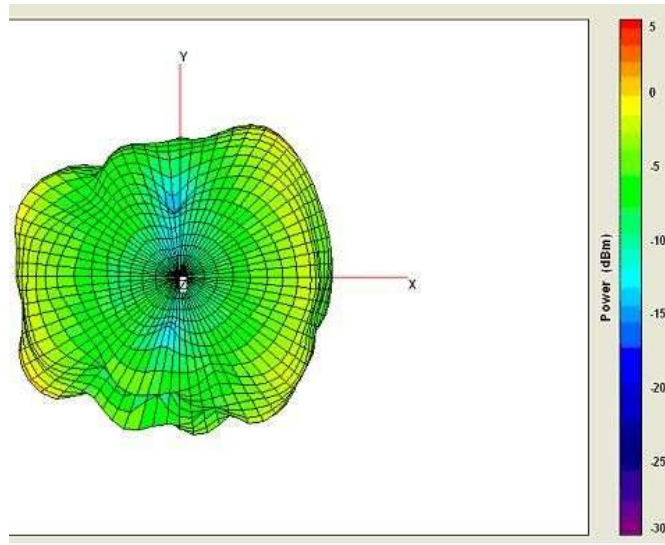


Center Frequency	<b>2300 MHz</b>
Horizontal (dBi) peak	1.0
Vertical (dBi) peak	2.37

— H-Pol

— V-Pol

— H+V

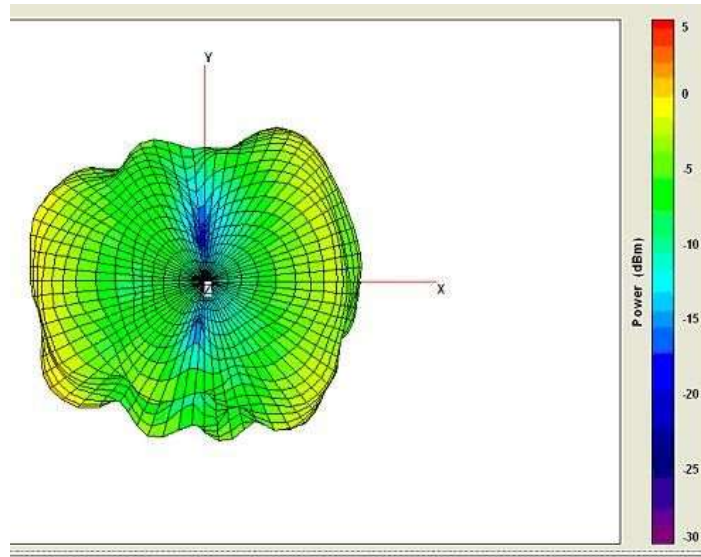


Center Frequency	<b>2350 MHz</b>
Horizontal (dBi) peak	0.71
Vertical (dBi) peak	1.05

— H-Pol

— V-Pol

— H+V



Center Frequency	<b>2400 MHz</b>
Horizontal (dBi) peak	<b>0.77</b>
Vertical (dBi) peak	<b>0.85</b>

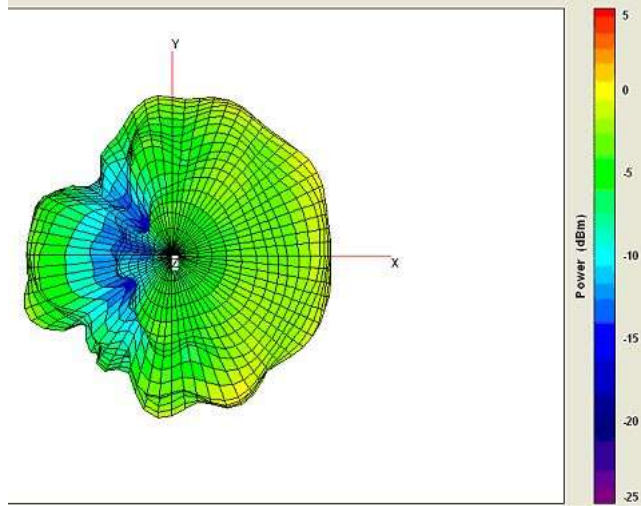
## AUX antenna: 2300 MHz - (3D)

*The Most Appropriate Antenna for Your Best Design!*

— H-Pol

— V-Pol

— H+V

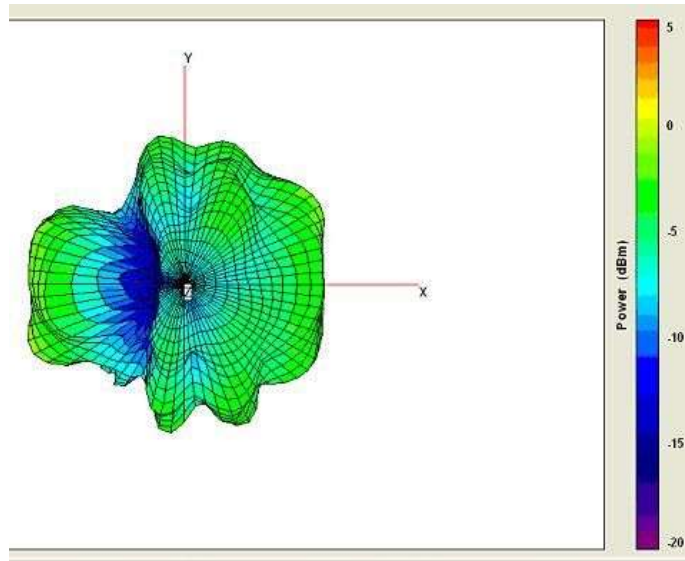


Center Frequency	<b>2300 MHz</b>
Horizontal (dBi) peak	<b>-0.66</b>
Vertical (dBi) peak	<b>-0.41</b>

— H-Pol

— V-Pol

— H+V

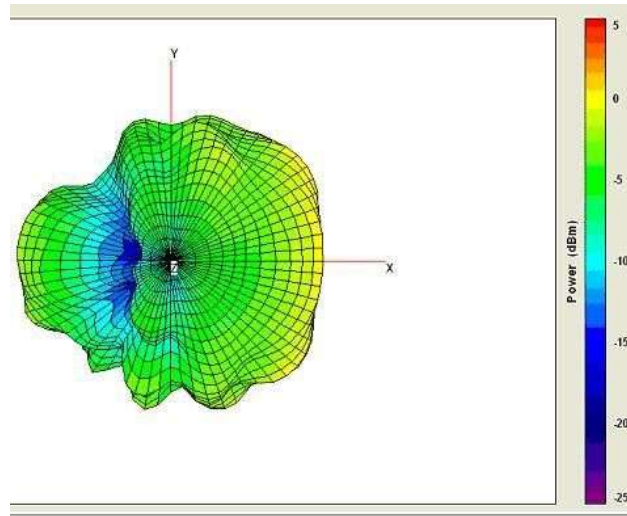


Center Frequency	<b>2350 MHz</b>
Horizontal (dBi) peak	<b>-0.35</b>
Vertical (dBi) peak	<b>-0.63</b>

— H-Pol

— V-Pol

— H+V



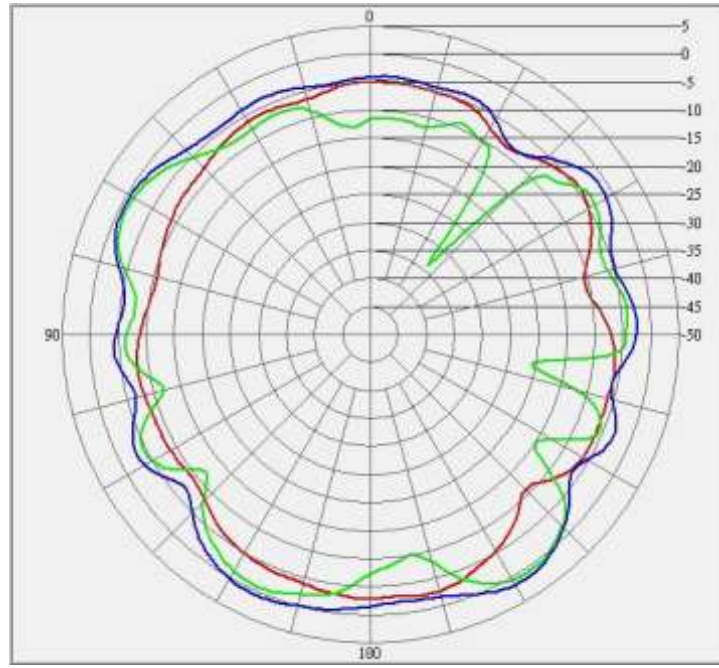
Center Frequency	<b>2400 MHz</b>
Horizontal (dBi) peak	<b>0.11</b>
Vertical (dBi) peak	<b>-0.51</b>

2400-2500MHz radiation characteristic

MAIN antenna: 2400 MHz - (2D)

*The Most Appropriate Antenna for Your Best Design!*

— H-Pol      — V-Pol      — H+V



Center Frequency	<b>2400 MHz</b>
Horizontal (dBi) peak	<b>-2.6</b>
Vertical (dBi) peak	<b>0.84</b>

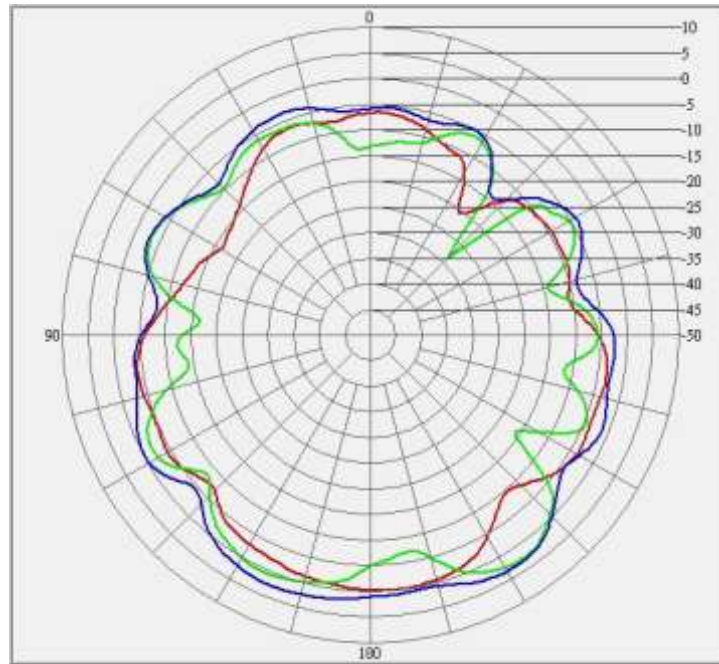
## MAIN antenna: 2450 MHz- (2D)

*The Most Appropriate Antenna for Your Best Design!*

— H-Pol

— V-Pol

— H+V



Center Frequency	<b>2450 MHz</b>
Horizontal (dBi) peak	<b>-0.09</b>
Vertical (dBi) peak	<b>2.65</b>



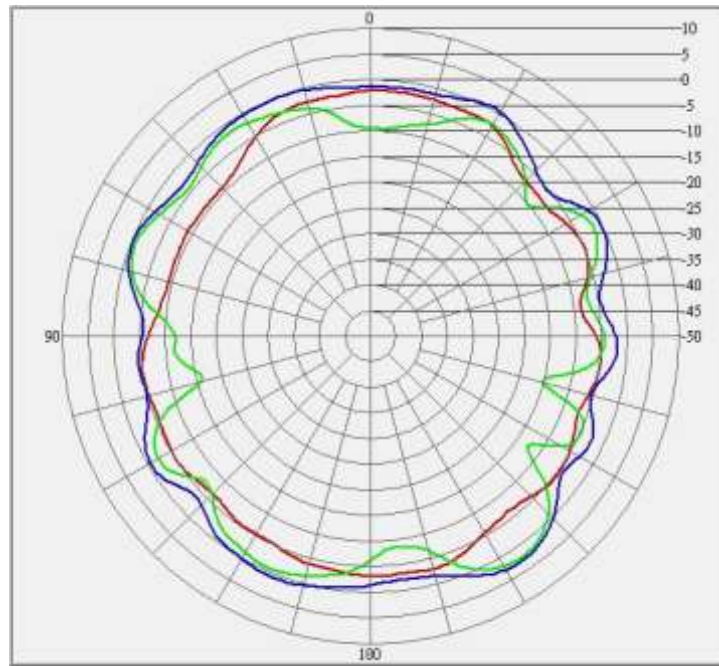
## MAIN antenna: 2500 MHz- (2D)

*The Most Appropriate Antenna for Your Best Design!*

— H-Pol

— V-Pol

— H+V



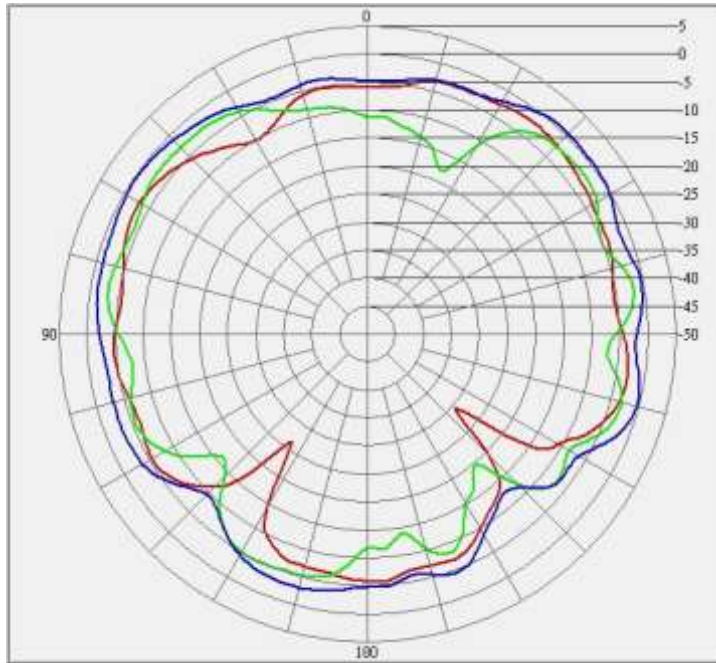
Center Frequency	<b>2500 MHz</b>
Horizontal (dBi) peak	<b>-2.04</b>
Vertical (dBi) peak	<b>2.2</b>

### AUX antenna: 2400 MHz- (2D)

— H-Pol

— V-Pol

— H+V

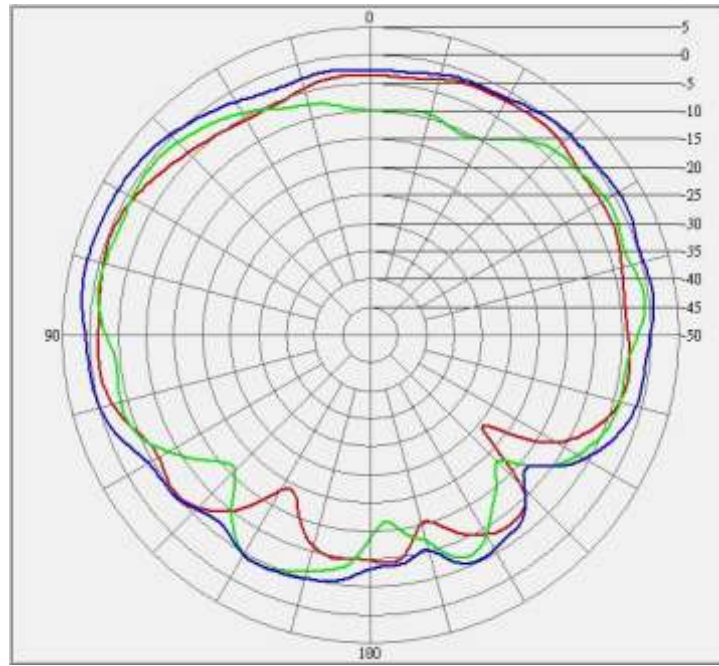


Center Frequency	<b>2400 MHz</b>
Horizontal (dBi) peak	<b>-0.8</b>
Vertical (dBi) peak	<b>-1.29</b>

**AUX antenna: 2450MHz- (2D)**

*The Most Appropriate Antenna for Your Best Design!*

— H-Pol      — V-Pol      — H+V



Center Frequency	<b>2450 MHz</b>
Horizontal (dBi) peak	<b>-0.84</b>
Vertical (dBi) peak	<b>-1.35</b>

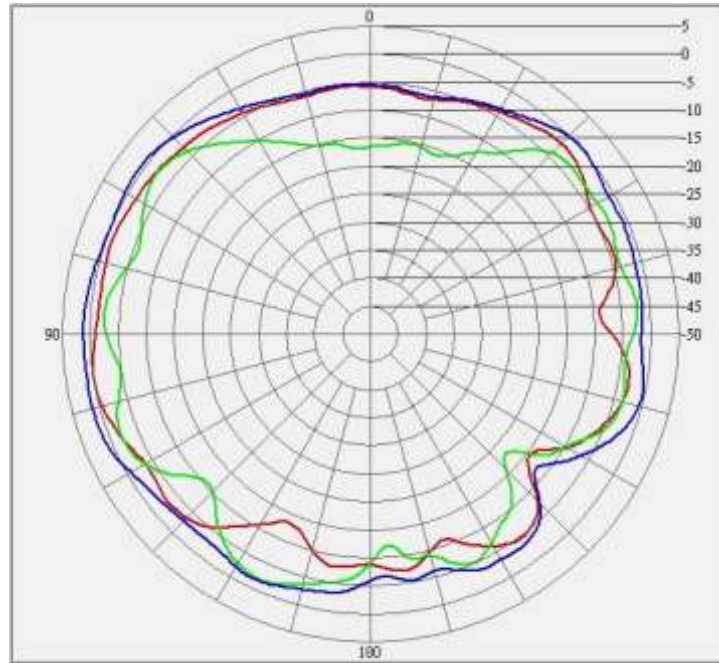
### AUX antenna: 2500MHz- (2D)

*The Most Appropriate Antenna for Your Best Design!*

— H-Pol

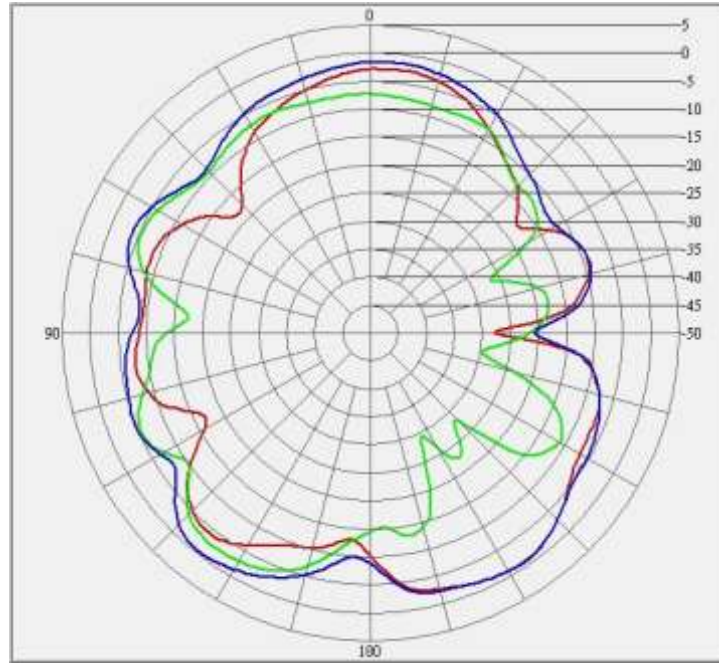
— V-Pol

— H+V



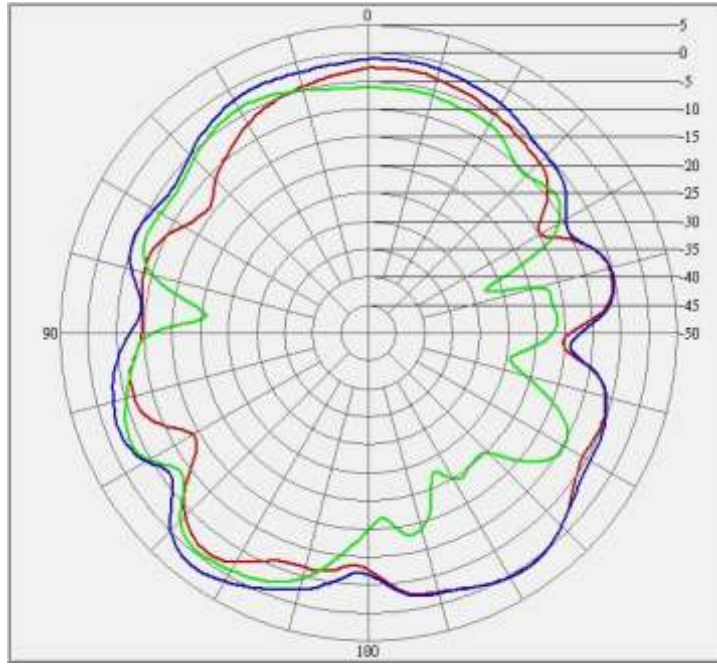
Center Frequency	<b>2500 MHz</b>
Horizontal (dBi) peak	<b>-1.62</b>
Vertical (dBi) peak	<b>-2.13</b>

H-Pol V-Pol H+V



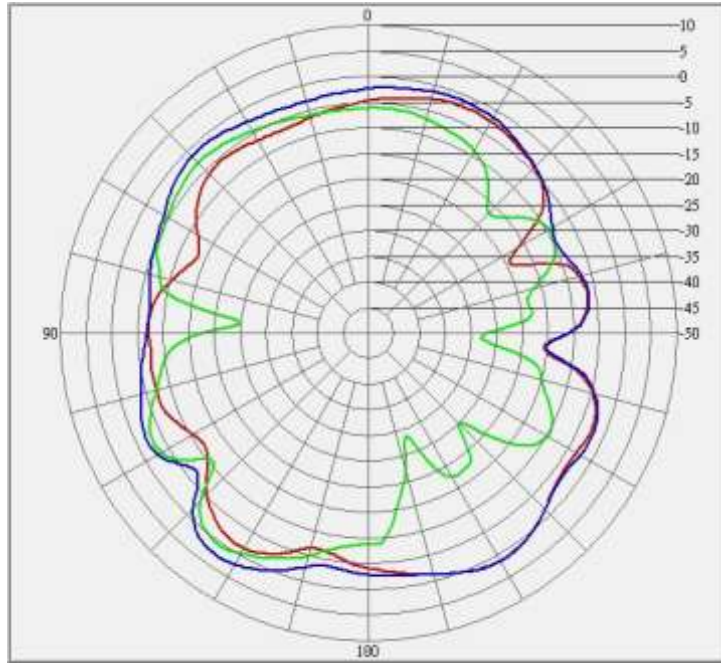
Center Frequency	<b>2400 MHz</b>
Horizontal (dBi) peak	<b>-1.63</b>
Vertical (dBi) peak	<b>-3.73</b>

— H-Pol — V-Pol — H+V



Center Frequency	<b>2450 MHz</b>
Horizontal (dBi) peak	<b>0.83</b>
Vertical (dBi) peak	<b>-2.53</b>

— H-Pol      — V-Pol      — H+V



Center Frequency	<b>2500 MHz</b>
Horizontal (dBi) peak	<b>0.82</b>
Vertical (dBi) peak	<b>-2.97</b>

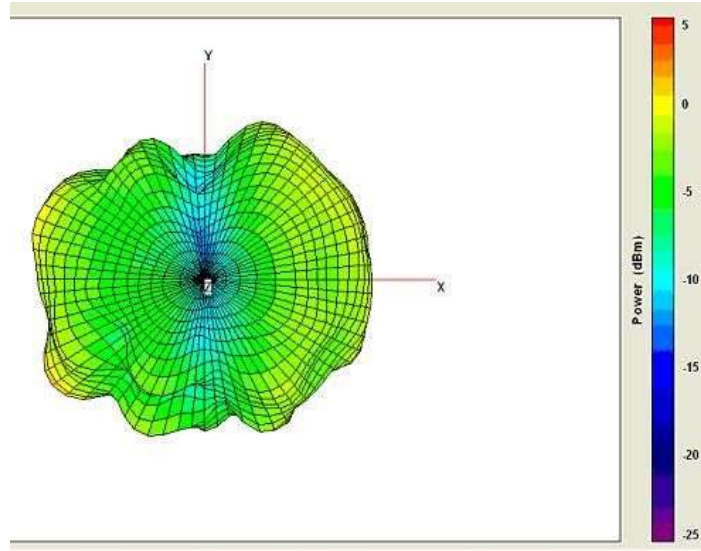
**MAIN antenna: 2500 MHz - (3D)**

*The Most Appropriate Antenna for Your Best Design!*

— H-Pol

— V-Pol

— H+V



Center Frequency	<b>2500MHz</b>
Horizontal (dBi) peak	<b>0.26</b>
Vertical (dBi) peak	<b>1.66</b>



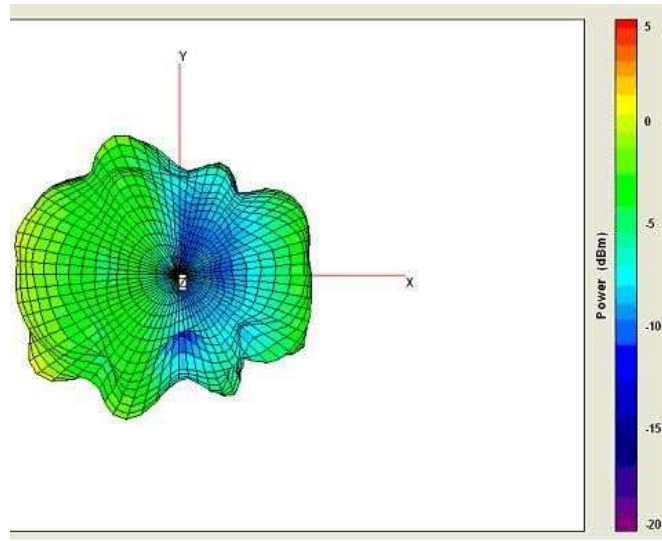
# MAIN antenna: 2600 MHz - (3D)

*The Most Appropriate Antenna for Your Best Design!*

— H-Pol

— V-Pol

— H+V

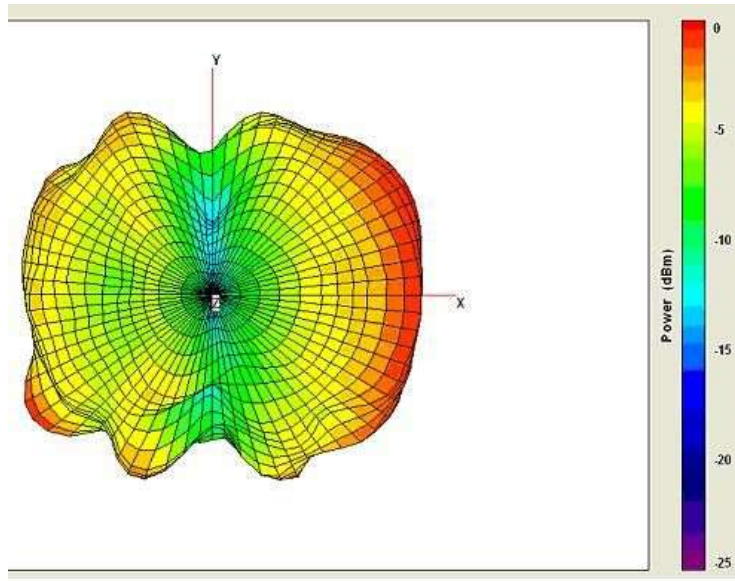


Center Frequency	<b>2600MHz</b>
Horizontal (dBi) peak	<b>1.68</b>
Vertical (dBi) peak	<b>0.93</b>

— H-Pol

— V-Pol

— H+V



Center Frequency	<b>2700MHz</b>
Horizontal (dBi) peak	<b>-0.51</b>
Vertical (dBi) peak	<b>-0.42</b>

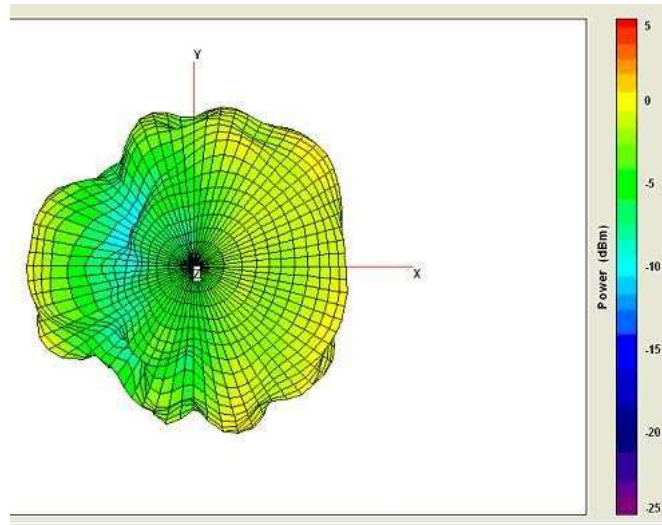
# AUX antenna: 2500 MHz - (3D)

*The Most Appropriate Antenna for Your Best Design!*

— H-Pol

— V-Pol

— H+V



Center Frequency	<b>2500MHz</b>
Horizontal (dBi) peak	<b>-0.46</b>
Vertical (dBi) peak	<b>0.39</b>

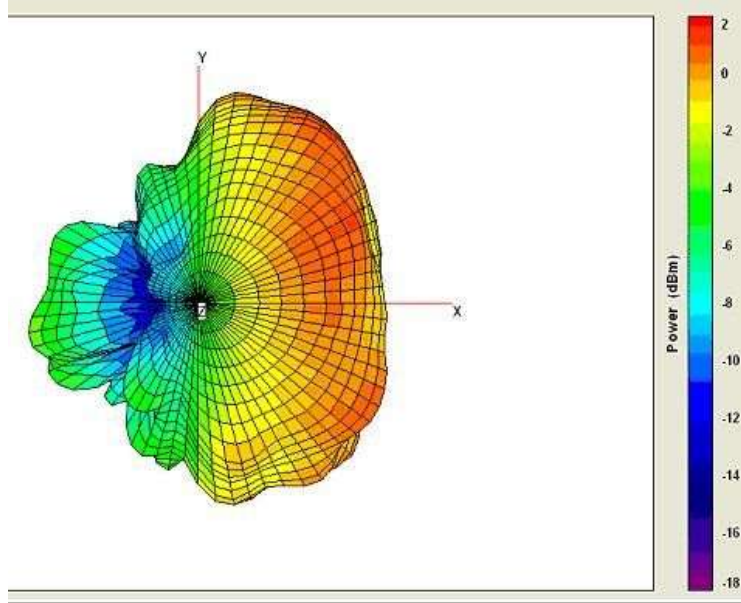
## AUX antenna: 2600 MHz - (3D)

*The Most Appropriate Antenna for Your Best Design!*

— H-Pol

— V-Pol

— H+V

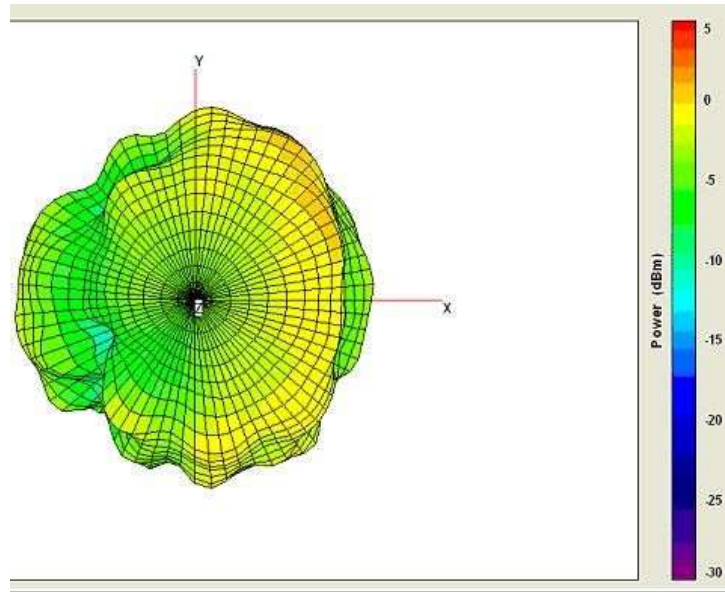


Center Frequency	<b>2600MHz</b>
Horizontal (dBi) peak	<b>-1.53</b>
Vertical (dBi) peak	<b>-0.34</b>

— H-Pol

— V-Pol

— H+V



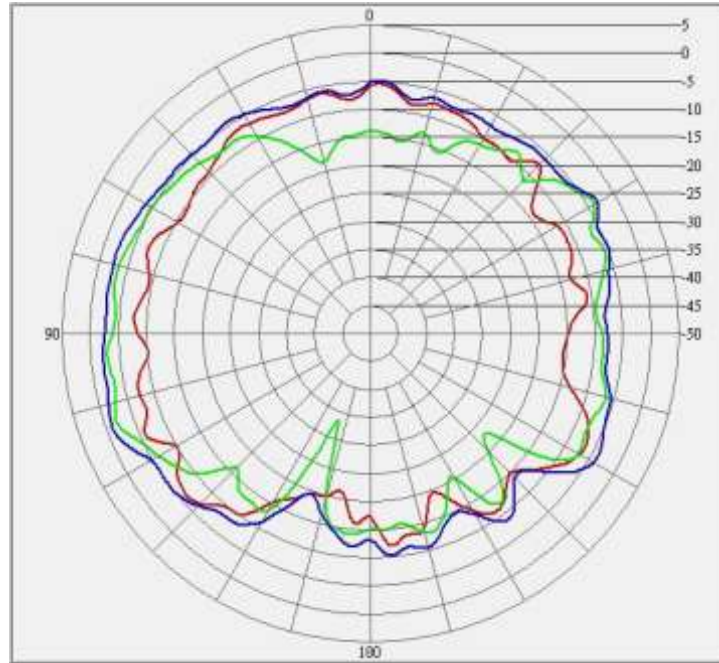
Center Frequency	<b>2700MHz</b>
Horizontal (dBi) peak	<b>-0.53</b>
Vertical (dBi) peak	<b>-0.46</b>

## 5150-5470 MHz radiation characteristic

### MAIN antenna: 5150 MHz - (2D)

*The Most Appropriate Antenna for Your Best Design!*

— H-Pol      — V-Pol      — H+V



Center Frequency	<b>5150 MHz</b>
Horizontal (dBi) peak	<b>-5.69</b>
Vertical (dBi) peak	<b>-2.14</b>

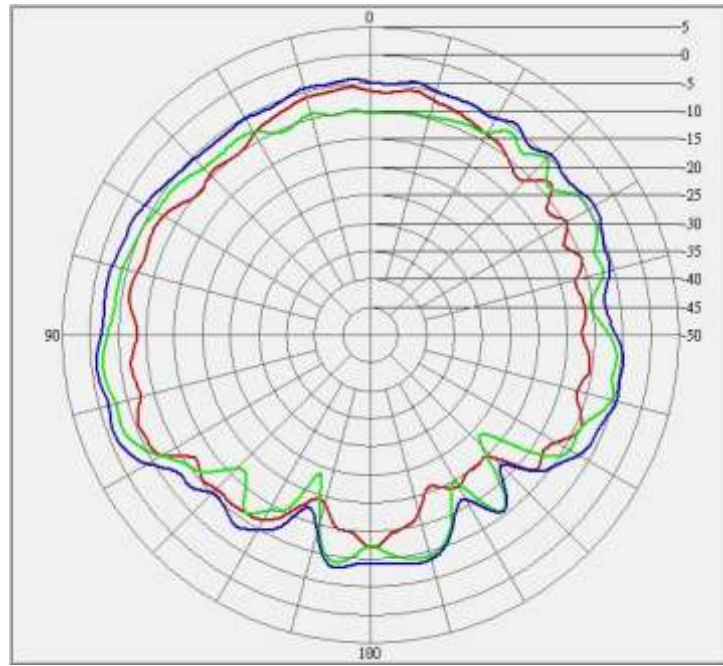
## MAIN antenna: 5350 MHz - (2D)

*The Most Appropriate Antenna for Your Best Design!*

— H-Pol

— V-Pol

— H+V



Center Frequency	<b>5350 MHz</b>
Horizontal (dBi) peak	<b>-5.61</b>
Vertical (dBi) peak	<b>-2.18</b>

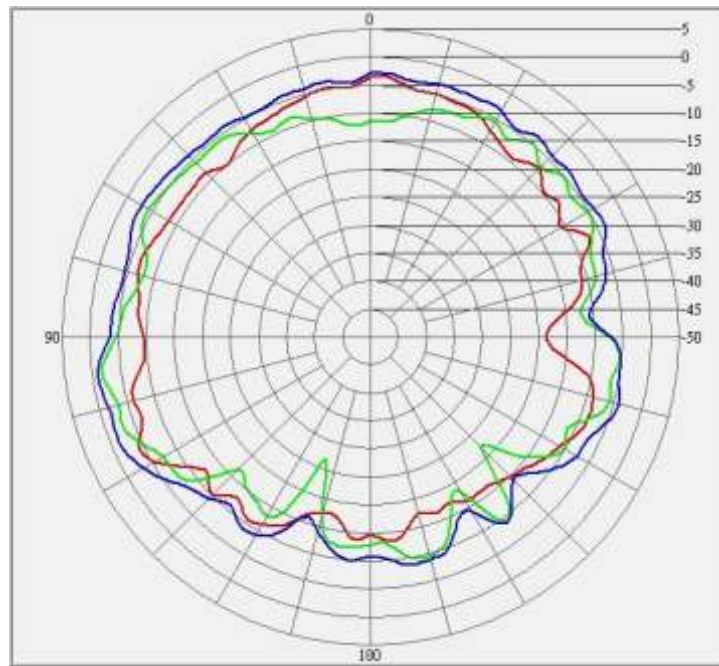
## MAIN antenna: 5470 MHz - (2D)

*The Most Appropriate Antenna for Your Best Design!*

— H-Pol

— V-Pol

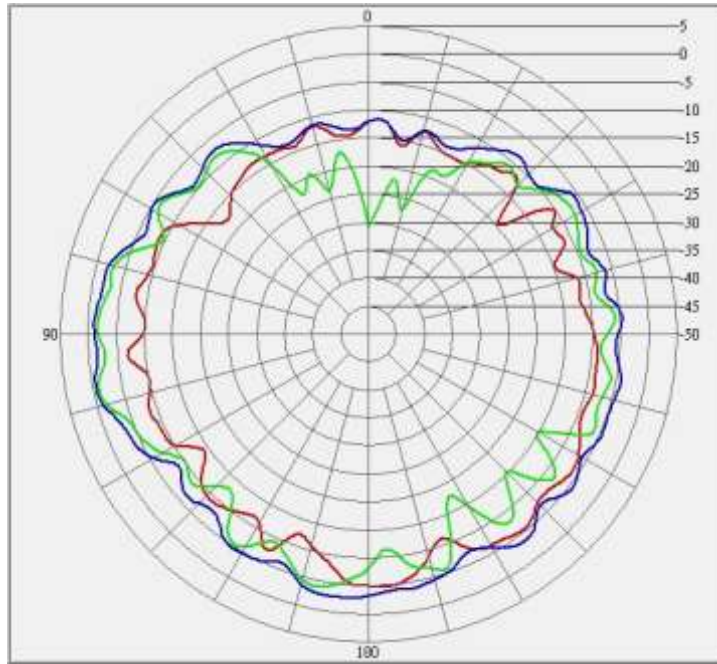
— H+V



Center Frequency	<b>5470 MHz</b>
Horizontal (dBi) peak	<b>-3.51</b>
Vertical (dBi) peak	<b>-2.13</b>



— H-Pol      — V-Pol      — H+V



Center Frequency	<b>5150 MHz</b>
Horizontal (dBi) peak	<b>-2.6</b>
Vertical (dBi) peak	<b>-1.56</b>

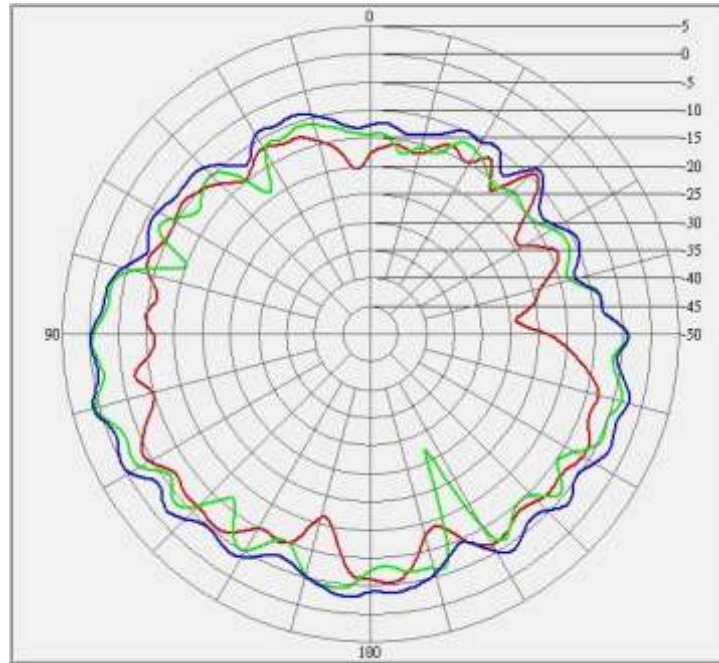
## AUX antenna: 5350 MHz - (2D)

*The Most Appropriate Antenna for Your Best Design!*

— H-Pol

— V-Pol

— H+V



Center Frequency	<b>5350 MHz</b>
Horizontal (dBi) peak	<b>-3.28</b>
Vertical (dBi) peak	<b>-0.65</b>

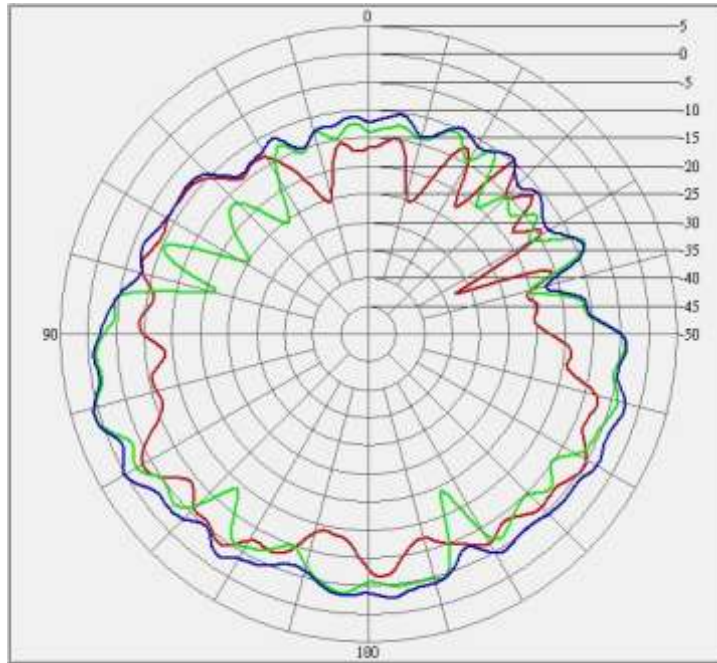
### AUX antenna: 5470 MHz - (2D)

*The Most Appropriate Antenna for Your Best Design!*

— H-Pol

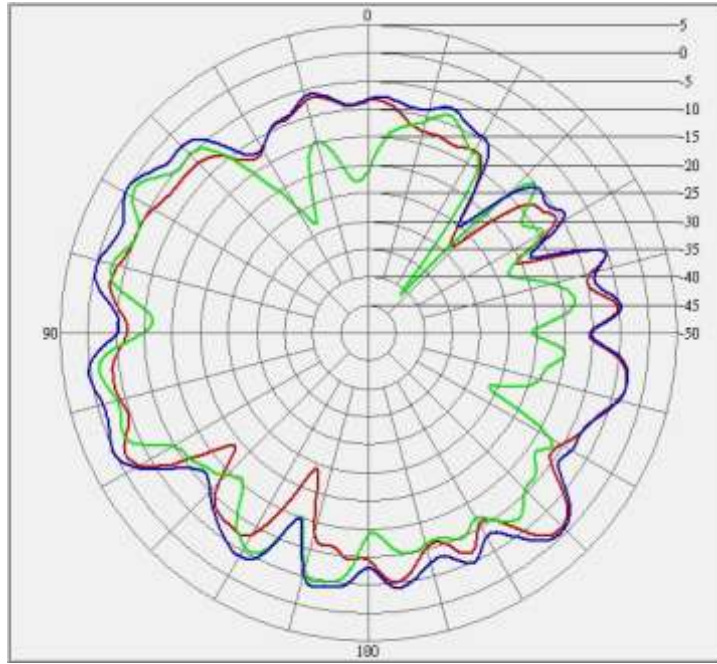
— V-Pol

— H+V



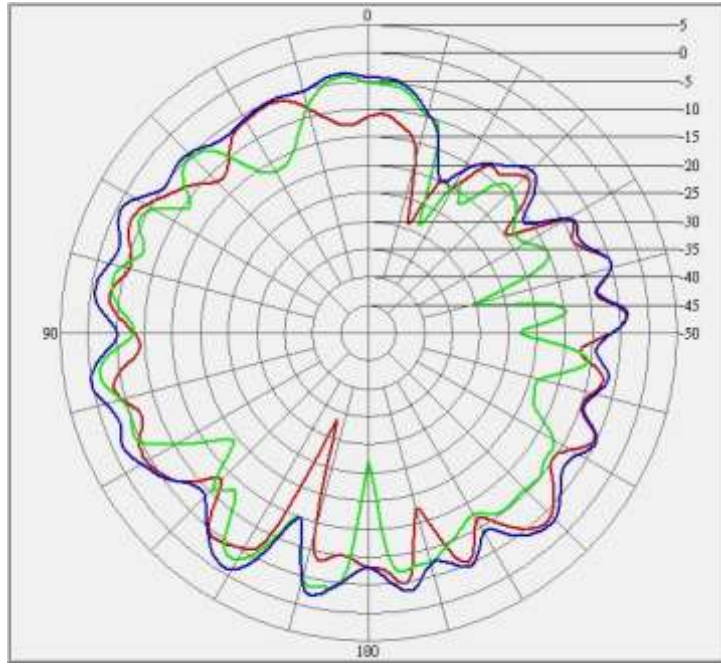
Center Frequency	<b>5470 MHz</b>
Horizontal (dBi) peak	<b>-4.67</b>
Vertical (dBi) peak	<b>-0.72</b>

— H-Pol      — V-Pol      — H+V



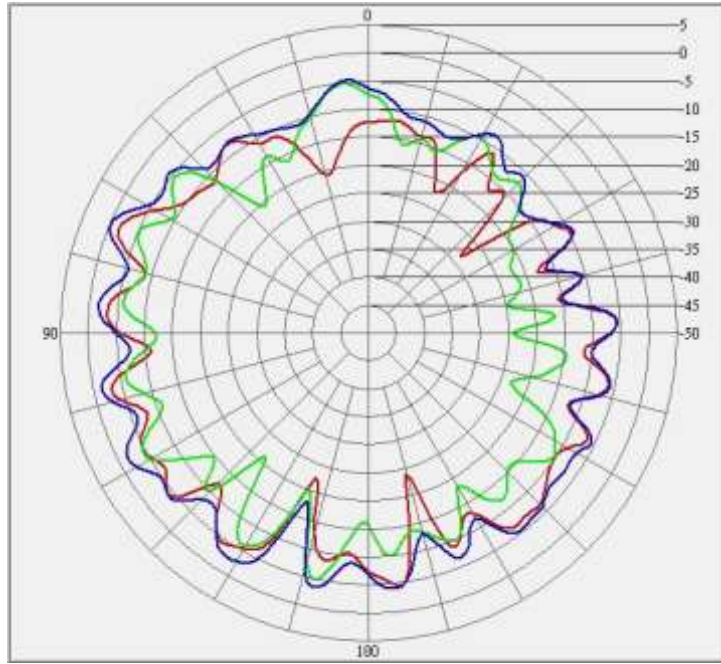
Center Frequency	<b>5150 MHz</b>
Horizontal (dBi) peak	<b>0.32</b>
Vertical (dBi) peak	<b>-0.93</b>

H-Pol V-Pol H+V



Center Frequency	<b>5350 MHz</b>
Horizontal (dBi) peak	<b>-2.22</b>
Vertical (dBi) peak	<b>-2.91</b>

— H-Pol      — V-Pol      — H+V



Center Frequency	<b>5470 MHz</b>
Horizontal (dBi) peak	<b>-1.59</b>
Vertical (dBi) peak	<b>-3.23</b>

**5725-5875 MHz radiation characteristic**

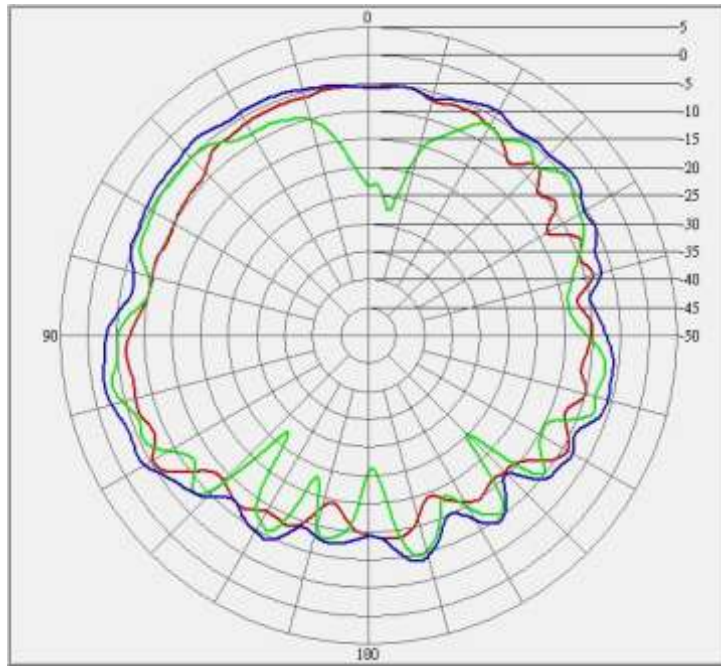
**MAIN antenna : 5725 MHz - (2D)**

*The Most Appropriate Antenna for Your Best Design!*

— H-Pol

— V-Pol

— H+V

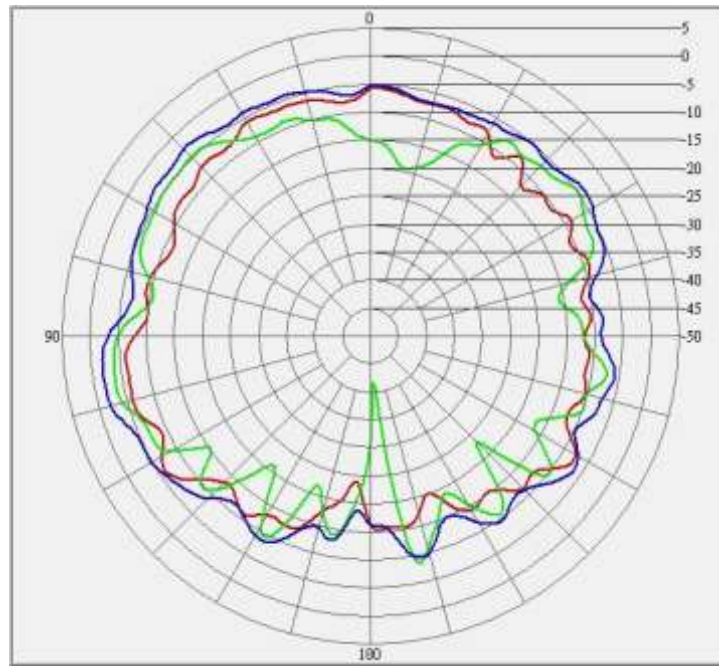


Center Frequency	<b>5725 MHz</b>
Horizontal (dBi) peak	<b>-5.3</b>
Vertical (dBi) peak	<b>-3.64</b>

— H-Pol

— V-Pol

— H+V



Center Frequency	<b>5825 MHz</b>
Horizontal (dBi) peak	<b>-5.72</b>
Vertical (dBi) peak	<b>-3.82</b>



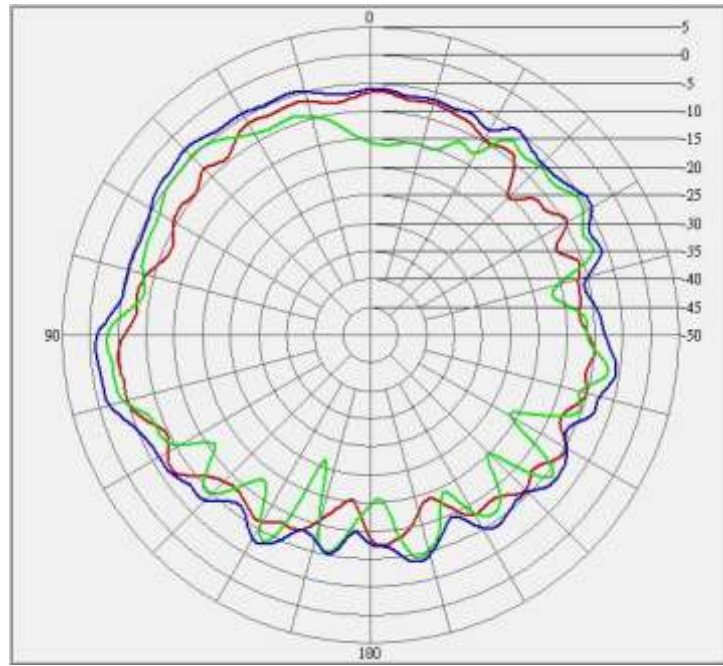
## MAIN antenna: 5875 MHz - (2D)

*The Most Appropriate Antenna for Your Best Design!*

— H-Pol

— V-Pol

— H+V



Center Frequency	<b>5875 MHz</b>
Horizontal (dBi) peak	<b>-4.83</b>
Vertical (dBi) peak	<b>-3.07</b>

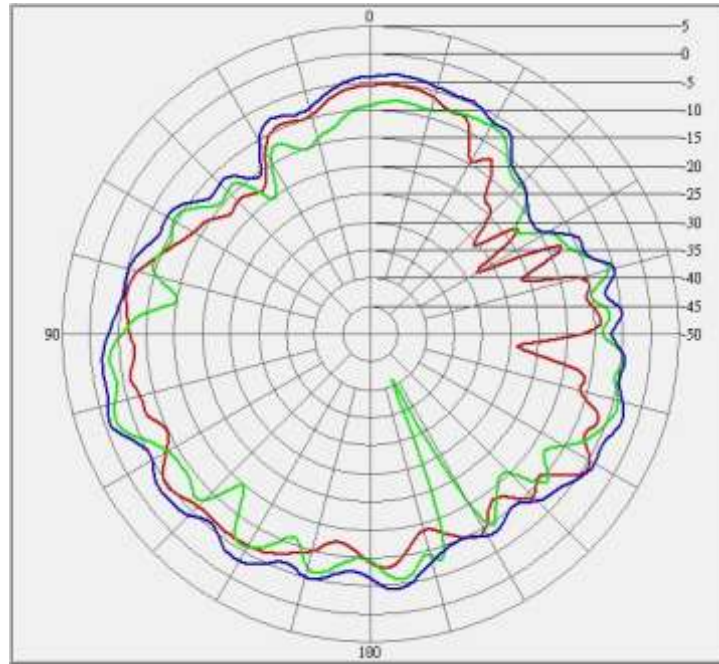
### AUX antenna : 5725 MHz - (2D)

*The Most Appropriate Antenna for Your Best Design!*

— H-Pol

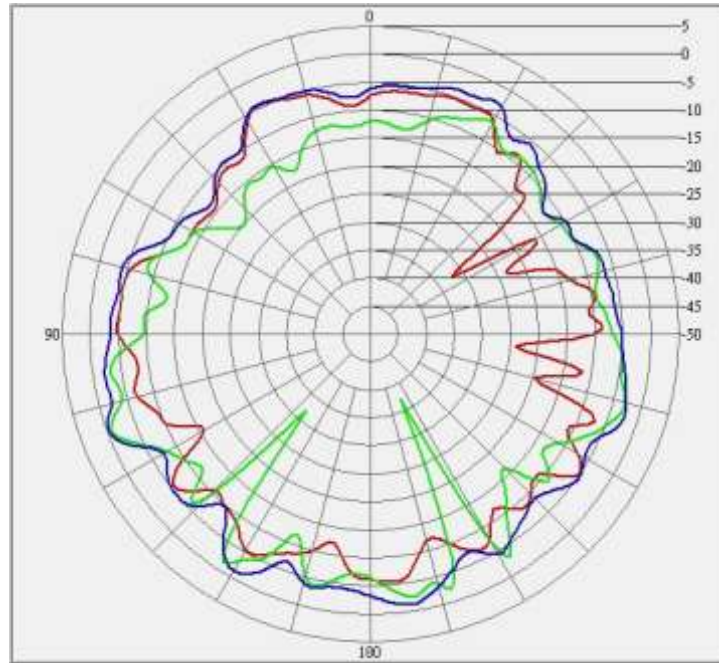
— V-Pol

— H+V



Center Frequency	<b>5725 MHz</b>
Horizontal (dBi) peak	<b>-4.1</b>
Vertical (dBi) peak	<b>-2.65</b>

— H-Pol      — V-Pol      — H+V



Center Frequency	<b>5825 MHz</b>
Horizontal (dBi) peak	<b>-4.7</b>
Vertical (dBi) peak	<b>-2.12</b>

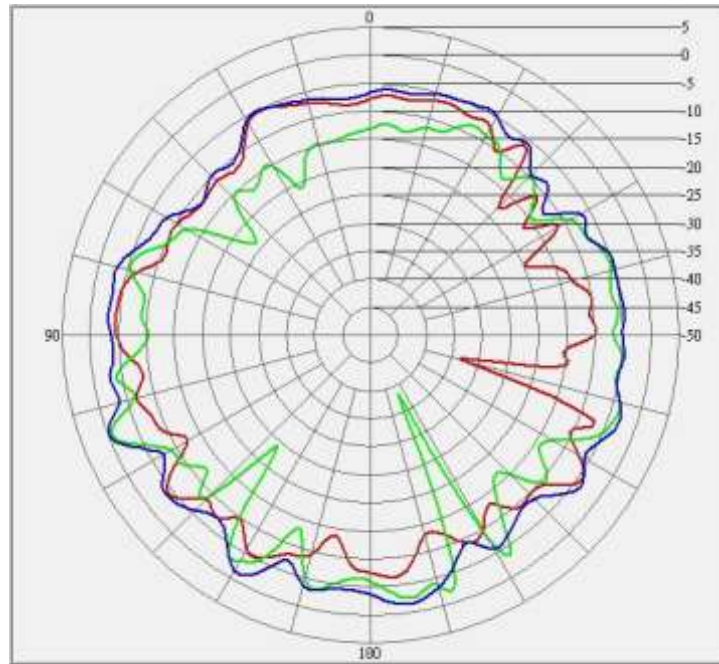
**AUX antenna : 5875 MHz - (2D)**

*The Most Appropriate Antenna for Your Best Design!*

— H-Pol

— V-Pol

— H+V

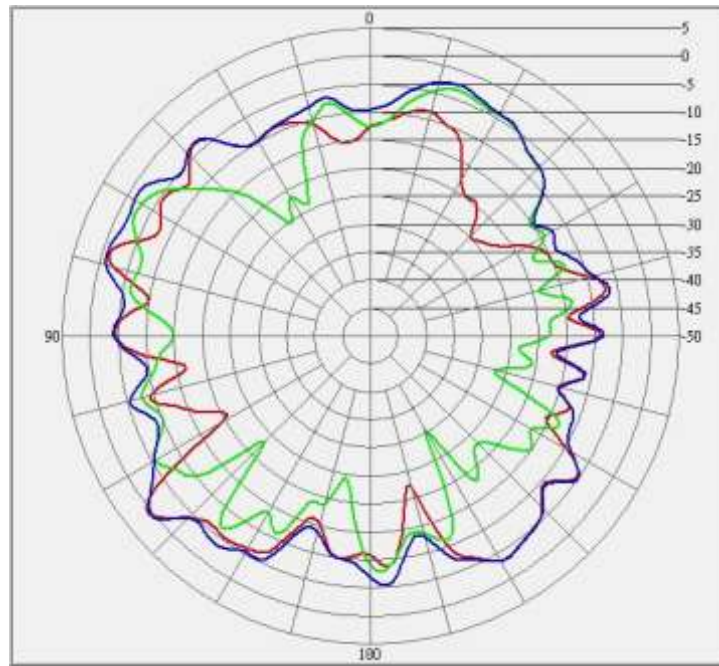


Center Frequency	<b>5875 MHz</b>
Horizontal (dBi) peak	<b>-4.64</b>
Vertical (dBi) peak	<b>-1.94</b>

H-Pol

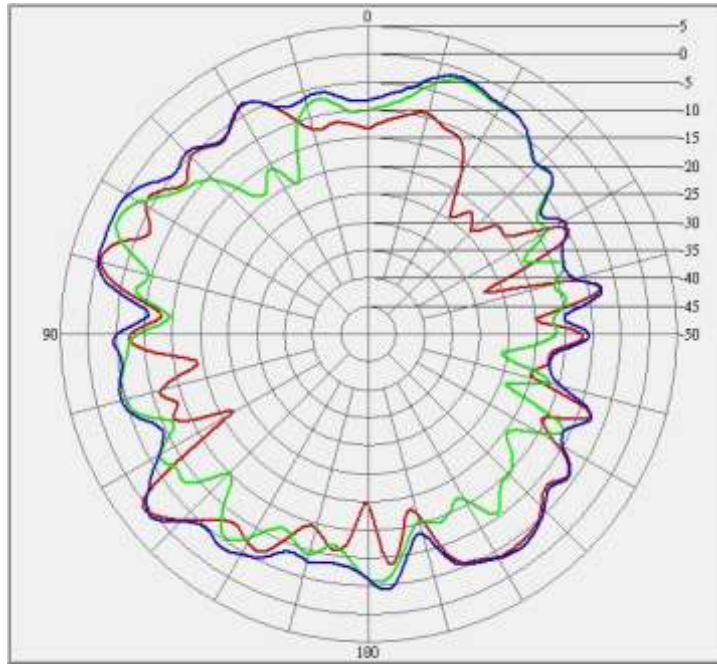
V-Pol

H+V



Center Frequency	<b>5725 MHz</b>
Horizontal (dBi) peak	<b>-1.13</b>
Vertical (dBi) peak	<b>-1.8</b>

— H-Pol      — V-Pol      — H+V

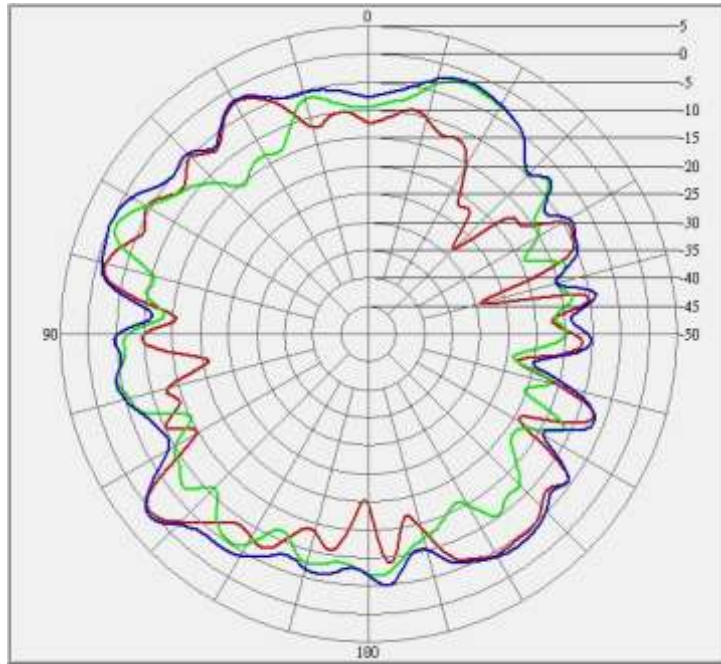


Center Frequency	<b>5825 MHz</b>
Horizontal (dBi) peak	<b>-1.29</b>
Vertical (dBi) peak	<b>-1.15</b>

H-Pol

V-Pol

H+V



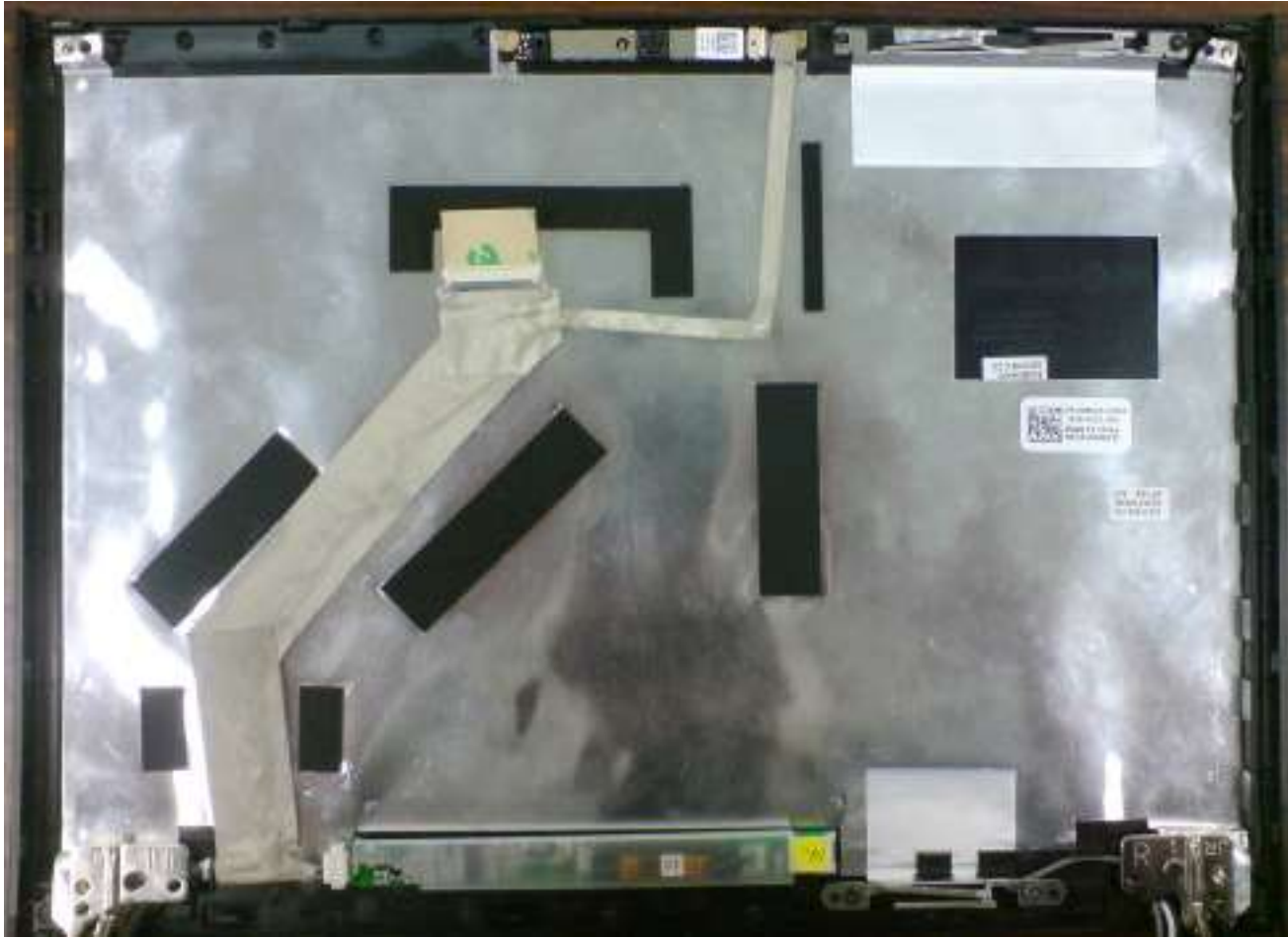
Center Frequency	<b>5875 MHz</b>
Horizontal (dBi) peak	<b>-0.81</b>
Vertical (dBi) peak	<b>-0.76</b>

## Section 4. Host Platform Information

OEM / ODM Host platform: (DELL Vostro 1220) platform correlated to antenna data

### Rating Label Photo:

WLAN(Main) WLAN(Aux)

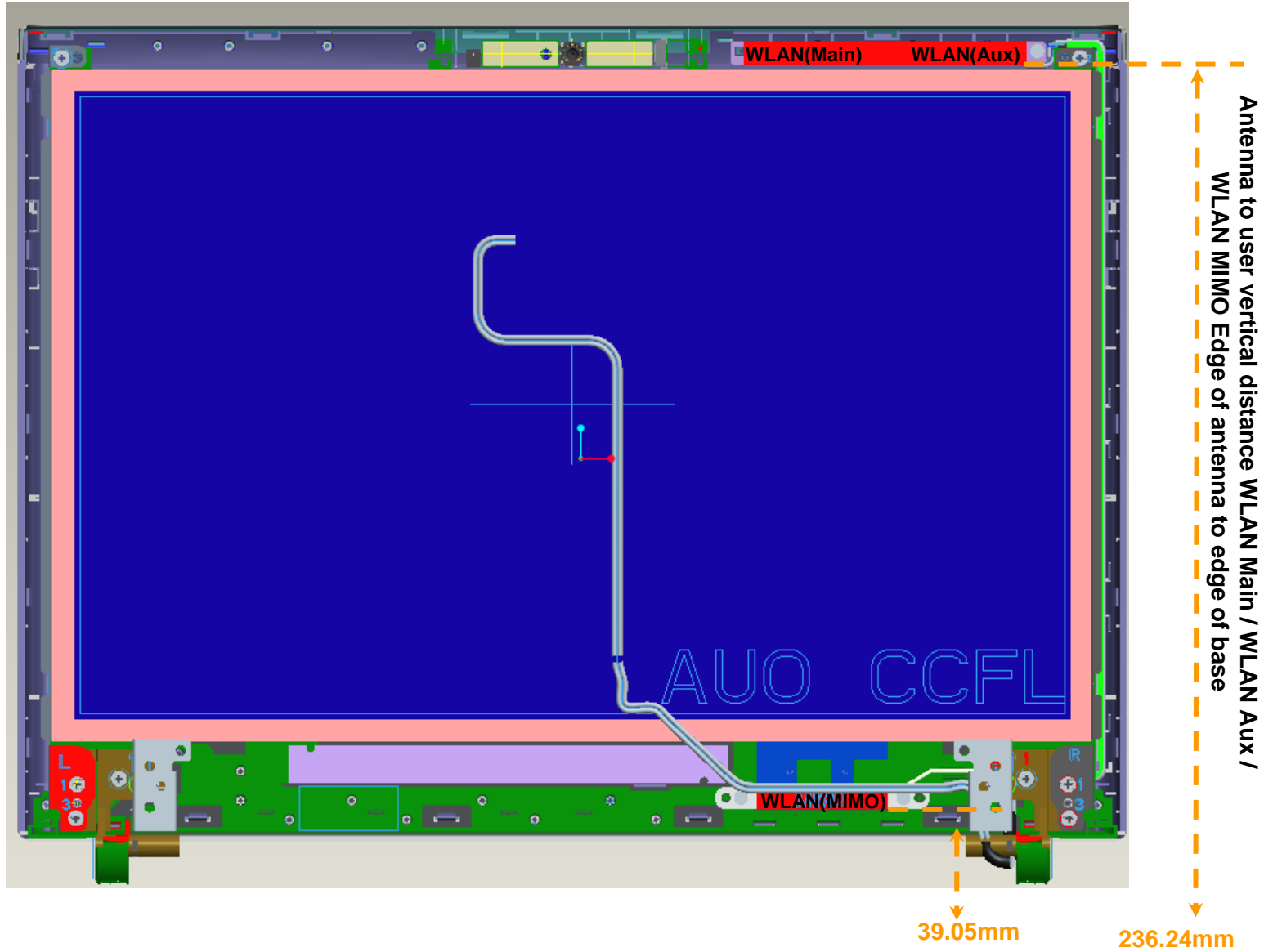


WLAN(MIMO)



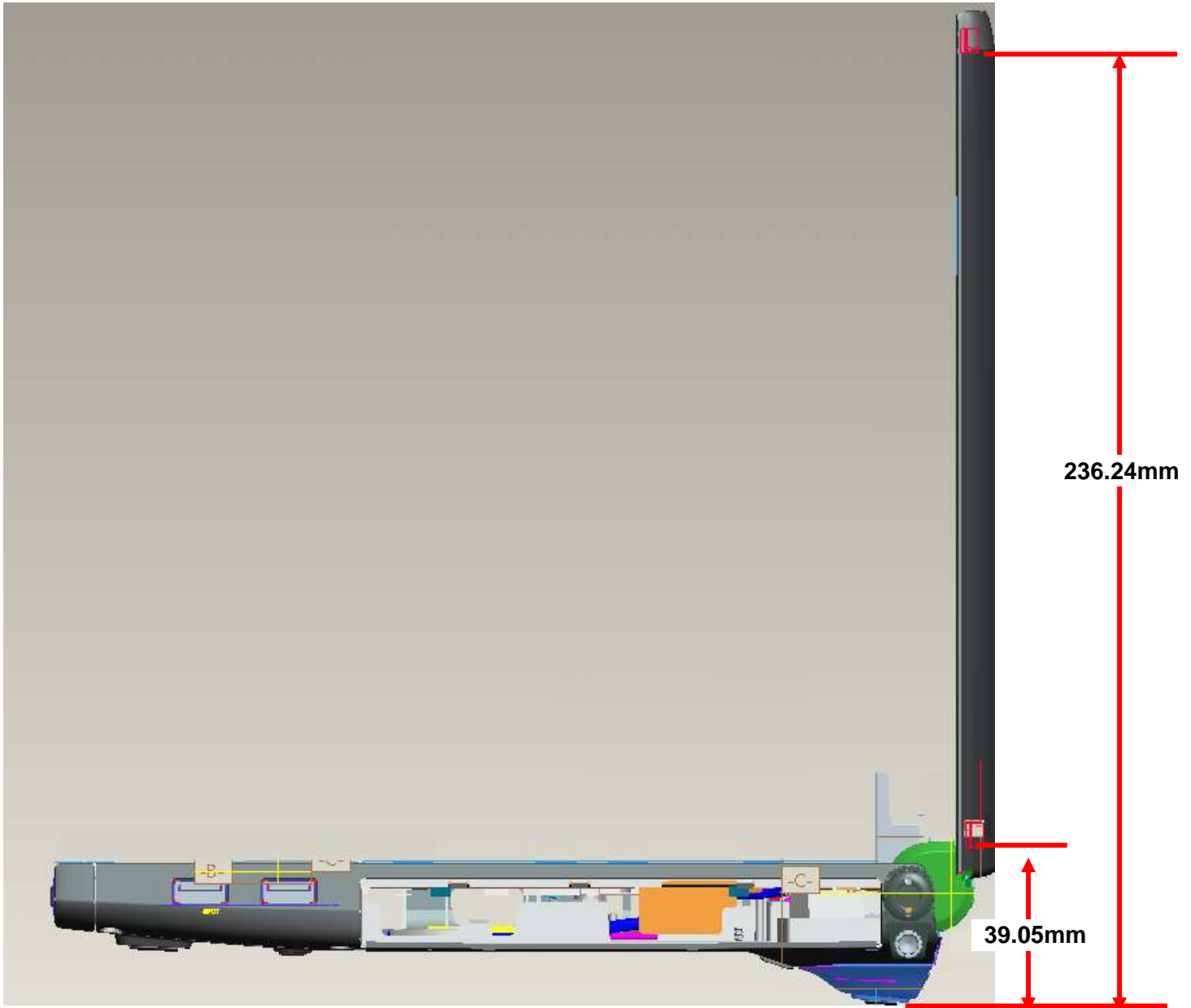
## Section 5. Antenna Host Platform Location Information

Include a **dimensioned photo or dimensioned drawing** of Tx1, Tx2 and Tx3 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 photo or dimensioned drawing** 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.**