

Regulatory WLAN Antenna Information 2.4/5GHz Dell Hanks Series Multiple Band Antennas with Cable & Connector

(English Language Required for Intel Regulatory Review / Approval)

Platform	
Platform Owner	DELL
Brand Name	DELL
Model Name	Hanks
ODM	Quanta
Target Launch Date	
Antenna	
Brand Name	
Part Number	<input checked="" type="checkbox"/> Tx1 Antenna: Main –APP8P-700063
	<input checked="" type="checkbox"/> Tx2 Antenna:Aux –APP8P-700063
	<input checked="" type="checkbox"/> Tx3 (or Rx3) Antenna : APP8P-700062
Module	
With WLAN Module	<input type="checkbox"/> 512AN
(Check Box)	<input type="checkbox"/> 533AN
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>

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 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)
Tx1 Antenna APP8P-700063 Main White	ACON Corporation	PIFA	1) KURABE /Sumitomo /GBE 2) O.D. 1.13mm 50 ohm coaxial cable 3)length: 758mm 4)Connector P/N:I-PEX MHF	2412-2462MHz 2.32 dBi (peak)	2412-2462MHz 4.45 dBi (peak)	2412-2462MHz 2.5 max	2412-2462MHz 2.13dBi (peak)
				2500-2700MHz 1.10 dBi (peak)	2500-2700MHz 3.43 dBi (peak)	2500-2700MHz 2.5 max	2500-2700MHz 2.33dBi (peak)
				5150-5470MHz -1.29 dBi (peak)	5150-5470MHz 1.54 dBi (peak)	5150-5470MHz 2.5 max	5150-5470MHz 2.83dBi (peak)
				5725-5850MHz -1.16 dBi (peak)	5725-5850MHz 1.89 dBi (peak)	5725-5850MHz 2.5 max	5725-5850MHz 3.05dBi (peak)
Tx2 antenna APP8P-700063 Aux Black	ACON Corporation	PIFA	1) KURABE /Sumitomo /GBE 2) O.D. 1.13mm 50 ohm coaxial cable 3)length 692 mm 4)Connector P/N:I-PEX MHF	2412-2462MHz 0.97dBi (peak)	2412-2462MHz 2.92dBi (peak)	2412-2462MHz 2.5 max	2412-2462MHz 1.95dBi (peak)
				2500-2700MHz 1.01dBi (peak)	2500-2700MHz 3.06dBi (peak)	2500-2700MHz 2.5 max	2500-2700MHz 2.05dBi (peak)
				5150-5470MHz -1.05dBi (peak)	5150-5470MHz 1.53dBi (peak)	5150-5470MHz 2.5 max	5150-5470MHz 2.58dBi (peak)
				5725-5850MHz -1.70dBi (peak)	5725-5850MHz 1.09dBi (peak)	5725-5850MHz 2.5 max	5725-5850MHz 2.79dBi (peak)
Tx3 (or Rx3) antenna APP8P-700062 MIMO Gray	ACON Corporation	PIFA	1) KURABE /Sumitomo /GBE 2) O.D. 1.13mm 50 ohm coaxial cable 3)length 638 mm 4)Connector P/N:I-PEX MHF	2412-2462MHz -0.80 dBi (peak)	2412-2462MHz 0.99dBi (peak)	2412-2462MHz 2.5 max	2412-2462MHz 1.79dBi (peak)
				2500-2700MHz XdBi (peak)	2500-2700MHz X dBi (peak)	2500-2700MHz X max	2500-2700MHz X dBi (peak)
				5150-5470MHz -0.47dBi (peak)	5150-5470MHz 1.91 dBi (peak)	5150-5470MHz 2.5 max	5150-5470MHz 2.38dBi (peak)
				5725-5850MHz 0.2 dBi (peak) *	5725-5850MHz 2.77 dBi (peak) *	5725-5850MHz 2.5 max *	5725-5850MHz 2.57dBi (peak) *

NOTE:

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

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Antenna Peak Gain Table:

Freq. (MHz)	WLAN Antenna-White(MAIN)			WLAN Antenna-Black(AUX)			MIMO Antenna-Gray		
	H	V	H + V	H	V	H + V	H	V	H + V
	dBi	dBi	dBi	dBi	dBi	dBi	dBi	dBi	dBi
2412	-0.11	1.19	2.34	-2.50	-0.29	0.03	-2.25	-3.69	-0.93
2437	0.11	2.03	3.04	-3.46	-0.18	0.07	-1.26	-1.97	0.20
2462	-0.67	2.32	3.34	-2.64	0.97	1.47	-0.8	-1.49	0.61
2500	-2.29	1.10	2.21	-2.29	1.01	1.49	X	X	X
2600	-4.84	-1.30	-0.17	-3.12	-1.27	-0.33	X	X	X
2700	-4.77	-1.25	-0.09	-2.87	-1.81	-0.88	X	X	X
5150	-2.56	-1.29	0	-5.10	-1.79	-1.38	-0.64	-1.29	0.03
5350	-2.84	-1.29	0.29	-3.10	-2.48	-0.62	-0.96	-0.47	-0.21
5470	-3.16	-1.56	-0.27	-1.47	-1.05	-0.38	-2.05	-0.64	1.02
5725	-4.49	-2.30	-1.18	-1.70	-5.49	-0.61	-2.35	0.20	1.87
5875	-4.72	-1.16	-0.5	-2.79	-3.32	-2.04	-2.09	-0.11	0.97

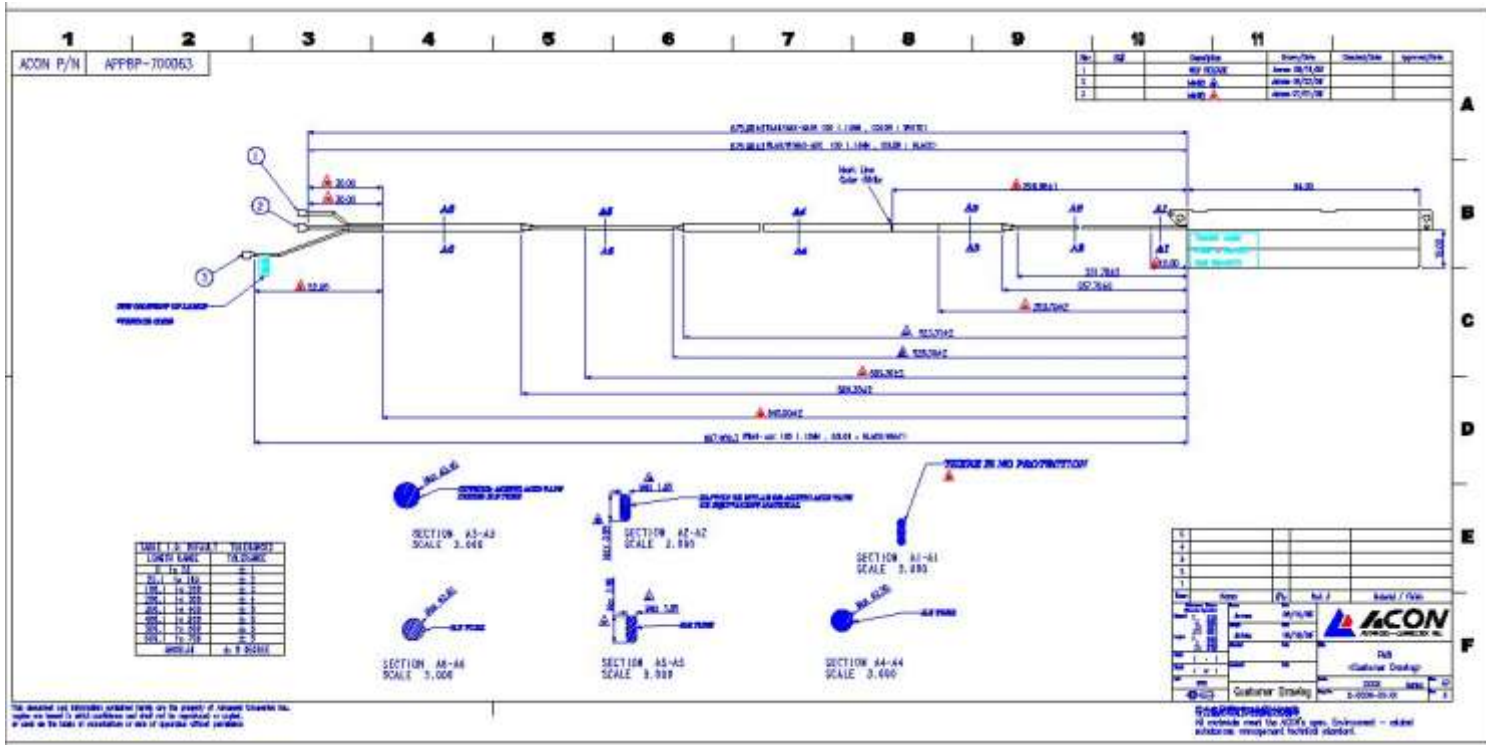
Antenna Peak Gain required being test in system basis.

- 1E frame contend absolutely peak antenna gain include H/V
- 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

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

Tx1 Antenna Dimensioned Drawing:

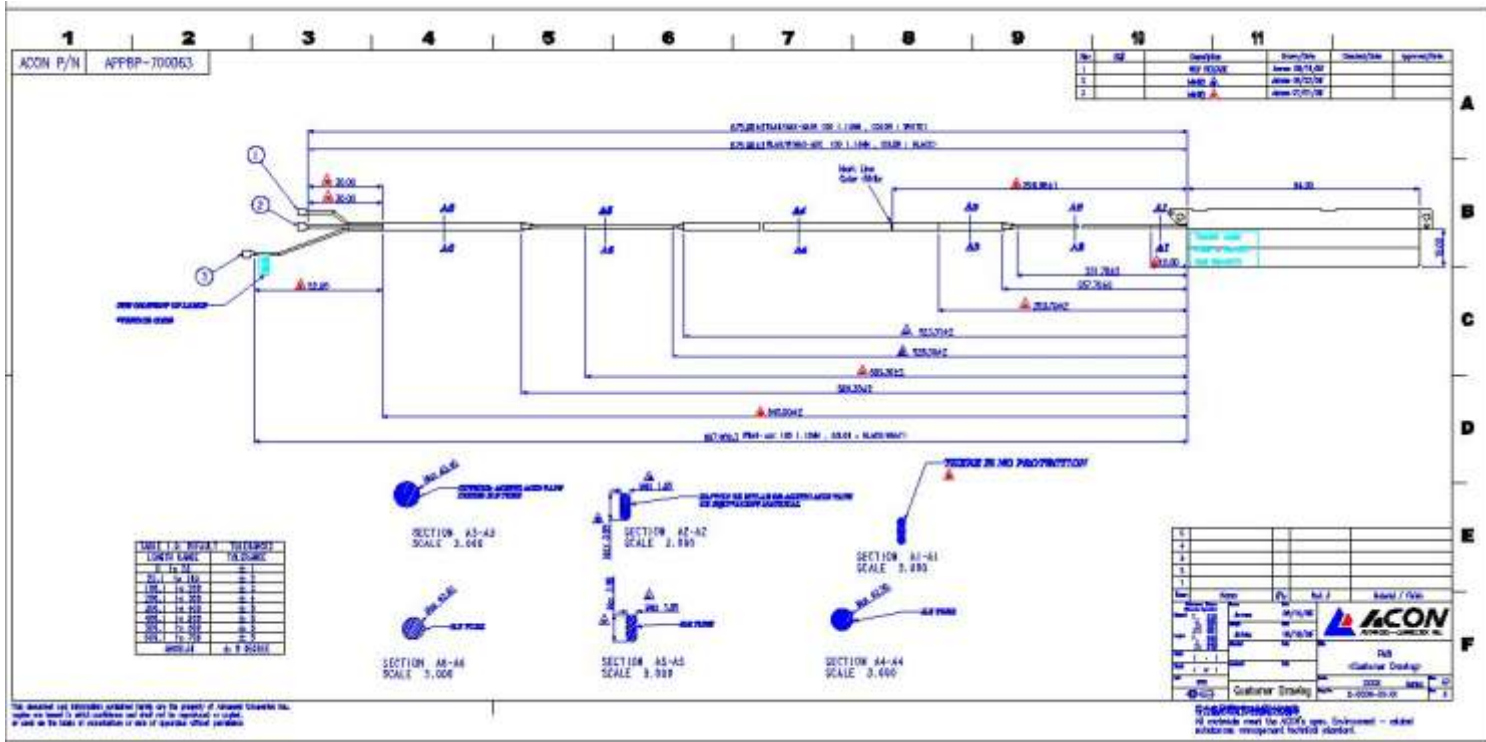


Tx1 Antenna Photo:-MAIN



Include a dimensioned photo and dimensioned drawing of Tx2 antenna here.

Tx2 Antenna Dimensioned Drawing:

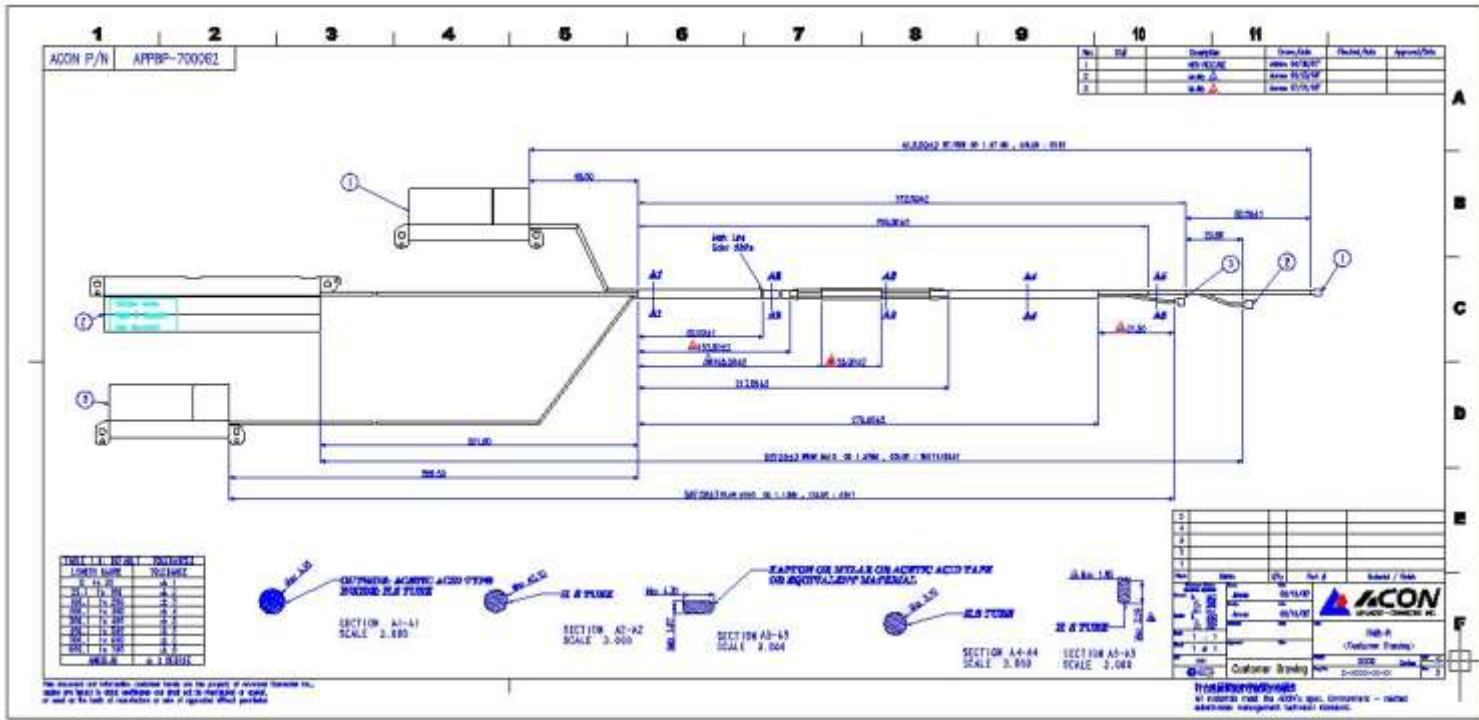


Tx2 Antenna Photo: AUX



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

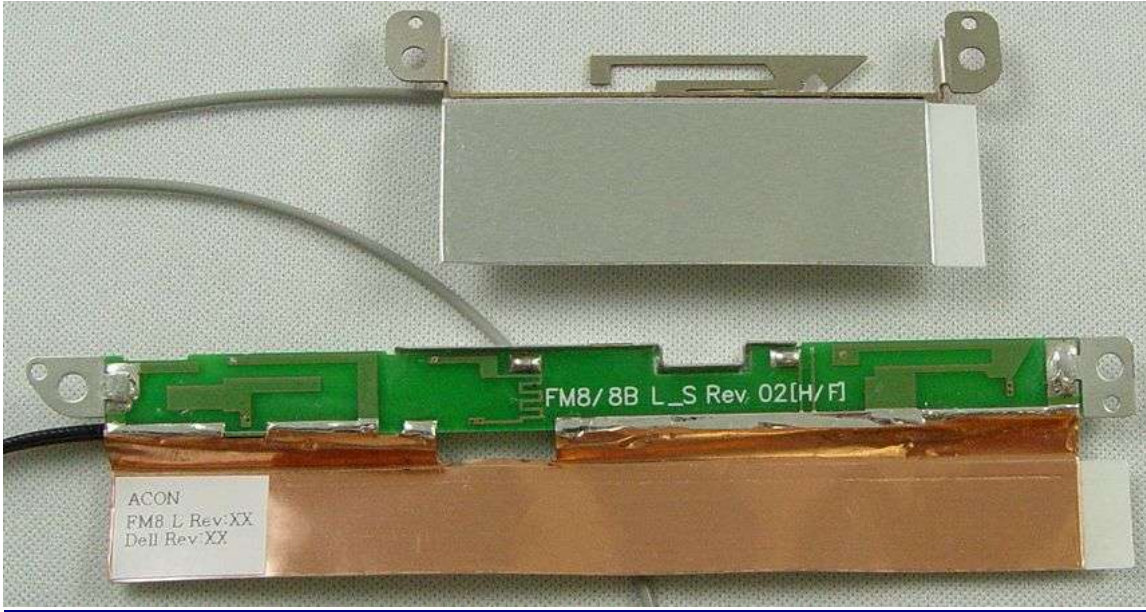
Tx3 (or Rx3) Antenna Dimensioned Drawing:



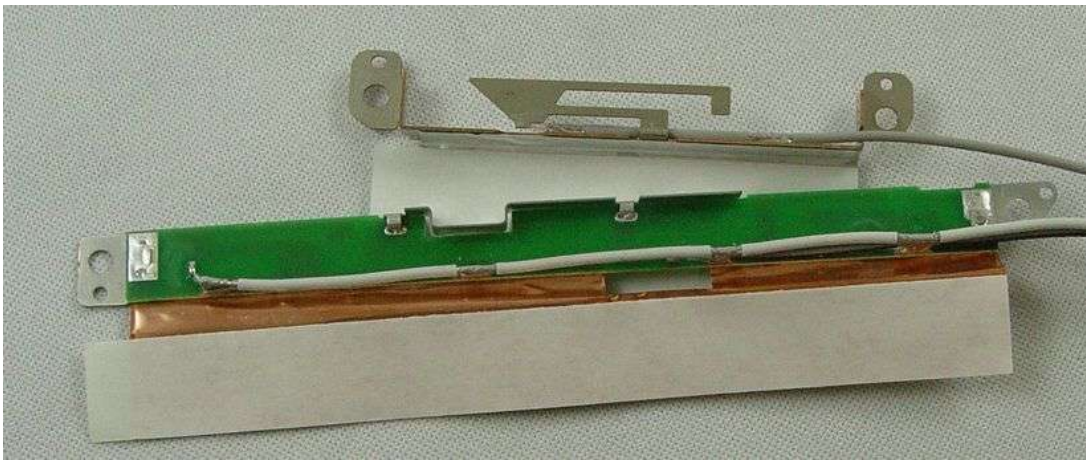
Tx3 (or Rx3) Antenna Photo:



Include front view photo of all 3 antennas here.



Include back view photo of all 3 antennas here.



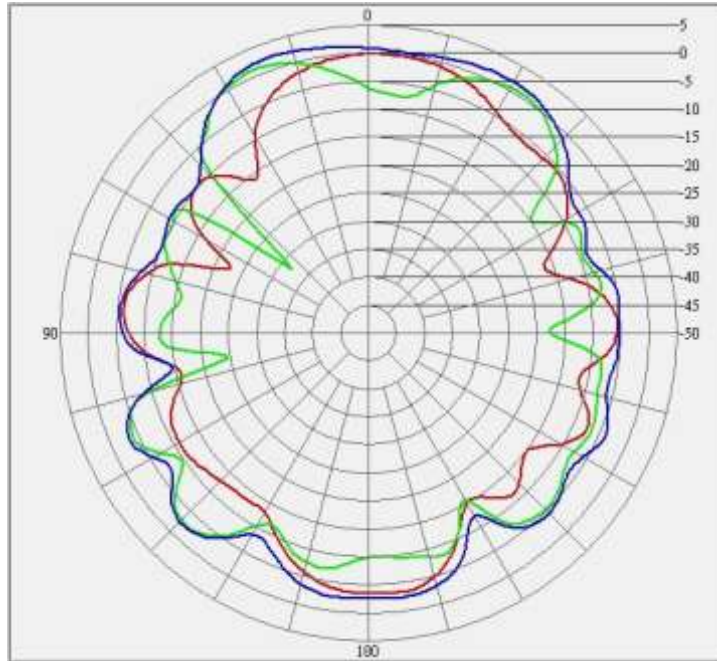
Section 3. Radiation characteristics of antennae Loaded in Host Platform

2412-2562MHz radiation characteristic

MAIN antenna: 2412 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol — V-Pol — H+V



Center Frequency	2412 MHz
Horizontal (dBi) peak	-0.11
Vertical (dBi) peak	1.19
H+V (dBi) peak	2.34

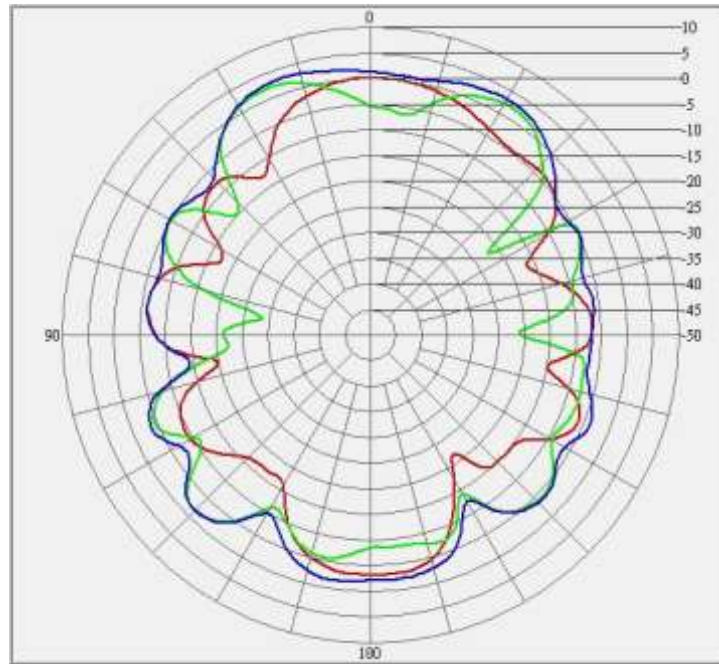
MAIN antenna: 2437 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol

— V-Pol

— H+V



Center Frequency	2437 MHz
Horizontal (dBi) peak	0.11
Vertical (dBi) peak	2.03
H+V (dBi) peak	3.04

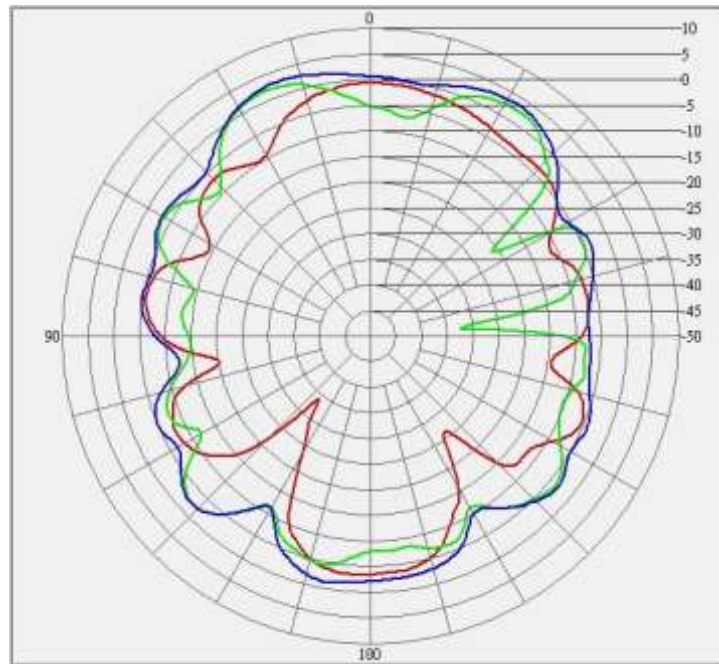
MAIN antenna: 2462 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol

— V-Pol

— H+V



Center Frequency	2462 MHz
Horizontal (dBi) peak	-0.67
Vertical (dBi) peak	2.32
H+V (dBi) peak	3.34

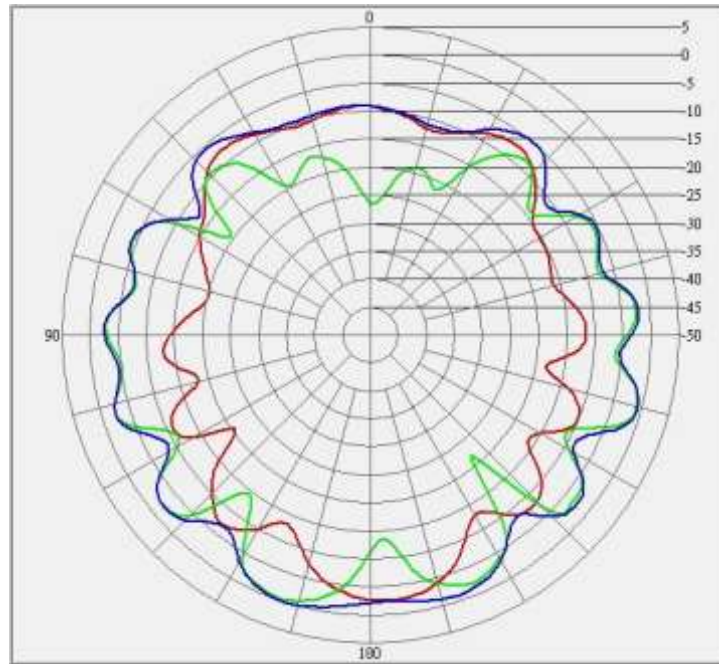
AUX antenna: 2412 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol

— V-Pol

— H+V



Center Frequency	2412 MHz
Horizontal (dBi) peak	-2.50
Vertical (dBi) peak	-0.29
H+V (dBi) peak	0.03

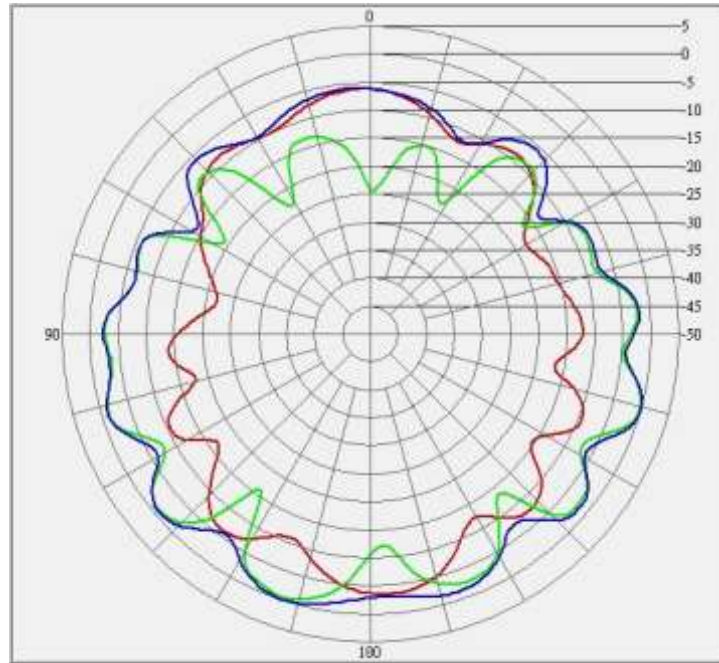
AUX antenna: 2437MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol

— V-Pol

— H+V



Center Frequency	2437 MHz
Horizontal (dBi) peak	-3.46
Vertical (dBi) peak	-0.18
H+V (dBi) peak	0.07

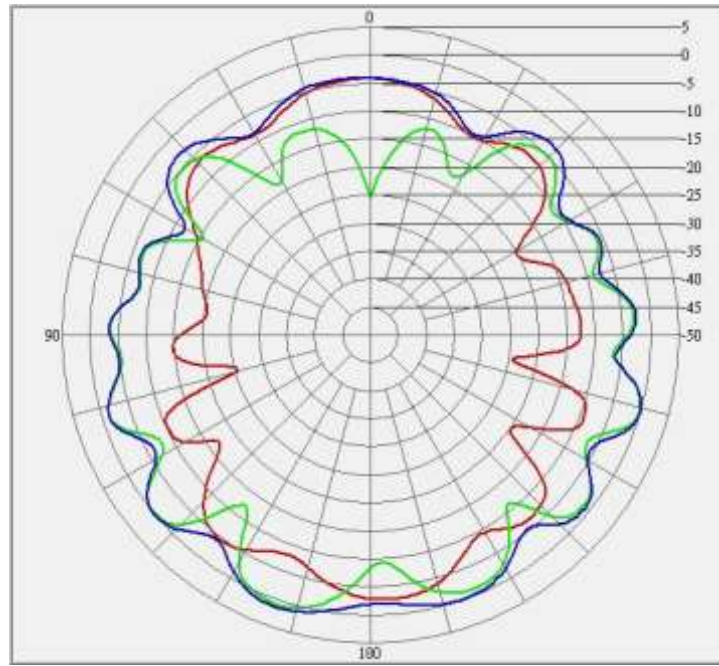
AUX antenna: 2462 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol

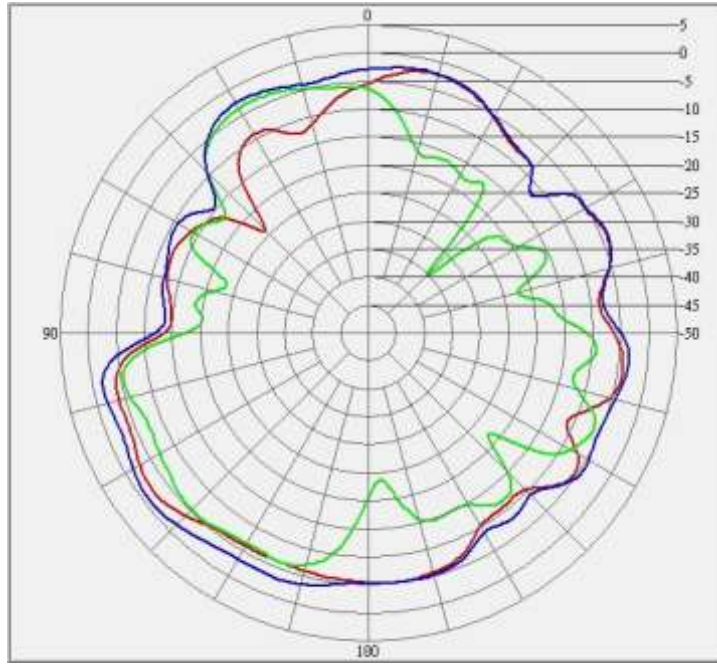
— V-Pol

— H+V



Center Frequency	2462 MHz
Horizontal (dBi) peak	-2.64
Vertical (dBi) peak	0.97
H+V (dBi) peak	1.47

— H-Pol — V-Pol — H+V



Center Frequency	2412 MHz
Horizontal (dBi) peak	-2.25
Vertical (dBi) peak	-3.69
H+V (dBi) peak	-0.93

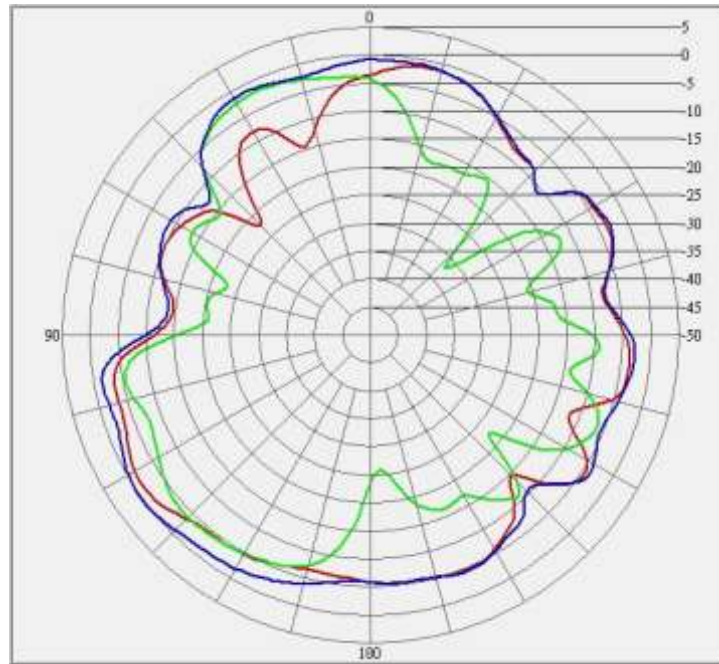
MIMO antenna: 2437 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol

— V-Pol

— H+V



Center Frequency	2437 MHz
Horizontal (dBi) peak	-1.26
Vertical (dBi) peak	-1.97
H+V (dBi) peak	0.20

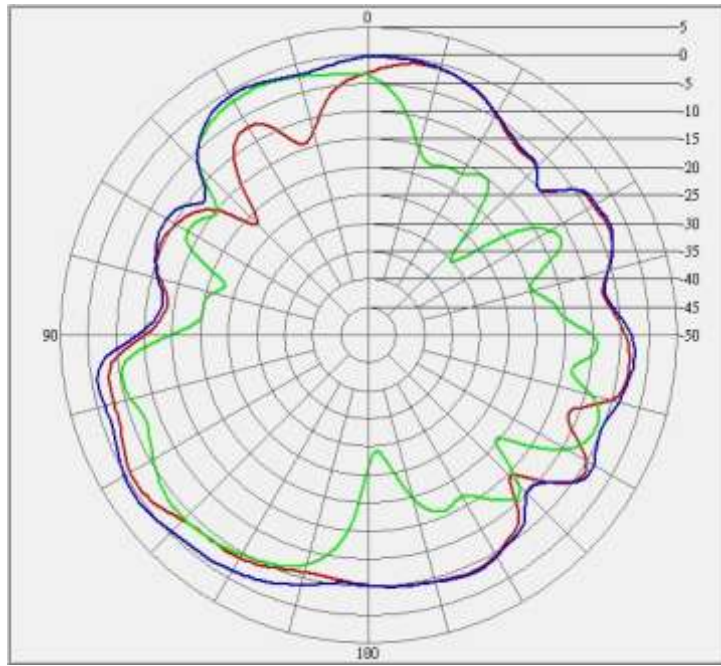
MIMO antenna: 2462 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol

— V-Pol

— H+V



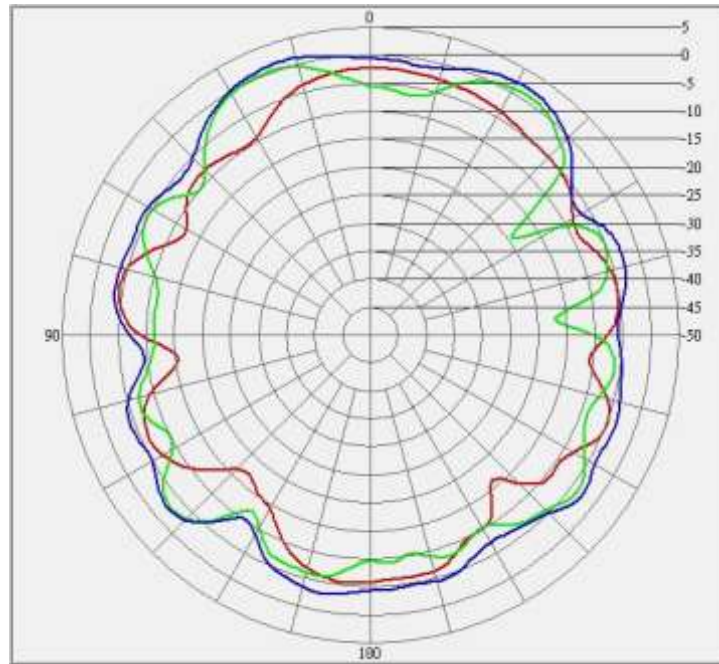
Center Frequency	2462 MHz
Horizontal (dBi) peak	-0.80
Vertical (dBi) peak	-1.49
H+V (dBi) peak	0.61

2500-2700MHz radiation characteristic

MAIN antenna: 2500MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol — V-Pol — H+V



Center Frequency	2500 MHz
Horizontal (dBi) peak	-2.29
Vertical (dBi) peak	1.10
H+V (dBi) peak	2.21

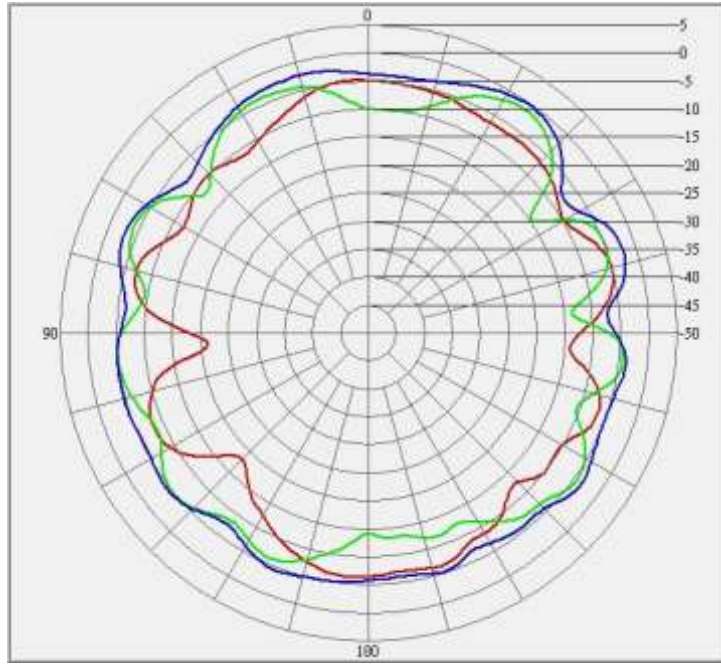
MAIN antenna: 2600 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol

— V-Pol

— H+V



Center Frequency	2600 MHz
Horizontal (dBi) peak	-4.84
Vertical (dBi) peak	-1.30
H+V (dBi) peak	-0.17

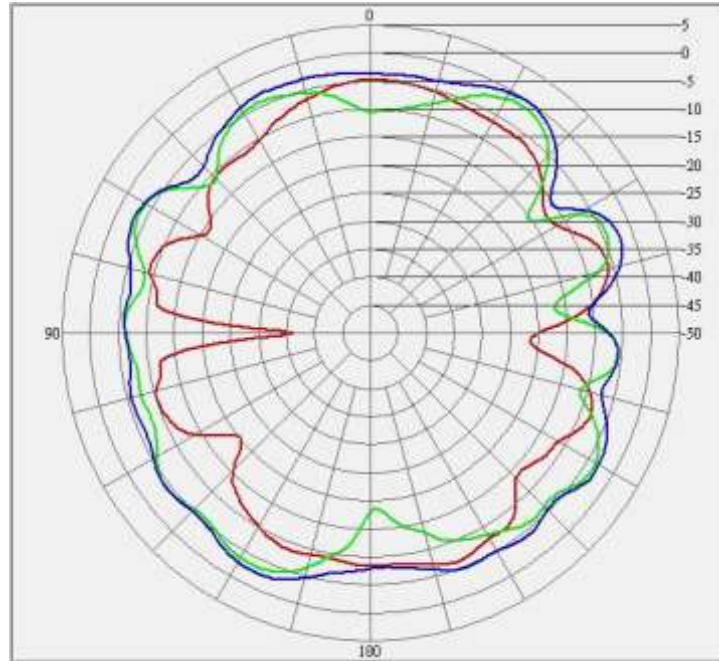
MAIN antenna:2700 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol

— V-Pol

— H+V

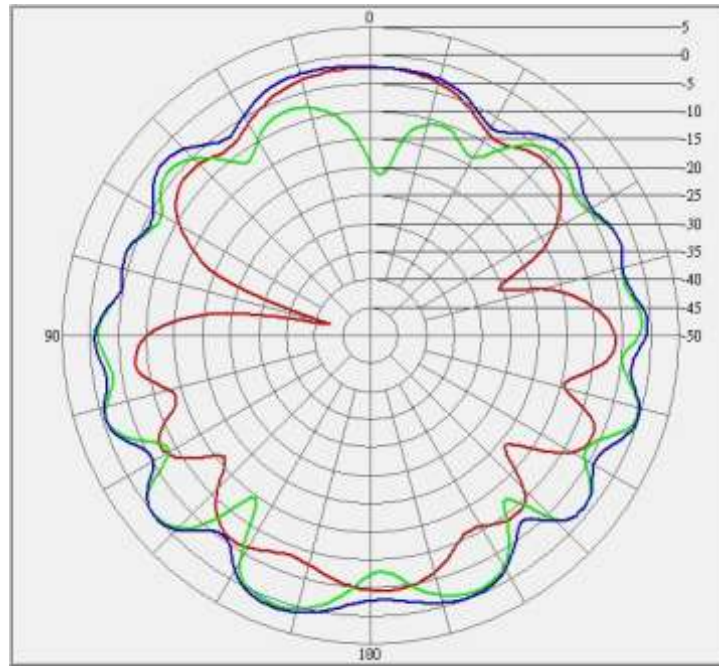


Center Frequency	2700 MHz
Horizontal (dBi) peak	-4.77
Vertical (dBi) peak	-1.25
H+V (dBi) peak	-0.09

— H-Pol

— V-Pol

— H+V

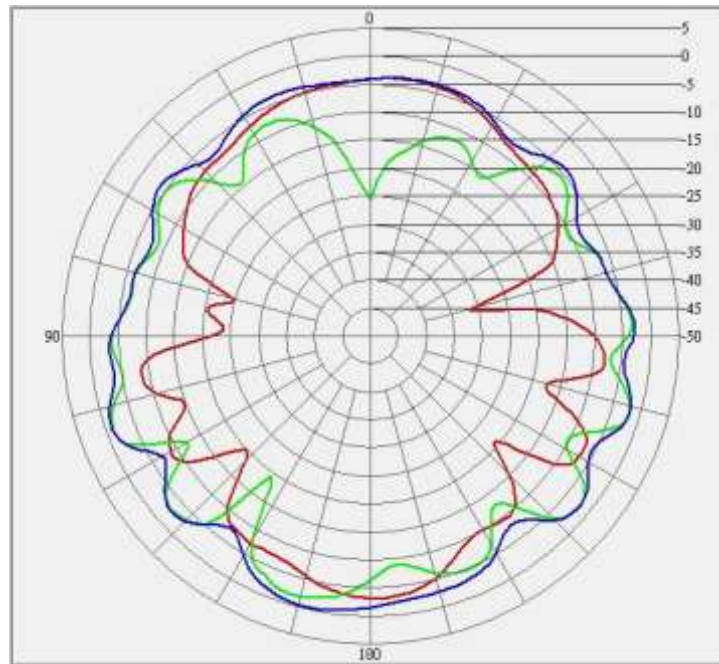


Center Frequency	2500 MHz
Horizontal (dBi) peak	-2.29
Vertical (dBi) peak	1.01
H+V (dBi) peak	1.49

— H-Pol

— V-Pol

— H+V



Center Frequency	2600 MHz
Horizontal (dBi) peak	-3.12
Vertical (dBi) peak	-1.27
H+V (dBi) peak	-0.33

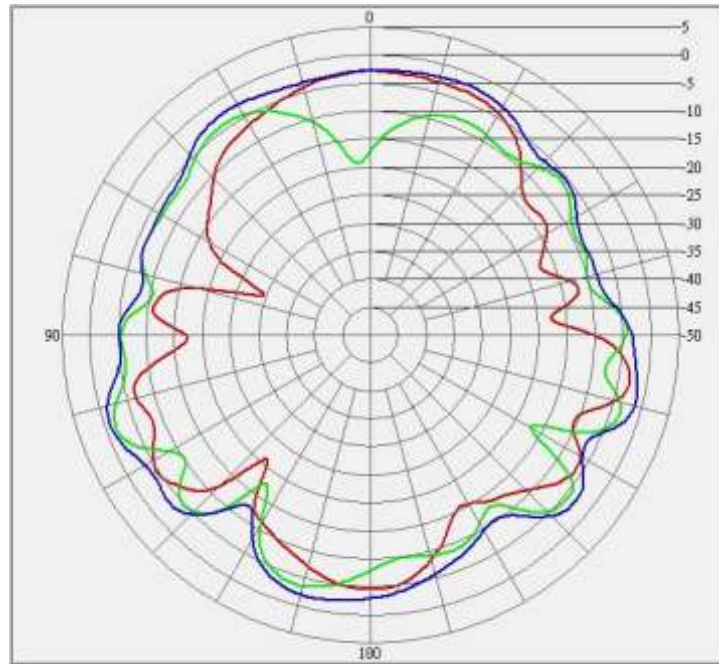
AUX antenna: 2700 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol

— V-Pol

— H+V



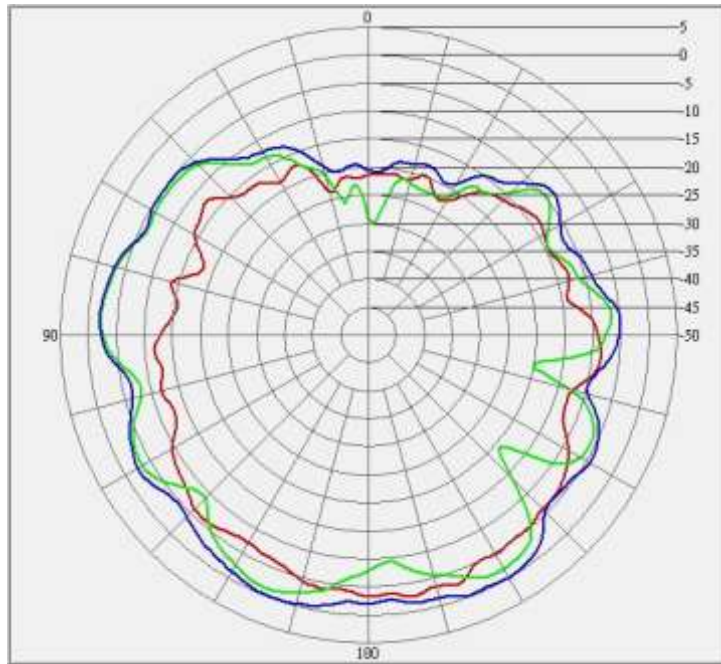
Center Frequency	2700 MHz
Horizontal (dBi) peak	-2.87
Vertical (dBi) peak	-1.81
H+V (dBi) peak	-0.88

5150-5470 MHz radiation characteristic

MAIN antenna: 5150 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol — V-Pol — H+V

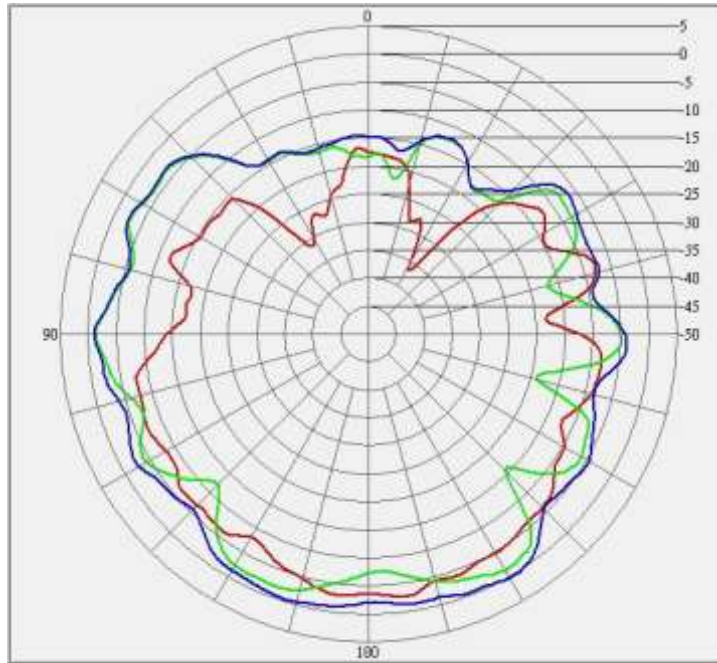


Center Frequency	5150 MHz
Horizontal (dBi) peak	-2.56
Vertical (dBi) peak	-1.29
H+V (dBi) peak	0

MAIN antenna: 5350 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol — V-Pol — H+V



Center Frequency	5350 MHz
Horizontal (dBi) peak	-2.84
Vertical (dBi) peak	-1.29
H+V (dBi) peak	0.29

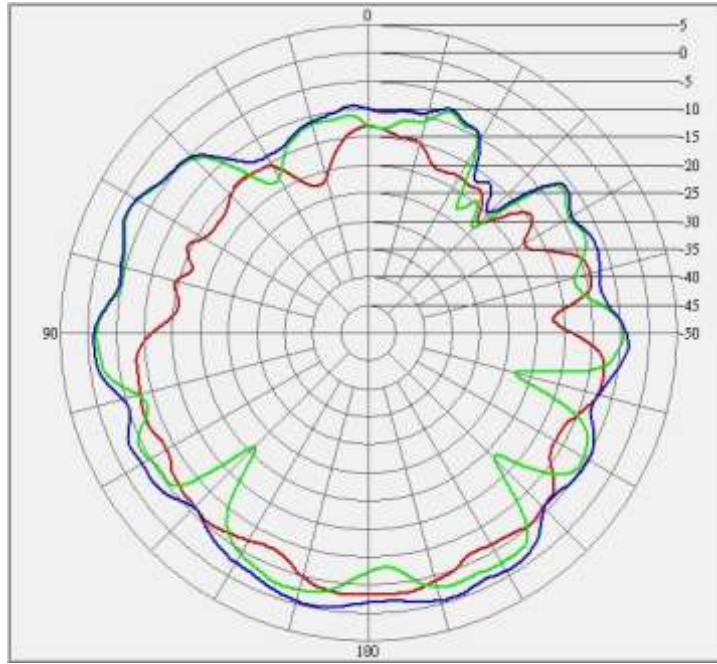
MAIN antenna: 5470 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol

— V-Pol

— H+V

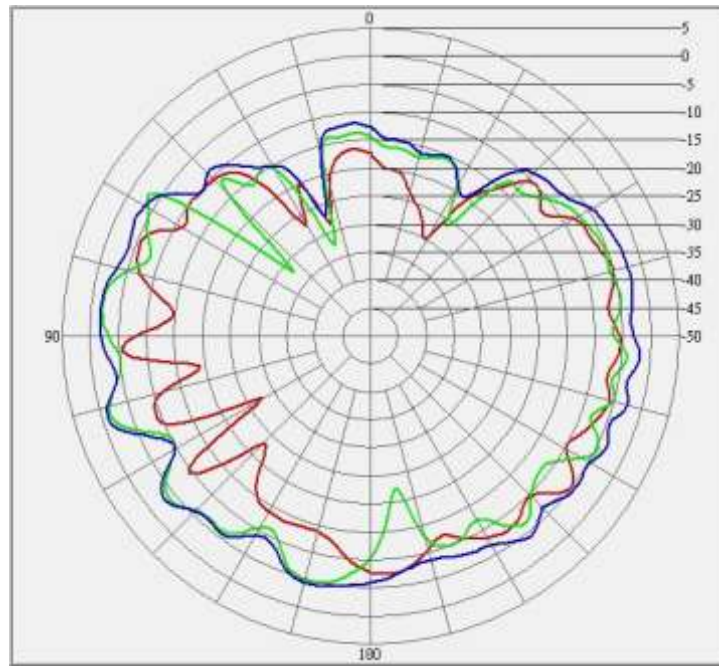


Center Frequency	5470 MHz
Horizontal (dBi) peak	-3.16
Vertical (dBi) peak	-1.56
H+V (dBi) peak	-0.27

— H-Pol

— V-Pol

— H+V



Center Frequency	5150 MHz
Horizontal (dBi) peak	-5.10
Vertical (dBi) peak	-1.79
H+V (dBi) peak	-1.38

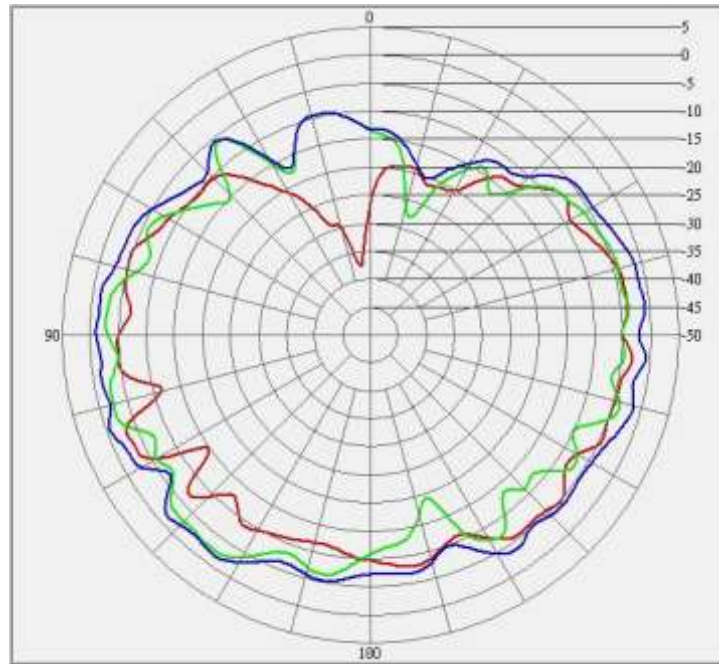
AUX antenna: 5350 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol

— V-Pol

— H+V



Center Frequency	5350 MHz
Horizontal (dBi) peak	-3.10
Vertical (dBi) peak	-2.48
H+V (dBi) peak	-0.62

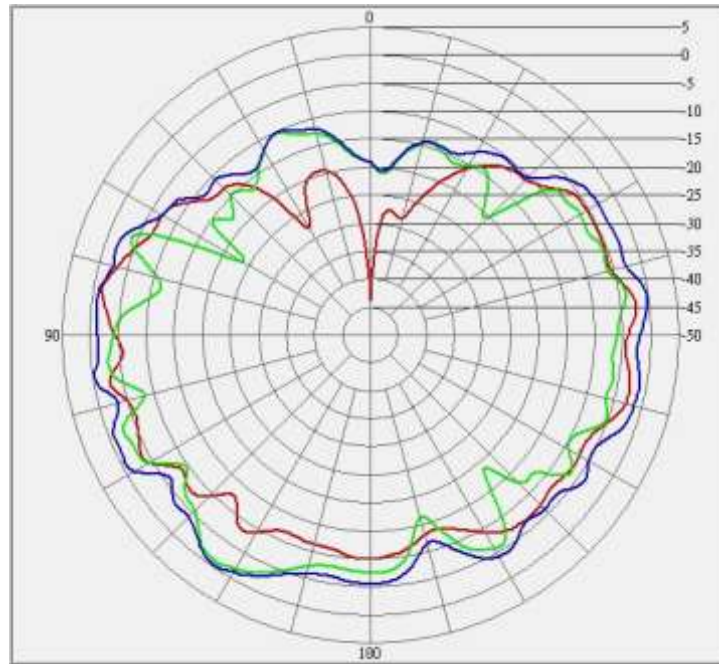
AUX antenna: 5470 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol

— V-Pol

— H+V

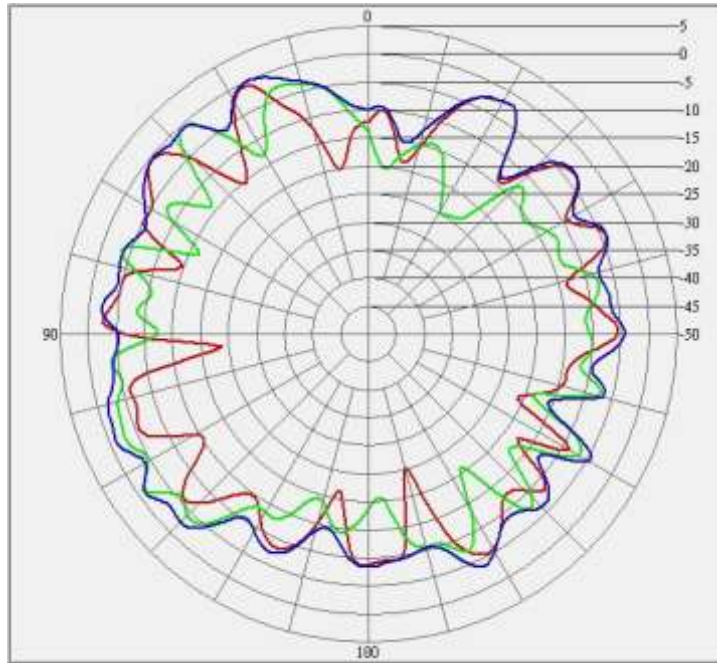


Center Frequency	5470 MHz
Horizontal (dBi) peak	-1.47
Vertical (dBi) peak	-1.05
H+V (dBi) peak	-0.38

MIMO antenna: 5150 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol — V-Pol — H+V

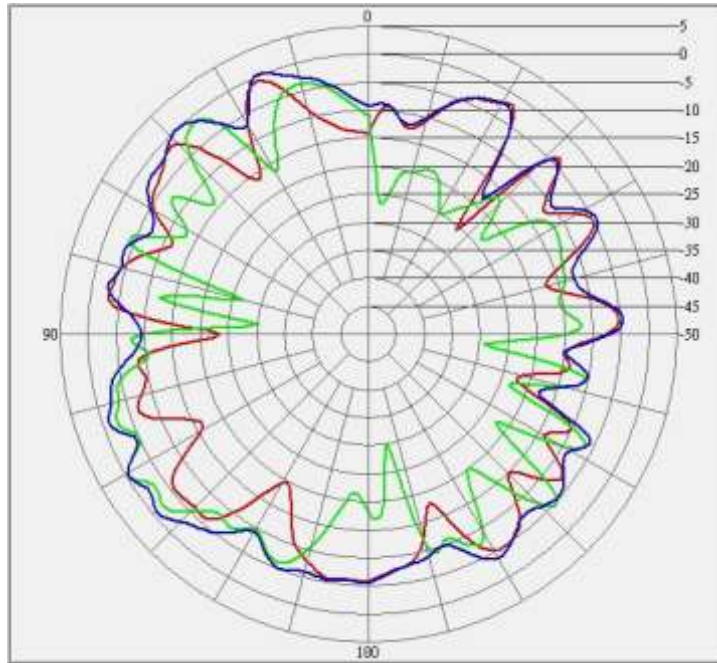


Center Frequency	5150 MHz
Horizontal (dBi) peak	-0.64
Vertical (dBi) peak	-1.29
H+V (dBi) peak	0.03

MIMO antenna: 5350 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol — V-Pol — H+V



Center Frequency	5350 MHz
Horizontal (dBi) peak	-0.96
Vertical (dBi) peak	-0.47
H+V (dBi) peak	-0.21

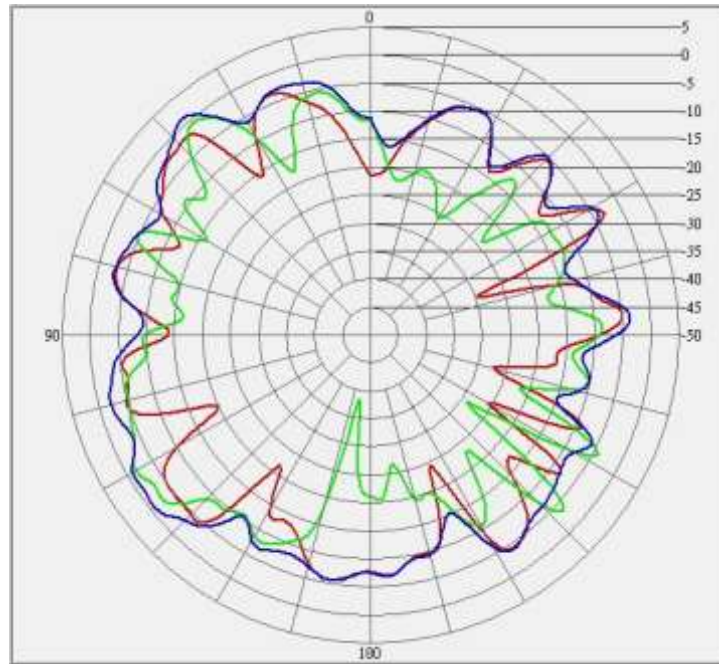
MIMO antenna: 5470 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol

— V-Pol

— H+V



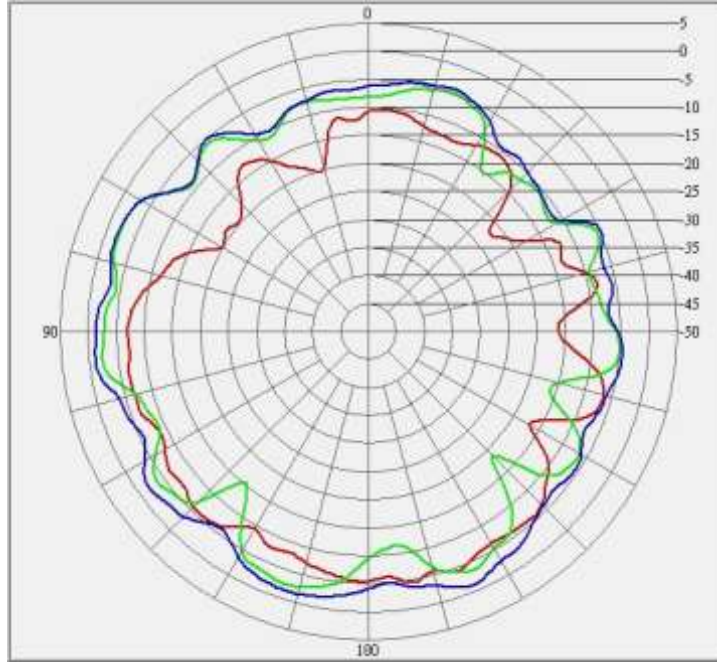
Center Frequency	5470 MHz
Horizontal (dBi) peak	-2.05
Vertical (dBi) peak	-0.64
H+V (dBi) peak	1.02

5725-5875 MHz radiation characteristic

MAIN antenna : 5725 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol — V-Pol — H+V



Center Frequency	5725 MHz
Horizontal (dBi) peak	-4.49
Vertical (dBi) peak	-2.30
H+V (dBi) peak	-1.18

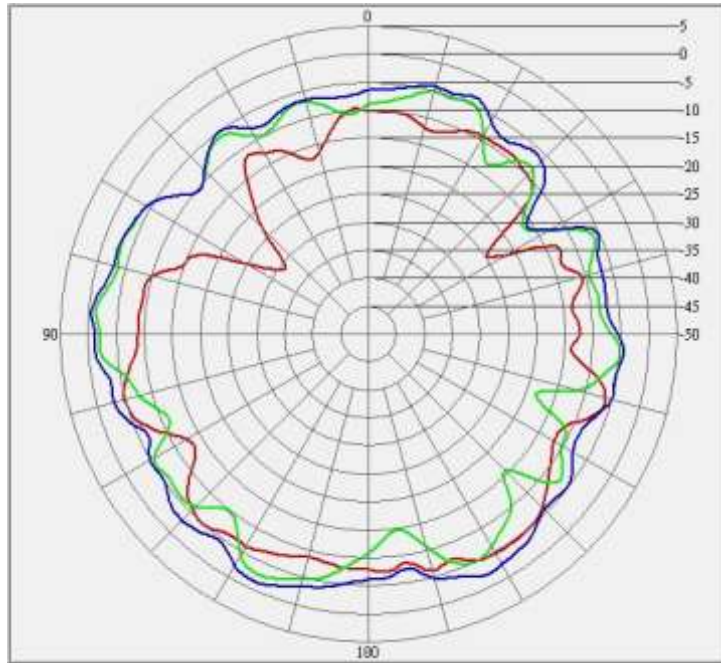
MAIN antenna: 5875 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol

— V-Pol

— H+V



Center Frequency	5875 MHz
Horizontal (dBi) peak	-4.72
Vertical (dBi) peak	-1.16
H+V (dBi) peak	-0.5

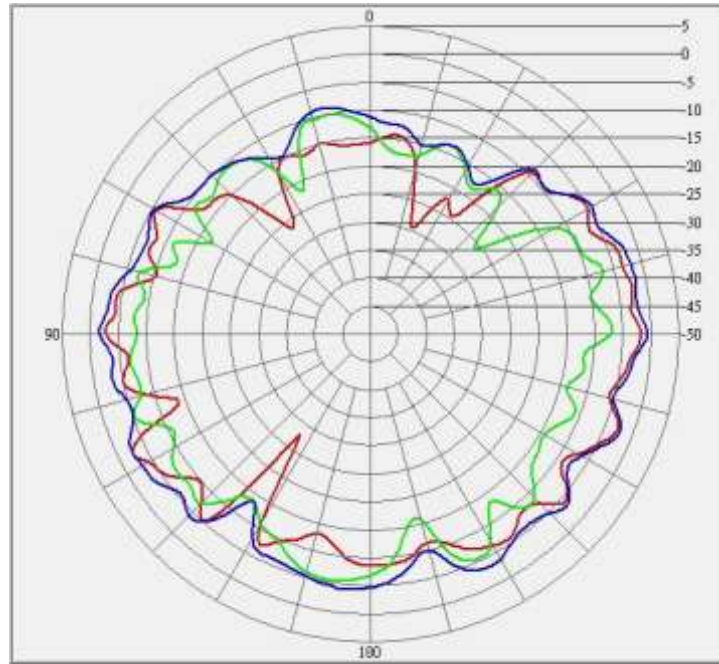
AUX antenna : 5725 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol

— V-Pol

— H+V



Center Frequency	5725 MHz
Horizontal (dBi) peak	-1.70
Vertical (dBi) peak	-5.49
H+V (dBi) peak	-0.61

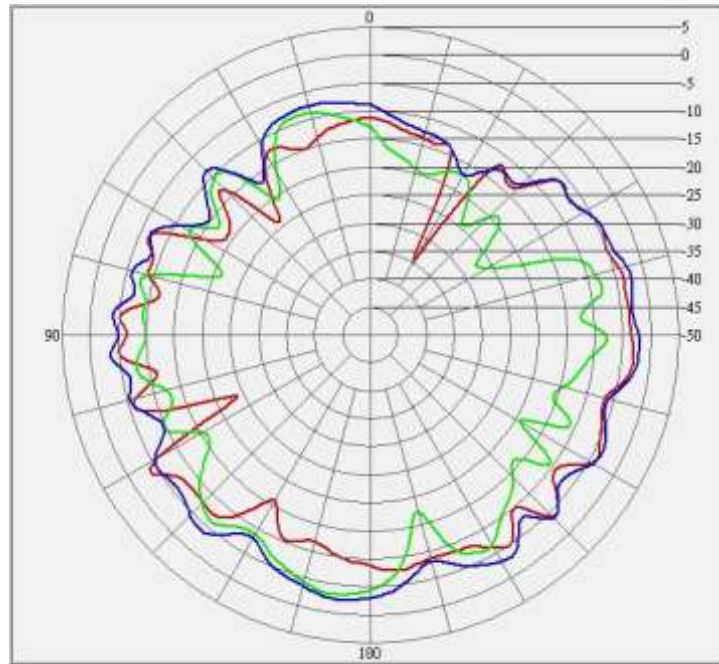
AUX antenna : 5875 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol

— V-Pol

— H+V



Center Frequency	5875 MHz
Horizontal (dBi) peak	-2.79
Vertical (dBi) peak	-3.32
H+V (dBi) peak	-2.04

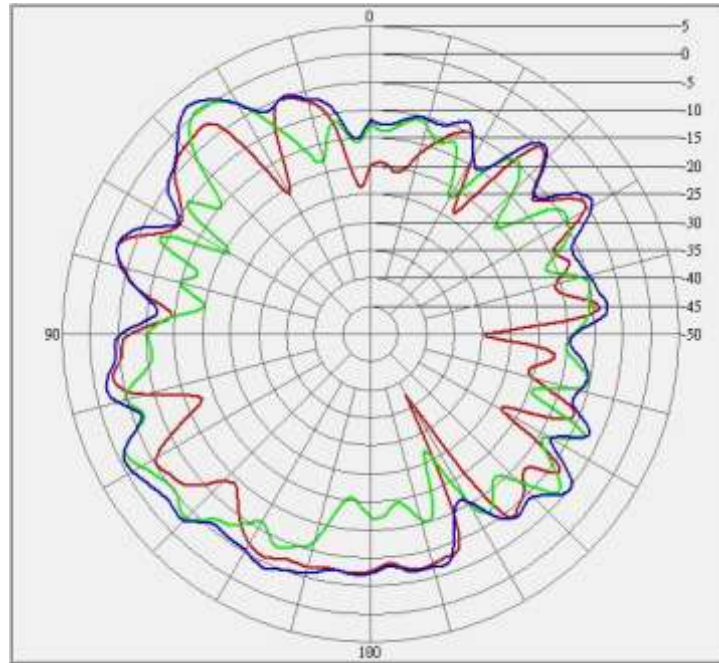
MIMO antenna : 5725 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol

— V-Pol

— H+V



Center Frequency	5725 MHz
Horizontal (dBi) peak	-2.35
Vertical (dBi) peak	0.2
H+V (dBi) peak	1.87

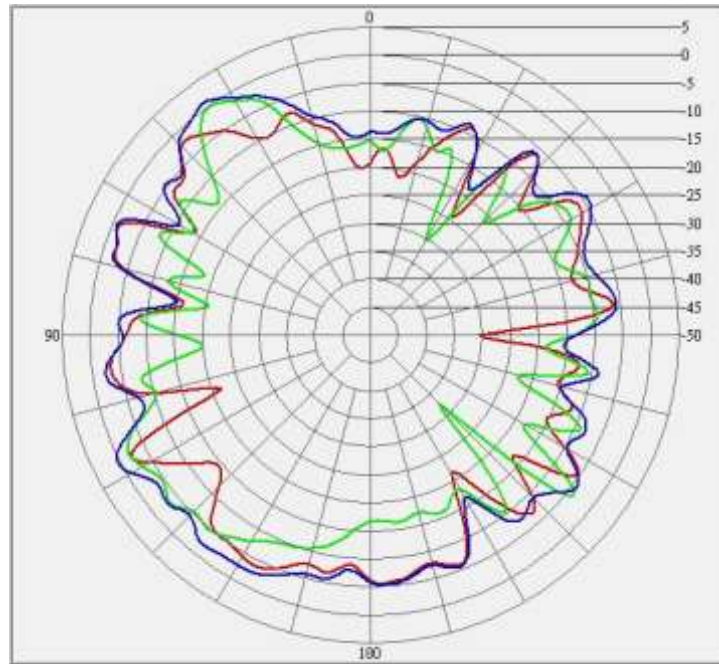
MIMO antenna : 5875 MHz

The Most Appropriate Antenna for Your Best Design!

— H-Pol

— V-Pol

— H+V



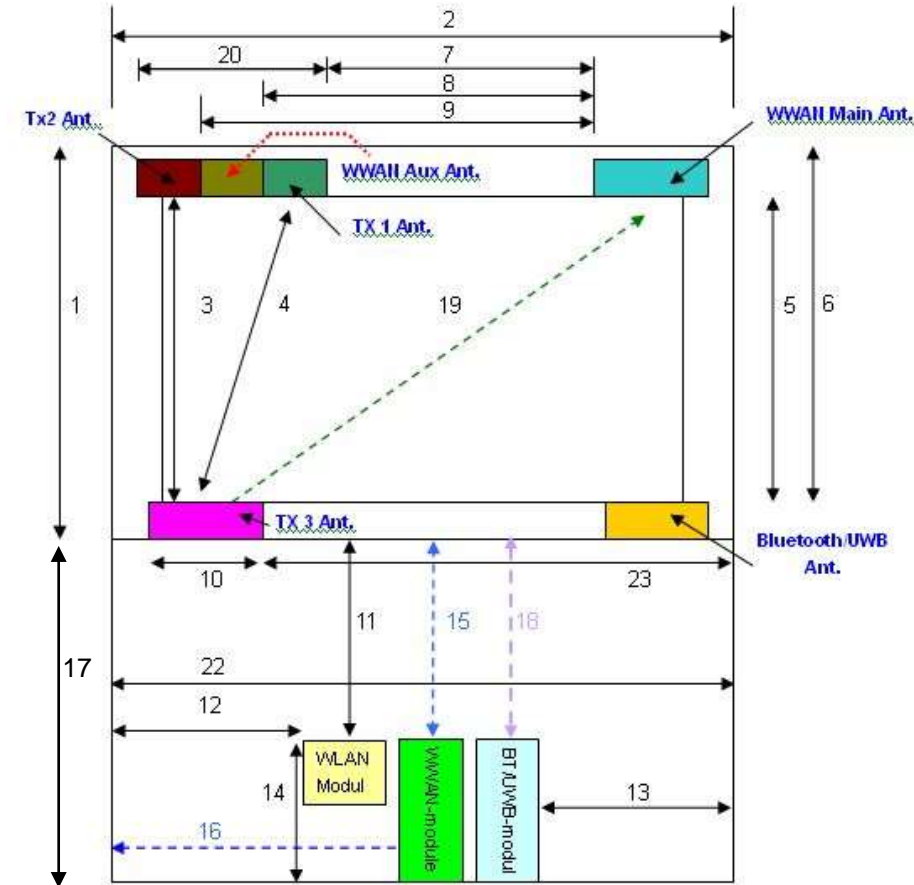
Center Frequency	5875 MHz
Horizontal (dBi) peak	-2.09
Vertical (dBi) peak	-0.11
H+V (dBi) peak	0.97

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 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.



Antenna placement
 Tx1 Antenna : WLAN main
 Tx2 Antenna : WLAN Aux
 Tx3 Antenna : MIMO

Antenna distance

- ①:250mm
- ②:370mm
- ③:220mm
- ④:230mm
- ⑤:215mm
- ⑥:232mm
- ⑦:131mm
- ⑧:165mm
- ⑨:207mm
- ⑰:320mm
- ⑳:275mm

Antenna size

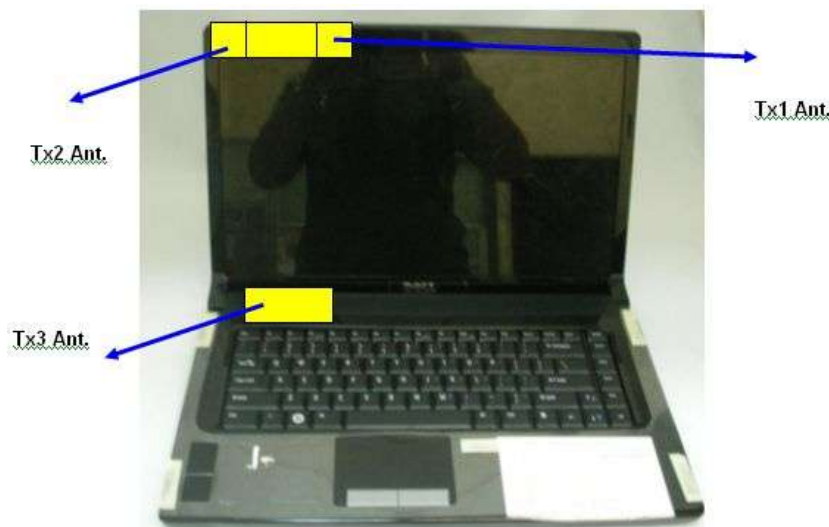
- ⑩:70mm
- ⑳:105mm

Module to base distance

- ①:165mm
- ②:140mm
- ③:143mm
- ④:75mm
- ⑤:153mm
- ⑥:157mm
- ⑦:153mm

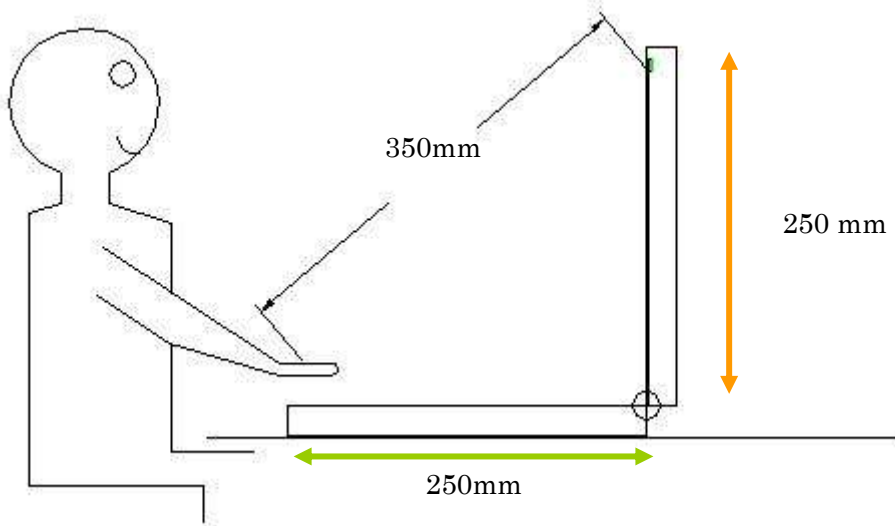
Base size

- ⑰:250mm
- ⑱:370mm



Section 6. Antenna dimensional information for SAR evaluation

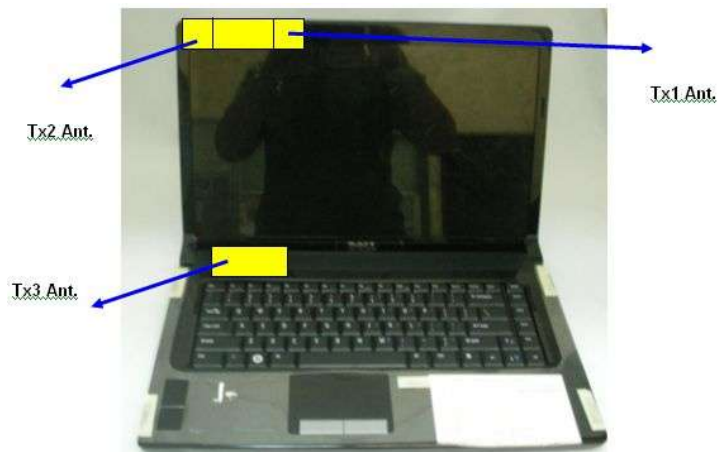
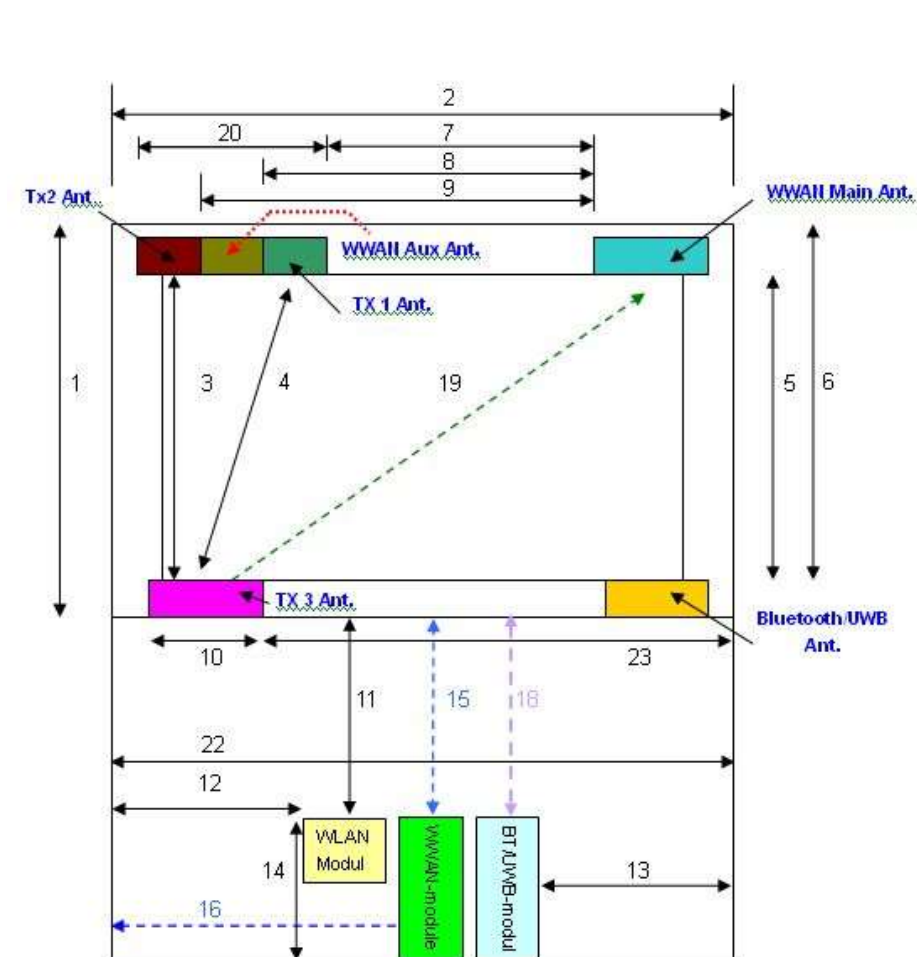
Include a **dimensioned photo or dimensioned drawing** showing the distance (mm) between the transmit antennas and the user (excluding hands, wrist, feet, lap/ thigh, and ankle)



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)



Antenna placement
 Tx1 Antenna : WLAN main
 Tx2 Antenna : WLAN Aux
 Tx3 Antenna : MIMO

Antenna distance

- ①:250mm
- ②:370mm
- ③:220mm
- ④:230mm
- ⑤:215mm
- ⑥:232mm
- ⑦:131mm
- ⑧:165mm
- ⑨:207mm
- ⑲:320mm
- ⑲:275mm

Antenna size

- ⑩:70mm
- ⑳:105mm

Module to base distance

- ⑪:165mm
- ⑫:140mm
- ⑬:143mm
- ⑭:75mm
- ⑮:153mm
- ⑯:157mm
- ⑱:153mm

Base size

- ⑰:250mm
- ⑳:370mm

Section 8. Local representative contact information

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