

## Regulatory WLAN Antenna Information

### Yageo WLAN Antennae exclusively for DELL AMG (PC Mode) Platform

<b>Platform</b>	
Platform Owner	DELL Corporation
Brand Name	DELL
Model Name	AMG (PC Mode)
ODM	Wistron Corporation
Target Launch Date	2008/ 09/ 19
<b>Antenna</b>	
Brand Name	Yageo
Part Number	<input checked="" type="checkbox"/> WLAN_Main Antenna: CAN4313792012501B
	<input checked="" type="checkbox"/> WLAN_Aux Antenna: CAN4313792022501B
	<input checked="" type="checkbox"/> MIMO Antenna : CAN4313792022501B
<b>Module</b>	
With WLAN Module	<input checked="" type="checkbox"/> Intel 5100
(Check Box)	<input checked="" type="checkbox"/> Intel 5300
	<input type="checkbox"/> WM3B2200BG
	<input type="checkbox"/> WM3B2915ABG
	<input type="checkbox"/> WM3945ABG
	<input type="checkbox"/> 4965AGN
	<input type="checkbox"/> 4965AG_
	<input type="checkbox"/> 533ANX Family
	<input type="checkbox"/> 512ANX Family
	<input type="checkbox"/> 533AN Family
	<input type="checkbox"/> 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	WLAN_Main Antenna, WLAN_Aux Antenna & MIMO Antenna antenna (Peak Gain W/ cable loss) *	Required	Required	Required	Required	Required
	1E OR 1F, 1G, 1H					
1F	WLAN_Main Antenna, WLAN_Aux Antenna & MIMO Antenna antenna (Peak Gain only) *	Required	Required	Required	Required	Required
1G	VSWR of cable including connector	Required	Required	Required	Required	Required
1H	WLAN_Main Antenna, WLAN_Aux Antenna & MIMO Antenna antenna (Cable loss W/ connector) *	Required	Required	Required	Required	Required
2	Dimensioned Photographs <u>and</u> Drawings of WLAN_Main Antenna, WLAN_Aux Antenna, and MIMO Antenna (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 Manufacturer	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)
CAN4313792012501B  WLAN_Main antenna	YAGEO	PIFA	50 ohm Coaxial length: 44.9 cm diameter: 1.13 mm Connector: Hirose U FL-LP IPEX MHF or equivalent	2400-2500MHz 0.64 dBi (peak)	2400-2500MHz 1.76 dBi (peak)	2400-2500MHz 3.00 max	2400-2500MHz 1.12 dBi (peak)
				2496-2690MHz -0.74 dBi (peak)	2496-2690MHz 0.41 dBi (peak)	2496-2690MHz 3.00 max	2496-2690MHz 1.15 dBi (peak)
				5150-5350MHz 1.57 dBi (peak)	5150-5350MHz 3.33 dBi (peak)	5150-5350MHz 3.00 max	5150-5350MHz 1.76 dBi (peak)
				5470-5725MHz -0.27 dBi (peak)	5470-5725MHz 1.57 dBi (peak)	5470-5725MHz 3.00 max	5470-5725MHz 1.84 dBi (peak)
				5725-5850MHz -1.10 dBi (peak)	5725-5850MHz 0.78 dBi (peak)	5725-5850MHz 3.00 max	5725-5850MHz 1.88 dBi (peak)
CAN4313792022501B  WLAN_Aux antenna	YAGEO Corporation	PIFA	50 ohm Coaxial length: 45.5 cm diameter: 1.13 mm Connector: Hirose U FL-LP IPEX MHF or equivalent	2400-2500MHz 0.27 dBi (peak)	2400-2500MHz 1.41 dBi (peak)	2400-2500MHz 3.00 max	2400-2500MHz 1.14 dBi (peak)
				2496-2690MHz -0.83 dBi (peak)	2496-2690MHz 0.34 dBi (peak)	2496-2690MHz 3.00 max	2496-2690MHz 1.17 dBi (peak)
				5150-5350MHz 1.23 dBi (peak)	5150-5350MHz 3.01 dBi (peak)	5150-5350MHz 3.00 max	5150-5350MHz 1.78 dBi (peak)
				5470-5725MHz -0.85 dBi (peak)	5470-5725MHz 1.02 dBi (peak)	5470-5725MHz 3.00 max	5470-5725MHz 1.87 dBi (peak)
				5725-5850MHz -0.84 dBi (peak)	5725-5850MHz 1.07 dBi (peak)	5725-5850MHz 3.00 max	5725-5850MHz 1.91 dBi (peak)
CAN4313792022501B  MIMO antenna	YAGEO Corporation	PIFA	50 ohm Coaxial length: 47.7 cm diameter: 1.13 mm Connector: Hirose U FL-LP IPEX MHF or equivalent	2400-2500MHz 0.03 dBi (Peak)	2400-2500MHz 1.22 dBi (peak)	2400-2500MHz 3.00 max	2400-2500MHz 1.19 dBi (peak)
				2496-2690MHz -2.76 dBi (Peak)	2496-2690MHz -1.53 dBi (peak)	2496-2690MHz 3.00 max	2496-2690MHz 1.23 dBi (peak)
				5150-5350MHz 1.02 dBi (Peak)	5150-5350MHz 2.89 dBi (peak)	5150-5350MHz 3.00 max	5150-5350MHz 1.87 dBi (peak)
				5470-5725MHz 0.09 dBi (Peak)	5470-5725MHz 2.05 dBi (peak)	5470-5725MHz 3.00 max	5470-5725MHz 1.96 dBi (peak)
				5725-5850MHz 0.60 dBi (peak)	5725-5850MHz 2.60 dBi (peak)	5725-5850MHz 3.00 max	5725-5850MHz 2.00 dBi (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:**

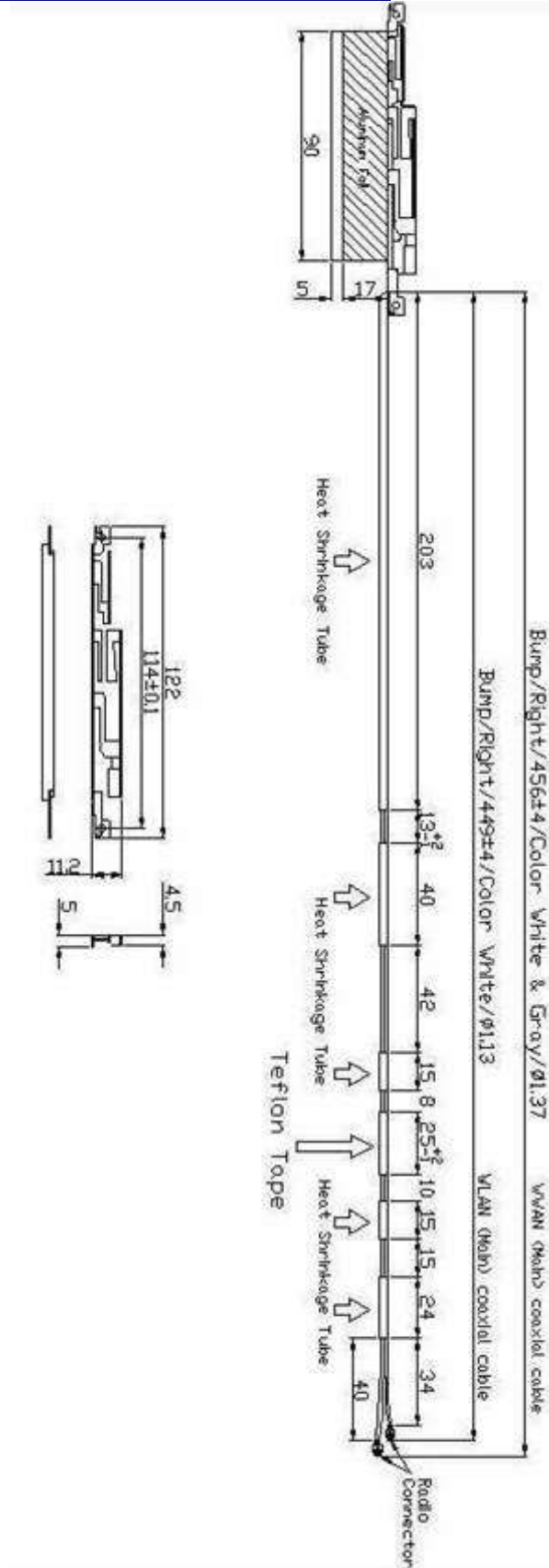
Frequency (MHz)	WLAN_Main Antenna		WLAN_Aux Antenna		MIMO Antenna	
	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
	(dBi)	(dBi)	(dBi)	(dBi)	(dBi)	(dBi)
2400	-1.63	-0.35	-4.57	-1.05	0.03	-1.52
2450	-0.78	0.64	-0.12	0.27	-0.64	-1.38
2500	-2.21	-0.73	-0.56	-0.89	-1.81	-1.91
2501	-4.81	-3.22	-2.07	-0.83	-3.27	-3.41
2593	-4.28	-1.70	-3.11	-5.22	-3.46	-3.34
2685	-4.69	-0.74	-3.19	-3.40	-5.09	-2.76
5150	-2.09	1.28	-0.85	-0.04	-4.06	1.02
5250	-2.47	1.57	-1.36	1.23	-3.32	0.89
5350	-2.01	1.35	-4.31	-1.02	-4.21	-0.07
5470	-3.06	-0.27	-6.20	-0.85	-3.99	-0.07
5600	-2.67	-1.41	-4.45	-0.90	-6.34	-1.24
5725	-2.00	-2.35	-4.28	-2.18	-6.38	0.09
5785	-1.10	-3.25	-3.49	-0.84	-5.17	0.60
5850	-1.20	-4.19	-3.00	-1.10	-5.76	-1.00

- 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.

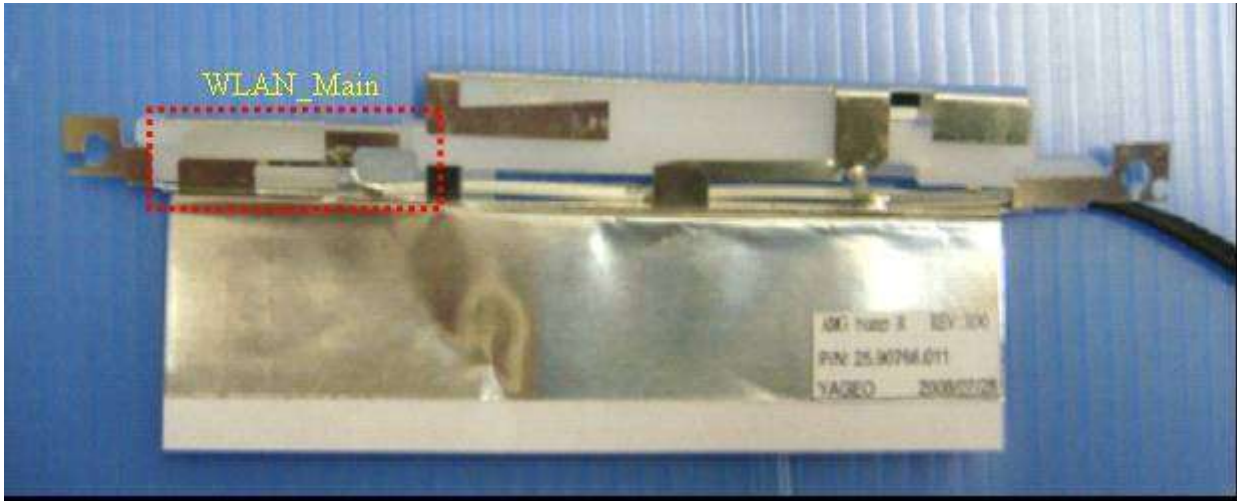
## Section 2. Dimensioned Photos or Drawings of Antennas

Include a dimensioned photo and dimensioned drawing of WLAN\_Main Antenna antenna here.

### WLAN Main Antenna Antenna Dimensioned Drawing:

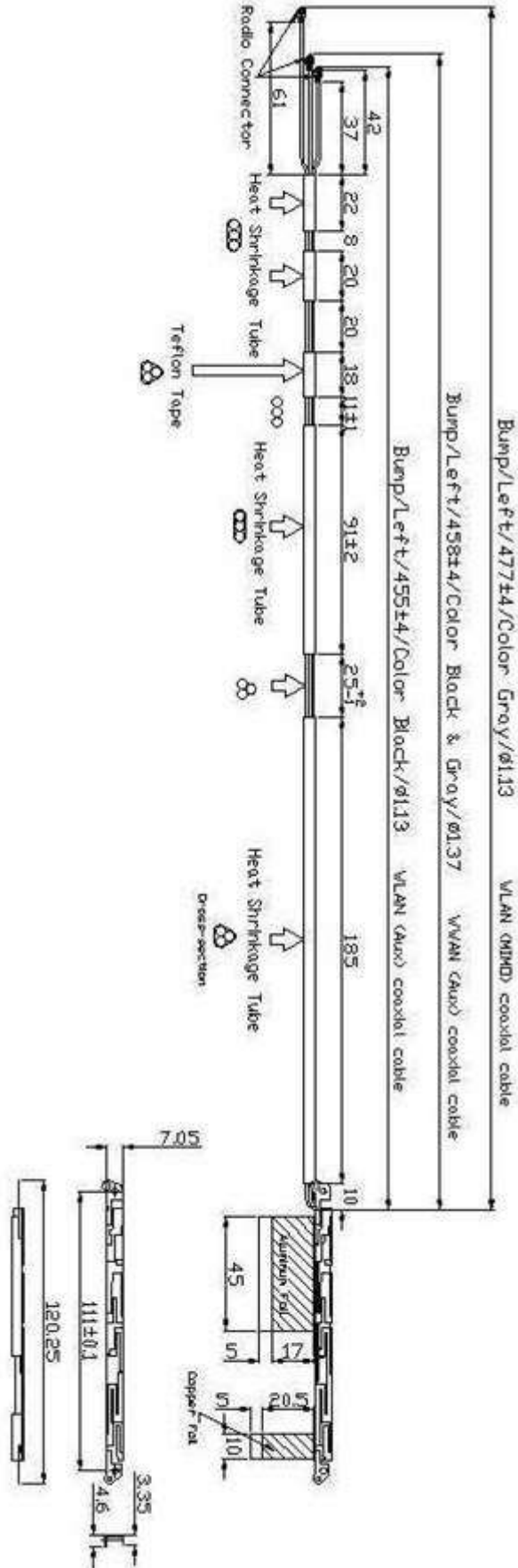


**WLAN Main Antenna Photo:**



Include a dimensioned photo and dimensioned drawing of WLAN\_Aux Antenna antenna here.

WLAN Aux Antenna Dimensioned Drawing:



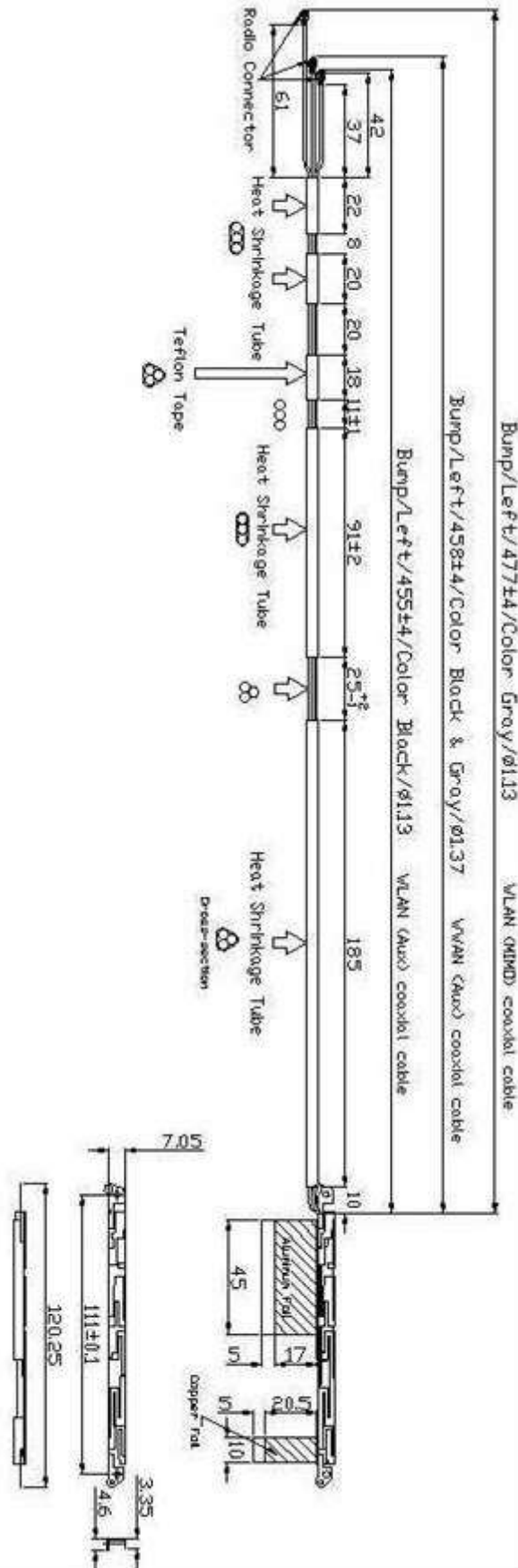
**WLAN Aux Antenna Photo:**



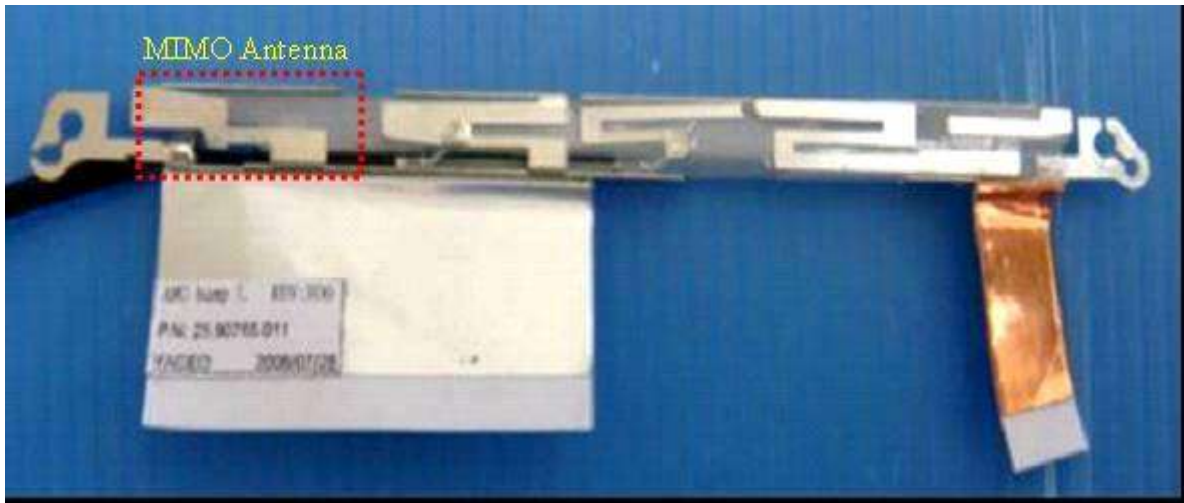


Include a dimensioned photo and dimensioned drawing of MIMO Antenna (or Rx3) antenna here.

MIMO Antenna Dimensioned Drawing:



**MIMO Antenna Photo:**



**Include front view photo of all 3 antennas here.**

Antenna Manufacturer: Yageo Corporation  
Antenna Part Number: CAN4313792012501B (WLAN\_Main),  
CAN4313792022501B (WLAN\_Aux),  
CAN4313792022501B (MIMO)



**Include back view photo of all 3 antennas here.**

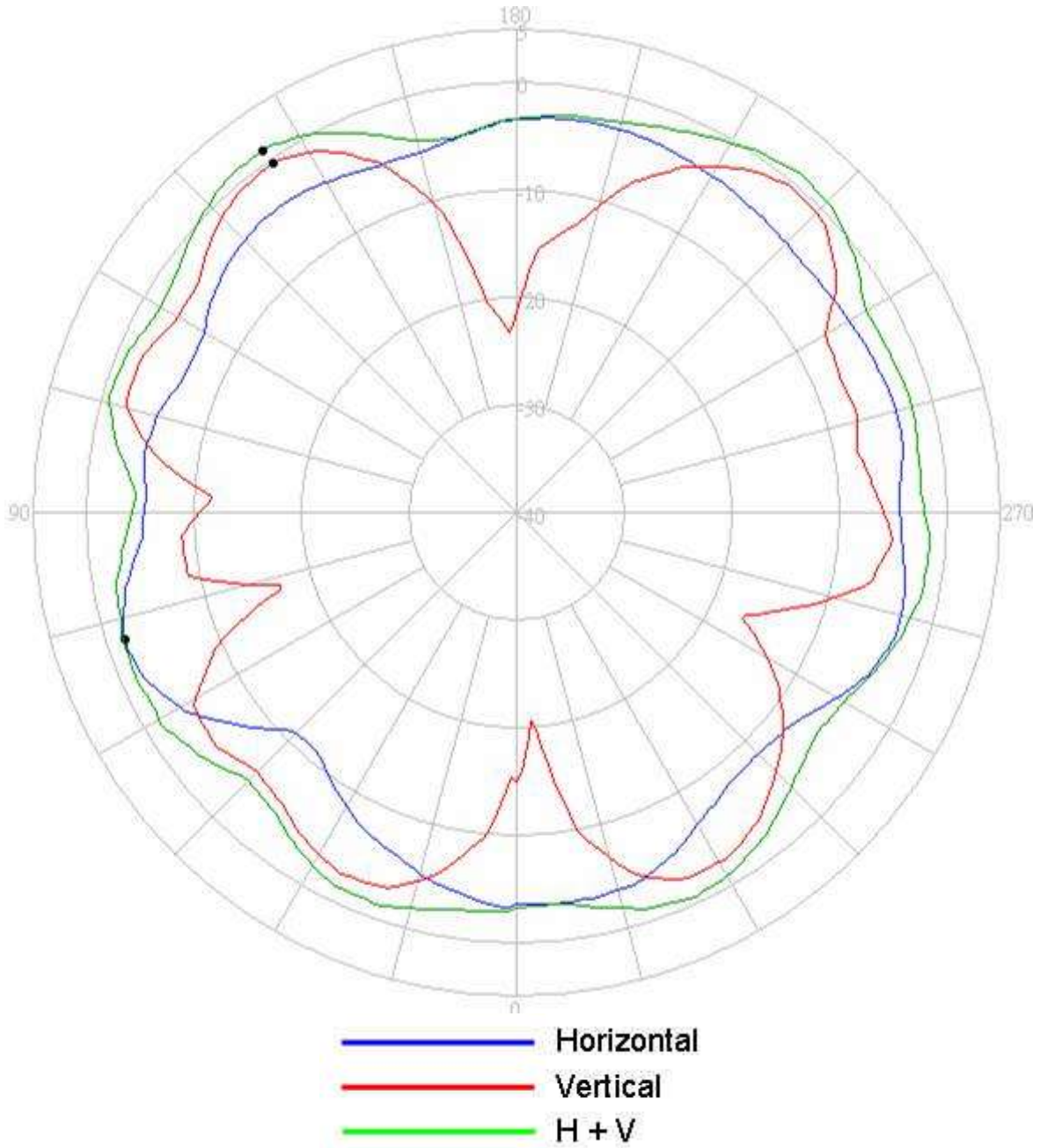
Antenna Manufacturer: Yageo Corporation  
Antenna Part Number: CAN4313792012501B (WLAN\_Main),  
CAN4313792022501B (WLAN\_Aux),  
CAN4313792022501B (MIMO)



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

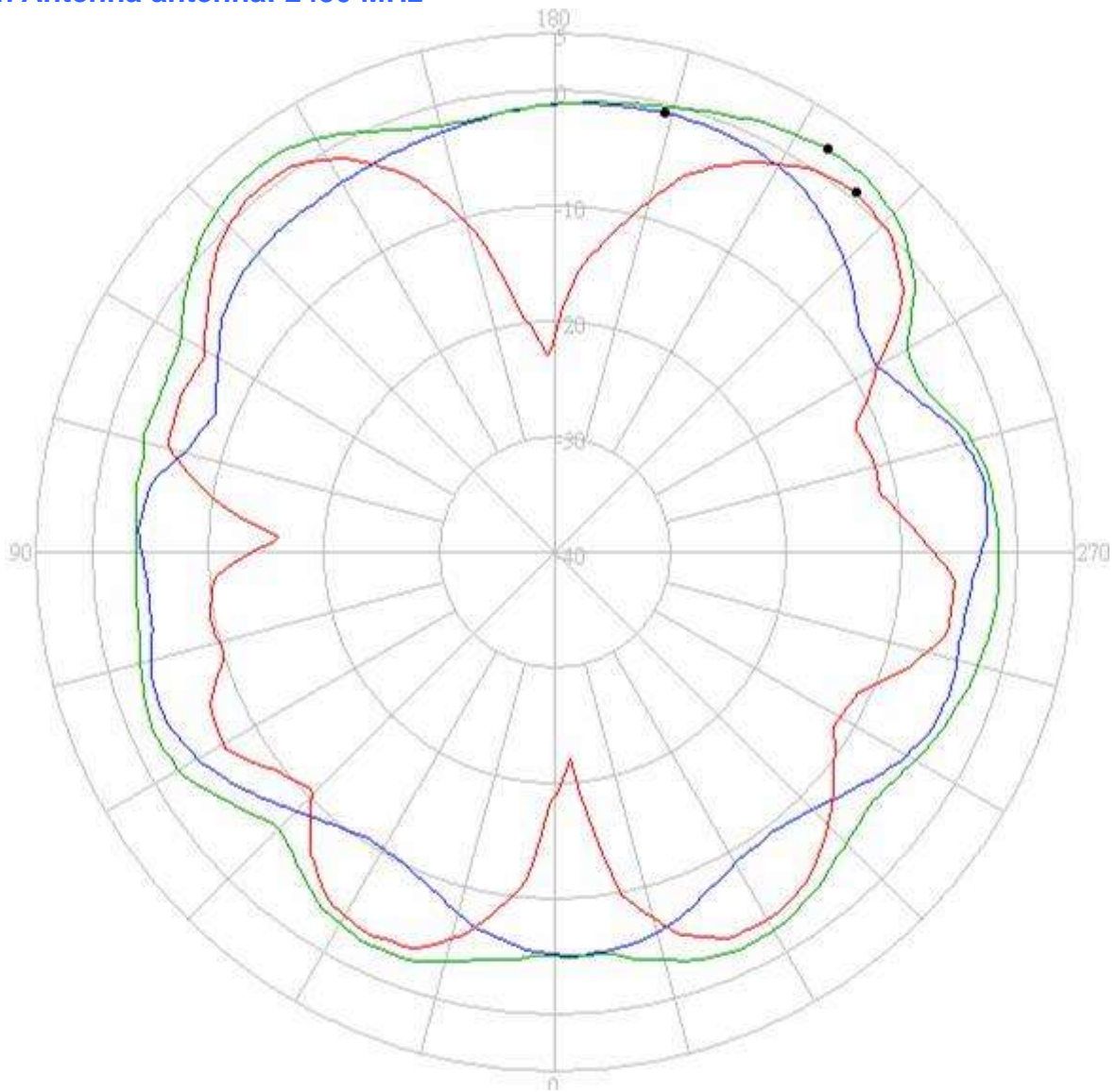
### 2400-2500MHz radiation characteristic

#### WLAN\_Main Antenna antenna: 2400 MHz



Center Frequency	2400 MHz
Horizontal (dBi) Peak	-1.63
Vertical (dBi) Peak	-0.35

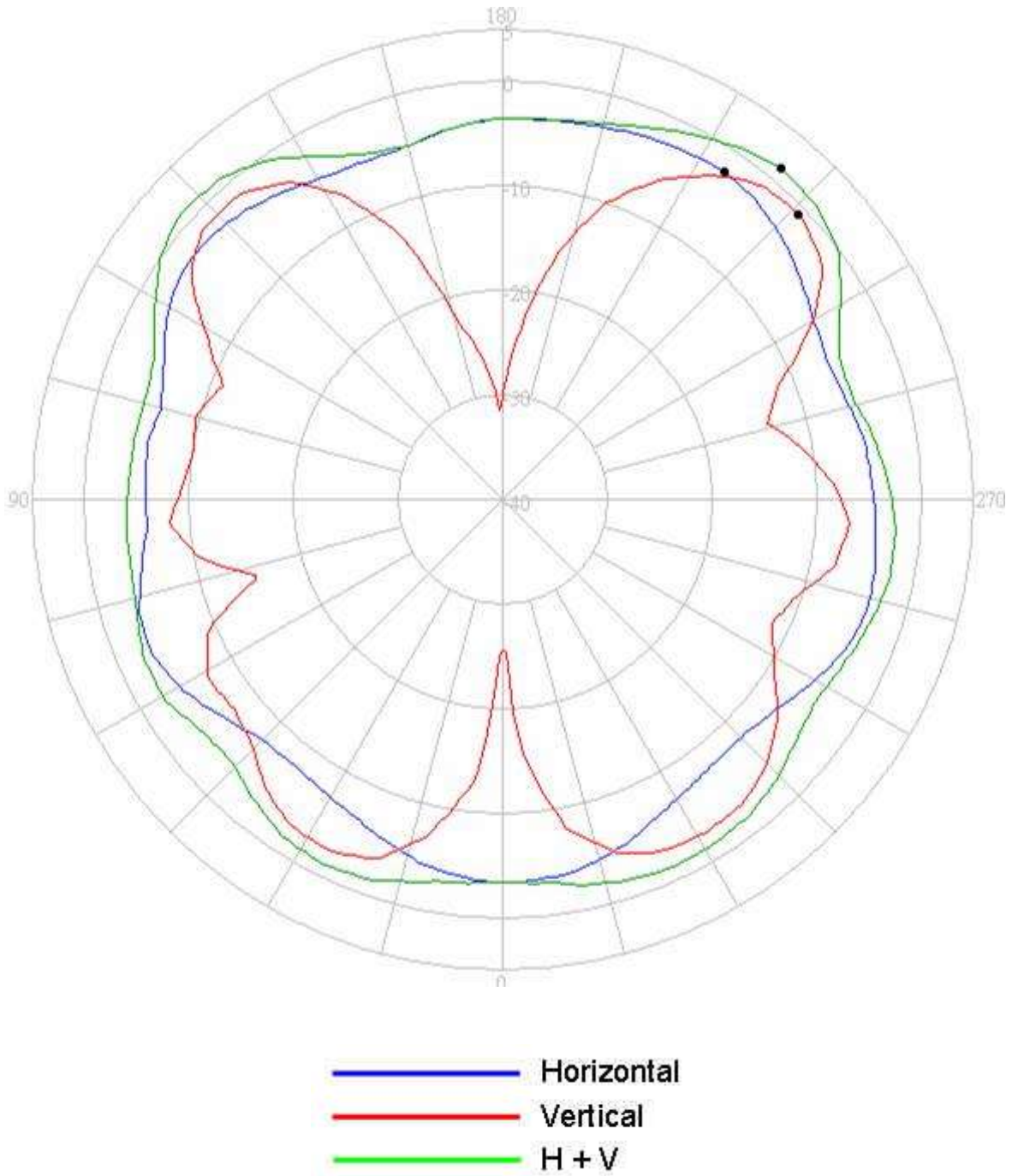
### WLAN\_Main Antenna antenna: 2450 MHz



- Horizontal
- Vertical
- H + V

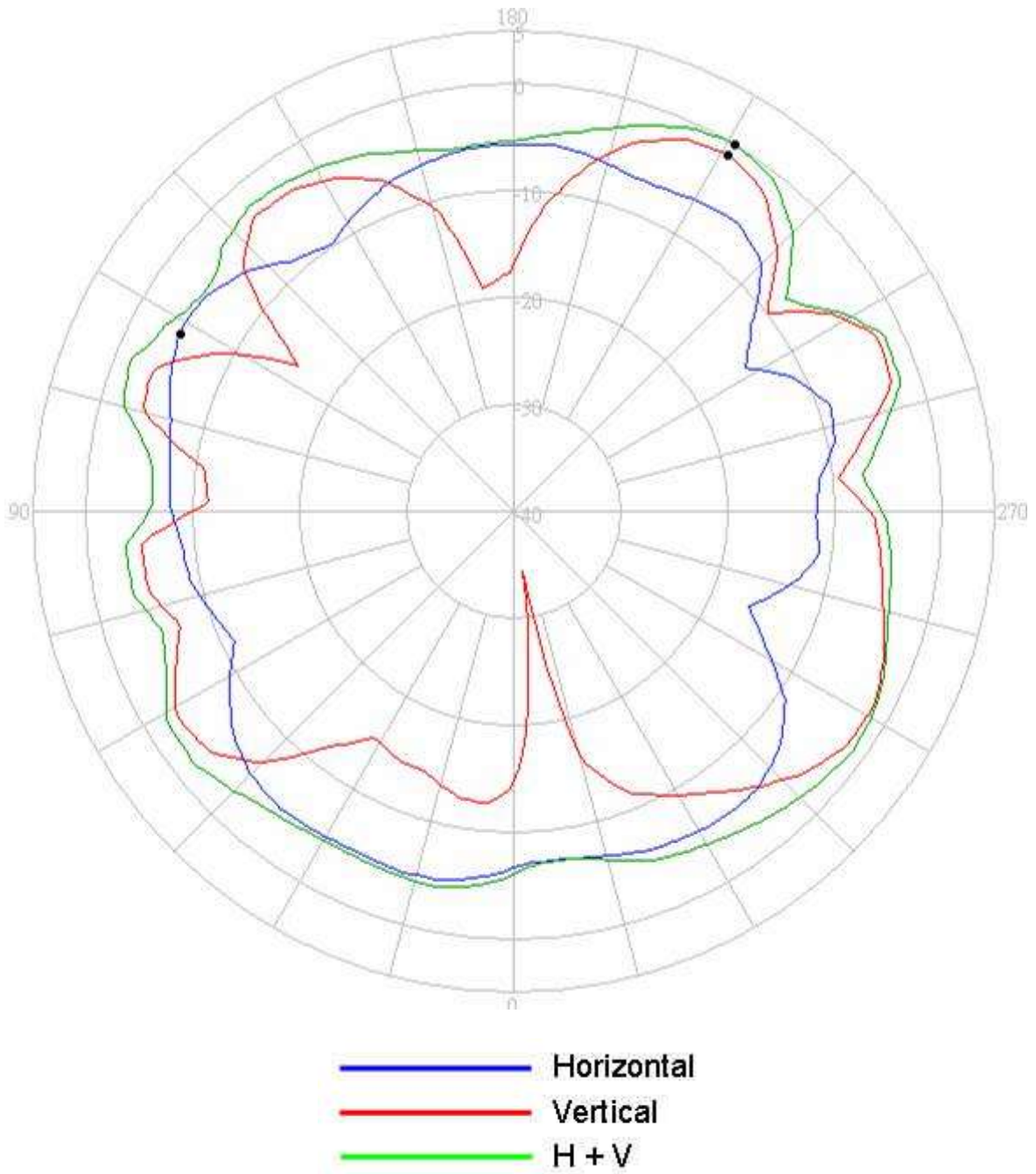
Center Frequency	<b>2450 MHz</b>
Horizontal (dBi) Peak	<b>-0.78</b>
Vertical (dBi) Peak	<b>0.64</b>

### WLAN\_Main Antenna antenna: 2500 MHz



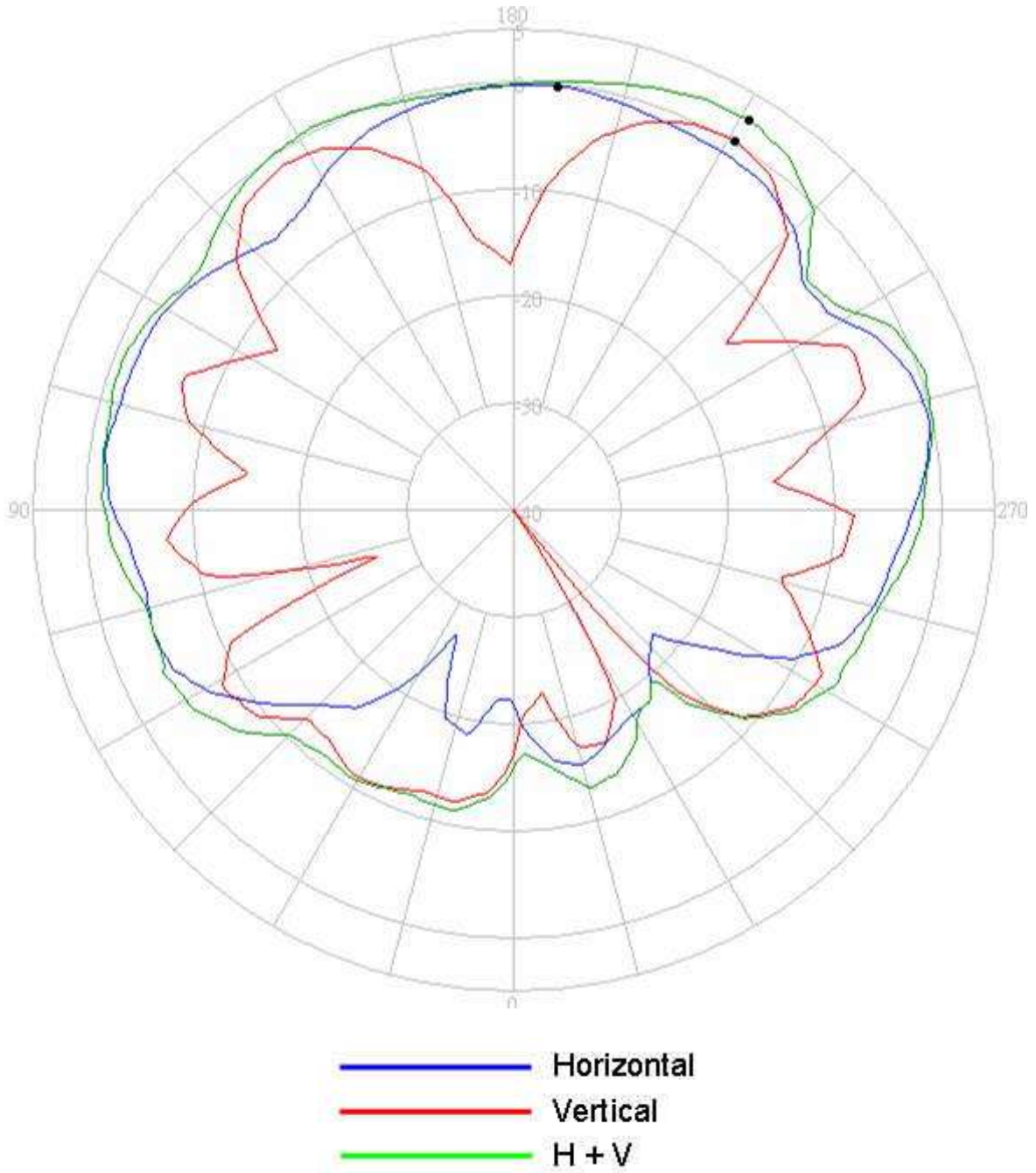
Center Frequency	2500 MHz
Horizontal (dBi) Peak	-2.21
Vertical (dBi) Peak	-0.73

**WLAN\_Aux Antenna antenna: 2400 MHz**



Center Frequency	<b>2400 MHz</b>
Horizontal (dBi) Peak	<b>-4.57</b>
Vertical (dBi) Peak	<b>-1.05</b>

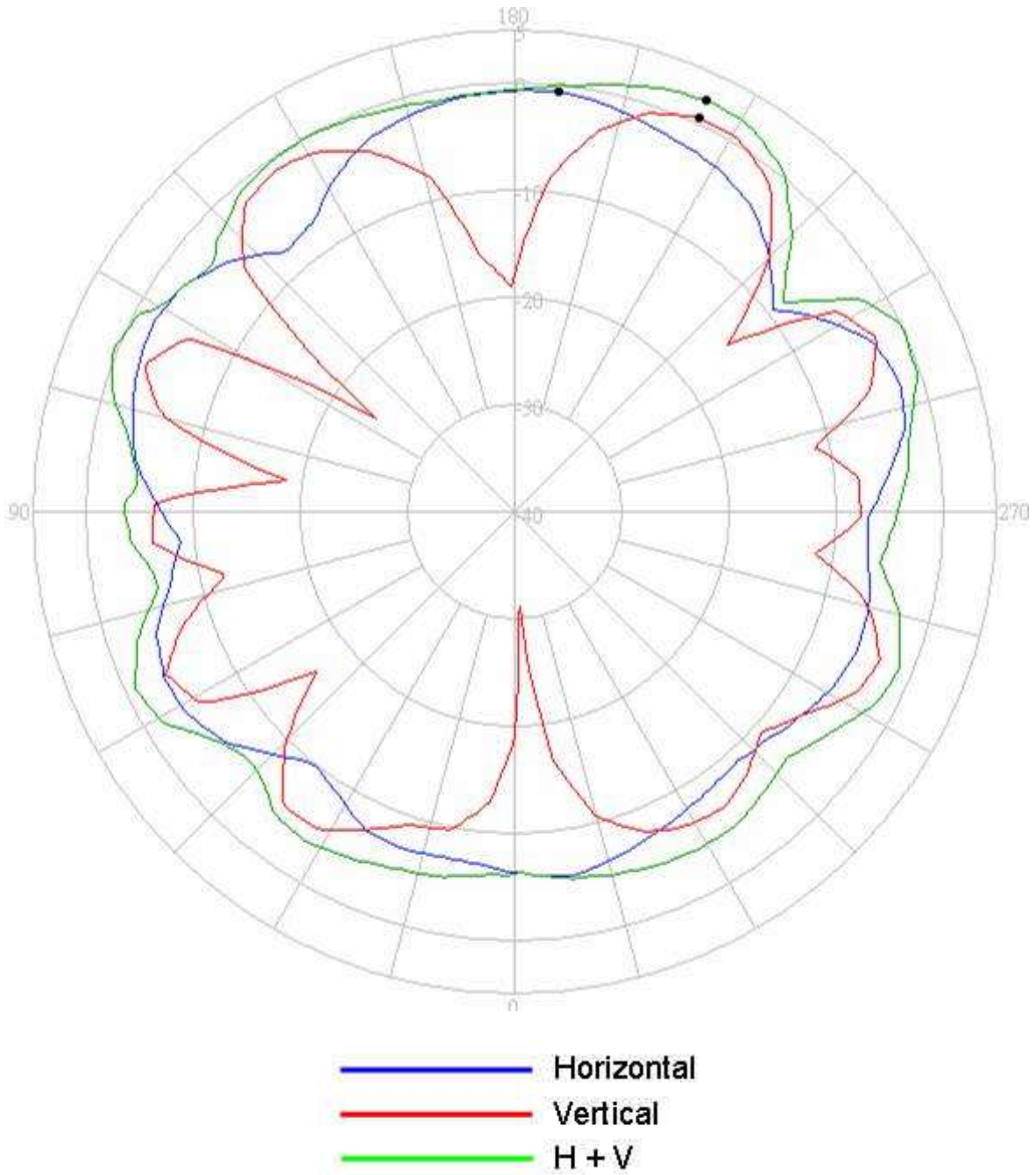
### WLAN\_Aux Antenna antenna: 2450 MHz



Center Frequency	2450 MHz
Horizontal (dBi) Peak	-0.12
Vertical (dBi) Peak	0.27

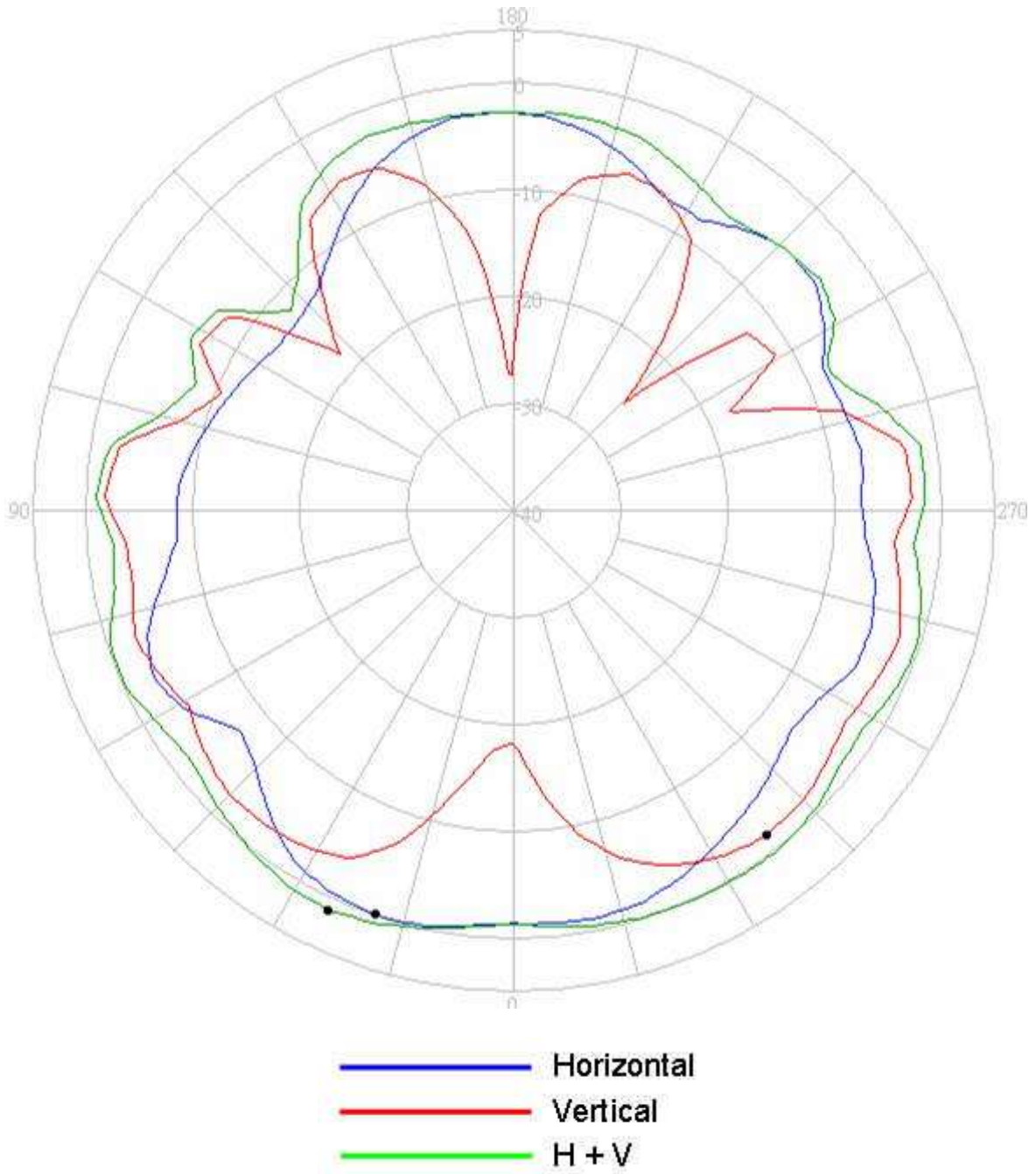


### WLAN\_Aux Antenna antenna: 2500 MHz



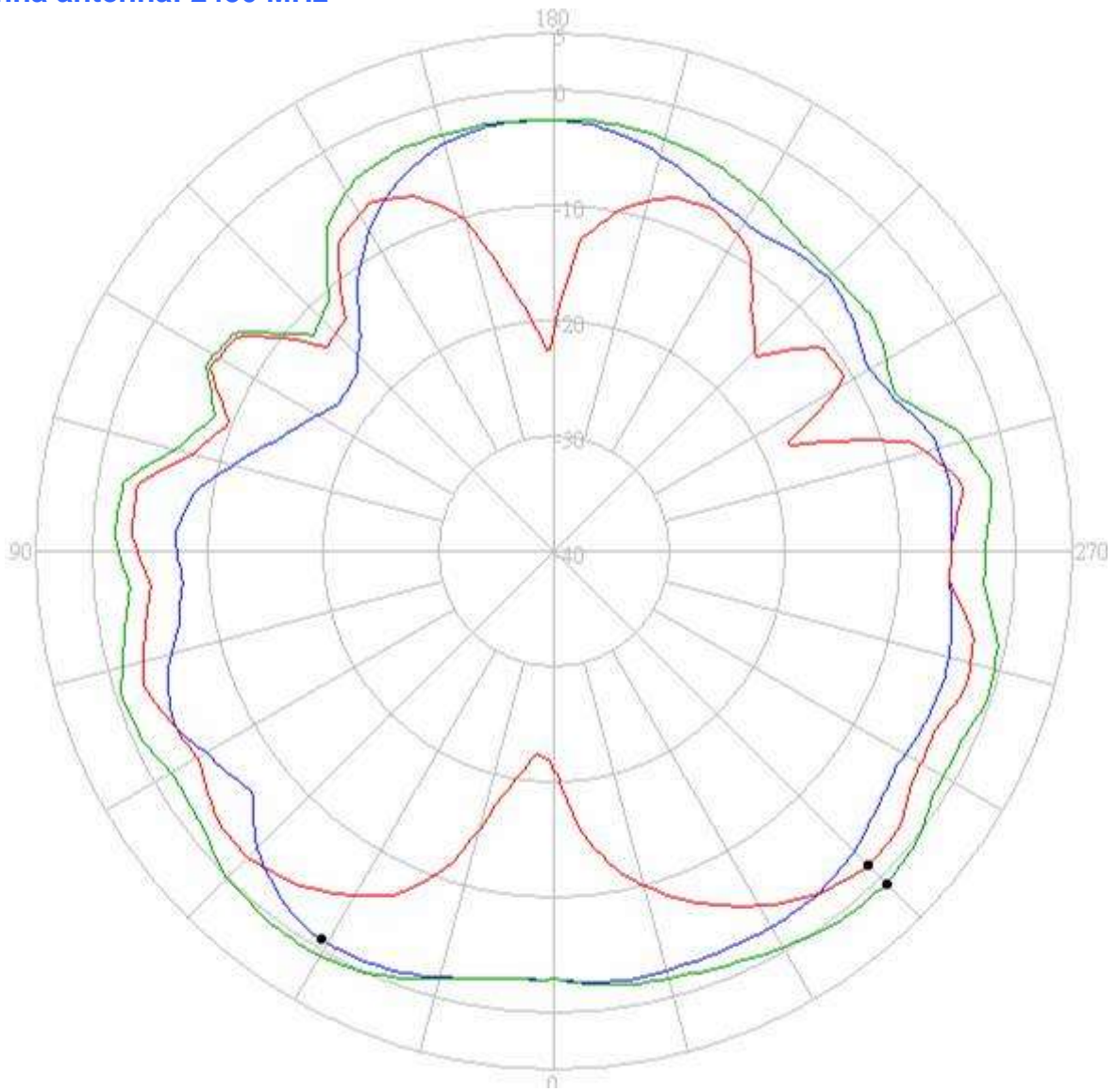
Center Frequency	2500 MHz
Horizontal (dBi) Peak	-0.56
Vertical (dBi) Peak	0.61

### MIMO Antenna antenna: 2400 MHz



Center Frequency	2400 MHz
Horizontal (dBi) Peak	0.03
Vertical (dBi) Peak	-1.52

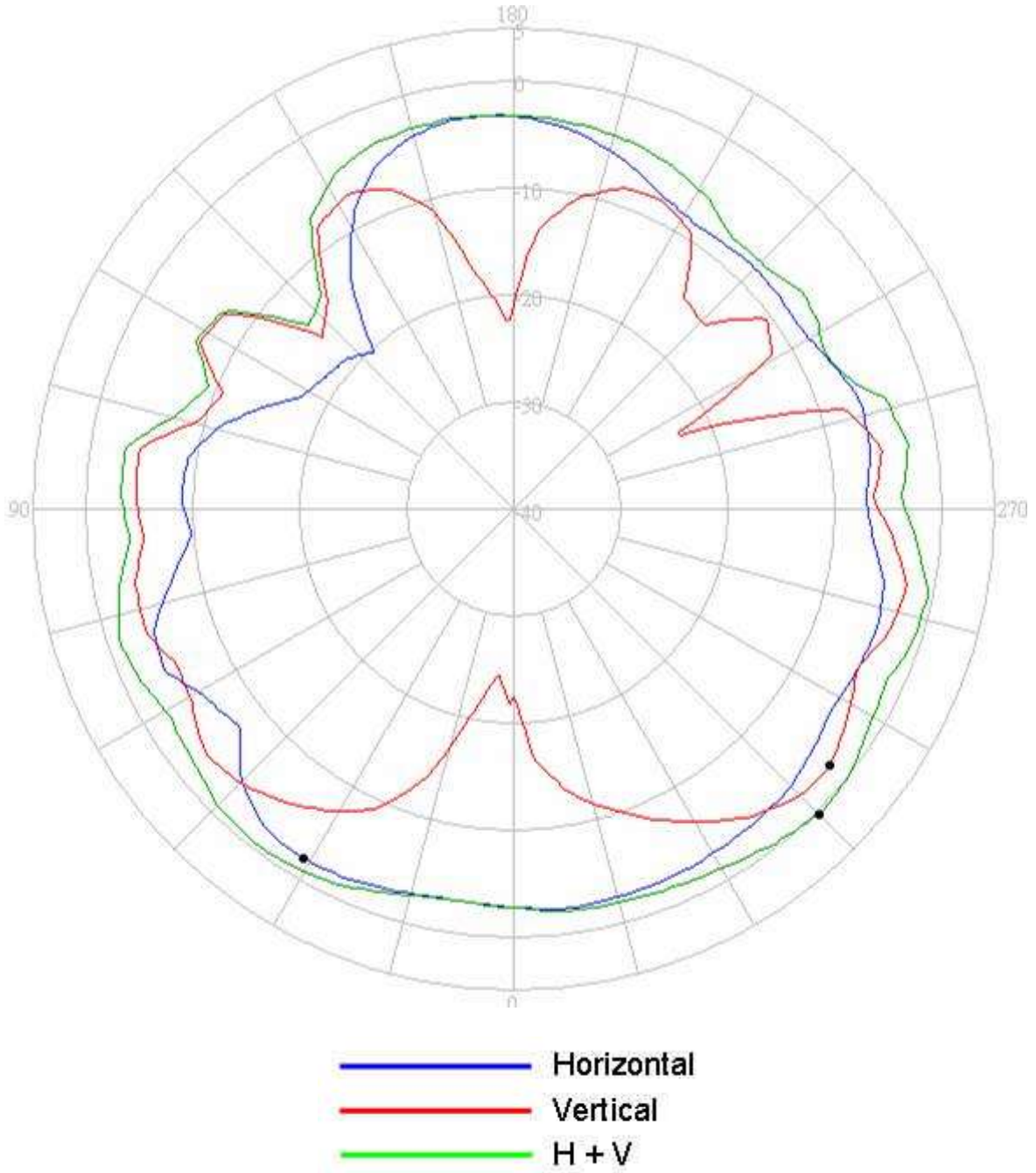
**MIMO Antenna antenna: 2450 MHz**



- Horizontal
- Vertical
- H + V

Center Frequency	<b>2450 MHz</b>
Horizontal (dBi) Peak	<b>-0.64</b>
Vertical (dBi) Peak	<b>-1.38</b>

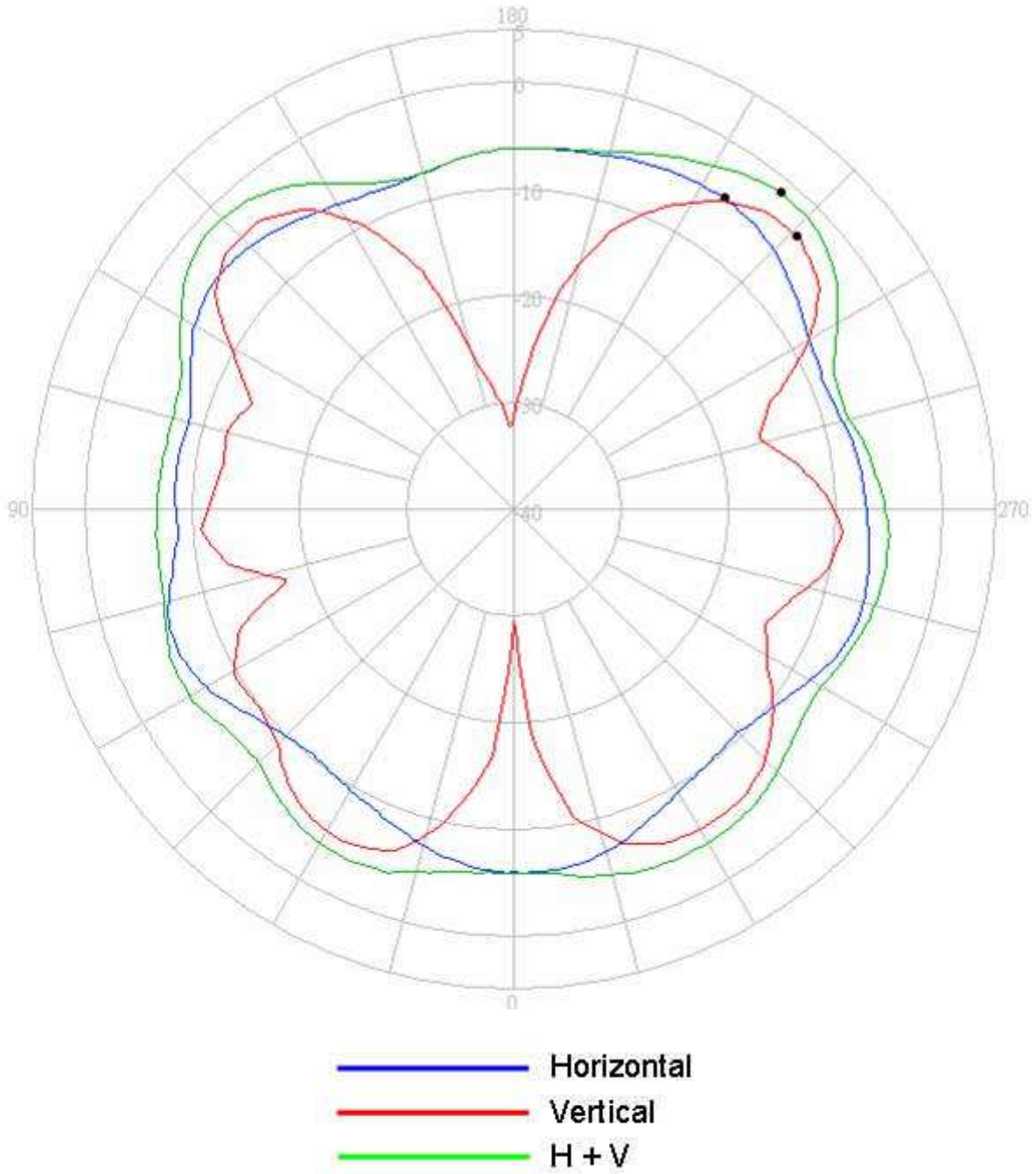
### MIMO Antenna antenna: 2500 MHz



Center Frequency	<b>2500 MHz</b>
Horizontal (dBi) Peak	<b>-1.81</b>
Vertical (dBi) Peak	<b>-1.91</b>

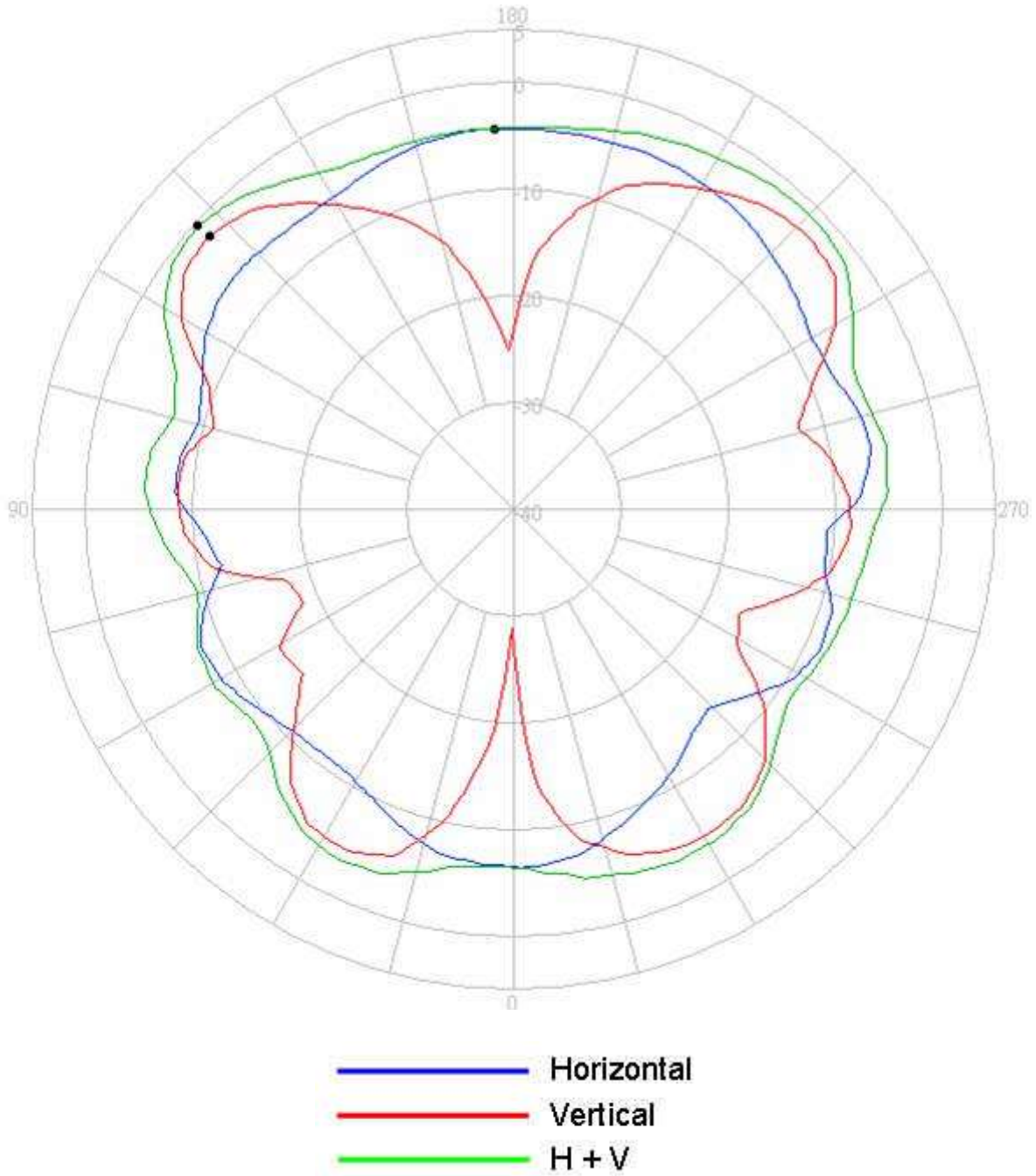
2490-2700MHz radiation characteristic

WLAN\_Main Antenna antenna: 2501MHz



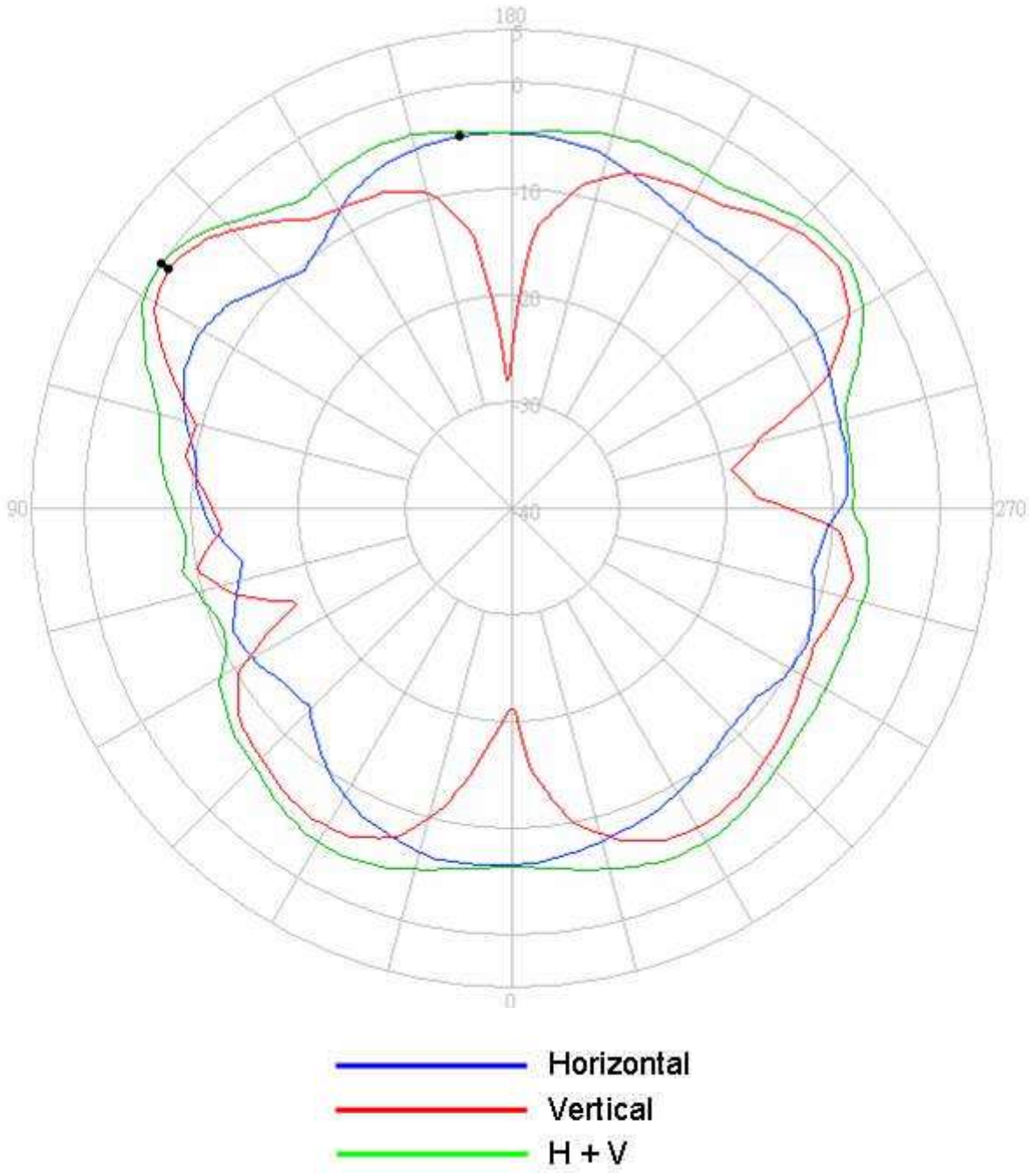
Center Frequency	2501 MHz
Horizontal (dBi) Peak	-4.81
Vertical (dBi) Peak	-3.22

**WLAN\_Main Antenna antenna: 2593MHz**



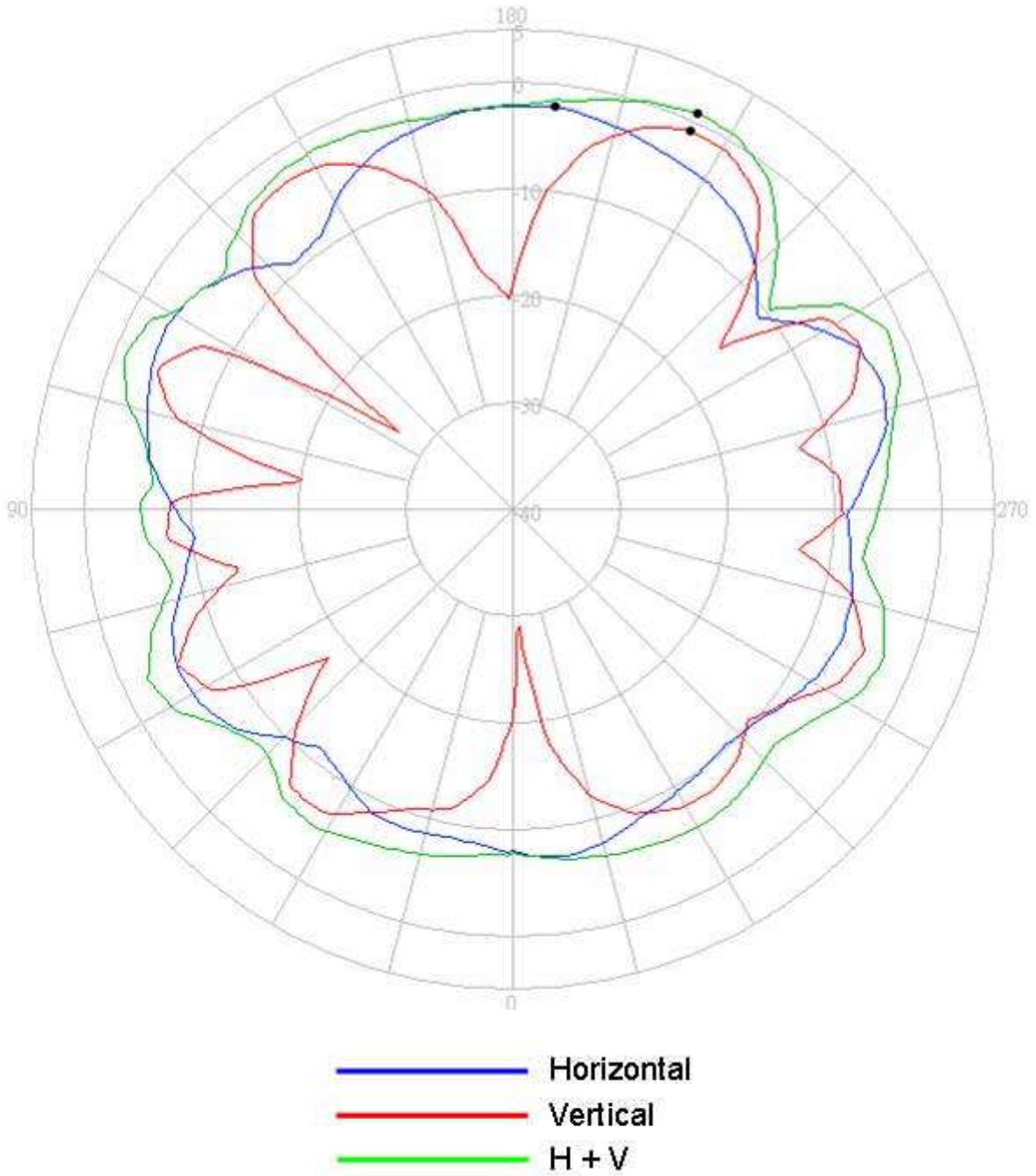
Center Frequency	<b>2593 MHz</b>
Horizontal (dBi) Peak	<b>-4.28</b>
Vertical (dBi) Peak	<b>-1.70</b>

### WLAN\_Main Antenna antenna: 2685 MHz



Center Frequency	2685 MHz
Horizontal (dBi) Peak	-4.69
Vertical (dBi) Peak	-0.74

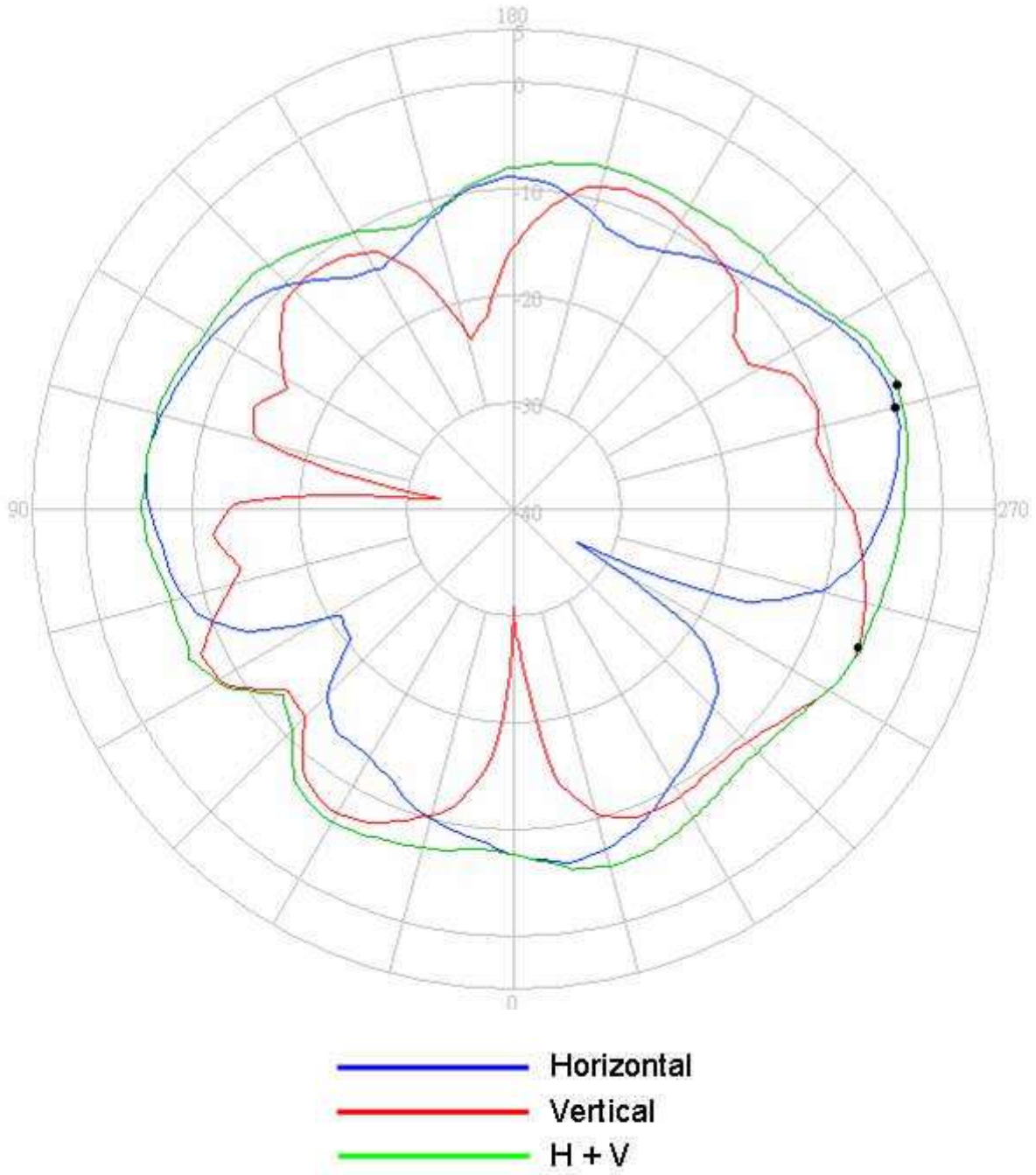
### WLAN\_Aux Antenna antenna: 2501MHz



Center Frequency	2501 MHz
Horizontal (dBi) Peak	-2.07
Vertical (dBi) Peak	-0.83

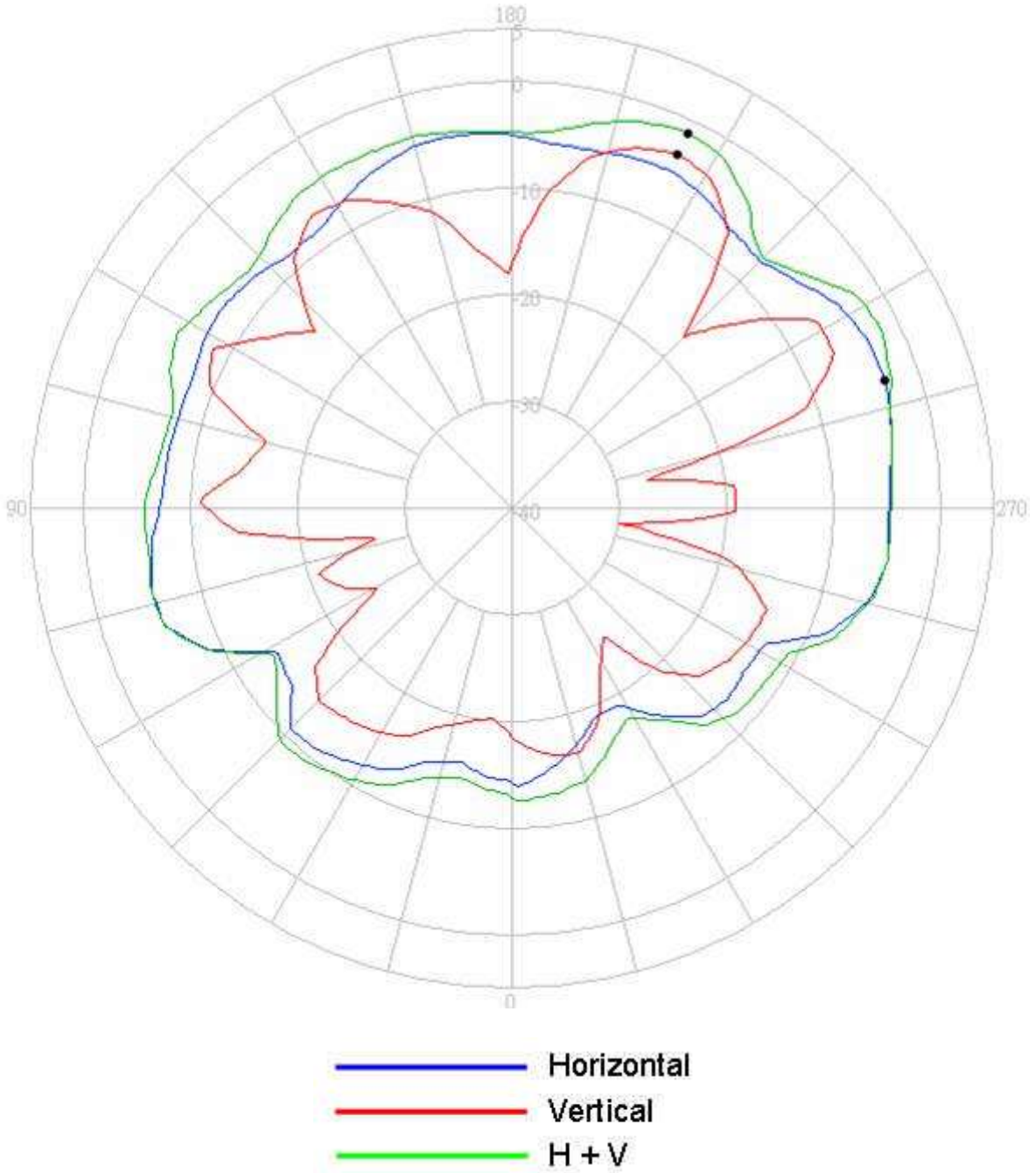


WLAN\_Aux Antenna antenna: 2593MHz



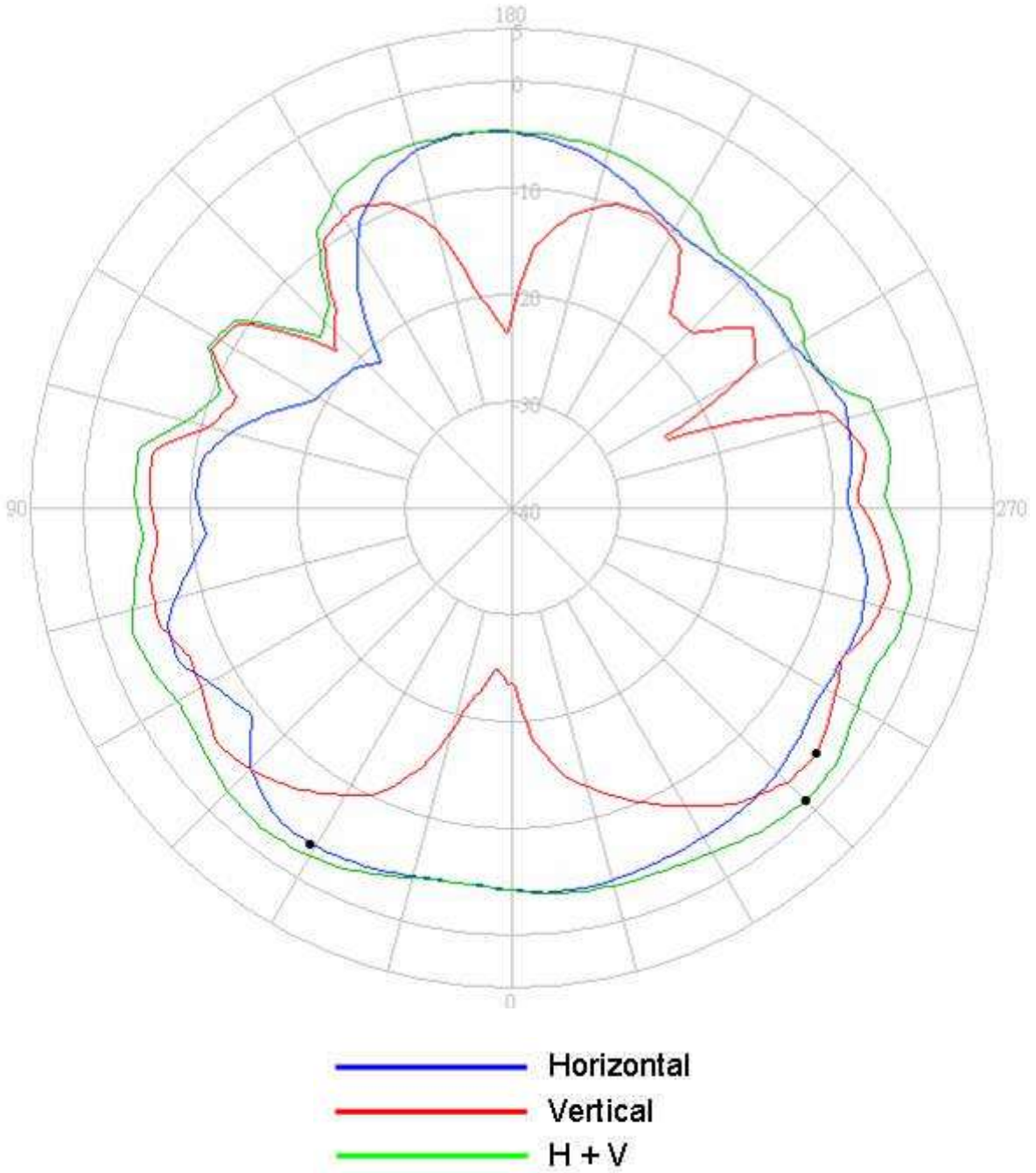
Center Frequency	2593 MHz
Horizontal (dBi) Peak	-3.11
Vertical (dBi) Peak	-5.22

WLAN\_Aux Antenna antenna: 2685 MHz



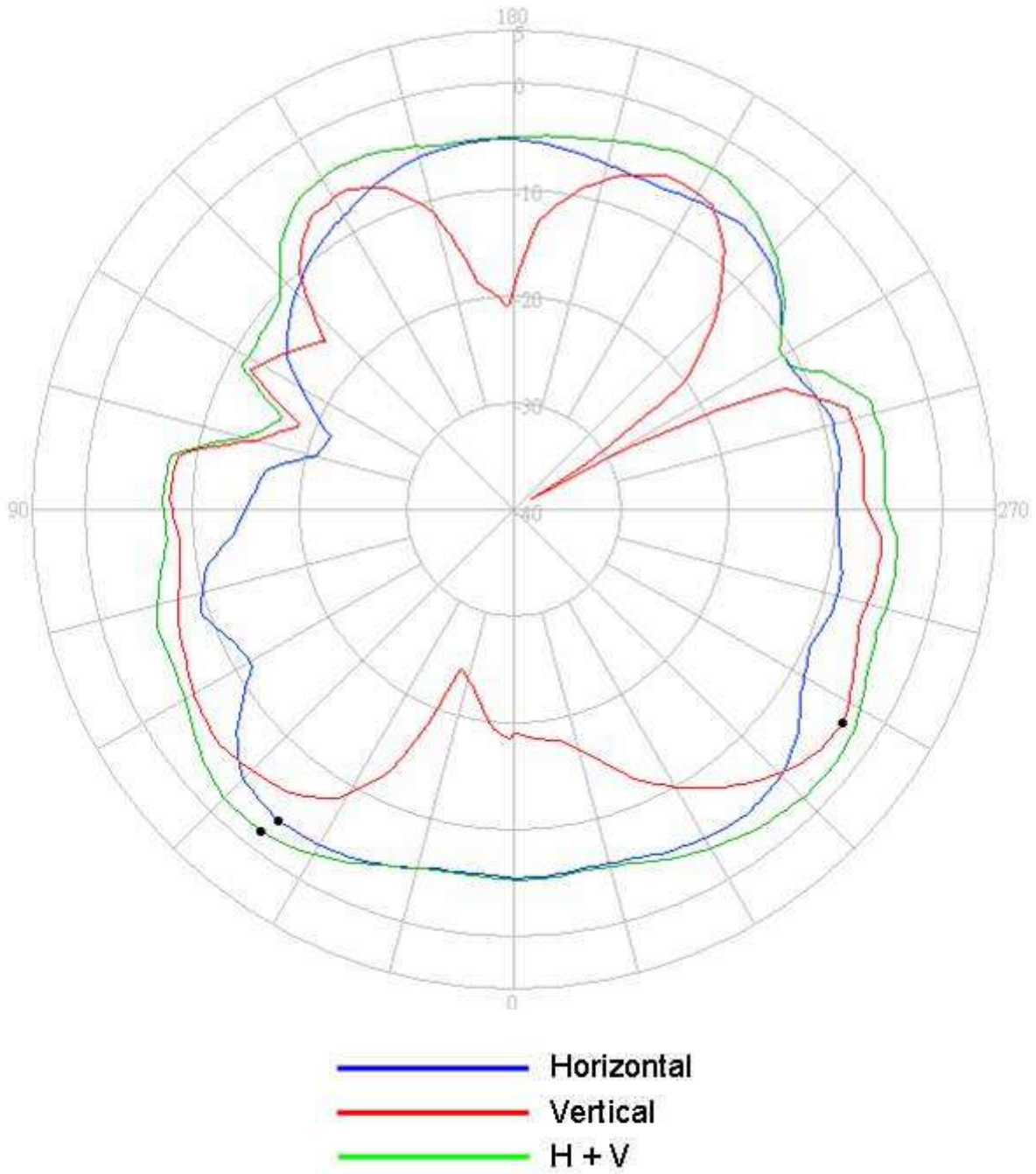
Center Frequency	2685 MHz
Horizontal (dBi) Peak	-3.19
Vertical (dBi) Peak	-3.40

### MIMO Antenna antenna: 2501MHz



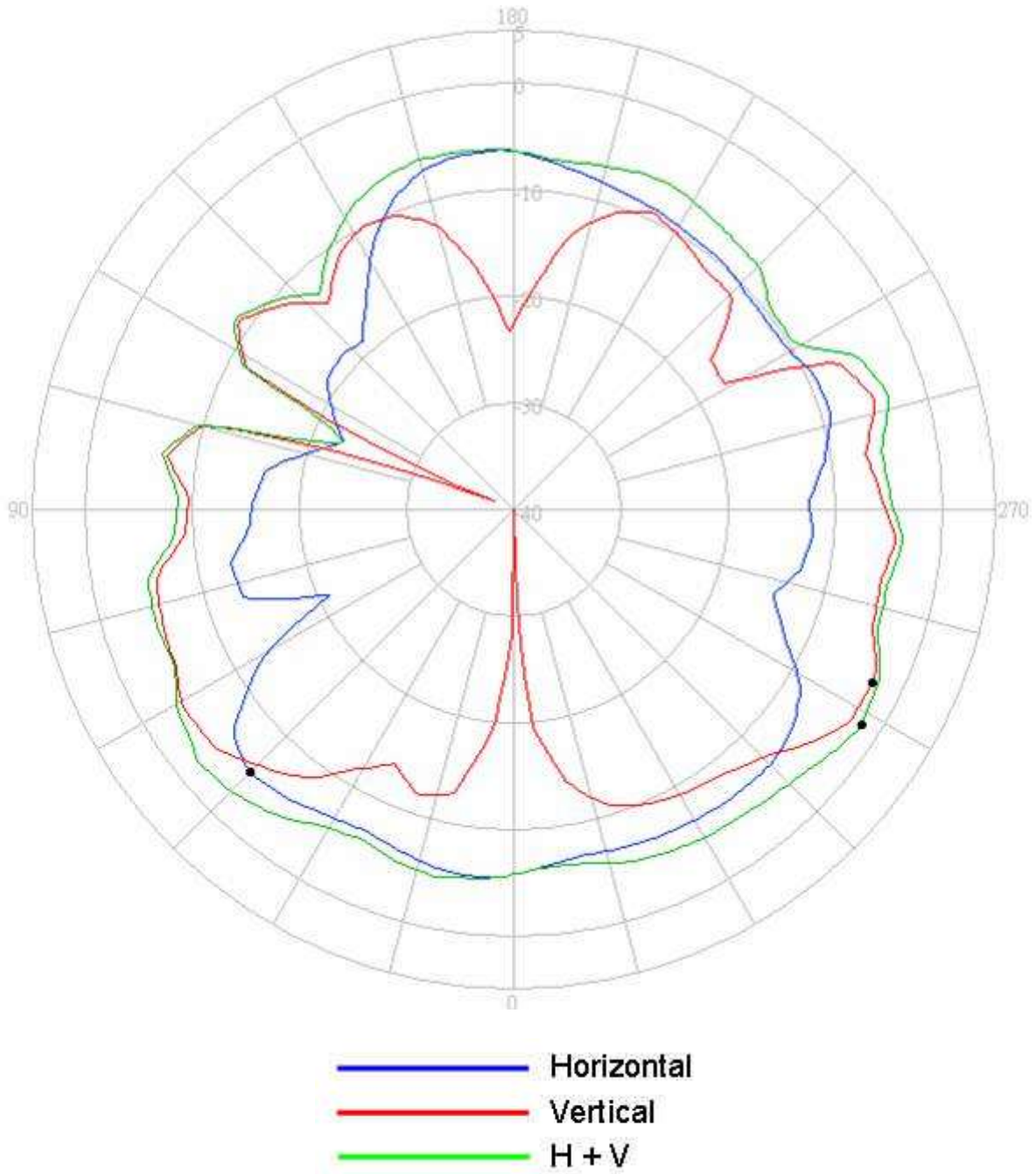
Center Frequency	2501 MHz
Horizontal (dBi) Peak	-3.27
Vertical (dBi) Peak	-3.41

### MIMO Antenna antenna: 2593MHz



Center Frequency	2593 MHz
Horizontal (dBi) Peak	-3.46
Vertical (dBi) Peak	-3.34

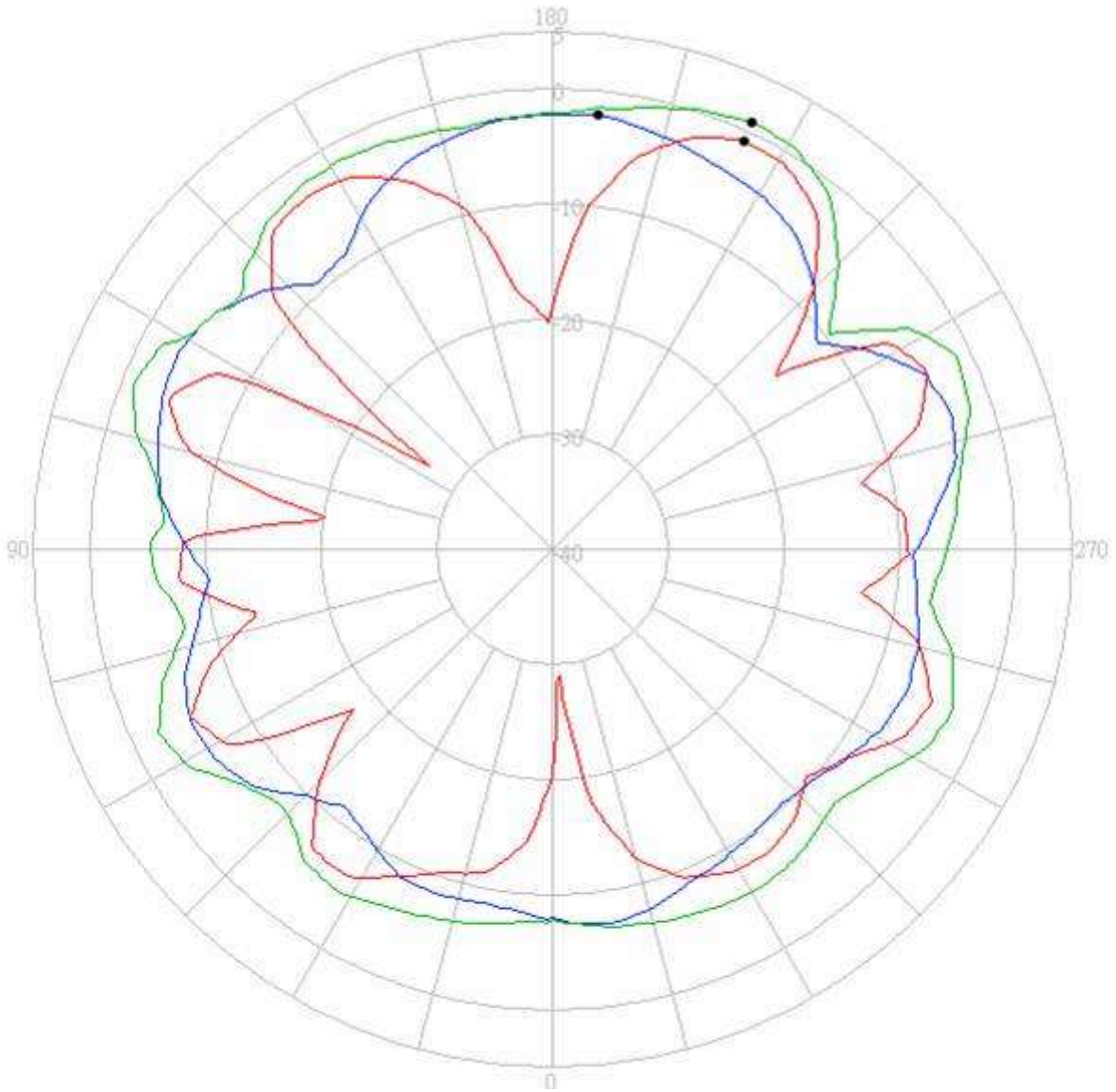
**MIMO Antenna antenna: 2685MHz**



Center Frequency	2685 MHz
Horizontal (dBi) Peak	-5.09
Vertical (dBi) Peak	-2.76

**5150-5350 MHz radiation characteristic**

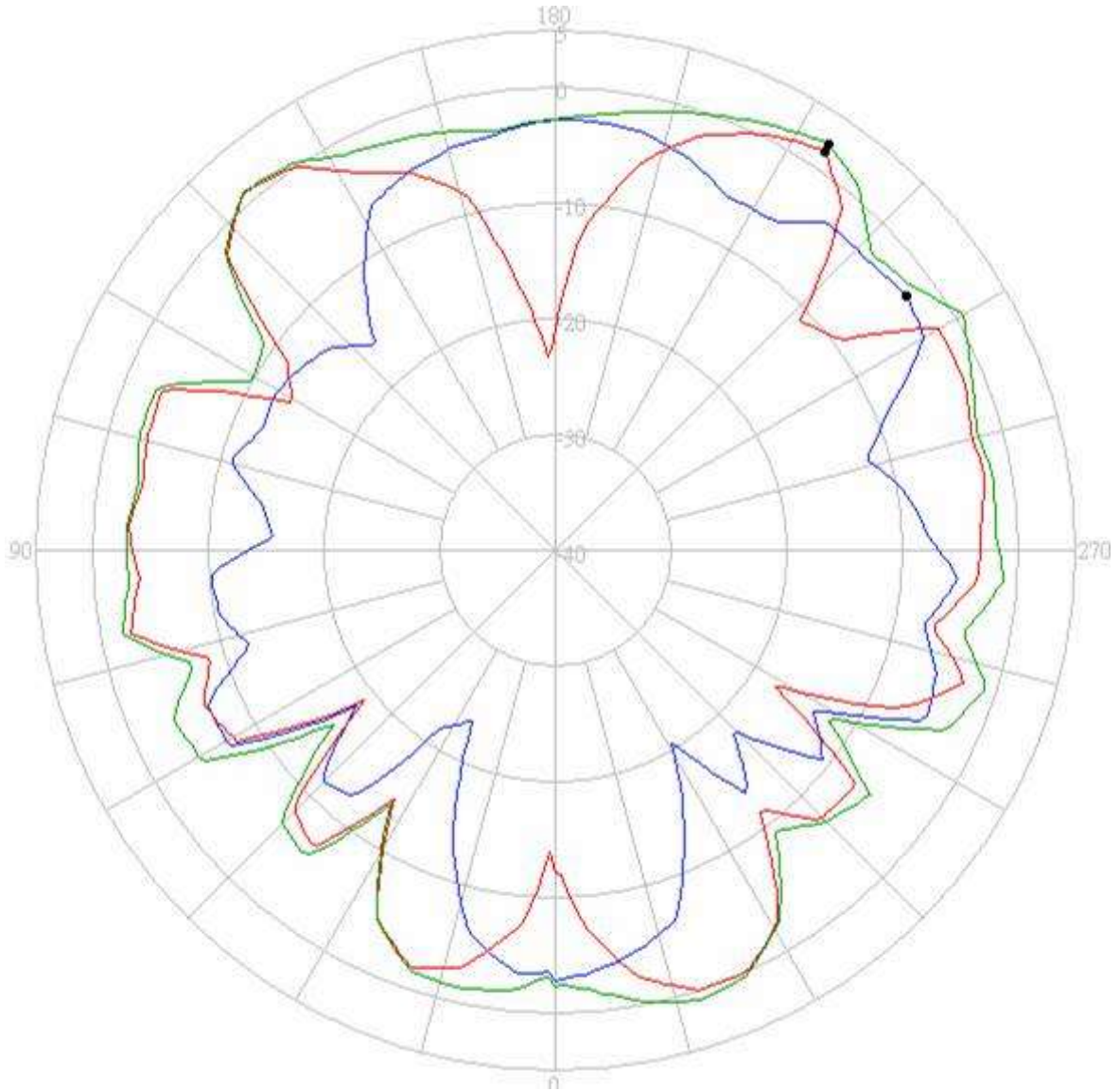
**WLAN\_Main Antenna antenna: 5150 MHz**



- Horizontal
- Vertical
- H + V

Center Frequency	<b>5150 MHz</b>
Horizontal (dBi) Peak	<b>-2.07</b>
Vertical (dBi) Peak	<b>-0.83</b>

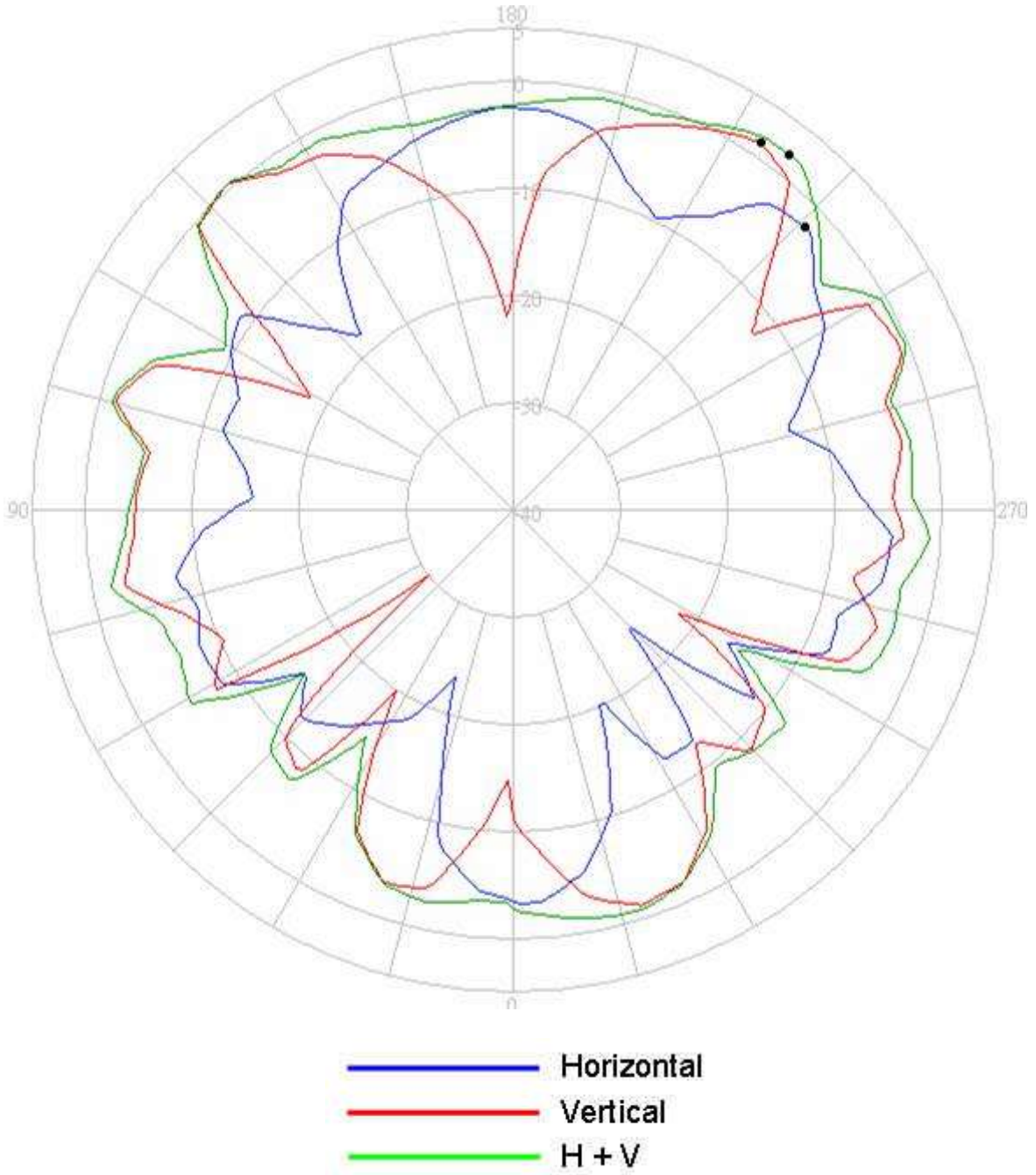
### WLAN\_Main Antenna antenna: 5250 MHz



- Horizontal
- Vertical
- H + V

Center Frequency	<b>5250 MHz</b>
Horizontal (dBi) Peak	<b>-2.47</b>
Vertical (dBi) Peak	<b>1.57</b>

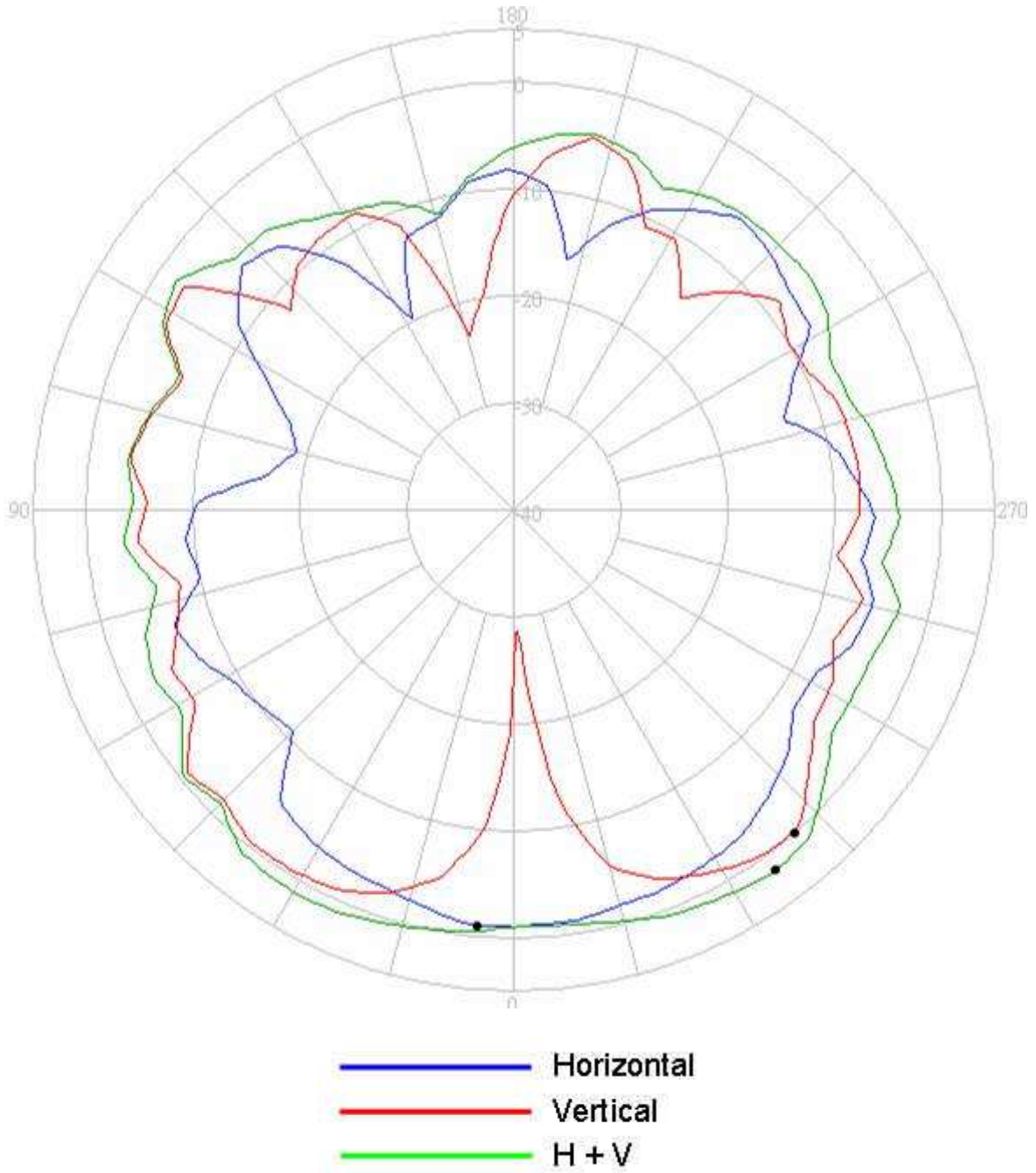
### WLAN\_Main Antenna antenna: 5350 MHz



Center Frequency	5350 MHz
Horizontal (dBi) Peak	-2.01
Vertical (dBi) Peak	1.35

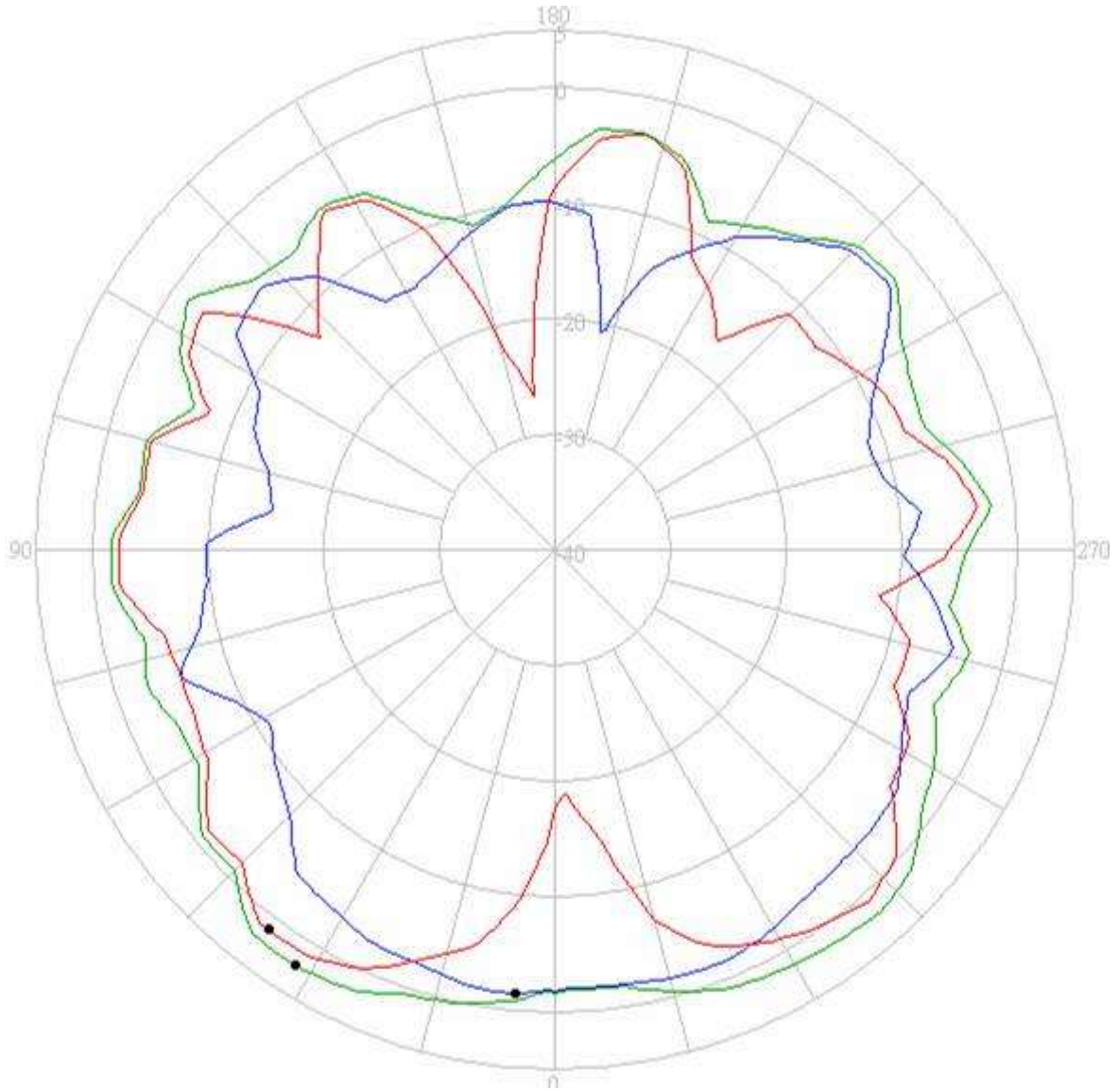


### WLAN\_Aux Antenna antenna: 5150 MHz



Center Frequency	5150 MHz
Horizontal (dBi) Peak	-0.85
Vertical (dBi) Peak	-0.04

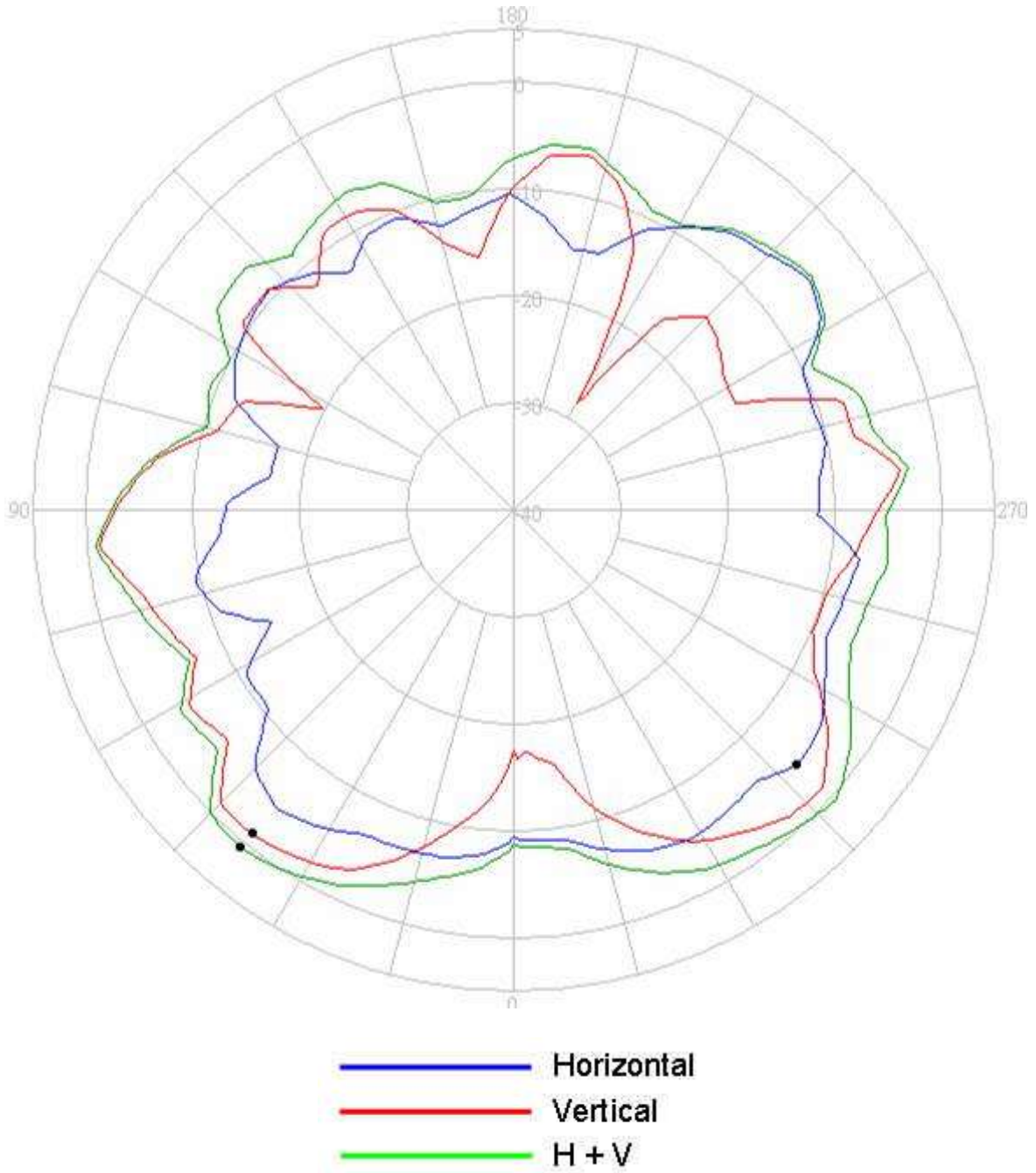
WLAN\_Aux Antenna antenna: 5250 MHz



- Horizontal
- Vertical
- H + V

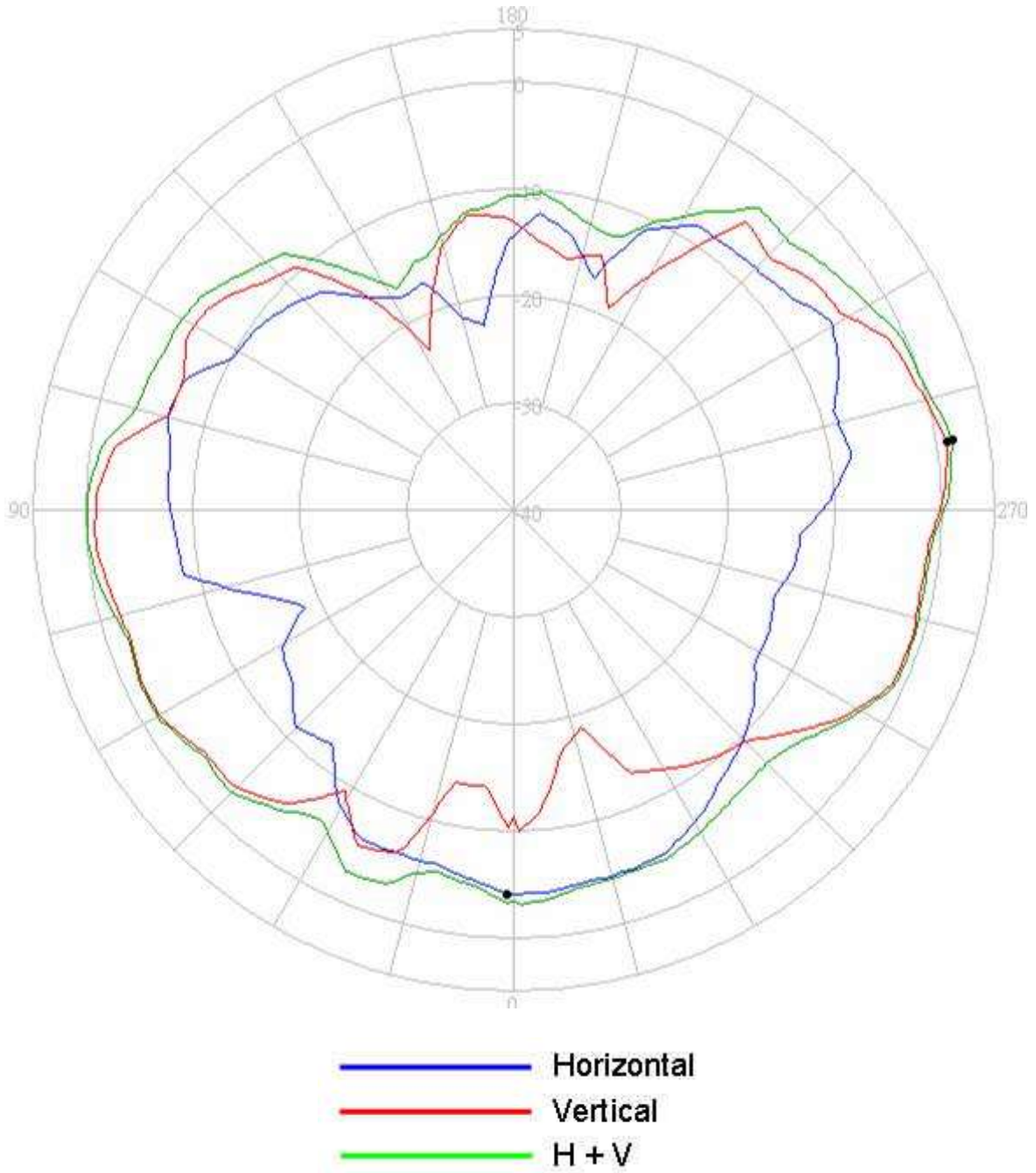
Center Frequency	5250 MHz
Horizontal (dBi) Peak	-1.36
Vertical (dBi) Peak	1.23

### WLAN\_Aux Antenna antenna: 5350 MHz



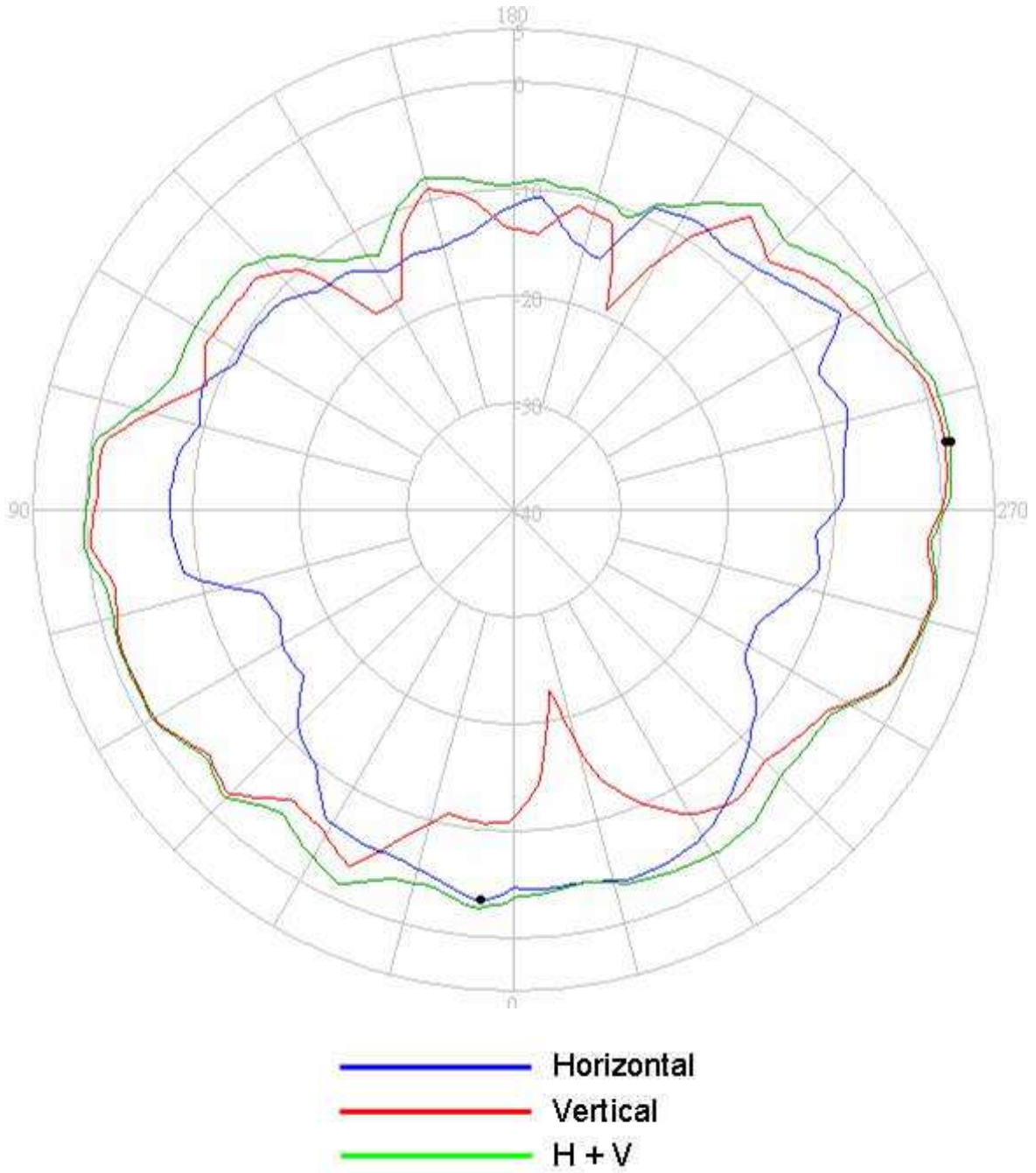
Center Frequency	5350 MHz
Horizontal (dBi) Peak	-4.31
Vertical (dBi) Peak	-1.02

### MIMO Antenna antenna: 5150 MHz



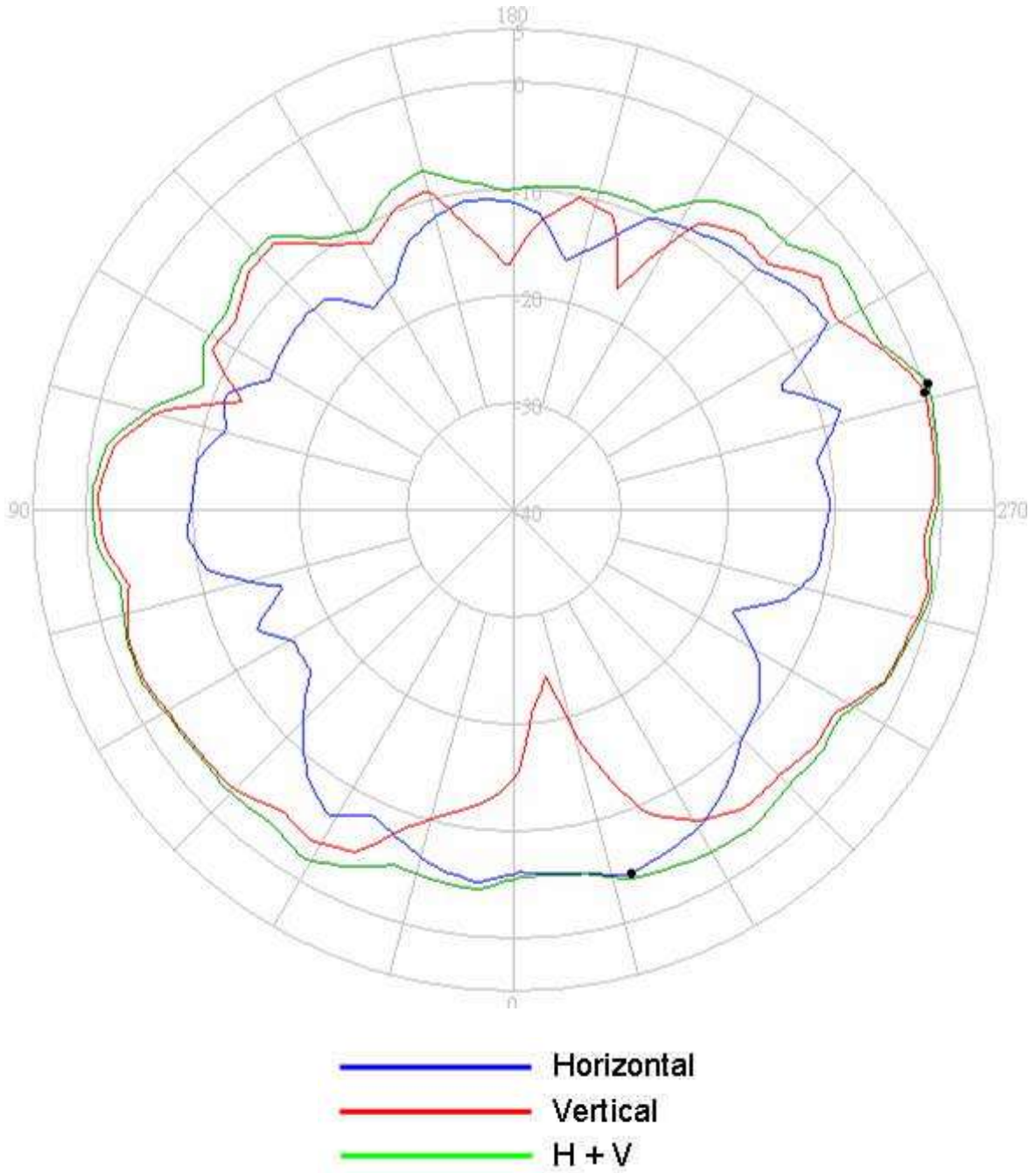
Center Frequency	5150 MHz
Horizontal (dBi) Peak	-4.06
Vertical (dBi) Peak	1.02

**MIMO Antenna antenna: 5250 MHz**



Center Frequency	<b>5250 MHz</b>
Horizontal (dBi) Peak	<b>-3.32</b>
Vertical (dBi) Peak	<b>0.89</b>

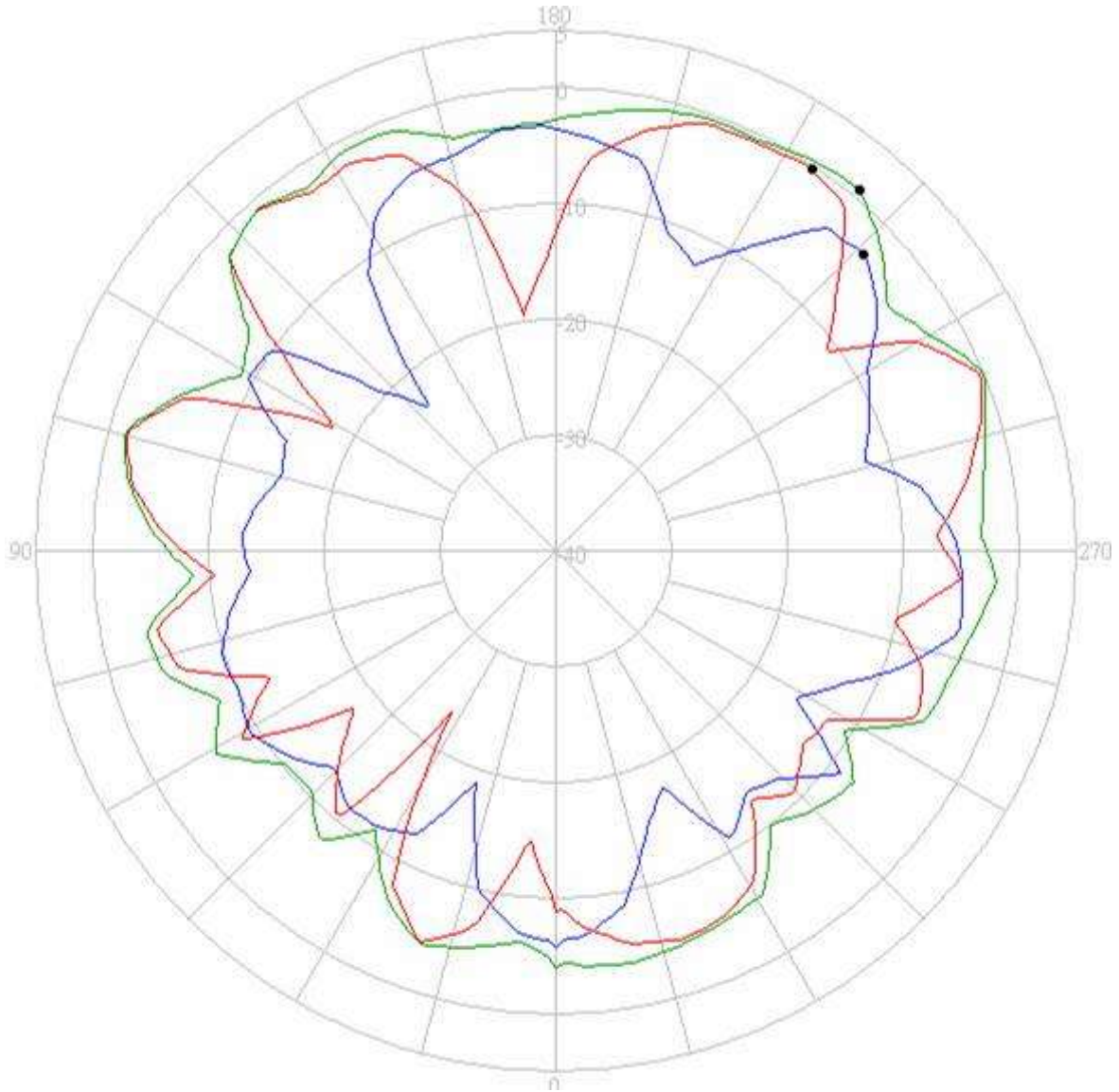
### MIMO Antenna antenna: 5350 MHz



Center Frequency	5350 MHz
Horizontal (dBi) Peak	-4.21
Vertical (dBi) Peak	-0.07

5470-5725MHz radiation characteristic

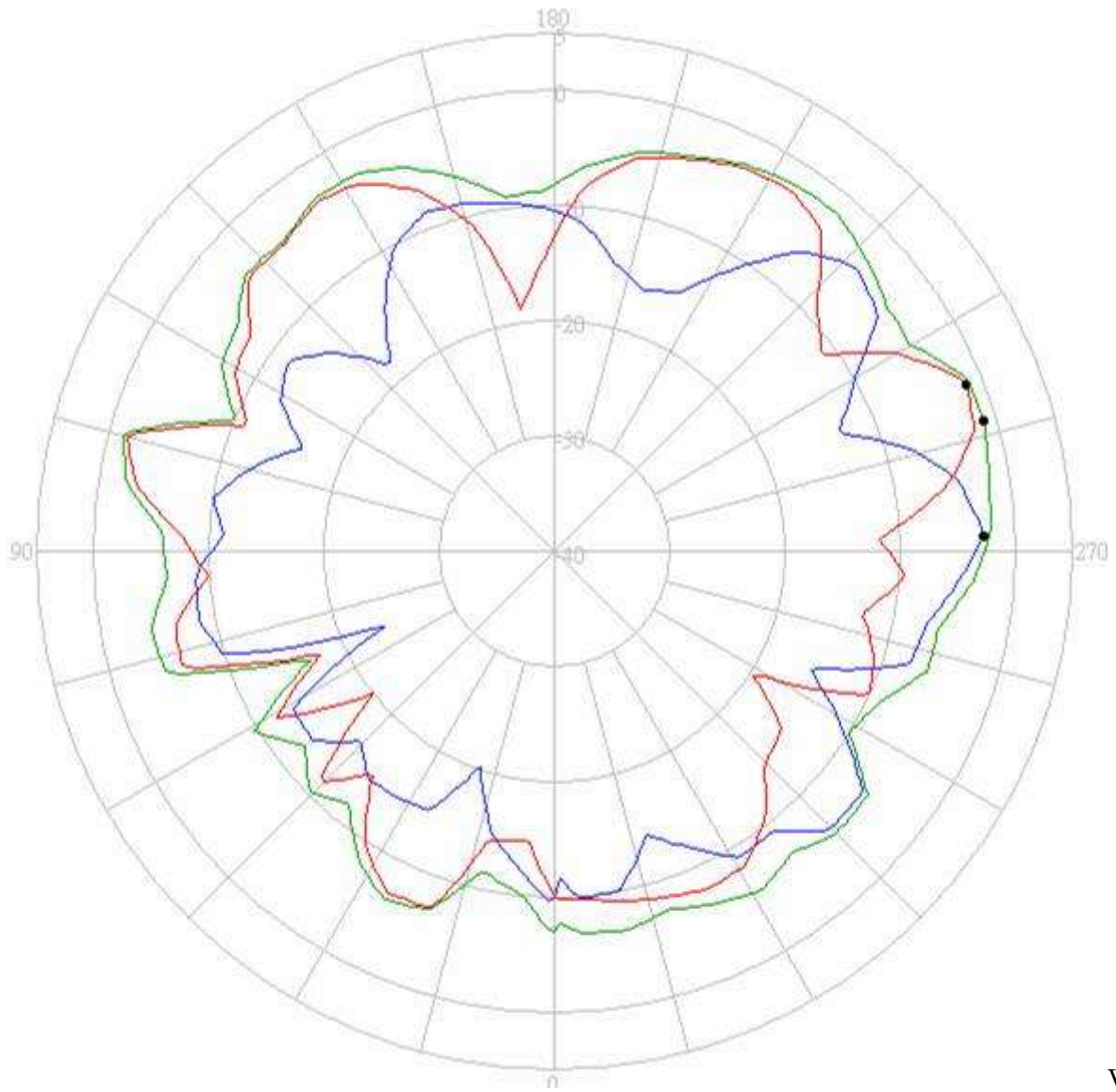
WLAN\_Main Antenna antenna: 5470 MHz



- Horizontal
- Vertical
- H + V

Center Frequency	5470 MHz
Horizontal (dBi) Peak	-3.06
Vertical (dBi) Peak	-0.27

### WLAN\_Main Antenna antenna: 5600 MHz



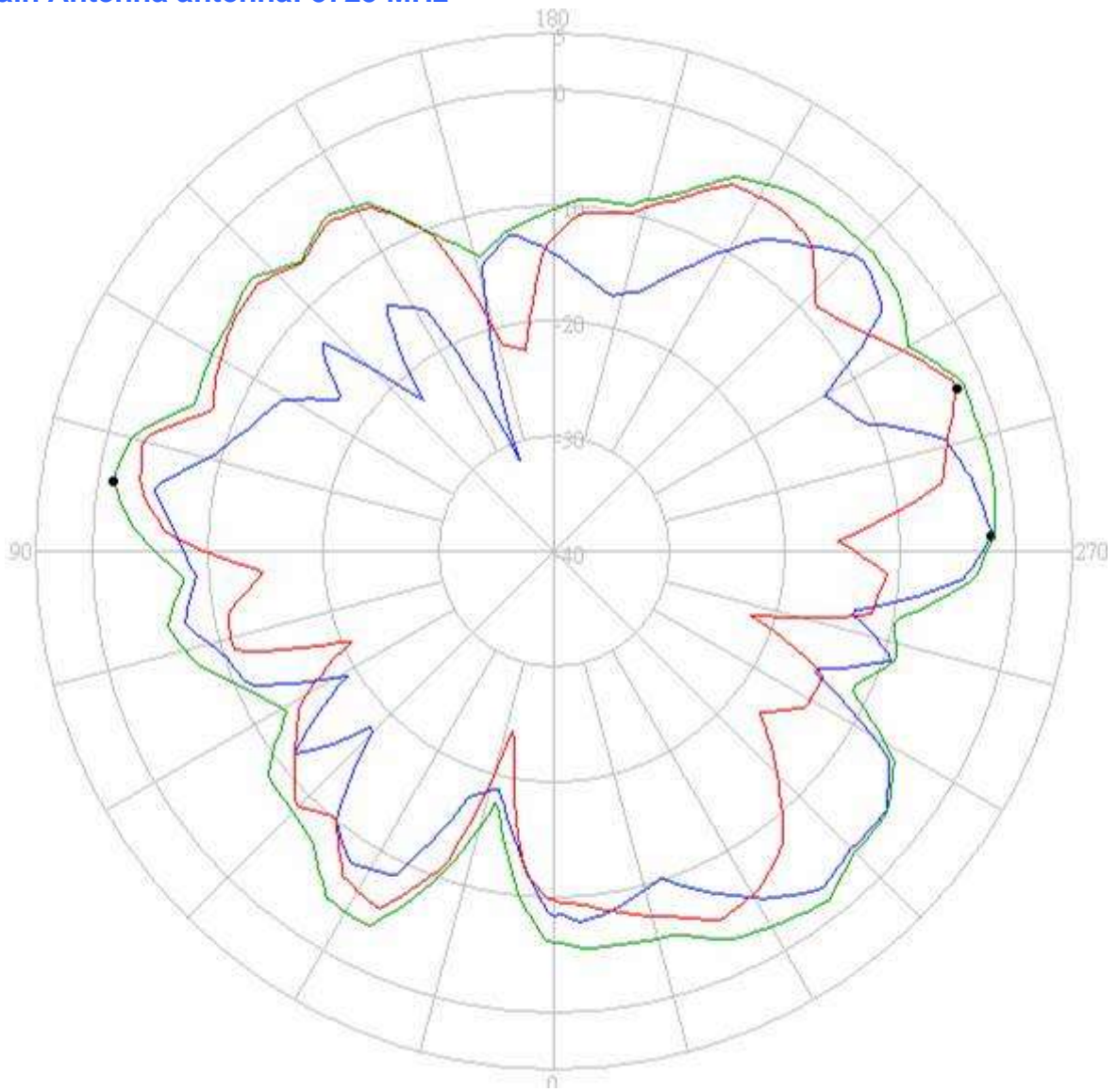
V

- Horizontal
- Vertical
- H + V

Center Frequency	<b>5600 MHz</b>
Horizontal (dBi) Peak	<b>-2.67</b>
Vertical (dBi) Peak	<b>-1.41</b>



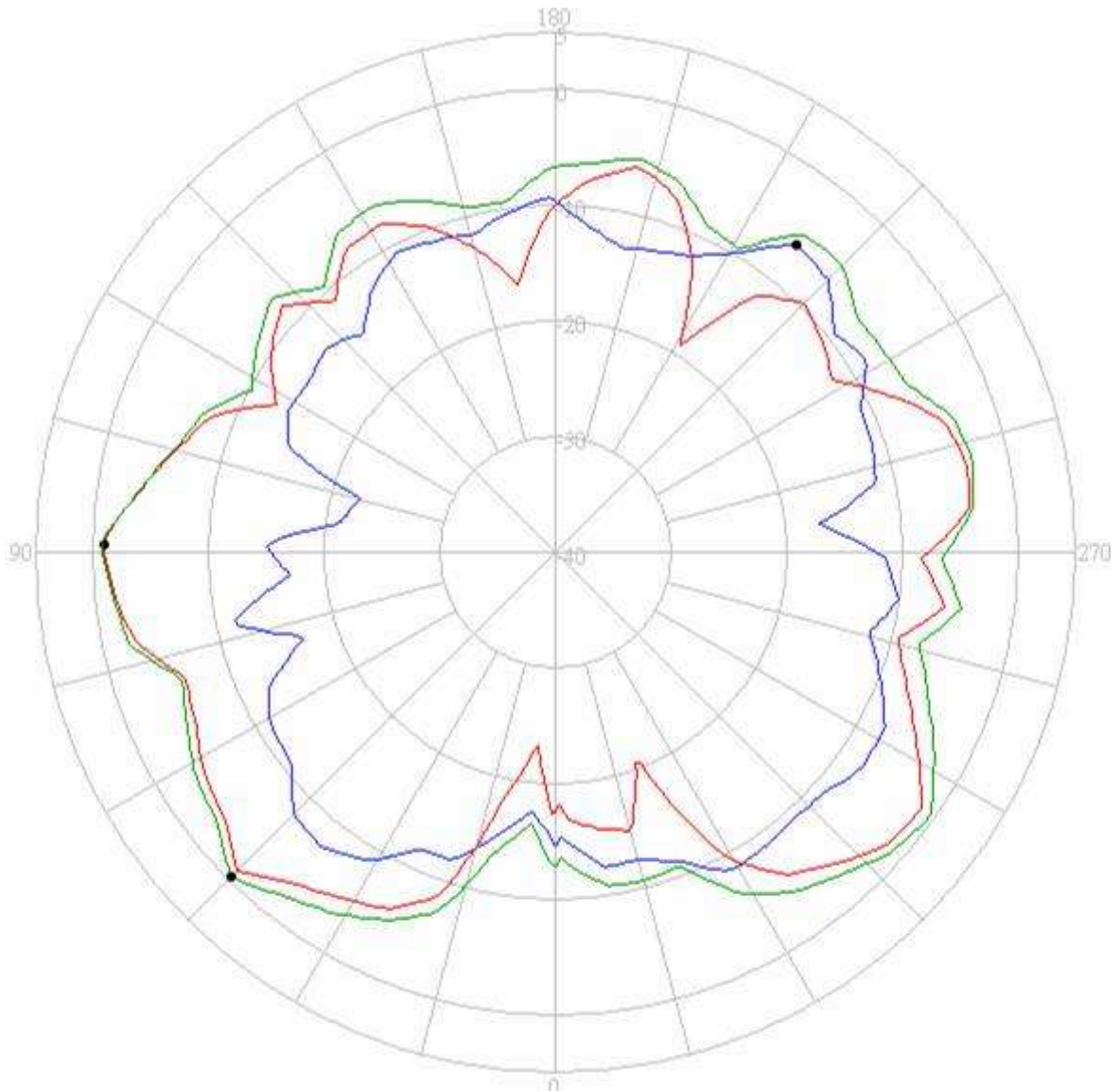
**WLAN\_Main Antenna antenna: 5725 MHz**



- Horizontal
- Vertical
- H + V

Center Frequency	<b>5725 MHz</b>
Horizontal (dBi) Peak	<b>-2.00</b>
Vertical (dBi) Peak	<b>-2.35</b>

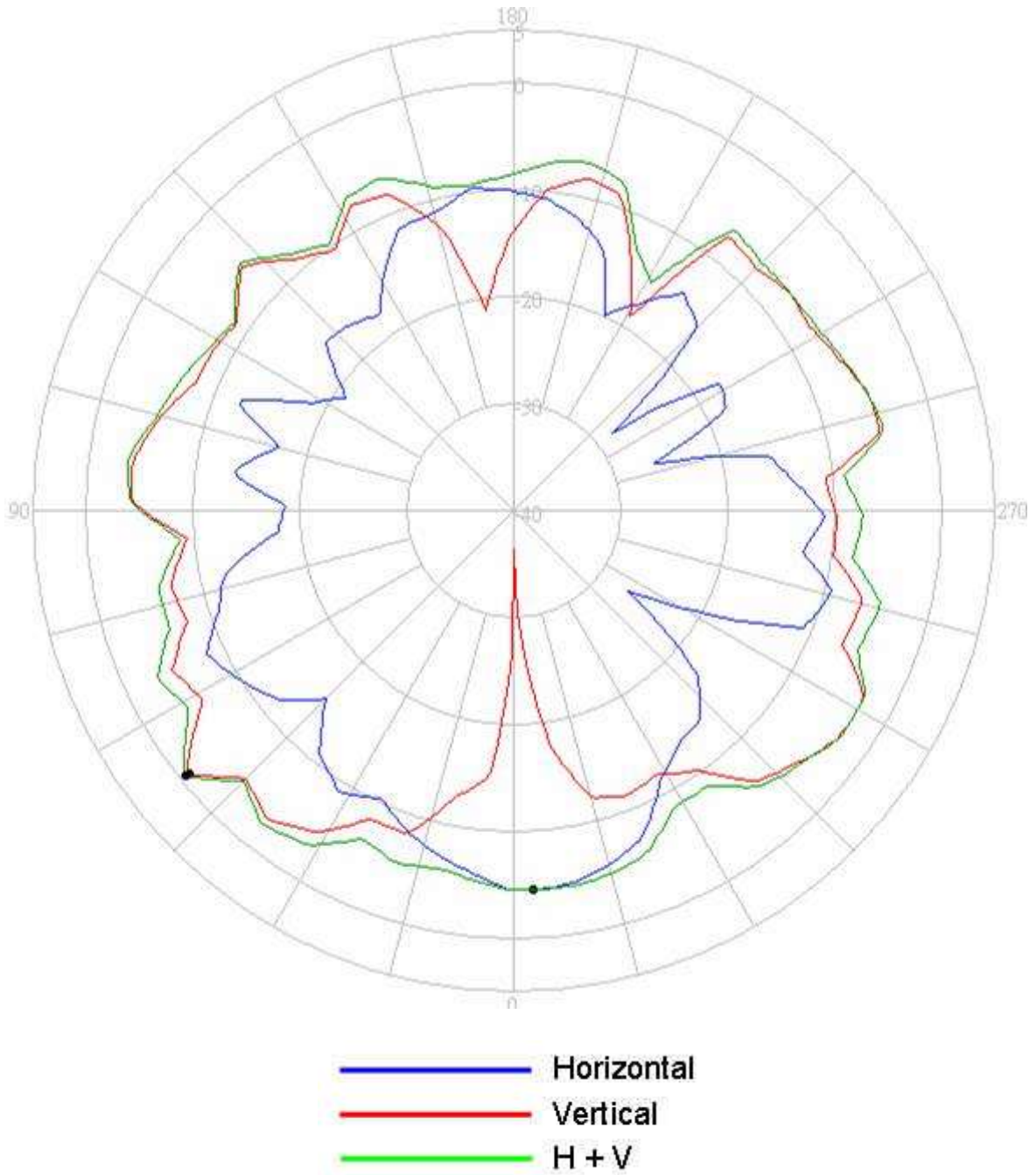
**WLAN\_Aux Antenna antenna: 5470 MHz**



- Horizontal
- Vertical
- H + V

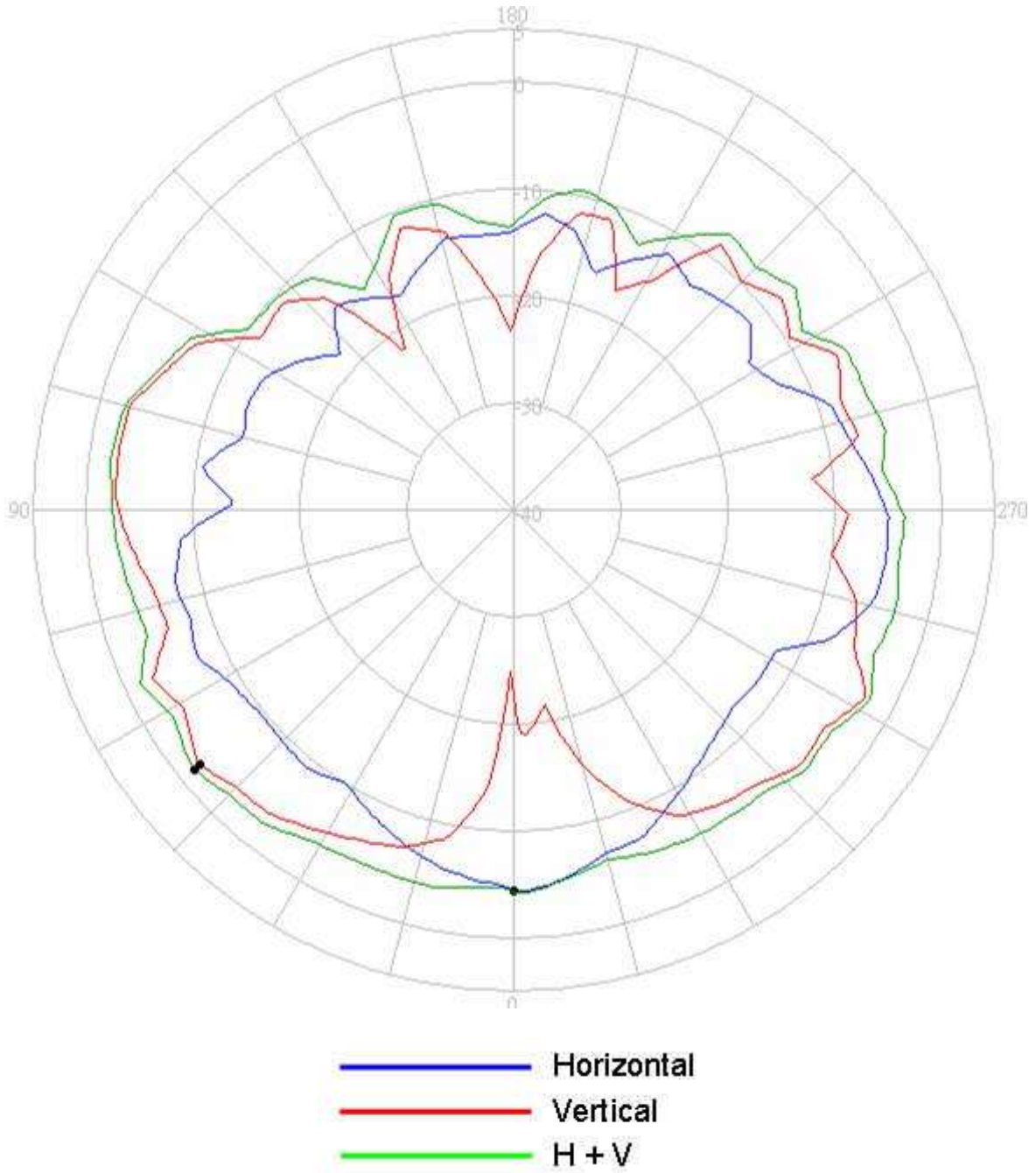
Center Frequency	<b>5470 MHz</b>
Horizontal (dBi) Peak	<b>-6.20</b>
Vertical (dBi) Peak	<b>-0.85</b>

### WLAN\_Aux Antenna antenna: 5600 MHz



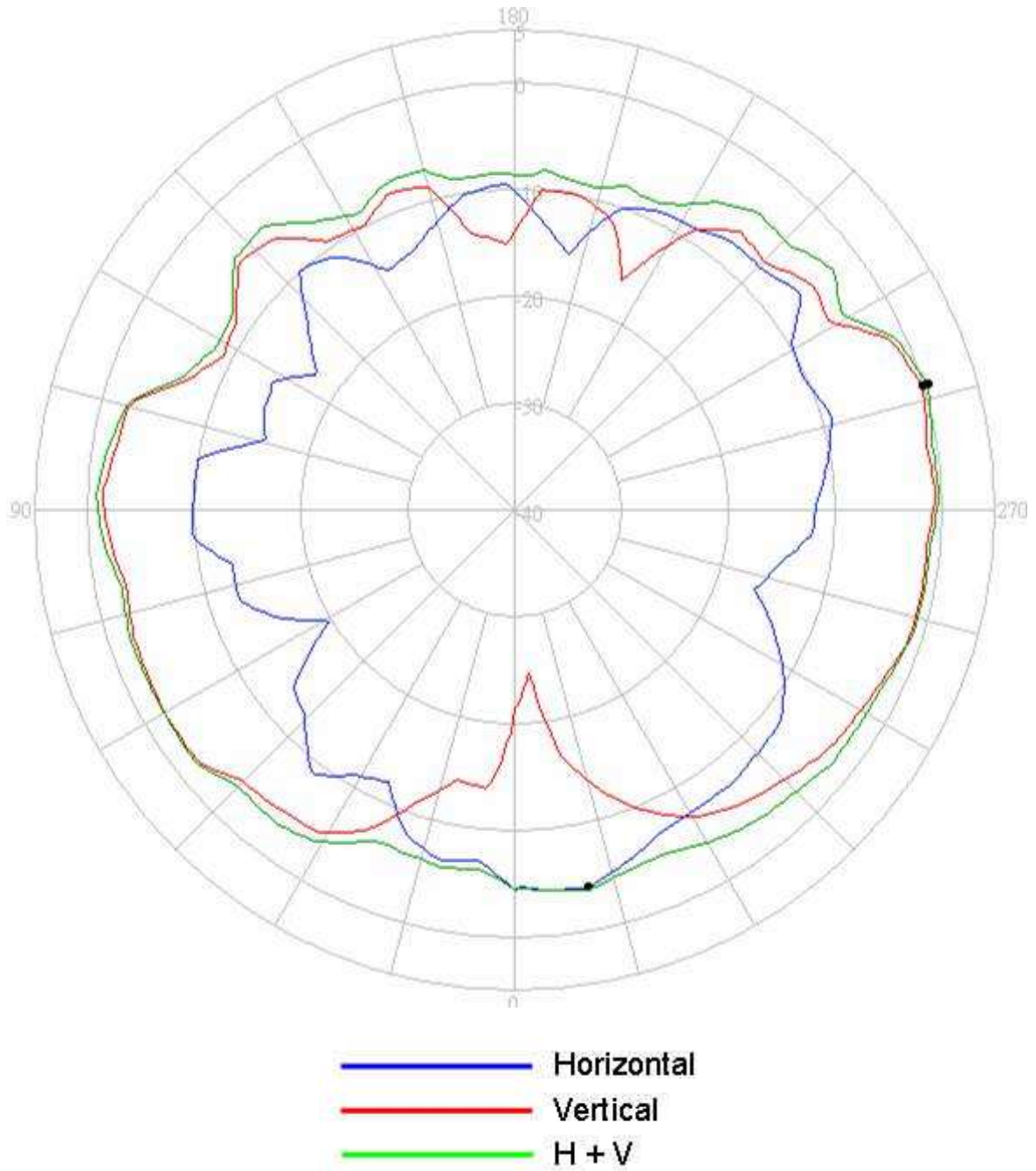
Center Frequency	5600 MHz
Horizontal (dBi) Peak	-4.45
Vertical (dBi) Peak	-0.90

### WLAN\_Aux Antenna antenna: 5725 MHz



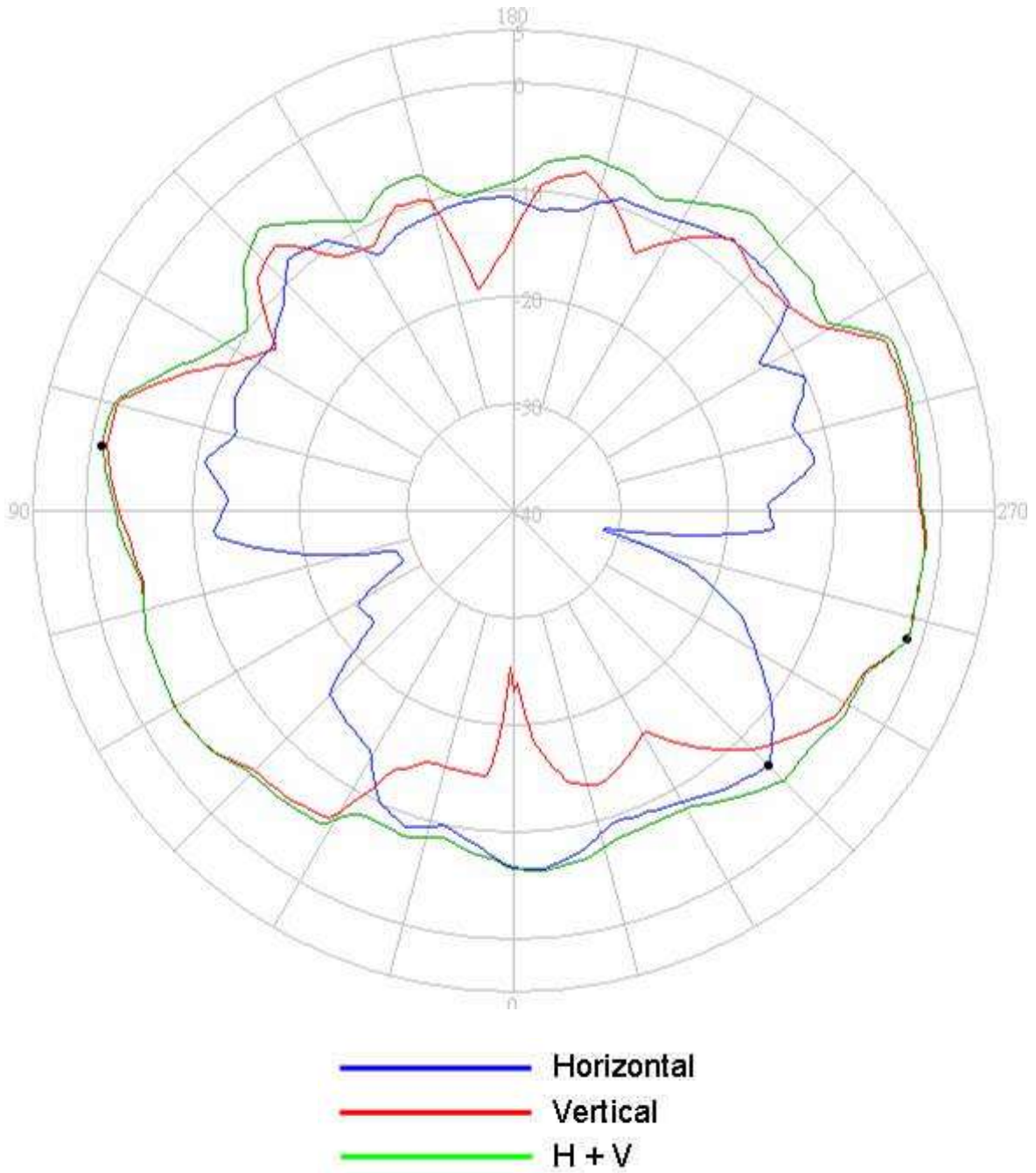
Center Frequency	5725 MHz
Horizontal (dBi) Peak	-4.28
Vertical (dBi) Peak	-2.18

**MIMO Antenna antenna: 5470 MHz**



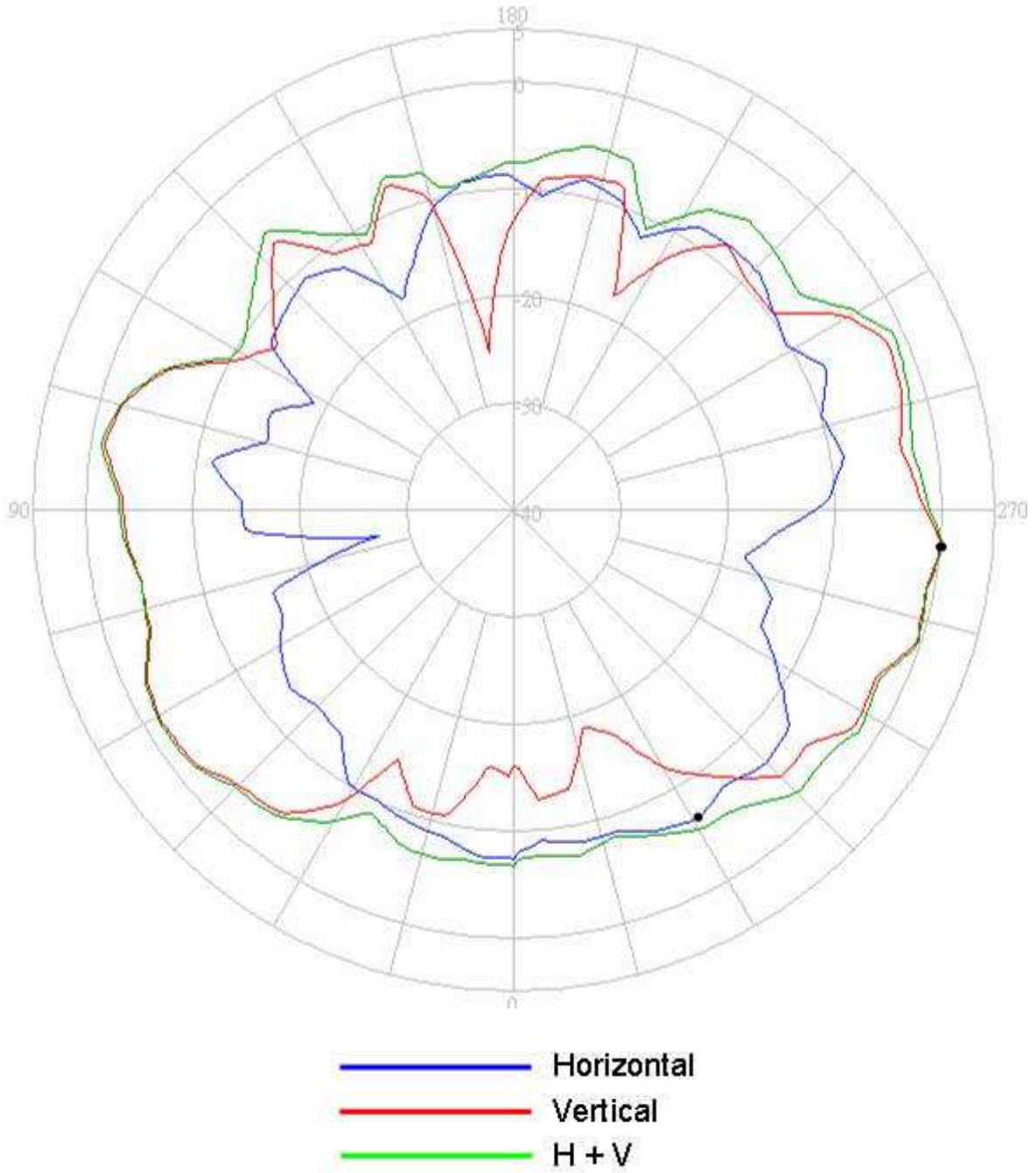
Center Frequency	<b>5470 MHz</b>
Horizontal (dBi) Peak	<b>-3.99</b>
Vertical (dBi) Peak	<b>-0.07</b>

**MIMO Antenna antenna: 5600 MHz**



Center Frequency	<b>5600 MHz</b>
Horizontal (dBi) Peak	<b>-6.34</b>
Vertical (dBi) Peak	<b>-1.24</b>

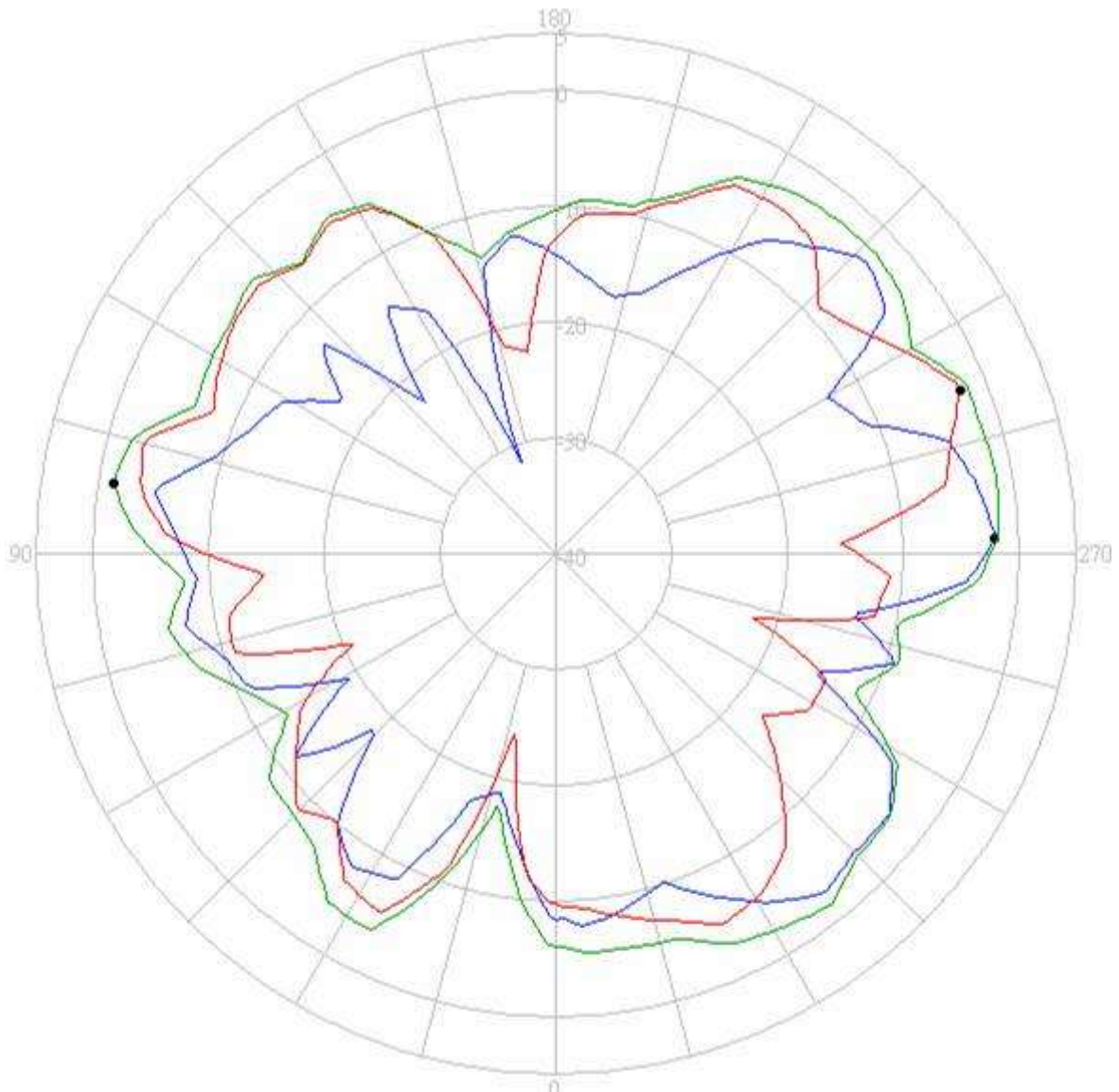
**MIMO Antenna antenna: 5725 MHz**



Center Frequency	5725 MHz
Horizontal (dBi) Peak	-6.38
Vertical (dBi) Peak	0.09

5725-5850 MHz radiation characteristic

WLAN\_Main Antenna antenna: 5725 MHz

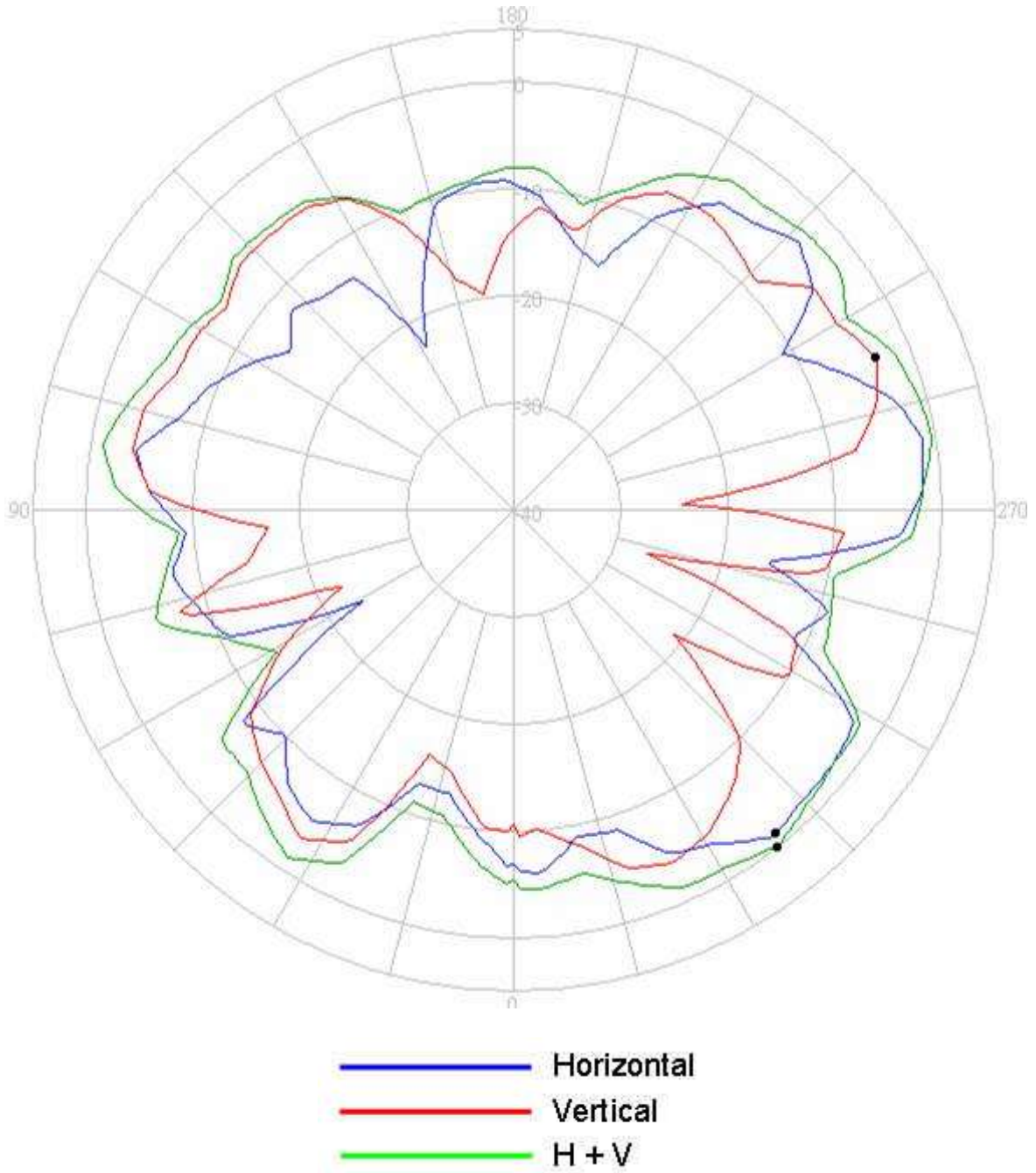


- Horizontal
- Vertical
- H + V

Center Frequency	5725 MHz
Horizontal (dBi) Peak	-2.00
Vertical (dBi) Peak	-2.35

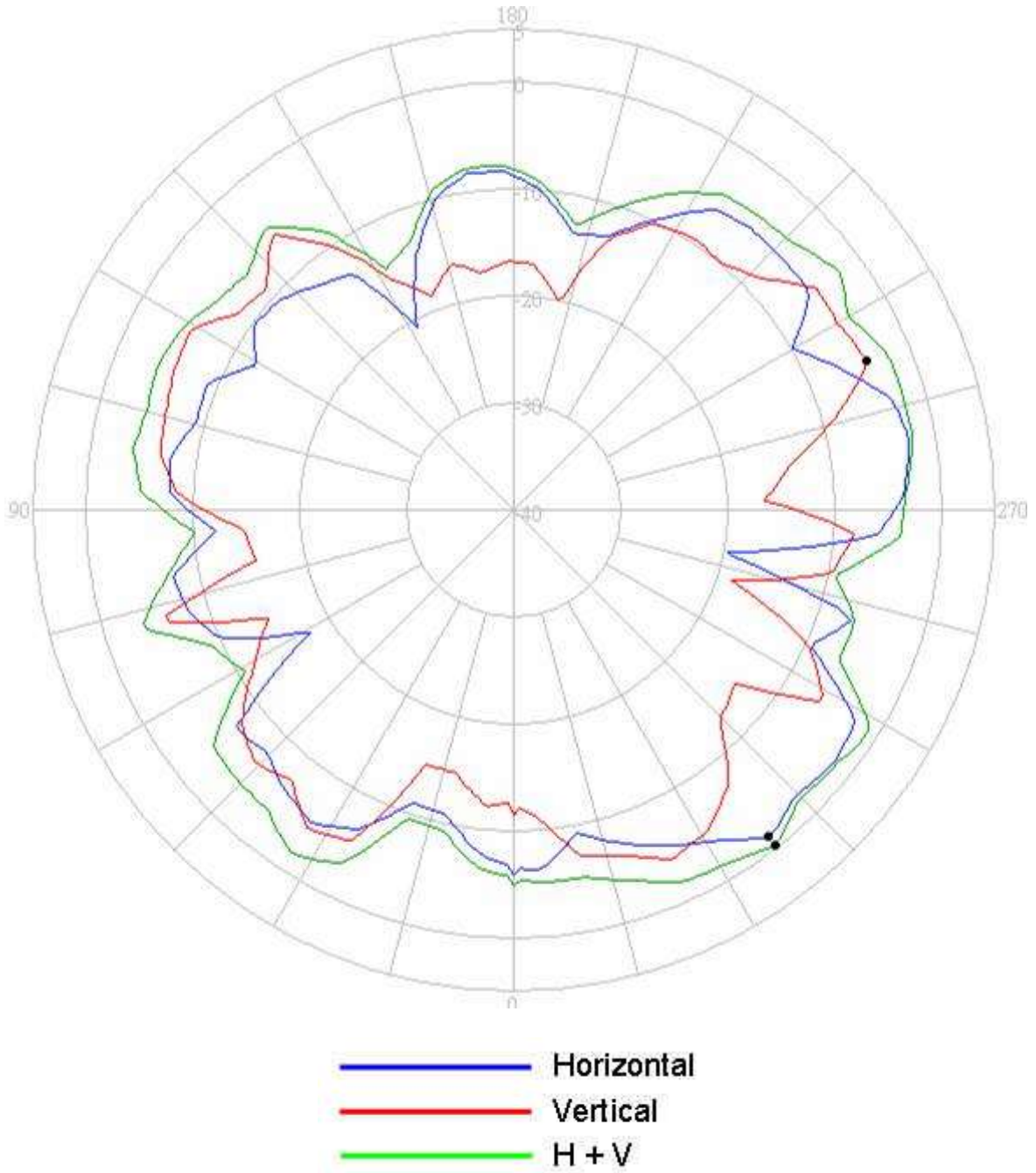


**WLAN\_Main Antenna antenna: 5785 MHz**



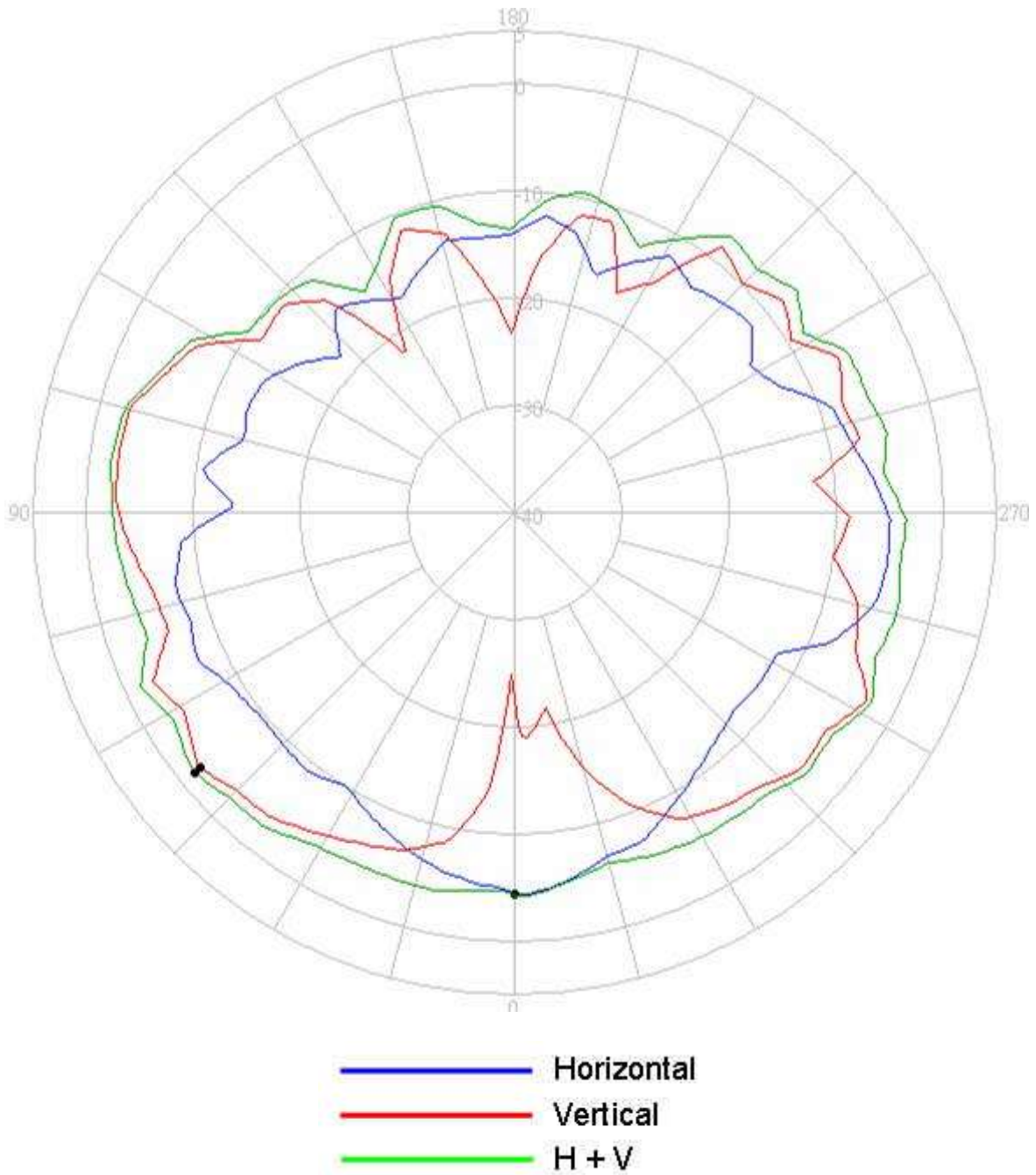
Center Frequency	5785 MHz
Horizontal (dBi) Peak	-1.10
Vertical (dBi) Peak	-3.25

### WLAN\_Main Antenna antenna: 5850 MHz



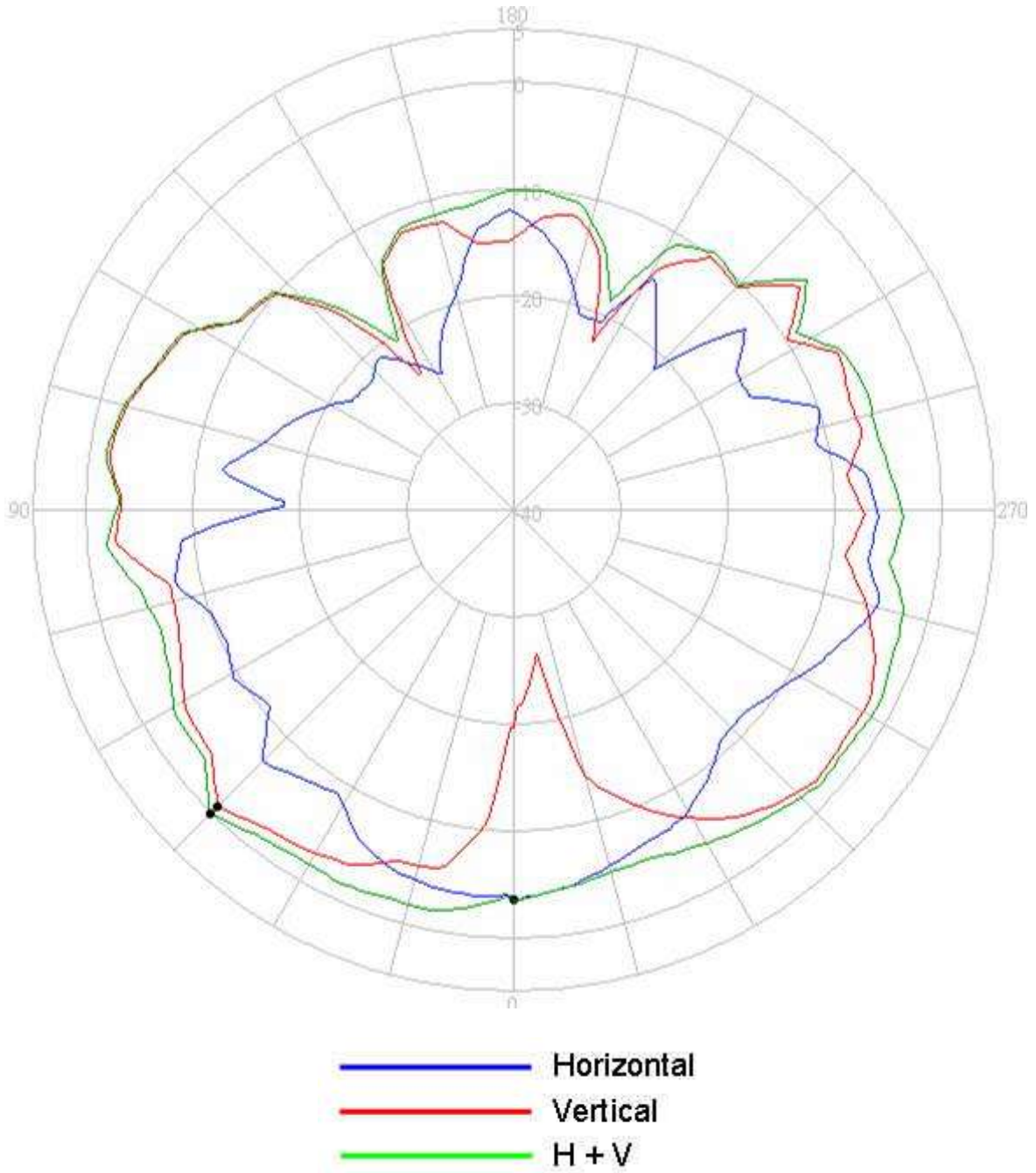
Center Frequency	5850 MHz
Horizontal (dBi) Peak	-1.20
Vertical (dBi) Peak	-4.19

**WLAN\_Aux Antenna antenna: 5725 MHz**



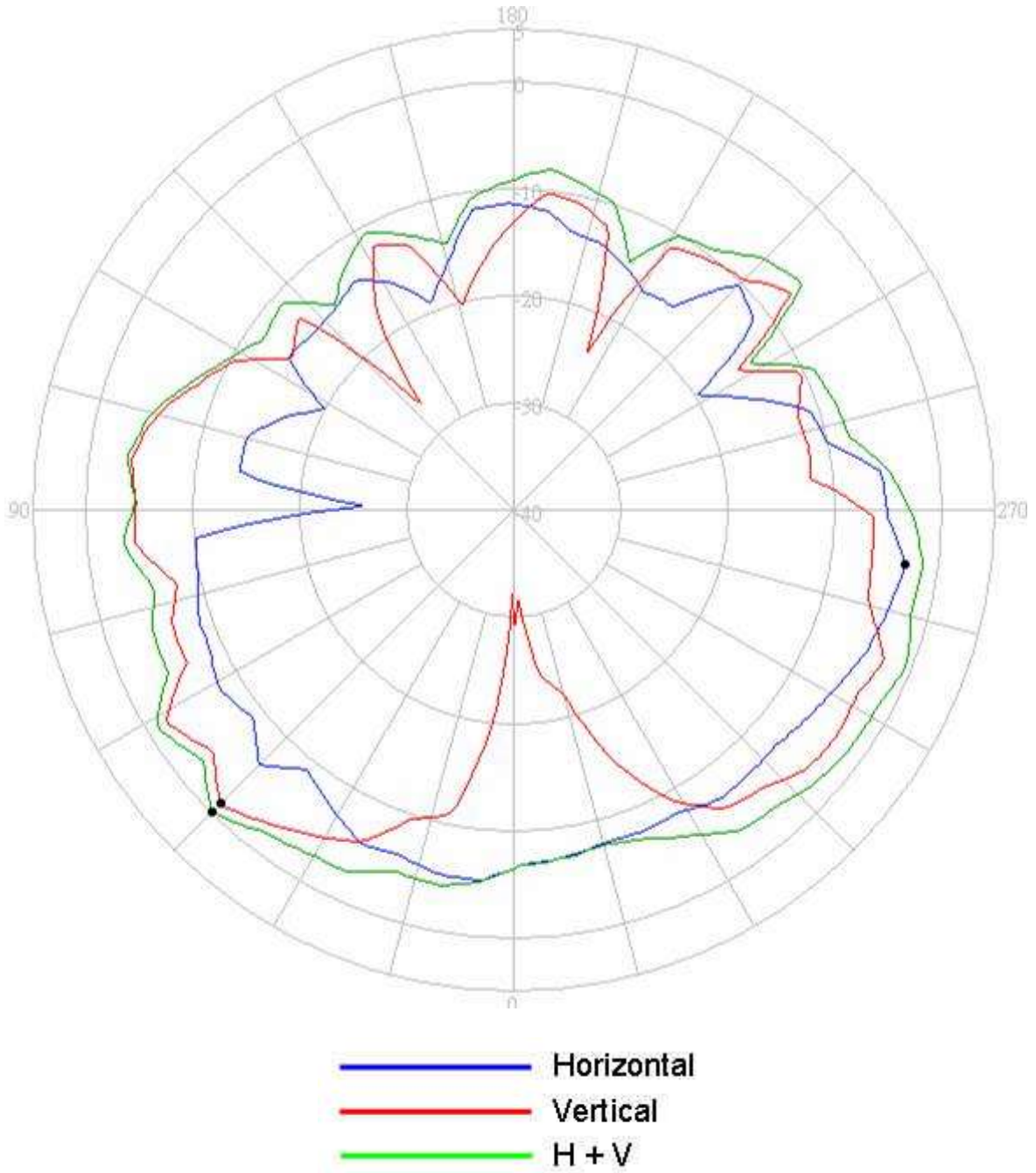
Center Frequency	5725 MHz
Horizontal (dBi) Peak	-4.28
Vertical (dBi) Peak	-2.18

### WLAN\_Aux Antenna antenna: 5785 MHz



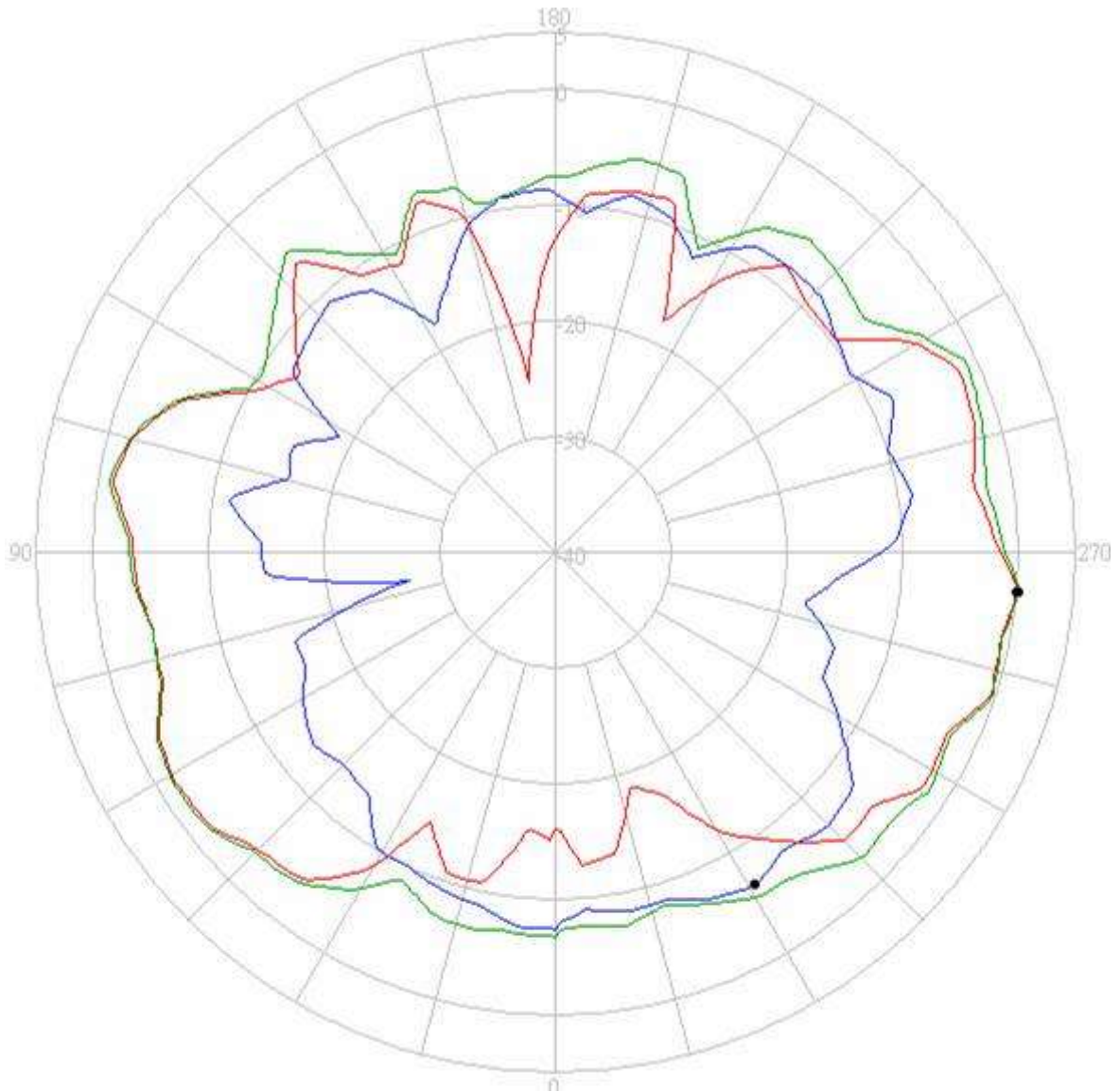
Center Frequency	5785 MHz
Horizontal (dBi) Peak	-3.49
Vertical (dBi) Peak	-0.84

**WLAN\_Aux Antenna antenna: 5850 MHz**



Center Frequency	<b>5850 MHz</b>
Horizontal (dBi) Peak	<b>-3.00</b>
Vertical (dBi) Peak	<b>-1.10</b>

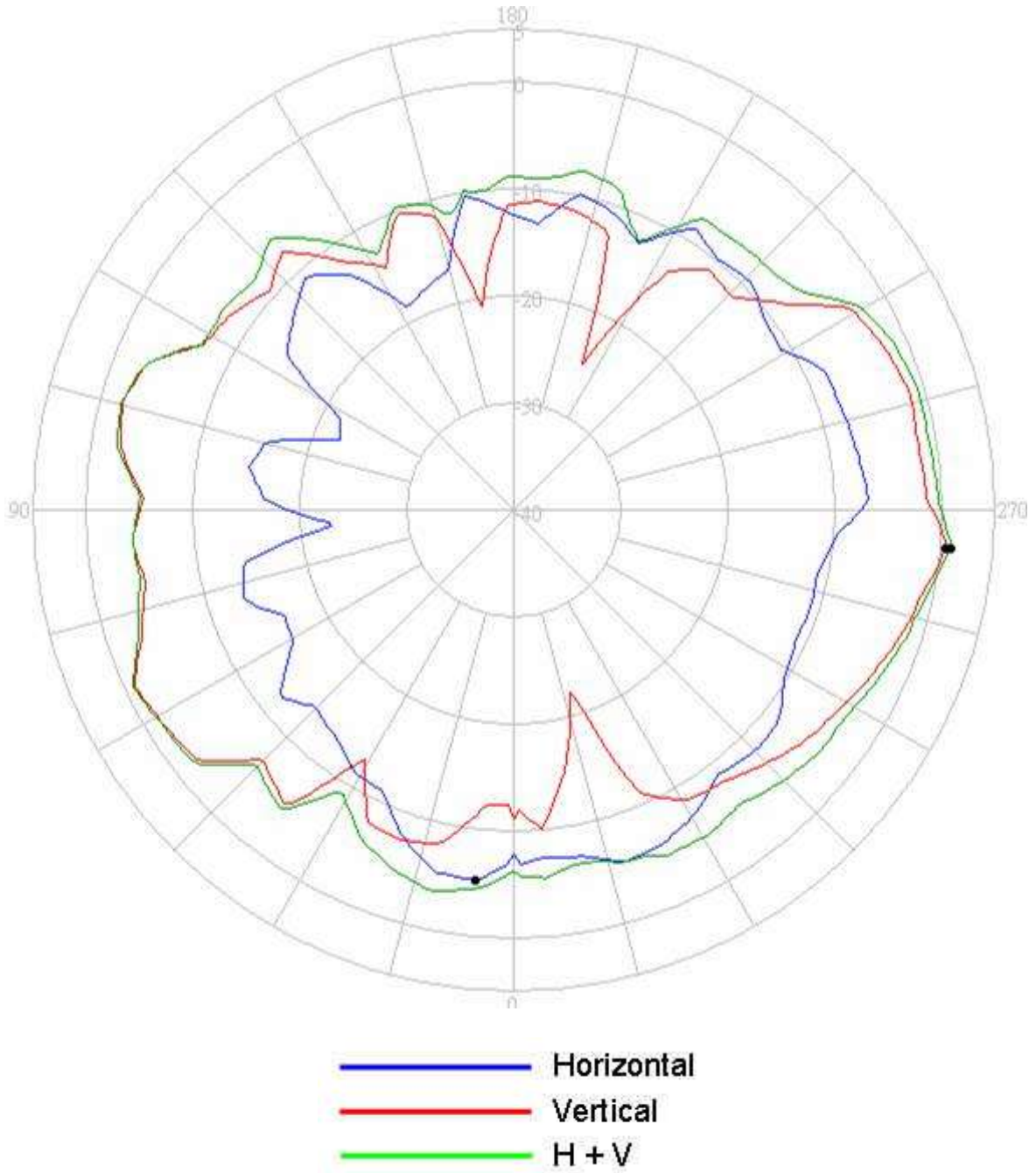
**MIMO Antenna antenna: 5725 MHz**



- Horizontal
- Vertical
- H + V

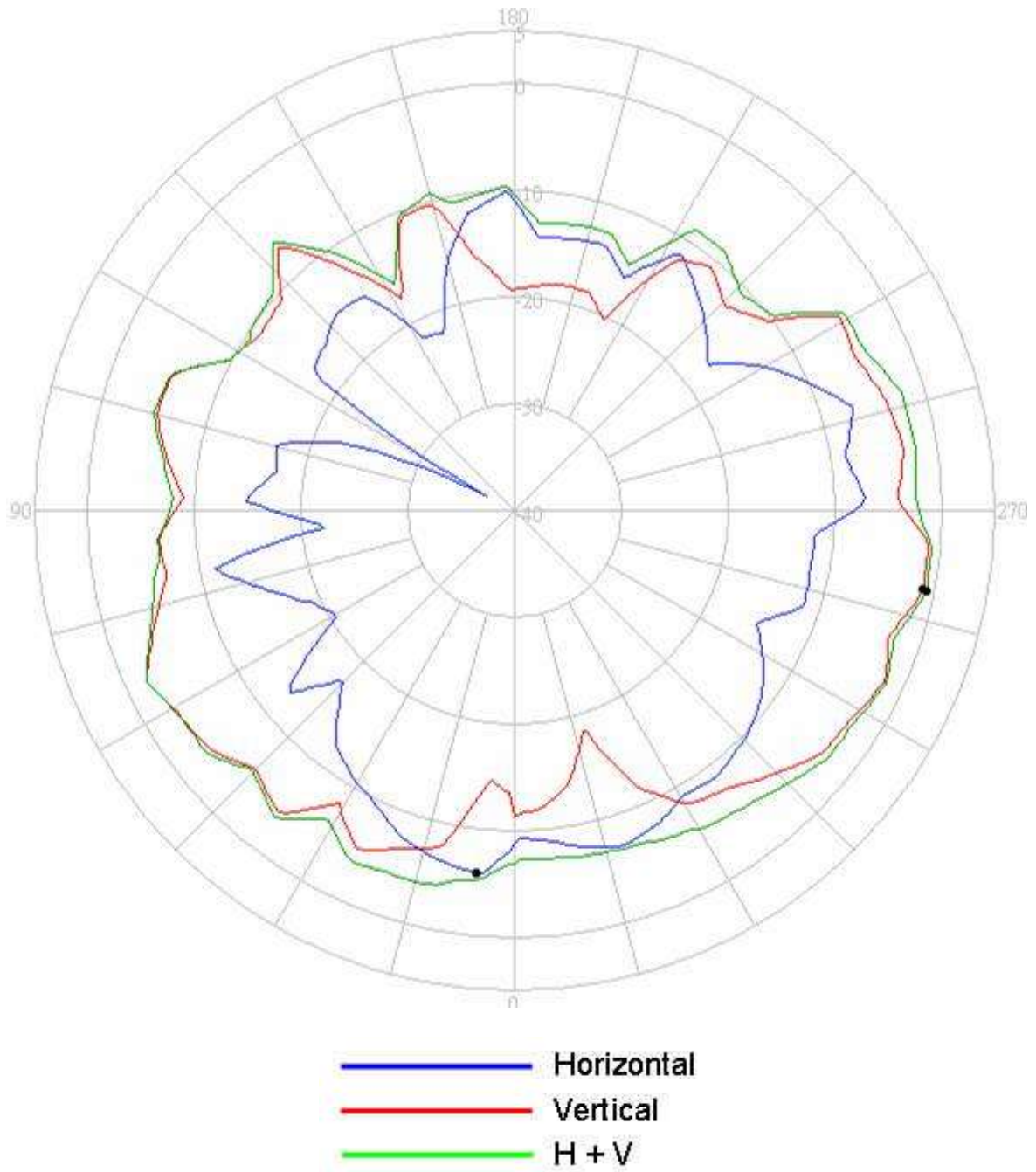
Center Frequency	<b>5725 MHz</b>
Horizontal (dBi) Peak	<b>-6.38</b>
Vertical (dBi) Peak	<b>0.09</b>

**MIMO Antenna antenna: 5785 MHz**



Center Frequency	<b>5785 MHz</b>
Horizontal (dBi) Peak	<b>-5.17</b>
Vertical (dBi) Peak	<b>0.60</b>

### MIMO Antenna antenna: 5850 MHz



Center Frequency	5850 MHz
Horizontal (dBi) Peak	-5.76
Vertical (dBi) Peak	-1.00



## Section 4. Host Platform Information

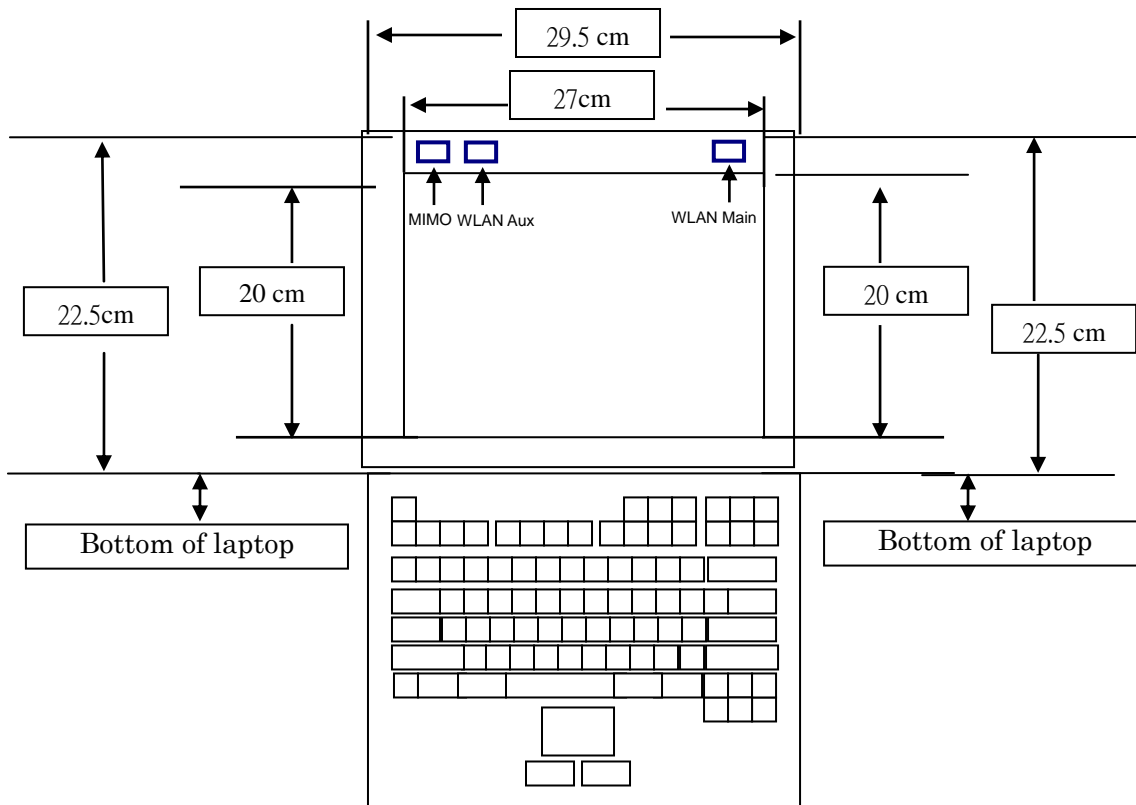
OEM / ODM Host platform: AMG (PC mode) platform correlated to antenna data

Rating Label Photo:

## Section 5. Antenna Host Platform Location Information

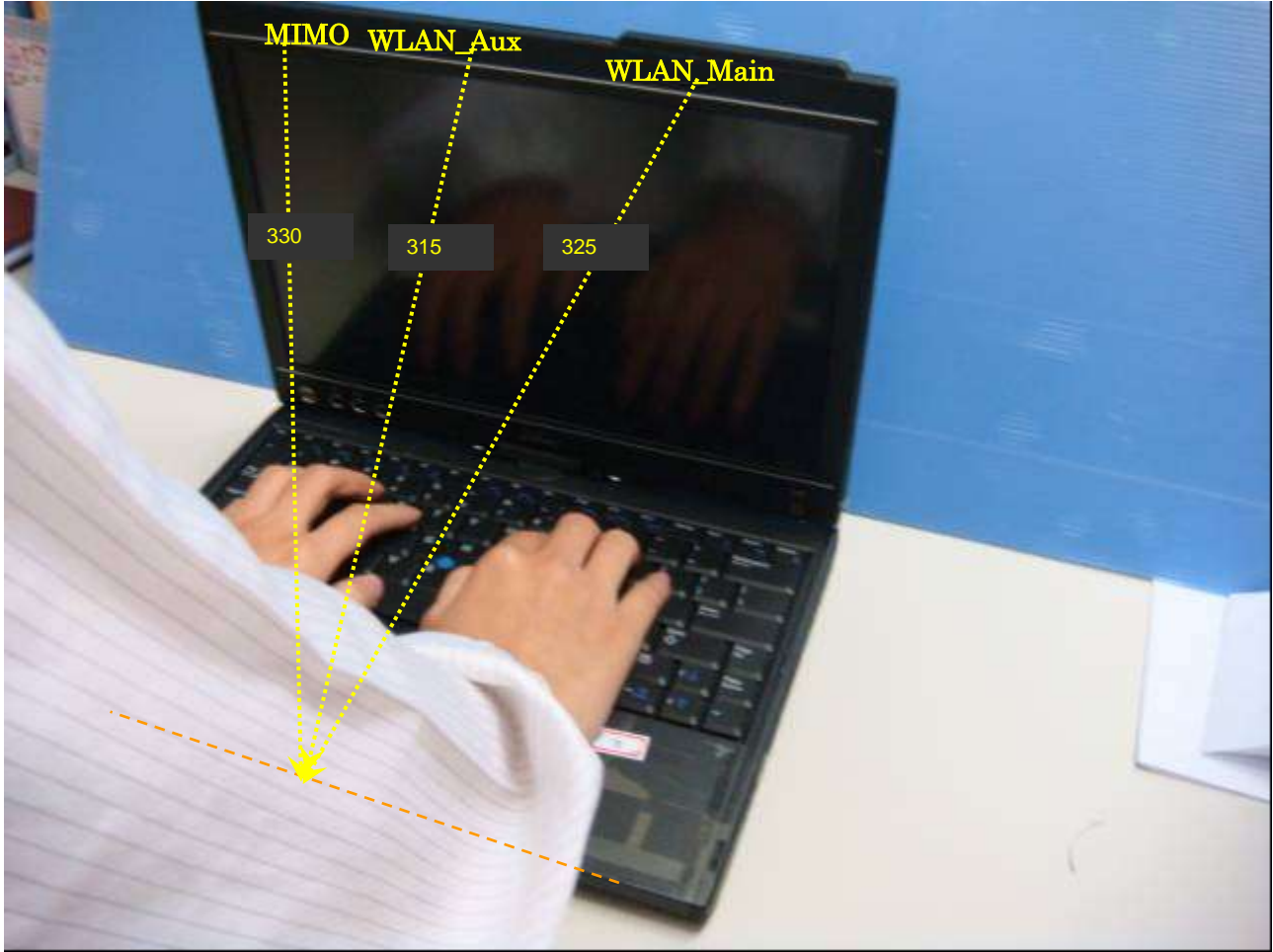
Include a **dimensioned photo** or **dimensioned drawing** of WLAN\_Main Antenna, WLAN\_Aux Antenna and MIMO Antenna placements (measurements are not required for receive-only antenna).

Any antenna that transmits must show dimensions to bottom of laptop.



## Section 6. Antenna dimensional information for SAR evaluation

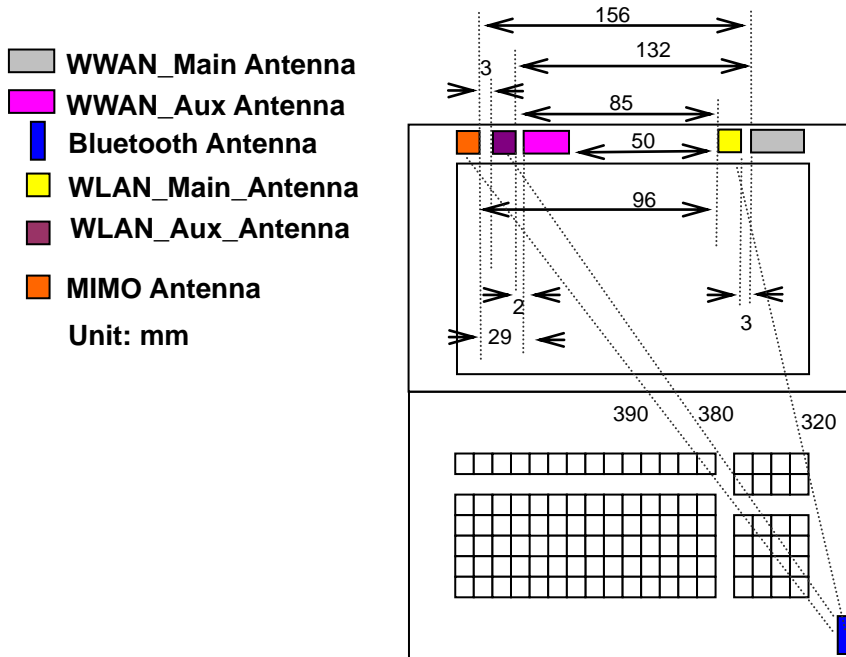
Include a **dimensioned photo** or **dimensioned drawing** showing the distance (mm) between the transmit antennas and the user (excluding hands, wrist, feet, lap/ thigh, and ankle)



## 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.

	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						