

## Regulatory WLAN Antenna Information 2.4/5GHz Tiger Multiple Band Antenna with Cable and Connector for IEEE 802.11a/b/g

<b>Platform</b>	
Platform Owner	Dell
Brand Name	Dell
Model Name	Tiger
<b>ODM</b>	Compal
Target Launch Date	(2008/ 11/ 12)
<b>Antenna</b>	
Brand Name	Tyco Electronics
Part Number	■ Tx1 Antenna: 2023641-1
	■ Tx2 Antenna: 2023641-1
<b>Module</b>	
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_
	<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	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 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)
(P/N: 2023641-1) Tx1 antenna	Tyco Electronics	PIFA	(P/N:20351-111R-37) 50 ohm Coaxial. length:40.3cm diameter: 1.37mm Connector: MHF	2400-2500MHz 0.60dBi (peak)	2400-2500MHz 1.64dBi (peak)	2400-2500MHz 1.2max*	2400-2500MHz 1.04dBi (peak) *
				2496-2690MHz 1.32dBi (peak)	2496-2690MHz 2.38dBi (peak)	2496-2690MHz 1.8max*	2496-2690MHz 1.06dBi (peak) *
				5150-5350MHz 1.07dBi (peak)	5150-5350MHz 2.56dBi (peak)	5150-5350MHz 1.5max*	5150-5350MHz 1.49dBi (peak) *
				5470-5725MHz 0.16dBi (peak)	5470-5725MHz 1.69dBi (peak)	5470-5725MHz 1.2max*	5470-5725MHz 1.53dBi (peak) *
				5725-5850MHz -0.16dBi (peak)	5725-5850MHz 1.45dBi (peak)	5725-5850MHz 1.2max*	5725-5850MHz 1.65dBi (peak) *
(P/N: 2023641-1) Tx2 (or Rx2) antenna	Tyco Electronics	PIFA	(P/N:20278-111R-13) 50 ohm Coaxial. length: 34.8cm diameter: 1.13mm Connector: MHF	2400-2500MHz 1.79dBi (peak) *	2400-2500MHz 2.90dBi (peak) *	2400-2500MHz 1.3max*	2400-2500MHz 1.11dBi (peak) *
				2496-2690MHz -0.08dBi (peak) *	2496-2690MHz 1.06dBi (peak) *	2496-2690MHz 1.6max*	2496-2690MHz 1.14dBi (peak) *
				5150-5350MHz 1.02dBi (peak) *	5150-5350MHz 2.68dBi (peak) *	5150-5350MHz 1.6max*	5150-5350MHz 1.66dBi (peak) *
				5470-5725MHz 0.69dBi (peak) *	5470-5725MHz 2.53dBi (peak) *	5470-5725MHz 1.3max*	5470-5725MHz 1.84dBi (peak) *
				5725-5850MHz 1.15dBi (peak) *	5725-5850MHz 2.99dBi (peak) *	5725-5850MHz 1.3max*	5725-5850MHz 1.84dBi (peak) *

#### NOTE:

(\*) If Rx2/Rx3 only (2<sup>nd</sup> or 3<sup>rd</sup> antenna receives only, e.g. for 512 family & 4965AGN) then the information marked with \* is not required

**Antenna Peak Gain Table:**

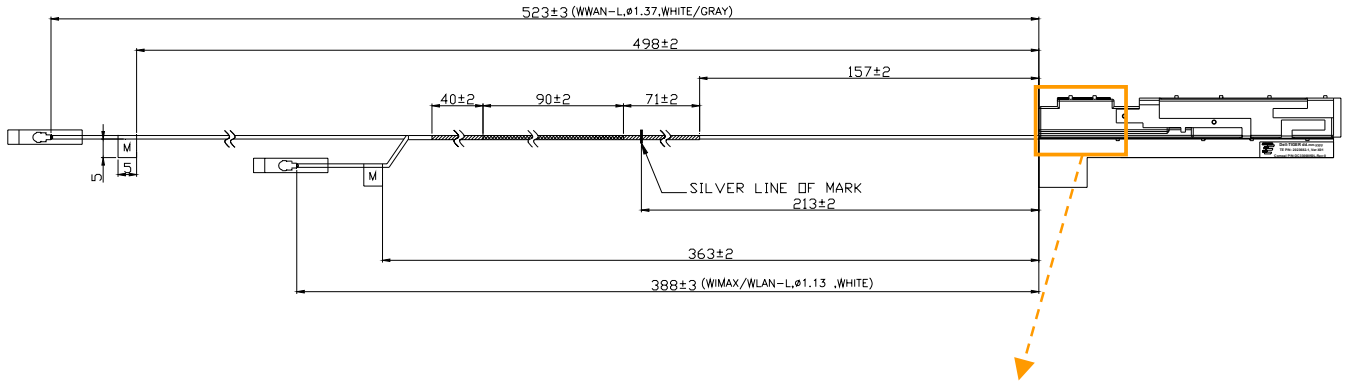
Frequency (MHz)	Tx1 antenna		Tx2 (or Rx2) Antenna	
	Horizontal (dBi)	Vertical (dBi)	Horizontal (dBi)	Vertical (dBi)
2400	-1.99	-3.66	-1.05	-1.62
2450	-0.91	-2.83	0.33	-0.24
2500	-0.47	-2.09	-0.44	-0.81
2501	-0.21	-1.98	-0.62	-2.75
2593	-0.41	-4.23	-0.66	-2.08
2685	0.65	-2.54	-1.06	-1.97
5150	-0.03	-2.25	-3.15	-1.17
5250	0.23	-2.08	-3.55	-0.64
5350	-0.09	-1.21	-1.15	0.63
5470	-1.00	-1.86	-3.73	-0.75
5600	-1.29	-2.29	-3.31	-1.44
5725	-2.87	-1.39	-1.94	-0.83
5785	-0.88	-0.63	-3.78	-1.39
5850	-1.51	-1.44	-1.94	-1.30

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

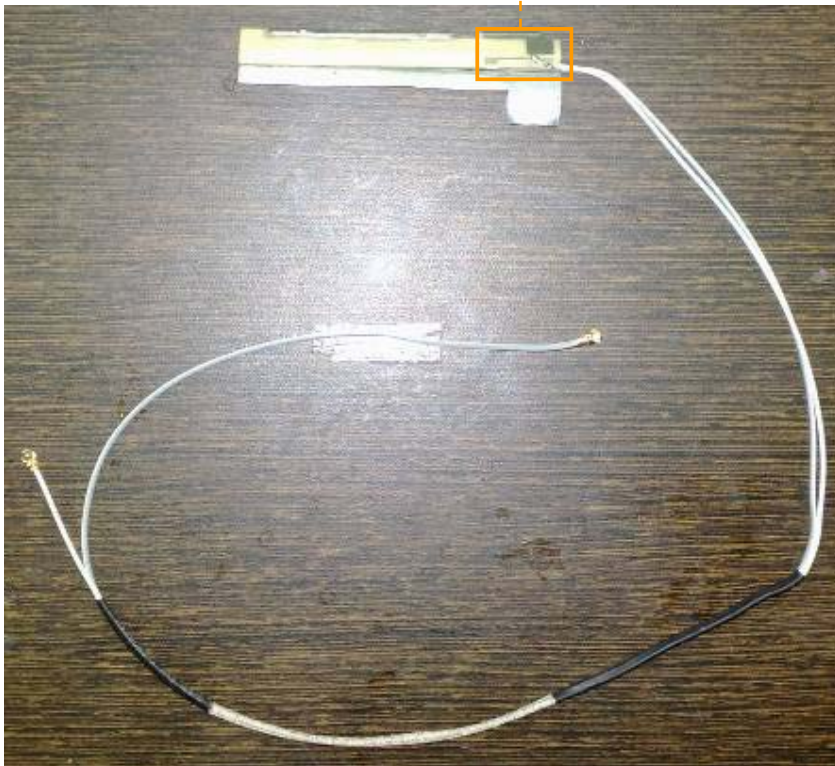
### Tx1 Antenna Dimensioned Drawing:



**Tx1 Antenna**

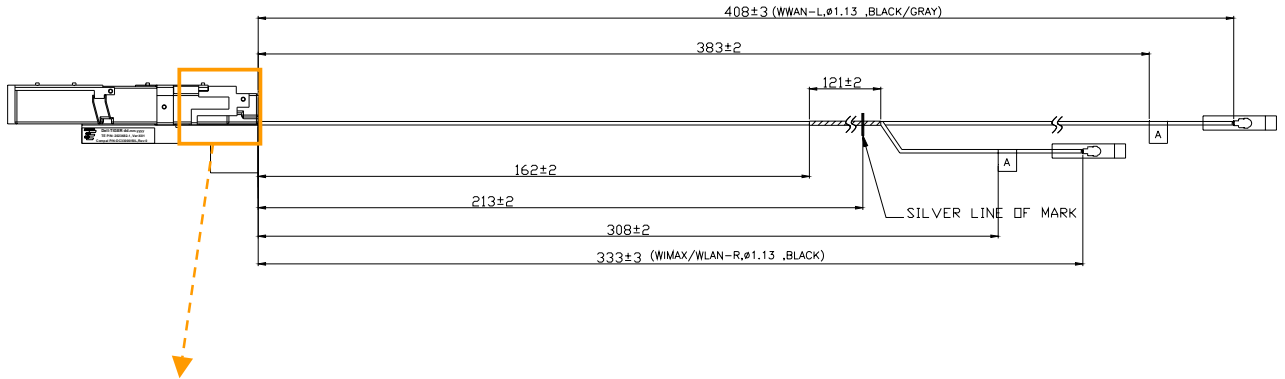
### Tx1 Antenna Photo:

**Tx1 Antenna**



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

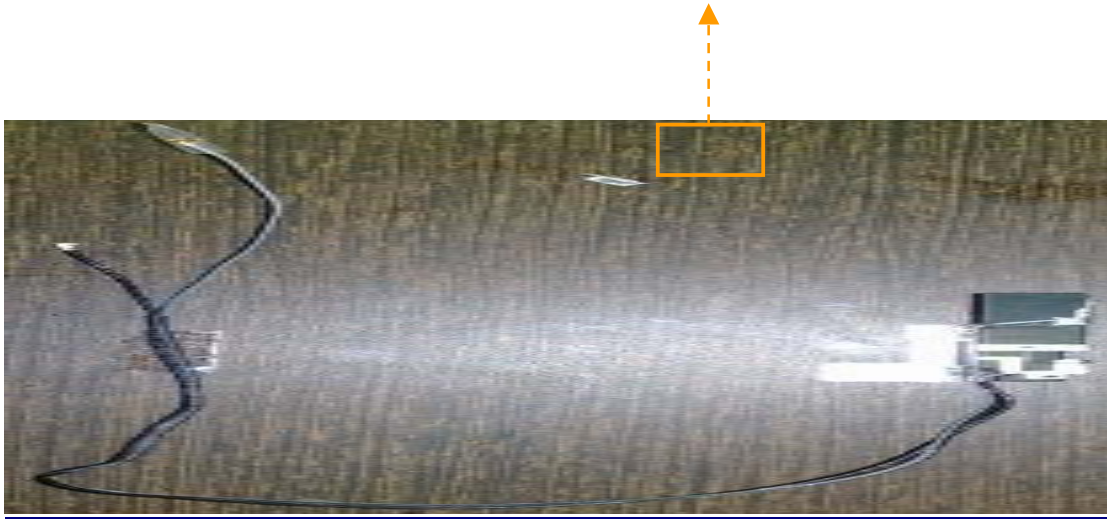
**Tx2 (or Rx2) Antenna Dimensioned Drawing:**



**Tx2 (or Rx2) Antenna**

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

**Tx2 (or Rx2) Antenna**

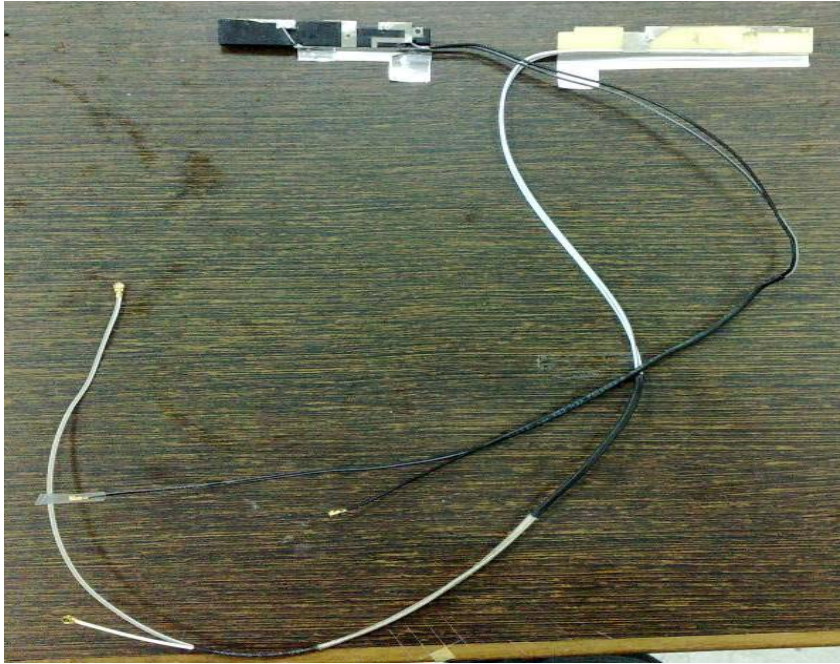




**Include front view photo of all 3 antennas here.**

Antenna Manufacturer: TYCO

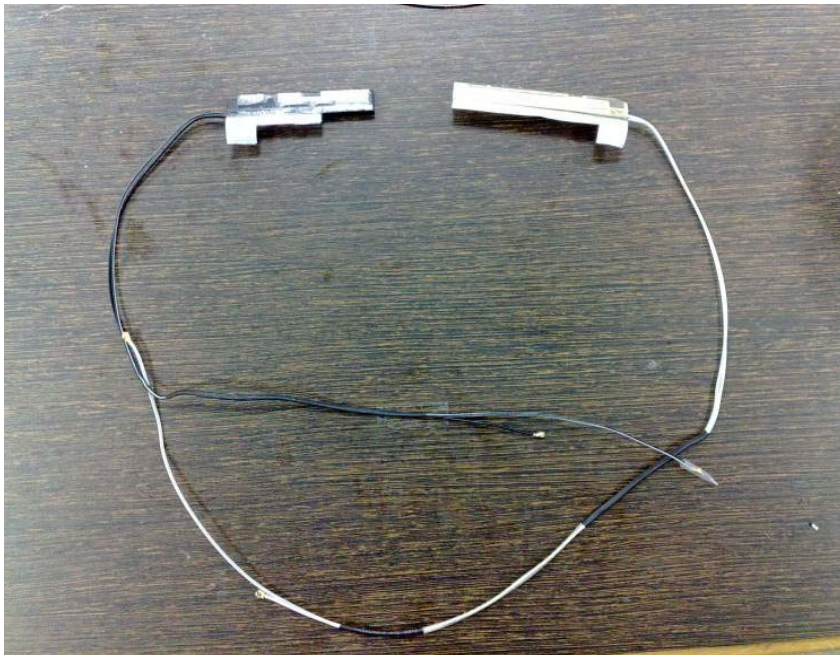
Antenna Part Number: 2023825 (Tx1), 2023825 (Tx2 or Rx2), 2023824 (Tx3 or Rx3)



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

Antenna Manufacturer: TYCO

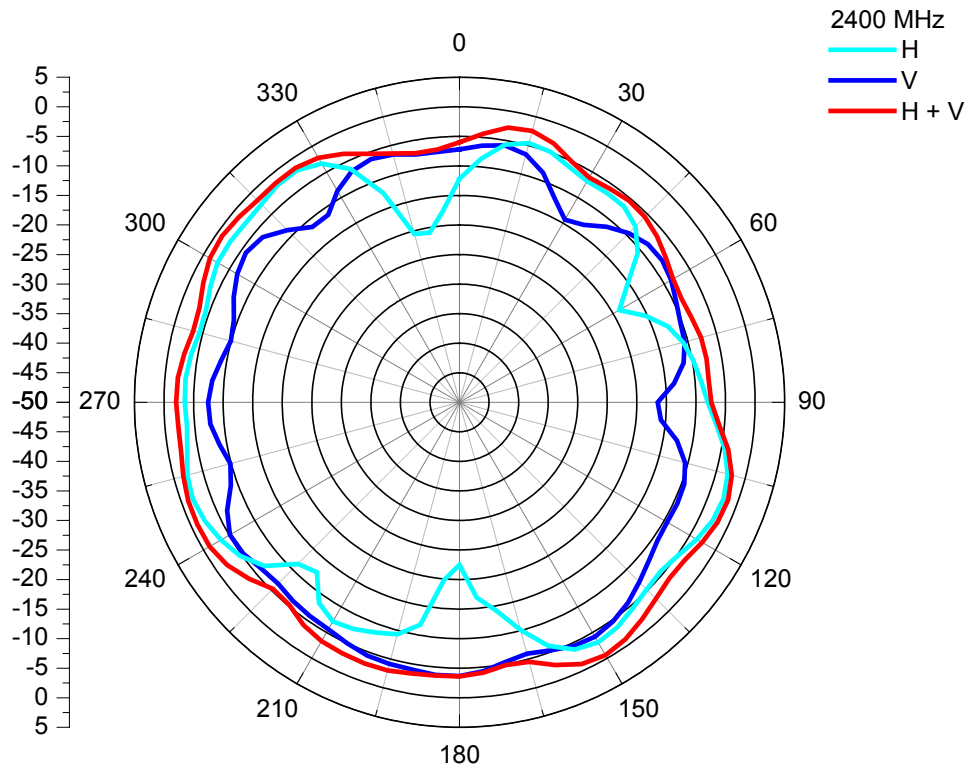
Antenna Part Number: 2023825 (Tx1), 2023825 (Tx2 or Rx2), 2023824 (Tx3 or Rx3)



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

### 2400-2500MHz radiation characteristic

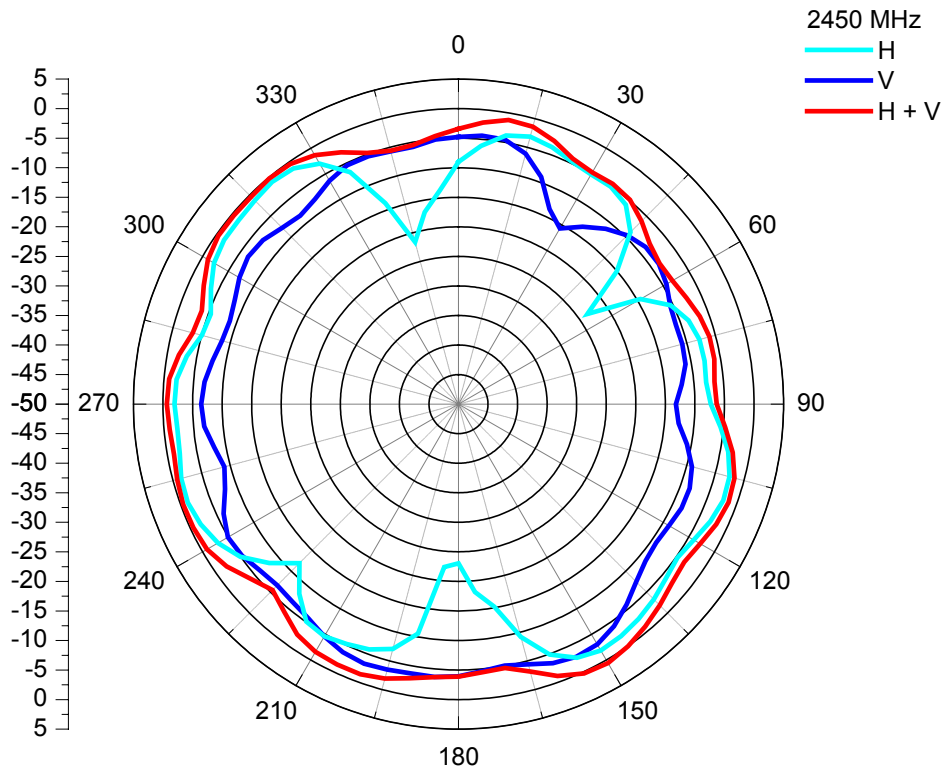
Tx1 antenna: 2400 MHz



Center Frequency	<b>2400 MHz</b>
Horizontal (dBi) peak	<b>-1.99</b>
Vertical (dBi) peak	<b>-3.66</b>

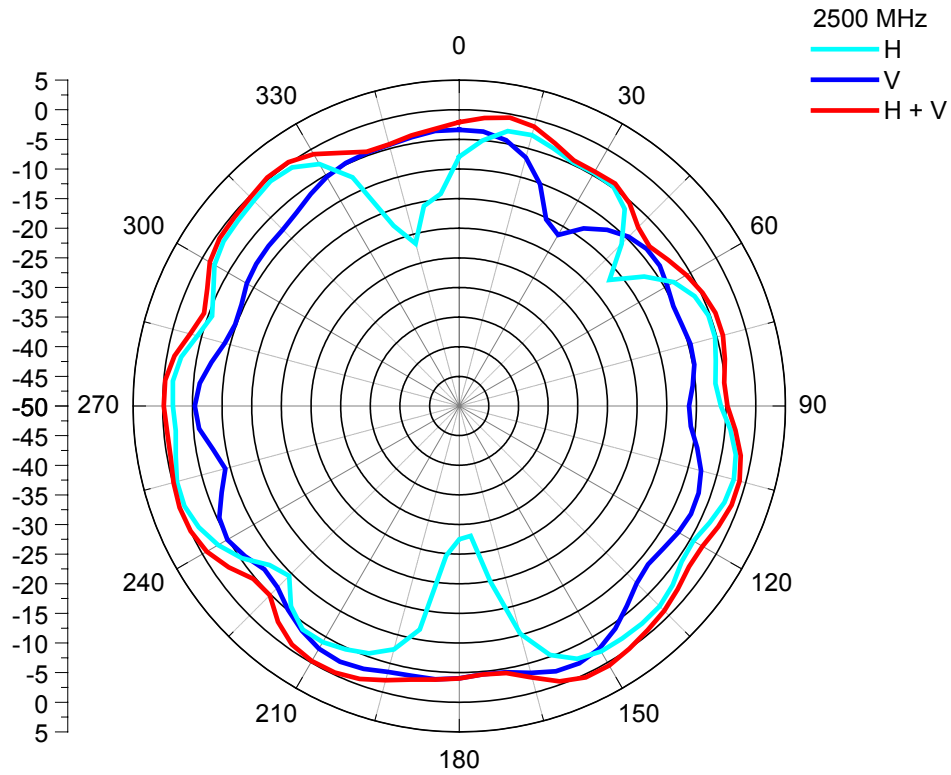


### Tx1 antenna: 2450 MHz



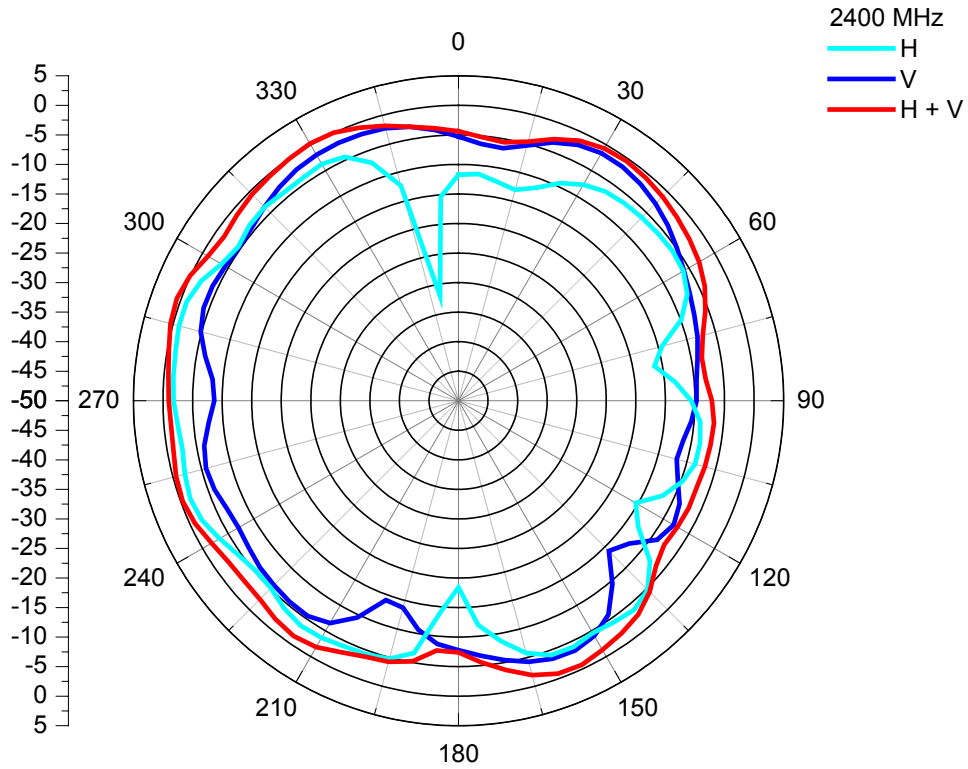
Center Frequency	<b>2450 MHz</b>
Horizontal (dBi) peak	<b>-0.91</b>
Vertical (dBi) peak	<b>-2.83</b>

### Tx1 antenna: 2500 MHz



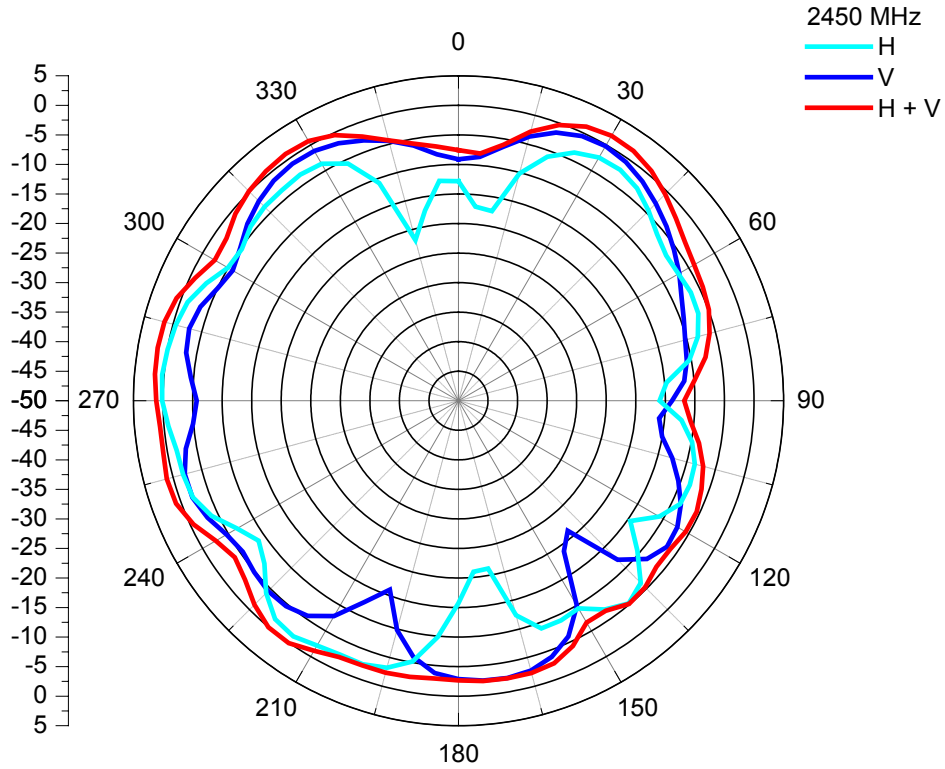
Center Frequency	<b>2500 MHz</b>
Horizontal (dBi) peak	<b>-0.47</b>
Vertical (dBi) peak	<b>-2.09</b>

**Tx2 (or Rx2) antenna: 2400 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)**



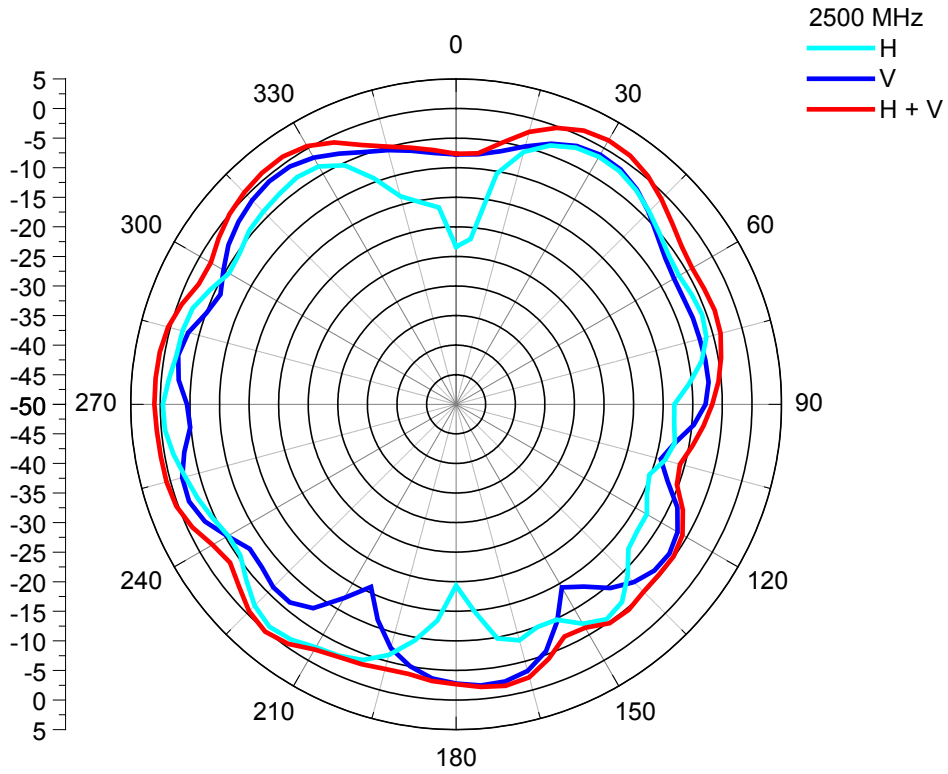
Center Frequency	<b>2400 MHz</b>
Horizontal (dBi) peak	<b>-1.05</b>
Vertical (dBi) peak	<b>-1.62</b>

**Tx2 (or Rx2) antenna: 2450 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)**



Center Frequency	<b>2450 MHz</b>
Horizontal (dBi) peak	<b>0.33</b>
Vertical (dBi) peak	<b>-0.24</b>

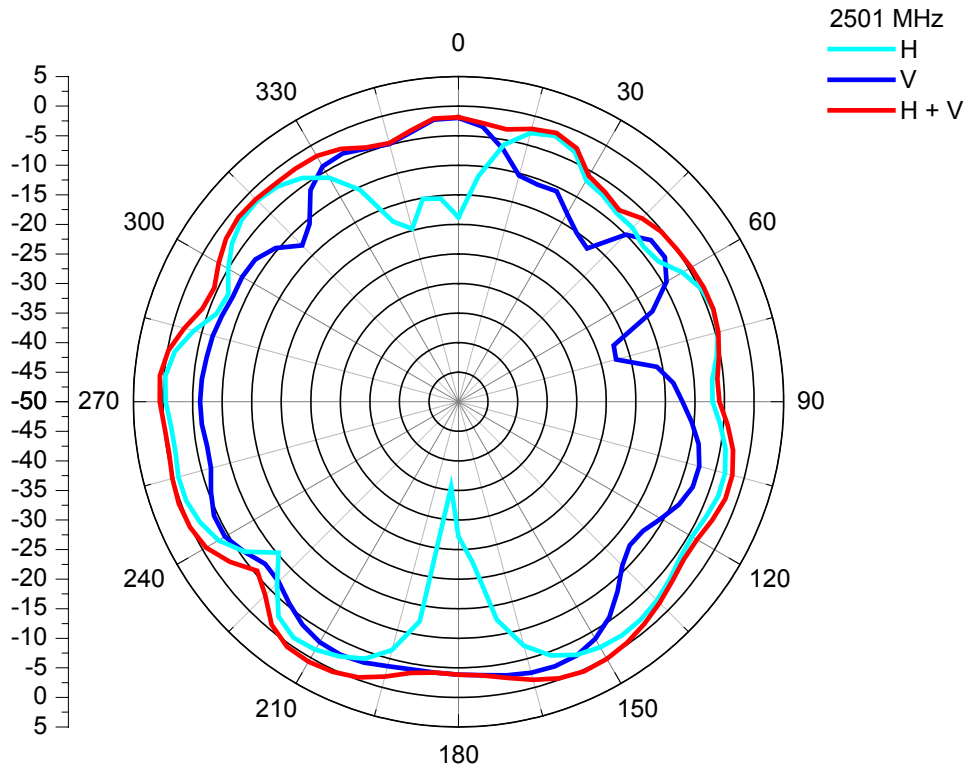
**Tx2 (or Rx2) antenna: 2500 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)**



Center Frequency	<b>2500 MHz</b>
Horizontal (dBi) peak	<b>-0.44</b>
Vertical (dBi) peak	<b>-0.81</b>

**2490-2700MHz radiation characteristic**

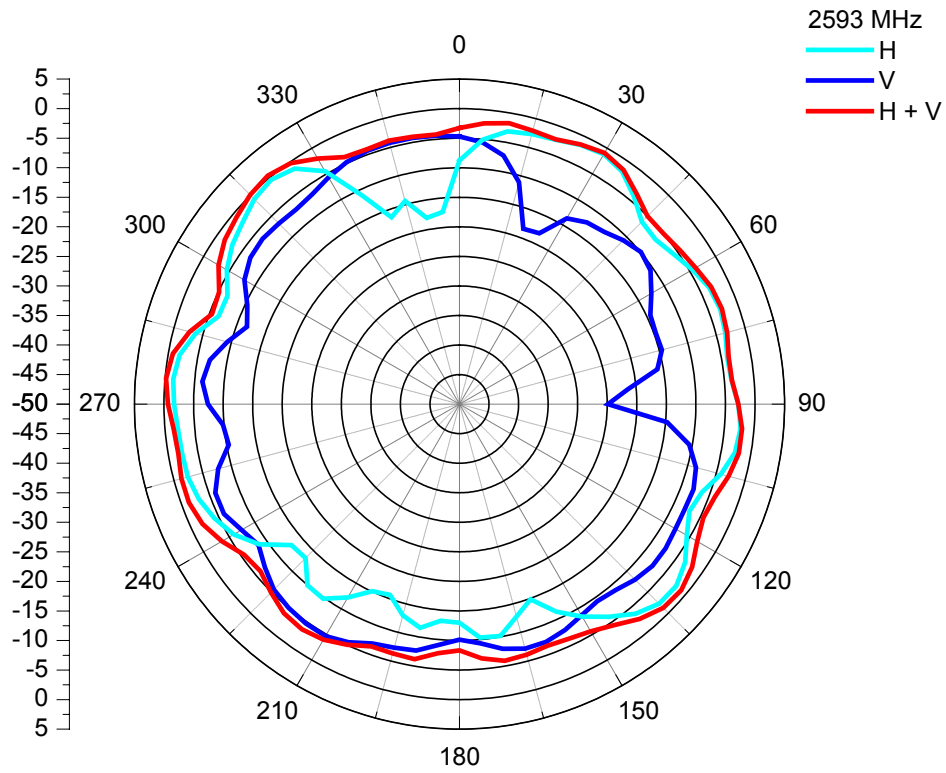
**Tx1antenna: 2501MHz**



Center Frequency	<b>2501MHz</b>
Horizontal (dBi) peak	<b>-0.21</b>
Vertical (dBi) peak	<b>-1.98</b>

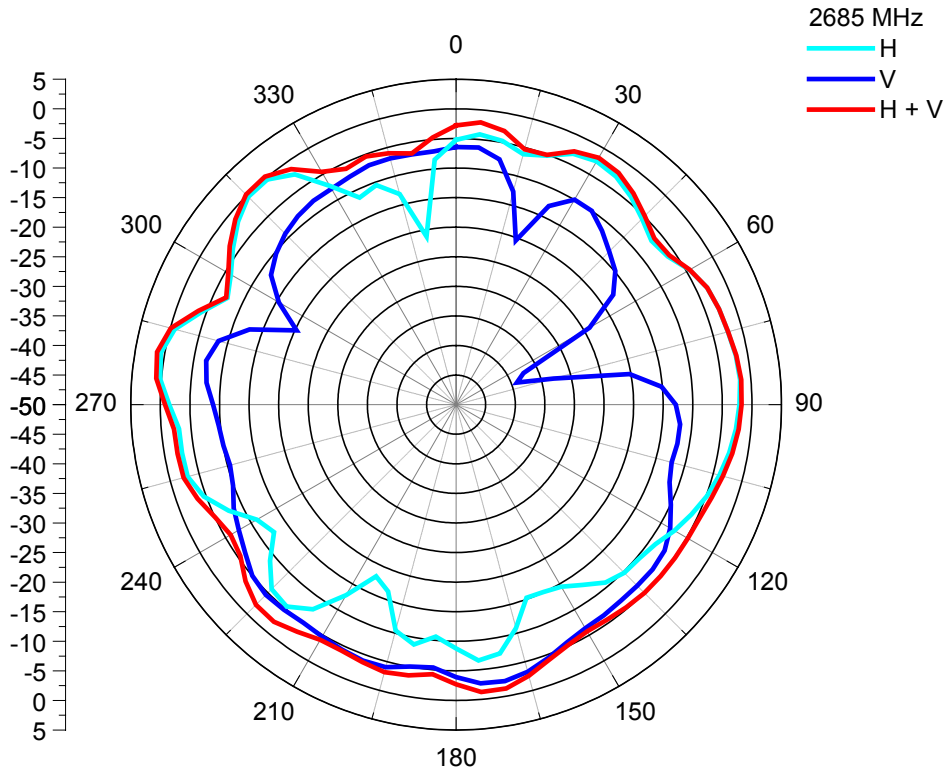


**Tx1 antenna: 2593MHz**



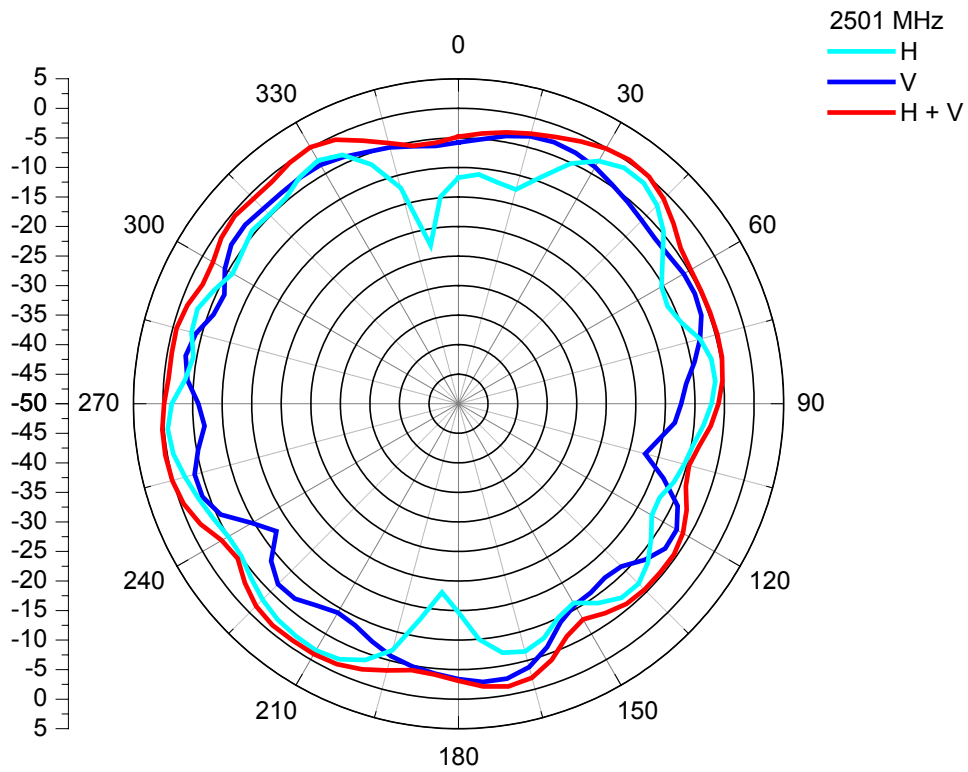
Center Frequency	<b>2593 MHz</b>
Horizontal (dBi) peak	<b>-0.41</b>
Vertical (dBi) peak	<b>-4.23</b>

### Tx1 antenna: 2685 MHz



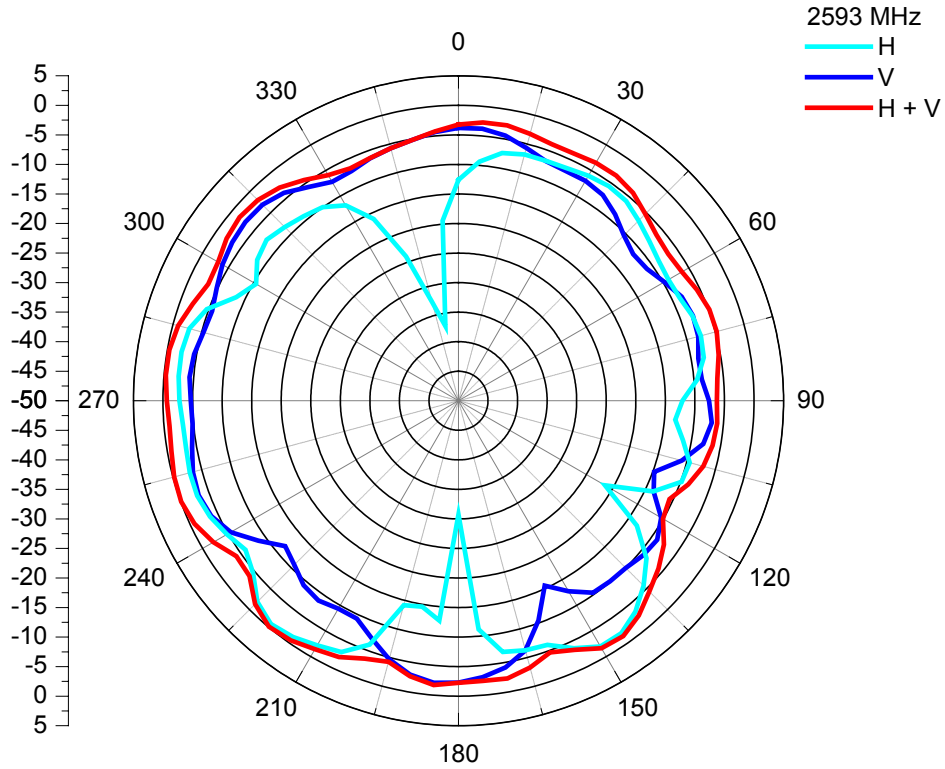
Center Frequency	<b>2685 MHz</b>
Horizontal (dBi) peak	<b>0.65</b>
Vertical (dBi) peak	<b>-2.54</b>

**Tx2 (or Rx2) antenna: 2501MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)**



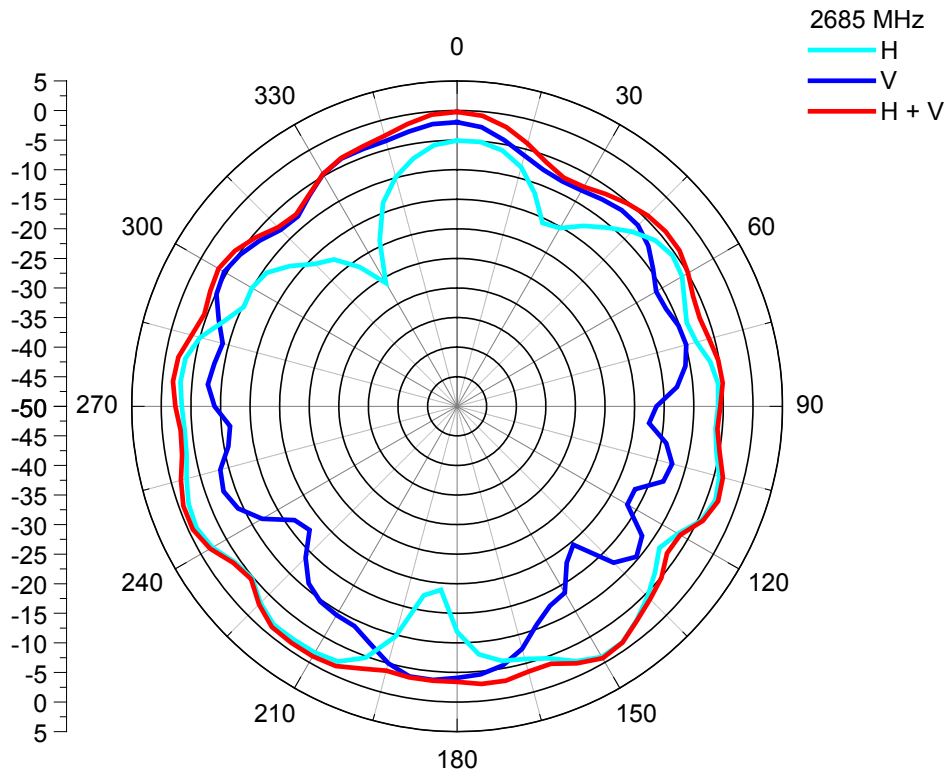
Center Frequency	<b>2501 MHz</b>
Horizontal (dBi) peak	<b>-0.62</b>
Vertical (dBi) peak	<b>-2.75</b>

**Tx2 (or Rx2) antenna: 2593MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)**



Center Frequency	<b>2593 MHz</b>
Horizontal (dBi) peak	<b>-0.66</b>
Vertical (dBi) peak	<b>-2.08</b>

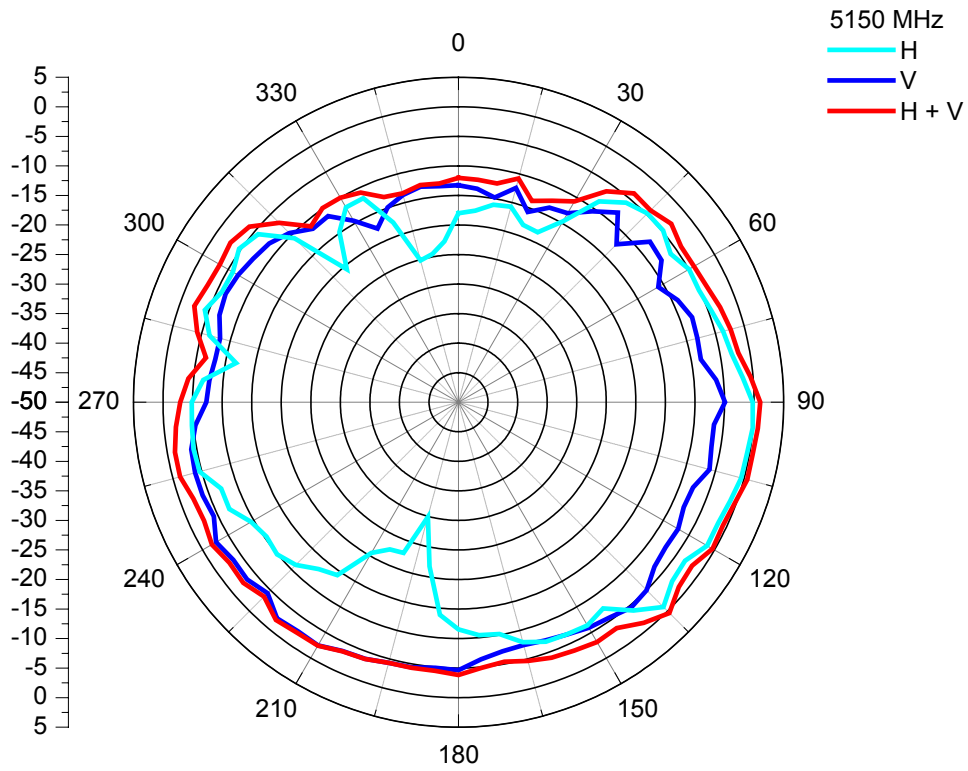
**Tx2 (or Rx2) antenna: 2685 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)**



Center Frequency	<b>2685 MHz</b>
Horizontal (dBi) peak	<b>-1.06</b>
Vertical (dBi) peak	<b>-1.97</b>

**5150-5350 MHz radiation characteristic**

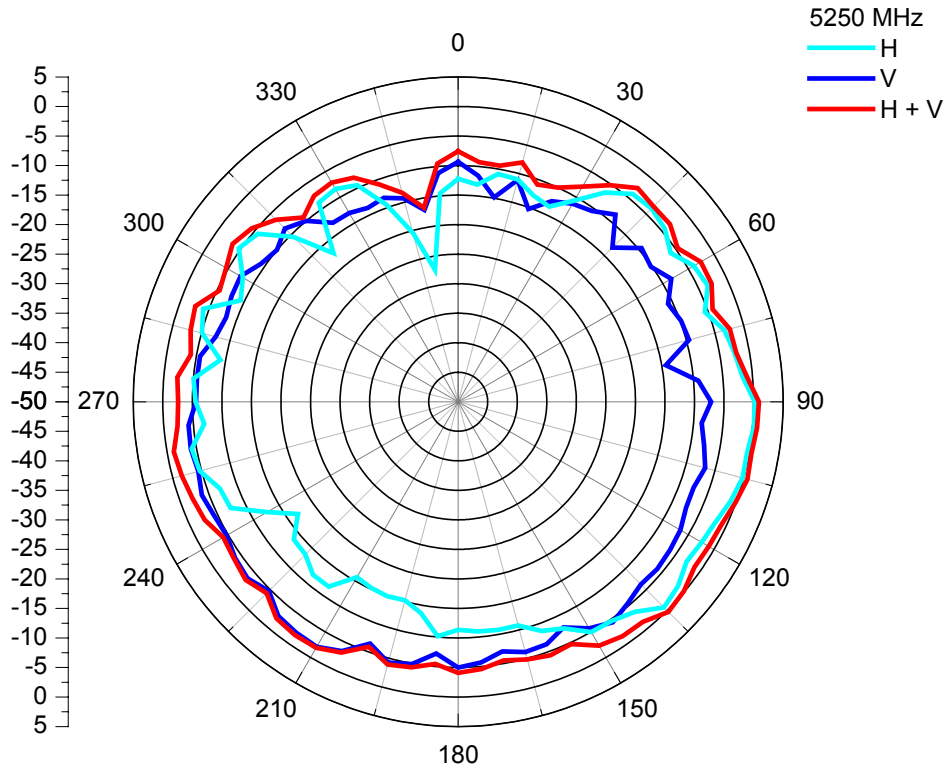
**Tx1 antenna: 5150 MHz**



Center Frequency	<b>5150 MHz</b>
Horizontal (dBi) peak	<b>-0.03</b>
Vertical (dBi) peak	<b>-2.25</b>

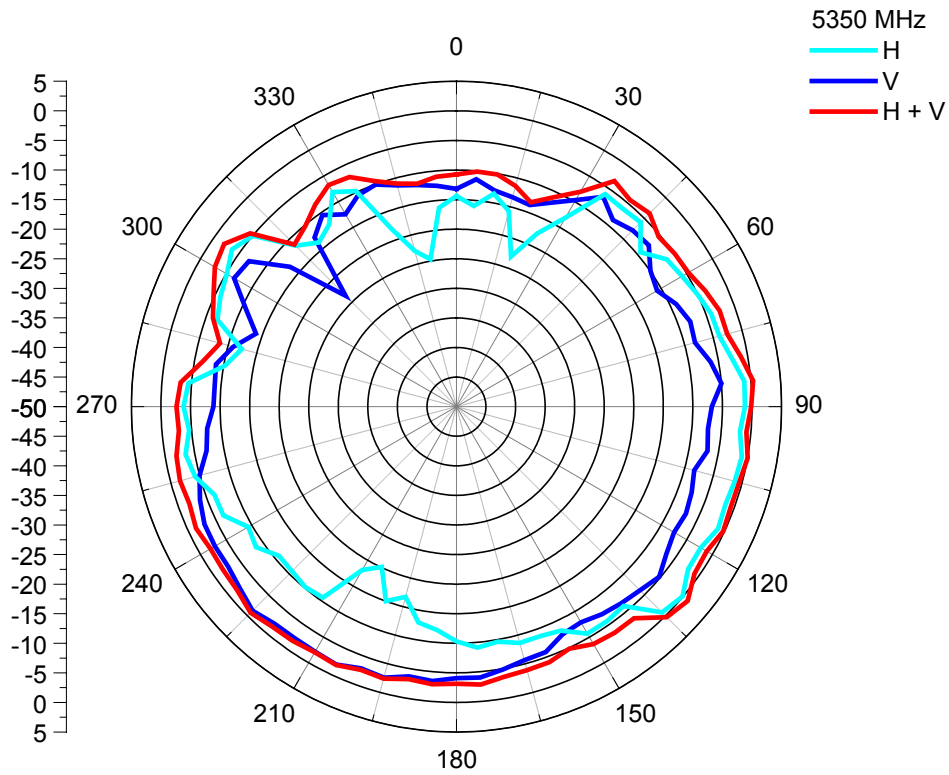


### Tx1 antenna: 5250 MHz



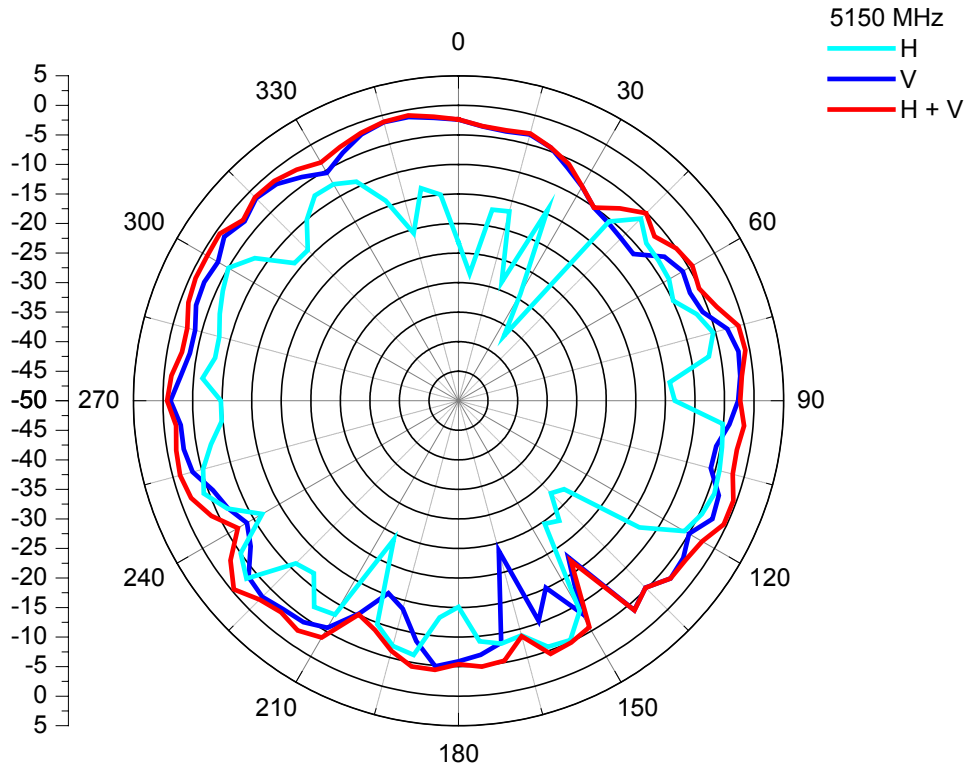
Center Frequency	<b>5250 MHz</b>
Horizontal (dBi) peak	<b>0.23</b>
Vertical (dBi) peak	<b>-2.08</b>

### Tx1 antenna: 5350 MHz



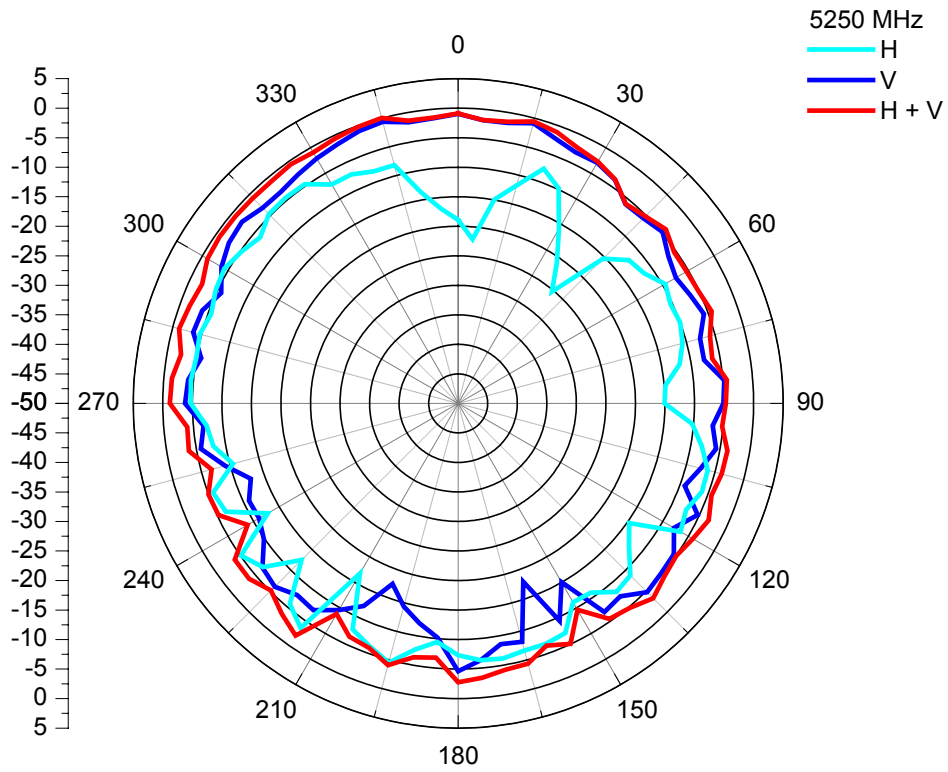
Center Frequency	<b>5350 MHz</b>
Horizontal (dBi) peak	<b>-0.09</b>
Vertical (dBi) peak	<b>-1.21</b>

**Tx2 (or Rx2) antenna: 5150 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)**



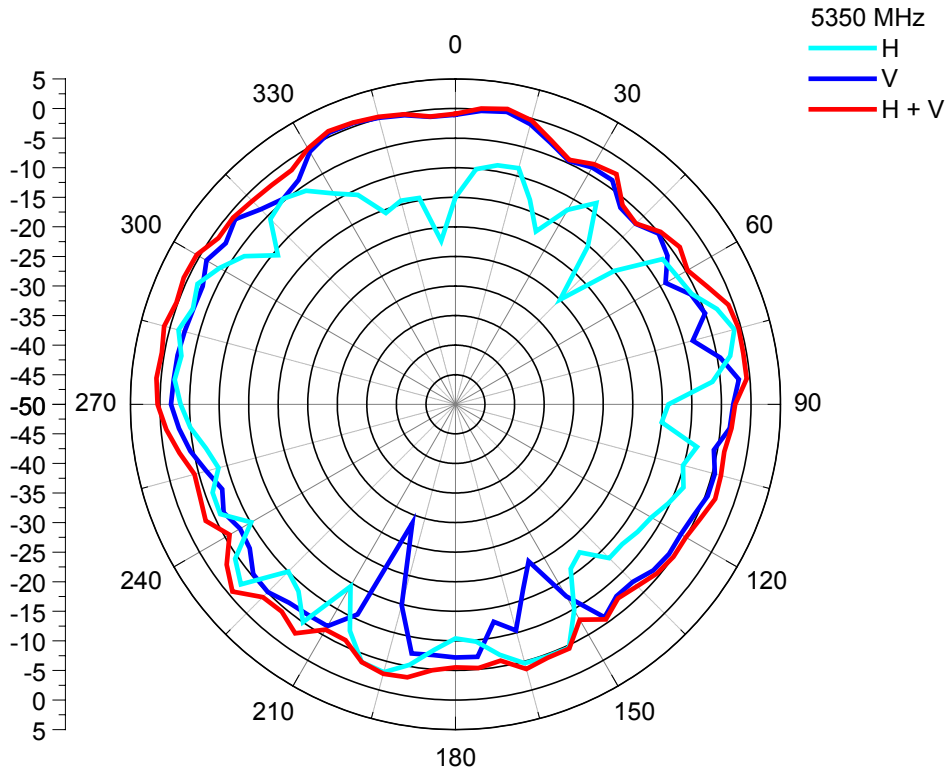
Center Frequency	<b>5150 MHz</b>
Horizontal (dBi) peak	<b>-3.15</b>
Vertical (dBi) peak	<b>-1.17</b>

**Tx2 (or Rx2) antenna: 5250 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)**



Center Frequency	<b>5250 MHz</b>
Horizontal (dBi) peak	<b>-3.55</b>
Vertical (dBi) peak	<b>-0.64</b>

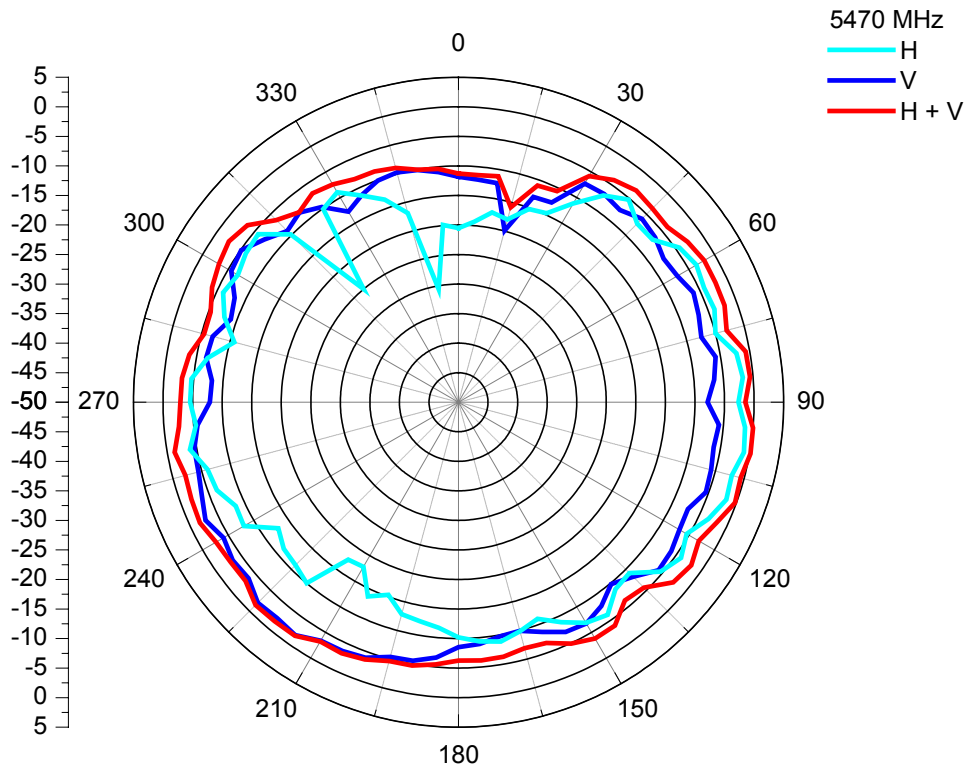
**Tx2 (or Rx2) antenna: 5350 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)**



Center Frequency	<b>5350 MHz</b>
Horizontal (dBi) peak	<b>-1.15</b>
Vertical (dBi) peak	<b>0.63</b>

**5470-5725MHz radiation characteristic**

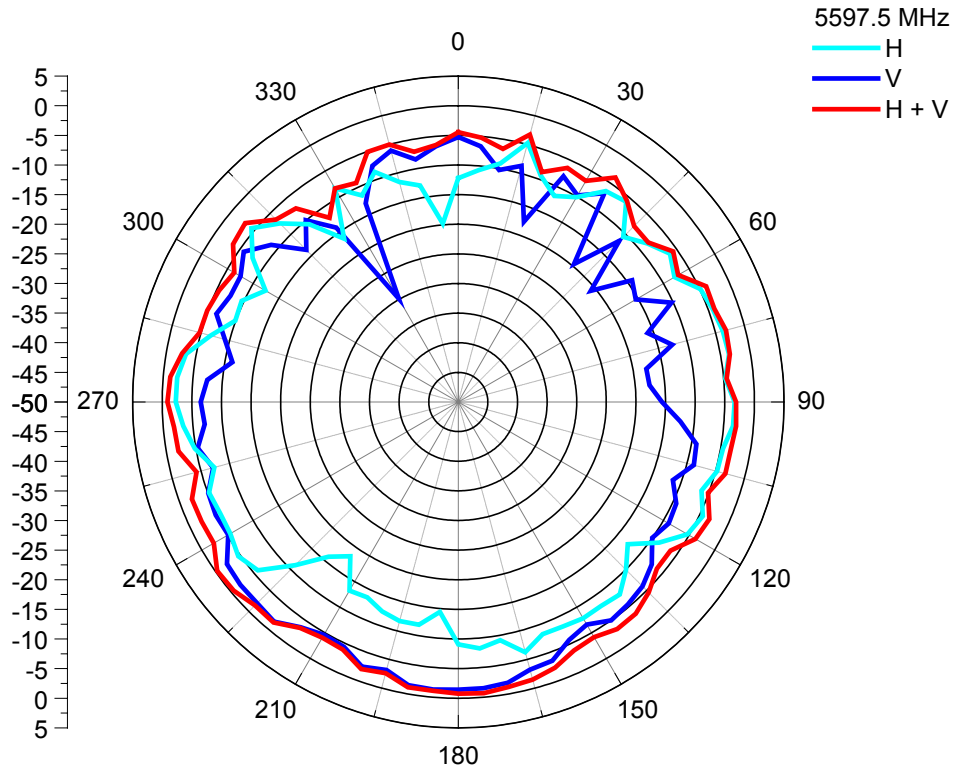
**Tx1 antenna: 5470 MHz**



Center Frequency	<b>5470 MHz</b>
Horizontal (dBi) peak	<b>-1.00</b>
Vertical (dBi) peak	<b>-1.86</b>

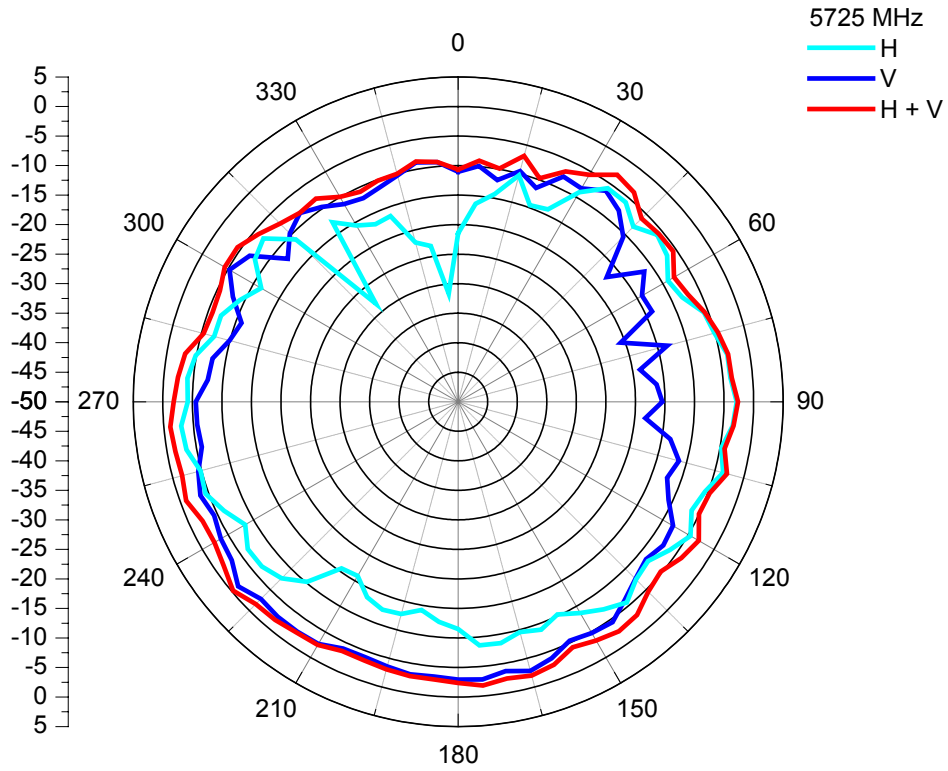


### Tx1 antenna: 5597.5 MHz



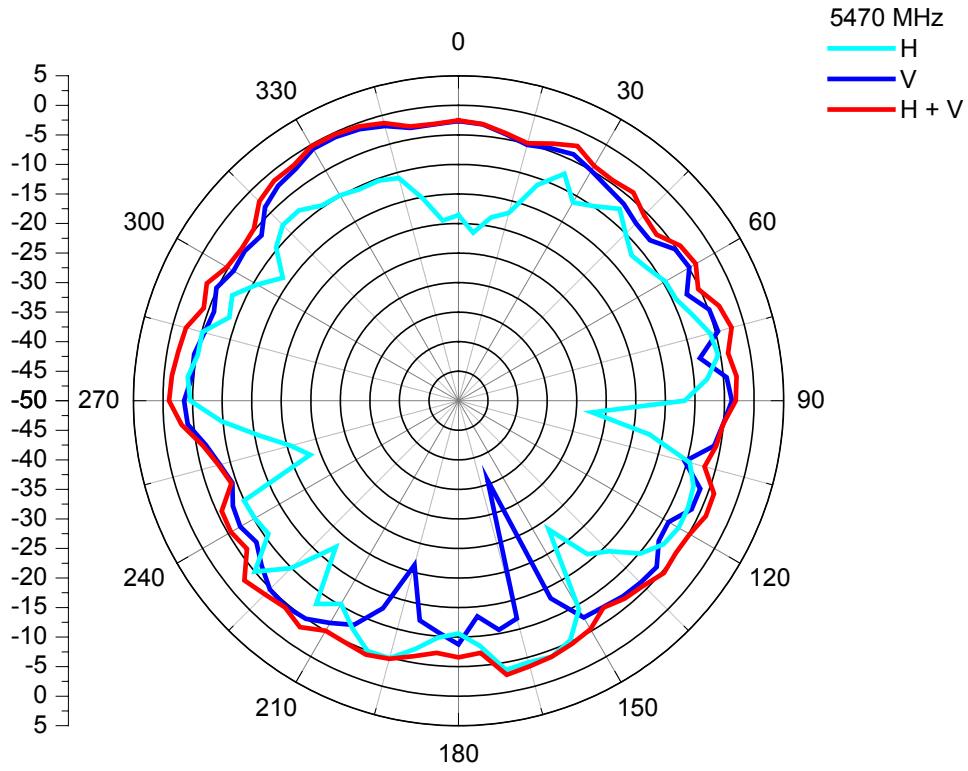
Center Frequency	<b>5597.5 MHz</b>
Horizontal (dBi) peak	<b>-1.29</b>
Vertical (dBi) peak	<b>-2.29</b>

### Tx1 antenna: 5725 MHz



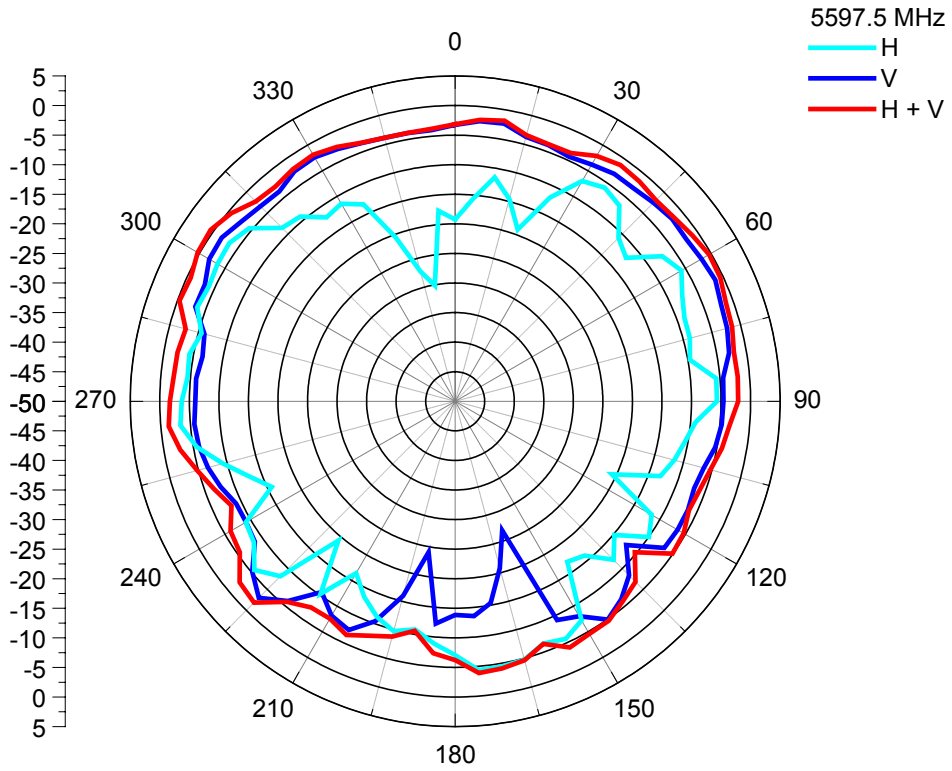
Center Frequency	<b>5725 MHz</b>
Horizontal (dBi) peak	<b>-2.87</b>
Vertical (dBi) peak	<b>-1.39</b>

**Tx2 (or Rx2) antenna: 5470 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)**



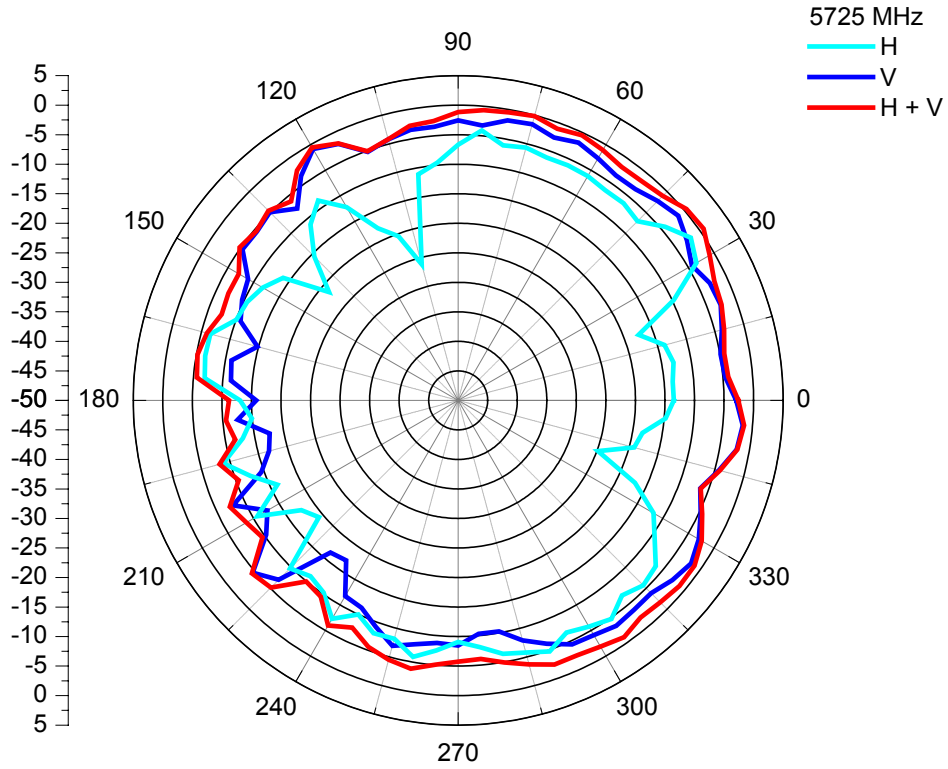
Center Frequency	<b>5470 MHz</b>
Horizontal (dBi) peak	<b>-3.73</b>
Vertical (dBi) peak	<b>-0.75</b>

**Tx2 (or Rx2) antenna: 5597.5 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)**



Center Frequency	<b>5597.5 MHz</b>
Horizontal (dBi) peak	<b>-3.31</b>
Vertical (dBi) peak	<b>-1.44</b>

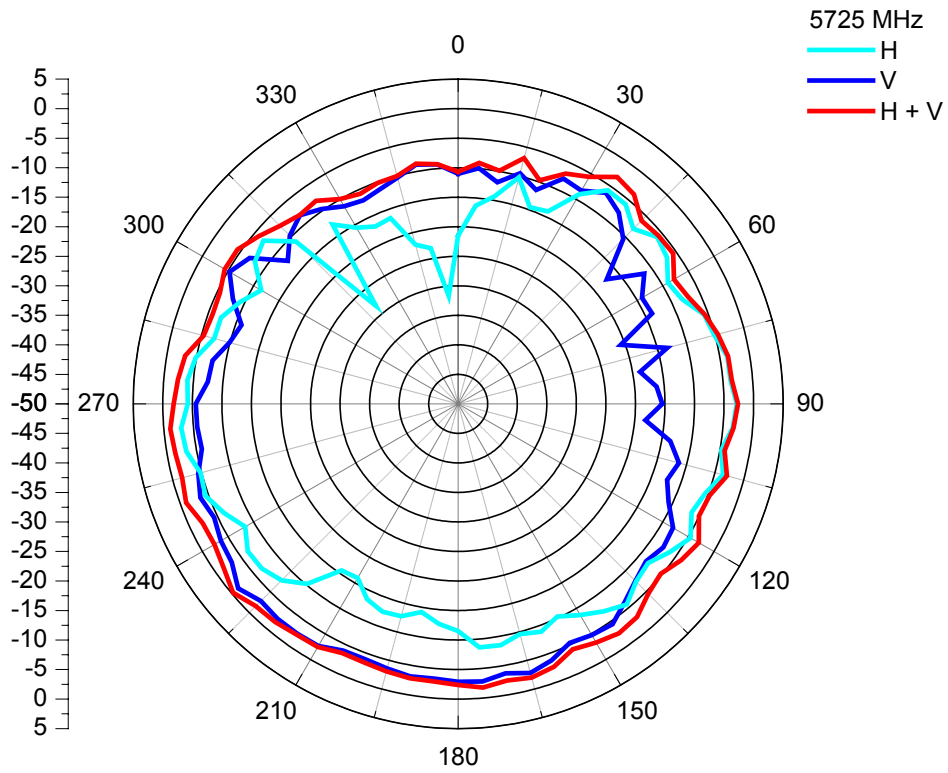
**Tx2 (or Rx2) antenna: 5725 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)**



Center Frequency	<b>5725 MHz</b>
Horizontal (dBi) peak	<b>-1.94</b>
Vertical (dBi) peak	<b>-0.83</b>

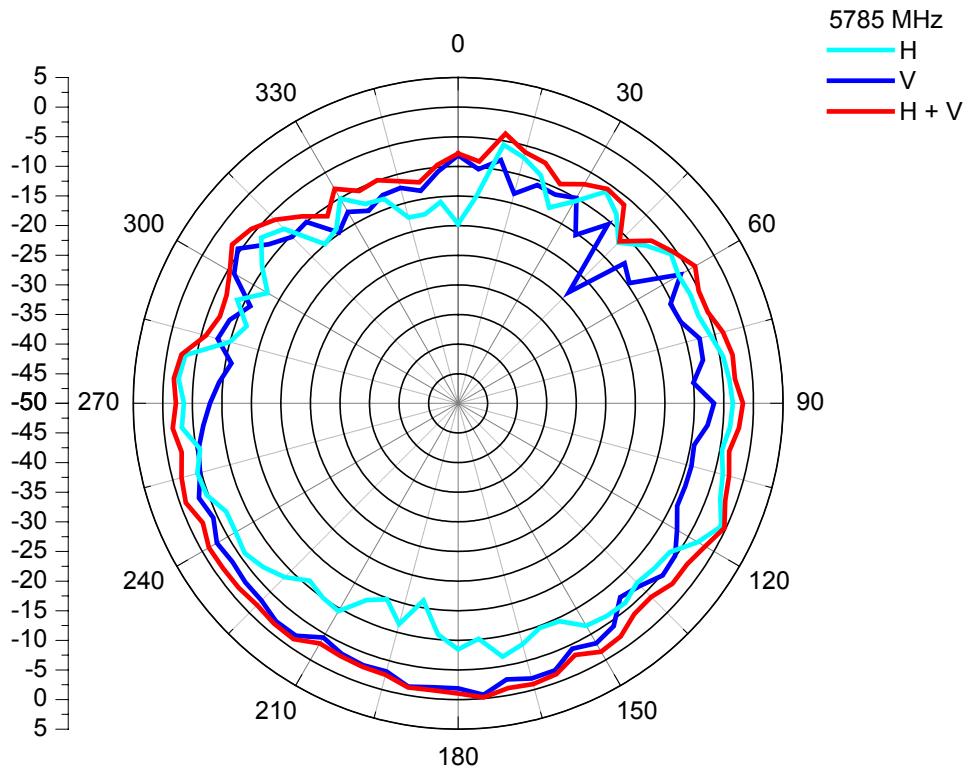
**5725-5850 MHz radiation characteristic**

**Tx1 antenna: 5725 MHz**



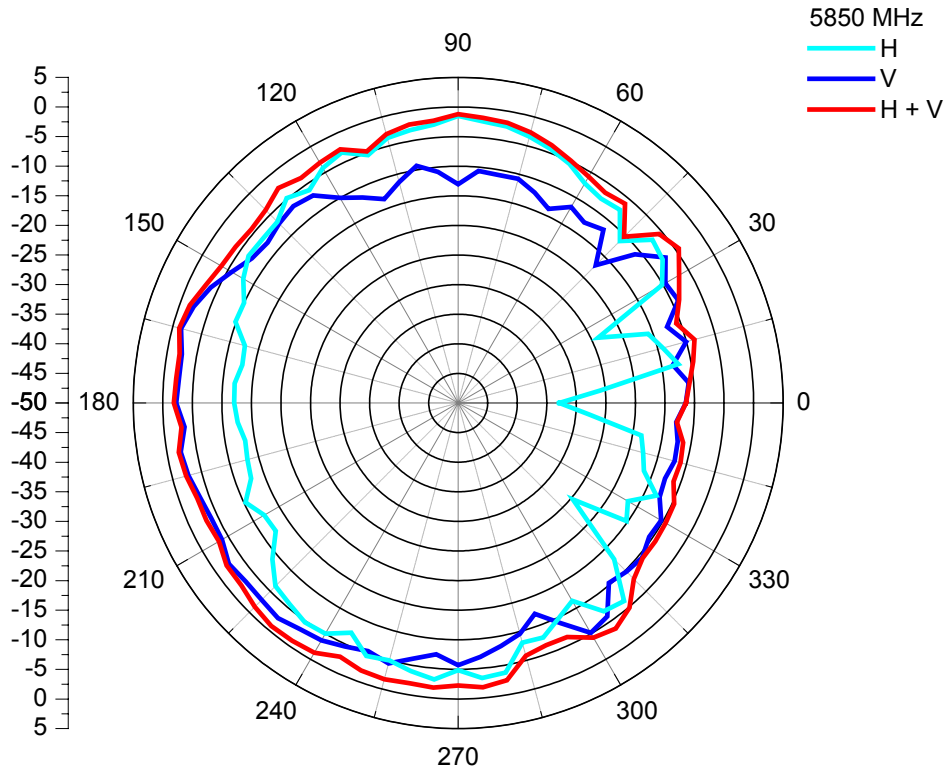
Center Frequency	<b>5725 MHz</b>
Horizontal (dBi) peak	<b>-2.87</b>
Vertical (dBi) peak	<b>-1.39</b>

### Tx1 antenna: 5785 MHz



Center Frequency	<b>5785 MHz</b>
Horizontal (dBi) peak	<b>-0.88</b>
Vertical (dBi) peak	<b>-0.63</b>

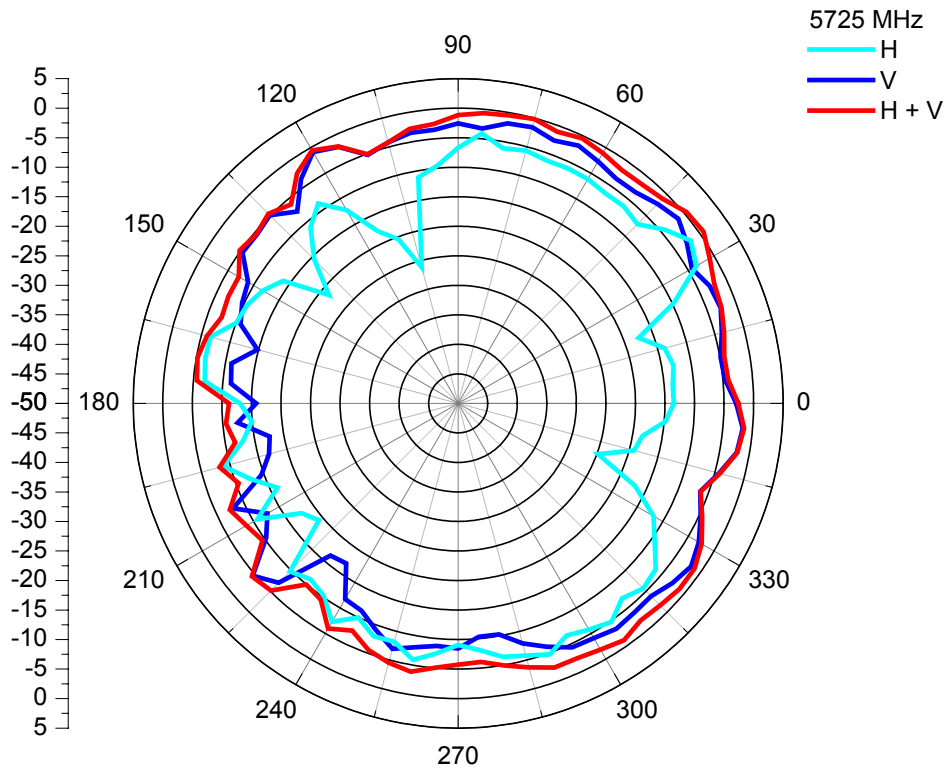
### Tx1 antenna: 5850 MHz



Center Frequency	<b>5850 MHz</b>
Horizontal (dBi) peak	<b>-1.51</b>
Vertical (dBi) peak	<b>-1.44</b>

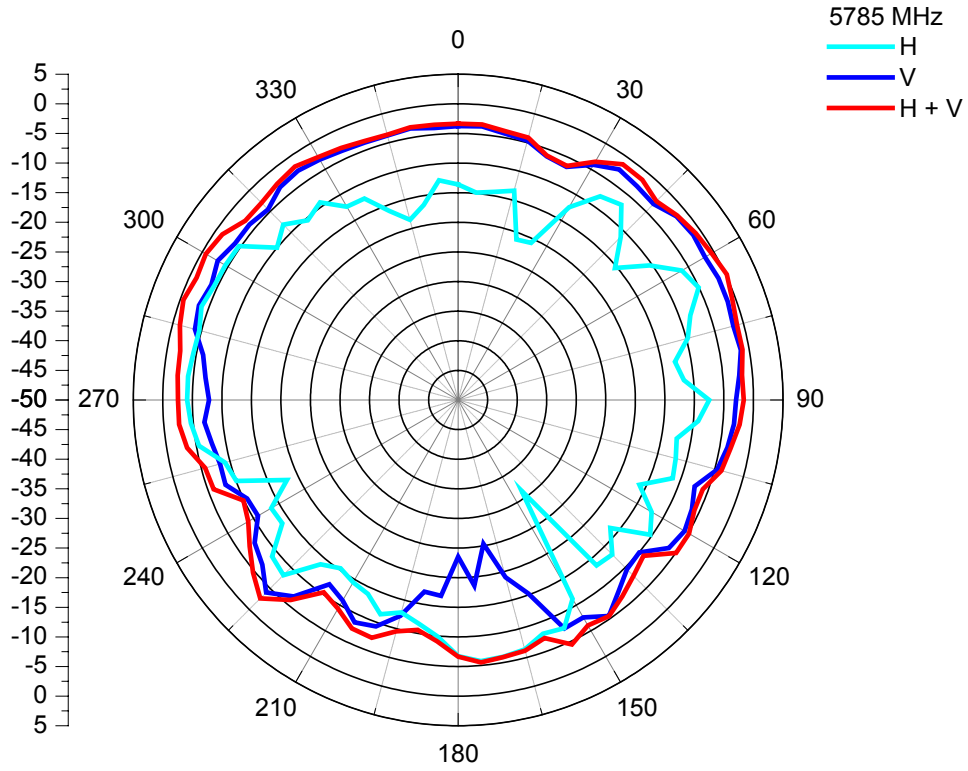


**Tx2 (or Rx2) antenna: 5725 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)**



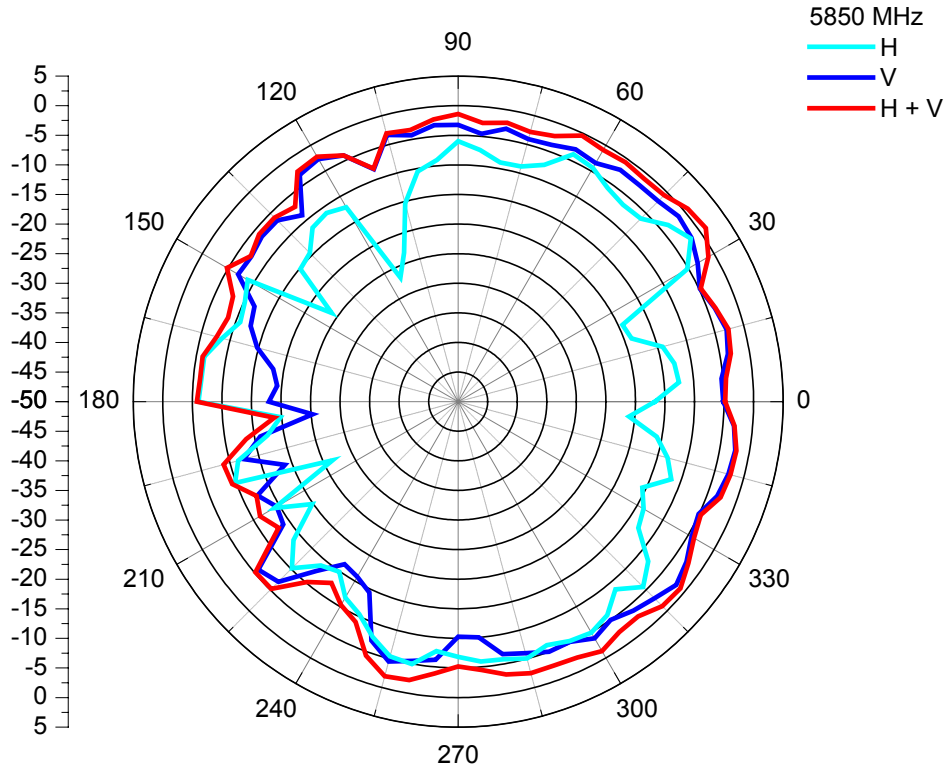
Center Frequency	<b>5725 MHz</b>
Horizontal (dBi) peak	<b>-1.94</b>
Vertical (dBi) peak	<b>-0.83</b>

**Tx2 (or Rx2) antenna: 5785 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)**



Center Frequency	<b>5785 MHz</b>
Horizontal (dBi) peak	<b>-3.78</b>
Vertical (dBi) peak	<b>-1.39</b>

**Tx2 (or Rx2) antenna: 5850 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)**



Center Frequency	<b>5850 MHz</b>
Horizontal (dBi) peak	<b>-1.94</b>
Vertical (dBi) peak	<b>-1.30</b>

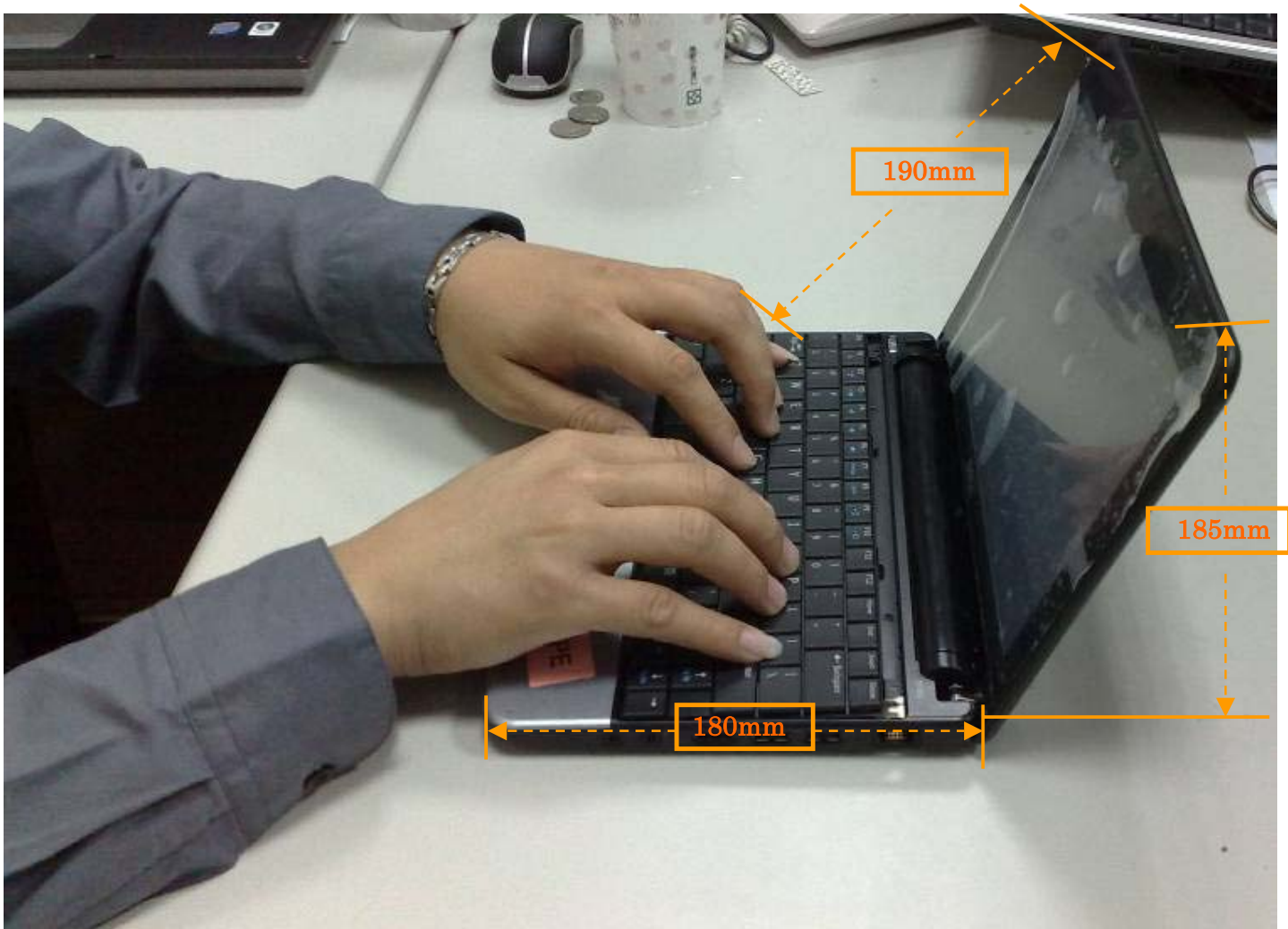
## Section 5. Antenna Host Platform Location Information

Include a **dimensioned photo or dimensioned drawing** of Tx1 and Tx2 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
<b>Argentina</b>						
<b>Brazil</b>						
<b>Indonesia</b>						
<b>Israel</b>						
<b>Malaysia</b>						
<b>Mexico</b>						
<b>Singapore</b>						Telecommunication Equipment Dealer License Required
<b>South Africa</b>						
<b>USA, Canada</b>						