

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

<b>Platform</b>	
Platform Owner	Dell
Brand Name	Dell
Model Name	Bear
ODM	Compal
Target Launch Date	(2009/ 02/ 24)
<b>Antenna</b>	
Brand Name	Tyco Electronics
Part Number	■ Tx1 Antenna: 2023775-1
	■ Tx2 Antenna: 2023776-1
<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: 2023775-1) Tx1 antenna	Tyco Electronics	PIFA	(P/N:20351-101R-37) 50 ohm Coaxial. length:40.0cm diameter: 1.37mm Connector: MHF	2400-2500MHz 2.28dBi (peak)	2400-2500MHz 3.31dBi (peak)	2400-2500MHz 1.44max*	2400-2500MHz 1.03dBi (peak) *
				2496-2690MHz 1.99dBi (peak)	2496-2690MHz 3.05dBi (peak)	2496-2690MHz 1.89max*	2496-2690MHz 1.06dBi (peak) *
				5150-5350MHz 2.24dBi (peak)	5150-5350MHz 3.72dBi (peak)	5150-5350MHz 1.65max*	5150-5350MHz 1.48dBi (peak) *
				5470-5725MHz 1.87dBi (peak)	5470-5725MHz 3.39dBi (peak)	5470-5725MHz 1.48max*	5470-5725MHz 1.52dBi (peak) *
				5725-5850MHz 1.44dBi (peak)	5725-5850MHz 3.08dBi (peak)	5725-5850MHz 1.56max*	5725-5850MHz 1.64dBi (peak) *
(P/N: 2023776-1) Tx2 (or Rx2) antenna	Tyco Electronics	PIFA	(P/N:20278-111R-13) 50 ohm Coaxial. length: 61.7cm diameter: 1.13mm Connector: MHF	2400-2500MHz 1.69dBi (peak) *	2400-2500MHz 3.65dBi (peak) *	2400-2500MHz 1.68max*	2400-2500MHz 1.96dBi (peak) *
				2496-2690MHz 1.00dBi (peak) *	2496-2690MHz 3.03dBi (peak) *	2496-2690MHz 1.63max*	2496-2690MHz 2.03dBi (peak) *
				5150-5350MHz 2.46dBi (peak) *	5150-5350MHz 5.40dBi (peak) *	5150-5350MHz 1.56max*	5150-5350MHz 2.94dBi (peak) *
				5470-5725MHz 1.35dBi (peak) *	5470-5725MHz 4.6dBi (peak) *	5470-5725MHz 1.31max*	5470-5725MHz 3.25dBi (peak) *
				5725-5850MHz 0.74dBi (peak) *	5725-5850MHz 3.83dBi (peak) *	5725-5850MHz 1.31max*	5725-5850MHz 3.26dBi (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:**

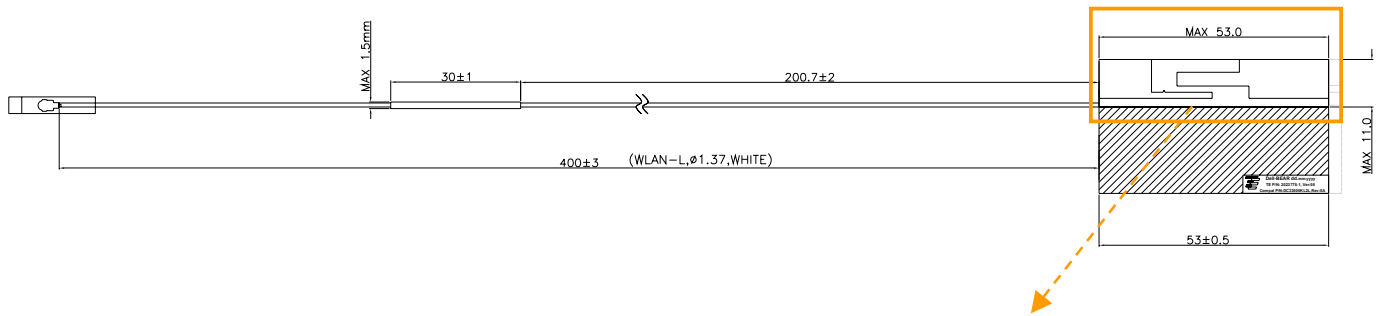
Frequency (MHz)	Tx1 antenna		Tx2 (or Rx2) Antenna	
	Horizontal (dBi)	Vertical (dBi)	Horizontal (dBi)	Vertical (dBi)
2400	0.39	-1.45	0.60	-1.05
2450	0.98	-0.45	0.57	-0.62
2500	0.80	-0.44	0.58	-0.76
2501	0.56	-0.13	0.61	-1.56
2593	0.45	0.07	0.48	-2.13
2685	0.44	0.08	0.48	-2.18
5150	-0.10	-0.19	-0.17	-2.42
5250	-0.30	-0.30	-0.19	-2.34
5350	-0.84	-1.24	-1.02	-2.91
5470	-1.28	-1.64	-1.85	-2.71
5600	1.24	-2.99	0.94	-0.58
5725	1.33	-1.71	0.72	-0.22
5785	1.10	-1.90	1.26	0.36
5850	1.05	-1.41	0.49	-0.11

- 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.

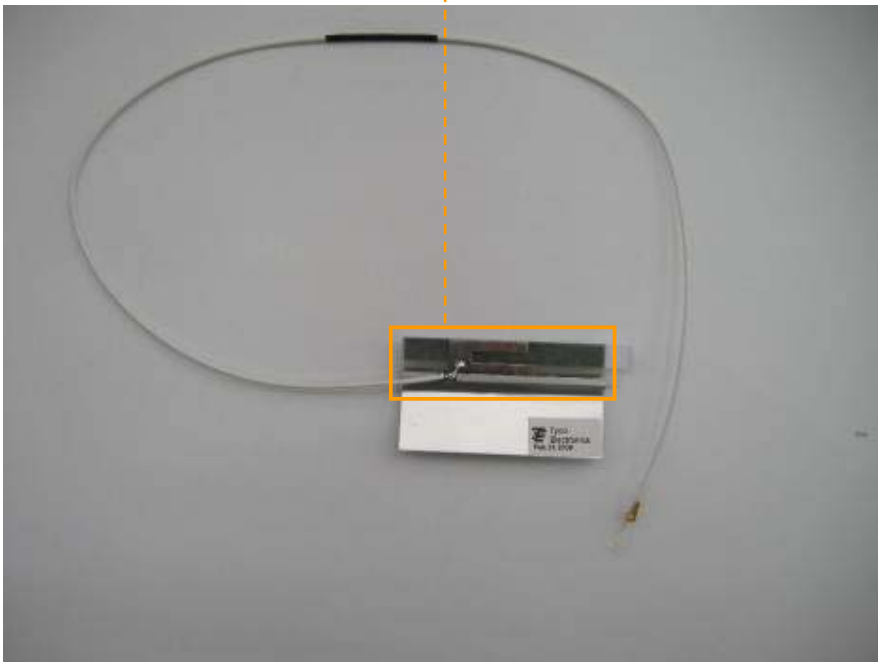
### Tx1 Antenna Dimensioned Drawing:



**Tx1 Antenna**

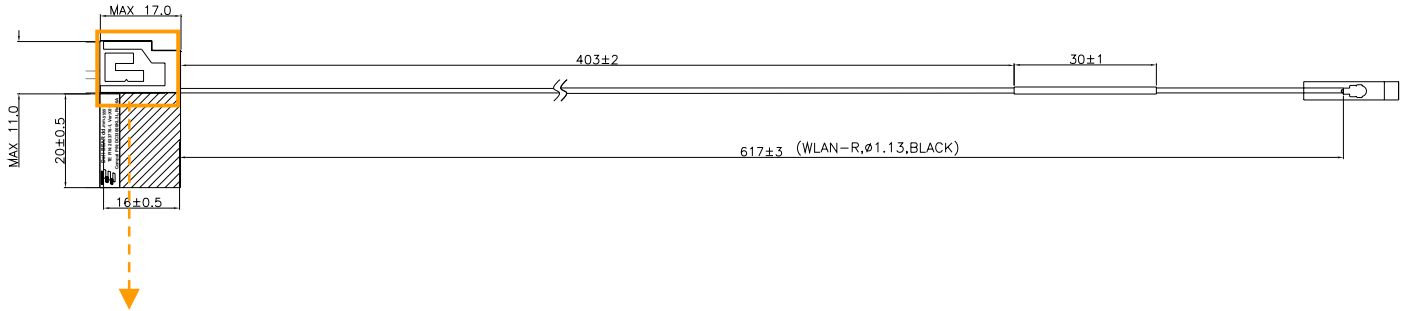
### Tx1 Antenna Photo:

**Tx1 Antenna**



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

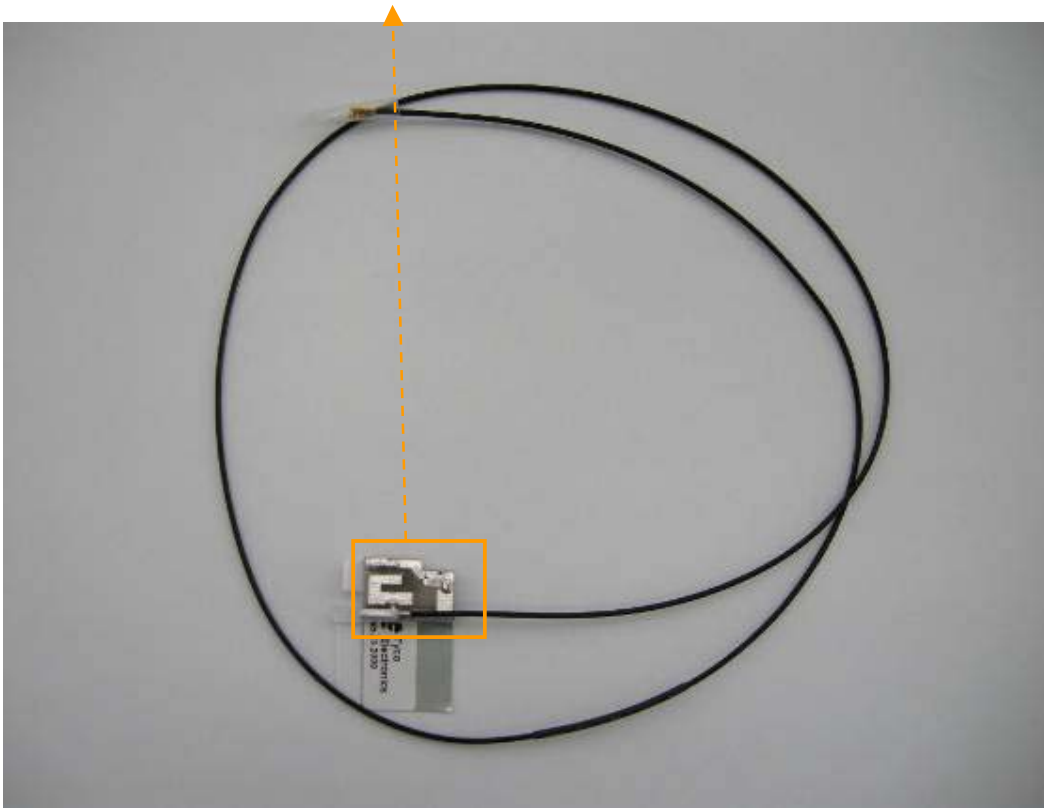
**Tx2 (or Rx2) Antenna Dimensioned Drawing:**



**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: 2023775-1 (Tx1), 2023776-1 (Tx2 or Rx2)



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

Antenna Manufacturer: TYCO

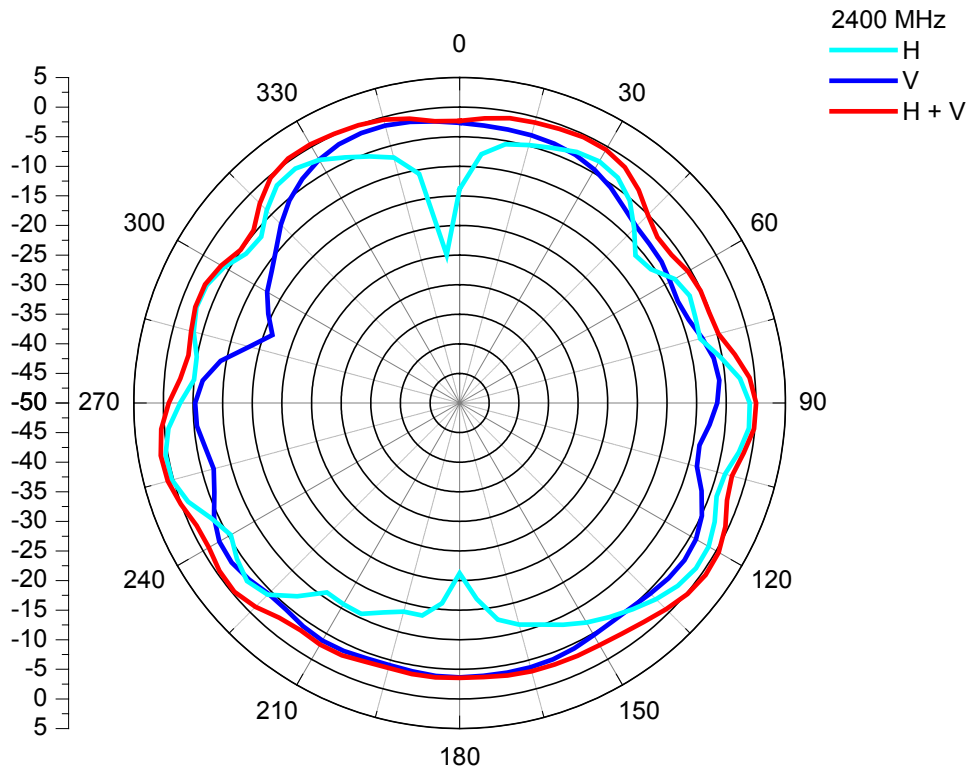
Antenna Part Number: 2023775-1 (Tx1), 2023776-1 (Tx2 or Rx2)



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

### 2400-2500MHz radiation characteristic

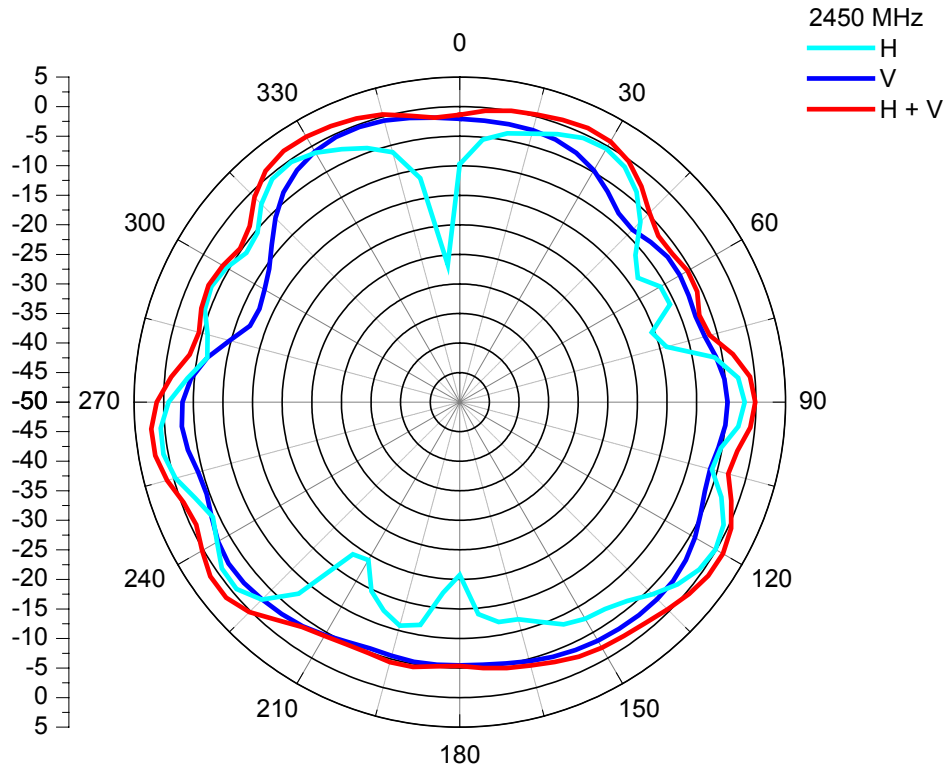
Tx1 antenna: 2400 MHz



Center Frequency	<b>2400 MHz</b>
Horizontal (dBi) peak	<b>0.39</b>
Vertical (dBi) peak	<b>-1.45</b>

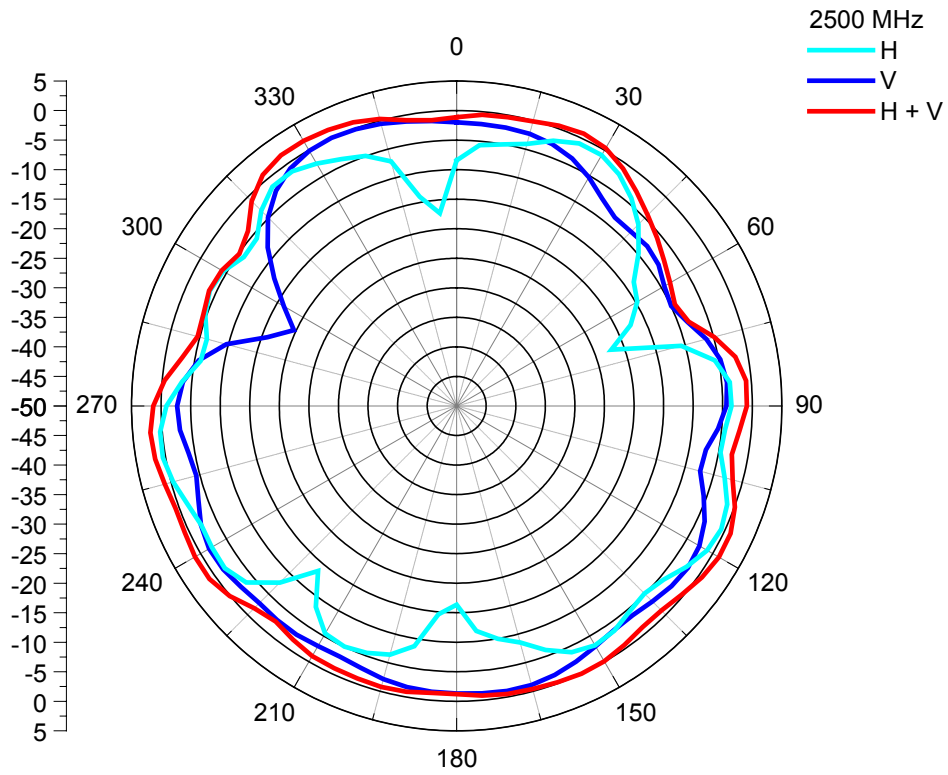


### Tx1 antenna: 2450 MHz



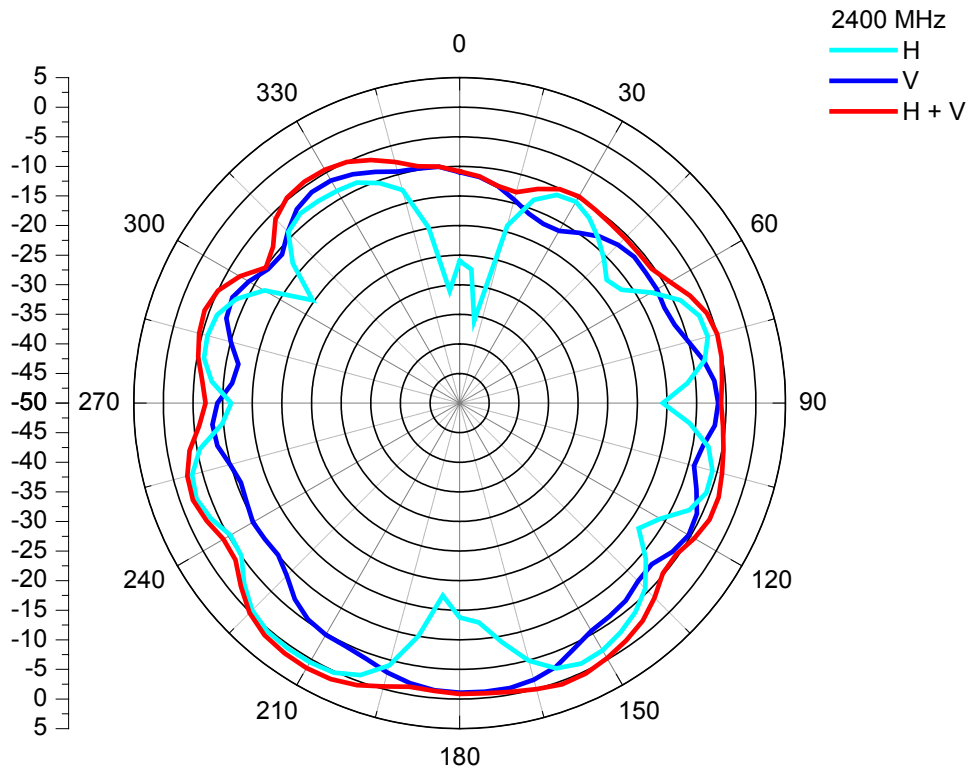
Center Frequency	<b>2450 MHz</b>
Horizontal (dBi) peak	<b>0.98</b>
Vertical (dBi) peak	<b>-0.45</b>

**Tx1 antenna: 2500 MHz**



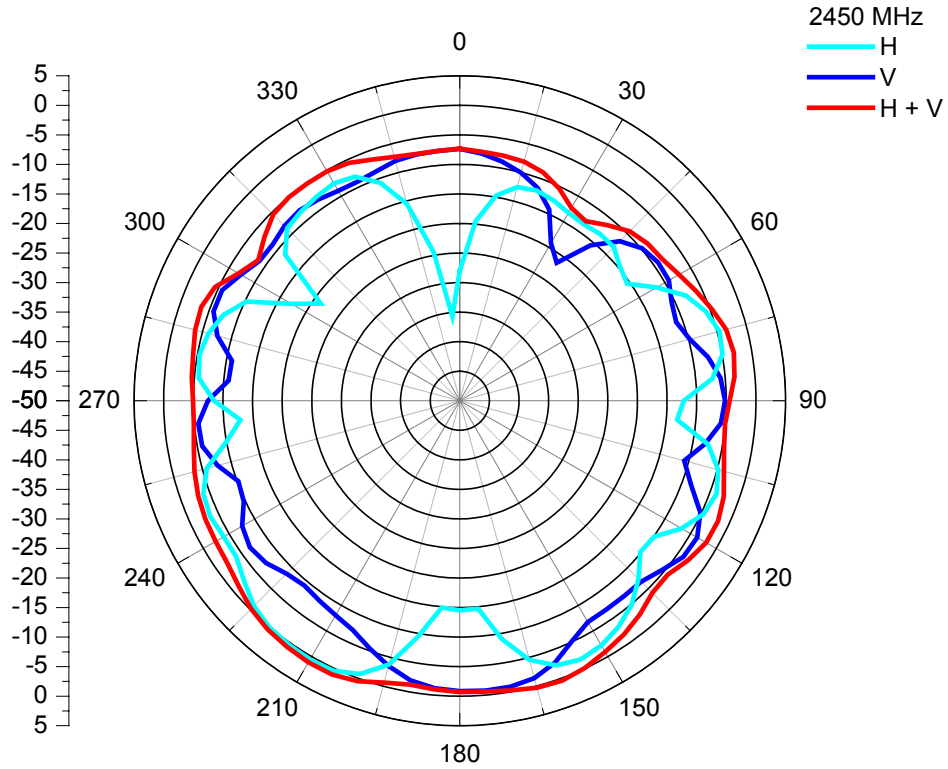
Center Frequency	<b>2500 MHz</b>
Horizontal (dBi) peak	<b>0.80</b>
Vertical (dBi) peak	<b>-0.44</b>

**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)**



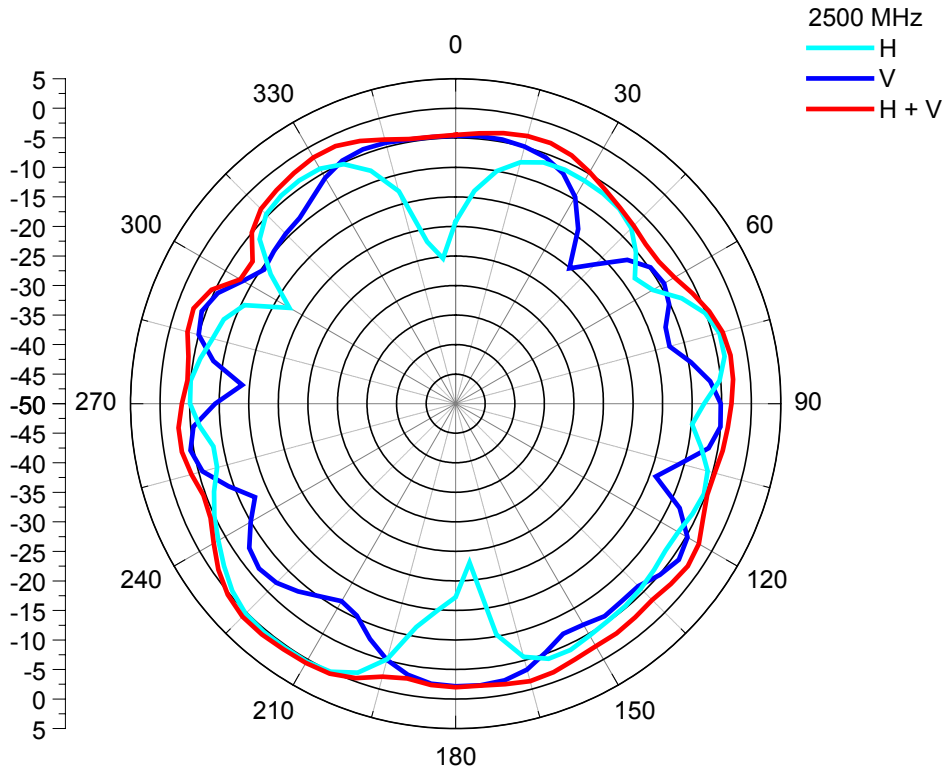
Center Frequency	<b>2400 MHz</b>
Horizontal (dBi) peak	<b>0.60</b>
Vertical (dBi) peak	<b>-1.05</b>

**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>0.57</b>
Vertical (dBi) peak	<b>-0.62</b>

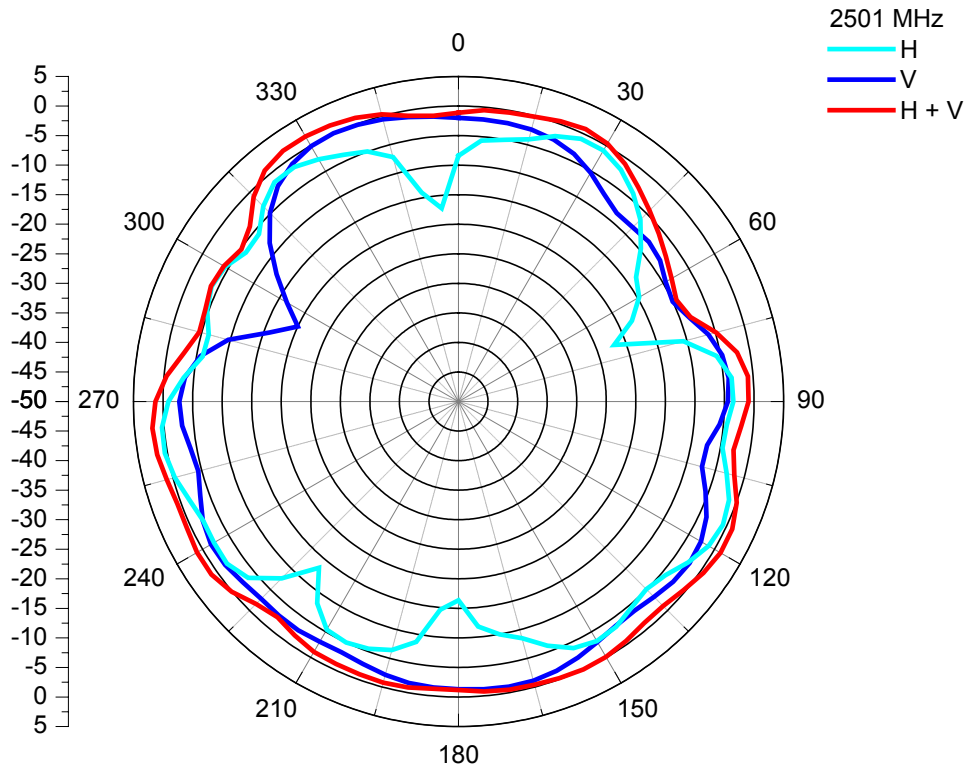
**Tx2 (or Rx2) antenna: 2500 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)**



Center Frequency	<b>2500 MHz</b>
Horizontal (dBi) peak	<b>0.58</b>
Vertical (dBi) peak	<b>-0.76</b>

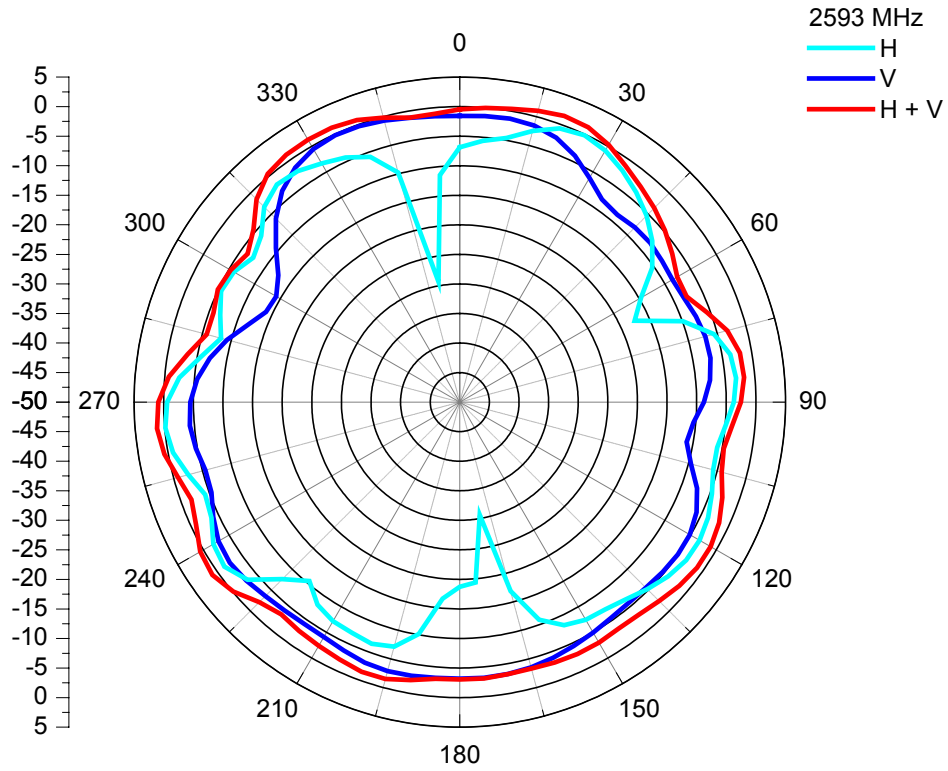
**2490-2700MHz radiation characteristic**

**Tx1antenna: 2501MHz**



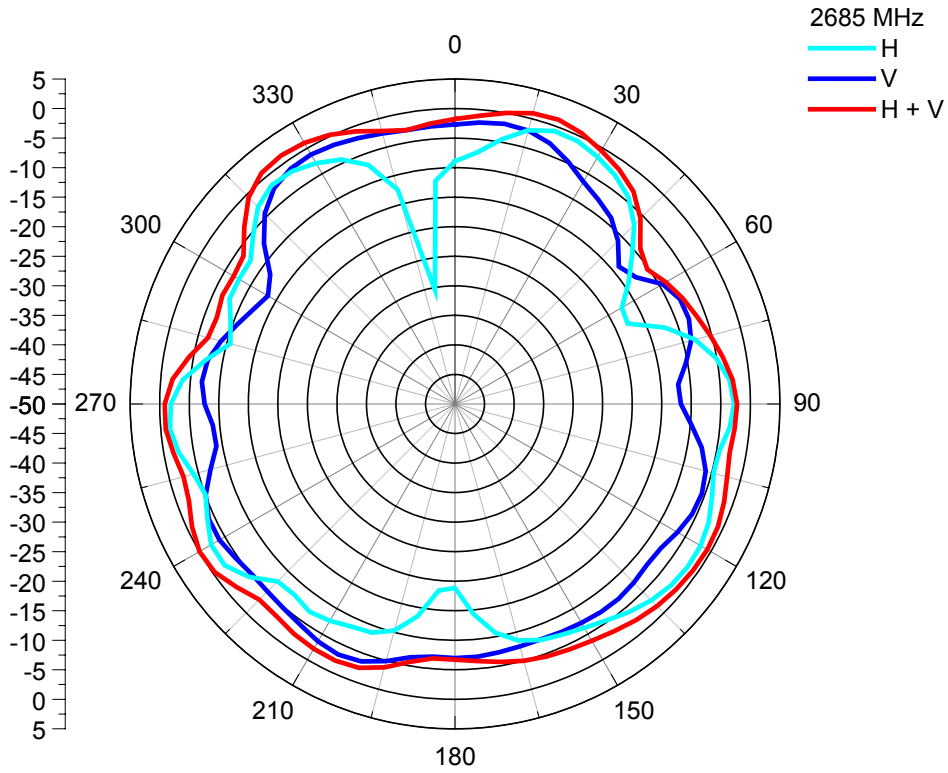
Center Frequency	<b>2501MHz</b>
Horizontal (dBi) peak	<b>0.56</b>
Vertical (dBi) peak	<b>-0.13</b>

### Tx1 antenna: 2593MHz



Center Frequency	<b>2593 MHz</b>
Horizontal (dBi) peak	<b>0.45</b>
Vertical (dBi) peak	<b>0.07</b>

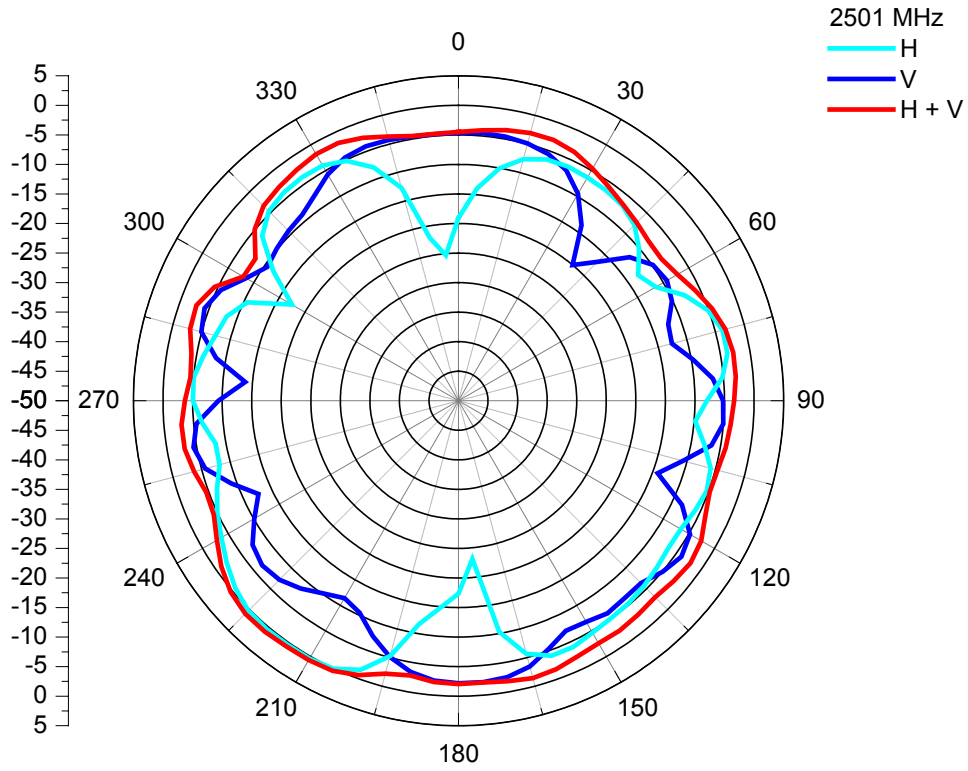
### Tx1 antenna: 2685 MHz



Center Frequency	<b>2685 MHz</b>
Horizontal (dBi) peak	<b>0.44</b>
Vertical (dBi) peak	<b>0.08</b>

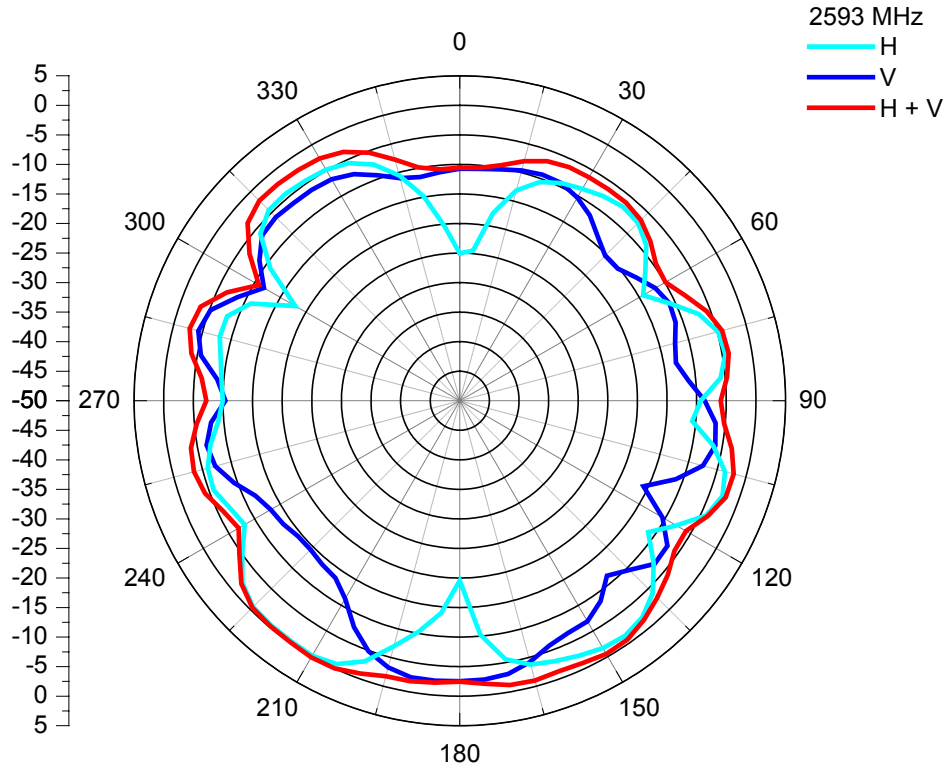


**Tx2 (or Rx2) antenna: 2501MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)**



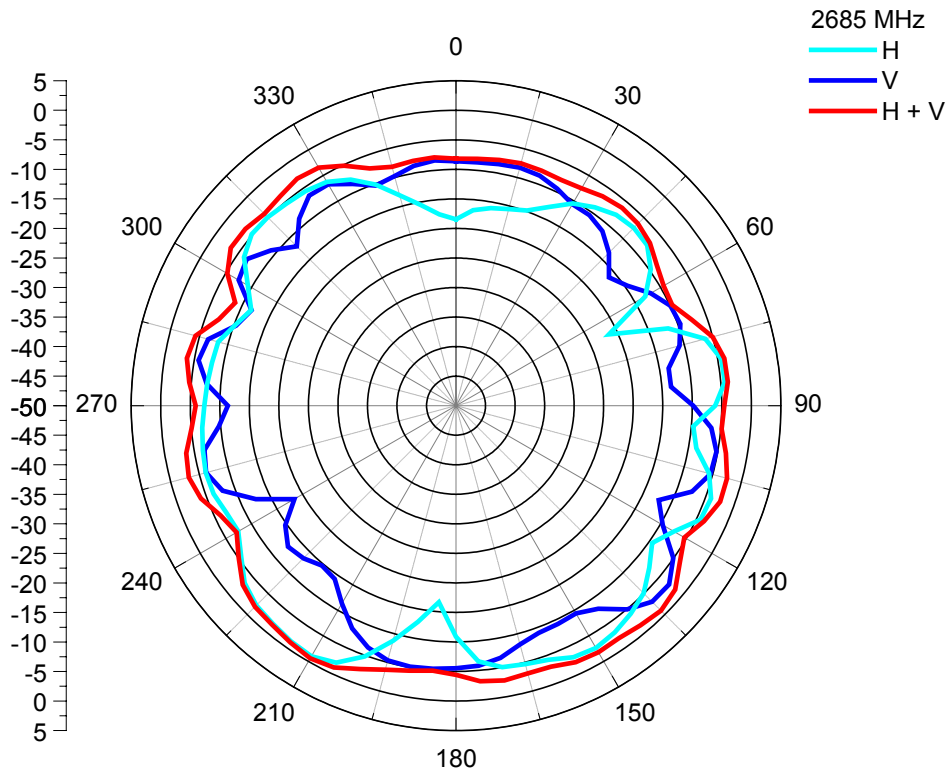
Center Frequency	<b>2501 MHz</b>
Horizontal (dBi) peak	<b>0.61</b>
Vertical (dBi) peak	<b>-1.56</b>

**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>0.48</b>
Vertical (dBi) peak	<b>-2.13</b>

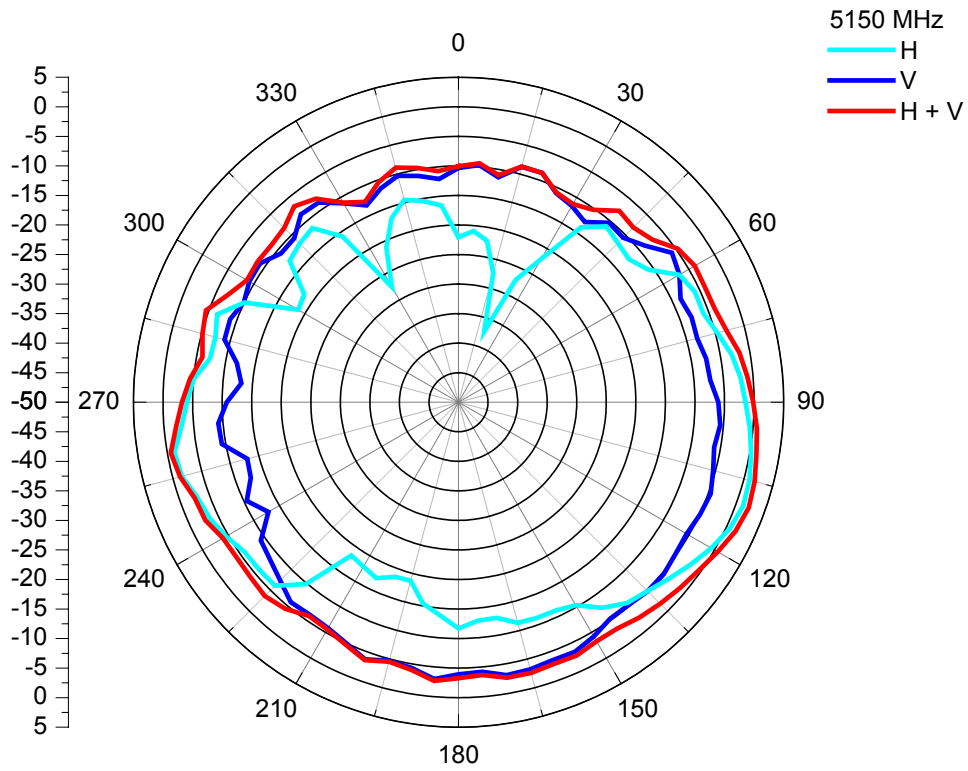
**Tx2 (or Rx2) antenna: 2685 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)**



Center Frequency	<b>2685 MHz</b>
Horizontal (dBi) peak	<b>0.48</b>
Vertical (dBi) peak	<b>-2.18</b>

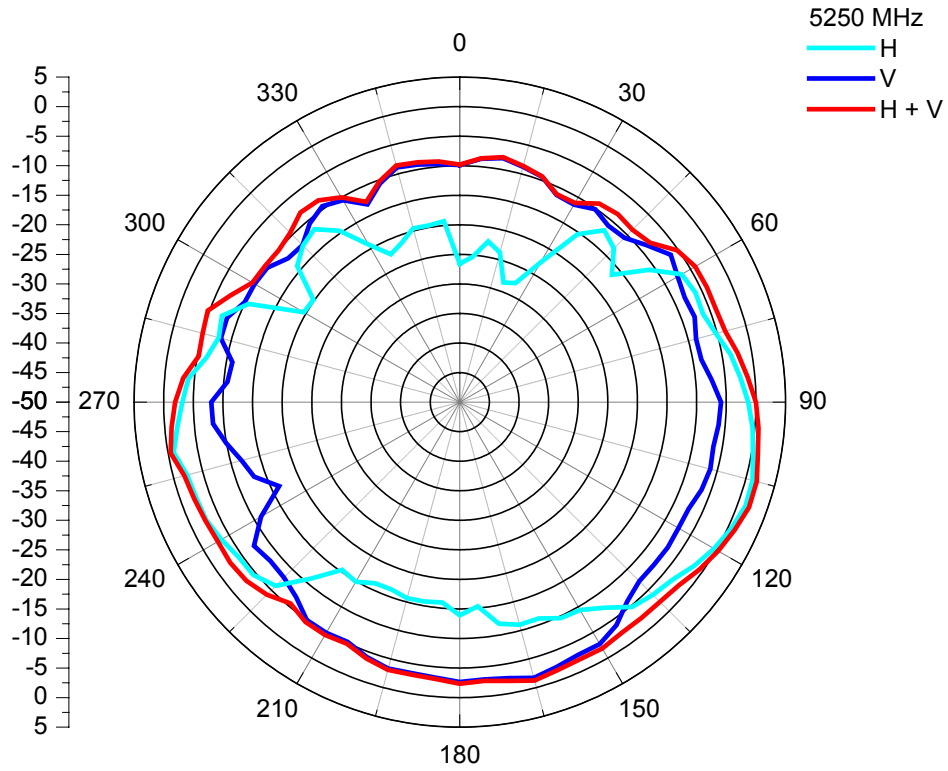
**5150-5350 MHz radiation characteristic**

**Tx1 antenna: 5150 MHz**



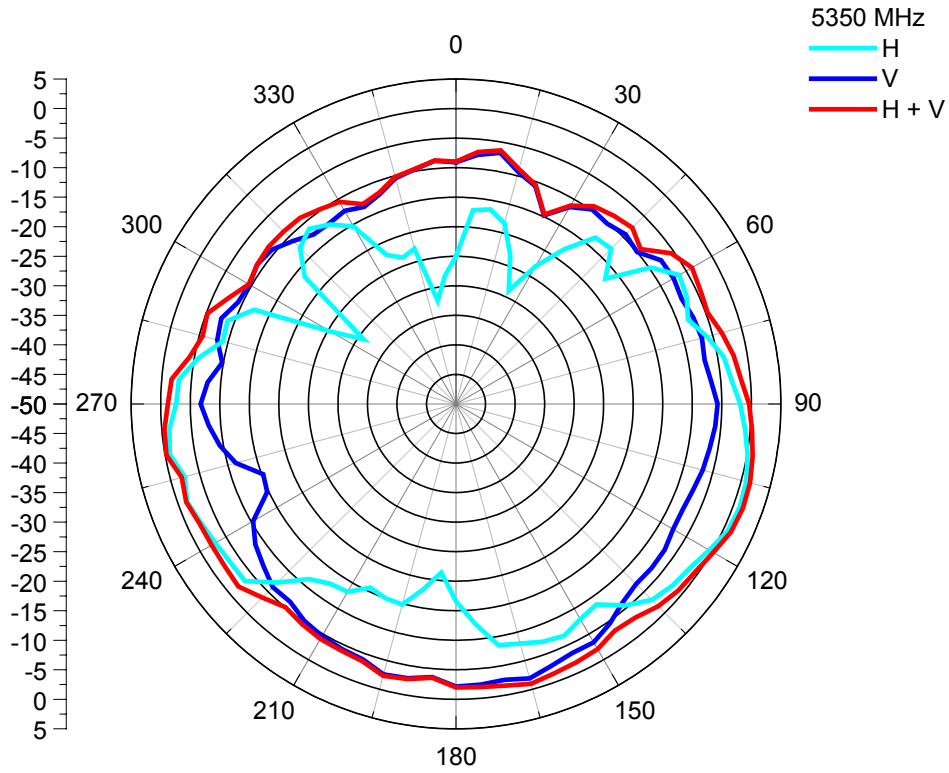
Center Frequency	<b>5150 MHz</b>
Horizontal (dBi) peak	<b>-0.01</b>
Vertical (dBi) peak	<b>-0.19</b>

### Tx1 antenna: 5250 MHz



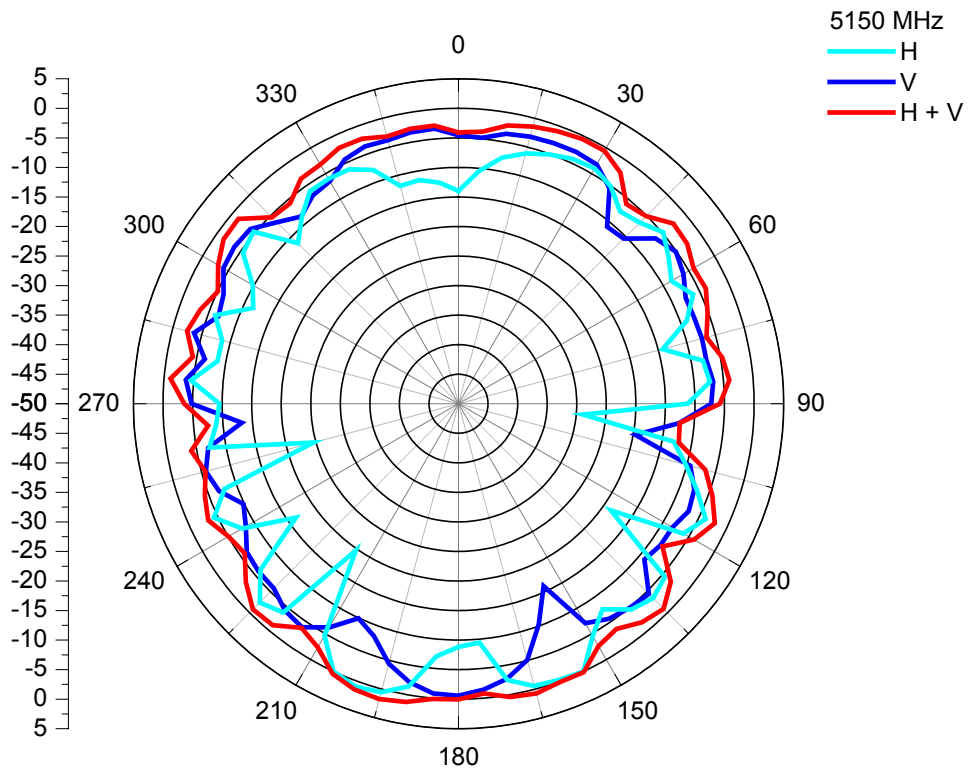
Center Frequency	<b>5250 MHz</b>
Horizontal (dBi) peak	<b>-0.30</b>
Vertical (dBi) peak	<b>-0.30</b>

### Tx1 antenna: 5350 MHz



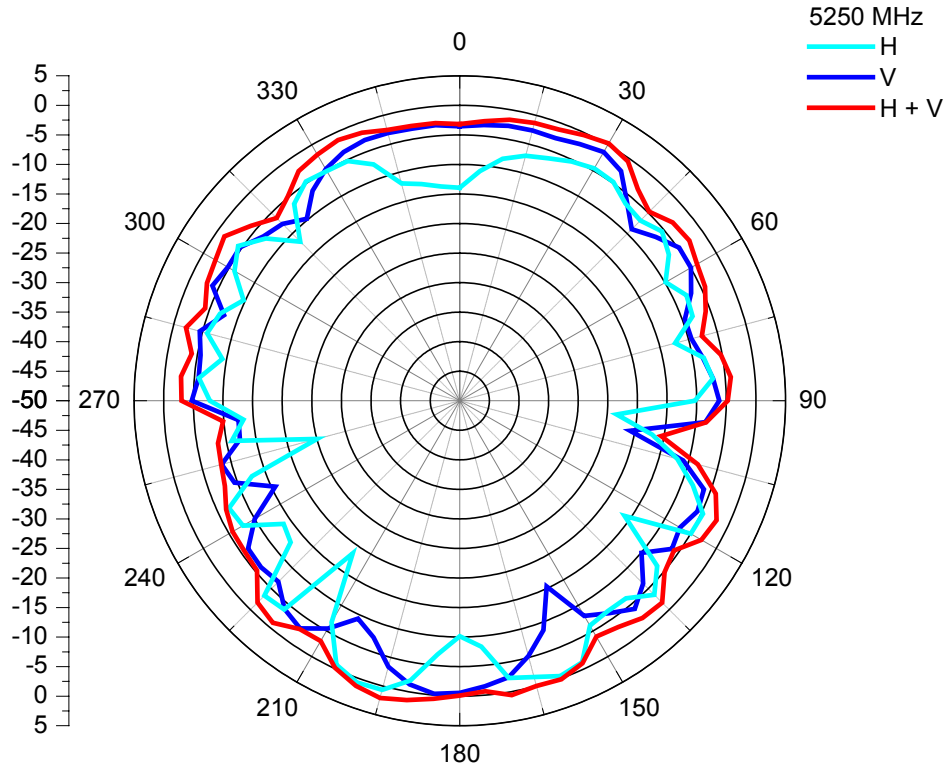
Center Frequency	<b>5350 MHz</b>
Horizontal (dBi) peak	<b>-0.84</b>
Vertical (dBi) peak	<b>-1.24</b>

**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>-0.17</b>
Vertical (dBi) peak	<b>-2.42</b>

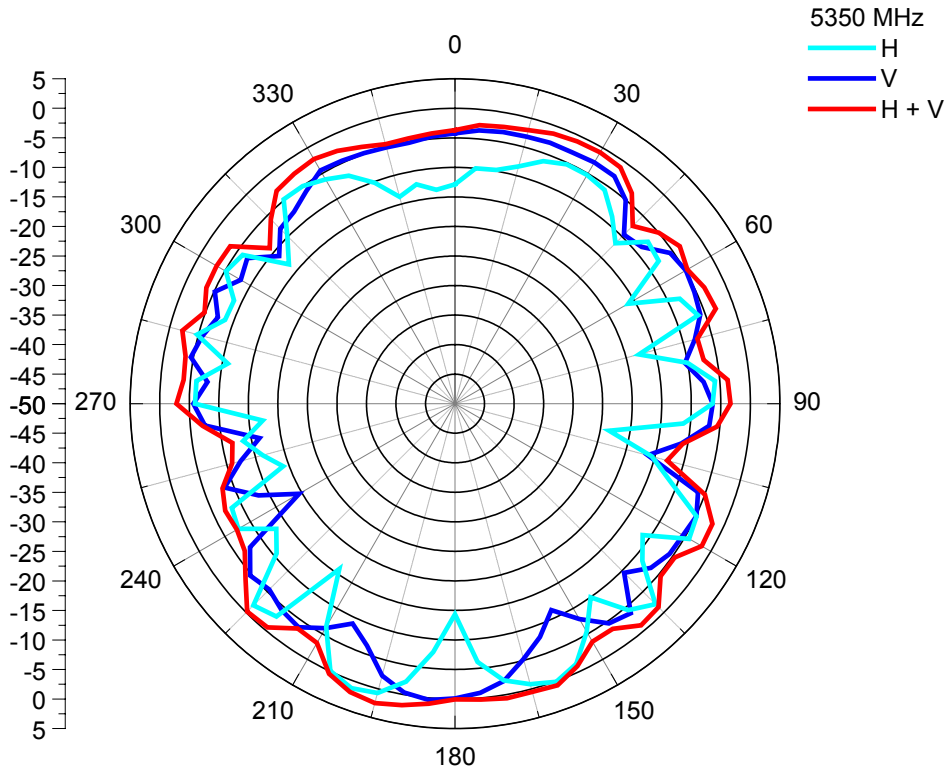
**Tx2 (or Rx2) antenna: 5250 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)**



Center Frequency	<b>5250 MHz</b>
Horizontal (dBi) peak	<b>-0.19</b>
Vertical (dBi) peak	<b>-2.34</b>



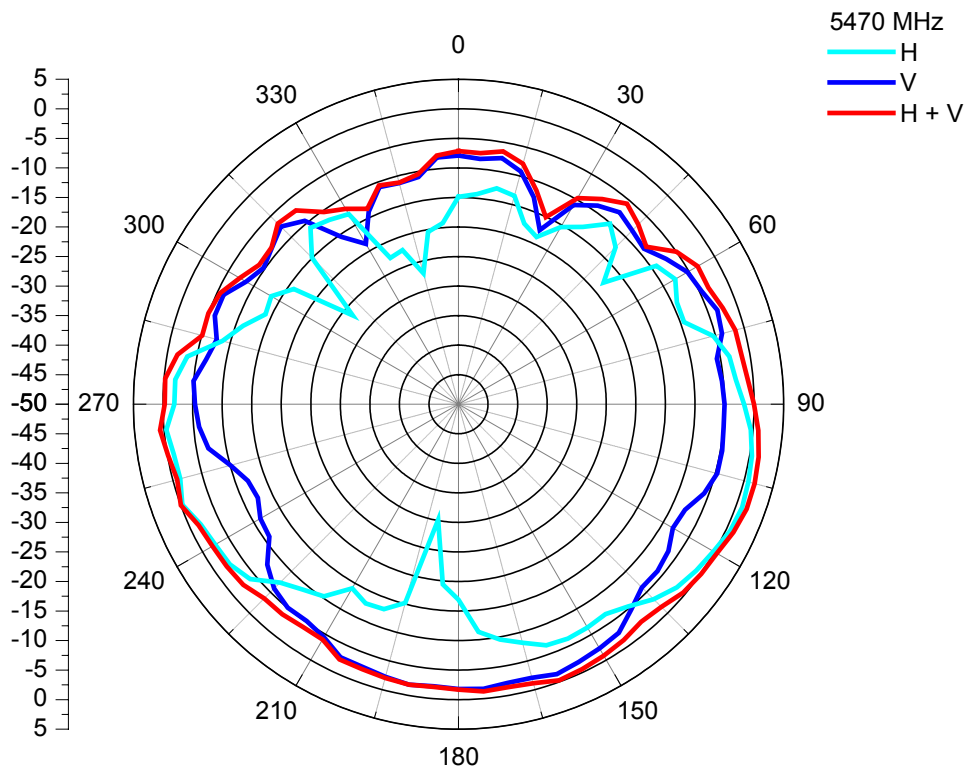
**Tx2 (or Rx2) antenna: 5350 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)**



Center Frequency	<b>5350 MHz</b>
Horizontal (dBi) peak	<b>-1.02</b>
Vertical (dBi) peak	<b>-2.91</b>

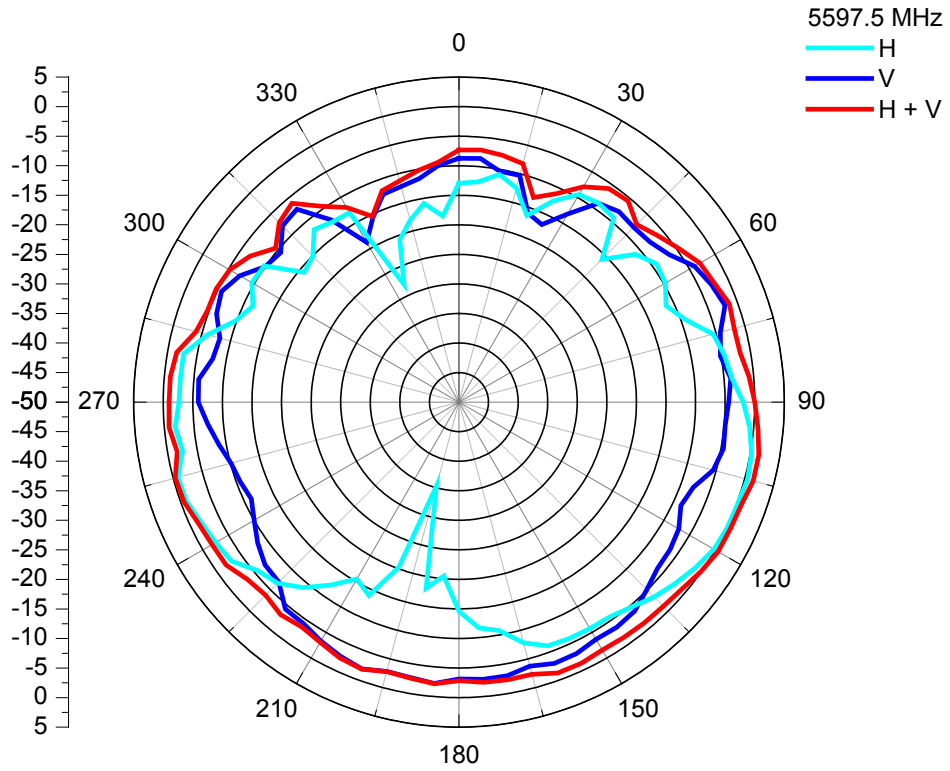
**5470-5725MHz radiation characteristic**

**Tx1 antenna: 5470 MHz**



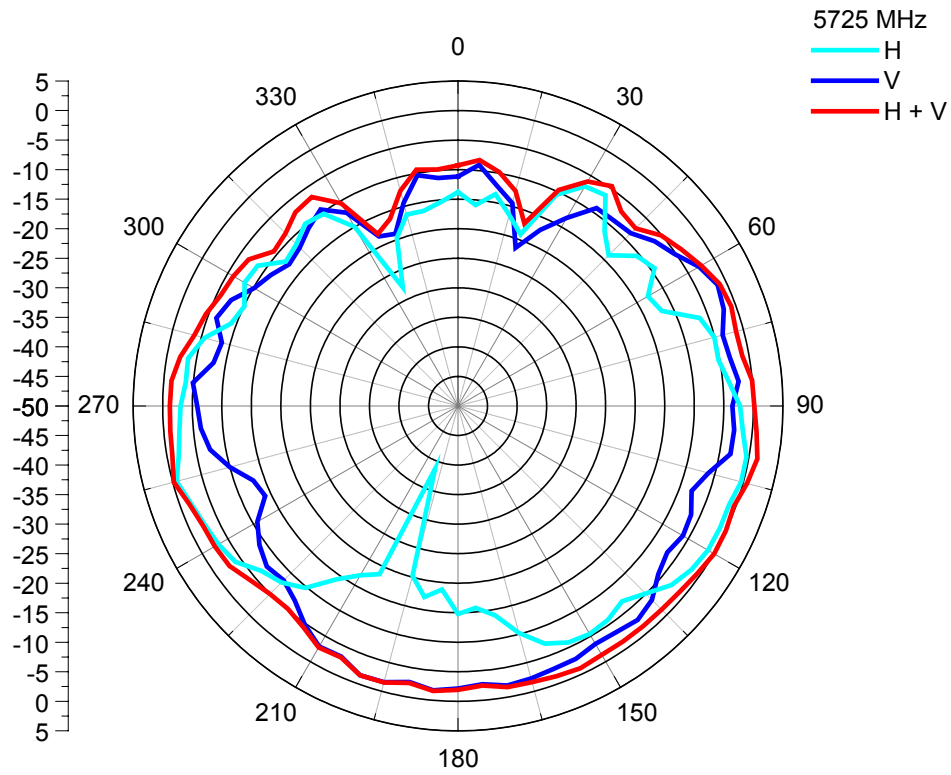
Center Frequency	<b>5470 MHz</b>
Horizontal (dBi) peak	<b>-1.28</b>
Vertical (dBi) peak	<b>-1.64</b>

**Tx1 antenna: 5597.5 MHz**



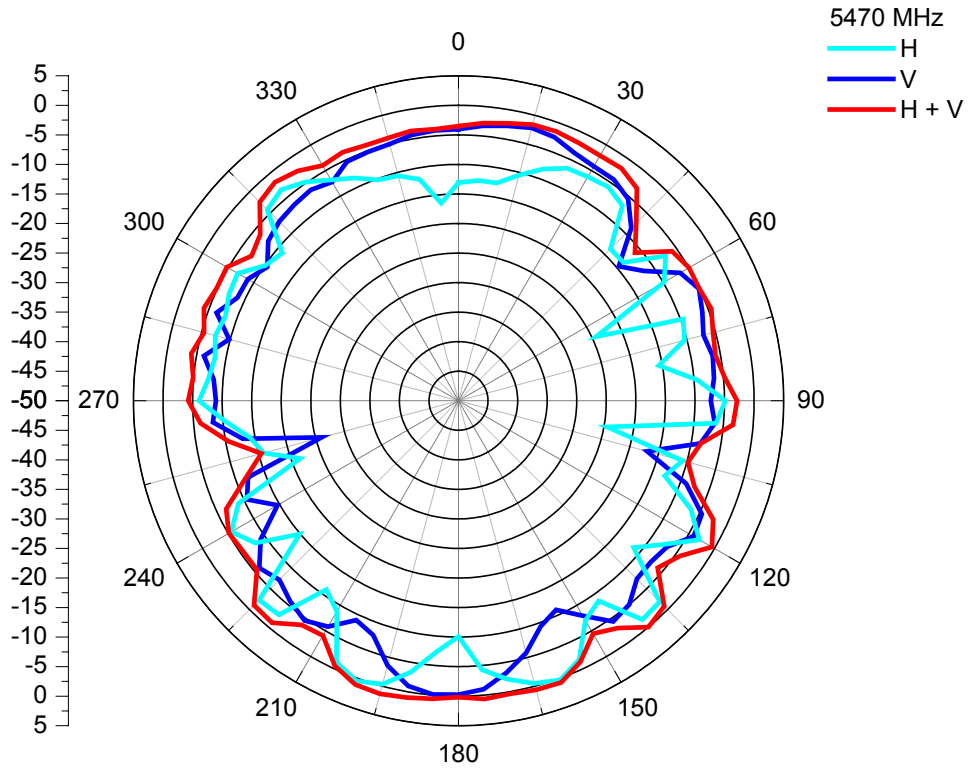
Center Frequency	<b>5597.5 MHz</b>
Horizontal (dBi) peak	<b>1.24</b>
Vertical (dBi) peak	<b>-2.99</b>

### Tx1 antenna: 5725 MHz



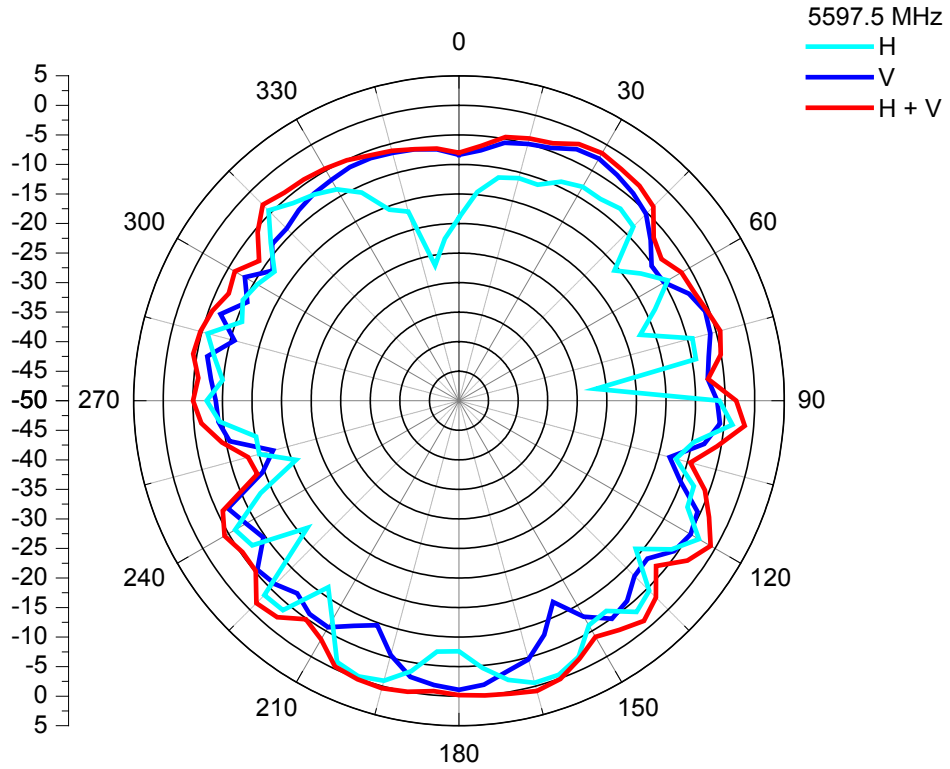
Center Frequency	<b>5725 MHz</b>
Horizontal (dBi) peak	<b>1.33</b>
Vertical (dBi) peak	<b>-1.71</b>

**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)**



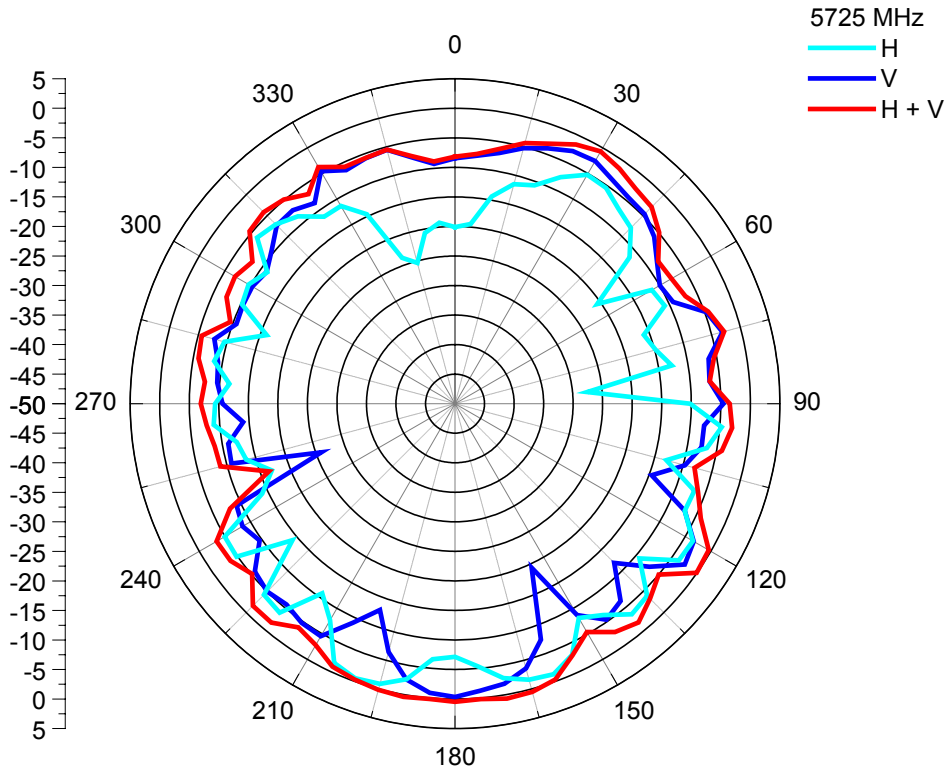
Center Frequency	<b>5470 MHz</b>
Horizontal (dBi) peak	<b>-1.85</b>
Vertical (dBi) peak	<b>-2.71</b>

**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>0.94</b>
Vertical (dBi) peak	<b>-0.58</b>

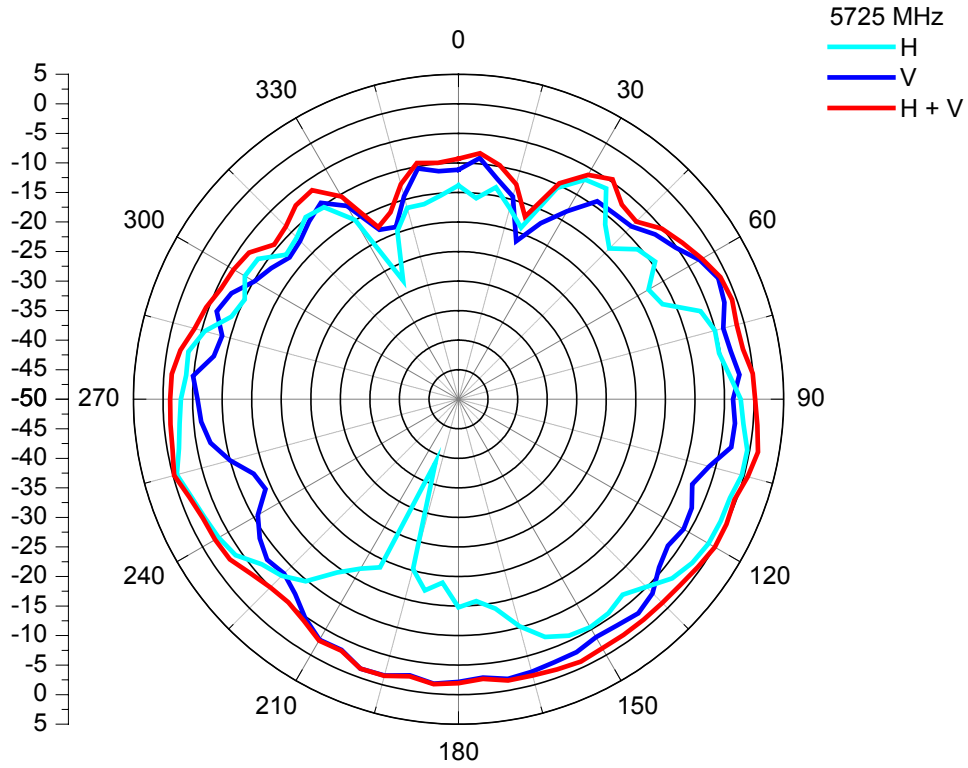
**Tx2 (or Rx2) antenna: 5725 MHz (Plot is not required if 2<sup>nd</sup> Antenna is receive only e.g. Rx2 for 512 family)**



Center Frequency	<b>5725 MHz</b>
Horizontal (dBi) peak	<b>0.72</b>
Vertical (dBi) peak	<b>-0.22</b>

**5725-5850 MHz radiation characteristic**

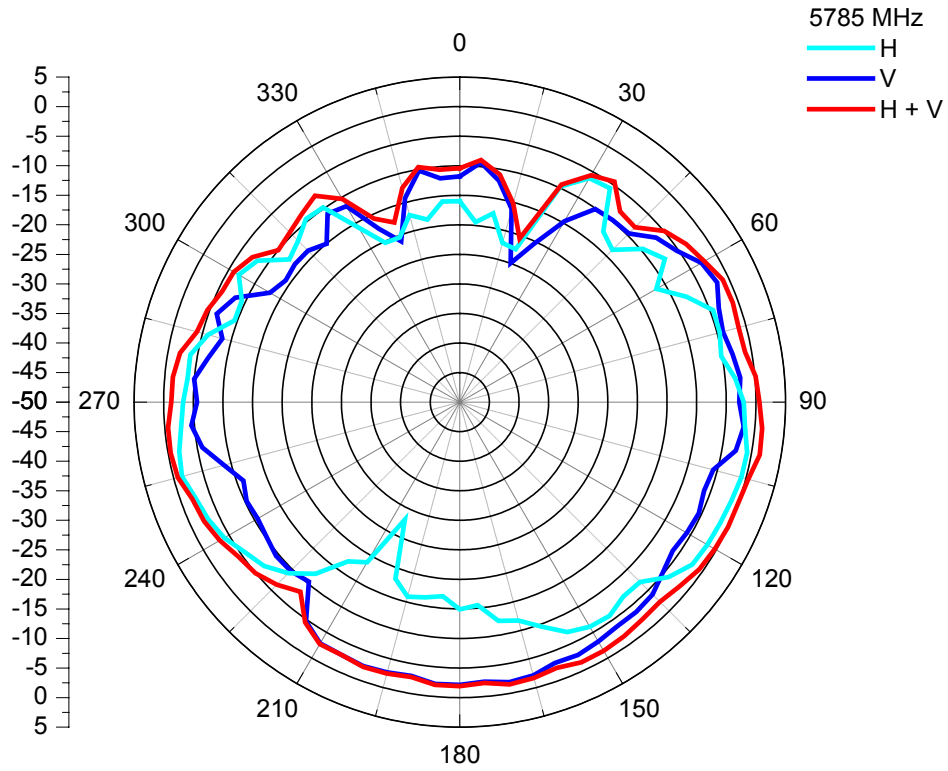
**Tx1 antenna: 5725 MHz**



Center Frequency	<b>5725 MHz</b>
Horizontal (dBi) peak	<b>1.33</b>
Vertical (dBi) peak	<b>-1.71</b>

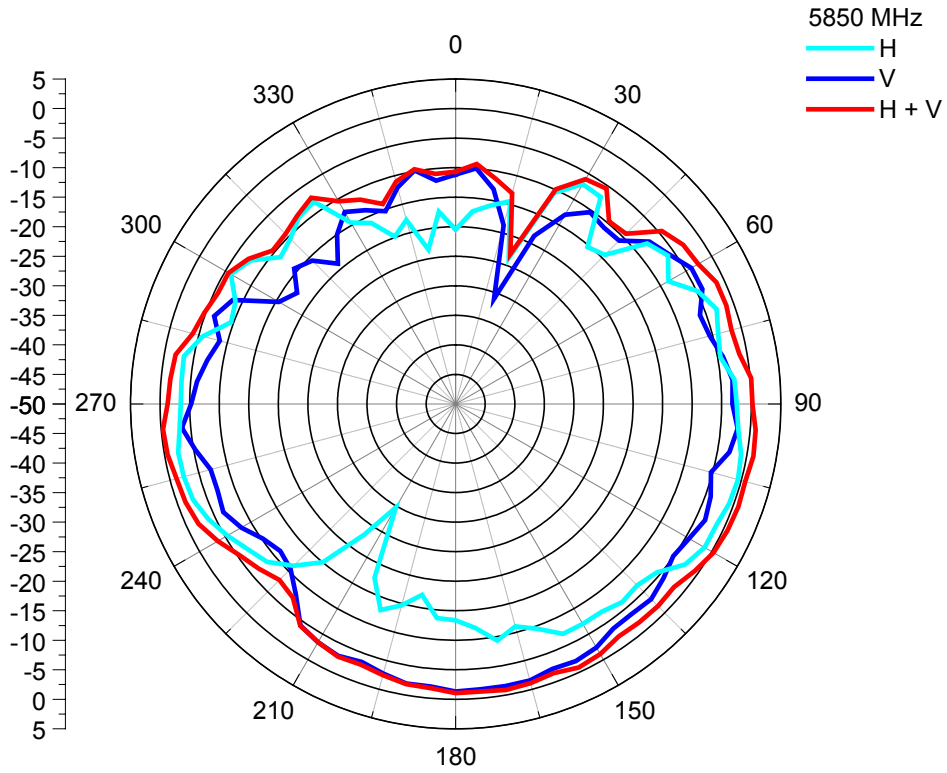


### Tx1 antenna: 5785 MHz



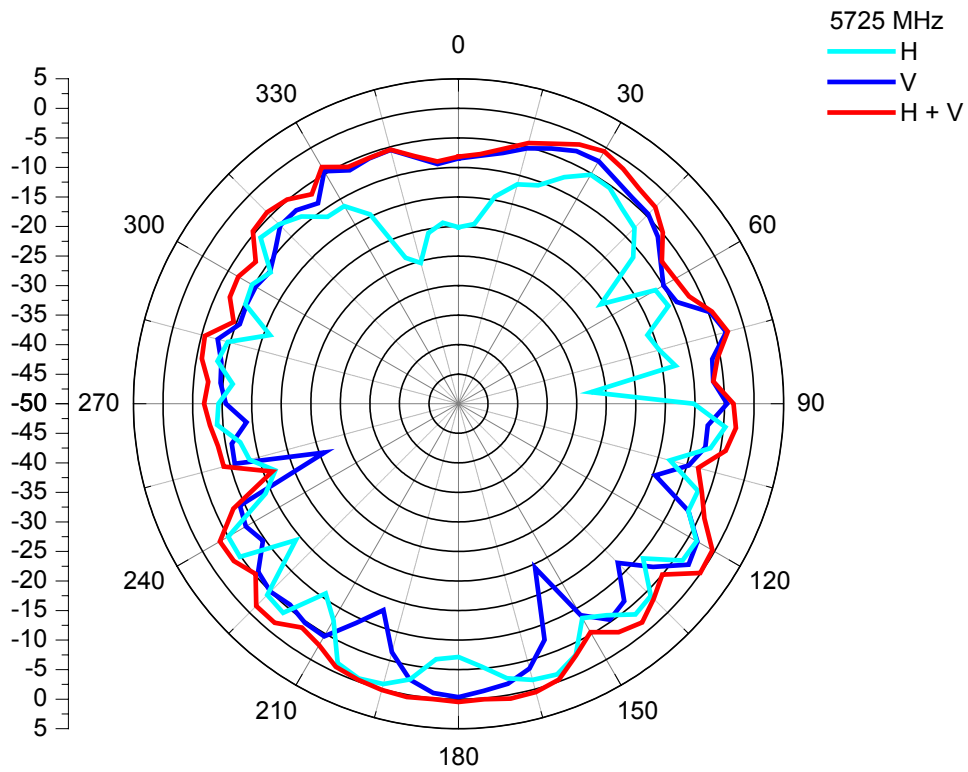
Center Frequency	<b>5785 MHz</b>
Horizontal (dBi) peak	<b>1.10</b>
Vertical (dBi) peak	<b>-1.90</b>

### Tx1 antenna: 5850 MHz



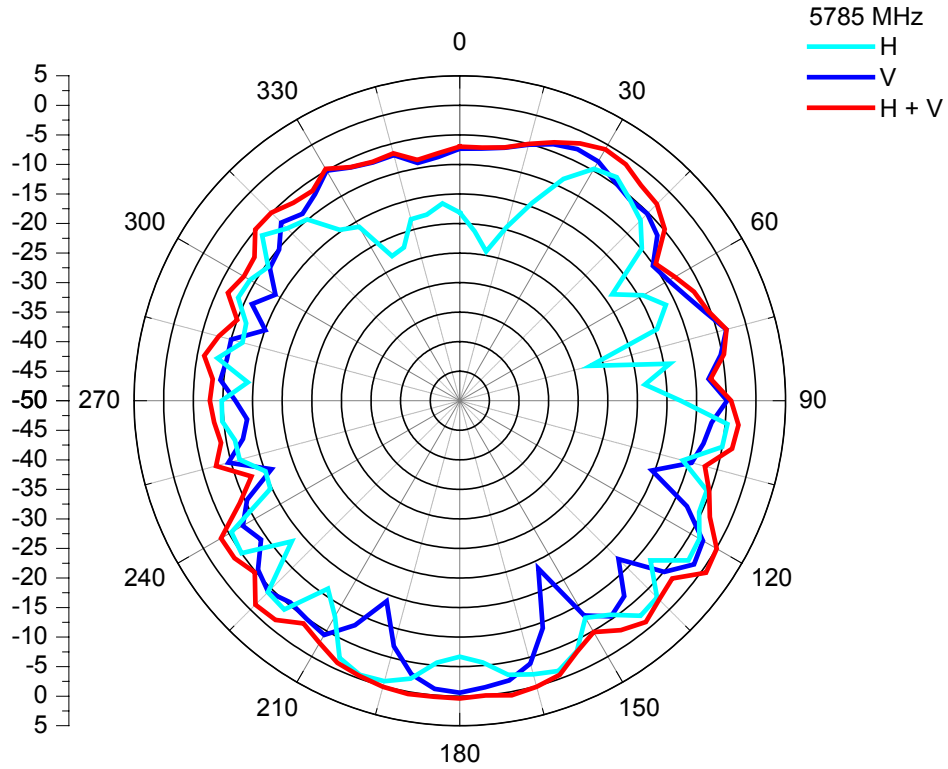
Center Frequency	<b>5850 MHz</b>
Horizontal (dBi) peak	<b>1.05</b>
Vertical (dBi) peak	<b>-1.41</b>

**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)**



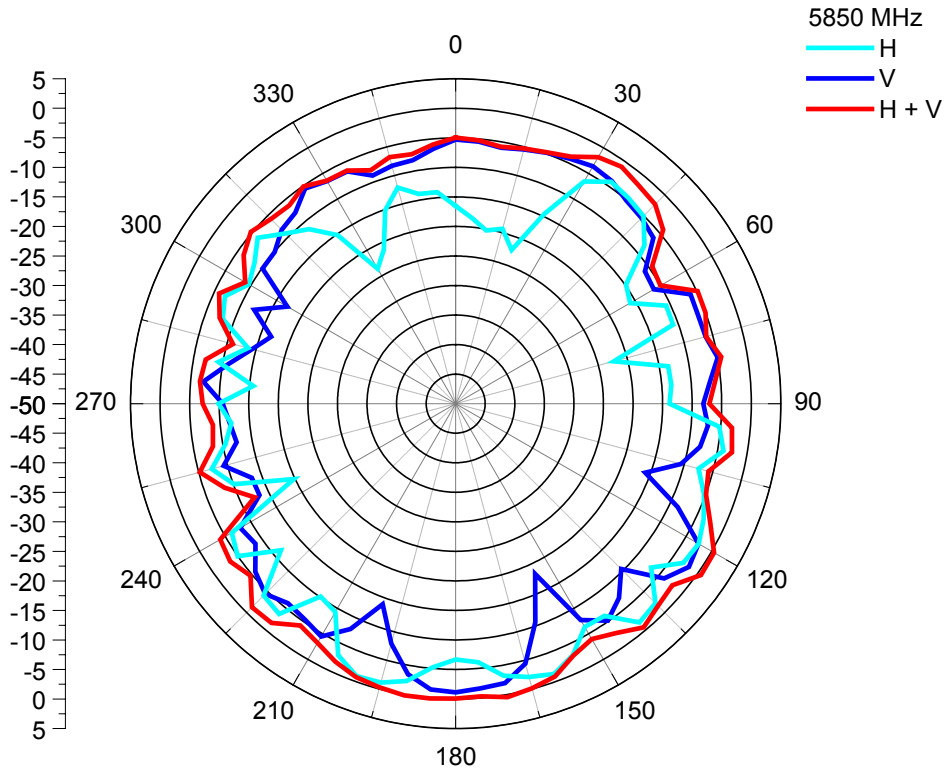
Center Frequency	<b>5725 MHz</b>
Horizontal (dBi) peak	<b>0.72</b>
Vertical (dBi) peak	<b>-0.22</b>

**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>1.26</b>
Vertical (dBi) peak	<b>0.36</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>0.49</b>
Vertical (dBi) peak	<b>-0.11</b>

## Section Section 4. Host Platform Information

OEM / ODM Host platform: Bear platform correlated to antenna data

Rating Label Photo:

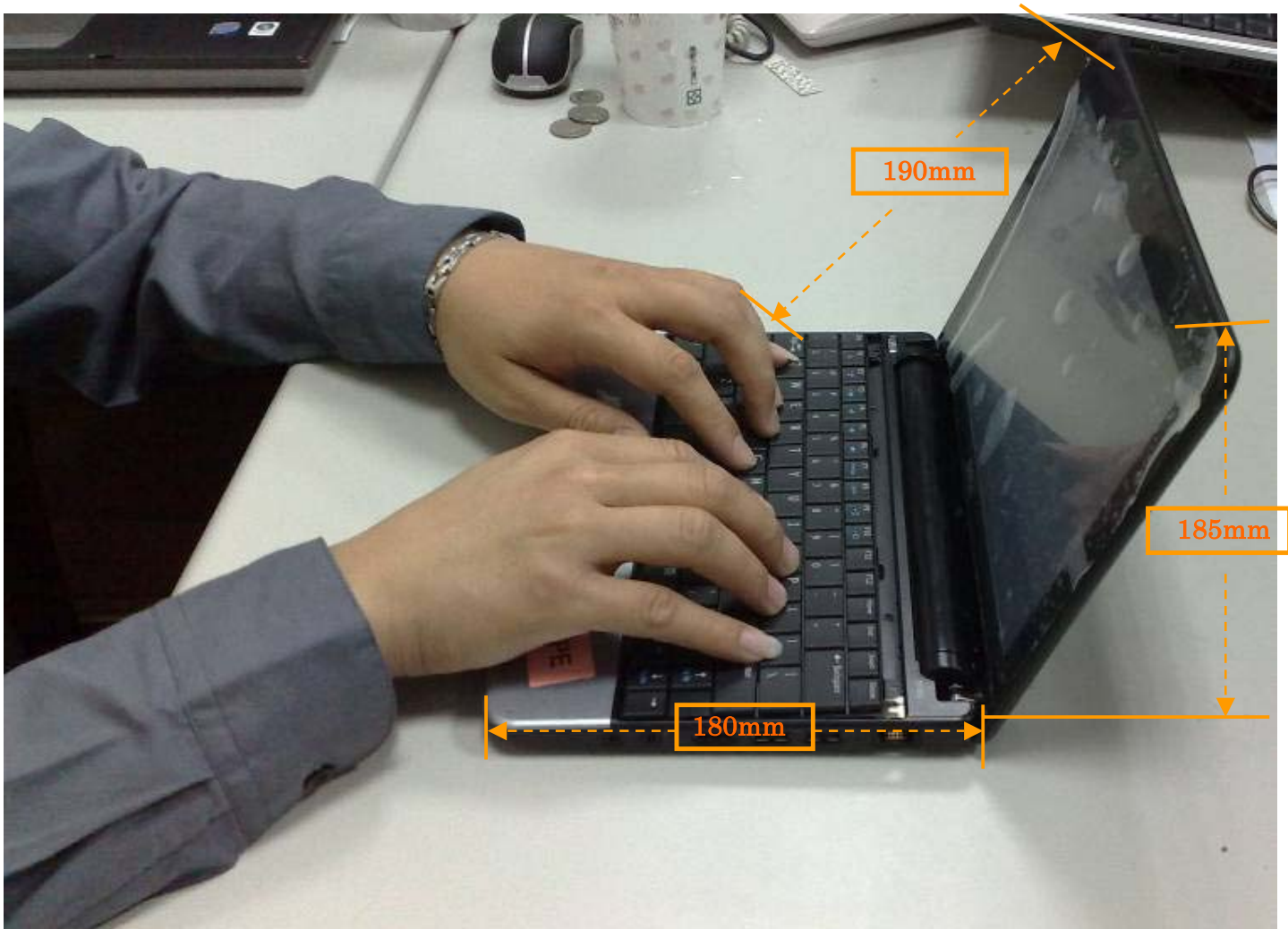
## Section 5. Antenna Host Platform Location Information

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)

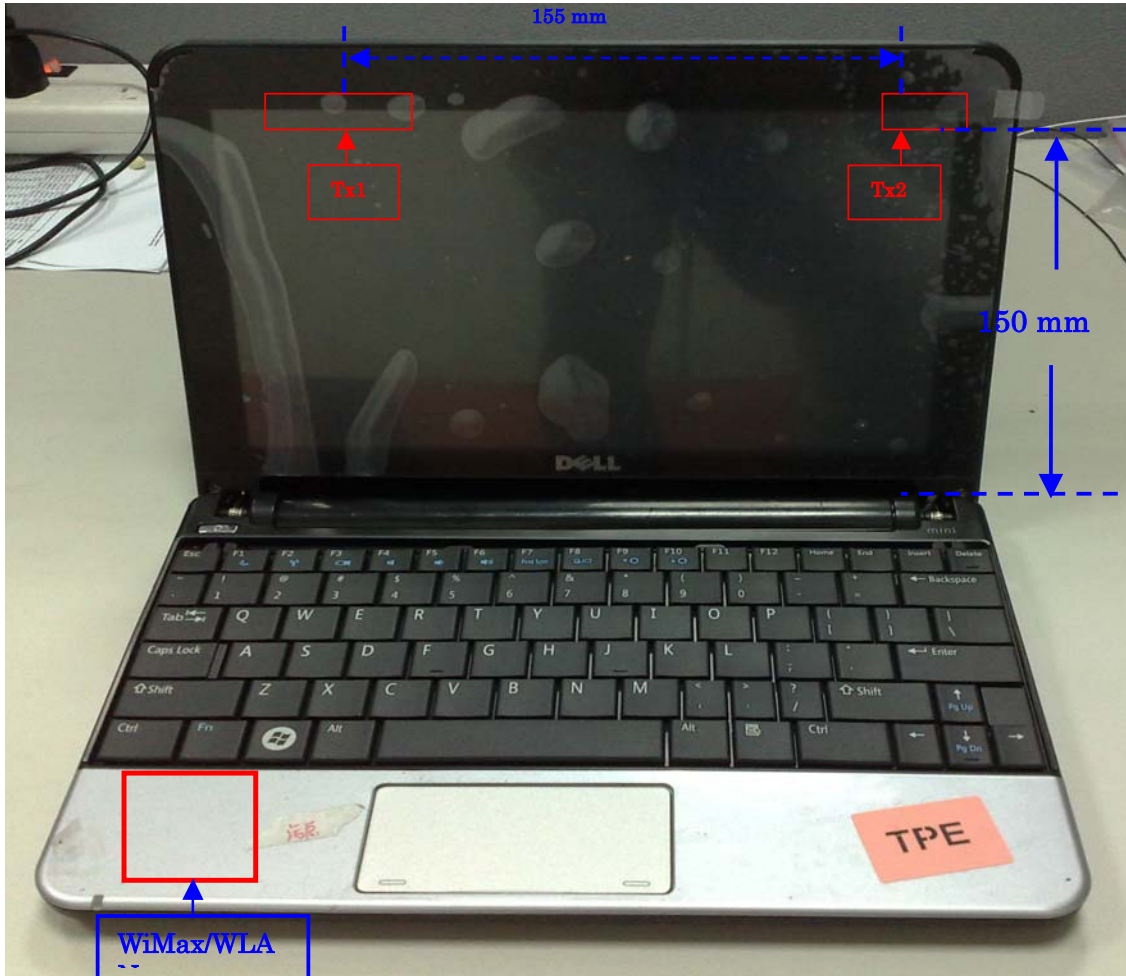




## Section 7. Diagram Example of Co-Location Antenna Separation

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>						