

# Regulatory WLAN Antenna Information (NB mode)

Platform information							
Brand	ODM	Platform model name (RMN)	Platform type (ex: Notebook PC, convertible PC, AIO...etc)			*SAR minimum separation (mm)	
HP Inc.	Compal Corporation	Dashiell (TPN-C155)	Convertible PC			15.6	
Antenna information							
Vendor	Type	Antenna Part number (Main/TX1)			Antenna Part number (Aux/ TX2)		
INPAQ	PIFA	DC33002K3C0 (WA-P-LBLB-02-130)			DC33002K3C0 (WA-P-LBLB-02-130)		
Peak gain w/ cable loss (dBi)							
2.4GHz 2400-2500MHz	5.2&5.3GHz 5150-5350MHz	5.5GHz 5470-5725MHz	5.8GHz 5725-5850MHz	6.2GHz 5925-6425MHz	6.5GHz 6425-6525MHz	6.7GHz 6525-6875MHz	6.9GHz 6875-7125MHz
2.46	2.61	2.64	2.16	2.5	1.45	2.23	2.03
Module information							
Model	Form factor and suffixes ( NGW/ HMW AND AN/ NB/ BN....)						
AX211NGW (Garfield Peak 2)	Intel Garfield Peak 2 AX211 Wi-Fi 6e +Bluetooth 5.2 M.2 2230 160MHz CNVi WW WLAN						
AX411NGW (Garfield Peak 4)	Intel Garfield Peak 4 AX411 Wi-Fi 6e +Bluetooth 5.2 M.2 2230 160MHz CNVi WW WLAN						
Notes (marked with *)							
<p><b>* SAR minimum separation (mm)</b></p> <ul style="list-style-type: none"> <li>- Regular NB: Minimum antenna-to-body (from antenna bottom to the bottom of the device)</li> <li>- Tablet / Convertible PC: Minimum antenna-to-edge (5 sides of the device)</li> <li>- Mini-tablet: Minimum antenna-to-edge (6 sides of the device)</li> </ul> <p><b>* 3D Peak Antenna gain should be equal or greater than -2 dBi</b></p> <ul style="list-style-type: none"> <li>- If a host integrator plans to use a lower gain antenna of the same type, additional CBP(FCC)/EDT(EU) testing need to be performed while the module is installed in the host.</li> </ul>							

## 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

# Antenna Information

## Section 1. Antenna Assembly Specifications

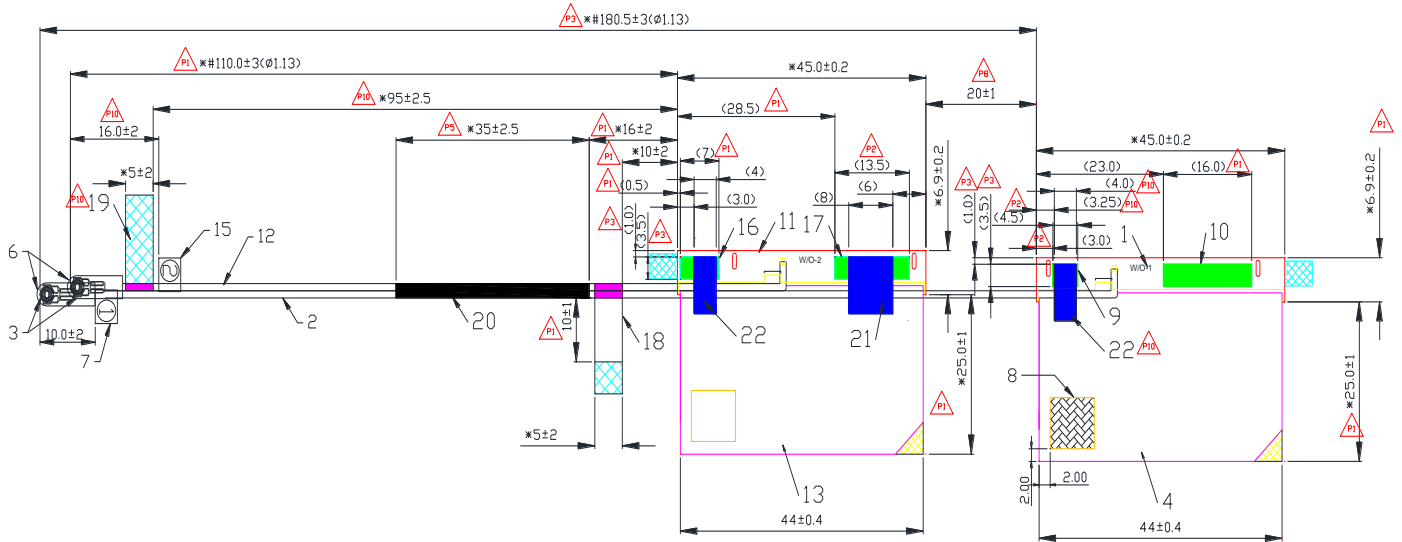
1A Antenna Part Number	1B Manu-facturer	1C Antenna Type	1D Cable Assembly Part Number and Information	Freq Range MHz	1E *Peak Gain W/ Cable loss (dBi)	1F Peak Gain w/o Cable Loss (dBi)	1G Max VSWR	1H Cable Loss (dB)
P/N: DC33002K3C0 (Vendor P/N: WA-P-LBLB-02-130) Main Antenna	INPAQ	PIFA	50 ohm Coaxial length: 110mm diameter: 1.13mm I-PEX MHF-4L	2400-2500	2.46	2.77	3	0.31
				5150-5250	2.49	2.93	3	0.44
				5250-5350	2.49	2.95	3	0.46
				5470-5725	2.64	3.11	3	0.47
				5725-5850	2.16	2.64	3	0.48
				5925-6425	2.50	3.00	3	0.50
				6425-6525	1.45	1.96	3	0.51
				6525-6875	2.23	2.75	3	0.52
				6875-7125	2.03	2.57	3	0.54
P/N: DC33002K3C0 (Vendor P/N: WA-P-LBLB-02-130) Aux Antenna	INPAQ	PIFA	50 ohm Coaxial length:180mm diameter: 1.13mm I-PEX MHF-4L	2400-2500	1.58	2.08	3	0.50
				5150-5250	2.53	3.24	3	0.71
				5250-5350	2.61	3.35	3	0.74
				5470-5725	2.37	3.14	3	0.77
				5725-5850	1.51	2.29	3	0.78
				5925-6425	1.35	2.17	3	0.82
				6425-6525	-1.84	-1.01	3	0.83
				6525-6875	-0.35	0.50	3	0.85
				6875-7125	-0.64	0.24	3	0.88

- Antenna Peak Gain required being test in system basis.
- 1E frame contend absolutely peak antenna gain include H/V

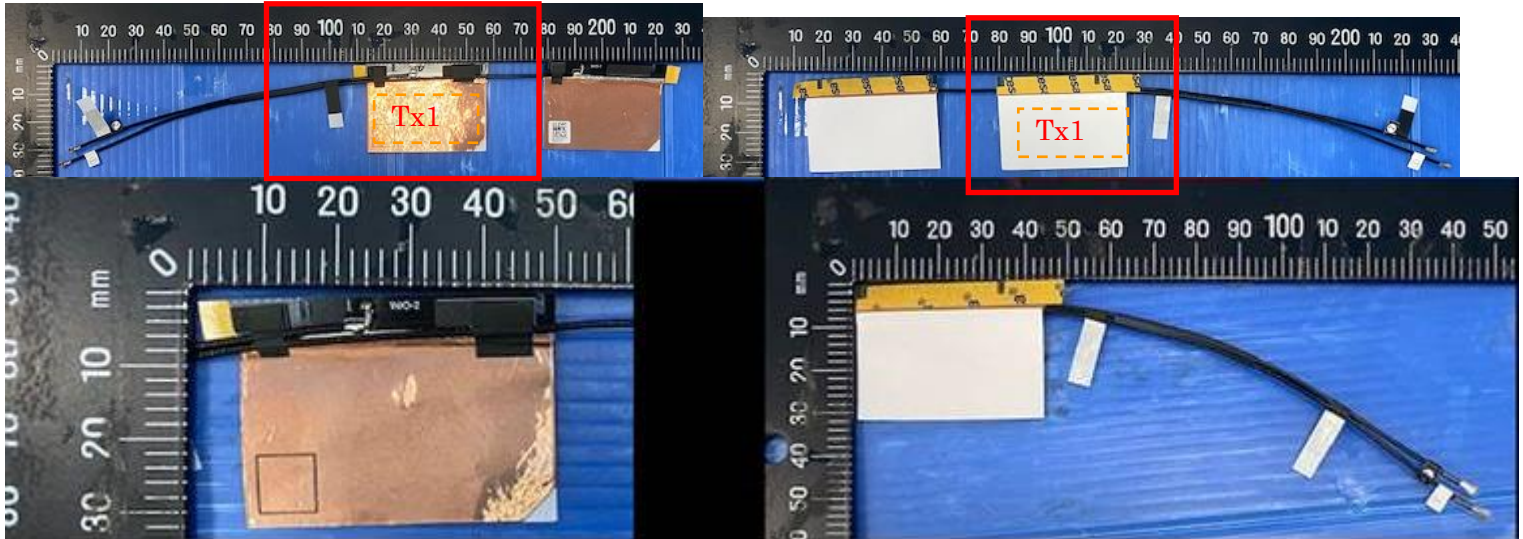
## Section 2. Dimensioned Photos or Drawings of Antennas

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

### Tx1 Antenna Dimensioned Drawing:

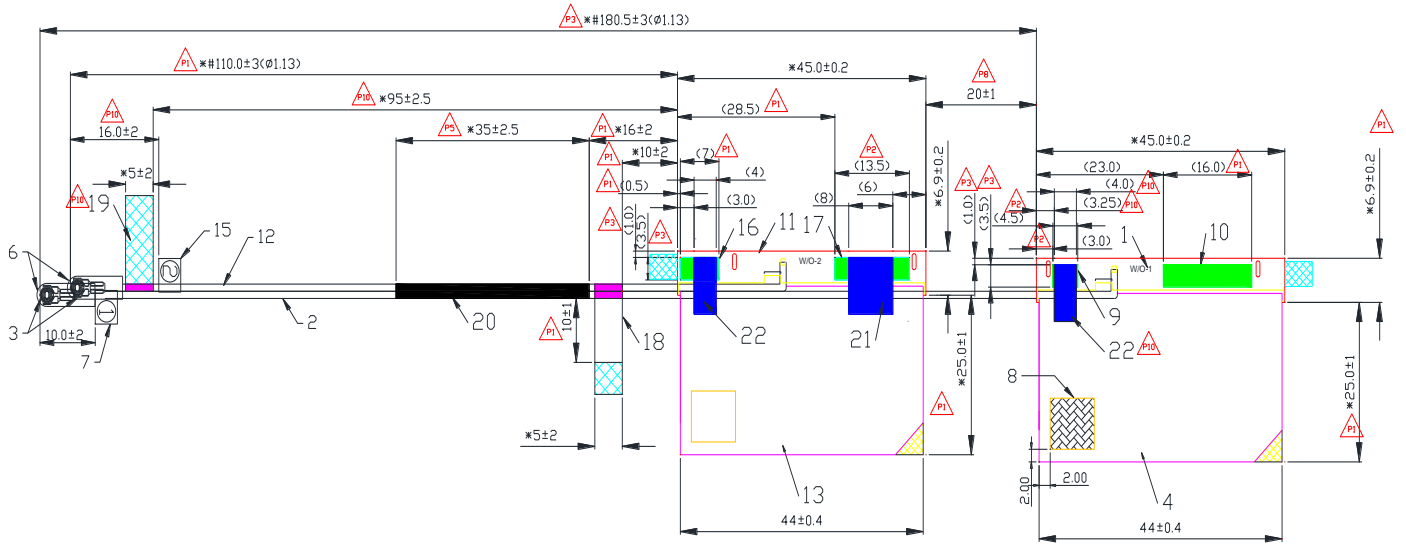


### Tx1 Antenna Photo:

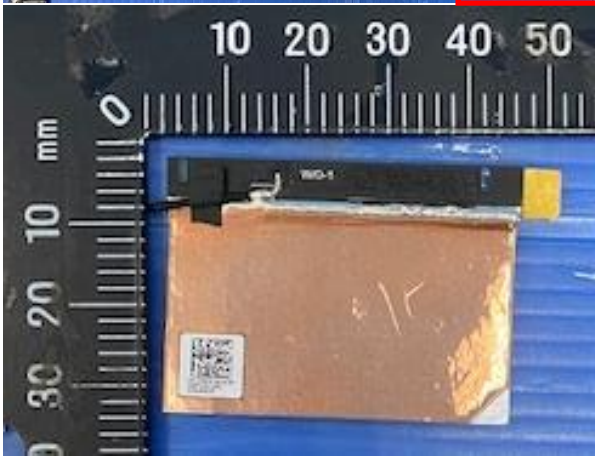


Include a dimensioned photo and dimensioned drawing of Tx2 (or Rx2) antenna here.

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



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

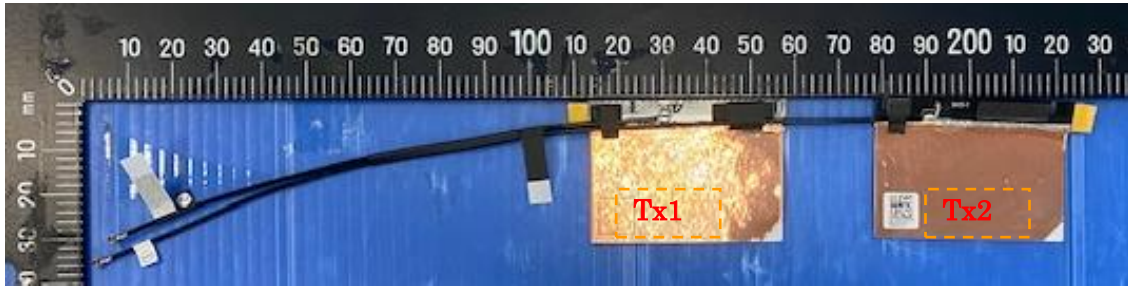


Note: antenna photo should include L type ruler

**Include front view photo of all 2 antennas here.**

Antenna Manufacturer: INPAQ

Antenna Part Number: DC33002K3C0 (WA-P-LBLB-02-130) (Tx1), DC33002K3C0 (WA-P-LBLB-02-130) (Tx2 or Rx2)

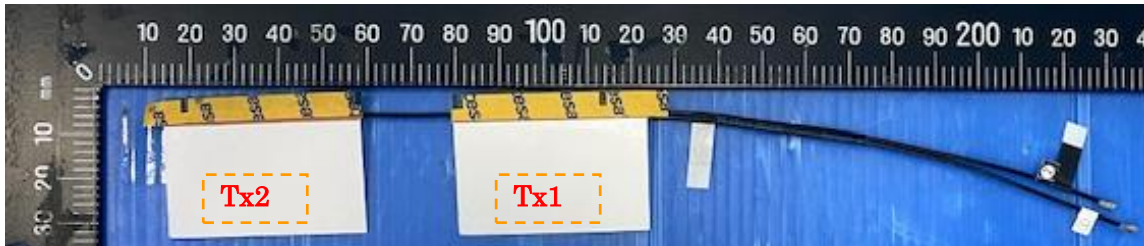


**Note: antenna photo should include L type ruler**

**Include back view photo of all 2 antennas here.**

Antenna Manufacturer: INPAQ

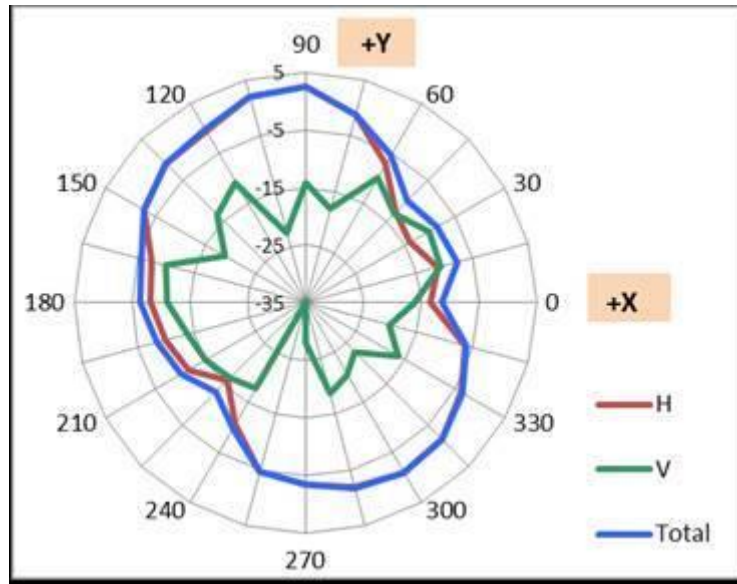
Antenna Part Number: DC33002K3C0 (WA-P-LBLB-02-130) (Tx1), DC33002K3C0 (WA-P-LBLB-02-130) (Tx2 or Rx2)



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

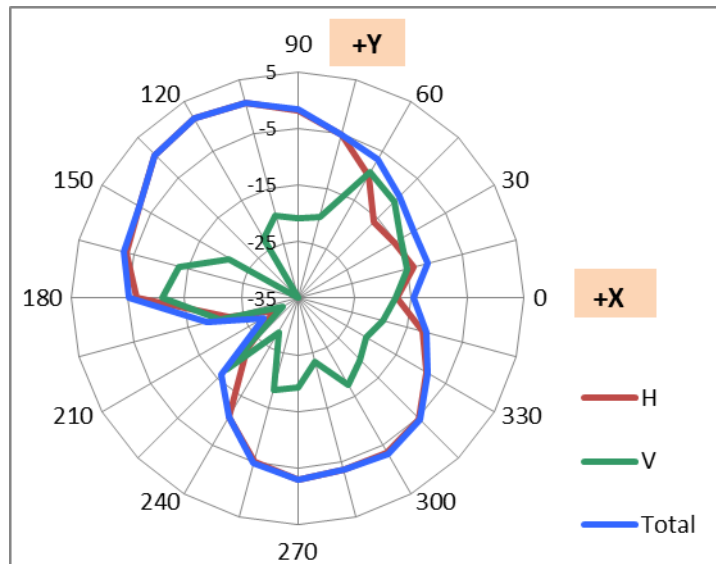
### 2400-2500MHz radiation characteristic (1E Peak Gain W/ Cable loss (dBi))

Main antenna:



Center Frequency	2400-2500 MHz
Horizontal+ Vertical (dBi) peak	2.46

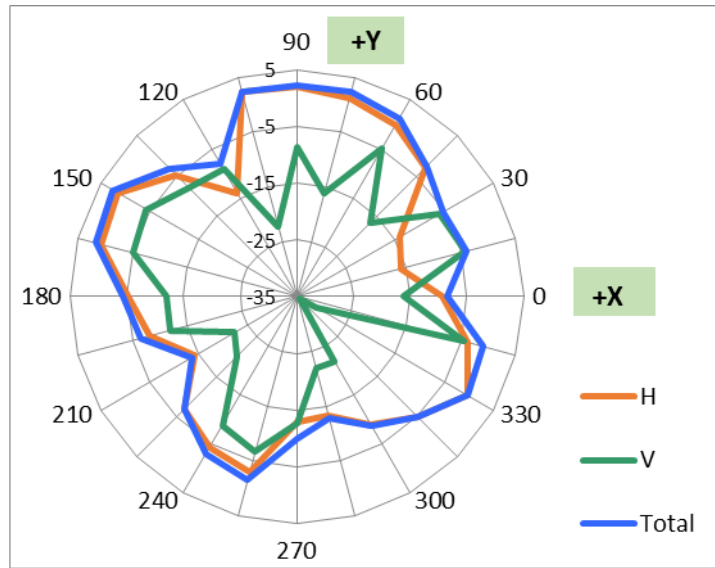
Aux antenna:



Center Frequency	2400-2500 MHz
Horizontal+ Vertical (dBi) peak	1.58

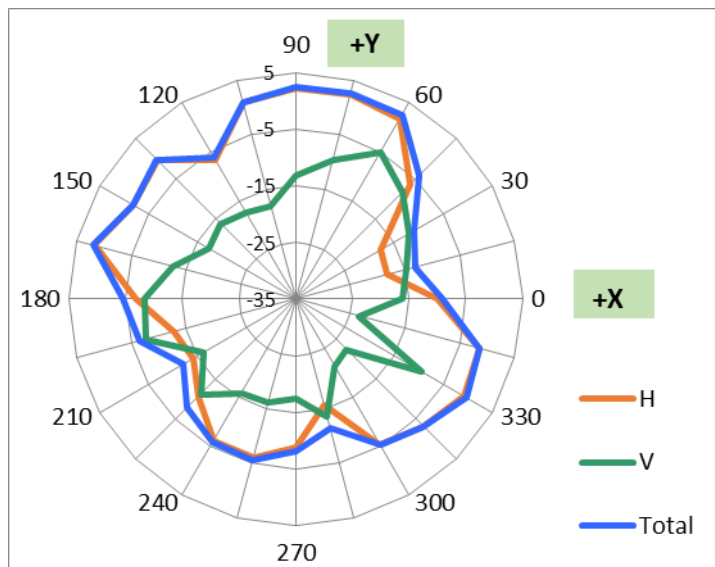
### 5150-5250MHz radiation characteristic

#### Main antenna:



Horizontal+ Vertical (dBi) peak	2.49
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#### Aux antenna:

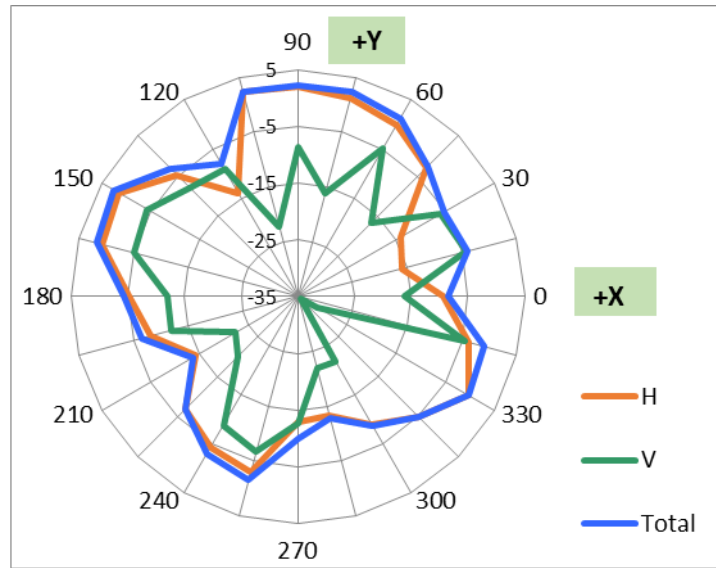


Horizontal+ Vertical (dBi) peak	2.53
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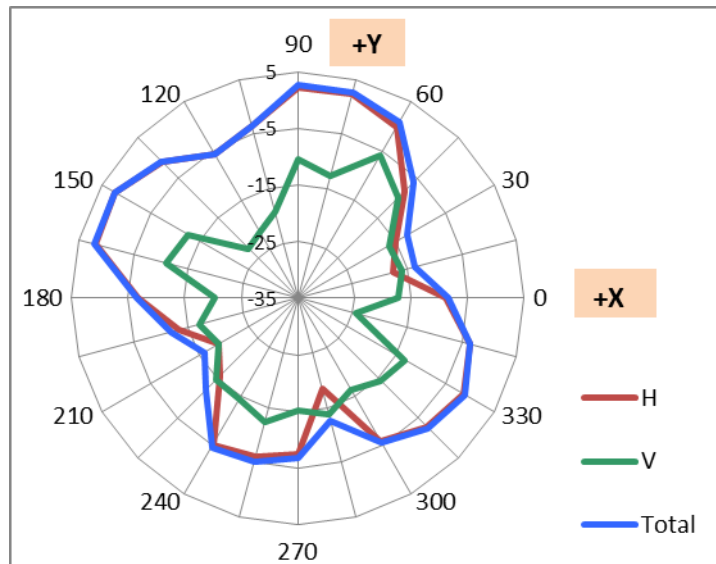
### 5250-5350MHz radiation characteristic

#### Main antenna:



Horizontal+ Vertical (dBi) peak	2.49
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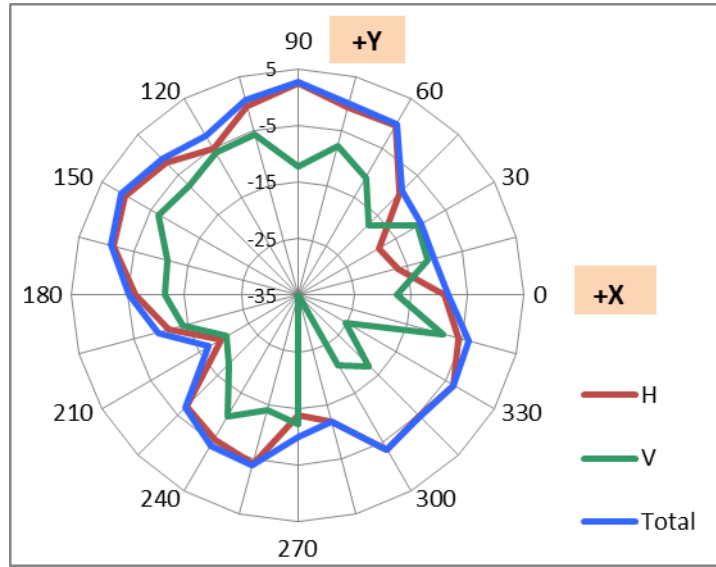
#### Aux antenna:



Horizontal+ Vertical (dBi) peak	2.61
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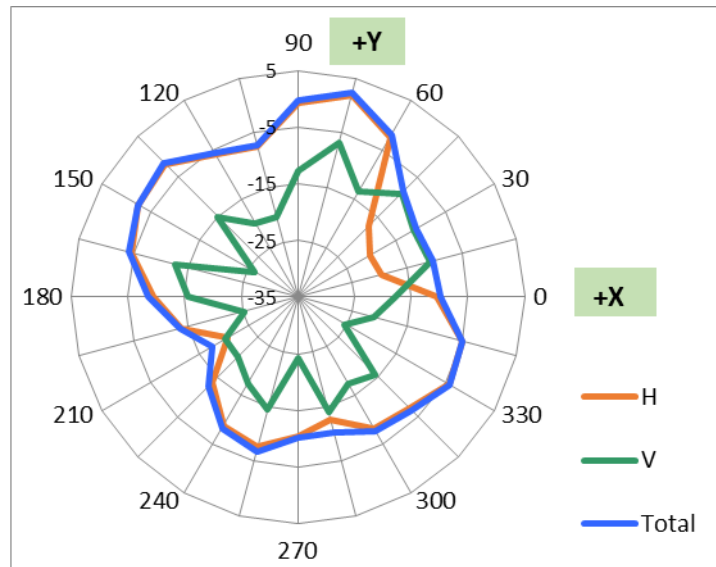
**5470-5725MHz radiation characteristic(1E Peak Gain W/ Cable loss (dBi))**

**Main antenna:**



Horizontal+ Vertical (dBi) peak	2.64
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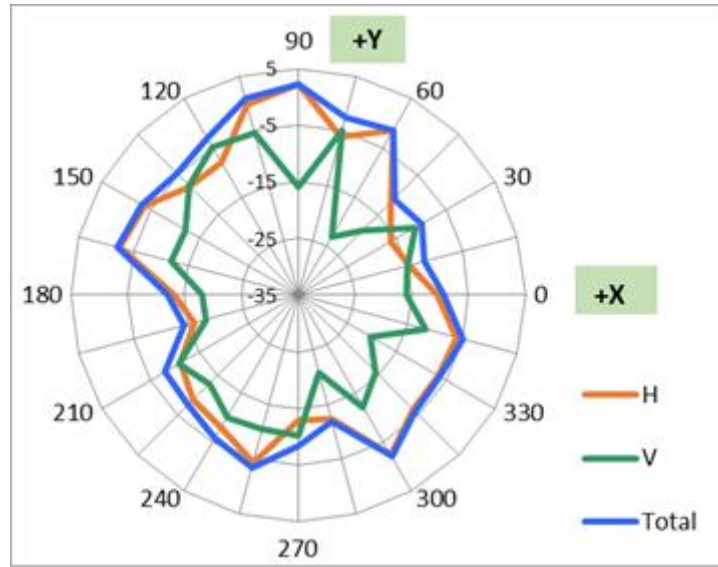
**Aux antenna:**



Horizontal+ Vertical (dBi) peak	2.37
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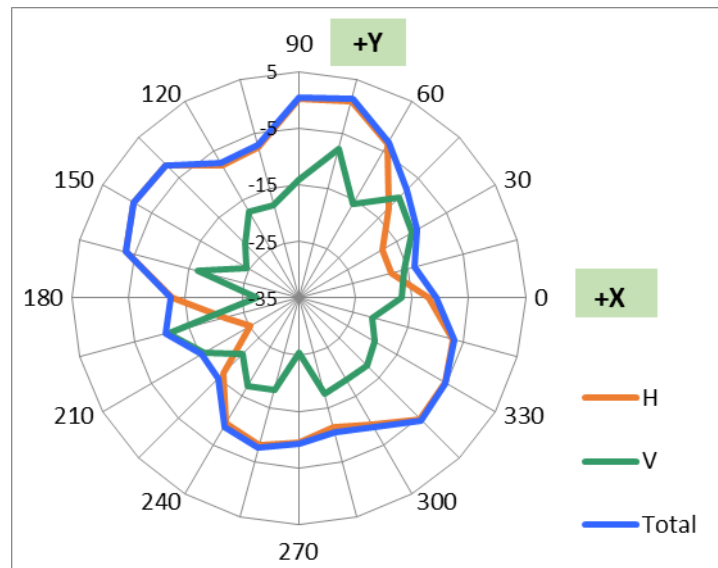
**5725-5850MHz radiation characteristic**(1E Peak Gain W/ Cable loss (dBi))

**Main antenna:**



Horizontal+ Vertical (dBi) peak	2.16
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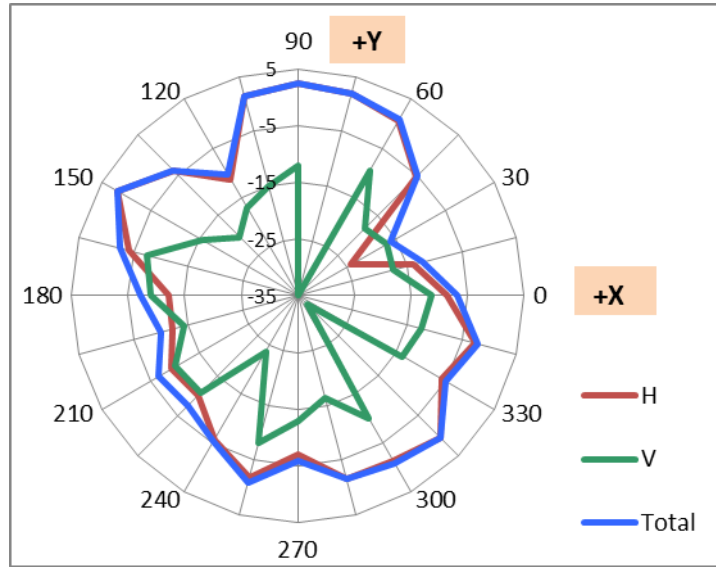
**Aux antenna:**



Horizontal+ Vertical (dBi) peak	1.51
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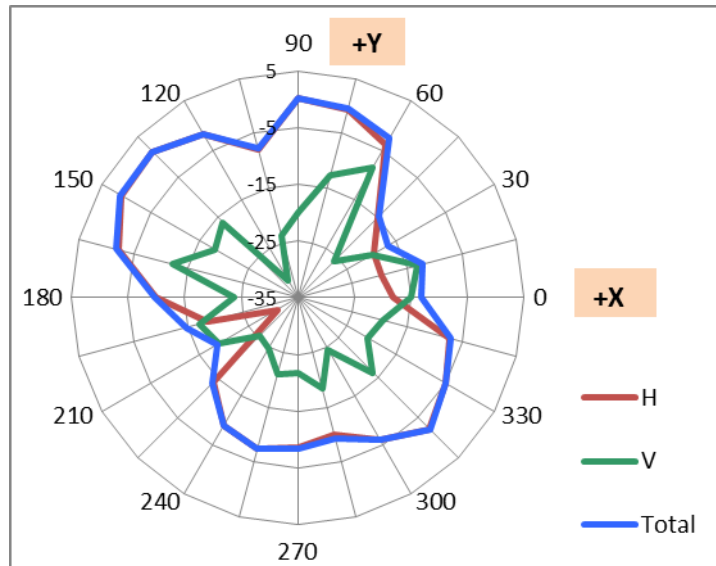
**5925-6425MHz radiation characteristic**(1E Peak Gain W/ Cable loss (dBi))

**Main antenna:**



Horizontal+ Vertical (dBi) peak	<b>2.50</b>
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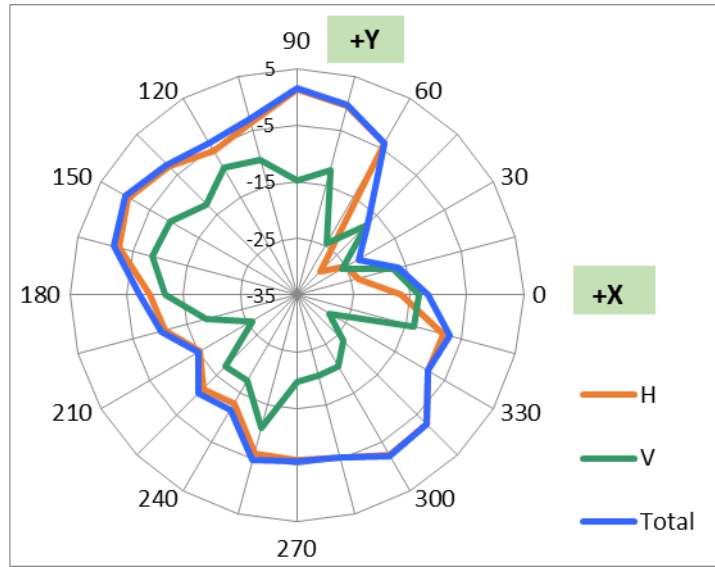
**Aux antenna:**



Horizontal+ Vertical (dBi) peak	<b>1.35</b>
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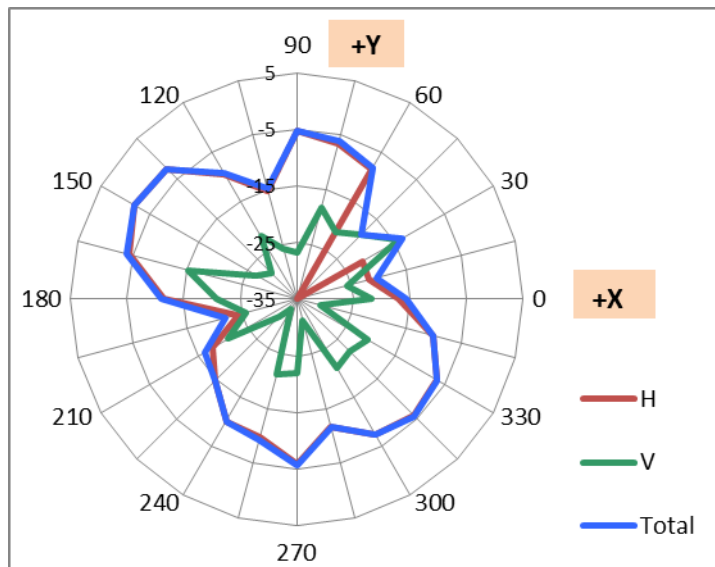
**6425-6525MHz radiation characteristic** (1E Peak Gain W/ Cable loss (dBi))

**Main antenna:**



Horizontal+ Vertical (dBi) peak	1.45
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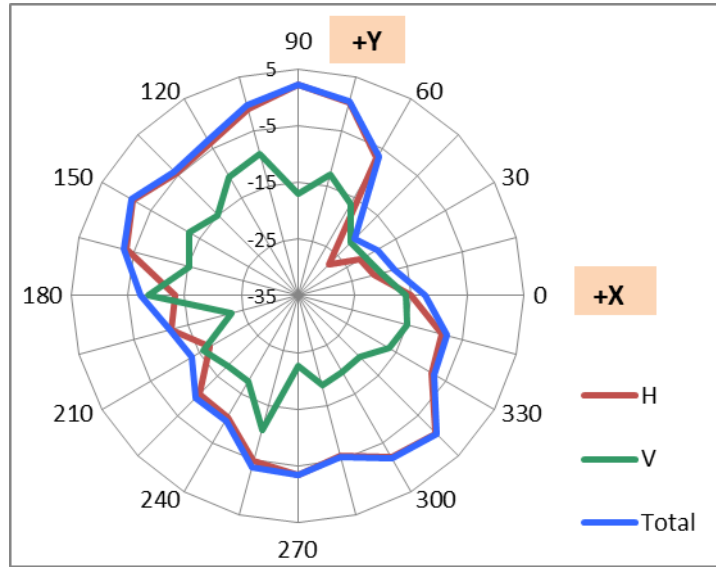
**Aux antenna:**



Horizontal+ Vertical (dBi) peak	-1.84
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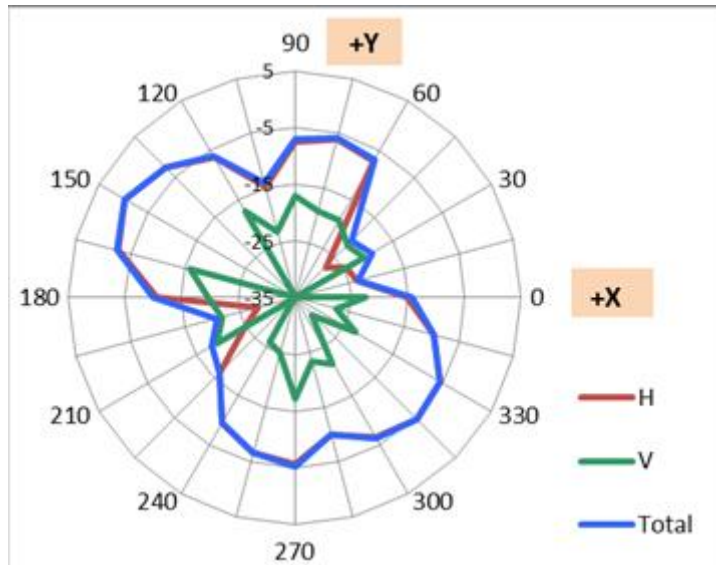
**6525-6875MHz radiation characteristic**(1E Peak Gain W/ Cable loss (dBi))

**Main antenna:**



Horizontal+ Vertical (dBi) peak	2.23
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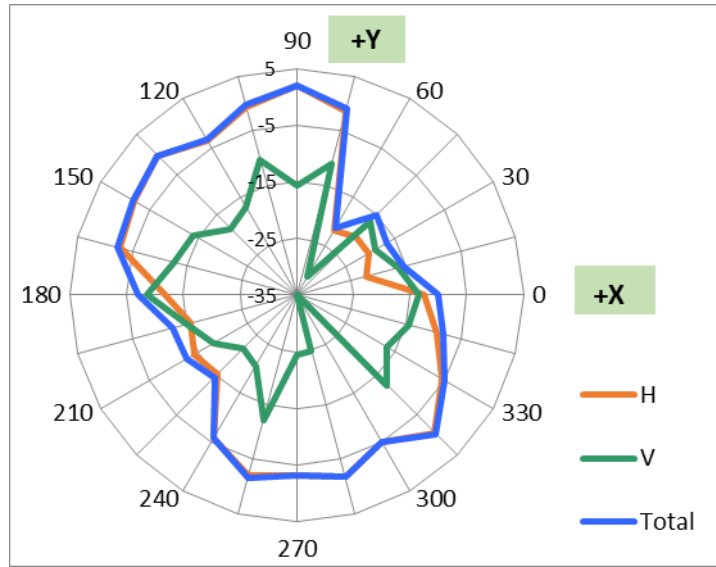
**Aux antenna:**



Horizontal+ Vertical (dBi) peak	-0.35
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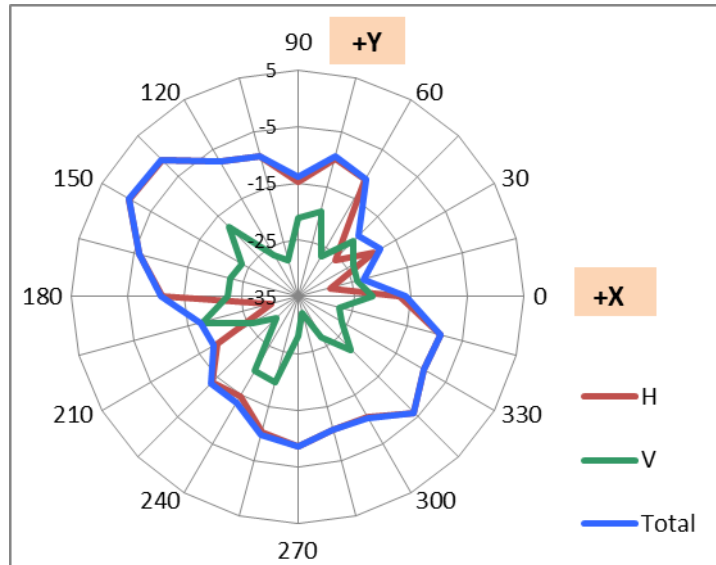
**6875-7125MHz radiation characteristic**(1E Peak Gain W/ Cable loss (dBi))

**Main antenna:**



Horizontal+ Vertical (dBi) peak	<b>2.03</b>
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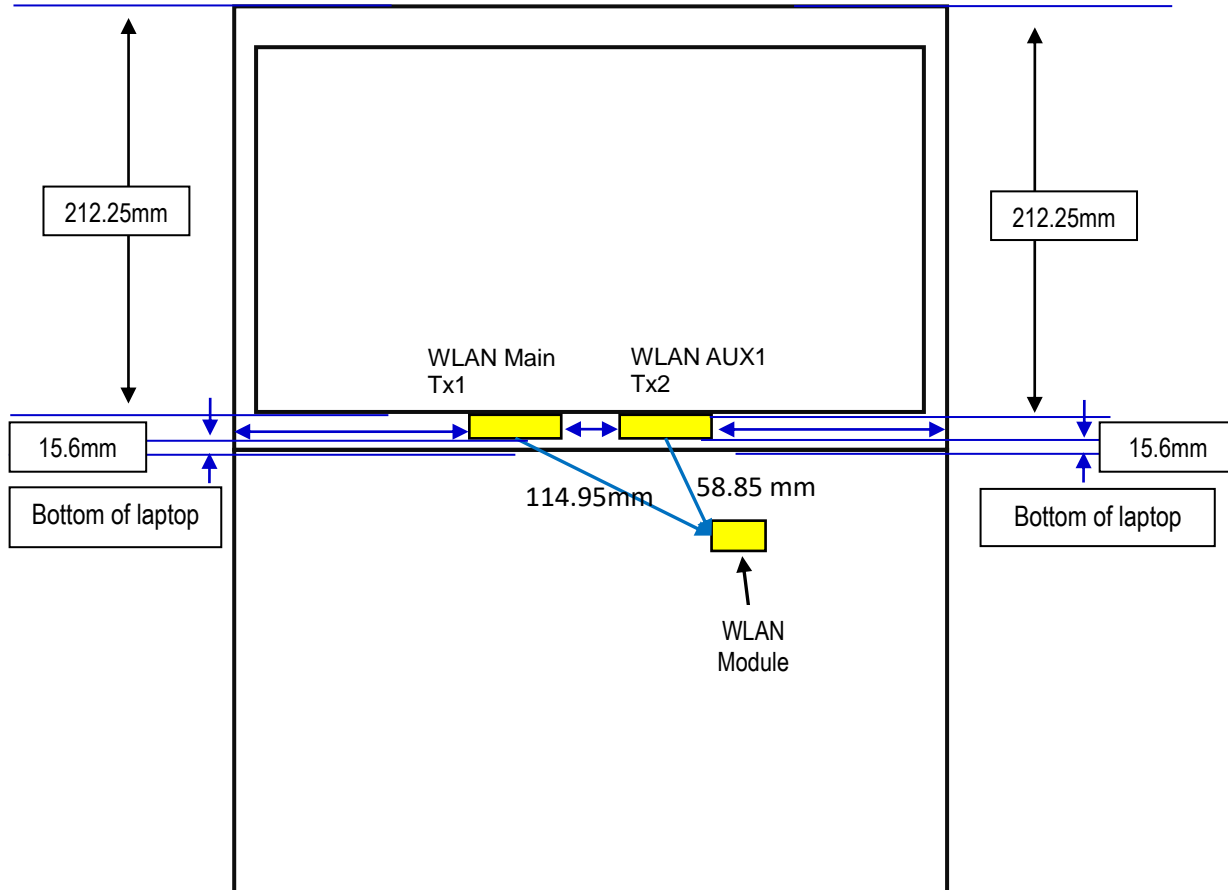
**Aux antenna:**



Horizontal+ Vertical (dBi) peak	<b>-0.64</b>
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## Section 4. Antenna Host Platform Location Information

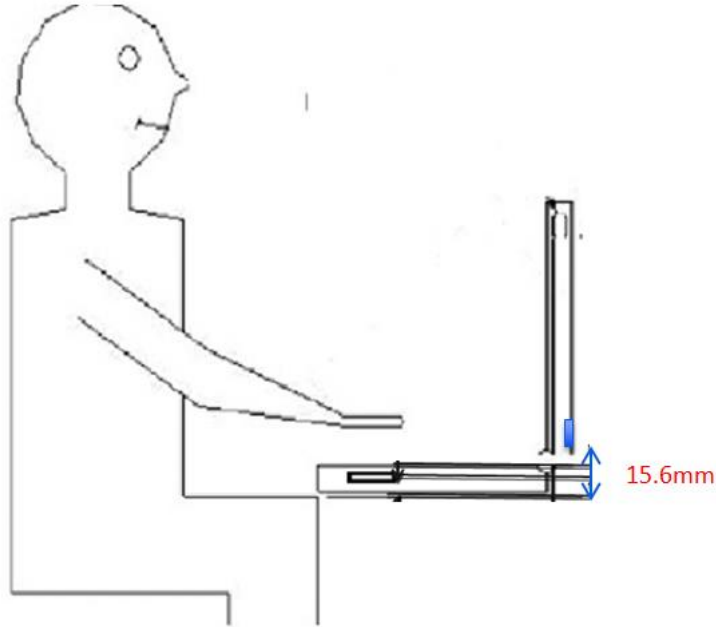
Include a **dimensioned photo(s) or dimensioned drawing(s)** of Main and Aux antenna placements (measurements are not required for receive-only antenna). Any antenna that transmits must show dimensions to bottom of laptop. Provide a description of the materials that are used for supporting or surrounding transmit antennas; for example, non-conductive plastics vs. conductive coated plastic or metallic materials.





## Section 5. Antenna dimensional information for SAR evaluation

Include a **dimensioned photo(s) or dimensioned drawing(s)** showing the distance (mm) between the transmit antennas and the user. For notebook/laptop hosts show lapheld position (example below). For tablet hosts show all orientations including lapheld, primary & secondary portrait, primary & secondary landscape positions. Include a description of any proximity sensors or power throttling implementations that limit or exclude use of any host orientation.



## Section 6. 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)

