

# Regulatory WLAN Antenna Information (TB 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                                                               | TPN-C154                  | Convertible PC                                             |                        |                        | 1.52                           |                        |
|                                                                                                                                                                                                                                                                                 |                                                                                  |                           |                                                            |                        |                        |                                |                        |
| Antenna information                                                                                                                                                                                                                                                             |                                                                                  |                           |                                                            |                        |                        |                                |                        |
| Vendor                                                                                                                                                                                                                                                                          |                                                                                  | Type                      | Antenna Part number (Main/TX1)                             |                        |                        | Antenna Part number (Aux/ TX2) |                        |
| INPAQ                                                                                                                                                                                                                                                                           |                                                                                  | PIFA                      | DC33002JZ00 (WA-P-LBLB-02-128)                             |                        |                        | DC33002JZ00 (WA-P-LBLB-02-128) |                        |
| Peak gain w/ cable loss (dBi)                                                                                                                                                                                                                                                   |                                                                                  |                           |                                                            |                        |                        |                                |                        |
| 2.4GHz<br>2400-2500MHz                                                                                                                                                                                                                                                          | 5.2&5.3GHz<br>5150-5350MHz                                                       | 5.5GHz<br>5470-5725MHz    | 5.8GHz<br>5725-5850MHz                                     | 6.2GHz<br>5925-6425MHz | 6.5GHz<br>6425-6525MHz | 6.7GHz<br>6525-6875MHz         | 6.9GHz<br>6875-7125MHz |
| -1.74                                                                                                                                                                                                                                                                           | 1.60                                                                             | -1.49                     | -1.67                                                      | -1.00                  | -0.39                  | -0.09                          | -0.09                  |
|                                                                                                                                                                                                                                                                                 |                                                                                  |                           |                                                            |                        |                        |                                |                        |
| 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 *)                                                                                                                                                                                                                                                           |                                                                                  |                           |                                                            |                        |                        |                                |                        |
| <b>* SAR minimum separation (mm)</b><br>- Regular NB: Minimum antenna-to-body (from antenna bottom to the bottom of the device)<br>- Tablet / Convertible PC: Minimum antenna-to-edge (5 sides of the device)<br>- Mini-tablet: Minimum antenna-to-edge (6 sides of the device) |                                                                                  |                           |                                                            |                        |                        |                                |                        |
| <b>* 3D Peak Antenna gain should be equal or greater than -2 dBi</b><br>- 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.                          |                                                                                  |                           |                                                            |                        |                        |                                |                        |

## 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

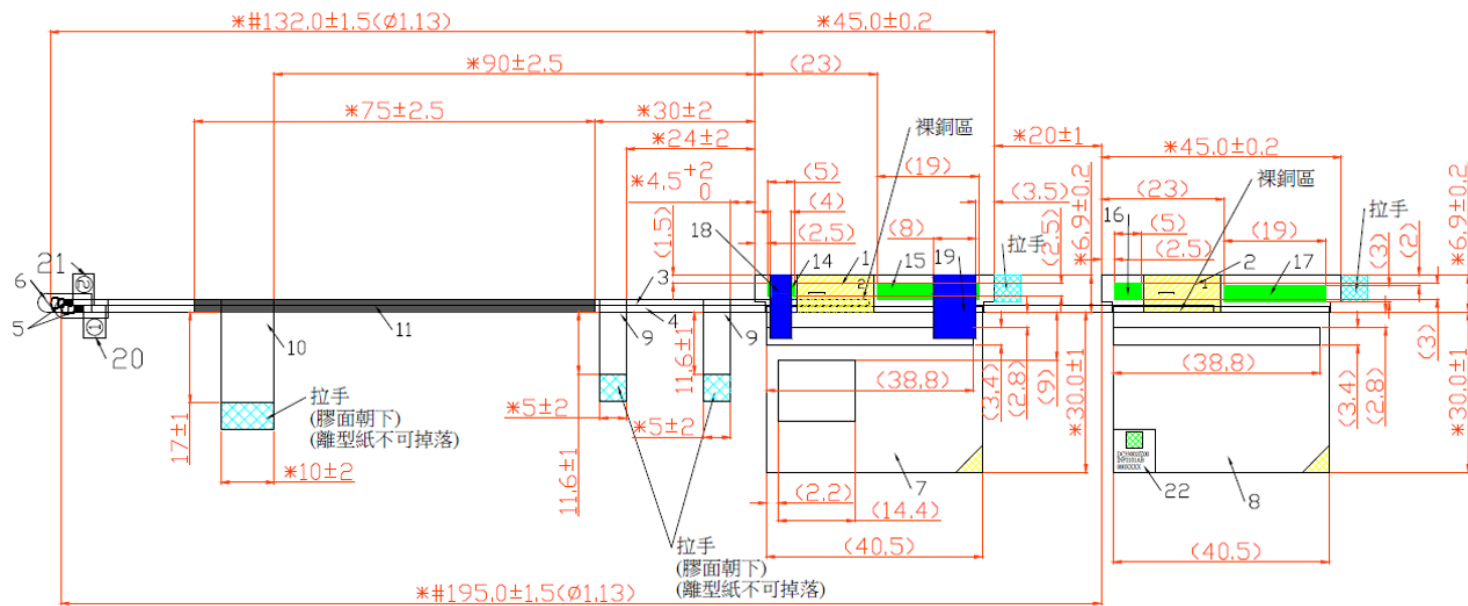
| 1A<br>Antenna Part Number                                          | 1B<br>Manu-facturer | 1C<br>Antenna Type | 1D<br>Cable Assembly Part Number and Information                    | Freq Range MHz | 1E<br>*Peak Gain W/ Cable loss (dBi) | 1F<br>Peak Gain w/o Cable Loss (dBi) | 1G<br>Max VSWR | 1H<br>Cable Loss (dB) |
|--------------------------------------------------------------------|---------------------|--------------------|---------------------------------------------------------------------|----------------|--------------------------------------|--------------------------------------|----------------|-----------------------|
| P/N: DC33002JZ00<br>(Vendor P/N: WA-P-LBLB-02-128)<br>Main Antenna | INPAQ               | PIFA               | 50 ohm Coaxial<br>length: 195mm<br>diameter: 1.13mm<br>I-PEX MHF-4L | 2400-2500      | -1.77                                | -1.35                                | 3              | 0.42                  |
|                                                                    |                     |                    |                                                                     | 5150-5250      | -0.89                                | -0.30                                | 3              | 0.59                  |
|                                                                    |                     |                    |                                                                     | 5250-5350      | -0.89                                | -0.27                                | 3              | 0.62                  |
|                                                                    |                     |                    |                                                                     | 5470-5725      | -1.61                                | -0.97                                | 3              | 0.64                  |
|                                                                    |                     |                    |                                                                     | 5725-5850      | -1.74                                | -1.09                                | 3              | 0.65                  |
|                                                                    |                     |                    |                                                                     | 5925-6425      | -1.00                                | -0.32                                | 3              | 0.68                  |
|                                                                    |                     |                    |                                                                     | 6425-6525      | -0.39                                | 0.30                                 | 3              | 0.69                  |
|                                                                    |                     |                    |                                                                     | 6525-6875      | -0.09                                | 0.62                                 | 3              | 0.71                  |
|                                                                    |                     |                    |                                                                     | 6875-7125      | -0.09                                | 0.64                                 | 3              | 0.73                  |
| P/N: DC33002JZ00<br>(Vendor P/N: WA-P-LBLB-02-128)<br>Aux Antenna  | INPAQ               | PIFA               | 50 ohm Coaxial<br>length:132mm<br>diameter: 1.13mm<br>I-PEX MHF-4L  | 2400-2500      | -1.74                                | -1.16                                | 3              | 0.58                  |
|                                                                    |                     |                    |                                                                     | 5150-5250      | 1.60                                 | 2.44                                 | 3              | 0.84                  |
|                                                                    |                     |                    |                                                                     | 5250-5350      | 1.60                                 | 2.47                                 | 3              | 0.87                  |
|                                                                    |                     |                    |                                                                     | 5470-5725      | -1.49                                | -0.60                                | 3              | 0.89                  |
|                                                                    |                     |                    |                                                                     | 5725-5850      | -1.67                                | -0.76                                | 3              | 0.91                  |
|                                                                    |                     |                    |                                                                     | 5925-6425      | -1.25                                | -0.30                                | 3              | 0.95                  |
|                                                                    |                     |                    |                                                                     | 6425-6525      | -1.31                                | -0.34                                | 3              | 0.97                  |
|                                                                    |                     |                    |                                                                     | 6525-6875      | -1.43                                | -0.44                                | 3              | 0.99                  |
|                                                                    |                     |                    |                                                                     | 6875-7125      | -1.86                                | -0.84                                | 3              | 1.02                  |

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

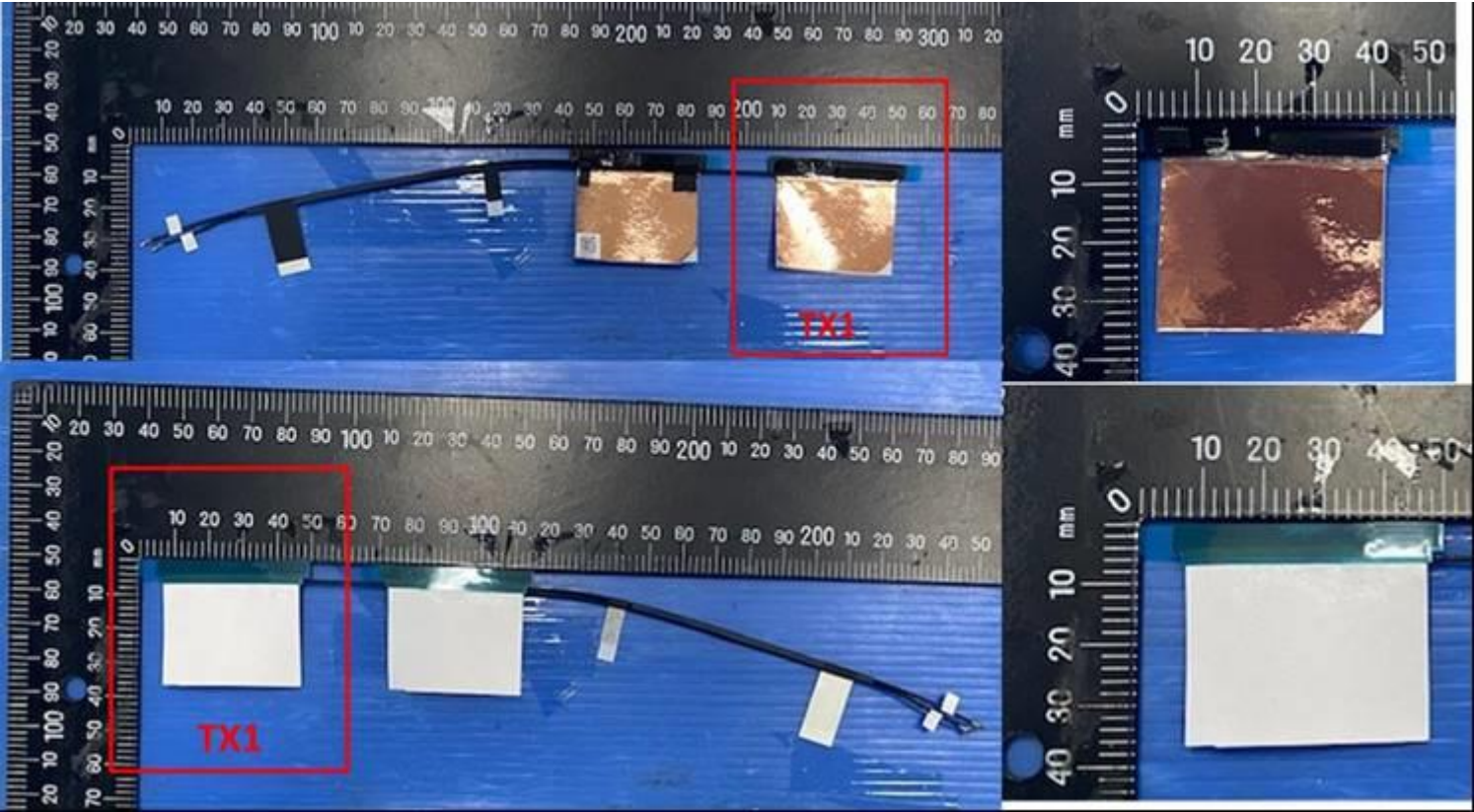
Section 2. Dimensioned Photos or Drawings of Antennas

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

Tx1 Antenna Dimensioned Drawing:



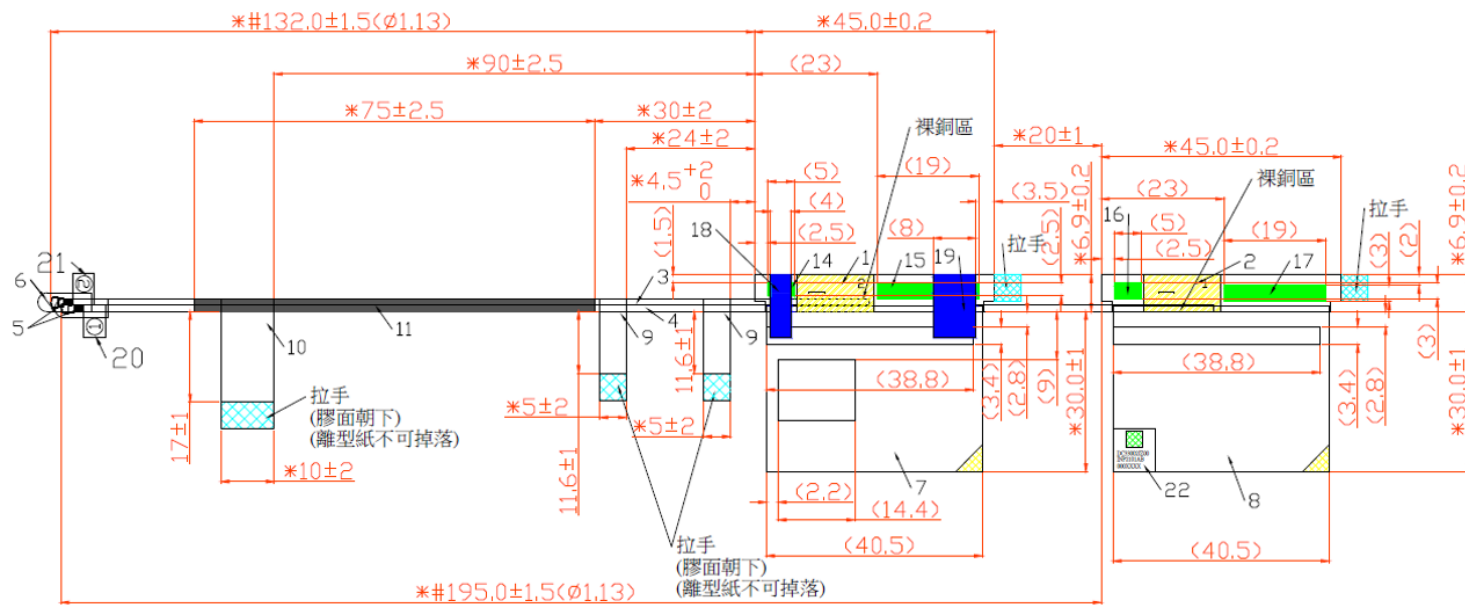
Tx1 Antenna Photo:



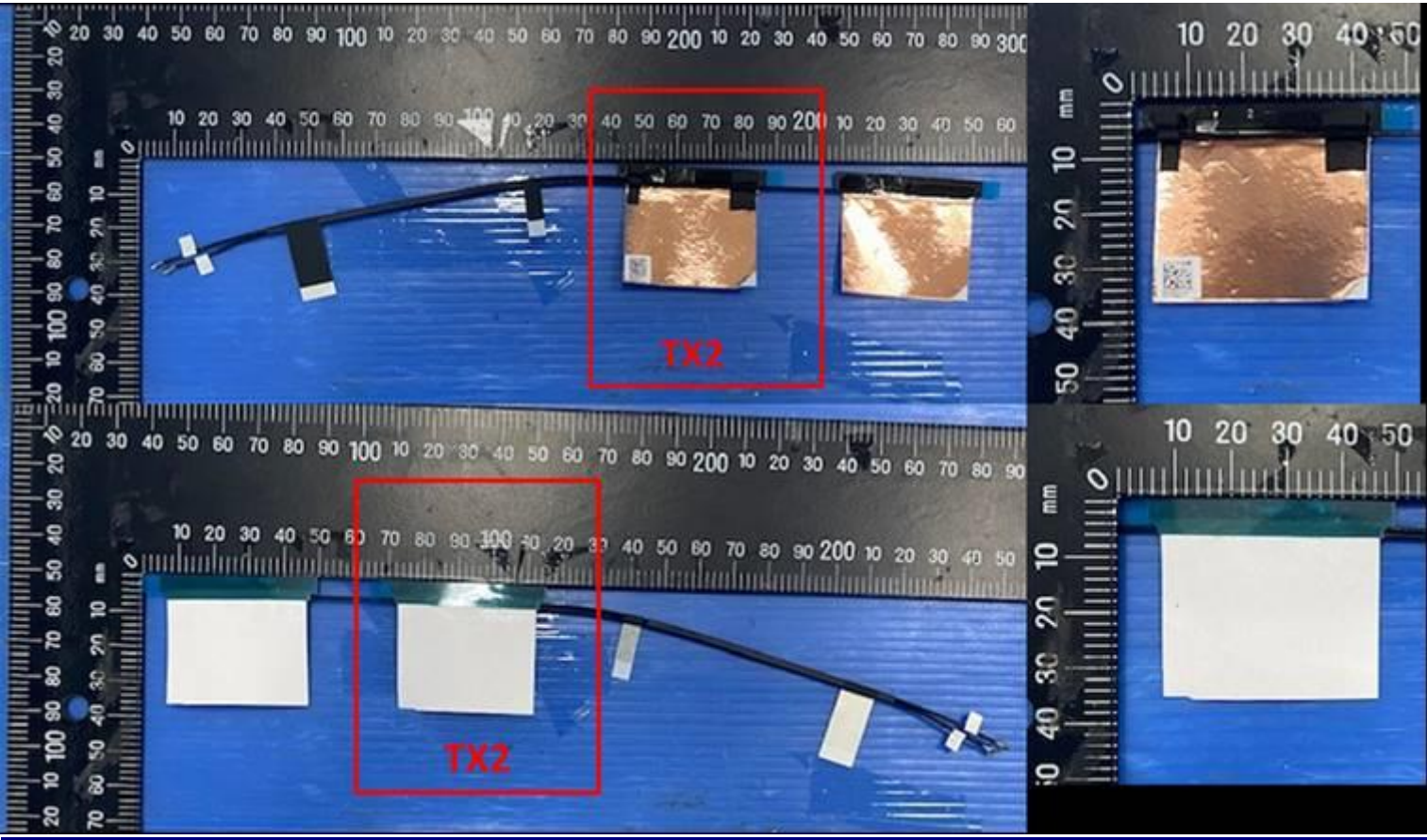


Include a dimensioned photo and dimensioned drawing of Tx2 (or Rx2) antenna here.

Tx2 (or Rx2) Antenna Dimensioned Drawing:



Tx2 (or Rx2) Antenna Photo:

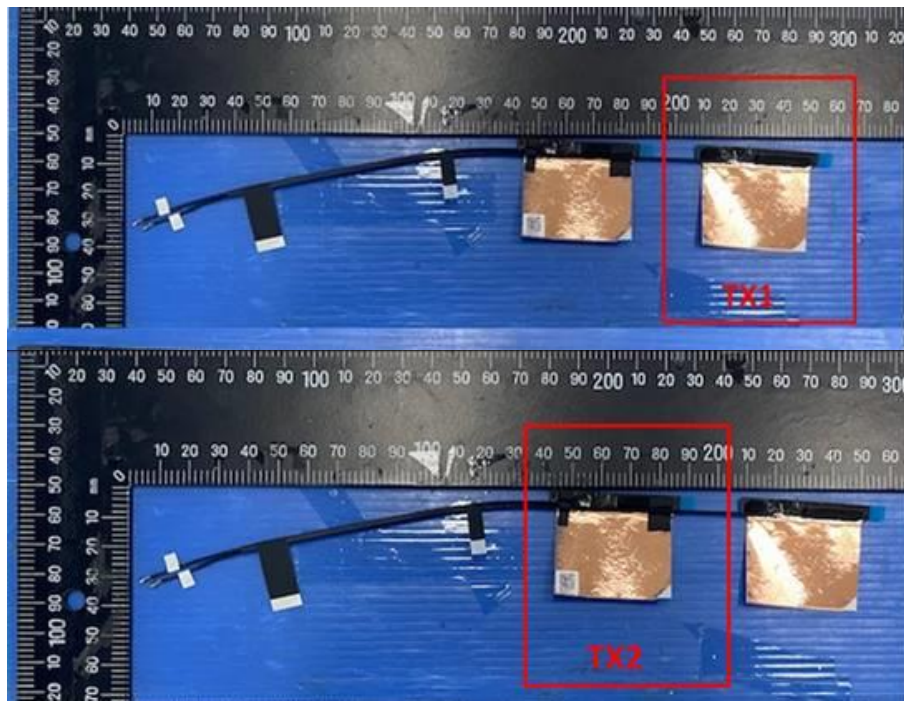


Note: antenna photo should include L type ruler

Include front view photo of all 2 antennas here.

Antenna Manufacturer: INPAQ

Antenna Part Number: DC33002JZ00(WA-P-LBLB-02-128) (Tx1), (Tx2 or Rx2)

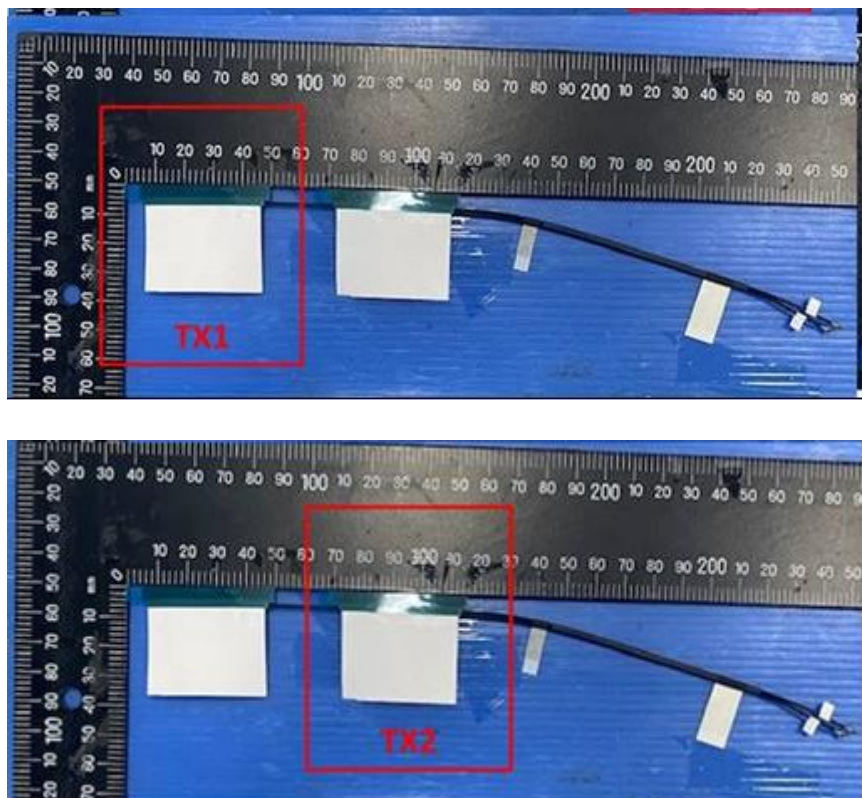


Note: antenna photo should include L type ruler

Include back view photo of all 2 antennas here.

Antenna Manufacturer: INPAQ

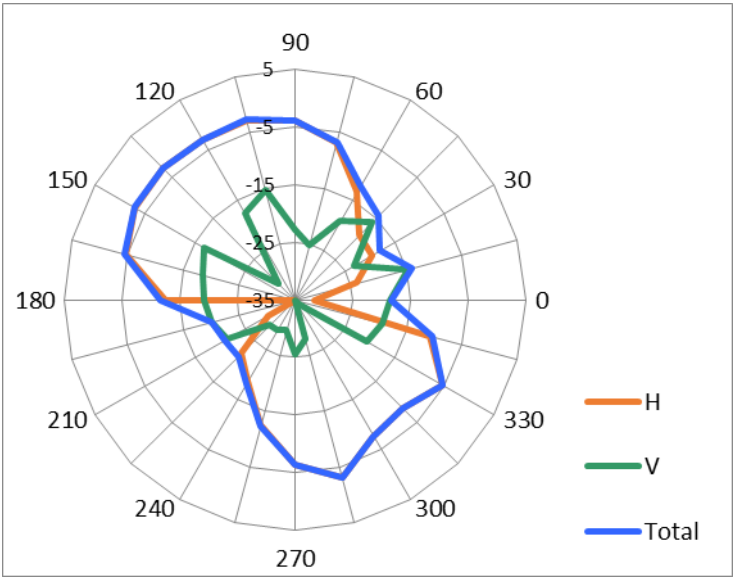
Antenna Part Number: DC33002JZ00(WA-P-LBLB-02-128) (Tx1), (Tx2 or Rx2)



Section 3. Radiation characteristics of antennae Loaded in Host Platform

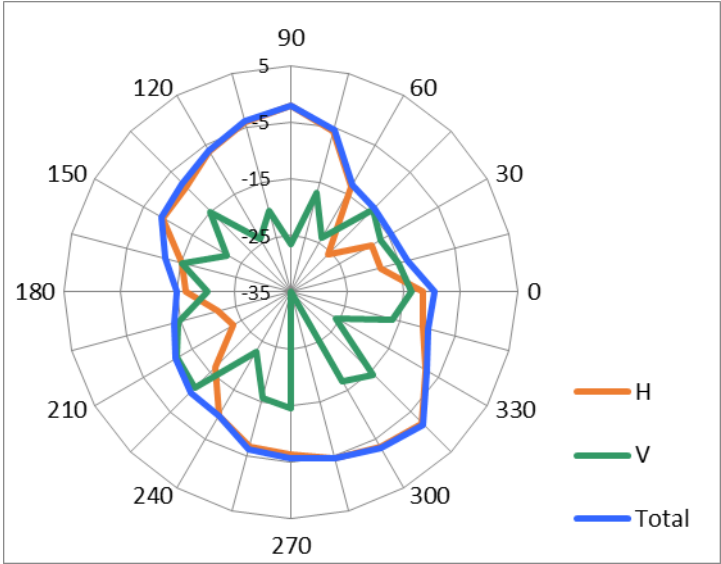
2400-2500MHz radiation characteristic (1E Peak Gain W/ Cable loss (dBi))

Main antenna:



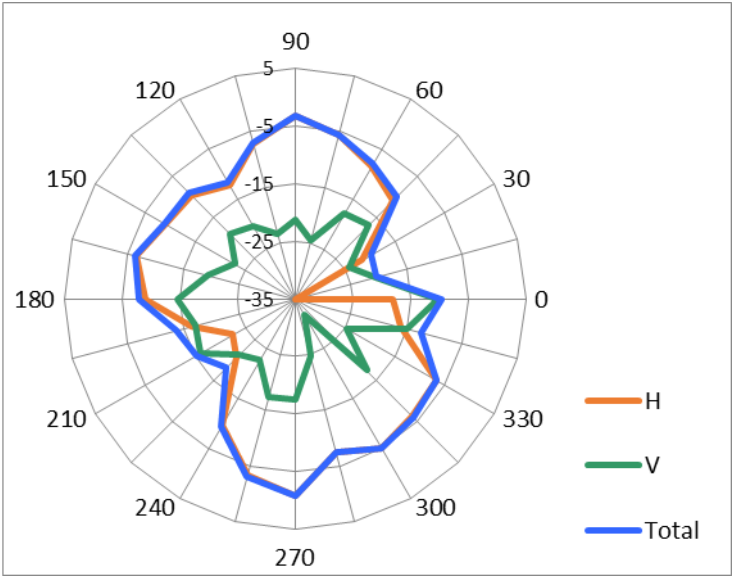
|                                 |               |
|---------------------------------|---------------|
| Center Frequency                | 2400-2500 MHz |
| Horizontal+ Vertical (dBi) peak | -1.77         |

Aux antenna:



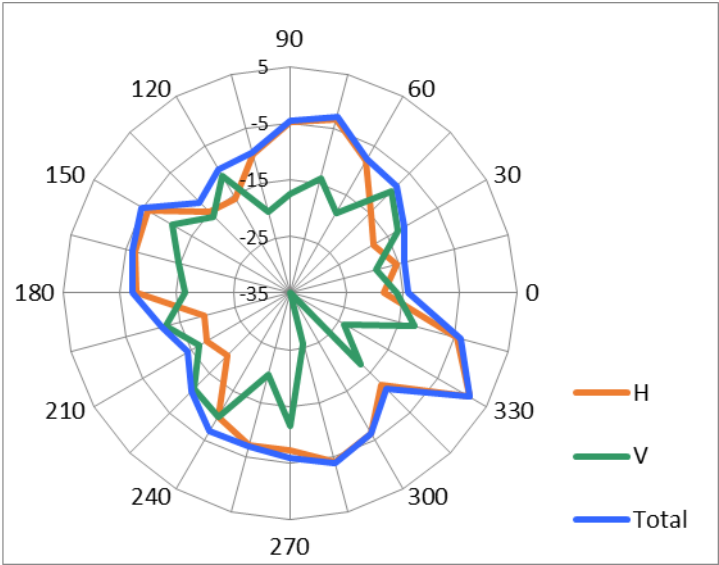
|                                 |               |
|---------------------------------|---------------|
| Center Frequency                | 2400-2500 MHz |
| Horizontal+ Vertical (dBi) peak | -1.74         |

5150-5250MHz radiation characteristic  
Main antenna:



|                                 |       |
|---------------------------------|-------|
| Horizontal+ Vertical (dBi) peak | -0.89 |
|---------------------------------|-------|

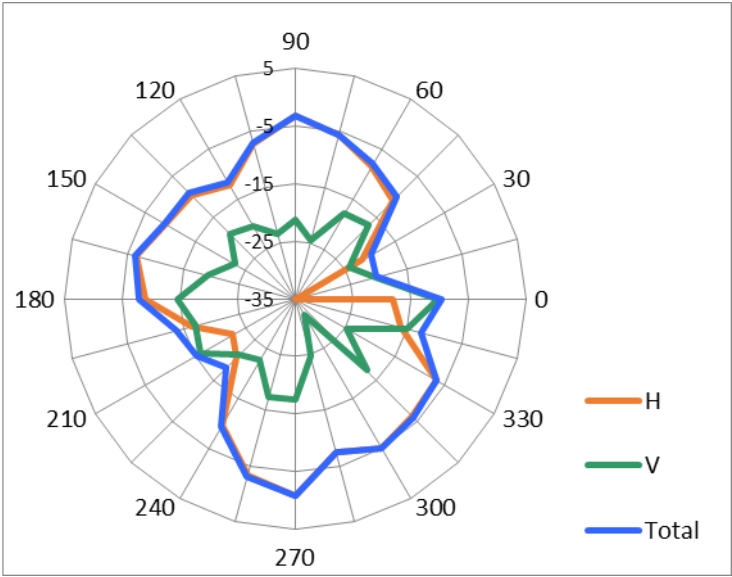
Aux antenna:



|                                 |      |
|---------------------------------|------|
| Horizontal+ Vertical (dBi) peak | 1.60 |
|---------------------------------|------|

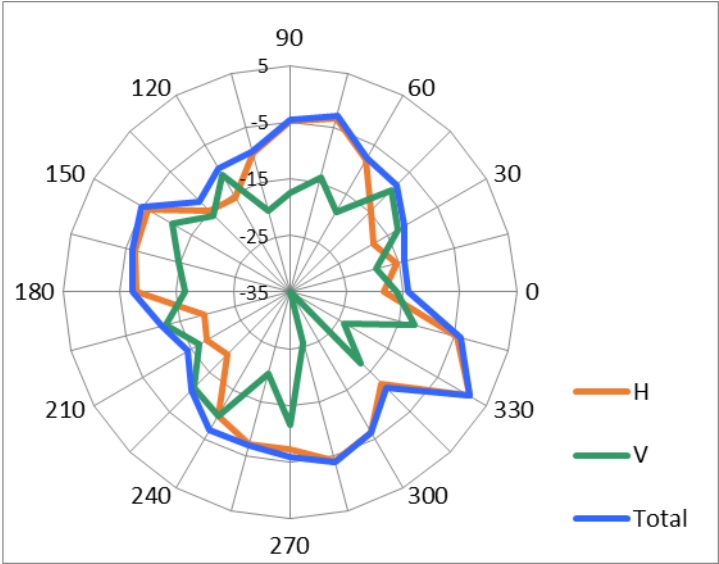


5250-5350MHz radiation characteristic  
Main antenna:



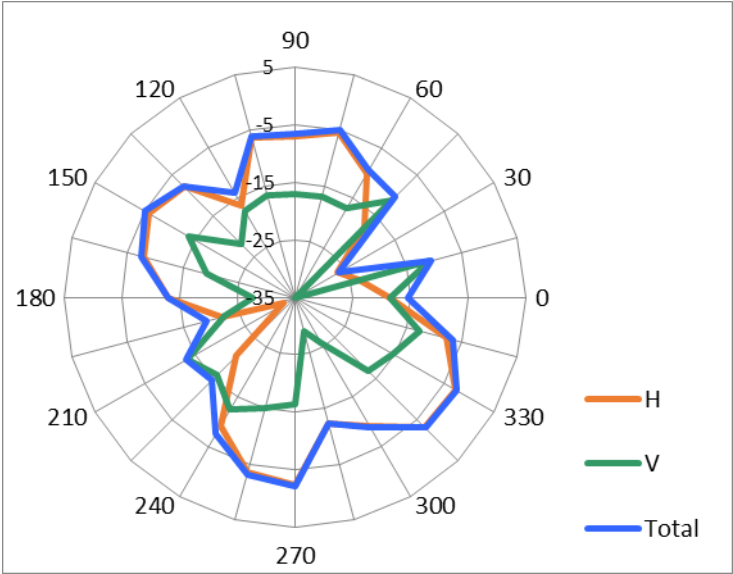
|                                 |       |
|---------------------------------|-------|
| Horizontal+ Vertical (dBi) peak | -0.89 |
|---------------------------------|-------|

Aux antenna:



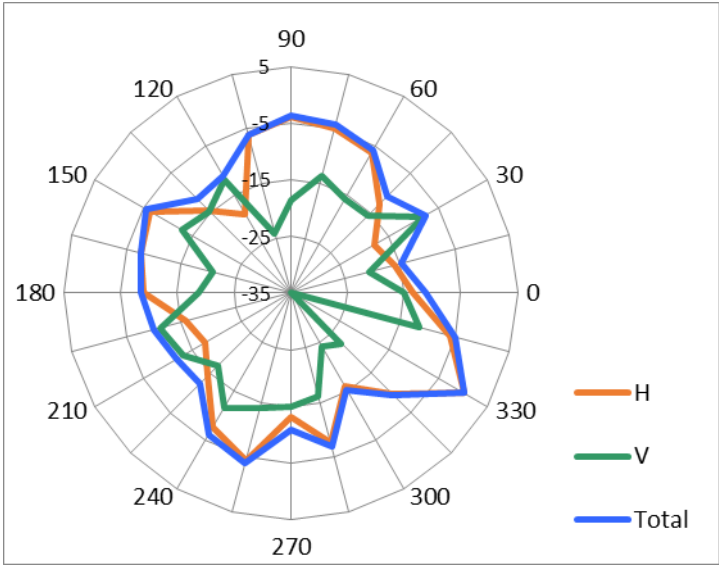
|                                 |      |
|---------------------------------|------|
| Horizontal+ Vertical (dBi) peak | 1.60 |
|---------------------------------|------|

5470-5725MHz radiation characteristic(1E Peak Gain W/ Cable loss (dBi))  
Main antenna:



|                                 |       |
|---------------------------------|-------|
| Horizontal+ Vertical (dBi) peak | -1.61 |
|---------------------------------|-------|

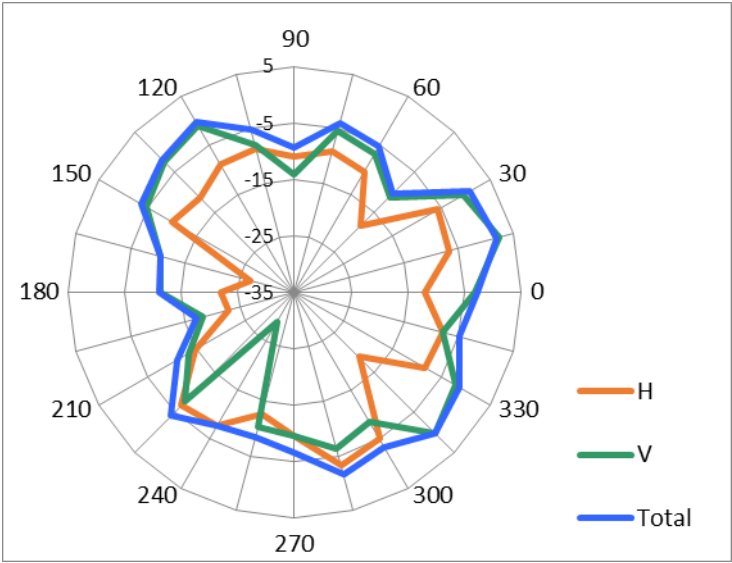
Aux antenna:



|                                 |       |
|---------------------------------|-------|
| Horizontal+ Vertical (dBi) peak | -1.49 |
|---------------------------------|-------|

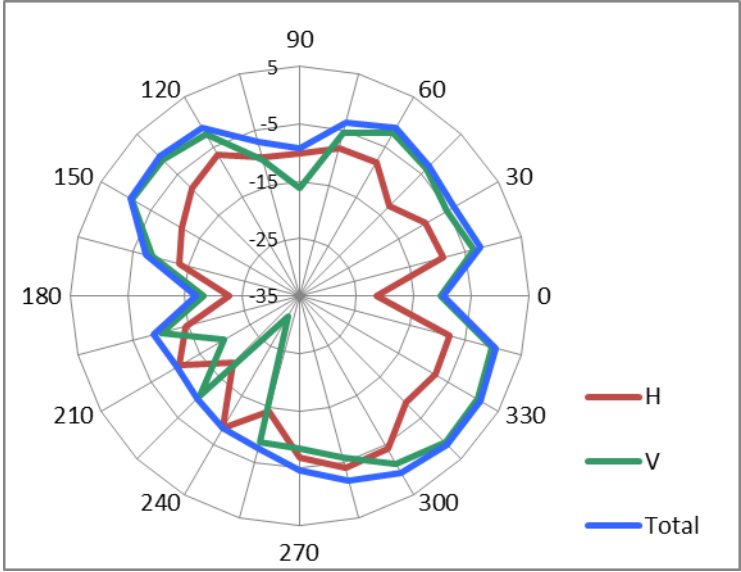
5725-5850MHz radiation characteristic(1E Peak Gain W/ Cable loss (dBi))

Main antenna:



|                                 |       |
|---------------------------------|-------|
| Horizontal+ Vertical (dBi) peak | -1.74 |
|---------------------------------|-------|

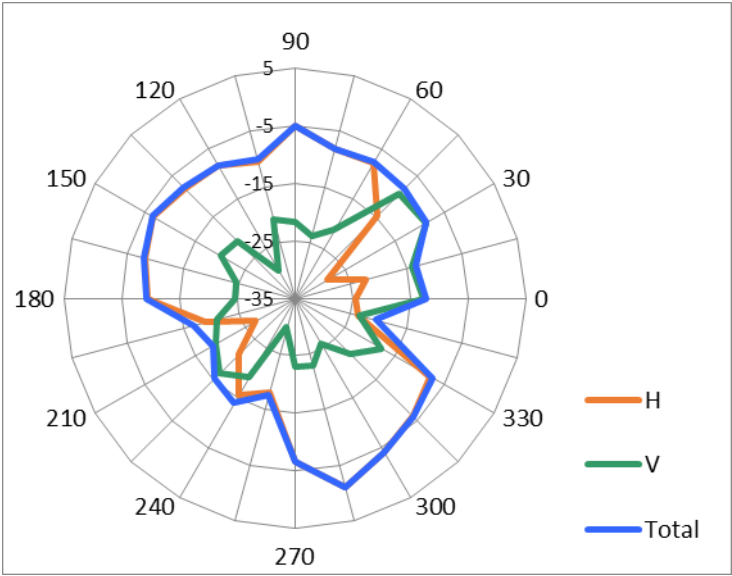
Aux antenna:



|                                 |       |
|---------------------------------|-------|
| Horizontal+ Vertical (dBi) peak | -1.67 |
|---------------------------------|-------|

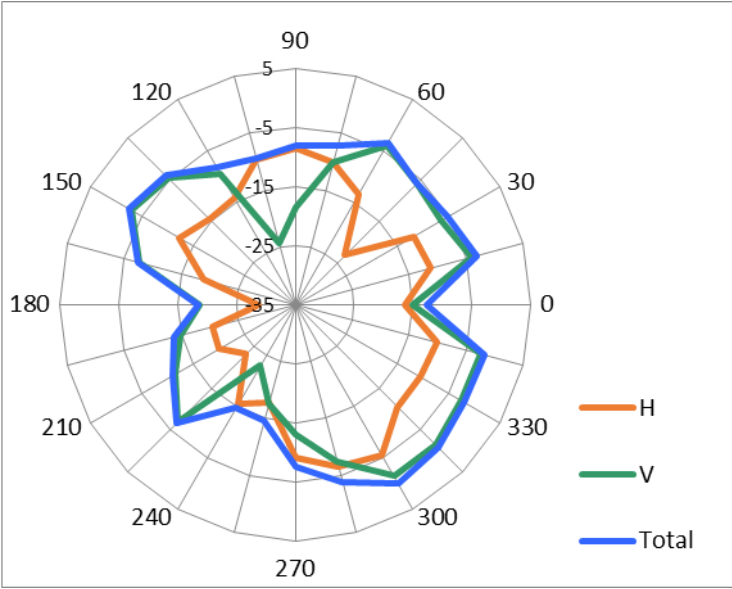
5925-6425MHz radiation characteristic(1E Peak Gain W/ Cable loss (dBi))

Main antenna:



|                                 |       |
|---------------------------------|-------|
| Horizontal+ Vertical (dBi) peak | -1.00 |
|---------------------------------|-------|

Aux antenna:

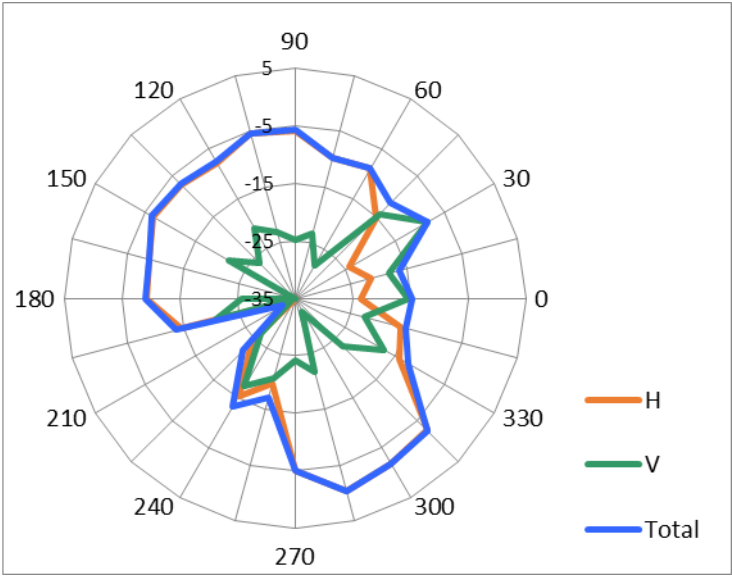


|                                 |       |
|---------------------------------|-------|
| Horizontal+ Vertical (dBi) peak | -1.25 |
|---------------------------------|-------|



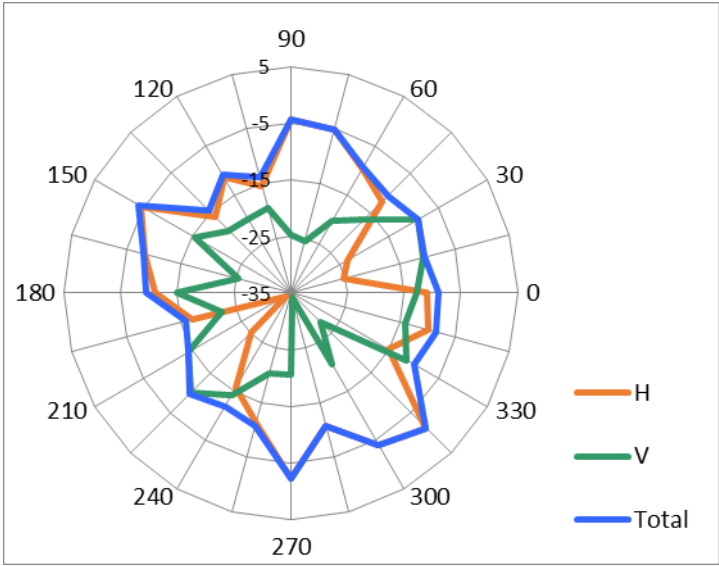
6425-6525MHz radiation characteristic (1E Peak Gain W/ Cable loss (dBi))

Main antenna:



|                                 |       |
|---------------------------------|-------|
| Horizontal+ Vertical (dBi) peak | -0.39 |
|---------------------------------|-------|

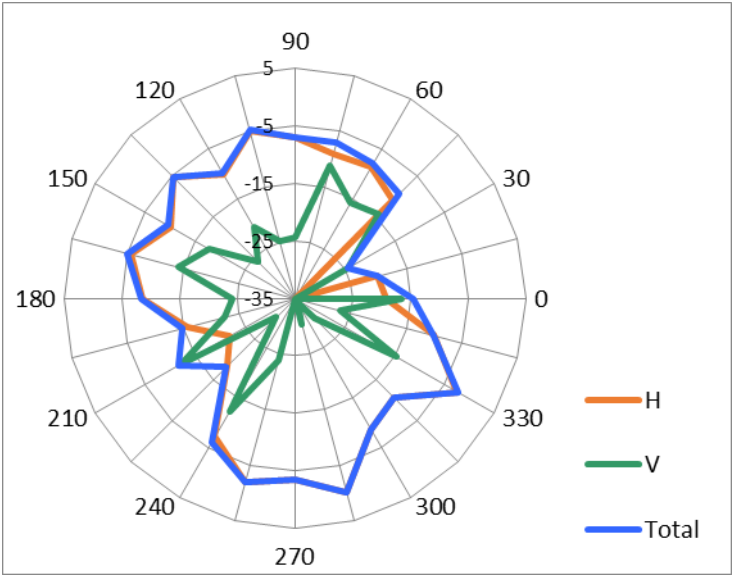
Aux antenna:



|                                 |       |
|---------------------------------|-------|
| Horizontal+ Vertical (dBi) peak | -1.31 |
|---------------------------------|-------|

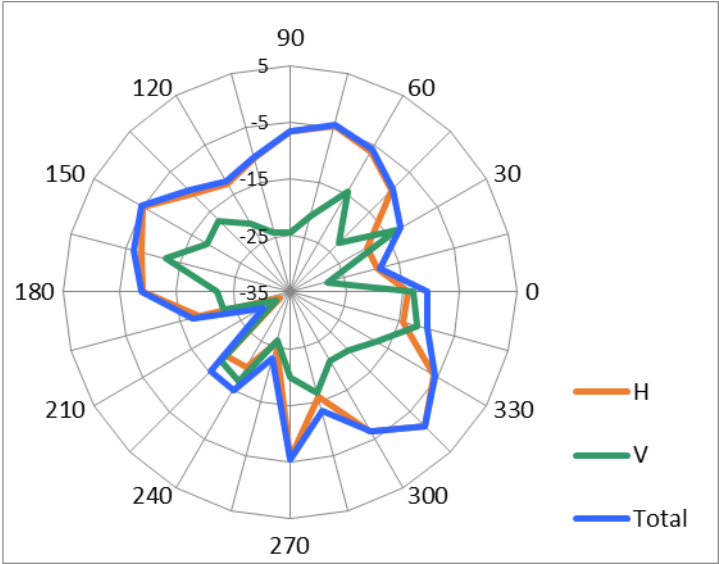
6525-6875MHz radiation characteristic(1E Peak Gain W/ Cable loss (dBi))

Main antenna:



|                                 |       |
|---------------------------------|-------|
| Horizontal+ Vertical (dBi) peak | -0.09 |
|---------------------------------|-------|

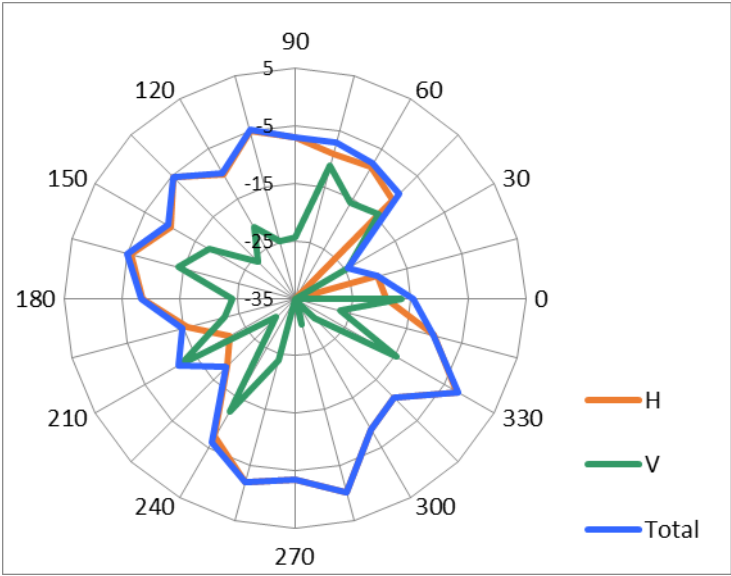
Aux antenna:



|                                 |       |
|---------------------------------|-------|
| Horizontal+ Vertical (dBi) peak | -1.43 |
|---------------------------------|-------|

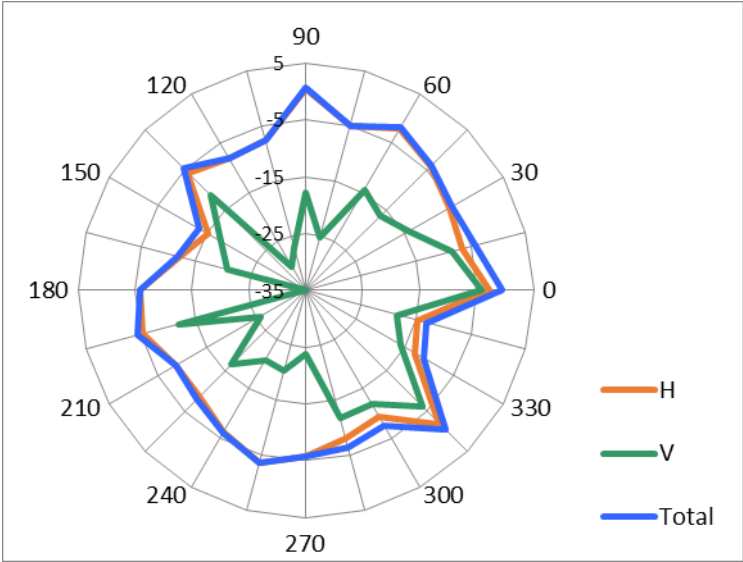
6875-7125MHz radiation characteristic(1E Peak Gain W/ Cable loss (dBi))

Main antenna:



|                                 |       |
|---------------------------------|-------|
| Horizontal+ Vertical (dBi) peak | -0.09 |
|---------------------------------|-------|

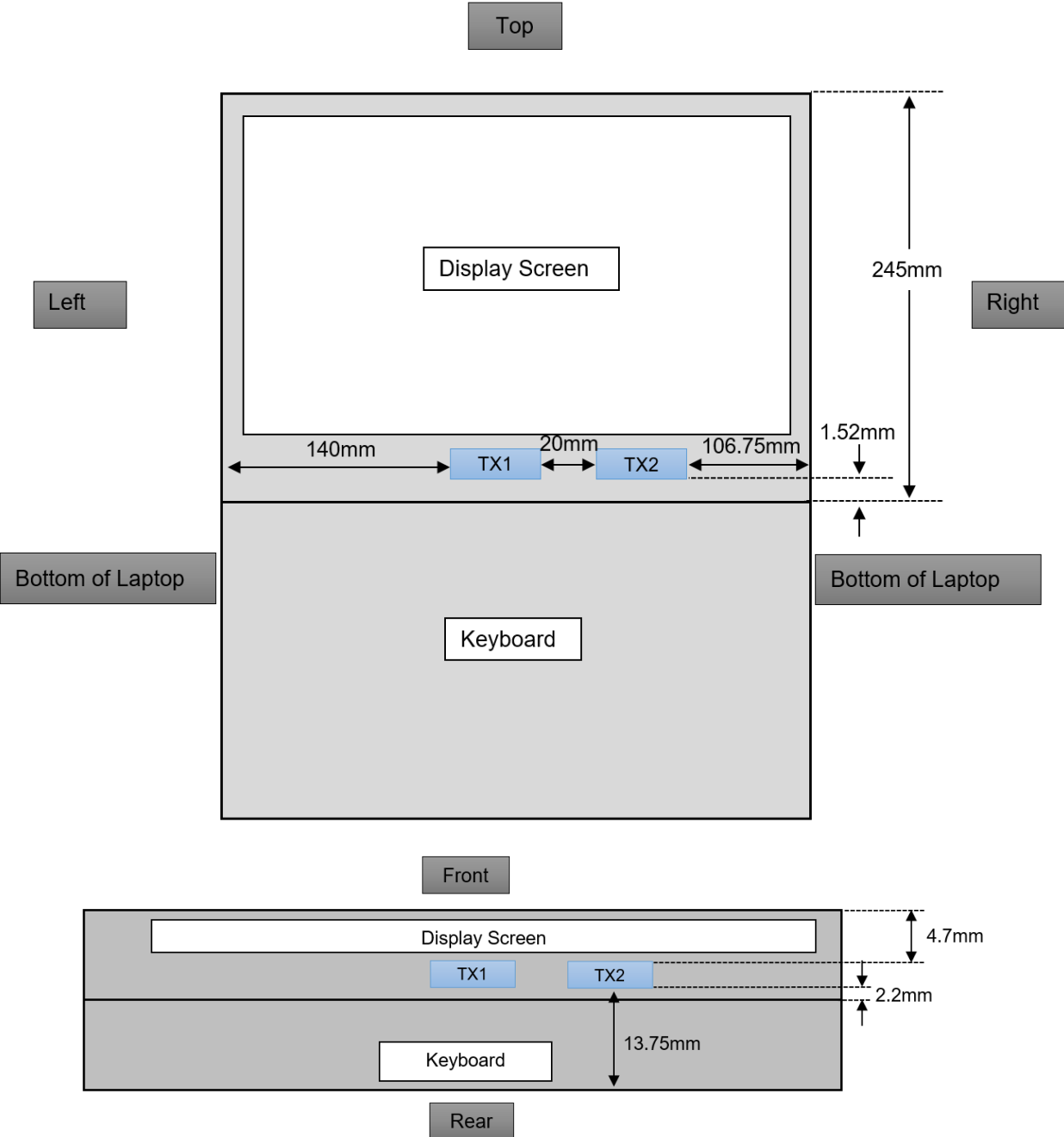
Aux antenna:



|                                 |       |
|---------------------------------|-------|
| Horizontal+ Vertical (dBi) peak | -1.86 |
|---------------------------------|-------|

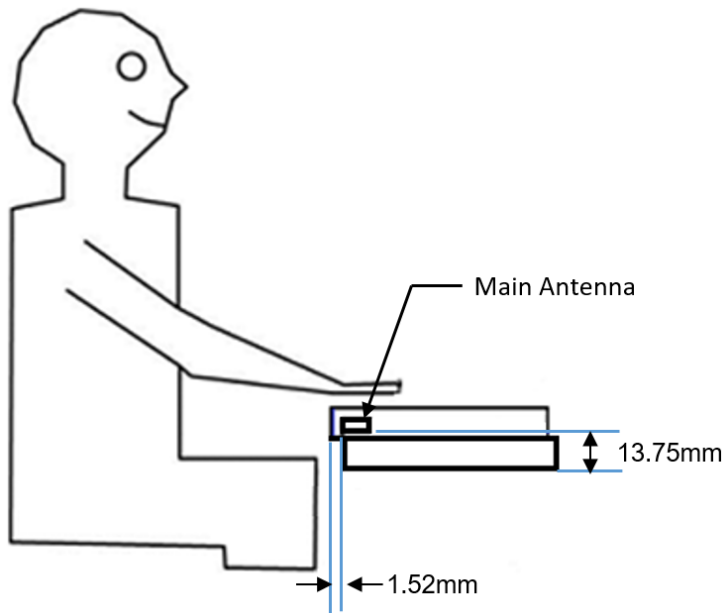
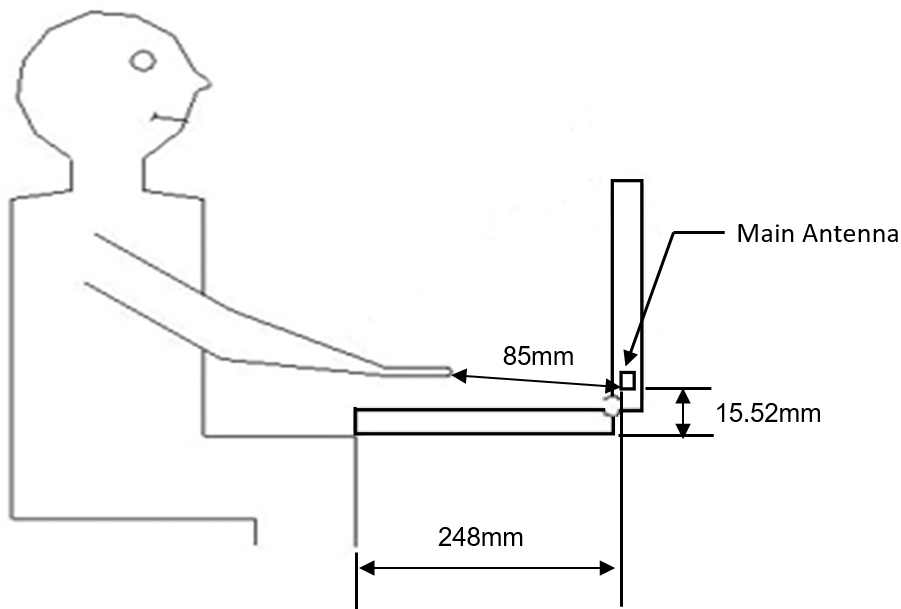
Section 4. Antenna Host Platform Location Information

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)

