

Regulatory WLAN Antenna Information

| | |
|--------------------|--|
| Platform | |
| Platform Owner | Dell Inc. |
| Brand Name | Dell |
| Regulatory Model | PT02 |
| Regulatory Type | PT02002 |
| ODM | Quanta Computer Inc. |
| Target Launch Date | 2010/3/30 |
| | |
| Antenna | |
| Brand Name | YAGEO |
| Part Number | ■ Tx1 Antenna: DQ643139W24 (WLAN Main) |
| | ■ Tx2 Antenna: DQ643139W24 (WLAN Aux) |
| | |
| Module | |
| With WLAN Module | ■ Intel 6250 |
| (Check Box) | |
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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 3rd 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:

| 6 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) |
|---------------------------------------|----------------------|-----------------------|--|--|--|-------------------|---------------------------|
| Tx1 Antenna DQ643139W2 4 | YAGEO Corporation | PIFA | 1) KURABE | 2412-2462MHz | 2412-2462MHz | 2412- 2462MHz | 2412- 2462MHz |
| | | | /Sumitom | -3.06dBi (peak) | -1.57dBi (peak) | 3 max | 1.49dBi (peak) |
| | | | 2) O,D. 1.13mm LLS 50 ohm coaxial cable | 2500-2700MHz | 2500-2700MHz | 2500- 2700MHz | 2500- 2700MHz |
| | | | 3)length:619 mm | -2.54dBi (peak) | -0.87dBi (peak) | 3 max | 1.67dBi (peak) |
| Main White | | | 4)Connector P/N:I-PEX MHF | 5150-5470MHz | 5150-5470MHz | 5150- 5470MHz | 5150- 5470MHz |
| | | | 0.95dBi (peak) | 3.36dBi (peak) | 3 max | 2.41dBi (peak) | |
| | | | 5725-5875MHz | 5725-5850MHz | 5725- 5850MHz | 5725- 5850MHz | |
| | | | 2.41dBi (peak) | 5.01dBi (peak) | 3 max | 2.6dBi (peak) | |
| Tx2 DQ643139W2 4 | YAGEO Corporation | PIFA | 1) KURABE | 2412-2462MHz | 2412-2462MHz | 2412- 2462MHz | 2412- 2462MHz |
| | | | /GBE | -0.93dBi (peak) | 0dBi (peak) | 3 max | 0.93dBi (peak) |
| | | | /Sumitom o | 2500-2700MHz | 2500-2700MHz | 2500- 2700MHz | 2500- 2700MHz |
| | | | 2) O,D. 1.13mm LLS 50 ohm coaxial cable | -1.62dBi (peak) | -0.58dBi (peak) | 3 max | 1.04dBi (peak) |
| Aux Black | | | 3)length:386 mm | 5150-5470MHz | 5150-5470MHz | 5150- 5470MHz | 5150- 5470MHz |
| | | | 4)Connector P/N:I-PEX MHF | 2.85dBi (peak) | 4.36dBi (peak) | 3 max | 1.51dBi (peak) |
| | | | 5725-5850MHz | 5725-5850MHz | 5725- 5850MHz | 5725- 5850MHz | |
| | | | 2.83dBi (peak) | 4.45dBi (peak) | 3 max | 1.62dBi (peak) | |

NOTE:

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

2D Antenna Peak Gain Table:

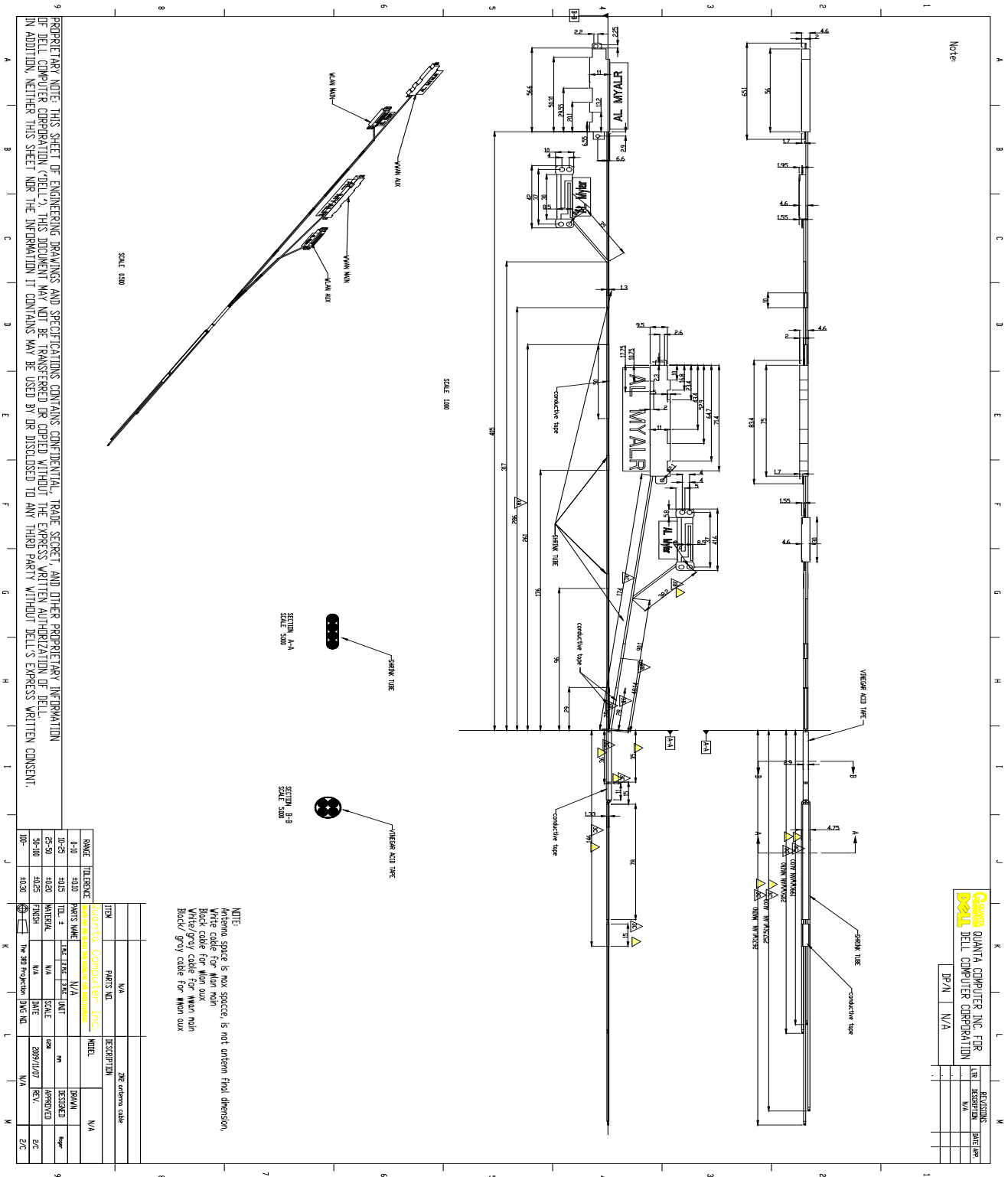
| Freq. (MHz) | WLAN-White(MAIN) | | WLAN-Black(AUX) | |
|----------------|------------------|-------|-----------------|-------|
| | H | V | H | V |
| | dBi | dBi | dBi | dBi |
| 2300 | -2.76 | -6.98 | -3.95 | -6.53 |
| 2350 | -5.66 | -5.51 | -4.28 | -5.40 |
| 2400 | -4.38 | -4.30 | -1.83 | -4.17 |
| 2450 | -3.26 | -3.06 | -0.93 | -2.23 |
| 2500 | -3.87 | -2.54 | -1.62 | -2.39 |
| 2600 | -4.98 | -3.65 | -3.29 | -6.99 |
| 2700 | -4.43 | -4.70 | -1.97 | -4.21 |
| 5150 | 0.95 | -5.79 | 1.95 | -4.28 |
| 5350 | 0.31 | -3.14 | 2.33 | -4.17 |
| 5470 | 0.26 | -3.70 | 2.85 | -3.17 |
| 5725 | 2.41 | -3.57 | 2.83 | -1.81 |
| 5825 | 2.23 | -3.74 | 1.93 | -2.72 |

- Antenna Peak Gain required being test in system basis.
- 1E frame contend absolutely peak antenna gain include H/V
- If Rx2 only (2nd antenna receives only, e.g. for 512 family) then the information is not required for Rx2.
- If Rx3 only (3rd 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.

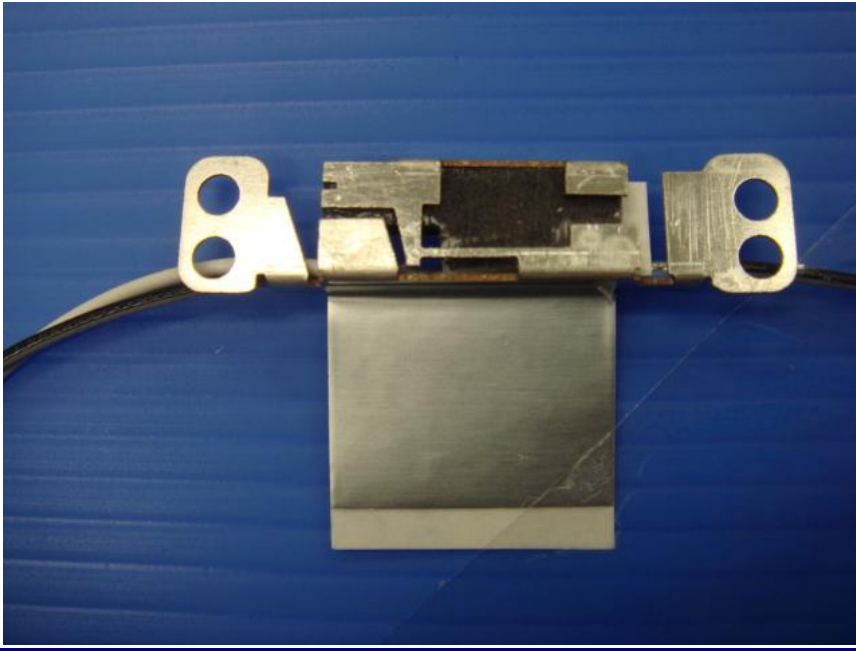
Tx1 Antenna Dimensioned Drawing:



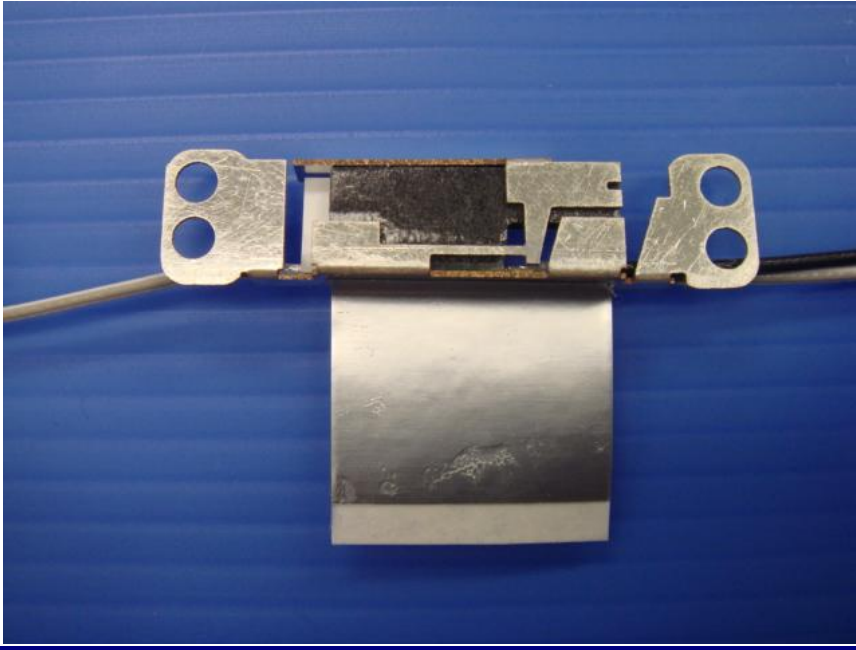
| ITEM | PARTS NO. | DESCRIPTION | QTY | REVISION | DATE |
|------|-----------|-------------|-----|----------|------|
| 1-1 | 3015 | ... | ... | ... | ... |
| 2-1 | 3015 | ... | ... | ... | ... |
| 3-1 | 3015 | ... | ... | ... | ... |
| 4-1 | 3015 | ... | ... | ... | ... |
| 5-1 | 3015 | ... | ... | ... | ... |
| 6-1 | 3015 | ... | ... | ... | ... |
| 7-1 | 3015 | ... | ... | ... | ... |
| 8-1 | 3015 | ... | ... | ... | ... |
| 9-1 | 3015 | ... | ... | ... | ... |

NOTE:
 Antenna space is max space, is not antenna final dimension.
 White cable for Nylon main
 Black cable for Nylon aux
 White/grey cable for Nylon main
 Black/grey cable for Nylon aux

Tx1 Antenna Photo:



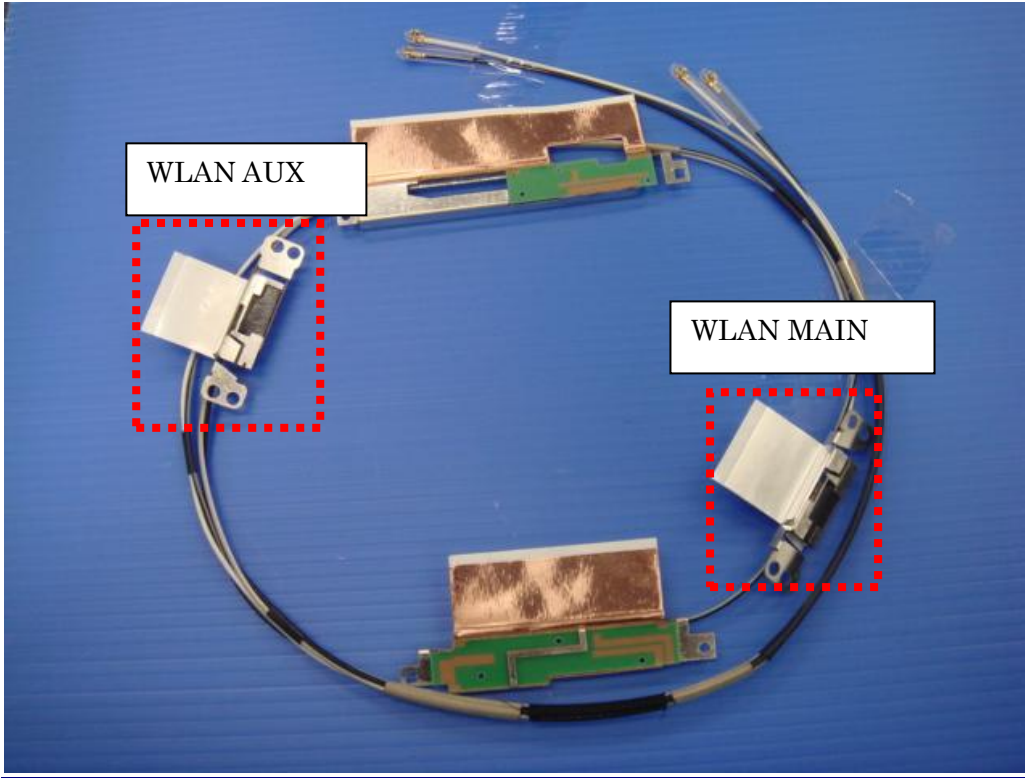
Tx2 (or Rx2) Antenna Photo:



Include front view photo of all 2 antennas here.

Antenna Manufacturer: YAGEO

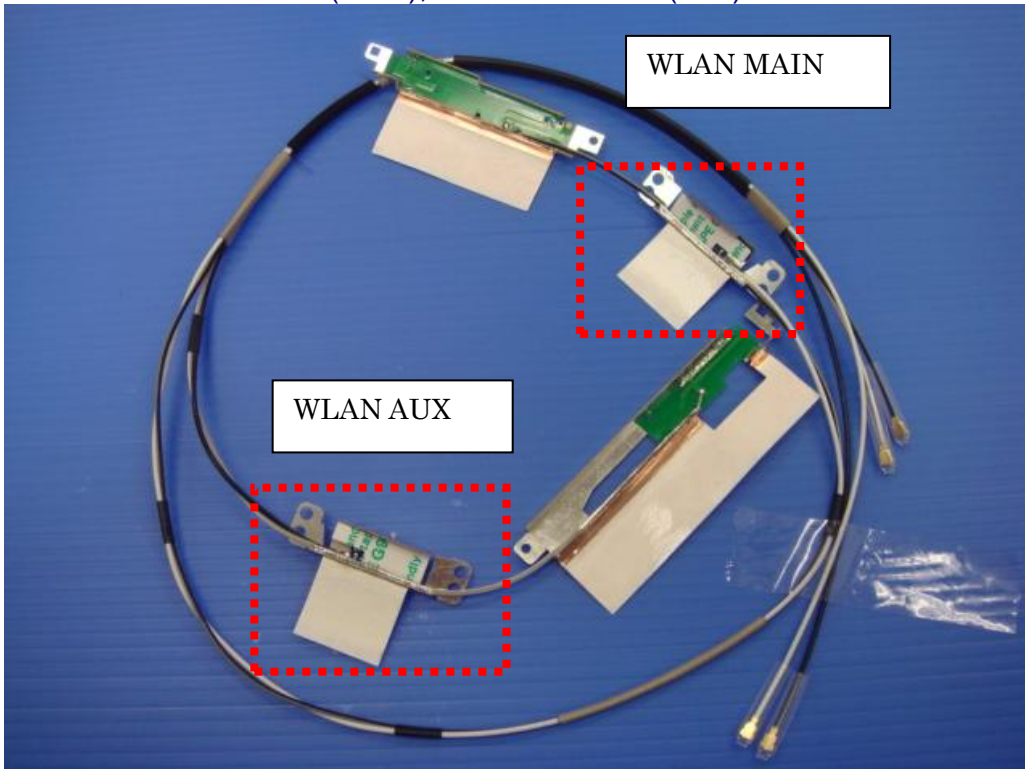
Antenna Part Number: DQ643139W24 (Main), DQ643139W24 (Aux)



Include back view photo of all 2 antennas here.

Antenna Manufacturer: YAGEO

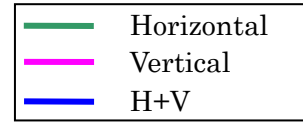
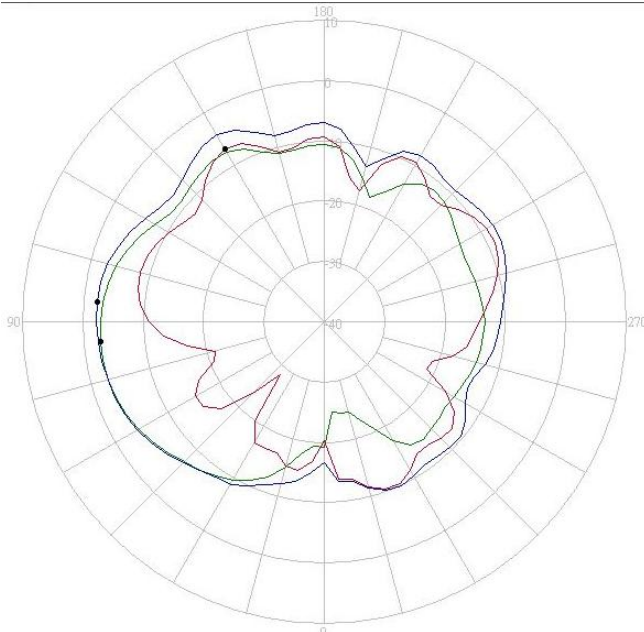
Antenna Part Number: DQ643139W24 (Main), DQ643139W24 (Aux)



Section 3. Radiation characteristics of antennae Loaded in Host Platform

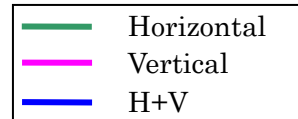
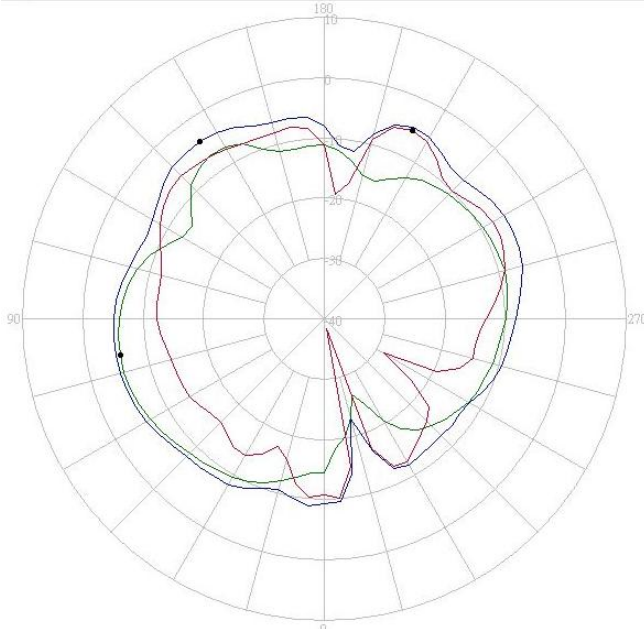
2300-2400MHz radiation characteristic

Tx1 antenna: 2300 MHz



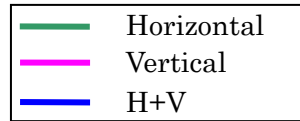
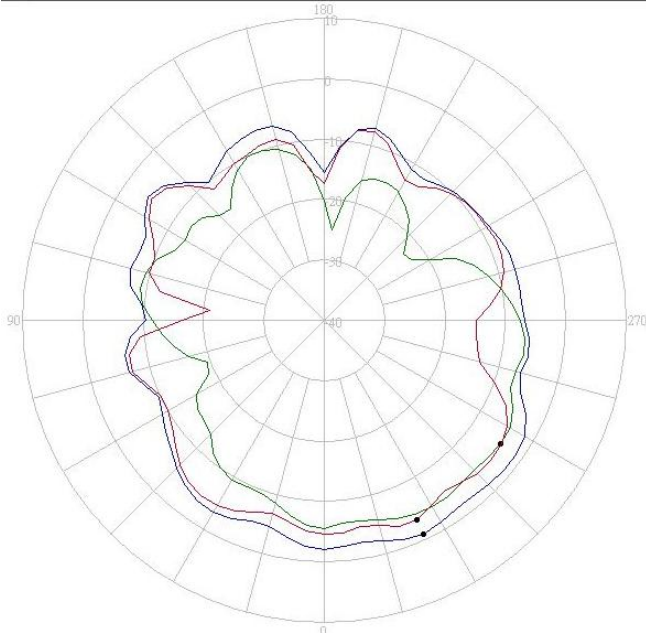
| 2300MHz | H | V |
|-----------|-------|-------|
| Peak Gain | -2.76 | -6.98 |

Tx1 antenna: 2350 MHz



| 2350MHz | H | V |
|-----------|-------|-------|
| Peak Gain | -5.66 | -5.51 |

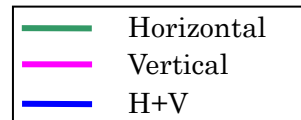
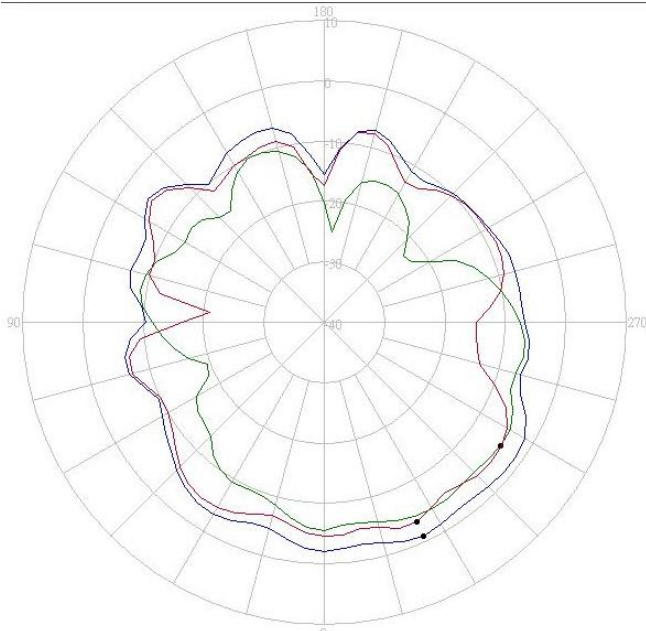
Tx1 antenna: 2400 MHz



| 2400MHz | H | V |
|-----------|-------|-------|
| Peak Gain | -4.38 | -4.30 |

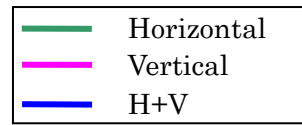
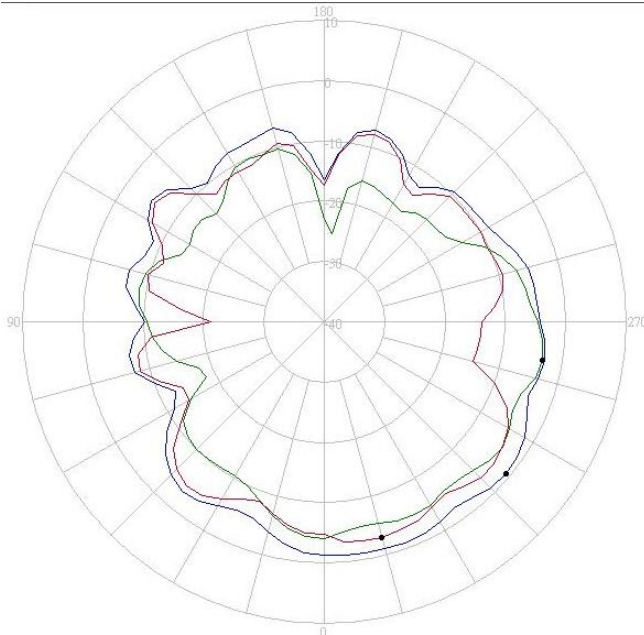
2400-2500MHz radiation characteristic

Tx1 antenna: 2400 MHz



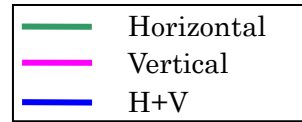
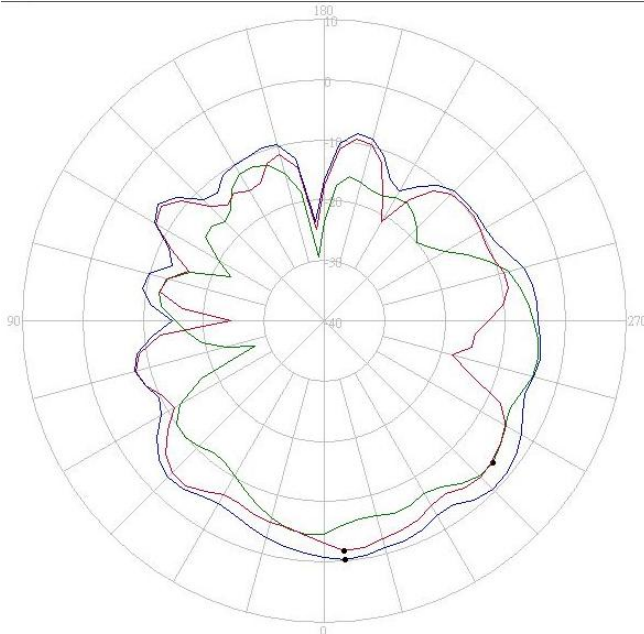
| 2400MHz | H | V |
|-----------|-------|-------|
| Peak Gain | -4.38 | -4.30 |

Tx1 antenna: 2450 MHz



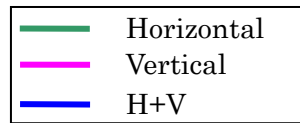
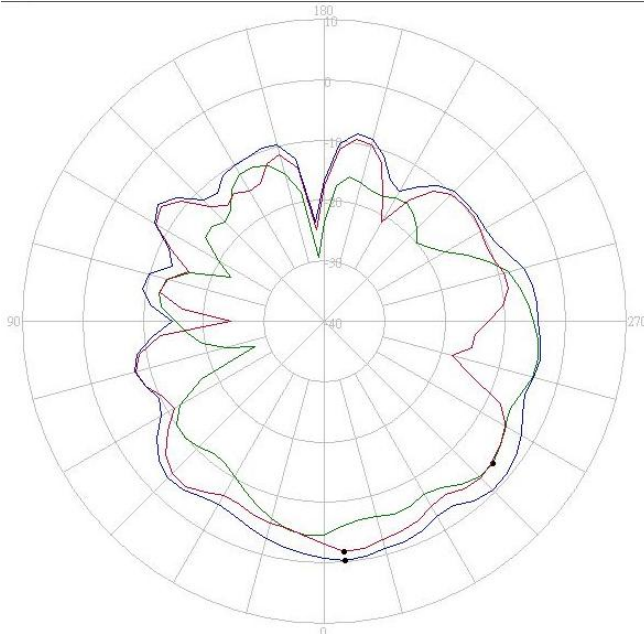
| 2450MHz | H | V |
|-----------|-------|-------|
| Peak Gain | -3.26 | -3.06 |

Tx1 antenna: 2500 MHz



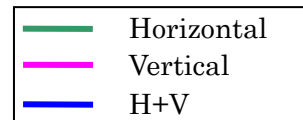
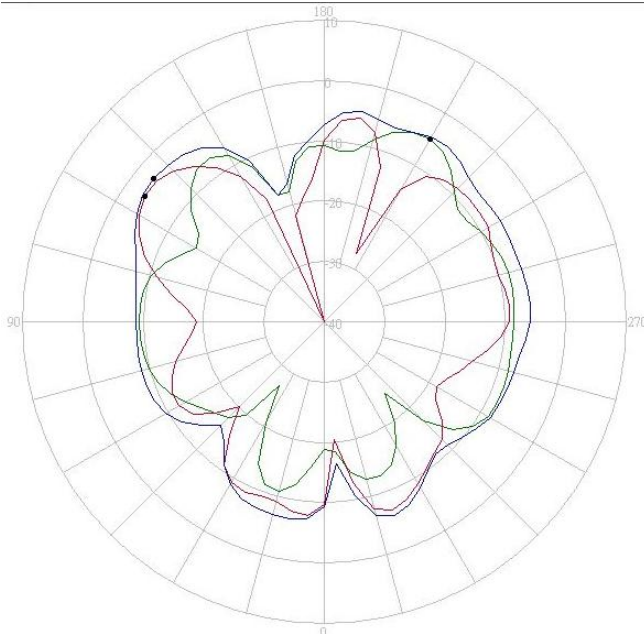
| 2500MHz | H | V |
|-----------|-------|-------|
| Peak Gain | -3.87 | -2.54 |

2500-2700MHz radiation characteristic
Tx1 antenna: 2500 MHz



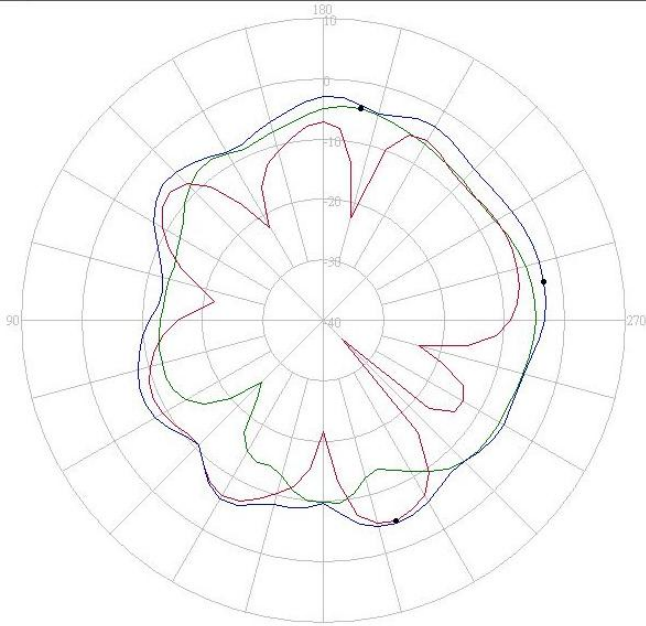
| 2500MHz | H | V |
|-----------|-------|-------|
| Peak Gain | -3.87 | -2.54 |

Tx1 antenna: 2600 MHz



| 2600MHz | H | V |
|-----------|-------|-------|
| Peak Gain | -4.98 | -3.65 |

Tx1 antenna: 2700MHz

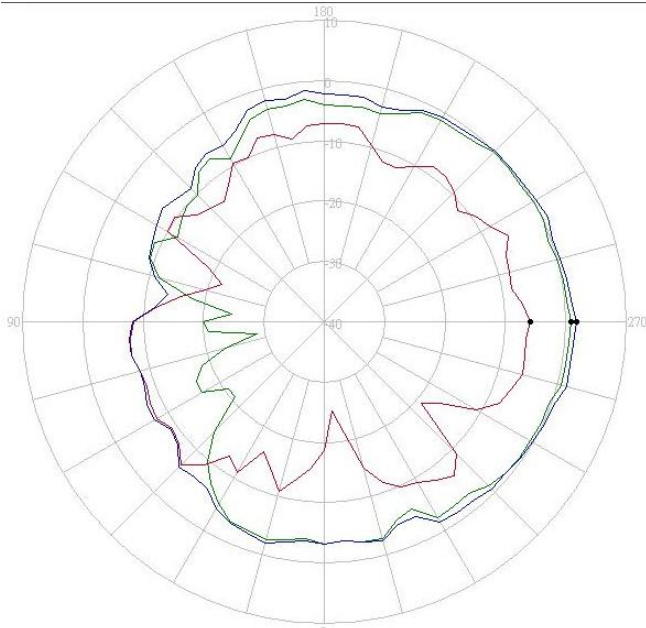


| | | |
|------------|----------|-----|
| Horizontal | Vertical | H+V |
|------------|----------|-----|

| 2700MHz | H | V |
|-----------|-------|-------|
| Peak Gain | -4.43 | -4.70 |

5150-5470MHz radiation characteristic

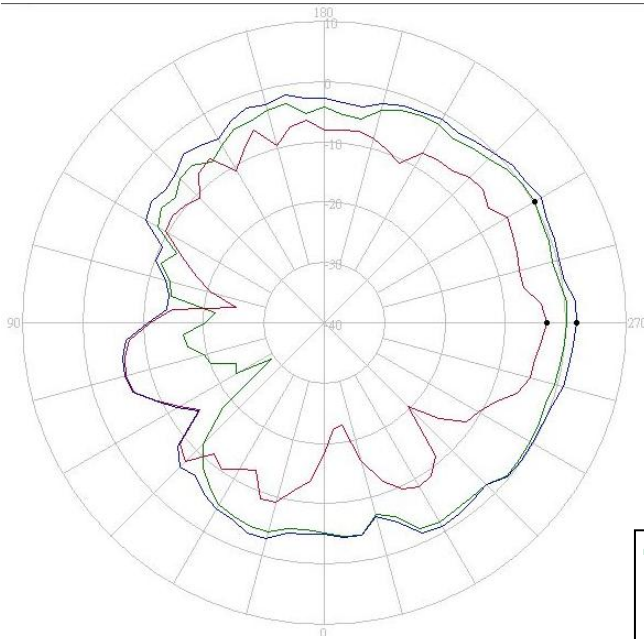
Tx1 antenna: 5150 MHz



| | | |
|------------|----------|-----|
| Horizontal | Vertical | H+V |
|------------|----------|-----|

| 5150MHz | H | V |
|-----------|------|-------|
| Peak Gain | 0.95 | -5.79 |

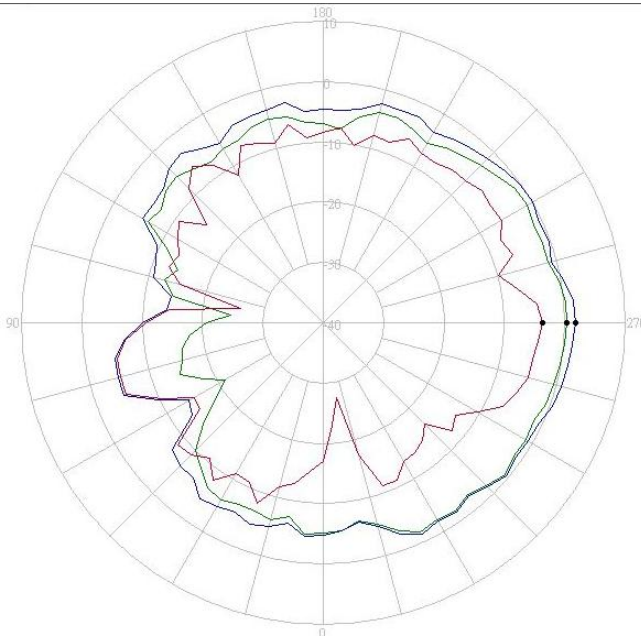
Tx1 antenna: 5350 MHz



| | | |
|------------|----------|-----|
| Horizontal | Vertical | H+V |
|------------|----------|-----|

| 5350MHz | H | V |
|-----------|------|-------|
| Peak Gain | 0.31 | -3.14 |

Tx1 antenna: 5470 MHz

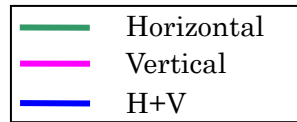
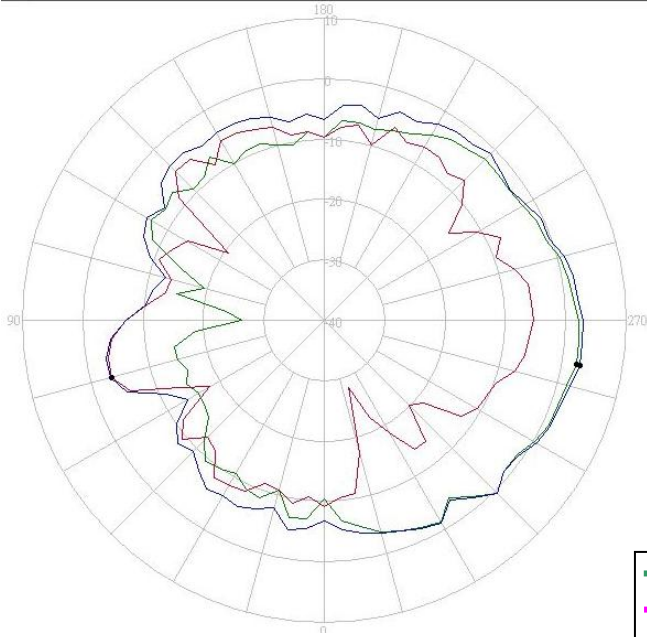


| | | |
|------------|----------|-----|
| Horizontal | Vertical | H+V |
|------------|----------|-----|

| 5470MHz | H | V |
|-----------|------|-------|
| Peak Gain | 0.26 | -3.70 |

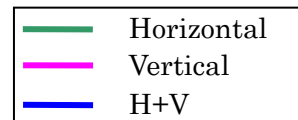
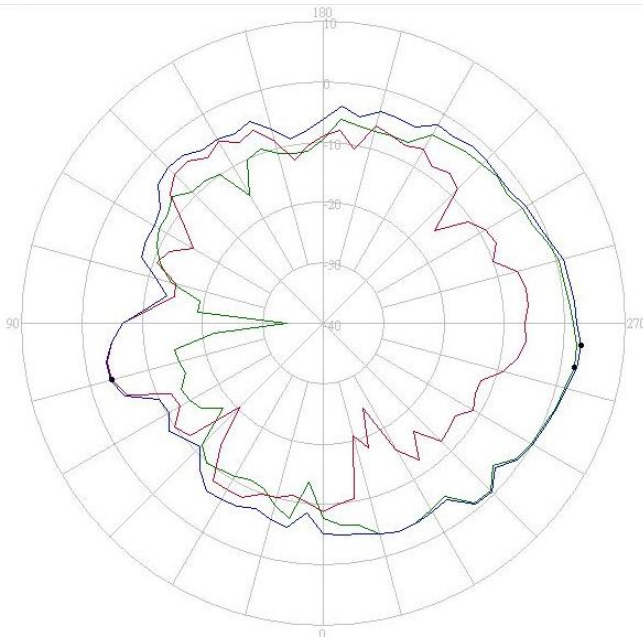
5725-5875MHz radiation characteristic

Tx1 antenna: 5725 MHz



| 5725MHz | H | V |
|-----------|------|-------|
| Peak Gain | 2.41 | -3.57 |

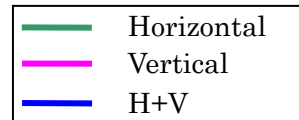
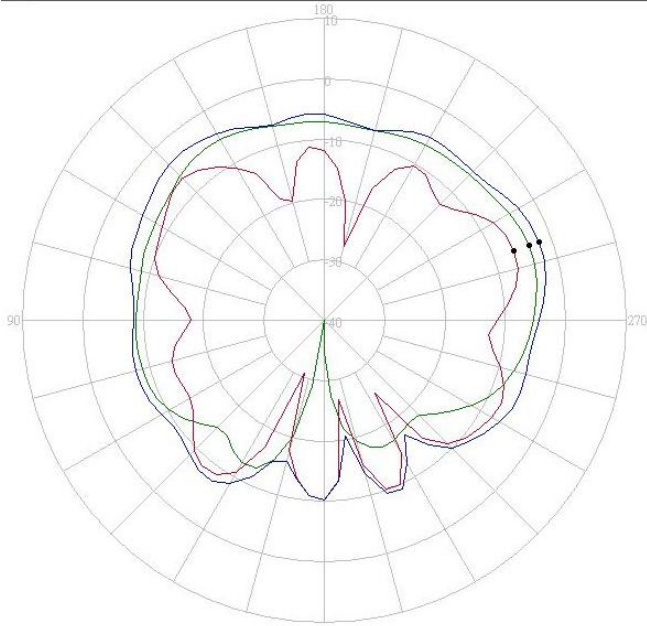
Tx1 antenna: 5825 MHz



| 5825MHz | H | V |
|-----------|------|-------|
| Peak Gain | 2.23 | -3.74 |

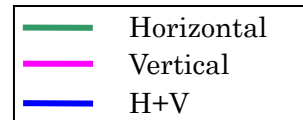
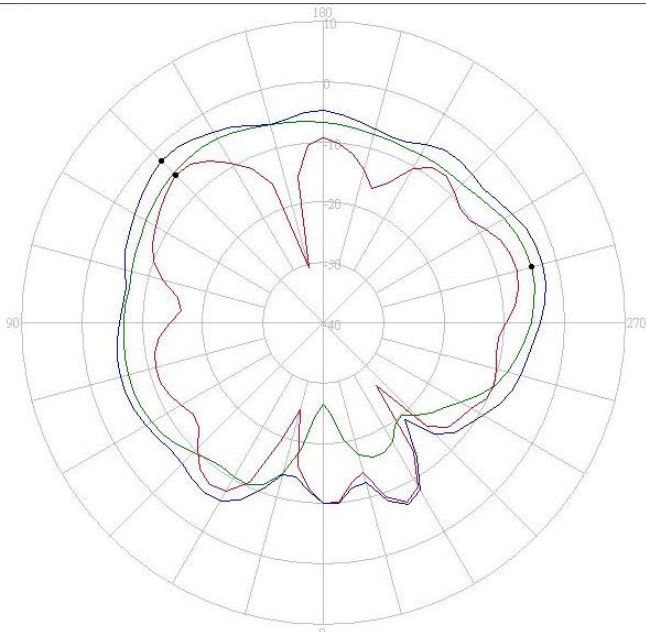
2300-2400MHz radiation characteristic

Tx2 antenna: 2300 MHz



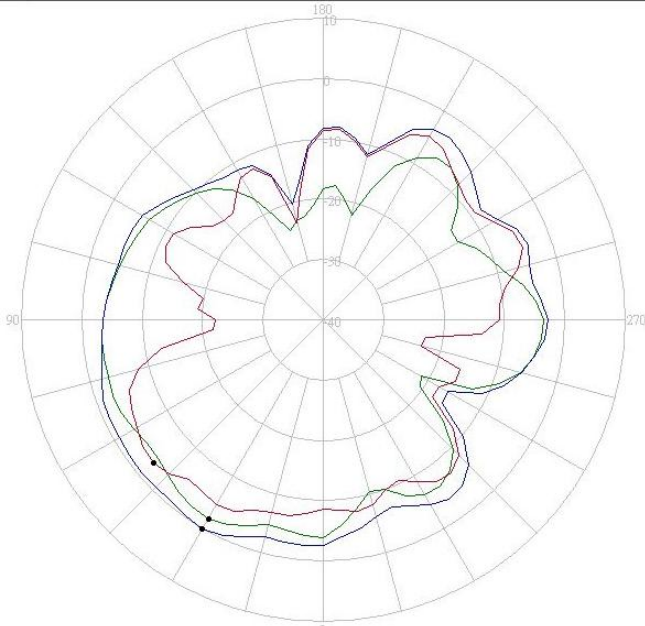
| 2300MHz | H | V |
|-----------|-------|-------|
| Peak Gain | -3.95 | -6.53 |

Tx2 antenna: 2350 MHz

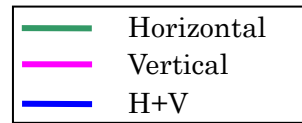


| 2350MHz | H | V |
|-----------|-------|-------|
| Peak Gain | -4.28 | -5.40 |

Tx2 antenna: 2400 MHz

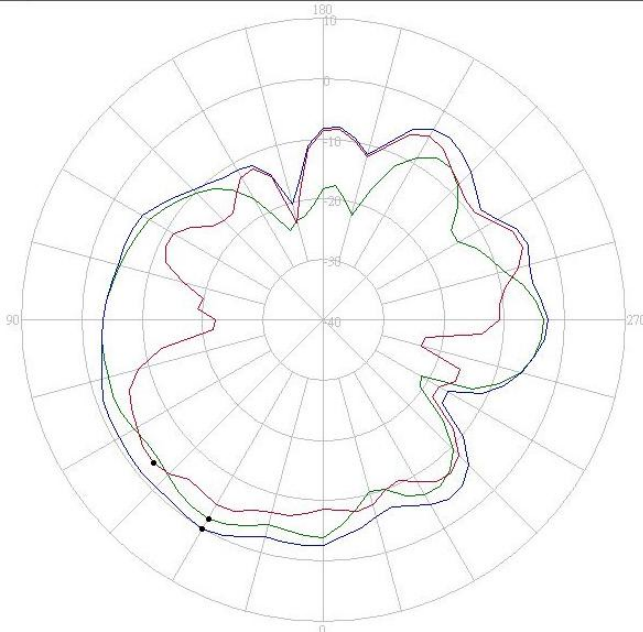


| 2400MHz | H | V |
|-----------|-------|-------|
| Peak Gain | -1.83 | -4.17 |

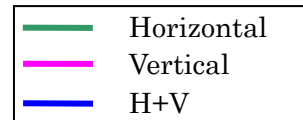


2400-2500MHz radiation characteristic

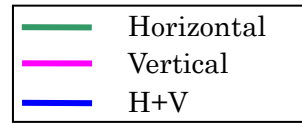
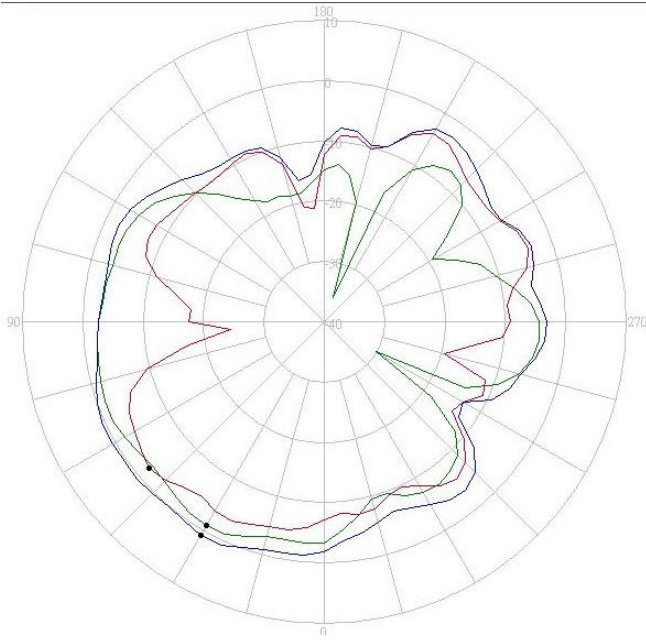
Tx2 antenna: 2400 MHz



| 2400MHz | H | V |
|-----------|-------|-------|
| Peak Gain | -1.83 | -4.17 |

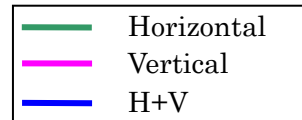
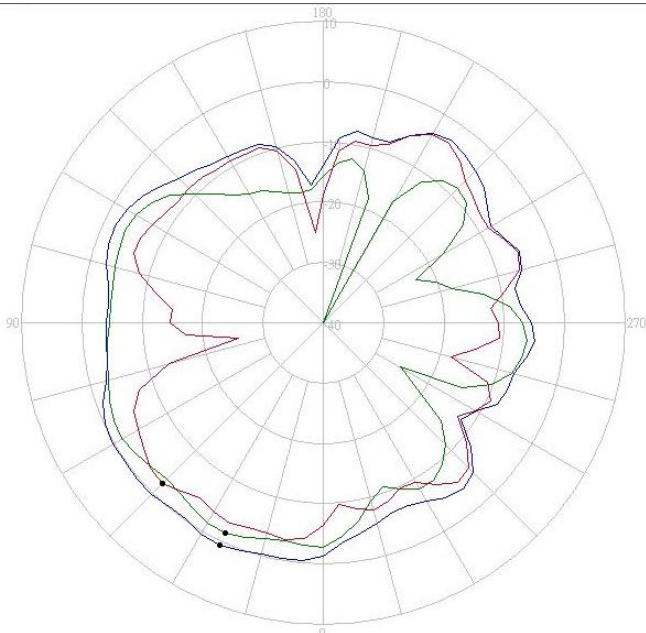


Tx2 antenna: 2450 MHz



| 2450MHz | H | V |
|-----------|-------|-------|
| Peak Gain | -0.93 | -2.23 |

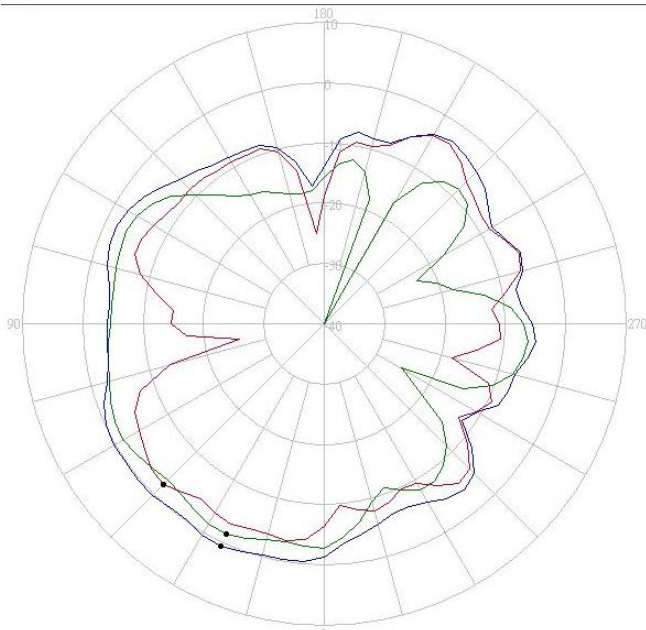
Tx2 antenna: 2500 MHz



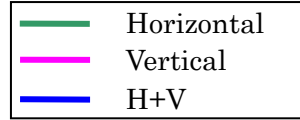
| 2500MHz | H | V |
|-----------|-------|-------|
| Peak Gain | -1.62 | -2.39 |

2500-2700MHz radiation characteristic

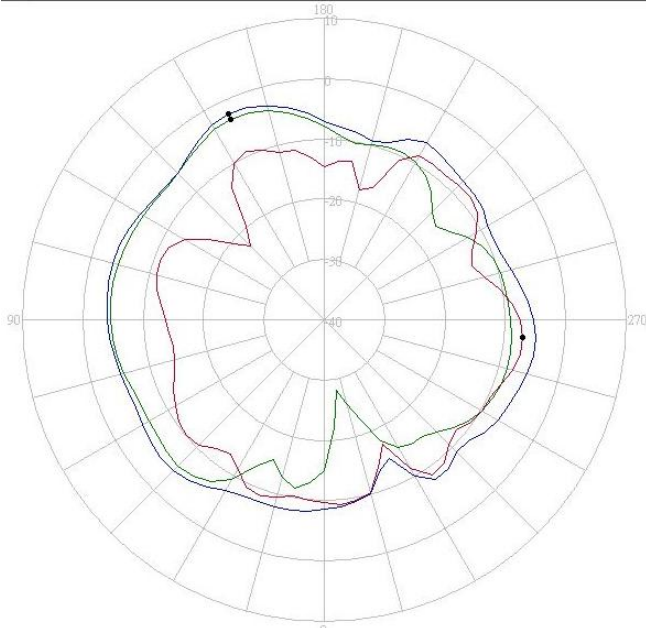
Tx2 antenna: 2500 MHz



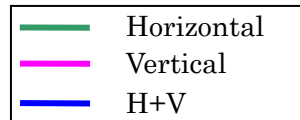
| 2500MHz | H | V |
|-----------|-------|-------|
| Peak Gain | -1.62 | -2.39 |



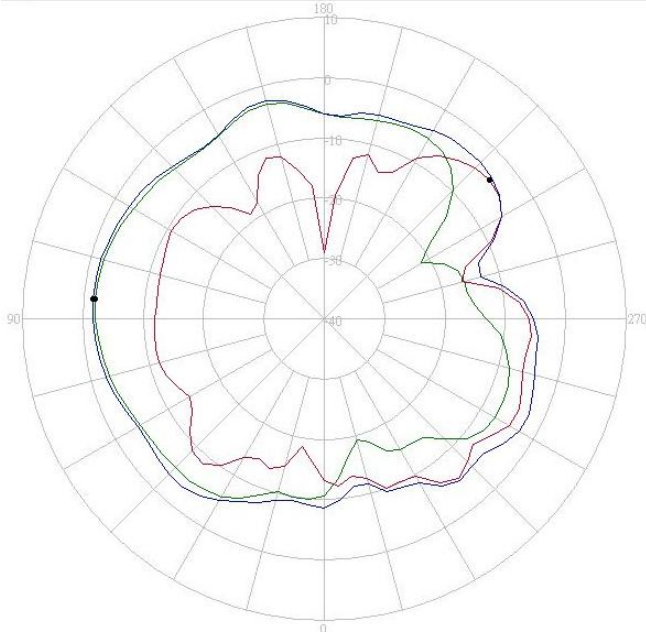
Tx2 antenna: 2600 MHz



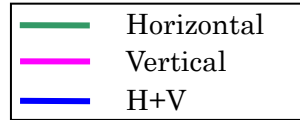
| 2600MHz | H | V |
|-----------|-------|-------|
| Peak Gain | -3.29 | -6.99 |



Tx2 antenna: 2700 MHz

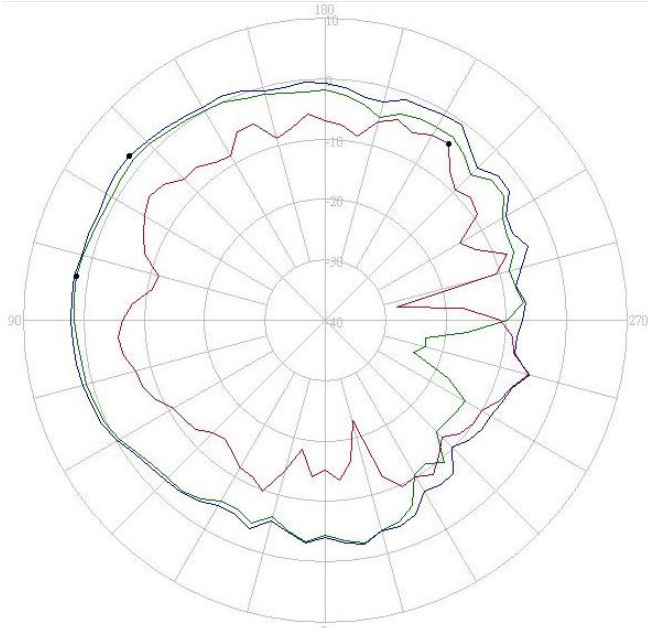


| 2700MHz | H | V |
|-----------|-------|-------|
| Peak Gain | -1.97 | -4.21 |

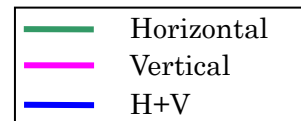


5150-5470MHz radiation characteristic

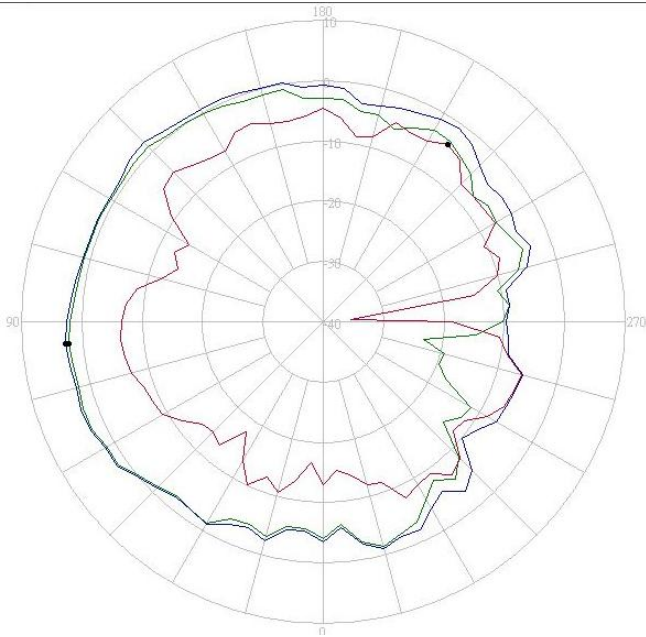
Tx2 antenna: 5150 MHz



| 5150MHz | H | V |
|-----------|------|-------|
| Peak Gain | 1.95 | -4.28 |



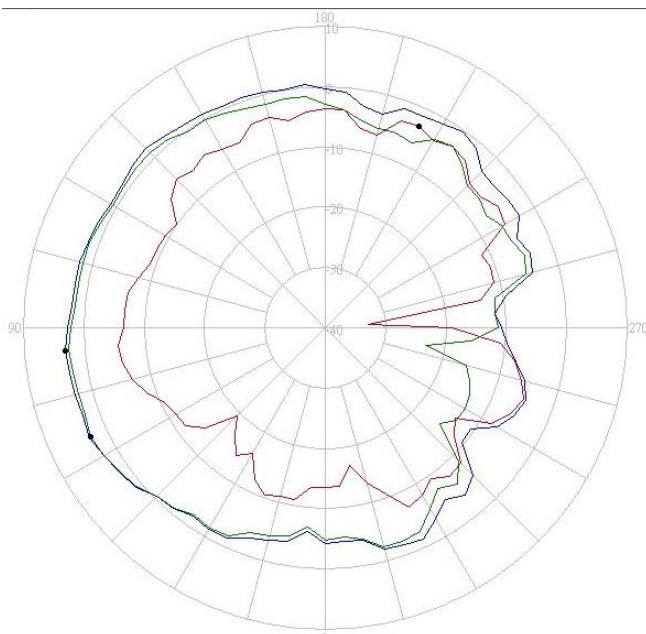
Tx2 antenna: 5350 MHz



| | |
|---|------------|
| — | Horizontal |
| — | Vertical |
| — | H+V |

| 5350MHz | H | V |
|-----------|------|-------|
| Peak Gain | 2.33 | -4.17 |

Tx2 antenna: 5470 MHz

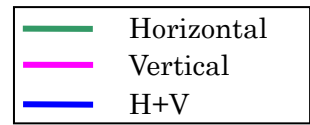
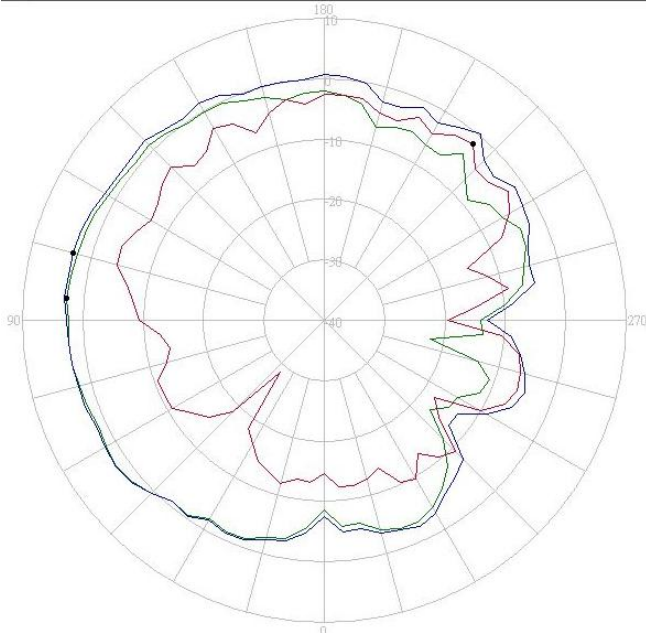


| | |
|---|------------|
| — | Horizontal |
| — | Vertical |
| — | H+V |

| 5470MHz | H | V |
|-----------|------|-------|
| Peak Gain | 2.85 | -3.17 |

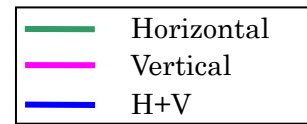
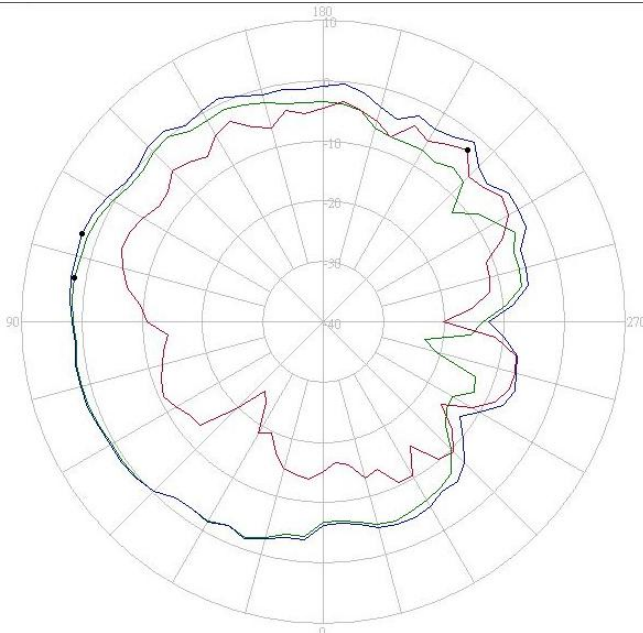
5725-5875MHz radiation characteristic

Tx2 antenna: 5725 MHz



| 5725MHz | H | V |
|-----------|------|-------|
| Peak Gain | 2.83 | -1.81 |

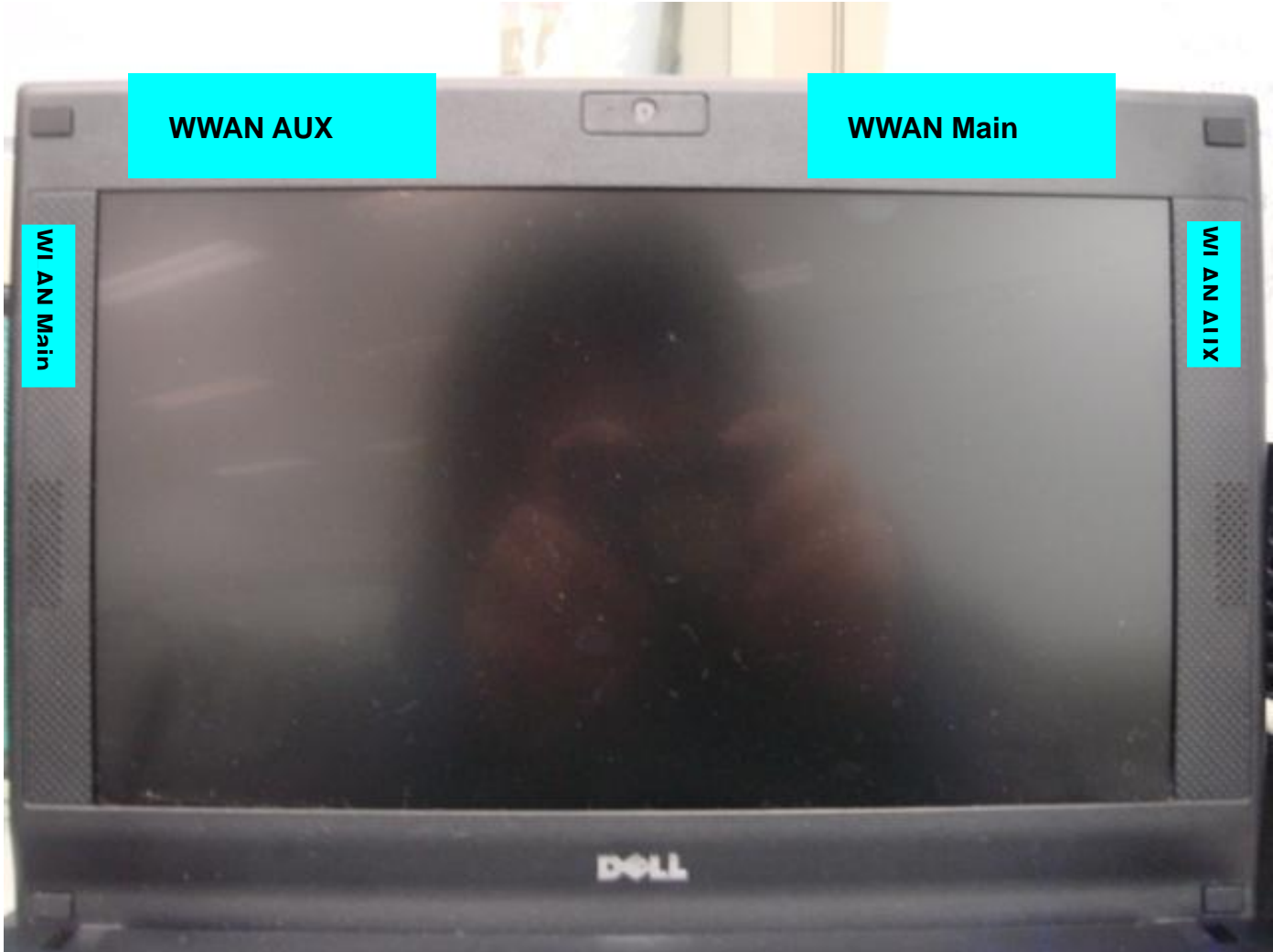
Tx2 antenna: 5825 MHz



| 5825MHz | H | V |
|-----------|------|-------|
| Peak Gain | 1.93 | -2.72 |

Section 4. Host Platform Information

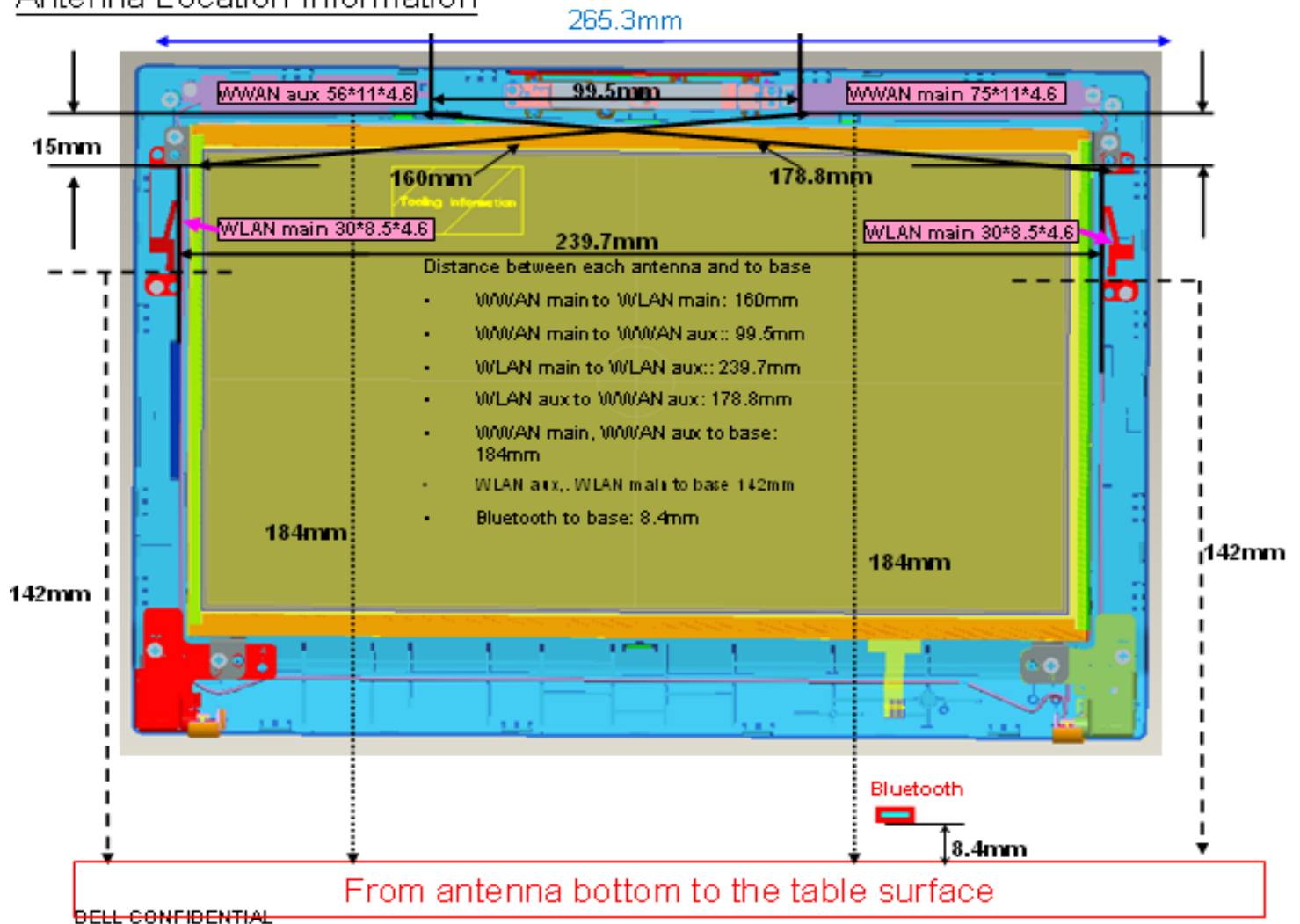
OEM / ODM Host platform: (DELL) platform correlated to antenna data
Rating Label Photo:



Section 5. Antenna Host Platform Location Information

Include a **dimensioned photo or dimensioned drawing** of Tx1, Tx2 and Tx3 antenna placements (measurements are not required for receive-only antenna). Any antenna that transmits must show dimensions to bottom of laptop.

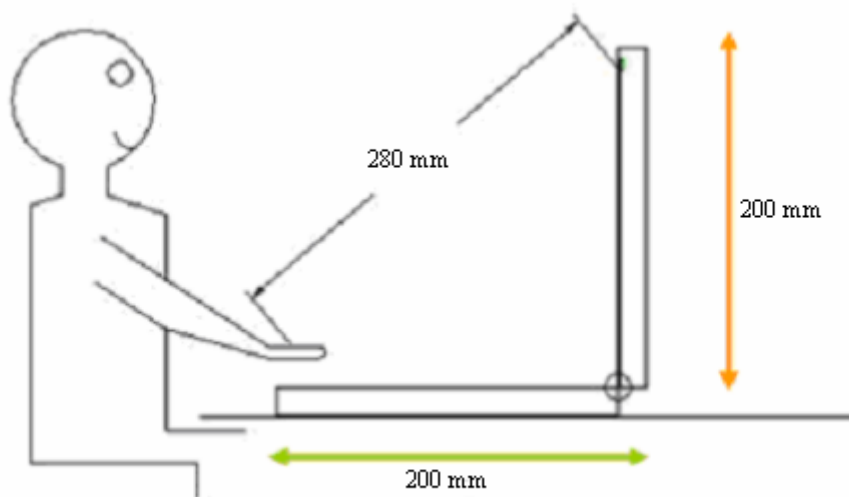
Antenna Location Information



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Section 6. Antenna dimensional information for SAR evaluation

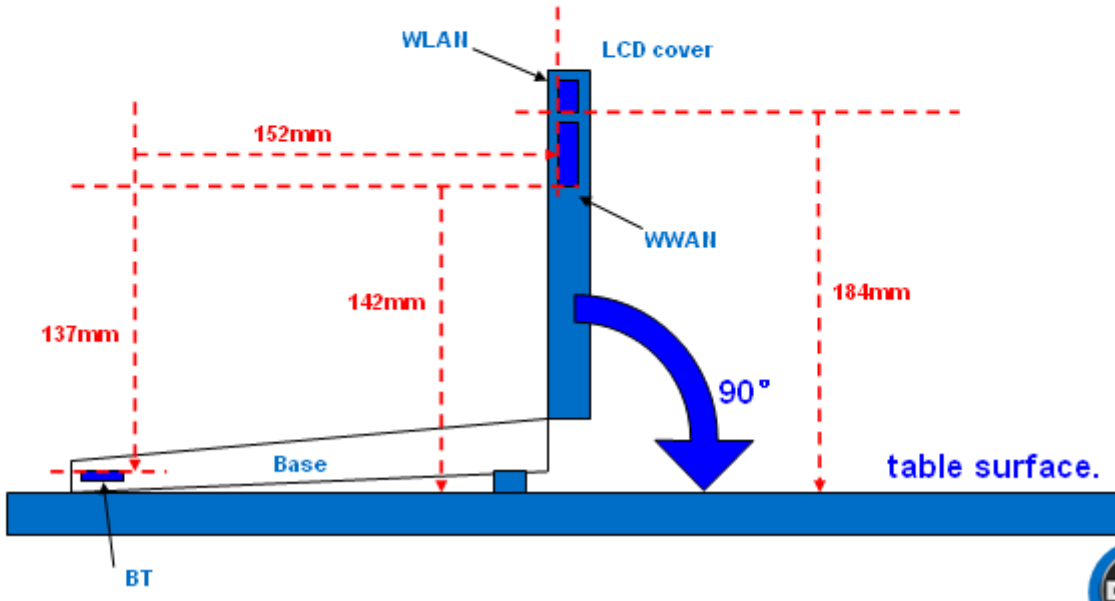
Include a **dimensioned photo or dimensioned drawing** showing the distance (mm) between the transmit antennas and the user (excluding hands, wrist, feet, lap/ thigh, and ankle)



Antenna dimensional information

Please open the LCD lid to **90°** , which is perpendicular to the table surface.

Then do those measurements.



Section 7. Diagram Example of Co-Location Antenna Separation

Include a **dimensioned photo or dimensioned drawing** showing the distance (mm) between all WLAN transmit antennas and other co-located radiator transmit antenna such as Bluetooth, WWAN,..

(Note: Due to the evolving rules regarding co-location, each platform will need to be reviewed on a case by case basis)



Section 8. Local representative contact information

Local representative contact information is required for regulatory support for target countries below.

| | Local company name | Contact name | Phone number | FAX Number | e-Mail Address | Notes |
|--------------|--------------------|--------------|--------------|------------|----------------|-------|
| Argentina | | | | | | |
| Brazil | | | | | | |
| Indonesia | | | | | | |
| Israel | | | | | | |
| Malaysia | | | | | | |
| Mexico | | | | | | |
| Singapore | | | | | | |
| South Africa | | | | | | |
| USA, Canada | | | | | | |