

# Regulatory WLAN Antenna Information 2.4/5GHz DELL Latitude 2000 Multiple Band Antenna with Cable and Connector for IEEE 802.11a/g/n

<b>Platform</b>	
Platform Owner	DELL
Brand Name	DELL
Model Name	Latitude 2000
ODM	Quanta
Target Launch Date	2009/05/30
<b>Antenna</b>	
Brand Name	Auden Techno Corp.
Part Number	■ Tx1 Antenna: <b>220143-09</b>
	■ Tx2 Antenna: <b>220143-09</b>
<b>Module</b>	
	■ 4312 HMC
	■ 4322 HMC

## 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: <b>220143-09</b> Tx1 (Main WLAN) antenna	Auden Techno Corp.	PIFA	(P/N: GBE RF 137XR4) 50 ohm Coaxial. length: 415mm diameter: 1.37mm Connector: IPEX	2300-2400MHz 0.55 dBi (peak)	2300-2400MHz 1.53 dBi (peak)	2300-2400MHz 1.94 max	2300-2400MHz 0.98 dBi (peak)
				2400-2500MHz 0.2 dBi (peak)	2400-2500MHz 1.22 dBi (peak)	2400-2500MHz 1.94 max	2400-2500MHz 1.02 dBi (peak)
				2500-2700MHz 1.04 dBi (peak)	2500-2700MHz 2.12 dBi (peak)	2500-2700MHz 2.87 max	2500-2700MHz 1.08 dBi (peak)
				5150-5350MHz 1.54 dBi (peak)	5150-5350MHz 3.73 dBi (peak)	5150-5350MHz 1.58 max	5150-5350MHz 2.19 dBi (peak)
				5470-5725MHz 1.29 dBi (peak)	5470-5725MHz 3.61 dBi (peak)	5470-5725MHz 2.07 max	5470-5725MHz 2.32 dBi (peak)
				5825-5875MHz 1.17 dBi (peak)	5825-5875MHz 3.58 dBi (peak)	5825-5875MHz 1.59 max	5825-5875MHz 2.41 dBi (peak)
(P/N: <b>220143-09</b> Tx2 (Aux WLAN) antenna	Auden Techno Corp.	PIFA	(P/N: GBE RF 137XR4) 50 ohm Coaxial. length: 460mm diameter: 1.37mm Connector: IPEX	2300-2400MHz 3.23 dBi (peak)	2300-2400MHz 4.31 dBi (peak)	2300-2400MHz 2.35 max	2300-2400MHz 1.08 dBi (peak)
				2400-2500MHz 3.10 dBi (peak)	2400-2500MHz 4.23 dBi (peak)	2400-2500MHz 1.43 max	2400-2500MHz 1.13 dBi (peak)
				2500-2700MHz 2.55 dBi (peak)	2500-2700MHz 3.75 dBi (peak)	2500-2700MHz 2.38 max	2500-2700MHz 1.2 dBi (peak)
				5150-5350MHz 0.69 dBi (peak)	5150-5350MHz 3.11 dBi (peak)	5150-5350MHz 1.7 max	5150-5350MHz 2.42 dBi (peak)
				5470-5725MHz 1.34 dBi (peak)	5470-5725MHz 3.92 dBi (peak)	5470-5725MHz 1.51 max	5470-5725MHz 2.58 dBi (peak)
				5825-5875MHz 0.91 dBi (peak)	5825-5875MHz 3.59 dBi (peak)	5825-5875MHz 1.73 max	5825-5875MHz 2.67 dBi (peak)

### NOTE:

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

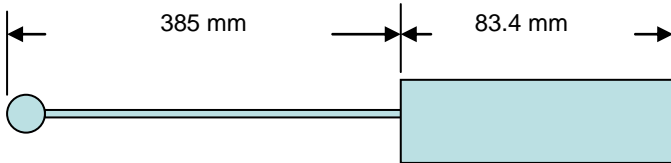
**Antenna Peak Gain Table:**

Frequency (MHz)	Tx1 (main WLAN) antenna		Tx2 (aux WLAN) Antenna	
	Horizontal (dBi)	Vertical (dBi)	Horizontal (dBi)	Vertical (dBi)
2300	-1.71	-1.06	-1.92	2.07
2350	-2.68	-0.91	-3.57	1.11
2400	-1.91	-0.88	-2.49	1.67
2450	-2.52	-1.35	-2.01	2.12
2500	-2.25	-1.46	-3.08	1.8
2600	-2.2	-1.09	-1.95	-1.04
2700	-2.46	-0.72	-3.61	-0.53
5150	-2.1	-0.41	-2.77	-0.58
5350	-3.01	0.27	-1.55	-1.12
5470	-2.87	-0.14	-1.79	-0.31
5725	-3.42	-1.84	-1.28	0.43
5825	-3.35	-1.63	-0.71	0.16
5875	-2.43	-0.78	-0.54	-0.59

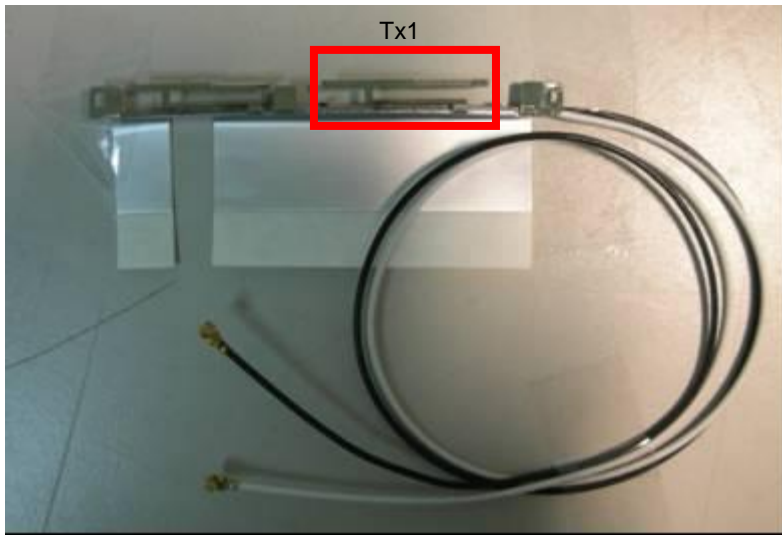
- Antenna Peak Gain required being test in system basis.
- 1E frame contend absolutely peak antenna gain include H/V
- If Rx3 only (3<sup>rd</sup> antenna receives only, e.g. for 4965AGN) then the information is not required for Rx3.

**Section 2. Dimensioned Photos or Drawings of Antennas**

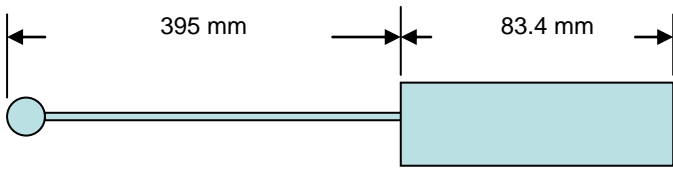
Include a dimensioned photo and dimensioned drawing of Tx1 (main WLAN) antenna here.



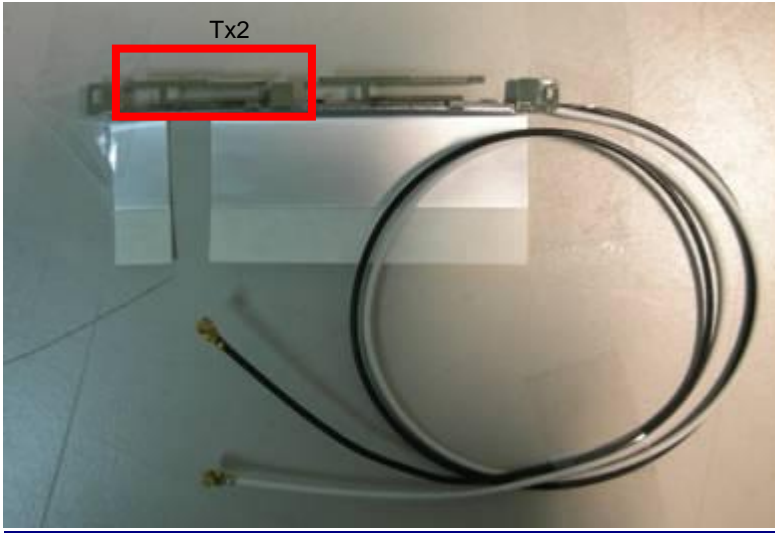
Tx1 WLAN Main Antenna Photo



**Include a dimensioned photo and dimensioned drawing of Tx2 (aux WLAN) antenna here.**



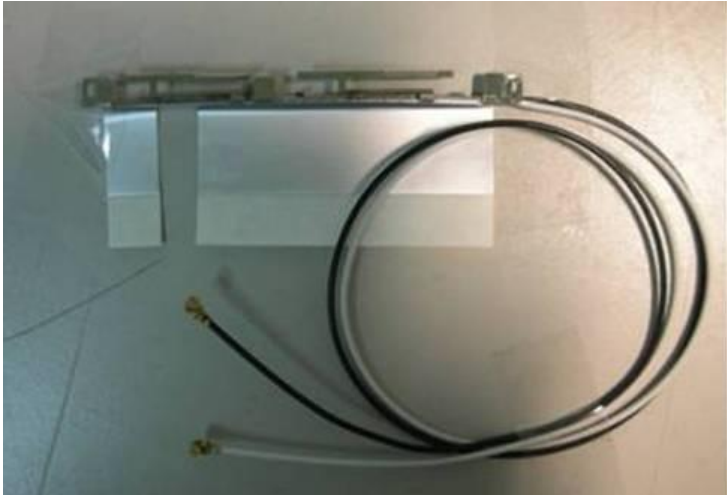
Tx2 WLAN AUX Antenna Photo



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

Antenna Manufacturer: Auden

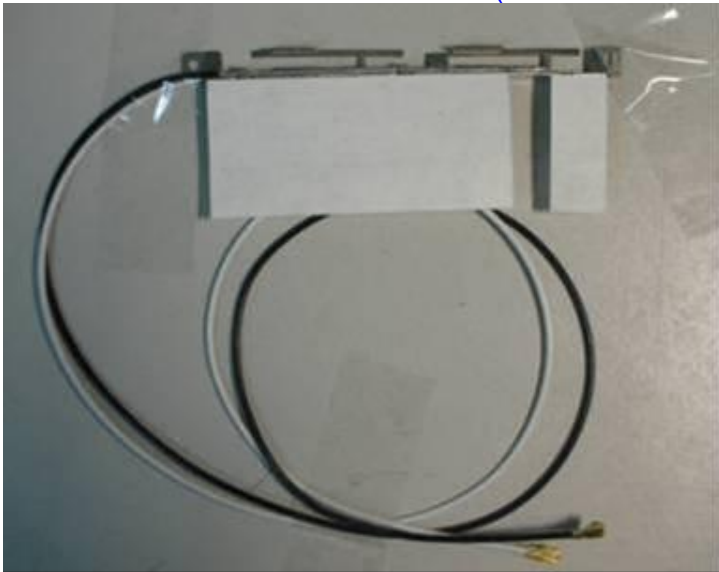
Antenna Part Number: 220143-09 (Tx1/WLAN Main), 220143-09 (Tx2 /WLAN AUX)



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

Antenna Manufacturer: Auden

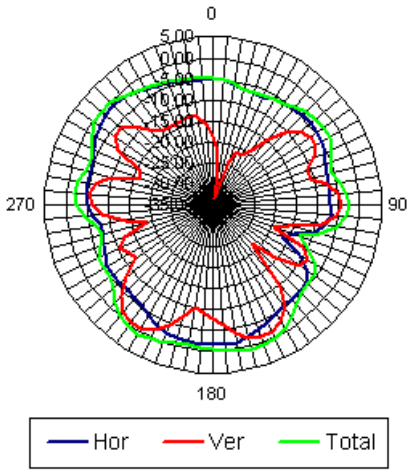
Antenna Part Number: 220143-09 (Tx1/WLAN Main), 220143-09 (Tx2 /WLAN AUX)



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

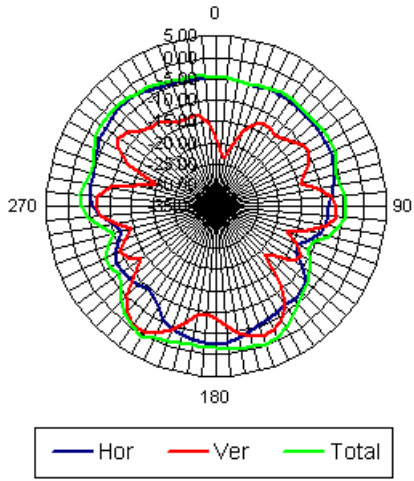
### 2300-2400MHz radiation characteristic

#### Tx1 antenna: 2300 MHz



Centre Frequency	2300 MHz
Horizontal peak gain (dBi)	-1.71
Vertical peak gain (dBi)	-1.06

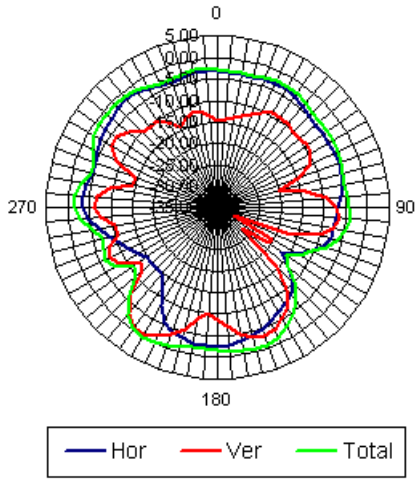
### Tx1 antenna: 2350 MHz



Centre Frequency	2350 MHz
Horizontal peak gain (dBi)	-2.68
Vertical peak gain (dBi)	-0.91

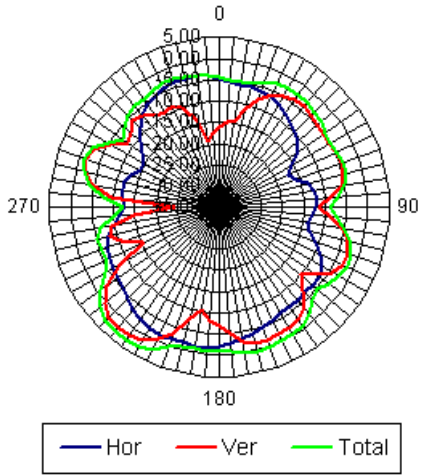


### Tx1 antenna: 2400 MHz



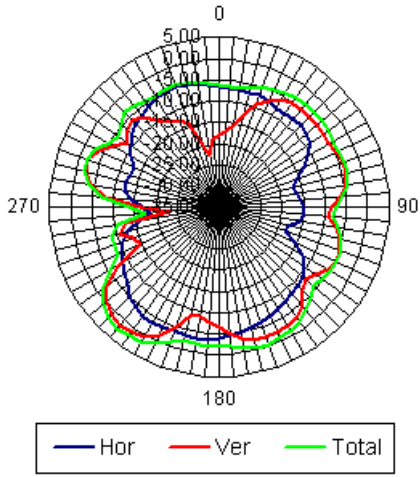
<b>Centre Frequency</b>	<b>2400 MHz</b>
Horizontal peak gain (dBi)	-1.91
Vertical peak gain (dBi)	-0.88

### Tx2 antenna: 2300 MHz



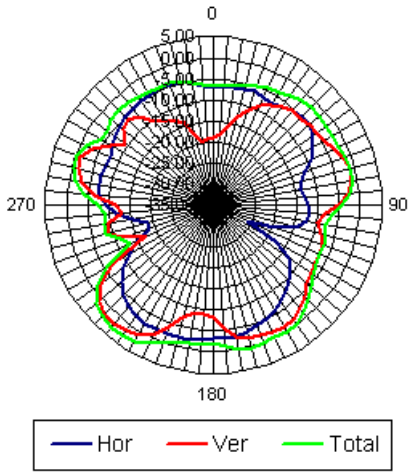
Centre Frequency	2300 MHz
Horizontal peak gain (dBi)	-1.92
Vertical peak gain (dBi)	2.07

### Tx2 antenna: 2350 MHz



<b>Centre Frequency</b>	<b>2350 MHz</b>
Horizontal peak gain (dBi)	-3.57
Vertical peak gain (dBi)	1.11

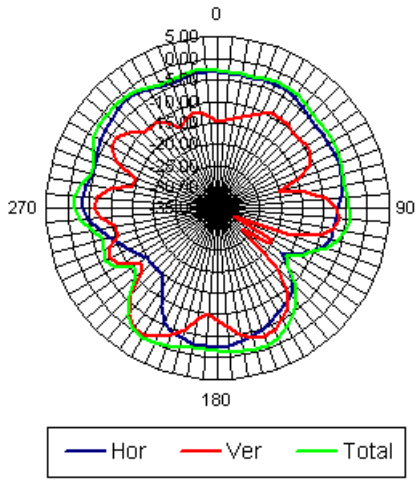
### Tx2 antenna: 2400 MHz



<b>Centre Frequency</b>	<b>2400 MHz</b>
Horizontal peak gain (dBi)	-2.49
Vertical peak gain (dBi)	1.67

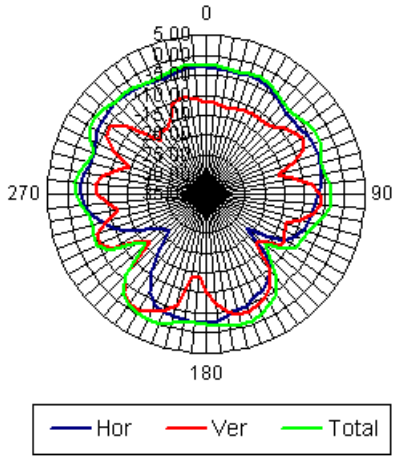
**2400-2500MHz radiation characteristic**

**Tx1antenna: 2400MHz**



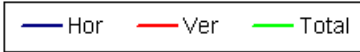
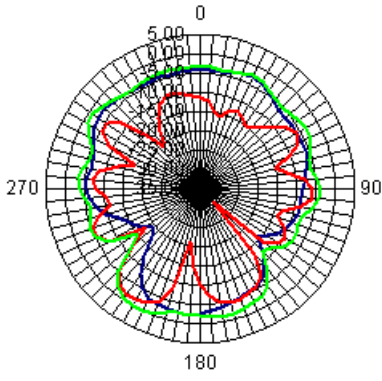
<b>Centre Frequency</b>	<b>2400 MHz</b>
Horizontal peak gain (dBi)	-1.91
Vertical peak gain (dBi)	-0.88

### Tx1 antenna: 2450MHz



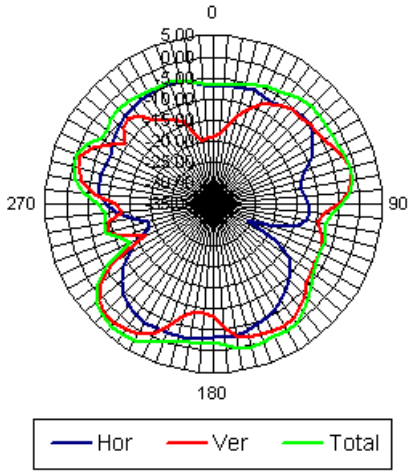
Centre Frequency	2450 MHz
Horizontal peak gain (dBi)	-2.52
Vertical peak gain (dBi)	-1.35

### Tx1 antenna: 2500 MHz



Centre Frequency	2500 MHz
Horizontal peak gain (dBi)	-2.25
Vertical peak gain (dBi)	-1.46

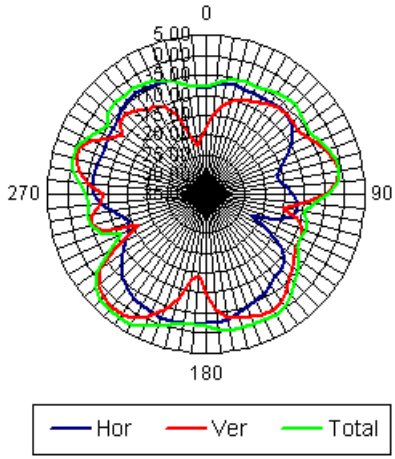
### Tx2 antenna: 2400MHz



Centre Frequency	2400 MHz
Horizontal peak gain (dBi)	-2.49
Vertical peak gain (dBi)	1.67

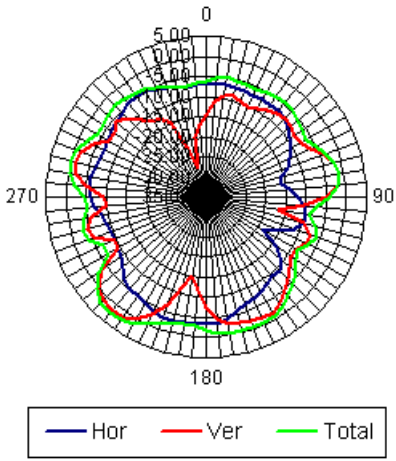


### Tx2 antenna: 2450MHz



<b>Centre Frequency</b>	<b>2450 MHz</b>
Horizontal peak gain (dBi)	-2.01
Vertical peak gain (dBi)	2.12

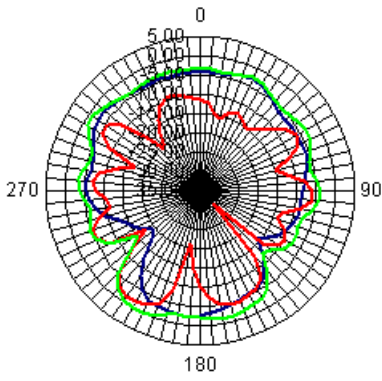
### Tx2 antenna: 2500 MHz



Centre Frequency	2500 MHz
Horizontal peak gain (dBi)	-3.08
Vertical peak gain (dBi)	1.80

## 2500-2700 MHz radiation characteristic

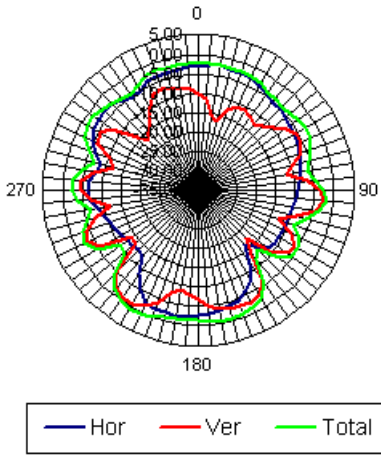
### Tx1 antenna: 2500 MHz



— Hor — Ver — Total

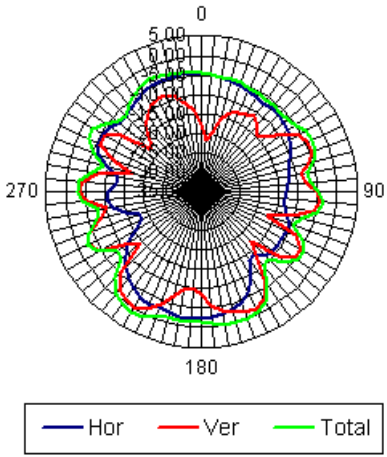
Centre Frequency	2500 MHz
Horizontal peak gain (dBi)	-2.25
Vertical peak gain (dBi)	-1.46

### Tx1 antenna: 2600 MHz



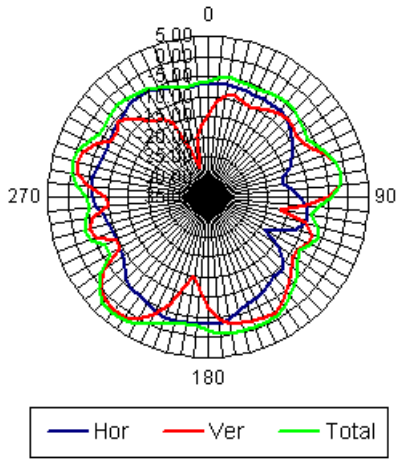
Centre Frequency	2600 MHz
Horizontal peak gain (dBi)	-2.20
Vertical peak gain (dBi)	-1.09

### Tx1 antenna: 2700 MHz



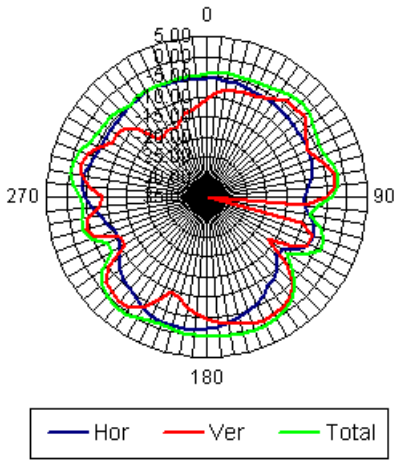
Centre Frequency	2700 MHz
Horizontal peak gain (dBi)	-2.46
Vertical peak gain (dBi)	-0.72

### Tx2 antenna: 2500 MHz



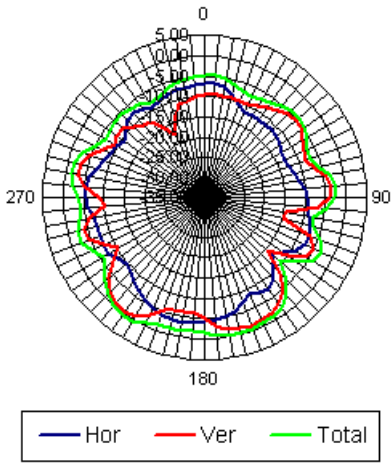
Centre Frequency	2500 MHz
Horizontal peak gain (dBi)	-3.08
Vertical peak gain (dBi)	1.80

### Tx2 antenna: 2600 MHz



Centre Frequency	2600 MHz
Horizontal peak gain (dBi)	-1.95
Vertical peak gain (dBi)	-1.04

### Tx2 antenna: 2700 MHz

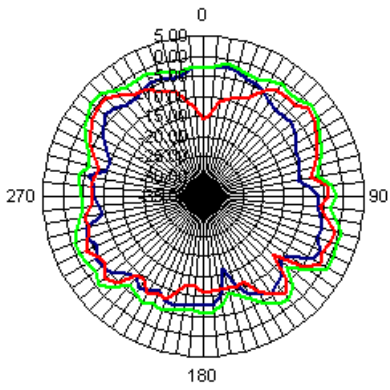


Centre Frequency	2700 MHz
Horizontal peak gain (dBi)	-3.61
Vertical peak gain (dBi)	-0.53



## 5150-5350MHz radiation characteristic

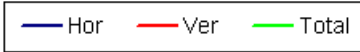
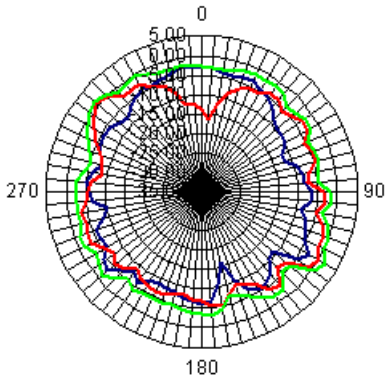
### Tx1 antenna: 5150 MHz



— Hor — Ver — Total

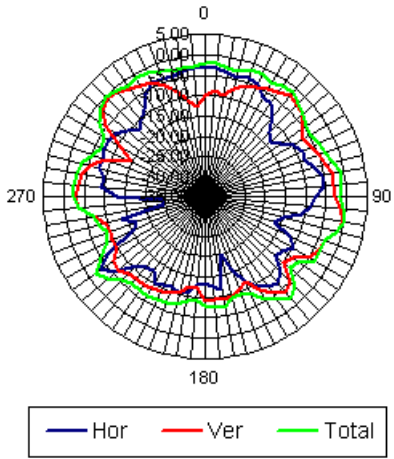
Centre Frequency	5150 MHz
Horizontal peak gain (dBi)	-2.10
Vertical peak gain (dBi)	-0.41

### Tx1 antenna: 5350 MHz



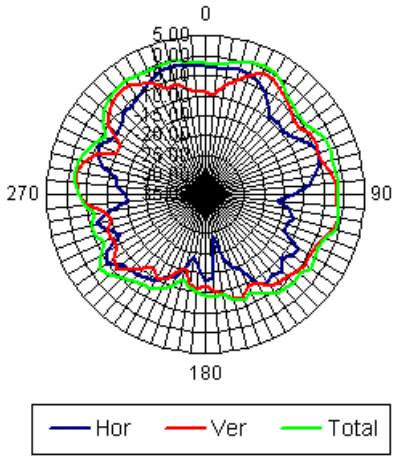
<b>Centre Frequency</b>	<b>5350MHz</b>
Horizontal peak gain (dBi)	-3.01
Vertical peak gain (dBi)	0.27

### Tx2 antenna: 5150 MHz



Centre Frequency	5150 MHz
Horizontal peak gain (dBi)	-2.77
Vertical peak gain (dBi)	-0.58

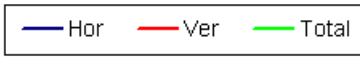
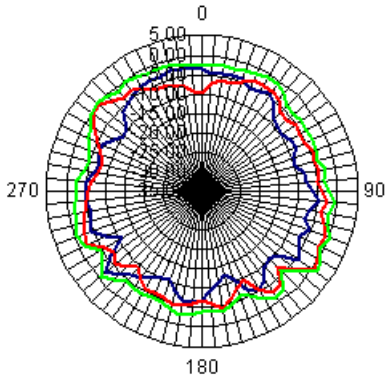
### Tx2 antenna: 5350 MHz



<b>Centre Frequency</b>	<b>5350 MHz</b>
Horizontal peak gain (dBi)	-1.55
Vertical peak gain (dBi)	-1.12

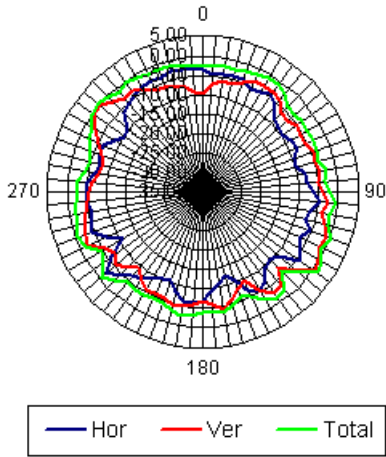
## 5470-5725 MHz radiation characteristic

### Tx1 antenna: 5470 MHz



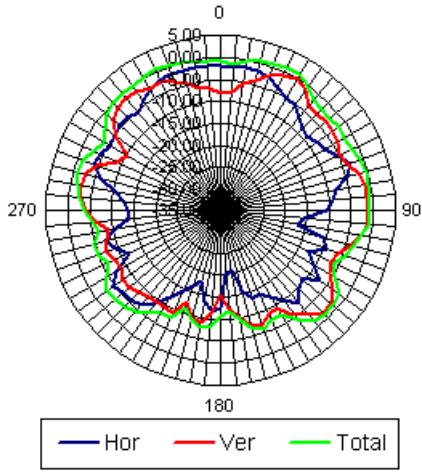
Centre Frequency	5470 MHz
Horizontal peak gain (dBi)	-2.87
Vertical peak gain (dBi)	-0.14

### Tx1 antenna: 5725 MHz



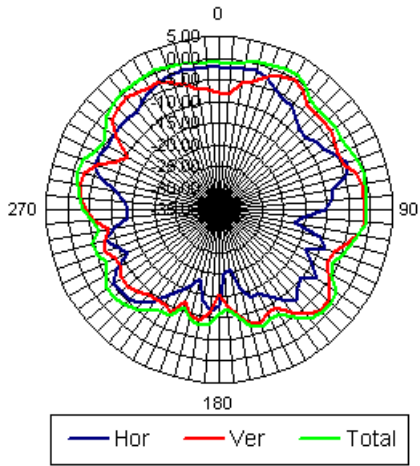
Centre Frequency	5725 MHz
Horizontal peak gain (dBi)	-3.42
Vertical peak gain (dBi)	-1.84

### Tx2 antenna: 5470 MHz



<b>Centre Frequency</b>	<b>5470 MHz</b>
Horizontal peak gain (dBi)	-1.79
Vertical peak gain (dBi)	-0.31

### Tx2 antenna: 5725 MHz

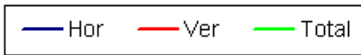
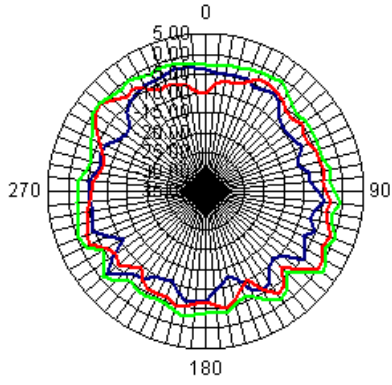


Centre Frequency	5725 MHz
Horizontal peak gain (dBi)	-1.28
Vertical peak gain (dBi)	0.43



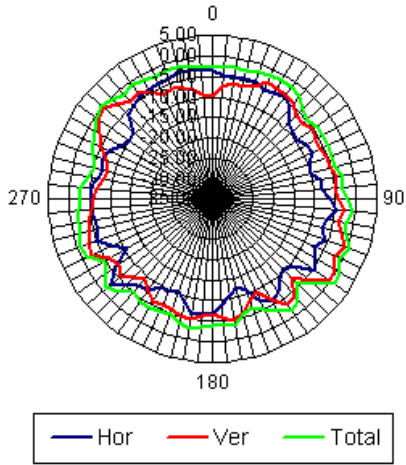
## 5825-5875 MHz radiation characteristic

### Tx1 antenna: 5825 MHz



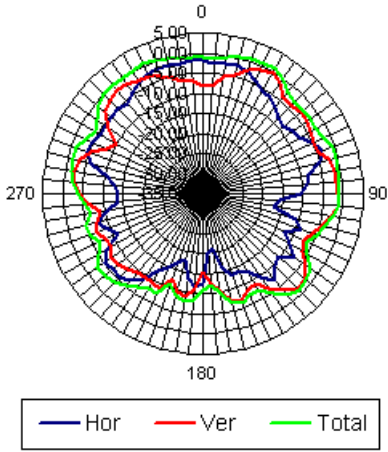
<b>Centre Frequency</b>	<b>5825 MHz</b>
Horizontal peak gain (dBi)	-3.35
Vertical peak gain (dBi)	-1.63

### Tx1 antenna: 5875 MHz



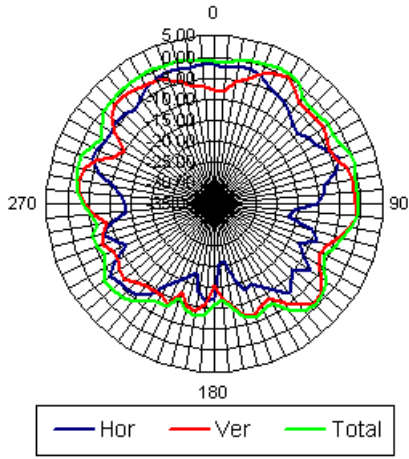
<b>Centre Frequency</b>	<b>5875 MHz</b>
Horizontal peak gain (dBi)	-2.43
Vertical peak gain (dBi)	-0.78

### Tx2 antenna: 5825 MHz



<b>Centre Frequency</b>	<b>5825 MHz</b>
Horizontal peak gain (dBi)	-0.71
Vertical peak gain (dBi)	0.16

### Tx2 antenna: 5875 MHz

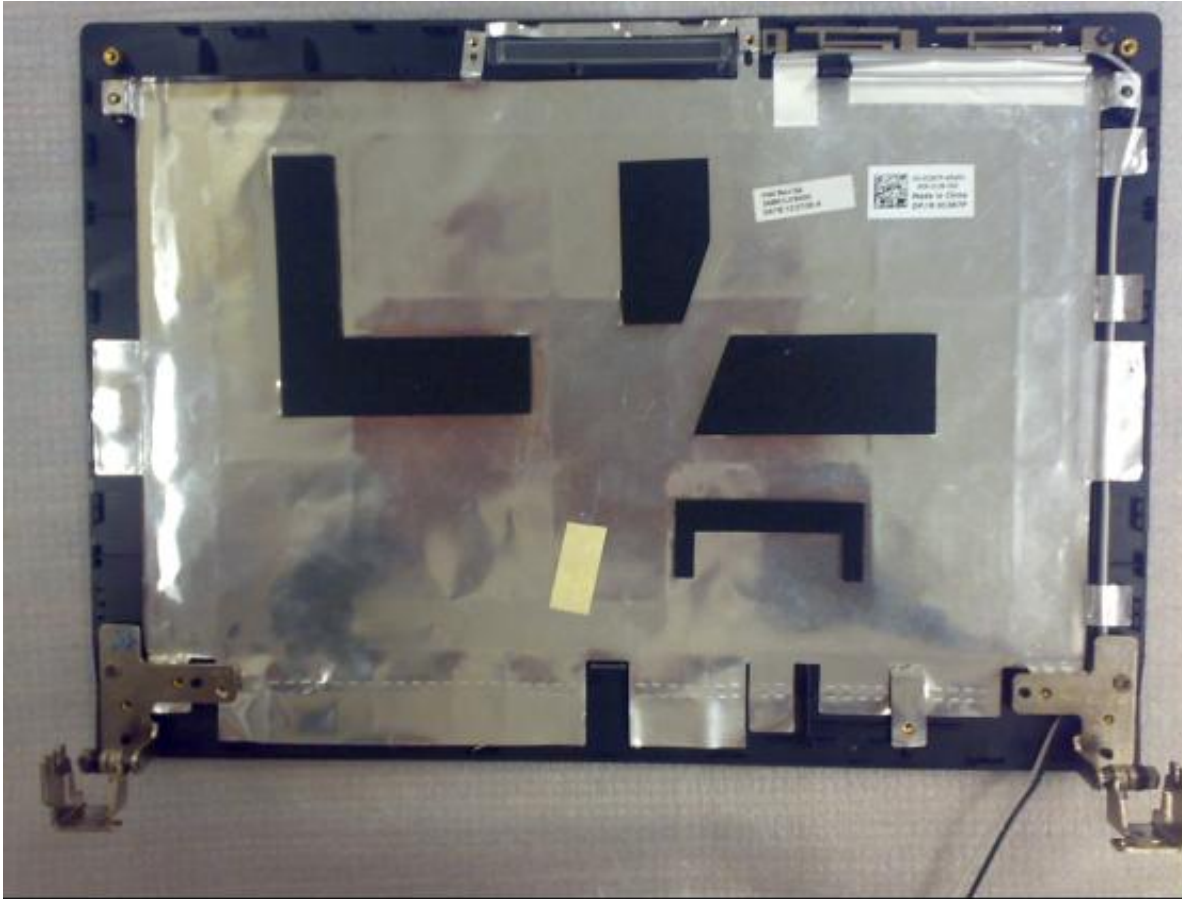


Centre Frequency	5875 MHz
Horizontal peak gain (dBi)	-0.54
Vertical peak gain (dBi)	-0.59

## Section 4. Host Platform Information

OEM / ODM Host platform: (DELL Latitude 2000) platform correlated to antenna data  
Rating Label Photo:

WLAN(Aux)    WLAN(main)



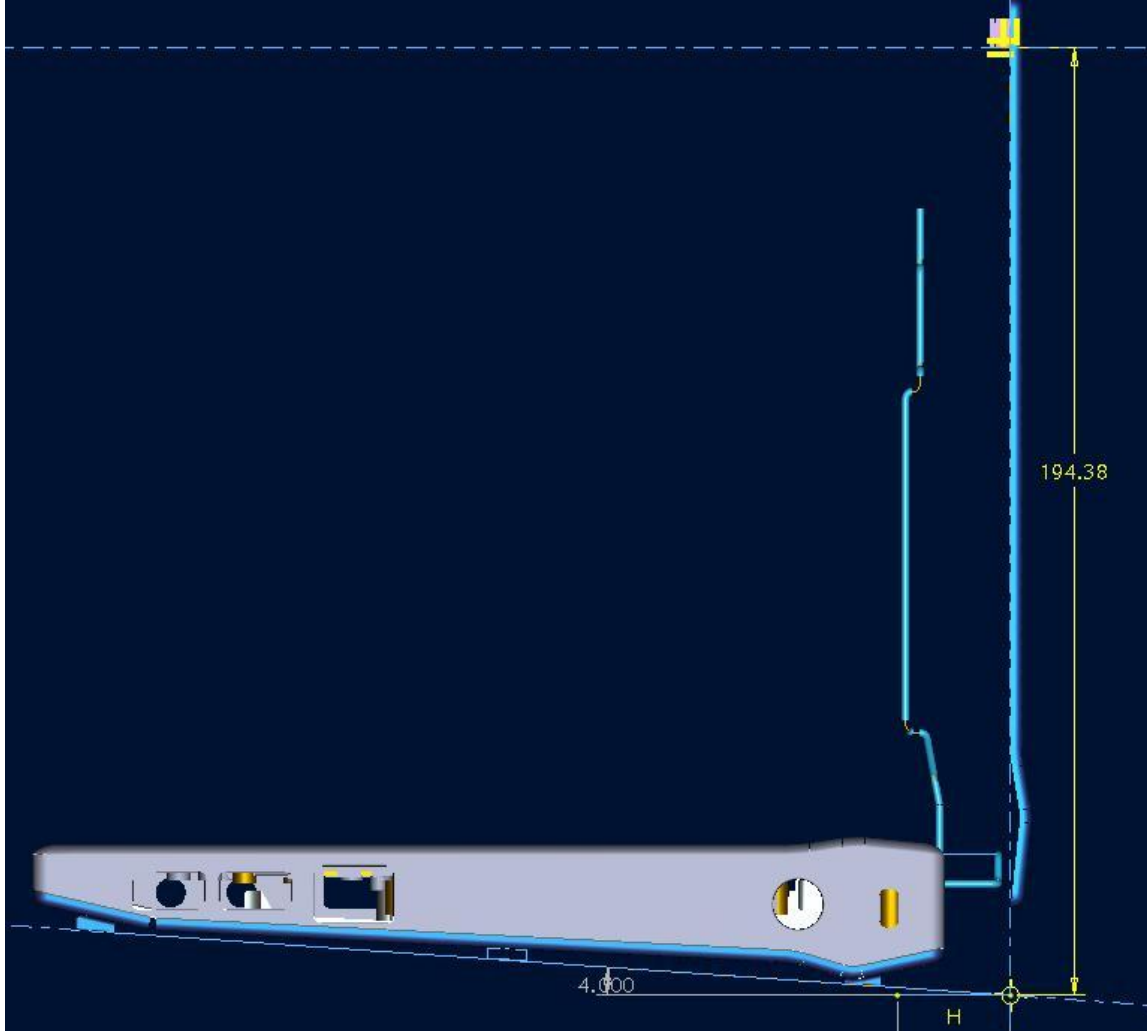
## Section 5. Antenna Host Platform Location Information

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.



## 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
Taiwan						
Argentina						
Brazil						
Indonesia						
Israel						
Malaysia						
Mexico						
Singapore						Telecommunication Equipment Dealer License Required
South Africa						
USA, Canada						