

Regulatory WLAN Antenna Information (Template)

English Language Required for Intel Regulatory Review / Approval

(OEM/ODM or antenna vendor is required to complete this document with platform antenna information.

Remove Intel references and make this your own document)

Platform information										
Brand	ODM	****End product model name	Intel platform (ex: Yes, No or NA)	Platform type (ex: regular NB, convertible PC, AIO...etc)	*SAR minimum separation (mm)					
DELL	Compal		Yes	Convertible PC	5.7					
****Please fill in exact product model name and make sure the model name is visible on product cover or any parts for end users recognize for authority inspection.										
Antenna information										
Vendor		Type			Antenna Part number (Main)			Antenna Part number (Aux)		
Speed Wireless Technology CO.,LTD.		PIFA(TB Mode)			F-OG-FH-6163-003-00 DC33002R12L			F-OG-FH-6163-003-00 DC33002R12L		
Peak gain w/ cable loss (dBi)*										
	2.4GHz 2400-2483.5 MHz	5.2GHz 5150-5250MHz	5.3GHz 5250-5350MHz	5.6GHz 5470-5725MHz	5.8GHz 5725-5850MHz	6.2GHz 5925-6425MHz	6.5GHz 6425-6525MHz	6.7GHz 6525-6875MHz	7.0 GHz 6875-7125MHz	
Main	0.09	2.6	2.88	4.28	3.43	N/A	N/A	N/A	N/A	
Aux	-0.59	2.47	1.8	2.56	1.0	N/A	N/A	N/A	N/A	
Intel Reference Gain/Type/ Separation distance										
Antenna Type	Antenna Peak gain (In dBi)*									Distance to the end user (mm)
	2.4GHz 2400-2483.5 MHz	5.2GHz 5150-5250MHz	5.3GHz 5250-5350MHz	5.6GHz 5470-5725MHz	5.8GHz 5725-5850MHz	6.2GHz 5925-6425MHz	6.5GHz 6425-6525MHz	6.7GHz 6525-6875MHz	7.0GHz 6875-7125MHz	Generic: refer to modular FCC SAR report
Design	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	Mid-power: ≥ 8 mm
PIFA	3.24	3.64	3.73	4.77	4.97	4.83	4.30	5.37	5.59	Low power: ≥ 5 mm
Dipole	2.89	2.92	3.19	4.41	4.22	4.83	4.30	4.49	5.34	
Notes (marked with *)										
* SAR minimum separation (mm)										
- Regular NB: Minimum antenna-to-body (from antenna bottom to the bottom of the device)										
- Tablet / Convertible PC: Minimum antenna-to-edge (5 sides of the device)										
- Mini-tablet: Minimum antenna-to-edge (6 sides of the device)										
* 3D Peak Antenna gain should be equal or greater than -2 dBi										
- 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.										

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1. Applicable test methods

The gain measurement shall follow by following conditions:

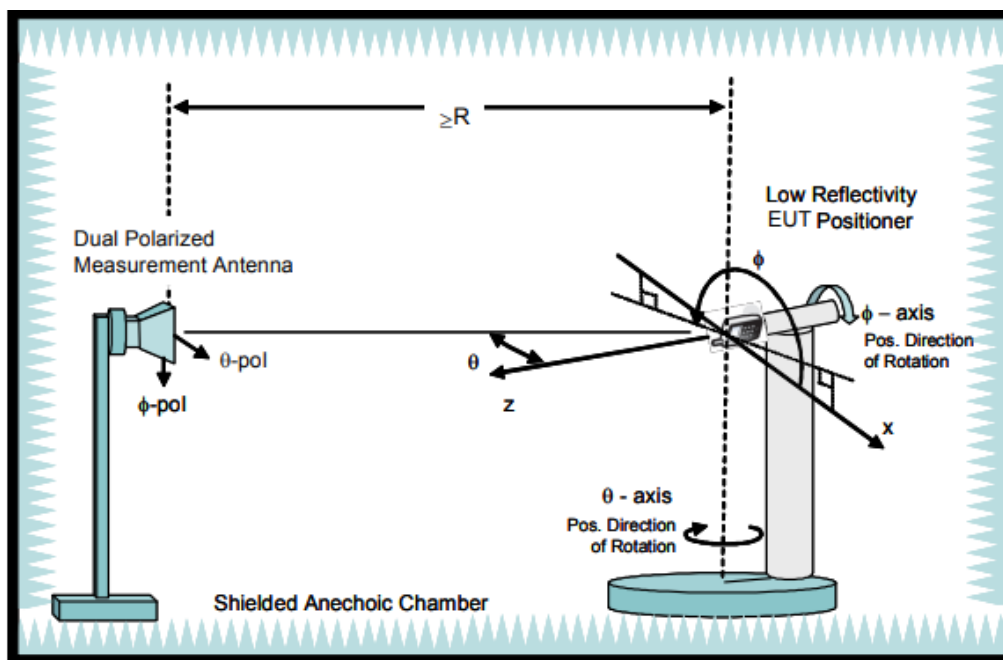
- It is required that all the antenna gain to be measured spherically and computed by spatial average be computed of the resultant gain.
- During gain measurement, all other antennas not under test should be terminated by 50 Ohm load in end of cable.
- Space points of 3D gain measurement are increase by specific steps from Theta 0~180 degrees, and Phi, 0~360 degrees, as figure below. The increment steps are different steps are different by antenna functions.

Theta Start	15 degree	Phi Start	0 degree
Theta Stop	165 degree	Phi Stop	360 degree
Theta Increment	15 degree	Phi Increment	15 degree

2. Test & System Description

a. Test setup

The testing of antenna gain should be made at a CTIA qualified lab with an RF anechoic chamber with at least 3-meter separation from the receive antenna to the antenna under test. The antenna gain report from unqualified lab can't be referenced a passing. Besides, all test equipment including horn antennas, adapters, cables, network analyzers, and receivers shall be calibrated per manufacturer's minimum calibration requirements.



b. Equipment list

AMS4500 Antenna Measurement System	
Device	
	RF-Shielded Room & Related Components
	Anechoic Absorber Materials
	Core Equipment & Software
	Design, Installation, Integration & Training
	LTE SISO Test Package
	WiFi (802-11a/b/g/n/ac/ax) SISO Test Package
	WiFi 6e SISO Test Package
	3126C-3500 Precision Sleeve Dipole (3000 - 4000 MHz)
	3126C-4500 Precision Sleeve Dipole (4000 - 5000 MHz)
	Support Envelope Correlation Calculation [ECCJ]
	Anritsu MT8862A Wireless Connectivity Test Set

3. Setup photo

Test Conditions

PC under test placed on a non-conductive structure at sufficient height to be in the 'quiet zone' of the chamber

The PC under test must be fully populated with a power, motherboard, hard drive, disk drives, etc... The purpose is to characterize the antennas on a fully populated customer deliverable unit.

PC's Control panel should be parallel with XY-plane and face to X-axle, see diagram below.



Antenna Information

Section 1. Antenna Assembly Specifications

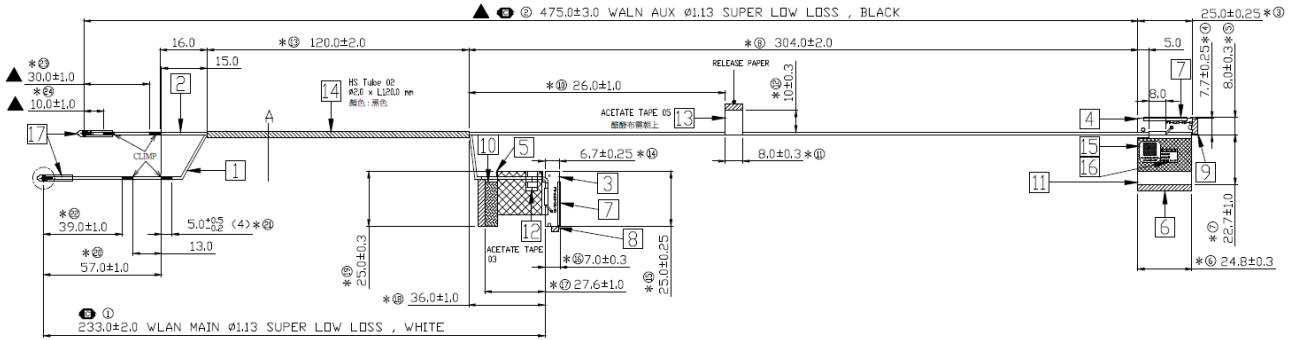
1A Antenna Part Number	1B Manufacturer	1C Antenna Type	1D Cable Assembly Part Number and Information	Freq Range MHz	1E * Peak Gain W/ Cable loss (dBi)	1F Peak Gain w/o Cable Loss (dBi)	1G Max VSWR	1H Cable Loss (dB)
Main Antenna Compal P/N DC33002R12L Speed P/N F-0G-FH-6163-003-00	Speed	PIFA	50 ohm Coaxial length: 233mm Diameter: 1.13mm	2400-2483.5	0.09	0.62	< 2.5	0.53
				5150-5250	2.6	3.4	< 2.5	0.8
				5250-5350	2.88	3.7	< 2.5	0.82
				5470-5725	4.28	5.12	< 2.5	0.84
				5725-5850	3.43	4.28	< 2.5	0.85
				5925-6425	NA	NA	NA	NA
				6425-6525	NA	NA	NA	NA
				6525-6875	NA	NA	NA	NA
				6875-7125	NA	NA	NA	NA
Aux Antenna Compal P/N DC33002R12L Speed P/N F-0G-FH-6163-003-00	Speed	PIFA	50 ohm Coaxial length: 475mm Diameter: 1.13mm	2400-2483.5	-0.59	0.48	< 2.5	1.07
				5150-5250	2.47	4.09	< 2.5	1.62
				5250-5350	1.8	3.47	< 2.5	1.67
				5470-5725	2.56	4.24	< 2.5	1.68
				5725-5850	1.0	2.71	< 2.5	1.71
				5925-6425	NA	NA	NA	NA
				6425-6525	NA	NA	NA	NA
				6525-6875	NA	NA	NA	NA
				6875-7125	NA	NA	NA	NA

- 3D Antenna Peak Gain required being test in system basis.

Section 2. Dimensioned Photos and Drawings of Antennas

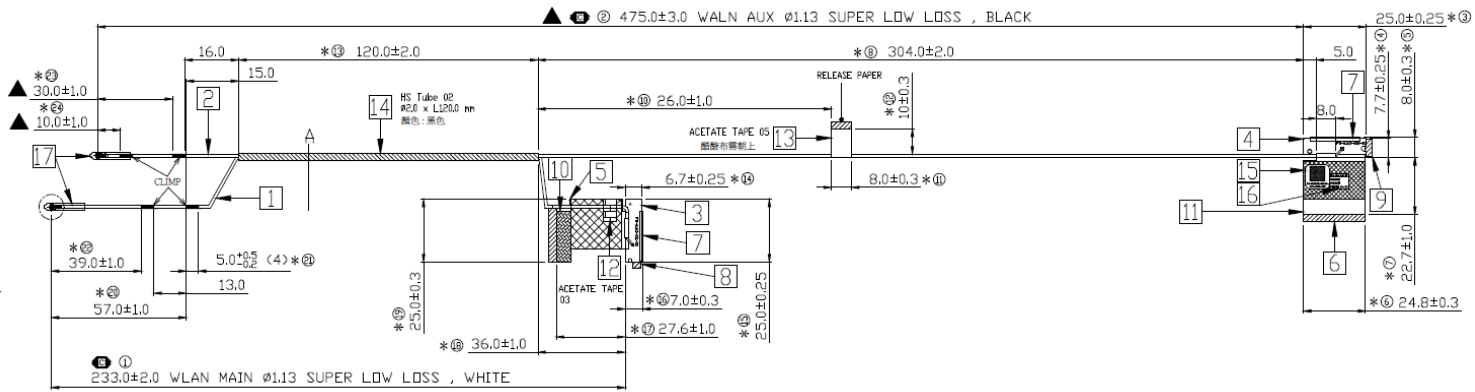
Include the dimensioned photo and drawing of Main antenna here.

Main Antenna Drawing:



Include the dimensioned photo and drawing of Aux antenna here.

Aux Antenna Drawing:

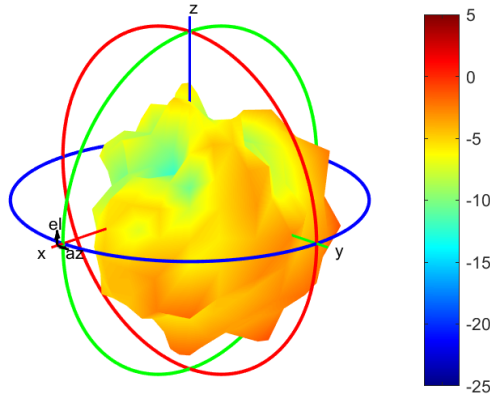


Section 3. Radiation characteristics of antenna loaded in Host Platform

Main Antenna

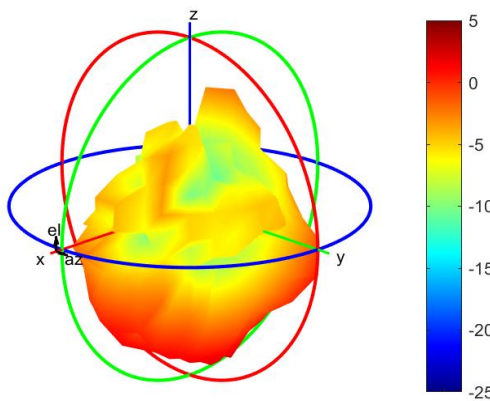
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
2400-2483.5	0.09



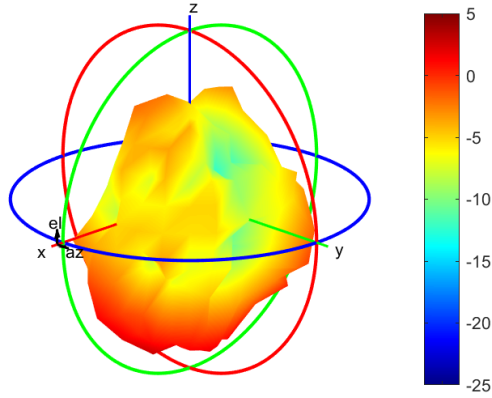
Max Antenna 3D Radiation Pattern 5150-5250 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5150-5250	2.6



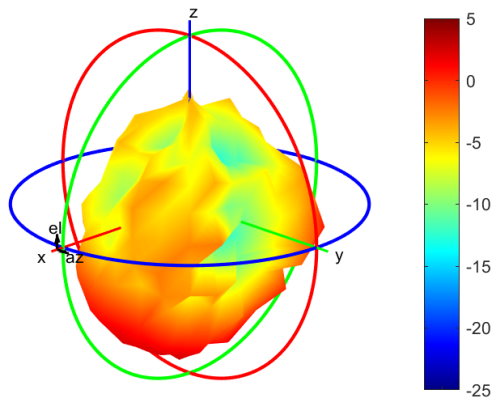
Max Antenna 3D Radiation Pattern 5250-5350 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5250-5350	2.88



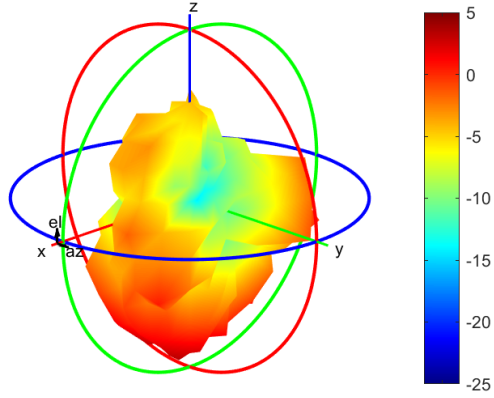
Max Antenna 3D Radiation Pattern 5470-5725 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5470-5725	4.28



Max Antenna 3D Radiation Pattern 5725-5850 MHz

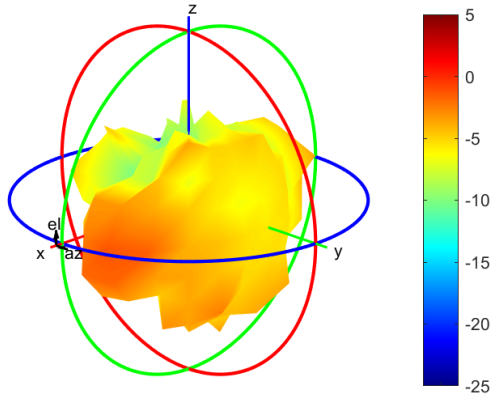
Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5725-5850	3.43



Auxiliary Antenna

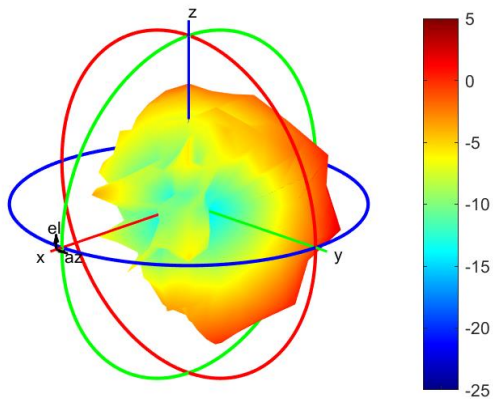
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
2400-2483.5	-0.59



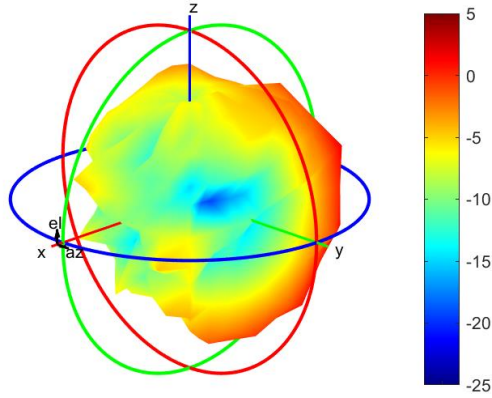
Max Antenna 3D Radiation Pattern 5150-5250 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5150-5250	2.47



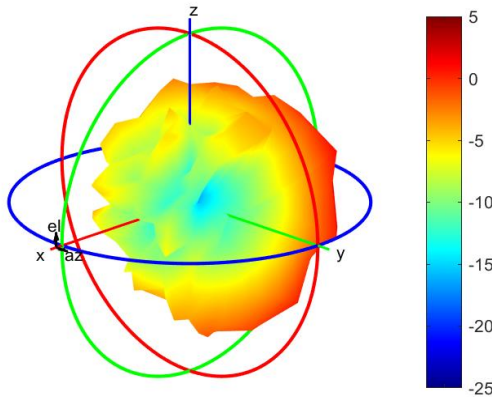
Max Antenna 3D Radiation Pattern 5250-5350 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5250-5350	1.8



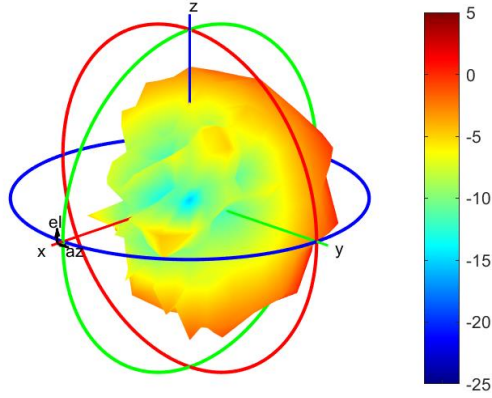
Max Antenna 3D Radiation Pattern 5470-5725 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5470-5725	2.56



Max Antenna 3D Radiation Pattern 5725-5850 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5725-5850	1.0



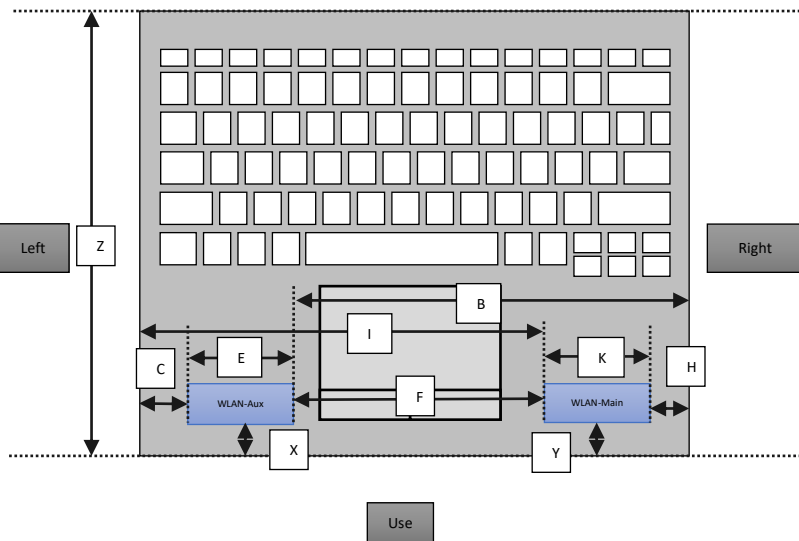
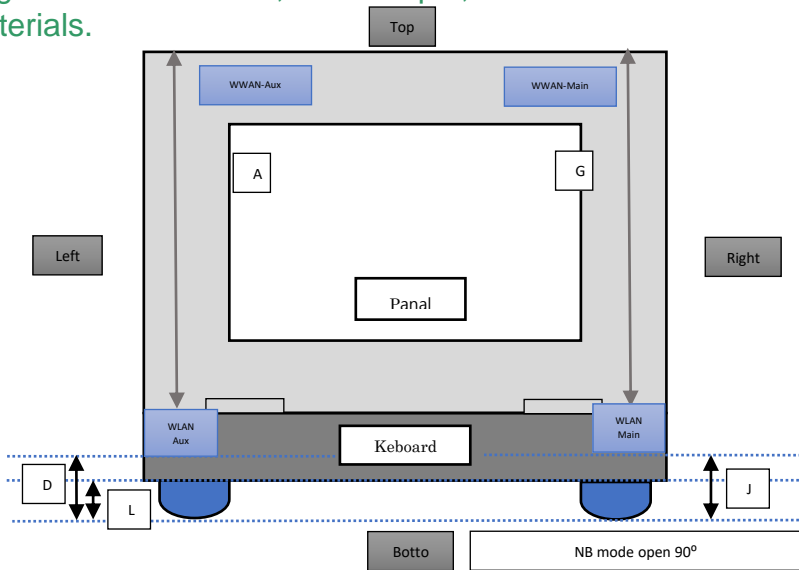
Section 4. Antenna Host Platform Location Information

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.

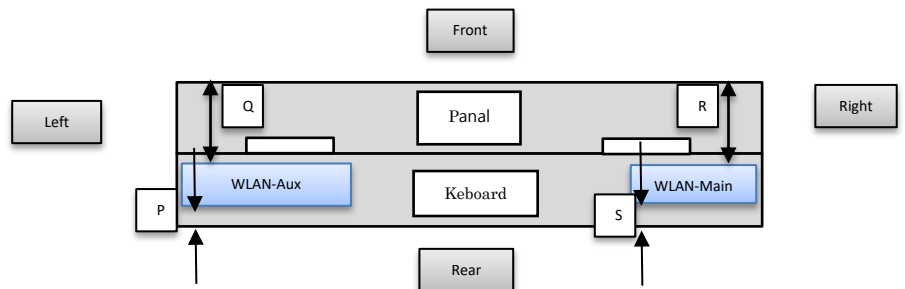
Minimum Separation Distance

Item	Antenna	Position	Distance (mm)
A	WLAN-Aux	to Top	199.1
B	WLAN-Aux	to Right	287.6
C	WLAN-Aux	to Left	5.9
D	WLAN-Aux	to Bottom	5.7
E	WLAN-Aux	Aux Antenna Length	8
F	Main-Aux	Main to Aux	275
G	WLAN-Main	to Top	199.1
H	WLAN-Main	to Right	5.9
I	WLAN-Main	to Left	287.6
J	WLAN-Main	to Bottom	5.7
K	WLAN-Main	Main Antenna Length	7
L	NB	Bumper thickness	2.1
X	WLAN-Main	to User	27.5
Y	WLAN-Aux	to User	27.6
Z	NB	Keyboard depth	204



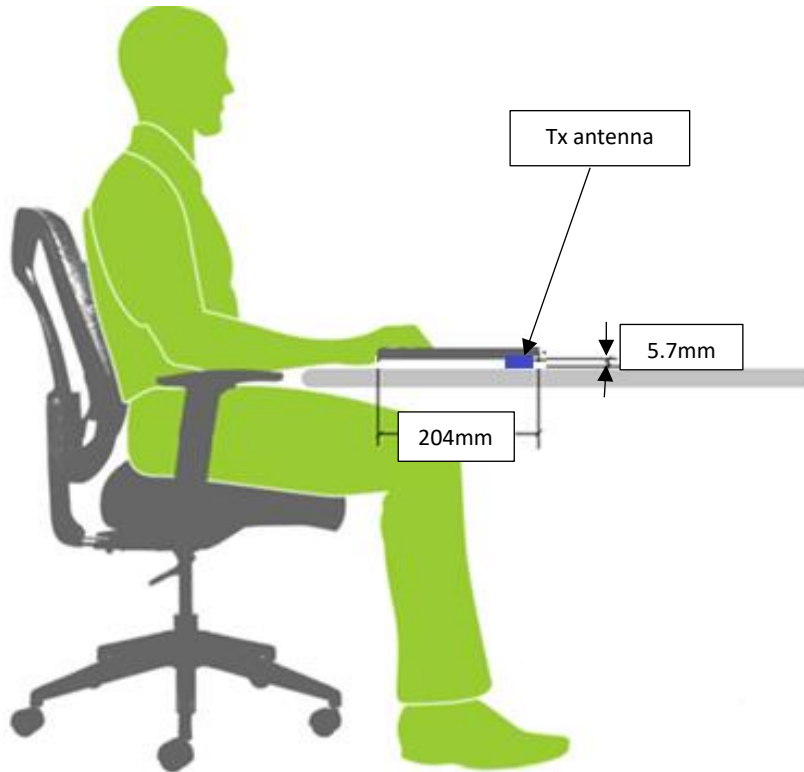
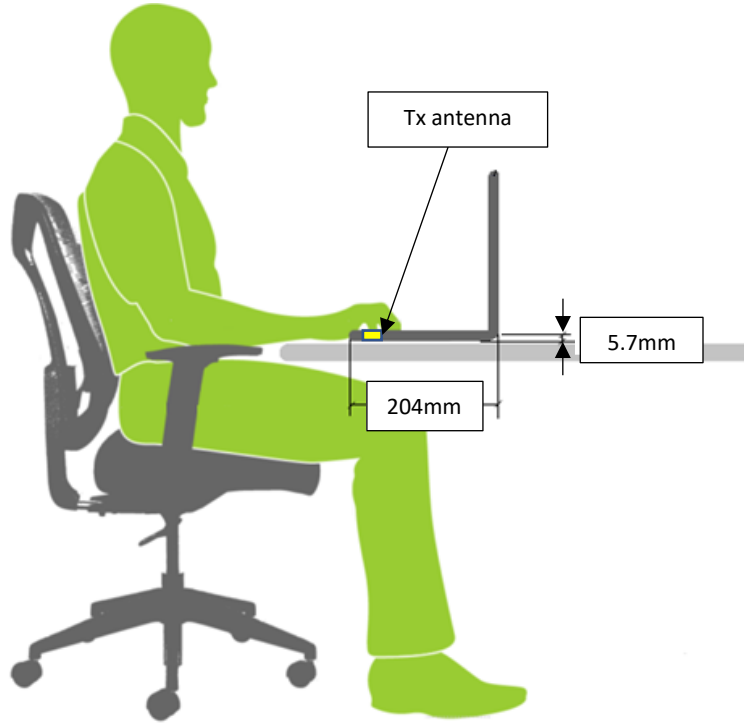
Minimum Separation Distance

Item	Antenna	Position	Distance (mm)
P	WLAN-Aux	to Front	5.9
Q	WLAN-Aux	to Rear	17.1
R	WLAN-Main	to Front	17.1
S	WLAN-Main	to Rear	5.7



Section 5. Antenna dimensional information for SAR evaluation

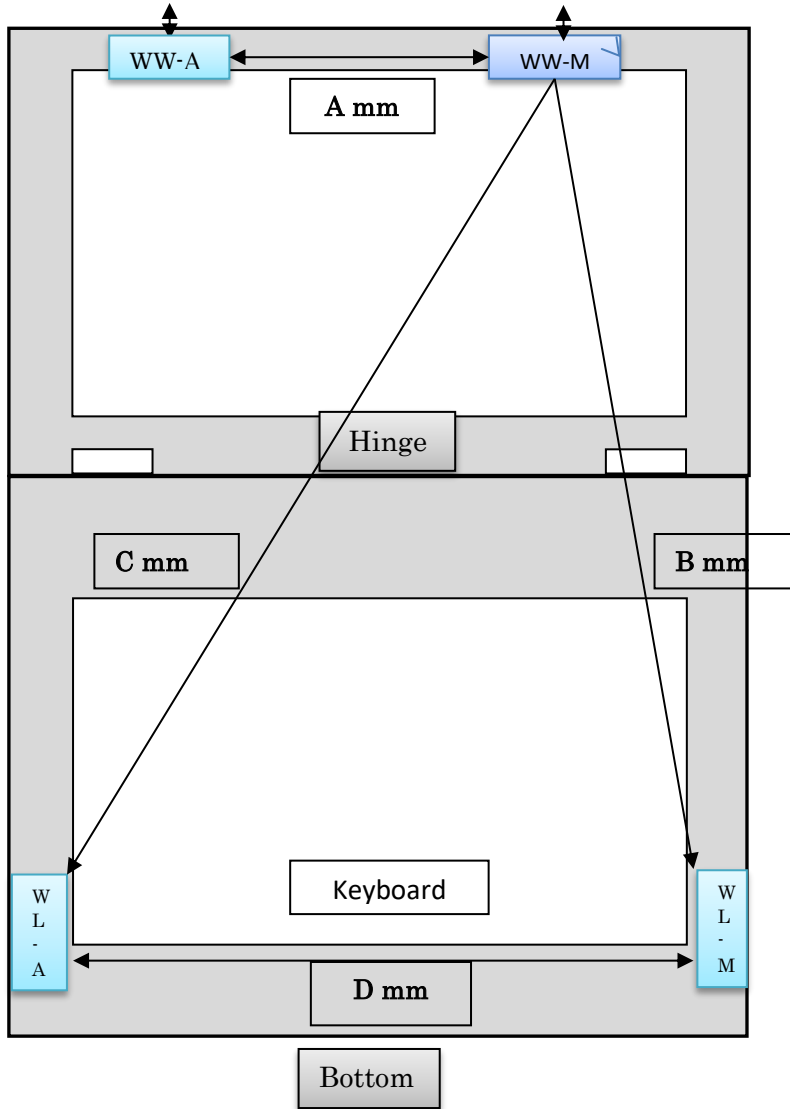
Include a **dimensioned photo(s) or dimensioned drawing(s)** showing the distance (mm) between the transmit antennas and the user. For notebook/laptop hosts show lapheld position (example below). For tablet hosts show all orientations including lapheld, primary & secondary portrait, primary & secondary 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)



Minimum Separation Distance			
Item	Antenna	Position	Distance
			(mm)
A	WWAN	Main to Aux	60
B	WWAN-Main	To WLAN Main	247.2
C	WWAN-Aux	To WLAN Aux	318.6
D	WLAN-Main	To WLAN Aux	275