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	P91F	Yes	Regular NB	**5.77mm**

*****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)
Speedwire	Monopole	F.0G.FH-6101-002-00 (DC33002CW1L)	F.0G.FH-6101-001-00 (DC33002CW0L)

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	**5.9GHz** 5850-5895MHz	**6.2GHz** 5925-6425MHz	**6.5GHz** 6425-6525MHz	**6.7GHz** 6525-6875MHz	**7.0 GHz** 6875-7125MHz
Main	2.84	1.89	1.89	2.65	2.65	0.53	NA	NA	NA	NA
Aux	2.90	2.86	2.86	2.88	2.88	2.65	NA	NA	NA	NA

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	**5.9GHz** 5850-5895MHz	**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	5.00	Mid-power: ≥ 8 mm
PIFA	3.24	3.64	3.73	4.77	4.97	4.72	4.83	4.30	5.37	5.59	
Dipole	2.89	2.92	3.19	4.41	4.22	4.22	4.83	4.30	4.49	5.34	Low power: ≥ 5 mm

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.

Table of contents

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.

    4.
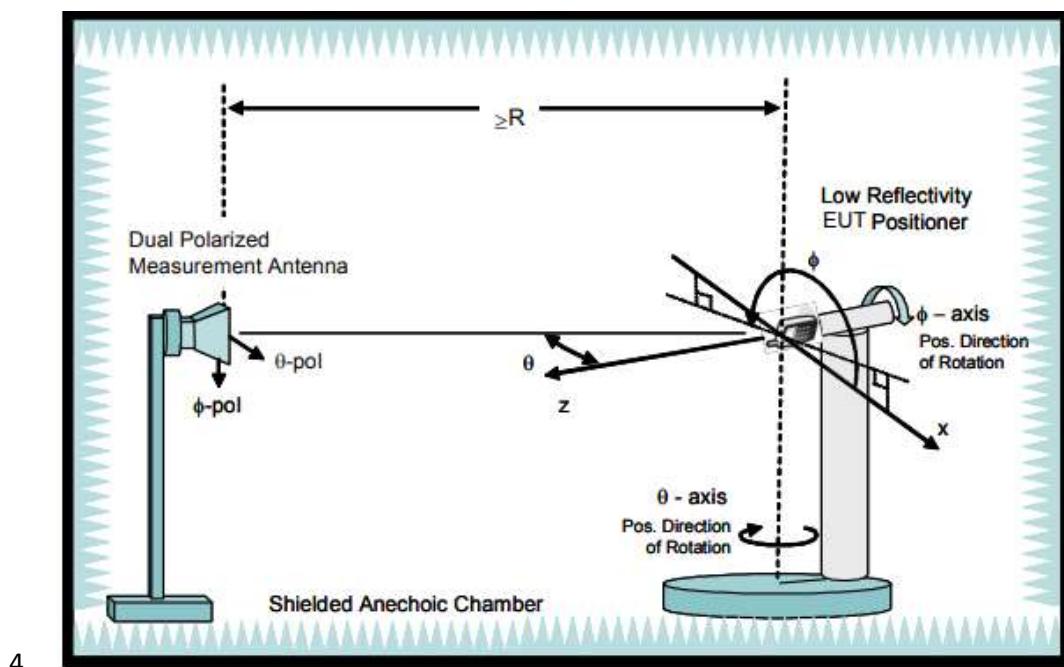
b. Equipment list

Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
Anechoic Chamber	AMS8500	-	ETS-Lindgren	22-Jun-22	10-Jul-24
Turn Table	2117-7200	SN00231447	ETS-Lindgren	22-Jun-22	10-Jul-24
Switch & Positioning systems	EMCenter	SN00242606	ETS-Lindgren	22-Jun-22	10-Jul-24
Measurement SW	EMQuest V1.15 build 27347	SN1802	ETS-Lindgren	22-Jun-22	10-Jul-24
Horn antenna	3164-10	SN00246202	ETS-Lindgren	22-Jun-22	10-Jul-24
Vector Network Analyzer	E5071C	PN5188-4462	Keysight	30-May-22	30-Nov-23
Cable 7.5m 400MHz to 18GHz(H-pol)	SS402	00100A1F5A1XXS	WOKEN	22-Jun-22	10-Nov-24
Cable 7.5m 400MHz to 18GHz(V-pol)	SS402	00100A1F5A1XXS	WOKEN	22-Jun-22	10-Nov-24
Cable 14m 400MHz to 18GHz	SS402	00100A1F5A1XXS	WOKEN	22-Jun-22	10-Nov-24
Temp & Humidity Logger	830	SN84972	PROVA	16-Jul-22	10-Jul-23

3. Setup photo
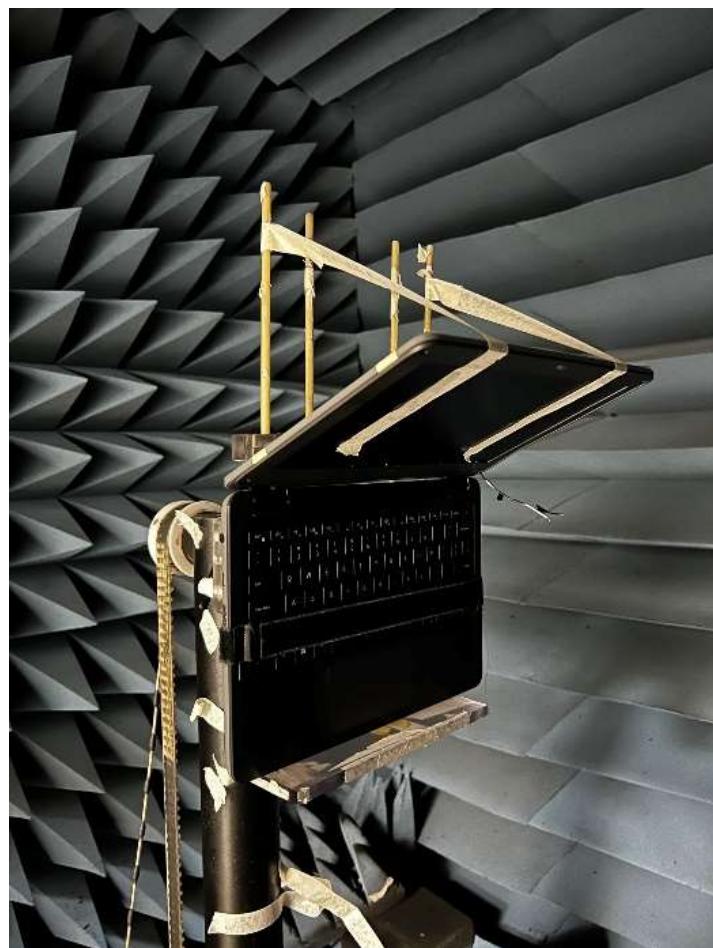
# Antenna Information

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)
F.0G.FH-6101-002-00 (DC33002CW1L) Main Antenna	Speedwire	Monopole	50 ohm Coaxial length: 39.4cm diameter: 1.37mm	2400-2483.5	2.84	3.77	3	0.93
				5150-5250	1.89	3.28	3	1.39
				5250-5350	1.89	3.29	3	1.4
				5470-5725	2.65	4.06	3	1.41
				5725-5850	2.65	4.37	3	1.72
				5850-5895	0.53	2.27	3	1.74
				5925-6425	NA	NA	NA	NA
				6425-6525	NA	NA	NA	NA
				6525-6875	NA	NA	NA	NA
				6875-7125	NA	NA	NA	NA
F.0G.FH-6101-001-00 (DC33002CW0L) Aux Antenna	Speedwire	Monopole	50 ohm Coaxial length: 4.25cm diameter: 1.37mm	2400-2483.5	2.9	3.00	3	0.10
				5150-5250	2.86	3.01	3	0.15
				5250-5350	2.86	3.01	3	0.15
				5470-5725	2.88	3.03	3	0.15
				5725-5850	2.88	4.73	3	1.85
				5850-5895	2.65	4.53	3	1.88
				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:
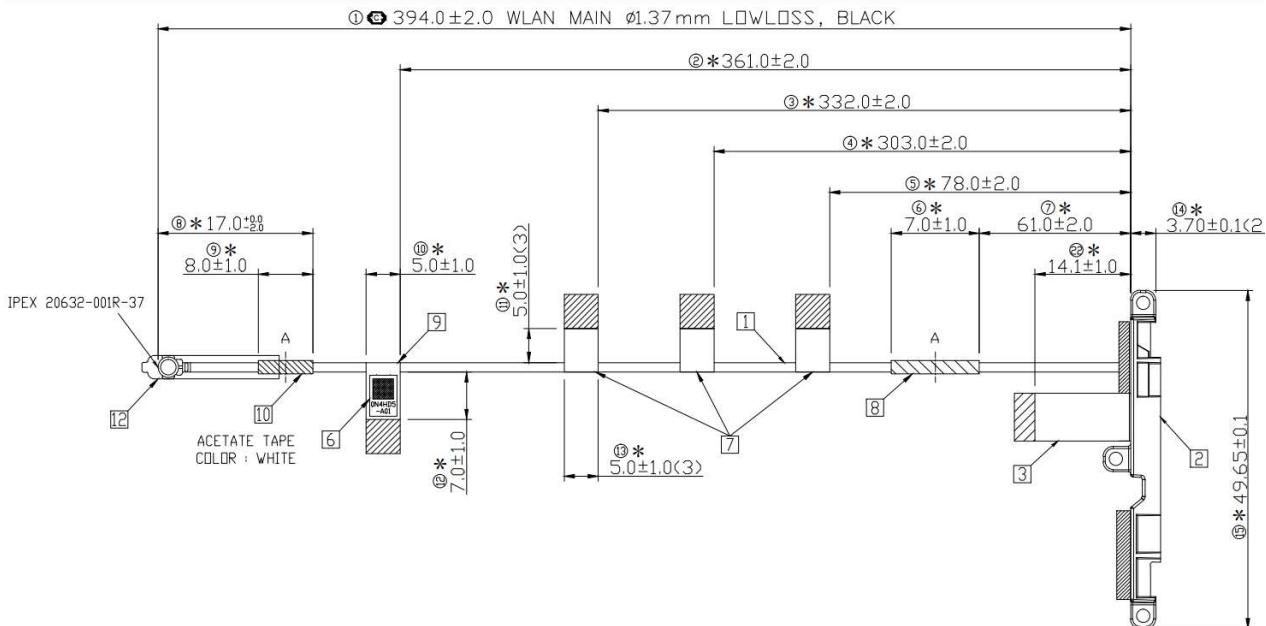

Main Antenna Photo (Front/Back):
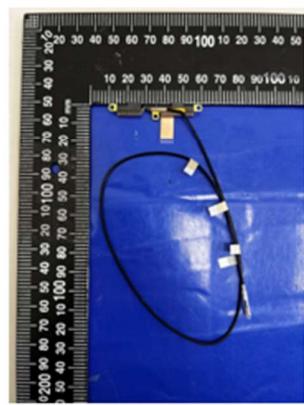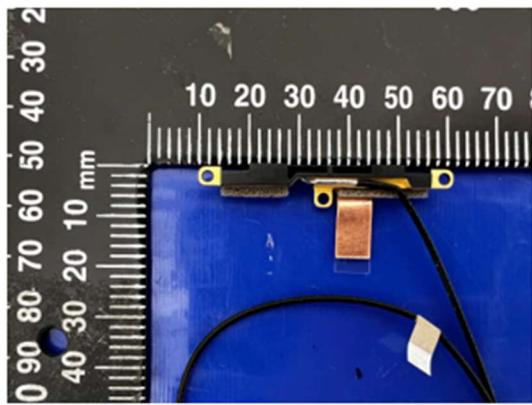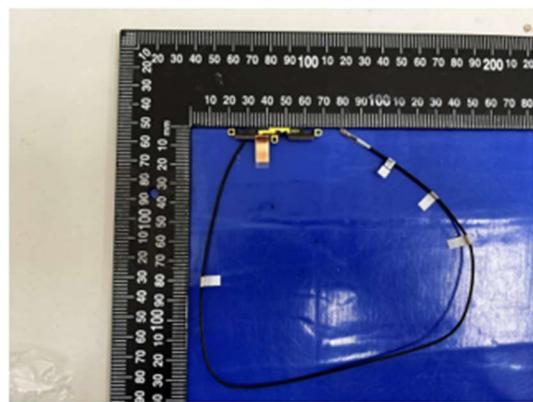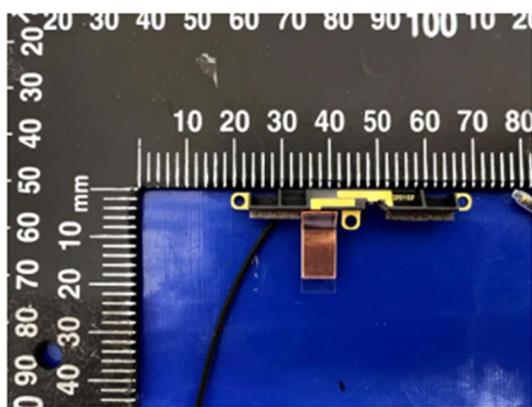
Note: antenna photo should include L type ruler

**Include the dimensioned photo and drawing of Aux antenna here.**

Aux Antenna Drawing:
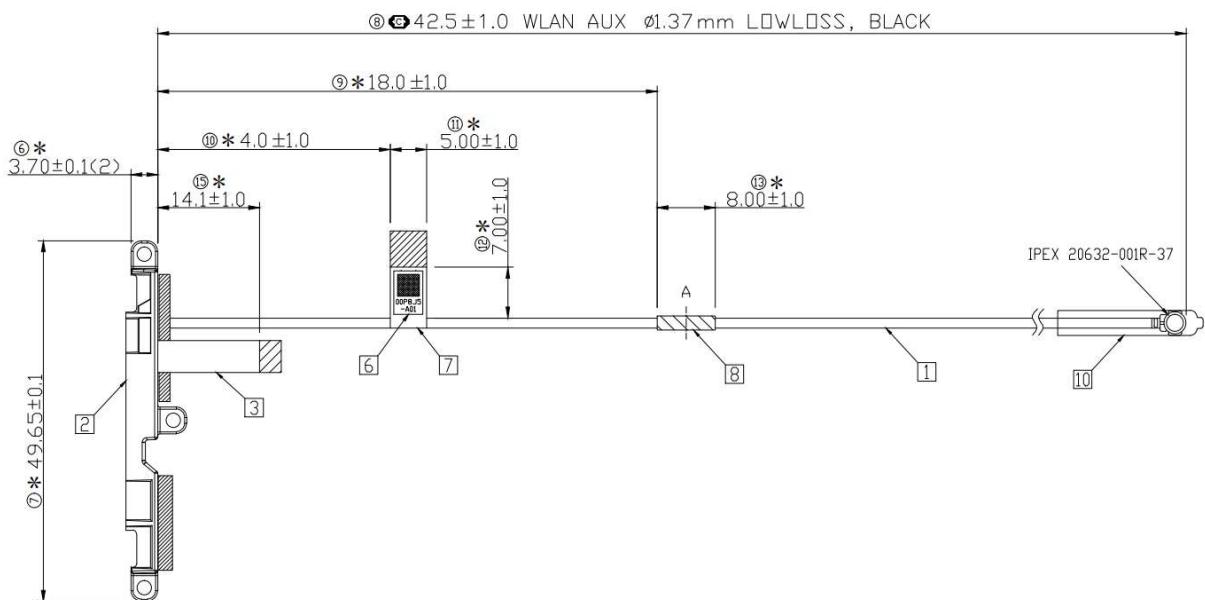
Aux Antenna Photo (Front/Back):
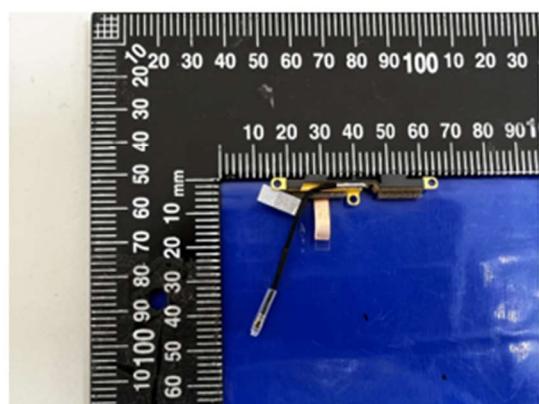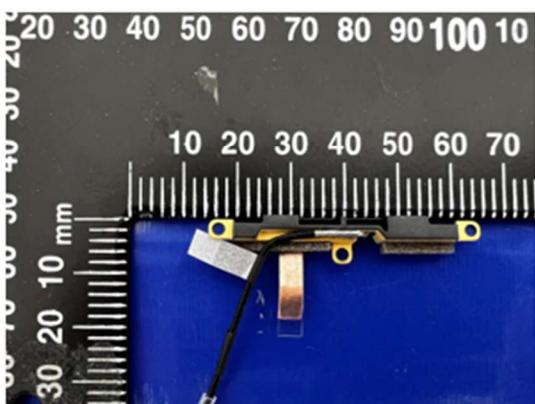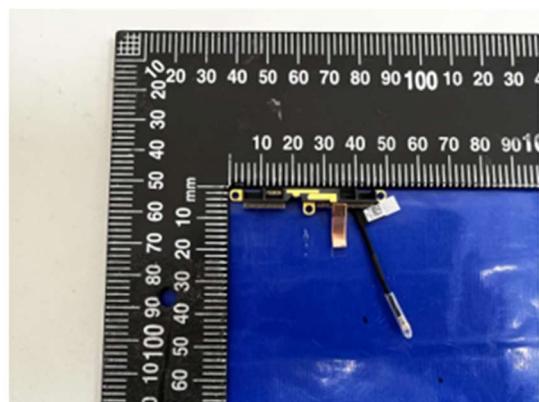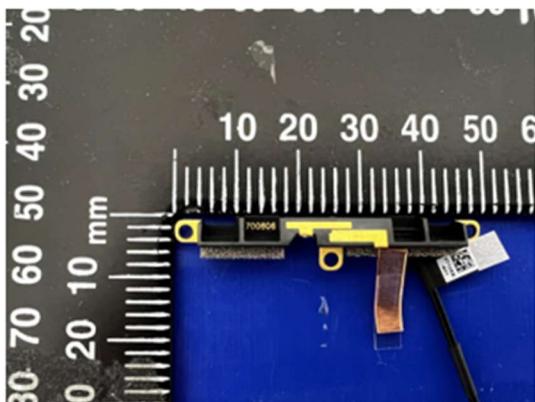
**Note: antenna photo should include L type ruler**
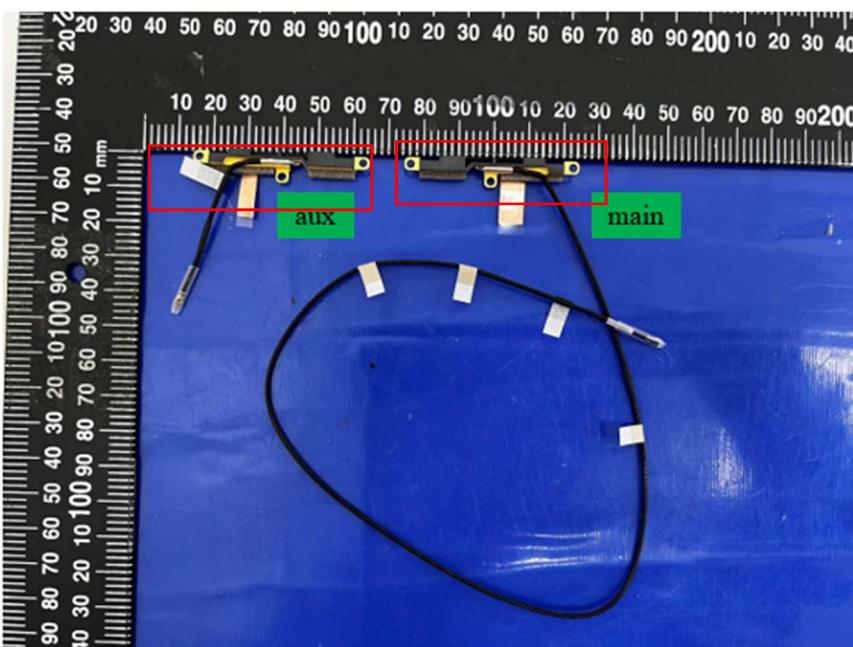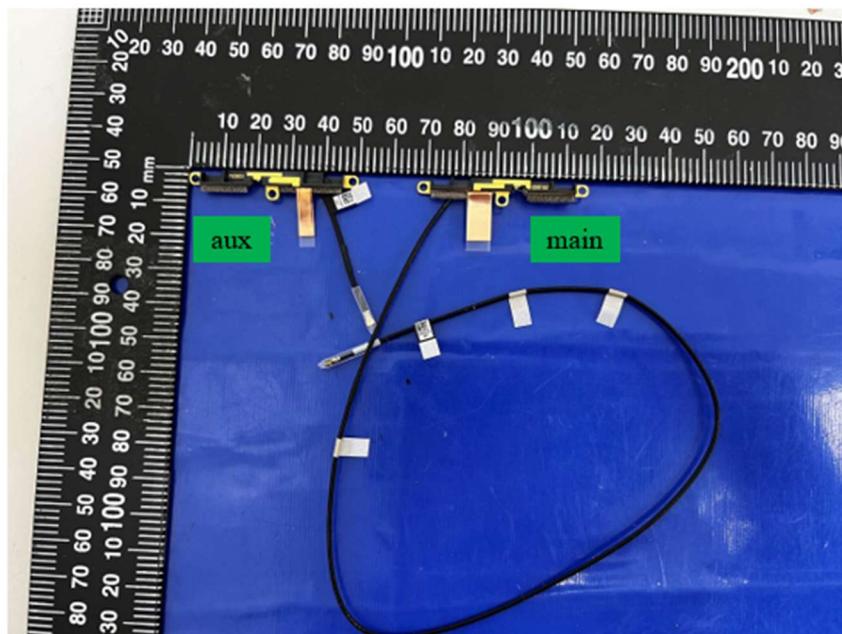
## Section 3. Radiation characteristics of antenna loaded in Host Platform

Main Antenna

Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

| Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
2400-2483.5	2.84
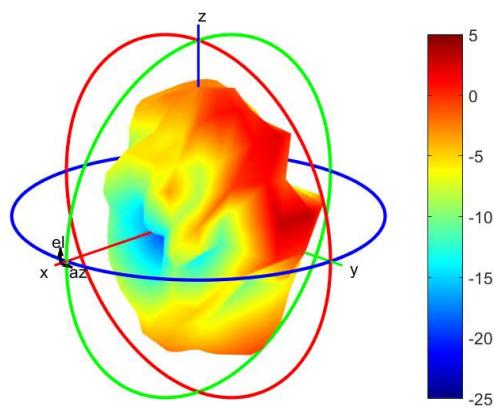
Max Antenna 3D Radiation Pattern 5150-5250 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5150-5250	1.89
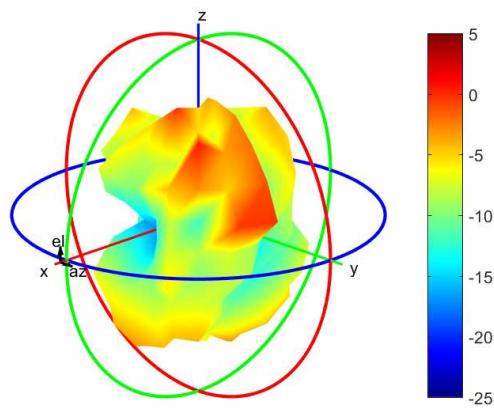
Max Antenna 3D Radiation Pattern 5250-5350 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5250-5350	1.89
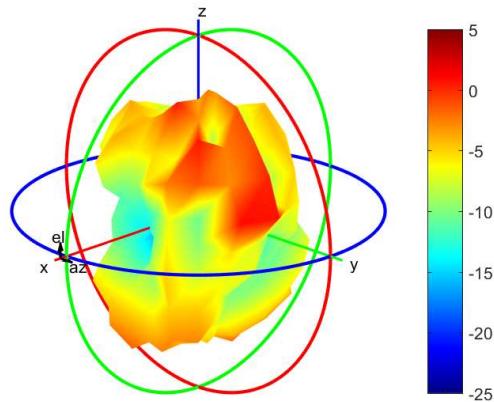
Max Antenna 3D Radiation Pattern 5470-5725 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5470-5725	2.65
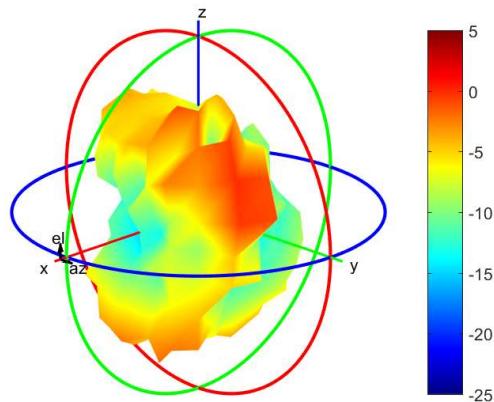
Max Antenna 3D Radiation Pattern 5725-5850 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5725-5850	2.65
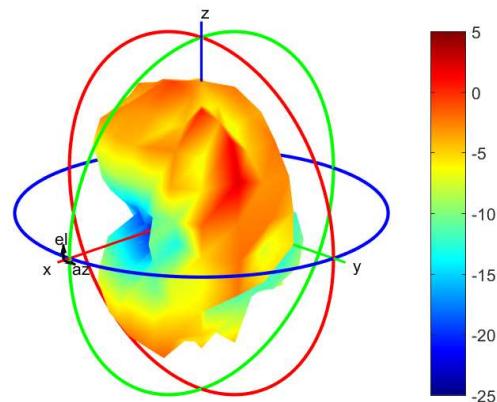
Max Antenna 3D Radiation Pattern 5850-5895 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5850-5895	0.53
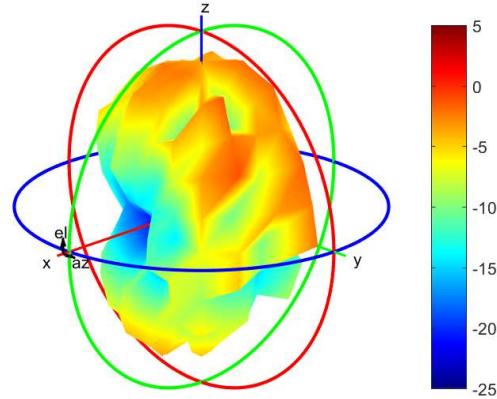
Auxiliary Antenna

Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
2400-2483.5	2.90
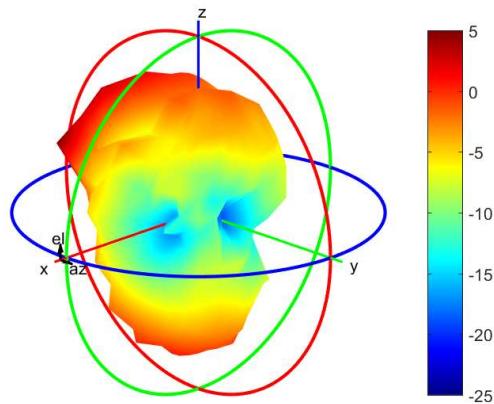
Max Antenna 3D Radiation Pattern 5150-5250 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5150-5250	2.86
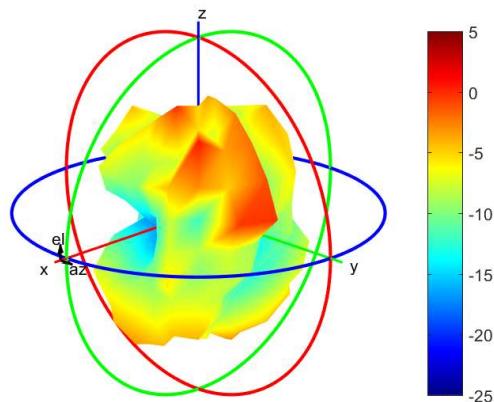
Max Antenna 3D Radiation Pattern 5250-5350 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5250-5350	2.86
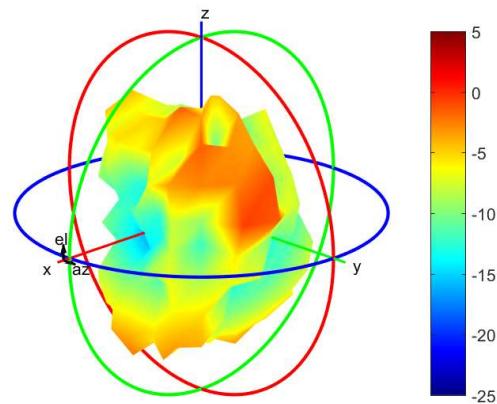
Max Antenna 3D Radiation Pattern 5470-5725 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5470-5725	2.88
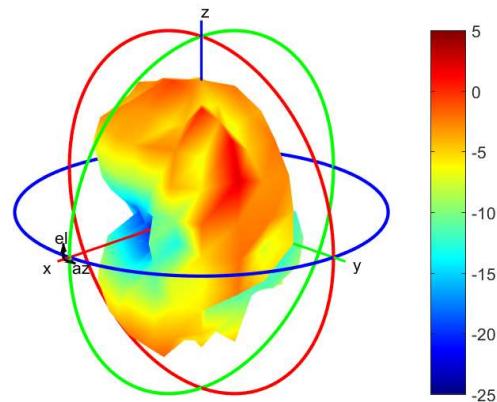
Max Antenna 3D Radiation Pattern 5725-5850 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5725-5850	2.88
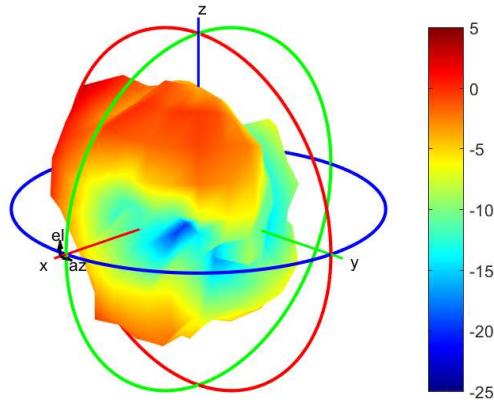
Max Antenna 3D Radiation Pattern 5850-5895 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5850-5895	2.65
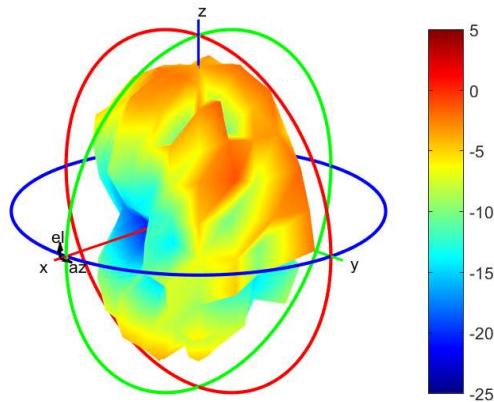
Section 4. Antenna Host Platform Location Information

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
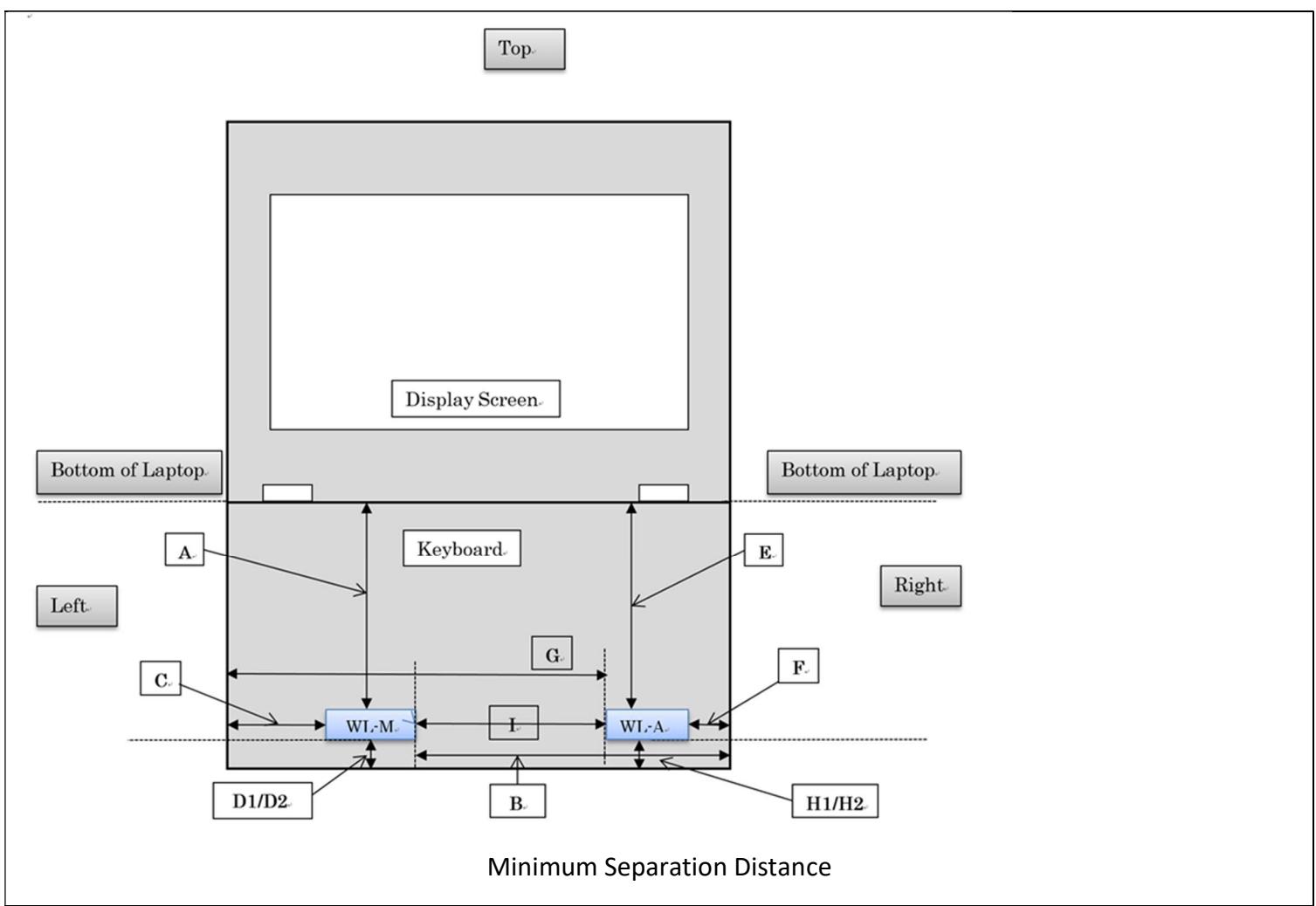
| Item	Antenna	Position	Distance (mm)
A	WLAN-Main	to Top	225.0mm
B	WLAN-Main	to Right	339.4mm
C	WLAN-Main	to Left	1.5mm
D-1	WLAN-Main	to Bottom of Laptop	5.77mm

		(Include Bumper)	
D-2	WLAN-Main	to Bottom of Laptop (NOT include Bumper)	4.77mm
E	WLAN-Aux	to Top	225.0mm
F	WLAN-Aux	to Right	1.5mm
G	WLAN-Aux	to Left	339.4mm
H-1	WLAN-Aux	to Bottom of Laptop (Include Bumper)	5.77mm
H-1	WLAN-Aux	to Bottom of Laptop (NOT include Bumper)	4.77mm
I	WLAN Main	to WLAN Aux	332.4mm

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.

2.0mm

5.77mm
Main Antenna

228mm
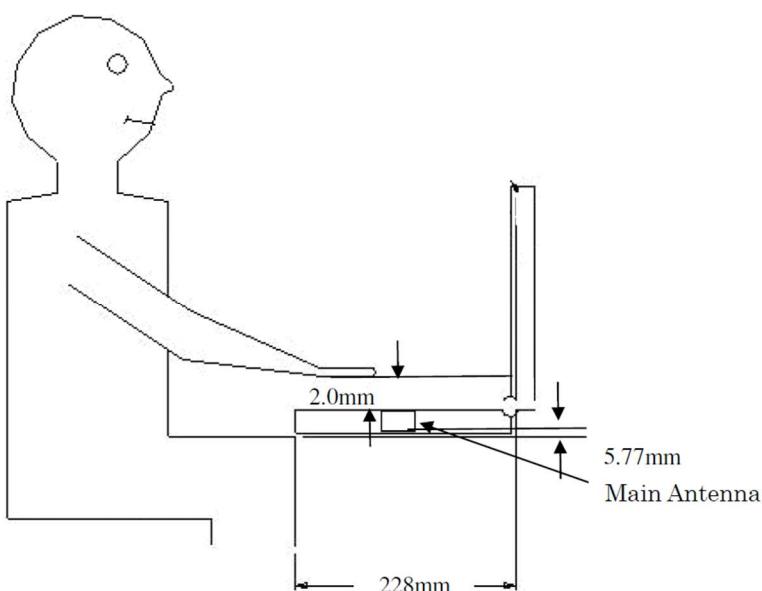
Section 6. Diagram Example of Co-Location Antenna Separation

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)
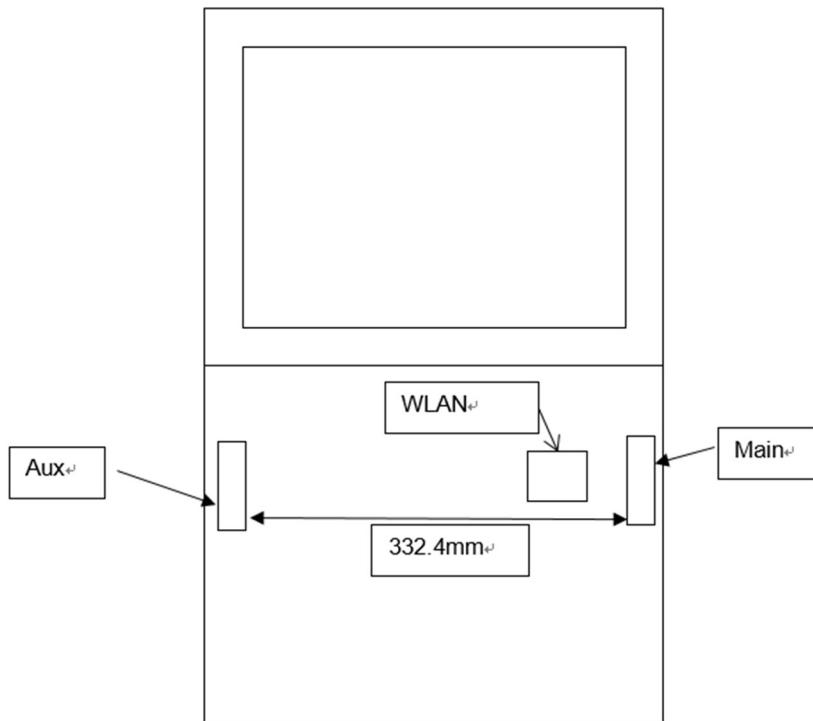
Revision History

Revision	Description	Date
10.3	Page2-5 Add Applicable test method, Test & System Description and Setup photo	July 24, 2022

10.4	Cover page
	  Add Intel 5.9GHz reference antenna gain
	Cover page/Section1/Section3
	  Add 5.9GHz antenna gain information
		September 15, 2022