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)
ASUS	Compal	CM3401FFA	No	Convertible PC	5.5mm (To Edge) 3mm (To keyboard)

*****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)
South Star	PIFA	DC33002TK00 (3.N201.0231)	DC33002TK10 (3.N201.0232)

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	2.39	2.75	2.75	2.77	2.85	2.85	NA	NA	NA	NA
Aux	2.47	2.62	2.58	2.92	2.92	2.91	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)

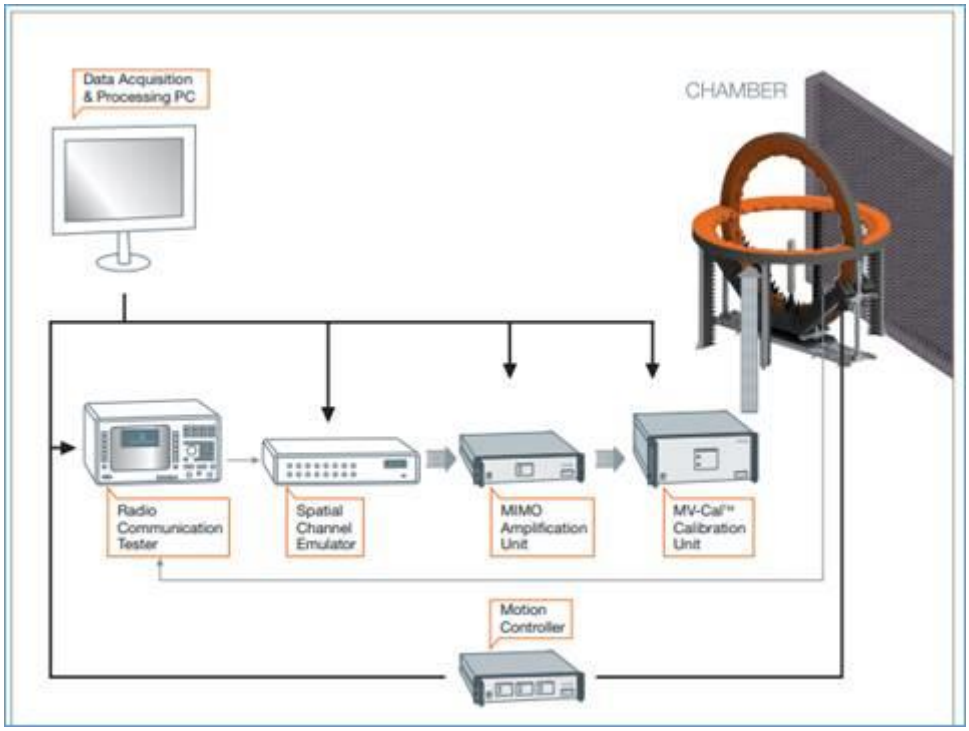
*** 3D Peak Antenna gain should be equal or greater than -2 dBi**
- If a host integrator plans to use a lower gain antenna of the same type, additional CBP(FCC)/EDT(EU) testing need to be performed while the module is installed in the host.

Table of contents

1. **Applicable test methods**

<insert test description here for test method>

The radiation pattern of antenna is measured in both horizontal polarization and vertical polarization. The radiation pattern measurements are performed in the three-dimensional anechoic chamber. The chamber provides less than –30dB reflectivity from 400MHz through 8GHz. The chamber is calibrated using both standard dipole antenna and horn antenna. The Gain here is expressed as dBi that standardizes the isotropic antenna. The Gain measurements and antenna radiation pattern are also performed in the same chamber described previously.



2. **Test & System Description**

a. Test setup

<insert test diagram here for test site utilized>

a. Test setup

1. Frequency Range

2400~2500MHz, for WLAN application.

5150~7125MHz, for WLAN application

2. Antenna Configuration

The antenna basically has two parts; the stamping and the cable assembly with the connector on one side.

3. VSWR

The VSWR is measured with network analyzer that support up to 8GHz. All the measurements are performed with the customer provided fixture.

b. Equipment list

<insert test diagram here for test site utilized>

The equipment for the antenna measurement we used is as follows:

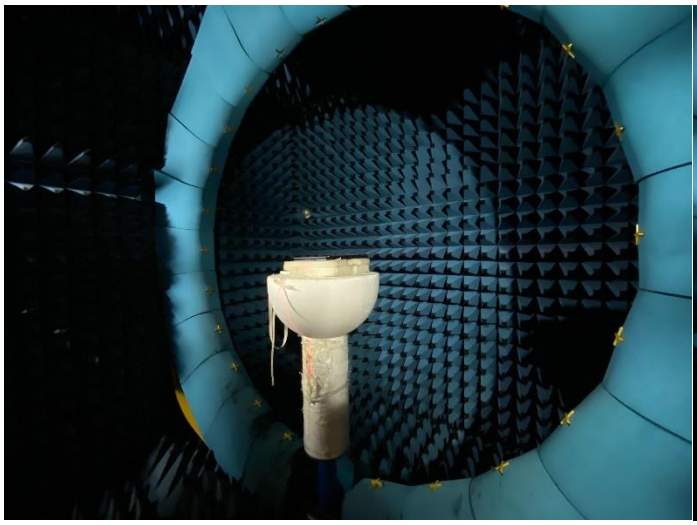
A. Network Analyzer, support up to 8GHz, to measure the VSWR and input impedance of antenna.

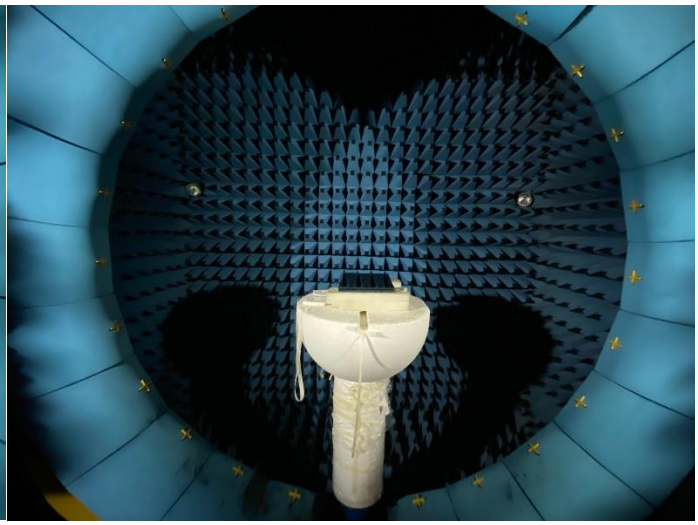
B. Three-dimensional anechoic chamber to measure antenna gain and radiation pattern(Standard horn antenna was used to calibrate the chamber)

C. Climatic chamber for mechanical tests.

item	Device	Type/Model	manufacturer	Cal. Date	Cal. Due Date
1.	Measurement system	StarMIMO 2.4m HV	MVG	2022/9/8	2023/9/8
2.	Turntable	Goniometer	MVG	N/A	N/A
3.	Measurement software	Wave Studio	MVG	N/A	N/A
4.	VNA	Agilent N5230C	Agilent (Keysight)	N/A	N/A
5.	Received antenna	StarMIMO 2.4m HV	MVG	2022/9/8	2023/9/8
6.	Position controller	Motion controller	MVG	N/A	N/A
7.	Cable 2.2m 9kHz~18GHz	SPS -AO-2.2m, 1801	AO Tech.	2022/9/8	2023/9/8
8.	Cable 5m 9kHz~18GHz	SPS-AO-5m, 1805	AO Tech.	2022/9/8	2023/9/8

3. Setup photo





Antenna Information

Section 1. Antenna Assembly Specifications

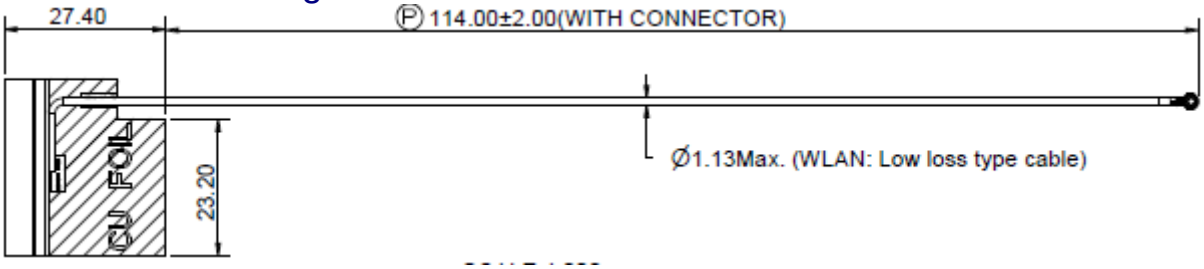
1A Antenna Part Number	1B Manufacturer	1C Antenna Type	1D Cable Assembly Part Number and Information	Freq Range MHz	1E * Peak Gain W/ Cable loss (dBi)	1F Peak Gain w/o Cable Loss (dBi)	1G Max VSWR	1H Cable Loss (dB)
DC33002TK00 (3.N201.0231) Main	South Star	PIFA	Connector: IPEX IPEX-4(20565-001R-13) 50 Ohm Coaxial Length:114 mm Diameter: 1.13mm Type: Low-Loss	2400-2483.5	2.39	2.68	3	0.29
				5150-5250	2.75	3.18	3	0.43
				5250-5350	2.75	3.18	3	0.43
				5470-5725	2.77	3.22	3	0.45
				5725-5850	2.85	3.3	3	0.45
				5850-5895	2.85	3.31	3	0.46
				5925-6425	NA	NA	NA	NA
				6425-6525	NA	NA	NA	NA
				6525-6875	NA	NA	NA	NA
				6875-7125	NA	NA	NA	NA
DC33002TK10 (3.N201.0232) Aux	South star	PIFA	Connector: IPEX IPEX-4(20565-001R-13) 50 Ohm Coaxial Length: 272mm Diameter: 1.13mm Type: Low-Loss	2400-2483.5	2.47	3.15	3	0.68
				5150-5250	2.62	3.65	3	1.03
				5250-5350	2.58	3.62	3	1.04
				5470-5725	2.92	3.99	3	1.07
				5725-5850	2.92	4.01	3	1.09
				5850-5895	2.91	4	3	1.09
				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.**

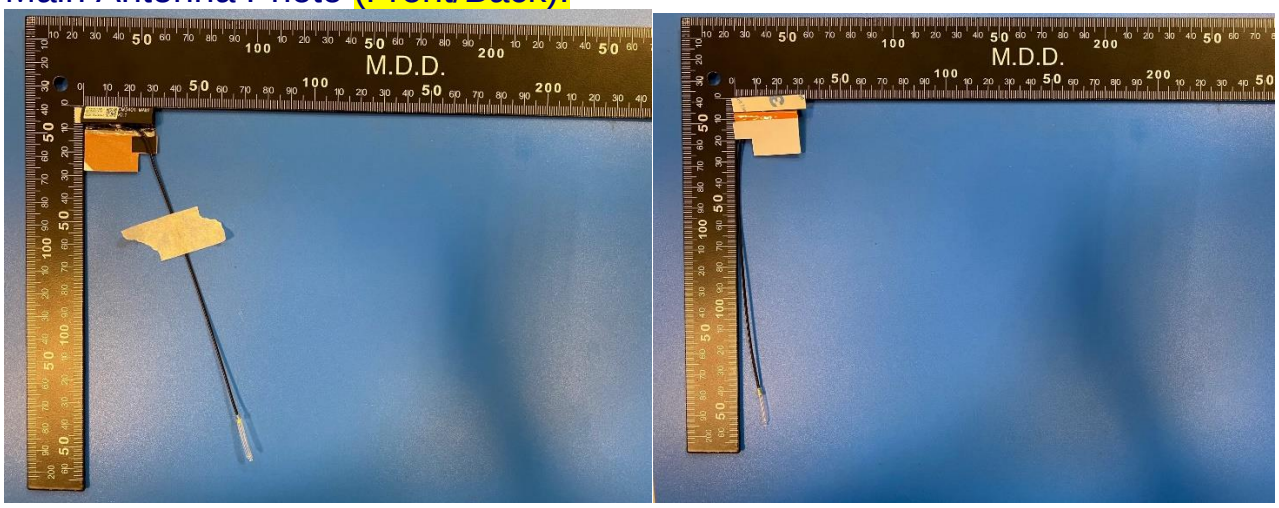
Section 2. Dimensioned Photos and Drawings of Antennas

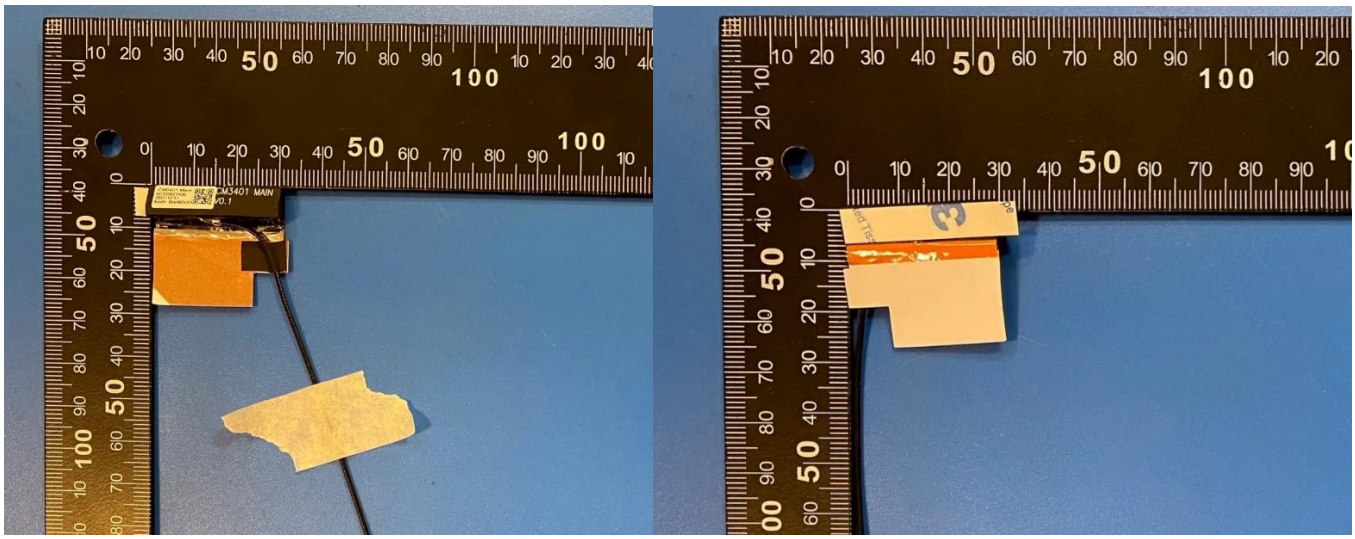
Include the dimensioned photo and drawing of Main antenna here.

Main Antenna Drawing:



Main Antenna Photo (Front/Back):

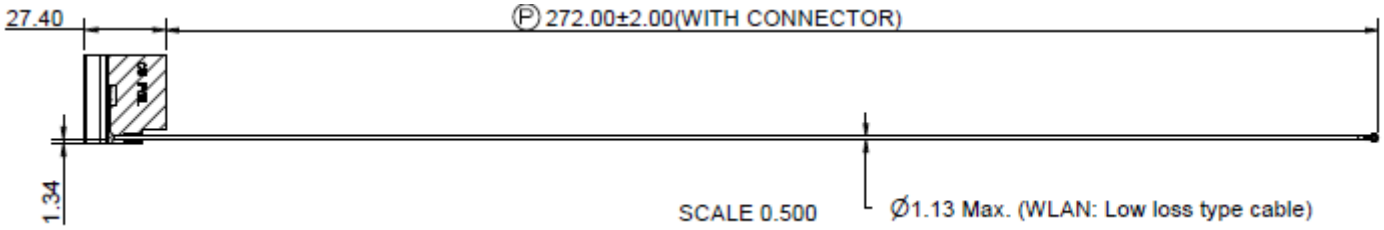




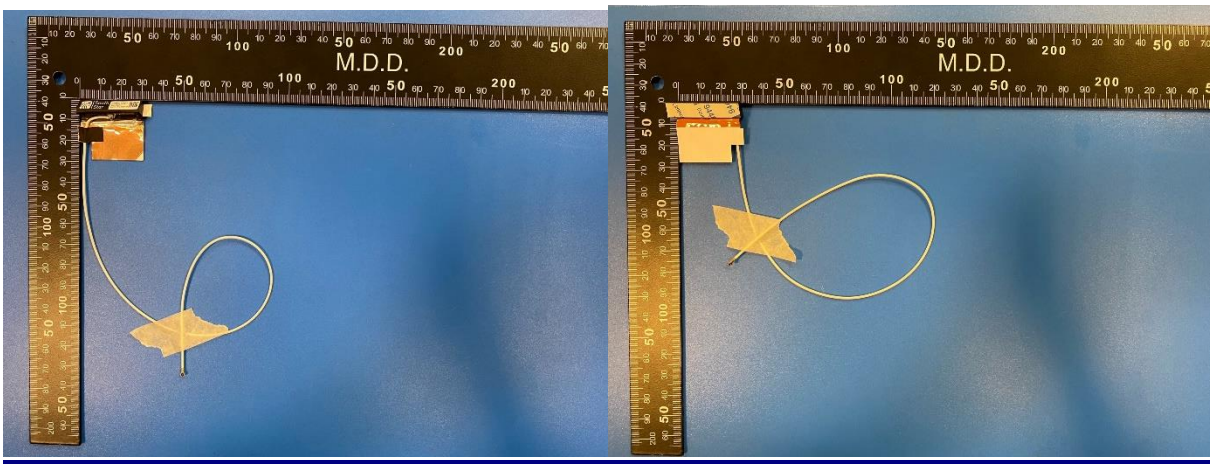
Note: antenna photo should include L type ruler

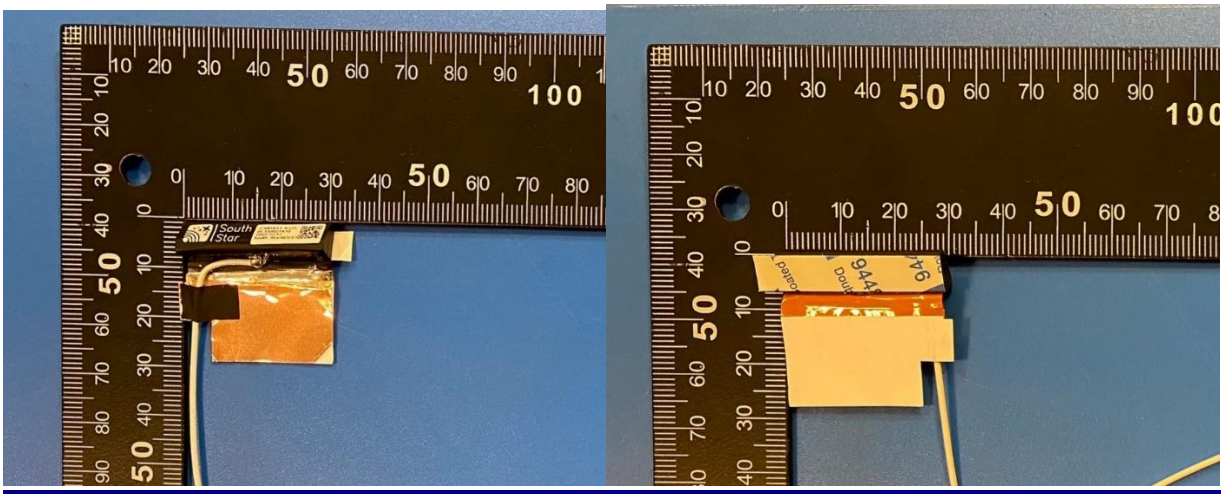
Include the dimensioned photo and drawing of Aux antenna here.

Aux Antenna Drawing:



Aux Antenna Photo (Front/Back):





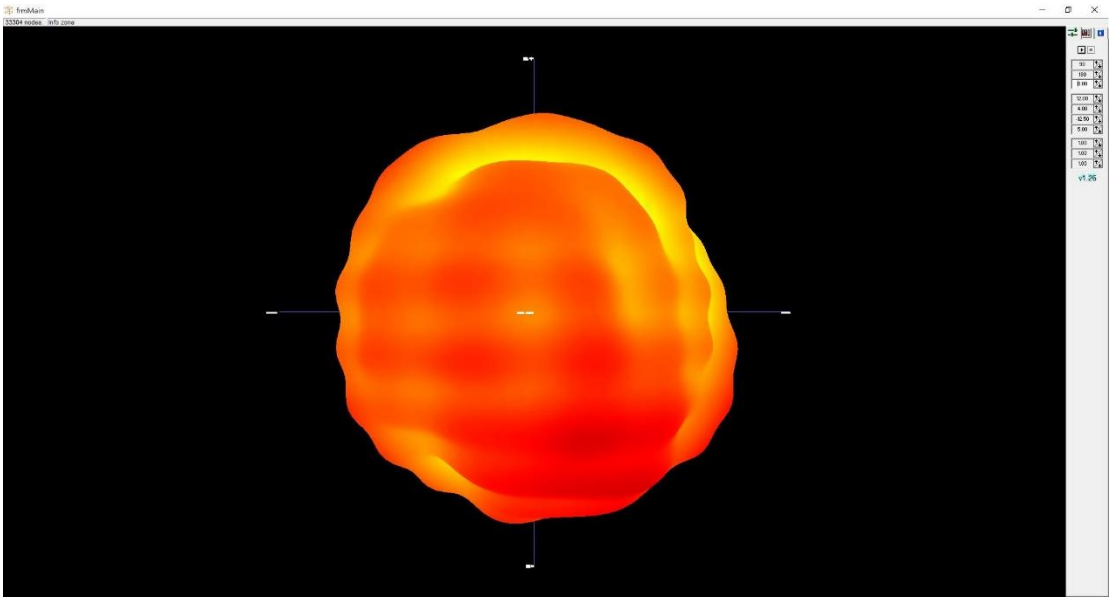
Note: antenna photo should include L type ruler

Section 3. Radiation characteristics of antenna loaded in Host Platform

Main Antenna

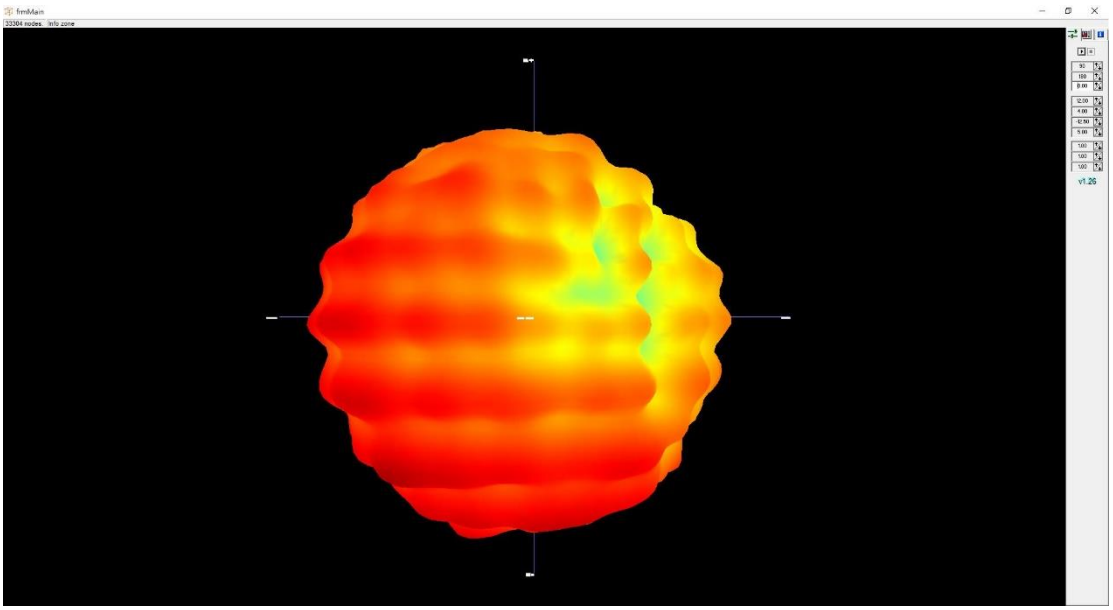
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
2400-2483.5	2.39



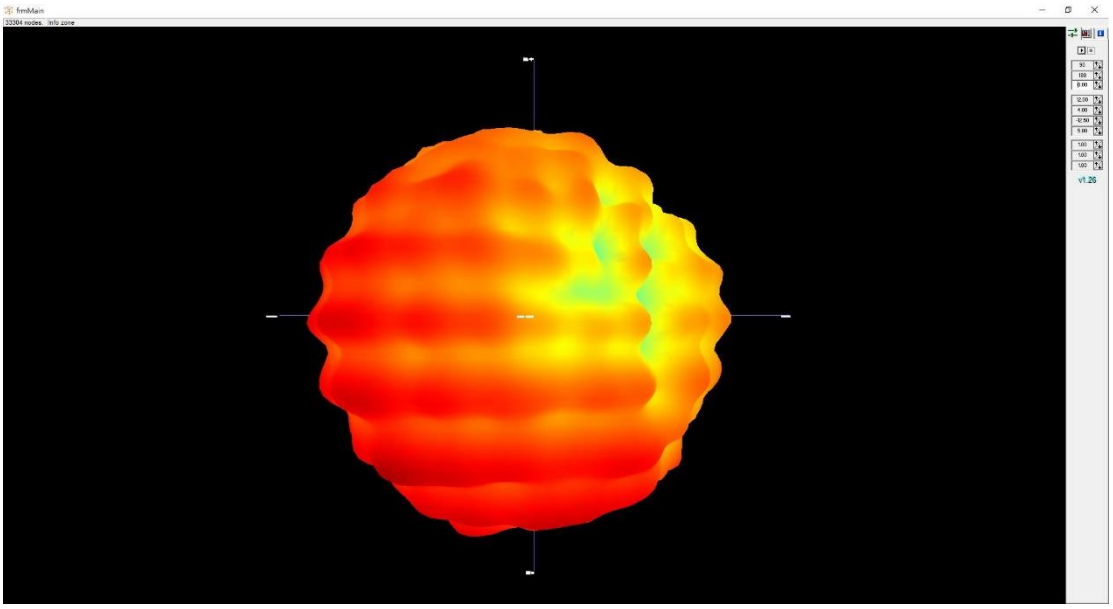
Max Antenna 3D Radiation Pattern 5150-5250 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5150-5250	2.75



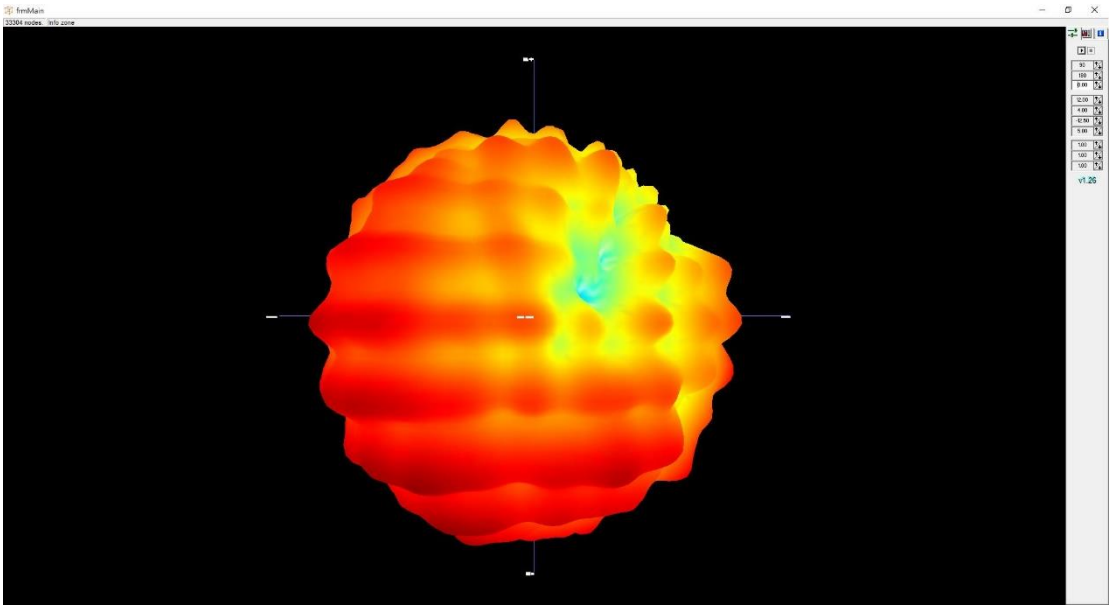
Max Antenna 3D Radiation Pattern 5250-5350 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5250-5350	2.75



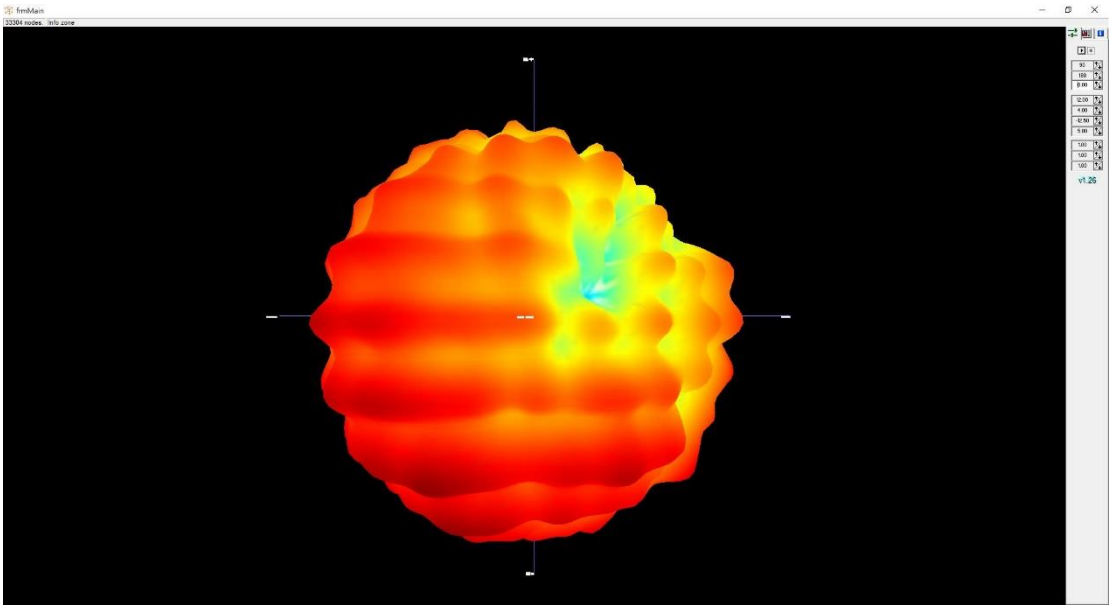
Max Antenna 3D Radiation Pattern 5470-5725 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5470-5725	2.77



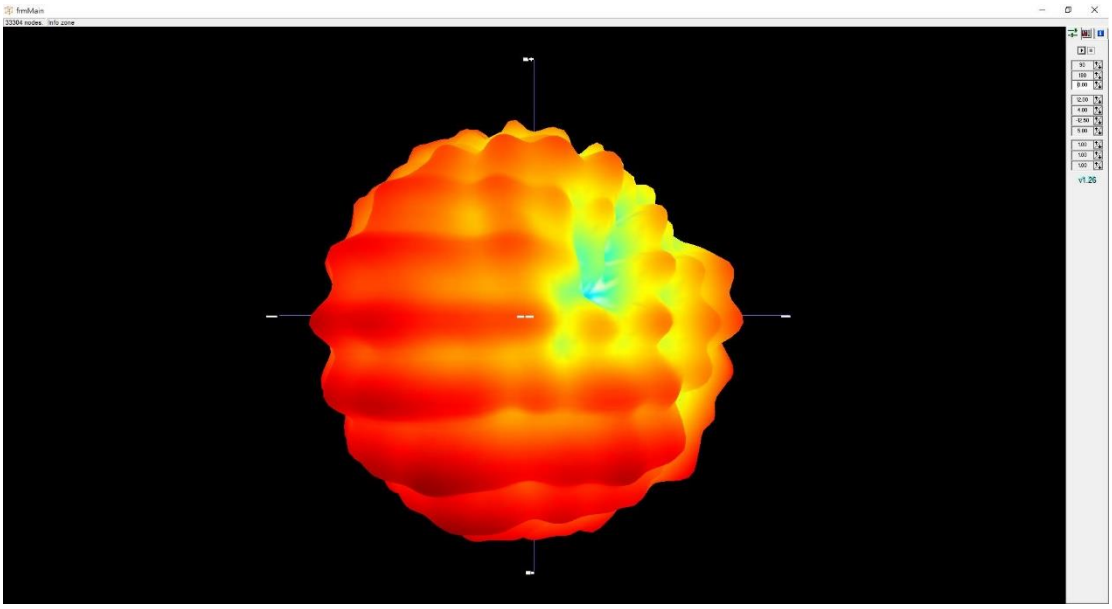
Max Antenna 3D Radiation Pattern 5725-5850 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5725-5850	2.85



Max Antenna 3D Radiation Pattern 5850-5895 MHz

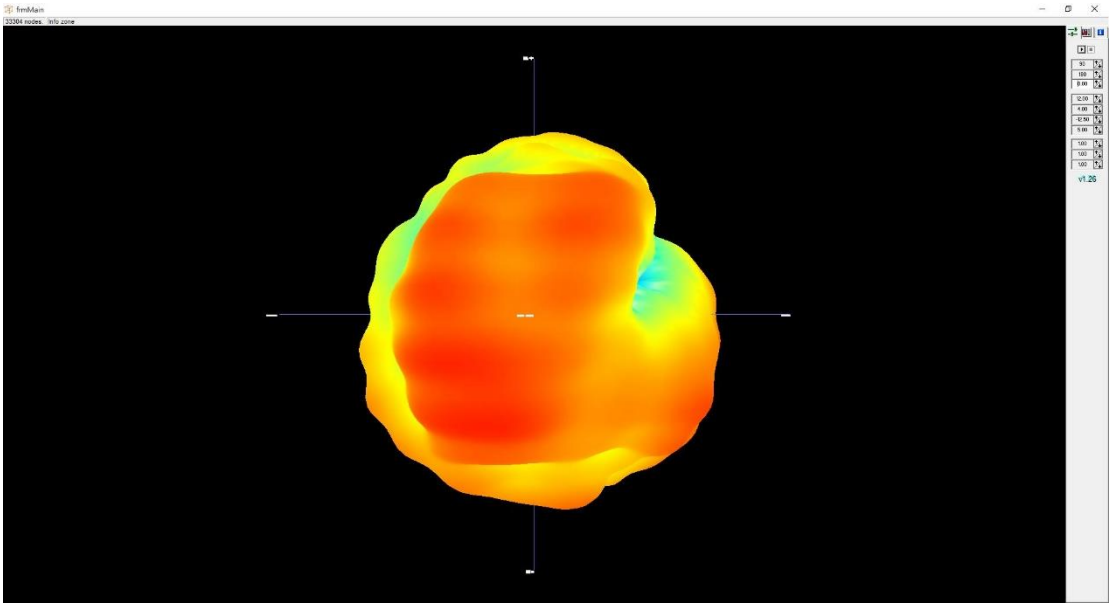
Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5850-5895	2.85



Auxiliary Antenna

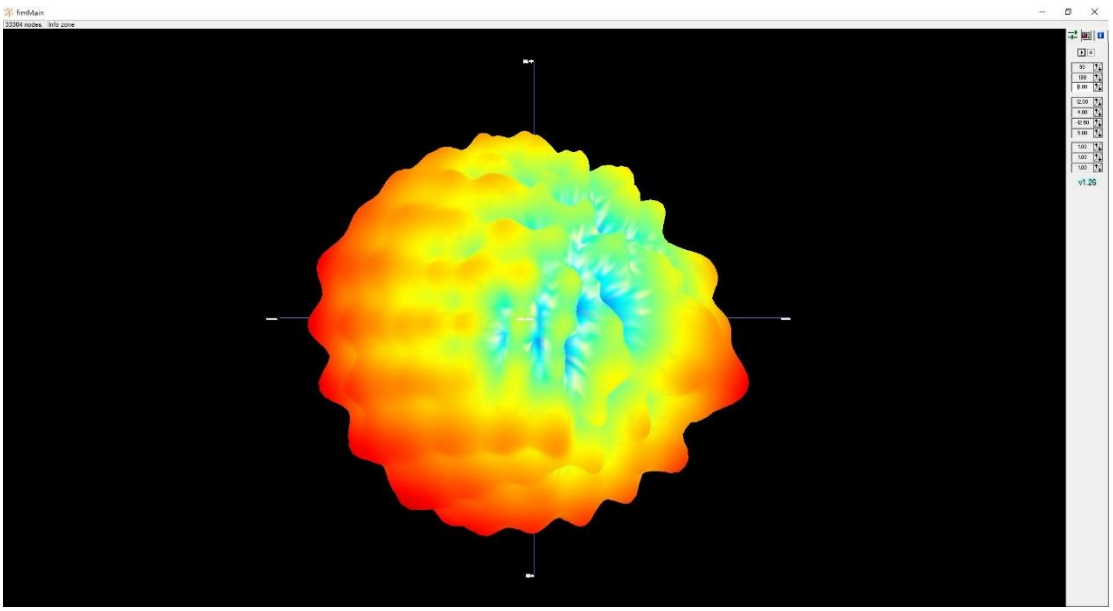
Max Antenna 3D Radiation Pattern 2400 – 2483.5 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
2400-2483.5	2.47



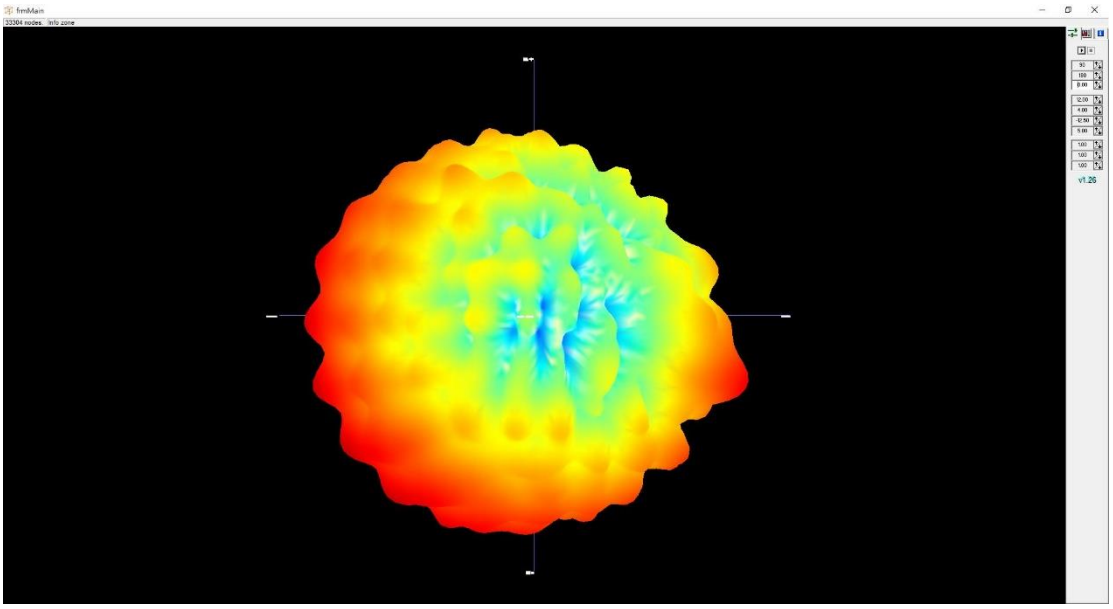
Max Antenna 3D Radiation Pattern 5150-5250 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5150-5250	2.62



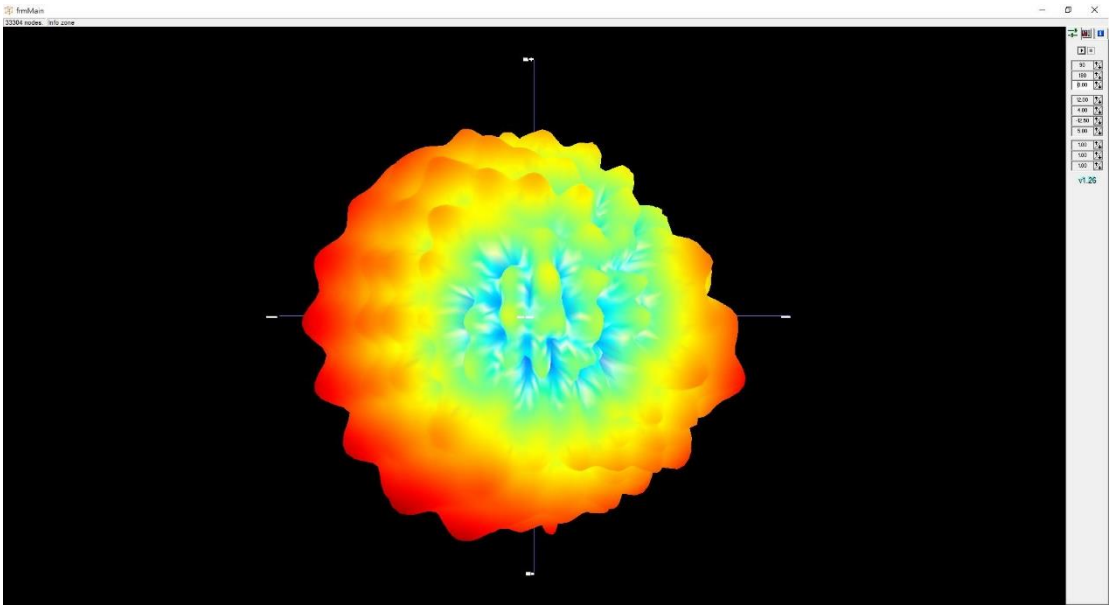
Max Antenna 3D Radiation Pattern 5250-5350 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5250-5350	2.58



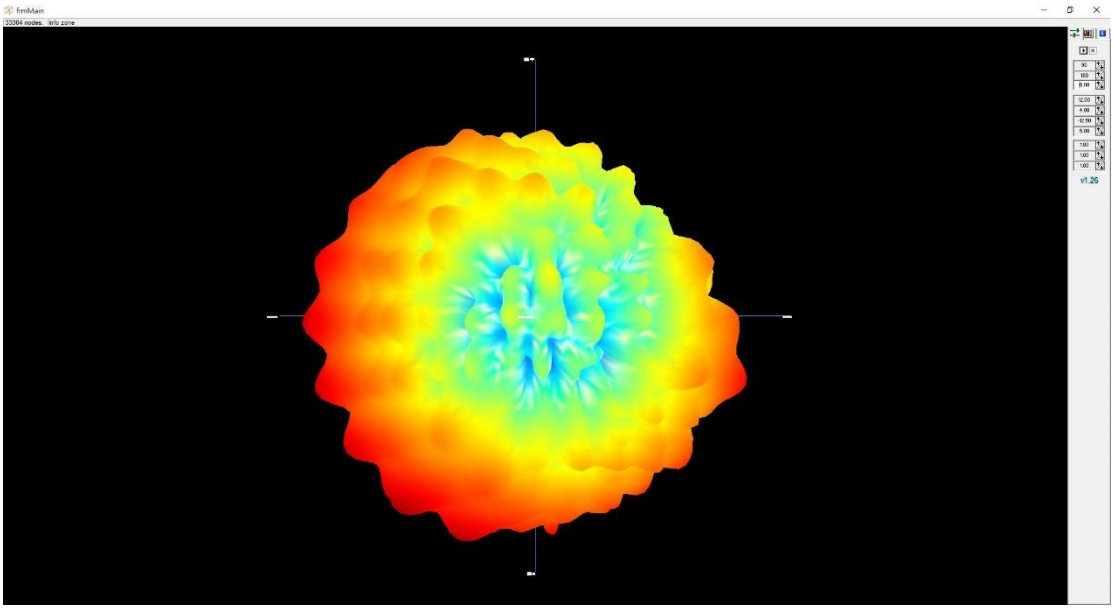
Max Antenna 3D Radiation Pattern 5470-5725 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5470-5725	2.92



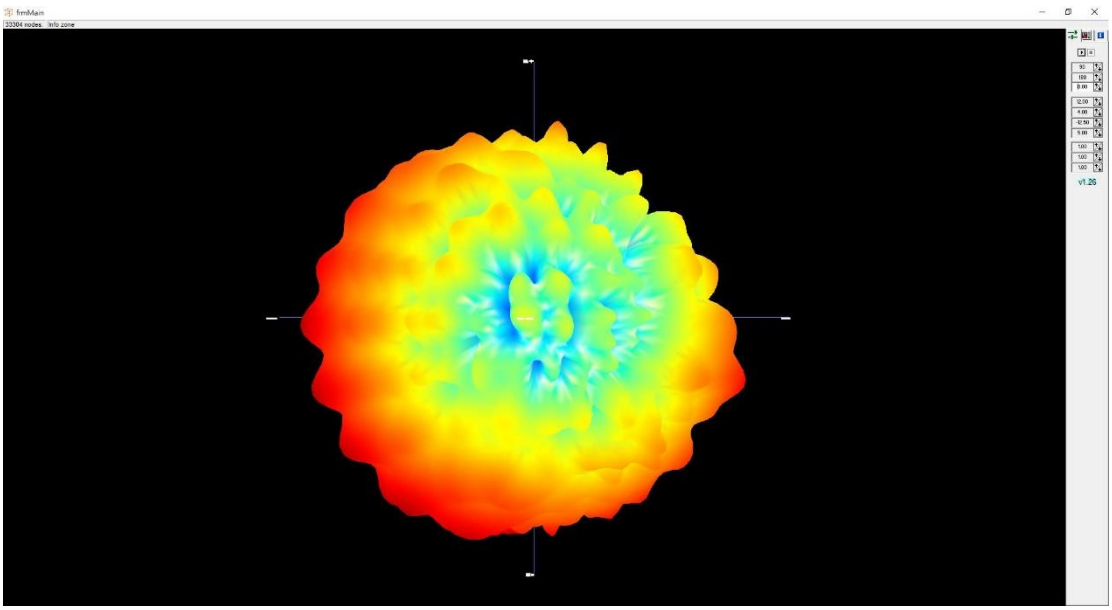
Max Antenna 3D Radiation Pattern 5725-5850 MHz

Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5725-5850	2.92



Max Antenna 3D Radiation Pattern 5850-5895 MHz

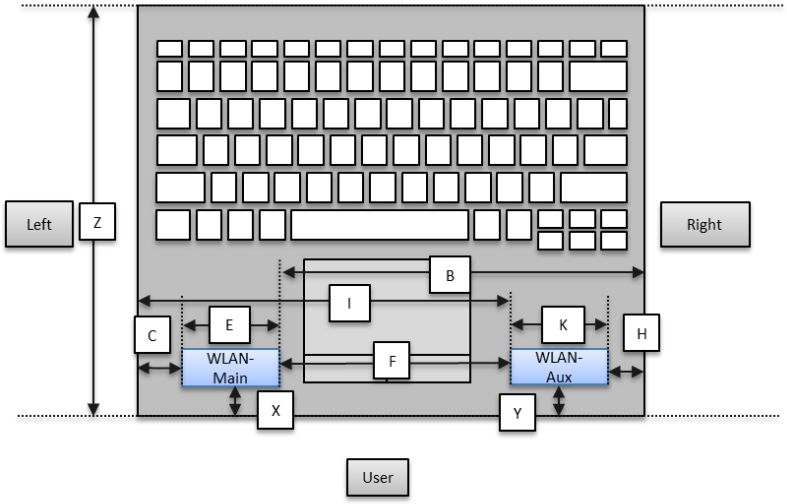
Frequency (MHz)	Peak Gain w/ Cable Loss (dBi)
5850-5895	2.91



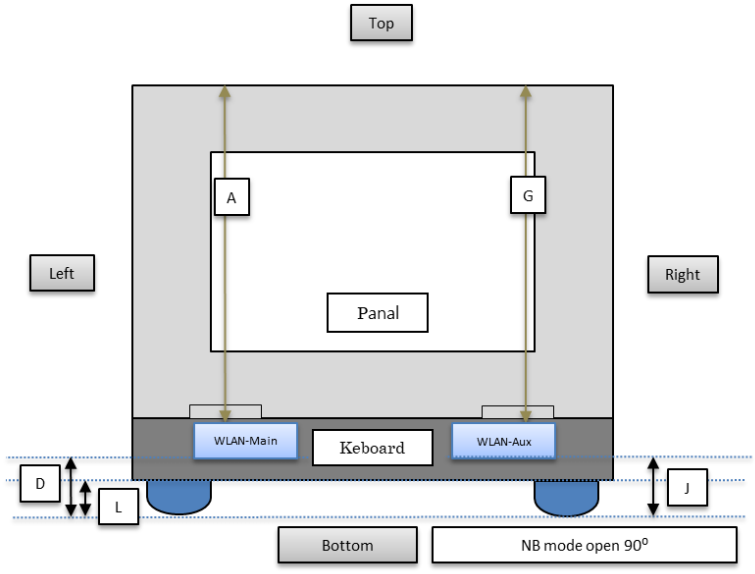
Section 4. Antenna Host Platform Location Information

Include a **dimensioned photo(s) or dimensioned drawing(s)** of Main and Aux antenna placements (measurements are not required for receive-only antenna).

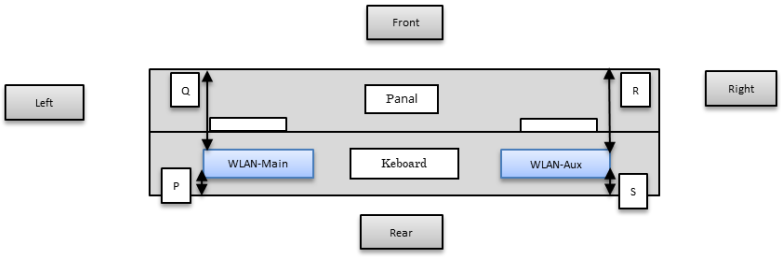
Any antenna that transmits must show dimensions to bottom of laptop. Provide a description of the materials that are used for supporting or surrounding transmit antennas; for example, non-conductive plastics vs. conductive coated plastic or metallic materials.



Minimum Separation Distance			
Item	Antenna	Position	Distance (mm)
A	WLAN-Main	to Top	220
B	WLAN-Main	to Right	232.3
C	WLAN-Main	to Left	57.1
D	WLAN-Main	to Bottom	6.69
E	WLAN-Main	Main Antenna Length	30
F	Main-Main	Main to Aux	149.2
G	WLAN-Aux	to Top	220
H	WLAN-Aux	to Right	53.1
I	WLAN-Aux	to Left	236.3
J	WLAN-Aux	to Bottom	6.69
K	WLAN-Aux	Aux Antenna Length	30
L	NB	Bumper thickness	1
X	WLAN-Aux	to User	5.5
Y	WLAN-Main	to User	5.5
Z	NB	Keyboard depth	234.9



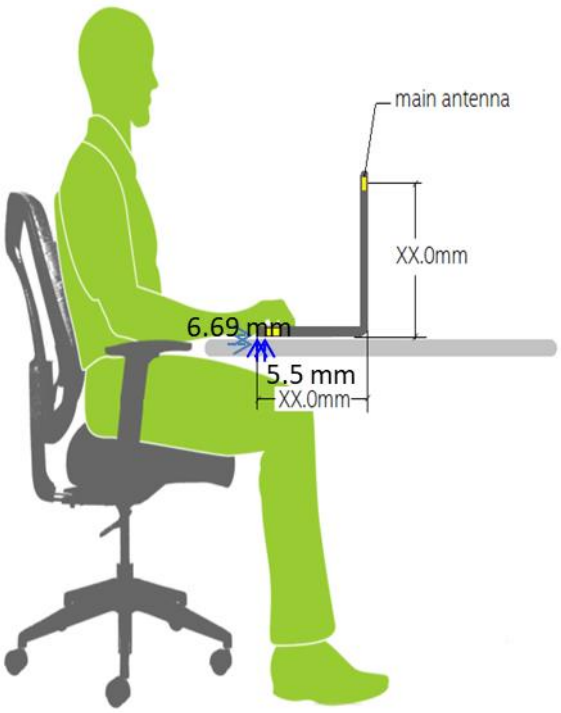
Minimum Separation Distance			
Item	Antenna	Position	Distance (mm)
A	WLAN-Main	to Top	220
B	WLAN-Main	to Right	232.3
C	WLAN-Main	to Left	57.1
D	WLAN-Main	to Bottom	6.69
E	WLAN-Main	Main Antenna Length	30
F	Main-Main	Main to Aux	149.2
G	WLAN-Aux	to Top	220
H	WLAN-Aux	to Right	53.1
I	WLAN-Aux	to Left	236.3
J	WLAN-Aux	to Bottom	6.69
K	WLAN-Aux	Aux Antenna Length	30
L	NB	Bumper thickness	1
X	WLAN-Aux	to User	5.5
Y	WLAN-Main	to User	5.5
Z	NB	Keyboard depth	234.9



Minimum Separation Distance			
Item	Antenna	Position	Distance (mm)
Q	WLAN-Main	to Front	13
P	WLAN-Main	to Rear	3
R	WLAN-Aux	to Front	13
S	WLAN-Aux	to Rear	3

Section 5. Antenna dimensional information for SAR evaluation

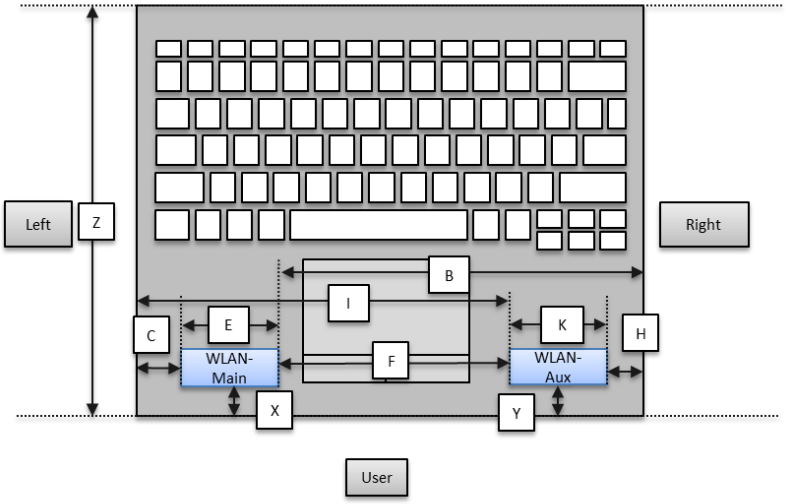
Include a **dimensioned photo(s) or dimensioned drawing(s)** showing the distance (mm) between the transmit antennas and the user. For notebook/laptop hosts show lapheld position (example below). For tablet hosts show all orientations including lapheld, primary & secondary portrait, primary & secondary 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	WLAN-Main	to Top	220
B	WLAN-Main	to Right	232.3
C	WLAN-Main	to Left	57.1
D	WLAN-Main	to Bottom	6.69
E	WLAN-Main	Main Antenna Length	30
F	Main-Main	Main to Aux	149.2
G	WLAN-Aux	to Top	220
H	WLAN-Aux	to Right	53.1
I	WLAN-Aux	to Left	236.3
J	WLAN-Aux	to Bottom	6.69
K	WLAN-Aux	Aux Antenna Length	30
L	NB	Bumper thickness	1
X	WLAN-Aux	to User	5.5
Y	WLAN-Main	to User	5.5
Z	NB	Keyboard depth	234.9