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)
	Quanta	LI7	Yes	Convertible NB	0.96

*****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)
WNC	PIFA	DQ6615GA100(81EAA615.GA1)	DQ6615GA100(81EAA615.GA1)

Peak gain w/ cable loss (dBi)*

	2.4GHz 2400-2483.5 MHz	5.2&5.3GHz 5150-5350MHz	5.5GHz 5470-5725MHz	5.8GHz 5725-5850MHz
Main	1.06	1.78	2.32	3.25
Aux	3.03	1.26	0.82	0.05

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.

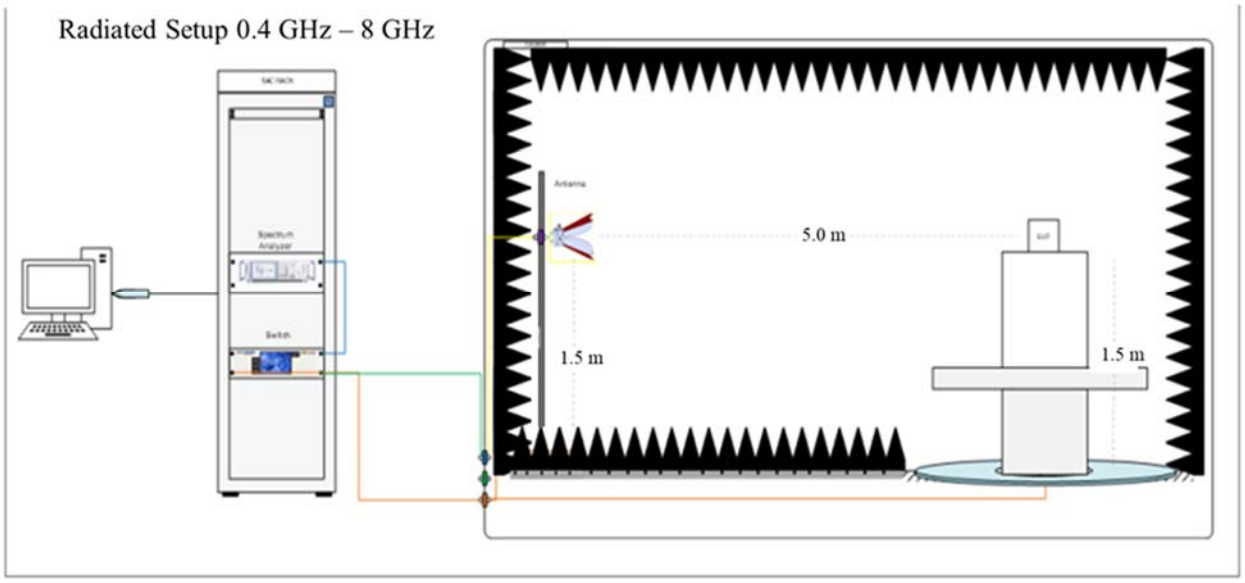
Table of contents

1. **Applicable test methods**

This test report is prepared for IdeaPad Flex 5 16” antenna testing under an Anechoic Chamber.

2. **Test & System Description**

a. Test setup



b. Equipment list

Item	Device	Type/Model	Serial#	Manufacturer	Cal. Date	Cal. Due Date
1	Anechoic Chamber	ETS-AMS	8500	ETS-Lindgren	2022-03	2023-03
2	Turn Table	ETS	-	ETS-Lindgren	2022-03	2023-03
3	Multi-Device Positioning Controller	Model 2090	00142407	ETS-Lindgren	2022-03	2023-03
4	Network Analyzer	E5071C	0171E5485A6J	Keysight	2022-05	2023-05
5	Horn antenna	3164-08	00140264	ETS-Lindgren	2022-03	2023-03
6	Cable 7.5m 400MHz to 18GHz (H-pol)	SS402	00100A1F5A1XXS	WOKEN	2022-03	2023-03
7	Cable 7.5m 400MHz to 18GHz (V-pol)	SS402	00100A1F5A1XXS	WOKEN	2022-03	2023-03
8	Cable 14m 400MHz to 18GHz	SS402	00100A1F5A1XXS	WOKEN	2022-03	2023-03
9	Temperature & Humidity Meter	HTC-01	-	METRAVI	2022-03	2023-03

Antenna Information

Section 1. Antenna Assembly Specifications

NB

1A	1B	1C	1D	Freq Range MHz	1E	1F	1G	1H
Antenna Part Number	Manufacturer	Antenna Type	Cable Assembly Part Number and Information		*Peak Gain W/ Cable loss (dBi)	Peak Gain w/o Cable Loss (dBi)	Max VSWR	Cable Loss (dB)
(P/N: 81EAA615.GA1) Main Antenna	WNC	PIFA	(P/N: U.FL-2LP-XXX) 50 ohm Coaxial length: 36.4cm diameter: 1.13mm	2400-2500	1.06	2.37	2.5	1.31
				5150-5350	1.78	3.71	2.5	1.93
				5470-5725	2.32	4.31	2.5	1.99
				5725-5850	3.25	5.28	2.5	2.03
(P/N: 81EAA615.GA1) Aux Antenna	WNC	PIFA	(P/N: U.FL-2LP-XXX) 50 ohm Coaxial length: 57.2cm diameter: 1.13mm	2400-2500	3.03	5.09	2.5	2.06
				5150-5350	1.26	4.29	2.5	3.03
				5470-5725	0.82	3.95	2.5	3.13
				5725-5850	0.05	3.24	2.5	3.19

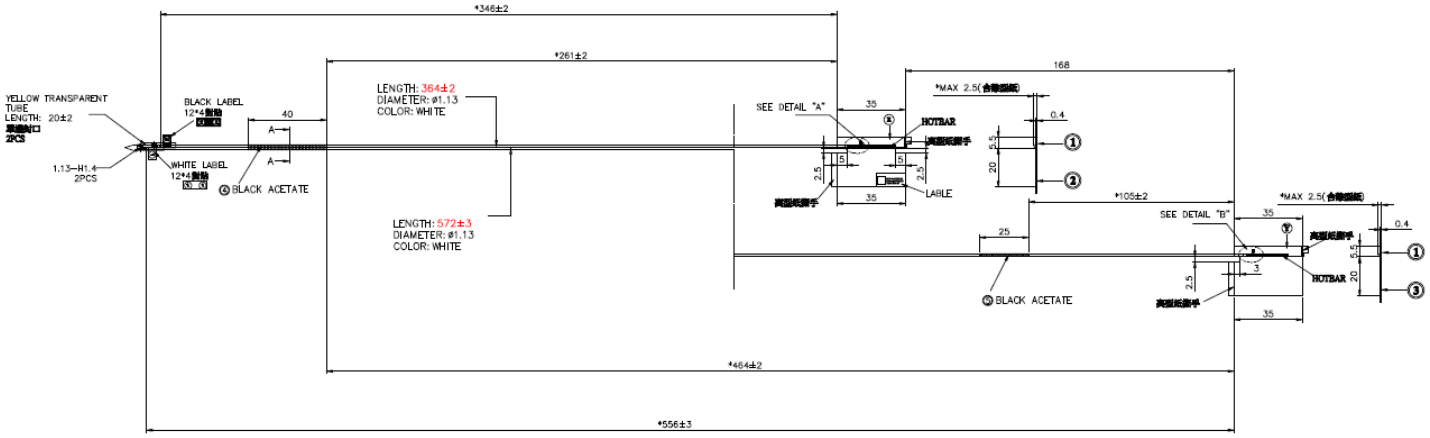
TB

1A	1B	1C	1D	Freq Range MHz	1E	1F	1G	1H
Antenna Part Number	Manufacturer	Antenna Type	Cable Assembly Part Number and Information		*Peak Gain W/ Cable loss (dBi)	Peak Gain w/o Cable Loss (dBi)	Max VSWR	Cable Loss (dB)
(P/N: 81EAA615.GA1) Main Antenna	WNC	PIFA	Example: (P/N: U.FL-2LP-XXX) 50 ohm Coaxial length: 36.4cm diameter: 1.13mm	2400-2500	0.85	2.16	2.5	1.31
				5150-5350	0.62	2.55	2.5	1.93
				5470-5725	-0.41	1.58	2.5	1.99
				5725-5850	0.32	2.35	2.5	2.03
(P/N: 81EAA615.GA1) Aux Antenna	WNC	PIFA	Example: (P/N: U.FL-2LP-XXX) 50 ohm Coaxial length: 57.2cm diameter: 1.13mm	2400-2500	0.94	3	2.5	2.06
				5150-5350	-0.73	2.3	2.5	3.03
				5470-5725	-0.04	3.09	2.5	3.13
				5725-5850	0.01	3.2	2.5	3.19

Section 2. Dimensioned Photos or Drawings of Antennas

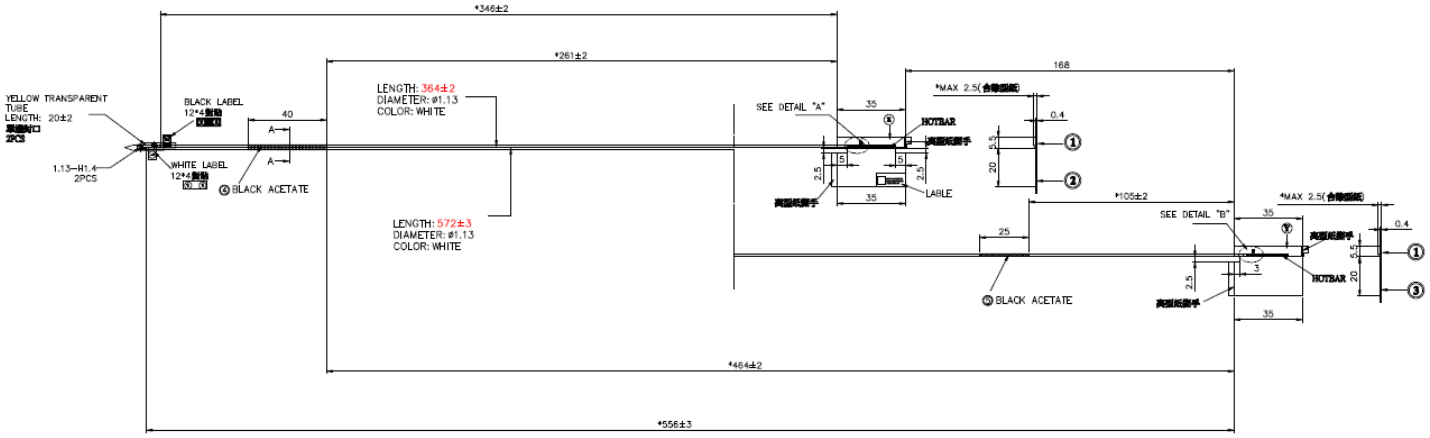
Include a dimensioned photo and dimensioned drawing of Main antenna here.

Main Antenna Dimensioned Drawing:



Include a dimensioned photo and dimensioned drawing of Aux antenna here.

Aux Antenna Dimensioned Drawing:



Include front view photo of all 2 antennas here.

Antenna Manufacturer: WNC
Antenna Part Number: 81EAA615.GA1 (Main), 81EAA615.GA1 (Aux)

Include back view photo of all 2 antennas here.

Antenna Manufacturer: WNC
Antenna Part Number: 81EAA615.GA1 (Main), 81EAA615.GA1 (Aux)

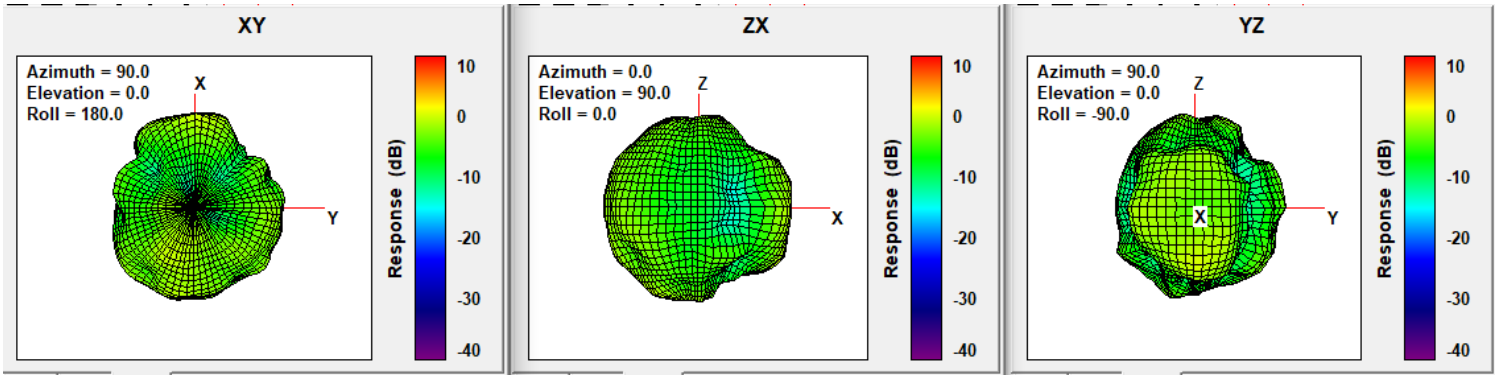
Note: antenna photo should include L type ruler

Section 3. Radiation characteristics of antennae Loaded in Host Platform

NB

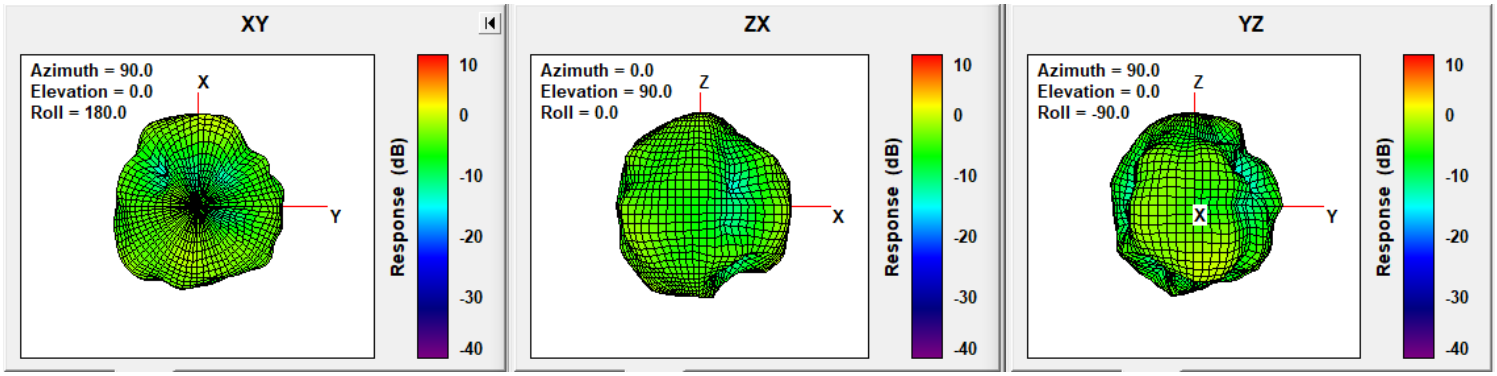
2400-2500MHz radiation characteristic

Main antenna: 2400 MHz



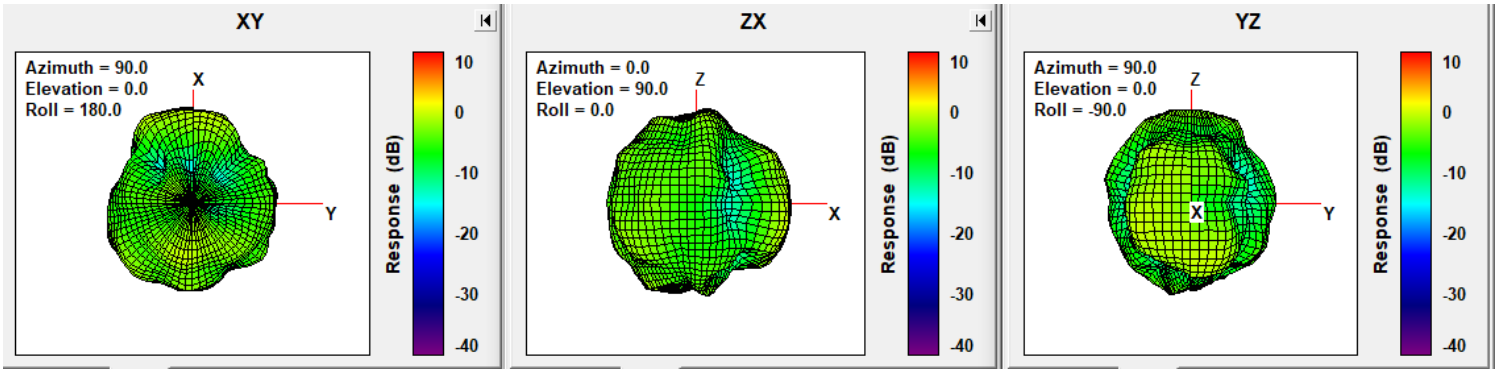
Center Frequency	**2400 MHz**
Three-dimensional (dBi) peak	1.06

Main antenna: 2450 MHz



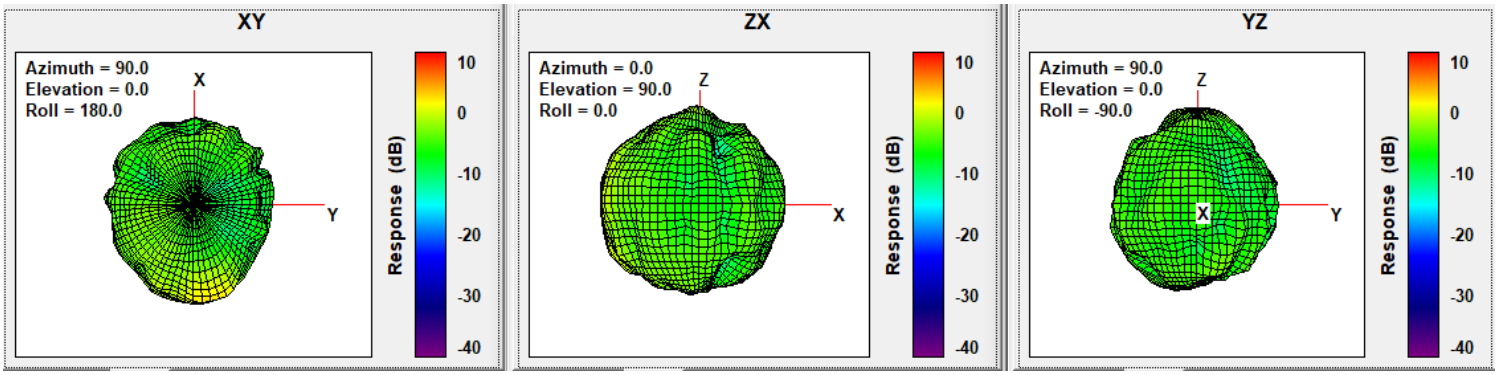
Center Frequency	**2450 MHz**
Three-dimensional (dBi) peak	0.28

Main antenna: 2500 MHz



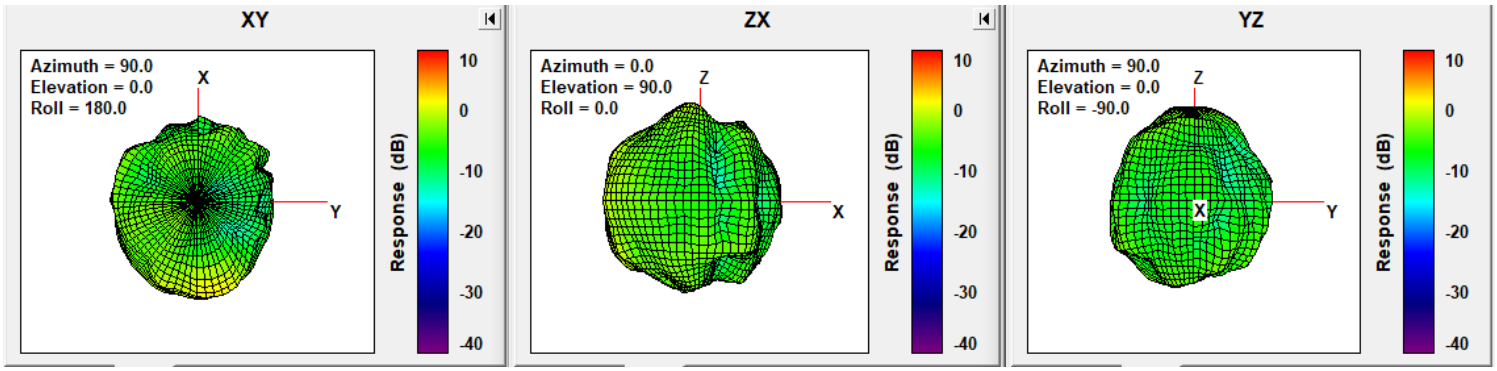
Center Frequency	**2500 MHz**
Three-dimensional (dBi) peak	0.38

Aux antenna: 2400 MHz



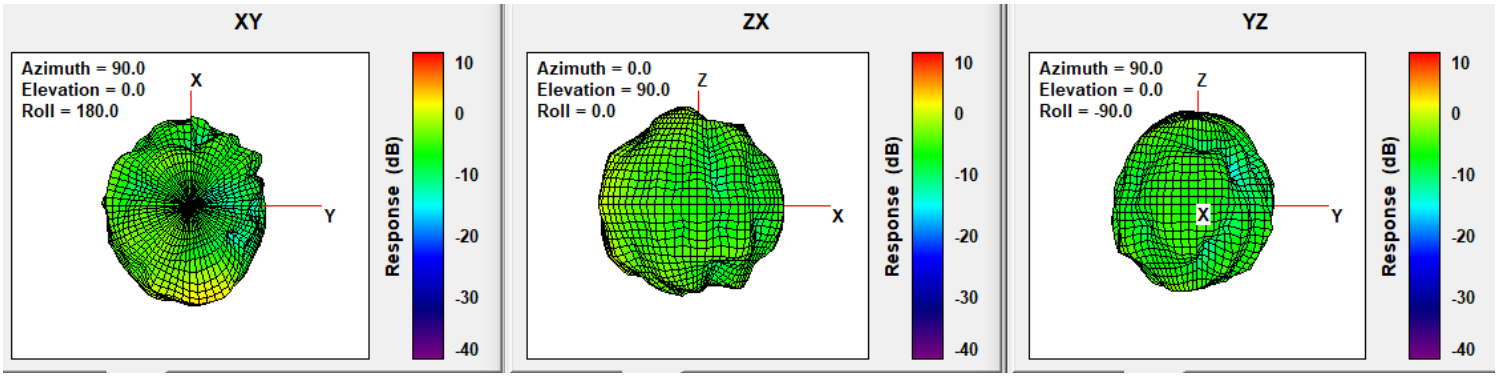
Center Frequency	**2400 MHz**
Three-dimensional (dBi) peak	2.89

Aux antenna: 2450 MHz



Center Frequency	**2450 MHz**
Three-dimensional (dBi) peak	2.55

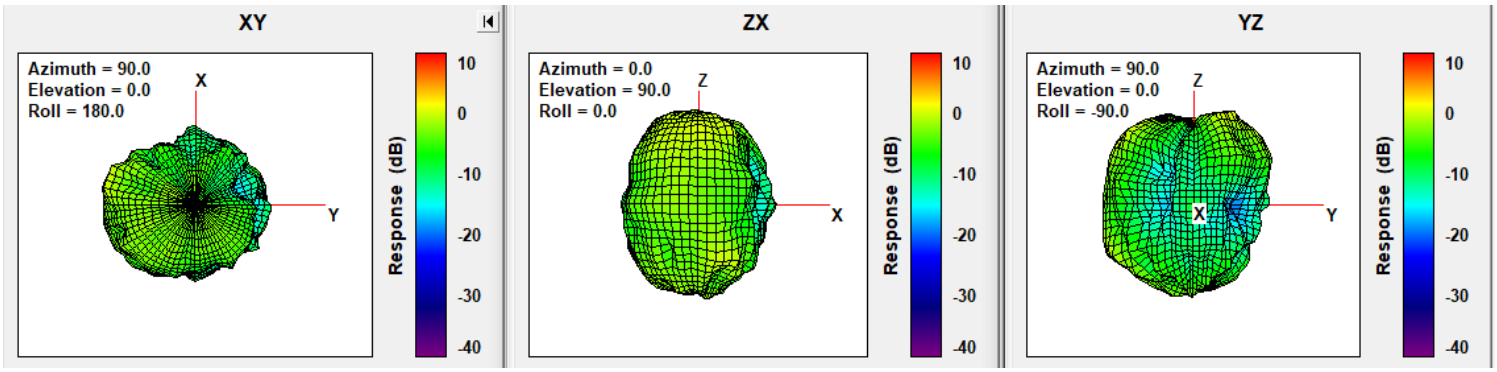
Aux antenna: 2500 MHz



Center Frequency	**2500 MHz**
Three-dimensional (dBi) peak	3.03

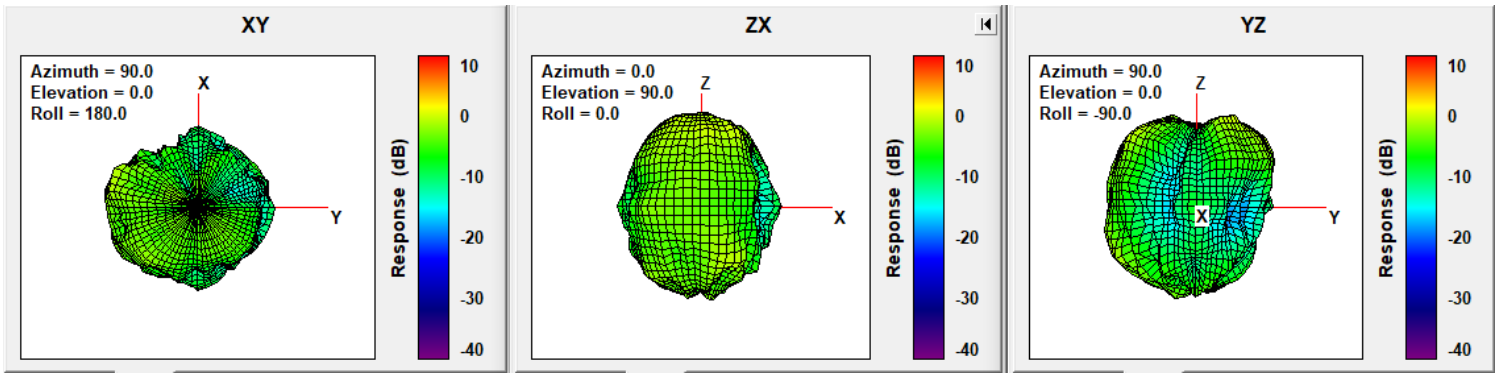
5150-5350MHz radiation characteristic

Main antenna: 5150 MHz



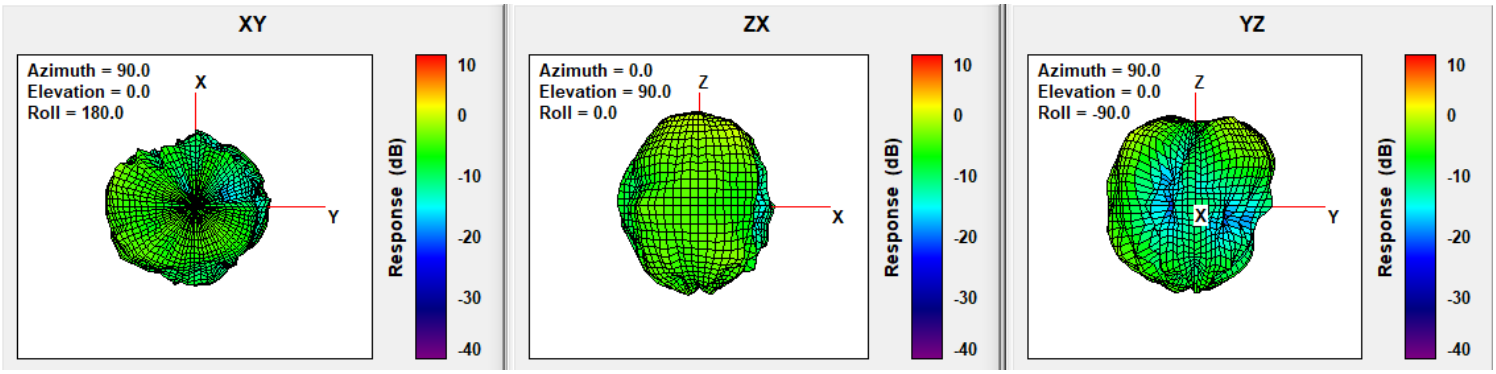
Center Frequency	**5150 MHz**
Three-dimensional (dBi) peak	1.78

Main antenna: 5250 MHz



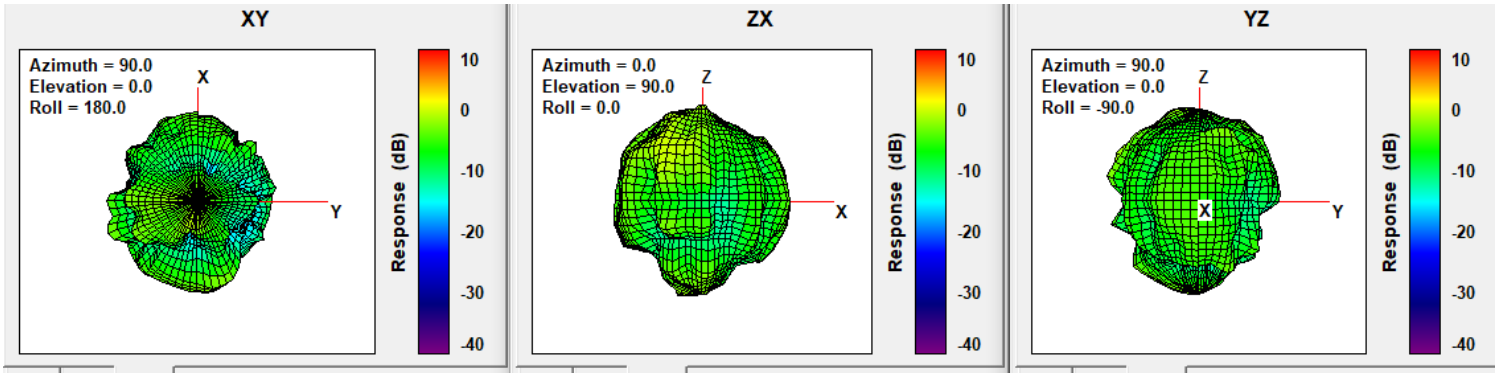
Center Frequency	**5250 MHz**
Three-dimensional (dBi) peak	1.17

Main antenna: 5350 MHz



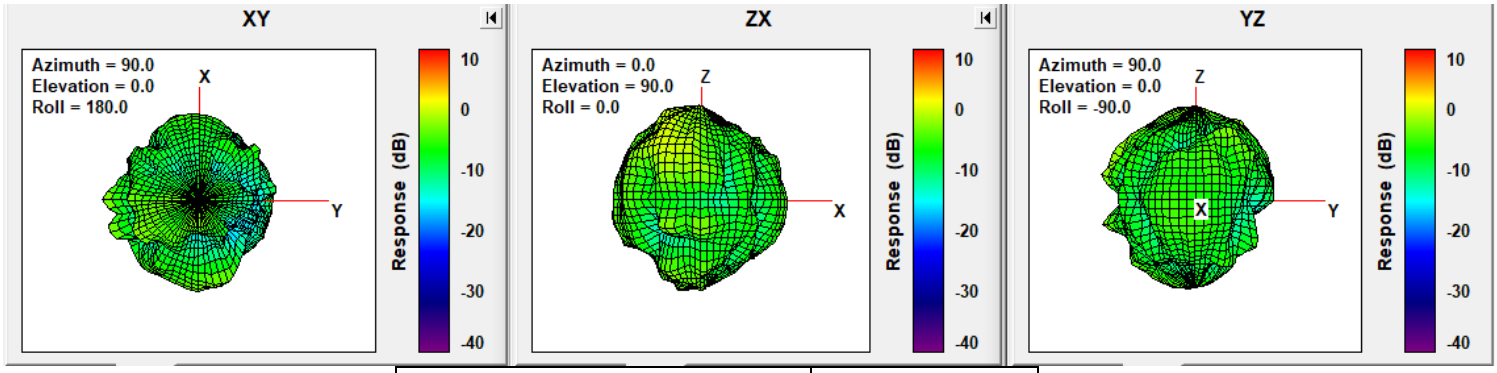
Center Frequency	**5350 MHz**
Three-dimensional (dBi) peak	0.54

Aux antenna: 5150 MHz



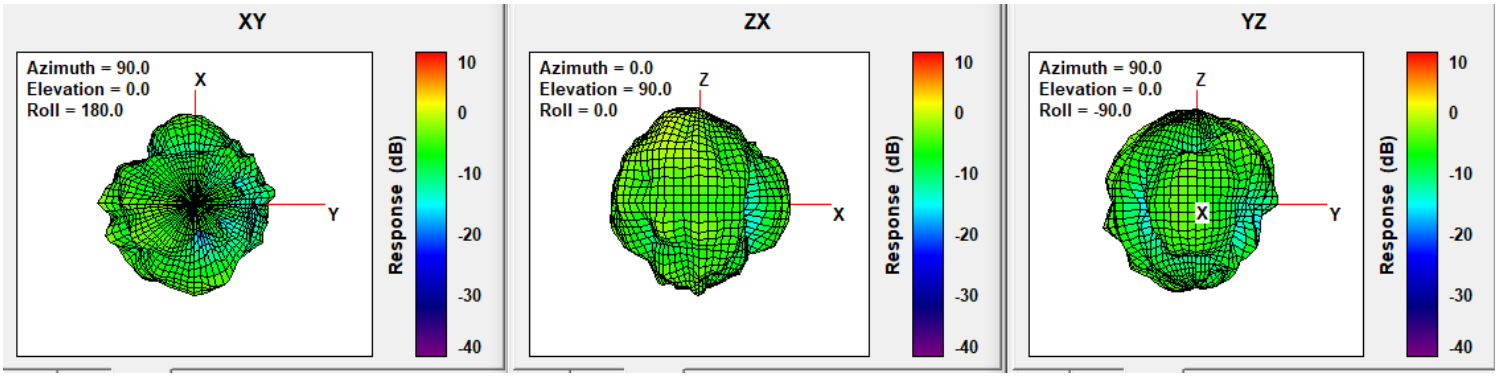
Center Frequency	**5150 MHz**
Three-dimensional (dBi) peak	0.30

Aux antenna: 5250 MHz



Center Frequency	**5250 MHz**
Three-dimensional (dBi) peak	1.26

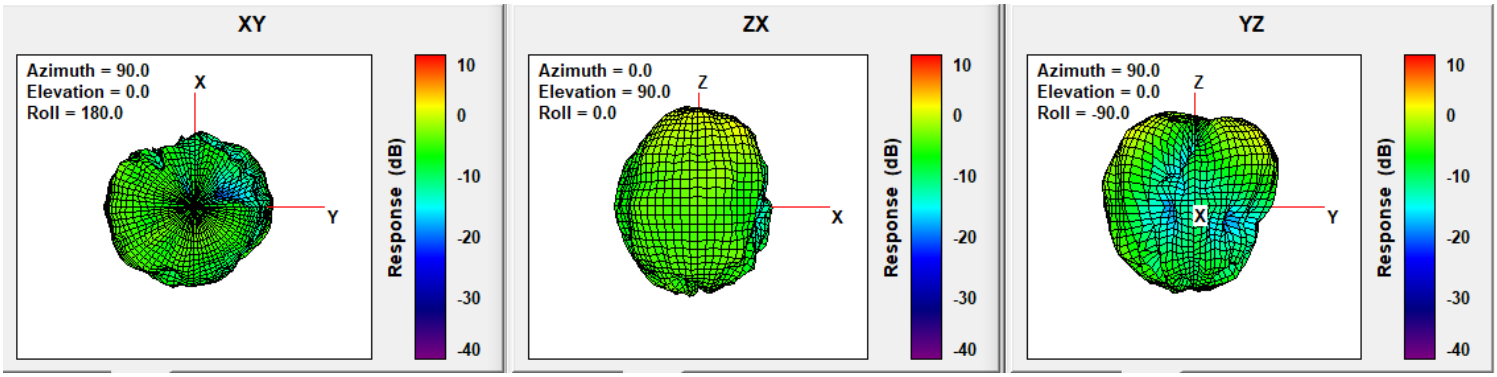
Aux antenna: 5350 MHz



Center Frequency	**5350 MHz**
Three-dimensional (dBi) peak	0.74

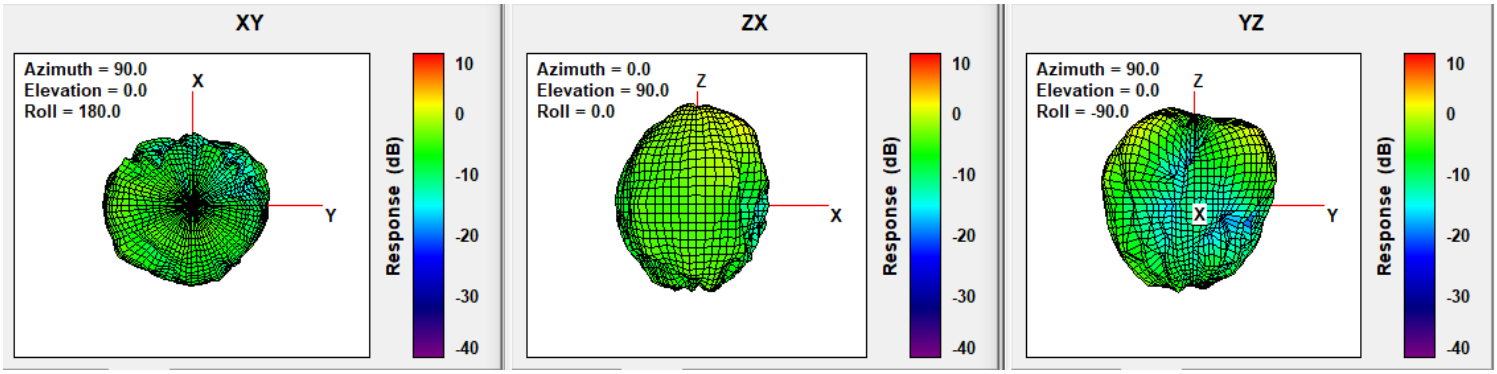
5470-5725MHz radiation characteristic

Main antenna: 5470 MHz



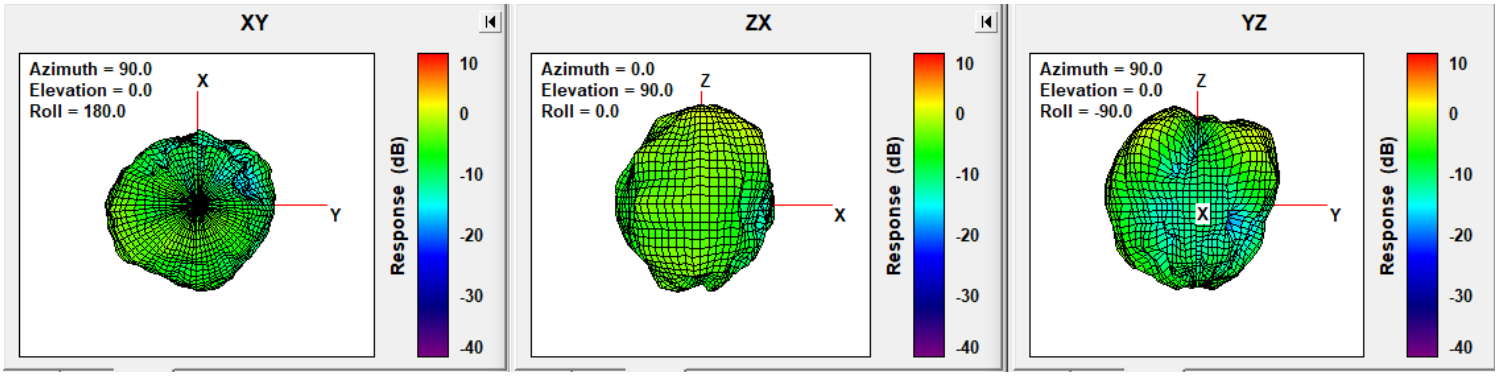
Center Frequency	**5470 MHz**
Three-dimensional (dBi) peak	2.32

Main antenna: 5600 MHz



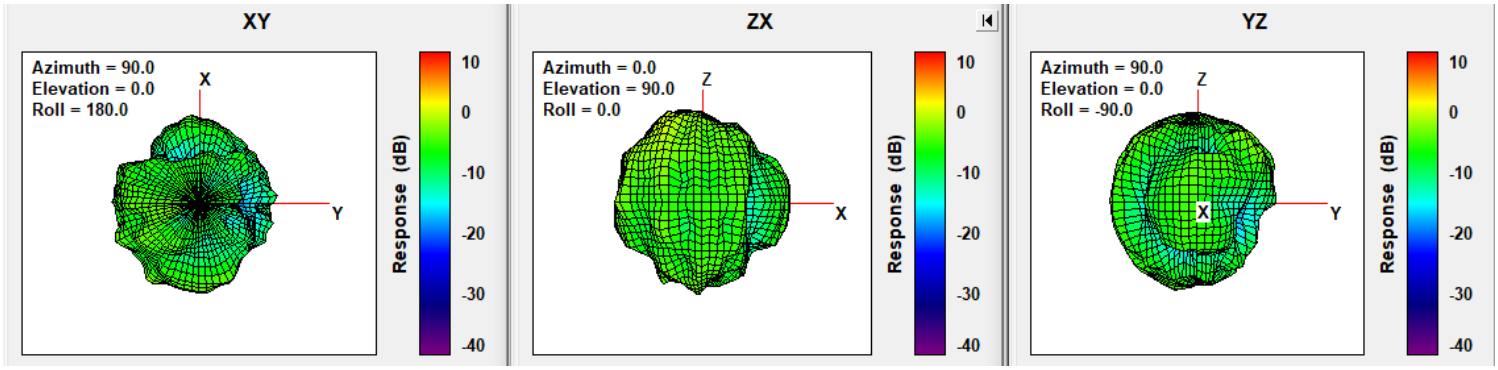
Center Frequency	**5600 MHz**
Three-dimensional (dBi) peak	2.15

Main antenna: 5725 MHz



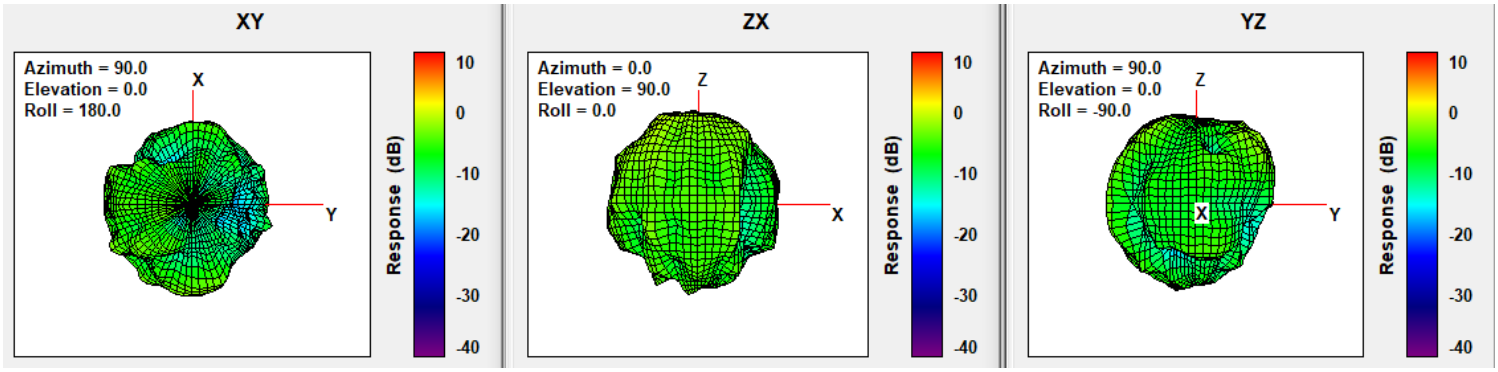
Center Frequency	**5725 MHz**
Three-dimensional (dBi) peak	2.22

Aux antenna: 5470 MHz



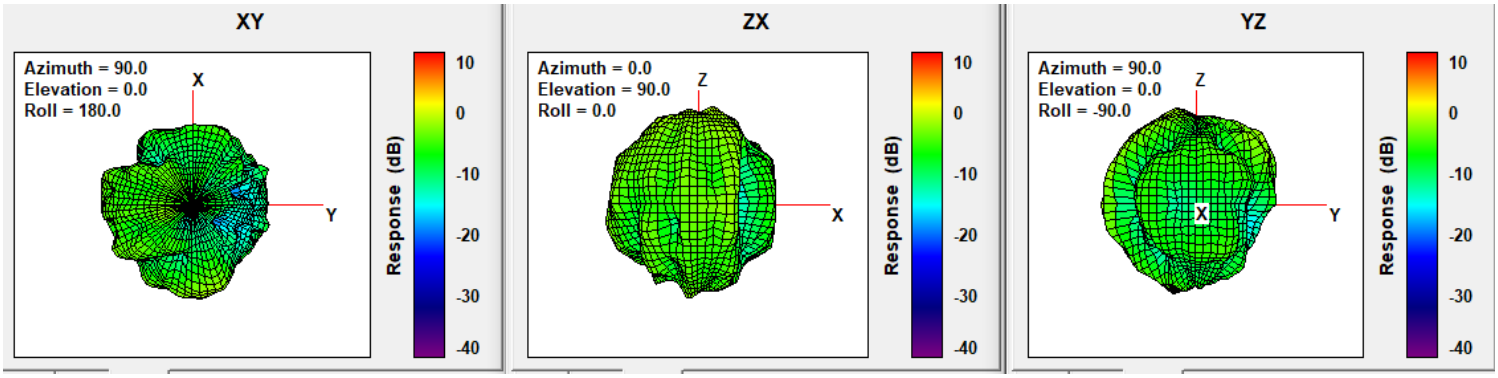
Center Frequency	**5470 MHz**
Three-dimensional (dBi) peak	0.82

Aux antenna: 5600 MHz



Center Frequency	**5600 MHz**
Three-dimensional (dBi) peak	0.05

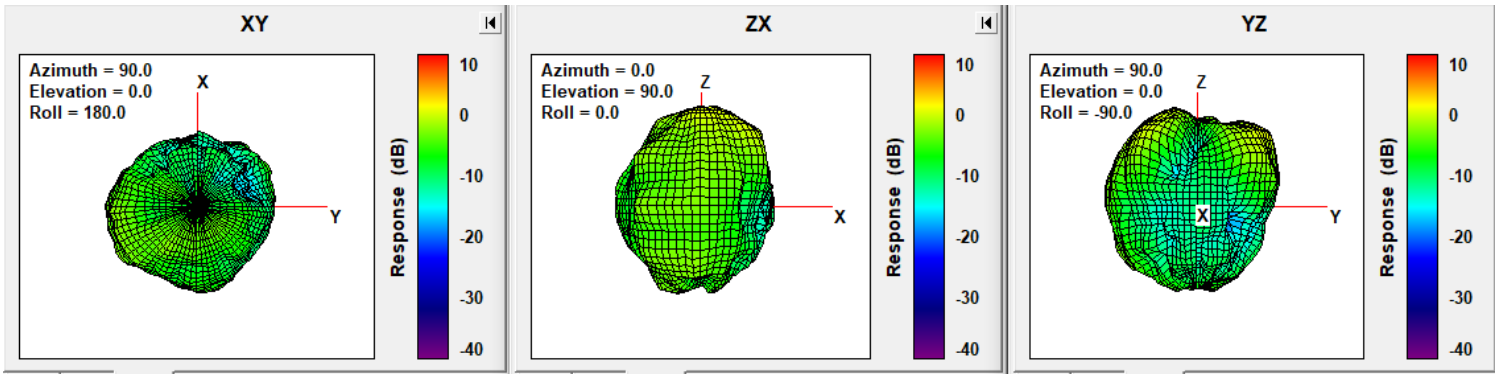
Aux antenna: 5725 MHz



Center Frequency	**5725 MHz**
Three-dimensional (dBi) peak	0.05

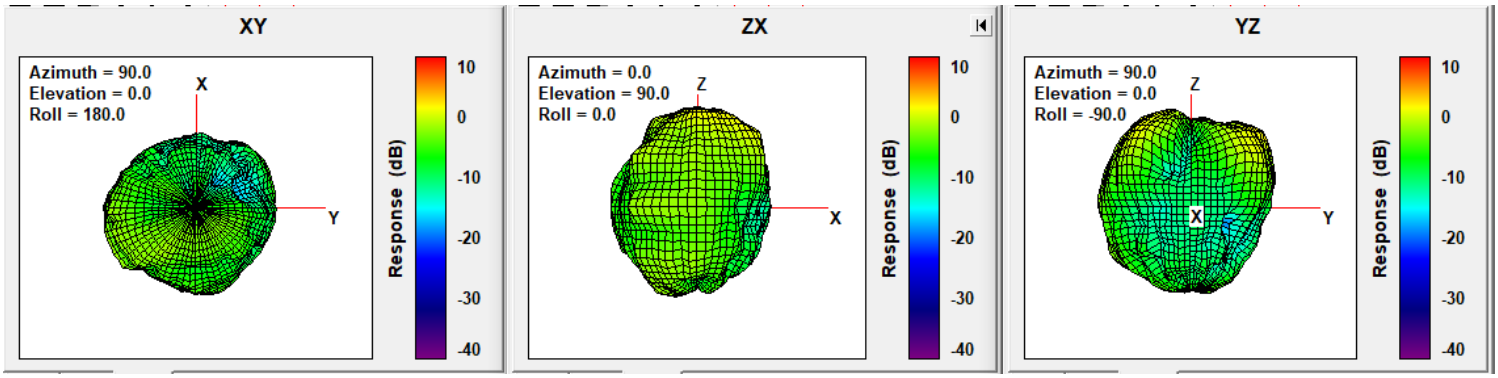
5725-5850MHz radiation characteristic

Main antenna: 5725 MHz



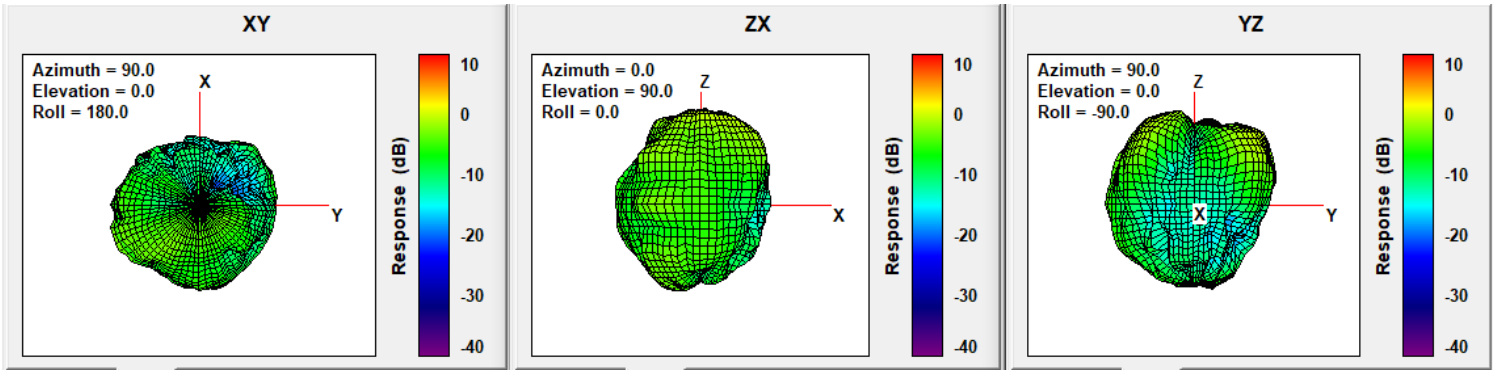
Center Frequency	**5725 MHz**
Three-dimensional (dBi) peak	2.22

Main antenna: 5785 MHz



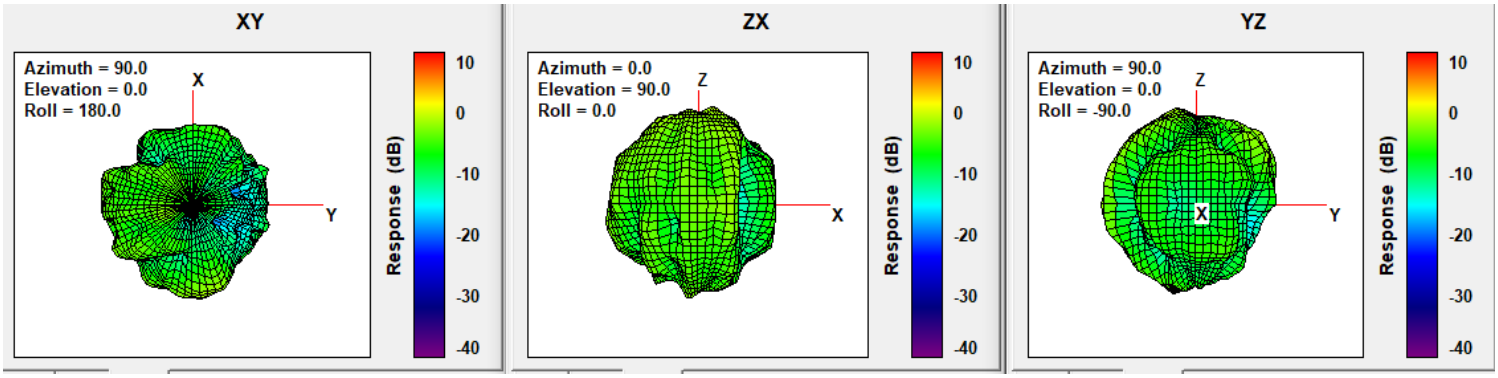
Center Frequency	**5785 MHz**
Three-dimensional (dBi) peak	3.25

Main antenna: 5850 MHz



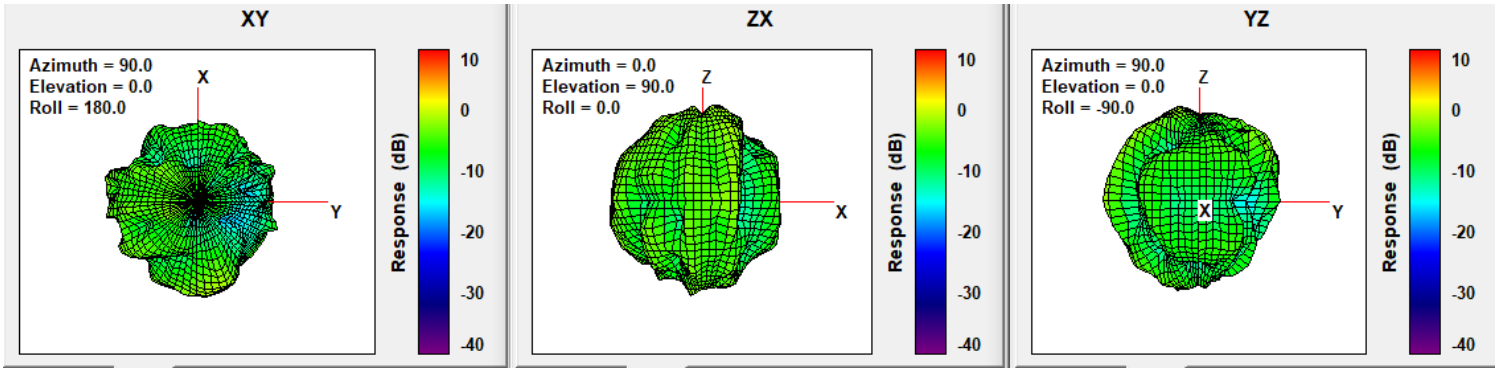
Center Frequency	**5850 MHz**
Three-dimensional (dBi) peak	1.12

Aux antenna: 5725 MHz



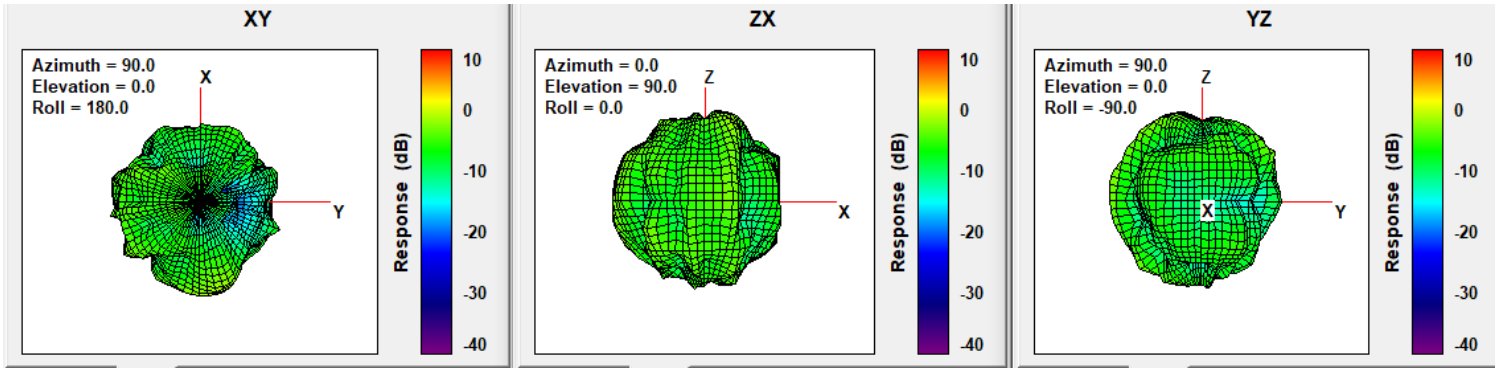
Center Frequency	**5725 MHz**
Three-dimensional (dBi) peak	0.05

Aux antenna: 5785 MHz



Center Frequency	**5785 MHz**
Three-dimensional (dBi) peak	-0.40

Aux antenna: 5850 MHz

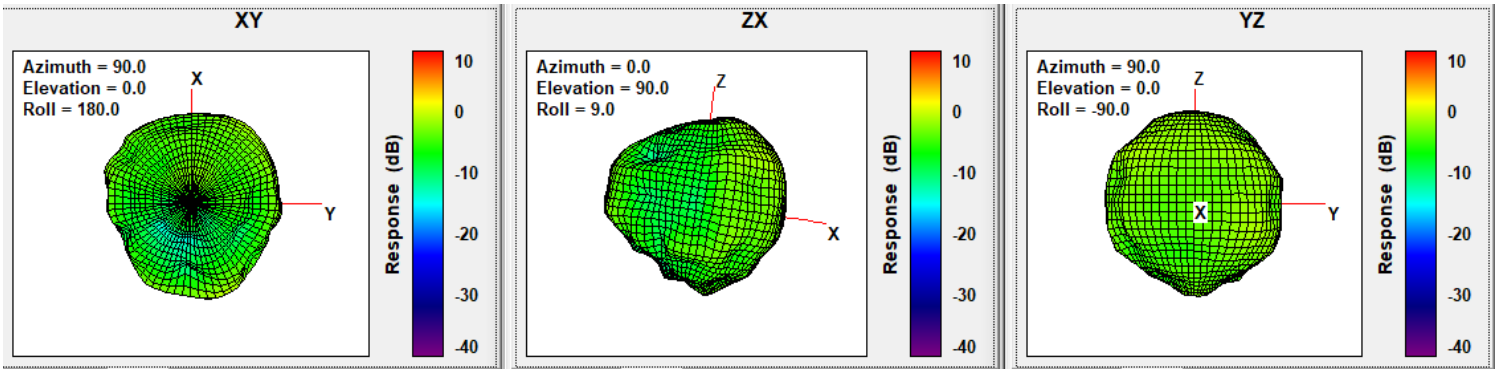


Center Frequency	**5850 MHz**
Three-dimensional (dBi) peak	-0.13

TB

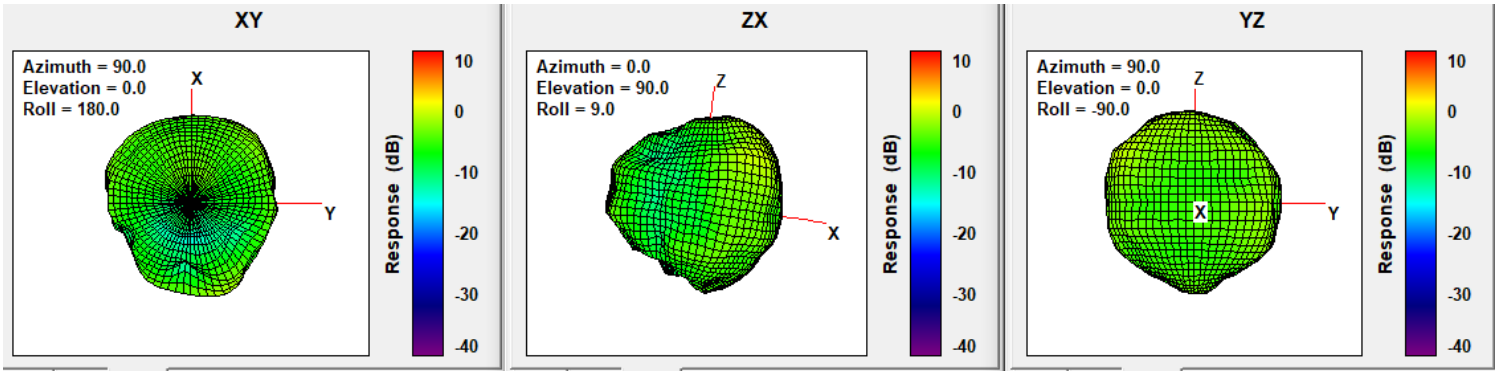
2400-2500MHz radiation characteristic

Main antenna: 2400 MHz



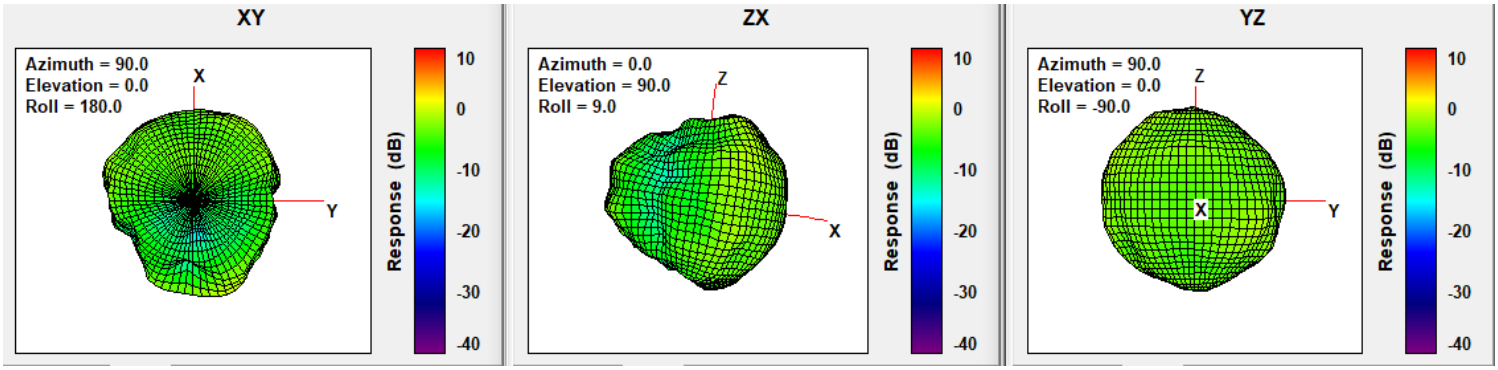
Center Frequency	**2400 MHz**
Three-dimensional (dBi) peak	0.28

Main antenna: 2450 MHz



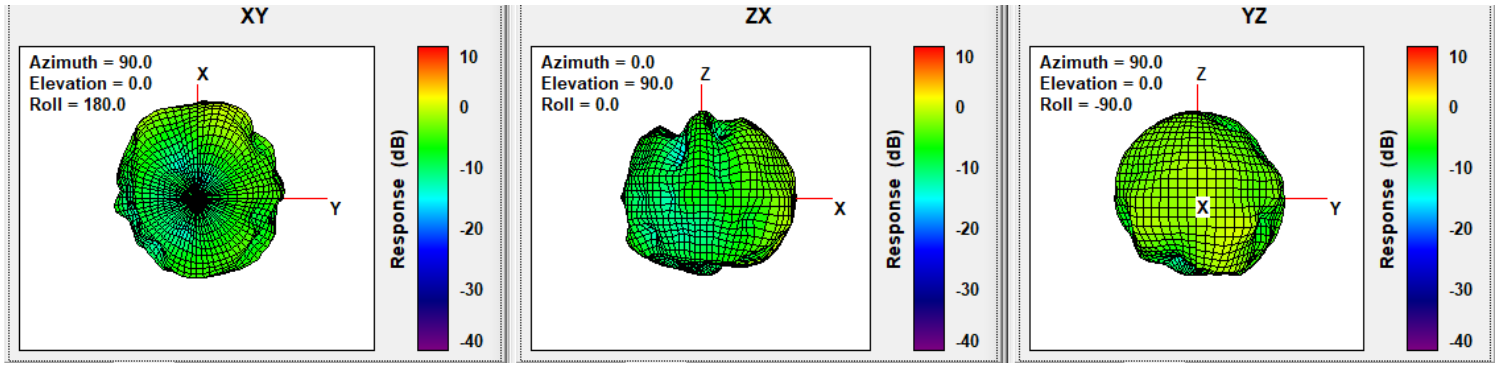
Center Frequency	**2450 MHz**
Three-dimensional (dBi) peak	0.21

Main antenna: 2500 MHz



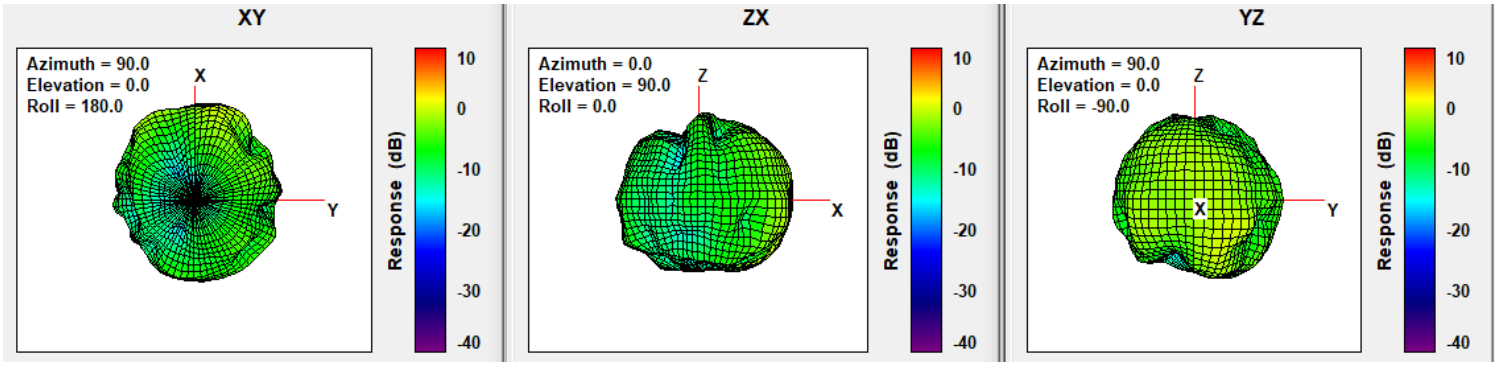
Center Frequency	**2500 MHz**
Three-dimensional (dBi) peak	0.85

Aux antenna: 2400 MHz



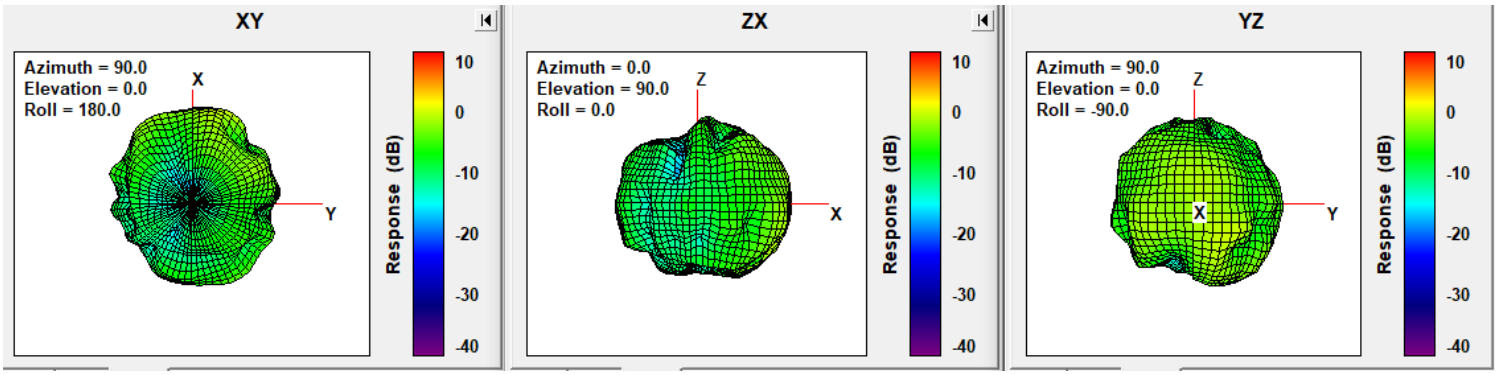
Center Frequency	**2400 MHz**
Three-dimensional (dBi) peak	0.85

Aux antenna: 2450 MHz



Center Frequency	**2450 MHz**
Three-dimensional (dBi) peak	0.94

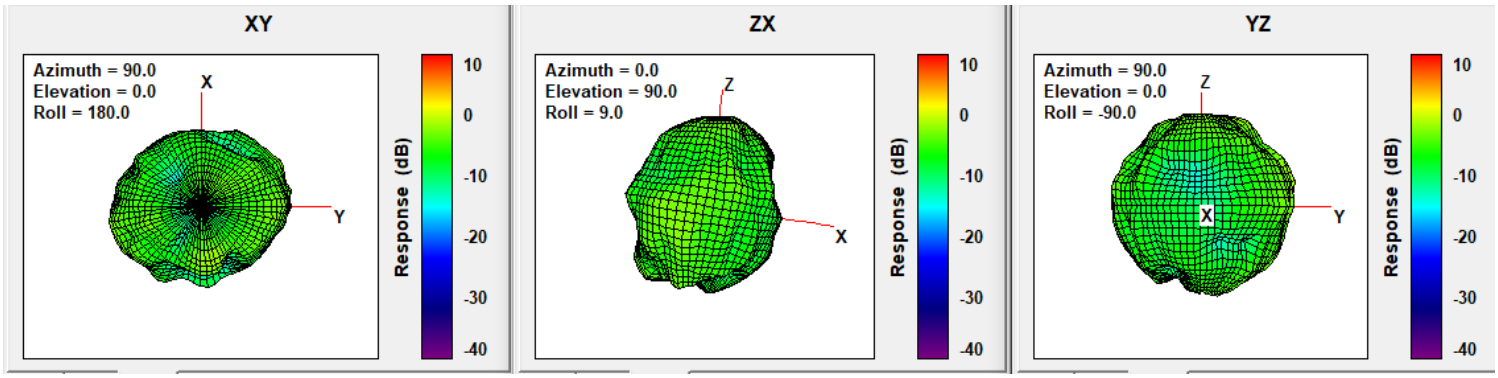
Aux antenna: 2500 MHz



Center Frequency	**2500 MHz**
Three-dimensional (dBi) peak	0.44

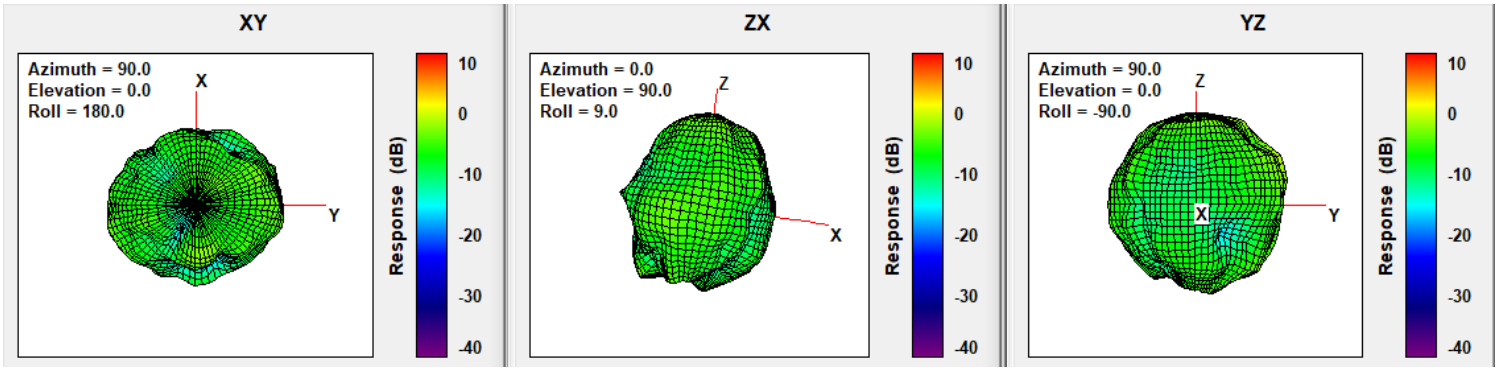
5150-5350MHz radiation characteristic

Main antenna: 5150 MHz



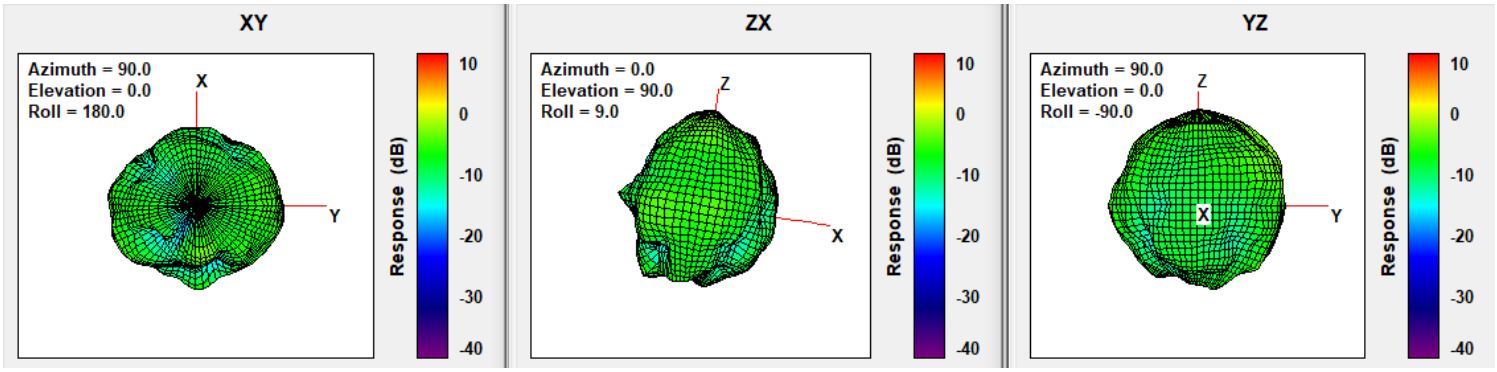
Center Frequency	**5150 MHz**
Three-dimensional (dBi) peak	-0.01

Main antenna: 5250 MHz



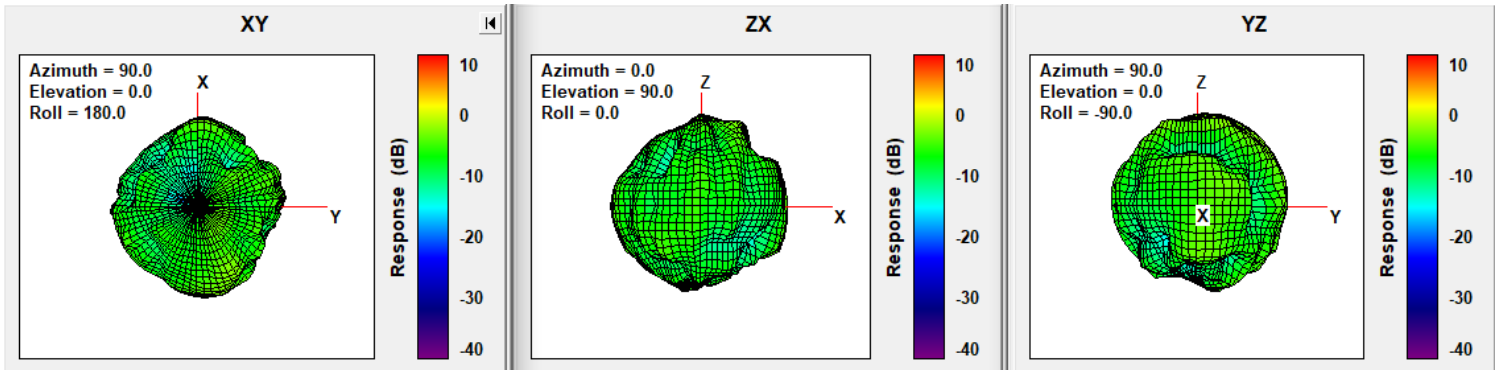
Center Frequency	**5250 MHz**
Three-dimensional (dBi) peak	0.62

Main antenna: 5350 MHz



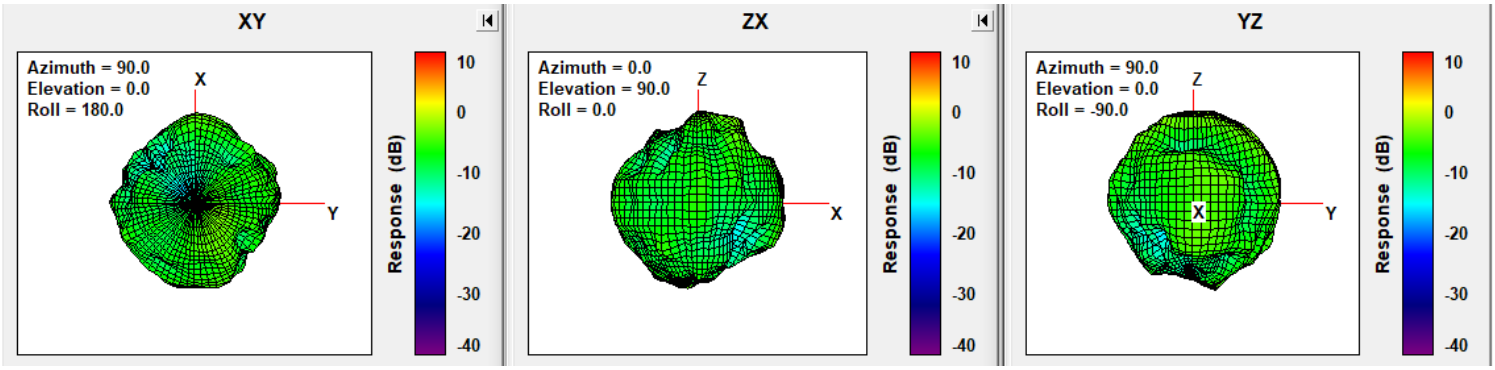
Center Frequency	**5350 MHz**
Three-dimensional (dBi) peak	-0.74

Aux antenna: 5150 MHz



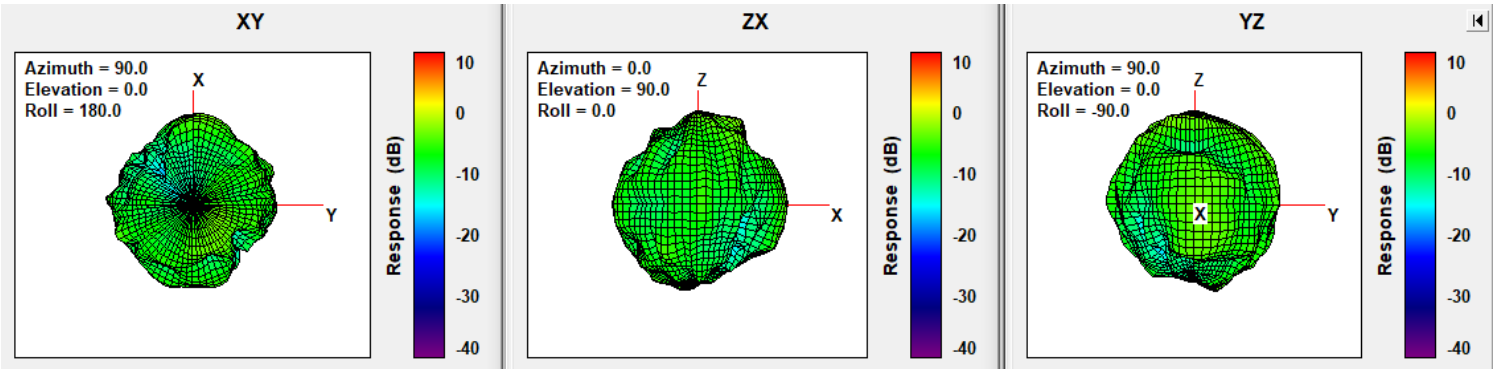
Center Frequency	**5150 MHz**
Three-dimensional (dBi) peak	-0.73

Aux antenna: 5250 MHz



Center Frequency	**5250 MHz**
Three-dimensional (dBi) peak	-1.46

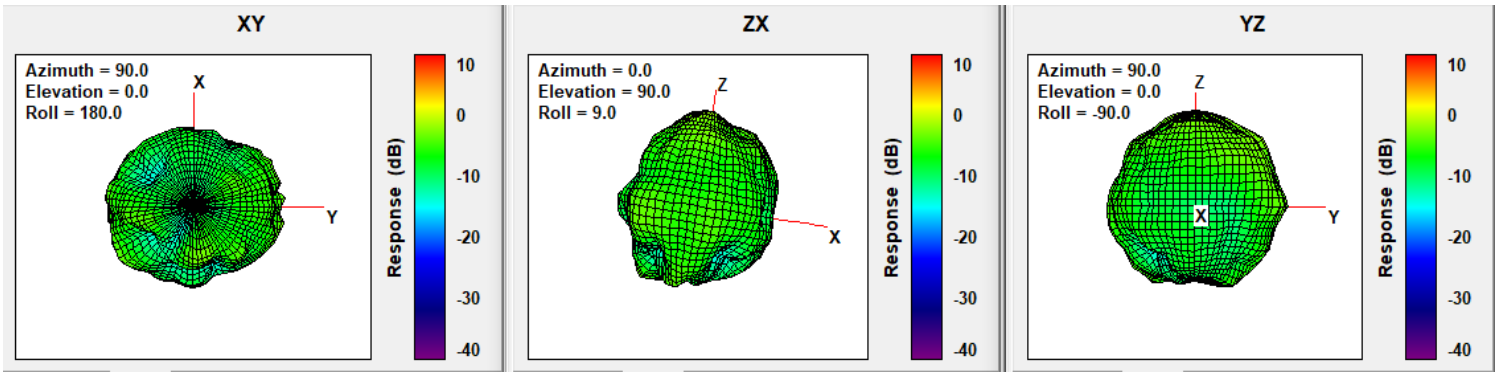
Aux antenna: 5350 MHz



Center Frequency	**5350 MHz**
Three-dimensional (dBi) peak	-1.26

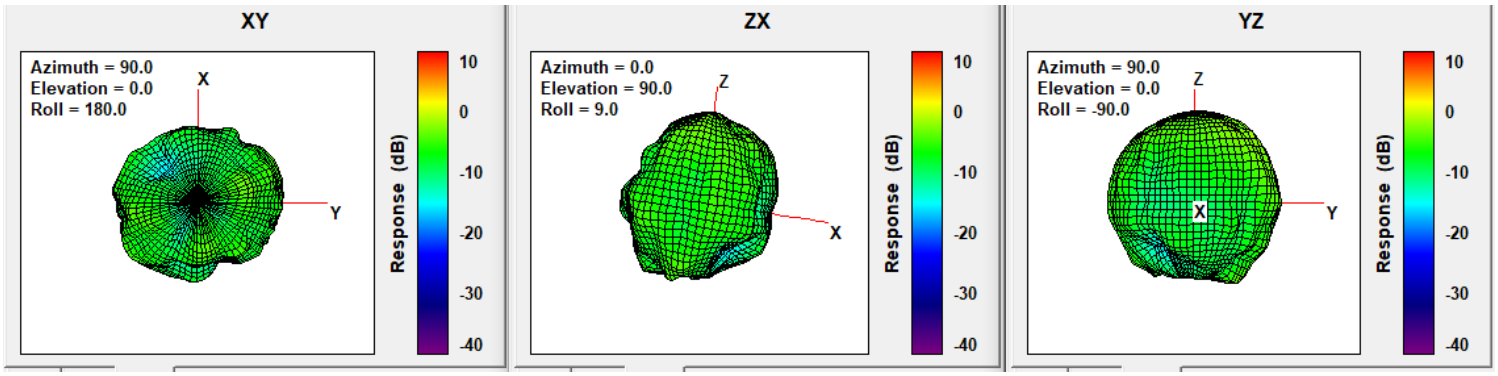
5470-5725MHz radiation characteristic

Main antenna: 5470 MHz



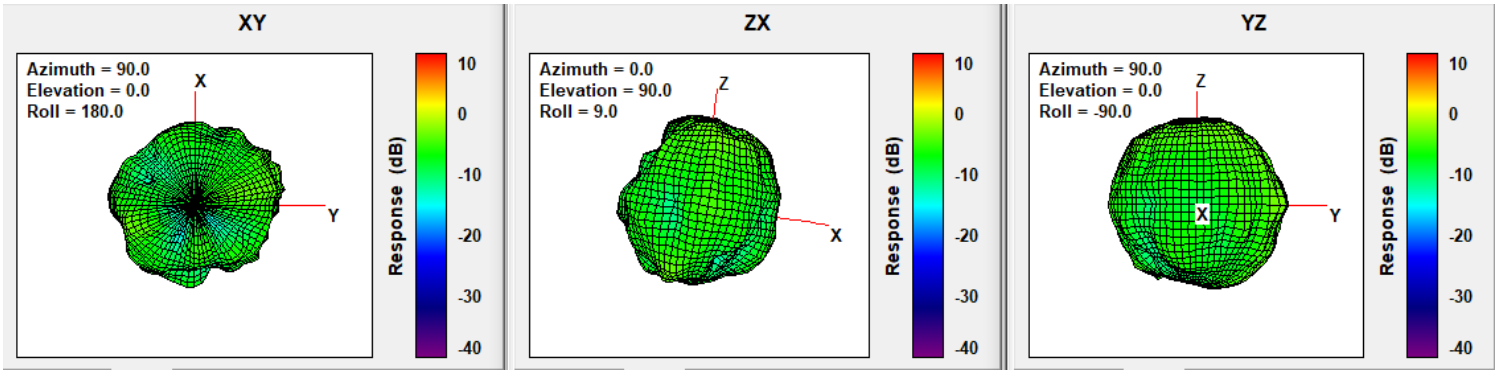
Center Frequency	**5470 MHz**
Three-dimensional (dBi) peak	-0.41

Main antenna: 5600 MHz



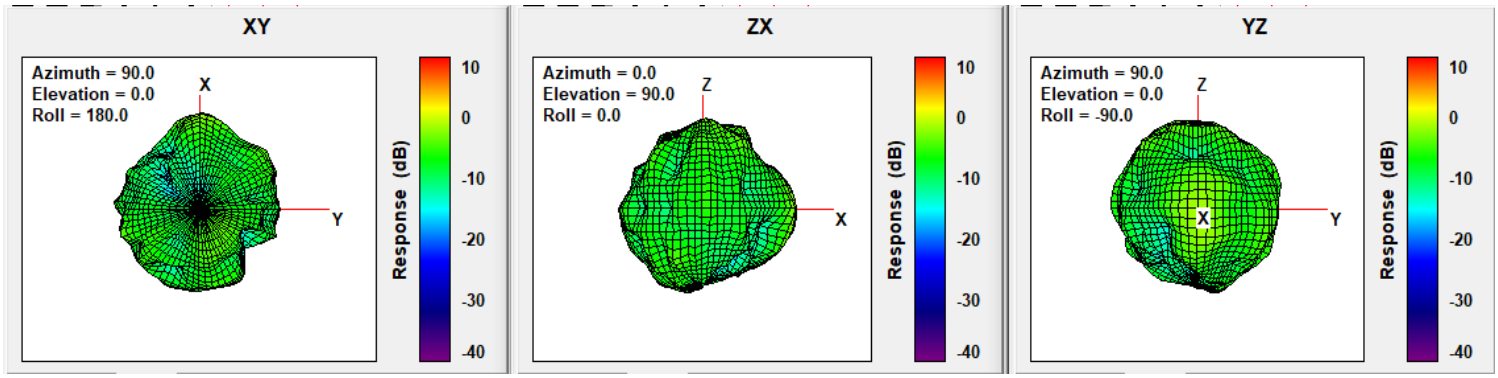
Center Frequency	**5600 MHz**
Three-dimensional (dBi) peak	-0.91

Main antenna: 5725 MHz



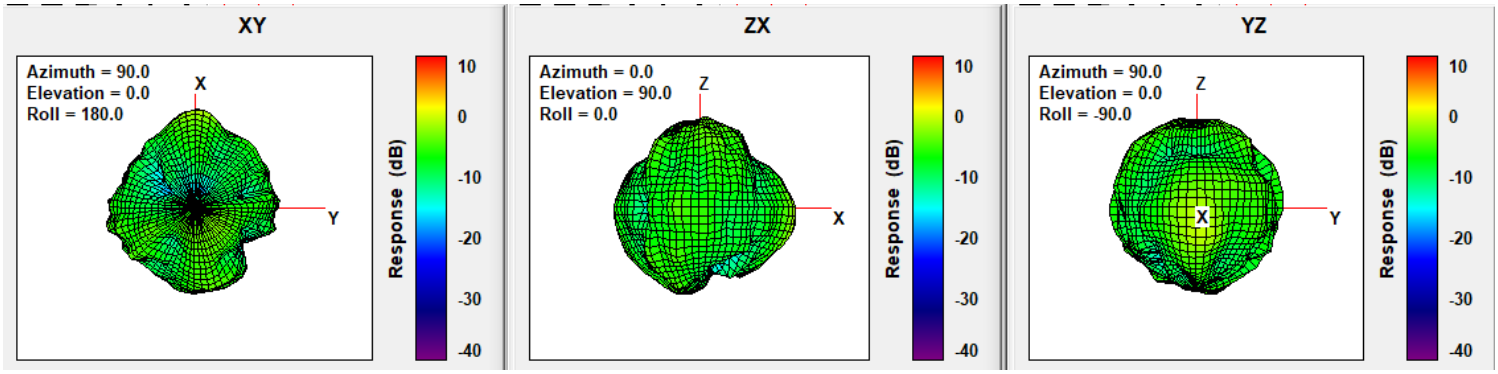
Center Frequency	**5725 MHz**
Three-dimensional (dBi) peak	-0.80

Aux antenna: 5470 MHz



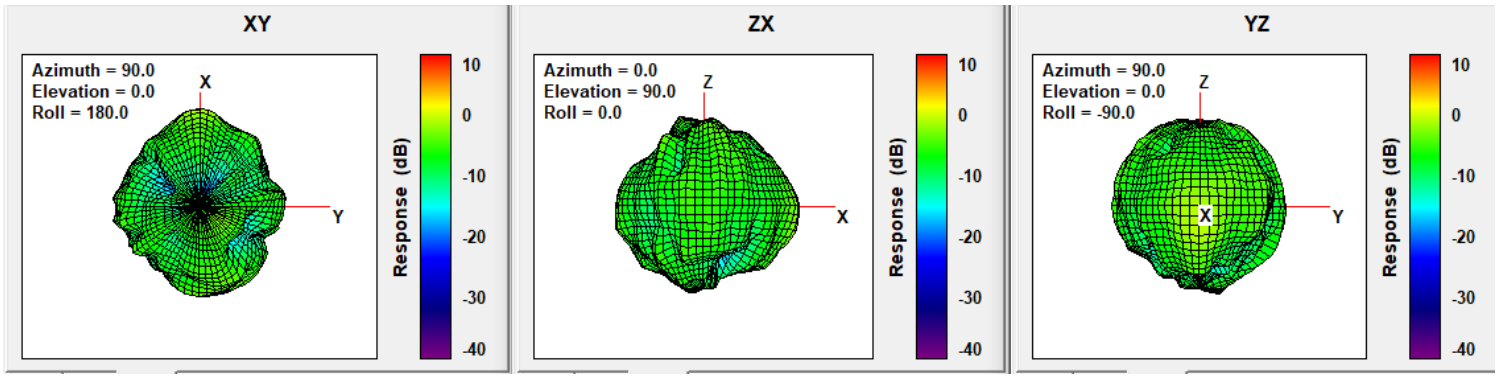
Center Frequency	**5470 MHz**
Three-dimensional (dBi) peak	-0.94

Aux antenna: 5600 MHz



Center Frequency	**5600 MHz**
Three-dimensional (dBi) peak	-0.04

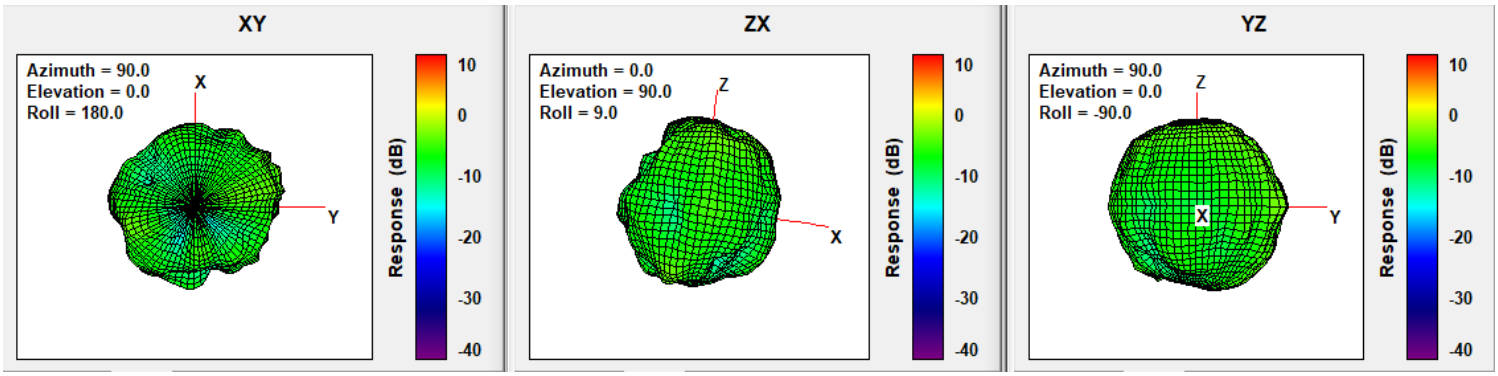
Aux antenna: 5725 MHz



Center Frequency	**5725 MHz**
Three-dimensional (dBi) peak	-0.38

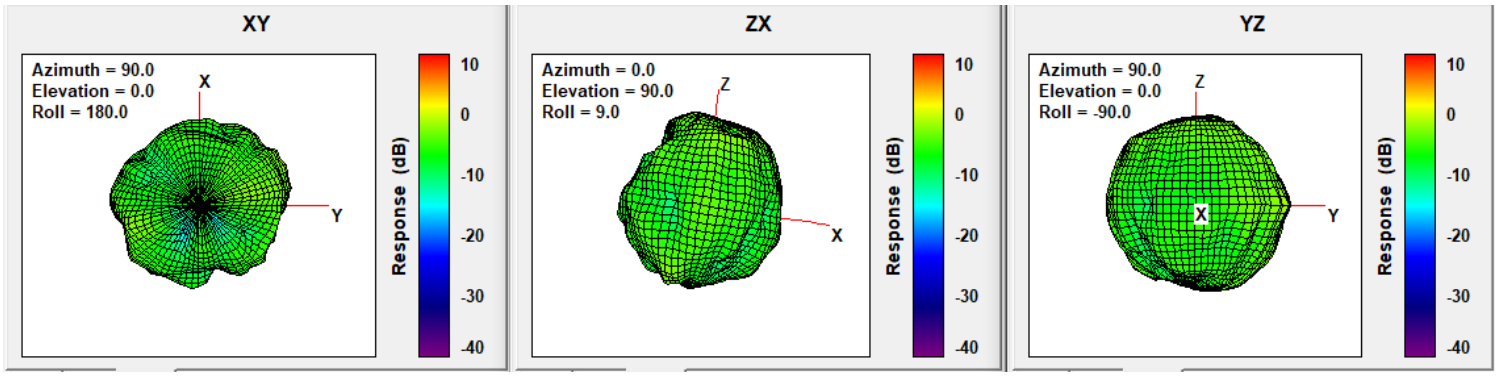
5725-5850MHz radiation characteristic

Main antenna: 5725 MHz



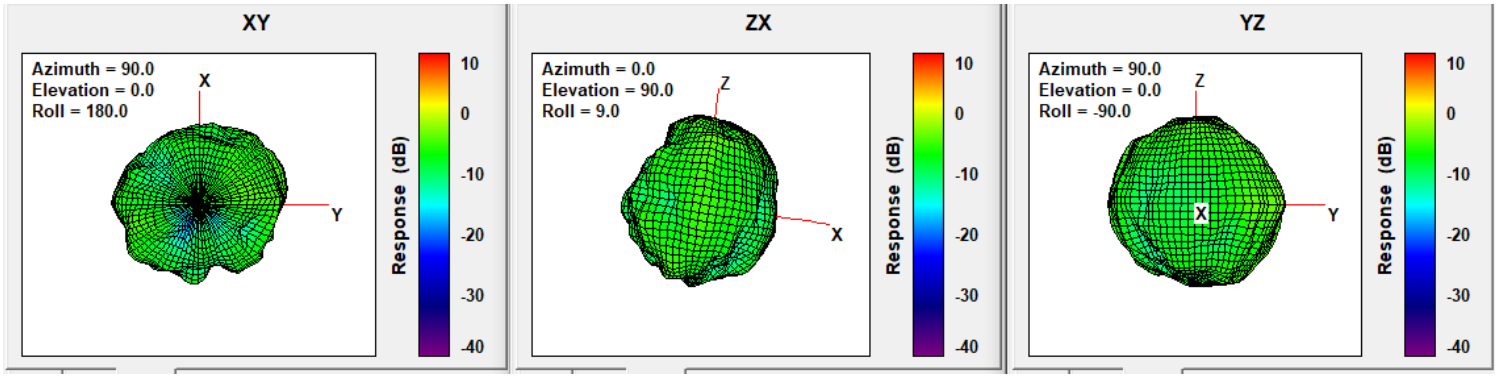
Center Frequency	**5725 MHz**
Three-dimensional (dBi) peak	-0.80

Main antenna: 5785 MHz



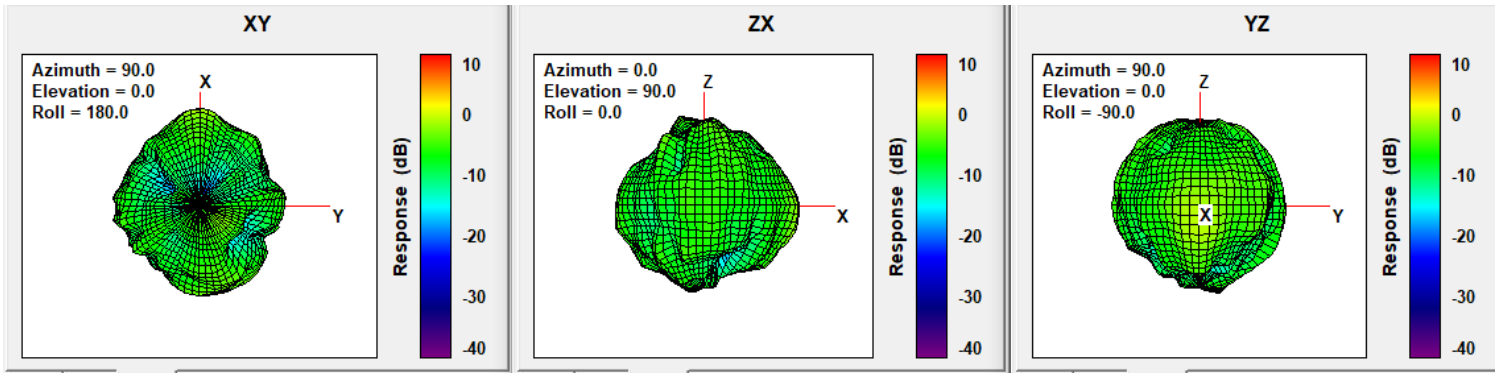
Center Frequency	**5785 MHz**
Three-dimensional (dBi) peak	0.32

Main antenna: 5850 MHz



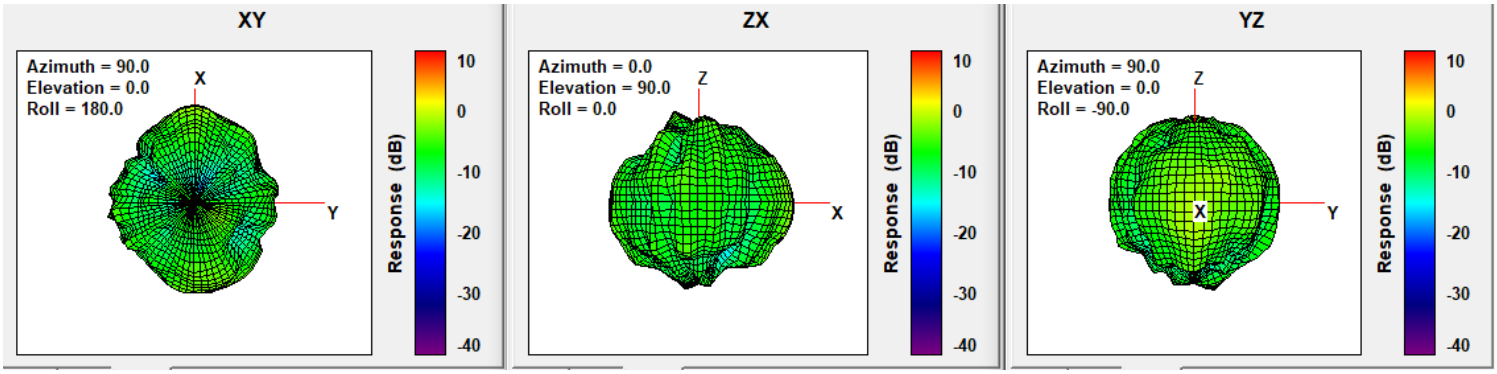
Center Frequency	**5850 MHz**
Three-dimensional (dBi) peak	-1.70

Aux antenna: 5725 MHz



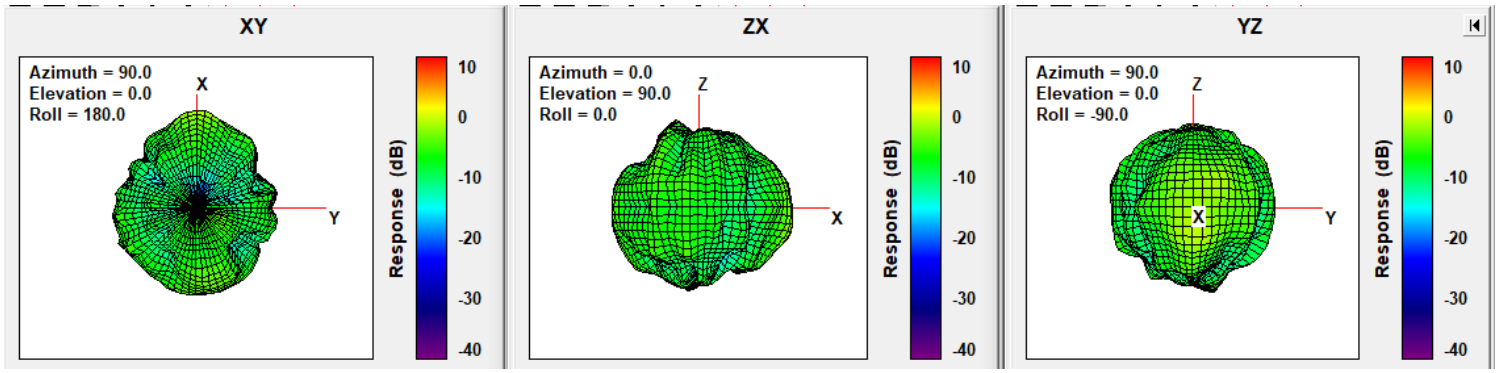
Center Frequency	**5725 MHz**
Three-dimensional (dBi) peak	-0.38

Aux antenna: 5785 MHz



Center Frequency	**5785 MHz**
Three-dimensional (dBi) peak	-0.51

Aux antenna: 5850 MHz

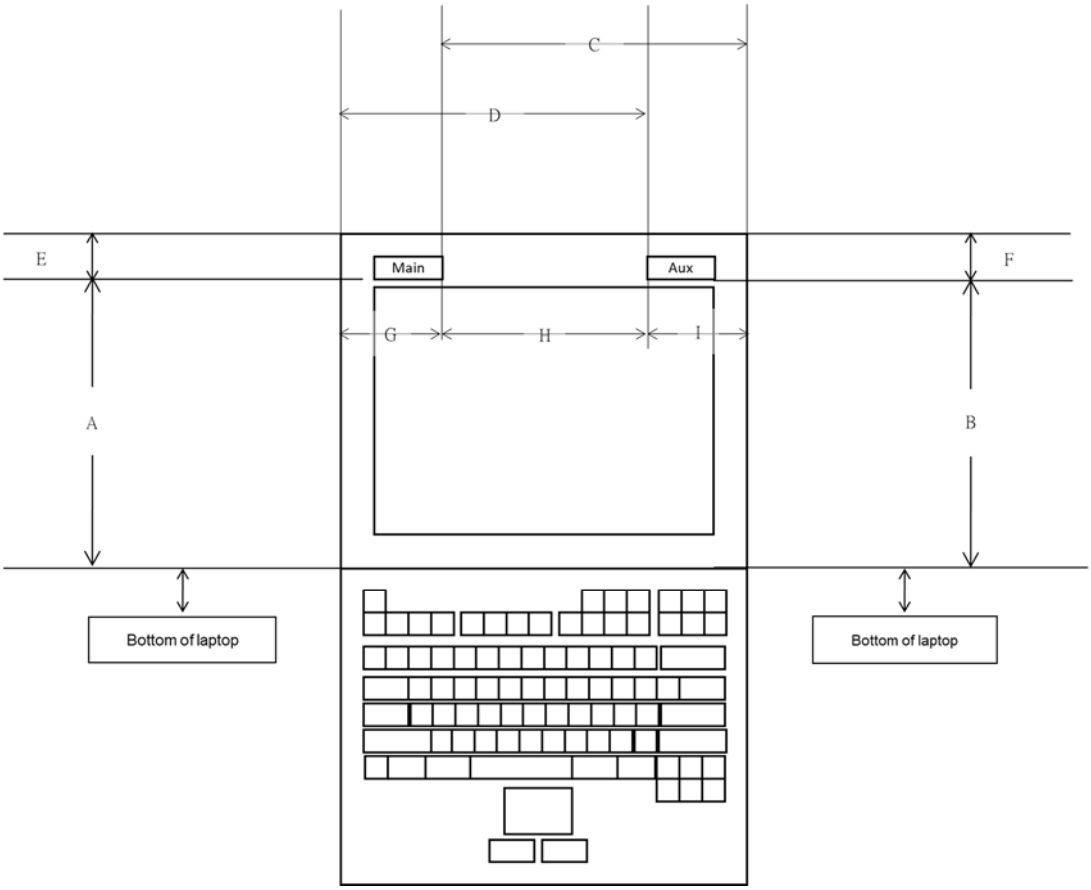


Center Frequency	**5850 MHz**
Three-dimensional (dBi) peak	0.01

Section 4. Antenna Host Platform Location Information

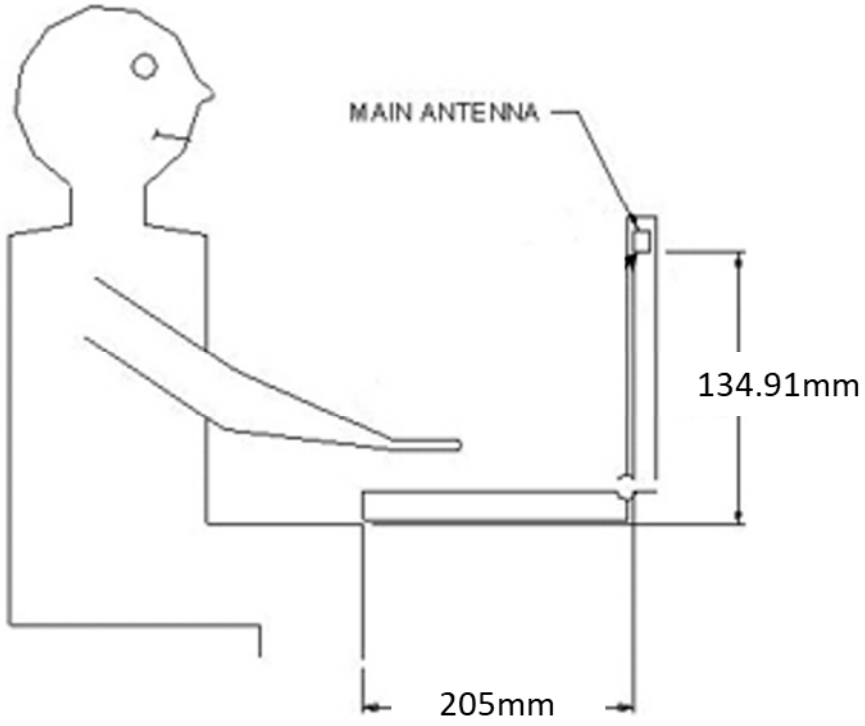
Include a **dimensioned photo(s) or dimensioned drawing(s)** of Main and Aux antenna placements (measurements are not required for receive-only antenna).
Any antenna that transmits must show dimensions to bottom of laptop. Provide a description of the materials that are used for supporting or surrounding 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	Antenna to Bottom	190.91
B	WLAN-Aux	Antenna to Bottom	190.91
C	WLAN-Main	to Right	224.3
D	WLAN-Aux	To Left	224.28
E	WLAN-Main	to Top	6.52
F	WLAN-Aux	to Top	6.52
G	WLAN-Main	to Left	31.06
H	WLAN	Aux to Main	158.22
I	WLAN-Aux	to Right	31.08



Section 5. Antenna dimensional information for SAR evaluation

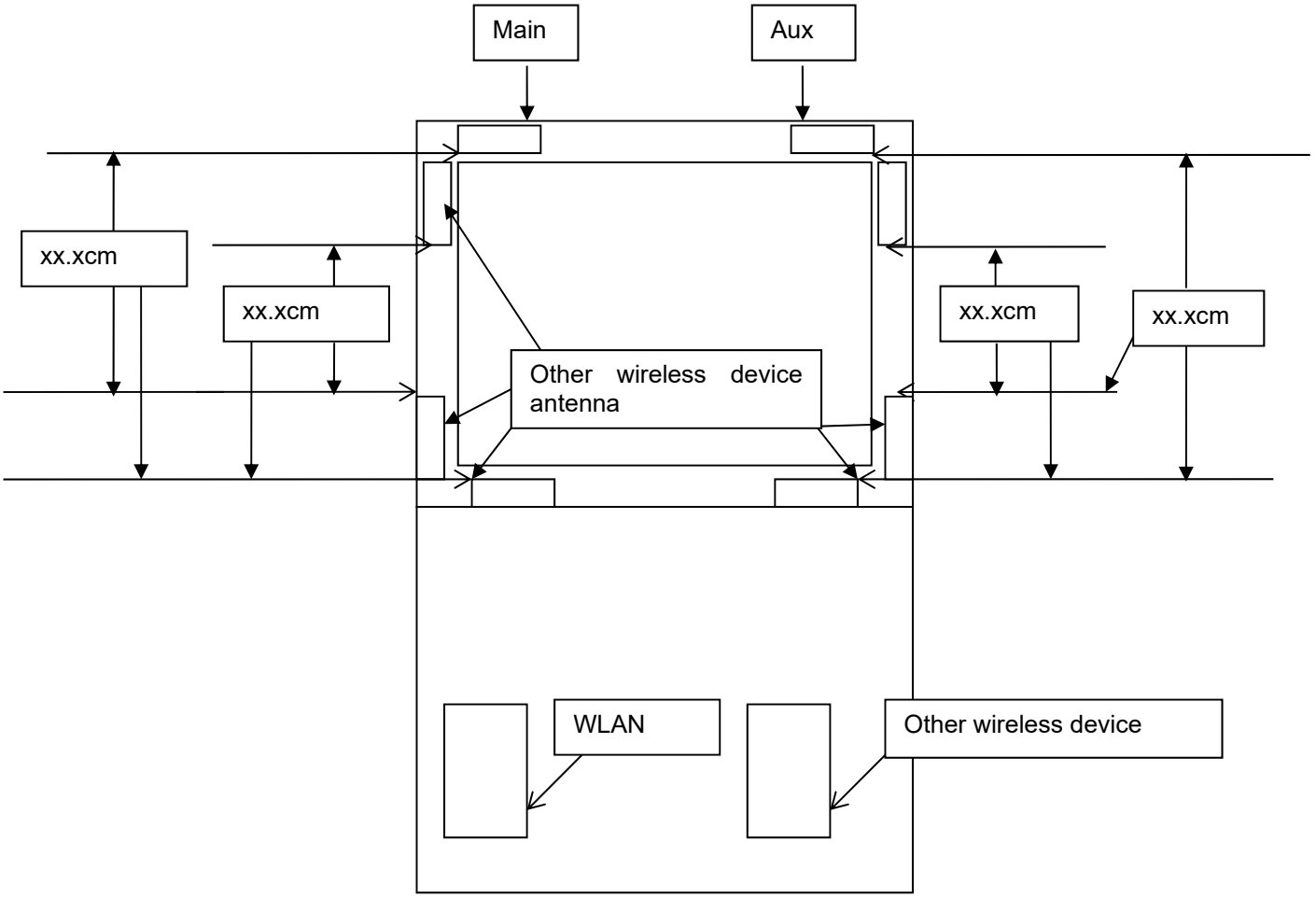
Include a **dimensioned photo(s) or dimensioned drawing(s)** showing the distance (mm) between the transmit antennas and the user. For notebook/laptop hosts show lapheld position (example below). For tablet hosts show all orientations including lapheld, primary & secondary portrait, primary & secondary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



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