

WLAN Antenna Information

ThinkPad X60 Tablet Series

[Wistron NeWeb Antenna]

Platform	
Platform owner	Lenovo(Japan) Limited
Brand name	ThinkPad X60 Tablet Series
Model name	X60T, X61T
ODM	Wistron Corporation
Target FCC Grant Date	before 2007 July 19
Target Launch Date	-
Antenna	
Brand name	Wistron NeWeb Corp.
Parts Number	Main Antenna-1: 25.90354.001
	Main Antenna-2: 25.90424.001 *1
	Aux Antenna: 25.90355.001
	MIMO 3rd Antenna: 25.90356.001 *2
Transmitter Module	
WLAN Tx Module	AR5BXB62, FCC ID: PPD-AR5BXB6 IC: 4104A-AR5BXB6
	AR5BXB72, FCC ID: PPD-AR5BXB72-L IC: 4104A-ARBXB72L

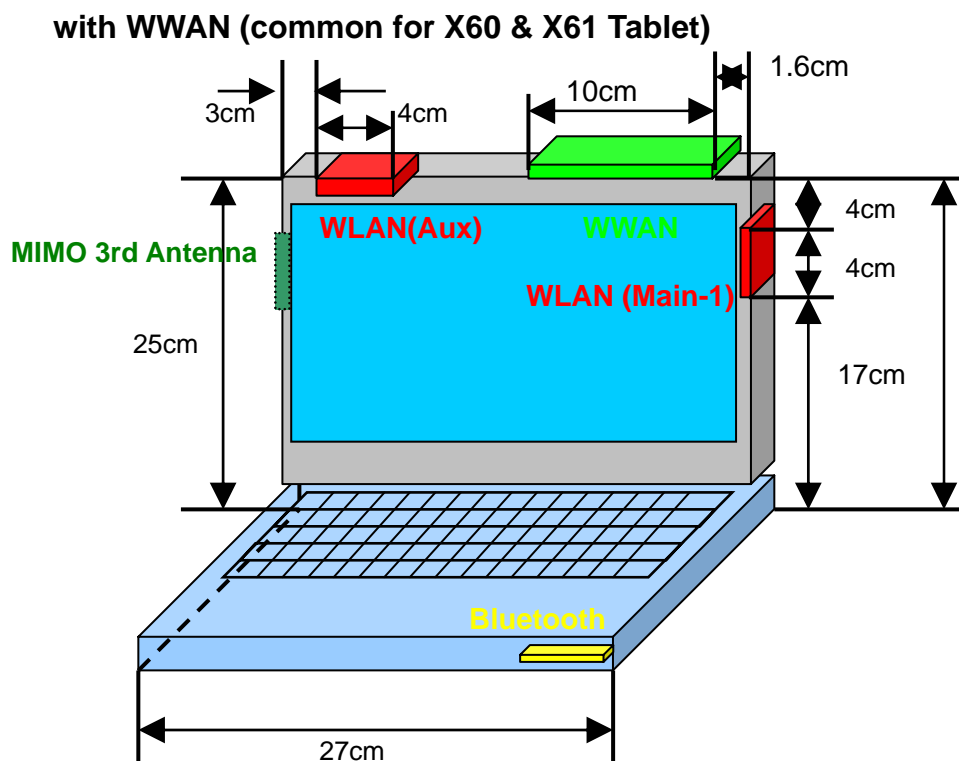
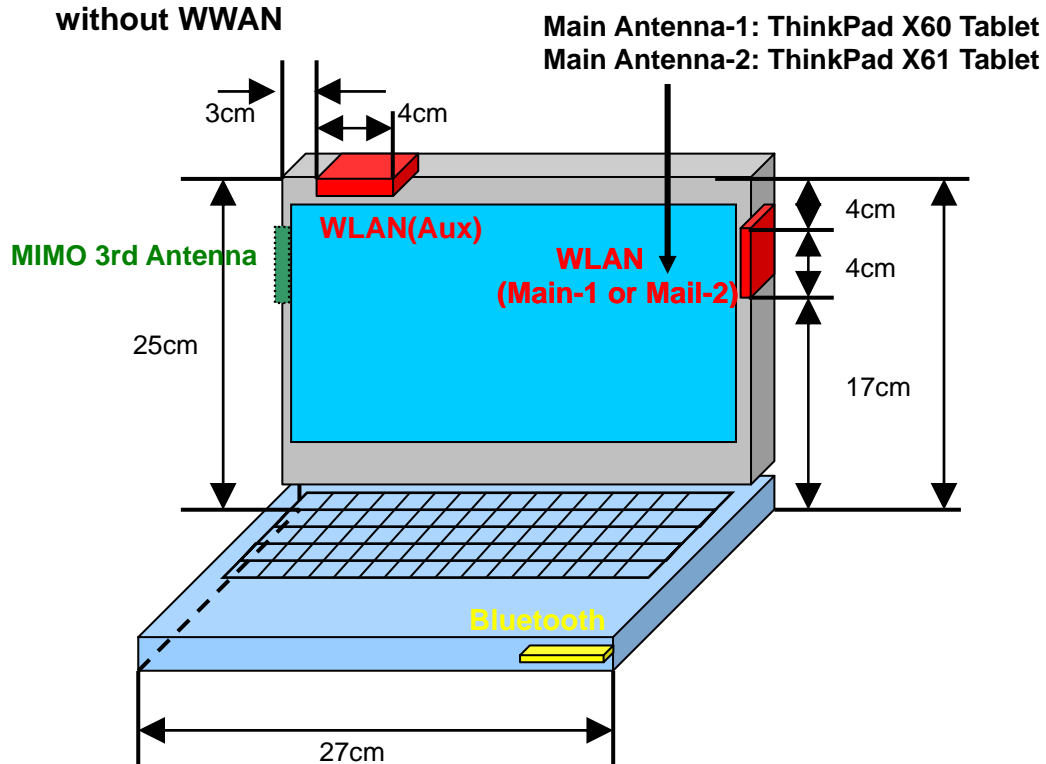
*1: The Main Antenna-2 is not used for the transmitter module, model AR5BXB72.

*2: The MIMO 3rd antenna is used for receiving only.

Section 1. Antenna Assembly Specifications

Note) The MIMO 3rd antenna is not used for transmission but receiving only, so the info hereafter is reference only.

Antenna locations:



Antenna Assembly Summary:

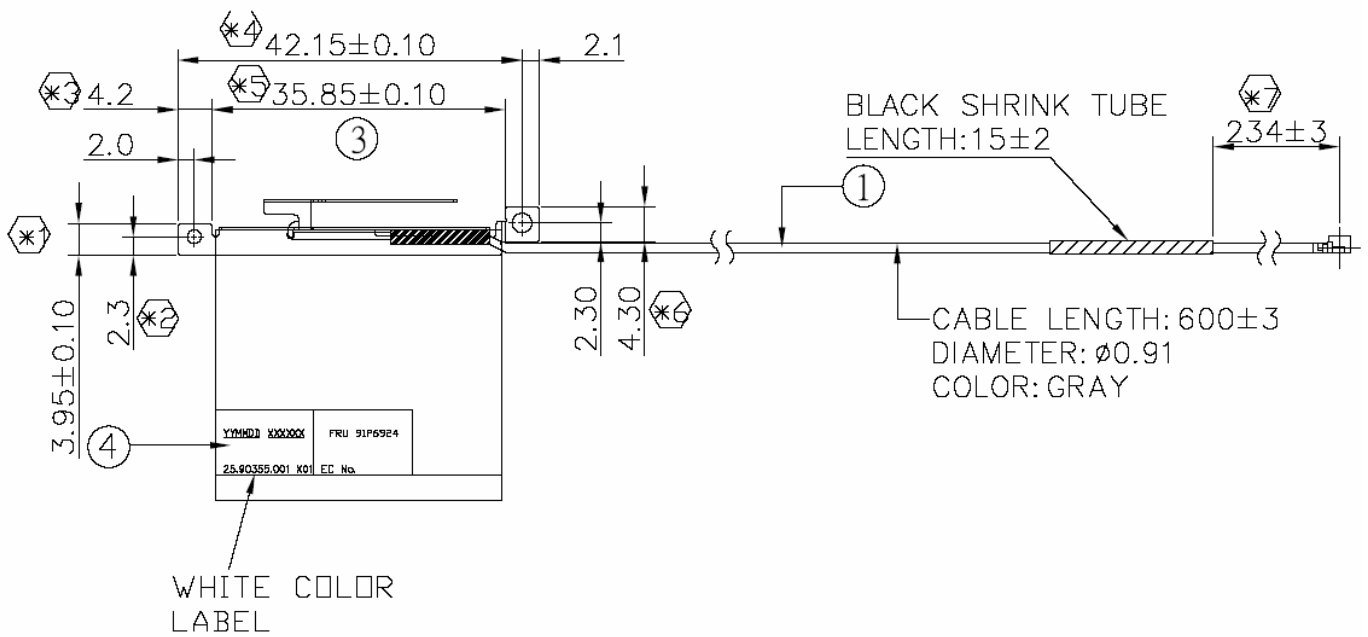
1A Antenna Part Number	1B Manufacture	1C Antenna Type	1D Cable Assembly Part Number and Information	1E *Peak Gain W/ Cable loss (dBi)	1F Peak Gain w/o Cable Loss (dBi)	1G VSWR	1H Cable Loss (dBi)
Main Antenna-1 (P/N: 25.90354.001)	Wistron NeWeb Corporation	PIFA	P/N: 50.EEL01.001 50 ohm Coaxial. Length: 600mm diameter: 0.92mm Connector: U.FL-LP-062	2400-2500MHz 0.90 dBi (peak)	2400-2500MHz 3.01 dBi (peak)	2400-2500MHz 3.0 max	2400-2500MHz 2.11 dBi (peak)
				5150-5350MHz 1.84 dBi (peak)	5150-5350MHz 4.99 dBi (peak)	5150-5350MHz 3.0 max	5150-5350MHz 3.16 dBi (peak)
				5470-5725MHz 1.86 dBi (peak)	5470-5725MHz 5.09 dBi (peak)	5470-5725MHz 3.0 max	5470-5725MHz 3.23 dBi (peak)
				5725-5850MHz 1.92 dBi (peak)	5725-5850MHz 5.25 dBi (peak)	5725-5850MHz 3.0 max	5725-5850MHz 3.33 dBi (peak)
Main Antenna-2 (P/N: 25.90424.001)	Wistron NeWeb Corporation	PIFA	P/N: 50.EEL01.001 50 ohm Coaxial. Length: 600mm diameter: 0.92mm Connector: U.FL-LP-062	2400-2500MHz -0.90 dBi (peak)	2400-2500MHz 1.21 dBi (peak)	2400-2500MHz 3.0 max	2400-2500MHz 2.11 dBi (peak)
				5150-5350MHz 2.54 dBi (peak)	5150-5350MHz 5.69 dBi (peak)	5150-5350MHz 3.0 max	5150-5350MHz 3.16 dBi (peak)
				5470-5725MHz 2.97 dBi (peak)	5470-5725MHz 6.19 dBi (peak)	5470-5725MHz 3.0 max	5470-5725MHz 3.23 dBi (peak)
				5470-5725MHz 2.97 dBi (peak)	5470-5725MHz 6.19 dBi (peak)	5470-5725MHz 3.0 max	5470-5725MHz 3.23 dBi (peak)
Auxiliary antenna P/N: 25.90355.001	Wistron NeWeb Corporation	PIFA	P/N: 50.EEL01.002 50 ohm Coaxial. Length: 700mm diameter: 0.92mm Connector: U.FL-LP-062	2400-2500MHz 1.52 dBi (peak)	2400-2500MHz 3.95 dBi (peak)	2400-2500MHz 3.0 max	2400-2500MHz 2.43 dBi (peak)
				5150-5350MHz 2.78 dBi (peak)	5150-5350MHz 6.42 dBi (peak)	5150-5350MHz 3.0 max	5150-5350MHz 3.64 dBi (peak)
				5470-5725MHz 2.72 dBi (peak)	5470-5725MHz 6.45 dBi (peak)	5470-5725MHz 3.0 max	5470-5725MHz 3.72 dBi (peak)
				5725-5850MHz 2.13 dBi (peak)	5725-5850MHz 5.79 dBi (peak)	5725-5850MHz 3.0 max	5725-5850MHz 3.85 dBi (peak)
MIMO 3rd antenna P/N: 25.90356.001	Wistron NeWeb Corporation	PIFA	P/N: 50.EEL01.003 50 ohm Coaxial. Length: 620mm diameter: 0.92mm Connector: U.FL-LP-062	2400-2500MHz 1.11 dBi (peak)	2400-2500MHz 3.28 dBi (peak)	2400-2500MHz 3.0 max	2400-2500MHz 2.17 dBi (peak)
				5150-5350MHz 1.57 dBi (peak)	5150-5350MHz 4.82 dBi (peak)	5150-5350MHz 3.0 max	5150-5350MHz 3.25 dBi (peak)
				5470-5725MHz 1.27 dBi (peak)	5470-5725MHz 4.60 dBi (peak)	5470-5725MHz 3.0 max	5470-5725MHz 3.33 dBi (peak)
				5725-5850MHz 0.93 dBi (peak)	5725-5850MHz 4.25 dBi (peak)	5725-5850MHz 3.0 max	5725-5850MHz 3.33 dBi (peak)

Antenna Peak Gain Table:

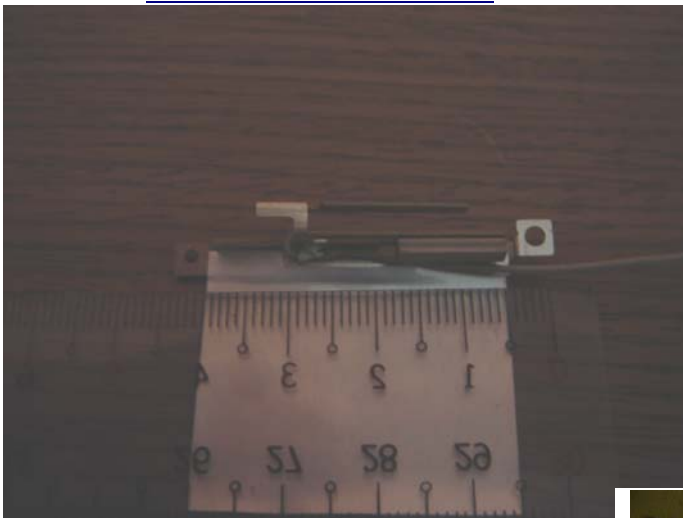
Frequency (MHz)	Main antenna-1		Main antenna-2		Aux Antenna		MIMO 3rd Antenna	
	Horizontal (dBi)	Vertical (dBi)	Horizontal (dBi)	Vertical (dBi)	Horizontal (dBi)	Vertical (dBi)	Horizontal (dBi)	Vertical (dBi)
2400	-2.31	0.90	-0.90	-1.78	0.00	-0.09	0.26	-1.59
2450	-1.50	0.81	-1.26	-2.04	1.52	-0.43	0.66	-0.62
2500	-2.02	0.01	-2.74	-2.14	0.24	-0.78	1.11	-2.99
5150	-6.69	1.49	-4.64	0.62	2.11	-3.36	0.77	1.57
5250	-5.20	1.72	-4.40	2.27	2.78	-2.44	0.17	0.17
5350	-3.73	1.84	-3.84	2.54	2.73	-2.26	0.01	1.03
5470	-5.34	1.86	-1.69	2.13	2.72	-2.24	-0.03	1.27
5600	-3.58	1.77	-0.43	2.91	2.57	-2.83	0.39	0.07
5725	-3.15	1.34	-0.41	2.97	2.13	-2.92	0.34	-0.03
5725	-3.15	1.34	-0.41	2.97	2.13	-2.92	0.34	-0.03
5750	-2.94	0.91	-1.15	2.39	1.94	-2.48	0.47	0.25
5800	-3.50	1.07	-0.31	2.34	1.73	-1.96	0.93	-0.07
5850	-2.36	1.92	-0.09	1.56	1.49	-1.71	0.24	-1.32

Section 2. Dimensioned Photos or Drawings of Antennas

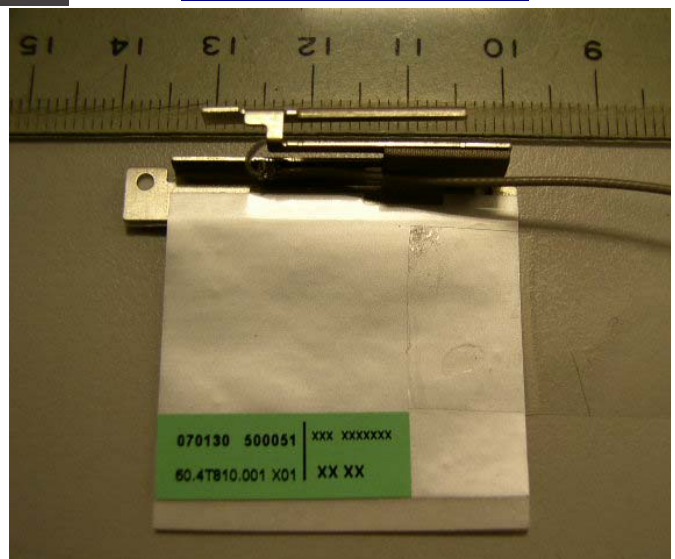
Main Antenna Dimensioned Drawing:



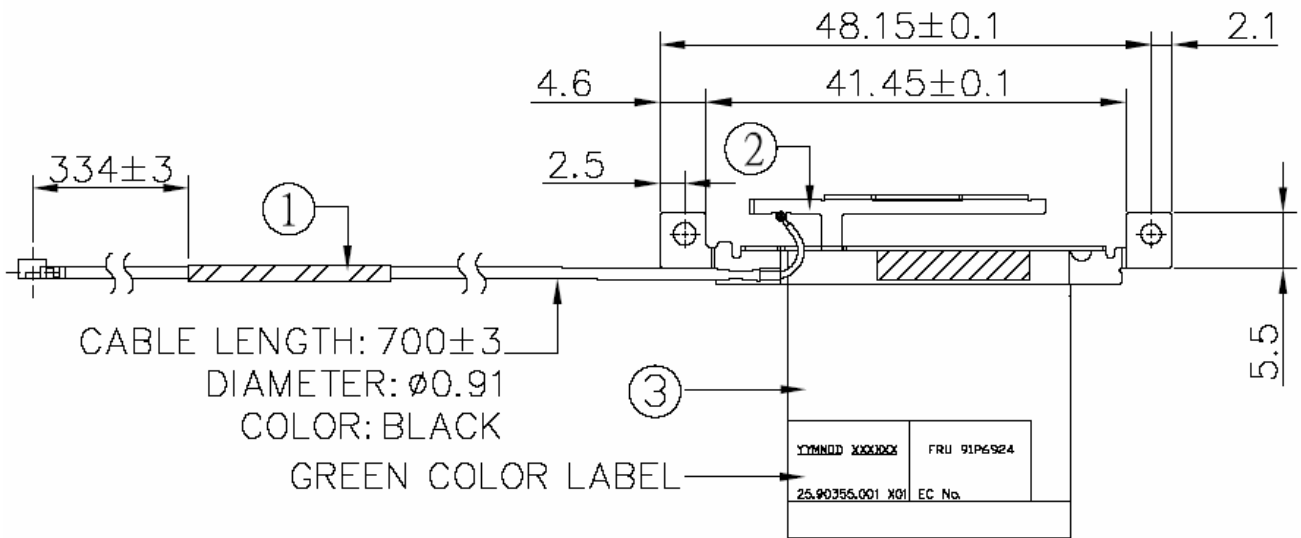
Main Antenna-1 Photo:



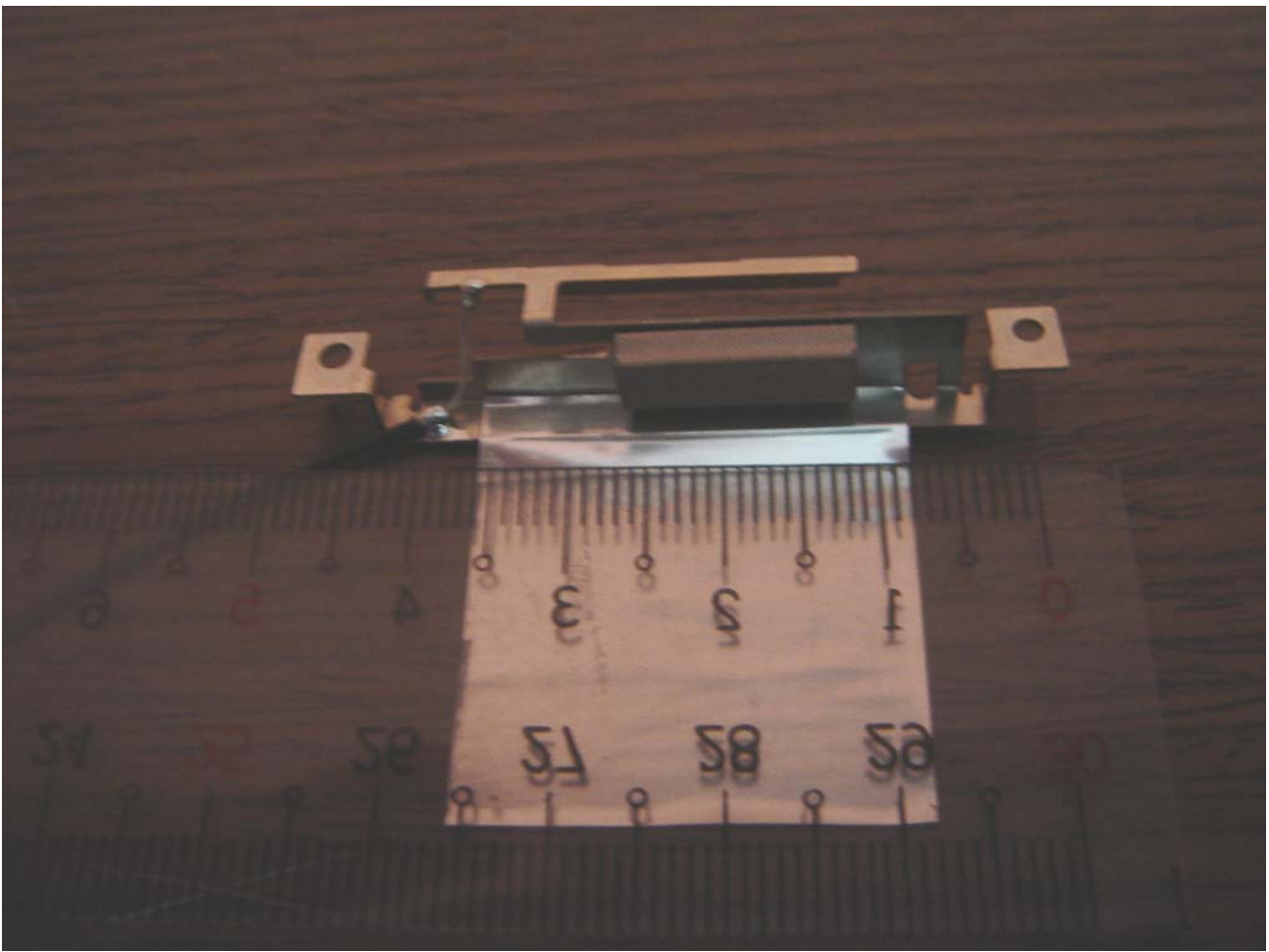
Main Antenna-2 Photo:



Aux Antenna Dimensioned Drawing:



Aux Antenna Photo:

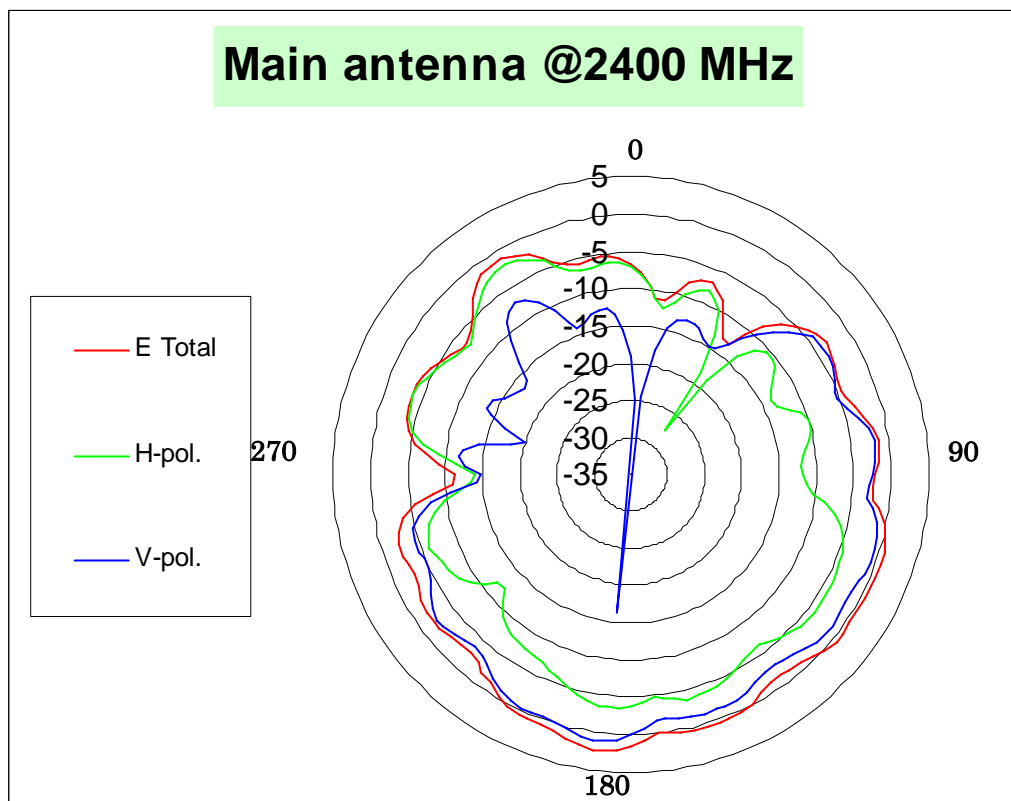


Section 3. Radiation Characteristics of Antenna Loaded in Host Platform

Hereafter, the each highest gain data in each frequency band of the previous table represents in this report.

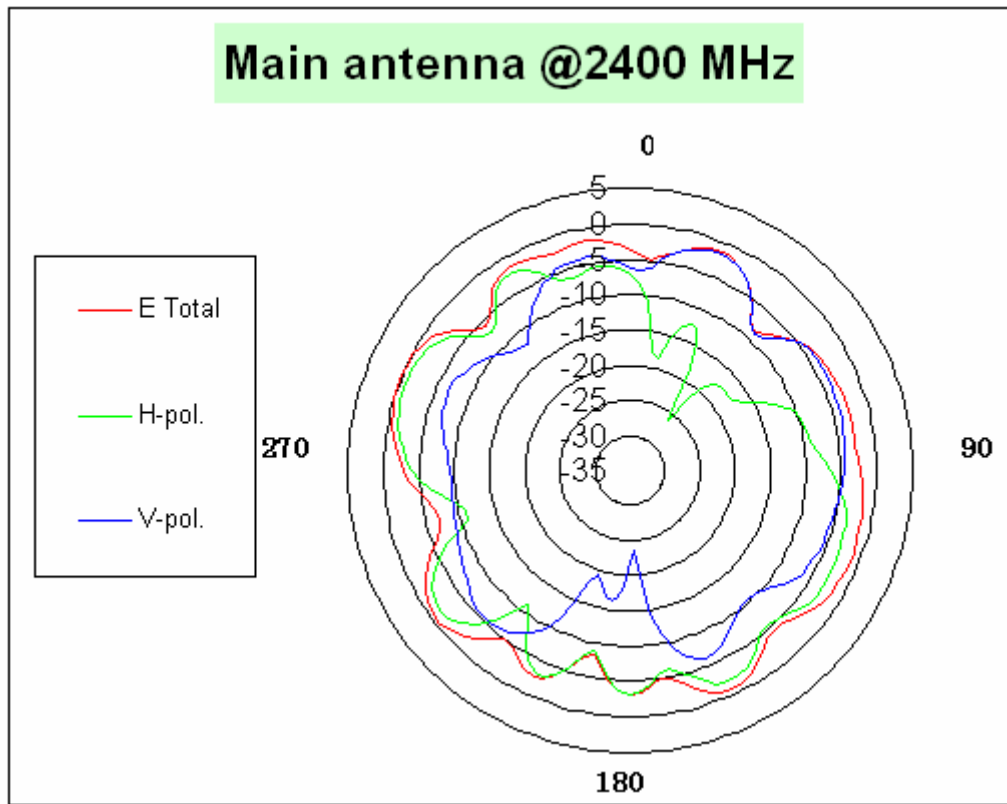
2400-2500MHz radiation characteristics

Main antenna-1: 2400 MHz



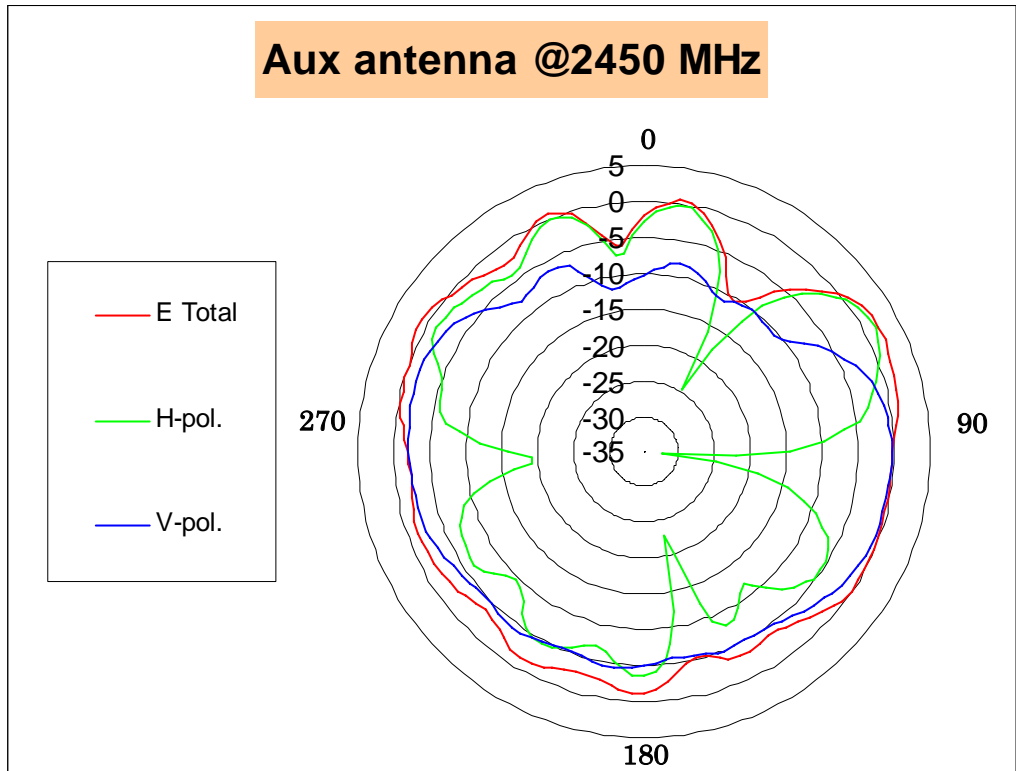
Center Frequency	2400 MHz
Horizontal (dBi) peak	-2.31 (327°)
Vertical (dBi) peak	0.90 (186°)

Main antenna-2: 2400 MHz



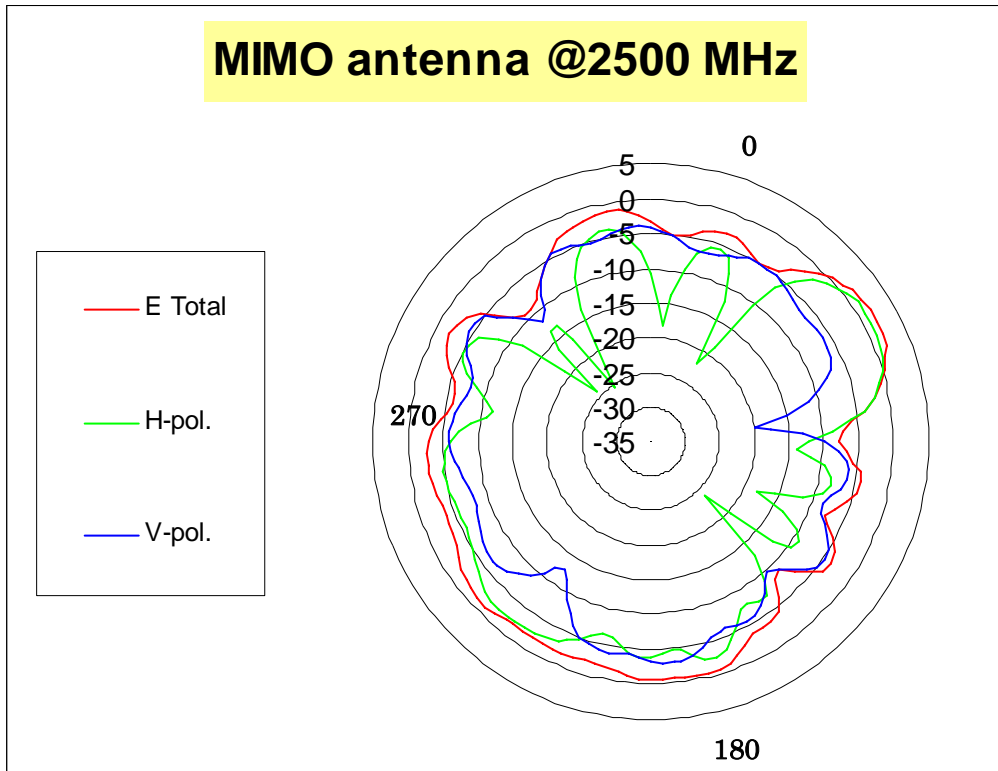
Center Frequency	2400 MHz
Horizontal (dBi) peak	-0.90 (291°)
Vertical (dBi) peak	-1.78 (21°)

Auxiliary antenna: 2450 MHz



Center Frequency	2450 MHz
Horizontal (dBi) peak	1.52 (60°)
Vertical (dBi) peak	-0.43 (90°)

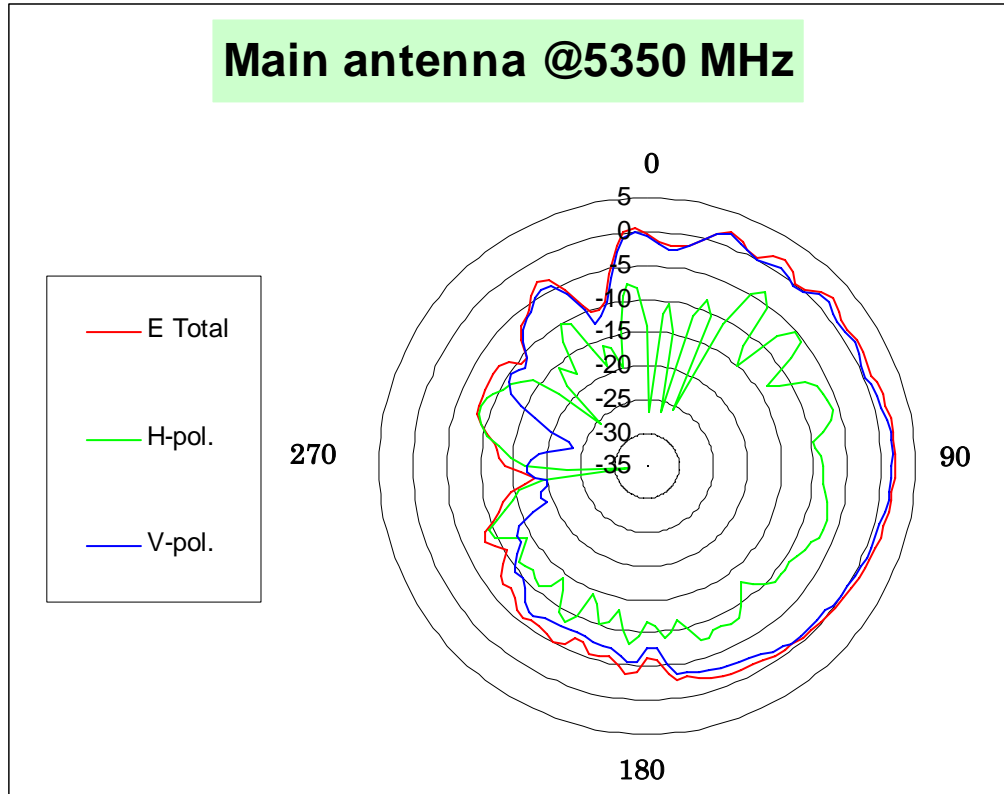
MIMO 3rd antenna: 2500 MHz



Center Frequency	2500 MHz
Horizontal (dBi) peak	1.11 (63°)
Vertical (dBi) peak	-2.99 (174°)

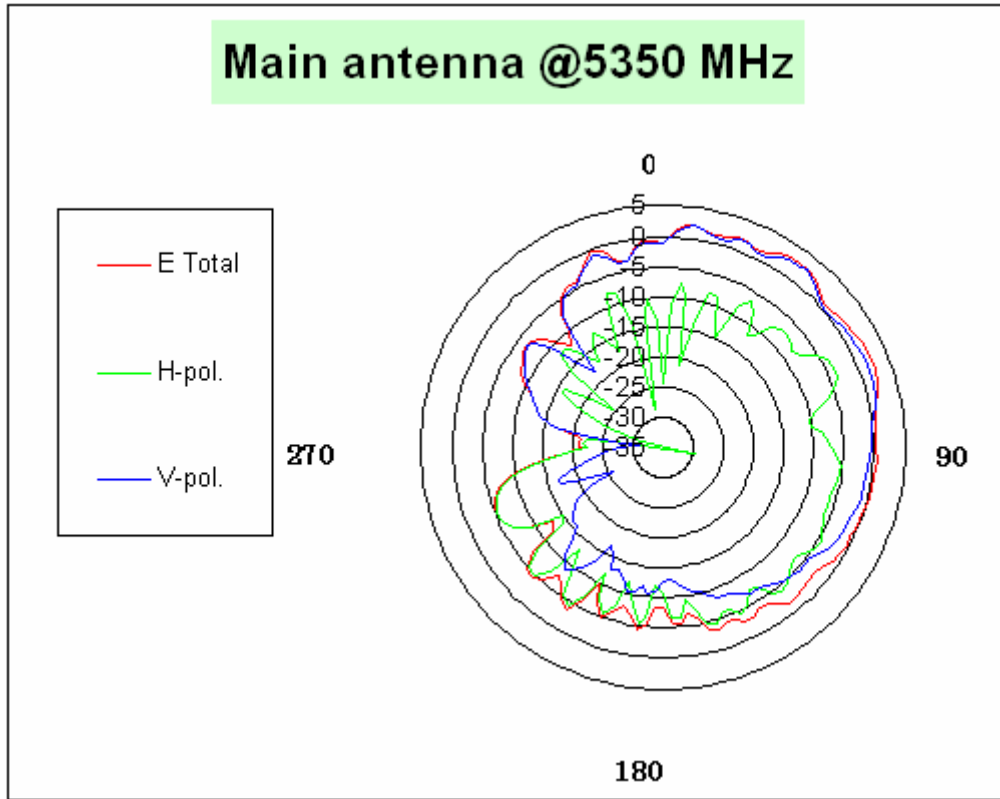
5150-5350 MHz radiation characteristics

Main antenna-1: 5350 MHz



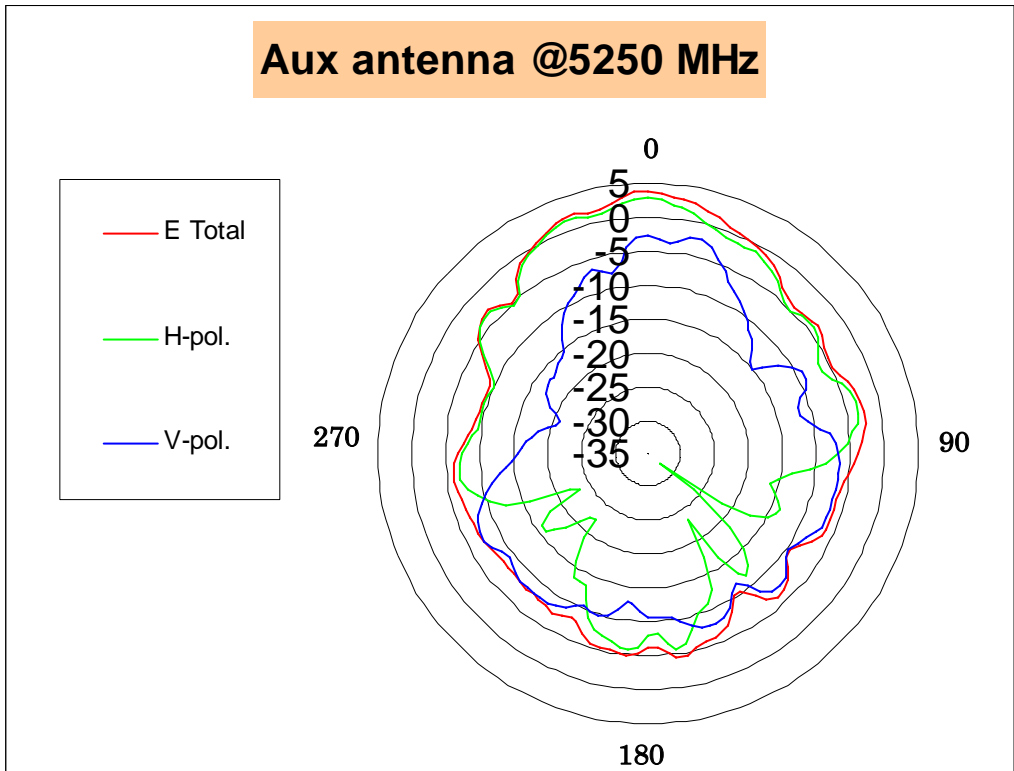
Center Frequency	5350 MHz
Horizontal (dBi) peak	-3.73 (33°)
Vertical (dBi) peak	1.84 (84°)

Main antenna-2: 5350 MHz



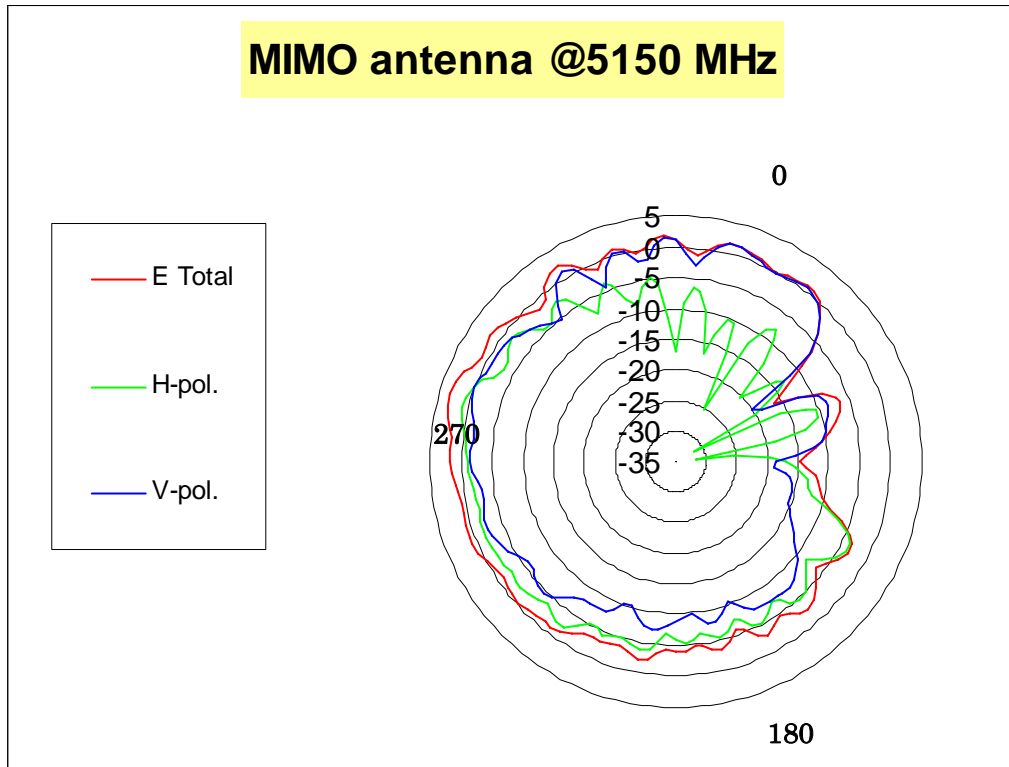
Center Frequency	5350 MHz
Horizontal (dBi) peak	-3.84 (66°)
Vertical (dBi) peak	2.54 (39°)

Auxiliary antenna: 5250 MHz



Center Frequency	5250 MHz
Horizontal (dBi) peak	2.78 (0°)
Vertical (dBi) peak	-2.44 (0°)

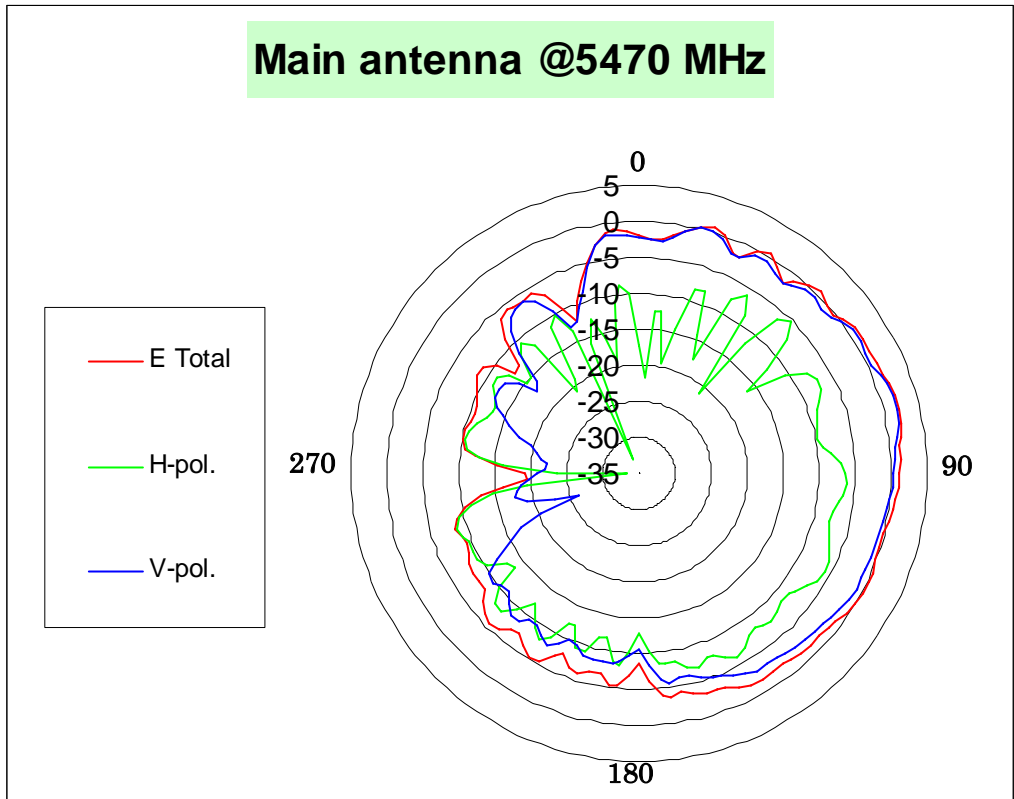
MIMO 3rd antenna: 5150 MHz



Center Frequency	5150 MHz
Horizontal (dBi) peak	0.77 (285°)
Vertical (dBi) peak	1.57 (15°)

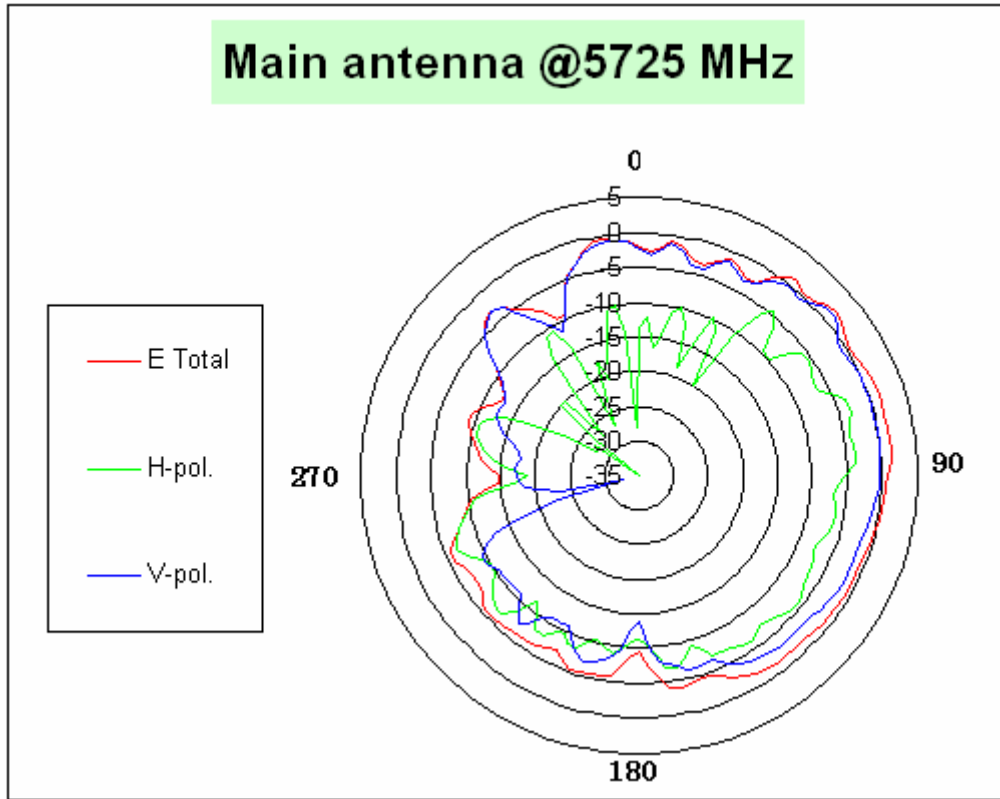
5470-5725MHz radiation characteristics

Main antenna-1: 5470 MHz



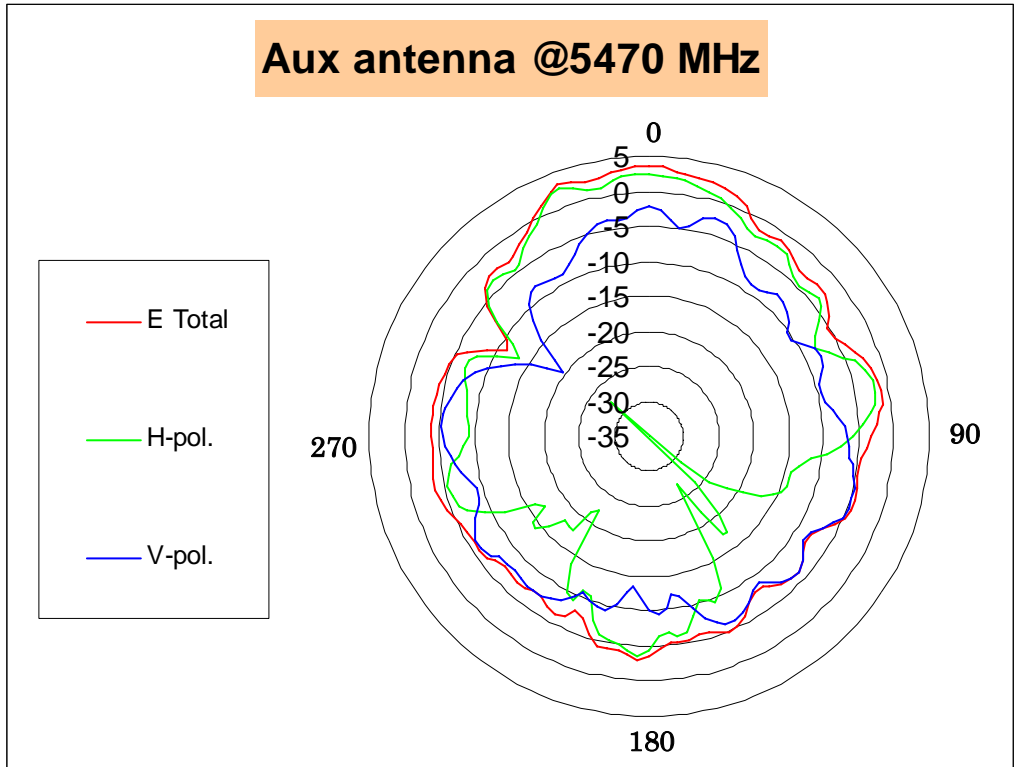
Center Frequency	5470 MHz
Horizontal (dBi) peak	-5.34 (117°)
Vertical (dBi) peak	1.86 (75°)

Main antenna-2: 5725 MHz



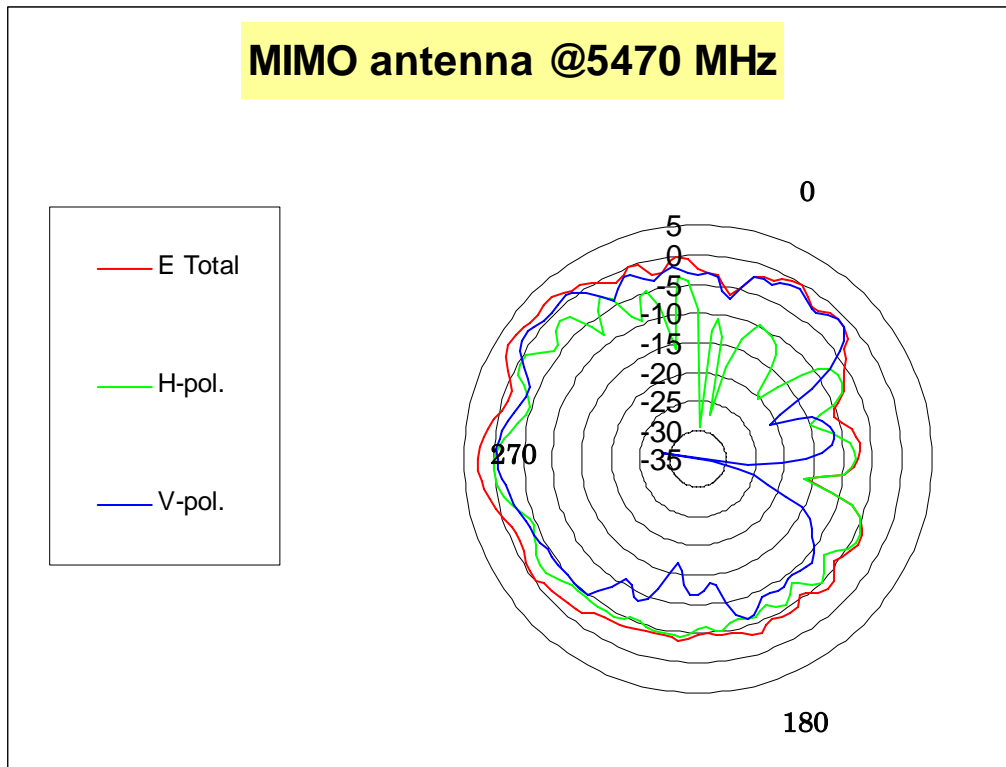
Center Frequency	5725 MHz
Horizontal (dBi) peak	-0.41 (54°)
Vertical (dBi) peak	2.97 (39°)

Auxiliary antenna: 5470 MHz



Center Frequency	5470 MHz
Horizontal (dBi) peak	2.72 (339°)
Vertical (dBi) peak	-2.24 (0°)

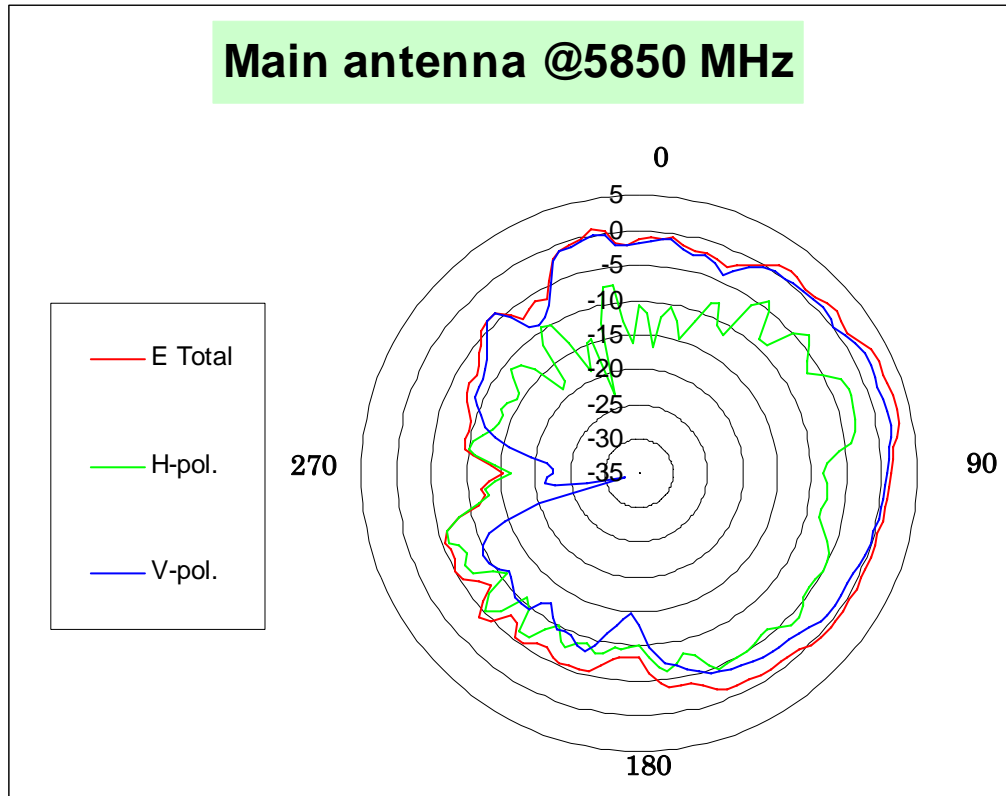
MIMO 3rd antenna: 5470 MHz



Center Frequency	5470 MHz
Horizontal (dBi) peak	-0.03 (267°)
Vertical (dBi) peak	1.27 (306°)

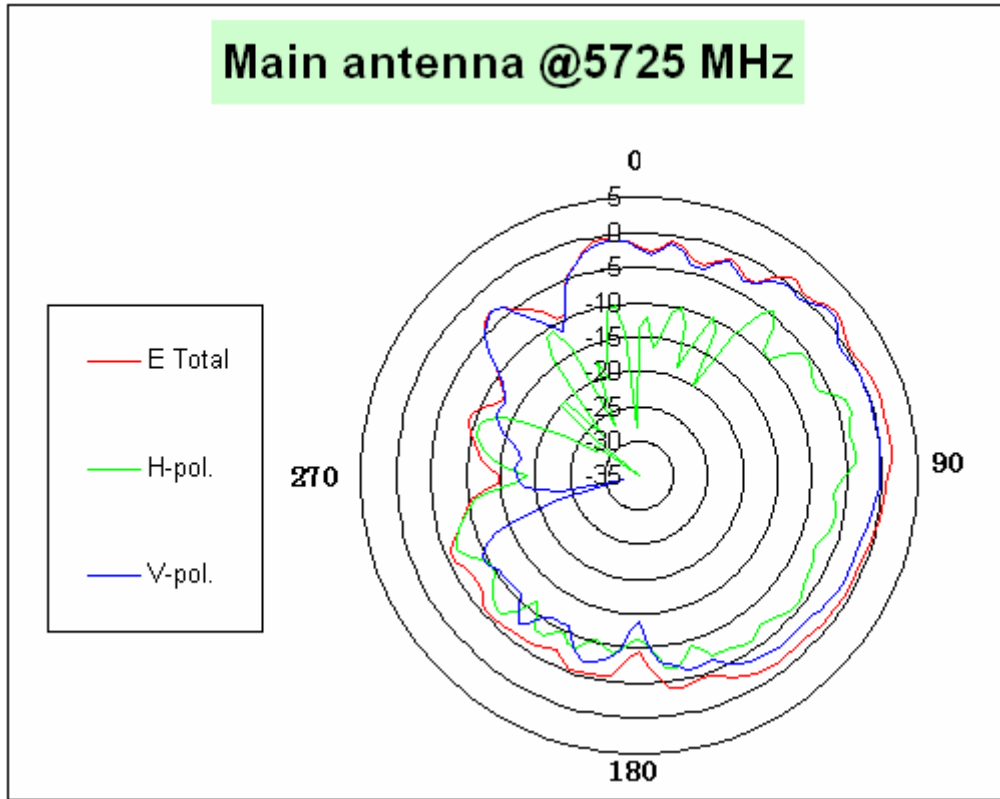
5725-5850 MHz radiation characteristics

Main antenna-1: 5850 MHz



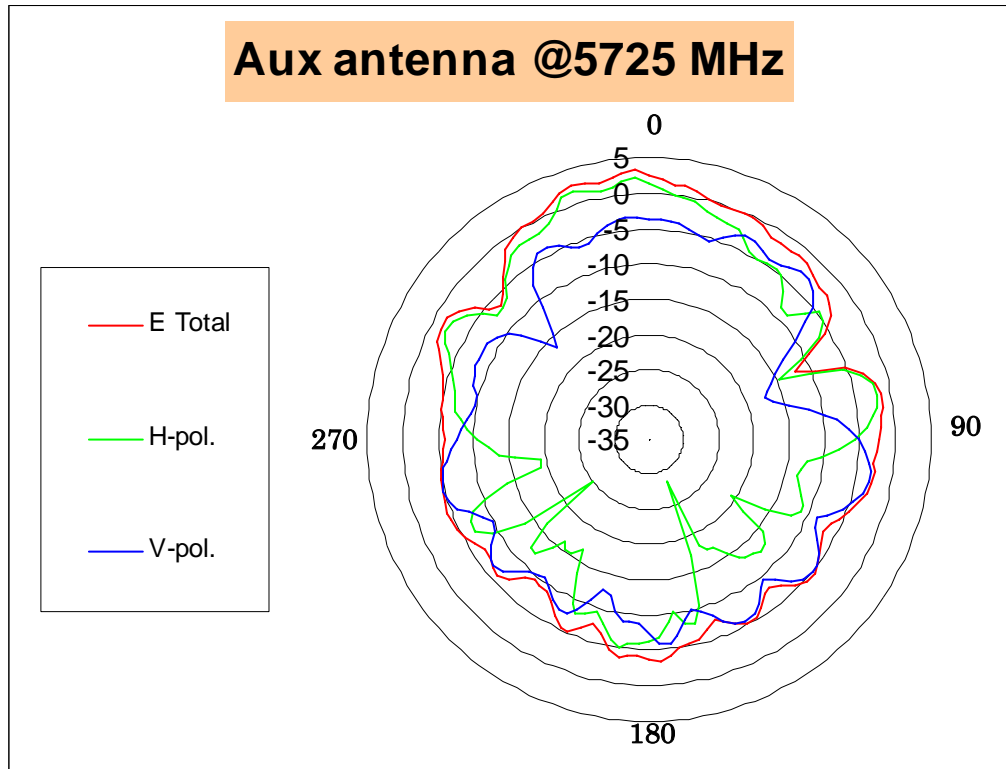
Center Frequency	5850 MHz
Horizontal (dBi) peak	-2.36 (69°)
Vertical (dBi) peak	1.92 (75°)

Main antenna-2: 5725 MHz



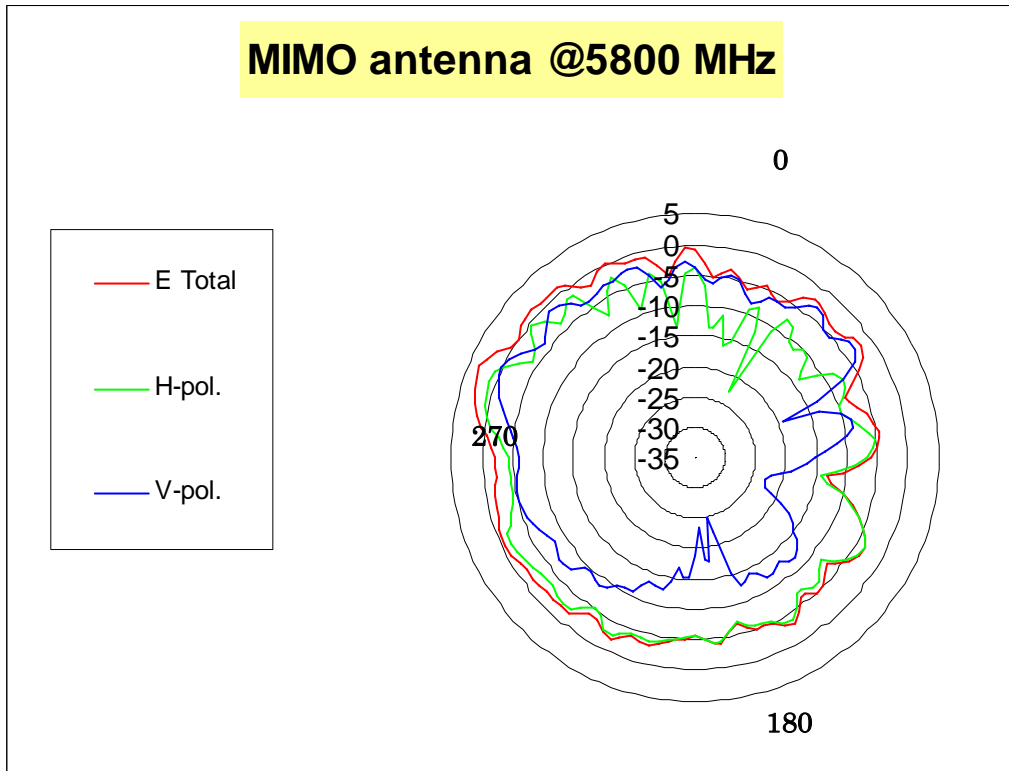
Center Frequency	5725 MHz
Horizontal (dBi) peak	-0.41 (54°)
Vertical (dBi) peak	2.97 (39°)

Auxiliary antenna: 5725 MHz



Center Frequency	5725 MHz
Horizontal (dBi) peak	2.13 (355°)
Vertical (dBi) peak	-2.92 (27°)

MIMO 3rd antenna: 5800 MHz



Center Frequency	5800 MHz
Horizontal (dBi) peak	0.93 (291°)
Vertical (dBi) peak	-0.07 (294°)

Section 4. Host Platform Information

Rating Label Photo: to be provided separately

Figure.1. Notebook operation mode

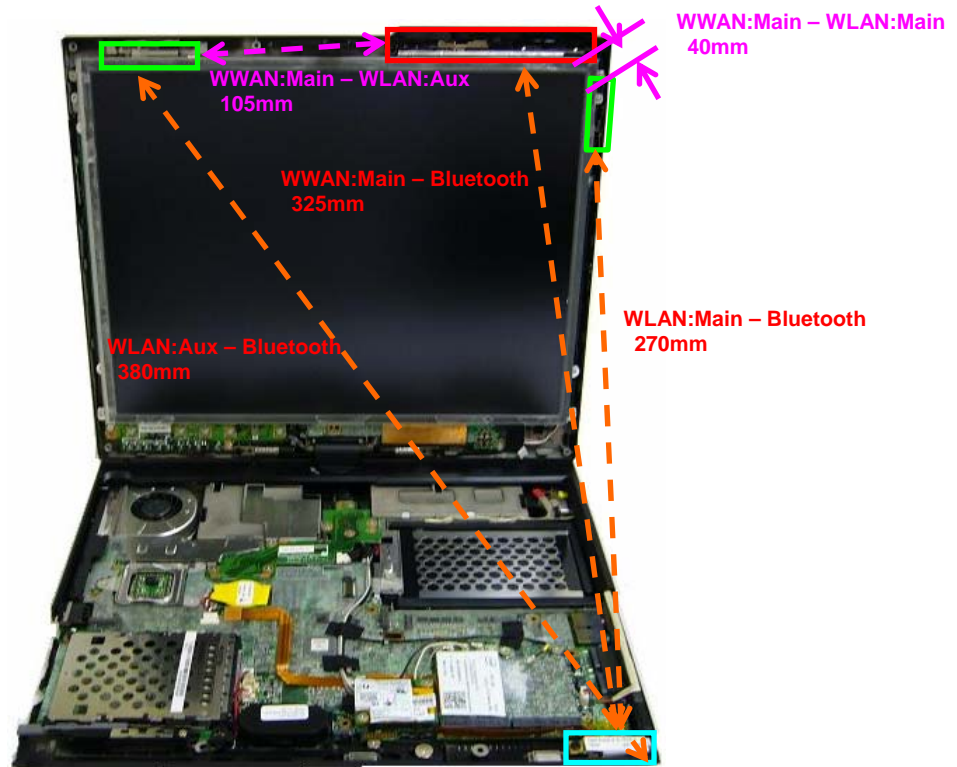
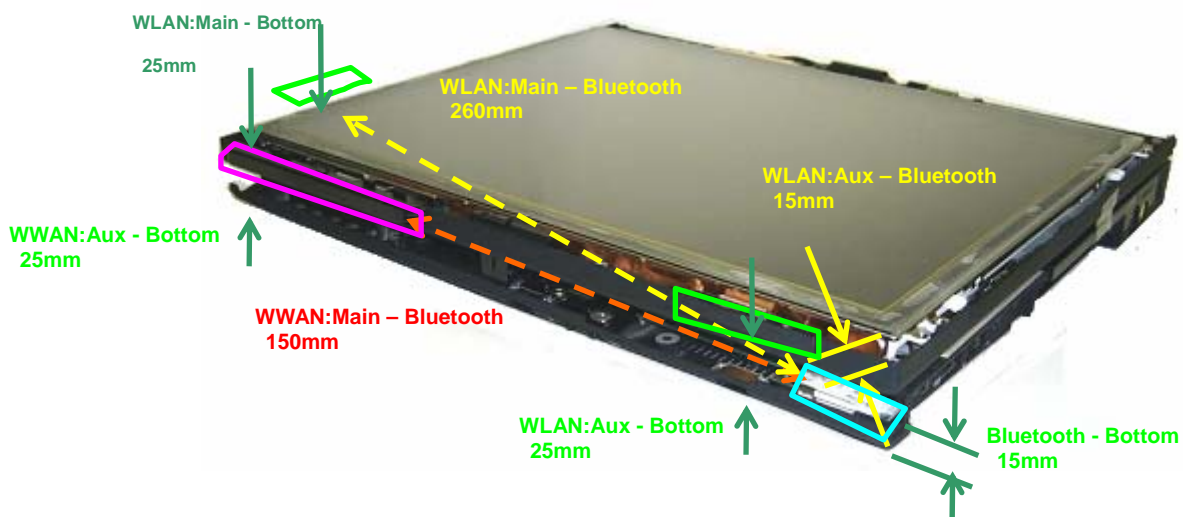
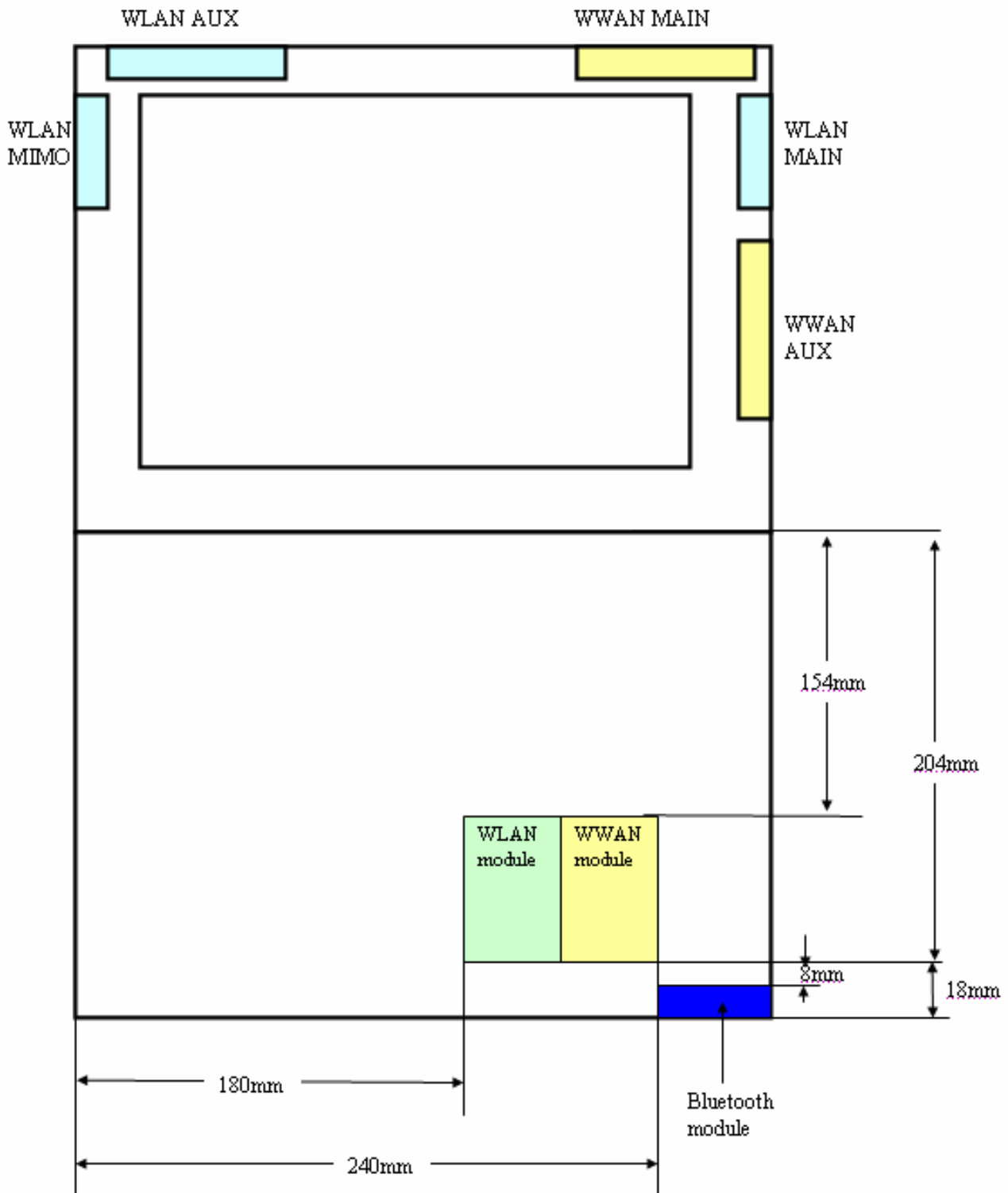


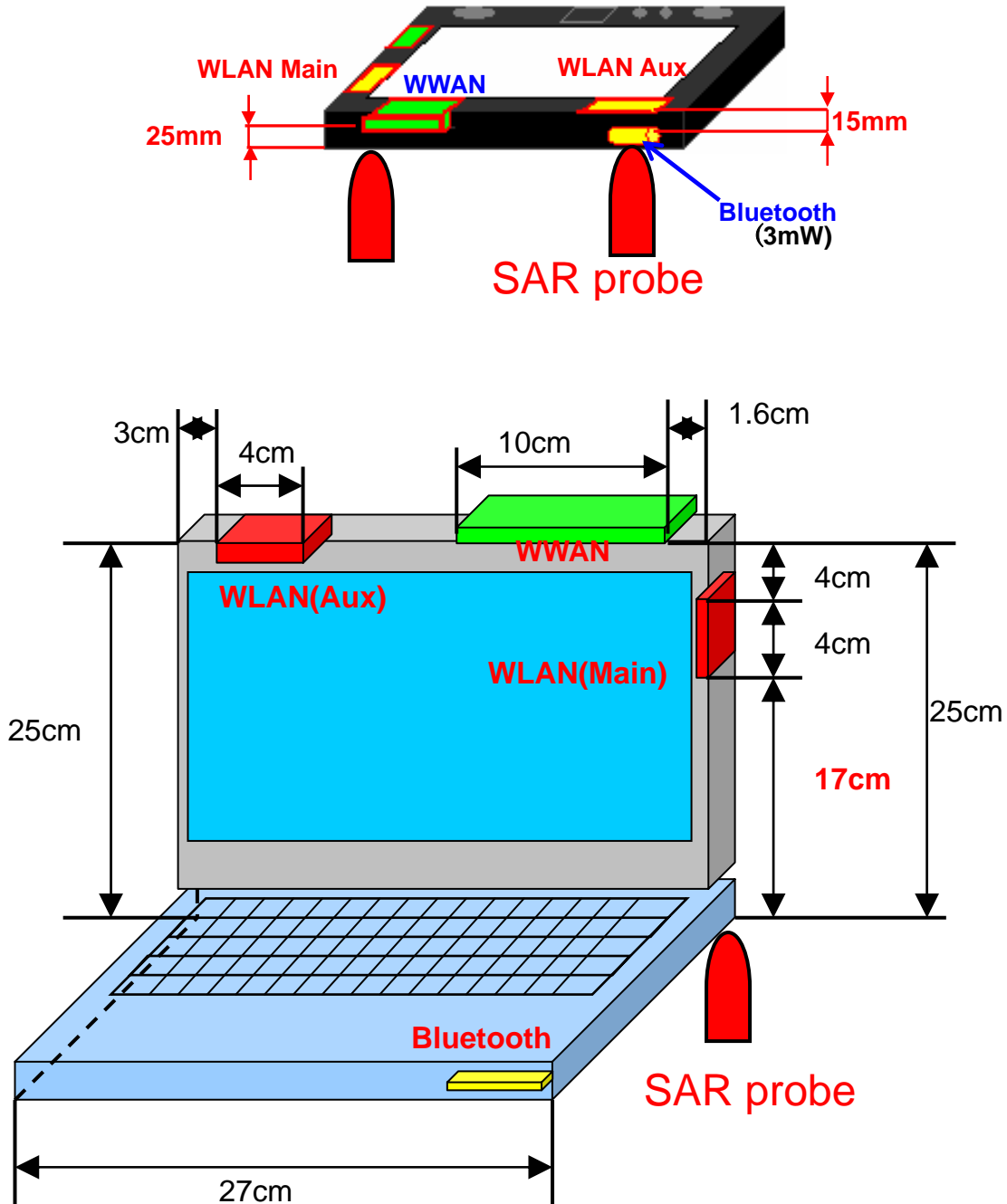
Figure.2. Tablet operation mode



Section 5. Antenna Host Platform Location Information

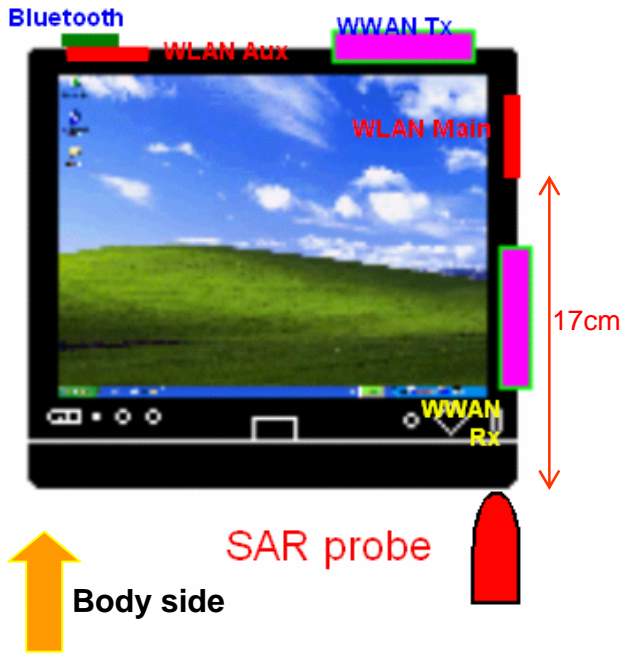


Section 6. Antenna dimensional information for SAR evaluation

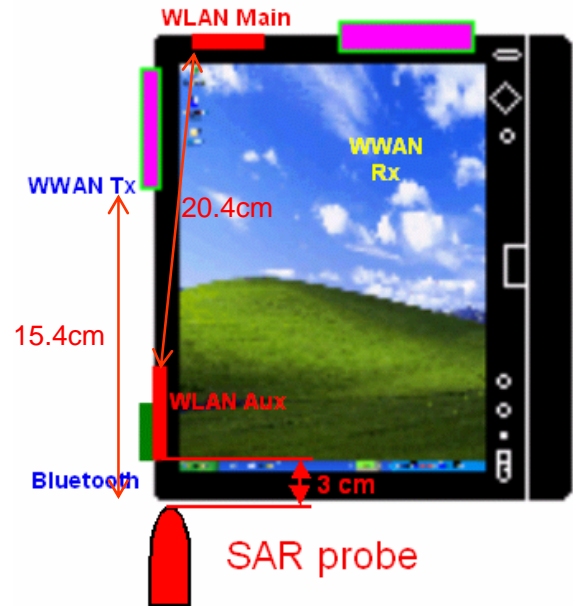




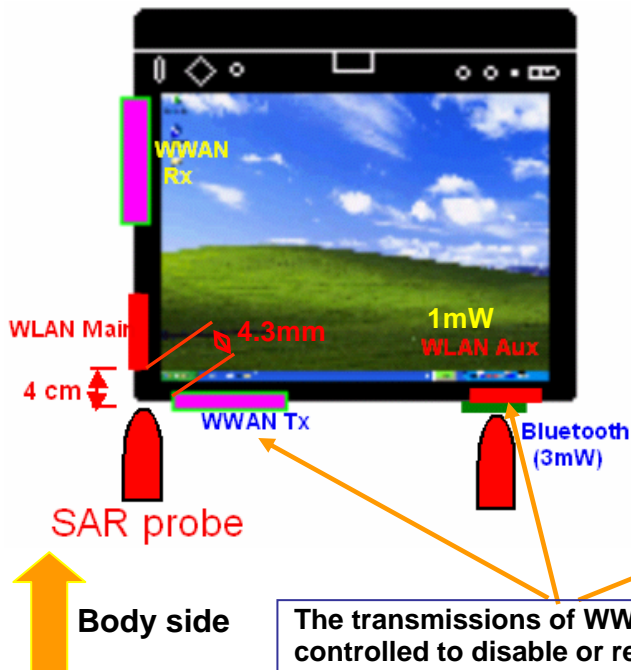
Tablet PL (Primary Landscape)



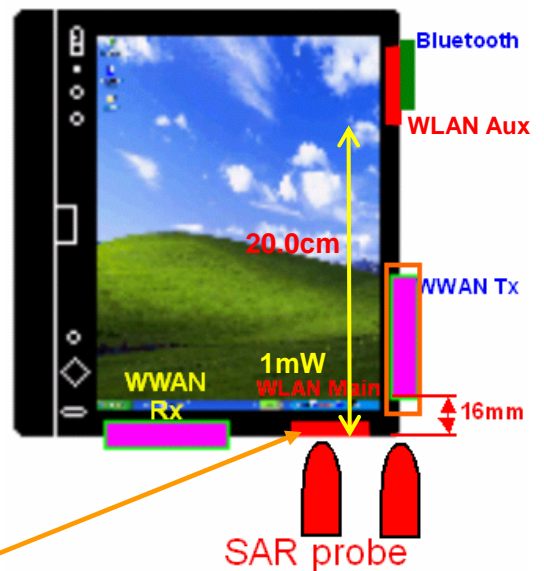
Tablet PP (Primary Portrait)



Tablet SL (Secondary Landscape)



Tablet SP (Secondary Portrait)



The transmissions of WWAN or WLAN at these angles are controlled to disable or reduce the power to 1mW. See the separate exhibit "RF Exposure Justification".

Section 7. Justification of Antenna Co-Location

The WLAN Tx/Rx antenna and the Bluetooth antenna are co-located with 15mm of separation distance, and both devices transmit RF simultaneously. See Section 4 & 6.

The WWAN Tx/Rx antenna and WLAN antennas are co-located within 20cm of separation distance, but both devices are controlled exclusively not to transmit RF simultaneously with the hand over logic within 11 seconds. See the separate exhibit "RF Exposure Justification".