

Antenna specification

1. Antenna location drawing

See the following documents:

- 6-1_Antenna Drawing_APYHRO00339.pdf

2. Working principle of multiple antennas

2.1 Antenna Diversity: None.

2.2 Power Mode: None.

3. Maximum antenna gain

WWAN antenna:

Band	Tx(Etotal)
B1 (WCDMA/LTE/NR)	-2.4 dBi
B2 (WCDMA/LTE)	-2.9 dBi
B3 (LTE/NR)	-3.6 dBi
B5 (WCDMA/LTE)	-3.4 dBi
B7 (LTE)	-1.6 dBi
B8 (WCDMA/LTE)	-1.8 dBi
B12 (LTE)	-5.6 dBi
B17 (LTE)	-5.6 dBi
B28 (LTE/NR)	-3.7 dBi
B38 (LTE)	-1.7 dBi
B40 (LTE/NR)	-2.0 dBi
B41 (LTE)	-1.6 dBi
B78 (NR)	-1.7 dBi
GSM850	-3.0 dBi
GSM900	-1.8 dBi
GSM1800	-3.6 dBi
GSM1900	-2.9 dBi

WLAN antenna:

Band (MHz)	Tx(Etotal)
2412-2472	-2.2 dBi
5150-5250	-0.7 dBi
5250-5350	-0.8 dBi
5470-5725	-1.8 dBi
5725-5850	-2.9 dBi

Bluetooth antenna:

Band (MHz)	Tx(Etotal)
2402-2480	-2.2 dBi

4. Maximum beamforming gain

5. The state of antenna simultaneous transmission

See the following documents :

- 11_Simultaneous_Tx_Combination_List_APYHRO00339.pdf

Note : WiFi 2.4GHz and BT are time-division exclusive control, so they will not operate at the same time.

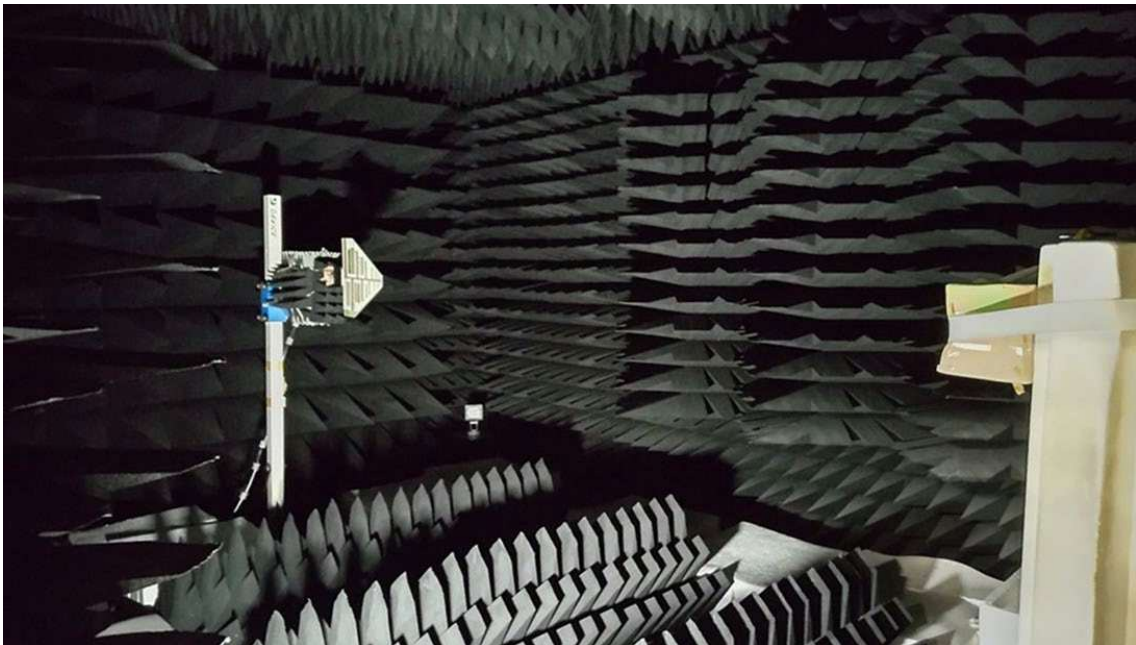
6. Type of antenna

All antenna: PIFA

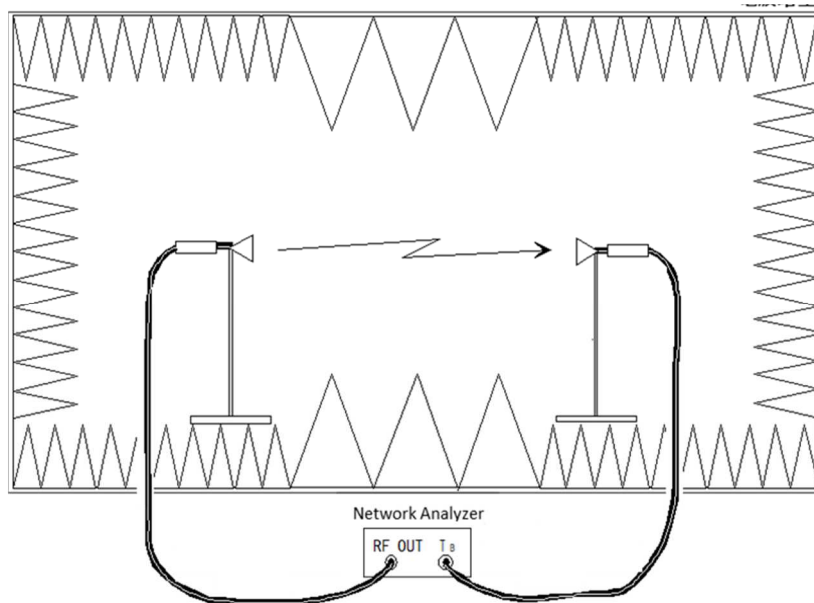
7. Radiation Pattern Test

The antenna is tested in free space in the anechoic chamber in Each Polarizations. The radiation patterns are measured at the center of transmit and receive bands. Following shows the geometry for this device is included in the test setup.

Chamber Information & Equipment list

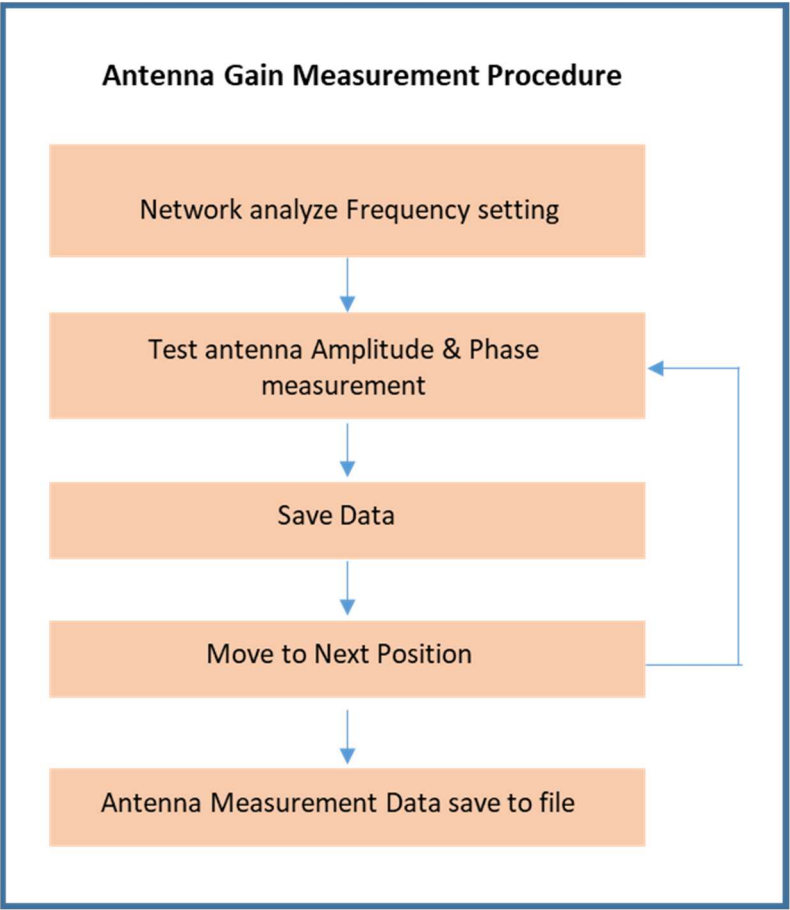


- Location : Sharp Makuhari bld.
- Size : 7m x 4.5m x 3.4m (L x W x H)
- Frequency : 150kHz – 40GHz
- Tx Antenna : 0.5GHz – 8GHz LPDA Single Polarization
- Quiet Zone : 60cm @ 3GHz (Far Field Length 2m)
- 2-axis DUT Positioner 360deg continuous rotation



Part	Model	Specification
Tx Antenna	LPDA	500MHz to 8GHz
	Double Ridge horn ETS-LINDGREN Model 3164-04	400MHz to 6GHz
Reference Antenna	Anritsu Dipole	For Each band
Network Analyzer	Agilent E5071C	300kHz to 8.5GHz

Antenna Gain Measurement Procedure



Test Dates 2025.06.10

Names of test personnel Hiroyasu Suetake

8.2 Antenna Gain

ANT		ANT1					
Band		B3/GSM1800	B2/GSM1900	B1	B40	B7/B41	B38
Frequency	Plane	1770	1910	1930	2300	2640	2610
Peak Gain (Etotal)	XY	-4.7	-3.3	-2.4	-4.1	-2.7	-3.0
	YZ	-3.8	-3.5	-2.8	-3.5	-5.9	-5.2
	XZ	-3.6	-2.9	-2.9	-2.0	-1.6	-1.7
Avg. Gain (Etotal)	XY	-6.9	-6.0	-5.8	-7.0	-7.6	-7.4
	YZ	-7.4	-7.3	-7.1	-7.0	-9.2	-8.8
	XZ	-5.2	-4.8	-4.8	-5.0	-5.6	-5.9

Unit [dBi]

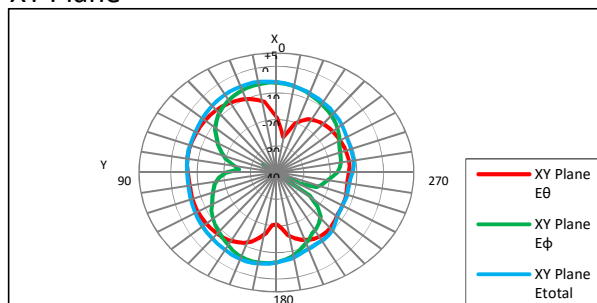
ANT		ANT2					ANT4
Band		B12/B17	B28	GSM850	B5	B8/GSM900	B78
Frequency	Plane	716	748	849	849	915	3700
Peak Gain (Etotal)	XY	-5.6	-3.7	-3.1	-3.4	-2.6	-4.0
	YZ	-6.0	-4.1	-3.0	-3.4	-1.8	-2.2
	XZ	-6.6	-4.8	-4.2	-4.9	-3.5	-1.7
Avg. Gain (Etotal)	XY	-6.5	-4.7	-4.8	-5.2	-4.7	-7.9
	YZ	-10.2	-8.2	-7.6	-8.0	-6.3	-6.3
	XZ	-10.0	-8.1	-7.4	-7.9	-6.3	-4.9

Unit [dBi]

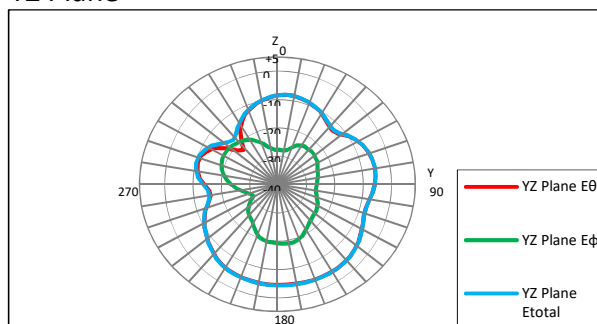
8.3 Antenna Pattern for Max Gain Plane

B3/GSM1800(1770MHz)

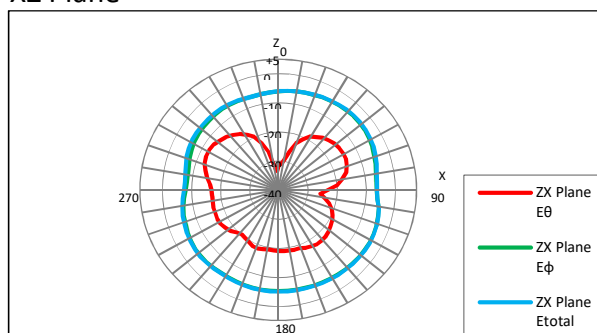
XY Plane



YZ Plane

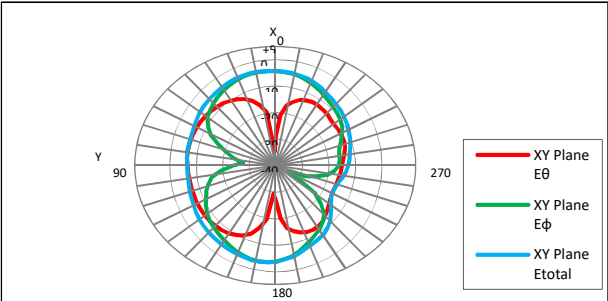


XZ Plane

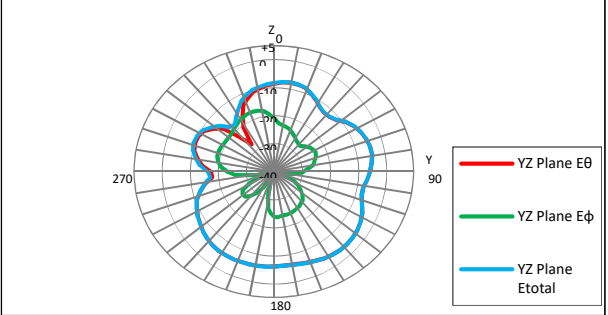


B2/GSM1900(1910MHz)

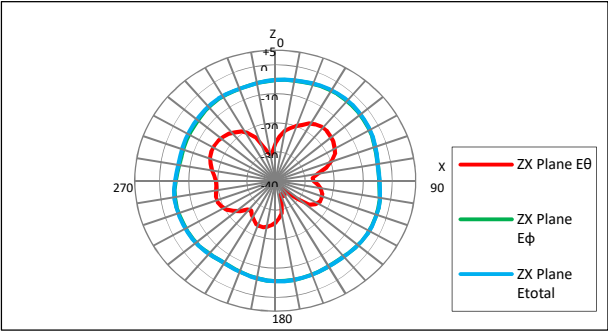
XY Plane



YZ Plane

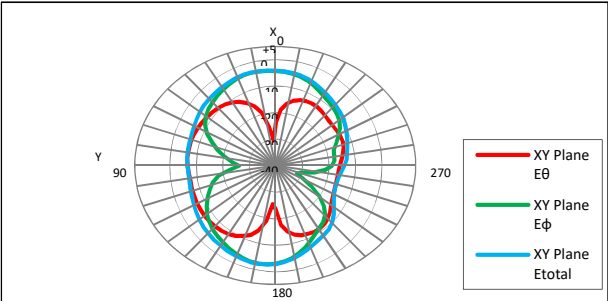


XZ Plane

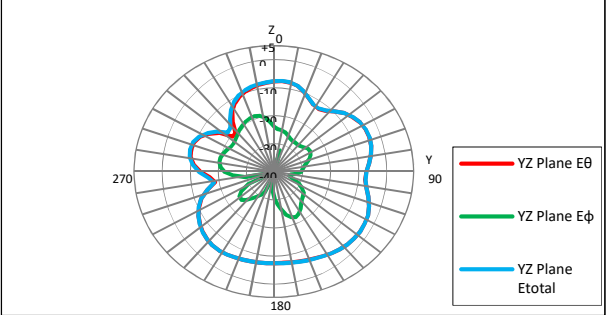


B1(1930MHz)

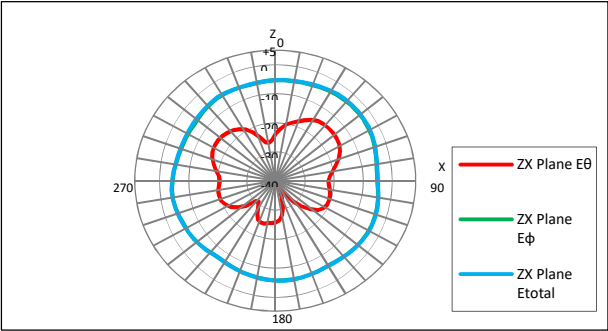
XY Plane



YZ Plane

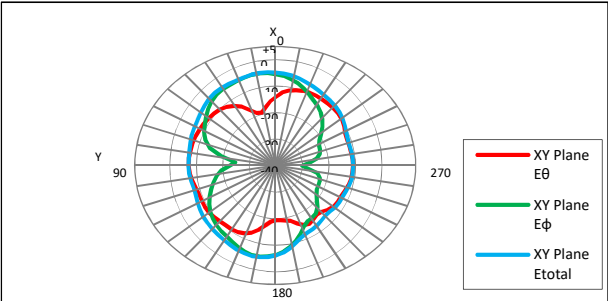


XZ Plane

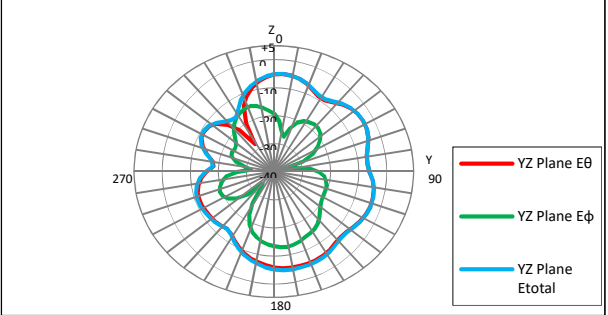


B40(2300MHz)

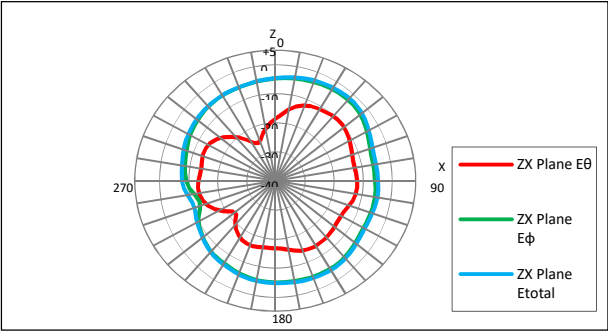
XY Plane



YZ Plane

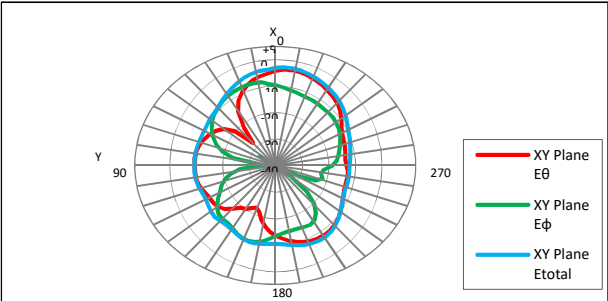


XZ Plane

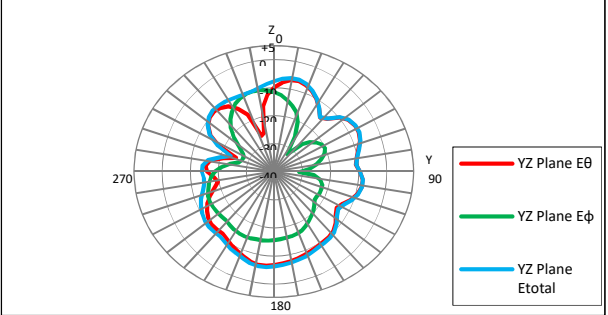


B7/B41(2640MHz)

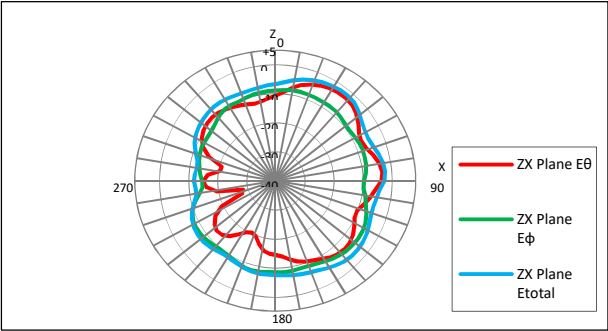
XY Plane



YZ Plane

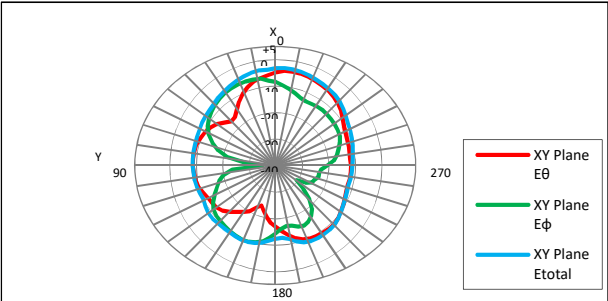


XZ Plane

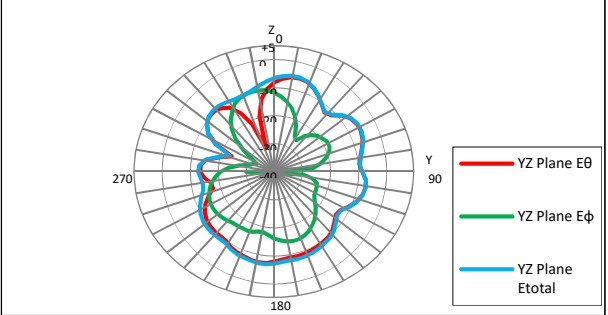


B38(2610MHz)

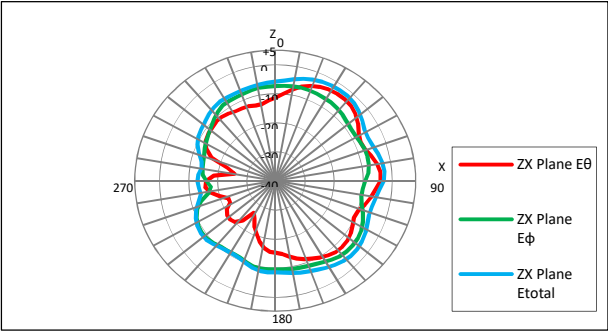
XY Plane



YZ Plane

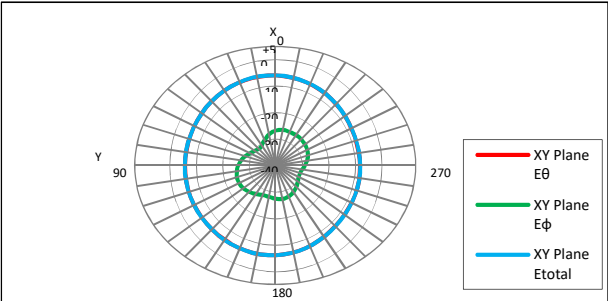


XZ Plane

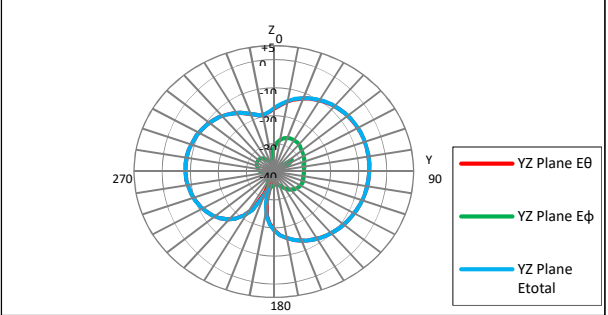


B12/B17(716MHz)

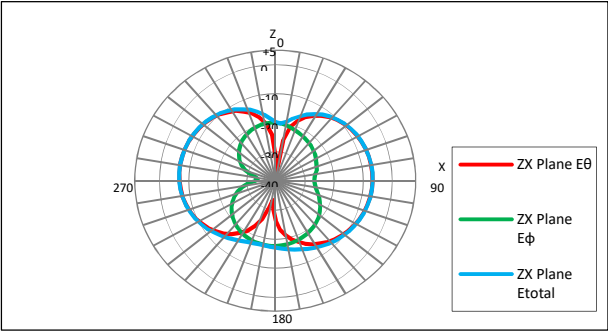
XY Plane



YZ Plane

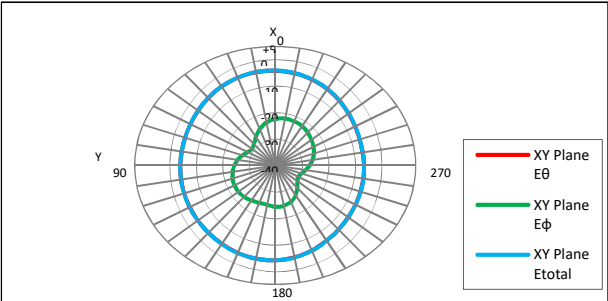


XZ Plane

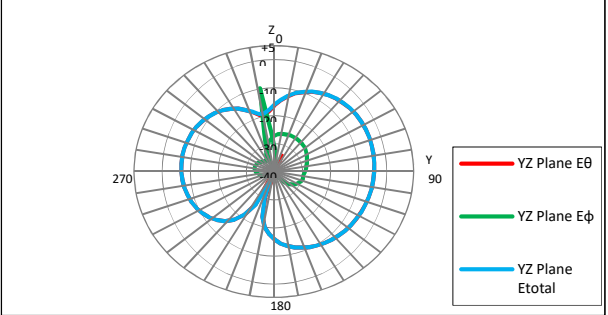


B28(748MHz)

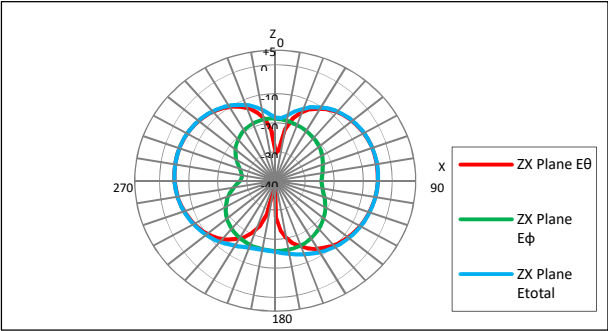
XY Plane



YZ Plane

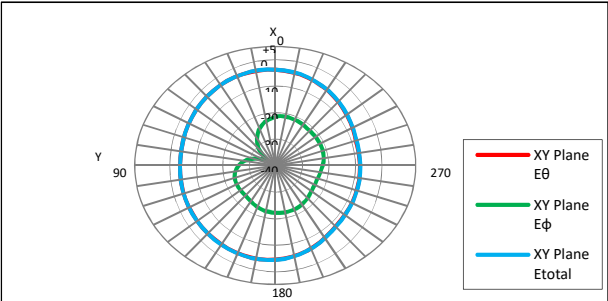


XZ Plane

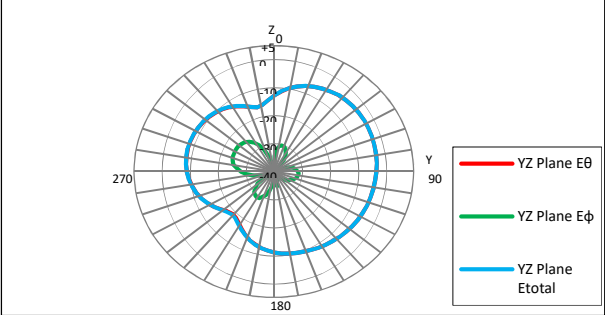


GSM850(849MHz)

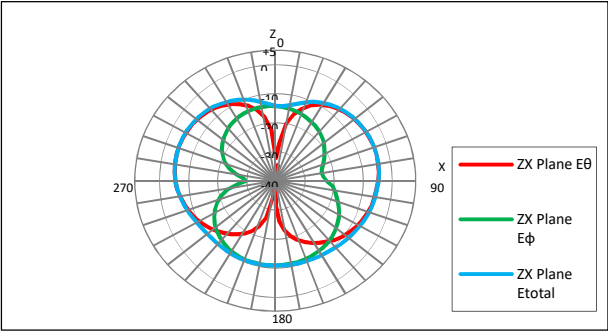
XY Plane



YZ Plane

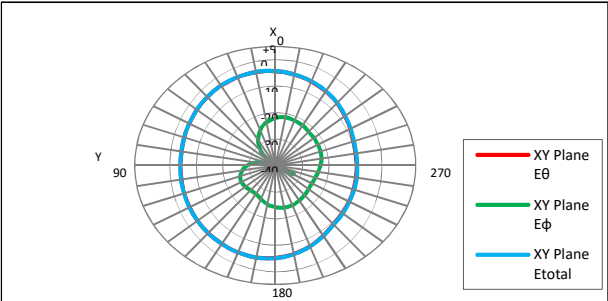


XZ Plane

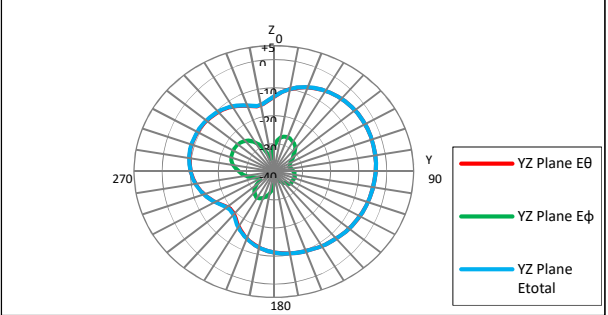


B5(849MHz)

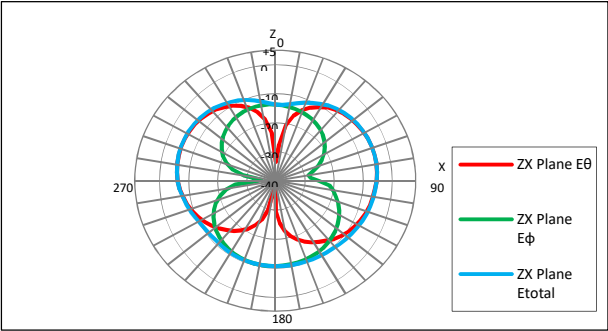
XY Plane



YZ Plane

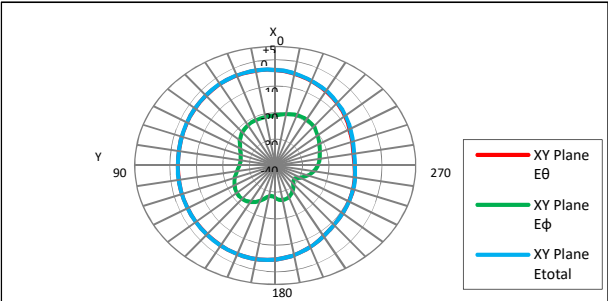


XZ Plane

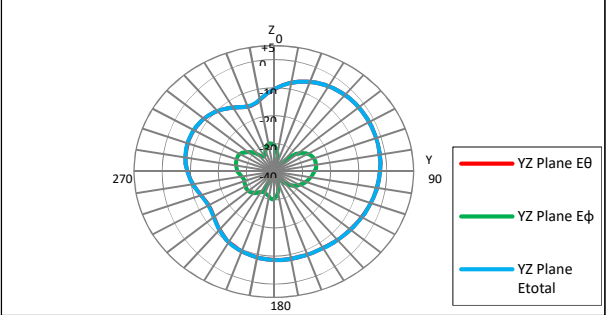


B8/GSM900(915MHz)

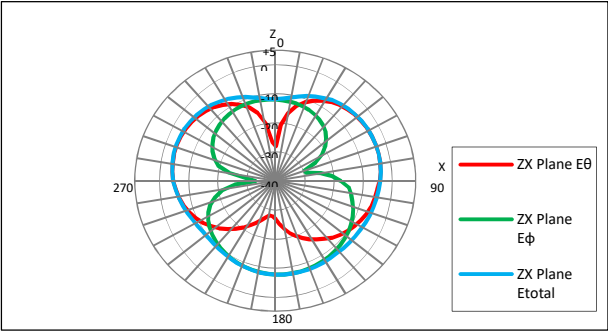
XY Plane



YZ Plane

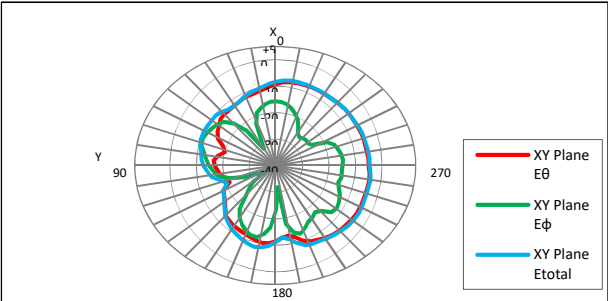


XZ Plane

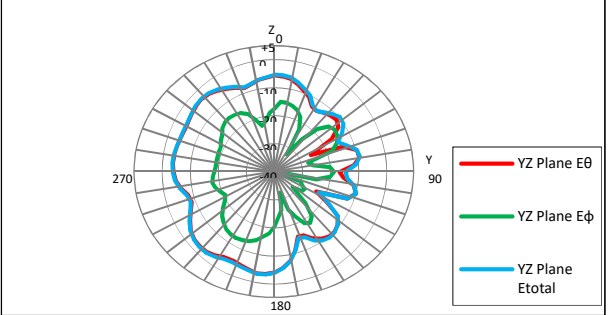


B78(3700MHz)

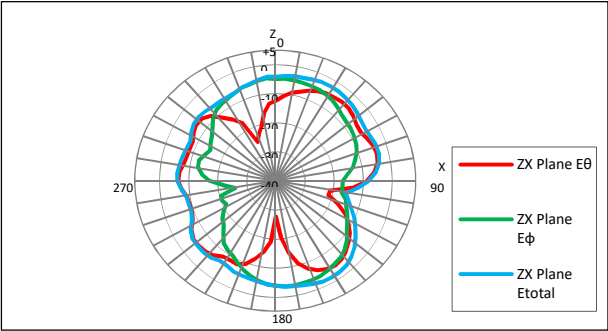
XY Plane



YZ Plane



XZ Plane



9.2 Antenna Gain

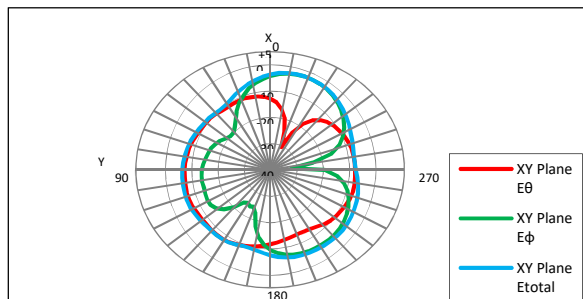
WiFi ANT (ANT7)			
Frequency	Plane	2480	5210
Peak Gain	XY	-2.2	-0.7
	YZ	-4.5	-3.5
	XZ	-3.2	-3.0
Avg. Gain	XY	-5.8	-5.8
	YZ	-8.4	-7.7
	XZ	-6.2	-6.8

Unit [dBi]

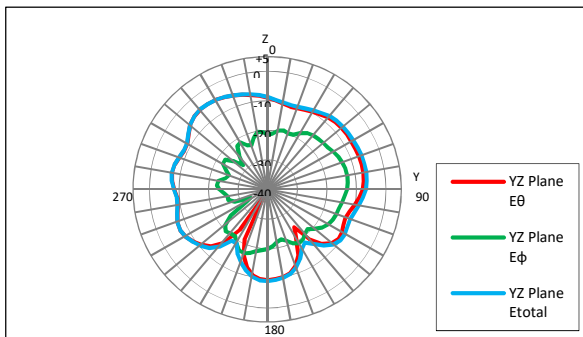
9.3 Antenna Pattern for Max Gain Plane

WiFi ANT (2480MHz)

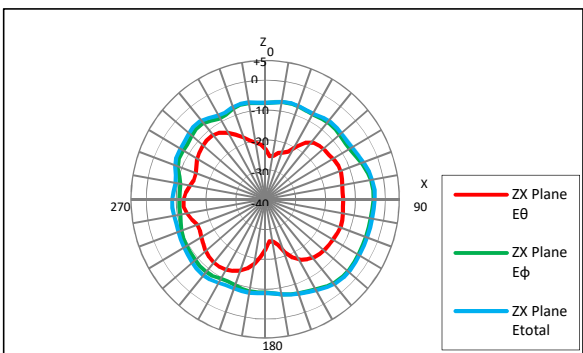
XY Plane



YZ Plane

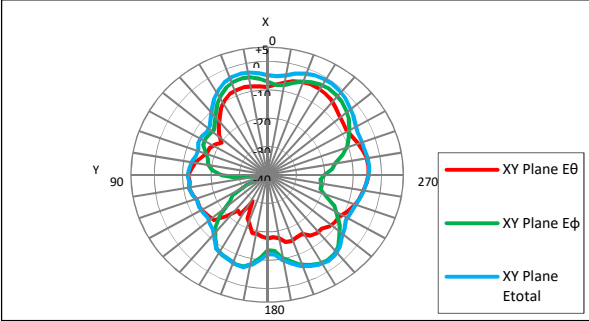


XZ Plane

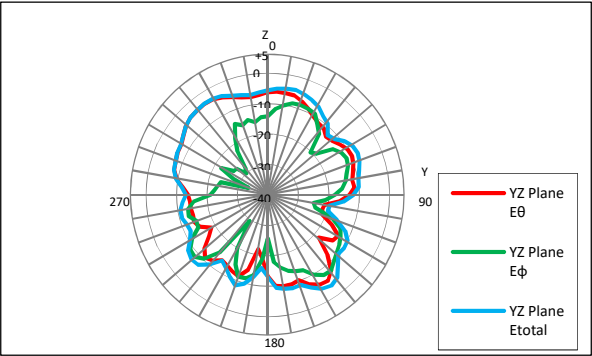


WiFi ANT (5210MHz)

XY Plane



YZ Plane



XZ Plane

