

Antenna specification

1. Antenna location drawing

See the following documents:

- 6-1_Antenna Drawing_APYHRO00334.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)	-1.2dBi
B2 (WCDMA/LTE)	-1.9dBi
B3 (LTE/NR)	-3.5dBi
B5 (WCDMA/LTE)	-4.5dBi
B8 (WCDMA/LTE)	-2.5dBi
B12 (LTE)	-6.0dBi
B17 (LTE)	-6.0dBi
B28 (LTE/NR)	-4.3dBi
B38 (LTE)	-4.3dBi
B40 (LTE/NR)	-1.6dBi
B41 (LTE)	-3.9dBi
B78 (NR)	-0.5dBi
GSM850	-3.7dBi
GSM900	-2.5dBi
GSM1800	-3.5dBi
GSM1900	-1.9dBi

WLAN antenna:

Band (MHz)	Tx(Etotal)
2412-2472	-0.6 dBi
5150-5250	-1.2 dBi
5250-5350	-1.3 dBi
5470-5725	-0.3 dBi
5725-5850	-0.4 dBi

Bluetooth antenna:

Band (MHz)	Tx(Etotal)
2402-2480	-0.6 dBi

4. Maximum beamforming gain

Don't use beamforming technology.

5. The state of antenna simultaneous transmission

See the following documents :

- 11_Simultaneous_Tx_Combination_List_APYHRO00334.pdf

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

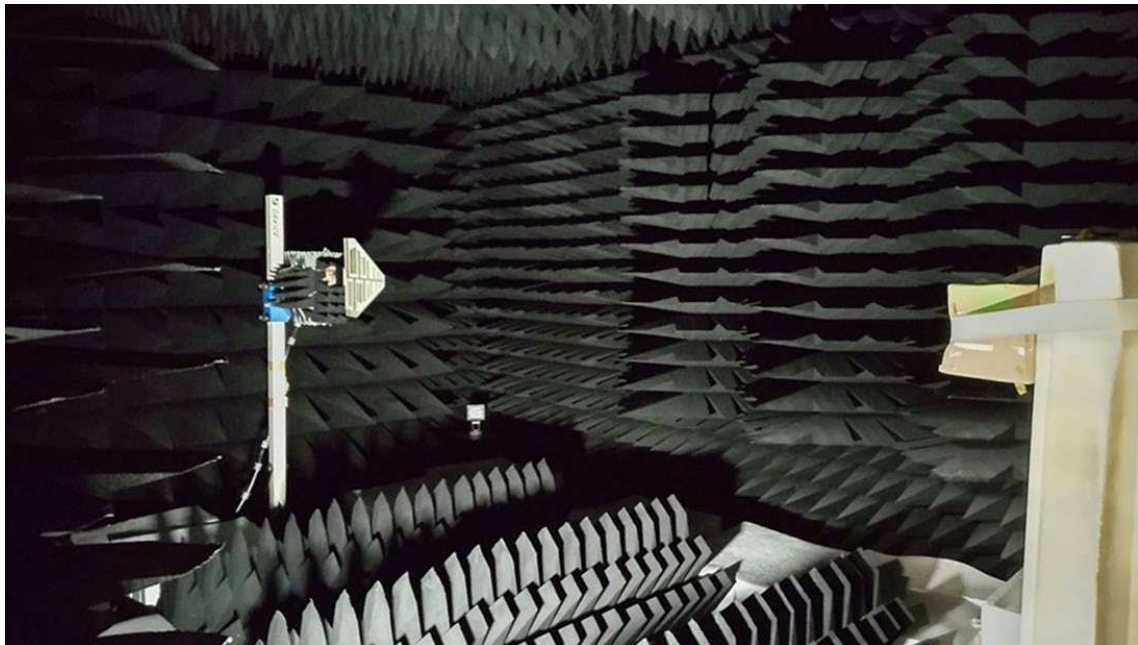
6. Type of antenna

All antenna: PIFA

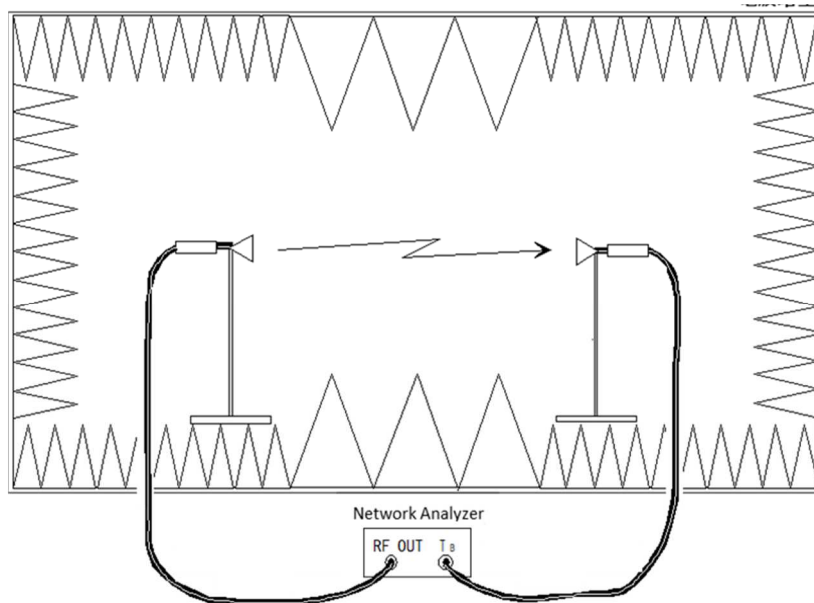
7. Radiation Pattern Test

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

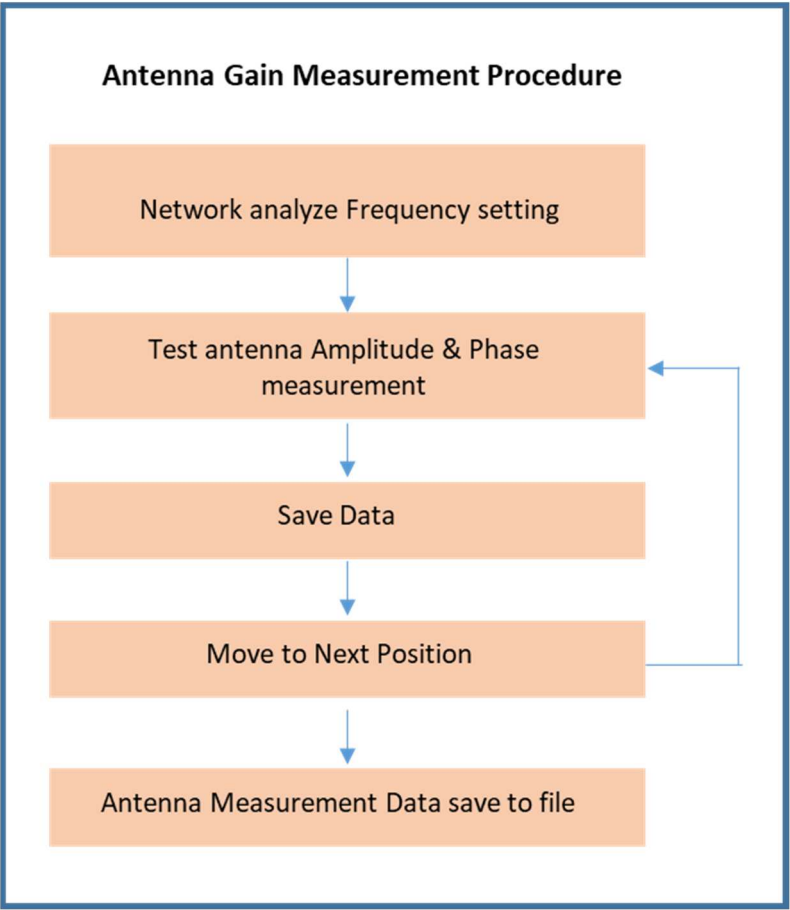


- Location : Sharp Makuhari bld.
- Size : 7m x 4.5m x 3.4m (L x W x H)
- Frequency : 150kHz – 40GHz
- Tx Antenna : 0.5GHz – 8GHz LPDA Single Polarization
- Quiet Zone : 60cm @ 3GHz (Far Field Length 2m)
- 2-axis DUT Positioner 360deg continuous rotation



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 2024.06.20

Names of test personnel Hiroyasu Suetake

Cellular
8.1 Antenna Photos

Figure 8

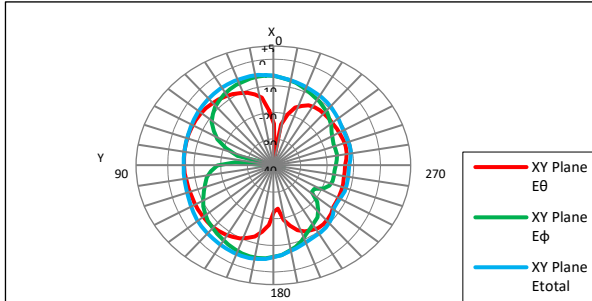


Cellular

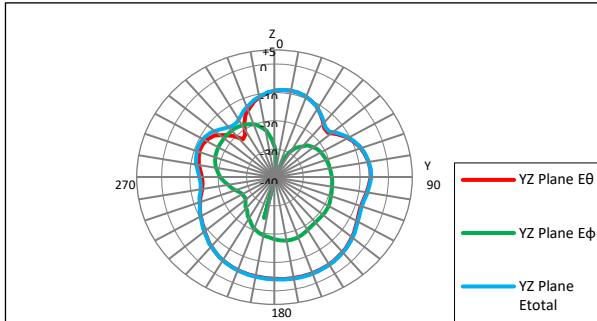
8.2 Antenna Pattern for Max Gain Plane

B3/GSM1800(1770MHz)

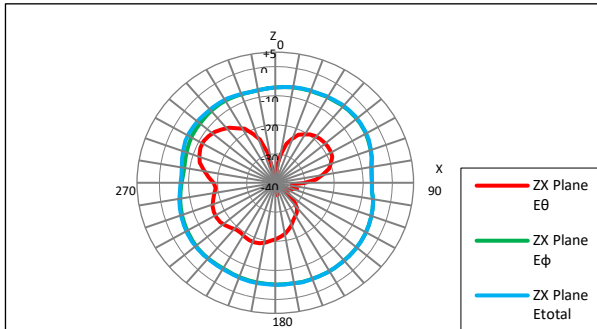
XY Plane



YZ Plane

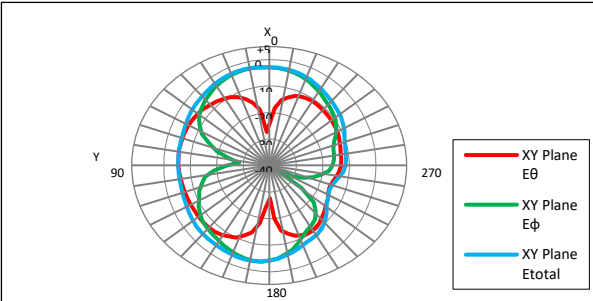


XZ Plane

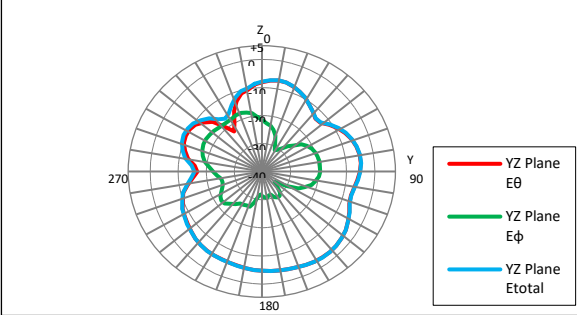


B2/GSM1900(1910MHz)

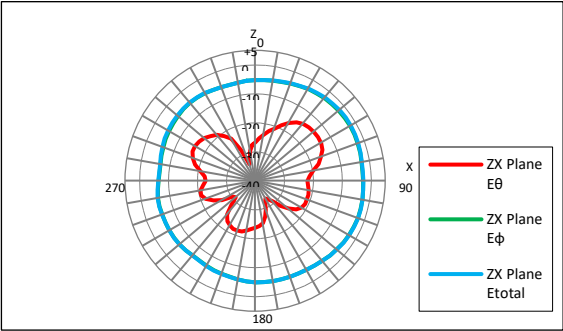
XY Plane



YZ Plane

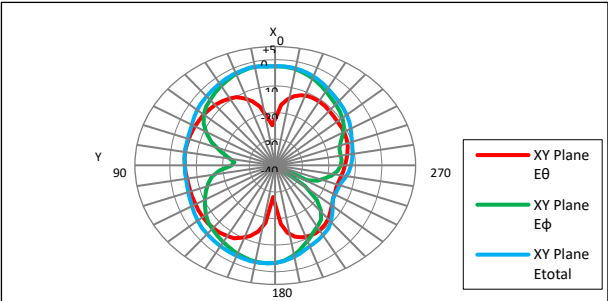


XZ Plane

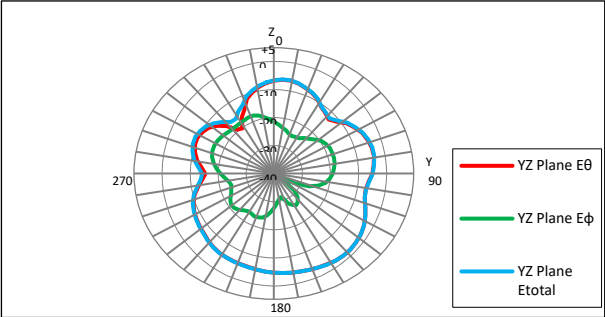


B1(1930MHz)

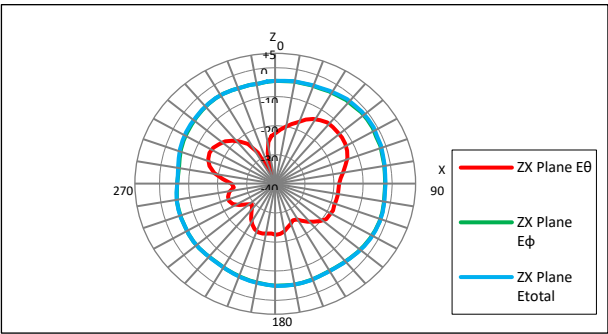
XY Plane



YZ Plane

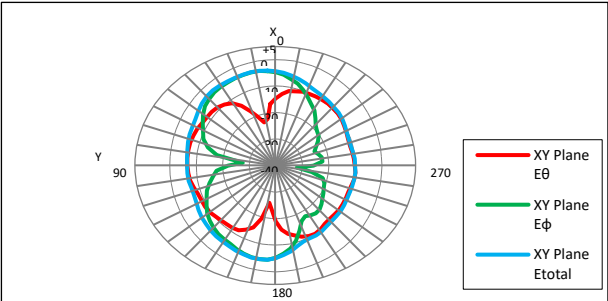


XZ Plane

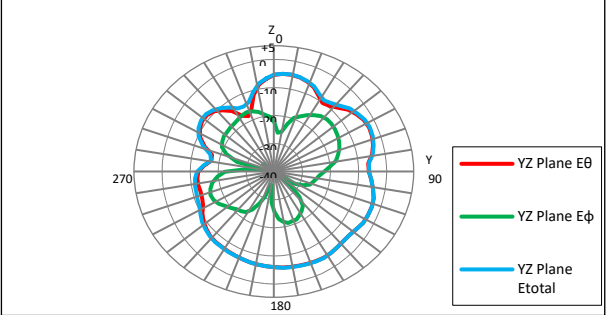


B40(2300MHz)

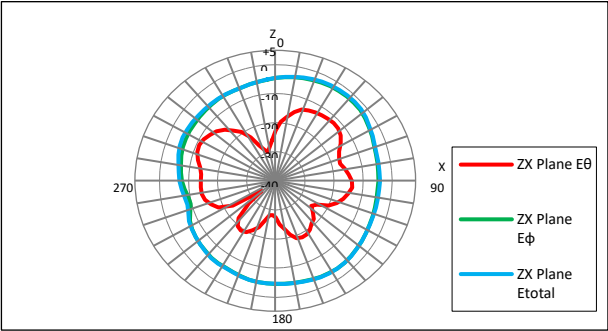
XY Plane



YZ Plane

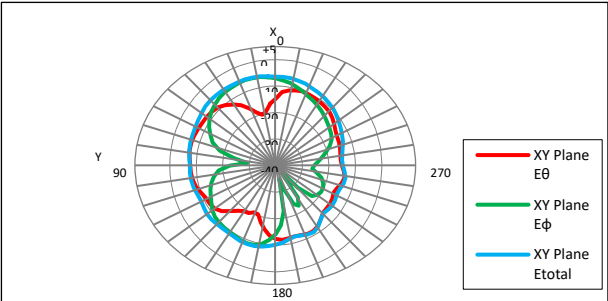


XZ Plane

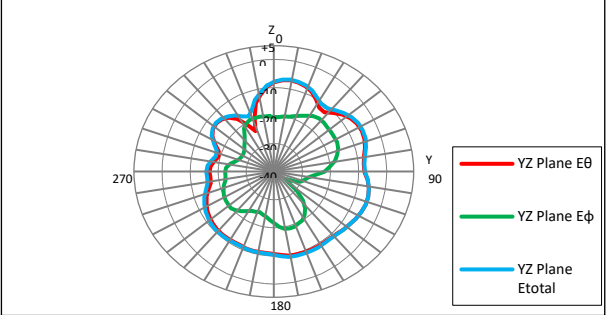


B41(2500MHz)

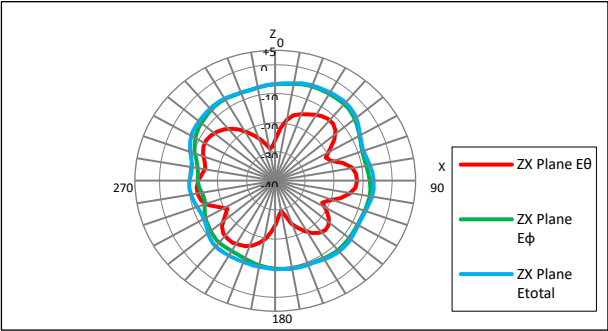
XY Plane



YZ Plane

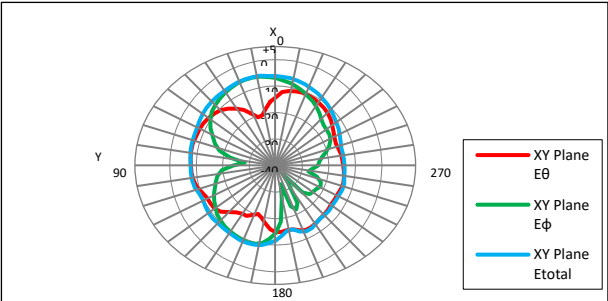


XZ Plane

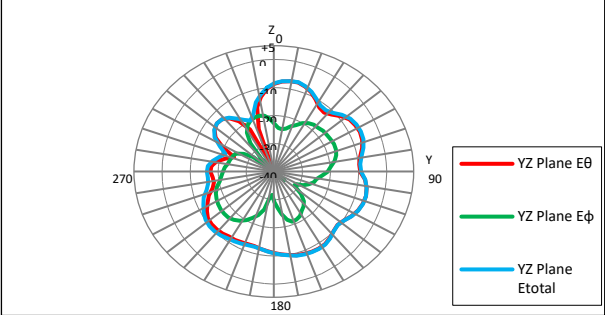


B38(2570MHz)

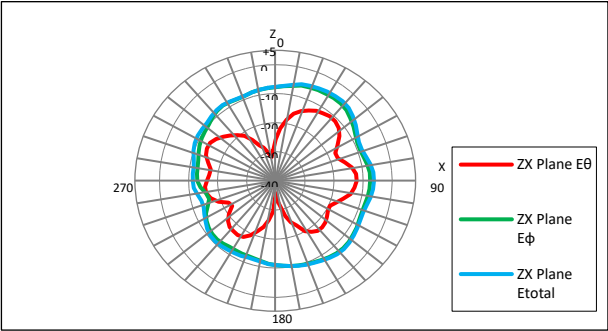
XY Plane



YZ Plane

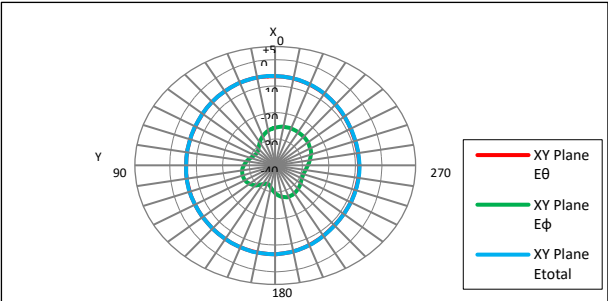


XZ Plane

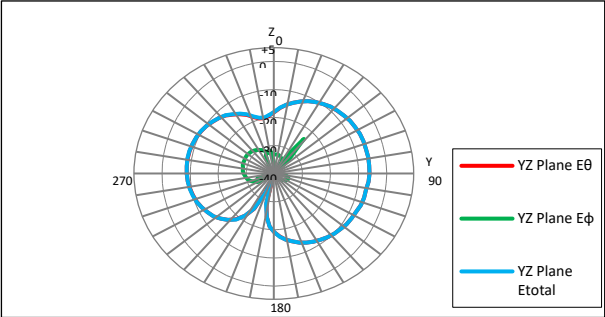


B12/B17(716MHz)

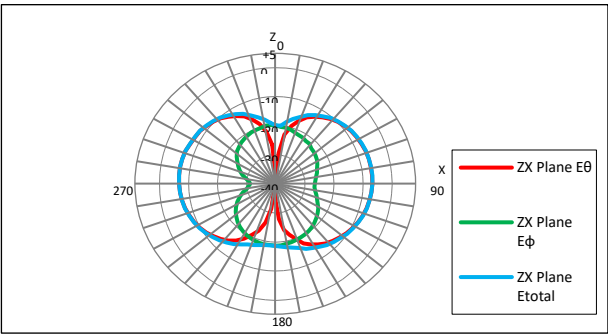
XY Plane



YZ Plane

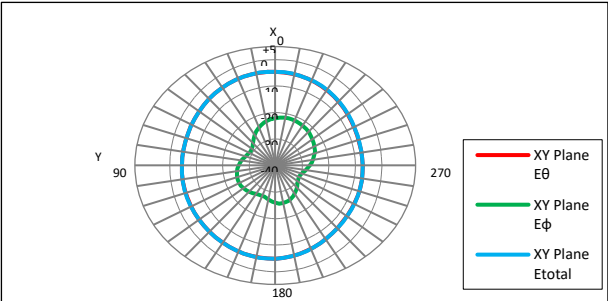


XZ Plane

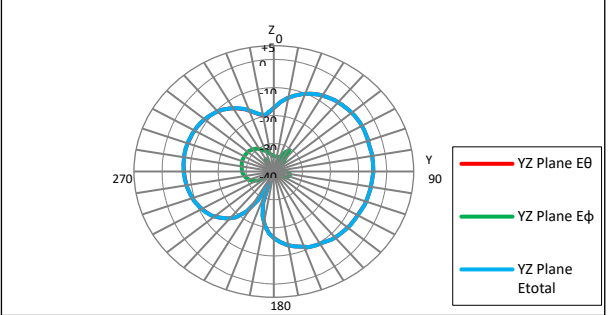


B28(748MHz)

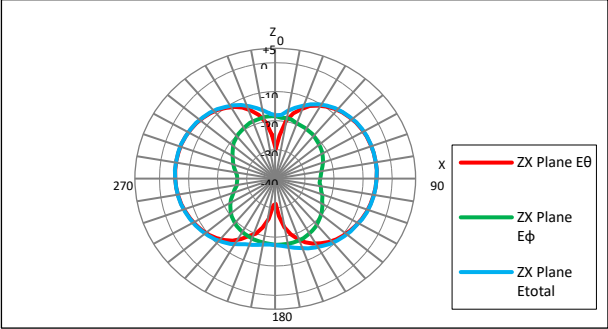
XY Plane



YZ Plane

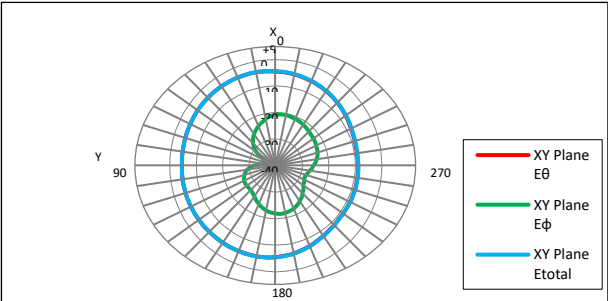


XZ Plane

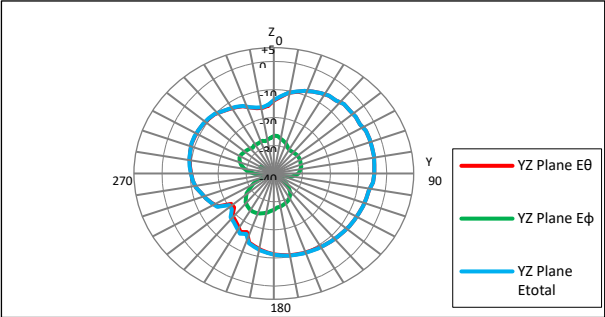


GSM850(849MHz)

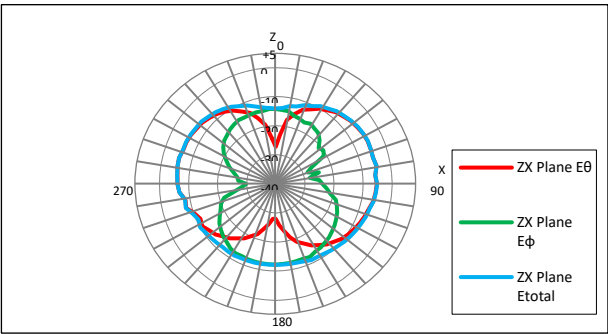
XY Plane



YZ Plane

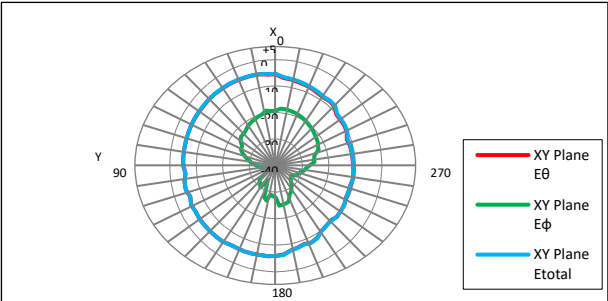


XZ Plane

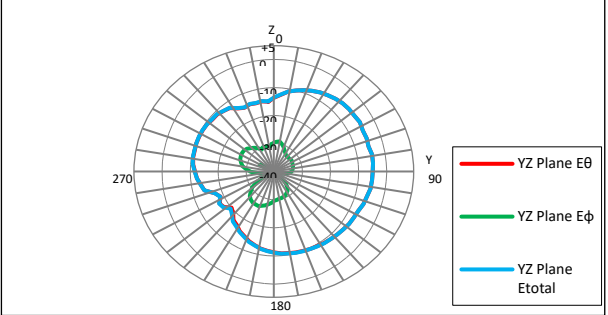


B5(849MHz)

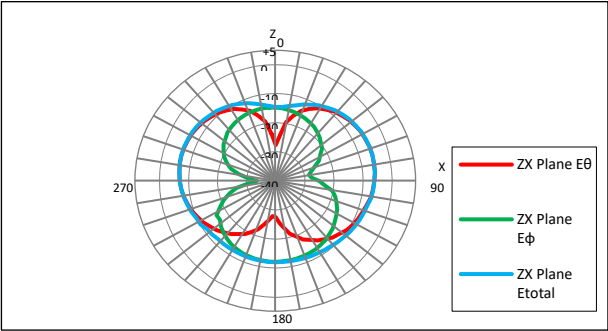
XY Plane



YZ Plane

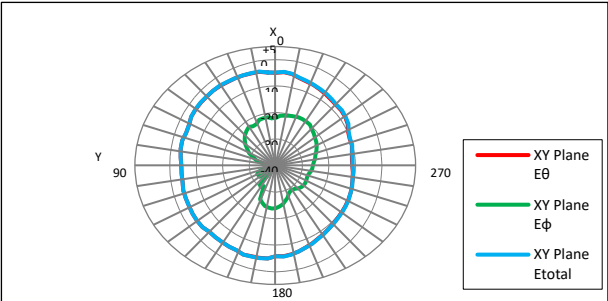


XZ Plane

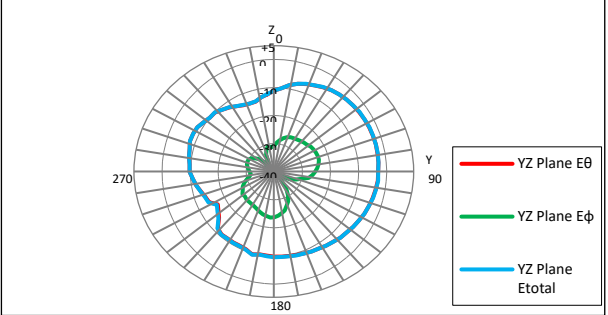


B8/GSM900(915MHz)

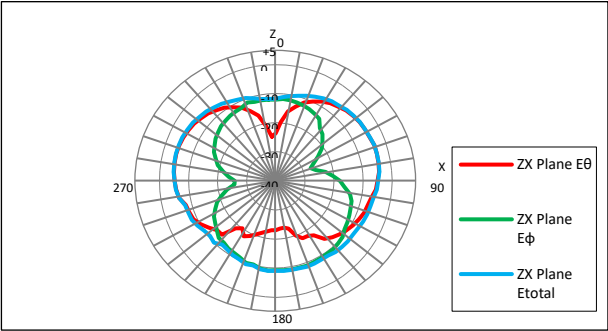
XY Plane



YZ Plane

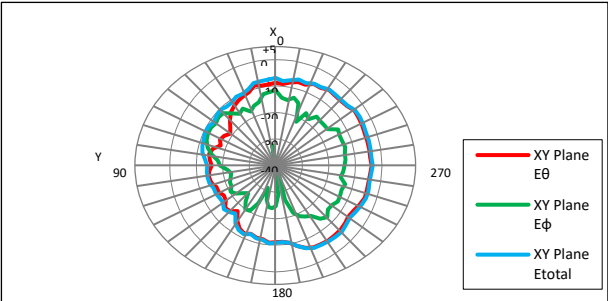


XZ Plane

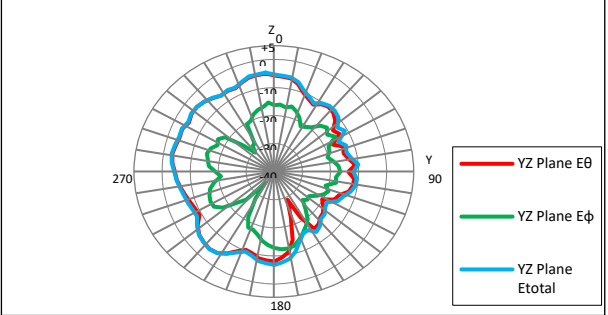


B78(3800MHz)

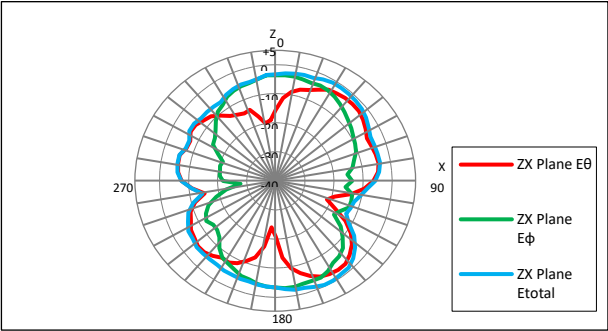
XY Plane



YZ Plane



XZ Plane

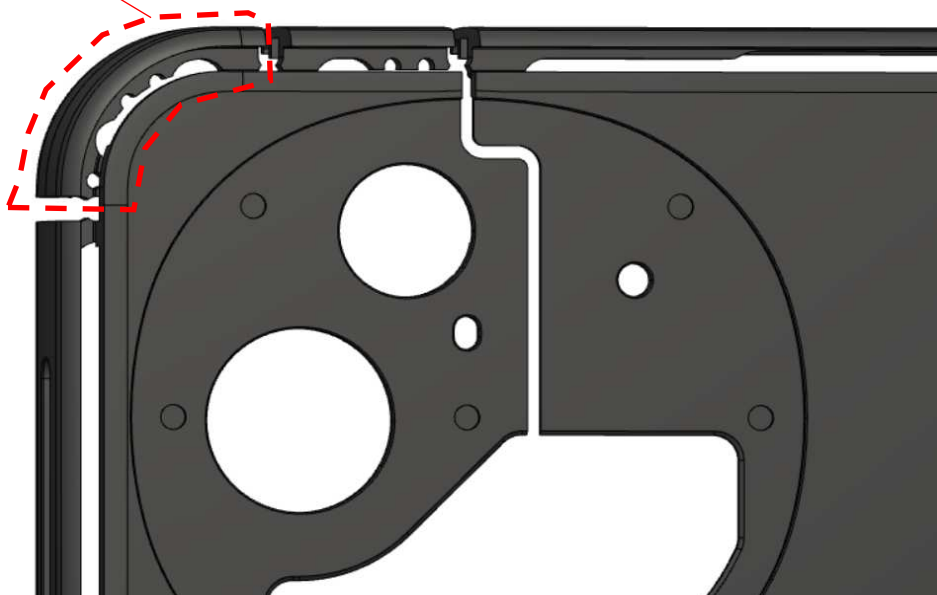


WiFi

9.1 Antenna Photos

WiFi ANT
(ANT7)

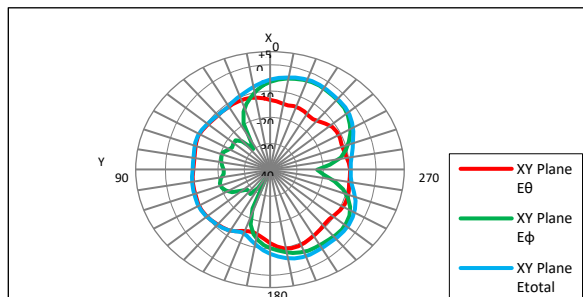
Figure 9



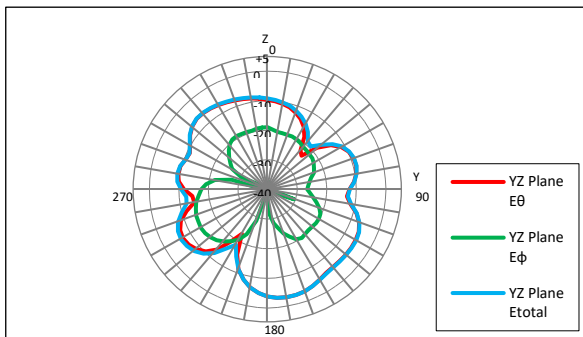
9.2 Antenna Pattern for Max Gain Plane

WiFi ANT (2420MHz)

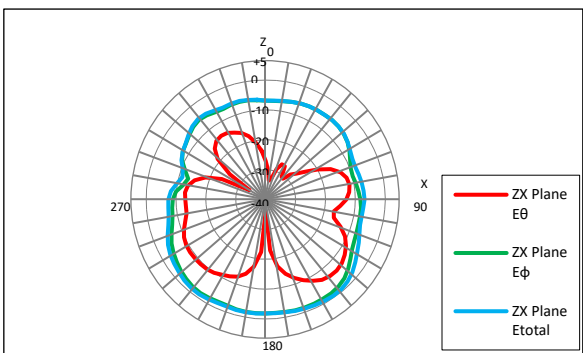
XY Plane



YZ Plane

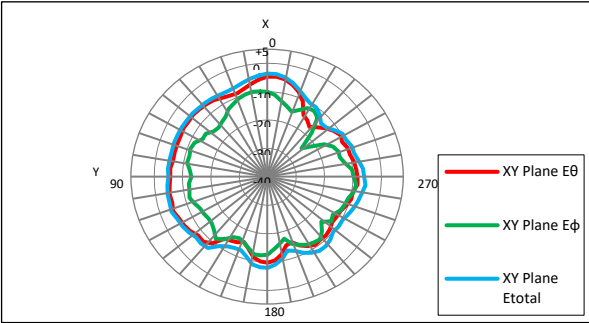


XZ Plane

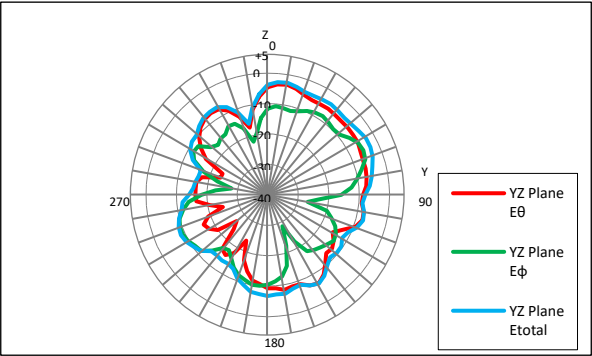


WiFi ANT (5720MHz)

XY Plane



YZ Plane



XZ Plane

