APPROVAL SHEET

Customer Name: VeriFone

Date: Mar.10.2025

Verifone P/N	
DCT P/N	B.1.01.L．1390(SH1607_WCN_FPC)
Description	ANTENNA,Mobile（SP7392B） WCN
Version	EVT

Prepared by	**Signed by**	Approved by Customer
RF Engineer	Yandong Tang	
ME Engineer	ZheQiang Guo	
Reviewed by	**Signed by**	
RF Manager	JianHua Wu	
ME Manager	GuoFu Cheng	
Project Manager	Jing Huang	

1 Antenna Description

1.2 Picture of the WCN antenna

WCN Antenna Structure
1. FPC with SPRING ; Fixed Internal Antenna （PIFA antenna）

1.3 Matching Circuit

WCN天線匹配	原始貼片	更改	SAR SENSOR	原始貼片	更改
L3504	10nH		L3503	22NH（可更改）	
R3505	3PF		L3513	100nH（可更改）	
C3528	NA		R3504	33PF 勿动	
R3510	0 Ohm		L3502	100nH 勿动	
C3553	NA		R3506	18PF 勿动	
R3511	33PF 勿动				
C3524	33PF 勿动				

1.4 Calibration certificate and darkroom

calibration certificate
Instrunent number: 551182950
Calibration Unit: 1/F, Building C5, Kangqiao Business Park, No.2555 Xiu Pu Road, Pudong New Area, Shanghai
Calibration date: Nov 17,2024
Next calibration date: Nov 16,2025
Calibrator: Yao Bo

2 Product Specification

2.1 S11 (Return Loss)

The S11 over the frequencies stated in Table 1 below shall be measured at the connector end of the cable for each antenna assembly. The S11 are measured with the antennas installed on platform. The S11 shall be 100% tested in production.

Test Parameter	698 MHz to 960 MHz	1710 MHz to 2690 MHz
S11:	-5dB Max	-5dB Max

2.2 Test environment

The radiation pattern and antenna gain shall be tested either with a conventional far field anechoic chamber or a near field anechoic chamber such as a Satimo SG24-L.

For a far field anechoic chamber, the gain measurements shall be made within an RF anechoic chamber with at least 3-meter separation from the receive antenna to the antenna under test (AUT). The RF anechoic chamber must be lined with absorptive material rated as a minimum frequency range from 400MHz to 10GHz. The notebook with the antenna assemblies installed shall be placed on a non-conductive structure at a sufficient height to be in the 'quiet zone' of the chamber. All test equipment including horn antennas, adapters, cables, network analyzers, and receivers shall be calibrated per manufacturer's minimum calibration requirements.
For a near field anechoic chamber, the AUT test must be place in the center (and within the admissible offset) of the probe array elements. The RF anechoic chamber must be lined with absorptive material rated as a minimum frequency range from 400MHz to 10GHz. The notebook with the antenna assemblies installed shall be placed on a non-conductive structure.

2.3 Antenna radiation measurement

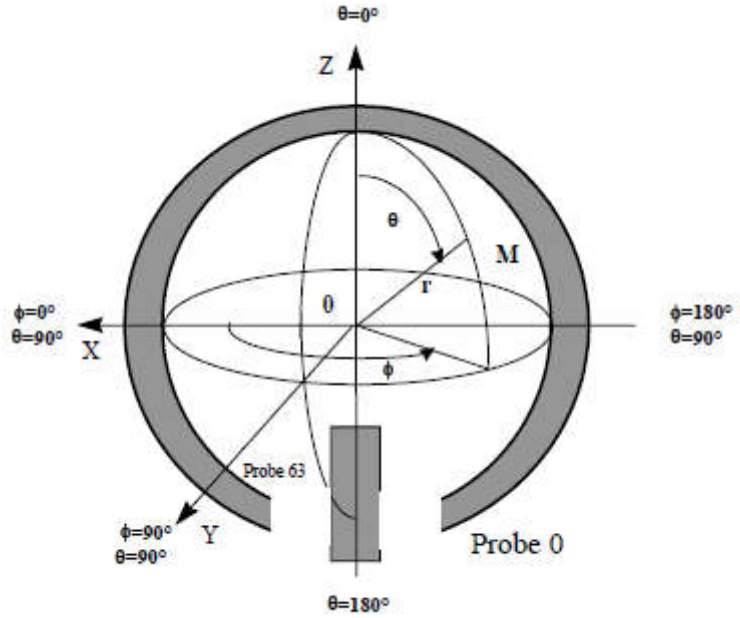
In order to ensure compliance with network carrier specifications, it is required to measure a 3-D gain measurement for WCN Antenna.

Table below specifies the details of the 3-D gain measurement points

Theta Start: 0°	Phi Start: 0°
Theta Stop: 150°	Phi Stop: 330°
Theta increment: 30°	Phi Increment: 30°

The table above specifies the minimum 23 measurement points (x2 polarizations) for each measurement frequency.

The axis and AUT orientation for gain measurements are outlined in below Figures.

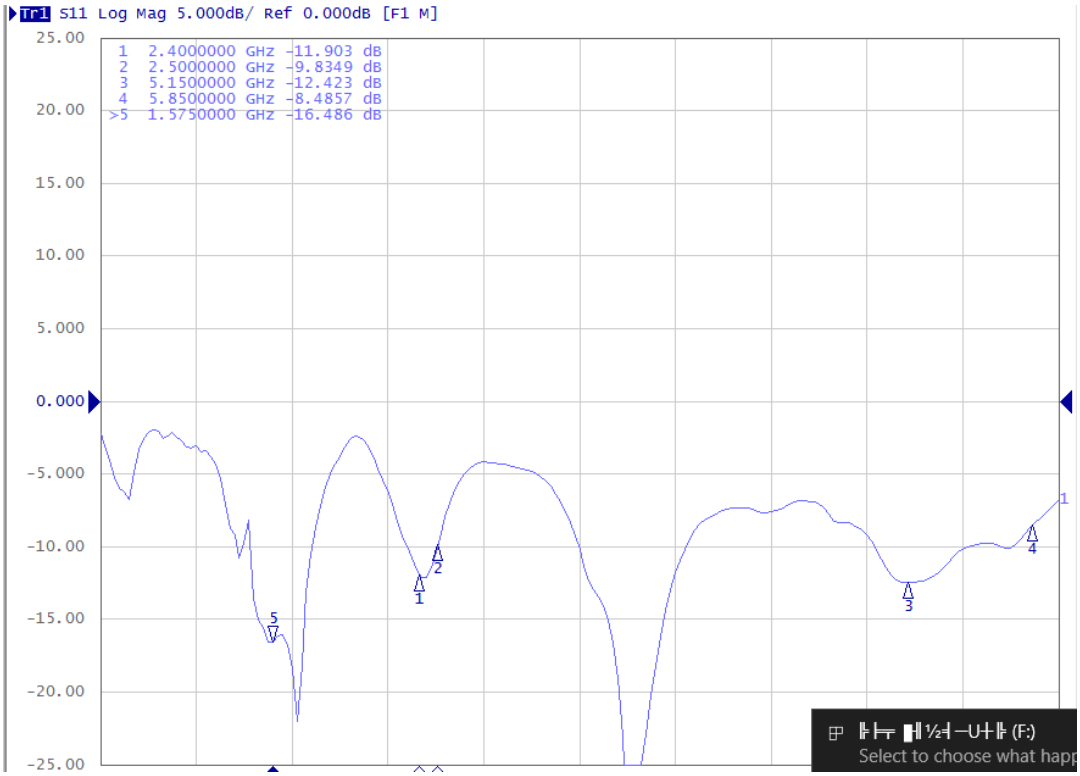


The probe 0 is near the door of the chamber.

The axis definition

3 Antenna Performance Test

3.1 S11 of WCN Antenna

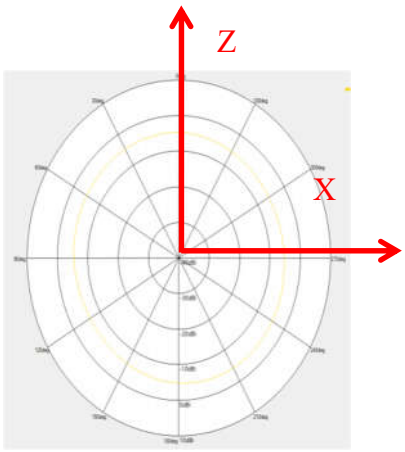


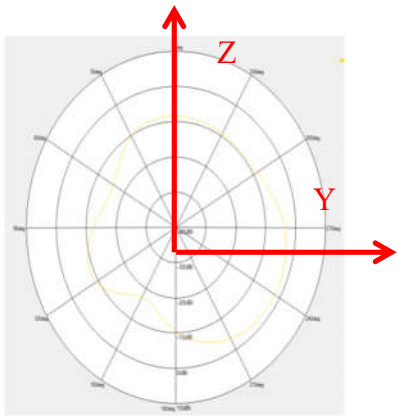
3.2 Antenna Radiated Efficiency

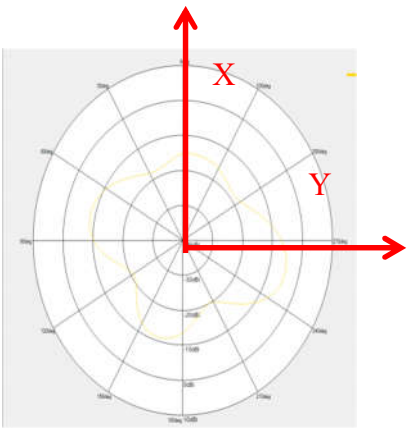
Frequency(MHz)	Efficiency	Efficiency(dB)	Peak Gain	Frequency(MHZ)	Efficiency	Efficiency(dB)	Peak Gain	Frequency(MHZ)	Efficiency	Efficiency(dB)	Peak Gain
1560	33	-4.8	0.8	2400	37.8	-4.2	1.1	5150	44.5	-3.5	1.07
1565	34.1	-4.7	1.1	2410	38.4	-4.2	1.1	5200	45.6	-3.4	1.05
1570	35.2	-4.5	1.3	2420	38.5	-4.1	1.2	5250	46.2	-3.4	1.20
1575	36.1	-4.4	1.5	2430	39.6	-4.0	1.1	5300	46.5	-3.3	1.21
1580	36.2	-4.4	1.6	2440	40.1	-4.0	1.2	5350	45.1	-3.5	1.19
1585	37.1	-4.3	1.7	2450	41.2	-3.9	1.0	5400	44.1	-3.6	1.15
1590	37.2	-4.3	2.0	2460	41.8	-3.8	1.0	5450	44.2	-3.5	1.12
1595	37.1	-4.3	2.0	2470	42	-3.8	0.9	5500	44.6	-3.5	1.13
1600	36.7	-4.4	2.1	2480	41.5	-3.8	0.8	5550	47.3	-3.3	1.19
1605	36.4	-4.4	1.9	2490	40.3	-3.9	0.9	5600	48.1	-3.2	1.22
1610	36.3	-4.4	1.4	2500	38.5	-4.1	0.9	5650	46.2	-3.4	1.16
平均值	35.9	-4.4	1.6	平均值	40	-4.0	1.0	5700	48.9	-3.1	1.06
								5750	48.2	-3.2	1.06
								5800	45.1	-3.5	1.06
								5850	43.6	-3.6	1.04
								平均	40	-3.4	1.10

3.3 Radiation Pattern

WCN antenna: 2400MHz

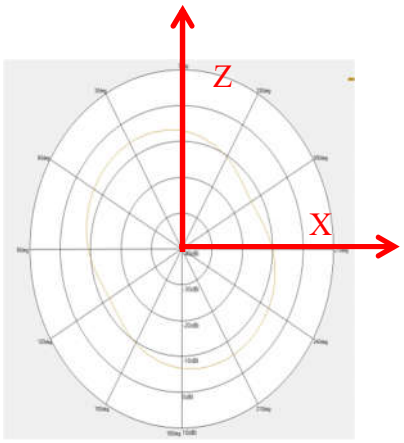


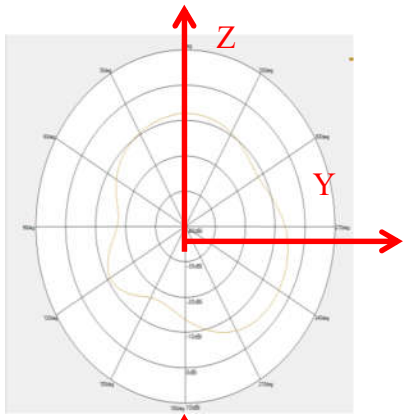


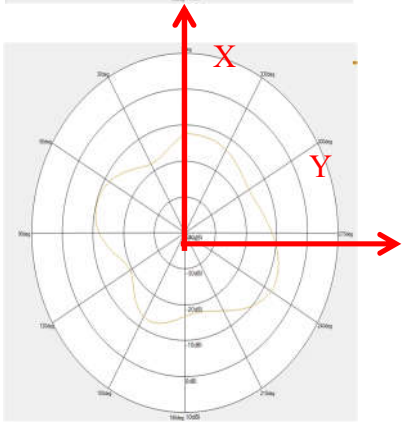


2400MHz		
Phi=0deg Peak (dBi)	-1.02	210 deg
Phi=90deg Peak (dBi)	-0.22	150 deg
Theta=90deg Peak(dBi)	-1.08	240 deg

WCN antenna: 2480MHz

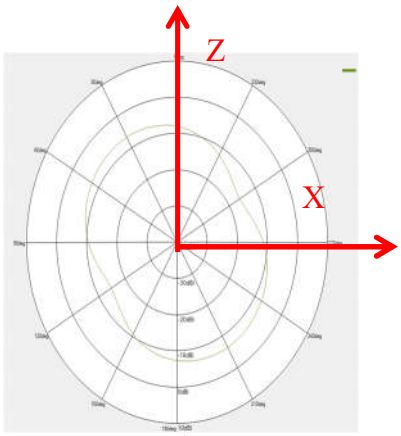


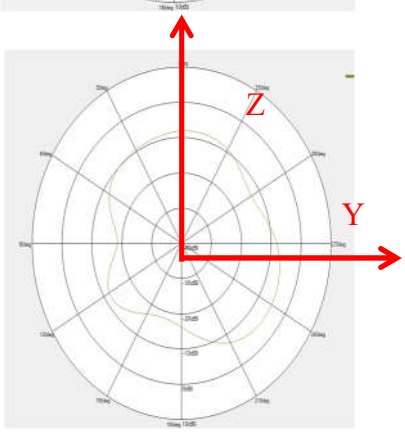


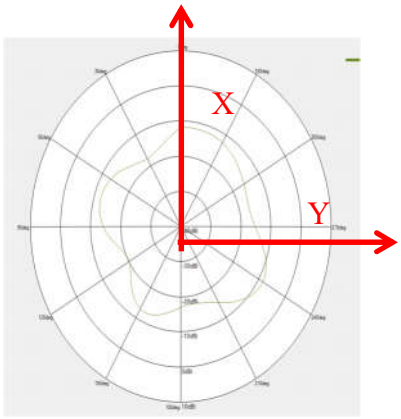


2480MHz		
Phi=0deg Peak (dBi)	1.12	210 deg
Phi=90deg Peak (dBi)	0.35	150 deg
Theta=90deg Peak(dBi)	-0.68	240 deg

WCN antenna: 2500MHz

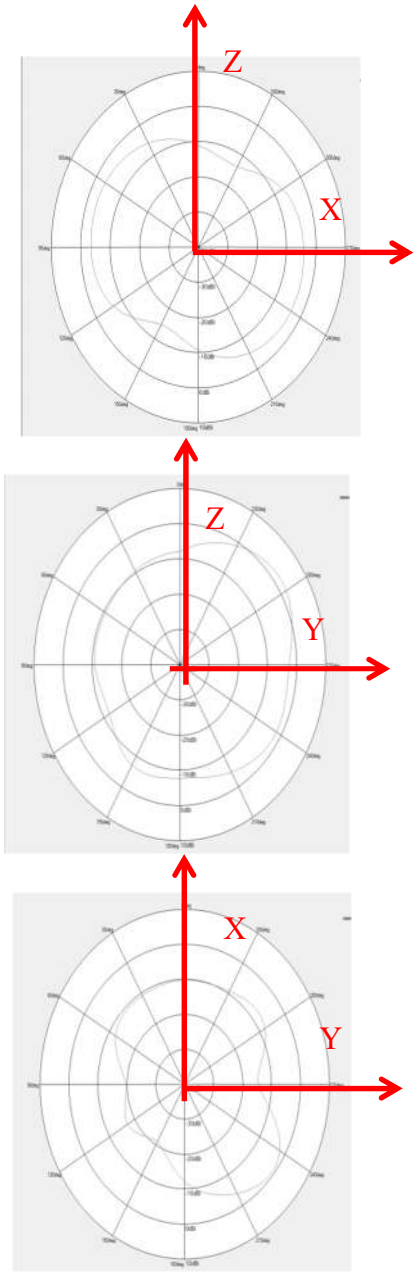






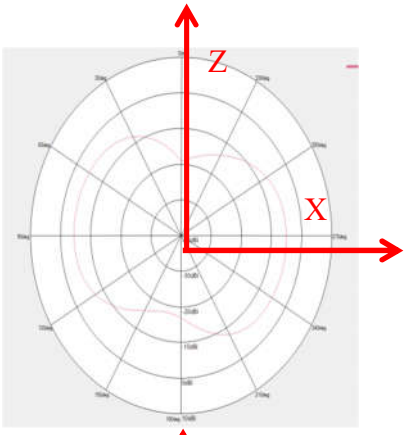
2500MHz		
Phi=0deg Peak (dBi)	1.03	210 deg
Phi=90deg Peak (dBi)	0.16	150 deg
Theta=90deg Peak(dBi)	-0.44	240 deg

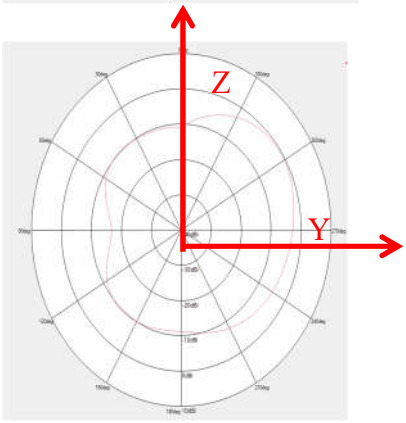
WCN antenna: 5150MHz

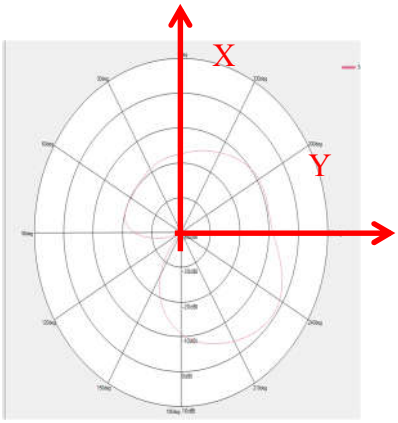


5150MHz		
Phi=0deg Peak (dBi)	1.15	210 deg
Phi=90deg Peak (dBi)	0.52	120 deg
Theta=90deg Peak(dBi)	-1.15	90 deg

WCN antenna: 5350MHz

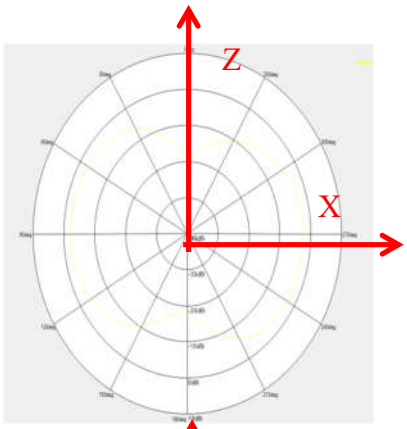


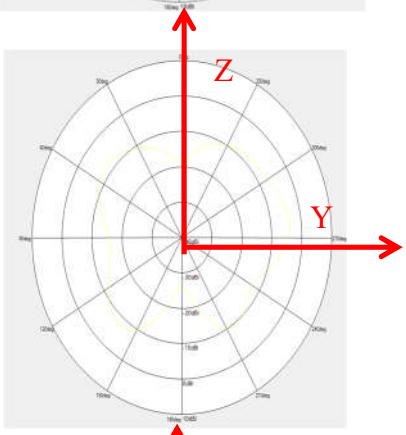


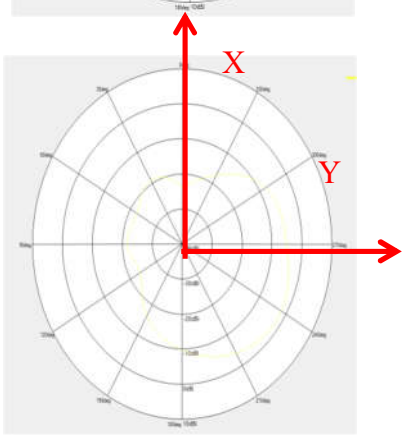


5350MHz		
Phi=0deg Peak (dBi)	0.33	120 deg
Phi=90deg Peak (dBi)	1.22	330 deg
Theta=90deg Peak(dBi)	-0.25	0 deg

WCN antenna: 5600MHz







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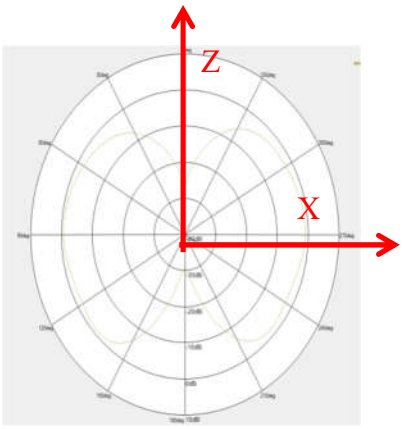
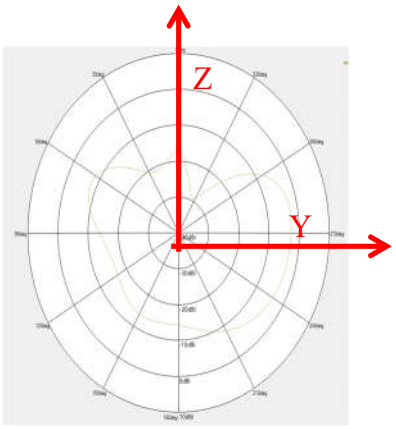
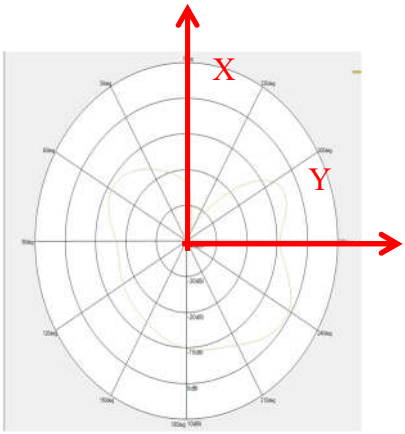
5600MHz		
Phi=0deg Peak (dBi)	-0.53	120 deg
Phi=90deg Peak (dBi)	-0.88	60 deg
Theta=90deg Peak(dBi)	1.15	60 deg

WCN antenna: 5850MHz

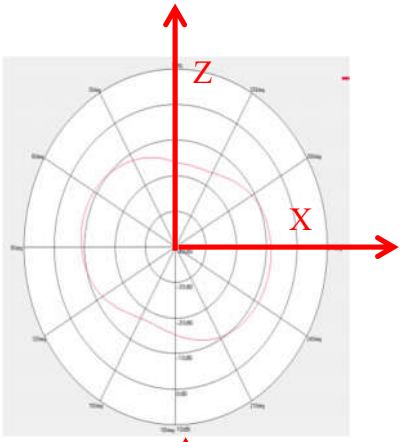


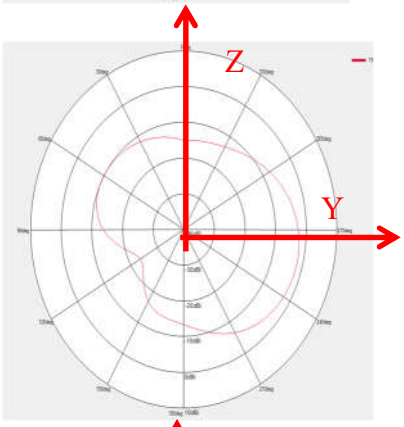


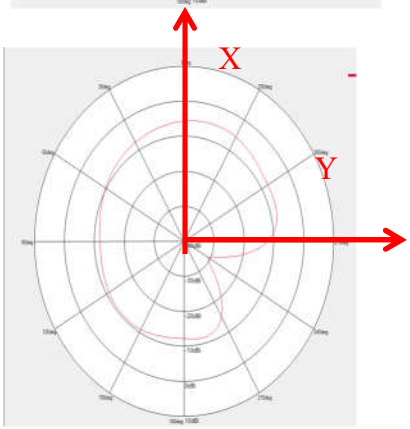


5850MHz		
Phi=0deg Peak (dBi)	-0.55	90 deg
Phi=90deg Peak (dBi)	-0.45	90 deg
Theta=90deg Peak(dBi)	1.14	90 deg

WCN antenna: 1575MHz







1575MHz		
Phi=0deg Peak (dBi)	1.41	0 deg
Phi=90deg Peak (dBi)	0.62	90 deg
Theta=90deg Peak(dBi)	-0.95	60 deg