

APPROVAL SHEET

Customer Name: VeriFone

Date: Jun. 28 2024

Verifone P/N	
DCT P/N	F-2A-XZ-0381-000-K0
Description	ANTENNA, V660P-A WCN
Version	DVT1

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Project:V660P-A	Author:Chun Yin	File Name: V660P-A WCN Antenna Approval sheet
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Huizhou Speed Wireless Technology Co., Ltd		

1 Antenna Description

Top View

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

1.1 Matching Circuit

WCN天線匹配	原始貼片	更改	SAR SENSOR	原始貼片	更改
L3504	39nH	10NH	L3503	100NH (可更改)	22NH
R3505	0 ohm	3PF	L3513	0ohm (可更改)	100NH
C3528	NA		R3504	33PF 勿动	
R3510	0 Ohm		L3502	100nH 勿动	
C3553	NA		R3506	18PF 勿动	
R3511	33PF 勿动	NA			
C3524	33PF 勿动	NA			
弹片3501	贴片	NA			
弹片3502	贴片	NA			

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

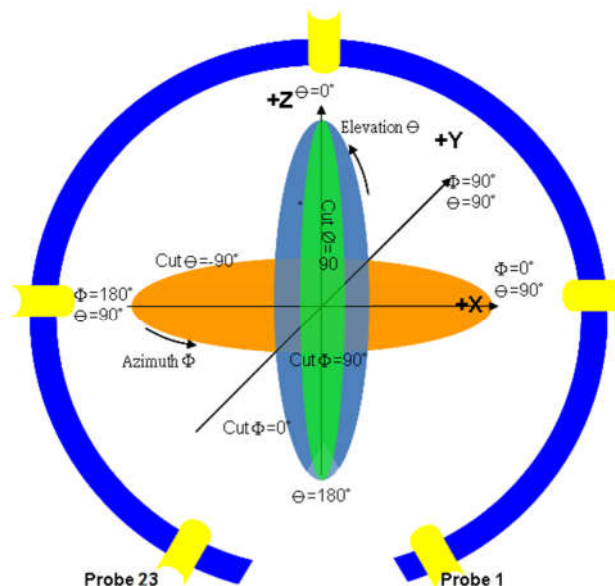
In order to ensure compliance with network carrier specifications, it is required to measure a 3-D gain measurement for WCN Antenna.

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.

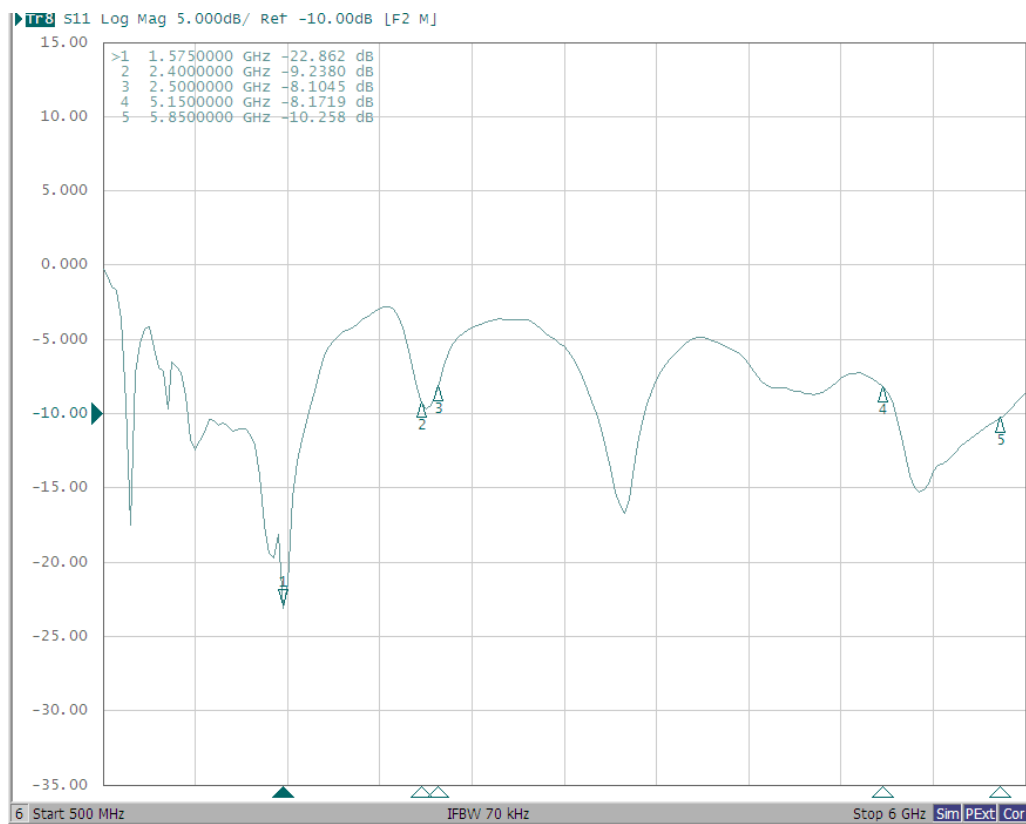
The axis and AUT orientation for gain measurements are outlined in below Figures.



The axis definition

3 Antenna Performance Test

3.1 S11 of WCN Antenna

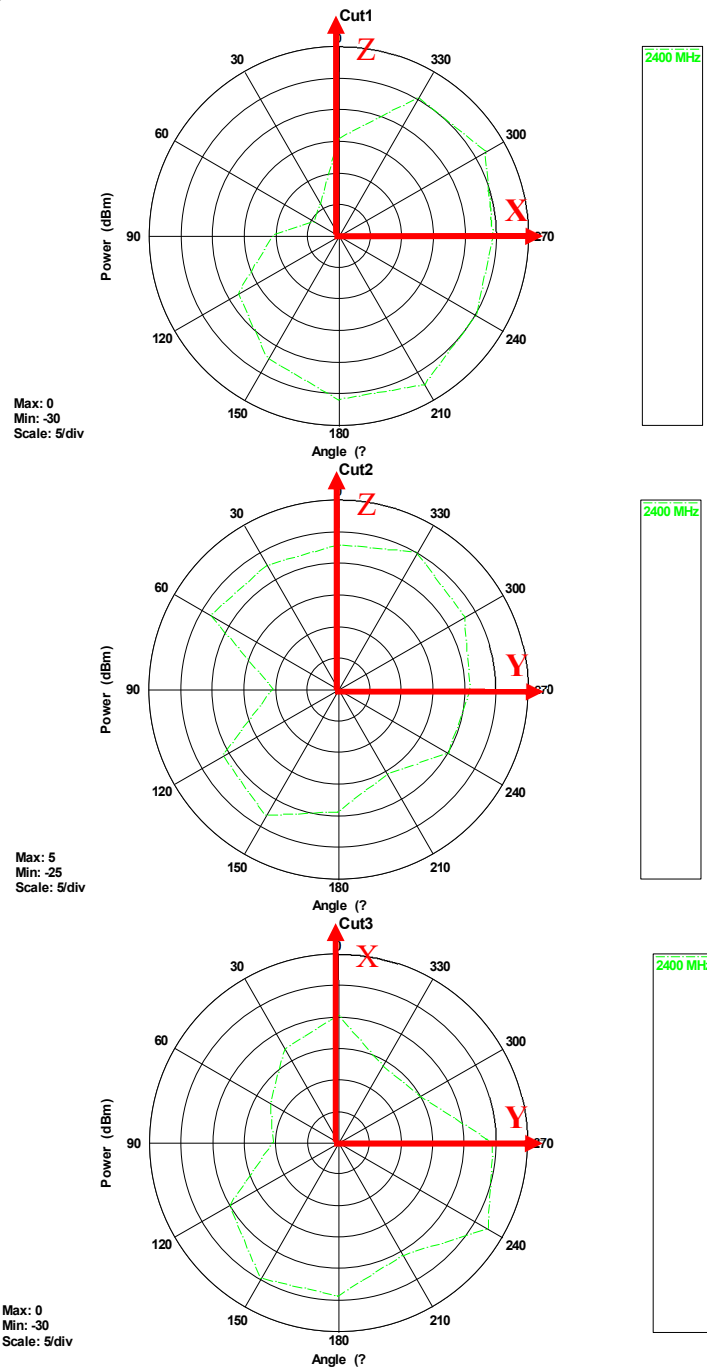


3.2 Antenna Radiated Efficiency

Frequency(MHz)	Efficiency	Efficiency(dB)	Peak Gain	Frequency(MHz)	Efficiency	Efficiency(dB)	Peak Gain	Frequency(MHz)	Efficiency	Efficiency(dB)	Peak Gain
1560	46.7	-3.3	0.8	2400	49.8	-3	1	5150	46.8	-3.3	1.6
1565	47.1	-3.3	0.8	2410	50.6	-3	1.2	5200	41.1	-3.9	1.4
1570	47.1	-3.3	0.7	2420	51.6	-2.9	1.4	5250	41	-3.9	1.3
1575	47.3	-3.3	0.6	2430	52.3	-2.8	1.6	5300	42.2	-3.7	1.6
1580	47.8	-3.2	0.6	2440	53.2	-2.7	1.6	5350	40.2	-4	1.6
1585	48.5	-3.1	0.5	2450	53.7	-2.7	1.6	5400	35.7	-4.5	0.5
1590	49	-3.1	0.4	2460	54.8	-2.6	1.6	5450	35.8	-4.5	0.3
1595	50	-3	0.4	2470	55.4	-2.6	1.6	5500	36.4	-4.4	0.3
1600	50.6	-3	0.3	2480	55.1	-2.6	1.6	5550	35.6	-4.5	0.3
1605	50.8	-2.9	0.4	2490	54.4	-2.6	1.5	5600	34.8	-4.6	0.2
1610	51.4	-2.9	0.5	2500	53.4	-2.7	1.5	5650	32.9	-4.8	-0.2
平均值	48.7	-3.1	0.3	平均值	53.1	-2.7	1.47	5700	32.8	-4.8	-0.3
								5750	36.5	-4.4	-0.3
								5800	36.4	-4.4	-0.3
								5850	36.7	-4.4	-0.3
								平均值	37.4	-4.3	0.51

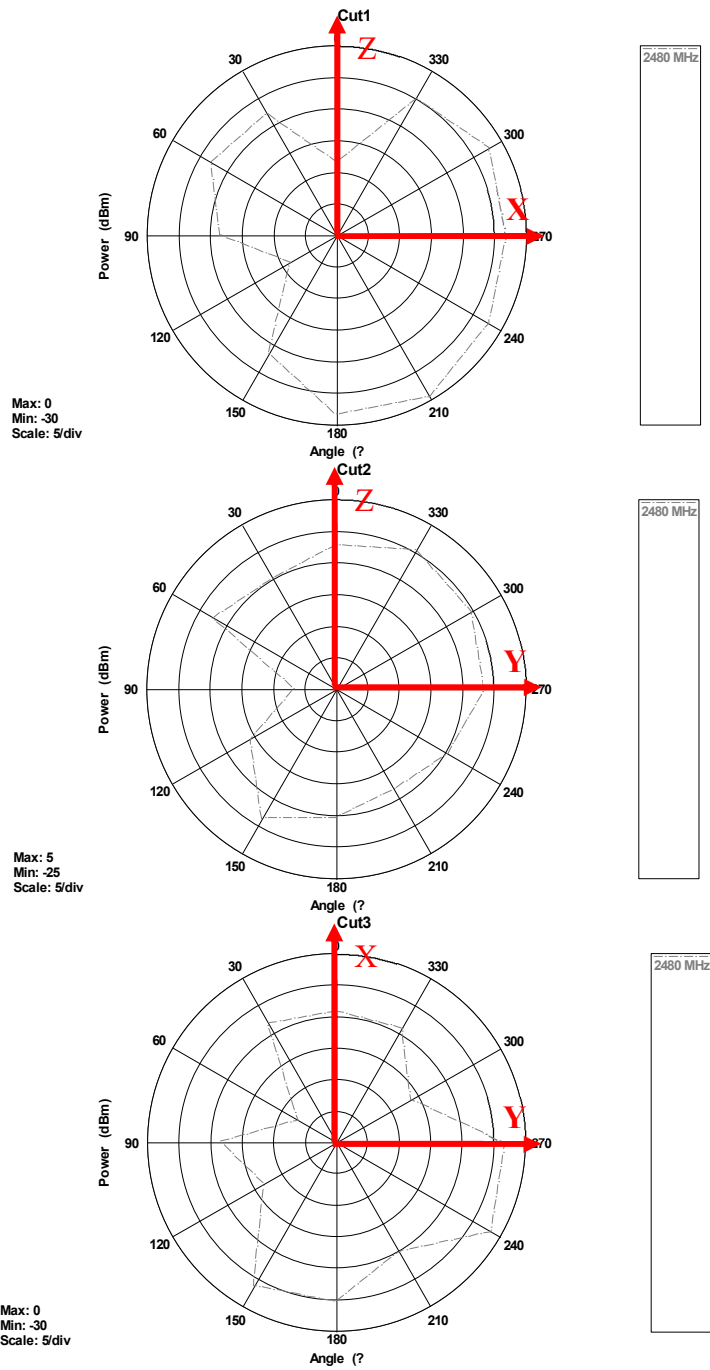
3.3 Radiation Pattern

WCN antenna: 2400MHz



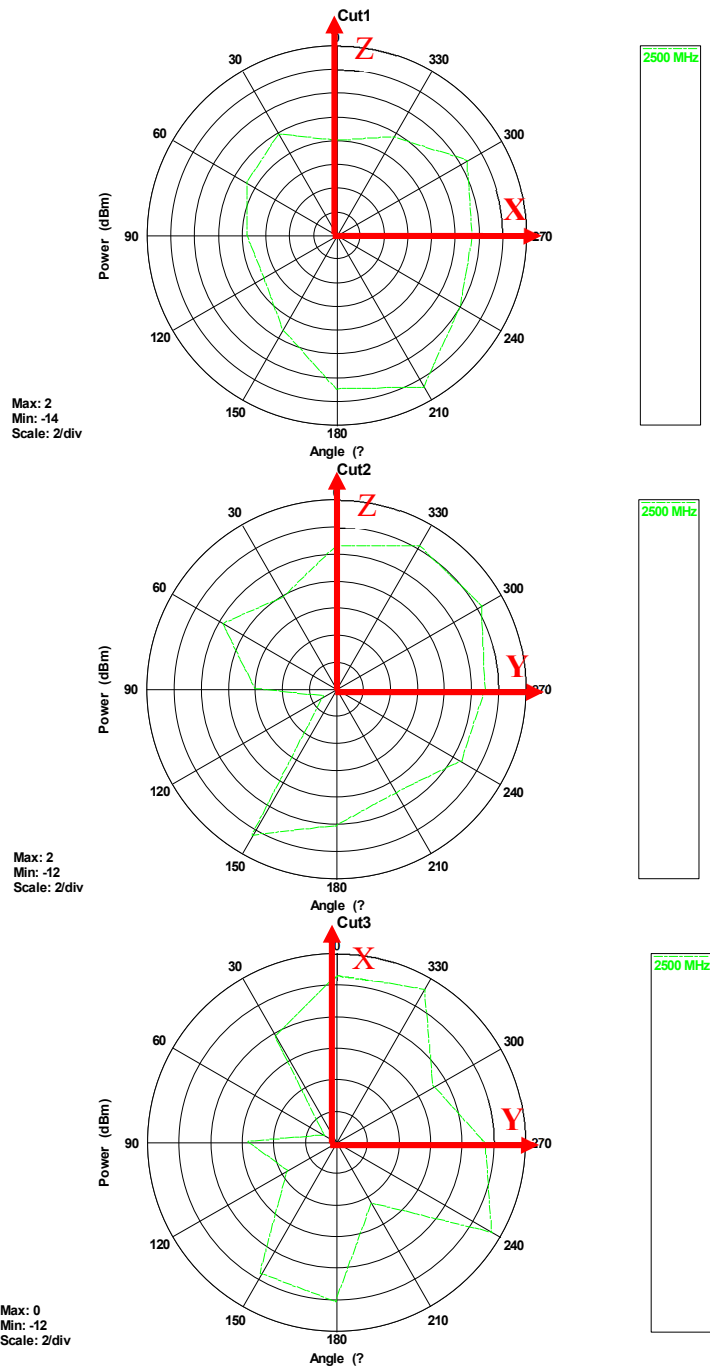
2400MHz		
Phi=0deg Peak (dBi)	-1.24	210 deg
Phi=90deg Peak (dBi)	0.12	150 deg
Theta=90deg Peak(dBi)	-1.39	240 deg

WCN antenna: 2480MHz



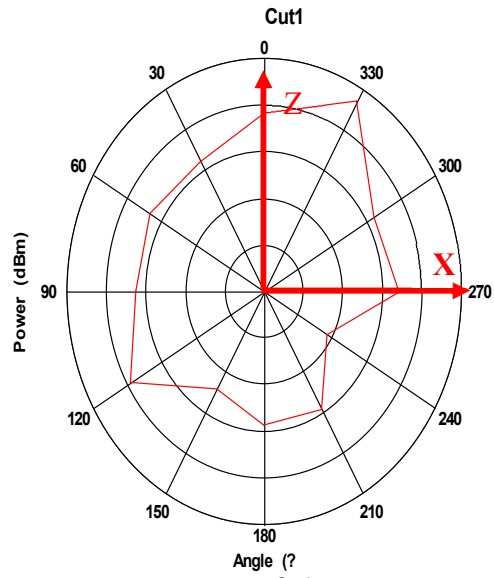
2480MHz		
Phi=0deg Peak (dBi)	0.66	210 deg
Phi=90deg Peak (dBi)	0.71	150 deg
Theta=90deg Peak(dBi)	-0.22	240 deg

WCN antenna: 2500MHz



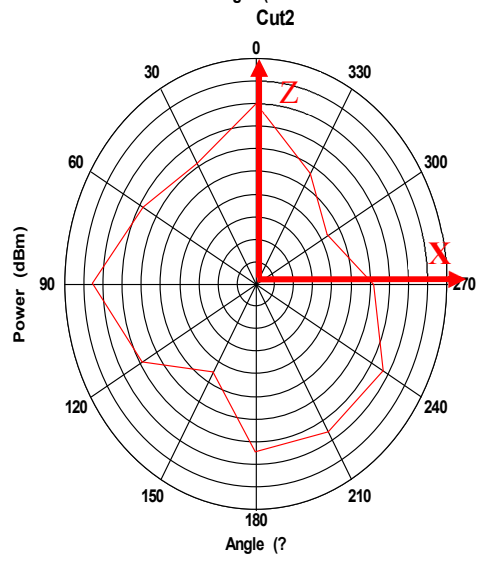
WCN antenna: 5150MHz

Max: 5
Min: -20
Scale: 5/div



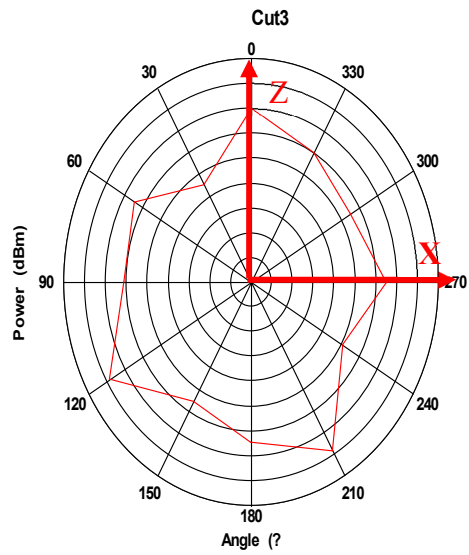
5150 MHz

Max: 2
Min: -18
Scale: 2/div



5150 MHz

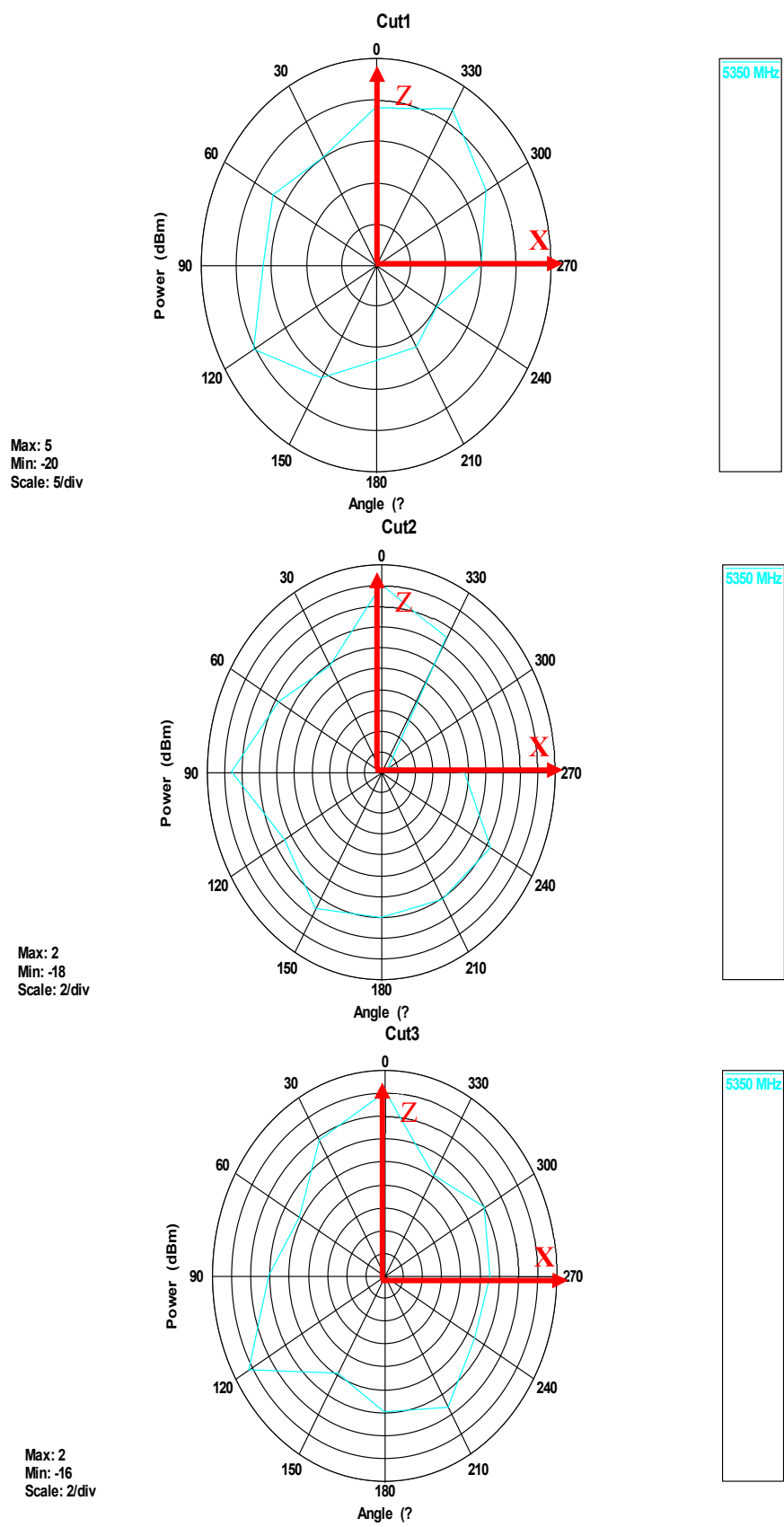
Max: 2
Min: -16
Scale: 2/div



5150 MHz

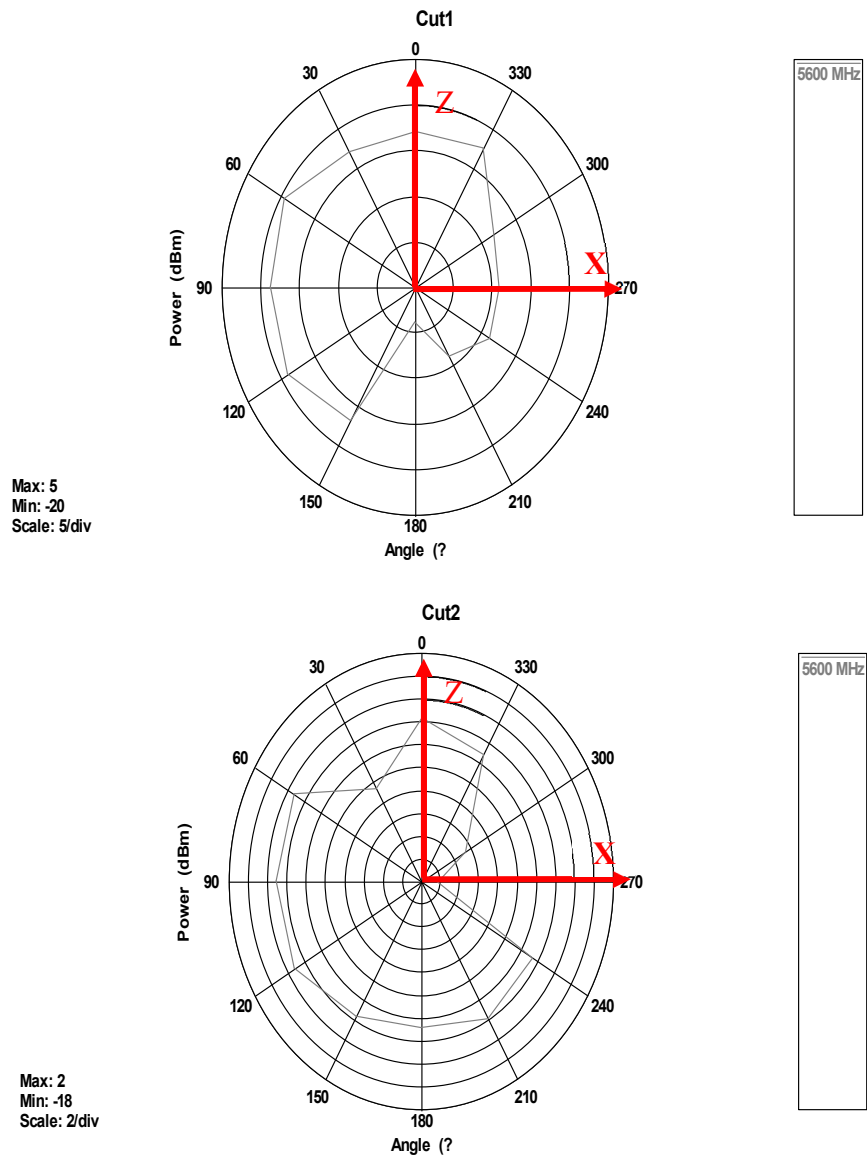
5150MHz		
Phi=0deg Peak (dBi)	-0.37	210 deg
Phi=90deg Peak (dBi)	-0.59	120 deg
Theta=90deg Peak(dBi)	-1	90 deg

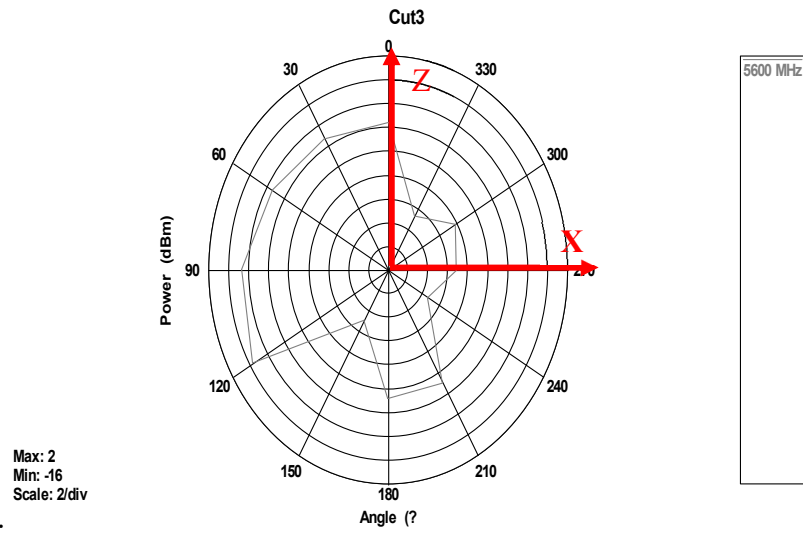
WCN antenna: 5350MHz



5350MHz		
Phi=0deg Peak (dBi)	0.36	120 deg
Phi=90deg Peak (dBi)	1.72	330 deg
Theta=90deg Peak(dBi)	0.05	0 deg

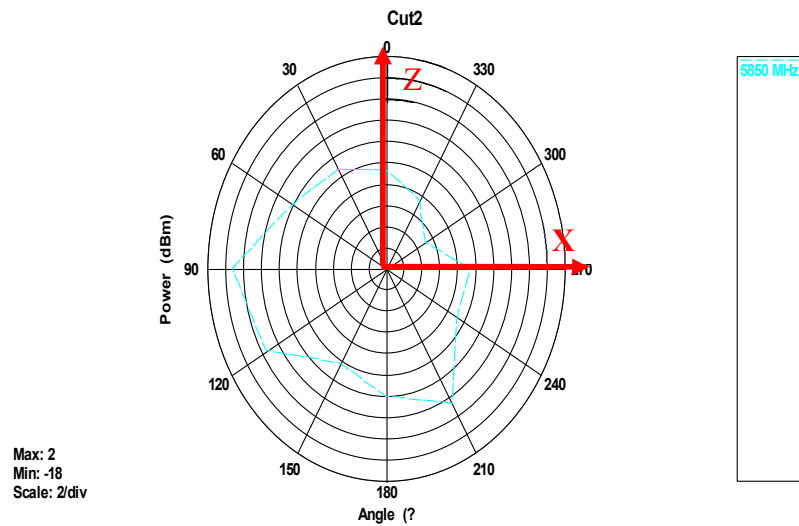
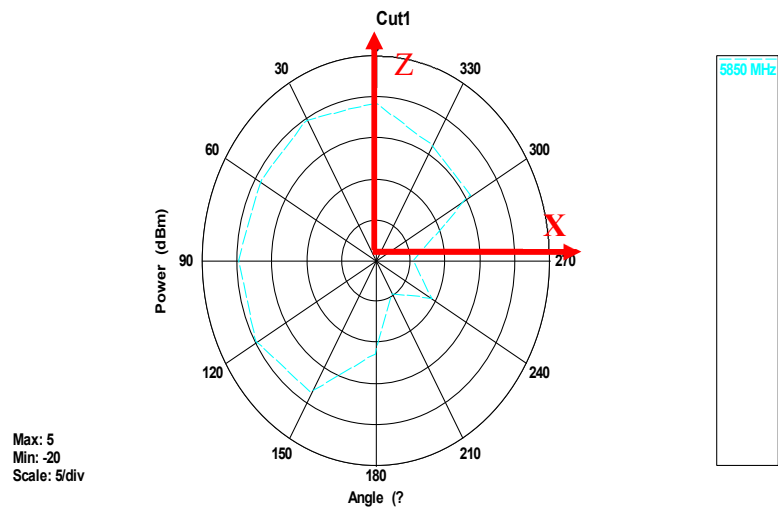
WCN antenna: 5600MHz

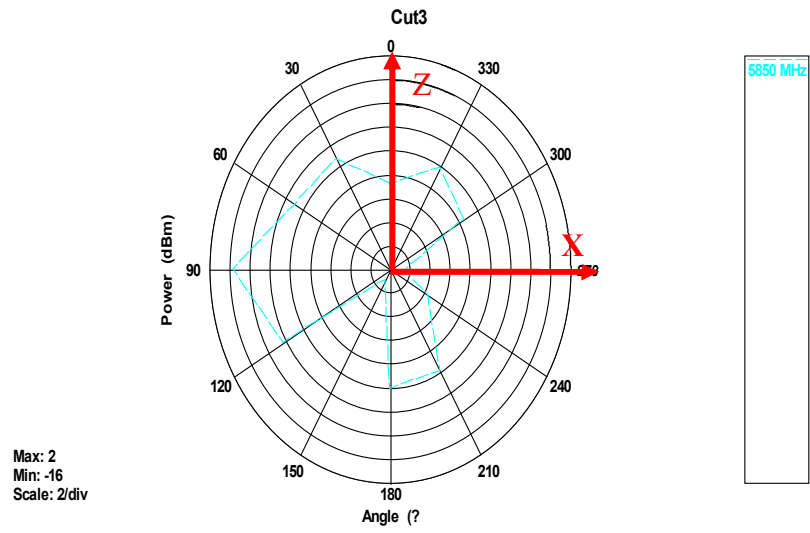




5600MHz		
Phi=0deg Peak (dBi)	-0.39	120 deg
Phi=90deg Peak (dBi)	-0.52	60 deg
Theta=90deg Peak(dBi)	-2.8	60 deg

WCN antenna: 5850MHz

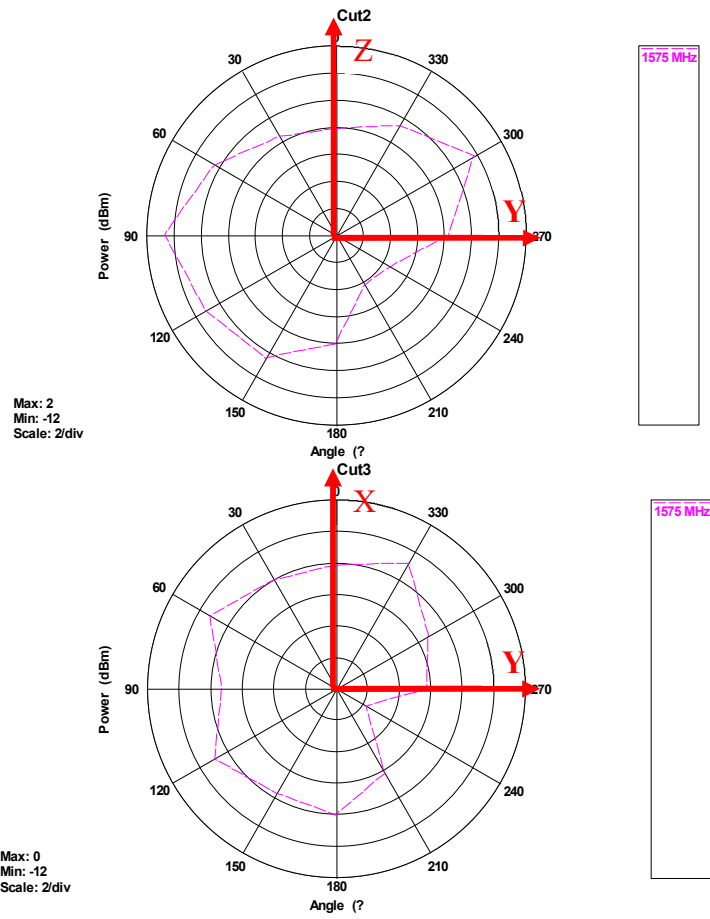




5850MHz		
Phi=0deg Peak (dBi)	-0.42	90 deg
Phi=90deg Peak (dBi)	-0.42	90 deg
Theta=90deg Peak(dBi)	-0.92	90 deg

WCN antenna: 1575MHz





1575MHz		
Phi=0deg Peak (dBi)	0.65	0 deg
Phi=90deg Peak (dBi)	0.65	90 deg
Theta=90deg Peak(dBi)	-2.8	60 deg