

APPROVAL SHEET

Customer Name: VeriFone

Date: Feb. 12 2025

Verifone P/N	
DCT P/N	F-2A-XZ-0381-000-K0
Description	ANTENNA, Portable (SP7392A) WCN
Version	DVT1

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Project:Portable (SP7392A)	Author:Tao Bi	File Name: Portable (SP7392A) WCN Antenna Approval sheet
Date: Feb.8.2025		
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Document No.:		
Zhejiang Haitong Communication Electronics Co., Ltd		

1 Antenna Description

1.1 The WCN antenna

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

1.2 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）	0hm
R3505	3PF	0hm	L3513	100nH（可更改）	
C3528	NA		R3504	33PF 勿动	
R3510	0 0hm		L3502	100nH 勿动	
C3553	NA		R3506	18PF 勿动	
R3511	33PF 勿动				
C3524	33PF 勿动				

1.3 Calibration certificate and darkroom

calibration certificate
Instrument 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(WaveStudio 1.6).

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

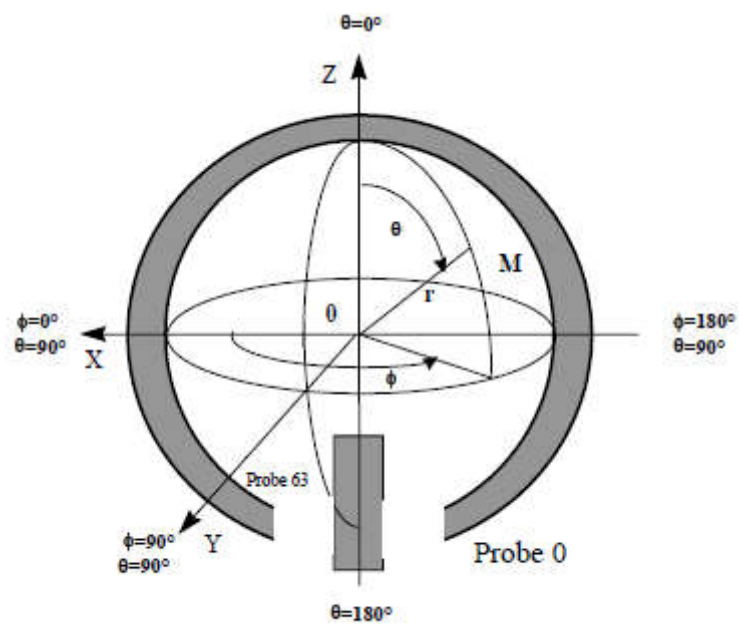
In order to ensure compliance with network carrier specifications, it is required to measure a 3-D gain measurement for WCN Antenna.

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.

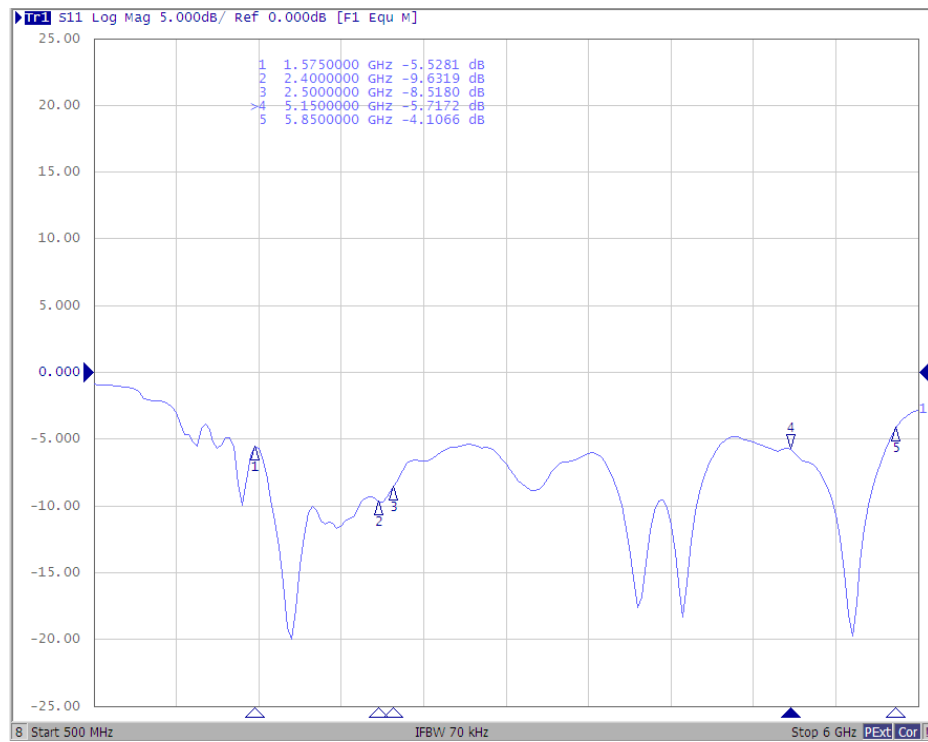


The probe 0 is near the door of the chamber.

The axis definition

3 Antenna Performance Test

3.1 S11 of WCN Antenna

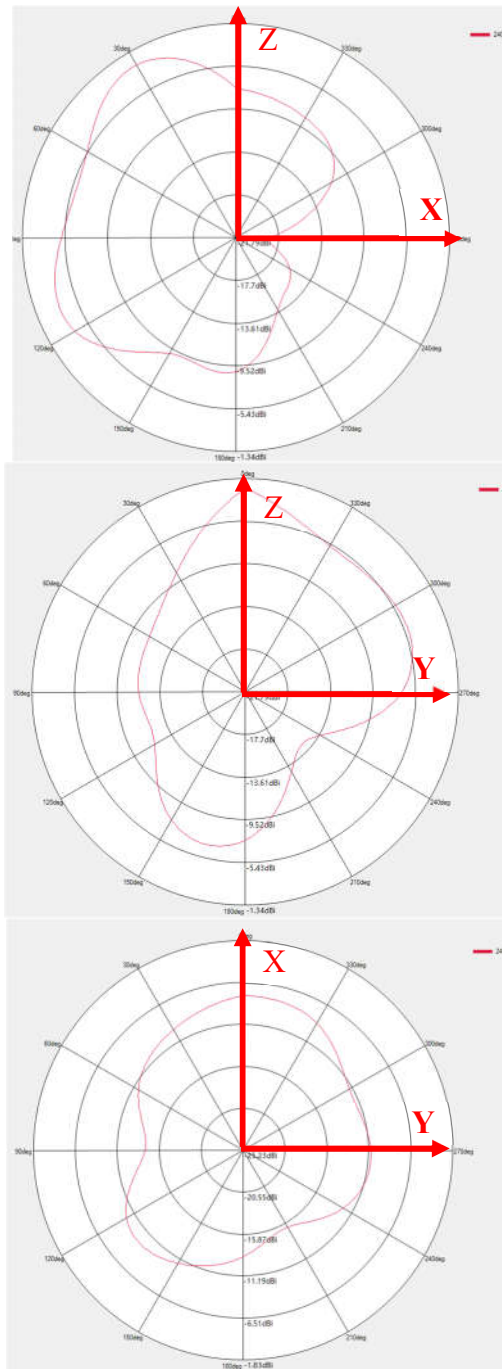


3.2 Antenna Radiated Efficiency

Frequency(MHZ))	Peak Gain	Frequency(MHZ)	Peak Gain	Frequency(MHZ)	Peak Gain
1560	1.1	2400	0	5150	1.01
1565	1.4	2410	0.1	5200	1.03
1570	1.5	2420	0	5250	1.2
1575	1.4	2430	0.4	5300	1.21
1580	1	2440	0.4	5350	1.18
1585	0.3	2450	1.1	5400	1.2
1590	0.1	2460	1.1	5450	1.12
1595	-0.1	2470	1.1	5500	1.13
1600	-0.3	2480	1.1	5550	1.16
1605	-1.1	2490	1.2	5600	1.17
1610	-0.4	2500	1.2	5650	1.13
平均值	0.4	平均值	0.7	5700	1.07
				5750	1.05
				5800	0.92
				5850	0.94
				平均值	1.1

3.3 Radiation Pattern

WCN antenna: 2400MHz



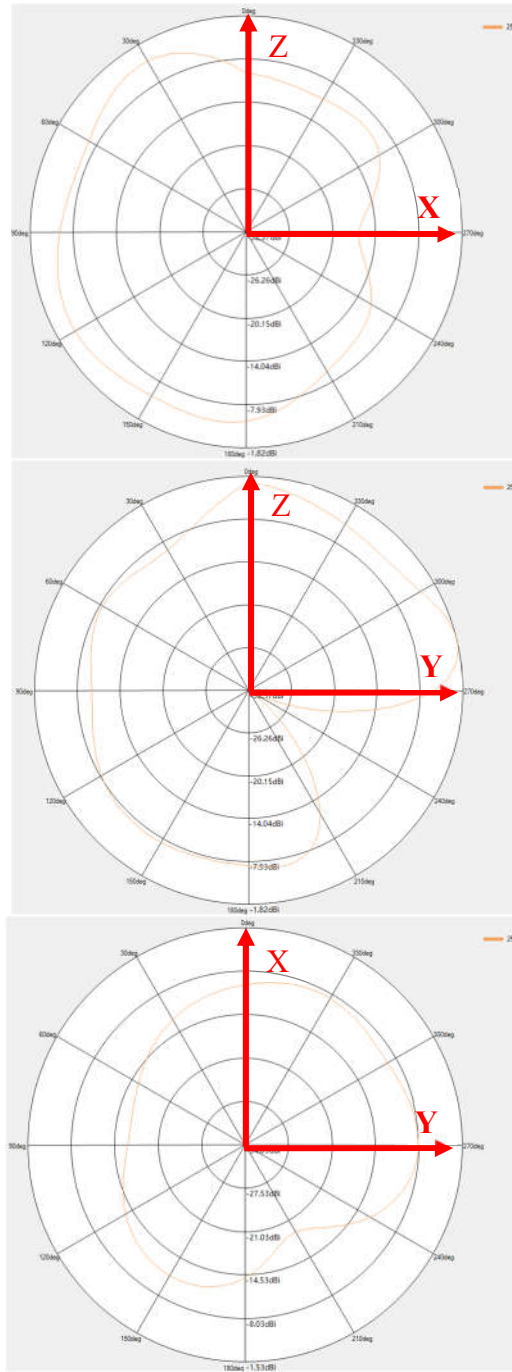
2400MHz		
Phi=0deg Peak (dBi)	-1.34	210 deg
Phi=90deg Peak (dBi)	-0.10	150 deg
Theta=90deg Peak(dBi)	-1.83	240 deg

WCN antenna: 2480MHz



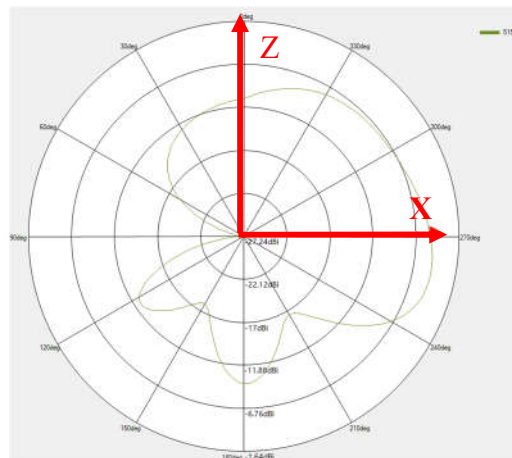
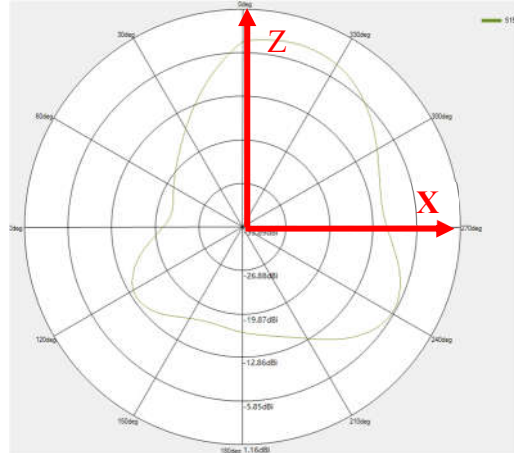
2480MHz		
Phi=0deg Peak (dBi)	1.1	210 deg
Phi=90deg Peak (dBi)	0.22	150 deg
Theta=90deg Peak(dBi)	-0.53	240 deg

WCN antenna: 2500MHz



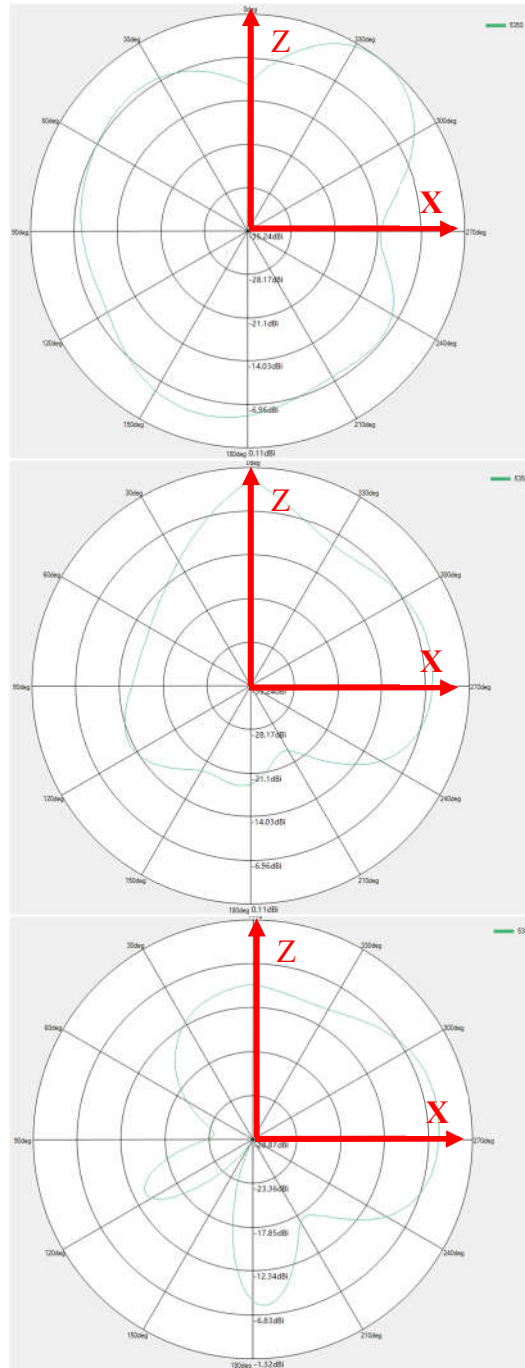
2500MHz		
Phi=0deg Peak (dBi)	1.2	210 deg
Phi=90deg Peak (dBi)	0.27	150 deg
Theta=90deg Peak(dBi)	-0.45	240 deg

WCN antenna: 5150MHz



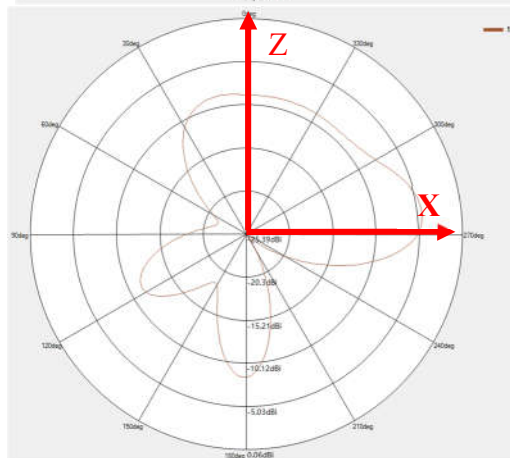
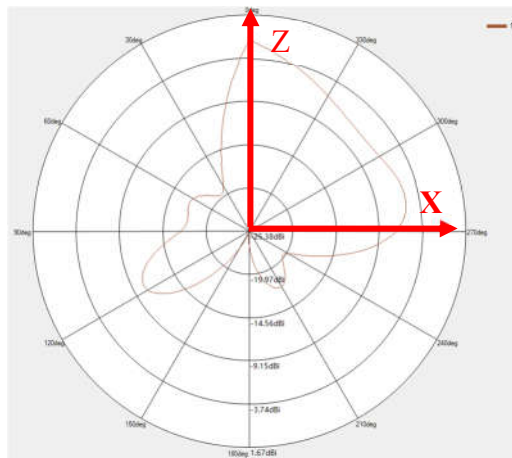
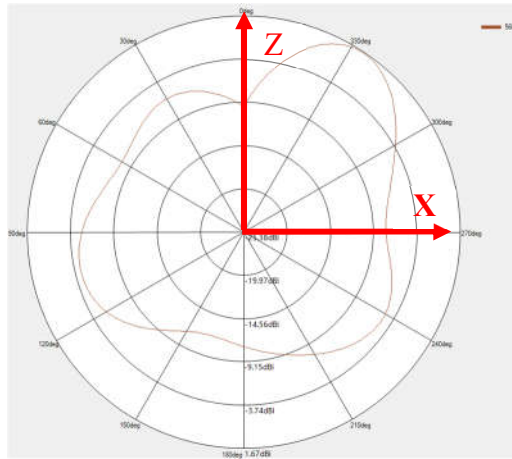
5150MHz		
Phi=0deg Peak (dBi)	1.01	210 deg
Phi=90deg Peak (dBi)	0.28	120 deg
Theta=90deg Peak(dBi)	-0.93	90 deg

WCN antenna: 5350MHz



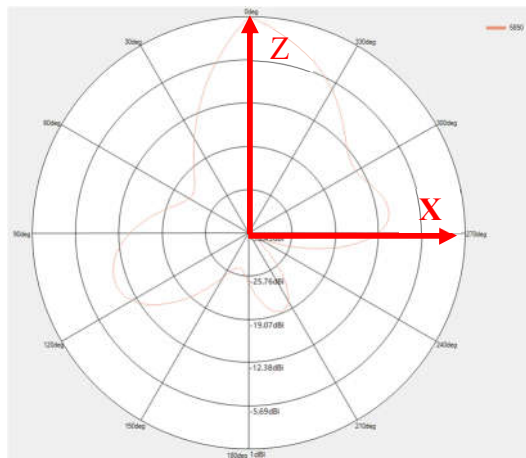
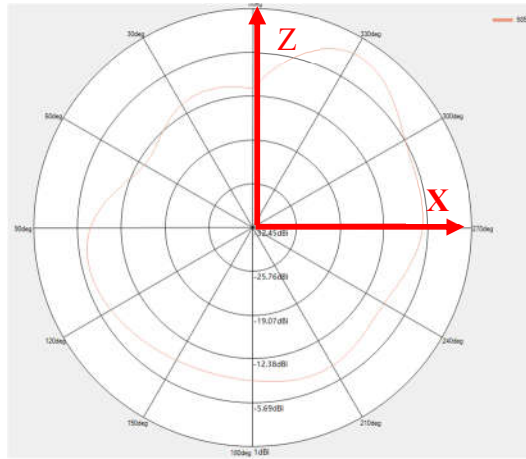
5350MHz		
Phi=0deg Peak (dBi)	0.07	120 deg
Phi=90deg Peak (dBi)	1.12	330 deg
Theta=90deg Peak(dBi)	-0.01	0 deg

WCN antenna: 5600MHz



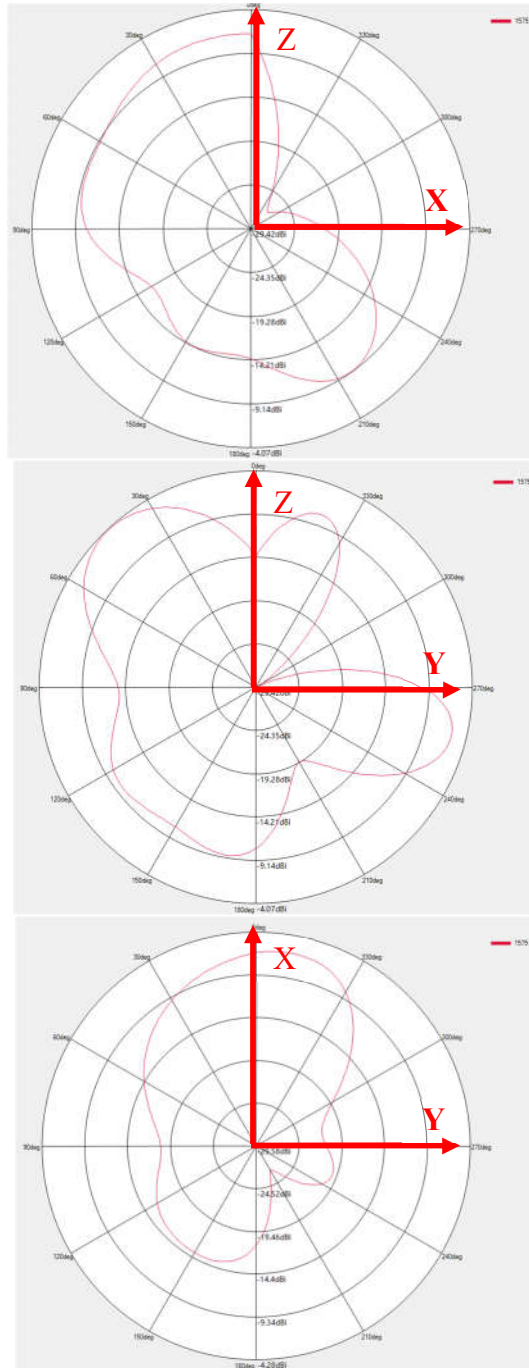
5600MHz		
Phi=0deg Peak (dBi)	-0.47	120 deg
Phi=90deg Peak (dBi)	-0.69	60 deg
Theta=90deg Peak(dBi)	1.17	60 deg

WCN antenna: 5850MHz



5850MHz		
Phi=0deg Peak (dBi)	-0.33	90 deg
Phi=90deg Peak (dBi)	-0.41	90 deg
Theta=90deg Peak(dBi)	0.94	90 deg

WCN antenna: 1575MHz



1575MHz		
Phi=0deg Peak (dBi)	1.35	0 deg
Phi=90deg Peak (dBi)	0.53	90 deg
Theta=90deg Peak(dBi)	-0.92	60 deg

1.2 NFC Antenna

NFC Frequency Band : 13.553 - 13.567 MHz

Modulation Type : ASK

Supported Card Type : A / B

NFC Antenna Type : Loop Antenna

NFC Antenna size : 75.40*66.35*1.5mm

NFC Antenna location : at the back of device screen