

# APPROVAL SHEET

1.2.1

1.2.2 Customer Name: VeriFone

Date: February. 28 2025

1.2.2.1 Verifone P/N	
1.2.2.2 DCT P/N	F001J4201T11000
Description	ANTENNA, FF base (EA7658A) BT
Version	EVT

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Project: FF Base	Author: Jiahao Zhang	File Name: FF Base (FJ42) BT Antenna
Date: Feb.28.2025		
Language: English	Check: Jiapeng Yan	Approval sheet
Document No.:		
Kunshan Innowave Communication Technology Co., Ltd		

## 2 Antenna Description

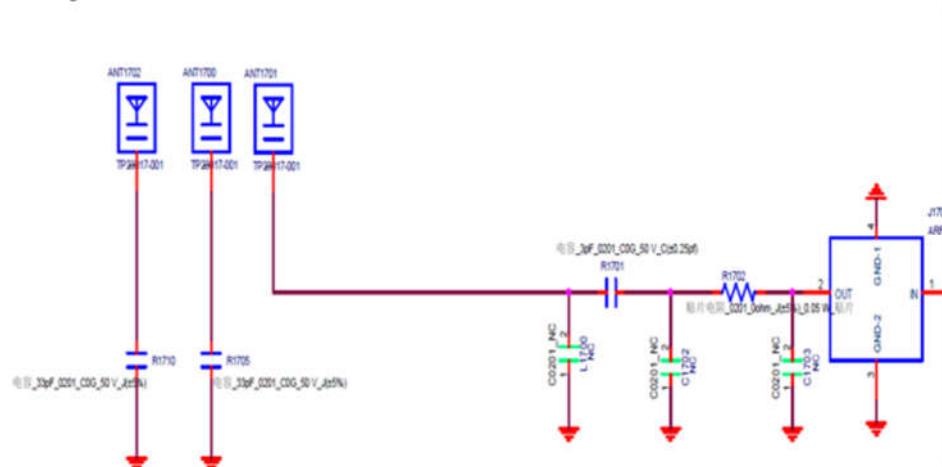
### 2.1 Location of FF base BT antenna in the test fixture

### 2.2 Picture of the EA7658A BT antenna

Top View

FF Base BT Antenna Structure
1. FPC with SPRING ; Fixed Internal Antenna (PIFA antenna)

### 2.3 Matching Circuit



EA7658A天線匹配	原始貼片	更改
L1700	NA	39nH
R1701	3PF	
C1702	NA	
R1702	0 Ohm	
C1703	NA	
R1715	33PF	
R1710	33PF	NA

## 2.4 Calibration certificate and darkroom

calibration certificate
Instrument number: M546521029
Calibration Unit: Guangdong Jingheng Testing Technology Co., Ltd
Calibration date: July 10, 2024
Next calibration date: July 9th, 2025
Calibrator: Mai Qifeng

## 3 Product Specification

### 3.1 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	2400 MHz to 2500 MHz
S11:	-14dB Max

### 3.2 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.

### 3.3 Antenna radiation measurement

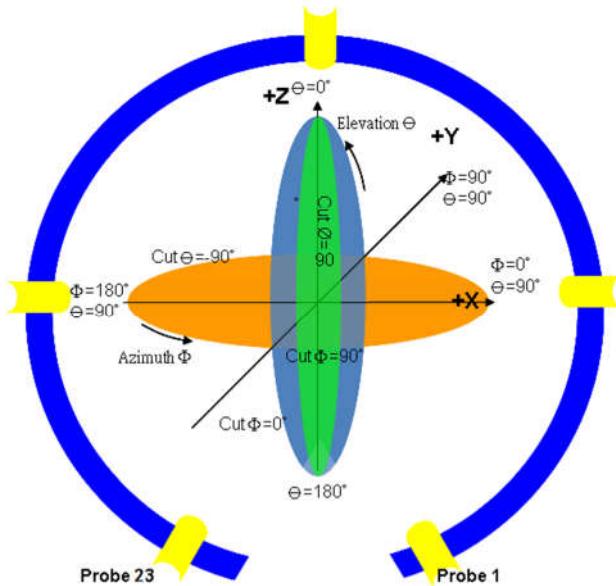
In order to ensure compliance with network carrier specifications, it is required to measure a 3-D gain measurement for EA7658A BT Antenna.

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°

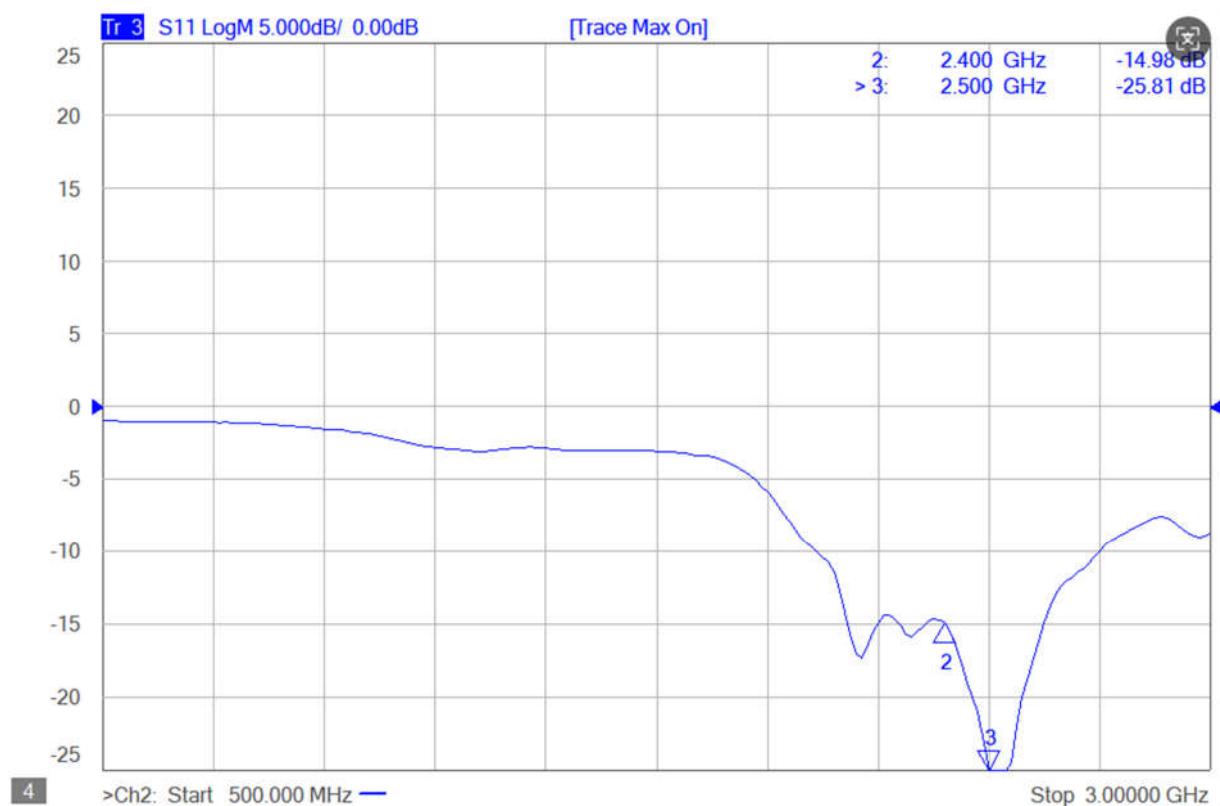
The table above specifies the minimum 23 measurement points (x2 polarizations) for each measurement frequency.

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



## 4 Antenna Performance Test

### 4.1 S11 of EA7658A BT Antenna

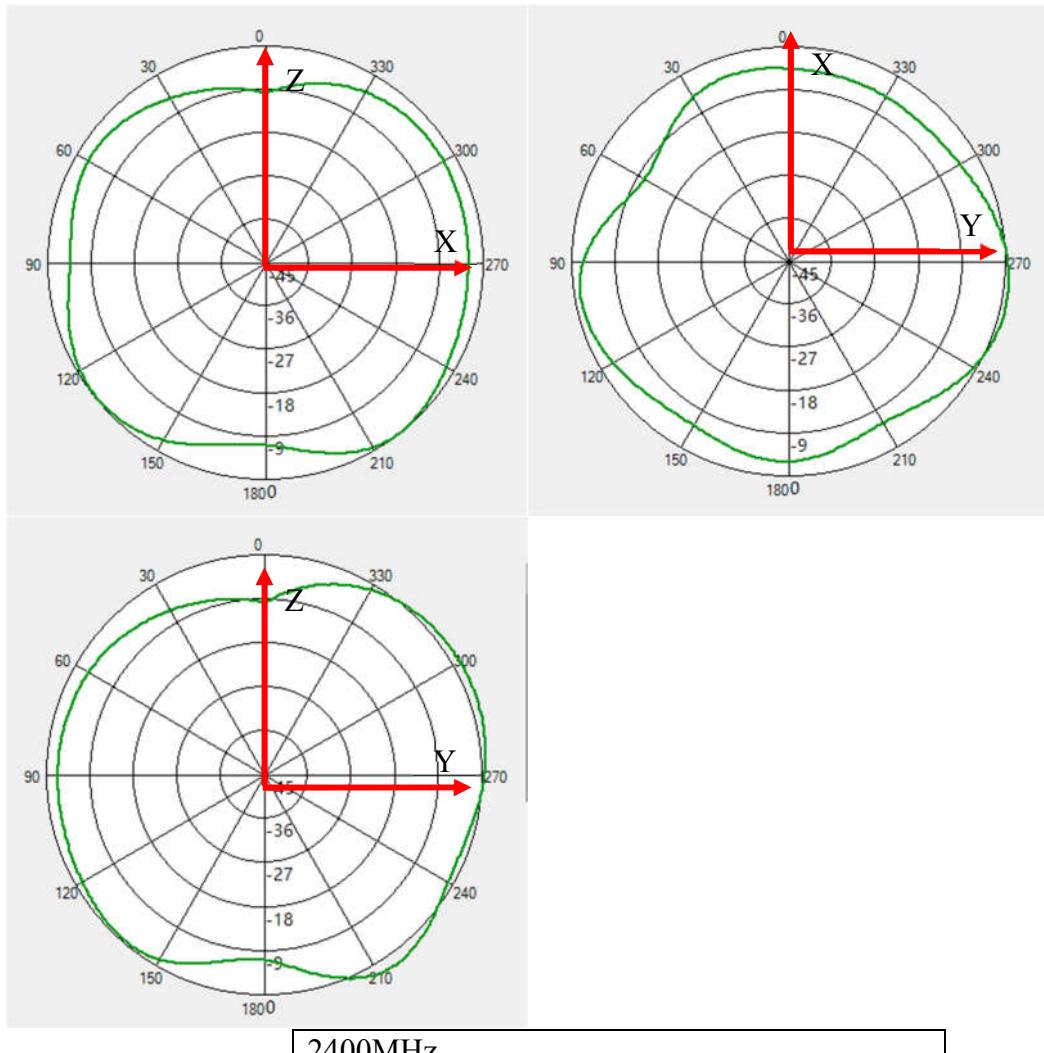


### 4.2 Antenna Radiated Efficiency

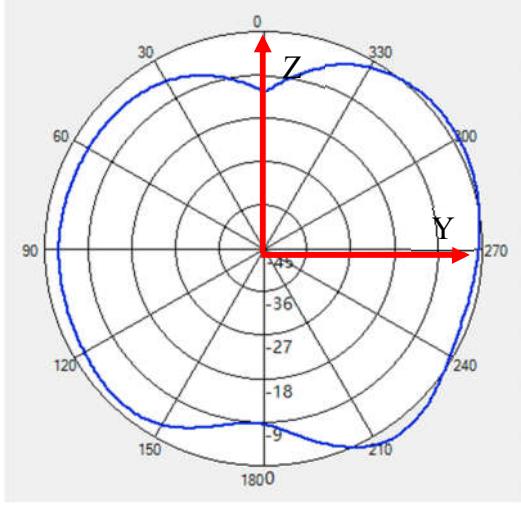
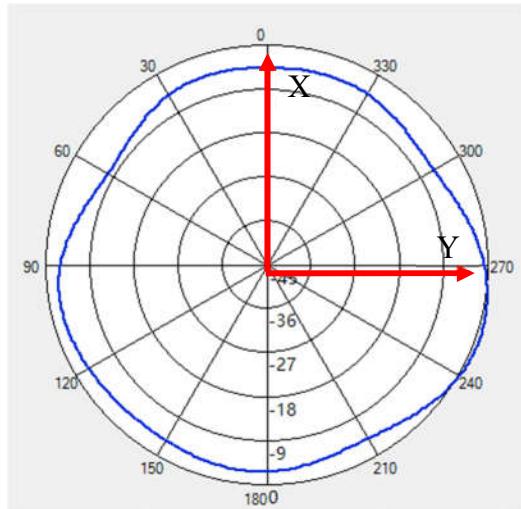
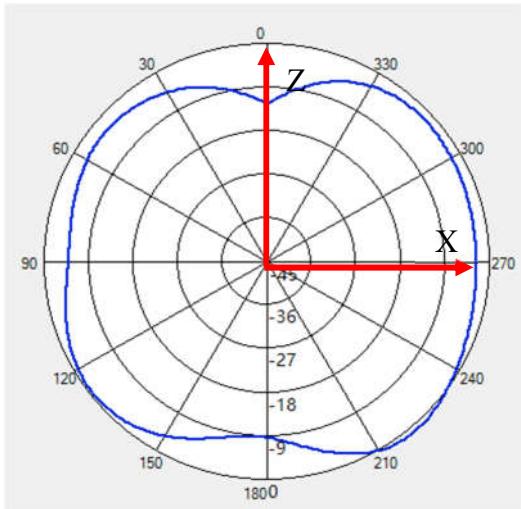
BT 天线			
Freq (MHz)	Effi (%)	Effi (dB)	Peak Gain
2400	58.7	-2.3	1.0
2410	60.8	-2.2	1.2
2420	59.5	-2.3	1.1
2430	61.0	-2.1	1.2
2440	61.9	-2.1	1.2
2450	60.9	-2.2	1.2
2460	60.1	-2.2	1.2
2470	59.4	-2.3	1.1
2480	59.4	-2.3	1.1
2490	58.2	-2.4	1.1
2500	57.7	-2.4	1.1
平均值	59.8	-2.2	1.1

### 4.3 Radiation Pattern

FF Base BT antenna: 2400MHz

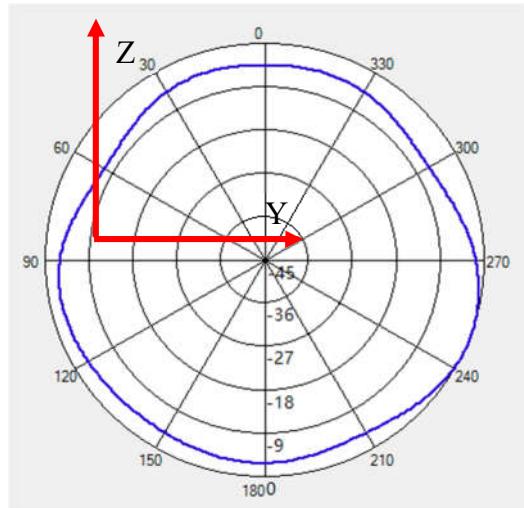
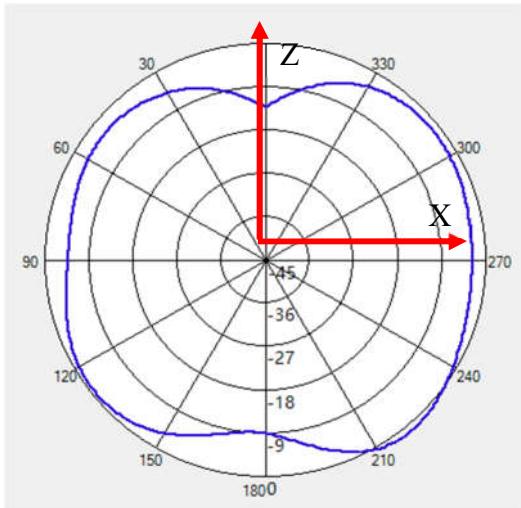


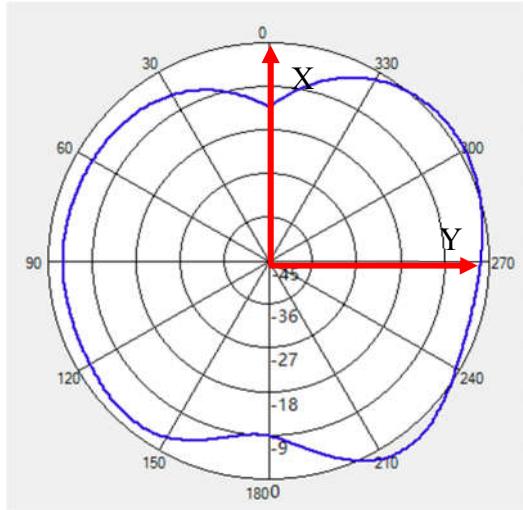
FF Base BT antenna: 2480MHz



2480MHz		
Phi=0deg Peak (dBi)	0.15	210 deg
Phi=90deg Peak (dBi)	1.11	150 deg
Theta=90deg Peak(dBi)	0.23	240 deg

FF base BT antenna: 2500MHz





2500MHz		
Phi=0deg Peak (dBi)	0.39	210 deg
Phi=90deg Peak (dBi)	0.99	150 deg
Theta=90deg Peak(dBi)	-0.17	240 deg