

Zhejiang Haitong communications
electronic Limited by Share Ltd.
(Shenzhen Haitong)

Customer: TCL Communication
Ltd.

Project name: T704SP

Product name: T704SP- Cellular & wifi antenna

Date: 2024.10.12

1. Antenna specification and test location

Antenna 0/1/2/3/4/5/6/7

Material: FPC

Manufacturer: Shenzhen Haitong

Manufacturer Address: Southern District, Phoenix Tower, 15 Nanshan District science and Technology North Road, Shenzhen, Guangdong.

Antenna gain and radiation pattern measured in SATIMO anechoic chamber.

Test engineer: youqiang zheng



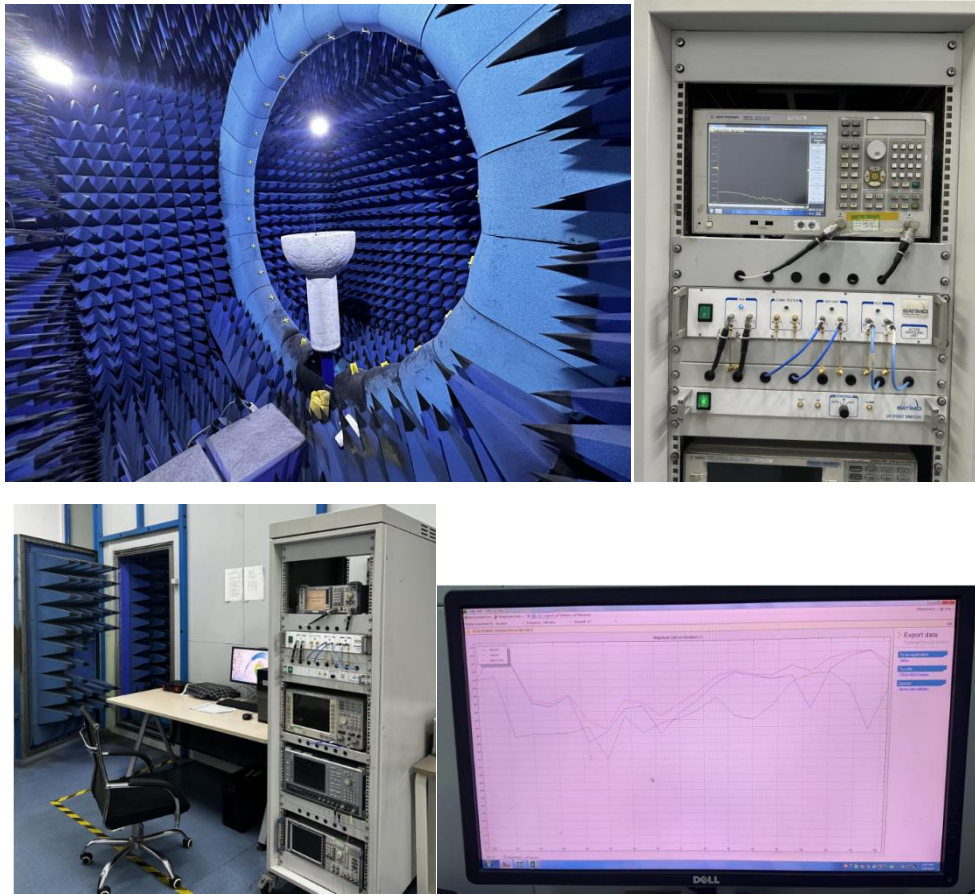
Test Equipment list

Description	Manufacturer	Model	Cal Date
Vector Network Analyzer	Agilent Technologies	E5071C	2024.10.10
Anechoic Chamber	SATIMO	SG24	2024.10.10

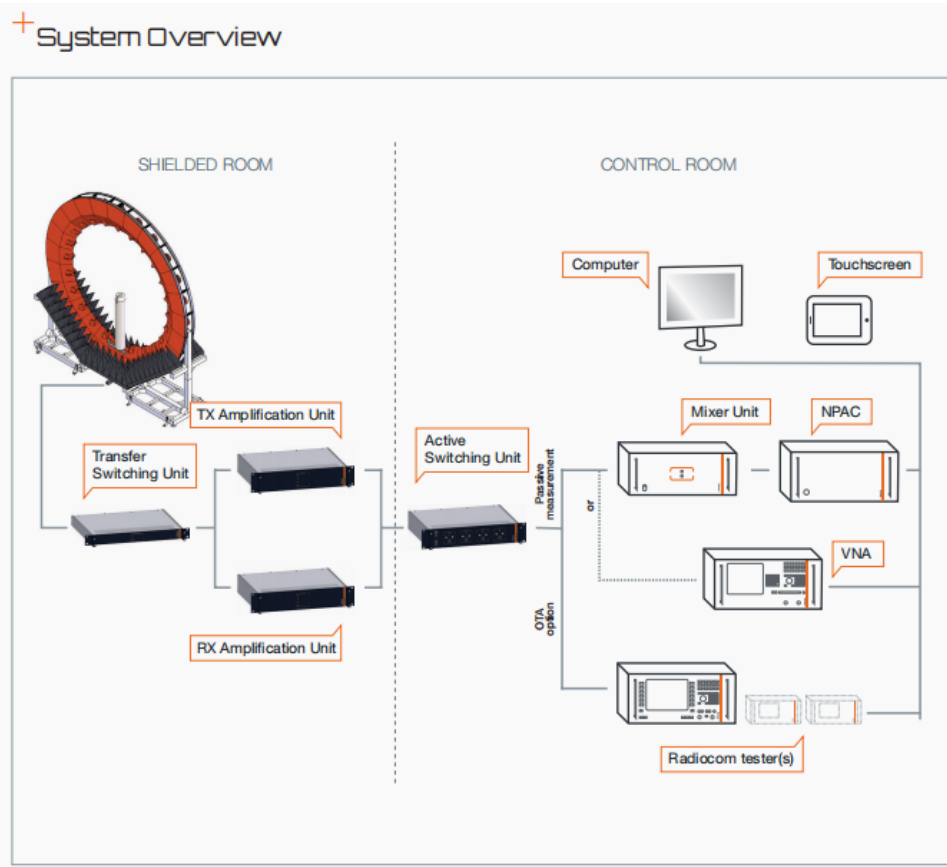
2. Test system introduction

2.1 Anechoic chamber

Our company has a number of anechoic chamber for OTA test. It is ranging from 400 MHz to 8.5 GHz, which can provide passive test and active test, including OTA overall 2G, 3G, 4G, 5G FR test, WiFi multi-mode test, GPS active test, Bluetooth active test. The test system can provide antenna gain, efficiency, radiation pattern, upper and lower hemisphere efficiency values and mutual disturbance correlation coefficient analysis.



2.2 Test system architecture



The figure above shows the connection and control process between the anechoic chamber of our company and the testing system and computer. The testing system has the characteristics of accurate, fast and simple testing. The operation interface is simple and humanized.

3. Test result

3.1 Antenna Gain

Antenna Gain

Gain of Antenna 0

Band	Gain average(dBi)	Gain Peak (dBi)
GSM850	-7	-3.8
GSM900	-10	-6.1
WCDMA B5	-7	-3.8
WCDMA B8	-11.1	-9.2
LTE B5	-7	-3.8
LTE B12	-6.7	-3.3
LTE B13	-6.6	-3.1
LTE B20	-6.8	-3.5
LTE B28	-6.7	-3.4
NR n5	-7	-3.8

Gain of Antenna 1

Band	Gain average(dBi)	Gain Peak (dBi)
(ENDC)LTE B2	-4.8	-1.3
(ENDC)LTE B66	-4.6	-1
(ENDC)LTE B7	-5.8	-2.6

Gain of Antenna 2

Band	Gain average(dBi)	Gain Peak (dBi)
GSM1800	-6	-2.3
GSM1900	-5	-1.6
WCDMA B1	-5	-1.3
WCDMA B2	-5	-1.6
WCDMA B4	-5.7	-2.6
LTE B1	-5	-1.3
LTE B2	-5	-1.6
LTE B3	-6	-2.3
LTE B4	-5.7	-2.6
LTE B66	-5.7	-2.6
LTE B48	-5.5	-1.1
NR n2	-5	-1.6
NR n66	-5.7	-2.6
NR n77 TX1	-5.5	-1.1
NR n78 TX1	-5.5	-1.1
NR n48	-5.5	-1.1

Gain of Antenna 4

Band	Gain average(dBi)	Gain Peak (dBi)
LTE B7	-5.3	-1.5

Gain of Antenna 6

Band	Gain average(dBi)	Gain Peak (dBi)
NR n77 TX2	-4.4	-0.3
NR n78TX2	-4.4	-0.3

Gain of Antenna 7

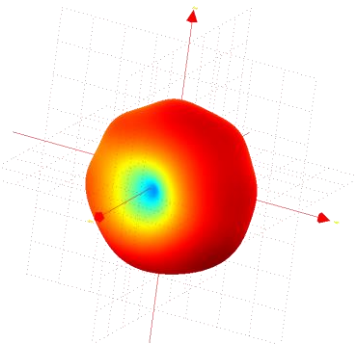
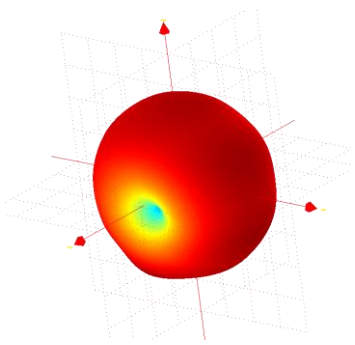
Band	Gain average(dBi)	Gain Peak (dBi)
Wi-Fi 2.4G/BT	-5.3	-0.8
Wi-Fi 5G	-6.1	-1.2

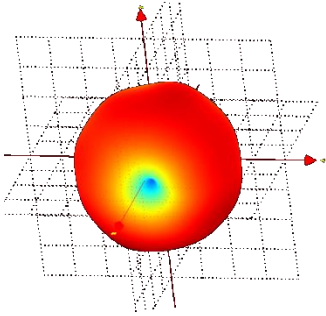
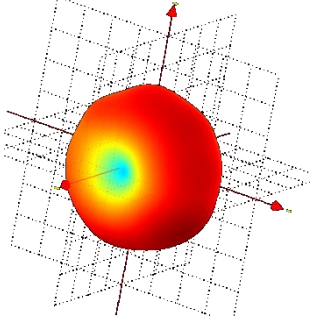
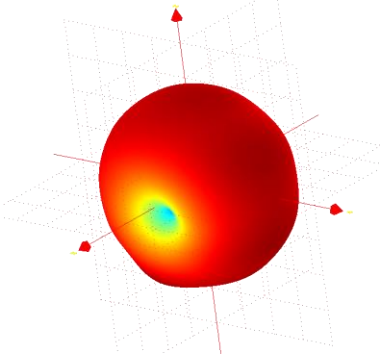
NFC antenna gain description:

The device does not support the test of NFC gain. In addition, all measurements were performed radiated and therefore additional antenna gain documentation is not required.

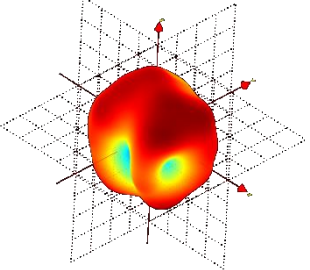
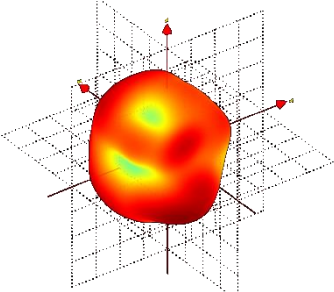
3.3 Radiation Pattern

Antenna 0

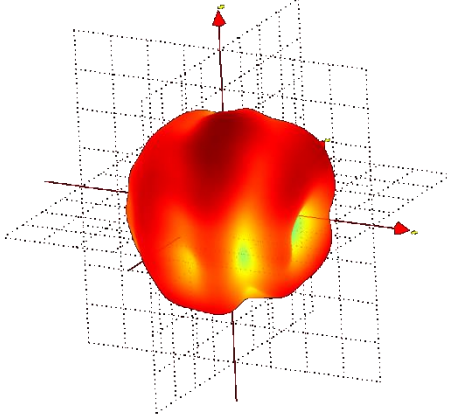
(Frequency Band)	GSM850/LTE B5/WCDMA B5/NR n5	B12
3D Radiation Pattern		
Efficiency[%]	19	21
Avg Gain [dBi]	-7	-6.7
Peak Gain [dBi]	-3.8	-3.3
(Frequency Band)	B13	B20

3D Radiation Pattern		
Efficiency[%]	22	20
Avg Gain [dBi]	-6.6	-6.8
Peak Gain [dBi]	-3.1	-3.5
(Frequency Band)	LTE B28	
3D Radiation Pattern		
Efficiency[%]	21	
Avg Gain [dBi]	-6.7	
Peak Gain [dBi]	-3.4	

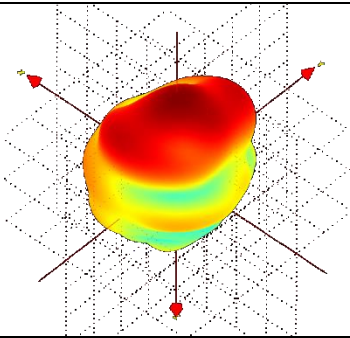
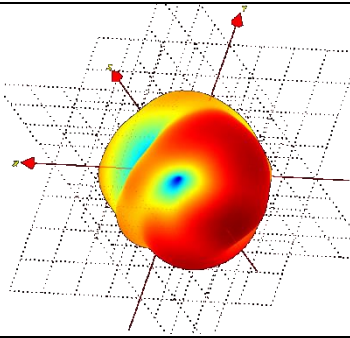
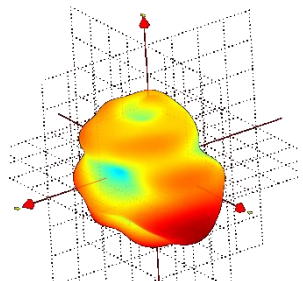
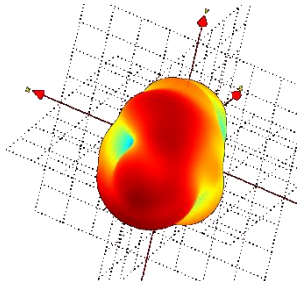
Antenna 1

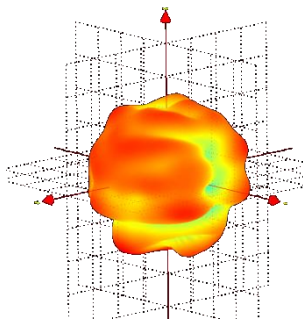
(Frequency Band)	B2	B66
3D Radiation Pattern		
Efficiency[%]	33	35
Avg Gain [dBi]	-4.8	-4.6
Peak Gain [dBi]	-1.3	-1

(Frequency Band)	B7
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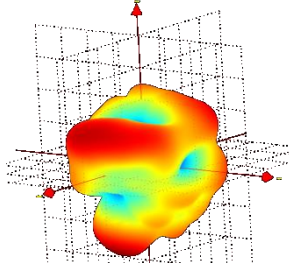
3D Radiation Pattern	
Efficiency[%]	28
Avg Gain [dBi]	-5.8
Peak Gain [dBi]	-26

Antenna 2

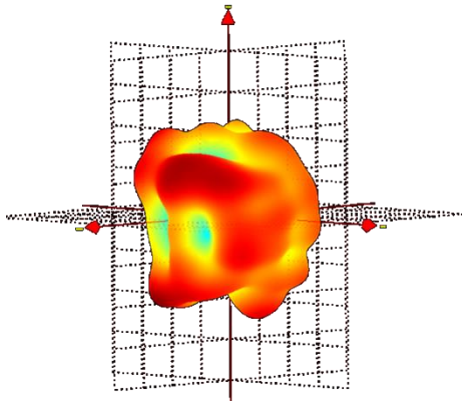
(Frequency Band)	WCDMA B1/LTE B1	GSM1900/WCDMA B2/LTE B2/NR n2
3D Radiation Pattern		
Efficiency[%]	31	30
Avg Gain [dBi]	-5.0	-5
Peak Gain [dBi]	-1.3	-1.6
(Frequency Band)	GSM1800/LTE B3	WCDMA B4/LTE B4/B66/NR n66
3D Radiation Pattern		
Efficiency[%]	26	27
Avg Gain [dBi]	-6.0	-5.7
Peak Gain [dBi]	-2.3	-2.6

(Frequency Band)	LTE B48/NR n48/n77 TX1/n78 TX1
3D Radiation Pattern	
Efficiency[%]	28
Avg Gain [dBi]	-5.5
Peak Gain [dBi]	-1.1

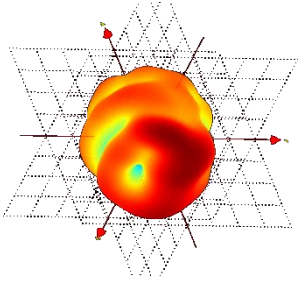
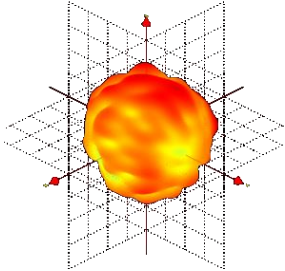
Antenna 4

(Frequency Band)	LTE B7
3D Radiation Pattern	
Efficiency[%]	30
Avg Gain [dBi]	-5.3
Peak Gain [dBi]	-1.5

Antenna 6

(Frequency Band)	n77 TX2/n78 TX2
3D Radiation Pattern	
Efficiency[%]	37
Avg Gain [dBi]	-4.4
Peak Gain [dBi]	-0.3

Antenna 7

(Frequency Band)	WiFi 2.4G/BT	WiFi 5G
3D Radiation Pattern		
Efficiency[%]	30	24
Avg Gain [dBi]	-5.3	-6.1
Peak Gain [dBi]	-0.8	-1.2