

# Global United Technology Services Co., Ltd.

Report No.: GTS202108000067F01

# **TEST REPORT**

Shanghai Notion Information Technology CO. LTD **Applicant:** 

Room 408, Building 2, Lane 666, Zhangheng Rd, Pudong New **Address of Applicant:** 

Area, Shanghai, China

Shanghai Notion Information Technology CO. LTD Manufacturer/Factory:

Room 408, Building 2, Lane 666, Zhangheng Rd, Pudong New Address of

Area, Shanghai, China Manufacturer/Factory:

**Equipment Under Test (EUT)** 

Product Name:

Model No.: R2811A, R281, R281A, P28, P28V

2AR45-R2811A FCC ID:

Applicable standards: FCC CFR Title 47 Part 2

FCC CFR Title 47 Part 22

FCC CFR Title 47 Part 24

Date of sample receipt: August 06, 2021

Date of Test: August 07, 2021-October 19, 2021

Date of report issued: October 20, 2021

PASS \* Test Result:

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

**Robinson Lo** Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.



# 2 Version

Version No.	Date	Description
00	October 20, 2021	Original
212111		
111111	111111111	

Prepared By:	Tiger. Chan	Date:	October 20, 2021
	Project Engineer	1/1/	
Check By:	Lobinson lund	Date:	October 20, 2021
	Reviewer		



# 3 Contents

		Page
2	VERSION	2
3	CONTENTS	3
4	TEST SUMMARY	4
5	GENERAL INFORMATION	5
	5.1 GENERAL DESCRIPTION OF EUT	5
	5.2 RELATED SUBMITTAL(s) / GRANT (s)	
	5.3 TEST METHODOLOGY	
	5.4 DEVIATION FROM STANDARDS	7
	5.5 ABNORMALITIES FROM STANDARD CONDITIONS	7
	5.6 TEST FACILITY	
	5.7 TEST LOCATION	7
6	TEST INSTRUMENTS LIST	8
7	SYSTEM TEST CONFIGURATION	10
	7.1 TEST MODE	10
	7.2 CONFIGURATION OF TESTED SYSTEM	
	7.3 CONDUCTED AVERAGE OUTPUT POWER AND ERP/EIRP	11
	7.4 PEAK-TO-AVERAGE RATIO	12
	7.5 OCCUPY BANDWIDTH	
	7.6 MODULATION CHARACTERISTIC	
	7.7 OUT OF BAND EMISSION AT ANTENNA TERMINALS	
	7.8 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT	
	7.9 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT	
	7.10 FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT	20
8	TEST SETUP PHOTO	21
9	EUT CONSTRUCTIONAL DETAILS	21



4 Test Summary

Section in CFR 47	Result
Part 1.1307	Pass*
Part 2.1093	FdSS
Part 2.1046	Dave
Part 22.913 (a) Part 24.232 (c)	Pass
Part 2.1046	Pass
Part 24.232	r ass
Part 2.1047	Pass
Part 2.1049	111111
	Pass
,	
	Park Park
	Pass
	Pass
Part 24.238	1 400
Part 2.1051	
Part 22.917	Pass
Part 24.238	1 1 1 1 1 1
Part 22.913(a)	Pass
\ /	1 833
Part 2.1055(a)(1)(b)	111111
	Pass
	Part Part of the
	Pass
	Part 1.1307 Part 2.1093 Part 2.1046 Part 22.913 (a) Part 24.232 (c) Part 24.232 Part 2.1047 Part 2.1047 Part 2.1049 Part 22.917(b) Part 24.238(b) Part 22.917 Part 24.238 Part 2.1053 Part 2.1053 Part 22.917 Part 24.238 Part 2.1051 Part 24.238 Part 2.917 Part 24.238

Pass: The EUT complies with the essential requirements in the standard.



# 5 General Information

# 5.1 General Description of EUT

Product Name:	CPE
Model No.:	R2811A, R281, R281A, P28, P28V
Test Model No.:	R2811A
Remark:All above mode	els are identical in the same PCB layout, interior structure and electrical circuits
The differences are app	pearance color and model name for commercial purpose.
Test sample(s) ID:	GTS202108000067-1
Sample(s) Status:	Engineer sample
S/N:	N/A
Hardware Version:	N/A
Software Version:	N/A
Support Networks:	WCDMA
Support Bands:	WCDMA Band II, WCDMA Band V
TX Frequency:	WCDMA Band II: 1852.40MHz-1907.60MHz
	WCDMA Band V: 826.40MHz -846.60MHz
Modulation type:	QPSK
Antenna type:	Integral Antenna
Antenna gain:	WCDMA Band II: 2dbi
	WCDMA Band V: 2dbi
Power supply:	AC ADAPTER 1
	MODEL: KFL-T43
	INPUT: AC 100-240V, 50/60Hz 0.8A
	OUTPUT: DC 12.0V/1500mA
	AC ADAPTER 2
	MODEL: RD1202000-C55-154MG
	INPUT: AC 100-240V, 50/60Hz 1.0A MAX
	OUTPUT: DC 12.0V/2A



#### **Operation Frequency List:**

WCDI	MA Band V	WCDMA Band II		
Channel	Frequency (MHz)	Channel	Frequency (MHz)	
4132	826.40	9262	1852.40	
4133	826.60	9263	1852.60	
111111			1111111111	
4181	836.20	9399	1879.80	
4182	836.40	9400	1880.00	
4183	836.60	9401	1880.20	
77777				
4232	846.40	9537	1907.40	
4233	846.60	9538	1907.60	

Regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

## Final test channel:

WCDM	A Band V	WCD	MA Band II
Channel	Frequency (MHz)	Channel	Frequency (MHz)
4132	826.40	9262	1852.40
4183	836.60	9400	1880.00
4233	846.60	9538	1907.60



## 5.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is filing to comply with Section Part 22/24 of the FCC CFR 47 Rules.

#### 5.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures document on ANSI C63.26:2015 and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057

#### 5.4 Deviation from Standards

None.

#### 5.5 Abnormalities from Standard Conditions

None.

#### 5.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

#### • FCC —Registration No.: 381383

Designation Number: CN5029

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files.

#### • IC —Registration No.: 9079A

CAB identifier: CN0091

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with

Registration No.: 9079A.

#### • NVLAP (LAB CODE:600179-0)

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

#### 5.7 Test Location

#### All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480 Fax: 0755-27798960



## 6 Test Instruments list

Rad	Radiated Emission:					
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 02 2020	July. 01 2025
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 24 2021	June. 23 2022
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 24 2021	June. 23 2022
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 24 2021	June. 23 2022
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 24 2021	June. 23 2022
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 24 2021	June. 23 2022
9	Coaxial Cable	GTS	N/A	GTS211	June. 24 2021	June. 23 2022
10	Coaxial cable	GTS	N/A	GTS210	June. 24 2021	June. 23 2022
11	Coaxial Cable	GTS	N/A	GTS212	June. 24 2021	June. 23 2022
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 24 2021	June. 23 2022
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 24 2021	June. 23 2022
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 24 2021	June. 23 2022
15	Band filter	Amindeon	82346	GTS219	June. 24 2021	June. 23 2022
16	Power Meter	Anritsu	ML2495A	GTS540	June. 24 2021	June. 23 2022
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 24 2021	June. 23 2022
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 24 2021	June. 23 2022
19	Splitter	Agilent	11636B	GTS237	June. 24 2021	June. 23 2022
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 24 2021	June. 23 2022
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 17 2021	Oct. 16 2022
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 17 2021	Oct. 16 2022
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 17 2021	Oct. 16 2022
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 24 2021	June. 23 2022



Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 24 2021	June. 23 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 24 2021	June. 23 2022
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 24 2021	June. 23 2022
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 24 2021	June. 23 2022
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 24 2021	June. 23 2022
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 24 2021	June. 23 2022
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 24 2021	June. 23 2022
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 24 2021	June. 23 2022

Gene	General used equipment:					
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 24 2021	June. 23 2022
2	Barometer	ChangChun	DYM3	GTS255	June. 24 2021	June. 23 2022



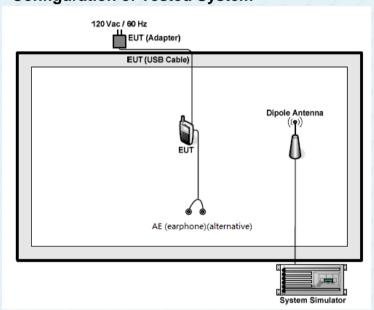
# 7 System test configuration

## 7.1 Test mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on the worst emission.

Test modes				
Band Radiated Conducted				
WCDMA Band II	■ RMC 12.2Kbps link	■ HSPA/RMC 12.2Kbps link		
WCDMA Band V	■ RMC 12.2Kbps link	■ HSPA/RMC 12.2Kbps link		

# 7.2 Configuration of Tested System



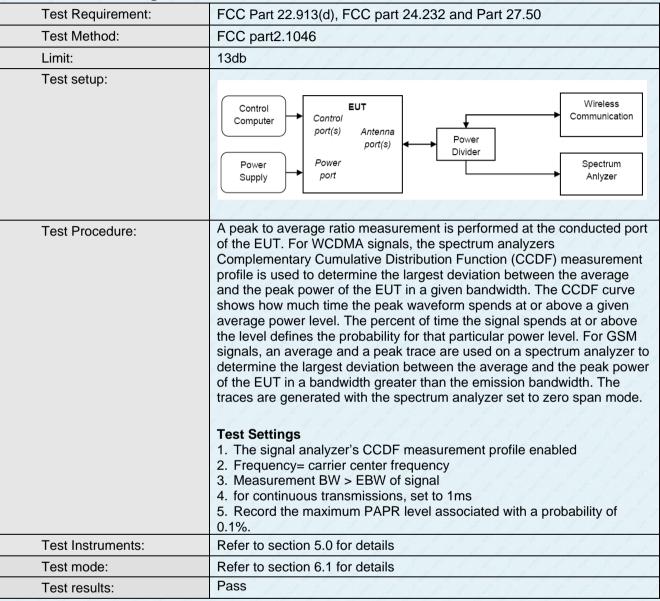


# 7.3 Conducted Average Output Power and ERP/EIRP

Test Requirement:	FCC part 22.913(a) and FCC part 24.232(c) and FCC part 27.50			
Test Method:	FCC part2.1046			
Limit:	WCDMA Band V: 7W(38.45dBm)			
	WCDMA Band II: 2W(33dBm)			
Test setup:	EUT Splitter Communication Tester			
	Power meter			
	Note: Measurement setup for testing on Antenna connector			
Test Procedure:	The transmitter output port was connected to base station.			
	<ol> <li>The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement.</li> </ol>			
	Set EUT at maximum power through base station.			
	Select lowest, middle, and highest channels for each band and different modulation.			
	5. Measure the maximum burst power.			
	6. EIRP=measured power+ antenna gain			
	ERP=EIRP-2.15			
Test Instruments:	Refer to section 5.0 for details			
Test mode:	Refer to section 6.1 for details			
Test results:	Pass			

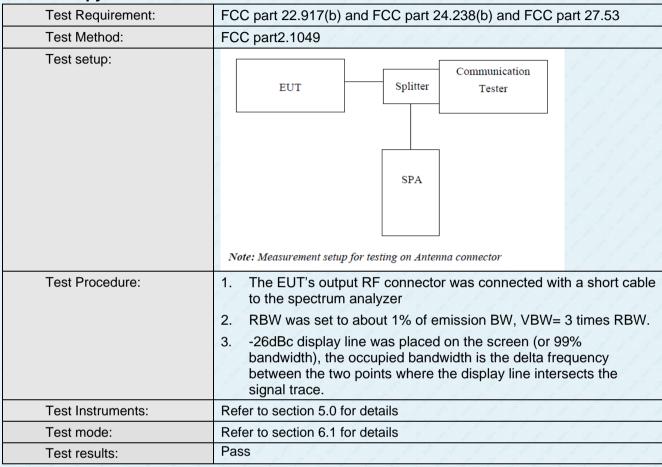


## 7.4 Peak-to-Average Ratio





### 7.5 Occupy Bandwidth

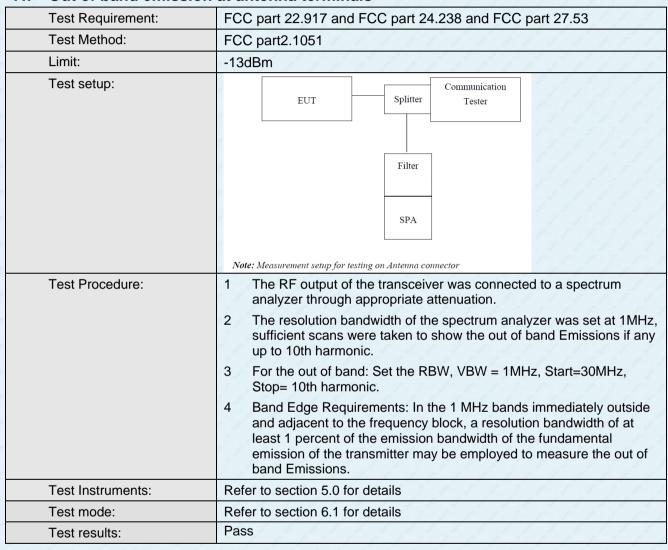




#### 7.6 MODULATION CHARACTERISTIC

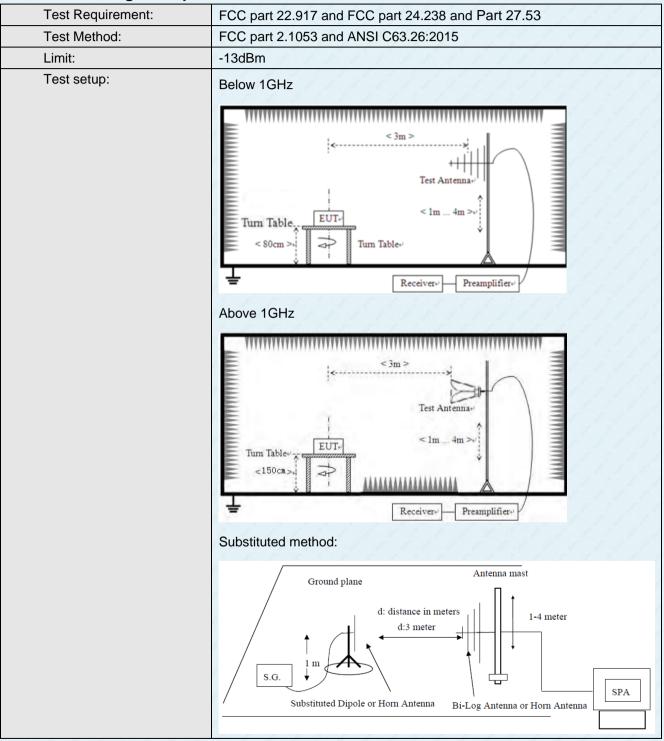
According to FCC § 2.1047(d), Part 22H & 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

### 7.7 Out of band emission at antenna terminals





## 7.8 Field strength of spurious radiation measurement



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Test Procedure:	<ol> <li>The EUT was placed on an non-conductive turntable using a non- conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.</li> </ol>		
	2. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.		
	<ol> <li>The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels).</li> <li>Once spurious emission was identified, the power of the emission was determined using the substitution method.</li> </ol>		
	The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.		
	EIRP = S.G. output (dBm) + Antenna Gain(dB/dBi) -		
	Cable Loss (dB)		
	ERP=EIRP-2.15		
Test Instruments:	Refer to section 5.0 for details		
Test mode:	Refer to section 6.1 for details		
Test results:	Pass		

Measurement Data



WCDMA Band II									
Channel	Frequenc y(MHz)	Polari zation	SGP [dBm]	Substitution Gain[dBi]	Cable loss[dB]	EIRP (dBm)	Limit (dBm)	Over Limit (dBm)	
Lowest	3704.80	Н	-50.55	13.13	3.88	-41.3	-13	-28.3	
	5557.20	H	-50.28	11.62	5.27	-43.93	-13	-30.93	
	7409.60	Ĥ	-46.85	10.22	6.73	-43.36	-13	-30.36	
	3704.80	V	-47.38	13.13	3.88	-38.13	-13	-25.13	
	5557.20	V	-48.55	11.62	5.27	-42.2	-13	-29.2	
	7409.60	V	-45.41	10.22	6.73	-41.92	-13	-28.92	
Middle	3760.00	Н	-47.51	13.13	3.9	-38.28	-13	-25.28	
	5640.00	H	-44.37	11.62	5.33	-38.08	-13	-25.08	
	7520.00	Ĥ	-44.52	10.22	6.82	-41.12	-13	-28.12	
	3760.00	V	-47.6	13.13	3.9	-38.37	-13	-25.37	
	5640.00	V	-49.94	11.62	5.33	-43.65	-13	-30.65	
	7520.00	V	-48.5	10.22	6.82	-45.1	-13	-32.1	
Highest	3815.20	/ H/	-49.24	13.13	3.92	-40.03	-13	-27.03	
	5722.80	Н	-50.6	11.62	5.4	-44.38	-13	-31.38	
	7630.40	H	-50.18	10.22	6.8	-46.76	-13	-33.76	
	3815.20	V	-49.06	13.13	3.92	-39.85	-13	-26.85	
	5722.80	V	-46.52	11.62	5.4	-40.3	-13	-27.3	
	7630.40	V	-49.11	10.22	6.8	-45.69	-13	-32.69	

The emission levels of below 1 GHz are very lower than the limit so not show in test report

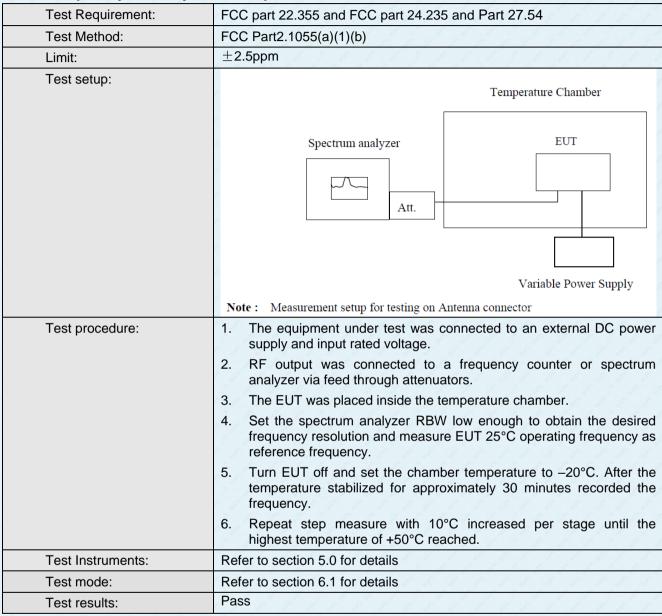


WCDMA Band V									
Channel	Frequenc y(MHz)	Polari zation	SGP [dBm]	Substitution Gain[dBi]	Cable loss[dB]	ERP (dBm)	Limit (dBm)	Over Limit (dBm)	
Lowest	1652.80	Н	-46.72	6.74	2.37	-44.5	-13	-31.5	
	2479.20	Н	-47.83	8.94	3.18	-44.22	-13	-31.22	
	3305.60	/ H	-49.42	10.62	3.62	-44.57	-13	-31.57	
	1652.80	V	-47.16	6.74	2.37	-44.94	-13	-31.94	
	2479.20	V	-47.09	8.94	3.18	-43.48	-13	-30.48	
	3305.60	V	-50.57	10.62	3.62	-45.72	-13	-32.72	
Middle	1672.80	Н	-47.3	6.74	2.39	-45.1	-13	-32.1	
	2509.20	H	-45.3	8.94	3.03	-41.54	-13	-28.54	
	3345.60	/ H/	-46.48	10.62	3.63	-41.64	-13	-28.64	
	1672.80	V	-51.33	6.74	2.39	-49.13	-13	-36.13	
	2509.20	V	-45.64	8.94	3.03	-41.88	-13	-28.88	
	3345.60	V	-49.78	10.62	3.63	-44.94	-13	-31.94	
Highest	1693.20	H	-47.17	6.74	2.4	-44.98	-13	-31.98	
	2539.80	И.	-50.49	8.94	3.06	-46.76	-13	-33.76	
	3386.40	/ H/	-51.52	10.62	3.64	-46.69	-13	-33.69	
	1693.20	V	-50.44	6.74	2.4	-48.25	-13	-35.25	
	2539.80	V	-46.15	8.94	3.06	-42.42	-13	-29.42	
	3386.40	V	-46.03	10.62	3.64	-41.2	-13	-28.2	

The emission levels of below 1 GHz are very lower than the limit so not show in test report

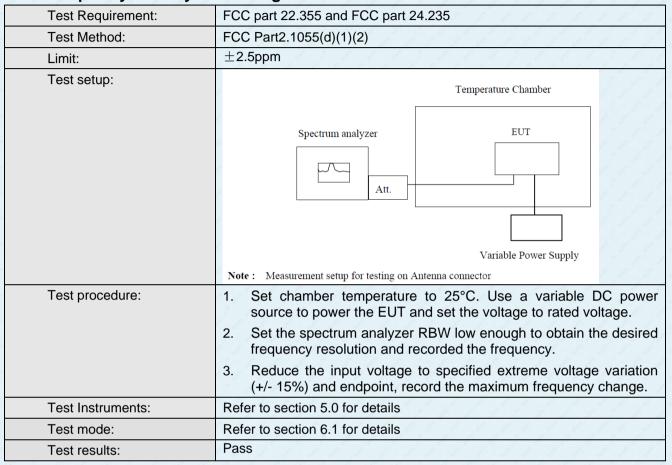


## 7.9 Frequency stability V.S. Temperature measurement





## 7.10 Frequency stability V.S. Voltage measurement





# 8 Test Setup Photo

Reference to the appendix I for details.

## 9 EUT Constructional Details

Reference to the appendix II for details.

----End-----