ACCREDITED
CERTIFICATE #5473.01

Test Report No.:
FCC2022-0037-RF4

RF Test Report

EUT	:	**Wireless Module**
MODEL	:	**N/A**
BRAND NAME	:	**A7672G**
CLIENT	:	**SIMCom Wireless Solutions Limited**
Classification Of Test	:	**N/A**

CVC Testing Technology Co., Ltd.

Client	**Name: SIMCom Wireless Solutions Limited** **Address: Building 3, No.289 LinHong Road,Changning District,Shanghai,P.R.China**
Manufacturer	**Name: SIMCom Wireless Solutions Limited** **Address: Building 3, No.289 LinHong Road,Changning District,Shanghai,P.R.China**
Equipment Under Test	**Name: Wireless Module** **Model/Type: A7672G** **Trade mark: N/A** **Serial NO.: N/A** **Sampe NO.:3-1**

Date of Receipt.	**2022.7.25**	Date of Testing	**2022.07.25～2022.10.09**

Test Specification	**Test Result**
ANSI C63.26-2015, **47 CFR Part 2, 22(H), 24(E), 27(L), 27(F), 27(H),90(S)** **ANSI/TIA-603-E**	PASS

Evaluation of Test Result	The equipment under test was found to comply with the requirements of the standards applied. **Issue Date: 2022.10.09**

Tested by:	Reviewed by:	Approved by:
Xu ZhenFei	Liu YongHai	Chen HuaWen
Name Signature	Name Signature	Name Signature

Other Aspects: NONE.

Abbreviations:OK, Pass= passed Fail = failed N/A= not applicable EUT= equipment, sample(s) under tested

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FCC2022-0037-RF4	Original release	2022.10.09

1 SUMMARY OF TEST RESULTS

STANDARD SECTION	TEST TYPE AND LIMIT	LIMIT	Report Section	RESULT
§2.1046	Conducted power output	---	Annex A	Report Only
§90.635(b)	Effective Radiated Power (LTE B26 814~824 MHz)	ERP < 100 Watt	3.1	N/A
§22.913(a)(5)	Effective Radiated Power (LTE B5) (LTE B26 824~849 MHz)	ERP < 7 Watt		
§27.50(b)(10) §27.50(c)(10)	Effective Radiated Power (LTE B12) (LTE B13)	ERP < 3 Watt		
§24.232(c) §27.50(h)(2)	Equivalent Isotropic Radiated Power (LTE B2) (LTE B7) (LTE B25) (LTE B38) (LTE B41)	EIRP < 2Watt		
§27.50(d)(4)	Equivalent Isotropic Radiated Power (LTE B4) (LTE B 66)	EIRP < 1Watt		
§27.50(a)(3)	Equivalent Isotropic Radiated Power (LTE B40)	EIRP < 0.25 Watt		
§2.1049	Occupied Bandwidth	---	Annex C	Report Only
§24.232(d)	Peak-to-Average Power Ratio	<13 dB	Annex B	PASS
§2.1055 §22.355	Frequency Stability	< 2.5 ppm	Annex F	PASS
§2.1055/ §24.235 §27.54/ §90.213	Frequency Stability	Within authorized bands of operation/frequency block.		
§2.1051 §22.917-5/26	Band Edge Compliance (LTE B5) (LTE B26 824~849 MHz)	< 43+10log10(P[Watts])	Annex D	PASS
§2.1051 §24.238(a)	Band Edge Compliance (LTE B2) (LTE B25)			
§2.1051 §27.53(a)	Band Edge Compliance (LTE B40)			
§2.1051 §27.53(c) §27.53(f)	Band Edge Compliance (LTE B13)			
§2.1051 §27.53(g)	Band Edge Compliance (LTE B12)			
§2.1051 §27.53(h)	Band Edge Compliance (LTE B4) (LTE B66)			
§2.1051 §27.53(m)	Band Edge Compliance (LTE B7) (LTE B38) (LTE B41)			
§2.1051 §90.691	Band Edge Compliance (LTE B26 814~824 MHz)			

STANDARD SECTION	TEST TYPE AND LIMIT	LIMIT	Report Section	RESULT
§2.1051 §22.917	Conducted Spurious Emission (LTE B5) (LTE B26 824~849 MHz)	< 43+10log10(P[Watts])	Annex E	PASS
§2.1051 §24.238(a)	Conducted Spurious Emission (LTE B2) (LTE B25)			
§2.1051 §27.53(a)	Conducted Spurious Emission (LTE B40)			
§2.1051 §27.53(c) §27.53(f)	Conducted Spurious Emission (LTE B13)			
§2.1051 §27.53(g)	Conducted Spurious Emission (LTE B12)			
§2.1051 §27.53(h)	Conducted Spurious Emission (LTE B4) (LTE B66)			
§2.1051 §27.53(m)	Conducted Spurious Emission (LTE B7) (LTE B38) (LTE B41)			
§2.1051 §90.691	Conducted Spurious Emission (LTE B26 814~824 MHz)			
§2.1051 §22.917	Radiates Spurious Emission (LTE B5) (LTE B26 824~849 MHz)	< 43+10log10(P[Watts])	3.6	PASS
§2.1051 §24.238(a)	Radiates Spurious Emission (LTE B2) (LTE B25)			
§2.1051 §27.53(a)	Radiates Spurious Emission (LTE B40)			
§2.1051 §27.53(c) §27.53(f)	Radiates Spurious Emission (LTE B13)			
§2.1051 §27.53(g)	Radiates Spurious Emission (LTE B12)			
§2.1051 §27.53(h)	Radiates Spurious Emission (LTE B4) (LTE B66)			
§2.1051 §27.53(m)	Radiates Spurious Emission (LTE B7) (LTE B38) (LTE B41)			
§2.1051 §90.691	Radiates Spurious Emission (LTE B26 814~824 MHz)			
§2.1051 §22.917	Radiates Spurious Emission (LTE B5) (LTE B26 824~849 MHz)			
§2.1051 §24.238(a)	Radiates Spurious Emission (LTE B2) (LTE B25)			
§2.1051 §27.53(a)	Radiates Spurious Emission (LTE B40)			

1.1 LIST OF TEST AND MEASUREMENT INSTRUMENTS

Antenna Port Conducted Test				
Equipment	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. Due**
Communication Shielded Room 1	CRT	4m*3m*3m	CRTDSWKSR44301	2024/04/24
Spectrum Analyzer	R&S	FSV30	104337	2022/11/03
Comprehensive Test Instrument	R&S	CMW500	137779	2023/07/10
Comprehensive Test Instrument	R&S	CMW500	169888	2022/12/01
LTE Comprehensive Test Instrument	KEYSIGHT	E7515A	MY58010639	2023/04/07
Analog Signal Generator	R&S	SMA100B	103663	2023/07/10
Vector Signal Generator	R&S	SMBV100B	101757	2023/06/22
Radiated Spurious Emission Test - 3M Chamber				
Equipment	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. Due**
3m Semi-Anechoic Chamber	Rohde&Schwarz	FACT-4	ST08035	2024/12/12
Spectrum Analyzer	Rohde&Schwarz	N9010B	MY57470323	2023/03/02
EMI Test Receiver	SCHWARZBECK	N9038A-508	MY532290079	2023/03/02
Broadband Antenna	ETS	VULB 9163	9163-530	2023/06/25
Waveguide Horn Antenna	QMS	HF906	360306/008	2023/03/04
Waveguide Horn Antenna	MORI	BBHA9170	00949	2023/07/31
Preamplifier	Rohde&Schwarz	BBV 9721	9721-050	2023/06/05
5G Bandstop Filters	Rohde&Schwarz	WRCJV12-4900-5100-5900 -6100-50EE	N/A	2022/12/20
Comprehensive tester	Rohde&Schwarz	CMW500	159000	2022/12/20

1.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	UNCERTAINTY
Maximum Peak Output Power	±0.9dB
Frequency Stability	±76.97Hz
Radiated emissions (30MHz~1GHz)	±5.0dB
Radiated emissions (1GHz ~18GHz)	±4.8dB
Radiated emissions (18GHz ~40GHz)	±5.1dB
Conducted emissions	±2.7dB
Occupied Channel Bandwidth	±43.58KHz
Band Edge Measurements	±2.7dB
Peak to average ratio	±0.76dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.3 TEST LOCATION

The tests and measurements refer to this report were performed by EMC testing Lab. of CVC Testing Technology Co., Ltd.

Address: No.3,TiantaiyiRoad,KaitaiAvenue,ScienceCity,Guangzhou,China
Post Code：510663 Tel：020-32293888
FAX：020-32293889 E-mail
Test Firm Registration Number: 937273

2 GENERAL INFORMATION

2.1 GENERAL PRODUCT INFORMATION

PRODUCT	Wireless Module			
BRAND	N/A			
MODEL	A7672G			
FCC ID	2AJYU-8BAE005			
POWER SUPPLY	DC 3.8V From host unit			
LTE CATEGORY	CAT 1			
MODULATION TYPE	LTE	QPSK, 16QAM		
OPERATING FREQUENCY And MAXIMUM OUTPUT POWER	Band	TX(MHz)	RX(MHz)	Maximum Output Power to Antenna
	LTE B2	1850 ~ 1910	1930 ~ 1990	23.54 dBm
	LTE B4	1710 ~ 1755	2110 ~ 2155	24.37 dBm
	LTE B5	824 ~ 849	869 ~ 894	23.50 dBm
	LTE B7	2500 ~ 2570	2620 ~ 2690	21.36 dBm
	LTE B12	699 ~ 716	729 ~ 746	24.03 dBm
	LTE B13	777 ~ 787	746 ~ 756	23.09 dBm
	LTE B25	1850 ~ 1915	1930 ~ 1995	23.67 dBm
	LTE B26 (814~ 824)	814~ 824	859 ~ 869	23.41 dBm
	LTE B26 (824~ 849)	824~ 849	869 ~ 894	23.53 dBm
	LTE B38	2570 ~ 2620	2570 ~ 2620	23.27 dBm
	LTE B40 Block A	2305 ~ 2315	2305 ~ 2315	23.55 dBm
	LTE B40 Block B	2350 ~ 2360	2350 ~ 2360	23.20 dBm
	LTE B41	2496 ~ 2690	2496 ~ 2690	23.08 dBm
	LTE B66	1710 ~ 1780	2110 ~ 2180	24.38 dBm
I/O PORTS	Refer to user's manual			
CABLE SUPPLIED	N/A			

Remark:

1. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
3. Please refer to the EUT photo document (Reference No.: FCC2022-0037-E) for detailed product photo.
4. FCC ID:2AJYU-8BAE005 and FCC ID:2AJYU-8BAE003, present the same electrical, physical and electro mechanics characteristics, the same PCB, layout and components. The only difference between them is the module names printed in the label, so the test data in the two reports is exactly the same.
5. The EUT have SISO function, provides 1 completed transmitter and 1 receiver.
6. LTE Band 26 overlaps the entire frequency range of LTE Band 5. Therefore, the test results provided inthis report covers Band 5 and the portion of Band 26 subject to Part 22.
7. LTE Band 66 overlaps the entire frequency range of LTE Band 4. Therefore, the test results provided in

this report covers Band 66 as well as Band 4.

8. LTE Band 25 overlaps the entire frequency range of LTE Band 2. Therefore, the test results provided in this report covers Band 25 as well as Band 2.
9. LTE Band 12 overlaps the entire frequency range of LTE Band 17. Therefore, the test results provided in this report covers Band 12 as well as Band 17.
10. LTE Band 40 overlaps the entire frequency range of LTE Band 38. Therefore, the test results provided in this report covers Band 40 as well as Band 38.
11. LTE CAT 1 16QAM (10MHz/15MHz/20MHz) not support full RB

2.2 Description of Accessories

2.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports.

EUT CONFIGURE MODE	DESCRIPTION
-	EUT + Adapter + with LTE link

Test modes are chosen as the worst case configuration below for LTE

Test items	LTE Band	Bandwidth (MHz)						Modulation		RB			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1%	50%	100%	L	M	H
RF power output	2	O	O	O	O	O	O	O	O	O	O	O	O	O	O
	4	O	O	O	O	O	O	O	O	O	O	O	O	O	O
	5	O	O	O	O	-	-	O	O	O	O	O	O	O	O
	7	-		O	O	O	O	O	O	O	O	O	O	O	O
	12	O	O	O	O	-	-	O	O	O	O	O	O	O	O
	13	-	-	O	O	-	-	O	O	O	O	O	O	O	O
	25	O	O	O	O	O	O	O	O	O	O	O	O	O	O
	26	O	O	O	O	O	-	O	O	O	O	O	O	O	O
	38	-	-	O	O	O	O	O	O	O	O	O	O	O	O
	40	-	-	O	O	-	-	O	O	O	O	O	O	O	O
	41	-	-	O	O	O	O	O	O	O	O	O	O	O	O
	66	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Occupied Bandwidth	7	O	O	O	O	-		O	O	-	-	O	O	O	O
	12	-	-	O	O	O	O	O	O	-	-	O	O	O	O
	13	O	O	O	O	-	-	O	O	-	-	O	O	O	O
	25	-	-	O	O	-	-	O	O	-	-	O	O	O	O
	26	O	O	O	O	O	O	O	O	-	-	O	O	O	O
	40	-	-	O	O	-	-	O	O	-	-	O	O	O	O
	41	-	-	O	O	O	O	O	O	-	-	O	O	O	O
	66	O	O	O	O	O	O	O	O	-	-	O	O	O	O
Note	1. The mark “O” means that this configuration is chosen for testing. 2. The mark “-” means that this configuration is not testing.														

Test items	LTE Band	Bandwidth (MHz)						Modulation		RB			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1%	50%	100%	L	M	H
Band Edge Compliance	7	-	-	O	O	O	O	O	O	O	-	O	O	-	O
	12	O	O	O	O	-	-	O	O	O	-	O	O	-	O
	13	-	-	O	O	-	-	O	O	O	-	O	O	-	O
	25	O	O	O	O	O	O	O	O	O	-	O	O	-	O
	26	O	O	O	O	O	-	O	O	O	-	O	O	-	O
	40	-	-	O	O	-	-	O	O	O	-	O	O	-	O
	41	-	-	O	O	O	O	O	O	O	-	O	O	-	O
	66	O	O	O	O	O	O	O	O	O	-	O	O	-	O
Peak-to-Average Power Ratio	7	-	-	O	O	O	O	O	O	O	-	O	O	O	O
	12	O	O	O	O	-	-	O	O	O	-	O	O	O	O
	13	-	-	O	O	-	-	O	O	O	-	O	O	O	O
	25	O	O	O	O	O	O	O	O	O	-	O	O	O	O
	26	O	O	O	O	O	-	O	O	O	-	O	O	O	O
	40	-	-	O	O	-	-	O	O	O	-	O	O	O	O
	41	-	-	O	O	O	O	O	O	O	-	O	O	O	O
	66	O	O	O	O	O	O	O	O	O	-	O	O	O	O
Frequency Stability	7	-	-	O	O	O	O	O	-	-	-	O	O	O	O
	12	O	O	O	O	-	-	O	-	-	-	O	O	O	O
	13	-	-	O	O	-	-	O	-	-	-	O	O	O	O
	25	O	O	O	O	O	O	O	-	-	-	O	O	O	O
	26	O	O	O	O	O	-	O	-	-	-	O	O	O	O
	40	-	-	O	O	-	-	O	-	-	-	O	O	O	O
	41	-	-	O	O	O	O	O	-	-	-	O	O	O	O
	66	O	O	O	O	O	O	O	-	-	-	O	O	O	O
Note	1. The mark “O” means that this configuration is chosen for testing. 2. The mark “-” means that this configuration is not testing.														

Test items	LTE Band	Bandwidth (MHz)						Modulation		RB			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1%	50%	100%	L	M	H
Conducted Spurious Emission	7	-	-	O	O	O	O	O	O	O	-	-	O	O	O
	12	O	O	O	O	-	-	O	O	O	-	-	O	O	O
	13	-	-	O	O	-	-	O	O	O	-	-	O	O	O
	25	O	O	O	O	O	O	O	O	O	-	-	O	O	O
	26	O	O	O	O	O	-	O	O	O	-	-	O	O	O
	40	-	-	O	O	-	-	O	O	O	-	-	O	O	O
	41	-	-	O	O	O	O	O	O	O	-	-	O	O	O
	66	O	O	O	O	O	O	O	O	O	-	-	O	O	O
Radiates Spurious Emission (Note3)	7	-	-	O	O	O	O	O	O	O	-	-	O	O	O
	12	O	O	O	O	-	-	O	O	O	-	-	O	O	O
	13	-	-	O	O	-	-	O	O	O	-	-	O	O	O
	25	O	O	O	O	O	O	O	O	O	-	-	O	O	O
	26	O	O	O	O	O	-	O	O	O	-	-	O	O	O
	40	-	-	O	O	-	-	O	O	O	-	-	O	O	O
	41	-	-	O	O	O	O	O	O	O	-	-	O	O	O
	66	O	O	O	O	O	O	O	O	O	-	-	O	O	O
Note	1. The mark “O” means that this configuration is chosen for testing. 2. The mark “-” means that this configuration is not testing. 3. Only the worst case was shown in test report														

Test CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RF power output	22deg. C, 65%RH	DC 12V from Adapter	Li Jialing
Effective Radiated Power	22deg. C, 65%RH	DC 12V from Adapter	Li Jialing
Frequency Stability	22deg. C, 65%RH	DC 12V from Adapter	Li Jialing
Occupied Bandwidth	22deg. C, 65%RH	DC 12V from Adapter	Li Jialing
Band Edge Compliance	22deg. C, 65%RH	DC 12V from Adapter	Li Jialing
Conducted Spurious Emission	22deg. C, 65%RH	DC 12V from Adapter	Li Jialing
Radiates Spurious Emission	23deg. C, 63%RH	DC 12V from Adapter	Li Jialing
Peak-to-Average Power Ratio	22deg. C, 65%RH	DC 12V from Adapter	Li Jialing

2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

FCC 47 CFR PART 2

FCC 47 CFR PART 22

FCC 47 CFR PART 24

FCC 47 CFR PART 27

FCC 47 CFR PART 90

KDB 971168 D01 POWER MEAS LICENSE DIGITAL SYSTEMS V03R01

ANSI/TIA-603-E

ANSI C63.26-2015

Note: All test items have been performed and recorded as per the above standards

2.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Support Equipment					
NO	Description	Brand	Model No.	Serial Number	Supplied by
1	Adapter	SHE	P-050B-050200 EU	N/A	Client

Support Cable							
NO	Description	Quantity (Number)	Length (cm)	Detachable (Yes/ No)	Shielded (Yes/ No)	Cores (Number)	Supplied by
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

3 TEST TYPES AND RESULTS

3.1 OUT POWER MEASUREMENT

3.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

Mobile / Portable station are limited to 100 watts E.R.P for LTE Band 26(814~824MHz).
Mobile / Portable station are limited to 7 watts E.R.P for LTE Band 5/26(824~849MHz).
Mobile / Portable station are limited to 3 watts E.R.P for LTE Band 12/13.
Mobile / Portable station are limited to 2 watts E.I.R.P for LTE Band 2/7/25/38/41.
Mobile / Portable station are limited to 1 watts E.I.R.P for LTE Band 4/66.
Mobile / Portable station are limited to 0.25 watts E.I.R.P for LTE Band 40.

3.1.2 TEST PROCEDURES

Subclause 5.6 of Per KDB 971168 D01 Power Meas License Digital Systems v03r01 or subclause 5.2.5.5 of ANSI C63.26-2015, the relevant equation for determing the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

EIRP = PT + GT – LC, ERP= EIRP - 2.15dBi, where

PT = transmitter output power dBm;

GT = gain of the transmitting antenna dBi;

LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

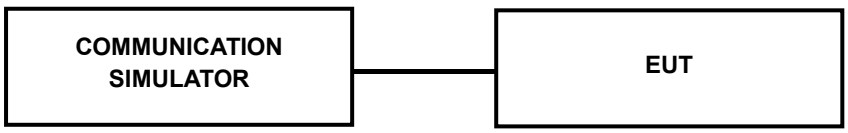
CONDUCTED POWER MEASUREMENT:

The EUT was set up for the maximum power with LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

3.1.3 TEST SETUP

EIRP / ERP Measurement:

CONDUCTED POWER MEASUREMENT:



3.1.4 TEST RESULTS

Please refer Annex A

3.2 FREQUENCY STABILITY

3.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

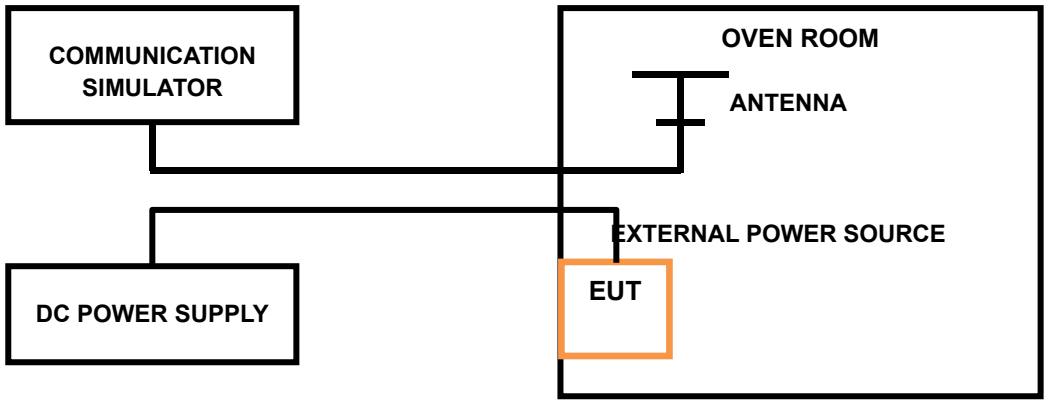
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

3.2.2 TEST PROCEDURE

a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded frequency error from the communication simulator.

3.2.3 TEST SETUP



3.2.4 TEST RESULTS

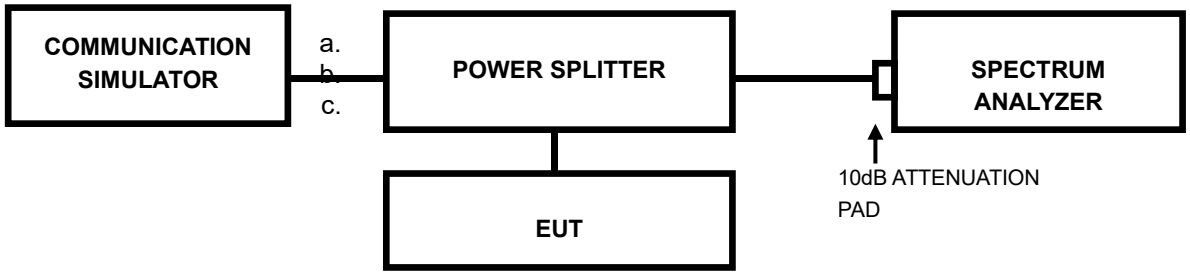
Please refer Annex F

3.3 OCCUPIED BANDWIDTH MEASUREMENT

3.3.1 TEST PROCEDURES

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

3.3.2 TEST SETUP



3.3.3 TEST RESULTS

Please refer Annex C

3.4 BAND EDGE MEASUREMENT

3.4.1 LIMITS OF BAND EDGE MEASUREMENT

§22.917(a) for LTE Band 5/Band 26(824~849 MHz)

The FCC limit is 43 + 10log10(P[Watts]) dB below the transmitter power P(Watts) in a 100kHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

§24.238 (a) for LTE Band 2/Band 25

Tthe FCC limit is 43 + 10log10(P[Watts]) dB below the transmitter power P(Watts) in a 1MHz bandwidth. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

§27.53 (c) for LTE Band 13

The FCC limit is 43 + 10log10(P[Watts]) dB below the transmitter power P(Watts) in a 100 kHz bandwidth. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed. In addition, the power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least 65 + 10 log10 p(watts), dB, for mobile and portable equipment

§27.53 (g) for LTE Band 12

Te FCC limit is 43 + 10log10(P[Watts]) dB below the transmitter power P(Watts) in a 100 kHz bandwidth. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

27.53 (h) for LTE Band 4/Band 66

The FCC limit is 43 + 10log10(P[Watts]) dB below the transmitter power P(Watts) in a 1 MHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

27.53 (m) for LTE Band 7/Band 38/Band 41

For mobile digital stations, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz

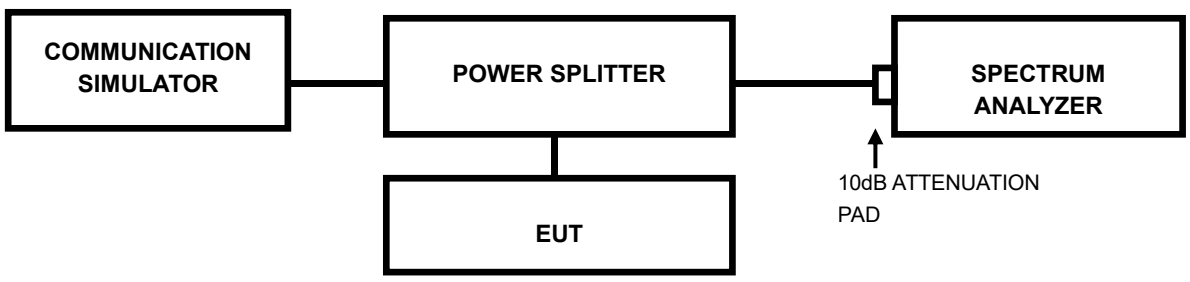
27.53 (a)(4) for LTE Band40

(i) By a factor of not less than: 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than 55 + 10 log (P) dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than 61 + 10 log (P) dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than 67 + 10 log (P) dB on all frequencies between 2328 and 2337 MHz;
(ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 55 + 10 log (P) dB on all frequencies between 2296 and 2300 MHz, 61 + 10 log (P) dB on all frequencies between 2292 and 2296 MHz, 67 + 10 log (P) dB on all frequencies between 2288 and 2292 MHz;
(iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2365 MHz.

90.69 (a) (2) for LTE Band 26(814~824MHz)

The power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + 10Log10(P)

3.4.2 TEST SETUP



3.4.3 TEST PROCEDURES

a. All measurements were done at low and high operational frequency range.

b. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 20kHz and VBW of the spectrum is 60kHz. (LTE bandwidth 1.4MHz).

c. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 30kHz and VBW of the spectrum is 100kHz. (LTE bandwidth 3MHz).

d. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 50kHz and VBW of the spectrum is 150kHz. (LTE bandwidth 5MHz).

e. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz. (LTE bandwidth 10MHz).

f. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 200kHz and VBW of the spectrum is 600kHz. (LTE bandwidth 15MHz).

g. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 300kHz and VBW of the spectrum is 1000kHz. (LTE bandwidth 20MHz).

h. Set the spectrum with RMS detector.

i. Record the max trace plot into the test report.

3.4.4 TEST RESULTS

Please refer Annex D

3.5 CONDUCTED SPURIOUS EMISSIONS

3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
The spectrum is scanned from 30MHz up to a frequency including its 10th harmonic.

Additional requirement for Band7/Band38/ Band41

For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz.

Additional requirement for Band13

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

Additional requirement for Band40

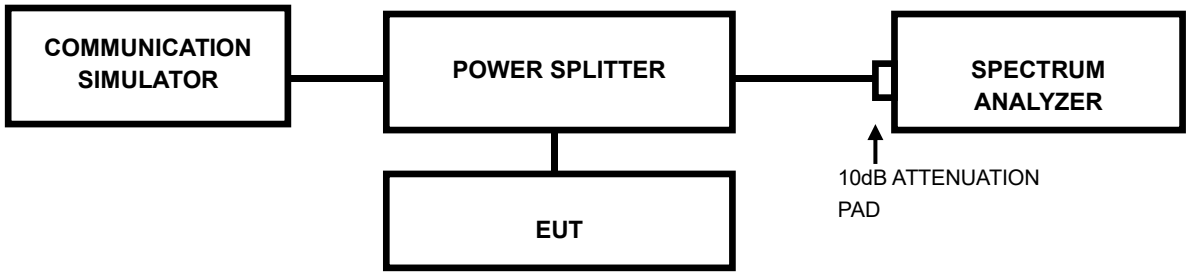
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 70 + 10 log(P) dB.

3.5.2 TEST PROCEDURE

a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.

b. Measuring frequency range is from 30 MHz up to a frequency inclouding its 10th harmocin. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

3.5.3 TEST SETUP



3.5.4 TEST RESULTS

Please refer Annex E

3.6 RADIATED EMISSION MEASUREMENT

3.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
The spectrum is scanned from 30MHz up to a frequency including its 10th harmonic.

Additional requirement for Band7/Band38/ Band41

For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz.

Additional requirement for Band13

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

Additional requirement for Band40

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 70 + 10 log(P) dB.

3.6.2 TEST PROCEDURES

a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The“Read Value” is the spectrum reading the maximum power value.

b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value “ of step a. Record the power level of S.G

c. EIRP(dBm) = S.G.POWER－TX cable loss + Antenna gain.

d. E.R.P(dBm) = E.I.P.R - 2.15dBi.

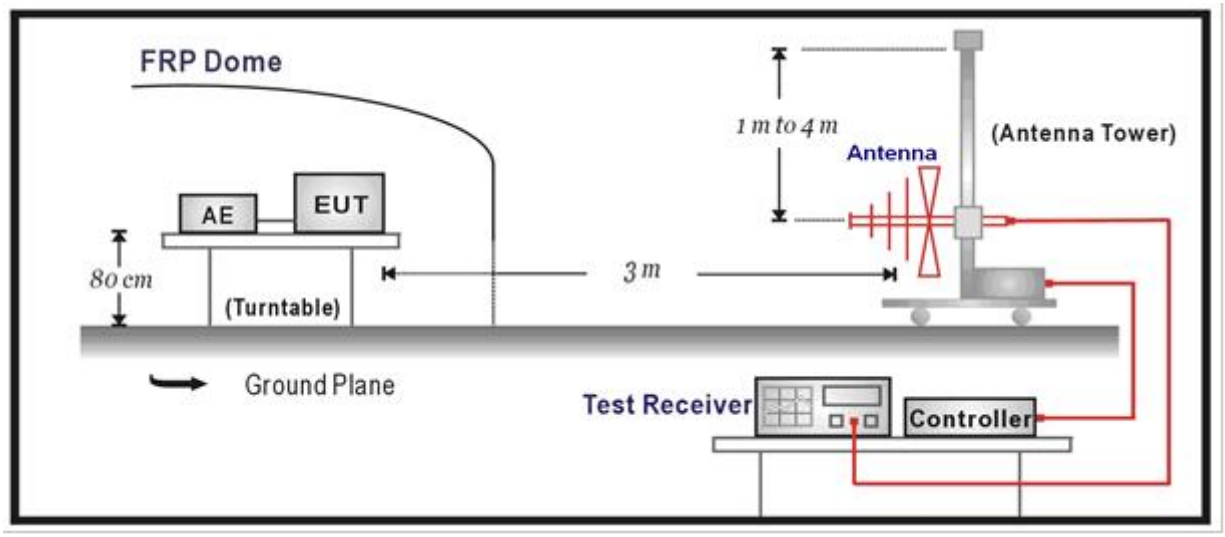
NOTE:

1.The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

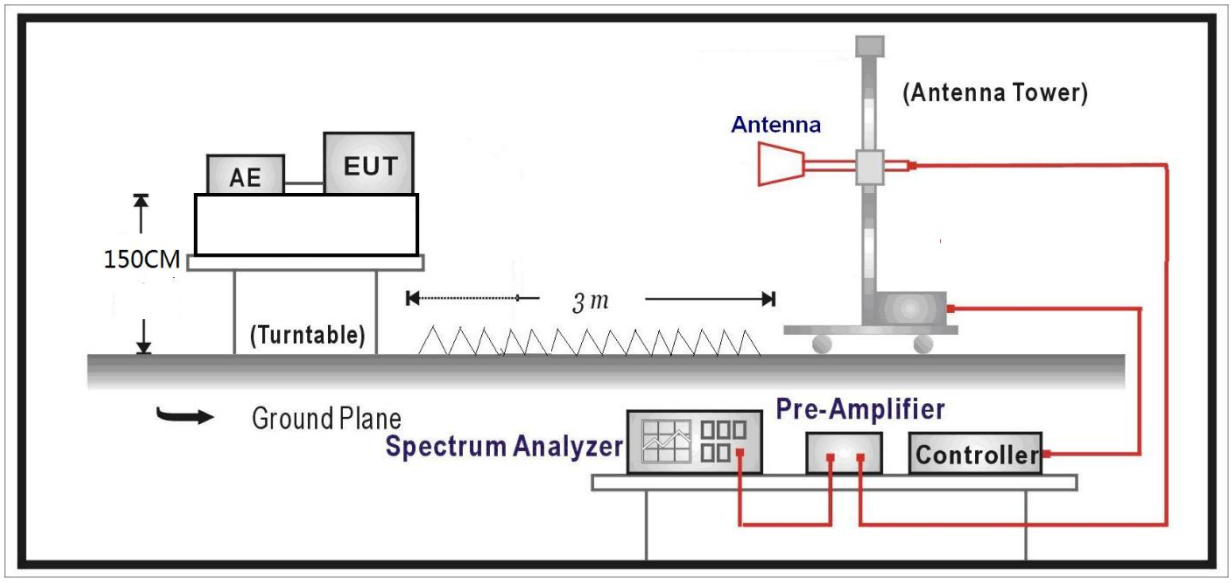
2.Only the worst case was shown in test report

3.6.3 TEST SETUP

Below 1GHz Test Setup:



Above 1GHz Test Setup:



Note: Above 1G is a directional antenna

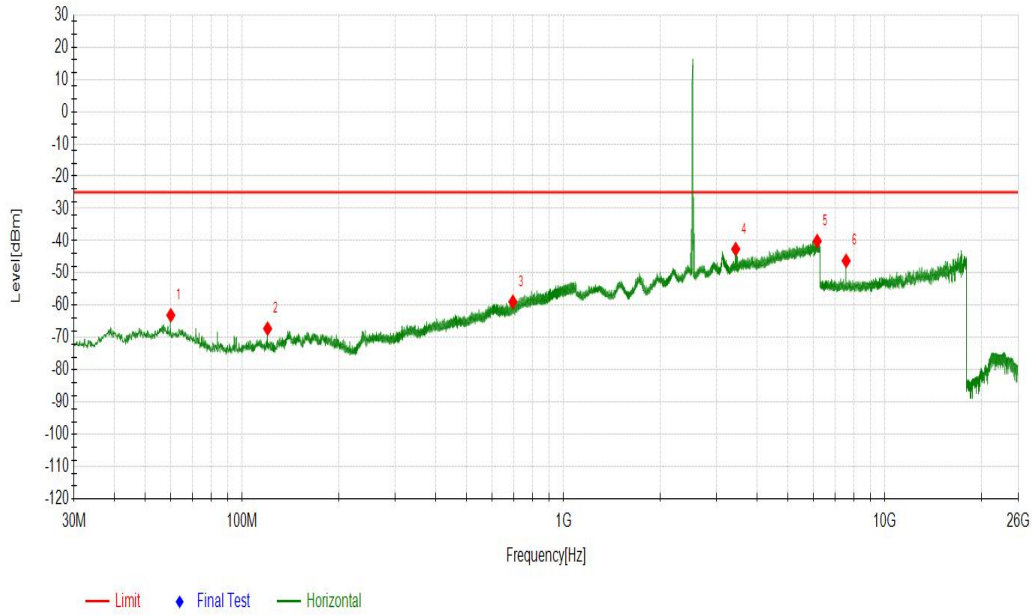
Depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.6.4 TEST RESULTS

Test Mode	LTE B7_QPSK_BW=5MHz_CH 20775_1RB

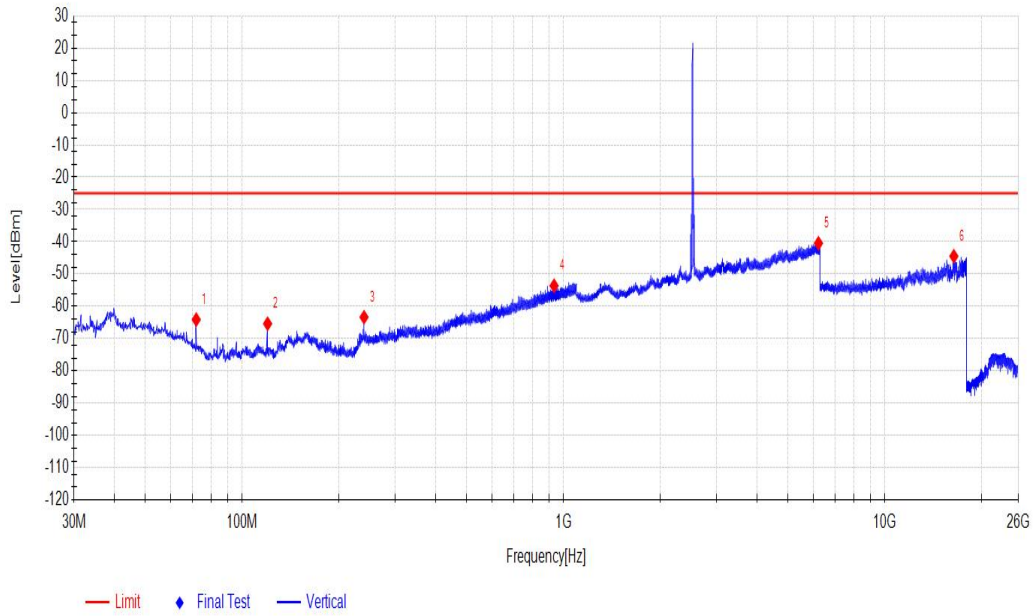
Horizontal



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]
1	59.9630	-90.26	-63.04	-25.00	38.04	27.22	10
2	119.9960	-90.45	-67.19	-25.00	42.19	23.26	168
3	695.7136	-92.87	-58.88	-25.00	33.88	33.99	262
4	3433.9934	-55.74	-42.57	-25.00	17.57	13.17	126
5	6158.0858	-60.69	-40.10	-25.00	15.10	20.59	33
6	7577.7678	-64.79	-46.20	-25.00	21.20	18.59	171

Test Mode	LTE B7_QPSK_BW=5MHz_CH 20775_1RB

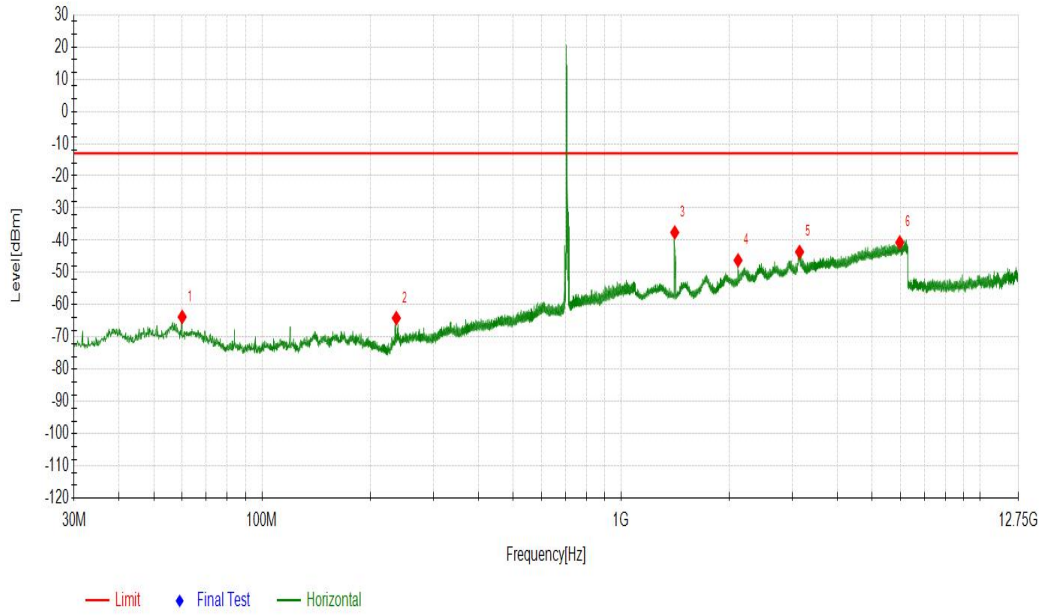
Vertical



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]
1	71.9482	-86.77	-64.08	-25.00	39.08	22.69	357
2	119.9960	-86.86	-65.35	-25.00	40.35	21.51	232
3	239.4199	-87.54	-63.33	-25.00	38.33	24.21	74
4	934.7755	-91.15	-53.60	-25.00	28.60	37.55	357
5	6214.1914	-60.38	-40.45	-25.00	15.45	19.93	360
6	16395.7696	-78.25	-44.47	-25.00	19.47	33.78	237

Test Mode	LTE B12_QPSK_BW=5MHz_CH 23155_1RB

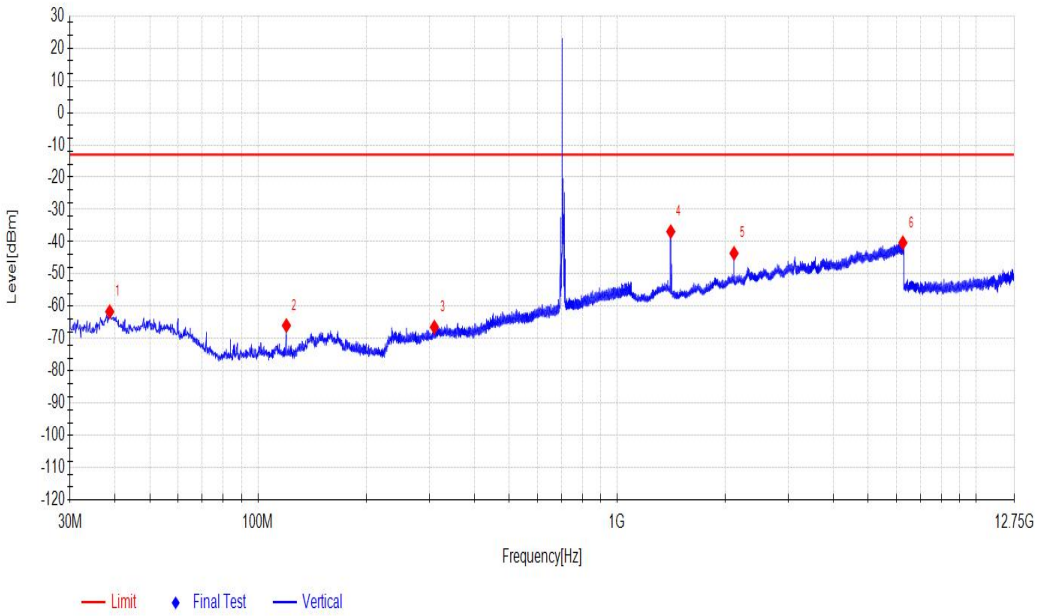
Horizontal



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]
1	59.9630	-90.94	-63.72	-13.00	50.72	27.22	236
2	236.6377	-87.35	-64.09	-13.00	51.09	23.26	0
3	1410.1420	-39.82	-37.53	-13.00	24.53	2.29	327
4	2115.9432	-53.51	-46.18	-13.00	33.18	7.33	296
5	3138.9439	-59.87	-43.58	-13.00	30.58	16.29	189
6	5966.0066	-61.07	-40.62	-13.00	27.62	20.45	219

Test Mode	LTE B12_QPSK_BW=5MHz_CH 23155_1RB

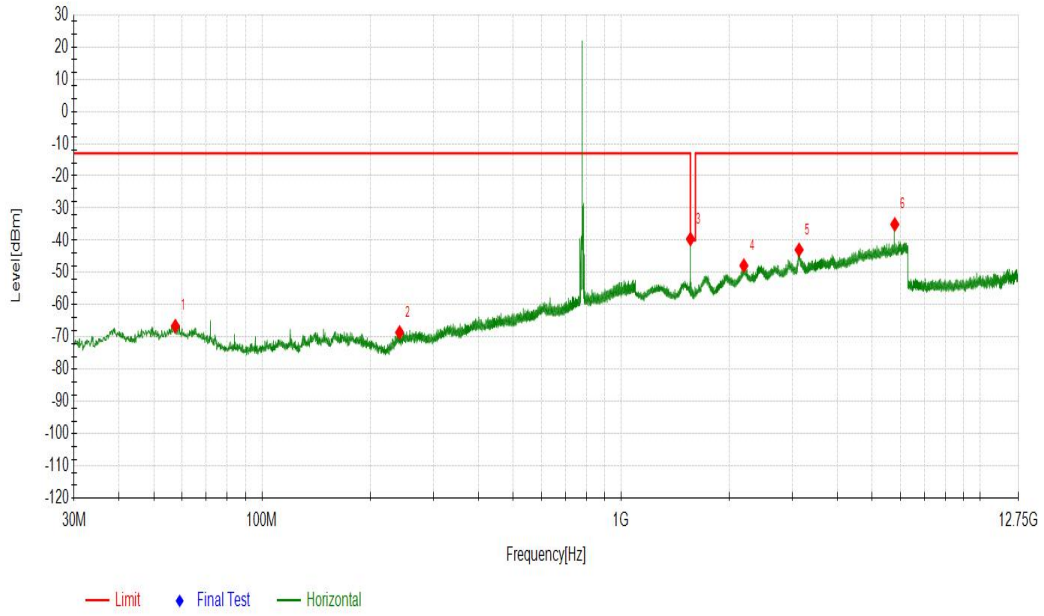
Vertical



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]
1	38.6679	-88.84	-61.63	-13.00	48.63	27.21	267
2	119.9960	-87.42	-65.91	-13.00	52.91	21.51	267
3	309.9400	-93.16	-66.40	-13.00	53.40	26.76	206
4	1410.5221	-41.16	-36.84	-13.00	23.84	4.32	267
5	2115.9432	-51.74	-43.56	-13.00	30.56	8.18	0
6	6244.2244	-60.41	-40.30	-13.00	27.30	20.11	337

Test Mode	LTE B13_QPSK_BW=5MHz_CH 23230_1RB

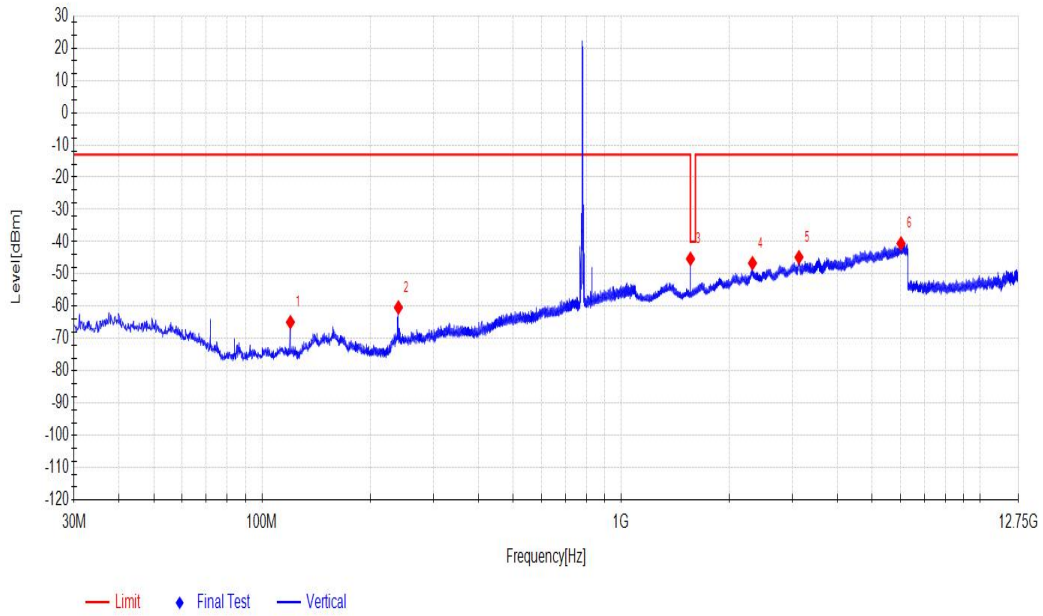
Horizontal



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]
1	57.3947	-94.36	-66.57	-13.00	53.57	27.79	244
2	241.6672	-92.31	-68.53	-13.00	55.53	23.78	244
3	1559.5119	-43.48	-39.56	-40.00	-0.44	3.92	214
4	2196.8994	-58.27	-47.81	-13.00	34.81	10.46	33
5	3129.7030	-59.75	-42.90	-13.00	29.90	16.85	82
6	5779.8680	-55.29	-35.04	-13.00	22.04	20.25	142

Test Mode	LTE B13_QPSK_BW=5MHz_CH 23230_1RB

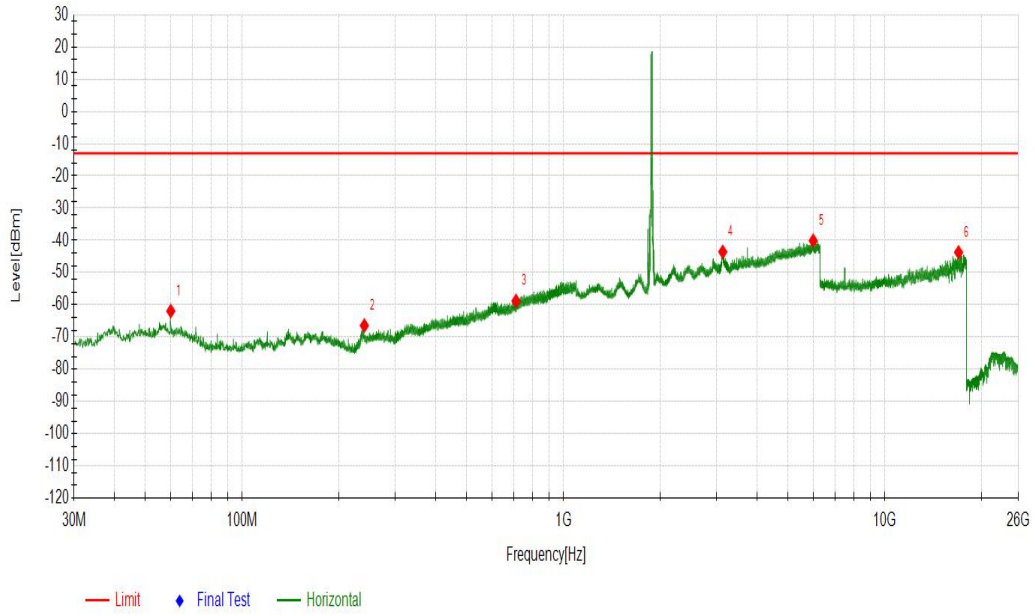
Vertical



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]
1	119.9960	-86.39	-64.88	-13.00	51.88	21.51	280
2	239.8480	-84.58	-60.33	-13.00	47.33	24.25	186
3	1559.5119	-48.64	-45.28	-40.00	5.28	3.36	186
4	2321.5643	-57.36	-46.62	-13.00	33.62	10.74	125
5	3127.3927	-59.91	-44.77	-13.00	31.77	15.14	327
6	6014.8515	-60.48	-40.51	-13.00	27.51	19.97	147

Test Mode	LTE B25_QPSK_BW=5MHz_CH 26065_1RB

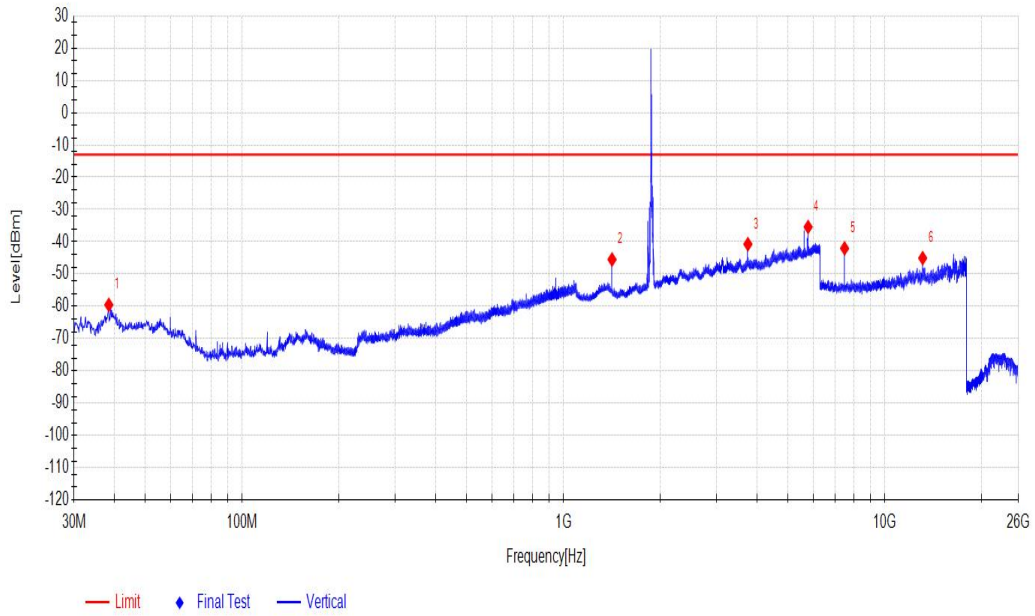
Horizontal



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]
1	59.9630	-89.13	-61.91	-13.00	48.91	27.22	174
2	239.9550	-90.11	-66.39	-13.00	53.39	23.72	357
3	711.2301	-92.71	-58.75	-13.00	45.75	33.96	113
4	3130.3630	-60.42	-43.54	-13.00	30.54	16.88	246
5	5984.1584	-60.47	-40.10	-13.00	27.10	20.37	125
6	16960.9361	-78.19	-43.71	-13.00	30.71	34.48	204

Test Mode	LTE B25_QPSK_BW=5MHz_CH 26065_1RB

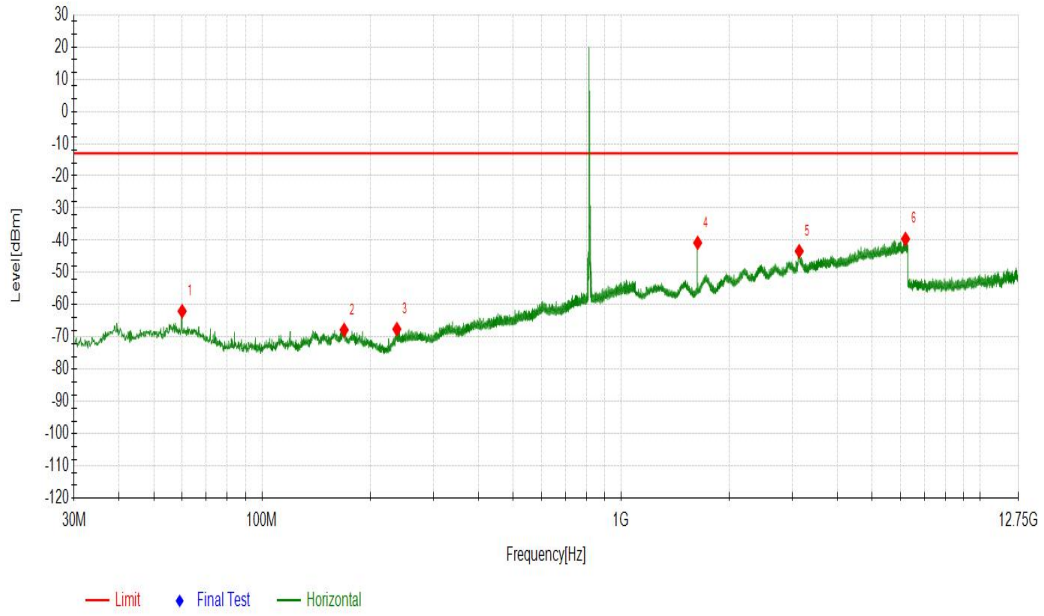
Vertical



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]
1	38.4538	-86.66	-59.51	-13.00	46.51	27.15	235
2	1415.8432	-49.61	-45.47	-13.00	32.47	4.14	266
3	3747.1947	-55.32	-40.73	-13.00	27.73	14.59	360
4	5770.2970	-54.42	-35.40	-13.00	22.40	19.02	277
5	7493.5194	-60.26	-42.02	-13.00	29.02	18.24	205
6	13115.9316	-69.86	-45.05	-13.00	32.05	24.81	296

Test Mode	LTE B26_QPSK_BW=10MHz_CH 26915_1RB

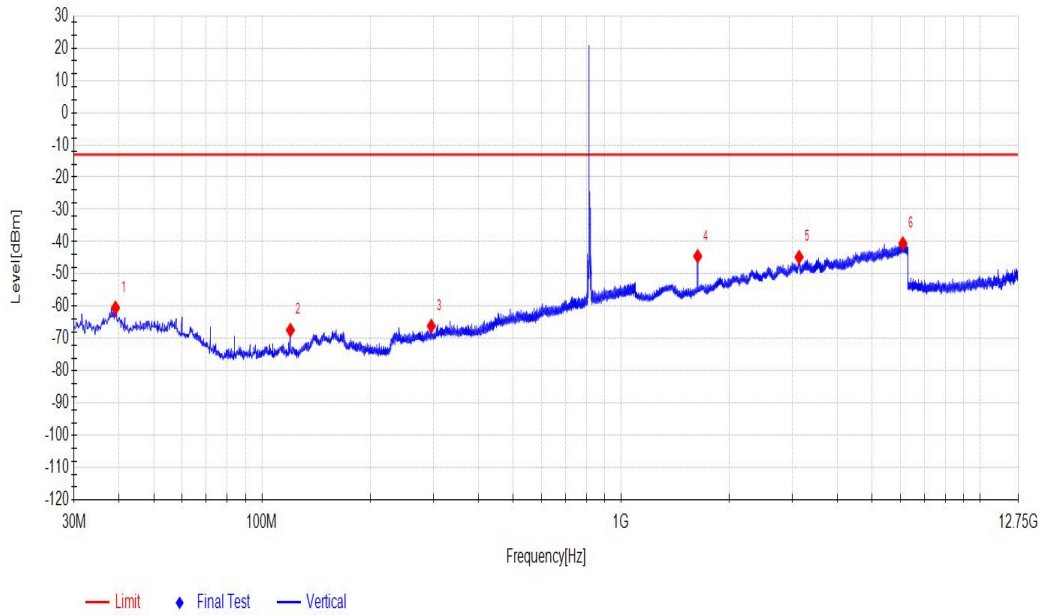
Horizontal



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]
1	59.9630	-89.17	-61.95	-13.00	48.95	27.22	175
2	169.3279	-93.25	-67.74	-13.00	54.74	25.51	114
3	237.4937	-90.90	-67.49	-13.00	54.49	23.41	326
4	1633.6267	-44.34	-40.76	-13.00	27.76	3.58	0
5	3132.0132	-60.09	-43.33	-13.00	30.33	16.76	339
6	6193.0693	-60.05	-39.55	-13.00	26.55	20.50	339

Test Mode	LTE B26_QPSK_BW=10MHz_CH 26915_1RB

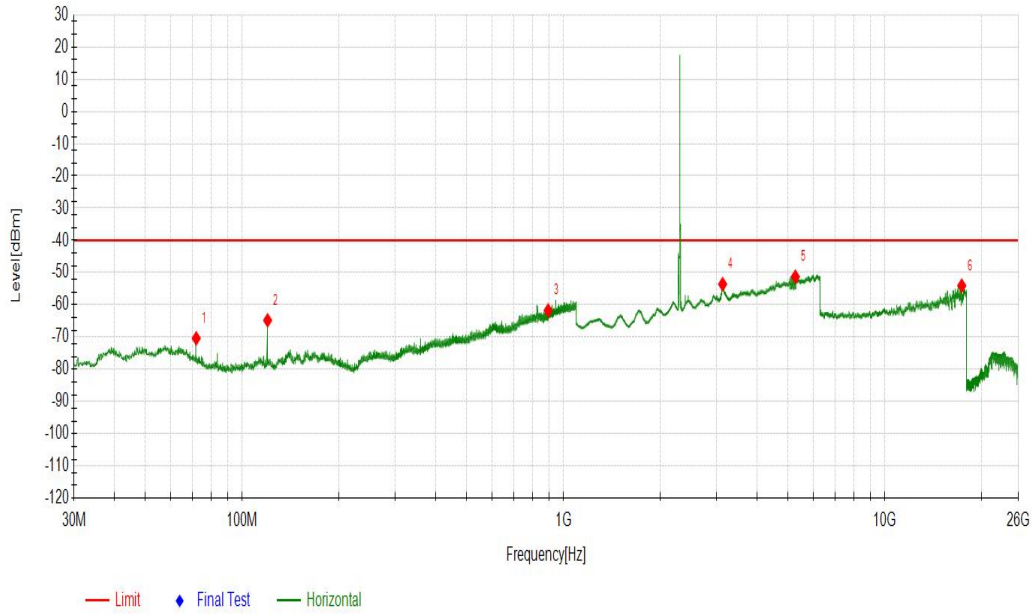
Vertical



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]
1	39.0959	-87.70	-60.44	-13.00	47.44	27.26	245
2	119.9960	-88.85	-67.34	-13.00	54.34	21.51	184
3	296.1356	-91.83	-66.08	-13.00	53.08	25.75	184
4	1633.6267	-49.02	-44.47	-13.00	31.47	4.55	245
5	3129.0429	-60.10	-44.74	-13.00	31.74	15.36	174
6	6089.4389	-61.16	-40.52	-13.00	27.52	20.64	326

Test Mode	LTE B40_QPSK_BW=10MHz_CH 38750_1RB

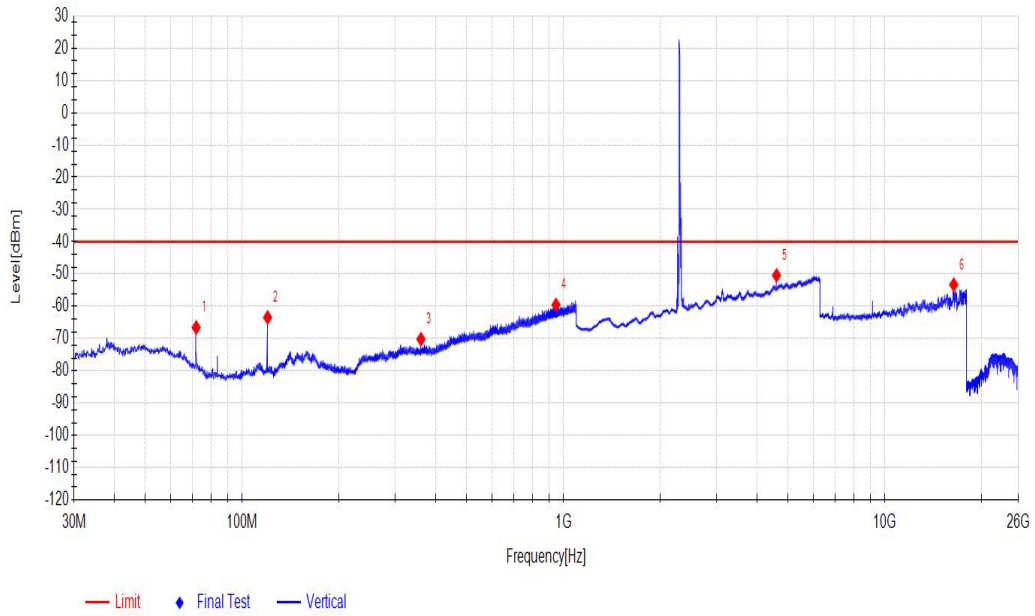
Horizontal



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]
1	71.9482	-94.89	-70.35	-40.00	30.35	24.54	206
2	119.9960	-88.04	-64.78	-40.00	24.78	23.26	84
3	895.5026	-98.24	-61.74	-40.00	21.74	36.50	54
4	3128.0528	-70.14	-53.56	-40.00	13.56	16.58	344
5	5266.9967	-69.86	-51.27	-40.00	11.27	18.59	95
6	17352.9253	-89.00	-54.04	-40.00	14.04	34.96	168

Test Mode	LTE B40_QPSK_BW=10MHz_CH 38750_1RB

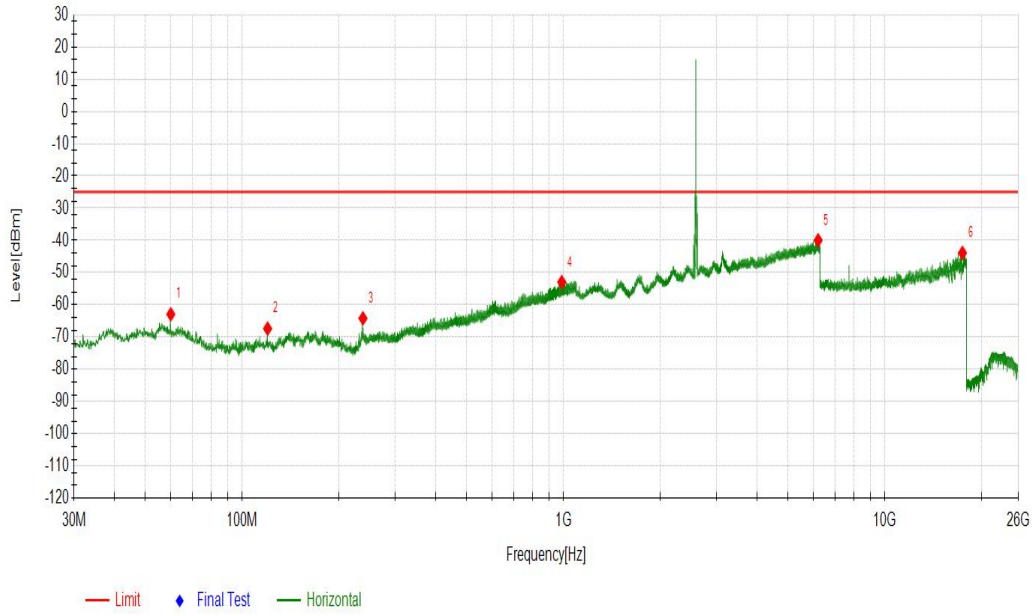
Vertical



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]
1	71.9482	-89.22	-66.53	-40.00	26.53	22.69	174
2	119.9960	-84.92	-63.41	-40.00	23.41	21.51	113
3	360.0210	-97.19	-70.13	-40.00	30.13	27.06	174
4	947.7238	-96.90	-59.49	-40.00	19.49	37.41	113
5	4602.3102	-66.40	-50.37	-40.00	10.37	16.03	192
6	16391.0891	-87.75	-53.29	-40.00	13.29	34.46	327

Test Mode	LTE B41_QPSK_BW=15MHz_CH 40620_1RB

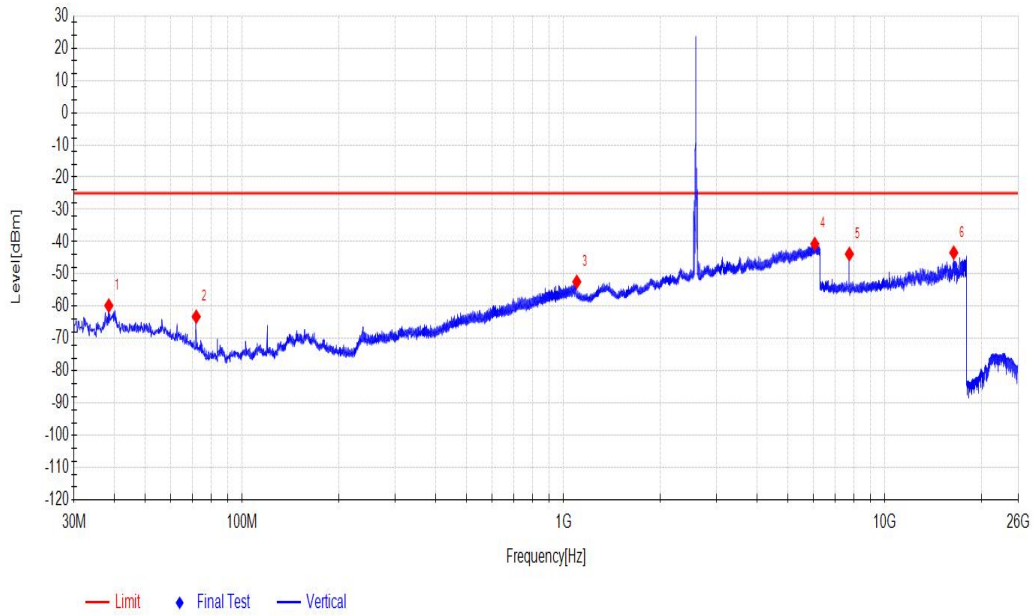
Horizontal



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]
1	59.9630	-90.12	-62.90	-25.00	37.90	27.22	200
2	119.9960	-90.61	-67.35	-25.00	42.35	23.26	200
3	237.6008	-87.60	-64.17	-25.00	39.17	23.43	357
4	987.6388	-91.31	-52.91	-25.00	27.91	38.40	74
5	6199.0099	-60.24	-39.95	-25.00	14.95	20.29	123
6	17438.3438	-78.74	-43.89	-25.00	18.89	34.85	52

Test Mode	LTE B41_QPSK_BW=15MHz_CH 40620_1RB

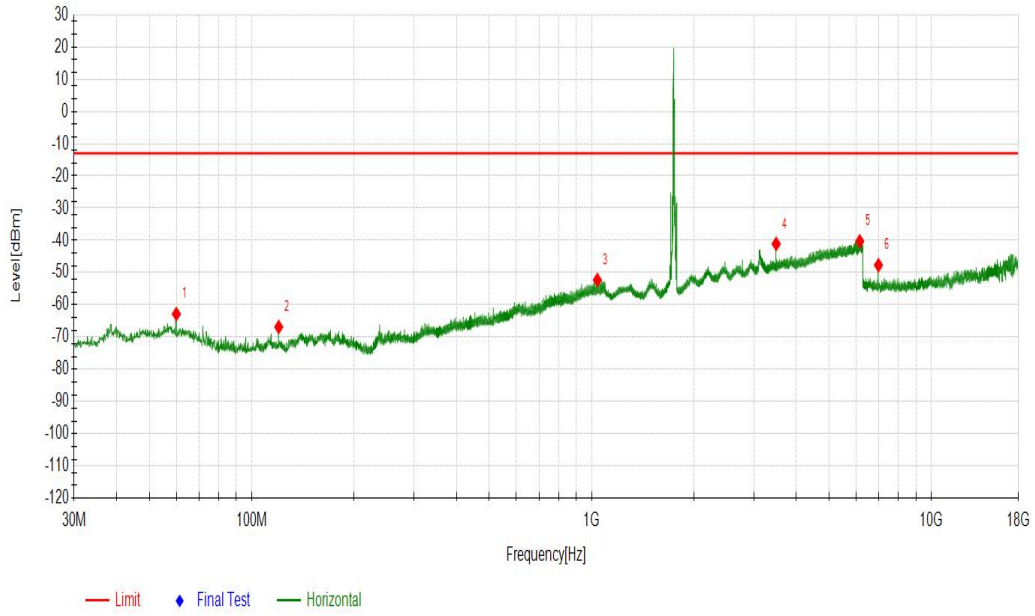
Vertical



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]
1	38.4538	-86.89	-59.74	-25.00	34.74	27.15	256
2	71.9482	-85.86	-63.17	-25.00	38.17	22.69	360
3	1099.6790	-91.85	-52.39	-25.00	27.39	39.46	351
4	6054.4554	-60.82	-40.66	-25.00	15.66	20.16	357
5	7753.2853	-62.90	-43.79	-25.00	18.79	19.11	216
6	16386.4086	-77.55	-43.37	-25.00	18.37	34.18	154

Test Mode	LTE B66_QPSK_BW=5MHz_CH 132322_1RB

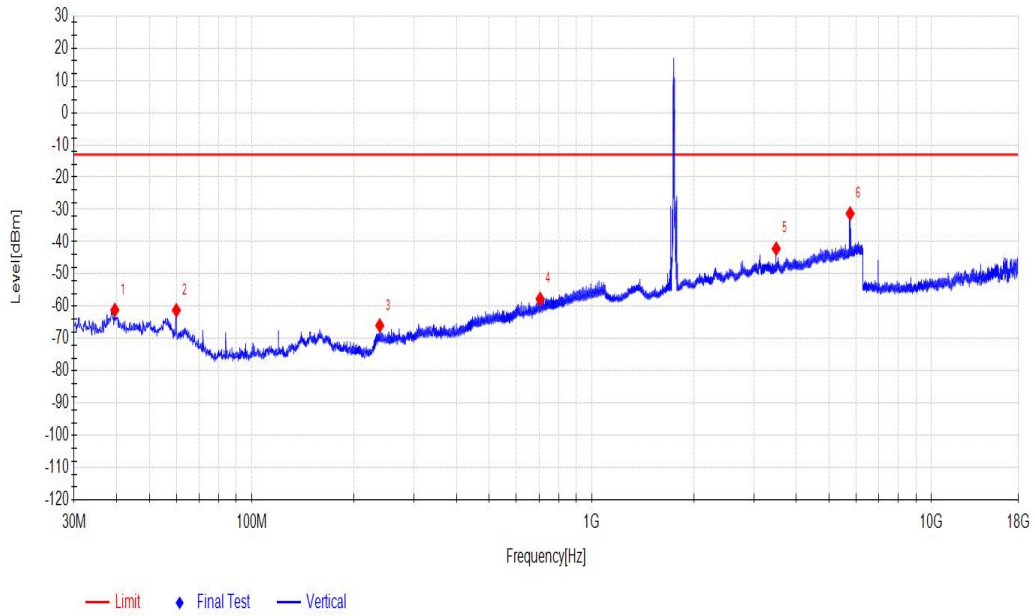
Horizontal



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]
1	59.9630	-90.04	-62.82	-13.00	49.82	27.22	206
2	119.9960	-90.09	-66.83	-13.00	53.83	23.26	206
3	1039.7530	-91.06	-52.26	-13.00	39.26	38.80	55
4	3492.0792	-53.72	-41.07	-13.00	28.07	12.65	307
5	6150.8251	-60.62	-40.26	-13.00	27.26	20.36	33
6	6983.3483	-65.88	-47.67	-13.00	34.67	18.21	327

Test Mode	LTE B66_QPSK_BW=5MHz_CH 132322_1RB

Vertical



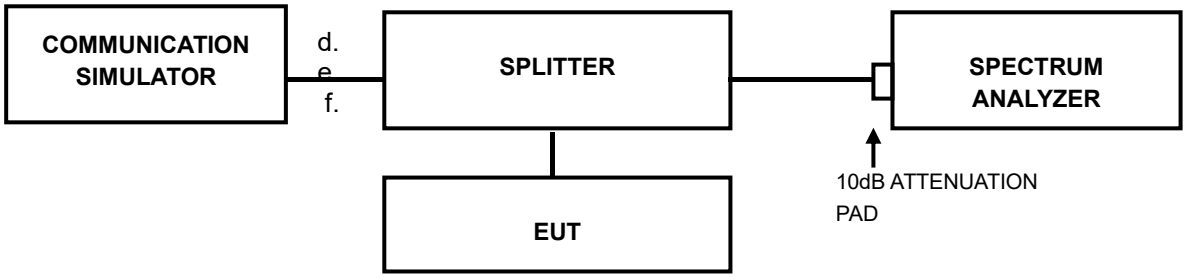
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]
1	39.5240	-88.35	-61.11	-13.00	48.11	27.24	275
2	59.9630	-88.11	-61.19	-13.00	48.19	26.92	154
3	237.9218	-89.97	-65.91	-13.00	52.91	24.06	360
4	705.2375	-92.31	-57.67	-13.00	44.67	34.64	3
5	3492.0792	-55.26	-42.13	-13.00	29.13	13.13	82
6	5763.0363	-50.14	-31.27	-13.00	18.27	18.87	177

3.7 PEAK TO AVERAGE RATIO

3.7.1 LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB

3.7.2 TEST SETUP



3.7.3 TEST PROCEDURES

1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

3.7.4 TEST RESULTS

Please refer Annex B

3.8 PHOTOGRAPHS OF TEST SETUP

Please refer to the attached file (Test Setup Photo).

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Important

(1) The test report is valid with the official seal of the laboratory and the signatures of Test engineer, Author and Reviewer simultaneously.

(2) The test report is invalid if altered.

(3) Any photocopies or part photocopies in the test report are forbidden without the written permission from the laboratory.

(4) Objections to the test report must be submitted to the laboratory within 15 days.

(5) Generally, commission test is responsible for the tested samples only.

Address of the laboratory:

CVC Testing Technology Co., Ltd.

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