REPORT No.: SZ23120090W03

TEST REPORT

APPLICANT	:	Sonim Technologies, Inc.
PRODUCT NAME	:	5G smartphone
MODEL NAME	:	P200
BRAND NAME	:	Sonim
FCC ID	:	WYPP200
STANDARD(S)	:	47 CFR Part 2 47 CFR Part 22 Subpart H 47 CFR Part 24 Subpart E 47 CFR Part 27 Subpart L
RECEIPT DATE	:	2023-12-21
TEST DATE	:	2024-01-04 to 2024-03-27
ISSUE DATE	:	2024-05-27

Edited by: Peng Mi (Rapporteur)

Approved by: Shen Junsheng (Supervisor)

MORLAB
Shenzhen Morlab Communications Technology Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China
Tel: 86-755-36698555 Fax: 86-755-36698525
Http://www.morlab.cn E-mail: service@morlab.cn

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Change History		
Version	Date	Reason for change
1.0	2024-05-27	First edition

1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Sonim Technologies, Inc.
Applicant Address:	4445 Eastgate Mall, Suite 200, San Diego, CA 92121, USA
Manufacturer:	Sonim Technologies, Inc.
Manufacturer Address:	4445 Eastgate Mall, Suite 200, San Diego, CA 92121, USA

1.2. Equipment Under Test (EUT) Description

Product Name:	5G smartphone	
Sample No.:	21#	
Hardware Version:	V1.0	
Software Version:	P200.AT01.30D	
Modulation Type:	WCDMA Mode with QPSK Modulation HSDPA/DC- HSDPA Mode with QPSK Modulation HSUPA Mode with QPSK Modulation HSPA+ Mode with 16QAM Modulation	
Operating Frequency Range:	WCDMA Band V	Tx: 824MHz-849MHz
		Rx: 869MHz-894MHz
	WCDMA Band IV	Tx: 1710MHz-1755MHz
		Rx: 2110MHz-2155MHz
	WCDMA Band II	Tx: 1850MHz-1910MHz
		Rx: 1930MHz-1990MHz
Antenna Type:	PIFA Antenna	
Antenna Gain:	WCDMA Band V:	ANT 2: -3.19dBi
	WCDMA Band IV:	ANT 1: -0.80dBi
	WCDMA Band II:	ANT 1: 0.01dBi

Accessory Information:	Battery	
	Brand Name:	N/A
	Model No.:	BAT-05000-11S
	Serial No.:	N/A
	Capacity:	5000mAh
	Rated Voltage:	3.87V
	Charge Limit:	4.45V
	Manufacturer:	Shenzhen Aerospace Electronic Co.,Ltd.
	AC Adapter	
	Brand Name:	N/A
	Model No.:	1-CHUSQ302-097
	Serial No.:	N/A
	Rated Output:	5V⎓3A or 9V⎓2A or 12V⎓1.5A
	Rated Input:	100-240V~50/60Hz, 0.5A
	Manufacturer:	HUIZHOU PUAN ELEOTRONICS CO.,LTD

Note 1: The transmitter (Tx) frequency arrangement of the WCDMA Band V used by the EUT can be represented with the formula F(n)=826.4+0.2*(n-4132), 4132<=n<=4233; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 4132 (826.4MHz), 4182(836.4MHz) and 4233 (846.6MHz).

Note 2: The transmitter (Tx) frequency arrangement of the WCDMA IV band used by the EUT can be represented with the formula F(n)=1712.4+0.2*(n-1312), 1312<=n<=1513; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 1312 (1712.4MHz), 1413 (1732.6MHz) and 1513 (1752.6MHz).

Note 3: The transmitter (Tx) frequency arrangement of the WCDMA Band II used by the EUT can be represented with the formula F(n)=1852.4+0.2*(n-9262), 9262<=n<=9538; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 9262 (1852.4MHz), 9400 (1880MHz) and 9538 (1907.6MHz).

Note 4: All test modes and data rates were considered and evaluated respectively by performing full test. Test modes are chosen to be reported as the worst case below:

WCDMA mode for WCDMA band V;

WCDMA mode for WCDMA band IV;

WCDMA mode for WCDMA band II;

Note 5: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

1.3. Maximum E.R.P./E.I.R.P. and Emission Designator

Test Mode	Maximum E.R.P./E.I.R.P. (W)	Emission Designator
WCDMA Band V	0.065	4M16F9W
WCDMA Band IV	0.206	4M16F9W
WCDMA Band II	0.215	4M17F9W

1.4. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 2, Part 22, Part 24 and Part 27 for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 2 (10-1-12 Edition)	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 22 (10-1-12 Edition)	Public Mobile Services
3	47 CFR Part 24 (10-1-12 Edition)	Personal Communications Services
4	47 CFR Part 27 (10-1-12 Edition)	Miscellaneous Wireless Communications Services

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Test Date	Test Engineer	Result	Method determination/ Remark
1	2.1046	Conducted RF Output Power	Jan. 04, 2024	Shen Biaohong	PASS	No deviation
2	24.232(d)	Peak -Average Ratio	Jan. 04, 2024	Gan Jing	PASS	No deviation
3	2.1049	Occupied Bandwidth	Jan. 04, 2024	Gan Jing	PASS	No deviation
4	2.1055, 22.355, 24.235, 27.54	Frequency Stability	Feb. 29, 2024	Gan Jing	PASS	No deviation
5	2.1051, 22.917(a), 24.238(a), 27.53(h)	Conducted Out of Band Emissions	Jan. 04, 2024	Gan Jing	PASS	No deviation
6	2.1051, 22.917(a), 24.238(a), 27.53(h)	Band Edge	Jan. 04, 2024	Gan Jing	PASS	No deviation
7	22.913(a), 24.232(c) 27.50(d)	Transmitter Radiated Power (EIPR/E.R.P.)	Jan. 04, 2024	Gan Jing	PASS	No deviation
8	2.1053, 22.917(a),	Radiated Out of Band	Jan. 12, 2024 to	Gao Jianrou	PASS	No deviation

	24.238(a), 27.53(h)	Emissions	Mar. 27, 2024			

Note 1: The tests were performed according to the method of measurements prescribed in KDB971168 D01 v03r01 and ANSI/TIA-603-E-2016.

Note 2: The path loss during the RF test is calibrated to correct the results by the offset setting in the test equipment. The ref offset 24.5dB contains two parts that cable loss 14.5dB and Attenuator 10dB.

Note 3: Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.

Note 4: When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% confidence intervals.

1.5. Environmental Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15-35
Relative Humidity (%):	30-60
Atmospheric Pressure (kPa):	86-106

2. 47 CFR Part 2, Part 22H, 24E&27L Requirements

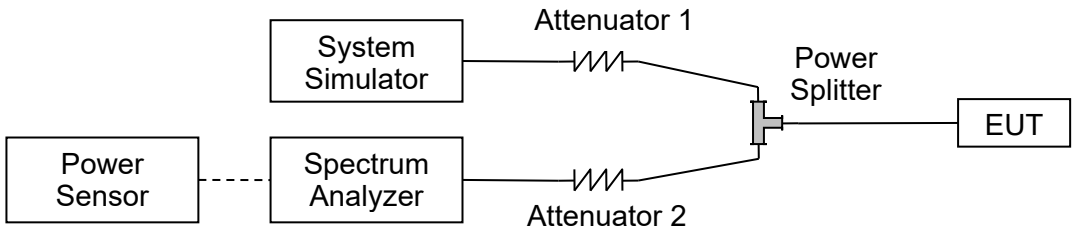
2.1. Conducted RF Output Power

2.1.1. Requirement

According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

2.1.2. Test Description

Test Setup:



The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.

2.1.3.Test Results

WCDMA Band V	Average Power (dBm)		
TX Channel	**4132**	**4182**	**4233**
Frequency (MHz)	**826.4**	**836.4**	**846.6**
RMC 12.2Kbps	23.29	23.47	23.45
HSDPA Subtest-1	22.31	22.50	22.59
HSDPA Subtest-2	22.38	22.51	22.55
HSDPA Subtest-3	21.90	21.93	22.08
HSDPA Subtest-4	21.89	22.06	22.12
DC-HSDPA Subtest-1	22.37	22.52	22.59
DC-HSDPA Subtest-2	22.38	22.51	22.61
DC-HSDPA Subtest-3	21.87	22.09	22.06
DC-HSDPA Subtest-4	21.90	21.98	22.10
HSUPA Subtest-1	22.83	22.53	22.59
HSUPA Subtest-2	21.90	22.07	22.04
HSUPA Subtest-3	22.35	22.60	22.58
HSUPA Subtest-4	22.39	22.55	22.61
HSUPA Subtest-5	22.47	22.56	22.60
HSPA+ (16QAM) Subtest-1	22.33	22.55	22.62

WCDMA Band IV	Average Power (dBm)		
TX Channel	**1312**	**1413**	**1513**
Frequency (MHz)	**1712.4**	**1732.6**	**1752.6**
RMC 12.2Kbps	23.92	23.94	23.86
HSDPA Subtest-1	22.63	22.70	22.73
HSDPA Subtest-2	22.69	22.65	22.70
HSDPA Subtest-3	22.14	22.27	22.20
HSDPA Subtest-4	22.15	22.22	22.27
DC-HSDPA Subtest-1	22.66	22.68	22.72
DC-HSDPA Subtest-2	22.71	22.70	22.69
DC-HSDPA Subtest-3	22.16	22.17	22.21
DC-HSDPA Subtest-4	22.15	22.16	22.14
HSUPA Subtest-1	22.60	22.75	22.68
HSUPA Subtest-2	22.11	22.20	22.10
HSUPA Subtest-3	22.55	22.72	22.64
HSUPA Subtest-4	22.61	22.69	22.68
HSUPA Subtest-5	22.64	22.68	22.66
HSPA+ (16QAM) Subtest-1	22.07	22.11	22.22

WCDMA Band II	Average Power (dBm)		
TX Channel	**9262**	**9400**	**9538**
Frequency (MHz)	**1852.4**	**1880.0**	**1907.6**
RMC 12.2Kbps	23.28	23.32	23.17
HSDPA Subtest-1	22.44	22.44	22.41
HSDPA Subtest-2	22.43	22.46	22.32
HSDPA Subtest-3	21.91	21.91	21.89
HSDPA Subtest-4	21.88	21.95	21.79
DC-HSDPA Subtest-1	22.38	22.36	22.35
DC-HSDPA Subtest-2	22.34	22.33	22.31
DC-HSDPA Subtest-3	21.89	21.89	21.87
DC-HSDPA Subtest-4	21.82	21.95	21.89
HSUPA Subtest-1	22.29	22.38	22.21
HSUPA Subtest-2	21.91	21.86	21.68
HSUPA Subtest-3	22.32	22.33	22.25
HSUPA Subtest-4	22.34	22.40	22.25
HSUPA Subtest-5	22.28	22.32	22.22
HSPA+ (16QAM) Subtest-1	21.80	21.85	21.66

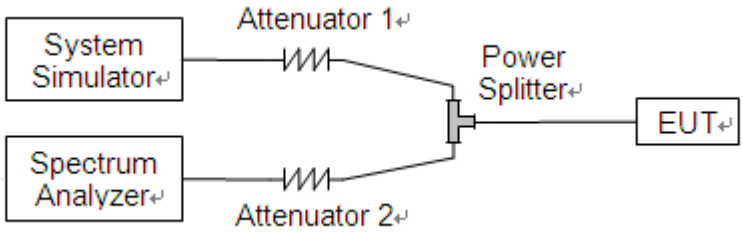
2.2. Peak to Average Ratio

2.2.1.Requirement

According to FCC 24.232(d) and 27.50(d), the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

2.2.2.Test Description

Test Setup:



The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.

2.2.3.Test procedure

1 .For GSM/EDGE operating mode:

a. Set RBW=1MHz, VBW=3MHz, peak detector in spectrum analyzer.
b. Set EUT in maximum output power, and triggered the bust signal.
c. Measured respectively the peak level and mean level, and the deviation was recorded as Peak to Average ratio.

2. For UMTS operating mode:

a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1%.

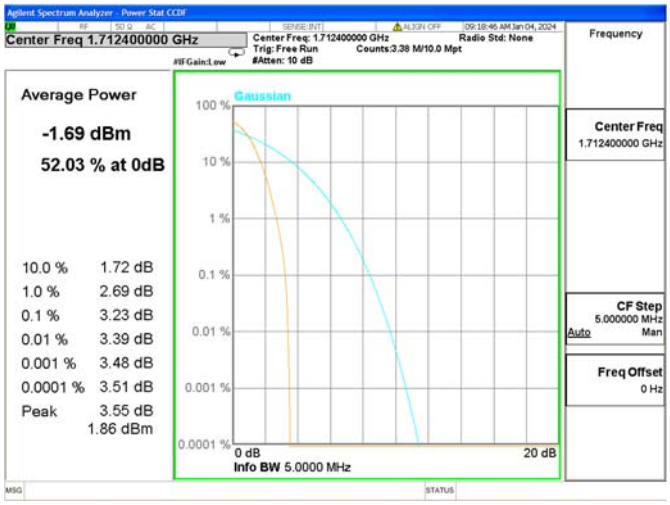
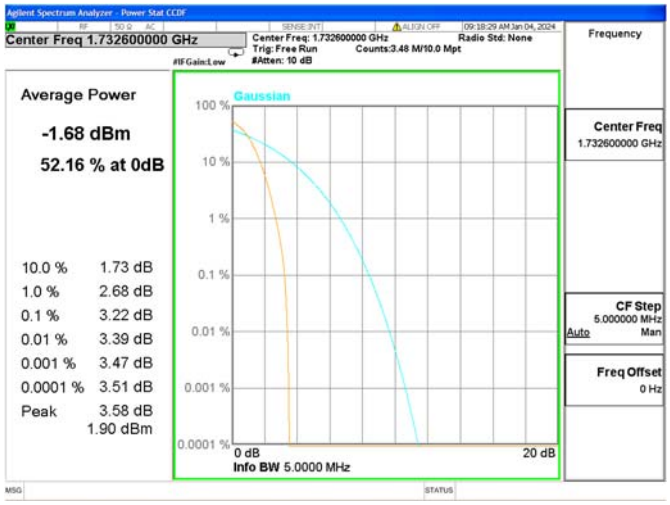
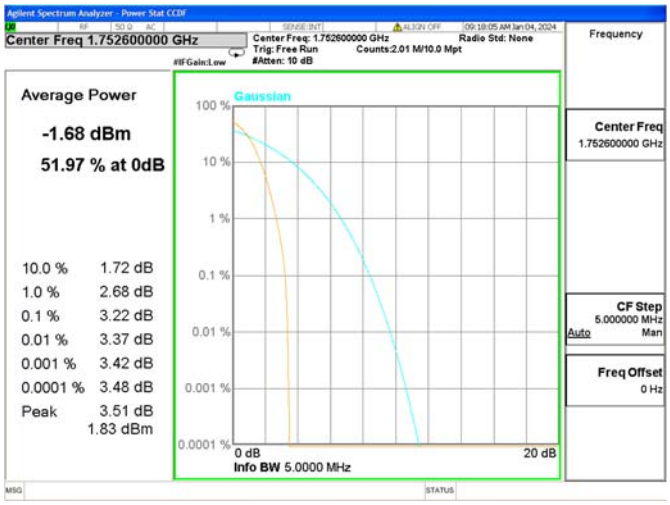
2.2.4.Test Result

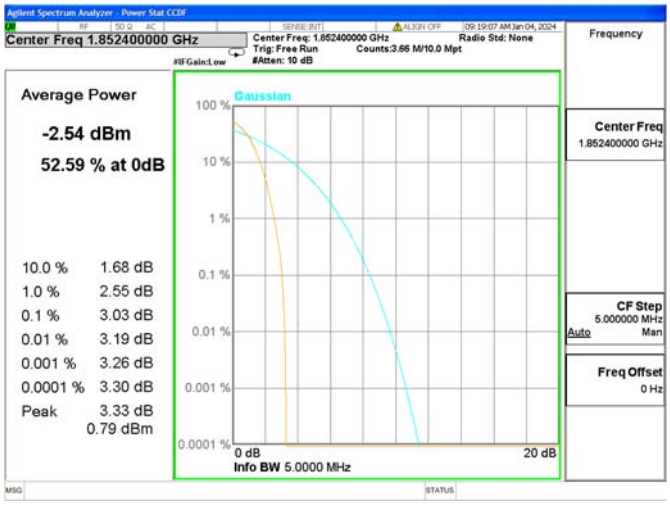
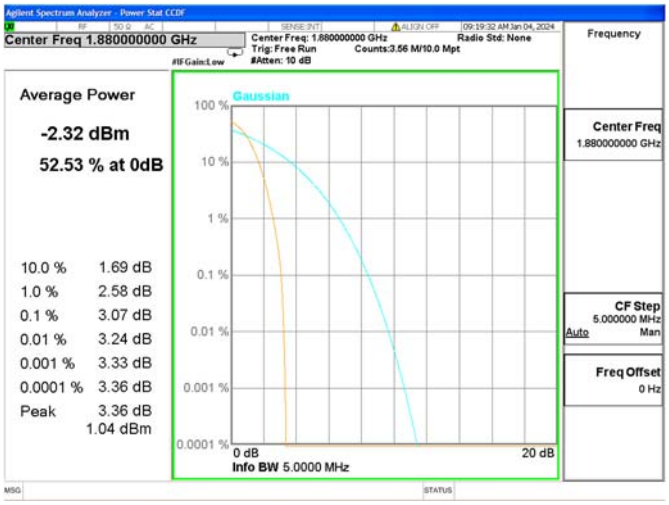
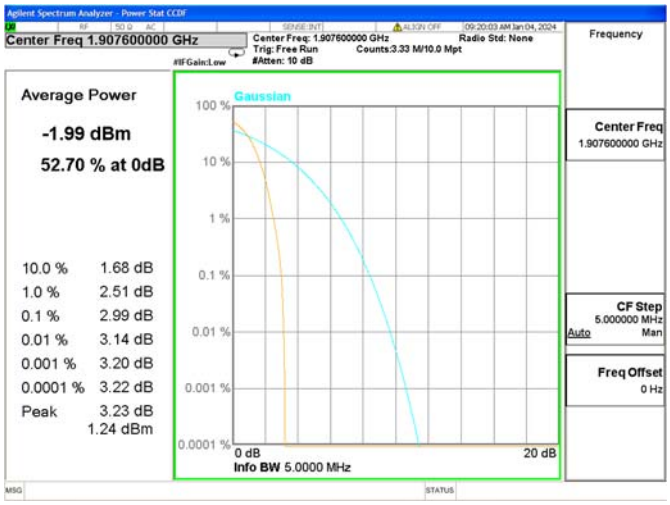
The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the Module.

A. Test Verdict:

WCDMA Band IV					
Mode	**Channel**	**Frequency (MHz)**	**Peak to Average ratio (dB)**	**Limit (dB)**	**Verdict**
WCDMA	1312	1712.4	3.23	13	PASS
	1413	1732.6	3.22		PASS
	1513	1752.6	3.22		PASS

WCDMA Band II					
Mode	**Channel**	**Frequency (MHz)**	**Peak to Average ratio (dB)**	**Limit (dB)**	**Verdict**
WCDMA	9262	1852.4	3.03	13	PASS
	9400	1880.0	3.07		PASS
	9538	1907.6	2.99		PASS

WCDMA Band IV, CH1312, 1712.4MHz	WCDMA Band IV, CH1413, 1732.6MHz
	
WCDMA Band IV, CH1513, 1752.6MHz	
	

WCDMA Band II, CH9262, 1852.4MHz	WCDMA Band II, CH9400, 1880.0MHz
	
WCDMA Band II, CH9538, 1907.6MHz	
	

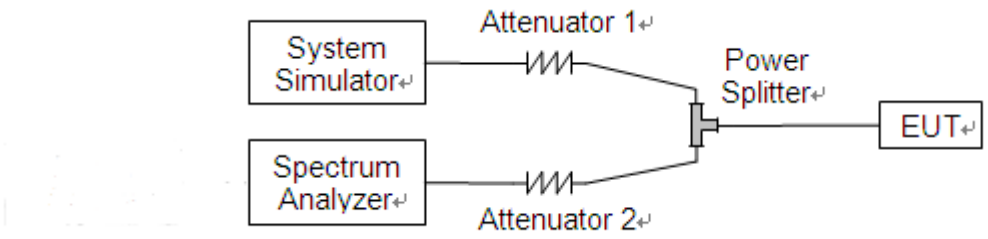
2.3. Occupied Bandwidth

2.3.1.Requirement

According to FCC section 2.1049, the occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission. Occupied bandwidth is also known as the 99% emission bandwidth.

2.3.2.Test Description

Test Setup:



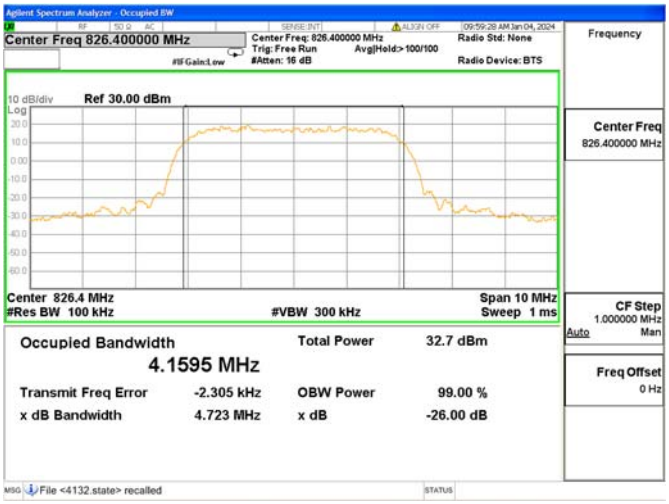
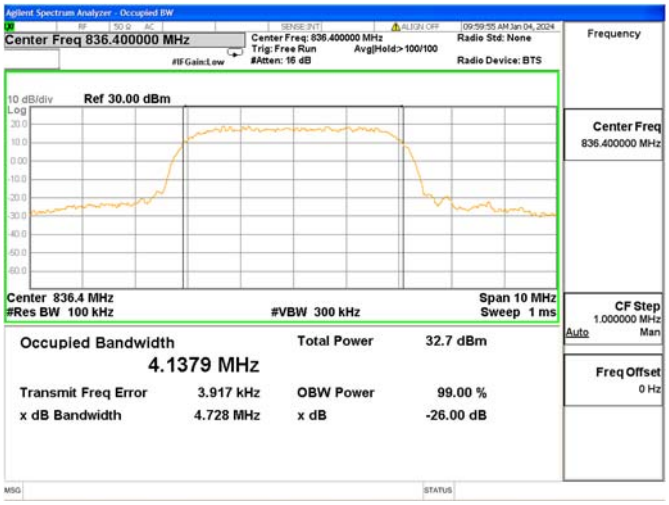
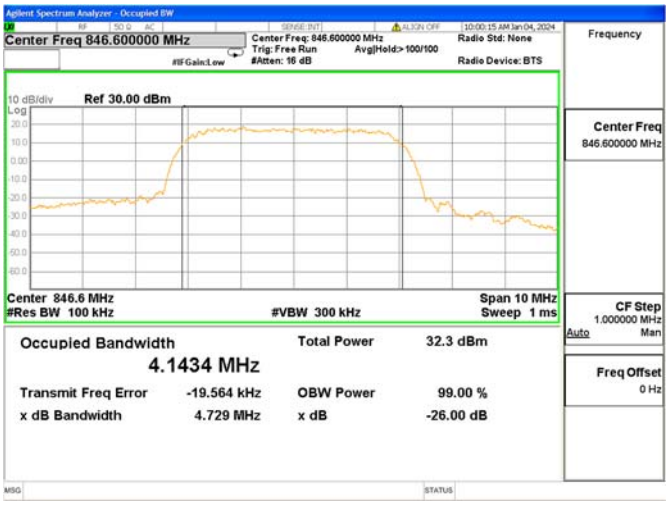
The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.

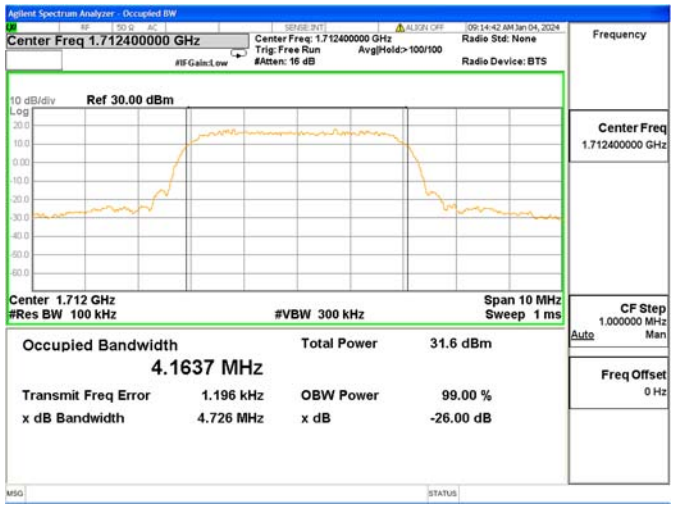
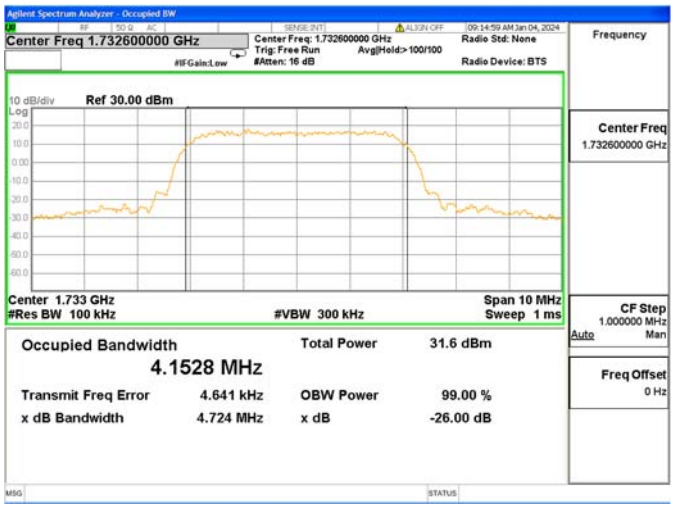
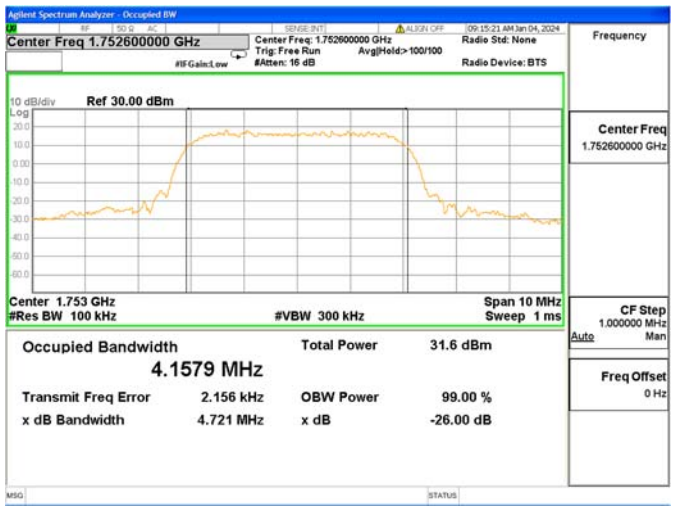
2.3.3.Test Result

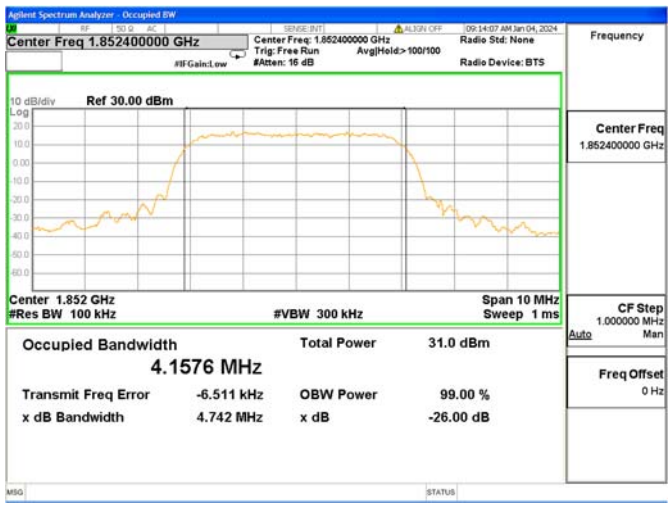
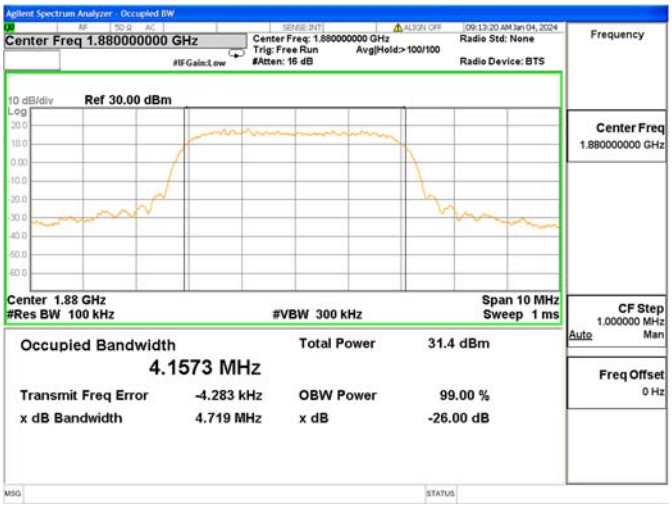
WCDMA Band V				
Mode	**Channel**	**Frequency (MHz)**	**99% Occupied Bandwidth (MHz)**	**26dB Bandwidth (MHz)**
WCDMA	4132	826.4	4.16	4.72
	4182	836.4	4.14	4.73
	4233	846.6	4.14	4.73

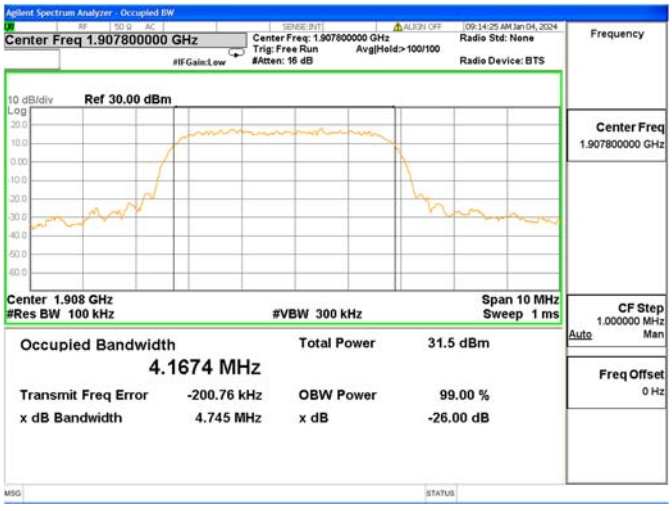
WCDMA Band IV				
Mode	**Channel**	**Frequency (MHz)**	**99% Occupied Bandwidth (MHz)**	**26dB Bandwidth (MHz)**
WCDMA	1312	1712.4	4.16	4.73
	1413	1732.6	4.15	4.72
	1513	1752.6	4.16	4.72

WCDMA Band II				
Mode	**Channel**	**Frequency (MHz)**	**99% Occupied Bandwidth (MHz)**	**26dB Bandwidth (MHz)**
WCDMA	9262	1852.4	4.16	4.74
	9400	1880.0	4.16	4.72
	9538	1907.6	4.17	4.75

WCDMA Band V, CH4132, 826.4MHz	WCDMA Band V, CH4182, 836.4MHz
	
WCDMA Band V, CH4233, 846.6MHz	
	

WCDMA Band IV, CH1312, 1712.4MHz	WCDMA Band IV, CH1413, 1732.6MHz
	
WCDMA Band IV, CH1513, 1752.6MHz	
	

WCDMA Band II, CH9262, 1852.4MHz	WCDMA Band II, CH9400, 1880.0MHz
	

WCDMA Band II, CH9538, 1907.6MHz	
	

2.4. Frequency Stability

2.4.1.Requirement

According to FCC section 22.355, 24.235 and 27.54 the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

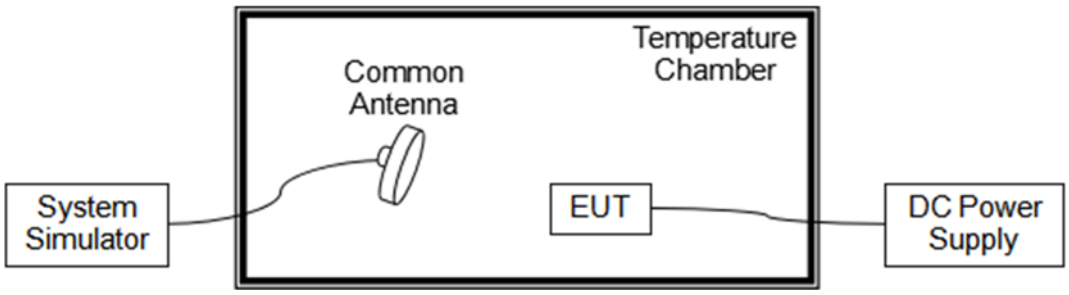
(a) The temperature is varied from -30°C to +50°C at intervals of not more than 10°C.

(b) For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

Note: The operating temperature of EUT is from -20°C to 55°C, which are specified by the applicant.

2.4.2.Test Description

Test Setup:



The EUT, which is powered by the DC Power Supply directly, is located in the Temperature Chamber. The EUT is commanded by the System Simulator (SS) to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS via a Common Antenna.

2.4.3.Test Result

The nominal, highest and lowest extreme voltages are separately 3.87V, 4.45V and 3.65V, which are specified by the applicant; the normal temperature here used is 20°C.

WCDMA Band V, CH4182, 836.4MHz Limit =±2.5ppm					
Voltage (%)	**Power (VDC)**	**Temp (°C)**	**Fre. Dev. (Hz)**	**Deviation (ppm)**	**Result**
Normal	3.87	+20(Ref)	13	0.016	PASS
Normal		-20	10	0.012	
Normal		-10	18	0.022	
Normal		0	17	0.020	
Normal		+10	17	0.020	
Normal		+20	14	0.017	
Normal		+30	10	0.012	
Normal		+40	19	**0.023**	
Normal		+50	15	0.018	
Normal		+55	19	**0.023**	
High	4.45	+20	18	0.022	
BATT.ENDPOINT	3.65	+20	19	**0.023**	

WCDMA Band IV, CH1413, 1732.6MHz Limit =Within Authorized Band					
Voltage (%)	**Power (VDC)**	**Temp (°C)**	**Fre. Dev. (Hz)**	**Deviation (ppm)**	**Result**
Normal	3.87	+20(Ref)	20	0.012	PASS
Normal		-20	22	**0.013**	
Normal		-10	-19	-0.011	
Normal		0	-5	-0.003	
Normal		+10	16	0.009	
Normal		+20	5	0.003	
Normal		+30	13	0.008	
Normal		+40	19	0.011	
Normal		+50	16	0.009	
Normal		+55	13	0.008	
High	4.45	+20	20	0.012	
BATT.ENDPOINT	3.65	+20	16	0.009	

WCDMA Band II, CH9400, 1880.0MHz Limit =Within Authorized Band					
Voltage (%)	**Power (VDC)**	**Temp (°C)**	**Fre. Dev. (Hz)**	**Deviation (ppm)**	**Result**
Normal	3.87	+20(Ref)	-18	-0.010	PASS
Normal		-20	-17	-0.009	
Normal		-10	15	0.008	
Normal		0	-21	-0.011	
Normal		+10	4	0.002	
Normal		+20	20	**0.011**	
Normal		+30	15	0.008	
Normal		+40	20	**0.011**	
Normal		+50	20	**0.011**	
Normal		+55	3	0.002	
High	4.45	+20	14	0.007	
BATT.ENDPOINT	3.65	+20	-18	-0.010	

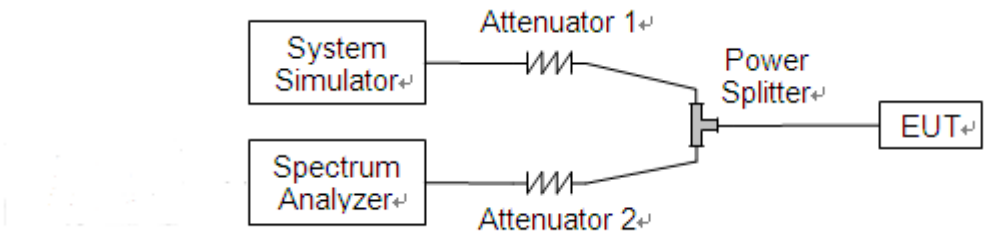
2.5. Conducted Out of Band Emissions

2.5.1.Requirement

According to FCC section 22.917(a), 24.238(a) and 27.53(h) 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. This calculated to be -13dBm. The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency.

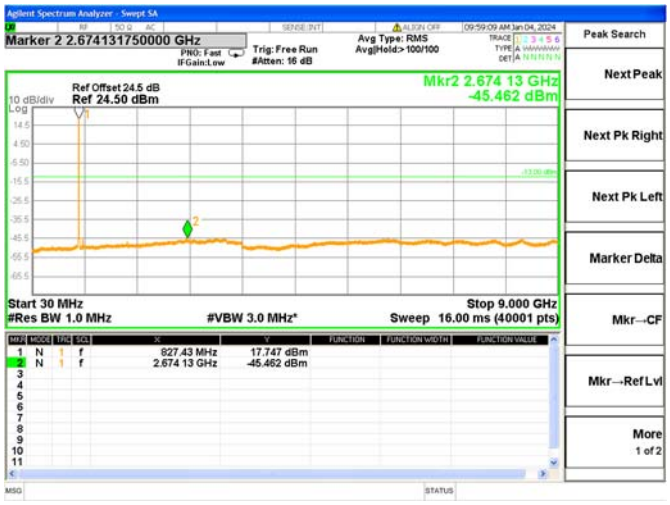
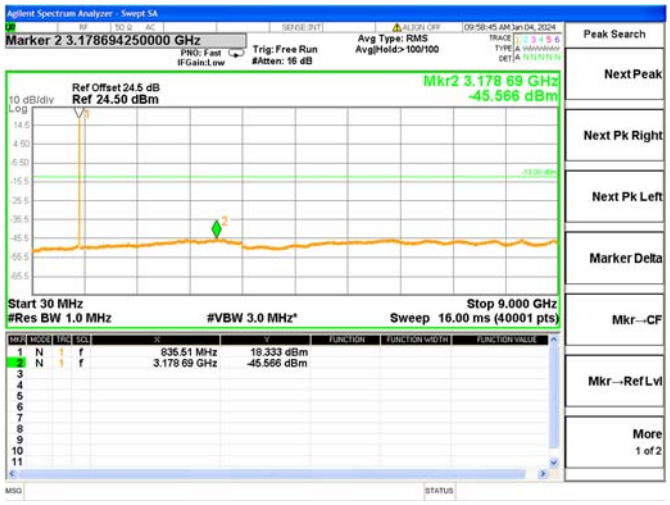
2.5.2.Test Description

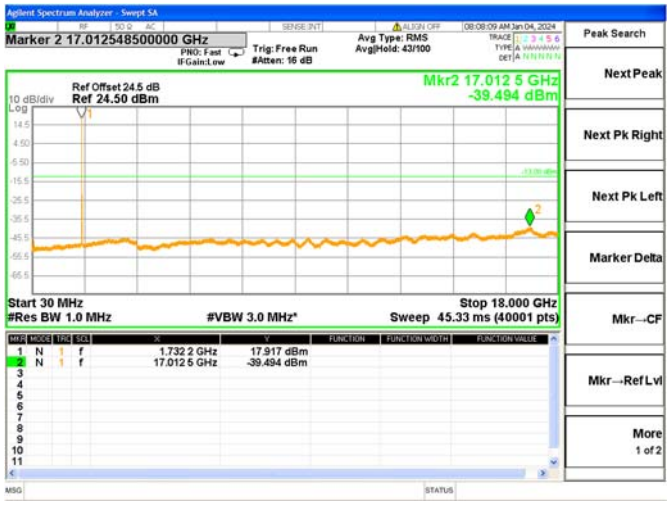
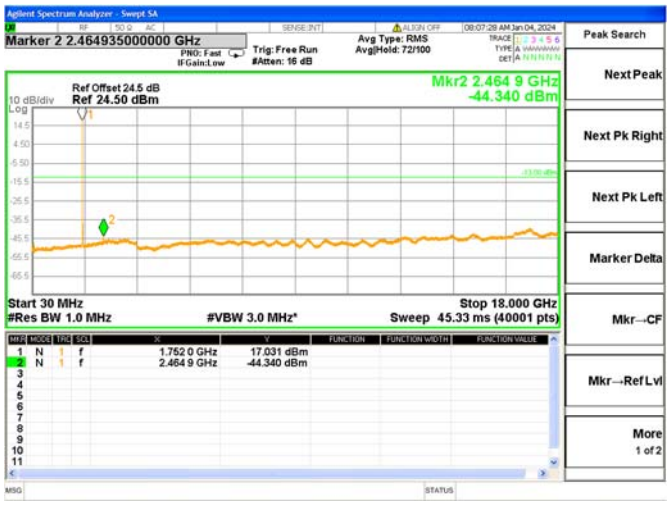
Test Setup:

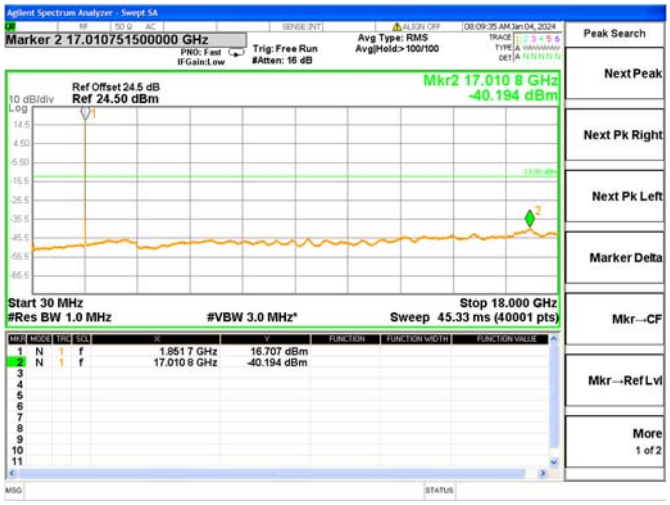
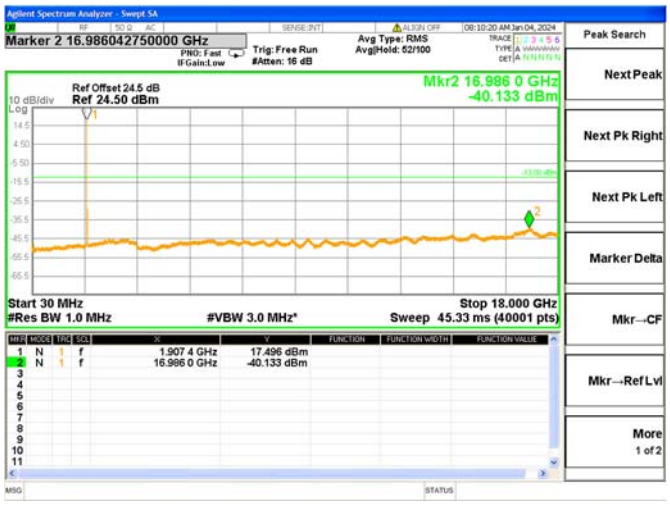


The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.

2.5.3.Test Result

WCDMA Band V, CH4132, 826.4MHz	WCDMA Band V, CH4182, 836.4MHz
	
WCDMA Band V, CH4233, 846.6MHz	
	

WCDMA Band IV,CH1312, 1712.4MHz	WCDMA Band IV, CH1413, 1732.6MHz
	
WCDMA Band IV, CH1513, 1752.6MHz	
	

WCDMA Band II, CH9262, 1852.4MHz	WCDMA Band II, CH9400, 1880.0MHz
	
WCDMA Band II, CH9538, 1907.6MHz	
	

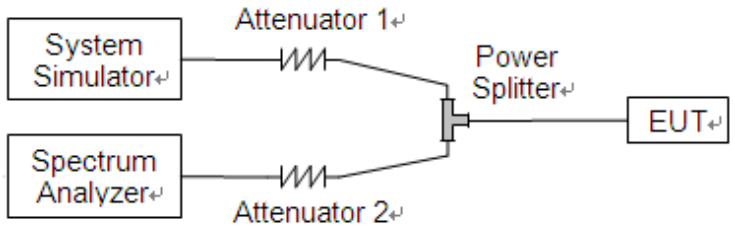
2.6. Band Edge

2.6.1.Requirement

According to FCC section 22.917(a), 24.238(a) and 27.53(h) 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.

2.6.2.Test Description

Test Setup:

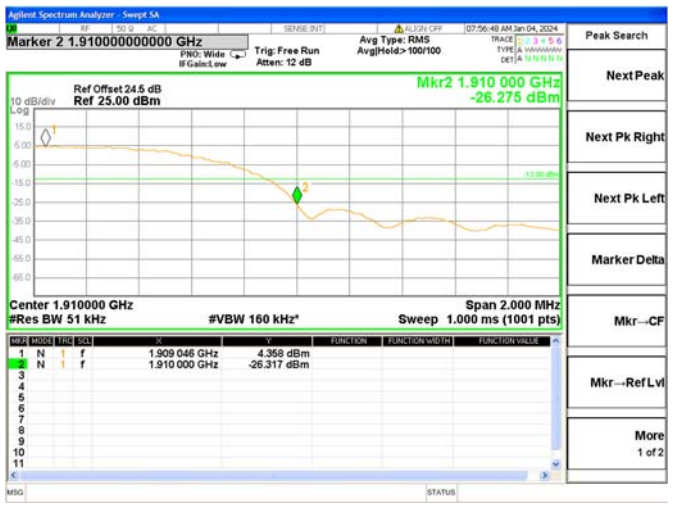


The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.

2.6.3.Test Result

The lowest and highest channels are tested to verify the band edge emissions.

WCDMA Band V, CH4132, 826.4MHz	WCDMA Band V, CH4233, 846.6MHz
	
WCDMA Band IV, CH1312, 1712.4MHz	**WCDMA Band IV, CH1513, 1752.6MHz**
	

WCDMA Band II, CH9262, 1852.4MHz	WCDMA Band II, CH9538, 1907.6MHz
	

2.7. Determining E.R.P. and/or E.I.R.P. from conducted RF output power measurements

2.7.1.Requirement

According to FCC section 22.913, the Effective Radiated Power (E.R.P.) of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.
According to FCC section 24.232, the broadband PCS mobile station is limited to 2 Watts e.i.r.p. peak power.
According to FCC section 27.50, mobile, and portable (hand-held) stations is limited to 1 Watts e.i.r.p. peak power.

2.7.2.Test Description

The test setups refer to section 2.1.3
A call is established between the EUT and the SS via a Common Antenna. The EUT is commanded by the SS to operate at the maximum and minimum output power (i.e. GSM850MHz band Power Control Level (PCL) = 5/19 and Power Class = 4, GSM1900MHz band Power Control Level (PCL) = 0/15 and Power Class = 1), and only the test result of the maximum output power was recorded. Please refer to section 2.1.3 of this report.
The relevant equation for determining the maximum E.R.P. or E.I.R.P. from the measured RF output power is given in Equation (1) as follows:
E.R.P. or E.I.R.P. = P_{Meas} + G_T
Where:
E.R.P. or E.I.R.P. effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as P_{Meas}, e.g., dBm or dBW)
P_{Meas} measured transmitter output power or PSD, in dBm or dBW
G_T gain of the transmitting antenna, in dBd (E.R.P.) or dBi (E.I.R.P.)
For devices utilizing multiple antennas, see ANSI C63.25-2015 6.4 for guidance with respect to determining the effective array transmit antenna gain term to be used in the above equation.
The following equations demonstrate the mathematical relationship between E.R.P. and E.I.R.P.:
a) E.R.P. = E.I.R.P. − 2.15, where E.R.P. and E.I.R.P. are expressed in consistent units.
b) E.I.R.P. = E.R.P. + 2.15, where E.R.P. and E.I.R.P. are expressed in consistent units.

2.7.3.Test Result

WCDMA Band V							
Band	Channel	Frequency (MHz)	Measured E.R.P.		Limit		Verdict
			dBm	W	dBm	W	
WCDMA	4132	826.4	17.95	0.062	38.5	7	PASS
	4182	836.4	18.13	0.065			PASS
	4233	846.6	18.11	0.065			PASS
HSDPA	4132	826.4	17.04	0.051	38.5	7	PASS
	4182	836.4	17.17	0.052			PASS
	4233	846.6	17.25	0.053			PASS
DC-HSDPA	4132	826.4	17.04	0.051	38.5	7	PASS
	4182	836.4	17.18	0.052			PASS
	4233	846.6	17.27	0.053			PASS
HSUPA	4132	826.4	17.49	0.056	38.5	7	PASS
	4182	836.4	17.26	0.053			PASS
	4233	846.6	17.27	0.053			PASS
HSPA+	4132	826.4	16.99	0.050	38.5	7	PASS
	4182	836.4	17.21	0.053			PASS
	4233	846.6	17.28	0.053			PASS
Note 1: For the HSDPA and HSUPA mode, all the subtests were tested and just the worst data were recorded in this report.							

WCDMA Band IV							
Band	Channel	Frequency (MHz)	Measured E.I.R.P.		Limit		Verdict
			dBm	W	dBm	W	
WCDMA	1312	1712.4	23.12	0.205	30	1	PASS
	1413	1732.6	23.14	0.206			PASS
	1513	1752.6	23.06	0.202			PASS
HSDPA	1312	1712.4	21.89	0.155	30	1	PASS
	1413	1732.6	21.90	0.155			PASS
	1513	1752.6	21.93	0.156			PASS
DC-HSDPA	1312	1712.4	21.91	0.155	30	1	PASS
	1413	1732.6	21.90	0.155			PASS
	1513	1752.6	21.92	0.156			PASS
HSUPA	1312	1712.4	21.84	0.153	30	1	PASS
	1413	1732.6	21.95	0.157			PASS
	1513	1752.6	21.88	0.154			PASS
HSPA+	1312	1712.4	21.27	0.134	30	1	PASS
	1413	1732.6	21.31	0.135			PASS
	1513	1752.6	21.42	0.139			PASS
Note 1: For the HSDPA and HSUPA mode, all the subtests were tested and just the worst data were recorded in this report.							

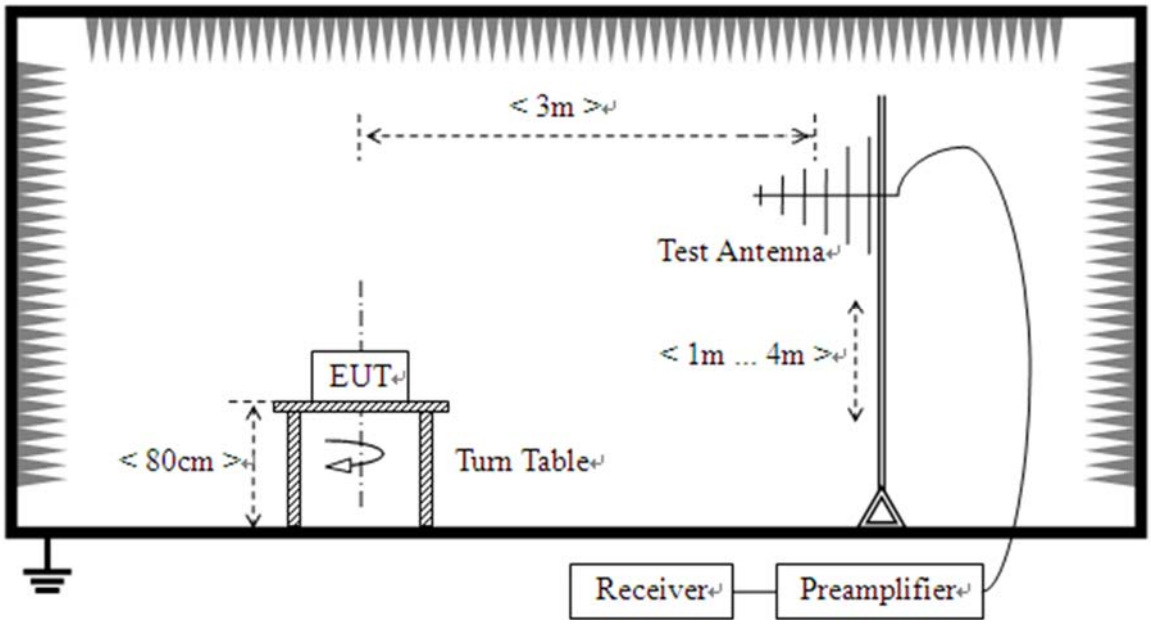
WCDMA Band II							
Band	Channel	Frequency (MHz)	Measured E.I.R.P.		Limit		Verdict
			dBm	W	dBm	W	
WCDMA	9262	1852.4	23.29	0.213	33	2	PASS
	9400	1880.0	23.33	0.215			PASS
	9538	1907.6	23.18	0.208			PASS
HSDPA	9262	1852.4	22.45	0.176	33	2	PASS
	9400	1880.0	22.47	0.177			PASS
	9538	1907.6	22.42	0.175			PASS
DC-HSDPA	9262	1852.4	22.39	0.173	33	2	PASS
	9400	1880.0	22.37	0.173			PASS
	9538	1907.6	22.36	0.172			PASS
HSUPA	9262	1852.4	22.35	0.172	33	2	PASS
	9400	1880.0	22.41	0.174			PASS
	9538	1907.6	22.26	0.168			PASS
HSPA+	9262	1852.4	21.81	0.152	33	2	PASS
	9400	1880.0	21.86	0.153			PASS
	9538	1907.6	21.67	0.147			PASS
Note 1: For the HSDPA and HSUPA mode, all the subtests were tested and just the worst data were recorded in this report.							

2.8. Radiated Out of Band Emissions

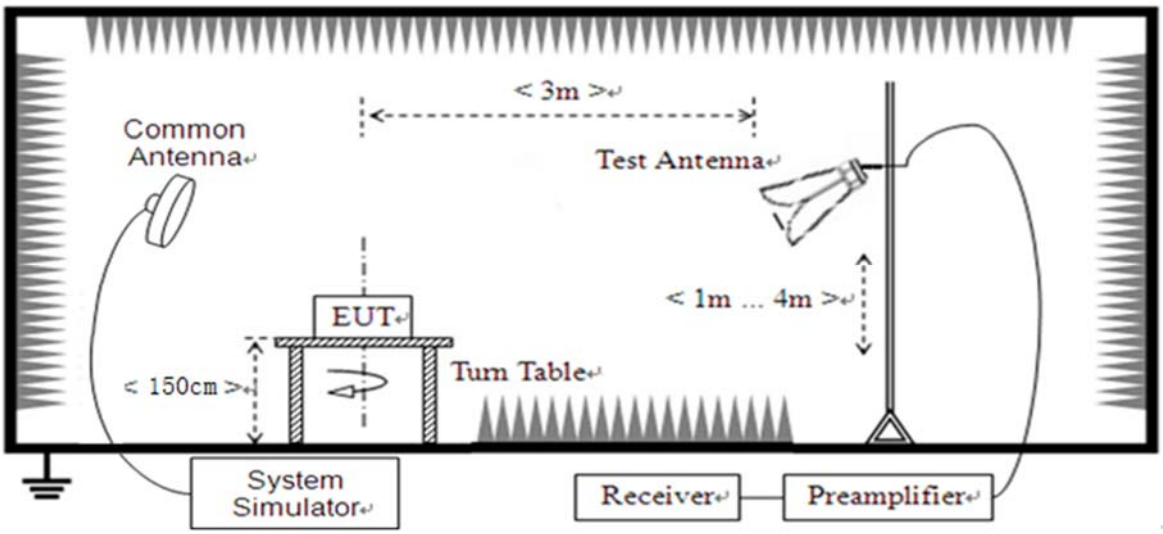
2.8.1.Requirement

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. This calculated to be -13dBm. The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency.

2.8.2.Test Description



(For the test frequency from 30MHz to1GHz)



(For the test frequency above 1GHz)

The EUT is located in a 3m Full-Anechoic Chamber, the cable loss, air loss and so on of the site as factors are pre-calibrated using the "Substitution" method, and calculated to correct the reading.
A call is established between the EUT and the SS via a Common Antenna. The EUT is commanded by the SS to operate at the maximum and minimum output power and only the test result of the maximum output power was recorded.
In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground and the Turn Table is actuated to turn from 0° to 360°to determine the maximum value of the radiated power. The emission levels at both horizontal and vertical polarizations should be tested. The Filters consists of Notch Filters and High Pass Filter.
Note: When doing measurements above 1GHz, the EUT has been within the 3dB cone width of the horn antenna during horizontal antenna.

2.8.3.Test Procedure

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements.

For measurements above 1GHz the resolution bandwidth is set to 1MHz, the video band width is set to 3MHz for peak measurements.

2.8.4.Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The lowest, middle and highest channels are tested to verify the out of band emissions.

The substitution corrections are obtained as described below:

$A_{SUBST} = P_{SUBST\_TX} - P_{SUBST\_RX} - L_{SUBST\_CABLES} + G_{SUBST\_TX\_ANT}$

$A_{TOT} = L_{CABLES} + A_{SUBST}$

Where A_{SUBST} is the final substitution correction including receive antenna gain.

P_{SUBST_TX} is signal generator level,

P_{SUBST_RX} is receiver level,

L_{SUBST_CABLES} is cable losses including TX cable,

$G_{SUBST\_TX\_ANT}$ is substitution antenna gain.

A_{TOT} is total correction factor including cable loss and substitution correction

During the test, the data of A_{TOT} was added in the test spectrum analyze, so spectrum analyze reading is the final values which contain the data of A_{TOT}.

Note1: The power of the EUT transmitting frequency should be ignored.

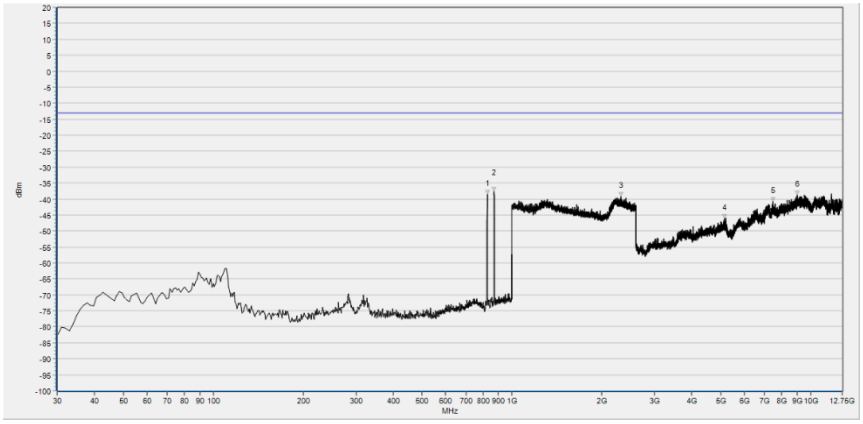
Note2: All test mode and condition mentioned were considered and evaluated respectively by performing full test, only the worst data were recorded and reported.

Note3: All spurious emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

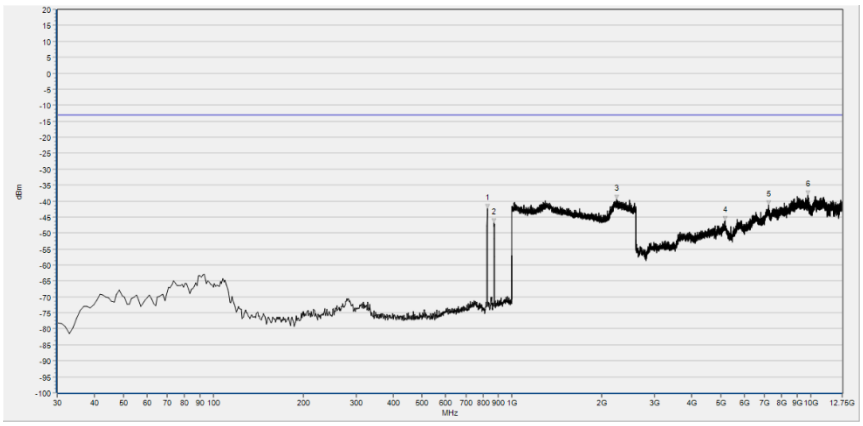
Note4: N/A means the frequency is the basic frequency or the base station frequency, they are no need to verdict.

Note5: The amplitude of emissions(18GHz to 10th harmonics) which are attenuated more than 20 dB below the limit are not be reported.

WCDMA Band V(WCDMA), Low Channel

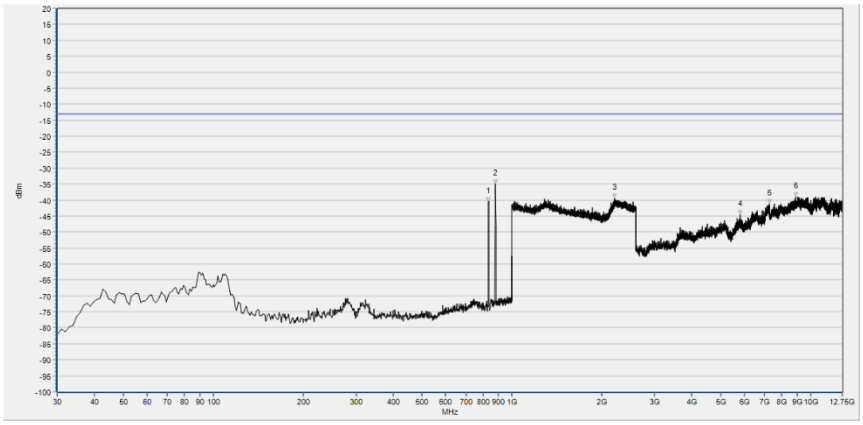


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	827.340	-38.54	-13.00	Horizontal	N/A
2	870.020	-37.55	-13.00	Horizontal	N/A
3	2314.446	-39.13	-13.00	Horizontal	PASS
4	5139.807	-46.16	-13.00	Horizontal	PASS
5	7463.657	-40.87	-13.00	Horizontal	PASS
6	9039.962	-38.76	-13.00	Horizontal	PASS

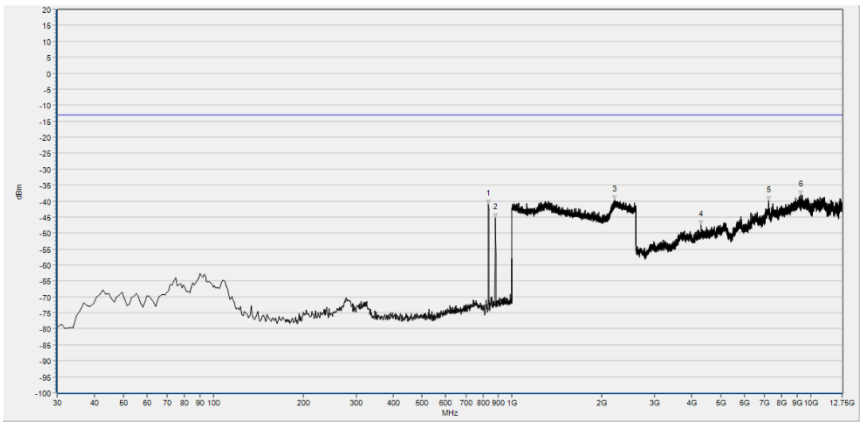


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	827.340	-42.24	-13.00	Vertical	N/A
2	870.020	-46.84	-13.00	Vertical	N/A
3	2245.298	-39.47	-13.00	Vertical	PASS
4	5160.111	-46.24	-13.00	Vertical	PASS
5	7240.316	-41.34	-13.00	Vertical	PASS
6	9772.740	-38.00	-13.00	Vertical	PASS

WCDMA Band V(WCDMA), Mid Channel

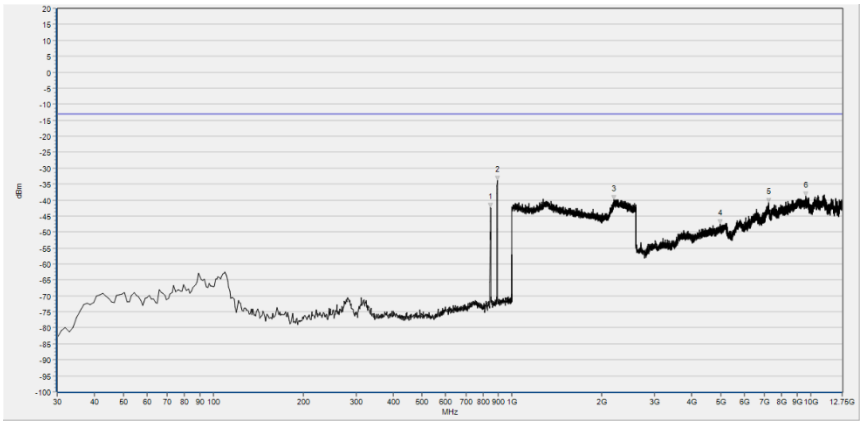


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	834.130	-40.57	-13.00	Horizontal	N/A
2	879.720	-34.88	-13.00	Horizontal	N/A
3	2207.523	-39.46	-13.00	Horizontal	PASS
4	5819.058	-44.57	-13.00	Horizontal	PASS
5	7262.466	-41.23	-13.00	Horizontal	PASS
6	8916.294	-39.08	-13.00	Horizontal	PASS

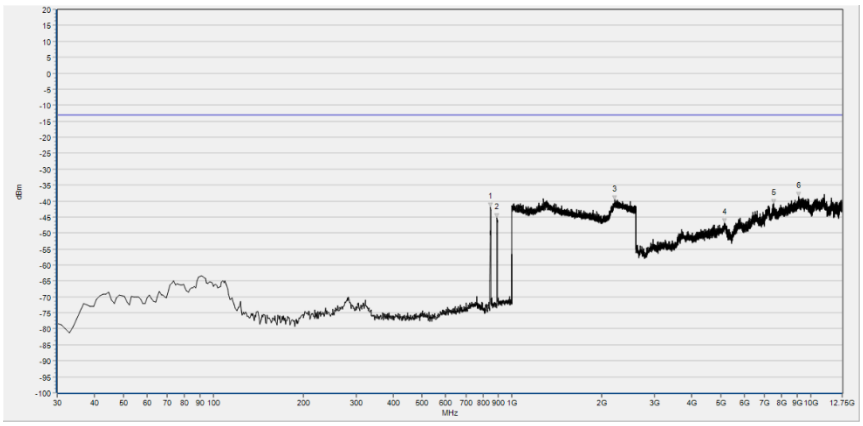


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	834.130	-40.98	-13.00	Vertical	N/A
2	880.690	-45.27	-13.00	Vertical	N/A
3	2209.444	-39.66	-13.00	Vertical	PASS
4	4299.973	-47.49	-13.00	Vertical	PASS
5	7227.396	-39.90	-13.00	Vertical	PASS
6	9281.760	-38.11	-13.00	Vertical	PASS

WCDMA Band V(WCDMA), High Channel

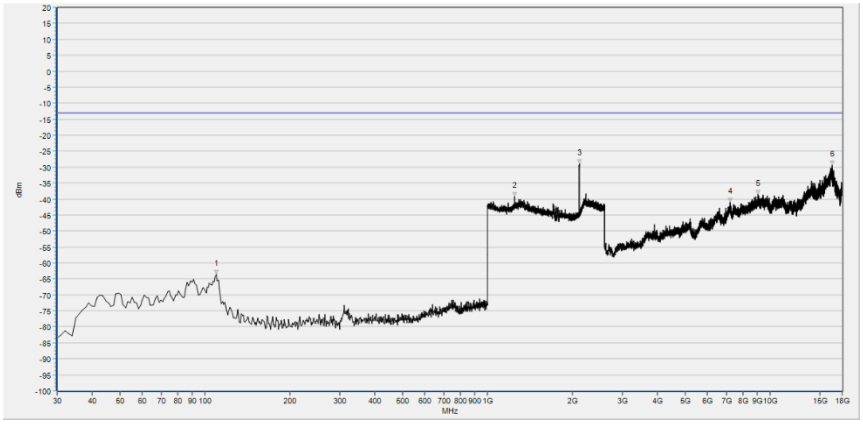


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	847.710	-42.32	-13.00	Horizontal	N/A
2	892.330	-33.79	-13.00	Horizontal	N/A
3	2197.279	-39.92	-13.00	Horizontal	PASS
4	4971.840	-47.48	-13.00	Horizontal	PASS
5	7236.625	-40.76	-13.00	Horizontal	PASS
6	9641.689	-38.79	-13.00	Horizontal	PASS

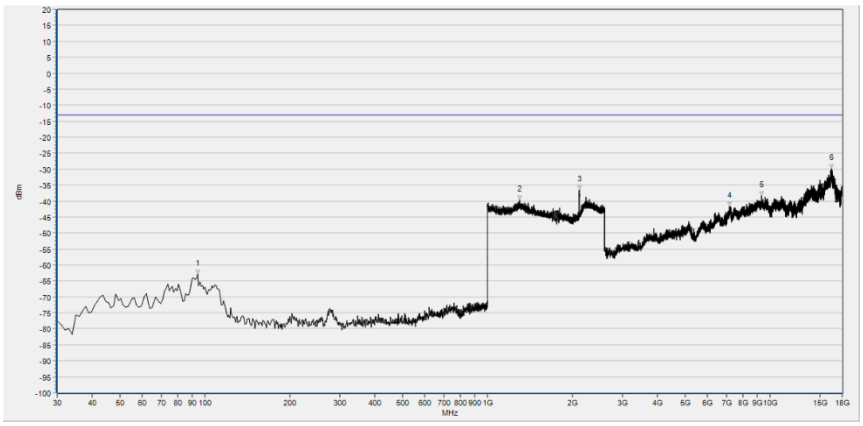


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	847.710	-41.90	-13.00	Vertical	N/A
2	891.360	-45.29	-13.00	Vertical	N/A
3	2210.084	-39.77	-13.00	Vertical	PASS
4	5130.578	-46.89	-13.00	Vertical	PASS
5	7528.260	-40.78	-13.00	Vertical	PASS
6	9124.868	-38.53	-13.00	Vertical	PASS

WCDMA Band IV(WCDMA), Low Channel

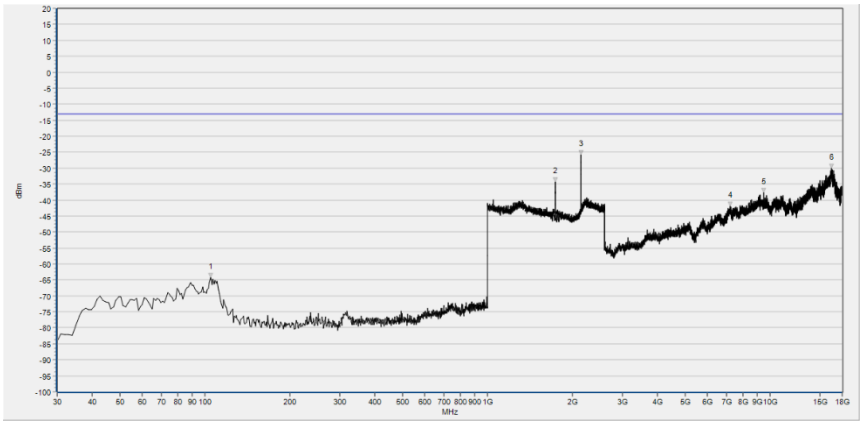


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	109.620	-63.65	-13.00	Horizontal	PASS
2	1246.523	-39.27	-13.00	Horizontal	PASS
3	2112.556	-29.04	-13.00	Horizontal	N/A
4	7241.307	-41.12	-13.00	Horizontal	PASS
5	9076.779	-38.63	-13.00	Horizontal	PASS
6	16547.025	-29.33	-13.00	Horizontal	PASS

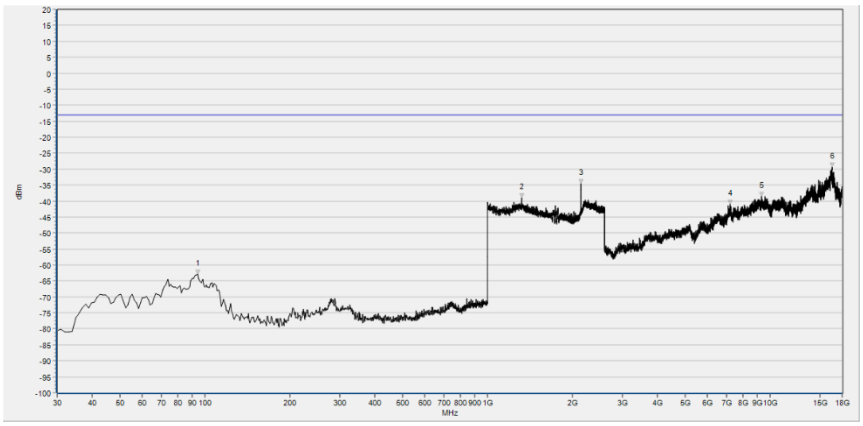


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	94.084	-62.83	-13.00	Vertical	PASS
2	1300.150	-39.75	-13.00	Vertical	PASS
3	2111.756	-36.59	-13.00	Vertical	N/A
4	7169.428	-41.69	-13.00	Vertical	PASS
5	9330.922	-38.32	-13.00	Vertical	PASS
6	16539.323	-29.88	-13.00	Vertical	PASS

WCDMA Band IV(WCDMA), Mid Channel

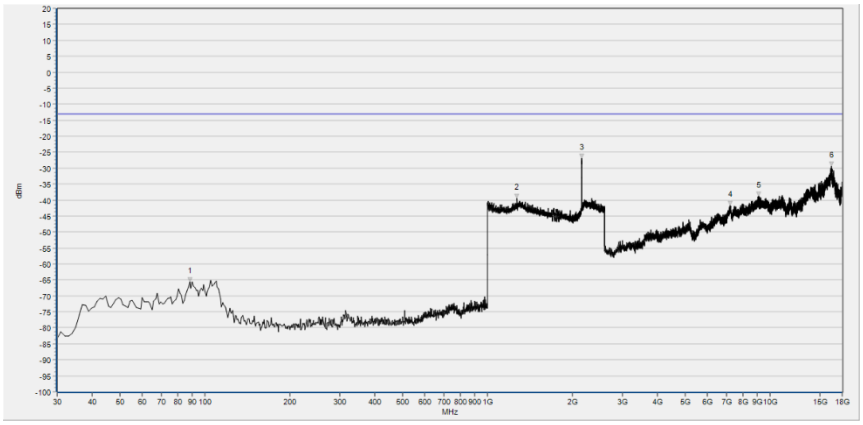


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	104.765	-64.15	-13.00	Horizontal	PASS
2	1738.769	-34.23	-13.00	Horizontal	N/A
3	2139.770	-25.91	-13.00	Horizontal	N/A
4	7225.904	-41.80	-13.00	Horizontal	PASS
5	9477.246	-37.57	-13.00	Horizontal	PASS
6	16539.323	-30.09	-13.00	Horizontal	PASS

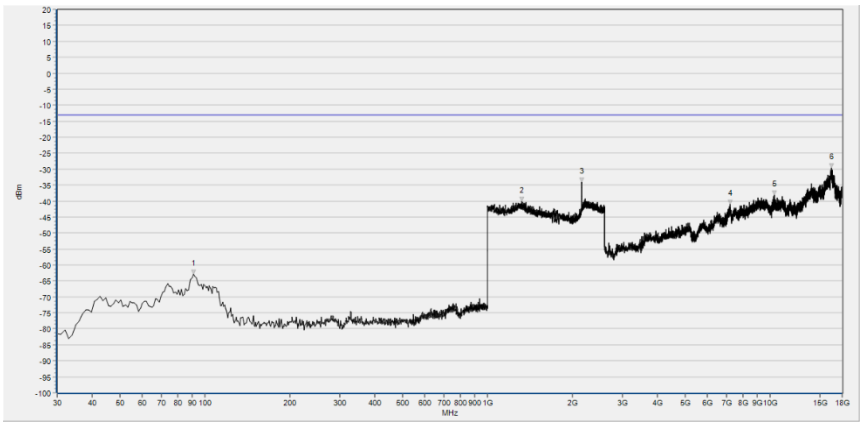


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	94.084	-62.87	-13.00	Vertical	PASS
2	1318.559	-38.91	-13.00	Vertical	PASS
3	2138.969	-34.48	-13.00	Vertical	N/A
4	7223.337	-41.07	-13.00	Vertical	PASS
5	9346.324	-38.50	-13.00	Vertical	PASS
6	16552.159	-29.37	-13.00	Vertical	PASS

WCDMA Band IV(WCDMA), High Channel

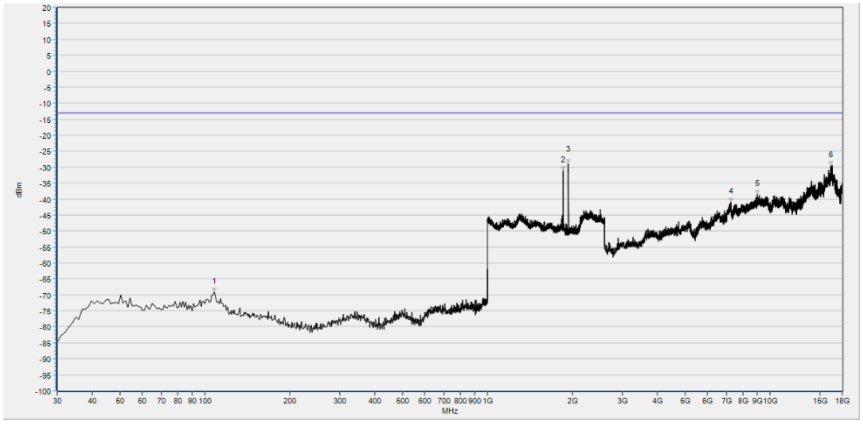


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	88.258	-65.61	-13.00	Horizontal	PASS
2	1272.936	-39.40	-13.00	Horizontal	PASS
3	2154.177	-27.01	-13.00	Horizontal	N/A
4	7231.039	-41.68	-13.00	Horizontal	PASS
5	9138.390	-38.71	-13.00	Horizontal	PASS
6	16526.488	-29.46	-13.00	Horizontal	PASS

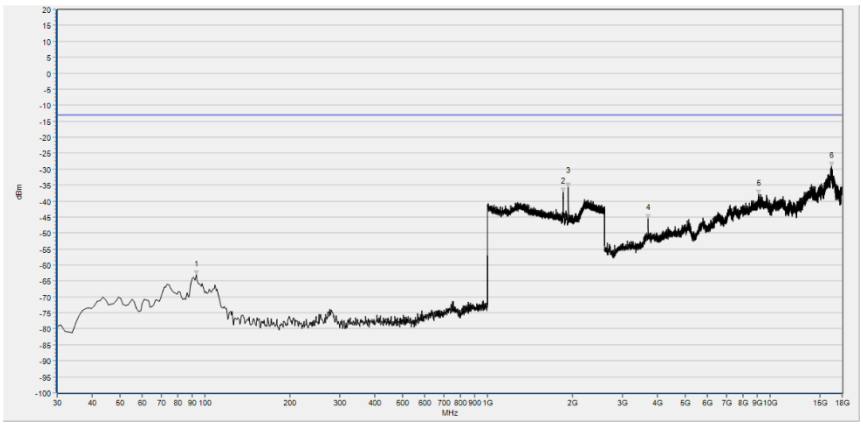


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	91.171	-62.82	-13.00	Vertical	PASS
2	1320.960	-40.10	-13.00	Vertical	PASS
3	2153.377	-34.17	-13.00	Vertical	N/A
4	7238.740	-41.05	-13.00	Vertical	PASS
5	10357.760	-38.02	-13.00	Vertical	PASS
6	16480.280	-29.53	-13.00	Vertical	PASS

WCDMA Band II(WCDMA), Low Channel

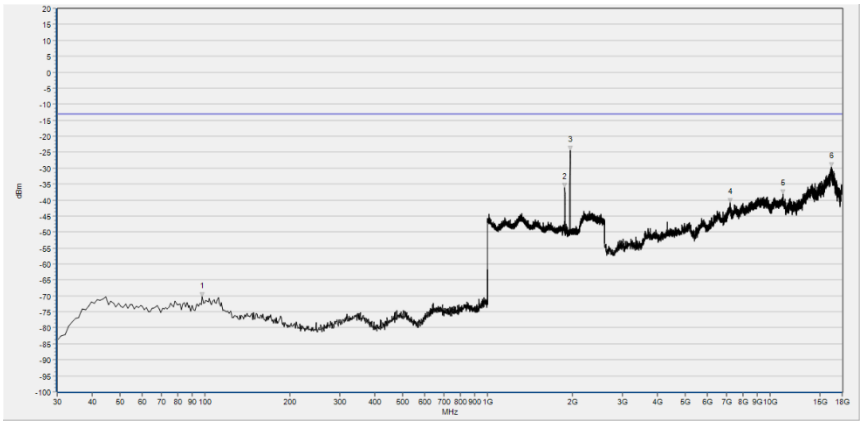


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	107.600	-69.16	-13.00	Horizontal	PASS
2	1851.541	-31.17	-13.00	Horizontal	N/A
3	1933.493	-28.99	-13.00	Horizontal	N/A
4	7254.446	-41.06	-13.00	Horizontal	PASS
5	8996.363	-38.53	-13.00	Horizontal	PASS
6	16384.106	-29.66	-13.00	Horizontal	PASS

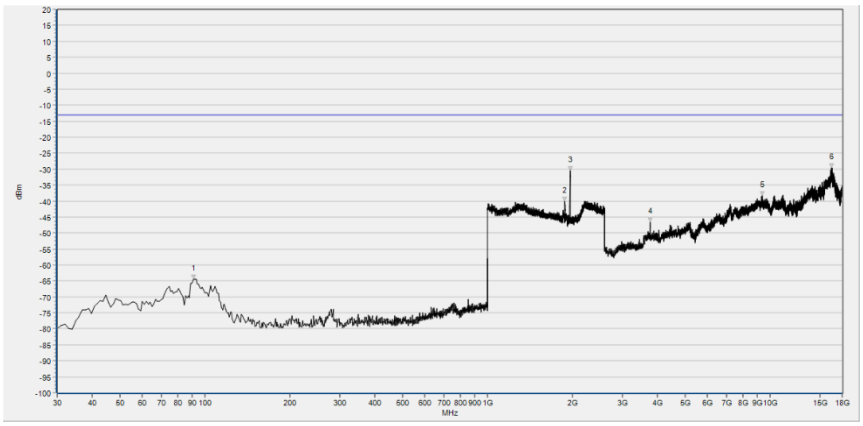


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	93.050	-63.19	-13.00	Vertical	PASS
2	1851.541	-37.12	-13.00	Vertical	N/A
3	1933.493	-35.54	-13.00	Vertical	N/A
4	3706.201	-45.47	-13.00	Vertical	PASS
5	9091.580	-37.91	-13.00	Vertical	PASS
6	16543.735	-29.25	-13.00	Vertical	PASS

WCDMA Band II(WCDMA), Mid Channel

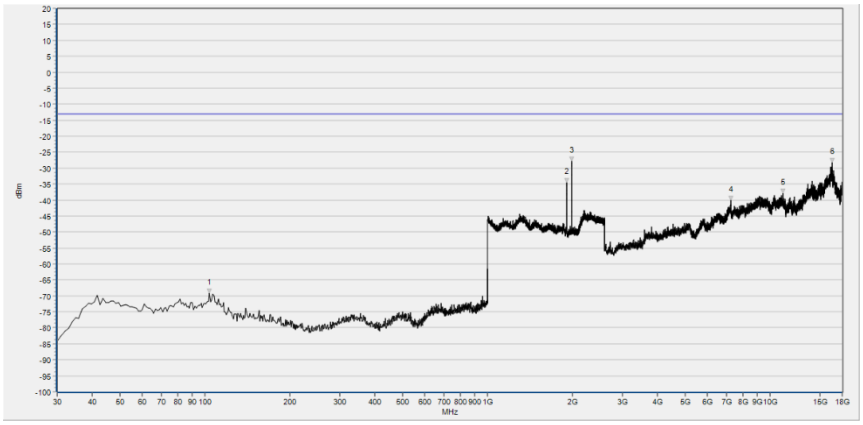


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	97.900	-70.38	-13.00	Horizontal	PASS
2	1878.431	-36.20	-13.00	Horizontal	N/A
3	1959.744	-24.42	-13.00	Horizontal	N/A
4	7229.242	-40.73	-13.00	Horizontal	PASS
5	11121.949	-38.11	-13.00	Horizontal	PASS
6	16524.132	-29.59	-13.00	Horizontal	PASS

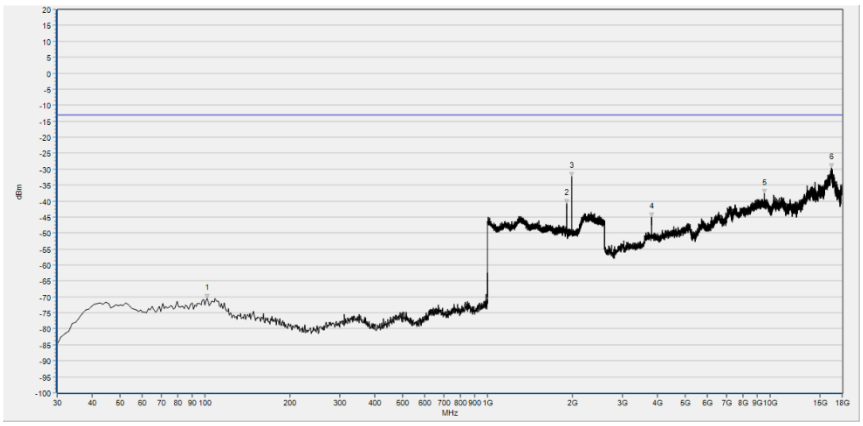


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	91.110	-64.54	-13.00	Vertical	PASS
2	1879.072	-40.10	-13.00	Vertical	N/A
3	1961.024	-30.59	-13.00	Vertical	N/A
4	3762.211	-46.59	-13.00	Vertical	PASS
5	9399.636	-38.40	-13.00	Vertical	PASS
6	16451.318	-29.62	-13.00	Vertical	PASS

WCDMA Band II(WCDMA), High Channel



No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	103.720	-69.22	-13.00	Horizontal	PASS
2	1908.523	-34.48	-13.00	Horizontal	N/A
3	1986.635	-27.74	-13.00	Horizontal	N/A
4	7251.646	-40.03	-13.00	Horizontal	PASS
5	11124.750	-37.96	-13.00	Horizontal	PASS
6	16560.538	-28.18	-13.00	Horizontal	PASS



No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	101.780	-70.49	-13.00	Vertical	PASS
2	1908.523	-40.84	-13.00	Vertical	N/A
3	1987.275	-32.30	-13.00	Vertical	N/A
4	3812.620	-44.98	-13.00	Vertical	PASS
5	9536.861	-37.66	-13.00	Vertical	PASS
6	16532.533	-29.65	-13.00	Vertical	PASS

Annex A Test Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for test performed on the EUT as specified in CISPR 16-1-2:

Test Items	Uncertainty
Output Power	±2.22dB
Bandwidth	±5%
Conducted Spurious Emission	±2.77dB
Radiated Emission	±2.95dB

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

Annex B Testing Laboratory Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Laboratory Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

3. Facilities and Accreditations

All measurement facilities used to collect the measurement data are located at FL.3, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10-2013 and CISPR Publication 22; the FCC designation number is CN1192, the test firm registration number is 226174.

4. Test Equipments Utilized

4.1 Conducted Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Due Date
EXA Signal Analyzer	MY51511149	N9020A	Agilent	2023.06.21	2024.06.20
Communication Test Station	6200995016	MT8820C	Anritsu	2023.09.19	2024.09.18
Temperature Chamber	S022177101 00089002	KMT-36LF 1A0	KOMEG	2023.09.19	2024.09.18

4.2 List of Software Used

Description	Manufacturer	Software Version
MORLAB EMCR	MORLAB	V1.2

4.3 Radiated Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Due Date
System Simulator	152038	CMW500	R&S	2023.10.17	2024.10.16
Receiver	MY54130016	N9038A	Agilent	2023.06.21	2024.06.20
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2023.07.01	2024.06.30
Test Antenna - Horn	9120D-963	BBHA 9120D	Schwarzbeck	2023.06.27	2024.06.26
RF Coaxial Cable (DC-18GHz)	MRE001	PE330	Pasternack	2023.06.27	2024.06.26
RF Coaxial Cable (DC-18GHz)	MRE002	CLU18	Pasternack	2023.06.27	2024.06.26
RF Coaxial Cable (DC-18GHz)	MRE003	CLU18	Pasternack	2023.06.27	2024.06.26
RF Coaxial Cable (DC-40GHz)	22290045	QA360-40-KK-0.5	Qualwave	2023.07.04	2024.07.03
RF Coaxial Cable (DC-40GHz)	22290046	QA360-40-KKF-2	Qualwave	2023.07.04	2024.07.03
Preamplifier (10MHz-6GHz)	46732	S10M100L3802	LUCIX CORP.	2023.06.27	2024.06.26
Preamplifier (2GHz-18GHz)	61171/61172	S020180L3203	LUCIX CORP.	2023.06.27	2024.06.26
Preamplifier (18GHz-40GHz)	DS77209	DCLNA0118-40C-S	Decentest	2023.07.04	2024.07.03
Notch Filter	N/A	WRCGV-W Band V	Wainwright	N/A	N/A
Notch Filter	N/A	WRCGV-W Band II	Wainwright	N/A	N/A
Notch Filter	N/A	WRCGV-W Band IV	Wainwright	N/A	N/A
Anechoic Chamber	N/A	9m*6m*6m	CRT	2022.05.10	2025.05.09

END OF REPORT