

FCC

RF

TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.



FOR
**Life Alert Cellular Combination Smoke/CO
Detector**

ISSUED TO
Life Alert Emergency Response, Inc.

16027 Ventura Blvd Ste 200 Encino, CA 91436-2747



Report No.: BL-SZ1680203-501
 EUT Type: Life Alert Cellular Combination Smoke/CO Detector
 Model Name: 1.0
 Brand Name: LASC-01
 Test Standard: 47 CFR Part 2 (10-1-15 Edition)
 47 CFR Part 22 (10-1-15 Edition)
 47 CFR Part 24 (10-1-15 Edition)
 FCC ID: 2ABZ7-918
 Test conclusion: Pass
 Test Date: Aug. 12, 2016 ~ Aug. 16, 2016
 Date of Issue: Sep. 7, 2016

Tested by: Tu Lang
Tu Lang
(Engineer)

Date Sep. 7, 2016

Approved by: Liao Jianming
Liao Jianming
(Technical Director)

Date Sep. 07, 2016



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Revision History

<u>Version</u>	<u>Issue Date</u>	<u>Revisions</u>
<u>Rev. 01</u>	<u>Aug. 30, 2016</u>	<u>Initial Issue</u>
<u>Rev. 02</u>	<u>Sep. 7, 2016</u>	<u>Adjusted the RSE test site in section 4.4 and attachment BL-SZ1680203 - AR, and retested all RSE in section . Annex A.7</u>

TABLE OF CONTENTS

1 ADMINISTRATIVE DATA (GENERAL INFORMATION) 5

 1.1 Identification of the Testing Laboratory 5

 1.2 Identification of the Responsible Testing Location 5

 1.3 Laboratory Condition 5

 1.4 Announce 5

2 PRODUCT INFORMATION 7

 2.1 Applicant..... 7

 2.2 Manufacturer 7

 2.3 Factory Information 7

 2.4 General Description for Equipment under Test (EUT) 7

 2.5 Ancillary Equipment..... 7

 2.6 Technical Information 7

3 SUMMARY OF TEST RESULTS 8

 3.1 Test Standards 8

 3.2 Verdict 8

4 GENERAL TEST CONFIGURATIONS 9

 4.1 Test Environments 9

 4.2 Test Equipment List..... 9

 4.3 Test Configurations 10

 4.4 Description of Test Setup 11

 4.4.1 For Antenna Port Test 11

 4.4.2 For Frequency Stability Test..... 11

4.4.3 For Radiated Test (30 MHz-1 GHz).....	12
4.4.4 For Radiated Test (Above 1 GHz)	12
5 TEST ITEMS	13
5.1 Transmitter Radiated Power (EIRP/ERP)	13
5.1.1 Limit	13
5.1.2 Test Setup	13
5.1.3 Test Procedure	13
5.1.4 Test Result.....	14
5.2 Peak to average ratio	15
5.2.1 Limit	15
5.2.2 Test Setup	15
5.2.3 Test Procedure	15
5.2.4 Test Result.....	16
5.3 Occupied Bandwidth	17
5.3.1 Limit	17
5.3.2 Test Setup	17
5.3.3 Test Procedure	17
5.3.4 Test Result.....	17
5.4 Frequency Stability.....	18
5.4.1 Limit	18
5.4.2 Test Setup	18
5.4.3 Test Procedure	18
5.4.4 Test Result.....	18
5.5 Spurious Emission at Antenna Terminals	19
5.5.1 Limit	19
5.5.2 Test Setup	19
5.5.3 Test Procedure	19
5.5.4 Test Result.....	19
5.6 Band Edge.....	20
5.6.1 Limit	20
5.6.2 Test Setup	20
5.6.3 Test Procedure	20

5.6.4 Test Result.....	20
5.7 Field Strength of Spurious Radiation.....	21
5.7.1 Limit	21
5.7.2 Test Setup	21
5.7.3 Test Procedure	21
5.7.4 Test Result.....	22
ANNEX A TEST RESULT	23
A.1 Transmitter Radiated Power (EIRP/ERP).....	23
A.2 Peak to Average Ratio	25
A.3 Occupied Bandwidth	27
A.4 Frequency Stability	29
A.5 Spurious Emission at Antenna Terminals	30
A.6 Band Edge	36
A.7 Field Strength of Spurious Radiation	37
ANNEX B TEST SETUP PHOTOS.....	49
ANNEX C EUT EXTERNAL PHOTOS.....	49
ANNEX D EUT INTERNAL PHOTOS.....	49

1 ADMINISTRATIVE DATA (GENERAL INFORMATION)

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6683 0100
Fax Number	+86 755 6182 4271

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	<p>The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1.</p> <p>The laboratory has been listed by US Federal Communications Commission to perform electromagnetic emission measurements. The recognition numbers of test site are 832625.</p> <p>The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.</p>
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Laboratory Condition

Ambient Temperature	25 to 35°C
Ambient Relative Humidity	40% - 60%
Ambient Pressure	98 kPa - 100 kPa

1.4 Announce

- (1) The test report reference to the report template version v1.0.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- (5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without

prior written approval from the laboratory.

2 PRODUCT INFORMATION

2.1 Applicant

Applicant	Life Alert Emergency Response, Inc.
Address	16027 Ventura Blvd Ste 200 Encino, CA 91436-2747

2.2 Manufacturer

Manufacturer	Global Brands Manufacture Limited
Address	EMS business unit, block F, Yue Yuen industrial estate, Huang Jiang town, Dong Guan City, Guang Dong Province, China.

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Type	Life Alert Cellular Combination Smoke/CO Detector
Model Name	1.0
Hardware Version	N/A
Software Version	N/A
Network and Wireless connectivity	3G Network WCDMA/HSDPA Band 2/5
About the Product	The equipment is Life Alert Cellular Combination Smoke/CO Detector, intended for used with information technology equipment.

2.5 Ancillary Equipment

N/A

2.6 Technical Information

Frequency Bands	WCDMA Band 2/5
Modulation Type	QPSK/16QAM
TX Frequency Range	WCDMA/HSDPA Band 2: 1850 -1910 MHz WCDMA/HSDPA Band 5: 824 - 849 MHz
Rx Frequency Range	WCDMA/HSDPA Band 2: 1930 - 1990 MHz WCDMA/HSDPA Band 5: 869 - 894 MHz
Power Class	WCDMA/HSDPA Band 2: 3 WCDMA/HSDPA Band 5: 3
Antenna Type	PIFA Antenna
Antenna Gain	WCDMA/HSDPA Band 2 2dBi WCDMA/HSDPA Band 5: 2dBi

Note 1: The above EUT information in section 2.4 and 2.6 was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2 (10-1-15 Edition)	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 22 (10-1-15 Edition)	Public Mobile Services
3	47 CFR Part 24 (10 - 1 - 15 Edition)	Personal Communications Services
4	TIA/EIA 603.D-2010	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
5	KDB 971168 D01 v02r02	Measurement Guidance For Certification of Licensed Digital Transmitters

3.2 Verdict

No.	Description	FCC Part No.	Test Result	Verdict
1	Conducted RF Output Power	2.1046	Reporting only (ANNEX A.1)	Pass
2	Effective (Isotropic) Radiated Power	2.1046 22.913 24.232	ANNEX A.1	Pass
3	Peak to average ratio	2.0146 24.232	ANNEX A.2	Pass
4	Occupied Bandwidth	2.1049 22.917 24.238	ANNEX A.3	Pass
5	Frequency Stability	2.1055 22.355 24.235	ANNEX A.4	Pass
6	Spurious Emission at Antenna Terminals	2.1051 22.917 24.238	ANNEX A.5	Pass
7	Band Edge	2.1051 22.917 24.238	ANNEX A.6	Pass
8	Field Strength of Spurious Radiation	2.1053 22.917 24.238	ANNEX A.7	Pass

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

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

Working Voltage of The EUT	NV (Normal Voltage)	4.5 V
	LV (Low Voltage)	4.05 V
	HV (High Voltage)	4.5 V
Working Temperature of The EUT	LT (Low Temperature)	-10 °C
	HT (High Temperature)	55°C

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	ROHDE&SCHWARZ	FSV-30	103118	2016.07.13	2017.07.12
Spectrum Analyzer	AGILENT	E4440A	MY45304434	2015.10.15	2016.10.14
Universal Radio Communication Tester	ROHDE&SCHWARZ	CMU 200	123666	2015.10.15	2016.10.14
Wireless Communications Test Set	ROHDE&SCHWARZ	CMW 500	102318	2016.07.13	2017.07.12
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2016.07.05	2017.07.04
Power Splitter	KMW	DCPD-LDC	1305003215	--	--
Power Sensor	ROHDE&SCHWARZ	NRP-Z21	103971	2016.07.13	2017.07.12
Attenuator (20 dB)	KMW	ZA-S1-201	110617091	--	--
Attenuator (6 dB)	KMW	ZA-S1-61	1305003189	--	--
DC Power Supply	ROHDE&SCHWARZ	IT6863A	60001401068 7210020	2016.07.13	2017.07.12
Temperature Chamber	ANGELANTIONI SCIENCE	SP20	1412	2016.07.13	2017.07.12
Test Antenna- Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	2015.07.22	2017.07.21
Test Antenna- Bi-Log(30 MHz-3 GHz)	SCHWARZBECK	VULB 9163	9163-624	2015.07.22	2017.07.21
Test Antenna- Horn(1-18 GHz)	SCHWARZBECK	BBHA 9120D	9120D-1148	2015.07.22	2017.07.21
Test Antenna- Horn(15-26.5 GHz)	SCHWARZBECK	BBHA 9170	9170-305	2015.07.22	2017.07.21
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2015.02.28	2017.02.27
Shielded Enclosure	ChangNing	CN-130701	130703	--	--

4.3 Test Configurations

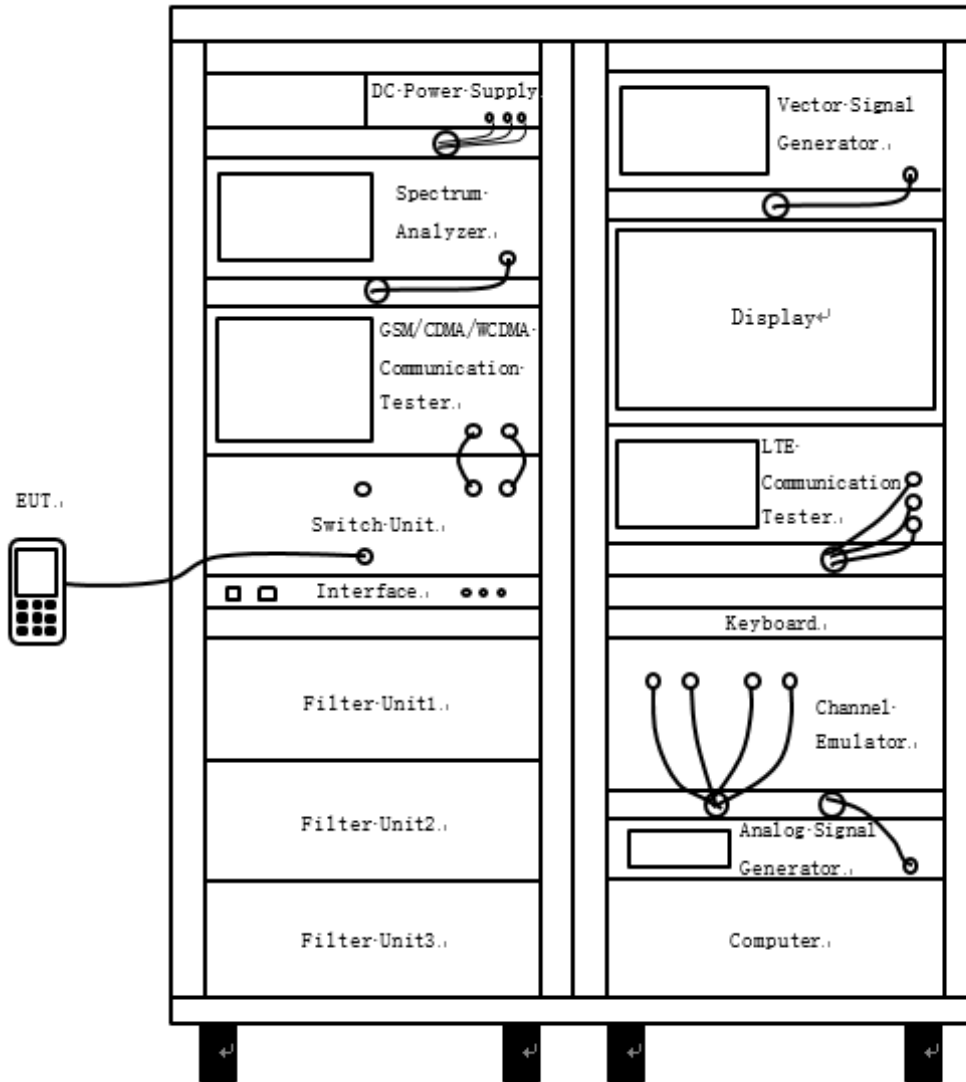
Test Items	Test Mode	Test Channel		
		LCH	MCH	HCH
E.R.P/E.I.R.P	WCDMA Band 2	v	v	v
	WCDMA Band 5	v	v	v
	HSDPA Band 2	v	v	v
	HSDPA Band 5	v	v	v
Peak to Average Ratio	WCDMA Band 2	v	v	v
Occupied Bandwidth	WCDMA Band 2	v	v	v
	WCDMA Band 5	v	v	v
Frequency Stability	WCDMA Band 2	v	v	v
	WCDMA Band 5	v	v	v
Spurious Emission at Antenna Terminals	WCDMA Band 2	v	v	v
	WCDMA Band 5	v	v	v
Band Edge	WCDMA Band 2	v	--	v
	WCDMA Band 5	v	--	v
Field Strength of Spurious Radiation	WCDMA Band 2	v	v	v
	WCDMA Band 5	v	v	v

Note 1: The mark "v" means that this configuration is chosen for testing.

Test Mode	UL Channel	UL Channel No.	UL Frequency (MHz)
WCDMA Band 2	LCH	9262	1852.4
	MCH	9400	1880.0
	HCH	9538	1907.6
WCDMA Band 5	LCH	4132	826.4
	MCH	4182	836.4
	HCH	4233	846.6

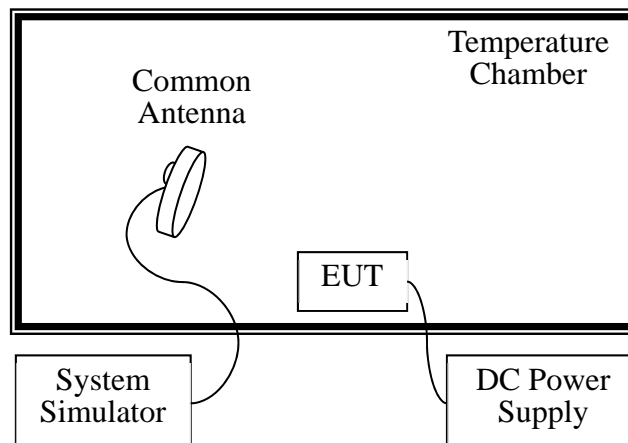
4.4 Description of Test Setup

4.4.1 For Antenna Port Test



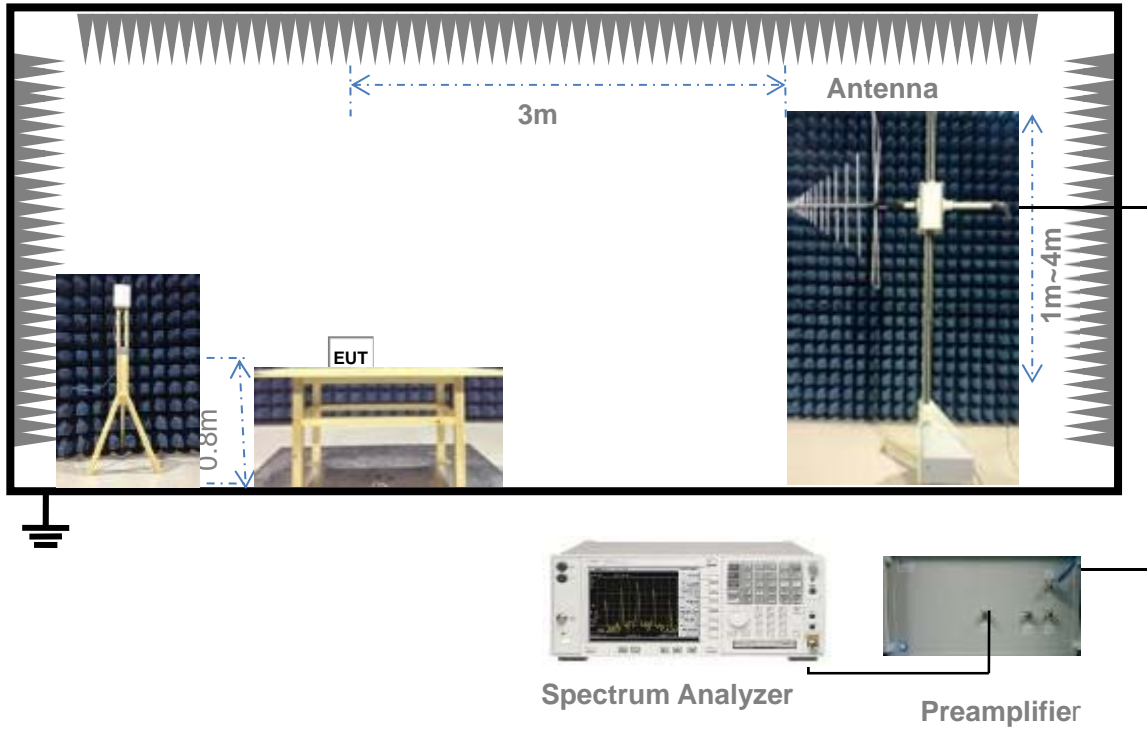
(Diagram 1)

4.4.2 For Frequency Stability Test



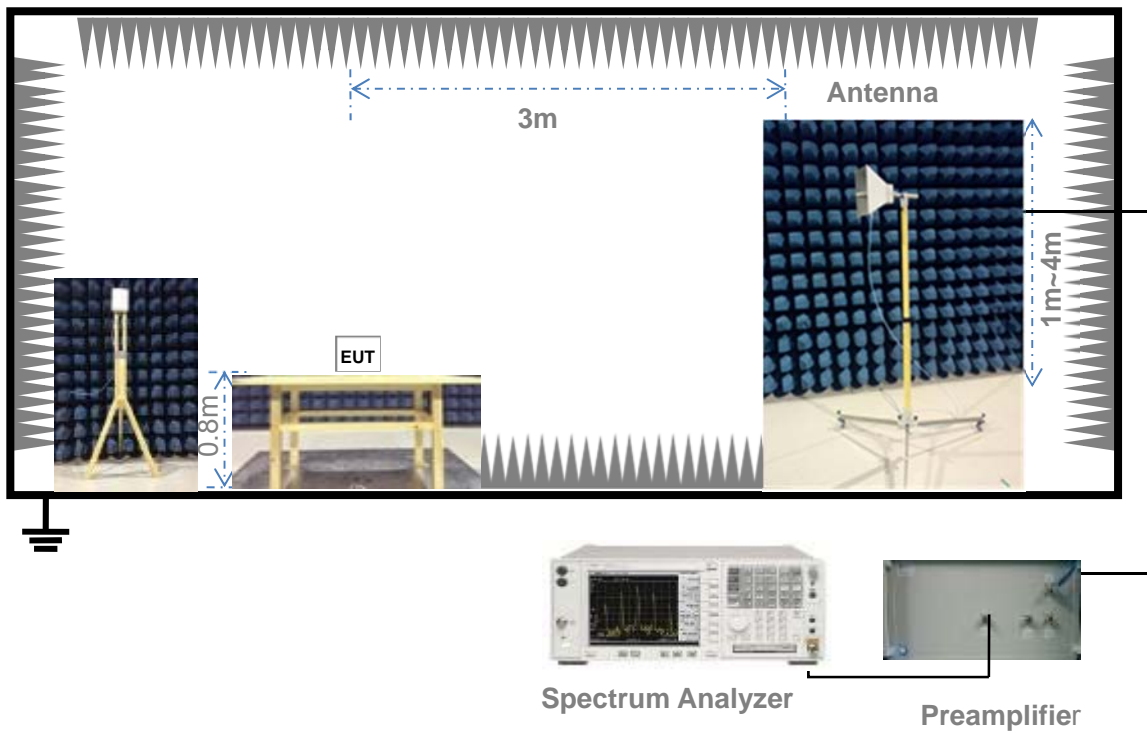
(Diagram 2)

4.4.3 For Radiated Test (30 MHz-1 GHz)



(Diagram 3)

4.4.4 For Radiated Test (Above 1 GHz)



(Diagram 4)

5 TEST ITEMS

5.1 Transmitter Radiated Power (EIRP/ERP)

5.1.1 Limit

FCC §2.1046(a) & 22.913 & 24.232

According to FCC section 22.913, the Effective Radiated Power (ERP) of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts, FCC section 24.232, Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

FCC section 27.50(d), Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP. Fixed stations operating in the 1710-1755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications, and FCC section 27.50(h) Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

5.1.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.1.3 Test Procedure

Description of the Conducted Output Power Measurement

A system simulator was used to establish communication with the EUT, Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

Note: Reference test setup 4.4.1 (Diagram 1)

Description of the Transmitter Radiated Power Measurement

In many cases, the RF output power limits for licensed digital transmission devices is specified in terms of effective radiated power (ERP) or equivalent isotropic radiated power (EIRP). Typically, ERP is specified when the operating frequency is less than or equal to 1 GHz and EIRP is specified when the operating frequency is greater than 1 GHz. Both are determined by adding the transmit antenna gain to the conducted RF output power with the primary difference between the two being that when determining the ERP, the transmit antenna gain is referenced to a dipole antenna (i.e., dBd) whereas when determining the EIRP, the transmit antenna gain is referenced to an isotropic antenna (dBi).

The relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

$$\text{ERP/EIRP} = \text{PMeas} + \text{GT} - \text{LC}$$

where:

ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);

PMeas = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

$\text{dBd (ERP)} = \text{dBi} - 2.15$

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

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

Note: Reference test setup 4.4.3 and 4.4.4 (Diagram 3, 4)

5.1.4 Test Result

Please refer to ANNEX A.1.

5.2 Peak to average ratio

5.2.1 Limit

FCC § 2.1046 & 24.232

In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.

Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with 24.232 (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of § 24.51. 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.

Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

5.2.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.2.3 Test Procedure

Here the lowest, middle and highest channels are selected to perform testing to verify the peak-to-average ratio.

Test procedures:

- a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
- b) Set resolution/measurement bandwidth \geq signal's occupied bandwidth;
- c) Set the number of counts to a value that stabilizes the measured CCDF curve;
- d) Set the measurement interval as follows:
 - 1) for continuous transmissions, set to 1 ms,
 - 2) for burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.

e) Record the maximum PAPR level associated with a probability of 0.1%.

Use one of the procedures presented in 4.1 to measure the total peak power and record as PPk. Use one of the applicable procedures presented 4.2 to measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

$$\text{PAPR (dB)} = \text{PPk (dBm)} - \text{PAvg (dBm)}.$$

Note: Reference test setup 4.4.1 (Diagram 1).

5.2.4 Test Result

Please refer to ANNEX A.2.

5.3 Occupied Bandwidth

5.3.1 Limit

FCC § 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

5.3.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.3.3 Test Procedure

The following procedure shall be used for measuring (99 %) power bandwidth

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the OBW).
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
- c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least $10\log(\text{OBW} / \text{RBW})$ below the reference level.
- d) NOTE—Steps a) through c) may require iteration to adjust within the specified tolerances.
- e) Set the detection mode to peak, and the trace mode to max hold..
- f) Use the 99 % power bandwidth function of the spectrum analyzer (if available) and report the measured bandwidth.
- g) If the instrument does not have a 99 % power bandwidth function, the trace data points are to be recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99 % power bandwidth is the difference between these two frequencies.
- h) The OBW shall be reported by providing plot(s) of the measuring instrument display. The frequency and amplitude axes and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

Note: Reference test setup 4.4.1 (Diagram 1).

5.3.4 Test Result

Please refer to ANNEX A.3.

5.4 Frequency Stability

5.4.1 Limit

FCC § 2.1055 & 22.355 & 24.235

Except as otherwise provided in this part, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table C-1 of this section.

Table C-1—Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency range (MHz)	Base, fixed (ppm)	Mobile > 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929	5.0	n/a	n/a
929 to 960	1.5	n/a	n/a
2110 to 2220	10.0	n/a	n/a

& 24.235

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.4.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.4.3 Test Procedure

1. The test is performed in a Temperature Chamber.
2. The EUT is configured as MS + DC Power Supply.

Note: Reference test setup 4.4.2 (Diagram 2).

5.4.4 Test Result

Please refer to ANNEX A.4.

5.5 Spurious Emission at Antenna Terminals

5.5.1 Limit

FCC §2.1051 & 22.917(a) & 24.238(a)

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 -13 dBm.

Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB.

5.5.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.5.3 Test Procedure

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. 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. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

Note: Reference test setup 4.4.1 (Diagram 1).

5.5.4 Test Result

Please refer to ANNEX A.5

5.6 Band Edge

5.6.1 Limit

FCC § 2.1051 & 22.917(b) & 24.238(b)

The power of any emission outside of the authorized operating frequency must be attenuated below the transmitting (P) by a factor of at least $43+10\log(P)$ dB.

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 (26 dB emission bandwidth) of the fundamental emission of the transmitter may be employed.

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 than $43 + 10 \log(P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log(P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

5.6.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.6.3 Test Procedure

The EUT, which is powered by the Battery, 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 50 Ohm; the path loss as the factor is calibrated to correct the reading.

1. The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.
2. The center of the spectrum analyzer was set to block edge frequency.

Note: Reference test setup 4.4.1 (Diagram 1).

5.6.4 Test Result

Please refer to ANNEX A.6.

5.7 Field Strength of Spurious Radiation

5.7.1 Limit

FCC § 2.1053 & 22.917 & 24.238

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 -13 dBm.

5.7.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.7.3 Test Procedure

1. On a test site, the EUT shall be placed at 80cm height on a turn table, and in the position close to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3 m from EUT to correspond to the fundamental frequency of the transmitter.
3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.
4. During the measurement of the EUT, the resolution bandwidth was to 1 MHz and the average bandwidth was set to 1 MHz.
5. The transmitter shall be switched on; the measuring receiver shall be tuned to the frequency of the transmitter under test.
6. The test antenna shall be raised and lowered through the specified range of height until the maximum signal level is detected by the measuring receiver.
7. The transmitter shall be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
8. The test antenna shall be raised and lowered again through the specified range of height until the maximum signal level is detected by the measuring receiver.
9. The maximum signal level detected by the measuring receiver shall be noted.
10. The EUT was replaced by half-wave dipole (824 ~ 849 MHz) or horn antenna (1 850 ~ 1 910 MHz) connected to a signal generator.
11. In necessary, the input attenuator setting on the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
12. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
13. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, which is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
14. The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
15. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.

Note: Reference test setup 4.4.3 and 4.4.4 (Diagram 3, 4)

5.7.4 Test Result

Please refer to ANNEX A.7.

ANNEX A TEST RESULT

A.1 Transmitter Radiated Power (EIRP/ERP)

WCDMA Mode Test Data:

Test Band	Test Channel	Conducted Output AV Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Limit (W)	Verdict
WCDMA Band 2	LCH	22.87	2	24.87	0.31	2.00	Pass
	MCH	22.48	2	24.48	0.28	2.00	Pass
	HCH	22.62	2	24.62	0.29	2.00	Pass
HSDPA Band 2	LCH	22.97	2	24.97	0.31	2.00	Pass
	MCH	22.49	2	24.49	0.28	2.00	Pass
	HCH	22.46	2	24.46	0.28	2.00	Pass

Test Band	Test Channel	Conducted Output AV Power (dBm)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	ERP (W)	Limit (W)	Verdict
WCDMA Band 5	LCH	20.60	2	-0.15	20.45	0.11	7.00	Pass
	MCH	21.10	2	-0.15	20.95	0.12	7.00	Pass
	HCH	20.90	2	-0.15	20.75	0.12	7.00	Pass
HSDPA Band 5	LCH	20.6	2	-0.15	20.45	0.11	7.00	Pass
	MCH	21.07	2	-0.15	20.92	0.12	7.00	Pass
	HCH	20.92	2	-0.15	20.77	0.12	7.00	Pass

Note 1: For the HSDPA and HSUPA mode, all the subtests were tested and just the worst data were recorded in this table.

Note 2: $ERP/EIRP = P_{Meas} + GT - LC$

ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as P_{Meas} , typically dBW or dBm);

P_{Meas} = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

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

$ERP = EIRP - 2.15$; where ERP and EIRP are expressed in consistent units.

HSDPA Conducted Output Power

Band	Channel	Conducted Output Average Power							
		Subtest1		Subtest2		Subtest3		Subtest4	
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)
HSDPA Band 2	LCH	22.97	0.20	22.7	0.19	21.7	0.15	20.97	0.13
	MCH	22.49	0.18	22.35	0.17	21.62	0.15	20.81	0.12
	HCH	22.46	0.18	22.14	0.16	21.85	0.15	21.09	0.13

HSDPA Conducted Output Power

Band	Channel	Conducted Output Average Power							
		Subtest1		Subtest2		Subtest3		Subtest4	
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	(dBm)	(W)
HSDPA Band 5	LCH	20.6	0.11	20.57	0.11	19.48	0.09	18.74	0.07
	MCH	21.07	0.13	20.99	0.13	19.89	0.10	19.12	0.08
	HCH	20.91	0.12	20.92	0.12	19.8	0.10	18.93	0.08

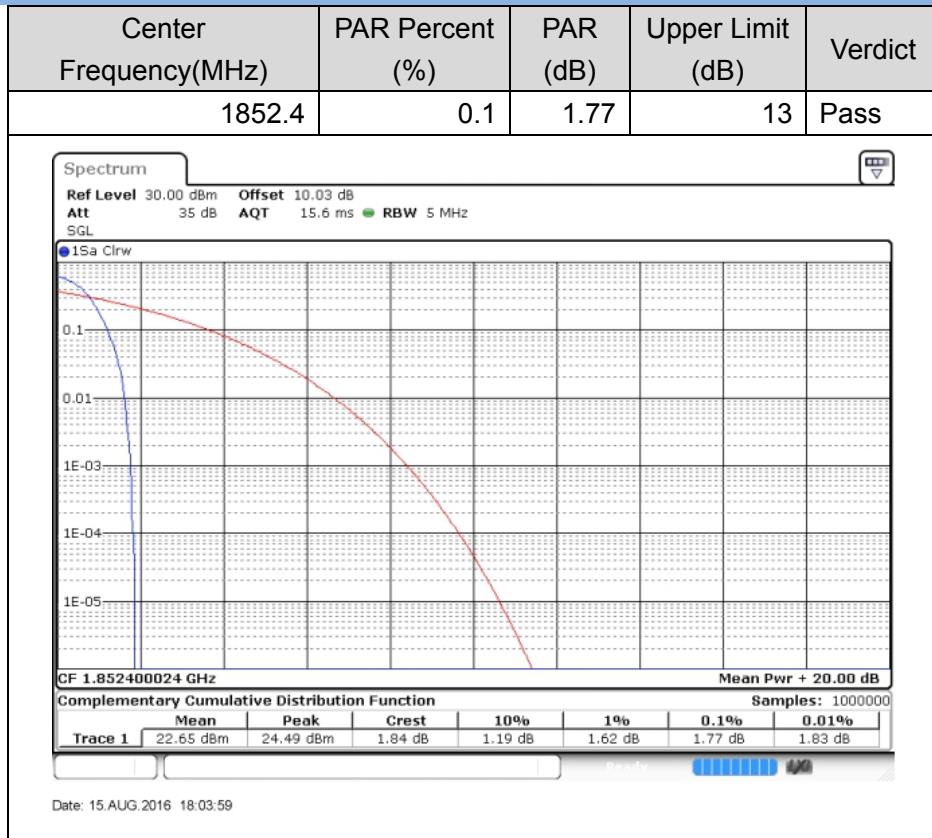
A.2 Peak to Average Ratio

WCDMA Test Data

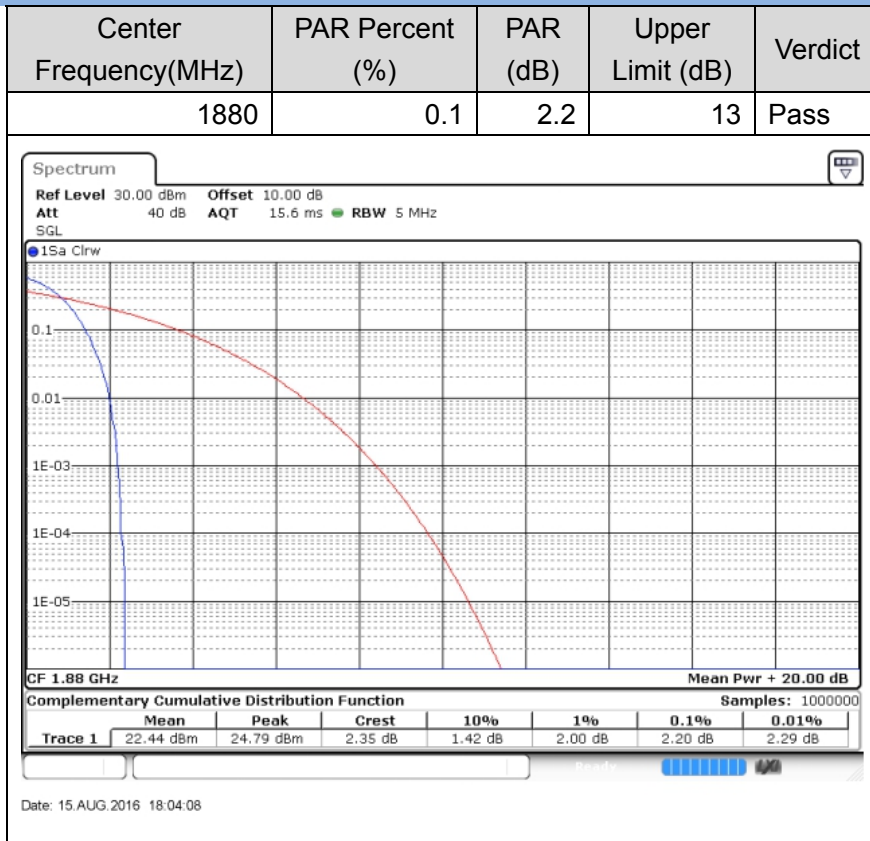
Test Band	Test Channel	Peak to Average ratio (dB)	Limit (dB)	Verdict
Band 2	LCH	1.77	13	Pass
	MCH	2.20	13	Pass
	HCH	1.42	13	Pass

Test Plots

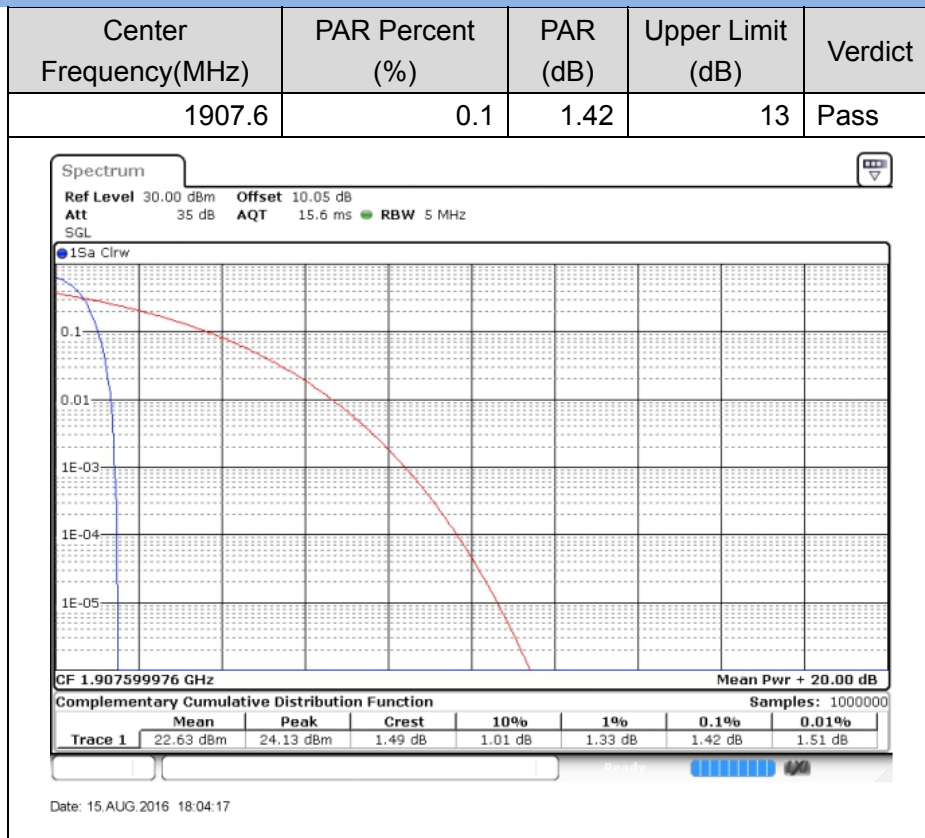
WCDMA LCH



WCDMA MCH



WCDMA HCH



A.3 Occupied Bandwidth

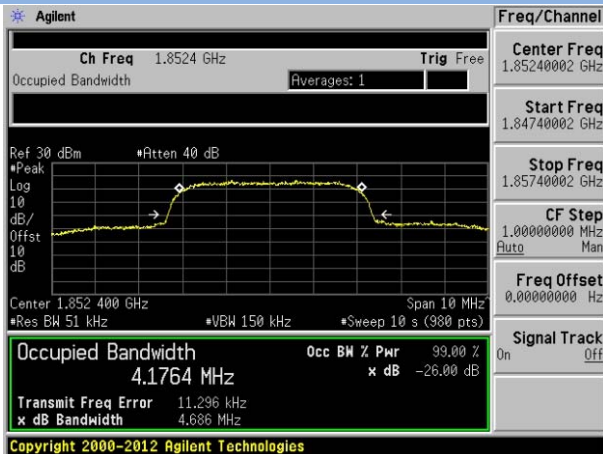
Note 1: All mode were tested, but only the typical data were reported in this report.

WCDMA Mode Test Data

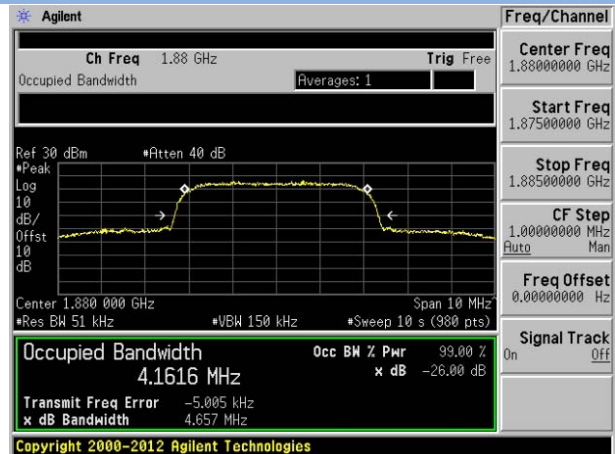
Test Band	Test Channel	Measured 99% Occupied Bandwidth (MHz)	Measured -26 dB Occupied Bandwidth (MHz)
WCDMA Band 2	LCH	4.18	4.69
	MCH	4.16	4.66
	HCH	4.21	4.73
WCDMA Band 5	LCH	4.17	4.66
	MCH	4.18	4.68
	HCH	4.16	4.63

WCDM Mode Test Plots

WCDMA Band 2 LCH



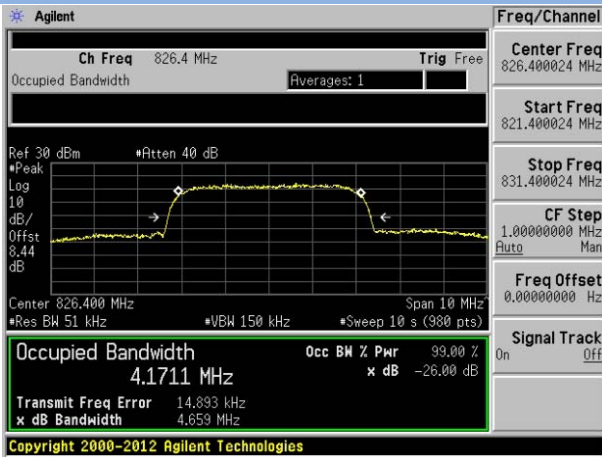
WCDMA Band 2 MCH



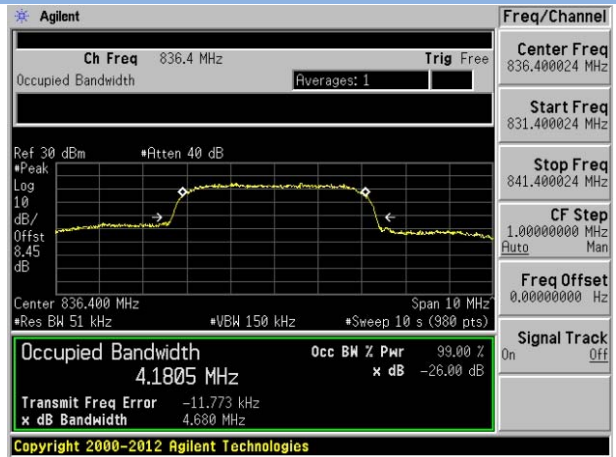
WCDMA Band 2 HCH



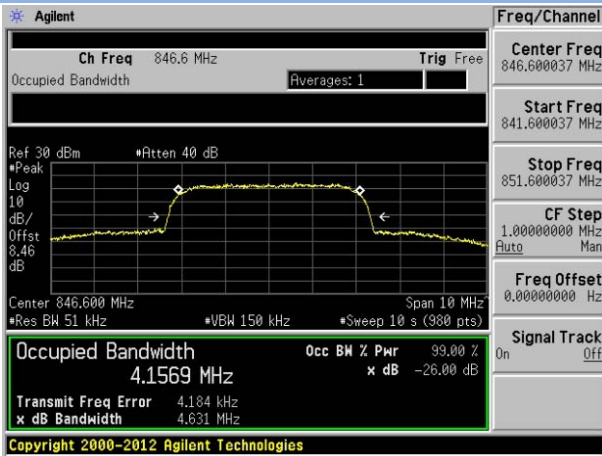
WCDMA Band 5 LCH



WCDMA Band 5 MCH



WCDMA Band 5 HCH



A.4 Frequency Stability

WCDMA Band 2

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	LCH 1852.4 MHz		MCH 1880 MHz		HCH 1907.6 MHz		
		Value (Hz)	Limits (Hz)	Value (Hz)	Limits (Hz)	Value (Hz)	Limits (Hz)	
4.5	-10	-9.50	±4631	-6.50	±4700	-2.16	±4769	Pass
	-5	7.46		6.38		1.86		
	0	5.82		6.84		5.56		
	+10	1.65		3.51		8.18		
	+20	-2.70		-3.78		-8.50		
	+30	5.31		8.24		8.80		
	+40	0.17		6.88		9.57		
	+50	-4.63		-2.63		-7.16		
+55	0.22	9.46	5.10					
4.05	+25	0.91	1.67	7.73				
4.5	+25	6.65	8.01	1.47				

WCDMA Band B5

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	LCH 826.4 MHz		MCH 836.4 MHz		HCH 846.6 MHz		
		Value (Hz)	Limits (Hz)	Value (Hz)	Limits (Hz)	Value (Hz)	Limits (Hz)	
4.5	-10	-9.41	±2066	-8.22	±2091	-7.56	±2116.5	Pass
	-5	3.92		0.54		6.61		
	0	2.04		6.55		4.12		
	+10	6.55		4.95		7.21		
	+20	-9.22		-8.67		-0.08		
	+30	0.39		8.40		4.83		
	+40	9.18		2.76		-5.36		
	+50	-7.01		-9.41		7.96		
+55	4.15	3.15	8.87					
4.05	+25	1.42	1.43	4.35				
4.5	+25	6.60	2.08	-0.45				

A.5 Spurious Emission at Antenna Terminals

Note 1: The frequency of verdict which mark by "N/A" should be ignored because they are MS carrier frequency.

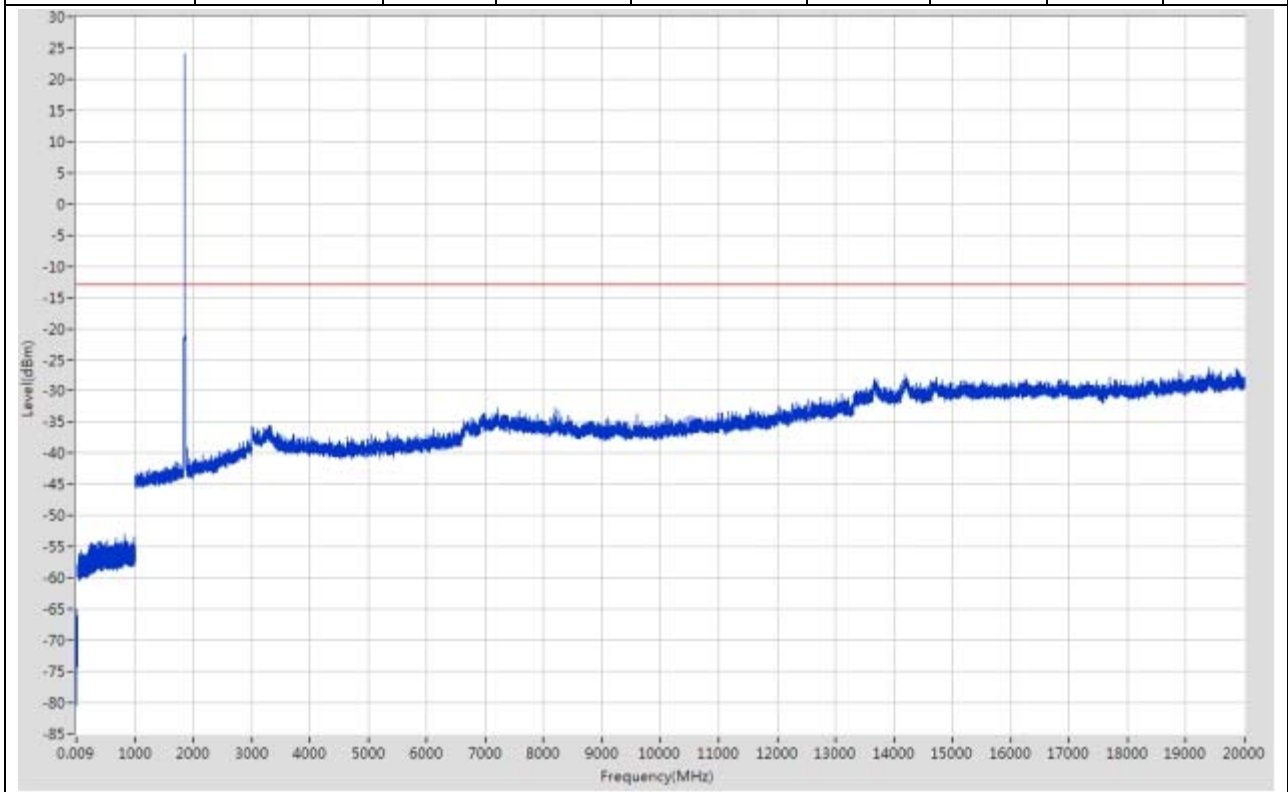
WCDMA Mode Test Verdict

Test Band	Test Channel	Verdict
WCDMA Band 2	LCH	Pass
	MCH	Pass
	HCH	Pass
WCDMA Band 5	LCH	Pass
	MCH	Pass
	HCH	Pass

Test Data

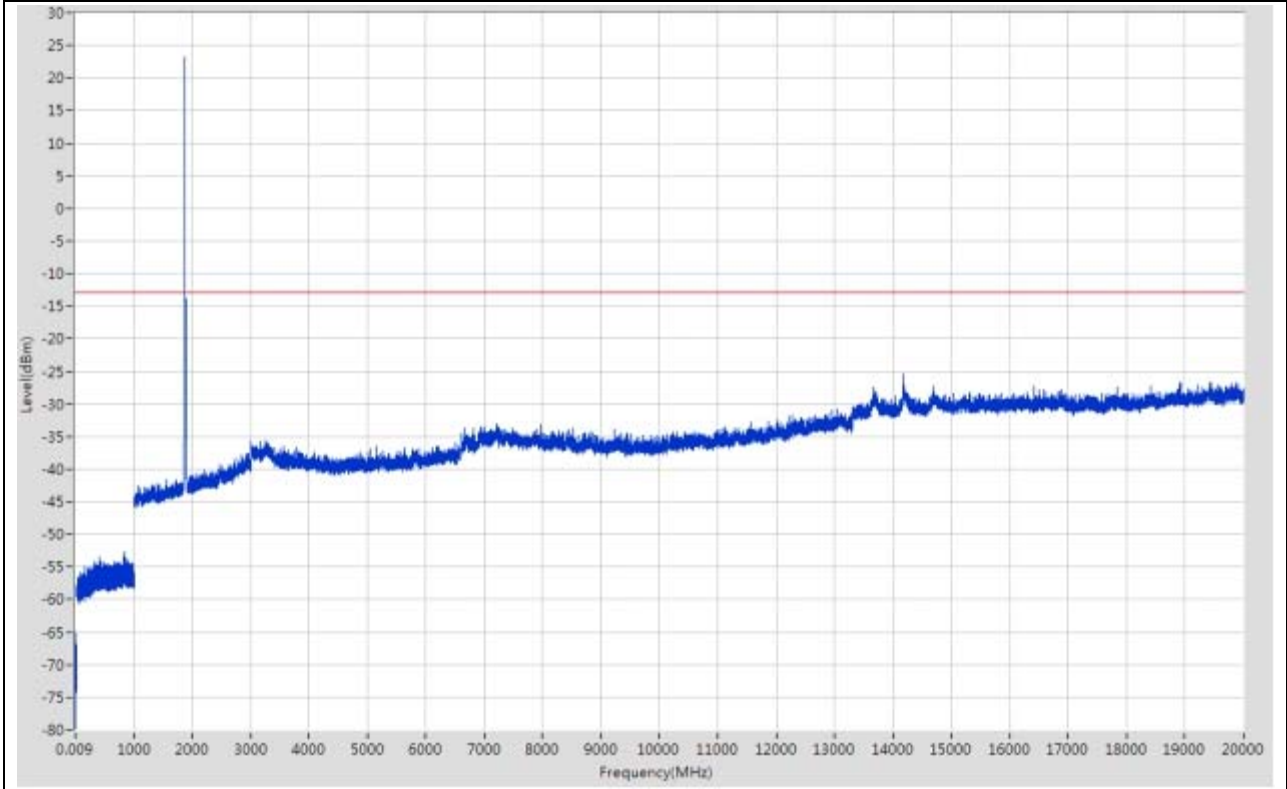
WCDMA Band 2 LCH

Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Verdict	Sweep Point
0.009	0.15	0.001	Peak	0.012	-66.9	-13	Pass	401
0.15	30	0.01	Peak	0.22	-64.95	-13	Pass	2985
30	1000	0.1	Peak	832.298	-53.07	-13	Pass	9699
1000	3000	1	Peak	1853.427	24.09	-13	N/A	2000
3000	20000	1	Peak	19382	-26.33	-13	Pass	17000



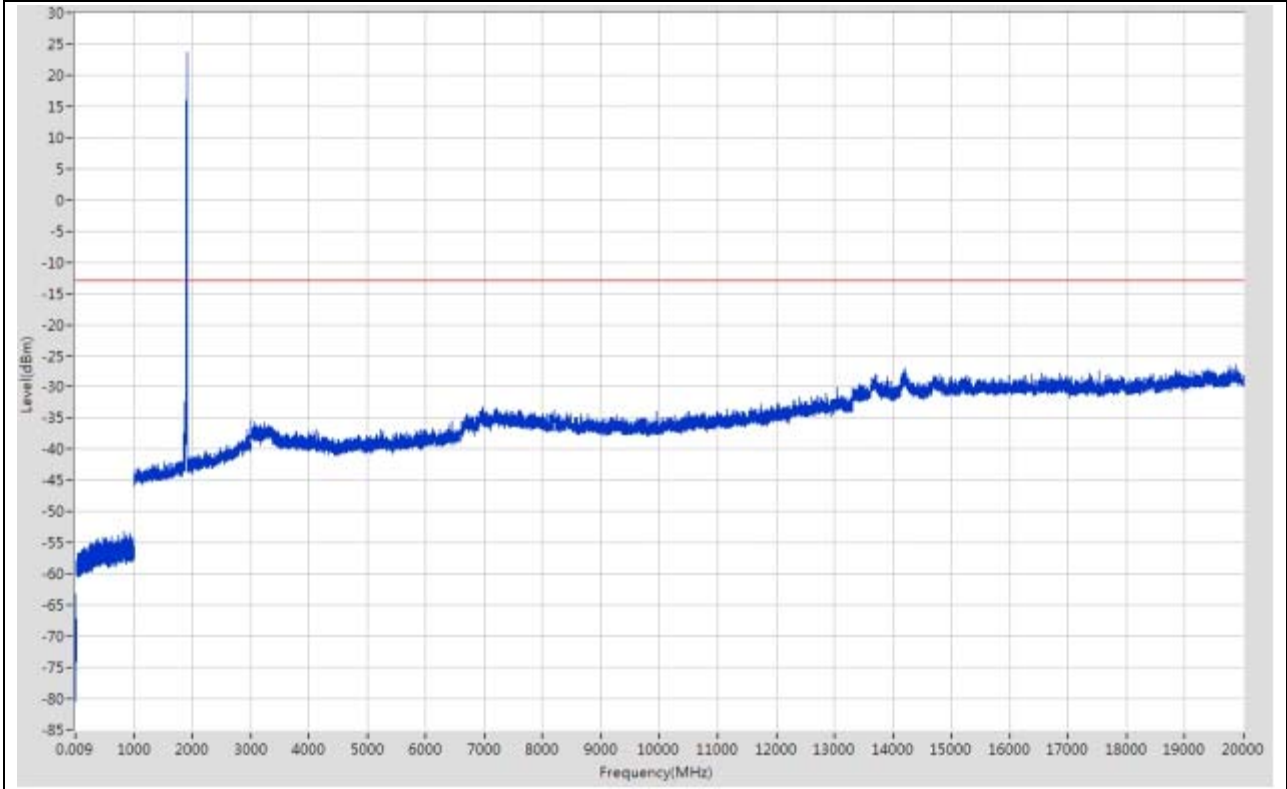
WCDMA Band 2 MCH

Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Verdict	Sweep Point
0.009	0.15	0.001	Peak	0.01	-66.98	-13	Pass	401
0.15	30	0.01	Peak	0.15	-65.04	-13	Pass	2985
30	1000	0.1	Peak	846.8	-52.73	-13	Pass	9699
1000	3000	1	Peak	1881.441	23.25	-13	N/A	2000
3000	20000	1	Peak	14163.363	-25.49	-13	Pass	17000



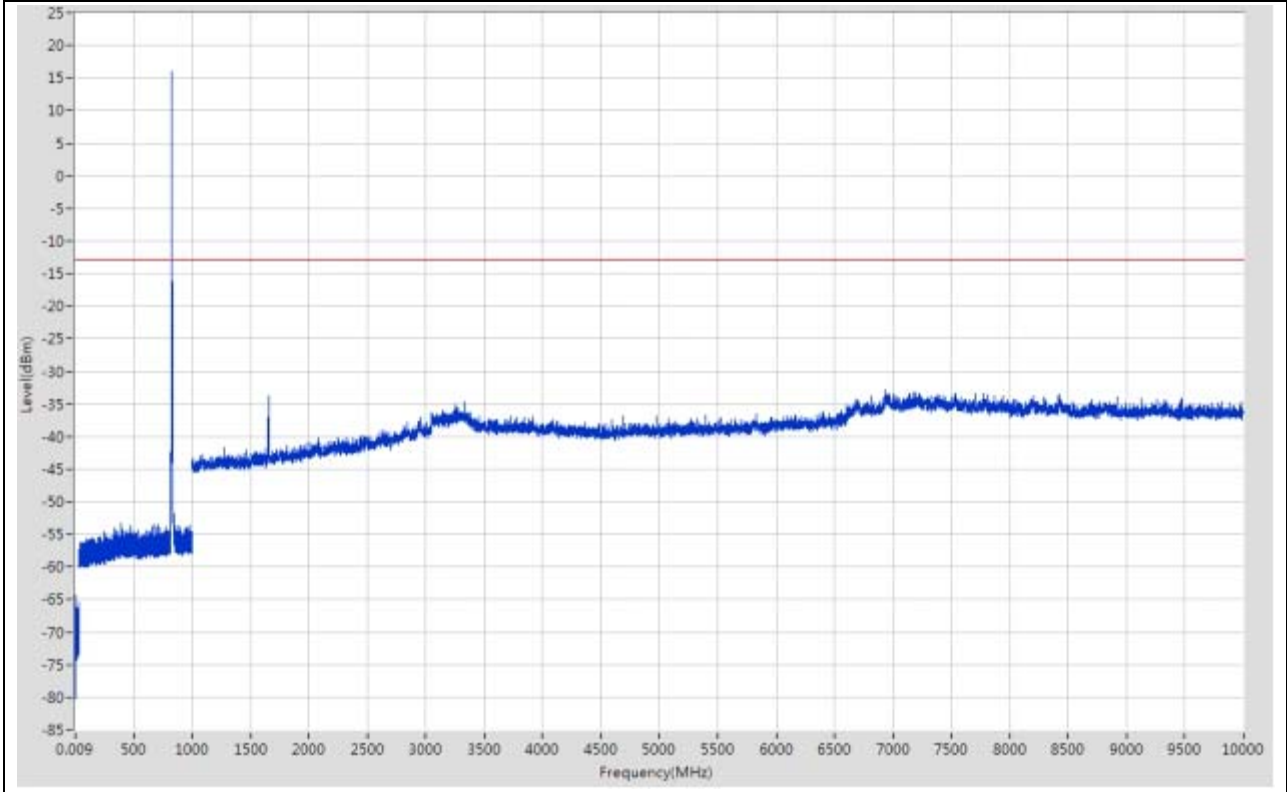
WCDMA Band 2 HCH

Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Verdict	Sweep Point
0.009	0.15	0.001	Peak	0.011	-67.4	-13	Pass	401
0.15	30	0.01	Peak	0.15	-63.26	-13	Pass	2985
30	1000	0.1	Peak	830.698	-53.3	-13	Pass	9699
1000	3000	1	Peak	1906.453	23.67	-13	N/A	2000
3000	20000	1	Peak	19884.813	-26.44	-13	Pass	17000



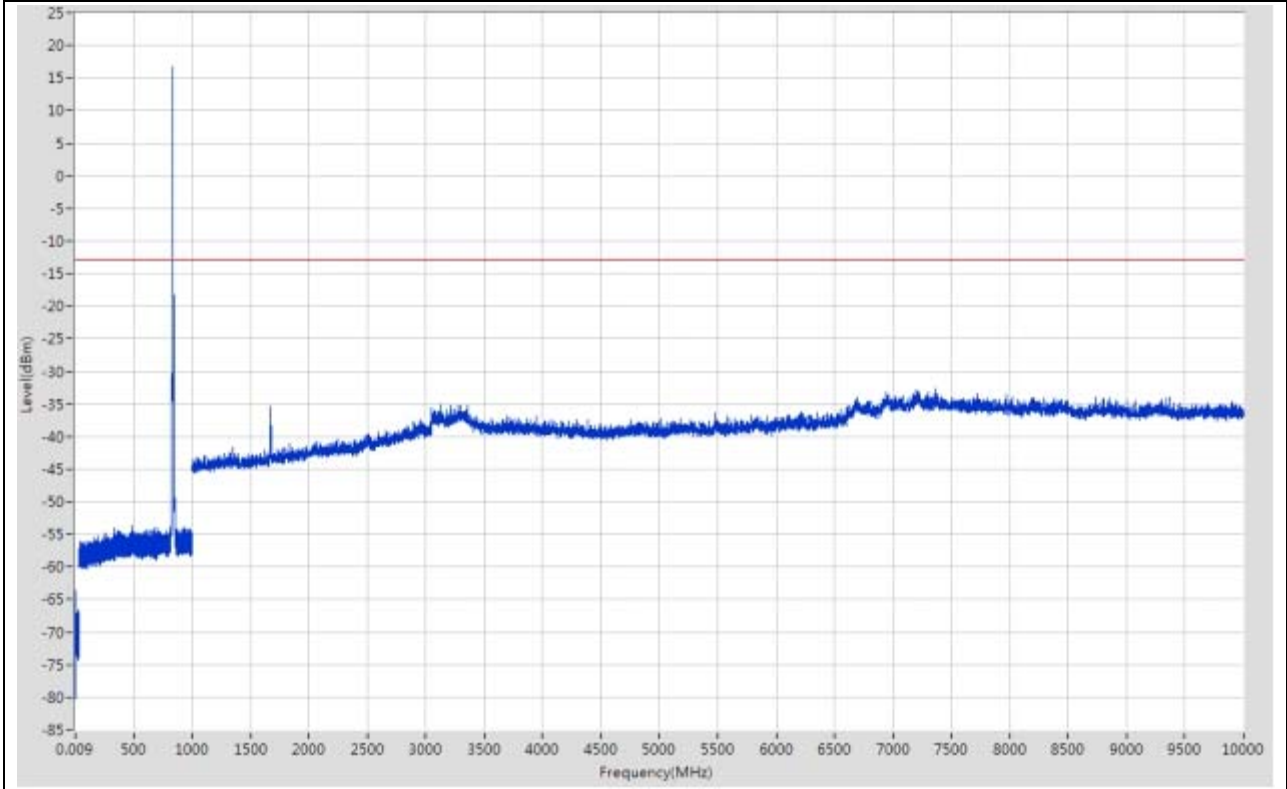
WCDMA Band 5 LCH

Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Verdict	Sweep Point
0.009	0.15	0.001	Peak	0.011	-67.74	-13	Pass	401
0.15	30	0.01	Peak	0.34	-64.42	-13	Pass	2985
30	500	0.1	Peak	389.677	-53.27	-13	Pass	4700
500	1000	0.1	Peak	827.566	15.93	-13	N/A	5000
1000	10000	1	Peak	6934.724	-32.87	-13	Pass	9000



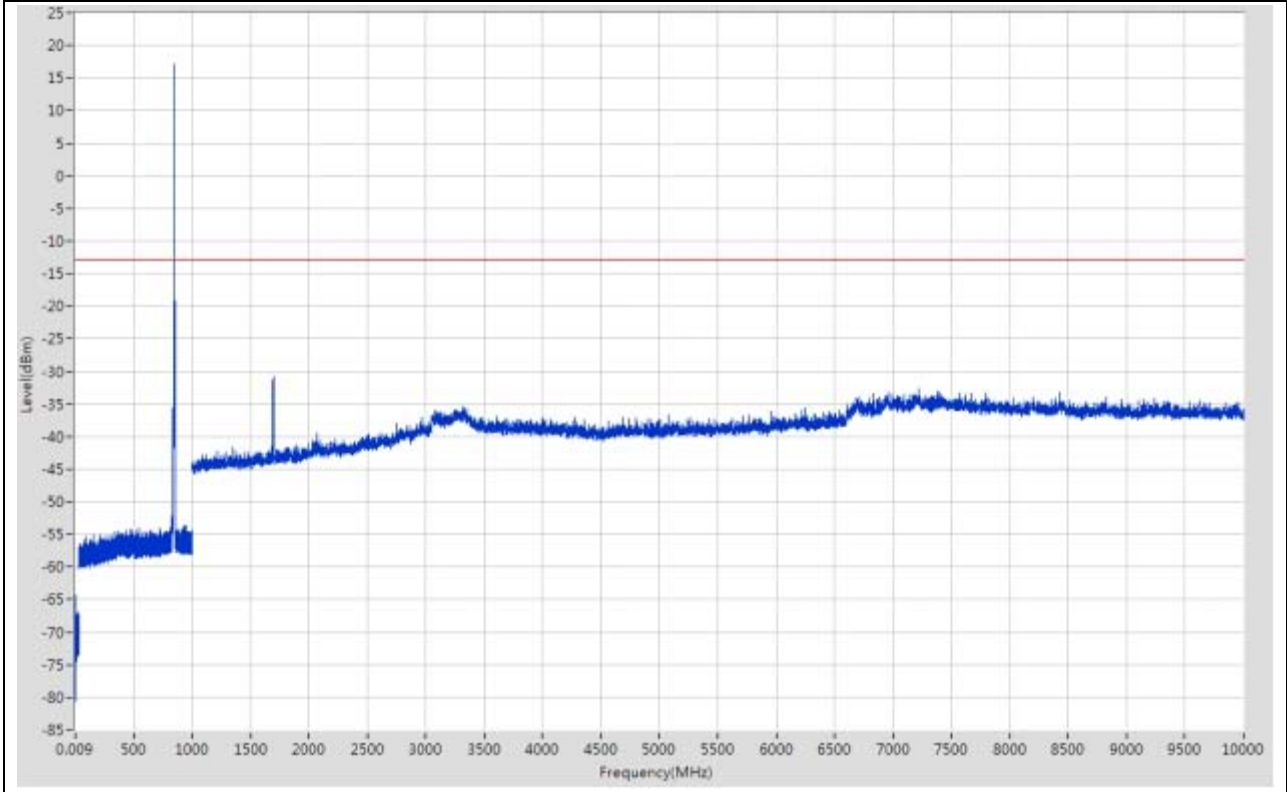
WCDMA Band 5 MCH

Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Verdict	Sweep Point
0.009	0.15	0.001	Peak	0.01	-66.46	-13	Pass	401
0.15	30	0.01	Peak	0.24	-63.68	-13	Pass	2985
30	500	0.1	Peak	484.897	-53.66	-13	Pass	4700
500	1000	0.1	Peak	835.467	16.75	-13	N/A	5000
1000	10000	1	Peak	7362.777	-32.7	-13	Pass	9000



WCDMA Band 5 HCH

Start Frequency (MHz)	Stop Frequency (MHz)	RBW (MHz)	Detector	Frequency (MHz)	Power (dBm)	Limit (dBm)	Verdict	Sweep Point
0.009	0.15	0.001	Peak	0.009	-68.21	-13	Pass	401
0.15	30	0.01	Peak	0.25	-64.44	-13	Pass	2985
30	500	0.1	Peak	474.595	-54.29	-13	Pass	4700
500	1000	0.1	Peak	845.769	17.04	-13	N/A	5000
1000	10000	1	Peak	1696.085	-30.82	-13	Pass	9000



A.6 Band Edge

WCDMA Mode Test Verdict

Test Band	Test Channel	Verdict
WCDMA Band 2	LCH	Pass
	HCH	Pass
WCDMA Band 5	LCH	Pass
	HCH	Pass

Test Result of Plots

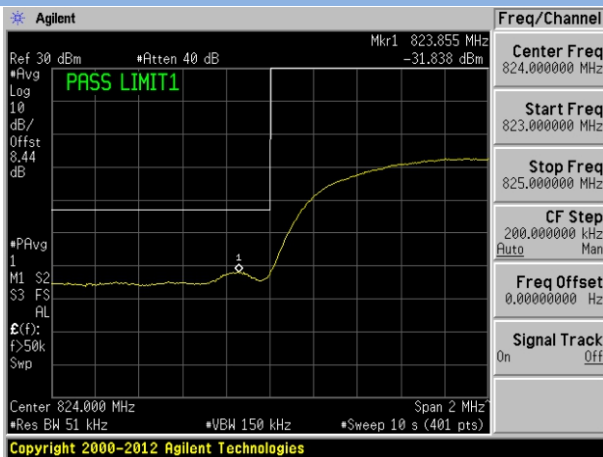
WCDMA Band 2 MHz LCH



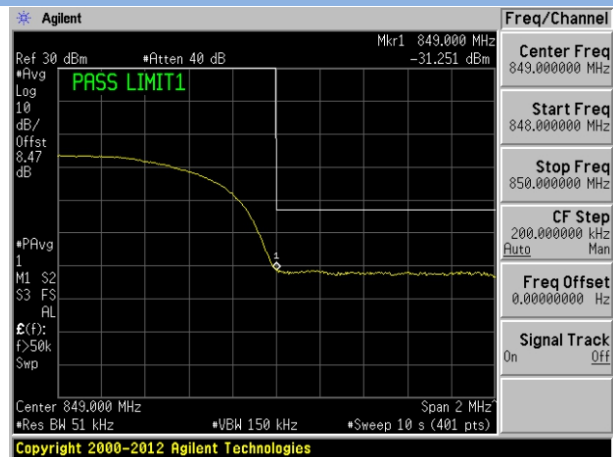
WCDMA Band 2 MHz HCH



WCDMA Band 5 MHz LCH



WCDMA Band 5 MHz HCH



A.7 Field Strength of Spurious Radiation

Note 1: The frequency of verdict which mark by "N/A" should be ignored because they are MS carrier frequency.

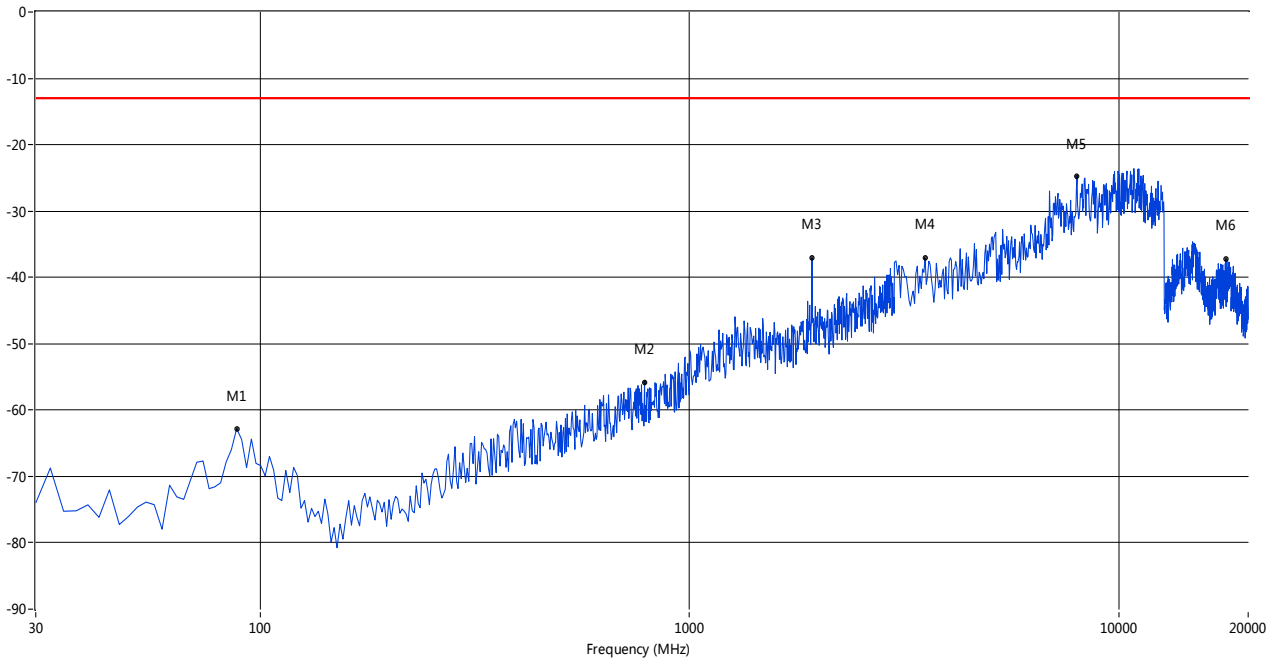
WCDMA Mode Test Verdict

Test Band	Test Channel	Verdict
WCDMA Band 2	LCH	Pass
	MCH	Pass
	HCH	Pass
WCDMA Band 5	LCH	Pass
	MCH	Pass
	HCH	Pass

Test Data

WCDMA Band 2 LCH, ANT V

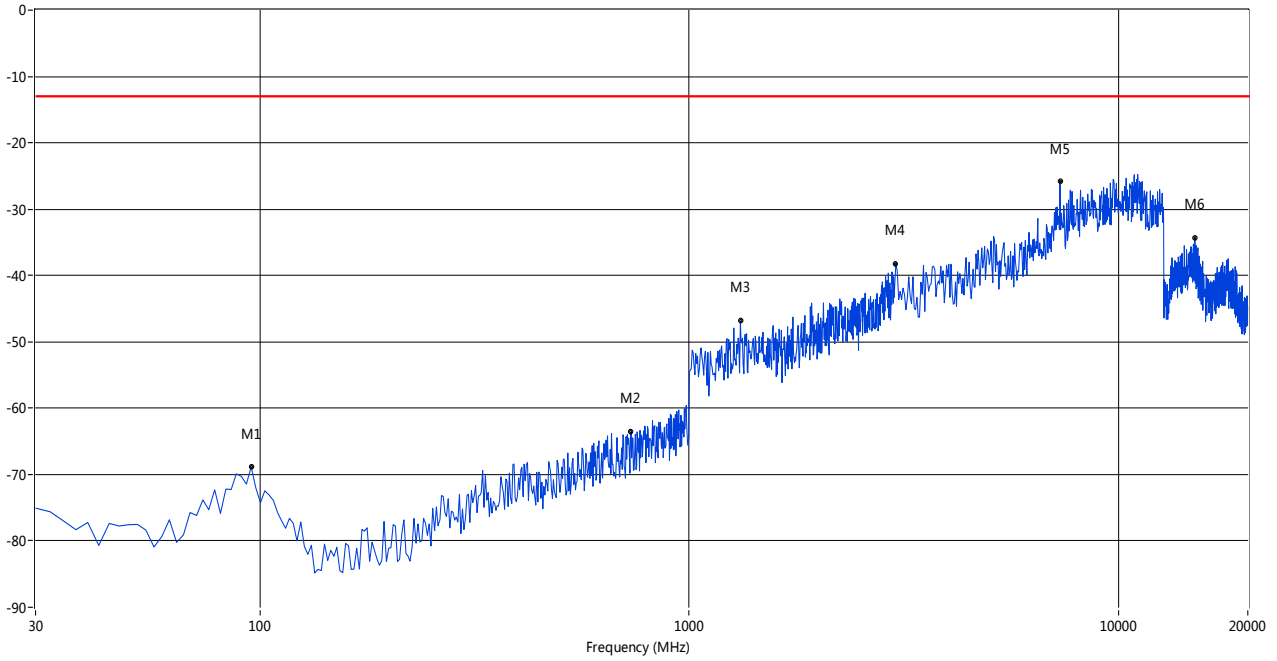
RSE Test case_FCC PART 24



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
88.06	-62.80	-2.82	-13.0	49.80	114.10	Vertical	Horizontal	PASS
784.71	-55.77	3.51	-13.0	42.77	232.20	Vertical	Horizontal	PASS
1927.68	-37.06	10.62	-13.0	24.06	273.70	Vertical	Horizontal	N/A
3534.91	-37.09	22.46	-13.0	24.09	6.20	Vertical	Horizontal	PASS
7984.41	-24.70	35.03	-13.0	11.70	111.60	Vertical	Horizontal	PASS
17721.94	-37.27	30.59	-13.0	24.27	210.90	Vertical	Horizontal	PASS

WCDMA Band 2 LCH, ANT H

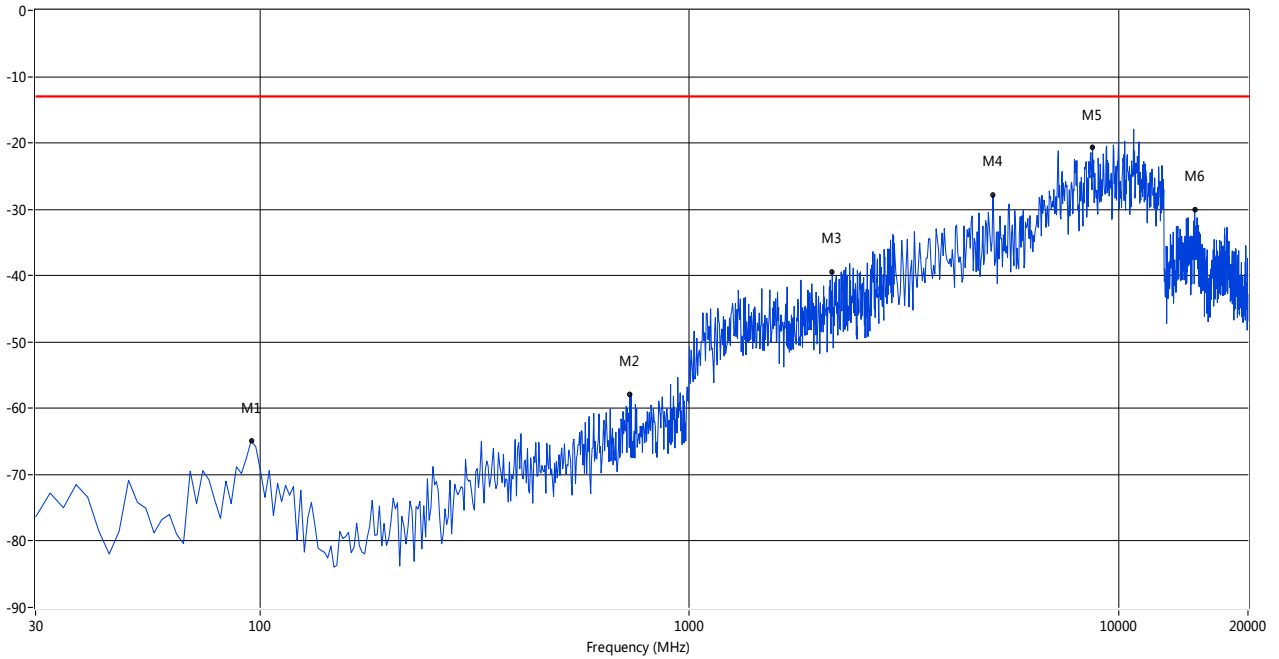
RSE Test case_FCC PART 24



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
95.31	-68.84	-3.48	-13.0	55.84	342.20	Horizontal	Horizontal	PASS
731.50	-63.57	2.53	-13.0	50.57	105.50	Horizontal	Horizontal	PASS
1314.21	-46.88	8.85	-13.0	33.88	60.20	Horizontal	Horizontal	PASS
3024.31	-38.18	21.89	-13.0	25.18	238.80	Horizontal	Horizontal	PASS
7303.62	-25.80	33.69	-13.0	12.80	224.90	Horizontal	Horizontal	PASS
15046.14	-34.27	31.76	-13.0	21.27	138.40	Horizontal	Horizontal	PASS

WCDMA Band 2 MCH, ANT V

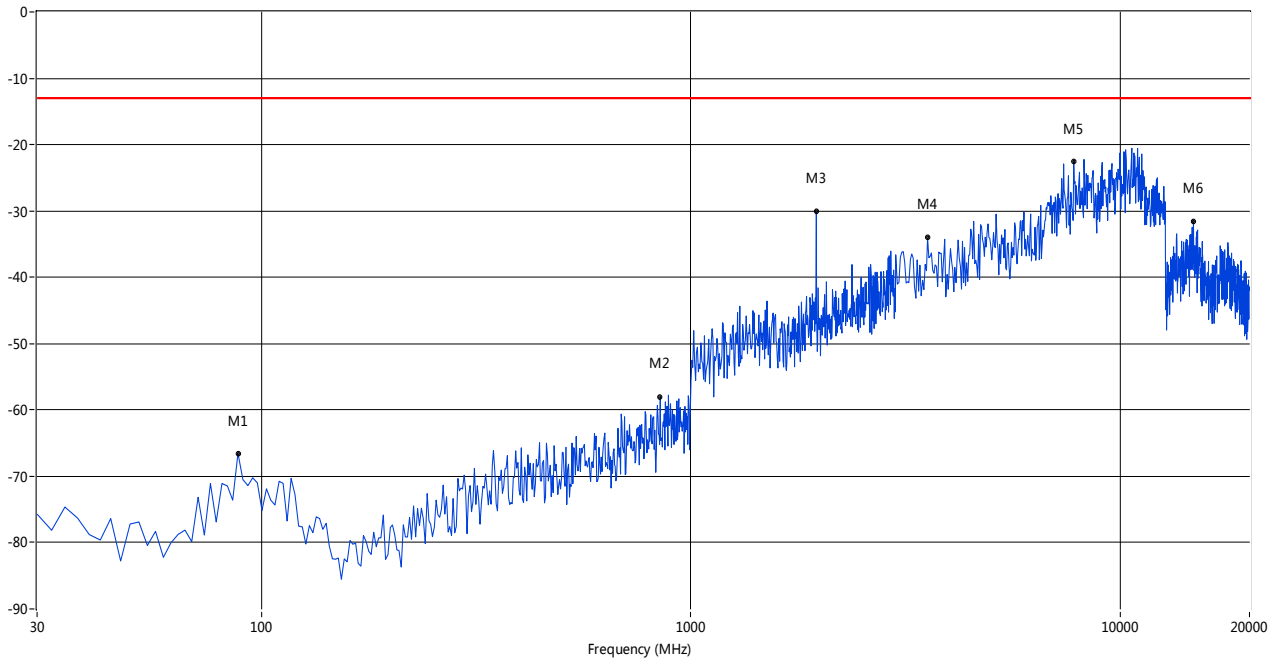
RSE Test case_FCC PART 24



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
95.31	-64.86	-3.48	-13.0	51.86	7.80	Vertical	Horizontal	PASS
726.66	-57.94	2.53	-13.0	44.94	168.60	Vertical	Horizontal	PASS
2152.12	-39.38	11.68	-13.0	26.38	33.10	Vertical	Horizontal	PASS
5091.02	-27.89	28.29	-13.0	14.89	351.00	Vertical	Horizontal	PASS
8689.53	-20.59	35.35	-13.0	7.59	152.40	Vertical	Horizontal	PASS
15028.06	-30.05	31.85	-13.0	17.05	197.30	Vertical	Horizontal	PASS

WCDMA Band 2 MCH, ANT H

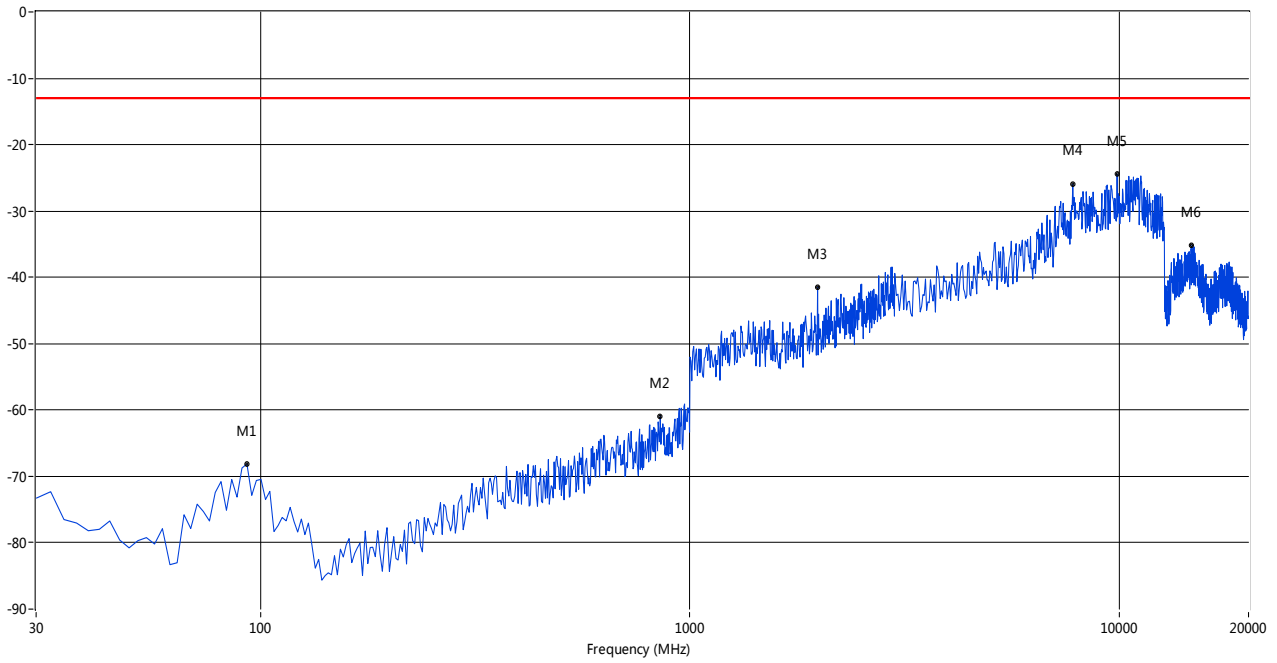
RSE Test case_FCC PART 24



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
88.06	-66.55	-2.82	-13.0	53.55	205.20	Horizontal	Horizontal	PASS
847.61	-58.05	4.48	-13.0	45.05	58.40	Horizontal	Horizontal	PASS
1957.61	-30.13	11.22	-13.0	17.13	274.20	Horizontal	Horizontal	N/A
3559.23	-34.06	22.53	-13.0	21.06	37.20	Horizontal	Horizontal	PASS
7789.90	-22.52	35.07	-13.0	9.52	110.50	Horizontal	Horizontal	PASS
14811.10	-31.57	31.73	-13.0	18.57	365.30	Horizontal	Horizontal	PASS

WCDMA Band 2 HCH, ANT V

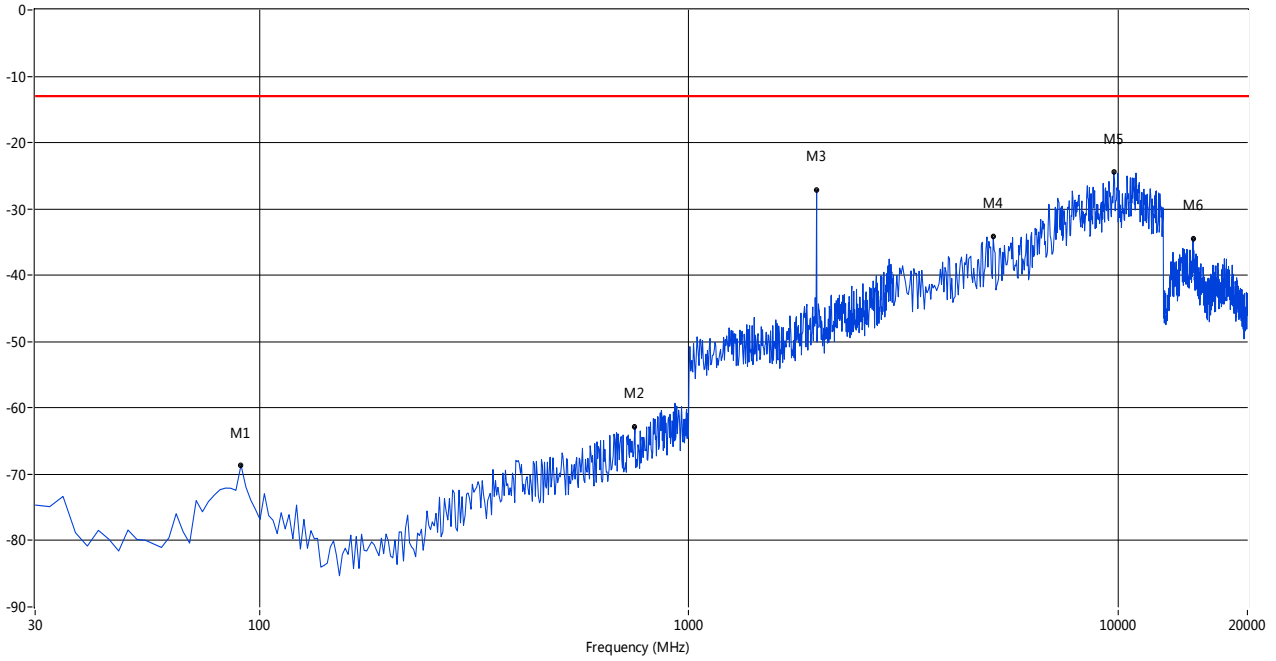
RSE Test case_FCC PART 24



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
92.89	-68.12	-2.89	-13.0	55.12	24.10	Vertical	Horizontal	PASS
852.44	-60.95	4.68	-13.0	47.95	193.00	Vertical	Horizontal	PASS
1982.54	-27.15	10.95	-13.0	14.15	46.30	Vertical	Horizontal	N/A
7789.90	-26.00	35.07	-13.0	13.00	309.10	Vertical	Horizontal	PASS
9880.92	-24.44	37.69	-13.0	11.44	355.70	Vertical	Horizontal	PASS
14756.86	-35.21	31.66	-13.0	22.21	218.10	Vertical	Horizontal	PASS

WCDMA Band 2 HCH, ANT H

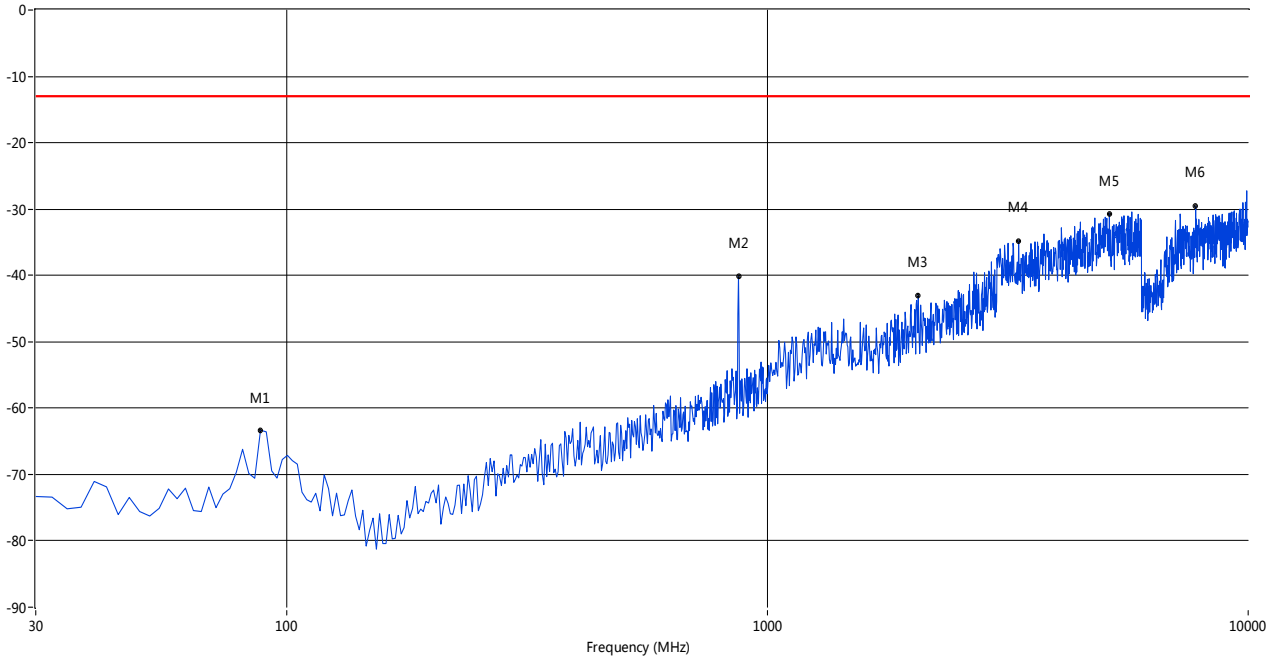
RSE Test case_FCC PART 24



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
90.47	-68.62	-2.26	-13.0	55.62	160.70	Horizontal	Horizontal	PASS
748.43	-62.83	2.80	-13.0	49.83	66.30	Horizontal	Horizontal	PASS
1982.54	-27.15	10.95	-13.0	14.15	46.30	Horizontal	Horizontal	N/A
5115.34	-34.22	28.41	-13.0	21.22	218.80	Horizontal	Horizontal	PASS
9759.35	-24.46	37.10	-13.0	11.46	300.90	Horizontal	Horizontal	PASS
14937.66	-34.42	31.90	-13.0	21.42	111.40	Horizontal	Horizontal	PASS

WCDMA Band 5 LCH, ANT V

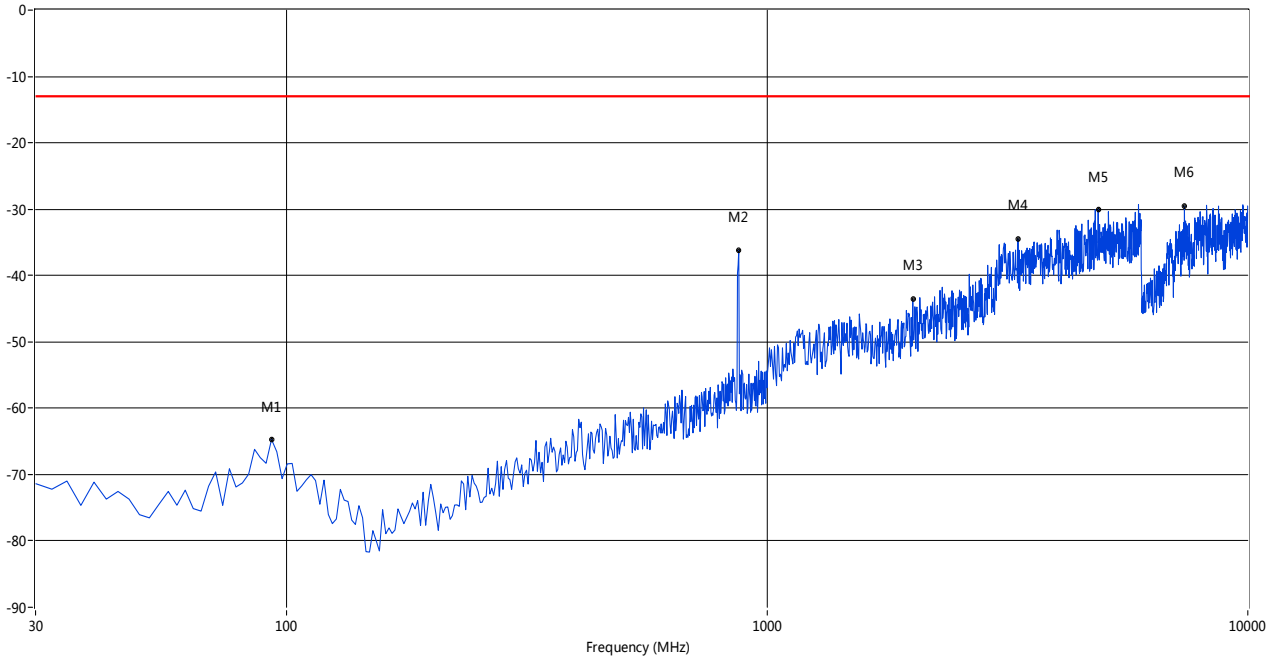
RSE Test case_FCC PART 22



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
88.06	-63.33	-2.64	-13.0	50.33	359.10	Vertical	Horizontal	PASS
869.38	-40.16	5.38	-13.0	27.16	151.90	Vertical	Horizontal	N/A
2057.36	-43.00	11.44	-13.0	30.00	231.50	Vertical	Horizontal	PASS
3329.18	-34.80	21.51	-13.0	21.80	114.30	Vertical	Horizontal	PASS
5139.65	-30.66	28.00	-13.0	17.66	22.20	Vertical	Horizontal	PASS
7775.56	-29.55	34.56	-13.0	16.55	179.40	Vertical	Horizontal	PASS

WCDMA Band 5 LCH, ANT H

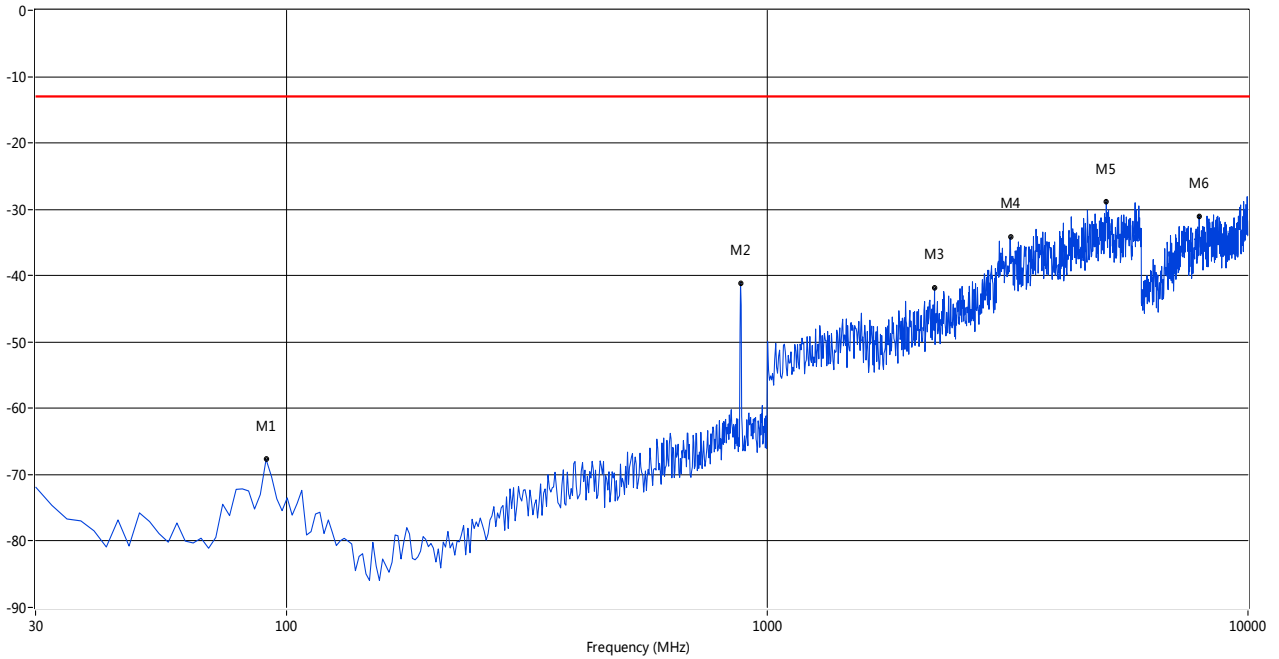
RSE Test case_FCC PART 22



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
92.89	-64.70	-2.67	-13.0	51.70	259.60	Horizontal	Horizontal	PASS
871.80	-36.15	5.36	-13.0	23.15	248.20	Horizontal	Horizontal	N/A
2007.48	-43.59	11.11	-13.0	30.59	168.20	Horizontal	Horizontal	PASS
3321.70	-34.46	21.47	-13.0	21.46	300.60	Horizontal	Horizontal	PASS
4877.81	-30.08	27.19	-13.0	17.08	333.40	Horizontal	Horizontal	PASS
7376.56	-29.58	34.13	-13.0	16.58	359.00	Horizontal	Horizontal	PASS

WCDMA Band 5 MCH, ANT V

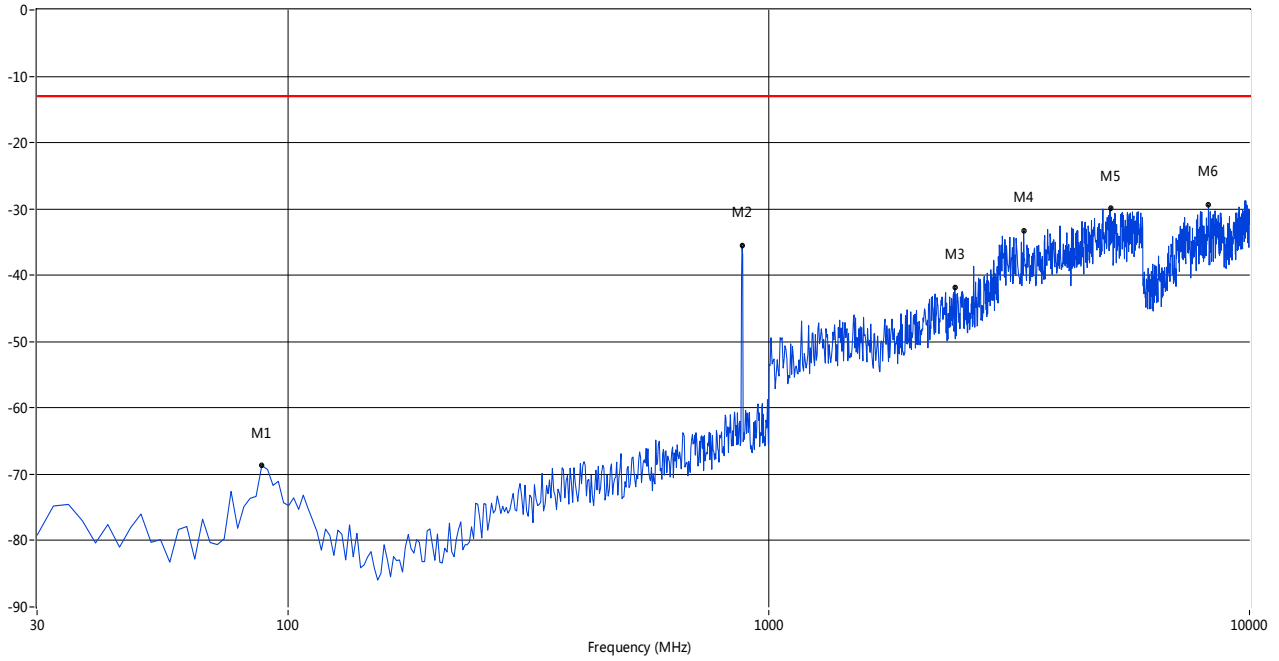
RSE Test case_FCC PART 22



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
90.47	-67.69	-2.10	-13.0	54.69	190.70	Vertical	Horizontal	PASS
879.05	-41.11	5.43	-13.0	28.11	129.30	Vertical	Horizontal	N/A
2226.93	-41.90	12.64	-13.0	28.90	163.20	Vertical	Horizontal	PASS
3201.99	-34.24	22.01	-13.0	21.24	250.00	Vertical	Horizontal	PASS
5072.32	-28.86	28.04	-13.0	15.86	196.70	Vertical	Horizontal	PASS
7915.21	-31.05	34.80	-13.0	18.05	337.30	Vertical	Horizontal	PASS

WCDMA Band 5 MCH, ANT H

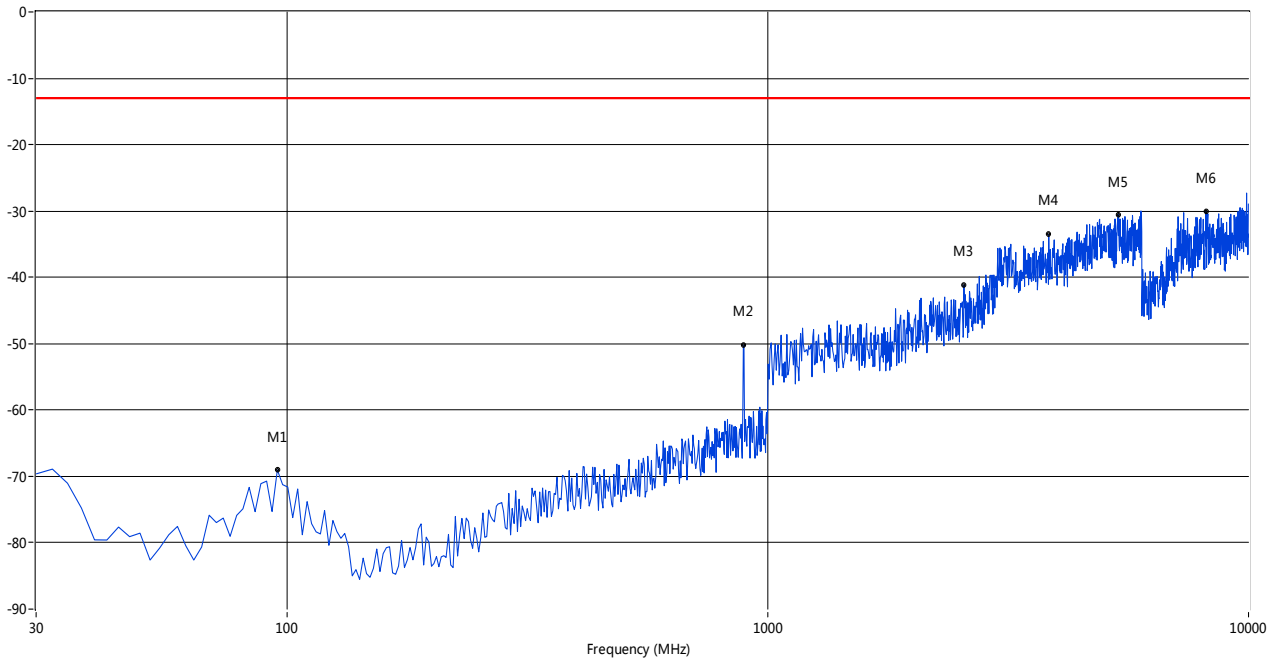
RSE Test case_FCC PART 22



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
88.06	-68.68	-2.64	-13.0	55.68	329.70	Horizontal	Horizontal	PASS
879.05	-35.56	5.43	-13.0	22.56	265.50	Horizontal	Horizontal	N/A
2436.41	-41.85	13.05	-13.0	28.85	165.00	Horizontal	Horizontal	PASS
3389.03	-33.33	21.47	-13.0	20.33	30.40	Horizontal	Horizontal	PASS
5132.17	-29.91	27.97	-13.0	16.91	111.20	Horizontal	Horizontal	PASS
8214.46	-29.46	35.59	-13.0	16.46	71.20	Horizontal	Horizontal	PASS

WCDMA Band 5 HCH, ANT V

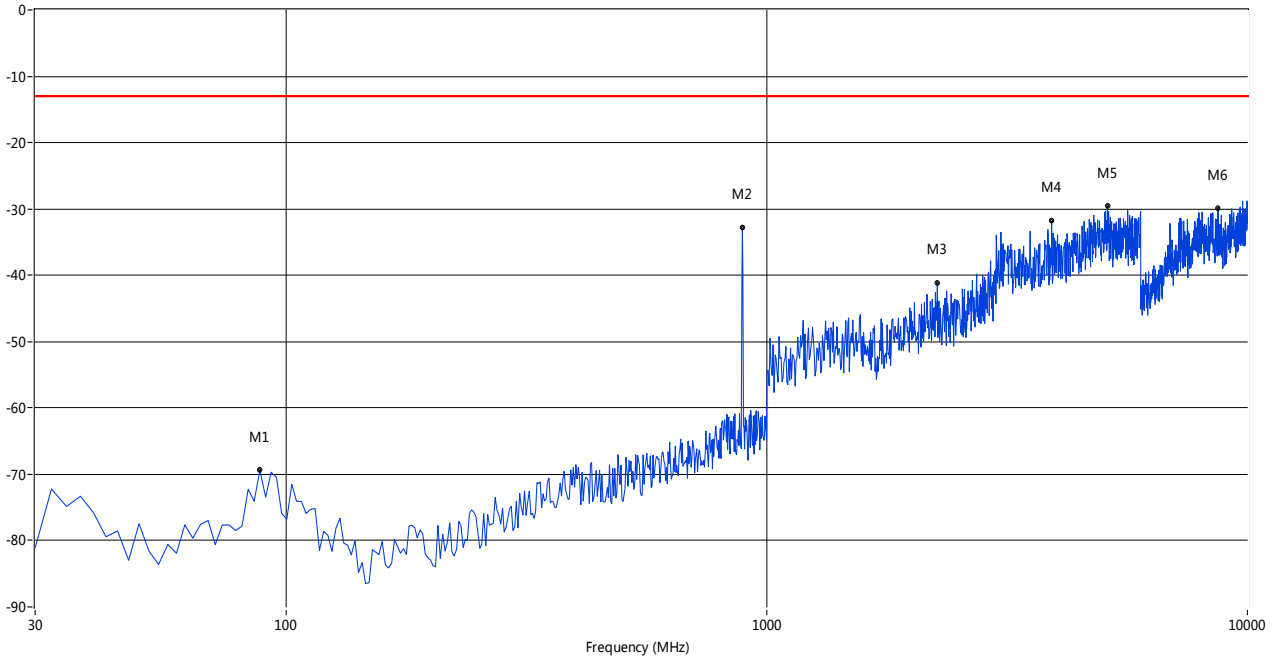
RSE Test case_FCC PART 22



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
95.31	-69.03	-3.33	-13.0	56.03	102.90	Vertical	Horizontal	PASS
891.15	-50.27	5.60	-13.0	37.27	112.40	Vertical	Horizontal	N/A
2556.11	-41.16	13.24	-13.0	28.16	142.20	Vertical	Horizontal	PASS
3837.91	-33.51	23.92	-13.0	20.51	58.40	Vertical	Horizontal	PASS
5364.09	-30.49	27.72	-13.0	17.49	282.60	Vertical	Horizontal	PASS
8144.64	-29.99	34.56	-13.0	16.99	42.40	Vertical	Horizontal	PASS

WCDMA Band 5 HCH, ANT H

RSE Test case_FCC PART 22



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
88.06	-69.39	-2.64	-13.0	56.39	227.40	Horizontal	Horizontal	PASS
888.73	-32.86	5.58	-13.0	19.86	268.90	Horizontal	Horizontal	N/A
2261.84	-41.13	12.99	-13.0	28.13	94.30	Horizontal	Horizontal	PASS
3912.72	-31.84	23.86	-13.0	18.84	325.10	Horizontal	Horizontal	PASS
5109.73	-29.58	28.44	-13.0	16.58	258.30	Horizontal	Horizontal	PASS
8673.32	-29.94	35.30	-13.0	16.94	255.70	Horizontal	Horizontal	PASS

ANNEX B TEST SETUP PHOTOS

Please refer to the document "BL- SZ1680203-AR.PDF".

ANNEX C EUT EXTERNAL PHOTOS

Please refer to the document "BL- SZ1680203-AW.PDF".

ANNEX D EUT INTERNAL PHOTOS

Please refer to the document "BL- SZ1680203-AI.PDF".

--END OF REPORT--