



## TEST REPORT

**No. I18N00176-CDMA**

for

**Meizu Technology Co.,Ltd.**

**LTE Mobile Phone**

**Model Name: M810L**

**FCC ID: 2ANQ6-M810L**

with

**Hardware Version: V1.0**

**Software Version: Flyme 6.3.5.0G**

**Issued Date: 2018-04-13**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of SAICT.

**Test Laboratory:**

Designation Number: CN1210

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## **REPORT HISTORY**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
I18N00176-CDMA	Rev.0	1st edition	2018-04-13

## **CONTENTS**

<b>1. TEST LABORATORY</b> .....	<b>4</b>
1.1. TESTING LOCATION.....	4
1.2. TESTING ENVIRONMENT.....	4
1.3. PROJECT DATA.....	4
1.4. SIGNATURE.....	4
<b>2. CLIENT INFORMATION</b> .....	<b>5</b>
2.1. APPLICANT INFORMATION.....	5
2.2. MANUFACTURER INFORMATION.....	5
<b>3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)</b> .....	<b>6</b>
3.1. ABOUT EUT.....	6
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST.....	6
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST.....	6
3.4. GENERAL DESCRIPTION.....	6
<b>4. REFERENCE DOCUMENTS</b> .....	<b>7</b>
4.1. REFERENCE DOCUMENTS FOR TESTING.....	7
<b>5. LABORATORY ENVIRONMENT</b> .....	<b>8</b>
<b>6. SUMMARY OF TEST RESULTS</b> .....	<b>9</b>
<b>7. TEST EQUIPMENTS UTILIZED</b> .....	<b>10</b>
<b>ANNEX A: MEASUREMENT RESULTS</b> .....	<b>11</b>
A.1 OUTPUT POWER.....	11
A.2 FIELD STRENGTH OF SPURIOUS RADIATION.....	15
A.3 FREQUENCY STABILITY.....	21
A.4 OCCUPIED BANDWIDTH.....	23
A.5 EMISSION BANDWIDTH.....	26
A.6 BAND EDGE COMPLIANCE.....	28
A.7 CONDUCTED SPURIOUS EMISSION.....	30

## 1. Test Laboratory

### 1.1. Testing Location

Company Name: Shenzhen Academy of Information and Communications  
Technology  
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### 1.2. Testing Environment

Normal Temperature: 15-35°C  
Relative Humidity: 20-75%

### 1.3. Project data

Testing Start Date: 2018-02-05  
Testing End Date: 2018-03-16

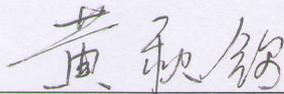
### 1.4. Signature



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Lai Minghua

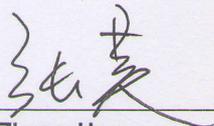
(Prepared this test report)



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Huang Qiuqin

(Reviewed this test report)



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Zhang Hao

Deputy Director of the laboratory

(Approved this test report)

## **2. Client Information**

### **2.1. Applicant Information**

Company Name: Meizu Technologies Co., Ltd.  
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Province,China  
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### **2.2. Manufacturer Information**

Company Name: Meizu Technologies Co., Ltd.  
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Telephone: 0086-0756-6116256  
Fax: /

### **3. Equipment Under Test (EUT) and Ancillary Equipment (AE)**

#### **3.1. About EUT**

Description	LTE Mobile Phone
Model Name	M810L
FCC ID	2ANQ6-M810L
Frequency Bands	CDMA BC0
Antenna	Integrated
Extreme vol. Limits	3.4VDC to 4.4VDC (nominal: 3.85VDC)
Extreme temp. Tolerance	-30°C to +50°C

#### **3.2. Internal Identification of EUT used during the test**

<b>EUT ID*</b>	<b>IMEI</b>	<b>HW Version</b>	<b>SW Version</b>	<b>Sample Arrival Date</b>
UT01aa	867865030005647	V1.0	Flyme 6.3.5.0G	2018-02-05

\*EUT ID: is used to identify the test sample in the lab internally.

#### **3.3. Internal Identification of AE used during the test**

<b>AE ID*</b>	<b>Description</b>
AE1	Battery1
AE2	Battery2
AE3	Battery3
AE4	Charger

AE1

Model	BA810
Manufacturer	Sunwoda Electronic CO.,LTD
Capacitance	3000 mAh

AE2

Model	BA810
Manufacturer	DONG GUAN DER NEW ENERGY CO.,LTD.
Capacitance	3000 mAh

AE3

Model	BA810
Manufacturer	Ningbo Veken Battery Co.,Ltd.
Capacitance	3000 mAh

AE4

Model	UP0520A
Manufacturer	Salcomp(Shenzhen)Co.,Ltd

\*AE ID: is used to identify the test sample in the lab internally.

#### **3.4. General Description**

The Equipment Under Test (EUT) is a model TD-LTE mobile phone with integrated antenna. It consists of normal options: lithium battery, charger. Manual and specifications of the EUT were provided to fulfil the test.

## 4. Reference Documents

### 4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

<b>Reference</b>	<b>Title</b>	<b>Version</b>
FCC Part 22	PUBLIC MOBILE SERVICES	10-1-16 Edition
FCC Part 2	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS	10-1-16 Edition
ANSI/TIA-603-E	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2016
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2014
KDB 971168 D01	Power Meas License Digital Systems	v03

## 5. LABORATORY ENVIRONMENT

**Control room / conducted chamber** did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 80 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 M
Ground system resistance	< 0.5

**Fully-anechoic chamber 2** (8.6 meters X 6.1 meters X 3.85 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 M
Ground system resistance	< 1
Site voltage standing-wave ratio ( $S_{VSWR}$ )	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 4000 MHz

**Semi-anechoic chamber 2 / Fully-anechoic chamber 3** (10 meters X 6.7 meters X 6.15 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 2 M
Ground system resistance	< 0.5
Normalised site attenuation (NSA)	< $\pm 3.5$ dB, 3 m distance
Site voltage standing-wave ratio ( $S_{VSWR}$ )	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

## 6. SUMMARY OF TEST RESULTS

Abbreviations used in this clause:		
Verdict Column	P	Pass
	F	Fail
	NA	Not applicable
	NM	Not measured
Location Column	A/B/C/D	The test is performed in test location A, B, C or D which are described in section 1.1 of this report

### CDMA BC0

Items	List	Clause in FCC rules	Section in this report	Verdict
1	Output Power	2.1046/22.913	A.1	P
2	Field Strength of Spurious Radiation	2.1053/22.917	A.2	P
3	Frequency Stability	2.1055/22.355	A.3	P
4	Occupied Bandwidth	2.1049/22.917	A.4	P
5	Emission Bandwidth	2.1049/22.917	A.5	P
6	Band Edge Compliance	2.1051/22.917	A.6	P
7	Conducted Spurious Emission	2.1051/22.917	A.7	P

## 7. Test Equipments Utilized

NO.	Description	TYPE	Manufacture	series number	CAL DUE DATE
1	Test Receiver	ESR7	R&S	101676	2018.11.29
2	BiLog Antenna	VULB9163	Schwarzbeck	9163 329	2020.02.27
3	Horn Antenna	3117	ETS-lindgren	00066577	2019.04.05
4	Horn Antenna	QSH-SL-18 -26-S-20	Q-par	17013	2020.01.15
5	Antenna	SBA 9113	Schwarzbeck	814	/
6	Antenna	SBA 9112	Schwarzbeck	302	/
7	Antenna	QWH-SL-18 -40-K-SG	Q-par	15979	2020.01.16
8	preamplifier	83017A	Agilent	MY39501110	/
9	Signal Generator	SMB100A	R&S	179725	2018.11.29
10	Fully Anechoic Chamber	FACT3-2.0	ETS-Lindgren	1285	2019.11.27
11	Spectrum Analyzer	FSV40	R&S	101192	2018.05.22
12	Universal Radio Communication Tester	CMU200	R&S	114540	2018-12-23
13	Universal Radio Communication Tester	CMU200	R&S	123210	2018-12-13
14	Spectrum Analyzer	FSU	R&S	200679	2018-12-13
15	Temperature Chamber	SH-241	ESPECs	92007516	2018-11-14
16	DC Power Supply	U3606A	Agilent Technologies	MY50450012	2018-11-14

### Test software

Item	Name	Vesion
Radiated	EMC32	Version 10.01.00

## **ANNEX A: MEASUREMENT RESULTS**

### **A.1 OUTPUT POWER**

#### **Reference**

FCC: CFR Part 2.1046, 22.913

#### **A.1.1 Summary**

During the process of testing, the EUT was controlled via R&S CMU200 DIGITAL RADIO COMMUNICATION TESTER to ensure max power transmission and proper modulation.

This result contains peak output power and EIRP measurements for the EUT. In all cases, output power is within the specified limits.

#### **A.1.2 Conducted**

##### **A.1.2.1 Method of Measurements**

The EUT was set up for the max output power with pseudo random data modulation.

These measurements were done at 3 frequencies, 824.7MHz, 836.52MHz and 848.31MHz for CDMA 800 band (bottom, middle and top of operational frequency range) for 1x RTT and EVDO.

##### **A1.2.2 Measurement results**

#### **CDMA 800**

##### **Measurement result**

Channel	Frequency(MHz)	Channel power(dBm)		
		1x RTT	1xEVDO	
			Rel0	RevA
1013	824.70	23.94	23.98	24.03
384	836.52	23.56	23.63	23.66
777	848.31	23.83	23.91	23.94

Note: Expanded measurement uncertainty is  $U = 0.488\text{dB}$ ,  $k = 1.96$

### A.1.3 Radiated

#### A.1.3.1 Description

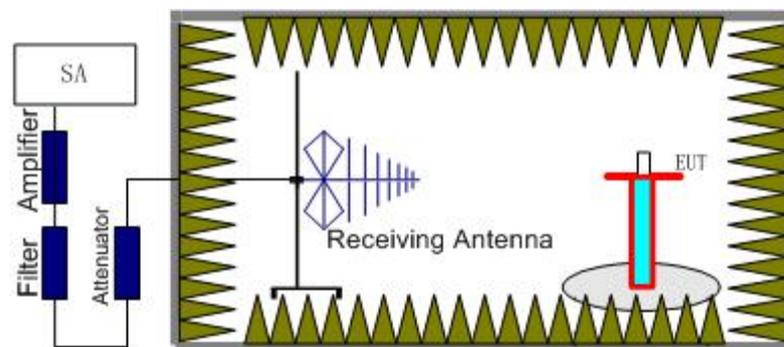
This is the test for the maximum radiated power from the EUT.

Rule Part 22.913(a) specifies “The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.”

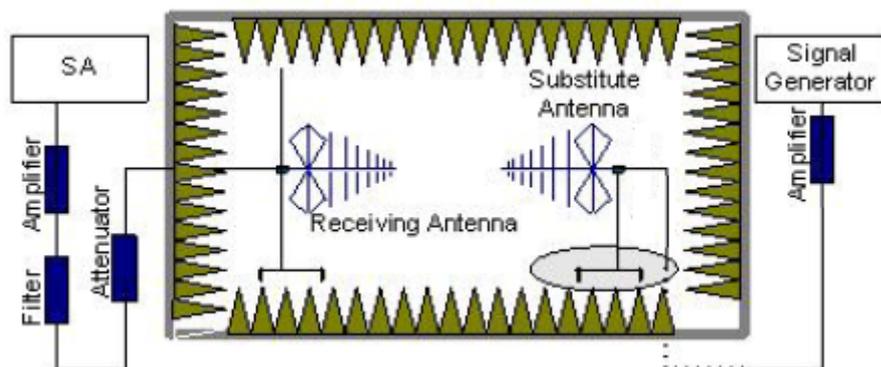
#### A.1.3.2 Method of Measurement

The measurements procedures in TIA-603-E-2016 are used.

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as ( $P_r$ ).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power ( $P_{Mea}$ ) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded ( $P_r$ ). The power of signal source ( $P_{Mea}$ ) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna

polarization.

4. An amplifier should be connected to the Signal Source output port. And the cable should be connected between the Amplifier and the Substitution Antenna.

The cable loss ( $P_{cl}$ ), the Substitution Antenna Gain ( $G_a$ ) and the Amplifier Gain ( $P_{Ag}$ ) should be recorded after test.

The measurement results are obtained as described below:

$$\text{Power(EIRP)} = P_{\text{Mea}} - P_{\text{Ag}} - P_{\text{cl}} + G_a$$

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $\text{ERP} = \text{EIRP} - 2.15\text{dB}$ .

**CDMA 800-ERP 22.913(a)**

**Limits**

	Burst Peak ERP (dBm)
CDMA 1X	≤38.45dBm (7W)
CDMA EVDO	≤38.45dBm (7W)

**Measurement result**

**CDMA 1X**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)+ P <sub>Ag</sub> (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
824.70	-12.08	-33.60	0.28	2.15	19.65	38.45	V
<b>836.52</b>	<b>-11.81</b>	<b>-33.50</b>	<b>0.25</b>	<b>2.15</b>	<b>19.79</b>	<b>38.45</b>	<b>V</b>
848.31	-12.43	-33.50	0.21	2.15	19.13	38.45	V

**CDMA EVDO**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)+ P <sub>Ag</sub> (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
824.70	-12.07	-33.60	0.28	2.15	19.66	38.45	V
836.52	-12.24	-33.50	0.25	2.15	19.36	38.45	V
848.31	-12.20	-33.50	0.21	2.15	19.37	38.45	V

Frequency: 836.52MHz

Peak ERP(dBm)=P<sub>Mea</sub>(-11.81dBm)-(P<sub>cl</sub>+P<sub>Ag</sub>)(-33.50dB)+G<sub>a</sub>(0.28dB)-2.15dB=19.79dBm

**ANALYZER SETTINGS: RBW = VBW = 3MHz**

Note: The maximum value of expanded measurement uncertainty for this test item is  $U =$

4.92dB(30MHz-3GHz)/4.88dB(3GHz-18GHz)/5.66dB(18GHz-40GHz),  $k = 2$

## A.2 FIELD STRENGTH OF SPURIOUS RADIATION

### Reference

FCC: CFR Part 2.1053, 22.917

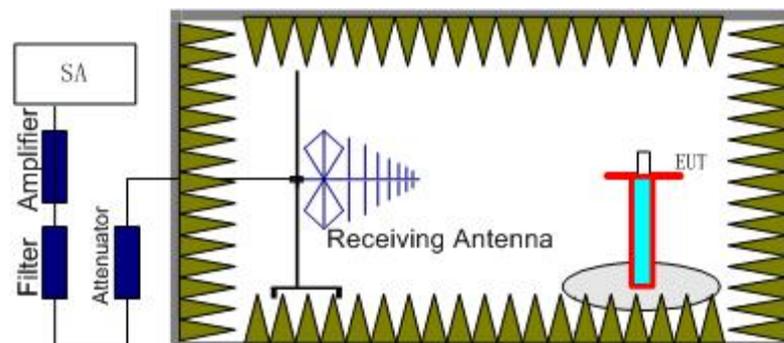
### A.2.1 Measurement Method

The measurement procedures in TIA-603-E-2016 are used.

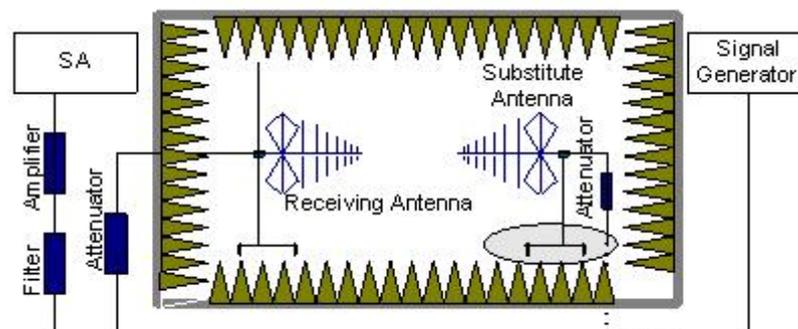
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier. The resolution bandwidth is set as outlined in Part 22.917. The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of CDMA800.

### The procedure of radiated spurious emissions is as follows:

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere

with the radiation pattern of the antenna. A power ( $P_{Mea}$ ) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded ( $P_r$ ). The power of signal source ( $P_{Mea}$ ) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. The Path loss ( $P_{pl}$ ) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain ( $G_a$ ) should be recorded after test.

A amplifier should be connected in for the test.

The Path loss ( $P_{pl}$ ) is the summation of the cable loss and the gain of the amplifier.

The measurement results are obtained as described below:

$$\text{Power(EIRP)} = P_{Mea} - P_{pl} + G_a$$

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $ERP = EIRP - 2.15dB$ .

### **A.2.2 Measurement Limit**

Part 22.917 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

The specification that emissions shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

### **A.2.3 Measurement Results**

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the CDMA800 band (824.7MHz, 836.52MHz, 848.31MHz) . It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the CDMA800 into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

**A.2.4 Measurement Results Table**

Frequency	Channel	Frequency Range	Result
CDMA 800MHz	Low	30MHz-10GHz	Pass
	Middle	30MHz-10GHz	Pass
	High	30MHz-10GHz	Pass

**A.2.5 Sweep Table**

Working Frequency	Subrange (GHz)	RBW	VBW	Sweep time (s)
800MHz	0.03~1	100KHz	300KHz	10
	1-2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~10	1 MHz	3 MHz	3

**CDMA 1X Channel 1013/824.7MHz**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	Path loss	Antenna Gain	Peak ERP(dBm)	Limit (dBm)	Polarization
6748	-37.05	1.80	-2.82	-43.82	-13.00	V
6905	-36.95	1.80	-2.87	-43.77	-13.00	V
7061	-36.82	1.80	-2.85	-43.62	-13.00	V
7302	-36.76	1.80	-2.65	-43.36	-13.00	V
7682	-37.04	1.80	-2.58	-43.57	-13.00	H
8601	-38.02	2.00	-1.64	-43.81	-13.00	V

**CDMA 1X Channel 384/836.52MHz**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	Path loss	Antenna Gain	Peak ERP(dBm)	Limit (dBm)	Polarization
1277	1.47	0.70	-40.76	-42.14	-13.00	V
7643	-37.00	1.80	-2.58	-43.53	-13.00	V
8053	-37.38	1.80	-2.18	-43.51	-13.00	H
9076	-37.80	2.10	-1.42	-43.47	-13.00	V
9399	-38.10	2.10	-1.12	-43.47	-13.00	V
9623	-38.61	2.10	-0.66	-43.52	-13.00	V

**CDMA 1X Channel 777/848.31MHz**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	Path loss	Antenna Gain	Peak ERP(dBm)	Limit (dBm)	Polarization
2658.5	-19.30	1.10	-18.93	-41.48	-13.00	V
6703	-37.34	1.80	-2.82	-44.11	-13.00	V
7026	-37.24	1.80	-2.85	-44.04	-13.00	V
7160	-36.90	1.80	-2.77	-43.62	-13.00	V
7353	-37.29	1.80	-2.65	-43.89	-13.00	V
7642	-36.84	1.80	-2.58	-43.37	-13.00	H

**CDMA EVDO Channel 1013/824.7MHz**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	Path loss	Antenna Gain	Peak ERP(dBm)	Limit (dBm)	Polarization
2580	-10.59	1.10	-20.19	-34.03	-13.00	V
6745	-36.48	1.80	-2.82	-43.25	-13.00	V
7059	-36.92	1.80	-2.85	-43.72	-13.00	V
7347	-36.77	1.80	-2.65	-43.37	-13.00	V
8085	-37.66	1.80	-2.18	-43.79	-13.00	H
9397	-37.96	2.10	-1.12	-43.33	-13.00	V

**CDMA EVDO Channel 384/836.52MHz**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	Path loss	Antenna Gain	Peak ERP(dBm)	Limit (dBm)	Polarization
6677	-37.42	1.80	-2.85	-44.22	-13.00	H
7110	-37.40	1.80	-2.77	-44.12	-13.00	V
7302	-37.34	1.80	-2.65	-43.94	-13.00	V
7654	-37.30	1.80	-2.58	-43.83	-13.00	V
8026	-38.24	1.80	-2.18	-44.37	-13.00	V
8337	-38.20	1.80	-2.04	-44.19	-13.00	H

**CDMA EVDO Channel 777/848.31MHz**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	Path loss	Antenna Gain	Peak ERP(dBm)	Limit (dBm)	Polarization
7026	-37.24	1.80	-2.85	-44.04	-13.00	V
7109	-37.18	1.80	-2.77	-43.90	-13.00	V
8114	-37.47	1.80	-2.15	-43.57	-13.00	H
8161	-37.70	1.80	-2.15	-43.80	-13.00	H
8670	-38.19	2.00	-1.64	-43.98	-13.00	V
9359	-38.24	2.10	-1.12	-43.61	-13.00	V

Note: The maximum value of expanded measurement uncertainty for this test item is  $U = 4.92\text{dB}(30\text{MHz}-3\text{GHz})/4.88\text{dB}(3\text{GHz}-18\text{GHz})/5.66\text{dB}(18\text{GHz}-40\text{GHz})$ ,  $k = 2$

### **A.3 FREQUENCY STABILITY**

#### **Reference**

FCC: CFR Part 2.1055, 22.355

#### **A.3.1 Method of Measurement**

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of R&S CMU200 DIGITAL RADIO COMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30°C.
3. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on channel 384 for CDMA 800 measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
5. Remeasure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments remeasuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50°C.
7. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10°C decrements from +50°C to -30°C. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

#### **A.3.2 Measurement Limit**

##### **A.3.2.1 For Hand carried battery powered equipment**

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.4VDC and 4.4VDC, with a nominal voltage of 3.85VDC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress.

For CDMA800, according to section. 22.355, frequency tolerance can be maintained within 2.5ppm.

##### **A.3.2.2 For equipment powered by primary supply voltage**

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. For this EUT

section 2.1055(d)(1) applies. This requires varying primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

For CDMA800, according to section. 22.355, frequency tolerance can be maintained within 2.5ppm.

### A.3.3 Measurement results

#### CDMA 800

##### Frequency Error vs Voltage

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.4	-8	0.010
3.85	-12	0.014
4.4	-9	0.011

##### Frequency Error vs Temperature

temperature(°C)	Frequency error(Hz)	Frequency error(ppm)
-30	-5	0.006
-20	-11	0.013
-10	-14	0.017
0	-23	0.027
10	-9	0.011
20	-7	0.008
30	-12	0.014
40	-11	0.013
50	-24	0.029

Expanded measurement uncertainty is 10Hz,  $k = 2$

## **A.4 OCCUPIED BANDWIDTH**

### **Reference**

FCC: CFR Part 2.1049, 22.917

### **A.4.1 Occupied Bandwidth Results**

Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the US Cellular frequency bands. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

The measurement method is from KDB 971168 D01 4.2:

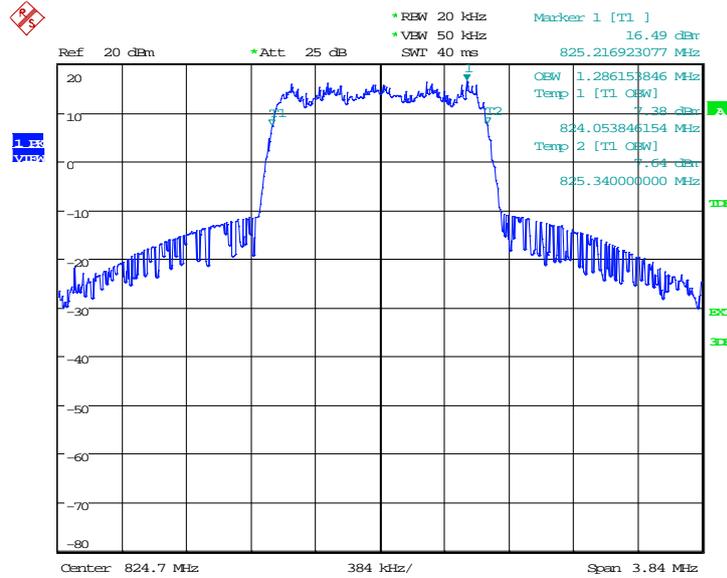
- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the OBW).
- b) The nominal IF filter bandwidth (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  $10\log(OBW / RBW)$  below the reference level.
- d) Set the detection mode to peak, and the trace mode to max hold.
- e) Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

**CDMA 800 (99% BW)**

Channel	Occupied Bandwidth (99% BW)( MHz)
1013	1.29
384	1.28
777	1.29

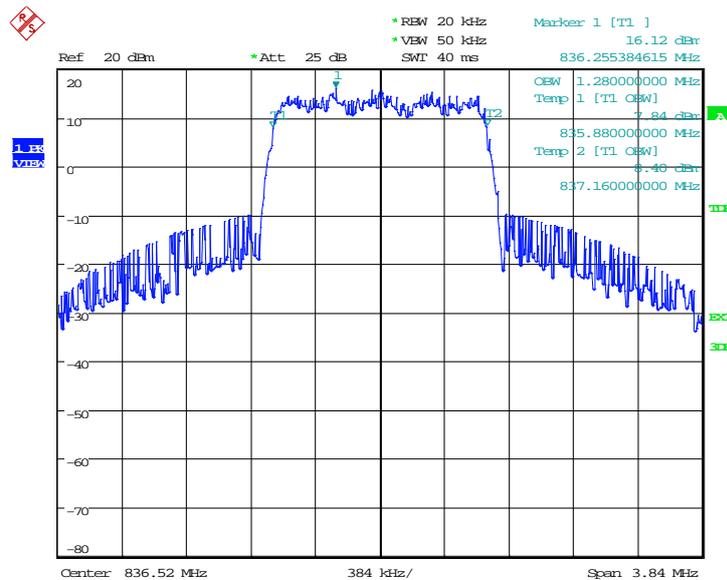
**CDMA 800**

**Channel 1013-Occupied Bandwidth (99% BW)**



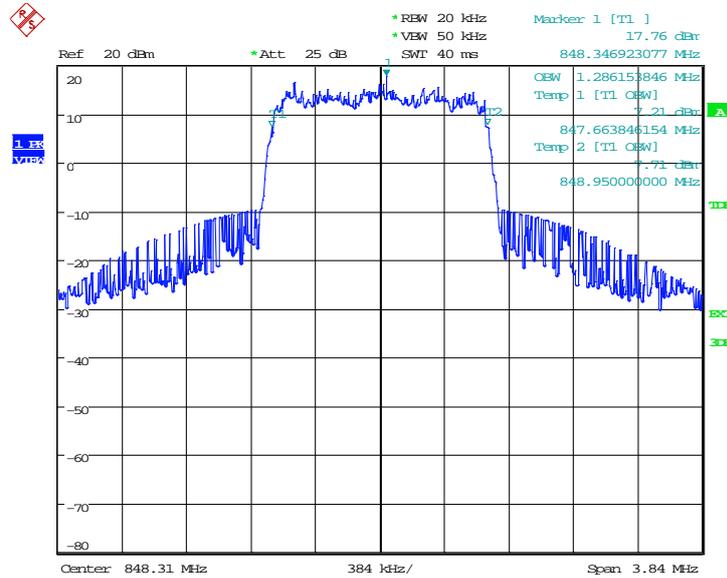
Date: 8.FEB.2018 12:24:33

**Channel 384-Occupied Bandwidth (99% BW)**



Date: 8.FEB.2018 12:26:38

### Channel 777-Occupied Bandwidth (99% BW)



Date: 8.FEB.2018 12:27:13

Note: Expanded measurement uncertainty is  $U = 3428\text{Hz}$ ,  $k = 2$

## A.5 EMISSION BANDWIDTH

### Reference

FCC: CFR Part 2.1049, 22.917

### A.5.1 Emission Bandwidth Results

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 emissions are attenuated at least 26 dB below the transmitter power.

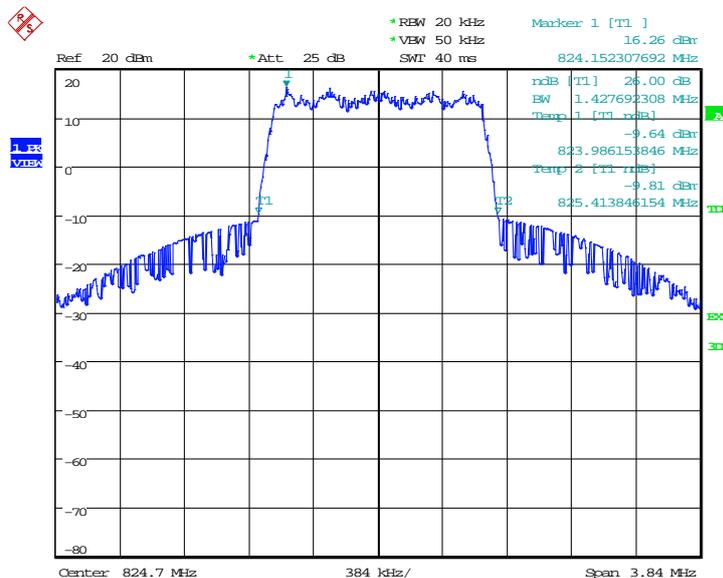
Similar to conducted emissions; Emission bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the US Cellular frequency band. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

### CDMA 800 (-26dBc BW)

Channel	Occupied Bandwidth (-26dBc BW)( MHz)
1013	1.43
384	1.42
777	1.42

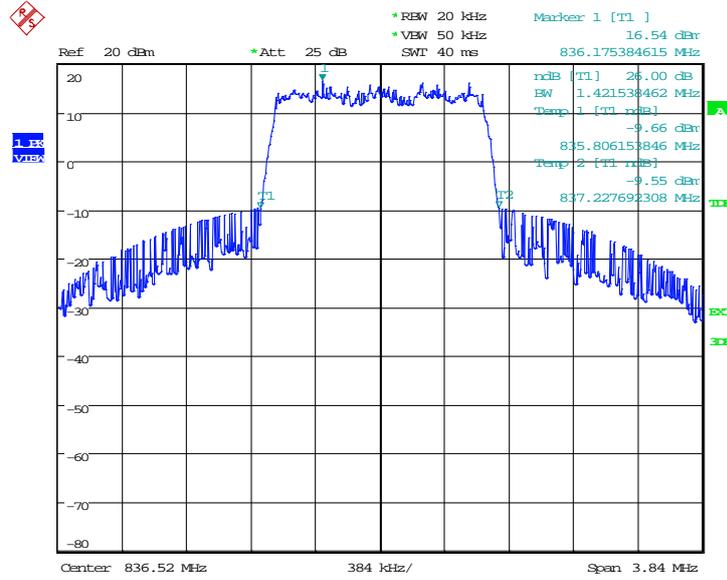
### CDMA 800

### Channel 1013-Occupied Bandwidth (-26dBc BW)



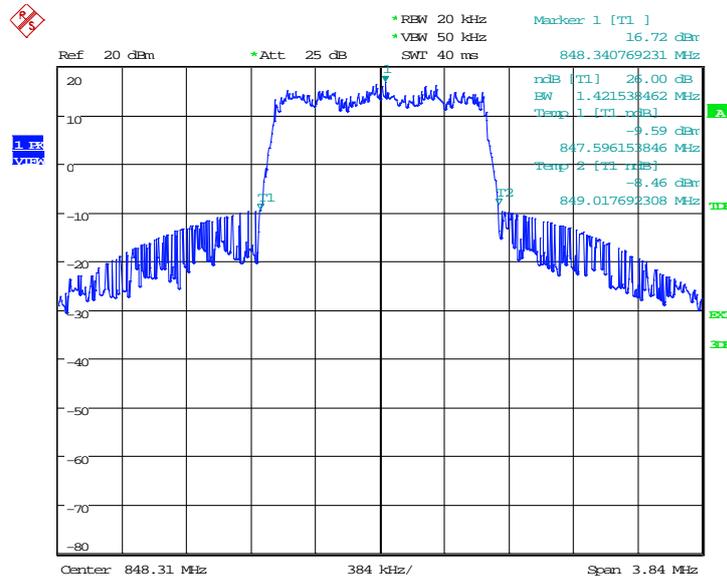
Date: 8.FEB.2018 12:25:17

### Channel 384-Occupied Bandwidth (-26dBc BW)



Date: 8.FEB.2018 12:26:01

### Channel 777-Occupied Bandwidth (-26dBc BW)



Date: 8.FEB.2018 12:27:46

Note: Expanded measurement uncertainty is  $U = 3428\text{Hz}$ ,  $k = 2$

## A.6 BAND EDGE COMPLIANCE

### Reference

FCC: CFR Part 2.1051, 22.917

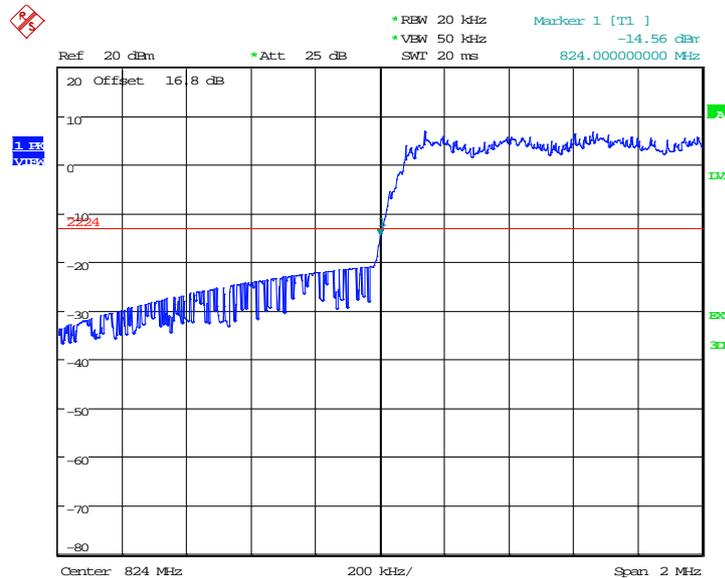
### Measurement limit

On any frequency outside frequency band of the US Cellular spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least  $43+10\log(P)$  dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

According to KDB 971168 D01 6.0, a relaxation of the reference bandwidth is often provided for measurements within a specified frequency range at the edge of the authorized frequency block/band. This is often implemented by permitting the use of a narrower RBW (typically limited to a minimum RBW of 1% of the OBW) for measuring the out-of-band emissions without a requirement to integrate the result over the full reference bandwidth.

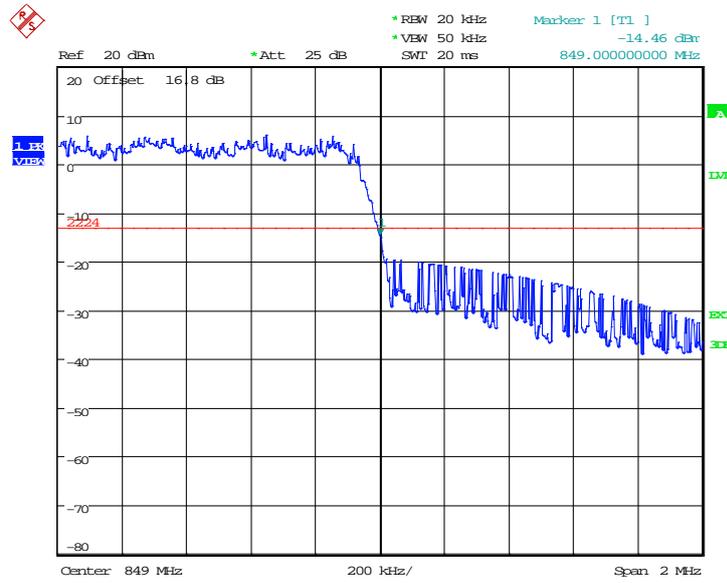
### CDMA 800

#### BAND EDGE BLOCK-Channel 1013



Date: 8.FEB.2018 12:30:19

**BAND EDGE BLOCK-Channel 777**



Date: 8.FEB.2018 12:29:32

Note: Expanded measurement uncertainty is  $U = 0.488\text{dB}(100\text{KHz}-2\text{GHz})/1.211\text{dB}(2\text{GHz}-26.5\text{GHz})$ ,  $k = 1.96$

## **A.7 CONDUCTED SPURIOUS EMISSION**

### **Reference**

FCC: CFR Part 2.1051, 22.917

### **A.7.1 Measurement Method**

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the mobile station equipment tested, this equates to a frequency range of 13 MHz to 9 GHz, data taken from 10 MHz to 25 GHz.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.
3. According to KDB 971168 D01 6.0, the applicable rule part specifies the reference bandwidth for measuring unwanted emission levels (typically, 100 kHz if the authorized frequency band/block is at or below 1 GHz and 1 MHz if the authorized frequency band/block is above 1 GHz)

### **CDMA 800 Transmitter**

Channel	Frequency (MHz)
1013	824.70
384	836.52
777	848.31

### **A. 7.2 Measurement Limit**

Part 22.917 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

The specification that emissions shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

**A. 7.3 Measurement result**

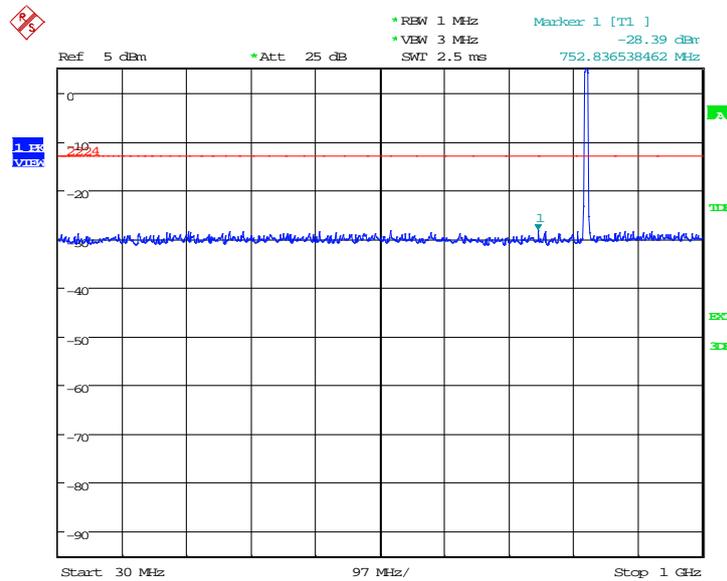
Only worst case result is given below

**CDMA 800**

**Channel 1013: 30MHz –1GHz**

Spurious emission limit –13dBm.

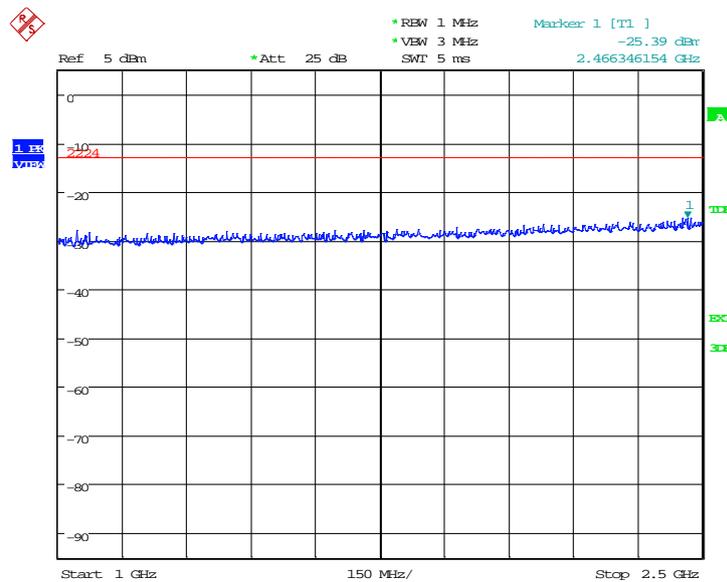
**NOTE: peak above the limit line is the carrier frequency.**



Date: 8.FEB.2018 12:31:42

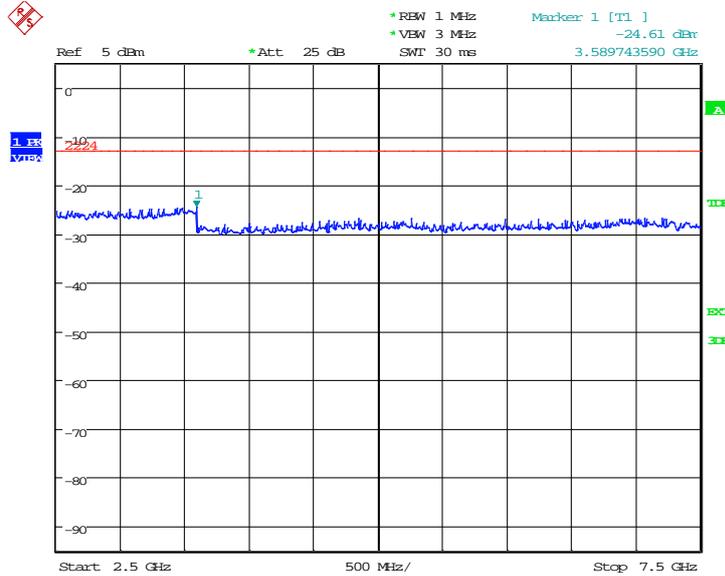
**Channel 1013: 1GHz – 2.5GHz**

Spurious emission limit –13dBm.



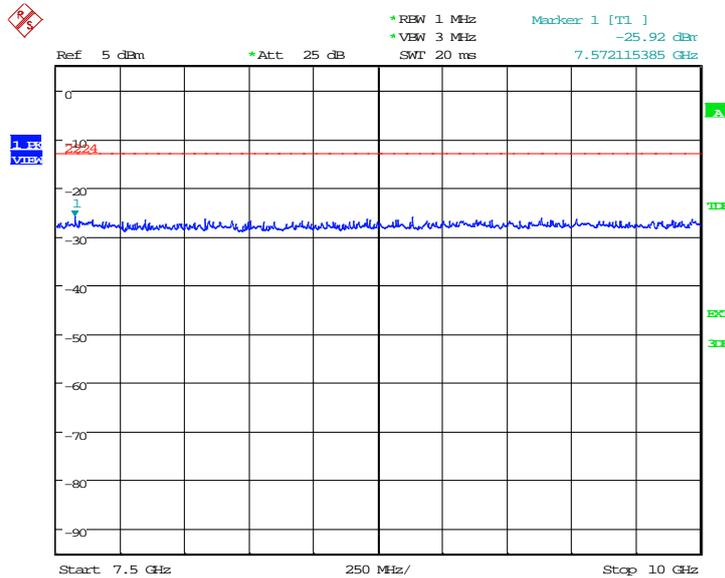
Date: 8.FEB.2018 12:34:57

**Channel 1013: 2.5GHz –7.5GHz**  
Spurious emission limit –13dBm.



Date: 8.FEB.2018 12:35:29

**Channel 1013: 7.5GHz – 10GHz**  
Spurious emission limit –13dBm.

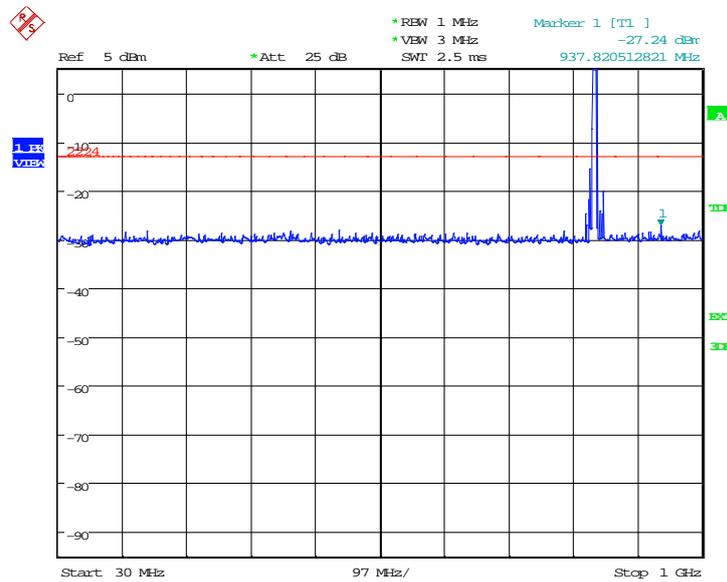


Date: 8.FEB.2018 12:38:09

**Channel 384: 30MHz –1GHz**

Spurious emission limit –13dBm.

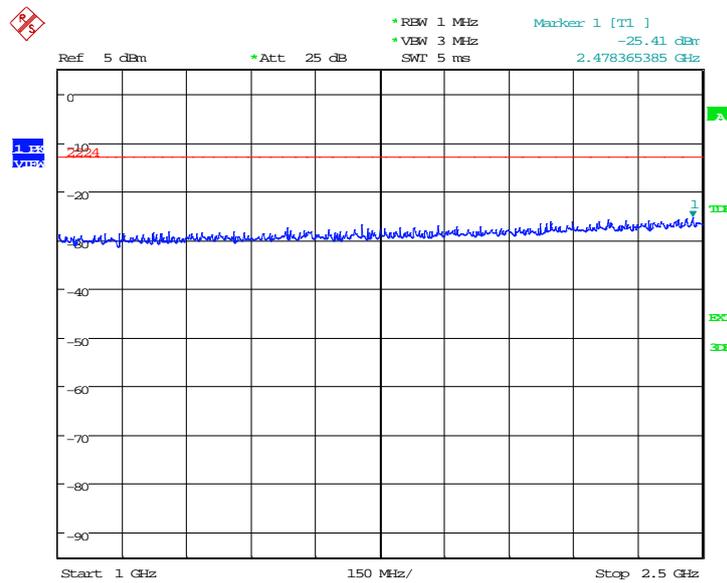
**NOTE: peak above the limit line is the carrier frequency.**



Date: 8.FEB.2018 12:32:46

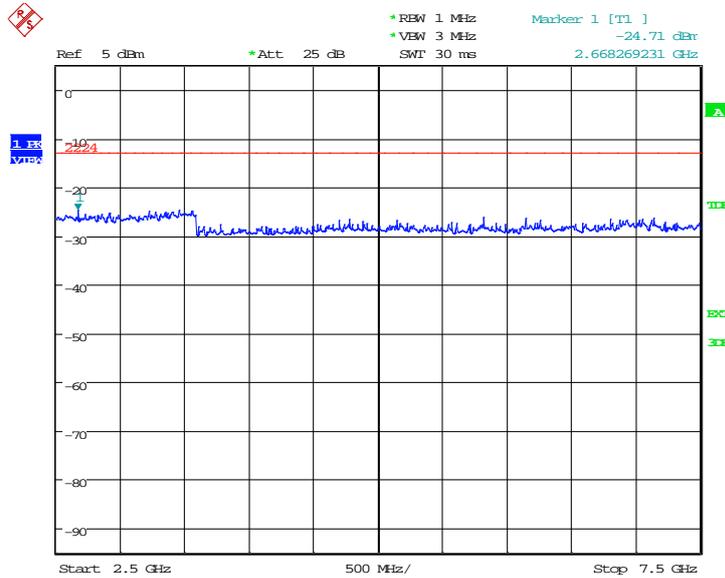
**Channel 384: 1GHz – 2.5GHz**

Spurious emission limit –13dBm.



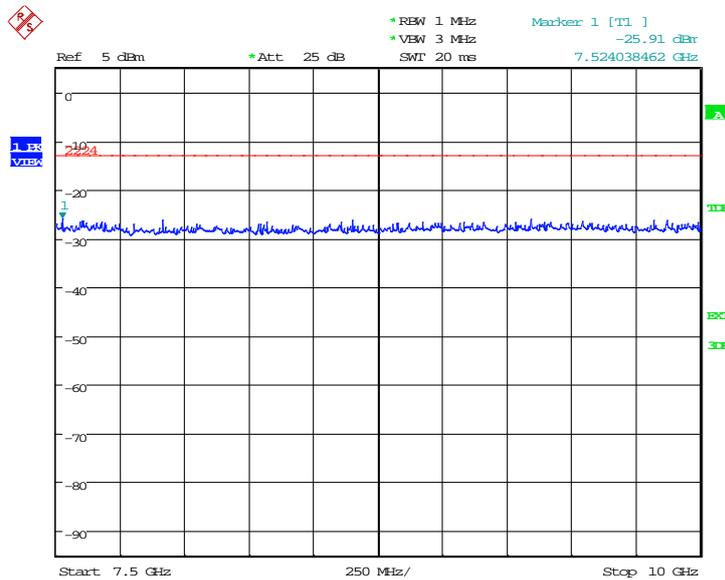
Date: 8.FEB.2018 12:34:32

**Channel 384: 2.5GHz –7.5GHz**  
Spurious emission limit –13dBm.



Date: 8.FEB.2018 12:35:55

**Channel 384: 7.5GHz – 10GHz**  
Spurious emission limit –13dBm.

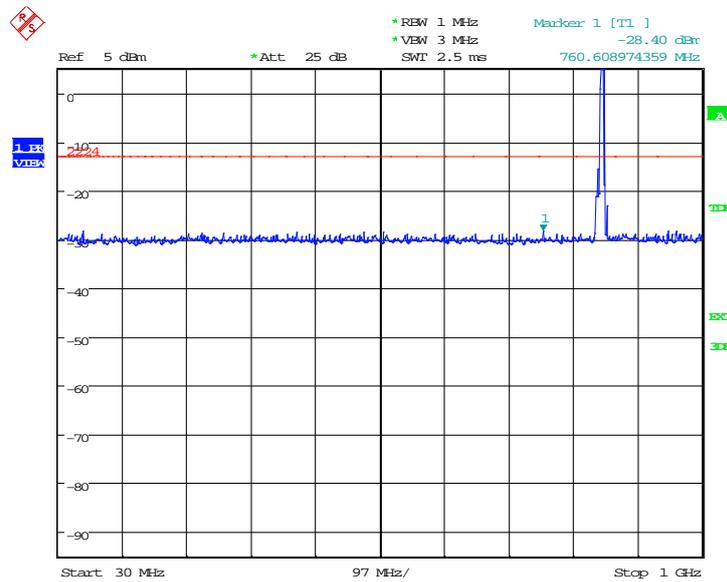


Date: 8.FEB.2018 12:37:18

**Channel 777: 30MHz –1GHz**

Spurious emission limit –13dBm.

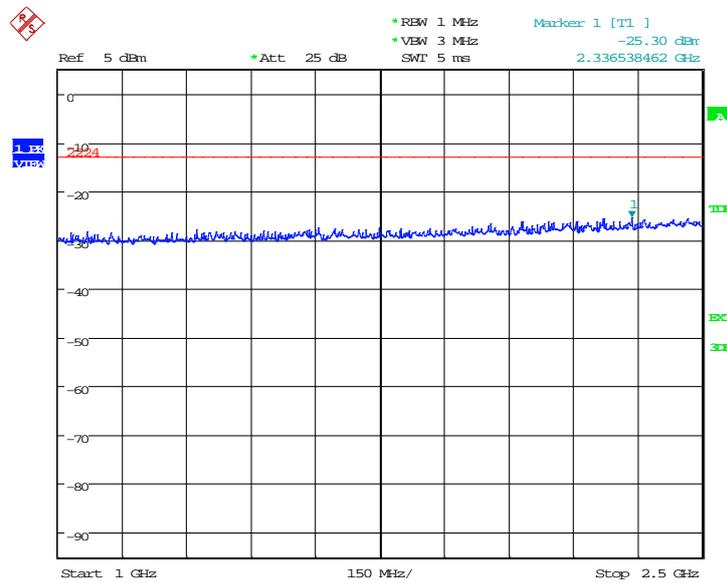
**NOTE: peak above the limit line is the carrier frequency.**



Date: 8.FEB.2018 12:33:23

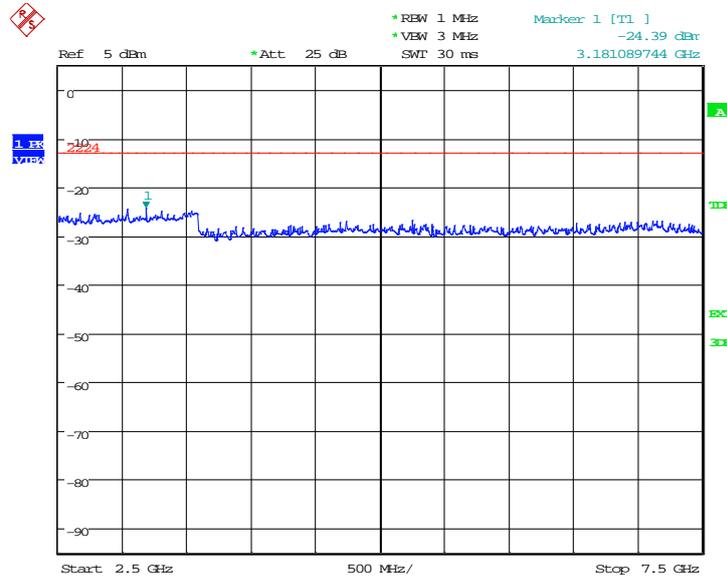
**Channel 777: 1GHz – 2.5GHz**

Spurious emission limit –13dBm.



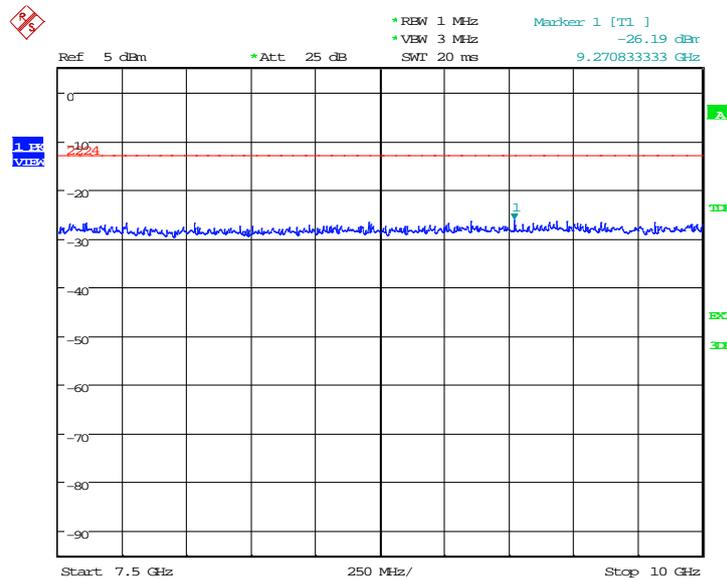
Date: 8.FEB.2018 12:34:01

**Channel 777: 2.5GHz –7.5GHz**  
Spurious emission limit –13dBm.



Date: 8.FEB.2018 12:36:14

**Channel 777: 7.5GHz – 10GHz**  
Spurious emission limit –13dBm.



Date: 8.FEB.2018 12:36:43

Note: Expanded measurement uncertainty is  $U = 0.488\text{dB}(100\text{KHz}-2\text{GHz})/1.211\text{dB}(2\text{GHz}-26.5\text{GHz})$ ,  $k = 1.96$

**\*\*\*END OF REPORT\*\*\***