TEST REPORT

No. 2013TAR912

for

TCT Mobile Limited

CDMA Mobile phone

Model Name: ALCATEL C230, ALCATEL 3000C

Marketing Name：/

FCC ID: RAD438

with

Hardware Version: PIO

Software Version: V1.4

Issued Date: 2014-03-11

Test Laboratory:

DAR accreditation (DIN EN ISO/IEC 17025): No. D-PL-12123-01-01

FCC 2.948 Listed: No.733176

IC O.A.T.S listed: No.6629B

TMC Beijing, Telecommunication Metrology Center of Ministry of Industry and Information Technology

3/F Shou Xiang Technology Building, No.51 Xueyuan Road, Hai Dian District, Beijing, P. R. China,100191.

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CONTENTS

1. Test Laboratory

1.1. Testing Location

Company Name:	TMC Beijing, Telecommunication Metrology Center of MIIT
Address:	3/F Shou Xiang Technology Building, No.51 Xueyuan Road, Hai Dian District, Beijing, P. R. China
Postal Code:	100191
Telephone:	00861062304633
Fax:	00861062304793

1.2. Testing Environment

Normal Temperature:	15-35℃
Relative Humidity:	20-75%

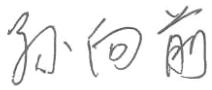
1.3. Project data

Testing Start Date:	2013-11-27
Testing End Date:	2014-03-08

1.4. Signature

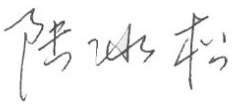
Zi Xiaogang

(Prepared this test report)



Sun Xiangqian

(Reviewed this test report)



Lu Bingsong

Deputy Director of the laboratory

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	TCT Mobile Limited
Address /Post:	5F, E building, No. 232, Liang Jing Road, ZhangJiang High-Tech Park, Pudong Area,Shanghai,201203,P.R.China
Contact:	Zhizhou Gong
Email:	zhizhou.gong@tcl.com
Telephone:	+86(0)21 61460666
Fax:	+86(0)21 61460602

2.2. Manufacturer Information

Company Name:	TCT Mobile Limited
Address /Post:	5F, E building, No. 232, Liang Jing Road, ZhangJiang High-Tech Park, Pudong Area,Shanghai,201203,P.R.China
Contact:	Zhizhou Gong
Email:	zhizhou.gong@tcl.com
Telephone:	+86(0)21 61460666
Fax:	+86(0)21 61460602

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

3.1. About EUT

Description	CDMA Mobile phone
Model Name	ALCATEL C230, ALCATEL 3000C
Marketing Name	/
FCC ID	RAD438
Frequency	CDMA 800MHz
Antenna	Integrated
Output power	22.58dBm maximum ERP measured for CDMA800
Extreme vol. Limits	3.2V DC to 4.3VDC (nominal: 3.7VDC)
Extreme temp. Tolerance	-30°C to +50°C

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Telecommunication Metrology Center of MIIT of People's Republic of China. The hardware of ALCATEL C230 and ALCATEL 3000C is the same. The only diiference between these two models is that ALCATEL C230 has card slot but ALCATEL 3000C has not. The test bases on the model ALCATEL C230.

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version
N05	9F3074058D3000	PIO	V1.4
N06	840000059F307C	PIO	V1.4

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

3.3. Internal Identification of AE used during the test

AE ID*	Description
AE1	Battery
AE2	Charger
AE3	Charger

AE1

Model	CAB22E0000C1
Manufacturer	BYD
Capacitance	750mAh
Nominal Voltage	3.7V

AE2

Model	CBA3002AG0C2
Manufacturer	Ten Pao

AE3

Model	CBA3002AG0C1
Manufacturer	BYD

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

3.4. Normal Accessory setting

Fully charged battery was used during the test.

3.5. General Description

The Equipment Under Test (EUT) is a model of CDMA 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.

Reference	Title	Version
FCC Part 22	PUBLIC MOBILE SERVICES	10-1-13 Edition
ANSI/TIA-603-C	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2004
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	2003
KDB971168 D01	Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems	2011

5. LABORATORY ENVIRONMENT

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

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

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

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 1 Ω
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×6.7 meters×6.15 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω
Normalised site attenuation (NSA)	< ±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

Items	List	Clause in FCC rules	Verdict
1	Output Power	22.913(a)	P
2	Emission Limit	2.1051/22.917	P
3	Conducted Emission	15.107/207	P
4	Frequency Stability	2.1055	P
5	Occupied Bandwidth	2.1049(h)(i)	P
6	Emission Bandwidth	22.917(b)	P
7	Band Edge Compliance	22.917(b)	P
8	Conducted Spurious Emission	2.1057/22.917	P

7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE
1	Test Receiver	ESCI	100344	R&S	2014-03-28
2	Test Receiver	ESU26	100376	R&S	2014-11-05
3	EMI Antenna	VULB 9163	514	Schwarzbeck	2014-11-10
4	EMI Antenna	3117	00139065	ETS-Lindgren	2014-07-31
5	LISN	ESH2-Z5	829991/012	R&S	2014-04-14
6	Universal Radio Communication Tester	CMU200	102228	R&S	2014-06-23
7	Universal Radio Communication Tester	E5515C	MY48361083	Agilent	2014-03-16
8	Spectrum Analyzer	E4440A	MY48250642	Agilent	2015-02-27
9	EMI Antenna	9117	177	Schwarzbeck	2014-06-29
10	EMI Antenna	VULB 9163	9163 175	Schwarzbeck	2014-07-13
11	EMI Antenna	3117	00119021	ETS-Lindgren	2014-04-19
12	Signal Generator	N5183A	MY49060052	Agilent	2014-03-18
13	Climate chamber	SH-241	92003546	ESPEC	2014-05-11
14	Loop Antenna	HFH2-Z2	829324/007	R&S	2014-12-12

ANNEX A: MEASUREMENT RESULTS

A.1 OUTPUT POWER

A.1.1 Summary

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMU-200) 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.
The power was measured with Rhode & Schwarz Spectrum Analyzer FSU (peak)
These measurements were done at 3 frequencies of CDMA 800(bottom, middle and top of operational frequency range).

CDMA 800

Measurement result

Channel	Frequency(MHz)	Channel power(dBm)
1013	824.70	22.99
384	836.52	23.35
777	848.31	21.90

A.1.3 Radiated

A.1.3.1 Description

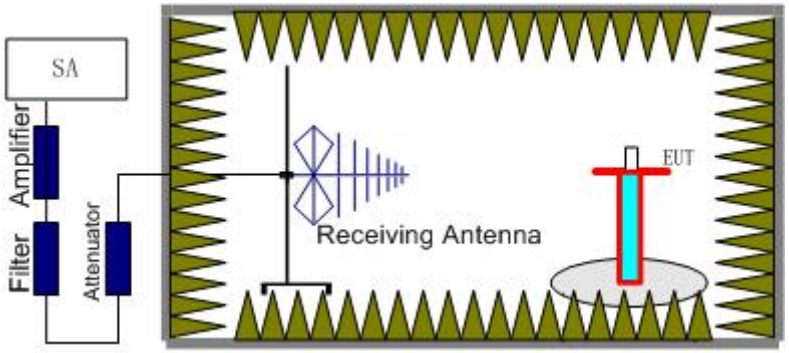
This is the test for the maximum radiated power from the EUT.

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

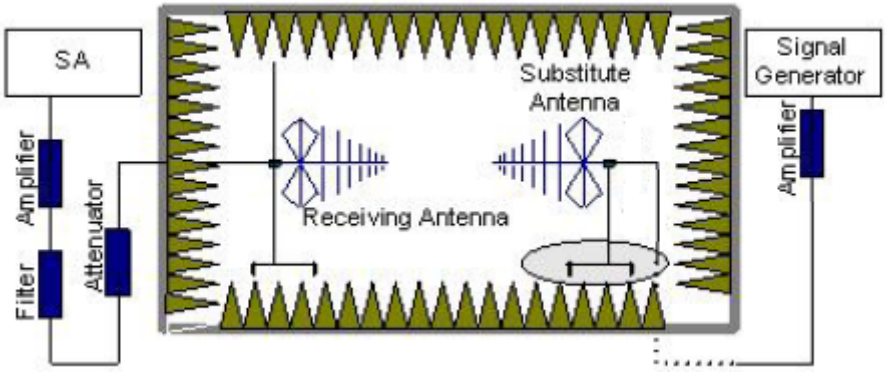
A.1.3.2 Method of Measurement

The measurements procedures in TIA-603C-2004 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 (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. A amplifier should be connected to the Signal Source output port. And the cable should be connect 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:
   Power(EIRP)=P_{Mea} - P_{Ag} - P_{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, ERP = EIRP -2.15dBi.

CDMA 800 -ERP

Limits

	Burst Peak ERP (dBm)
CDMA800	≤38.45dBm (7W)

Measurement result

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Correction (dB)	ERP(dBm)	Polarization
824.70	-25.59	2.07	-53.00	0.84	2.15	22.35	H
836.52	-25.29	2.08	-53.00	0.90	2.15	**22.58**	H
848.31	-27.39	2.09	-53.00	0.95	2.15	20.42	H

Frequency: 836.52MHz

Peak ERP(dBm)= P_{Mea}(-25.29dBm)- P_{cl}(2.08dB)-P_{Ag}(-53.00dB)-G_a (0.90dB)-2.15dB=22.58dBm

ANALYZER SETTINGS: RBW = VBW = 3MHz

A.2 EMISSION LIMIT

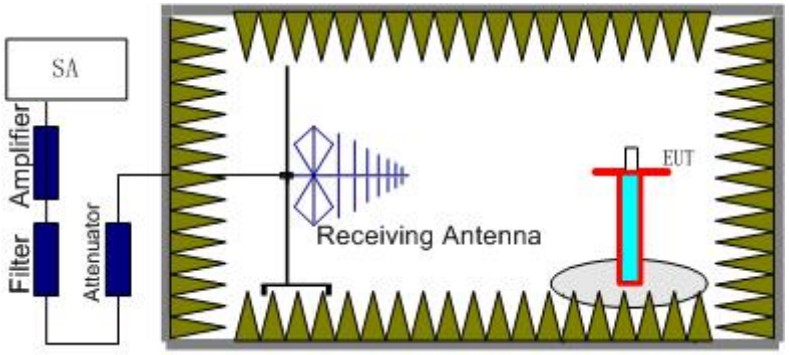
A.2.1 Measurement Method

The measurement procedures in TIA-603C-2004 are used.

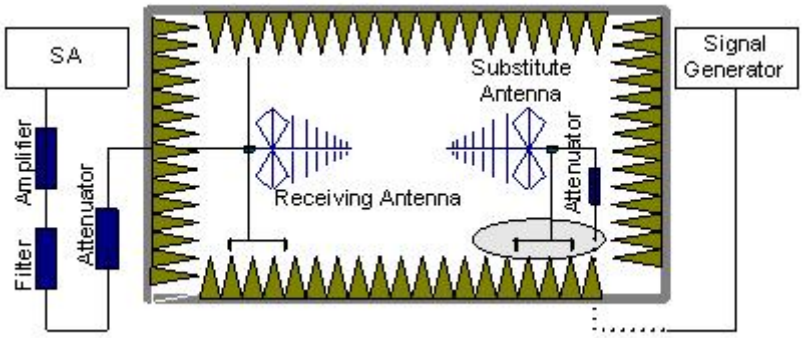
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment. The resolution bandwidth is set as outlined in Part 22.917. The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels 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:
   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 -2.15dBi.

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 CDMA800. 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 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
CDMA800	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)
CDMA800	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 800 Channel 1013/824.7MHz

Frequency(MHz)	P_{Mea}(dBm)	Path Loss	Antenna Gain	Correction (dB)	Peak ERP(dBm)	Limit （dBm）	Polarization
1649.73	-47.78	2.91	-5.44	2.15	-47.40	-13.00	V
3297.52	-45.50	4.22	-7.41	2.15	-44.46	-13.00	H
4123.34	-53.26	4.68	-8.57	2.15	-51.52	-13.00	V
4949.35	-51.66	5.10	-9.61	2.15	-49.30	-13.00	H
5771.48	-54.22	5.68	-10.11	2.15	-51.94	-13.00	H
6597.50	-49.40	6.10	-10.70	2.15	-46.95	-13.00	H

CDMA 800 Channel 384/836.52MHz

Frequency(MHz)	P_{Mea}(dBm)	Path Loss	Antenna Gain	Correction (dB)	Peak ERP(dBm)	Limit （dBm）	Polarization
1672.71	-47.16	2.97	-5.34	2.15	-46.94	-13.00	H
3346.73	-48.65	4.23	-7.53	2.15	-47.50	-13.00	H
4181.65	-52.42	4.68	-8.61	2.15	-50.64	-13.00	V
5020.39	-57.35	5.16	-9.71	2.15	-54.95	-13.00	V
6340.69	-66.63	5.84	-10.47	2.15	-64.15	-13.00	H
6692.16	-51.17	6.12	-10.79	2.15	-48.65	-13.00	H

CDMA 800 Channel 777/848.31MHz

Frequency(MHz)	P_{Mea}(dBm)	Path Loss	Antenna Gain	Correction (dB)	Peak ERP(dBm)	Limit （dBm）	Polarization
1697.12	-51.50	2.95	-5.23	2.15	-51.37	-13.00	H
3392.18	-43.07	4.23	-7.64	2.15	-41.81	-13.00	H
4240.54	-50.20	4.74	-8.64	2.15	-48.45	-13.00	H
5936.67	-56.30	5.52	-10.17	2.15	-53.80	-13.00	H
6786.61	-50.42	6.17	-10.89	2.15	-47.85	-13.00	H
8624.95	-66.58	7.39	-12.30	2.15	-63.82	-13.00	H

A.3 CONDUCTED EMISSION

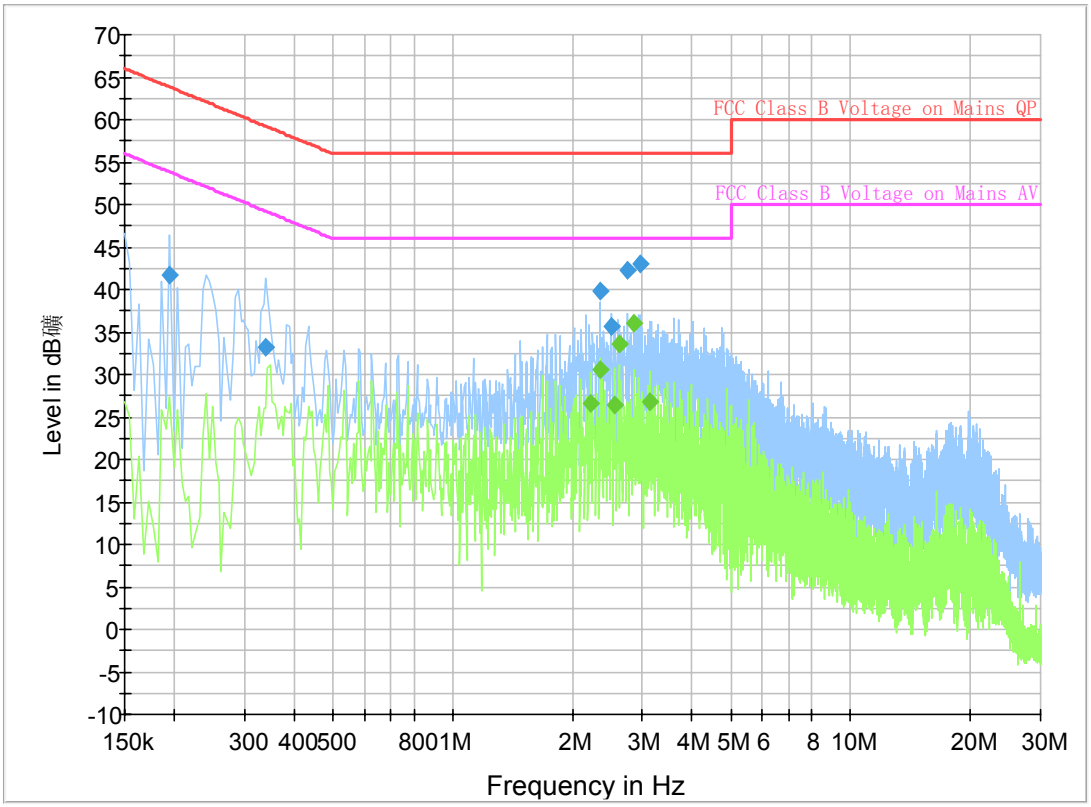
The measurement procedure in ANSI C63.4-1003 is used. Conducted Emission is measured with travel charger.

A.3.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi -Peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50
* Decreases with logarithm of the frequency		

A.3.2 Measurement result

CDMA800-AE2



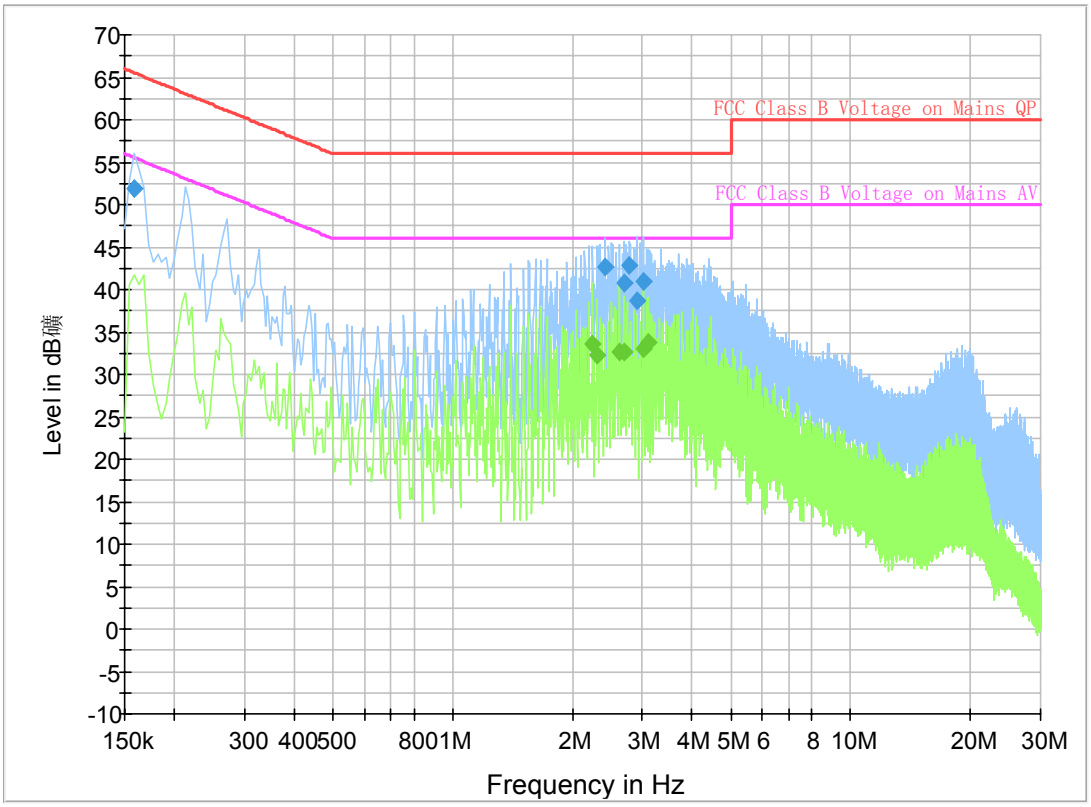
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.195000	41.7	GND	L1	9.8	22.1	63.8
0.339000	33.2	GND	L1	9.8	26.0	59.2
2.355000	39.8	GND	L1	9.7	16.2	56.0
2.503500	35.7	GND	L1	9.7	20.3	56.0
2.746500	42.3	GND	L1	9.7	13.7	56.0
2.953500	43.0	GND	L1	9.7	13.0	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
2.224500	26.5	GND	L1	9.7	19.5	46.0
2.355000	30.6	GND	L1	9.7	15.4	46.0
2.544000	26.3	GND	L1	9.7	19.7	46.0
2.616000	33.7	GND	L1	9.7	12.3	46.0
2.850000	36.0	GND	L1	9.7	10.0	46.0
3.142500	26.9	GND	L1	9.7	19.1	46.0

CDMA800-AE3



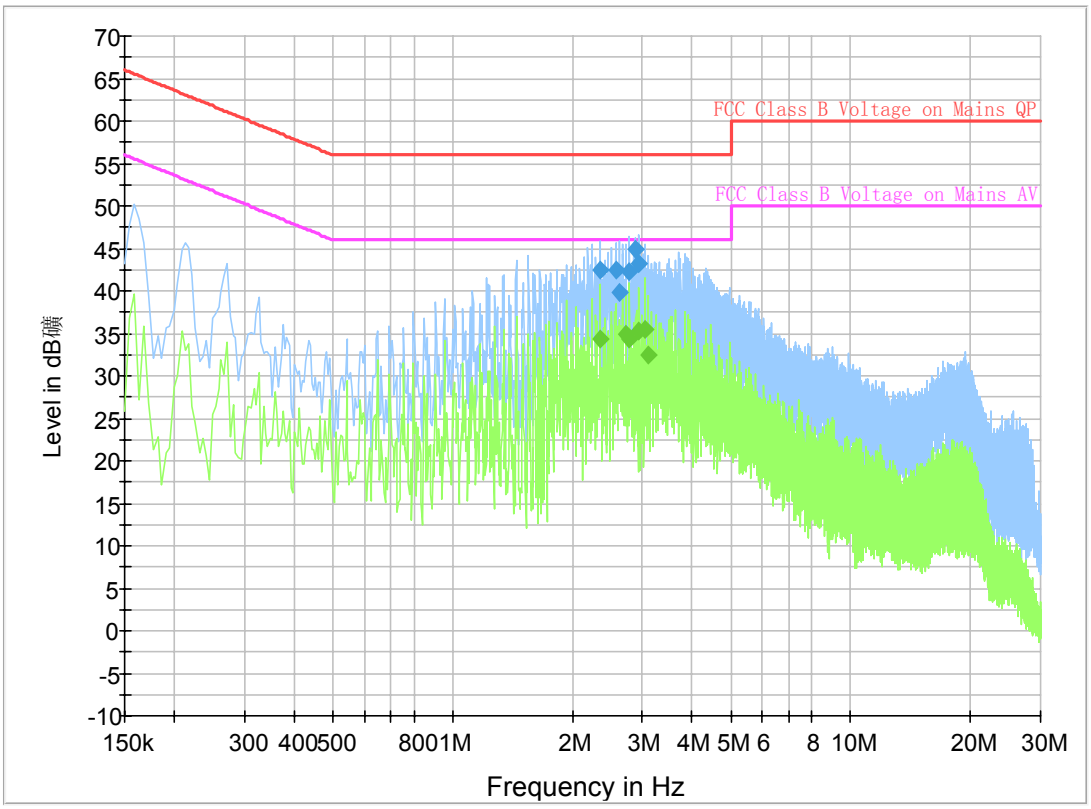
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.159000	52.0	GND	L1	9.8	13.5	65.5
2.409000	42.7	GND	L1	9.7	13.3	56.0
2.688000	40.7	GND	L1	9.7	15.3	56.0
2.787000	42.9	GND	L1	9.7	13.1	56.0
2.904000	38.7	GND	L1	9.7	17.3	56.0
3.007500	40.9	GND	L1	9.7	15.1	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
2.251500	33.6	GND	L1	9.7	12.4	46.0
2.310000	32.2	GND	L1	9.7	13.8	46.0
2.629500	32.6	GND	L1	9.7	13.4	46.0
2.688000	32.6	GND	L1	9.7	13.4	46.0
3.007500	33.0	GND	L1	9.7	13.0	46.0
3.111000	33.7	GND	L1	9.7	12.3	46.0

MP3



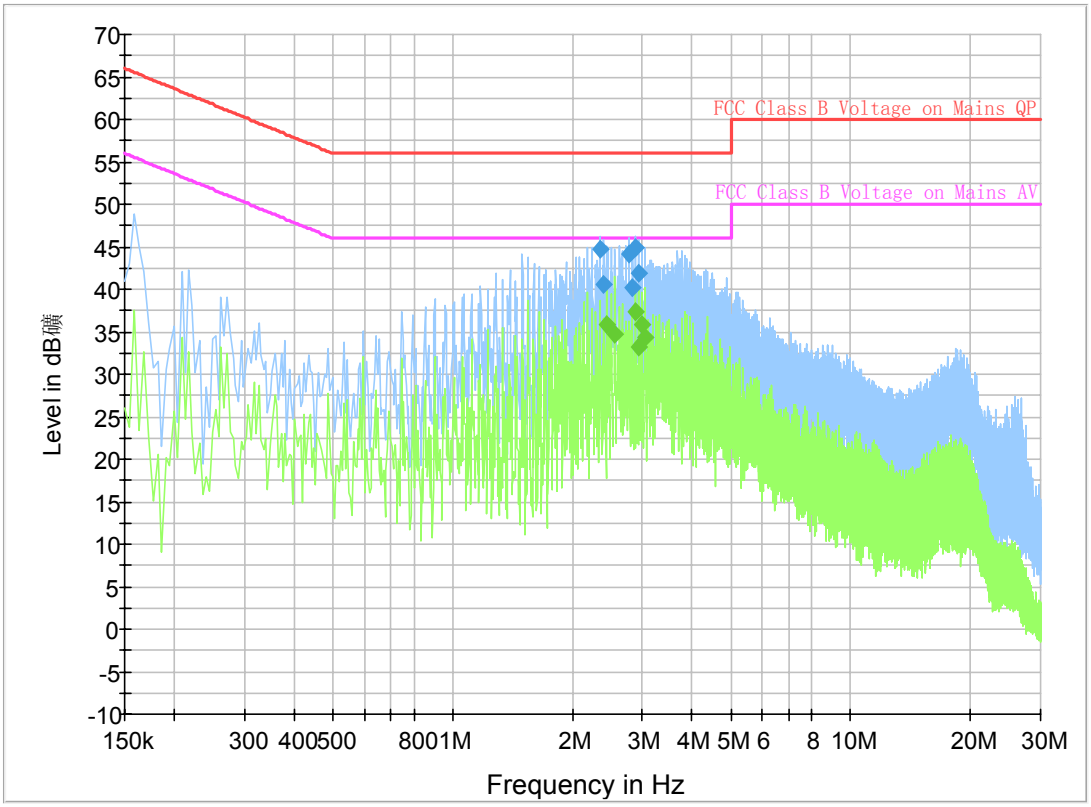
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
2.350500	42.4	GND	L1	9.7	13.6	56.0
2.566500	42.5	GND	L1	9.7	13.5	56.0
2.625000	39.9	GND	L1	9.7	16.1	56.0
2.787000	42.3	GND	L1	9.7	13.7	56.0
2.886000	44.9	GND	L1	9.7	11.1	56.0
2.944500	43.1	GND	L1	9.7	12.9	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
2.350500	34.3	GND	L1	9.7	11.7	46.0
2.728500	34.9	GND	L1	9.7	11.1	46.0
2.787000	34.3	GND	L1	9.7	11.7	46.0
2.944500	35.3	GND	L1	9.7	10.7	46.0
3.048000	35.5	GND	L1	9.7	10.5	46.0
3.106500	32.5	GND	L1	9.7	13.5	46.0

CAMERA



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
2.341500	44.8	GND	L1	9.7	11.2	56.0
2.400000	40.6	GND	L1	9.7	15.4	56.0
2.778000	44.1	GND	L1	9.7	11.9	56.0
2.836500	40.2	GND	L1	9.7	15.8	56.0
2.881500	45.0	GND	L1	9.7	11.0	56.0
2.940000	41.8	GND	L1	9.7	14.2	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
2.445000	35.9	GND	L1	9.7	10.1	46.0
2.562000	34.8	GND	L1	9.7	11.2	46.0
2.881500	37.4	GND	L1	9.7	8.6	46.0
2.940000	33.3	GND	L1	9.7	12.7	46.0
2.985000	35.9	GND	L1	9.7	10.1	46.0
3.043500	34.4	GND	L1	9.7	11.6	46.0

A.4 FREQUENCY STABILITY

A.4.1 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℃.
3. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on mid channel of 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℃ increments from -30℃ to +50℃. 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℃.
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 increments from +50℃ to -30℃. 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℃ during the measurement procedure.

A.4.2 Measurement Limit

A.4.2.1 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. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. 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 3.2VDC and 4.3VDC, with a nominal voltage of 3.7VDC. 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. These voltages represent a tolerance of -10 % and +12.5 %. For the purposes of measuring frequency stability these voltage limits are to be used.

A.4.2.2 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. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. 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.

A.4.3 Measurement results

CDMA 800

Frequency Error vs Voltage

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.2	-3	0.004
3.7	-3	0.004
4.3	-4	0.005

Frequency Error vs Temperature

temperature(℃)	Frequency error(Hz)	Frequency error(ppm)
-30	-4	0.005
-20	-4	0.005
-10	-4	0.005
0	5	0.006
10	5	0.006
20	-4	0.005
30	3	0.004
40	-5	0.006
50	-2	0.002

A.5 OCCUPIED BANDWIDTH

A.5.1 Occupied Bandwidth Results

Similar to conducted emissions; 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 CDMA frequency band. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

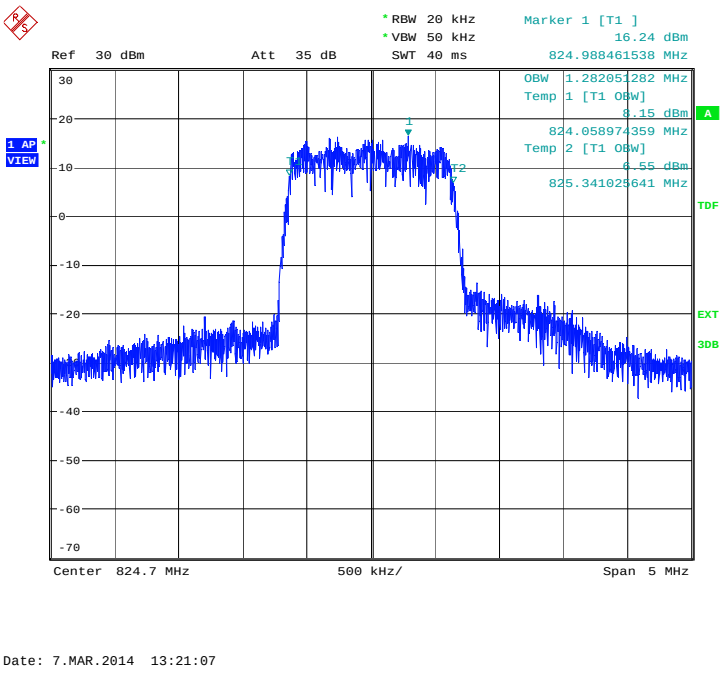
CDMA 800 (99% BW)

Channel	Occupied Bandwidth (99% BW)(MHz)
1013	1.282
384	1.266
777	1.282

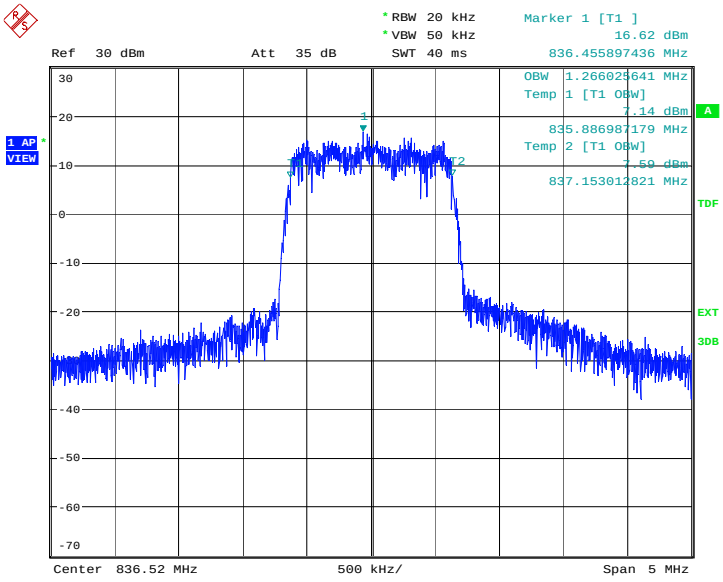
ANALYZER SETTINGS: RBW=20 kHz, VBW=50 kHz

CDMA 800

Channel 1013-Occupied Bandwidth (99% BW)



Channel 384-Occupied Bandwidth (99% BW)



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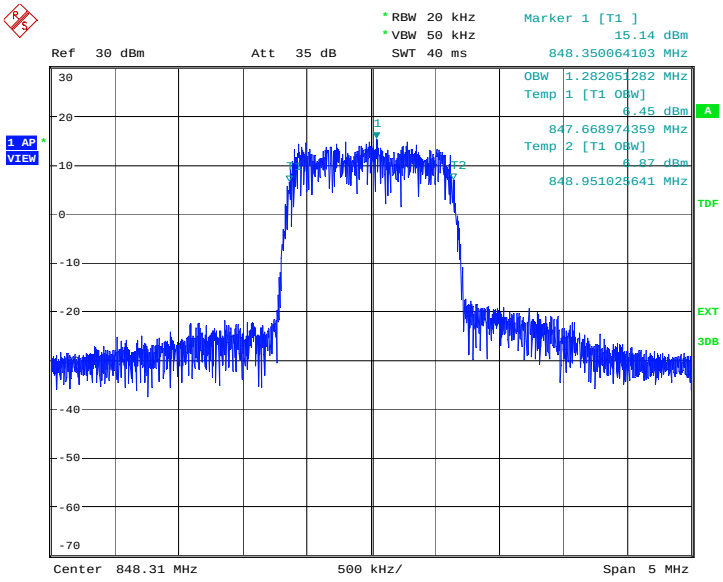
Channel 777-Occupied Bandwidth (99% BW)



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A.6 EMISSION BANDWIDTH

A.6.1Emission Bandwidth Results

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 CDMA frequency band. Table below lists the measured 100% BW. Spectrum analyzer plots are included on the following pages.

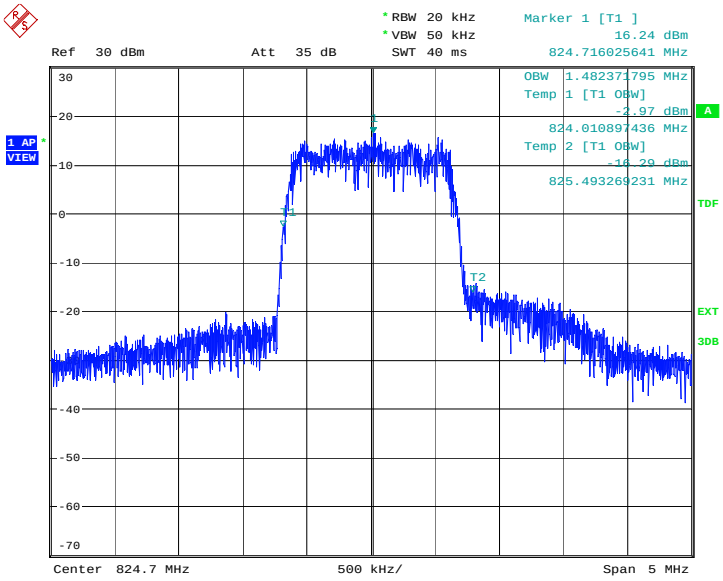
CDMA 800 (100% BW)

Channel	Emission Bandwidth (100% BW)(MHz)
1013	1.482
384	1.378
777	1.378

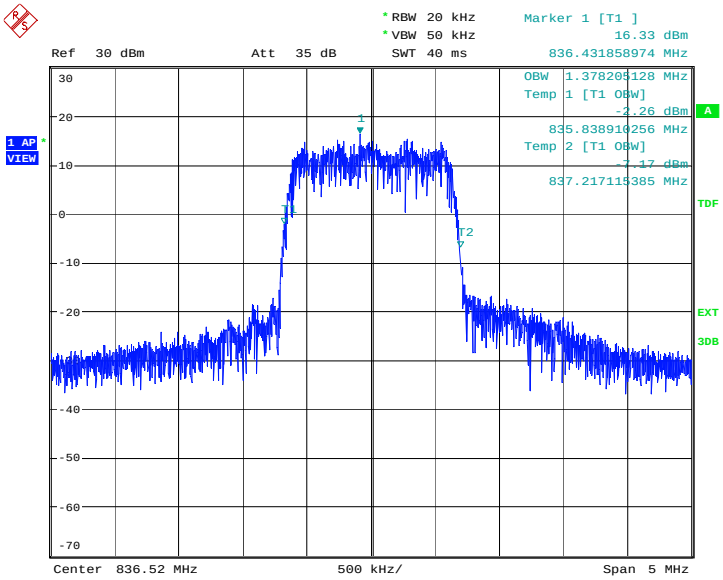
ANALYZER SETTINGS: RBW=20 kHz, VBW=50 kHz

CDMA 800

Channel 1013-Emission Bandwidth (100% BW)



Channel 384-Emission Bandwidth (100% BW)



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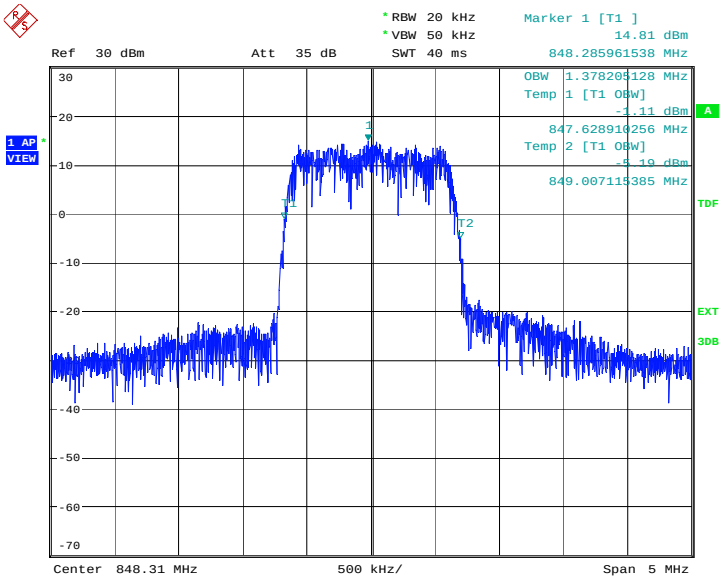
Channel 777-Emission Bandwidth (100% BW)



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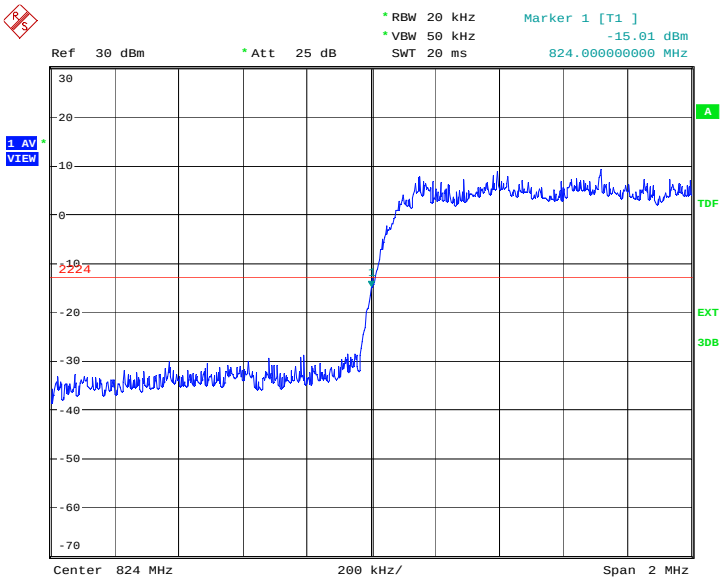
A.7 BAND EDGE COMPLIANCE

CDMA 800

LOW BAND EDGE BLOCK-Channel 1013



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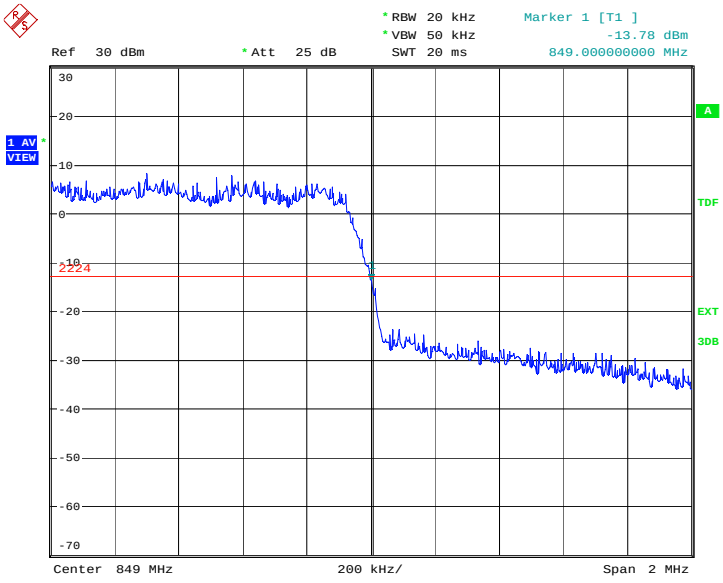
HIGH BAND EDGE BLOCK-Channel 777



Date: 7.MAR.2014 13:54:20

A.8 CONDUCTED SPURIOUS EMISSION

A.8.1 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 CDMA800, data taken from 30 MHz to 10GHz.
2. The sweep time is set automatically by instrument itself. That should be the optimal sweep time for the span and the RBW. If the sweep time is too short, that is sweep is too fast, the sweep result is not accurate; If the sweep time is too long, that is sweep is too low, some frequency components may be lost. The instrument will give a optimal sweep time according the selected span and RBW.
3. The procedure to get the conducted spurious emission is as follows:
   The trace mode is set to MaxHold to get the highest signal at each frequency;
   Wait 25 seconds;
   Get the result.
4. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

CDMA 800 Transmitter

Channel	Frequency (MHz)
1013	824.70
384	836.52
777	848.31

A. 8.2 Measurement Limit

Part 24.238 and 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.

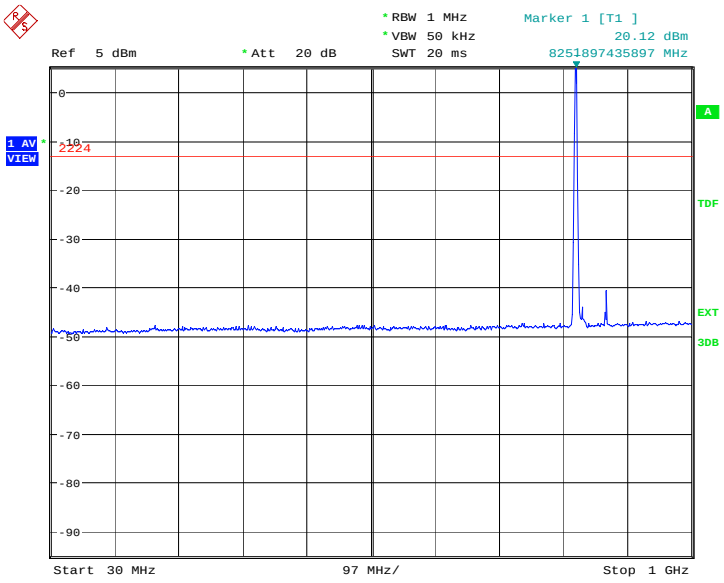
A.8.3 Measurement result

CDMA 800

A. 8.3.1 Channel 1013: 30MHz –1GHz

Spurious emission limit –13dBm.

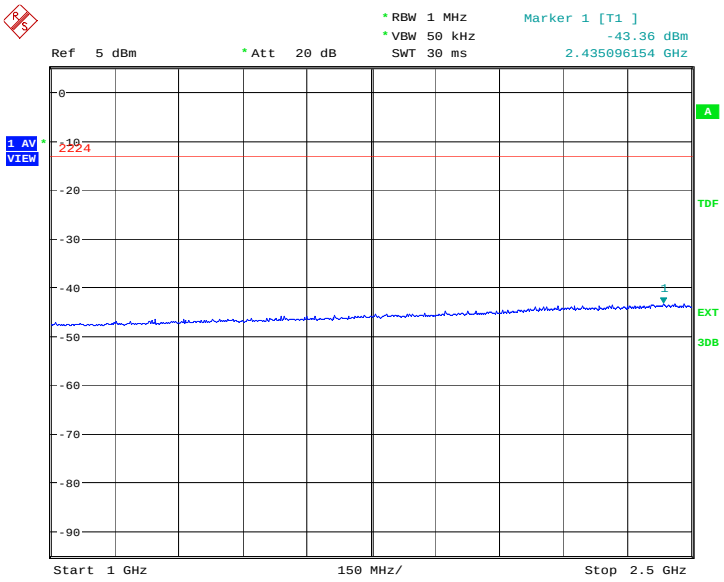
NOTE: peak above the limit line is the carrier frequency.



Date: 7.MAR.2014 13:25:08

A. 8.3.2 Channel 1013: 1GHz – 2.5GHz

Spurious emission limit –13dBm.

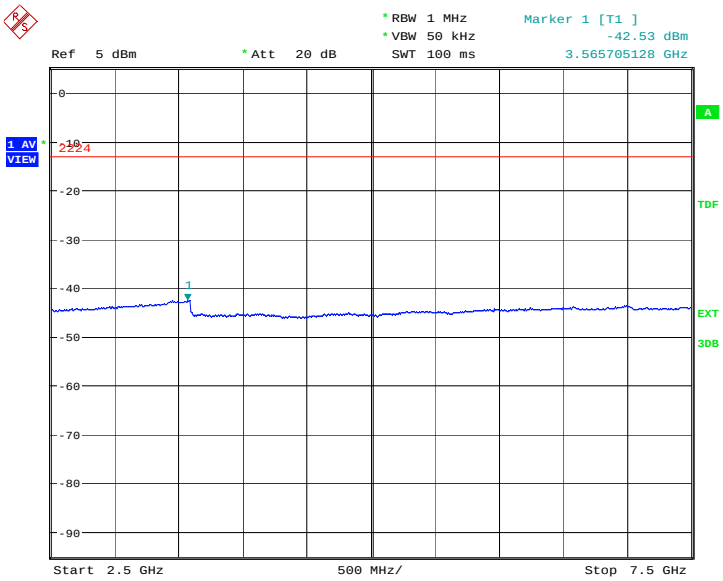


Date: 7.MAR.2014 13:25:35

A. 8.3.3 Channel 1013: 2.5GHz –7.5GHz

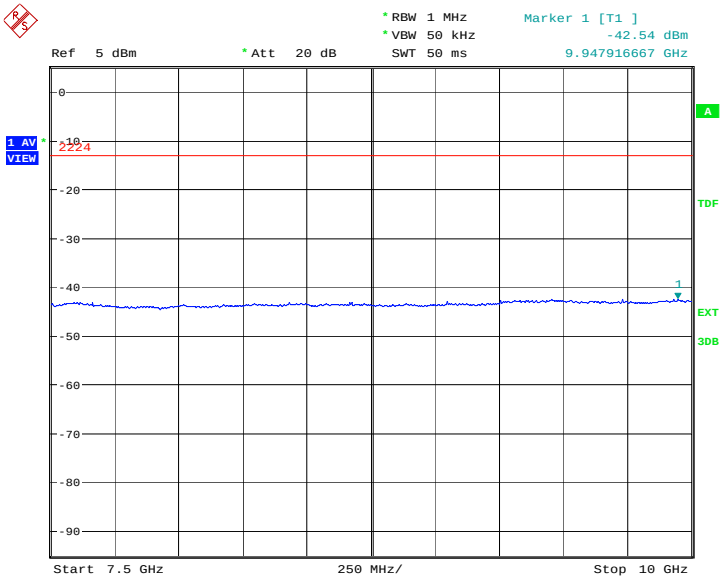
Spurious emission limit –13dBm.

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



A. 8.3.4 Channel 1013: 7.5GHz – 10GHz

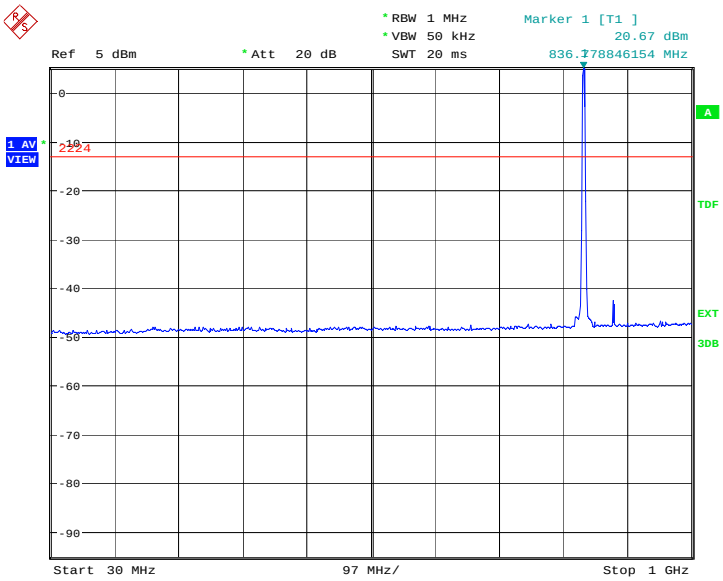
Spurious emission limit –13dBm.



A. 8.3.5 Channel 384: 30MHz –1GHz

Spurious emission limit –13dBm.

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



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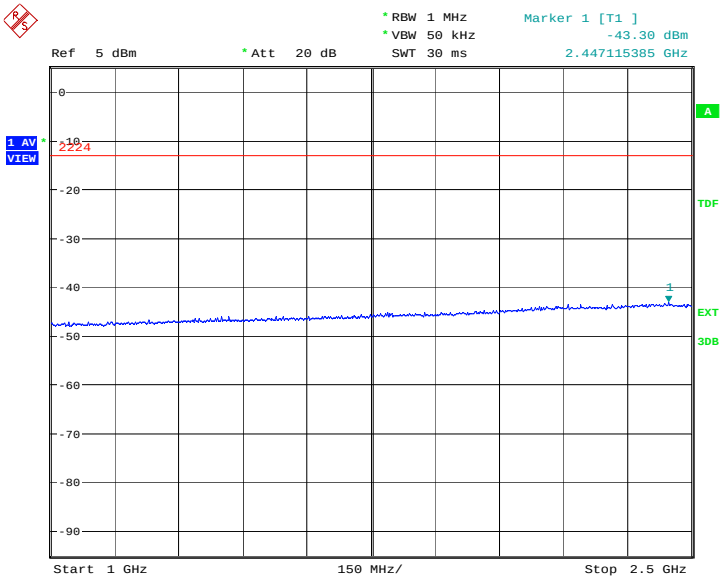
A.8.3.6 Channel 384: 1GHz – 2.5GHz

Spurious emission limit –13dBm.



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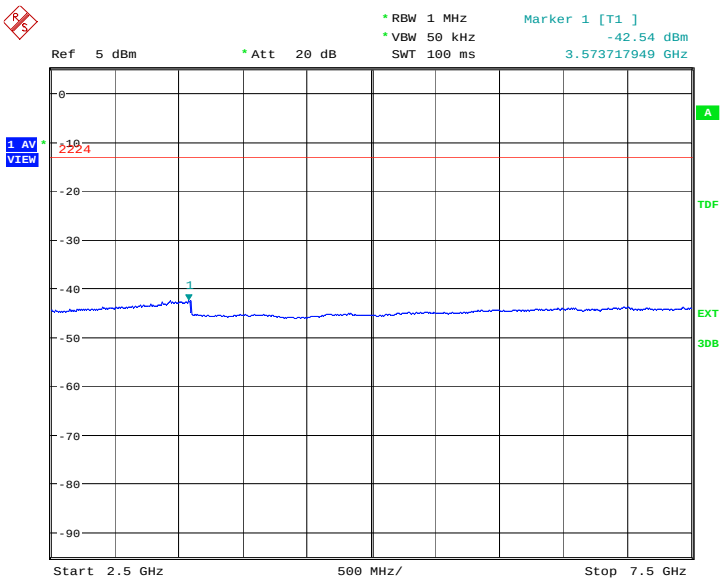
A. 8.3.7 Channel 384: 2.5GHz –7.5GHz

Spurious emission limit –13dBm.



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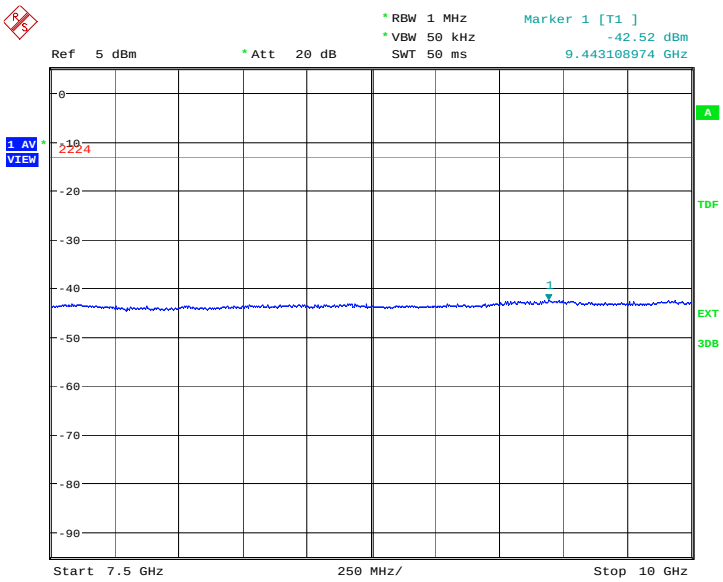
A. 8.3.8 Channel 384: 7.5GHz – 10GHz

Spurious emission limit –13dBm.

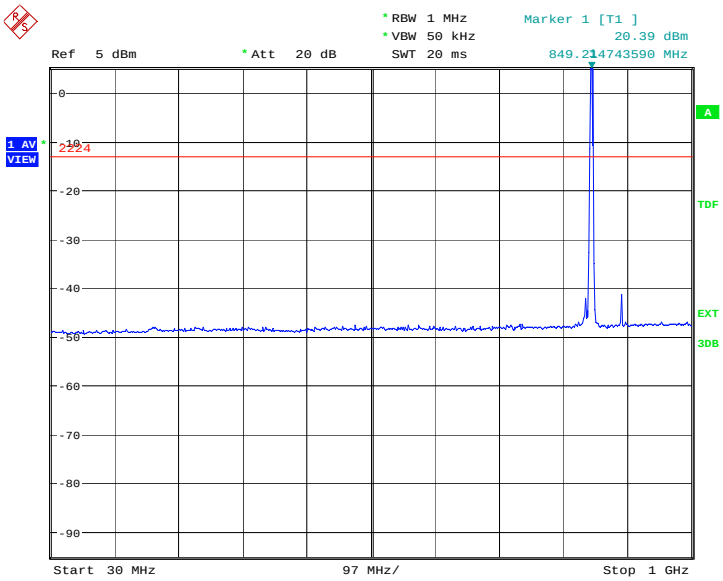


Date: 7.MAR.2014 13:28:16

A. 8.3.9 Channel 777: 30MHz –1GHz

Spurious emission limit –13dBm.

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



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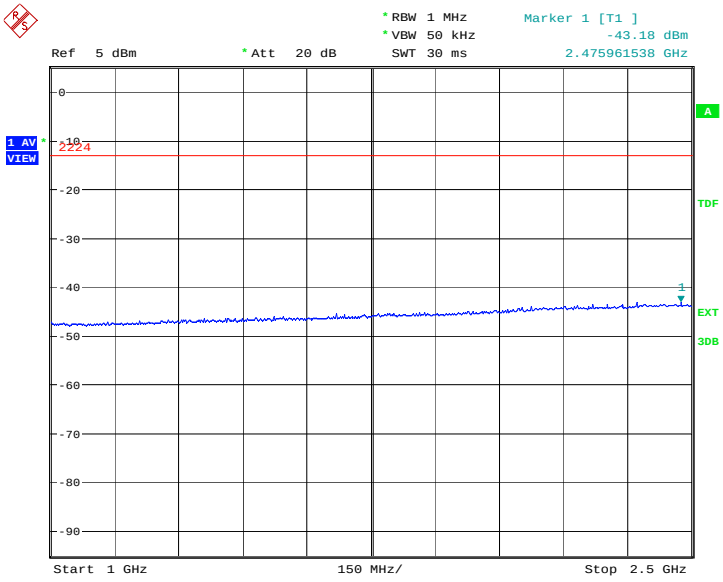
A. 8.3.10 Channel 777: 1GHz – 2.5GHz

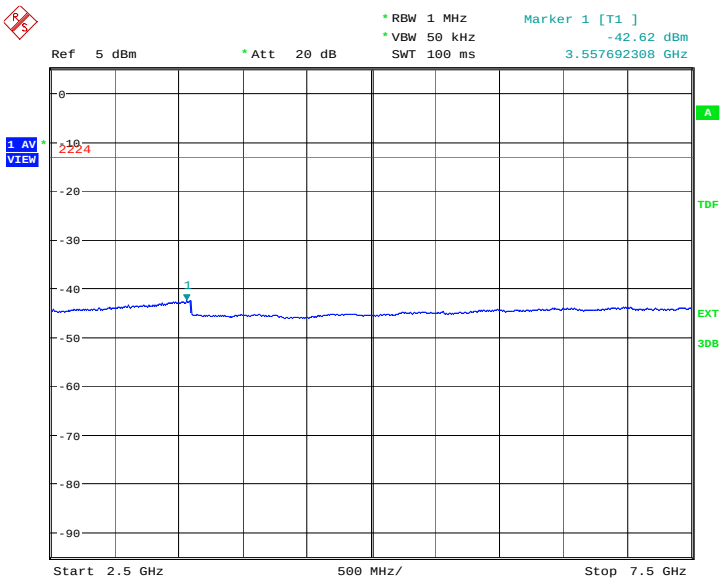
Spurious emission limit –13dBm.



Date: 7.MAR.2014 13:29:10

A. 8.3.11 Channel 777: 2.5GHz –7.5GHz

Spurious emission limit –13dBm.



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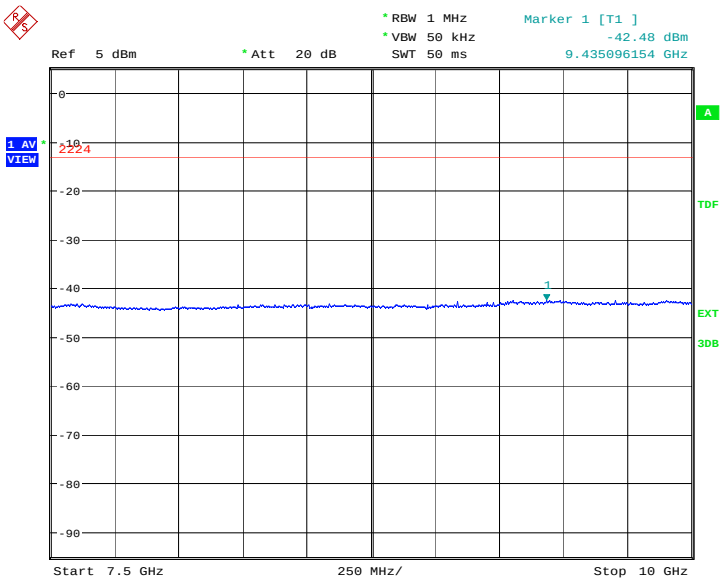
A. 8.3.12 Channel 777: 7.5GHz – 10GHz

Spurious emission limit –13dBm.



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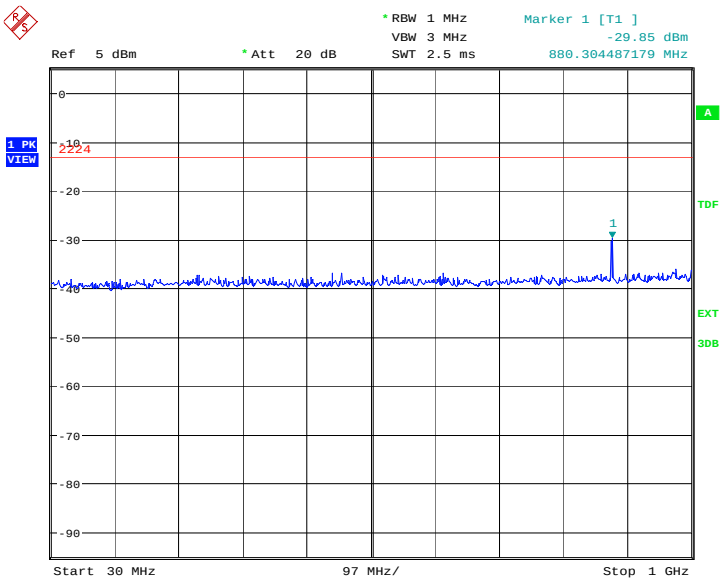
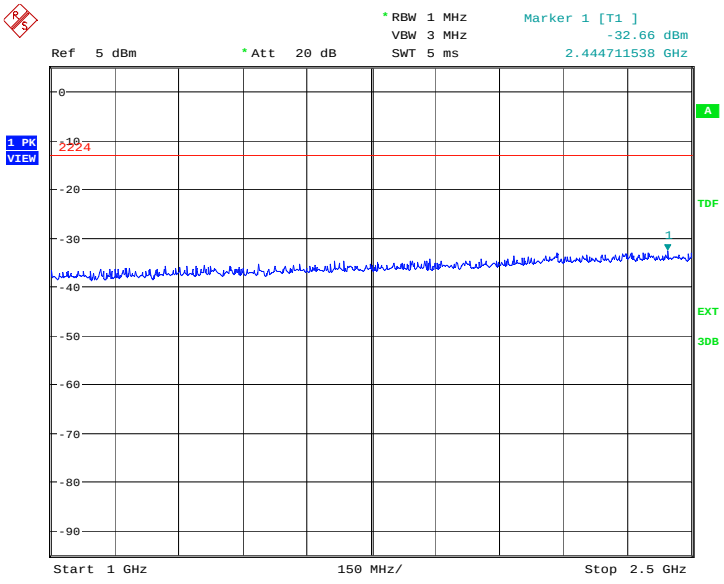
A. 8.3.13 Idle mode: 30MHz – 1GHz

Spurious emission limit -13dBm.



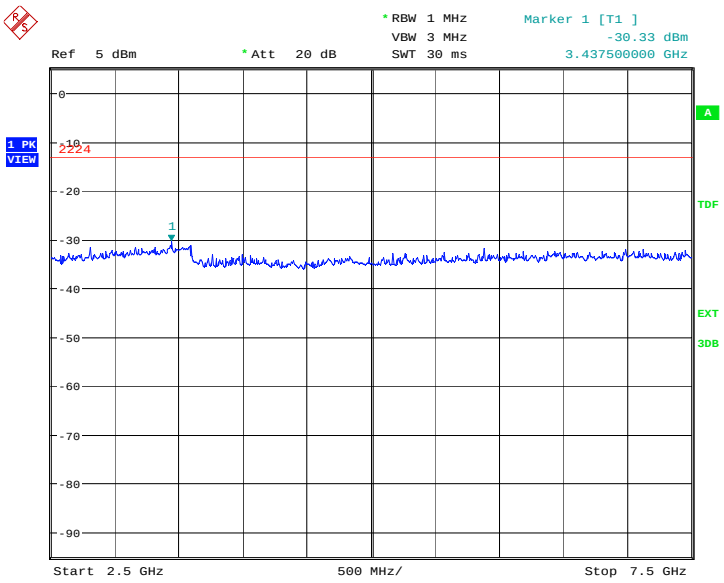
A.8.3.14 Idle mode: 1GHz – 2.5GHz

Spurious emission limit -13dBm.



A.8.3.15 Idle mode: 2.5GHz – 7.5GHz

Spurious emission limit -13dBm.



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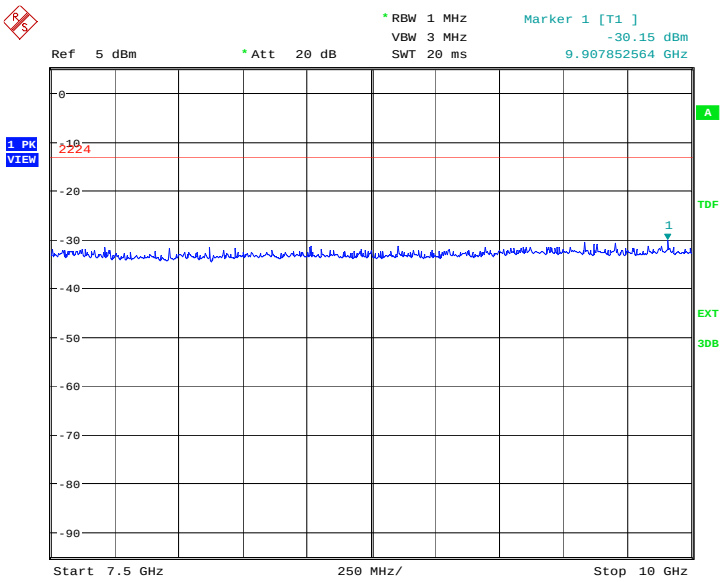
A.8.3.16 Idle mode: 7.5GHz – 10GHz

Spurious emission limit -13dBm.



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