TEST REPORT

No. I17N00068-WCDMA

for

Power Idea Technology (Shenzhen) Co., Ltd.

TD-LTE digital mobile phone

Model Name: RG730

IC: 11113A-RG730

with

Hardware Version: 1.04

Software Version: RG730_US_25_V1.01_V02W_20161205

Issued Date: 2017-03-06

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 CTTL.

Test Laboratory:

IC O.A.T.S listed: No.21856

CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I17N00068-WCDMA	Rev.0	1st edition	2017-03-06

NOTE: All the original values of this report quoted directly from No.I17N00067.

CONTENTS

1. Test Laboratory

1.1. Testing Location

Company Name:	CTTL ShenZhen,Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT
Address:	TCL International E city No. 1001 Zhongshanyuan Road, Nanshan District, Shenzhen, Guangdong, China
Postal Code:	518048
Telephone:	+86(755)33322000
Fax:	+86(755)33322000

1.2. Testing Environment

Normal Temperature:	15-35℃
Relative Humidity:	20-75%
Air pressure	980 - 1040 hPa

The climatic requirements above are general exclude the special requirements for dedicated test environments listed in section 5 and some specific test cases in other parts of this report.

1.3. Project data

Testing Start Date:	2017-01-19
Testing End Date:	2017-02-28

1.4. Signature

Lai Minghua
(Prepared this test report)

Yang Zi'an
(Reviewed this test report)

Zhang Bojun
Deputy Director of the laboratory
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	Power Idea Technology (Shenzhen) Co., Ltd.
Address /Post:	4th Floor, A Section, Languang Science&technology Building, No.7 Xinxi RD, Hi-Tech Industrial Park North, Nanshan District, ShenZhen, P.R.C.
Contact Person:	alex.ma
Contact Email	alex.ma@pwidea.com
Telephone:	0086-0755-86220211
Fax:	/

2.2. Manufacturer Information

Company Name:	Power Idea Technology (Shenzhen) Co., Ltd.
Address /Post:	4th Floor, A Section, Languang Science&technology Building, No.7 Xinxi RD, Hi-Tech Industrial Park North, Nanshan District, ShenZhen, P.R.C.
Contact Person:	alex.ma
Contact Email	alex.ma@pwidea.com
Telephone:	0086-0755-86220211
Fax:	/

3. Equipment UnderTest (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	TD-LTE digital mobile phone
Model Name	RG730
IC	11113A-RG730
Antenna	Integrated
RF power setting in TEST SW	RG730_US_25_V1.01_V02W_20161205
Extreme vol. Limits	3.6VDC to 4.2VDC (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 CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version	Sample Arrival Date
S01	867453021949725	1.04	RG730_US_25_V1.01 _V02W_20161205	2017-01-19

*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

AE1

Model	Li-ion Rechargeable Battery
Manufacturer	Springpower Technology (Shenzhen) Co., LTD
Capacitance	3020mAh

AE2

Model	HKC0055010-2D
Manufacturer	SHENZHEN HUNTKEY ELECTRIC 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.

Reference	Title	Version
RSS-Gen	RSS-Gen —General Requirements for Compliance of Radio Apparatus	Issue 4
RSS-132	Cellular Telephones Employing New Technologies Operating in the Bands 824-849 MHz and 869-894 MHz	Issue 3
RSS-133	2 GHz Personal Communications Services	Issue 6
ANSI/TIA-603-D	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2010
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	MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS	v02r02
ANSI C63.26	American National Standard of Procedures for Compliance Testing of Licensed Transmitters Used in Licensed Radio Service	2015

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 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 ˚C, Max. = 30 ˚C
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 ˚C, Max. = 30 ˚C
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

WCDMA Band II

Items	Test Name	Clause in IC rules RSS-Gen and RSS- 133	Verdict
1	Output Power	6.4	P
2	Emission Limit	6.5	P
3	Frequency Stability	6.3	P
4	Occupied Bandwidth	6.6	P
5	Emission Bandwidth	6.6	P
6	Band Edge Compliance	6.5	P
7	Conducted Spurious Emission	6.6	P
8	PEAK-TO-AVERAGE POWER RATIO	6.4	P

WCDMA Band V

Items	Test Name	Clause in IC rules RSS-Gen and RSS-132	Verdict
1	Output Power	5.4	P
2	Emission Limit	5.5	P
3	Frequency Stability	5.3	P
4	Occupied Bandwidth	6.6	P
5	Emission Bandwidth	6.6	P
6	Band Edge Compliance	5.5	P
7	Conducted Spurious Emission	6.6	P
8	PEAK-TO-AVERAGE POWER RATIO	5.4	P

Receiver Radiated Emission

Items	Test Name	Clause in IC rules		Verdict
		RSS-132	RSS-133	
9	Receiver Radiated Emissions	4.6	6.6	P

TestEquipments Utilized

NO.	Description	TYPE	Manufacture	series number	CAL DUE DATE
1	Test Receiver	ESR7	R&S	101675	2017-07-21
2	BiLog Antenna	VULB9163	Schwarzbeck	9163 330	2017-04-22
3	Horn Antenna	3117	ETS-Lindgren	00066585	2019-03-05
4	Antenna	SBA 9113	814	Schwarzbeck	/
5	Antenna	SBA 9112	302	Schwarzbeck	/
6	Antenna	3160-09	LM4750/00118388	ETS-Lindgren	2018.07.14
7	preamplifier	83017A	MY39501110	Agilent	/
8	Signal Generator	SMR40	R&S	100541	2017-06-27
9	Fully Anechoic Chamber	FACT5-2.0	ETS-Lindgren	4166	2018-05-13
10	Spectrum Analyzer	FSP40	R&S	100378	2017-12-15
11	Universal Radio Communication Tester	CMU200	R&S	114544	2017-09-09
12	Universal Radio Communication Tester	CMU200	R&S	123210	2017-12-25
13	Spectrum Analyzer	FSU	R&S	200679	2017-12-25
14	Temperature Chamber	SH-241	ESPECs	92007516	2017-11-29
15	DC Power Supply	U3606A	Agilent Technologies	MY50450012	2017-11-22

Test software

Item	Name	Vesion
Radiated	EMC32	Version 10.01.00

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.

These measurements were done at 3 frequencies, 1852.4 MHz, 1880.0MHz and 1907.6MHz for WCDMA Band II;826.4MHz, 836.6MHz and 846.6MHz for WCDMA Band V(bottom, middle and top of operational frequency range).

WCDMA Band II

Measurement result

QPSK

	CH	Frequency(MHz)	output power(dBm)
WCDMA (Band II)	9262	1852.4	22.59
	9400	1880.0	22.97
	9538	1907.6	22.63

WCDMA Band V

Measurement result

QPSK

	CH	Frequency(MHz)	output power(dBm)
WCDMA (Band V)	4132	826.4	22.91
	4183	836.6	22.89
	4233	846.6	23.39

A.1.3 Radiated

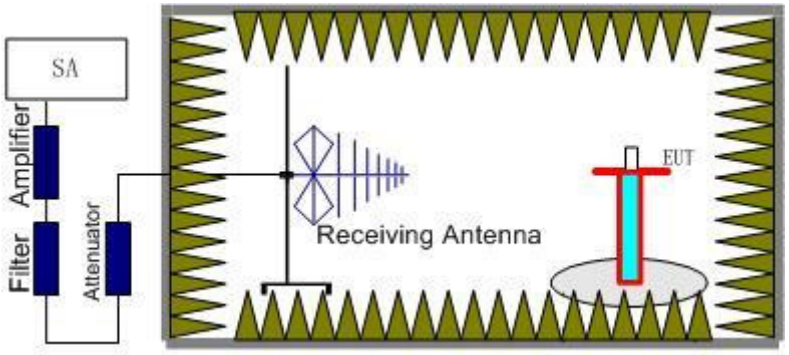
A.1.3.1 Description

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

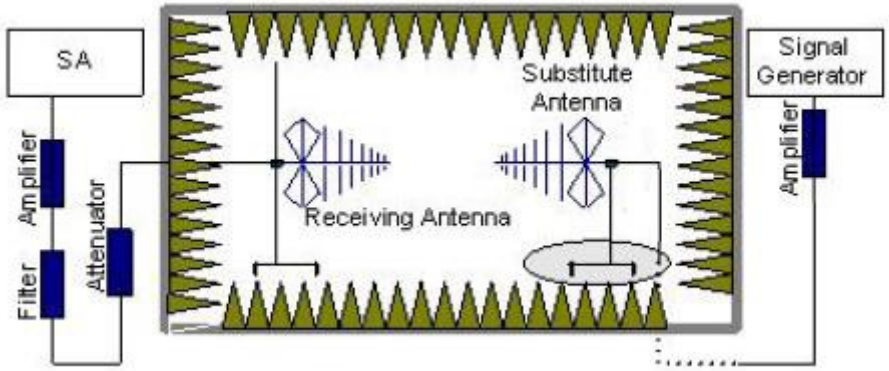
A.1.3.2 Method of Measurement

The measurements procedures in TIA-603-D-2010 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 EUTthrough 360°and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequenciesin 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, ansubstitution 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 thesignal generator output until the value of the receiver reach thepreviously 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.

WCDMA Band II-EIRP

Limits

	Burst Peak EIRP (dBm)
WCDMA Band II	≤33dBm (2W)

Measurement result

QPSK

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)+ P_{Ag}(dB)	G_a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1852.40	-7.10	-29.40	0.15	22.45	33.00	H
1880.00	-6.80	-29.30	0.25	22.75	33.00	H
1907.60	**-5.81**	**-29.30**	**0.35**	**23.84**	**33.00**	**H**

Frequency**:** 1907.6MHz

Peak EIRP(dBm)= P_{Mea}(-5.81dBm)-（P_{cl}+P_{Ag}）(-29.30dB)+G_a (0.35dB) =23.84dBm

ANALYZER SETTINGS: RBW = VBW = 5MHz

WCDMA Band V-ERP

Limits

	Burst Peak ERP (dBm)
WCDMA Band V	≤38.45dBm

Measurement result

QPSK

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)+ P_{Ag}(dB)	G_a Antenna Gain(dB)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
826.40	-10.82	-33.60	0.28	2.15	20.91	40.61	H
836.60	-9.86	-33.50	0.25	2.15	21.74	40.61	H
846.60	**-9.68**	**-33.50**	**0.21**	**2.15**	**21.88**	**40.61**	**H**

Frequency**:** 846.60MHz

Peak ERP(dBm)= P_{Mea}(-9.68dBm)-（P_{cl}+P_{Ag}）(-33.50dB)+G_a (0.21dB)-2.15dB=21.88dBm

ANALYZER SETTINGS: RBW = VBW = 5MHz

A.2 EMISSION LIMIT

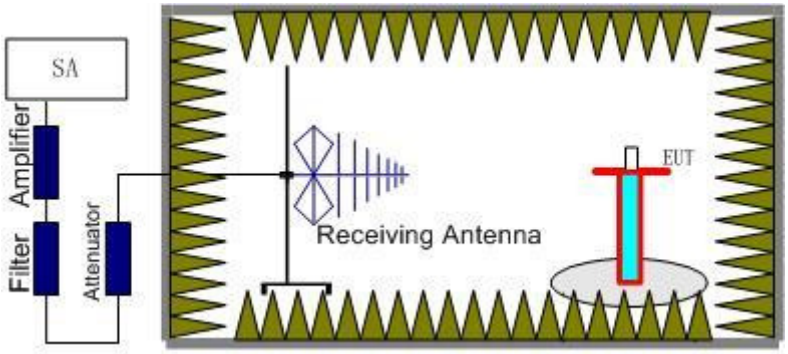
A.2.1 Measurement Method

The measurements procedures in TIA-603-D-2010 are used.

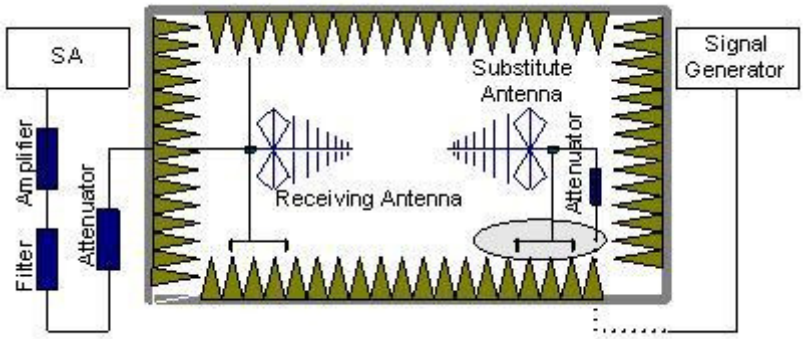
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of WCDMA Band II, WCDMA Band V and WCDMA Band IV.

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 EUTthrough 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, ansubstitution 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 thesignal generator output until the value of the

receiver reach thepreviously 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

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 WCDMA Band II (1852.4 MHz, 1880.0MHz and 1907.6MHz),WCDMA Band V(826.4MHz, 836.6MHz and 846.6MHz). 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 WCDMA Band II,WCDMA Band V 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
WCDMA Band V	Low	30MHz-10GHz	Pass
	Middle	30MHz-10GHz	Pass
	High	30MHz-10GHz	Pass
WCDMA Band II	Low	30MHz-20GHz	Pass
	Middle	30MHz-20GHz	Pass
	High	30MHz-20GHz	Pass

A.2.5 Sweep Table

Working Frequency	Subrange (GHz)	RBW	VBW	Sweep time (s)
WCDMA Band V	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
WCDMA Band II	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
	8~11	1 MHz	3 MHz	3
	11~14	1 MHz	3 MHz	3
	14~18	1 MHz	3 MHz	3
	18~20	1 MHz	3 MHz	2

WCDMA BAND II Mode Channel 9262/1852.4MHz（QPSK）

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain	Peak EIRP(dBm)	Limit（dBm）	Polarization
16799.06	-33.90	2.90	-0.26	-37.06	-13.00	V
17291.91	-33.66	2.90	-1.01	-37.57	-13.00	H
17445.47	-33.28	3.20	-1.08	-37.56	-13.00	H
17604.94	-32.95	3.20	-1.01	-37.16	-13.00	H
17795.91	-32.81	3.20	-0.75	-36.76	-13.00	V
17922.56	-31.48	3.20	-0.64	-35.32	-13.00	H

WCDMA BAND II Mode Channel 9400/1880MHz（QPSK）

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain	Peak EIRP(dBm)	Limit（dBm）	Polarization
5636.63	-31.18	1.30	-2.54	-35.02	-13.00	H
16725.56	-34.29	2.90	-0.26	-37.45	-13.00	H
17203.97	-33.93	2.90	-1.01	-37.84	-13.00	H
17416.59	-33.40	3.20	-1.08	-37.68	-13.00	H
17831.34	-33.32	3.20	-0.84	-37.36	-13.00	H
17925.19	-32.56	3.20	-0.64	-36.40	-13.00	H

WCDMA BAND II Mode Channel 9538/1907.6MHz（QPSK）

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain	Peak EIRP(dBm)	Limit（dBm）	Polarization
5720.63	-28.43	1.50	-2.73	-32.66	-13.00	V
16817.44	-33.77	2.90	-0.26	-36.93	-13.00	H
17298.47	-34.18	2.90	-1.01	-38.09	-13.00	H
17423.81	-32.00	3.20	-1.08	-36.28	-13.00	H
17791.97	-33.72	3.20	-0.75	-37.67	-13.00	H
17923.88	-32.02	3.20	-0.64	-35.86	-13.00	H

WCDMA BAND V Mode Channel 4132/826.4MHz（QPSK）

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain	Peak EIRP(dBm)	Limit（dBm）	Polarization
6748.00	-41.47	1.80	-2.82	-48.24	-13.00	V
7001.00	-41.38	1.80	-2.85	-48.18	-13.00	V
7077.50	-41.79	1.80	-2.85	-48.59	-13.00	V
7350.00	-41.18	1.80	-2.65	-47.78	-13.00	V
8625.50	-42.56	2.00	-1.64	-48.35	-13.00	V
8680.00	-42.49	2.00	-1.64	-48.28	-13.00	V

WCDMA BAND V Mode Channel 4183/836.6MHz（QPSK）

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain	Peak EIRP(dBm)	Limit（dBm）	Polarization
7126.50	-41.46	1.80	-2.77	-48.18	-13.00	H
7585.50	-41.43	1.80	-2.57	-47.95	-13.00	V
8053.50	-41.72	1.80	-2.18	-47.85	-13.00	H
8558.00	-41.91	2.00	-1.77	-47.83	-13.00	V
9120.00	-42.76	2.10	-1.36	-48.37	-13.00	V
9359.00	-42.50	2.10	-1.12	-47.87	-13.00	V

WCDMA BAND V Mode Channel 4233/846.6MHz（QPSK）

Frequency(MHz)	P_{Mea}(dBm)	Path loss	Antenna Gain	Peak EIRP(dBm)	Limit（dBm）	Polarization
8163.00	-41.80	1.80	-2.15	-47.90	-13.00	H
8253.50	-42.45	1.80	-1.90	-48.30	-13.00	V
8354.50	-42.13	1.80	-2.04	-48.12	-13.00	H
8518.00	-42.24	2.00	-1.77	-48.16	-13.00	V
8596.50	-42.08	2.00	-1.77	-48.00	-13.00	V
9012.50	-42.20	2.10	-1.42	-47.87	-13.00	H

A.3 FREQUENCY STABILITY

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℃.
3. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on mid channel of WCDMA Band II, WCDMA Band V, 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.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" 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 3.6VDC and 4.2VDC, 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. For the purposes of measuring frequency stability these voltage limits are to be used.

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.

A.3.3 Measurement results

WCDMA Band II

Frequency Error vs Voltage-QPSK

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.6	33	0.039
3.7	8	0.010
4.2	2	0.002

Frequency Error vs Temperature-QPSK

temperature(℃)	Frequency error(Hz)	Frequency error(ppm)
-30	14	0.017
-20	35	0.042
-10	28	0.033
0	19	0.023
10	7	0.008
20	5	0.006
30	11	0.013
40	27	0.032
50	13	0.016

WCDMA Band V

Frequency Error vs Voltage-QPSK

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.6	14	0.007
3.7	7	0.004
4.2	9	0.005

Frequency Error vs Temperature-QPSK

temperature(℃)	Frequency error(Hz)	Frequency error(ppm)
-30	35	0.019
-20	26	0.014
-10	15	0.008
0	8	0.004
10	17	0.009
20	11	0.006
30	25	0.013
40	26	0.014
50	38	0.020

A.4 OCCUPIED BANDWIDTH

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/PCS frequency bands. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

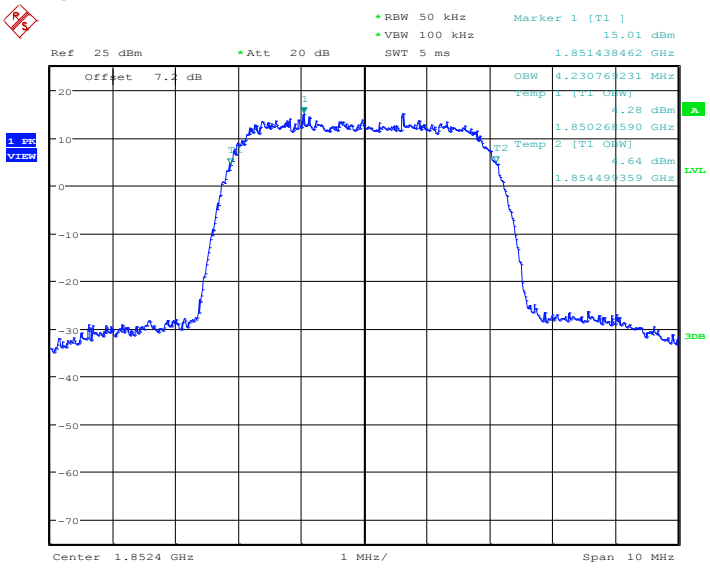
The measurement method of IC is from RSS-GEN 6.6:

The transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.

Note: Video averaging is not permitted. A peak, or peak hold, may be used in place of the sampling detector as this may produce a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold may be necessary to determine the occupied bandwidth if the device is not transmitting continuously. The trace data points are recovered and are directly summed in linear power level 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 and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the 99% occupied bandwidth.

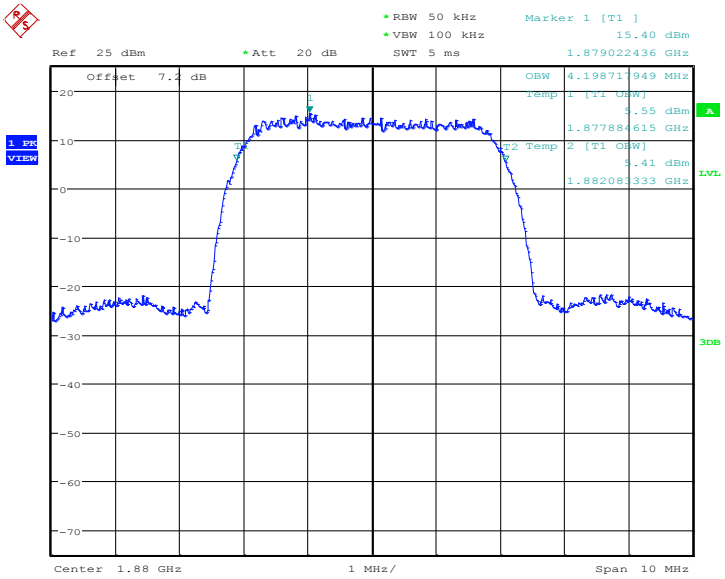
WCDMA Band Ⅱ

Channel 9262-Occupied Bandwidth (99% BW)-QPSK



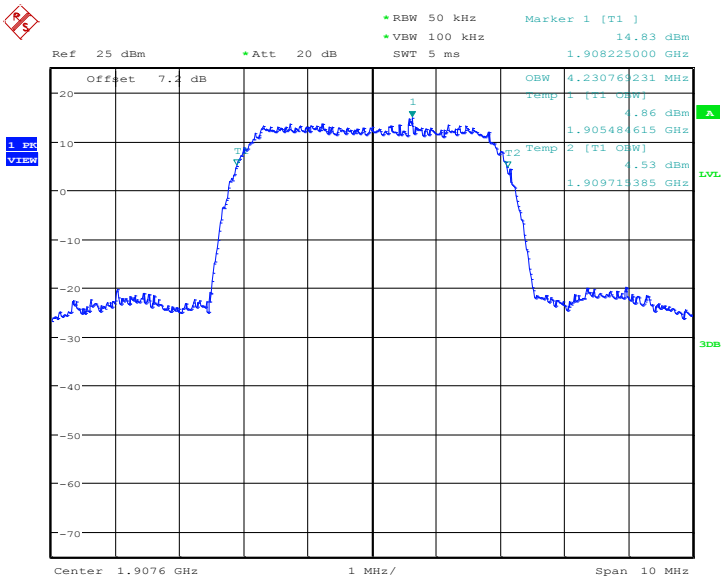
Date: 21.JAN.2017 05:36:14

Channel 9400-Occupied Bandwidth (99% BW)-QPSK



Date: 21.JAN.2017 05:38:28

Channel 9538-Occupied Bandwidth (99% BW)-QPSK



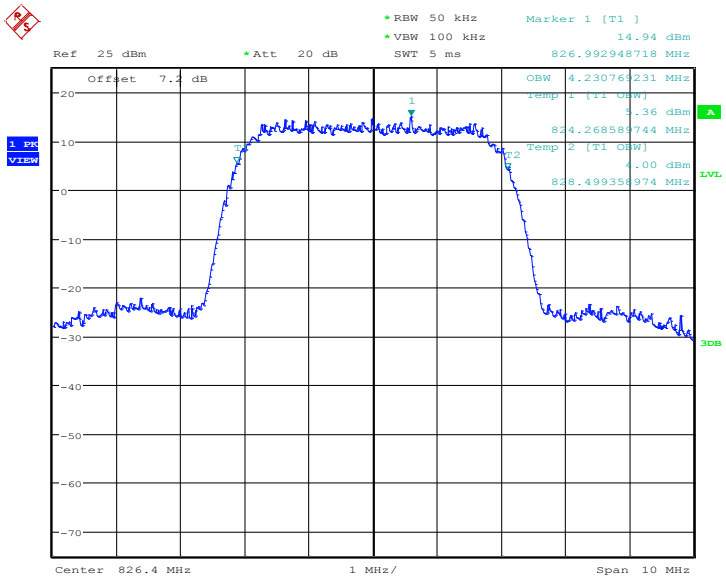
Date: 21.JAN.2017 05:39:21

WCDMA Band V(99% BW)-QPSK

Frequency(MHz)	Occupied Bandwidth (99% BW)(MHz)
826.4	4.23
836.6	4.23
846.6	4.25

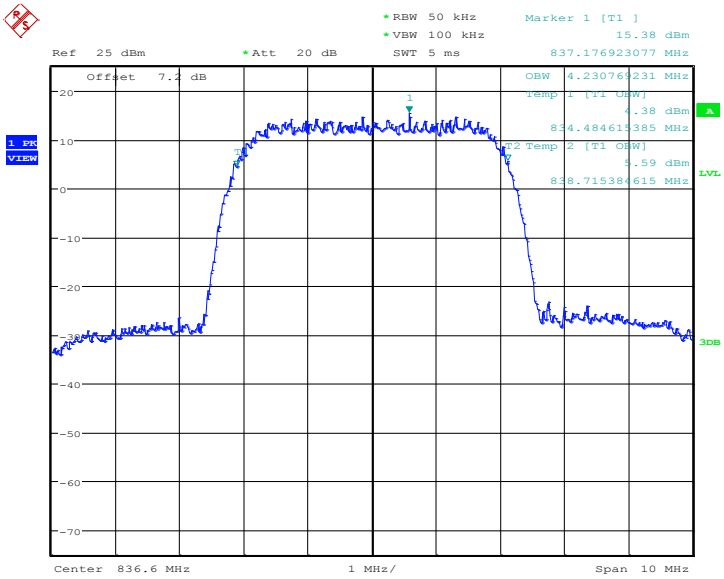
WCDMA Band V

Channel 4132-Occupied Bandwidth (99% BW)-QPSK



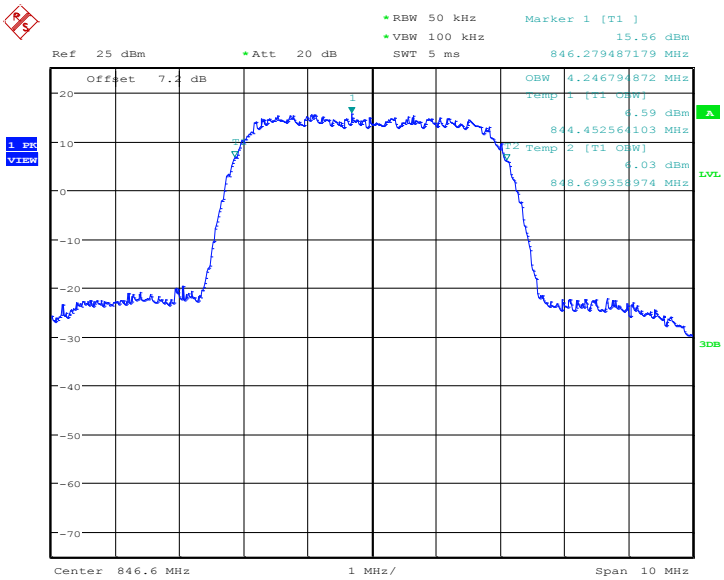
Date: 21.JAN.2017 06:18:21

Channel 4183-Occupied Bandwidth (99% BW)-QPSK



Date: 21.JAN.2017 06:18:56

Channel 4233-Occupied Bandwidth (99% BW)-QPSK



Date: 21.JAN.2017 06:16:03

A.5 EMISSION BANDWIDTH

A.5.1Emission 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.

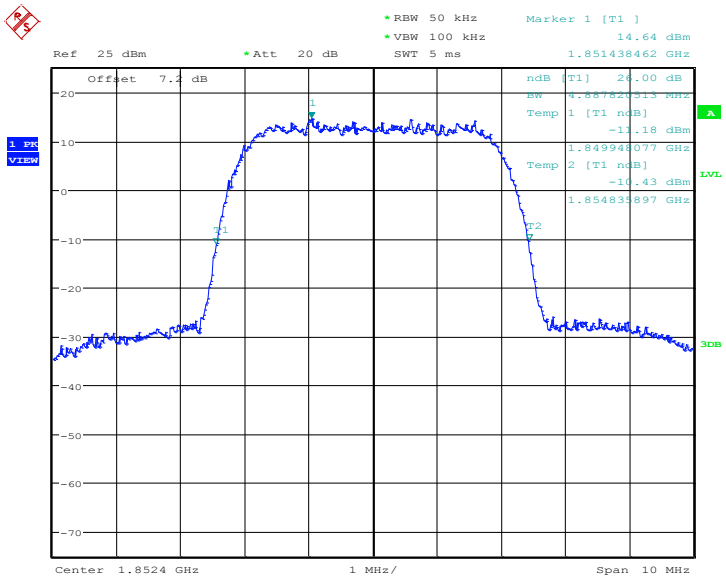
Similar to conducted emissions; Emission bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies. Table below lists the measured 100% BW. Spectrum analyzer plots are included on the following pages.

WCDMA Band II (-26 dB BW)-QPSK

Frequency(MHz)	Emission Bandwidth (-26 dB BW)(MHz)
1852.4	4.89
1880.0	4.86
1907.6	4.84

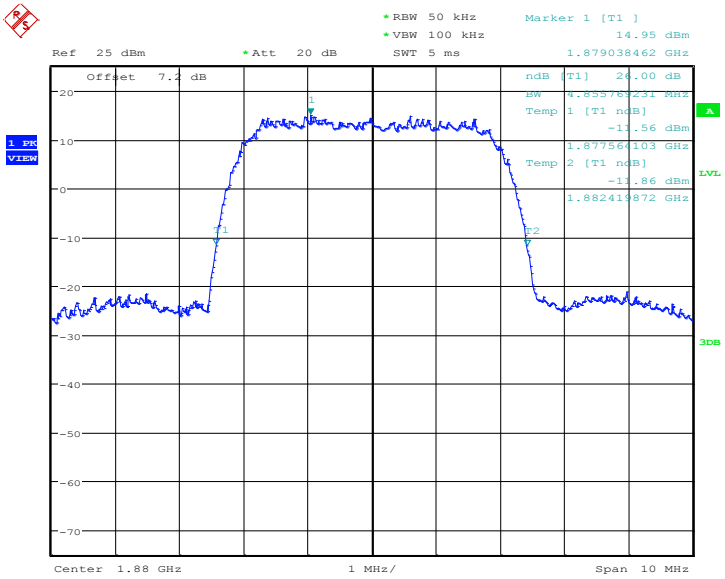
WCDMA Band II

Channel 9262-Emission Bandwidth (-26 dB BW)-QPSK



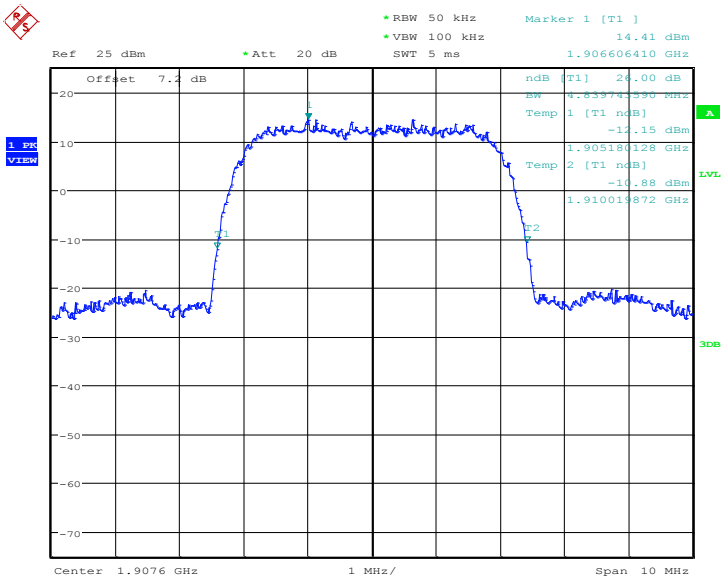
Date: 21.JAN.2017 05:36:58

Channel 9400-Emission Bandwidth (-26 dB BW)-QPSK



Date: 21.JAN.2017 05:37:46

Channel 9538-Emission Bandwidth (-26 dB BW)-QPSK



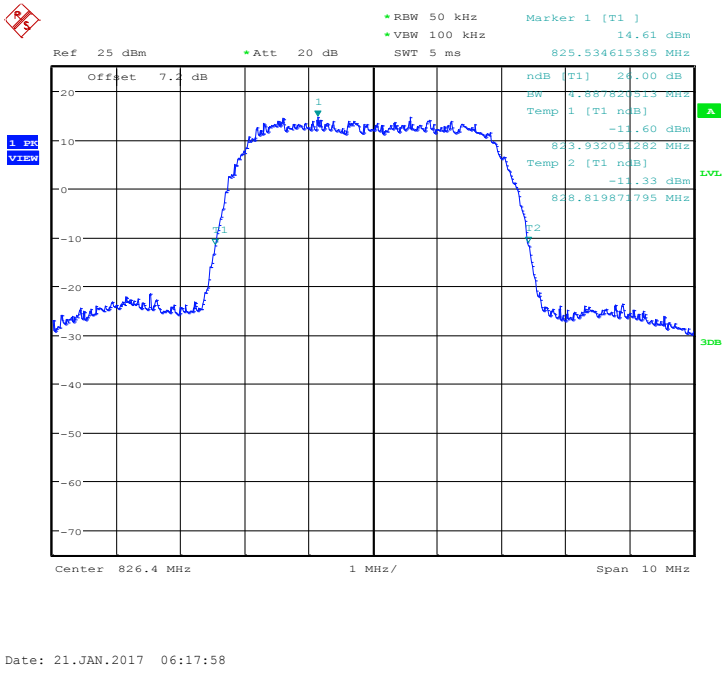
Date: 21.JAN.2017 05:39:58

WCDMA Band V(-26 dB BW)-QPSK

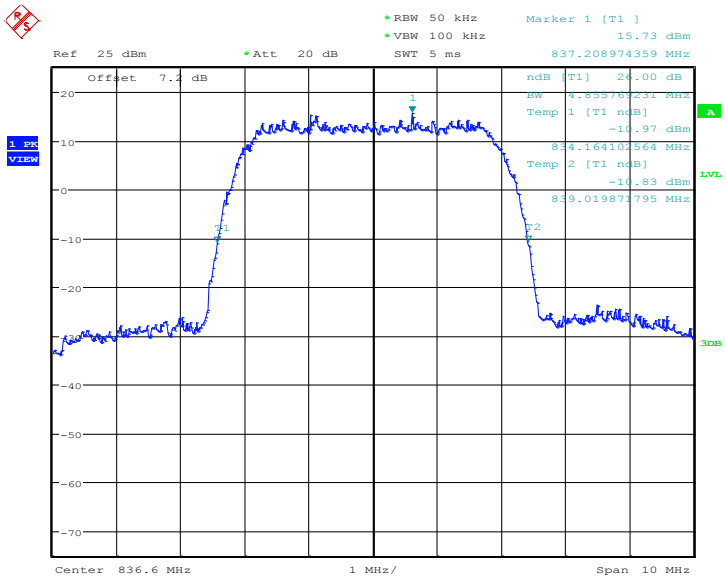
Frequency(MHz)	Emission Bandwidth (-26 dB BW)(MHz)
826.40	4.89
836.60	4.86
846.60	4.87

WCDMA Band V

Channel 4132-Emission Bandwidth (-26 dB BW)-QPSK

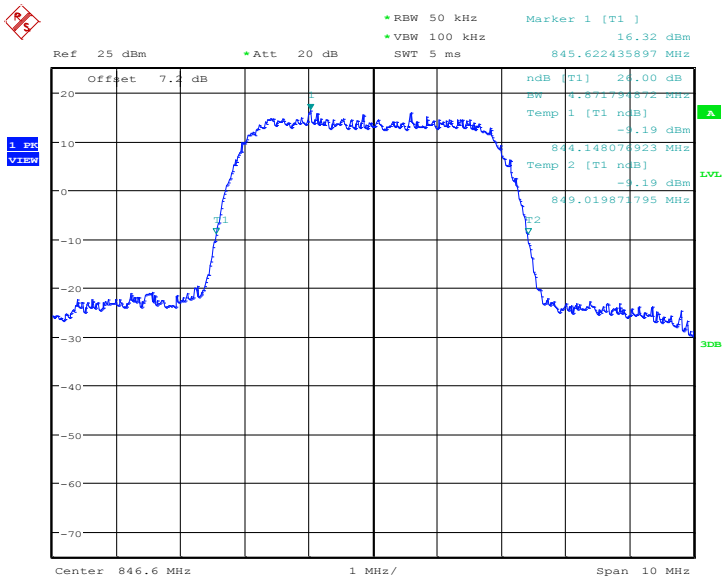


Channel 4183-Emission Bandwidth (-26 dB BW)-QPSK



Date: 21.JAN.2017 06:17:20

Channel 4233-Emission Bandwidth (-26 dB BW)-QPSK



Date: 21.JAN.2017 06:16:34

A.6 BAND EDGE COMPLIANCE

A.6.1 Measurement limit

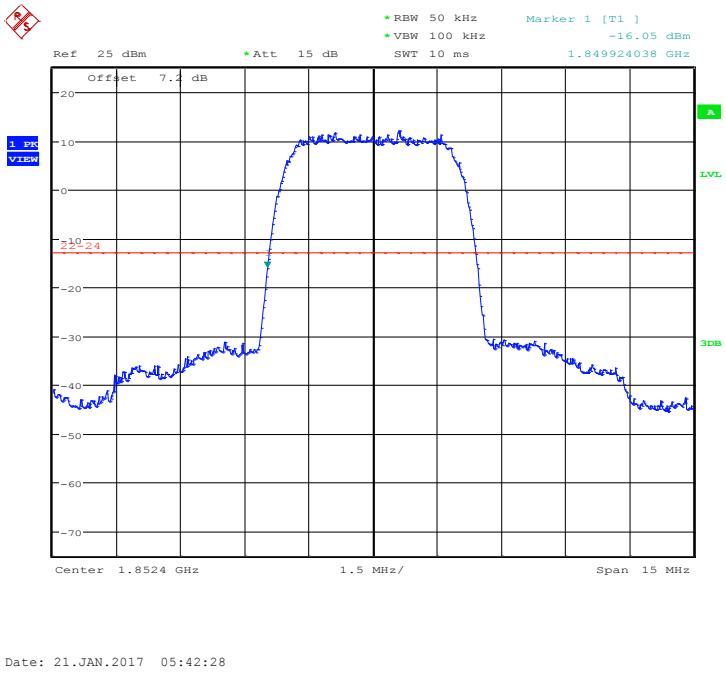
On any frequency outside frequency band of the US Cellular/PCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log (P) dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

According to KDB 971168, 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.

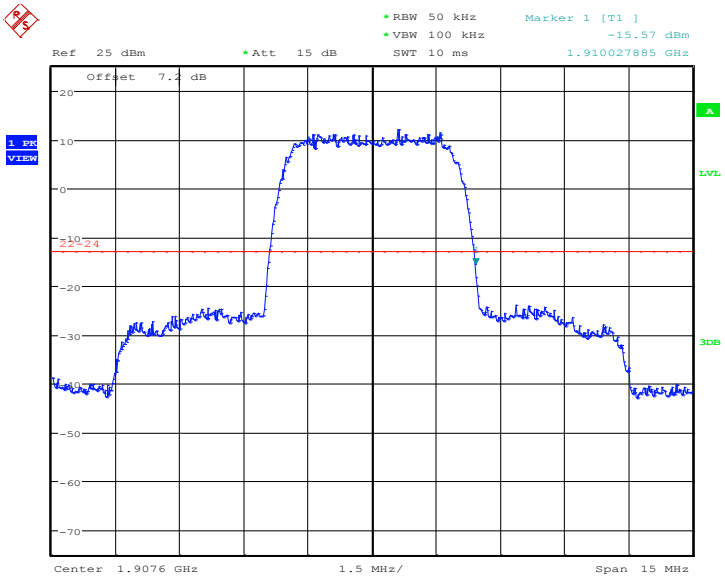
A.6.2 Measurement result

WCDMA Band Ⅱ

LOW BAND EDGE BLOCK-A (WCDMA Band Ⅱ)-Channel 9262-QPSK



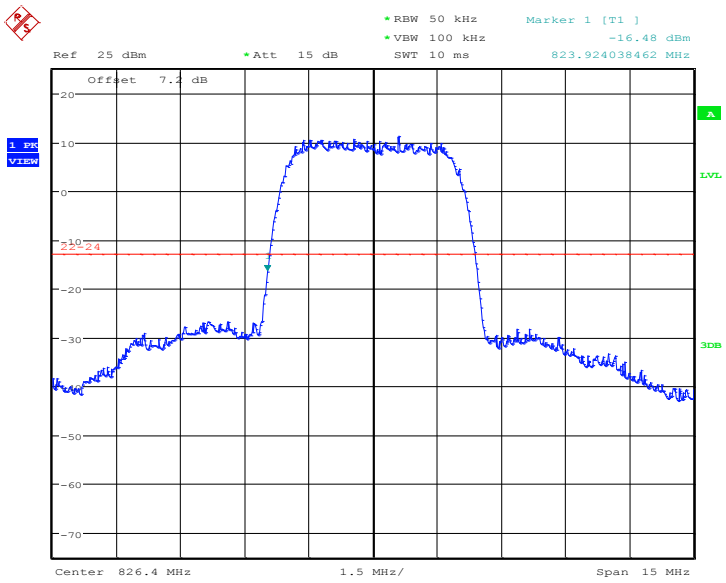
HIGH BAND EDGE BLOCK-C (WCDMA Band Ⅱ) –Channel 9538-QPSK



Date: 21.JAN.2017 05:41:06

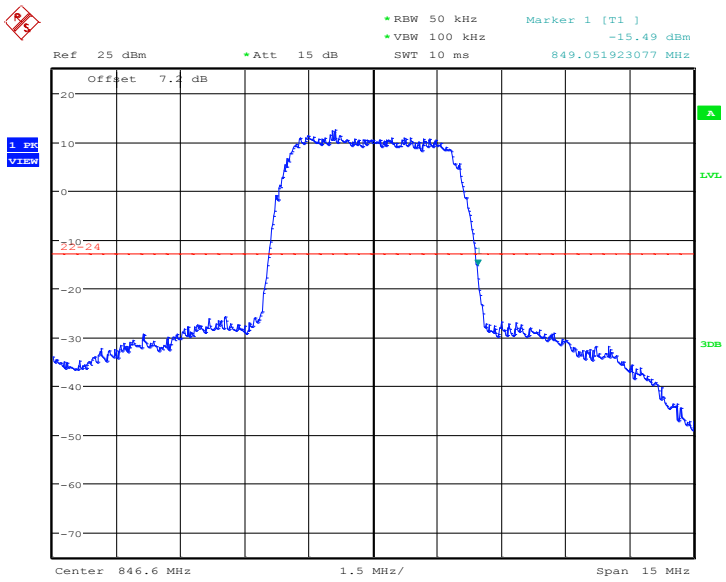
WCDMA Band Ⅴ

LOW BAND EDGE BLOCK-A (WCDMA Band Ⅴ)-Channel 4132-QPSK



Date: 21.JAN.2017 06:12:38

HIGH BAND EDGE BLOCK-C (WCDMA Band Ⅴ) –Channel 4233-QPSK



Date: 21.JAN.2017 06:13:34

A.7 CONDUCTED SPURIOUS EMISSION

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 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)

WCDMA Band Ⅱ Transmitter

Channel	Frequency (MHz)
9262	1852.40
9400	1880.00
9538	1907.60

WCDMA Band Ⅴ Transmitter

Channel	Frequency (MHz)
4132	826.40
4183	836.60
4233	846.60

A.7.2 Measurement Limit

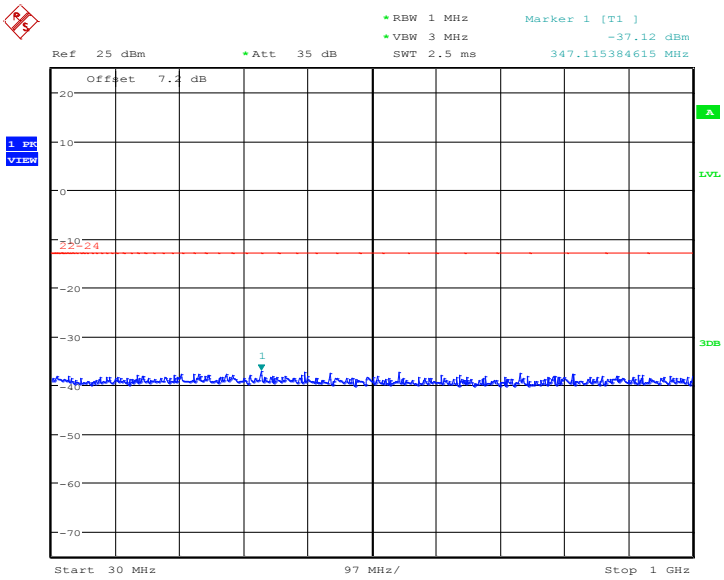
The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. 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

WCDMA Band Ⅱ

Channel 9262: 30MHz –1GHz

Spurious emission limit –13dBm.

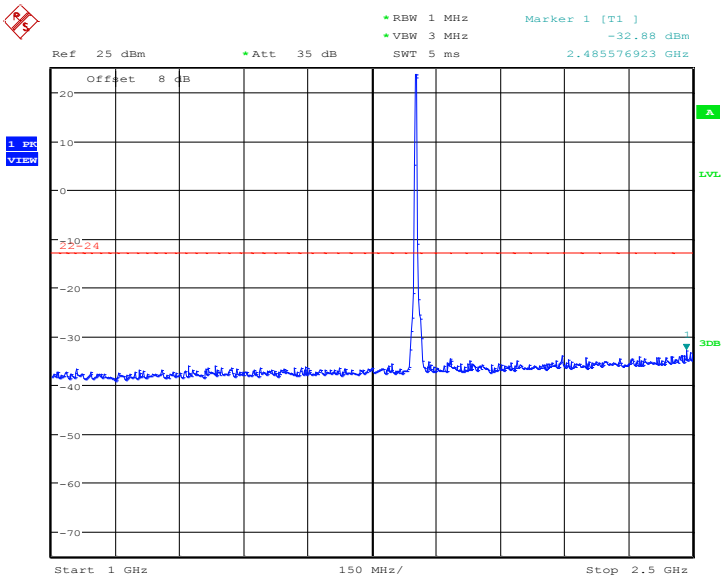


Date: 21.JAN.2017 05:44:27

Channel 9262: 1GHz –2.5GHz

Spurious emission limit –13dBm.

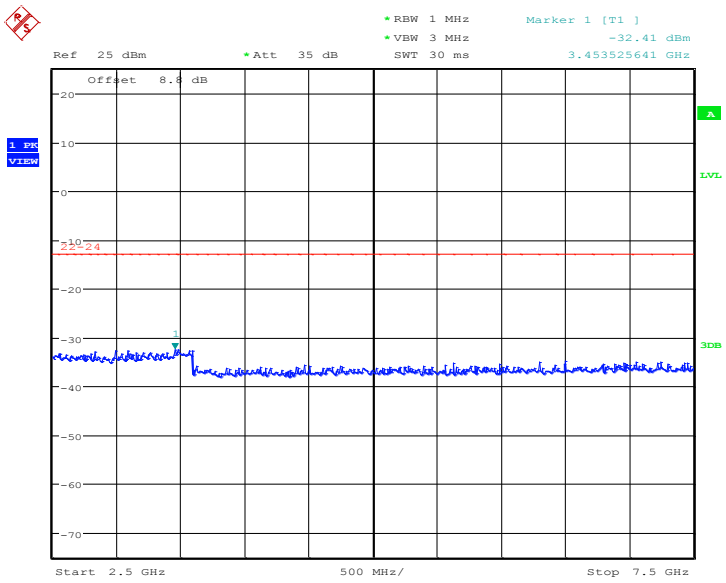
NOTE: peak above the limit line is the carrier frequency.



Date: 21.JAN.2017 05:49:38

Channel 9262: 2.5GHz –7.5GHz

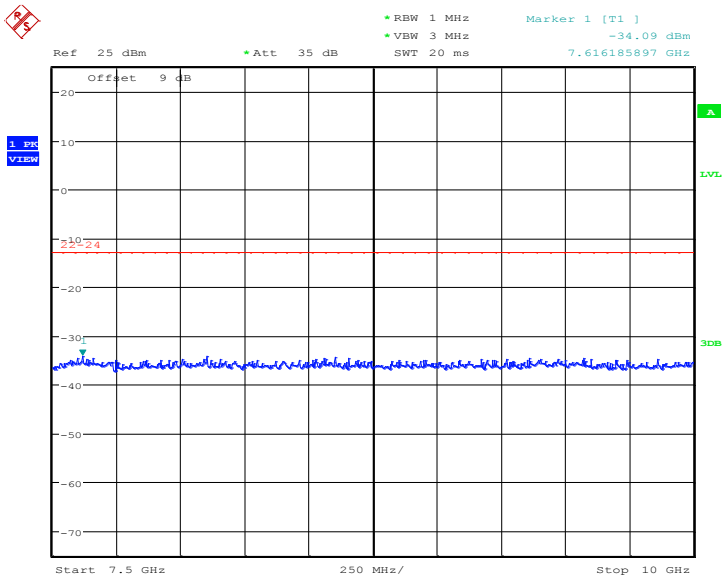
Spurious emission limit –13dBm.



Date: 21.JAN.2017 05:50:23

Channel 9262: 7.5GHz –10GHz

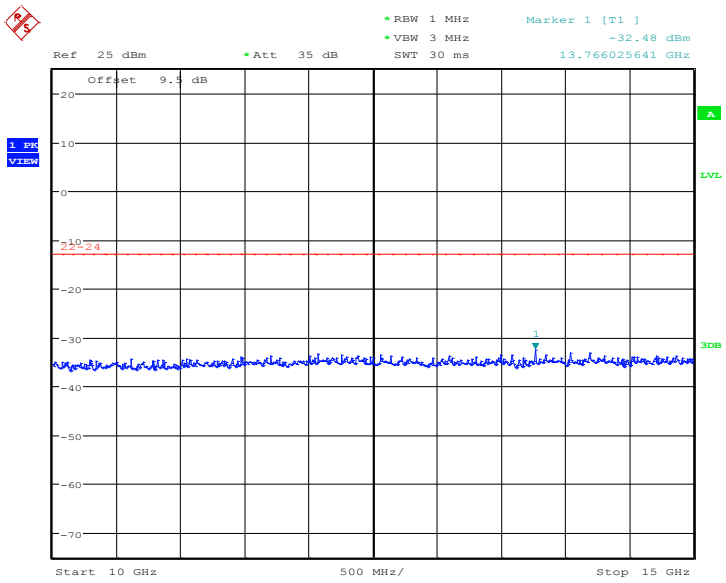
Spurious emission limit –13dBm.



Date: 21.JAN.2017 05:53:56

Channel 9262: 10GHz –15GHz

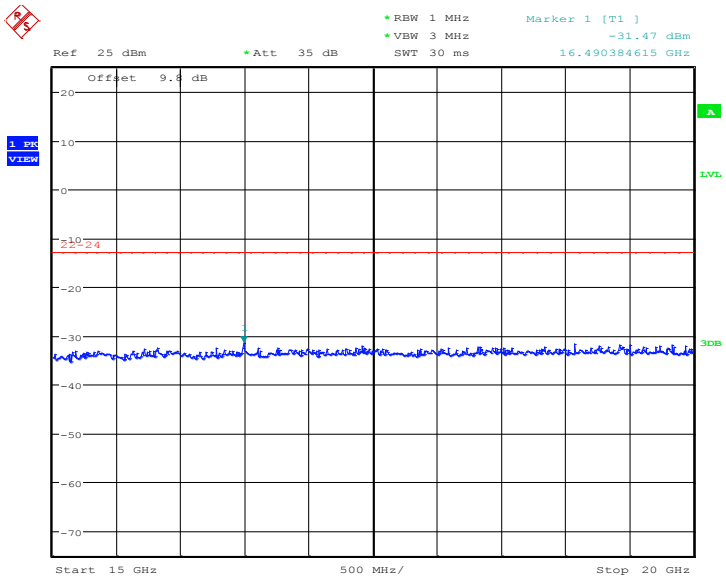
Spurious emission limit –13dBm.



Date: 21.JAN.2017 05:54:38

Channel 9262: 15GHz –20GHz

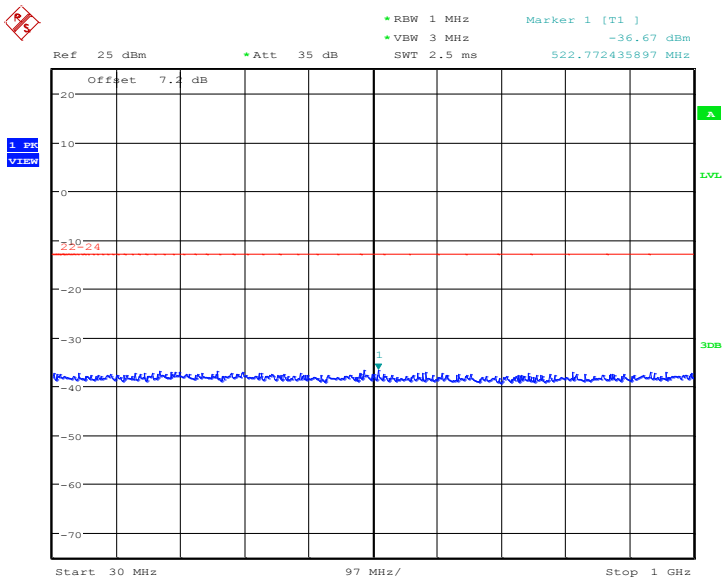
Spurious emission limit –13dBm.



Date: 21.JAN.2017 05:57:59

Channel 9400: 30MHz –1GHz

Spurious emission limit –13dBm.

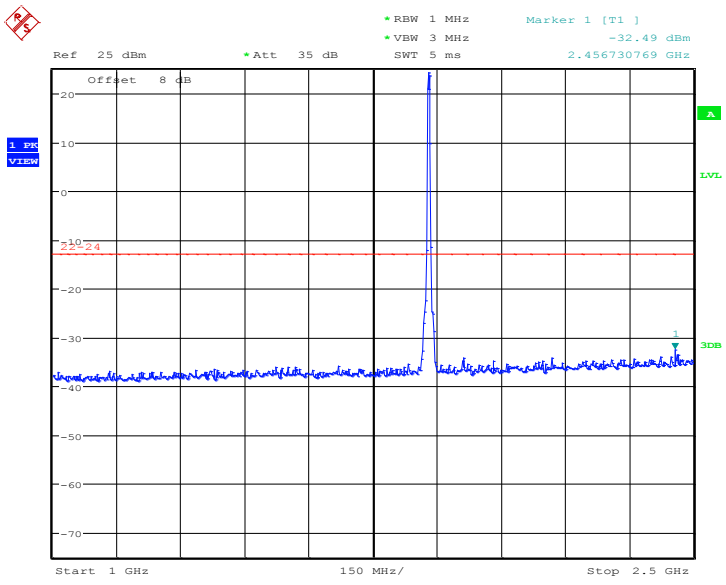


Date: 21.JAN.2017 05:46:45

Channel 9400: 1GHz –2.5GHz

Spurious emission limit –13dBm.

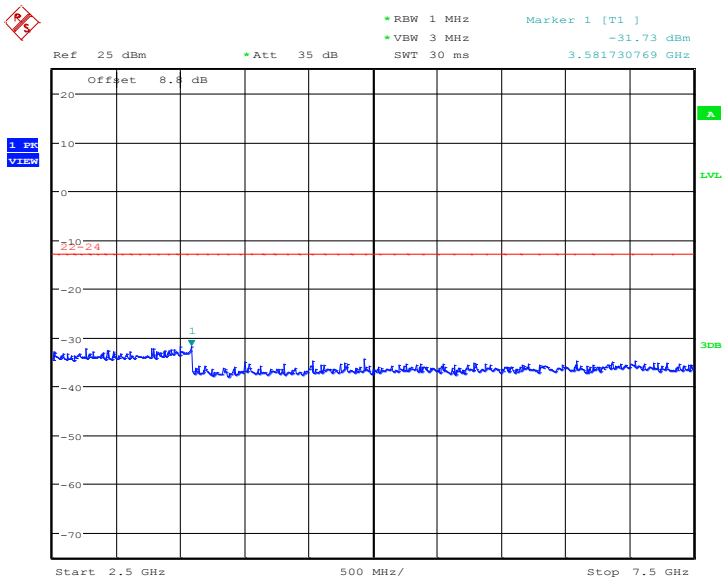
NOTE: peak above the limit line is the carrier frequency.



Date: 21.JAN.2017 05:48:54

Channel 9400: 2.5GHz –7.5GHz

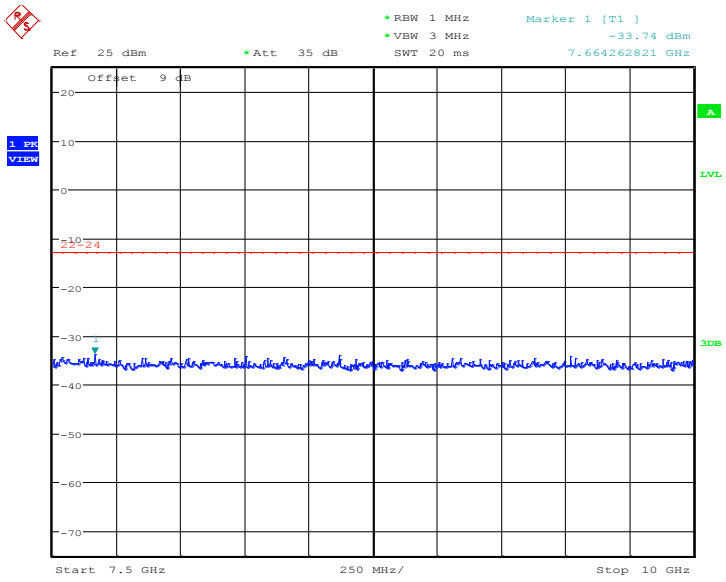
Spurious emission limit –13dBm.



Date: 21.JAN.2017 05:51:10

Channel 9400: 7.5GHz –10GHz

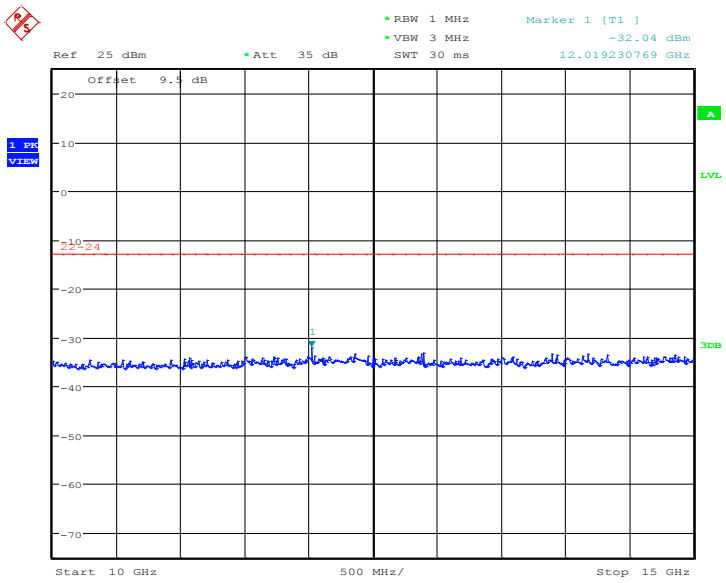
Spurious emission limit –13dBm.



Date: 21.JAN.2017 05:53:16

Channel 9400: 10GHz –15GHz

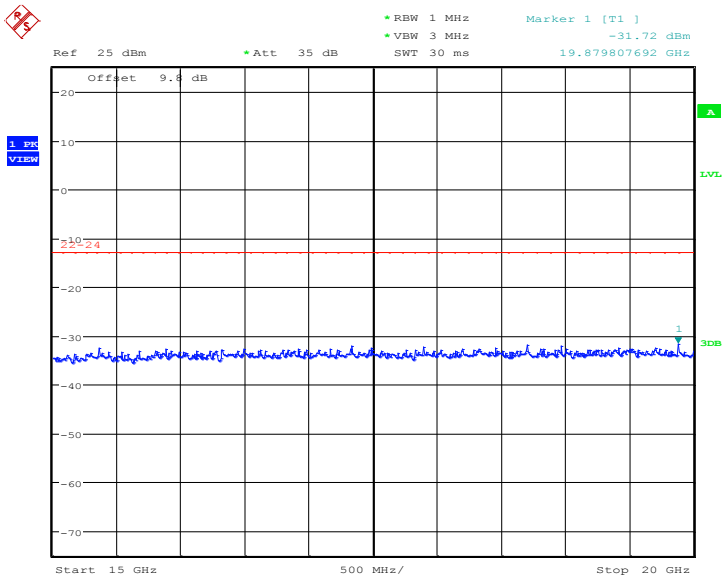
Spurious emission limit –13dBm.



Date: 21.JAN.2017 05:55:11

Channel 9400: 15GHz –20GHz

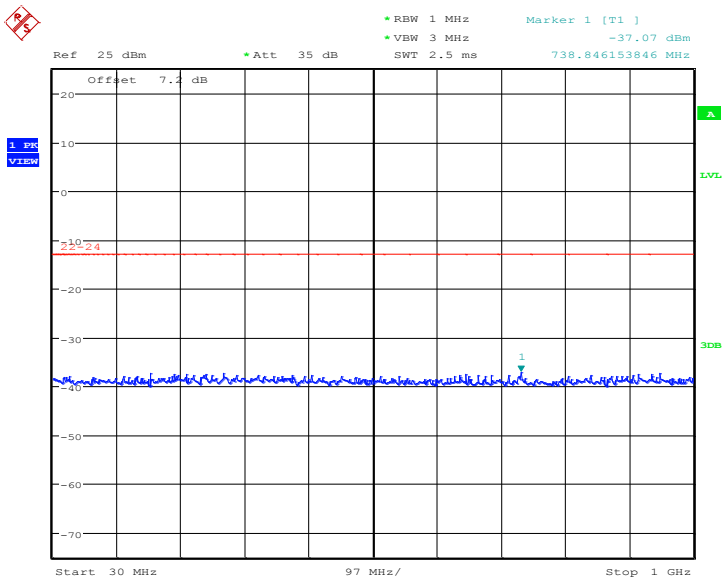
Spurious emission limit –13dBm.



Date: 21.JAN.2017 05:56:58

Channel 9538: 30MHz –1GHz

Spurious emission limit –13dBm.

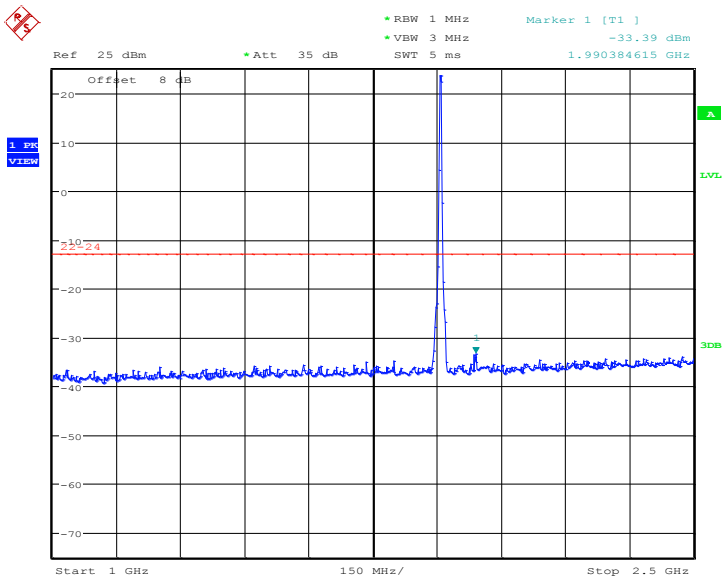


Date: 21.JAN.2017 05:47:22

Channel 9538: 1GHz –2.5GHz

Spurious emission limit –13dBm.

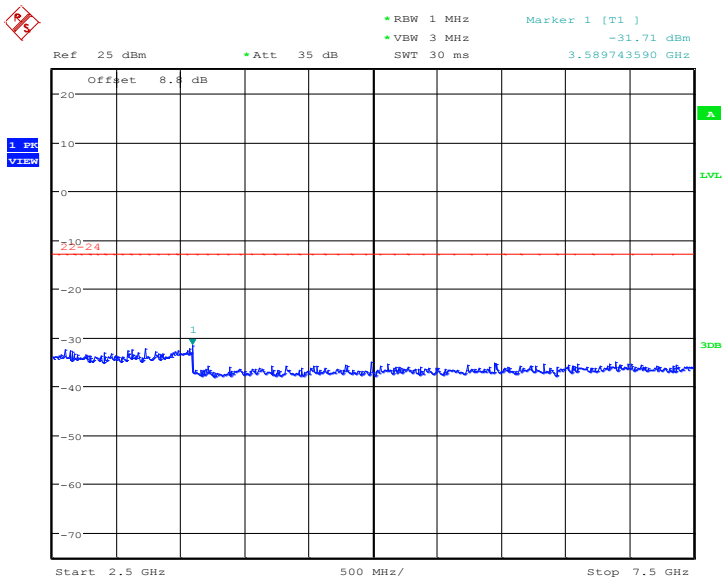
NOTE: peak above the limit line is the carrier frequency.



Date: 21.JAN.2017 05:48:14

Channel 9538: 2.5GHz –7.5GHz

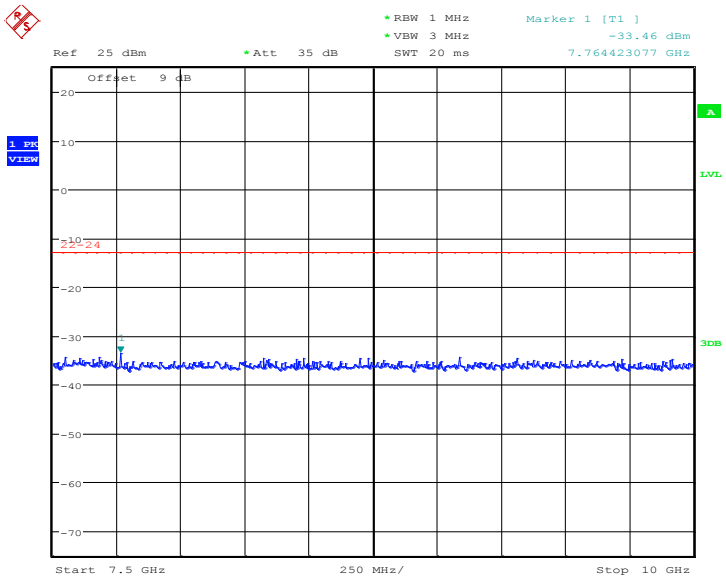
Spurious emission limit –13dBm.



Date: 21.JAN.2017 05:51:42

Channel 9538: 7.5GHz –10GHz

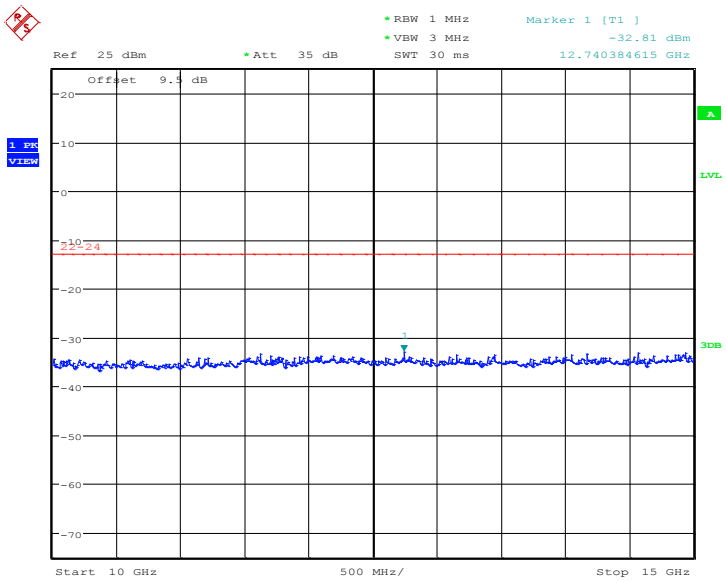
Spurious emission limit –13dBm.



Date: 21.JAN.2017 05:52:36

Channel 9538: 10GHz –15GHz

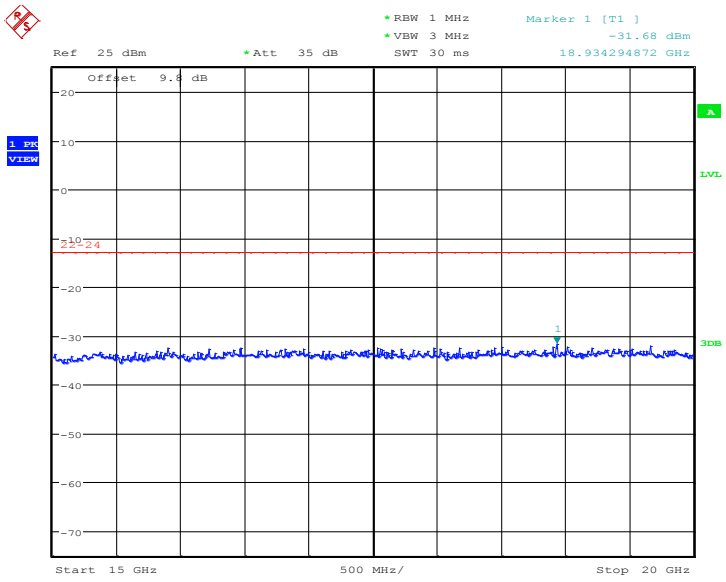
Spurious emission limit –13dBm.



Date: 21.JAN.2017 05:55:47

Channel 9538: 15GHz –20GHz

Spurious emission limit –13dBm.



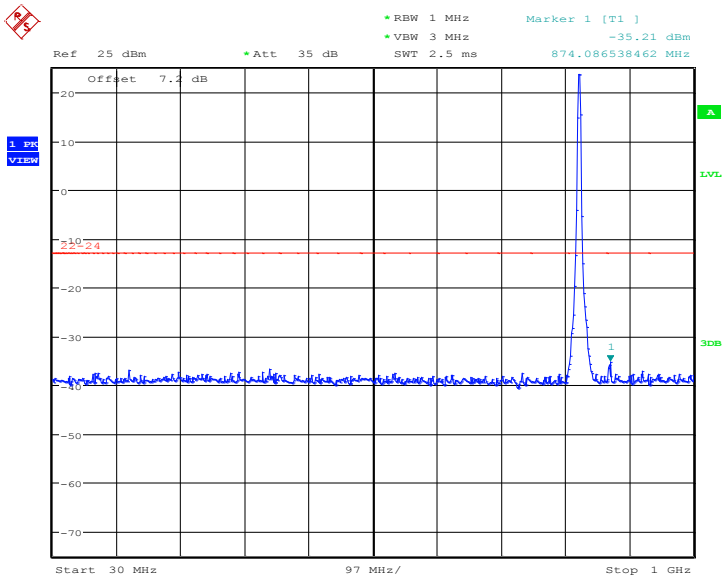
Date: 21.JAN.2017 05:56:24

WCDMA Band Ⅴ

Channel 4132: 30MHz –1GHz

Spurious emission limit –13dBm.

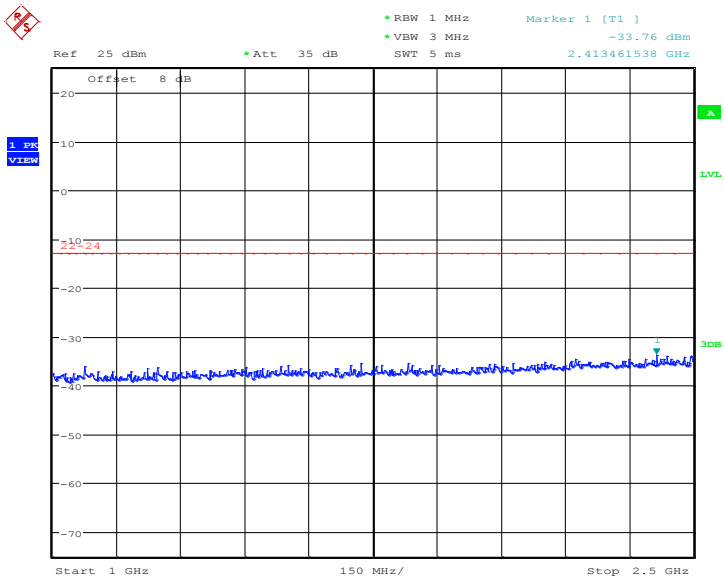
NOTE: peak above the limit line is the carrier frequency.



Date: 21.JAN.2017 06:03:09

Channel 4132: 1GHz – 2.5GHz

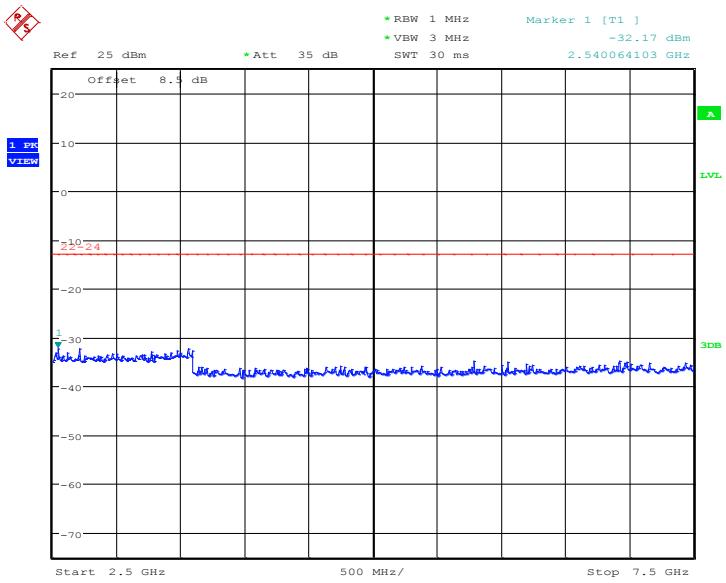
Spurious emission limit –13dBm.



Date: 21.JAN.2017 06:06:41

Channel 4132: 2.5GHz –7.5GHz

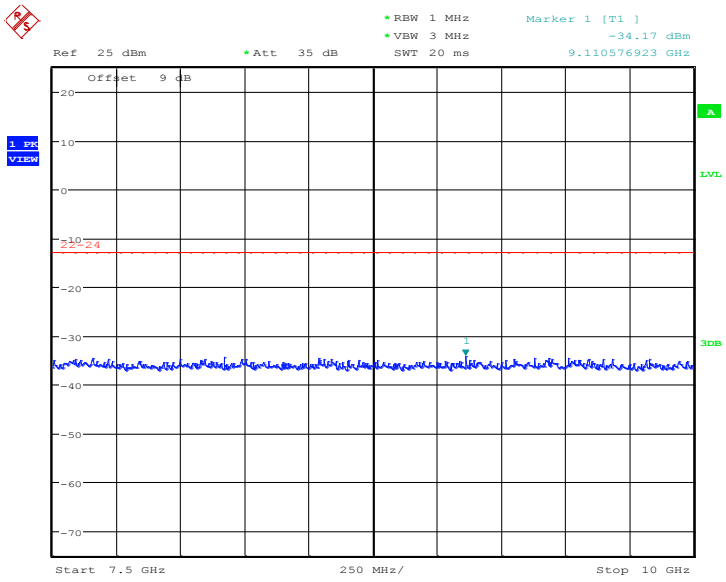
Spurious emission limit –13dBm.



Date: 21.JAN.2017 06:07:50

Channel 4132: 7.5GHz – 10GHz

Spurious emission limit –13dBm.

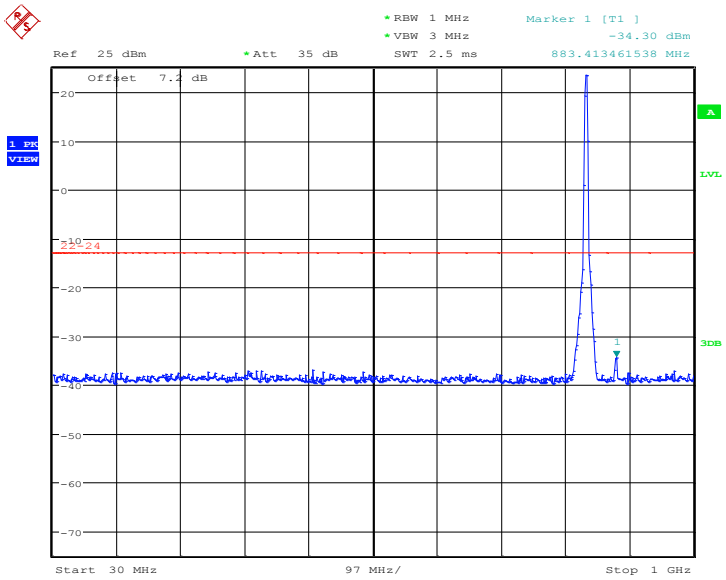


Date: 21.JAN.2017 06:11:05

Channel 4183: 30MHz –1GHz

Spurious emission limit –13dBm.

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



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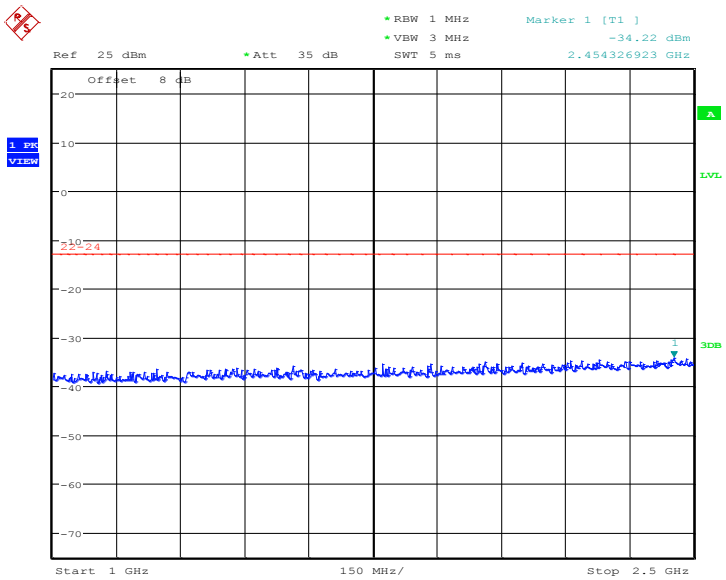
Channel 4183: 1GHz – 2.5GHz

Spurious emission limit –13dBm.



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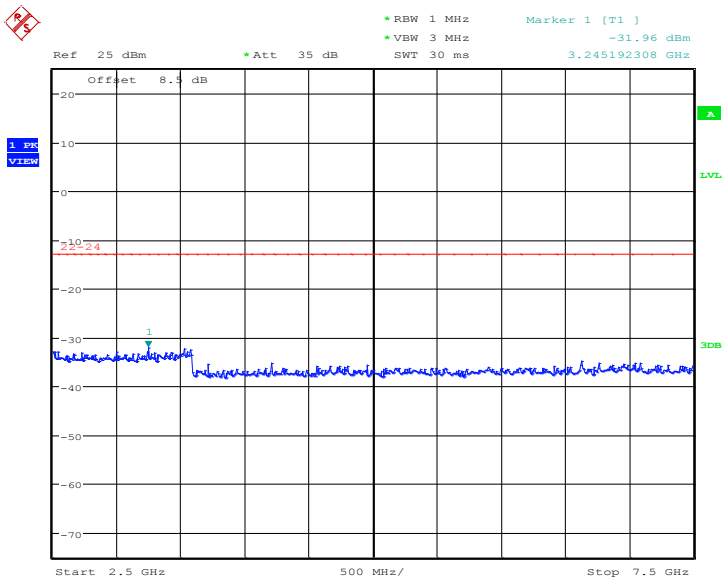
Channel 4183: 2.5GHz –7.5GHz

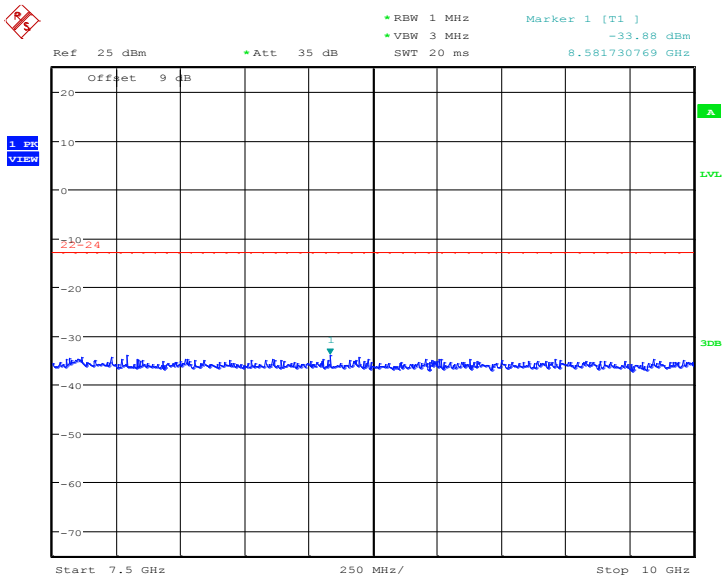
Spurious emission limit –13dBm.



Date: 21.JAN.2017 06:08:30

Channel 4183: 7.5GHz – 10GHz

Spurious emission limit –13dBm.

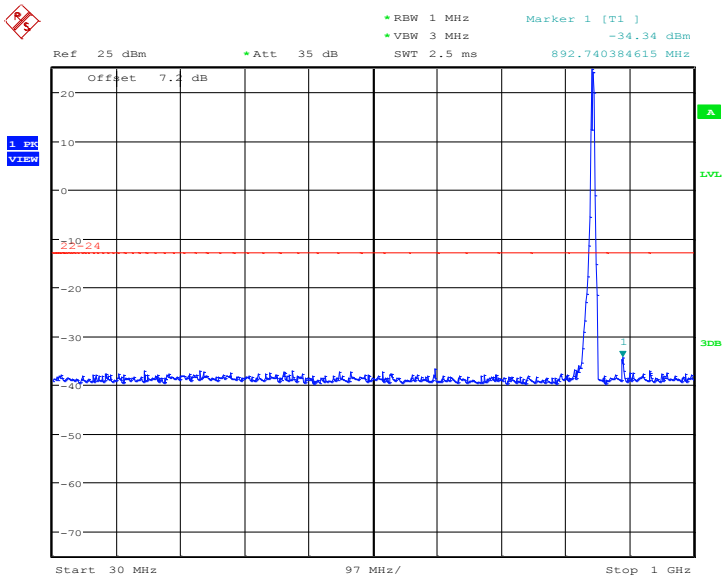


Date: 21.JAN.2017 06:10:32

Channel 4233: 30MHz –1GHz

Spurious emission limit –13dBm.

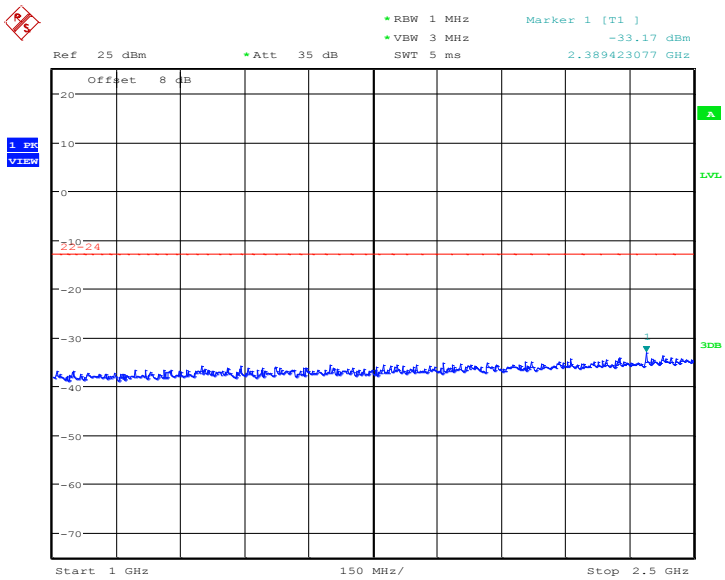
NOTE: peak above the limit line is the carrier frequency.



Date: 21.JAN.2017 06:04:37

Channel 4233: 1GHz – 2.5GHz

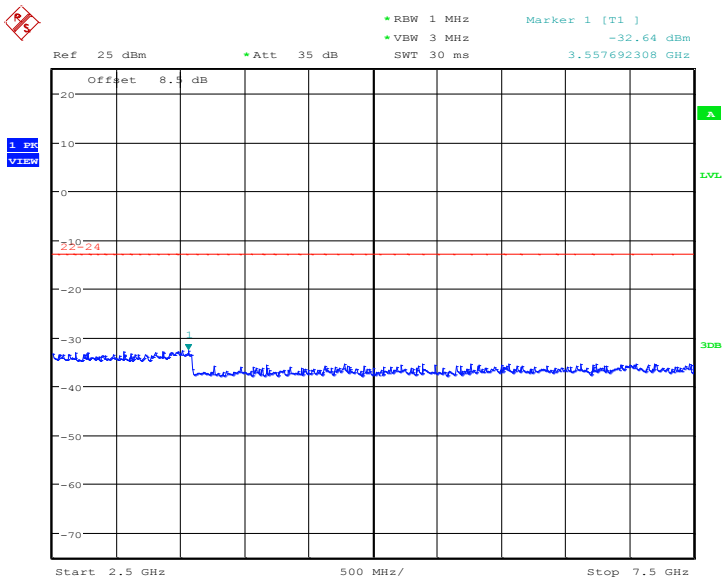
Spurious emission limit –13dBm.



Date: 21.JAN.2017 06:05:40

Channel 4233: 2.5GHz –7.5GHz

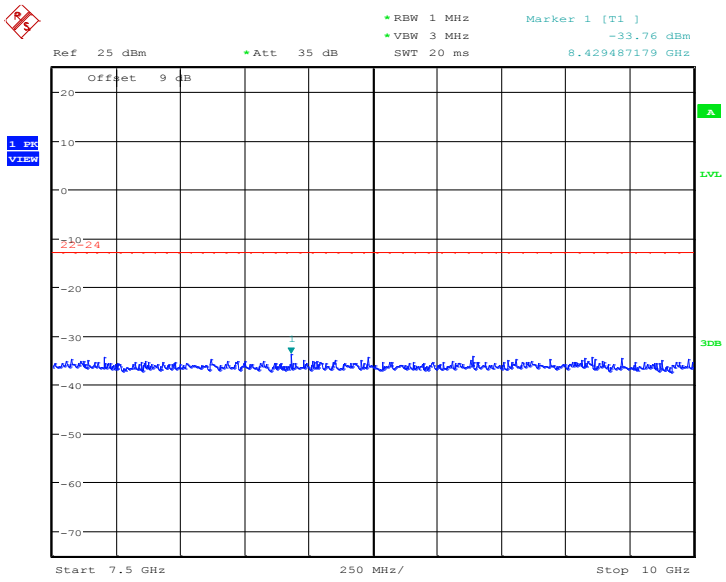
Spurious emission limit –13dBm.



Date: 21.JAN.2017 06:09:21

Channel 4233: 7.5GHz – 10GHz

Spurious emission limit –13dBm.



Date: 21.JAN.2017 06:09:52

A.8 PEAK-TO-AVERAGE POWER RATIO

Reference

According to RSS 132 and 133, the transmitter's peak-to-average power ratio (PAPR) 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.

According to KDB 971168:

a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;

b) Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;

c) Set the number of counts to a value that stabilizes the measured CCDF curve;

d) Set the measurement interval to 1 ms

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

A.8.1 Measurement limit

not exceed 13 dB

A.8.2 Measurement results

Measurement result

WCDMA Band II

Measurement result-QPSK

	CH	Frequency(MHz)	PAPR(dB)
WCDMA (Band II)	9400	1880.0	3.45

WCDMA Band V

Measurement result-QPSK

	CH	Frequency(MHz)	PAPR(dB)
WCDMA (Band V)	4183	836.6	3.47

A.9 RECEIVER RADIATION EMISSION

A.9.1 Method of Measurement

The measurement procedure in ANSI C64.4-2003 is used. The EUT is placed on a 80cm height non-conductive table locating on the center of turntable. From 30MHz-1GHz, the measurement distance is 10m. For frequency range above 1GHz, the measurement distance is 3m.

The EUT is measured with travel charger and the operating mode is idle without CMU200's signaling.

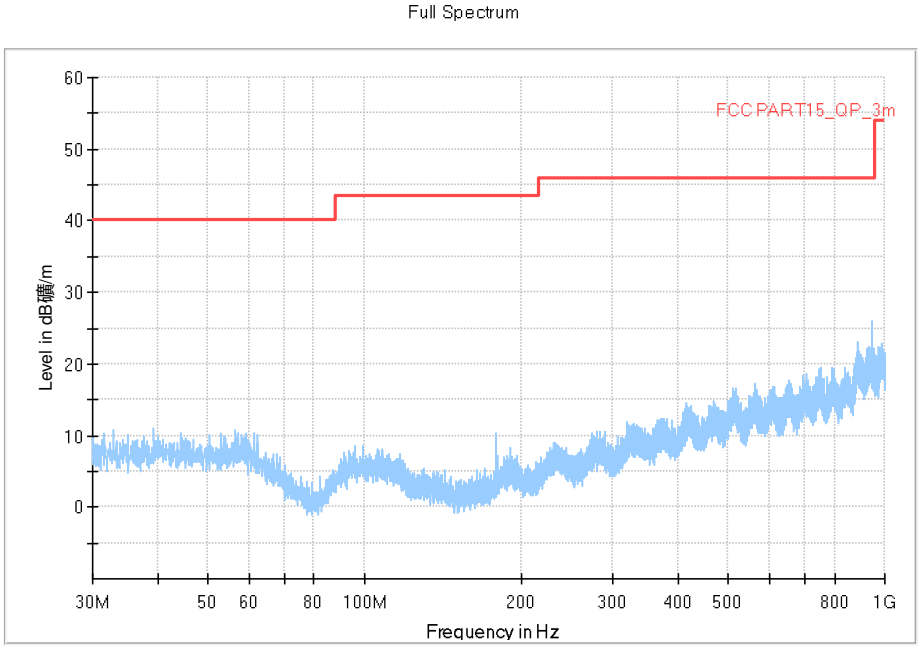
A.9.2 Method of Measurement

Frequency of Emission (MHz)	Limit (dBμV/m)	Measurement Distance (m)
30-88	30	10
88-216	33.5	10
216-960	36	10
960-1000	44	10
>1000	54	3

A. 9.3 Measurement results

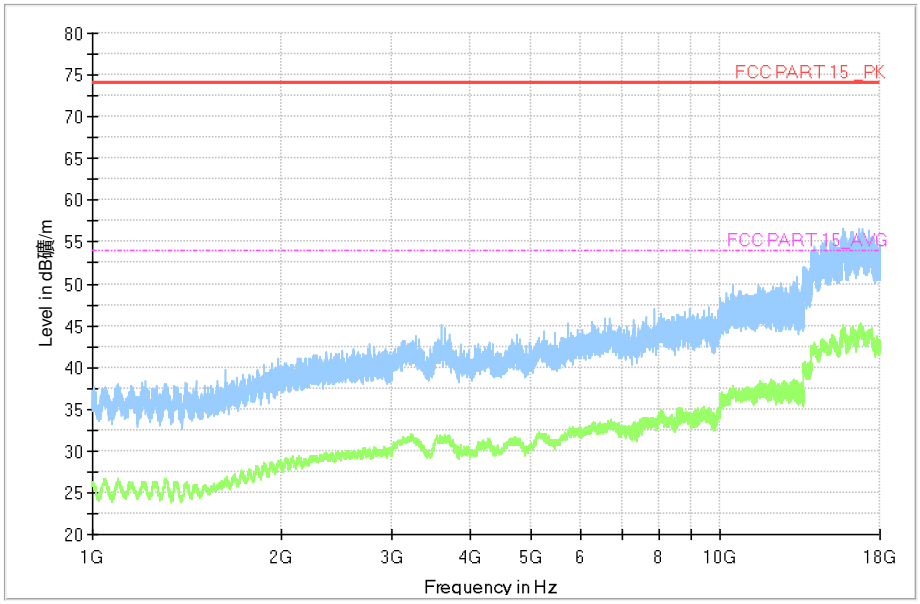
IF bandwidth: 120 kHz

Idle Mode: 30MHz-1GHz

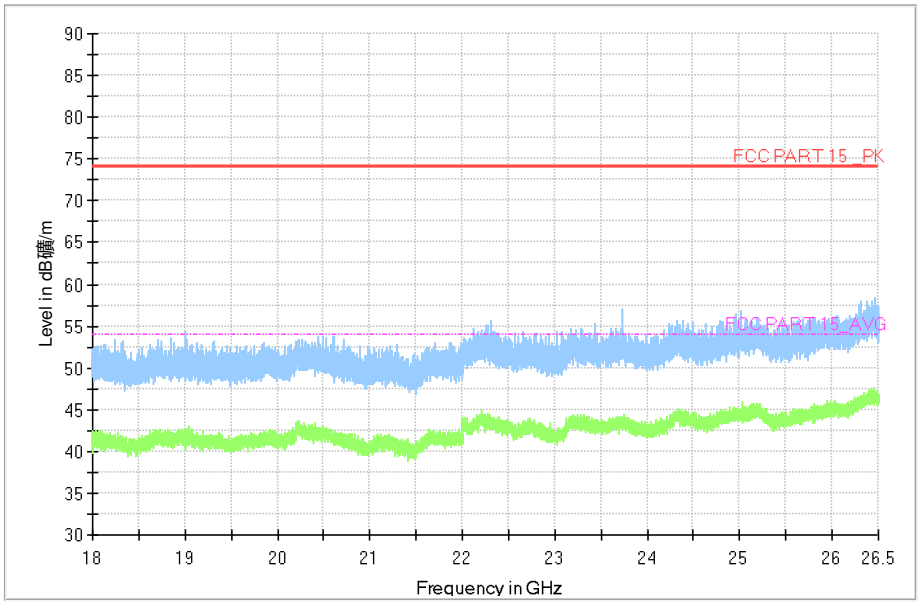


RBW / VBW 1 MHz

Idle Mode: 1GHz-18GHz



Idle Mode: 18GHz-26.5GHz



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