TEST REPORT

No. 2011TAR071

for

ZTE CORPORATION

HSPA LGA Module

Model Name: MF206A

FCC ID: Q78-ZTEMF206A

IC: 5200A-ZTEMF2026A

with

Hardware Version: BD_MF206AV1.0.0B01

Software Version: MF206A-2.0.0

Issued Date: Feb 23, 2011

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 TMC Beijing.

Test Laboratory:

DAR accreditation (DIN EN ISO/IEC 17025): No. DAT-P-114/01-01

FCC 2.948 Listed: No.733176

IC O.A.T.S listed: No.6629A-1

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

Shouxiang Science Building, No 51, Xueyuan Road, Haidian District, Beijing, P.R.China 100191

Tel:+86(0)10-62304633-2678, Fax:+86(0)10-62304793 Email:welcome@emcite.com. www.emcite.com

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1. Test Laboratory

1.1. Testing Location

Company Name:	TMC Beijing, Telecommunication Metrology Center of MIIT
Address:	Shouxiang Science Building, No 51, Xueyuan Road, Haidian District, Beijing, P.R.China
Postal Code:	100191
Telephone:	00861062304633
Fax:	00861062304793

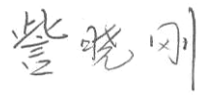
1.2. Testing Environment

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

1.3. Project data

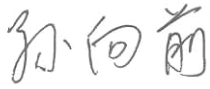
Testing Start Date:	Jan 07, 2011
Testing End Date:	Feb 22, 2011

1.4. Signature



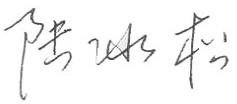
Zi Xiaogang

(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:	ZTE CORPORATION
Address /Post:	ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China
City:	Shenzhen
Postal Code:	518057
Country:	China
Telephone:	0086 21 68895196

2.2. Manufacturer Information

Company Name:	ZTE CORPORATION
Address /Post:	ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China
City:	Shenzhen
Postal Code:	518057
Country:	China
Telephone:	0086 21 68895196

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

3.1. About EUT

Description	HSPA LGA Module
Model Name	MF206A
FCC ID	Q78-ZTEMF206A
IC ID	5200A-ZTEMF2026A
Frequency	GSM 850MHz; PCS 1900MHz; WCDMA Band II; WCDMA Band V
Antenna	external
Output power	28.39 dBm maximum EIRP measured for GSM1900
Extreme vol. Limits	4.8VDC to 5.2VDC (nominal: 5.0VDC)
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.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
N04	356118040000135	MF206A-2.0.0	BD_MF206AV1.0.0B01

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

3.3. General Description

The Equipment Under Test (EUT) is a model of HSPA LGA Module with extegrated antenna. Manual and specifications of the EUT were provided to fulfil the test. Samples undergoing test were selected by the Client.

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 27	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	V 10.1.07
RSS-Gen	RSS-Gen — General Requirements and Information for the Certification of Radiocommunication Equipment	Issue 2, June 2007
RSS139	Advanced Wireless Services Equipment Operating in the Bands 1710-1755 MHz and 2110-2155 MHz	Issue 2, February 2009
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

5. LABORATORY ENVIRONMENT

Semi-anechoic chamber (23 meters×17meters×10meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Normalised site attenuation (NSA)	< ±3.2 dB, 10 m distance, from 30 to 1000 MHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 2000 MHz

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

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Conducted chamber did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber (6.8 meters×3.08 meters×3.53 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80 to 2000 MHz

6. SUMMARY OF TEST RESULTS

WCDMA Band II

Items	Test Name	Clause in FCC rules	Clause in IC rules RSS-Gen and RSS- 133	Section in this report	Verdict
1	Output Power	24.232(b)	6.4	A.1	P
2	Emission Limit	24.238, 2.1051	6.5	A.2	P
3	Frequency Stability	24.235, 2.1055	6.3	A.4	P
4	Occupied Bandwidth	2.1049(h)(i)	4.6.1	A.5	P
5	Emission Bandwidth	24.238(b)	4.6.1	A.6	P
6	Band Edge Compliance	24.238(b)	6.5	A.7	P
7	Conducted Spurious Emission	24.238, 2.1057	6.5	A.8	P

WCDMA Band V

Items	Test Name	Clause in FCC rules	Clause in IC rules RSS-Gen and RSS-132	Section in this report	Verdict
1	Output Power	§2.1046(a), 22.913(a)	4.4	A.1	P
2	Emission Limit	22.917, 2.1051	4.5	A.2	P
3	Frequency Stability	22.235, 2.1055	4.3	A.4	P
4	Occupied Bandwidth	2.1049(h)(i)	4.6.1	A.5	P
5	Emission Bandwidth	22.917(b)	4.6.1	A.6	P
6	Band Edge Compliance	22.917(b)	4.5	A.7	P
7	Conducted Spurious Emission	22.917, 2.1057	4.5	A.8	P

Receiver Radiated Emission

Items	Test Name	Clause in FCC rules	Clause in IC rules		Section in this report	Verdict
			RSS-132	RSS-133		
1	Receiver Radiated Emissions	15.109 , 2.1053	4.6	6.6	A.2	P

7. Test Equipments Utilized

NO.	NAME	TYPE	SERIES NUMBER	PRODUCER	CAL DUE DATE
1	Test Receiver	ESCI	100766	R&S	2011-12-06
2	Test Receiver	ESI40	831564/002	R&S	2011-07-12
3	BiLog Antenna	VULB9163	9163-175	Schwarzbeck	2011-07-05
4	BiLog Antenna	VULB9163	9163-302	Schwarzbeck	2011-07-10
5	Signal Generator	SMB100A	102063	R&S	2011-07-05
7	LISN	ESH2-Z5	829991/012	R&S	2011-07-20
8	Spectrum Analyzer	FSU26	200030	R&S	2011-12-18
9	Spectrum Analyzer	FSU46	100054	R&S	2011-10-14
10	Universal Radio Communication Tester	CMU200	100680	R&S	2011-12-23
11	Universal Radio Communication Tester	CMU200	109914	R&S	2011-07-21
12	Dual-Ridge Waveguide Horn Antenna	3117	00119024	ETS	2012-08-31
13	Dual-Ridge Waveguide Horn Antenna	3117	00119021	ETS	2013-07-09
14	Dual-Ridge Waveguide Horn Antenna	3116	2663	EMCO	2011-07-01
15	Dual-Ridge Waveguide Horn Antenna	3116	2661	EMCO	2011-07-01
16	Climatic chamber	PL-2G	343074	ESPEC	2011-12-15

ANNEX A: MEASUREMENT RESULTS

A.1 OUTPUT POWER (§22.913(a)/§24.232(b))

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, 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).

Limit

According to FCC§2.1046.

A.1.2.2 Test Condition

RBW	VBW	Sweep Time	Span
10MHz	10MHz	800ms	50MHz

WCDMA Band II

Measurement result

	CH	Frequency(MHz)	output power(dBm)	Target (dB)
WCDMA (Band II)	9262	1852.4	22.93	21±2
	9400	1880.0	22.71	21±2
	9538	1907.6	22.37	21±2

WCDMA Band V

Measurement result

	CH	Frequency(MHz)	output power(dBm)	Target (dB)
WCDMA (Band V)	4132	826.4	22.89	22±1
	4183	836.6	22.94	22±1
	4233	846.6	22.82	22±1

A.1.3 Radiated

A.1.3.1 Description

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

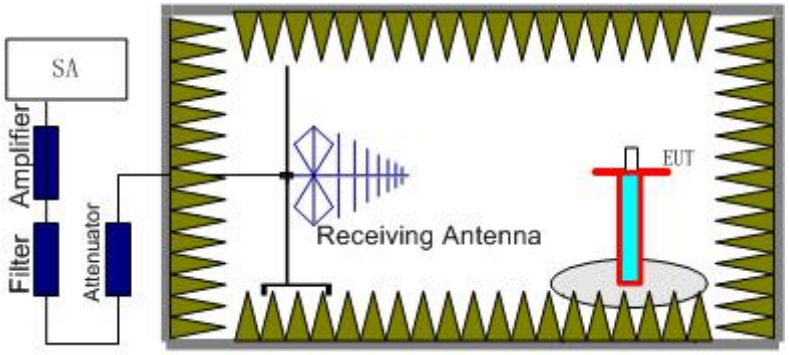
Rule Part 24.232(b) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

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

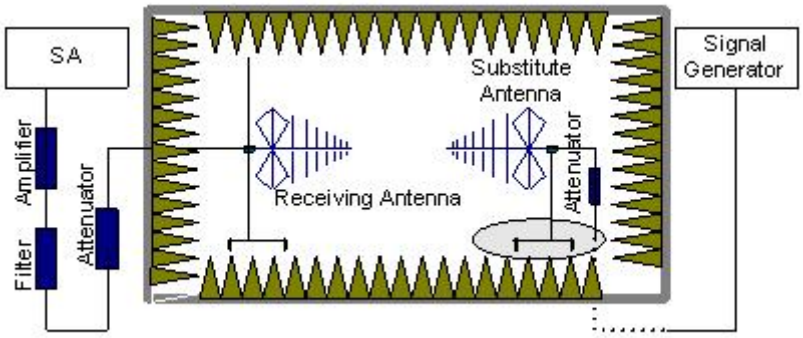
A.1.3.2 Method of Measurement

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. The cable loss (P_{cl}) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain (G_a) should be recorded after test.
   The measurement results are obtained as described below:
   Power(EIRP)=P_{Mea}+ 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

WCDMA Band II

Frequency(MHz)	Peak ERP(dBm)	P_{cl} Cable Loss(dB)	G_a Antenna Gain(dB)	P_{Mea}(dBm)	Polarization
1850.4	18.65	-10.9	27.5	2.05	Horizontal
1880	18.66	-10.8	27.5	1.96	Horizontal
1907.6	**19.58**	-11.3	27.5	3.38	Horizontal

Frequency:19.58 MHz

Peak EIRP(dBm)= P_{Mea}(3.38dBm)+ P_{cl}(-11.3dB)+G_a (27.5dB) =19.58 dBm

ANALYZER SETTINGS: RBW = VBW = 3MHz

WCDMA Band V-ERP

Limits

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

Measurement result

WCDMA Band V

Frequency(MHz)	Peak ERP(dBm)	P_{cl} Cable Loss(dB)	G_a Antenna Gain(dB)	Correction (dBm)	P_{Mea}(dBm)	Polarization
826.4	13.89	20.5	5.3	2.15	-9.76	Horizontal
836.6	12.91	20.5	5.3	2.15	-10.74	Horizontal
846.6	**14.10**	20.5	5.3	2.15	-9.55	Horizontal

Frequency: 846.6MHz

Peak ERP(dBm)= P_{Mea}(-9.55dBm)+ P_{cl}(20.5dB)+G_a (5.3dB)-2.15dBm= 14.10dBm

ANALYZER SETTINGS: RBW = VBW = 3MHz

A.2 EMISSION LIMT (§2.1051/§22.917§24.238)

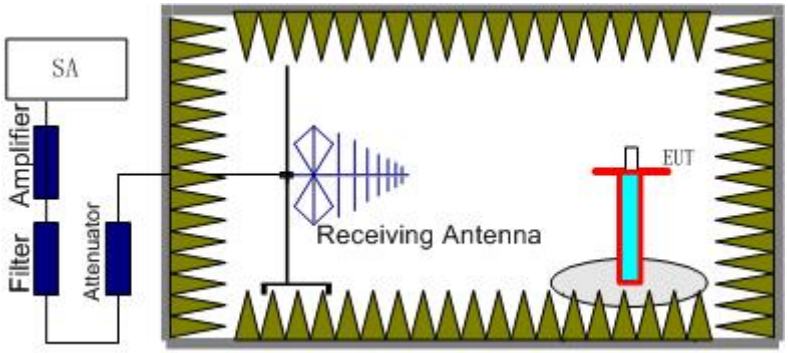
A.2.1 Measurement Method

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

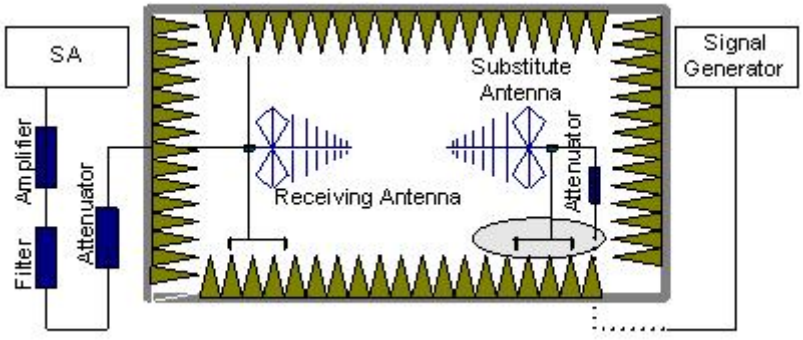
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The resolution bandwidth is set as outlined in Part 24.238 and Part 24.917. The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of WCDMA Band II and WCDMA Band V.

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 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.2.3 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the WCDMA Band II (1852.4 MHz, 1880.0MHz and 1907.6MHz) and 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 and 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
GSM 850MHz	Low	30MHz-10GHz	Pass
	Middle	30MHz-10GHz	Pass
	High	30MHz-10GHz	Pass
GSM 1900MHz	Low	30MHz-20GHz	Pass
	Middle	30MHz-20GHz	Pass
	High	30MHz-20GHz	Pass
GSM 850MHz	Low	9KHz-30MHz	Pass
	Middle	9KHz-30MHz	Pass
	High	9KHz-30MHz	Pass
GSM 1900MHz	Low	9KHz-30MHz	Pass
	Middle	9KHz-30MHz	Pass
	High	9KHz-30MHz	Pass
Received GSM 850MHz	Idle Mode	9KHz-10GHz	Pass
Received GSM 1900MHz	Idle Mode	9KHz-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

Frequency(MHz)	Peak ERP(dBm)	Path Loss	Antenna Gain	P_{Mea}(dBm)	Limit （dBm）	Polarization
3703.25	-44.12	11.57	-8.14	-40.69	-13	V
5120.04	-59.55	13.76	-9.77	-55.56	-13	H
7404.90	-44.04	16.79	-11.34	-38.59	-13	V
8525.55	-56.82	18.25	-12.22	-50.79	-13	V
11225.11	-48.95	21.36	-12.40	-39.99	-13	V
16815.77	-50.34	27.11	-12.40	-35.63	-13	H

WCDMA BAND II Mode Channel 9400/1880MHz

Frequency(MHz)	Peak ERP(dBm)	Path Loss	Antenna Gain	P_{Mea}(dBm)	Limit （dBm）	Polarization
3762.36	-36.18	11.66	-8.21	-32.73	-13	H
5639.65	-39.00	14.46	-10.06	-34.60	-13	V
7520.13	-44.73	17.05	-11.42	-39.10	-13	V
8640.25	-56.22	18.43	-12.31	-50.10	-13	V
13356.59	-52.10	23.66	-13.66	-42.10	-13	H
16279.73	-49.03	26.59	-12.66	-35.10	-13	H

WCDMA BAND II Mode Channel 9538/1907.6MHz

Frequency(MHz)	Peak ERP(dBm)	Path Loss	Antenna Gain	P_{Mea}(dBm)	Limit （dBm）	Polarization
3812.98	-40.57	11.85	-8.27	-36.99	-13	V
5719.02	-40.16	14.56	-10.09	-35.69	-13	V
7631.01	-52.53	17.08	-11.53	-46.98	-13	V
10957.31	-55.68	21.06	-12.41	-47.03	-13	H
12424.14	-56.93	22.67	-12.67	-46.93	-13	H
14938.68	-52.76	25.20	-13.51	-41.07	-13	H

WCDMA BAND II Receiver Mode

Frequency(MHz)	Peak ERP(dBm)	Path Loss	Antenna Gain	P_{Mea}(dBm)	Limit （dBm）	Polarization
5121.05	-59.55	13.76	-9.77	-55.56	-13	H
7521.13	-44.73	17.05	-11.42	-39.10	-13	V
8525.50	-56.82	18.25	-12.22	-50.79	-13	V
11225.41	-48.95	21.36	-12.40	-39.99	-13	V
13357.59	-52.10	23.66	-13.66	-42.10	-13	H
14939.65	-52.76	25.20	-13.51	-41.07	-13	H

WCDMA BAND V Mode Channel 4132/826.4MHz

Frequency(MHz)	Peak ERP(dBm)	Path Loss	Antenna Gain	Correction (dBm)	P_{Mea}(dBm)	Limit （dBm）	Polarization
1636.90	-57.69	7.82	-5.48	2.15	-55.35	-13	V
2600.53	-59.47	9.78	-5.66	2.15	-55.35	-13	V
3300.75	-51.15	10.99	-7.42	2.15	-47.58	-13	V
4039.16	-58.33	12.19	-8.52	2.15	-54.66	-13	H
5013.10	-59.11	13.54	-9.71	2.15	-55.28	-13	V
7216.94	-56.27	16.54	-11.22	2.15	-50.95	-13	V

WCDMA BAND V Mode Channel 4183/836.6MHz

Frequency(MHz)	Peak ERP(dBm)	Path Loss	Antenna Gain	Correction (dBm)	P_{Mea}(dBm)	Limit （dBm）	Polarization
1428.26	-60.05	7.29	-5.44	2.15	-58.20	-13	V
1794.77	-50.61	8.17	-4.82	2.15	-47.26	-13	V
3351.49	-47.13	10.99	-7.54	2.15	-43.68	-13	V
4179.43	-53.60	12.33	-8.61	2.15	-49.88	-13	V
6198.74	-58.54	15.22	-10.36	2.15	-53.68	-13	V
6685.81	-51.55	15.76	-10.79	2.15	-46.58	-13	V

WCDMA BAND V Mode Channel 4233/846.6MHz

Frequency(MHz)	Peak ERP(dBm)	Path Loss	Antenna Gain	Correction (dBm)	P_{Mea}(dBm)	Limit （dBm）	Polarization
3391.26	-43.40	11.10	-7.64	2.15	-39.94	-13	V
4239.22	-46.64	12.42	-8.64	2.15	-42.86	-13	V
5086.72	-53.93	13.63	-9.75	2.15	-50.05	-13	V
6782.88	-41.59	15.96	-10.88	2.15	-36.51	-13	V
9115.41	-54.12	19.06	-12.60	2.15	-47.66	-13	H
9539.25	-54.47	19.39	-12.58	2.15	-47.66	-13	H

WCDMA BAND V Receiver Mode Channel

Frequency(MHz)	Peak ERP(dBm)	Path Loss	Antenna Gain	Correction (dBm)	P_{Mea}(dBm)	Limit （dBm）	Polarization
1429.25	-60.05	7.29	-5.44	2.15	-58.20	-13	V
1634.91	-57.69	7.82	-5.48	2.15	-55.35	-13	V
4180.11	-53.60	12.33	-8.61	2.15	-49.88	-13	V
6198.22	-58.54	15.22	-10.36	2.15	-53.68	-13	V
6684.52	-51.55	15.76	-10.79	2.15	-46.58	-13	V
9540.60	-54.47	19.39	-12.58	2.15	-47.66	-13	H

A.3 FREQUENCY STABILITY (§2.1055/§24.235)

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 channel 9400 for WCDMA Band II and channel 4183 for 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. 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 4.8VDCand 5.2VDC with a nominal voltage of 5VDC. 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.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. 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.3.3 Measurement results

WCDMA Band Ⅱ

Frequency Error vs Voltage

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
4.8	27	0.029
5	30	0.032
5.2	35	0.037

Frequency Error vs Temperature

temperature(℃)	Frequency error(Hz)	Frequency error(ppm)
-30	37	0.039
-20	35	0.037
-10	34	0.036
0	32	0.034
10	30	0.032
20	30	0.032
30	30	0.032
40	32	0.034
50	35	0.037

WCDMA Band Ⅴ

Frequency Error vs Voltage

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
4.8	9	0.010
5	7	0.007
5.2	10	0.011

Frequency Error vs Temperature

temperature(℃)	Frequency error(Hz)	Frequency error(ppm)
-30	14	0.015
-20	12	0.013
-10	10	0.011
0	9	0.010
10	7	0.007
20	7	0.007
30	7	0.007
40	9	0.010
50	10	0.011

A.4 OCCUPIED BANDWIDTH (§2.1049(h)(i))

A.4.1 Occupied Bandwidth Results

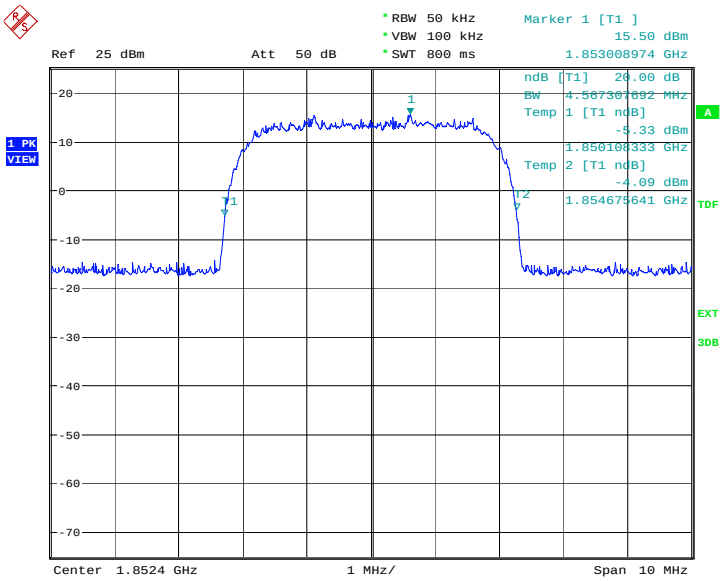
Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of WCDMA Band II and WCDMA Band V. The table below lists the measured -20dBc BW. Spectrum analyzer plots are included on the following pages.

WCDMA Band II(-20dBc)

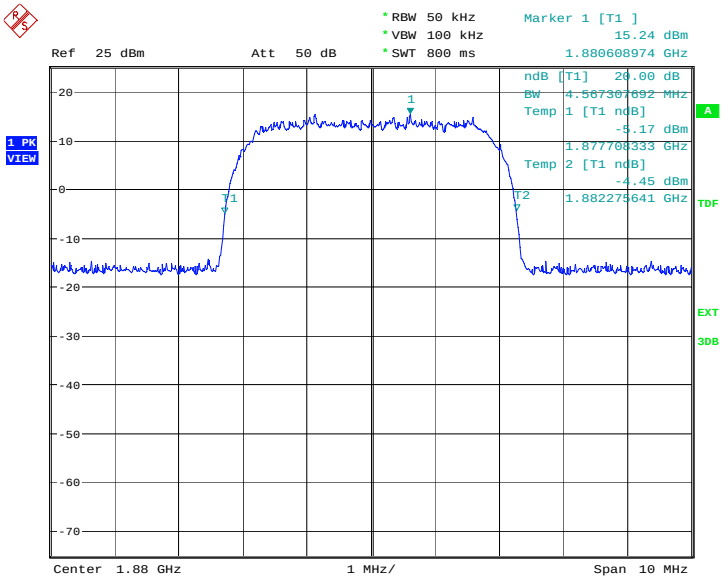
Frequency(MHz)	Occupied Bandwidth (-20dBc BW)(MHz)
1852.4	4.567
1880.0	4.567
1907.6	4.567

WCDMA Band Ⅱ

Channel 9262-Occupied Bandwidth (-20dBc BW)

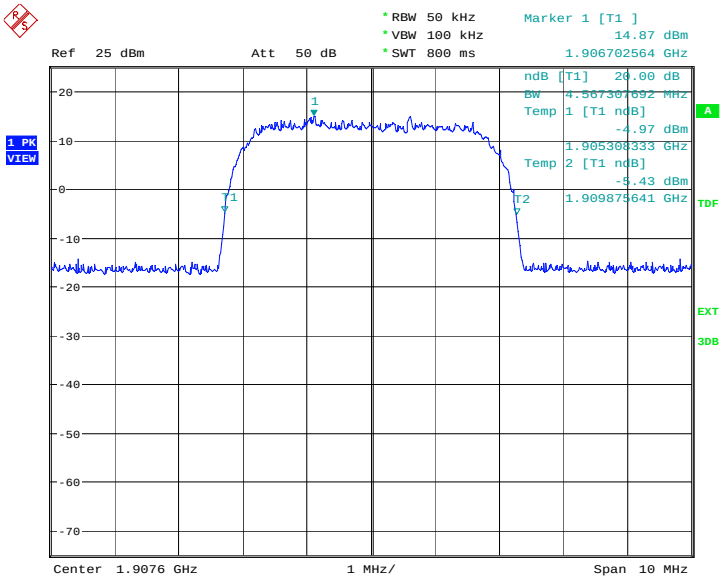


Channel 9400-Occupied Bandwidth (-20dBc BW)



Date: 18.FEB.2011 00:07:44

Channel 9538-Occupied Bandwidth (-20dBc BW)



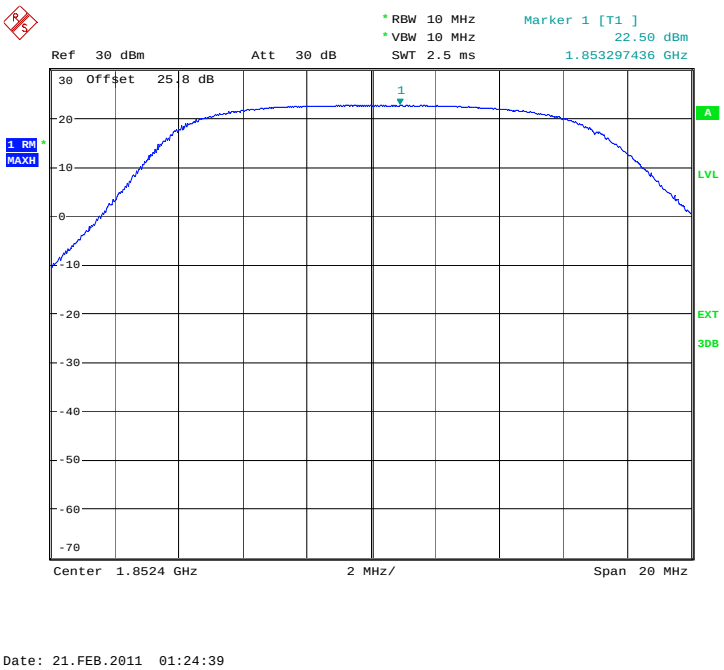
Date: 18.FEB.2011 00:08:13

WCDMA Band II(-20dBc)-IC

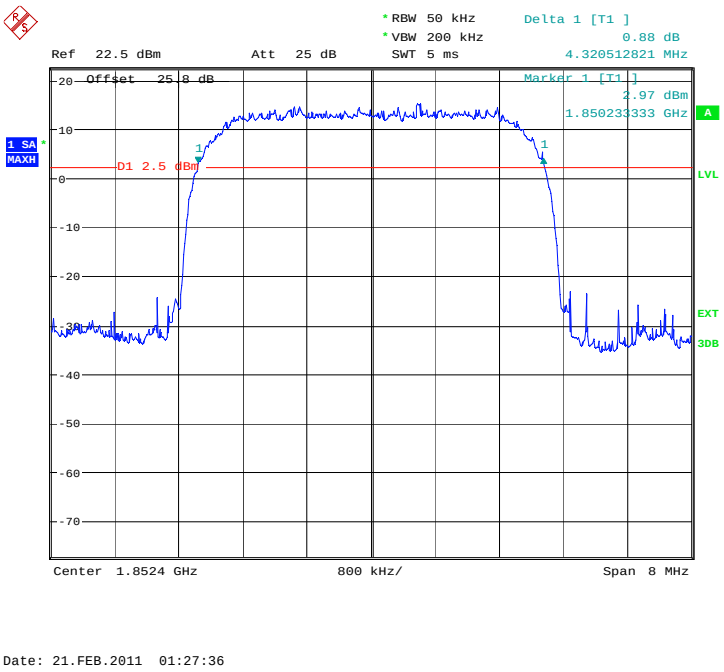
Frequency(MHz)	Occupied Bandwidth (-20dBc BW)(MHz)
1852.4	4.321
1880.0	4.333
1907.6	4.333

WCDMA Band Ⅱ

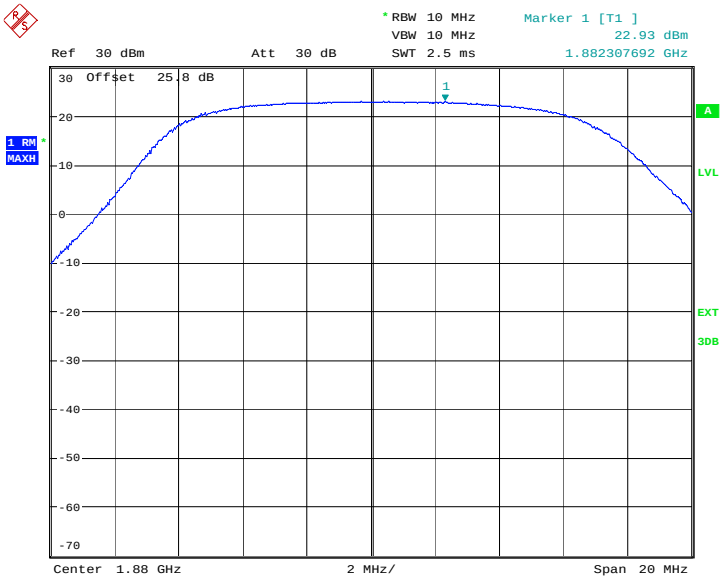
Channel 9262-Occupied Bandwidth Reference Level



Channel 9262-Occupied Bandwidth (-20dBc BW)

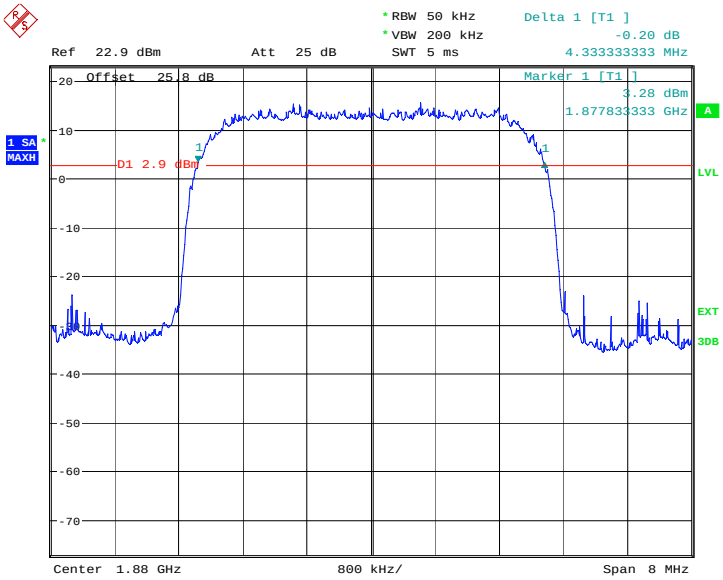


Channel 9400-Occupied Bandwidth Reference Level



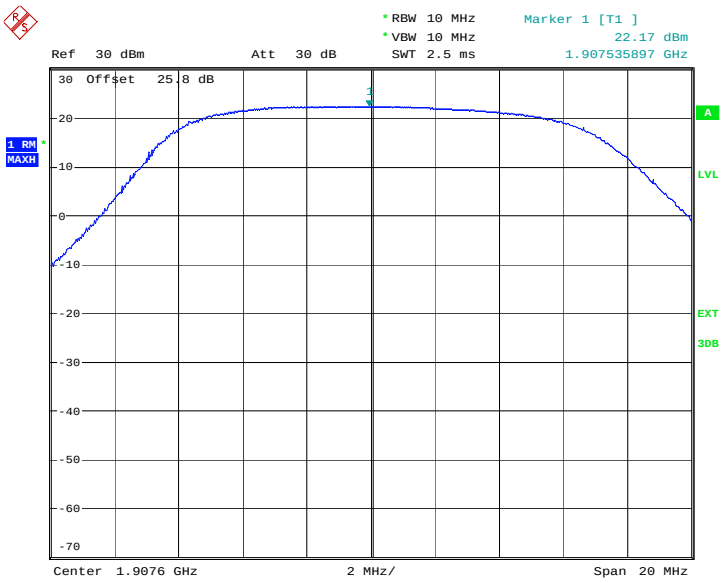
Date: 21.FEB.2011 01:05:00

Channel 9400-Occupied Bandwidth (-20dBc BW)



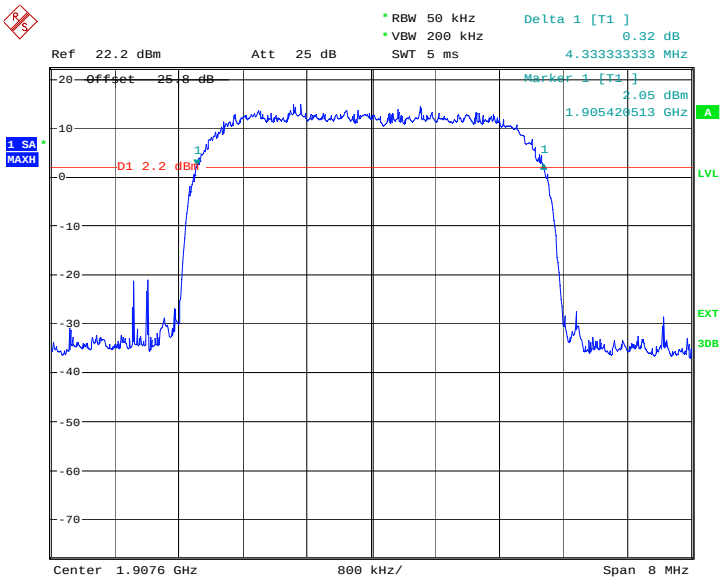
Date: 21.FEB.2011 01:07:14

Channel 9538-Occupied Reference Level (-20dBc BW)



Date: 21.FEB.2011 00:56:23

Channel 9538-Occupied Bandwidth (-20dBc BW)



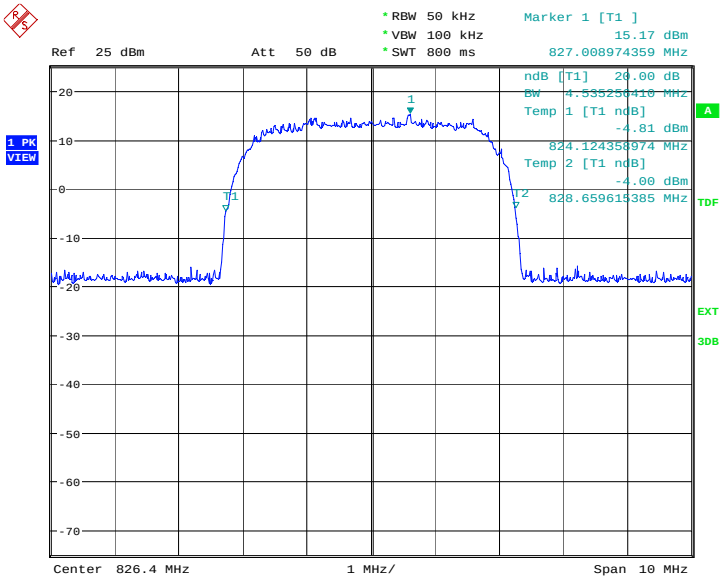
Date: 21.FEB.2011 00:58:43

WCDMA Band V(-20dBc)

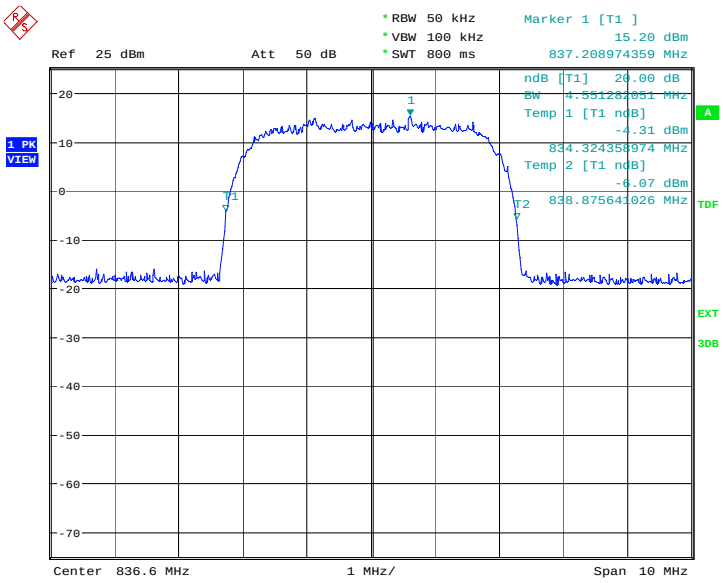
Frequency(MHz)	Occupied Bandwidth (-20dBc BW)(MHz)
826.4	4.535
836.6	4.551
846.6	4.551

WCDMA Band Ⅴ

Channel 4132-Occupied Bandwidth (-20dBc BW)

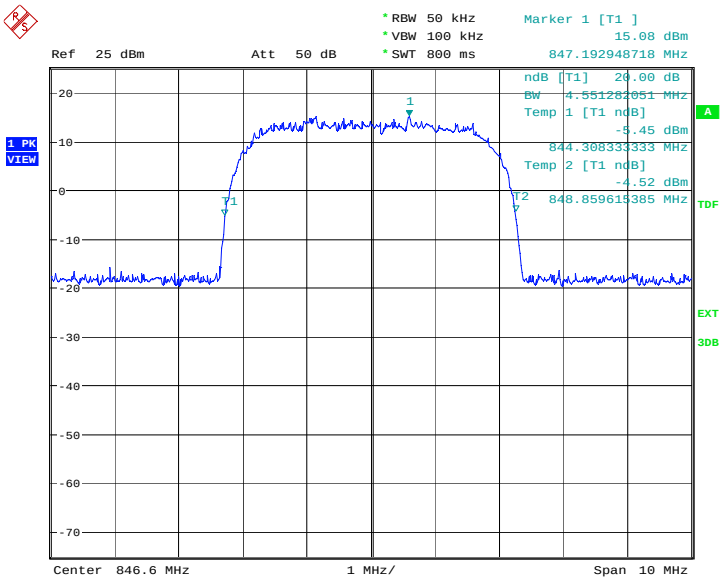


Channel 4183-Occupied Bandwidth (-20dBc BW)



Date: 18.FEB.2011 00:20:28

Channel 4233-Occupied Bandwidth (-20dBc BW)



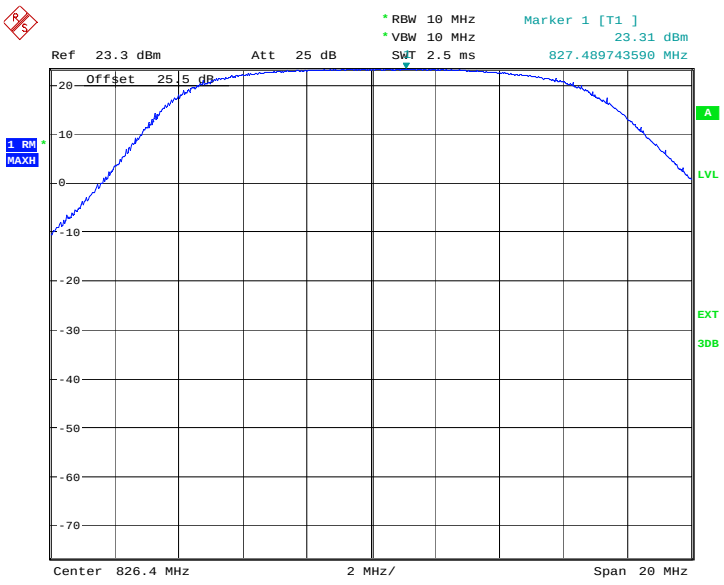
Date: 18.FEB.2011 00:20:57

WCDMA Band V(-20dBc)-IC

Frequency(MHz)	Occupied Bandwidth (-20dBc BW)(MHz)
826.4	4.269
836.6	4.224
846.6	4.231

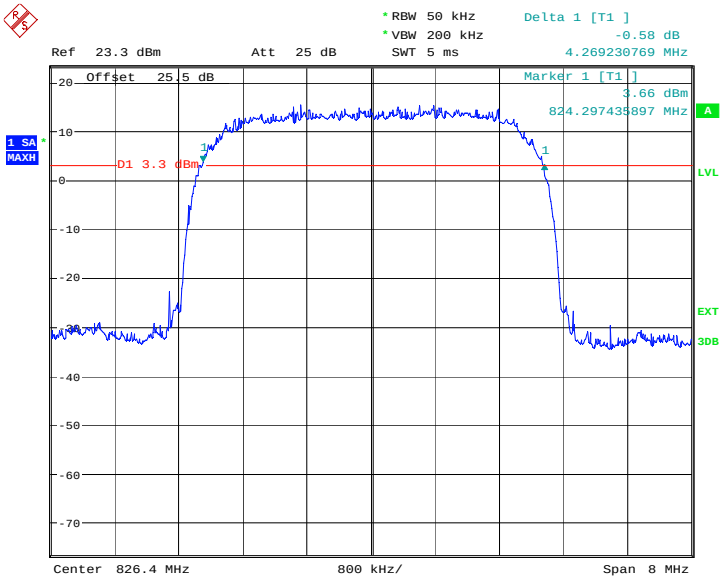
WCDMA Band Ⅴ

Channel 4132-Occupied Bandwidth Reference Level



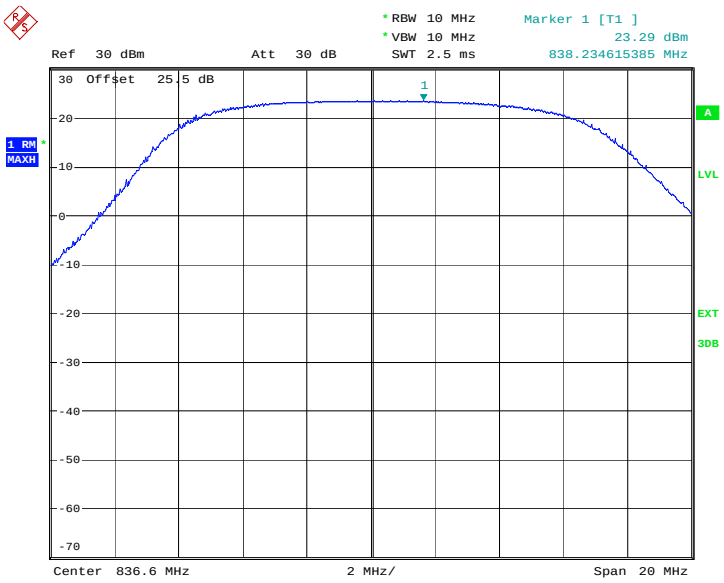
Date: 21.FEB.2011 01:34:05

Channel 4132-Occupied Bandwidth (-20dBc BW)



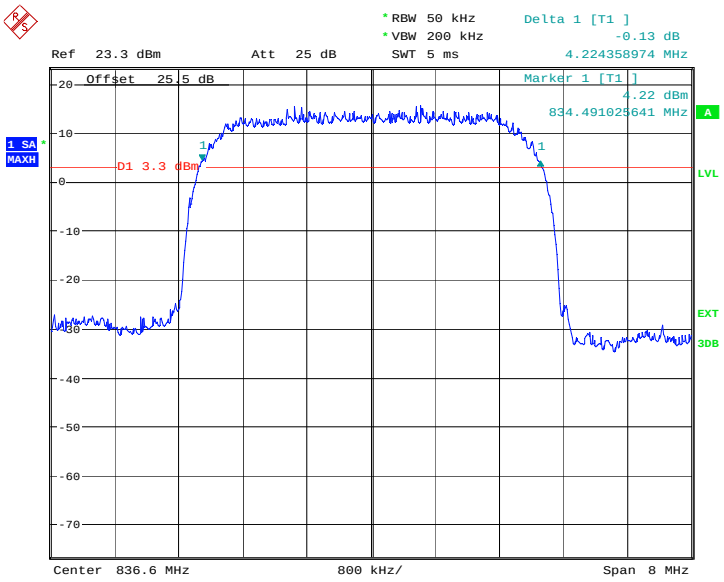
Date: 21.FEB.2011 01:35:48

Channel 4183-Occupied Reference Level



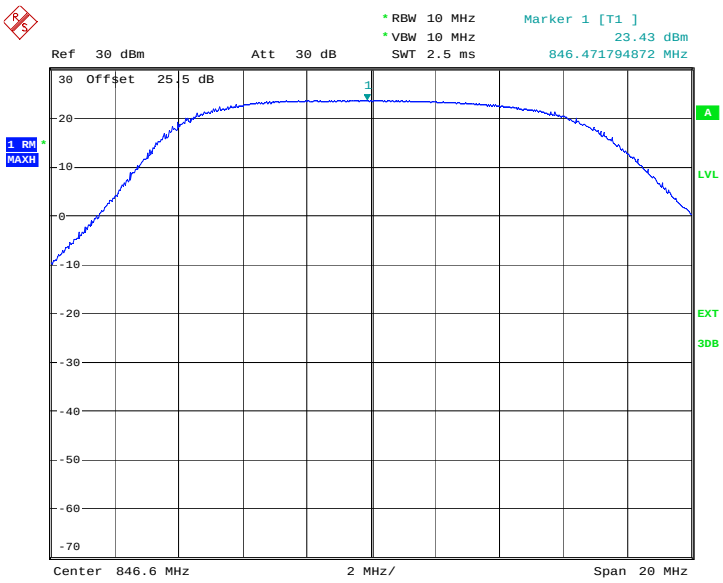
Date: 21.FEB.2011 01:39:37

Channel 4183-Occupied Bandwidth (-20dBc BW)



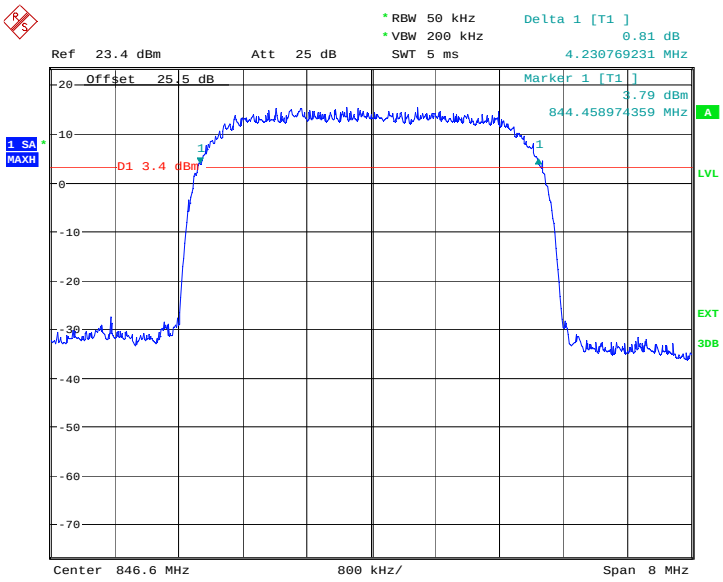
Date: 21.FEB.2011 01:41:20

Channel 4233-Occupied Bandwidth Reference Level



Date: 21.FEB.2011 01:59:46

Channel 4233-Occupied Bandwidth (-20dBc BW)



Date: 21.FEB.2011 02:01:12

A.5 EMISSION BANDWIDTH (§22.917(b)/§24.238(b))

A.5.1Emission Bandwidth Results

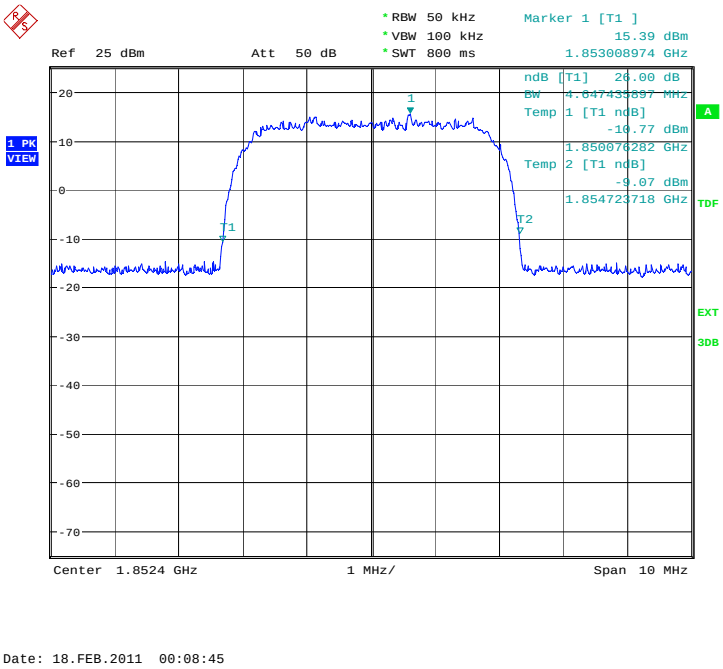
Similar to conducted emissions; Emission bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of WCDMA Band II and WCDMA Band V. Table below lists the measured -26dBc BW. Spectrum analyzer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

WCDMA Band II(-26dBc)

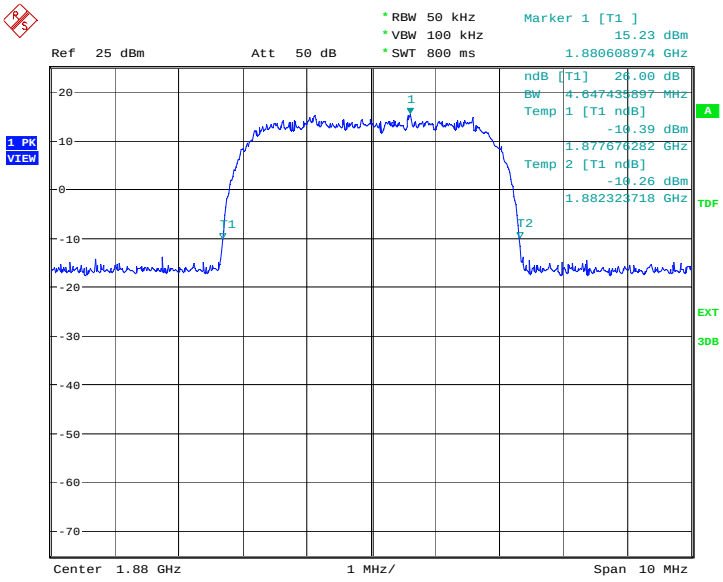
Frequency(MHz)	Occupied Bandwidth (–26dBc BW)(MHz)
1852.4	4.647
1880.0	4.647
1907.6	4.663

WCDMA Band II

Channel 9262-Occupied Bandwidth (-26dBc BW)

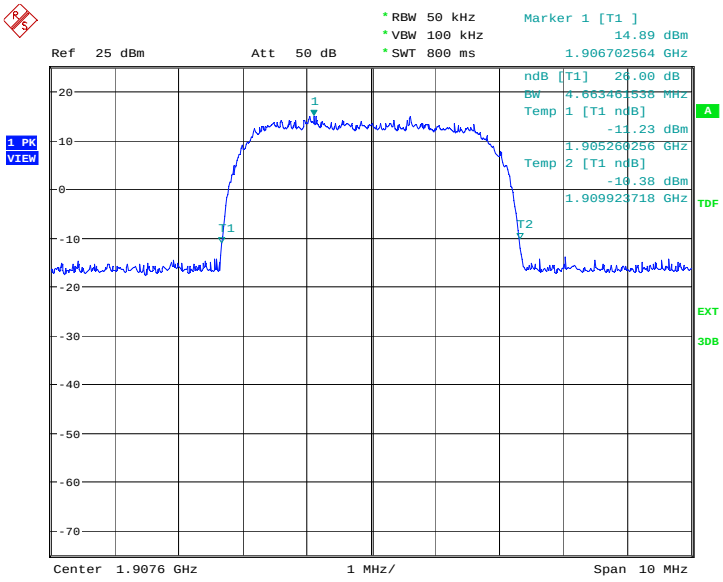


Channel 9400-Occupied Bandwidth (-26dBc BW)



Date: 18.FEB.2011 00:09:14

Channel 9538-Occupied Bandwidth (-26dBc BW)



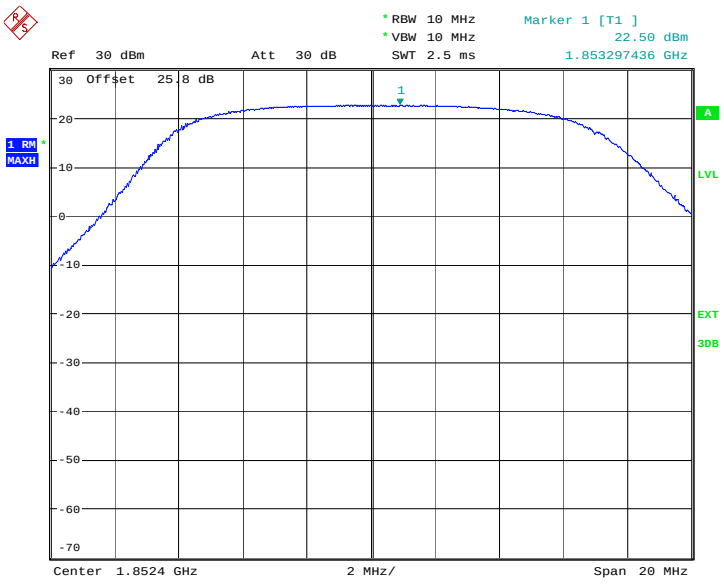
Date: 18.FEB.2011 00:09:44

WCDMA Band II(-26dBc)-IC

Frequency(MHz)	Occupied Bandwidth (–26dBc BW)(MHz)
1852.4	4.526
1880.0	4.526
1907.6	4.526

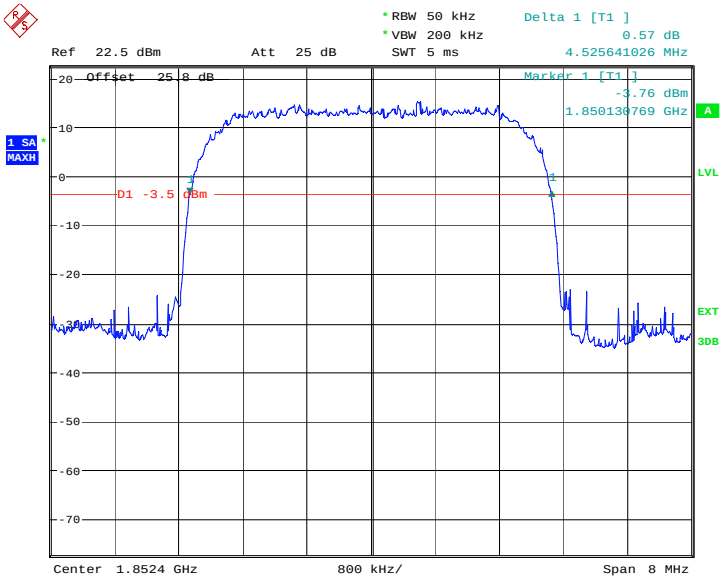
WCDMA Band Ⅱ

Channel 9262-Occupied Bandwidth Reference Level



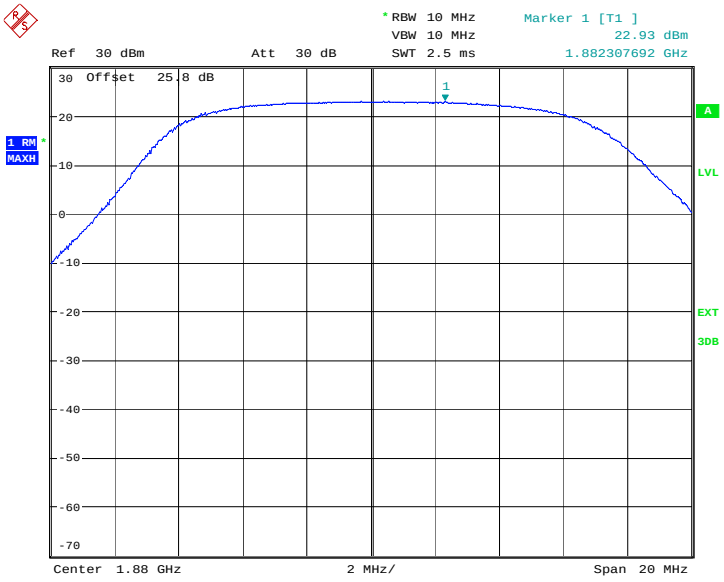
Date: 21.FEB.2011 01:24:39

Channel 9262-Occupied Bandwidth (-26dBc BW)



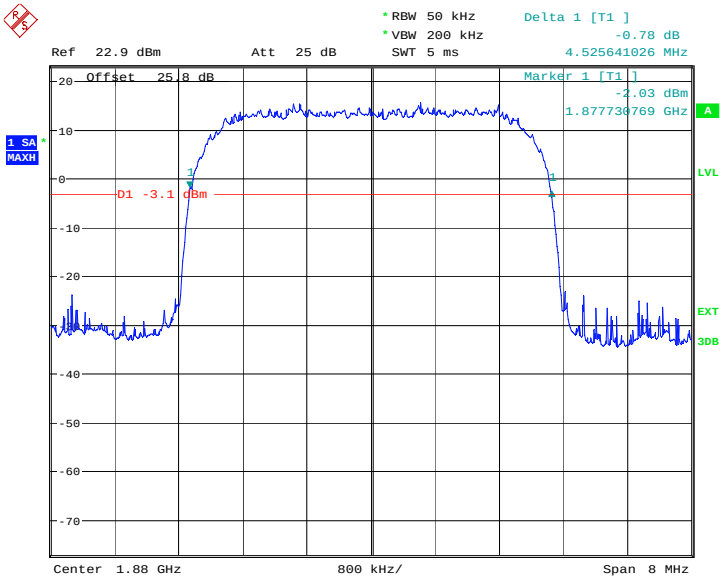
Date: 21.FEB.2011 01:28:45

Channel 9400-Occupied Bandwidth Reference Level



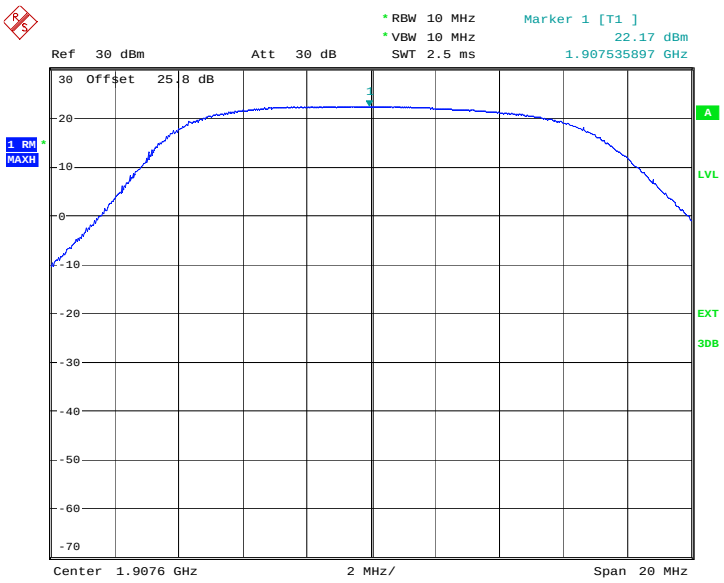
Date: 21.FEB.2011 01:05:00

Channel 9400-Occupied Bandwidth (-26dBc BW)



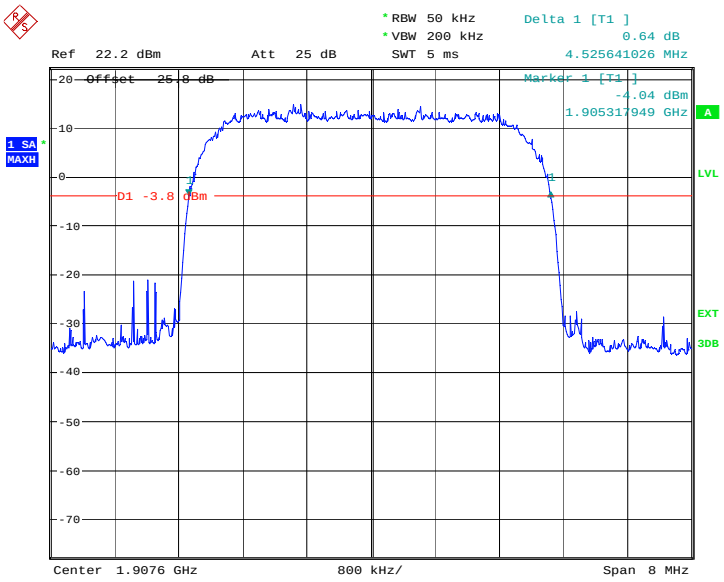
Date: 21.FEB.2011 01:08:55

Channel 9538-Occupied Reference Level



Date: 21.FEB.2011 00:56:23

Channel 9538-Occupied Bandwidth (-26dBc BW)



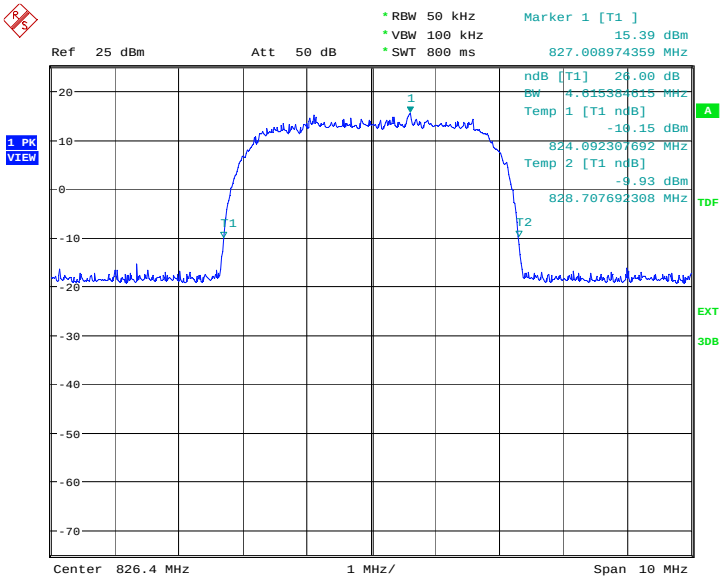
Date: 21.FEB.2011 00:59:57

WCDMA Band Ⅴ(-26dBc)

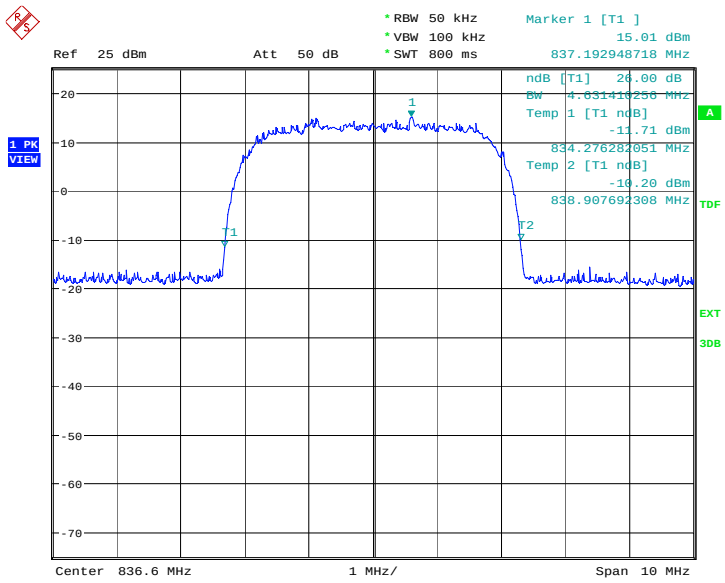
Frequency(MHz)	Occupied Bandwidth (–26dBc BW)(MHz)
826.40	4.615
836.60	4.631
846.60	4.647

WCDMA Band Ⅴ

Channel 4132-Occupied Bandwidth (-26dBc BW)

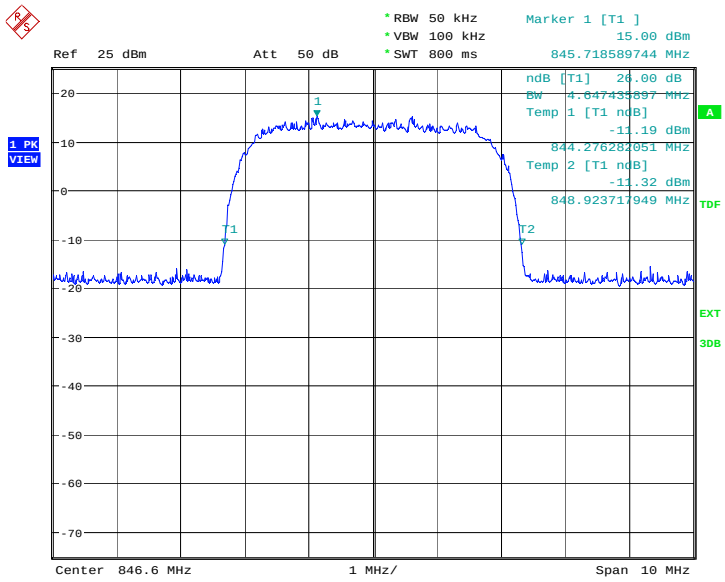


Channel 4183-Occupied Bandwidth (-26dBc BW)



Date: 18.FEB.2011 00:21:58

Channel 4233-Occupied Bandwidth (-26dBc BW)



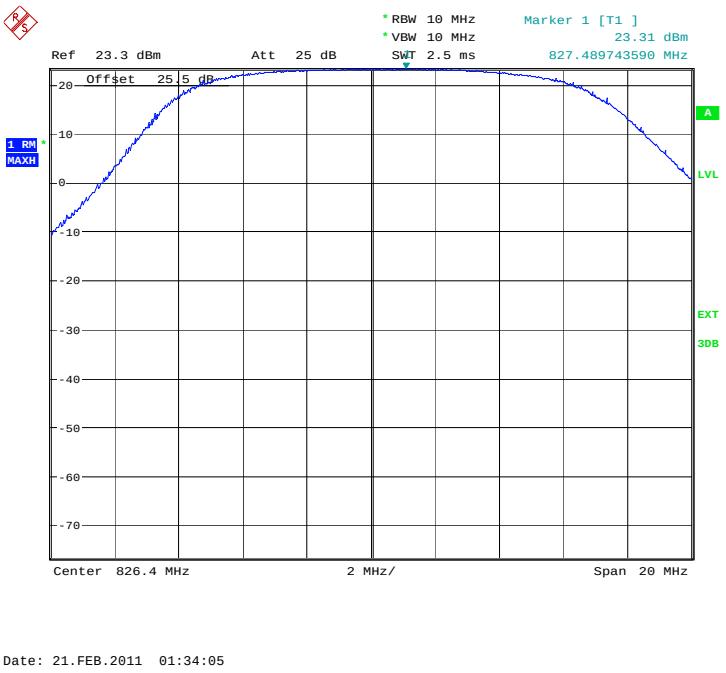
Date: 18.FEB.2011 00:22:27

WCDMA Band Ⅴ(-26dBc)-IC

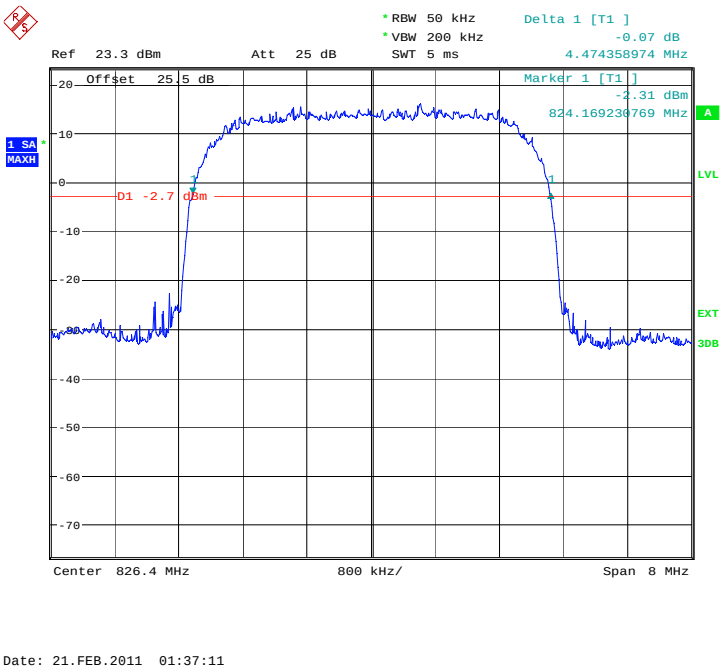
Frequency(MHz)	Occupied Bandwidth (–26dBc BW)(MHz)
826.40	4.474
836.60	4.481
846.60	4.500

WCDMA Band Ⅴ

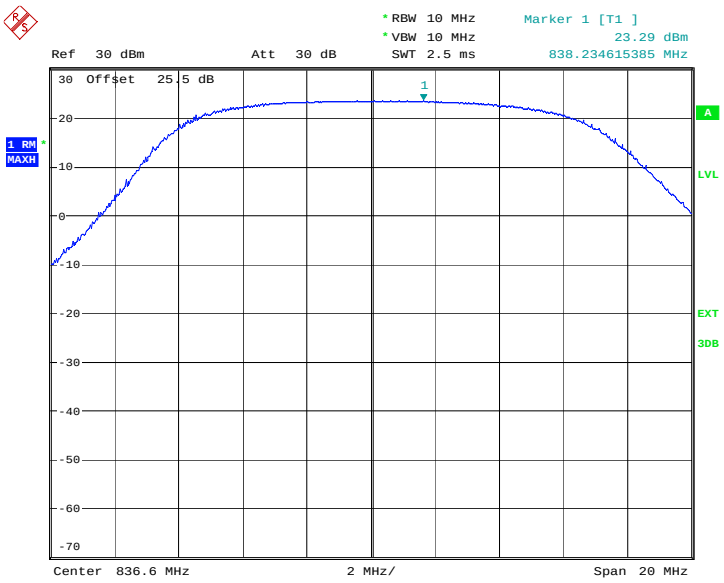
Channel 4132-Occupied Bandwidth Reference Level



Channel 4132-Occupied Bandwidth (-26dBc BW)

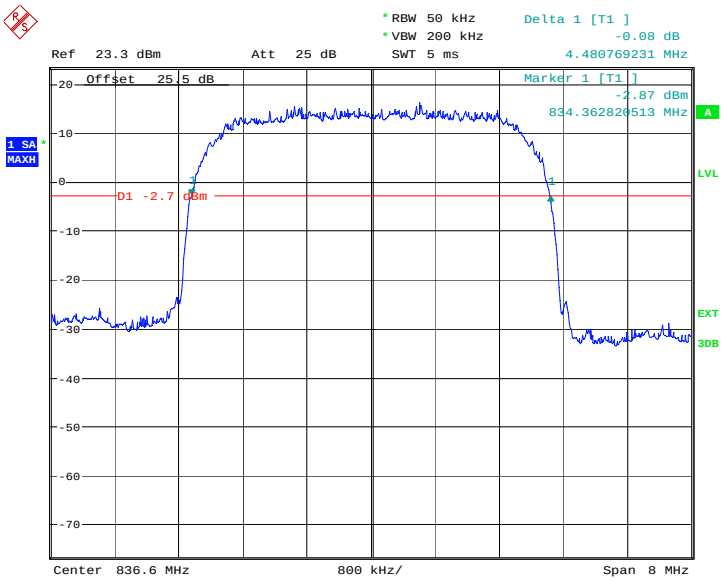


Channel 4183-Occupied Reference Level



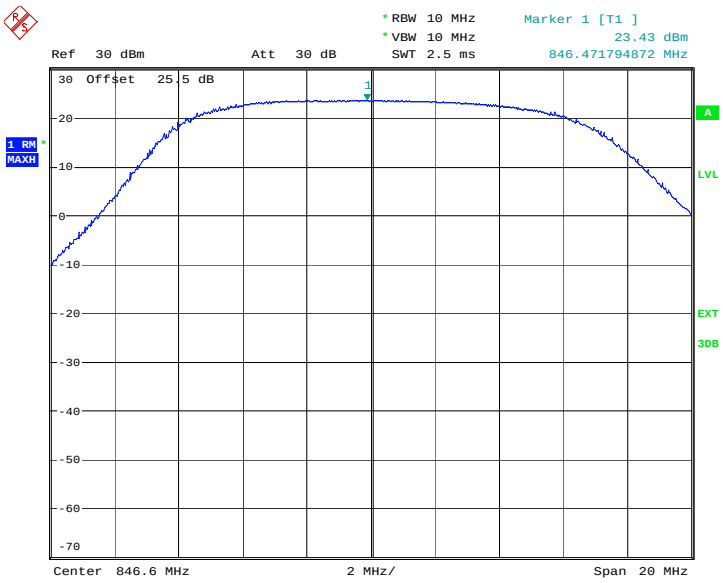
Date: 21.FEB.2011 01:39:37

Channel 4183-Occupied Bandwidth (-26dBc BW)



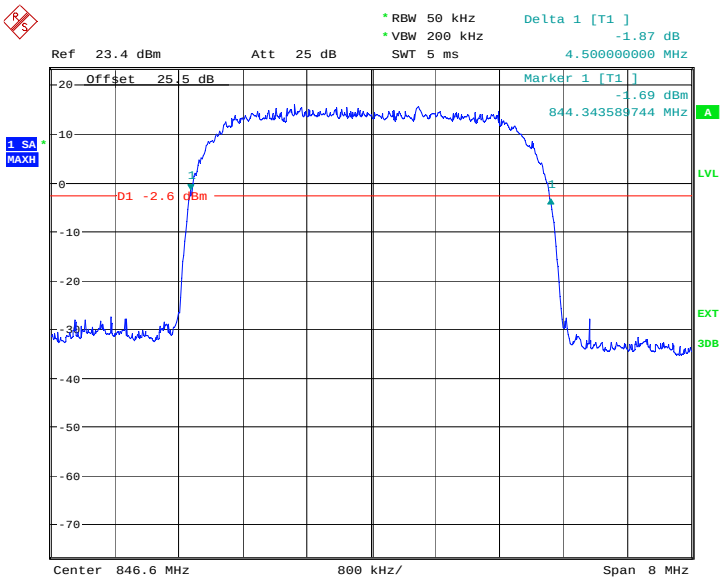
Date: 21.FEB.2011 01:43:09

Channel 4233-Occupied Bandwidth Reference Level



Date: 21.FEB.2011 01:59:46

Channel 4233-Occupied Bandwidth (-26dBc BW)

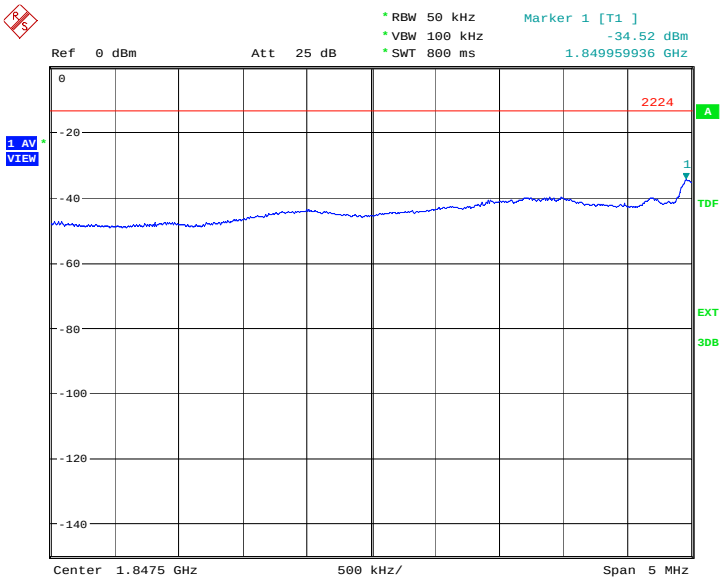


Date: 21.FEB.2011 02:02:28

A.6 BAND EDGE COMPLIANCE (§22.917(b)/§24.238(b))

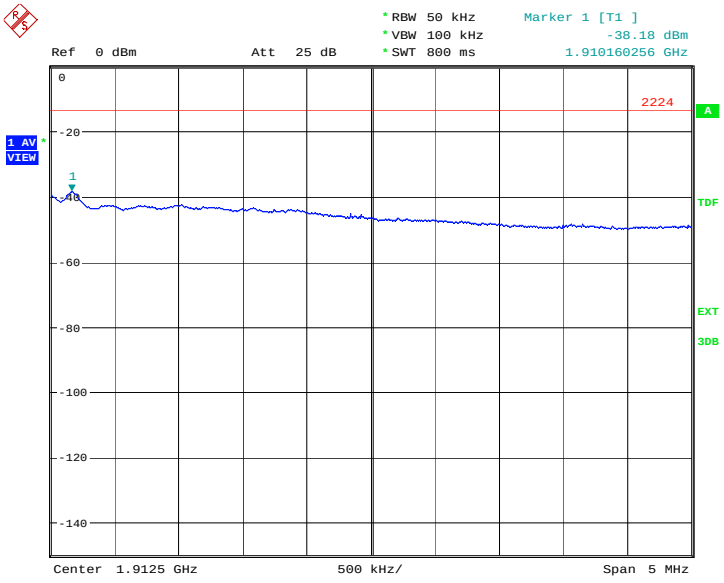
WCDMA Band Ⅱ

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



Date: 18.FEB.2011 00:10:16

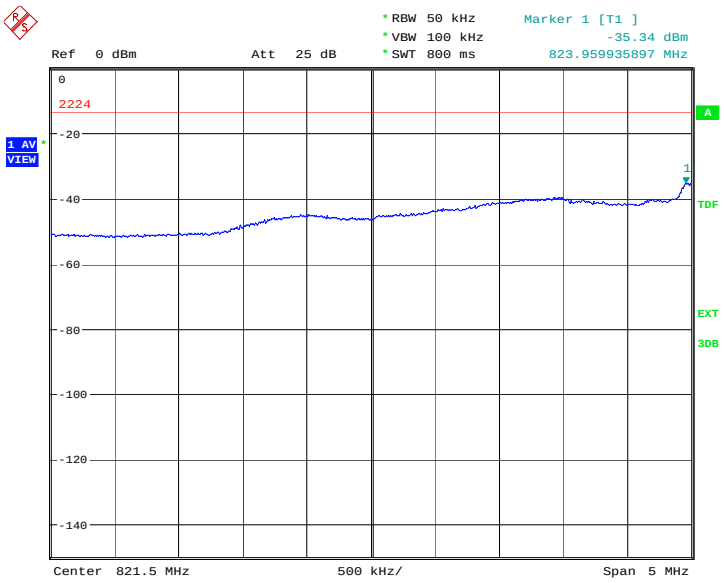
HIGH BAND EDGE BLOCK-C (WCDMA Band Ⅱ) –Channel 9538



Date: 18.FEB.2011 00:10:47

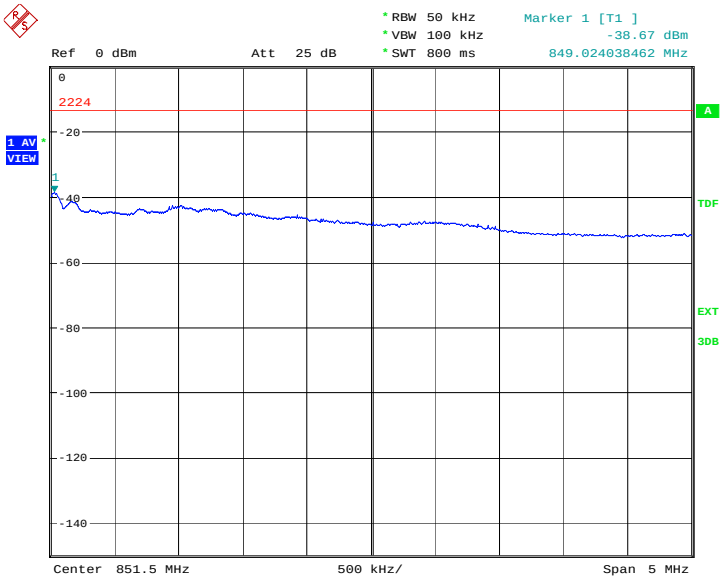
WCDMA Band Ⅴ

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



Date: 18.FEB.2011 00:22:59

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



Date: 18.FEB.2011 00:23:30

A.7 CONDUCTED SPURIOUS EMISSION (§2.1057/§22.917/§24.238)

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 equipment of WCDMA Band II, this equates to a frequency range of 30 MHz to 19.1 GHz, data taken from 30 MHz to 20 GHz. For WCDMA Band V, data taken from 30 MHz to 10GHz.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

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

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.

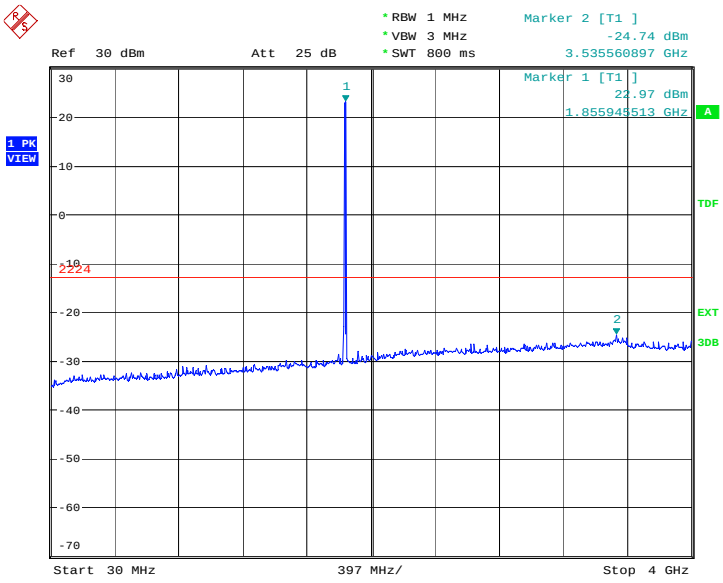
A.7.3 Measurement result

WCDMA Band Ⅱ

A. 7.3.1 Channel 9262: 30MHz –4GHz

Spurious emission limit –13dBm.

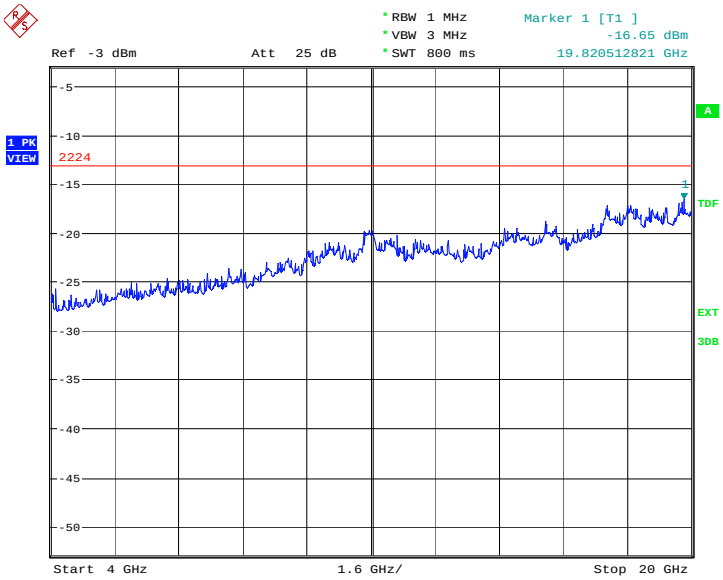
NOTE: peak above the limit line is the carrier frequency.



Date: 18.FEB.2011 00:11:18

A.7.3.2 Channel 9262: 4GHz –20GHz

Spurious emission limit –13dBm.

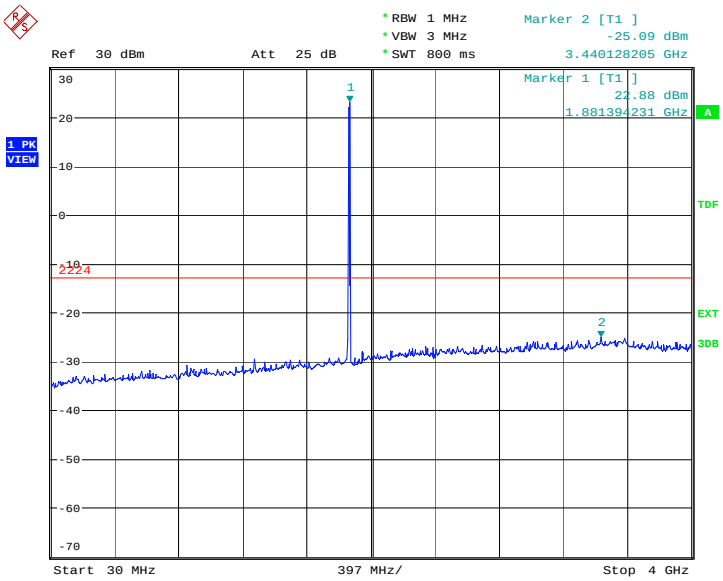


Date: 18.FEB.2011 00:11:47

A.7.3.3 Channel 9400: 30MHz – 4GHz

Spurious emission limit –13dBm.

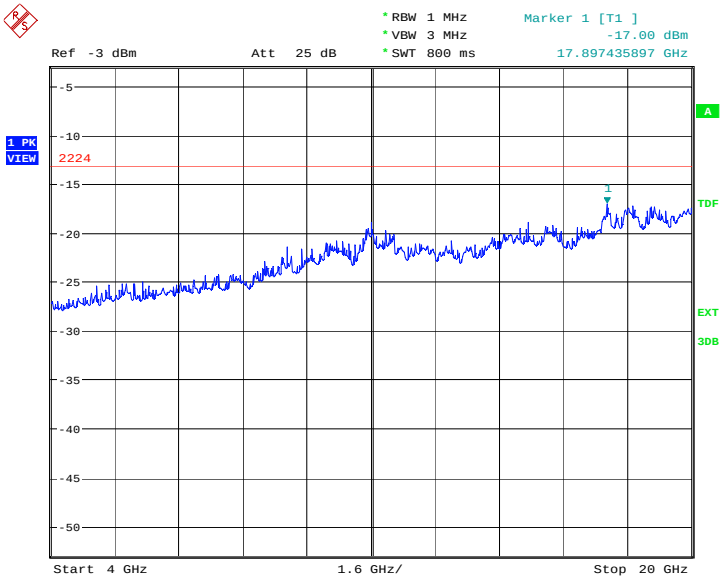
NOTE: peak above the limit line is the carrier frequency.



Date: 18.FEB.2011 00:12:18

A. 7.3.4 Channel 9400: 4GHz – 20GHz

Spurious emission limit –13dBm.

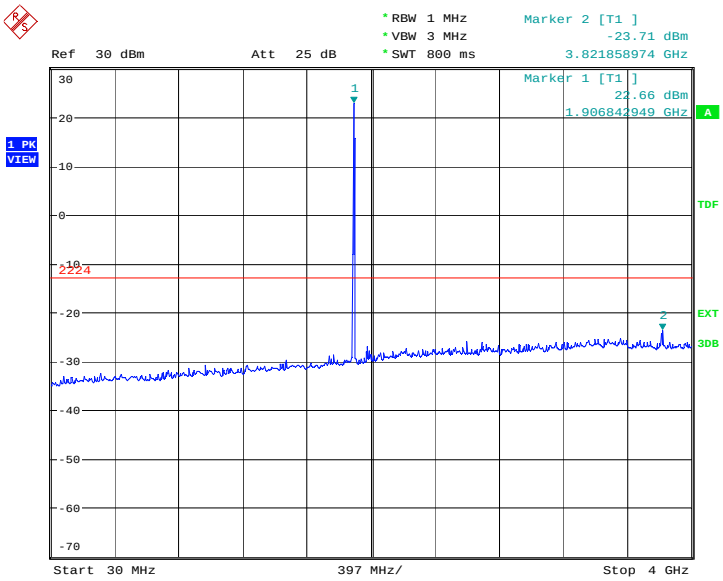


Date: 18.FEB.2011 00:12:47

A. 7.3.5 Channel 9538: 30MHz – 4GHz

Spurious emission limit –13dBm.

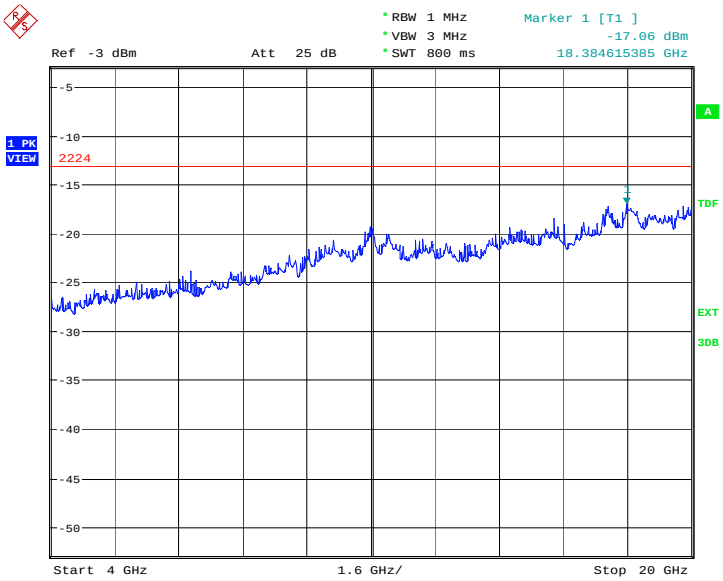
NOTE: peak above the limit line is the carrier frequency.



Date: 18.FEB.2011 00:13:18

A. 7.3.6 Channel 9538: 4GHz – 20GHz

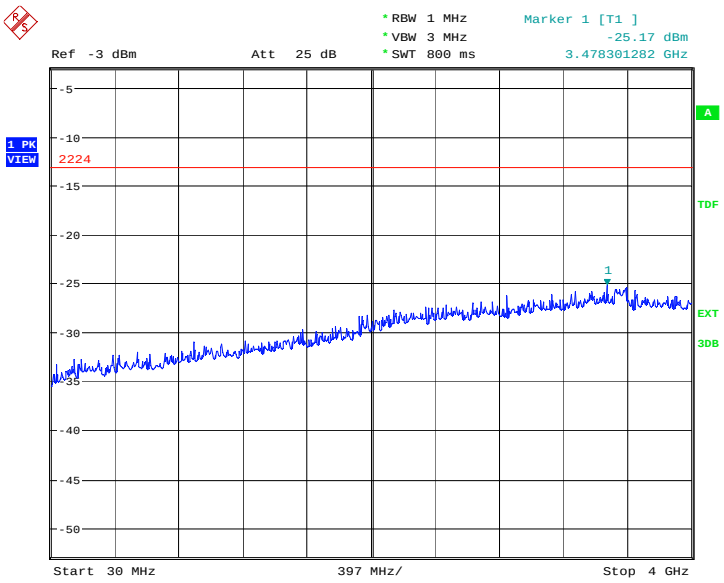
Spurious emission limit –13dBm.



Date: 18.FEB.2011 00:13:47

A.7.3.7 Idle mode: 30MHz – 4GHz

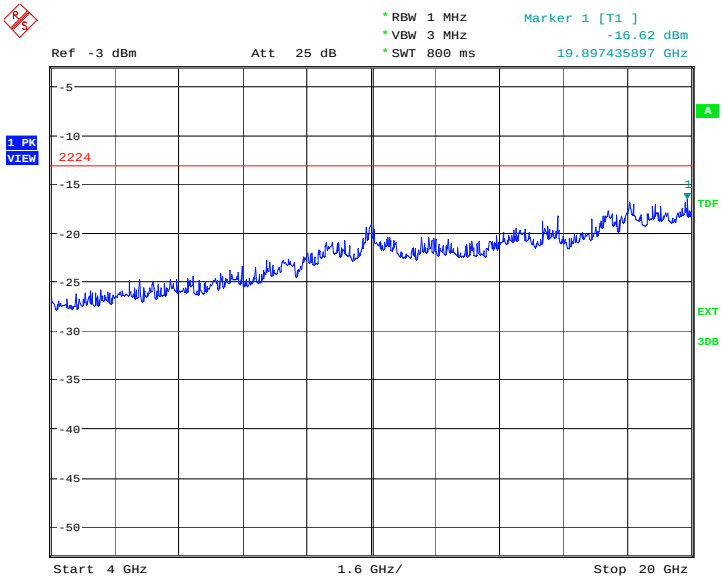
Spurious emission limit -13dBm.



Date: 18.FEB.2011 00:14:16

A. 7.3.8 Idle mode: 4GHz – 20GHz

Spurious emission limit -13dBm.



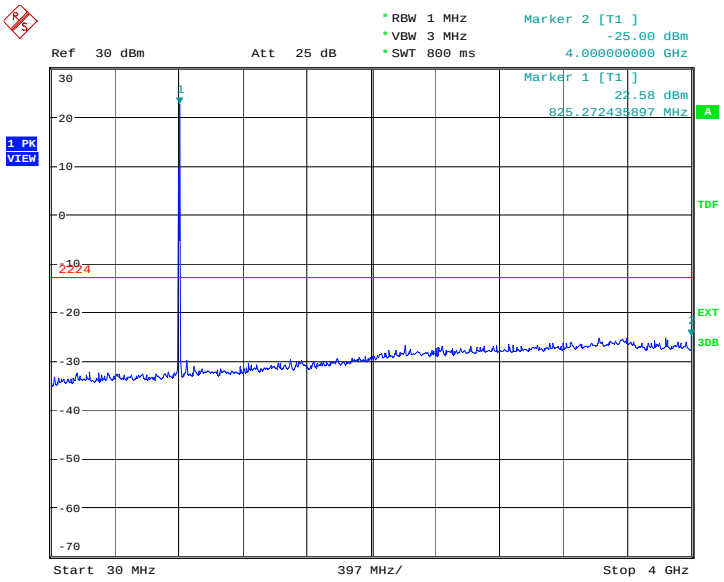
Date: 18.FEB.2011 00:14:45

WCDMA Band Ⅴ

A. 7.3.9 Channel 4132: 30MHz – 4GHz

Spurious emission limit –13dBm.

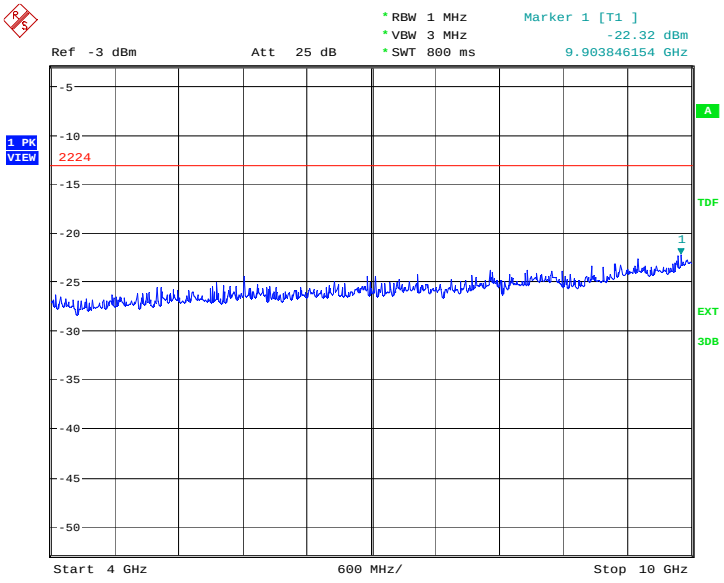
NOTE: peak above the limit line is the carrier frequency.



Date: 18.FEB.2011 00:24:01

A. 7.3.10 Channel 4132: 4GHz – 10GHz

Spurious emission limit –13dBm.

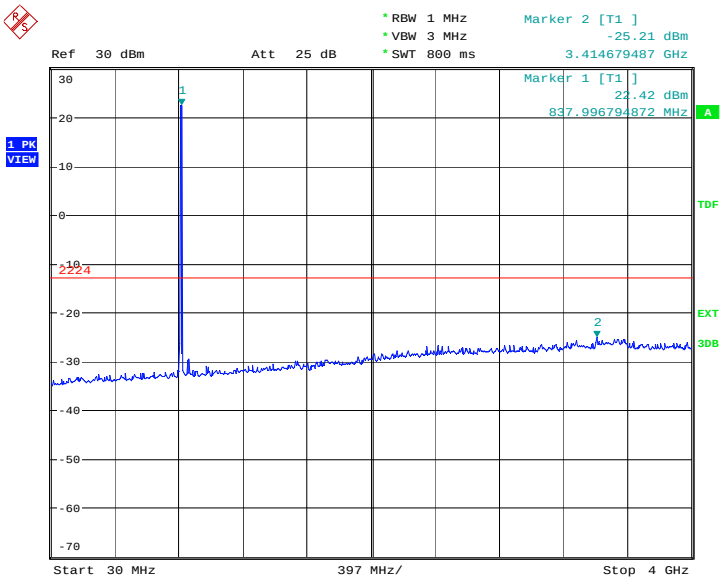


Date: 18.FEB.2011 00:24:29

A.7.3.11 Channel 4183: 30MHz – 4GHz

Spurious emission limit –13dBm.

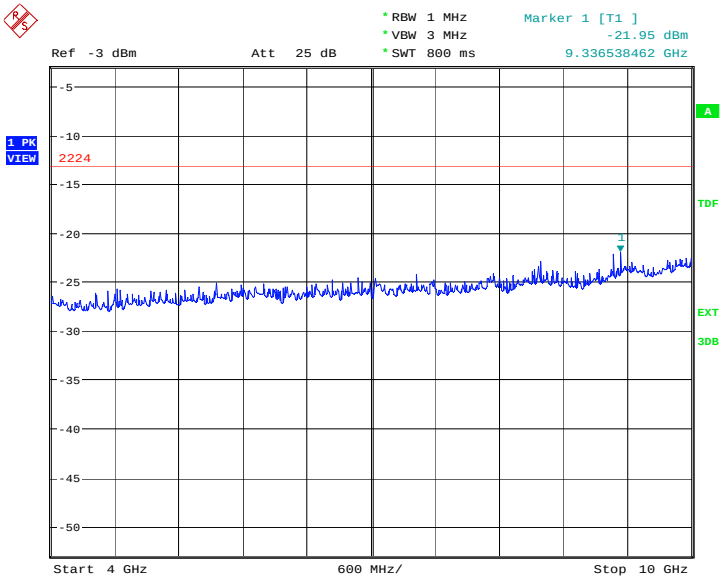
NOTE: peak above the limit line is the carrier frequency.



Date: 18.FEB.2011 00:25:01

A. 7.3.12 Channel 4183:4GHz – 10GHz

Spurious emission limit –13dBm.

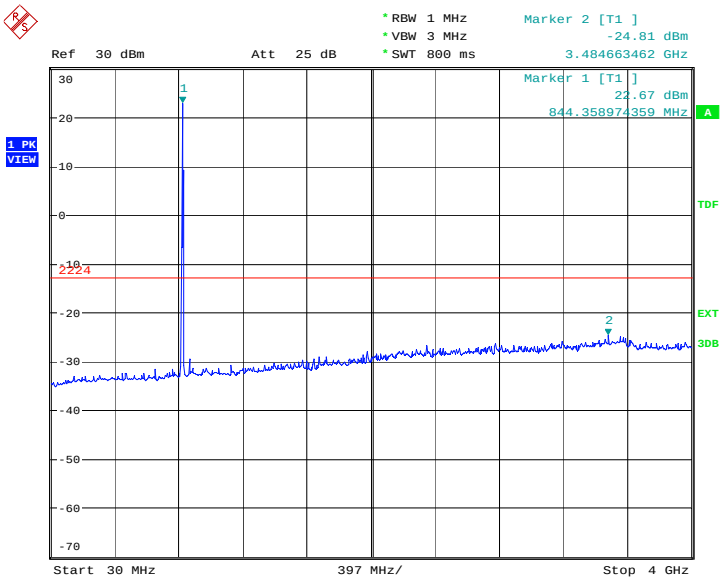


Date: 18.FEB.2011 00:25:29

A.7.3.13 Channel 4233: 30MHz – 4GHz

Spurious emission limit –13dBm.

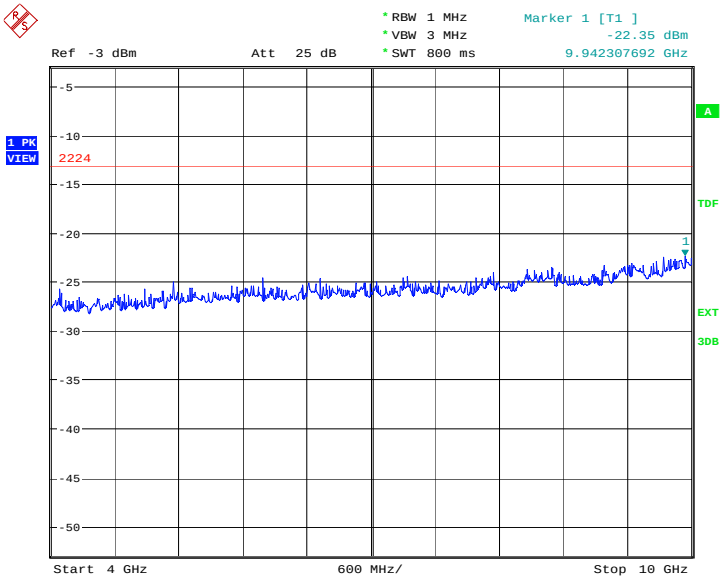
NOTE: peak above the limit line is the carrier frequency.



Date: 18.FEB.2011 00:26:00

A. 7.3.14 Channel 4233: 4GHz – 10GHz

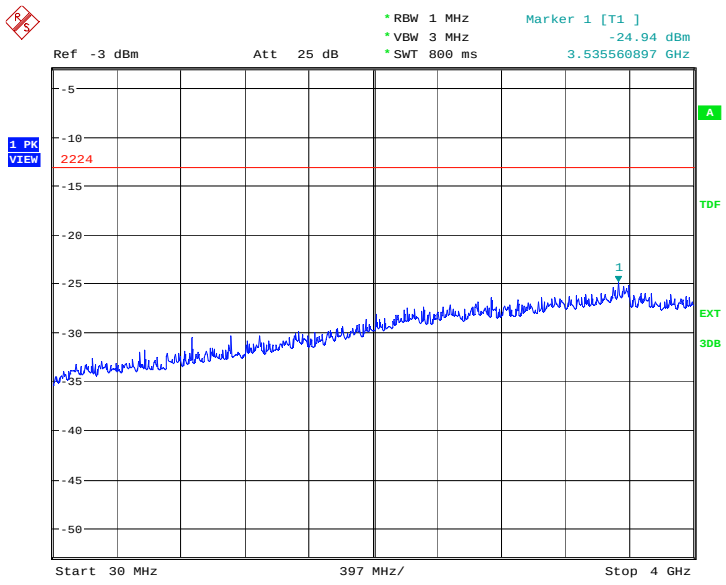
Spurious emission limit –13dBm.



Date: 18.FEB.2011 00:26:29

A. 7.3.15 Idle mode: 30MHz – 4GHz

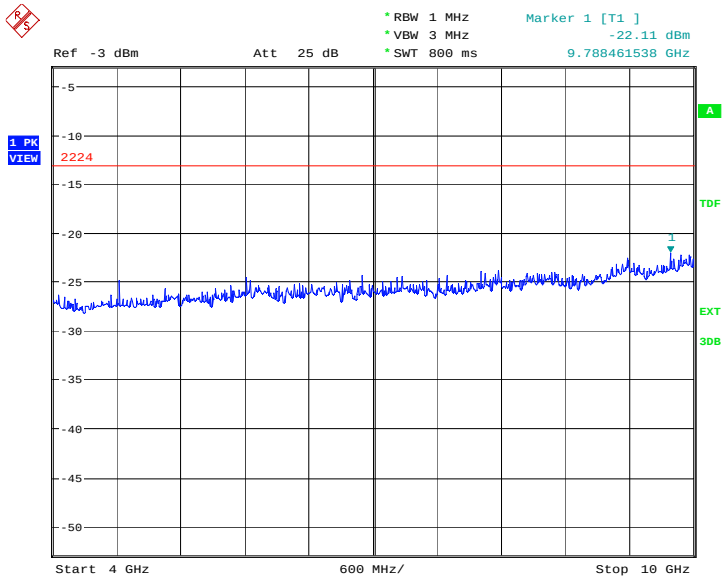
Spurious emission limit -13dBm.



Date: 18.FEB.2011 00:26:58

A.7.3.16 Idle mode: 4GHz – 10GHz

Spurious emission limit -13dBm.



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