



TEST REPORT

No. 2011TAR106

for

ZTE CORPORATION

CDMA1x/GSM Digital Mobile Handset

Model Name: ZTE-CF450

With

FCC ID: Q78-ZTECF450

Hardware Version: 1.1

Software Version: VZW_US_F450V1.0.0B11

Issued Date: Mar 25, 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. DGA-PL-114/01-02

FCC 2.948 Listed: No.733176

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

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1. Test Laboratory

1.1. Testing Location

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

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

1.3. Project data

Testing Start Date: Mar 03, 2011
Testing End Date: Mar 25, 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
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Email: zhang.min13@zte.com.cn
Telephone: 0086 21 68897541
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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
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Email: zhang.min13@zte.com.cn
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Fax: 0086 21 50801070

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

3.1. About EUT

Description	CDMA1x/GSM Digital Mobile Handset
Model Name	ZTE-CF450
FCC ID	Q78-ZTECF450
Frequency	CDMA 800MHz; CDMA 1900MHz
Antenna	Internal
Power supply	Battery or Charger (AC Adaptor)
Output power	23.58 dBm maximum ERP measured for CDMA1900
Extreme vol. Limits	3.5VDC 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 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
N03	356540040002441	1.1	VZW_US_F450V1.0.0B11
N04	356540040002599	1.1	VZW_US_F450V1.0.0B11

*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	SN
AE1	Battery	/
AE2	Charger	/

AE1

Model	Li3710T42P3h483757
Manufacturer	ZTE
Capacitance	1000mAh
Nominal Voltage	3.7V

AE2

Model	STC-A22O50I700USBA-Z
Manufacturer	DOKOCOM
Length of DC line	120cm

*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 of CDMA1x/GSM Digital Mobile Handset with integrated antenna. It consists of normal options: lithium battery, charger. 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 24	PERSONAL COMMUNICATIONS SERVICES	V 10.1.09
FCC Part 22	PUBLIC MOBILE SERVICES	V 10.1.09
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	2009

5. LABORATORY ENVIRONMENT

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

Temperature	Min. = 15 °C, Max. = 30 °C
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 °C, Max. = 35 °C
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 °C, Max. = 30 °C
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 °C, Max. = 30 °C
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

Items	List	Clause in FCC rules	Verdict
1	Output Power	22.913(a)/24.232(b)	P
2	Emission Limit	2.1051/22.917/24.238	P
3	Conducted Emission	15.107/207	P
4	Frequency Stability	2.1055/24.235	P
5	Occupied Bandwidth	2.1049(h)(i)	P
6	Emission Bandwidth	22.917(b)/24.238(b)	P
7	Band Edge Compliance	22.917(b)/24.238(b)	P
8	Conducted Spurious Emission	2.1057/22.917/24.238	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, 848.31MHz for CDMA 800 band, (bottom, middle and top of operational frequency range).

CDMA 800

Measurement result

Channel	Frequency(MHz)	Channel power(dBm)	Target (dB)
1013	824.70	23.81	24±1
384	836.52	24.09	24±1
777	848.31	23.86	24±1

CDMA 1900

Measurement result

Channel	Frequency(MHz)	Channel power(dBm)	Target (dB)
25	1851.25	24.50	24±1
600	1880.00	24.47	24±1
1175	1908.75	24.51	24±1

A.1.3 Radiated

A.1.3.1 Description

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

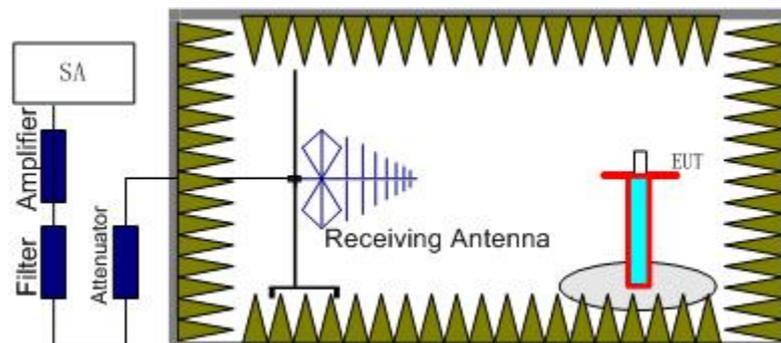
Rule Part 24.232(b) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

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

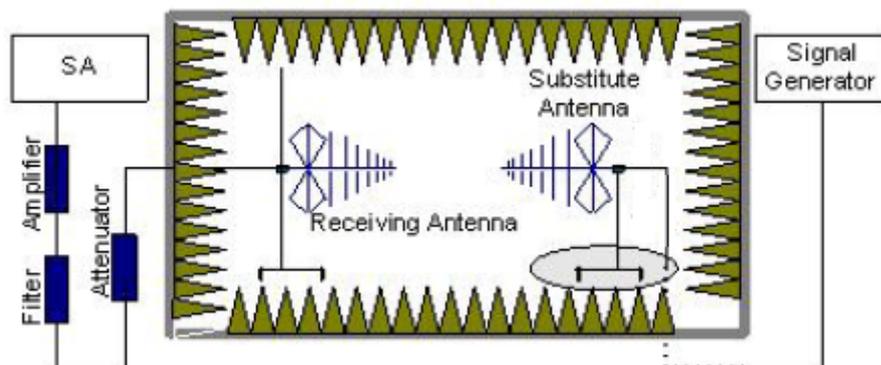
A.1.3.2 Method of Measurement

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

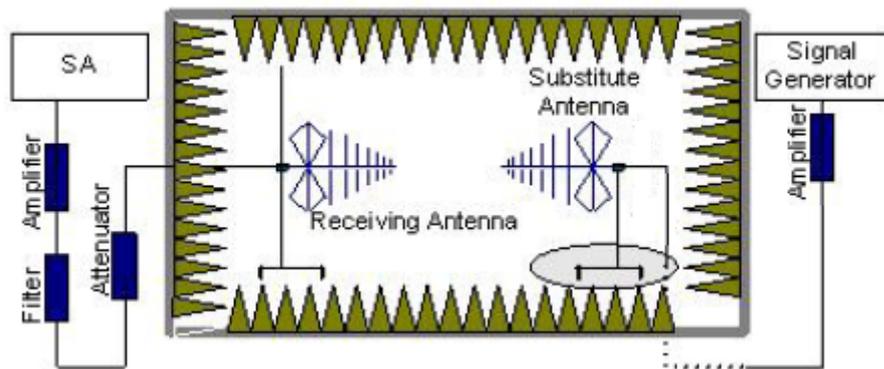
1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected 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.



For 1900MHz working frequency test



For 850MHz working frequency test

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. For 850MHz working frequency test:

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:

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

For 1900MHz working frequency test:

A cable should be connected between the Signal Source and the Substitution Antenna.

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

The measurement results are obtained as described below:

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

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, $ERP = EIRP - 2.15\text{dBi}$.

CDMA 800 -ERP

Limits

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

Measurement result

Frequency(MHz)	Peak ERP(dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	Correction (dBm)	P _{Mea} (dBm)	Polarization
824.70	19.96	-9.6	30.1	5.3	2.15	-3.69	H
836.52	20.43	-9.6	30.1	5.3	2.15	-3.22	V
848.31	19.56	-9.6	30.1	5.3	2.15	-4.09	H

Frequency: 836.52MHz

Peak ERP(dBm)= P_{Mea}(-3.22dBm)+ P_{cl}(-9.6dB)+ P_{Ag}(30.1dB)+G_a (5.3dB)-2.15dBm=50.43dBm

ANALYZER SETTINGS: RBW = VBW = 3MHz

CDMA 1900 -EIRP

Limits

	Burst Peak ERP (dBm)
CDMA1900	≤33dBm (2W)

Frequency(MHz)	Peak EIRP(dBm)	P _{cl} Cable Loss(dB)	G _a Antenna Gain(dB)	P _{Mea} (dBm)	Polarization
1850.2	23.56	-10.9	27.5	6.96	H
1880	23.58	-10.8	27.5	6.88	H
1909.8	22.19	-11.3	27.5	5.99	H

Frequency: 1880MHz

Peak EIRP(dBm)= P_{Mea}(6.88dBm)+ P_{cl}(-10.8dB)+G_a (27.5dB) =23.58dBm

ANALYZER SETTINGS: RBW = VBW = 3MHz

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

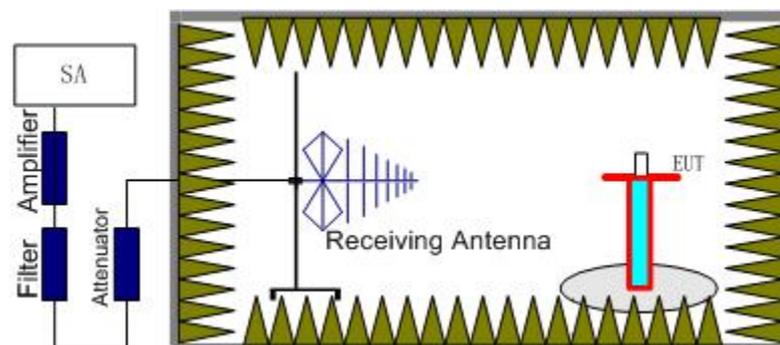
A.2.1 Measurement Method

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

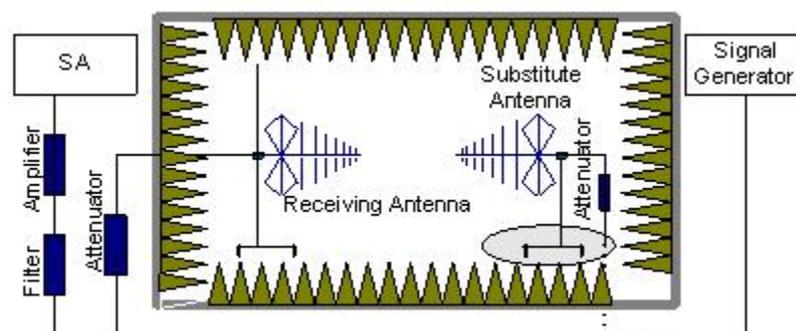
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 10GHz. The resolution bandwidth is set as outlined in Part 24.238 and Part 22.917. The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the CDMA800 band.

The procedure of radiated spurious emissions is as follows:

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



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



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

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

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

A amplifier should be connected in for the test.

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

The measurement results are obtained as described below:

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

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

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

A.2.4 Measurement Results Table

Frequency	Channel	Frequency Range	Result
CDMA800	Low	30MHz-10GHz	Pass
	Middle	30MHz-10GHz	Pass
	High	30MHz-10GHz	Pass
CDMA1900	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)
CDMA800	0.03~1	100KHz	300KHz	10
	1-2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~10	1 MHz	3 MHz	3
CDMA1900	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

CDMA 800 Channel 1013/824.7MHz

Frequency(MHz)	Peak ERP(dBm)	Path Loss	Antenna Gain	Correction	P _{Mea} (dBm)	Limit (dBm)	Polarization
				(dBm)			
1332.12	-65.27	7.07	-4.50	2.15	-60.55	-13	H
4257.90	-63.75	12.45	-8.66	2.15	-57.81	-13	V
3867.89	-66.19	11.96	-8.34	2.15	-60.42	-13	H
6834.91	-62.66	16.04	-10.93	2.15	-55.40	-13	H
9235.86	-61.69	19.20	-12.60	2.15	-52.94	-13	H
8738.73	-63.76	18.54	-12.39	2.15	-55.46	-13	H

CDMA 800 Channel 384/836.52MHz

Frequency(MHz)	Peak ERP(dBm)	Path Loss	Antenna Gain	Correction	P _{Mea} (dBm)	Limit (dBm)	Polarization
				(dBm)			
1652.57	-61.10	7.85	-5.44	2.15	-56.54	-13	V
2135.25	-61.78	8.87	-4.32	2.15	-55.08	-13	V
3632.52	-64.63	11.51	-8.06	2.15	-59.03	-13	H
4235.92	-68.01	12.42	-8.64	2.15	-62.08	-13	H
6471.14	-65.11	15.65	-10.58	2.15	-57.89	-13	V
8894.65	-61.84	18.68	-12.51	2.15	-53.52	-13	H

CDMA 800 Channel 777/848.31MHz

Frequency(MHz)	Peak ERP(dBm)	Path Loss	Antenna Gain	Correction	P _{Mea} (dBm)	Limit (dBm)	Polarization
				(dBm)			
1068.98	-64.99	6.37	-2.06	2.15	-58.53	-13	H
1694.74	-62.93	7.95	-5.26	2.15	-58.09	-13	H
3239.96	-65.91	10.85	-7.28	2.15	-60.19	-13	V
8480.80	-51.89	18.24	-12.19	2.15	-43.69	-13	V
8832.02	-62.34	18.59	-12.46	2.15	-54.06	-13	H
9888.72	-63.35	19.79	-12.44	2.15	-53.85	-13	H

CDMA 1900 Channel 25/1851.25MHz

Frequency(MHz)	Peak EIRP(dBm)	Path Loss	Antenna Gain	P _{Mea} (dBm)	Limit (dBm)	Polarization
3702.22	-61.35	11.57	7.26	-42.52	-13	V
5553.14	-66.83	14.28	8.51	-44.04	-13	V
7405.98	-57.52	16.79	9.81	-30.91	-13	H
11107.8	-75.49	21.23	10.56	-43.70	-13	H
14093.28	-84.43	24.40	11.29	-48.75	-13	H
17453.67	-78.59	27.66	10.44	-40.49	-13	H

CDMA 1900 Channel 600/1880.00MHz

Frequency(MHz)	Peak EIRP(dBm)	Path Loss	Antenna Gain	P _{Mea} (dBm)	Limit (dBm)	Polarization
3759.74	-46.19	11.67	-8.21	-42.73	-13	H
5639.11	-44.99	14.46	-10.06	-40.59	-13	V
7520.80	-35.32	17.05	-11.42	-29.69	-13	H
10470.09	-57.69	20.49	-12.49	-49.69	-13	V
12872.45	-56.91	23.10	-13.14	-46.96	-13	V
14996.35	-54.70	25.27	-13.50	-42.93	-13	H

CDMA 1900 Channel 1175/1908.75MHz

Frequency(MHz)	Peak EIRP(dBm)	Path Loss	Antenna Gain	P _{Mea} (dBm)	Limit (dBm)	Polarization
3816.40	-43.58	11.87	-8.28	-40.00	-13	H
5725.35	-39.60	14.57	-10.09	-35.13	-13	H
7636.01	-29.44	17.09	-11.54	-23.89	-13	H
9185.07	-61.12	19.18	-12.60	-54.53	-13	V
11452.47	-53.44	21.57	-12.40	-44.28	-13	H
16039.36	-53.34	26.29	-12.95	-40.00	-13	H

A.3 CONDUCTED EMISSION (\$15.107\$15.207)

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

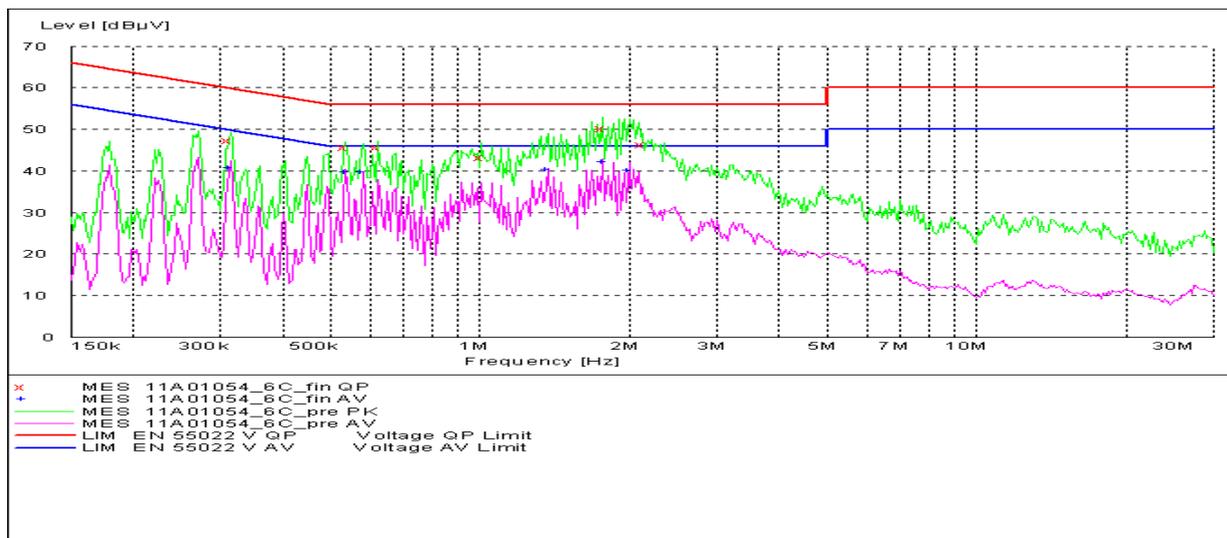
A.3.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi -Peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

* Decreases with logarithm of the frequency

A.3.2 Measurement result

CDMA800



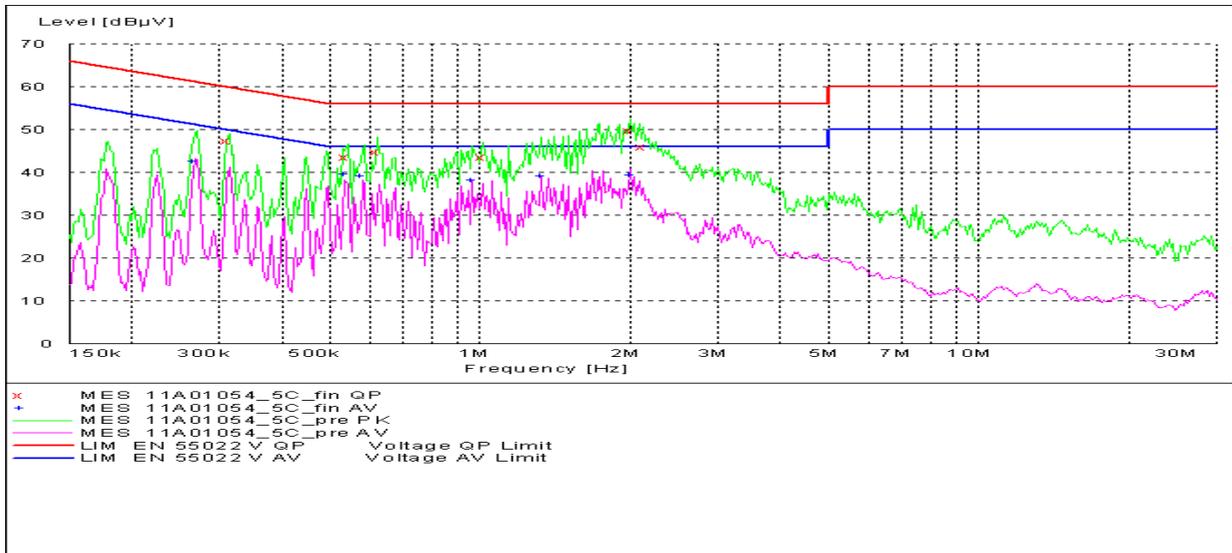
MEASUREMENT RESULT: "11A01054_6C_fin QP"

Frequency MHz	Level dB μ V	Transd	Limit dB	Margin dB μ V	Line dB	PE
0.313237	47.40	10.1	60	12.5	L1	GND
0.536077	45.70	10.1	56	10.3	L1	GND
0.622369	45.70	10.1	56	10.3	L1	GND
1.003399	43.30	10.1	56	12.7	L1	GND
1.769261	50.20	10.1	56	5.8	L1	GND
2.123040	46.30	10.1	56	9.7	L1	GND

MEASUREMENT RESULT: "11A01054_6C_fin AV"

Frequency MHz	Level dBμV	Transd	Limit dB	Margin dBμV	Line	PE
0.313237	40.80	10.1	50	9.0	L1	GND
0.536077	39.80	10.1	46	6.2	L1	GND
0.580494	39.70	10.1	46	6.3	L1	GND
1.365955	40.40	10.1	46	5.6	L1	GND
1.769261	42.20	10.1	46	3.8	L1	GND
1.993648	40.20	10.1	46	5.8	L1	GND

CDMA1900



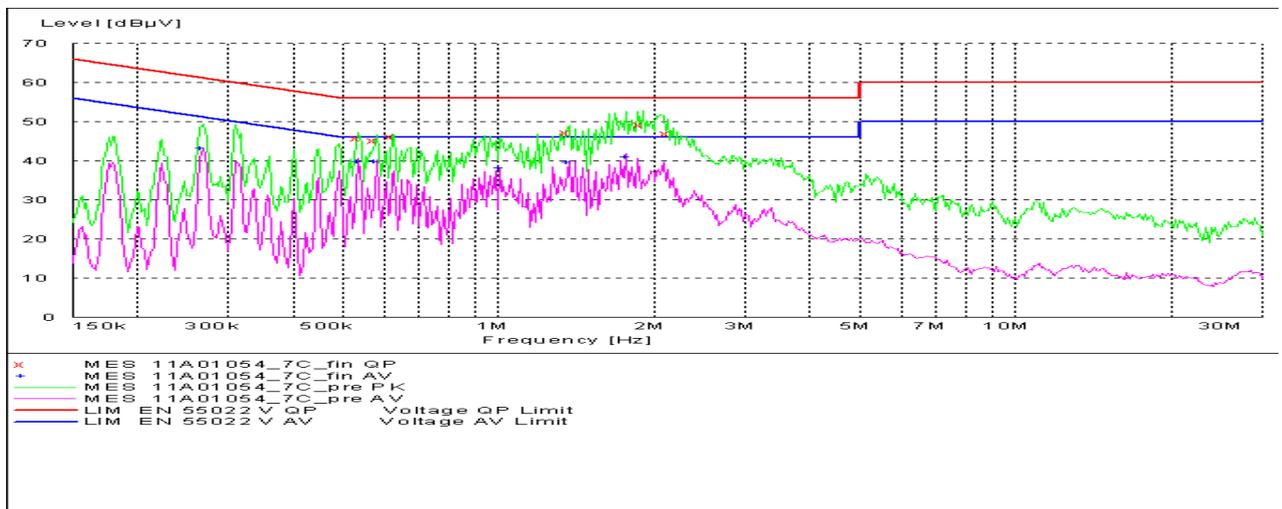
MEASUREMENT RESULT: "11A01054_5C_fin QP"

Frequency MHz	Level dBμV	Transd	Limit dB	Margin dBμV	Line	PE
0.313237	47.40	10.1	60	12.5	L1	GND
0.541438	43.50	10.1	56	12.5	L1	GND
0.622369	44.80	10.1	56	11.2	L1	GND
1.013433	43.60	10.1	56	12.4	L1	GND
2.000000	49.70	10.1	56	6.3	L1	GND
2.123040	46.00	10.1	56	10.0	L1	GND

MEASUREMENT RESULT: "11A01054_5C_fin AV"

Frequency MHz	Level dBμV	Transd	Limit dB	Margin dBμV	Line	PE
0.267135	42.60	10.1	51	8.6	L1	GND
0.536077	39.50	10.1	46	6.5	L1	GND
0.580494	39.20	10.1	46	6.8	L1	GND
0.964247	38.10	10.1	46	7.9	L1	GND
1.325782	39.10	10.1	46	6.9	L1	GND
2.000000	39.40	10.1	46	6.6	L1	GND

MP3



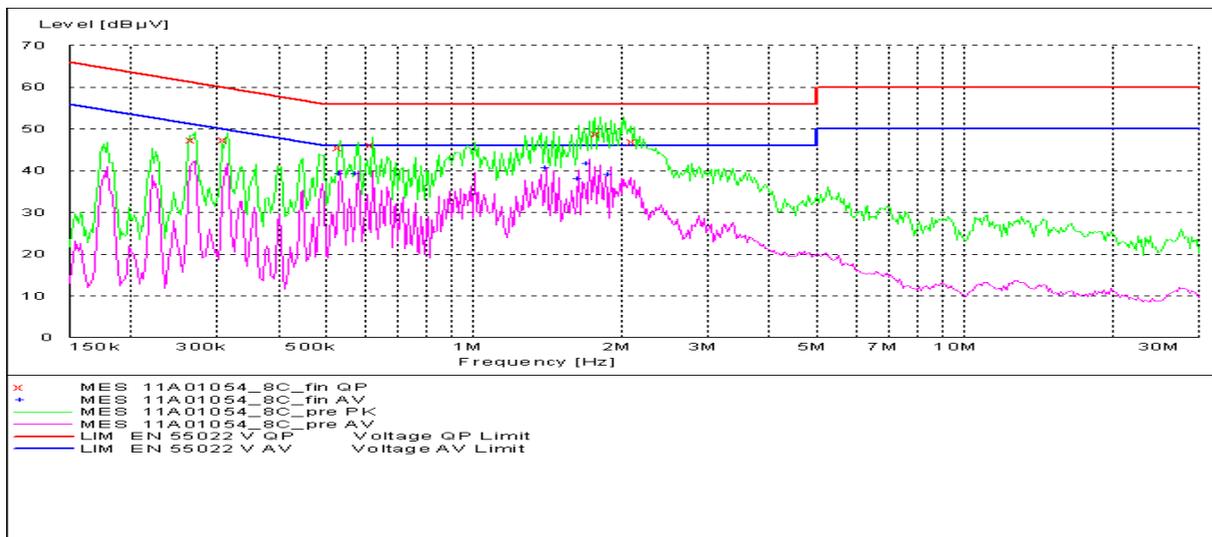
MEASUREMENT RESULT: "11A01054_7C_fin QP"

Frequency MHz	Level dBμV	Transd	Limit dB	Margin dBμV	Line	PE
0.536077	45.70	10.1	56	10.3	L1	GND
0.580494	45.10	10.1	56	10.9	L1	GND
0.622369	46.10	10.1	56	9.9	L1	GND
1.365955	47.10	10.1	56	8.9	L1	GND
1.896887	49.10	10.1	56	6.9	L1	GND
2.123040	46.90	10.1	56	9.1	L1	GND

MEASUREMENT RESULT: "11A01054_7C_fin AV"

Frequency MHz	Level dB μ V	Transd	Limit dB	Margin dB μ V	Line	PE
0.267135	43.10	10.1	51	8.1	L1	GND
0.536077	39.70	10.1	46	6.3	L1	GND
0.580494	39.70	10.1	46	6.3	L1	GND
1.003399	38.10	10.1	46	7.9	L1	GND
1.365955	39.50	10.1	46	6.5	L1	GND
1.769261	41.00	10.1	46	5.0	L1	GND

CAMERA



MEASUREMENT RESULT: "11A01054_8C_fin QP"

Frequency MHz	Level dB μ V	Transd	Limit dB	Margin dB μ V	Line	PE
0.269806	47.30	10.1	61	13.8	L1	GND
0.313237	47.30	10.1	60	12.6	L1	GND
0.536077	45.60	10.1	56	10.4	L1	GND
0.622369	46.10	10.1	56	9.9	L1	GND
1.804823	48.90	10.1	56	7.1	L1	GND
2.123040	46.90	10.1	56	9.1	L1	GND

MEASUREMENT RESULT: "11A01054_8C_fin AV"

Frequency MHz	Level dB μ V	Transd	Limit dB	Margin dB μ V	Line dB	PE
0.536077	39.30	10.1	46	6.7	L1	GND
0.580494	39.40	10.1	46	6.6	L1	GND
1.407344	40.60	10.1	46	5.4	L1	GND
1.633883	38.10	10.1	46	7.9	L1	GND
1.717228	41.70	10.1	46	4.3	L1	GND
1.896887	39.20	10.1	46	6.8	L1	GND

A.4 FREQUENCY STABILITY (§2.1055/§24.235)

A.4.1 Method of Measurement

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

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

A.4.2 Measurement Limit

A.4.2.1 For Hand carried battery powered equipment

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.5VDC 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. These voltages represent a tolerance of -10 % and +12.5 %. For the purposes of measuring frequency stability these voltage limits are to be used.

A.4.2.2 For equipment powered by primary supply voltage

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. For this EUT section

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

A.4.3 Measurement results

CDMA 800

Frequency Error vs Voltage

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.5	-1.66	0.011
3.7	-2.19	0.015
4.2	-1.72	0.012

Frequency Error vs Temperature

temperature(°C)	Frequency error(Hz)	Frequency error(ppm)
-30	-1.55	0.011
-20	-1.60	0.011
-10	-1.66	0.011
0	-1.72	0.012
10	-2.19	0.015
20	-2.19	0.015
30	-2.19	0.015
40	-1.72	0.012
50	-1.60	0.011

CDMA 1900

Frequency Error vs Voltage

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.5	-5.01	0.025
3.7	-5.40	0.027
4.2	-6.23	0.031

Frequency Error vs Temperature

temperature(°C)	Frequency error(Hz)	Frequency error(ppm)
-30	-7.86	0.039
-20	-7.05	0.035
-10	-6.35	0.032
0	-6.23	0.031
10	-5.40	0.027
20	-5.40	0.027
30	-5.40	0.027
40	-6.23	0.031
50	-6.35	0.032

A.5 OCCUPIED BANDWIDTH (§2.1049(h)(i))

A.5.1 Occupied Bandwidth Results

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

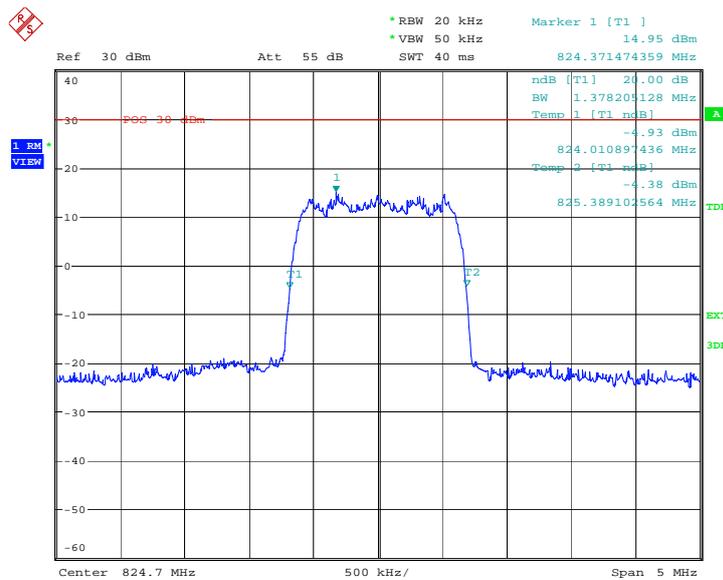
CDMA 800 (-20dBc BW)

Channel	Occupied Bandwidth (-20dBc BW)(MHz)
1013	1.378
384	1.394
777	1.378

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

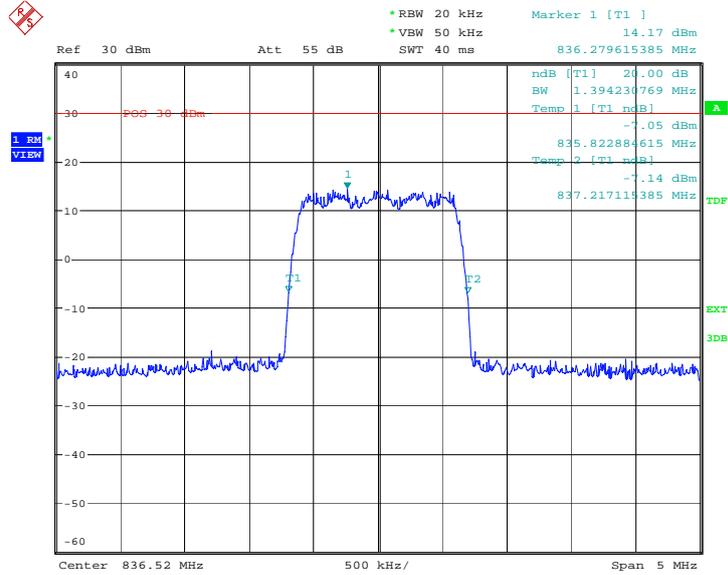
CDMA 800

Channel 1013-Occupied Bandwidth (-20dBc BW)



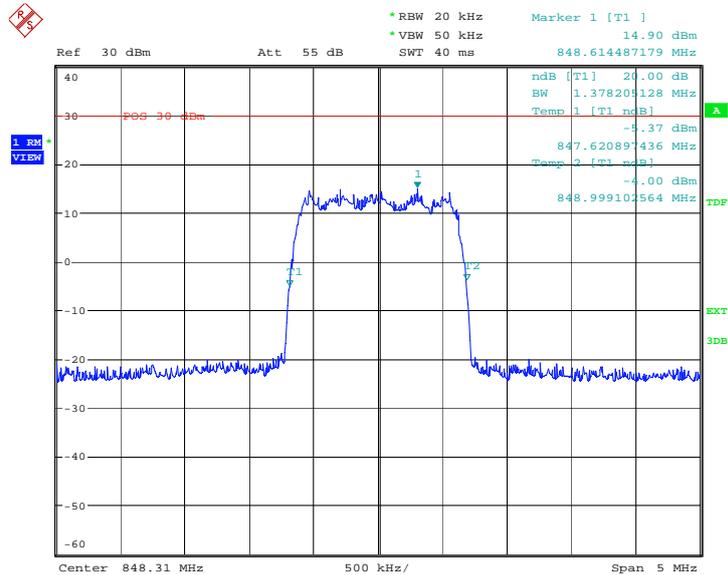
Date: 17.MAR.2011 07:12:16

Channel 384-Occupied Bandwidth (-20dBc BW)



Date: 17.MAR.2011 07:12:54

Channel 777-Occupied Bandwidth (-20dBc BW)



Date: 17.MAR.2011 07:13:29

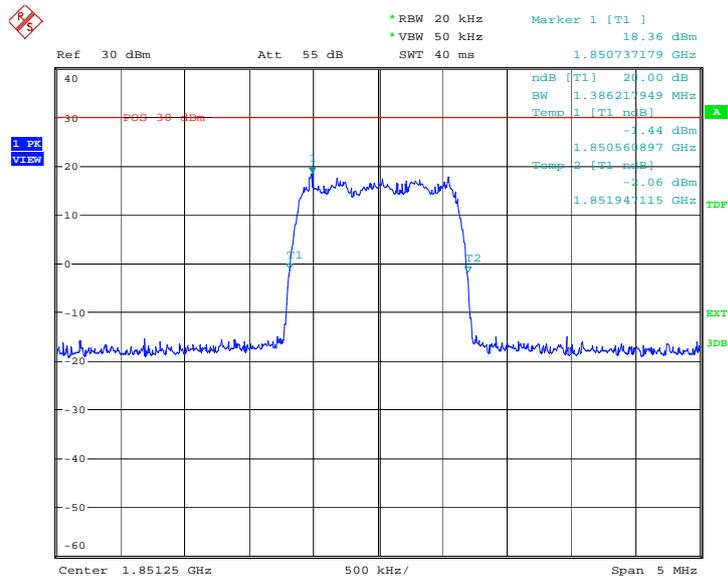
CDMA 1900 (-20dBc BW)

Channel	Occupied Bandwidth (-20dBc BW)(MHz)
25	1.426
600	1.418
1175	1.410

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

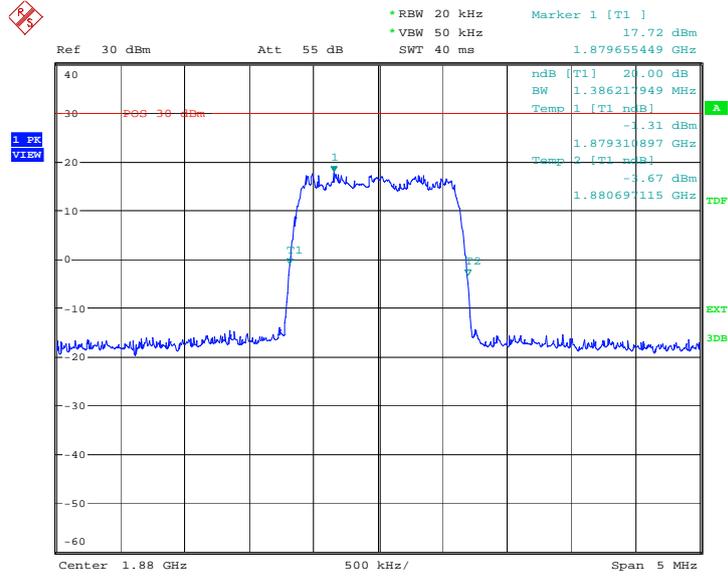
CDMA 1900

Channel 25-Occupied Bandwidth (-20dBc BW)



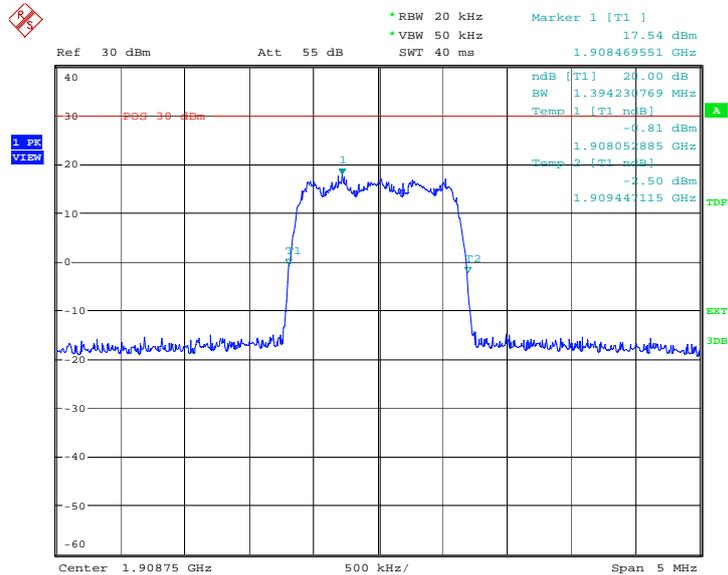
Date: 21.MAR.2011 02:50:07

Channel 600-Occupied Bandwidth (-20dBc BW)



Date: 21.MAR.2011 02:50:49

Channel 1175-Occupied Bandwidth (-20dBc BW)



Date: 21.MAR.2011 02:51:24

A.6 EMISSION BANDWIDTH (§22.917(b)/§24.238(b))

A.6.1 Emission Bandwidth Results

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

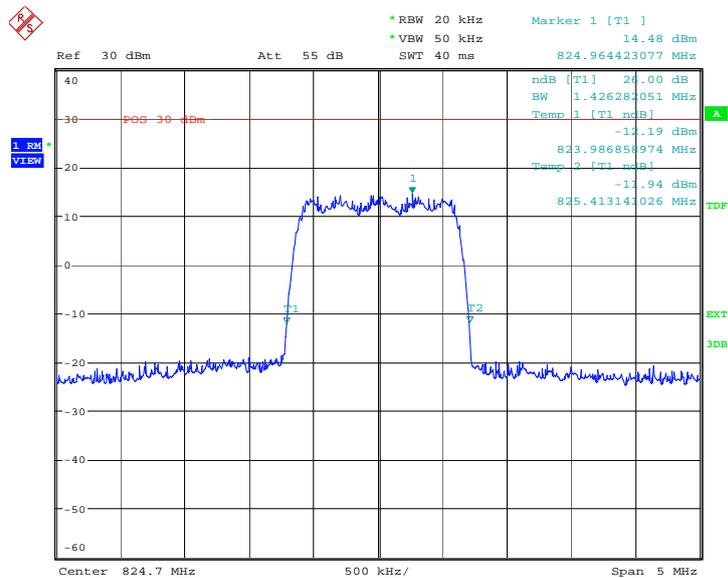
CDMA 800 (-26dBc)

Channel	Occupied Bandwidth (-26dBc BW)(MHz)
1013	1.386
384	1.386
777	1.394

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

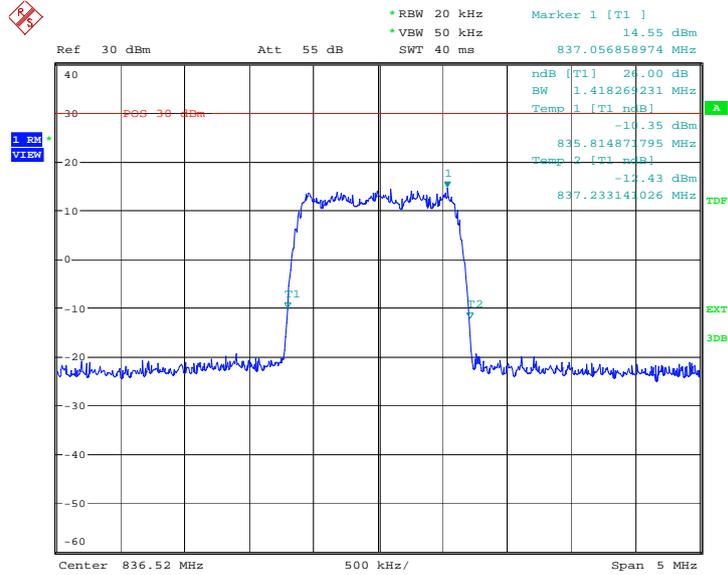
CDMA 800

Channel 1013-Occupied Bandwidth (-26dBc BW)



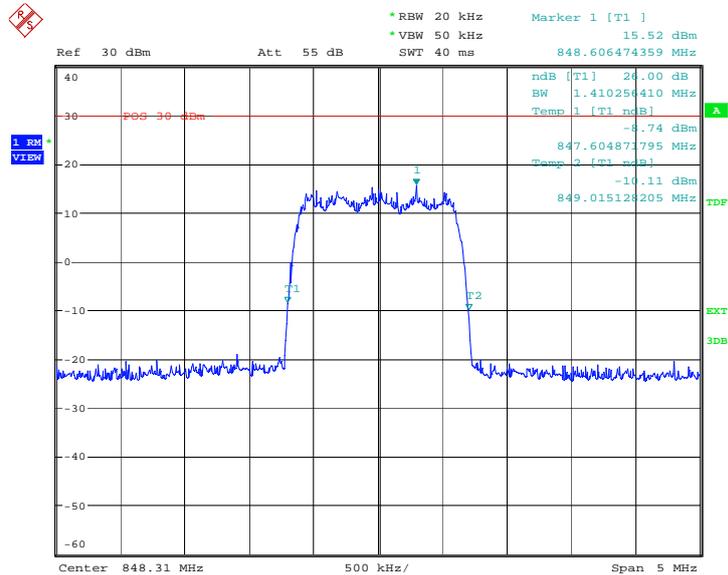
Date: 17.MAR.2011 07:14:06

Channel 384-Occupied Bandwidth (-26dBc BW)



Date: 17.MAR.2011 07:14:40

Channel 777-Occupied Bandwidth (-26dBc BW)



Date: 17.MAR.2011 07:15:12

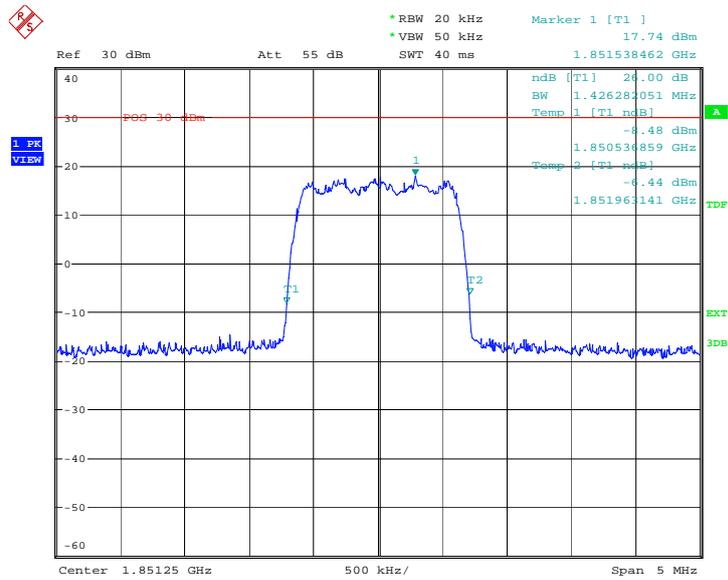
CDMA 1900 (-26dBc)

Channel	Occupied Bandwidth (-26dBc BW)(MHz)
25	1.426
600	1.426
1175	1.426

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

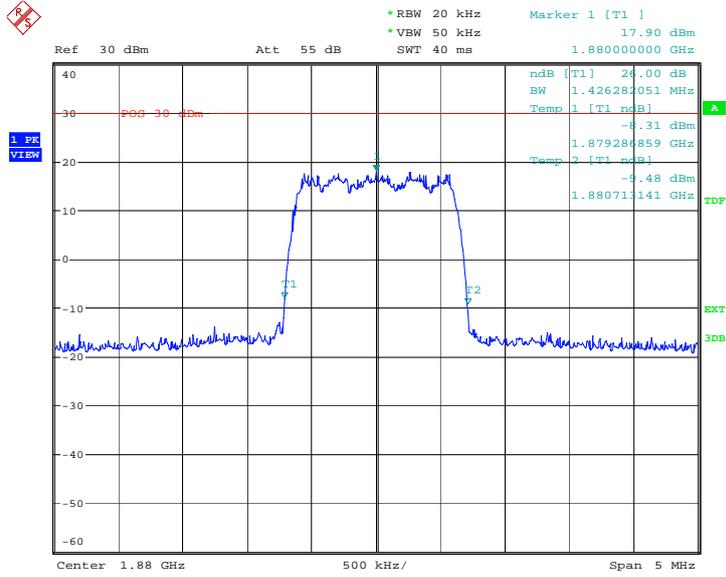
CDMA 1900

Channel 25-Occupied Bandwidth (-26dBc BW)

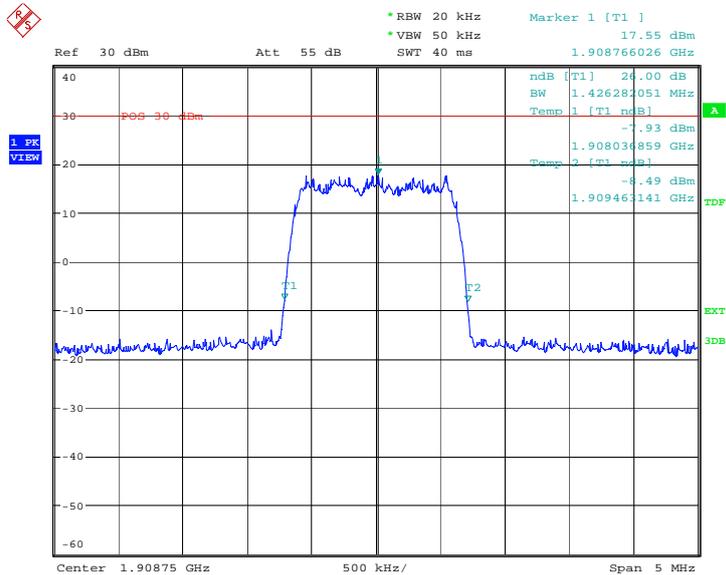


Date: 21.MAR.2011 02:51:59

Channel 600-Occupied Bandwidth (-26dBc BW)



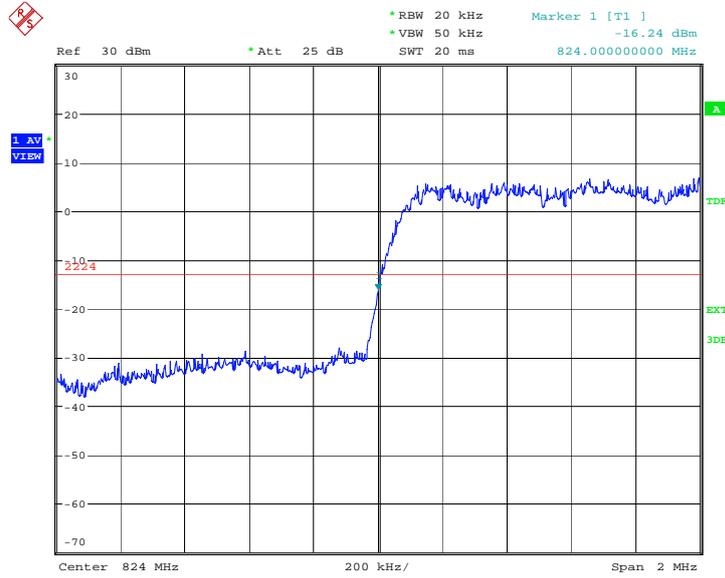
Channel 1175-Occupied Bandwidth (-26dBc BW)



A.7 BAND EDGE COMPLIANCE (§22.917(b)/§24.238(b))

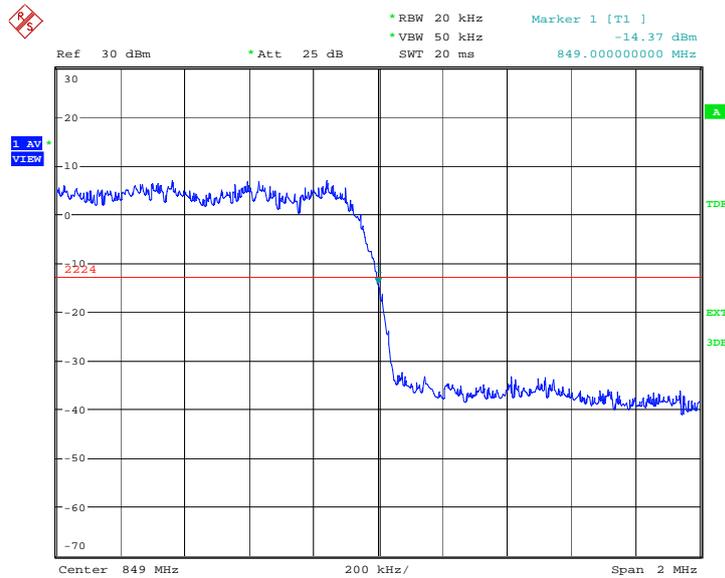
CDMA 800

BAND EDGE BLOCK-Channel 1013



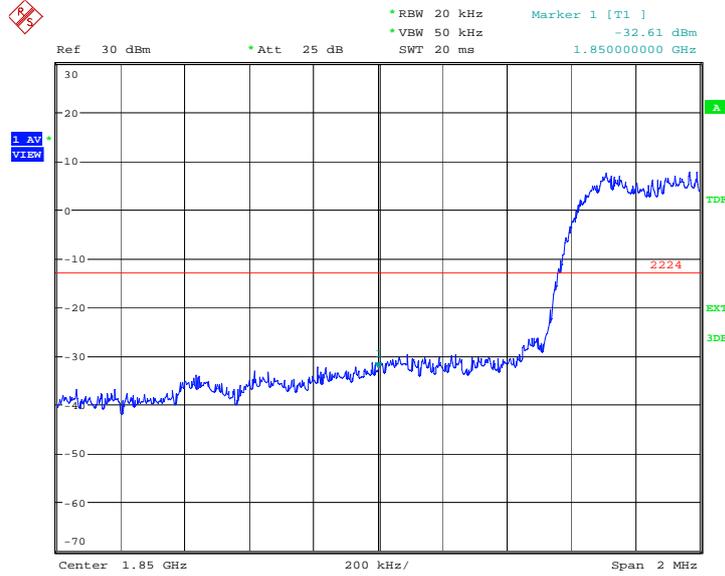
Date: 18.MAR.2011 00:32:29

HIGH BAND EDGE BLOCK-Channel 777



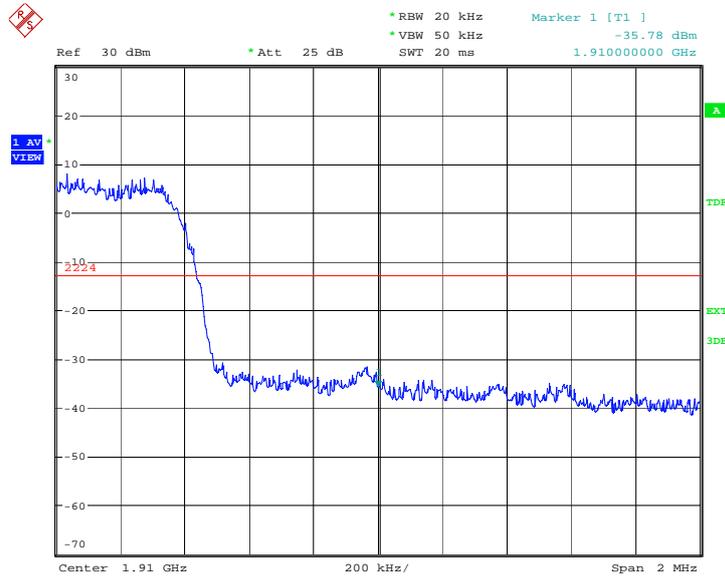
Date: 18.MAR.2011 00:33:43

**CDMA 1900
BAND EDGE BLOCK-Channel 25**



Date: 21.MAR.2011 04:06:35

HIGH BAND EDGE BLOCK-Channel 1175



Date: 21.MAR.2011 04:06:53

A.8 CONDUCTED SPURIOUS EMISSION (§2.1057/§22.917/§24.238)

A.8.1 Measurement Method

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

1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the equipment of CDMA1900, , data taken from 30 MHz to 20 GHz. For CDMA800, data taken from 30 MHz to 10GHz.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

CDMA 800 Transmitter

Channel	Frequency (MHz)
1013	824.70
384	836.52
777	848.31

CDMA 1900 Transmitter

Channel	Frequency (MHz)
25	1851.25
600	1880.00
1175	1908.75

A. 8.2 Measurement Limit

Part 24.238 and Part 22.917 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

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

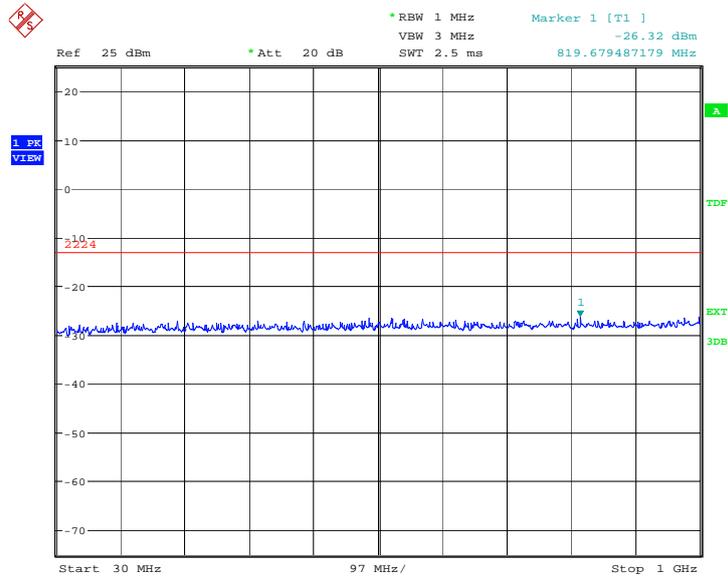
A.8.3 Measurement result

CDMA 1900

A. 8.3.1 Channel 25: 30MHz –1GHz

Spurious emission limit –13dBm.

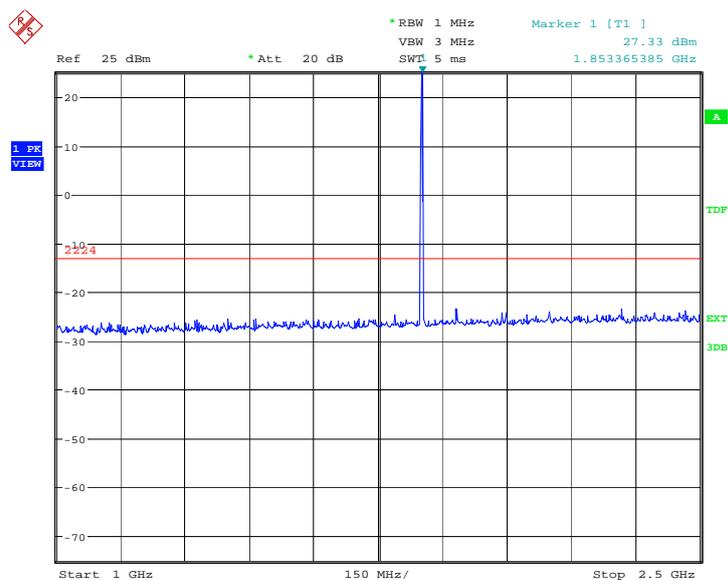
NOTE: peak above the limit line is the carrier frequency.



Date: 21.MAR.2011 03:35:09

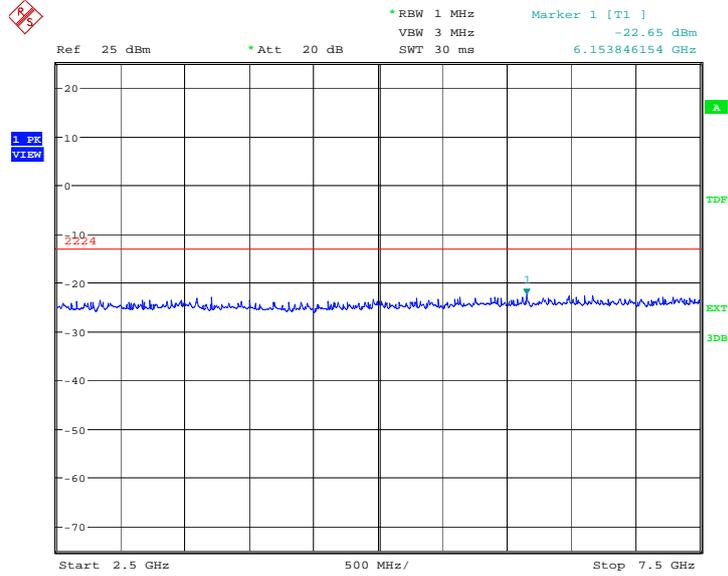
A.8.3.2 Channel 25: 1GHz –2.5GHz

Spurious emission limit –13dBm.



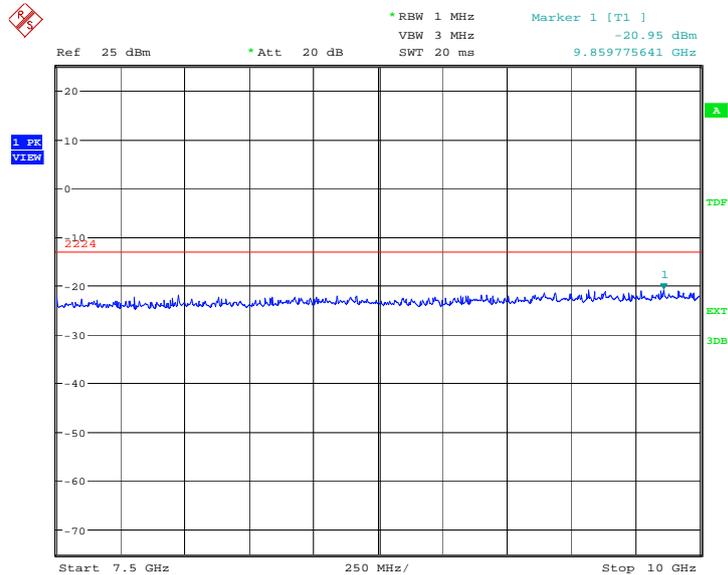
Date: 21.MAR.2011 03:35:36

A.8.3.3 Channel 25: 2.5GHz –7.5GHz
Spurious emission limit –13dBm.



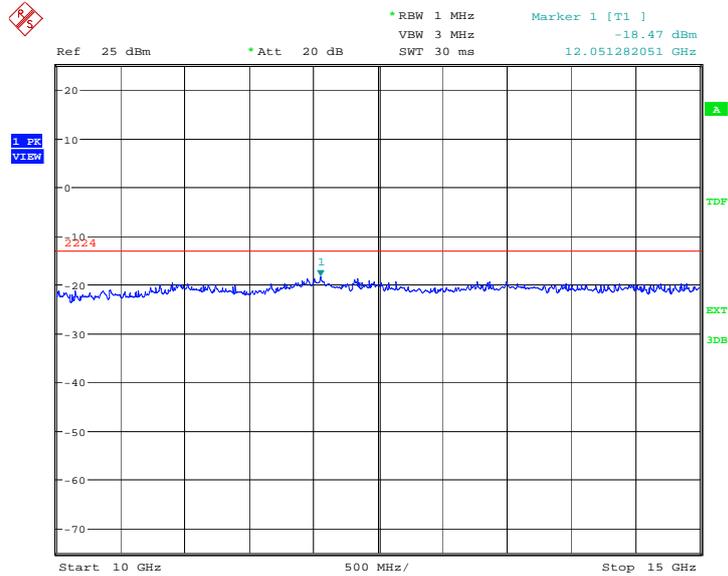
Date: 21.MAR.2011 03:36:03

A.8.3.4 Channel 25: 7.5GHz –10GHz
Spurious emission limit –13dBm.



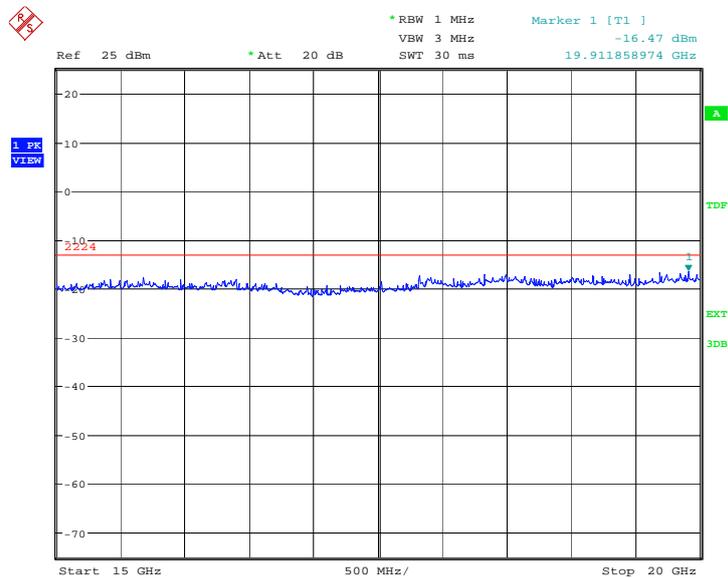
Date: 21.MAR.2011 03:36:30

A.8.3.5 Channel 25: 10GHz –15GHz
Spurious emission limit –13dBm.



Date: 21.MAR.2011 03:36:57

A.8.3.6 Channel 25: 15GHz –20GHz
Spurious emission limit –13dBm.

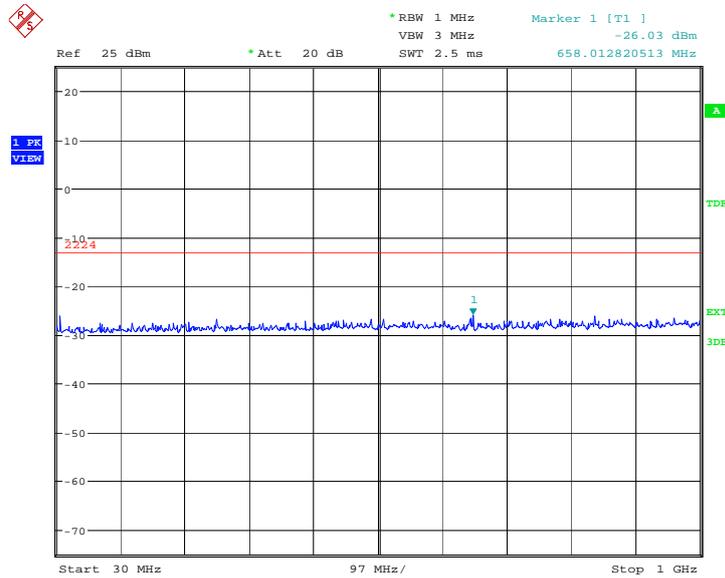


Date: 21.MAR.2011 03:37:24

A. 8.3.7 Channel 600: 30MHz –1GHz

Spurious emission limit –13dBm.

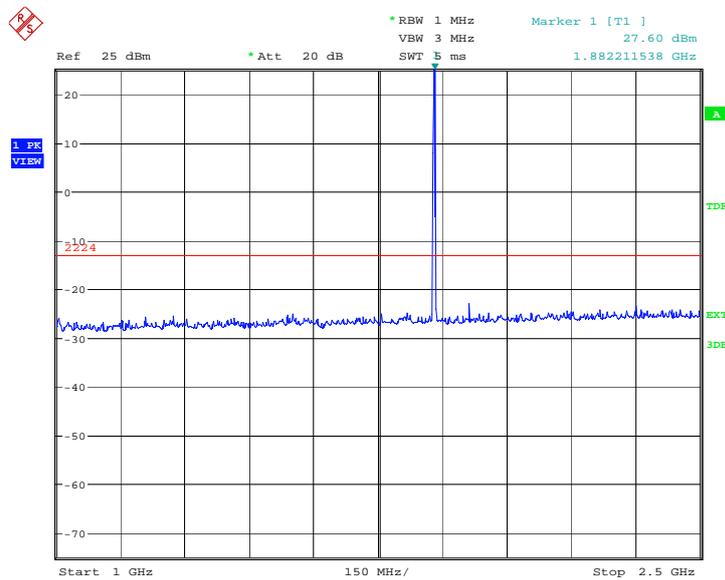
NOTE: peak above the limit line is the carrier frequency.



Date: 21.MAR.2011 03:38:04

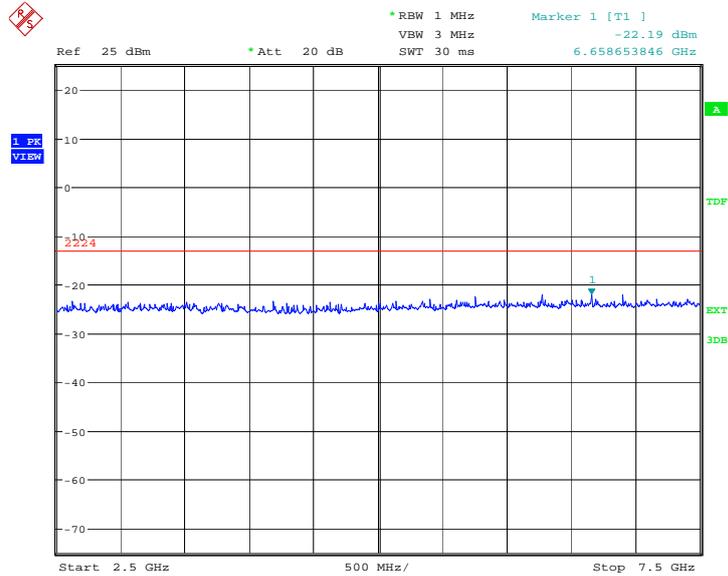
A.8.3.8 Channel 600: 1GHz –2.5GHz

Spurious emission limit –13dBm.



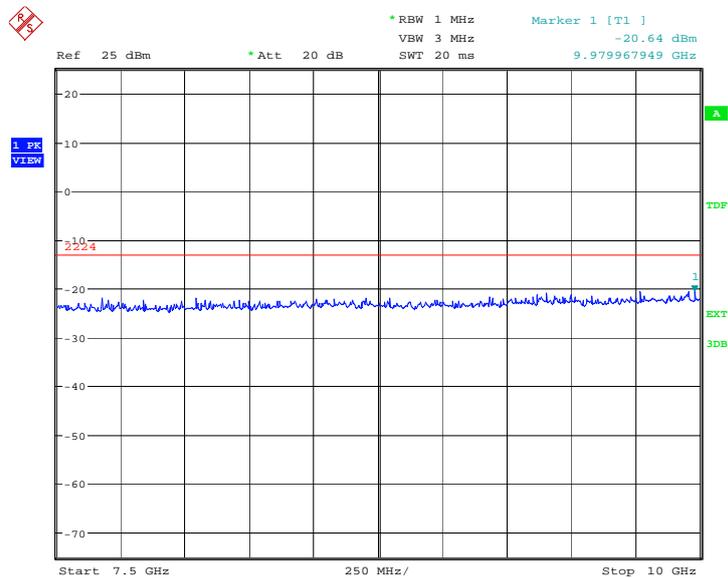
Date: 21.MAR.2011 03:38:31

A.8.3.9 Channel 600: 2.5GHz –7.5GHz
Spurious emission limit –13dBm.



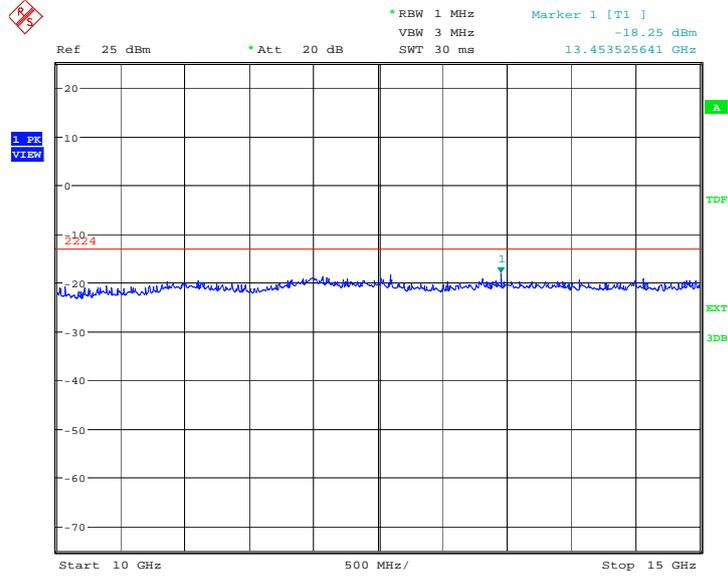
Date: 21.MAR.2011 03:38:58

A.8.3.10 Channel 600: 7.5GHz –10GHz
Spurious emission limit –13dBm.



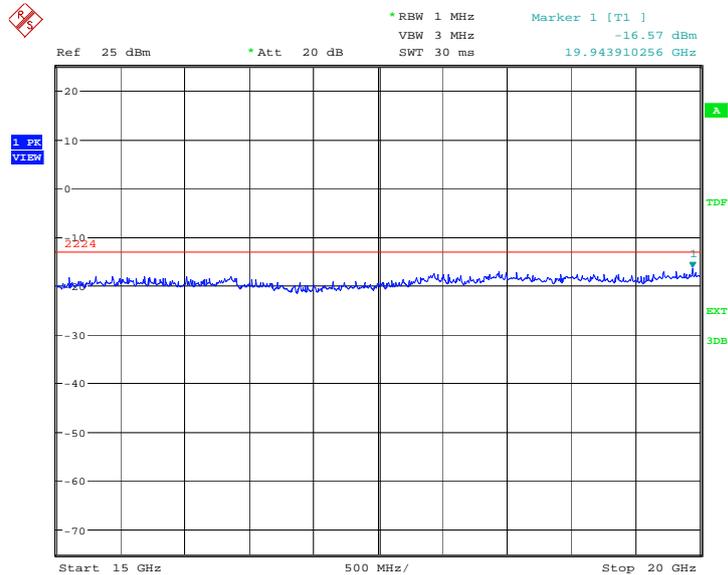
Date: 21.MAR.2011 03:39:25

A.8.3.11 Channel 600: 10GHz –15GHz
Spurious emission limit –13dBm.



Date: 21.MAR.2011 03:39:52

A.8.3.12 Channel 600: 15GHz –20GHz
Spurious emission limit –13dBm.

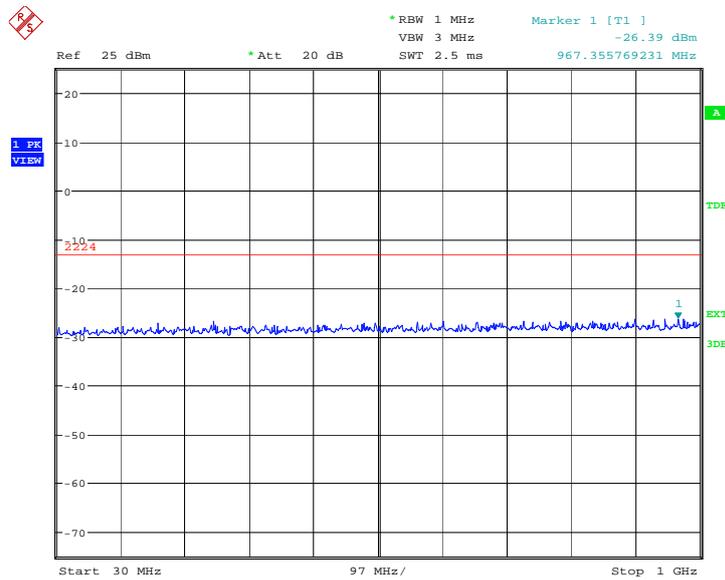


Date: 21.MAR.2011 03:40:19

A. 8.3.13 Channel 1175: 30MHz –1GHz

Spurious emission limit –13dBm.

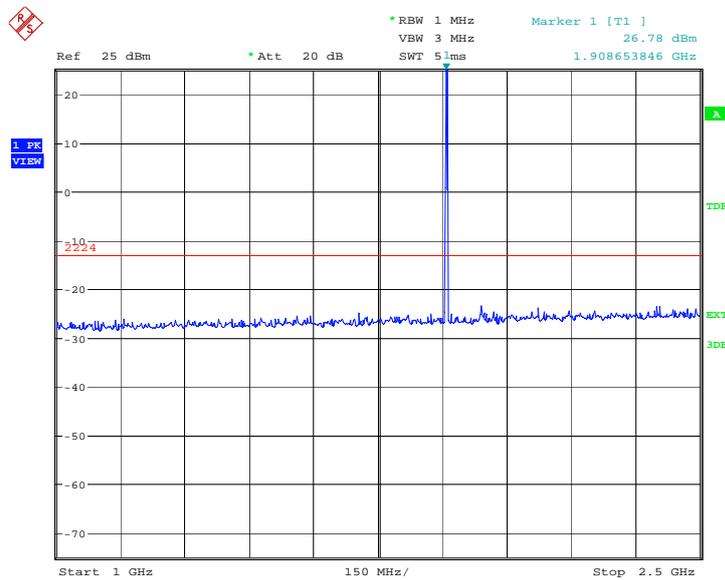
NOTE: peak above the limit line is the carrier frequency.



Date: 21.MAR.2011 03:41:13

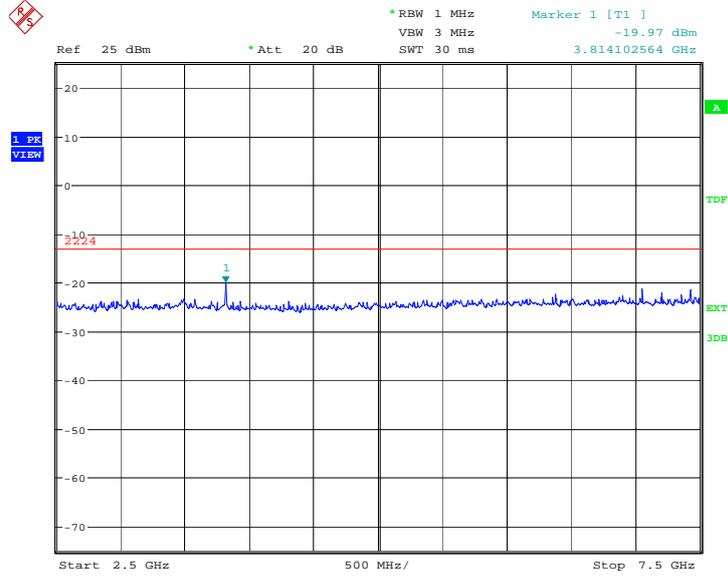
A.8.3.14 Channel 1175: 1GHz –2.5GHz

Spurious emission limit –13dBm.



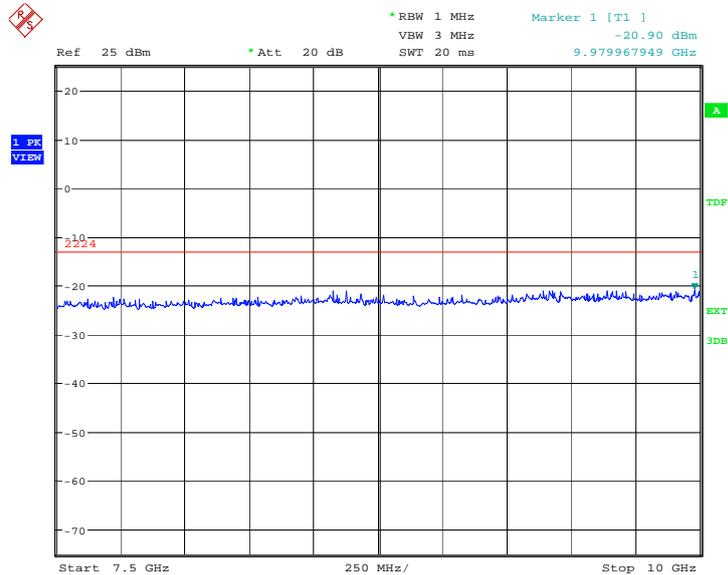
Date: 21.MAR.2011 03:41:40

A.8.3.15 Channel 1175: 2.5GHz –7.5GHz
Spurious emission limit –13dBm.



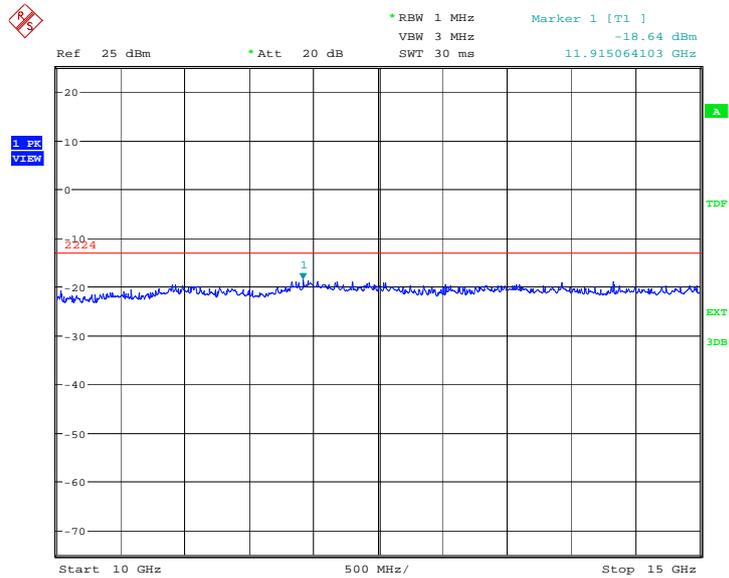
Date: 21.MAR.2011 03:42:07

A.8.3.16 Channel 1175: 7.5GHz –10GHz
Spurious emission limit –13dBm.



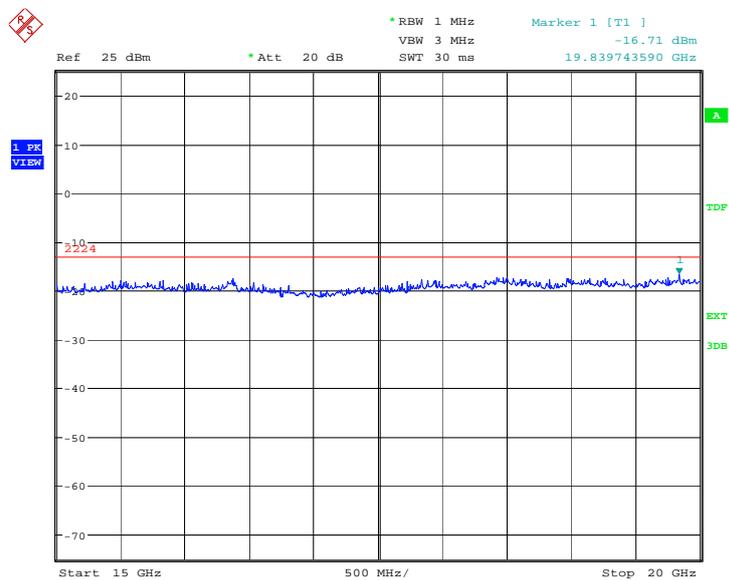
Date: 21.MAR.2011 03:42:34

A.8.3.17 Channel 1175: 10GHz –15GHz
Spurious emission limit –13dBm.



Date: 21.MAR.2011 03:43:01

A.8.3.18 Channel 1175: 15GHz –20GHz
Spurious emission limit –13dBm.

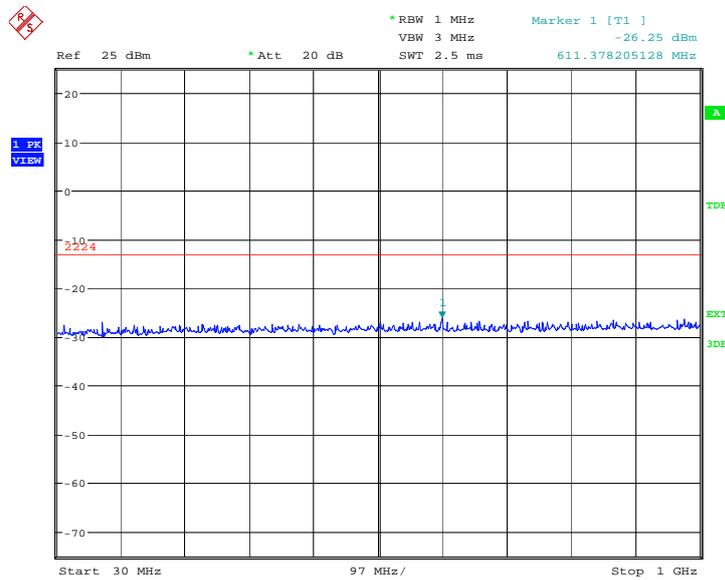


Date: 21.MAR.2011 03:43:28

A. 8.3.19 Idle mode: 30MHz –1GHz

Spurious emission limit –13dBm.

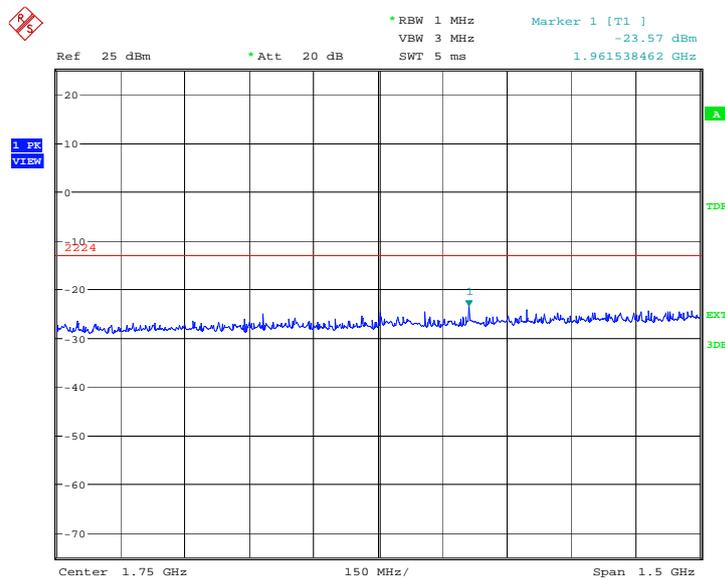
NOTE: peak above the limit line is the carrier frequency.



Date: 21.MAR.2011 04:12:10

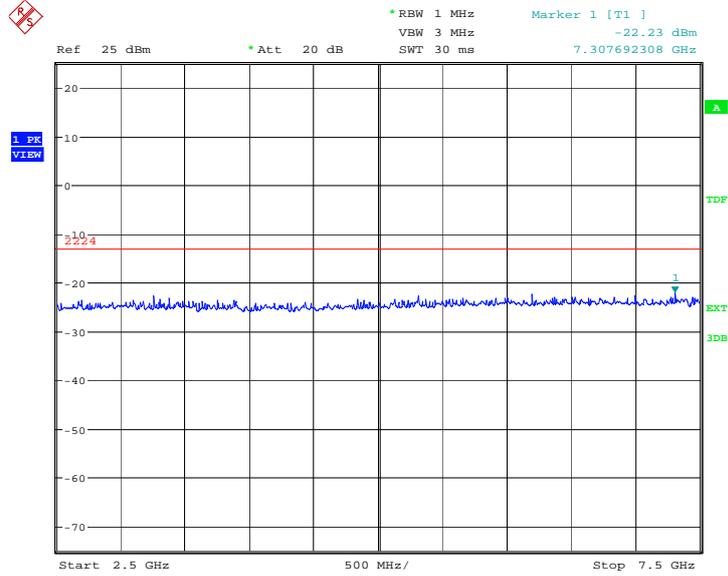
A.8.3.20 Idle mode: 1GHz –2.5GHz

Spurious emission limit –13dBm.



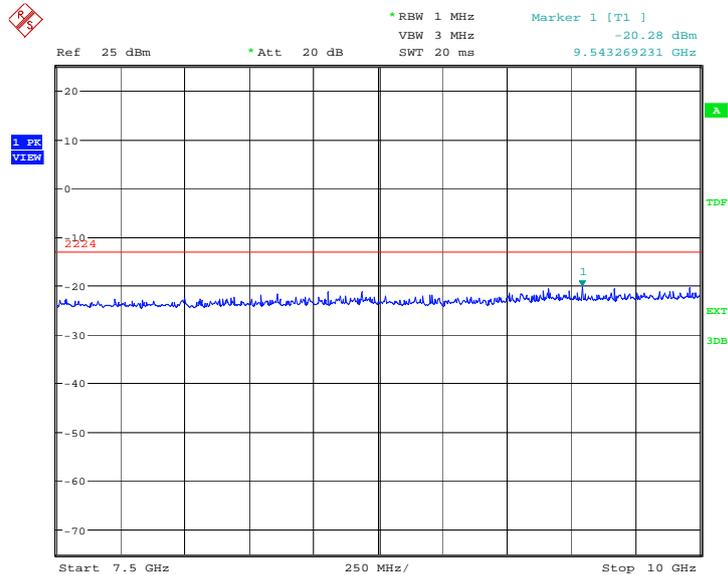
Date: 21.MAR.2011 04:12:38

A.8.3.21 Idle mode: 2.5GHz –7.5GHz
Spurious emission limit –13dBm.



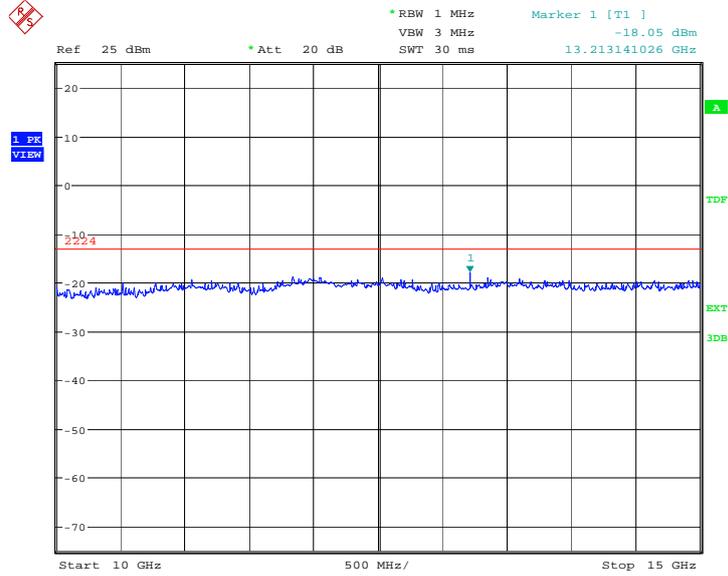
Date: 21.MAR.2011 04:13:05

A.8.3.22 Idle mode: 7.5GHz –10GHz
Spurious emission limit –13dBm.



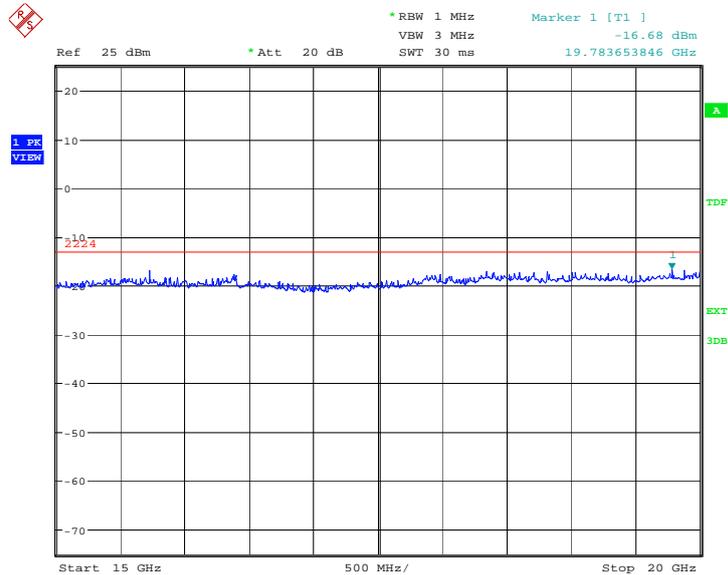
Date: 21.MAR.2011 04:13:32

A.8.3.23 Idle mode: 10GHz –15GHz
Spurious emission limit –13dBm.



Date: 21.MAR.2011 04:13:59

A.8.3.24 Idle mode: 15GHz –20GHz
Spurious emission limit –13dBm.



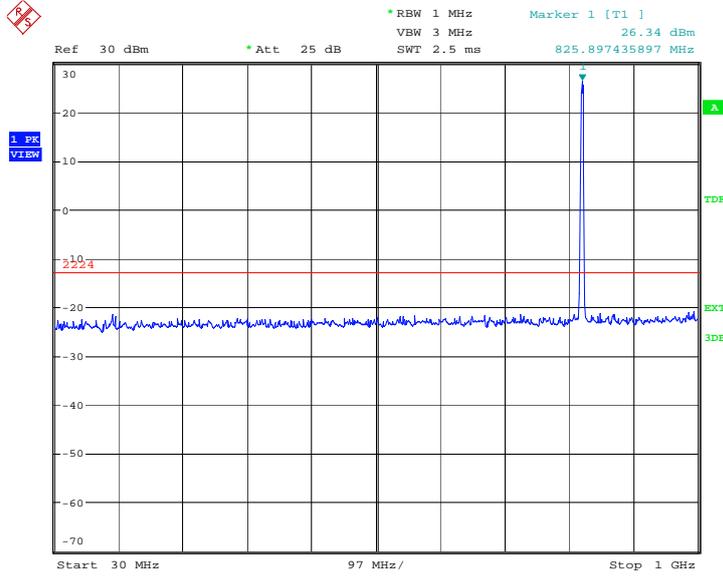
Date: 21.MAR.2011 04:14:26

CDMA 800

A. 8.3.25 Channel 1013: 30MHz –1GHz

Spurious emission limit –13dBm.

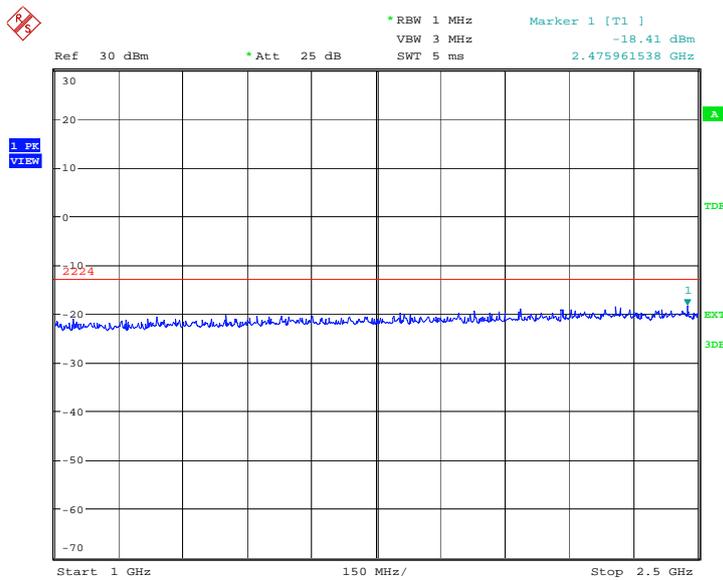
NOTE: peak above the limit line is the carrier frequency.



Date: 18.MAR.2011 00:42:56

A. 8.3.26 Channel 1013: 1GHz – 2.5GHz

Spurious emission limit –13dBm.

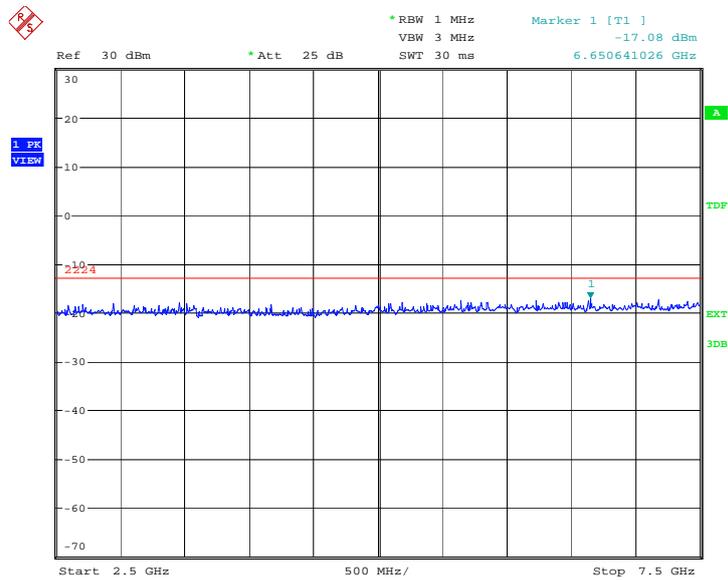


Date: 18.MAR.2011 00:43:22

A. 8.3.27 Channel 1013: 2.5GHz –7.5GHz

Spurious emission limit –13dBm.

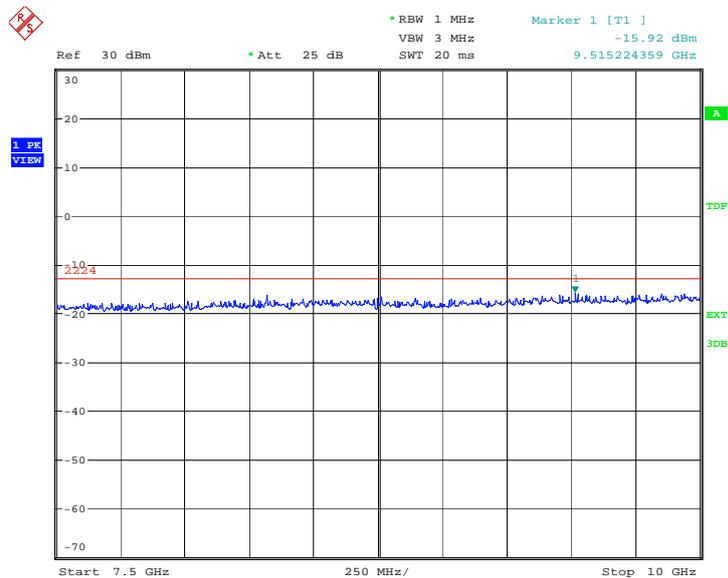
NOTE: peak above the limit line is the carrier frequency.



Date: 18.MAR.2011 00:43:49

A. 8.3.28 Channel 1013: 7.5GHz – 10GHz

Spurious emission limit –13dBm.

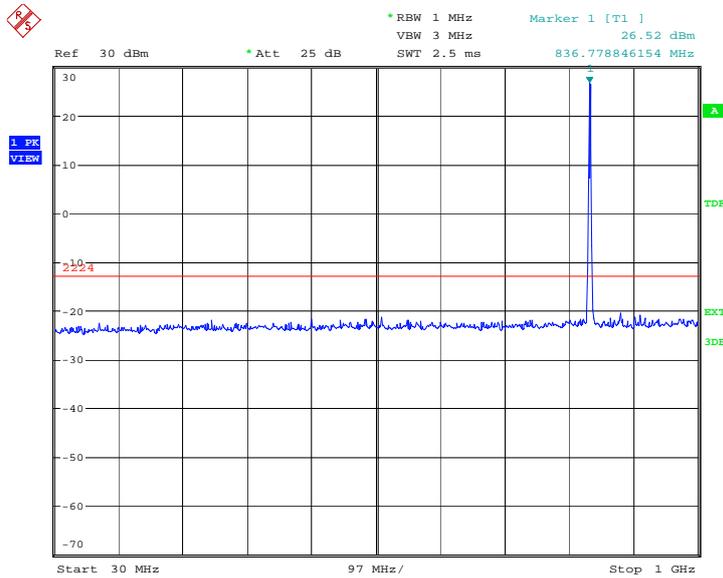


Date: 18.MAR.2011 00:44:16

A. 8.3.29 Channel 384: 30MHz –1GHz

Spurious emission limit –13dBm.

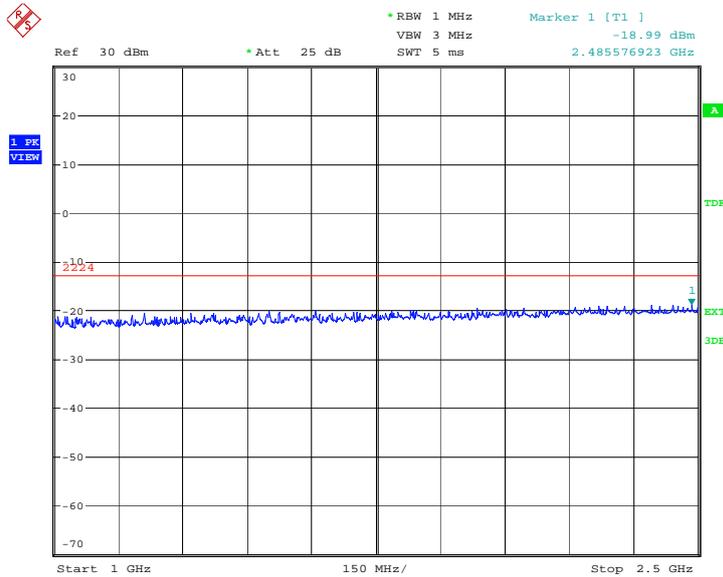
NOTE: peak above the limit line is the carrier frequency.



Date: 18.MAR.2011 00:45:19

A.8.3.30 Channel 384: 1GHz – 2.5GHz

Spurious emission limit –13dBm.

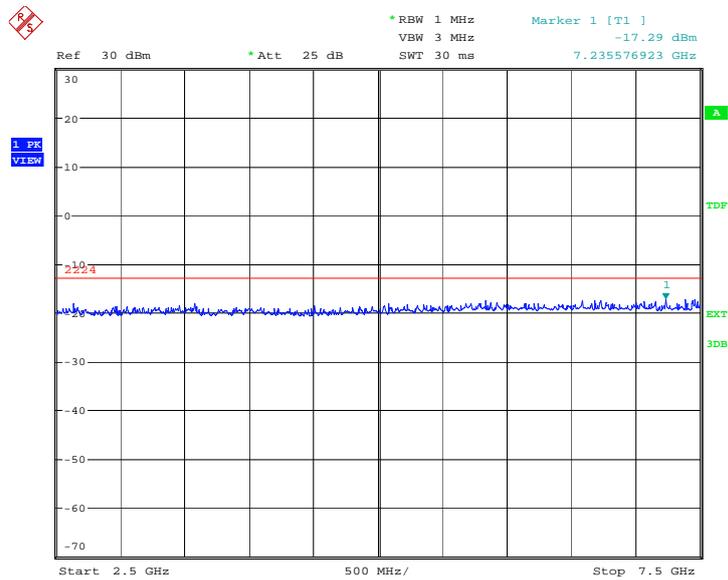


Date: 18.MAR.2011 00:45:46

A. 8.3.31 Channel 384: 2.5GHz –7.5GHz

Spurious emission limit –13dBm.

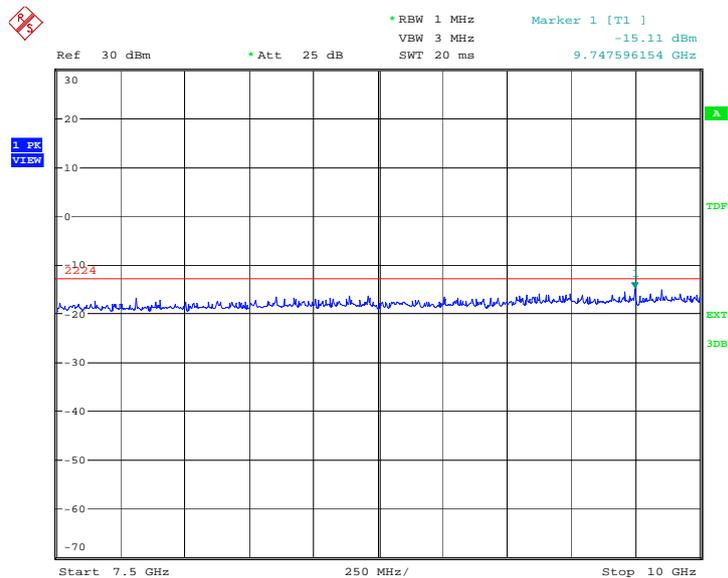
NOTE: peak above the limit line is the carrier frequency.



Date: 18.MAR.2011 00:46:13

A. 8.3.32 Channel 384: 7.5GHz – 10GHz

Spurious emission limit –13dBm.

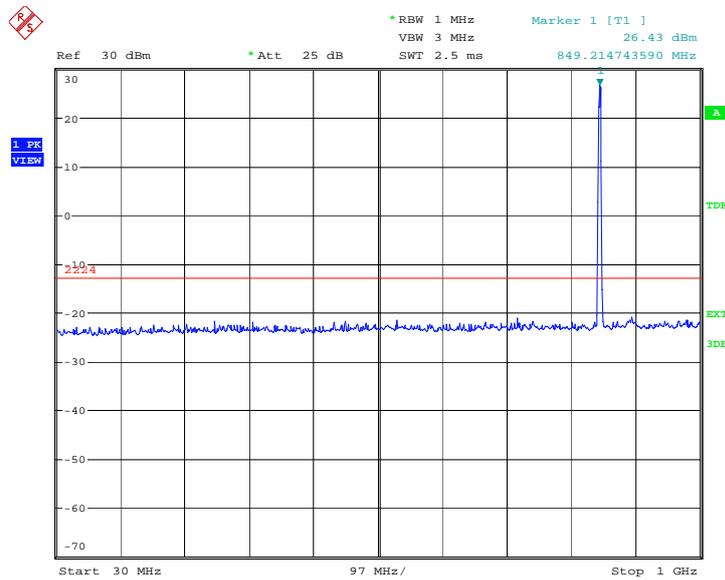


Date: 18.MAR.2011 00:46:39

A. 8.3.33 Channel 777: 30MHz –1GHz

Spurious emission limit –13dBm.

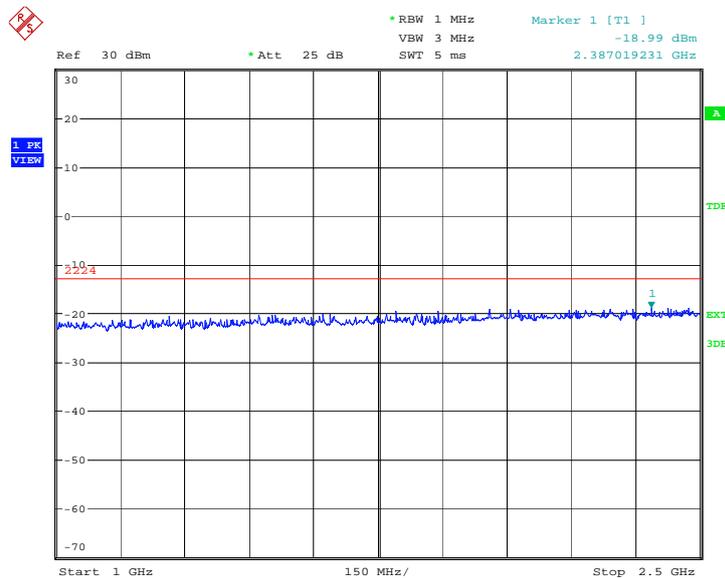
NOTE: peak above the limit line is the carrier frequency.



Date: 18.MAR.2011 00:47:48

A. 8.3.34 Channel 777: 1GHz – 2.5GHz

Spurious emission limit –13dBm.

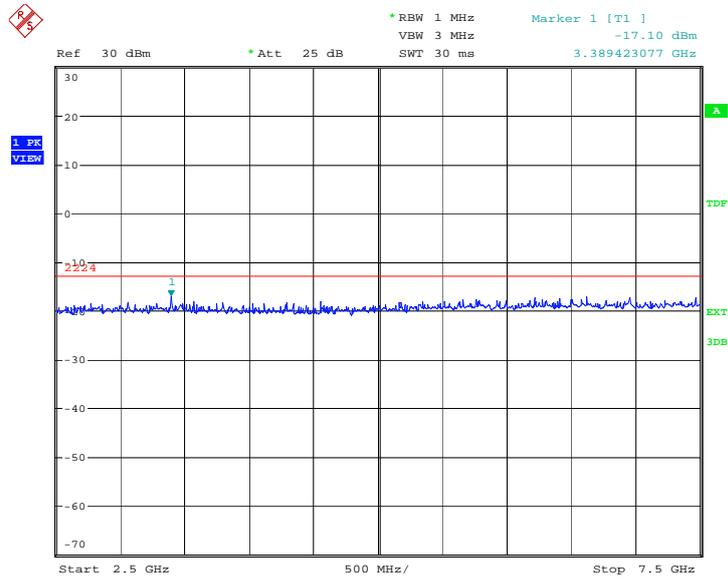


Date: 18.MAR.2011 00:48:15

A. 8.3.35 Channel 777: 2.5GHz –7.5GHz

Spurious emission limit –13dBm.

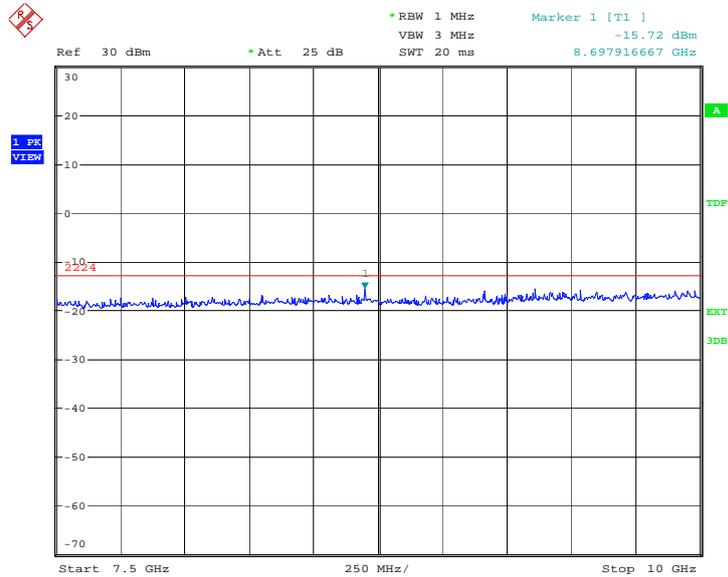
NOTE: peak above the limit line is the carrier frequency.



Date: 18.MAR.2011 00:48:42

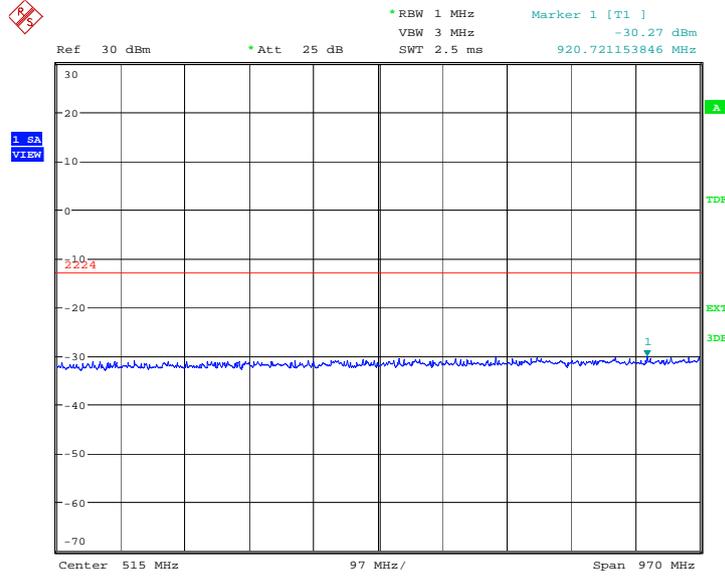
A. 8.3.36 Channel 777: 7.5GHz – 10GHz

Spurious emission limit –13dBm.



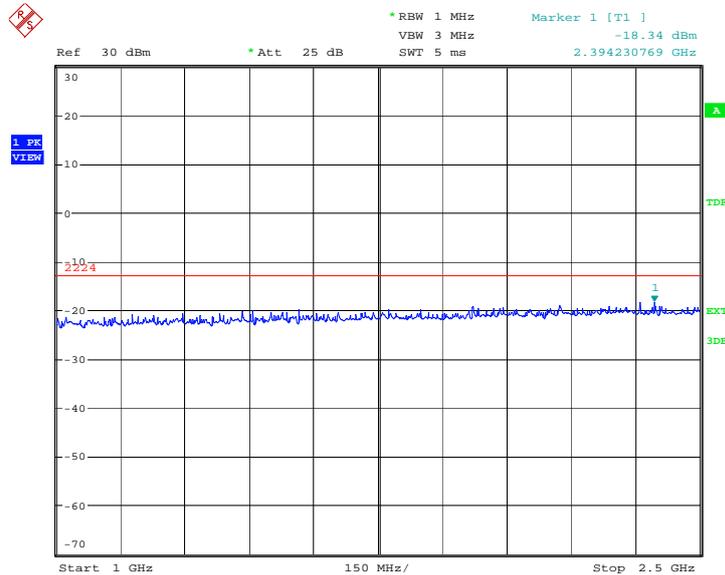
Date: 18.MAR.2011 00:49:08

A. 8.3.37 Idle mode: 30MHz – 1GHz
Spurious emission limit -13dBm.



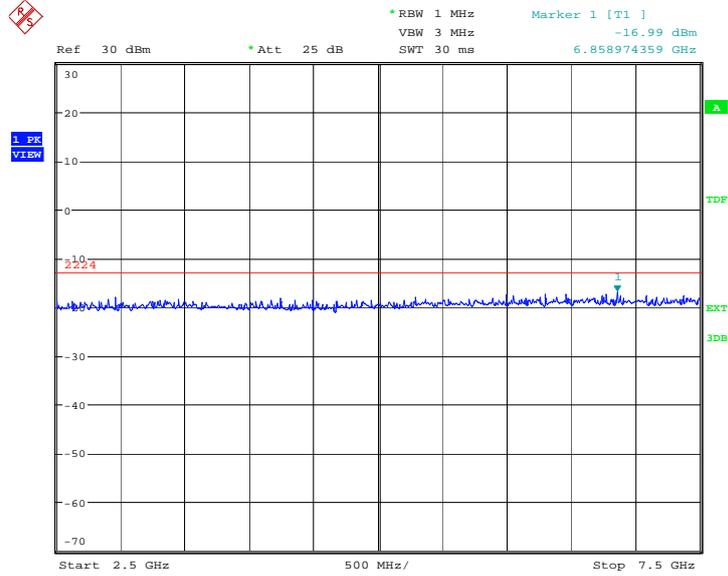
Date: 18.MAR.2011 00:49:52

A.8.3.38 Idle mode: 1GHz – 2.5GHz
Spurious emission limit -13dBm.



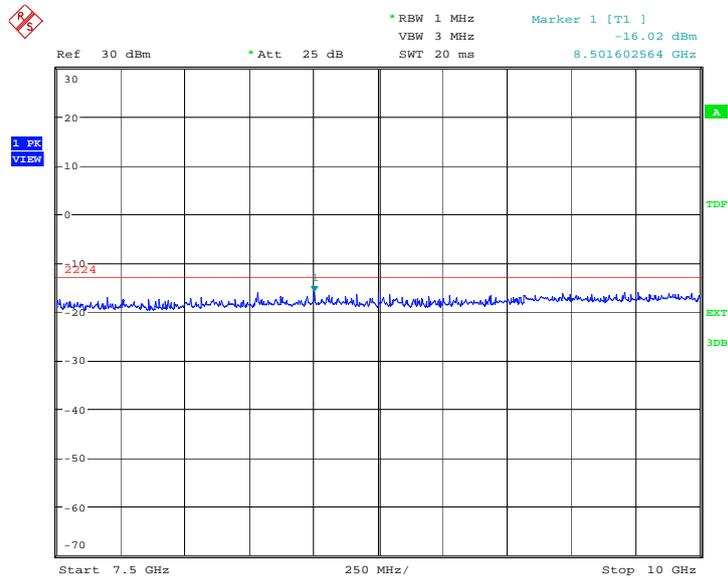
Date: 18.MAR.2011 00:50:19

A.8.3.39 Idle mode: 2.5GHz – 7.5GHz
Spurious emission limit -13dBm.



Date: 18.MAR.2011 00:50:46

A.8.3.40 Idle mode: 7.5GHz – 10GHz
Spurious emission limit -13dBm.



Date: 18.MAR.2011 00:51:13

END OF REPORT