



TEST REPORT

No. 2011TAR225

for

TCT Mobile Limited

HSDPA/UMTS dual band / GSM four bands mobile phone

Model Name: BrandyS

Marketing Name: one touch 990S

FCC ID : RAD159

with

Hardware Version: PIO

Software Version: V520

Issued Date: May 13, 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

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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

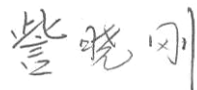
1.2. Testing Environment

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

1.3. Project data

Testing Start Date: Mar 27, 2011
Testing End Date: May 13, 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: TCT Mobile Limited
Address /Post: 5F, E building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,
Pudong Area Shanghai, P.R. China. 201203
City: Shanghai
Country: China
Telephone: 0086-21-61460890
Fax: 0086-21-61460602

2.2. Manufacturer Information

Company Name: TCT Mobile Limited
Address /Post: 5F, E building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,
Pudong Area Shanghai, P.R. China. 201203
City: Shanghai
Country: China
Telephone: 0086-21-61460890
Fax: 0086-21-61460602

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

3.1. About EUT

Description	HSDPA/UMTS dual band / GSM four bands mobile phone
Model Name	BrandyS
Marketing Name	one touch 990S
FCC ID	RAD159
Frequency	GSM 850MHz; PCS 1900MHz; WCDMA BAND IV;
Antenna	Internal
Power supply	Battery or Charger (AC Adaptor)
Output power	25.26 dBm maximum EIRP measured for WCDMA BAND IV
Extreme vol. Limits	3.5VDC to 4.2VDC (nominal: 3.8VDC)
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
N18	012579000000322	PIO	V520
N19	012579000000249	PIO	V520

*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	/
AE3	Charger	/
AE4	Charger	/

AE1

Model	CAB31P0000C1
Manufacturer	BYD
Capacitance	1300mAh
Nominal Voltage	3.7V

AE2

Model	CBA3001AG0C1
Manufacturer	BYD
Length of DC line	120cm

AE3

Model	CBA3001AG0C2
Manufacturer	Tenpao
Length of DC line	120cm

AE4

Model	CBA3000AG0C1
Manufacturer	Tenpao
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 HSDPA/UMTS dual band / GSM four bands mobile phone with integrated antenna. It consists of normal options: lithium battery, charger Manual and specifications of the EUT were provided to fulfil the test. 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 10.1.09
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	2003

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	27.50(d)(2)	P
2	Emission Limit	2.1051/27.53(g)	P
3	CONDUCTED EMISSION	15.107/15.207	P
4	Frequency Stability	2.1055/27.54	P
5	Occupied Bandwidth	2.1049(h)(i)	P
6	Emission Bandwidth	27.53(b)	P
7	Band Edge Compliance	27.53(b)	P
8	Conducted Spurious Emission	2.1057/ 27.53(g)	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 (§27.50(d)(2))

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 (RMS) These measurements were done at 3 frequencies, 1712.4MHz, 1740MHz, and 1752.6MHz for WCDMA Band IV. (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 IV

Measurement result

WCDMA (Band IV)	CH	Frequency(MHz)	output power(dBm)	Target (dB)
	1312	1712.4	22.18	22±1
	1450	1740	21.91	22±1
	1513	1752.6	22.01	22±1

ANALYZER SETTINGS: VBW=RBW=10MHz; SPAN=50MHz;SWT=800ms

A.1.3 Radiated

A.1.3.1 Description

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

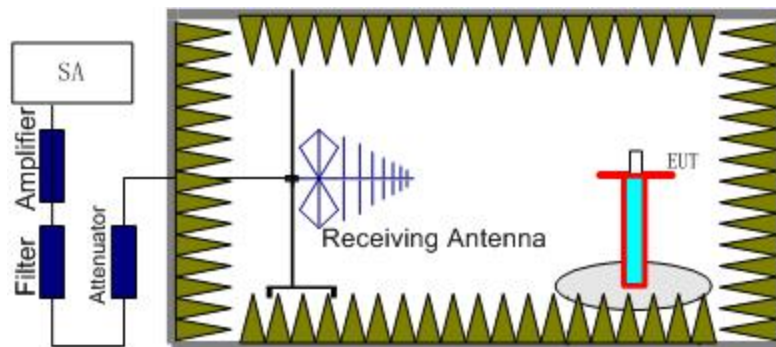
Rule Part 24.232(b) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

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

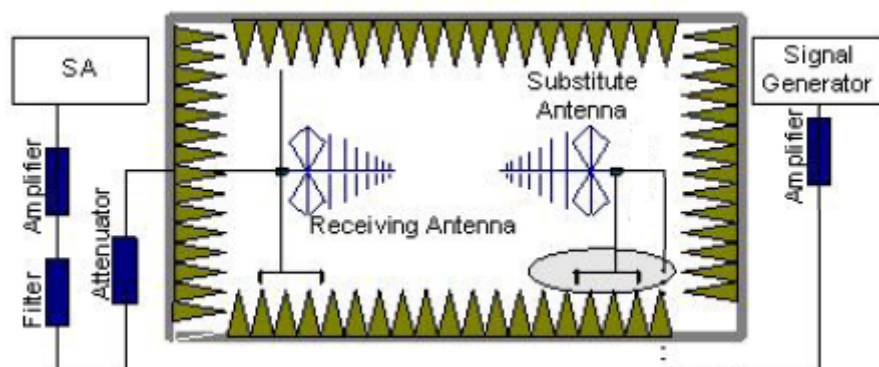
A.1.3.2 Method of Measurement

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. 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:

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

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

WCDMA Band IV-EIRP

Limits

	Burst Peak EIRP (dBm)
WCDMA Band IV	30dBm (2W)

Measurement result

Frequency(MHz)	Peak ERP(dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	P _{Mea} (dBm)	Polarization
1712.4	25.26	-8.32	50	3.81	-25.90	V
1740	21.78	-8.37	50	3.77	-29.17	V
1752.6	24.34	-8.42	50	3.73	-26.50	H

Frequency: 1712.4MHz

Peak EIRP(dBm)= P_{Mea}(-25.90dBm)+ P_{cl}(-8.32dB)+ P_{Ag}(50dB)+G_a (3.81dB) =25.26dBm

ANALYZER SETTINGS: RBW = VBW = 3MHz

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

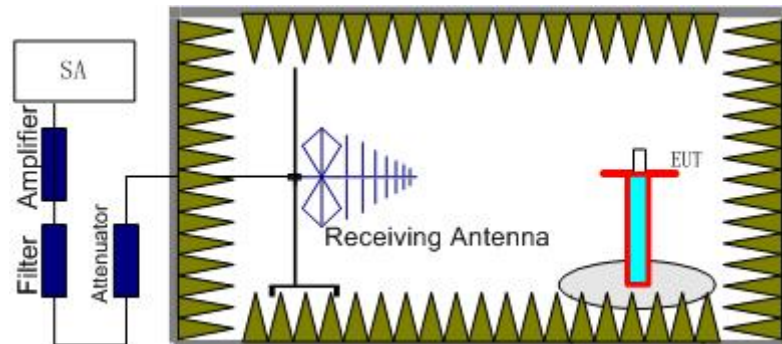
A.2.1 Measurement Method

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

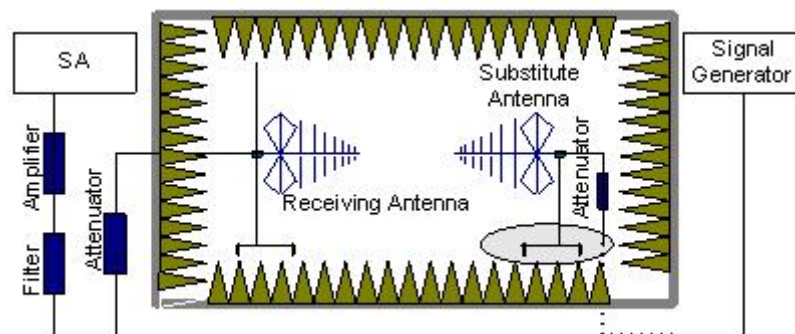
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The resolution bandwidth is set 1MHz as outlined in Part 27.53. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the WCDMA Band IV.

The procedure of radiated spurious emissions is as follows:

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the 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 27.53 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 WCDMA Band IV (1712.4MHz, 1740MHz and 1752.6MHz). 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 WCDMA Band IV into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

A.2.4 Measurement Results Table

Frequency	Channel	Frequency Range	Result
WCDMA Band IV	Low	30MHz-20GHz	Pass
	Middle	30MHz-20GHz	Pass
	High	30MHz-20GHz	Pass

A.2.5 Sweep Table

Working Frequency	Subrange (GHz)	RBW	VBW	Sweep time (s)
WCDMA Band IV	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 IV Mode Channel 1312/1712.4MHz

Frequency(MHz)	Peak EIRP(dBm)	Path Loss	Antenna Gain	P _{Mea} (dBm)	Limit (dBm)	Polarization
3427.09	-47.18	5.77	-7.73	-45.22	-13	32.22
5177.05	-65.01	7.26	-9.81	-62.46	-13	49.46
6853.76	-53.87	7.94	-10.95	-50.86	-13	37.86
10103.87	-60.46	9	-12.42	-57.04	-13	44.04
13533.8	-61.96	9.92	-13.81	-58.07	-13	45.07
17662.02	-57.44	11.41	-13.4	-55.45	-13	42.45

WCDMA BAND IV Mode Channel 1450/1740MHz

Frequency(MHz)	Peak EIRP(dBm)	Path Loss	Antenna Gain	P _{Mea} (dBm)	Limit (dBm)	Polarization
3482.28	-52.34	5.65	-7.86	-50.13	-13	37.13
5100.26	-66.58	7.08	-9.76	-63.9	-13	50.9
7849.93	-64.28	8.27	-11.75	-60.8	-13	47.8
11357.25	-61.72	9.52	-12.4	-58.84	-13	45.84
15023.09	-59.36	10.46	-13.5	-56.32	-13	43.32
17285.27	-56.36	11.26	-12.91	-54.71	-13	41.71

WCDMA BAND IV Mode Channel 1513/1752.6MHz

Frequency(MHz)	Peak EIRP(dBm)	Path Loss	Antenna Gain	P _{Mea} (dBm)	Limit (dBm)	Polarization
3502.85	-50.14	5.78	-7.9	-48.02	-13	35.02
5165.82	-63.41	7.29	-9.8	-60.9	-13	47.9
7008.46	-61.62	8.41	-11.11	-58.92	-13	45.92
8861.17	-66.14	8.72	-12.49	-62.37	-13	49.37
10242.76	-62.73	9.02	-12.45	-59.3	-13	46.3
17565.73	-53.28	11.4	-13.34	-51.34	-13	38.34

A.3 CONDUCTED EMISSION (§15.107§15.207)

The measurement procedure in ANSI C63.4-2003 is used. Conducted Emission is measured with travel charger.

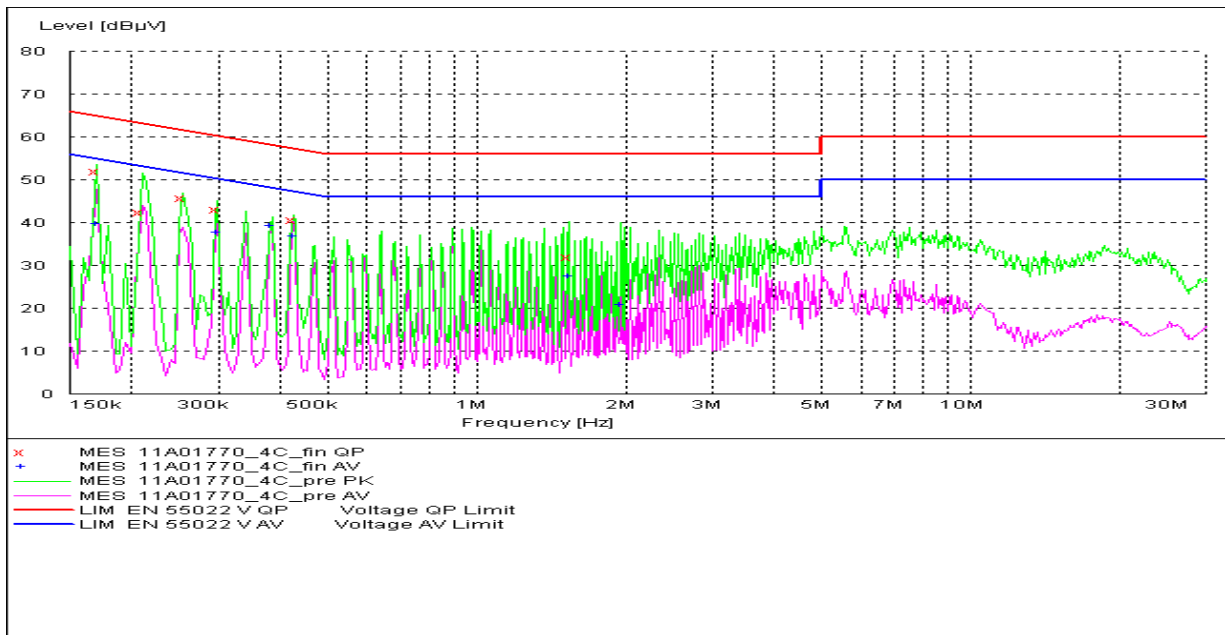
A.3.1 Limit

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

* Decreases with logarithm of the frequency

A.3.2 Measurement result

WCDMA Band IV-AE2



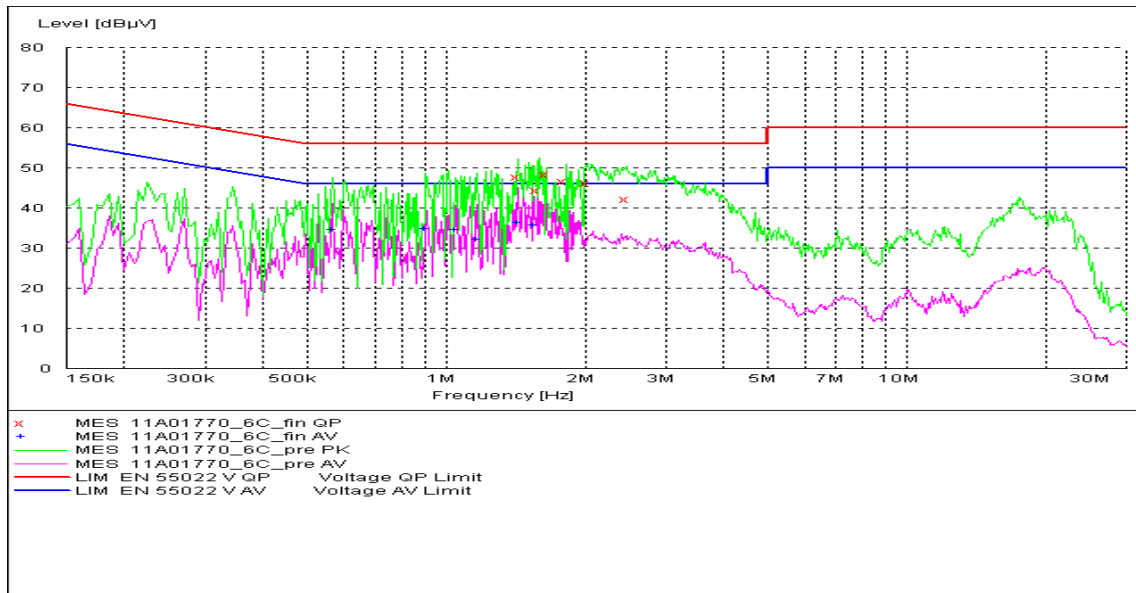
MEASUREMENT RESULT: "11A01770_4C_fin QP"

Frequency MHz	Level dBµV	Transd	Limit dB	Margin dBµV	Line	PE
0.170000	51.90	10.1	65	13.1	N	GND
0.210000	42.30	10.1	63	20.9	N	GND
0.255000	45.70	10.1	62	15.9	L1	GND
0.300000	43.00	10.1	60	17.3	N	GND
0.425000	40.70	10.1	57	16.7	N	GND
1.535000	32.00	10.1	56	24.0	L1	GND

MEASUREMENT RESULT: "11A01770_4C_fin AV"

Frequency MHz	Level dBμV	Transd	Limit dB	Margin dBμV	Line	PE
0.170000	39.70	10.1	55	15.3	L1	GND
0.300000	37.60	10.1	50	12.7	N	GND
0.385000	39.20	10.1	48	9.0	N	GND
0.425000	36.80	10.1	47	10.5	N	GND
1.535000	27.40	10.1	46	18.6	N	GND
1.960000	20.90	10.1	46	25.1	N	GND

WCDMA Band IV-AE3



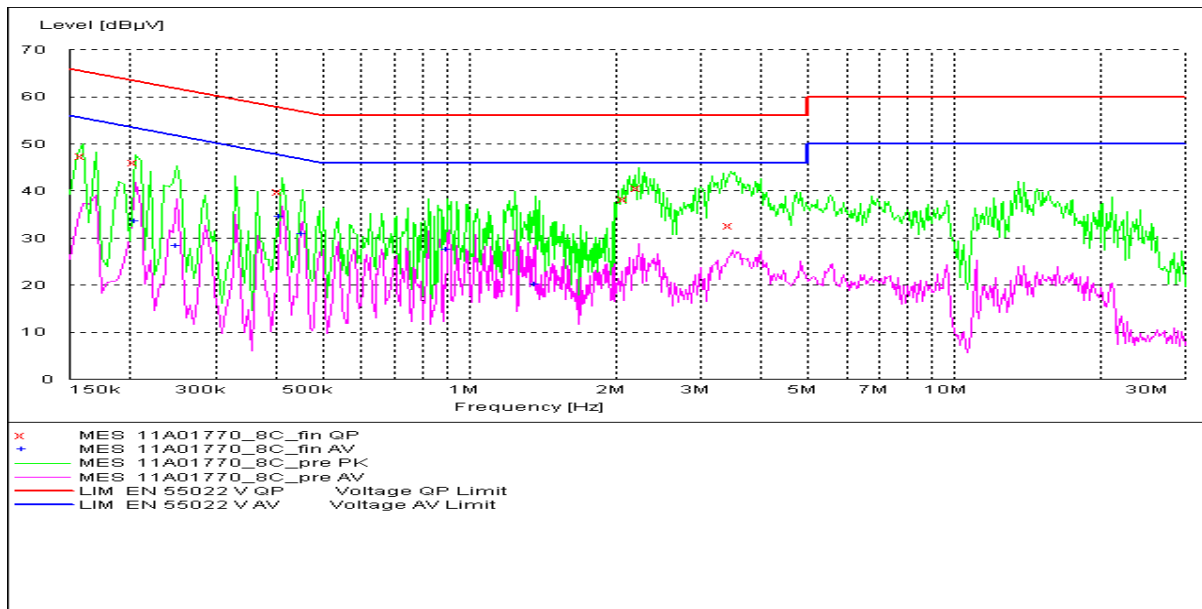
MEASUREMENT RESULT: "11A01770_6C_fin QP"

Frequency MHz	Level dBμV	Transd	Limit dB	Margin dBμV	Line	PE
1.435000	47.80	10.1	56	8.3	N	GND
1.590000	44.30	10.1	56	11.7	L1	GND
1.650000	48.50	10.1	56	7.5	N	GND
1.815000	46.70	10.1	56	9.4	N	GND
2.032128	46.20	10.1	56	9.8	N	GND
2.460389	42.10	10.1	56	13.9	L1	GND

MEASUREMENT RESULT: "11A01770_6C_fin AV"

Frequency MHz	Level dBμV	Transd	Limit dB	Margin dBμV	Line	PE
0.565000	34.70	10.1	46	11.3	N	GND
0.905000	34.90	10.1	46	11.1	N	GND
1.050000	34.70	10.1	46	11.3	L1	GND
1.170000	32.10	10.1	46	13.9	N	GND
1.435000	36.30	10.1	46	9.8	L1	GND
1.550000	35.70	10.1	46	10.3	N	GND

WCDMA Band IV-AE4



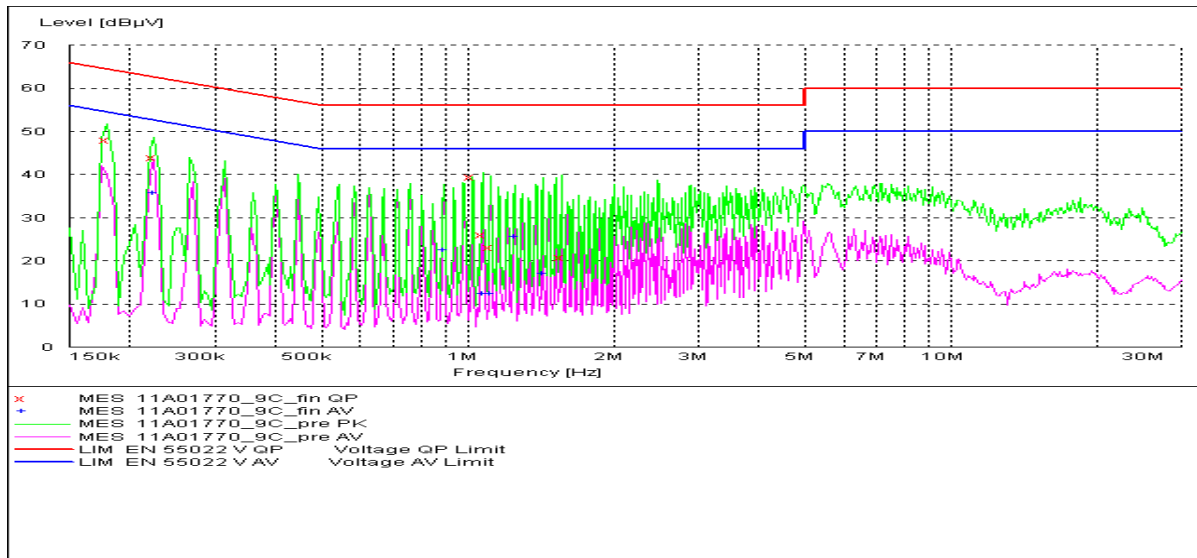
MEASUREMENT RESULT: "11A01770_8C_fin QP"

Frequency MHz	Level dBμV	Transd	Limit dB	Margin dBμV	Line	PE
0.160000	47.30	10.1	66	18.2	L1	GND
0.205000	46.00	10.1	63	17.4	L1	GND
0.410000	39.70	10.1	58	18.0	N	GND
2.114724	38.30	10.1	56	17.7	N	GND
2.236029	40.60	10.1	56	15.4	N	GND
3.465826	32.70	10.1	56	23.3	L1	GND

MEASUREMENT RESULT: "11A01770_8C_fin AV"

Frequency MHz	Level dB μ V	Transd	Limit dB	Margin dB μ V	Line	PE
0.205000	33.60	10.1	53	19.8	N	GND
0.250000	28.40	10.1	52	23.3	N	GND
0.410000	34.50	10.1	48	13.1	N	GND
0.455000	30.80	10.1	47	16.0	L1	GND
0.905000	27.60	10.1	46	18.4	N	GND
1.365000	20.10	10.1	46	25.9	L1	GND

MP3



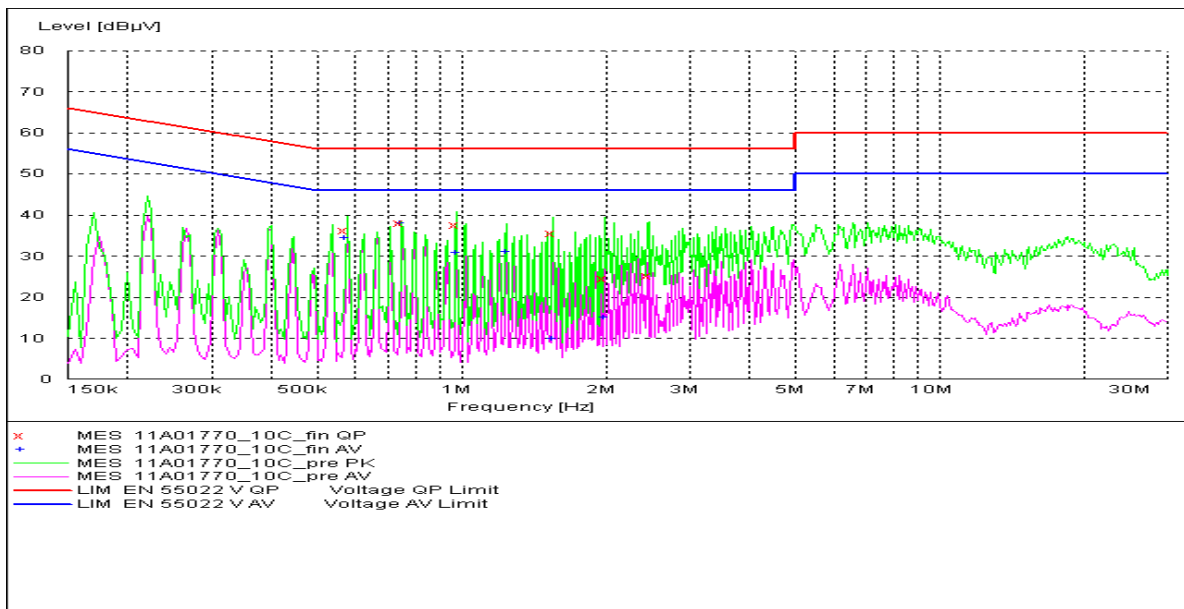
MEASUREMENT RESULT: "11A01770_9C_fin QP"

Frequency MHz	Level dB μ V	Transd	Limit dB	Margin dB μ V	Line	PE
0.180000	48.00	10.1	65	16.5	N	GND
0.225000	43.90	10.1	63	18.7	N	GND
1.025000	39.40	10.1	56	16.6	N	GND
1.075000	26.00	10.1	56	30.0	N	GND
1.120000	23.00	10.1	56	33.0	N	GND
1.565000	20.80	10.1	56	35.2	L1	GND

MEASUREMENT RESULT: "11A01770_9C_fin AV"

Frequency MHz	Level dBμV	Transd	Limit dB	Margin dBμV	Line	PE
0.225000	35.70	10.1	53	17.0	N	GND
0.895000	22.60	10.1	46	23.4	N	GND
1.075000	12.40	10.1	46	33.6	L1	GND
1.120000	12.40	10.1	46	33.6	N	GND
1.250000	25.70	10.1	46	20.3	L1	GND
1.430000	17.00	10.1	46	29.0	N	GND

CAMERA



MEASUREMENT RESULT: "11A01770_10C_fin QP"

Frequency MHz	Level dBμV	Transd	Limit dB	Margin dBμV	Line	PE
0.575000	36.30	10.1	56	19.8	L1	GND
0.750000	37.90	10.1	56	18.1	L1	GND
0.975000	37.60	10.1	56	18.4	N	GND
1.550000	35.40	10.1	56	20.6	N	GND
1.995000	24.50	10.1	56	31.5	N	GND
2.480072	25.10	10.1	56	30.9	L1	GND

MEASUREMENT RESULT: "11A01770_10C_fin AV"

Frequency MHz	Level dB μ V	Transd	Limit dB	Margin dB μ V	Line dB	PE
0.575000	34.50	10.1	46	11.5	N	GND
0.750000	38.00	10.1	46	8.0	L1	GND
0.975000	30.70	10.1	46	15.3	N	GND
1.240000	31.00	10.1	46	15.0	L1	GND
1.550000	10.00	10.1	46	36.0	N	GND
1.995000	15.10	10.1	46	30.9	N	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 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°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 3.8VDC. 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

WCDMA Band IV

Frequency Error vs Voltage

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.5	-13	0.016
3.8	-15	0.019
4.2	-15	0.019

Frequency Error vs Temperature

temperature(°C)	Frequency error(Hz)	Frequency error(ppm)
-30	-19	0.024
-20	-17	0.022
-10	-15	0.019
0	-15	0.019
10	-13	0.016
20	-13	0.016
30	-15	0.019
40	-17	0.022
50	-17	0.022

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

A.5.1 Occupied Bandwidth Results

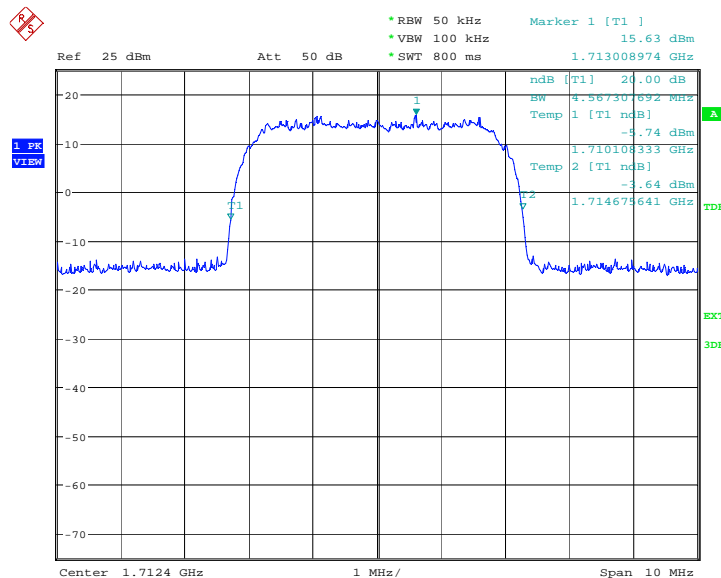
Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of WCDMA IV. The table below lists the measured -20dBc BW. Spectrum analyzer plots are included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

WCDMA Band IV(-20dBc)

Frequency(MHz)	Occupied Bandwidth (-20dBc BW)(MHz)
1712.4	4.567
1740	4.551
1752.6	4.567

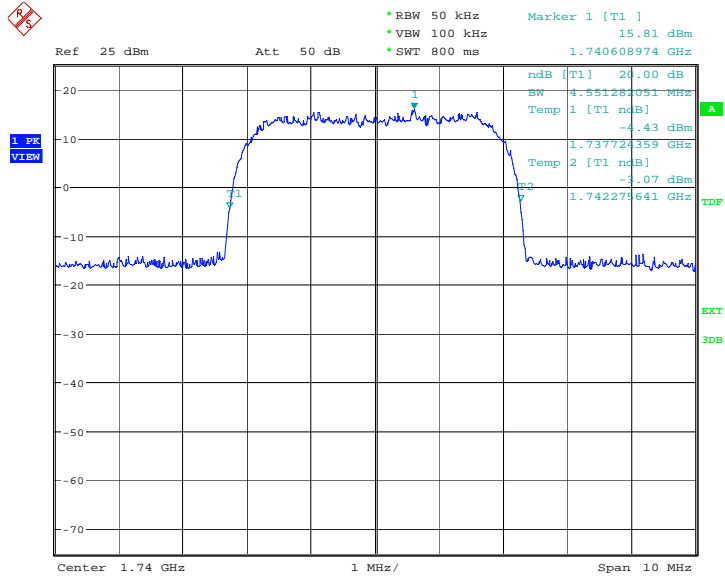
WCDMA Band IV

Channel 1312-Occupied Bandwidth (-20dBc BW)



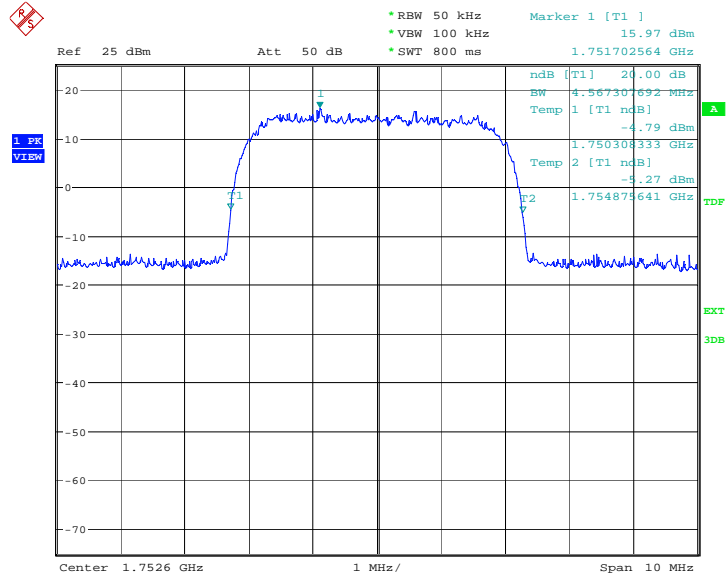
Date: 13.APR.2011 07:27:48

Channel 1450-Occupied Bandwidth (-20dBc BW)



Date: 13.APR.2011 07:28:18

Channel 1513-Occupied Bandwidth (99%)

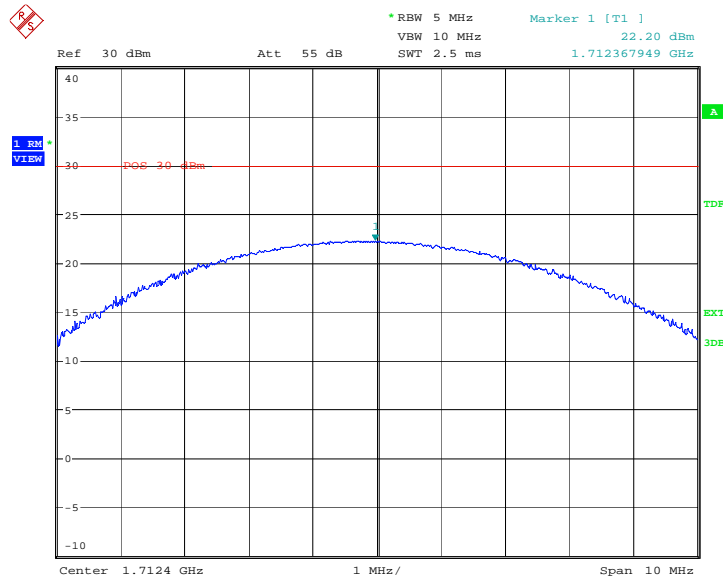


Date: 13.APR.2011 07:28:48

WCDMA Band IV(-20dBc)-IC

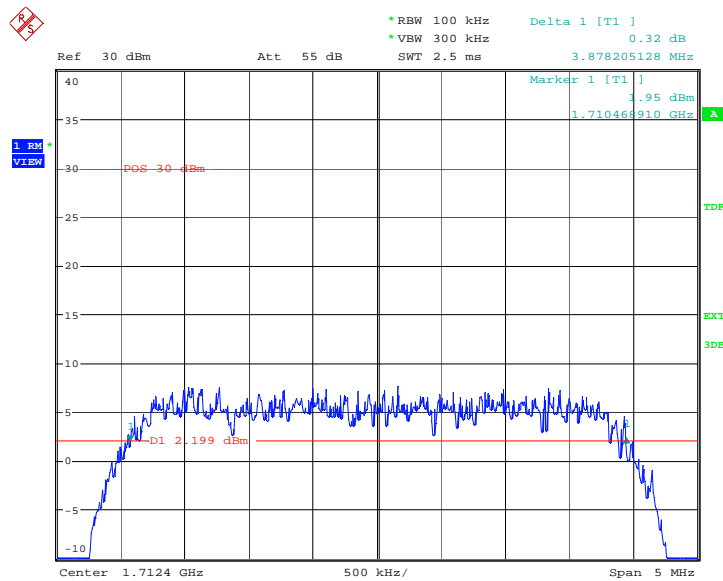
Frequency(MHz)	Occupied Bandwidth (-20dBc BW)(MHz)
1712.4	3.878
1740	3.894
1752.6	3.870

Channel 1312-Occupied Bandwidth Reference Level



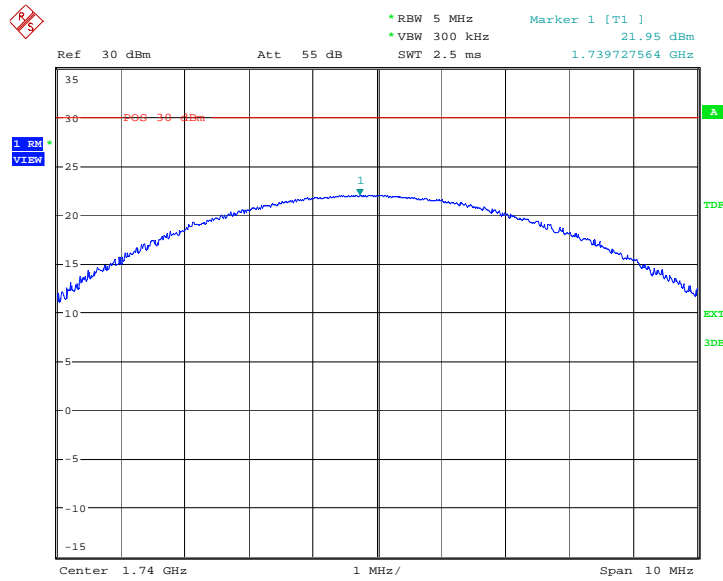
Date: 13.MAY.2011 02:34:40

Channel 1312-Occupied Bandwidth (-20dBc BW)



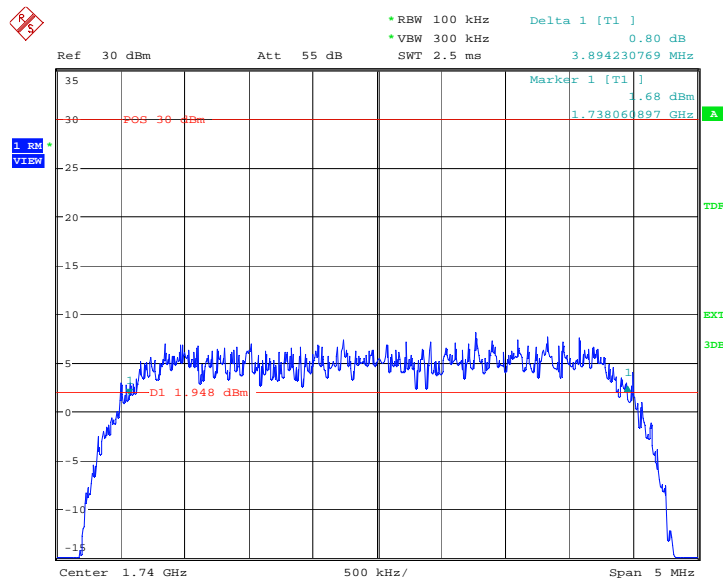
Date: 13.MAY.2011 02:35:40

Channel 1450-Occupied Bandwidth Reference Level



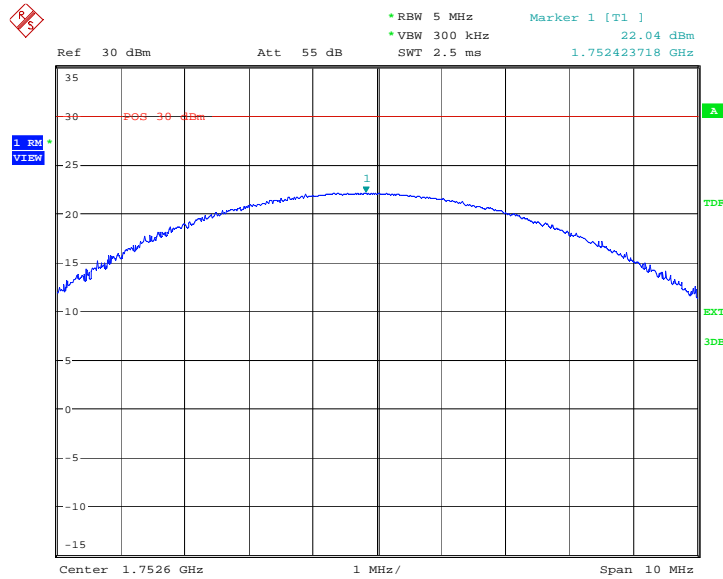
Date: 13.MAY.2011 02:36:49

Channel 1450-Occupied Bandwidth (-20dBc BW)



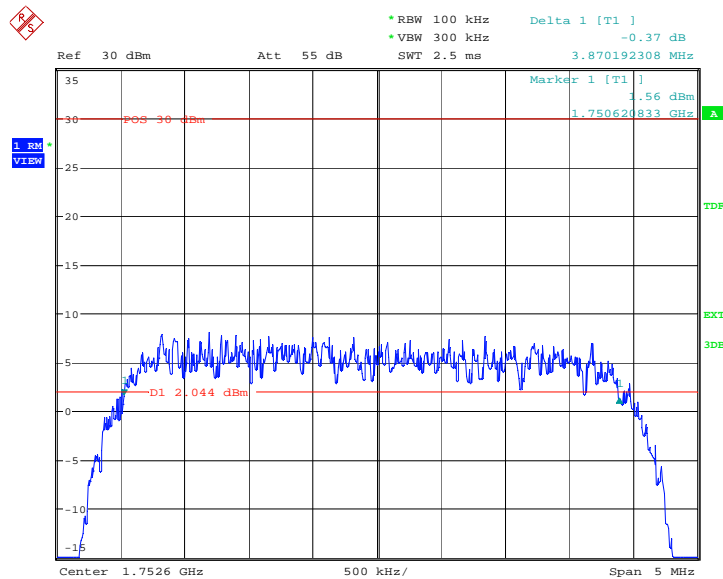
Date: 13.MAY.2011 02:37:51

Channel 1513-Occupied Reference Level (-20dBc BW)



Date: 13.MAY.2011 02:38:52

Channel 1513-Occupied Bandwidth (-20dBc BW)



Date: 13.MAY.2011 02:39:47

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

A.6.1 Emission Bandwidth Results

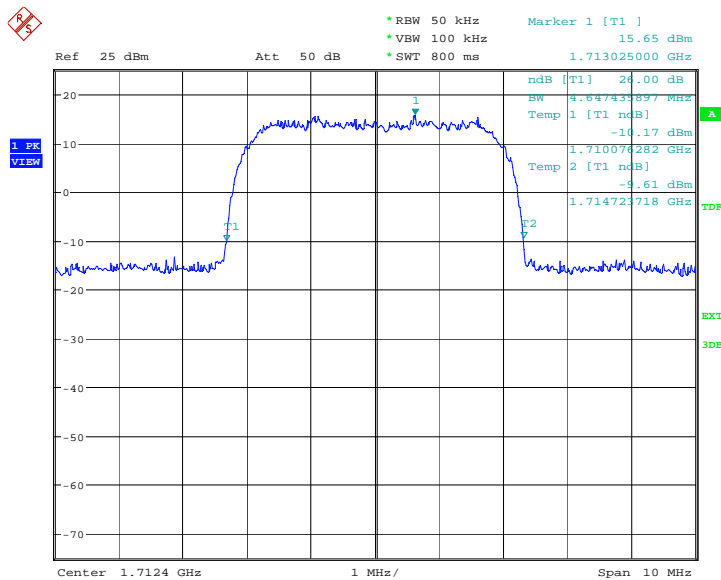
Similar to conducted emissions; Emission bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of WCDMA Band IV. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included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

WCDMA Band IV(-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc BW)(MHz)
1712.4	4.647
1740	4.647
1752.6	4.647

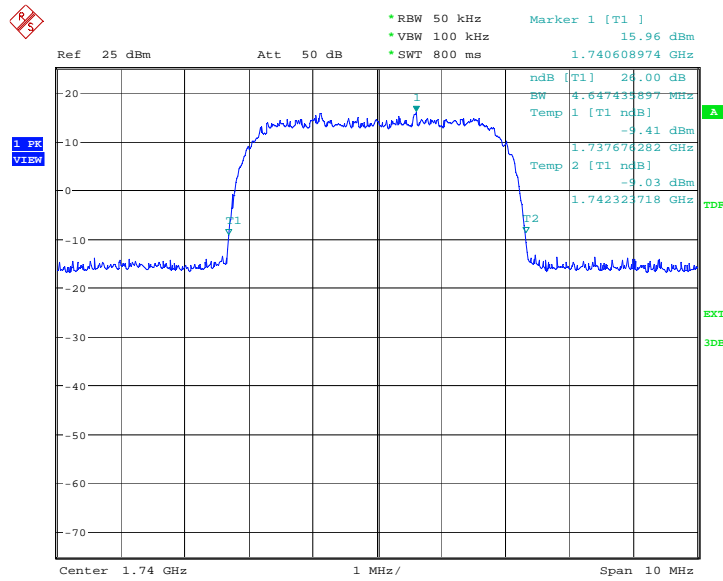
WCDMA Band IV

Channel 1312-Occupied Bandwidth (-26dBc BW)



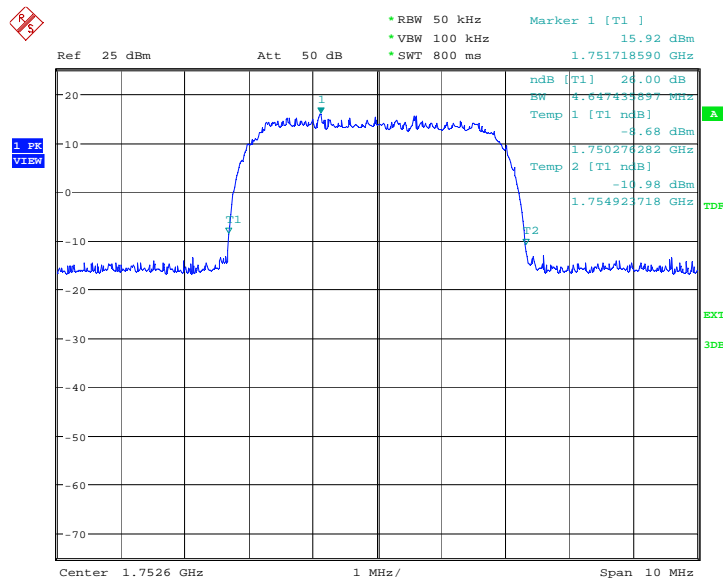
Date: 13.APR.2011 07:29:19

Channel 1450-Occupied Bandwidth (-26dBc BW)



Date: 13.APR.2011 07:29:49

Channel 1513-Occupied Bandwidth (-26dBc BW)

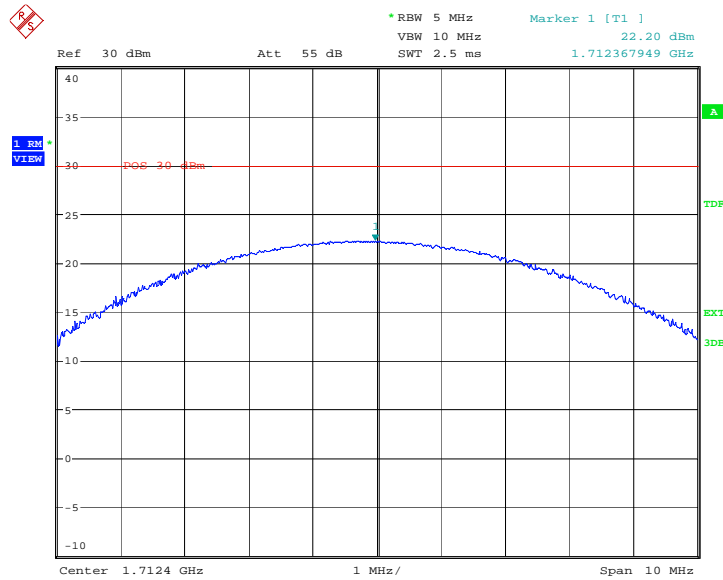


Date: 13.APR.2011 07:30:18

WCDMA Band IV(-26dBc)-IC

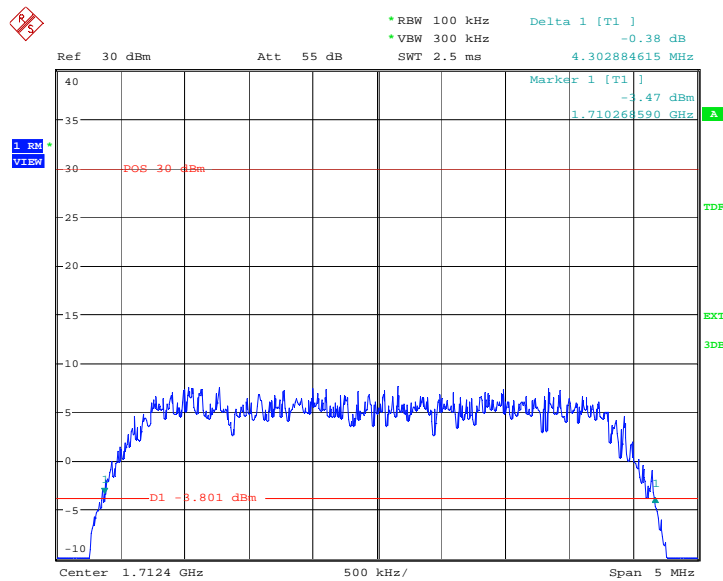
Frequency(MHz)	Occupied Bandwidth (-26dBc BW)(MHz)
1712.4	4.303
1740	4.343
1752.6	4.279

Channel 1312-Occupied Bandwidth Reference Level



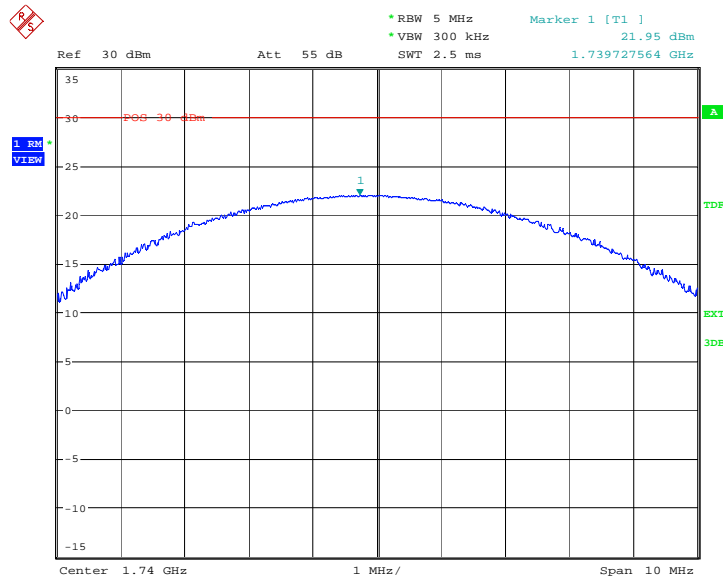
Date: 13.MAY.2011 02:34:40

Channel 1312-Occupied Bandwidth (-26dBc BW)



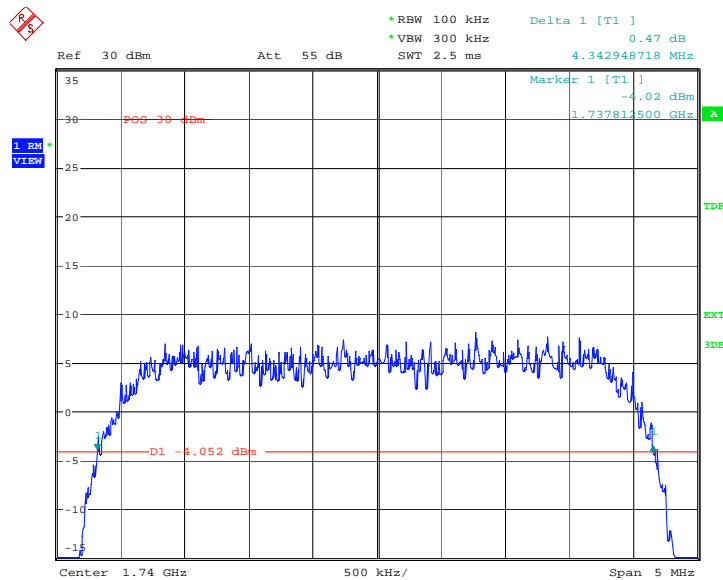
Date: 13.MAY.2011 02:36:34

Channel 1450-Occupied Bandwidth Reference Level



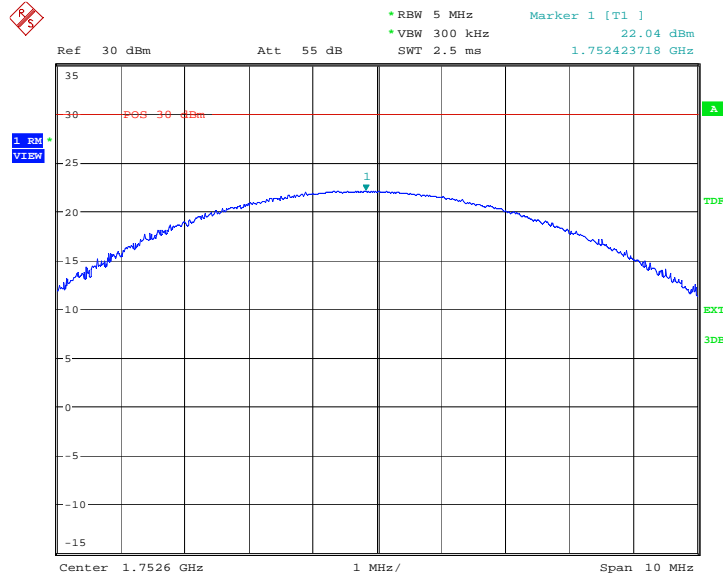
Date: 13.MAY.2011 02:36:49

Channel 1450-Occupied Bandwidth (-26dBc BW)



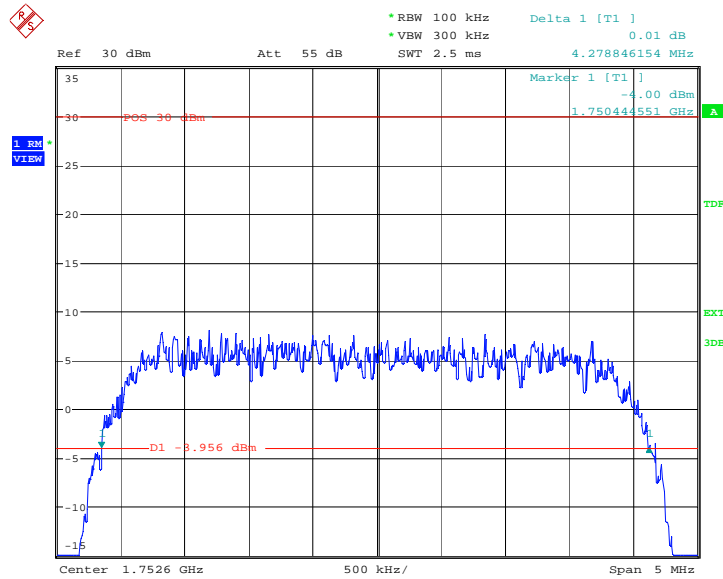
Date: 13.MAY.2011 02:38:36

Channel 1513-Occupied Reference Level



Date: 13.MAY.2011 02:38:52

Channel 1513-Occupied Bandwidth (-26dBc BW)

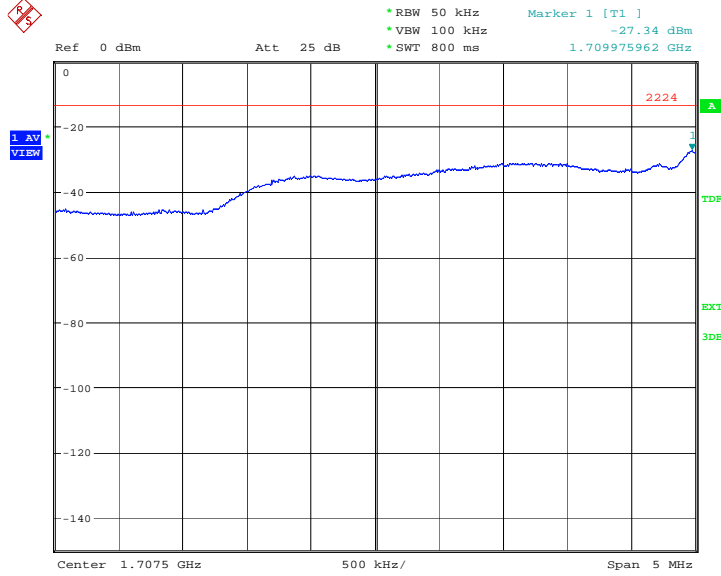


Date: 13.MAY.2011 02:40:27

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

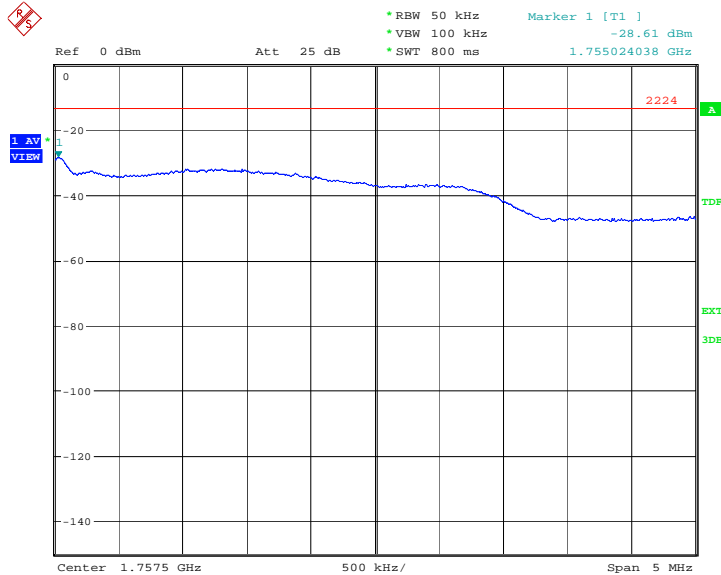
WCDMA Band IV

LOW BAND EDGE BLOCK-A (WCDMA Band IV)-Channel 1312



Date: 13.APR.2011 07:30:50

HIGH BAND EDGE BLOCK-C (WCDMA Band IV) –Channel 1513



Date: 13.APR.2011 07:31:21

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 WCDMA Band IV, this equates to a frequency range of 30 MHz to 17.55 GHz, data taken from 30 MHz to 20 GHz.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

WCDMA Band IV Transmitter

Channel	Frequency (MHz)
1312	1712.40
1450	1740.00
1513	1752.60

A. 8.2 Measurement Limit

Part 27.53(h) 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.

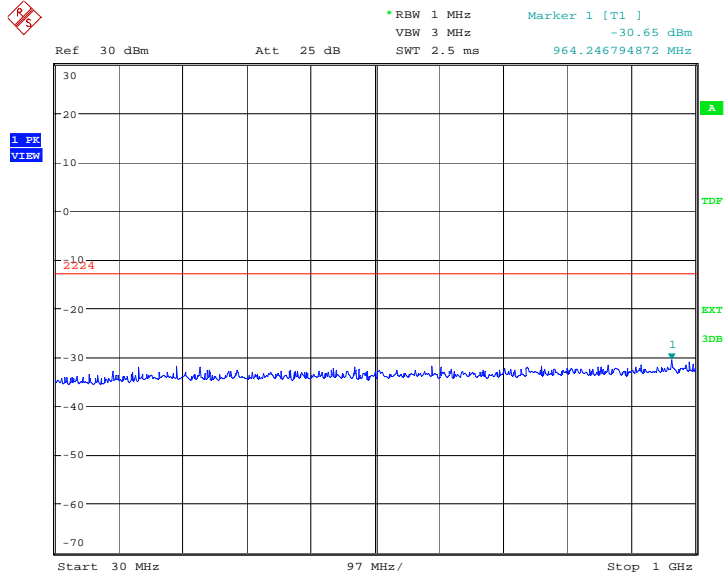
A.8.3 Measurement result

WCDMA Band IV

A.7.3.1 Channel 1312: 30MHz –1GHz

Spurious emission limit –13dBm.

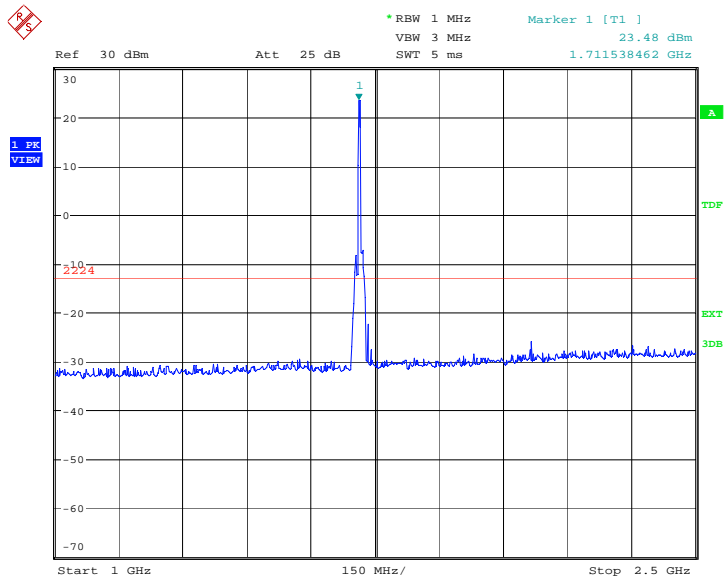
NOTE: peak above the limit line is the carrier frequency.



Date: 13.APR.2011 07:31:52

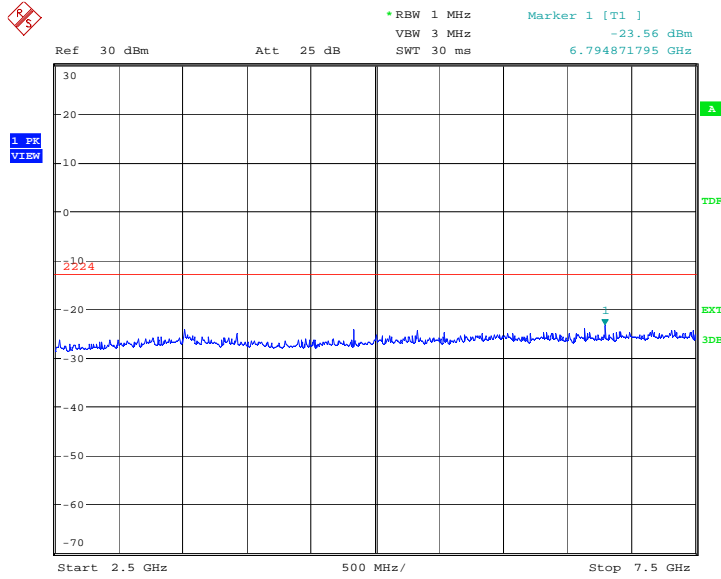
A.7.3.2 Channel 1312: 1GHz –2.5GHz

Spurious emission limit –13dBm.



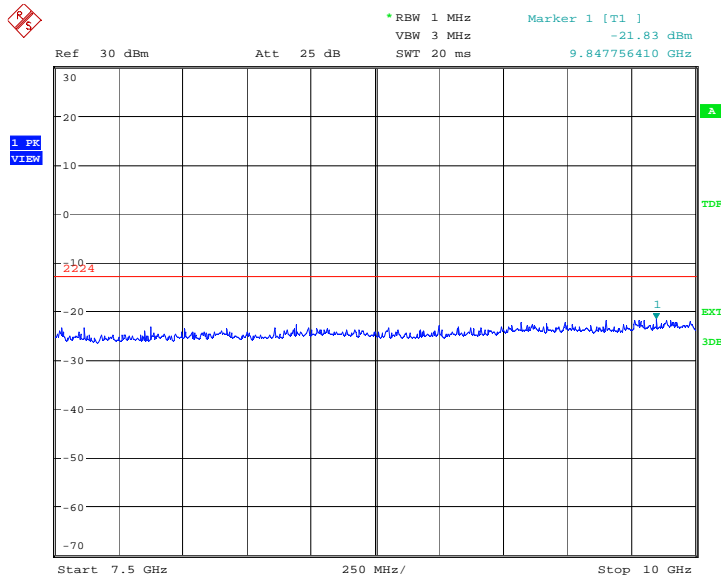
Date: 13.APR.2011 07:32:21

A.7.3.3 Channel 1312: 2.5GHz –7.5GHz
Spurious emission limit –13dBm.



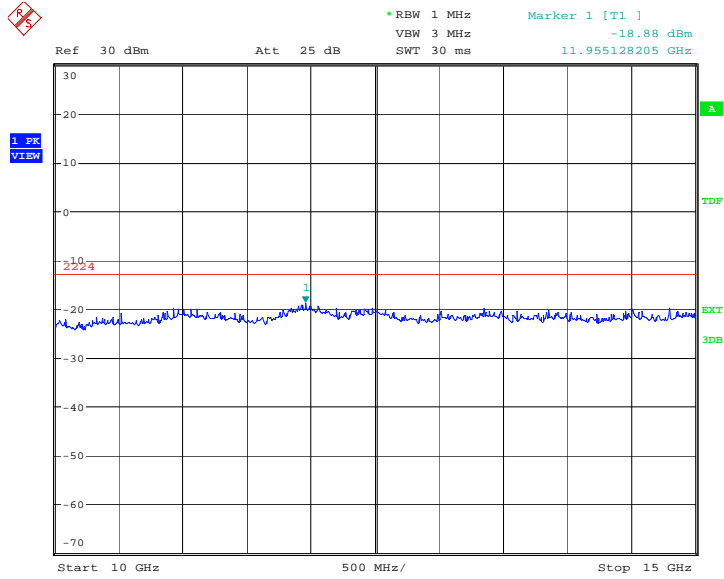
Date: 13.APR.2011 07:32:49

A.7.3.4 Channel 1312: 7.5GHz –10GHz
Spurious emission limit –13dBm.



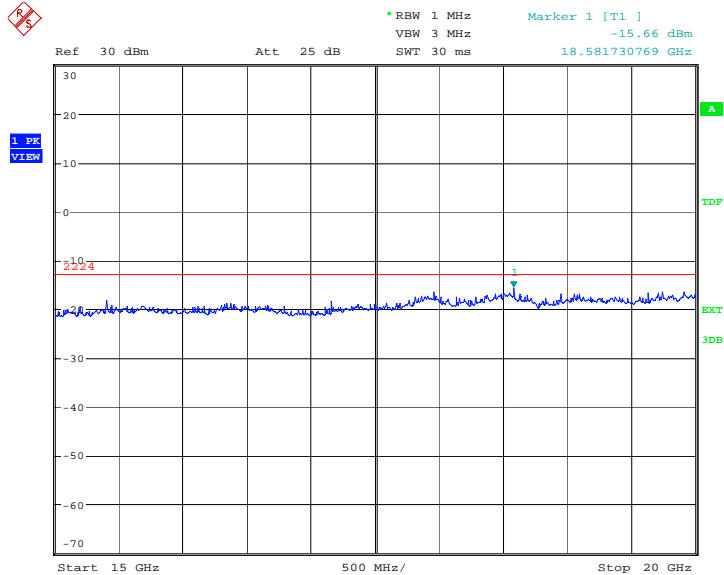
Date: 13.APR.2011 07:33:17

A.7.3.5 Channel 1312: 10GHz –15GHz
Spurious emission limit –13dBm.



Date: 13.APR.2011 07:33:46

A.7.3.6 Channel 1312: 15GHz –20GHz
Spurious emission limit –13dBm.

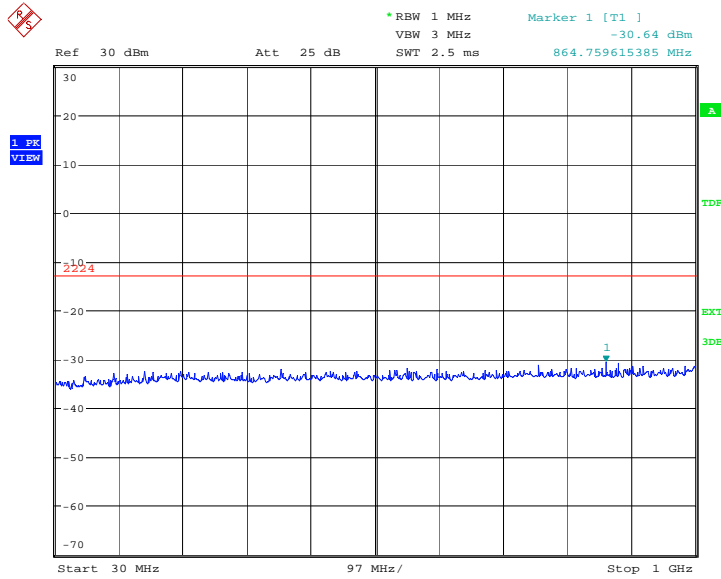


Date: 13.APR.2011 07:34:14

A. 7.3.7 Channel 1450: 30MHz –1GHz

Spurious emission limit –13dBm.

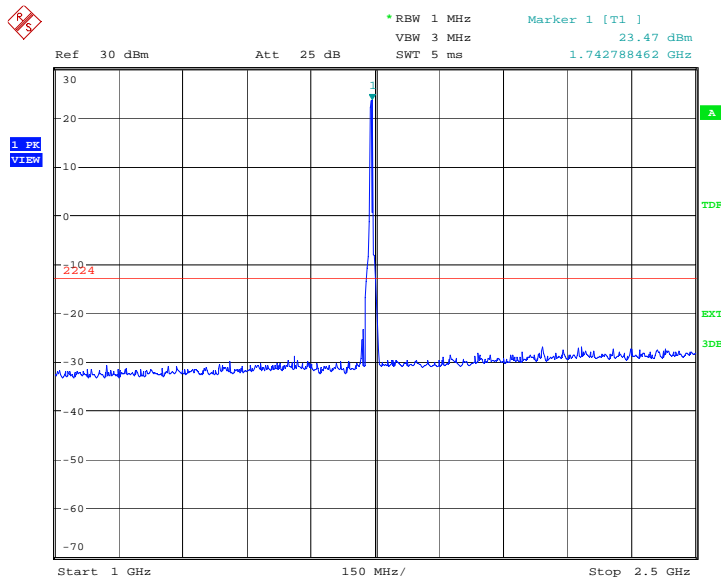
NOTE: peak above the limit line is the carrier frequency.



Date: 13.APR.2011 07:34:45

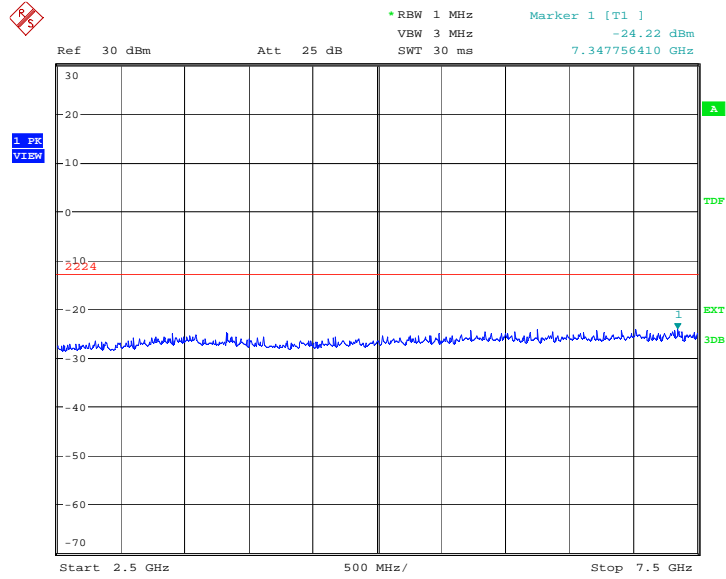
A.7.3.8 Channel 1450: 1GHz –2.5GHz

Spurious emission limit –13dBm.



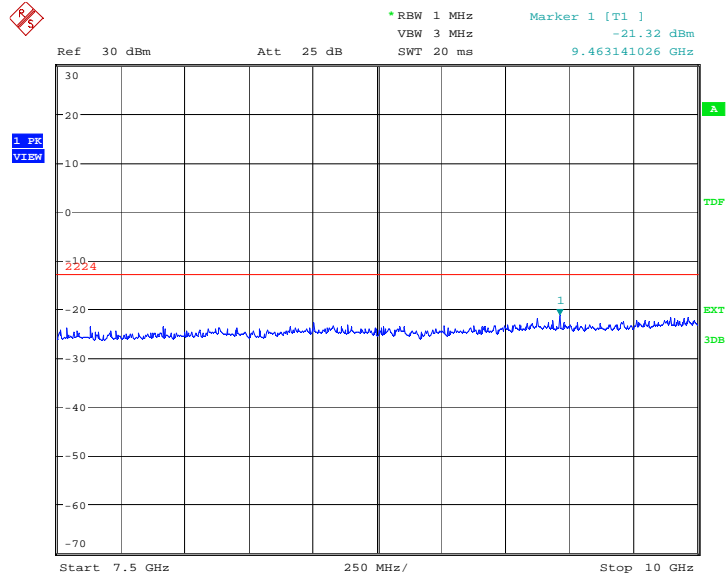
Date: 13.APR.2011 07:35:14

A.7.3.9 Channel 1450: 2.5GHz –7.5GHz
Spurious emission limit –13dBm.



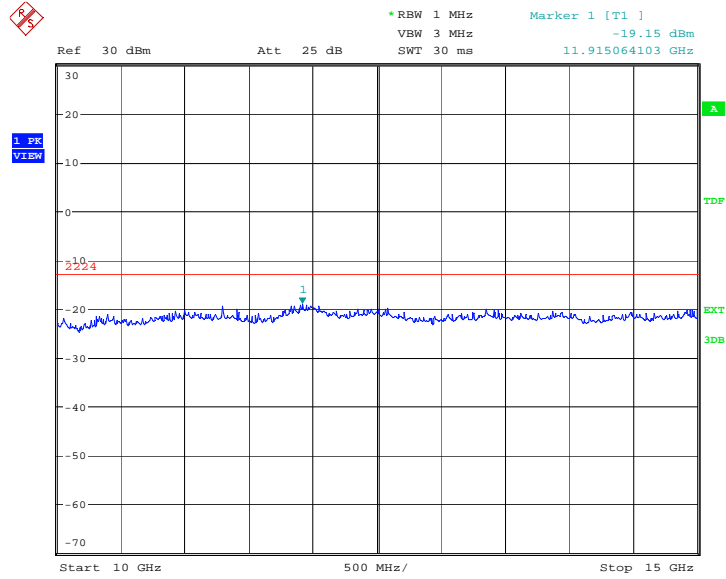
Date: 13.APR.2011 07:35:42

A.7.3.10 Channel 1450: 7.5GHz –10GHz
Spurious emission limit –13dBm.



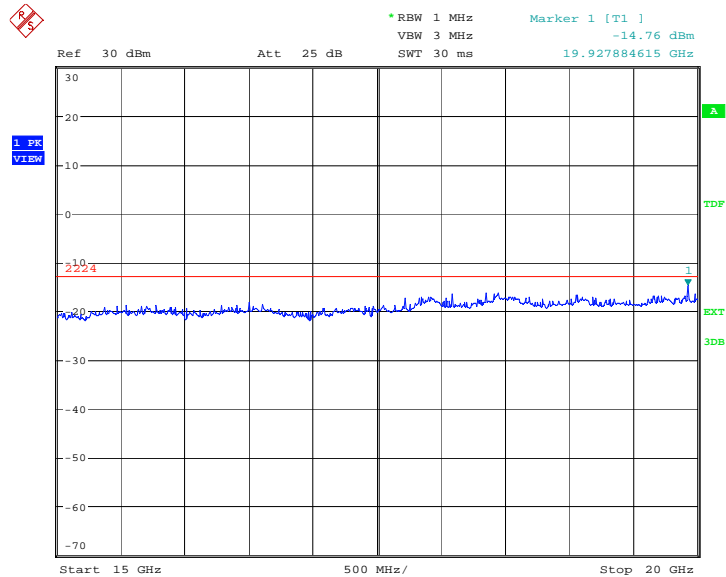
Date: 13.APR.2011 07:36:10

A.7.3.11 Channel 1450: 10GHz –15GHz
Spurious emission limit –13dBm.



Date: 13.APR.2011 07:36:38

A.7.3.12 Channel 1450: 15GHz –20GHz
Spurious emission limit –13dBm.

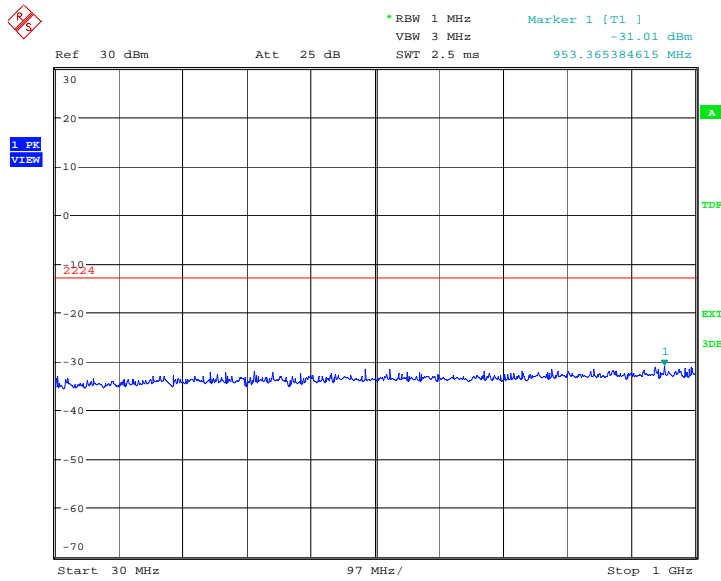


Date: 13.APR.2011 07:37:07

A. 7.3.13 Channel 1513: 30MHz –1GHz

Spurious emission limit –13dBm.

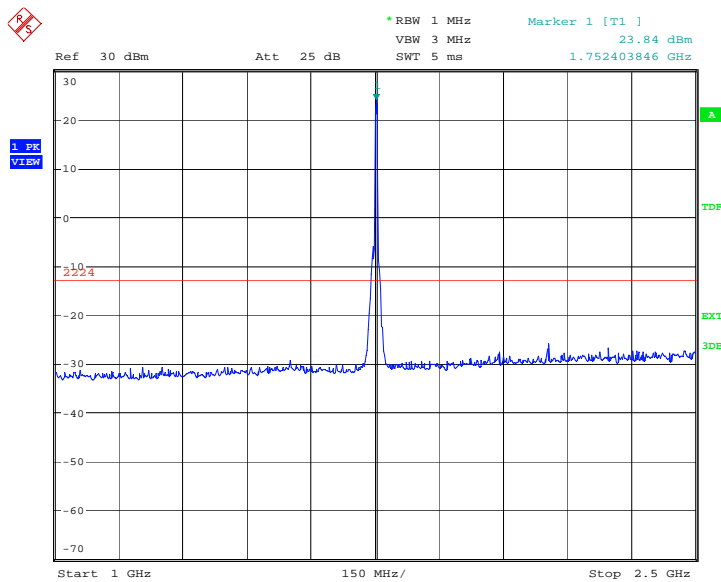
NOTE: peak above the limit line is the carrier frequency.



Date: 13.APR.2011 07:37:38

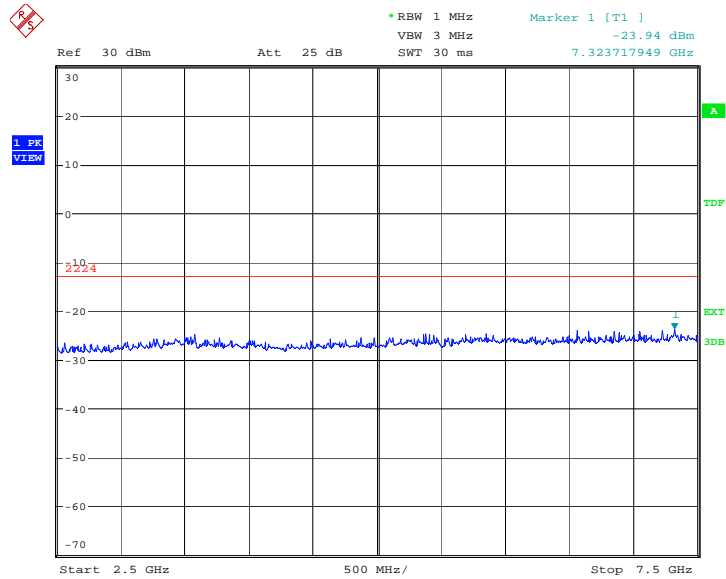
A.7.3.14 Channel 1513: 1GHz –2.5GHz

Spurious emission limit –13dBm.



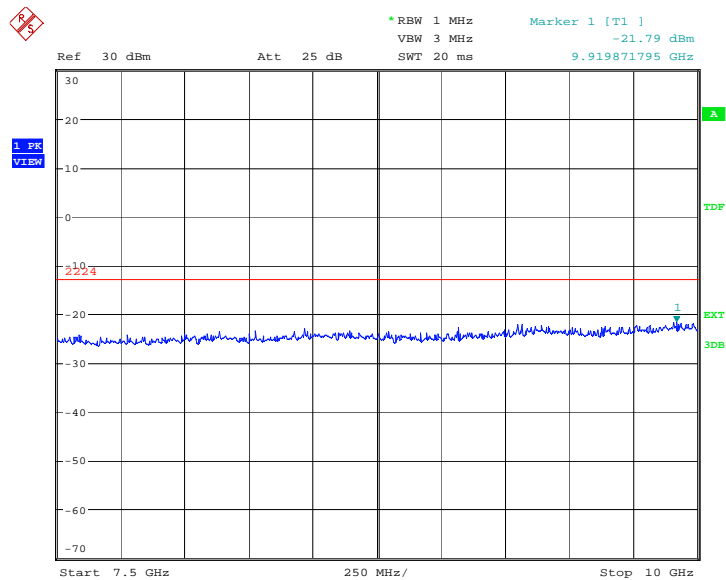
Date: 13.APR.2011 07:38:06

A.7.3.15 Channel 1513: 2.5GHz –7.5GHz
Spurious emission limit –13dBm.



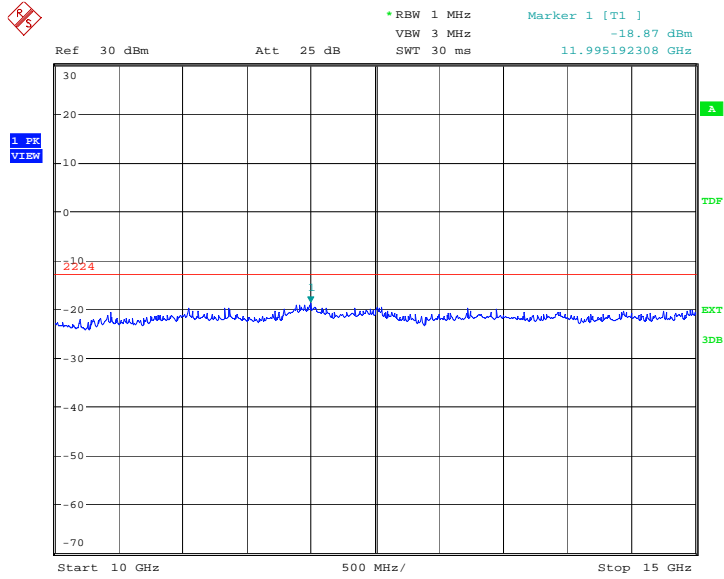
Date: 13.APR.2011 07:38:34

A.7.3.16 Channel 1513: 7.5GHz –10GHz
Spurious emission limit –13dBm.



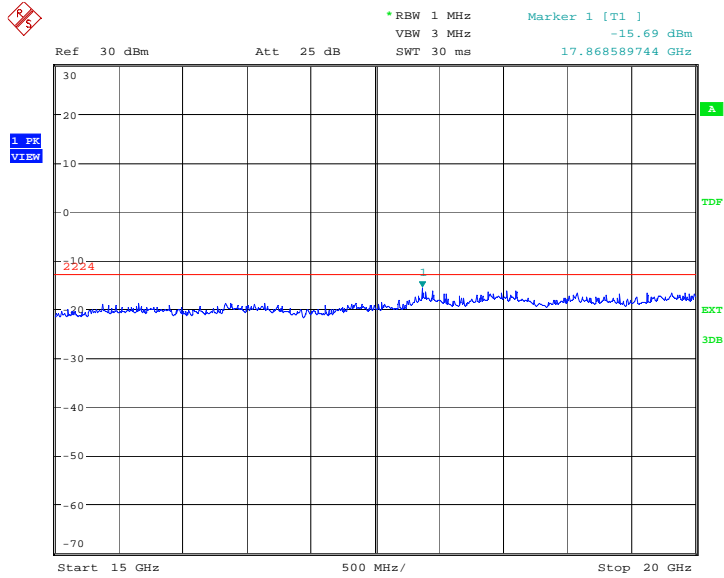
Date: 13.APR.2011 07:39:03

A.7.3.17 Channel 1513: 10GHz –15GHz
Spurious emission limit –13dBm.



Date: 13.APR.2011 07:39:31

A.7.3.18 Channel 1513: 15GHz –20GHz
Spurious emission limit –13dBm.

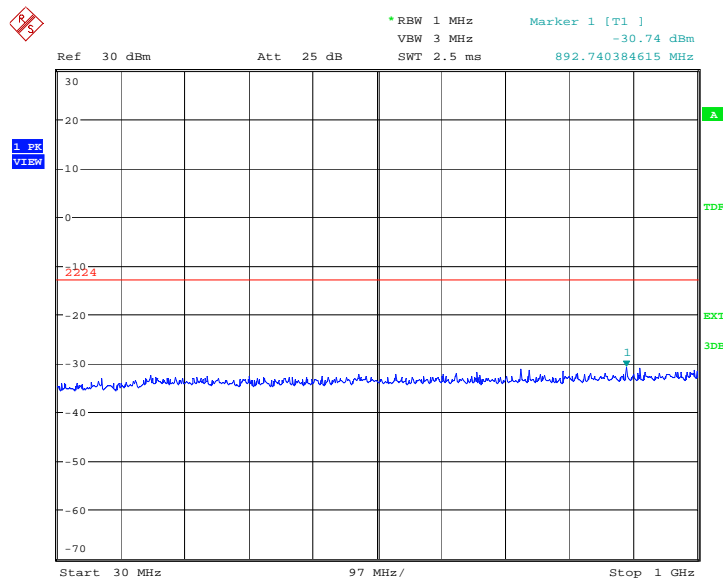


Date: 13.APR.2011 07:39:59

A. 7.3.19 Idle mode: 30MHz –1GHz

Spurious emission limit –13dBm.

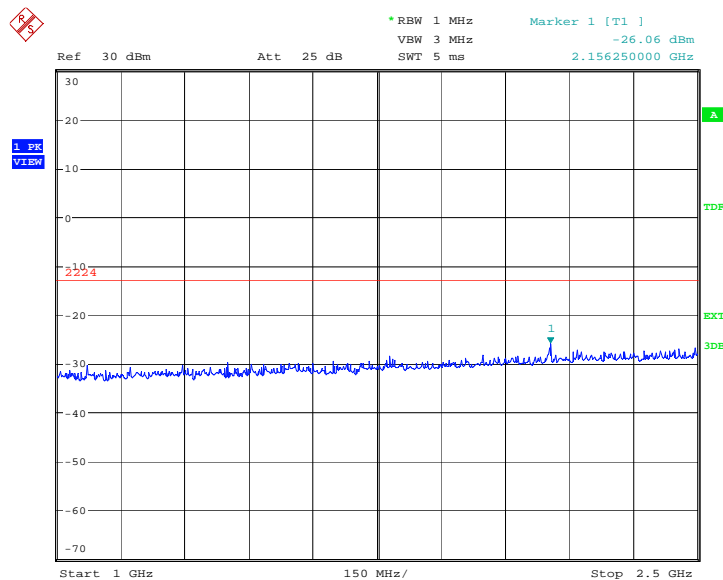
NOTE: peak above the limit line is the carrier frequency.



Date: 13.APR.2011 07:40:29

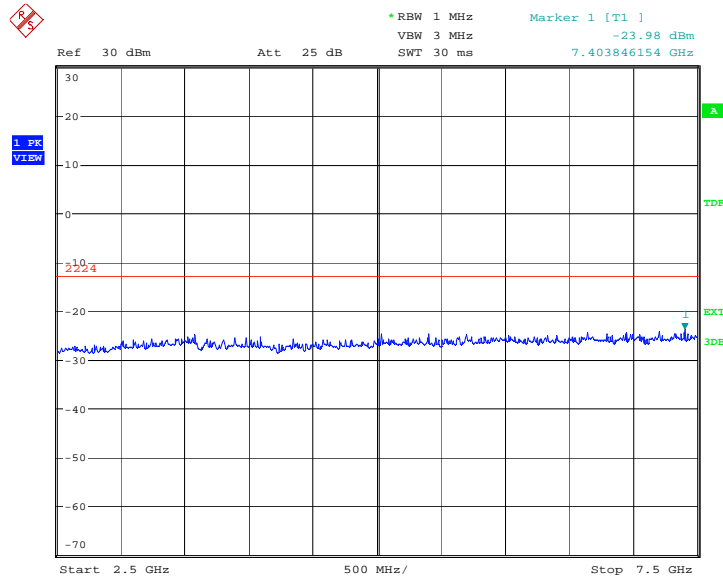
A.7.3.20 Idle mode: 1GHz –2.5GHz

Spurious emission limit –13dBm.



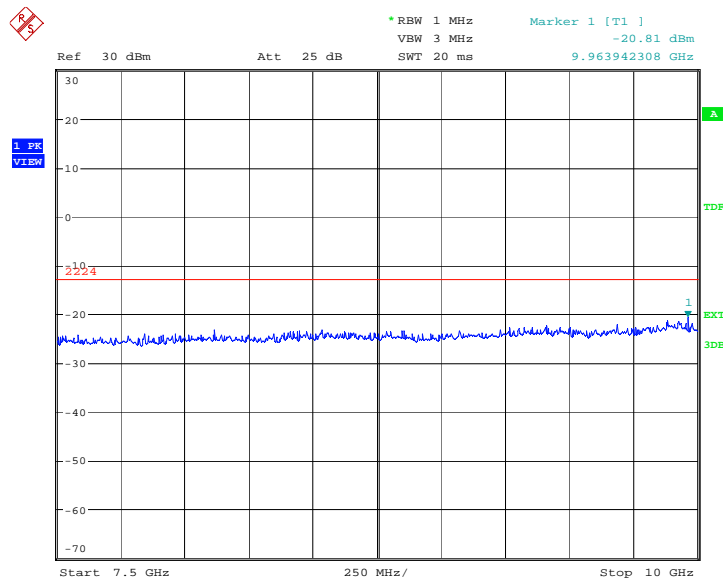
Date: 13.APR.2011 07:40:57

A.7.3.21 Idle mode: 2.5GHz –7.5GHz
Spurious emission limit –13dBm.



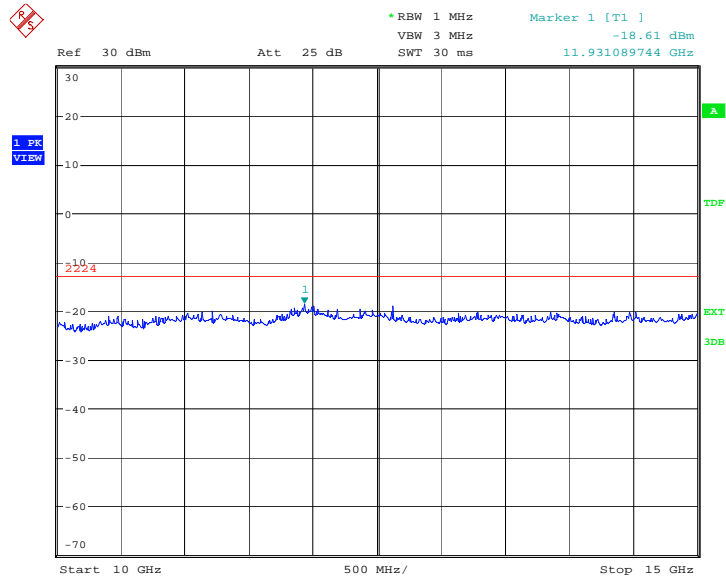
Date: 13.APR.2011 07:41:25

A.7.3.22 Idle mode: 7.5GHz –10GHz
Spurious emission limit –13dBm.



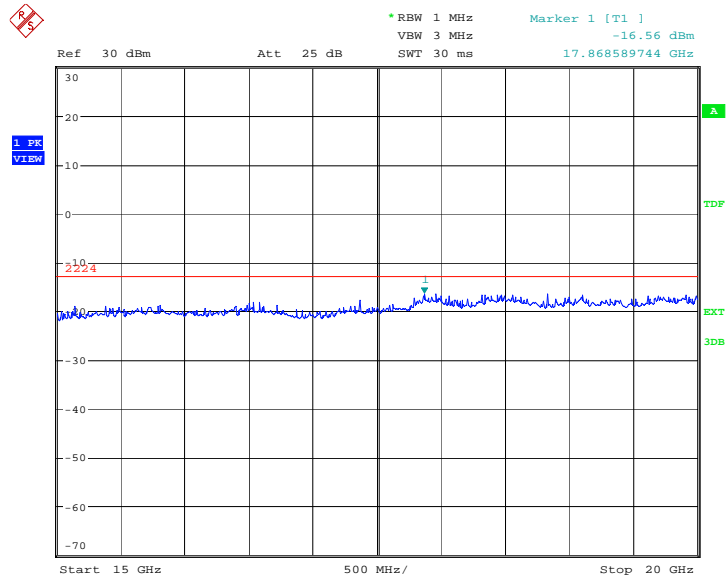
Date: 13.APR.2011 07:41:54

A.7.3.23 Idle mode: 10GHz –15GHz
Spurious emission limit –13dBm.



Date: 13.APR.2011 07:42:22

A.7.3.24 Idle mode: 15GHz –20GHz
Spurious emission limit –13dBm.



Date: 13.APR.2011 07:42:50

END OF REPORT