



# TEST REPORT

No. 2011TAR178

for

**TCT Mobile Limited**

**HSDPA/UMTS dual band / GSM four bands mobile phone**

**Model Name: BrandyA**

**Marketing Name: one touch 990A**

**FCC ID: RAD158**

with

**Hardware Version: PIO**

**Software Version: V520**

**Issued Date: Apr 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. 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

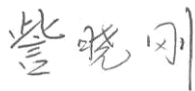
### **1.2. Testing Environment**

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

### **1.3. Project data**

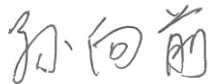
Testing Start Date: Mar 27, 2011  
Testing End Date: Apr 25, 2011

### **1.4. Signature**



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**Zi Xiaogang**  
**(Prepared this test report)**



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**Sun Xiangqian**  
**(Reviewed this test report)**



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**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	BrandyA
Marketing Name	one touch 990A
FCC ID	RAD158
Frequency	GSM 850MHz; PCS 1900MHz; WCDMA Band II; WCDMA Band V
Antenna	Internal
Power supply	Battery or Charger(AC Adaptor)
Output power	26.16dBm maximum EIRP measured for WCDMA Band II
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**

<b>EUT ID*</b>	<b>SN or IMEI</b>	<b>HW Version</b>	<b>SW Version</b>
N09	012578000000274	PIO	V520
N10	012578000000324	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**

<b>AE ID*</b>	<b>Description</b>	<b>SN</b>
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.

<b>Reference</b>	<b>Title</b>	<b>Version</b>
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	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**

<b>Items</b>	<b>List</b>	<b>Clause in FCC rules</b>	<b>Verdict</b>
1	Output Power	22.913(a)/24.232(b)	P
2	Emission Limit	2.1051/22.917/24.238	P
3	CONDUCTED EMISSION	15.107/15.207	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, 1852.4 MHz, 1880.0MHz and 1907.6MHz for WCDMA Band II;826.4MHz, 836.6MHz and 846.6MHz for WCDMA Band V. (bottom, middle and top of operational frequency range).

##### **Limit**

According to FCC§2.1046.

##### **A.1.2.2 Test Condition**

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

#### **WCDMA Band II**

##### **Measurement result**

WCDMA (Band II)	CH	Frequency(MHz)	output power(dBm)	Target (dB)
	9262	1852.4	23.88	22±2
	9400	1880.0	23.79	22±2
	9538	1907.6	23.82	22±2

#### **WCDMA Band V**

##### **Measurement result**

WCDMA (Band V)	CH	Frequency(MHz)	output power(dBm)	Target (dB)
	4132	826.4	23.45	22±2
	4183	836.6	23.41	22±2
	4233	846.6	23.43	22±2

### A.1.3 Radiated

#### A.1.3.1 Description

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

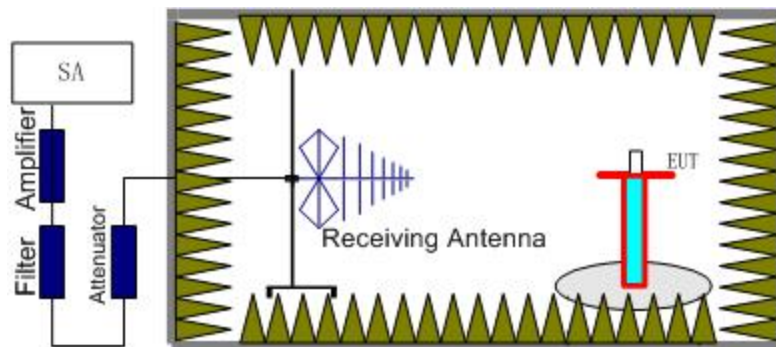
Rule Part 24.232(b) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

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

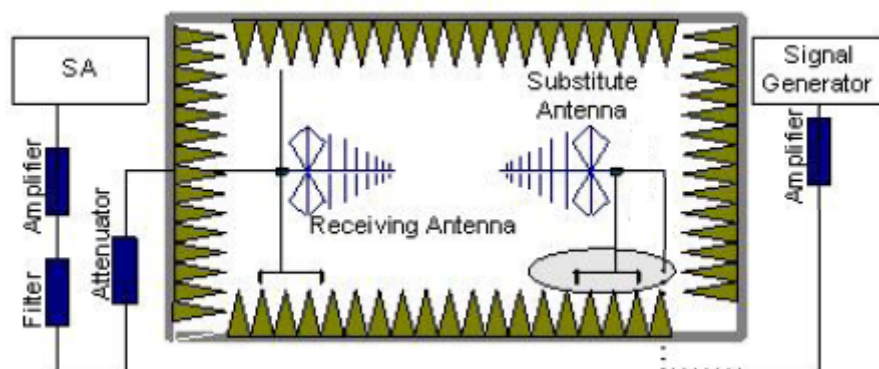
#### A.1.3.2 Method of Measurement

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 II-EIRP**

**Limits**

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

**Measurement result**

Frequency(MHz)	Peak ERP(dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> Antenna Gain(dB)	P <sub>Mea</sub> (dBm)	Polarization
1852.4	26.16	-8.32	50.00	3.81	-23.39	H
1880	23.73	-8.37	50.00	3.77	-25.81	V
1907.6	24.90	-8.42	50.00	3.73	-24.59	H

Frequency: 1852.4MHz

Peak EIRP(dBm)= P<sub>Mea</sub>(-23.39dBm)+ P<sub>cl</sub>(-8.32dB)+ P<sub>Ag</sub>(50.00dB)+G<sub>a</sub> (3.81dB) =26.16dBm

**ANALYZER SETTINGS: RBW = VBW = 3MHz**

**WCDMA Band V-ERP**

**Limits**

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

**Measurement result**

Frequency(MHz)	Peak ERP(dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> Antenna Gain(dB)	Correction (dBm)	P <sub>Mea</sub> (dBm)	Polarization
826.4	21.87	-5.58	53.00	-0.85	2.15	-25.39	H
836.6	20.66	-5.60	53.00	-0.90	2.15	-26.55	H
846.6	22.51	-5.64	53.00	-0.94	2.15	-24.64	H

Frequency: 846.6MHz

Peak ERP(dBm)= P<sub>Mea</sub>(-24.64dBm)+ P<sub>cl</sub>(-5.64dB)+ P<sub>Ag</sub>(53.00dB)+G<sub>a</sub> (-0.94dB)-2.15dBm  
=22.51dBm

**ANALYZER SETTINGS: RBW = VBW = 3MHz**

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

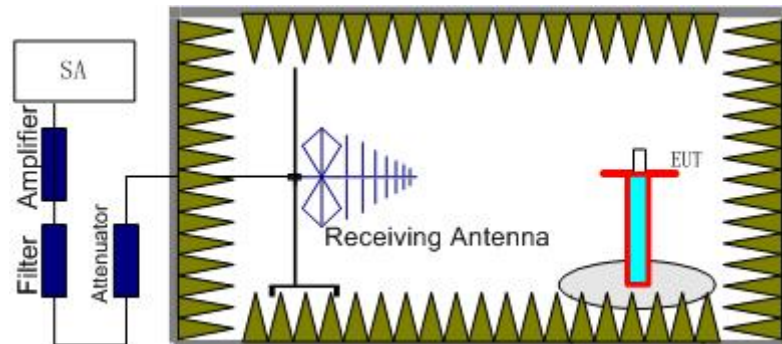
### A.2.1 Measurement Method

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

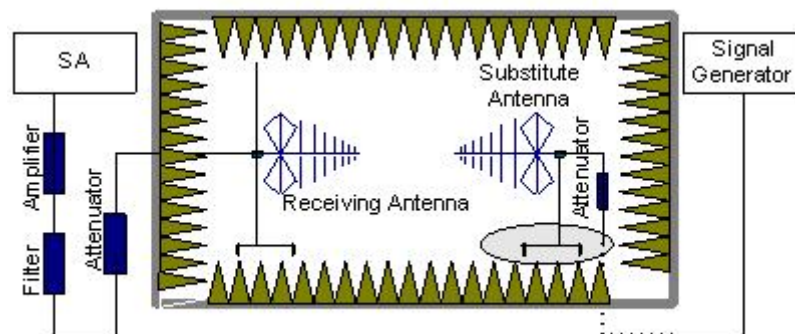
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The resolution bandwidth is set as outlined in Part 24.238 and Part 24.917. The spectrum is scanned with the mobile station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

#### The procedure of radiated spurious emissions is as follows:

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



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



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

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

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

A amplifier should be connected in for the test.

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

The measurement results are obtained as described below:

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

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 WCDMA Band II (1852.4 MHz, 1880.0MHz and 1907.6MHz) and WCDMA Band V (826.4MHz, 836.6MHz and 846.6MHz) . It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the WCDMA Band II and WCDMA Band V into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.



#### A.2.4 Measurement Results Table

Frequency	Channel	Frequency Range	Result
WCDMA Band V	Low	30MHz-10GHz	Pass
	Middle	30MHz-10GHz	Pass
	High	30MHz-10GHz	Pass
WCDMA Band II	Low	30MHz-20GHz	Pass
	Middle	30MHz-20GHz	Pass
	High	30MHz-20GHz	Pass

#### A.2.5 Sweep Table

Working Frequency	Subrange (GHz)	RBW	VBW	Sweep time (s)
WCDMA Band V	0.03~1	100KHz	300KHz	10
	1-2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~10	1 MHz	3 MHz	3
WCDMA Band II	0.03~1	100KHz	300KHz	10
	1-2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~11	1 MHz	3 MHz	3
	11~14	1 MHz	3 MHz	3
	14~18	1 MHz	3 MHz	3
	18~20	1 MHz	3 MHz	2

**WCDMA BAND II Mode Channel 9262/1852.4MHz**

Frequency(MHz)	Peak ERP(dBm)	Path Loss	Antenna Gain	P <sub>Mea</sub> (dBm)	Limit (dBm)	Polarization
3702.31	-41.36	5.91	-8.14	-39.13	-13	H
5077.33	-66.56	7.20	-9.75	-64.01	-13	V
6878.50	-68.85	7.98	-10.98	-65.85	-13	H
8652.30	-66.58	8.36	-12.32	-62.62	-13	H
10201.59	-64.20	8.85	-12.44	-60.61	-13	V
13794.73	-63.48	10.00	-13.92	-59.56	-13	H

**WCDMA BAND II Mode Channel 9400/1880MHz**

Frequency(MHz)	Peak ERP(dBm)	Path Loss	Antenna Gain	P <sub>Mea</sub> (dBm)	Limit (dBm)	Polarization
3757.54	-51.26	5.95	-8.21	-49.00	-13	H
5462.26	-70.32	7.51	-9.98	-67.85	-13	V
7140.94	-65.88	8.17	-11.18	-62.87	-13	V
9028.25	-67.34	8.40	-12.60	-63.14	-13	V
10315.33	-64.67	9.27	-12.46	-61.48	-13	H
15027.84	-64.62	10.46	-13.49	-61.59	-13	H

**WCDMA BAND II Mode Channel 9538/1907.6MHz**

Frequency(MHz)	Peak ERP(dBm)	Path Loss	Antenna Gain	P <sub>Mea</sub> (dBm)	Limit (dBm)	Polarization
3817.55	-49.74	6.09	-8.28	-47.55	-13	V
5050.42	-68.90	7.14	-9.73	-66.31	-13	V
7152.58	-67.87	8.16	-11.19	-64.84	-13	V
8636.42	-66.43	8.44	-12.31	-62.56	-13	V
9975.46	-68.52	9.19	-12.41	-65.30	-13	H
13254.20	-64.48	9.86	-13.55	-60.79	-13	V

**WCDMA BAND V Mode Channel 4132/826.4MHz**

Frequency(MHz)	Peak ERP(dBm)	Path Loss	Antenna Gain	Correction	P <sub>Mea</sub> (dBm)	Limit (dBm)	Polarization
				(dBm)			
2454.15	-58.08	4.99	-5.26	2.15	-59.96	-13	V
3906.61	-67.19	6.13	-8.39	2.15	-67.08	-13	V
4493.65	-67.35	6.66	-8.80	2.15	-67.36	-13	H
6173.18	-65.22	7.80	-10.34	2.15	-64.83	-13	H
6978.72	-66.47	8.04	-11.08	2.15	-65.58	-13	H
7969.57	-66.76	8.30	-11.87	2.15	-65.34	-13	H

**WCDMA BAND V Mode Channel 4183/836.6MHz**

Frequency(MHz)	Peak ERP(dBm)	Path Loss	Antenna Gain	Correction	P <sub>Mea</sub> (dBm)	Limit (dBm)	Polarization
				(dBm)			
1676.98	-42.91	4.01	-5.32	2.15	-43.75	-13	V
2100.24	-63.66	4.44	-4.20	2.15	-66.05	-13	V
3950.04	-68.90	6.25	-8.44	2.15	-68.86	-13	V
5039.32	-67.97	7.12	-9.72	2.15	-67.52	-13	V
6427.70	-68.50	7.77	-10.54	2.15	-67.88	-13	H
9739.72	-66.4	9.08	-12.50	2.15	-65.13	-13	V

**WCDMA BAND V Mode Channel 4233/846.6MHz**

Frequency(MHz)	Peak ERP(dBm)	Path Loss	Antenna Gain	Correction	P <sub>Mea</sub> (dBm)	Limit (dBm)	Polarization
				(dBm)			
1695.84	-54.47	3.99	-5.24	2.15	-55.37	-13	V
3501.54	-67.31	5.79	-7.90	2.15	-67.35	-13	H
4272.58	-69.96	6.51	-8.66	2.15	-69.96	-13	V
4948.31	-66.58	7.17	-9.61	2.15	-66.29	-13	V
5694.52	-67.17	7.68	-10.08	2.15	-66.92	-13	H
8557.80	-64.97	8.41	-12.25	2.15	-63.28	-13	V

### 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.

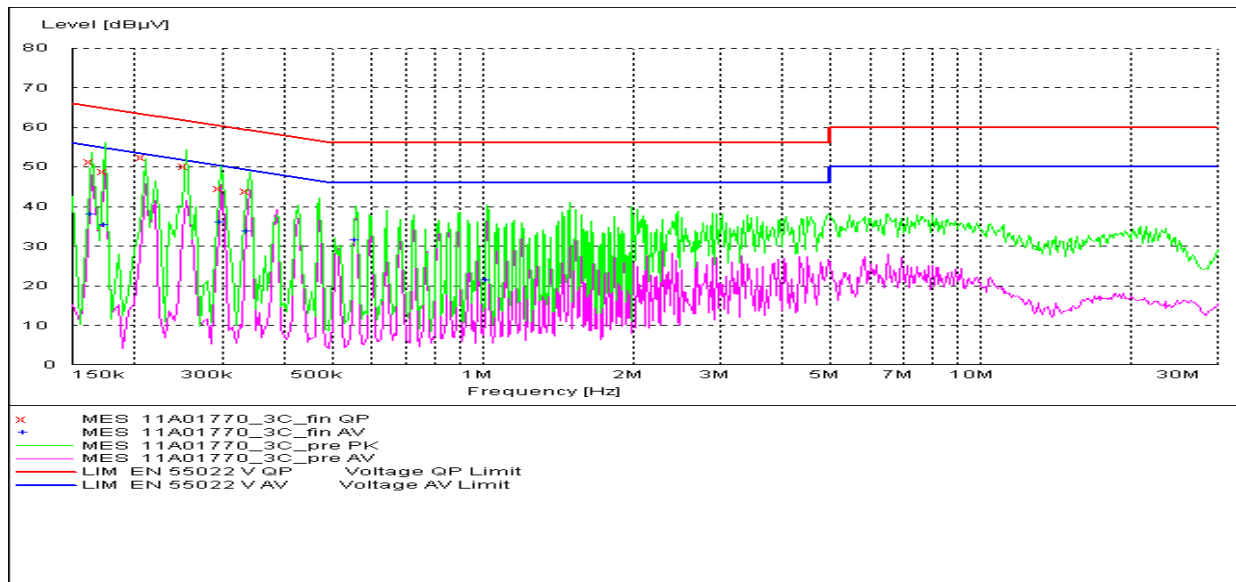
#### A.3.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dB $\mu$ 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

##### WCDMA Band II-AE2



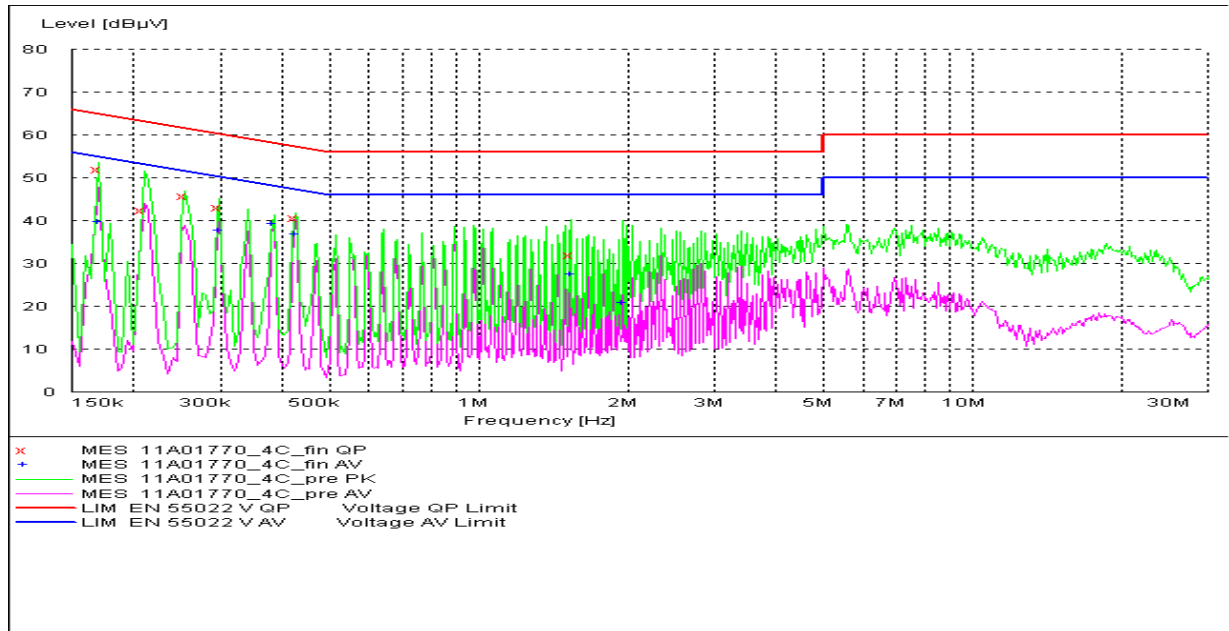
#### MEASUREMENT RESULT: "11A01770\_3C\_fin QP"

Frequency MHz	Level dB $\mu$ V	Transd	Limit dB	Margin dB $\mu$ V	Line	PE
0.165000	51.30	10.1	65	13.9	L1	GND
0.175000	48.90	10.1	65	15.9	N	GND
0.210000	52.30	10.1	63	10.9	N	GND
0.255000	50.10	10.1	62	11.5	N	GND
0.300000	44.50	10.1	60	15.8	N	GND
0.340000	43.80	10.1	59	15.5	N	GND

**MEASUREMENT RESULT: "11A01770\_3C\_fin AV"**

Frequency MHz	Level dBμV	Transd	Limit dB	Margin dBμV	Line	PE
0.165000	38.10	10.1	55	17.1	N	GND
0.175000	35.20	10.1	55	19.5	L1	GND
0.300000	36.10	10.1	50	14.2	N	GND
0.340000	33.80	10.1	49	15.4	L1	GND
0.555000	31.40	10.1	46	14.6	N	GND
1.025000	21.40	10.1	46	24.6	N	GND

**WCDMA Band V-AE2**



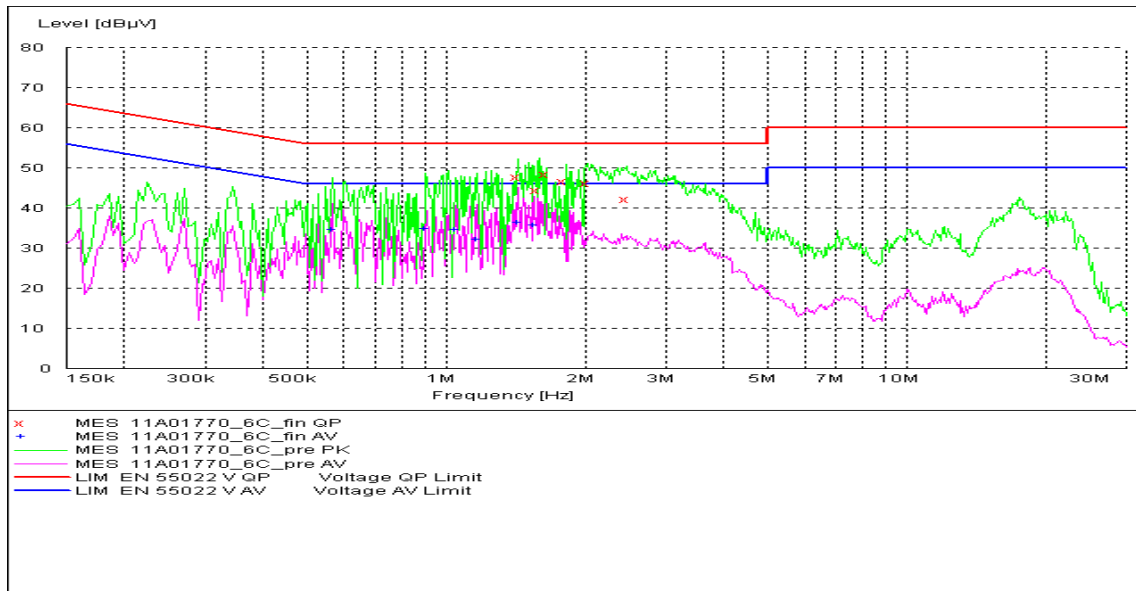
**MEASUREMENT RESULT: "11A01770\_4C\_fin QP"**

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 V-AE3**



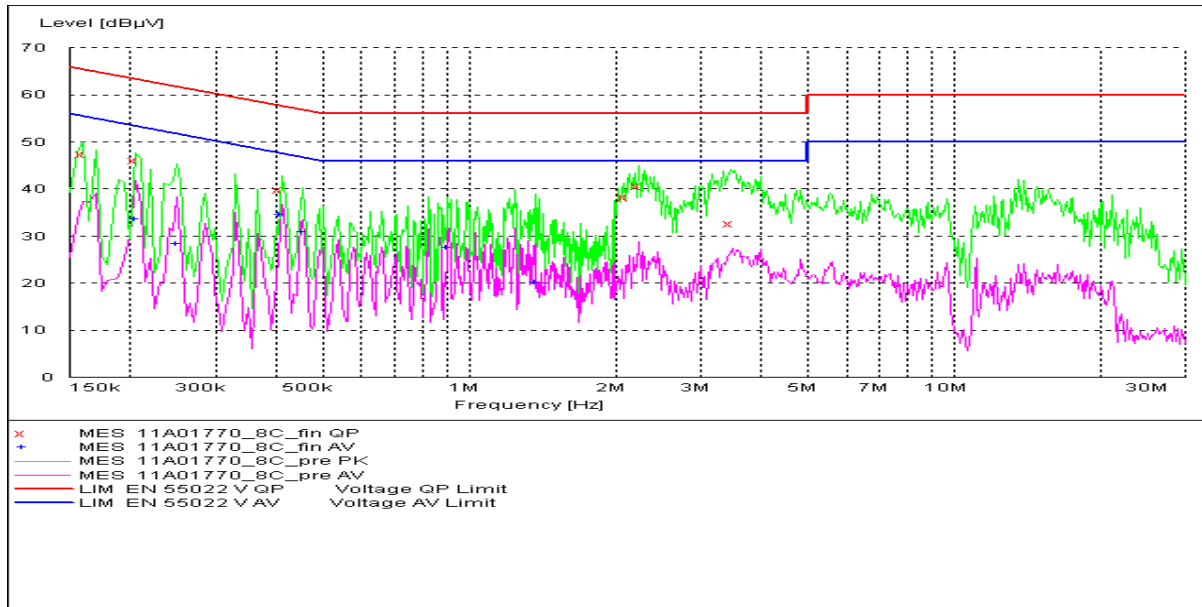
**MEASUREMENT RESULT: "11A01770\_6C\_fin QP"**

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 V-AE4**



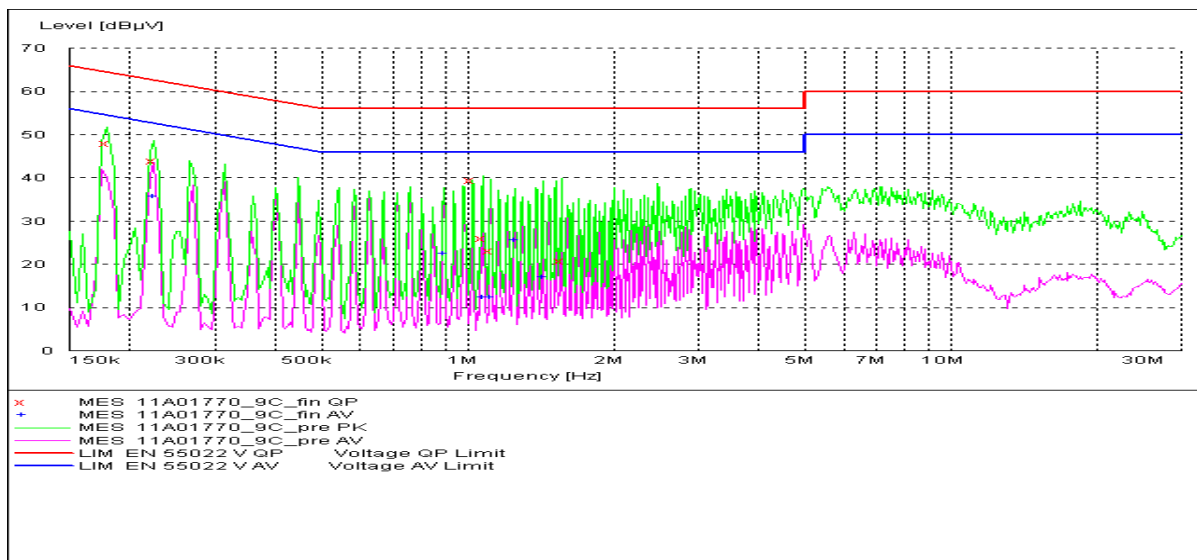
**MEASUREMENT RESULT: "11A01770\_8C\_fin QP"**

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 $\mu$ V	Transd	Limit dB	Margin dB $\mu$ 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"**

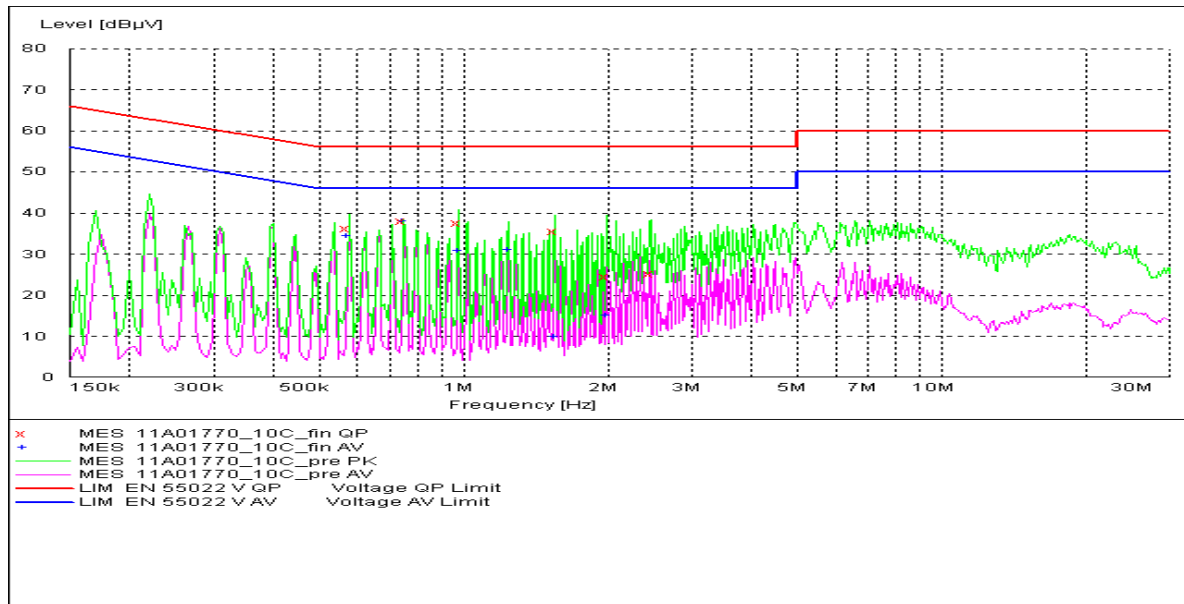
Frequency MHz	Level dB $\mu$ V	Transd	Limit dB	Margin dB $\mu$ V	Line	PE
0.180000	48.00	10.1	65	16.5	N	GND
0.225000	43.90	10.1	63	18.7	N	GND
1.025000	39.40	10.1	56	16.6	N	GND
1.075000	26.00	10.1	56	30.0	N	GND
1.120000	23.00	10.1	56	33.0	N	GND
1.565000	20.80	10.1	56	35.2	L1	GND



**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 $\mu$ V	Transd	Limit dB	Margin dB $\mu$ 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, 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 II

##### Frequency Error vs Voltage

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.5	-21	0.030
3.8	-23	0.033
4.2	-23	0.033

##### Frequency Error vs Temperature

temperature(°C)	Frequency error(Hz)	Frequency error(ppm)
-30	-25	0.036
-20	-25	0.036
-10	-23	0.033
0	-23	0.033
10	-21	0.030
20	-21	0.030
30	-21	0.030
40	-23	0.033
50	-23	0.033

##### WCDMA Band V

##### Frequency Error vs Voltage

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.5	39	0.057
3.8	40	0.058
4.2	43	0.062

##### Frequency Error vs Temperature

temperature(°C)	Frequency error(Hz)	Frequency error(ppm)
-30	43	0.062
-20	43	0.062
-10	40	0.058
0	40	0.058
10	39	0.057
20	39	0.057
30	40	0.058
40	43	0.062
50	43	0.062

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

### A.5.1 Occupied Bandwidth Results

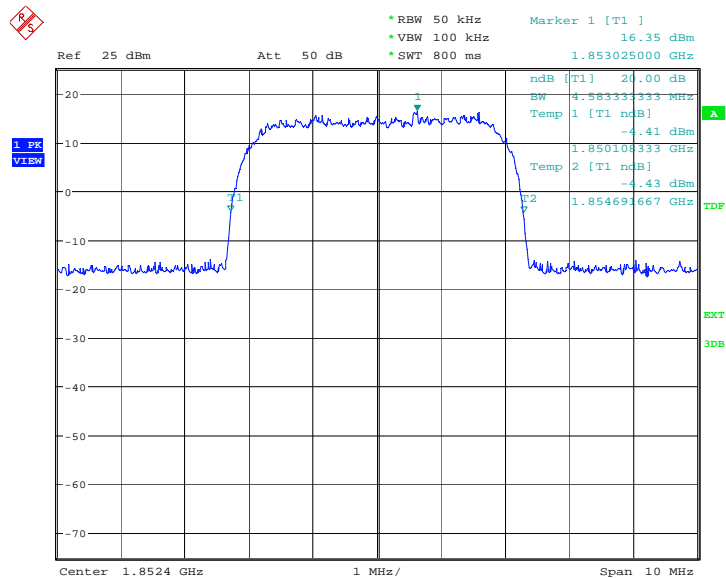
Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of WCDMA Band II and WCDMA Band V. The table below lists the measured -20dBc BW. Spectrum analyzer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

#### WCDMA Band II(-20dBc)

Frequency(MHz)	Occupied Bandwidth (-20dBc BW)( MHz)
1852.4	4.583
1880.0	4.567
1907.6	4.551

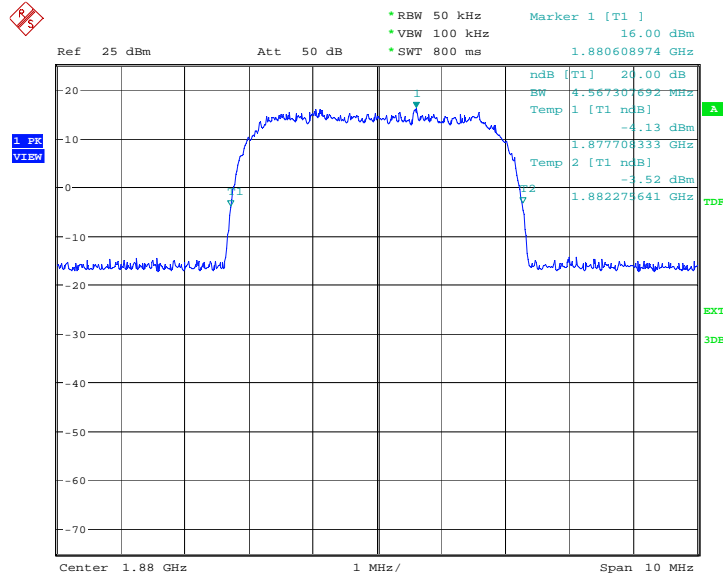
#### WCDMA Band II

#### Channel 9262-Occupied Bandwidth (-20dBc BW)



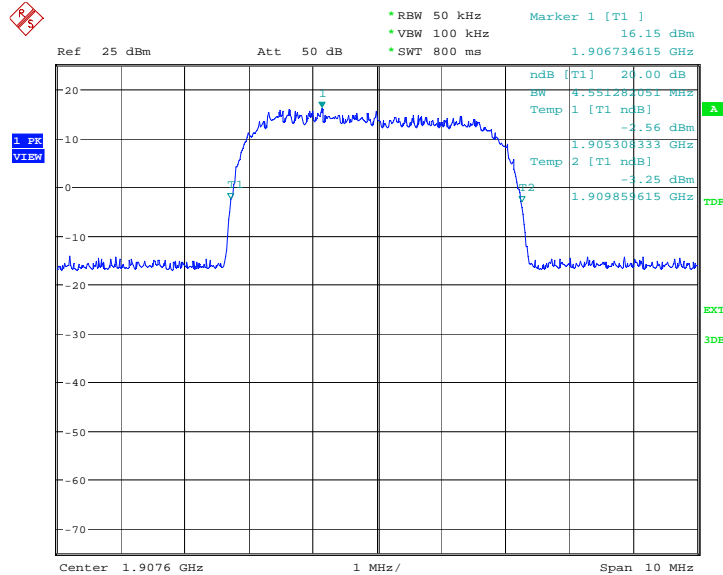
Date: 13.APR.2011 04:44:14

### Channel 9400-Occupied Bandwidth (-20dBc BW)



Date: 13.APR.2011 04:44:44

### Channel 9538-Occupied Bandwidth (-20dBc BW)



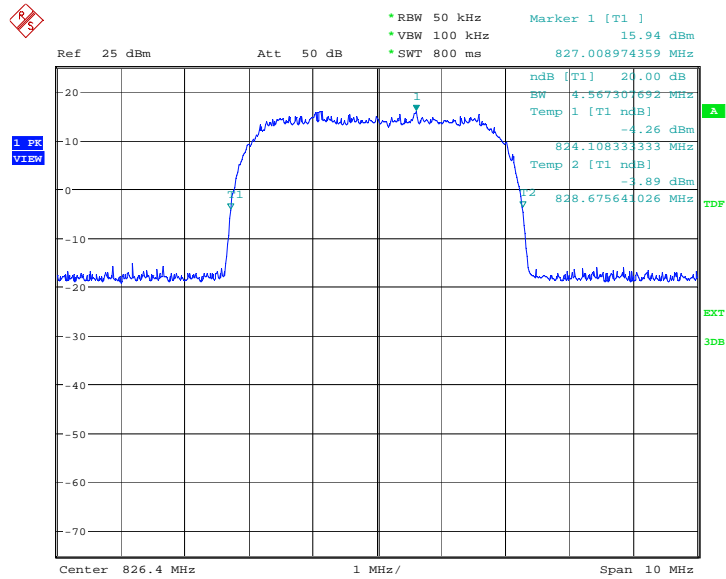
Date: 13.APR.2011 04:45:14

**WCDMA Band V(-20dBc)**

Frequency(MHz)	Occupied Bandwidth (-20dBc BW)( MHz)
826.4	4.567
836.6	4.583
846.6	4.567

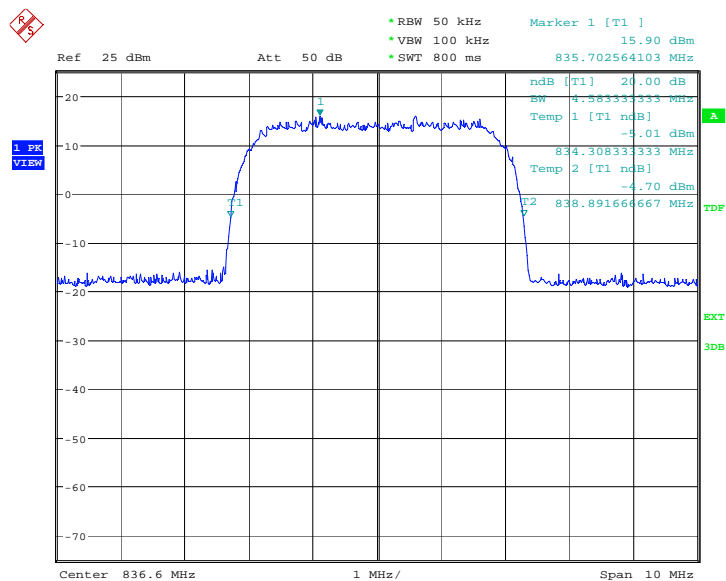
**WCDMA Band V**

**Channel 4132-Occupied Bandwidth (-20dBc BW)**



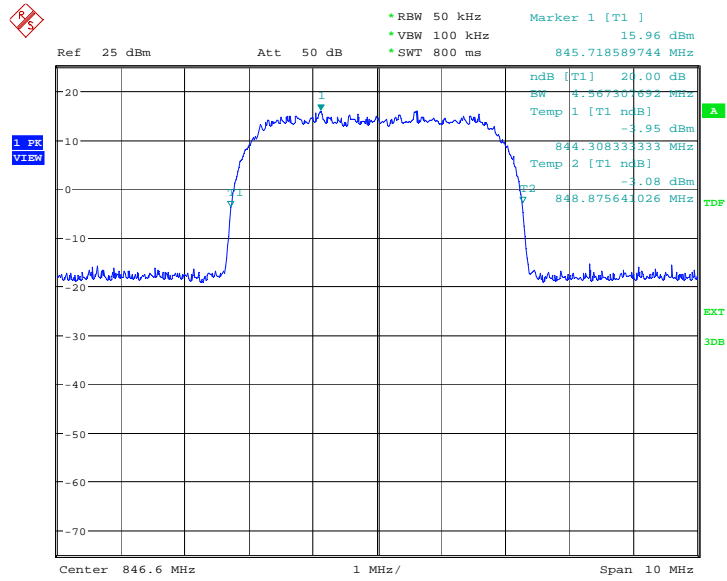
Date: 13.APR.2011 05:09:45

**Channel 4183-Occupied Bandwidth (-20dBc BW)**



Date: 13.APR.2011 05:10:15

### Channel 4233-Occupied Bandwidth (-20dBc BW)



Date: 13.APR.2011 05:10:44



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

### A.6.1 Emission Bandwidth Results

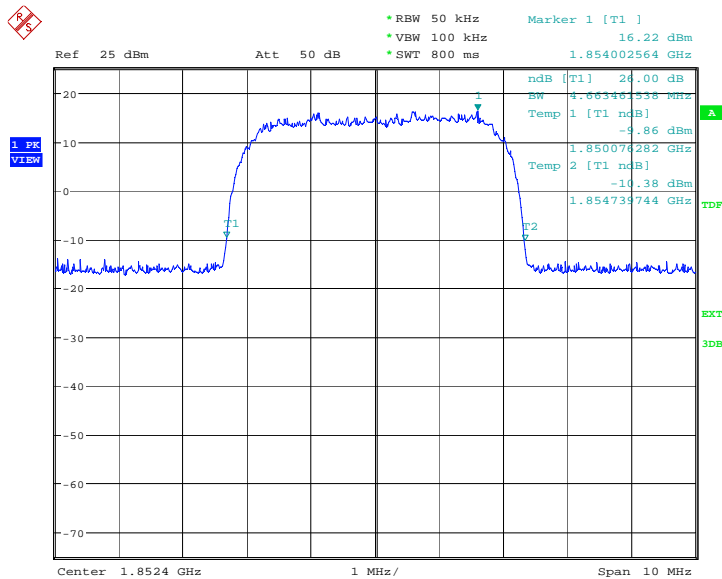
Similar to conducted emissions; Emission bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of WCDMA Band II and WCDMA Band V. Table below lists the measured -26dBc BW. Spectrum analyzer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

#### WCDMA Band II(-26dBc)

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

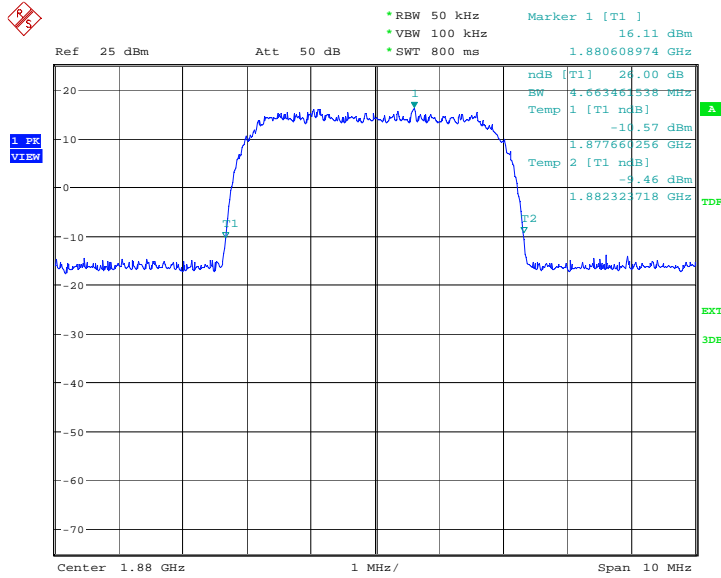
#### WCDMA Band II

#### Channel 9262-Occupied Bandwidth (-26dBc BW)



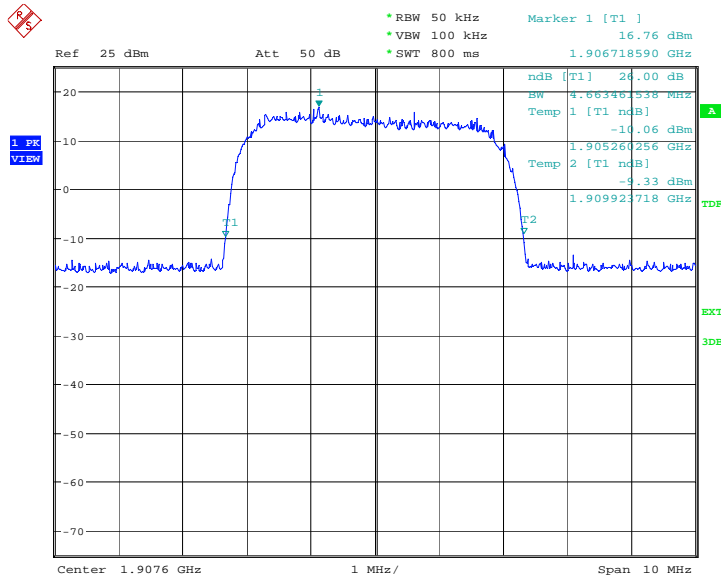
Date: 13.APR.2011 04:45:45

### Channel 9400-Occupied Bandwidth (-26dBc BW)



Date: 13.APR.2011 04:46:14

### Channel 9538-Occupied Bandwidth (-26dBc BW)



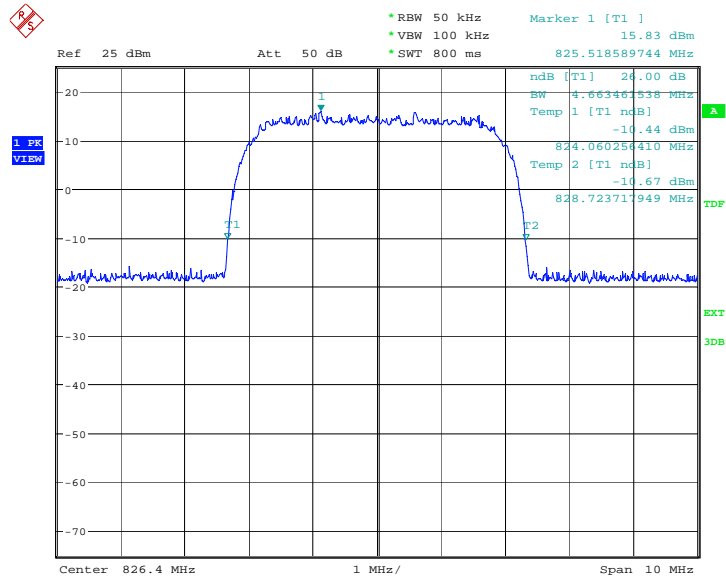
Date: 13.APR.2011 04:46:44

### WCDMA Band V (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc BW)( MHz)
826.40	4.663
836.60	4.679
846.60	4.647

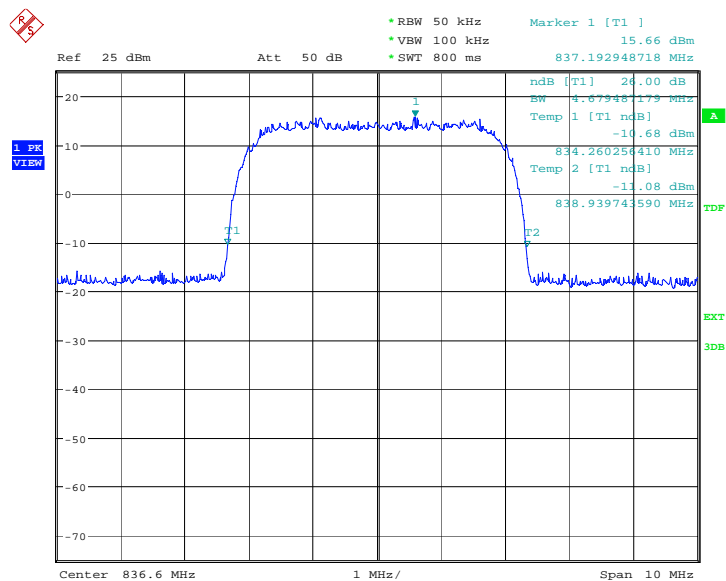
### WCDMA Band V

#### Channel 4132-Occupied Bandwidth (-26dBc BW)



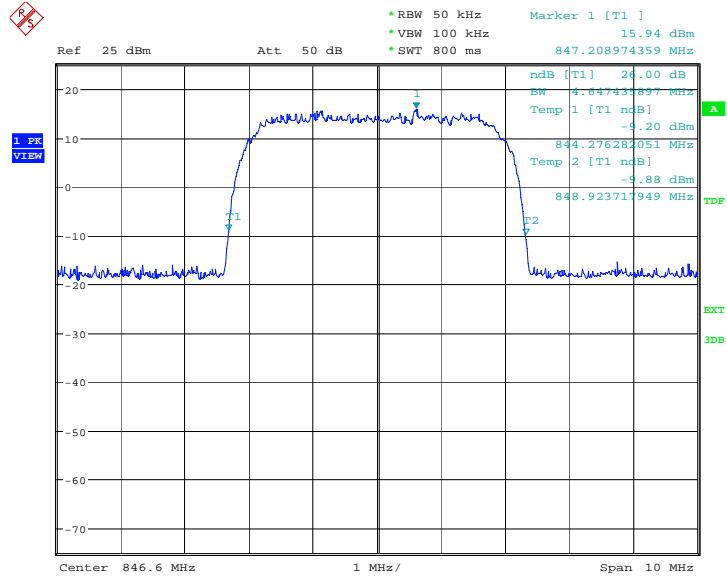
Date: 13.APR.2011 05:11:15

#### Channel 4183-Occupied Bandwidth (-26dBc BW)



Date: 13.APR.2011 05:11:45

### Channel 4233-Occupied Bandwidth (-26dBc BW)

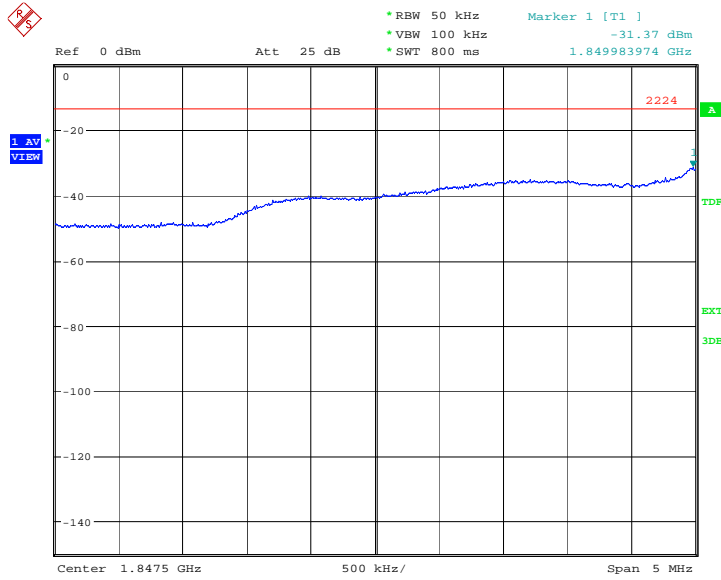


Date: 13.APR.2011 05:12:14

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

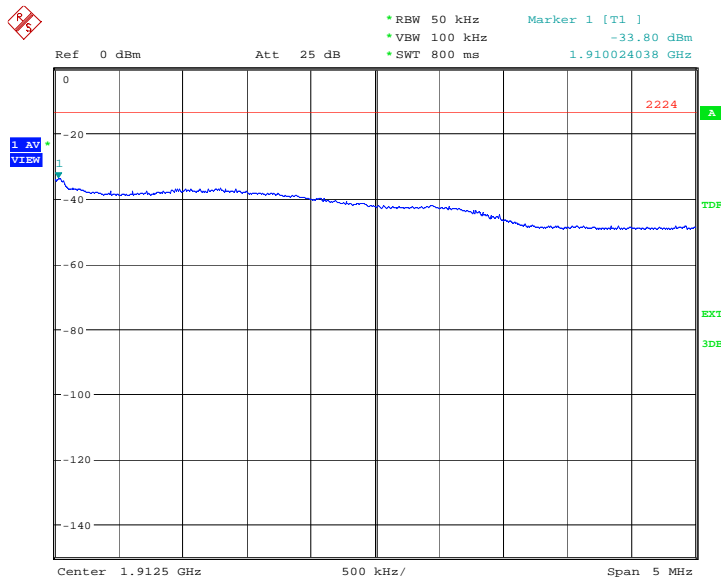
### WCDMA Band II

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



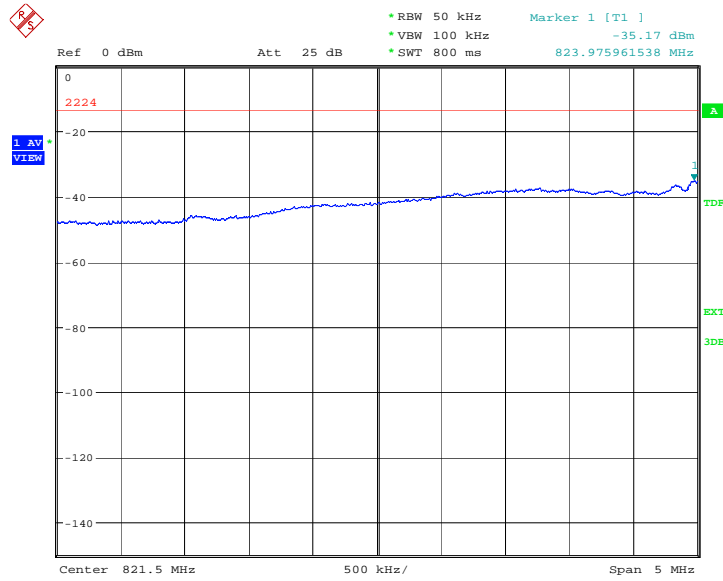
Date: 13.APR.2011 04:47:15

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



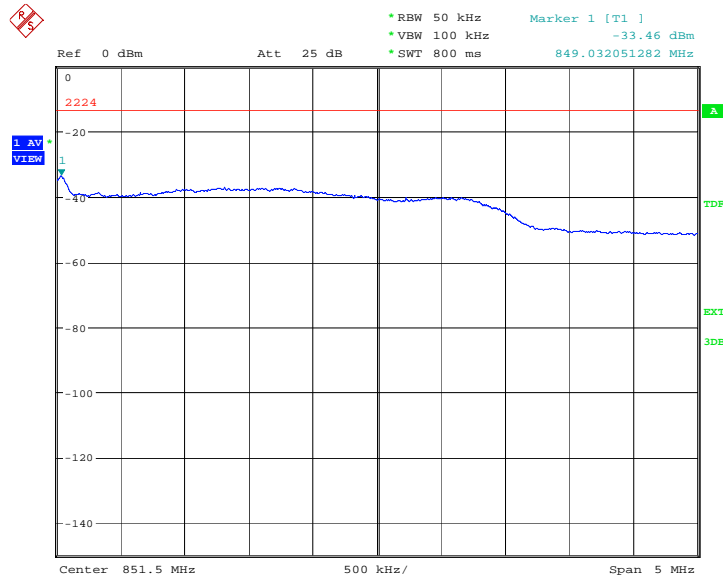
Date: 13.APR.2011 04:47:46

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



Date: 13.APR.2011 05:12:45

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



Date: 13.APR.2011 05:13:16

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

#### **WCDMA Band II Transmitter**

Channel	Frequency (MHz)
9262	1852.40
9400	1880.00
9538	1907.60

#### **WCDMA Band V Transmitter**

Channel	Frequency (MHz)
4132	826.40
4183	836.60
4233	846.60

### **A. 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.

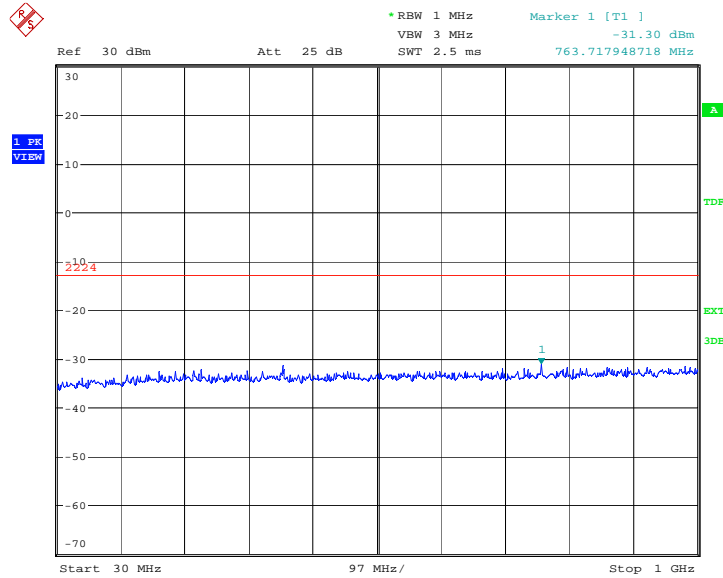
### A.8.3 Measurement result

#### WCDMA Band II

##### A. 8.3.1 Channel 9262: 30MHz –1GHz

Spurious emission limit –13dBm.

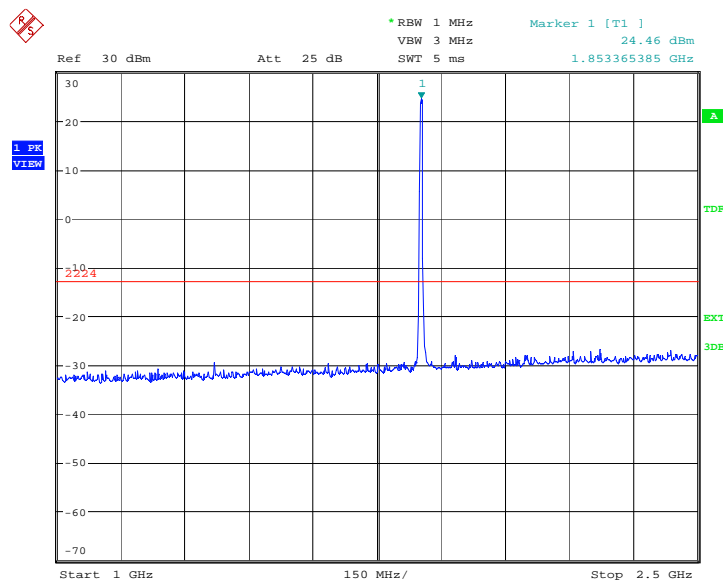
**NOTE: peak above the limit line is the carrier frequency.**



Date: 13.APR.2011 04:55:08

##### A.8.3.2 Channel 9262: 1GHz –2.5GHz

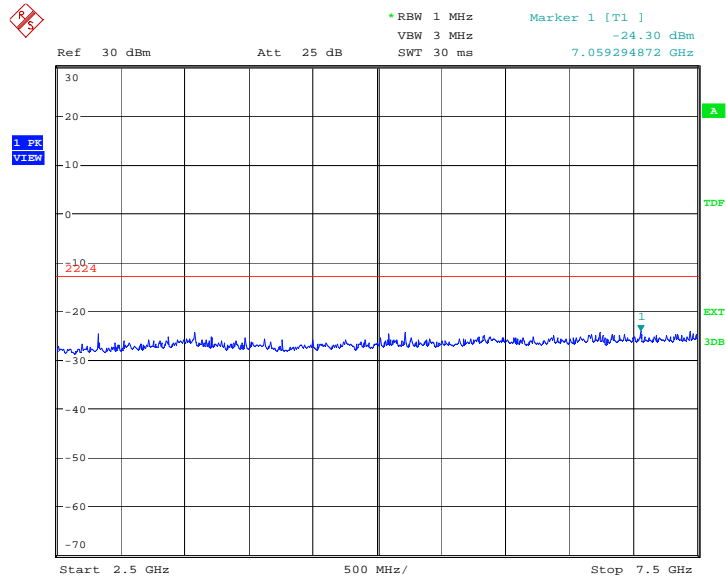
Spurious emission limit –13dBm.



Date: 13.APR.2011 04:55:36

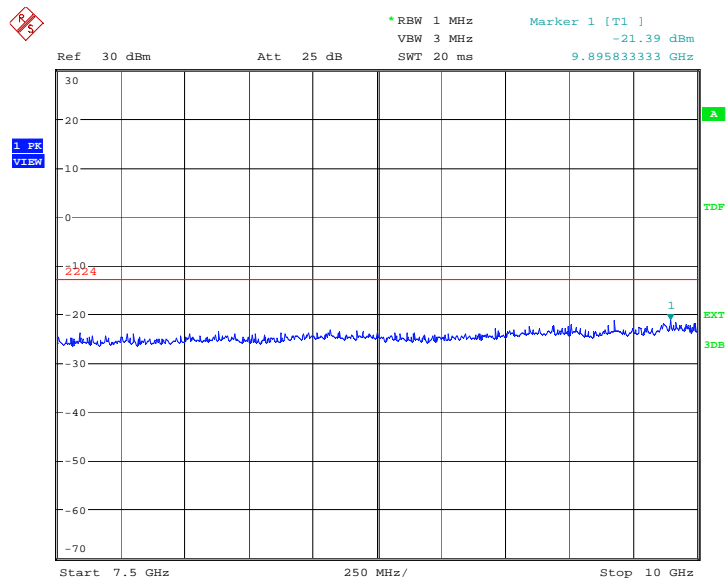


**A.8.3.3 Channel 9262: 2.5GHz –7.5GHz**  
Spurious emission limit –13dBm.



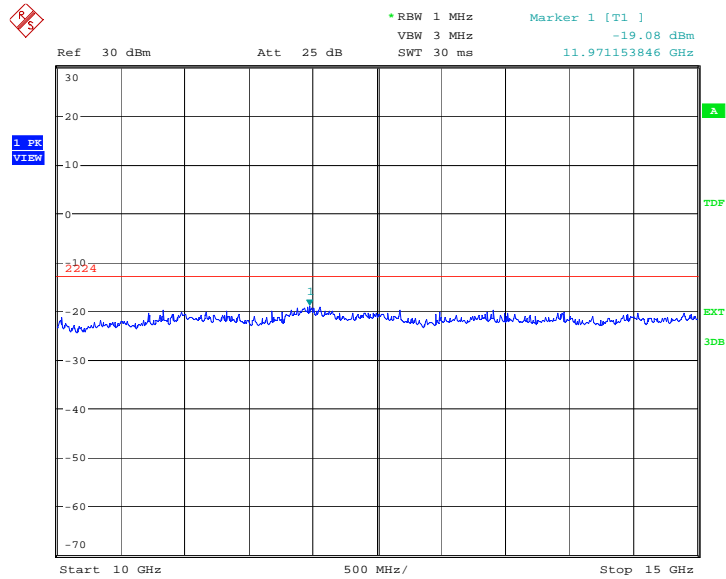
Date: 13.APR.2011 04:56:04

**A.8.3.4 Channel 9262: 7.5GHz –10GHz**  
Spurious emission limit –13dBm.



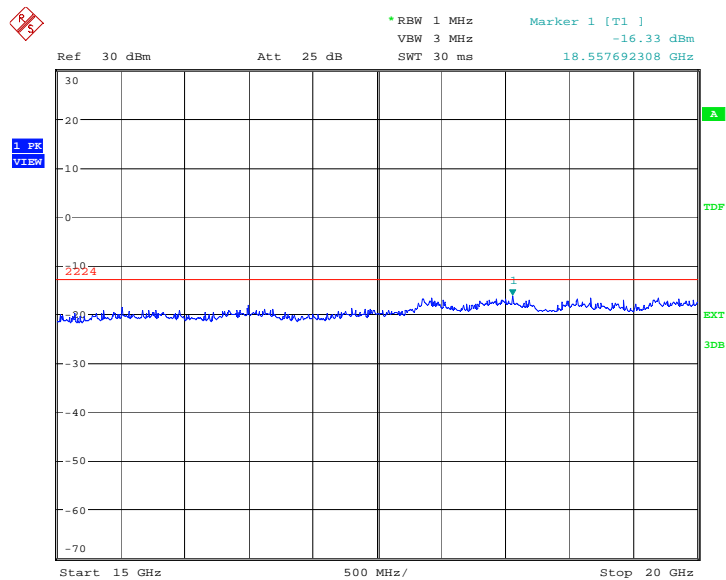
Date: 13.APR.2011 04:56:32

**A.8.3.5 Channel 9262: 10GHz –15GHz**  
Spurious emission limit –13dBm.



Date: 13.APR.2011 04:57:01

**A.8.3.6 Channel 9262: 15GHz –20GHz**  
Spurious emission limit –13dBm.

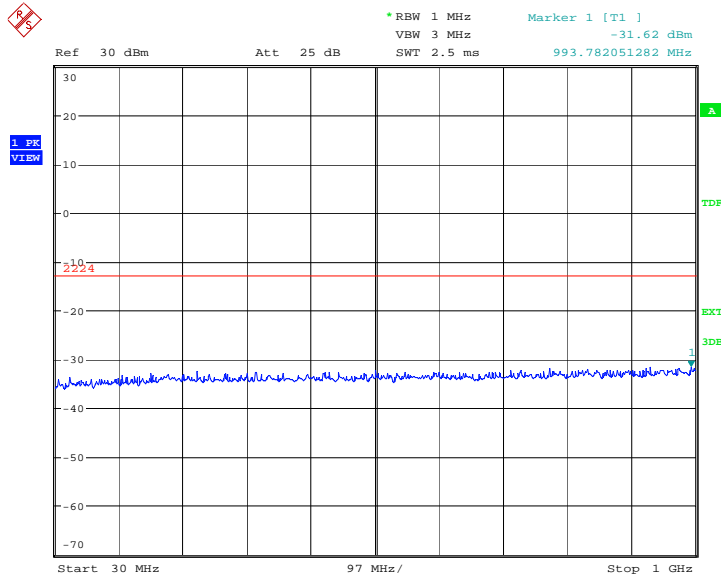


Date: 13.APR.2011 04:57:29

### A. 8.3.7 Channel 9400: 30MHz –1GHz

Spurious emission limit –13dBm.

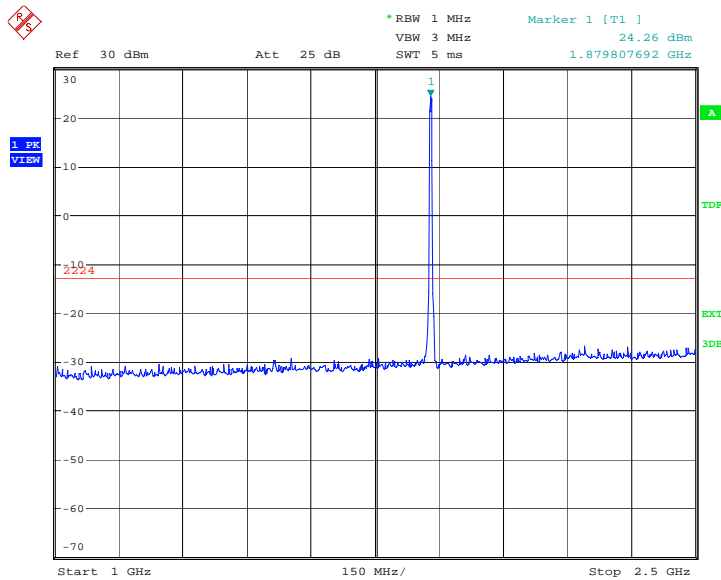
**NOTE: peak above the limit line is the carrier frequency.**



Date: 13.APR.2011 04:58:00

### A.8.3.8 Channel 9400: 1GHz –2.5GHz

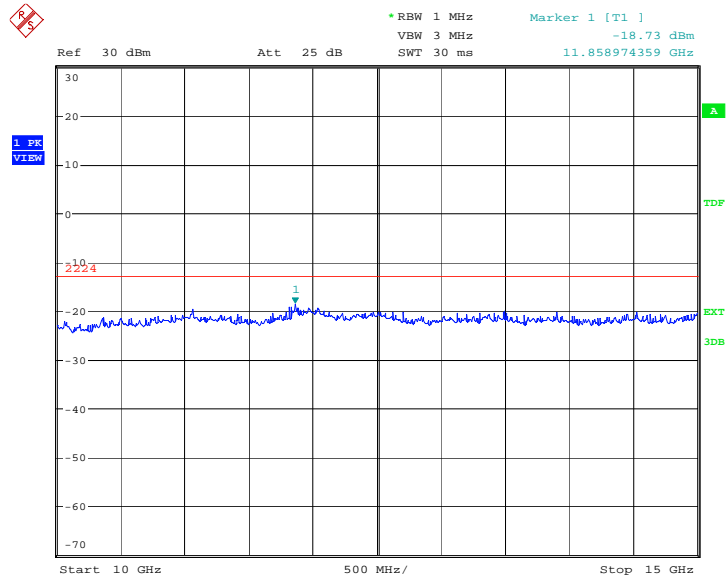
Spurious emission limit –13dBm.



Date: 13.APR.2011 04:58:28

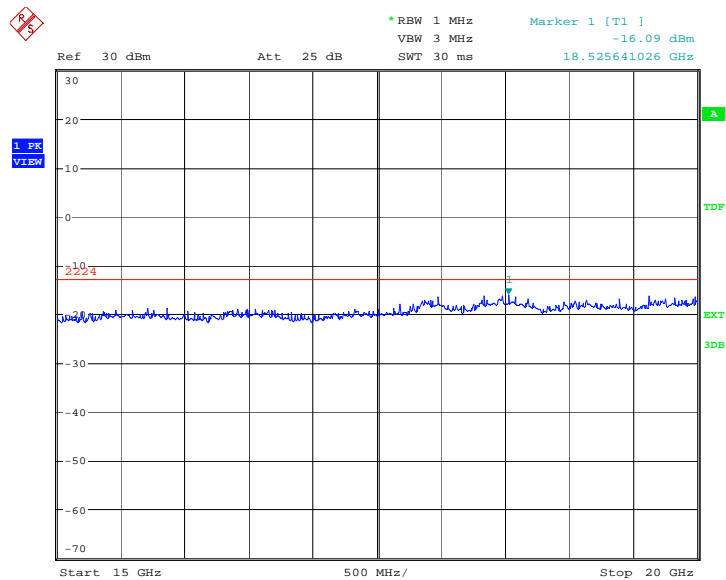


**A.8.3.11 Channel 9400: 10GHz –15GHz**  
Spurious emission limit –13dBm.



Date: 13.APR.2011 04:59:53

**A.8.3.12 Channel 9400: 15GHz –20GHz**  
Spurious emission limit –13dBm.

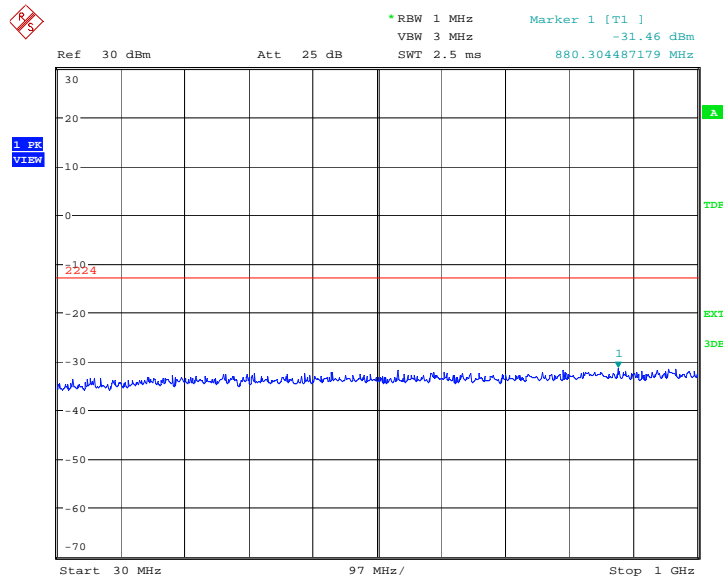


Date: 13.APR.2011 05:00:21

### A. 8.3.13 Channel 9538: 30MHz –1GHz

Spurious emission limit –13dBm.

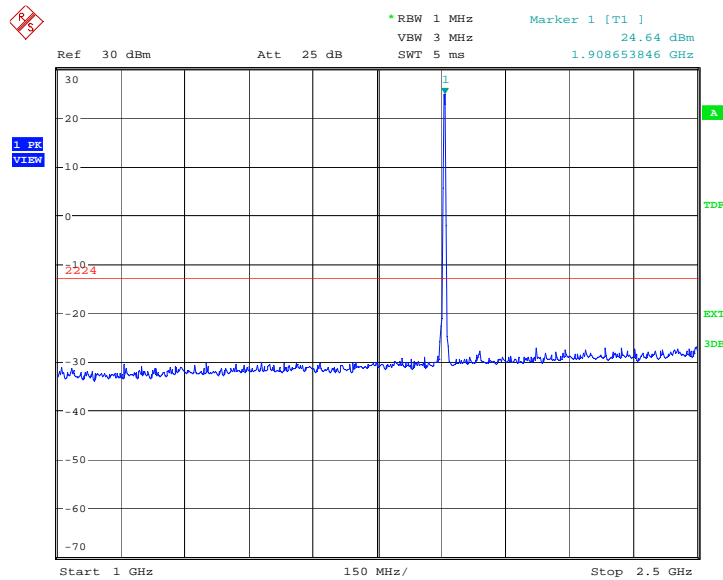
**NOTE: peak above the limit line is the carrier frequency.**



Date: 13.APR.2011 05:00:52

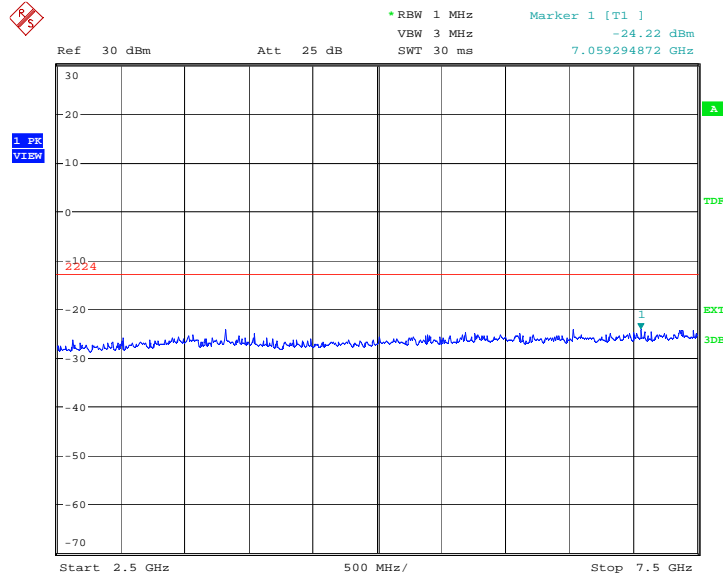
### A.8.3.14 Channel 9538: 1GHz –2.5GHz

Spurious emission limit –13dBm.



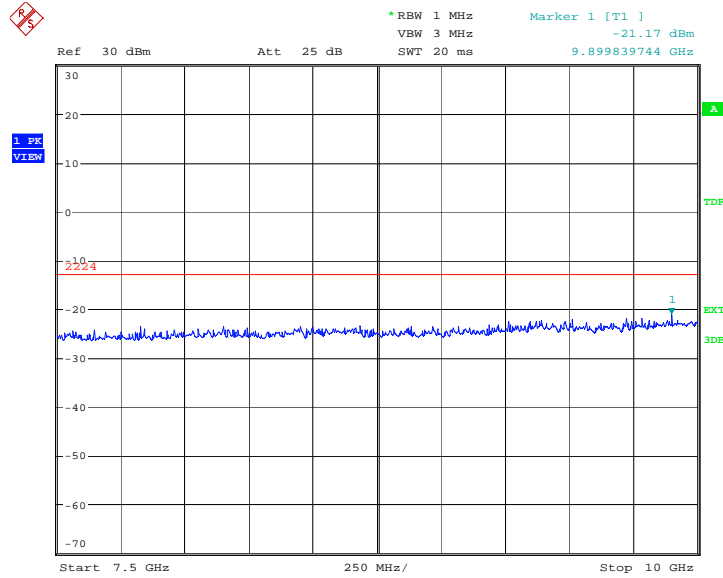
Date: 13.APR.2011 05:01:21

**A.8.3.15 Channel 9538: 2.5GHz –7.5GHz**  
Spurious emission limit –13dBm.



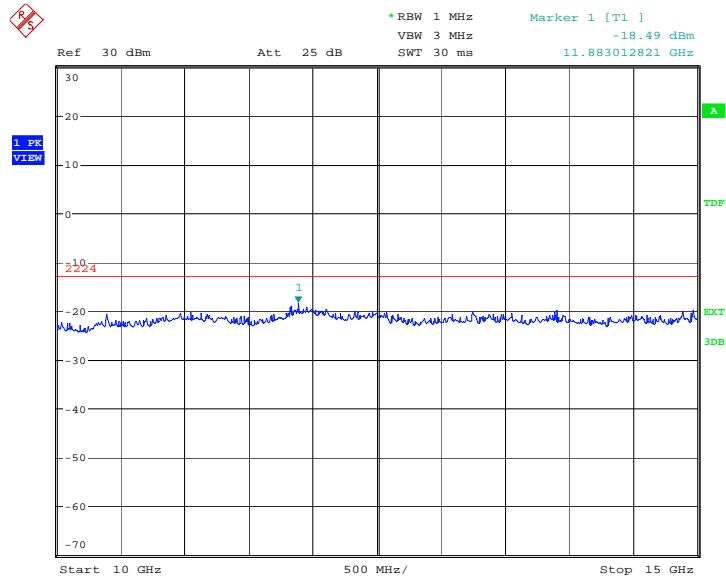
Date: 13.APR.2011 05:01:49

**A.8.3.16 Channel 9538: 7.5GHz –10GHz**  
Spurious emission limit –13dBm.



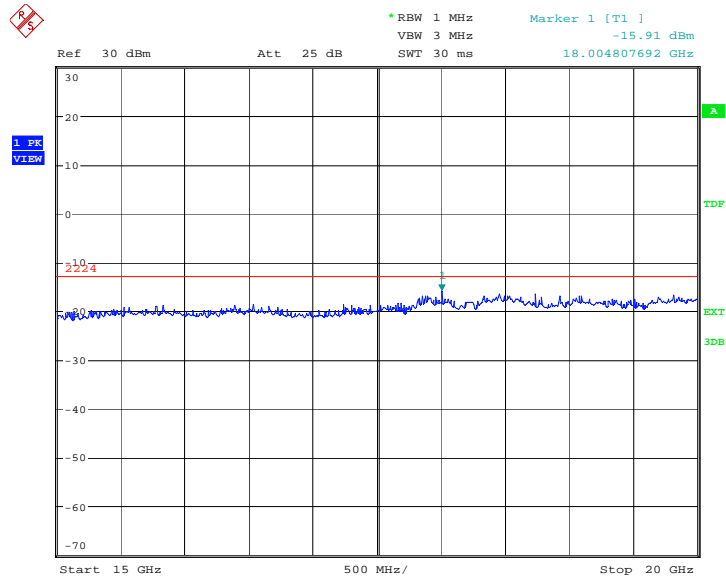
Date: 13.APR.2011 05:02:17

**A.8.3.17 Channel 9538: 10GHz –15GHz**  
Spurious emission limit –13dBm.



Date: 13.APR.2011 05:02:45

**A.8.3.18 Channel 9538: 15GHz –20GHz**  
Spurious emission limit –13dBm.



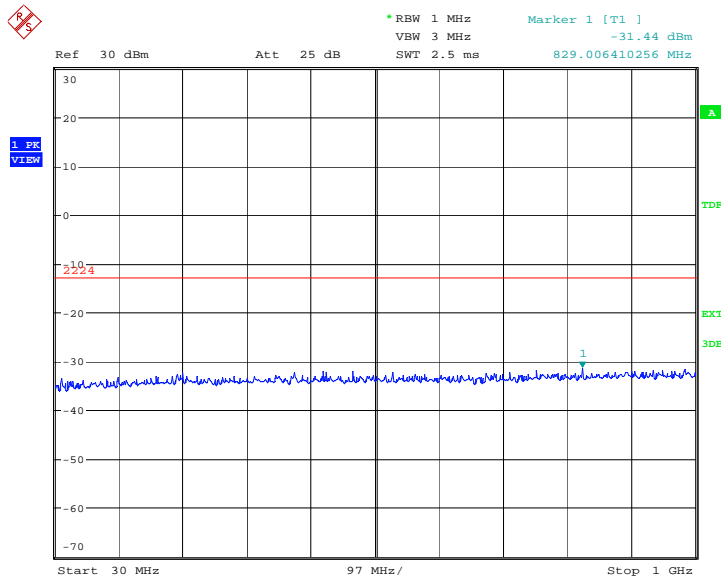
Date: 13.APR.2011 05:03:14



**A. 8.3.19 Idle mode: 30MHz –1GHz**

Spurious emission limit –13dBm.

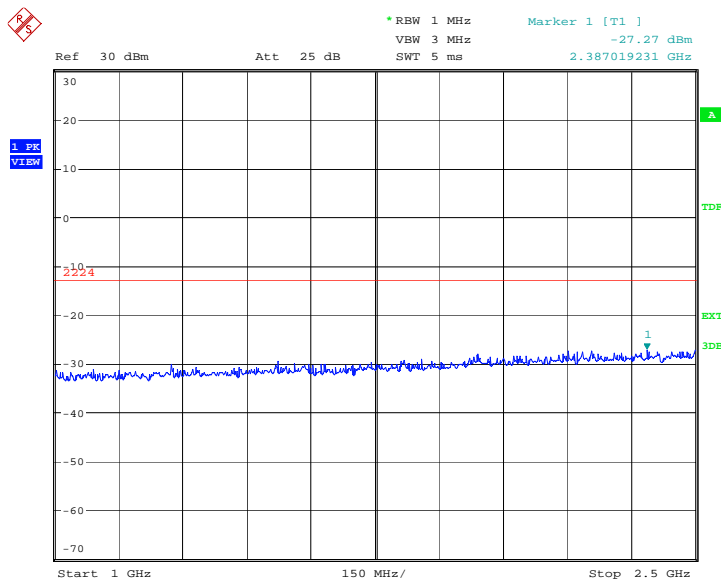
**NOTE: peak above the limit line is the carrier frequency.**



Date: 13.APR.2011 05:03:43

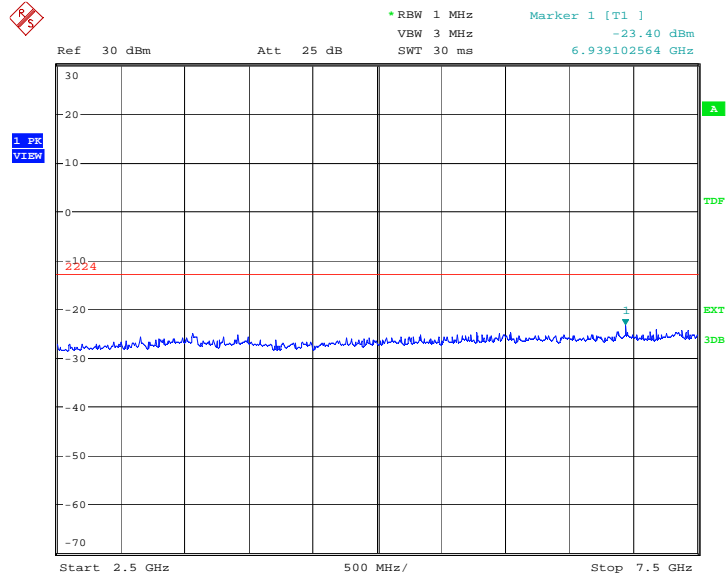
**A.8.3.20 Idle mode: 1GHz –2.5GHz**

Spurious emission limit –13dBm.



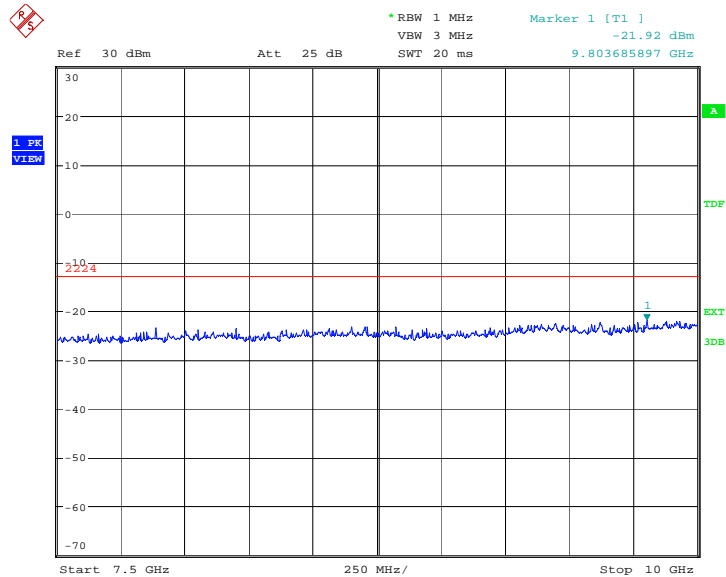
Date: 13.APR.2011 05:04:11

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



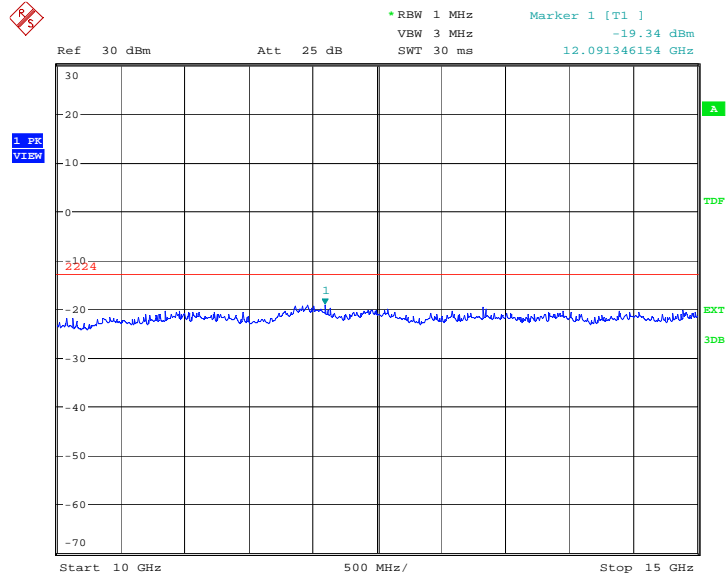
Date: 13.APR.2011 05:04:39

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



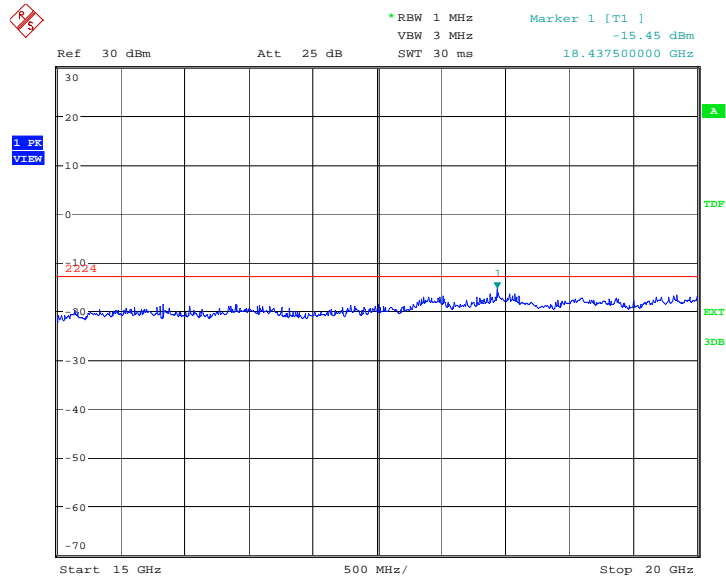
Date: 13.APR.2011 05:05:08

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



Date: 13.APR.2011 05:05:36

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



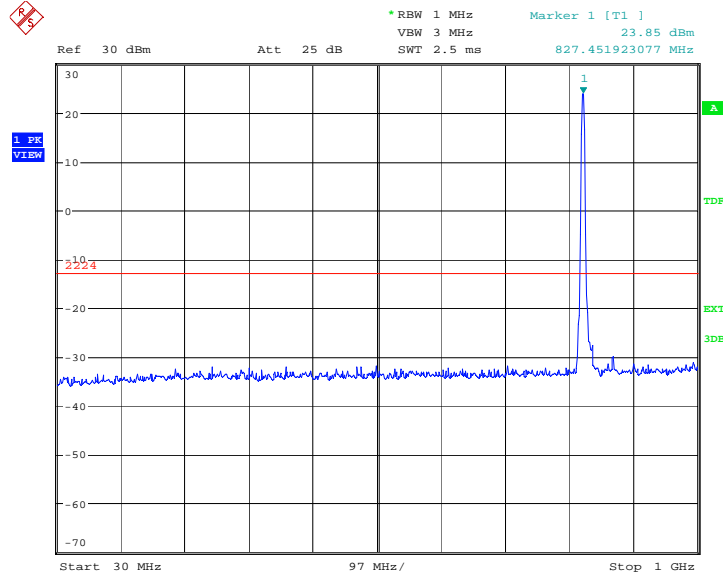
Date: 13.APR.2011 05:06:04

**WCDMA Band V**

**A. 8.3.25 Channel 4132: 30MHz –1GHz**

Spurious emission limit –13dBm.

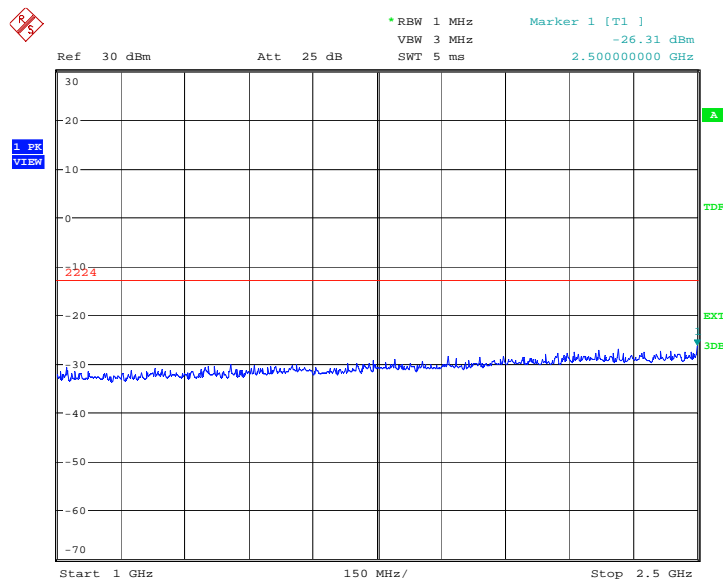
**NOTE: peak above the limit line is the carrier frequency.**



Date: 13.APR.2011 05:13:47

**A. 8.3.26 Channel 4132: 1GHz – 2.5GHz**

Spurious emission limit –13dBm.

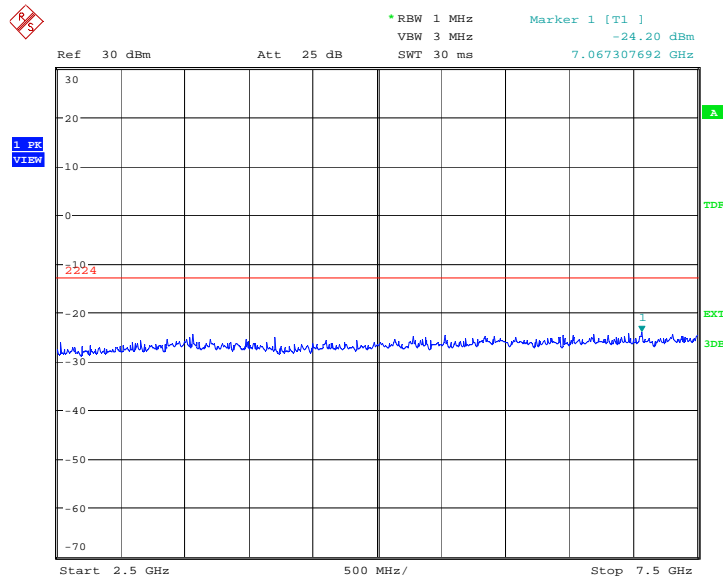


Date: 13.APR.2011 05:14:16

**A. 8.3.27 Channel 4132: 2.5GHz –7.5GHz**

Spurious emission limit –13dBm.

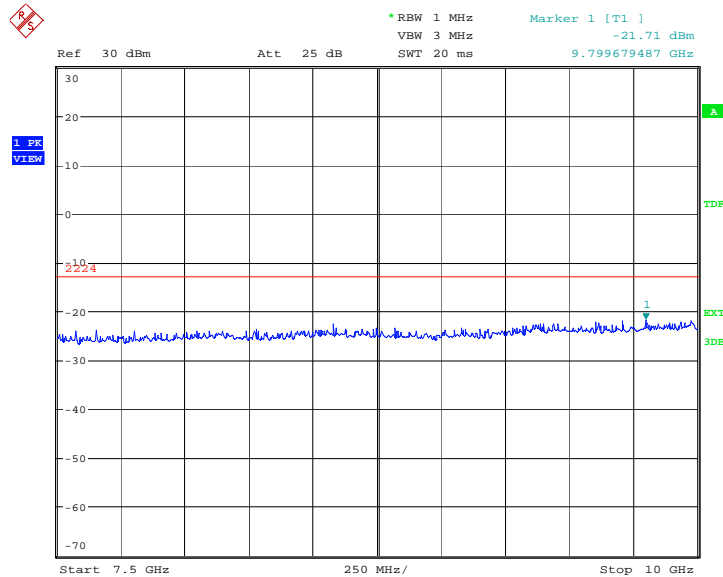
**NOTE: peak above the limit line is the carrier frequency.**



Date: 13.APR.2011 05:14:44

**A. 8.3.28 Channel 4132: 7.5GHz – 10GHz**

Spurious emission limit –13dBm.

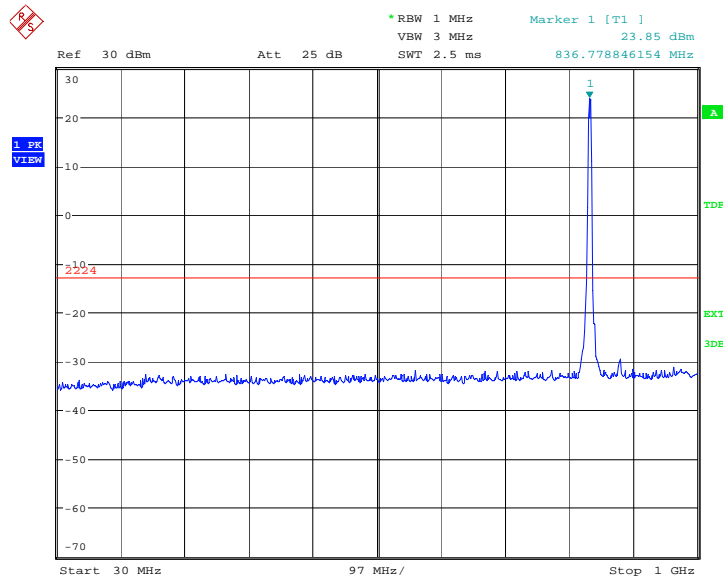


Date: 13.APR.2011 05:15:12

### A. 8.3.29 Channel 4183: 30MHz –1GHz

Spurious emission limit –13dBm.

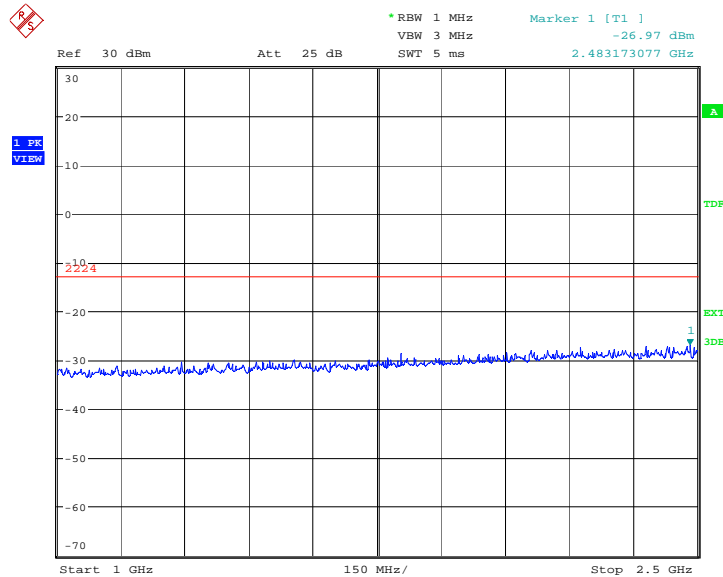
**NOTE: peak above the limit line is the carrier frequency.**



Date: 13.APR.2011 05:15:44

### A.8.3.30 Channel 4183: 1GHz – 2.5GHz

Spurious emission limit –13dBm.

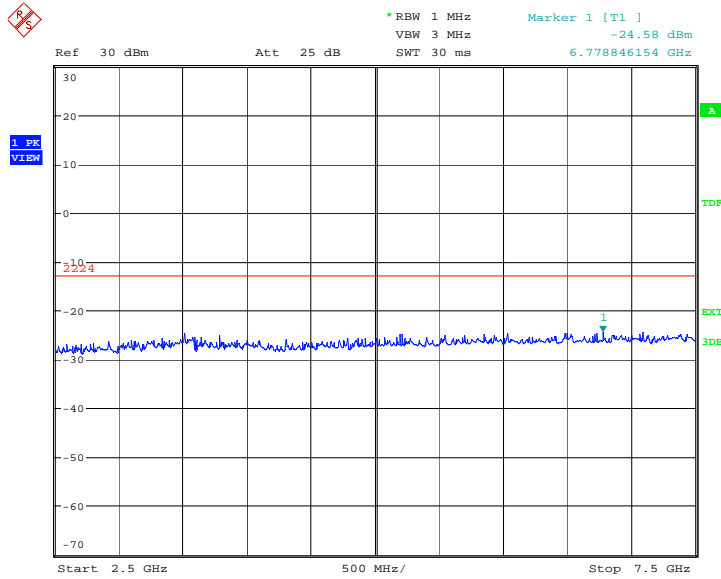


Date: 13.APR.2011 05:16:12

**A. 8.3.31 Channel 4183: 2.5GHz –7.5GHz**

Spurious emission limit –13dBm.

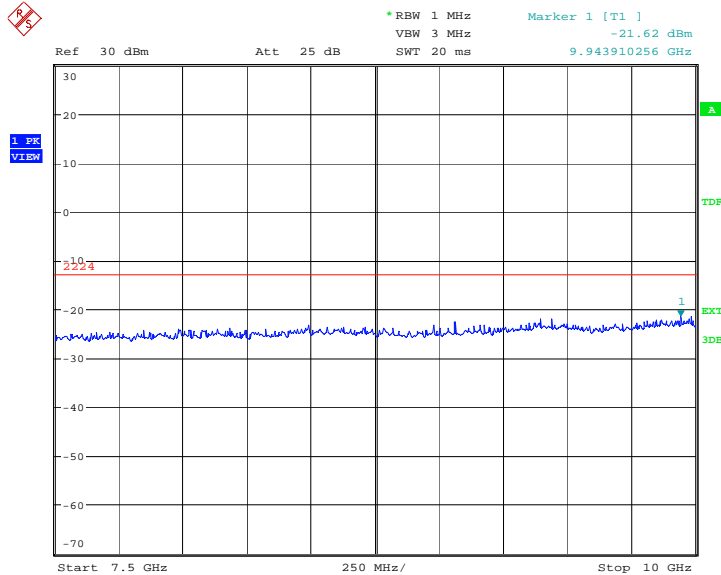
**NOTE: peak above the limit line is the carrier frequency.**



Date: 13.APR.2011 05:16:40

**A. 8.3.32 Channel 4183: 7.5GHz – 10GHz**

Spurious emission limit –13dBm.

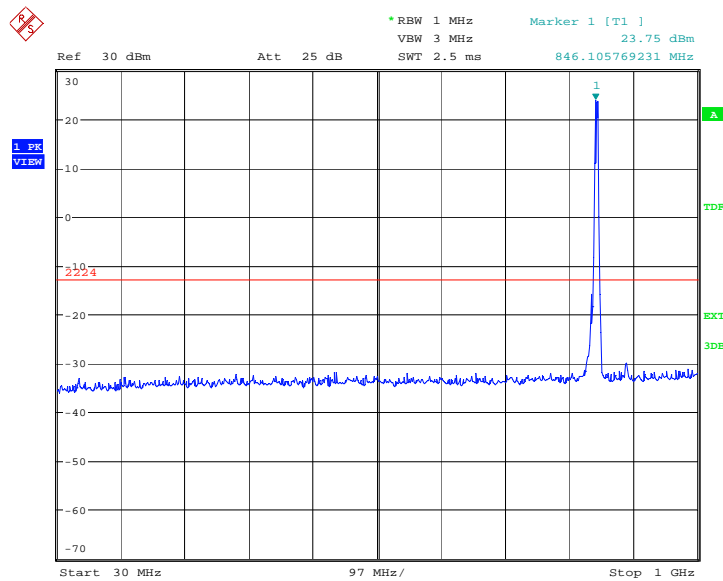


Date: 13.APR.2011 05:17:08

**A. 8.3.33 Channel 4233: 30MHz –1GHz**

Spurious emission limit –13dBm.

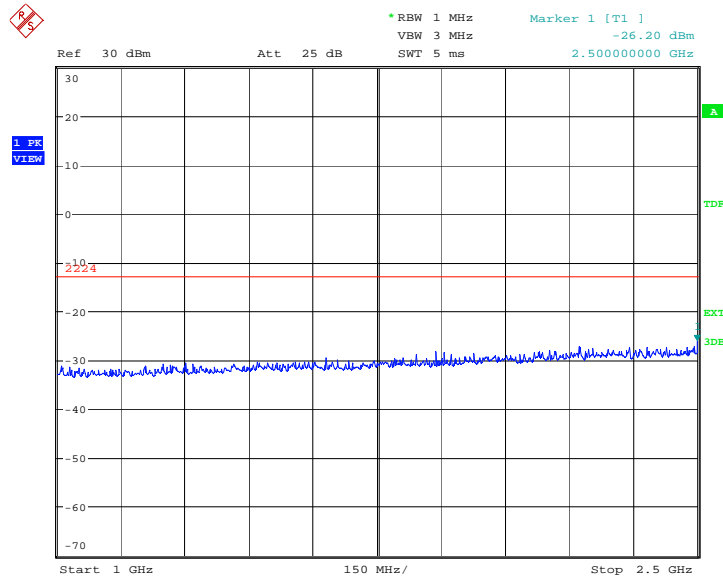
**NOTE: peak above the limit line is the carrier frequency.**



Date: 13.APR.2011 05:17:39

**A. 8.3.34 Channel 4233: 1GHz – 2.5GHz**

Spurious emission limit –13dBm.



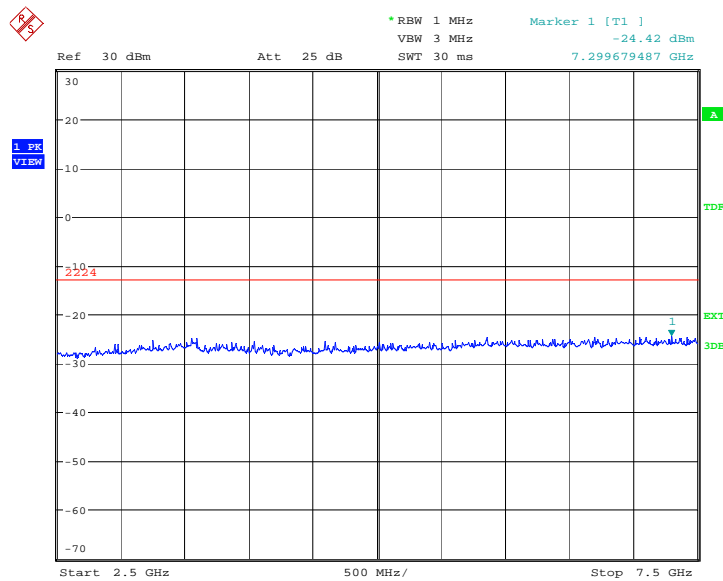
Date: 13.APR.2011 05:18:08



**A. 8.3.35 Channel 4233: 2.5GHz –7.5GHz**

Spurious emission limit –13dBm.

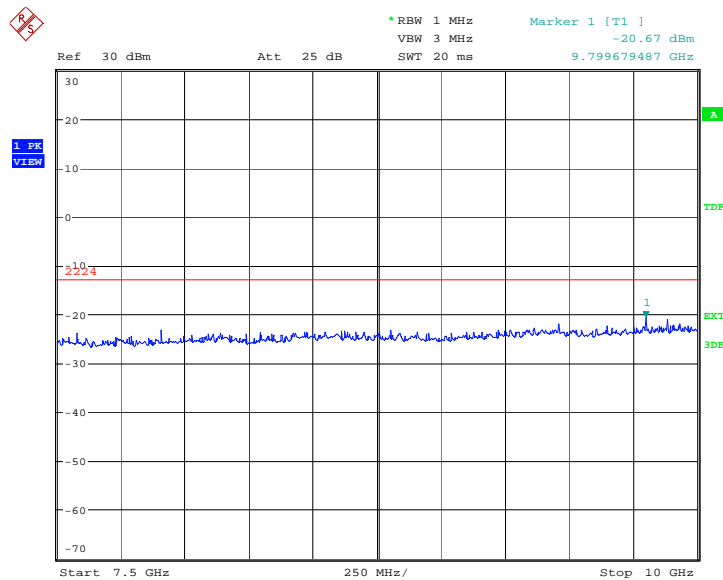
**NOTE: peak above the limit line is the carrier frequency.**



Date: 13.APR.2011 05:18:36

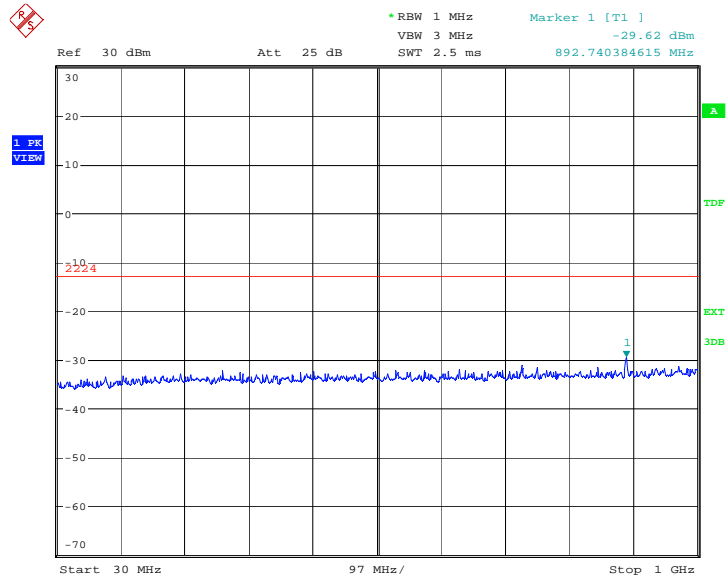
**A. 8.3.36 Channel 4233: 7.5GHz – 10GHz**

Spurious emission limit –13dBm.



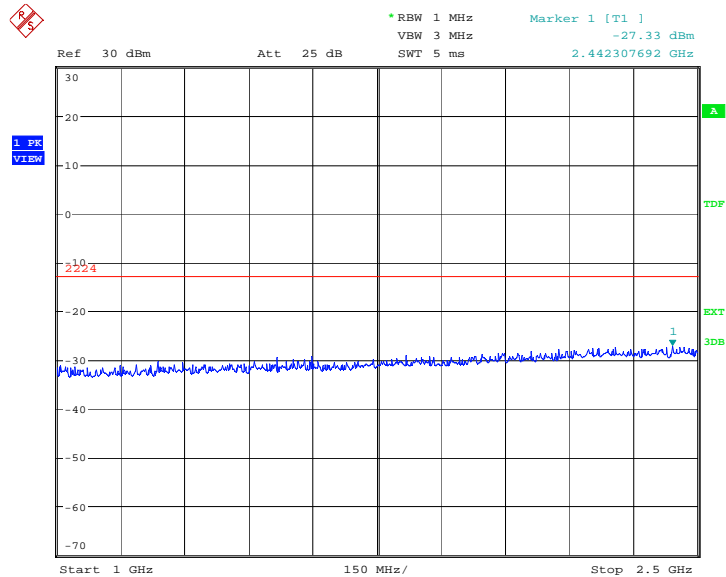
Date: 13.APR.2011 05:19:04

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



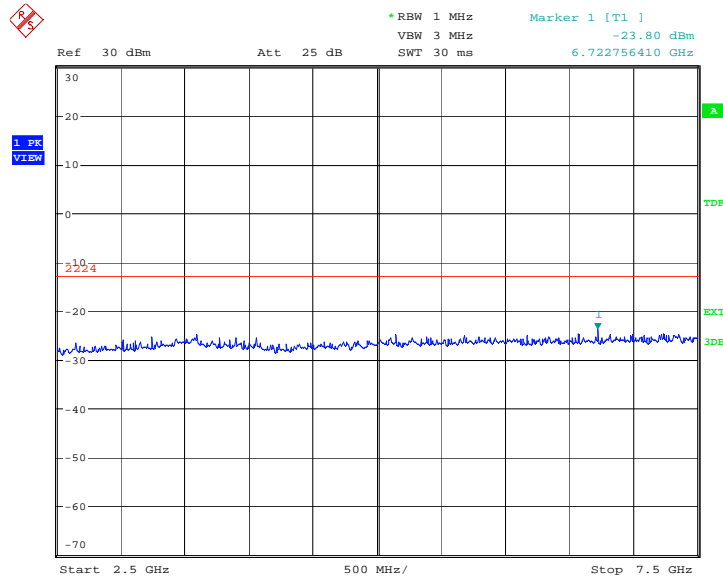
Date: 13.APR.2011 05:19:33

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



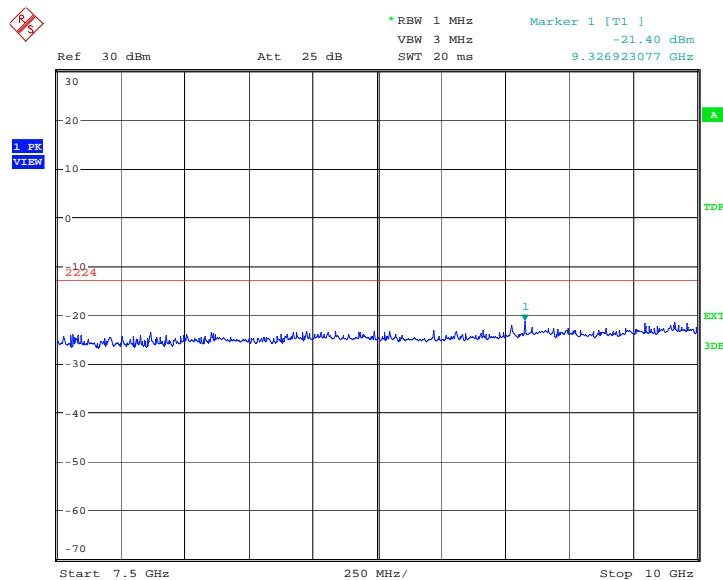
Date: 13.APR.2011 05:20:02

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



Date: 13.APR.2011 05:20:30

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



Date: 13.APR.2011 05:20:58

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