TEST REPORT

No. 2012TAR213

for

TCT Mobile Limited

UMTS Dualband / GSM Quadband mobile phone

Model Name: Crystalk 3G

Marketing Name：A382G

FCC ID: RAD247

with

Hardware Version: PIO04

Software Version: SW71C

Issued Date: Jun 28, 2012

Test Laboratory:

DAR accreditation (DIN EN ISO/IEC 17025): No. DGA-PL-114/01-02

FCC 2.948 Listed: No.733176

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

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

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CONTENTS

1. Test Laboratory

1.1. Testing Location

Company Name:	TMC Beijing, Telecommunication Metrology Center of MIIT
Address:	3/F Shou Xiang Technology Building, No.51 Xueyuan Road, Hai Dian District, Beijing, P. R. China
Postal Code:	100191
Telephone:	00861062304633
Fax:	00861062304793

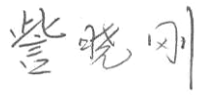
1.2. Testing Environment

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

1.3. Project data

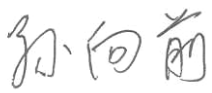
Testing Start Date:	Apr 12, 2012
Testing End Date:	May 04, 2012

1.4. Signature



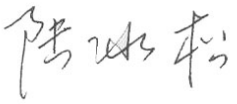
Zi Xiaogang

(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	UMTS Dualband / GSM Quadband mobile phone
Model Name	Crystalk 3G
Marketing Name	A382G
FCC ID	RAD247
Frequency	GSM 850MHz; PCS 1900MHz; WCDMA Band II; WCDMA Band V
Antenna	Internal
Power supply	Battery or Charger (AC Adaptor)
Output power	32.97 dBm maximum ERP measured for GSM850
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
N03	013090000006151	PIO04	SW71C
N04	013090000004404	PIO04	SW71C

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

3.3. Internal Identification of AE used during the test

AE ID*	Description
AE1	Battery
AE2	Charger
AE3	Charger cradle

AE1

Model	CAB31L0000C1
Manufacturer	BYD
Capacitance	1000mAh
Nominal Voltage	3.7V

AE2

Model	CBA3002AG0C1
Manufacturer	BYD
Length of DC line	100cm

AE3

Model	CBC32C0AA0C3
Manufacturer	Yingju
Length of DC line	100cm

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

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

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

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

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

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

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

6. SUMMARY OF TEST RESULTS

Items	List	Clause in FCC rules	Verdict
1	Output Power	22.913(a)/24.232(c)	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	2012-06-06
2	Test Receiver	ESI40	831564/002	R&S	2012-07-12
3	BiLog Antenna	VULB9163	9163-175	Schwarzbeck	2012-07-05
4	BiLog Antenna	VULB9163	9163-302	Schwarzbeck	2012-07-10
5	Signal Generator	SMB100A	102063	R&S	2012-07-05
7	LISN	ESH2-Z5	829991/012	R&S	2012-07-20
8	Spectrum Analyzer	FSU26	200030	R&S	2012-07-18
9	Spectrum Analyzer	FSU46	100054	R&S	2012-09-14
10	Universal Radio Communication Tester	CMU200	100680	R&S	2012-07-23
11	Universal Radio Communication Tester	CMU200	109914	R&S	2012-07-21
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	2012-07-01
15	Dual-Ridge Waveguide Horn Antenna	3116	2661	EMCO	2012-07-01
16	Climatic chamber	PL-2G	343074	ESPEC	2012-07-15

ANNEX A: MEASUREMENT RESULTS

A.1 OUTPUT POWER

A.1.1 Summary

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMU-200) to ensure max power transmission and proper modulation.
This result contains peak output power and EIRP measurements for the EUT. In all cases, output power is within the specified limits.

A.1.2 Conducted

A.1.2.1 Method of Measurements

The EUT was set up for the max output power with pseudo random data modulation.
The power was measured with Rhode & Schwarz Spectrum Analyzer FSU (peak)
These measurements were done at 3 frequencies, 1850.2 MHz, 1880.0MHz and 1909.8MHz for PCS1900 band;824.4MHz, 836.6MHz and 848.8MHz for GSM850 band. (bottom, middle and top of operational frequency range).

A.1.2.2 Test Condition

RBW	VBW	Sweep Time	Span
1MHz	1MHz	300ms	10MHz

GSM850

Limit

	Power step	Nominal Peak output power (dBm)
GSM	5	33dBm(2W)

Measurement result

GSM（GMSK）

Frequency(MHz)	Power Step	Peak output power(dBm)
824.2	5	**31.69**
836.6	5	31.50
848.8	5	31.46

PCS1900

Limit

	Power step	Nominal Peak output power (dBm)
GSM	0	30dBm(1W)
GPRS	3	30dBm(1W)

Measurement result

GSM（GMSK）

Frequency(MHz)	Power Step	Peak output power(dBm)
1850.2	0	**29.58**
1880.0	0	29.43
1909.8	0	29.21

A.1.3 Radiated

A.1.3.1 Description

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

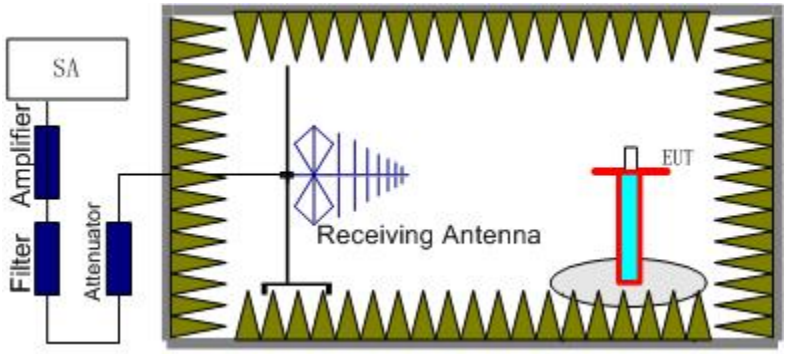
Rule Part 24.232(c) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

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

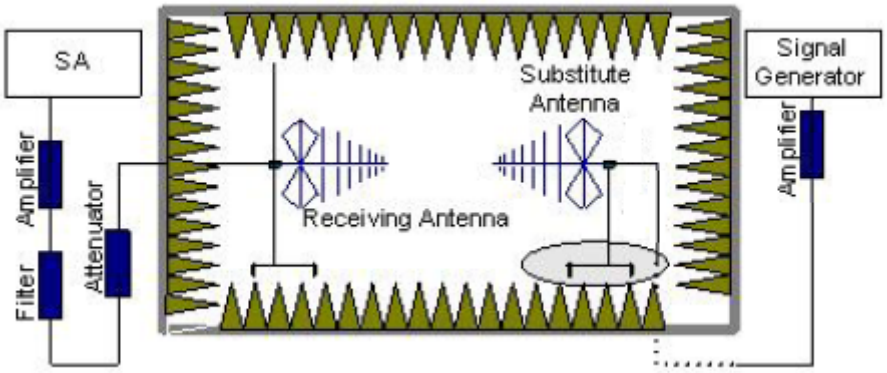
A.1.3.2 Method of Measurement

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:
   Power(EIRP)=P_{Mea}+ P_{Ag} + P_{cl} + G_a
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.

GSM 850-ERP 22.913(a)

Limits

	Power Step	Burst Peak ERP (dBm)
GSM	5	≤38.45dBm (7W)
GPRS	3	≤38.45dBm (7W)

Measurement result

GSM

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Correction (dBm)	Peak ERP(dBm)	Polarization
824.2	-15.39	2.26	-53.00	0.84	2.15	32.36	H
836.6	-14.72	2.26	-53.00	0.90	2.15	**32.97**	H
848.8	-15.76	2.28	-53.00	0.95	2.15	31.86	H

Frequency**:** 836.6 MHz

Peak ERP(dBm)= P_{Mea}(-14.72dBm) - P_{cl}(2.26dB) - P_{Ag}(-53.00dB) - G_a (0.90dB)-2.15dBm

=32.97dBm

ANALYZER SETTINGS: RBW = VBW = 3MHz

PCS1900-EIRP 24.232(b)

Limits

	Power Step	Burst Peak EIRP (dBm)
GSM	0	≤33dBm (2W)
GPRS	3	≤33dBm (2W)

Measurement result

GSM

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
1850.2	-18.36	5.95	-50.00	-4.56	30.25	H
1880.0	-16.21	7.05	-50.00	-4.43	31.17	H
1909.8	-13.25	9.12	-50.00	-4.30	**31.93**	H

Frequency**:** 1909.8 MHz

Peak EIRP(dBm)= P_{Mea}(-13.25dBm) - P_{cl}(9.12dB) - P_{Ag}(50.00dB) - G_a (-4.30dB) =31.93 dBm

ANALYZER SETTINGS: RBW = VBW = 3MHz

A.2 EMISSION LIMT

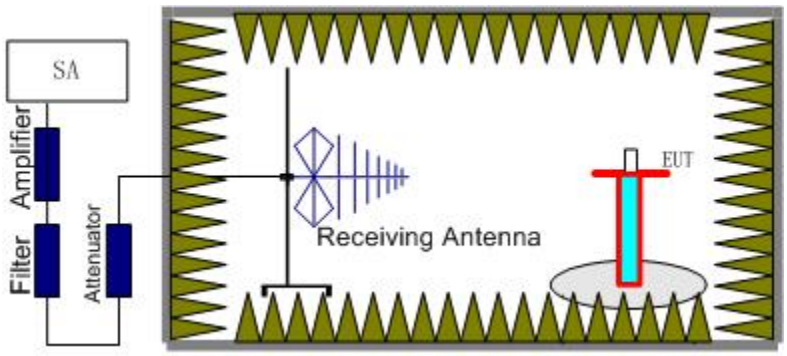
A.2.1 Measurement Method

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

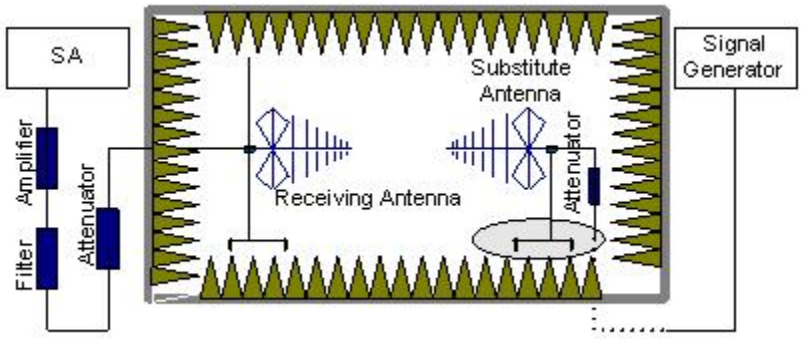
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The resolution bandwidth is set as outlined in Part 24.238 and Part 22.917. The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the PCS1900 and GSM850.

The procedure of radiated spurious emissions is as follows:

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



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



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

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

4. The Path loss (P_{pl}) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain (G_a) should be recorded after test.
   A amplifier should be connected in for the test.
   The Path loss (P_{pl}) is the summation of the cable loss and the gain of the amplifier.
   The measurement results are obtained as described below:
   Power(EIRP)=P_{Mea}+ P_{pl} + G_a
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.

A.2.2 Measurement Limit

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

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

A.2.3 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the PCS (1850.2 MHz, 1880 MHz and 1909.8 MHz) ,GSM850 (824.2MHz, 836.6MHz, 848.8MHz) . 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 PCS1900 ,GSM850 into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

A.2.4 Measurement Results Table

Frequency	Channel	Frequency Range	Result
GSM 850MHz	Low	30MHz-10GHz	Pass
	Middle	30MHz-10GHz	Pass
	High	30MHz-10GHz	Pass
GSM 1900MHz	Low	30MHz-20GHz	Pass
	Middle	30MHz-20GHz	Pass
	High	30MHz-20GHz	Pass

A.2.5 Sweep Table

Working Frequency	Subrange (GHz)	RBW	VBW	Sweep time (s)
850MHz	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
1900MHz	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

GSM Mode Channel 128/824.2MHz

Frequency(MHz)	P_{Mea}(dBm)	Path Loss	Antenna Gain	Correction (dBm)	Peak ERP(dBm)	Limit （dBm）	Polarization
3296.57	-62.25	4.93	-7.41	2.15	-61.92	-13.00	V
4945.05	-70.88	7.17	-9.60	2.15	-70.60	-13.00	H
5768.93	-56.51	11.00	-10.11	2.15	-59.55	-13.00	H
6593.78	-42.75	7.56	-10.69	2.15	-41.77	-13.00	H
7417.16	-47.31	8.99	-11.35	2.15	-47.10	-13.00	H
7987.16	-67.18	7.50	-11.89	2.15	-64.94	-13.00	V

GSM Mode Channel 190/836.6MHz

Frequency(MHz)	P_{Mea}(dBm)	Path Loss	Antenna Gain	Correction (dBm)	Peak ERP(dBm)	Limit （dBm）	Polarization
3713.84	-69.93	5.36	-8.16	2.15	-69.28	-13.00	V
5079.63	-65.80	7.45	-9.75	2.15	-65.65	-13.00	H
5856.05	-51.40	12.01	-10.14	2.15	-55.42	-13.00	V
6692.24	-44.70	7.54	-10.79	2.15	-43.60	-13.00	H
7530.15	-52.24	8.00	-11.43	2.15	-50.96	-13.00	H
9011.01	-67.06	8.33	-12.60	2.15	-64.94	-13.00	H

GSM Mode Channel 251/848.8MHz

Frequency(MHz)	P_{Mea}(dBm)	Path Loss	Antenna Gain	Correction (dBm)	Peak ERP(dBm)	Limit （dBm）	Polarization
5941.15	-52.58	13.51	-10.18	2.15	-58.06	-13.00	V
6789.93	-49.06	7.53	-10.89	2.15	-47.85	-13.00	V
7191.72	-68.05	8.87	-11.22	2.15	-67.85	-13.00	V
8445.46	-65.71	8.09	-12.17	2.15	-63.78	-13.00	V
9565.71	-68.04	8.33	-12.57	2.15	-65.95	-13.00	V
9899.89	-66.09	8.95	-12.44	2.15	-64.75	-13.00	V

GSM Mode Channel 512/1850.2MHz

Frequency(MHz)	P_{Mea}(dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit （dBm）	Polarization
3700.34	-49.12	5.31	-8.14	-46.29	-13.00	H
5550.40	-40.00	8.71	-10.02	-38.69	-13.00	H
7400.96	-31.63	9.07	-11.34	-29.36	-13.00	H
11101.32	-33.65	9.18	-12.40	-30.43	-13.00	V
12951.58	-47.69	9.95	-13.24	-44.40	-13.00	V
14801.50	-48.63	11.61	-13.54	-46.70	-13.00	H

GSM Mode Channel 661/1880.0MHz

Frequency(MHz)	P_{Mea}(dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit （dBm）	Polarization
3760.05	-45.51	5.97	-8.21	-43.27	-13.00	H
5640.24	-38.20	9.59	-10.06	-37.73	-13.00	H
7519.92	-32.78	8.11	-11.42	-29.47	-13.00	H
9399.77	-43.74	8.24	-12.60	-39.38	-13.00	V
11279.73	-29.98	9.17	-12.40	-26.75	-13.00	V
15040.25	-47.91	11.32	-13.49	-45.74	-13.00	V

GSM Mode Channel 810/1909.8MHz

Frequency(MHz)	P_{Mea}(dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit （dBm）	Polarization
3819.63	-43.59	5.56	-8.28	-40.87	-13.00	H
5729.41	-40.00	10.05	-10.09	-39.96	-13.00	H
7639.56	-33.88	7.85	-11.54	-30.19	-13.00	H
11458.46	-30.06	9.24	-12.40	-26.90	-13.00	V
13368.01	-51.66	10.52	-13.67	-48.51	-13.00	V
17188.09	-47.97	11.76	-12.74	-46.99	-13.00	V

A.3 CONDUCTED EMISSION

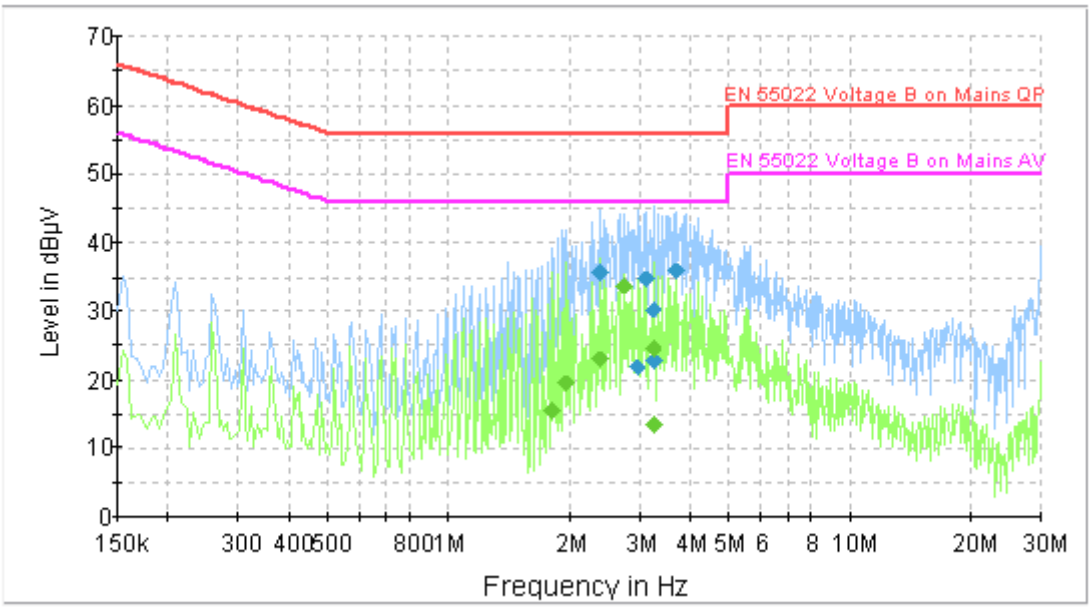
The measurement procedure in ANSI C63.4-1003 is used. Conducted Emission is measured with travel charger.

A.3.1 Limit

Frequency of Emission (MHz)	Conducted Limit (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

GSM850MHz



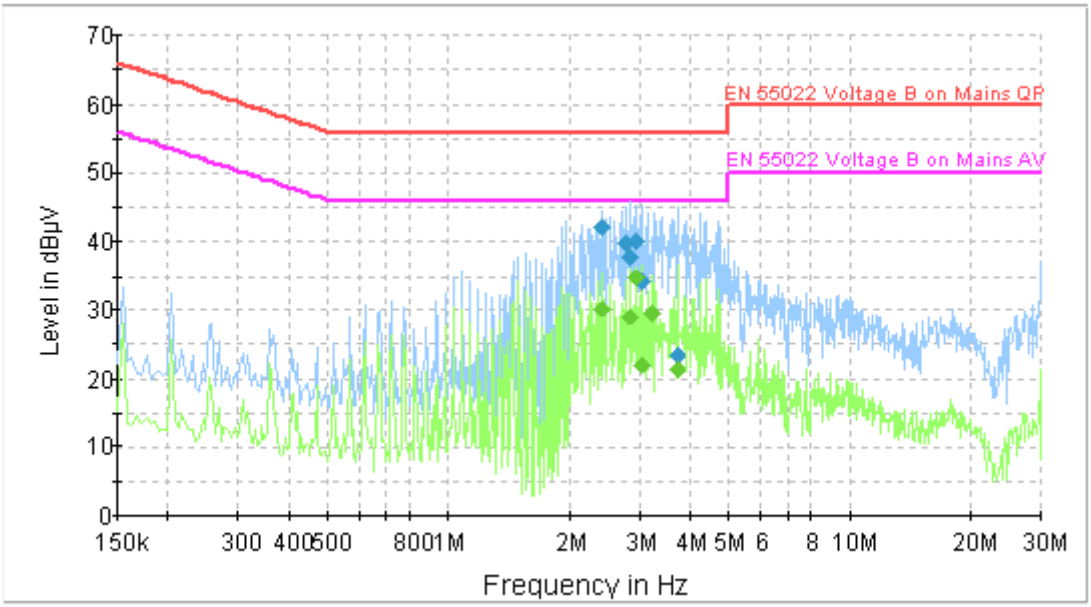
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
2.393361	35.5	GND	N	9.8	20.5	56.0
2.965848	21.7	GND	L1	9.8	34.3	56.0
3.117522	34.6	GND	L1	9.8	21.4	56.0
3.228286	30.1	GND	L1	9.8	25.9	56.0
3.276952	22.8	GND	L1	9.8	33.2	56.0
3.693649	35.8	GND	N	9.8	20.2	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.819500	15.5	GND	L1	9.8	30.5	46.0
1.977000	19.5	GND	N	9.8	26.5	46.0
2.393361	23.0	GND	N	9.8	23.0	46.0
2.752060	33.8	GND	N	9.8	12.2	46.0
3.228286	24.5	GND	N	9.8	21.5	46.0
3.276952	13.3	GND	L1	9.8	32.7	46.0

PCS1900MHz



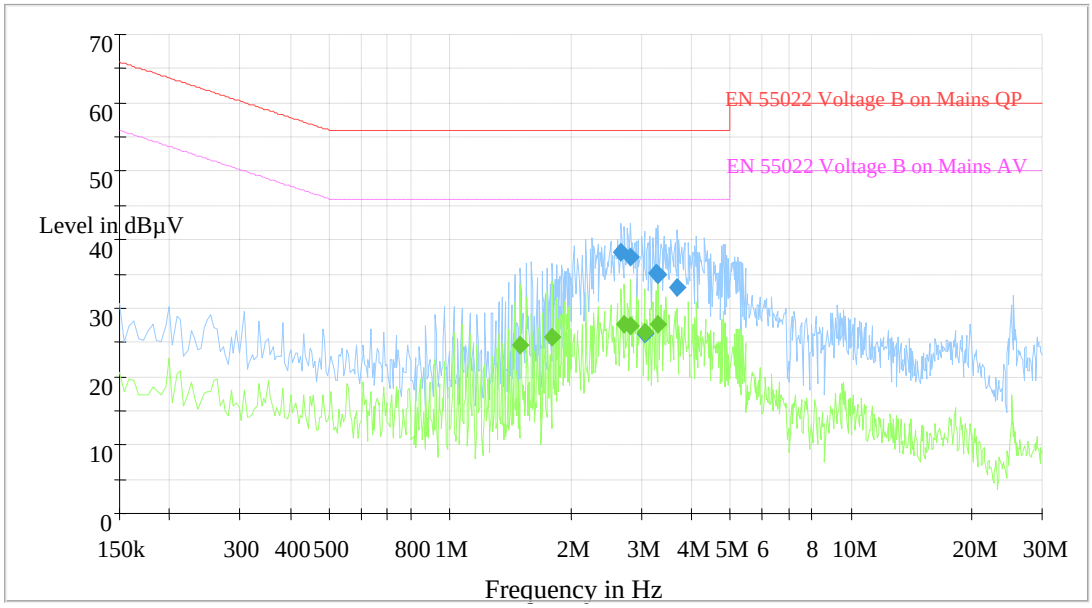
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
2.417355	42.2	GND	N	9.8	13.8	56.0
2.779650	39.7	GND	N	9.8	16.3	56.0
2.835661	37.8	GND	N	9.8	18.2	56.0
2.936411	40.1	GND	N	9.8	15.9	56.0
3.040739	34.3	GND	N	9.8	21.7	56.0
3.712117	23.4	GND	L1	9.8	32.6	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
2.417355	30.3	GND	N	9.8	15.7	46.0
2.835661	29.0	GND	L1	9.8	17.0	46.0
2.936411	34.6	GND	N	9.8	11.4	46.0
3.040739	22.1	GND	L1	9.8	23.9	46.0
3.196243	29.4	GND	L1	9.8	16.6	46.0
3.712117	21.3	GND	N	9.8	24.7	46.0

CAMERA



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
2.670924	38.2	GND	N	9.8	17.8	56.0
2.821553	37.6	GND	N	9.8	18.4	56.0
3.055943	26.3	GND	N	9.8	29.7	56.0
3.260649	35.2	GND	L1	9.8	20.8	56.0
3.309804	34.8	GND	N	9.8	21.2	56.0
3.693649	32.9	GND	N	9.8	23.1	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.500000	24.7	GND	L1	9.8	21.3	46.0
1.801500	25.7	GND	N	9.8	20.3	46.0
2.724745	27.7	GND	N	9.8	18.3	46.0
2.821553	27.5	GND	N	9.8	18.5	46.0
3.055943	26.5	GND	N	9.8	19.5	46.0
3.309804	27.7	GND	L1	9.8	18.3	46.0

A.4 FREQUENCY STABILITY

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℃.
3. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on mid channel of PCS 1900 and GSM850, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10℃ increments from -30℃ to +50℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
5. Remeasure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments remeasuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50℃.
7. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 C increments from +50℃ to -30℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

A.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

GSM 850

Frequency Error vs Voltage

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.5	-11	0.028
3.7	-9	0.023
4.2	-12	0.031

Frequency Error vs Temperature

temperature(℃)	Frequency error(Hz)	Frequency error(ppm)
-30	-12	0.031
-20	-11	0.028
-10	-11	0.028
0	-9	0.023
10	-9	0.023
20	-9	0.023
30	-11	0.028
40	-11	0.028
50	-12	0.031

PCS 1900

Frequency Error vs Voltage

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.5	20	0.042
3.7	18	0.038
4.2	23	0.049

Frequency Error vs Temperature

temperature(℃)	Frequency error(Hz)	Frequency error(ppm)
-30	23	0.049
-20	20	0.042
-10	20	0.042
0	18	0.038
10	18	0.038
20	18	0.038
30	20	0.042
40	20	0.042
50	23	0.049

A.5 OCCUPIED BANDWIDTH

A.5.1 Occupied Bandwidth Results

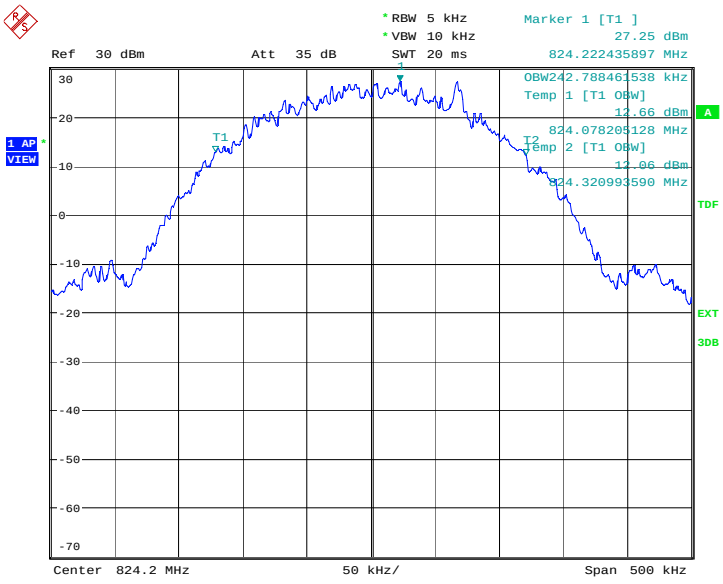
Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of PCS1900 band and GSM850 band. The table below lists the measured -20dBc BW. Spectrum analyzer plots are included on the following pages.

GSM 850(-20dBc)

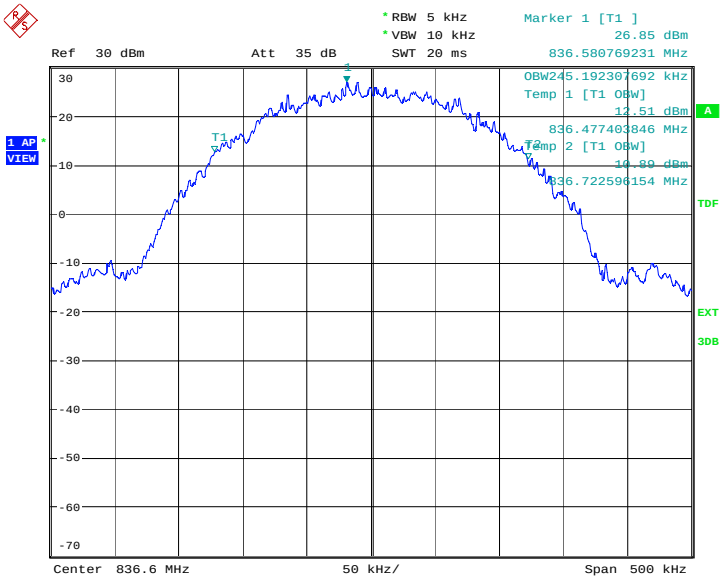
Frequency(MHz)	Occupied Bandwidth (-20dBc BW)(kHz)
824.2	242.788
836.6	245.192
848.8	243.589

GSM 850

Channel 128-Occupied Bandwidth (-20dBc BW)

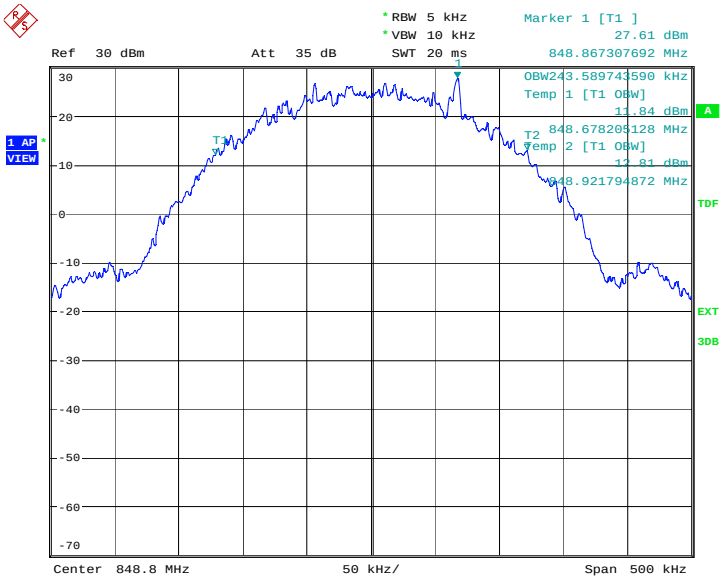


Channel 190-Occupied Bandwidth (-20dBc BW)



Date: 16.APR.2012 00:30:51

Channel 251-Occupied Bandwidth (-20dBc BW)



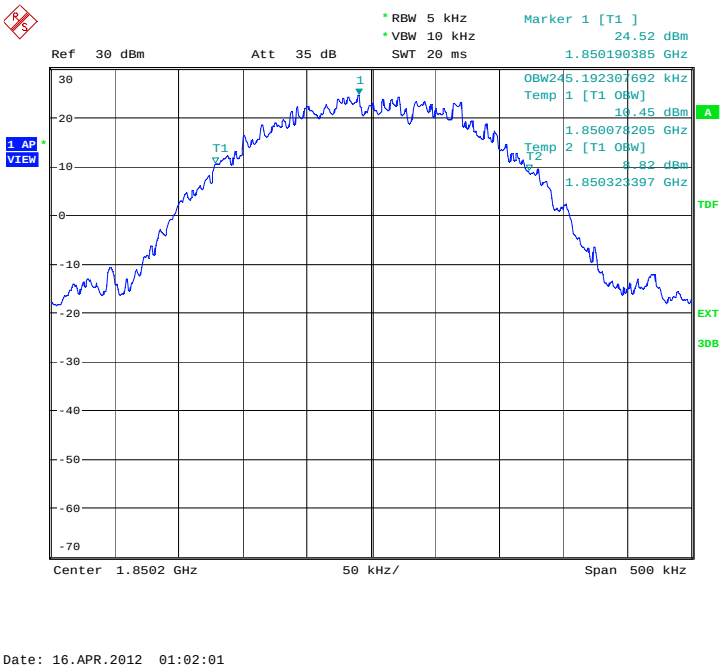
Date: 16.APR.2012 00:31:23

PCS 1900(-20dBc)

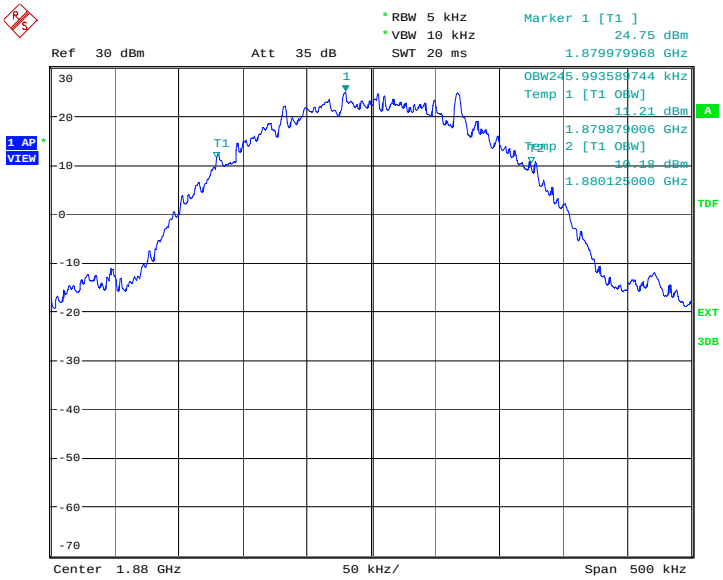
Frequency(MHz)	Occupied Bandwidth (-20dBc BW)(kHz)
1850.2	245.192
1880.0	245.993
1909.8	248.397

PCS 1900

Channel 512-Occupied Bandwidth (-20dBc BW)

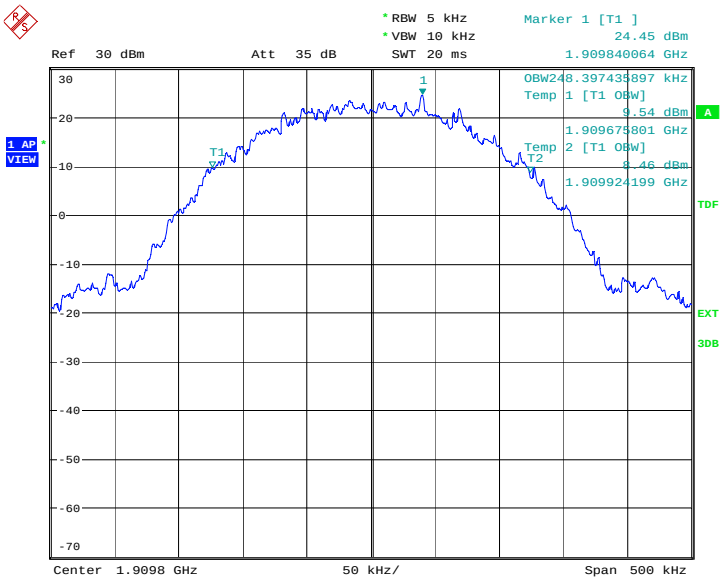


Channel 661-Occupied Bandwidth (-20dBc BW)



Date: 16.APR.2012 01:02:33

Channel 810-Occupied Bandwidth (-20dBc BW)



Date: 16.APR.2012 01:03:05

A.6 EMISSION BANDWIDTH

A.6.1Emission Bandwidth Results

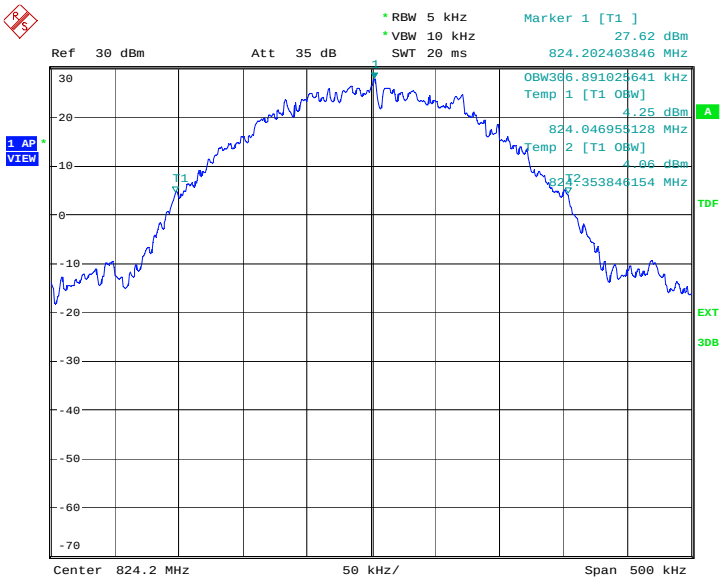
Similar to conducted emissions; Emission bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of PCS1900 band and GSM850 band. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

GSM 850(-26dBc)

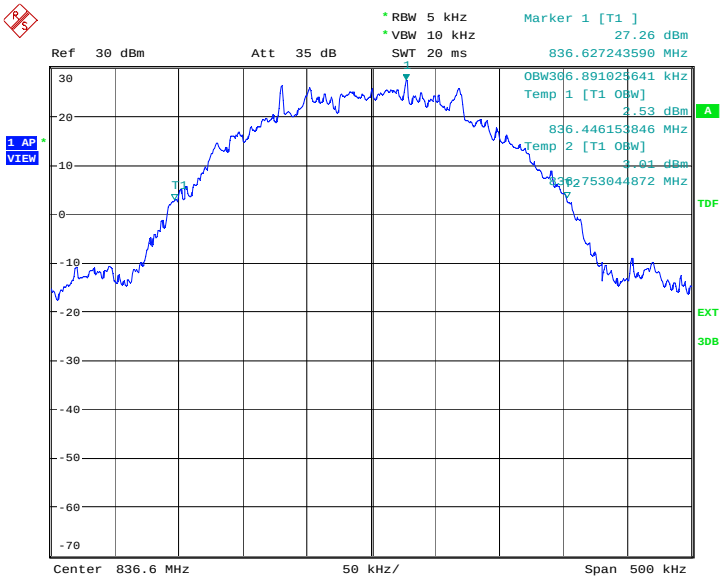
Frequency(MHz)	Occupied Bandwidth (–26dBc BW)(kHz)
824.2	306.891
836.6	306.891
848.8	305.288

GSM 850

Channel 128-Occupied Bandwidth (-26dBc BW)

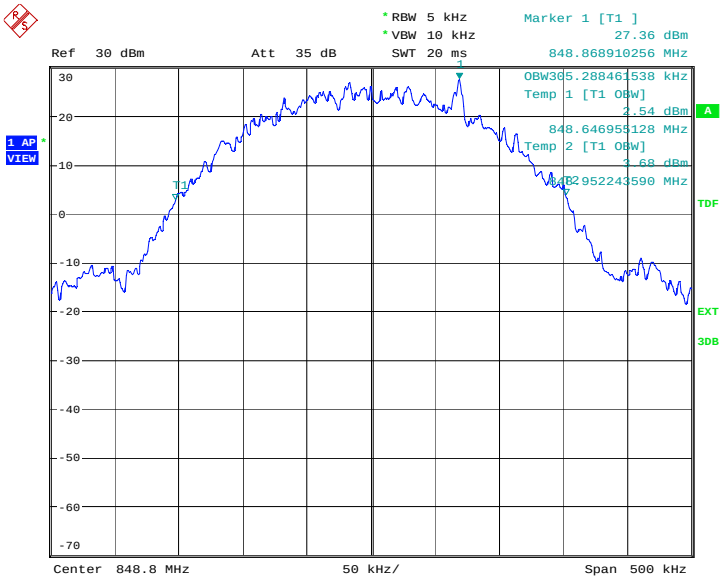


Channel 190-Occupied Bandwidth (-26dBc BW)



Date: 16.APR.2012 00:32:30

Channel 251-Occupied Bandwidth (-26dBc BW)



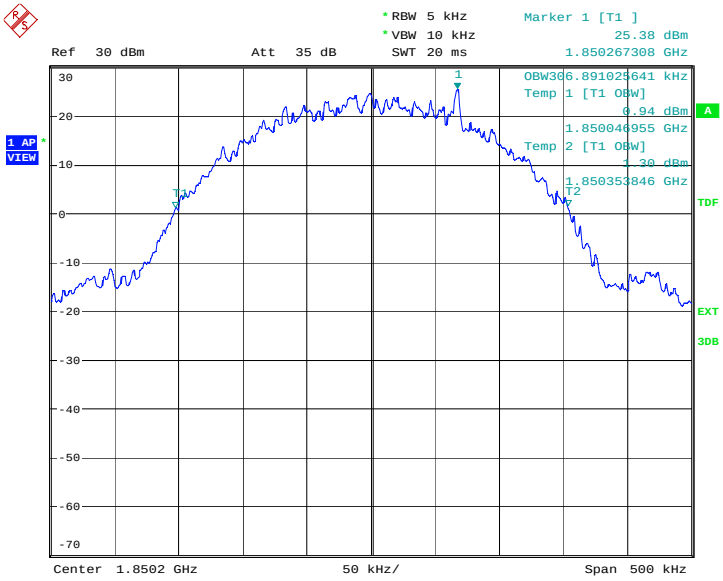
Date: 16.APR.2012 00:33:02

PCS 1900(-26dBc)

Frequency(MHz)	Occupied Bandwidth (–26dBc BW)(kHz)
1850.2	306.891
1880.0	306.891
1909.8	306.891

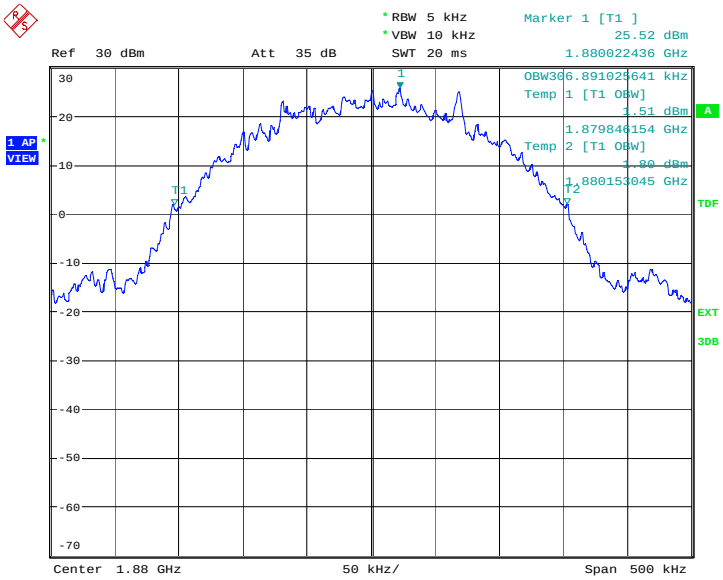
PCS 1900

Channel 512-Occupied Bandwidth (-26dBc BW)



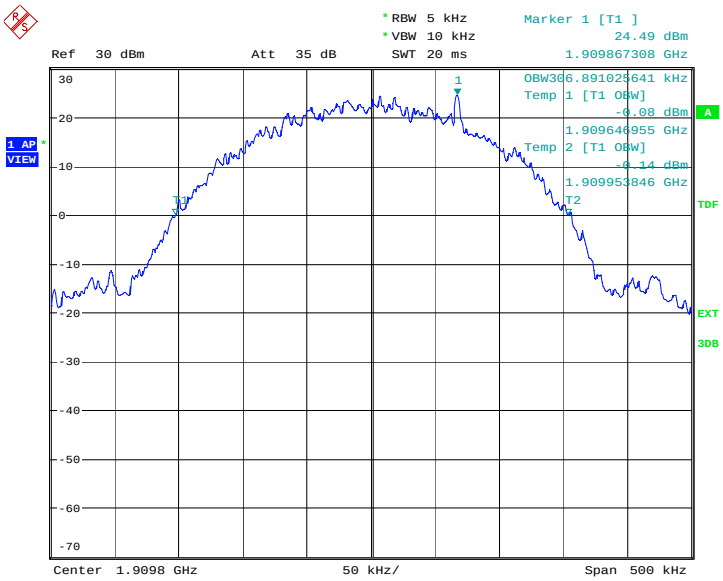
Date: 16.APR.2012 01:03:39

Channel 661-Occupied Bandwidth (-26dBc BW)



Date: 16.APR.2012 01:04:11

Channel 810-Occupied Bandwidth (-26dBc BW)

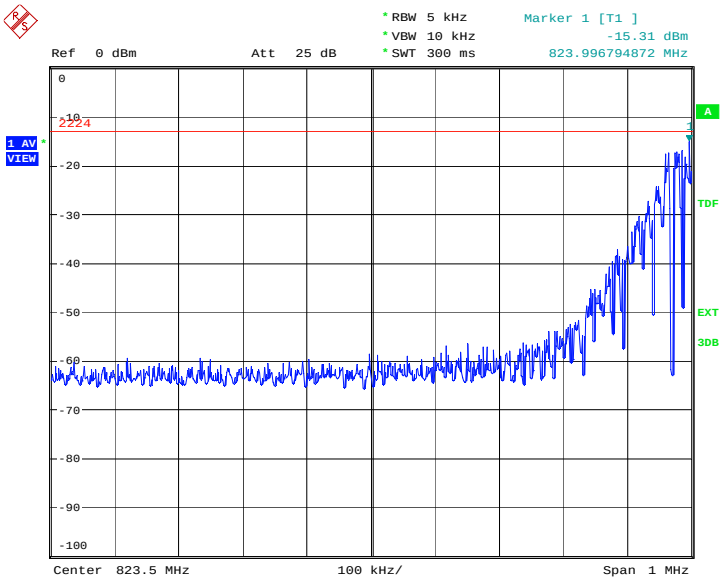


Date: 16.APR.2012 01:04:44

A.7 BAND EDGE COMPLIANCE

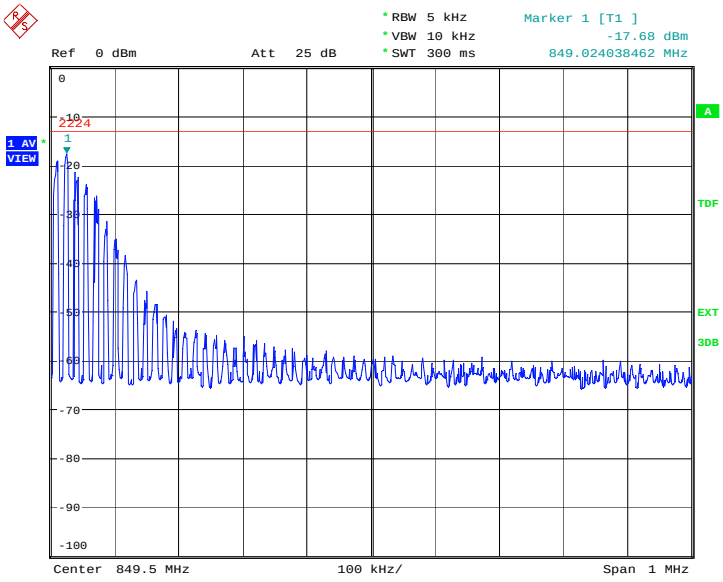
GSM 850

LOW BAND EDGE BLOCK-A (GSM850)-Channel 128



Date: 16.APR.2012 00:33:11

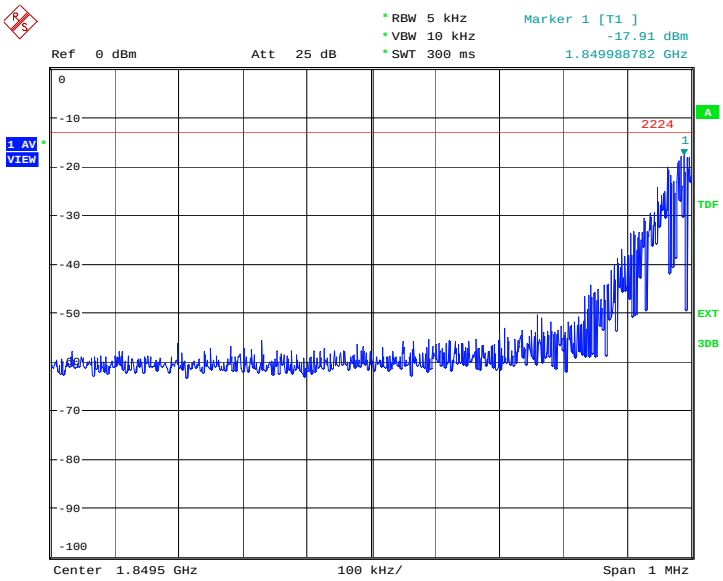
HIGH BAND EDGE BLOCK-C (GSM850) –Channel 251



Date: 16.APR.2012 00:33:20

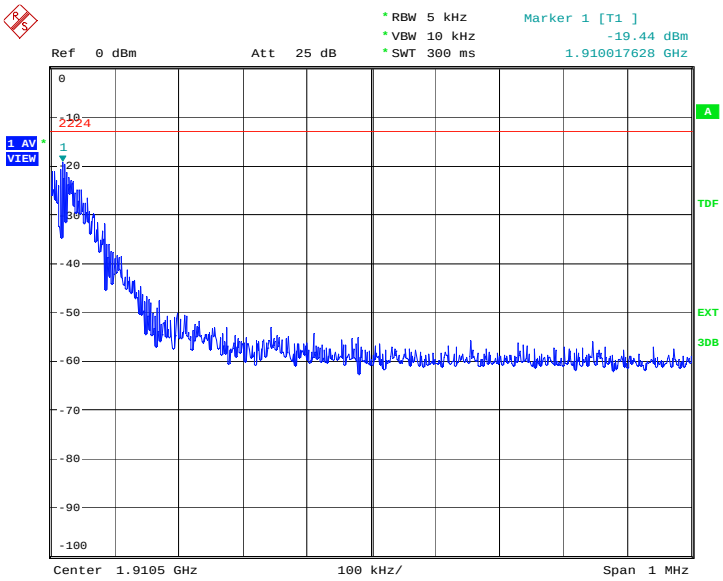
PCS 1900

LOW BAND EDGE BLOCK-A (PCS-1900)-Channel 512



Date: 16.APR.2012 01:04:53

HIGH BAND EDGE BLOCK-C (PCS-1900) –Channel 810



Date: 16.APR.2012 01:05:02

A.8 CONDUCTED SPURIOUS EMISSION

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 PCS1900 band, this equates to a frequency range of 30 MHz to 19.1 GHz, data taken from 30 MHz to 20 GHz. For GSM850, data taken from 30 MHz to 10 GHz.
2. The sweep time is set automatically by instrument itself. That should be the optimal sweep time for the span and the RBW. If the sweep time is too short, that is sweep is too fast, the sweep result is not accurate; If the sweep time is too long, that is sweep is too low, some frequency components may be lost. The instrument will give a optimal sweep time according the selected span and RBW.
3. The procedure to get the conducted spurious emission is as follows:
   The trace mode is set to MaxHold to get the highest signal at each frequency;
   Wait 25 seconds;
   Get the result.
4. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

GSM850 Transmitter

Channel	Frequency (MHz)
128	824.2
190	836.6
251	848.8

PCS1900 Transmitter

Channel	Frequency (MHz)
512	1850.2
661	1880.0
810	1909.8

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.

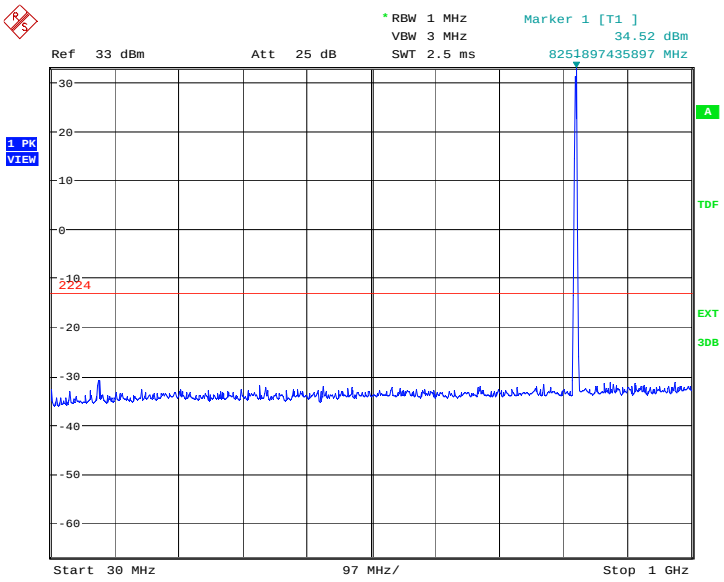
A. 8.3 Measurement result

GSM850

A.8.3.1 Channel 128: 30MHz – 1GHz

Spurious emission limit –13dBm.

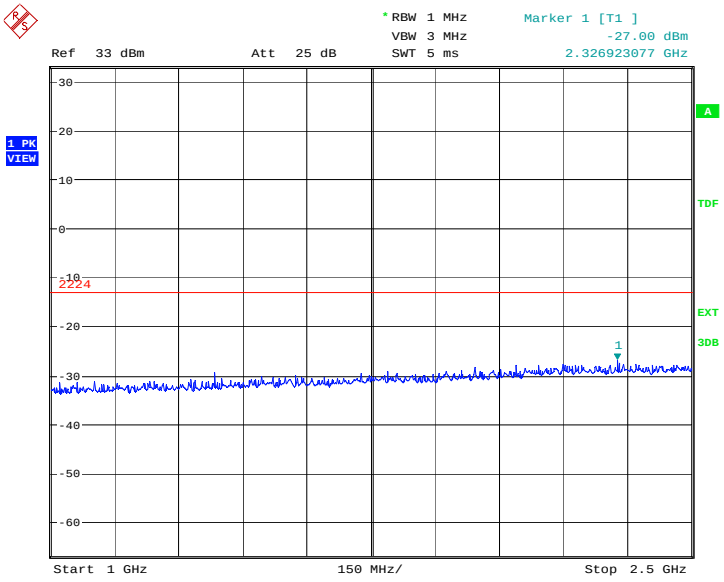
NOTE: peak above the limit line is the carrier frequency.



Date: 16.APR.2012 00:33:49

A.8.3.2 Channel 128: 1GHz – 2.5GHz

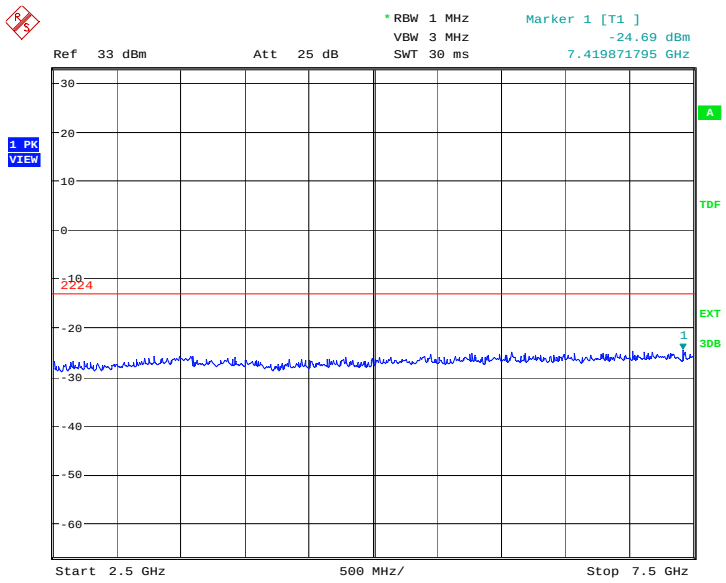
Spurious emission limit –13dBm.



Date: 16.APR.2012 00:34:17

A.8.3.3 Channel 128: 2.5GHz – 7.5GHz

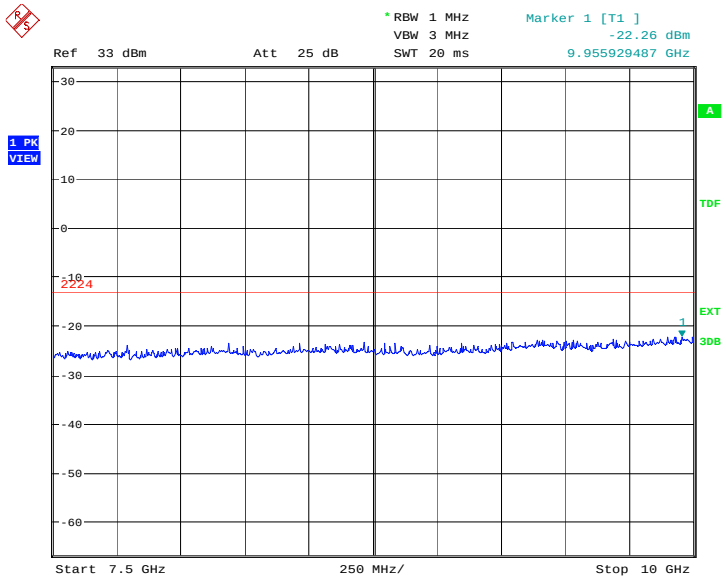
Spurious emission limit –13dBm.



Date: 16.APR.2012 00:34:46

A.8.3.4 Channel 128: 7.5GHz –10GHz

Spurious emission limit –13dBm.

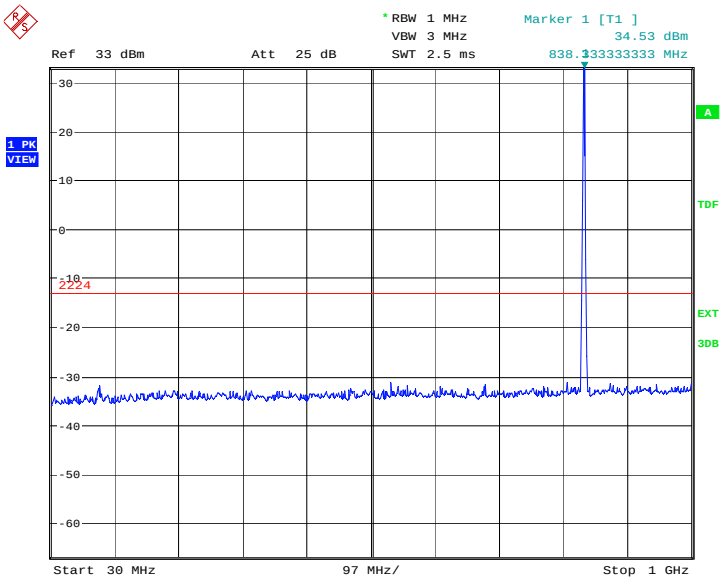


Date: 16.APR.2012 00:35:14

A.8.3.5 Channel 190: 30MHz – 1GHz

Spurious emission limit –13dBm

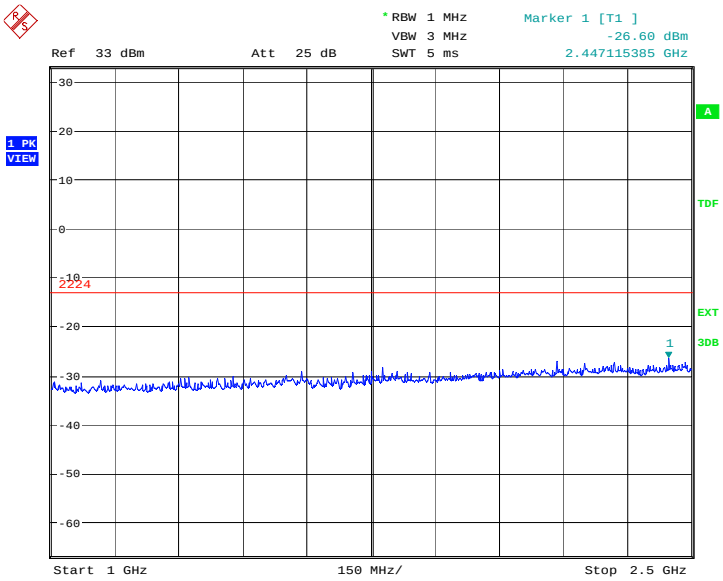
NOTE: peak above the limit line is the carrier frequency.



Date: 16.APR.2012 00:35:43

A.8.3.6 Channel 190: 1GHz –2.5GHz

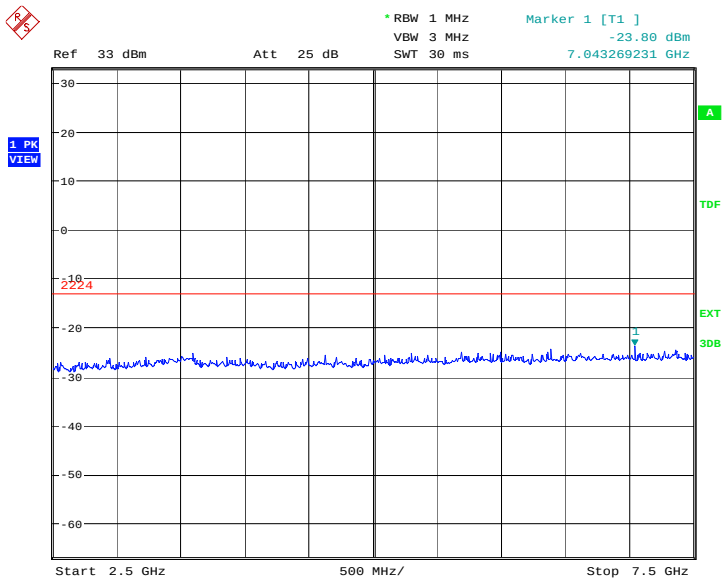
Spurious emission limit –13dBm



Date: 16.APR.2012 00:36:12

A.8.3.7 Channel 190: 2.5GHz –7.5GHz

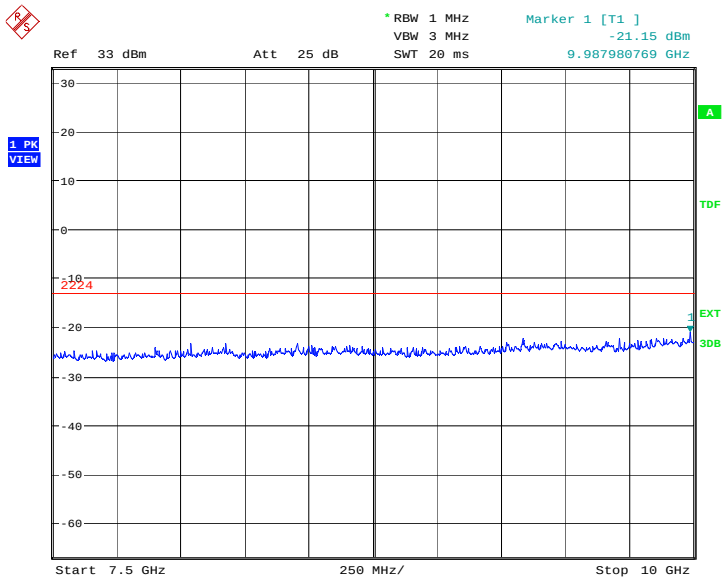
Spurious emission limit –13dBm



Date: 16.APR.2012 00:36:40

A.8.3.8 Channel 190: 7.5GHz –10GHz

Spurious emission limit –13dBm

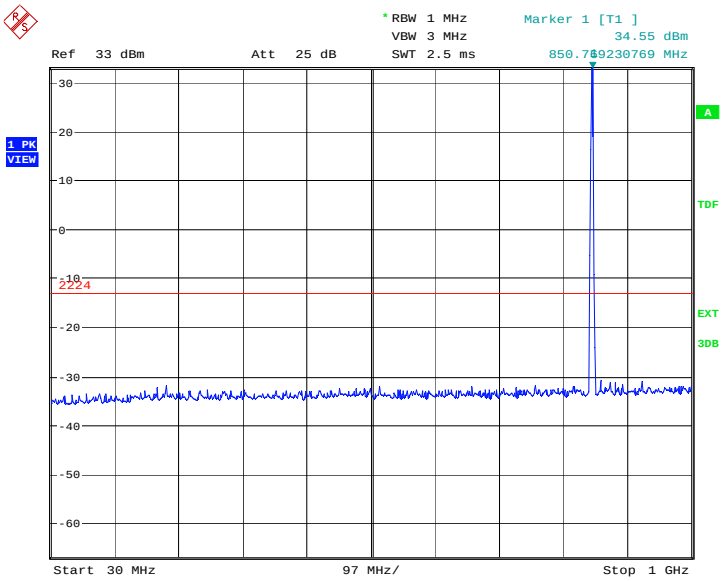


Date: 16.APR.2012 00:37:09

A.8.3.9 Channel 251: 30MHz – 1GHz

Spurious emission limit –13dBm.

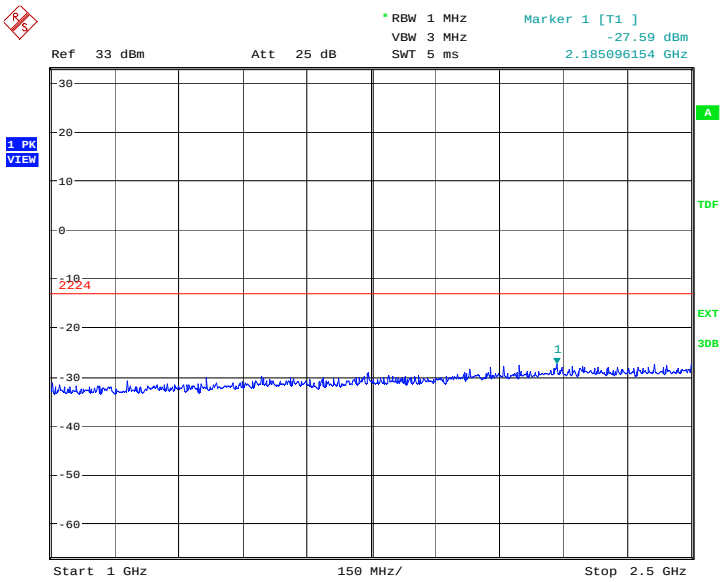
NOTE: peak above the limit line is the carrier frequency.



Date: 16.APR.2012 00:37:38

A.8.3.10 Channel 251: 1GHz – 2.5GHz

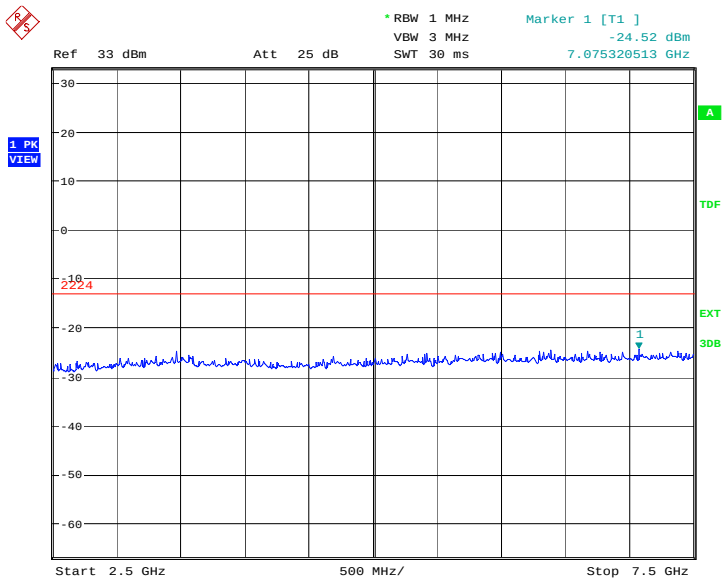
Spurious emission limit –13dBm.



Date: 16.APR.2012 00:38:06

A.8.3.11 Channel 251:2.5GHz – 7.5GHz

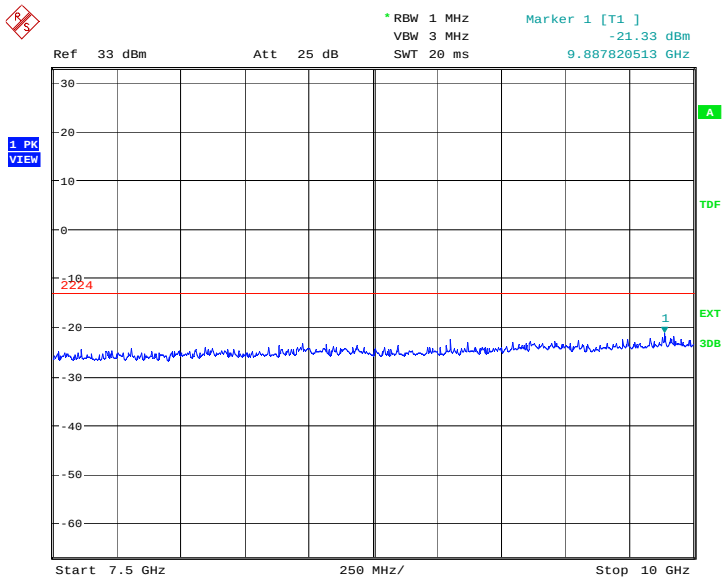
Spurious emission limit –13dBm.



Date: 16.APR.2012 00:38:34

A.8.3.12 Channel 251: 7.5GHz – 10GHz

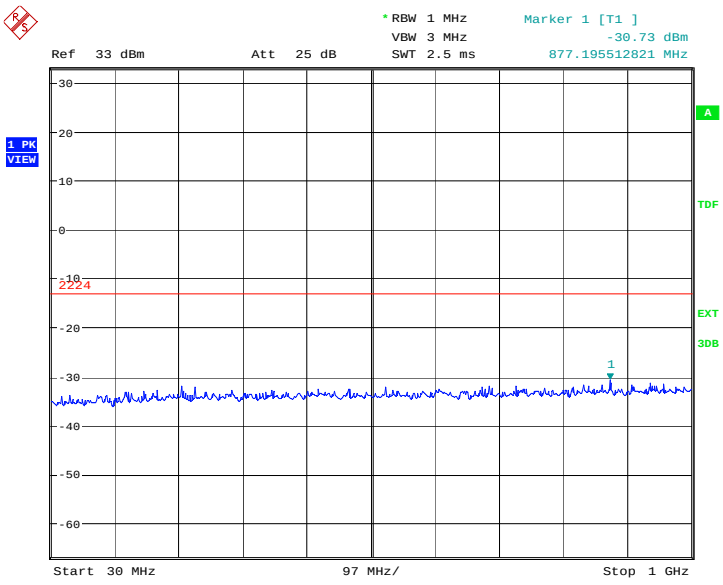
Spurious emission limit –13dBm.



Date: 16.APR.2012 00:39:03

A.8.3.13 Idle mode: 30MHz – 1GHz

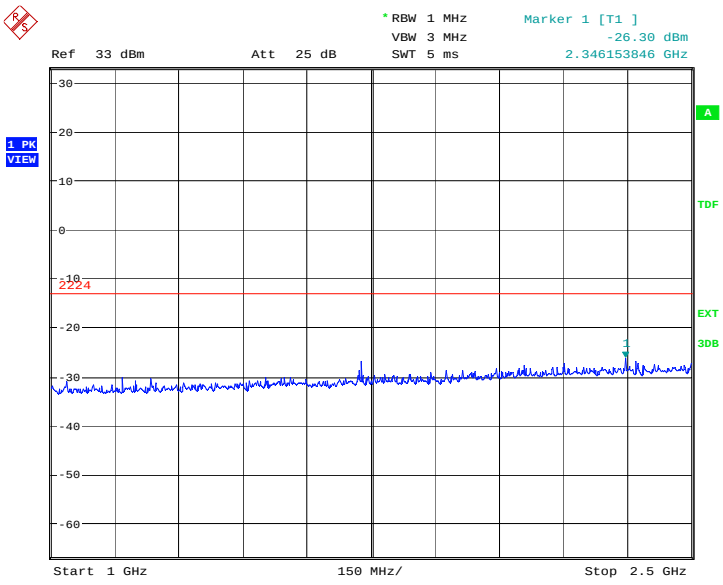
Spurious emission limit –13dBm.



Date: 16.APR.2012 00:39:32

A.8.3.14 Idle mode: 1GHz – 2.5GHz

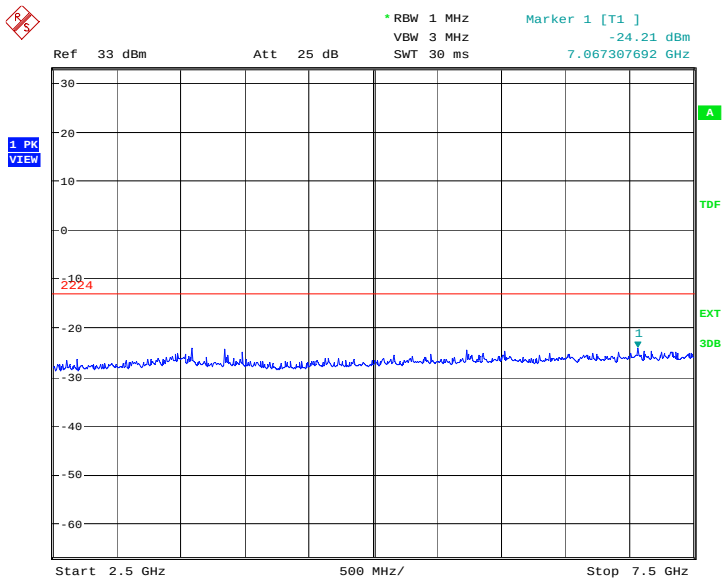
Spurious emission limit –13dBm.



Date: 16.APR.2012 00:40:00

A.8.3.15 Idle mode: 2.5GHz – 7.5GHz

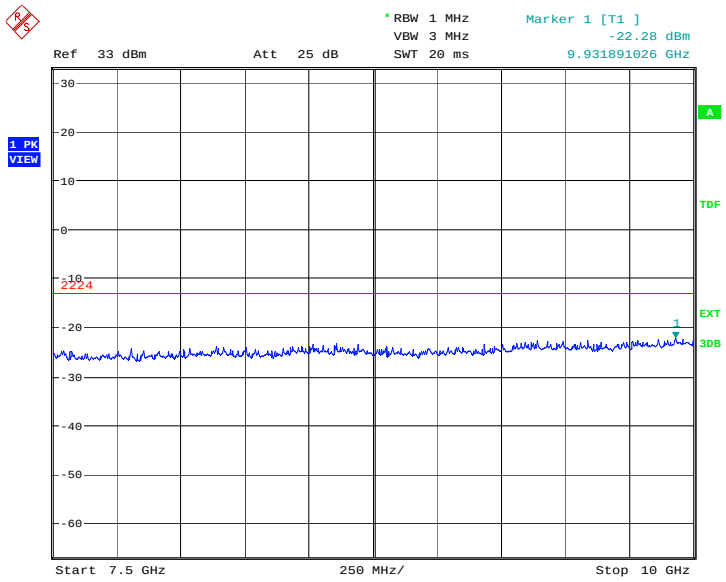
Spurious emission limit –13dBm.



Date: 16.APR.2012 00:40:29

A.8.3.16 Idle mode: 7.5GHz – 10GHz

Spurious emission limit –13dBm.

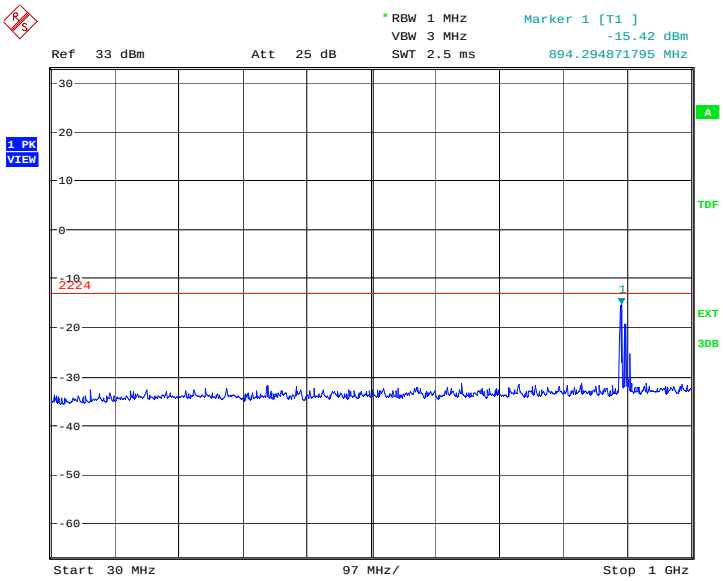


Date: 16.APR.2012 00:40:57

PCS1900

A.8.3.17 Channel 512: 30MHz – 1GHz

Spurious emission limit –13dBm.

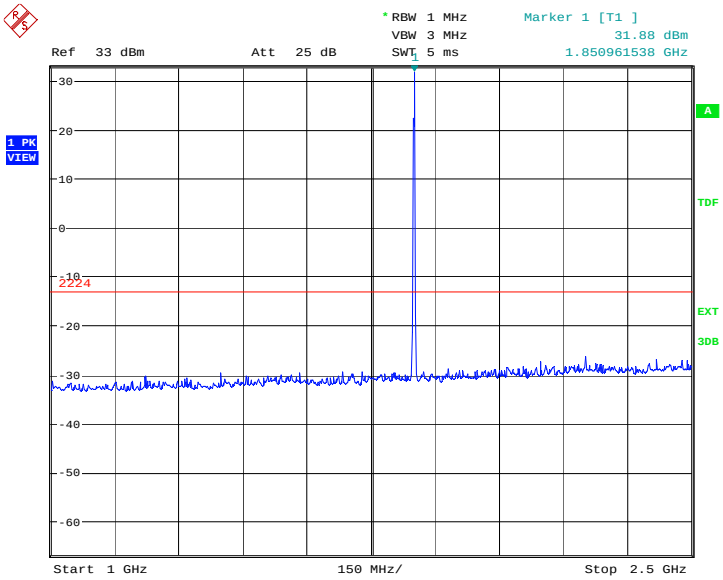


Date: 16.APR.2012 01:05:30

A.8.3.18 Channel 512: 1GHz – 2.5GHz

Spurious emission limit –13dBm.

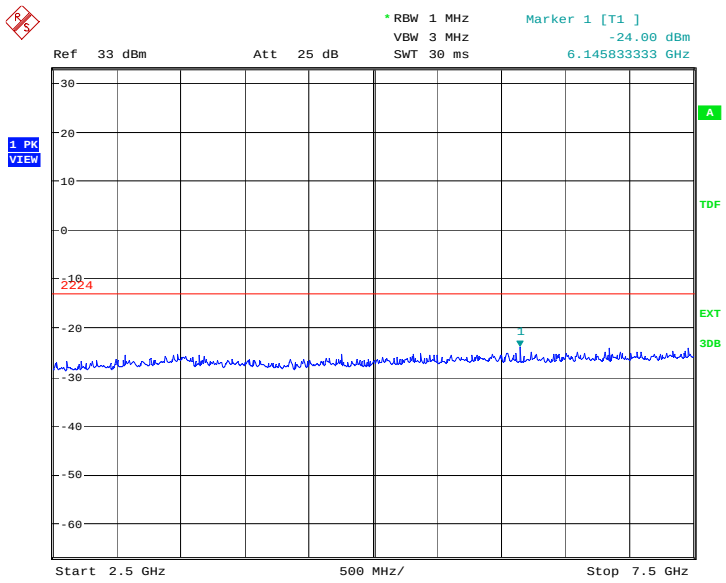
NOTE: peak above the limit line is the carrier frequency.



Date: 16.APR.2012 01:05:59

A.8.3.19 Channel 512: 2.5GHz – 7.5GHz

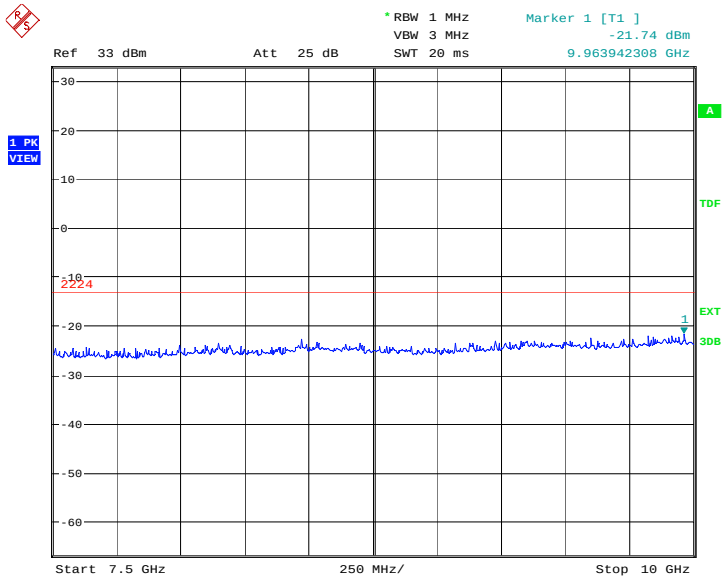
Spurious emission limit –13dBm.



Date: 16.APR.2012 01:06:27

A.8.3.20 Channel 512: 7.5GHz –10GHz

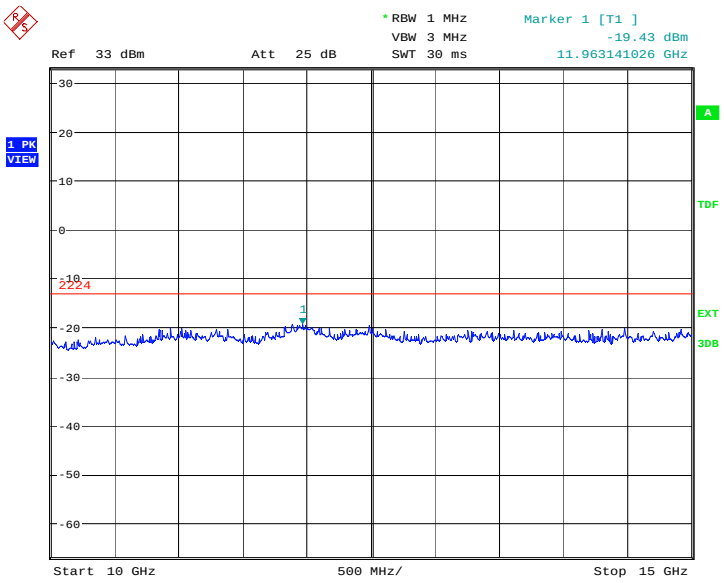
Spurious emission limit –13dBm.



Date: 16.APR.2012 01:06:55

A.8.3.21 Channel 512: 10GHz –15GHz

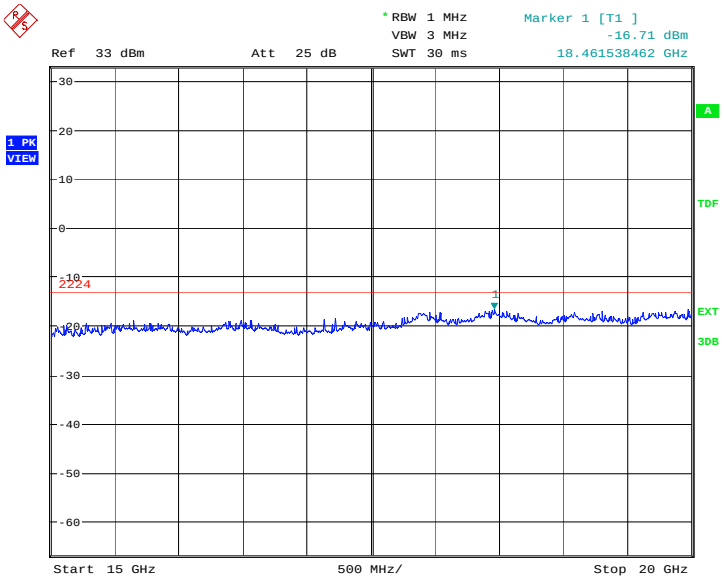
Spurious emission limit –13dBm.



Date: 16.APR.2012 01:07:23

A.8.3.22 Channel 512: 15GHz –20GHz

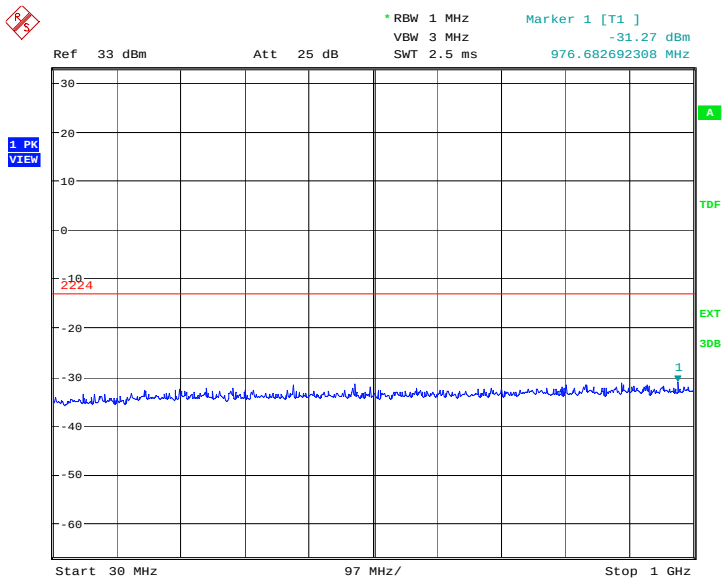
Spurious emission limit –13dBm.



Date: 16.APR.2012 01:07:52

A.8.3.23 Channel 661: 30MHz – 1GHz

Spurious emission limit –13dBm

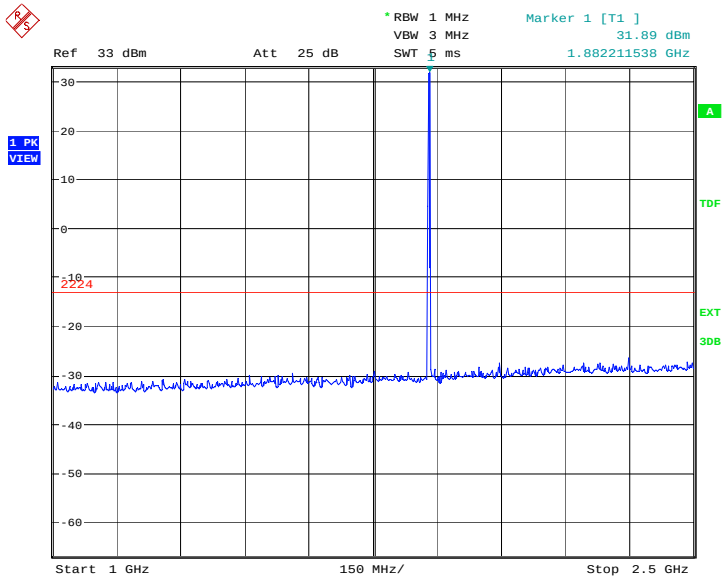


Date: 16.APR.2012 01:08:21

A.8.3.24 Channel 661: 1GHz –2.5GHz

Spurious emission limit –13dBm

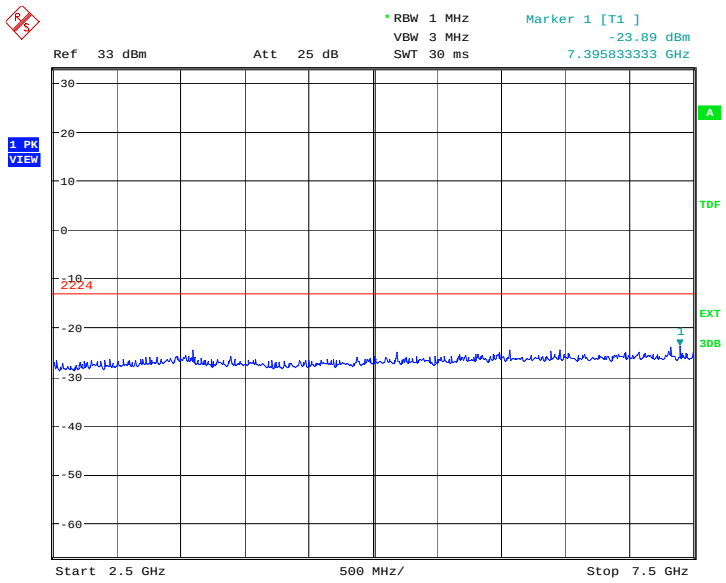
NOTE: peak above the limit line is the carrier frequency.



Date: 16.APR.2012 01:08:49

A.8.3.25 Channel 661: 2.5GHz –7.5GHz

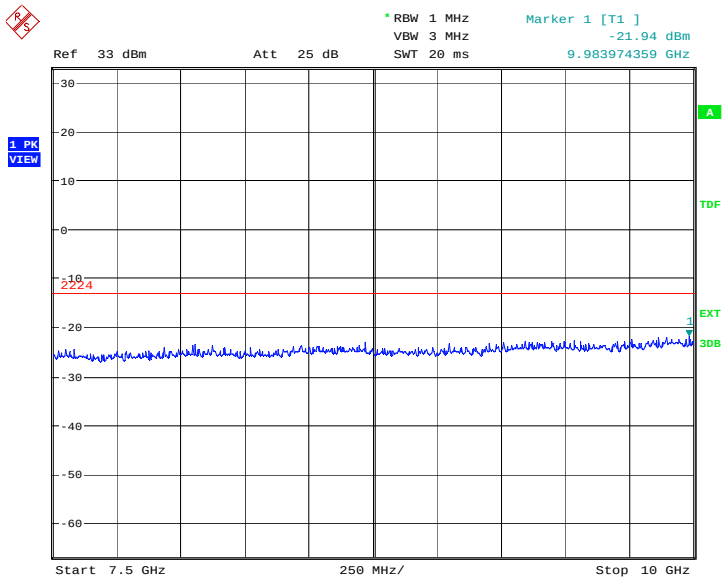
Spurious emission limit –13dBm



Date: 16.APR.2012 01:09:17

A.8.3.26 Channel 661: 7.5GHz –10GHz

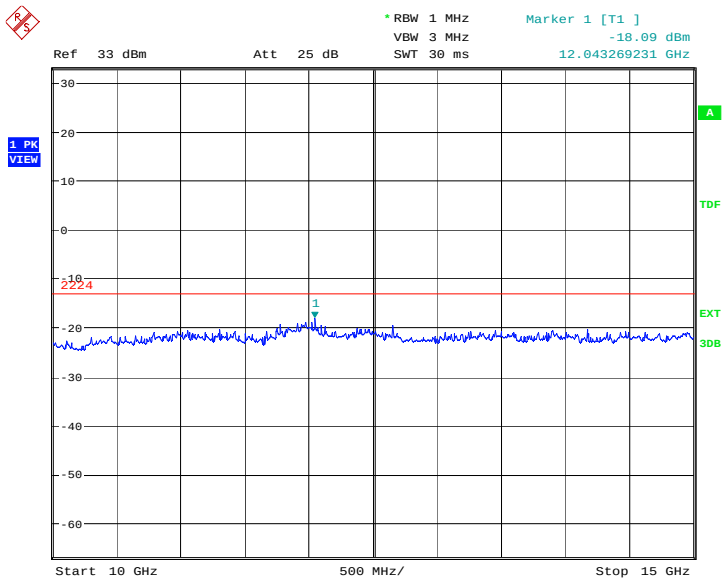
Spurious emission limit –13dBm



Date: 16.APR.2012 01:09:45

A.8.3.27 Channel 661: 10GHz –15GHz

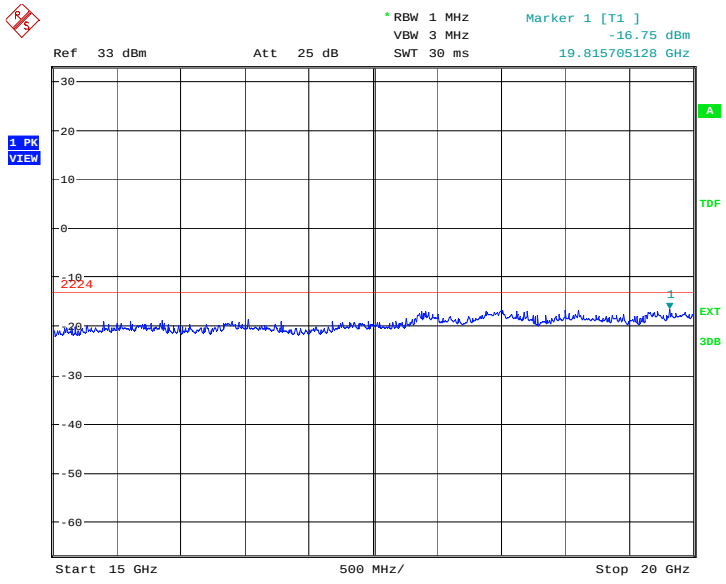
Spurious emission limit –13dBm.



Date: 16.APR.2012 01:10:13

A.8.3.28 Channel 661: 15GHz –20GHz

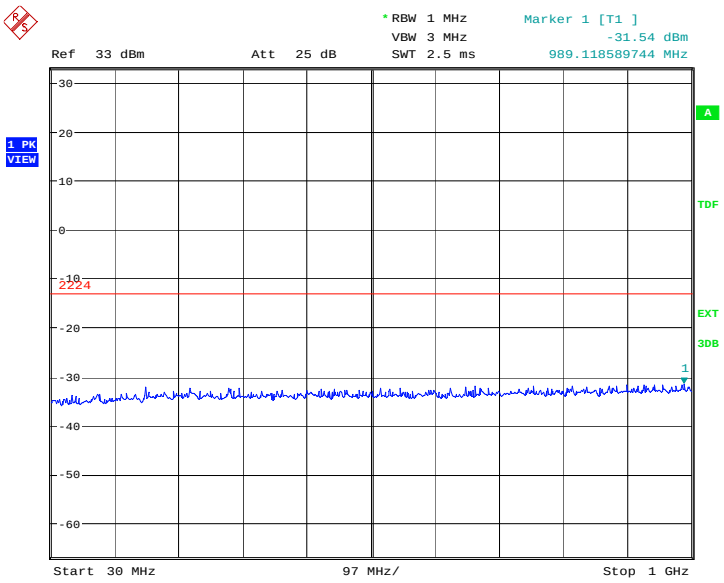
Spurious emission limit –13dBm.



Date: 16.APR.2012 01:10:42

A.8.3.29 Channel 810: 30MHz – 1GHz

Spurious emission limit –13dBm.

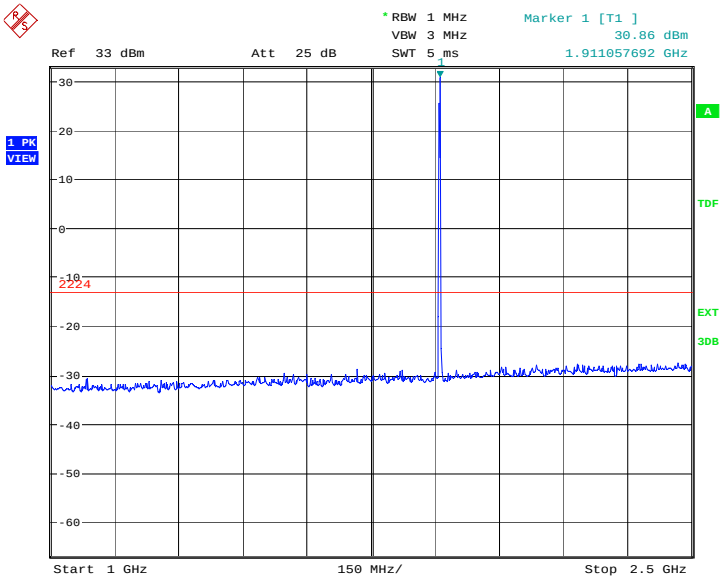


Date: 16.APR.2012 01:11:10

A.8.3.30 Channel 810: 1GHz – 2.5GHz

Spurious emission limit –13dBm.

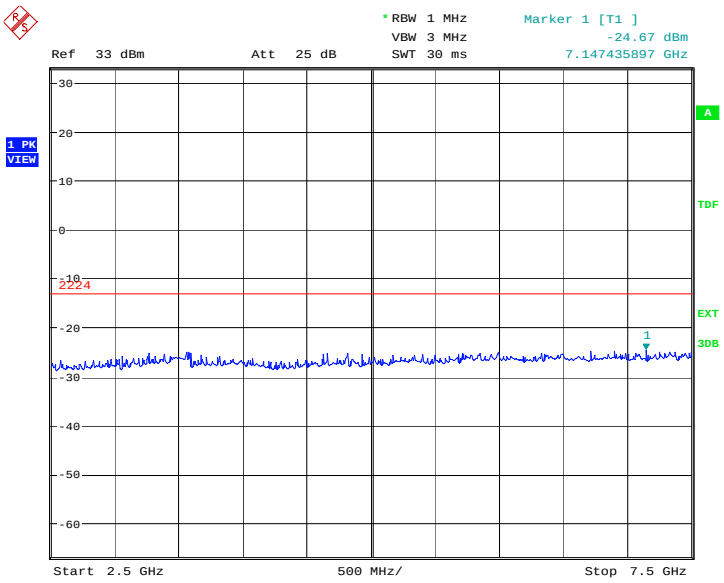
NOTE: peak above the limit line is the carrier frequency.



Date: 16.APR.2012 01:11:39

A.8.3.31 Channel 810:2.5GHz – 7.5GHz

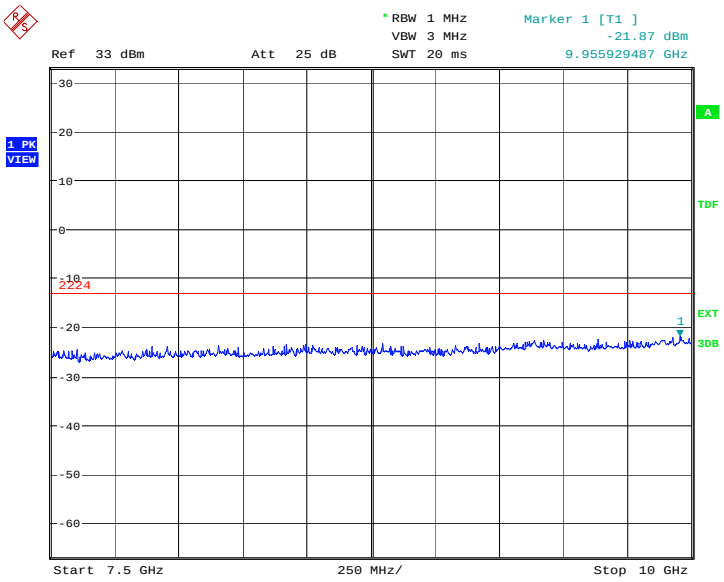
Spurious emission limit –13dBm.



Date: 16.APR.2012 01:12:07

A.8.3.32 Channel 810: 7.5GHz – 10GHz

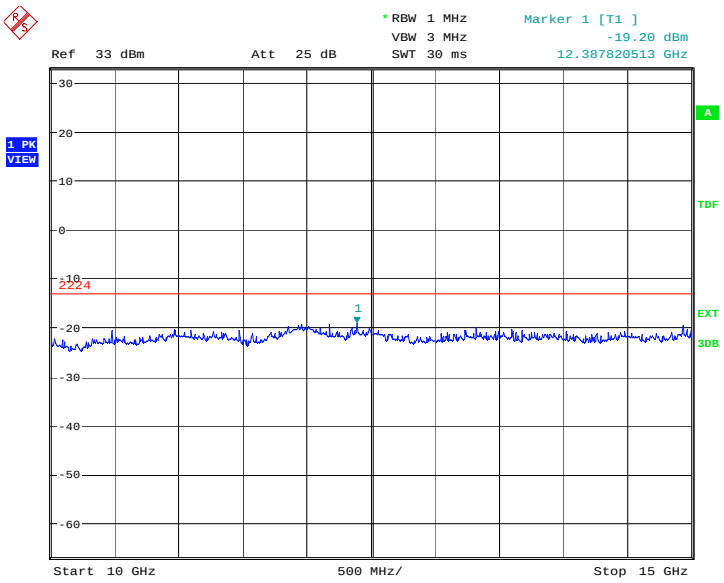
Spurious emission limit –13dBm.



Date: 16.APR.2012 01:12:35

A.8.3.33 Channel 810: 10GHz –15GHz

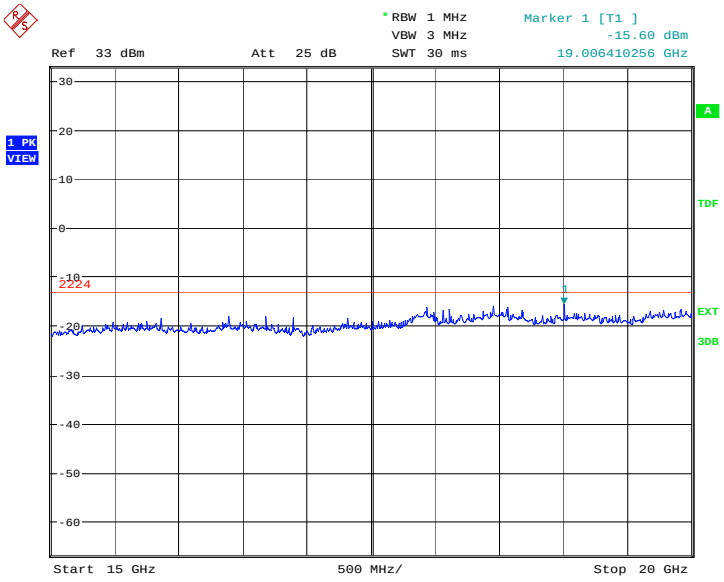
Spurious emission limit –13dBm.



Date: 16.APR.2012 01:13:03

A.8.3.34 Channel 810: 15GHz –20GHz

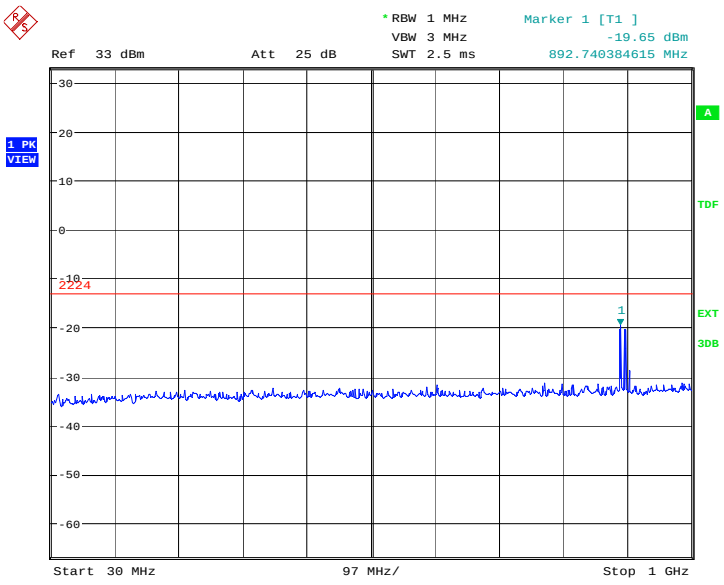
Spurious emission limit –13dBm.



Date: 16.APR.2012 01:13:31

A.8.3.35 Idle mode: 30MHz – 1GHz

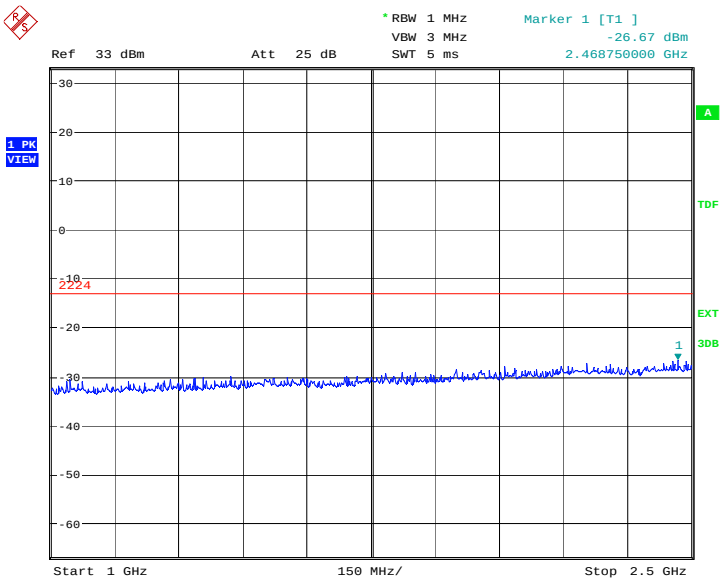
Spurious emission limit –13dBm.



Date: 16.APR.2012 01:14:00

A.8.3.36 Idle mode: 1GHz – 2.5GHz

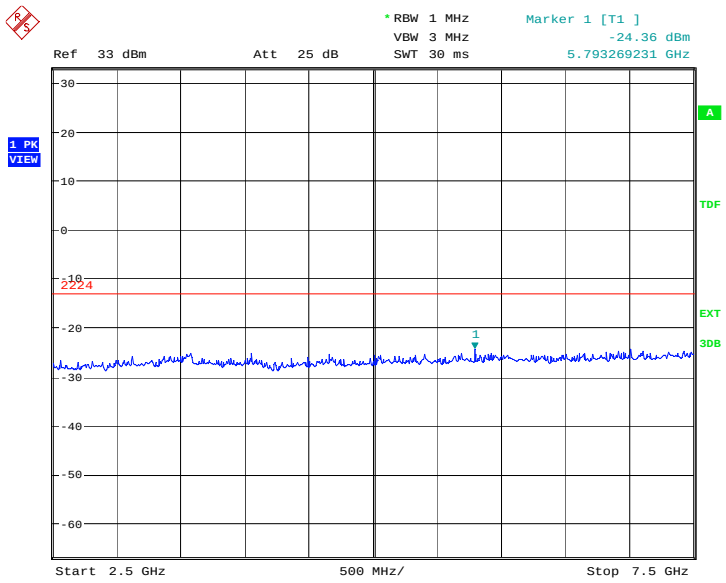
Spurious emission limit –13dBm.



Date: 16.APR.2012 01:14:28

A.8.3.37 Idle mode: 2.5GHz – 7.5GHz

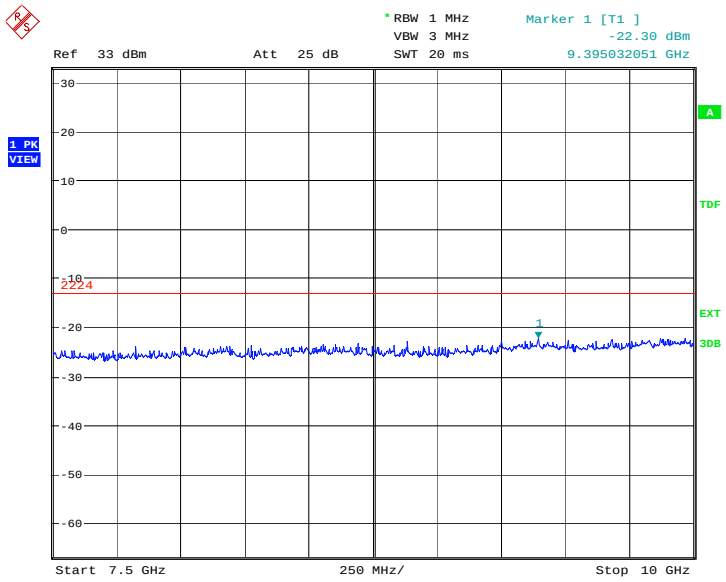
Spurious emission limit –13dBm.



Date: 16.APR.2012 01:14:56

A.8.3.38 Idle mode: 7.5GHz – 10GHz

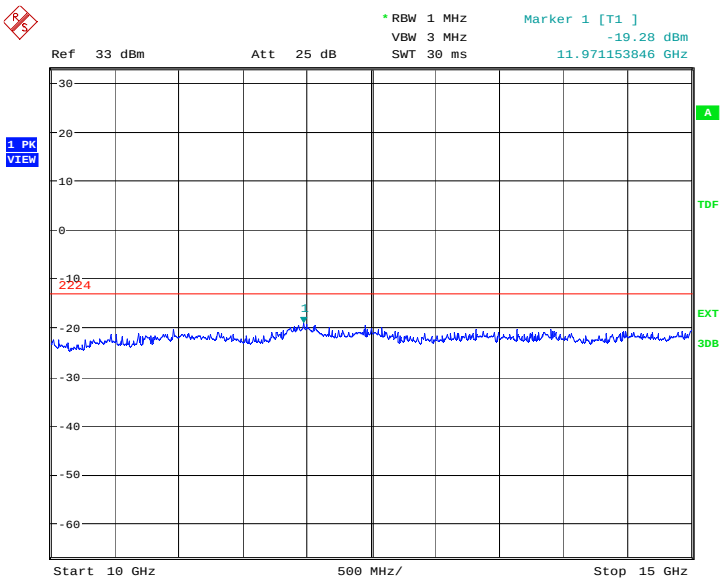
Spurious emission limit –13dBm.



Date: 16.APR.2012 01:15:24

A.8.3.39 Idle mode: 10GHz –15GHz

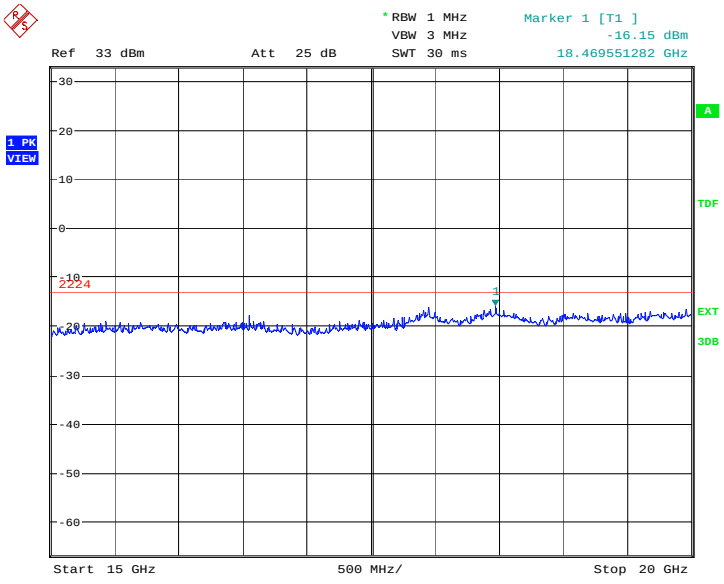
Spurious emission limit –13dBm.



Date: 16.APR.2012 01:15:52

A.8.3.40 IDLE mode: 15GHz –20GHz

Spurious emission limit –13dBm.



Date: 16.APR.2012 01:16:21

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