



# TEST REPORT

No. I14Z45242-GTE01

for

**VSN Technologies Inc.**

**Quad GSM/Dual WCDMA Smart Phone**

**Model Name: V2000**

**Marketing Name: R.40**

**FCC ID: 2AA9WV2000**

**IC No.: 11665A-V2000**

with

**Hardware Version: P3**

**Software Version: TBW972148\_8911\_V007284**

**Issued Date: 2014-03-17**

**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. D-PL-12123-01-01***

***FCC 2.948 Listed: No.733176***

***IC O.A.T.S listed: No.6629B***

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## 1. Test Laboratory

### 1.1. Testing Location

Company Name: TMC Beijing, Telecommunication Metrology Center of MIIT  
Address: No.18A, Kangding Street, Beijing Economical Development Area,  
Beijing, China  
Postal Code: 100176  
Telephone: 00861067857376  
Fax: 00861067857376

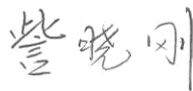
### 1.2. Testing Environment

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

### 1.3. Project data

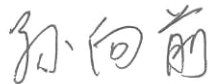
Testing Start Date: 2014-03-04  
Testing End Date: 2014-03-14

### 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: VSN Technologies Inc.  
Address /Post: 1975 E. Sunrise Blvd., #400 Fort Lauderdale, FL  
City: fort lauderdale  
Postal Code: 33323  
Country: United States  
Contact Person: Donghailun  
Contact Email: amit.verma@vsnmobil.com  
Telephone: 9546094912  
Fax: 9543068450

### **2.2. Manufacturer Information**

Company Name: Beijing Benywave Technology Co. Ltd.  
Address /Post: NO.55 Jiachang 2 Road, OPTO-Mechatronics  
Industrial Park, Tongzhou District  
City: Beijing  
Postal Code: 100111  
Country: China  
Telephone: +86-10-58928917  
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### 3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

#### 3.1. About EUT

Description	Quad GSM/Dual WCDMA Smart Phone
Model Name	V2000
Marketing Name	R.40
FCC ID	2AA9WV2000
IC ID	11665A-V2000
Frequency	GSM850; PCS1900; WCDMA Band II; WCDMA Band V
Antenna	Integrated
Output power	31.03dBm maximum EIRP measured for PCS1900
Extreme vol. Limits	3.6VDC 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
UT01a	864513010011689	P3	TBW972148_8911_V007284
UT10a	864513010011580	P3	TBW972148_8911_V007284

\*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	Battery
AE3	Battery
AE4	Travel charger

AE1, AE2, AE3

Model	TBT9605
Manufacturer	REVEL
Capacitance	1700mAh
Nominal voltage	3.7V

AE4

Model	/
Manufacturer	REVEL
Length of cable	/

AE5

Model	/
Manufacturer	REVEL
Length of cable	98cm

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

### **3.4. Normal Accessory setting**

Fully charged battery was used during the test.

### **3.5. General Description**

The Equipment Under Test (EUT) is a model of Quad GSM/Dual WCDMA Smart Phone with integrated antenna. It consists of normal options: lithium battery, charger. Manual and specifications of the EUT were provided to fulfil the test.

## 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	10-1-13 Edition
FCC Part 22	PUBLIC MOBILE SERVICES	10-1-13 Edition
RSS-Gen	RSS-Gen — General Requirements and Information for the Certification of Radiocommunication Equipment	Issue 3, December 2010
RSS-132	Cellular Telephones Employing New Technologies Operating in the Bands 824-849 MHz and 869-894 MHz	Issue 3
RSS-133	2 GHz Personal Communications Services	Issue 6
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
KDB971168 D01	Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems	2011

## 5. LABORATORY ENVIRONMENT

**Control room / conducted chamber** did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. =20 %, Max. = 80 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω

**Fully-anechoic chamber 2** (8.6 meters×6.1 meters×3.85 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 1 Ω
Site voltage standing-wave ratio ( $S_{VSWR}$ )	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 4000 MHz

**Semi-anechoic chamber 2 / Fully-anechoic chamber 3** (10 meters×6.7 meters×6.15 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω
Normalised site attenuation (NSA)	< ±3.5 dB, 3 m distance
Site voltage standing-wave ratio ( $S_{VSWR}$ )	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz



## 6. SUMMARY OF TEST RESULTS

### GSM 850

Items	Test Name	Clause in FCC rules	Clause in IC rules RSS-Gen and RSS-132	Section in this report	Verdict
1	Output Power	§2.1046(a), 22.913(a)	4.4	A.1	P
2	Emission Limit	22.917, 2.1051	4.5	A.2	P
3	CONDUCTED EMISSION	15.107/15.207		A.3	P
4	Frequency Stability	22.235, 2.1055	4.3	A.4	P
5	Occupied Bandwidth	2.1049(h)(i)	4.1/4.6.1	A.5	P
6	Emission Bandwidth	22.917(b)	4.6.1	A.6	P
7	Band Edge Compliance	22.917(b)	4.5	A.7	P
8	Conducted Spurious Emission	22.917, 2.1057	4.5	A.8	P
9	peak-to-average power ratio		5.4	A.9	P

### PCS 1900

Items	Test Name	Clause in FCC rules	Clause in IC rules RSS-Gen and RSS- 133	Section in this report	Verdict
1	Output Power	24.232(b)	6.4	A.1	P
2	Emission Limit	24.238, 2.1051	6.5	A.2	P
3	CONDUCTED EMISSION	15.107/15.207		A.3	P
4	Frequency Stability	24.235, 2.1055	6.3	A.4	P
5	Occupied Bandwidth	2.1049(h)(i)	4.1/4.6.1	A.5	P
6	Emission Bandwidth	24.238(b)	4.6.1	A.6	P
7	Band Edge Compliance	24.238(b)	6.5	A.7	P
8	Conducted Spurious Emission	24.238, 2.1057	6.5	A.8	P
9	peak-to-average power ratio		6.4	A.9	P

### Receiver Radiated Emission

Items	Test Name	Clause in FCC rules	Clause in IC rules		Section in this report	Verdict
			RSS-132	RSS-133		
1	Receiver Radiated Emissions	15.109 2.1053	4.6	6.6	A.9	P

## 7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE
1	Test Receiver	ESCI	100344	R&S	2014-03-28
2	Test Receiver	ESU26	100376	R&S	2014-11-05
3	EMI Antenna	VULB 9163	514	Schwarzbeck	2014-11-10
4	EMI Antenna	3117	00139065	ETS-Lindgren	2014-07-31
5	LISN	ESH2-Z5	829991/012	R&S	2014-04-14
6	Universal Radio Communication Tester	CMU200	102228	R&S	2014-06-23
7	Universal Radio Communication Tester	E5515C	MY48361083	Agilent	2015-02-27
8	Spectrum Analyzer	E4440A	MY48250642	Agilent	2015-02-27
9	EMI Antenna	9117	177	Schwarzbeck	2014-06-29
10	EMI Antenna	VULB 9163	9163 175	Schwarzbeck	2014-07-13
11	EMI Antenna	3117	00119021	ETS-Lindgren	2014-04-19
12	Signal Generator	N5183A	MY49060052	Agilent	2014-03-18
13	Climate chamber	SH-241	92003546	ESPEC	2014-05-11
14	Loop Antenna	HFH2-Z2	829324/007	R&S	2014-12-12

## **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 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**

	Power step	Nominal Peak output power (dBm)
GSM	5	33dBm(2W)
GPRS	3	33dBm(2W)
EGPRS	6	27dBm(0.5W)

#### **Measurement result**

##### **GSM(GMSK)**

Frequency(MHz)	Power Step	Output power(dBm)
824.2	5	31.91
836.6	5	31.89
848.8	5	31.79

##### **GPRS(GMSK, 1Slot)**

Frequency(MHz)	Power Step	Output power(dBm)
824.2	3	31.44
836.6	3	31.71
848.8	3	31.59

**EGPRS(8PSK, 1Slot)**

Frequency(MHz)	Power Step	Output power(dBm)
824.2	6	26.06
836.6	6	26.00
848.8	6	25.98

**PCS1900**

	Power step	Nominal Peak output power (dBm)
GSM	0	30dBm(1W)
GPRS	3	30dBm(1W)
EGPRS	5	26dBm(0.4W)

**Measurement result**
**GSM(GMSK)**

Frequency(MHz)	Power Step	Output power(dBm)
1850.2	0	29.11
1880.0	0	29.19
1909.8	0	29.67

**GPRS(GMSK, 1Slot)**

Frequency(MHz)	Power Step	Output power(dBm)
1850.2	3	29.25
1880.0	3	29.14
1909.8	3	29.65

**EGPRS(8PSK, 1Slot)**

Frequency(MHz)	Power Step	Output power(dBm)
1850.2	5	25.04
1880.0	5	25.28
1909.8	5	25.45

### A.1.3 Radiated

#### A.1.3.1 Description

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

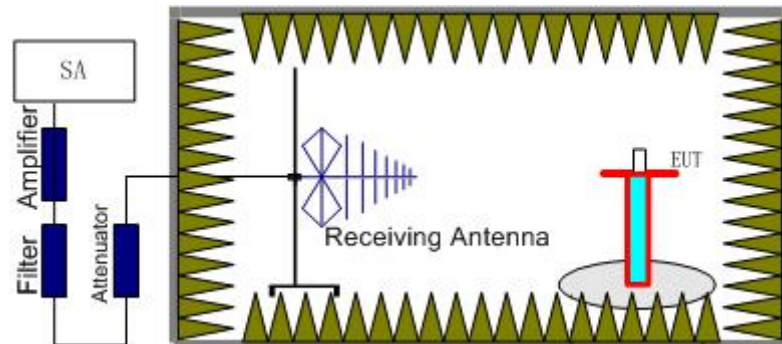
Rule Part 24.232(c) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

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

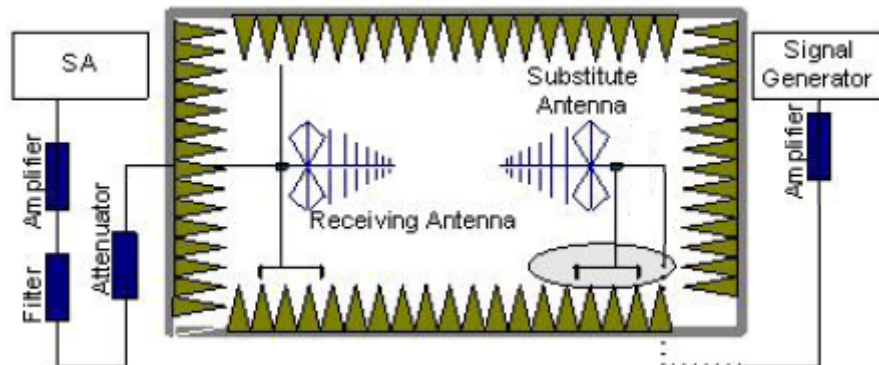
#### A.1.3.2 Method of Measurement

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:

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

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

**GSM 850-ERP 22.913(a)**
**Limits**

	Power Step	Burst Peak ERP (dBm)
GSM	5	≤38.45dBm (7W)
GPRS	3	≤38.45dBm (7W)
EGPRS	6	≤38.45dBm (7W)

**Measurement result**
**GSM**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> Antenna Gain(dB)	Correction (dB)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
824.20	-17.57	2.07	-53.00	0.84	2.15	30.37	38.45	8.08	H
836.60	-18.00	2.08	-53.00	0.90	2.15	29.87	38.45	8.58	H
848.80	-19.77	2.09	-53.00	0.95	2.15	28.04	38.45	10.41	H

**GPRS**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> Antenna Gain(dB)	Correction (dB)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
824.20	-17.71	2.07	-53.00	0.84	2.15	30.23	38.45	8.22	H
836.60	-18.09	2.08	-53.00	0.90	2.15	29.78	38.45	8.67	H
848.80	-19.82	2.09	-53.00	0.95	2.15	27.99	38.45	10.46	H

**EGPRS**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> Antenna Gain(dB)	Correction (dB)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
824.20	-22.55	2.07	-53.00	0.84	2.15	25.39	38.45	13.06	H
836.60	-23.38	2.08	-53.00	0.90	2.15	24.49	38.45	13.96	H
848.80	-25.30	2.09	-53.00	0.95	2.15	22.51	38.45	15.94	H

Frequency: 824.20MHz

Peak ERP(dBm)=P<sub>Mea</sub>(-17.57dBm) - P<sub>cl</sub>(2.07dB) - P<sub>Ag</sub>(-53.00dB) - G<sub>a</sub> (0.84dB)-2.15dB=30.37dBm

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



**PCS1900-EIRP 24.232(c)**
**Limits**

	Power Step	Burst Peak EIRP (dBm)
GSM	0	≤33dBm (2W)
GPRS	3	≤33dBm (2W)
EGPRS	5	≤33dBm (2W)

**Measurement result**
**GSM**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1850.20	-22.63	3.19	-50.00	-4.56	28.74	33.00	4.26	H
1880.00	-20.30	3.11	-50.00	-4.43	31.02	33.00	1.98	H
1909.80	-21.10	3.18	-50.00	-4.30	30.02	33.00	2.98	H

**GPRS**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1850.20	-22.62	3.19	-50.00	-4.56	28.75	33.00	4.25	H
1880.00	-20.29	3.11	-50.00	-4.43	31.03	33.00	1.97	H
1909.80	-21.05	3.18	-50.00	-4.30	30.07	33.00	2.93	H

**EGPRS**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	P <sub>Ag</sub> (dB)	G <sub>a</sub> Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1850.20	-25.12	3.19	-50.00	-4.56	26.25	33.00	6.75	H
1880.00	-22.57	3.11	-50.00	-4.43	28.75	33.00	4.25	H
1909.80	-23.59	3.18	-50.00	-4.30	27.53	33.00	5.47	H

Frequency: 1880.00MHz

Peak EIRP(dBm)= P<sub>Mea</sub>(-20.29dBm) - P<sub>cl</sub>(3.11dB) - P<sub>Ag</sub>(-50.00dB) - G<sub>a</sub> (-4.43dB) =31.03dBm

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

## A.2 EMISSION LIMIT

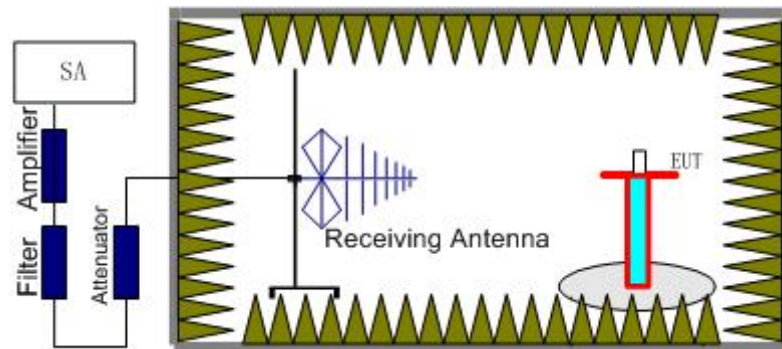
### A.2.1 Measurement Method

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

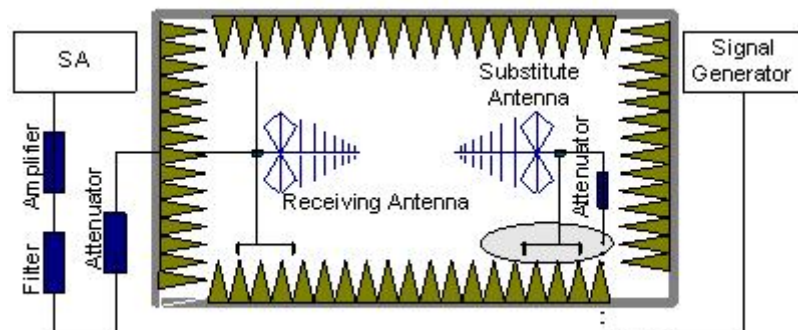
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The resolution bandwidth is set as outlined in Part 24.238 and Part 22.917. The spectrum is scanned with the mobile station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

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

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 PCS1900 band (1850.2 MHz, 1880 MHz and 1909.8 MHz) and GSM850 band (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-10GHz	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 <sub>Mea</sub> (dBm)	Path Loss	Antenna Gain	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Margin(dB)	Polarization
1648.55	-25.69	2.91	-5.45	2.15	-25.30	-13.00	12.30	V
3297.06	-47.05	4.22	-7.41	2.15	-46.01	-13.00	33.01	H
4120.90	-52.55	4.68	-8.57	2.15	-50.81	-13.00	37.81	H
5769.46	-46.45	5.69	-10.11	2.15	-44.18	-13.00	31.18	H
7174.41	-59.48	6.36	-11.20	2.15	-56.79	-13.00	43.79	V
8558.73	-60.16	7.22	-12.25	2.15	-57.28	-13.00	44.28	H

**GSM Mode Channel 190/836.6MHz**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	Path Loss	Antenna Gain	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Margin(dB)	Polarization
1673.05	-25.87	2.97	-5.34	2.15	-25.65	-13.00	12.65	V
3346.12	-45.64	4.23	-7.53	2.15	-44.49	-13.00	31.49	H
4183.01	-46.98	4.68	-8.61	2.15	-45.20	-13.00	32.20	H
5019.53	-54.37	5.16	-9.71	2.15	-51.97	-13.00	38.97	H
6451.74	-59.72	5.85	-10.56	2.15	-57.16	-13.00	44.16	V
8097.71	-58.87	6.93	-11.96	2.15	-55.99	-13.00	42.99	H

**GSM Mode Channel 251/848.8MHz**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	Path Loss	Antenna Gain	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Margin(dB)	Polarization
1697.63	-28.68	2.95	-5.23	2.15	-28.55	-13.00	15.55	V
3395.07	-45.63	4.22	-7.65	2.15	-44.35	-13.00	31.35	V
4244.08	-49.64	4.76	-8.65	2.15	-47.90	-13.00	34.90	H
5506.21	-61.32	5.46	-10.00	2.15	-58.93	-13.00	45.93	V
5970.25	-60.90	5.53	-10.19	2.15	-58.39	-13.00	45.39	V
7137.67	-59.91	6.41	-11.18	2.15	-57.29	-13.00	44.29	H

**GSM Mode Channel 512/1850.2MHz**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Margin(dB)	Polarization
3700.66	-40.00	4.44	-8.14	-36.30	-13.00	23.30	H
5550.62	-53.72	5.46	-10.02	-49.16	-13.00	36.16	V
7400.78	-54.17	6.42	-11.34	-49.25	-13.00	36.25	H
9071.37	-61.22	7.53	-12.60	-56.15	-13.00	43.15	V
9876.44	-59.11	7.54	-12.45	-54.20	-13.00	41.20	H
13960.59	-51.98	9.21	-13.98	-47.21	-13.00	34.21	H

**GSM Mode Channel 661/1880.0MHz**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Margin(dB)	Polarization
3759.86	-41.73	4.52	-8.21	-38.04	-13.00	25.04	H
5640.25	-52.65	5.45	-10.06	-48.04	-13.00	35.04	V
8826.70	-57.83	7.37	-12.46	-52.74	-13.00	39.74	V
11280.36	-53.08	8.55	-12.40	-49.23	-13.00	36.23	V
13356.44	-52.91	9.09	-13.66	-48.34	-13.00	35.34	H
15040.66	-38.60	9.64	-13.49	-34.75	-13.00	21.75	H

**GSM Mode Channel 810/1909.8MHz**

Frequency(MHz)	P <sub>Mea</sub> (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Margin(dB)	Polarization
3819.59	-42.54	4.49	-8.28	-38.75	-13.00	25.75	H
4896.02	-61.53	5.17	-9.51	-57.19	-13.00	44.19	H
5989.73	-60.50	5.61	-10.20	-55.91	-13.00	42.91	V
11458.59	-50.43	8.64	-12.40	-46.67	-13.00	33.67	H
13368.50	-46.50	9.07	-13.67	-41.90	-13.00	28.90	H
15278.76	-37.51	9.98	-13.44	-34.05	-13.00	21.05	V

### **A.3 CONDUCTED EMISSION**

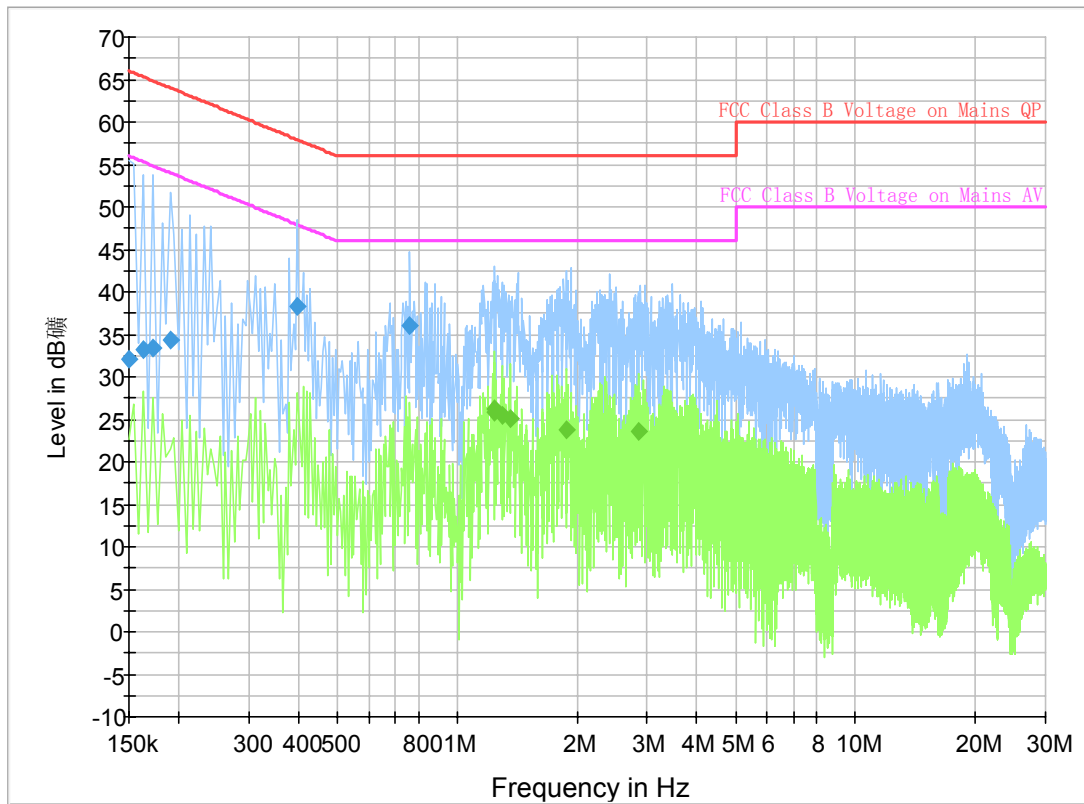
The measurement procedure in ANSI C63.4-1003 is used. Conducted Emission is measured with travel charger.

#### **A.3.1 Limit**

Frequency of Emission (MHz)	Conducted Limit (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 GSM850MHz



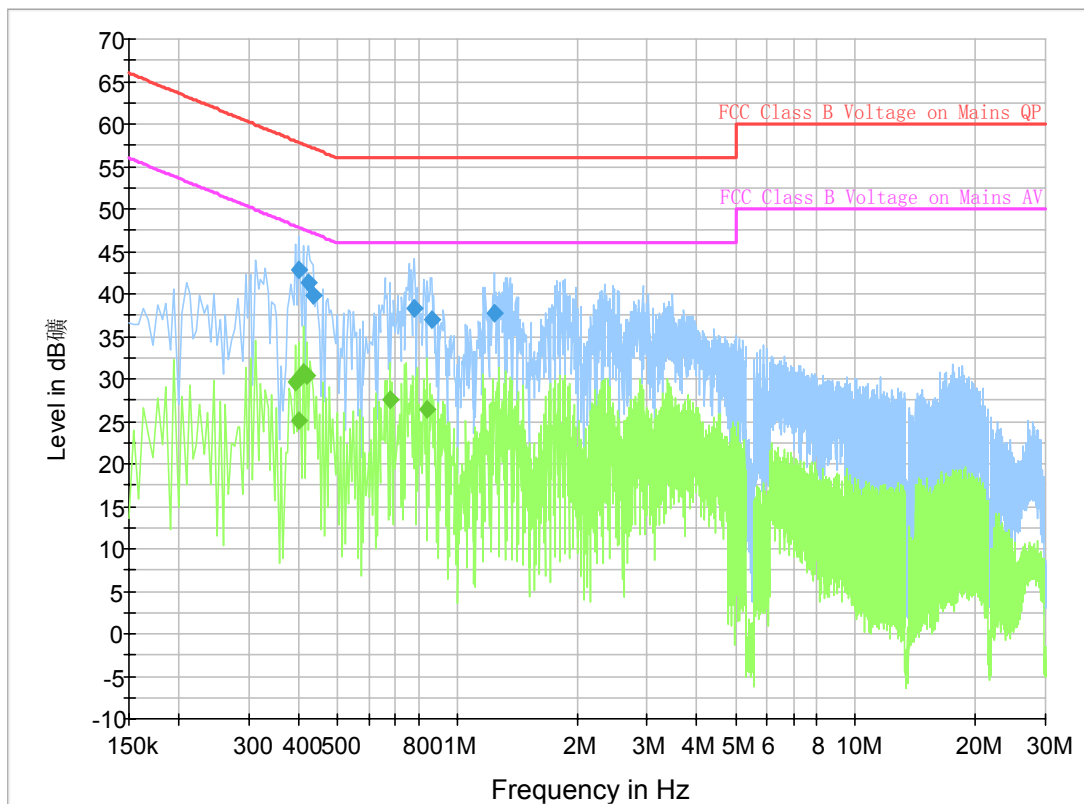
#### Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	32.0	GND	N	9.8	34.0	66.0
0.163500	33.2	GND	N	9.8	32.1	65.3
0.172500	33.4	GND	N	9.8	31.4	64.8
0.190500	34.4	GND	N	9.8	29.6	64.0
0.397500	38.2	GND	N	9.8	19.7	57.9
0.762000	36.0	GND	N	9.8	20.0	56.0

#### Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
1.234500	26.3	GND	L1	9.7	19.7	46.0
1.243500	25.8	GND	L1	9.7	20.2	46.0
1.293000	25.4	GND	L1	9.7	20.6	46.0
1.360500	25.1	GND	L1	9.7	20.9	46.0
1.882500	23.8	GND	L1	9.7	22.2	46.0
2.859000	23.6	GND	L1	9.7	22.4	46.0

## PCS1900MHz



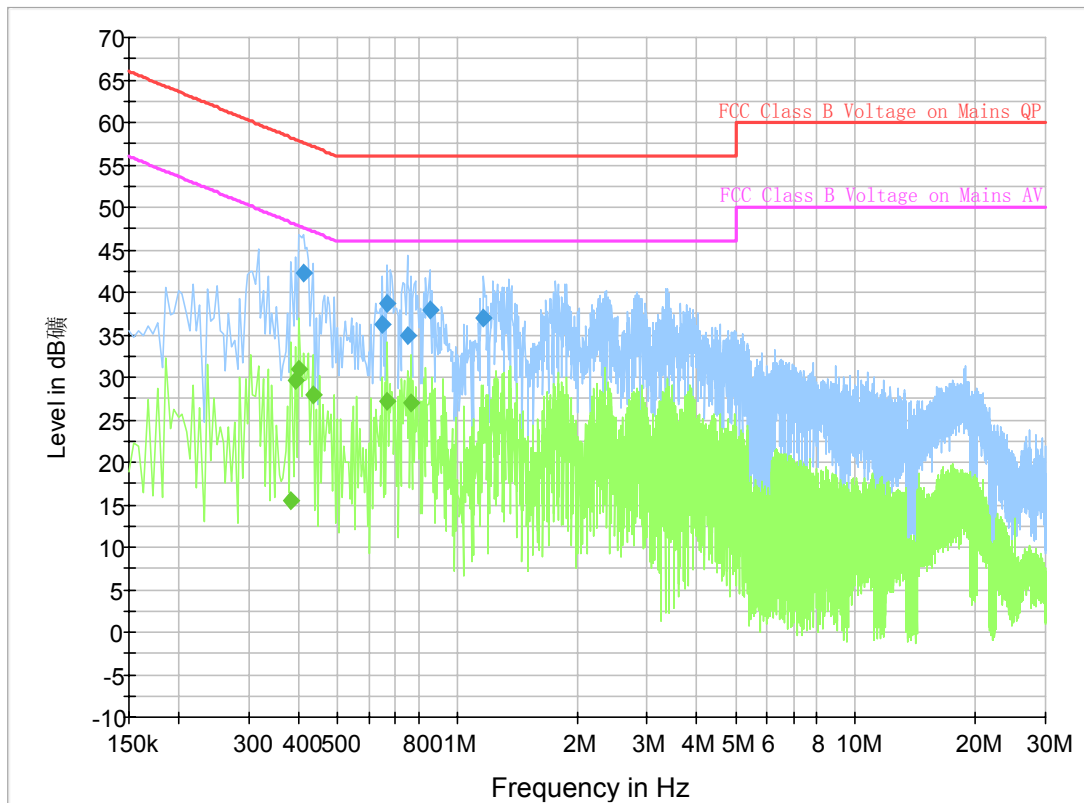
## Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.402000	42.9	GND	L1	9.8	14.9	57.8
0.424500	41.3	GND	L1	9.8	16.1	57.4
0.433500	39.8	GND	L1	9.8	17.4	57.2
0.780000	38.4	GND	L1	9.8	17.6	56.0
0.861000	37.1	GND	L1	9.8	18.9	56.0
1.239000	37.8	GND	L1	9.7	18.2	56.0

## Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.393000	29.6	GND	L1	9.8	18.5	48.0
0.402000	25.1	GND	L1	9.8	22.7	47.8
0.411000	30.7	GND	L1	9.8	16.9	47.6
0.420000	30.4	GND	L1	9.8	17.0	47.4
0.676500	27.6	GND	L1	9.8	18.4	46.0
0.843000	26.4	GND	L1	9.8	19.6	46.0

## MP3



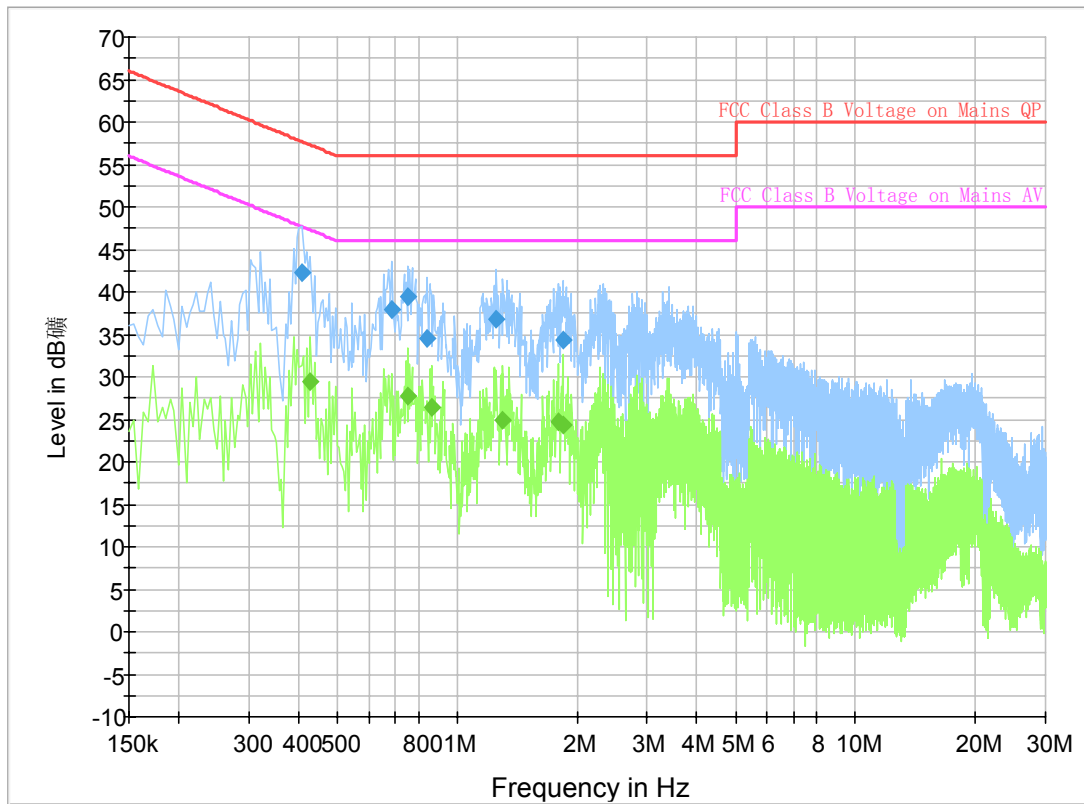
## Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.411000	42.2	GND	L1	9.8	15.5	57.6
0.649500	36.3	GND	L1	9.8	19.7	56.0
0.667500	38.6	GND	L1	9.8	17.4	56.0
0.748500	34.9	GND	N	9.8	21.1	56.0
0.852000	38.0	GND	L1	9.8	18.0	56.0
1.167000	36.9	GND	L1	9.7	19.1	56.0

## Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.384000	15.4	GND	L1	9.8	32.7	48.2
0.393000	29.5	GND	L1	9.8	18.5	48.0
0.402000	31.0	GND	L1	9.8	16.8	47.8
0.433500	27.9	GND	L1	9.8	19.3	47.2
0.667500	27.1	GND	L1	9.8	18.9	46.0
0.766500	27.0	GND	L1	9.8	19.0	46.0

## CAMERA



### Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.406500	42.3	GND	L1	9.8	15.4	57.7
0.685500	37.9	GND	L1	9.8	18.1	56.0
0.753000	39.4	GND	L1	9.8	16.6	56.0
0.843000	34.4	GND	N	9.7	21.6	56.0
1.252500	36.8	GND	L1	9.7	19.2	56.0
1.842000	34.4	GND	L1	9.7	21.6	56.0

### Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.429000	29.5	GND	L1	9.8	17.8	47.3
0.753000	27.8	GND	L1	9.8	18.2	46.0
0.861000	26.4	GND	L1	9.8	19.6	46.0
1.302000	25.0	GND	L1	9.7	21.0	46.0
1.792500	24.7	GND	L1	9.7	21.3	46.0
1.842000	24.4	GND	L1	9.7	21.6	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°C.
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°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 3.6VDC 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)
3.6	16	0.019
3.8	17	0.021
4.2	-15	0.018

##### Frequency Error vs Temperature

temperature(°C)	Frequency error(Hz)	Frequency error(ppm)
-30	15	0.018
-20	-23	0.027
-10	15	0.018
0	18	0.021
10	24	0.029
20	20	0.024
30	17	0.020
40	20	0.023
50	16	0.019

##### PCS 1900

##### Frequency Error vs Voltage

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.6	24	0.013
3.8	26	0.014
4.2	25	0.013

##### Frequency Error vs Temperature

temperature(°C)	Frequency error(Hz)	Frequency error(ppm)
-30	33	0.018
-20	34	0.018
-10	39	0.021
0	33	0.017
10	28	0.015
20	40	0.021
30	33	0.018
40	37	0.020
50	45	0.024

## A.5 OCCUPIED BANDWIDTH

### A.5.1 Occupied Bandwidth Results

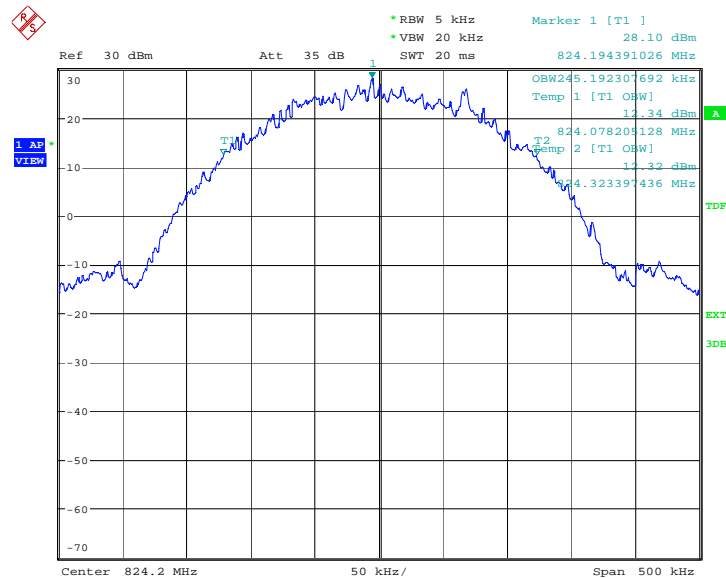
Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of PCS1900 band and GSM850 band. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

#### GSM 850(99% BW)

Frequency(MHz)	Occupied Bandwidth (99% BW)( kHz)
824.2	245.192
836.6	248.397
848.8	245.994

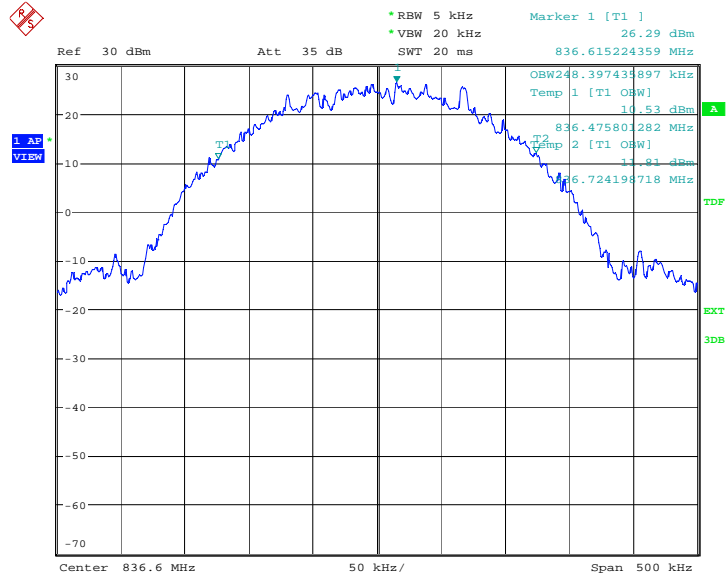
#### GSM 850

#### Channel 128-Occupied Bandwidth (99% BW)



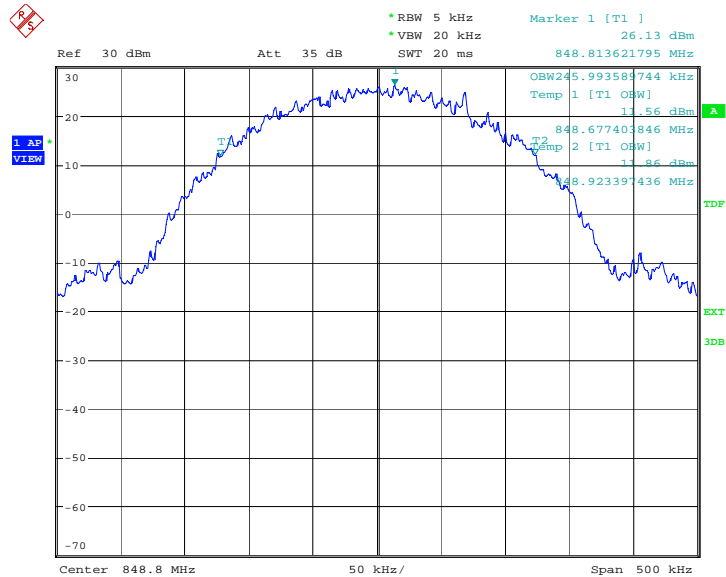
Date: 4.MAR.2014 13:42:37

### Channel 190-Occupied Bandwidth (99% BW)



Date: 4.MAR.2014 13:43:09

### Channel 251-Occupied Bandwidth (99% BW)



Date: 4.MAR.2014 13:43:42

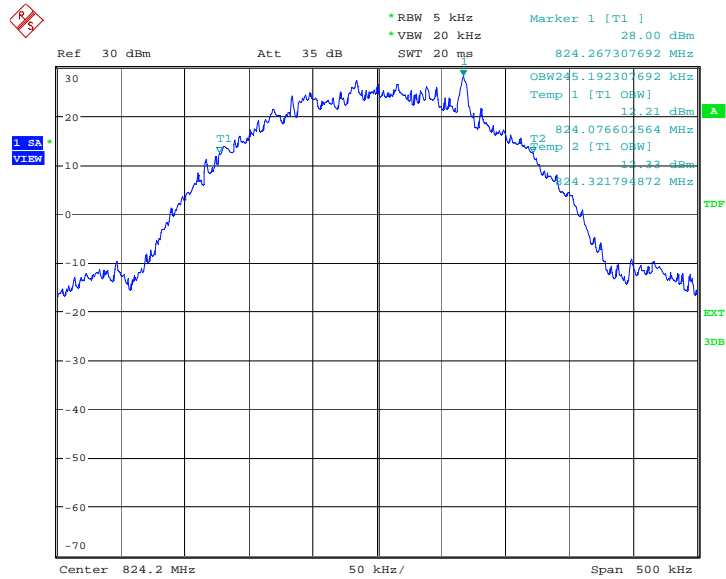


### GSM 850(99% BW)-IC

Frequency(MHz)	Occupied Bandwidth (99% BW)( kHz)
824.2	245.192
836.6	242.788
848.8	244.391

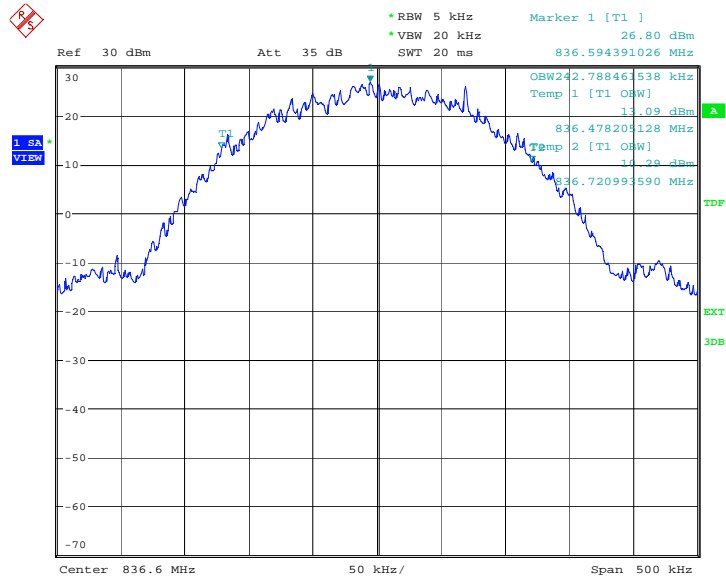
### GSM 850

#### Channel 128-Occupied Bandwidth (99% BW)



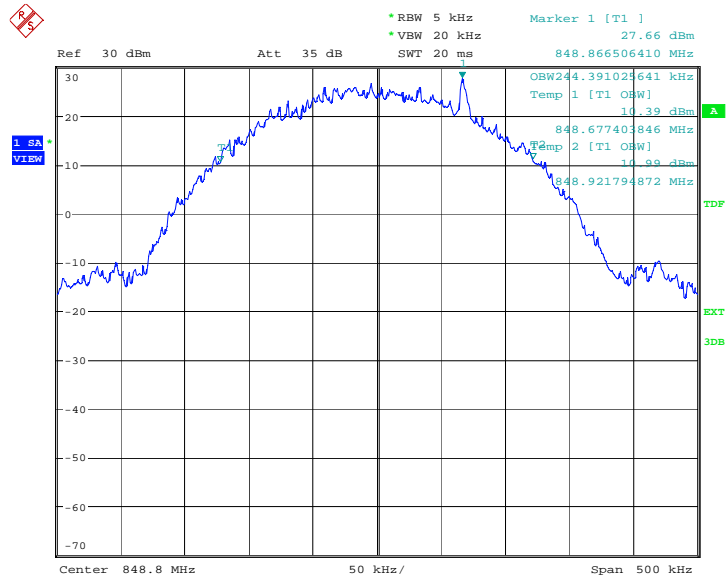
Date: 4.MAR.2014 13:46:22

### Channel 190-Occupied Bandwidth (99% BW)



Date: 4.MAR.2014 13:46:54

### Channel 251-Occupied Bandwidth (99% BW)



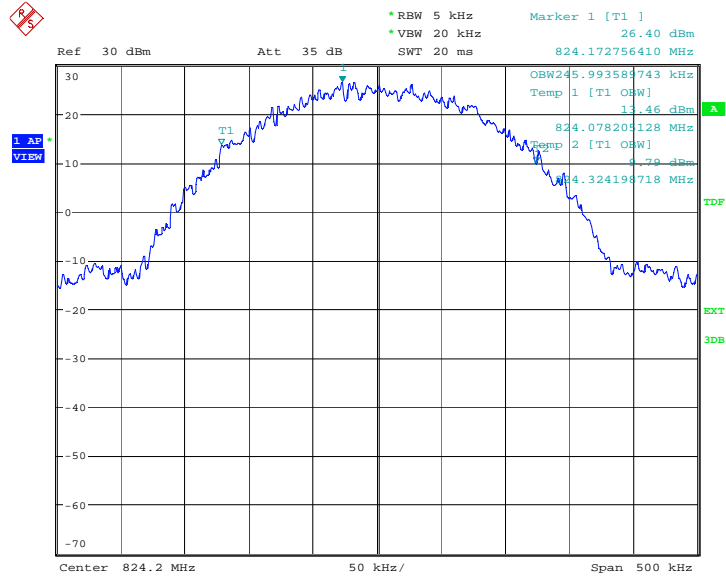
Date: 4.MAR.2014 13:47:26

### GPRS 850(99% BW)

Frequency(MHz)	Occupied Bandwidth (99% BW)( kHz)
824.2	245.994
836.6	242.788
848.8	243.590

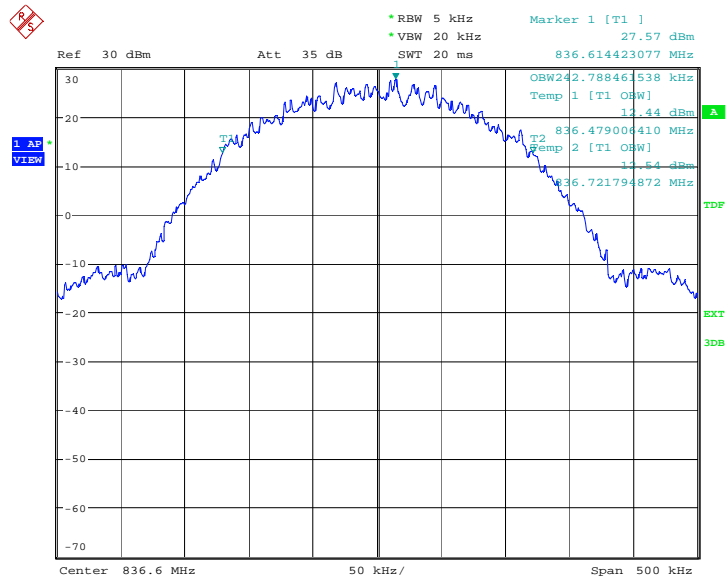
### GPRS 850

#### Channel 128-Occupied Bandwidth (99% BW)



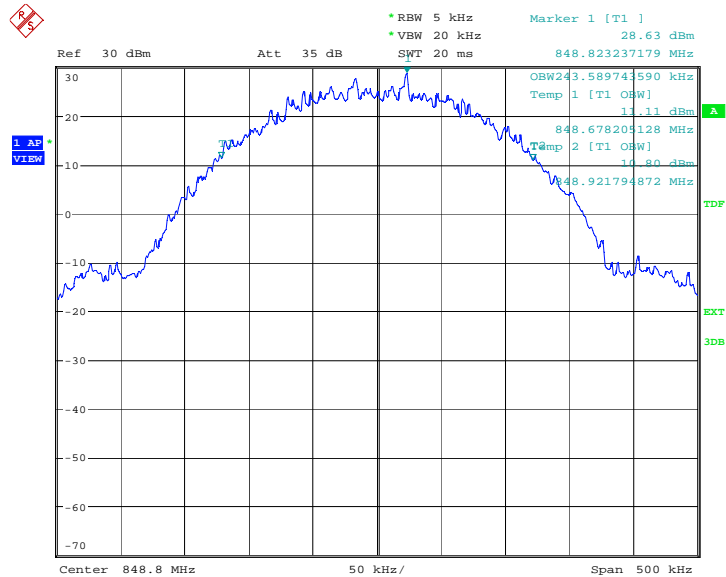
Date: 4.MAR.2014 14:17:23

### Channel 190-Occupied Bandwidth (99% BW)



Date: 4.MAR.2014 14:17:55

### Channel 251-Occupied Bandwidth (99% BW)



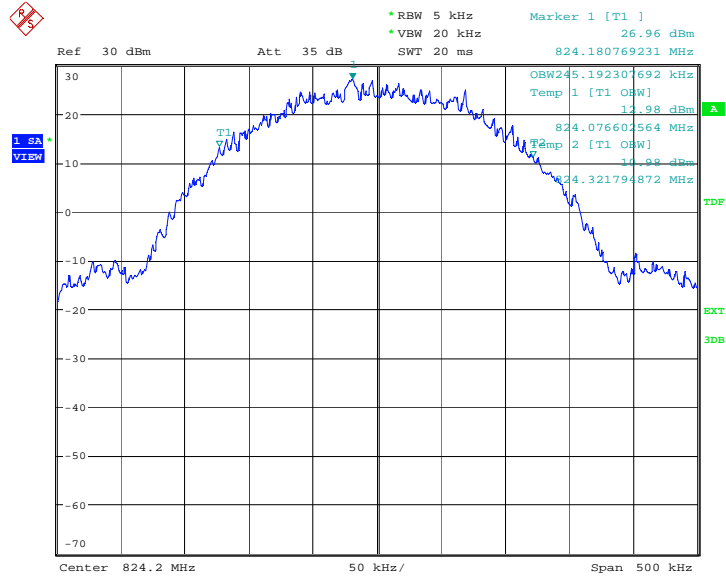
Date: 4.MAR.2014 14:18:27

### GPRS 850(99% BW)-IC

Frequency(MHz)	Occupied Bandwidth (99% BW)( kHz)
824.2	245.192
836.6	245.192
848.8	244.391

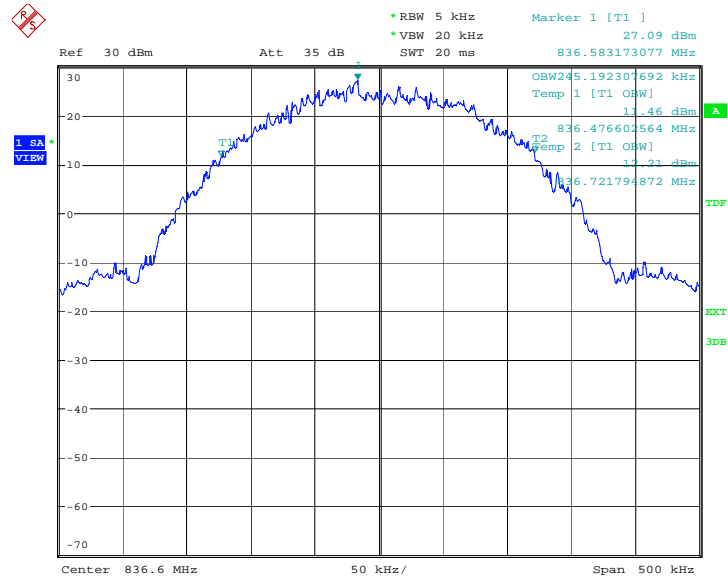
### GPRS 850

#### Channel 128-Occupied Bandwidth (99% BW)



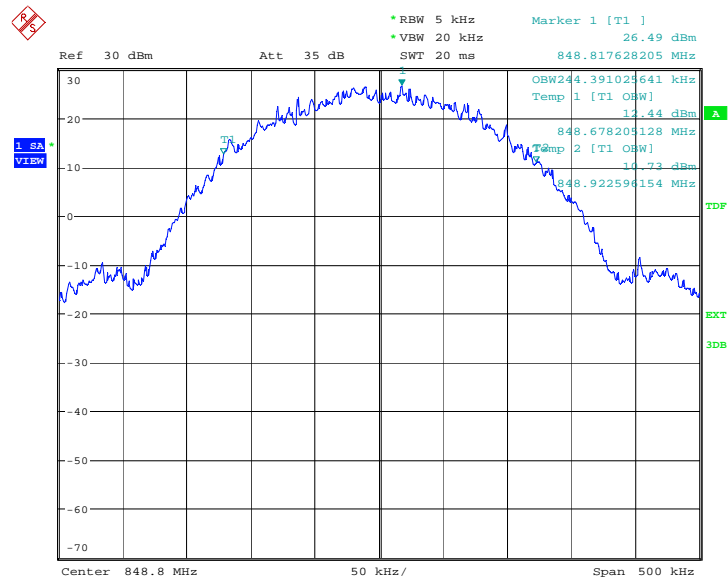
Date: 4.MAR.2014 14:21:07

### Channel 190-Occupied Bandwidth (99% BW)



Date: 4.MAR.2014 14:21:39

### Channel 251-Occupied Bandwidth (99% BW)



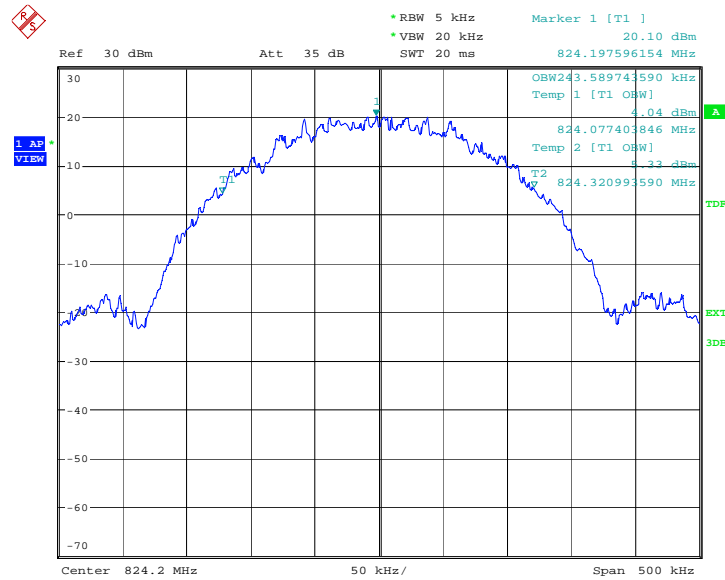
Date: 4.MAR.2014 14:22:11

### EGPRS 850-8PSK(99% BW)

Frequency(MHz)	Occupied Bandwidth (99% BW)( kHz)
824.2	243.590
836.6	242.788
848.8	241.987

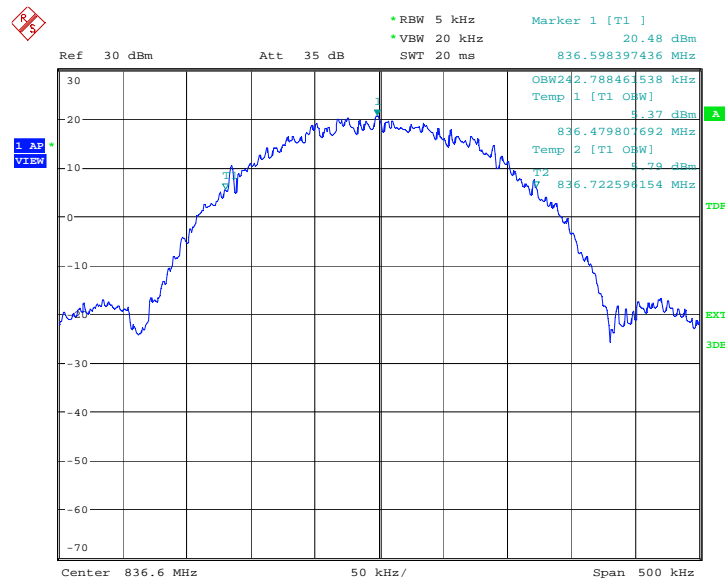
### EGPRS 850-8PSK

#### Channel 128-Occupied Bandwidth (99% BW)



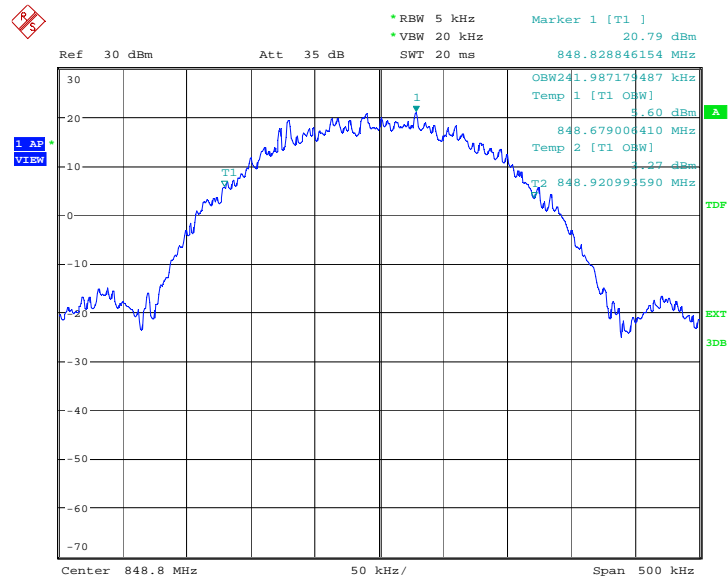
Date: 4.MAR.2014 14:41:59

#### Channel 190-Occupied Bandwidth (99% BW)



Date: 4.MAR.2014 14:42:31

### Channel 251-Occupied Bandwidth (99% BW)



Date: 4.MAR.2014 14:43:03

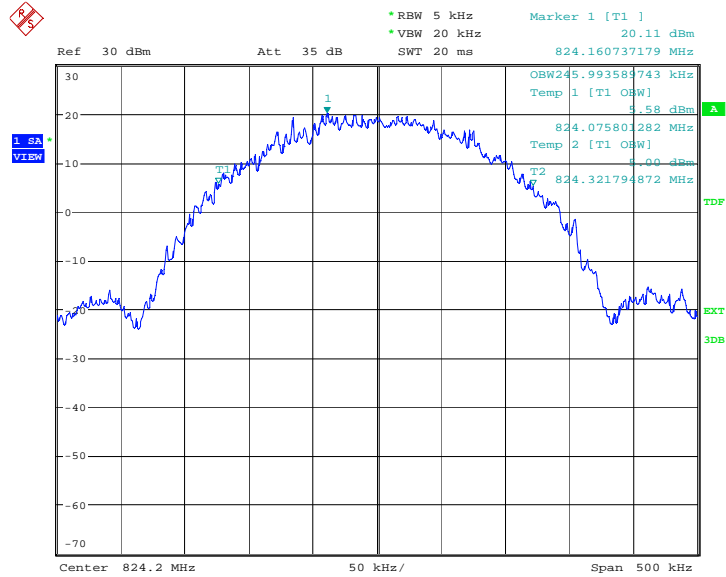


### EGPRS 850-8PSK (99% BW)-IC

Frequency(MHz)	Occupied Bandwidth (99% BW)( kHz)
824.2	245.994
836.6	245.994
848.8	245.994

### EGPRS 850-8PSK

#### Channel 128-Occupied Bandwidth (99% BW)



Date: 4.MAR.2014 14:45:43

• RBW 5 kHz  
 • VBW 20 kHz  
 SWT 20 ms

Ref 30 dBm  
 Att 35 dB

Marker 1 [T1]  
 836.647275641 MHz  
 20.00 dBm

OBW245.993589744 kHz  
 Temp 1 [T1 OBW]  
 5.28 dBm

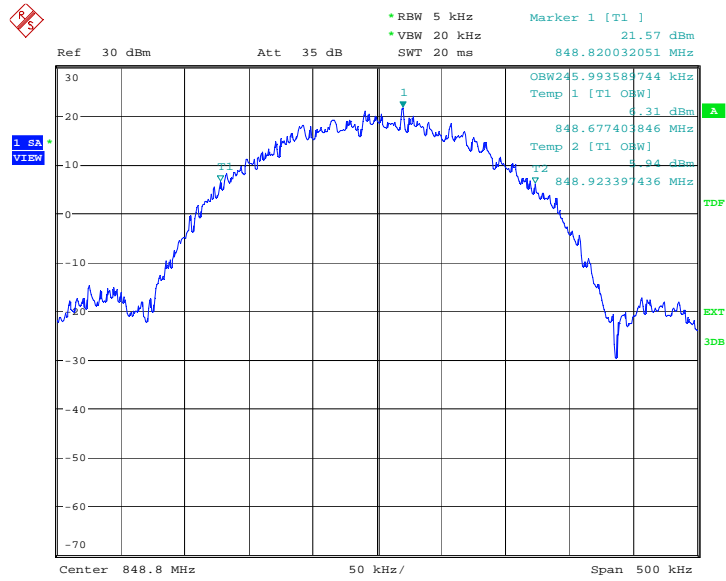
836.476602564 MHz  
 Temp 2 [T1 OBW]  
 4.76 dBm

836.722596154 MHz

Center 836.6 MHz  
 50 kHz/  
 Span 500 kHz

Date: 4.MAR.2014 14:46:15

### Channel 251-Occupied Bandwidth (99% BW)



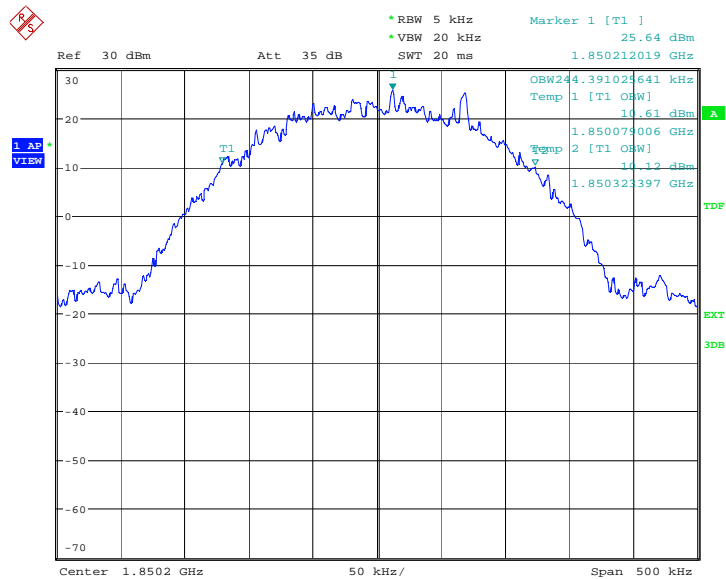
Date: 4.MAR.2014 14:46:47

### PCS 1900(99% BW)

Frequency(MHz)	Occupied Bandwidth (99% BW)( kHz)
1850.2	244.391
1880.0	245.192
1909.8	245.994

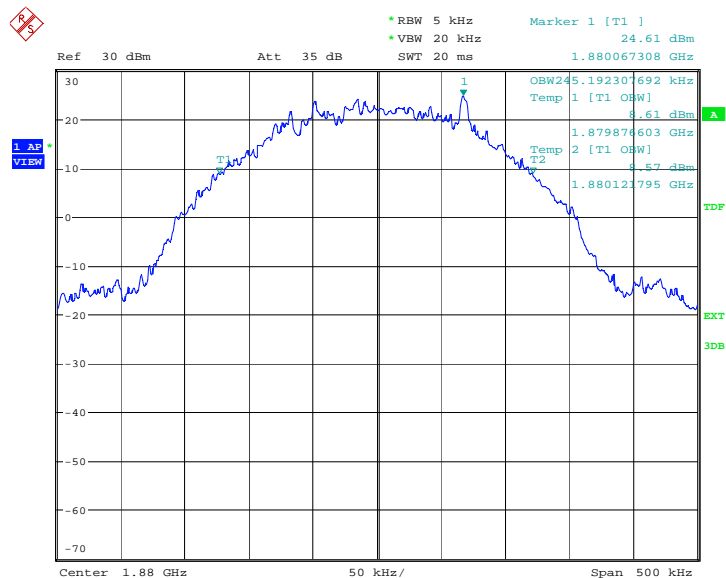
### PCS 1900

#### Channel 512-Occupied Bandwidth (99% BW)



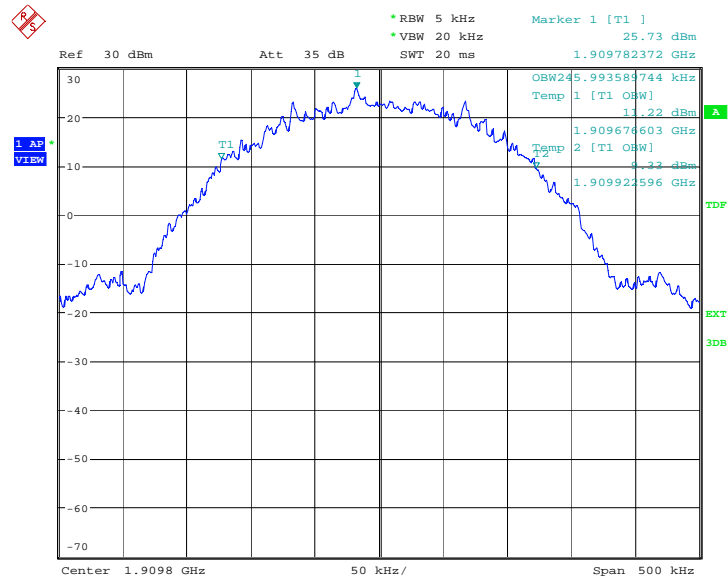
Date: 4.MAR.2014 13:58:58

#### Channel 661-Occupied Bandwidth (99% BW)



Date: 4.MAR.2014 13:59:30

### Channel 810-Occupied Bandwidth (99% BW)



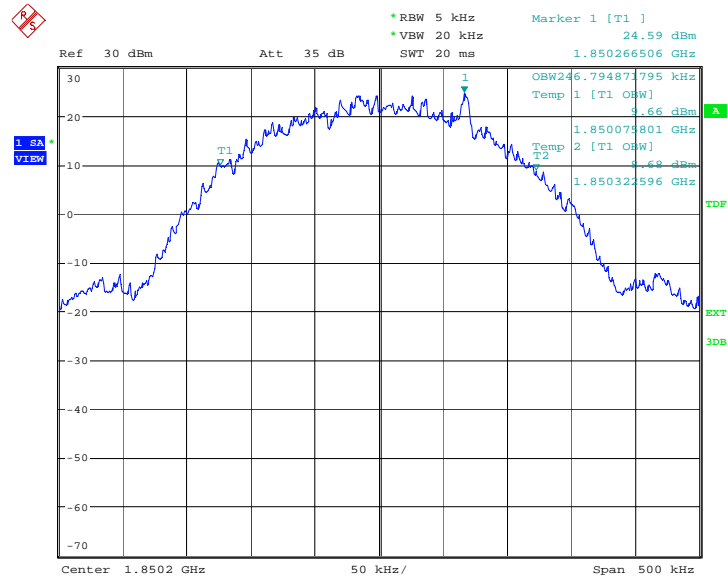
Date: 4.MAR.2014 14:00:02

### PCS 1900(99% BW)-IC

Frequency(MHz)	Occupied Bandwidth (99% BW)( kHz)
1850.2	246.795
1880.0	244.391
1909.8	245.994

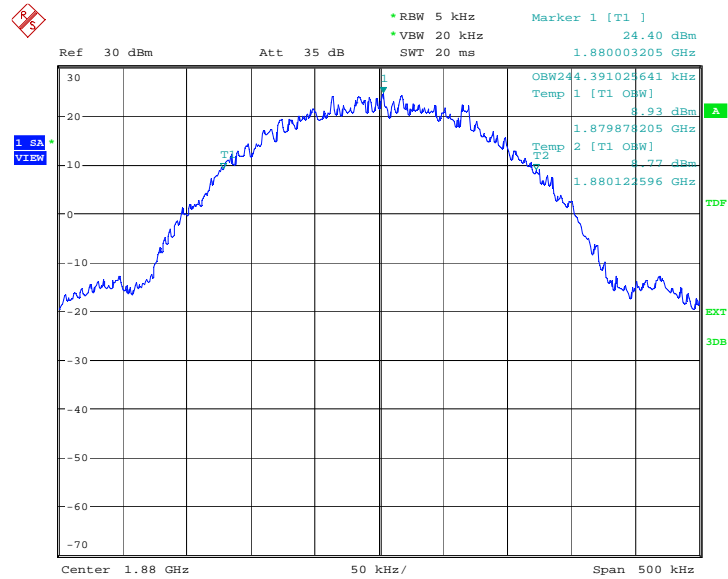
### PCS 1900

#### Channel 512-Occupied Bandwidth (99% BW)



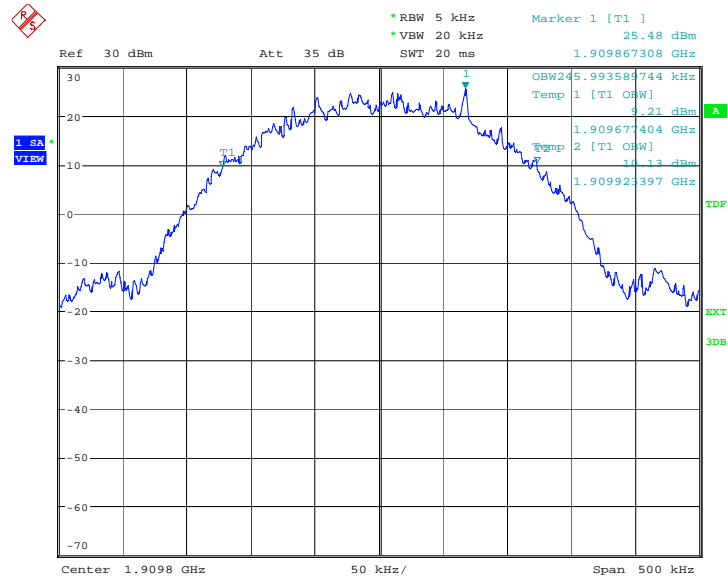
Date: 4.MAR.2014 14:02:42

### Channel 661-Occupied Bandwidth (99% BW)



Date: 4.MAR.2014 14:03:14

### Channel 810-Occupied Bandwidth (99% BW)



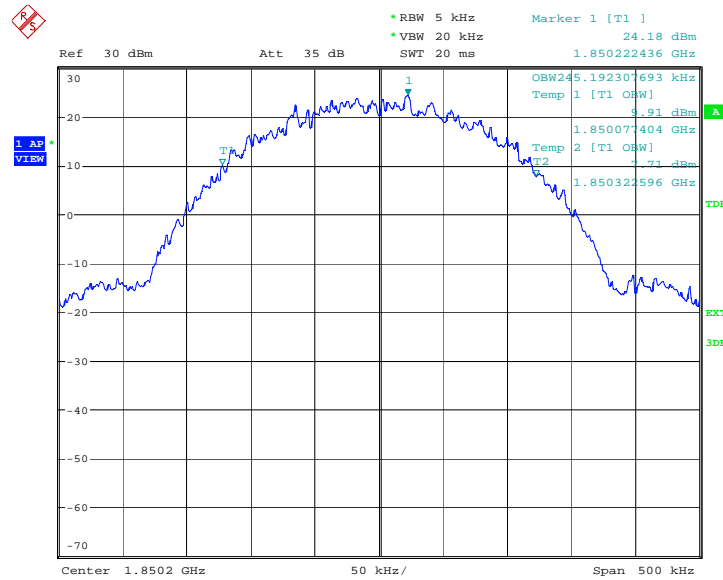
Date: 4.MAR.2014 14:03:46

### GPRS 1900(99% BW)

Frequency(MHz)	Occupied Bandwidth (99% BW)( kHz)
1850.2	245.192
1880.0	244.391
1909.8	244.391

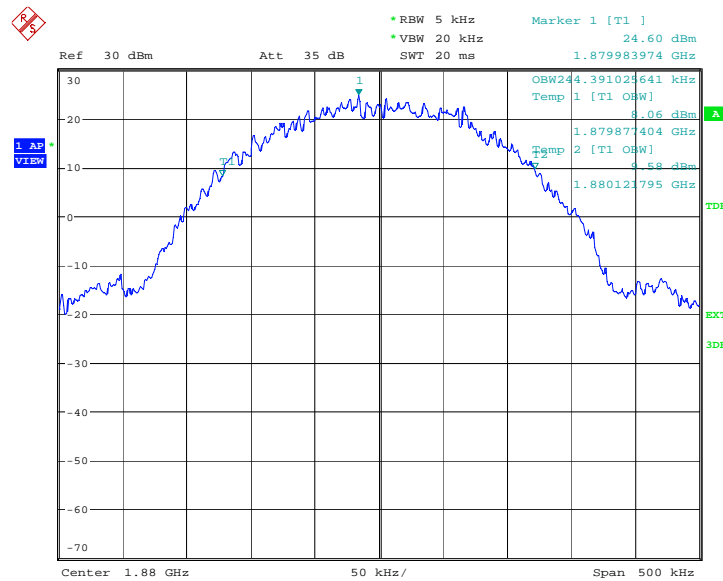
### GPRS 1900

#### Channel 512-Occupied Bandwidth 99% BW)



Date: 4.MAR.2014 14:31:51

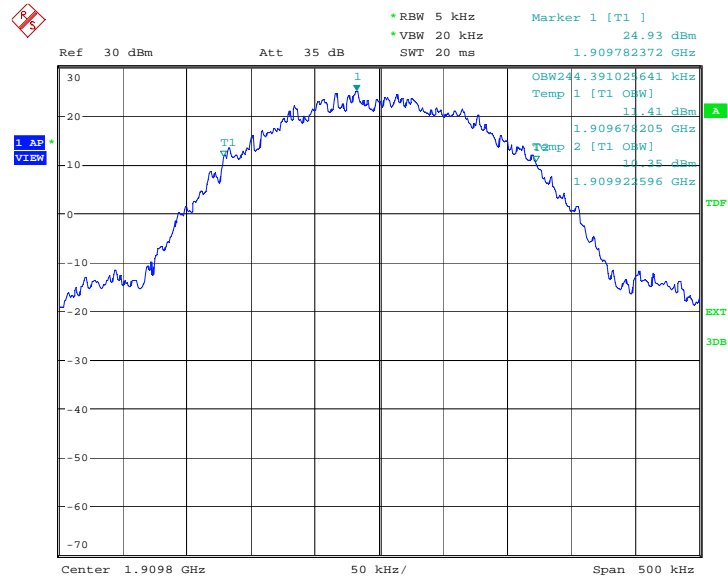
#### Channel 661-Occupied Bandwidth (99% BW)



Date: 4.MAR.2014 14:32:23



### Channel 810-Occupied Bandwidth (99% BW)



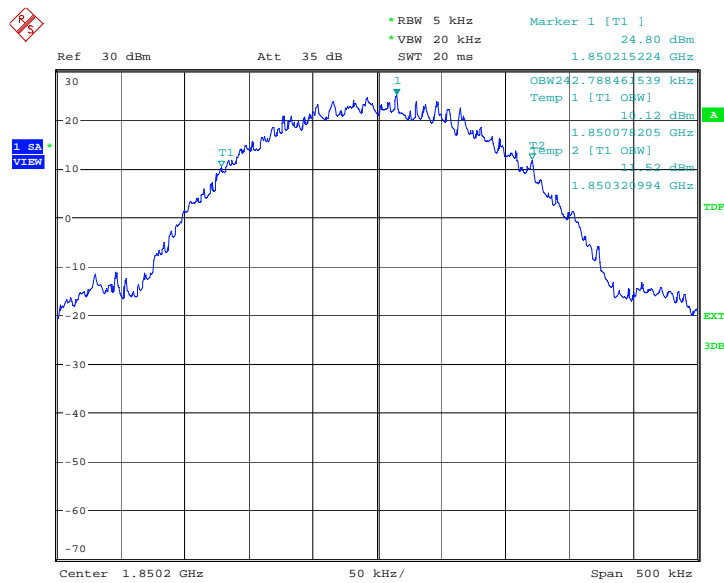
Date: 4.MAR.2014 14:32:55

### GPRS 1900(99% BW)-IC

Frequency(MHz)	Occupied Bandwidth (99% BW)( kHz)
1850.2	242.788
1880.0	243.590
1909.8	245.994

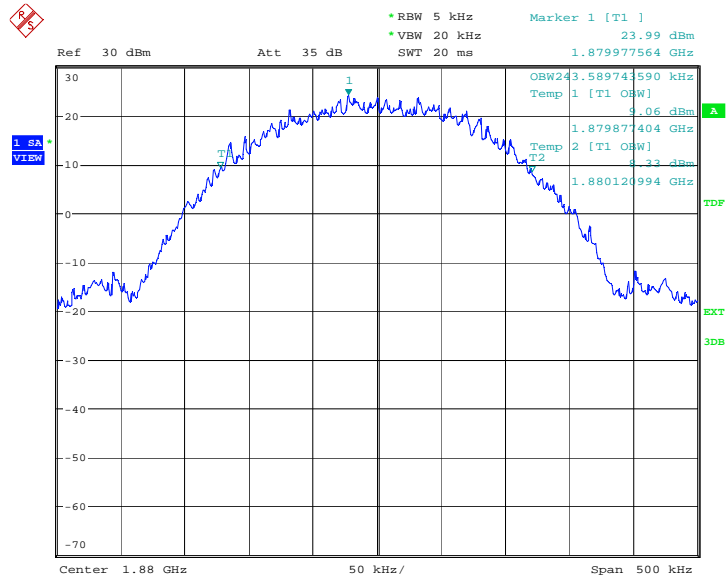
### GPRS 1900

#### Channel 512-Occupied Bandwidth 99% BW)



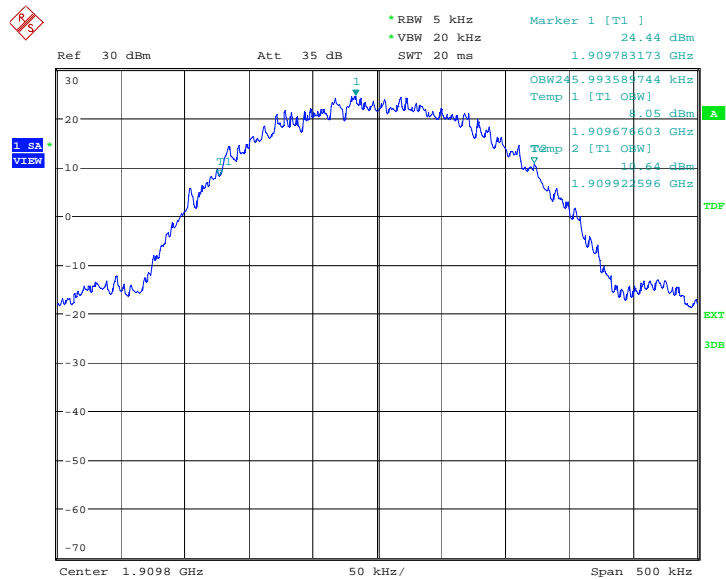
Date: 4.MAR.2014 14:35:35

### Channel 661-Occupied Bandwidth (99% BW)



Date: 4.MAR.2014 14:36:07

### Channel 810-Occupied Bandwidth (99% BW)



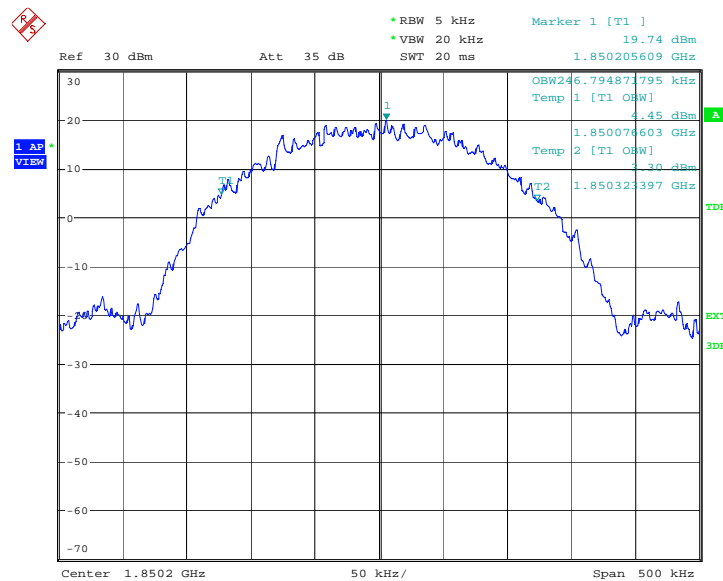
Date: 4.MAR.2014 14:36:39

### EGPRS 1900-8PSK (99% BW)

Frequency(MHz)	Occupied Bandwidth (99% BW)( kHz)
1850.2	246.795
1880.0	246.795
1909.8	248.397

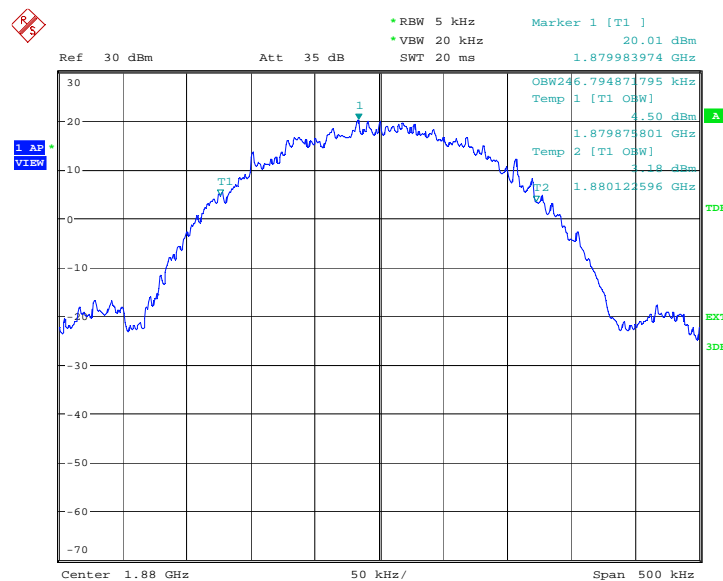
### EGPRS 1900-8PSK

#### Channel 512-Occupied Bandwidth (99% BW)



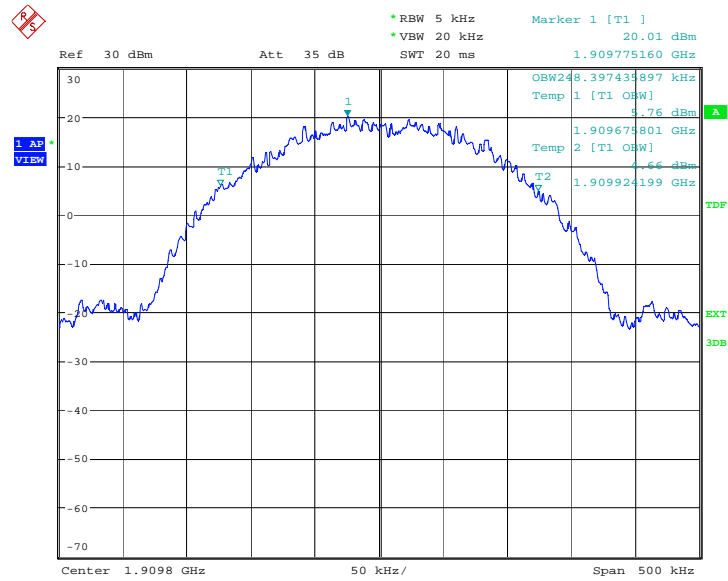
Date: 4.MAR.2014 14:49:21

#### Channel 661-Occupied Bandwidth (99% BW)



Date: 4.MAR.2014 14:49:53

### Channel 810-Occupied Bandwidth (99% BW)



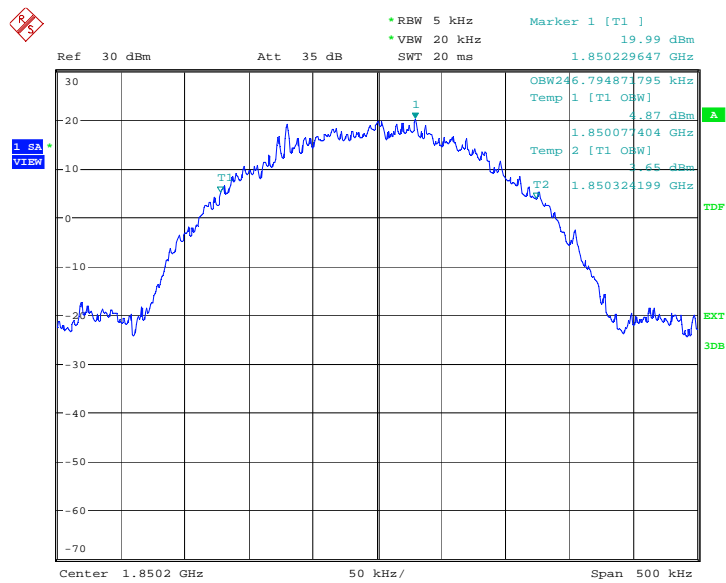
Date: 4.MAR.2014 14:50:25

### EGPRS 1900-8PSK (99% BW)-IC

Frequency(MHz)	Occupied Bandwidth (99% BW)( kHz)
1850.2	246.795
1880.0	248.397
1909.8	246.795

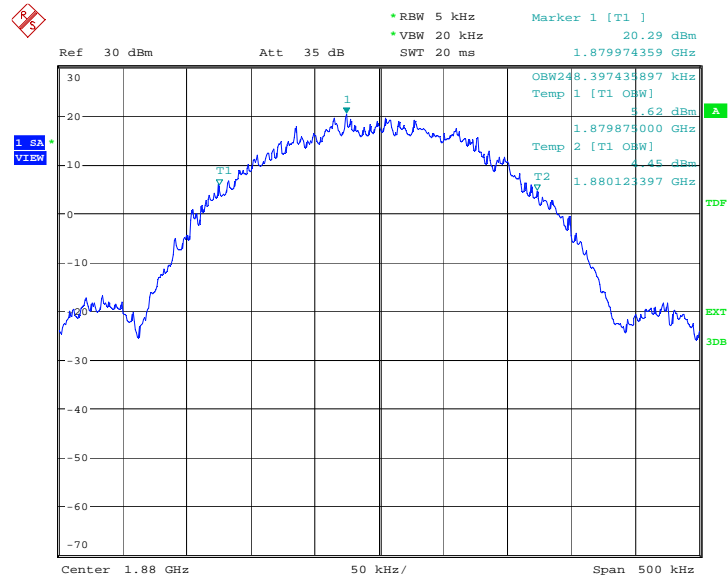
### EGPRS 1900-8PSK

#### Channel 512-Occupied Bandwidth (99% BW)



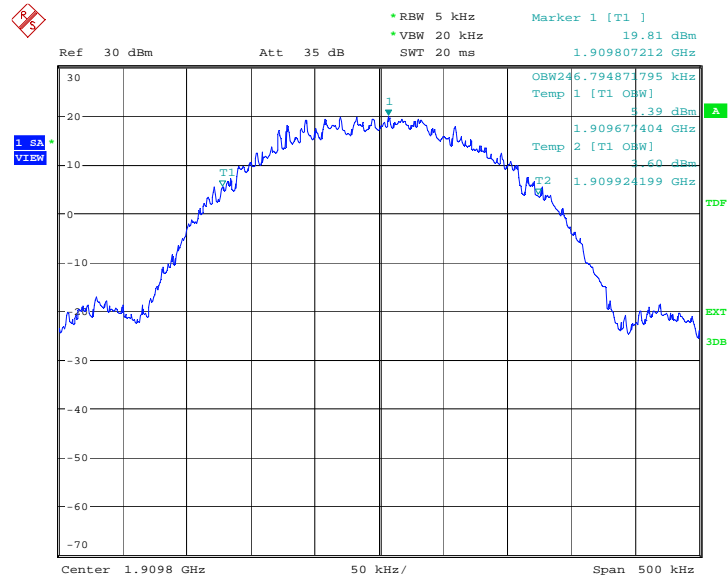
Date: 4.MAR.2014 14:53:04

### Channel 661-Occupied Bandwidth (99% BW)



Date: 4.MAR.2014 14:53:37

### Channel 810-Occupied Bandwidth (99% BW)



Date: 4.MAR.2014 14:54:09



## A.6 EMISSION BANDWIDTH

### A.6.1 Emission Bandwidth Results

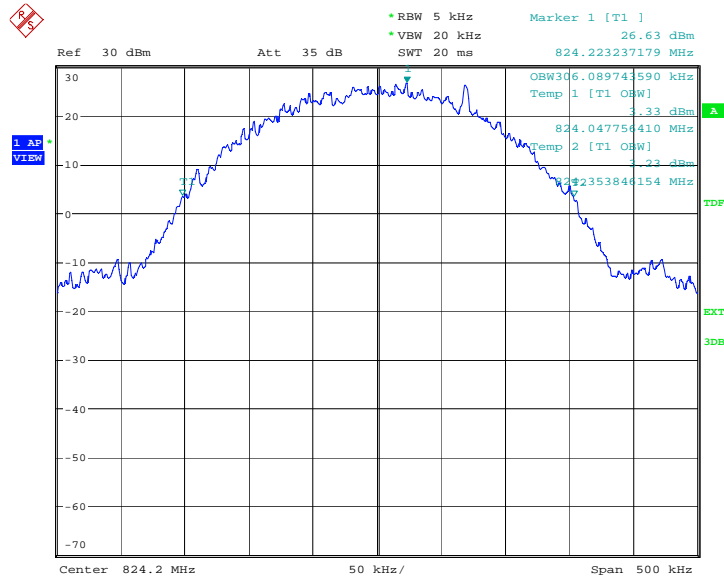
Similar to conducted emissions; Emission bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of PCS1900 band and GSM850 band. Table below lists the measured 100% BW. Spectrum analyzer plots are included on the following pages.

#### GSM 850(100% BW)

Frequency(MHz)	Emission Bandwidth (100% BW)( kHz)
824.2	306.090
836.6	306.090
848.8	307.692

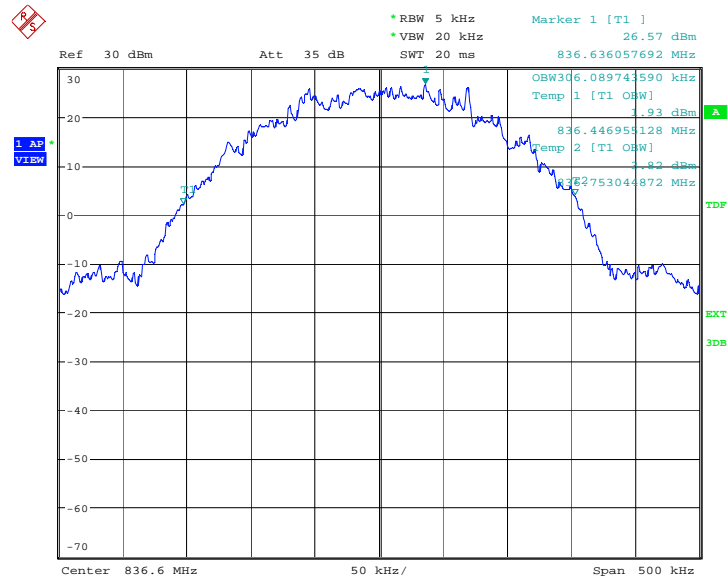
#### GSM 850

#### Channel 128-Emission Bandwidth (100% BW)



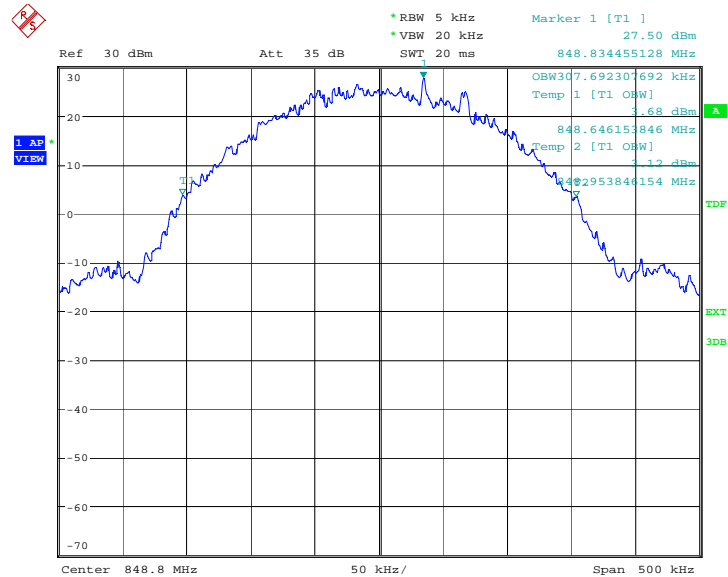
Date: 4.MAR.2014 13:44:15

### Channel 190-Emission Bandwidth (100% BW)



Date: 4.MAR.2014 13:44:48

### Channel 251-Emission Bandwidth (100% BW)



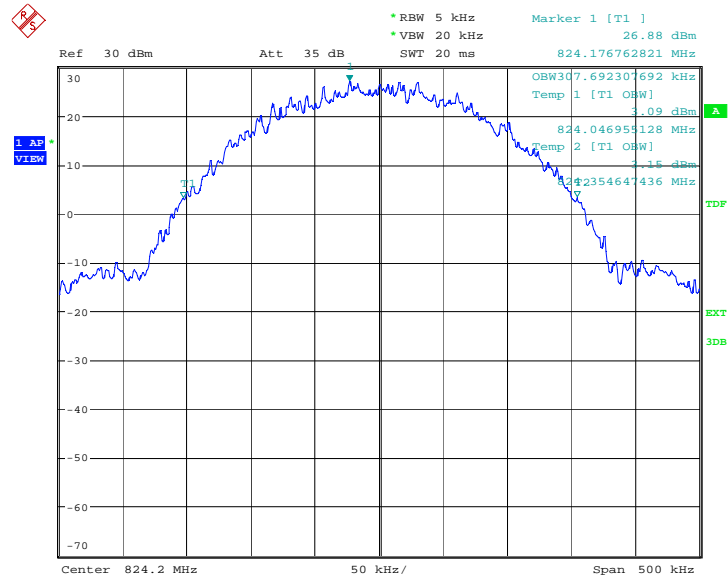
Date: 4.MAR.2014 13:45:20

### GPRS 850(100% BW)

Frequency(MHz)	Emission Bandwidth (100% BW)( kHz)
824.2	307.692
836.6	306.891
848.8	305.288

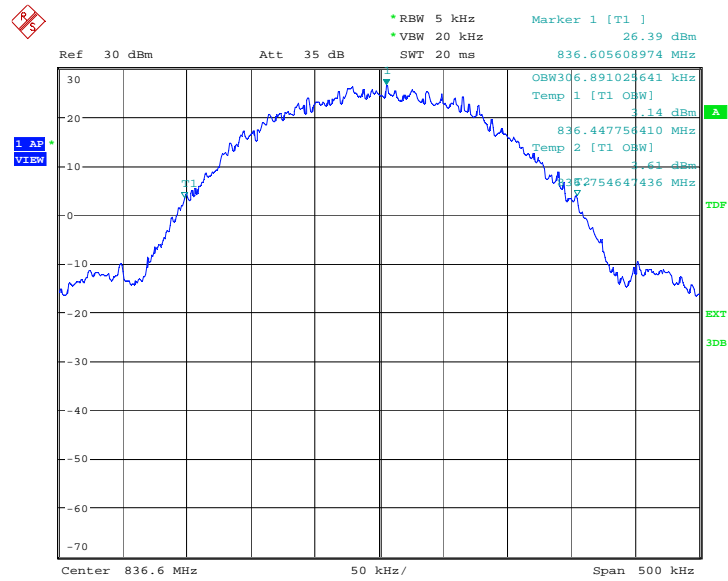
### GPRS 850

#### Channel 128-Emission Bandwidth (100% BW)



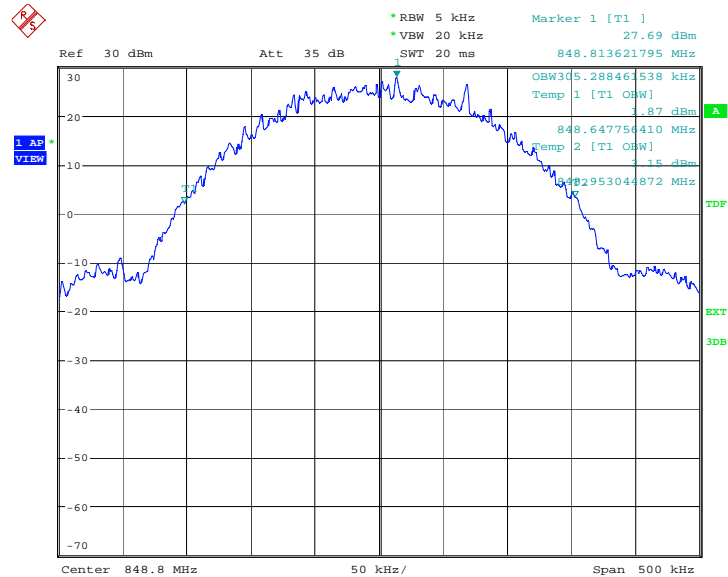
Date: 4.MAR.2014 14:19:01

### Channel 190-Emission Bandwidth (100% BW)



Date: 4.MAR.2014 14:19:33

### Channel 251-Emission Bandwidth (100% BW)



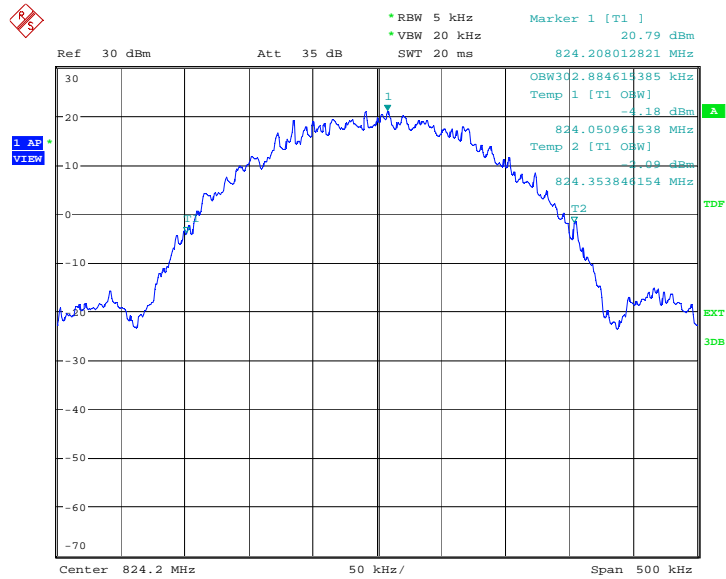
Date: 4.MAR.2014 14:20:05

### EGPRS 850-8PSK (100% BW)

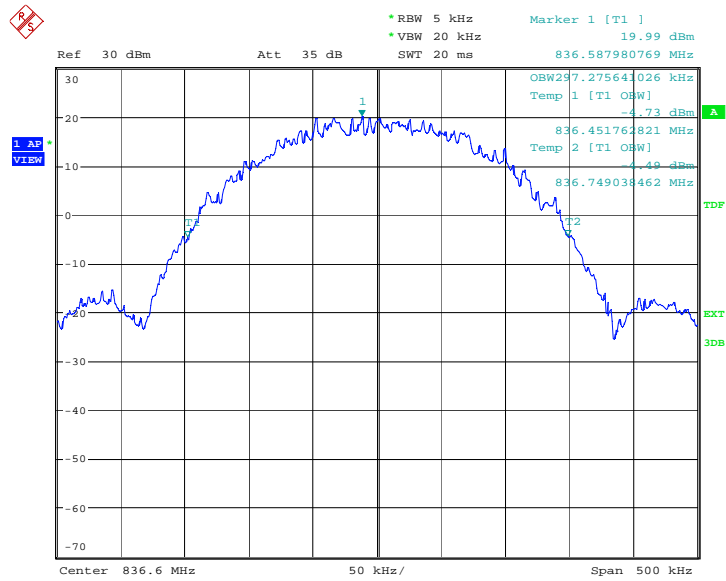
Frequency(MHz)	Emission Bandwidth (100% BW)( kHz)
824.2	302.885
836.6	297.276
848.8	300.481

### EGPRS 850-8PSK

#### Channel 128-Emission Bandwidth (100% BW)

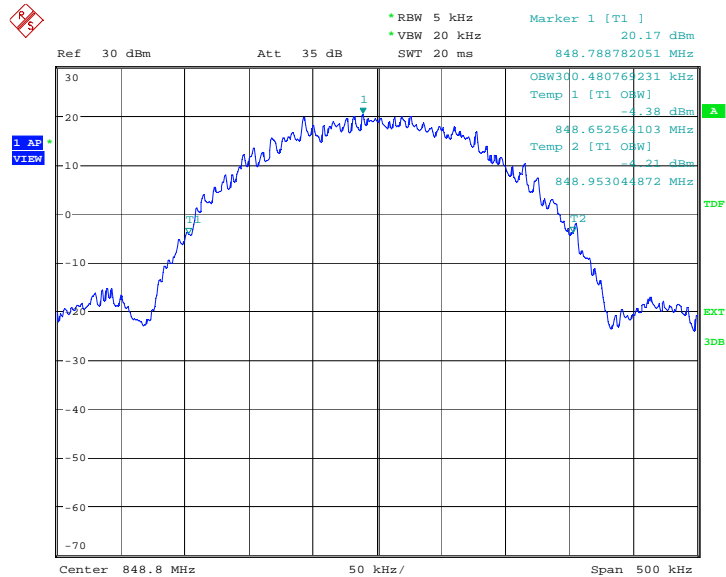


### Channel 190-Emission Bandwidth (100% BW)



Date: 4.MAR.2014 14:44:09

### Channel 251-Emission Bandwidth (100% BW)



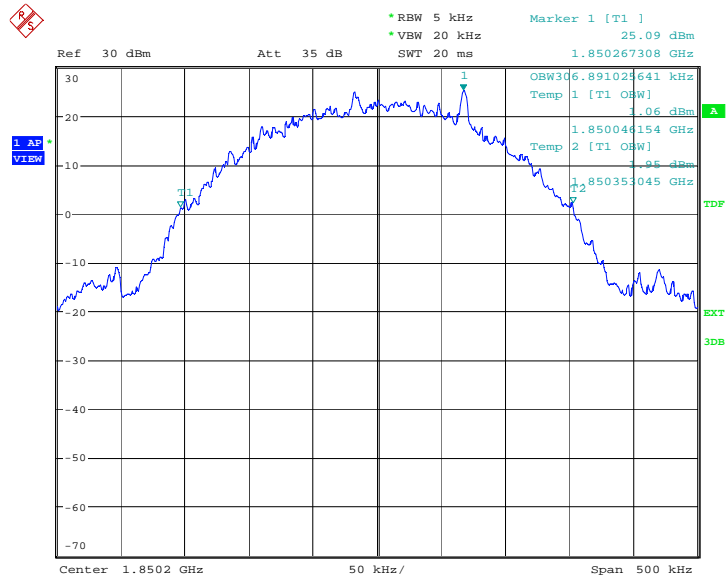
Date: 4.MAR.2014 14:44:41

### PCS 1900(100% BW)

Frequency(MHz)	Emission Bandwidth (100% BW)( kHz)
1850.2	306.891
1880.0	306.090
1909.8	310.096

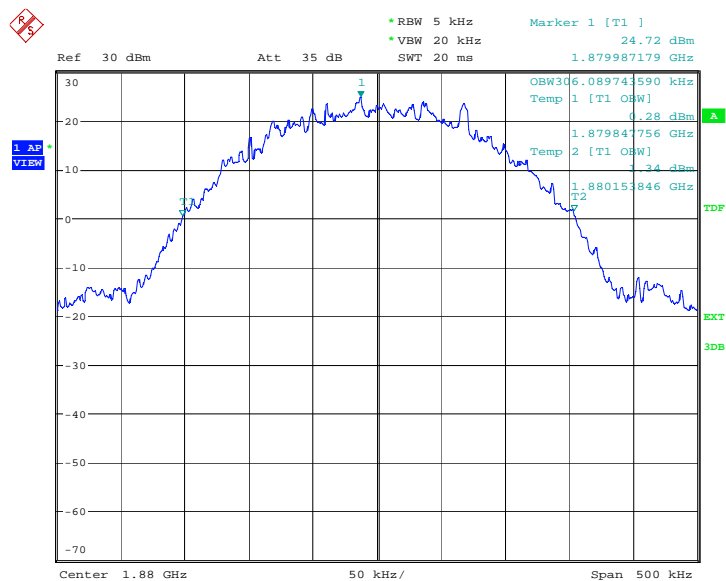
### PCS 1900

#### Channel 512-Emission Bandwidth (100% BW)



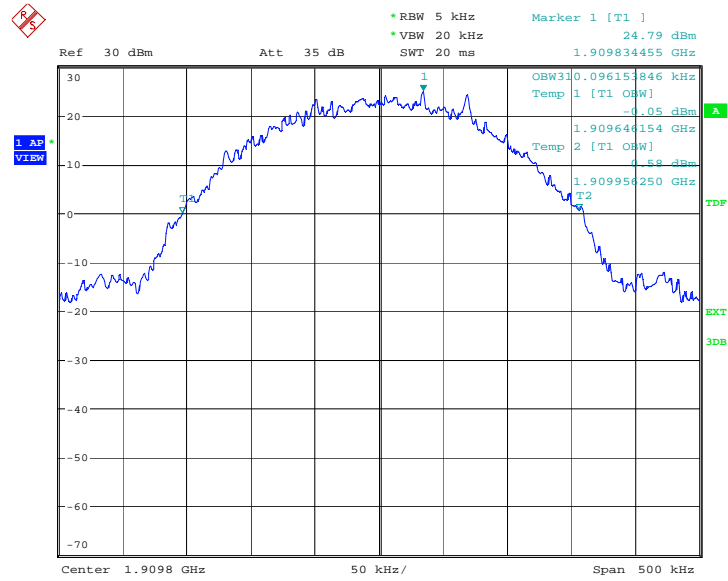
Date: 4.MAR.2014 14:00:36

#### Channel 661-Emission Bandwidth (100% BW)



Date: 4.MAR.2014 14:01:08

### Channel 810-Emission Bandwidth (100% BW)



Date: 4.MAR.2014 14:01:40

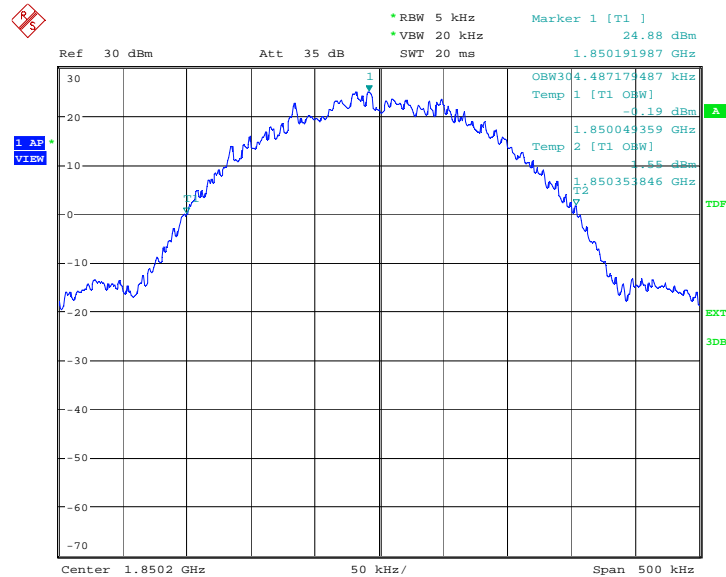


### GPRS 1900(100% BW)

Frequency(MHz)	Emission Bandwidth (100% BW)( kHz)
1850.2	304.487
1880.0	305.288
1909.8	307.692

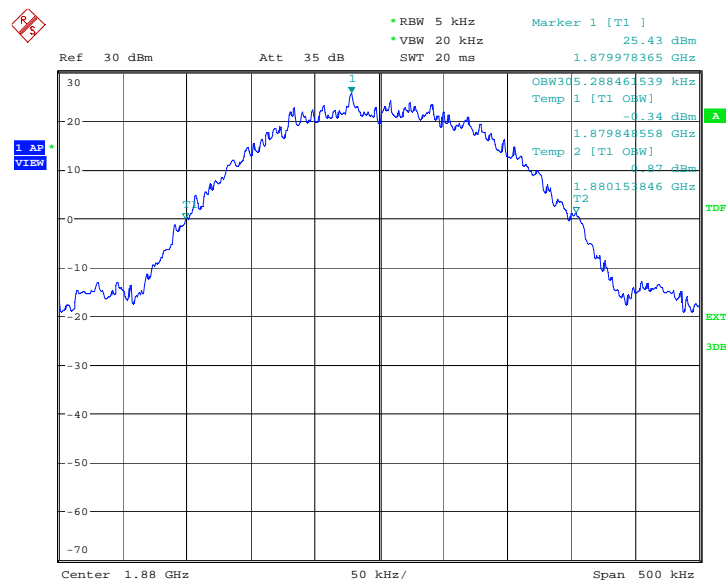
### GPRS 1900

#### Channel 512-Emission Bandwidth (100% BW)



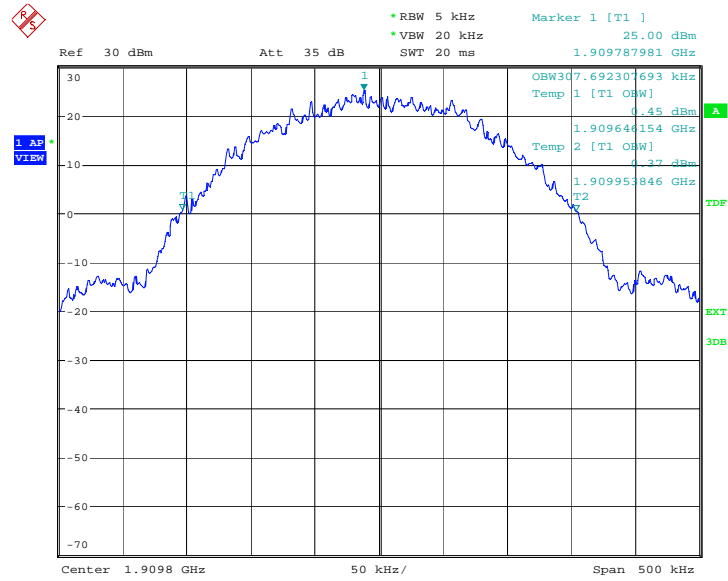
Date: 4.MAR.2014 14:33:29

#### Channel 661-Emission Bandwidth (100% BW)



Date: 4.MAR.2014 14:34:01

### Channel 810-Emission Bandwidth (100% BW)



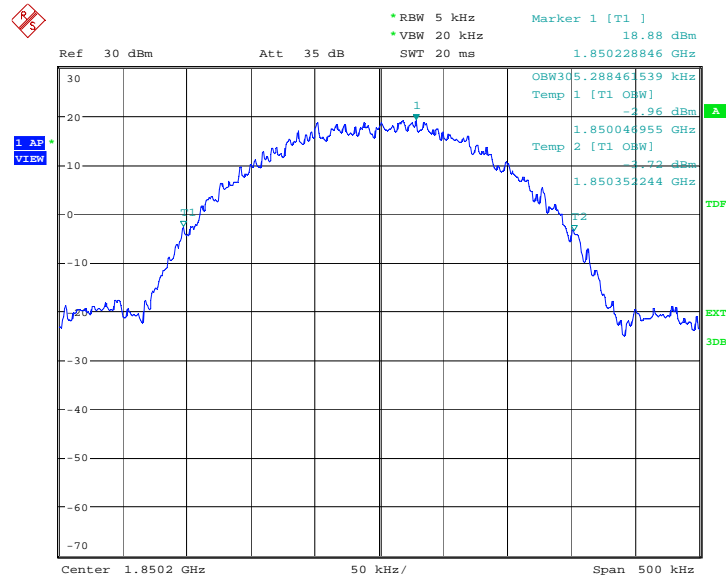
Date: 4.MAR.2014 14:34:33

### EGPRS 1900-8PSK (100% BW)

Frequency(MHz)	Emission Bandwidth (100% BW)( kHz)
1850.2	305.288
1880.0	302.885
1909.8	301.282

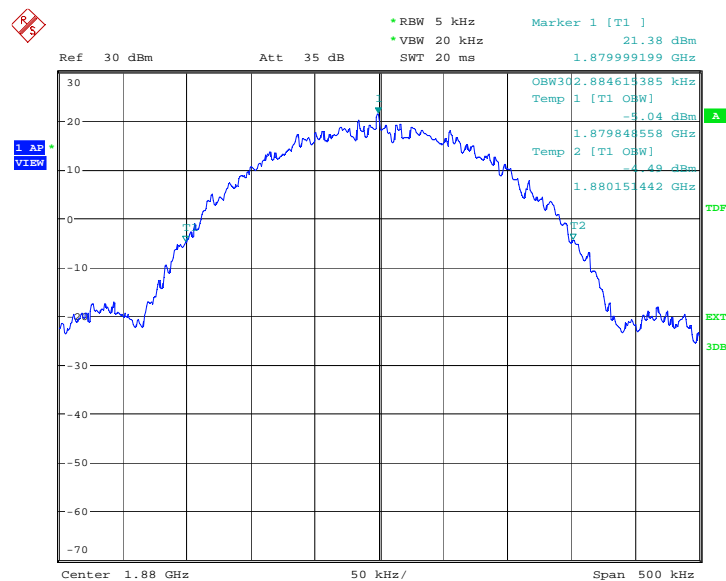
### EGPRS 1900-8PSK

#### Channel 512-Emission Bandwidth (100% BW)



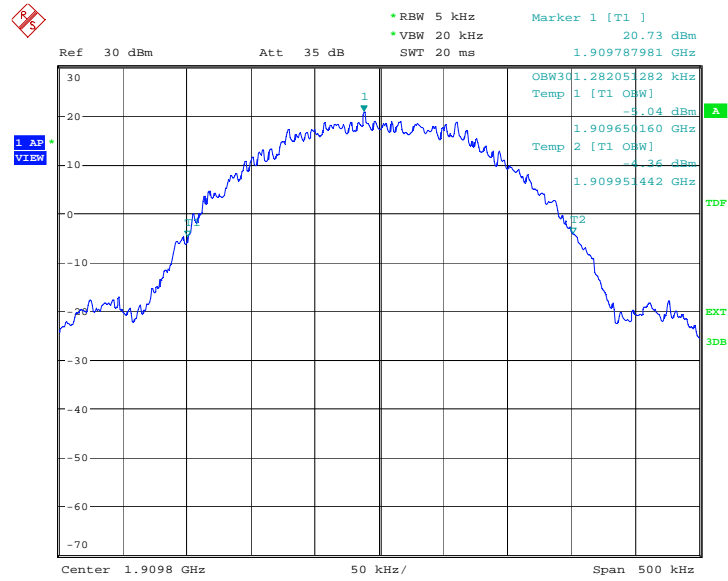
Date: 4.MAR.2014 14:50:59

#### Channel 661-Emission Bandwidth (100% BW)



Date: 4.MAR.2014 14:51:31

### Channel 810-Emission Bandwidth (100% BW)

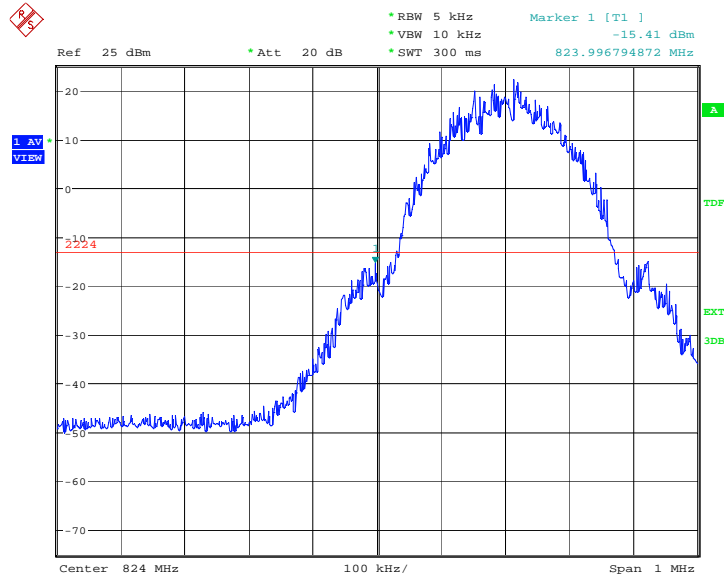


Date: 4.MAR.2014 14:52:03

## A.7 BAND EDGE COMPLIANCE

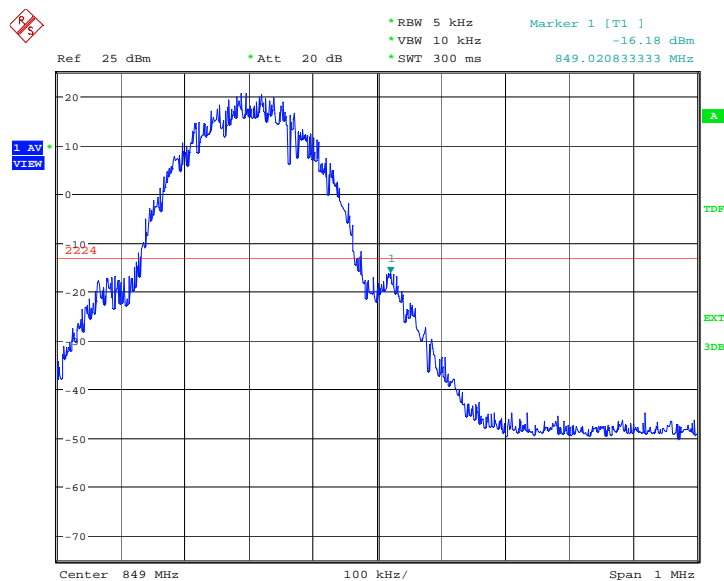
### GSM 850

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



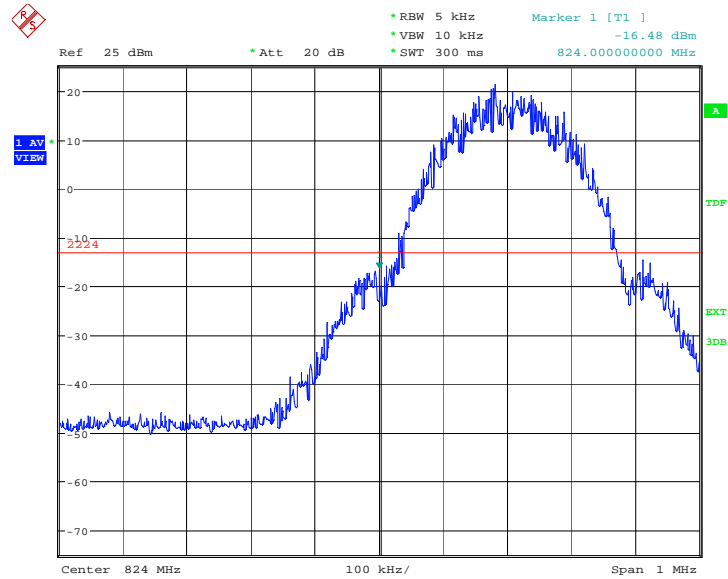
Date: 4.MAR.2014 13:45:34

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



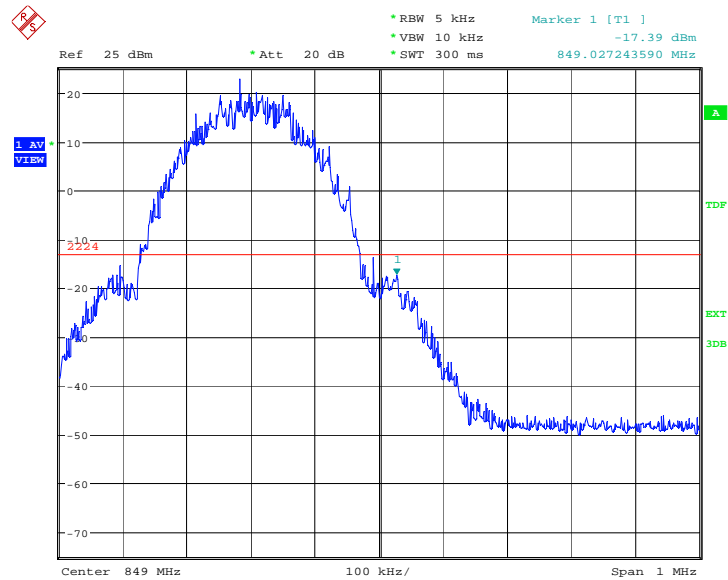
Date: 4.MAR.2014 13:45:48

## GPRS 850 LOW BAND EDGE BLOCK-A (GSM850)-Channel 128



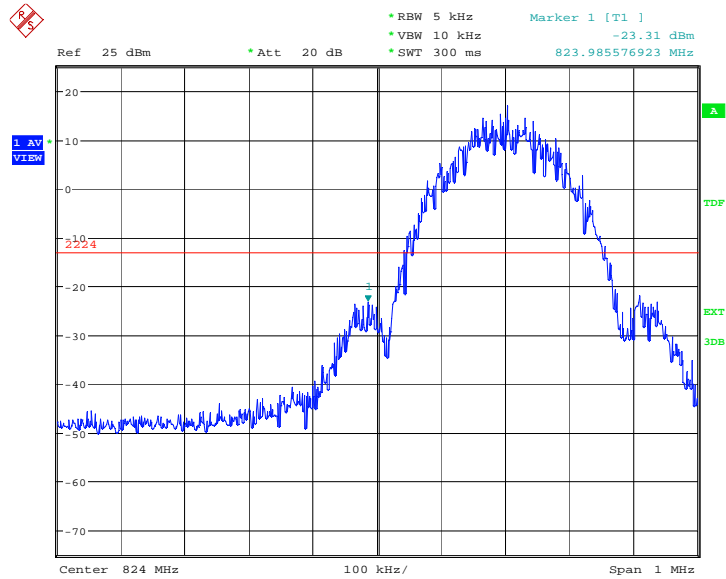
Date: 4.MAR.2014 14:20:19

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



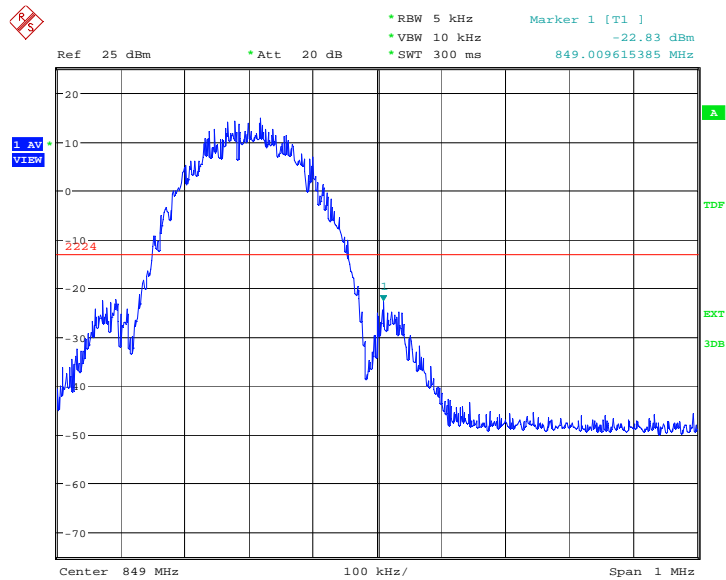
Date: 4.MAR.2014 14:20:33

## EGPRS 850-8PSK LOW BAND EDGE BLOCK-A (GSM850)-Channel 128



Date: 4.MAR.2014 14:44:55

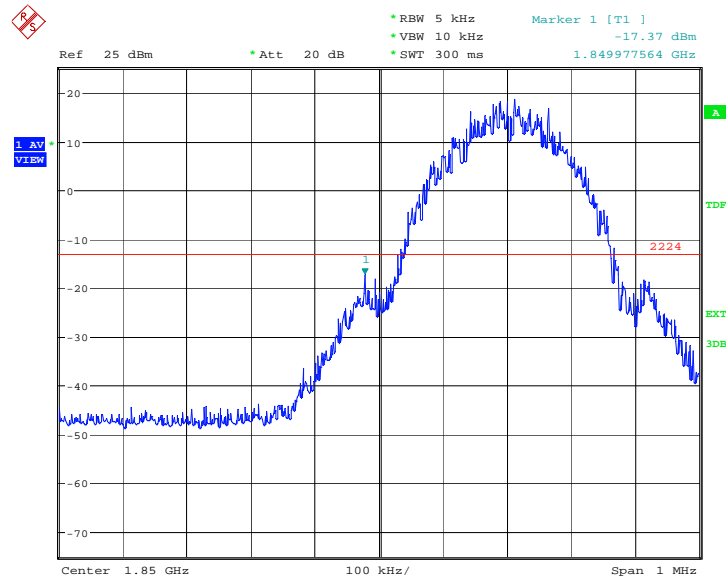
## HIGH BAND EDGE BLOCK-C (GSM850) –Channel 251



Date: 4.MAR.2014 14:45:09

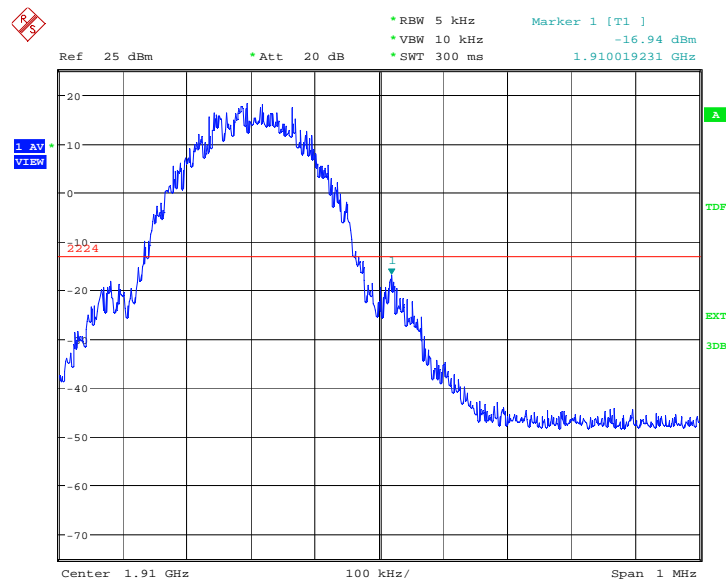
## PCS 1900

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



Date: 4.MAR.2014 14:01:54

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

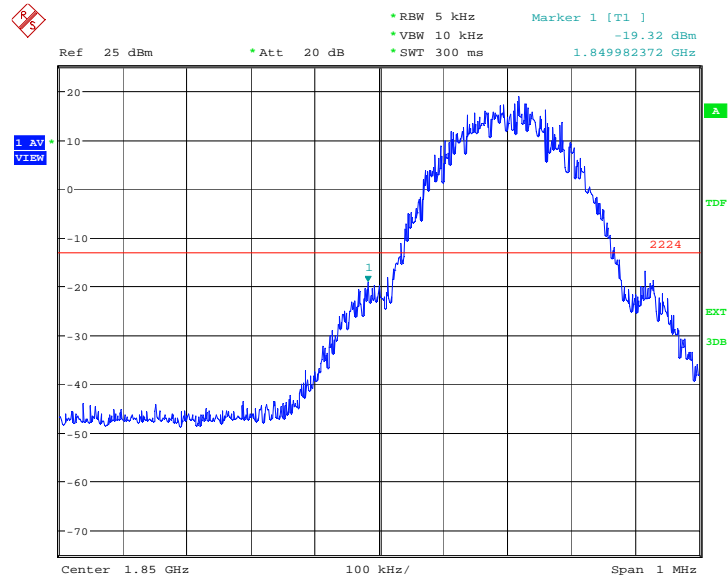


Date: 4.MAR.2014 14:02:08



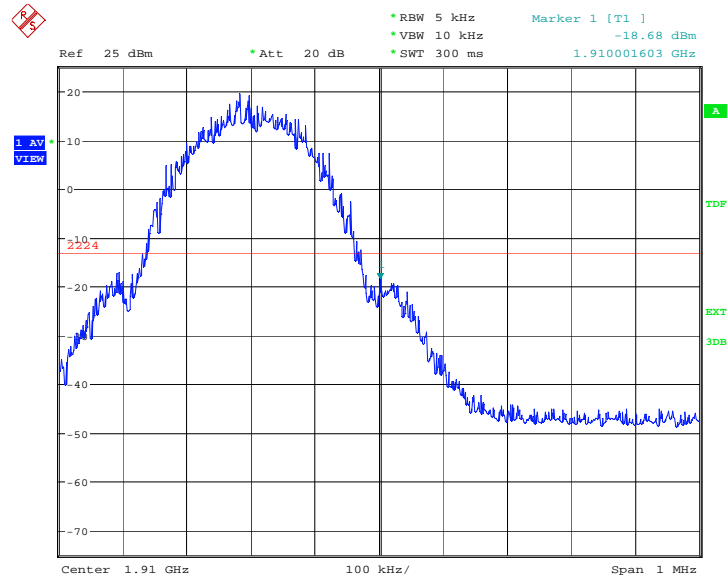
## GPRS 1900

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



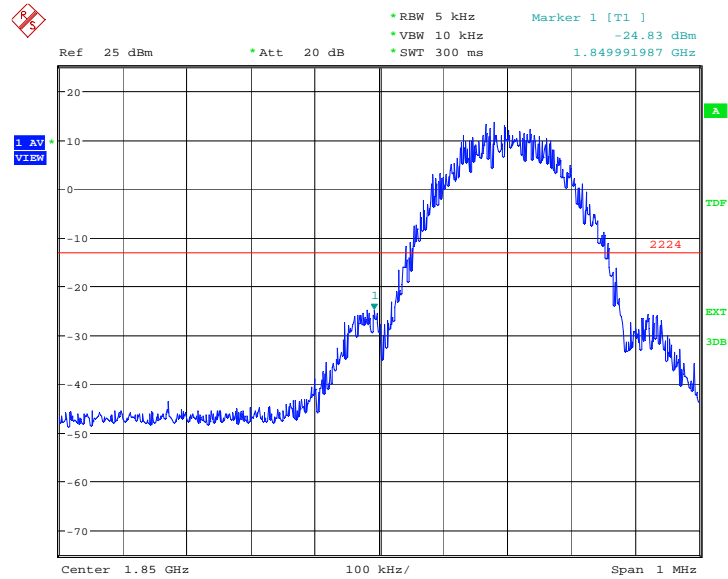
Date: 4.MAR.2014 14:34:47

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



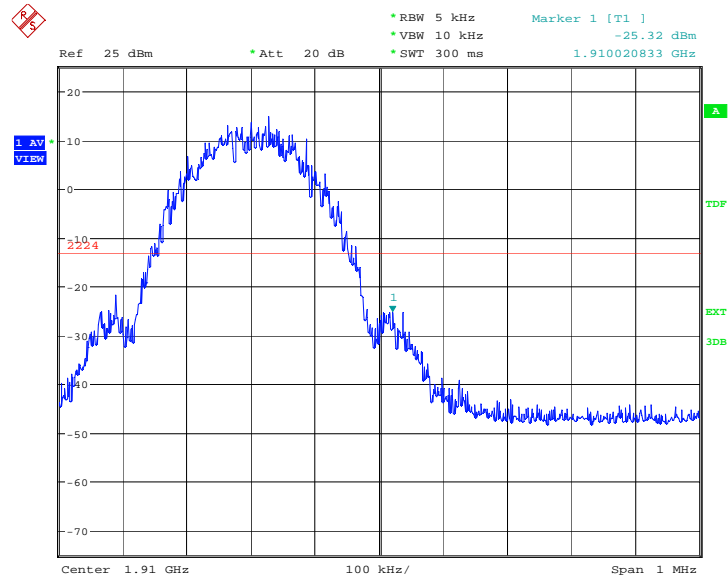
Date: 4.MAR.2014 14:35:01

## EGPRS 1900-8PSK LOW BAND EDGE BLOCK-A (PCS-1900)-Channel 512



Date: 4.MAR.2014 14:52:17

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



Date: 4.MAR.2014 14:52:31

## **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.

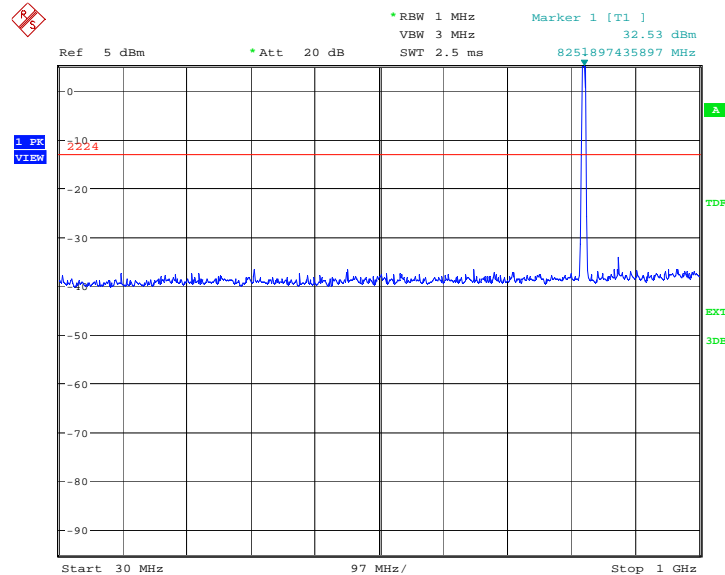
## A. 8.3 Measurement result

### GSM850

#### A.8.3.1 Channel 128: 30MHz – 1GHz

Spurious emission limit –13dBm.

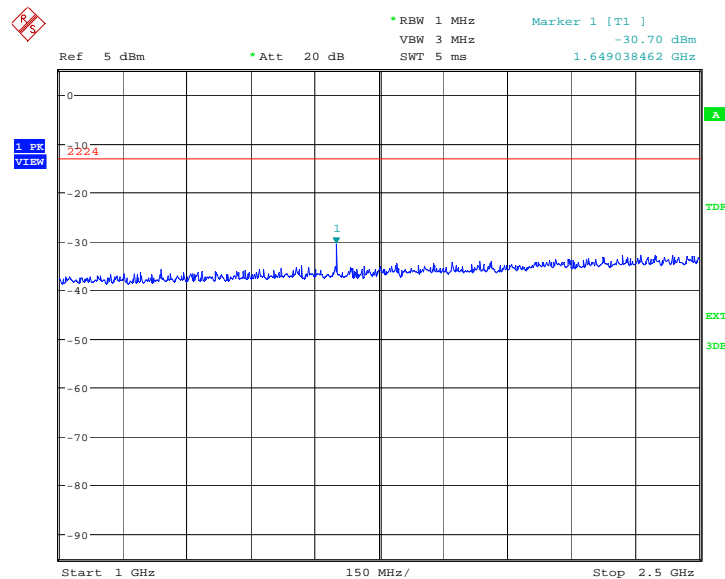
**NOTE: peak above the limit line is the carrier frequency.**



Date: 4.MAR.2014 13:48:02

#### A.8.3.2 Channel 128: 1GHz – 2.5GHz

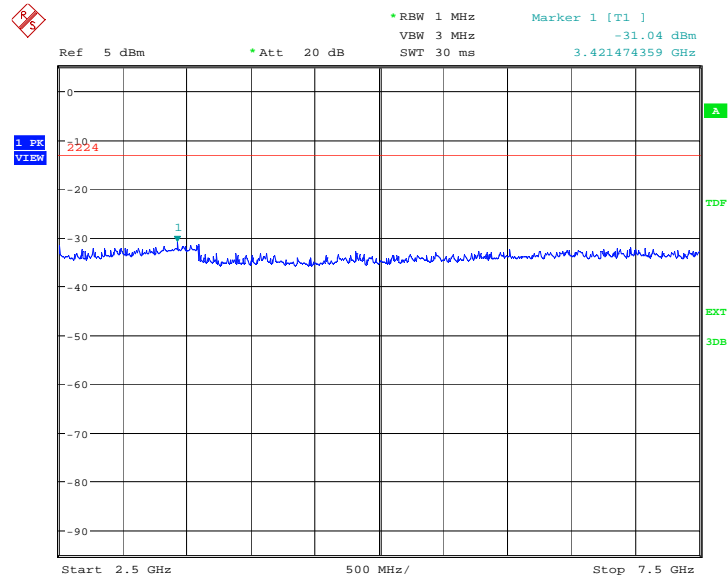
Spurious emission limit –13dBm.



Date: 4.MAR.2014 13:48:31

### A.8.3.3 Channel 128: 2.5GHz – 7.5GHz

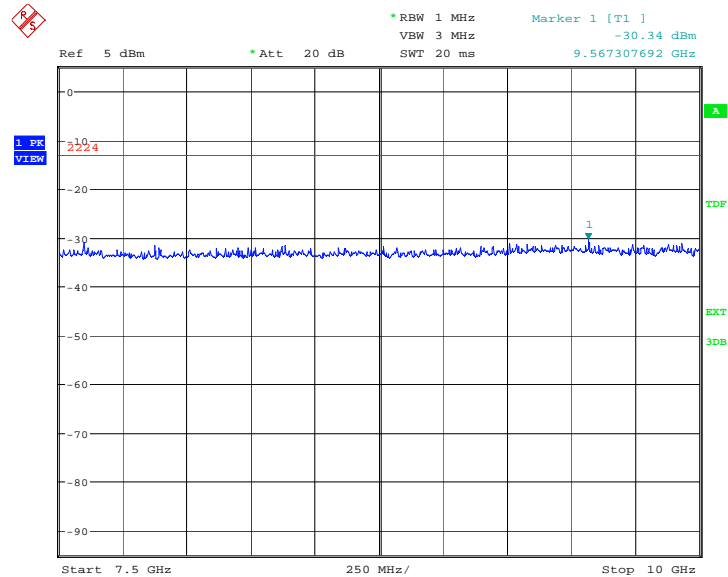
Spurious emission limit –13dBm.



Date: 4.MAR.2014 13:48:59

### A.8.3.4 Channel 128: 7.5GHz –10GHz

Spurious emission limit –13dBm.

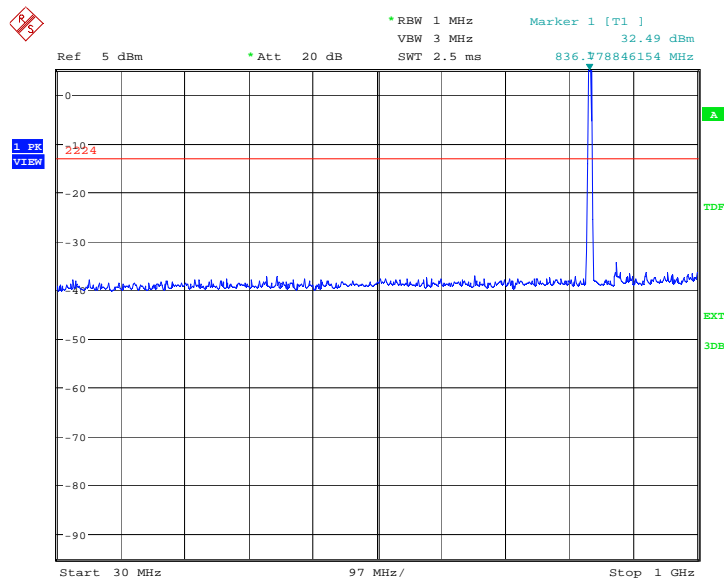


Date: 4.MAR.2014 13:49:27

### A.8.3.5 Channel 190: 30MHz – 1GHz

Spurious emission limit –13dBm

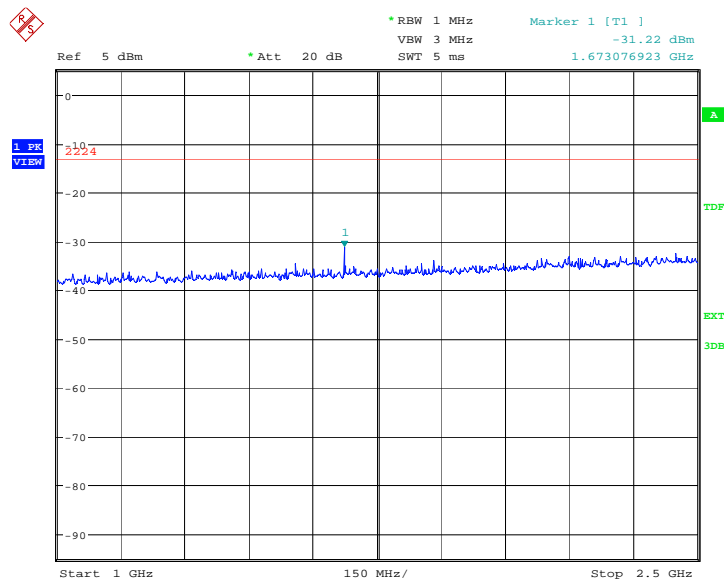
**NOTE: peak above the limit line is the carrier frequency.**



Date: 4.MAR.2014 13:49:56

### A.8.3.6 Channel 190: 1GHz –2.5GHz

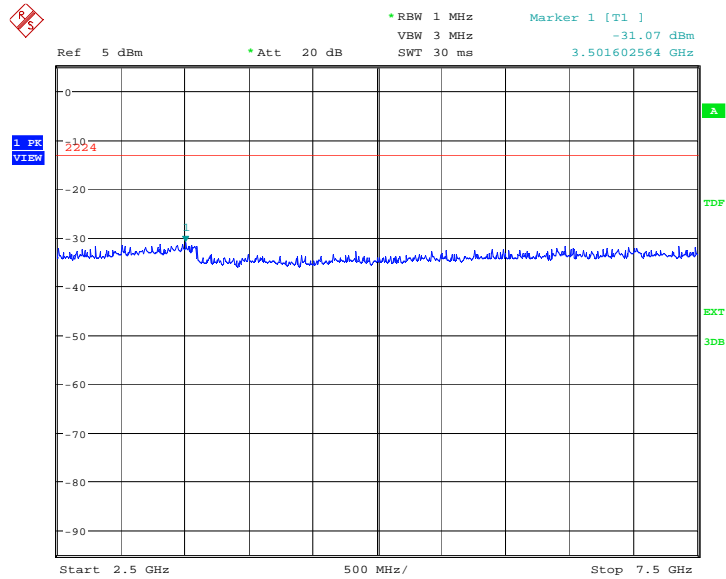
Spurious emission limit –13dBm



Date: 4.MAR.2014 13:50:25

### A.8.3.7 Channel 190: 2.5GHz –7.5GHz

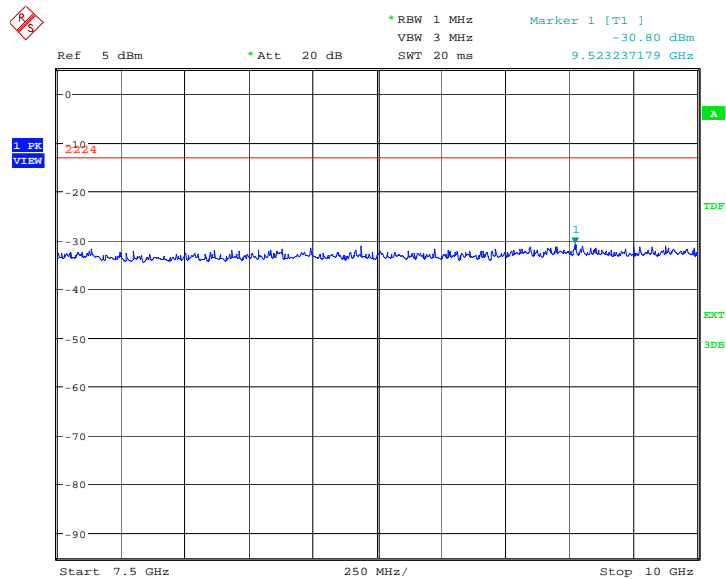
Spurious emission limit –13dBm



Date: 4.MAR.2014 13:50:53

### A.8.3.8 Channel 190: 7.5GHz –10GHz

Spurious emission limit –13dBm

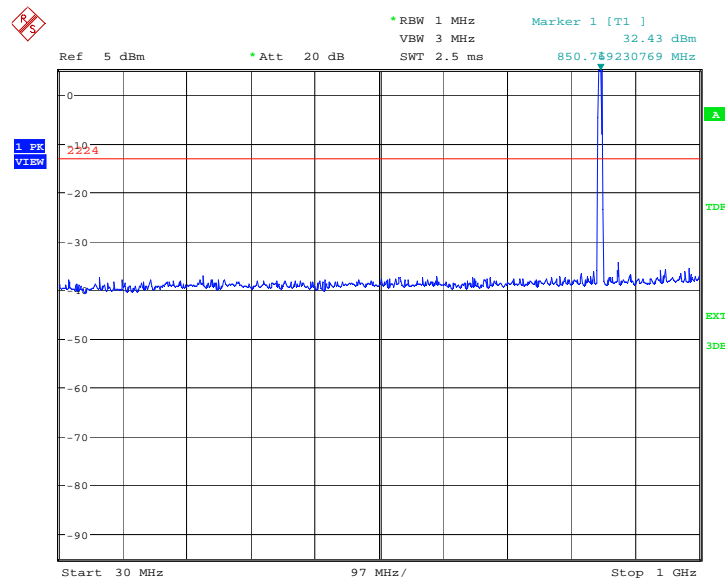


Date: 4.MAR.2014 13:51:21

### A.8.3.9 Channel 251: 30MHz – 1GHz

Spurious emission limit –13dBm.

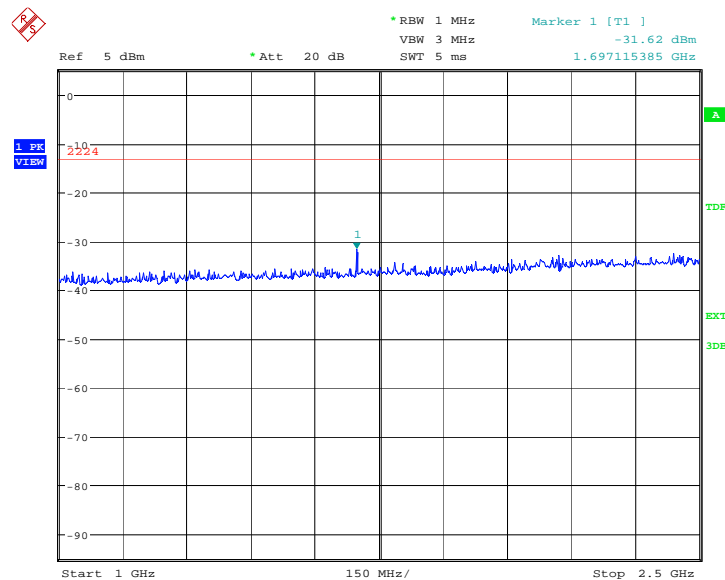
**NOTE:** peak above the limit line is the carrier frequency.



Date: 4.MAR.2014 13:51:50

### A.8.3.10 Channel 251: 1GHz – 2.5GHz

Spurious emission limit –13dBm.

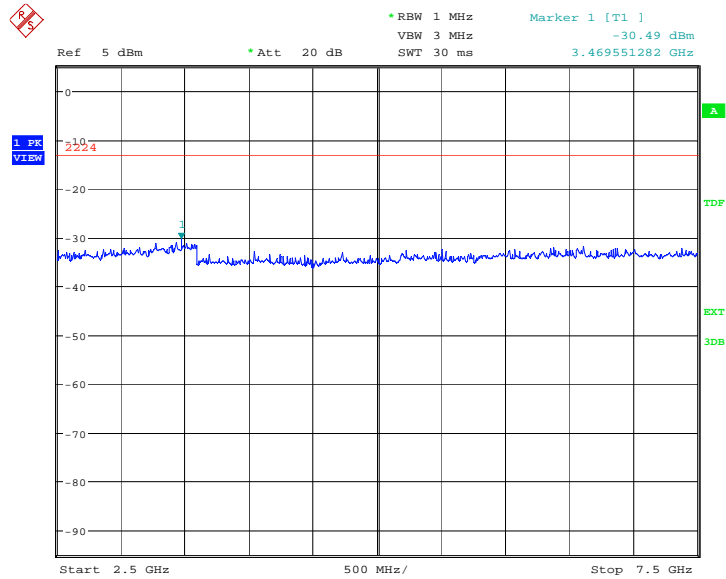


Date: 4.MAR.2014 13:52:18



### A.8.3.11 Channel 251:2.5GHz – 7.5GHz

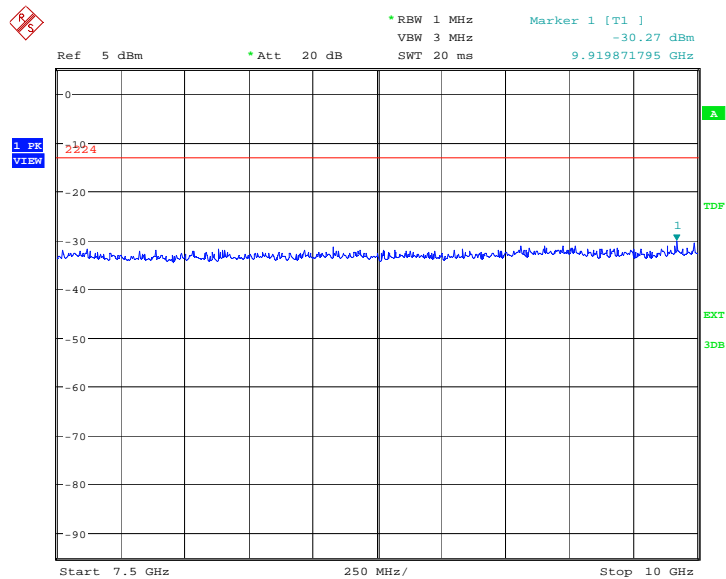
Spurious emission limit –13dBm.



Date: 4.MAR.2014 13:52:47

### A.8.3.12 Channel 251: 7.5GHz – 10GHz

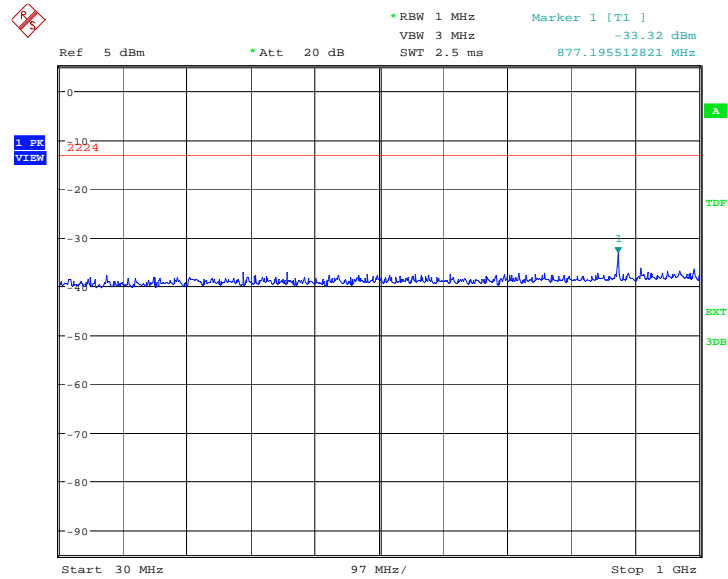
Spurious emission limit –13dBm.



Date: 4.MAR.2014 13:53:15

### A.8.3.13 Idle mode: 30MHz – 1GHz

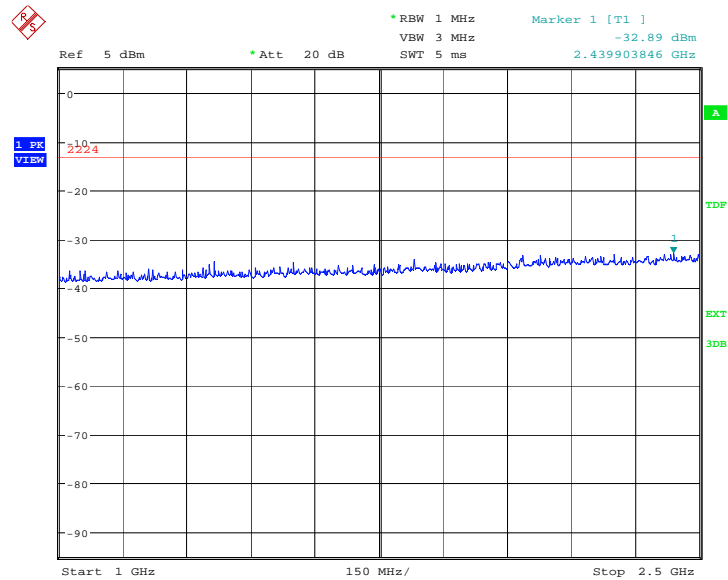
Spurious emission limit –13dBm.



Date: 4.MAR.2014 13:53:44

### A.8.3.14 Idle mode: 1GHz – 2.5GHz

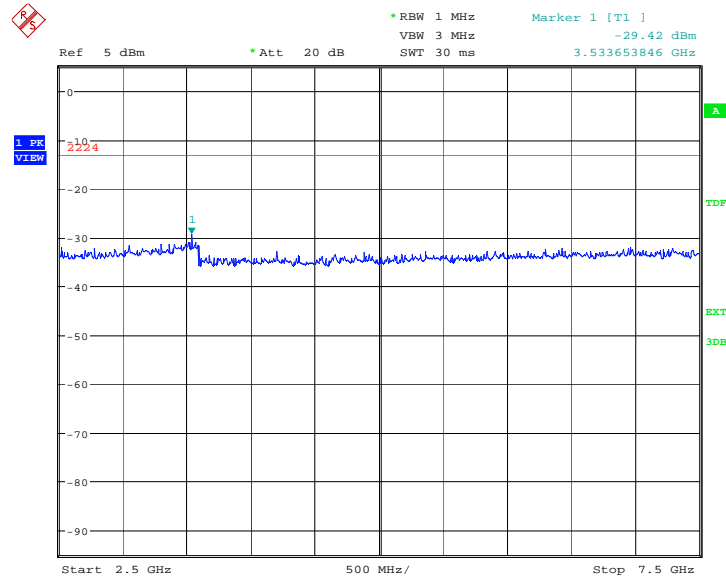
Spurious emission limit –13dBm.



Date: 4.MAR.2014 13:54:12

### A.8.3.15 Idle mode: 2.5GHz – 7.5GHz

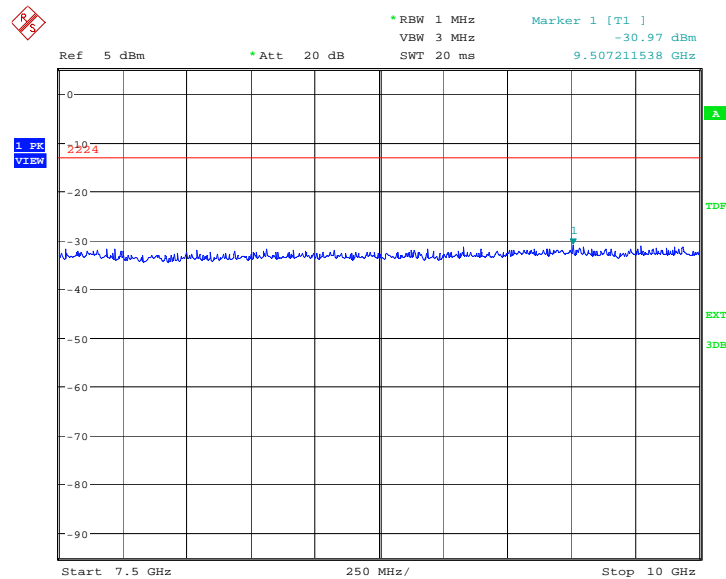
Spurious emission limit –13dBm.



Date: 4.MAR.2014 13:54:41

### A.8.3.16 Idle mode: 7.5GHz – 10GHz

Spurious emission limit –13dBm.

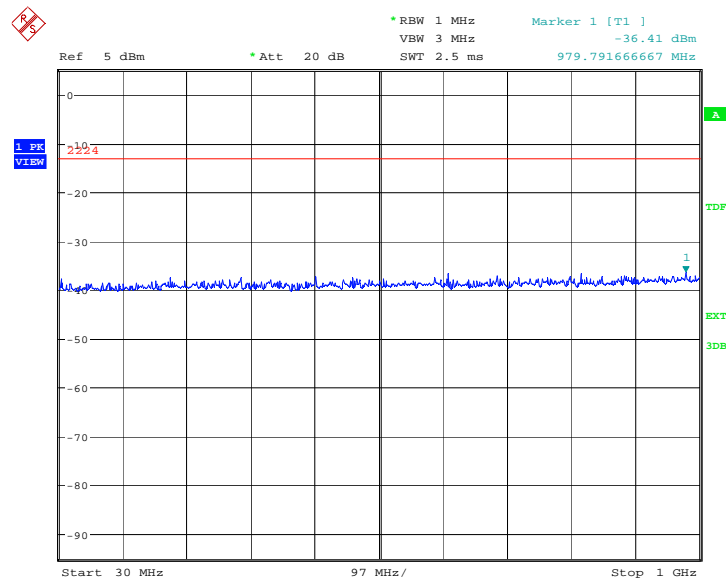


Date: 4.MAR.2014 13:55:09

## PCS1900

### A.8.3.17 Channel 512: 30MHz – 1GHz

Spurious emission limit –13dBm.

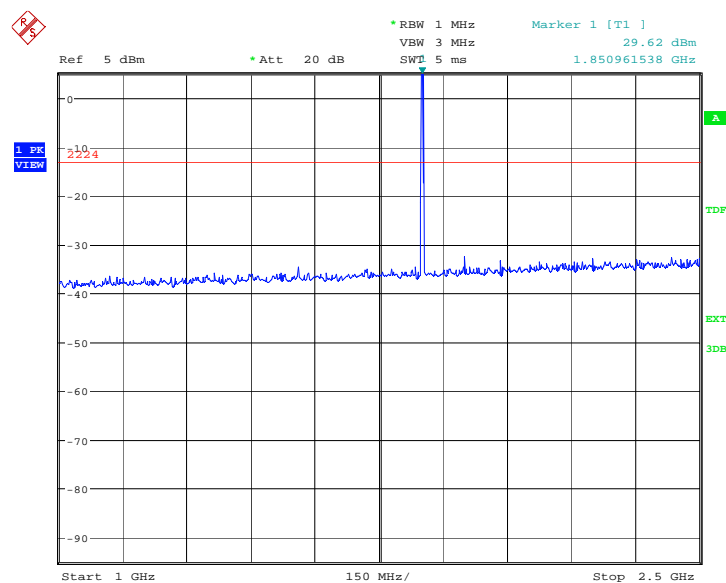


Date: 4.MAR.2014 14:04:21

### A.8.3.18 Channel 512: 1GHz – 2.5GHz

Spurious emission limit –13dBm.

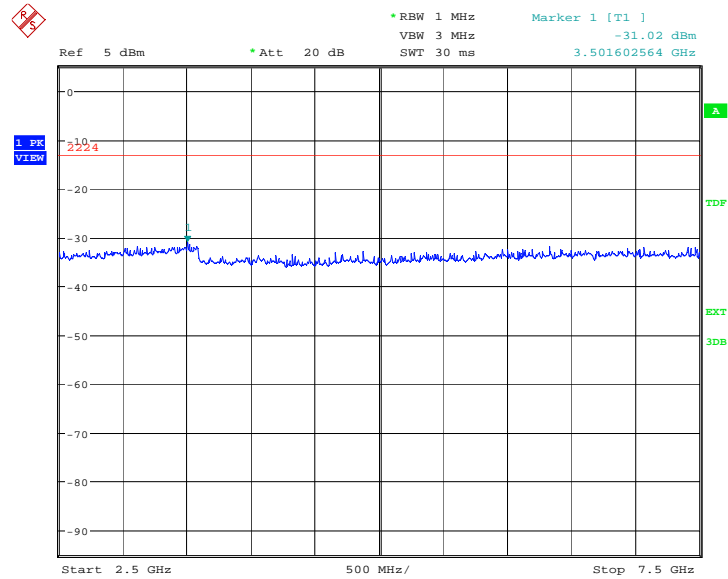
**NOTE: peak above the limit line is the carrier frequency.**



Date: 4.MAR.2014 14:04:49

### A.8.3.19 Channel 512: 2.5GHz – 7.5GHz

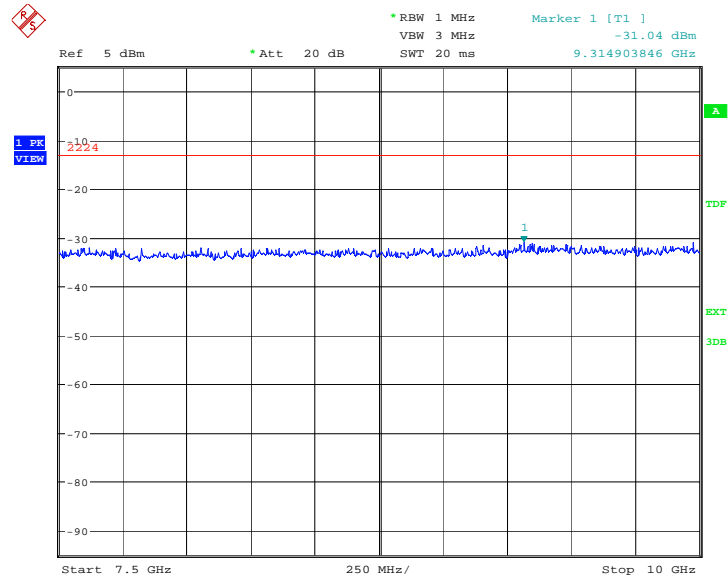
Spurious emission limit –13dBm.



Date: 4.MAR.2014 14:05:17

### A.8.3.20 Channel 512: 7.5GHz –10GHz

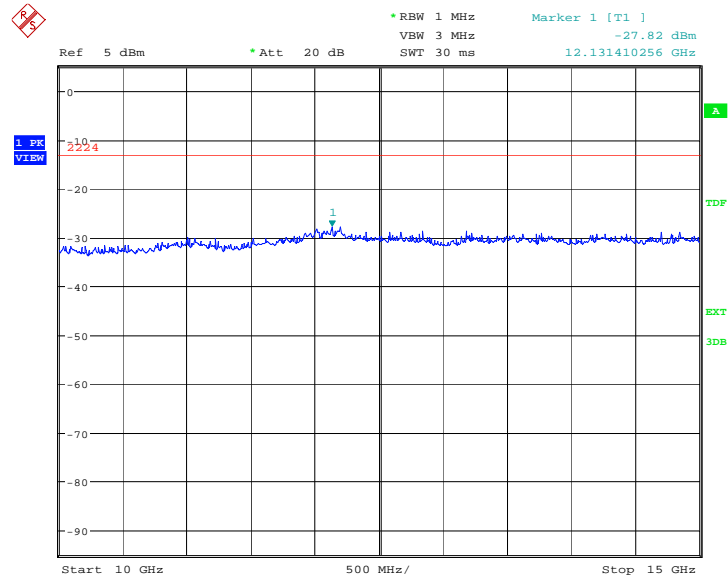
Spurious emission limit –13dBm.



Date: 4.MAR.2014 14:05:46

### A.8.3.21 Channel 512: 10GHz –15GHz

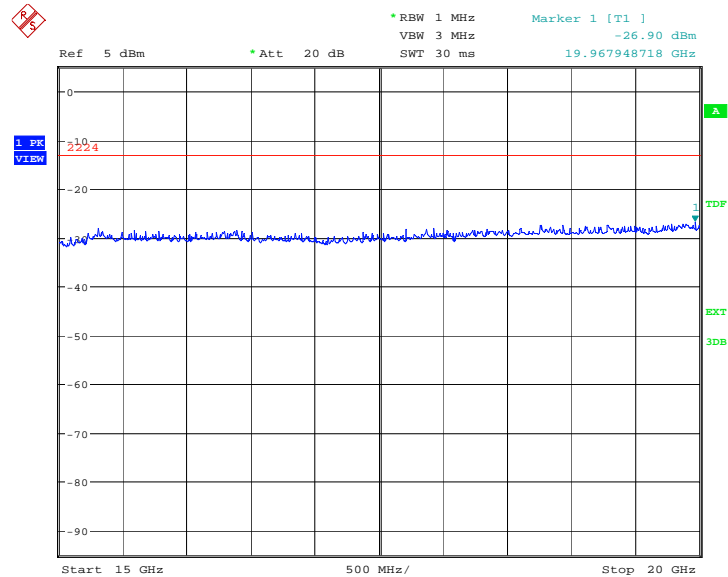
Spurious emission limit –13dBm.



Date: 4.MAR.2014 14:06:14

### A.8.3.22 Channel 512: 15GHz –20GHz

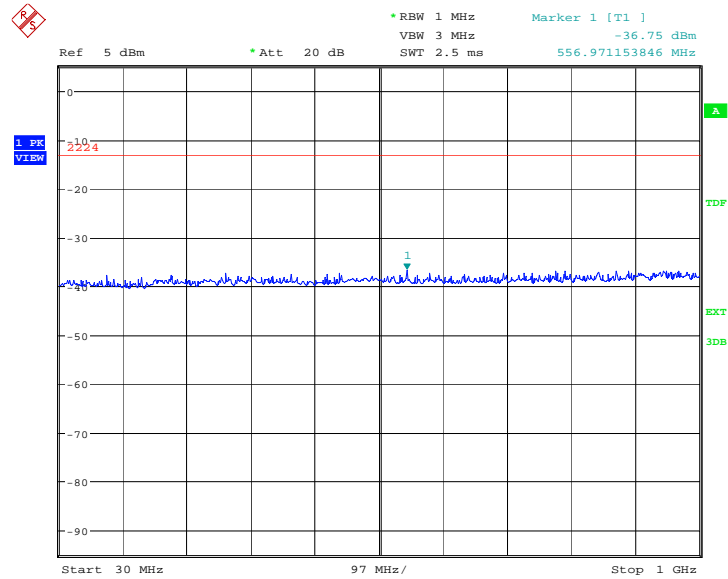
Spurious emission limit –13dBm.



Date: 4.MAR.2014 14:06:42

### A.8.3.23 Channel 661: 30MHz – 1GHz

Spurious emission limit –13dBm

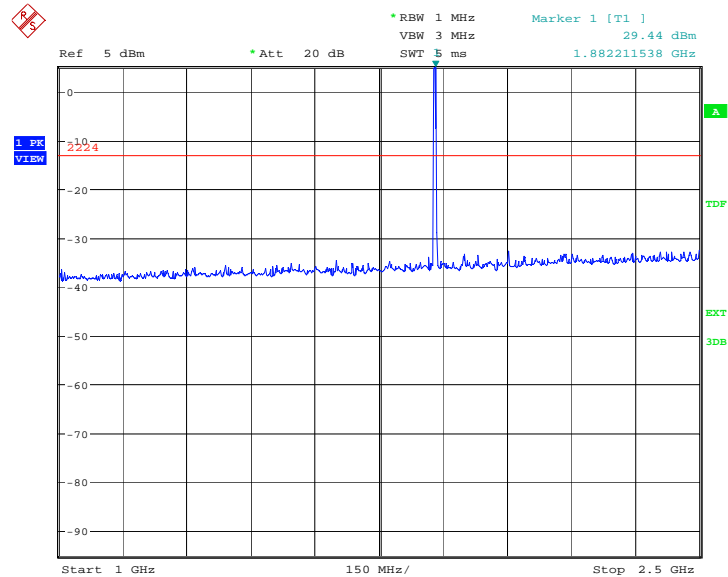


Date: 4.MAR.2014 14:07:11

### A.8.3.24 Channel 661: 1GHz –2.5GHz

Spurious emission limit –13dBm

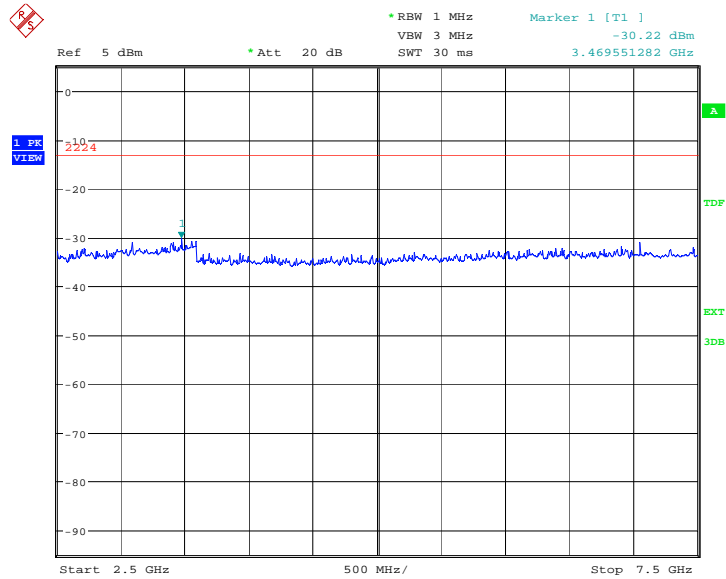
**NOTE: peak above the limit line is the carrier frequency.**



Date: 4.MAR.2014 14:07:39

### A.8.3.25 Channel 661: 2.5GHz –7.5GHz

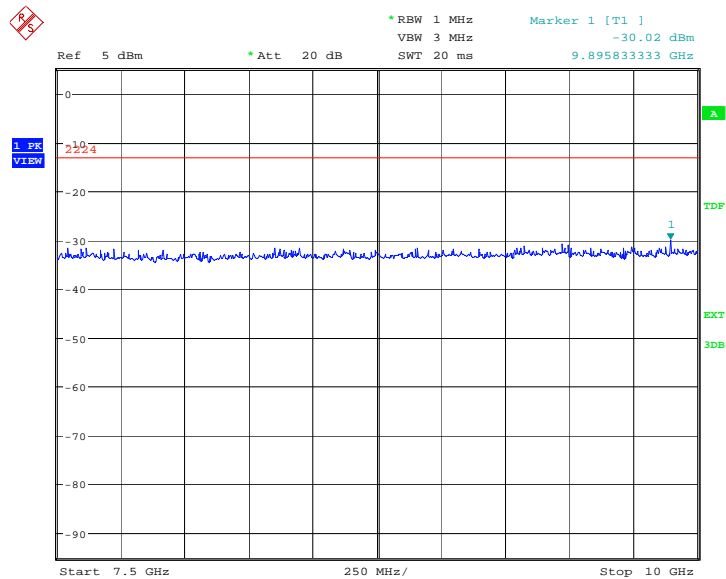
Spurious emission limit –13dBm



Date: 4.MAR.2014 14:08:07

### A.8.3.26 Channel 661: 7.5GHz –10GHz

Spurious emission limit –13dBm

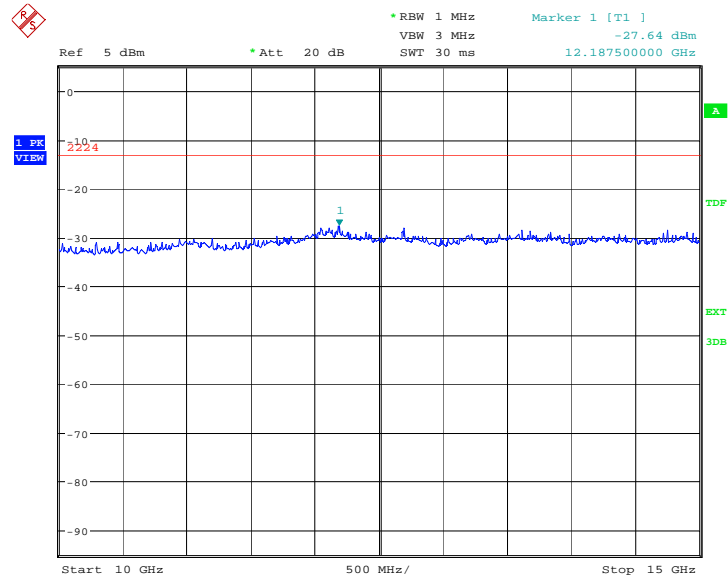


Date: 4.MAR.2014 14:08:35



### A.8.3.27 Channel 661: 10GHz –15GHz

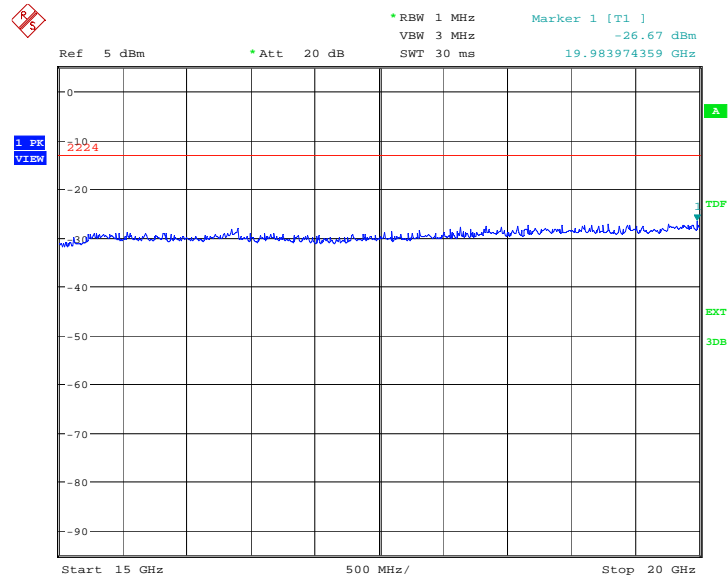
Spurious emission limit –13dBm.



Date: 4.MAR.2014 14:09:03

### A.8.3.28 Channel 661: 15GHz –20GHz

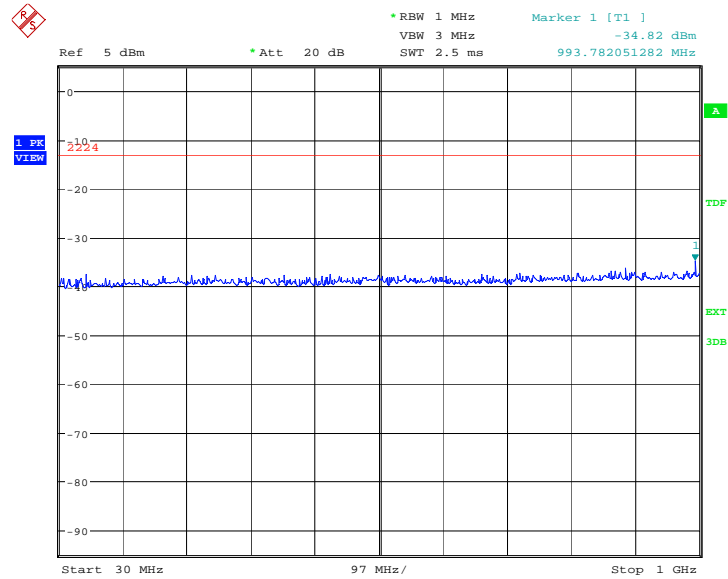
Spurious emission limit –13dBm.



Date: 4.MAR.2014 14:09:32

### A.8.3.29 Channel 810: 30MHz – 1GHz

Spurious emission limit –13dBm.

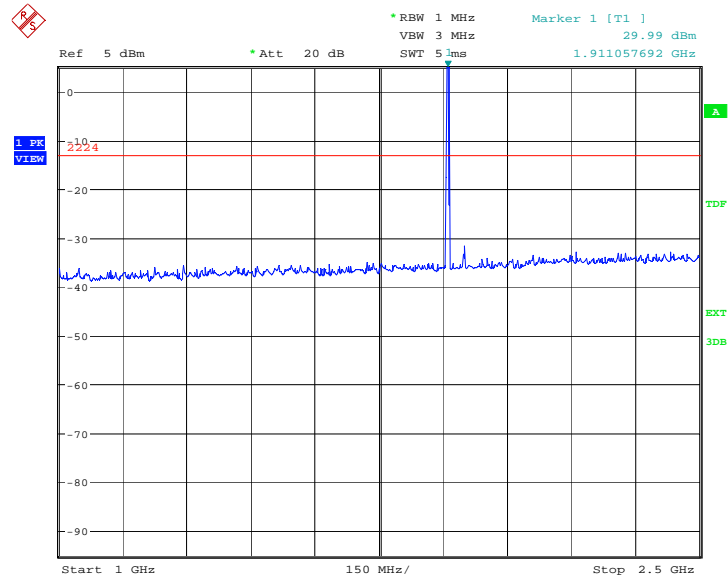


Date: 4.MAR.2014 14:10:00

### A.8.3.30 Channel 810: 1GHz – 2.5GHz

Spurious emission limit –13dBm.

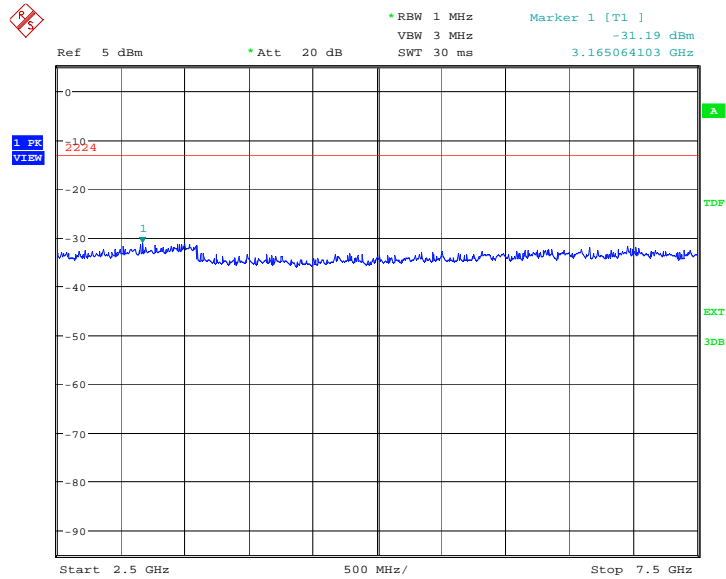
**NOTE: peak above the limit line is the carrier frequency.**



Date: 4.MAR.2014 14:10:29

### A.8.3.31 Channel 810:2.5GHz – 7.5GHz

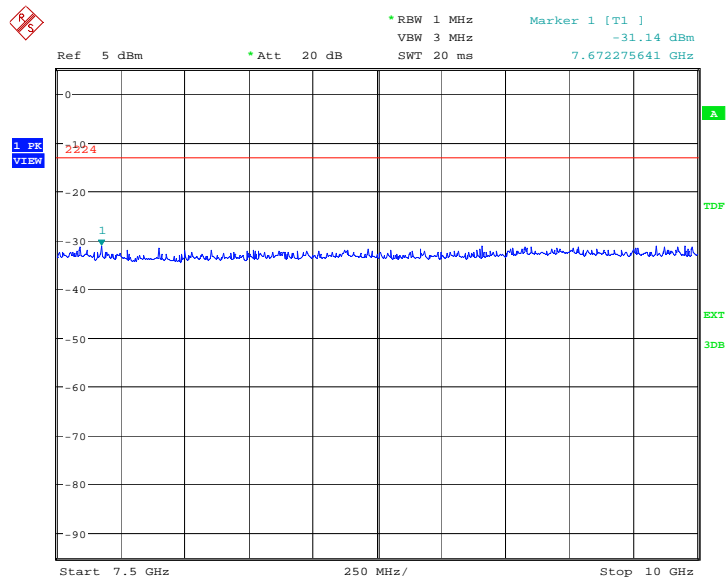
Spurious emission limit –13dBm.



Date: 4.MAR.2014 14:10:57

### A.8.3.32 Channel 810: 7.5GHz – 10GHz

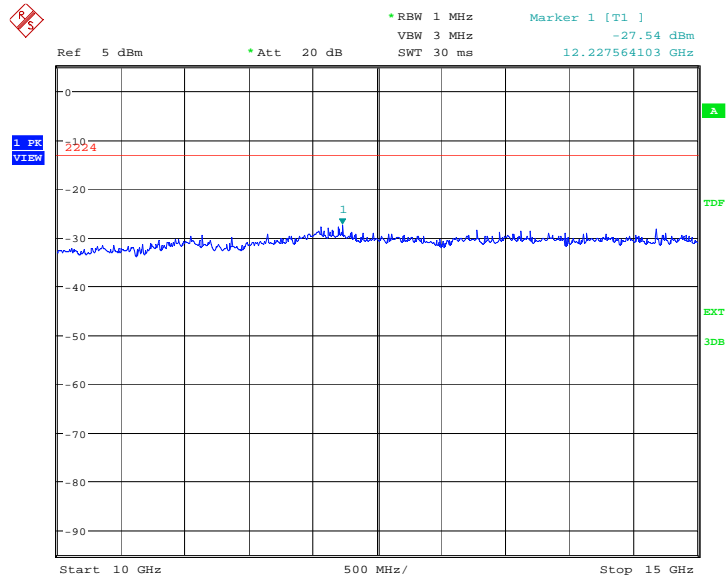
Spurious emission limit –13dBm.



Date: 4.MAR.2014 14:11:25

### A.8.3.33 Channel 810: 10GHz –15GHz

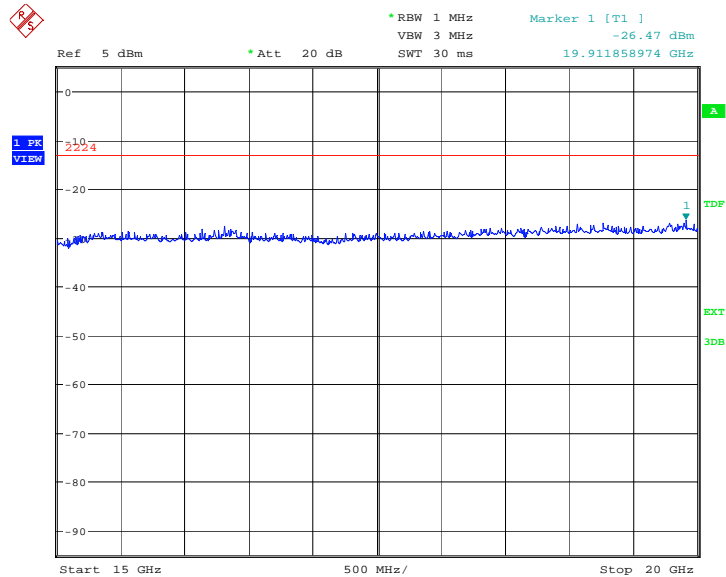
Spurious emission limit –13dBm.



Date: 4.MAR.2014 14:11:53

### A.8.3.34 Channel 810: 15GHz –20GHz

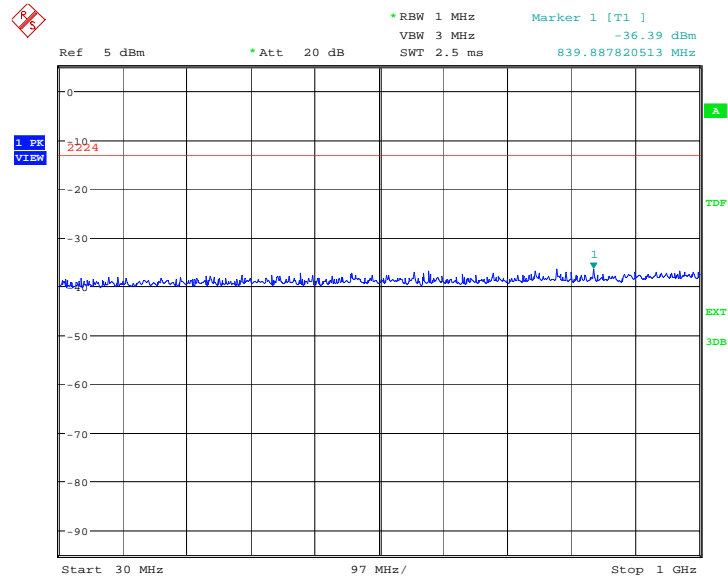
Spurious emission limit –13dBm.



Date: 4.MAR.2014 14:12:21

### A.8.3.35 Idle mode: 30MHz – 1GHz

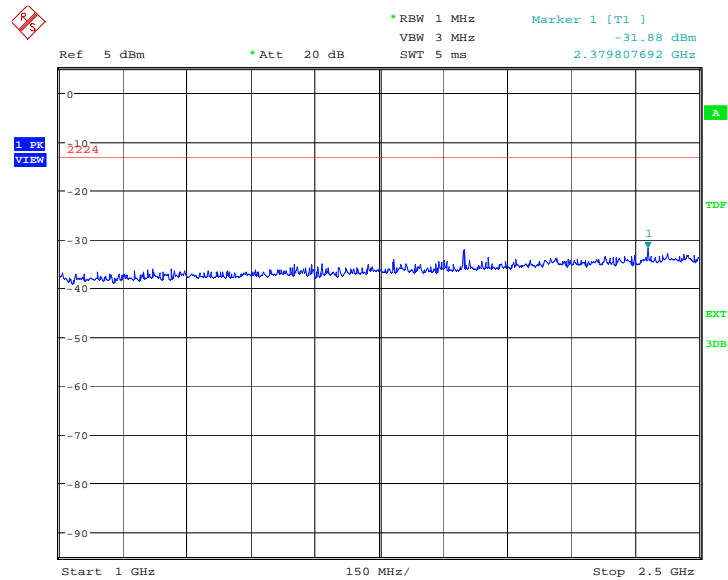
Spurious emission limit –13dBm.



Date: 4.MAR.2014 14:12:50

### A.8.3.36 Idle mode: 1GHz – 2.5GHz

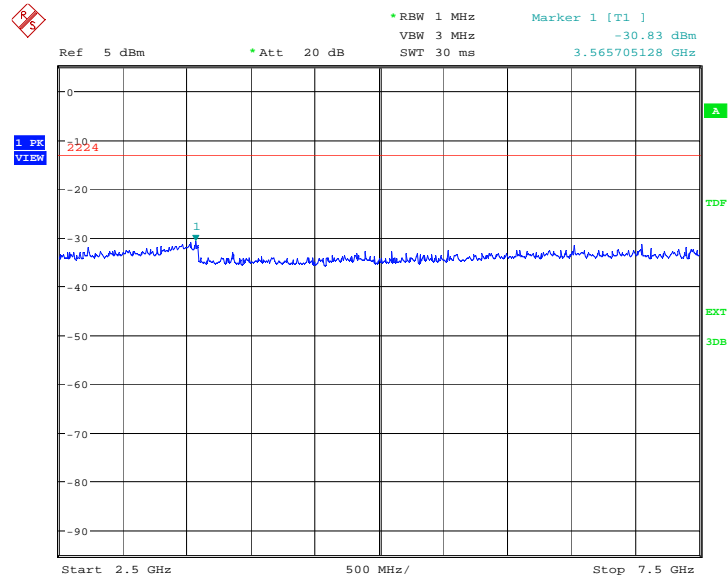
Spurious emission limit –13dBm.



Date: 4.MAR.2014 14:13:18

### A.8.3.37 Idle mode: 2.5GHz – 7.5GHz

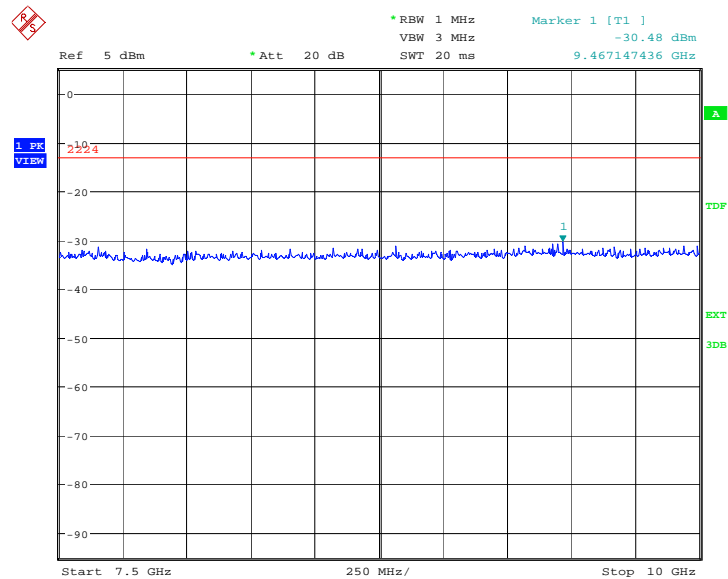
Spurious emission limit –13dBm.



Date: 4.MAR.2014 14:13:46

### A.8.3.38 Idle mode: 7.5GHz – 10GHz

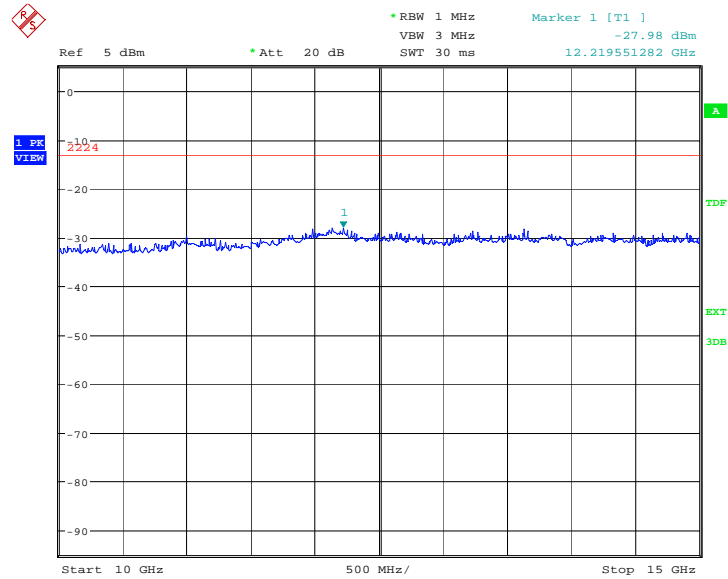
Spurious emission limit –13dBm.



Date: 4.MAR.2014 14:14:14

### A.8.3.39 Idle mode: 10GHz –15GHz

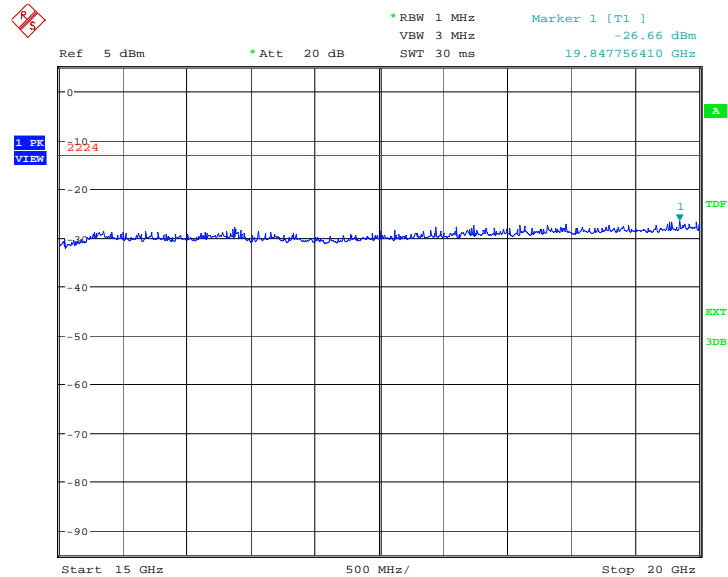
Spurious emission limit –13dBm.



Date: 4.MAR.2014 14:14:42

### A.8.3.40 IDLE mode: 15GHz –20GHz

Spurious emission limit –13dBm.



Date: 4.MAR.2014 14:15:10

## **A.9 PEAK-TO-AVERAGE POWER RATIO**

### **A.9.1 Measurement description**

According to RSS 132 and 133, the transmitter's peak-to-average power ratio (PAPR) shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.

The parameter of spectrum analyzer: RBW = 10MHz, detector = sample, No. of sample = 500,000

### **A.9.2 Measurement results**

#### **Frequency Error vs Temperature**

	Frequency(MHz)	PAPR(dB)
GSM850	836.6	7.628
GPRS850	836.6	7.660
EGPRS850	836.6	10.962
PCS1900	1880.0	7.660
GPRS1900	1880.0	7.660
EGPRS1900	1880.0	10.994



## **A.10 RECEIVER RADIATION EMISSION**

### **A.10.1 Method of Measurement**

The measurement procedure in ANSI C64.4-2003 is used. The EUT is placed on a 80cm height non-conductive table locating on the center of turntable. From 30MHz-1GHz, the measurement distance is 10m. For frequency range above 1GHz, the measurement distance is 3m.

The EUT is measured with travel charger and the operating mode is idle without CMU200's signaling.

### **A.10.2 Method of Measurement**

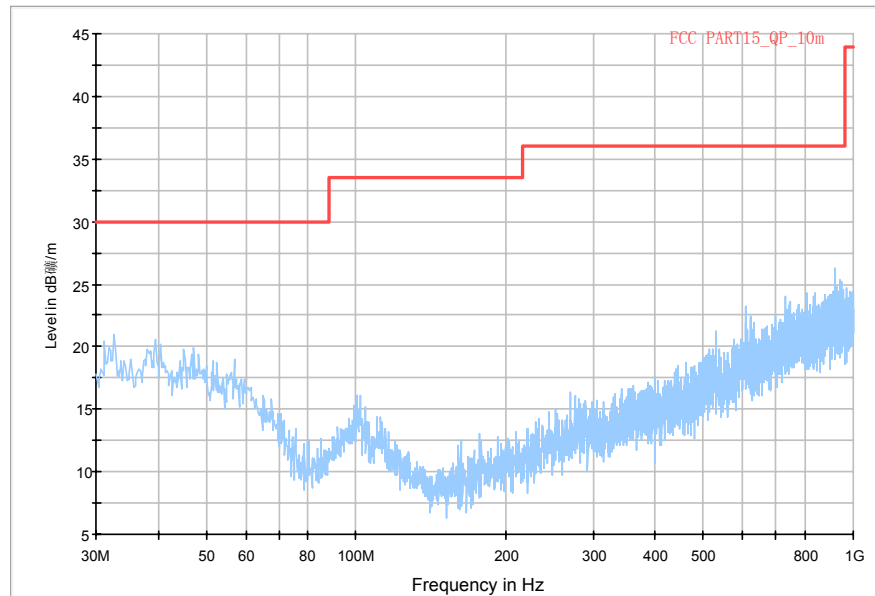
Frequency of Emission (MHz)	Limit (dB $\mu$ V/m)	Measurement Distance (m)
30-88	30	10
88-216	33.5	10
216-960	36	10
960-1000	44	10
>1000	54	3

### A. 10.3 Measurement results

IF bandwidth: 120 kHz

#### Idle Mode: 30MHz-1GHz

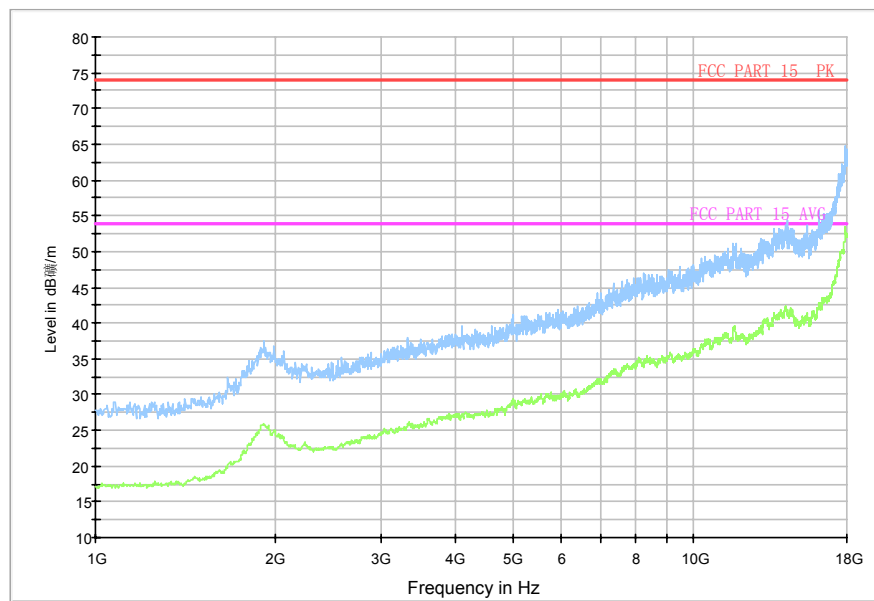
Normal RE\_30M-1GHz\_10m



RBW / VBW 1 MHz

#### Idle Mode: 1GHz-18GHz

Normal RE\_1G-18GHz\_directly



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