



# TEST REPORT

No. I14Z45433-GTE01

for

**TCT Mobile Limited**

**HSUPA/HSDPA/UMTS dual-band / GSM quadband mobile phone**

**Model Name: Soul-3.5 FF**

**Marketing Name: 4019M**

**FCC ID: RAD443**

with

**Hardware Version: PIO**

**Software Version: v121-C**

**Issued Date: 2014-05-22**

**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: 3/F Shou Xiang Technology Building, No.51 Xueyuan Road, Hai  
Dian District, Beijing, P. R. China  
Postal Code: 100191  
Telephone: 00861062304633  
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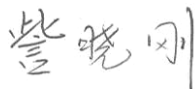
### 1.2. Testing Environment

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

### 1.3. Project data

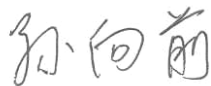
Testing Start Date: 2014-03-24  
Testing End Date: 2014-05-20

### 1.4. Signature



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



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



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**Lu Bingsong**  
**Deputy Director of the laboratory**  
**(Approved this test report)**

## **2. Client Information**

### **2.1. Applicant Information**

Company Name: TCT Mobile Limited  
Address /Post: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,  
Pudong Area Shanghai, P.R. China.  
City: Shanghai  
Postal Code: 201203  
Country: China  
Contact Person: Gong Zhizhou  
Contact Email: zhizhou.gong@jrdcom.com  
Telephone: 0086-21-61460890  
Fax: 0086-21-61460602

### **2.2. Manufacturer Information**

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

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

#### 3.1. About EUT

Description	HSUPA/HSDPA/UMTS dual-band / GSM quadband mobile phone
Model Name	4019M
Marketing Name	Soul-3.5 FF
FCC ID	RAD443
Antenna	Integrated
Output power	32.22dBm maximum ERP measured for GSM850
Extreme vol. Limits	3.4VDC 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.

Note: The EUT is a variant model of 4019A. Only ERP and RSE have been retested, the other result is coming from 4019A.

#### 3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version
UT01a	014007000000132	PIO	v121-C

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

#### 3.3. Internal Identification of AE used during the test

AE ID*	Description	SN	Remarks
AE1	Battery	B222150169A	/
AE2	Battery	B111248CCEA	/
AE3	Travel charger	/	/
AE4	Travel charger	/	/
AE5	USB cable	/	/
AE6	USB cable	/	/
AE1/AE2			
	Model	CAB31P0000C1	
	Manufacturer	BYD	
	Capacitance	1300 mAh	
	Nominal voltage	3.7 V	
AE3			
	Model	CBA3007AG0C1	
	Manufacturer	BYD	
	Length of cable	/	
AE4			
	Model	CBA3007AG0C3	
	Manufacturer	Yingju	

Length of cable	/
AE5	
Model	CDA3122002C2
Manufacturer	Shenghua
Length of cable	97 cm

AE6	
Model	CDA3122002C1
Manufacturer	Juwei
Length of cable	101 cm

\*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 HSUPA/HSDPA/UMTS dual-band / GSM quadband mobile phone with integrated antenna. 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.

<b>Reference</b>	<b>Title</b>	<b>Version</b>
FCC Part 24	PERSONAL COMMUNICATIONS SERVICES	10-1-13 Edition
FCC Part 22	PUBLIC MOBILE SERVICES	10-1-13 Edition
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

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.	Description	TYPE	series number	MANUFACTURE	CAL DUE DATE
1	Test Receiver	ESCI	100344	R&S	2015-03-03
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	NV216	101200	R&S	2014-07-11
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	00119024	ETS-Lindgren	2016-01-20
12	Signal Generator	N5183A	MY49060052	Agilent	2015-03-02
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 Digital Radio Communication tester (CMU-200). 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	3	33dBm(2W)

#### **Measurement result**

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

Frequency(MHz)	Power Step	Output power(dBm)
824.2	5	31.25
836.6	5	31.21
848.8	5	31.10

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

Frequency(MHz)	Power Step	Output power(dBm)
824.2	3	31.37
836.6	3	31.30
848.8	3	31.11

**EGPRS(GMSK, 1Slot)**

Frequency(MHz)	Power Step	Output power(dBm)
824.2	3	31.40
836.6	3	31.42
848.8	3	31.36

**PCS1900**

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

**Measurement result**

**GSM(GMSK)**

Frequency(MHz)	Power Step	Output power(dBm)
1850.2	0	28.39
1880.0	0	28.33
1909.8	0	28.34

**GPRS(GMSK, 1Slot)**

Frequency(MHz)	Power Step	Output power(dBm)
1850.2	3	28.42
1880.0	3	28.26
1909.8	3	28.33

**EGPRS(GMSK, 1Slot)**

Frequency(MHz)	Power Step	Output power(dBm)
1850.2	3	28.32
1880.0	3	28.31
1909.8	3	28.37

### A.1.3 Radiated

#### A.1.3.1 Description

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

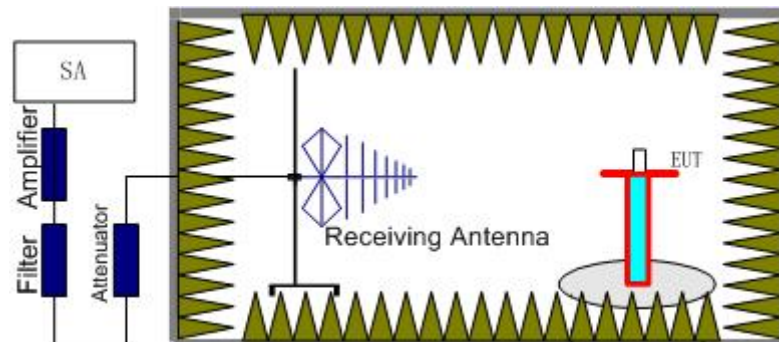
Rule Part 24.232(c) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

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

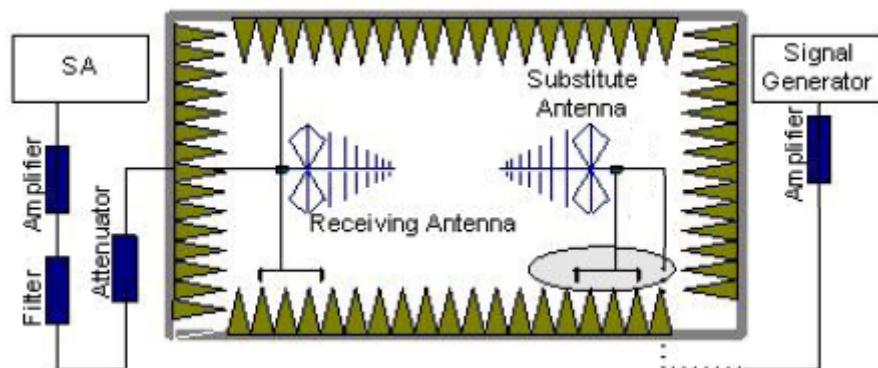
#### A.1.3.2 Method of Measurement

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	-14.73	2.07	-53.00	0.84	2.15	33.21	38.45	5.24	H
836.60	-14.83	2.08	-53.00	0.90	2.15	33.04	38.45	5.41	H
848.80	-15.99	2.09	-53.00	0.95	2.15	31.82	38.45	6.63	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	-14.72	2.07	-53.00	0.84	2.15	33.22	38.45	5.23	H
836.60	-14.75	2.08	-53.00	0.90	2.15	33.12	38.45	5.33	H
848.80	-15.98	2.09	-53.00	0.95	2.15	31.83	38.45	6.62	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	-14.75	2.07	-53.00	0.84	2.15	33.19	38.45	5.26	H
836.60	-14.76	2.08	-53.00	0.90	2.15	33.11	38.45	5.34	H
848.80	-15.94	2.09	-53.00	0.95	2.15	31.87	38.45	6.58	H

Frequency: 824.20MHz

Peak ERP(dBm)=P<sub>Mea</sub>(-14.72dBm)-P<sub>cl</sub>(2.07dB)-P<sub>Ag</sub>(-53.00dB)-G<sub>a</sub>(0.84dB)-2.15dB=33.22dBm

**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	-20.66	3.19	-50.00	-4.56	30.71	33.00	2.29	H
1880.00	-19.87	3.11	-50.00	-4.43	31.45	33.00	1.55	H
1909.80	-19.56	3.18	-50.00	-4.30	31.56	33.00	1.44	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	-20.45	3.19	-50.00	-4.56	30.92	33.00	2.08	H
1880.00	-19.91	3.11	-50.00	-4.43	31.41	33.00	1.59	H
1909.80	-19.73	3.18	-50.00	-4.30	31.39	33.00	1.61	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	-20.68	3.19	-50.00	-4.56	30.69	33.00	2.31	H
1880.00	-19.92	3.11	-50.00	-4.43	31.40	33.00	1.60	H
1909.80	-19.71	3.18	-50.00	-4.30	31.41	33.00	1.59	H

Frequency: 1909.80MHz

Peak EIRP(dBm)= P<sub>Mea</sub>(-19.56dBm) - P<sub>cl</sub>(3.18dB) - P<sub>Ag</sub>(-50.00dB) - G<sub>a</sub> (-4.30dB) =31.56dBm

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

## A.2 EMISSION LIMIT

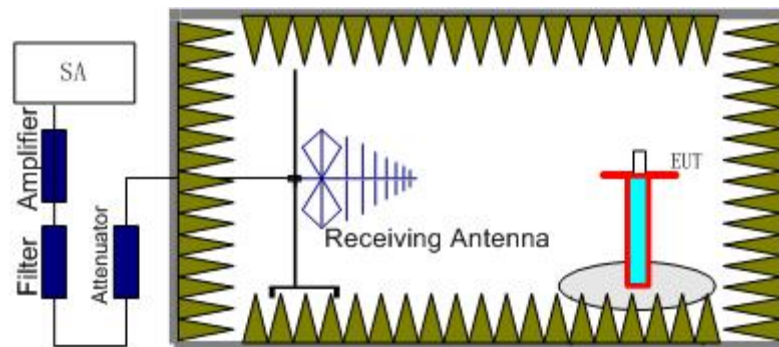
### **A.2.1 Measurement Method**

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

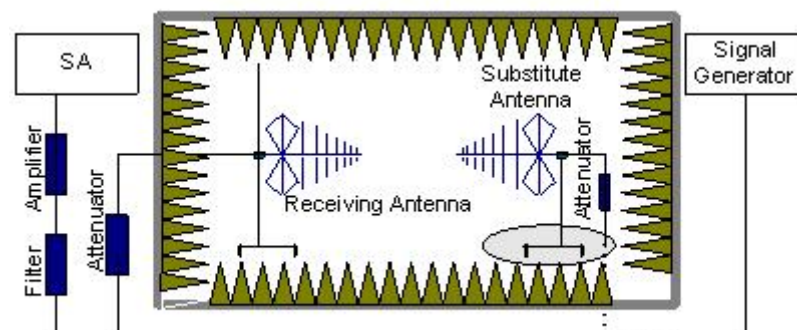
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The resolution bandwidth is set as outlined in Part 24.238 and Part 22.917. The spectrum is scanned with the mobile station 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 ( $P_r$ ).
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-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 <sub>Mea</sub> (dBm)	Path Loss	Antenna Gain	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Margin(dB)	Polarization
1648.55	-48.11	2.91	-5.45	2.15	-47.72	-13.00	34.72	V
3188.73	-64.51	4.10	-7.15	2.15	-63.61	-13.00	50.61	H
4018.94	-65.57	4.66	-8.51	2.15	-63.87	-13.00	50.87	V
5270.01	-65.00	5.33	-9.86	2.15	-62.62	-13.00	49.62	H
6997.94	-63.65	6.25	-11.10	2.15	-60.95	-13.00	47.95	H
8794.21	-62.27	7.45	-12.44	2.15	-59.43	-13.00	46.43	V

**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
1673.06	-41.43	2.97	-5.34	2.15	-41.21	-13.00	28.21	V
3129.11	-67.17	4.01	-7.01	2.15	-66.32	-13.00	53.32	V
4631.20	-65.42	4.96	-9.04	2.15	-63.49	-13.00	50.49	V
5693.12	-64.69	5.52	-10.08	2.15	-62.28	-13.00	49.28	H
6207.78	-63.73	5.78	-10.37	2.15	-61.29	-13.00	48.29	V
7058.54	-63.85	6.53	-11.14	2.15	-61.39	-13.00	48.39	V

**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
1697.69	-40.00	2.95	-5.23	2.15	-39.87	-13.00	26.87	V
3275.16	-63.53	4.18	-7.36	2.15	-62.50	-13.00	49.50	H
4093.80	-62.52	4.72	-8.56	2.15	-60.83	-13.00	47.83	H
4822.37	-65.72	5.14	-9.38	2.15	-63.63	-13.00	50.63	V
6196.93	-65.58	5.77	-10.36	2.15	-63.14	-13.00	50.14	H
7110.67	-65.14	6.36	-11.17	2.15	-62.48	-13.00	49.48	V

**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
3700.35	-59.39	4.44	-8.14	-55.69	-13.00	42.69	V
5550.60	-59.24	5.46	-10.02	-54.68	-13.00	41.68	V
7400.76	-60.18	6.42	-11.34	-55.26	-13.00	42.26	H
8439.61	-66.85	7.01	-12.16	-61.70	-13.00	48.70	H
9971.37	-63.88	7.80	-12.41	-59.27	-13.00	46.27	V
13628.45	-58.16	9.22	-13.85	-53.53	-13.00	40.53	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
3760.21	-61.40	4.52	-8.21	-57.71	-13.00	44.71	H
5705.74	-67.88	5.51	-10.08	-63.31	-13.00	50.31	V
7143.70	-65.09	6.39	-11.19	-60.29	-13.00	47.29	V
8463.01	-66.62	6.92	-12.18	-61.36	-13.00	48.36	H
10698.86	-64.60	8.01	-12.46	-60.15	-13.00	47.15	H
13159.66	-50.26	9.14	-13.46	-45.94	-13.00	32.94	V

**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
4176.59	-65.65	4.69	-8.61	-61.73	-13.00	48.73	H
5436.42	-66.02	5.43	-9.96	-61.49	-13.00	48.49	V
7638.95	-52.77	6.73	-11.54	-47.96	-13.00	34.96	V
8616.18	-65.96	7.45	-12.29	-61.12	-13.00	48.12	H
9574.29	-66.18	7.79	-12.57	-61.40	-13.00	48.40	V
13833.41	-56.20	9.18	-13.93	-51.45	-13.00	38.45	V

### A.3 CONDUCTED EMISSION

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

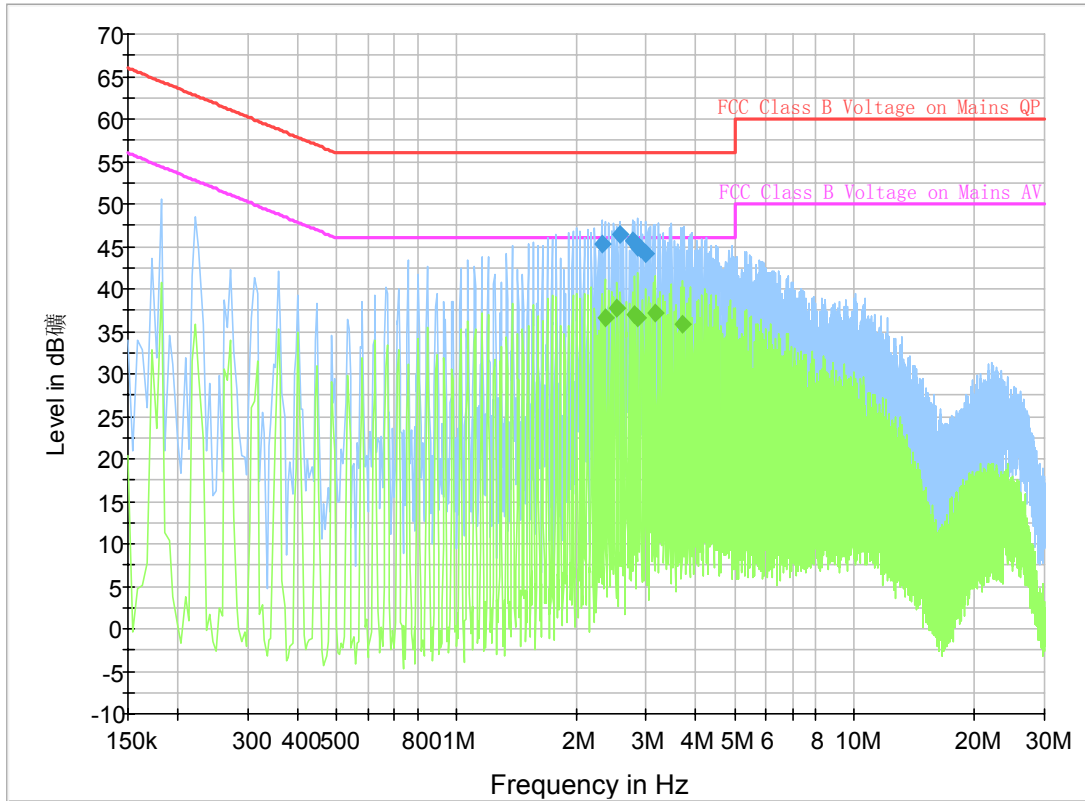
#### **A.3.1 Limit**

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**



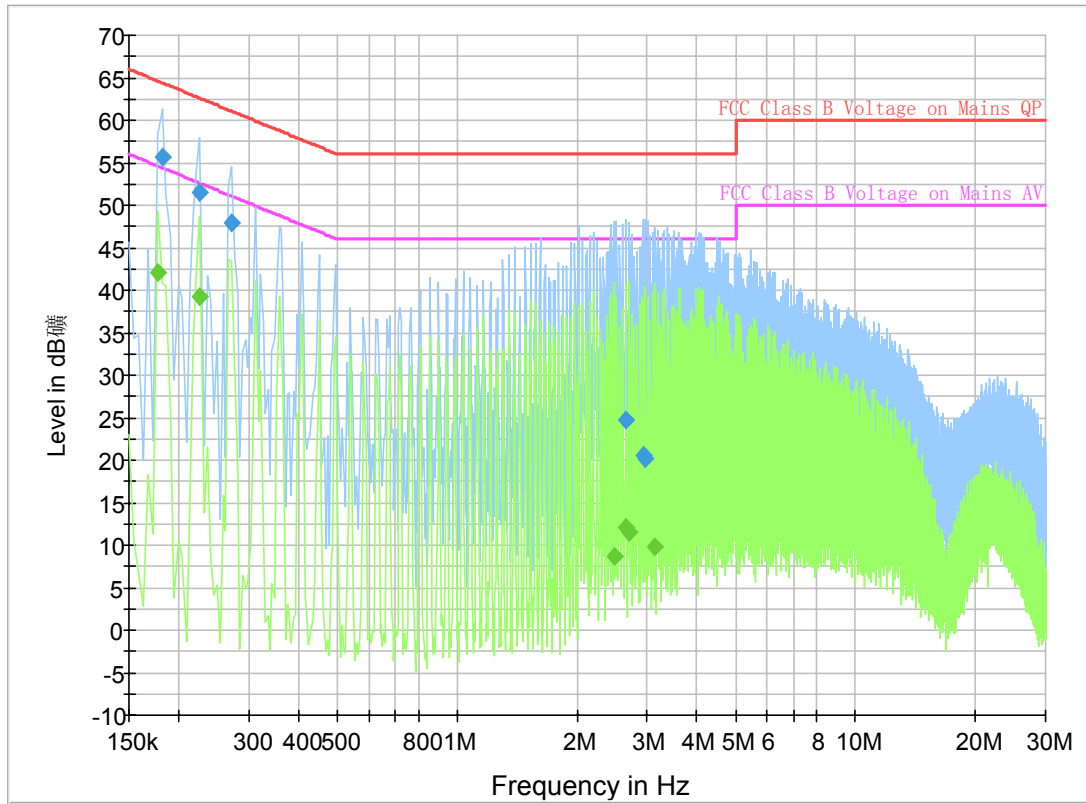
**Final Result 1**

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
2.319000	45.3	GND	N	9.7	10.7	56.0
2.584500	46.4	GND	N	9.7	9.6	56.0
2.764500	45.6	GND	L1	9.7	10.4	56.0
2.854500	45.0	GND	L1	9.7	11.0	56.0
2.899500	44.8	GND	L1	9.7	11.2	56.0
2.989500	44.1	GND	N	9.7	11.9	56.0

**Final Result 2**

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
2.364000	36.5	GND	N	9.7	9.5	46.0
2.539500	37.7	GND	N	9.7	8.3	46.0
2.809500	36.9	GND	L1	9.7	9.1	46.0
2.854500	36.5	GND	L1	9.7	9.5	46.0
3.165000	37.1	GND	N	9.7	8.9	46.0
3.700500	35.8	GND	N	9.7	10.2	46.0

PCS1900MHz



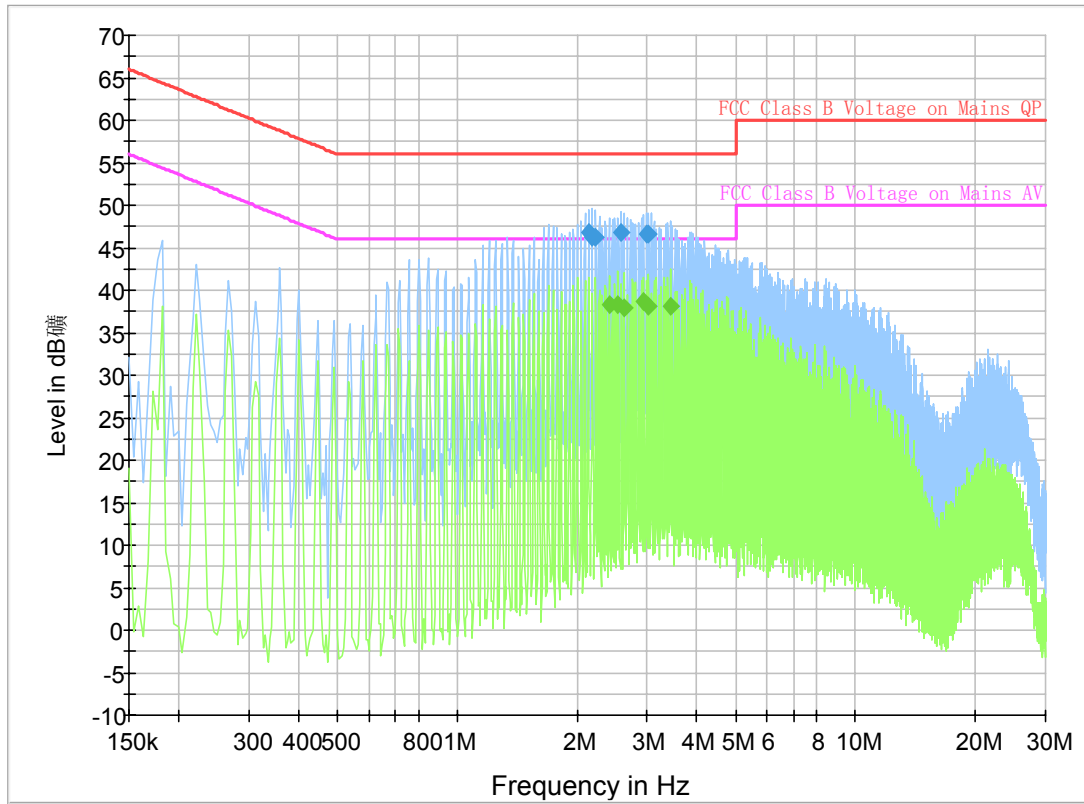
**Final Result 1**

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.181500	55.6	GND	L1	9.8	8.8	64.4
0.226500	51.6	GND	L1	9.8	11.0	62.6
0.271500	47.9	GND	L1	9.8	13.1	61.1
2.647500	24.7	GND	N	9.7	31.3	56.0
2.922000	20.6	GND	L1	9.7	35.4	56.0
2.967000	20.1	GND	L1	9.7	35.9	56.0

**Final Result 2**

Frequency (MHz)	Average (dB $\mu$ V)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.177000	42.1	GND	N	9.8	12.5	54.6
0.226500	39.2	GND	L1	9.8	13.4	52.6
2.472000	8.6	GND	L1	9.7	37.4	46.0
2.647500	12.1	GND	N	9.7	33.9	46.0
2.692500	11.5	GND	N	9.7	34.5	46.0
3.142500	9.8	GND	N	9.7	36.2	46.0

PCS1900MHz



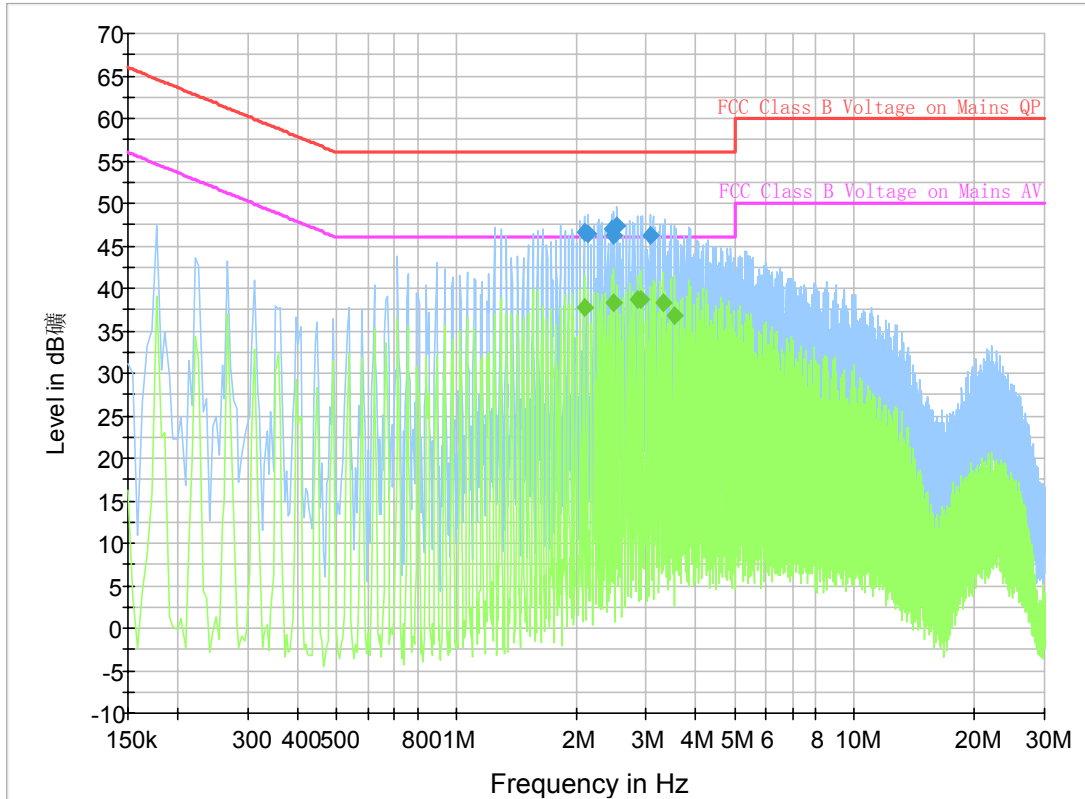
**Final Result 1**

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
2.139000	46.7	GND	N	9.7	9.3	56.0
2.184000	46.2	GND	N	9.7	9.8	56.0
2.229000	46.1	GND	L1	9.7	9.9	56.0
2.584500	46.8	GND	L1	9.7	9.2	56.0
2.985000	46.6	GND	L1	9.7	9.4	56.0
3.030000	46.5	GND	L1	9.7	9.5	56.0

**Final Result 2**

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
2.404500	38.3	GND	L1	9.7	7.7	46.0
2.539500	38.3	GND	N	9.7	7.7	46.0
2.629500	37.9	GND	L1	9.7	8.1	46.0
2.940000	38.6	GND	N	9.7	7.4	46.0
3.030000	38.1	GND	L1	9.7	7.9	46.0
3.430500	38.1	GND	L1	9.7	7.9	46.0

MP3



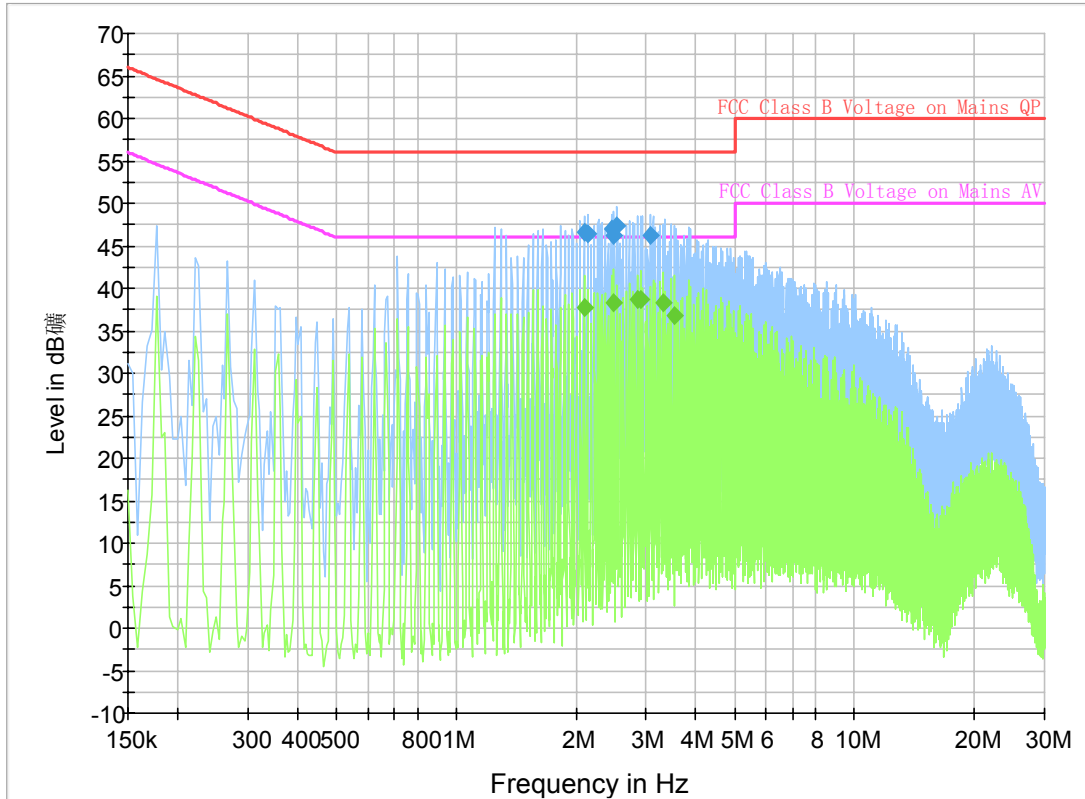
**Final Result 1**

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
2.094000	46.7	GND	L1	9.7	9.3	56.0
2.139000	46.4	GND	L1	9.7	9.6	56.0
2.449500	47.0	GND	N	9.7	9.0	56.0
2.494500	46.1	GND	N	9.7	9.9	56.0
2.539500	47.4	GND	N	9.7	8.6	56.0
3.075000	46.2	GND	N	9.7	9.8	56.0

**Final Result 2**

Frequency (MHz)	Average (dB $\mu$ V)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
2.094000	37.7	GND	N	9.7	8.3	46.0
2.494500	38.2	GND	N	9.7	7.8	46.0
2.850000	38.7	GND	N	9.7	7.3	46.0
2.895000	38.6	GND	N	9.7	7.4	46.0
3.295500	38.4	GND	L1	9.7	7.6	46.0
3.520500	36.7	GND	N	9.7	9.3	46.0

CAMERA



**Final Result 1**

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
2.094000	46.7	GND	L1	9.7	9.3	56.0
2.139000	46.4	GND	L1	9.7	9.6	56.0
2.449500	47.0	GND	N	9.7	9.0	56.0
2.494500	46.1	GND	N	9.7	9.9	56.0
2.539500	47.4	GND	N	9.7	8.6	56.0
3.075000	46.2	GND	N	9.7	9.8	56.0

**Final Result 2**

Frequency (MHz)	Average (dB $\mu$ V)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
2.094000	37.7	GND	N	9.7	8.3	46.0
2.494500	38.2	GND	N	9.7	7.8	46.0
2.850000	38.7	GND	N	9.7	7.3	46.0
2.895000	38.6	GND	N	9.7	7.4	46.0
3.295500	38.4	GND	L1	9.7	7.6	46.0
3.520500	36.7	GND	N	9.7	9.3	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°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 3.4VDC 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)
3.4	-11	0.013
3.8	-15	0.018
4.2	-12	0.015

##### Frequency Error vs Temperature

temperature(°C)	Frequency error(Hz)	Frequency error(ppm)
-30	-15	0.018
-20	-18	0.021
-10	-16	0.019
0	-14	0.017
10	-31	0.037
20	-16	0.019
30	-14	0.017
40	-19	0.022
50	-12	0.015

##### PCS 1900

##### Frequency Error vs Voltage

Voltage(V)	Frequency error(Hz)	Frequency error(ppm)
3.4	-24	0.013
3.8	-29	0.016
4.2	-28	0.015

##### Frequency Error vs Temperature

temperature(°C)	Frequency error(Hz)	Frequency error(ppm)
-30	-28	0.015
-20	-19	0.010
-10	-34	0.018
0	-26	0.014
10	-25	0.013
20	-30	0.016
30	-33	0.018
40	-27	0.014
50	-21	0.011

## A.5 OCCUPIED BANDWIDTH

### A.5.1 Occupied Bandwidth Results

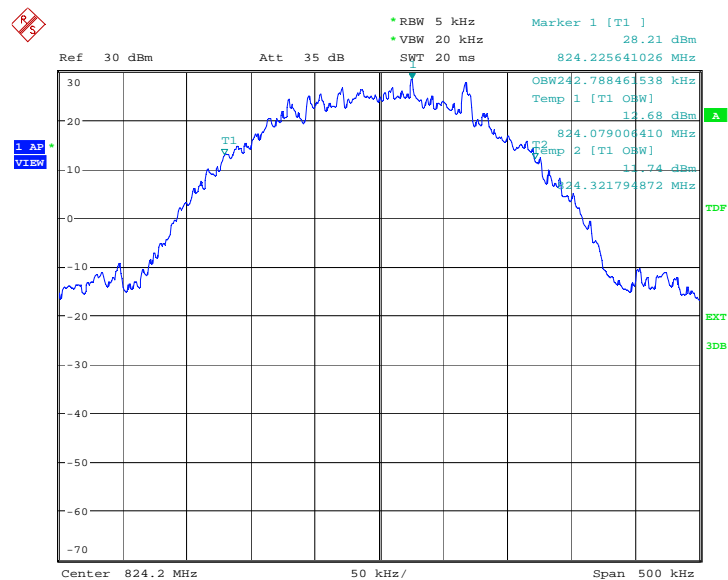
Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of PCS1900 band and GSM850 band. The table below lists the measured 99% BW. Spectrum analyzer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

#### **GSM 850(99% BW)**

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

#### **GSM 850**

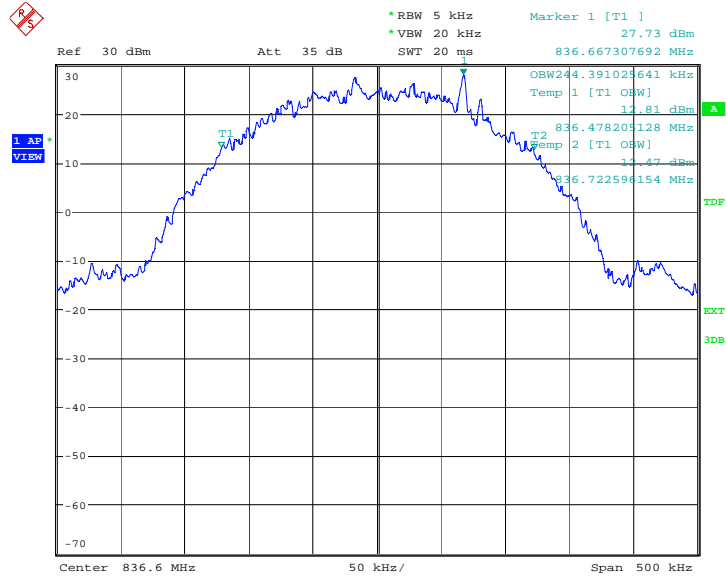
#### **Channel 128-Occupied Bandwidth (99% BW)**



Date: 24.APR.2014 11:18:53

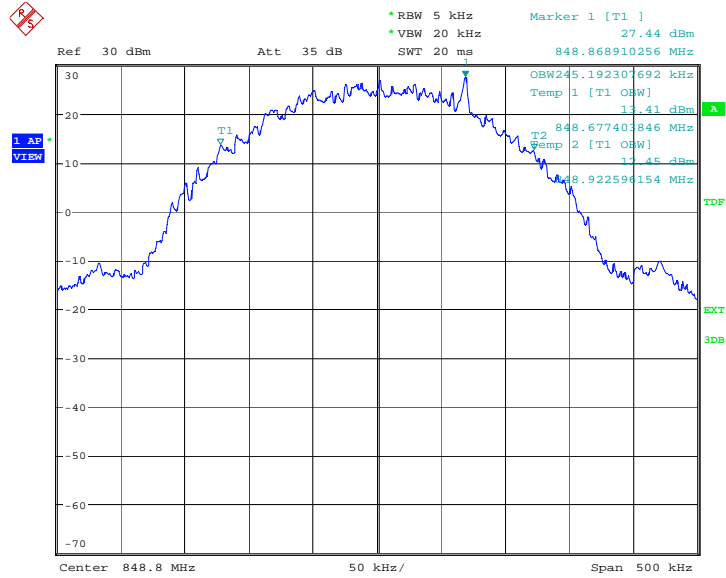


### Channel 190-Occupied Bandwidth (99% BW)



Date: 24.APR.2014 11:19:26

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



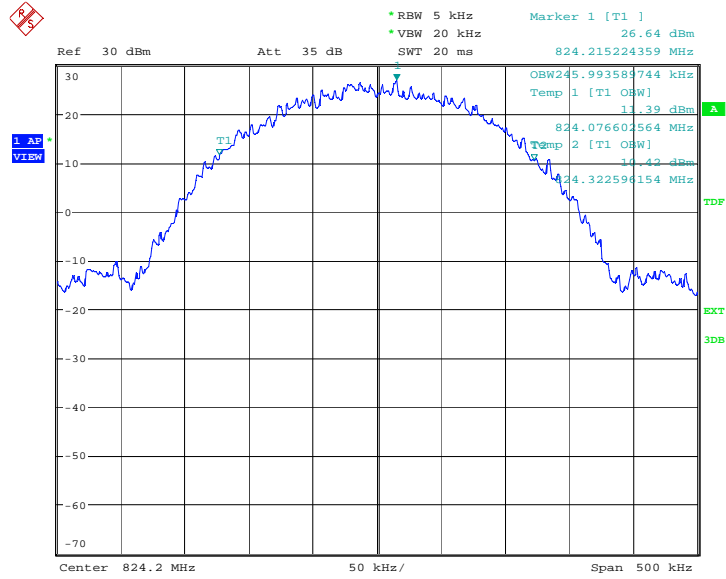
Date: 24.APR.2014 11:19:58

**GPRS 850(99% BW)**

Frequency(MHz)	Occupied Bandwidth (99% BW)( kHz)
824.2	245.994
836.6	245.192
848.8	244.391

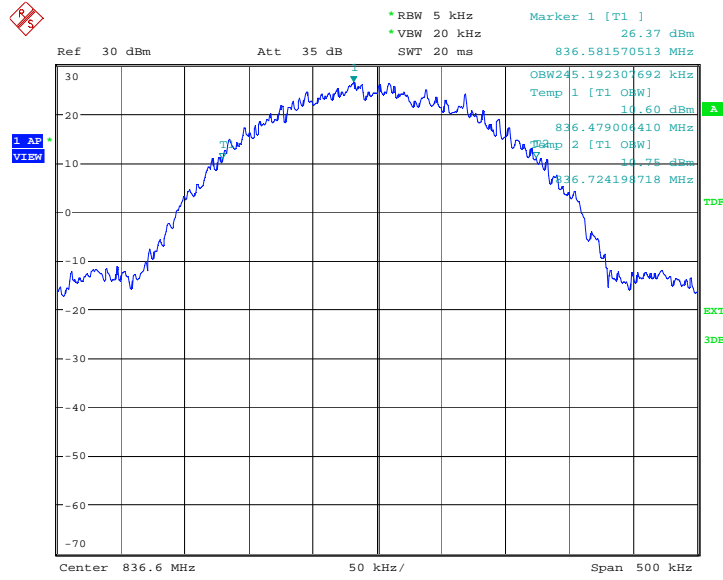
**GPRS 850**

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



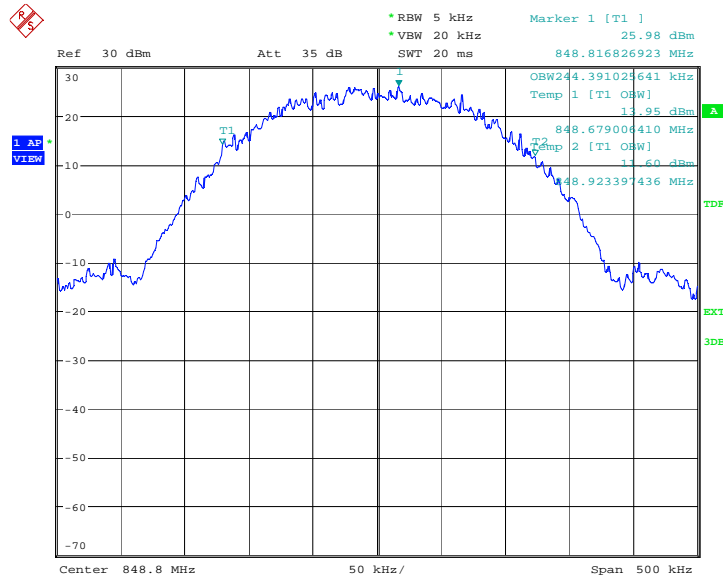
Date: 24.APR.2014 11:53:21

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



Date: 24.APR.2014 11:53:53

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

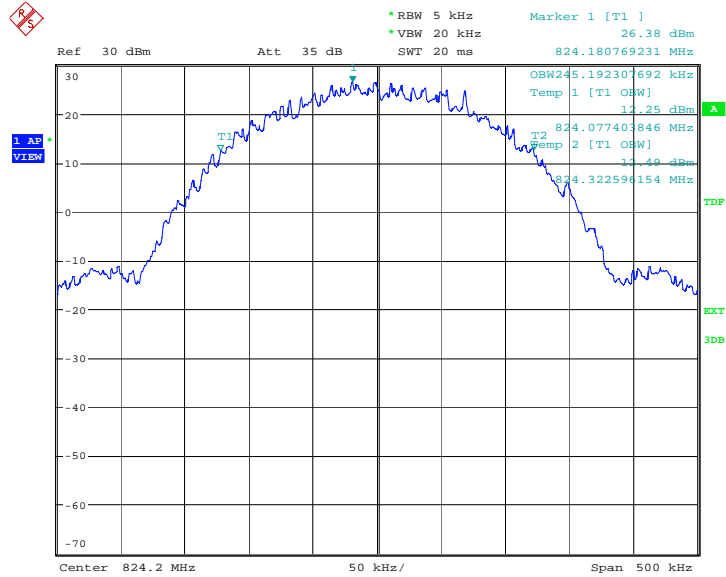


Date: 24.APR.2014 11:54:25

**EGPRS 850-GMSK(99% BW)**

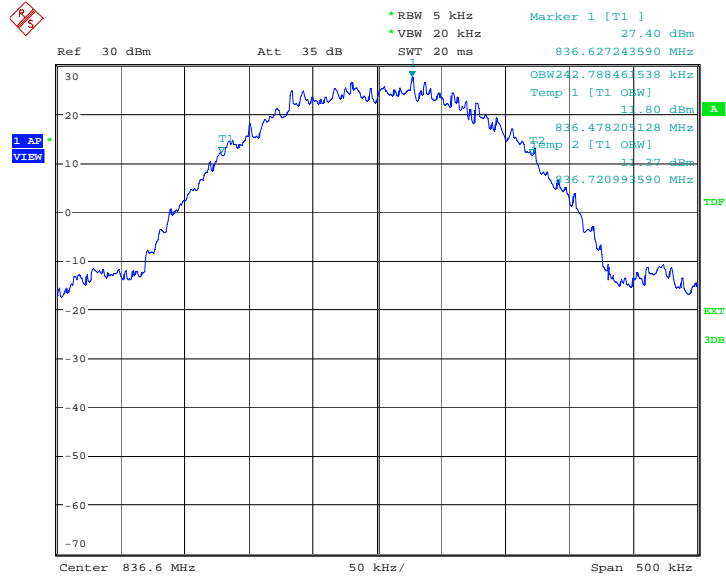
Frequency(MHz)	Occupied Bandwidth (99% BW)( kHz)
824.2	245.192
836.6	242.788
848.8	244.391

**EGPRS 850-GMSK  
Channel 128-Occupied Bandwidth (99% BW)**



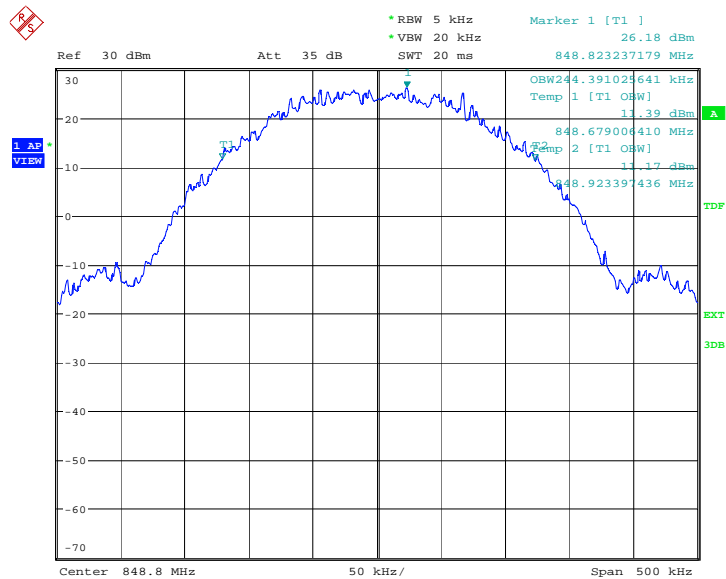
Date: 20.MAY.2014 08:26:34

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



Date: 20.MAY.2014 08:27:07

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



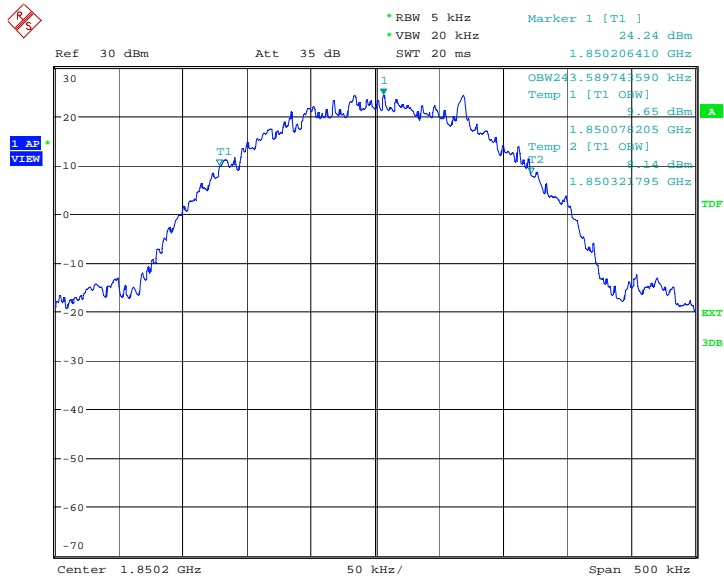
Date: 20.MAY.2014 08:27:39

**PCS 1900(99% BW)**

Frequency(MHz)	Occupied Bandwidth (99% BW)( kHz)
1850.2	243.590
1880.0	243.590
1909.8	241.186

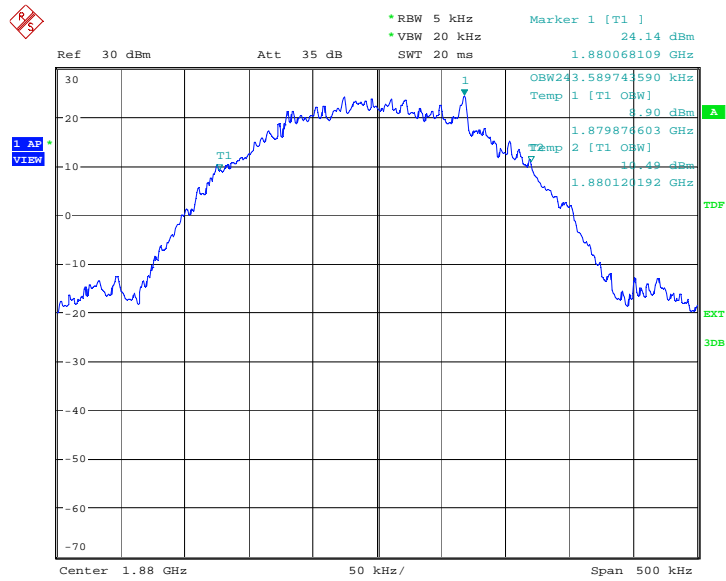
**PCS 1900**

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



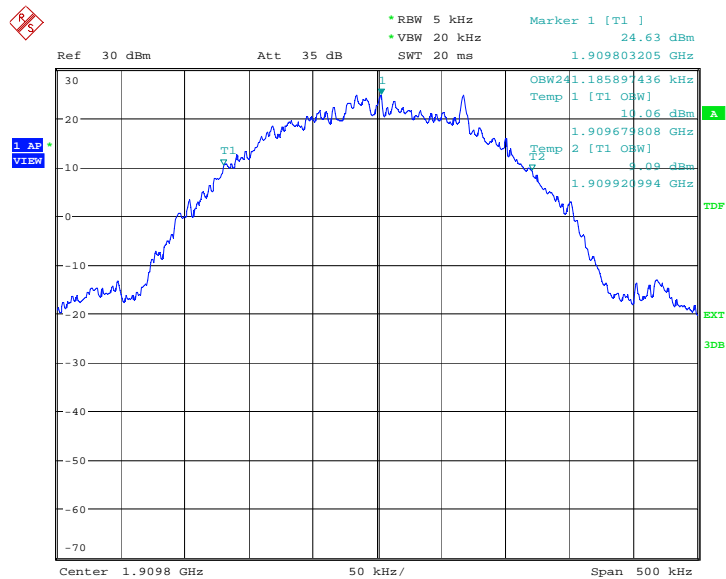
Date: 24.APR.2014 11:34:52

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



Date: 24.APR.2014 11:35:24

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



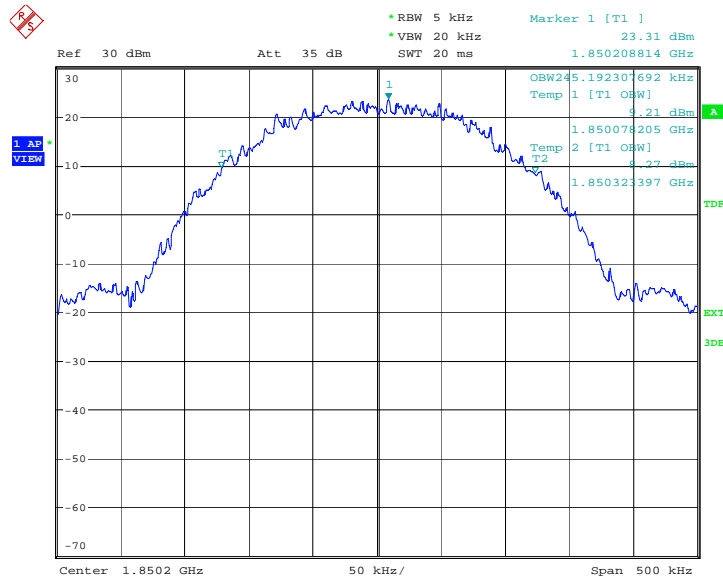
Date: 24.APR.2014 11:35:57

**GPRS 1900(99% BW)**

Frequency(MHz)	Occupied Bandwidth (99% BW)( kHz)
1850.2	245.192
1880.0	243.590
1909.8	242.788

**GPRS 1900**

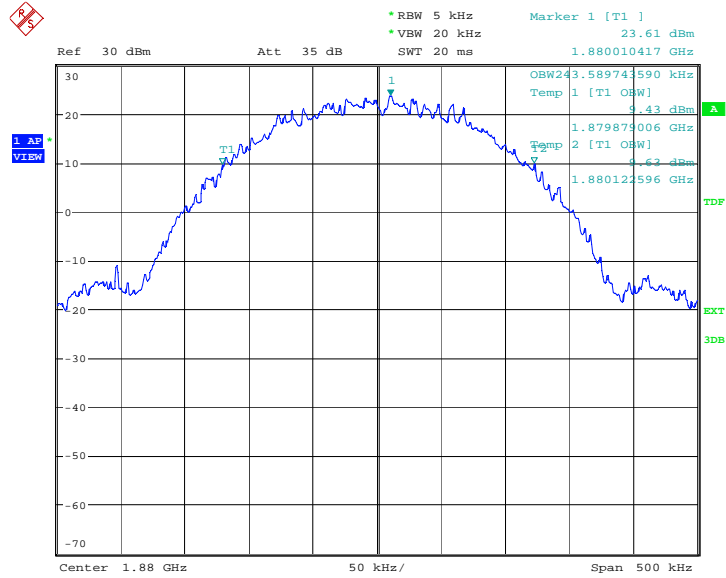
**Channel 512-Occupied Bandwidth (99% BW)**



Date: 24.APR.2014 11:57:35

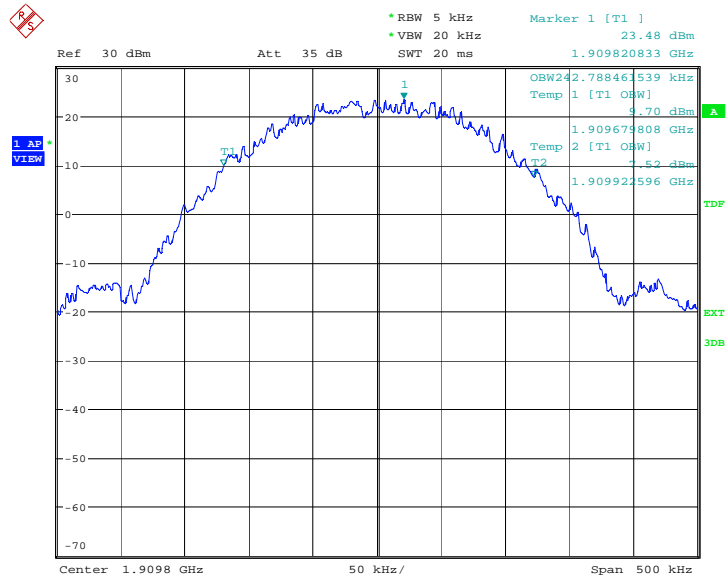


### Channel 661-Occupied Bandwidth (99% BW)



Date: 24.APR.2014 11:58:08

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



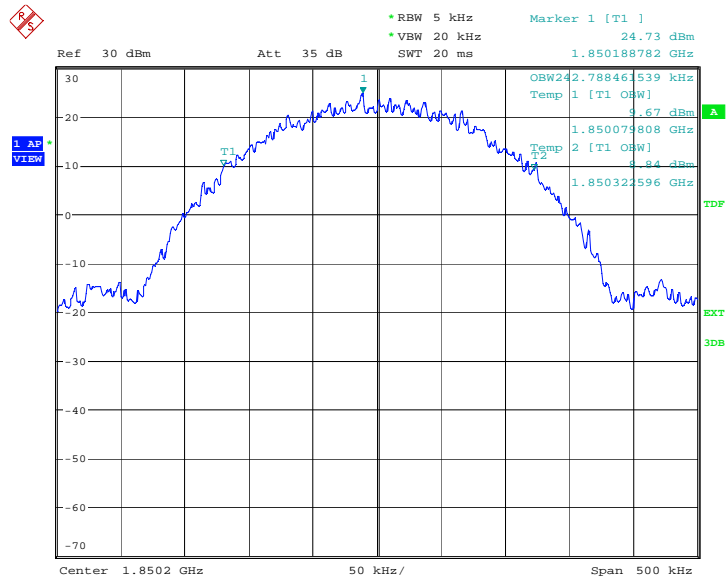
Date: 24.APR.2014 11:58:40

**EGPRS 1900-GMSK(99% BW)**

Frequency(MHz)	Occupied Bandwidth (99% BW)( kHz)
1850.2	242.788
1880.0	245.192
1909.8	245.192

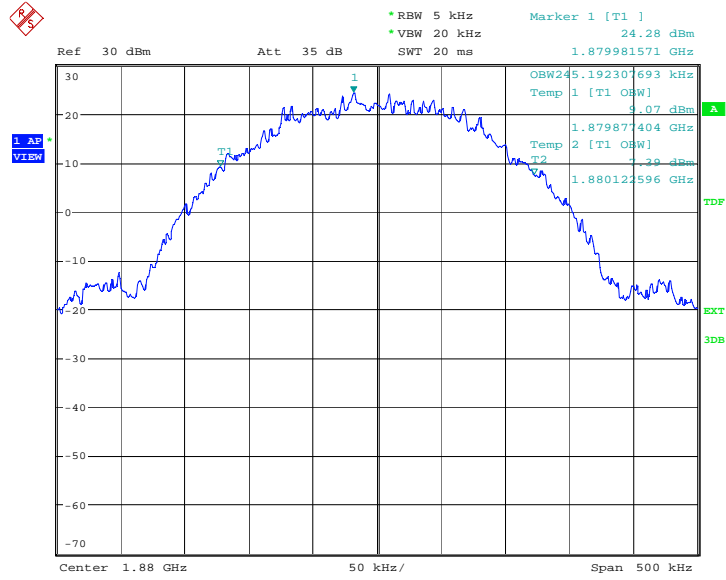
**EGPRS 1900-GMSK**

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



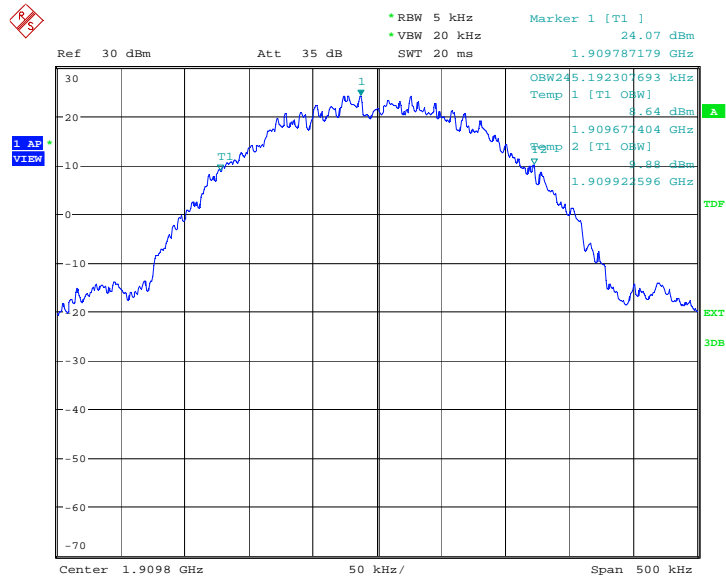
Date: 20.MAY.2014 08:31:59

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



Date: 20.MAY.2014 08:32:32

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



Date: 20.MAY.2014 08:33:04

## A.6 EMISSION BANDWIDTH

### A.6.1 Emission Bandwidth Results

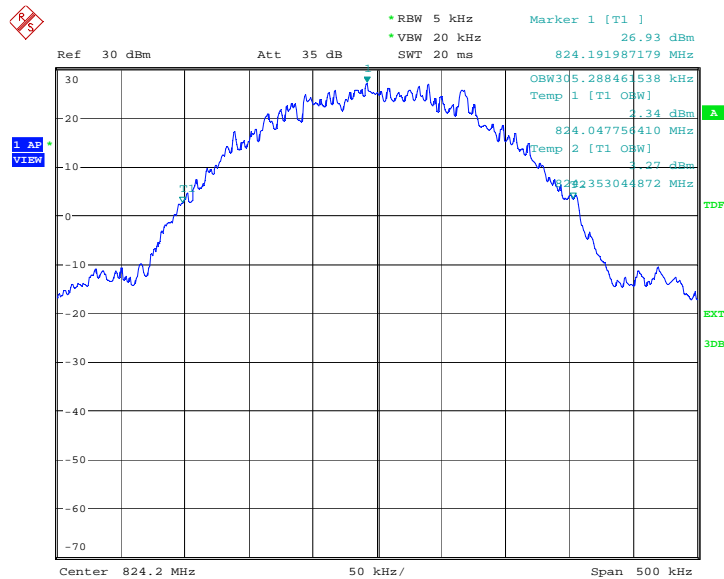
Similar to conducted emissions; Emission bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of PCS1900 band and GSM850 band. Table below lists the measured 100% BW. Spectrum analyzer plots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

#### GSM 850(100% BW)

Frequency(MHz)	Emission Bandwidth (100% BW)( kHz)
824.2	305.288
836.6	306.090
848.8	306.090

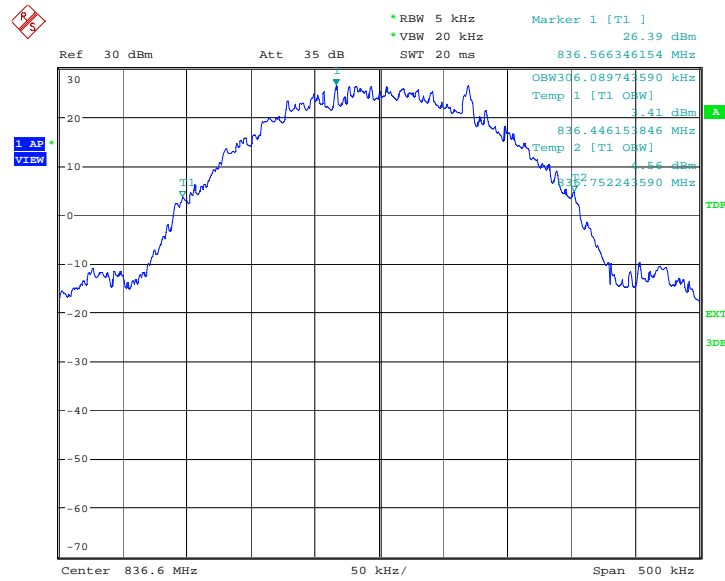
#### GSM 850

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



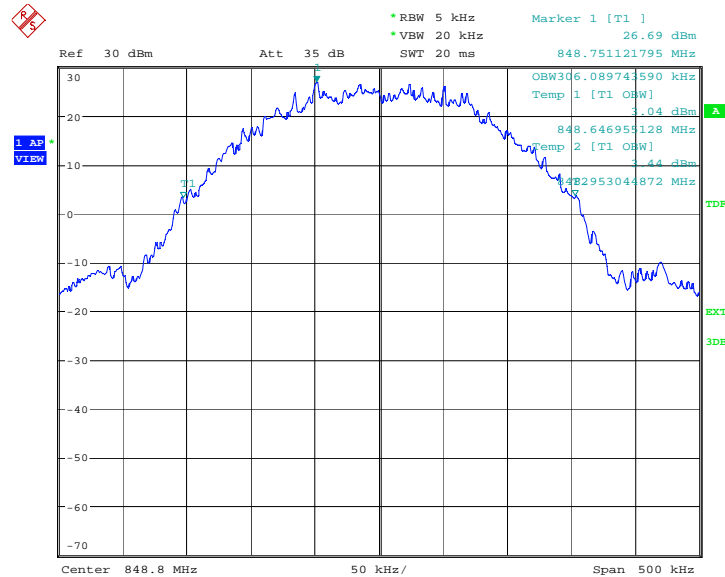
Date: 24.APR.2014 11:20:31

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



Date: 24.APR.2014 11:21:04

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



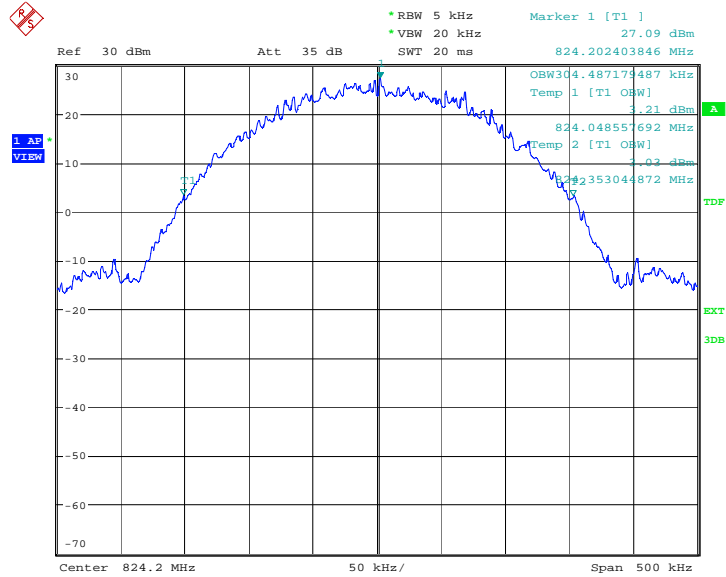
Date: 24.APR.2014 11:21:36

**GPRS 850(100% BW)**

Frequency(MHz)	Emission Bandwidth (100% BW)( kHz)
824.2	304.487
836.6	306.090
848.8	304.487

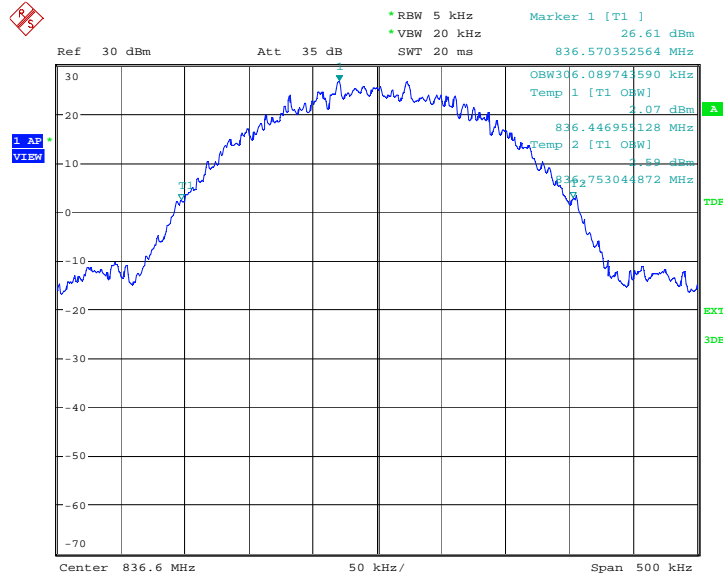
**GPRS 850**

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



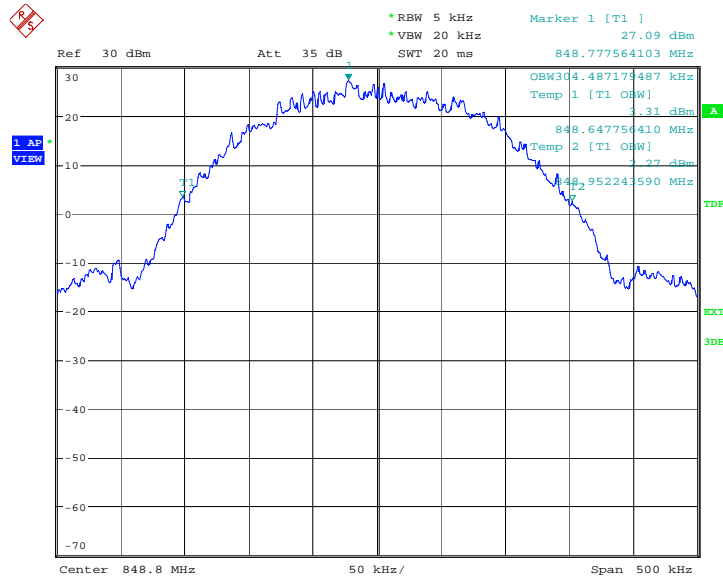
Date: 24.APR.2014 11:54:59

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



Date: 24.APR.2014 11:55:31

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



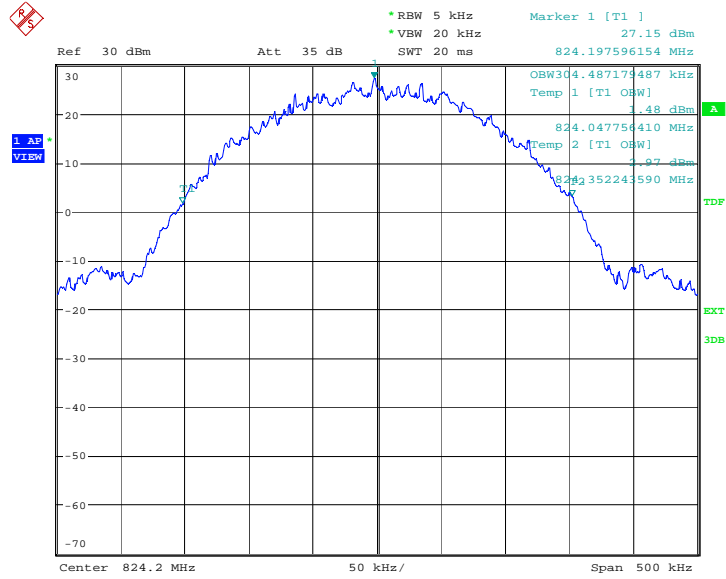
Date: 24.APR.2014 11:56:03

**EGPRS 850-GMSK(100% BW)**

Frequency(MHz)	Emission Bandwidth (100% BW)( kHz)
824.2	304.487
836.6	305.288
848.8	304.487

**EGPRS 850-GMSK**

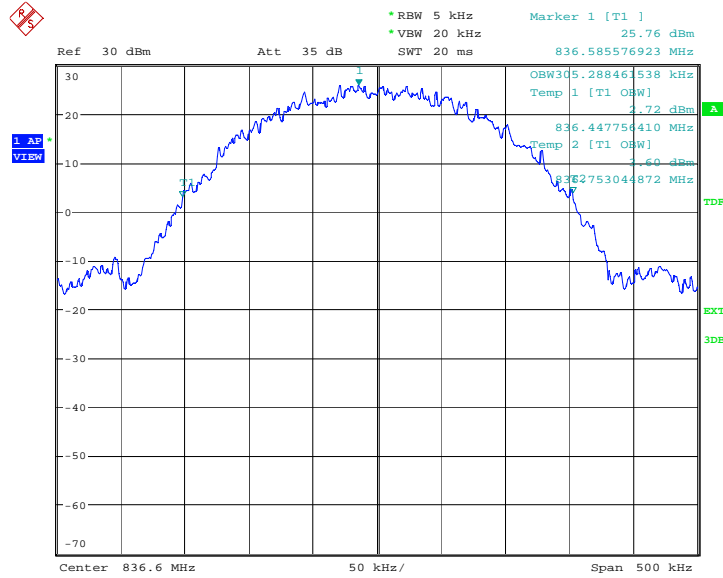
**Channel 128-Emission Bandwidth (100% BW)**



Date: 20.MAY.2014 08:28:13

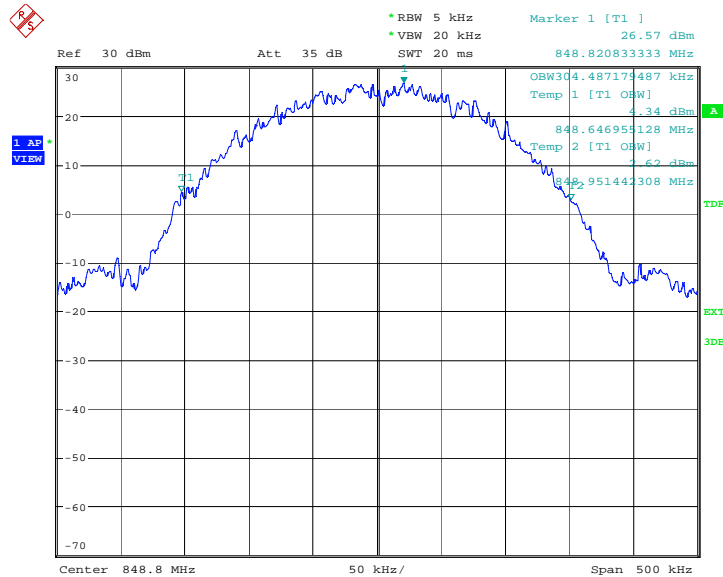


### Channel 190-Emission Bandwidth (100% BW)



Date: 20.MAY.2014 08:28:45

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



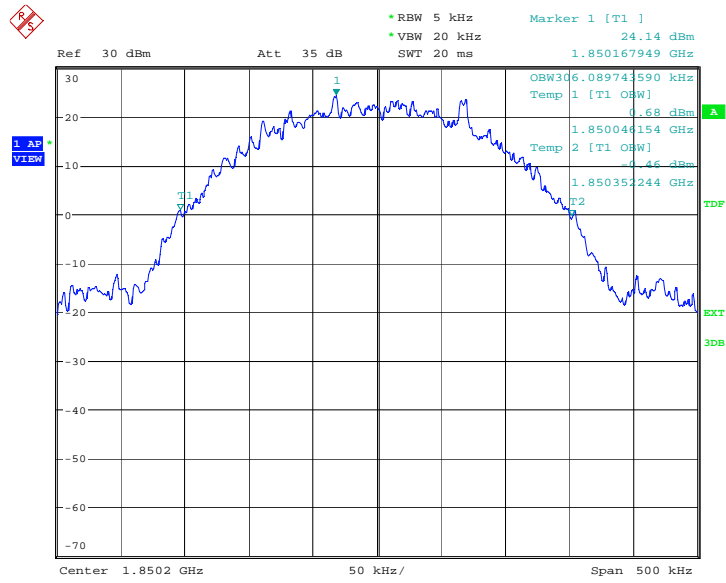
Date: 20.MAY.2014 08:29:17

**PCS 1900(100% BW)**

Frequency(MHz)	Emission Bandwidth (100% BW)( kHz)
1850.2	306.090
1880.0	305.288
1909.8	304.487

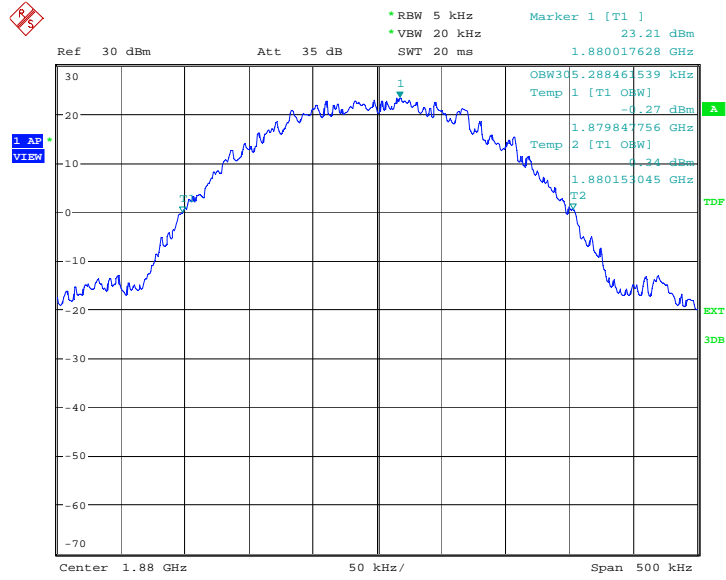
**PCS 1900**

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



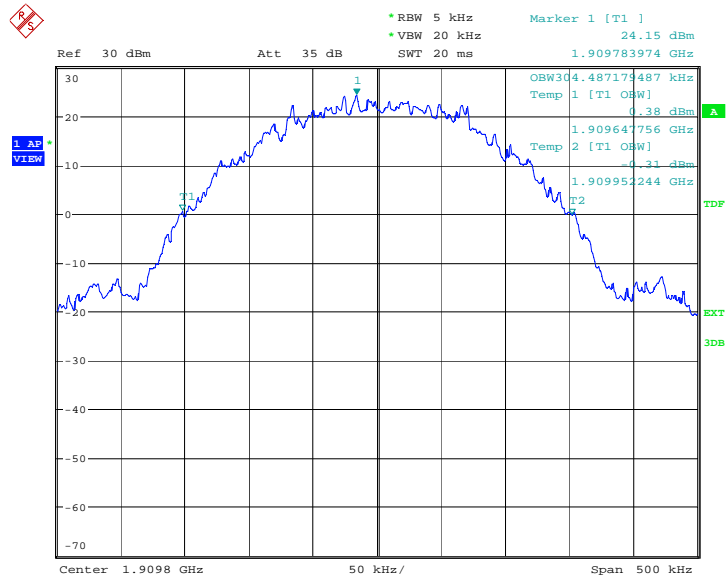
Date: 24.APR.2014 11:36:30

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



Date: 24.APR.2014 11:37:03

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



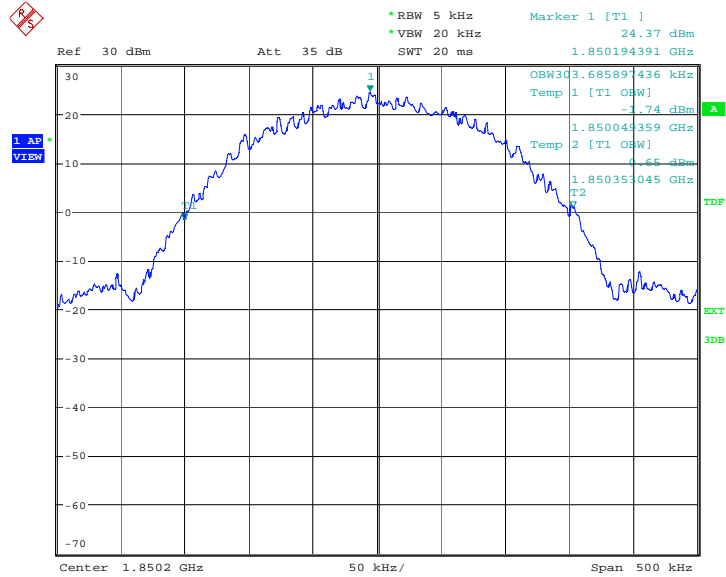
Date: 24.APR.2014 11:37:35

**GPRS 1900(100% BW)**

Frequency(MHz)	Emission Bandwidth (100% BW)( kHz)
1850.2	303.686
1880.0	304.487
1909.8	305.288

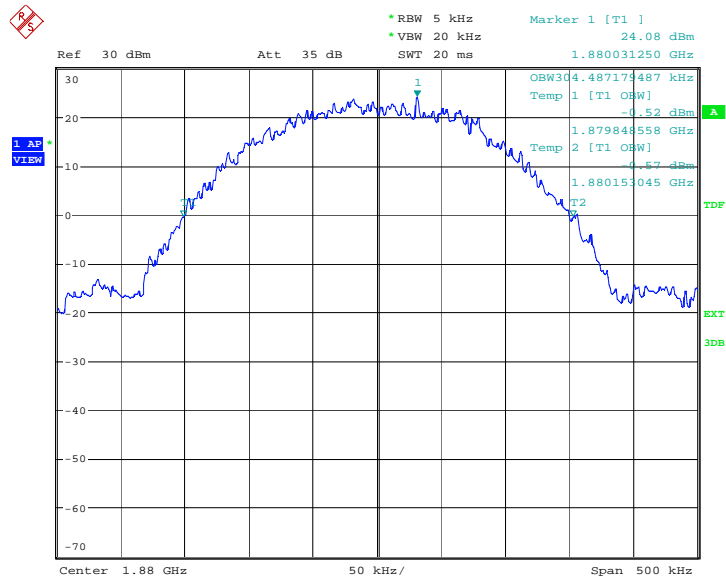
**GPRS 1900**

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



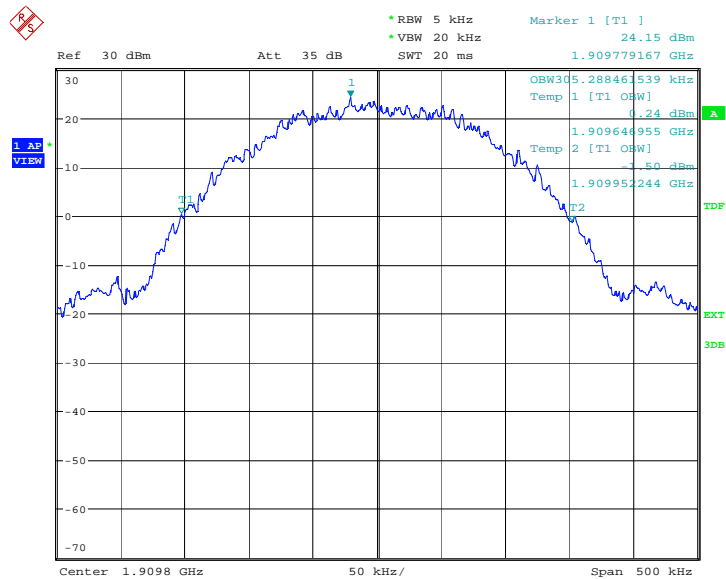
Date: 24.APR.2014 11:59:14

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



Date: 24.APR.2014 11:59:46

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



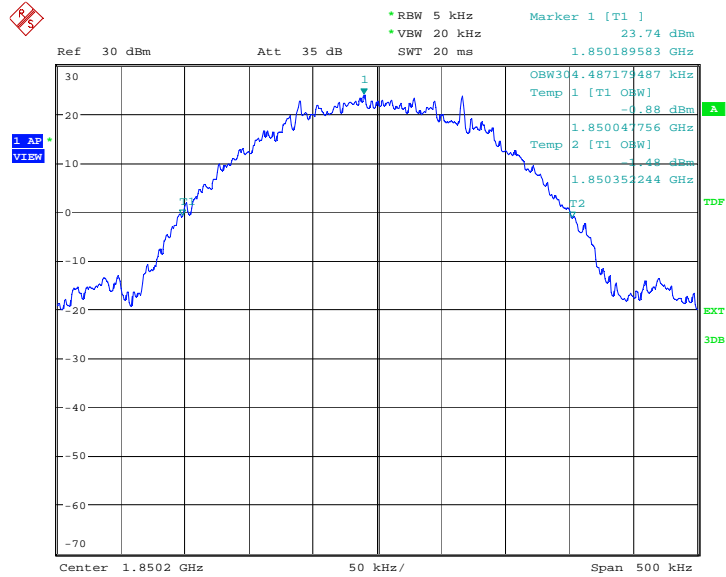
Date: 24.APR.2014 12:00:18

**EGPRS 1900-GMSK(100% BW)**

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

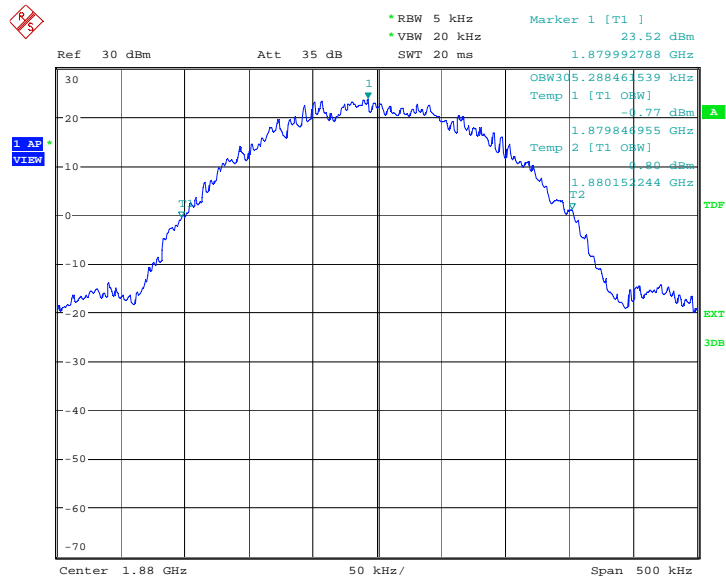
**EGPRS 1900-GMSK**

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



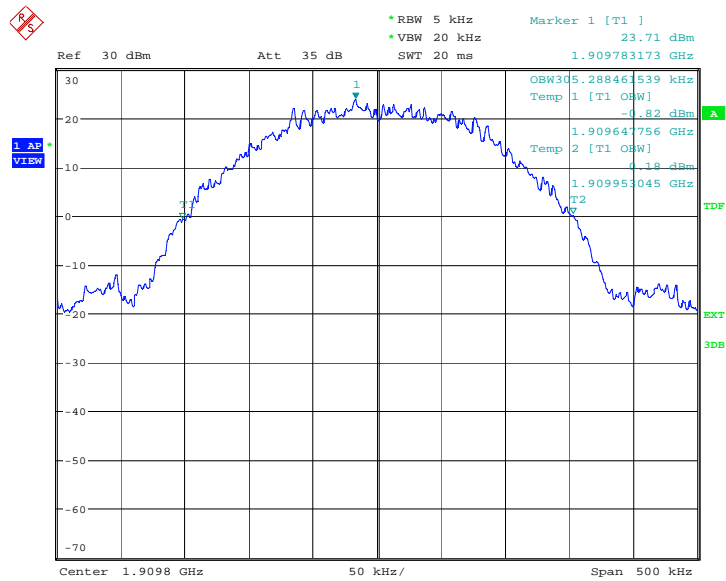
Date: 20.MAY.2014 08:33:38

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



Date: 20.MAY.2014 08:34:10

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

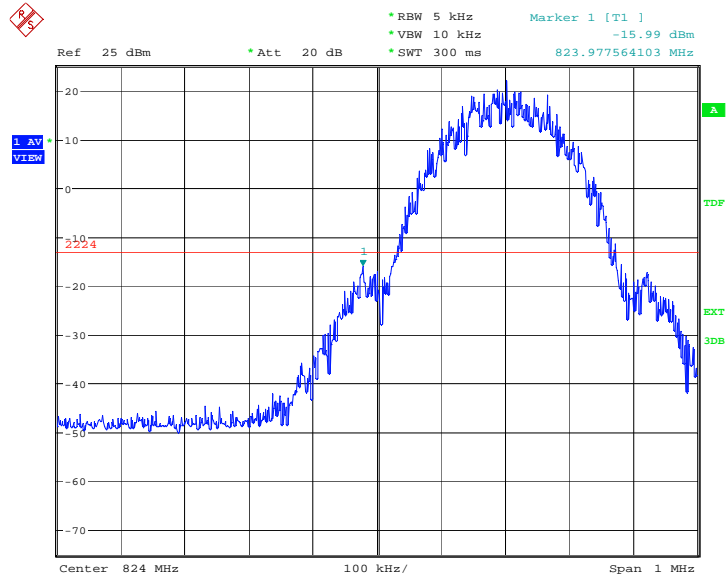


Date: 20.MAY.2014 08:34:42

## A.7 BAND EDGE COMPLIANCE

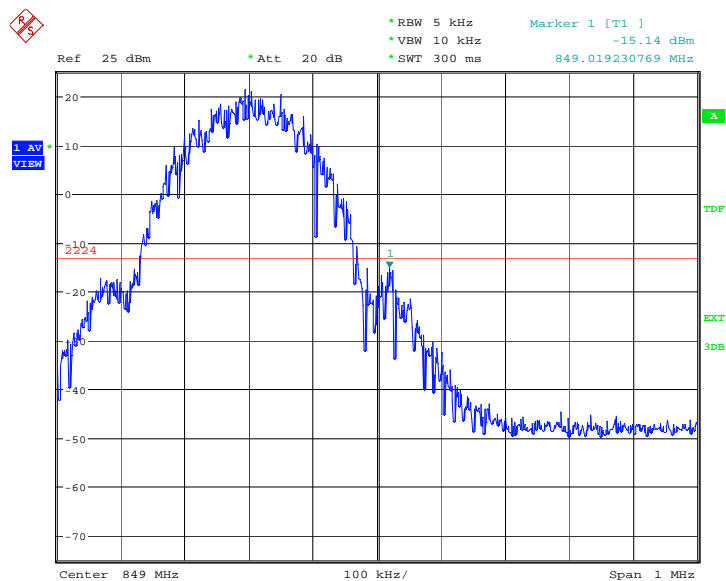
### GSM 850

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



Date: 24.APR.2014 16:07:55

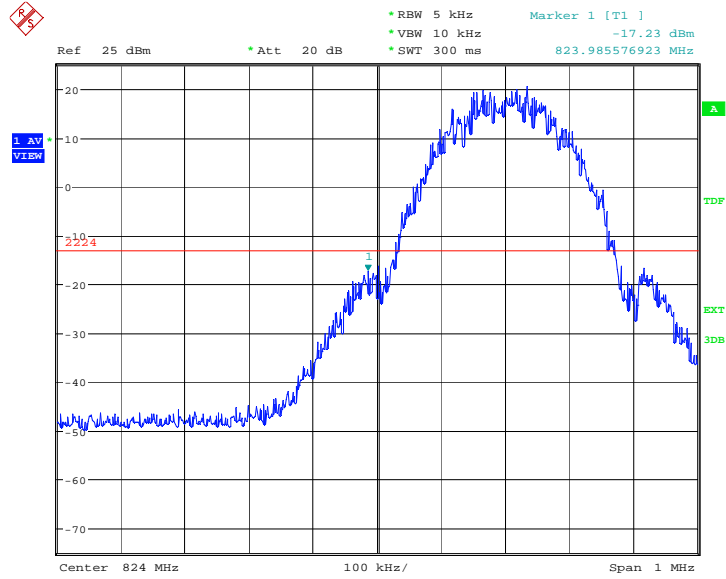
#### HIGH BAND EDGE BLOCK-C (GSM850) –Channel 251



Date: 24.APR.2014 16:08:09



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



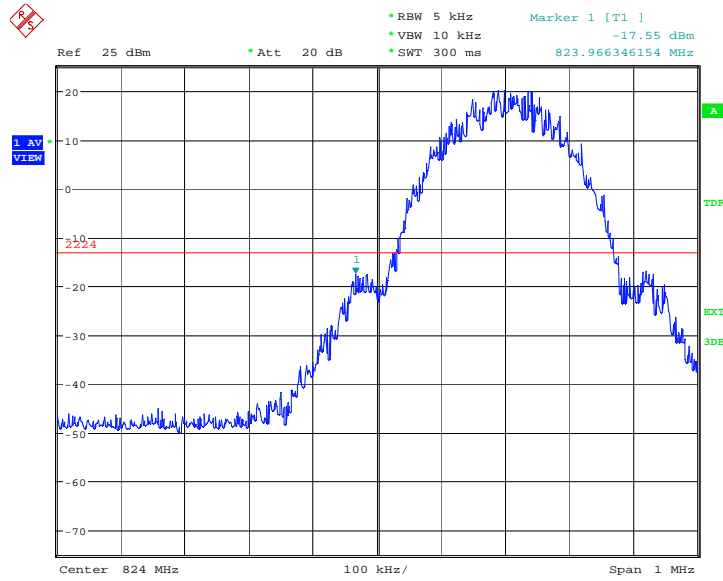
Date: 24.APR.2014 16:10:23

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



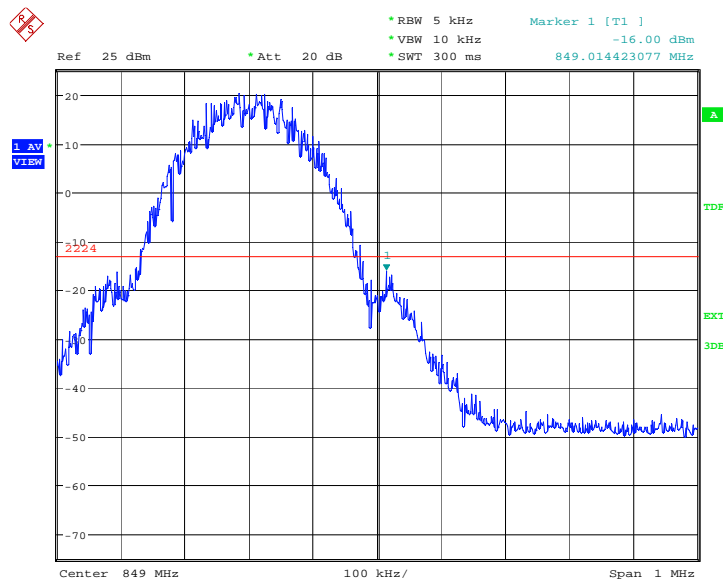
Date: 24.APR.2014 16:10:37

**EGPRS 850-GMSK**  
**LOW BAND EDGE BLOCK-A (GSM850)-Channel 128**



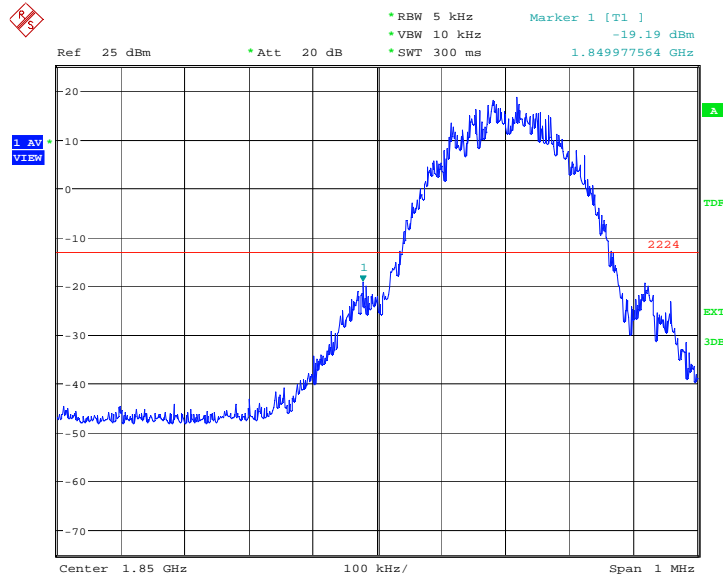
Date: 20.MAY.2014 08:29:31

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



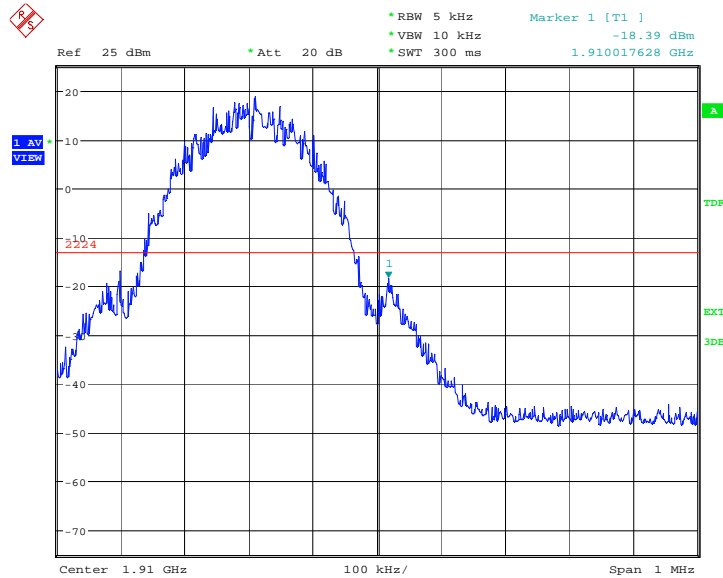
Date: 20.MAY.2014 08:29:45

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



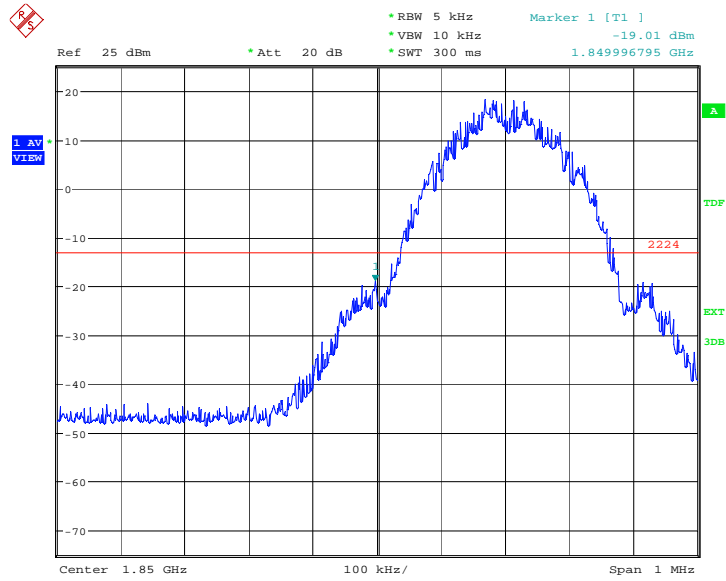
Date: 24.APR.2014 11:37:49

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



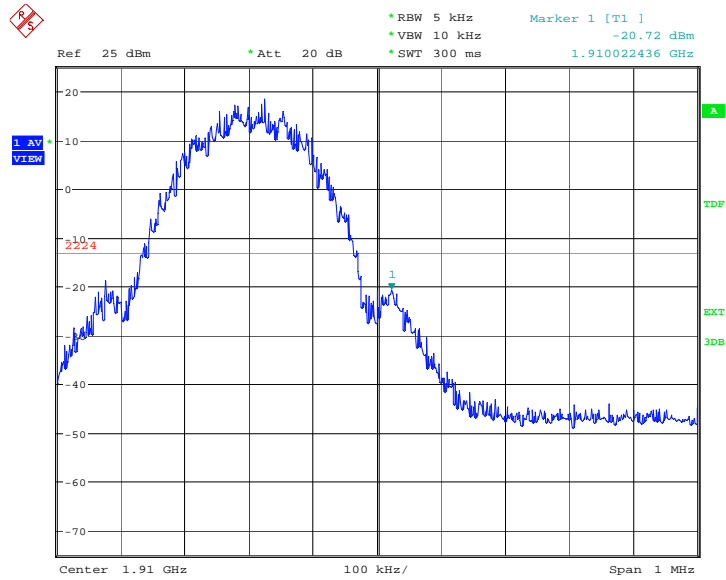
Date: 24.APR.2014 11:38:03

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



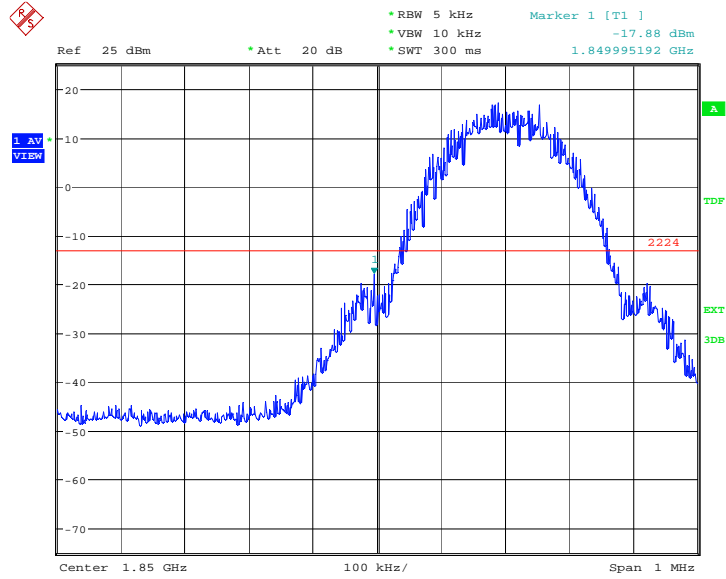
Date: 24.APR.2014 12:00:32

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



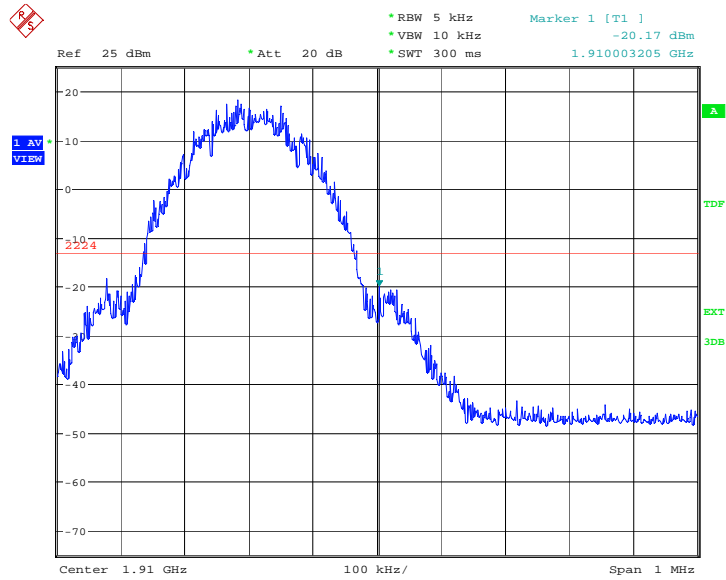
Date: 24.APR.2014 12:00:46

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



Date: 20.MAY.2014 08:34:56

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



Date: 20.MAY.2014 08:35:10

## **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.

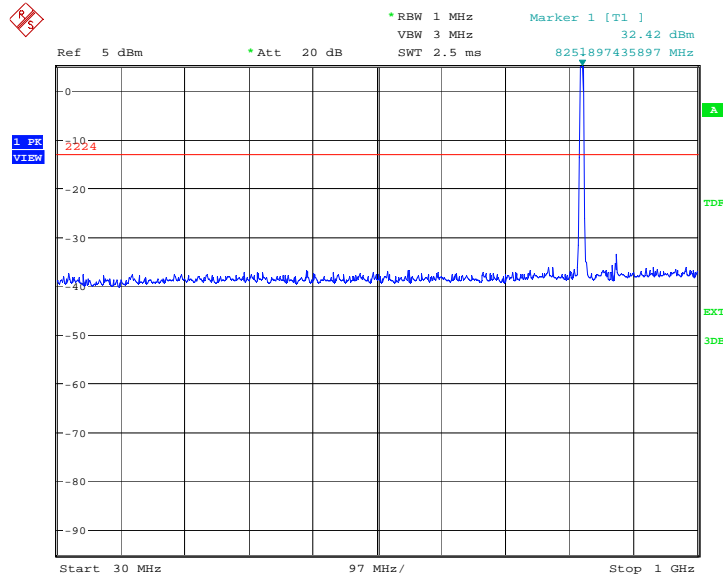
### A. 8.3 Measurement result

#### GSM850

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

Spurious emission limit –13dBm.

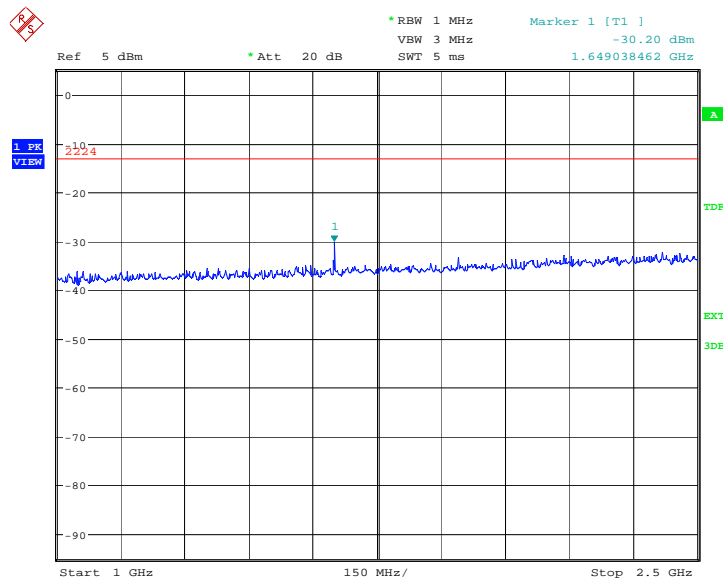
**NOTE: peak above the limit line is the carrier frequency.**



Date: 24.APR.2014 11:22:32

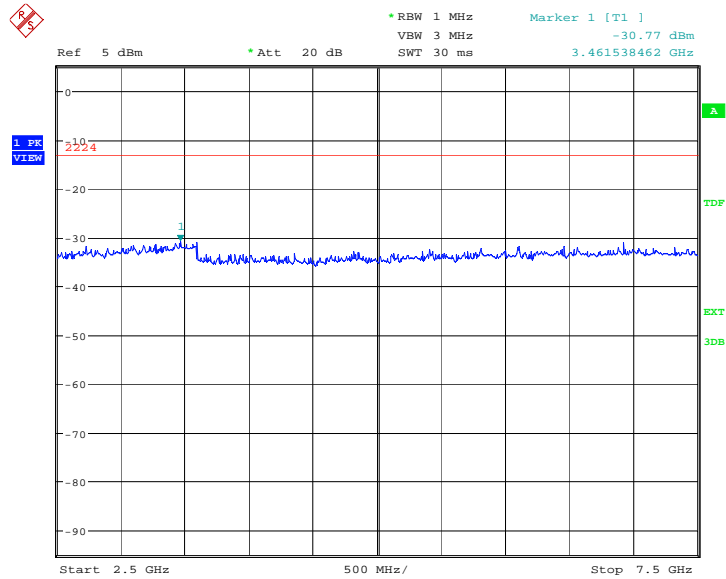
##### A.8.3.2 Channel 128: 1GHz – 2.5GHz

Spurious emission limit –13dBm.



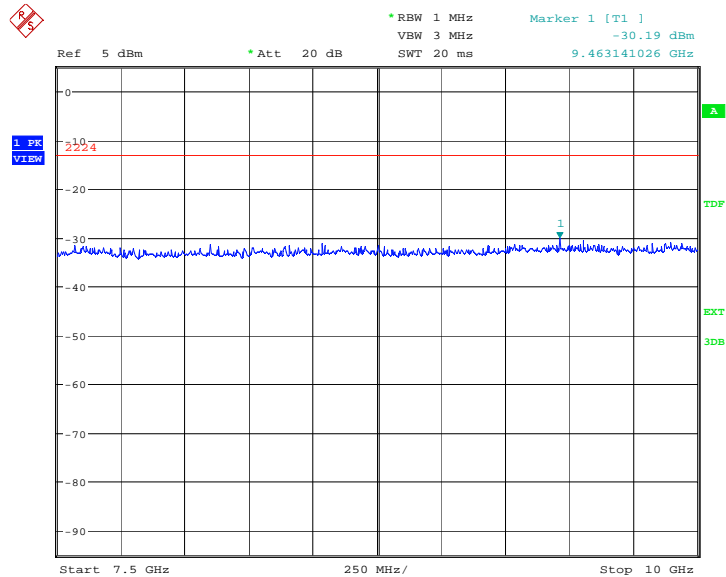
Date: 24.APR.2014 11:23:01

**A.8.3.3 Channel 128: 2.5GHz – 7.5GHz**  
Spurious emission limit –13dBm.



Date: 24.APR.2014 11:23:29

**A.8.3.4 Channel 128: 7.5GHz –10GHz**  
Spurious emission limit –13dBm.



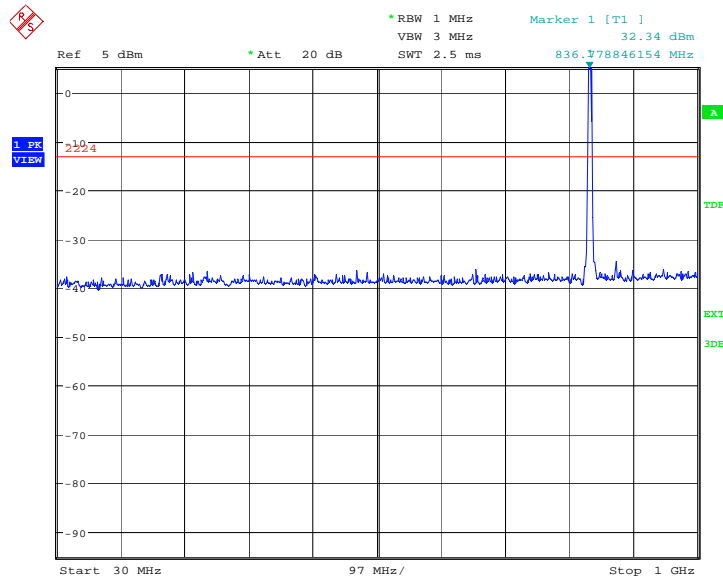
Date: 24.APR.2014 11:23:57



### A.8.3.5 Channel 190: 30MHz – 1GHz

Spurious emission limit –13dBm

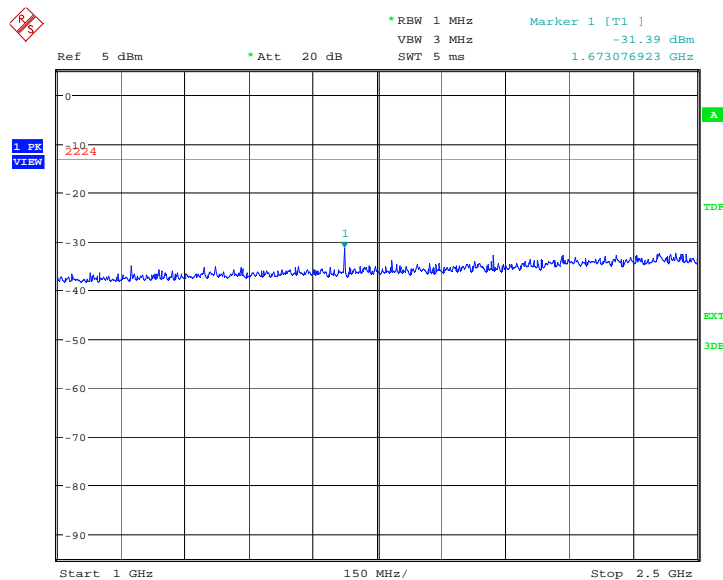
**NOTE: peak above the limit line is the carrier frequency.**



Date: 24.APR.2014 11:24:26

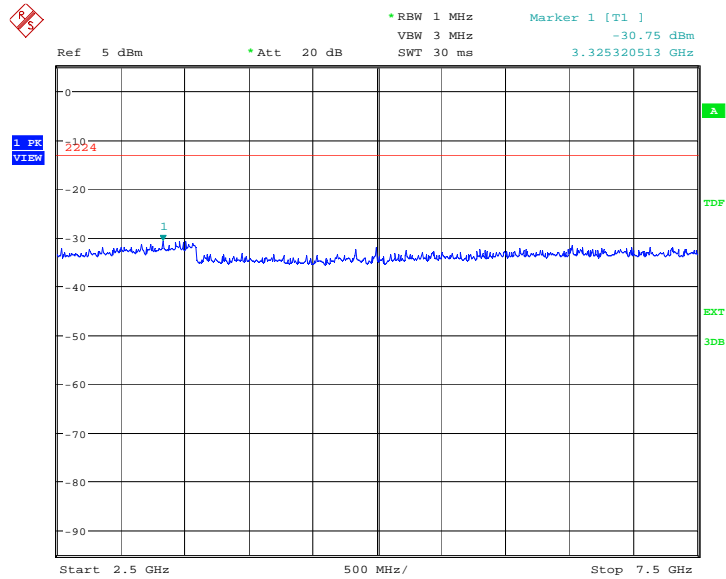
### A.8.3.6 Channel 190: 1GHz –2.5GHz

Spurious emission limit –13dBm



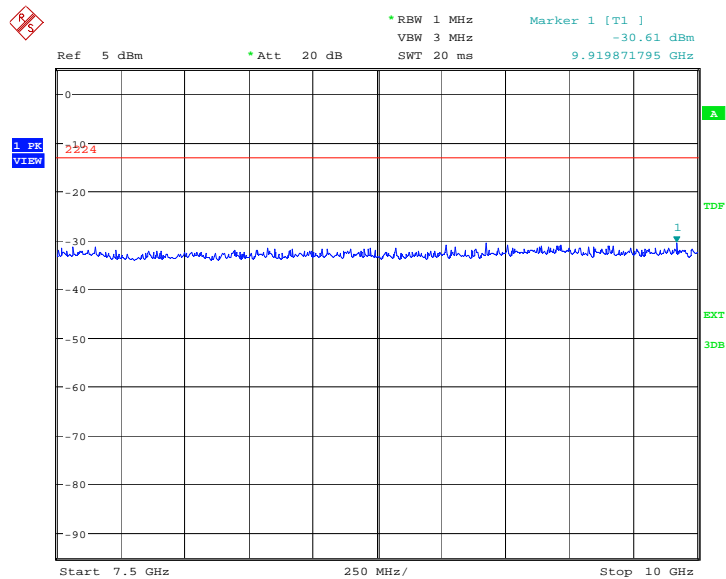
Date: 24.APR.2014 11:24:54

**A.8.3.7 Channel 190: 2.5GHz –7.5GHz**  
Spurious emission limit –13dBm



Date: 24.APR.2014 11:25:22

**A.8.3.8 Channel 190: 7.5GHz –10GHz**  
Spurious emission limit –13dBm

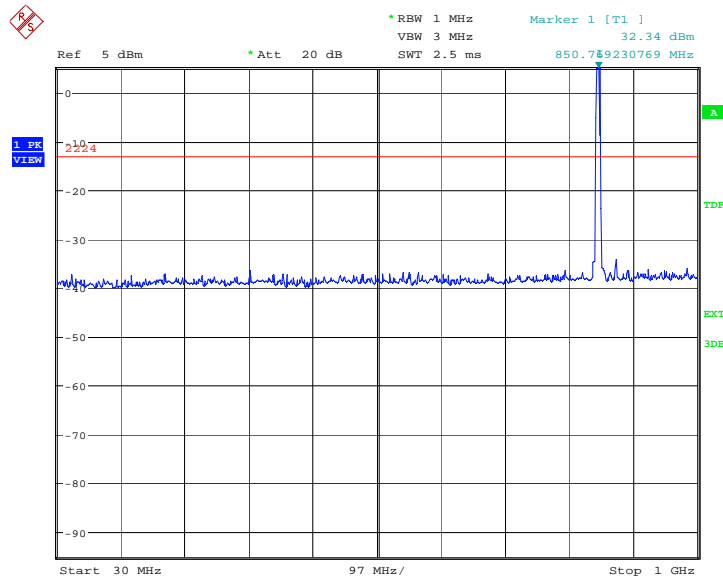


Date: 24.APR.2014 11:25:50

### A.8.3.9 Channel 251: 30MHz – 1GHz

Spurious emission limit –13dBm.

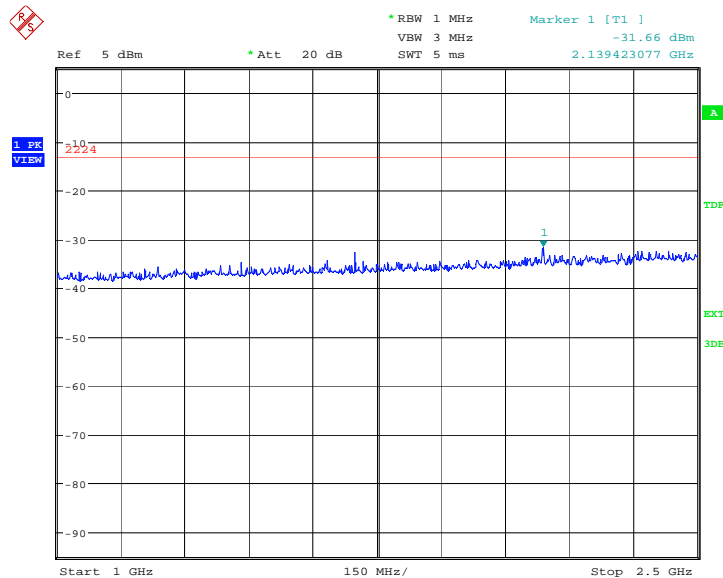
**NOTE: peak above the limit line is the carrier frequency.**



Date: 24.APR.2014 11:26:19

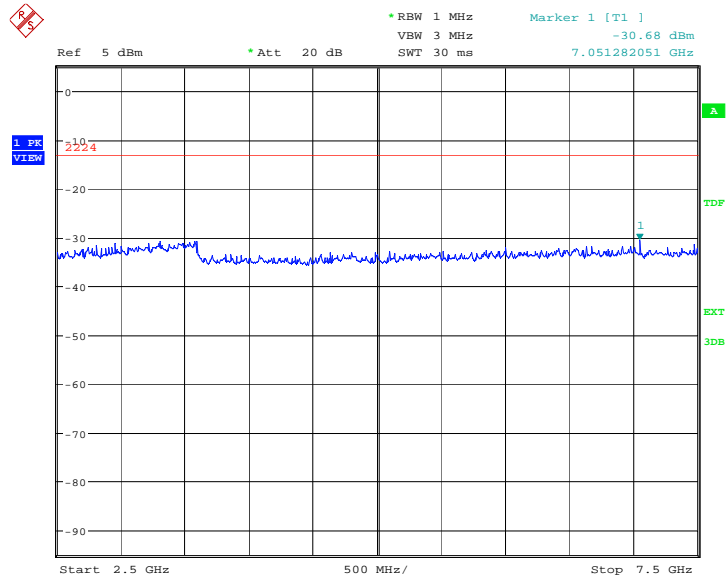
### A.8.3.10 Channel 251: 1GHz – 2.5GHz

Spurious emission limit –13dBm.



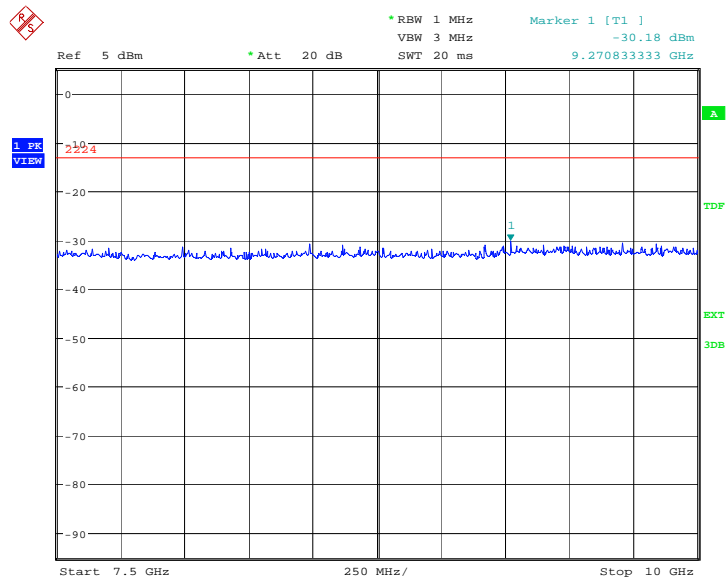
Date: 24.APR.2014 11:26:47

**A.8.3.11 Channel 251:2.5GHz – 7.5GHz**  
Spurious emission limit –13dBm.



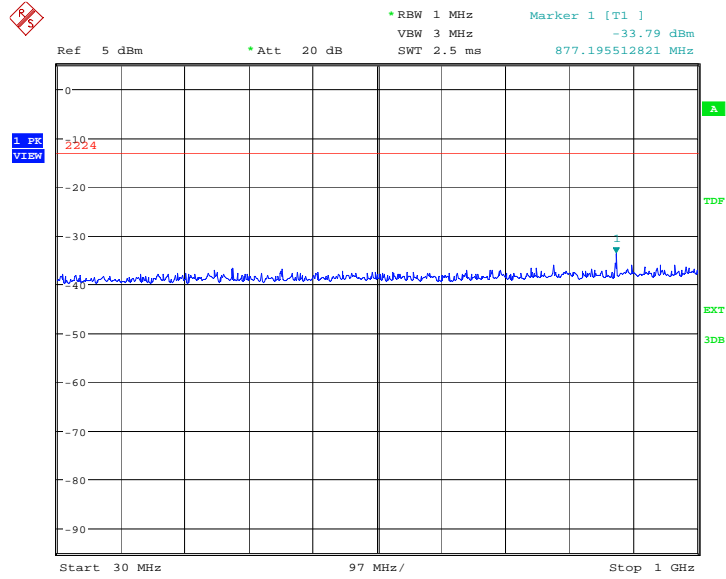
Date: 24.APR.2014 11:27:15

**A.8.3.12 Channel 251: 7.5GHz – 10GHz**  
Spurious emission limit –13dBm.



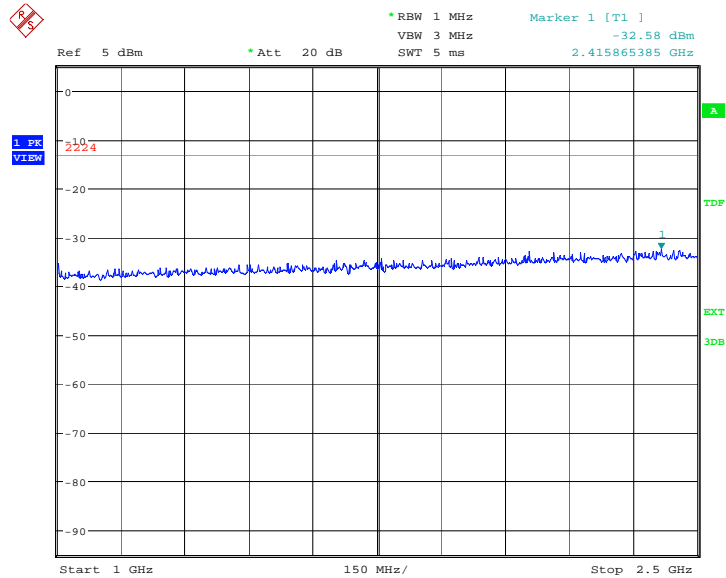
Date: 24.APR.2014 11:27:43

**A.8.3.13 Idle mode: 30MHz – 1GHz**  
Spurious emission limit –13dBm.



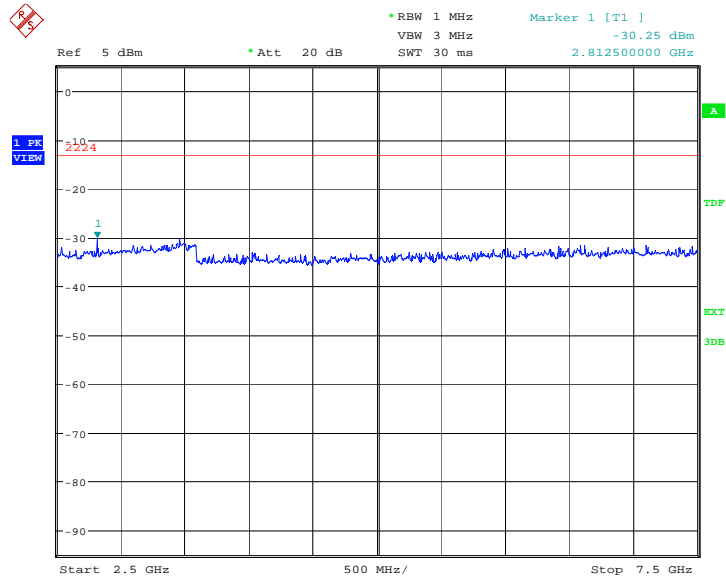
Date: 24.APR.2014 11:28:12

**A.8.3.14 Idle mode: 1GHz – 2.5GHz**  
Spurious emission limit –13dBm.



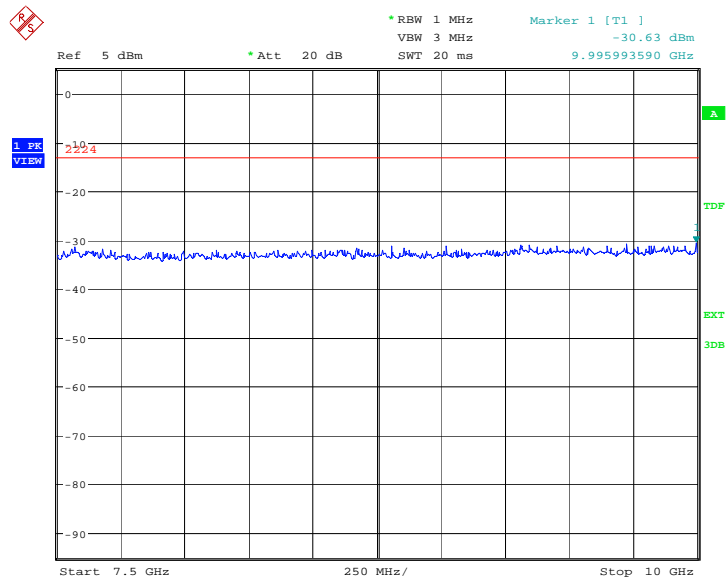
Date: 24.APR.2014 11:28:39

**A.8.3.15 Idle mode: 2.5GHz – 7.5GHz**  
Spurious emission limit –13dBm.



Date: 24.APR.2014 11:29:07

**A.8.3.16 Idle mode: 7.5GHz – 10GHz**  
Spurious emission limit –13dBm.

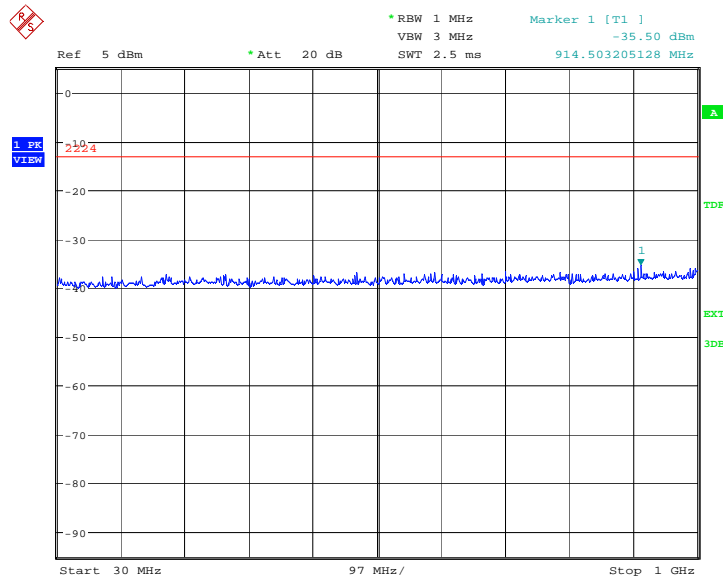


Date: 24.APR.2014 11:29:35

**PCS1900**

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

Spurious emission limit -13dBm.

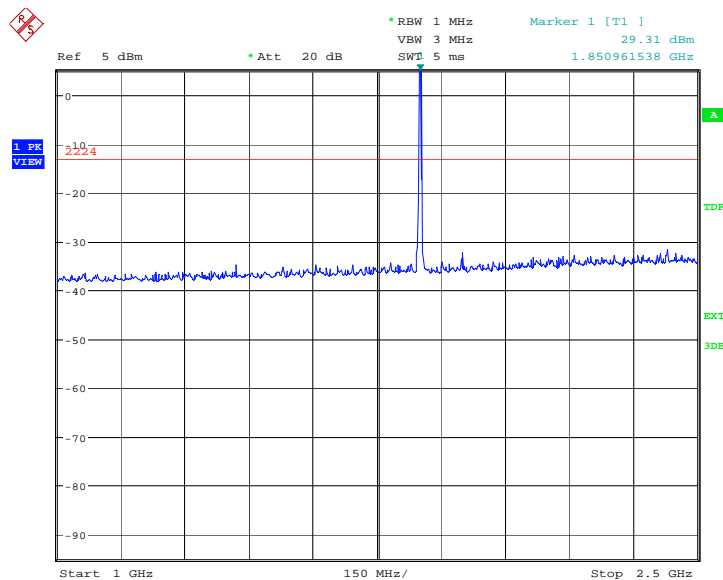


Date: 24.APR.2014 11:38:31

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

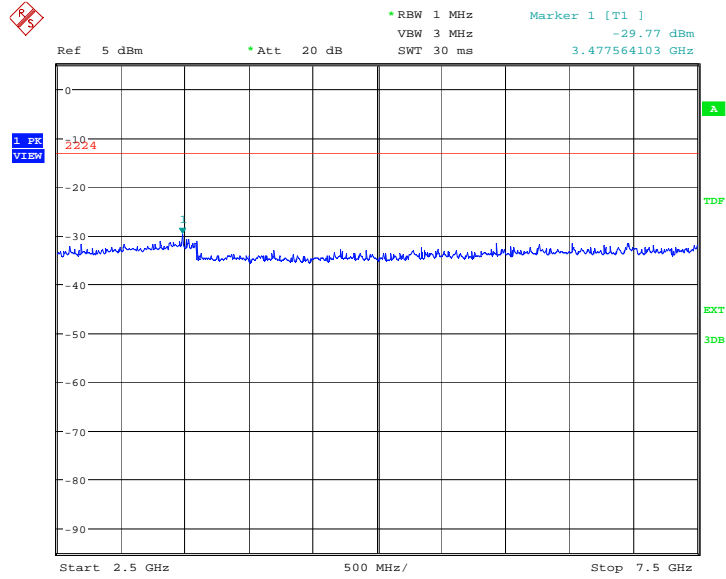
Spurious emission limit -13dBm.

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



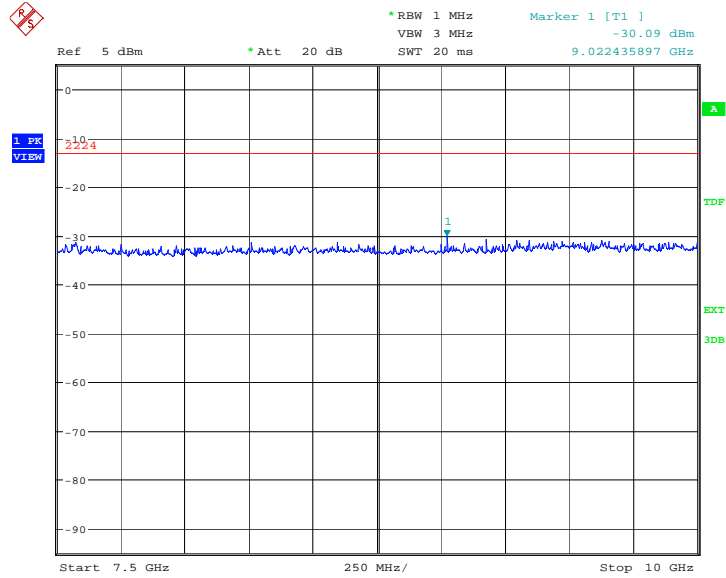
Date: 24.APR.2014 11:39:00

**A.8.3.19 Channel 512: 2.5GHz – 7.5GHz**  
Spurious emission limit –13dBm.



Date: 24.APR.2014 11:39:28

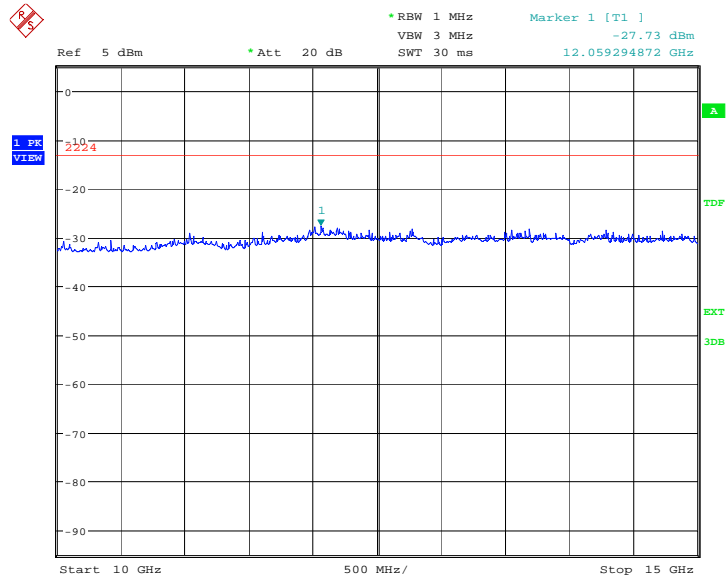
**A.8.3.20 Channel 512: 7.5GHz –10GHz**  
Spurious emission limit –13dBm.



Date: 24.APR.2014 11:39:56

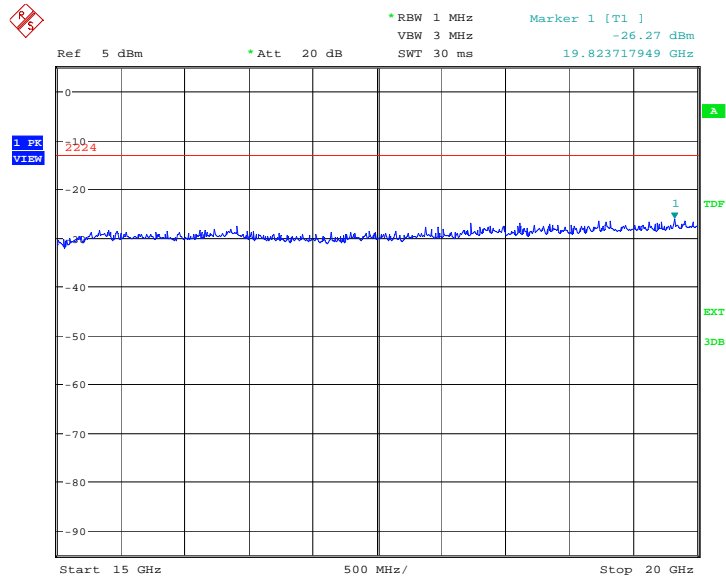


**A.8.3.21 Channel 512: 10GHz –15GHz**  
Spurious emission limit –13dBm.



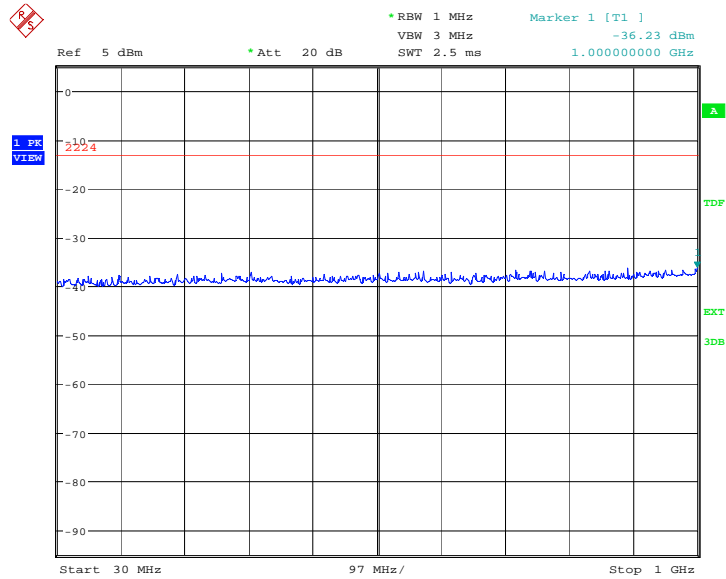
Date: 24.APR.2014 11:40:24

**A.8.3.22 Channel 512: 15GHz –20GHz**  
Spurious emission limit –13dBm.



Date: 24.APR.2014 11:40:52

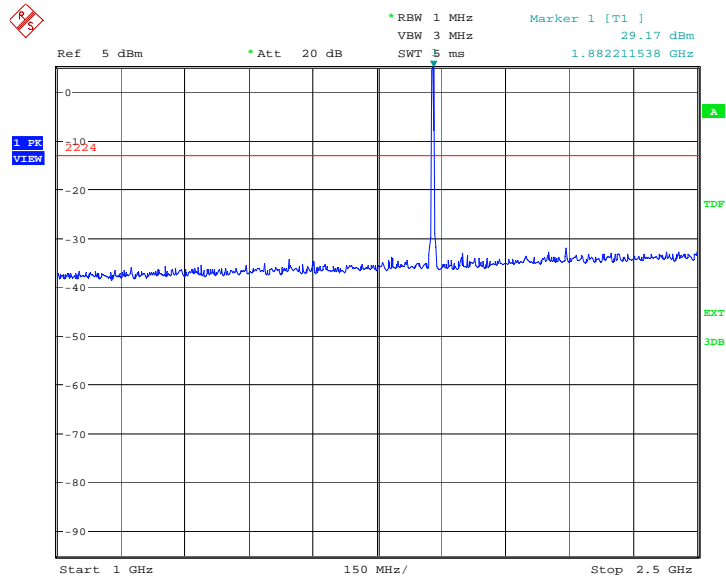
**A.8.3.23 Channel 661: 30MHz – 1GHz**  
Spurious emission limit –13dBm



Date: 24.APR.2014 11:41:21

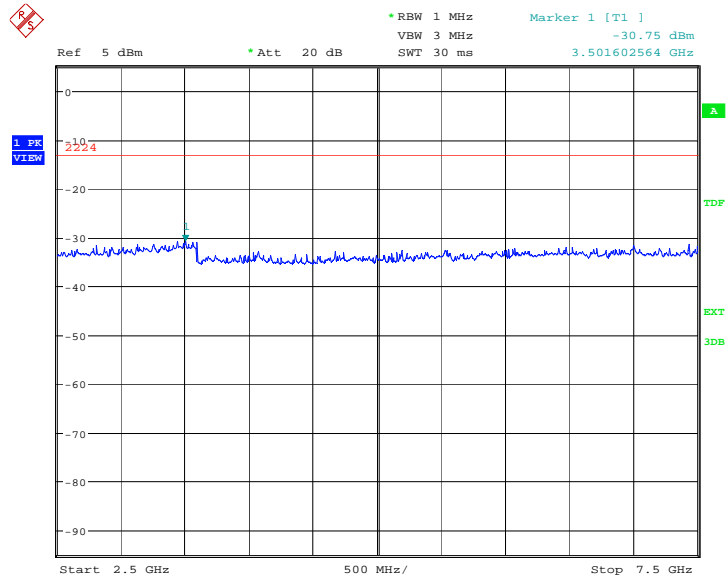
**A.8.3.24 Channel 661: 1GHz – 2.5GHz**  
Spurious emission limit –13dBm

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



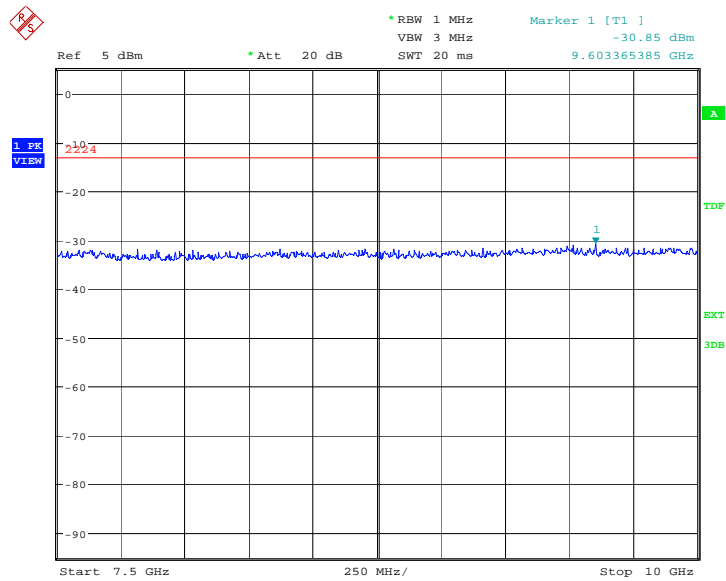
Date: 24.APR.2014 11:41:49

**A.8.3.25 Channel 661: 2.5GHz –7.5GHz**  
Spurious emission limit –13dBm



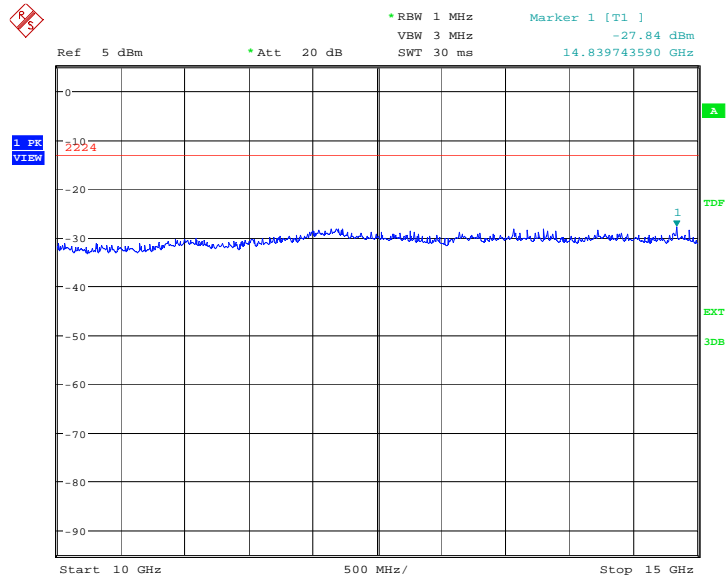
Date: 24.APR.2014 11:42:17

**A.8.3.26 Channel 661: 7.5GHz –10GHz**  
Spurious emission limit –13dBm



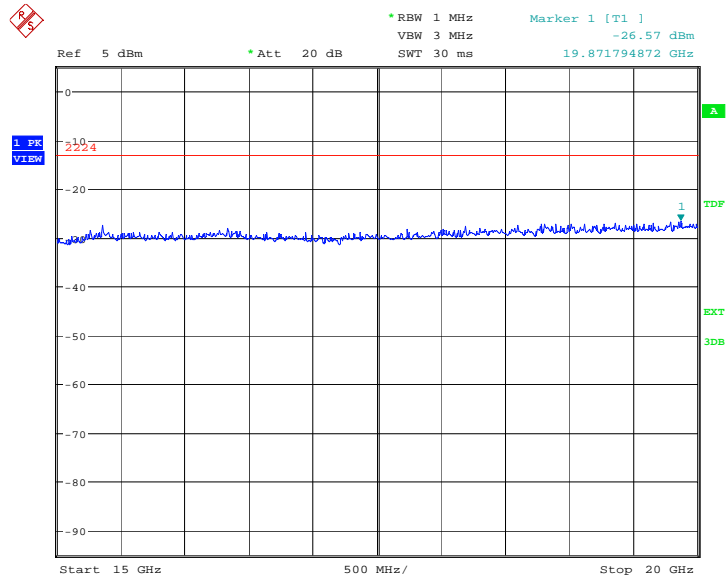
Date: 24.APR.2014 11:42:46

**A.8.3.27 Channel 661: 10GHz –15GHz**  
Spurious emission limit –13dBm.



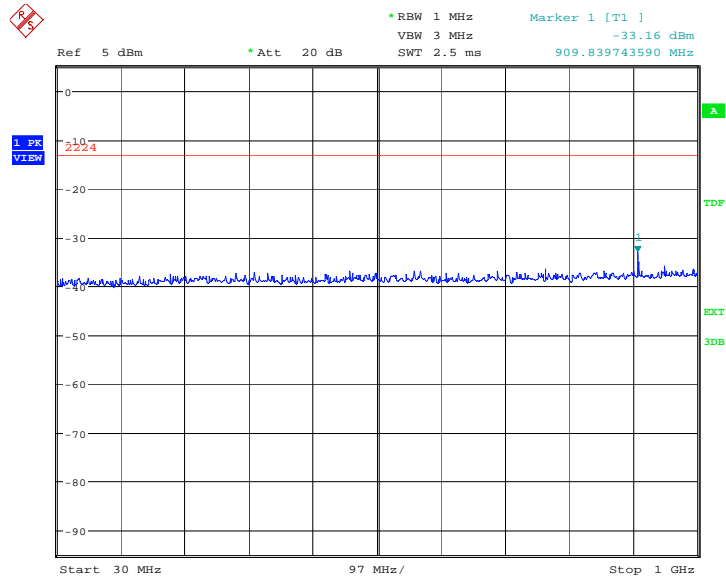
Date: 24.APR.2014 11:43:14

**A.8.3.28 Channel 661: 15GHz –20GHz**  
Spurious emission limit –13dBm.



Date: 24.APR.2014 11:43:42

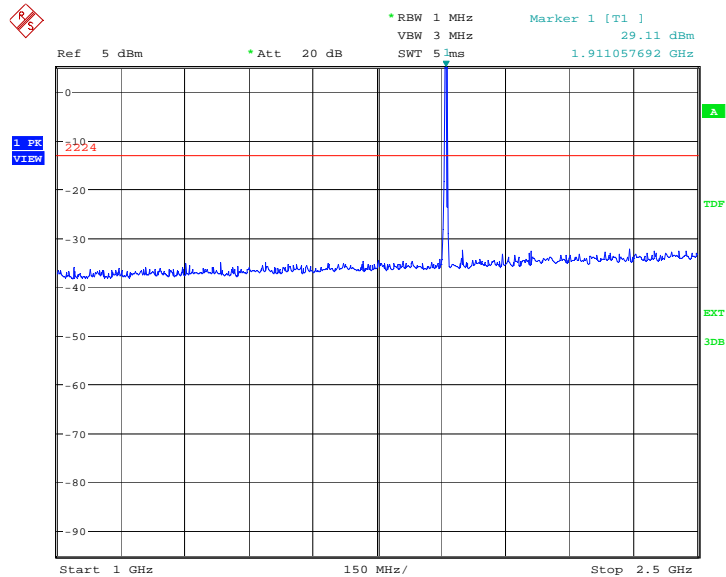
**A.8.3.29 Channel 810: 30MHz – 1GHz**  
Spurious emission limit –13dBm.



Date: 24.APR.2014 11:44:11

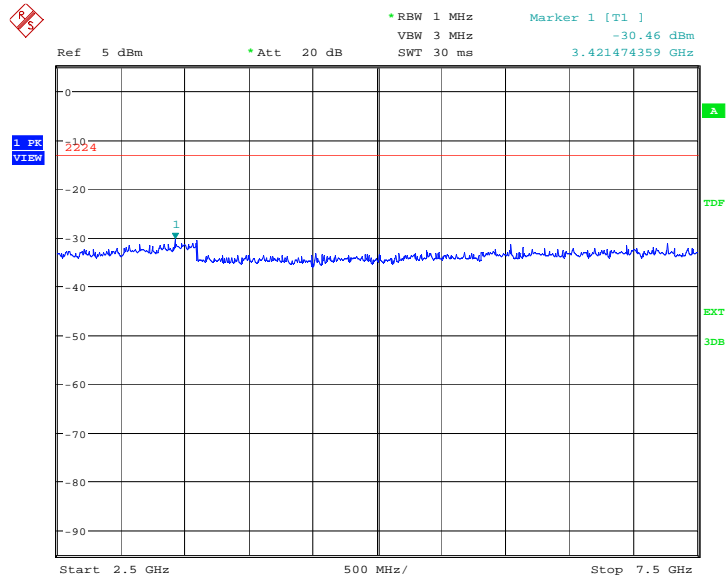
**A.8.3.30 Channel 810: 1GHz – 2.5GHz**  
Spurious emission limit –13dBm.

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



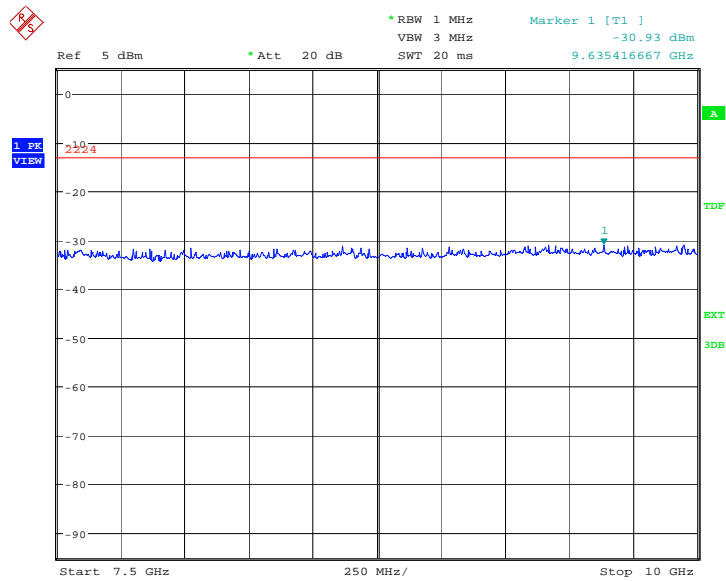
Date: 24.APR.2014 11:44:39

**A.8.3.31 Channel 810:2.5GHz – 7.5GHz**  
Spurious emission limit –13dBm.



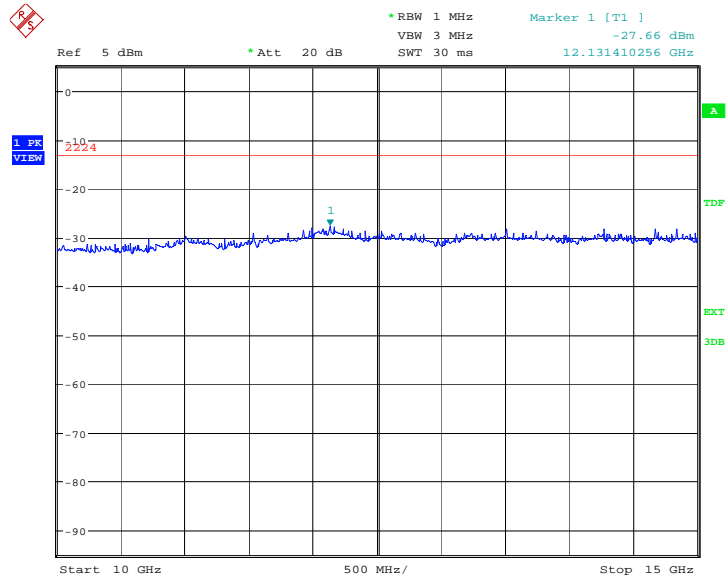
Date: 24.APR.2014 11:45:07

**A.8.3.32 Channel 810: 7.5GHz – 10GHz**  
Spurious emission limit –13dBm.



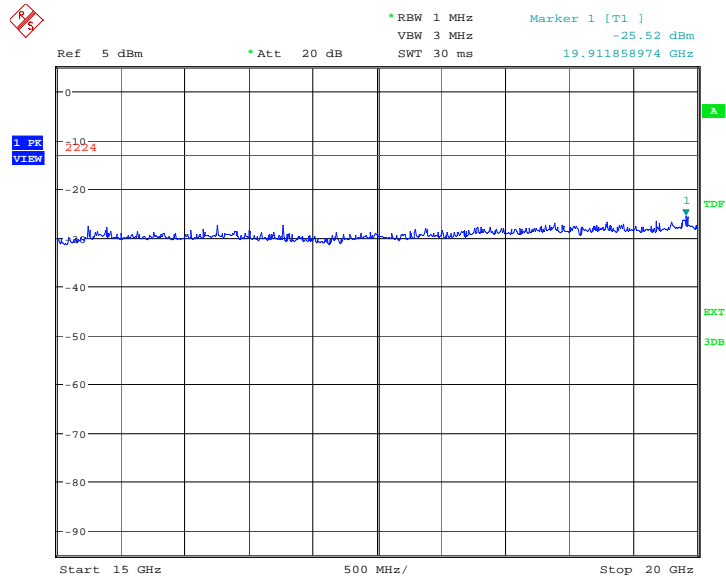
Date: 24.APR.2014 11:45:35

**A.8.3.33 Channel 810: 10GHz –15GHz**  
Spurious emission limit –13dBm.



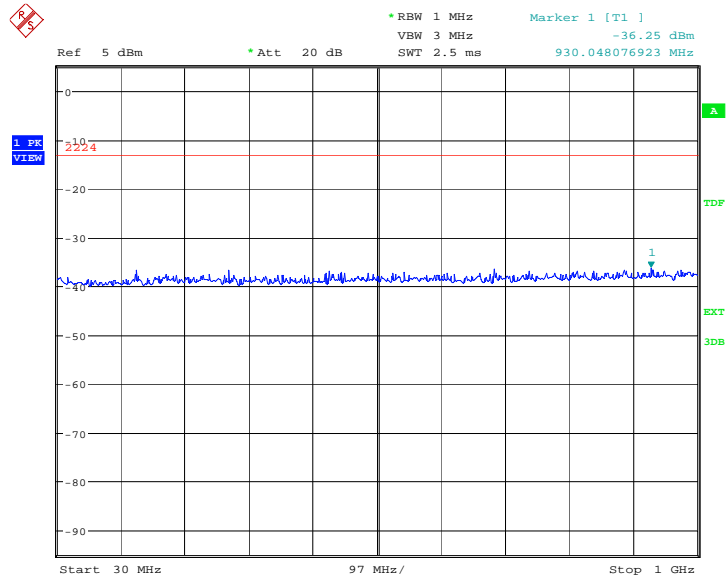
Date: 24.APR.2014 11:46:03

**A.8.3.34 Channel 810: 15GHz –20GHz**  
Spurious emission limit –13dBm.



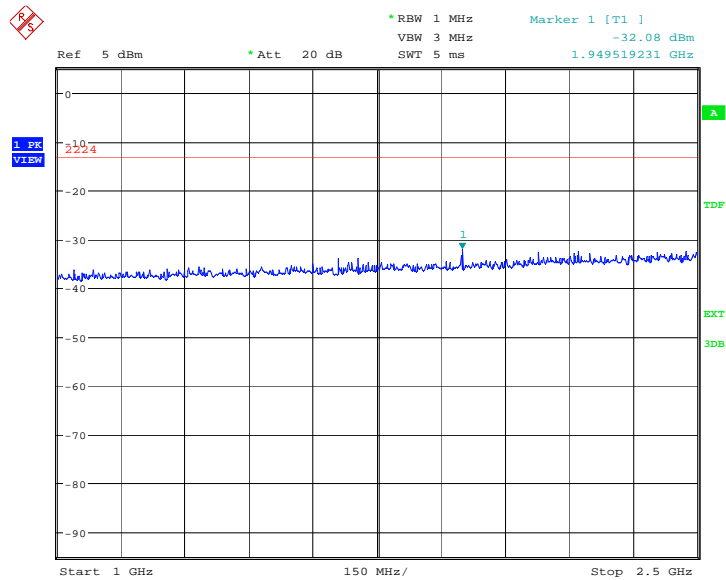
Date: 24.APR.2014 11:46:32

**A.8.3.35 Idle mode: 30MHz – 1GHz**  
Spurious emission limit –13dBm.



Date: 24.APR.2014 11:47:00

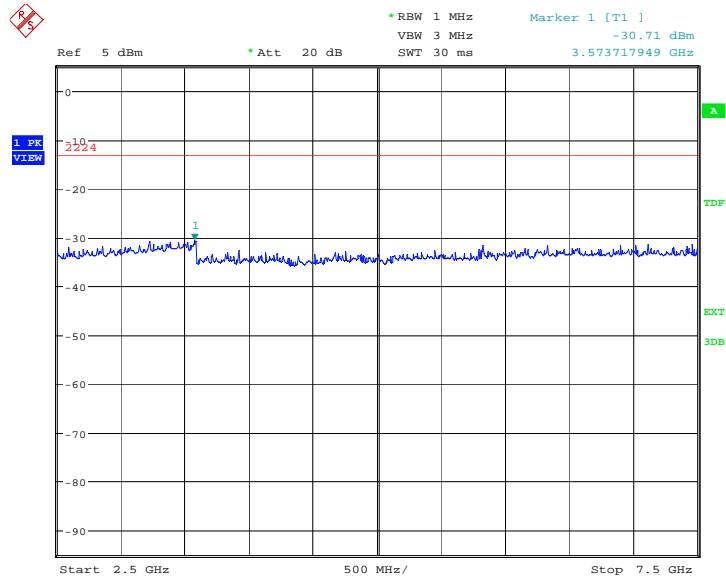
**A.8.3.36 Idle mode: 1GHz – 2.5GHz**  
Spurious emission limit –13dBm.



Date: 24.APR.2014 11:47:28

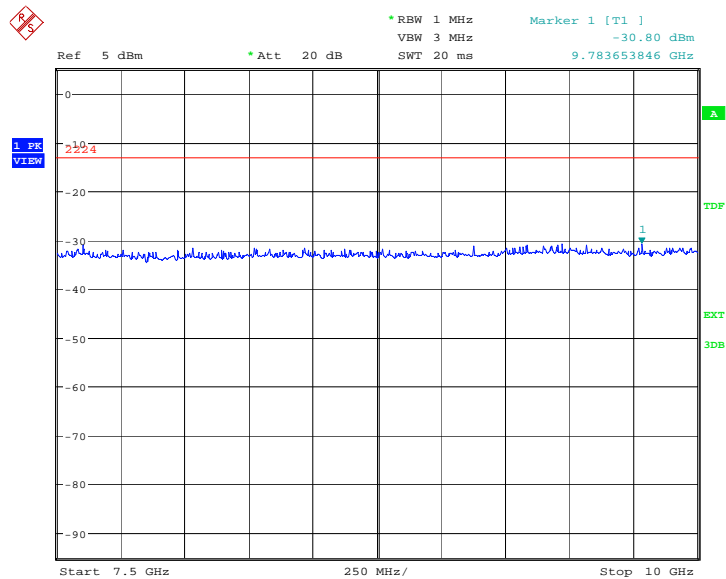


**A.8.3.37 Idle mode: 2.5GHz – 7.5GHz**  
Spurious emission limit –13dBm.



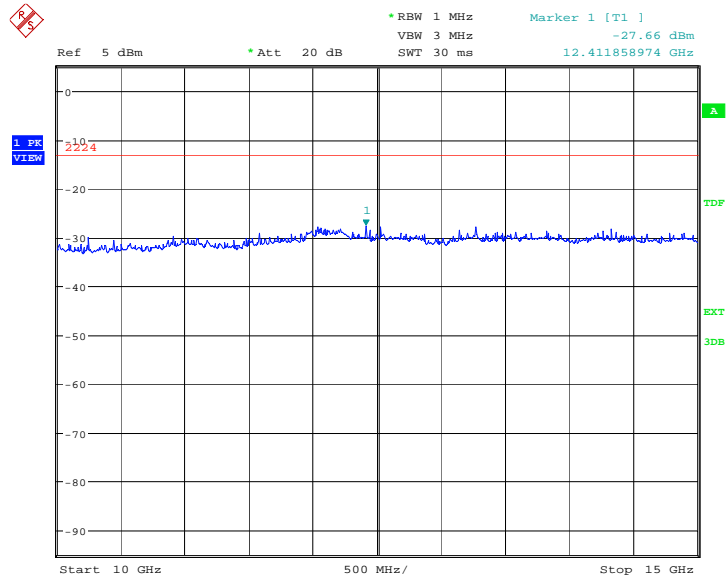
Date: 24.APR.2014 11:47:57

**A.8.3.38 Idle mode: 7.5GHz – 10GHz**  
Spurious emission limit –13dBm.



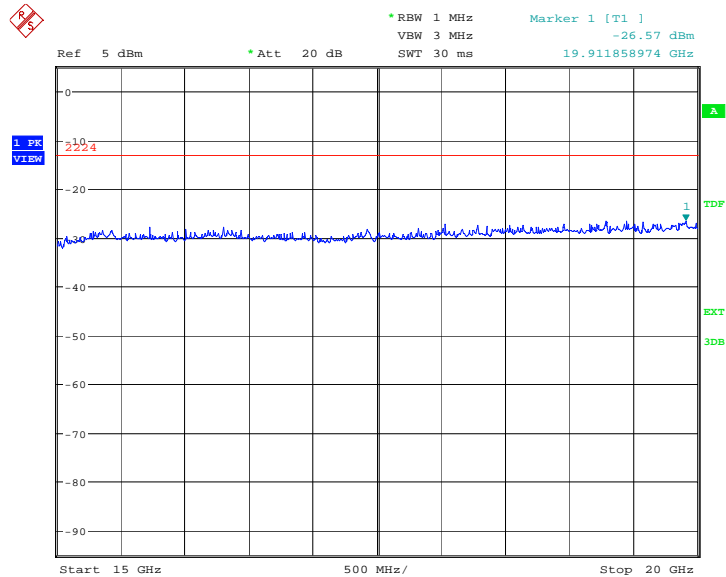
Date: 24.APR.2014 11:48:25

**A.8.3.39 Idle mode: 10GHz –15GHz**  
Spurious emission limit –13dBm.



Date: 24.APR.2014 11:48:53

**A.8.3.40 IDLE mode: 15GHz –20GHz**  
Spurious emission limit –13dBm.



Date: 24.APR.2014 11:49:21

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