



# RF Test Report

**Product Name: UMTS/GPRS/GSM Mobile Phone with  
Bluetooth**

**Model Number: HUAWEI U5200**

**Report No: SYBH(Z-RF)018072011-2002**

**FCC ID:QISU5200**

**Reliability Laboratory of Huawei Technologies Co., Ltd.**

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## Notice

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Notice 2

**Modification Information:**

Modification Information

Modification Information	1	
	2	
	3	<i>Not Applicable!</i>
	4	
	5	
	6	
	7	



<b>REGULATION</b>	<b>FCC CFR47 Part 2: Subpart J;</b>
	<b>FCC CFR47 Part 24: Subpart E;</b>
<b>START OF TEST</b>	<b>Jul.23, 2011</b>
<b>END OF TEST</b>	<b>Jul.24, 2011</b>
<b>Final Judgement:</b>	<b>Pass</b>

Approved By

Jul.28, 2011  
Date

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Operator

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# 1 Summary

The table below summarizes the measurements and results for the EUT. Detailed results and descriptions are shown in the following pages.

Table 1 Summary of results

FCC Measurement Specification	FCC Limits Part(s)	Description	Result
2.1046	24.232	Effective Isotropic radiated power of Transmitter	PASS
2.1046	24.232	Conducted Power of Transmitter	PASS
2.1047		Modulation Characteristics	PASS
2.1049		Occupied Bandwidth	PASS
2.1051	24.238	Band Edges Compliance	PASS
2.1051	24.238	Spurious Emission at Antenna Terminal	PASS
2.1055	24.235	Frequency Stability	PASS
2.1053	24.238	Radiated Spurious Emissions	PASS

## 2 Product Description

### 2.1 Production Information

#### 2.1.1 General Description

HSUPA/HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth HUAWEI U5200 is subscriber equipment in the WCDMA/GSM system. The HSUPA/HSDPA/UMTS frequency band is Band II and AWS, and Band II test data included in this report. The GSM/GPRS/EDGE frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900, but only PCS1900MHz band test data included in this report. The Mobile Phone implements such functions as RF signal receiving/transmitting, HSUPA/HSDPA/UMTS and GSM/GPRS/EDGE protocol processing, voice, video, MMS service, and GPS etc. Externally it provides micro SD card interface, earphone port(to provide voice service) and USIM card interface. It also provides Bluetooth module to synchronize data between a PC and the phone, or to exchange data with other Bluetooth devices.

#### 2.1.2 Support function and Service

The EUT support the function and service as follows:

Service and Test mode List

Service Name	Characteristic	Corresponding Test Mode	Note
Data	Modulation: GMSK	TM1	GPRS/GSM
Data	Modulation: 8PSK	TM2	EDGE
Data	Modulation: QPSK	TM3	WCDMA
Data	Modulation: QPSK	TM4	HSDPA
Data	Modulation: QPSK	TM5	HSUPA

Note: \* The specified GPRS test conditions & settings are defined in 3GPP TS51.010 V5.4.0 and the EDGE test conditions & settings are defined in 3GPP TS51.010 The WCDMA test condition & settings are defined in 3GPP TS 34.121.

### 2.2 Modification Information

For original equipment, following table is not application.

Modification Information

Model Number	Board/Module	Original Version	New Version	Modify Information
Not applicable				



### **3 Test Site Description**

The test site of:

***Huawei Technologies Co. Ltd.  
P.O. Box 518129  
Huawei base, bantian,  
Longgang District, Shenzhen, China***

#### **3.1 Testing Period**

The test have been performed during the period of

**Jul.23, 2011 –Jul.24, 2011**

#### **3.2 General Set up Description**

**TM1:** GSM/GPRS Mode with GMSK Modulation

**TM2:** EDGE Mode with 8PSK Modulation

**TM3:** WCDMA Mode with QPSK Modulation

**TM4:** HSDPA Mode with QPSK Modulation

**TM5:** HSUPA Mode with QPSK Modulation

## 4 Product Description

### 4.1 Technical Characteristics

#### 4.1.1 Frequency Range

Frequency Range

Uplink band:	1850 to 1910 MHz
Downlink band:	1930 to 1990 MHz

#### 4.1.2 Channel Spacing / Separation

Channel Spacing / Separation

	EDGE/GPRS/GSM	WCDMA
Channel raster	30k Hz	200k Hz
Channel spacing:	200k Hz	5MHz

#### 4.1.3 Type of Emission

Type of Emission

	EDGE/GPRS/GSM	WCDMA
Emission Designation:	300KG7W / 300KGXW	5M00F9W

According to CFR 47 (FCC) part 2, subpart C, section 2.201 and 2.202

#### 4.1.4 Environmental Requirements

Table 2 Environmental Requirements

Minimum temperature:	- 10 °C
Maximum temperature:	+ 55 °C
Relative Humidity:	5%-95%RH

#### 4.1.5 Power Source

Table 3 Power Source

AC voltage nominal:	~ 120 V
AC voltage range	~ 100 V to ~ 240 V
AC current maximal:	1A

#### 4.1.6 Tune-up Procedure

According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (9).

Please reference the document Tune-up Procedure in TCF.

#### 4.1.7 Applied DC Voltages and Currents

According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (8).

The voltage and current in the final RF stage is:

Applied RF Module Voltages and Currents

Voltage:	=== +3.6~4.2V
Current:	1A According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (8)

## 4.2 EUT Identification List

### 4.2.1 Board Information

Table 4 Board Information

UMTS/GPRS/GSM Mobile Phone with Bluetooth		
HUAWEI U5200		
Board and Module		
Hardware Version	Serial Number	Software Version
Ver.C	G8P2A11131700125	U5200CBTB208

### 4.2.2 Adapter Technical Data

AC/DCAdapter Model	HS-050040U6
Manufacturer	Huawei Technologies Co., Ltd.
Input Voltage	~100-240V 50/60Hz 0.2A
Output Voltage	5V  0.4A
Rated Power	2W

### 4.2.3 Battery Technical Data

Battery Model:	HB4J1H
Rated capacity:	1200 mAh
Nominal Voltage:	 3.7 V
Charging Voltage:	 4.2 V

### 4.2.4 FCC Identification

**Grantee Code:** QIS  
**Product Code:** U5200  
**FCC Identification:** QISU5200

## 5 Main Test Instruments

Table 5 Main Test Equipments

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until
Power supply	KEITHLEY	2303	1288003	Sep.27,2011
Universal Radio Communication Tester	R&S	CMU200	105822	Oct.24.2011
Wireless Communication Test set	Agilent	N4010A	MY49081592	Dec.14.2011
Universal Radio Communication Tester	Agilent	E5515C	MY50260239	Aug.04,2011
Spectrum Analyzer	Agilent	E4440A	MY49420179	Apr.24,2012
Signal Analyzer	R&S	FSQ31	200021	Sep.27,2011
Temperature Chamber	WEISS	WKL64	24600294	Jan.03,2012
Signal generator	Agilent	E8257D	MY49281095	Jul.09.2012
Vector Signal Generator	R&S	SMU200A	104162	Sep.07,2011
Test receiver	R&S	ESIB26	100318	May.04.2012
Tunable Dipole	Schwarzbeck	D6925-UHAP/D6925 0-VHAP	919/1009	Dec.13.2011
Tunable Dipole	Schwarzbeck	D6925-UHAP/D6925 0-VHAP	979/917	Dec.13.2011
Horn Antenna	R & S	HF906	359287/005	May.07, 2012
Horn Antenna	R & S	HF906	359287/006	April.27, 2012
Broadband Antenna	SCHAFFNER	CBL 6112B	2536	Sep.21, 2011
Broadband Antenna	SCHAFFNER	CBL 6112B	2941	Jun.11, 2012
Horn Antenna	ETS-LINDGREN	3160	60008	Sep.20.2011
Horn Antenna	ETS-LINDGREN	3160	60006	Oct.27.2011

## 6 Transmitter Measurements

### 6.1 Effective Isotropic radiated power of Transmitter (EIRP)

#### 6.1.1 Test Conditions

Table 6 Test Conditions

Preconditioning:	0.5 hour
Measured at:	enclosure
Ambient temperature:	25°C
Relative humidity:	55%
Test Configurations:	TM1/TM2/TM3 at frequency Bottom, Middle, Top

#### 6.1.2 Test Specifications and Limits

##### 6.1.2.1 Specification

CFR 47 (FCC) part 2.1046 and part 24 subpart E

##### 6.1.2.2 Supporting Standards

Table 7 Supporting Standards:

ANSI/TIA-603-C:2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP TS51.010	Digital cellular telecommunications system Mobile Station (MS) conformance specification;
3GPP TS 34.121	Technical Specification Group Radio Access Network; User Equipment (UE) conformance specification; Radio transmission and reception (FDD);

##### 6.1.2.3 Limits

Compliance with part 24.232, mobile/portable stations are limited to 2 watts EIRP peak power.  
 $W(\text{dBm}) = 10 \cdot \log(W_{\text{In mW}})$ .

Table 8 Limits

Maximum Output Power (Watts)	< 2 Watts
Maximum Output Power (dBm)	< 33 dBm

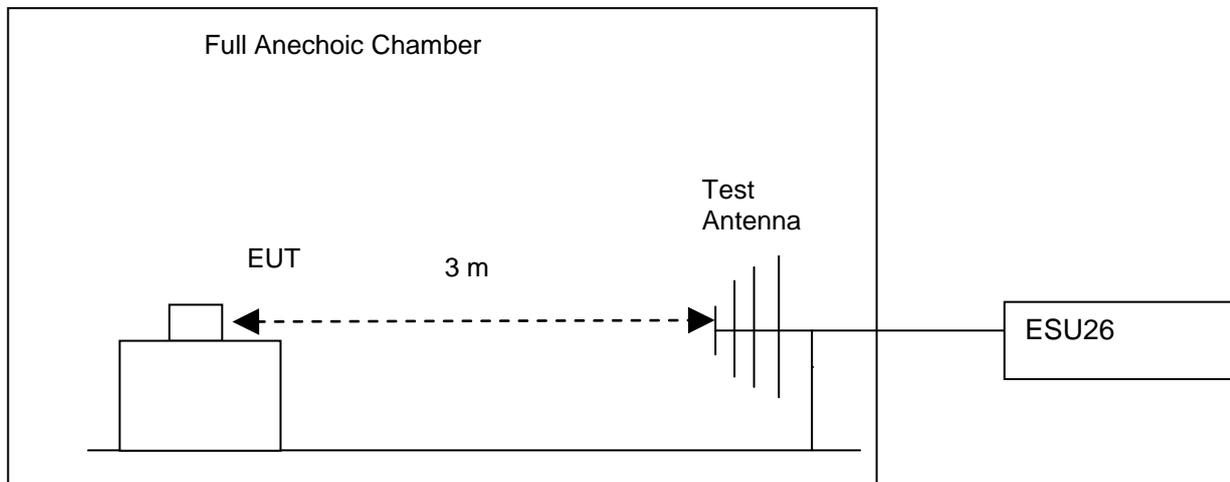
#### 6.1.3 Test Method and Setup

- For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, EIRP shall be measured when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in 2.1033(c)(8). Connect the EUT to the wireless communication tester CMU200 via the air interface. The band is set as PCS.
- Test the Radiated maximum output power by the CMU200 received from test antenna.
- Use substitution method to verify the maximum output power. The EUT is substituted by a horn antenna. The horn is connected to a signal generator. And then adjust the output level of the signal

generator to get the same received power recorded in step (b) on CMU200, and record the power level of Signal Generator. Of course, the cable loss at the test frequency should be compensated.

**Test setup**

**Step 1: Pre-test**



**Step 2: Substitution method to verify the maximum EIRP**

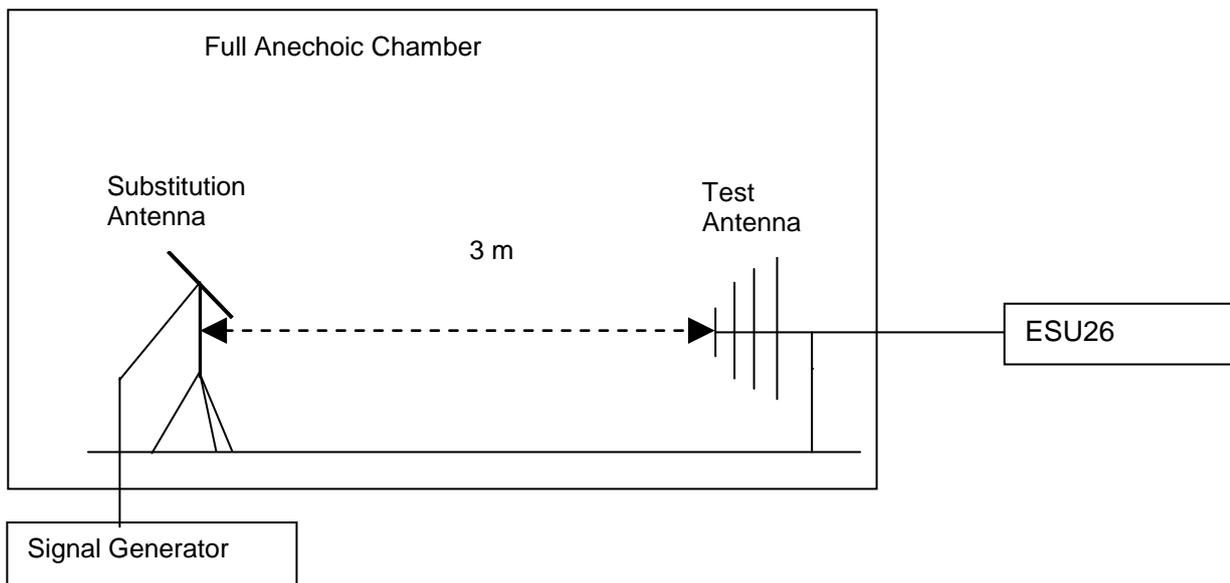


Figure 1. Test Set-up

NOTE: Effective Isotropic radiated power (EIRP) refers to the radiation power output of the EUT, assuming all emissions are radiated from half-wave horn antennas. There is a constant difference of 2.15 dB between EIRP and ERP.  $EIRP (dBm) = ERP (dBm) + 2.15$  (ITU-R Recommendation SM.329-10).

## 6.1.4 Measurement Results

### 6.1.4.1 Pre-test Results

Table 9 Measurement Results

		RF Output Power (EIRP)					
TEST CONDITIONS		Channel 512(B) 1850.2MHz		Channel 661(M) 1880.0MHz		Channel 810(T) 1909.8MHz	
		dBm		dBm		dBm	
T <sub>nom</sub> (25 °C)/ V <sub>nom</sub> (3.7V)		Measured	Limit	Measured	Limit	Measured	Limit
TM1		26.42	33	26.45	33	26.55	33
TM2		22.85	33	22.83	33	22.87	33
TEST CONDITIONS		Channel 9262(B) 1852.4MHz		Channel 9400(M) 1880.0MHz		Channel 9538(T) 1907.6MHz	
		dBm		dBm		dBm	
T <sub>nom</sub> (25 °C)/ V <sub>nom</sub> (3.7V)		Measured	Limit	Measured	Limit	Measured	Limit
TM3		19.10	33	19.15	33	18.91	33

Note: Measurement the EIRP with RMS detector.

### 6.1.4.2 Substitution Results

Table 10 Substitution Results

Test Mode	Freq. [MHz]	Meas Level [dBm]	Substitution Antenna Type	SGP [dBm]	Substitution Gain [dBi]	Cable Loss [dB]	Substitution Level (EIRP) [dBm]	FCC limit [dBm]	Result
TM1	1850.2	26.42	Horn Ant.	22.96	4.5	1	26.46	33	Pass
TM1	1880.0	26.45	Horn Ant.	22.98	4.5	1	26.48	33	Pass
TM1	1909.8	26.55	Horn Ant.	22.72	4.8	1	26.52	33	Pass
TM2	1850.2	22.85	Horn Ant.	19.32	4.5	1	22.82	33	Pass
TM2	1880.0	22.83	Horn Ant.	19.35	4.5	1	22.85	33	Pass
TM2	1909.8	22.87	Horn Ant.	19.09	4.8	1	22.89	33	Pass
TM3	1852.4	19.10	Horn Ant.	15.63	4.5	1	19.13	33	Pass
TM3	1880.0	19.15	Horn Ant.	15.67	4.5	1	19.17	33	Pass
TM3	1907.6	18.91	Horn Ant.	15.18	4.8	1	18.98	33	Pass



Note: a, For get the EIRP (Efficient Isotropic Radiated Power) in substitution method, the following formula should take to calculate it,

$$\text{EIRP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBi]}$$

NOTE: SGP- Signal Generator Level

b, RBW=10kHz, VBW=300kHz, and integrated by the instrument to 250kHz for TM1 and TM2 and 5M for TM3.

### 6.1.5 Conclusion

The equipment **PASSED** the requirement of this clause.

## 6.2 Conducted Power of Transmitter

### 6.2.1 Test Conditions

Table 11 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	55 %
Test Configurations:	TM1/TM2/TM3/TM4/TM5 at frequency Bottom, Middle, Top

### 6.2.2 Test Specifications and Limits

#### 6.2.2.1 Specification

CFR 47 (FCC) part 2.1047 and part 24 subpart E

#### 6.2.2.2 Supporting Standards

Table 12 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP TS51.010 0:2005	Digital cellular telecommunications system Mobile Station (MS) conformance specification;
3GPP TS 34.121 V8.7.0:2009	Technical Specification Group Radio Access Network; User Equipment (UE) conformance specification; Radio transmission and reception (FDD);

#### 6.2.2.3 Limits

Compliance with part 24.232, in no any case may the peak power of a mobile station transmitter exceed 2 W. The calculated longitude EIRP by following formula:

$$EIRP(dBm) = 10 \cdot \log(EIRP_{in\ mW}).$$

And for conducted power, we can use Antenna Gain to calculate the limit. So the conducted power:

$$P_{cod}(dBm) = EIRP(dBm) - Gain(dBi).$$

and  $Gain(dBi) = Gain(dBd) + 2.15dB$

Table 13 Limits

Maximum Output Power (Watts)	< 2 Watts (33 dBm)
Antenna Gain(dBi):	-1.32
Antenna Gain(dBd):	-3.47
Maximum Conducted Output Power (dBm)	< 36.47

For HSDPA test mode, there are 4 sub-tests for different configuration.

Table 14 HSDPA conducted max power pre-scan

Sub-test	$\beta_c$	$\beta_d$	$\beta_d$ (SF)	$\beta_c/\beta_d$	HS	CM (dB)	MPR (dB)
1	2/15	15/15	64	2/15	4/15	0	0
2	12/15	15/15	64	12/15	24/15	1	0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

For HSUPA test mode, there are 5 sub-tests for different configuration.

Table 15 HSUPA conducted max power pre-scan

Sub-test	$\beta_c$	$\beta_d$	$\beta_d$ (SF)	$\beta_c/\beta_d$	$\beta_{HS}$ (Note 1)	$\beta_{ec}$	$\beta_{ed}$ (Note 5) (Note 6)	$\beta_{ed}$ (SF)	$\beta_{ed}$ (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 6)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/22 5	1309/22 5	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}$ : 47/15 $\beta_{ed2}$ : 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (Note 4)	15/15 (Note 4)	64	15/15 (Note 4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1:  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  and  $\Delta_{CQI} = 30/15$  with  $\beta_{hs} = 30/15 * \beta_c$ .

Note 2: CM = 1 for  $\beta_c/\beta_d = 12/15$ ,  $hs/c = 24/15$ . For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the  $\beta_c/\beta_d$  ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to  $\beta_c = 10/15$  and  $\beta_d = 15/15$ .

Note 4: For subtest 5 the  $\beta_c/\beta_d$  ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to  $\beta_c = 14/15$  and  $\beta_d = 15/15$ .

Note 5: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 6:  $\beta_{ed}$  can not be set directly, it is set by Absolute Grant Value.

### 6.2.3 Test Method and Setup

(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, Conducted maximum power shall be measured when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in 2.1033(c)(8). Connect the EUT to the wireless communication tester CMU200 via the antenna connector. The band class is set as PCS.

(b) Test the Conducted maximum output power by the CMU200.

### Test setup

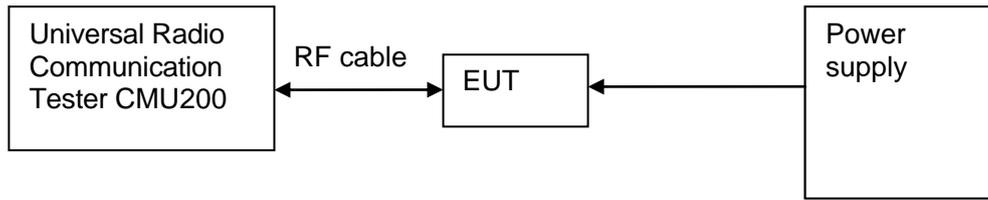


Figure 2. Test Set-up

### 6.2.4 Measurement Results

Table 16 Measurement Results

TEST CONDITIONS		RF Output Power (Conducted)					
		Channel 512(B)		Channel 661(M)		Channel 810(T)	
		1850.2MHz		1880.0MHz		1909.8MHz	
		dBm		dBm		dBm	
T <sub>nom</sub> (25 °C)/ V <sub>nom</sub> (3.7V)		Measure d	Limit	Measured	Limit	Measure d	Limit
TM1		29.89	36.47	29.92	36.47	30.02	36.47
TM2		26.32	36.47	26.30	36.47	26.34	36.47
TEST CONDITIONS		Channel 9262(B)		Channel 9400(M)		Channel 9538(T)	
		1852.4MHz		1880.0MHz		1907.6MHz	
		dBm		dBm		dBm	
T <sub>nom</sub> (25 °C)/ V <sub>nom</sub> (3.7V)		Measure d	Limit	Measured	Limit	Measure d	Limit
TM3		22.57	36.47	22.62	36.47	22.38	36.47
TM4	Case1	22.02	36.47	22.08	36.47	21.88	36.47
	Case2	21.28	36.47	21.83	36.47	21.48	36.47
	Case3	20.77	36.47	21.33	36.47	20.75	36.47
	Case4	20.72	36.47	21.37	36.47	20.73	36.47
TM5	Case1	21.42	36.47	21.59	36.47	21.53	36.47
	Case2	20.48	36.47	20.41	36.47	20.22	36.47
	Case3	20.38	36.47	20.65	36.47	20.41	36.47
	Case4	20.35	36.47	20.82	36.47	20.65	36.47
	Case5	21.49	36.47	21.71	36.47	21.57	36.47

Note: Measurement the conducted output power with RMS detector.



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## 6.2.5 Conclusion

The equipment **PASSED** the requirement of this clause.

## 6.3 Modulation Characteristics

### 6.3.1 Test Conditions

Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	55 %
Test Configurations:	TM1/TM2/TM3 at frequency Middle

### 6.3.2 Test Specifications and Limits

#### 6.3.2.1 Specification

CFR 47 (FCC) part 2.1047 and part 24 subpart E

#### 6.3.2.2 Supporting Standards

Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP TS51.010	Digital cellular telecommunications system Mobile Station (MS) conformance specification;
3GPP TS 34.121	Technical Specification Group Radio Access Network; User Equipment (UE) conformance specification; Radio transmission and reception (FDD);

#### 6.3.2.3 Limits

No specific modulation characteristics requirement limits in part 2.1047 and part 24 subpart E.

Limits

Limits	Not applicable
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### 6.3.3 Test Method and Setup

Connect the Mobile Phone to Universal Radio Communication Tester CMU200 via the antenna connector. The frequency band is set as PCS; the Mobile Phone's output is matched with 50  $\Omega$  load, test method was according to 3GPP TS 51.010 and 3GPP TS 34.121. The waveform quality and constellation of the Mobile Phone was tested.

#### Test setup

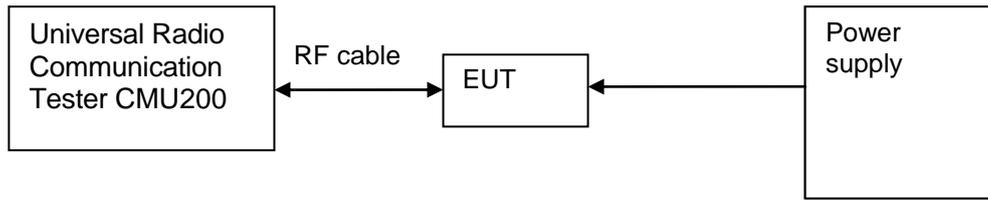


Figure 3. Test Set-up

### 6.3.4 Measurement Results

#### Measurement Results

		Modulation Characteristic	
TEST CONDITIONS		Channel661(M) 1880.0MHz	
		Measured	
		TM1	TM2
T <sub>nom</sub> (25 °C)	V <sub>nom</sub> (3.7V)	Refer to Appendix A	Refer to Appendix A
TEST CONDITIONS		Channel9400(M) 1880.0MHz	
		Measured	
		TM3	
T <sub>nom</sub> (25 °C)	V <sub>nom</sub> (3.7V)	Refer to Appendix A	

### 6.3.5 Conclusion

The equipment **PASSED** the requirement of this clause.

For the measurement results refer to appendix A.

## 6.4 Occupied Bandwidth

### 6.4.1 Test Conditions

Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	55 %
Test Configurations:	TM1/TM2/TM3 at frequency Bottom, Middle, Top

### 6.4.2 Test Specifications and Limits

#### 6.4.2.1 Specification

CFR 47 (FCC) part 2.1049 and part 24 subpart E

#### 6.4.2.2 Supporting Standards

Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP TS51.010	Digital cellular telecommunications system Mobile Station (MS) conformance specification;
3GPP TS 34.121	Technical Specification Group Radio Access Network; User Equipment (UE) conformance specification; Radio transmission and reception (FDD);

#### 6.4.2.3 Limits

No specific occupied bandwidth requirement in part 24 subpart E, but the occupied bandwidth was defined in part 2.1049: the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured.

Limits

Upper /lower frequency limits	0.5% of the mean power
-------------------------------	------------------------

### 6.4.3 Test Method and Setup

Mobile Phone was connected to the wireless signal analyzer R&S FSQ31 via the one RF connector. The band class is set as PCS; Mobile Phone was controlled to transmit maximum power. Measure and record the occupied bandwidth of the Mobile Phone by the R&S FSQ31.

The OBW, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

Refer to 47CFR part2.1049 section (g)&(h).

(g) Transmitter in which the modulating base band comprises not more than three independent channels - when modulated by the full complement of signals for which the transmitter is rated. The level of modulation for each channel should be set to that prescribed in rule parts applicable to the services for which the transmitter is intended. If specific modulation levels are not set forth in the rules, the tests should provide the manufacturer's maximum rated condition.

(h) Transmitters employing digital modulation techniques - when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudorandom generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at discretion of the user.

For TM1/TM2 following RBW and VBW are employed:

Measurement bandwidth (RBW): 3 kHz (Resolution bandwidth)

Video bandwidth (VBW): 10 kHz

For TM3 following RBW and VBW are employed:

Measurement bandwidth (RBW): 50 kHz (Resolution bandwidth)

Video bandwidth (VBW): 500 kHz

### Test Set-up

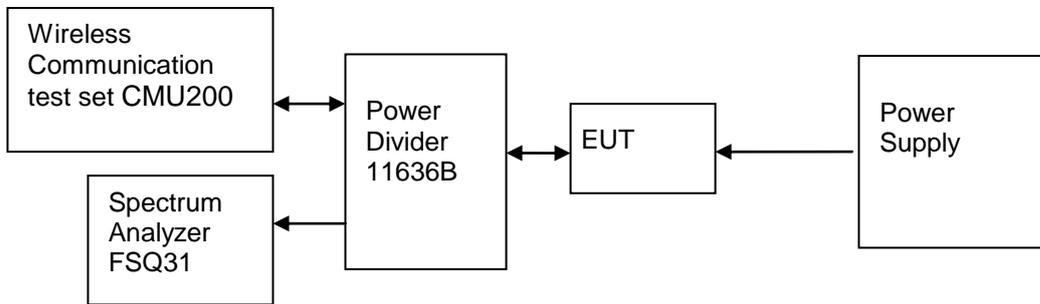


Figure 4. Test Set-up

### 6.4.4 Measurement Results

Measurement Results

TEST CONDITIONS		Occupied Bandwidth					
Center Frequency		Channel512(B) 1850.2MHz		Channel661(M) 1880.0MHz		Channel810(T) 1909.8MHz	
		Measured (kHz)		Measured (kHz)		Measured (kHz)	
		TM1	TM2	TM1	TM2	TM1	TM2
T <sub>nom</sub> (25 °C) V <sub>nom</sub> (3.7V)	99%	246.79	246.79	243.59	246.79	243.59	240.38
Center Frequency		Channel9262(B) 1852.4MHz		Channel9400(M) 1880.0MHz		Channel9538(T) 1907.6MHz	
		Measured (MHz)		Measured (MHz)		Measured (MHz)	



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		TM3	TM3	TM3
$T_{nom}$ (25 °C) $V_{nom}$ (3.7V)	99%	4.13	4.15	4.15

#### 6.4.5 Conclusion

The equipment **PASSED** the requirement of this clause.  
For the measurement results refer to appendix B.

## 6.5 Band Edges Compliance

### 6.5.1 Test Conditions

Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25°C
Relative humidity:	55 %
Test Configurations:	TM1/TM2/TM3 at frequency Bottom, Top

### 6.5.2 Test Specifications and Limits

#### 6.5.2.1 Specification

CFR 47 (FCC) part 2.1051 and Part24 Subpart E

#### 6.5.2.2 Supporting Standards

Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP TS51.010	Digital cellular telecommunications system Mobile Station (MS) conformance specification;
3GPP TS 34.121	Technical Specification Group Radio Access Network; User Equipment (UE) conformance specification; Radio transmission and reception (FDD);

#### 6.5.2.3 Limits

Compliance with part 24.238, all spurious emission must be attenuated below the transmitter power by at least  $43 + 10 \log_{10} P(W)$ . (Whereas P is the rated power of the EUT).

Limits for GPRS

	TM1	TM2	TM3
Rated Power:	30 dBm	26 dBm	24 dBm
Required attenuation:	$43 + 10 \log(1) = 43$ , 30 dBm - 43 dB	$43 + 10 \log(0.4) = 39$ , 26 dBm - 39 dB	$43 + 10 \log(0.25) = 37$ , 24 dBm - 37 dB
Absolute level	- 13 dBm	- 13 dBm	- 13 dBm

### 6.5.3 Test Method and Setup

Mobile Phone was connected to the wireless signal analyzer R&S FSQ31 via the one RF connector, the band class is set as PCS. Mobile Phonewas controlled to transmit maximum power. Measure and record band edges compliance of the Mobile Phone by the R&S FSQ31.

For TM1/TM2 following RBW and VBW are employed:  
 Measurement bandwidth (RBW): 3 kHz (Resolution bandwidth)  
 Video bandwidth (VBW): 10 kHz  
 For TM3 following RBW and VBW are employed:  
 Measurement bandwidth (RBW): 50 kHz (Resolution bandwidth)  
 Video bandwidth (VBW): 200 kHz

**Test Set-up**

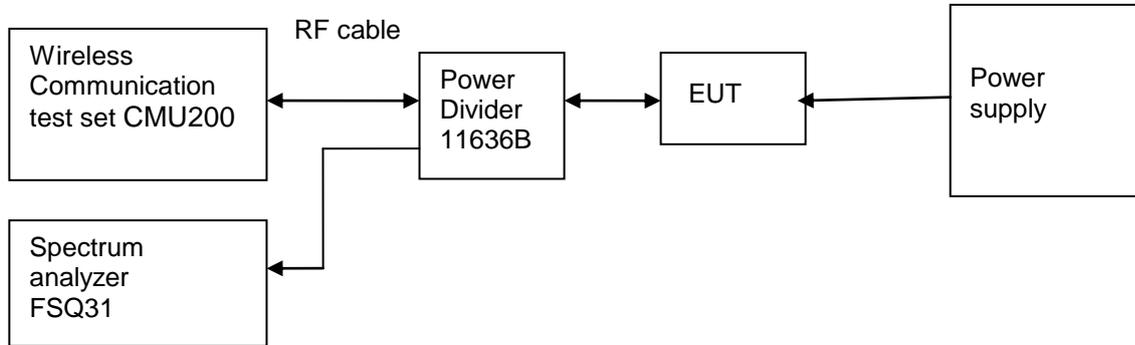


Figure 5. Test Set-up

**6.5.4 Measurement Results**

Measurement Results outside Band Edges-- Single Carrier

Band	Frequency of Band edges [MHz]	Channel Number	Test Mode	Spurious Level measured [dBm]	FCC limit	Result
$T_{nom} (25\text{ }^{\circ}\text{C}), V_{nom} (3.7\text{V})$						
PCS	1850.2	512	TM1	<-13(See appendix C)	- 13 dBm	Pass
	1909.8	810	TM1	<-13(See appendix C)	- 13 dBm	Pass
	1850.2	512	TM2	<-13(See appendix C)	- 13 dBm	Pass
	1909.8	810	TM2	<-13(See appendix C)	- 13 dBm	Pass
	1852.4	9262	TM3	<-13(See appendix C)	- 13 dBm	Pass
	1907.6	9538	TM3	<-13(See appendix C)	- 13 dBm	Pass

**6.5.5 Conclusion**

The equipment **PASSED** the requirement of this clause.  
 For the measurement results refer to appendix C.

## 6.6 Spurious Emission at Antenna Terminal

### 6.6.1 Test Conditions

Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25°C
Relative humidity:	55 %
Test Configurations:	TM1/TM2/TM3 at frequency Bottom, Middle ,Top

### 6.6.2 Test Specifications and Limits

#### 6.6.2.1 Specification

CFR 47 (FCC) part 2.1051 and Part24 Subpart E

#### 6.6.2.2 Supporting Standards

Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP TS51.010 V5.4.0.0:2005	Digital cellular telecommunications system Mobile Station (MS) conformance specification;
3GPP TS 34.121 V8.7.0:2009	Technical Specification Group Radio Access Network; User Equipment (UE) conformance specification; Radio transmission and reception (FDD);

#### 6.6.2.3 Limits

Compliance with part 24.238, all spurious emission must be attenuated below the transmitter power by at least  $43 + 10 \log_{10} P$ . (Whereas P is the rated power of the EUT).

Limits for GPRS Mode

	TM1	TM2	TM3
Rated Power:	30 dBm	26 dBm	24 dBm
Required attenuation:	$43 + 10 \log(1) = 43$ , 30 dBm - 43 dB	$43 + 10 \log(0.4) = 39$ , 26 dBm - 39 dB	$43 + 10 \log(0.25) = 37$ , 24 dBm - 37 dB
Absolute level	- 13 dBm	- 13 dBm	- 13 dBm

### 6.6.3 Test Method and Setup

The EUT was connected to the wireless signal analyzer R&S FSQ31 via the one RF connector, the

band class is set as PCS. The EUT was controlled to transmit maximum power. Measure and record the Conducted Spurious Emission of the EUT by the R&S FSQ31.

According to part 24.238, the defined measurement bandwidth as following:

24.238 (b) Measurement procedure: Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater.

Measurement bandwidth (RBW) for 9 kHz up to 150 kHz: 1 kHz;  
Measurement bandwidth (RBW) for 150 kHz up to 30MHz: 10 kHz;  
Measurement bandwidth (RBW) for 30 MHz up to 20GHz: 1MHz;

### Test Set-up

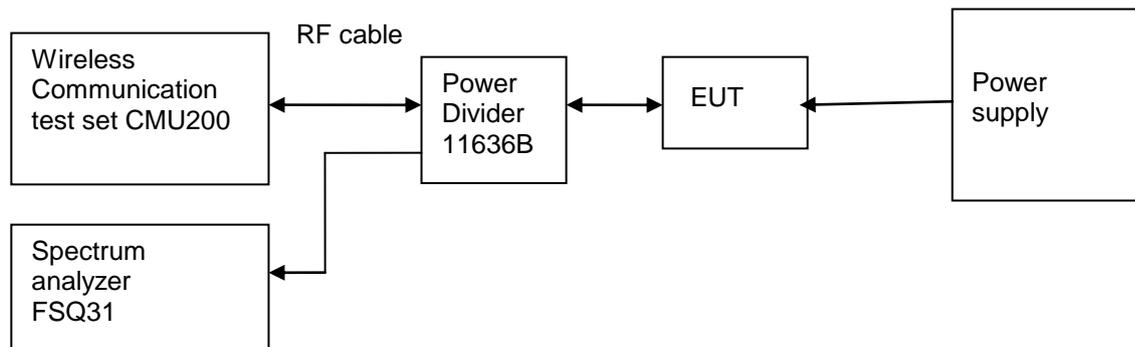


Figure 6. Test Set-up

### 6.6.4 Measurement Results

Measurement Results

Channel Number	Test Mode	Test Range (Frequency)	Output Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
Channel 512(B)	TM1	9 kHz~20GHz	30	<- 13 dBm (See appendix D)	- 13 dBm	Pass
	TM2	9 kHz~20GHz	26	<- 13 dBm (See appendix D)	- 13 dBm	Pass
Channel 9262(B)	TM3	9 kHz~20GHz	24	<- 13 dBm (See appendix D)	- 13 dBm	Pass
Channel 661(M)	TM1	9 kHz~20GHz	30	<- 13 dBm (See appendix D)	- 13 dBm	Pass
	TM2	9 kHz~20GHz	26	<- 13 dBm (See appendix D)	- 13 dBm	Pass
Channel 9400(M)	TM3	9 kHz~20GHz	24	<- 13 dBm (See appendix D)	- 13 dBm	Pass
Channel	TM1	9 kHz~20GHz	30	<- 13 dBm	- 13	Pass

810(T)				(See appendix D)	dBm	
	TM2	9 kHz~20GHz	26	<- 13 dBm (See appendix D)	- 13 dBm	Pass
Channel 9538(T)	TM3	9 kHz~20GHz	24	<- 13 dBm (See appendix D)	- 13 dBm	Pass

### 6.6.5 Conclusion

The equipment **PASSED** the requirement of this clause.  
For the measurement results refer to appendix D.

## 6.7 Radiated Spurious Emissions

### 6.7.1 Test Conditions

Test Conditions

Preconditioning:	0.5 hour
Measured at:	enclosure
Ambient temperature:	25°C
Relative humidity:	55%
Test Configurations:	TM1/TM2/TM3/TM4/TM5 at frequency Middle

### 6.7.2 Test Specifications and Limits

#### 6.7.2.1 Specification

CFR 47 (FCC) part 2.1053 and part 24.238

#### 6.7.2.2 Supporting Standards

Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP TS51.010 V5.4.0.0:2005	Digital cellular telecommunications system Mobile Station (MS) conformance specification;
3GPP TS 34.121 V8.7.0:2009	Technical Specification Group Radio Access Network; User Equipment (UE) conformance specification; Radio transmission and reception (FDD);

#### 6.7.2.3 Limits

Compliance with part 24.238, all spurious emission must be attenuated below the transmitter power by at least  $43 + 10 \log_{10} P$ . (Whereas P is the rated power of the EUT).

Limits

Rated Power:	24 dBm
Required attenuation:	$43 + 10 \log(0.25) = 37$ , 24 dBm – 37 dB
Absolute level	- 13 dBm

### 6.7.3 Test Method and Setup

A test site fulfilling the requirements of ITU-R Recommendation SM329-11 was used. The EUT was placed on a non-conducting support in the anechoic chamber and was operated from a power source via an RF filter to avoid radiation from the power leads.

According to part 24.238, the defined measurement bandwidth as following:

24.238(b) Measurement procedure: Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater.

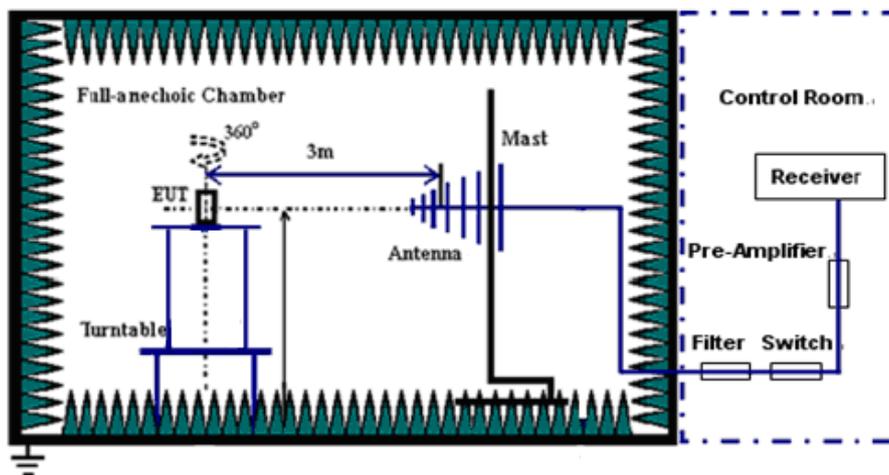
Measurement bandwidth (RBW) for 9 kHz up to 150 kHz: 1 kHz;  
Measurement bandwidth (RBW) for 150 kHz up to 30 MHz: 10 kHz;  
Measurement bandwidth (RBW) for 30MHz up to 26.5GHz: 1MHz;

## Test Set-up

### Step 1:

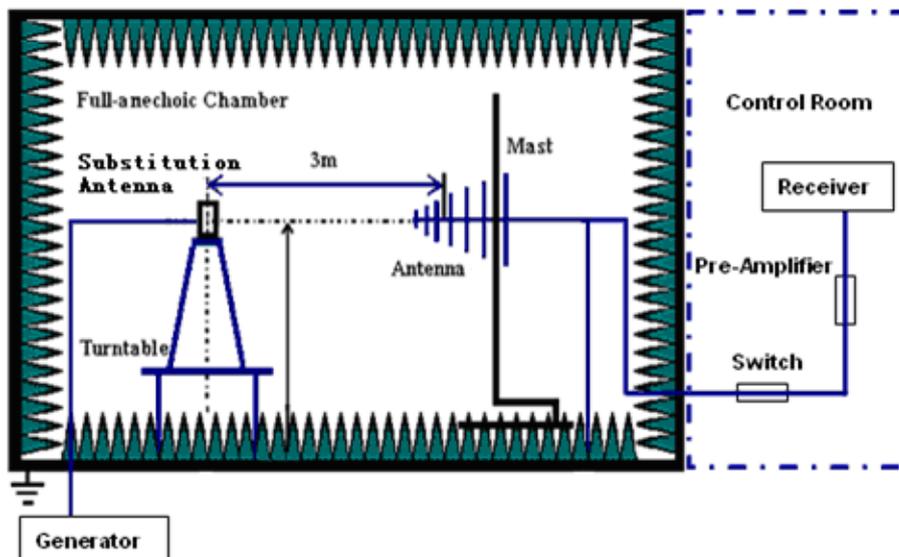
For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, EIRP shall be measured when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in 2.1033(c)(8). Connect the EUT to the BTS simulator via the air interface.

Test the Radiated maximum output power by the Test Receiver from test antenna.



### Step 2:

Use substitution method to verify the maximum output power. The EUT is substituted by a dipole antenna. The dipole is connected to a signal generator. And then adjust the output level of the signal generator to get the same received power recorded in step1 on Test Receiver, and record the power level of Signal Generator. Of course, the cable loss at the test frequency should be compensated.



Test should be performed in normal voltage condition.

No peak found in pre- test. All frequency points' margin is bigger than 20dB, so the substitution method isn't used.

Calculation Sample:

Substitution Results

Freq. [MHz]	Measurement Value [dBm]	Substitution Antenna Type	Gain [dBd]	Cable Loss [dB]	Signal Generator Level [dBm]	Substitution Level [dBm]	FCC limit [dBm]	Result

Note: For get the E.R.P. (Efficient Radiated Power) in substitution method, the following formula should take to calculate it,

$$\text{E.R.P. [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBd]}$$

NOTE: SGP- Signal Generator Level

#### 6.7.4 Conclusion

The equipment **PASSED** the requirement of this clause.  
For the measurement results refer to appendix\_E

## 6.8 Frequency Stability

### 6.8.1 Test Conditions

Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	See below
Relative humidity:	55 %
Test Configurations:	TM1/TM2/TM3 at frequency Middle

### 6.8.2 Test Specifications and Limits

#### 6.8.2.1 Specification

CFR 47 (FCC) part 2.1055 and Part24 Subpart E

#### 6.8.2.2 Supporting Standards

Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
3GPP TS51.010 V5.4.0.0:2005	Digital cellular telecommunications system Mobile Station (MS) conformance specification;
3GPP TS 34.121 V8.7.0:2009	Technical Specification Group Radio Access Network; User Equipment (UE) conformance specification; Radio transmission and reception (FDD);

#### 6.8.2.3 Limits

No specific frequency stability requirement in part 2.1055 and part 24.235.

### 6.8.3 Test Method and Setup

The frequency stability shall be measured with variation of ambient temperature as follows:

- (1) From -30 ° to +50 ° centigrade for all equipment except that specified in subparagraphs
- (2) and (3) of paragraph 2.1055

(a) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10° centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short-term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency determining and stabilizing circuitry need be subjected to the temperature variation test.

(b) The frequency stability shall be measured with variation of primary supply voltage as follows:

- (1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.
- (2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point, which shall be specified by the manufacturer.

(3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

(c) When deemed necessary, the Commission may require tests of frequency stability under conditions in addition to those specifically set out in paragraphs (a), (b), (c) of this section. (For example, measurements showing the effect of proximity to large metal objects, or of various types of antennas, may be required for portable equipment.)

The EUT can only work in such extreme voltage 3.6V and 4.2V, so here the EUT is tested in the 3.6V and 4.2V.

### Test Set up

Connect the EUT to the Wireless Communication test set CMU200 via the connector. Then measure the frequency error by the Wireless Communication test set CMU200. The EUT's output is matched with a 50 Ω load.

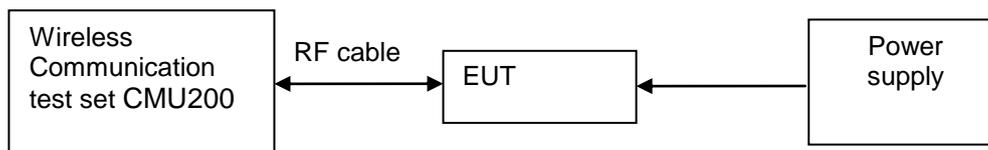


Figure 7. Test Set up

### 6.8.4 Measurement Results

#### 6.8.4.1 Measurement Results vs. Variation of Temperature

- **TM1, 3.7V DC Channel No.661(1880.0MHz)**

Measurement Results vs. Variation of Temperature – TM1

Temperature	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	1880.0	-11	Pass
-20 °C	1880.0	-11	Pass
-10 °C	1880.0	-12	Pass
0 °C	1880.0	12	Pass
+10 °C	1880.0	19	Pass
+20 °C	1880.0	-14	Pass
+30 °C	1880.0	11	Pass
+40 °C	1880.0	-17	Pass

+50 °C	1880.0	10	Pass
--------	--------	----	------

● **TM2, 3.7V DC Channel No.661(1880.0MHz)**

Measurement Results vs. Variation of Temperature – TM2

Temperature	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	1880.0	-15	Pass
-20 °C	1880.0	-16	Pass
-10 °C	1880.0	-12	Pass
0 °C	1880.0	-13	Pass
+10 °C	1880.0	-17	Pass
+20 °C	1880.0	-9	Pass
+30 °C	1880.0	-10	Pass
+40 °C	1880.0	-12	Pass
+50 °C	1880.0	-10	Pass

● **TM3, 3.7V DC Channel No.9400(1880.0MHz)**

Measurement Results vs. Variation of Temperature – TM3

Temperature	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	1880.0	-14	Pass
-20 °C	1880.0	-12	Pass
-10 °C	1880.0	17	Pass
0 °C	1880.0	-12	Pass
+10 °C	1880.0	-15	Pass
+20 °C	1880.0	-16	Pass
+30 °C	1880.0	-9	Pass
+40 °C	1880.0	-14	Pass
+50 °C	1880.0	-12	Pass

**6.8.4.2 Measurement Results vs. Variation of Voltage**

● **TM1, 25 °C ,Channel No. 661(1880.0MHz)**

## Measurement Results vs. Variation of Voltage – TM1

Voltage	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
4.2V	1880.0	-15	Pass
3.7V	1880.0	-12	Pass
3.6 V	1880.0	-25	Pass

● **TM2, 25 °C ,Channel No. 661(1880.0MHz)**

## Measurement Results vs. Variation of Voltage – TM2

Voltage	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
4.2V	1880.0	-21	Pass
3.7 V	1880.0	-12	Pass
3.6 V	1880.0	-9	Pass

● **TM3, 25 °C ,Channel No. 9400(1880.0MHz)**

## Measurement Results vs. Variation of Voltage – TM3

Voltage	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
4.2V	1880.0	-15	Pass
3.7V	1880.0	-12	Pass
3.6 V	1880.0	9	Pass

### 6.8.5 Conclusion

The equipment **PASSED** the requirement of this clause.

## 7 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

System Measurement Uncertainty

Items		Extended Uncertainty
Effective Isotropic radiated power of Transmitter	EIRP (dBm)	U=3dB; k=2
Band Width	Magnitude (%)	U=0.2%; k=2
Band Edge Compliance	Disturbance Power(dBm)	U=2.0dB; k=2
Conducted Spurious Emission at Antenna Terminal	Disturbance Power(dBm)	U=2.0dB; k=2
Frequency Stability	Frequency Accuracy(ppm)	U=0.21ppm; k=2



## 8 Appendices

Appendix A	Measurement Results Modulation Characteristics
Appendix B	Measurement Results Occupied Bandwidth
Appendix C	Measurement Results Band Edges
Appendix D	Measurement Results Spurious Emission at Antenna Terminal
Appendix E	Measurement Results Radiated Spurious Emissions
Appendix F	Photos of Radiated Spurious Emissions

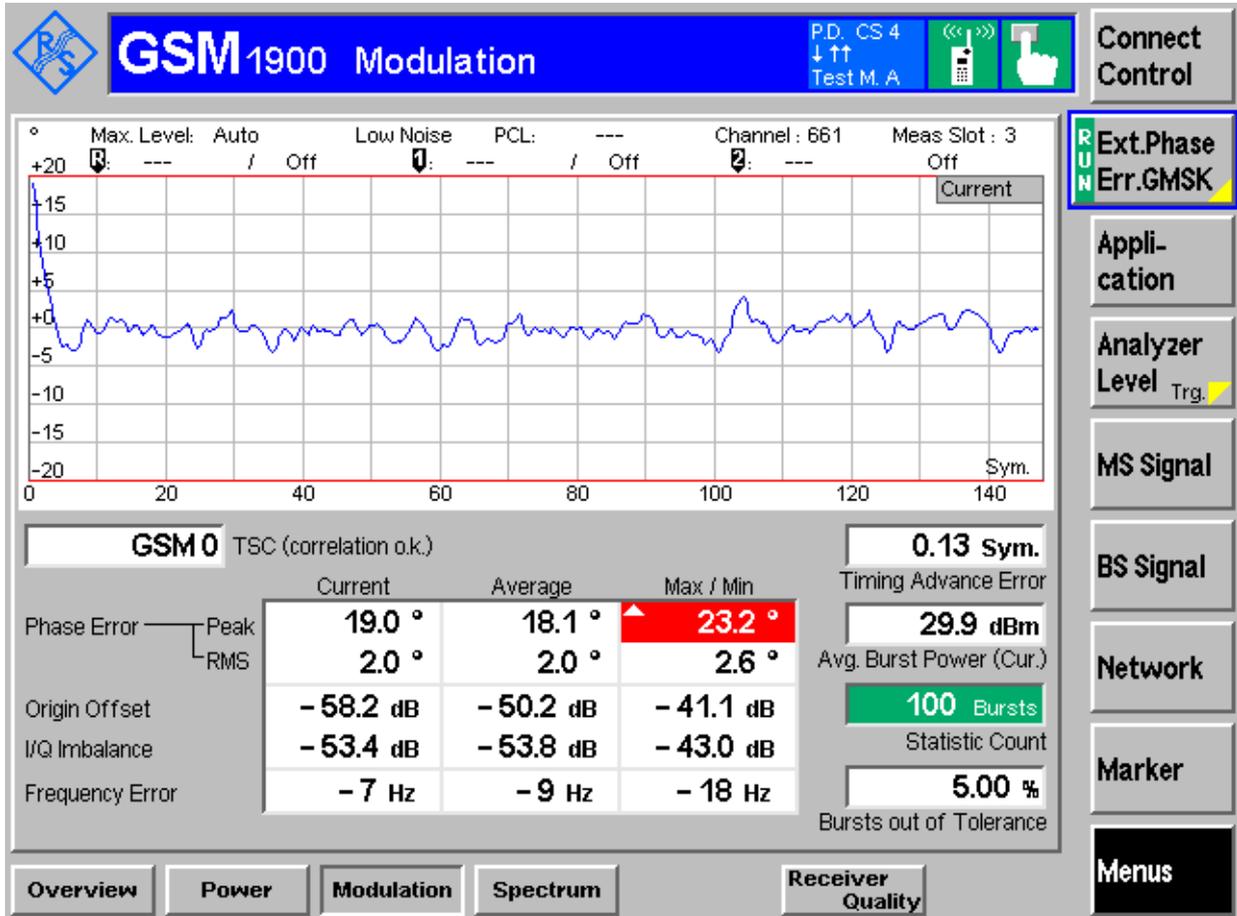


# Appendix A

## Modulation Characteristics According to FCC Part 2.1047 & Part24 Subpart E

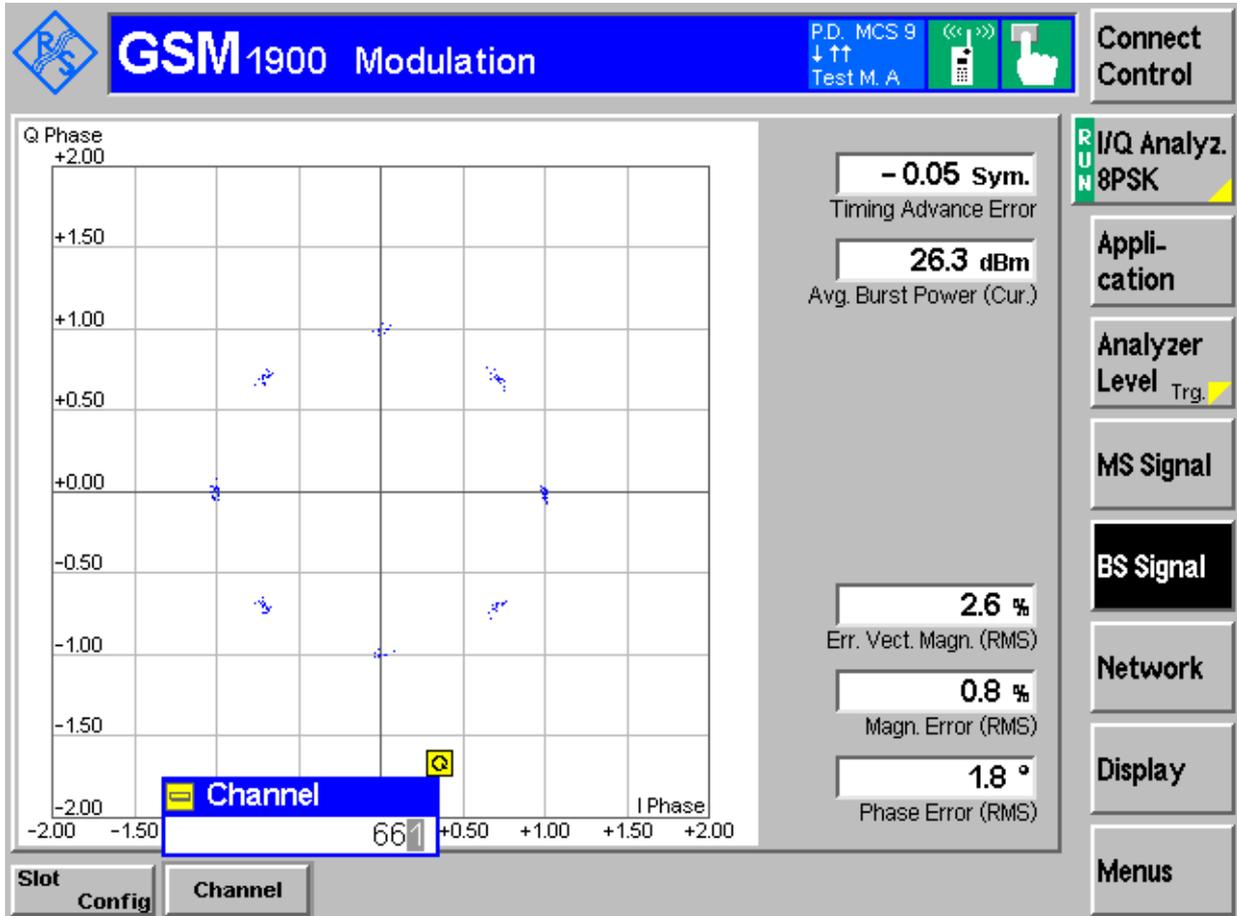


# TM1:GPRS/GSM Channel 661



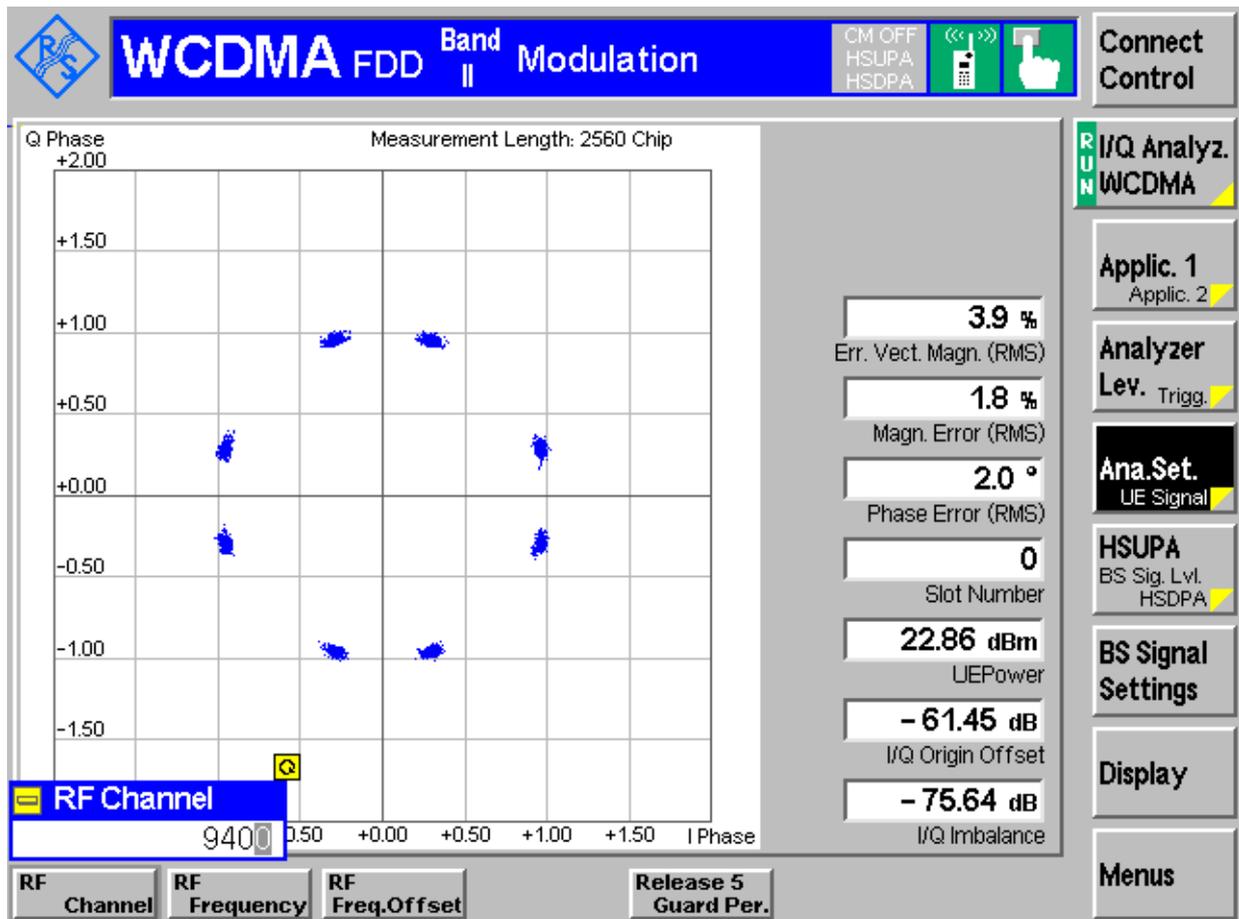


# TM2:EDGE Channel 661





# TM3: WCDMA Channel 9400





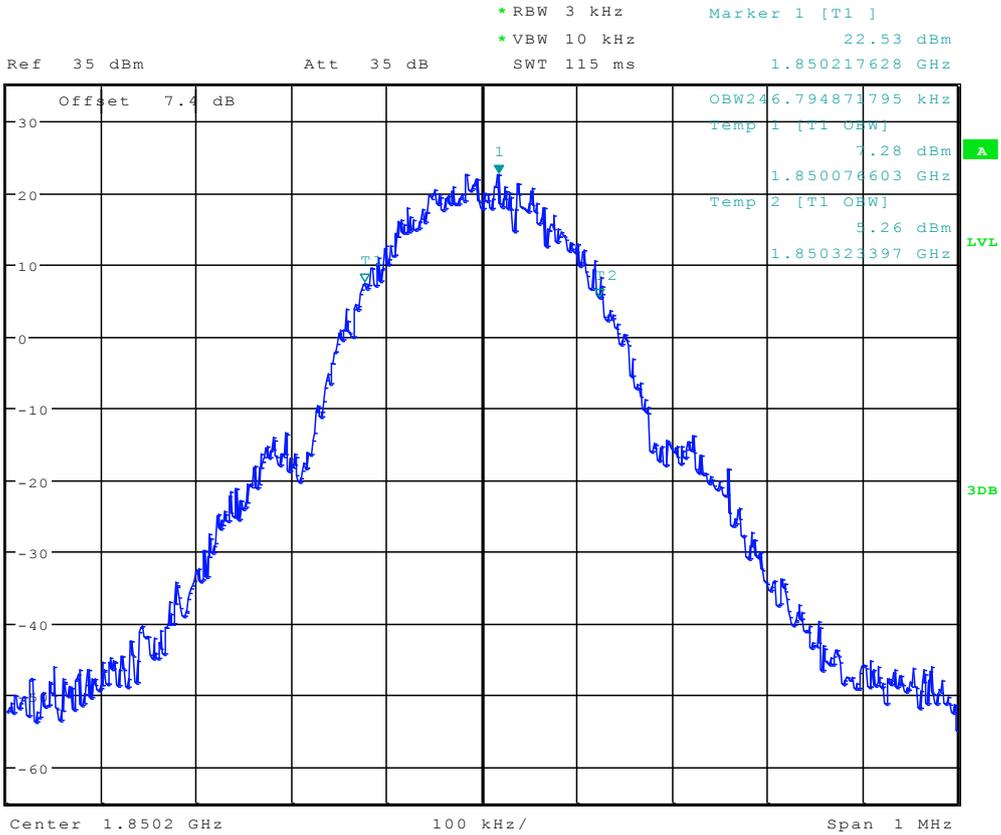
## **Appendix B**

# Occupied Bandwidth

## According to FCC Part 2.1049 & Part 24 Subpart E

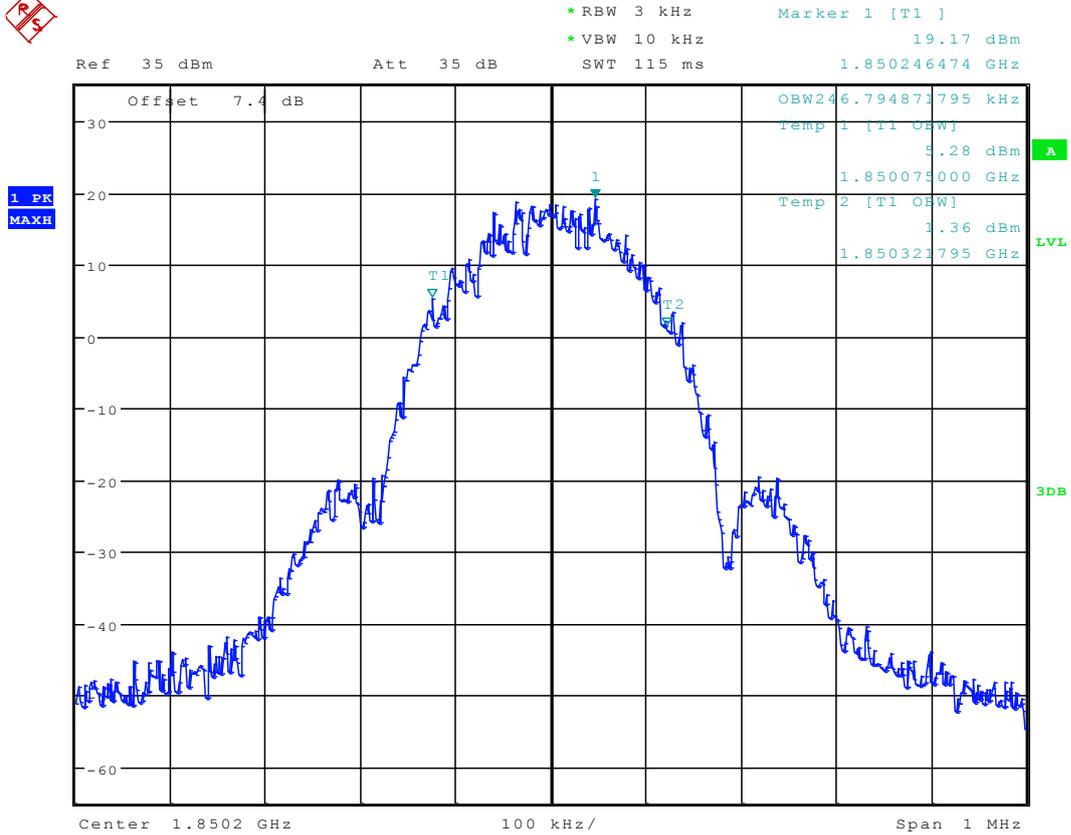


# TM1:GPRS/GSM Channel 512



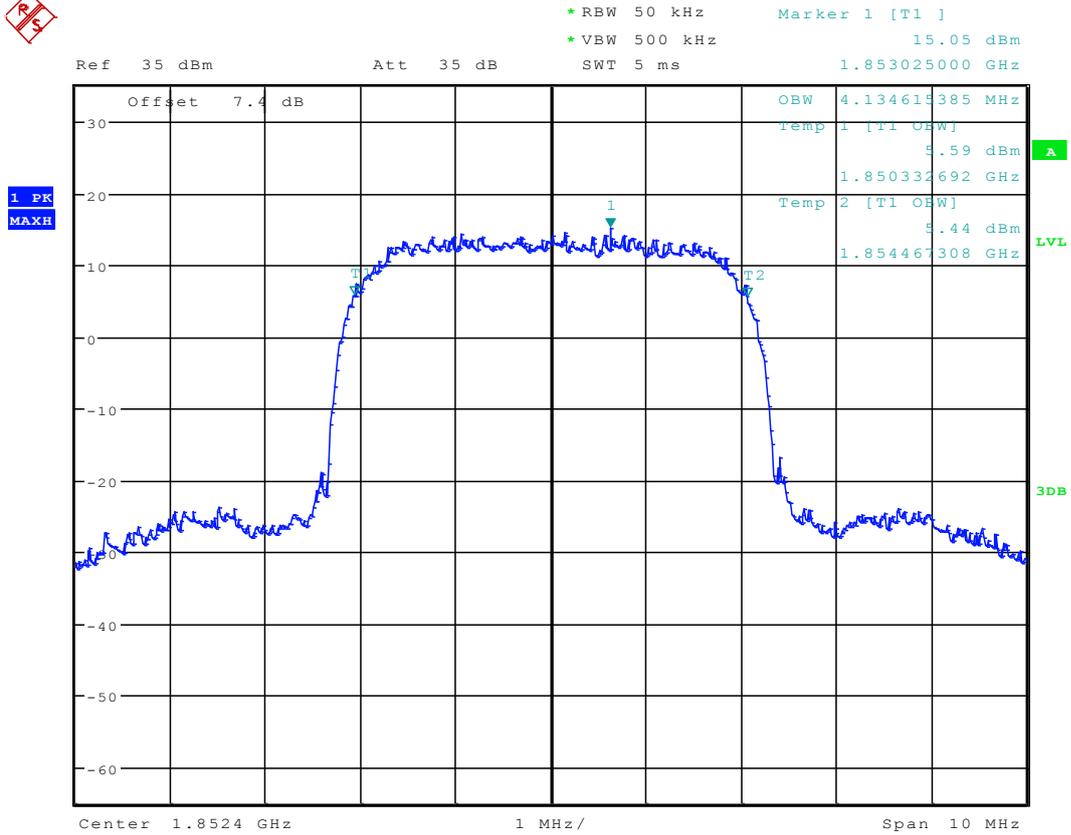


# TM2:EDGE Channel 512



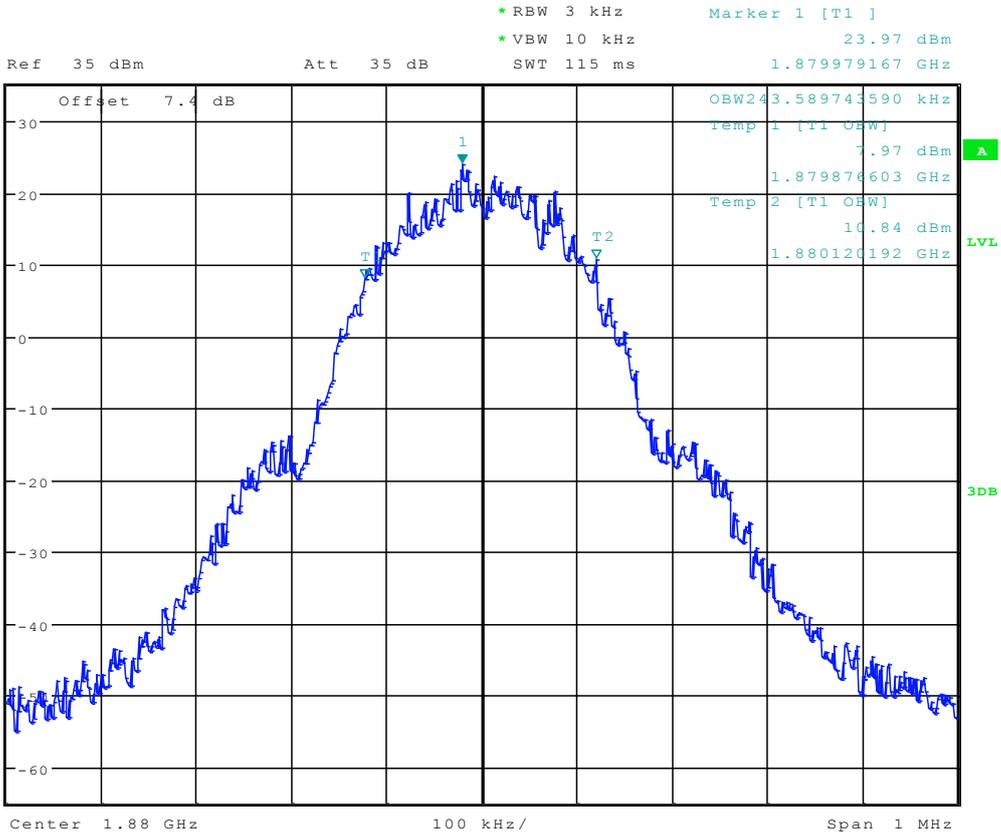


# TM3: WCDMA Channel 9262



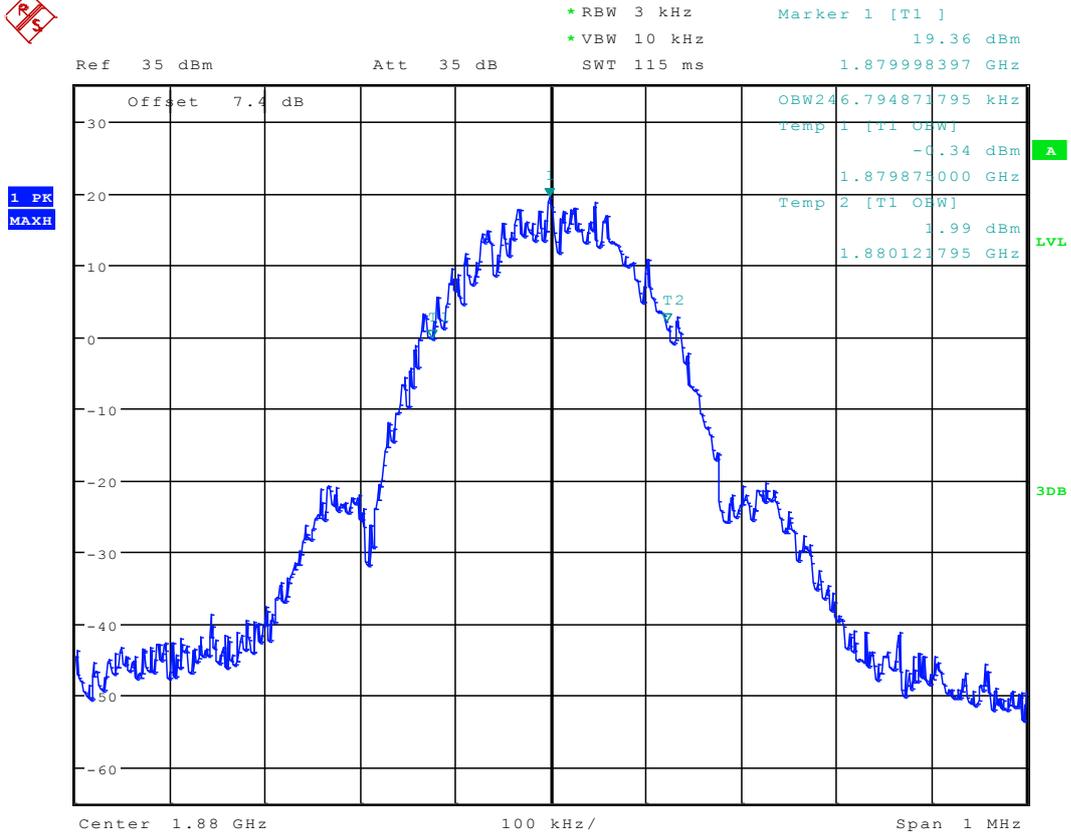


# TM1:GPRS/GSM Channel 661



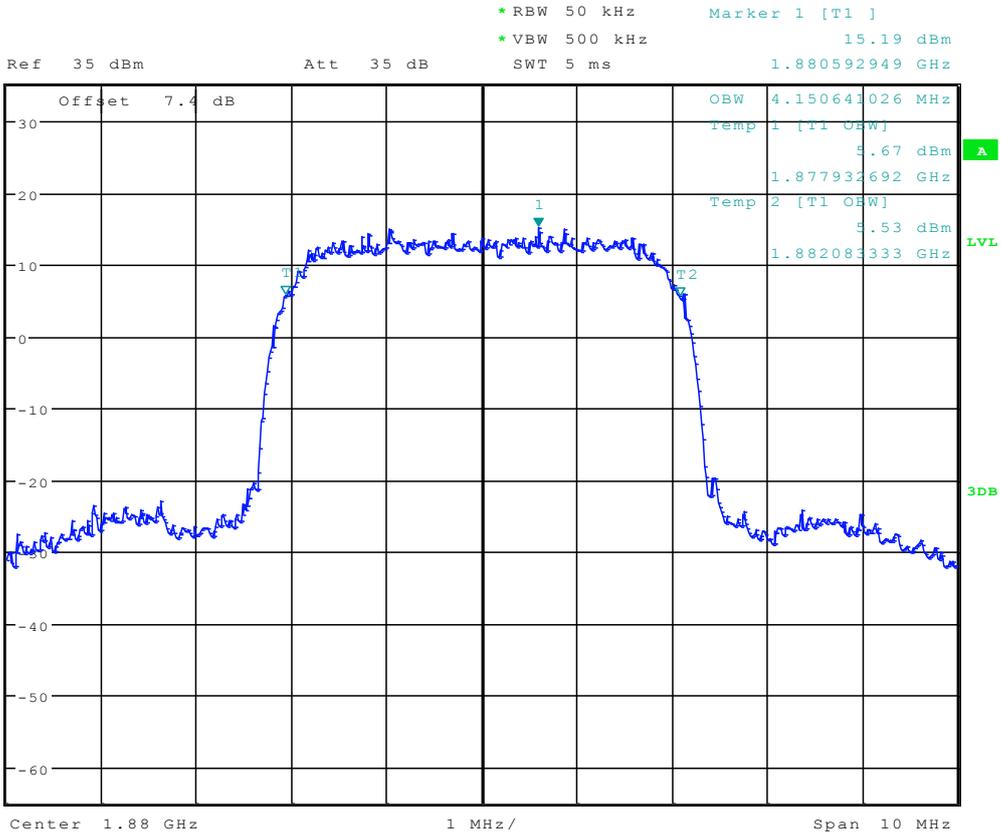


# TM2:EDGE Channel 661





# TM3: WCDMA Channel 9400

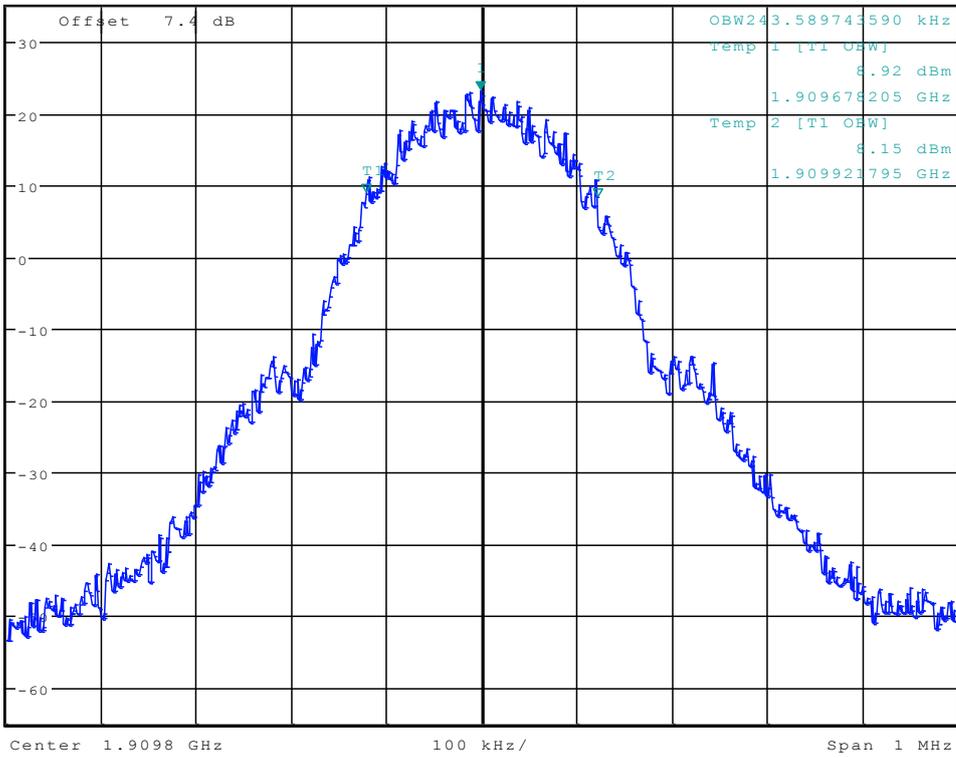




# TM1:GPRS/GSM Channel 810



Ref 35 dBm Att 35 dB \*RBW 3 kHz \*VBW 10 kHz SWT 115 ms Marker 1 [T1 ] 23.20 dBm 1.909798397 GHz



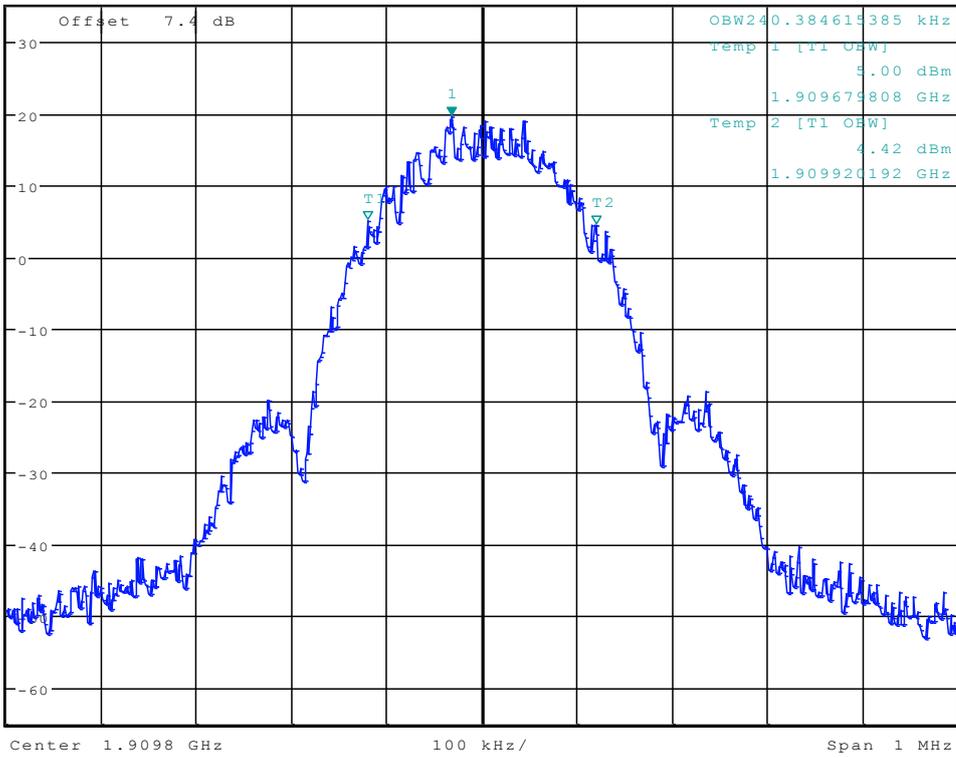


# TM2:EDGE Channel 810



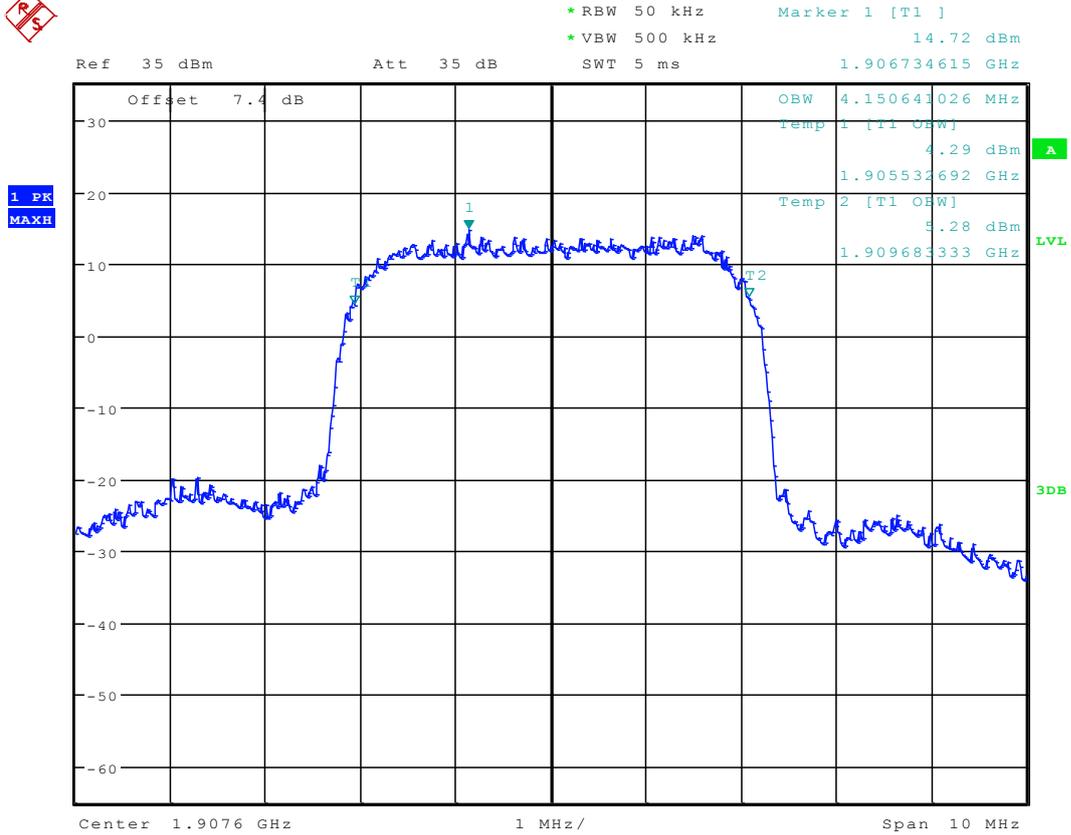
Ref 35 dBm Att 35 dB \*RBW 3 kHz \*VBW 10 kHz SWT 115 ms

Marker 1 [T1 ] 19.54 dBm 1.909767949 GHz





# TM3: WCDMA Channel 9538





# Appendix C

## Band Edges Compliance According to FCC Part 2.1051 & 24.238



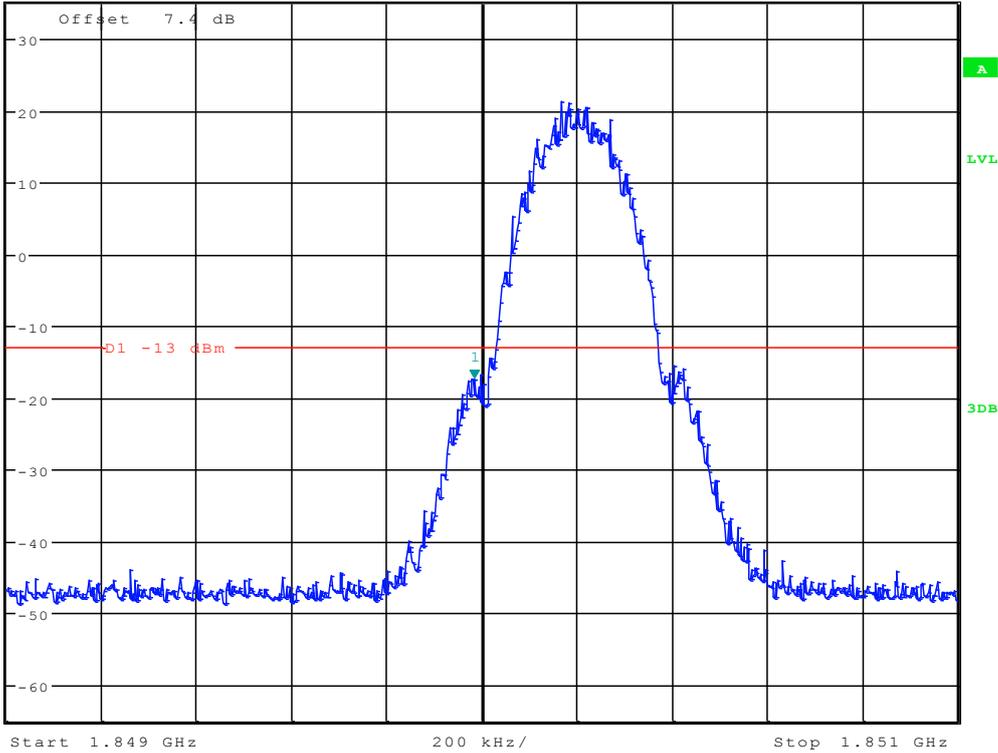
# TM1:GPRS/GSM

## Left Edge

### Channel 512

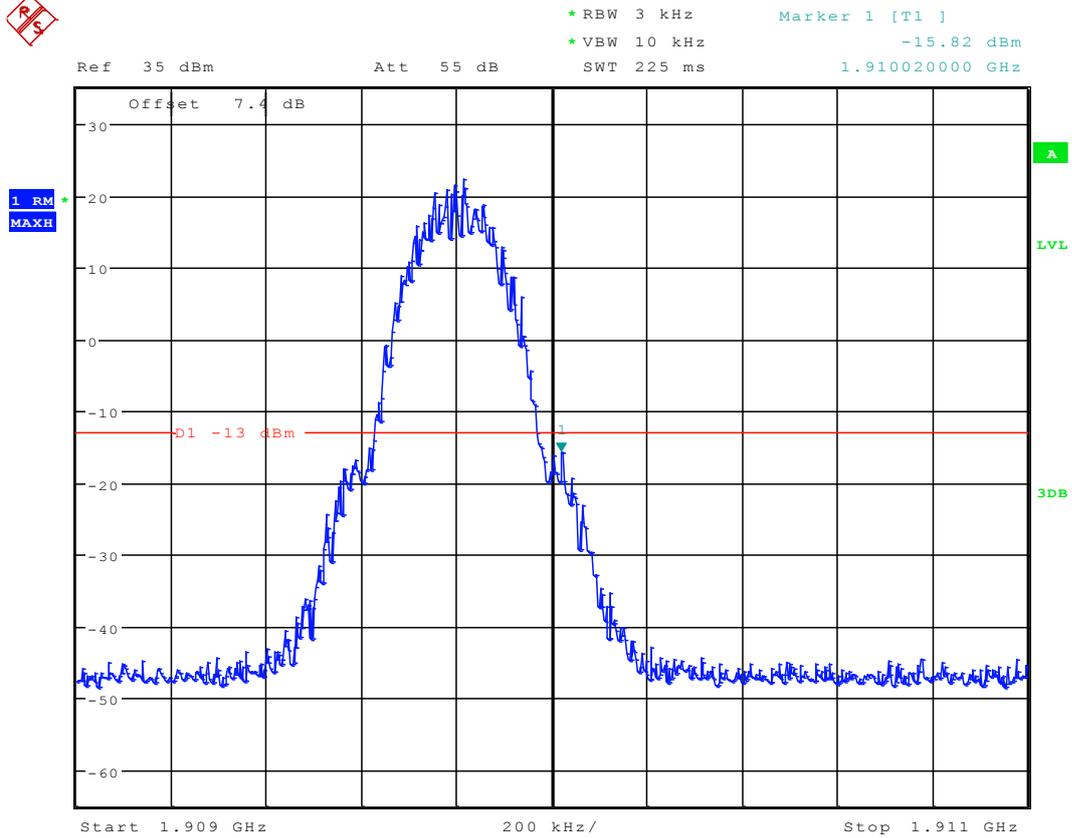


Ref 35 dBm Att 55 dB SWT 225 ms  
\*RBW 3 kHz \*VBW 10 kHz  
Marker 1 [T1] -17.34 dBm  
1.849985000 GHz





## Right Edge Channel 810





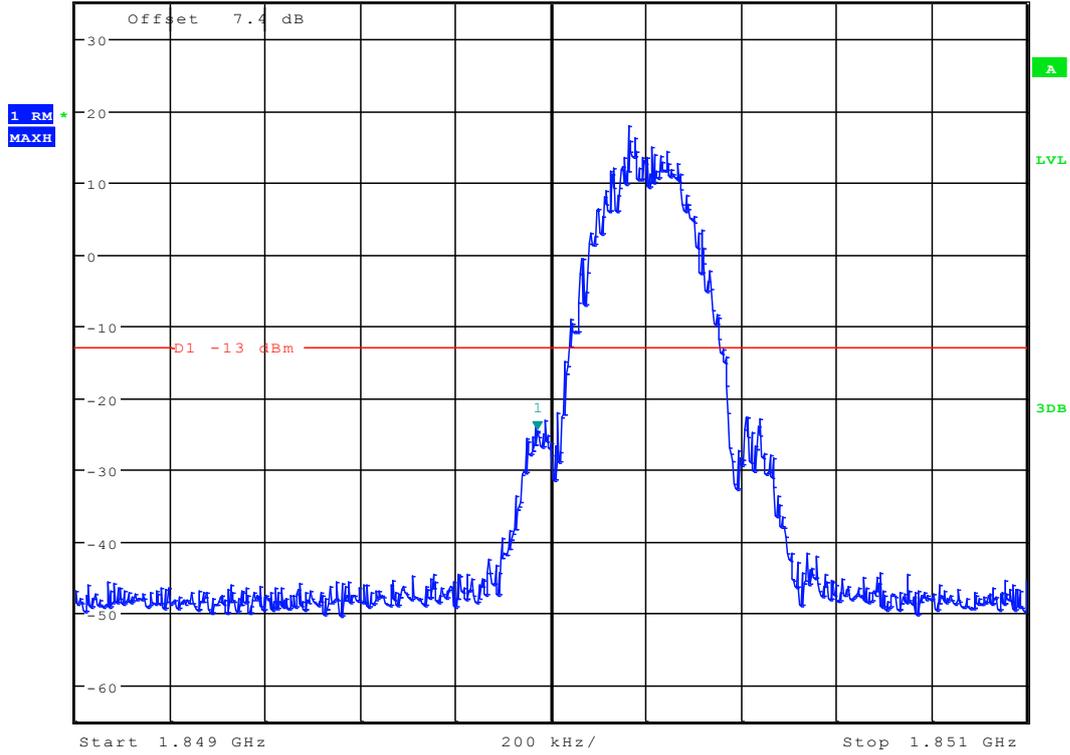
# TM2:EDGE

## Left Edge

### Channel 512

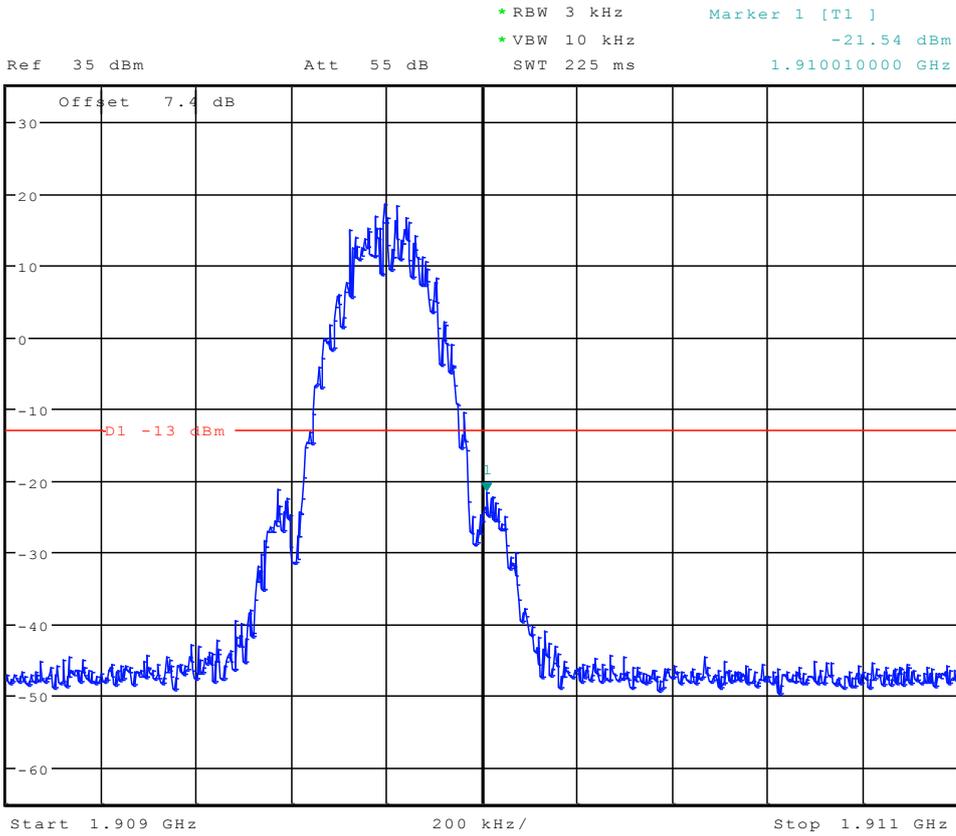


Ref 35 dBm      Att 55 dB      \*RBW 3 kHz      Marker 1 [T1]      \*VBW 10 kHz      -24.56 dBm  
SWT 225 ms      1.849970000 GHz





## Right Edge Channel 810

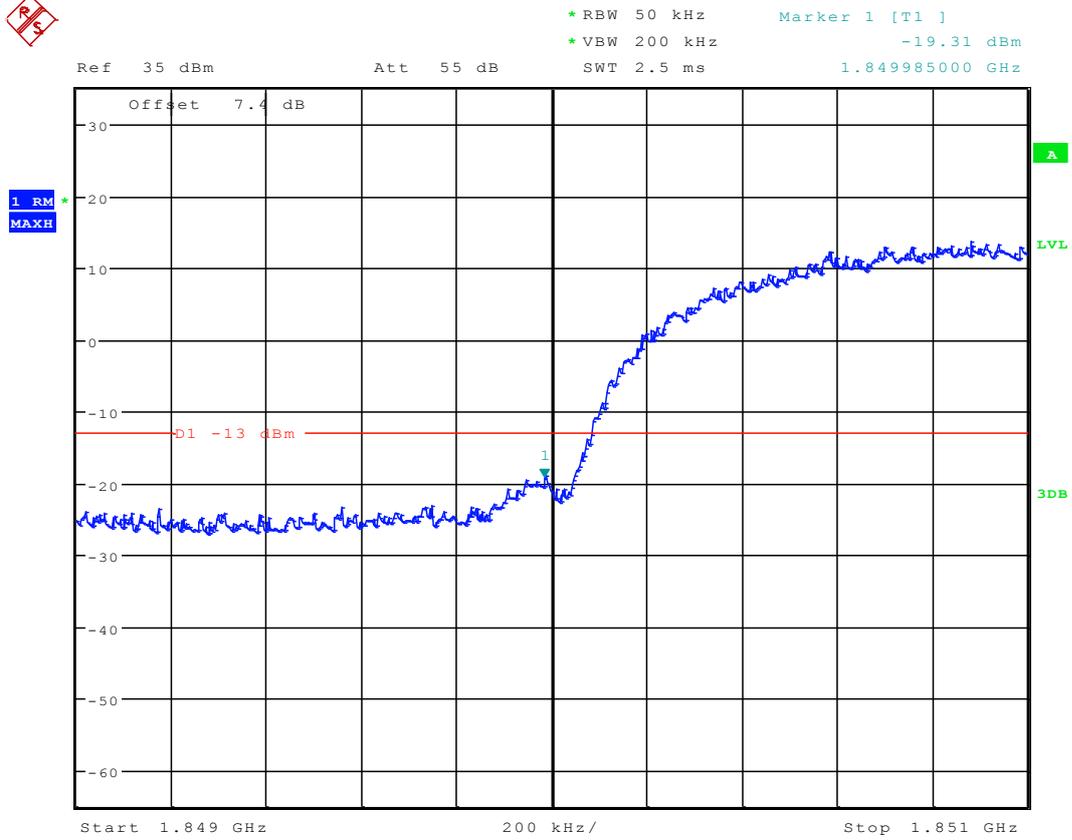




# TM3: WCDMA

## Left dge

### Channel 9262

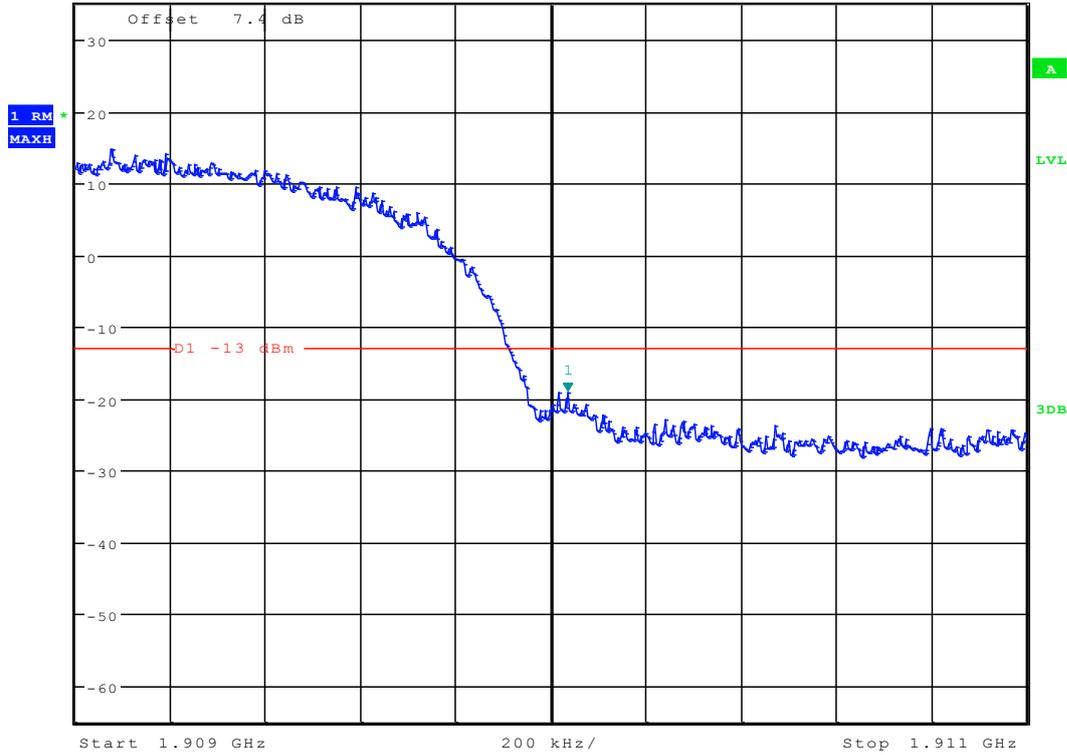




## Right Edge Channel 9538



\* RBW 50 kHz      Marker 1 [T1 ]  
\* VBW 200 kHz      -19.10 dBm  
Ref 35 dBm      Att 55 dB      SWT 2.5 ms      1.910035000 GHz





## **Appendix D**

# Spurious Emission at Antenna Terminal

According to FCC Part 2.1051 & 24.238

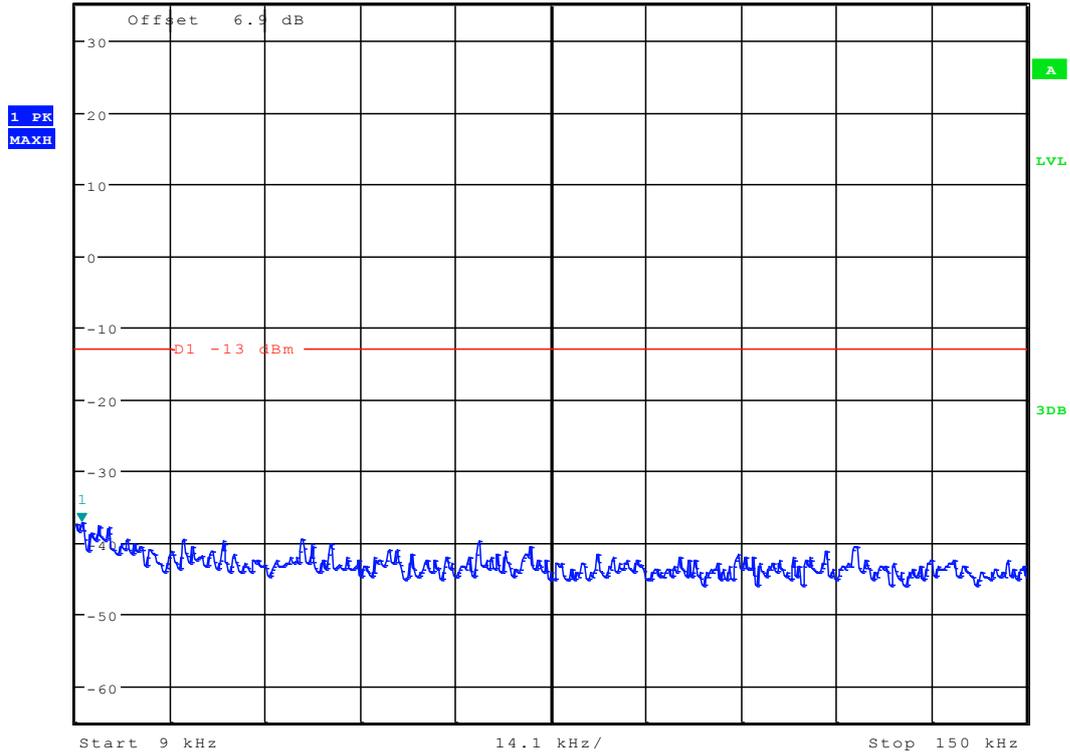


# TM1:GPRS/GSM

## Channel 512

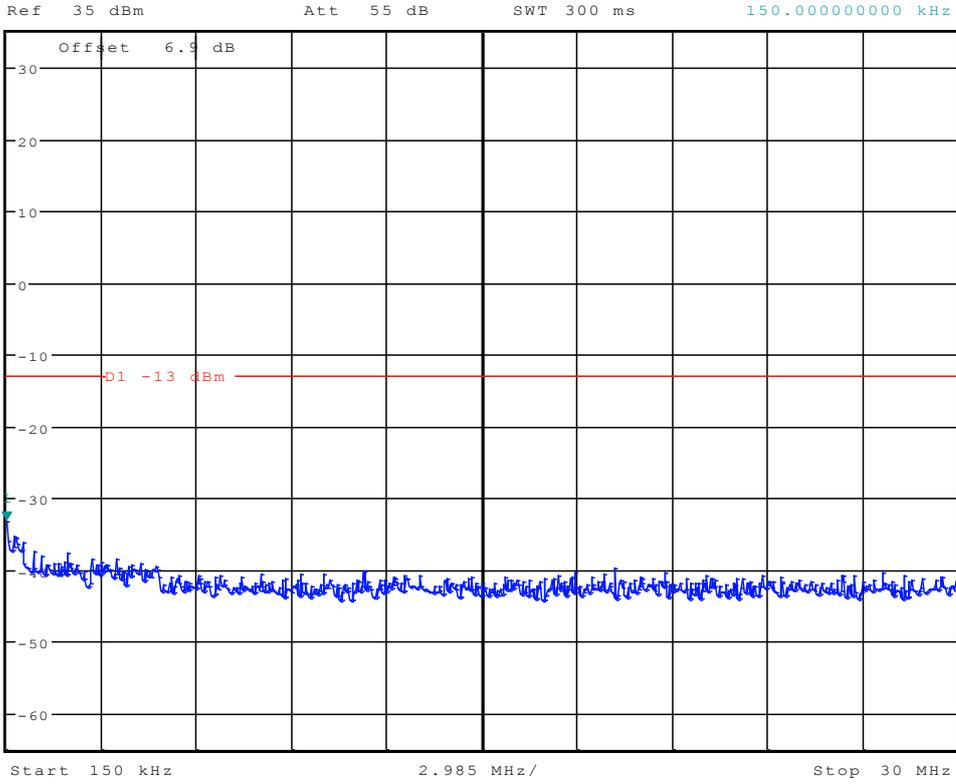


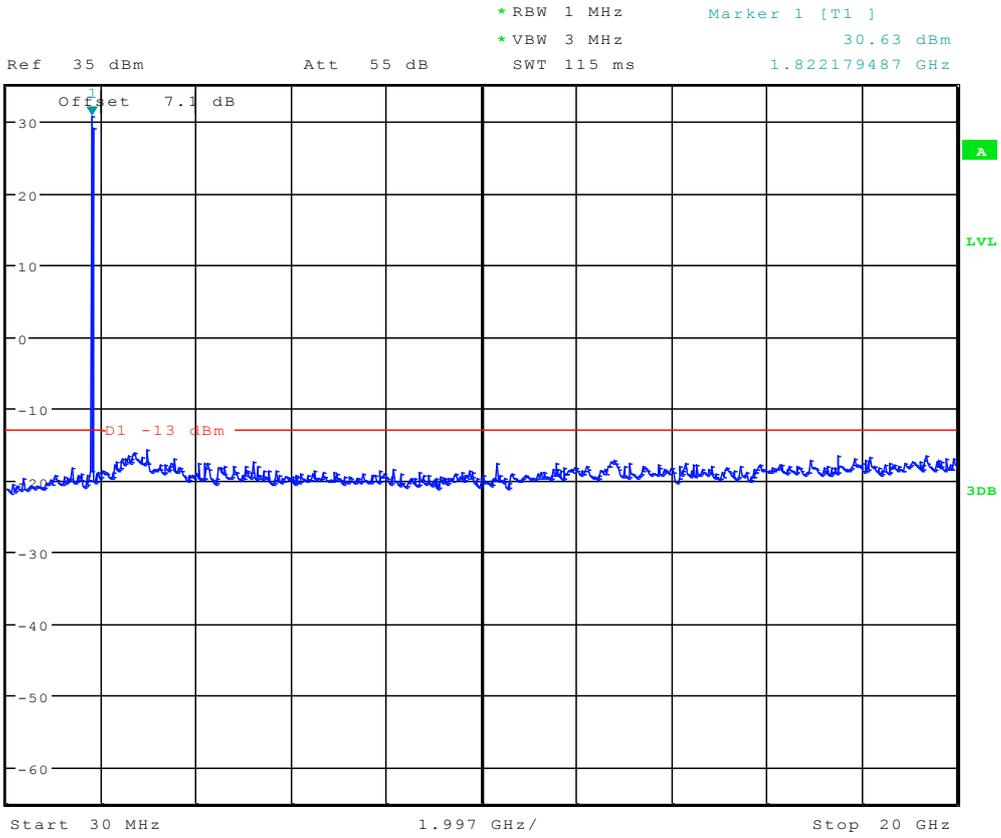
\*RBW 1 kHz      Marker 1 [T1 ]  
\*VBW 10 kHz      -37.19 dBm  
Ref 35 dBm      Att 55 dB      SWT 145 ms      9.903846154 kHz





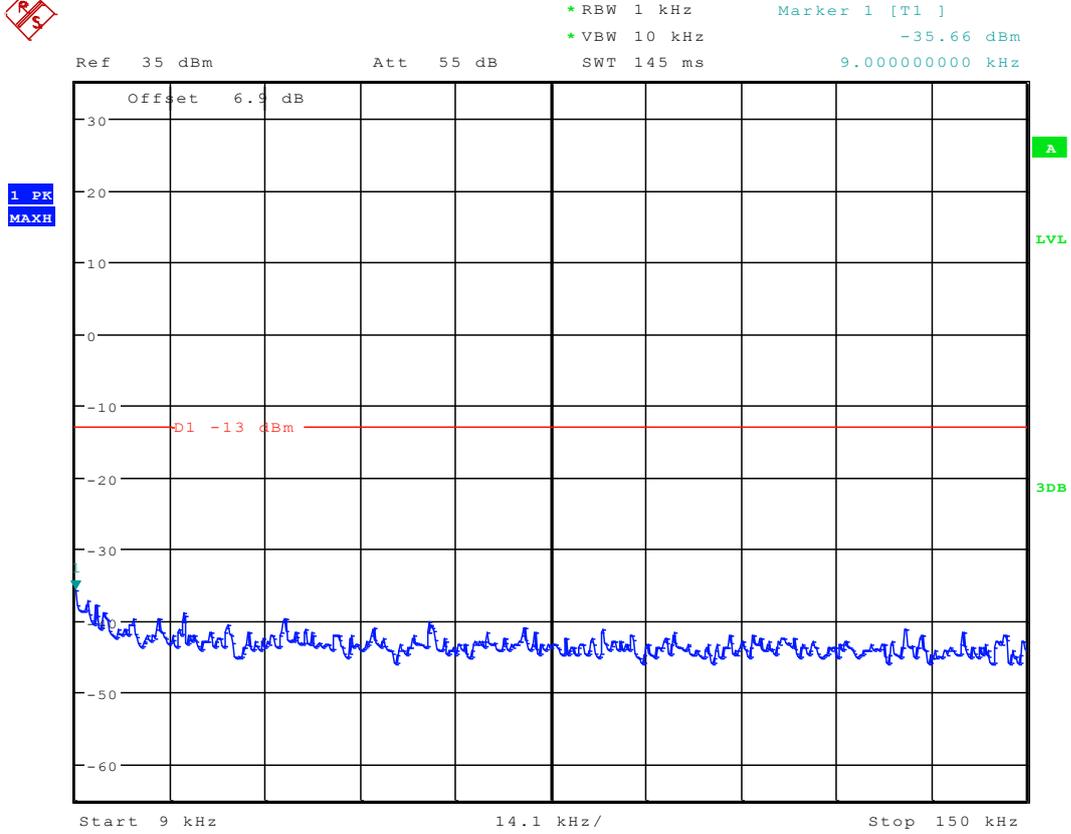
\* RBW 10 kHz      Marker 1 [T1 ]  
\* VBW 30 kHz      -33.28 dBm  
SWT 300 ms      150.000000000 kHz





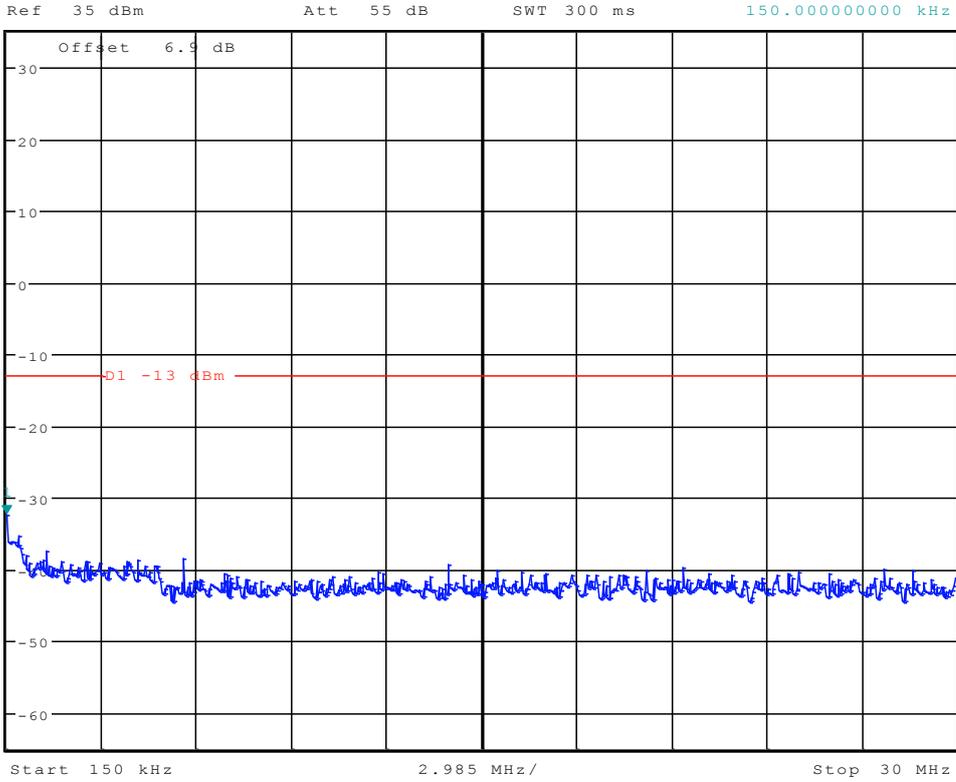


# Channel 661





\*RBW 10 kHz      Marker 1 [T1 ]  
\*VBW 30 kHz      -32.37 dBm  
SWT 300 ms      150.000000000 kHz

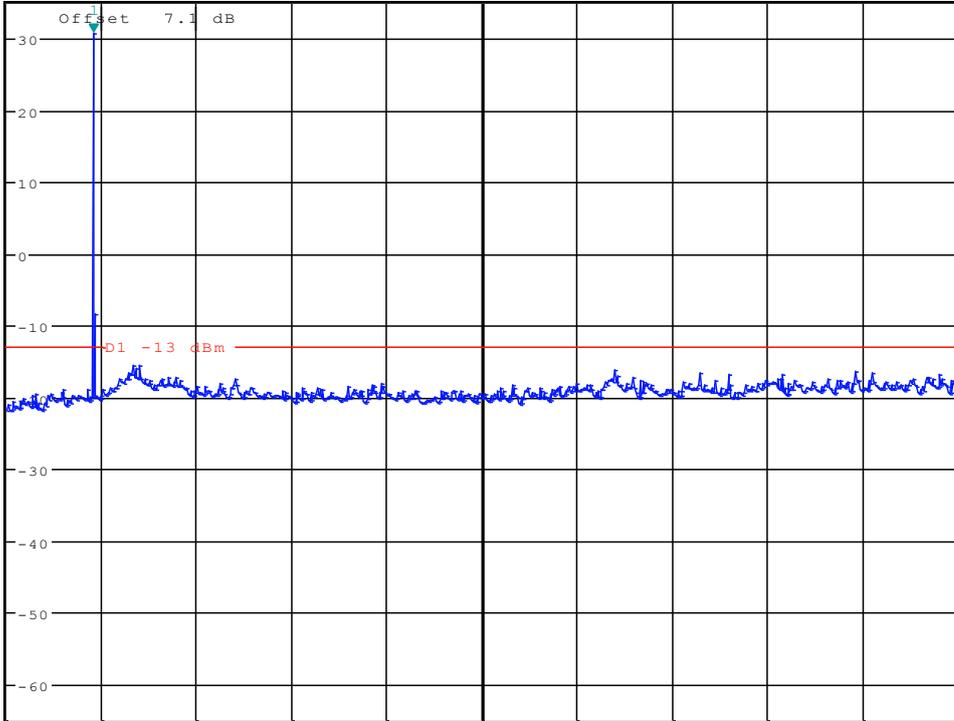




\* RBW 1 MHz      Marker 1 [T1 ]  
\* VBW 3 MHz      30.68 dBm  
SWT 115 ms      1.854182692 GHz

Ref 35 dBm

Att 55 dB



Start 30 MHz

1.997 GHz/

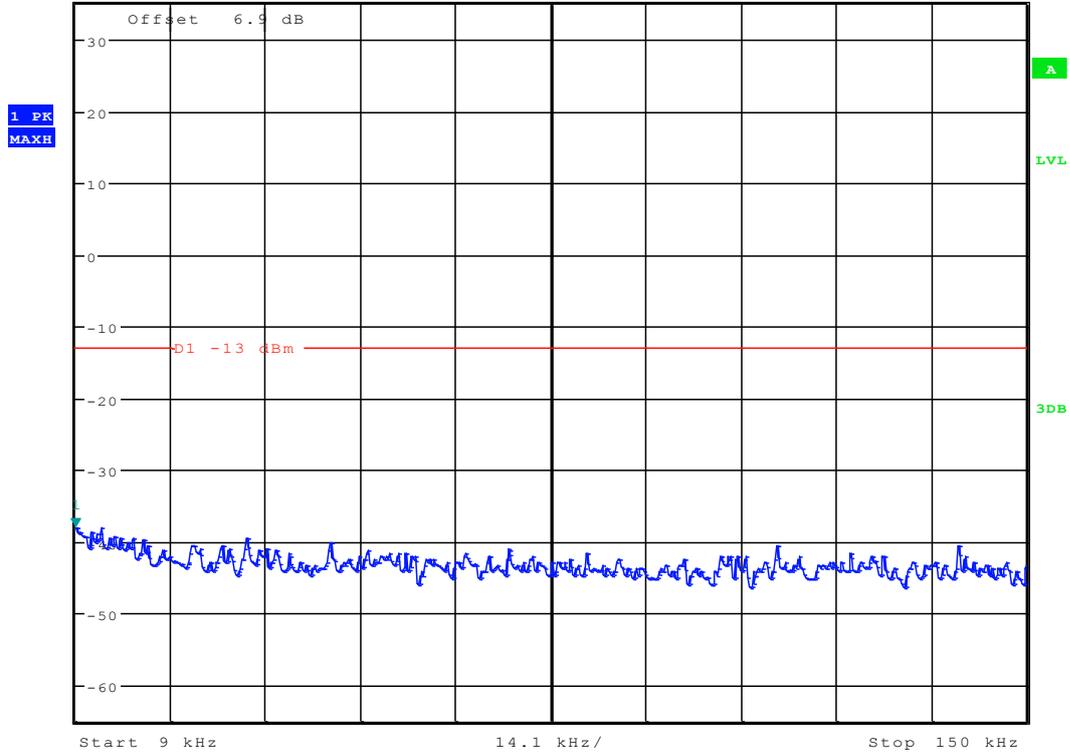
Stop 20 GHz



# Channel 810

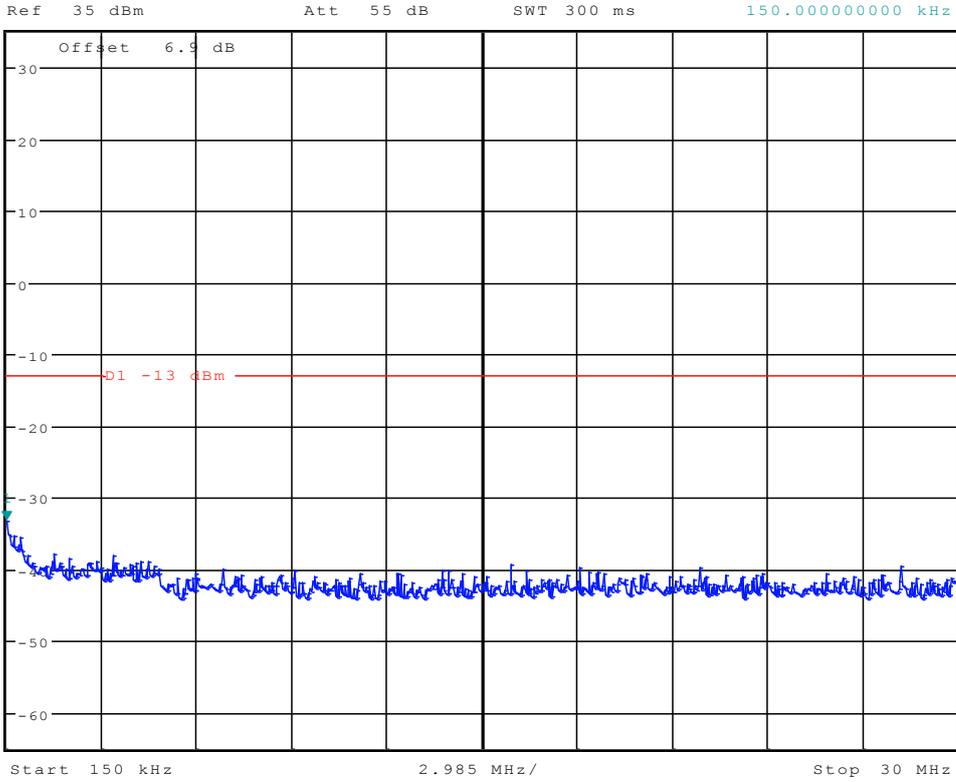


Ref 35 dBm      Att 55 dB      \*RBW 1 kHz      Marker 1 [T1 ]  
\*VBW 10 kHz      -38.08 dBm  
SWT 145 ms      9.000000000 kHz



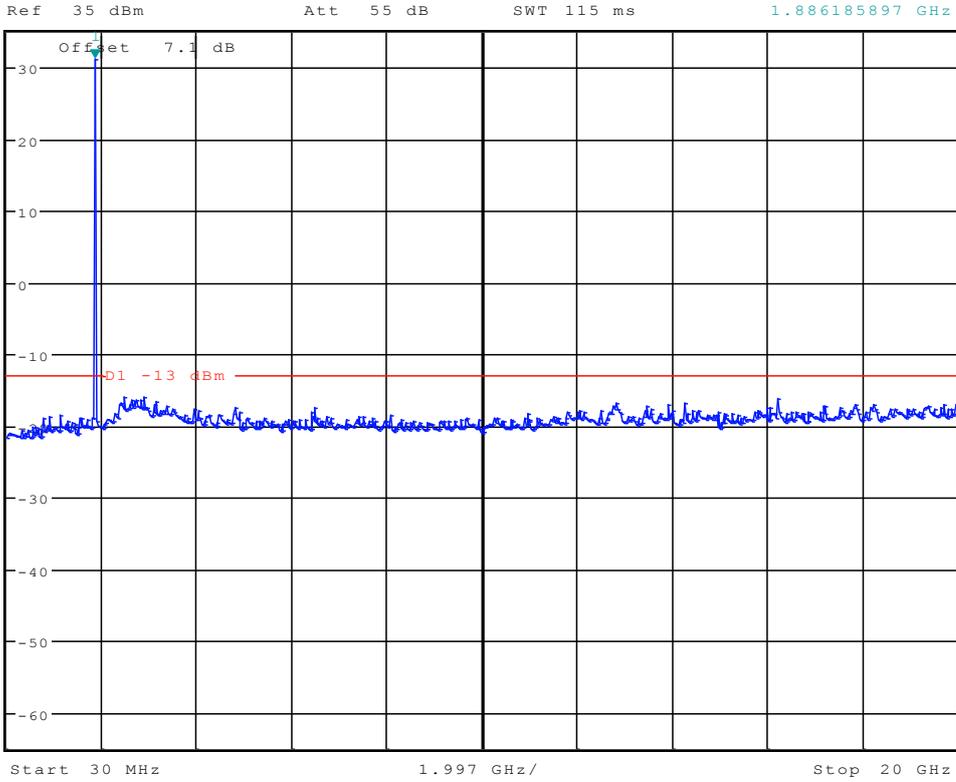


\* RBW 10 kHz      Marker 1 [T1 ]  
\* VBW 30 kHz      -33.22 dBm  
SWT 300 ms      150.000000000 kHz





\* RBW 1 MHz      Marker 1 [T1 ]  
\* VBW 3 MHz      31.03 dBm  
SWT 115 ms      1.886185897 GHz

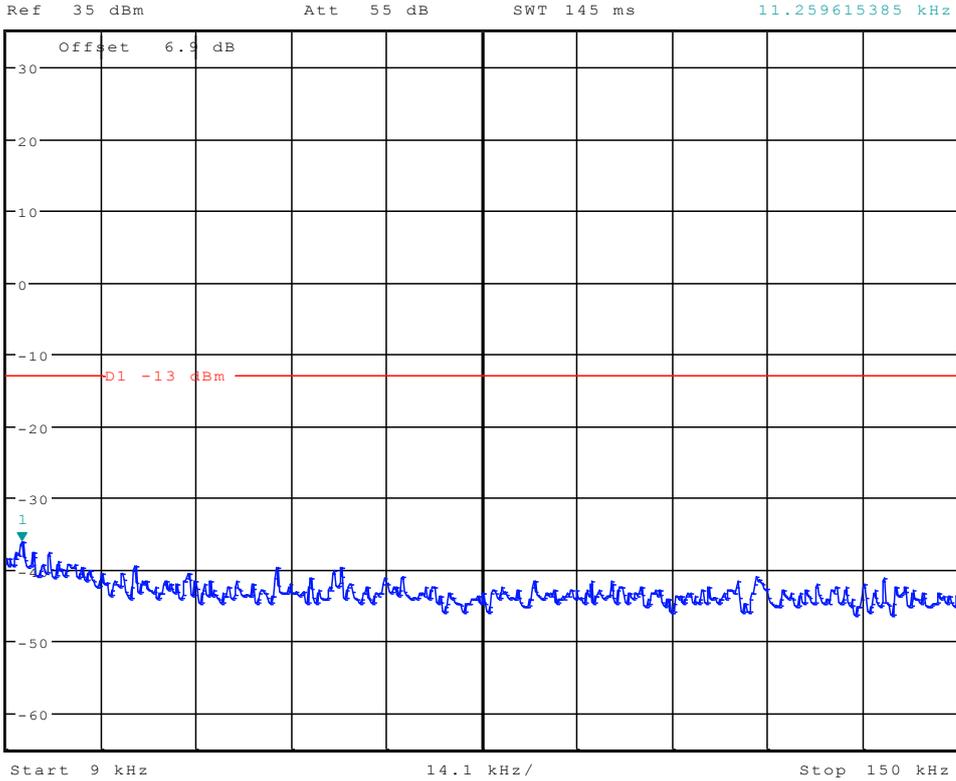




# TM2:EDGE Channel 512

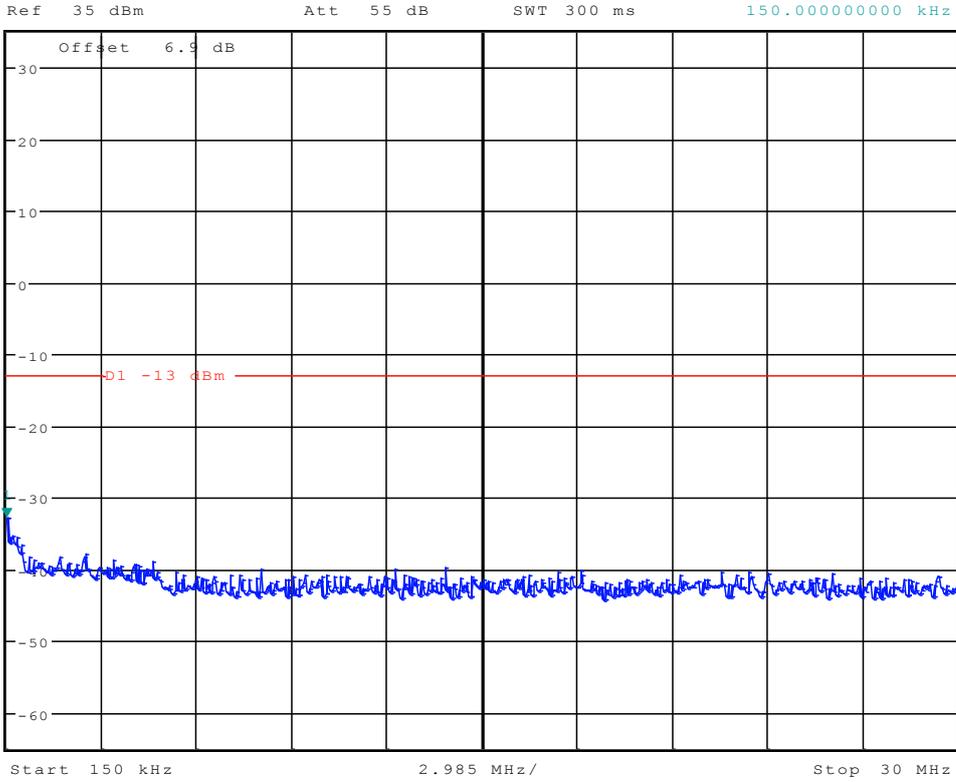


\*RBW 1 kHz      Marker 1 [T1 ]  
\*VBW 10 kHz      -36.06 dBm  
SWT 145 ms      11.259615385 kHz



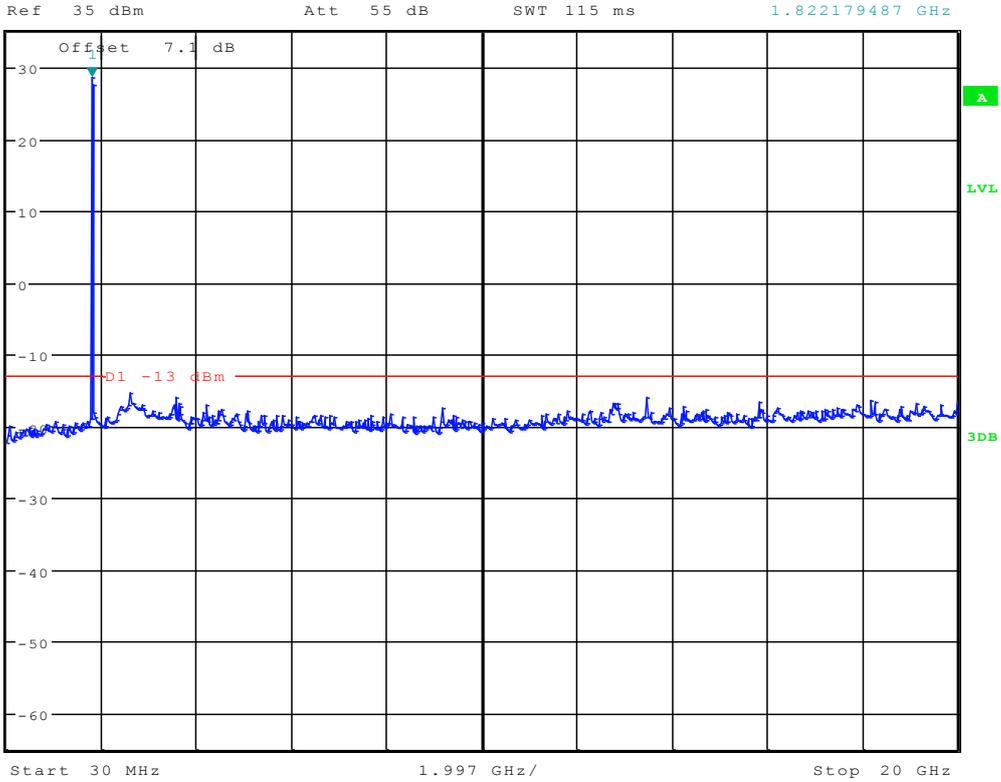


\* RBW 10 kHz      Marker 1 [T1 ]  
\* VBW 30 kHz      -32.76 dBm  
SWT 300 ms      150.000000000 kHz





\* RBW 1 MHz      Marker 1 [T1 ]  
\* VBW 3 MHz      28.69 dBm  
SWT 115 ms      1.822179487 GHz

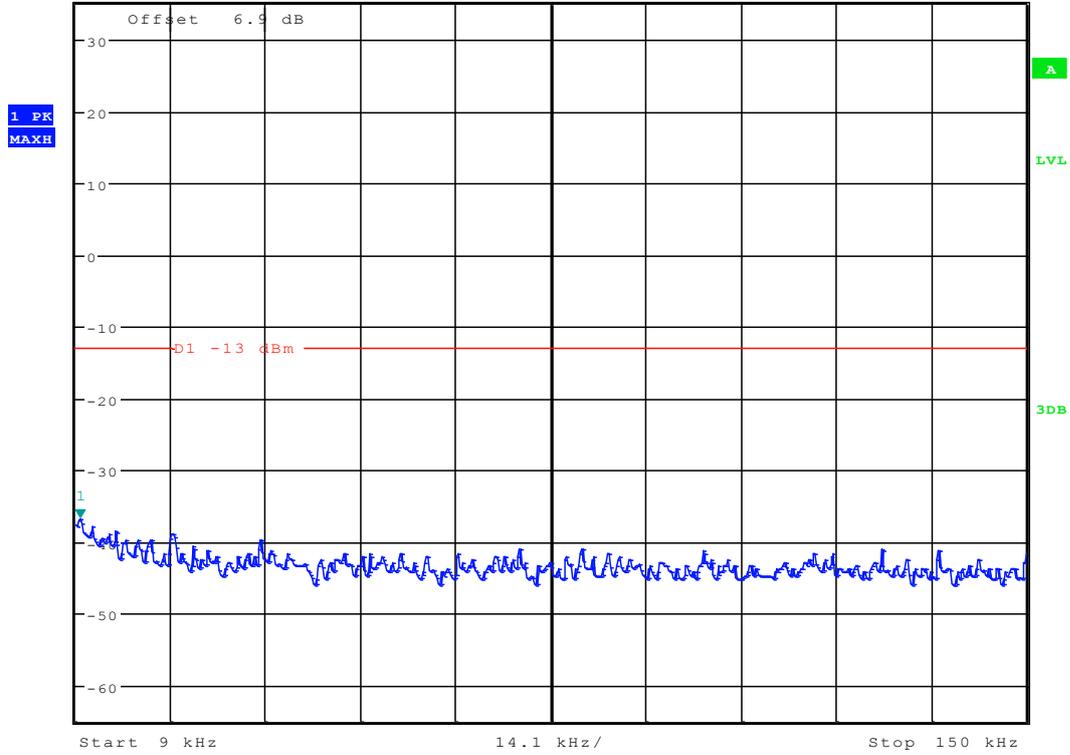




# Channel 661

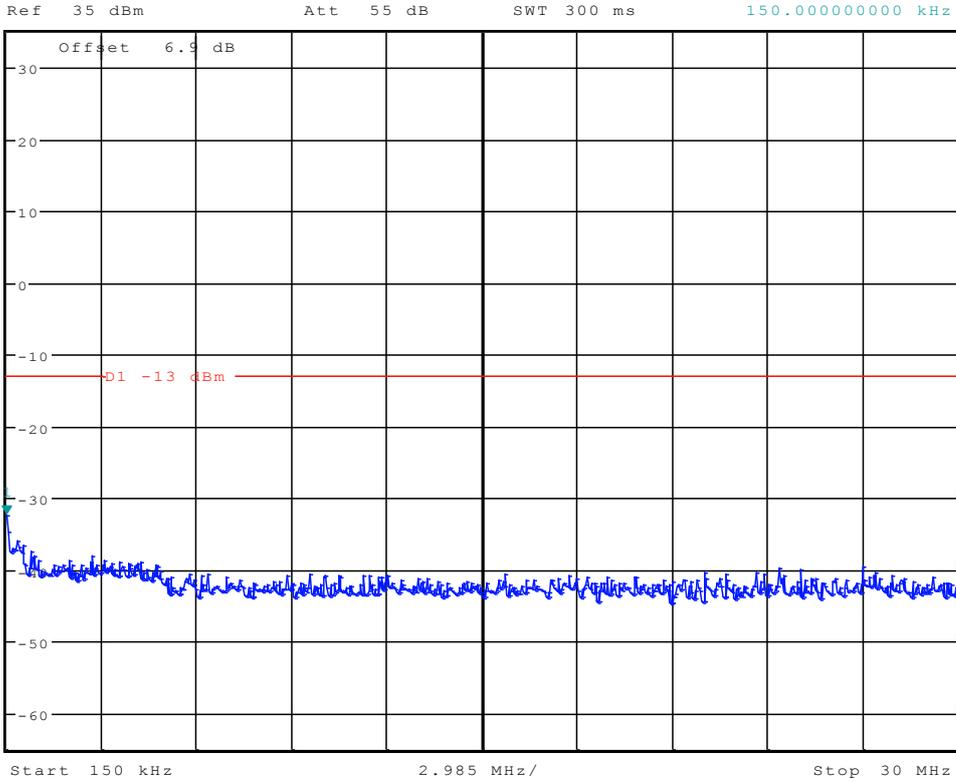


Ref 35 dBm      Att 55 dB      \*RBW 1 kHz      Marker 1 [T1 ]  
\*VBW 10 kHz      -36.74 dBm  
SWT 145 ms      9.677884615 kHz



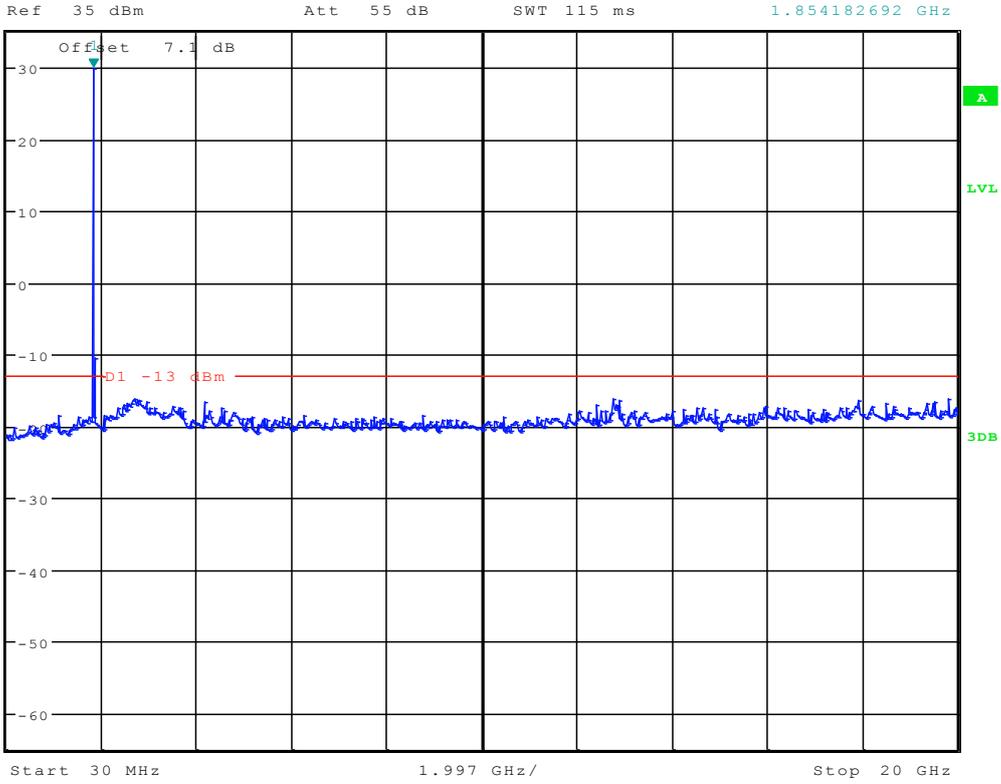


\* RBW 10 kHz      Marker 1 [T1 ]  
\* VBW 30 kHz      -32.32 dBm  
SWT 300 ms      150.000000000 kHz





\* RBW 1 MHz      Marker 1 [T1 ]  
\* VBW 3 MHz      29.86 dBm  
SWT 115 ms      1.854182692 GHz





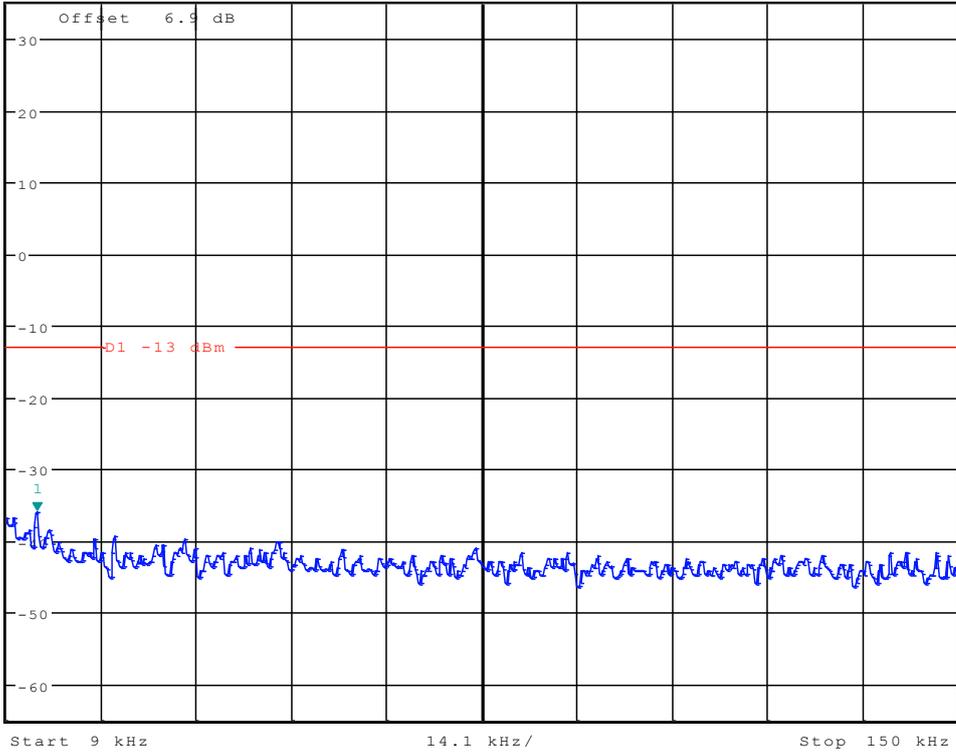
# Channel 810



\*RBW 1 kHz      Marker 1 [T1 ]  
\*VBW 10 kHz      -35.89 dBm  
SWT 145 ms      13.519230769 kHz

Ref 35 dBm

Att 55 dB

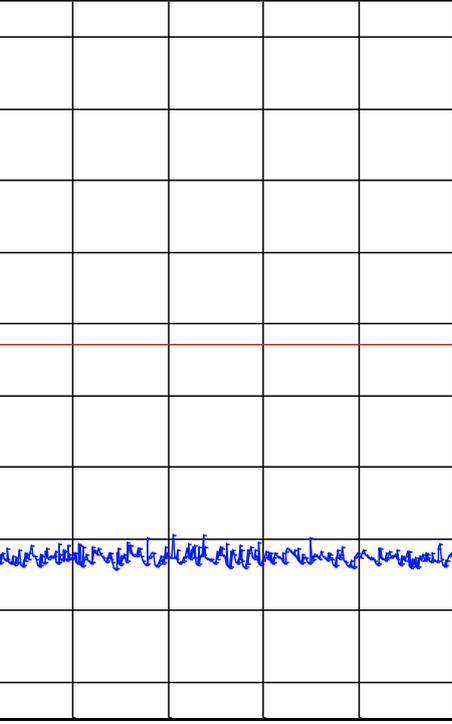




\* RBW 10 kHz      Marker 1 [T1 ]  
\* VBW 30 kHz      -31.51 dBm  
SWT 300 ms      197.836538462 kHz

Ref 35 dBm

Att 55 dB



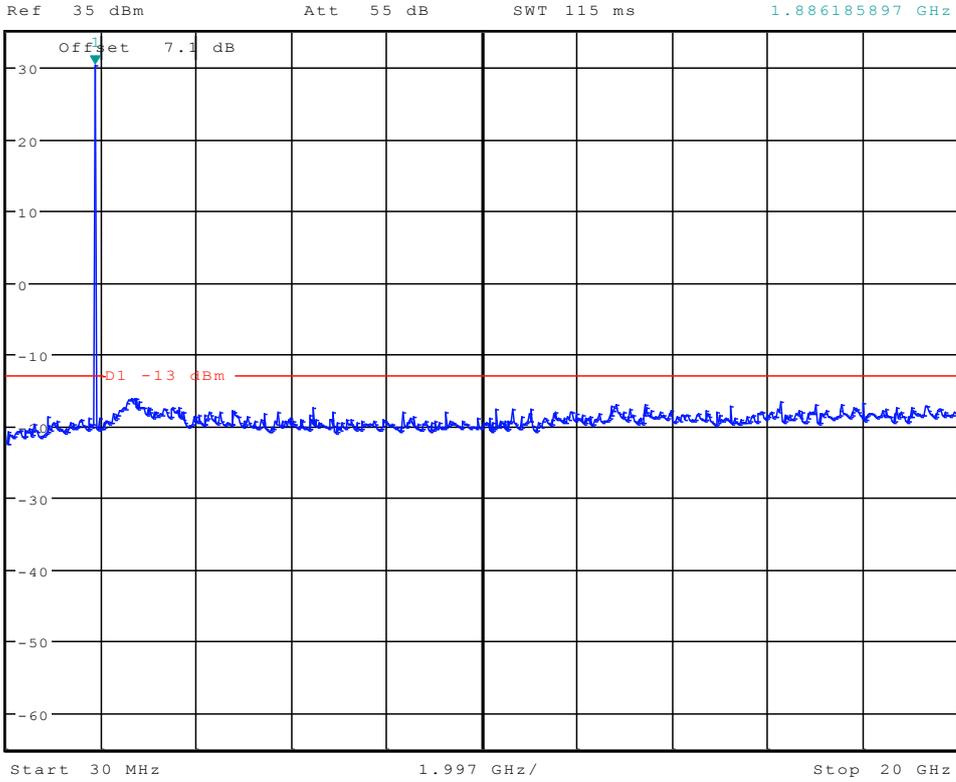
Start 150 kHz

2.985 MHz/

Stop 30 MHz

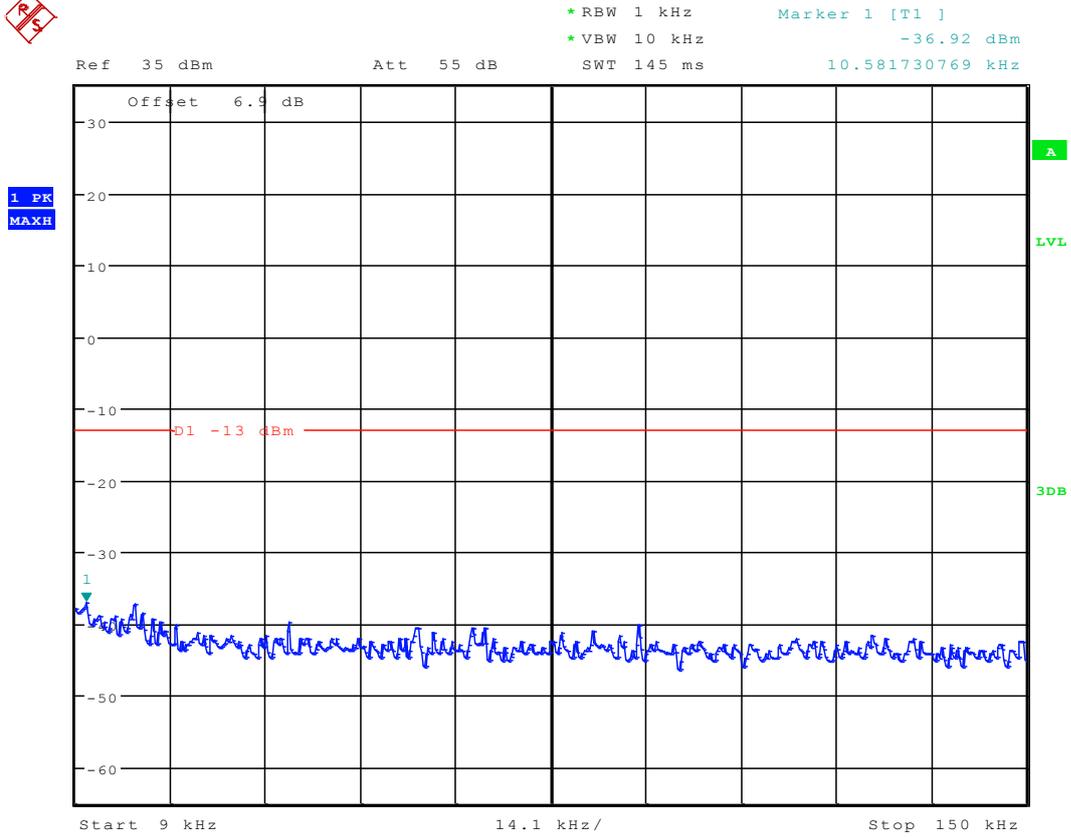


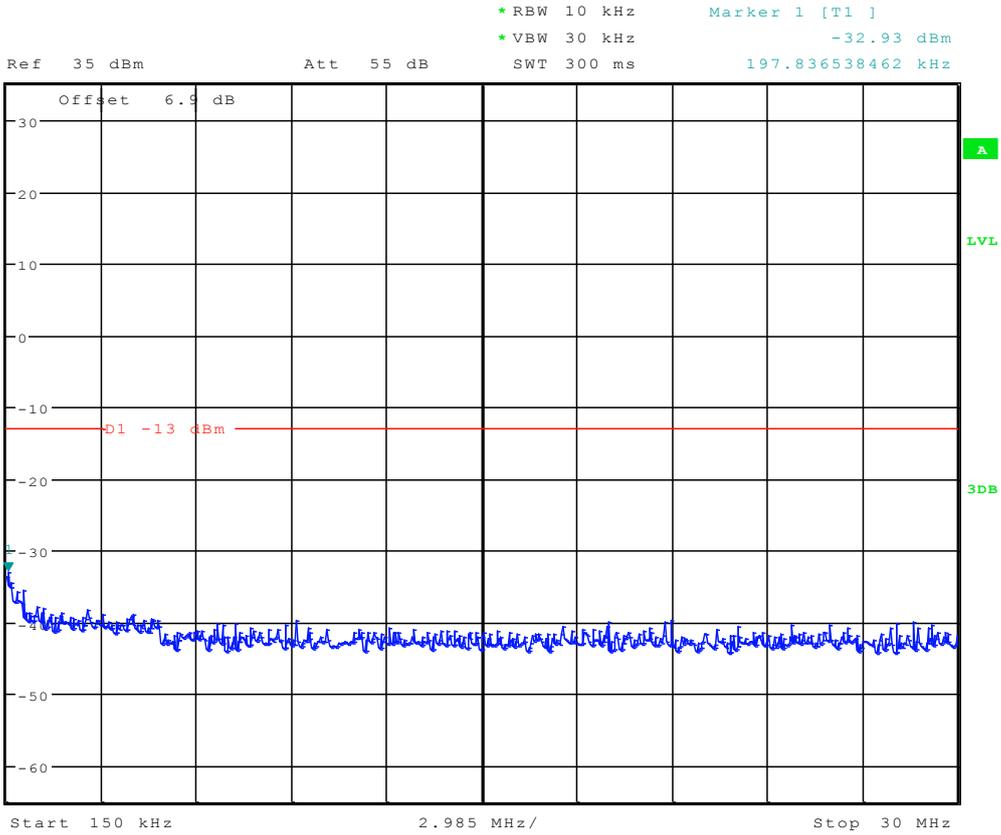
\* RBW 1 MHz      Marker 1 [T1 ]  
\* VBW 3 MHz      30.32 dBm  
SWT 115 ms      1.886185897 GHz

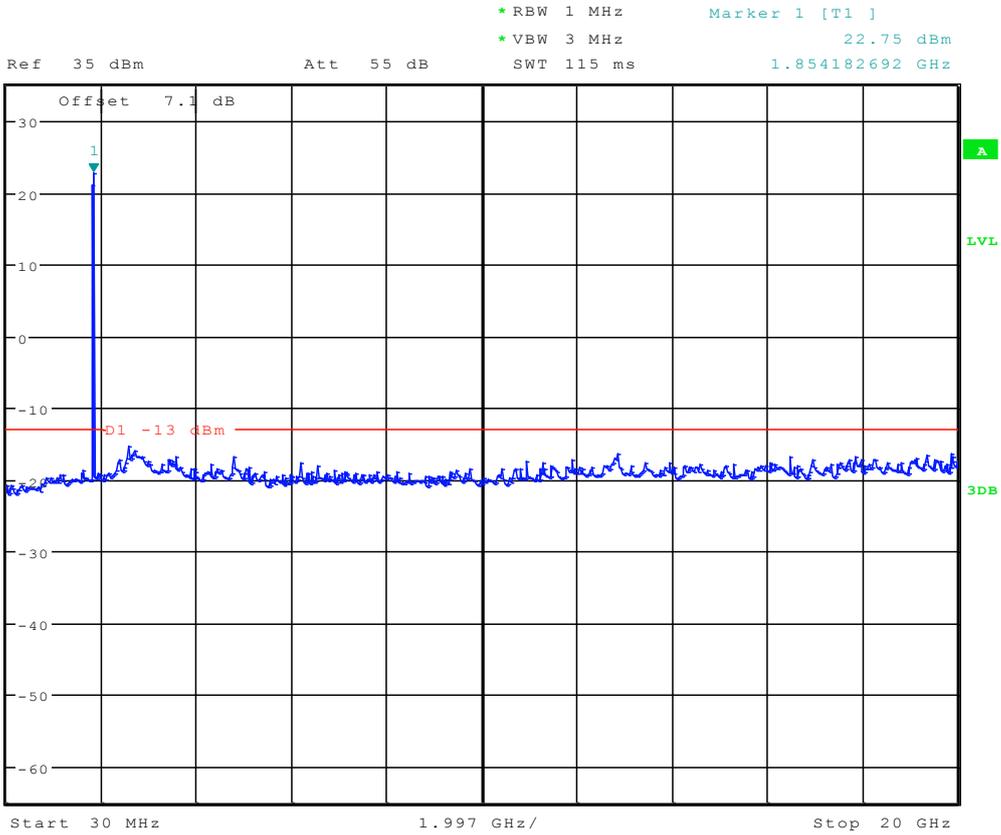




# TM3: WCDMA Channel 9262





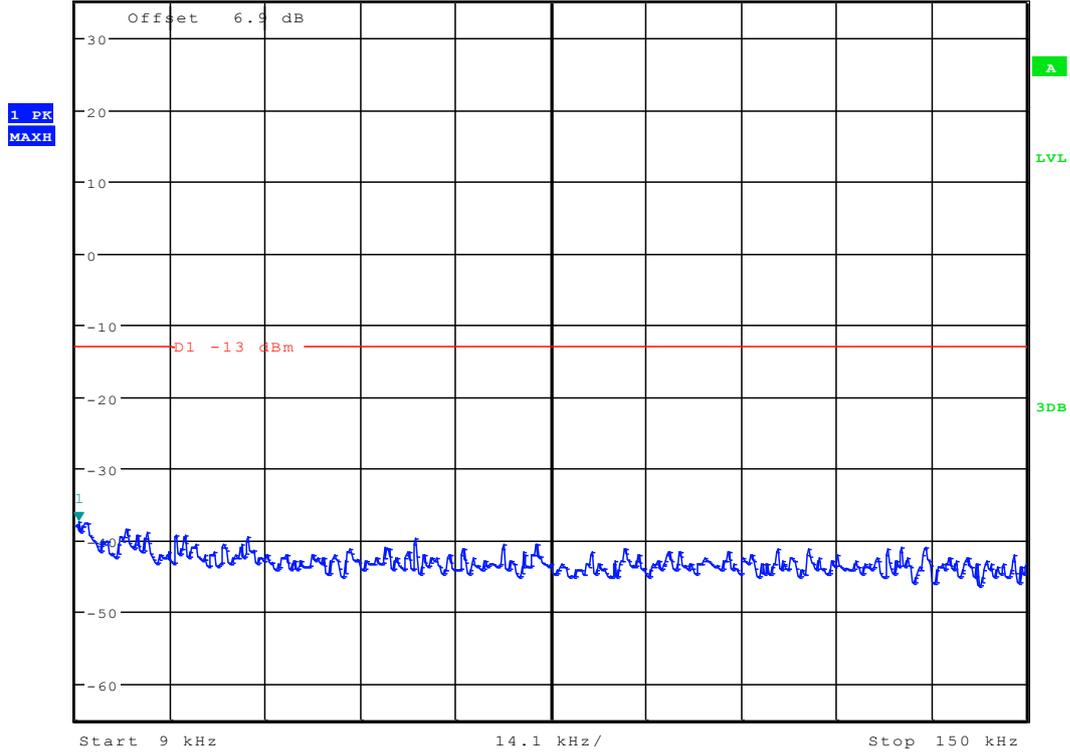




# Channel 9400

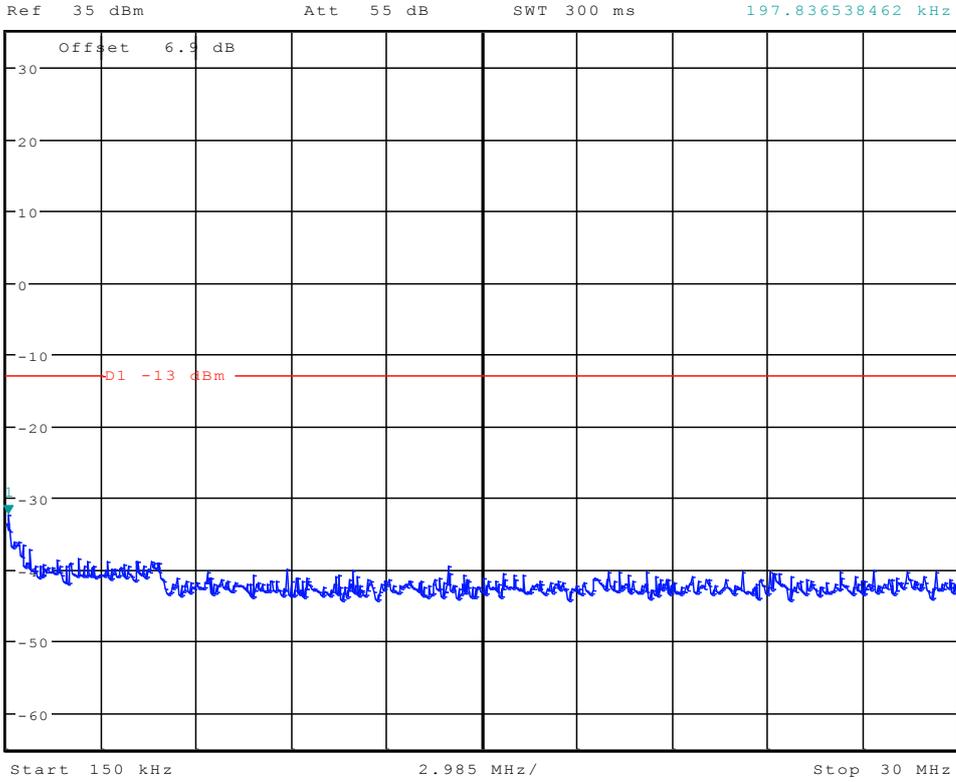


\*RBW 1 kHz      Marker 1 [T1 ]  
\*VBW 10 kHz      -37.38 dBm  
Ref 35 dBm      Att 55 dB      SWT 145 ms      9.451923077 kHz



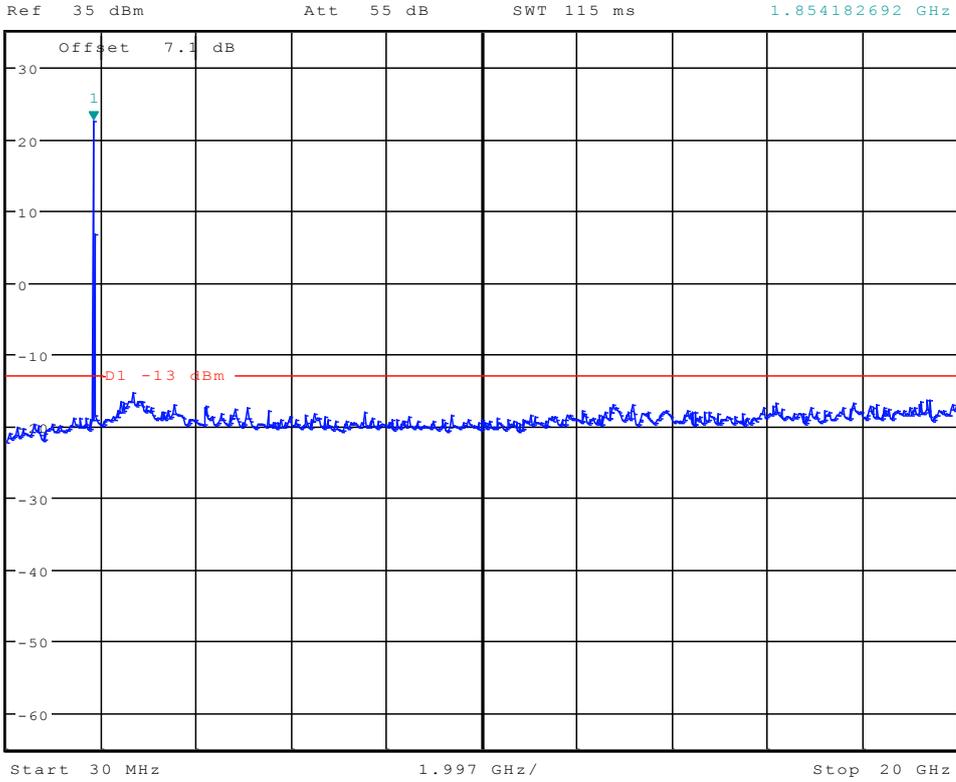


\* RBW 10 kHz      Marker 1 [T1 ]  
\* VBW 30 kHz      -32.32 dBm  
SWT 300 ms      197.836538462 kHz





\*RBW 1 MHz      Marker 1 [T1 ]  
\*VBW 3 MHz      22.49 dBm  
SWT 115 ms      1.854182692 GHz

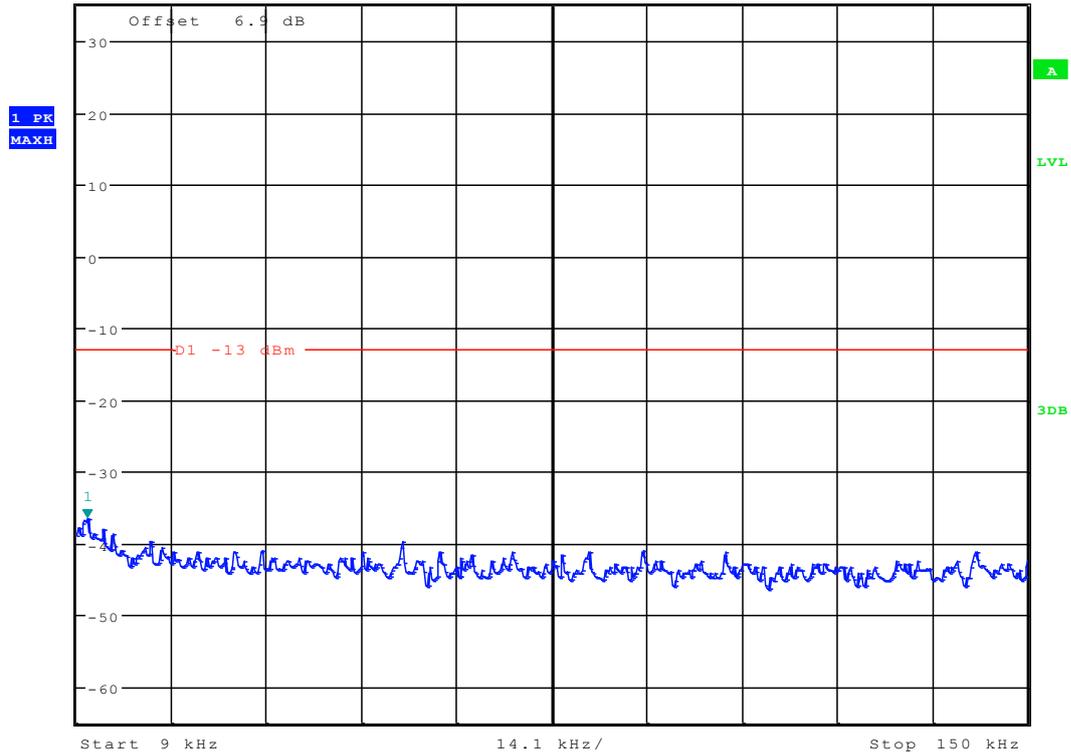




# Channel 9538

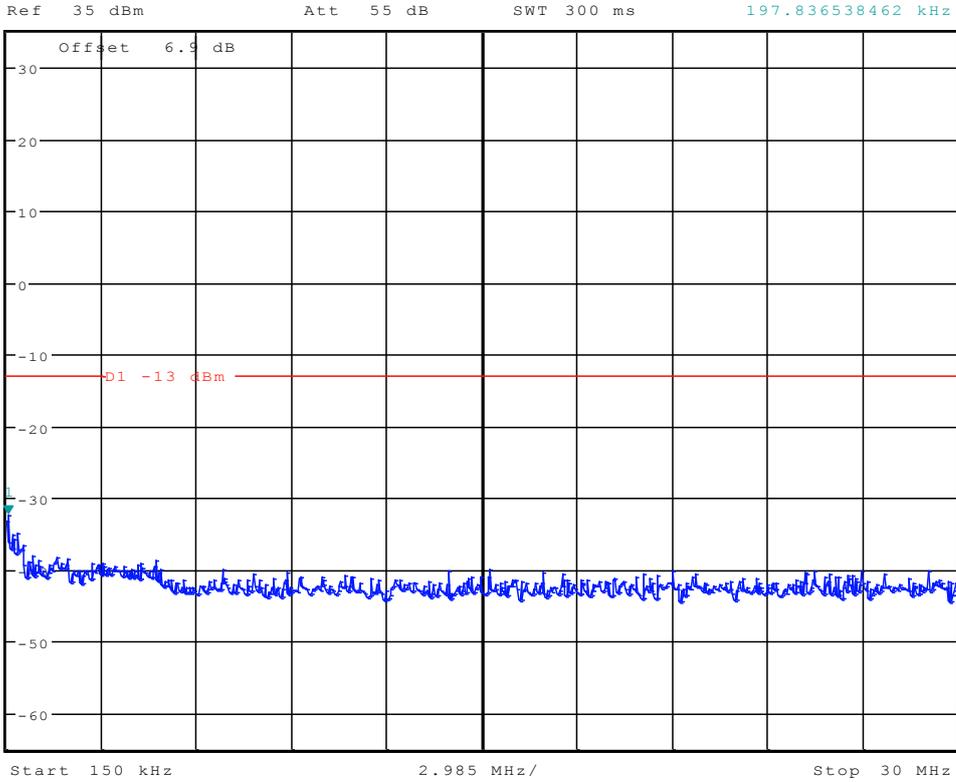


Ref 35 dBm Att 55 dB RBW 1 kHz Marker 1 [T1 ]  
\*VBW 10 kHz -36.48 dBm  
SWT 145 ms 10.581730769 kHz



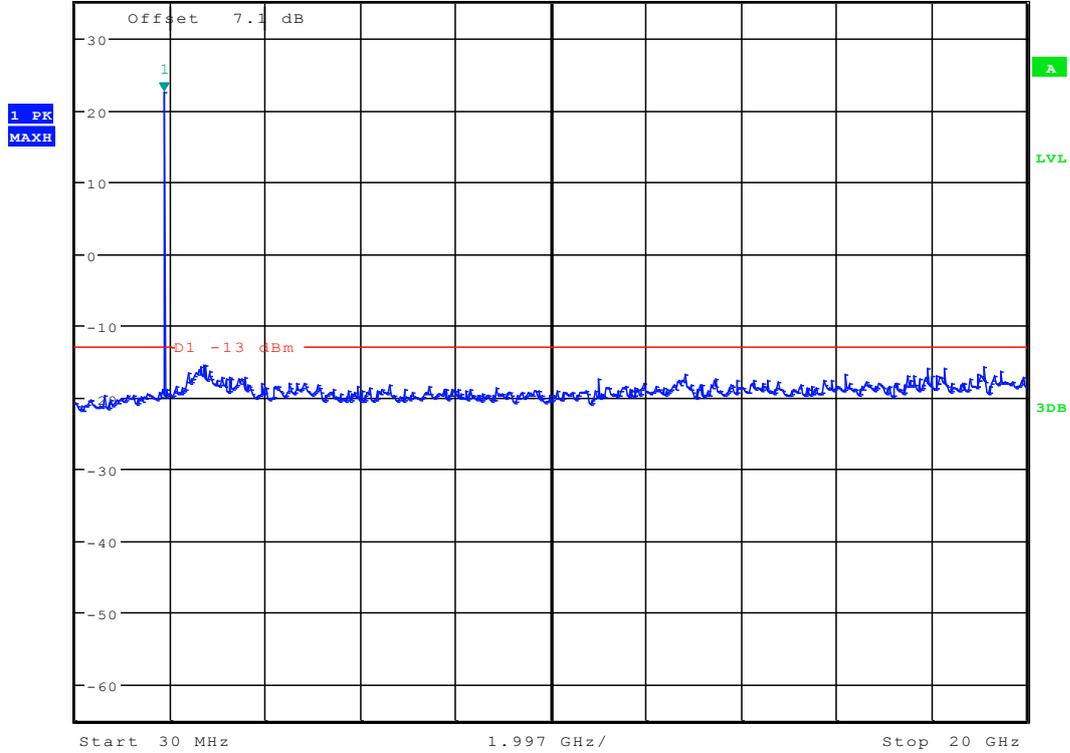


\* RBW 10 kHz      Marker 1 [T1 ]  
\* VBW 30 kHz      -32.32 dBm  
SWT 300 ms      197.836538462 kHz





\* RBW 1 MHz      Marker 1 [T1 ]  
\* VBW 3 MHz      22.50 dBm  
Ref 35 dBm      Att 55 dB      SWT 115 ms      1.886185897 GHz





## Appendix E

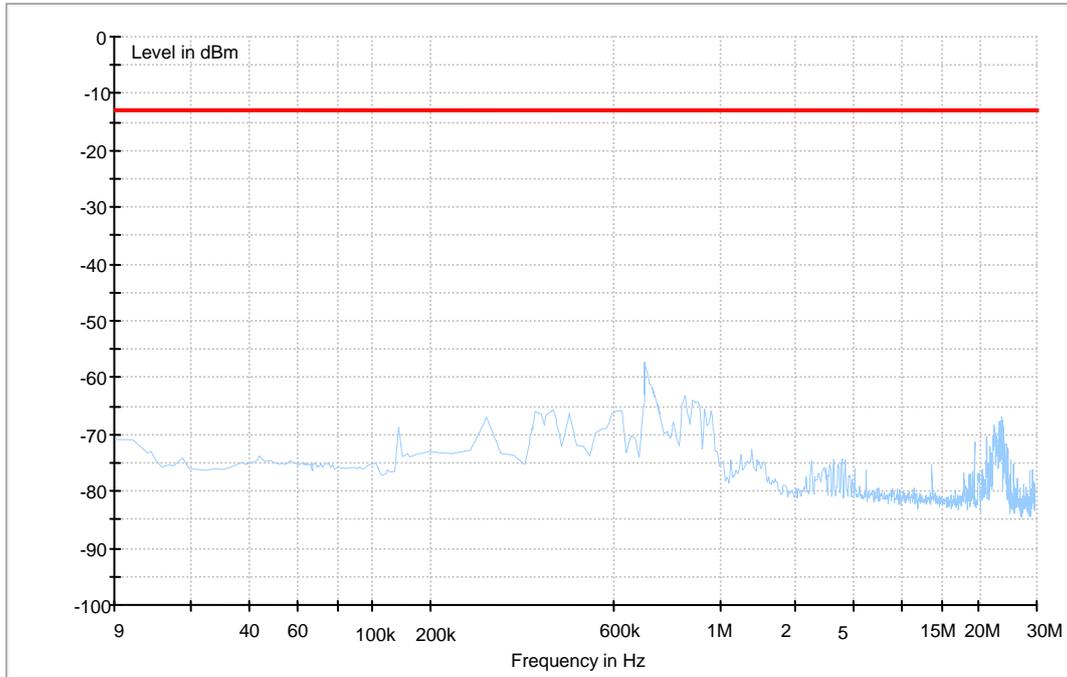
# Radiated Spurious Emissions

According to FCC Part 2.1053 & Part 24.238



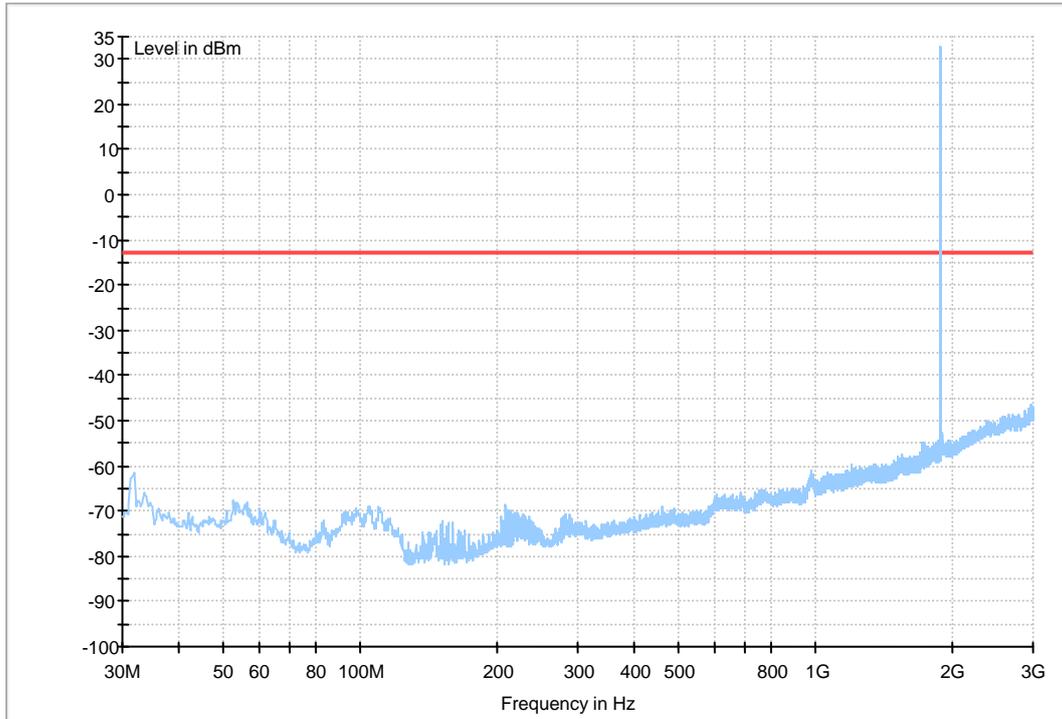
## GSM 1900

Traffic Mode (9kHz-30MHz)



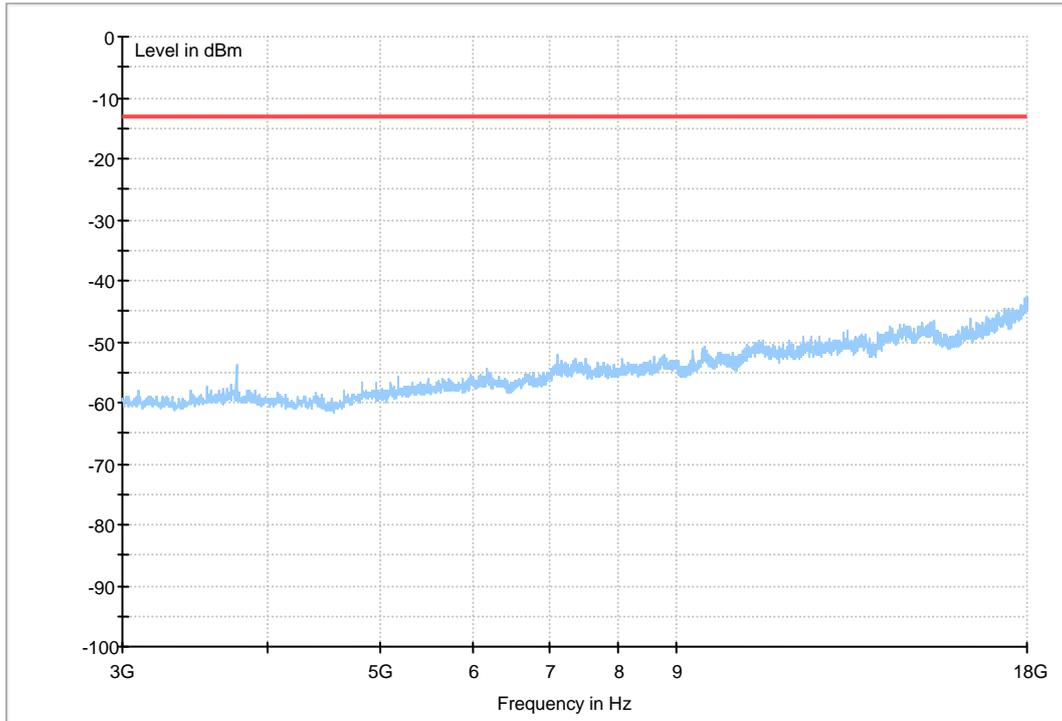


### Traffic Mode (30MHz-3GHz)



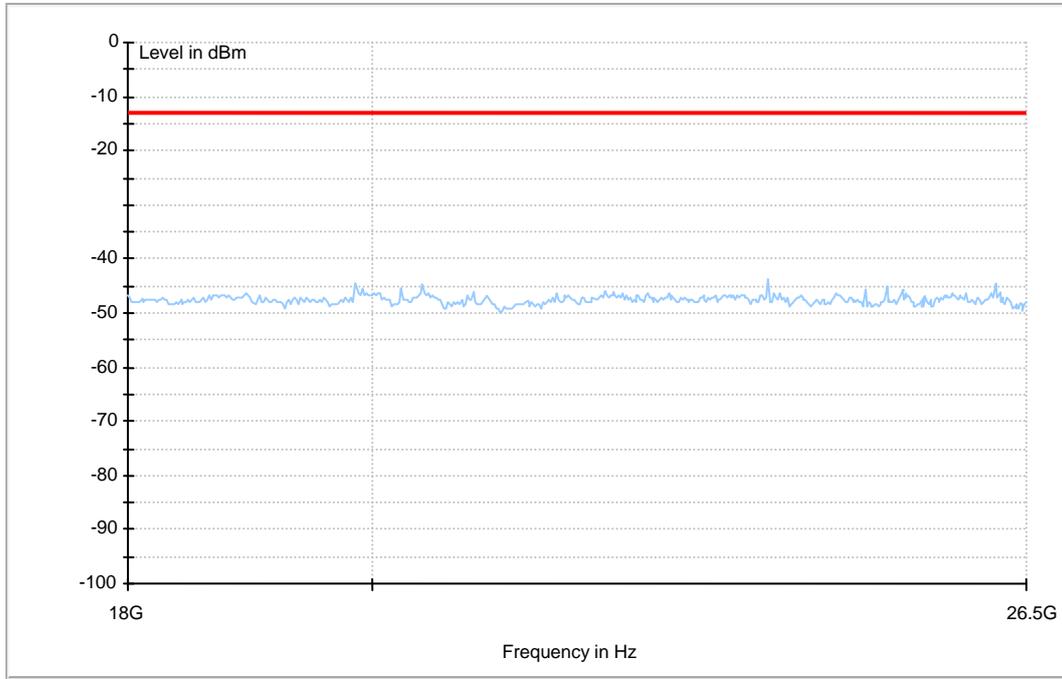


### Traffic Mode (3GHz-18GHz)





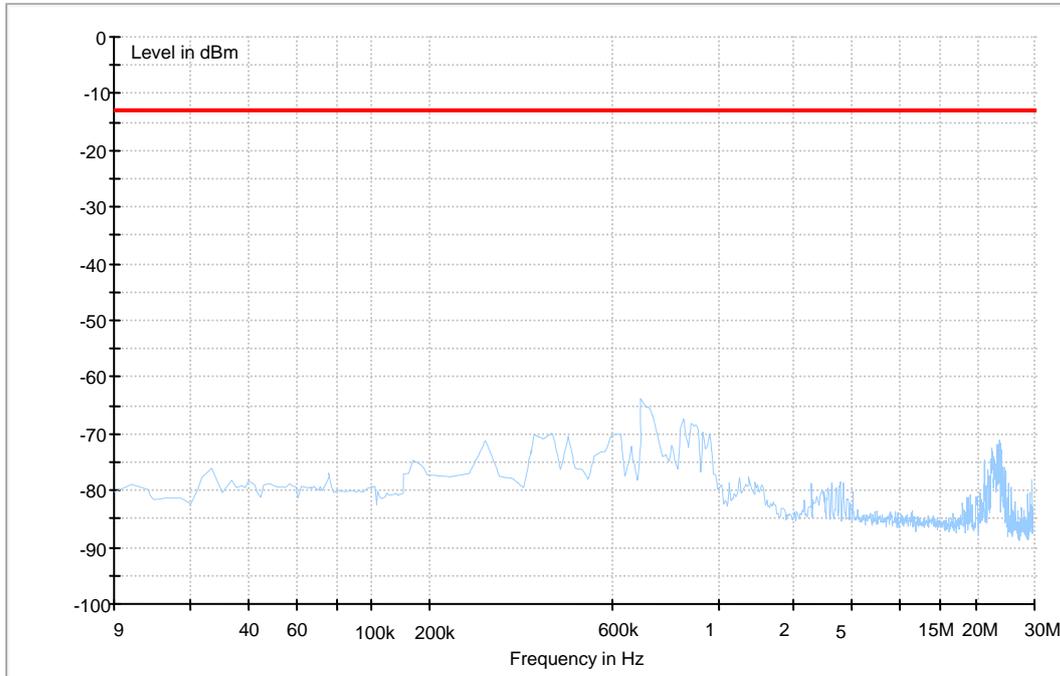
### Traffic Mode (18GHz-26.5GHz)





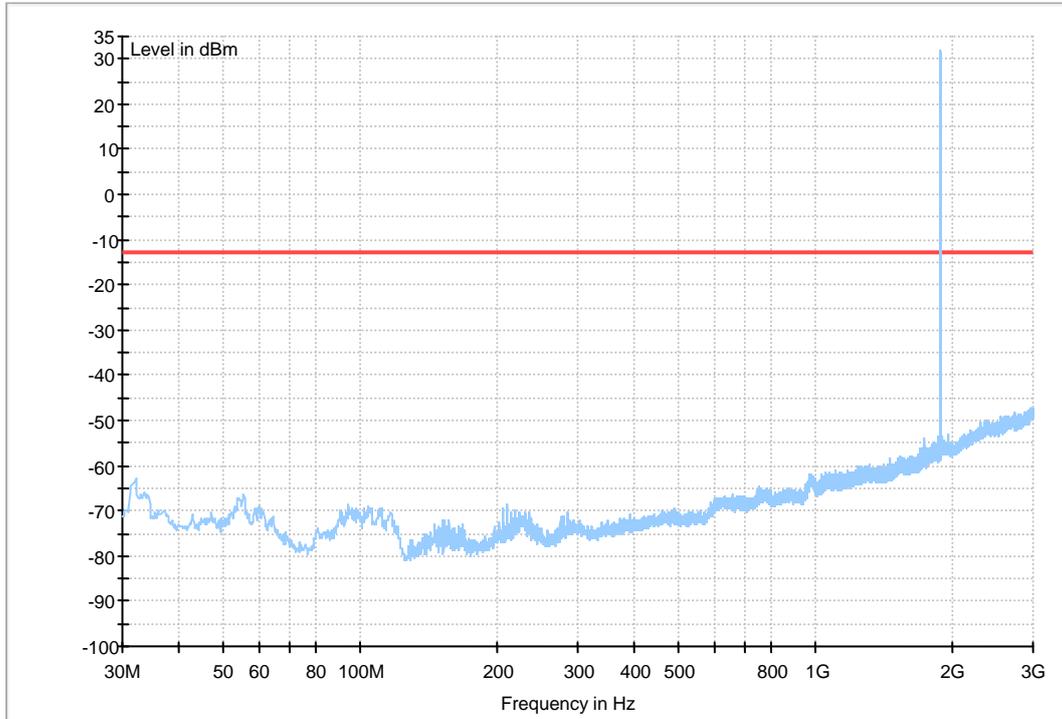
## GPRS1900

Traffic Mode (9kHz-30MHz)



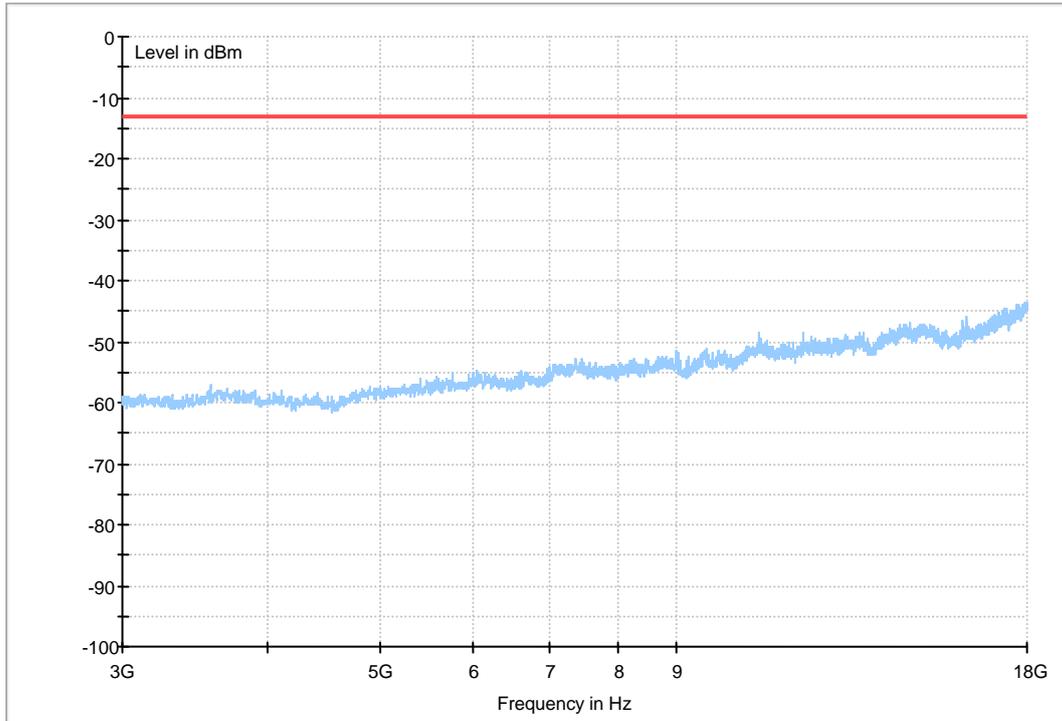


### Traffic Mode (30MHz-3GHz)



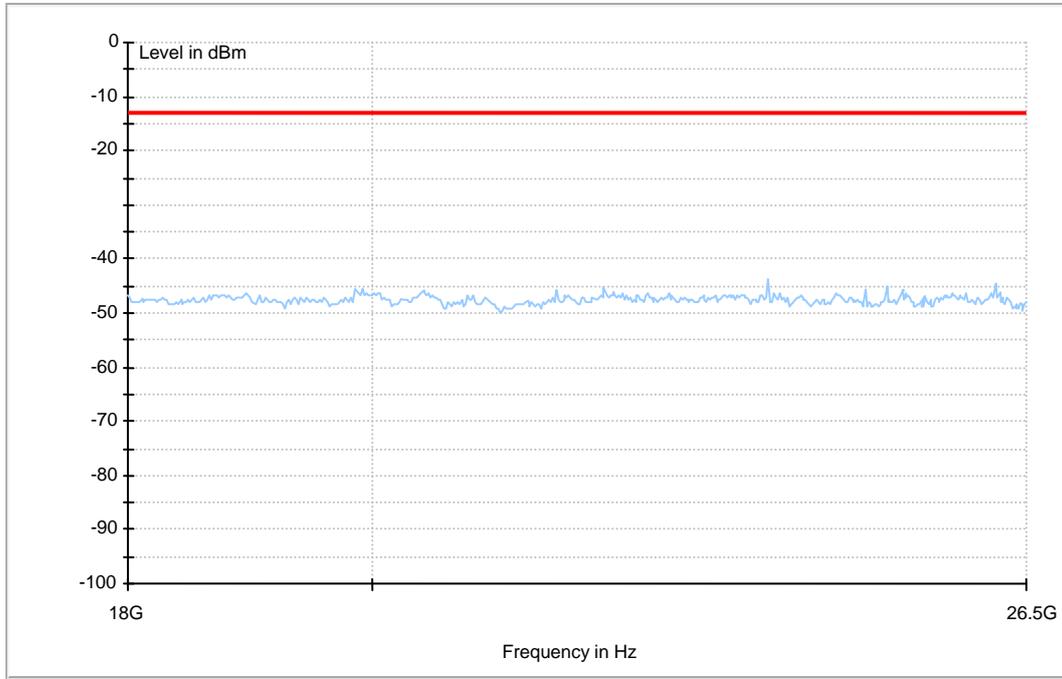


### Traffic Mode (3GHz-18GHz)





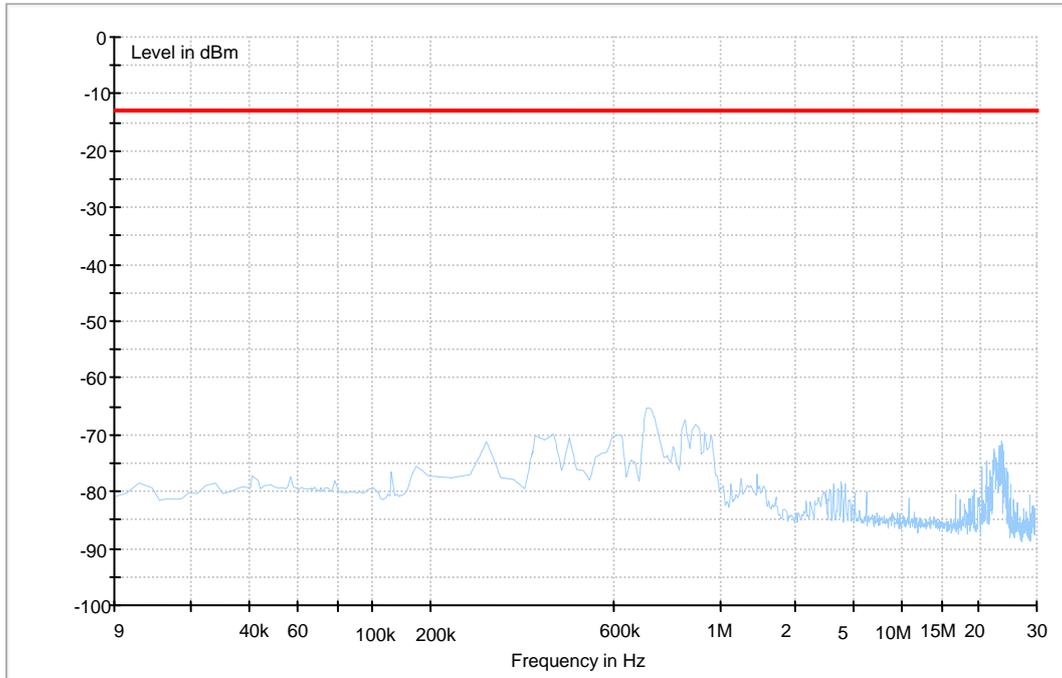
### Traffic Mode (18GHz-26.5GHz)





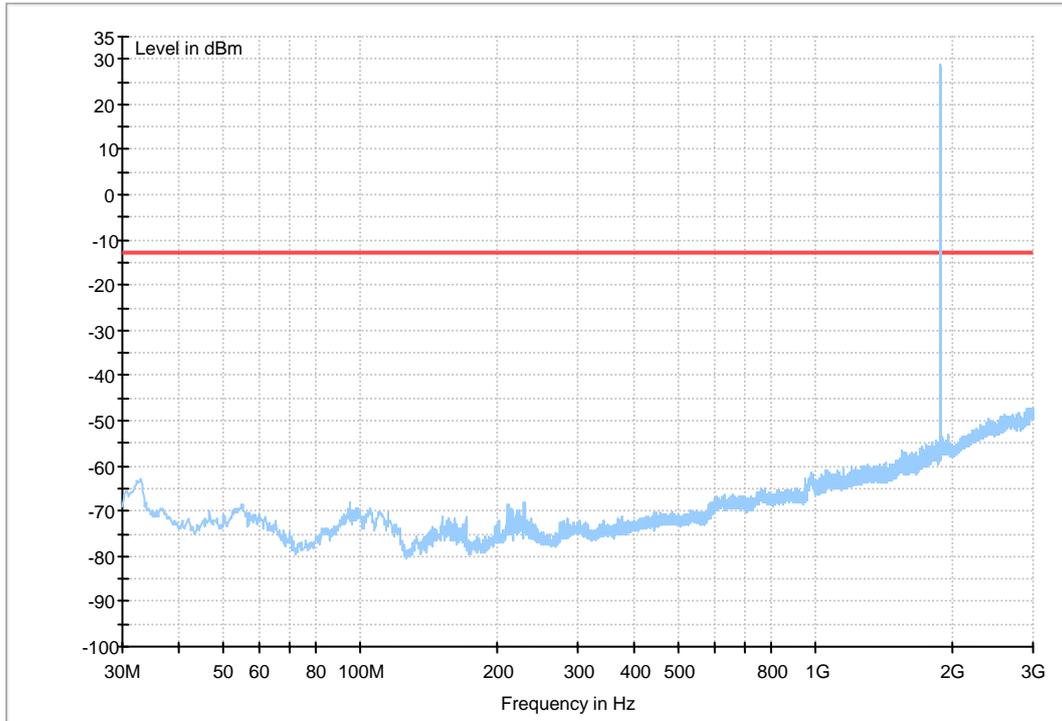
## EDGE 1900

Traffic Mode (9kHz-30MHz)



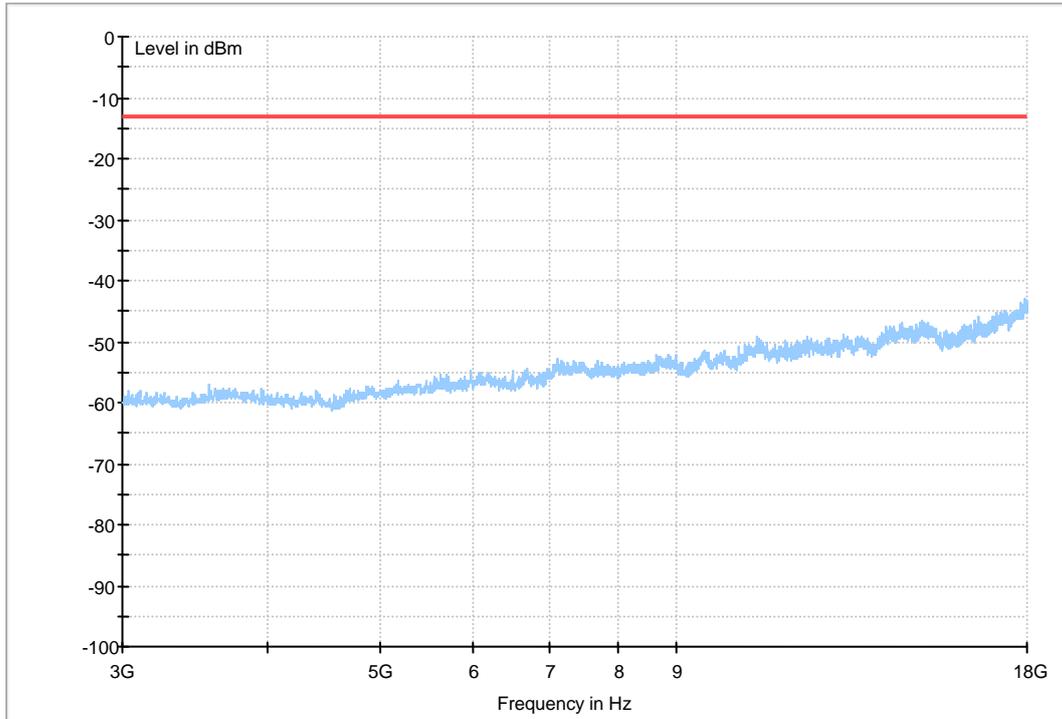


### Traffic Mode (30MHz-3GHz)



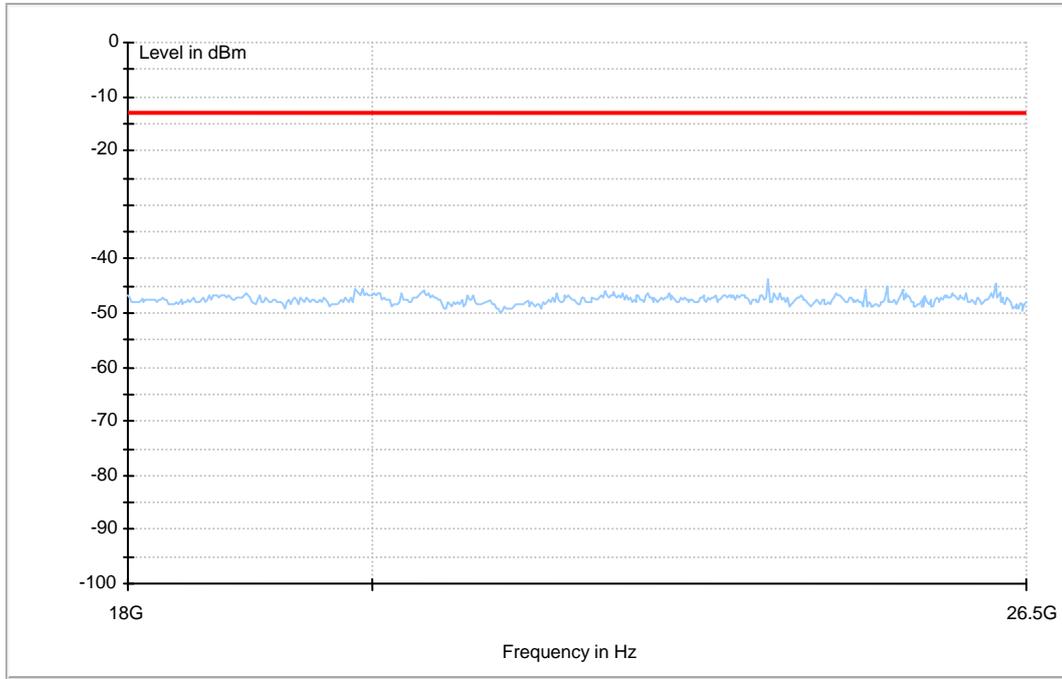


### Traffic Mode (3GHz-18GHz)





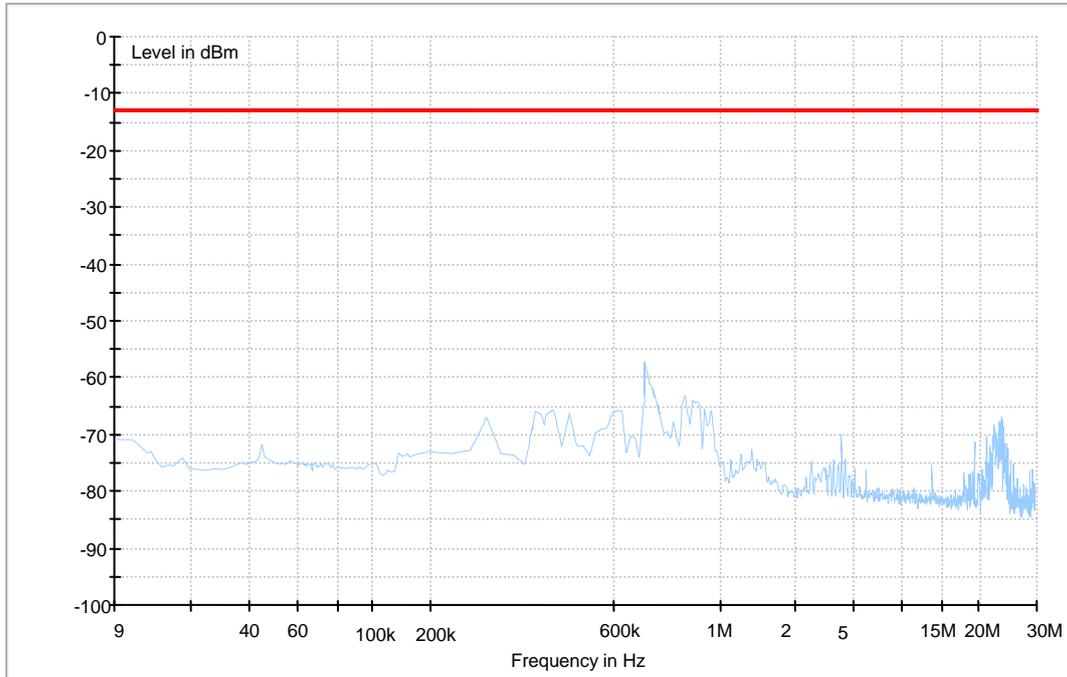
### Traffic Mode (18GHz-26.5GHz)





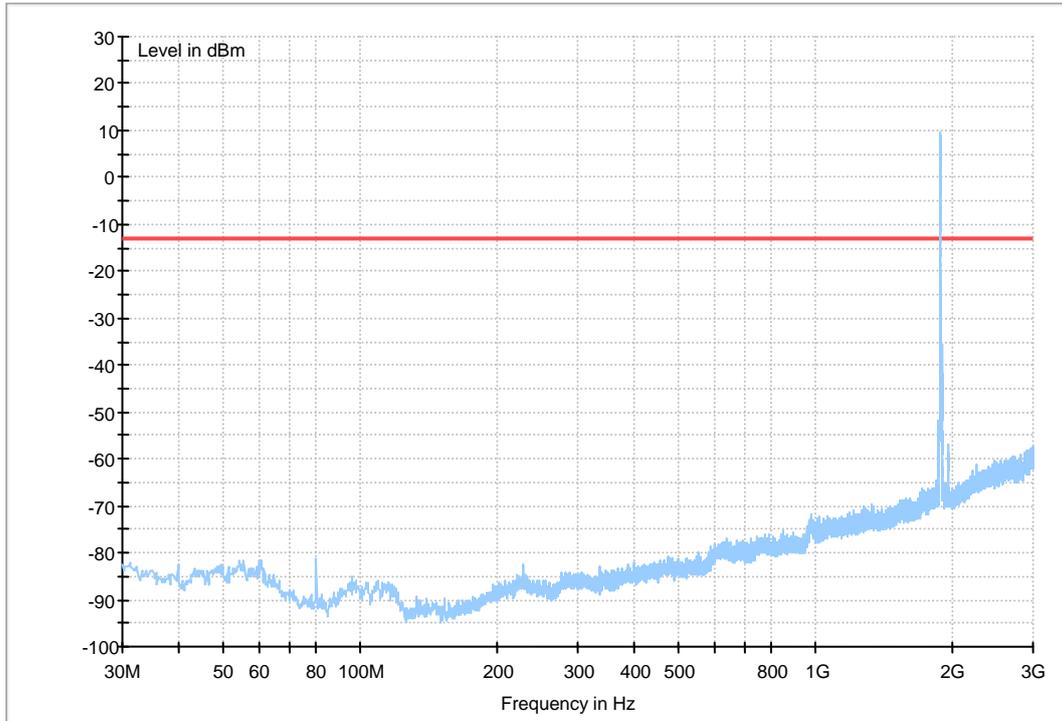
## WCDMA 1900

Traffic Mode (9kHz-30MHz)



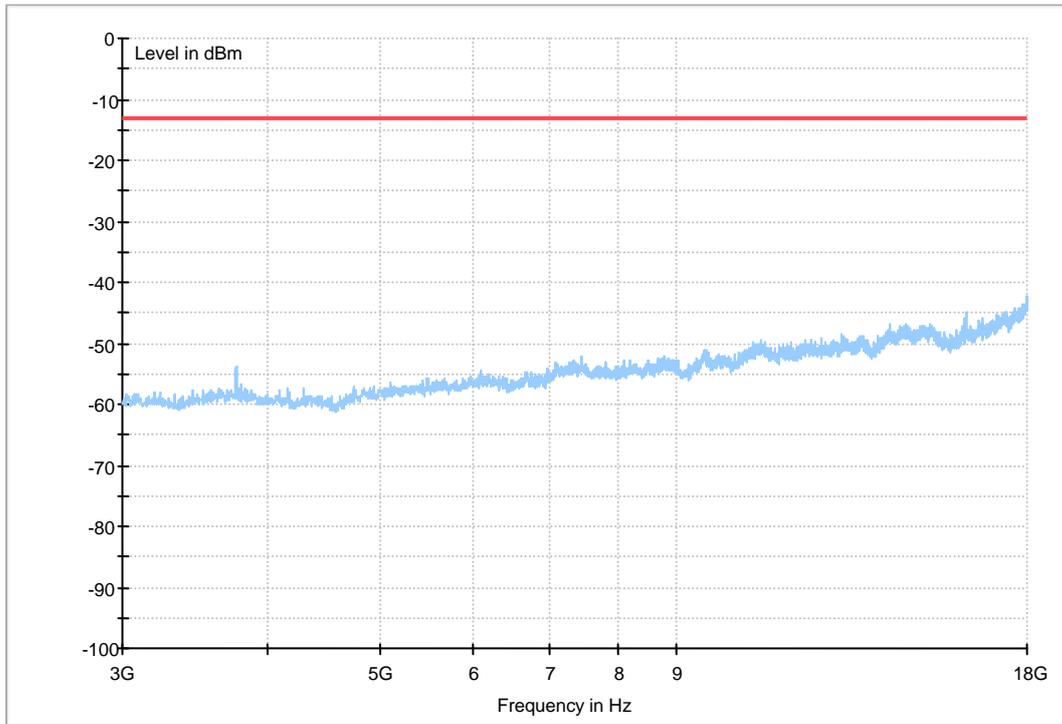


### Traffic Mode (30MHz-3GHz)



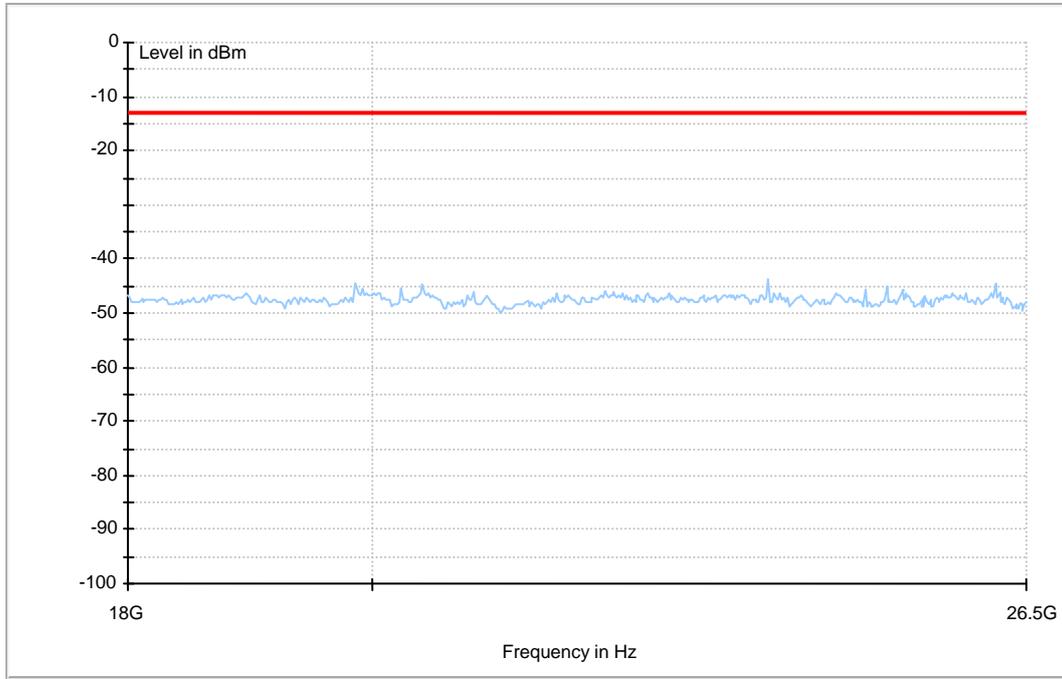


### Traffic Mode (3GHz-18GHz)





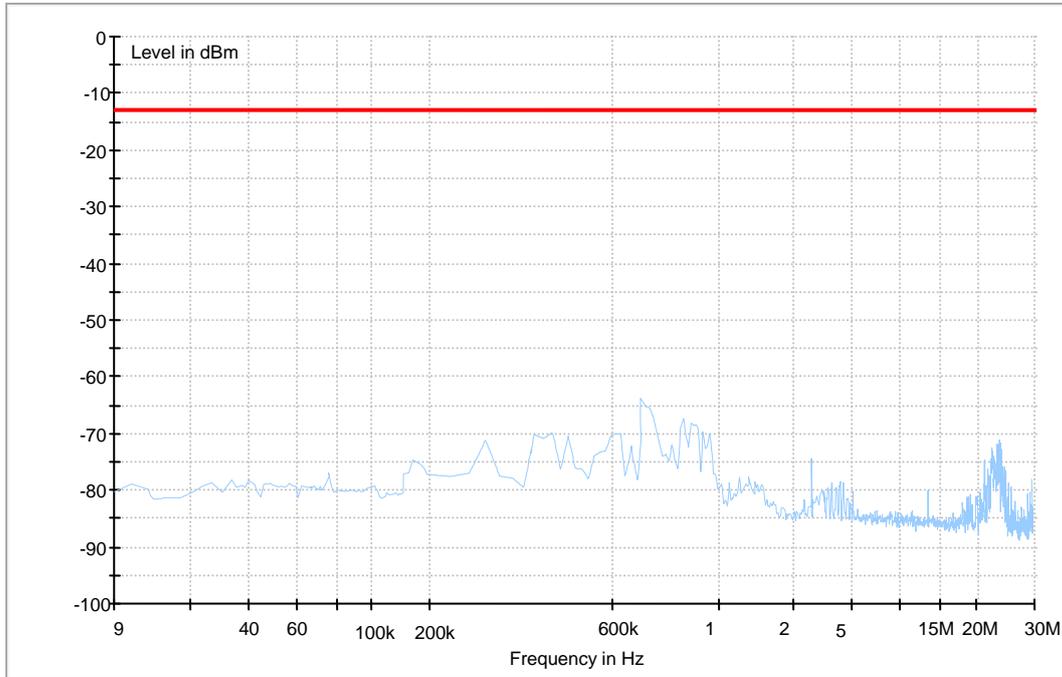
### Traffic Mode (18GHz-26.5GHz)





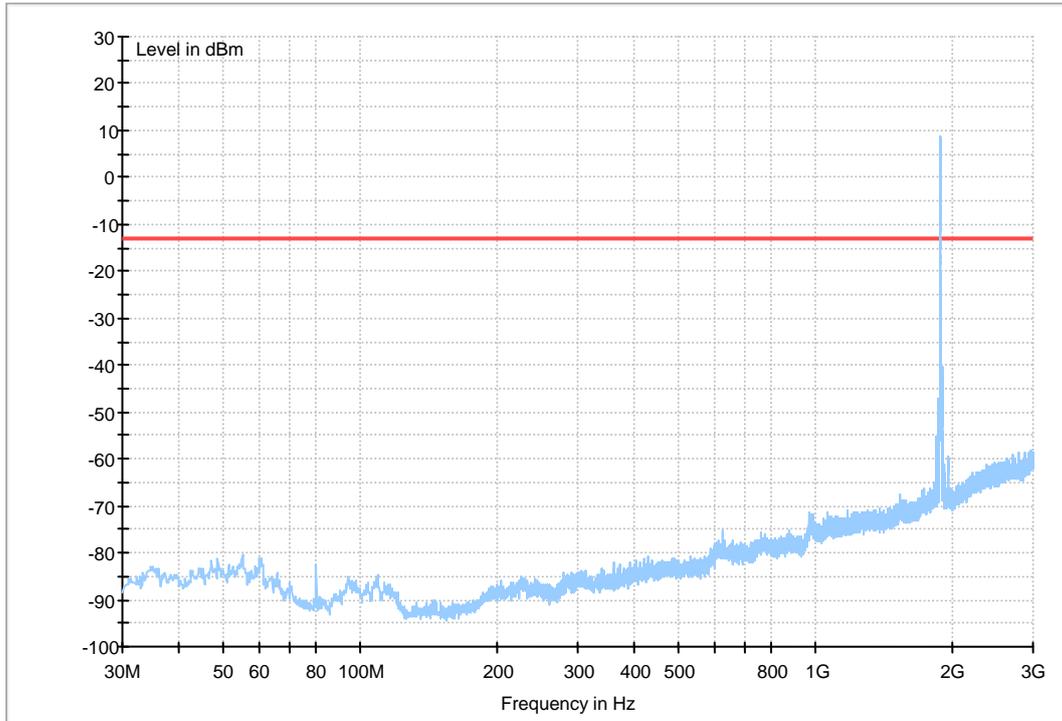
## HSDPA 1900

Traffic Mode (9kHz-30MHz)



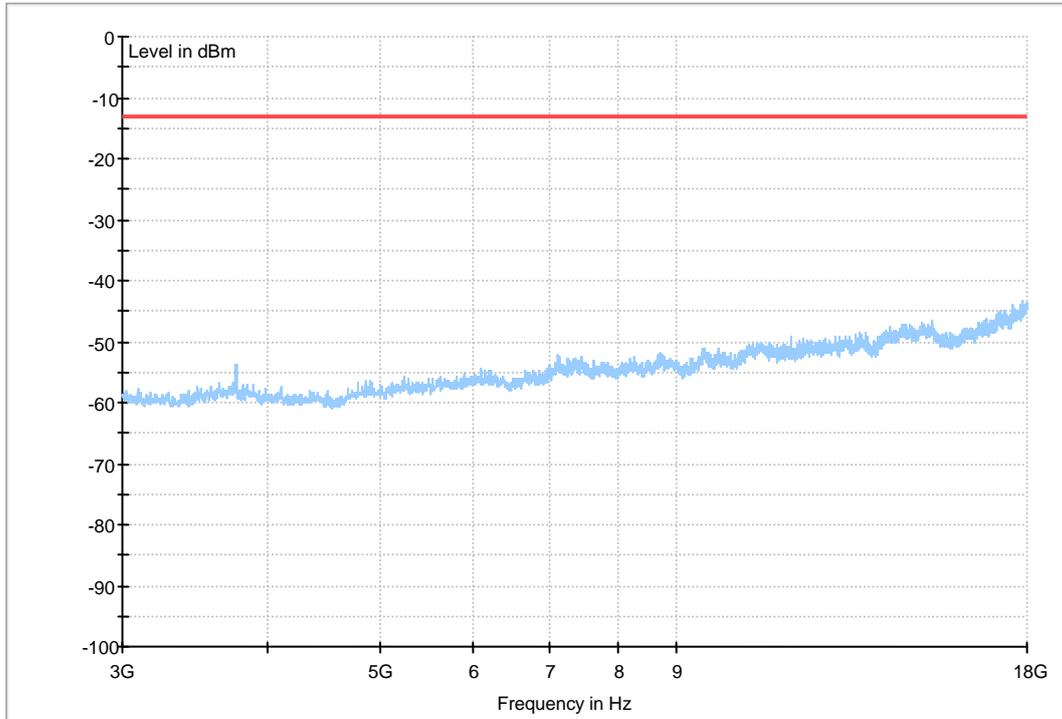


### Traffic Mode (30MHz-3GHz)



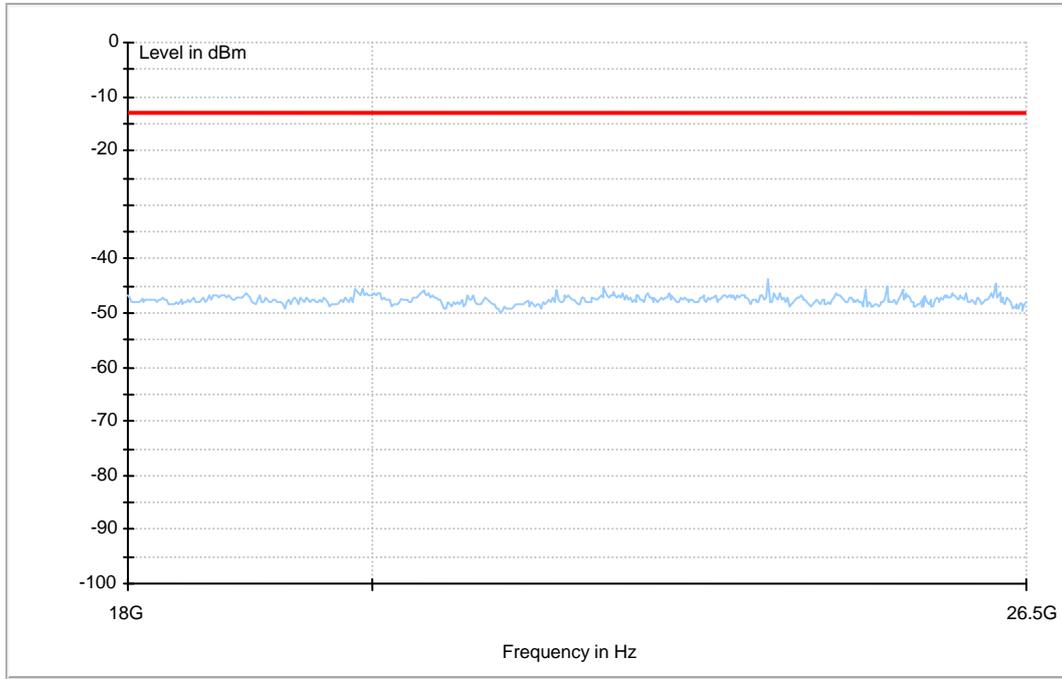


### Traffic Mode (3GHz-18GHz)





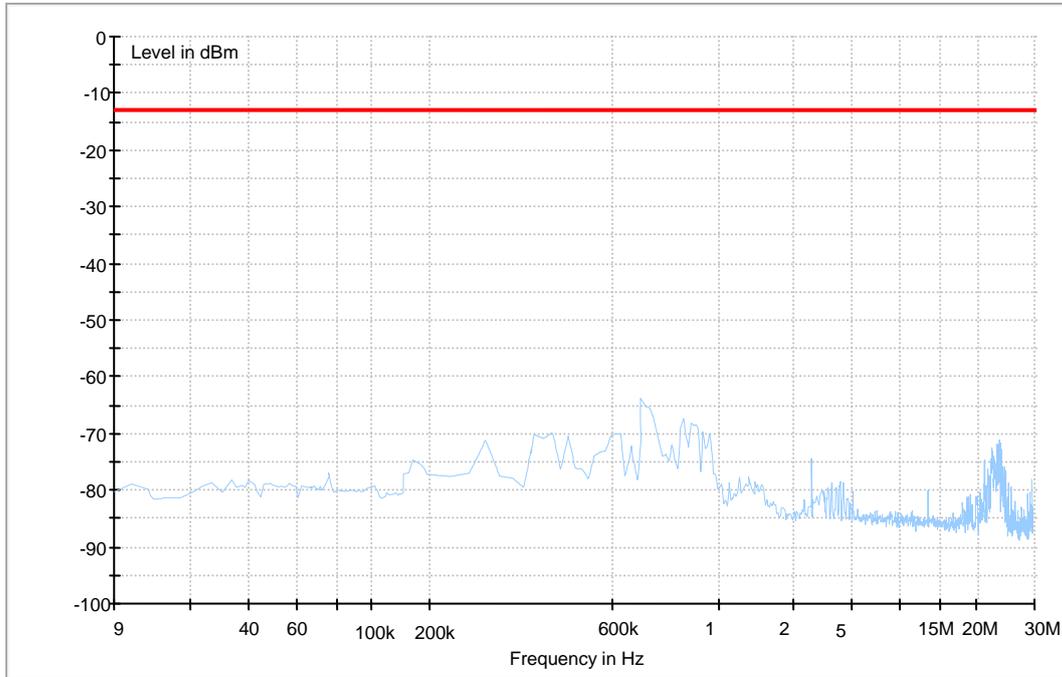
### Traffic Mode (18GHz-26.5GHz)





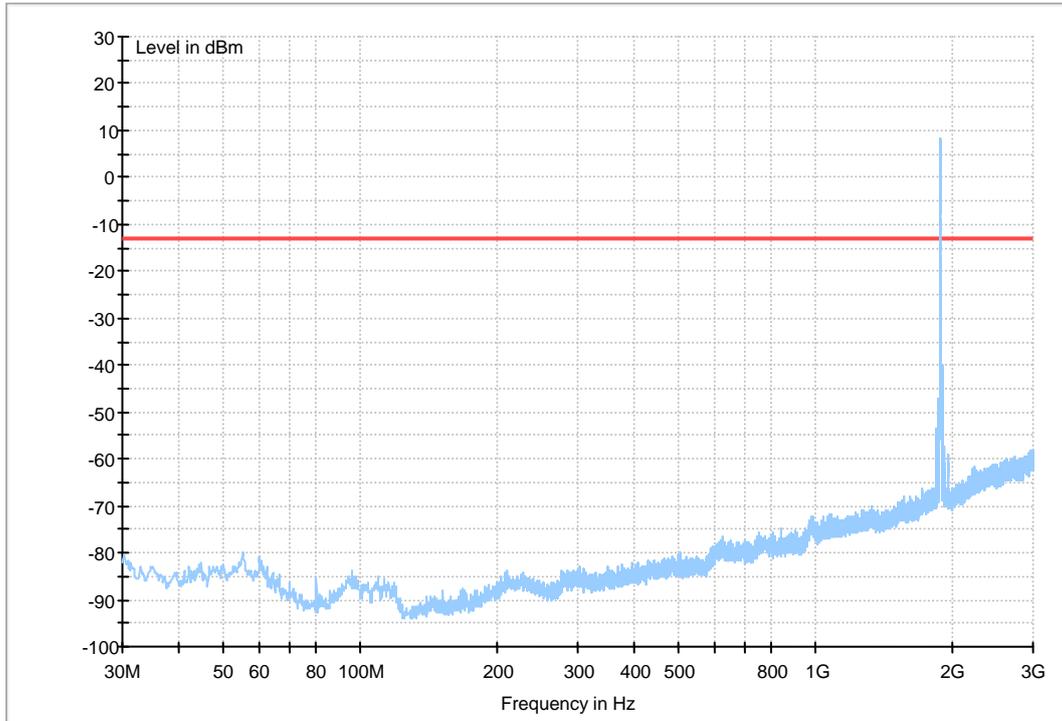
## HSUPA 1900

Traffic Mode (9kHz-30MHz)



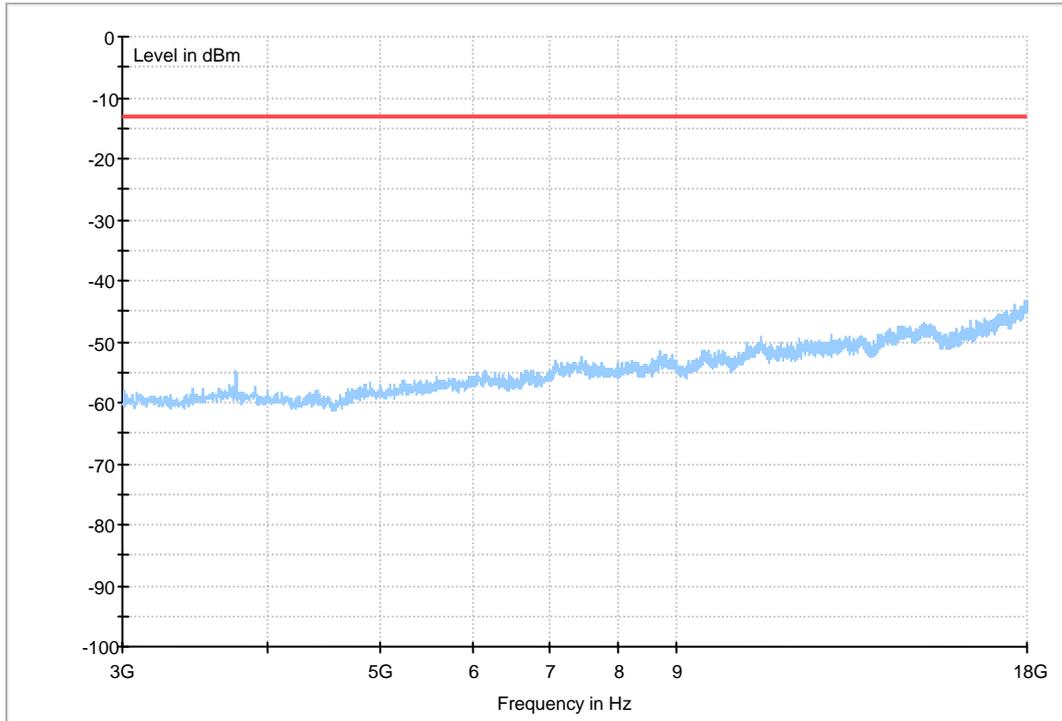


### Traffic Mode (30MHz-3GHz)



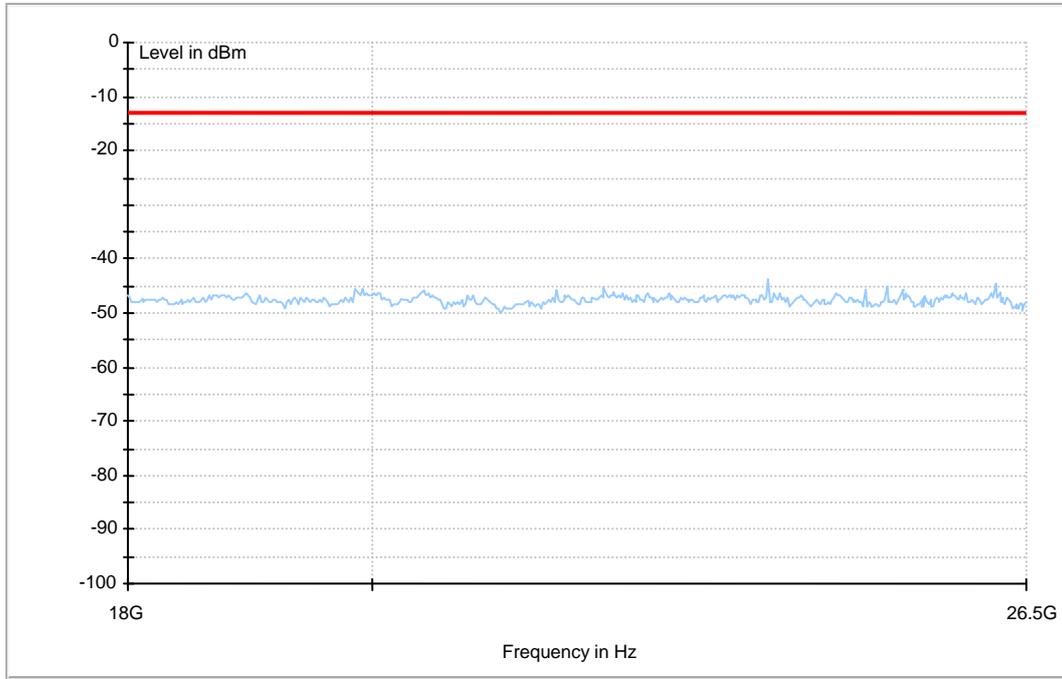


### Traffic Mode (3GHz-18GHz)





### Traffic Mode (18GHz-26.5GHz)





## **Appendix F**

# Photos of Radiated Spurious Emissions



# Photos of Test Setup



## 1 Radiated Spurious Emissions



Radiated Spurious Emission (below 3GHz)



Radiated Spurious Emission (3GHz to18GHz)



Radiated Spurious Emission (18GHz to26.5GHz)