FCC Test Report

FOR

Manufacturer: Intel Corporation

Model Number: BT210/BT230/BT510

Product Description: Smartphone with GSM/GPRS/EDGE, UMTS/HSPA, Wi-Fi, BT, GPS and FM-Rx Radios

FCC ID: O2Z-BTXZ0

47 CFR Part 2, 22, 24

TEST REPORT #: EMC_INTEL- 023-12001_WWAN
DATE: 2012-11-30

FCC listed:
A2LA Accredited

IC recognized #
3462B-1

***CETECOM* Inc.**
411 Dixon Landing Road ◆ Milpitas, CA 95035 ◆ U.S.A.
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CETECOM Inc. is a Delaware Corporation with Corporation number: 2905571

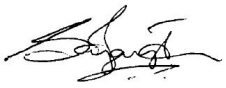
Table of Contents

1 Assessment

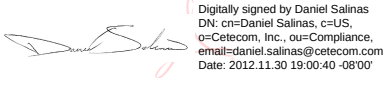
The following device was tested against the applicable criteria specified in FCC rules Parts 2, 22 and 24 of Title 47 of the Code of Federal Regulations and no deviations were ascertained during the course of the tests performed.

Company	Description	Model #
Intel Corporation	Smartphone with GSM/GPRS/EDGE, UMTS/HSPA, Wi-Fi, BT, GPS and FM-Rx Radios	BT210/BT230/BT510

Responsible for Testing Laboratory:

Date	Section	Name	Signature
2012-11-30	Compliance	Sajay Jose (EMC Manager)	

Responsible for the Report:

Date	Section	Name	Signature
2012-11-30	Compliance	Daniel Salinas (EMC Engineer)	 Digitally signed by Daniel Salinas DN: cn=Daniel Salinas, c=US, o=Cetecom, Inc., ou=Compliance, email=daniel.salinas@cetecom.com Date: 2012.11.30 19:00:40 -08'00'

The test results of this test report relate exclusively to the test item specified in Section3.
CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM Inc. USA.

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Address:	411 Dixon Landing Road Milpitas, CA 95035 U.S.A.
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Test Lab Manager:	Sajay Jose
Test Engineer:	Daniel Salinas

2.2 Identification of the Client

Client:	Intel Corporation
Street Address:	2200 Mission College Blvd
City/Zip Code	Santa Clara, 95054
Country	United States
Contact Person:	Christine Ryan
Phone No.	+1 (408) 300 2167

2.3 Identification of the Manufacturer

Same as Client.

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Model No:	BT210, BT230, BT510
Product Description:	Smartphone with GSM/GPRS/EDGE, UMTS/HSPA, Wi-Fi, BT, GPS and FM-Rx Radios
Hardware Version :	ZQB DV 1.1B
Software Version :	ZYB ICS 8184
FCC-ID:	O2Z-BTXZ0
Frequency Range of Test:	GSM 850: 824.2-848.8MHz; PCS 1900: 1850.2-1909.8MHz FDD V: 826.4-846.6MHz; FDD II: 1852.4-1907.6MHz
No. of Channels:	GSM850: 125 and PCS 1900: 300 FDD II: 278 and FDD V: 102
Type(s) of Modulation:	GSM: GMSK, 8-PSK UMTS: QPSK
Antenna Info:	Type: PIFA Manufacturer stated Antenna Gain: -0.75 dBi for GSM 850 MHz band of operation 1.06 dBi for PCS 1900 MHz band of operation. EUT also includes Diversity Antenna- RX only.
Rated Operating Voltage Range (DC):	3.6V (Low) / 3.7V (Nominal) / 4.2V (Max)
Rated Operating Temperature Range:	–10°C ~ +55°C
Test Sample Status:	Pre-production

3.2 Identification of the Equipment under Test (EUT)

EUT #	Serial Number	HW Version	SW Version	Notes
1	LEXP1LPEM103976	ZQB DV 1	ZYB ICS 7113	Sample for test cases in Section 6.2, 6.3, 6.4 of this report.
2	LEXP1LPEM103716	ZQB DV 1.1B	ZYB ICS 8184	Sample for test cases in Section 6.1,and 6.5 of this report.

3.3 Identification of Accessory equipment

AE #	Type	Manufacturer	Model	Comments
1	Headset	PCH INTERNATIONAL	G64341--002	1m cable
2	AC Power Adapter	PCH INTERNATIONAL	KSFUFB0500100QW 1UK	UK Power adapter
3	USB Cable	SHENZHEN YIHUAXING ELECTRONICS CO., LTD	Mdenes BT510	1.5m cable

3.4 Environmental conditions during Test:

The following environmental conditions were maintained during the course of testing:

Ambient Temperature: 20-25^{o}C

Relative humidity: 40-60%

3.5 Dates of Testing:

Oct 22, 2012-Nov 26, 2012

4 Subject of Investigation

The objective of the measurements applied by CETECOM Inc. was to establish compliance of the EUT as described under Ch. 3 of this Test Report, with the applicable criteria specified in

- 47 CFR Part 2: Title 47 of the Code of Federal Regulations: Chapter I-Federal Communications Commission Frequency allocations and radio treaty matters; general rules and regulations.
- 47 CFR Part 22: Title 47 of the Code of Federal Regulations: Chapter I-Federal Communications Commission subchapter B- common carrier services; Part 22- Public mobile services
- 47 CFR Part 24: Title 47 of the Code of Federal Regulations: Chapter I-Federal Communications Commission subchapter B- common carrier services; Part 24- Personal communication services

This test report is to support a request for new equipment authorization under the FCC ID **O2Z-BTXZ0.**

5 Summary of Measurement Results

850 MHz Band:

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1046 §22.913 (a)	RF Output Power	Nominal	GSM 850	■	☐	☐	☐	Complies
			UMTS Band V	■	☐	☐	☐	Complies
§2.1055 §22.355	Frequency Stability	Nominal	GSM 850	■	☐	☐	☐	Complies
			UMTS Band V	■	☐	☐	☐	Complies
§2.1049 §22.917(b)	Occupied Bandwidth	Nominal	GSM 850	■	☐	☐	☐	Complies
			UMTS Band V	■	☐	☐	☐	Complies
§2.1051 §22.917	Band Edge Compliance	Nominal	GSM 850	■	☐	☐	☐	Complies
			UMTS Band V	■	☐	☐	☐	Complies
§2.1051 §22.917	Conducted Spurious Emissions	Nominal	GSM 850	■	☐	☐	☐	Complies
			UMTS Band V	■	☐	☐	☐	Complies
§2.1053 §22.917	Radiated Spurious Emissions	Nominal	GSM 850	■	☐	☐	☐	Complies
			UMTS Band V	■	☐	☐	☐	Complies

Note: NA= Not Applicable; NP= Not Performed.

1900 MHz Band:

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1046 §24.232 (a)	RF Output Power	Nominal	GSM 1900	■	☐	☐	☐	Complies
			UMTS Band II	■	☐	☐	☐	Complies
§2.1055 §24.235	Frequency Stability	Nominal	GSM 1900	■	☐	☐	☐	Complies
			UMTS Band II	■	☐	☐	☐	Complies
§2.1049 §24.238(b)	Occupied Bandwidth	Nominal	GSM 1900	■	☐	☐	☐	Complies
			UMTS Band II	■	☐	☐	☐	Complies
§2.1051 §24.238	Band Edge Compliance	Nominal	GSM 1900	■	☐	☐	☐	Complies
			UMTS Band II	■	☐	☐	☐	Complies
§2.1051 §24.238	Conducted Spurious Emissions	Nominal	GSM 1900	■	☐	☐	☐	Complies
			UMTS Band II	■	☐	☐	☐	Complies
§2.1053 §24.238	Radiated Spurious Emissions	Nominal	GSM 1900	■	☐	☐	☐	Complies
			UMTS Band II	■	☐	☐	☐	Complies

Note: NA= Not Applicable; NP= Not Performed.

6 Measurements

6.1 RF Power Output

6.1.1 References

FCC: CFR Part 2.1046, CFR Part 22.913, CFR Part 24.232

6.1.2 Measurement requirements:

6.1.2.1 FCC 2.1046: RF power output.

Power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on circuit elements as specified. The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

6.1.3 Limits:

6.1.3.1 FCC 22.913 (a) Effective radiated power limits.

The effective radiated power (ERP) of mobile transmitters must not exceed 7 Watts.

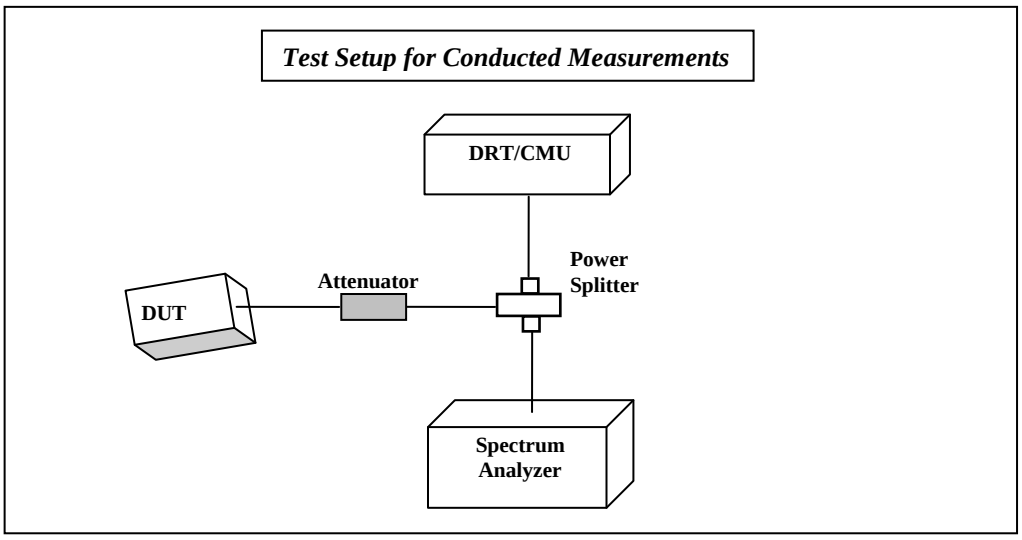
6.1.3.2 FCC 24.232 (b) Power limits.

(b) Mobile/portable stations are limited to 2 Watts effective isotropic radiated power (EIRP).

6.1.4 Conducted Output Power Measurement

6.1.4.1 Measurement Procedure:

Ref: TIA-603C 2004 2.2.1



1. Connect the equipment as shown in the above diagram. A Digital Radio Communication Tester (DRT: R&S CMU200 here) is used to enable the EUT to transmit and to measure the output power.
2. Adjust the settings of the CMU200 to set the EUT to its maximum power at the required channel.
3. Record the Peak and Average Output power level measured by the CMU200.
4. Correct the measured level for all losses in the RF path.
5. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band and for all types of modulation schemes.
    a. GMSK mode measurements performed in 1 Uplink configuration
    b. EGPRS mode measurements performed in 1 Uplink MCS-9 configuration
    c. UMTS mode measurements performed in RMC 12.2k configuration

Measurement Uncertainty= +/- 0.5 dB

6.1.4.2 Test Conditions:

Tnom: 20^{o}C; Vnom: 3.7 V

6.1.4.3 Measurement Results:

GSM 850: GMSK Mode		
Frequency (MHz)	**Conducted Peak Output Power from the EUT**	**Conducted Average Output Power**
	(dBm)	**(dBm)**
824.2	31.3	31.2
836.6	31.4	31.2
848.8	31.4	31.2

EGPRS 850: 8PSK Mode		
Frequency (MHz)	**Conducted Peak Output Power from the EUT**	**Conducted Average Output Power**
	(dBm)	**(dBm)**
824.2	28.9	26.2
836.6	28.8	26.1
848.8	28.9	26.2

FDD V: UMTS Mode	
Frequency (MHz)	**Conducted Peak Output Power from the EUT**
	(dBm)
826.2	27.0
836.6	26.9
846.6	26.9

GSM 1900: GMSK Mode		
Frequency (MHz)	**Conducted Peak Output Power from the EUT**	**Conducted Average Output Power**
	(dBm)	**(dBm)**
1850.2	29.6	29.5
1880	29.6	29.4
1909.8	29.5	29.4

EGPRS 1900: 8PSK Mode		
Frequency (MHz)	**Conducted Peak Output Power from the EUT**	**Conducted Average Output Power**
	(dBm)	**(dBm)**
1850.2	27.7	24.7
1880	27.6	24.6
1909.8	27.5	24.6

FDD II: UMTS Mode	
Frequency (MHz)	**Conducted Peak Output Power**
	(dBm)
1852.4	26.0
1880	26.0
1907.6	26.0

6.1.5 PEAK-AVERAGE Ratio

A Peak to average ratio measurement is performed at the conducted port of the EUT. For CDMA signals, the spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

6.1.5.1 Limits:

FCC CFR 47 §24.232 (D)
Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

6.1.5.2 Test Procedure:

(GSM/ EGPRS modes) = Measured Peak output power- Measured Average Output power
(UMTS Mode)= based on CCDF measurement on Spectrum Analyzer

6.1.5.3 Test Results:

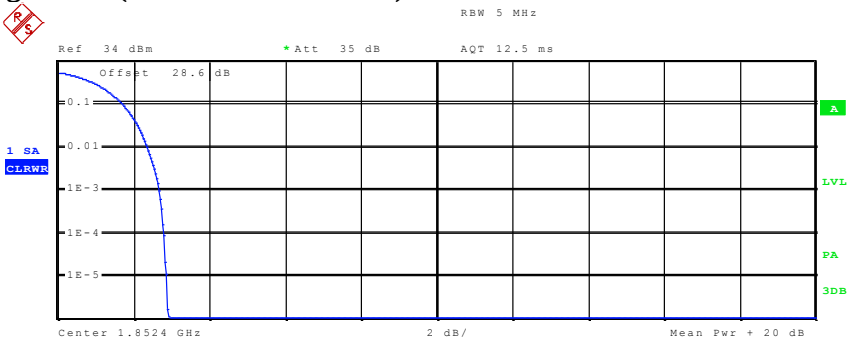
Peak-Average Ratio in 1900 MHz band of operation (dB)			
Channel	**GMSK Mode**	**8PSK Mode**	**UMTS Mode**
Low	0.1	3.0	2.8
Mid	0.2	3.0	2.9
High	0.1	2.9	2.7

6.1.5.4 Test Verdict:

Pass

6.1.5.5 Test Data:

Peak-Average Ratio (FDD II: UMTS mode) low Channel



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 7.1MHz

	Trace 1
Mean	24.11 dBm
Peak	26.99 dBm
Crest	2.89 dB
10 %	1.67 dB
1 %	2.34 dB
.1 %	2.66 dB
.01 %	2.79 dB

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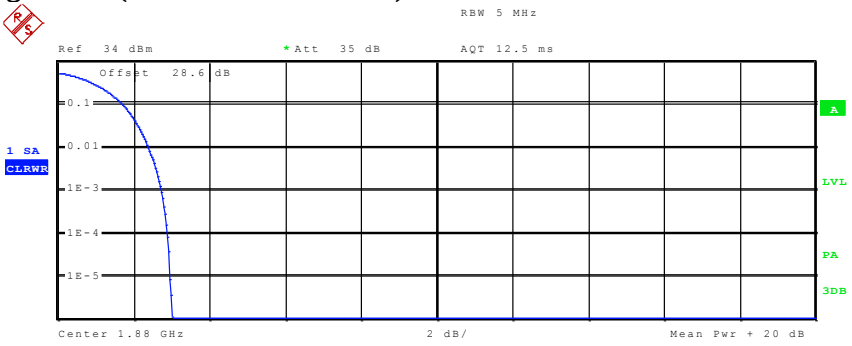
Peak-Average Ratio (FDD II: UMTS mode) mid Channel



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 7.1MHz

	Trace 1
Mean	24.06 dBm
Peak	27.06 dBm
Crest	3.00 dB
10 %	1.67 dB
1 %	2.37 dB
.1 %	2.72 dB
.01 %	2.88 dB

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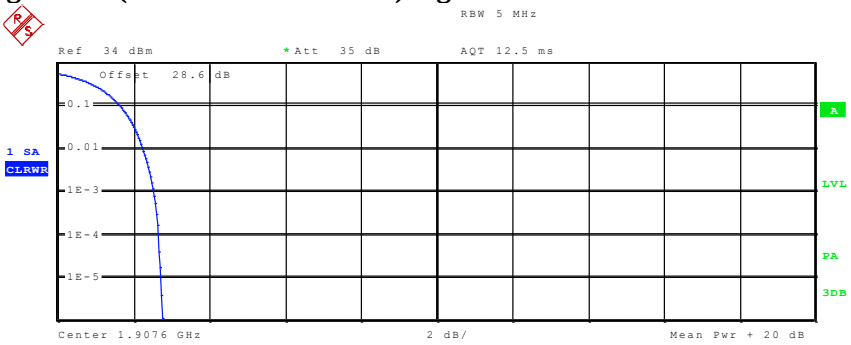
Peak-Average Ratio (FDD II: UMTS mode) high Channel



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 7.1MHz

	Trace 1
Mean	24.33 dBm
Peak	27.06 dBm
Crest	2.73 dB
10 %	1.60 dB
1 %	2.21 dB
.1 %	2.50 dB
.01 %	2.66 dB

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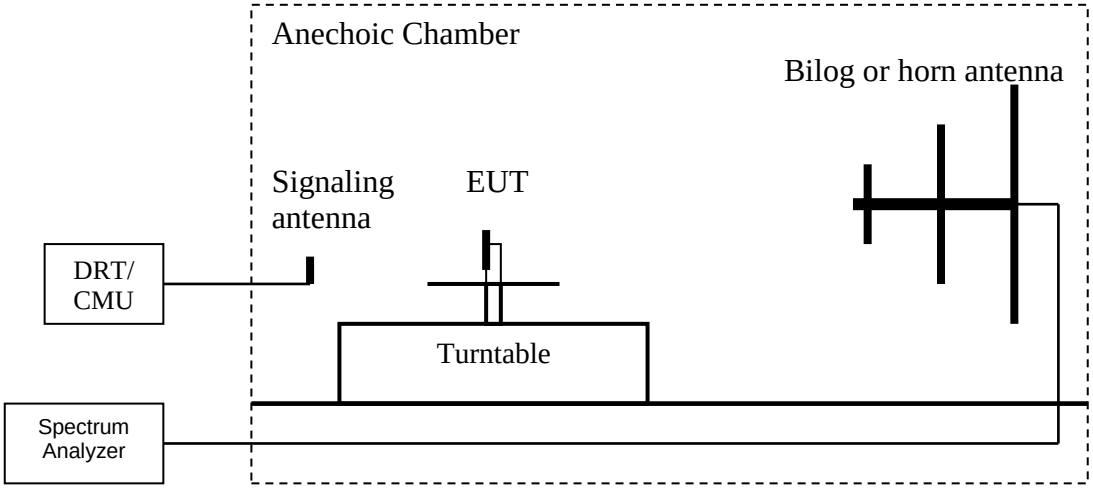
6.1.6 Radiated Output Power Measurement

6.1.6.1 Radiated Output Power Measurement procedure

Ref: TIA-603C 2004 -2.2.17.2 Effective Radiated Power (ERP) or Effective Isotropic Radiated Power (EIRP)



1. Connect the equipment as shown in the above diagram with the EUT's antenna in center of the turn table.
2. Adjust the settings of the Digital Radio Communication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to the channel frequency. Set the analyzer to measure peak hold with the required settings.
4. Rotate the EUT 360°. Record the peak level in dBm (**LVL**).
5. Replace the EUT with a vertically polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS)**. **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the ERP using the following equation:
   ERP (dBm) = **LVL** (dBm) + **LOSS** (dB)
8. Determine the EIRP using the following equation:
   EIRP (dBm) = **ERP** (dBm) + 2.14 (dB)
9. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.

6.1.7 Test Conditions:

Tnom: 20°C; Vnom: 3.7 V

6.1.8 Test Verdict

Pass.

6.1.9 Test Results

6.1.9.1 RF Power Output 850MHz band

Limits:
FCC: Nominal Peak Output Power < 38.45 dBm (7W)

GSM 850: GMSK Mode	
Frequency (MHz)	**Radiated Power**
	ERP (dBm)
824.2	27.86
836.6	28.82
848.8	28.70

EGPRS 850: 8PSK Mode	
Frequency (MHz)	**Radiated Power**
	ERP (dBm)
824.2	24.78
836.6	25.78
848.8	25.53

FDD V: UMTS Mode	
Frequency (MHz)	**Radiated Power**
	ERP (dBm)
826.4	22.39
836.6	22.56
846.6	21.89

6.1.9.2 RF Power Output 1900MHz band

Limits:

Nominal Peak Output Power < 33 dBm (2W)

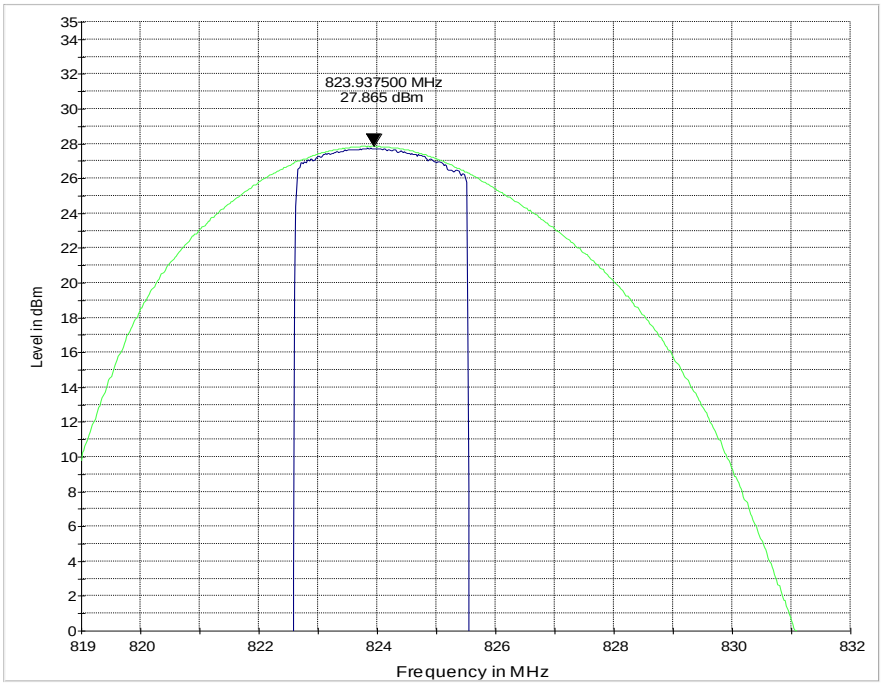
GSM 1900: GMSK Mode	
Frequency (MHz)	**Radiated Power**
	EIRP (dBm)
1850.2	28.31
1880.0	28.34
1909.8	27.56

EGPRS 1900: 8PSK Mode	
Frequency (MHz)	**Radiated Power**
	EIRP (dBm)
1850.2	24.66
1880.0	24.63
1909.8	24.01

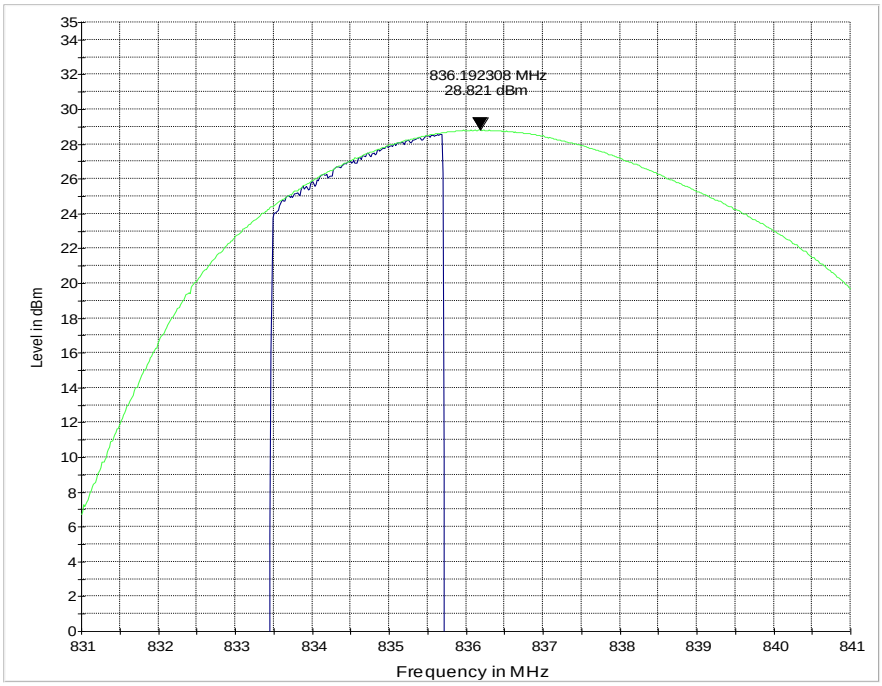
FDD II: UMTS Mode	
Frequency (MHz)	**Radiated Power**
	EIRP (dBm)
1852.4	22.41
1880.0	23.70
1907.6	23.76

6.1.9.3 Plots:

ERP (GSM 850) CHANNEL 128



ERP (GSM 850) CHANNEL 190



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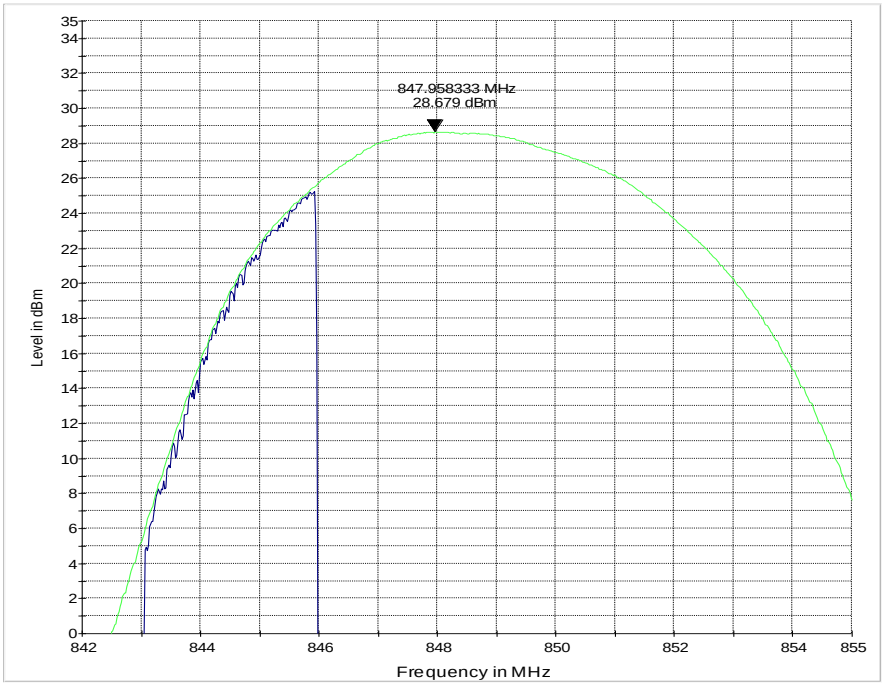

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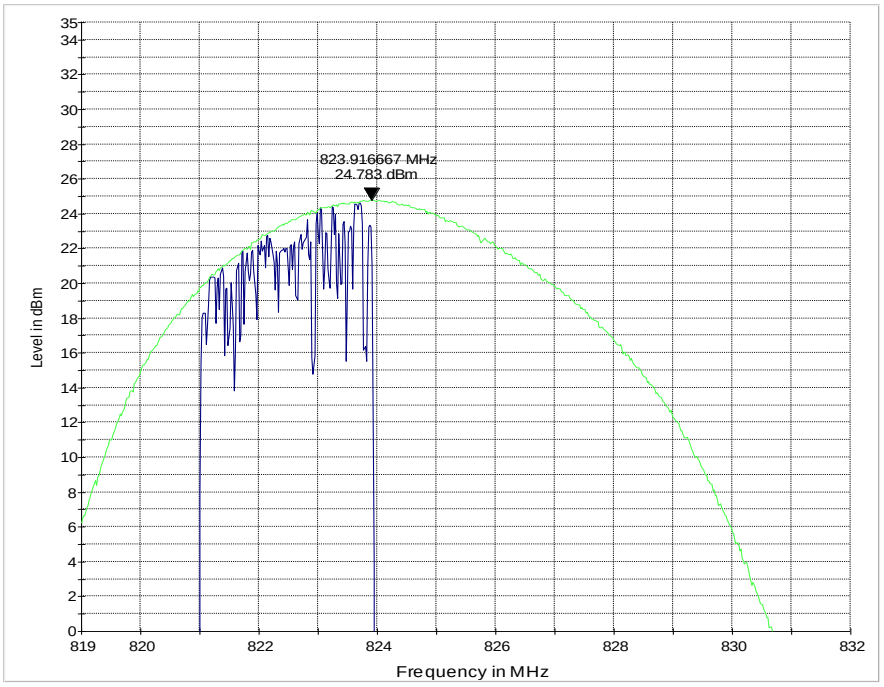

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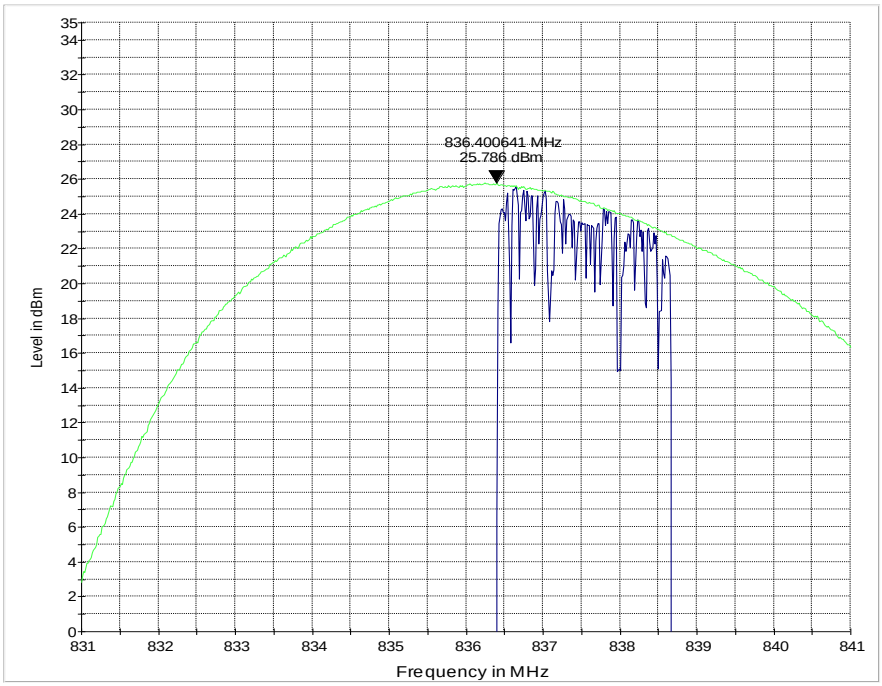

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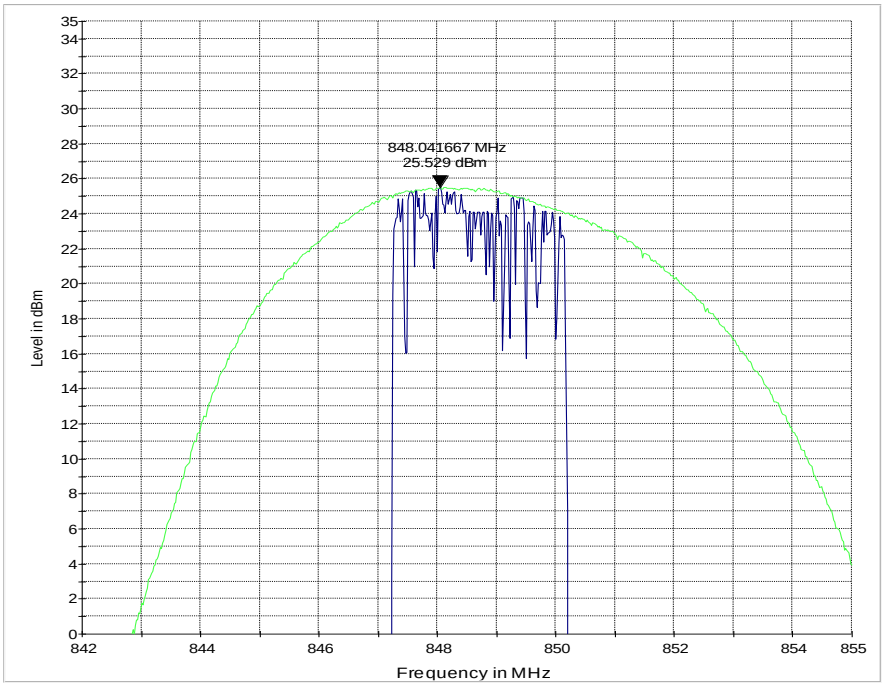

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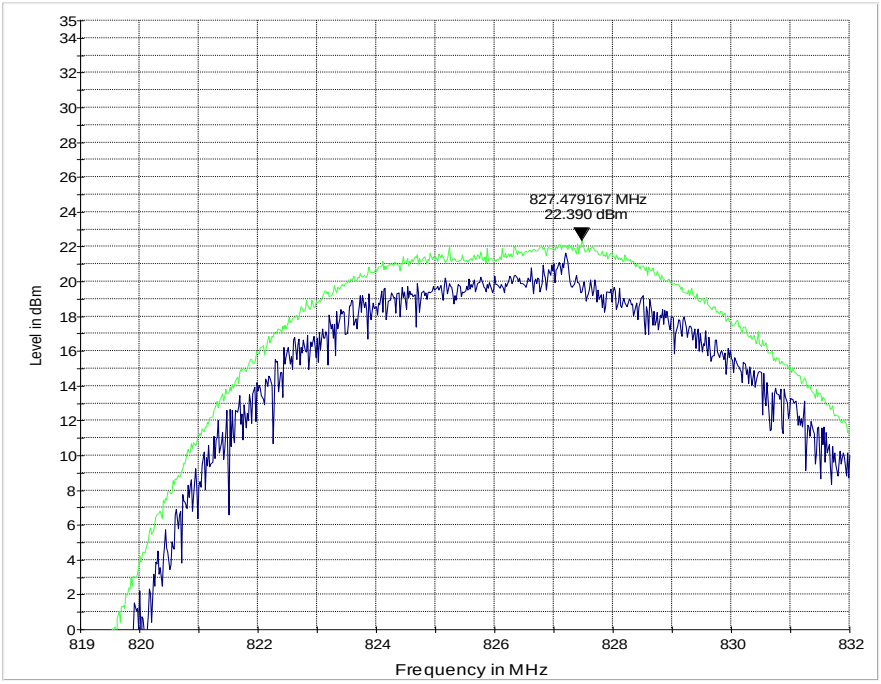

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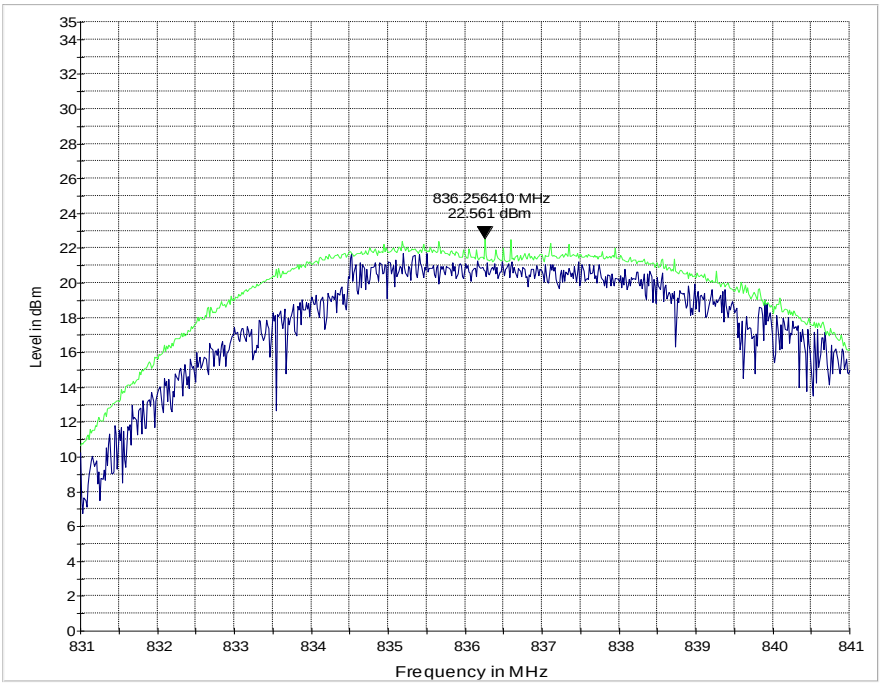

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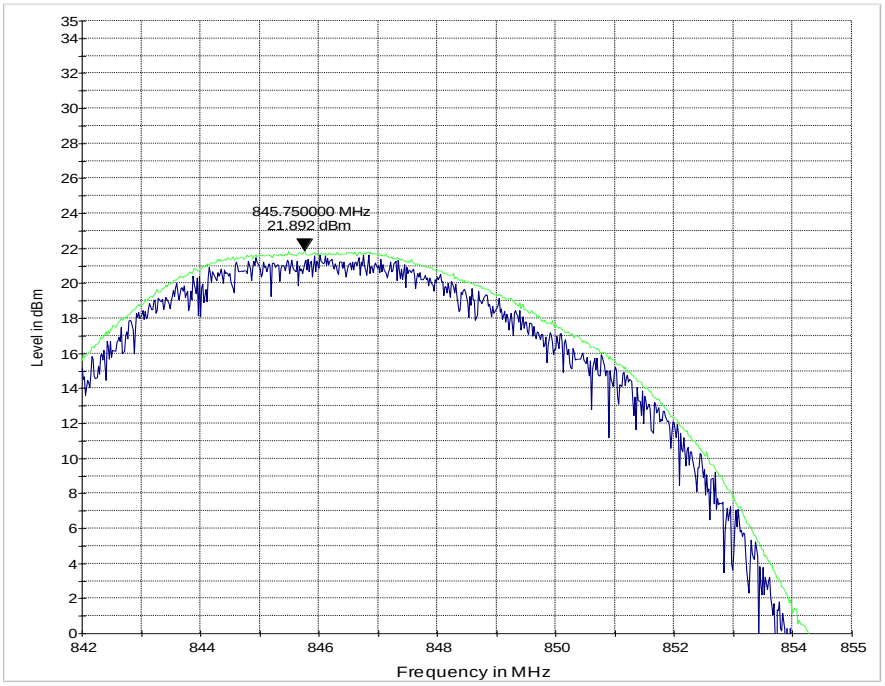
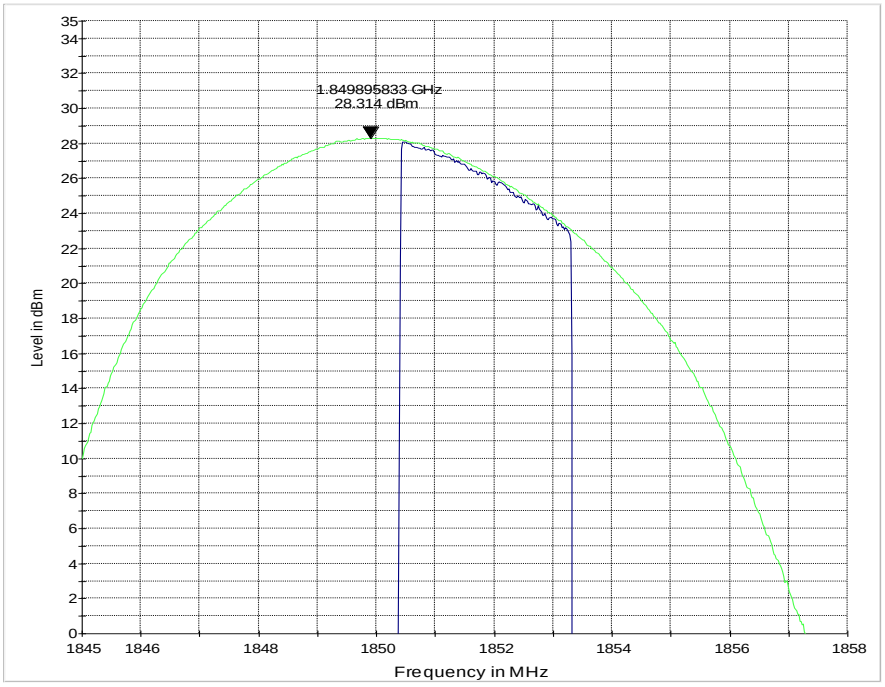


EIRP (PCS-1900) CHANNEL 512



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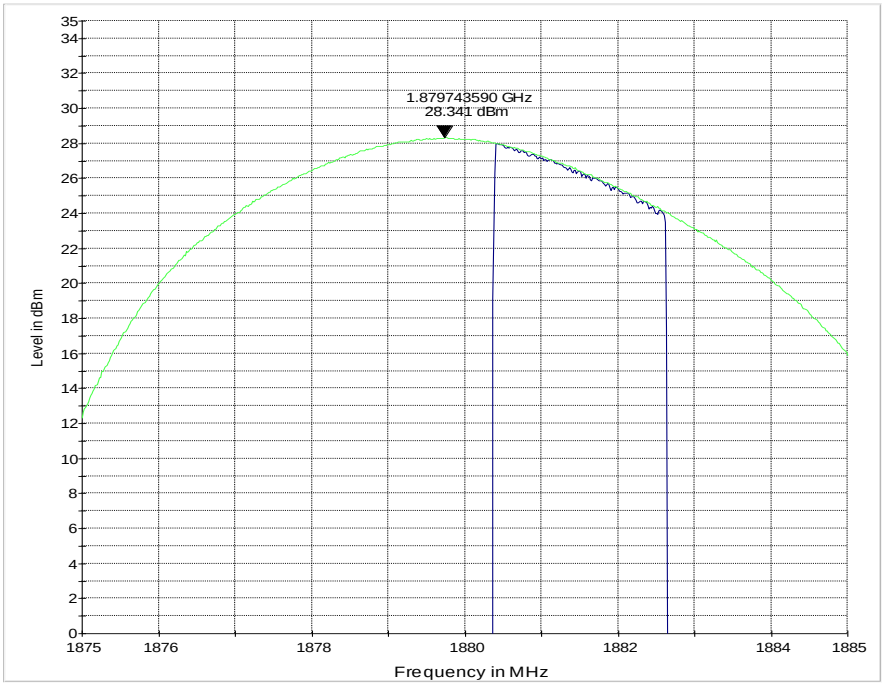

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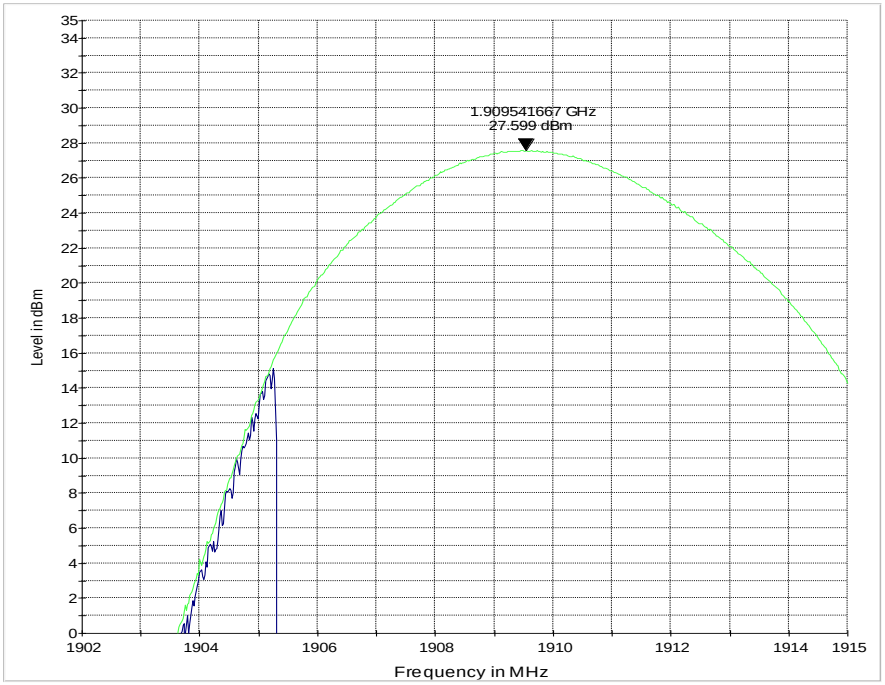

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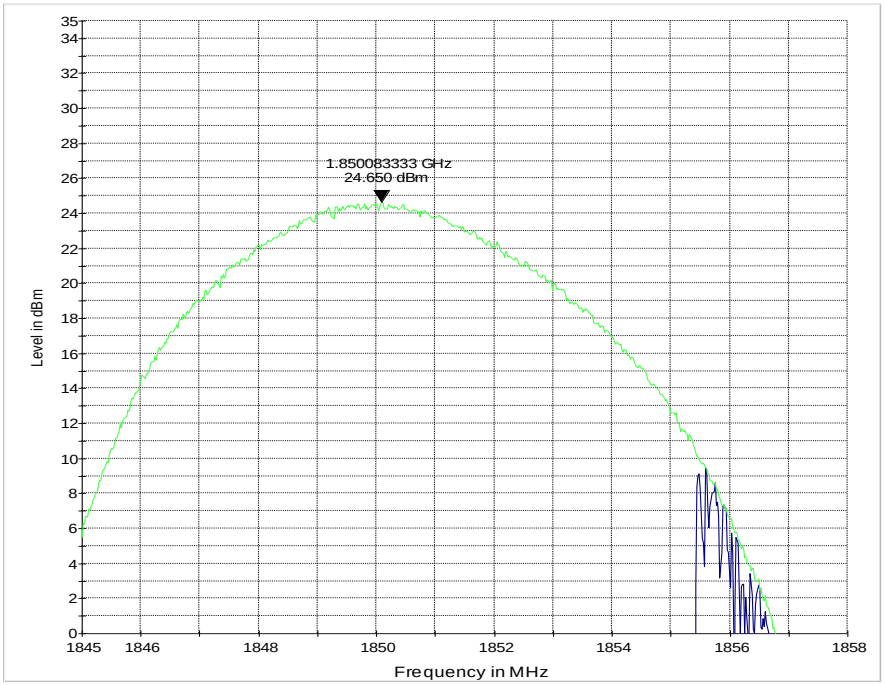

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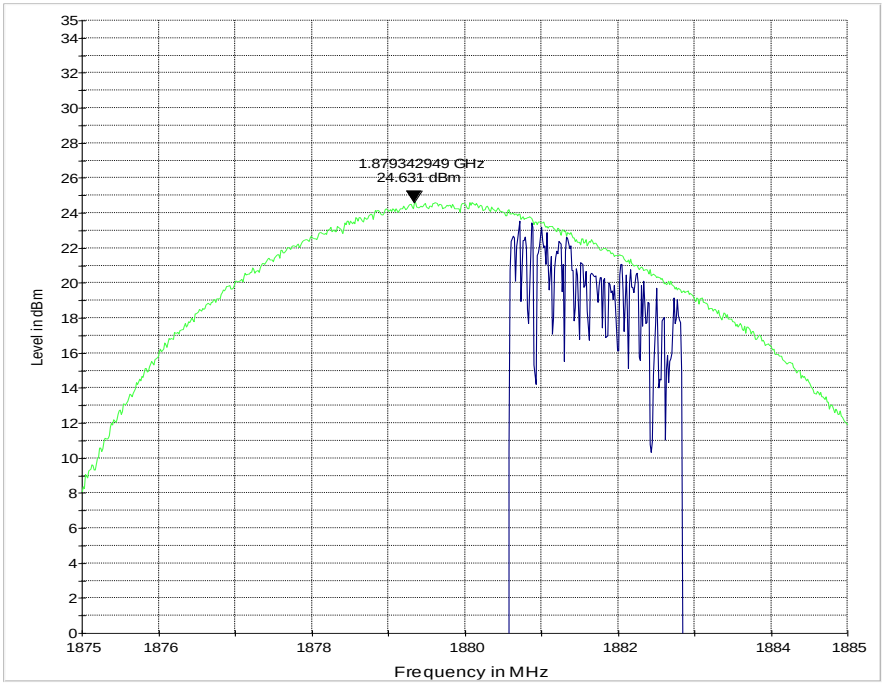
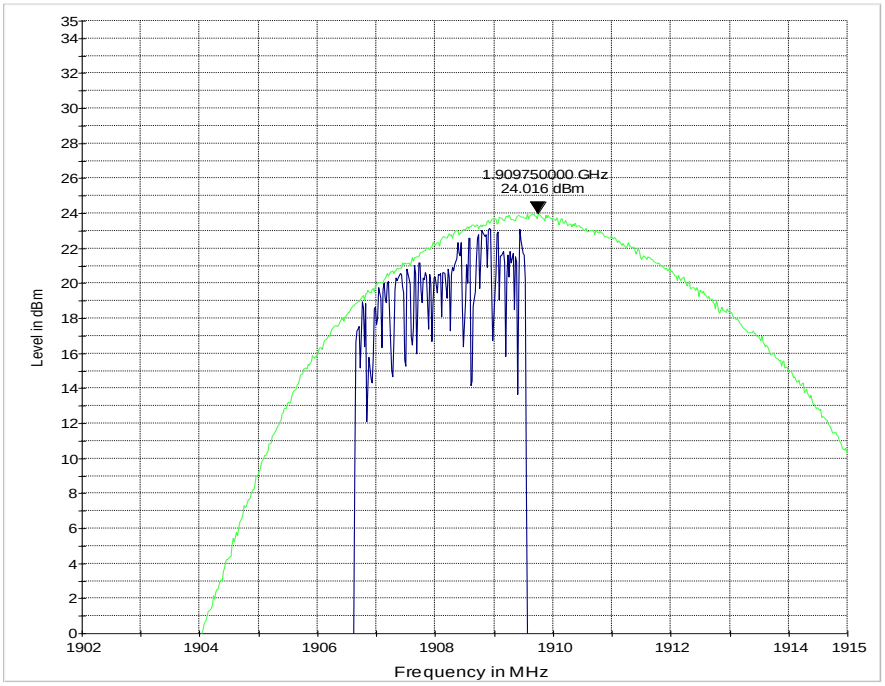


EIRP (EGPRS 1900) CHANNEL 810



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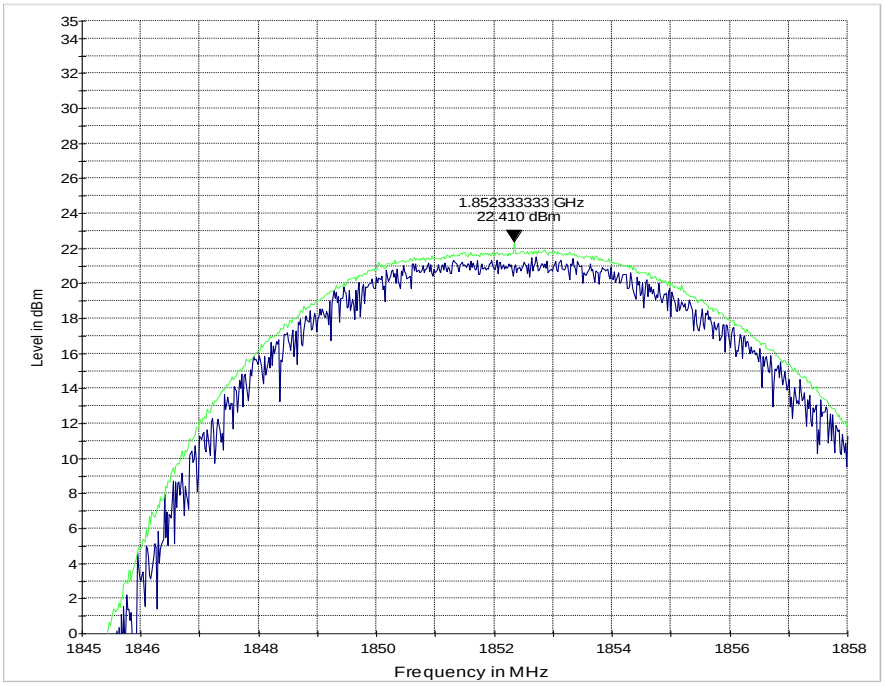

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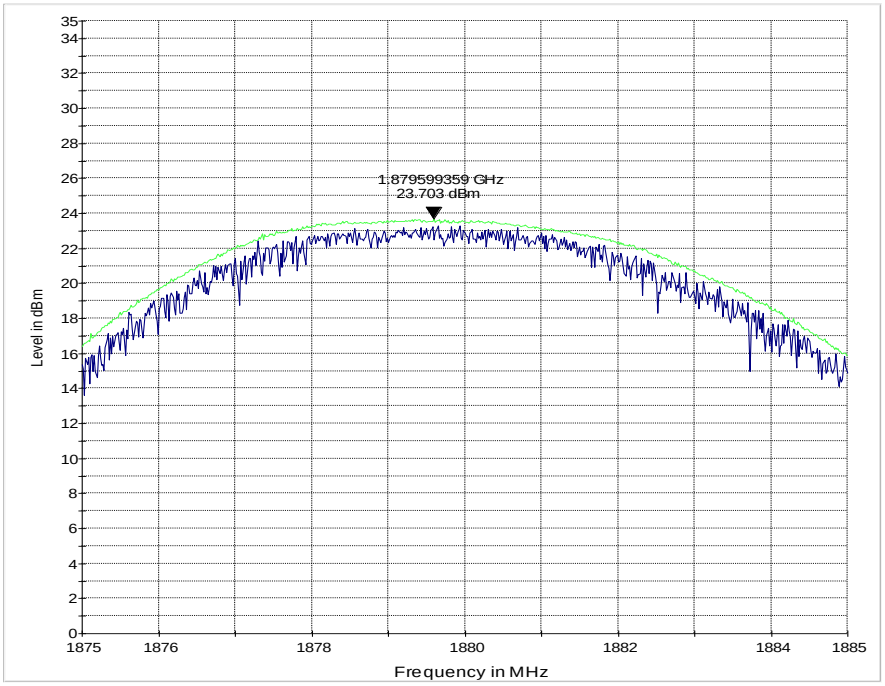

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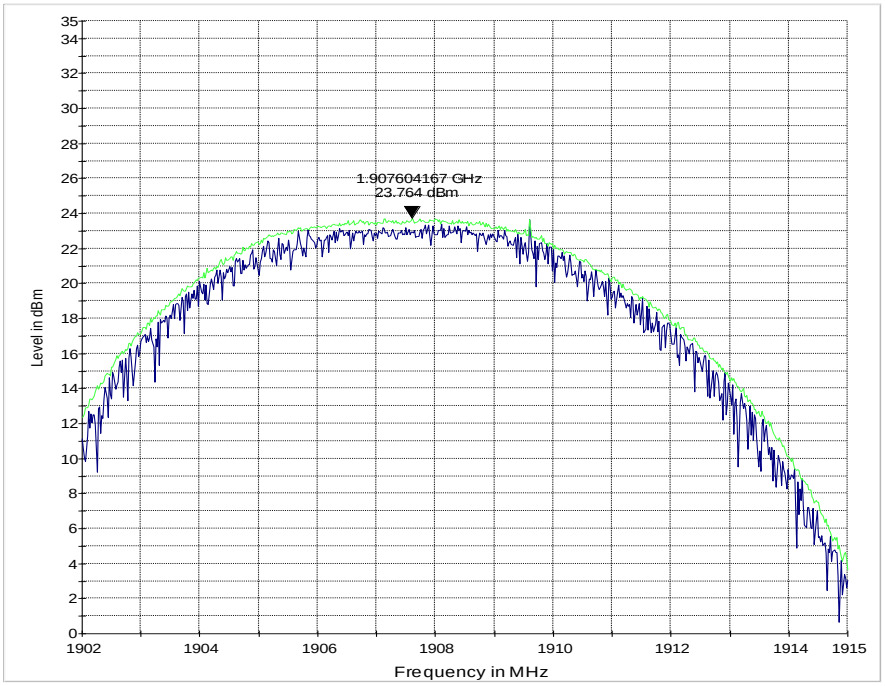


6.2 Occupied Bandwidth/Emission Bandwidth

6.2.1 References

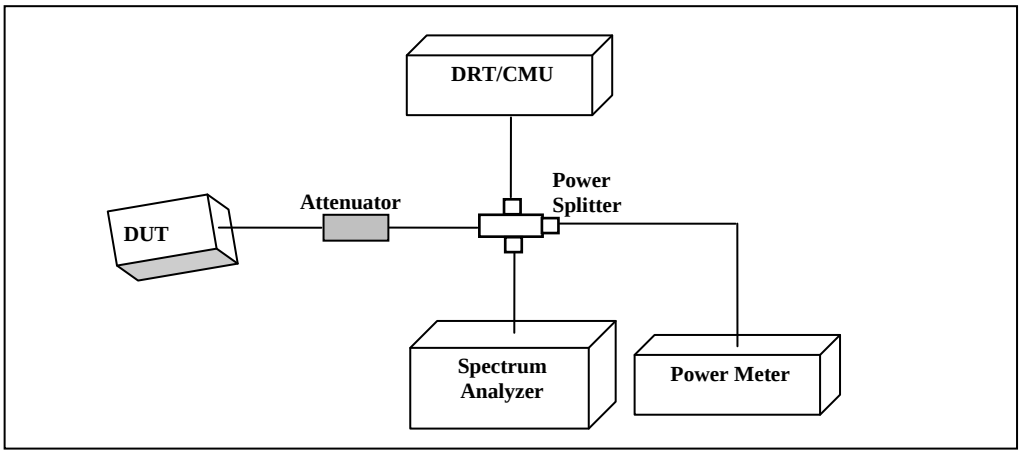
FCC: CFR Part 2.1049, CFR Part 22.917, CFR Part 24.238

6.2.2 Measurement requirements:

6.2.2.1 FCC 2.1049: Occupied bandwidth

The occupied bandwidth, 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.
(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.

6.2.3 Occupied / Emission bandwidth measurement procedure



1. Connect the equipment as shown in the above diagram.
2. Adjust the settings of the Digital Radio Communication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to measure the 99% (-20 dB) occupied bandwidth.
4. Set the spectrum analyzer to measure the -26 dB emission bandwidth.
5. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.

Spectrum analyzer settings:
Measurement bandwidth of atleast 1% of the occupied bandwidth.
GSM: RBW=3 kHz; VBW=10 kHz; Span=1 MHz; Detector: Peak- Max Hold.
UMTS: RBW=50 kHz VBW=200 kHz; Span=10 MHz; Detector: Peak- Max Hold.
Measurement Uncertainty: ±10 kHz

6.2.4 Test Conditions:

Tnom: 20°C; Vnom: 3.7 V

6.2.5 Test Results

6.2.5.1 Occupied/Emission Bandwidth- 850 MHz band

GSM 850: GMSK Mode		
Frequency (MHz)	**99% Occupied Bandwidth (kHz)**	**-26dBc Bandwidth (kHz)**
824.2	240.38	314.1
836.6	243.59	315.7
848.8	245.19	315.7

EGPRS 850: 8PSK Mode		
Frequency (MHz)	**99% Occupied Bandwidth (kHz)**	**-26dBc Bandwidth (kHz)**
824.2	243.59	317.3
836.6	243.59	312.5
848.8	245.19	314.1

FDD V: UMTS Mode		
Frequency (MHz)	**99% Occupied Bandwidth (MHz)**	**-26dBc Bandwidth (MHz)**
826.4	4.0	4.64
836.6	4.1	4.66
846.6	4.1	4.63

Occupied/Emission Bandwidth- 1900 MHz band

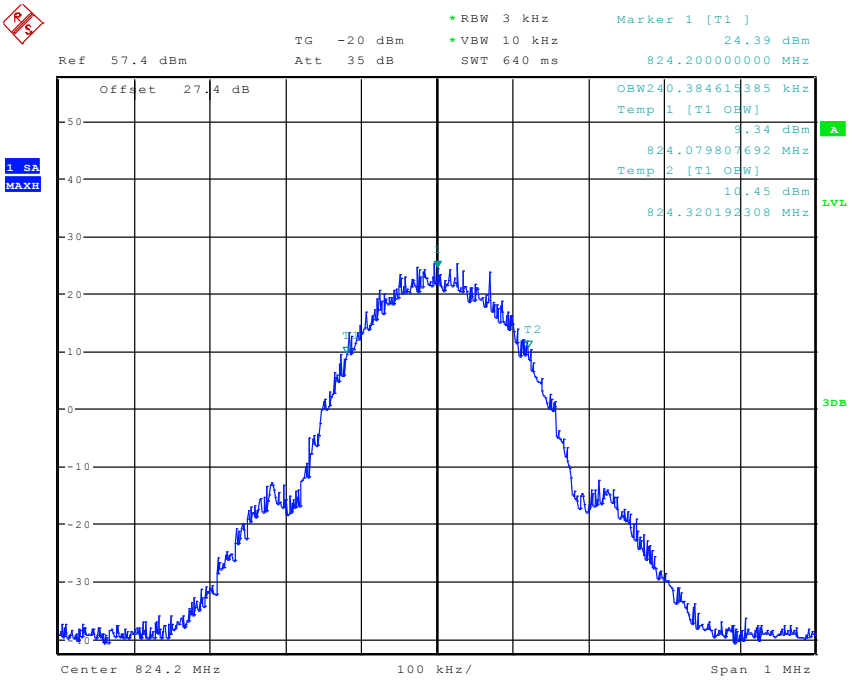
GSM 1900: GMSK Mode		
Frequency (MHz)	**99% Occupied Bandwidth (kHz)**	**-26dBc Bandwidth (kHz)**
1850.2	251.60	315.7
1880.0	243.59	317.3
1909.8	245.19	317.3

EGPRS 1900: 8PSK Mode		
Frequency (MHz)	**99% Occupied Bandwidth (kHz)**	**-26dBc Bandwidth (kHz)**
1850.2	241.99	312.5
1880.0	241.99	320.5
1909.8	245.19	315.7

FDD II: UMTS Mode		
Frequency (MHz)	**99% Occupied Bandwidth (MHz)**	**-26dBc Bandwidth (MHz)**
1852.4	4.07	4.62
1880.0	4.07	4.62
1907.6	4.07	4.60

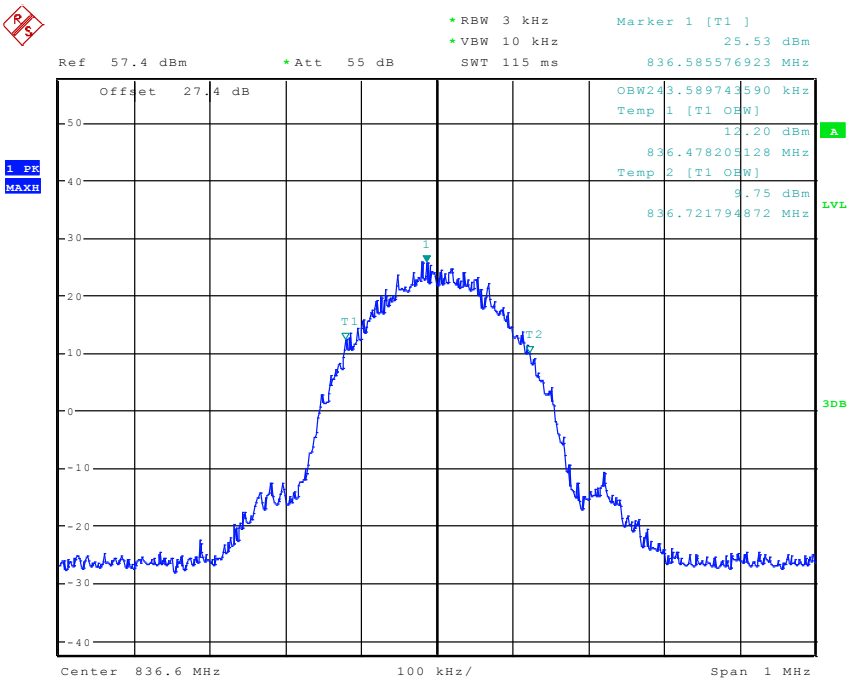
6.2.5.2 Plots:

Occupied band Width GSM850 MHz Channel 128 GSM



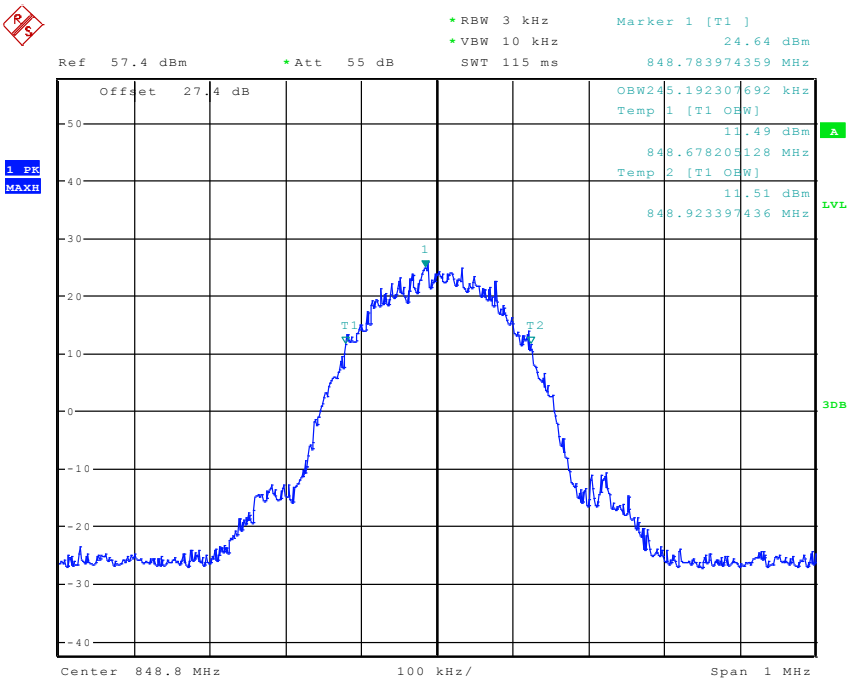
Date: 17.NOV.2012 09:22:49

Occupied band Width GSM850 MHz Channel 190 GSM



Date: 26.NOV.2012 13:30:54

Occupied band Width GSM850 MHz Channel 251 GSM



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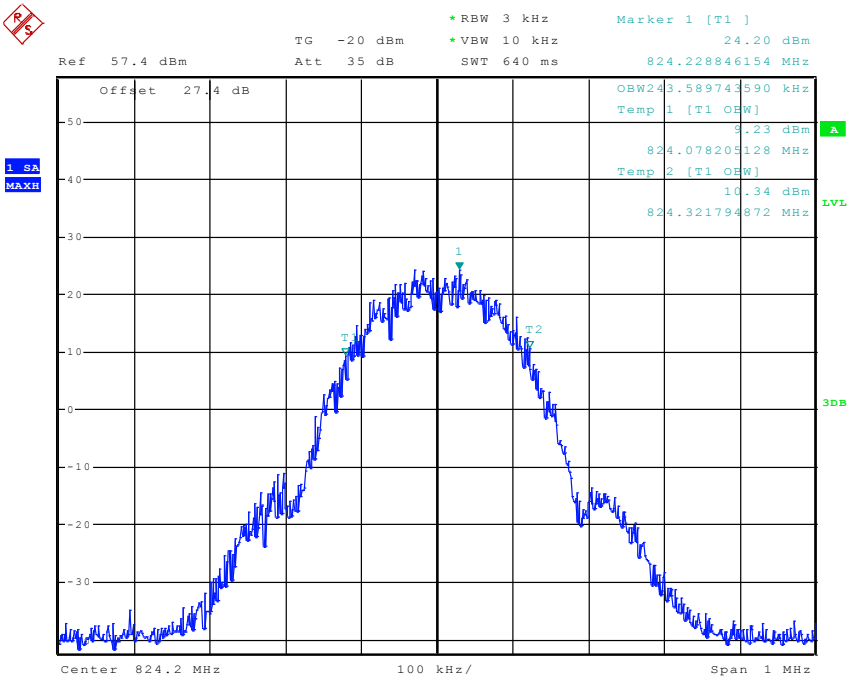
Occupied band Width GSM850 MHz Channel 128 EGPRS



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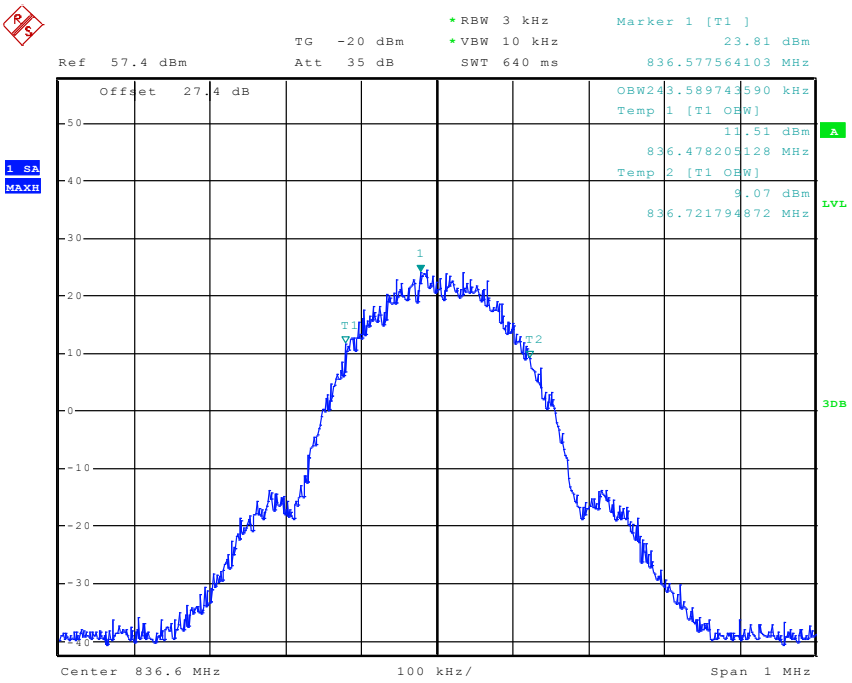

Date: 17.NOV.2012 09:33:00

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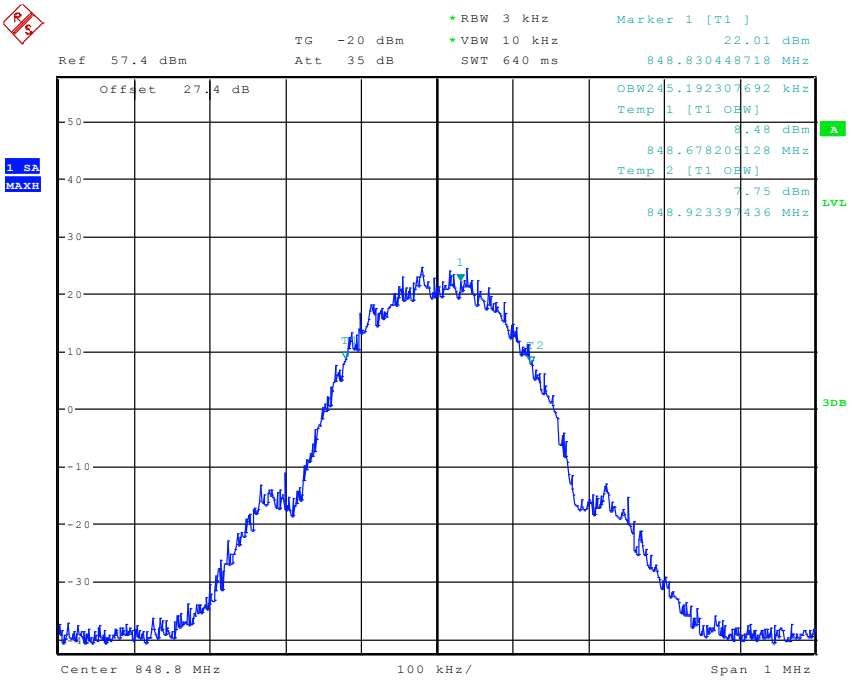
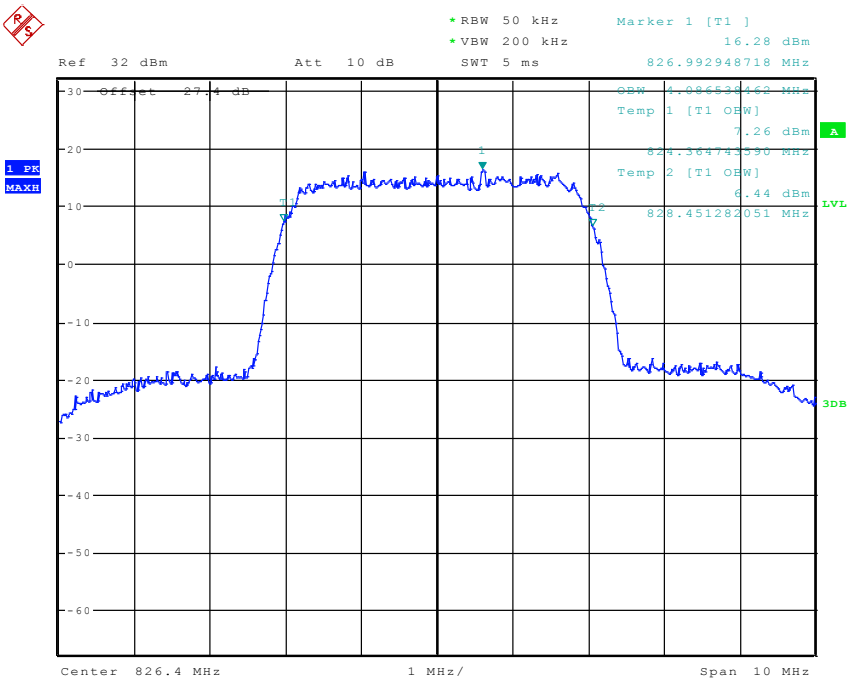


Date: 17.NOV.2012 09:28:22

Occupied band Width UMTS FDD5 Channel 4132



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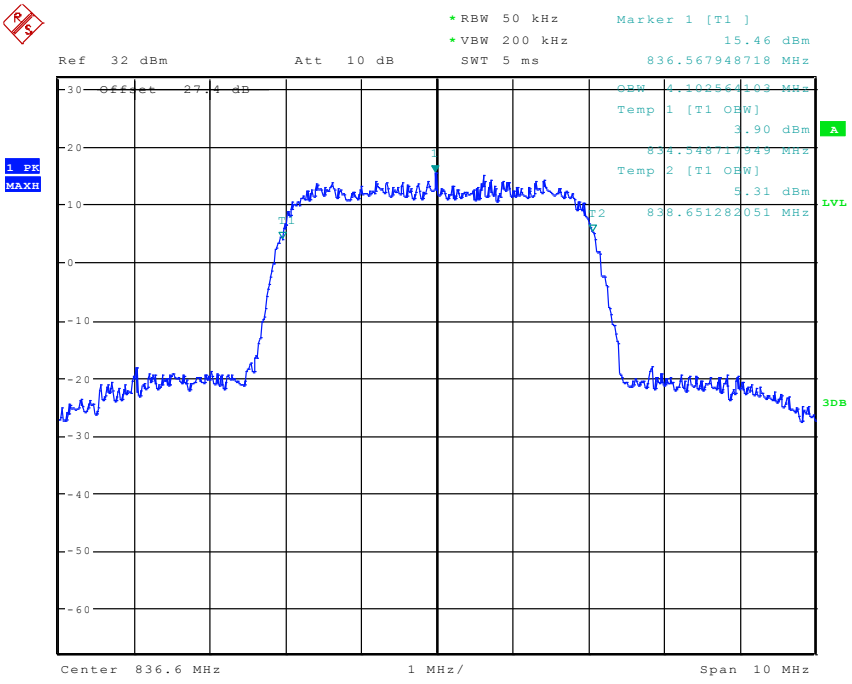

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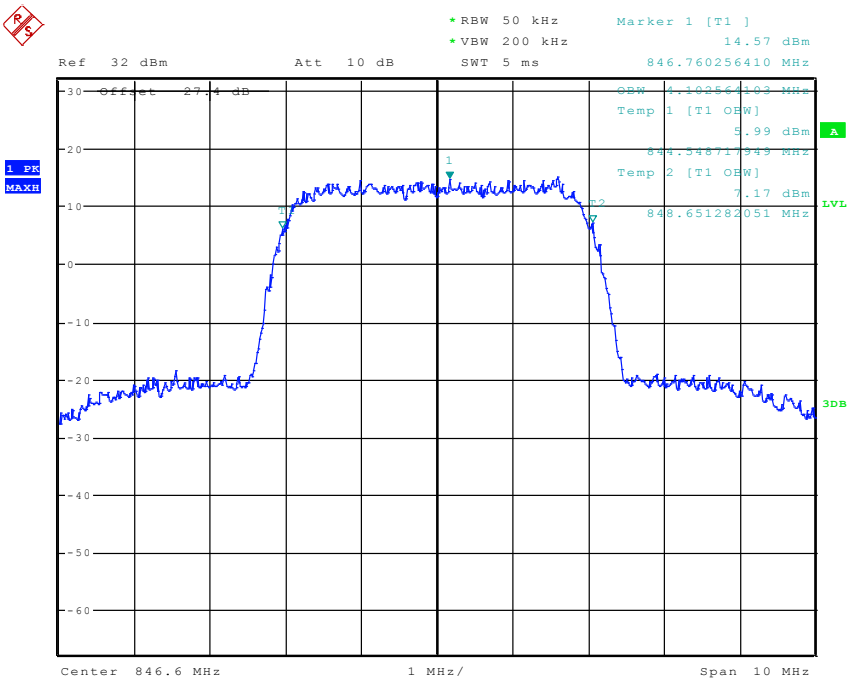

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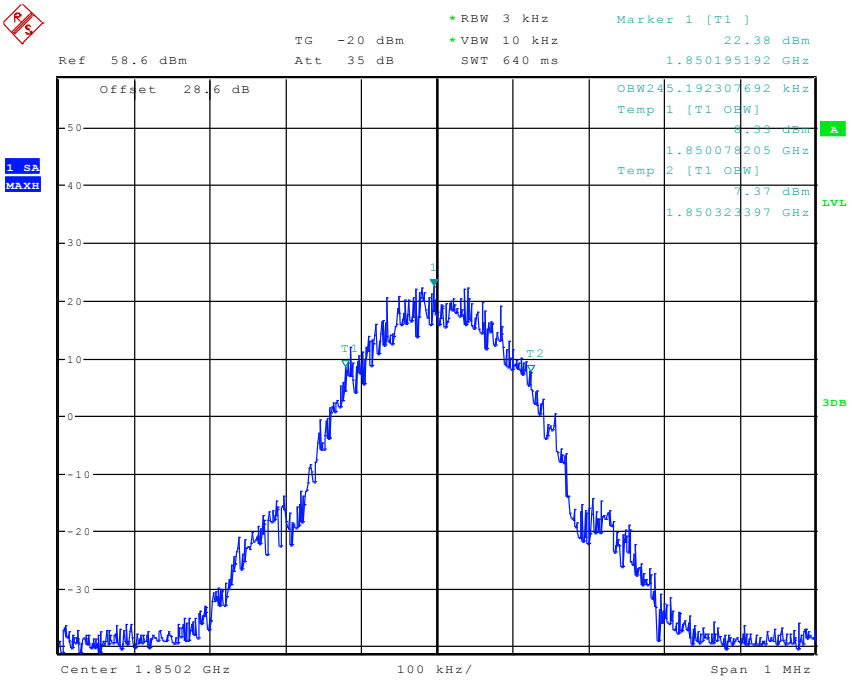
Occupied band Width PCS1900 MHz Channel 512 GSM



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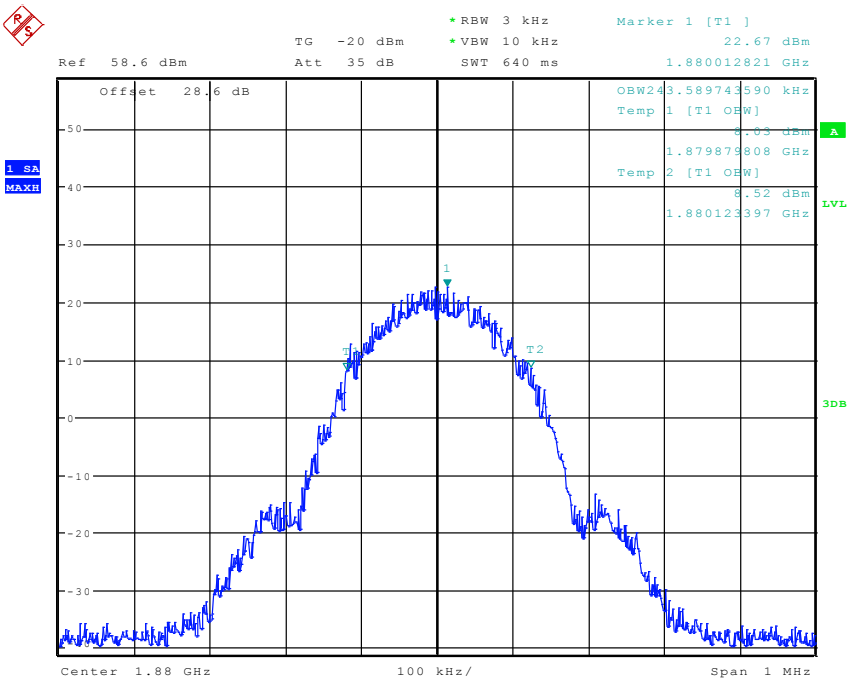
Occupied band Width PCS1900 MHz Channel 661 GSM



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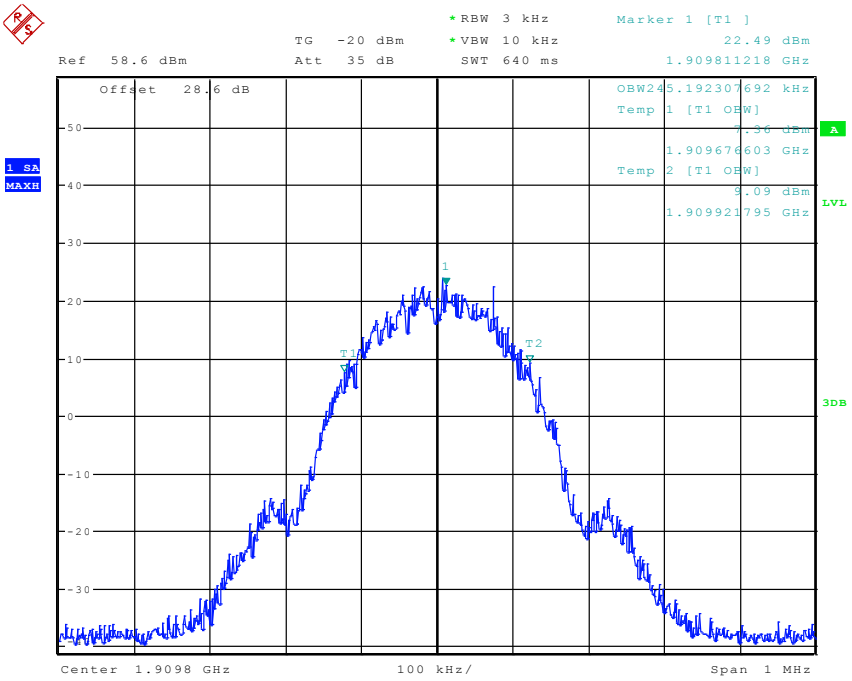

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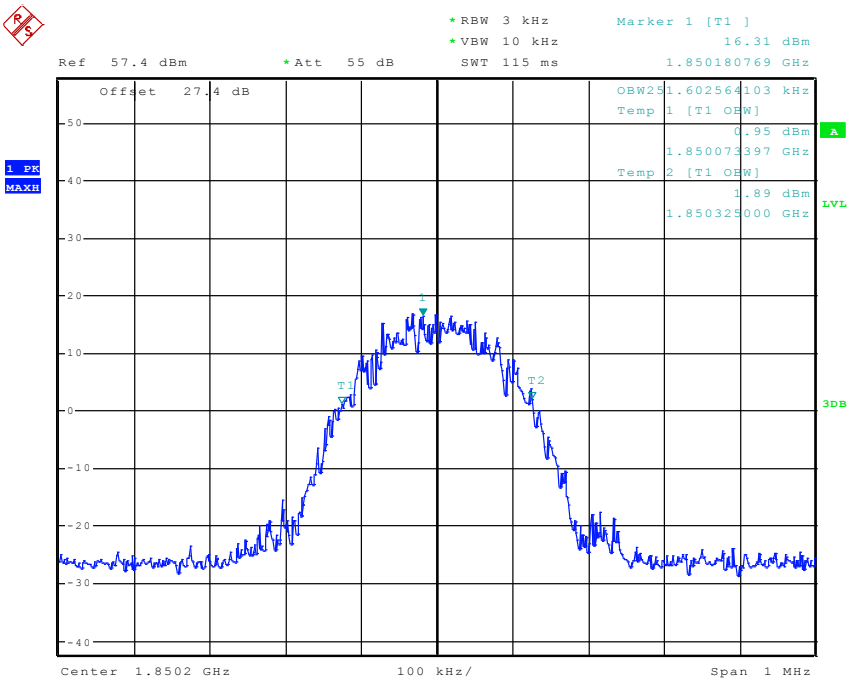

Date: 26.NOV.2012 14:01:47

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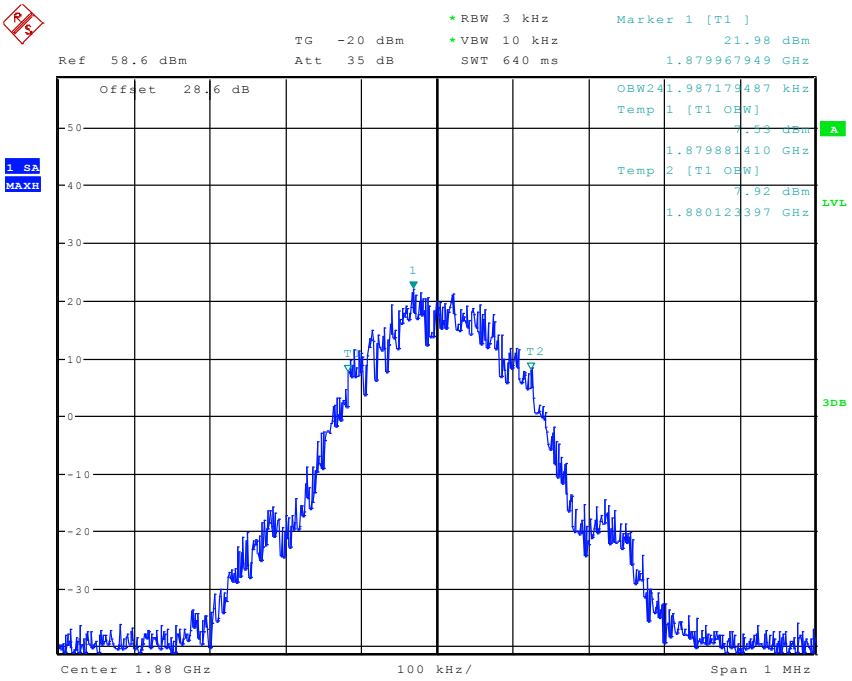

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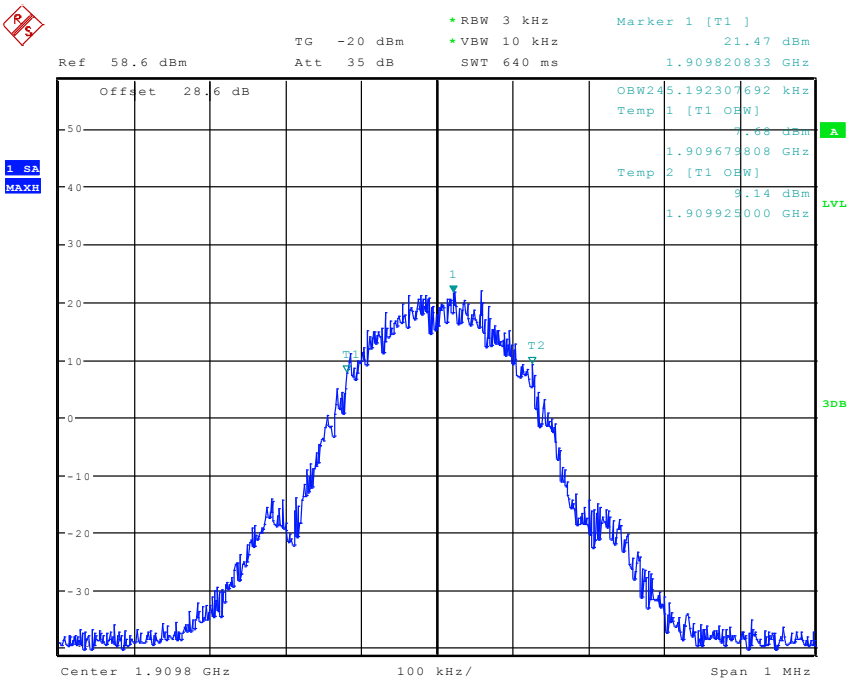
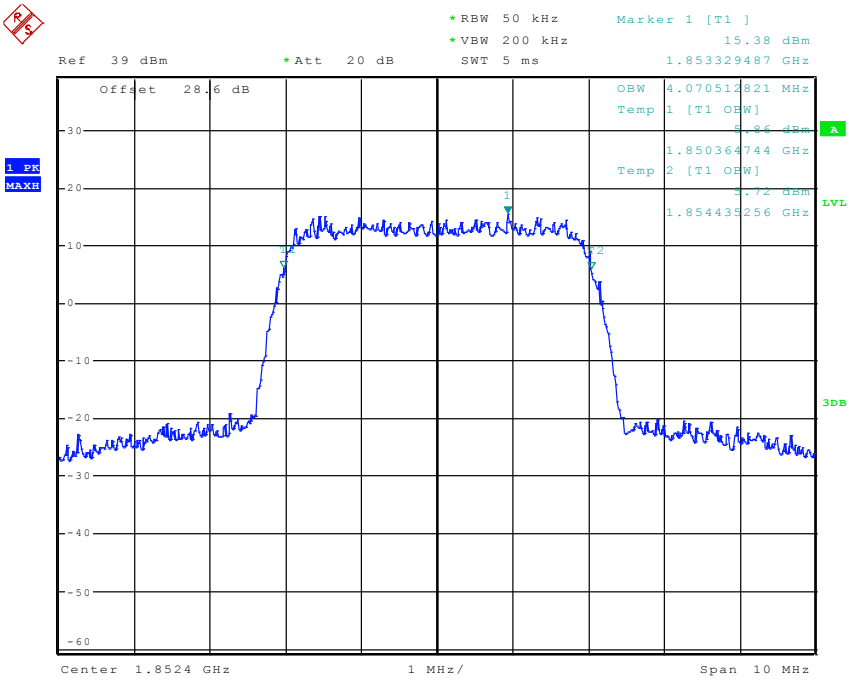


Date: 17.NOV.2012 10:03:21

Occupied band Width UMTS FDD2 Channel 9262



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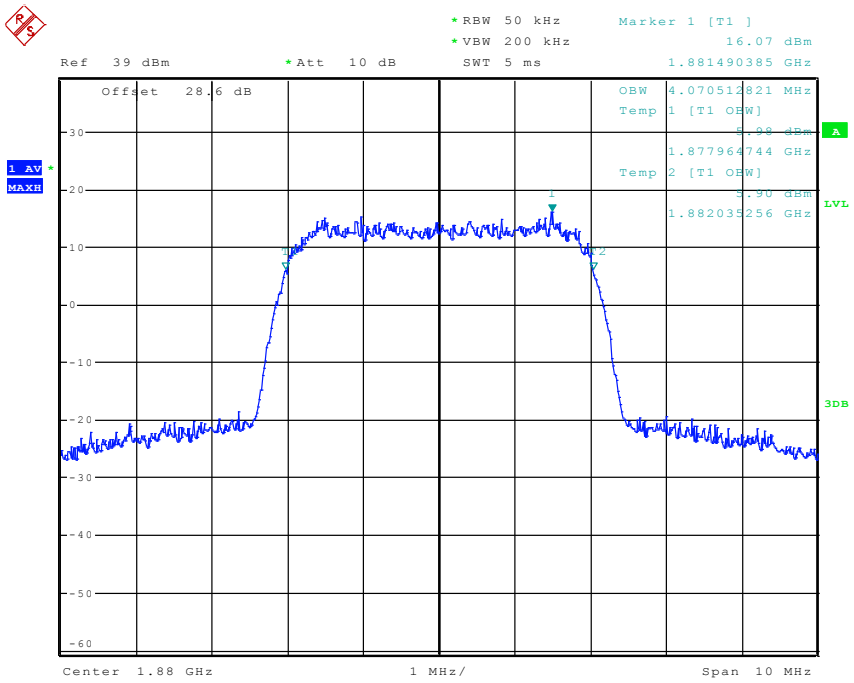

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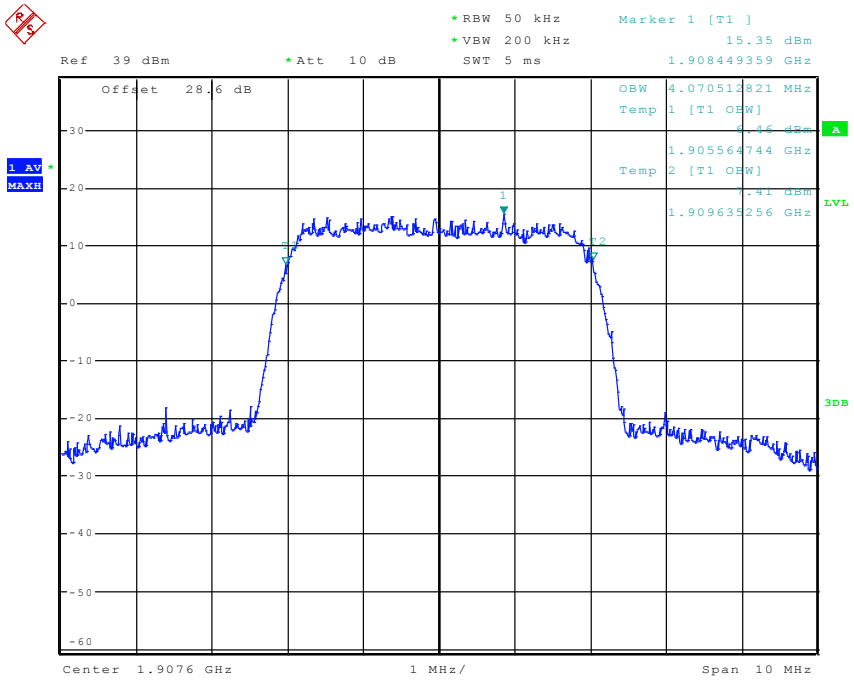

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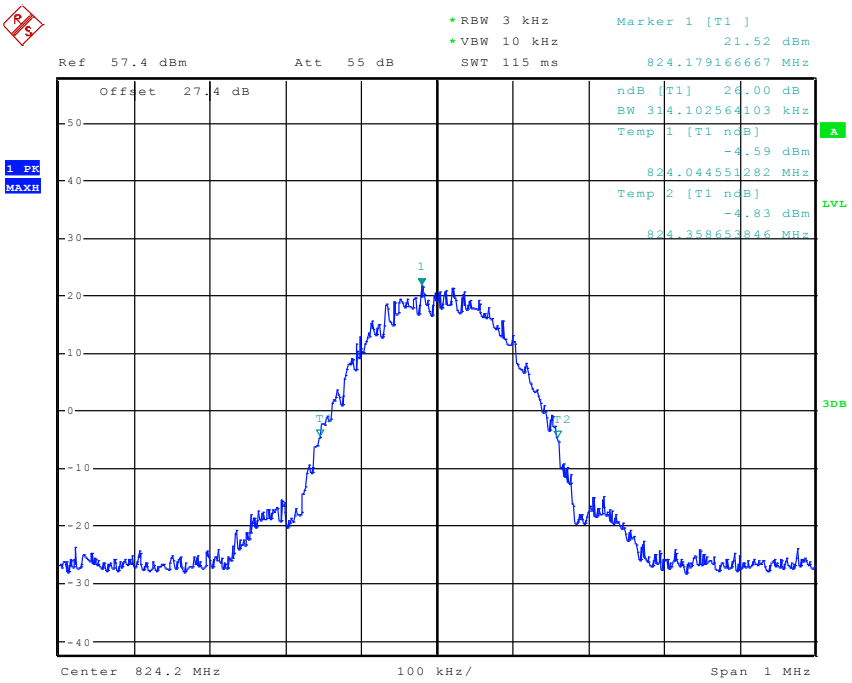
Emission band Width GSM850 MHz Channel 128 GSM



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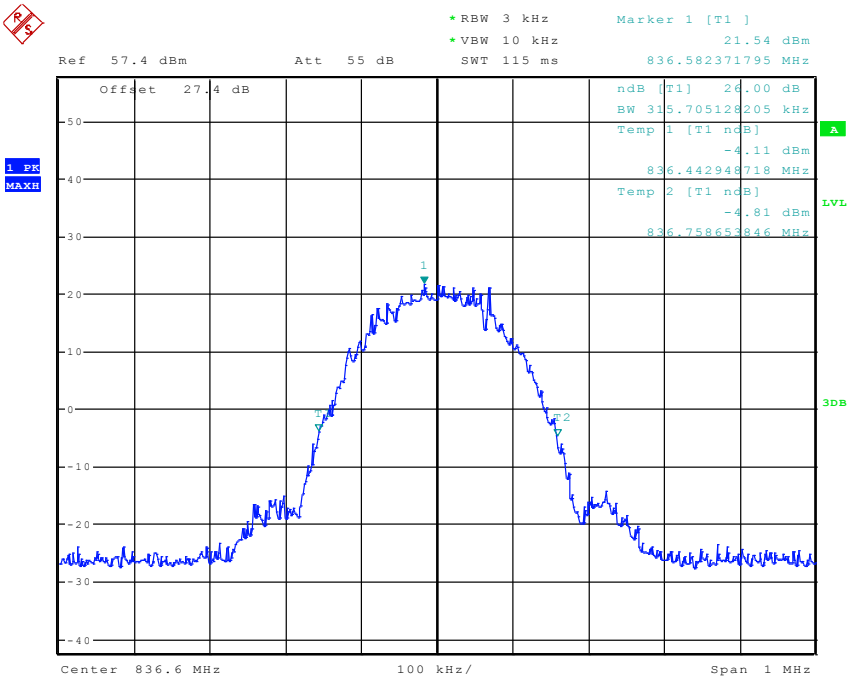
Emission band Width GSM850 MHz Channel 190 GSM



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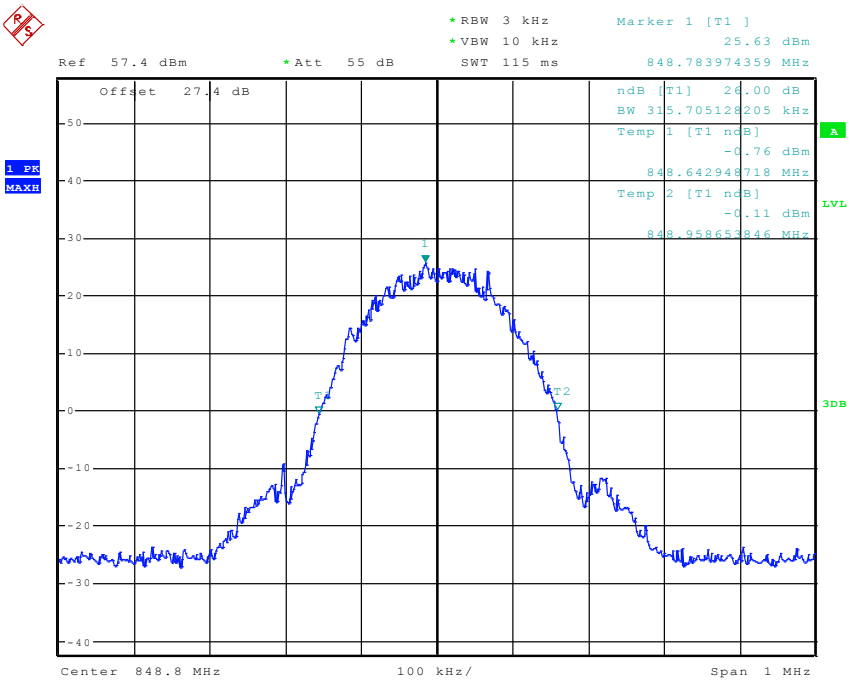

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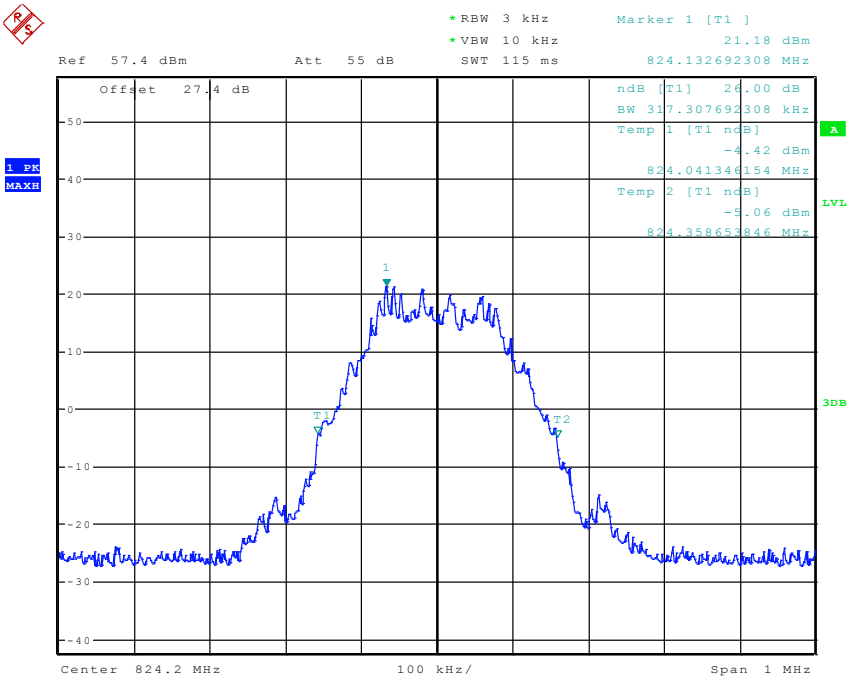

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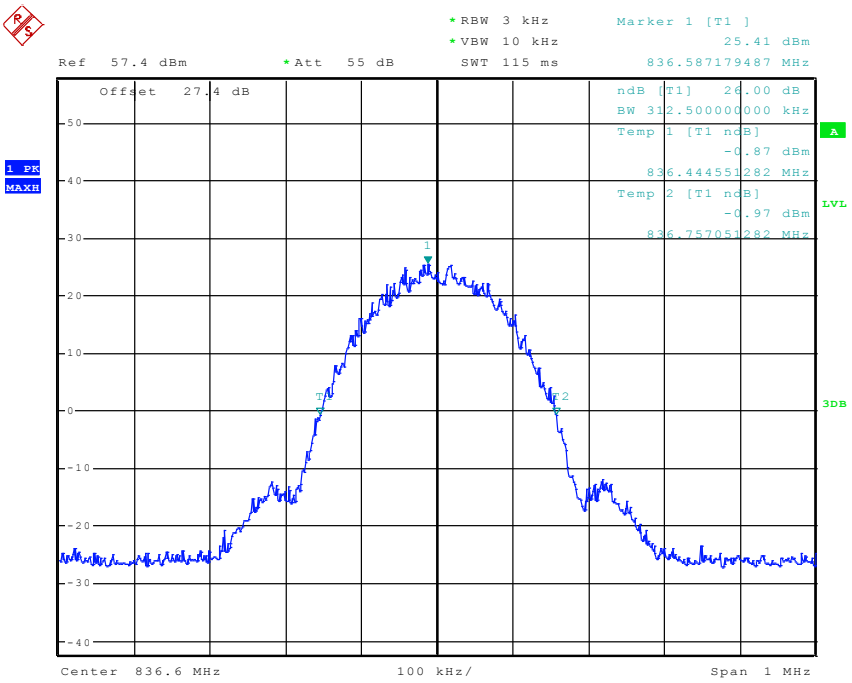

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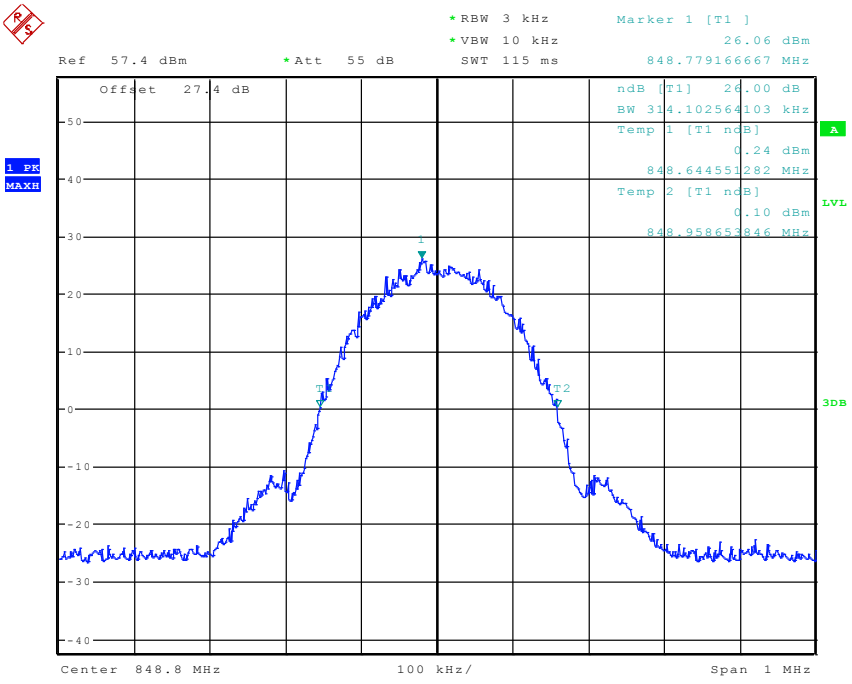

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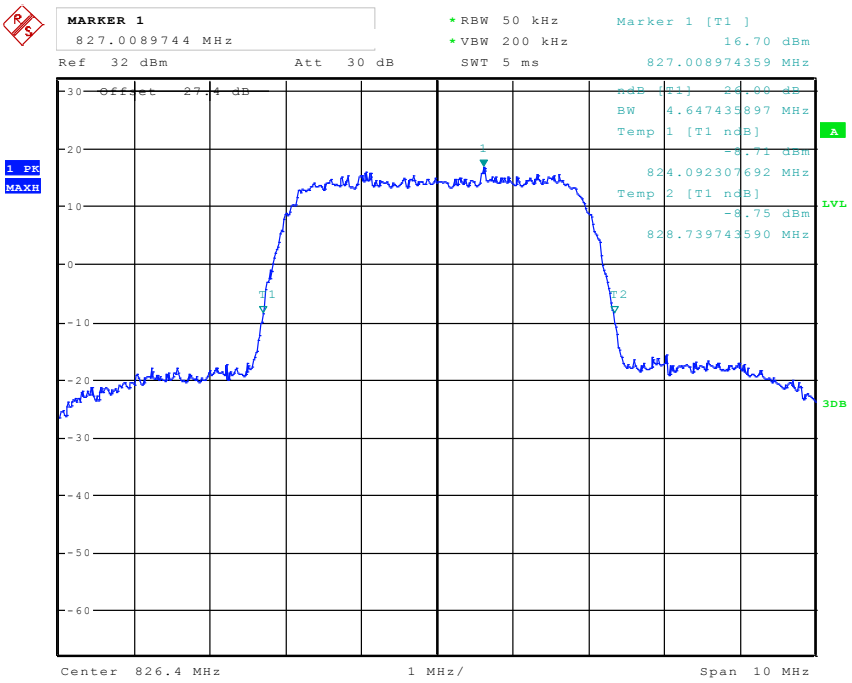
Emission band Width UMTS FDD5 Channel 4132



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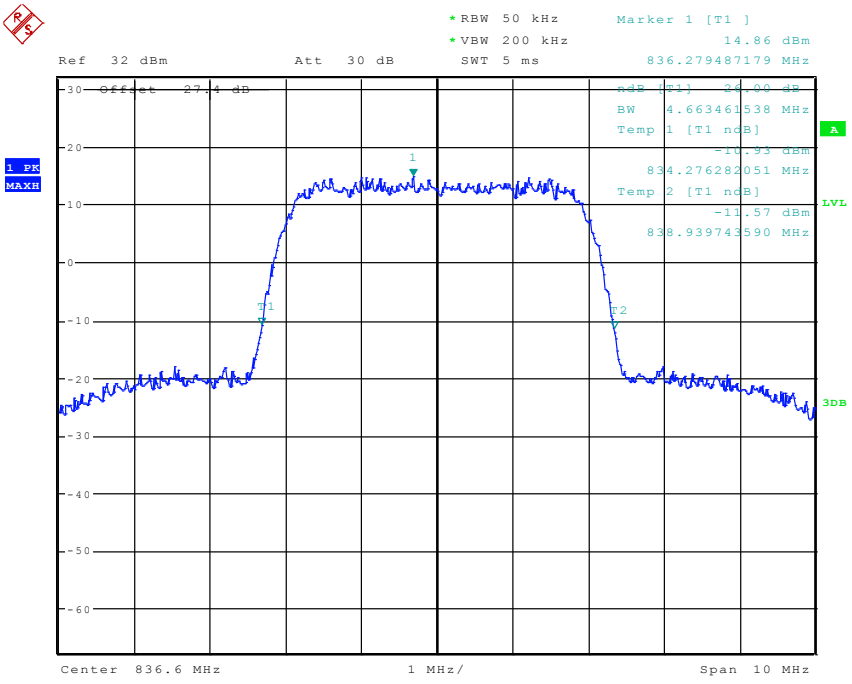

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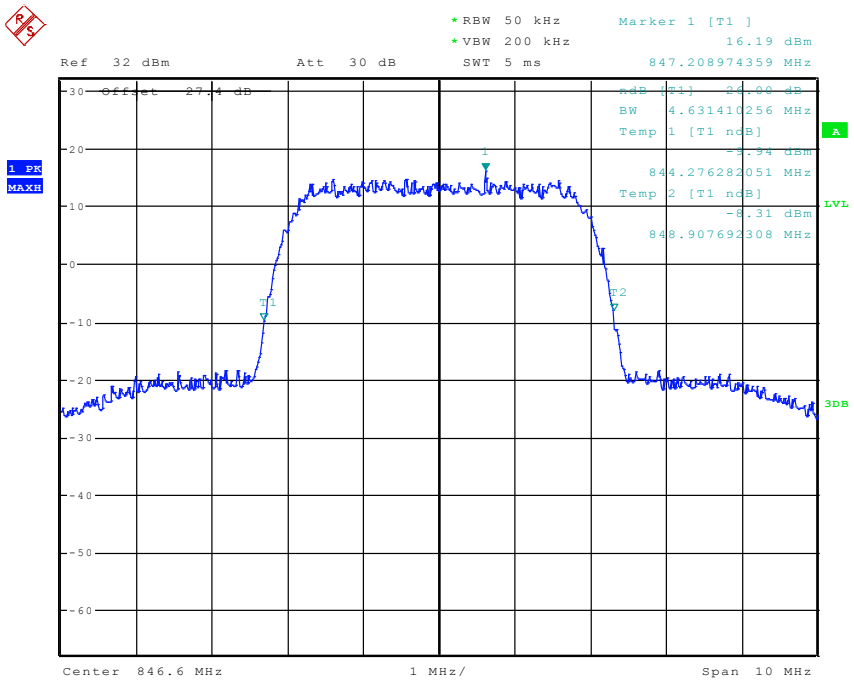

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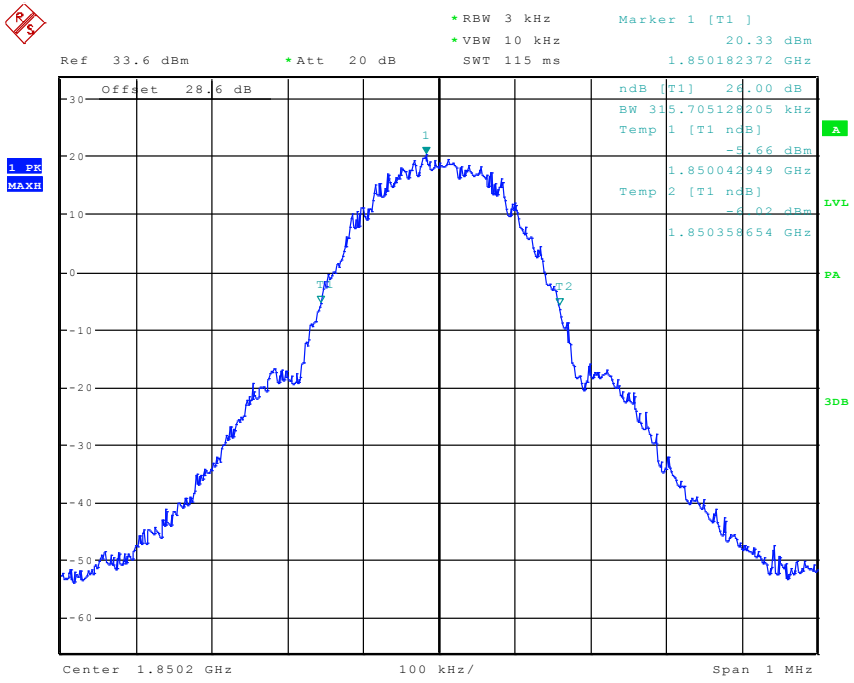
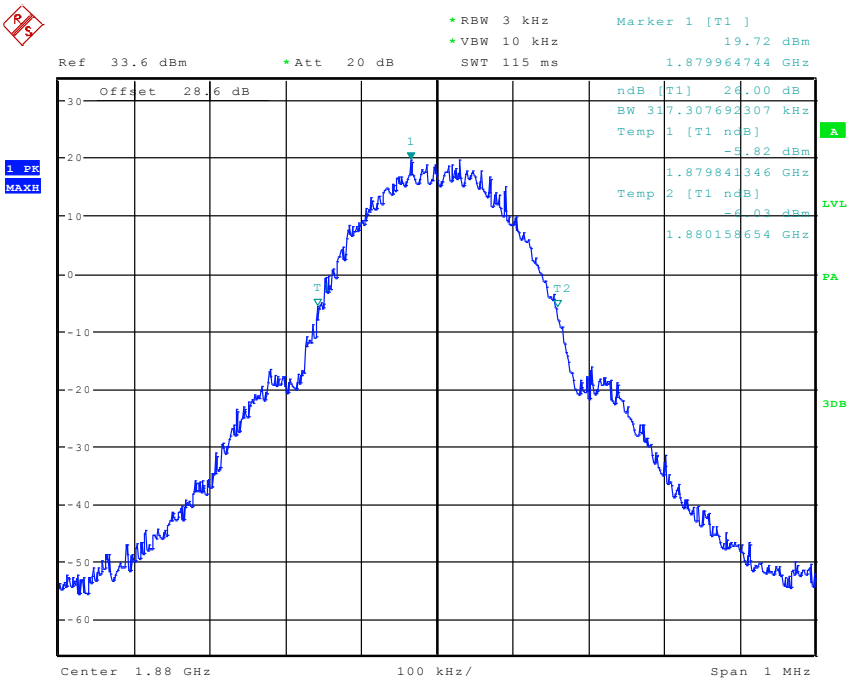
Emission band Width PCS1900 MHz Channel 512 GSM



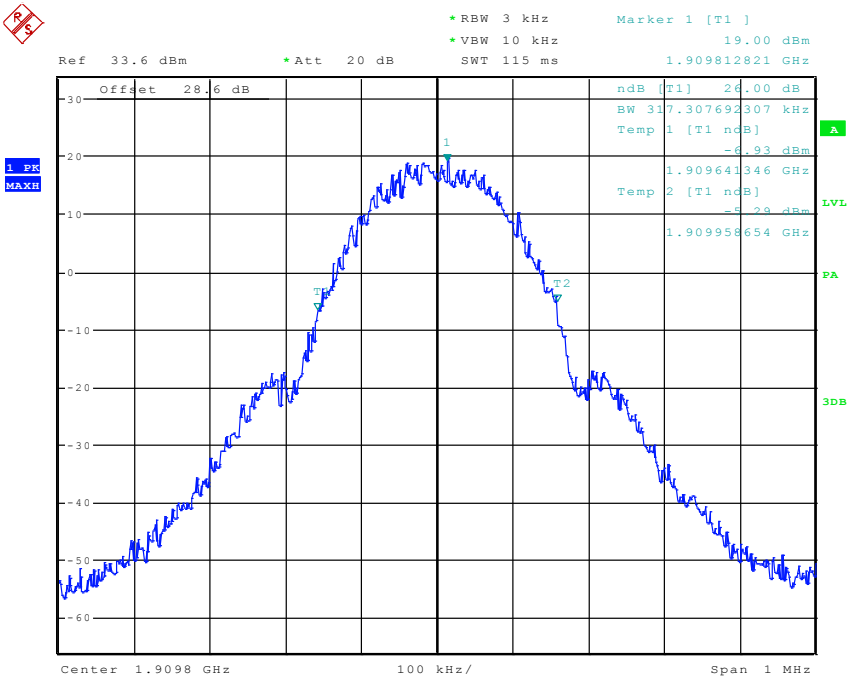
Date: 8.NOV.2012 14:02:52

Emission band Width PCS1900 MHz Channel 661 GSM



Date: 8.NOV.2012 14:03:47

Emission band Width PCS1900 MHz Channel 810 GSM



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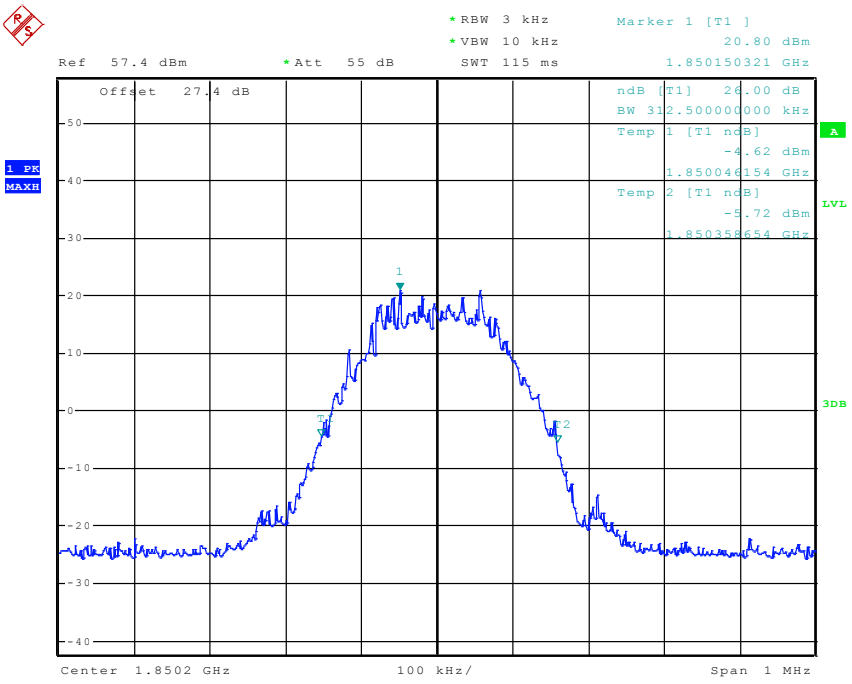

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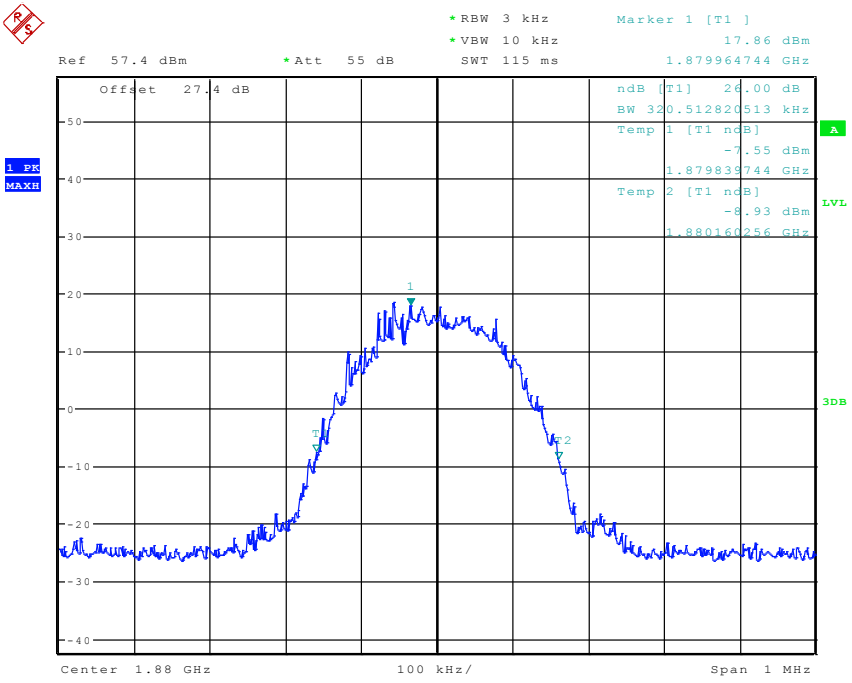

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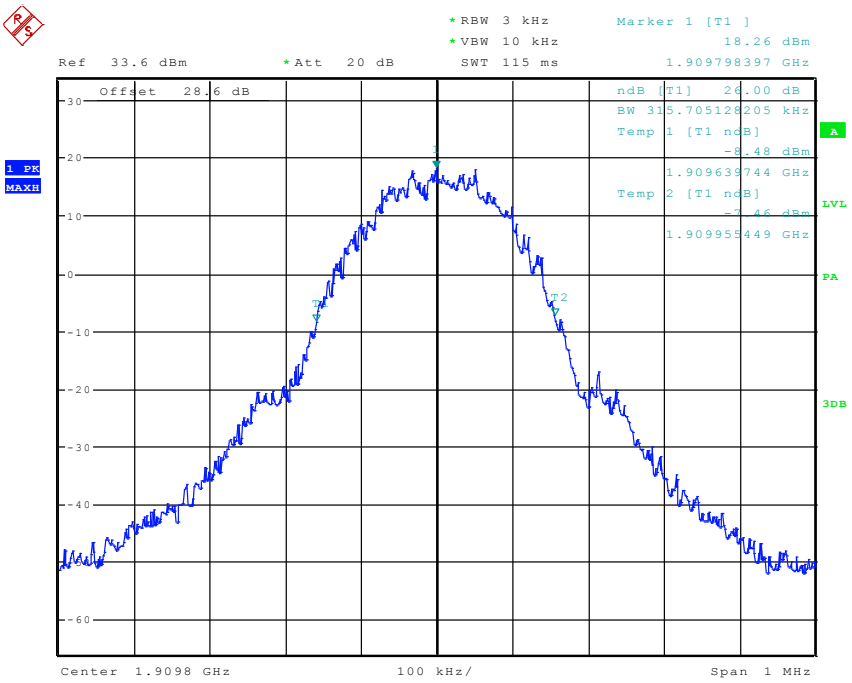

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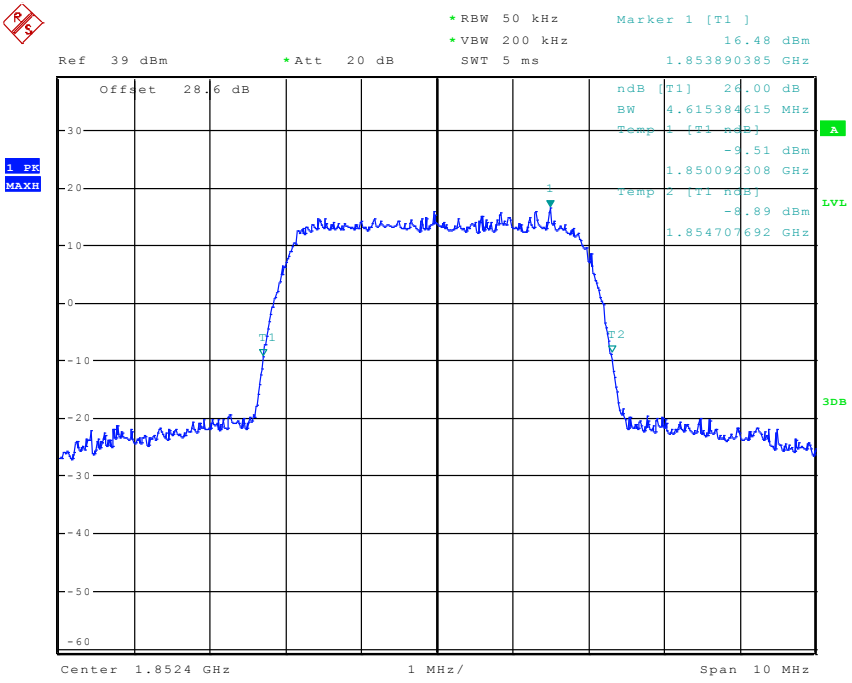
Emission band Width UMTS FDD2 Channel 9262



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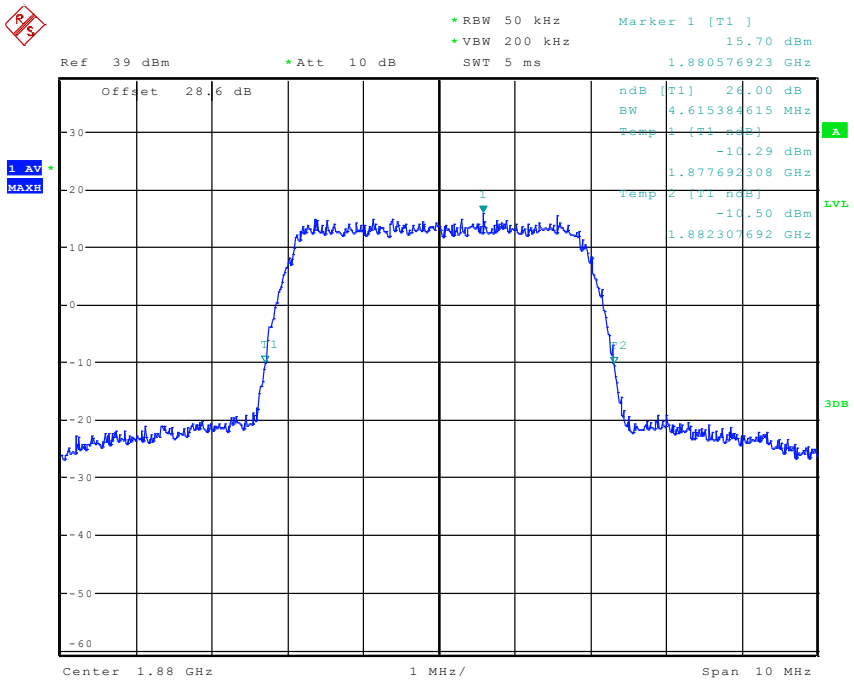

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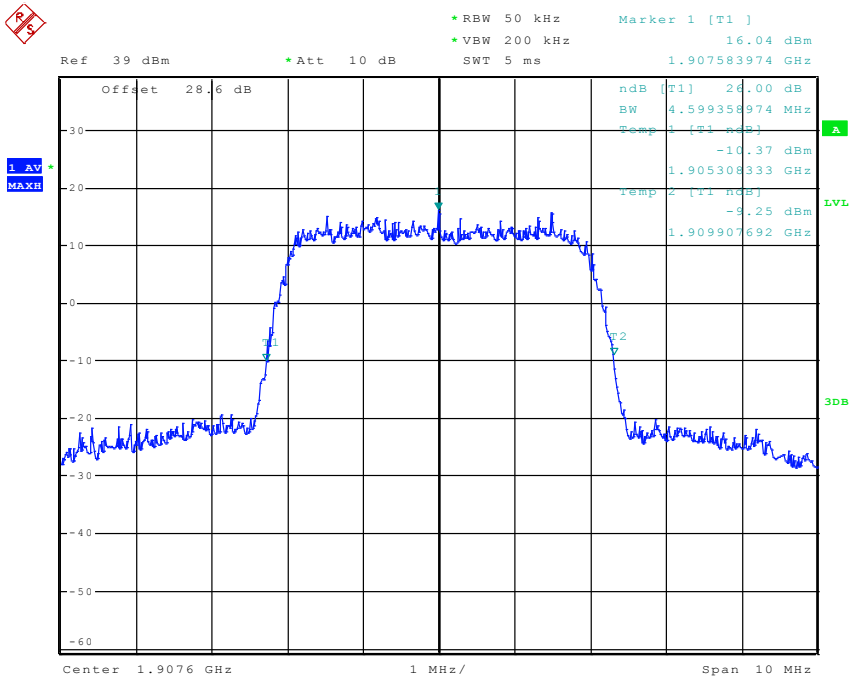
Emission band Width UMTS FDD2 Channel 9538



Date: 13.NOV.2012 22:11:05

6.3 Frequency Stability

6.3.1 References

FCC: CFR Part 2.1055, CFR Part 22.355, CFR Part 24.235

6.3.2 Measurement requirements:

6.3.2.1 Frequency Stability

Frequency stability is a measure of frequency drift due to temperature and supply voltage variations with reference to the frequency measured at an appropriate reference temperature and the rated supply voltage.
A hand-held device that is only capable of operating using internal batteries shall be tested using a new battery without any further requirement to vary the supply voltage. Alternatively, an external supply voltage can be used and set at the battery nominal voltage, and again at the battery operating end point voltage which shall be specified by the equipment manufacturer.

6.3.3 Limits

6.3.3.1 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. 24.235/22.355 Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.
As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d) (2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.5VDC and 4.2VDC, with a nominal voltage of 3.7VDC. 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 –5.4% and +13.5%. For the purposes of measuring frequency stability these voltage limits are to be used.

6.3.3.2 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. 24.235/22.355 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.

6.3.4 Frequency Stability measurement procedure:

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 CMU 200 Universal Radio Communication Tester.
1. Measure the carrier frequency at room temperature.
2. Subject the EUT to soak at -30 C.
3. With the EUT, powered via nominal voltage, connected to the CMU 200 and in a simulated call on mid channel (190 for GSM 850 & 4183 for FDD5 & 661 for PCS1900 & 9400 for FDD2), 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, un-powered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Re-measure carrier frequency at low and high voltage. Pause at nominal voltage for 1 1/2 hours un-powered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to soak at +50 C.
7. With the EUT, powered via nominal voltage, connected to the CMU 200 and in a simulated call on mid channel (190 for GSM 850 & 4183 for FDD5 & 661 for PCS1900 & 9400 for FDD2), 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, un-powered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5 C during the measurement procedure.

6.3.5 Test Verdict:

Pass.

6.3.6 Test Results:

Test Results Frequency Stability (GSM-850): Channel 190 (836.6 MHz)

Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)
Low V: 3.5	10	0.011953
Nominal V:3.7	9	0.010757
High V: 4.2	11	0.013148

§2.1055 (a)(1) AFC FREQ ERROR vs. TEMPERATURE

Temperature (^{o}C)	Frequency Error (Hz)	Frequency Error (ppm)
-30	24	0.028687
-20	21	0.025101
-10	11	0.013148
0	16	0.019125
+10	11	0.013148
+20	9	0.010757
+30	15	0.017929
+40	14	0.016734
+50	14	0.016734

§2.1055 (b)(2) Battery end point

Battery End Point (V DC)	Frequency Error (Hz)	Frequency Error (ppm)
3.2	9	0.010757

Test Results Frequency Stability (GSM-1900): Channel 661 (1880.0 MHz)

Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)
Low V:3.5	15	0.007978
Nominal V:3.7	13	0.006914
High V: 4.2	11	0.005851

§2.1055 (a)(1) AFC FREQ ERROR vs. TEMPERATURE

Temperature (^{o}C)	Frequency Error (Hz)	Frequency Error (ppm)
-30	27	0.014361
-20	21	0.011170
-10	13	0.006914
0	18	0.009574
+10	18	0.009574
+20	13	0.006914
+30	23	0.012234
+40	21	0.011170
+50	15	0.007978

§2.1055 (b)(2) Battery end point

Battery End Point (V DC)	Frequency Error (Hz)	Frequency Error (ppm)
3.2	10	0.005319

Test Results Frequency Stability (FDD V): Channel 4183 (836.6 MHz)

Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)
Low V: 3.5	10	0.011953
Nominal V:3.7	9	0.010759
High V:4.2	11	0.013148

§2.1055 (a)(1) AFC FREQ ERROR vs. TEMPERATURE

Temperature (^{o}C)	Frequency Error (Hz)	Frequency Error (ppm)
-30	17	0.020320
-20	11	0.013148
-10	10	0.011953
0	14	0.016734
+10	8	0.009562
+20	10	0.011953
+30	9	0.010757
+40	13	0.015539
+50	11	0.013148

§2.1055 (b)(2) Battery end point

Battery End Point (V DC)	Frequency Error (Hz)	Frequency Error (ppm)
3.2	10	0.011953

Test Results Frequency Stability (FDD II): Channel 9400 (1880.0 MHz)

Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)
Low V: 3.5	18	0.009574
Nominal V:3.7	19	0.010106
High V: 4.2	18	0.009574

§2.1055 (a)(1) AFC FREQ ERROR vs. TEMPERATURE

Temperature (^{o}C)	Frequency Error (Hz)	Frequency Error (ppm)
-30	24	0.012765
-20	21	0.011170
-10	28	0.014893
0	15	0.007978
+10	19	0.010106
+20	19	0.010106
+30	17	0.009042
+40	11	0.005851
+50	15	0.007978

§2.1055 (b)(2) Battery end point

Battery End Point (V DC)	Frequency Error (Hz)	Frequency Error (ppm)
3.2	18	0.009574

6.4 Conducted Spurious Emissions

6.4.1 References

FCC: CFR Part 2.1051, CFR Part 22.917, CFR Part 24.238

6.4.2 Measurement requirements:

6.4.2.1 FCC 2.1051: Spurious emissions at antenna terminals.

The radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in FCC 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

6.4.3 Limits

(a) *Out of band emissions*. 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.
For all power levels +30dBm to 0dBm, this becomes a constant specification of -13dBm.

6.4.3.1 FCC 22.917 Emission limitations for cellular equipment.

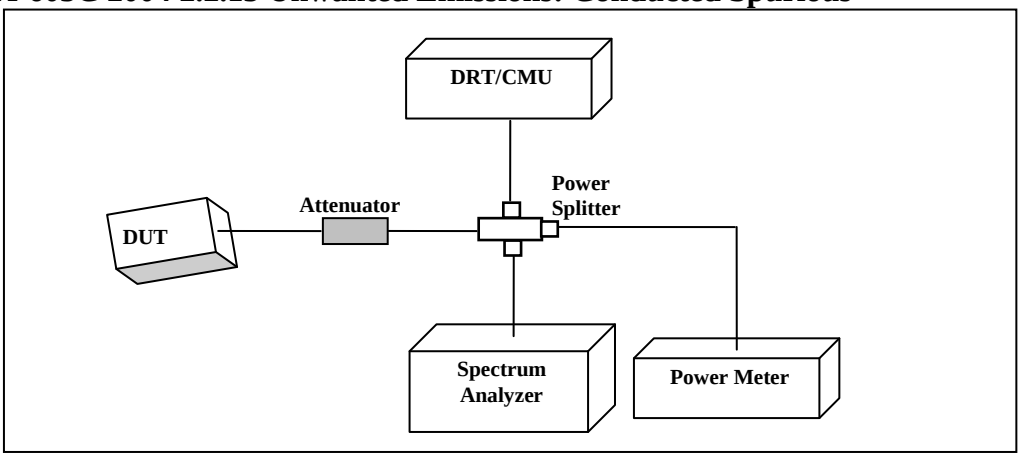
The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.
(b) *Measurement procedure.* Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

6.4.3.2 FCC 24.238 Emission limitations for Broadband PCS equipment.

The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.
(b) *Measurement procedure.* Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

6.4.4 Conducted Out of band Emissions measurement procedure

Ref: TIA-603C 2004 2.2.13 Unwanted Emissions: Conducted Spurious



1. Connect the equipment as shown in the above diagram.
2. Set the spectrum analyzer to measure peak hold with the required settings.
3. Set the signal generator to a known output power and record the path loss in dB (**LOSS)** for frequencies up to the tenth harmonic of the EUT's carrier frequency. \
   LOSS = Generator Output Power (dBm) – Analyzer reading (dBm).
4. Replace the signal generator with the EUT.
5. Adjust the settings of the Digital Radio Communication Tester (DRT) to set the EUT to its maximum power at the required channel.
6. Set the spectrum analyzer to measure peak hold with the required settings. Offset the spectrum analyzer reference level by the path loss measured above.
7. Measure and record all spurious emissions up to the tenth harmonic of the carrier frequency.
8. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.
9. If necessary steps 6 and 7 may be performed with the spectrum analyzer set to average detector.

6.4.4.1 Measurement settings:

Conducted spurious emissions:
RBW/VBW=1MHz; Span=to cover 10th harmonic; Detector: Peak- Max Hold.
Band edge emissions:
GSM: RBW/VBW=3 kHz; Span=1MHz; Detector: Peak- Max Hold.
UMTS: RBW/VBW=50 kHz; Span=1MHz; Detector: Peak- Max Hold.

Measurement Uncertainty: ±0.5 dB

6.4.5 Test Conditions:

Tnom: 20^{o}C; Vnom: 3.7 V

6.4.6 Test Verdict:

Pass.

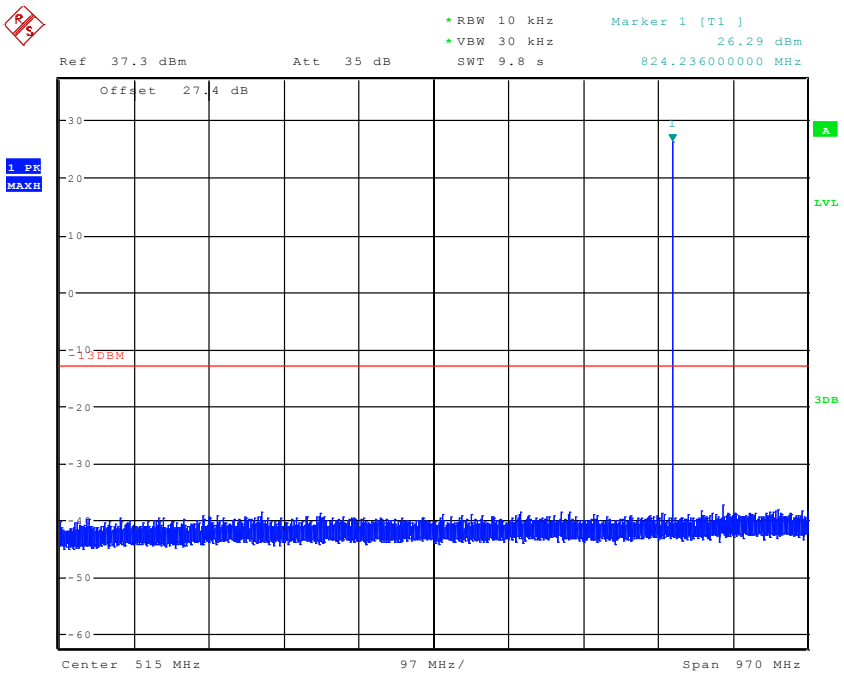
6.4.7 **Test Results:**

No measurable spurious emissions observed which are within 3dB from the limit line.
Unless mentioned otherwise, emission peaks above the limit line in the plots is from the EUT TCH signal.

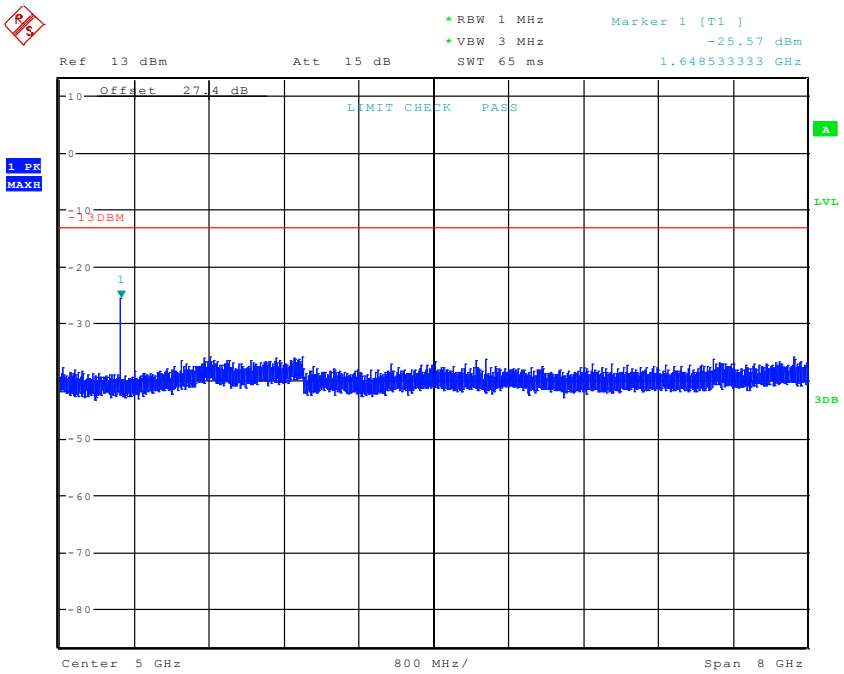
All measurement performed in GSM and UMTS mode with highest power settings. Plots here show worst case emission for each channel under any modulation.

6.4.8 Plots:

Conducted Out of band Emission GSM850 channel 128:

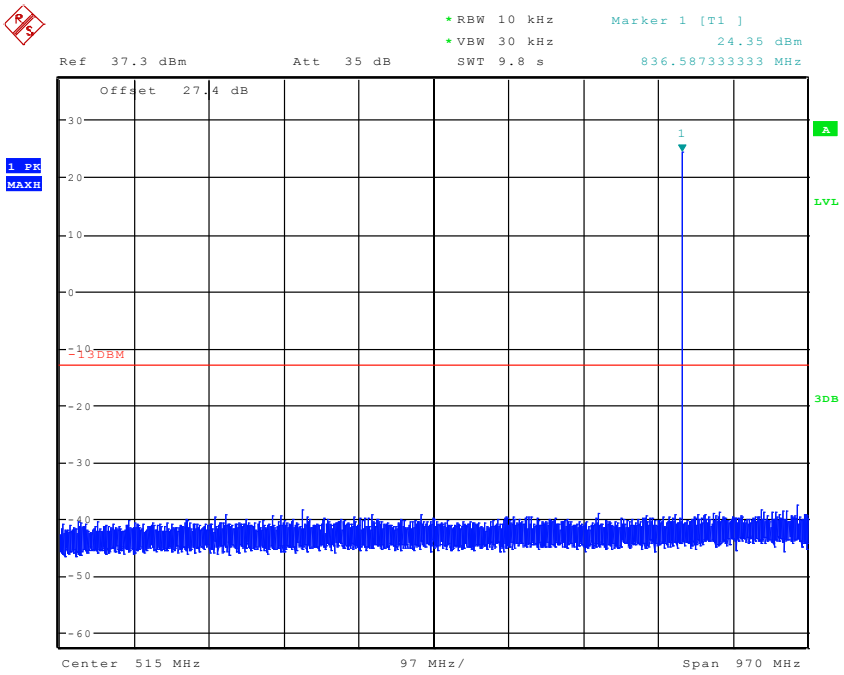


Date: 7.NOV.2012 15:43:25

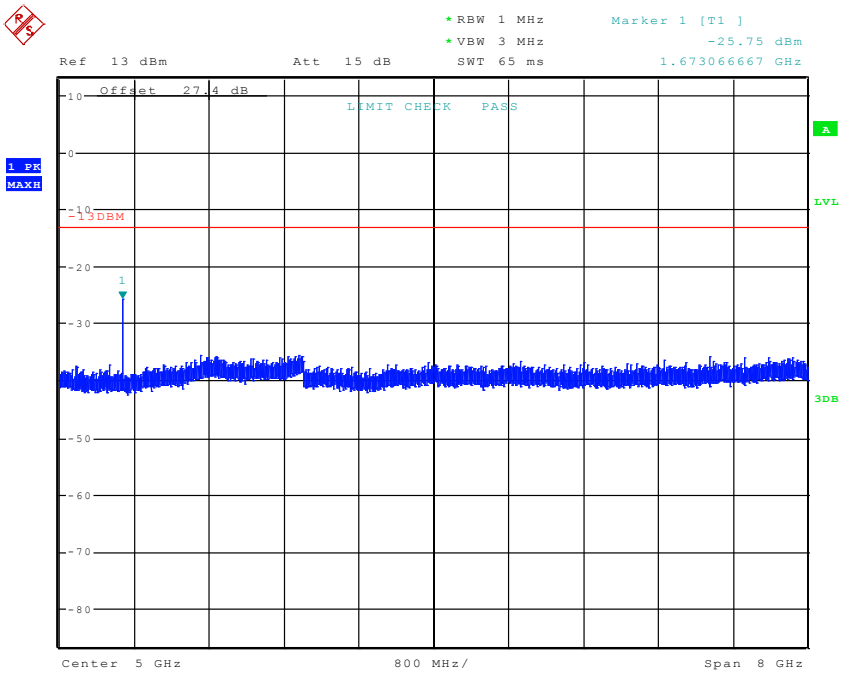


Date: 7.NOV.2012 15:56:36

Conducted Out of band Emission GSM850 channel 190:

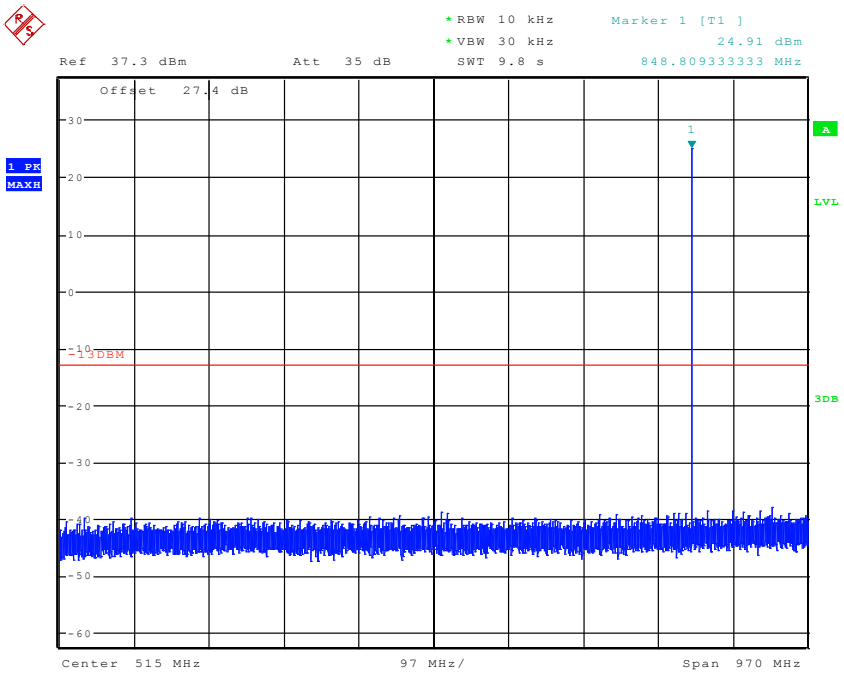


Date: 7.NOV.2012 15:46:56

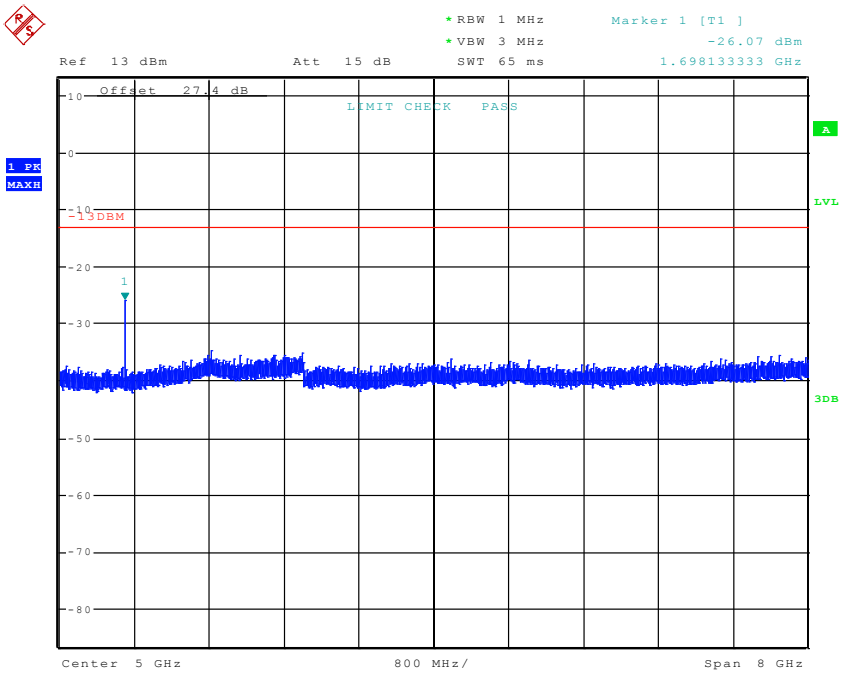


Date: 7.NOV.2012 15:55:29

Conducted Out of band Emission GSM850 channel 251:

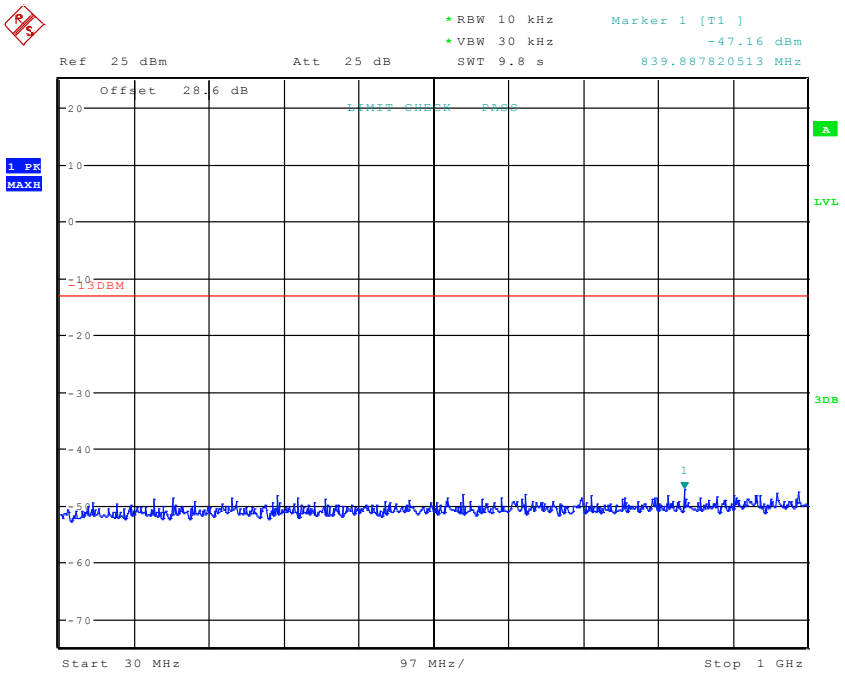


Date: 7.NOV.2012 15:48:36



Date: 7.NOV.2012 15:53:53

Conducted Out of band Emission GSM1900 channel 512:



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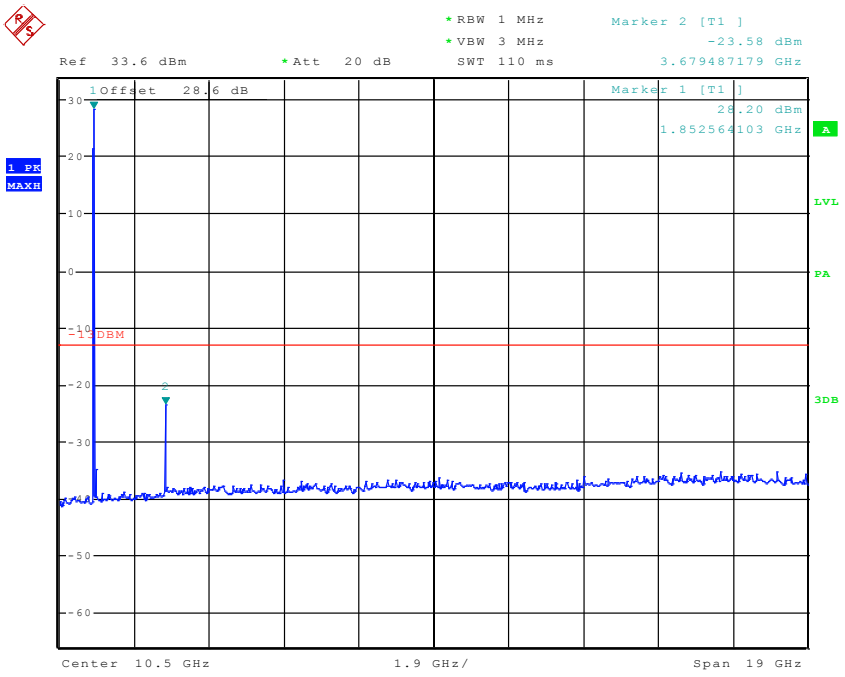
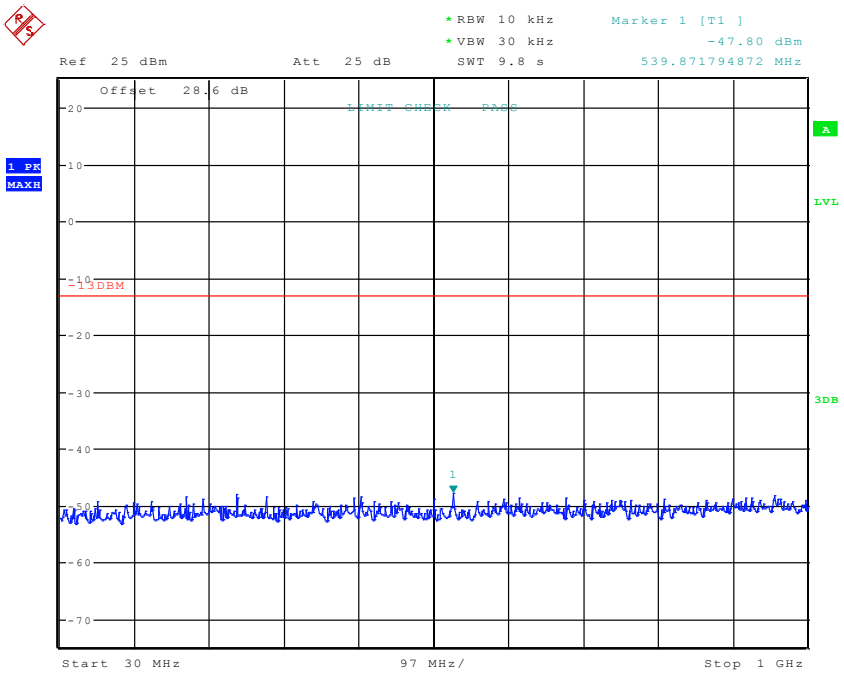


Date: 8.NOV.2012 11:35:56

Conducted Out of band Emission GSM1900 channel 661:



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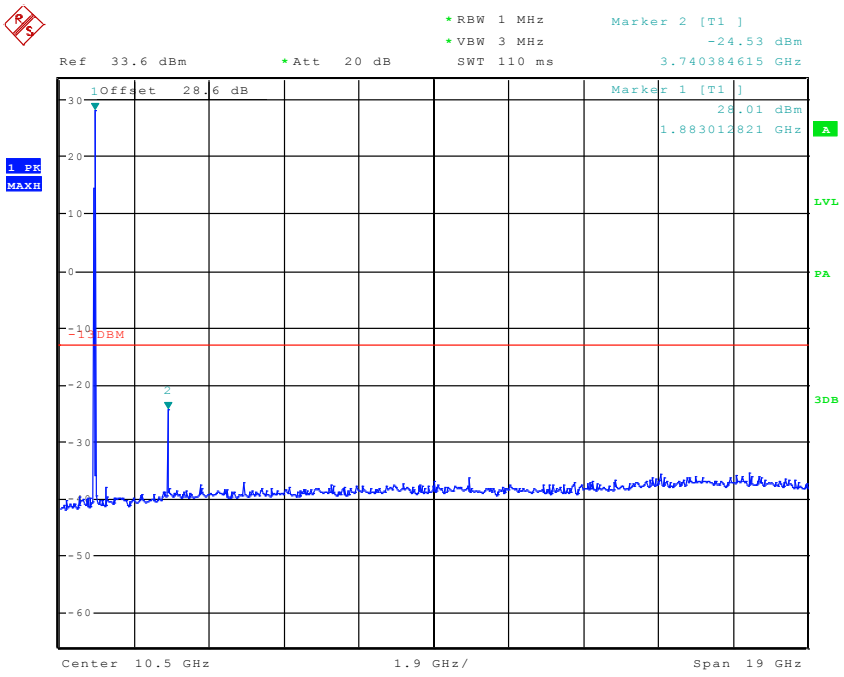
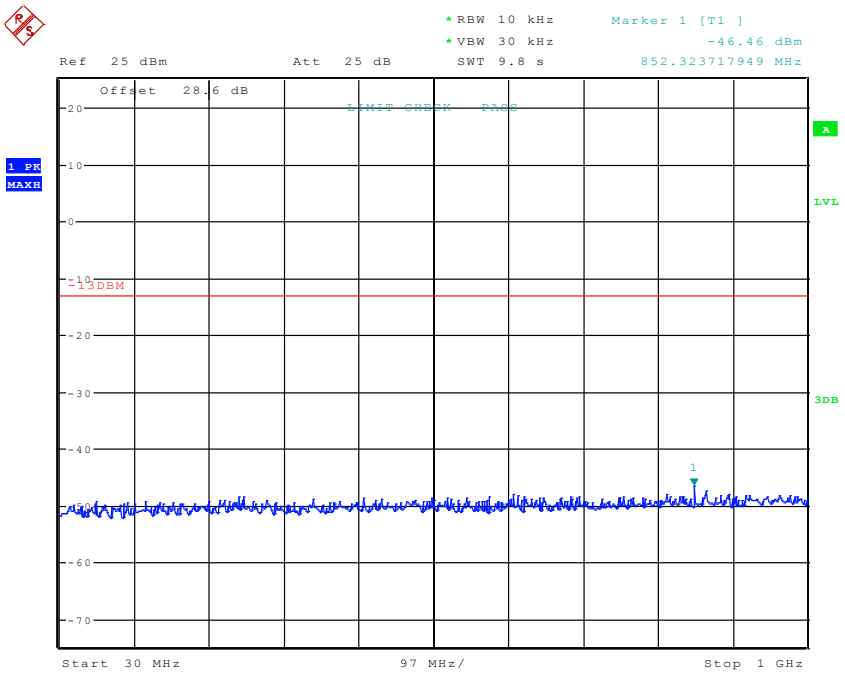


Date: 8.NOV.2012 11:39:45

Conducted Out of band Emission GSM1900 channel 810:



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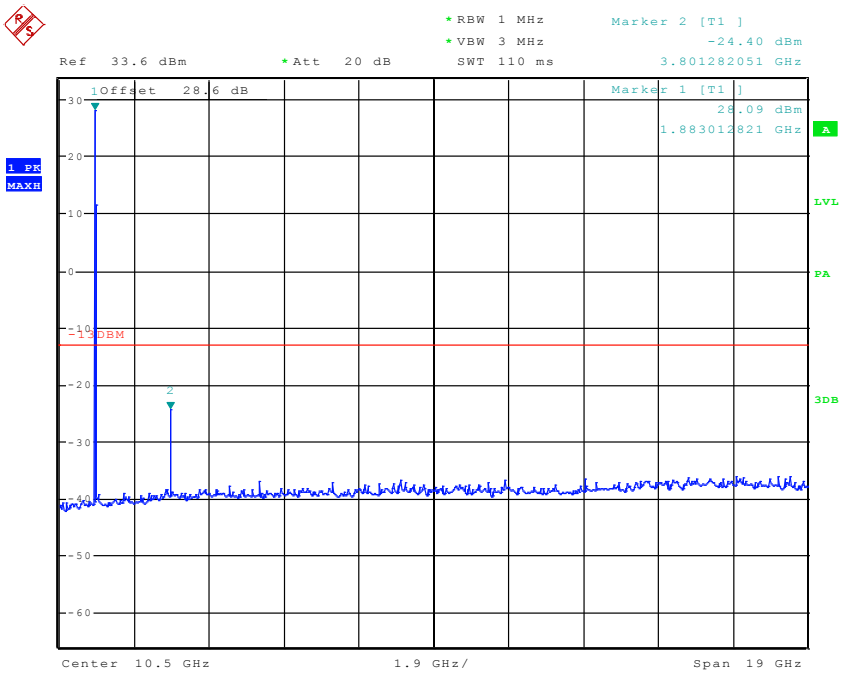
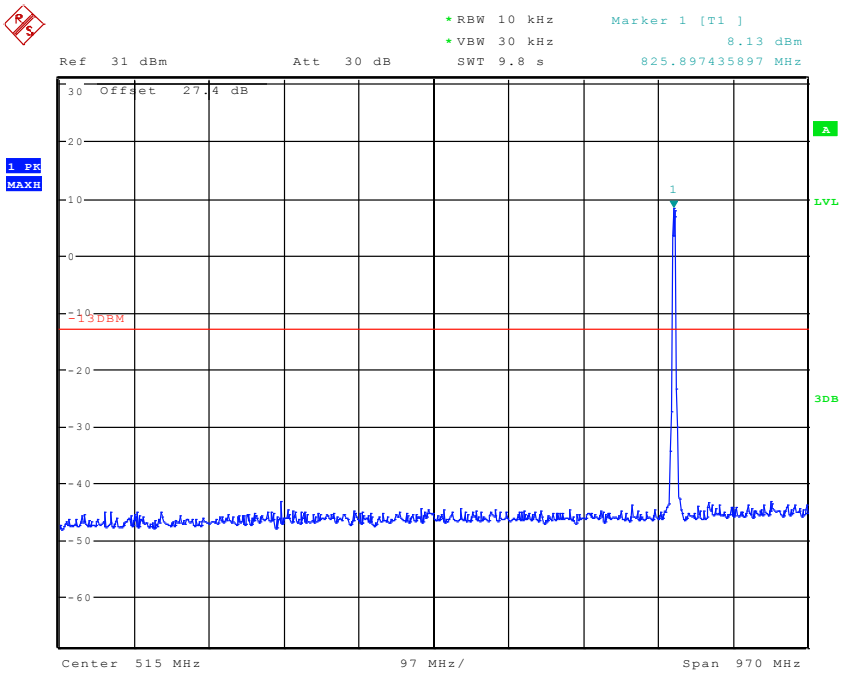
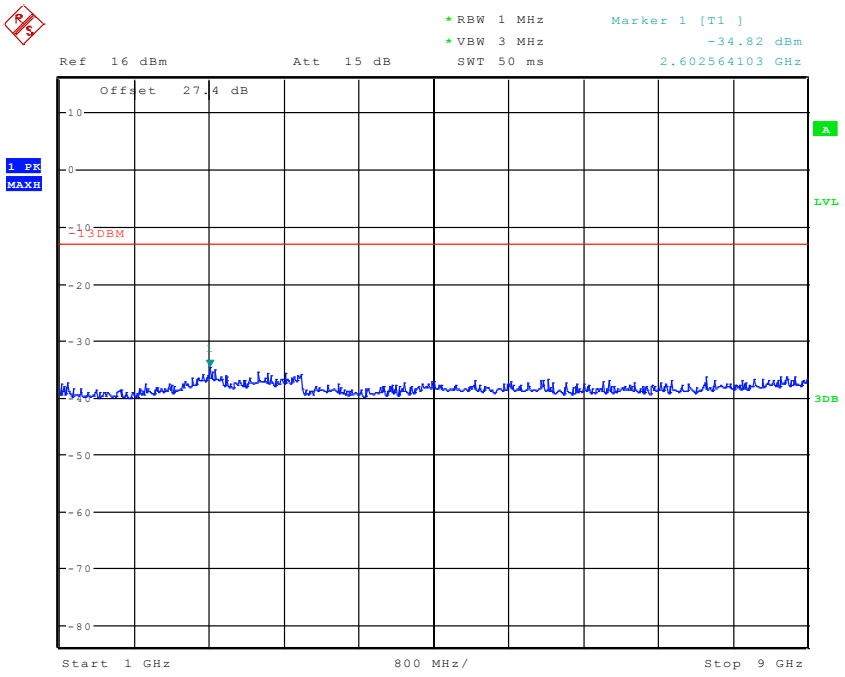


Date: 8.NOV.2012 11:40:38

Conducted Out of band Emission UMTS FDD5 channel 4132:

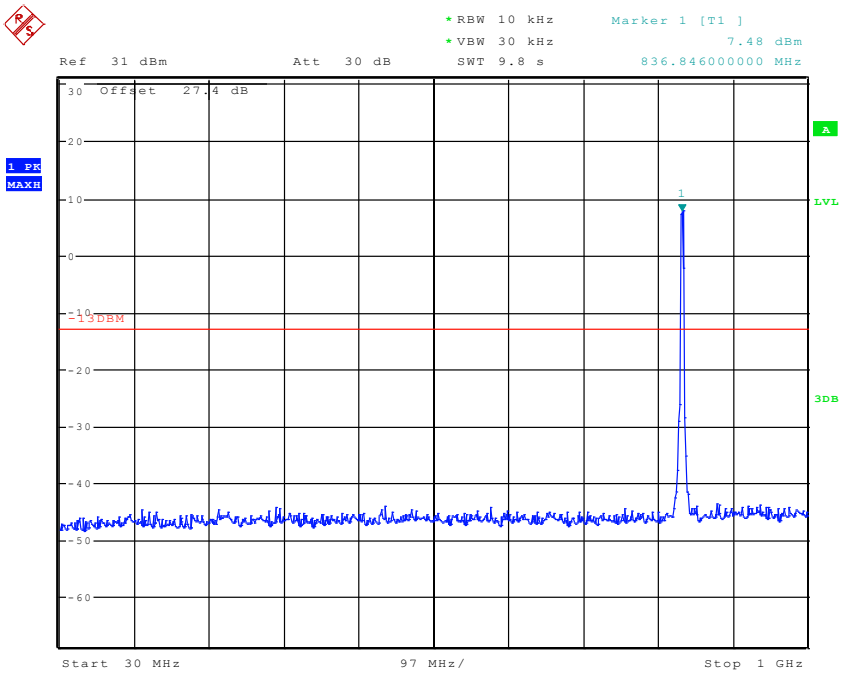


Date: 13.NOV.2012 16:53:18



Date: 13.NOV.2012 17:10:12

Conducted Out of band Emission UMTS FDD5 channel 4183:



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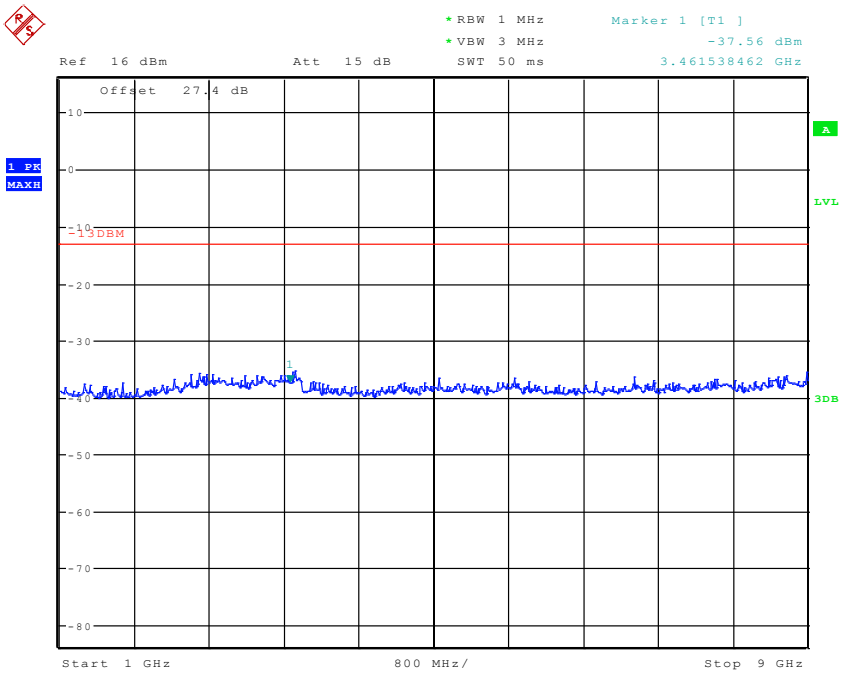

Date: 13.NOV.2012 17:07:51

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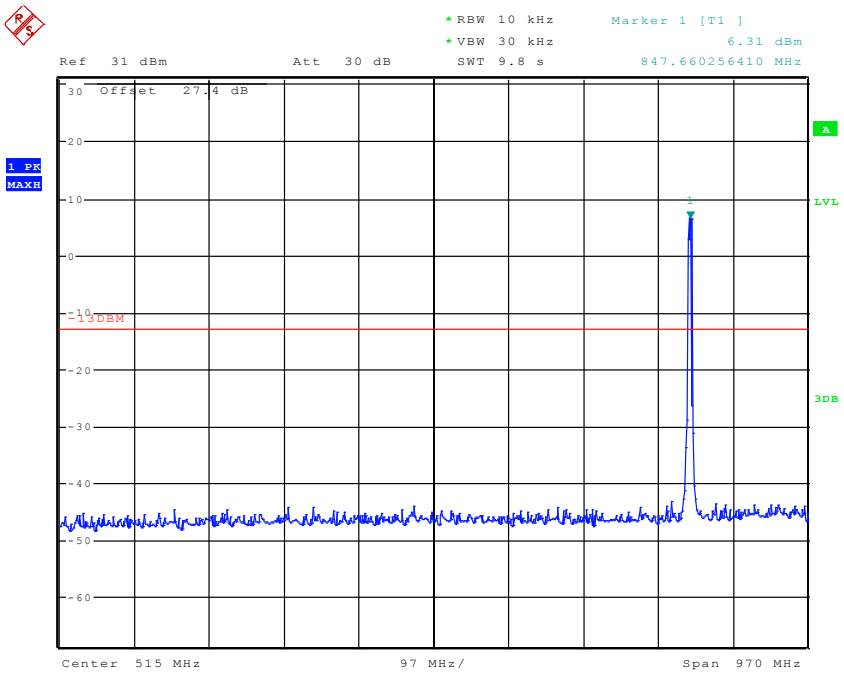

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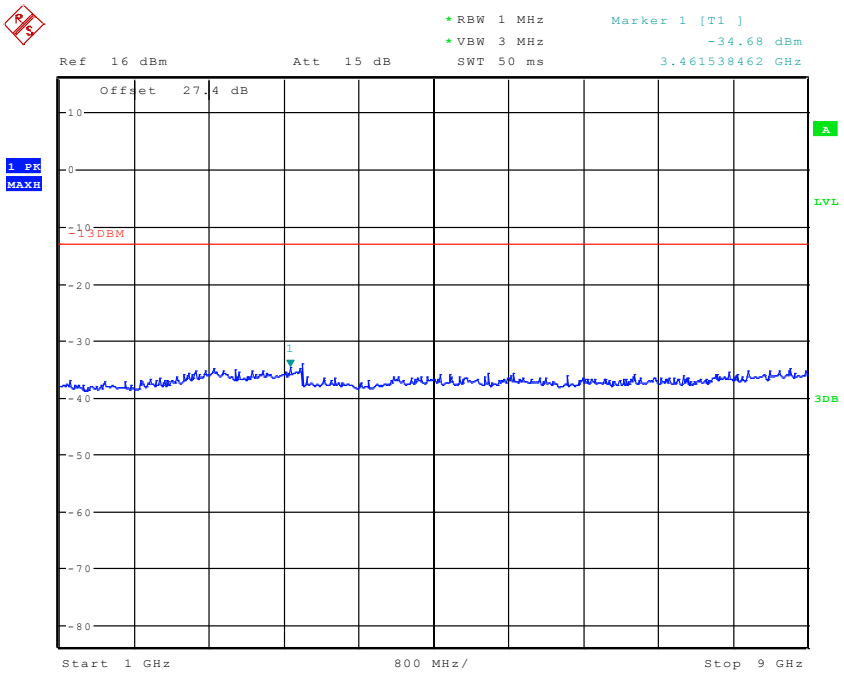

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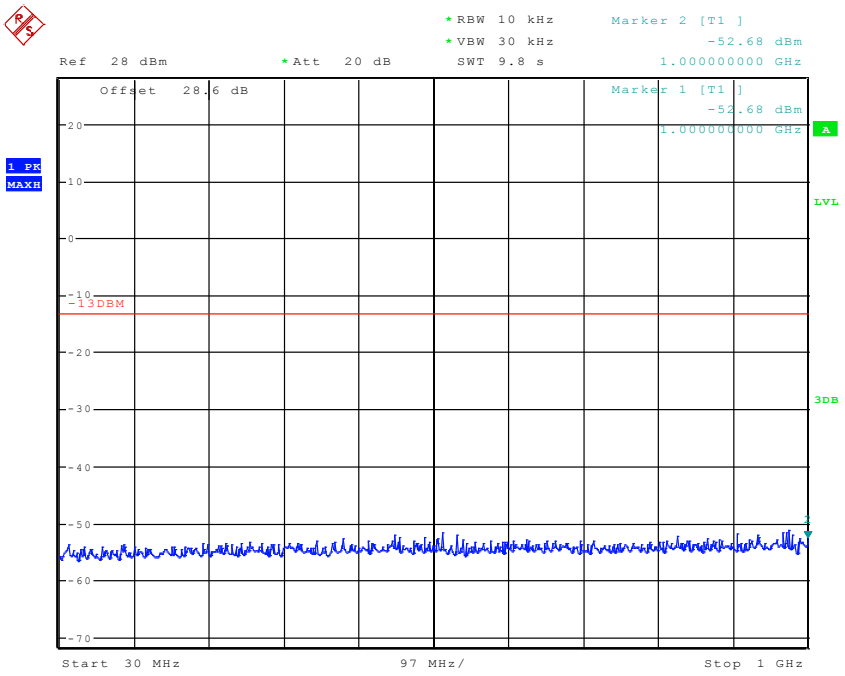
Conducted Out of band Emission UMTS FDD2 channel 9262:



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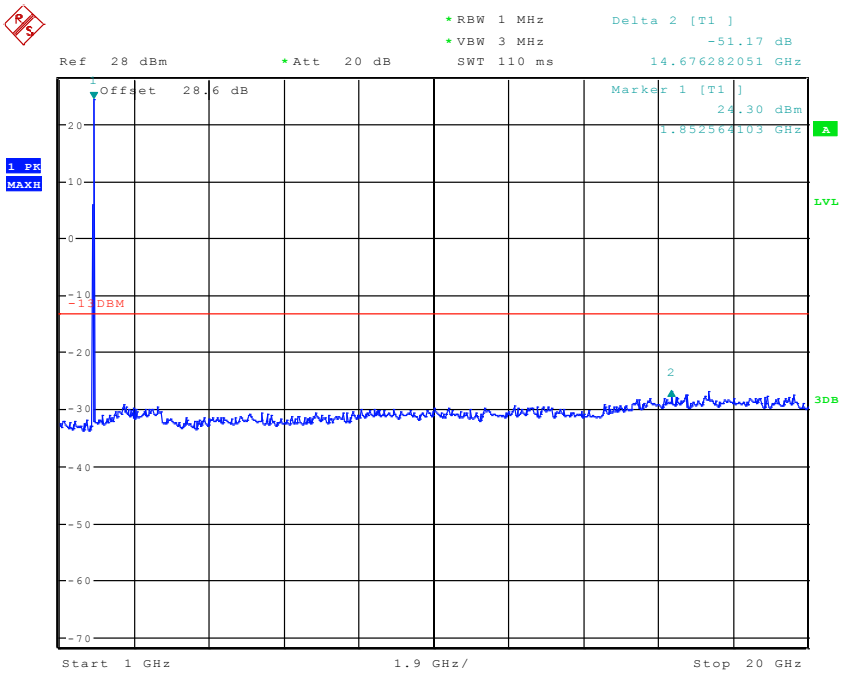

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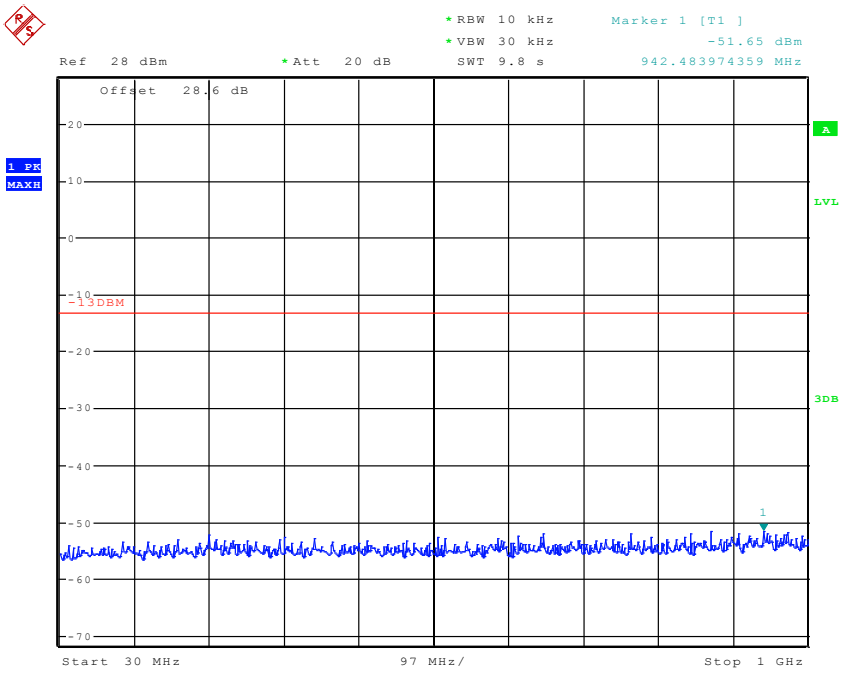
Conducted Out of band Emission UMTS FDD2 channel 9400:



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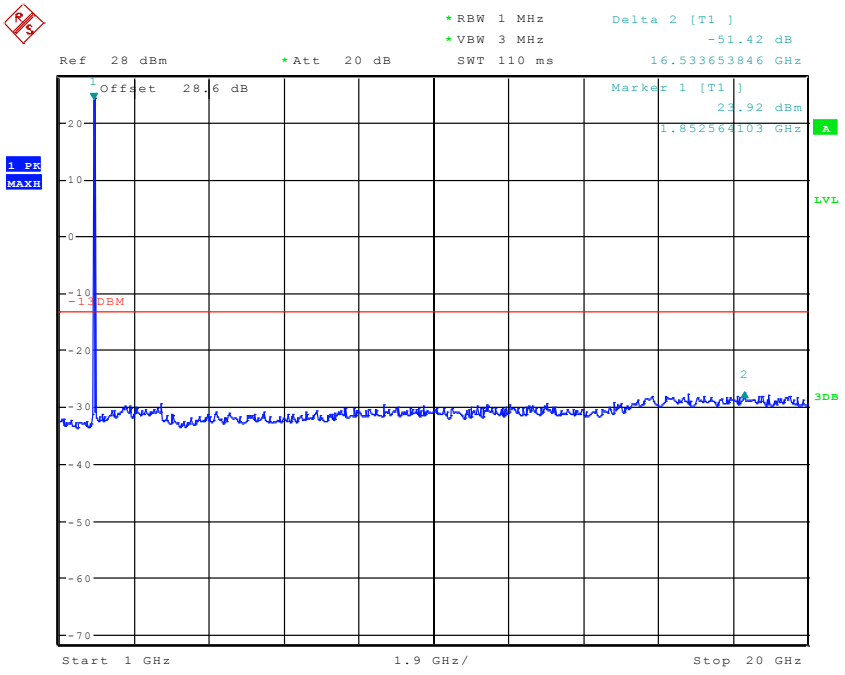

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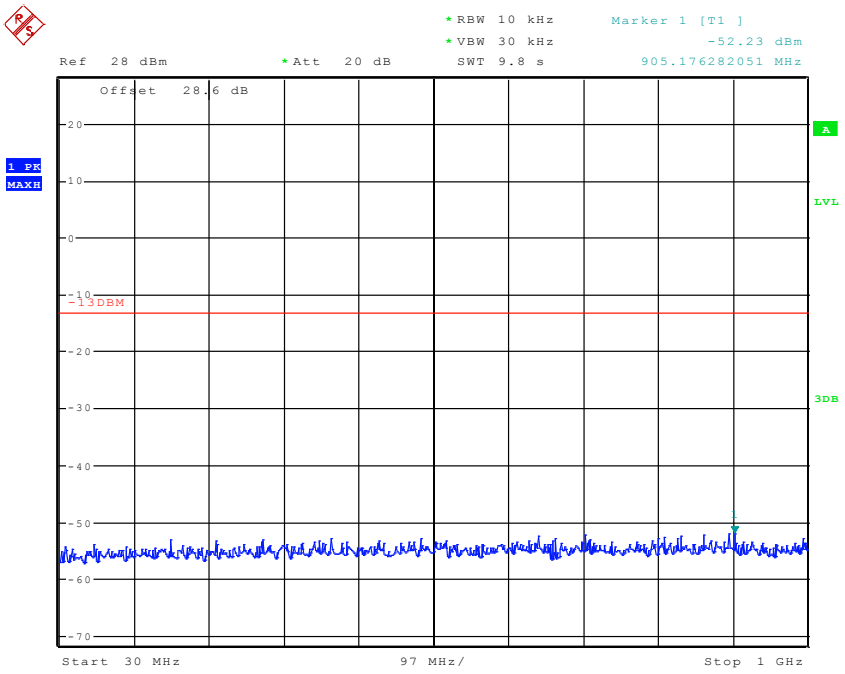

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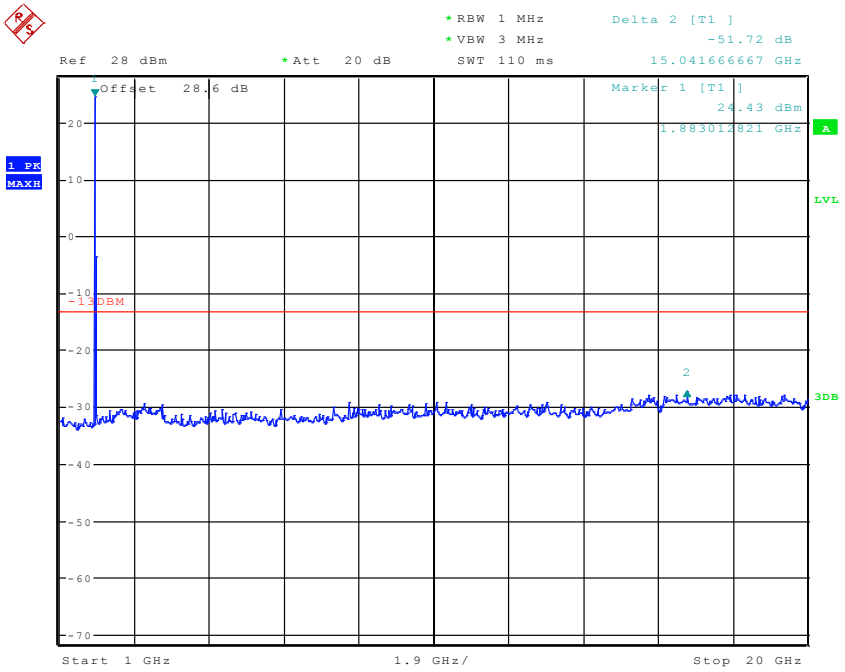

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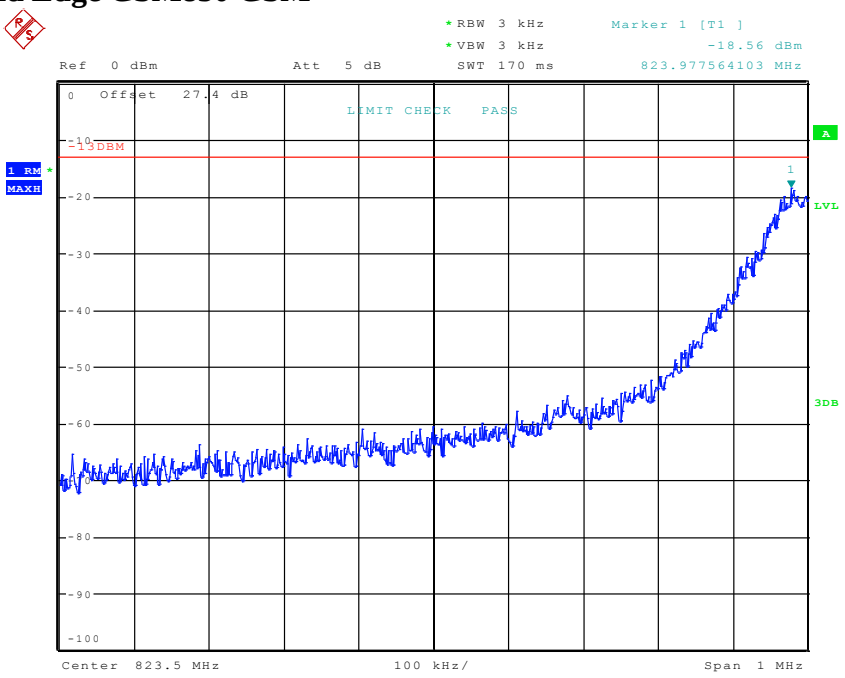
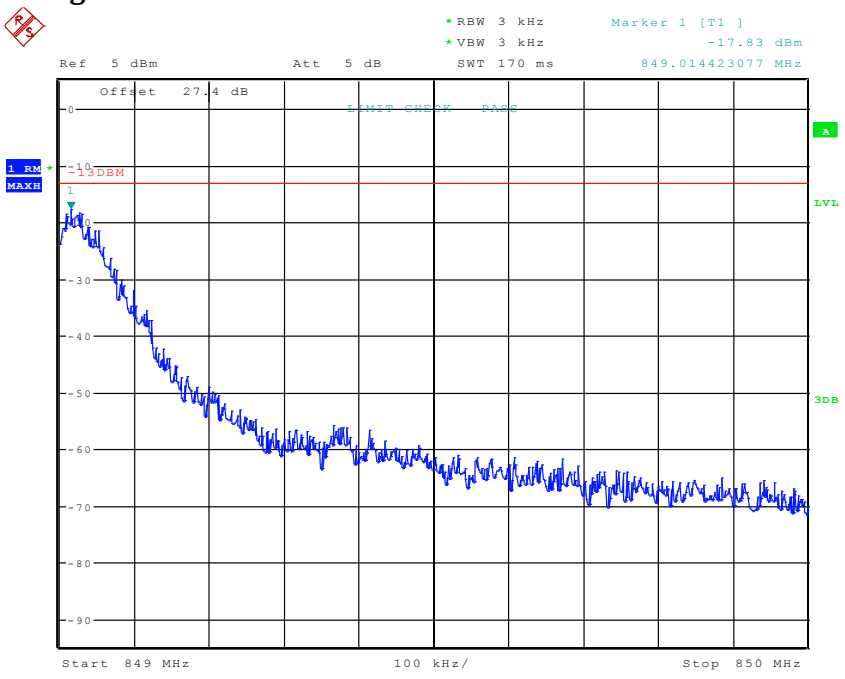
Lower Band Edge GSM850 GSM



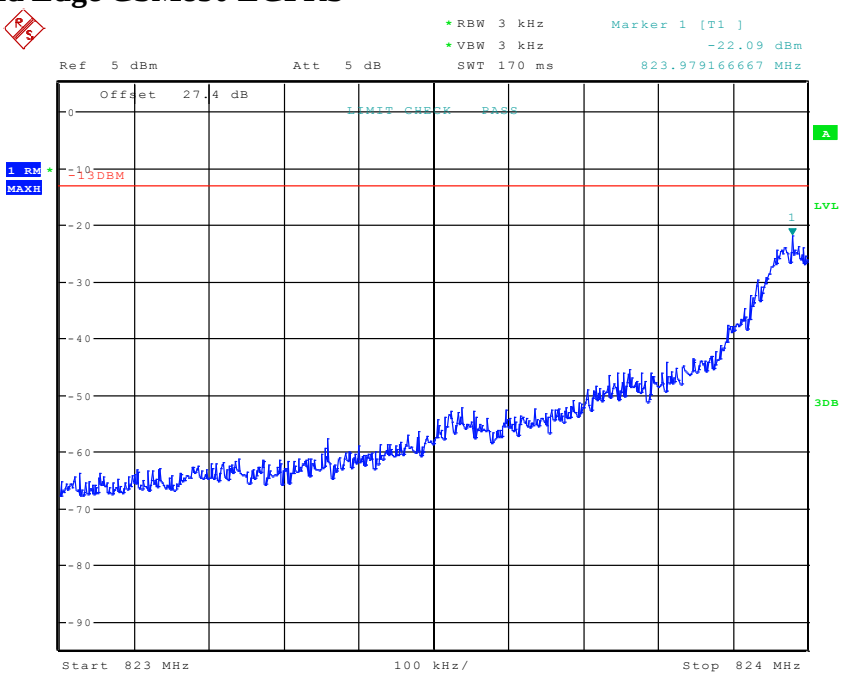
Date: 8.NOV.2012 10:43:16

Upper Band Edge GSM850 GSM



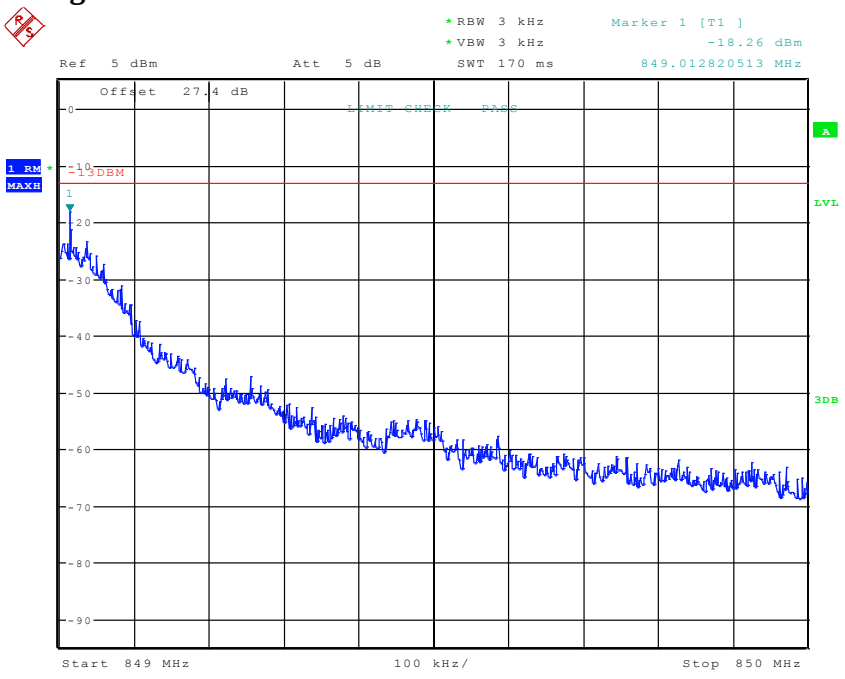
Date: 8.NOV.2012 10:45:34

Lower Band Edge GSM850 EGPRS



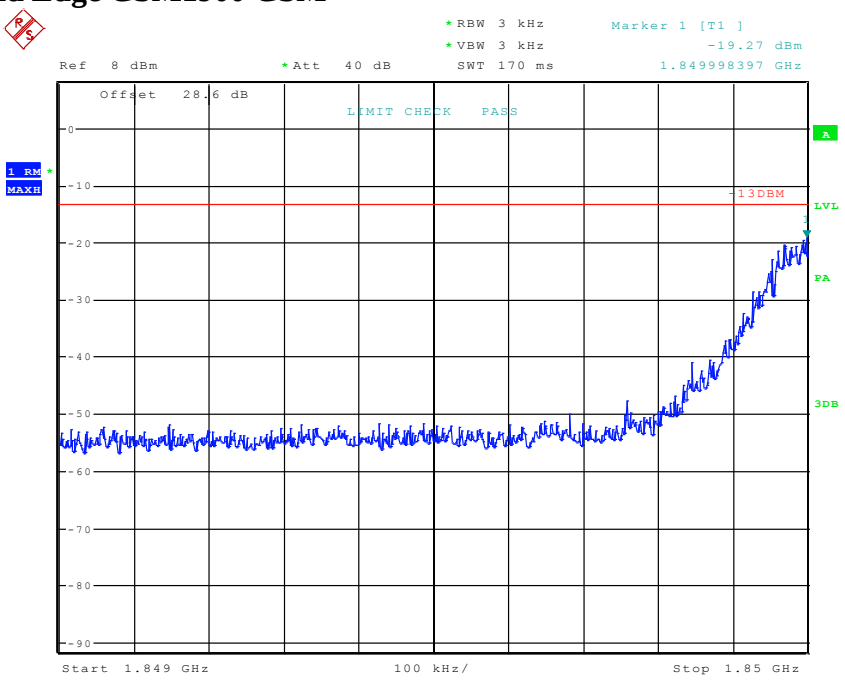
Date: 8.NOV.2012 10:50:27

Upper Band Edge GSM850 EGPRS



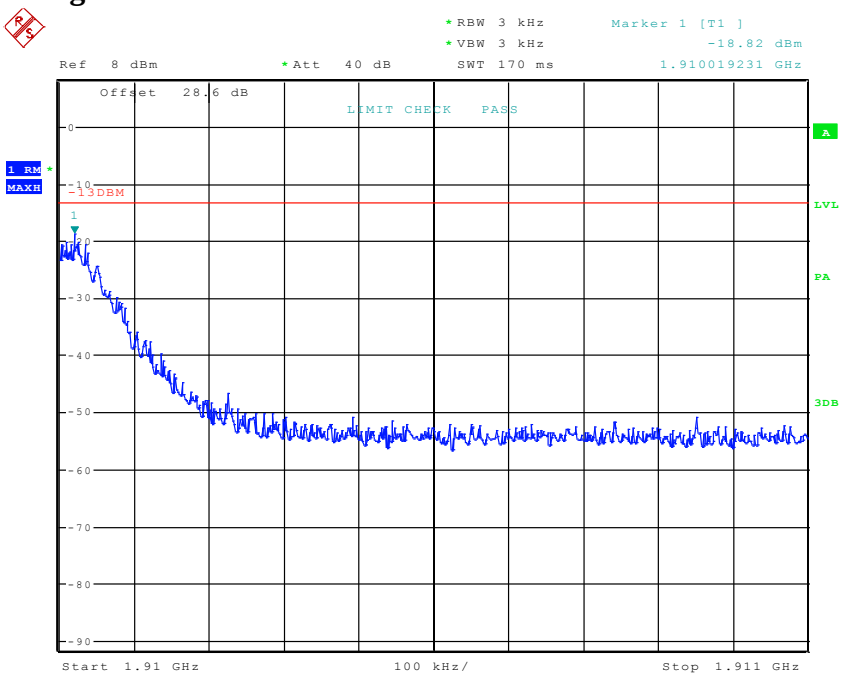
Date: 8.NOV.2012 10:47:56

Lower Band Edge GSM1900 GSM



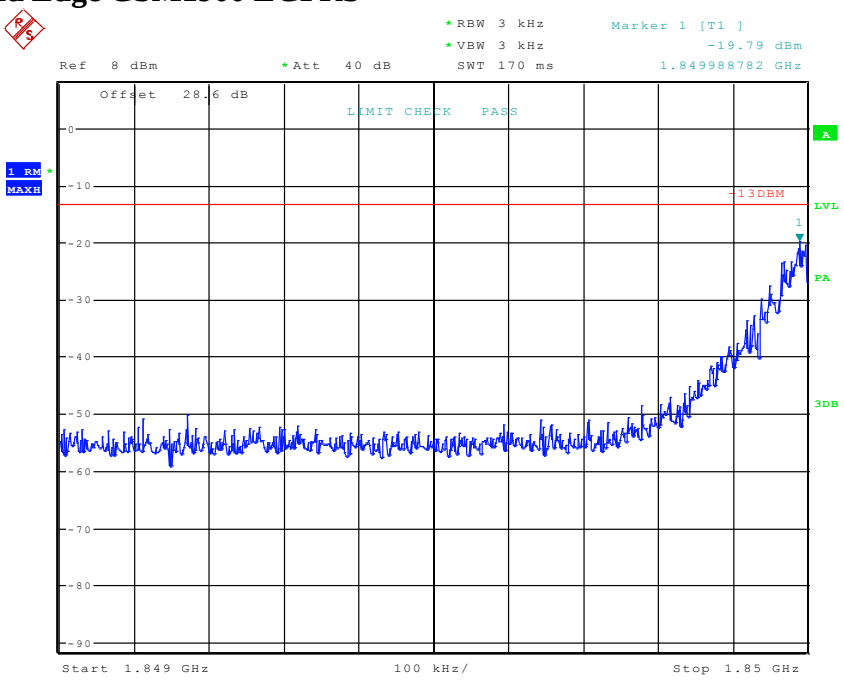
Date: 8.NOV.2012 15:37:02

Upper Band Edge GSM1900 GSM



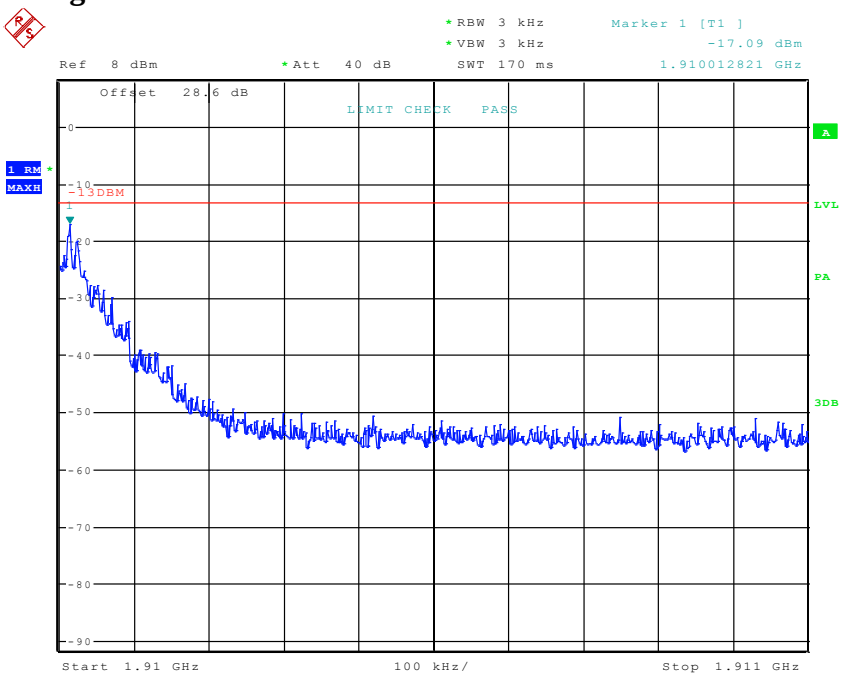
Date: 8.NOV.2012 15:36:06

Lower Band Edge GSM1900 EGPRS



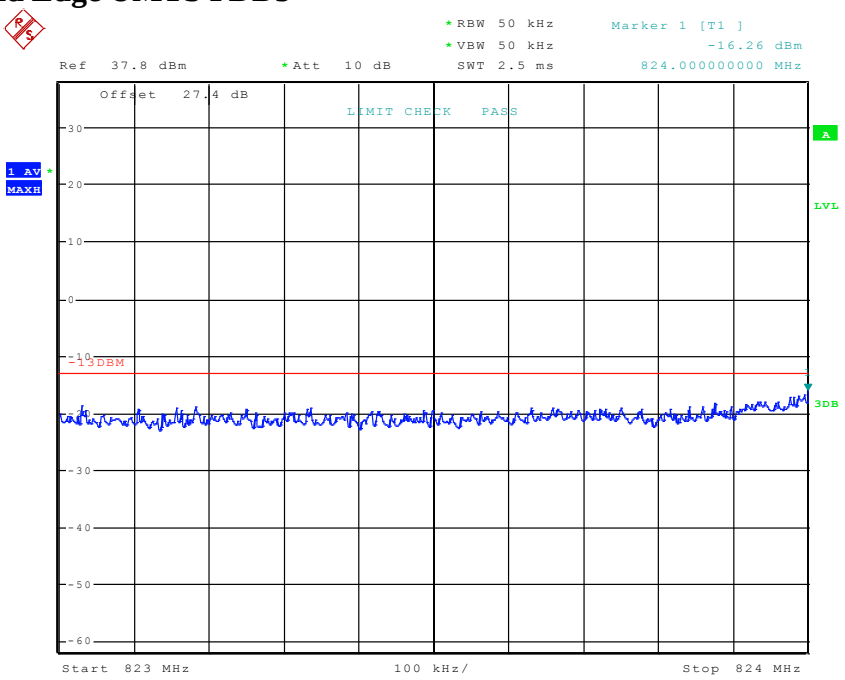
Date: 8.NOV.2012 15:32:28

Upper Band Edge GSM1900 EGPRS



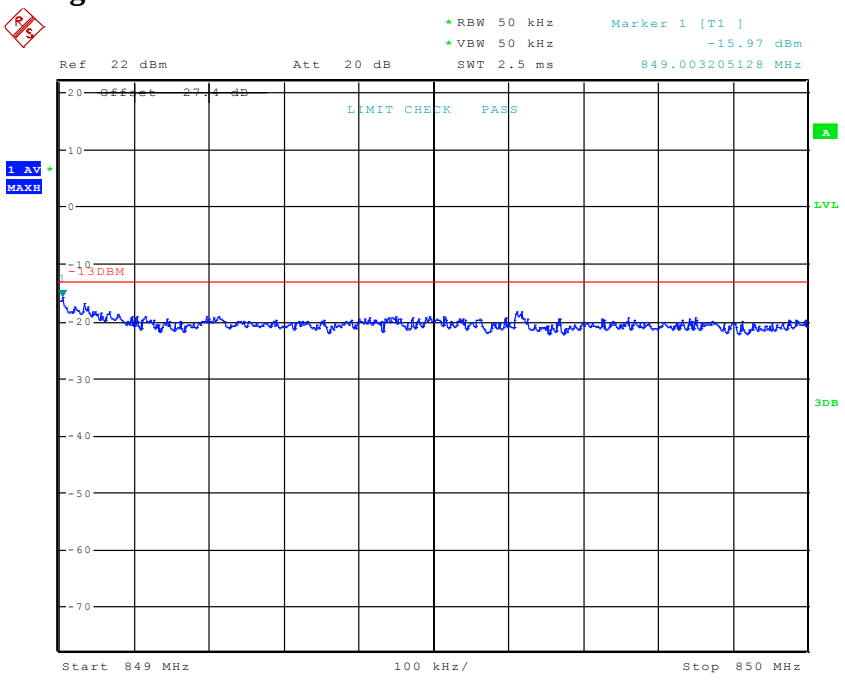
Date: 8.NOV.2012 15:33:43

Lower Band Edge UMTS FDD5



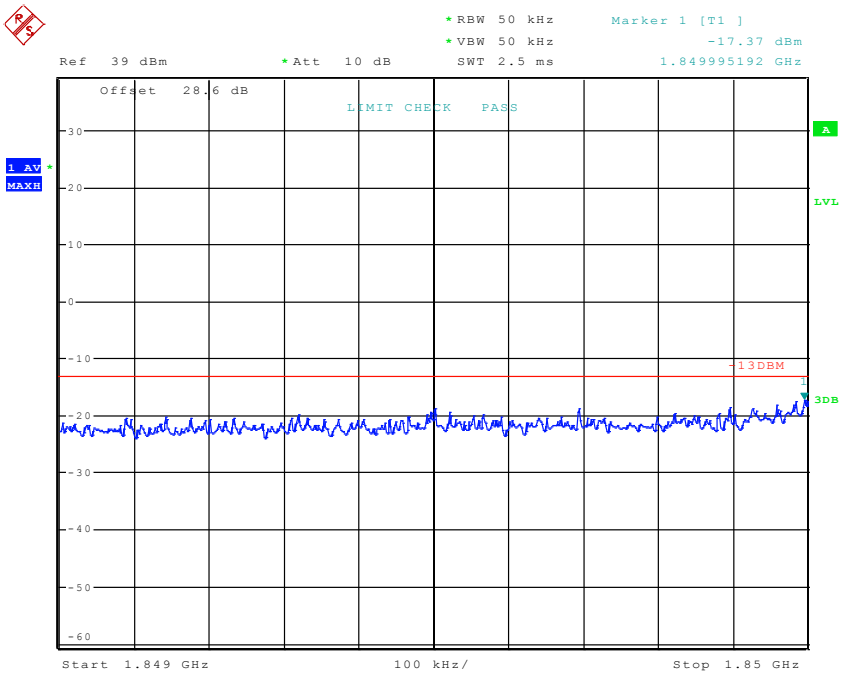
Date: 13.NOV.2012 22:26:26

Upper Band Edge UMTS FDD5



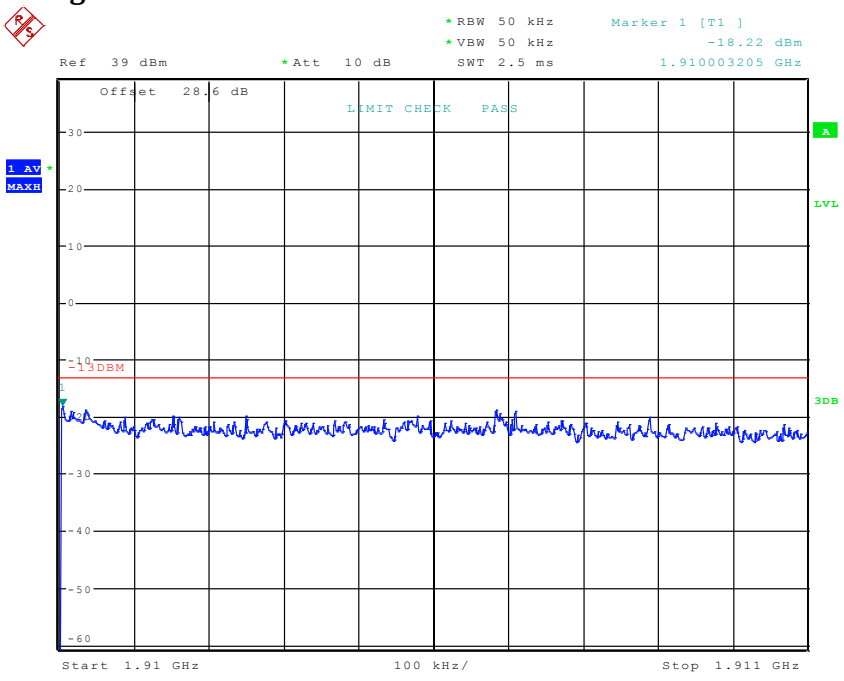
Date: 13.NOV.2012 18:06:41

Lower Band Edge UMTS FDD2



Date: 13.NOV.2012 22:17:35

Upper Band Edge UMTS FDD2



Date: 13.NOV.2012 22:21:01

6.5 Spurious Emissions Radiated

6.5.1 References

FCC: CFR Part 2.1053, CFR Part 22.917, CFR Part 24.238

6.5.2 Measurement requirements:

6.5.2.1 FCC 2.1053: Field strength of spurious radiation.

Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission.

6.5.3 Limits:

(a) *Out of band emissions*. 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.
For all power levels +30dBm to 0dBm, this becomes a constant specification of -13dBm.

6.5.3.1 FCC 22.917 Emission limitations for cellular equipment.

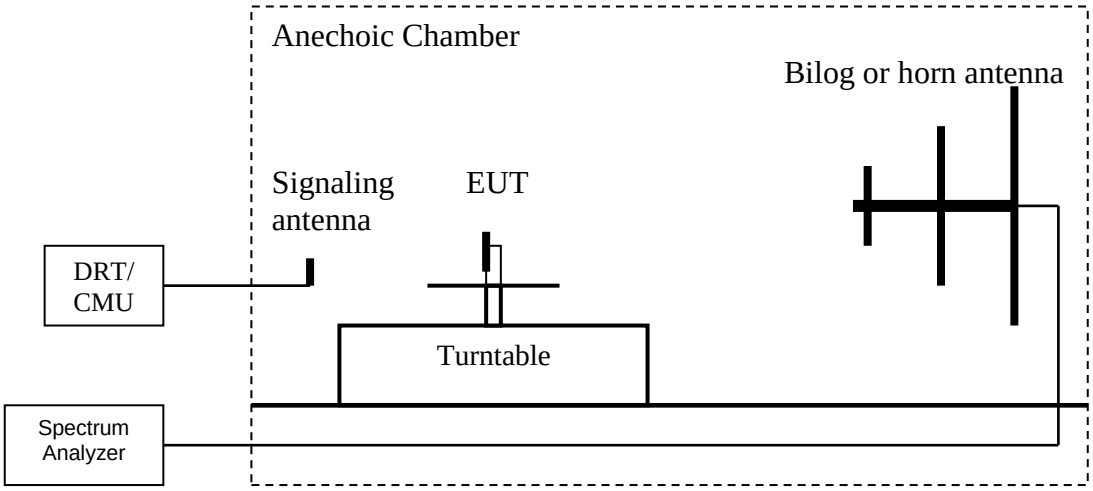
The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.
(b) *Measurement procedure.* Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

6.5.3.2 FCC 24.238 Emission limitations for Broadband PCS equipment.

The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.
(b) Measurement procedure. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

6.5.4 Radiated out of band measurement procedure:

Ref: TIA-603C 2004- 2.2.12 Unwanted emissions: Radiated Spurious



1. Connect the equipment as shown in the above diagram with the EUT's antenna in a horizontal orientation.
2. Adjust the settings of the Digital Radio Communication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to measure peak hold with the required settings.
4. Place the measurement antenna in a horizontal orientation. Rotate the EUT 360°. Raise the measurement antenna up to 4 meters in 0.5 meters increments and rotate the EUT 360° at each height to maximize all emissions. Measure and record all spurious emissions (**LVL**) up to the tenth harmonic of the carrier frequency.
5. Replace the EUT with a horizontally polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS)**. **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the level of spurious emissions using the following equation:
   Spurious (dBm) = **LVL** (dBm) + **LOSS** (dB):
8. Repeat steps 4, 5 and 6 with all antennas vertically polarized.
9. Determine the level of spurious emissions using the following equation:
   Spurious (dBm) = **LVL** (dBm) + **LOSS** (dB):
10. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.
    (N**ote:** Steps 5 and 6 above are performed prior to testing and **LOSS** is recorded by test software. Steps 3, 4 and 7 above are performed with test software.)

6.5.5 Sample Calculations for Radiated Measurements

6.5.5.1 Power Measurements using Substitution Procedure:

The measurement on the Spectrum Analyzer is used as a basis for the Substitution procedure.
The EUT is replaced with a Signal Generator and an antenna. The setting on the Signal Generator is varied until the Spectrum Analyzer displays the original reading. EIRP is calculated as-

EIRP (dBm)= Signal Generator setting (dBm)- Cable Loss (dB)+ Antenna Gain (dBi)
Eg:

Frequency (MHz)	Measured SA (dBµV)	Signal Generator setting (dBm)	Antenna Gain (dBi)	Dipole Gain (dBd)	Cable Loss (dB)	EIRP (dBm)
1000	95.5	24.5	6.5	0	3.5	27.5

6.5.6 Measurement Survey:

The site is constructed in accordance with ANSI C63.4 requirements and is recognized by the FCC to be in compliance for a 3m site. The spectrum is scanned from 30MHz to the 10th harmonic of the highest frequency generated by the EUT.
Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the 850 MHz and 1900 MHz bands of operation.
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 GSM-850 & PCS-1900 band into any of the other blocks respectively. 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.

Radiated emission measurements were made in GMSK and RMC Modes (for UMTS), since these modes operate with the highest output power and hence represents the worst case scenario.

All measurements are done in horizontal and vertical antenna polarization; and on three orientations of the EUT. The plots show the worst case where it is not indicated otherwise. Unless mentioned otherwise, the peaks in the plots are from the carrier frequency.

6.5.7 Test Conditions:

Tnom: 20^{o}C; Vnom: 3.7 V

6.5.8 Test Verdict:

Pass.

6.5.9 Test Results:

6.5.9.1 Test Results Transmitter Spurious Emission GSM850:

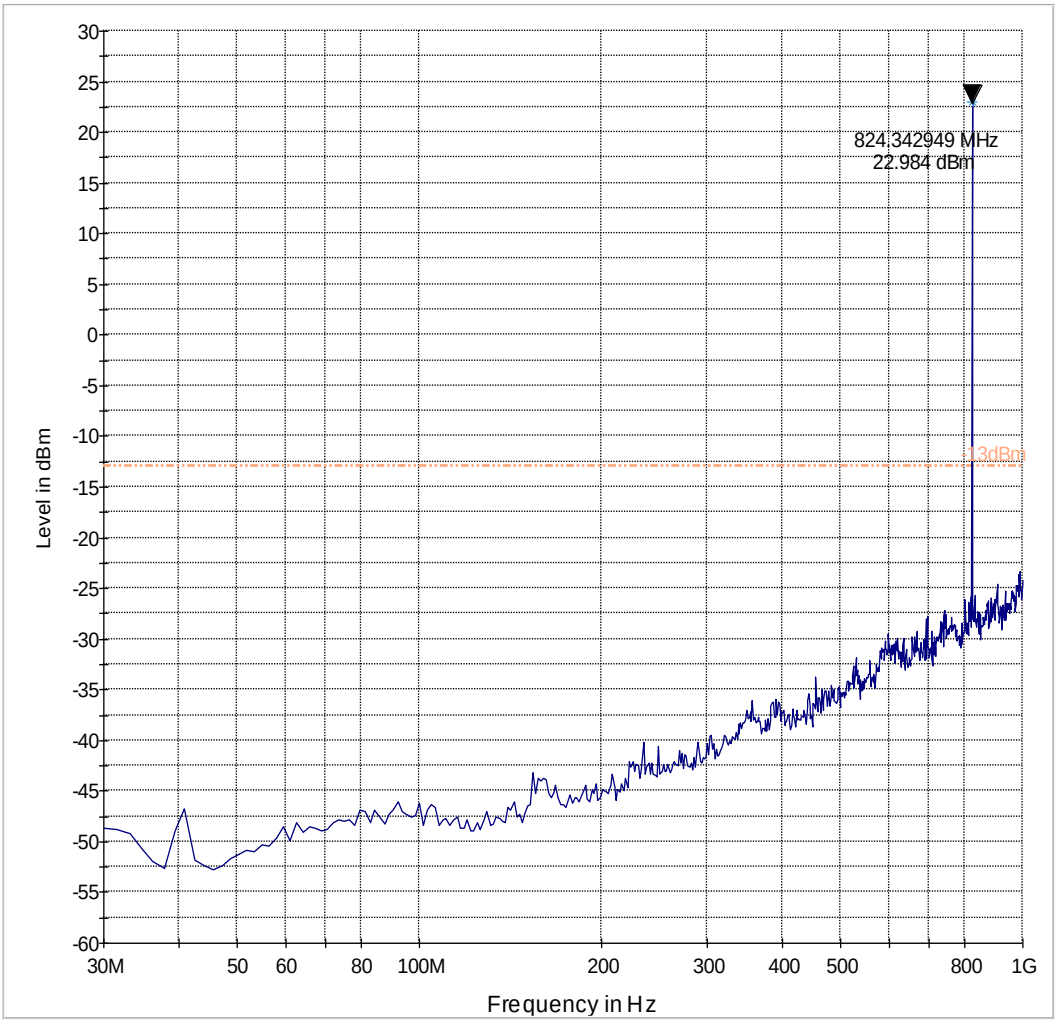
Harmonic	Tx ch-128 Freq. (MHz)	Level (dBm)	Tx ch-190 Freq. (MHz)	Level (dBm)	Tx ch-251 Freq. (MHz)	Level (dBm)
1	**824.2**	-	**836.6**	-	**848.8**	-
2	**1648.4**	NF	**1673.2**	NF	**1697.6**	NF
3	**2472.6**	-47.86	**2509.8**	-47.47	**2546.4**	-46.86
4	**3296.8**	NF	**3346.4**	NF	**3395.2**	NF
5	**4121**	NF	**4183**	NF	**4244**	NF
6	**4945.2**	NF	**5019.6**	NF	**5092.8**	NF
7	**5769.4**	NF	**5856.2**	NF	**5941.6**	NF
8	**6593.6**	NF	**6692.8**	NF	**6790.4**	NF
9	**7417.8**	NF	**7529.4**	NF	**7639.2**	NF
10	**8242**	NF	**8366**	NF	**8488**	NF
NF = Noise Floor Measurement Uncertainty: ±3dB						

Legend for the plots:

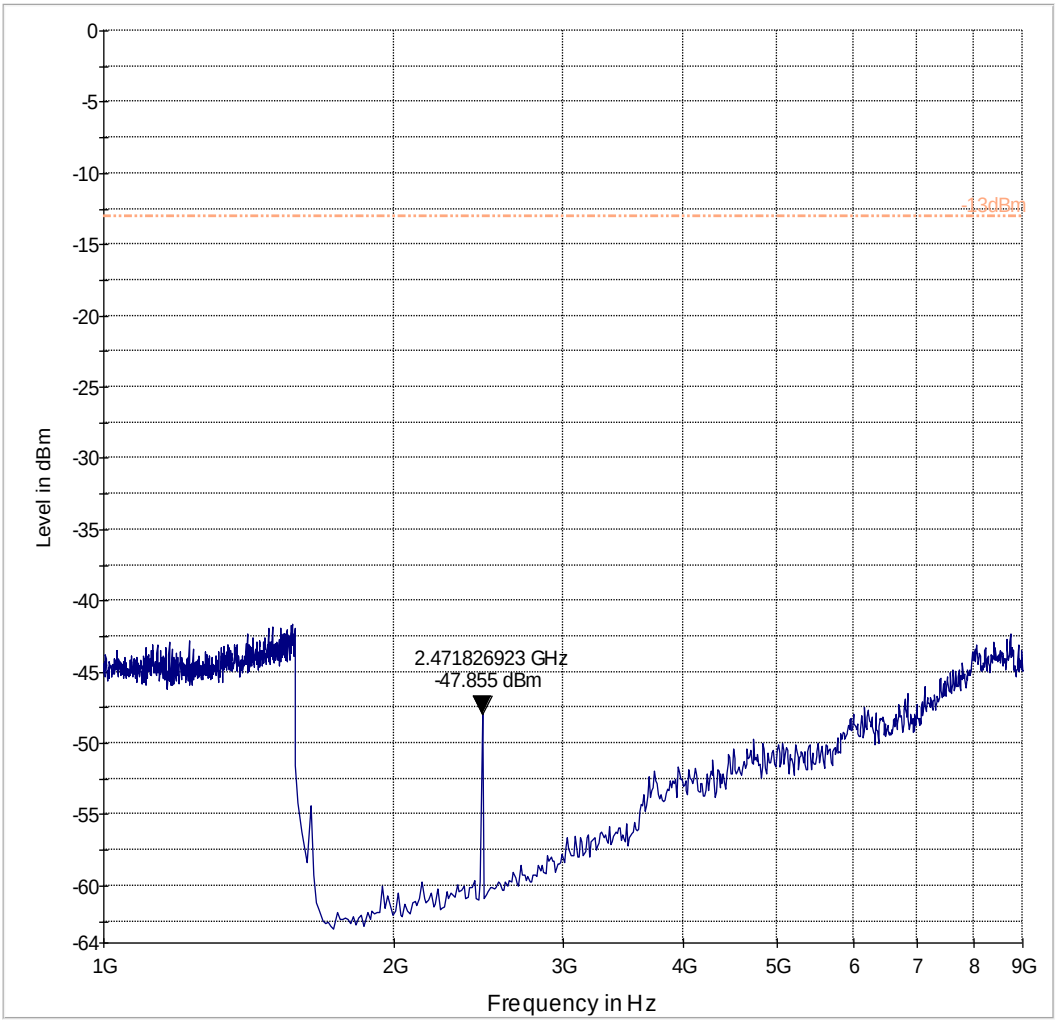
-13dBm.LimitLine
Preview Result
Data Reduction Result
Final Measurement Result

Radiated Spurious Emissions (GSM-850) TX: Low Channel

Test results 30M-1GHz

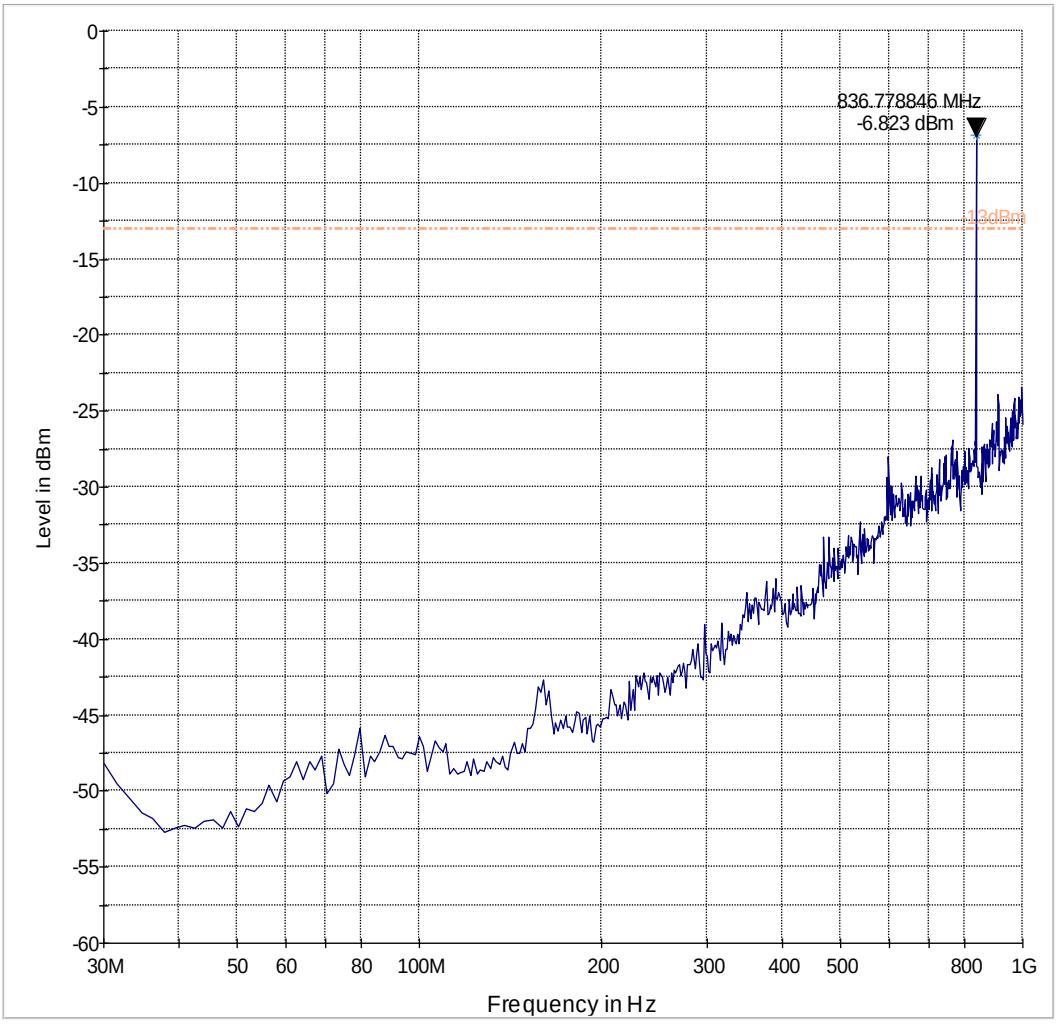


Test results 1GHz-9GHz

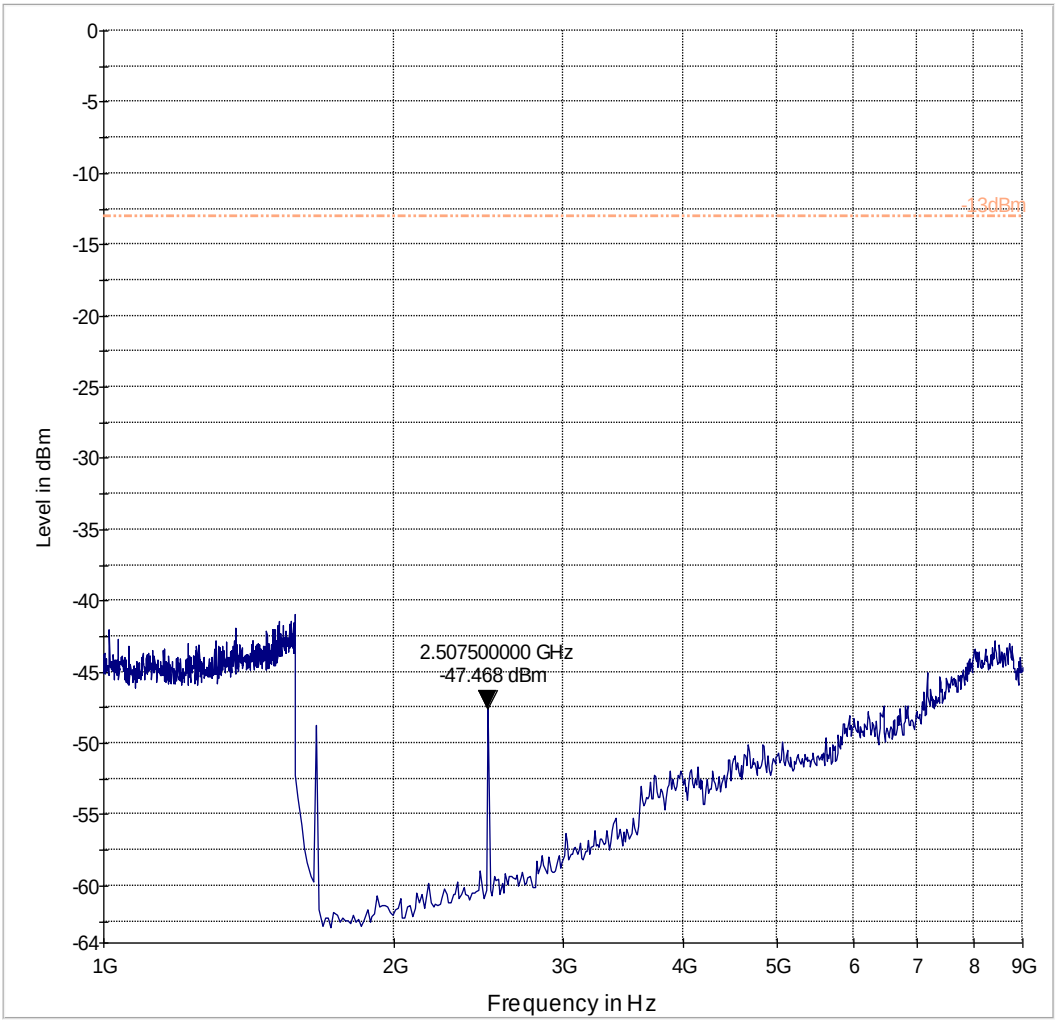


Radiated Spurious Emissions (GSM-850) TX: Mid Channel

Test results 30M-1GHz

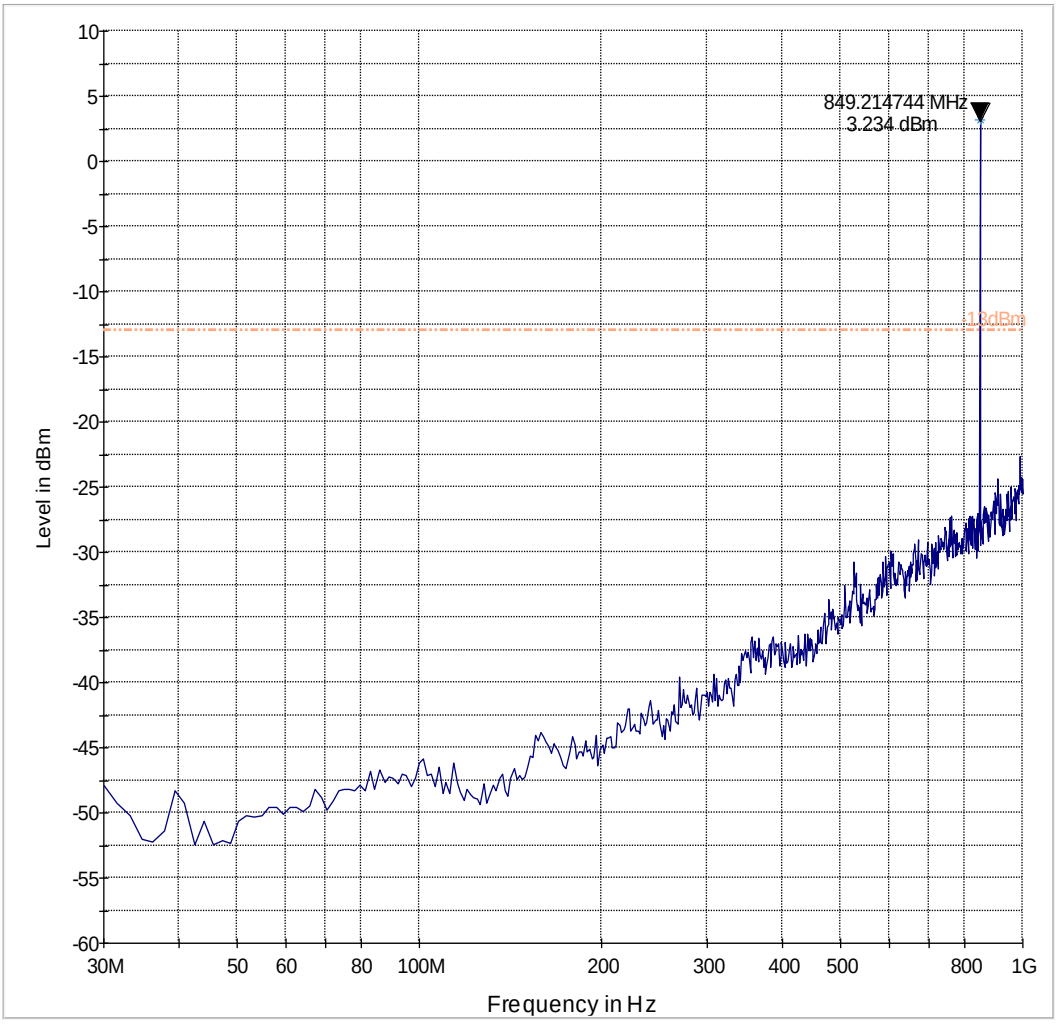


Test results 1GHz-9GHz

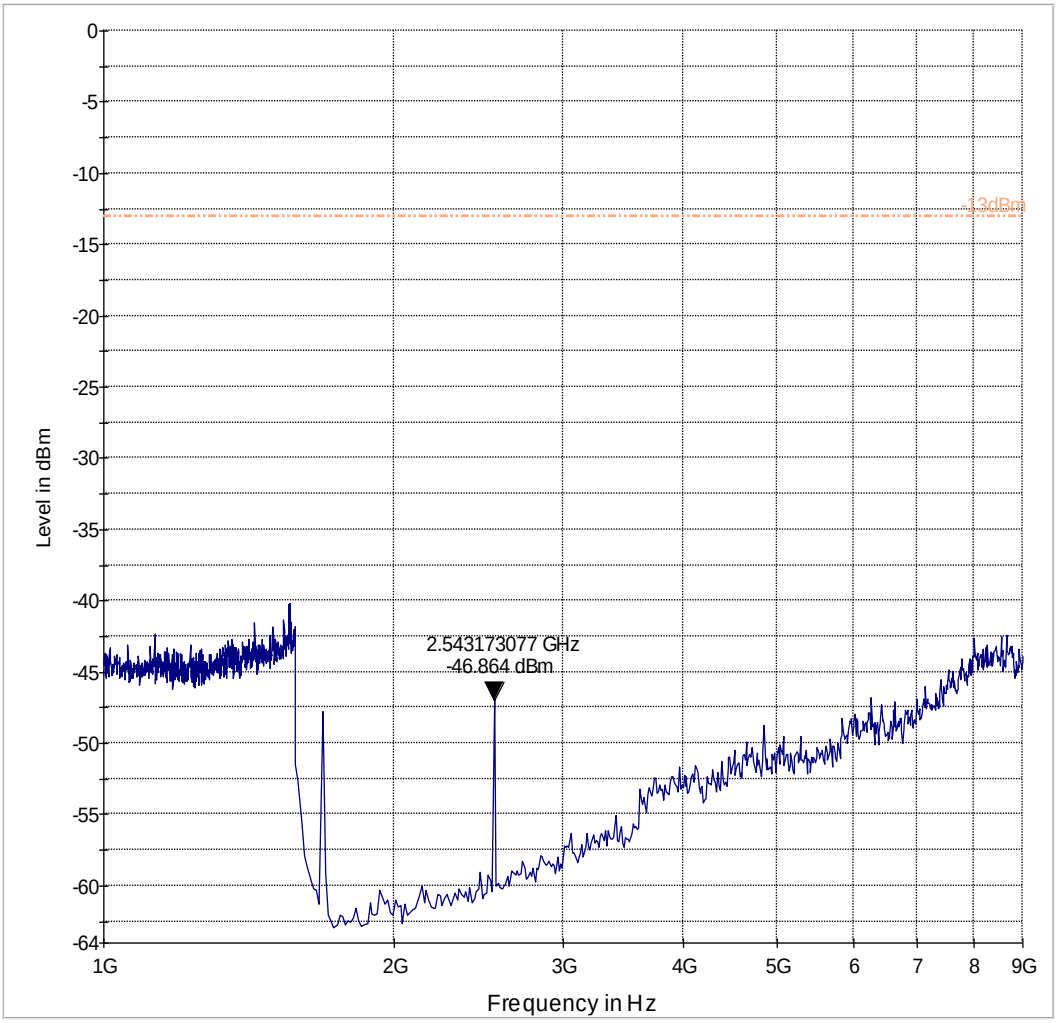


Radiated Spurious Emissions (GSM-850) TX: High Channel

Test results 30M-1GHz



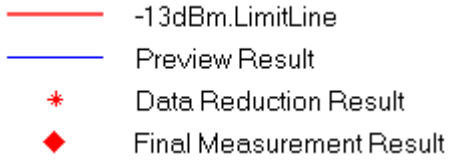
Test results 1GHz-9GHz



6.5.9.2 Test Results Transmitter Spurious Emission UMTS FDDV

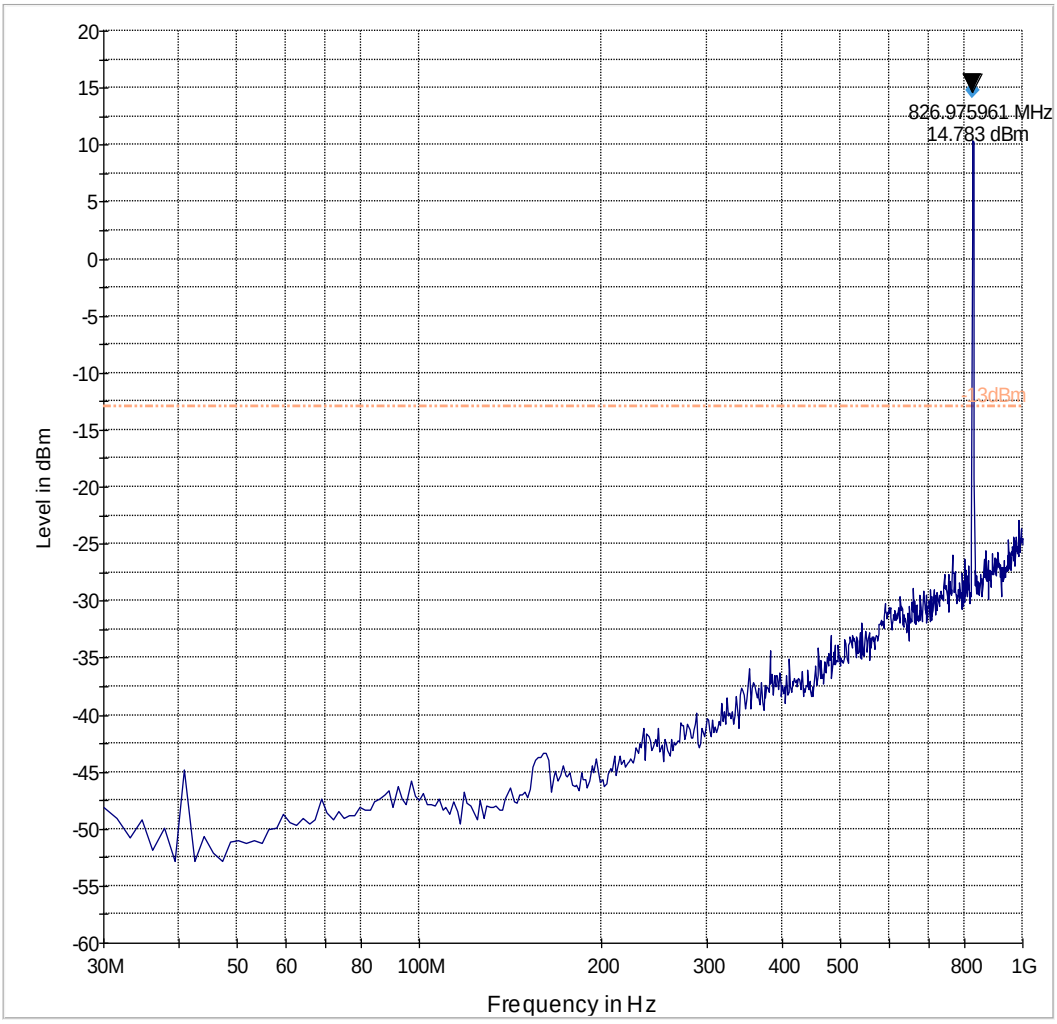
Harmonic	Tx ch-4132 Freq. (MHz)	Level (dBm)	Tx ch-4183 Freq. (MHz)	Level (dBm)	Tx ch-4233 Freq. (MHz)	Level (dBm)
1	**826.4**	-	**836.6**	-	**846.6**	-
2	**1652.8**	NF	**1673.2**	NF	**1693.2**	NF
3	**2479.2**	NF	**2509.8**	NF	**2539.8**	NF
4	**3305.6**	NF	**3346.4**	NF	**3386.4**	NF
5	**4132**	NF	**4183**	NF	**4233**	NF
6	**4958.4**	NF	**5019.6**	NF	**5079.6**	NF
7	**5784.8**	NF	**5856.2**	NF	**5926.2**	NF
8	**6611.2**	NF	**6692.8**	NF	**6772.8**	NF
9	**7437.6**	NF	**7529.4**	NF	**7619.4**	NF
10	**8264**	NF	**8366**	NF	**8466**	NF
NF= Noise Floor Measurement Uncertainty: ±3dB						

Legend for the plots:

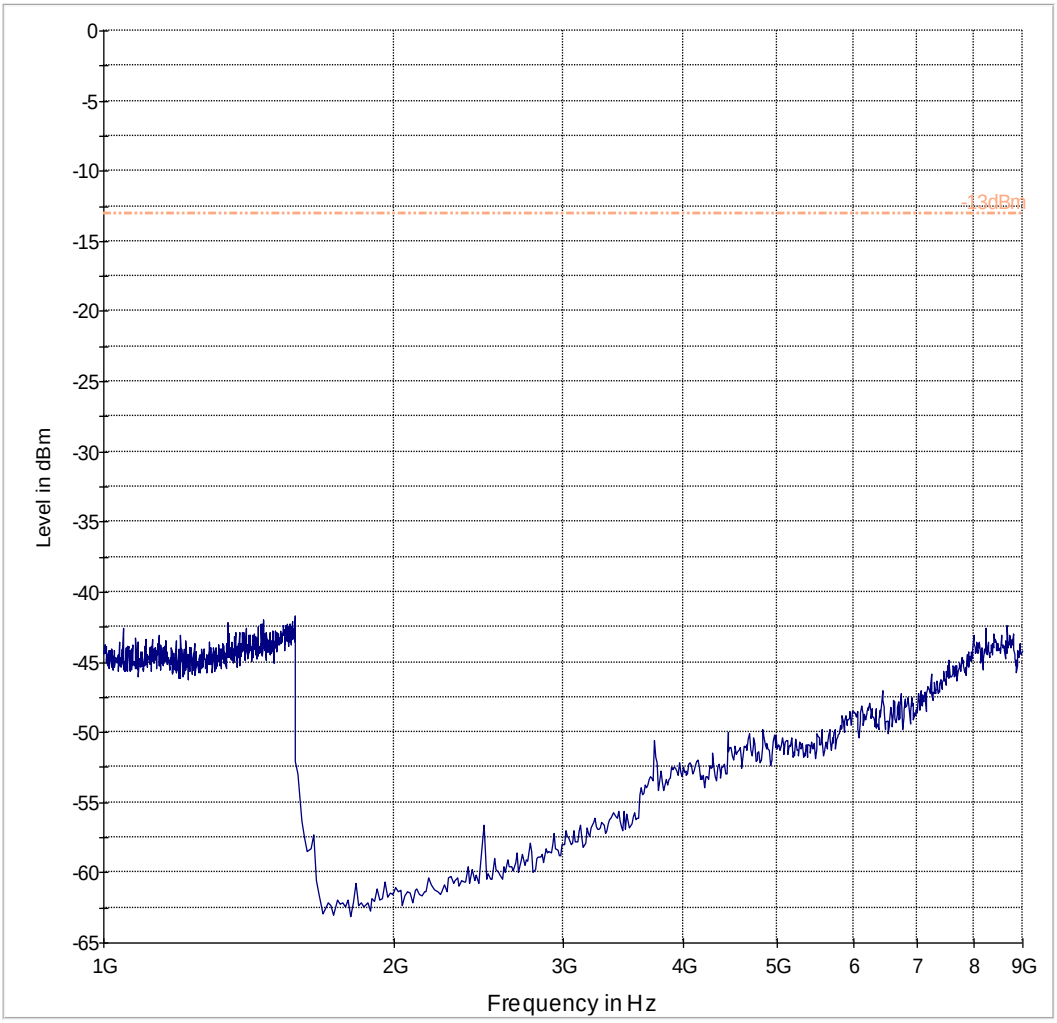


Radiated Spurious Emissions (UMTS Band 5) TX: Low Channel

Test results 30M-1GHz

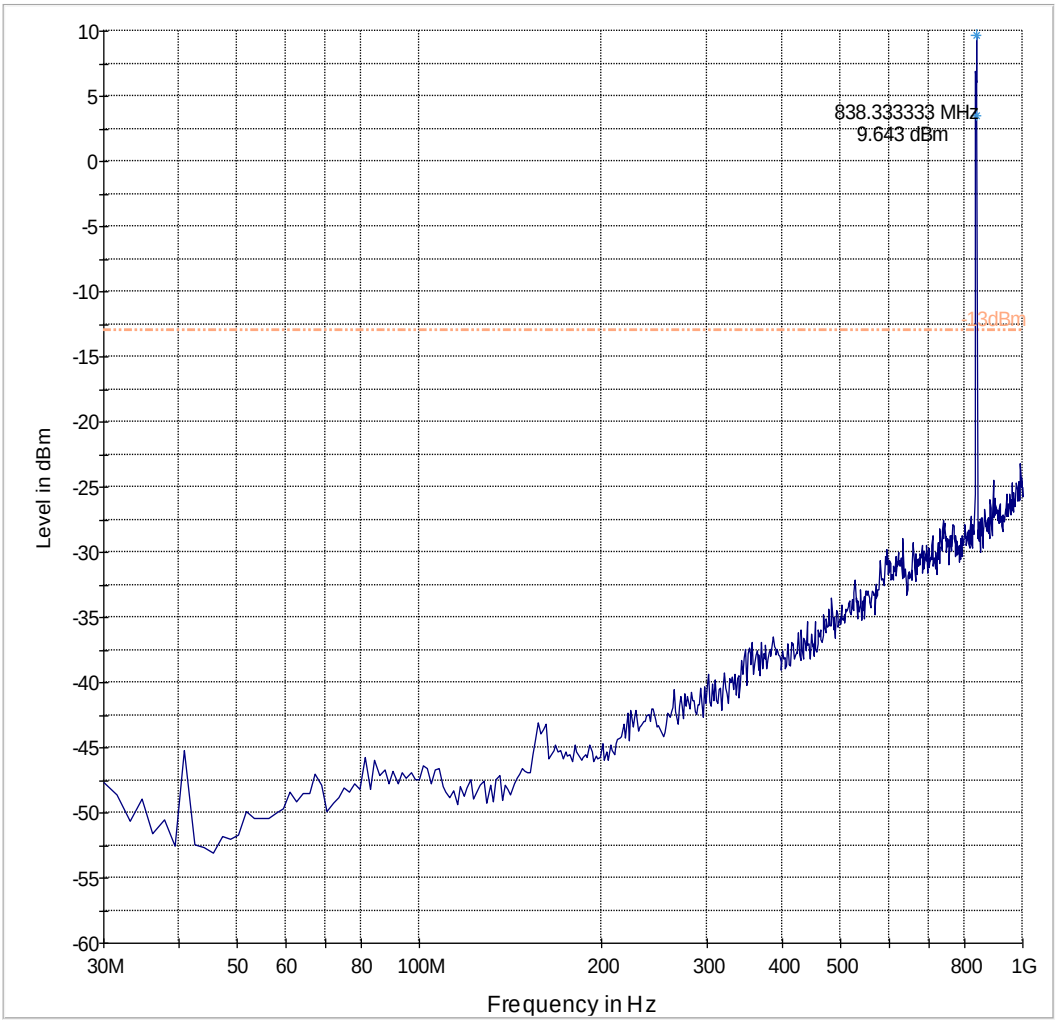


Test results 1GHz-9GHz

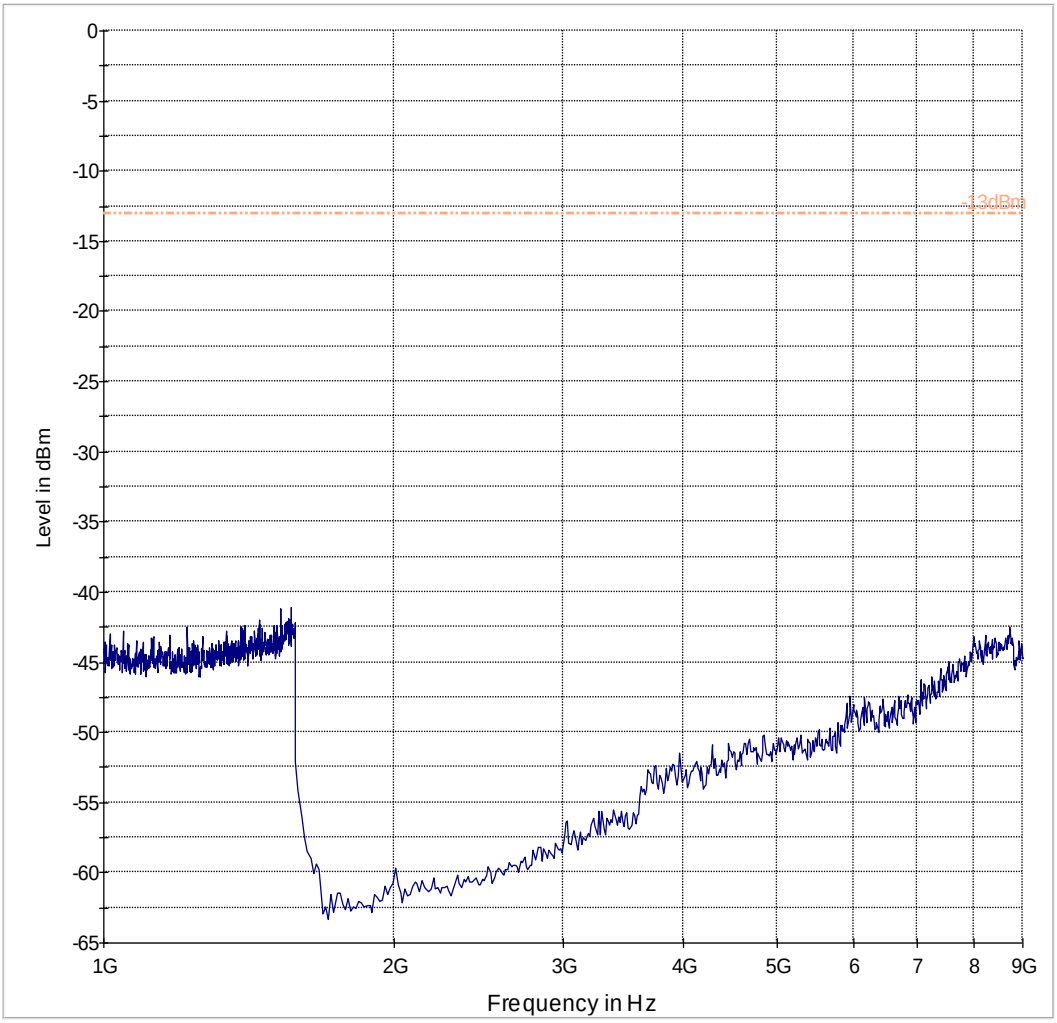


Radiated Spurious Emissions (UMTS Band 5) TX: Mid Channel

Test results 30M-1GHz

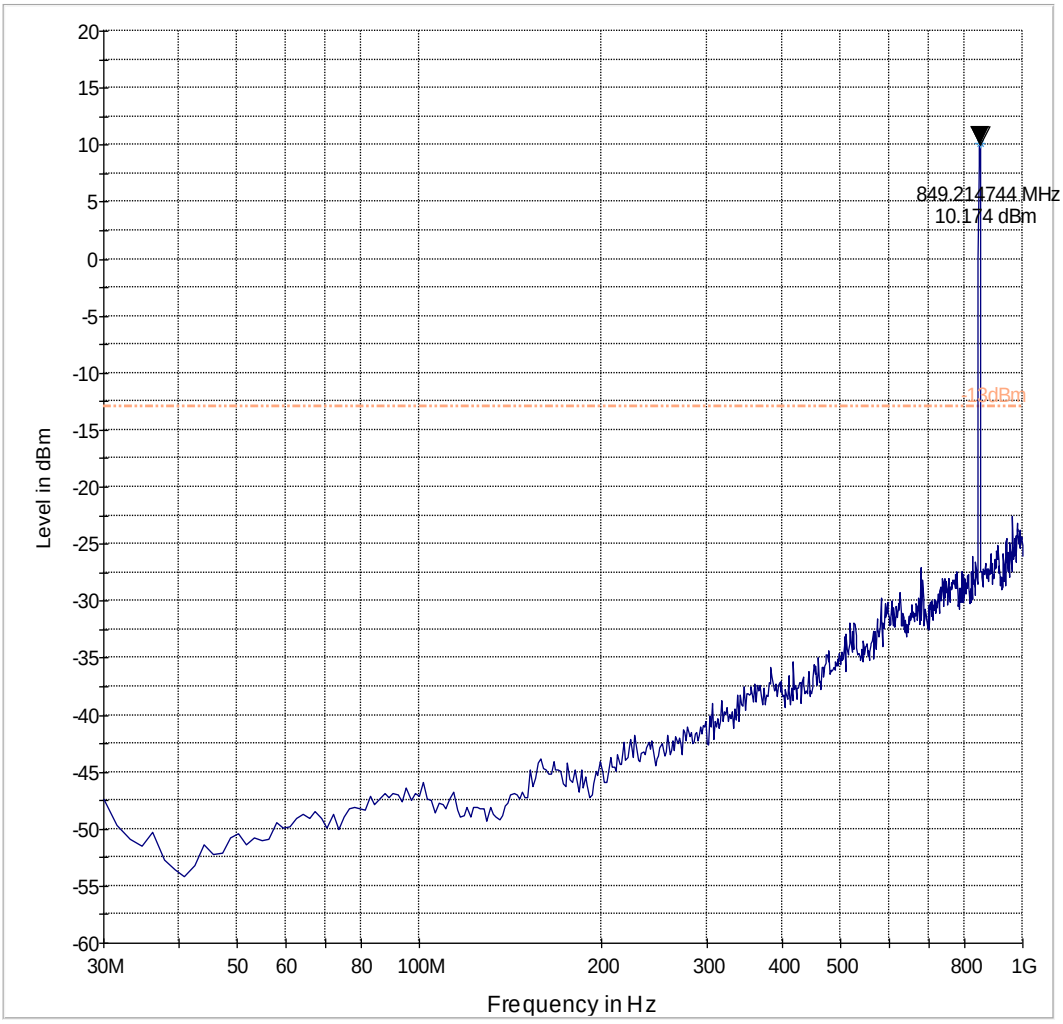


Test results 1GHz-9GHz

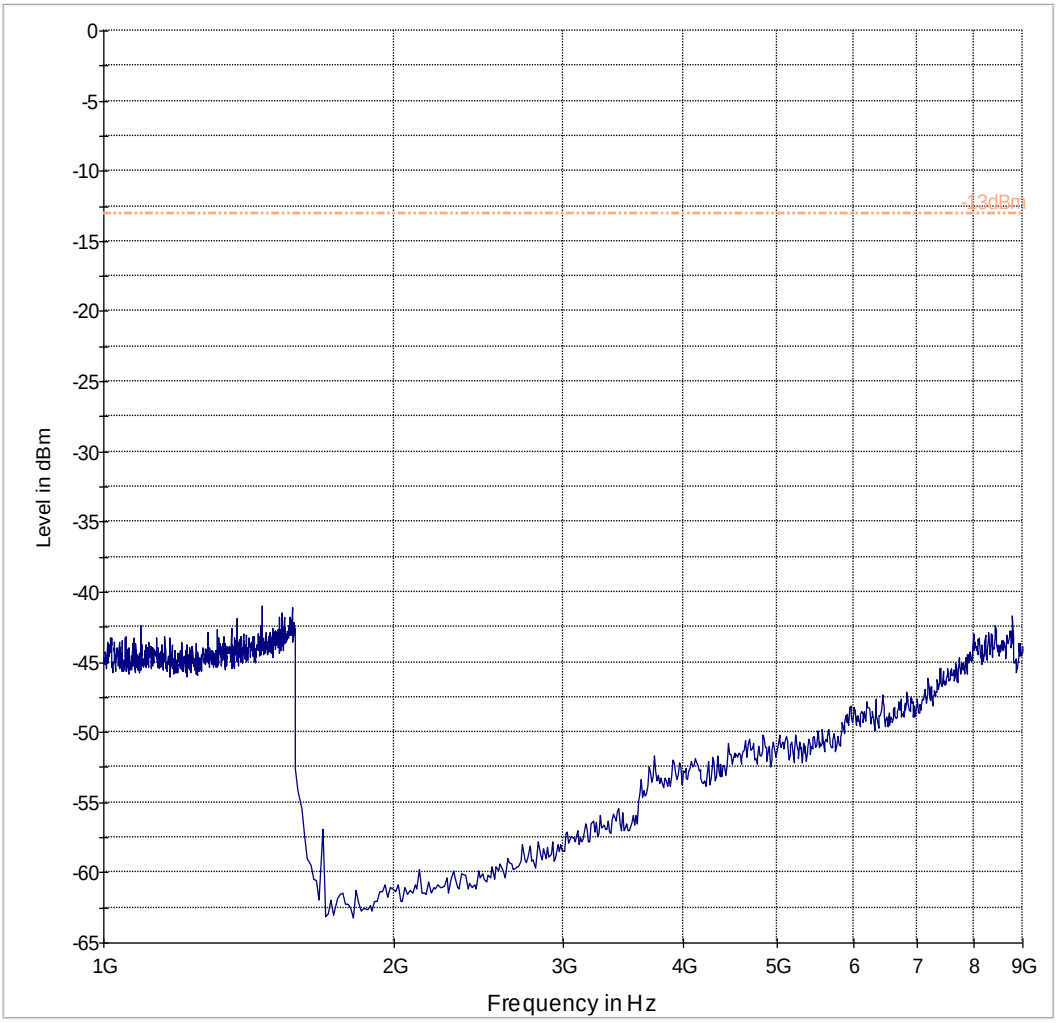


Radiated Spurious Emissions (UMTS Band 5) TX: High Channel

Test results 30M-1GHz



Test results 1GHz-9GHz



6.5.9.3 Test Results Transmitter Spurious Emission PCS-1900:

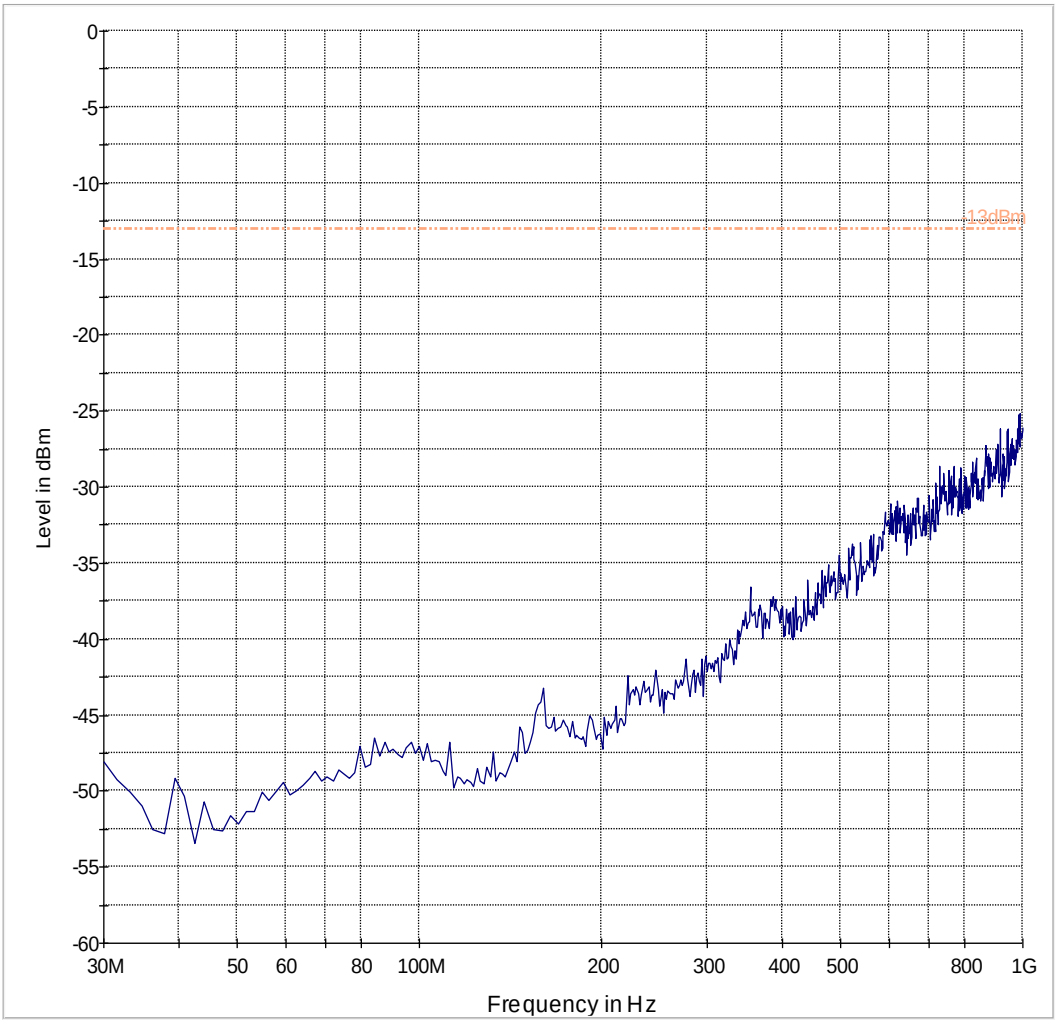
Harmonic	Tx ch-512 Freq.(MHz)	Level (dBm)	Tx ch-661 Freq. (MHz)	Level (dBm)	Tx ch-810 Freq. (MHz)	Level (dBm)
1	**1850.2**	-	**1880.0**	-	**1909.8**	-
2	**3700.4**	NF	**3760**	NF	**3819.6**	NF
3	**5550.6**	NF	**5640**	NF	**5729.4**	NF
4	**7400.8**	NF	**7520**	NF	**7639.2**	NF
5	**9251**	NF	**9400**	NF	**9549**	NF
6	**11101.2**	NF	**11280**	NF	**11458.8**	NF
7	**12951.4**	NF	**13160**	NF	**13368.6**	NF
8	**14801.6**	NF	**15040**	NF	**15278.4**	NF
9	**16651.8**	NF	**16920**	NF	**17188.2**	NF
10	**18502**	NF	**18800**	NF	**19098**	NF
NF = Noise Floor Measurement Uncertainty: ±3dB						

Legend for the plots:

-13dBm.LimitLine
Preview Result
Data Reduction Result
Final Measurement Result

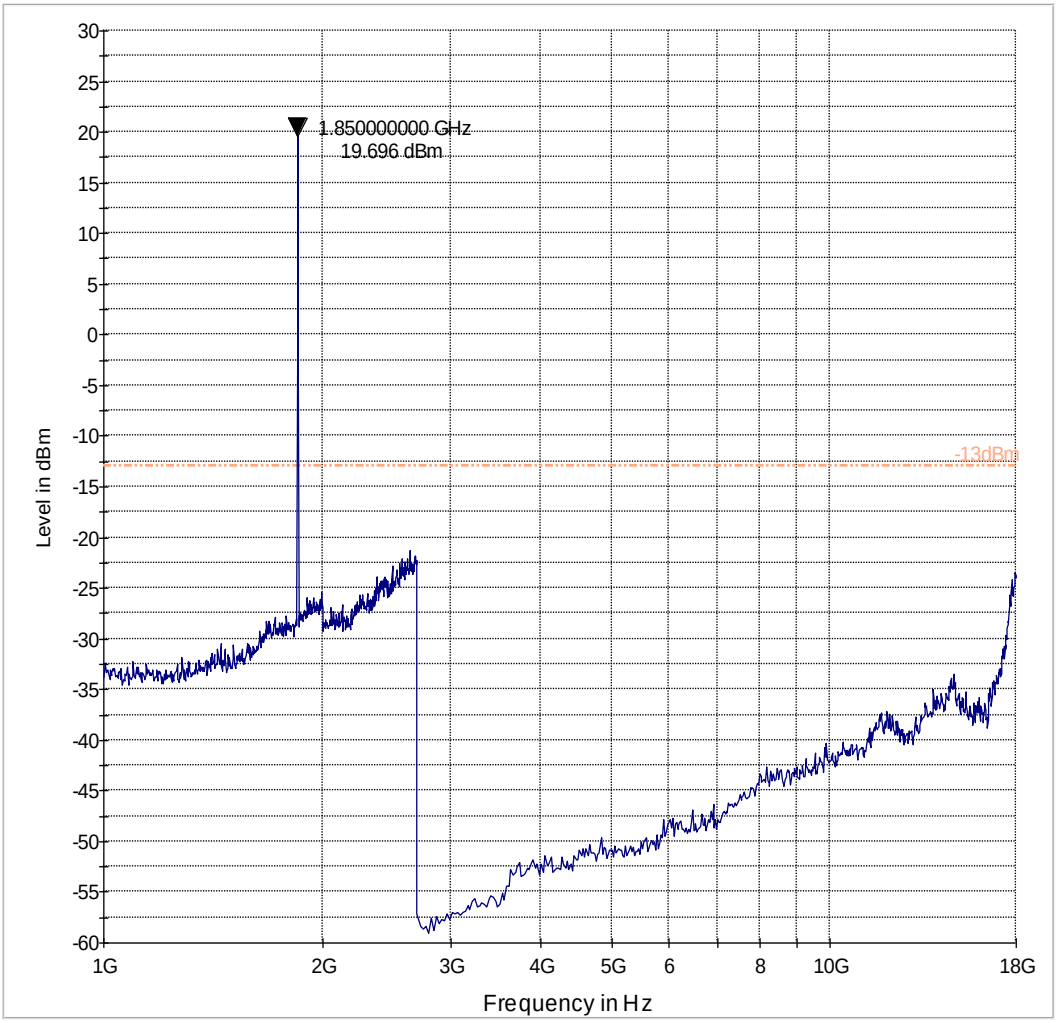
Radiated Spurious Emissions (GSM-1900) TX: Low Channel

Test results 30M-1GHz



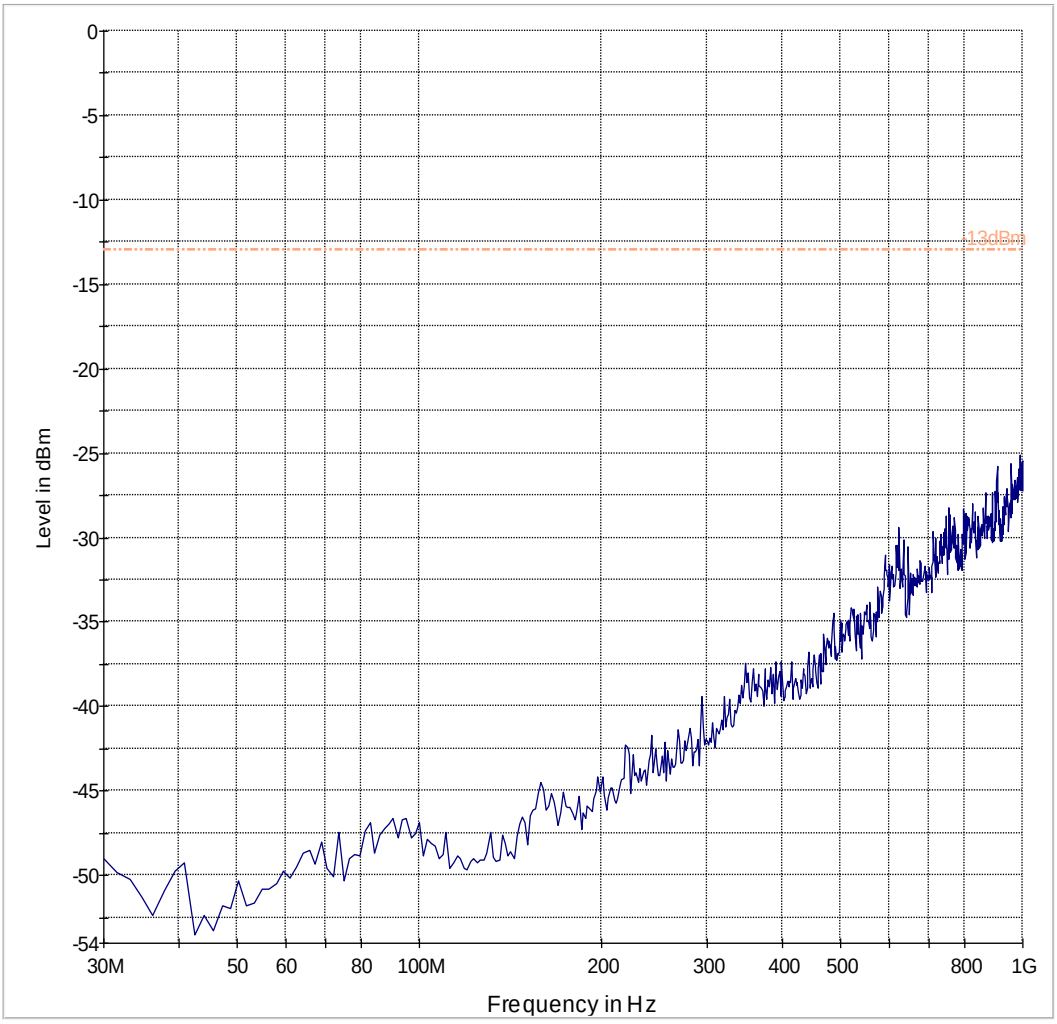
-13dBm Preview Result 1-PK+

Test results 1GHz-18GHz

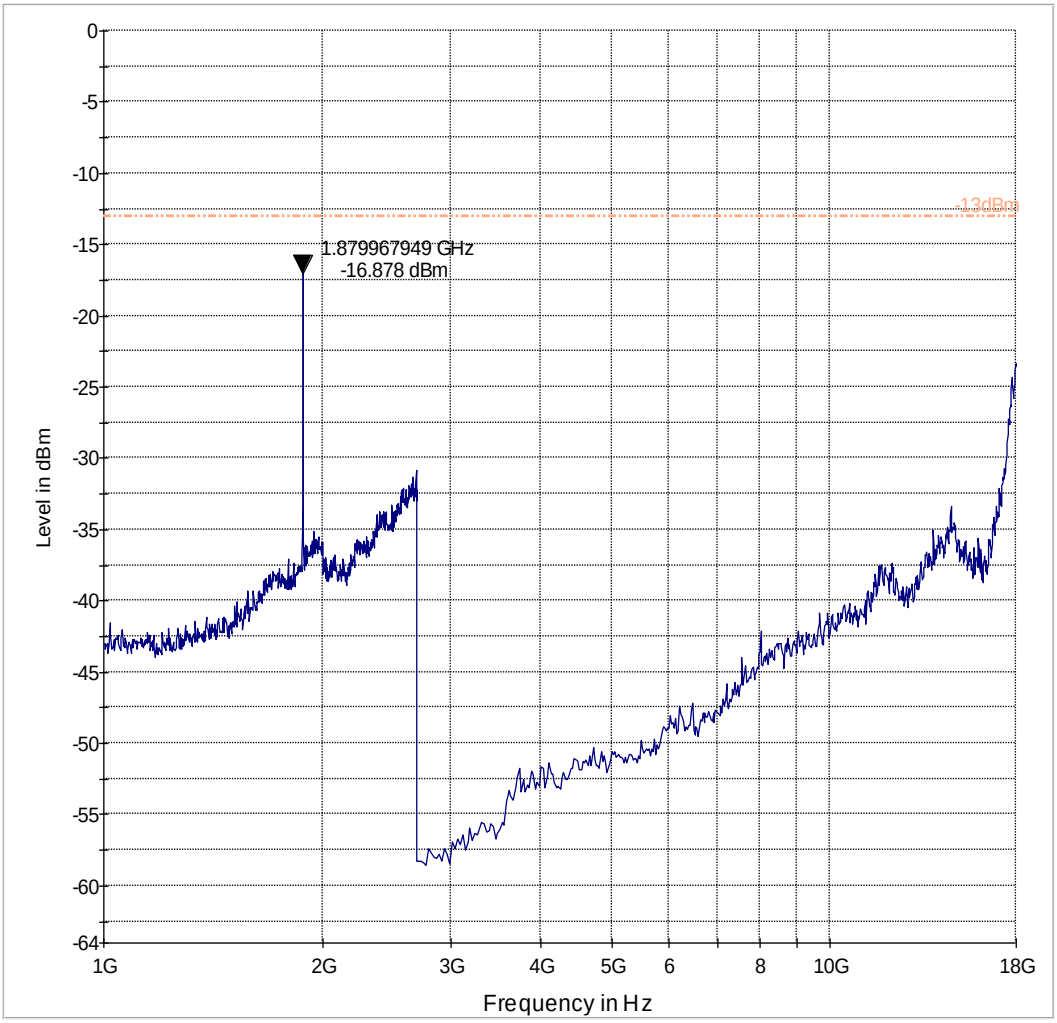


Radiated Spurious Emissions (GSM-1900) TX: Mid Channel

Test results 30M-1GHz

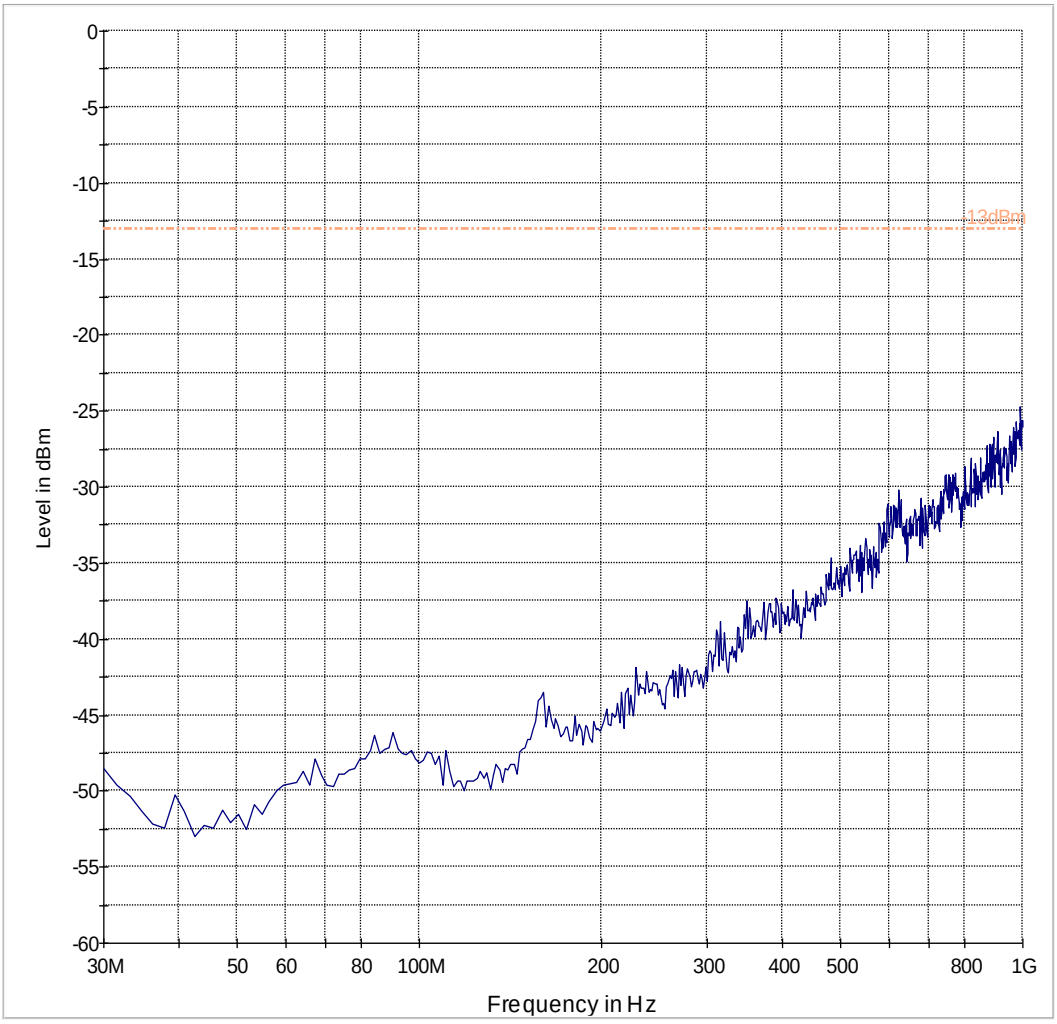


Test results 1GHz-18GHz

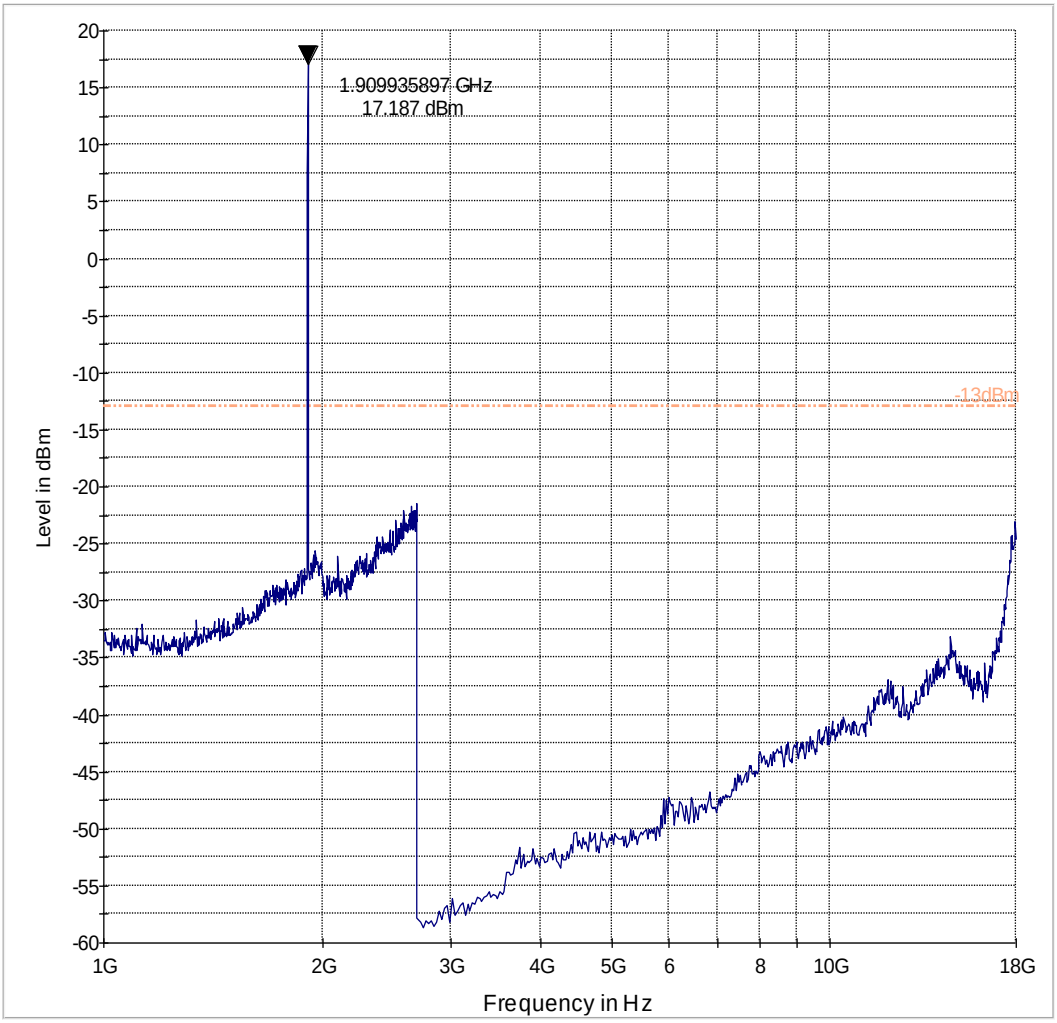


Radiated Spurious Emissions (GSM-1900) TX: High Channel

Test results 30M-1GHz

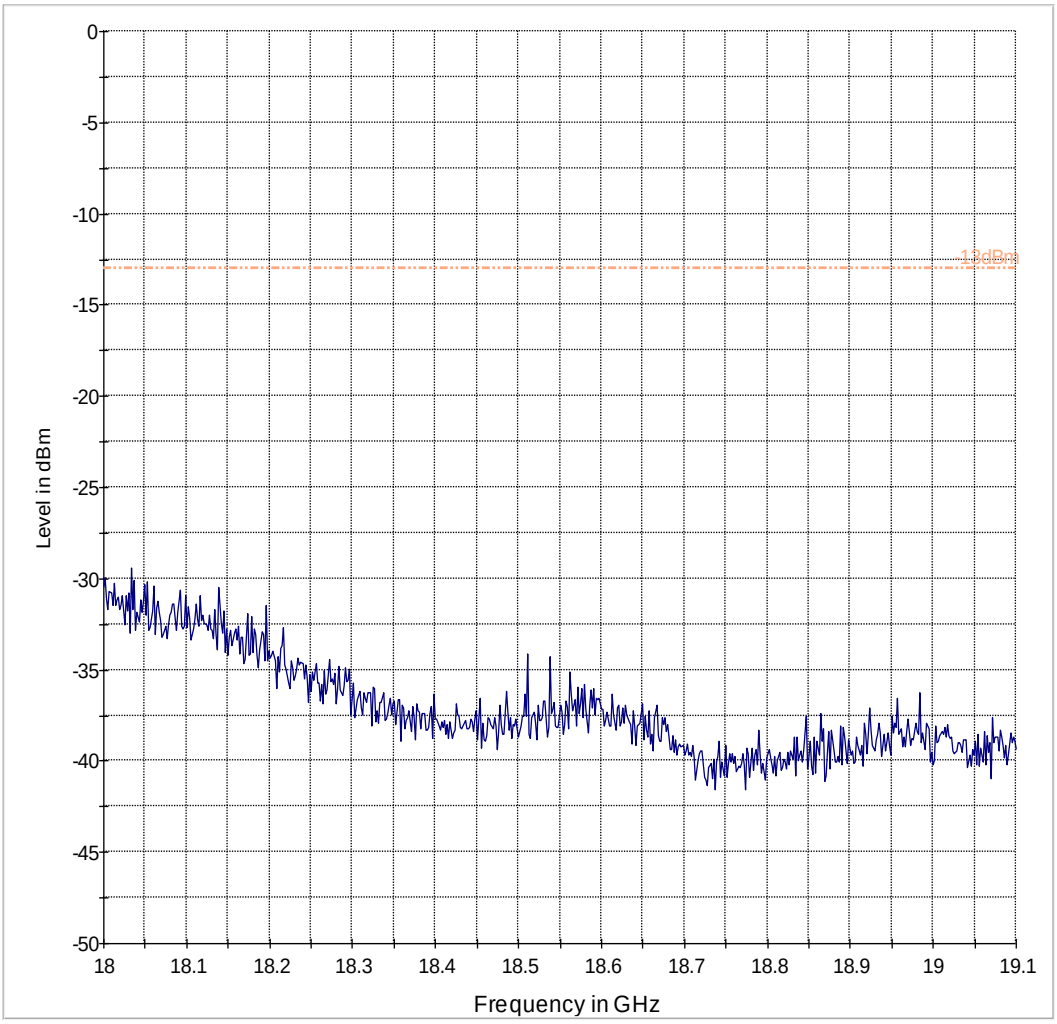


Test results 1GHz-18GHz



Test results 18GHz-19.1GHz

Note: Worst case representation for all channels of operation in band.



6.5.9.4 Test Results Transmitter Spurious Emission UMTS FDD2:

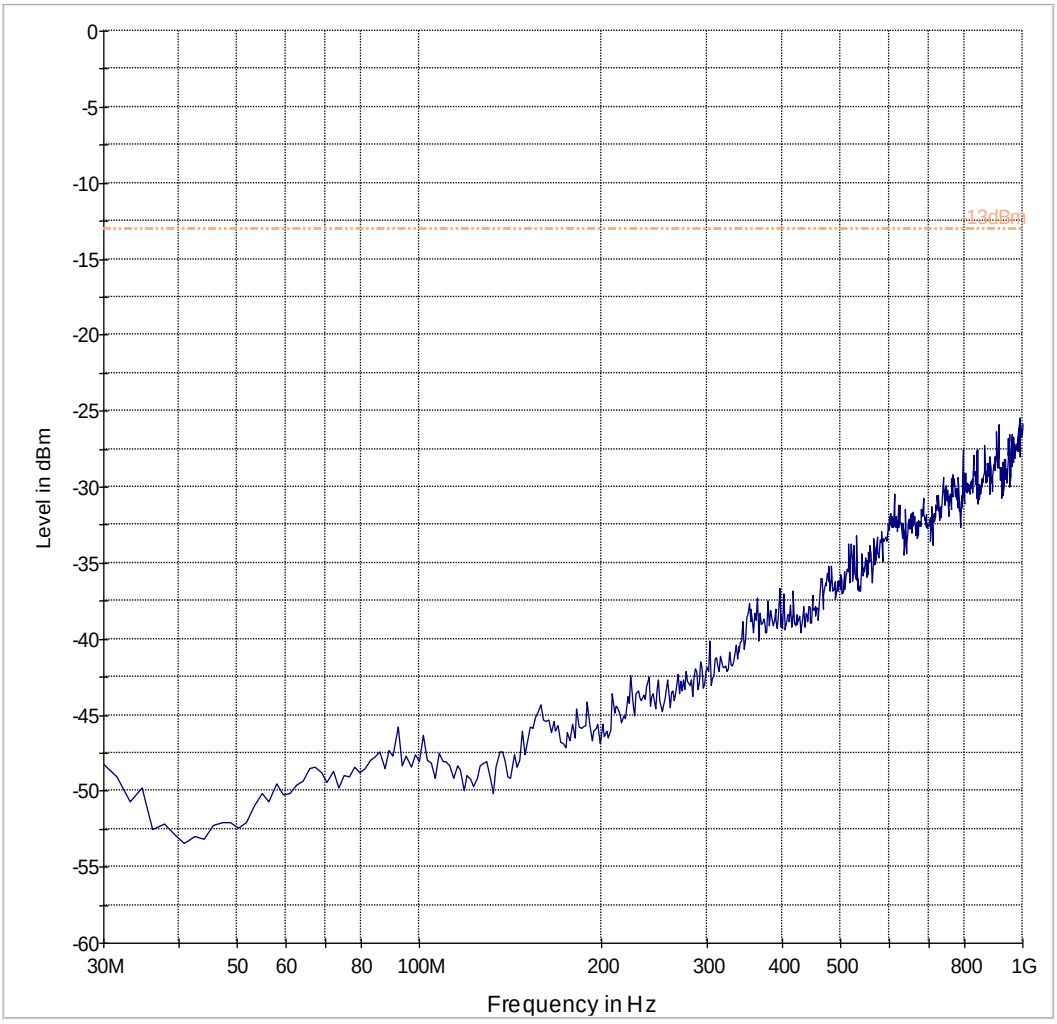
Harmonic	Tx ch-9262 Freq. (MHz)	Level (dBm)	Tx ch-9400 Freq. (MHz)	Level (dBm)	Tx ch-9538 Freq. (MHz)	Level (dBm)
1	**1852.4**	-	**1880.0**	-	**1907.6**	-
2	**3704.8**	NF	**3760**	NF	**3815.2**	NF
3	**5557.2**	NF	**5640**	NF	**5722.8**	NF
4	**7409.6**	NF	**7520**	NF	**7630.4**	NF
5	**9262**	NF	**9400**	NF	**9538**	NF
6	**11114.4**	NF	**11280**	NF	**11445.6**	NF
7	**12966.8**	NF	**13160**	NF	**13353.2**	NF
8	**14819.2**	NF	**15040**	NF	**15260.8**	NF
9	**16671.6**	NF	**16920**	NF	**17168.4**	NF
10	**18524**	NF	**18800**	NF	**19076**	NF
NF= Noise Floor Measurement Uncertainty: ±3dB						

Legend for the plots:

-13dBm.LimitLine
Preview Result
Data Reduction Result
Final Measurement Result

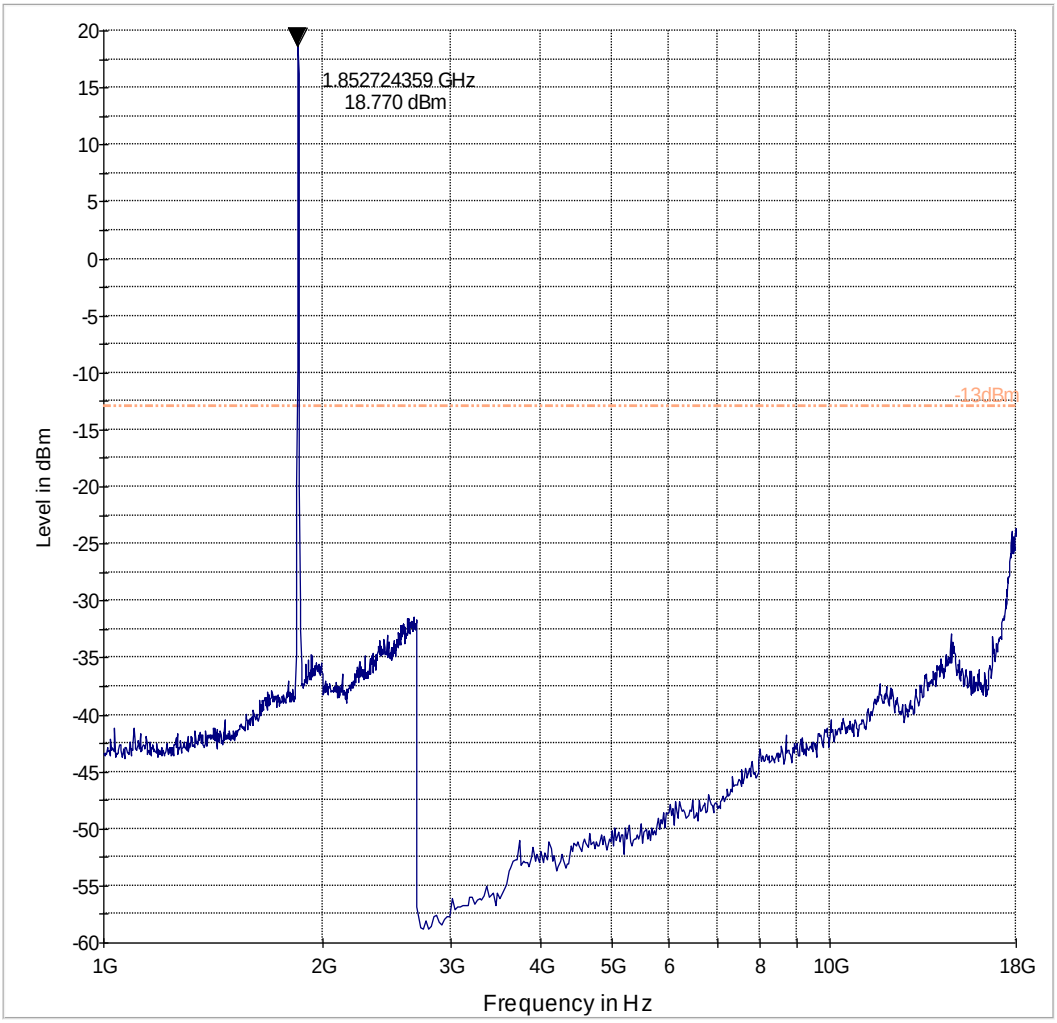
Radiated Spurious Emissions (UMTS Band 2) TX: Low Channel

Test results 30M-1GHz



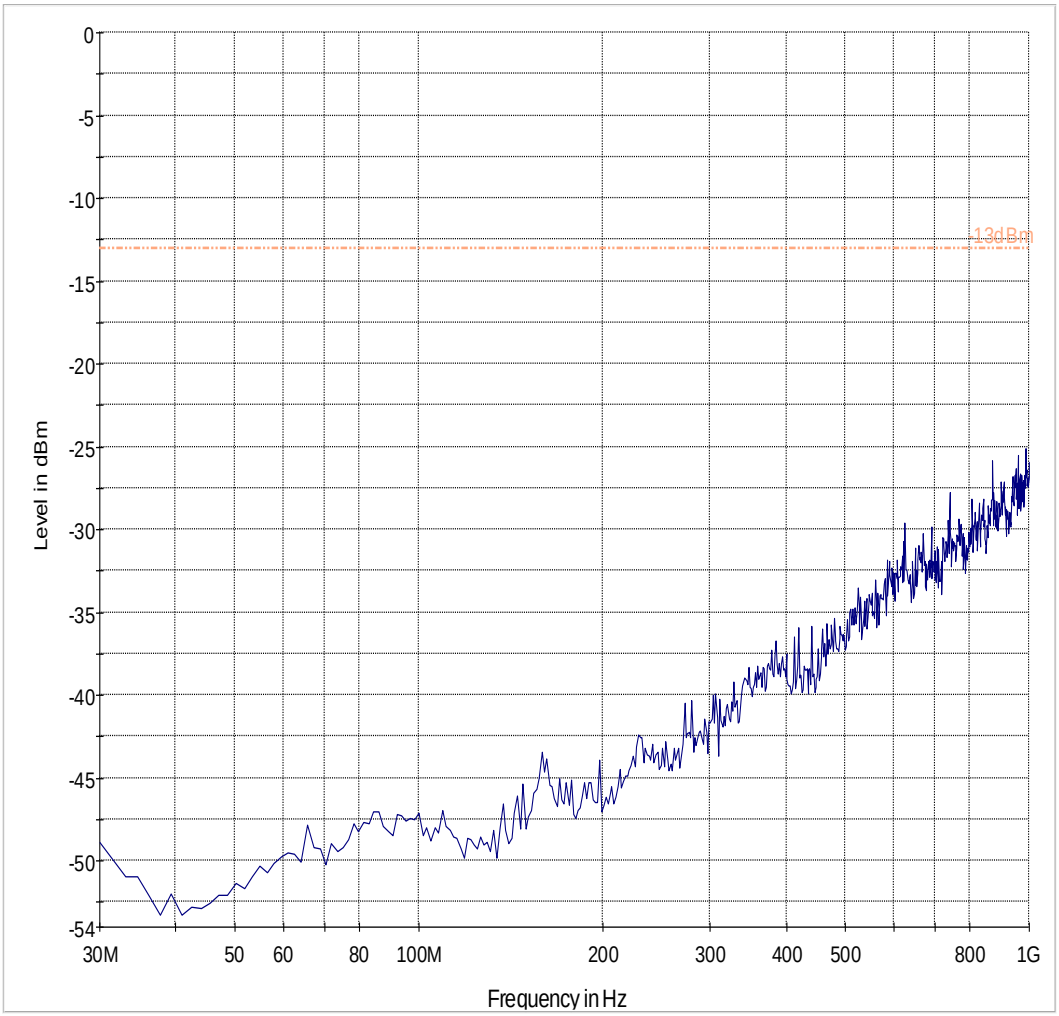
-13dBm Preview Result 1-PK+

Test results 1GHz-18GHz

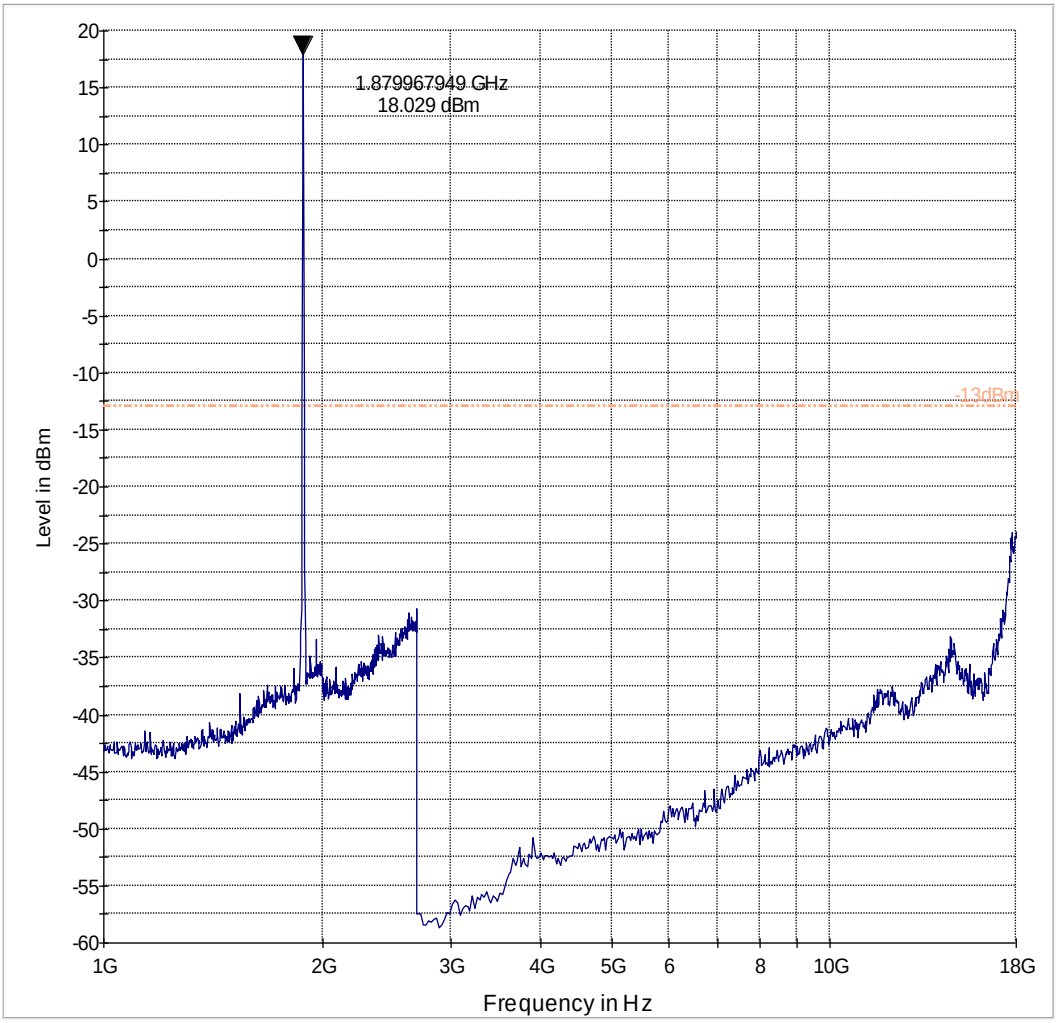


Radiated Spurious Emissions (UMTS Band 2) TX: Mid Channel

Test results 30M-1GHz

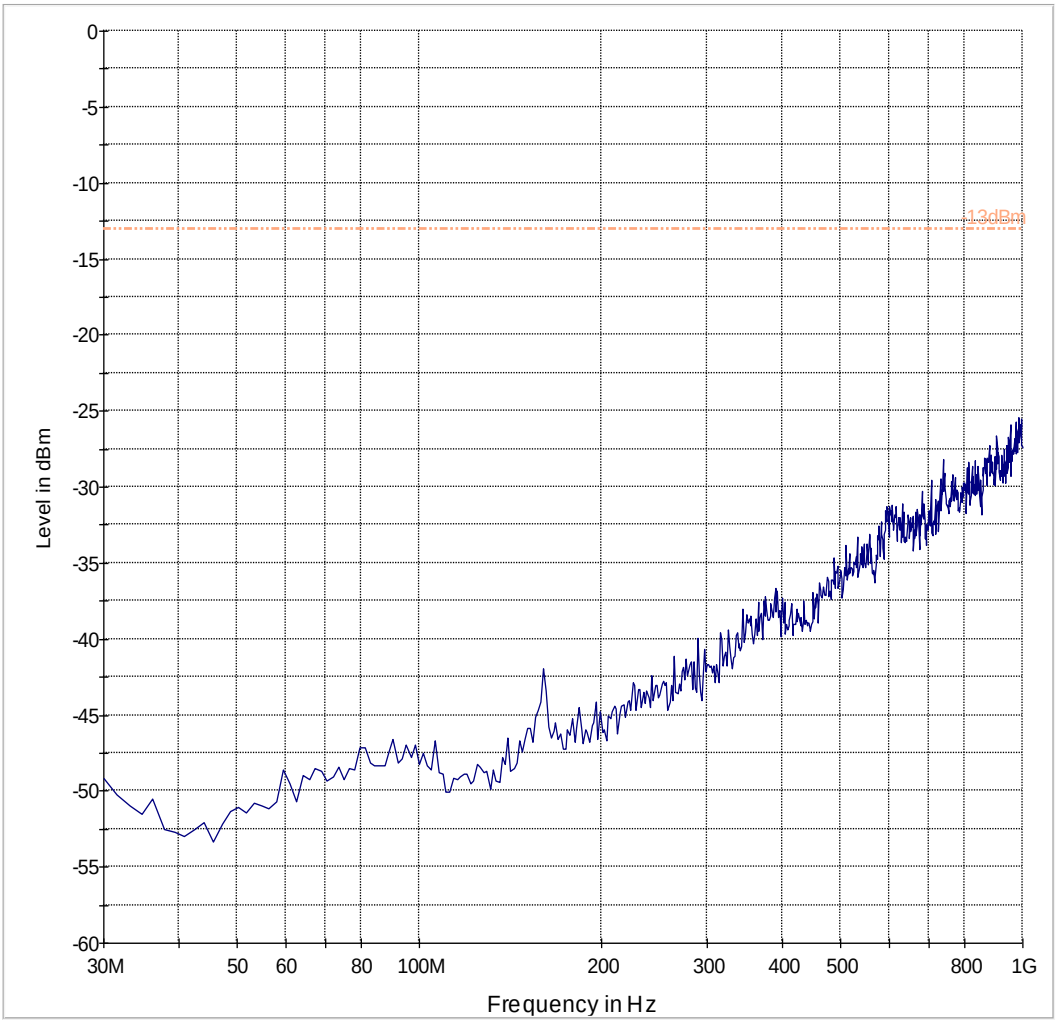


Test results 1GHz-18GHz

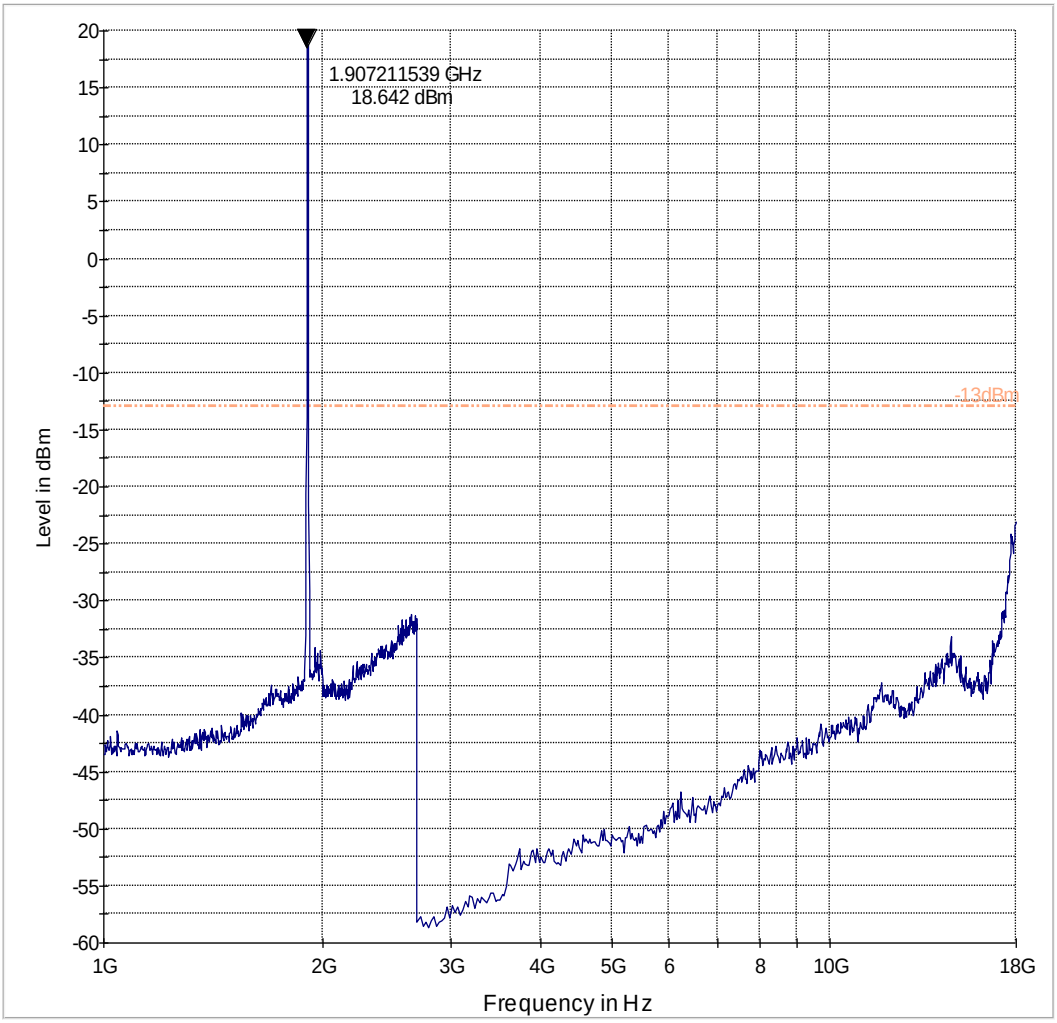


Radiated Spurious Emissions (UMTS Band 2) TX: High Channel

Test results 30M-1GHz

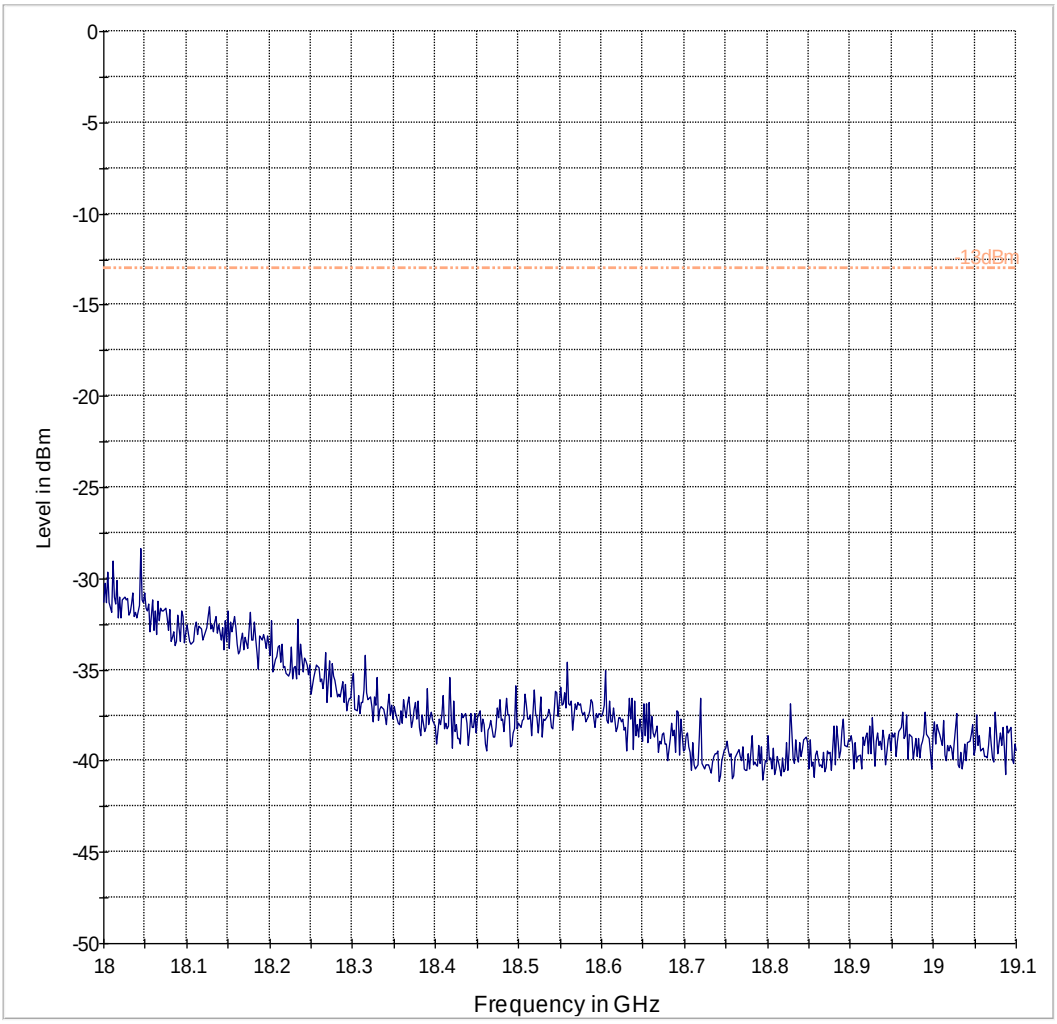


Test results 1GHz-18GHz



Test results 18GHz-19.1GHz

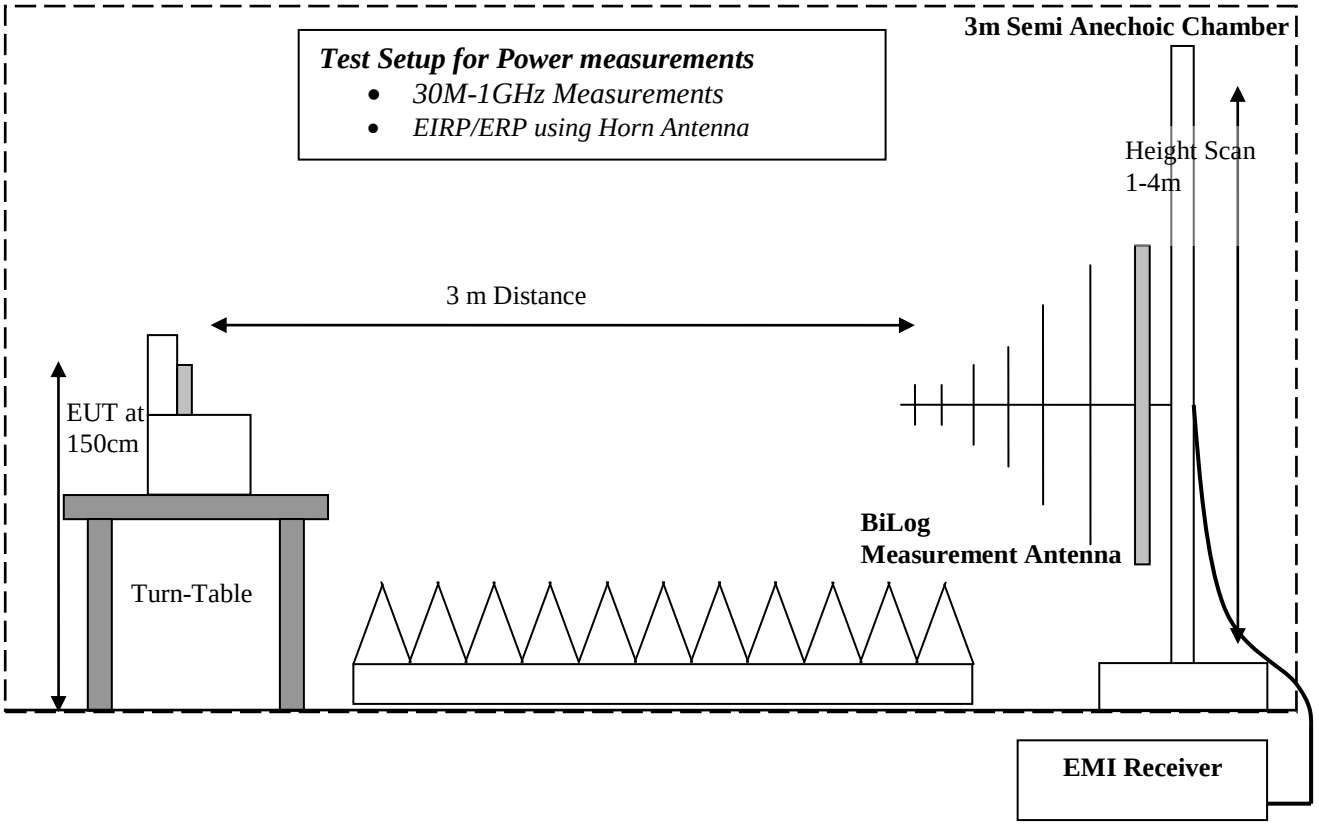
Note: Worst case representation for all channels of operation in band.

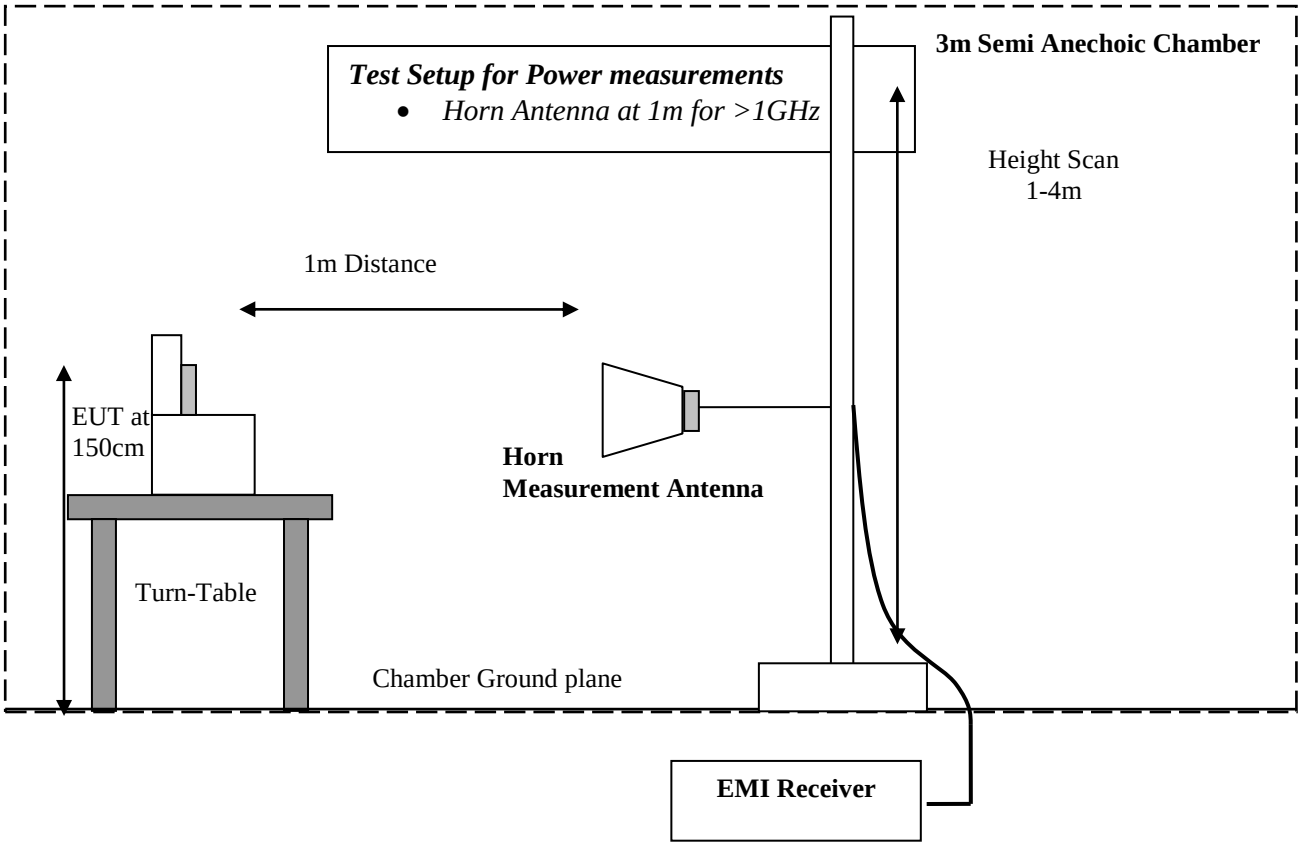


7 Test Equipment and Ancillaries used for tests

Instrument/Ancillary	Model	Manufacturer	Serial No.	Cal Date	Cal Interval
Radio Communication Tester	CMU 200	Rohde & Schwarz	101821	May 2011	2 Years
Radio Communication Tester	CMU 200	Rohde & Schwarz	109879	May 2011	2 Years
Radio Communication Tester	CMU 200	Rohde & Schwarz	110759	May 2011	2 Years
EMI Receiver/Analyzer	ESU 40	Rohde & Schwarz	100251	Aug 2012	2 Years
Spectrum Analyzer	FSU	Rohde & Schwarz	200302	May 2011	2 Years
Loop Antenna	6512	EMCO	00049838	Apr 2012	3 years
Biconilog Antenna	3141	EMCO	0005-1186	Mar 2012	3 years
Horn Antenna (1-18GHz)	3115	ETS	00035111	Mar 2012	3 years
Horn Antenna (1-18GHz)	3115	ETS	00035114	Apr 2012	3 years
Horn Antenna (18-40GHz)	3116	ETS	00070497	Aug 2011	3 years
Communication Antenna	IBP5-900/1940	Kathrein	n/a	n/a	n/a
High Pass Filter	5HC2700	Trilithic Inc.	9926013	Part of system calibration	
High Pass Filter	4HC1600	Trilithic Inc.	9922307	Part of system calibration	
6GHz High Pass Filter	HPM50106	Microtronics	001	Part of system calibration	
Pre-Amplifier	JS4-00102600	Miteq	00616	Part of system calibration	
LISN	50-25-2-08	FCC	08014	Jan 2012	1 year
Power Smart Sensor	R&S	NRP-Z81	100161	May 2011	2 Years
DC Power Supply	6655A	Hewlett Packard	3403A-00487	n/a	n/a
Multimeter	MM200	Klein	N/A	Apr 2011	2 Years
Temp Hum Logger	TM320	Dickson	03280063	Feb 2012	1 Year
Temp Hum Logger	TM325	Dickson	5285354	Feb 2012	1 Year

8 Test Setup Diagrams





9 Revision History

Date	Report Name	Changes to report	Report prepared by
2012-11-27	EMC_INTEL- 023-12001_WWAN	First Version	Daniel Salinas