



FCC Test Report

Product Name: Fixed Wireless Terminal

Model Number: F203

Report No: SYBH(Z-RF)005032011-2001
FCC ID: QISF203

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Notice

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REPORT ON

FCC Test of Fixed Wireless Terminal

M/N: F203

Report No: SYBH(Z-RF)005032011-2001

FCC ID: QISF203

REGULATION

FCC CFR47 Part 2: Subpart J;

FCC CFR47 Part 22: Subpart H;

CONCLUSION

PASS

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Contents

1	SUMMARY.....	5
2	PRODUCT DESCRIPTION	6
2.1	PRODUCTION INFORMATION.....	6
2.2	MODIFICATION INFORMATION	6
3	TEST SITE DESCRIPTION.....	7
3.1	TESTING PERIOD	7
3.2	GENERAL SET UP DESCRIPTION.....	7
4	PRODUCT DESCRIPTION.....	8
4.1	TECHNICAL CHARACTERISTICS	8
4.2	EUT IDENTIFICATION LIST.....	10
5	MAIN TEST INSTRUMENTS.....	11
6	TRANSMITTER MEASUREMENTS.....	11
6.1	EFFECTIVE RADIATED POWER OF TRANSMITTER (ERP)	12
6.2	CONDUCTED OUTPUT POWER	15
6.3	MODULATION CHARACTERISTICS	17
6.4	OCCUPIED BANDWIDTH	19
6.5	BAND EDGES COMPLIANCE.....	22
6.6	SPURIOUS EMISSION AT ANTENNA TERMINAL	24
6.7	FREQUENCY STABILITY	26
7	SYSTEM MEASUREMENT UNCERTAINTY	30
8	APPENDIXES.....	31



1 Summary

The table below summarizes the measurements and results for the CDMA Fixed Wireless Terminal F203. 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	22.913	Effective Radiated Power of Transmitter	PASS
2.1046	22.913	Conducted Power of Transmitter	PASS
2.1047		Modulation Characteristics	PASS
2.1049		Occupied Bandwidth	PASS
2.1051	22.917	Band Edges compliance	PASS
2.1051	22.917	Spurious Emission at Antenna Terminal	PASS
2.1053	22.917	Radiated Spurious Emission	PASS
2.1055	22.355	Frequency Stability	PASS

Note: The Radiated Spurious Emissions' test results are shown in the EMC report.



2 Product Description

2.1 Production Information

2.1.1 General Description

F203 is a CDMA Fixed Wireless Terminal. It's operated in Band Class 0. The Wireless Terminal implements such functions as RF signal receiving / Transmitting, CDMA protocol processing, voice, data etc. The TX is 824MHz-849MHz, the RX is 869MHz-894MHz for Band Class 0.

And only CDMA 800. The TX is 824MHz-849MHz, the RX is 869MHz-894MHz.included. Externally it provides USB interface (to computers), antenna interface, and power interface, in addition to the charging interface

2.1.2 Support function and Service

The Fixed Wireless Terminal support the function and service as follows:

Table 2 Service and Test mode List

Service Name	Characteristic	Corresponding Test Mode	Note
voice and data	Modulation: QPSK	TM1*	
voice and data	Modulation: HPSK	TM3*	

Note: * Refer to ANSI/TIA-98-E section 1.3 for the information of TM (Test Mode) .

2.2 Modification Information

For original equipment, following table is not application.

Table 3 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

Mar. 01, 2011 —Mar. 03, 2011

3.2 General Set up Description

TM1: Forward Traffic Channel Radio Configuration 1, Reverse Traffic Channel Radio Configuration 1

TM3: Forward Traffic Channel Radio Configuration 3, Reverse Traffic Channel Radio Configuration 3

Parameter	Units	Value
\hat{I}_{or}	dBm/1.23 MHz	-104
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7.4

4 Product Description

4.1 Technical Characteristics

4.1.1 Frequency Range

Table 4 Frequency Range

Uplink band:	824 to 849 MHz
Downlink band:	869 to 894 MHz

4.1.2 Channel Spacing / Separation

Table 5 Channel Spacing / Separation

Channel spacing:	1.23 MHz
Channel raster:	30 KHz

4.1.3 Type of Emission

Table 6 Type of Emission

Emission Designation:	1M23F9W
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According to CFR 47 (FCC) part 2, subpart C, section 2.201 and 2.202

4.1.4 Environmental Requirements

Table 7 Environmental Requirements

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

4.1.5 Power Source

Table 8 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:

Table 9 Applied RF module DC Voltages and Currents

Voltage:	 +3.7V
Current:	1000mA According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (8)



4.2 EUT Identification List

4.2.1 Board Information

Table 10 Board Information

Fixed Wireless Terminal		
F203		
Board and Module		
Equipment Designation / Description	Hardware Version	Serial Number
Centre Processing Unit	WL1FP2225M	731052222581
Interface Processing Unit	WLV1THTU	731052222596

4.2.2 Battery Technical Data

Name	Qty	Manufacture	Serials number	Description
Rechargeable Li-ion	1	Huawei Technologies Co., Ltd.	GRPA40226769	Battery Model: HGB-2A10x3 Rated capacity: 1000mAh Nominal Voltage:  +3.6V Charging Voltage:  +4.2V

4.2.3 FCC Identification

Grantee Code: QIS
Product Code: F203
FCC Identification: QISF203



5 Main Test Instruments

Table 11 Main Test Equipments

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until
Power supply	KEITHLEY	2303	1288003	Sep.27,2011
Wireless Communication Test set	Agilent	N4010A	MY49081592	Dec.14.2011
Universal Radio Communication Tester	R&S	CMU200	105822	Oct.24.2011
Universal Radio Communication Tester	Agilent	E5515C	MY50260239	Aug.04,2011
Spectrum Analyzer	Agilent	E4440A	MY49420179	Apr.24,2011
Signal Analyzer	R&S	FSQ40	100025	Oct.09,2011
Signal Analyzer	R&S	FSQ31	200021	Sep.27,2011
Temperature Chamber	ESPEC	MW3030	611403	May.12,2011
Signal Generator	R&S	SMR40	100325	May.12,2011
Vector Signal Generator	R&S	SMU200A	104162	Sep.07,2011
Spectrum Analyzer	R&S	FSU26	EG26725	Mar.07,2011
Test receiver	R&S	ESIB26	100318	May.04.2011
Tunable Dipole	Schwarzbeck	D69250-UHAP/ D69250-VHAP	919/1009	Dec.13.2011
Tunable Dipole	Schwarzbeck	D69250-UHAP/ D69250-VHAP	979/917	Dec.13.2011
Horn Antenna	R & S	HF906	359287/005	May.07, 2011
Horn Antenna	R & S	HF906	359287/006	April.27, 2011
Broadband Antenna	SCHAFFNER	CBL 6112B	2536	Sep.21, 2011
Broadband Antenna	SCHAFFNER	CBL 6112B	2941	Jun.11, 2011
Horn Antenna	ETS-LINDGR EN	3160	60008	Sep.20.2011
Horn Antenna	ETS-LINDGR EN	3160	60006	Oct.27.2011



6 Transmitter Measurements

6.1 Effective Radiated Power of Transmitter (ERP)

6.1.1 Test Conditions

Table 12 Test Conditions

Preconditioning:	0.5 hour
Measured at:	enclosure
Ambient temperature:	25.3°C
Relative humidity:	51%
Test Configurations:	CDMA TM1 and TM3 at frequency B,M,T

6.1.2 Test Specifications and Limits

6.1.2.1 Specification

CFR 47 (FCC) part 2.1046 and part 22.913

6.1.2.2 Supporting Standards

Table 13 Supporting Standards:

ANSI/TIA-603-C:2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA-98-E: 2003	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum F203

6.1.2.3 Limits

Compliance with part 22.913, in no any case may the peak power of a HUAWEI C8500/C8500 cdma2000 Digital Mobile Phone transmitter exceed 7 W. The calculated longitude ERP by following formula: $ERP(dBm) = 10 \cdot \log(ERP_{in\ mwatts})$.

Table 14 Limits

Maximum Output Power (Watts)	< 7 Watts
Maximum Output Power (dBm)	< 38.5 dBm

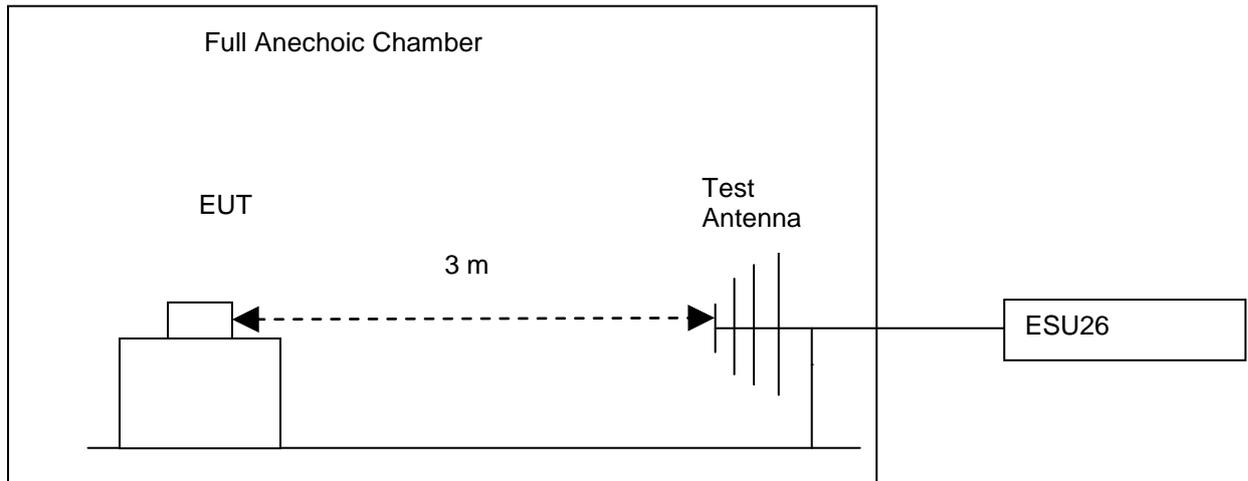
6.1.3 Test Method and Setup

- (a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, ERP 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 HUAWEI C8500/C8500 cdma2000 Digital Mobile Phone to the wireless communication tester CMU200 via the air interface. The band class is set as US Cellular.
- (b) Test the Radiated maximum output power by the CMU200 received from test antenna.

- (c) 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 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 ERP

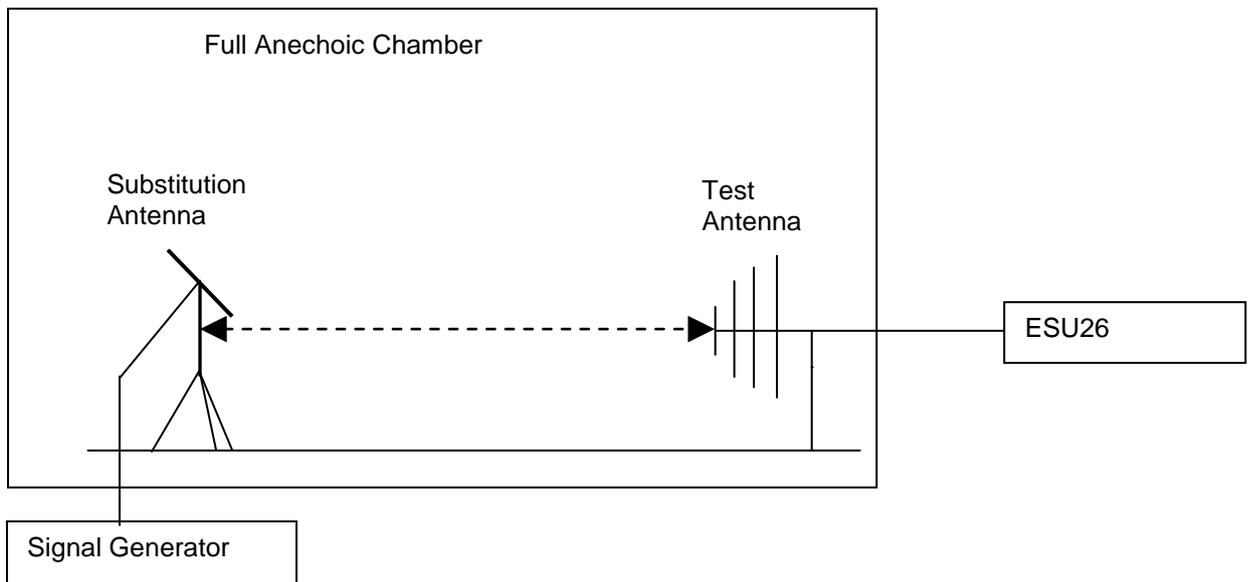


Figure 1. Test Set-up

NOTE: Effective radiated power (ERP) refers to the radiation power output of the EUT, assuming all emissions are radiated from half-wave dipole antennas.



6.1.4 Measurement Results

Table 15 Measurement Results

TEST CONDITIONS		RF Output Power(ERP)					
		Channel1013(B) 824.7MHz		Channel283(M) 833.49Mhz		Channel777(T) 848.31MHz	
		dBm		dBm		dBm	
		Measured	Limit	Measured	Limit	Measured	Limit
TM1	T _{nom} (25 °C) V _{nom} (3.7V)	22.20	38.5	22.11	38.5	21.93	38.5
TM3	T _{nom} (25 °C) V _{nom} (3.7V)	22.51	38.5	22.34	38.5	22.03	38.5

6.1.4.1 Substitution Results

Table 16 Substitution Results

Test Mode	Freq. [MHz]	Meas. Level [dBm]	Substitution Antenna Type	SGP [dBm]	Substitution Gain [dBd]	Cable Loss [dB]	Substitution Level (ERP)[dBm]	Limit [dBm]	Result
TM1	824.7	22.20	Dipole Ant.	25.80	-2.95	0.6	22.25	38.5	Pass
TM1	833.49	22.11	Dipole Ant.	25.83	-3.02	0.6	22.21	38.5	Pass
TM1	848.31	21.93	Dipole Ant.	25.77	-3.11	0.6	22.06	38.5	Pass
TM3	824.7	22.51	Dipole Ant.	26.03	-2.95	0.6	22.48	38.5	Pass
TM3	833.49	22.34	Dipole Ant.	26.08	-3.02	0.6	22.46	38.5	Pass
TM3	848.31	22.03	Dipole Ant.	25.94	-3.11	0.6	22.23	38.5	Pass

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

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

NOTE: SGP- Signal Generator Level

b, A CDMA EVDO signal with bandwidth of 1.23MHz is created by the vector generator R&S SMU200A.

c, RBW=10kHz, VBW=300kHz, and integrated by the instrument to 1.23MHz.

6.1.5 Conclusion

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



6.2 Conducted output power

6.2.1 Test Conditions

Table 17 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25.3°C
Relative humidity:	51%
Test Configurations:	CDMA TM1 and TM3 at frequency B,M ,T

6.2.2 Test Specifications and Limits

6.2.2.1 Specification

CFR 47 (FCC) part 2.1046 and part 22.913

6.2.2.2 Supporting Standards

Table 18 Supporting Standards:

ANSI/TIA-603-C:2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA-98-E: 2003	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations

6.2.2.3 Limits

Compliance with part 22.913, in no any case may the peak power of a mobile station transmitter exceed 7 W. The calculated longitude ERP by following formula:

$$ERP(dBm) = 10 \cdot \log (ERP_{in \text{ mwatts}}).$$

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

$$P_{cod.}(dBm) = ERP(dBm) - Gain(dBd).$$

and Gain (dBd) = Gain(dBi) - 2.15dB

Table 19 Limits

Maximum Output Power (Watts)	< 7 Watts (38.5dBm)
Antenna Gain(dBd):	-2
Maximum Conducted Output Power (dBm)	< 40.5dBm

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 Mobile Station to the wireless communication tester CMU200 via the antenna connector. The band class is set as US Cellular.

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

Test setup

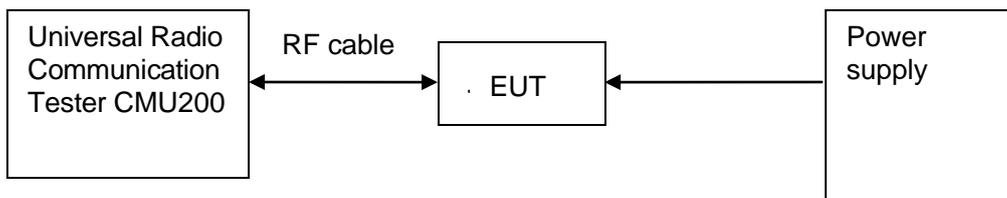


Figure 2. Test Set-up

6.2.4 Measurement Results

Table 20 Measurement Results

TEST CONDITIONS		RF Output Power(ERP)					
		Channel1013(B) 824.7MHz		Channel283(M) 833.49Mhz		Channel777(T) 848.31MHz	
		dBm		dBm		dBm	
		Measured	Limit	Measured	Limit	Measured	Limit
TM1	Tnom (25 °C) Vnom (3.7V)	24.79	40.5	24.63	40.5	24.48	40.5
TM3	Tnom (25 °C) Vnom (3.7V)	24.94	40.5	24.71	40.5	24.60	40.5

6.2.5 Conclusion

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



6.3 Modulation Characteristics

6.3.1 Test Conditions

Table 21 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25.3 °C
Relative humidity:	51 %
Test Configurations:	CDMA mode TM1 and TM3 at frequency M

6.3.2 Test Specifications and Limits

6.3.2.1 Specification

CFR 47 (FCC) part 2.1047 and part 22 subpart H.

6.3.2.2 Supporting Standards

Table 22 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA-98-E: 2003	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum HUAWEI C8500/C8500 Wireless Modules.

6.3.2.3 Limits

No specific modulation characteristics requirement limits in part 2.1047 and part 22 subpart H.

Table 23 Limits

Limits	Not applicable
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6.3.3 Test Method and Setup

Connect the F203 to Universal Radio Communication Tester CMU200 via the antenna connector. The band class is set as US Cellular; the F203 output is matched with 50 Ω loads, test method was according to ANSI/TIA-98-E. The waveform quality and constellation of F203 were tested.

Test setup

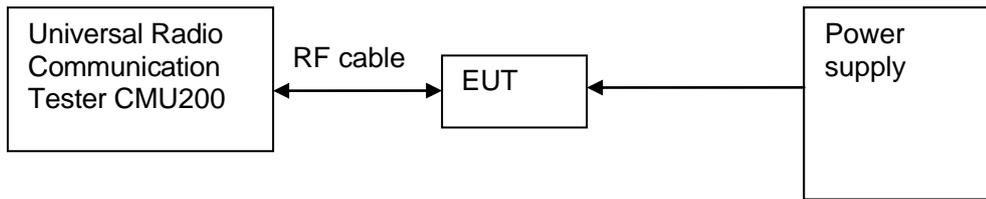


Figure 3. Test Set-up

6.3.4 Measurement Results

Table 24 Measurement Results

TEST CONDITIONS	Modulation Characteristic	
	Channel 283(M) 833.49MHz	
	Measured	
	CDMA Mode TM1 & TM3	
T _{nom} (25 °C)	V _{nom} (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

Table 25 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25.3 °C
Relative humidity:	51 %
Test Configurations:	CDMA TM1 and TM3 at frequency B,M ,T

6.4.2 Test Specifications and Limits

6.4.2.1 Specification

CFR 47 (FCC) part 2.1049 and part 22 subpart H.

6.4.2.2 Supporting Standards

Table 26 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA-98-E: 2003	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum.

6.4.2.3 Limits

No specific occupied bandwidth requirement in part 22 subpart H, 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.

Table 27 Limits

Upper /lower frequency limits	0.5% of the mean power
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6.4.3 Test Method and Setup

F203 was connected to the wireless signal analyzer FSQ31 via the one RF connector. The band class is set as US Cellular; F203 was controlled to transmit maximum power. Measure and record the occupied bandwidth of the F203 by the 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.

Measurement bandwidth (RBW): 30 kHz (Resolution bandwidth)

Video bandwidth (VBW): 300 kHz

Test Set-up

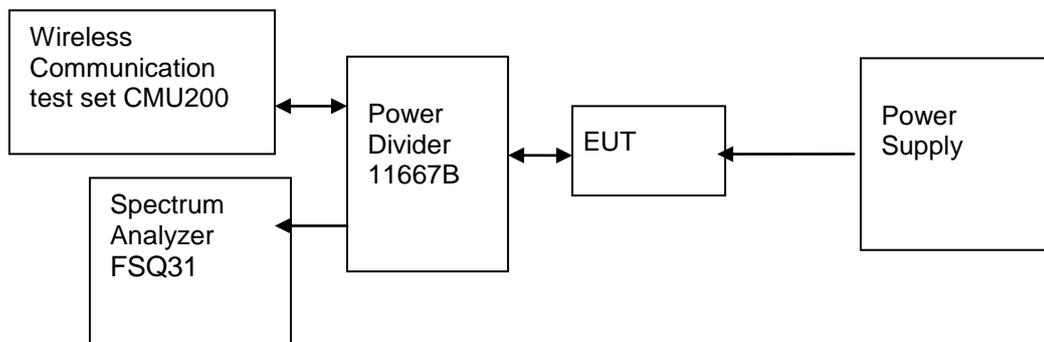


Figure 4. Test Set-u

6.4.4 Measurement Results

Table 28 Measurement Results

TEST CONDITIONS		Occupied Bandwidth					
		Channel1013 (B) 824.70MHz		Channel283 (M) 833.49Mhz		Channel777(T) 848.31MHz	
		Measured (MHz)		Measured (MHz)		Measured (MHz)	
		CDMA		CDMA		CDMA	
		TM1	TM3	TM1	TM3	TM1	TM3
Tnom (25 °C)	Vnom (3.7V)	1.284	1.284	1.276	1.269	1.269	1.269



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

Table 29 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25.3°C
Relative humidity:	51 %
Test Configurations:	CDMA TM1 and TM3 at frequency B,T

6.5.2 Test Specifications and Limits

6.5.2.1 Specification

CFR 47 (FCC) part 2.1051 and part 22.917

6.5.2.2 Supporting Standards

Table 30 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA-98-E: 2003	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum.

6.5.2.3 Limits

Compliance with 22.917, 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 in Watt).

Table 31 Limits

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

6.5.3 Test Method and Setup

F203 was connected to the wireless signal analyzer FSQ31 via the one RF connector, the band class is set as US Cellular. FSQ31 was controlled to transmit maximum power. Measure and record Band edge compliance of the F203 by the FSQ31.

Measurement bandwidth (RBW): 13 kHz (Resolution bandwidth)

Video bandwidth (VBW): 130 kHz

Test Set-up

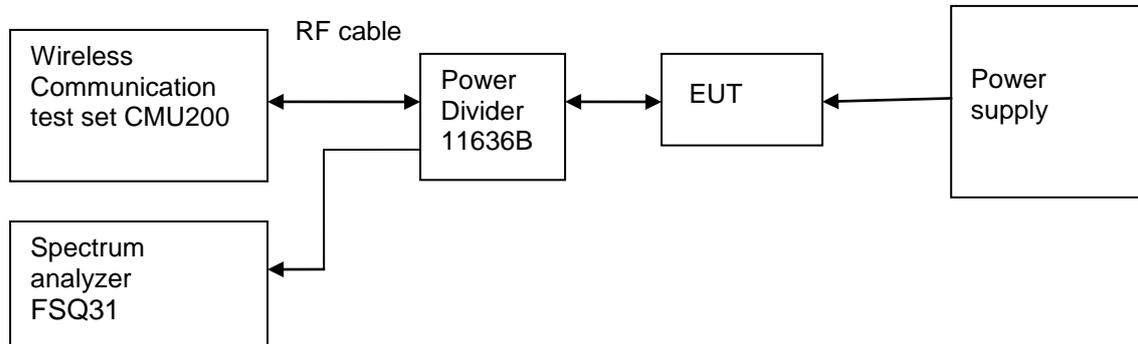


Figure 5. Test Set-up

6.5.4 Measurement Results

Table 32 Measurement Results outside Band Edges-- Single Carrier

Band	Frequency of Band edges [MHz]	Channel Number	Test Mode	Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
US Cellular	$T_{nom} (25\text{ }^{\circ}\text{C}), V_{nom} (3.7\text{V})$						
	824	1013 (B)	TM1 & TM3	24	<-13(See appendix C)	- 13 dBm	Pass
	849	777 (T)	TM1 & TM3	24	<-13(See appendix C)	- 13 dBm	Pass
US Cellular	$T_{nom} (25\text{ }^{\circ}\text{C}), V_{nom} (3.7\text{V})$						
	824	1013 (B)	Subtype 0 & Subtype 2	24	<-13(See appendix C)	- 13 dBm	Pass
	849	777 (T)	Subtype 0 & Subtype 2	24	<-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

Table 33 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25.3°C
Relative humidity:	51 %
Test Configurations:	CDMA TM1 and TM3 at frequency B,M,T

6.6.2 Test Specifications and Limits

6.6.2.1 Specification

CFR 47 (FCC) part 2.1051 and part 22.917

6.6.2.2 Supporting Standards

Table 34 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA-98-E: 2003	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum.

6.6.2.3 Limits

Compliance with part 22.917, 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 in Watt).

Table 35 Limits

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

6.6.3 Test Method and Setup

F203 was connected to the wireless signal analyzer FSQ31 via the one RF connector, the band class is set as US Cellular. F203 was controlled to transmit maximum power. Measure and record the Conducted Spurious Emission of the F203 by the FSQ31.

According to part 22.917, the defined measurement bandwidth as following:

22.917(b) Measurement procedure: Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz 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 30 MHz up to 1 GHz: 100 kHz;
Measurement bandwidth (RBW) for 1GHz up to 12.75GHz: 1MHz;

Test Set-up

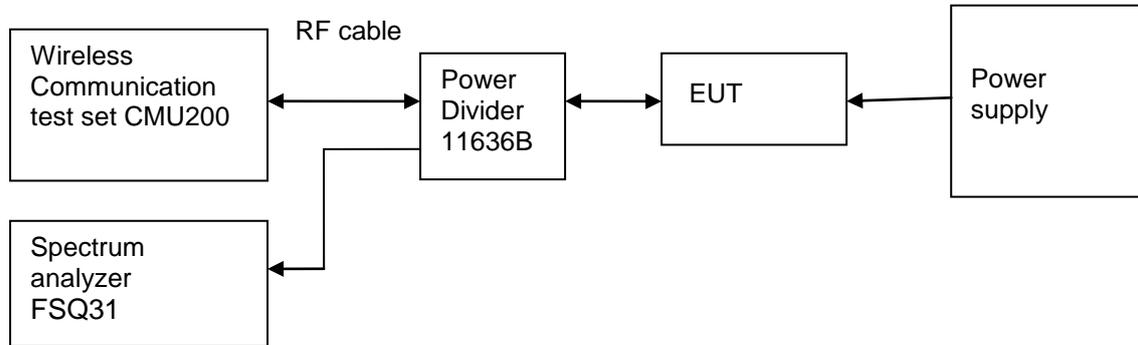


Figure 6. Test Set-up

6.6.4 Measurement Results

Table 36 Measurement Results

Channel Number	Test Mode	Test Range (Frequency)	Output Power [dBm]	Spurious Level measured [dBm]	FCC limit	Result
Channel 1013(B)	TM1	9 kHz ~12.75GHz	24	<- 13 dBm (See appendix D)	- 13 dBm	Pass
	TM3	9 kHz ~12.75GHz	24	<- 13 dBm (See appendix D)	- 13 dBm	Pass
Channel 283 (M)	TM1	9 kHz ~12.75GHz	24	<- 13 dBm (See appendix D)	- 13 dBm	Pass
	TM3	9 kHz ~12.75GHz	24	<- 13 dBm (See appendix D)	- 13 dBm	Pass
Channel 777 (T)	TM1	9 kHz ~12.75GHz	24	<- 13 dBm (See appendix D)	- 13 dBm	Pass
	TM3	9 kHz ~12.75GHz	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 Frequency Stability

6.7.1 Test Conditions

Table 37 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	See below
Relative humidity:	51 % at 25.3 °C
Test Configurations:	CDMA TM1 and TM3 at frequency M

6.7.2 Test Specifications and Limits

6.7.2.1 Specification

CFR 47 (FCC) part 2.1055 and part 22.355

6.7.2.2 Supporting Standards

Table 38 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA-98E: 2003	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum.

6.7.2.3 Limits

According to part 22.355, from 821MHz to 896MHz, for mobile device, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances 2.5ppm.

6.7.3 Test Method and Setup

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

- (1) From -30° to $+50^{\circ}$ 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 F203 to the Wireless Communication test set CMU200 via the connector. Then measure the frequency error by the Wireless Communication test set CMU200. F203's output is matched with a 50 Ω loads.

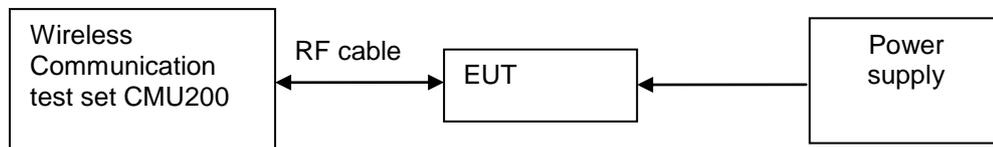


Figure 7. Test Set up

6.7.4 Measurement Results

6.7.4.1 Measurement Results vs. Variation of Temperature

- TM1, 3.7V DC Channel No.283(833.49MHz)

Table 39 Measurement Results vs. Variation of Temperature—TM1

Temperature	Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	24	833.49	-7	Pass
-20 °C	24	833.49	-11	Pass
-10 °C	24	833.49	7	Pass
0 °C	24	833.49	-15	Pass
+10 °C	24	833.49	-3	Pass
+20 °C	24	833.49	13	Pass
+30 °C	24	833.49	-5	Pass
+40 °C	24	833.49	-1	Pass
+50 °C	24	833.49	12	Pass



● TM3, 3.7V DC Channel No.283(833.49MHz)

Table 40 Measurement Results vs. Variation of Temperature – TM3

Temperature	Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
-30 °C	24	833.49	5	Pass
-20 °C	24	833.49	-13	Pass
-10 °C	24	833.49	-8	Pass
0 °C	24	833.49	-11	Pass
+10 °C	24	833.49	6	Pass
+20 °C	24	833.49	-4	Pass
+30 °C	24	833.49	5	Pass
+40 °C	24	833.49	11	Pass
+50 °C	24	833.49	-7	Pass



6.7.4.2 Measurement Results vs. Variation of Voltage

- TM1, 25 °C ,Channel No. **283(833.49MHz)**

Table 41 Measurement Results vs. Variation of Voltage—TM1

Voltage	Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
3.6	24	833.49	4	Pass
3.7	24	833.49	-11	Pass
4.2	24	833.49	3	Pass

- TM3, 25 °C ,Channel No. **283(833.49MHz)**

Table 42 Measurement Results vs. Variation of Voltage—TM3

Voltage	Power (dBm)	Nominal Frequency (MHz)	Measured Frequency Error(Hz)	Result
3.6	24	833.49	-13	Pass
3.7	24	833.49	7	Pass
4.2	24	833.49	2	Pass

6.7.5 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:

Table 43 System Measurement Uncertainty

Items		Extended Uncertainty
Effective Radiated Power of Transmitter	ERP(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
Field Strength of Spurious Radiation	ERP(dBm)	U=2.2dB; k=2
Conducted Output Power	Power(dBm)	U=0.39dB; k=2



8 Appendixes

Appendix A	Measurement Results Modulation Characteristics	3pages
Appendix B	Measurement Results Occupied Bandwidth	7 pages
Appendix C	Measurement Results Band Edges	5 pages
Appendix D	Measurement Results Spurious Emission at Antenna Terminal	25 pages

----- END OF REPORT -----



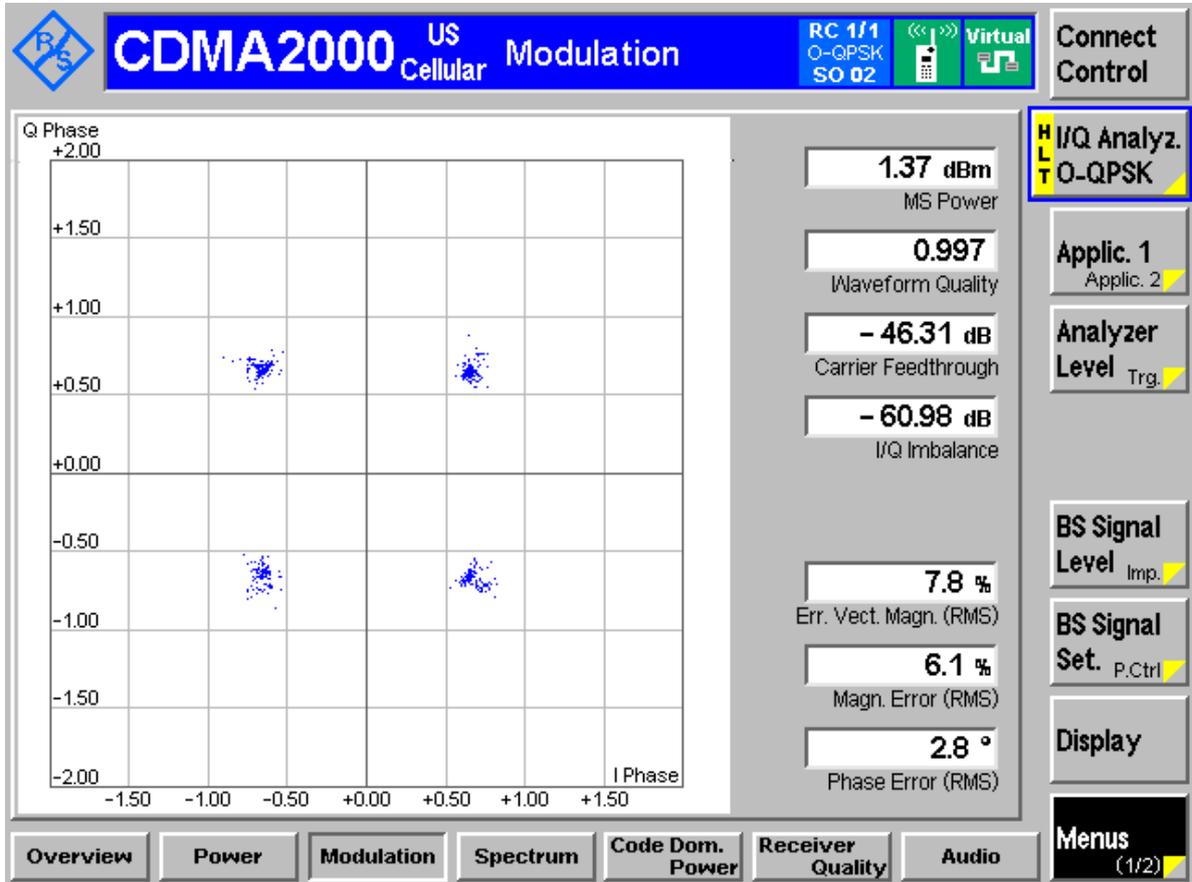
Appendix A

Modulation Characteristics

According to FCC Part 2.1047 & Part22 Subpart H

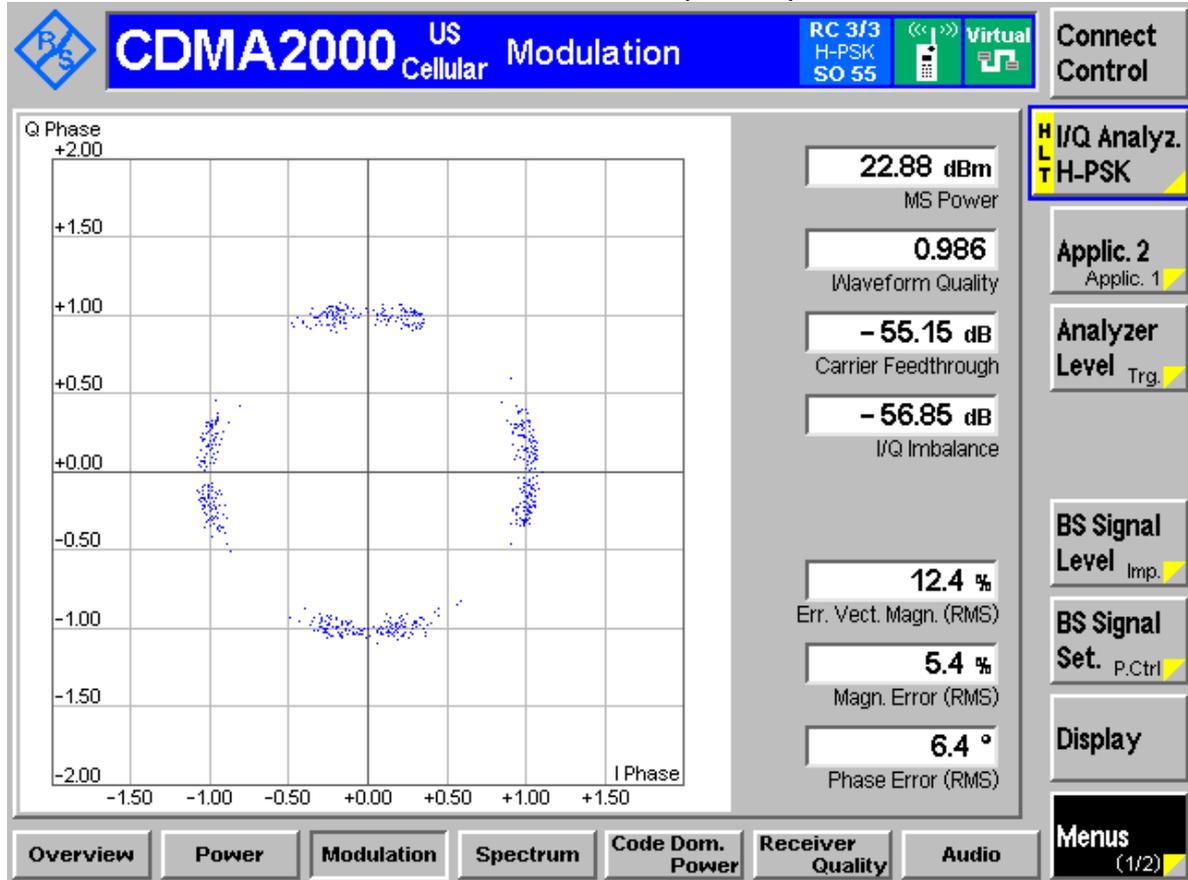


Channel 283(TM1)





Channel 283(TM3)



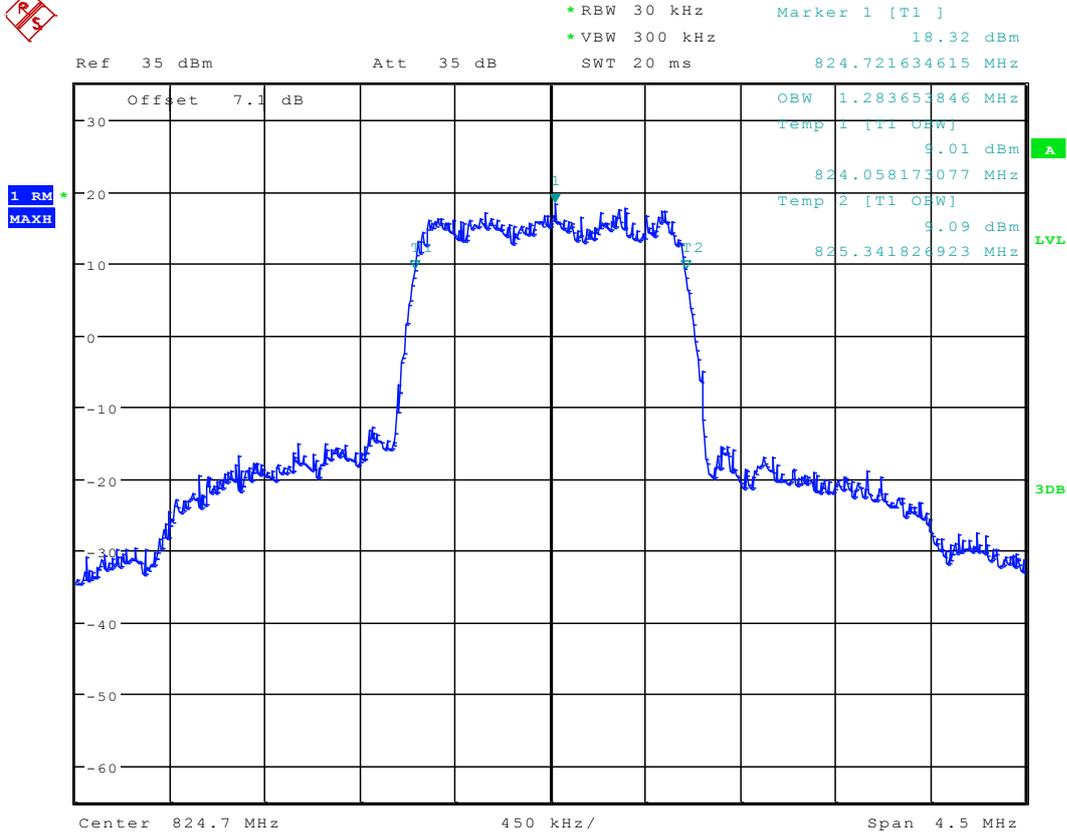


Appendix B

Occupied Bandwidth According to FCC Part 2.1049 & Part 22 Subpart H



Channel 1013 (TM1)



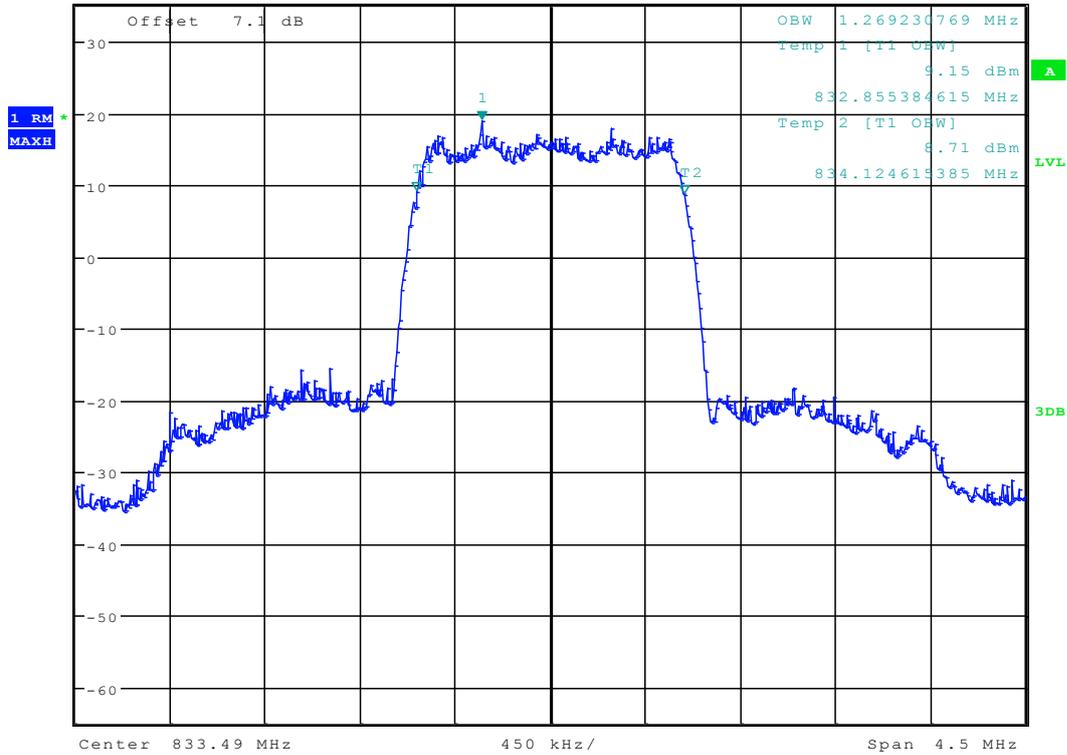
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Channel 1013 (TM3)



*RBW 30 kHz Marker 1 [T1]
 *VBW 300 kHz 18.98 dBm
 Ref 35 dBm Att 35 dB SWT 20 ms 833.165480769 MHz



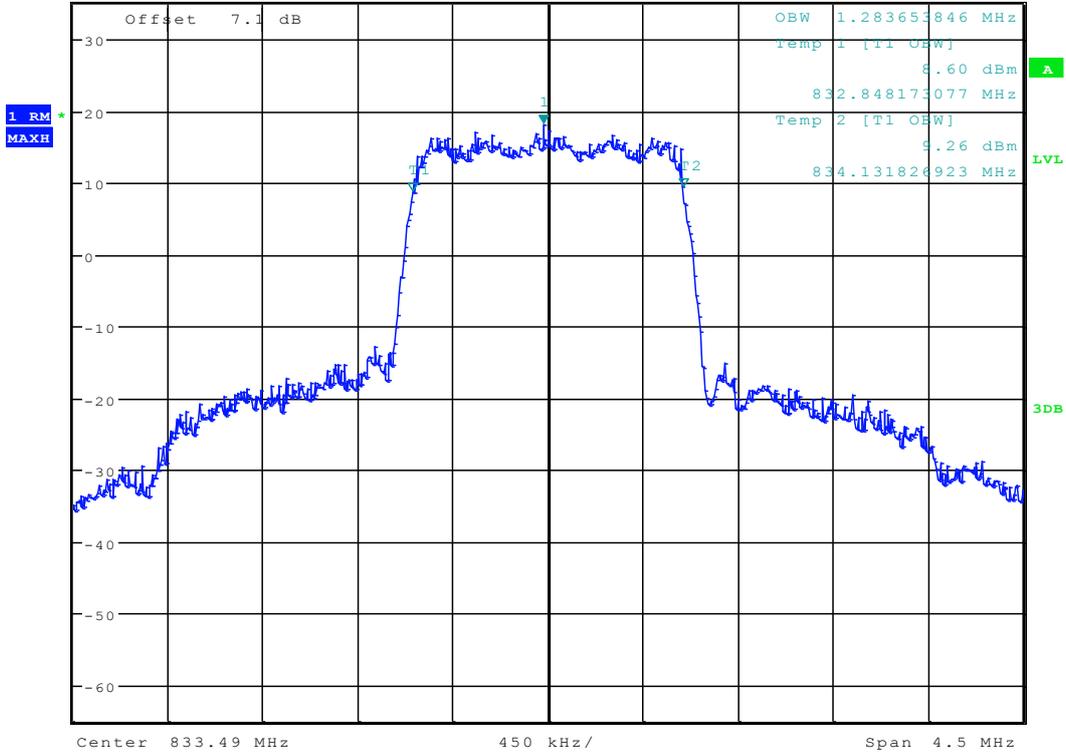
Date: 25.FEB.2011 10:11:39



Channel 283 (TM1)



*RBW 30 kHz Marker 1 [T1]
 *VBW 300 kHz 18.01 dBm
 Ref 35 dBm Att 35 dB SWT 20 ms 833.468365385 MHz



Date: 25.FEB.2011 10:10:56



Channel 283 (TM3)



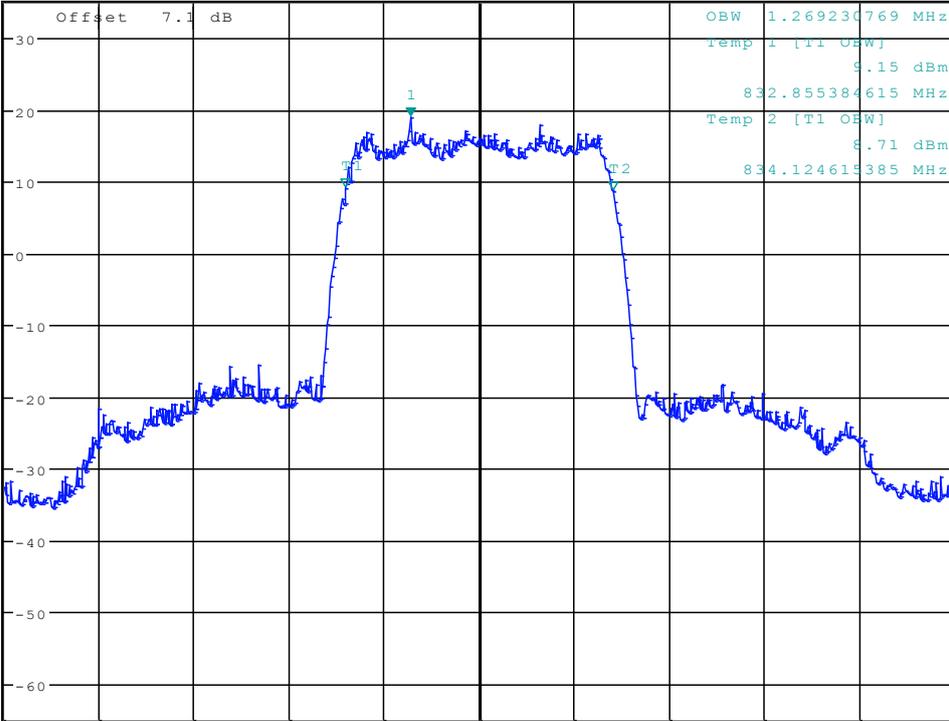
*RBW 30 kHz Marker 1 [T1]
*VBW 300 kHz 18.98 dBm
SWT 20 ms 833.165480769 MHz

Ref 35 dBm

Att 35 dB

833.165480769 MHz

1 RM
MAXH



Center 833.49 MHz

450 kHz/

Span 4.5 MHz

Date: 25.FEB.2011 10:11:39



Channel 777 (TM1)



*RBW 30 kHz Marker 1 [T1]
*VBW 300 kHz 17.84 dBm
848.057596154 MHz

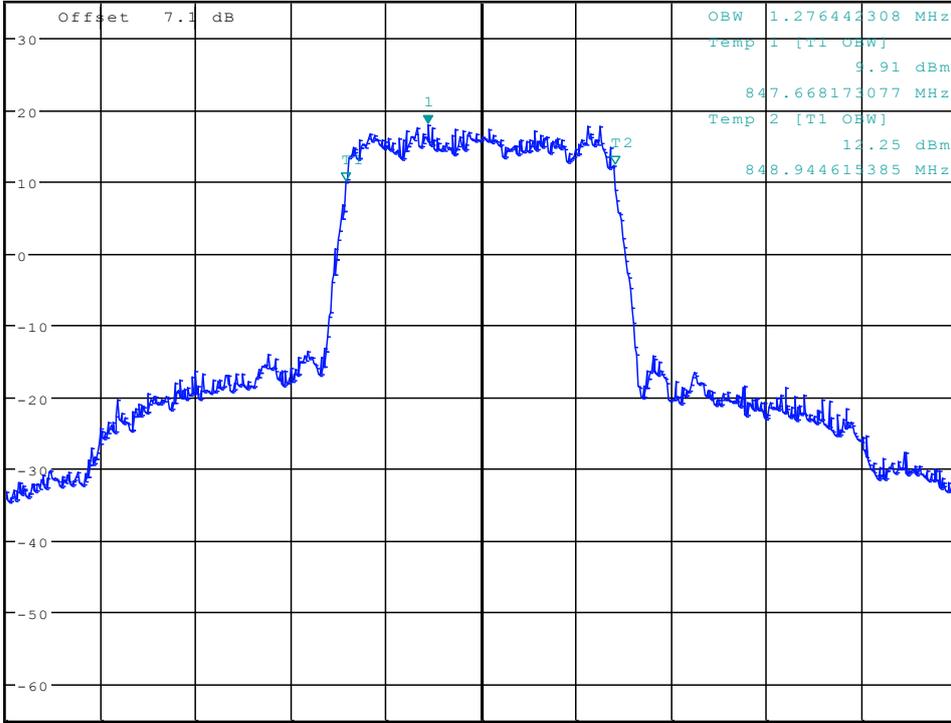
Ref 35 dBm

Att 35 dB

SWT 20 ms

848.057596154 MHz

1 RM
MAXH



A

LVL

3DB

Center 848.31 MHz

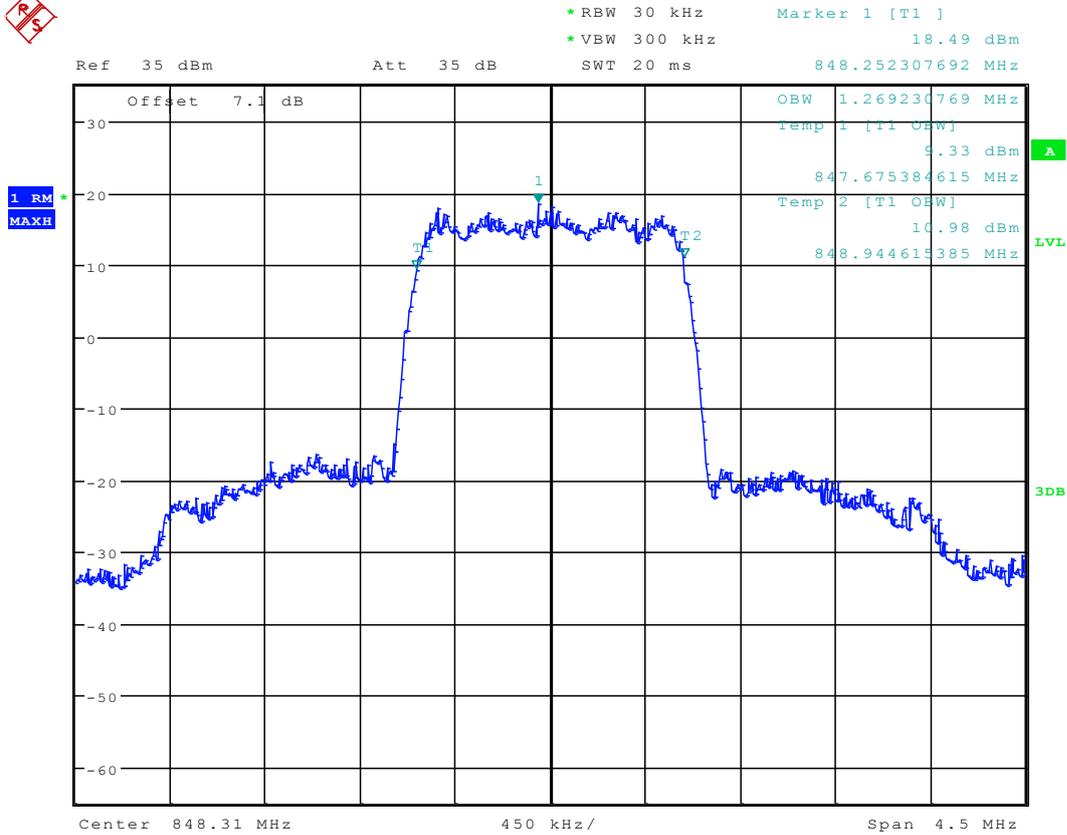
450 kHz/

Span 4.5 MHz

Date: 25.FEB.2011 10:11:10



Channel 777 (TM3)



Date: 25.FEB.2011 10:11:53

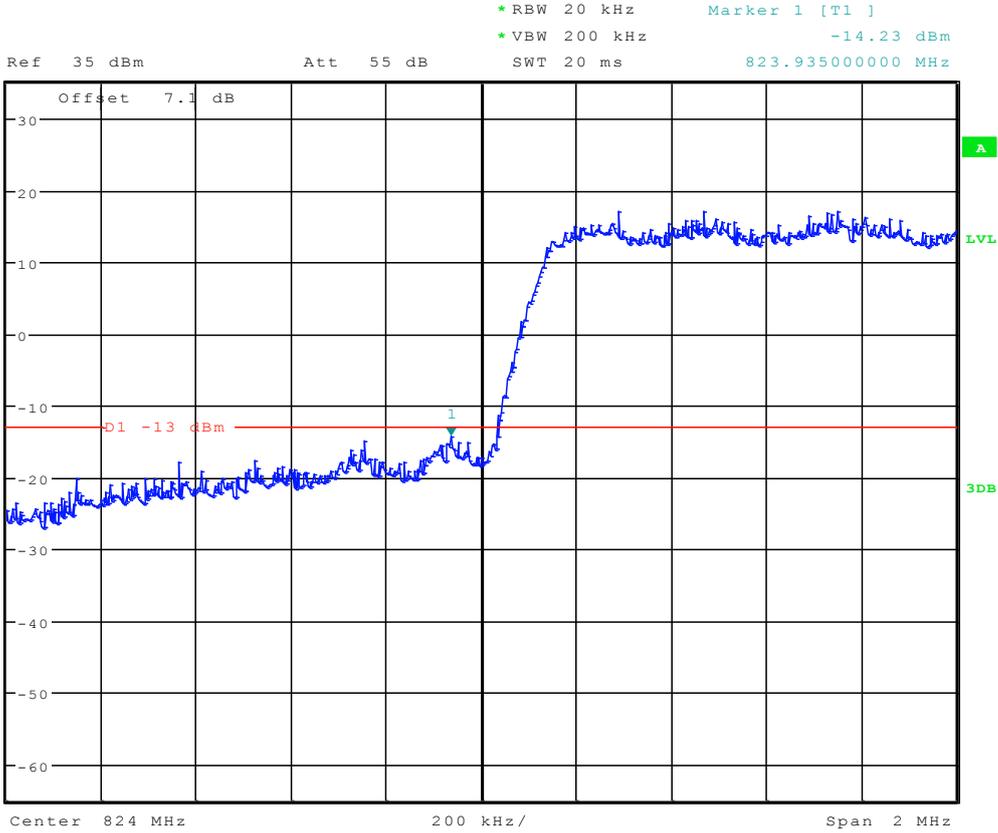


Appendix C

Band Edges Compliance According to FCC Part 2.1051 & 22.917



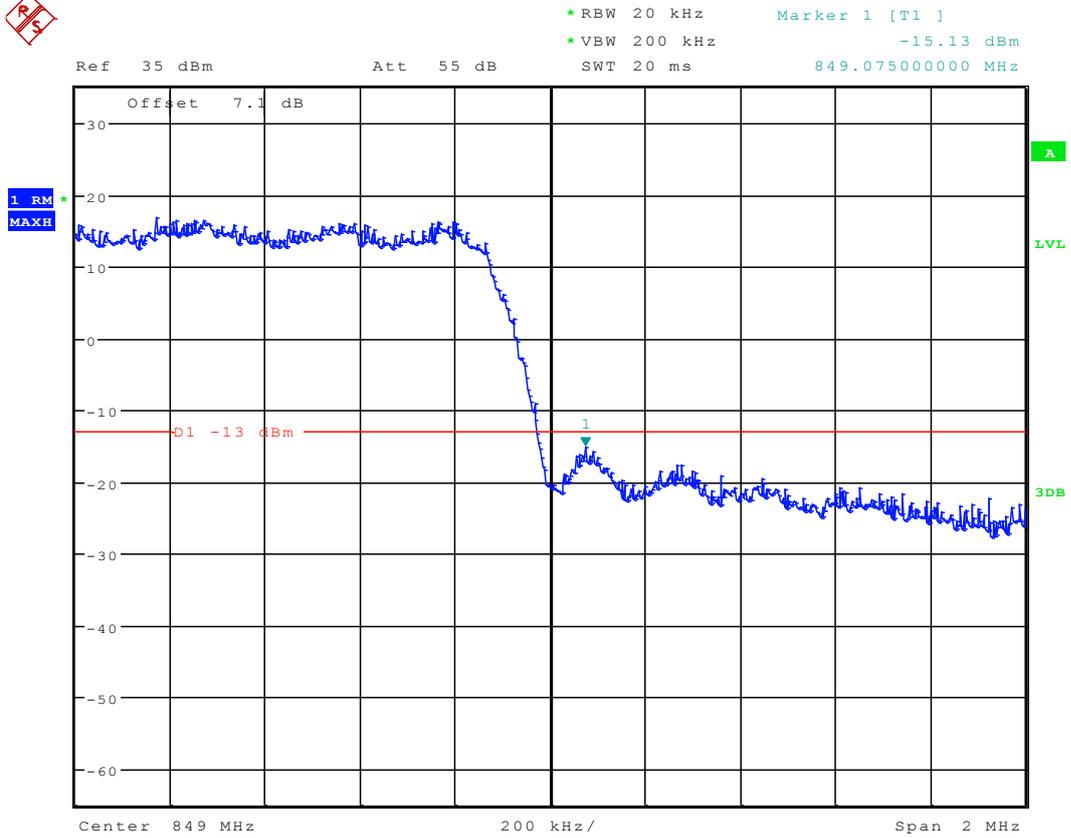
TM1 Left Edge Channel 1013



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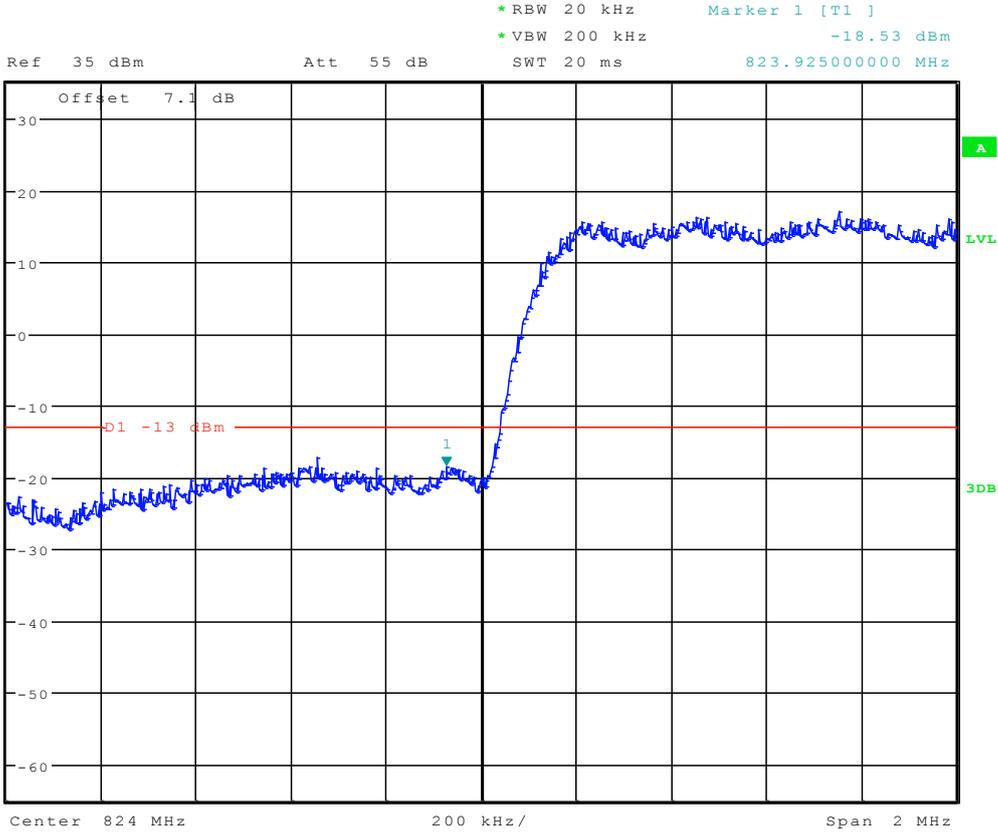
Right Edge Channel 777



Date: 25.FEB.2011 10:08:01



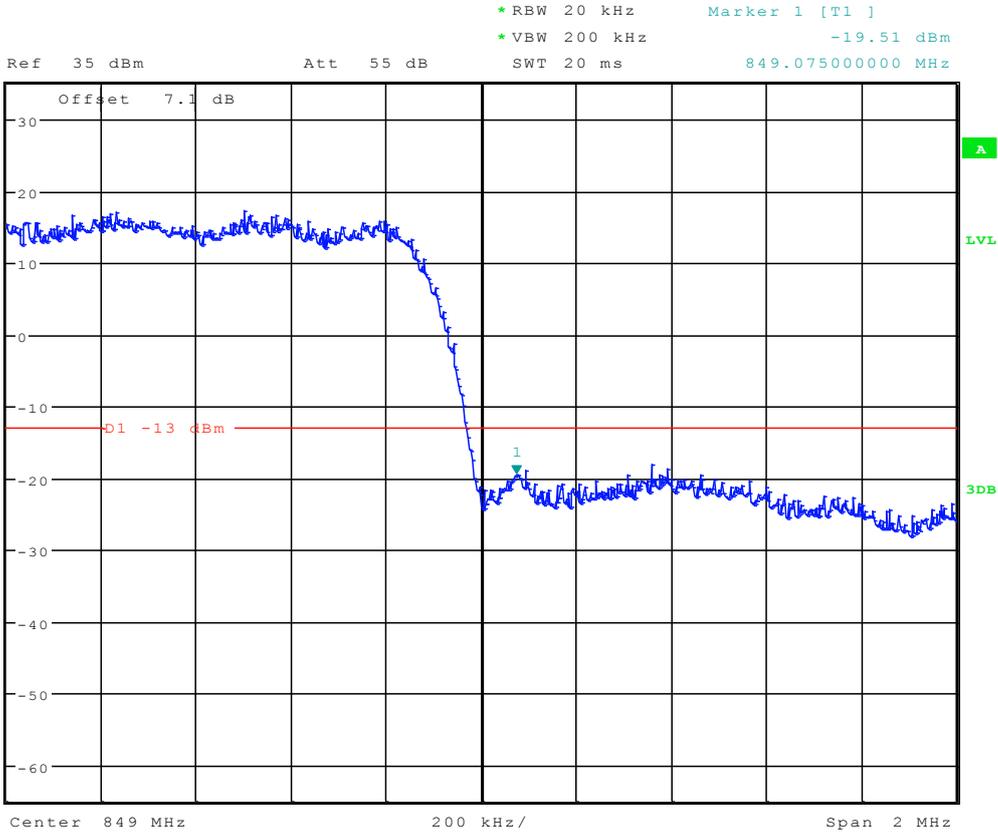
TM3 Left Edge Channel 1013



Date: 25.FEB.2011 10:08:16



Right Edge Channel 777



Date: 25.FEB.2011 10:08:31



Appendix D

Spurious Emission at Antenna Terminal

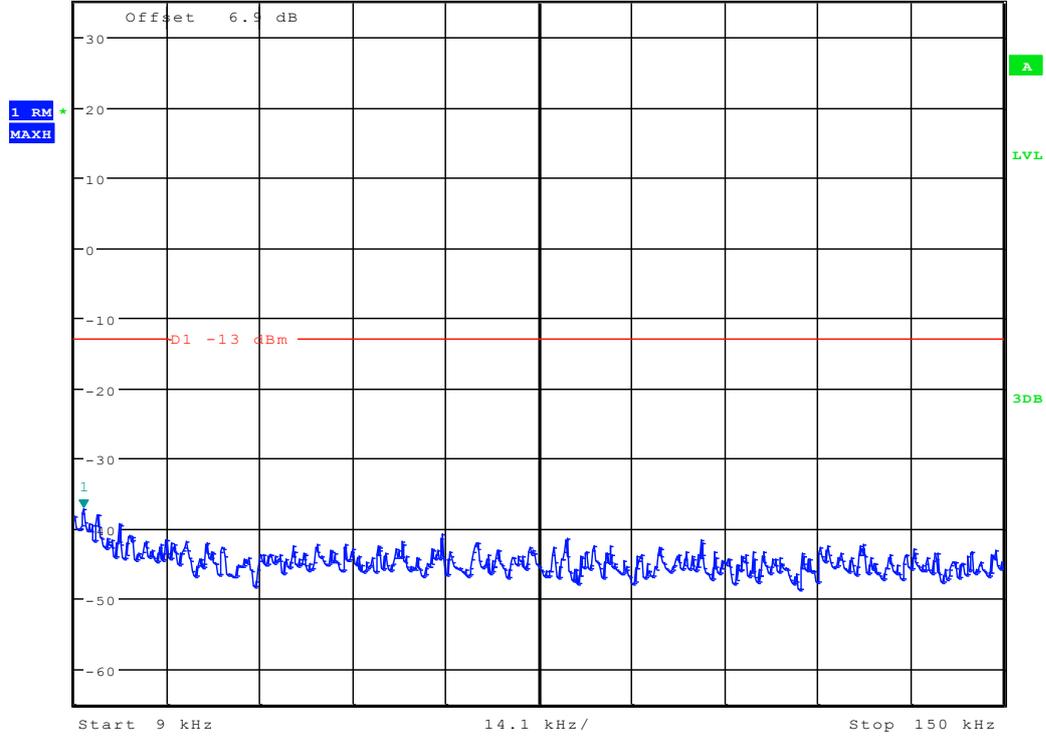
According to FCC Part 2.1051 & 22.917



Channel 1013 (TM1)



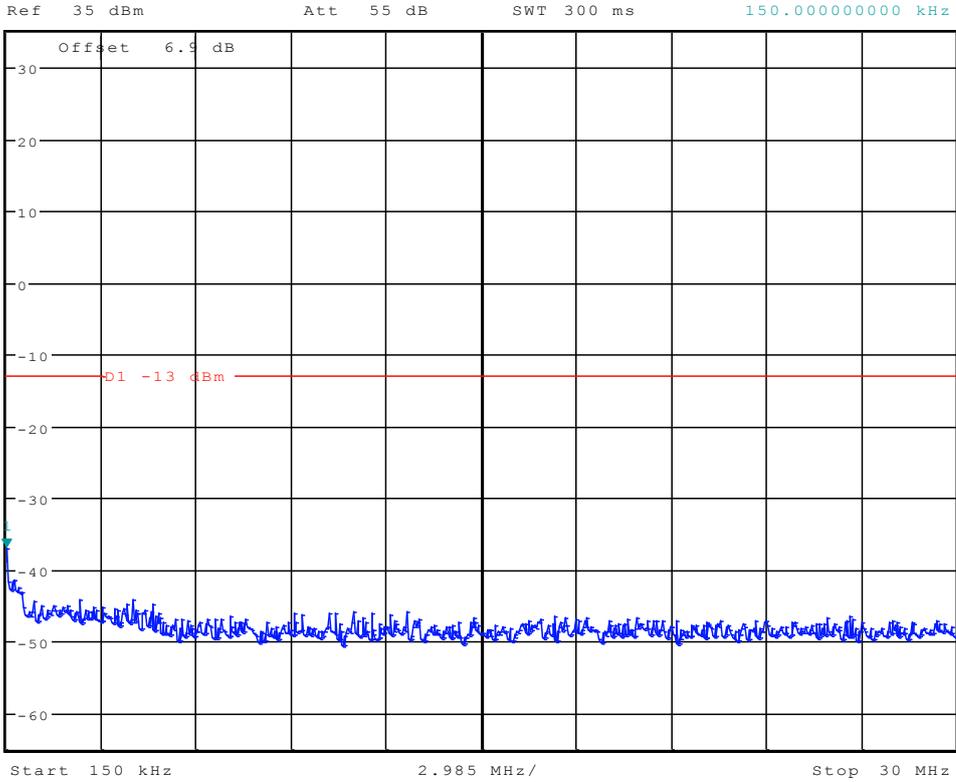
* RBW 1 kHz Marker 1 [T1]
 * VBW 10 kHz -37.19 dBm
 Ref 35 dBm Att 55 dB SWT 145 ms 10.355769231 kHz



Date: 25.FEB.2011 10:12:03



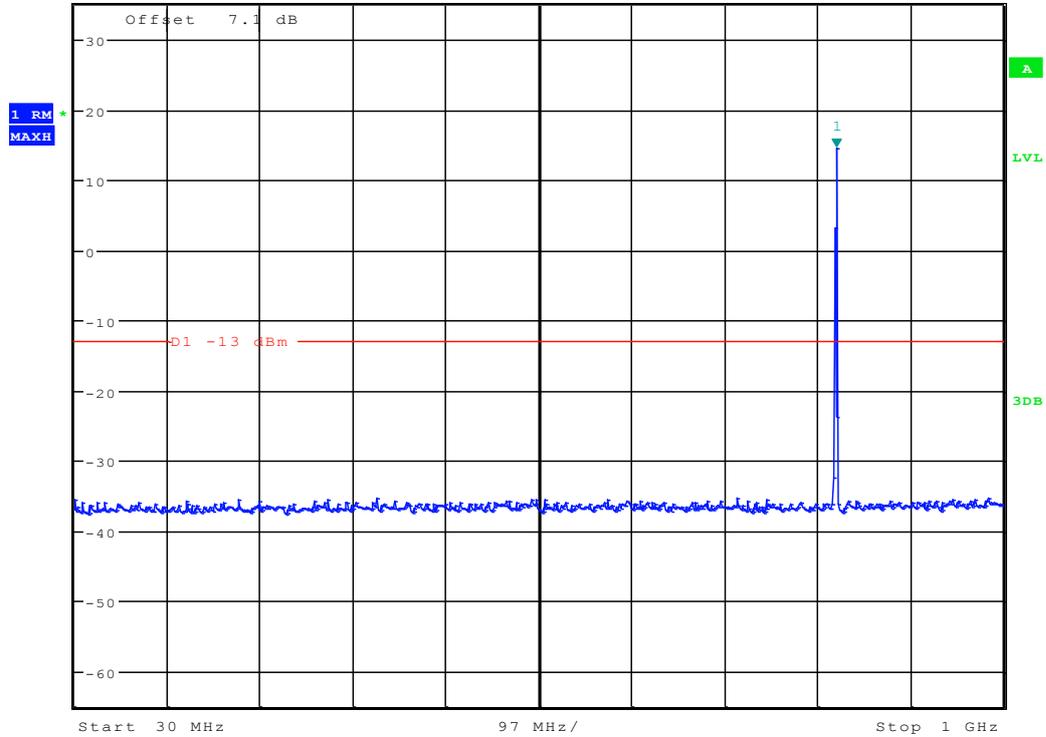
*RBW 10 kHz Marker 1 [T1]
*VBW 30 kHz -37.01 dBm
SWT 300 ms 150.000000000 kHz



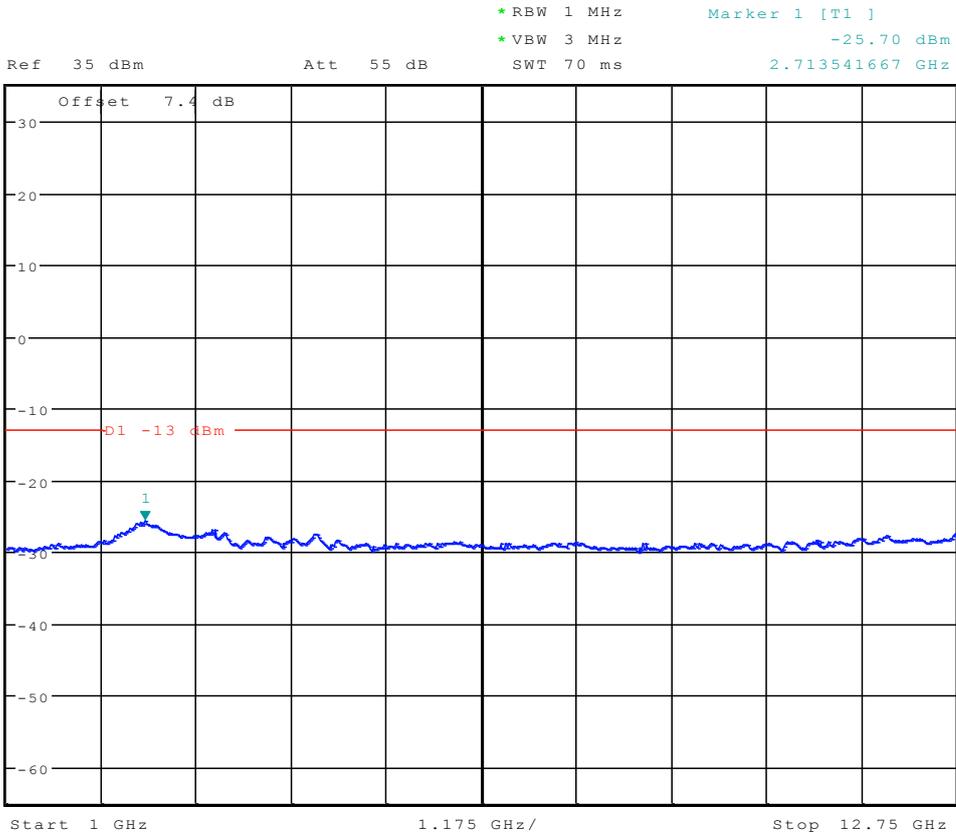
Date: 25.FEB.2011 10:12:29



Ref 35 dBm Att 55 dB
* RBW 100 kHz Marker 1 [T1]
* VBW 300 kHz 14.48 dBm
SWT 100 ms 825.897435897 MHz



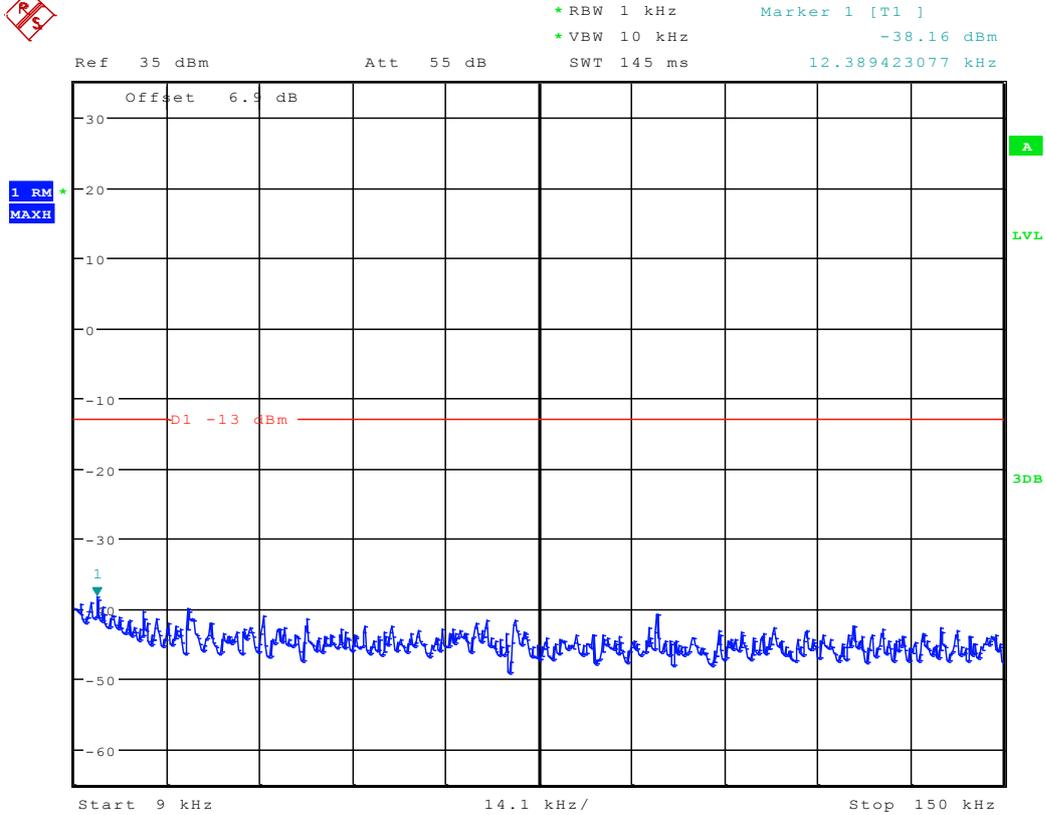
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Date: 25.FEB.2011 10:13:21



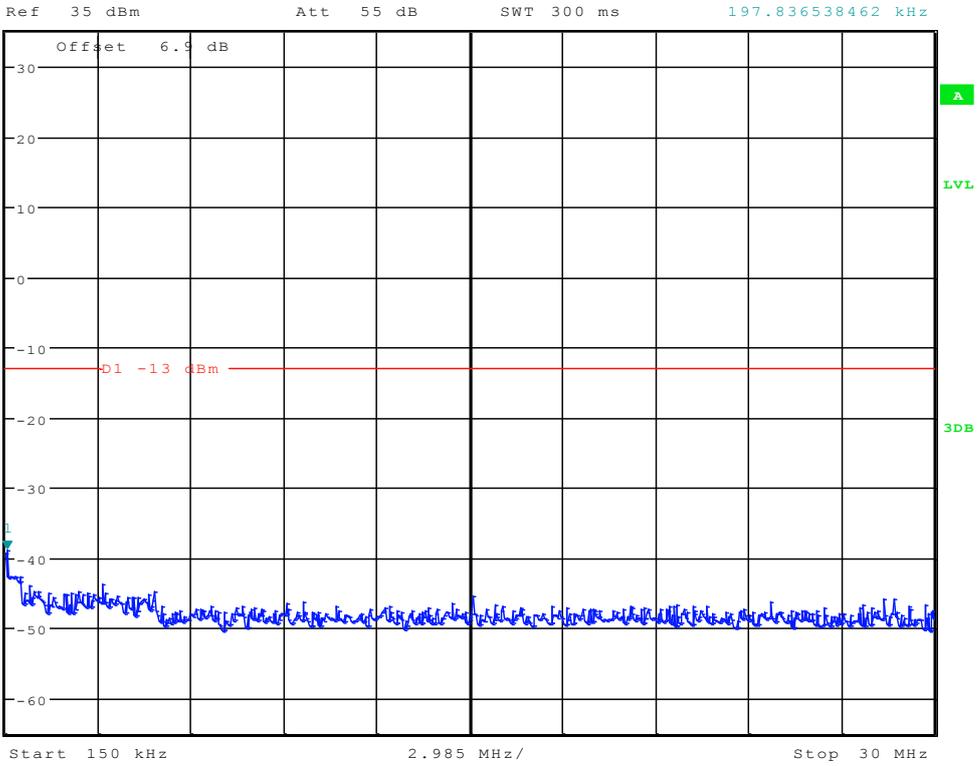
Channel 283 (TM1)



Date: 25.FEB.2011 10:12:12



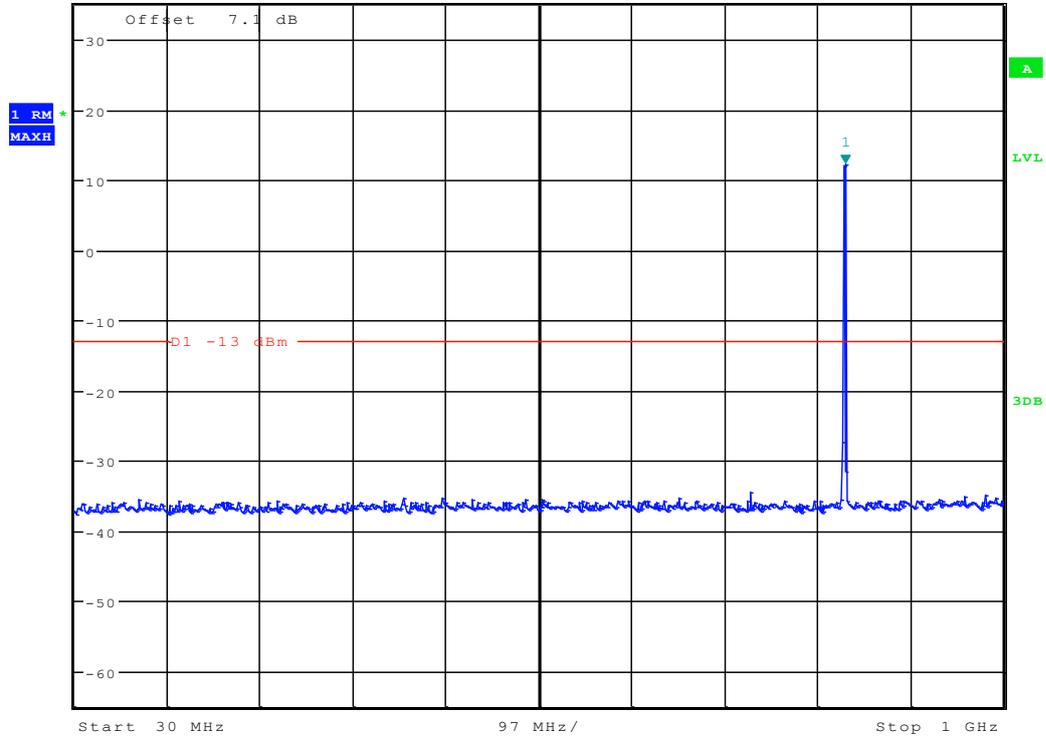
* RBW 10 kHz Marker 1 [T1]
* VBW 30 kHz -38.75 dBm
SWT 300 ms 197.836538462 kHz



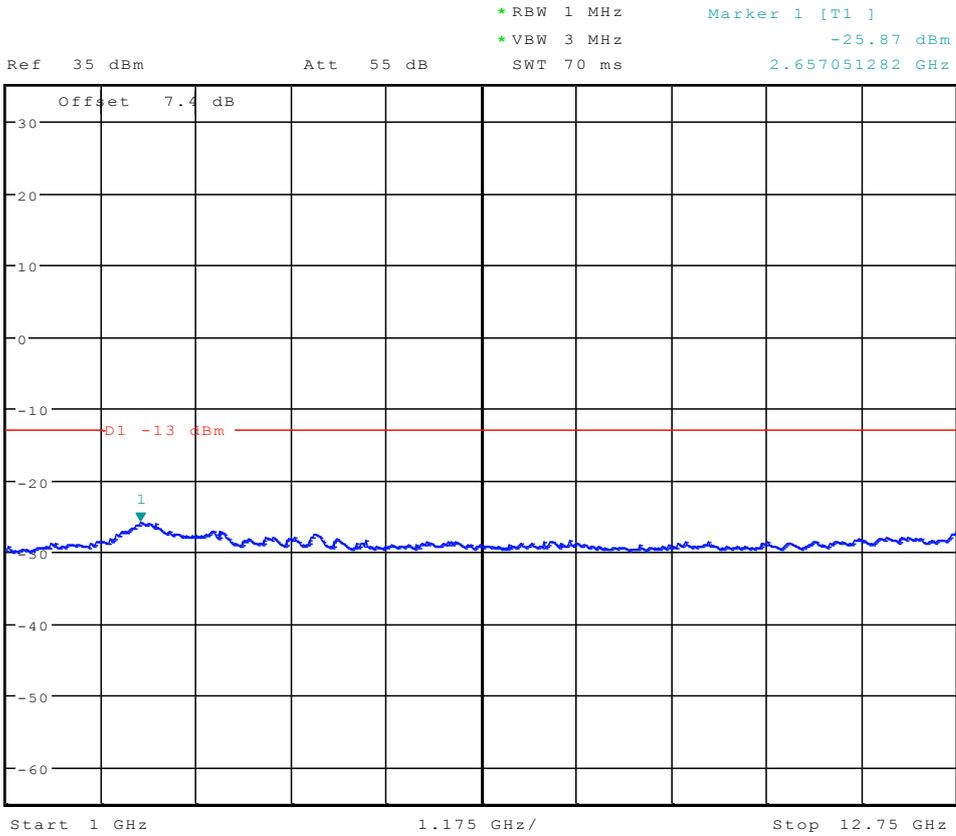
Date: 25.FEB.2011 10:12:38



Ref 35 dBm Att 55 dB
* RBW 100 kHz Marker 1 [T1]
* VBW 300 kHz 12.13 dBm
SWT 100 ms 835.224358974 MHz



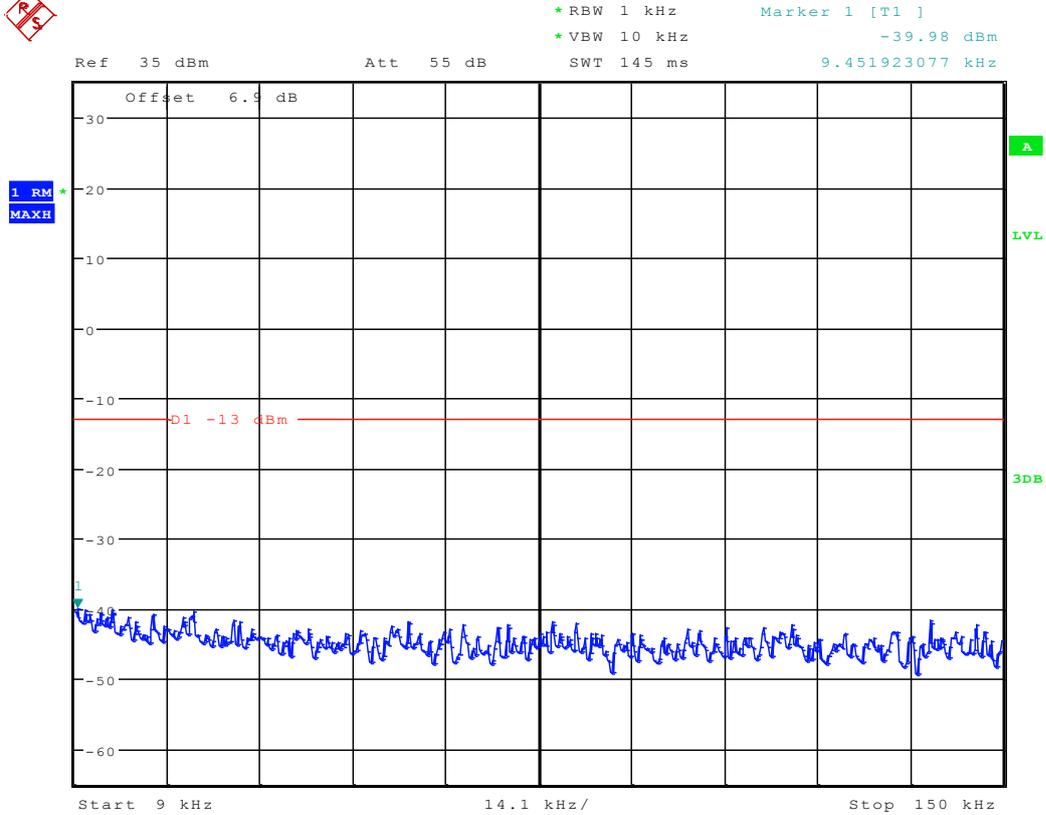
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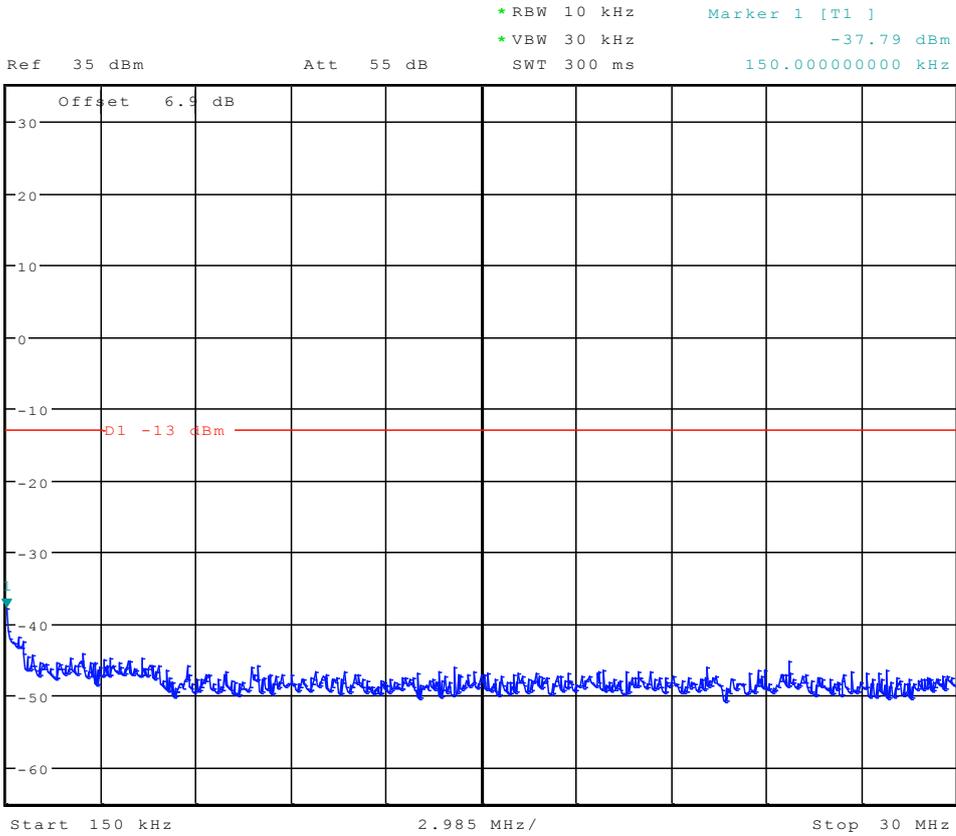
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Channel 777 (TM1)



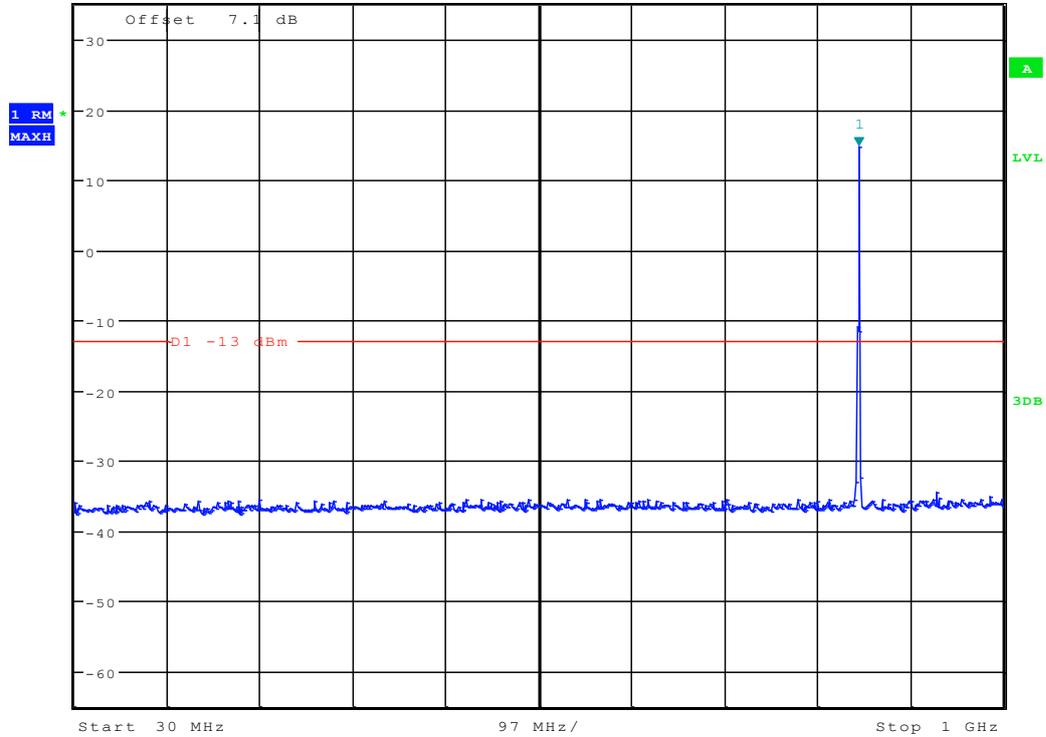
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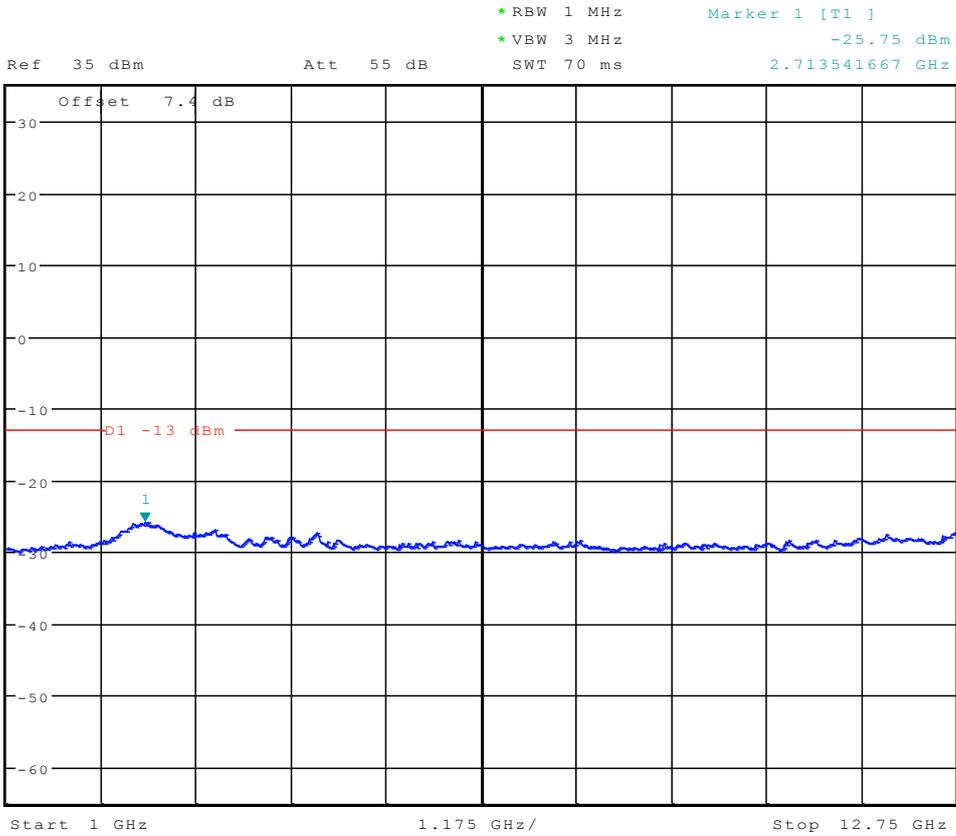
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Ref 35 dBm Att 55 dB * RBW 100 kHz Marker 1 [T1]
* VBW 300 kHz 14.78 dBm
SWT 100 ms 849.214743590 MHz



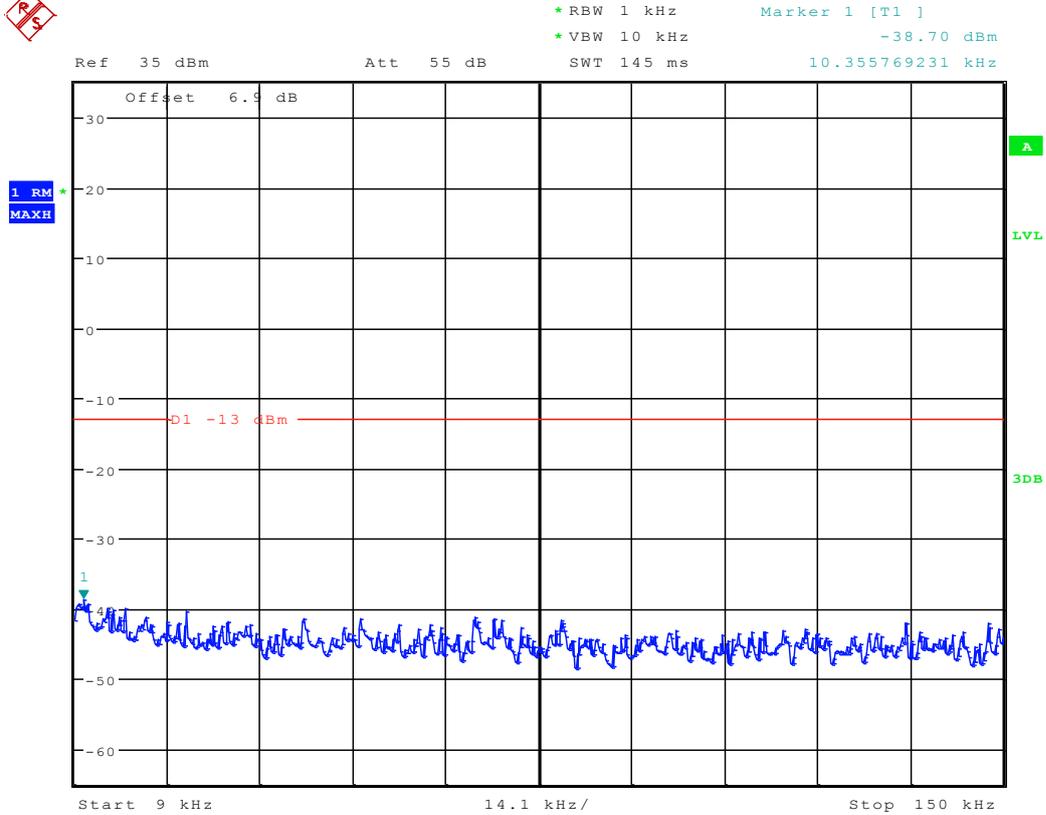
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Date: 25.FEB.2011 10:13:38



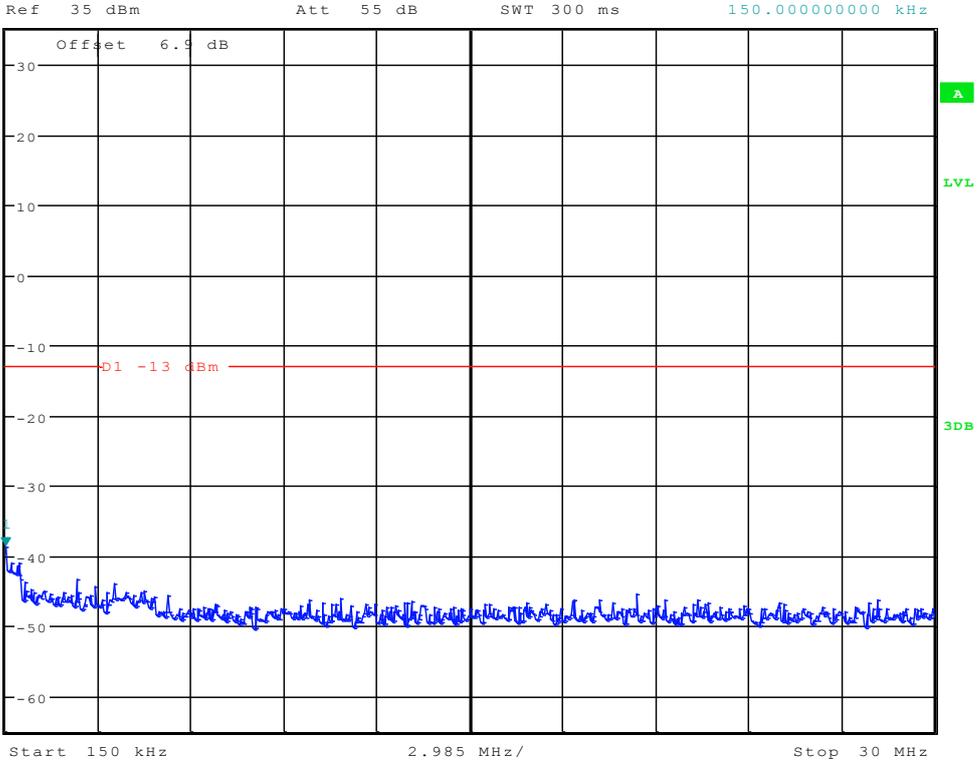
Channel 1013 (TM3)



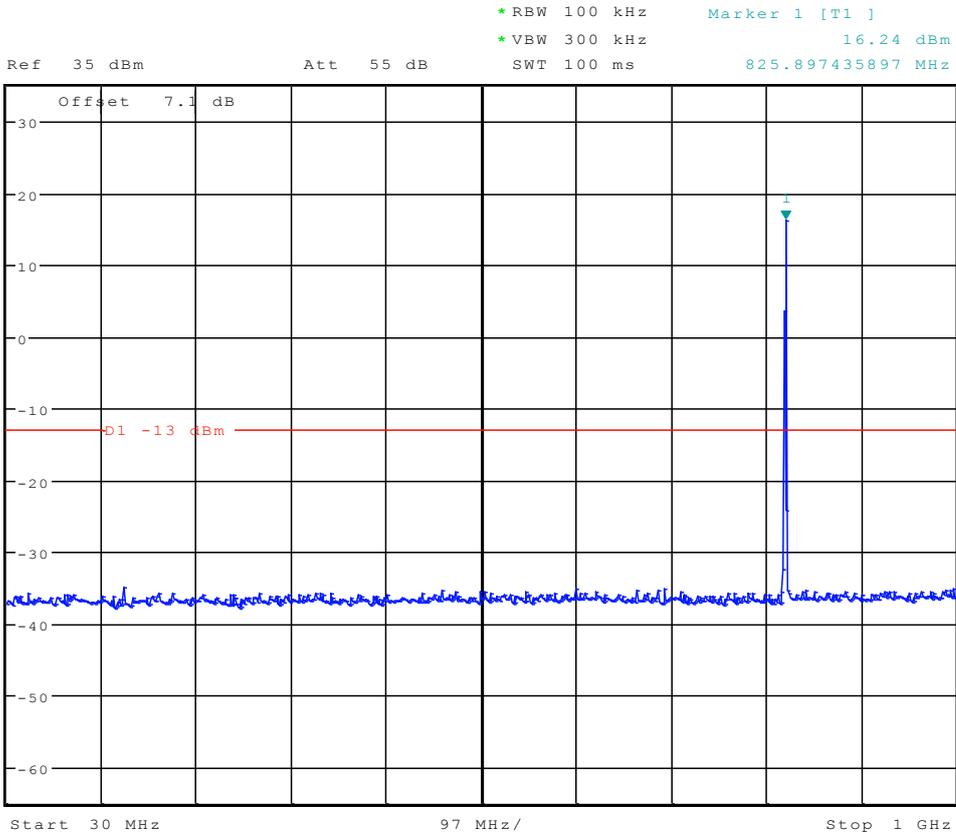
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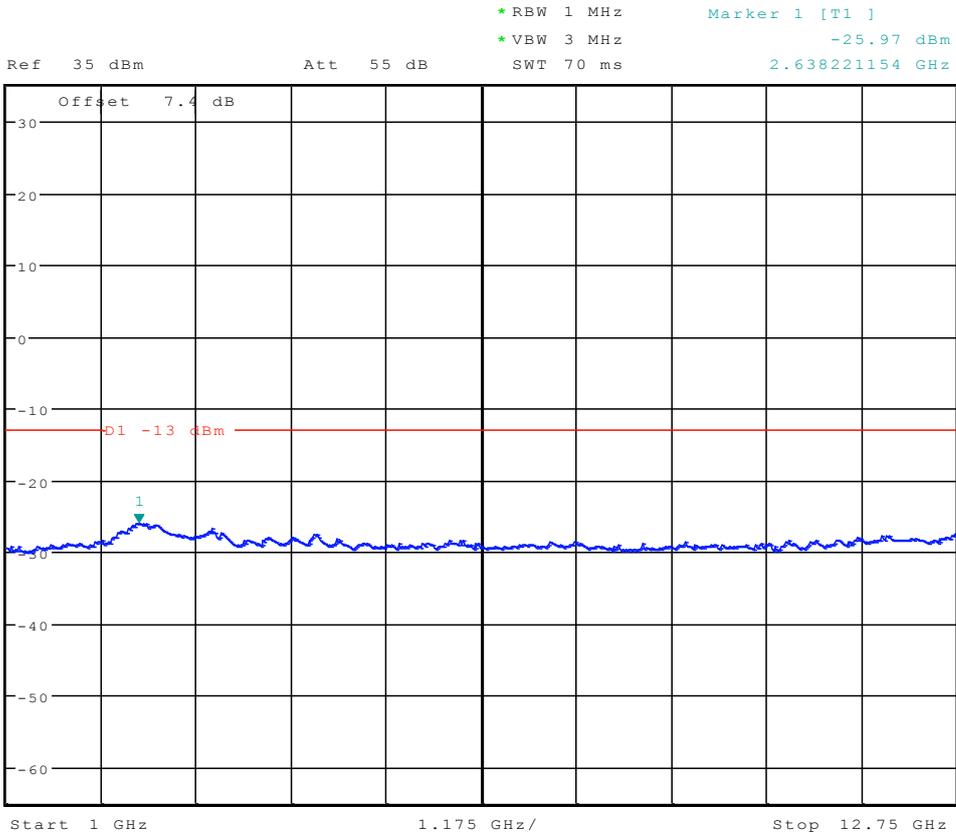
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* VBW 30 kHz -38.57 dBm
SWT 300 ms 150.000000000 kHz



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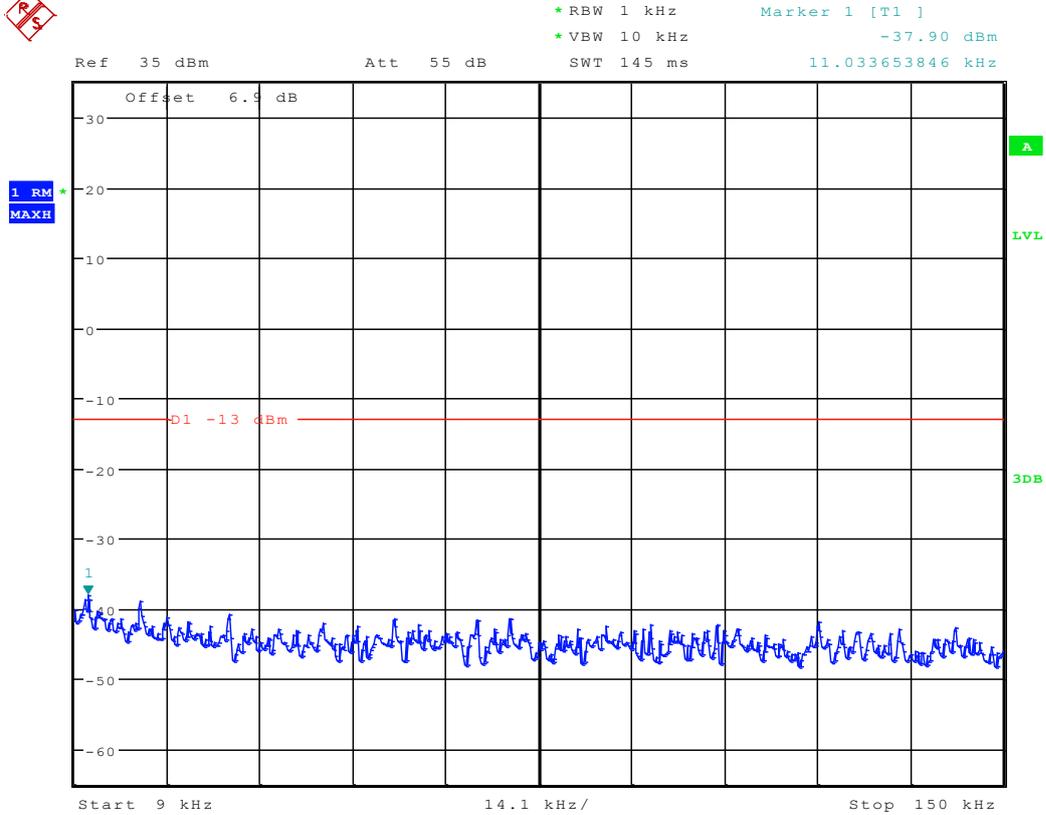
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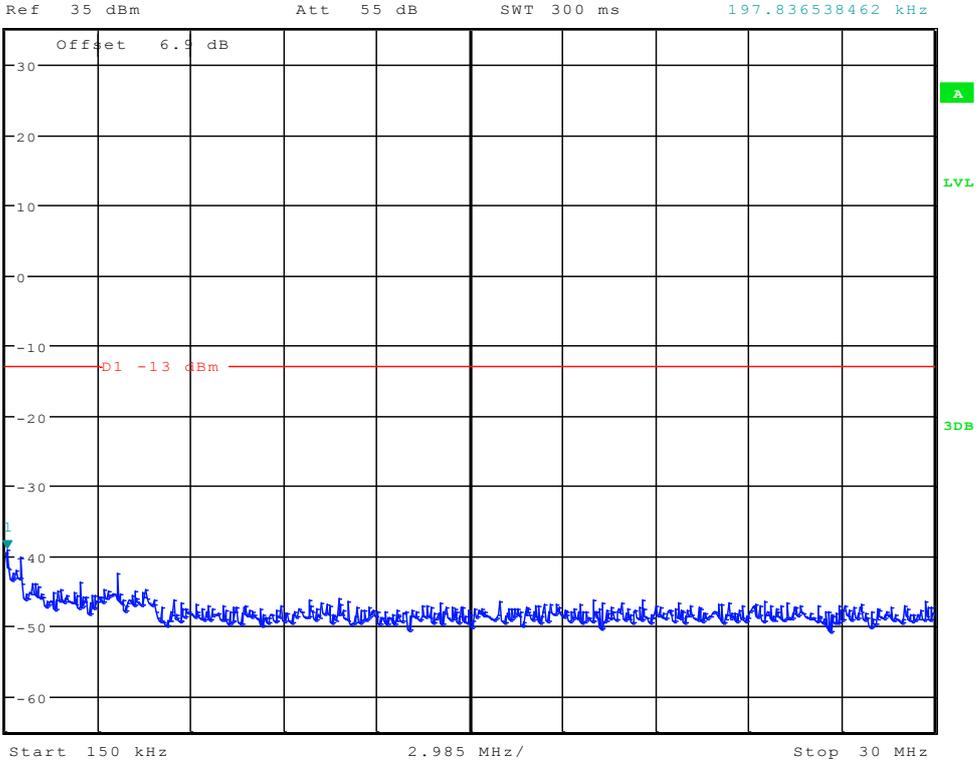
Channel 283 (TM3)



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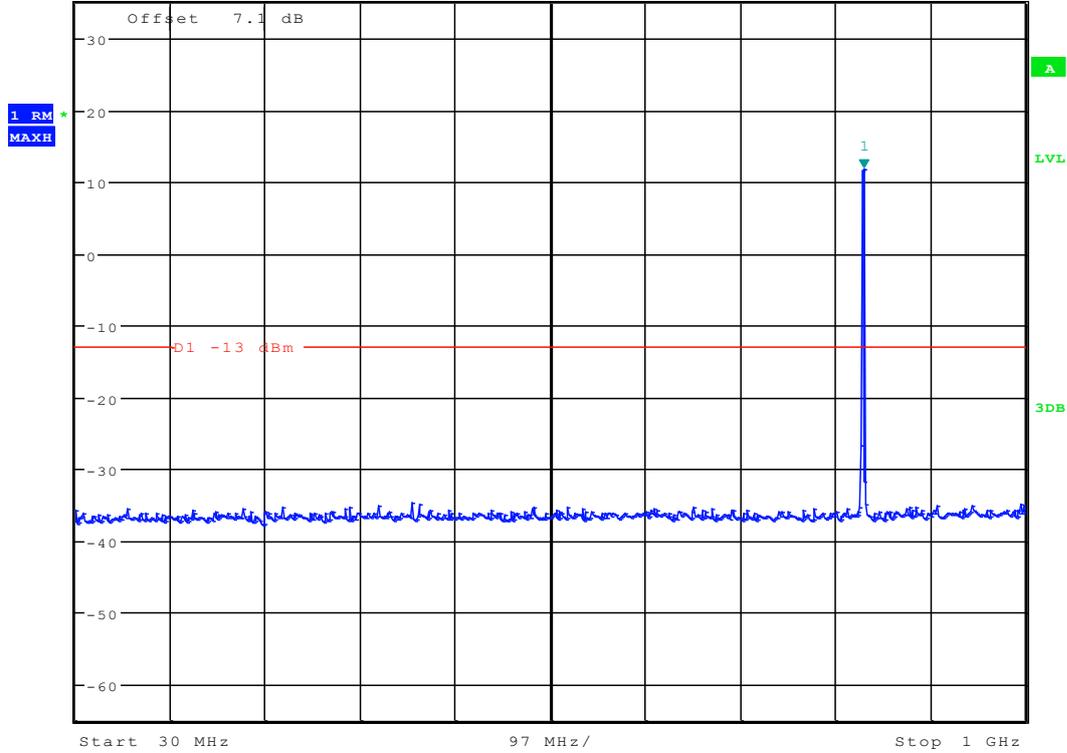
* RBW 10 kHz Marker 1 [T1]
* VBW 30 kHz -39.10 dBm
SWT 300 ms 197.836538462 kHz



Date: 25.FEB.2011 10:14:22



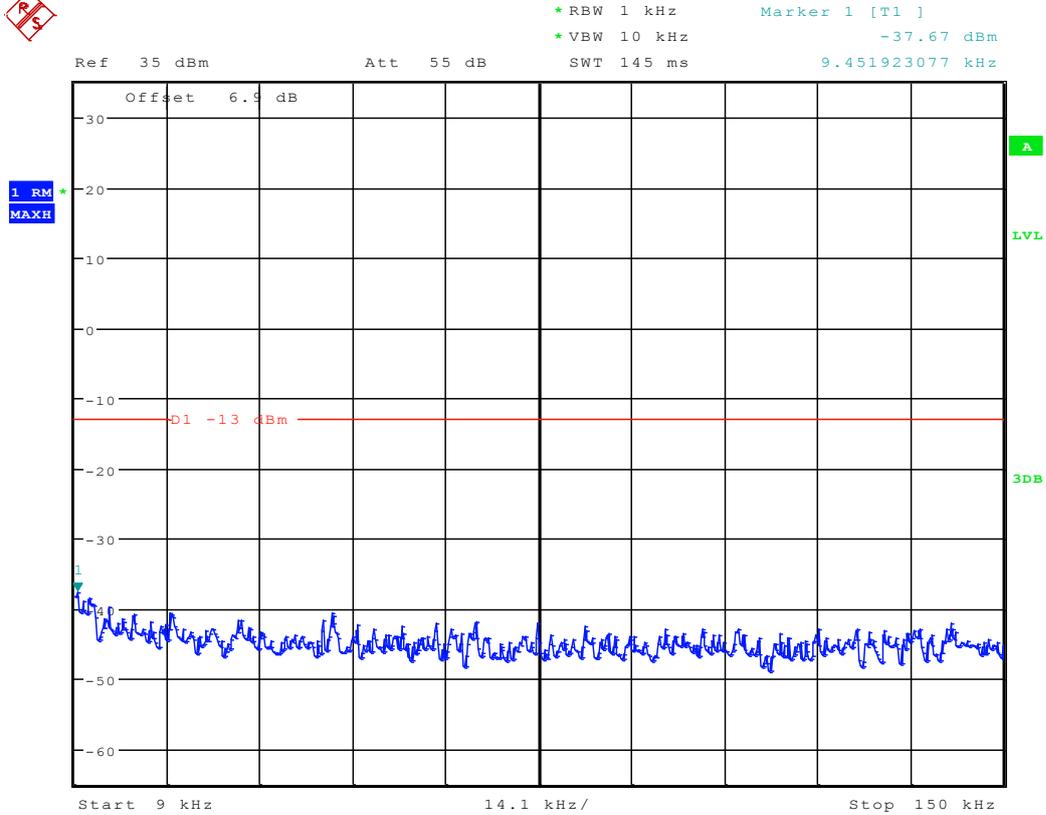
*RBW 100 kHz Marker 1 [T1]
 *VBW 300 kHz 11.76 dBm
 Ref 35 dBm Att 55 dB SWT 100 ms 835.224358974 MHz



Date: 25.FEB.2011 10:14:48



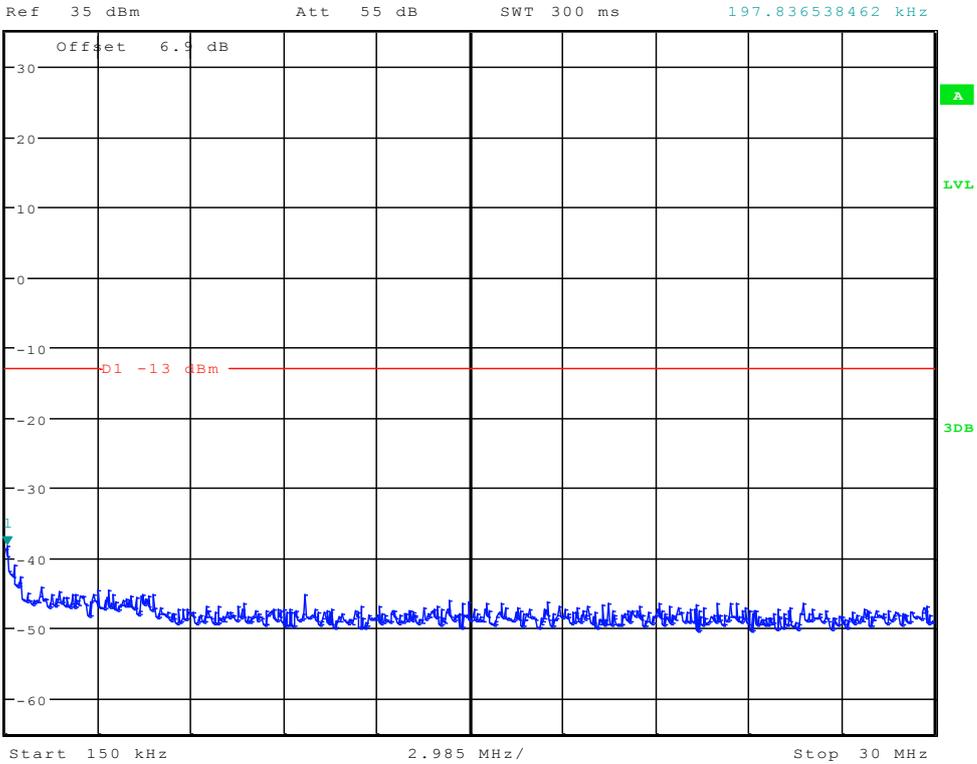
Channel 777 (TM3)



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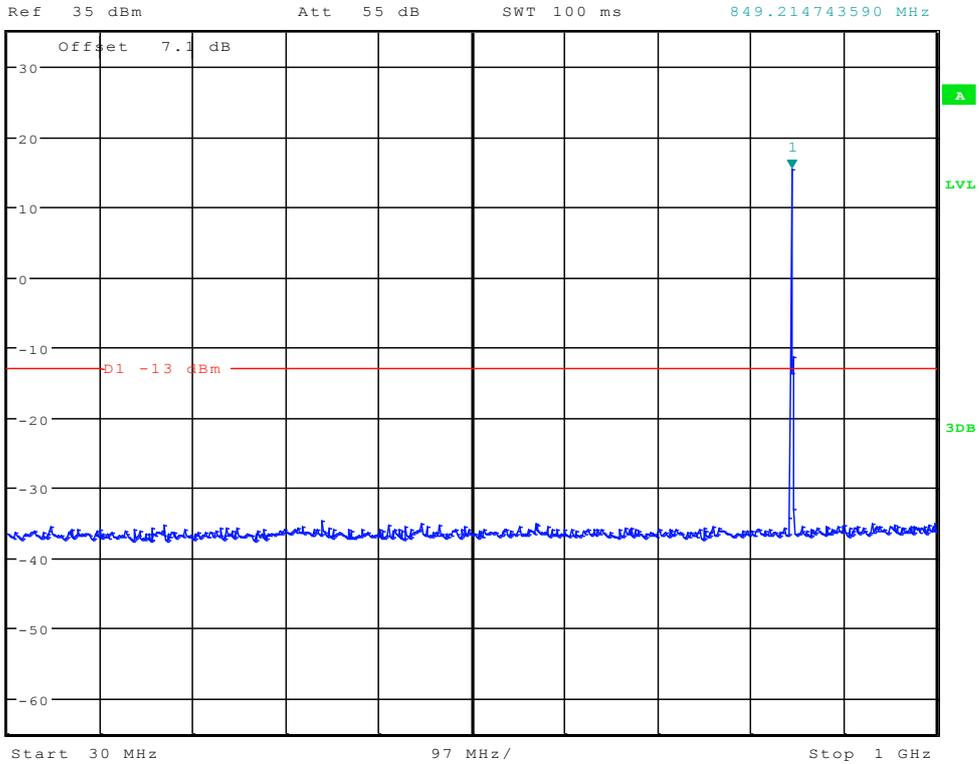
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* VBW 30 kHz -38.18 dBm
SWT 300 ms 197.836538462 kHz



Date: 25.FEB.2011 10:14:31



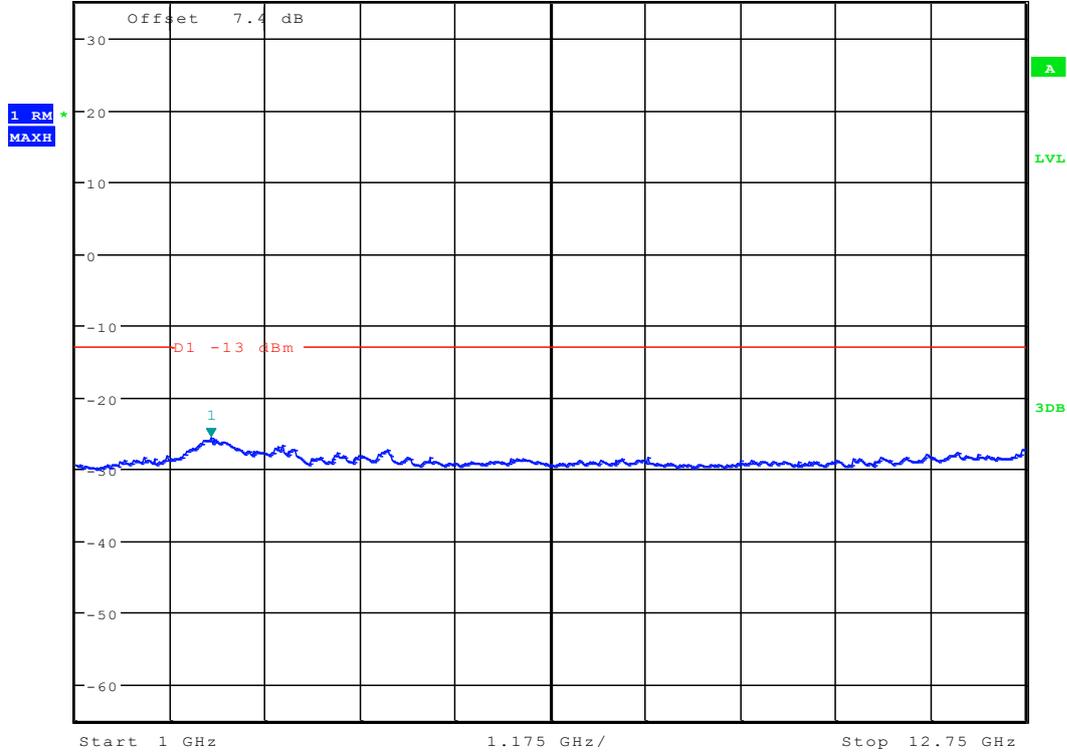
* RBW 100 kHz Marker 1 [T1]
* VBW 300 kHz 15.39 dBm
SWT 100 ms 849.214743590 MHz



Date: 25.FEB.2011 10:14:57



Ref 35 dBm Att 55 dB *RBW 1 MHz Marker 1 [T1] *VBW 3 MHz -25.69 dBm
SWT 70 ms 2.675881410 GHz



Date: 25.FEB.2011 10:15:23