



FCC Test Report of E392u-511
FCC ID: QISE392U-511



Appendix A

Transmitter Output Power According to FCC Part 2.1046 & Part 22.913



Conducted Power of Transmitter

Table 1 Measurement Results

		RF Output Power (Conducted)					
TEST CONDITIONS		Channel128(B)		Channel192(M)		Channel251(T)	
		824.2MHz		837.0MHz		848.8MHz	
		dBm		dBm		dBm	
T_{nom} / V_{nom}		Measured	Limit	Measured	Limit	Measured	Limit
TM1		31.36	38.65	31.87	38.65	31.62	38.65
TM2		25.80	38.65	25.92	38.65	26.02	38.65
TEST CONDITIONS		Channel4132(B)		Channel4182(M)		Channel4233(T)	
		826.4MHz		836.4MHz		846.6MHz	
		dBm		dBm		dBm	
T_{nom} / V_{nom}		Measured	Limit	Measured	Limit	Measured	Limit
TM3		21.95	38.65	21.93	38.65	22.03	38.65
TM4	Case1	21.42	38.65	21.38	38.65	21.37	38.65
	Case2	21.23	38.65	21.26	38.65	21.35	38.65
	Case3	20.65	38.65	20.56	38.65	20.77	38.65
	Case4	20.59	38.65	20.47	38.65	20.67	38.65
TM5	Case1	21.47	38.65	21.39	38.65	21.55	38.65
	Case2	20.25	38.65	20.15	38.65	20.14	38.65
	Case3	20.36	38.65	20.32	38.65	20.36	38.65
	Case4	20.29	38.65	20.18	38.65	20.13	38.65
	Case5	21.02	38.65	20.93	38.65	20.98	38.65



Effective Radiated Power of Transmitter (ERP)

Table 2 Substitution Results

Test Mode	Freq. [MHz]	Meas. Level [dBm]	Substitution Antenna Type	SGP [dBm]	Substitution Gain [dBd]	Cable Loss [dB]	Substitution Level (ERP) [dBm]	FCC limit [dBm]	Result
TM1	824.2	31.21	Dipole Ant.	34.70	-2.75	0.6	31.35	38.5	Pass
TM1	837.0	31.72	Dipole Ant.	35.15	-2.87	0.6	31.68	38.5	Pass
TM1	848.8	31.47	Dipole Ant.	34.87	-2.85	0.6	31.42	38.5	Pass
TM2	824.2	25.65	Dipole Ant.	29.03	-2.75	0.6	25.68	38.5	Pass
TM2	837.0	25.77	Dipole Ant.	29.22	-2.87	0.6	25.75	38.5	Pass
TM2	848.8	25.87	Dipole Ant.	29.26	-2.85	0.6	25.81	38.5	Pass
TM3	826.4	21.80	Dipole Ant.	25.13	-2.75	0.6	21.78	38.5	Pass
TM3	836.4	21.78	Dipole Ant.	25.19	-2.87	0.6	21.72	38.5	Pass
TM3	846.6	21.88	Dipole Ant.	25.28	-2.85	0.6	21.83	38.5	Pass

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

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

b, SGP=Signal Generator Level



Appendix B

Modulation Characteristics

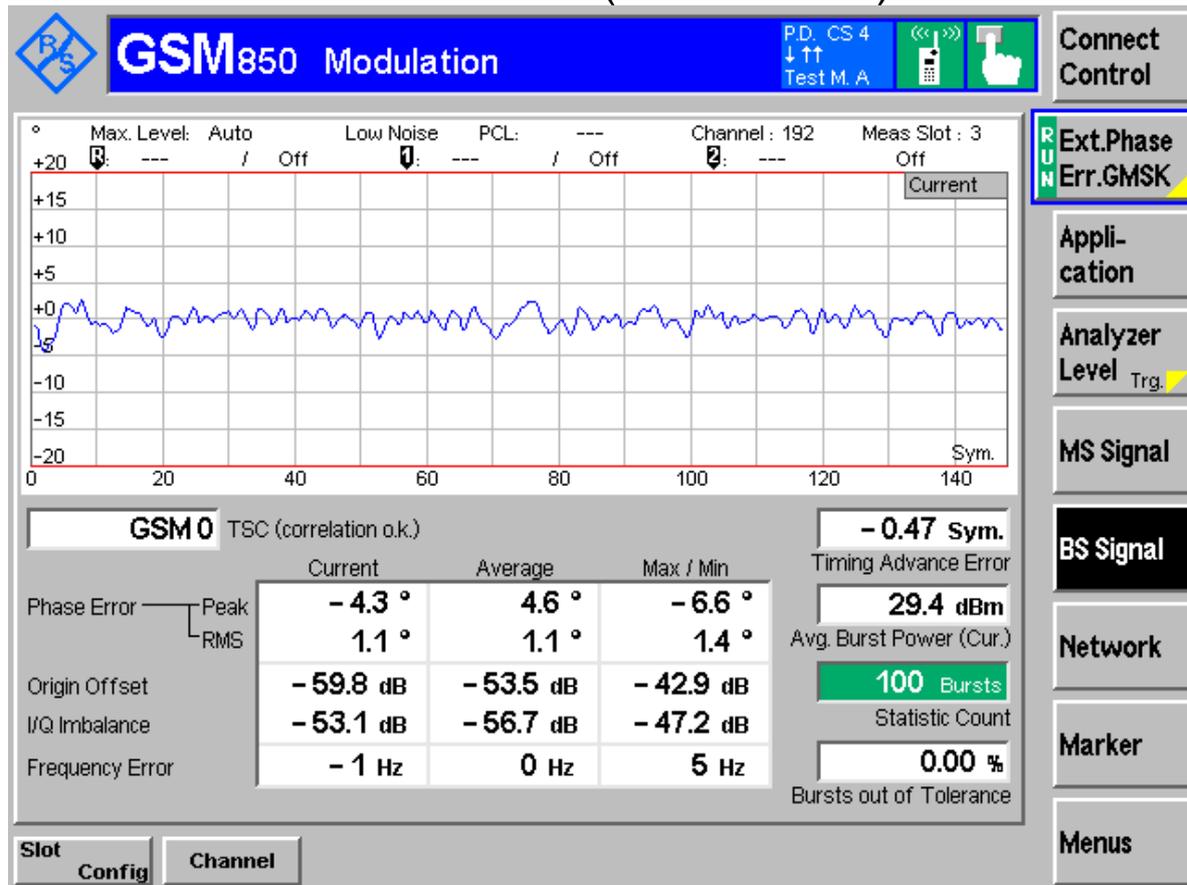
According to FCC Part 2.1047 & Part22 Subpart H



1 Test Plot

1.1 Test Mode = TM 1

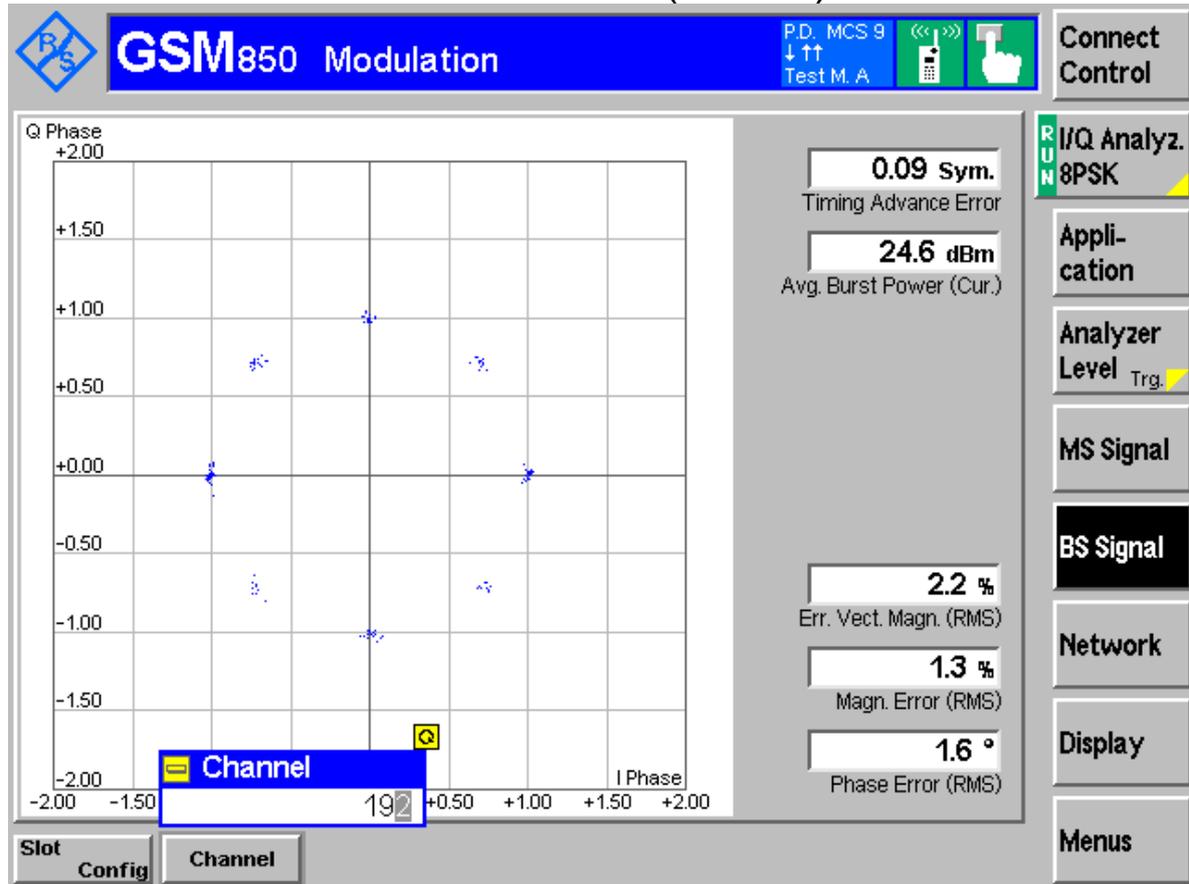
Channel 192 (GPRS/GSM)





1.2 Test Mode = TM 2

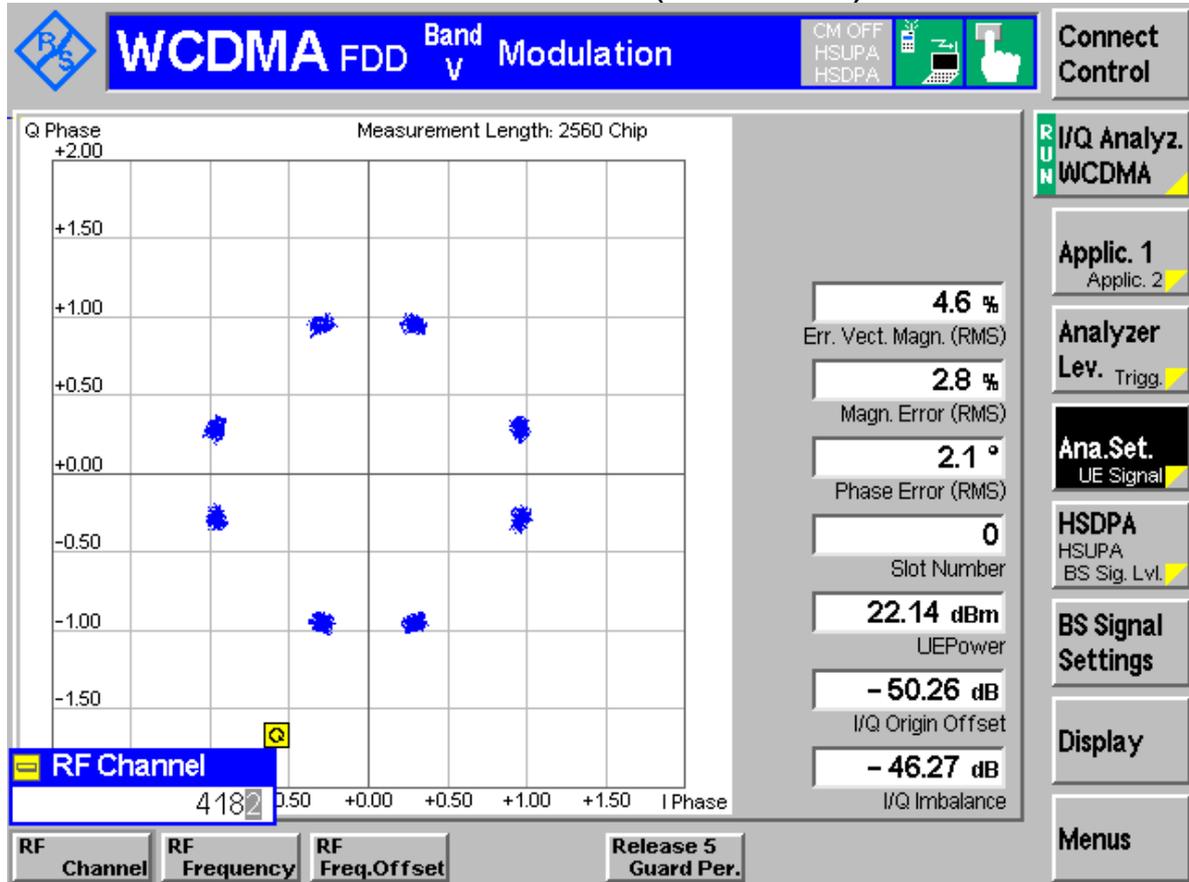
Channel 192 (EDGE)





1.3 Test Mode = TM 3

Channel 4182 (WCDMA)



END



Appendix C

Occupied Bandwidth

According to FCC Part 2.1049 & Part 22 Subpart H



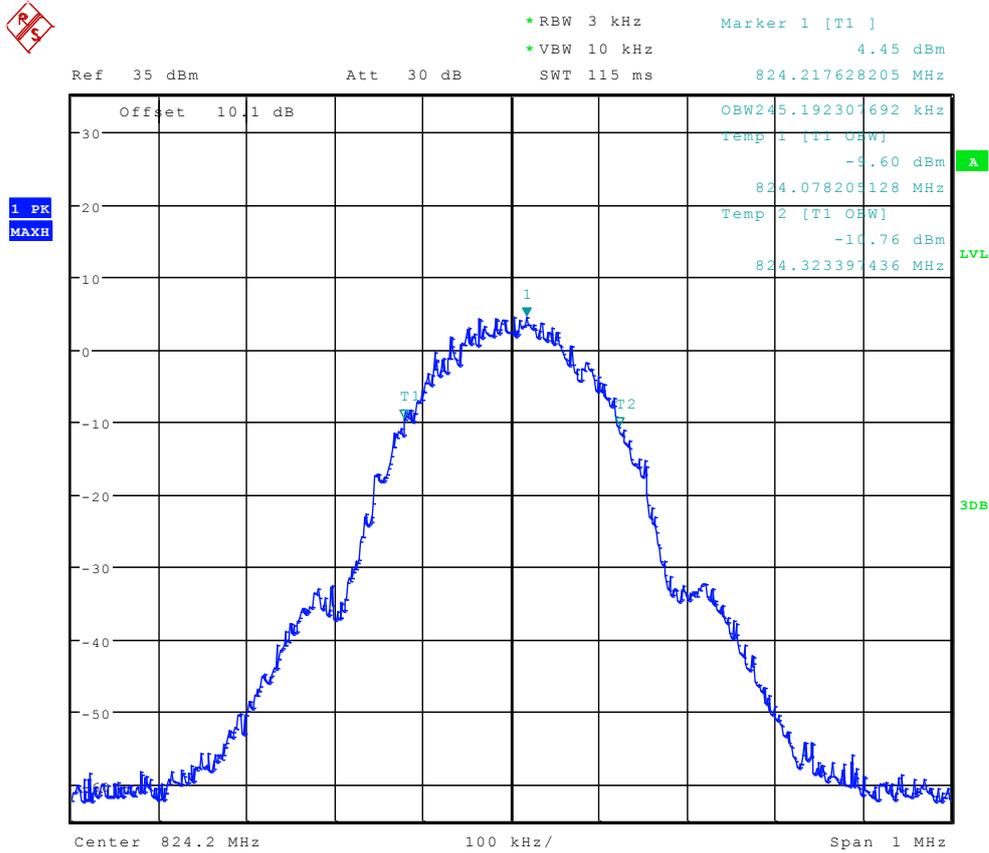
Result Table

Table 1 Measurement Results

Test Mode	RF Channel	Occupied Bandwidth [kHz]	Verdict
TM1	128	245.19	Pass
	192	245.19	Pass
	251	246.79	Pass
TM2	128	248.40	Pass
	192	245.19	Pass
	251	241.99	Pass
Test Mode	RF Channel	Occupied Bandwidth [MHz]	Verdict
TM3	4132	4.12	Pass
	4182	4.12	Pass
	4233	4.15	Pass



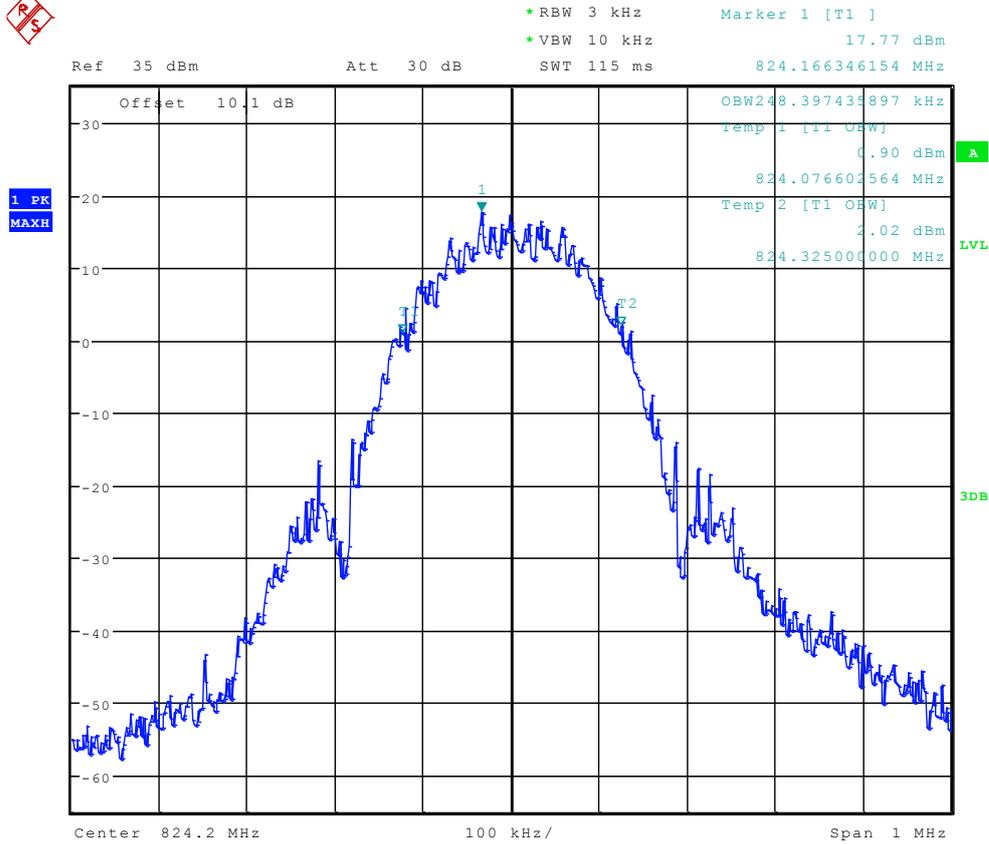
Channel 128 (TM1:GPRS/GSM)



Date: 23.DEC.2011 11:01:30



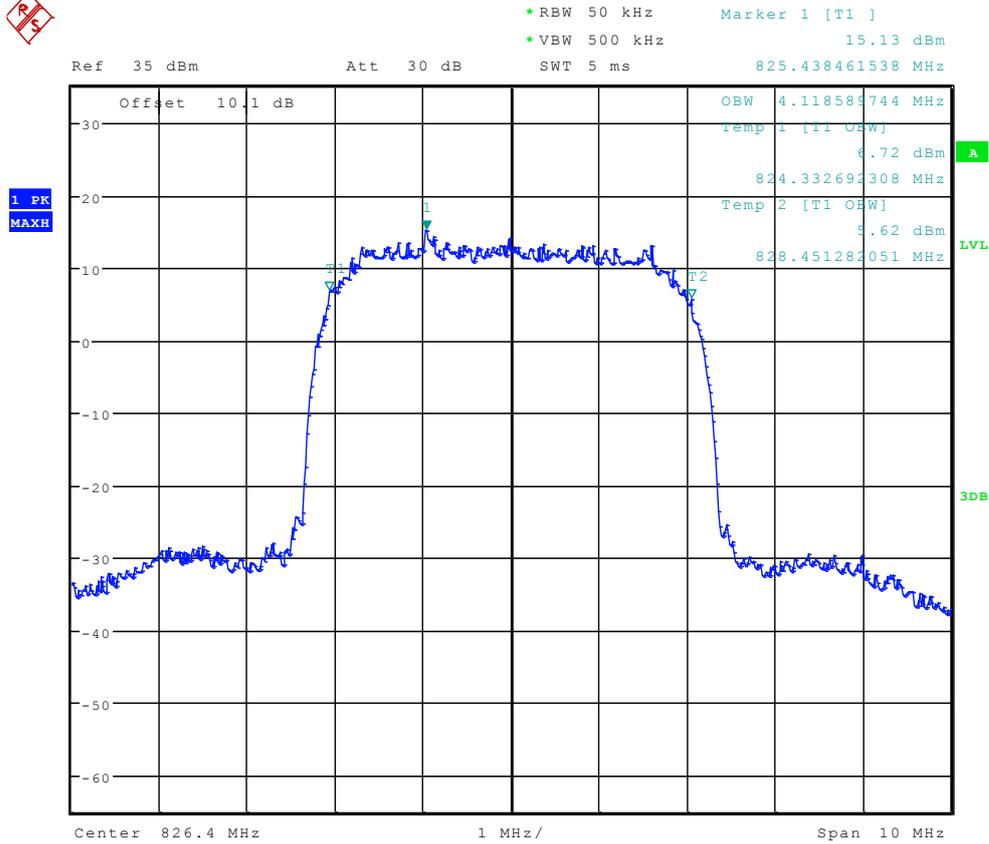
Channel 128 (TM2:EDGE)



Date: 23.DEC.2011 11:09:56



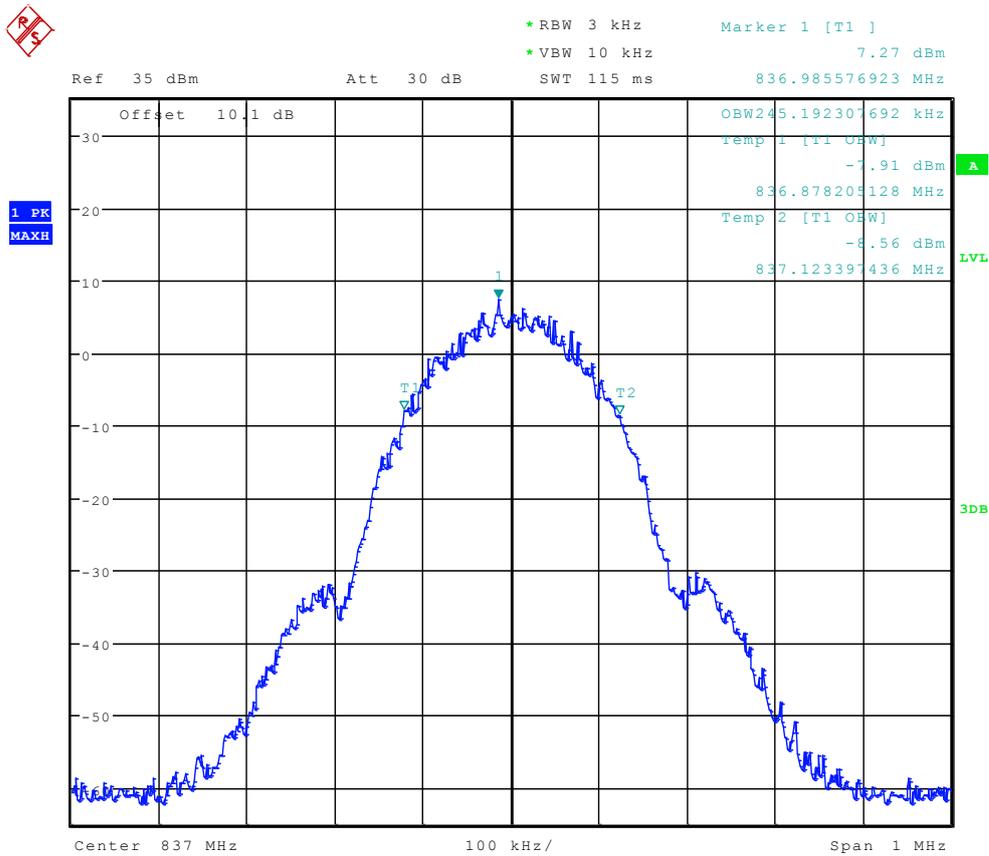
Channel 4132 (TM3: WCDMA)



Date: 23.DEC.2011 11:16:10



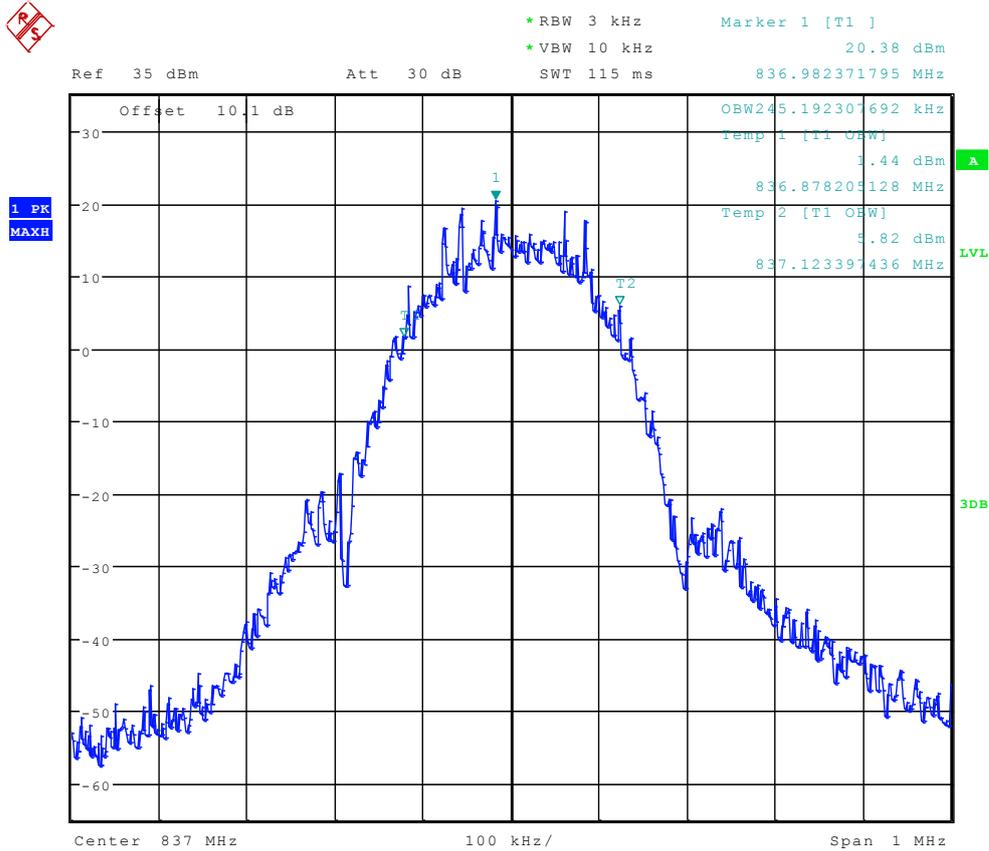
Channel 192 (TM1:GPRS/GSM)



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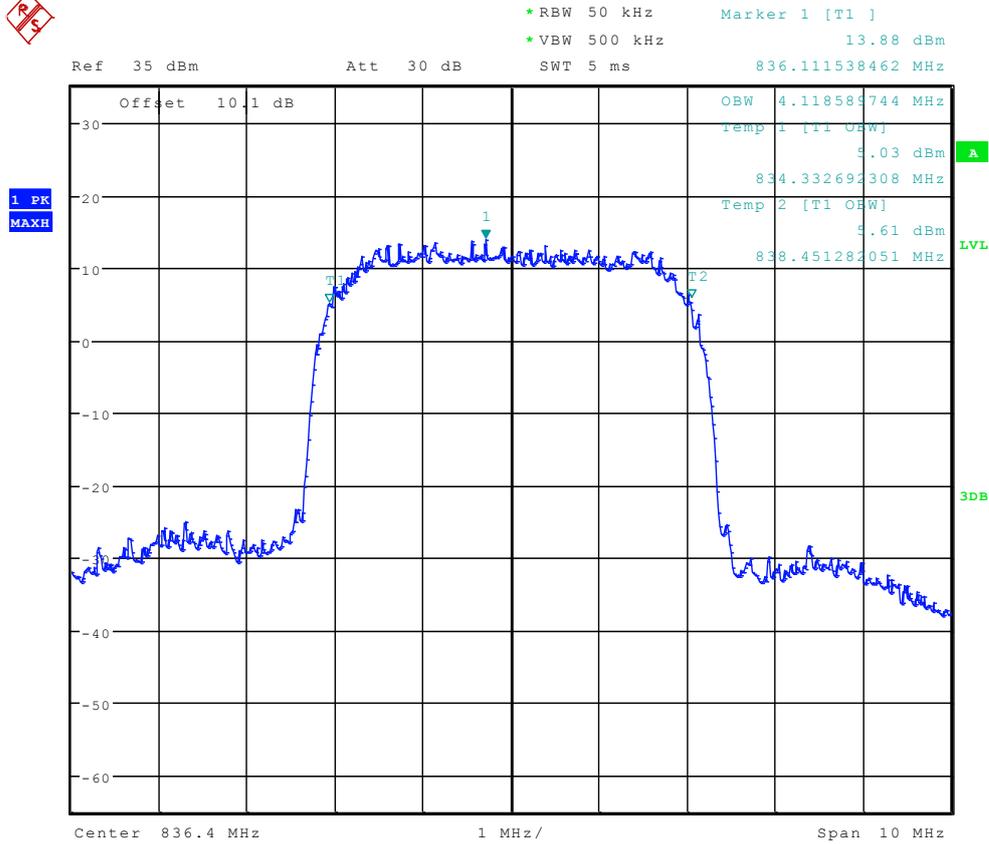
Channel 192 (TM2:EDGE)



Date: 23.DEC.2011 11:10:10



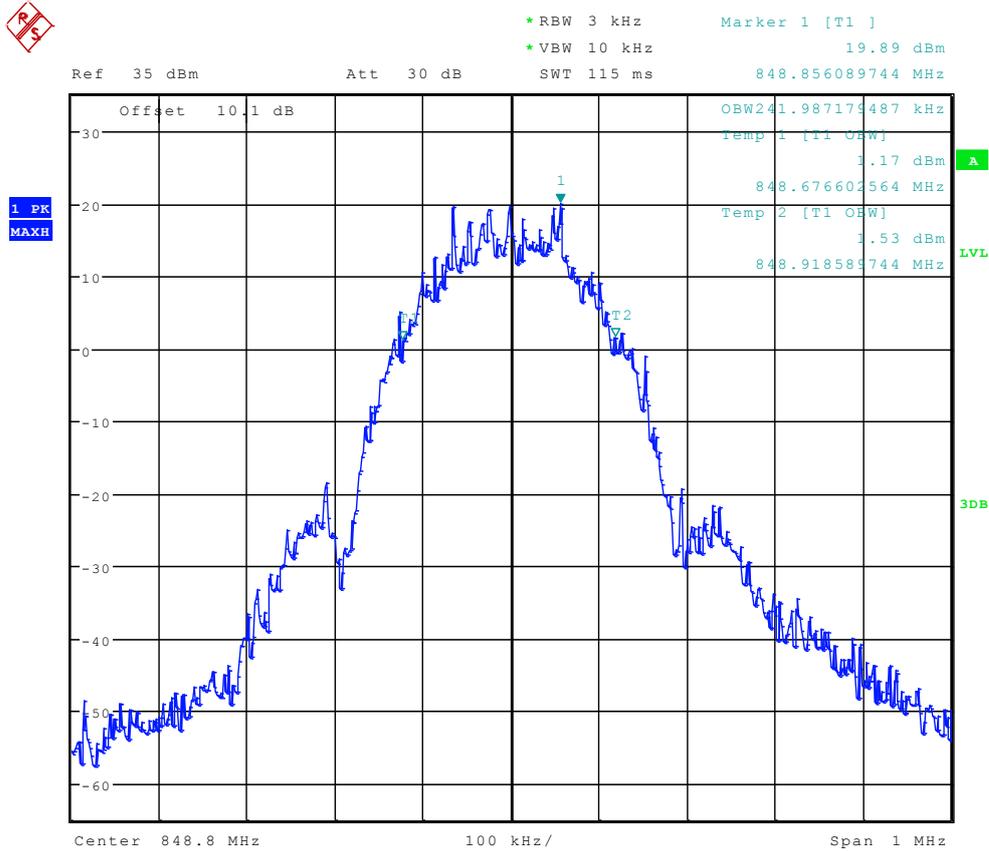
Channel 4182 (TM3: WCDMA)



Date: 23.DEC.2011 11:16:24



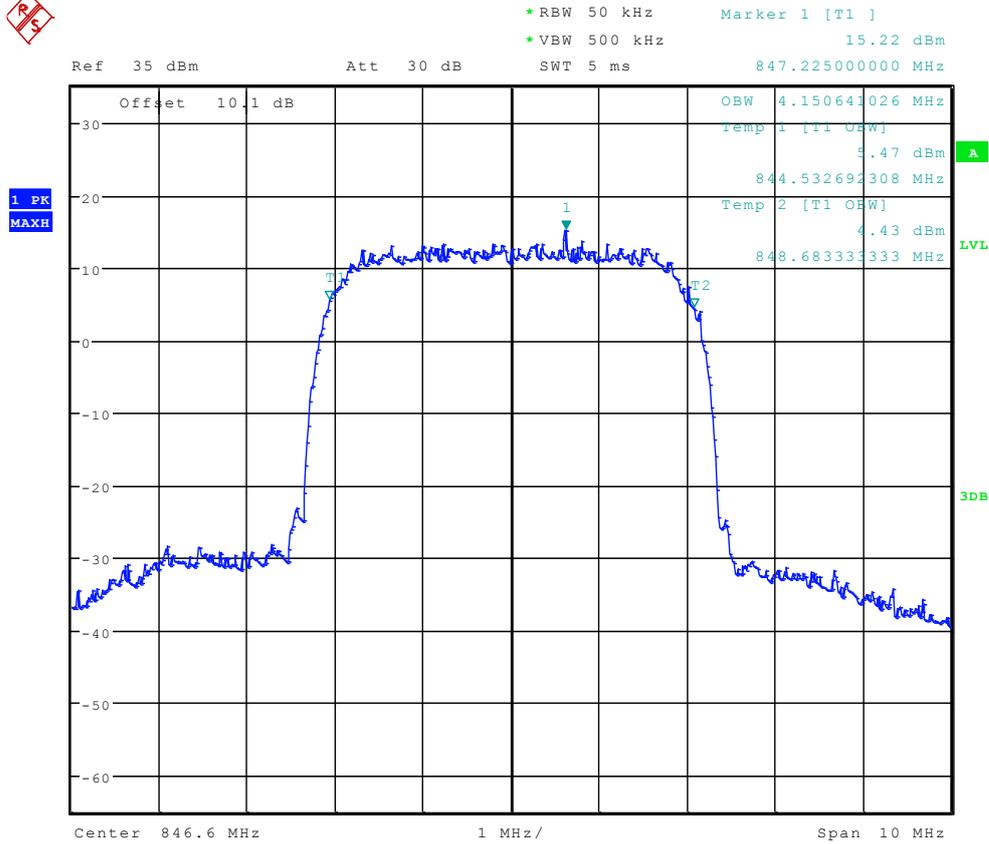
Channel 251 (TM2:EDGE)



Date: 23.DEC.2011 11:10:24



Channel 4233 (TM3: WCDMA)



Date: 23.DEC.2011 11:16:37

END



Appendix D

Band Edges Compliance

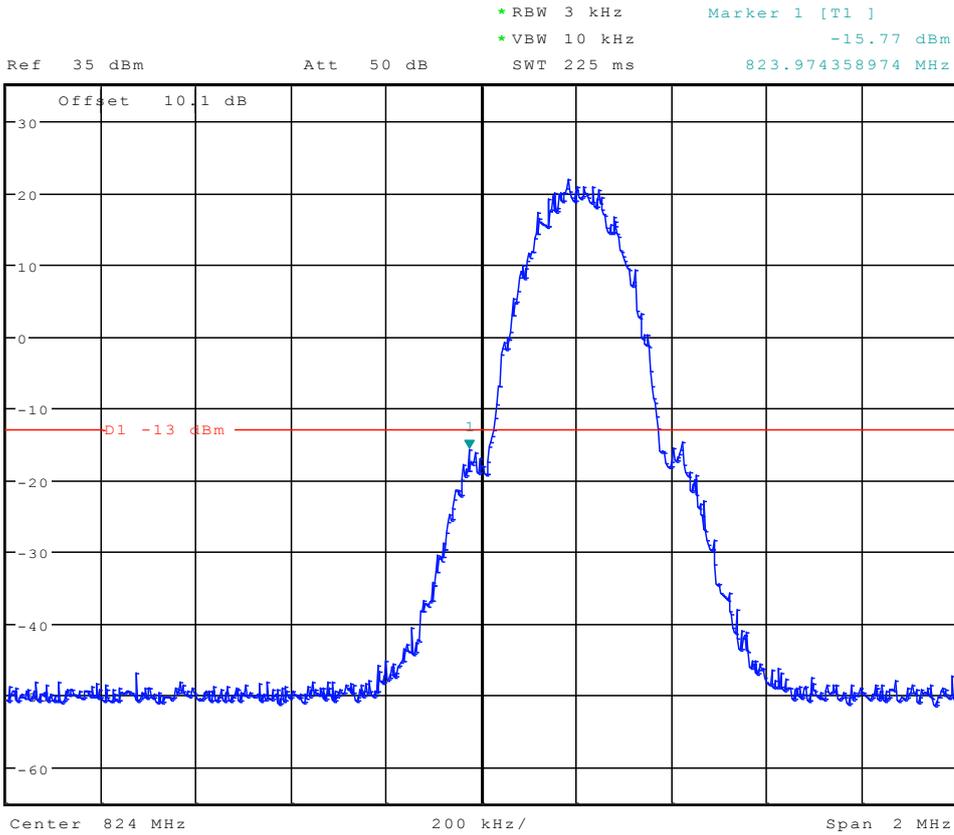
According to FCC Part 2.1051 & Part 22 Subpart H



TM1:GPRS/GSM

Left Edge

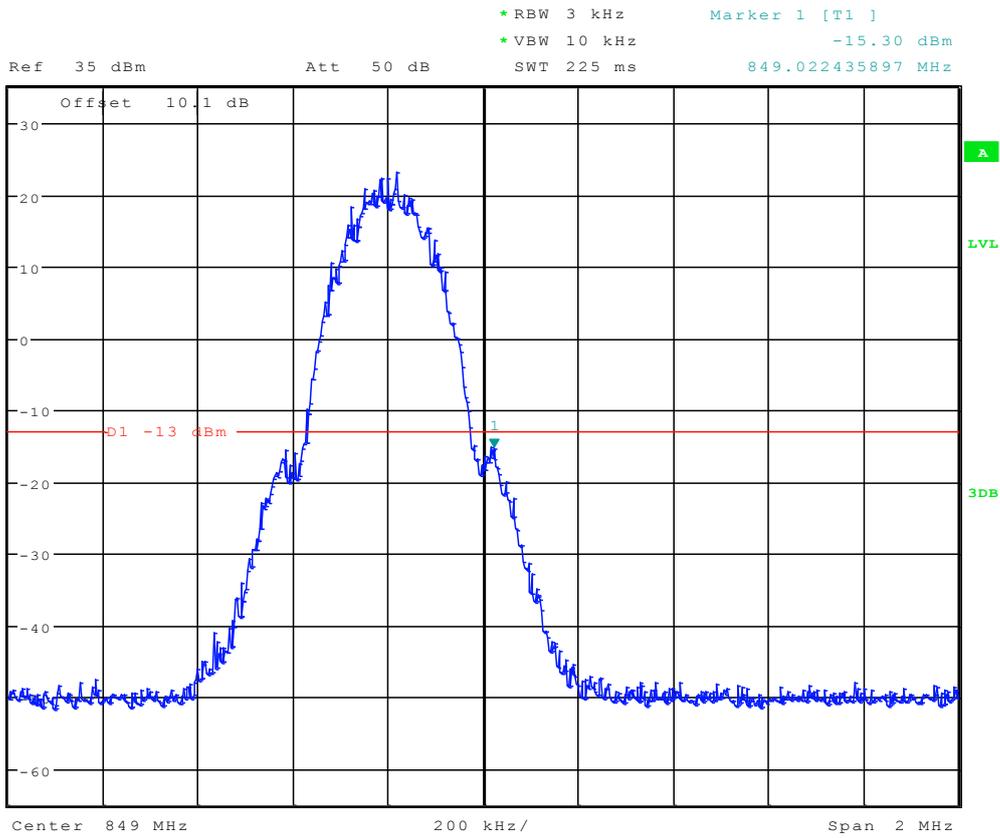
Channel 128



Date: 23.DEC.2011 11:55:08



Right Edge Channel 251



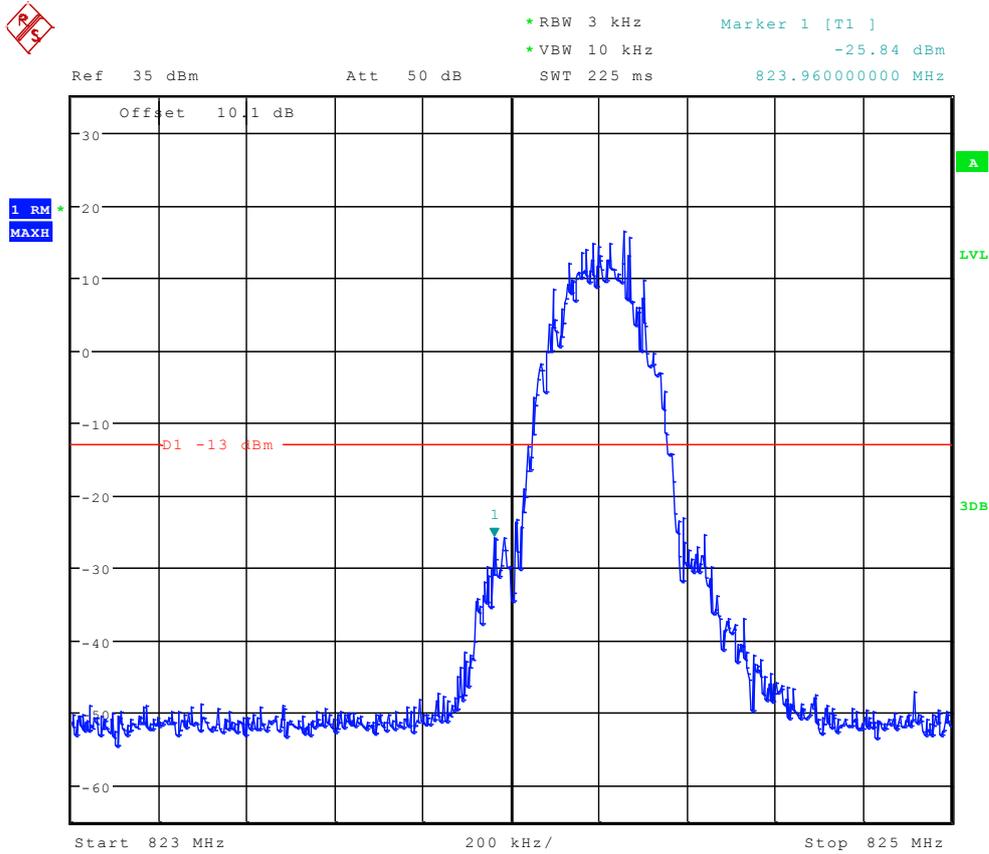
Date: 23.DEC.2011 11:57:03



TM2:EDGE

Left Edge

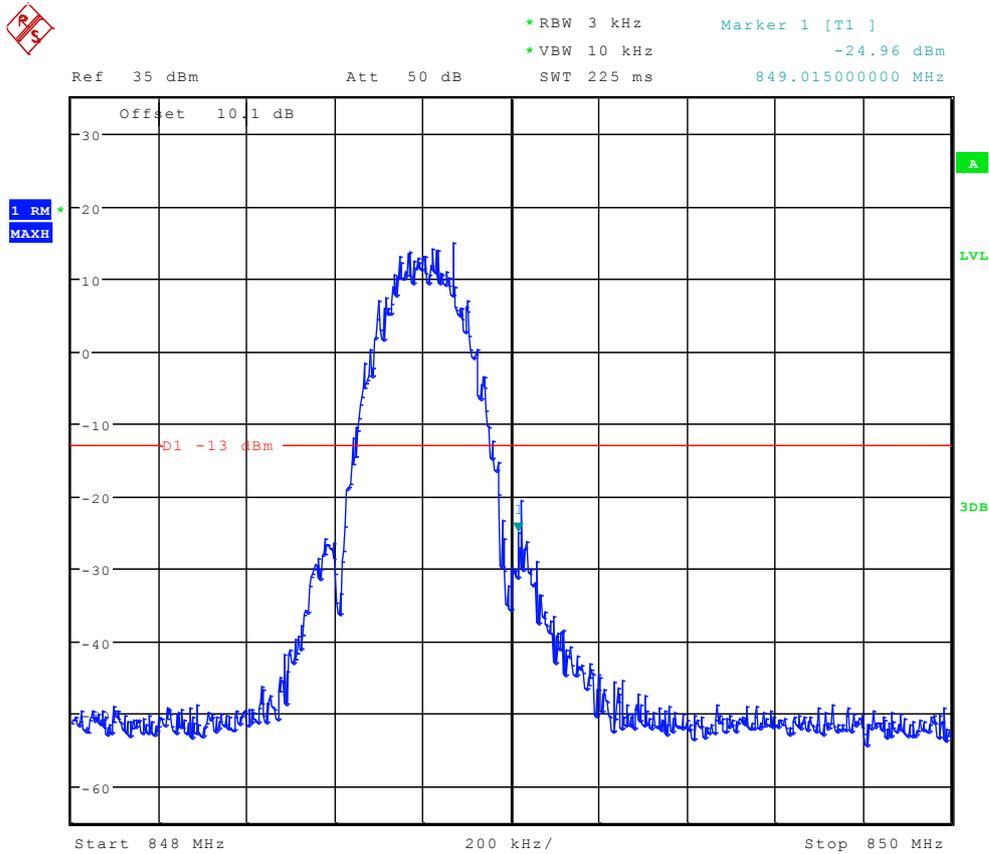
Channel 128



Date: 23.DEC.2011 11:13:36



Right Edge Channel 251



Date: 23.DEC.2011 11:13:50



TM3: WCDMA

Left Edge

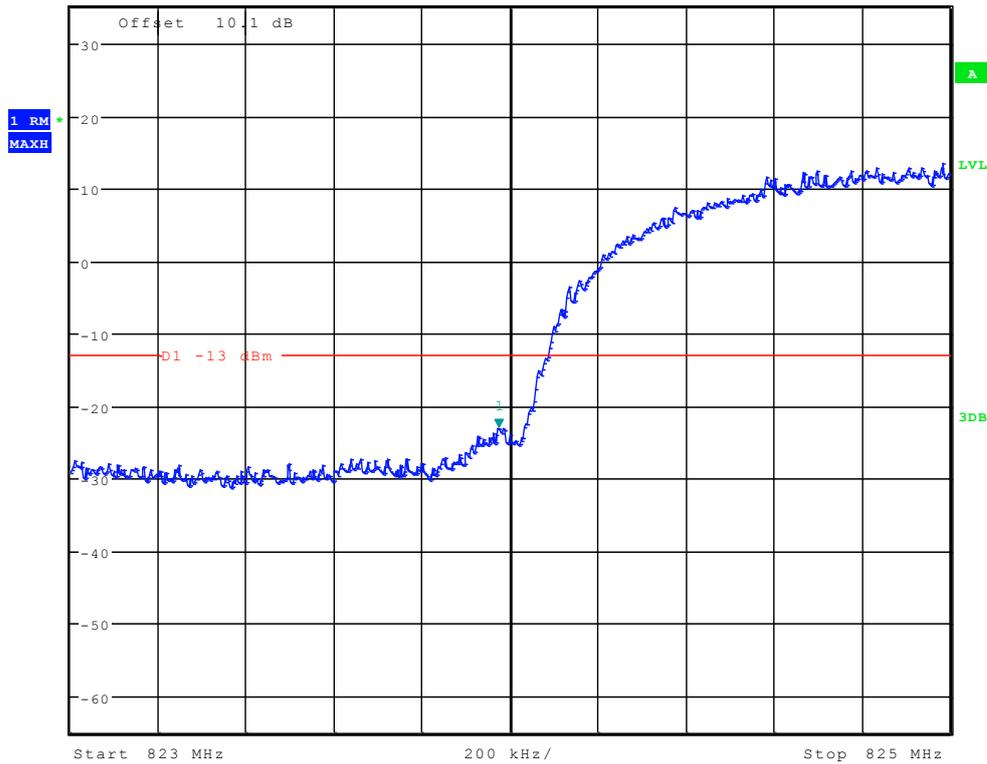
Channel 4132



Ref 35 dBm Att 50 dB SWT 2.5 ms 823.97500000 MHz

*RBW 50 kHz Marker 1 [T1] -22.99 dBm

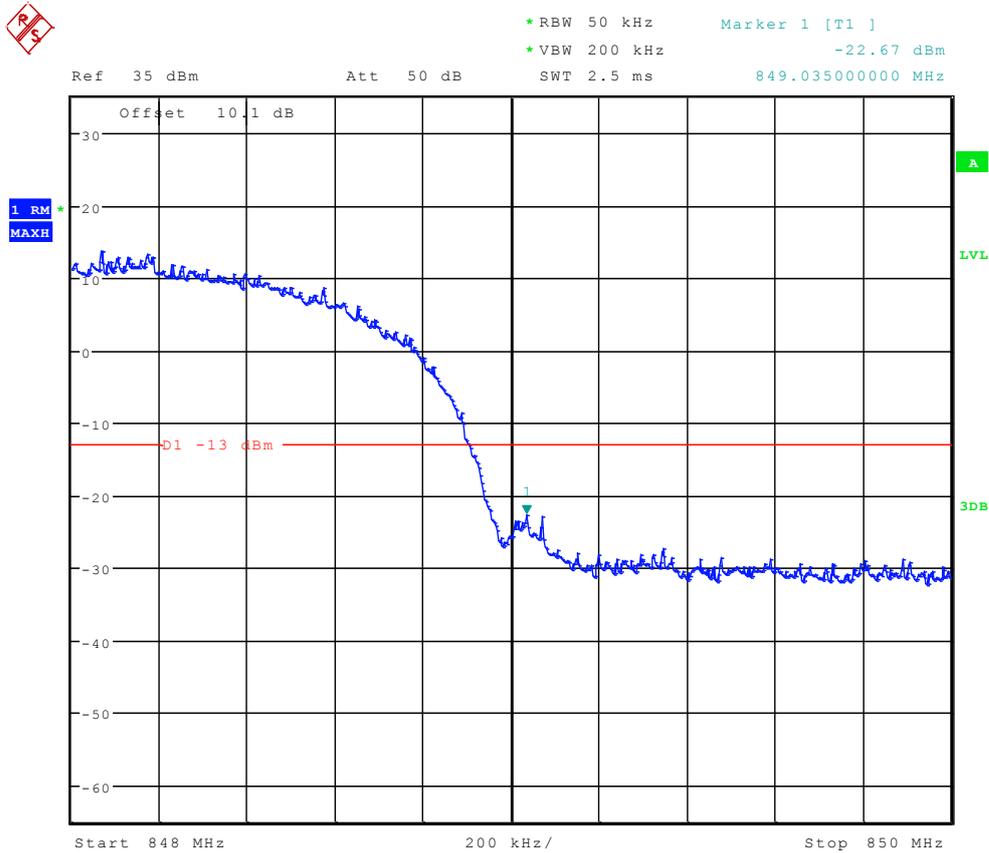
*VBW 200 kHz



Date: 23.DEC.2011 11:24:08



Right Edge Channel 4233



Date: 23.DEC.2011 11:24:21

END



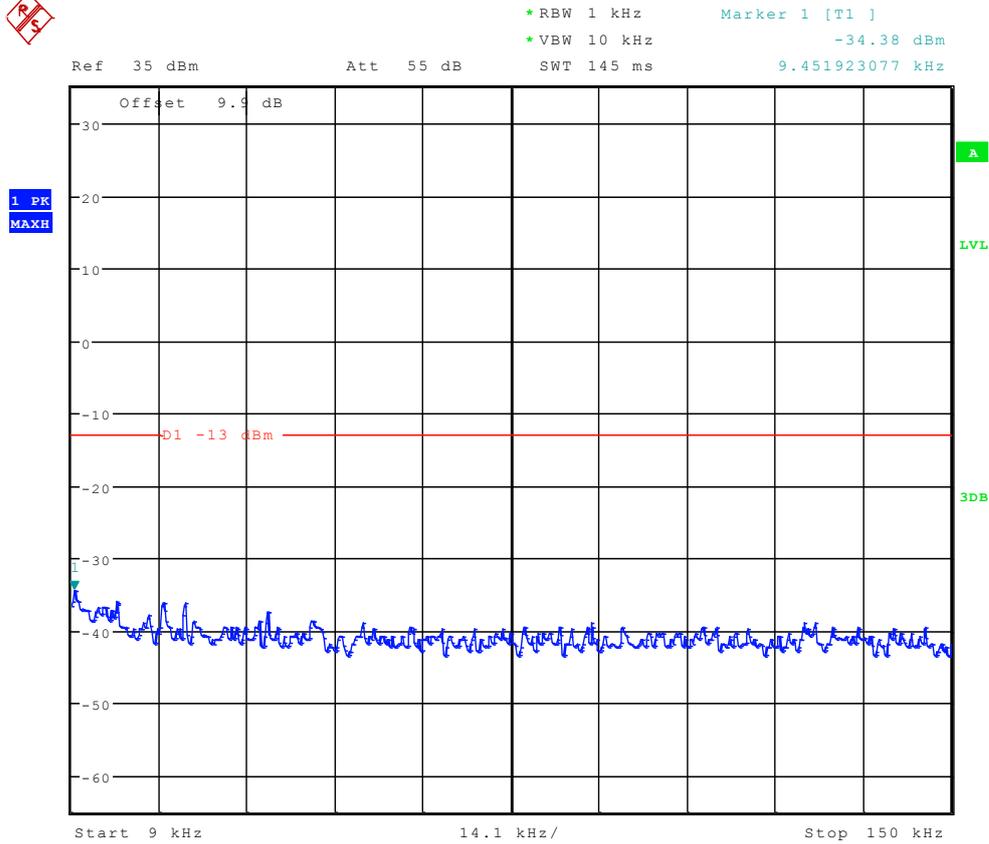
Appendix E

Spurious Emission at Antenna Terminal

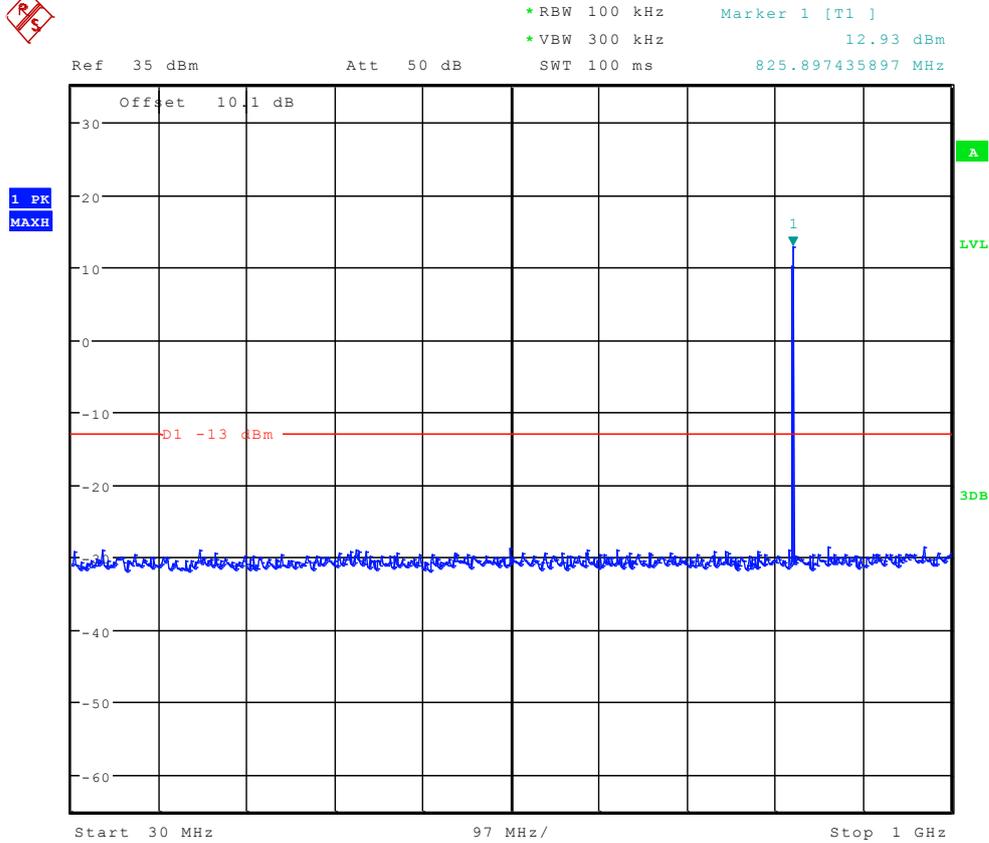
According to FCC Part 2.1051 & Part 22 Subpart H



TM1:GPRS/GSM Channel 128



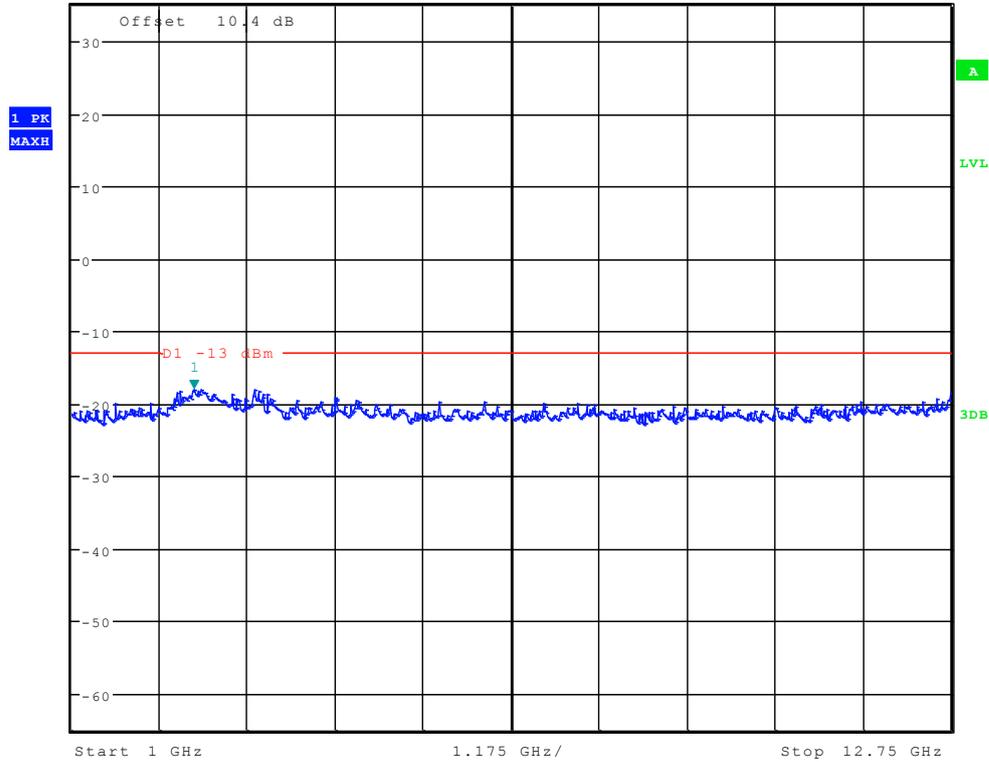
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Date: 23.DEC.2011 11:03:40



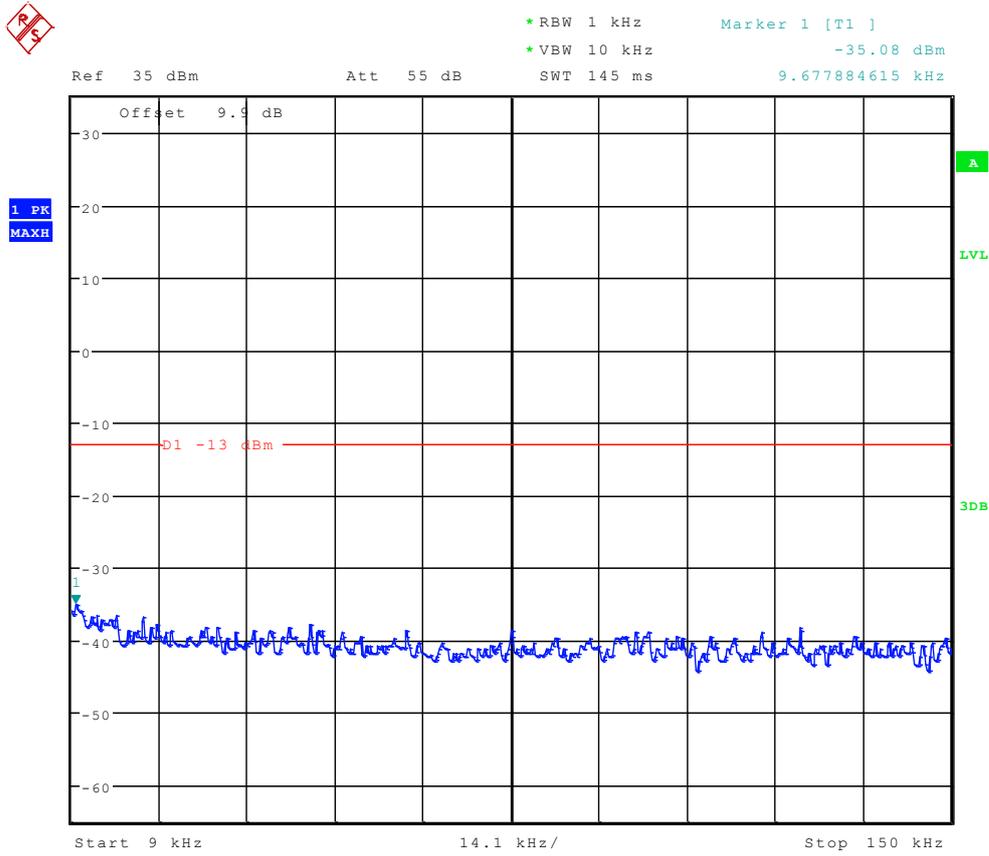
Ref 35 dBm Att 50 dB SWT 70 ms *RBW 1 MHz Marker 1 [T1] -18.02 dBm
 *VBW 3 MHz 2.638221154 GHz



Date: 23.DEC.2011 11:04:24



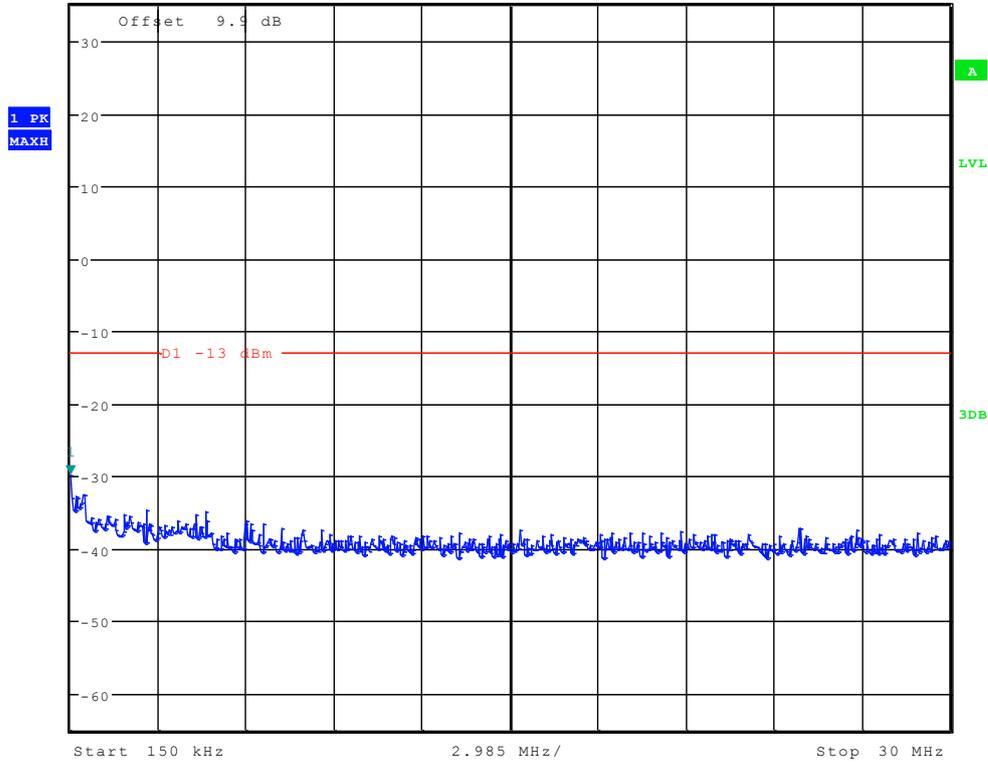
Channel 192



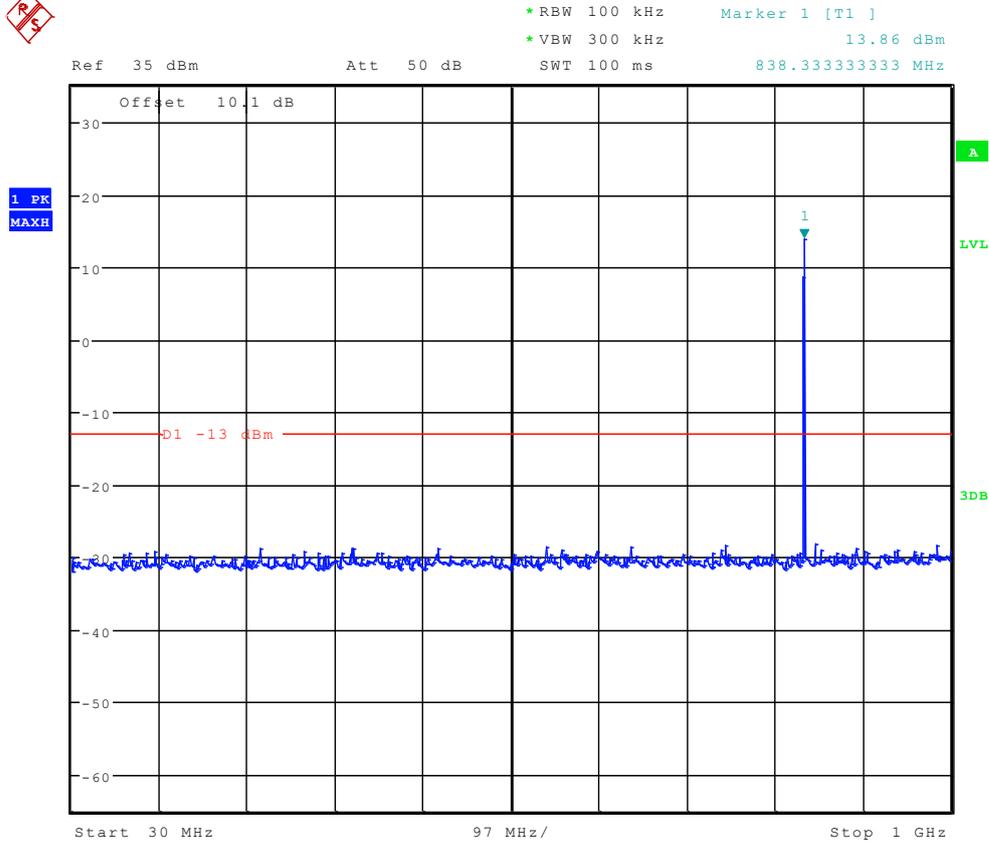
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Ref 35 dBm Att 55 dB SWT 300 ms
 *RBW 10 kHz Marker 1 [T1] -29.76 dBm
 *VBW 30 kHz 150.000000000 kHz



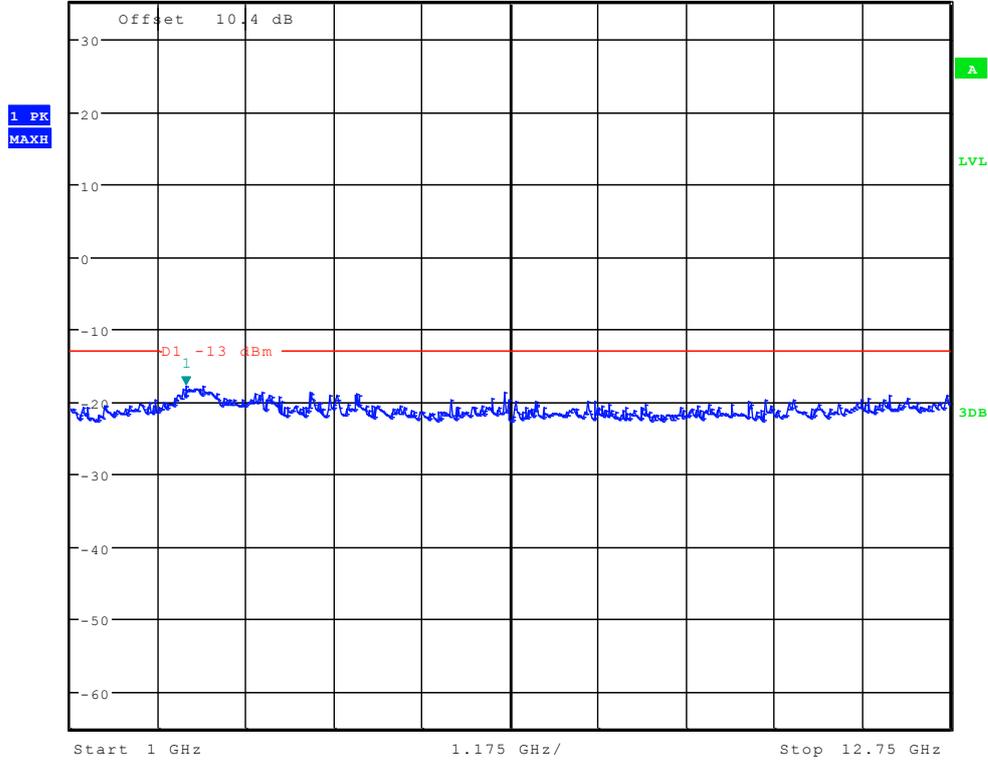
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Date: 23.DEC.2011 11:03:55



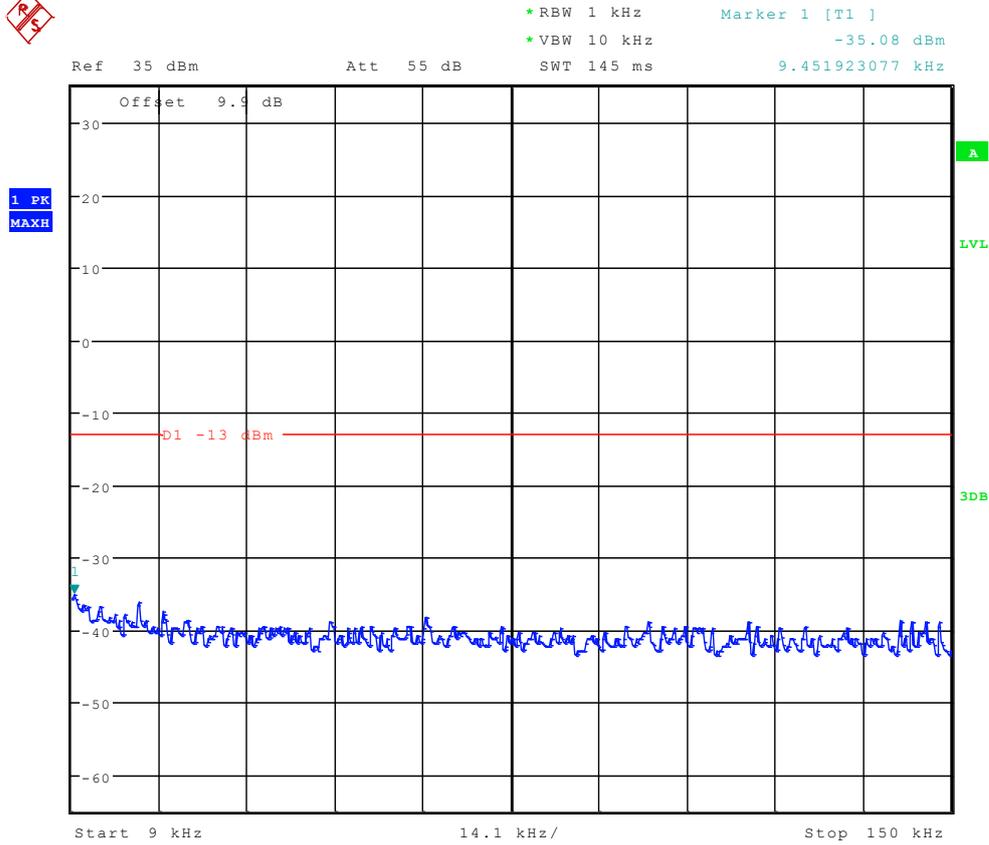
*RBW 1 MHz Marker 1 [T1]
 *VBW 3 MHz -17.75 dBm
 Ref 35 dBm Att 50 dB SWT 70 ms 2.544070513 GHz



Date: 23.DEC.2011 11:04:39



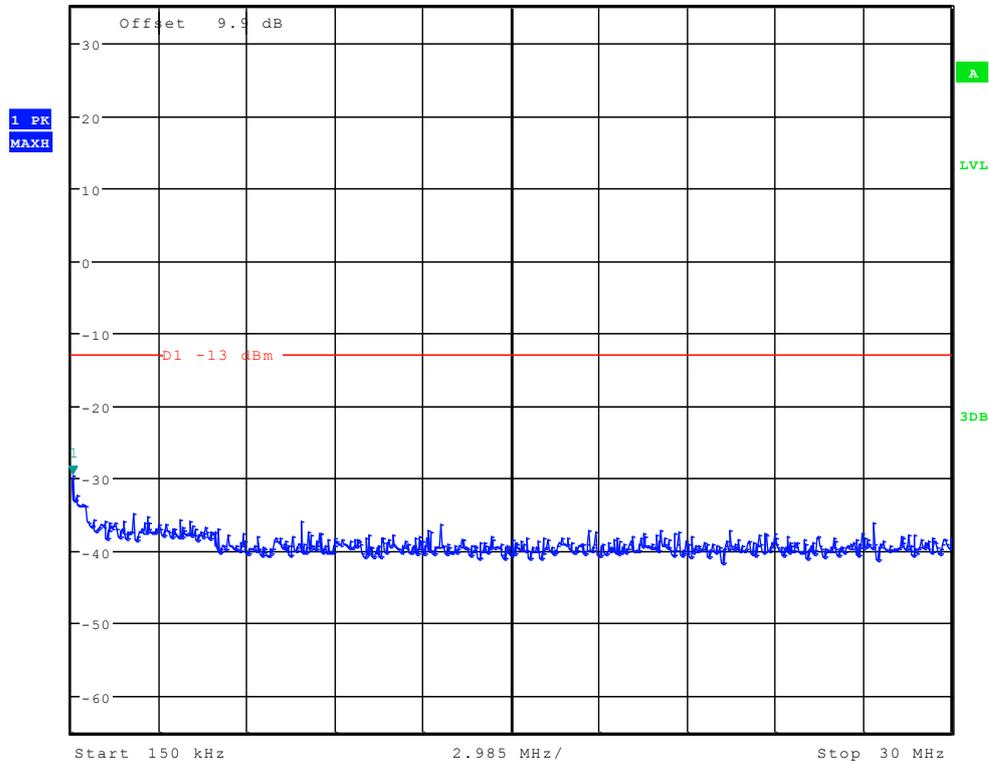
Channel 251



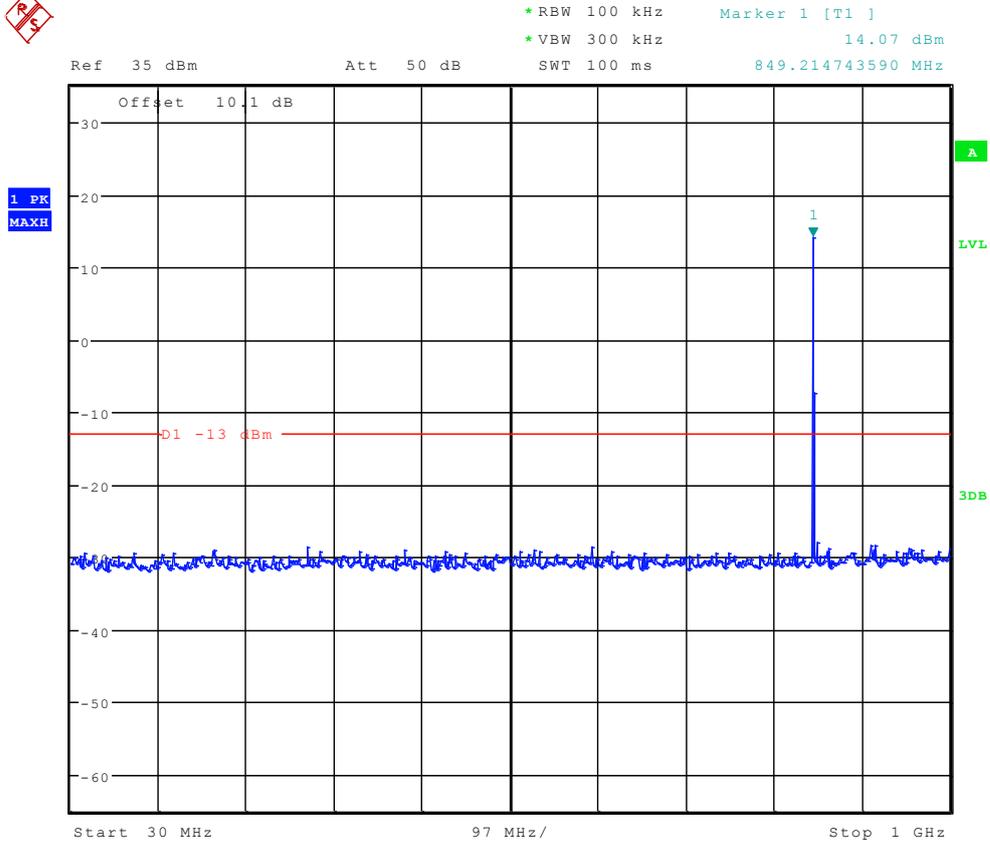
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Ref 35 dBm Att 55 dB SWT 300 ms
 *RBW 10 kHz Marker 1 [T1] -29.59 dBm
 *VBW 30 kHz 197.836538462 kHz



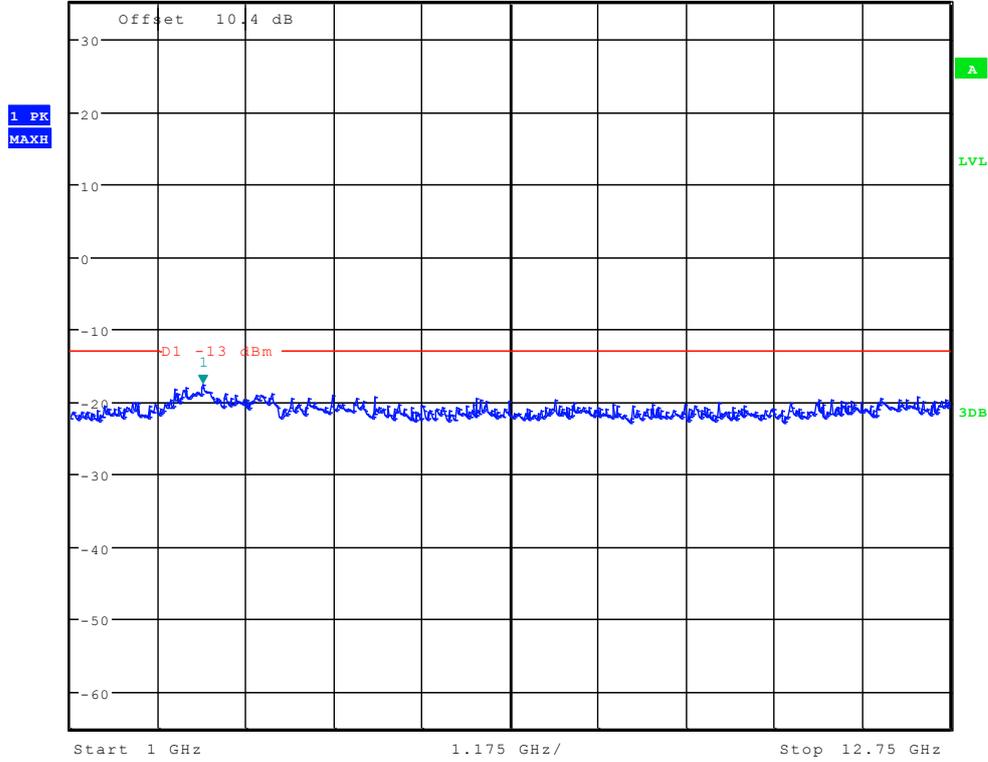
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Date: 23.DEC.2011 11:04:09



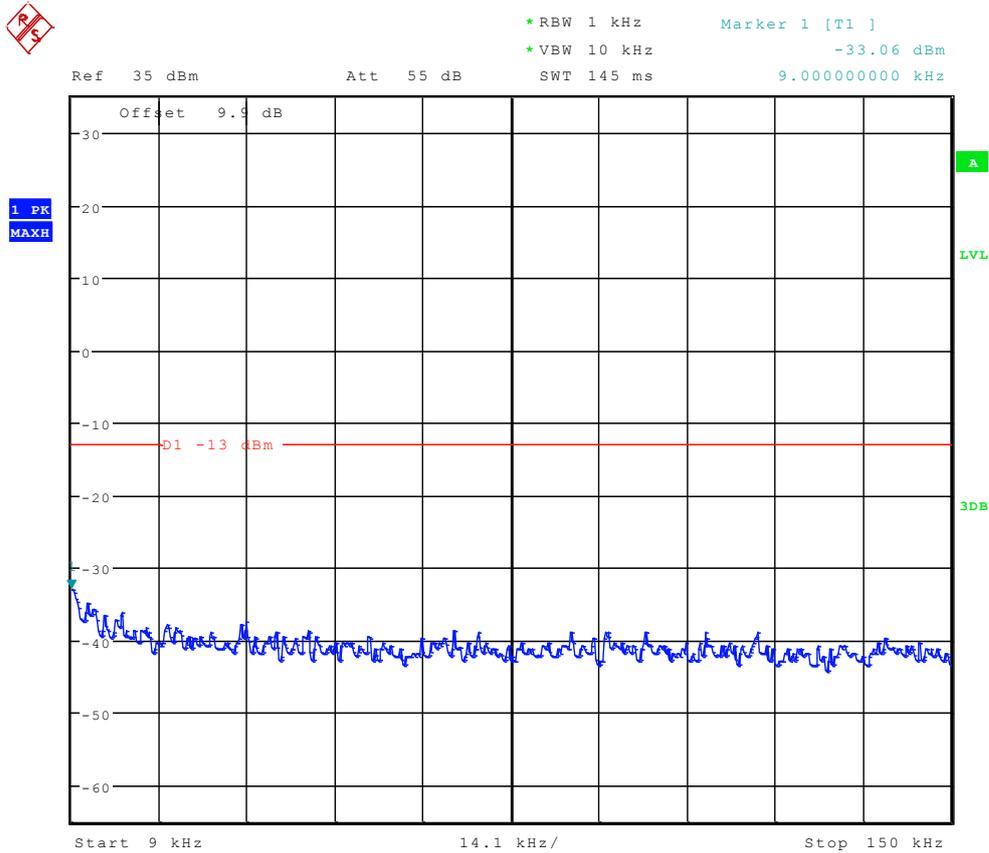
Ref 35 dBm Att 50 dB SWT 70 ms
 *RBW 1 MHz Marker 1 [T1] -17.65 dBm
 *VBW 3 MHz 2.770032051 GHz



Date: 23.DEC.2011 11:04:53



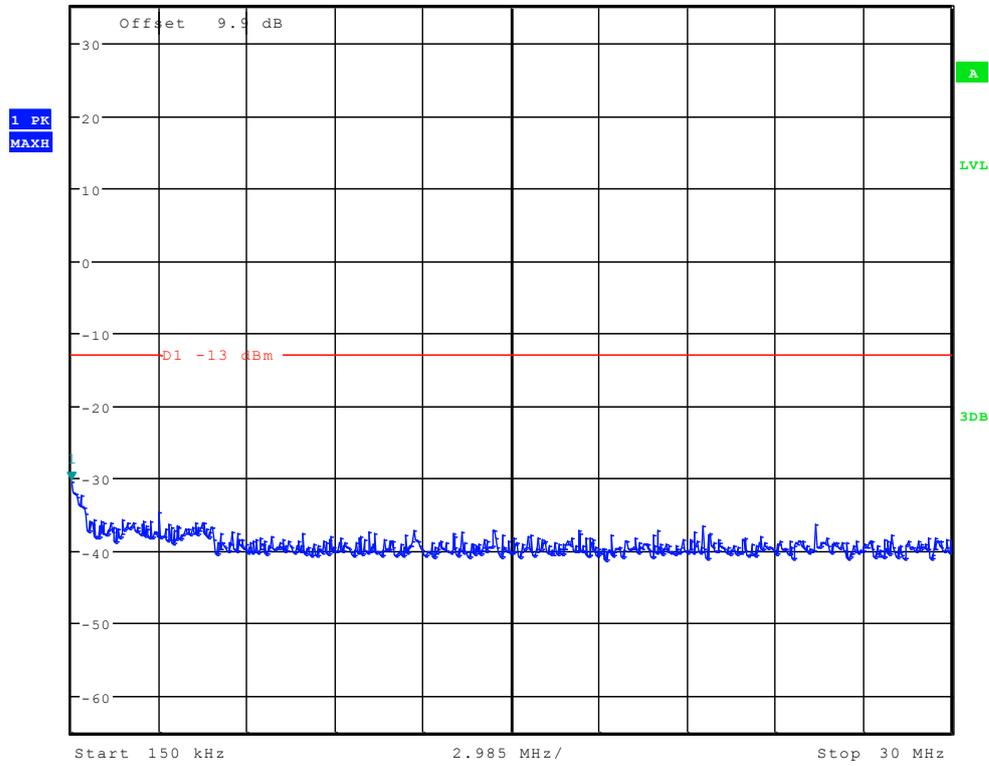
TM2:EDGE Channel 128



Date: 23.DEC.2011 11:10:39



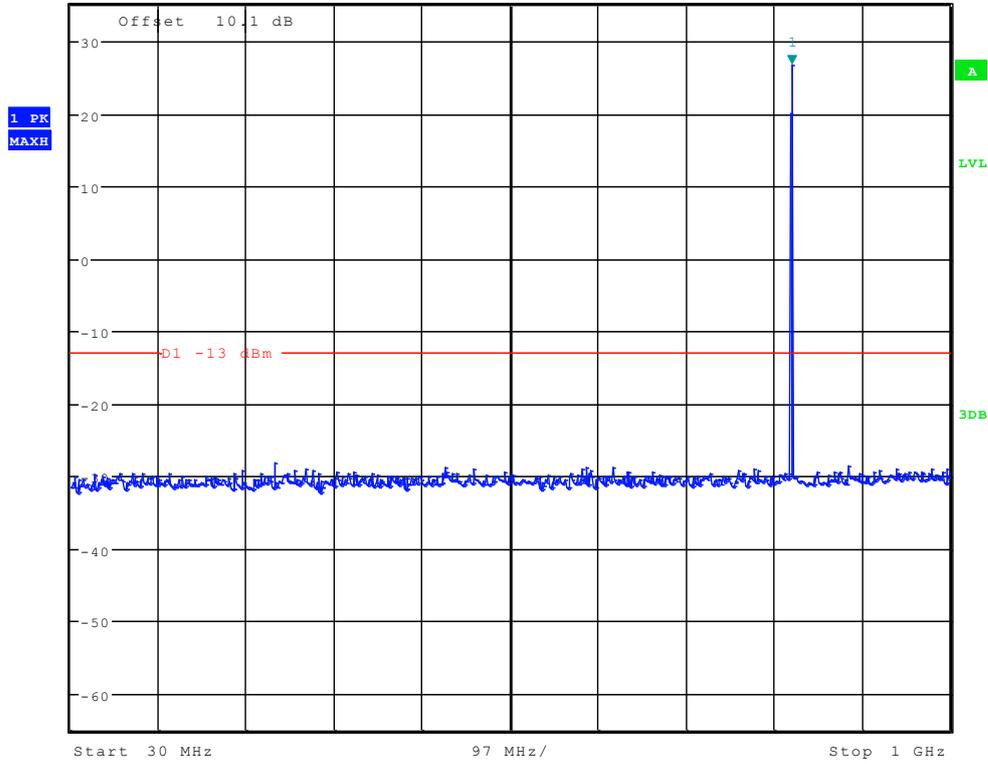
Ref 35 dBm Att 55 dB SWT 300 ms
 *RBW 10 kHz Marker 1 [T1] -30.52 dBm
 *VBW 30 kHz 150.000000000 kHz



Date: 23.DEC.2011 11:11:22



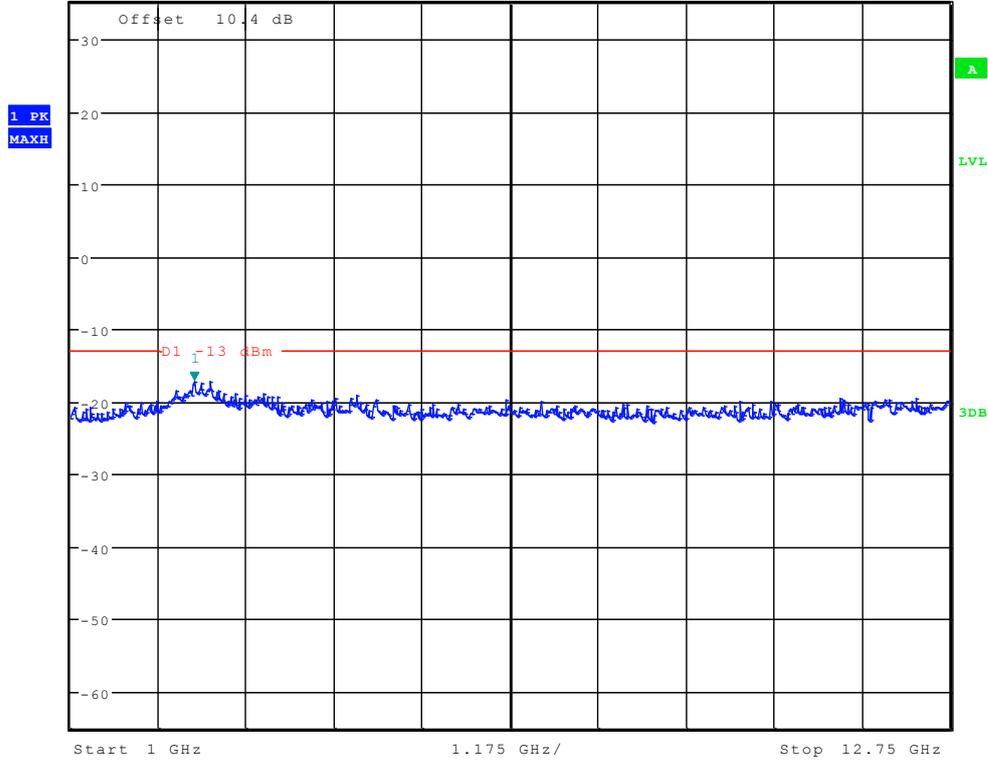
Ref 35 dBm Att 50 dB SWT 100 ms
 *RBW 100 kHz Marker 1 [T1] 26.79 dBm
 *VBW 300 kHz 825.897435897 MHz



Date: 23.DEC.2011 11:12:06



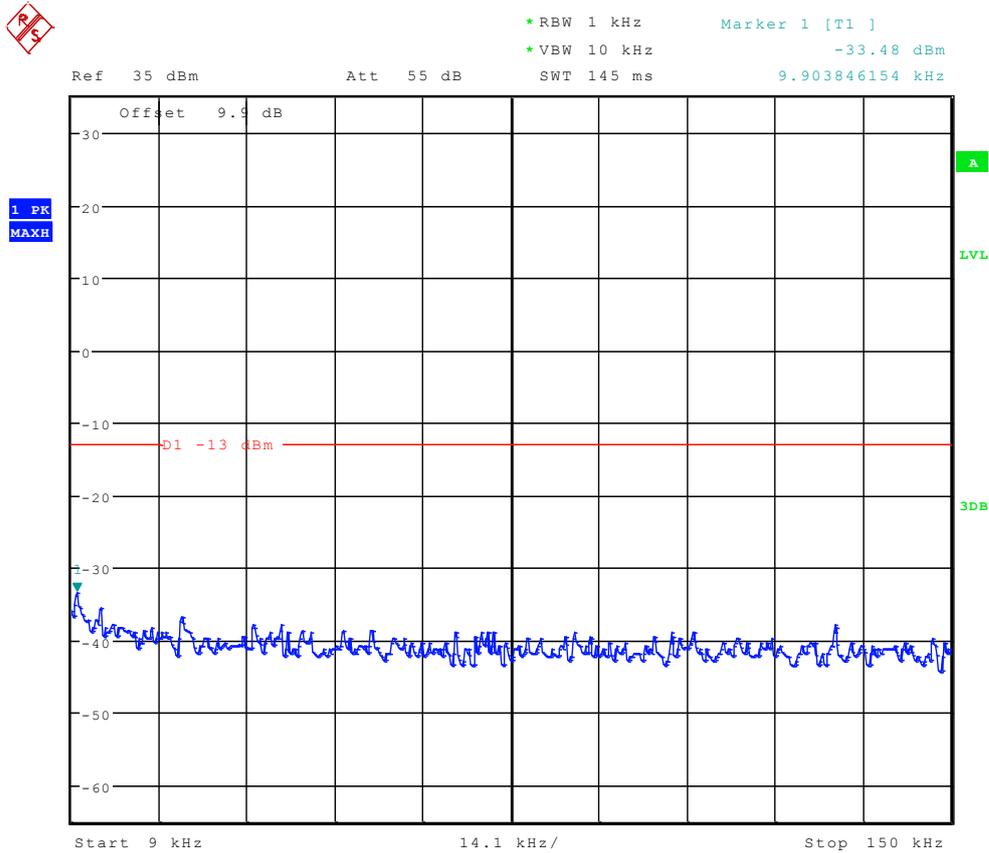
Ref 35 dBm Att 50 dB SWT 70 ms Marker 1 [T1] -17.23 dBm
 *RBW 1 MHz *VBW 3 MHz 2.657051282 GHz



Date: 23.DEC.2011 11:12:50



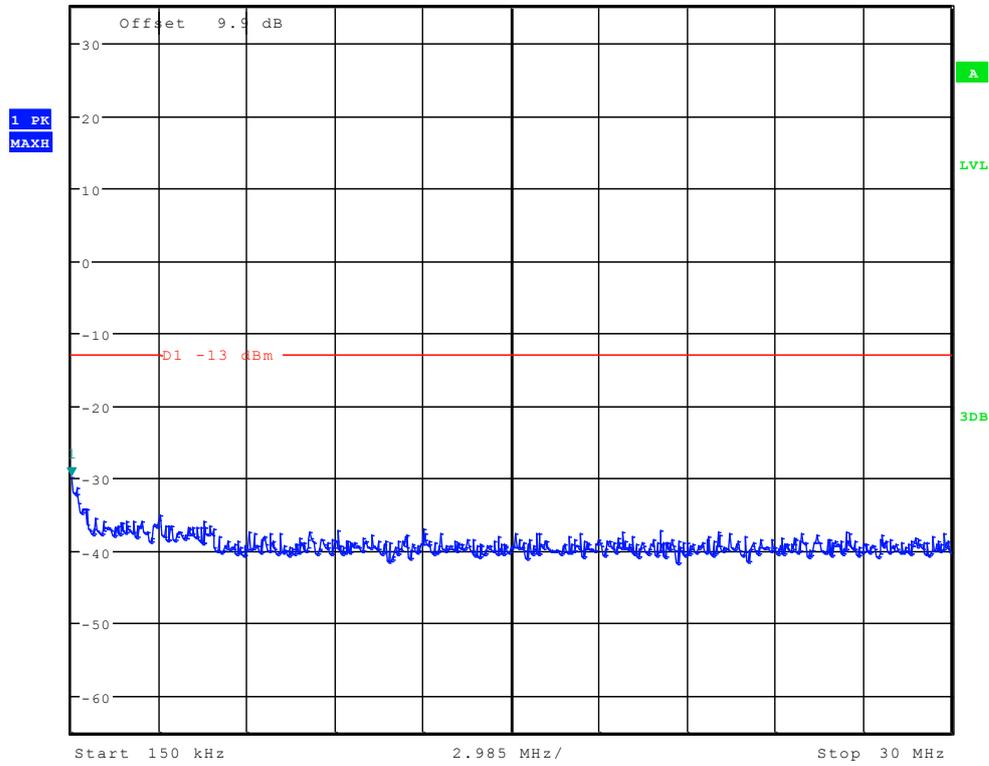
Channel 192



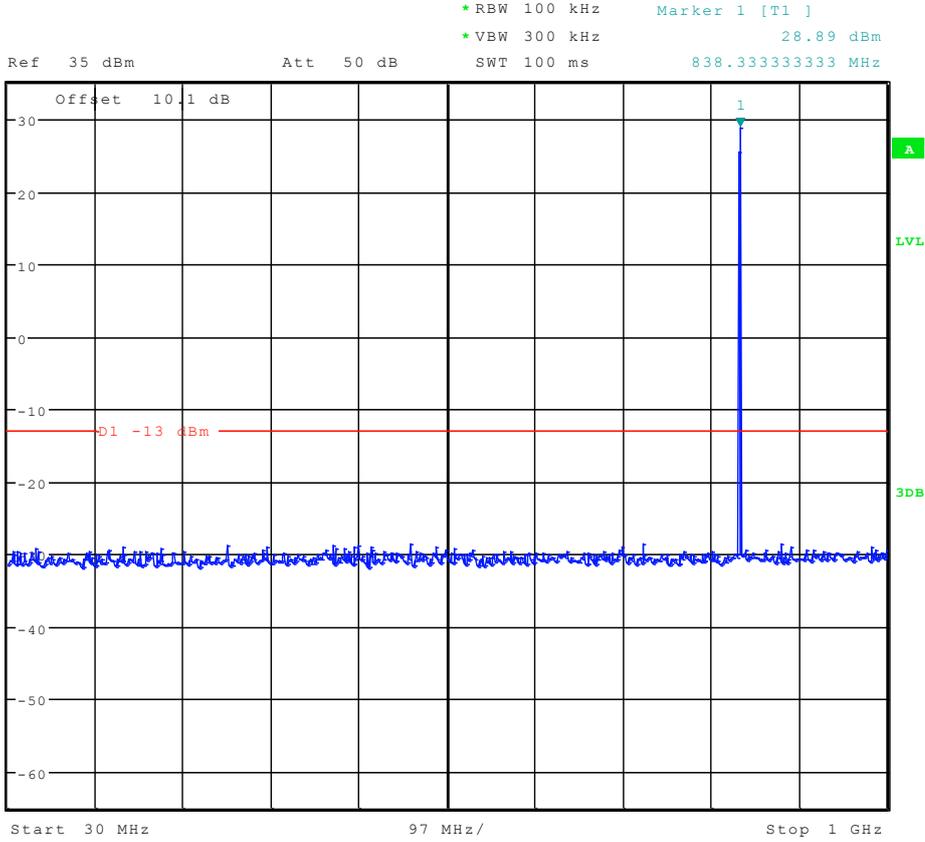
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Ref 35 dBm Att 55 dB SWT 300 ms 150.000000000 kHz
 *RBW 10 kHz Marker 1 [T1]
 *VBW 30 kHz -29.87 dBm



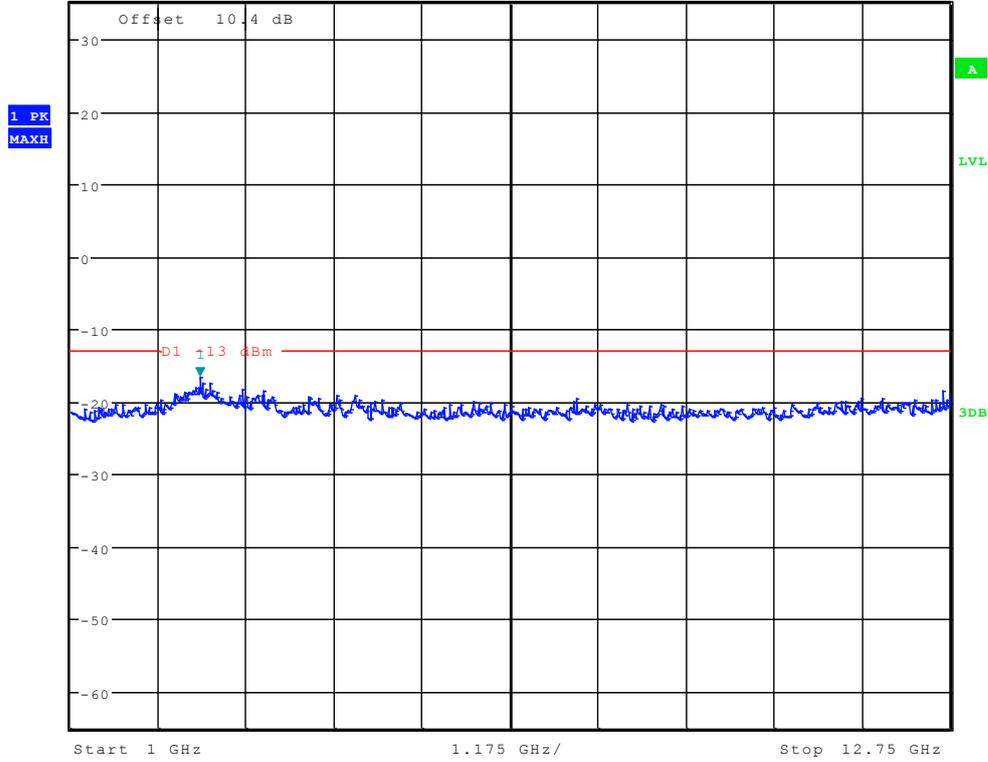
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Date: 23.DEC.2011 11:12:21



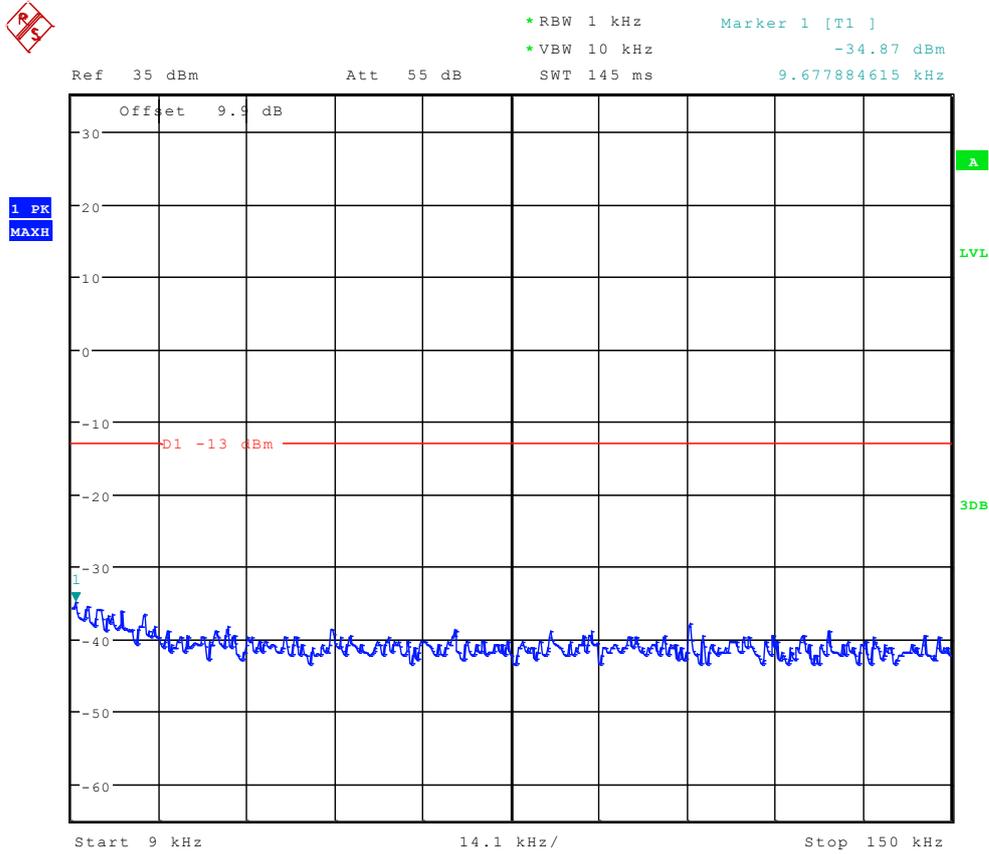
Ref 35 dBm Att 50 dB SWT 70 ms
 *RBW 1 MHz Marker 1 [T1] -16.54 dBm
 *VBW 3 MHz 2.732371795 GHz



Date: 23.DEC.2011 11:13:05



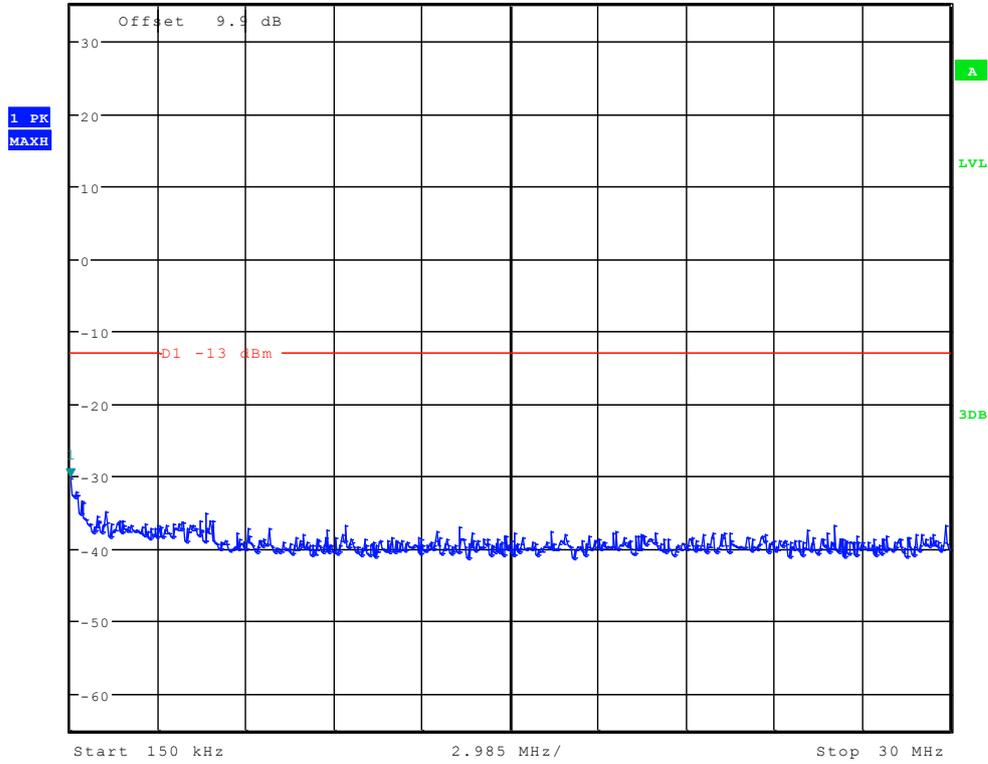
Channel 251



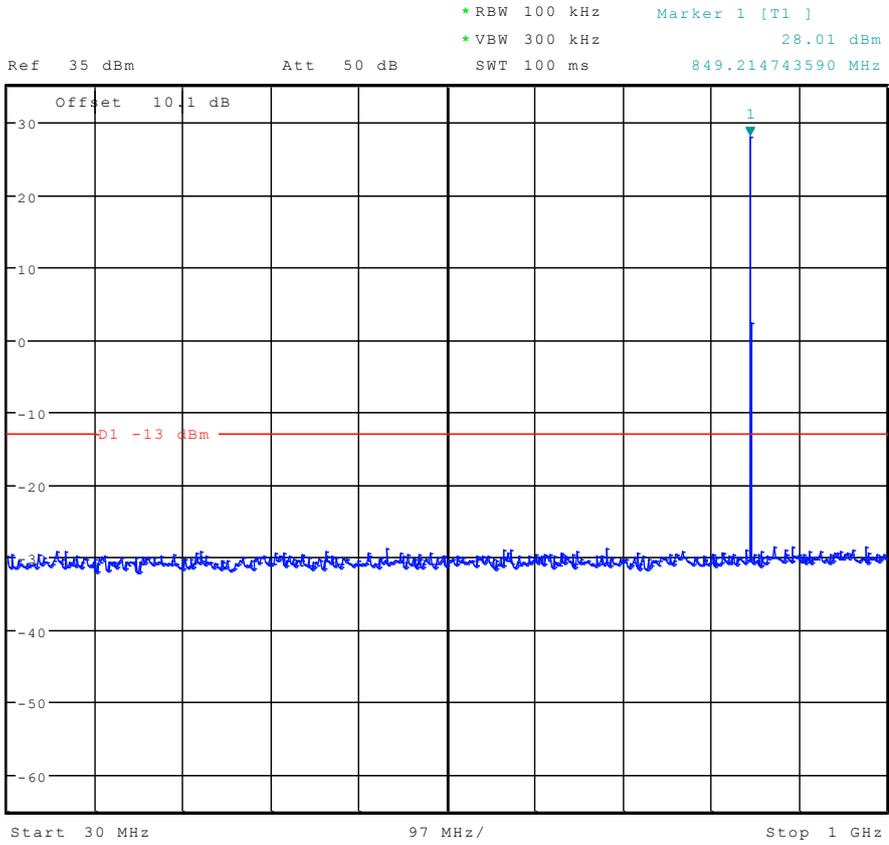
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Ref 35 dBm Att 55 dB SWT 300 ms
 *RBW 10 kHz Marker 1 [T1] -30.22 dBm
 *VBW 30 kHz 150.000000000 kHz



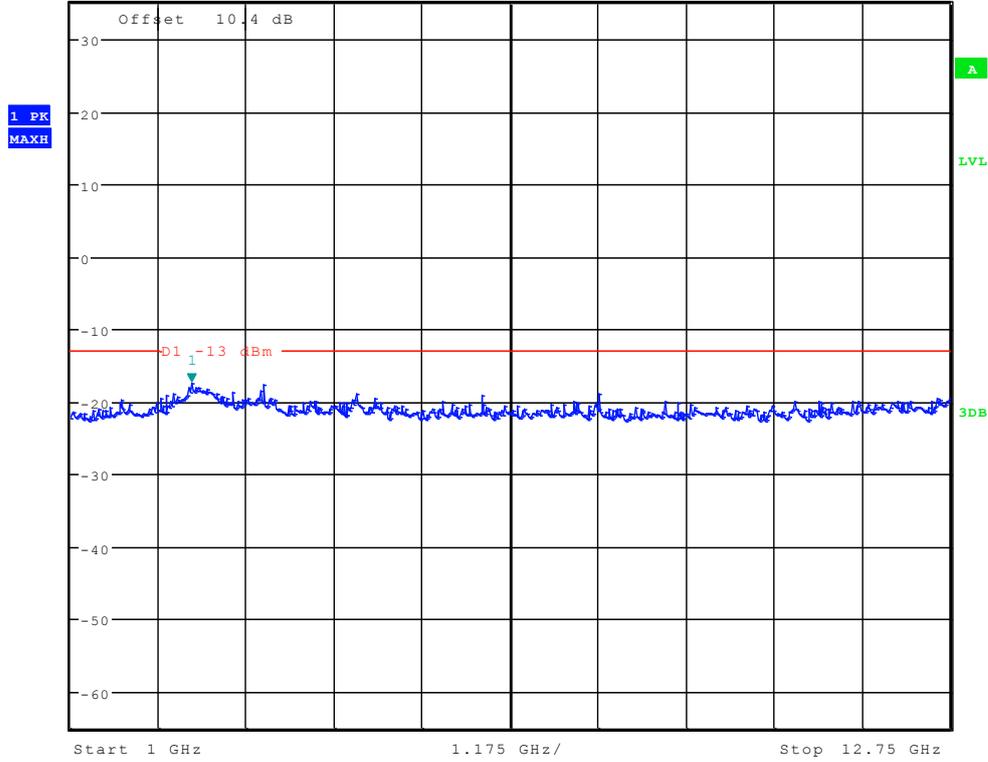
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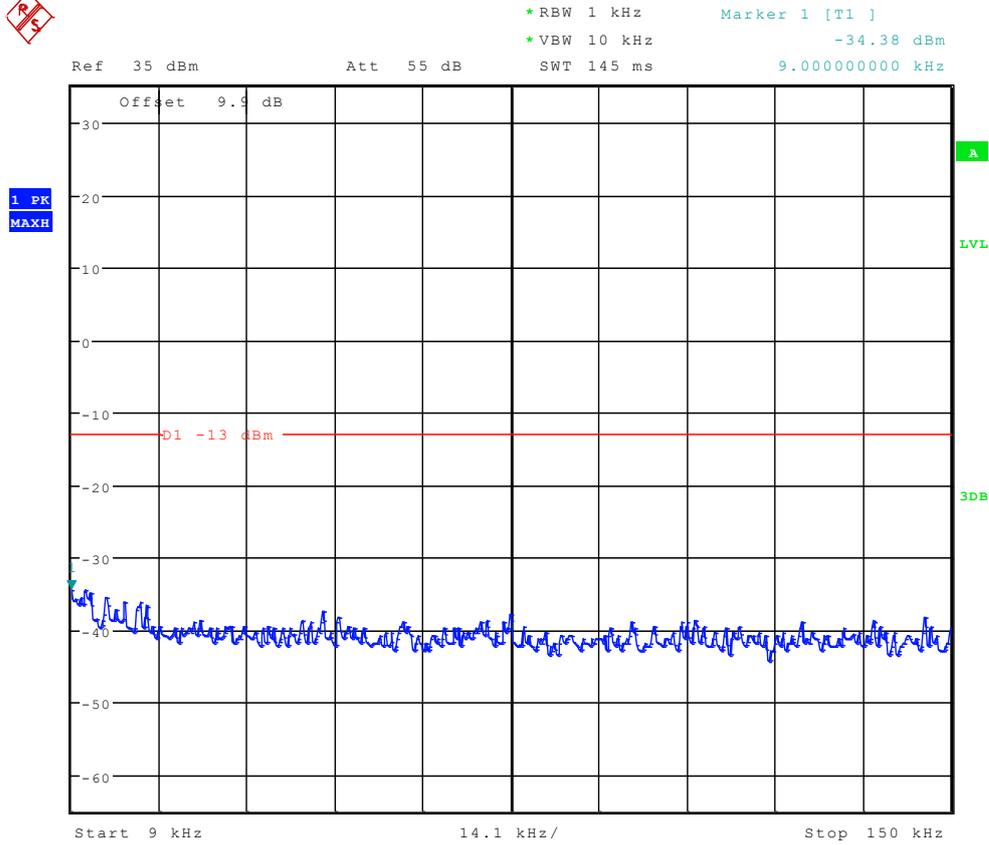
*RBW 1 MHz Marker 1 [T1]
 *VBW 3 MHz -17.35 dBm
 Ref 35 dBm Att 50 dB SWT 70 ms 2.619391026 GHz



Date: 23.DEC.2011 11:13:19



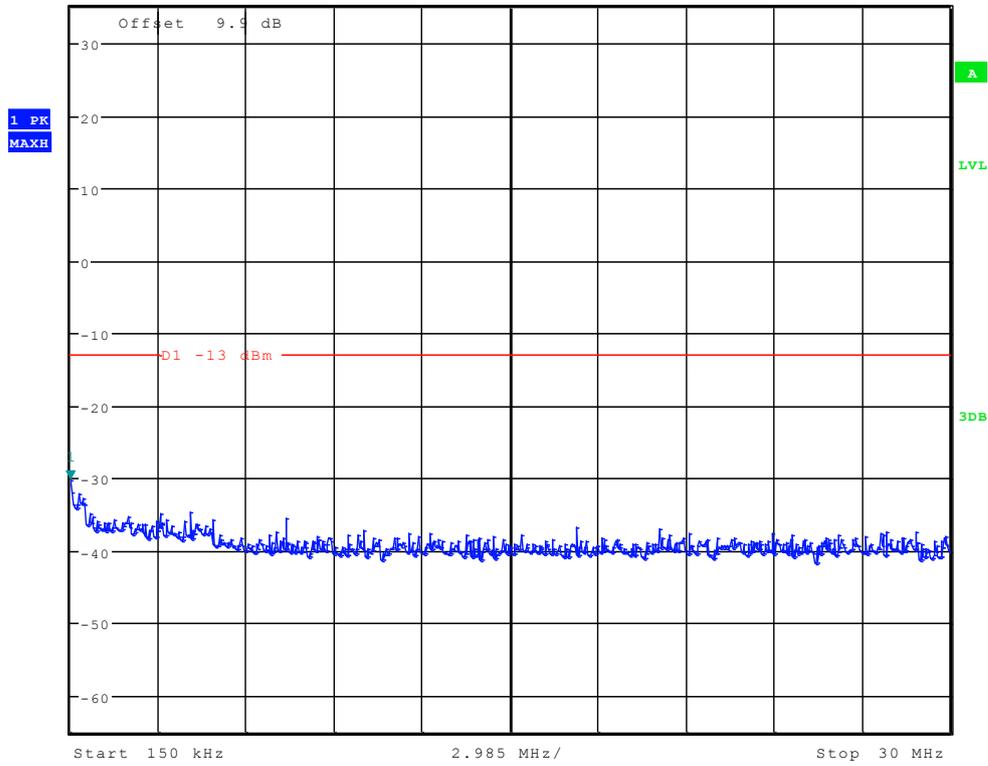
TM3: WCDMA Channel 4132



Date: 23.DEC.2011 11:16:52



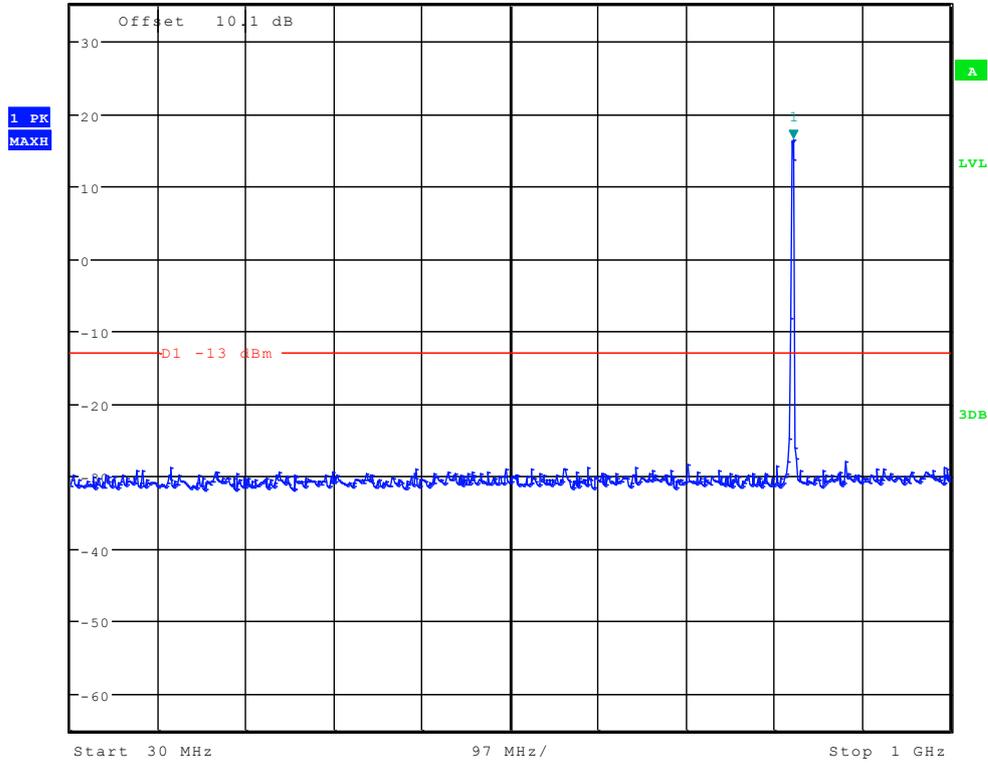
Ref 35 dBm Att 55 dB SWT 300 ms
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 *VBW 30 kHz 150.00000000 kHz



Date: 23.DEC.2011 11:17:36



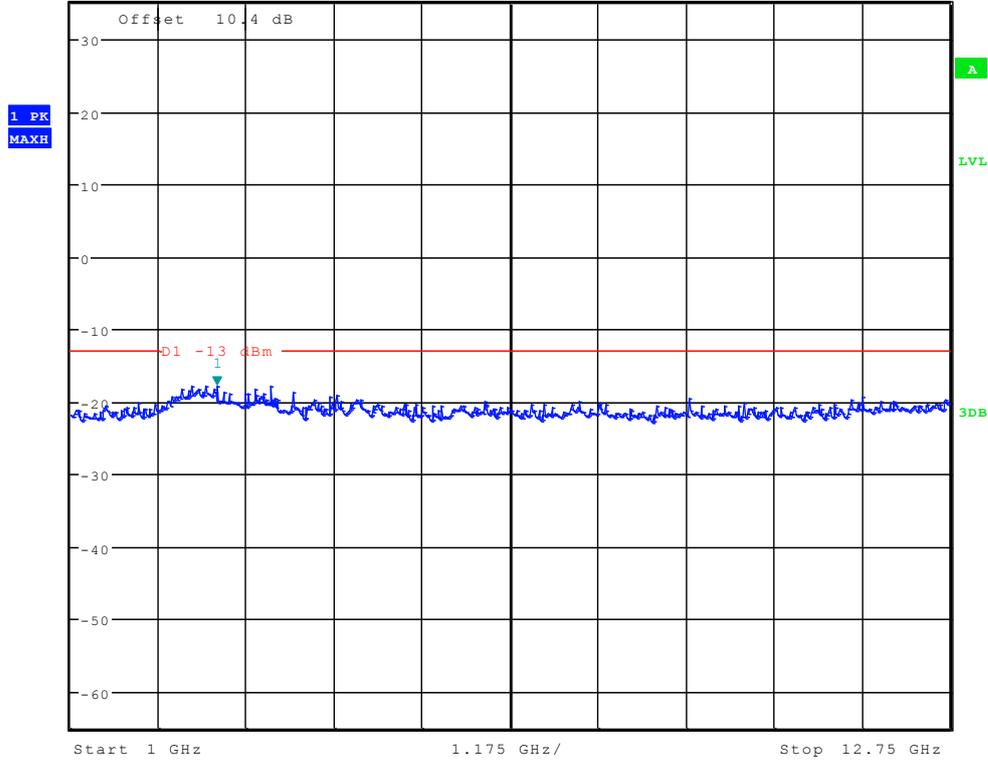
Ref 35 dBm Att 50 dB SWT 100 ms
 *RBW 100 kHz Marker 1 [T1] 16.51 dBm
 *VBW 300 kHz 827.451923077 MHz



Date: 23.DEC.2011 11:18:20



Ref 35 dBm Att 50 dB SWT 70 ms
 *RBW 1 MHz Marker 1 [T1] -17.81 dBm
 *VBW 3 MHz 2.958333333 GHz



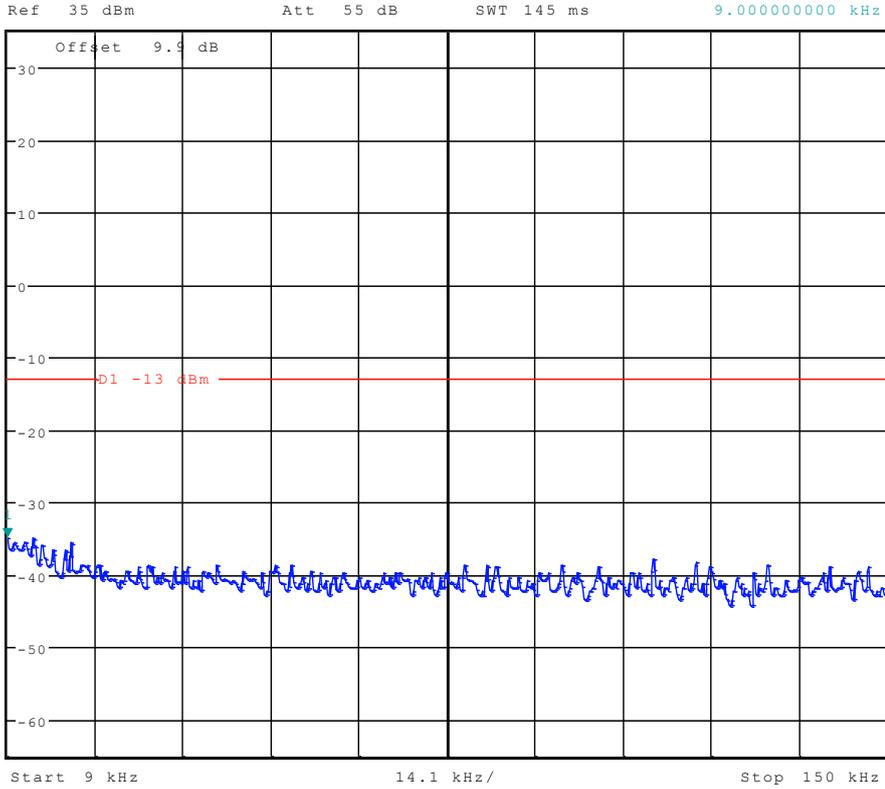
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Channel 4182



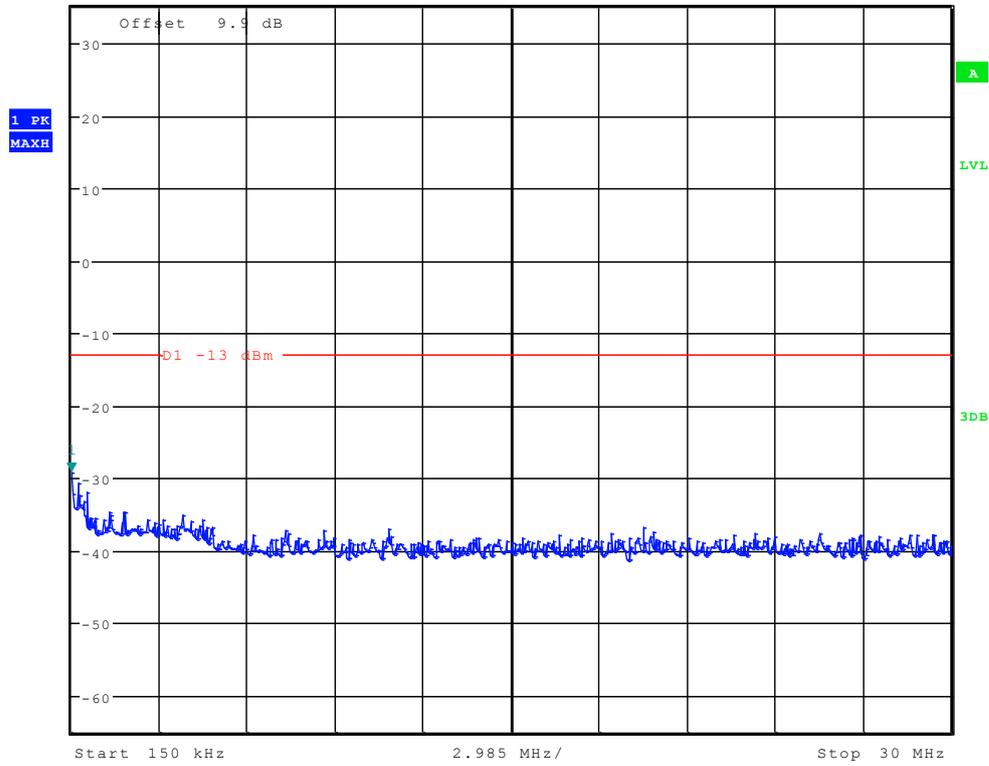
*RBW 1 kHz Marker 1 [T1]
*VBW 10 kHz -34.87 dBm
SWT 145 ms 9.000000000 kHz



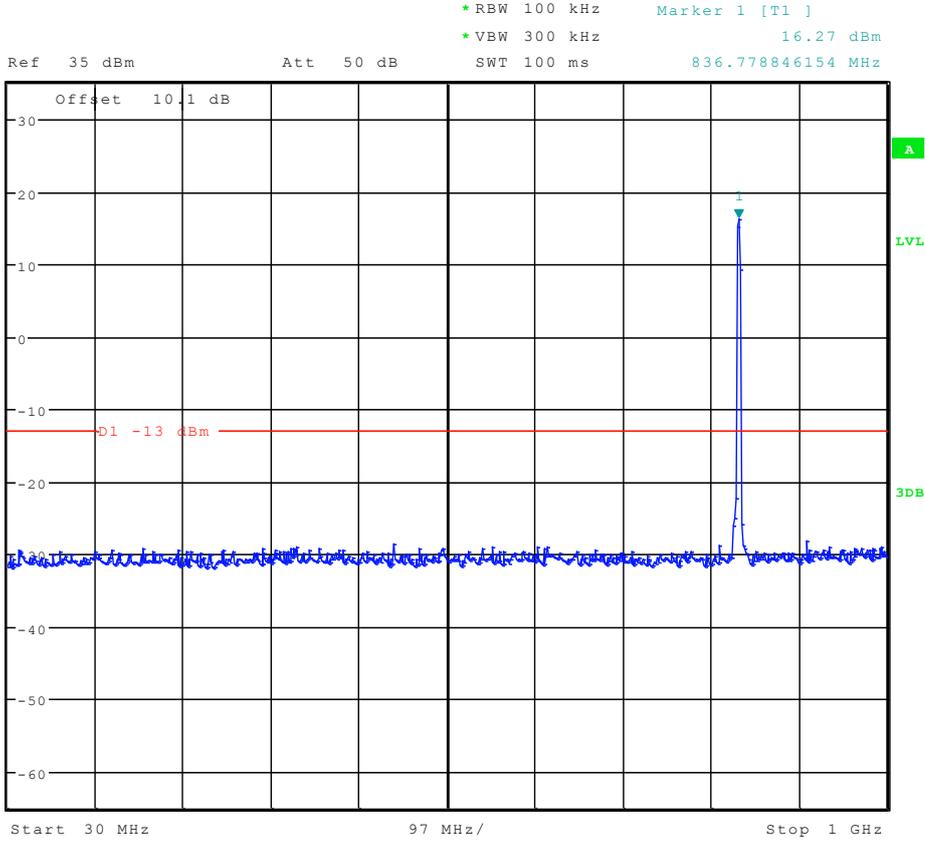
Date: 23.DEC.2011 11:17:07



*RBW 10 kHz Marker 1 [T1]
*VBW 30 kHz -29.16 dBm
Ref 35 dBm Att 55 dB SWT 300 ms 150.000000000 kHz



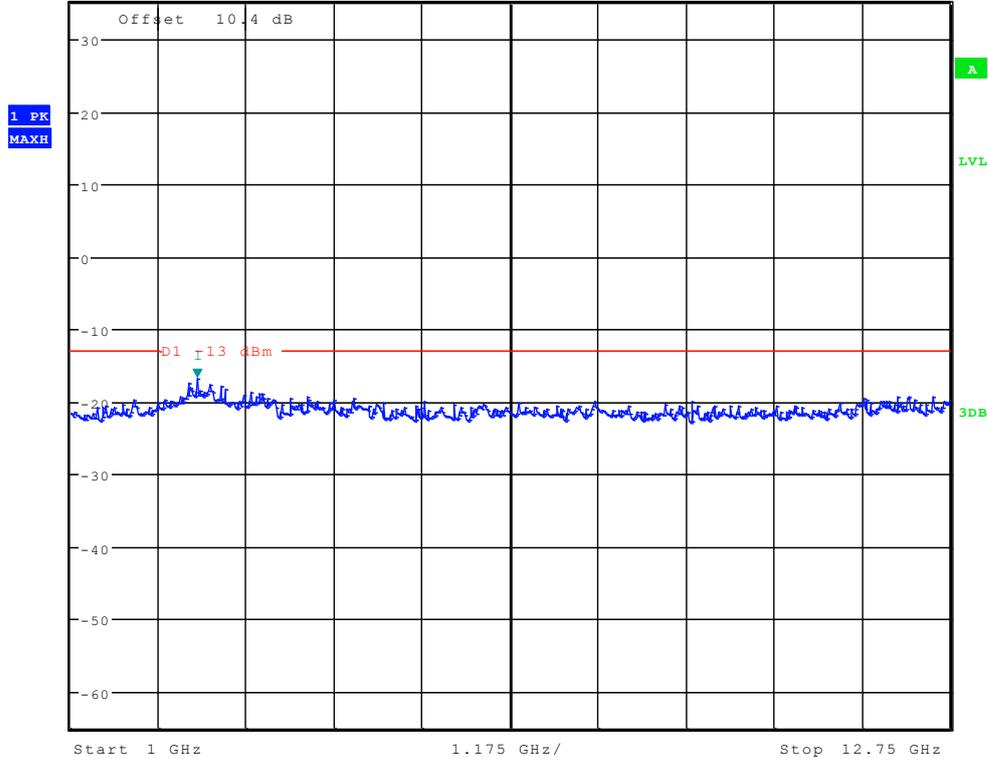
Date: 23.DEC.2011 11:17:50



Date: 23.DEC.2011 11:18:34



Ref 35 dBm Att 50 dB SWT 70 ms Marker 1 [T1] -16.87 dBm
 *RBW 1 MHz *VBW 3 MHz 2.694711538 GHz



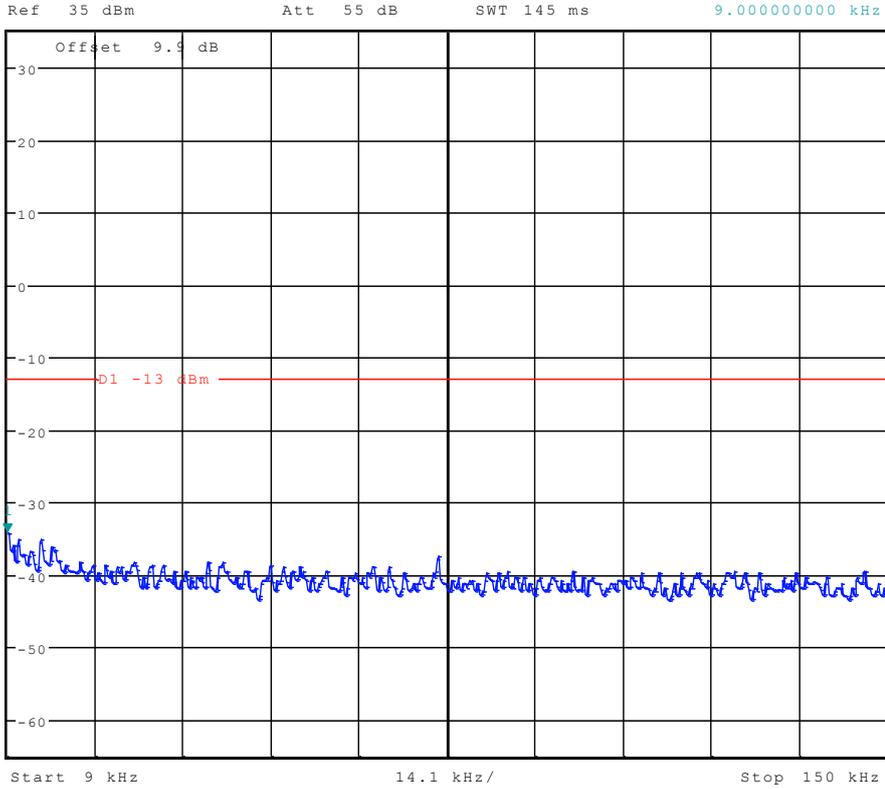
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Channel 4233



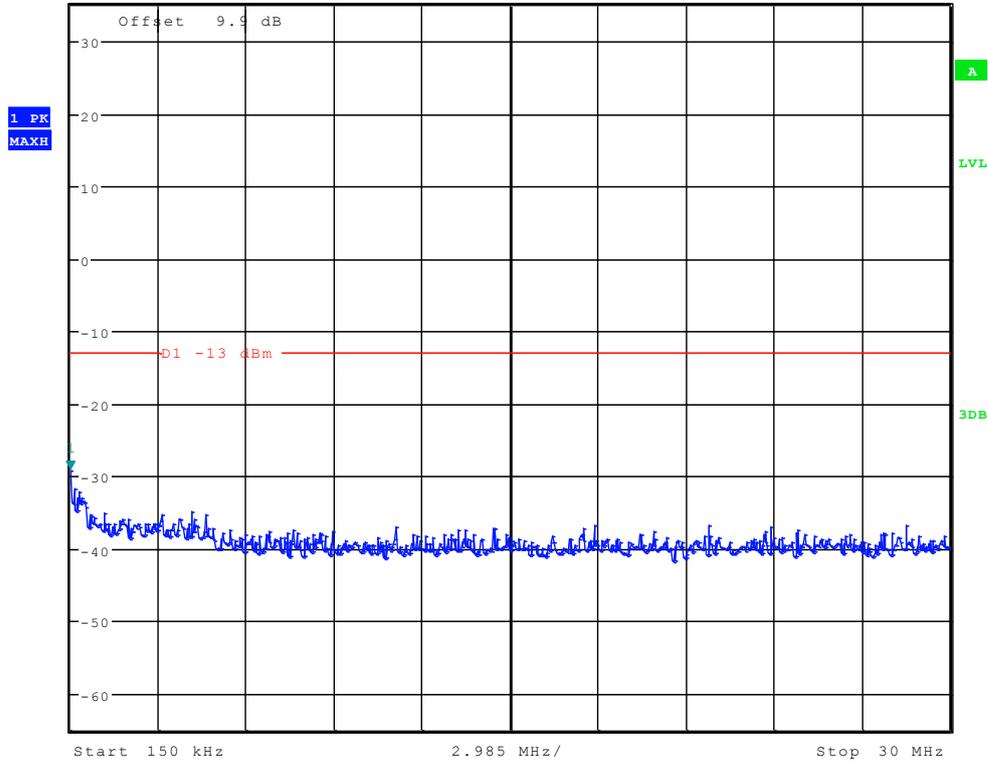
*RBW 1 kHz Marker 1 [T1]
*VBW 10 kHz -34.19 dBm
SWT 145 ms 9.000000000 kHz



Date: 23.DEC.2011 11:17:21



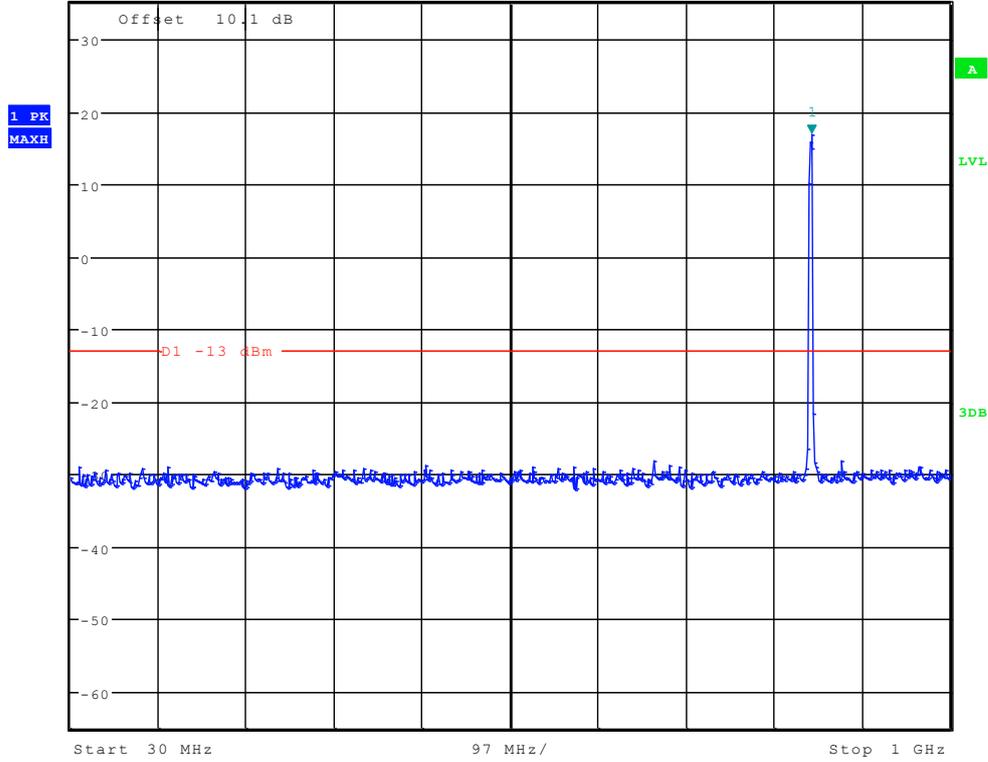
*RBW 10 kHz Marker 1 [T1]
*VBW 30 kHz -29.21 dBm
Ref 35 dBm Att 55 dB SWT 300 ms 150.000000000 kHz



Date: 23.DEC.2011 11:18:05



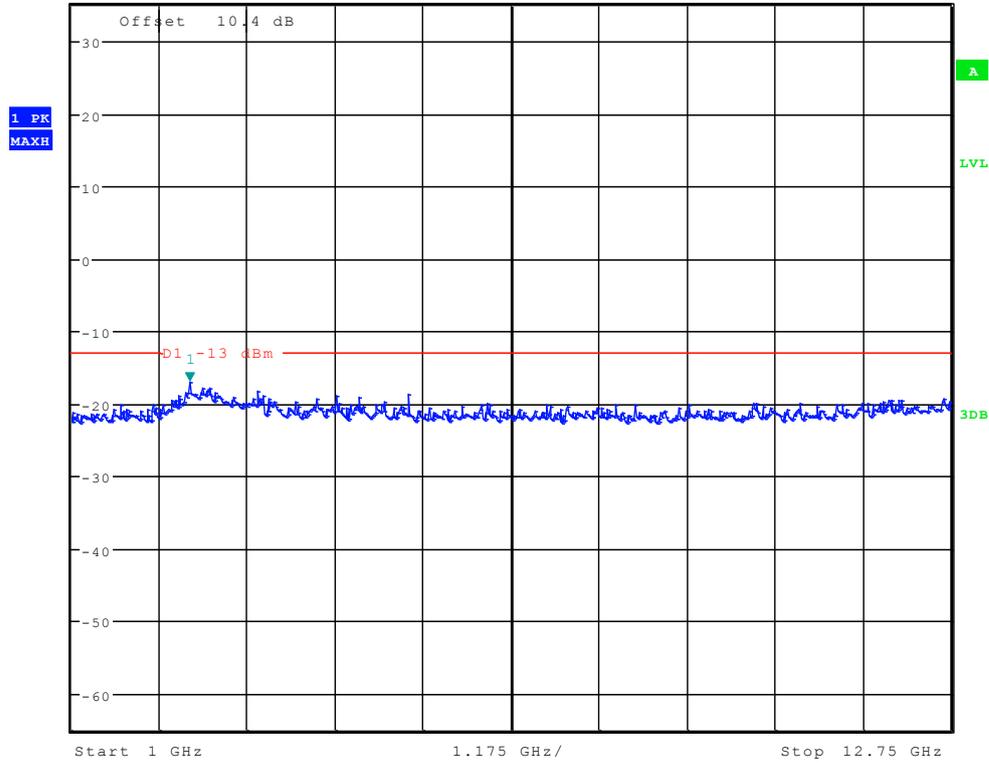
Ref 35 dBm Att 50 dB SWT 100 ms
 *RBW 100 kHz Marker 1 [T1] 16.83 dBm
 *VBW 300 kHz 847.660256410 MHz



Date: 23.DEC.2011 11:18:49



*RBW 1 MHz Marker 1 [T1]
*VBW 3 MHz -17.00 dBm
Ref 35 dBm Att 50 dB SWT 70 ms 2.581730769 GHz



Date: 23.DEC.2011 11:19:33

END



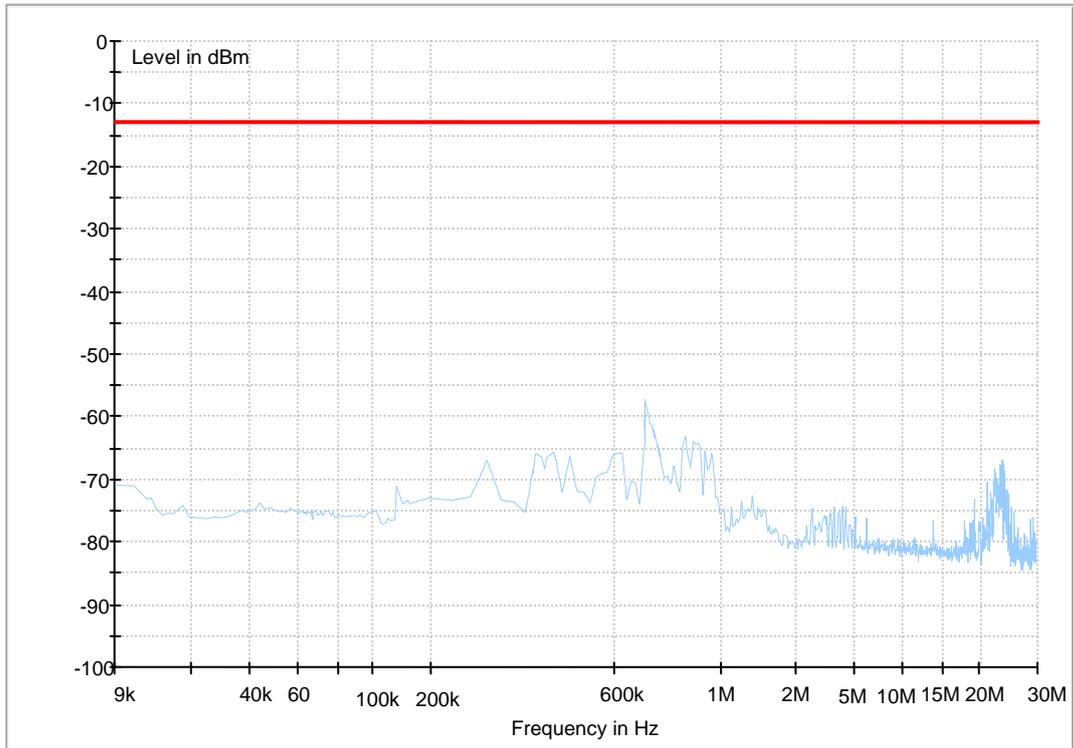
Appendix F

Radiated spurious emission

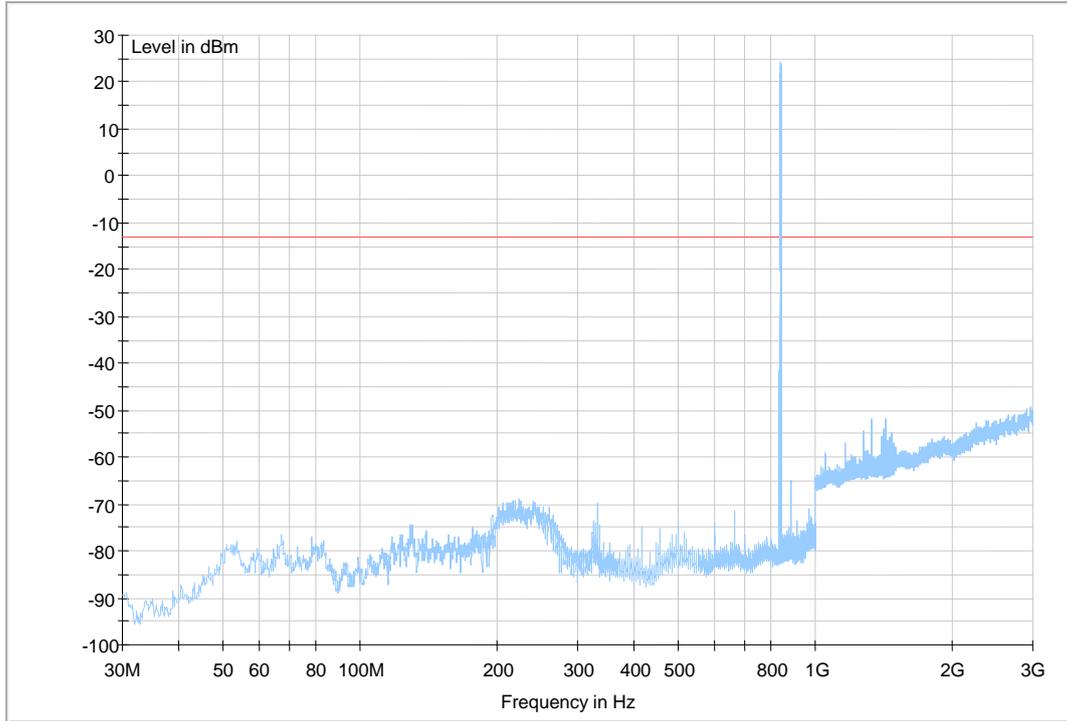
According to FCC Part 2.1053 & Part 22.917

GPRS 850

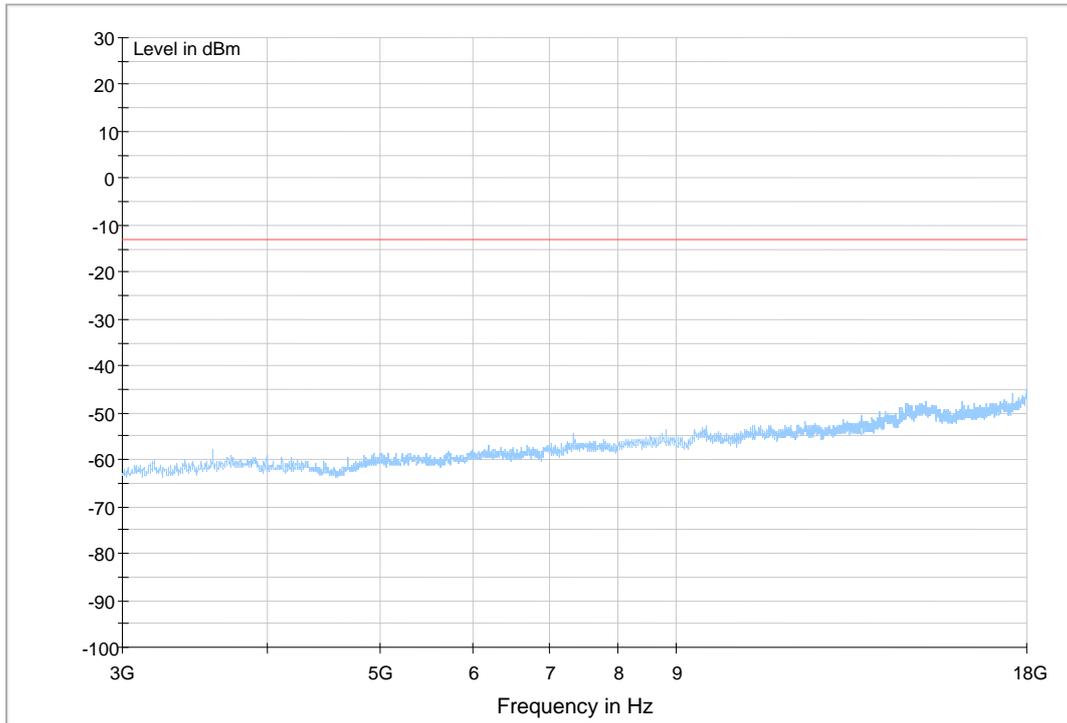
(9kHz~30MHz)



(30MHz~3GHz)

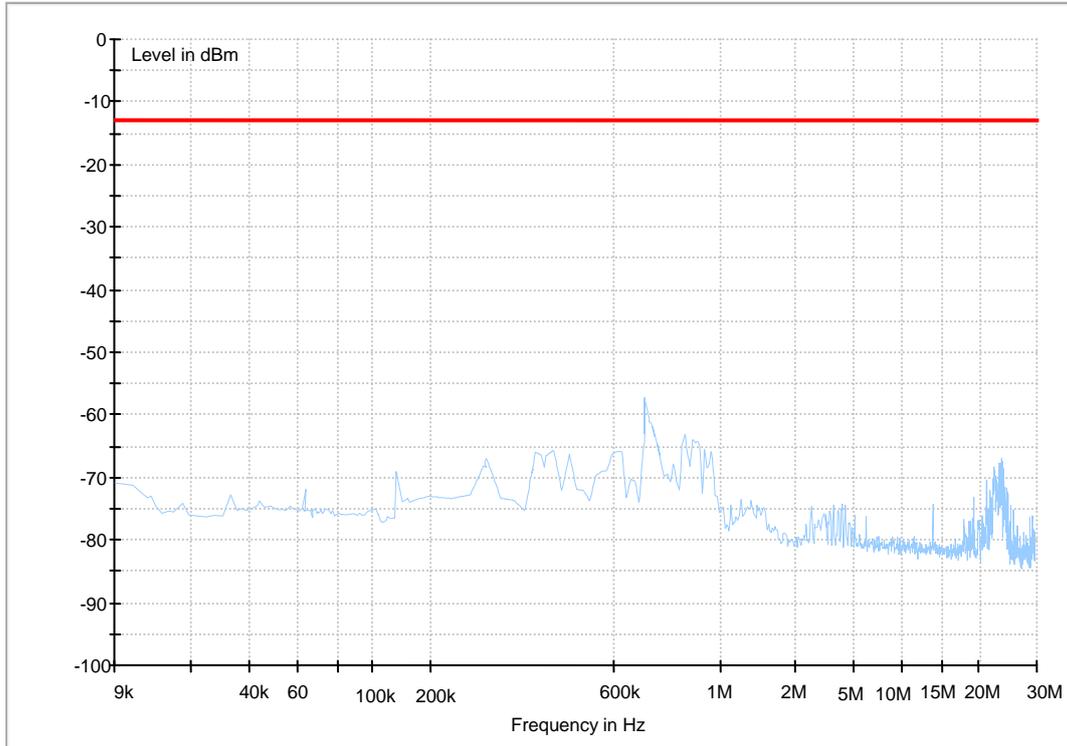


(3GHz~18GHz)

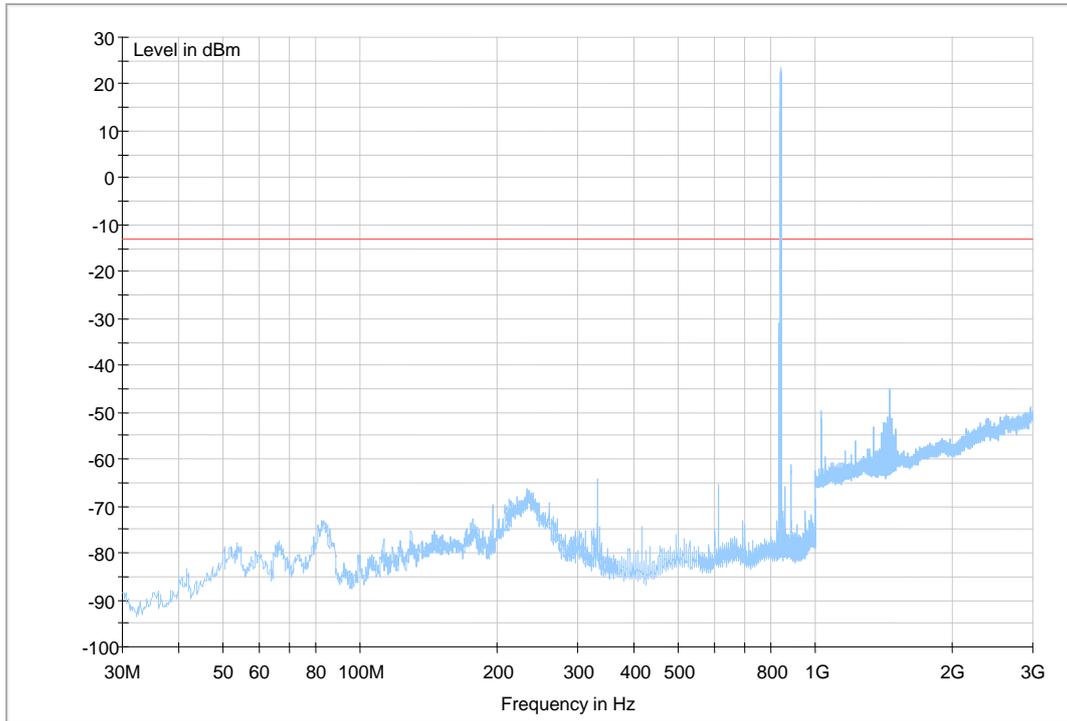


EDGE 850

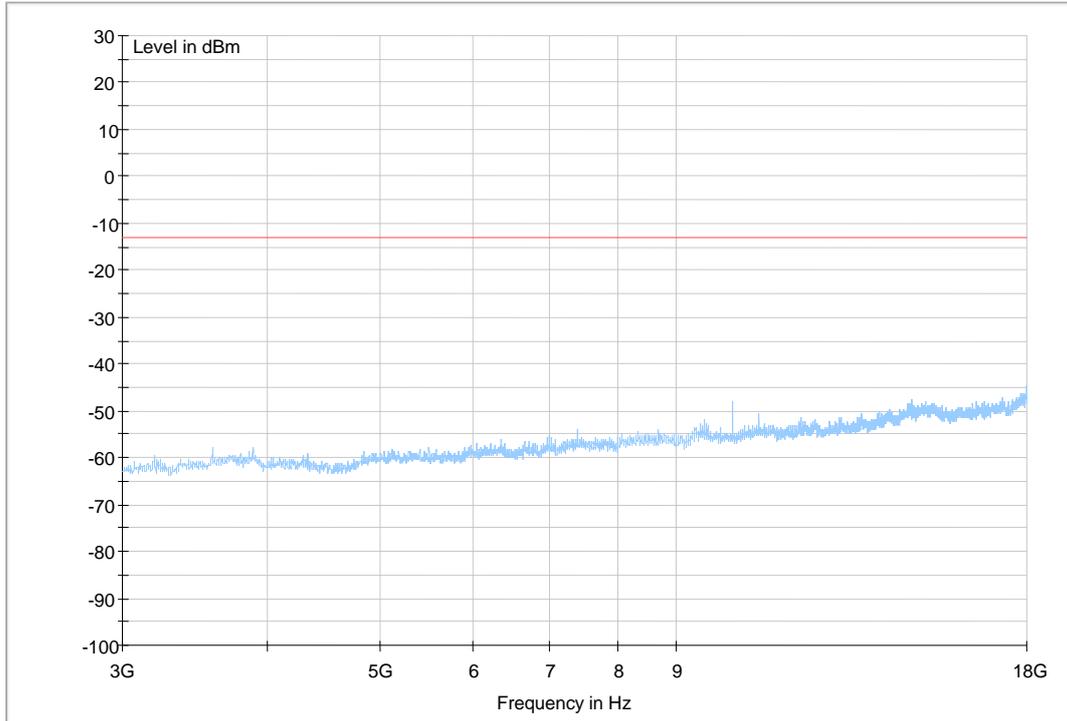
(9kHz~30MHz)



(30MHz~3GHz)

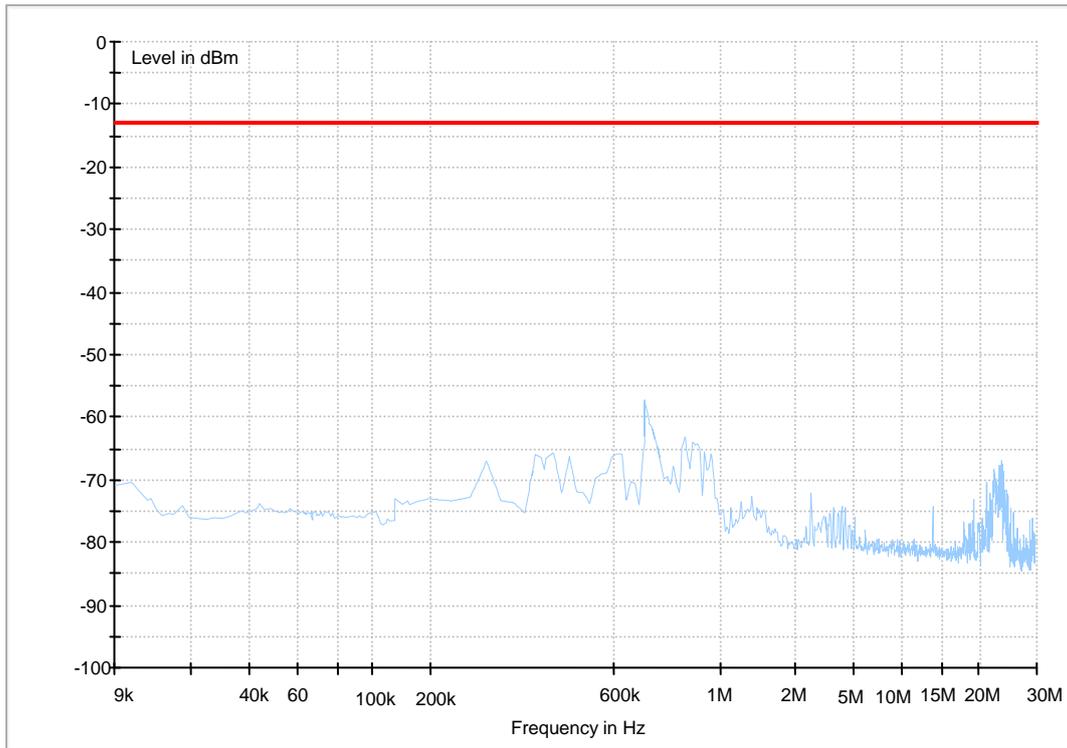


(3GHz~18GHz)



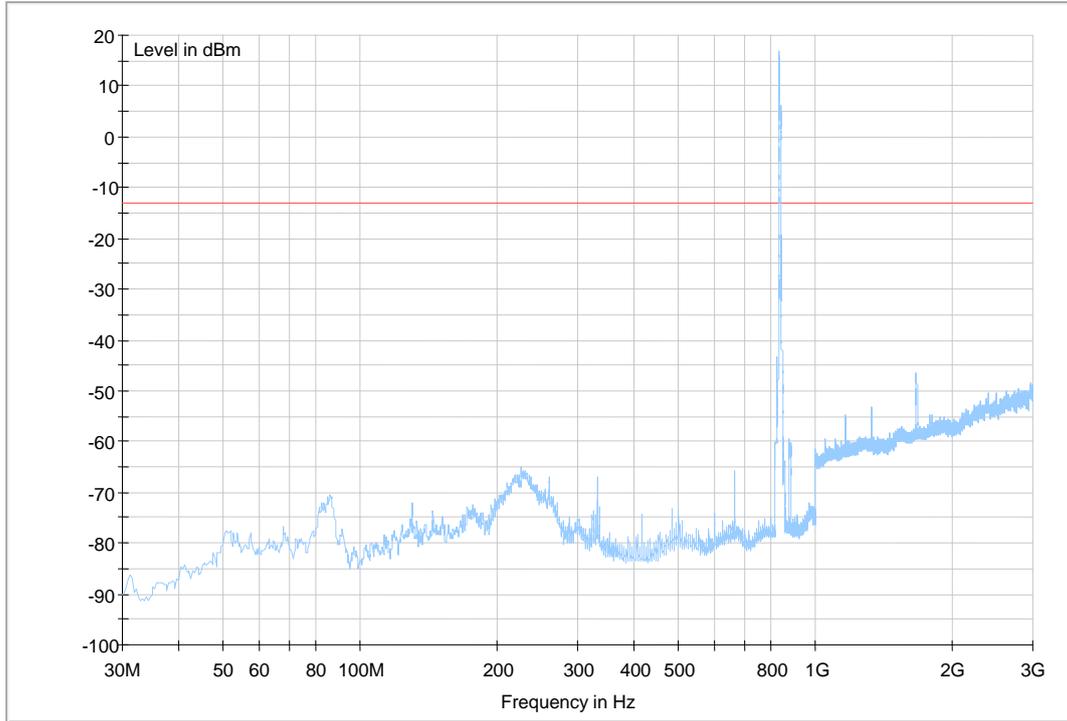
WCDMA Band V

(9KHz~30MHz)



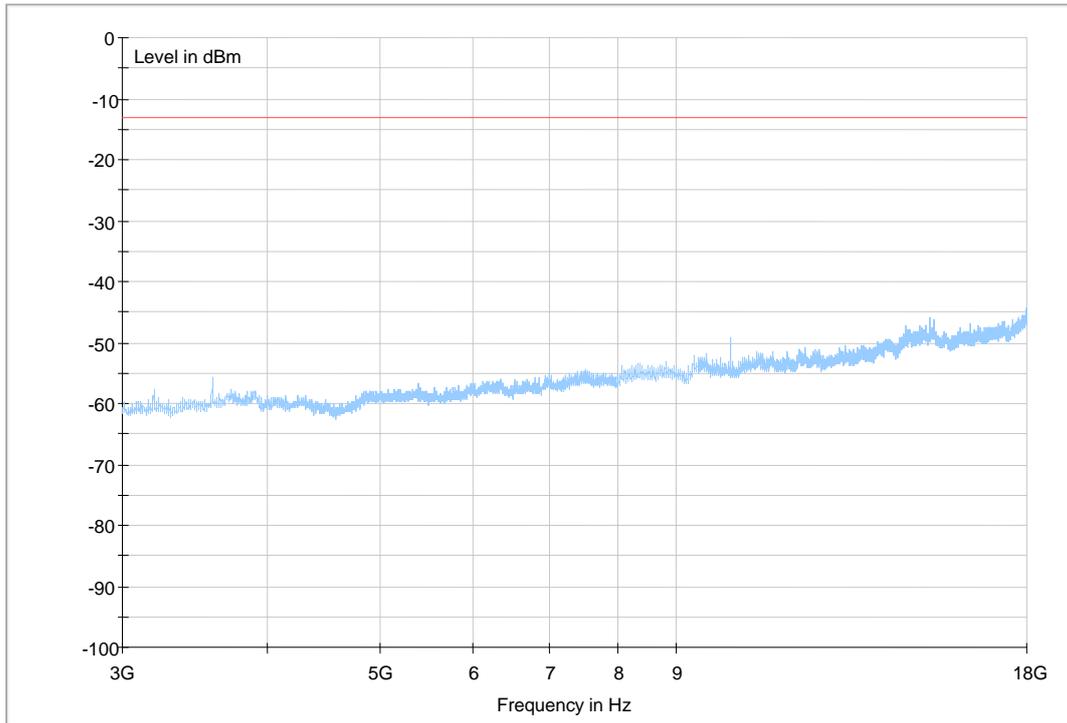


(30MHz~3GHz)





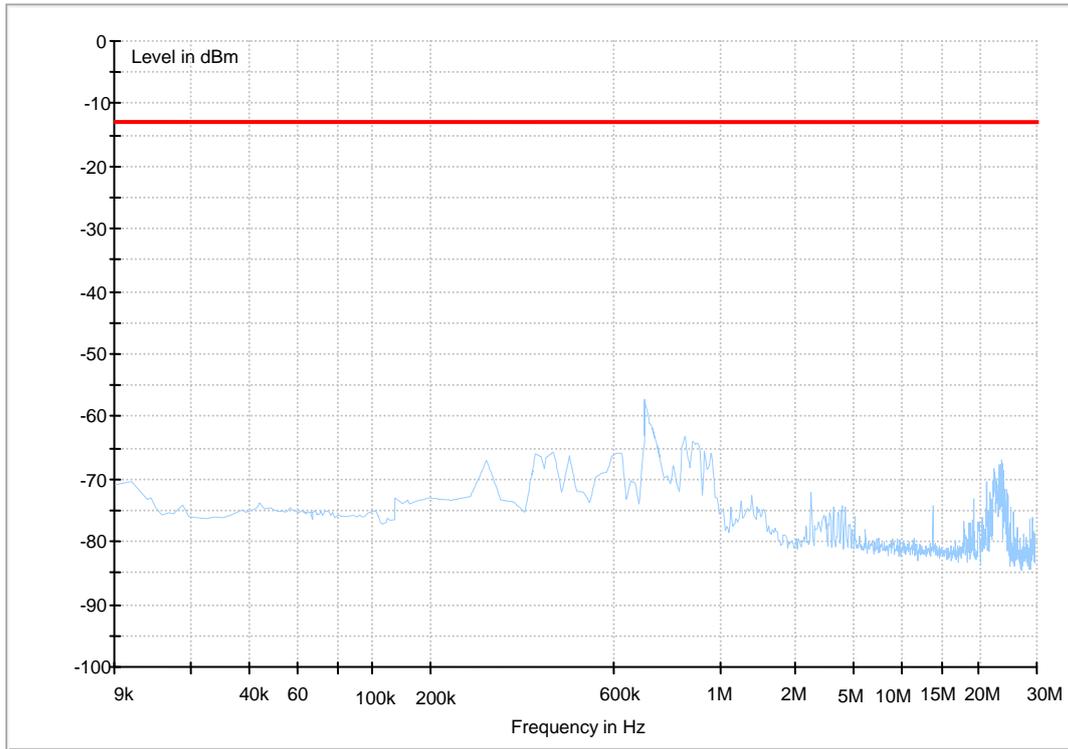
(3GHz~18GHz)





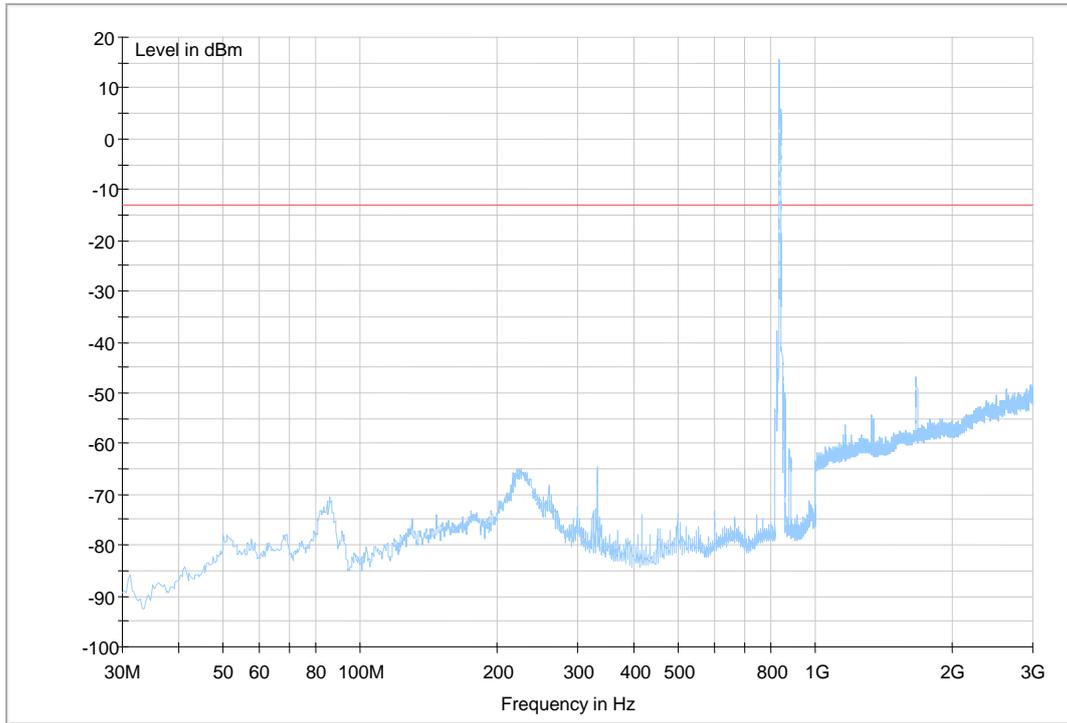
HSDPA Band V

(9KHz~30MHz)



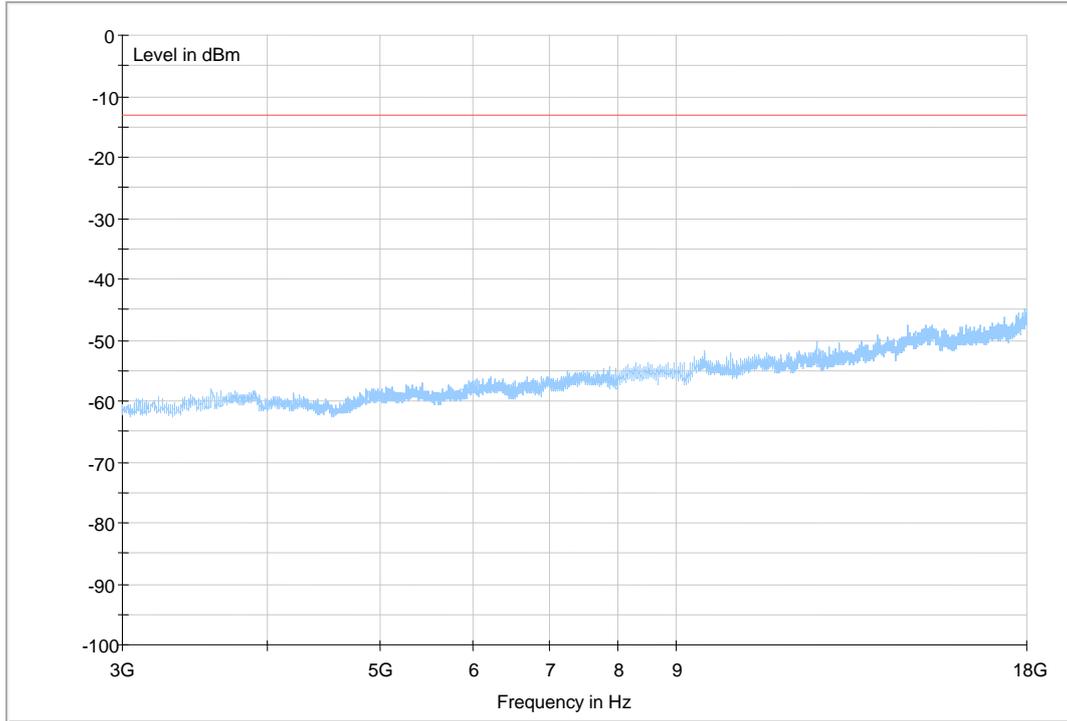


(30MHz~3GHz)





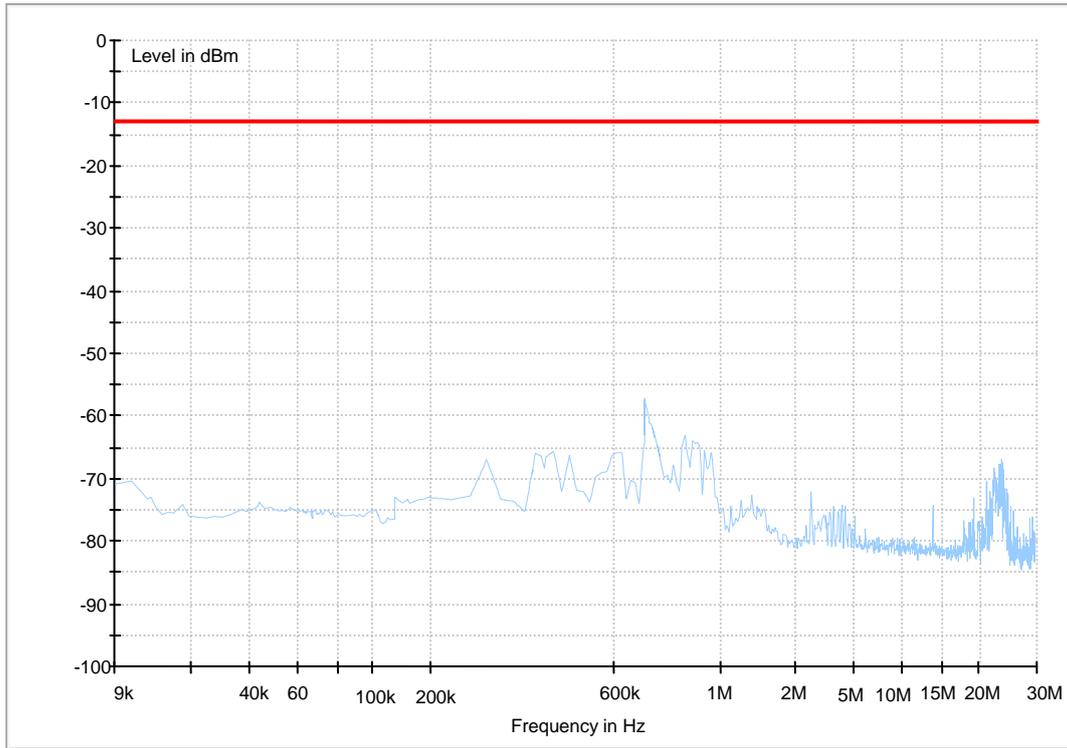
(3GHz~18GHz)



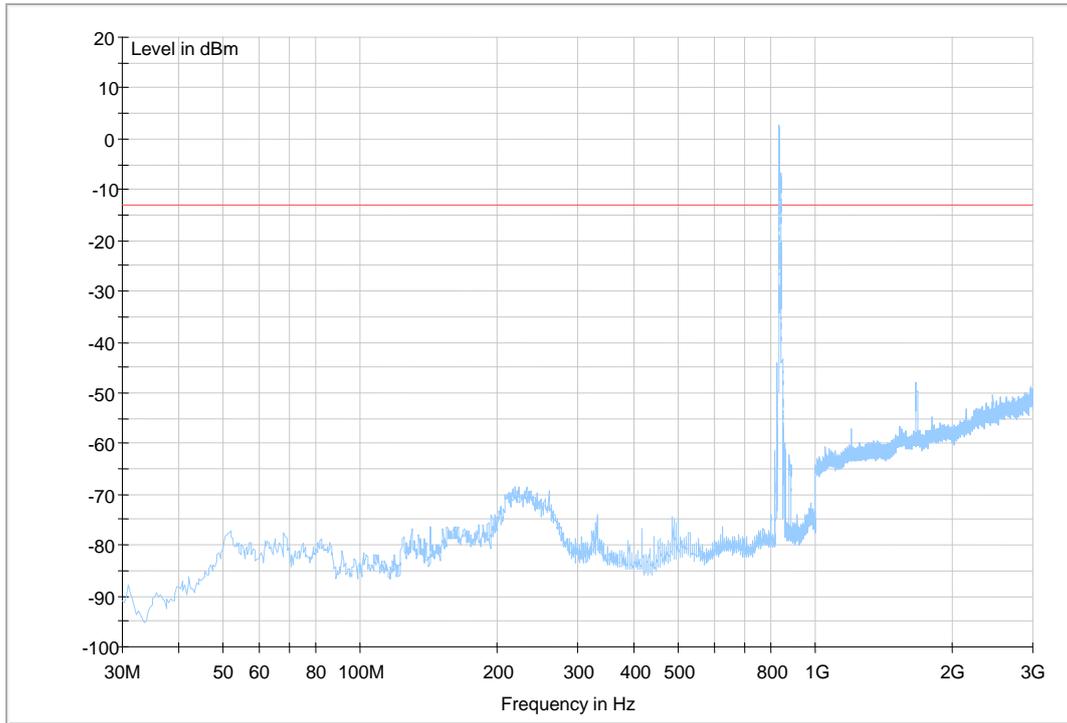


HSUPA Band V

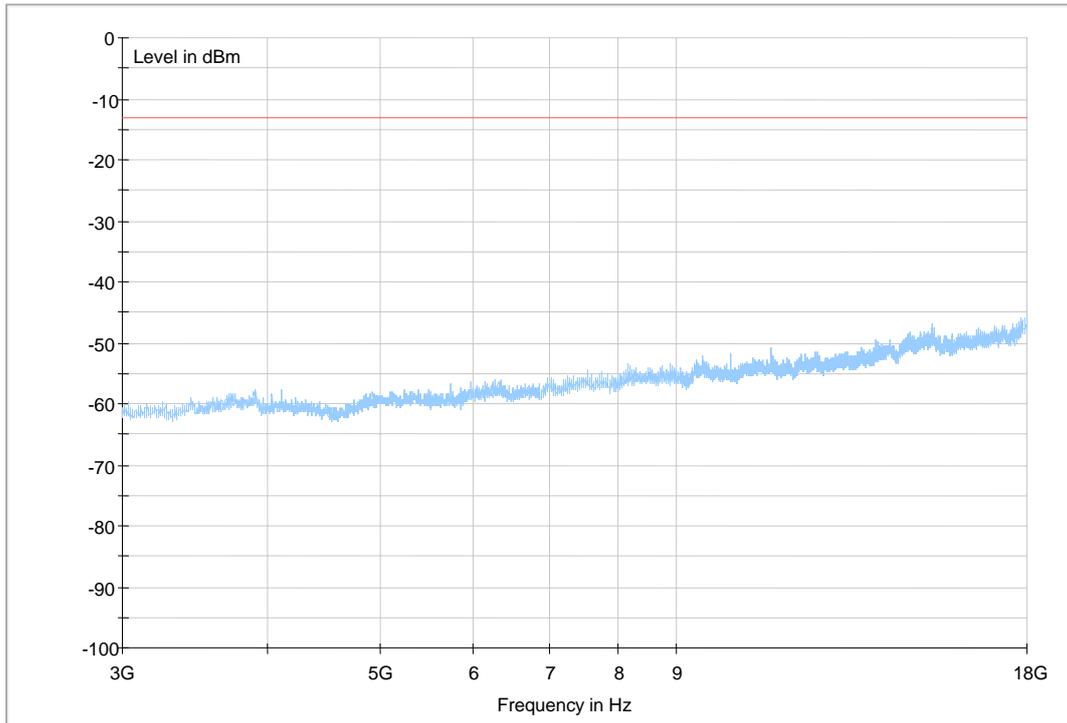
(9KHz~30MHz)



(30MHz~3GHz)



(3GHz~18GHz)



END



Appendix G

Frequency Stability According to FCC Part 2.1055 & Part 22.355



Frequency Error vs. Temperature:

Test Mode	RF Ch.	Volt.	Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Freq. vs. 20 °C [ppm]	Limit [ppm]	Verdict
TM 1	M	100%	-30 °C	20	0.023895	---	±2.5	Pass
			-20 °C	16	0.019116	---	±2.5	Pass
			-10 °C	-15	-0.017921	---	±2.5	Pass
			0 °C	11	0.013142	---	±2.5	Pass
			10 °C	13	0.015532	---	±2.5	Pass
			20 °C	-12	-0.014337	---	±2.5	Pass
			30 °C	-14	-0.016726	---	±2.5	Pass
			40 °C	15	0.017921	---	±2.5	Pass
TM 2	M	100%	50 °C	18	0.021505	---	±2.5	Pass
			-30 °C	13	0.015532	---	±2.5	Pass
			-20 °C	-17	-0.020311	---	±2.5	Pass
			-10 °C	15	0.017921	---	±2.5	Pass
			0 °C	-11	-0.013142	---	±2.5	Pass
			10 °C	12	0.014337	---	±2.5	Pass
			20 °C	-9	-0.010753	---	±2.5	Pass
			30 °C	8	0.009558	---	±2.5	Pass
TM 3	M	100%	40 °C	11	0.013142	---	±2.5	Pass
			50 °C	-16	-0.019116	---	±2.5	Pass
			-30 °C	18	0.021521	---	±2.5	Pass
			-20 °C	11	0.013152	---	±2.5	Pass
			-10 °C	-12	-0.014347	---	±2.5	Pass
			0 °C	9	0.01076	---	±2.5	Pass
			10 °C	-14	-0.016738	---	±2.5	Pass
			20 °C	6	0.007174	---	±2.5	Pass
			30 °C	-3	-0.003587	---	±2.5	Pass
			40 °C	13	0.015543	---	±2.5	Pass
			50 °C	-12	-0.014347	---	±2.5	Pass



Frequency Error vs. Voltage:

Test Mode	RF Ch.	Temp.	Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Freq. vs. 20 °C [ppm]	Limit [ppm]	Verdict
TM 1	M	20 °C	85 %	-8	-0.009558	---	±2.5	Pass
			100 %	9	0.010753	---	±2.5	Pass
			115 %	12	0.014337	---	±2.5	Pass
TM 2	M	20 °C	85 %	-15	-0.017921	---	±2.5	Pass
			100 %	13	0.015532	---	±2.5	Pass
			115 %	-10	-0.011947	---	±2.5	Pass
TM 3	M	20 °C	85 %	18	0.021521	---	±2.5	Pass
			100 %	-15	-0.017934	---	±2.5	Pass
			115 %	-11	-0.013152	---	±2.5	Pass