



# Appendix A

## Transmitter Output Power According to FCC Part 2.1046 & Part 22.913



## Conducted Power of Transmitter

TEST CONDITIONS		RF Output Power (Conducted)					
		Channel128(L)		Channel192(M)		Channel251(H)	
		824.2MHz		837.0MHz		848.8MHz	
		dBm		dBm		dBm	
$T_{nom} / V_{nom}$		Measured	Limit	Measured	Limit	Measured	Limit
TM1		32.64	38.5	32.35	38.5	31.88	38.5
TM2		27.36	38.5	27.11	38.5	26.73	38.5
TEST CONDITIONS		Channel4132(L)		Channel4182(M)		Channel4233(H)	
		826.4MHz		836.4MHz		846.6MHz	
		dBm		dBm		dBm	
$T_{nom} / V_{nom}$		Measured	Limit	Measured	Limit	Measured	Limit
TM3		21.91	38.5	22.35	38.5	22.21	38.5
TM4	Case1	21.41	38.5	21.81	38.5	21.67	38.5
	Case2	21.22	38.5	21.69	38.5	21.55	38.5
	Case3	20.53	38.5	21.04	38.5	20.86	38.5
	Case4	19.52	38.5	20.11	38.5	19.92	38.5

Note: RBW > emission bandwidth, VBW > 3 x RBW.



## Peak-to-Average Ratio

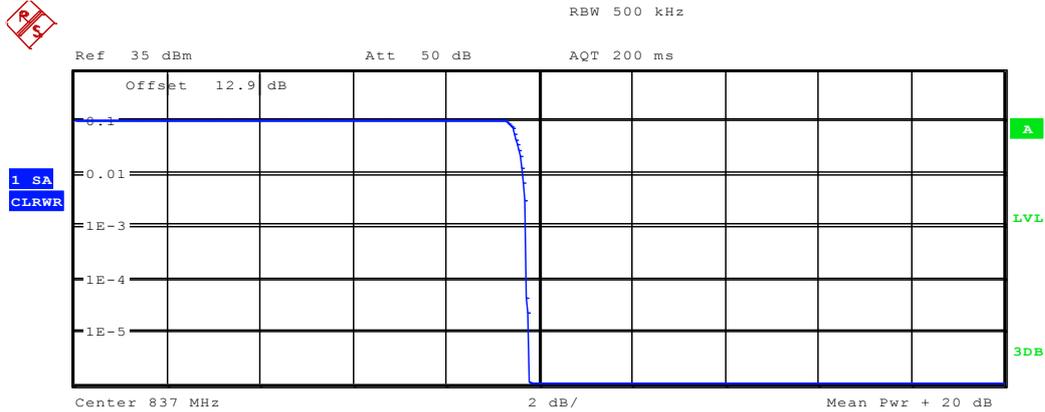
TEST CONDITIONS		Peak-to-Average Ratio					
		Channel128(L)		Channel192(M)		Channel251(H)	
		824.2MHz		837.0MHz		848.8MHz	
		dB		dB		dB	
$T_{nom} / V_{nom}$		Measured	Limit	Measured	Limit	Measured	Limit
TM1		9.54	13	<b>9.74</b>	13	9.61	13
TM2		12.32	13	<b>12.88</b>	13	12.53	13
TEST CONDITIONS		Channel4132(L)		Channel4182(M)		Channel4233(H)	
		826.4MHz		836.4MHz		846.6MHz	
		dB		dB		dB	
$T_{nom} / V_{nom}$		Measured	Limit	Measured	Limit	Measured	Limit
TM3		2.57	13	<b>3.14</b>	13	2.62	13
TM4	Case1	2.56	13	2.62	13	2.63	13
	Case2	2.65	13	2.57	13	2.58	13
	Case3	2.51	13	2.34	13	2.65	13
	Case4	2.48	13	2.43	13	2.76	13



## Test Plot of Peak-to-Average Ratio

Note: All relevant operation modes have been tested, and the worst case Plot is included in this report.

### TM1



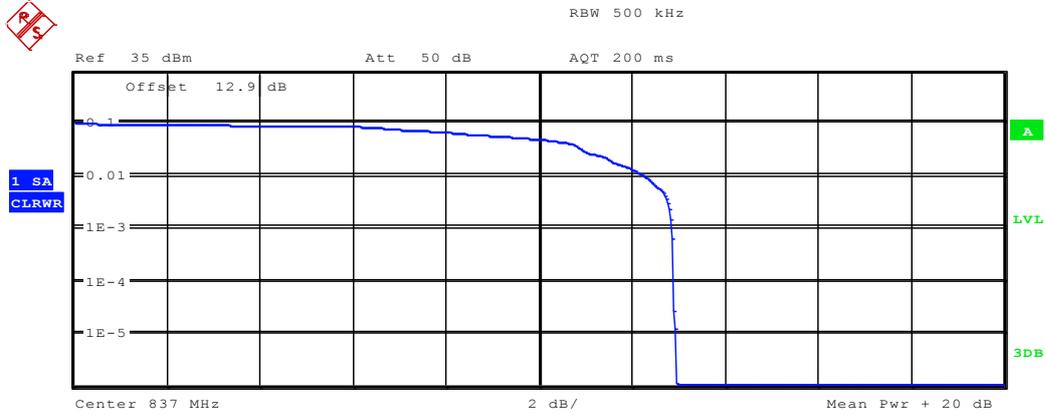
Complementary Cumulative Distribution Function  
NOF samples: 100000, Usable BW: 424kHz

Trace 1	
Mean	22.33 dBm
Peak	32.12 dBm
Crest	9.79 dB
10 %	9.36 dB
1 %	9.68 dB
.1 %	9.74 dB
.01 %	9.74 dB

Date: 7.AUG.2012 10:08:48



## TM2



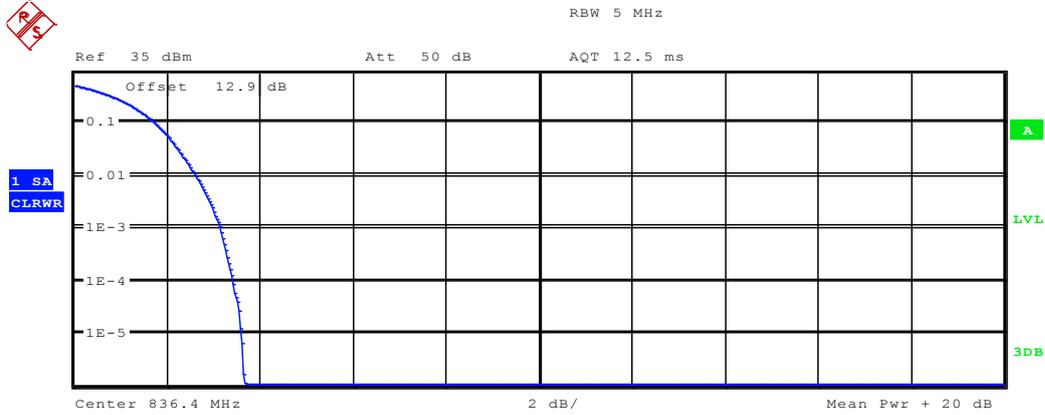
Complementary Cumulative Distribution Function  
NOF samples: 100000, Usable BW: 424kHz

	Trace 1
Mean	16.77 dBm
Peak	29.72 dBm
Crest	12.96 dB
10 %	1.83 dB
1 %	12.28 dB
.1 %	12.88 dB
.01 %	12.92 dB

Date: 7.AUG.2012 10:11:01



### TM3/TM4



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

Trace 1	
Mean	21.90 dBm
Peak	25.56 dBm
Crest	3.66 dB
10 %	1.73 dB
1 %	2.63 dB
.1 %	3.14 dB
.01 %	3.43 dB

Date: 7.AUG.2012 10:06:24



### Effective Radiated Power of Transmitter (ERP)

Test Mode	Freq. [MHz]	Meas. Level [dBm]	Substitution Antenna Type	SGP [dBm]	Substitution Gain [dBd]	Cable Loss [dB]	Substitution Level (ERP)	FCC limit [dBm]	Result
							[dBm]		
TM1	824.2	28.99	Dipole Ant.	32.14	-2.75	0.6	28.79	38.5	Pass
TM1	837.0	28.7	Dipole Ant.	31.97	-2.87	0.6	28.5	38.5	Pass
TM1	848.8	28.23	Dipole Ant.	31.48	-2.85	0.6	28.03	38.5	Pass
TM2	824.2	23.71	Dipole Ant.	27.08	-2.75	0.6	23.73	38.5	Pass
TM2	837.0	23.46	Dipole Ant.	26.99	-2.87	0.6	23.52	38.5	Pass
TM2	848.8	23.08	Dipole Ant.	26.33	-2.85	0.6	22.88	38.5	Pass
TM3	826.4	18.14	Dipole Ant.	21.67	-2.75	0.6	18.32	38.5	Pass
TM3	836.4	18.7	Dipole Ant.	22.18	-2.87	0.6	18.71	38.5	Pass
TM3	846.6	18.51	Dipole Ant.	21.76	-2.85	0.6	18.31	38.5	Pass

Note1: a, For getting the ERP (Efficient Radiated Power) in substitution method, the following formula should be taken to calculate it,

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

b, SGP=Signal Generator Level

Note2: RBW > emission bandwidth, VBW > 3 x RBW.

-----The END-----



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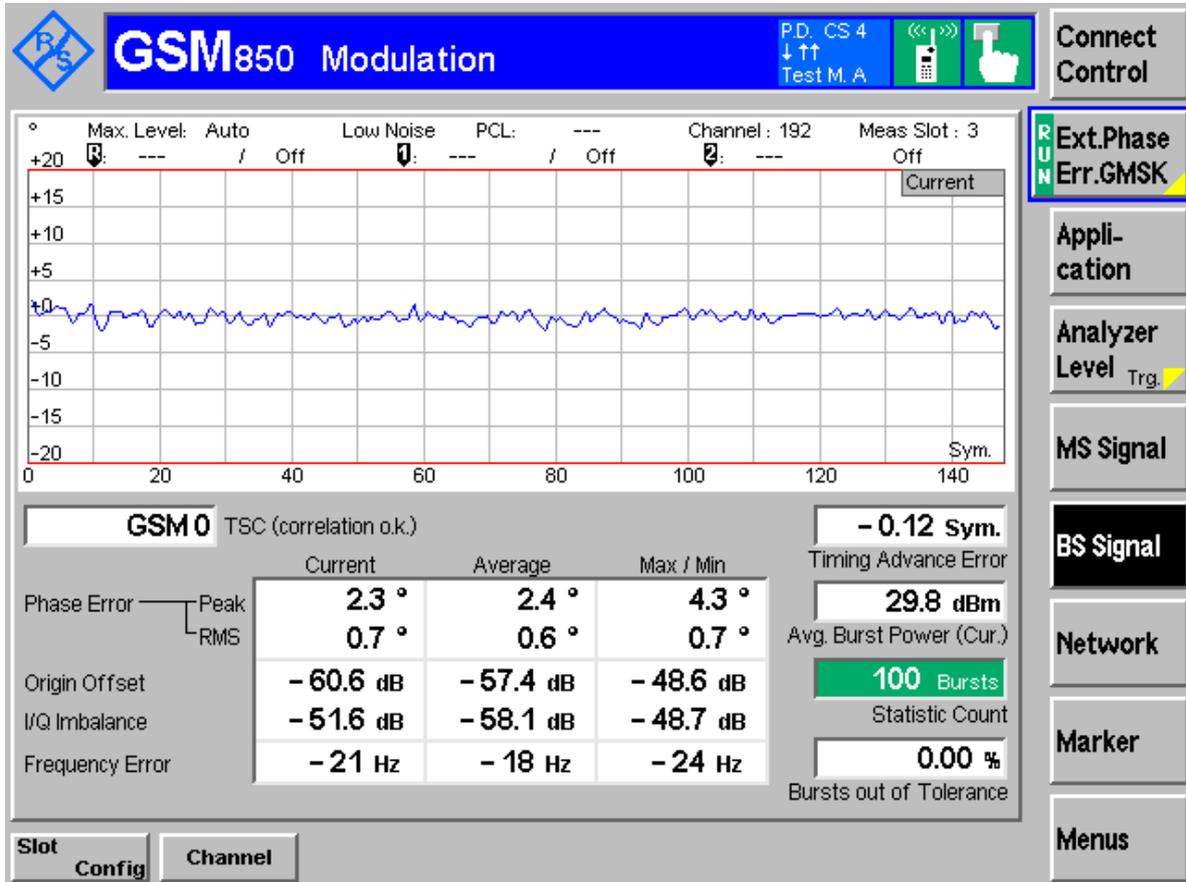
## Appendix B

# Modulation Characteristics

According to FCC Part 2.1047 & Part22 Subpart H

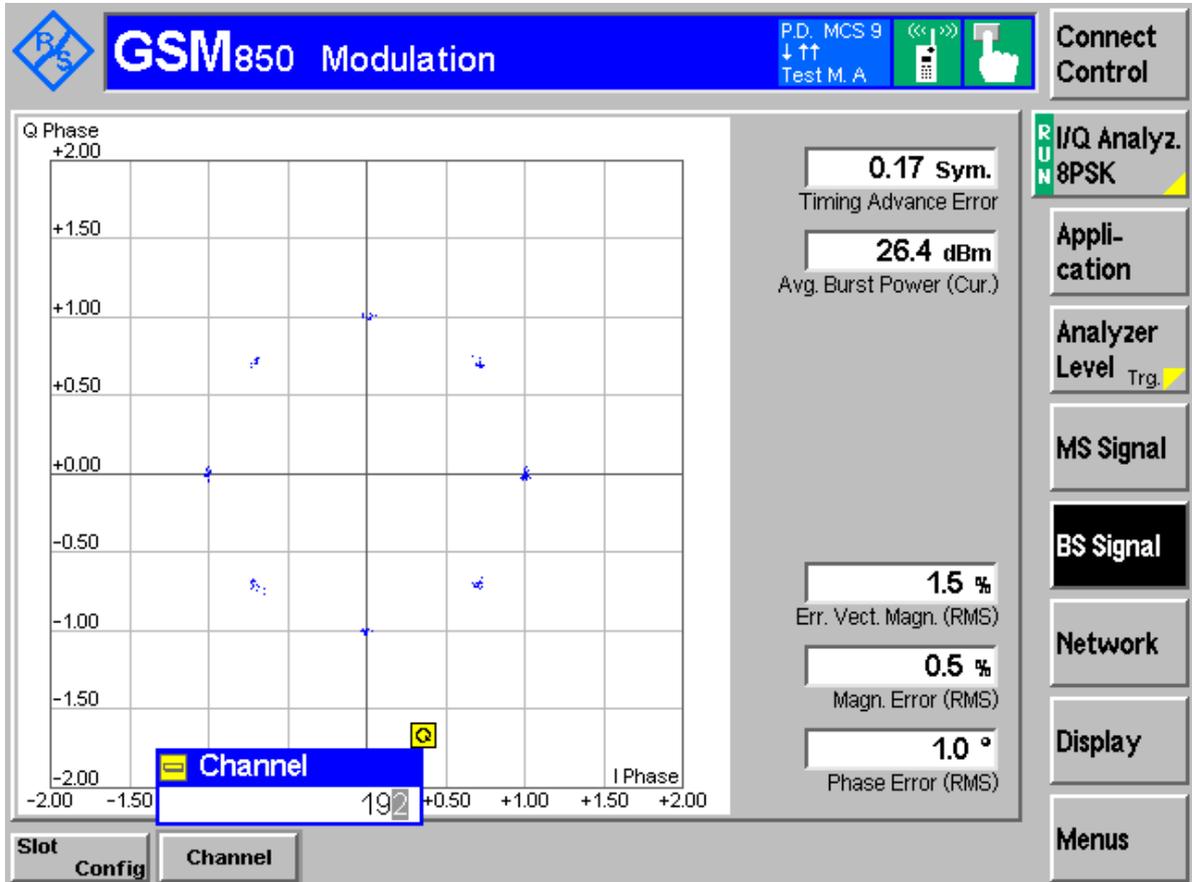


## Channel 192 (TM1:GPRS/GSM)



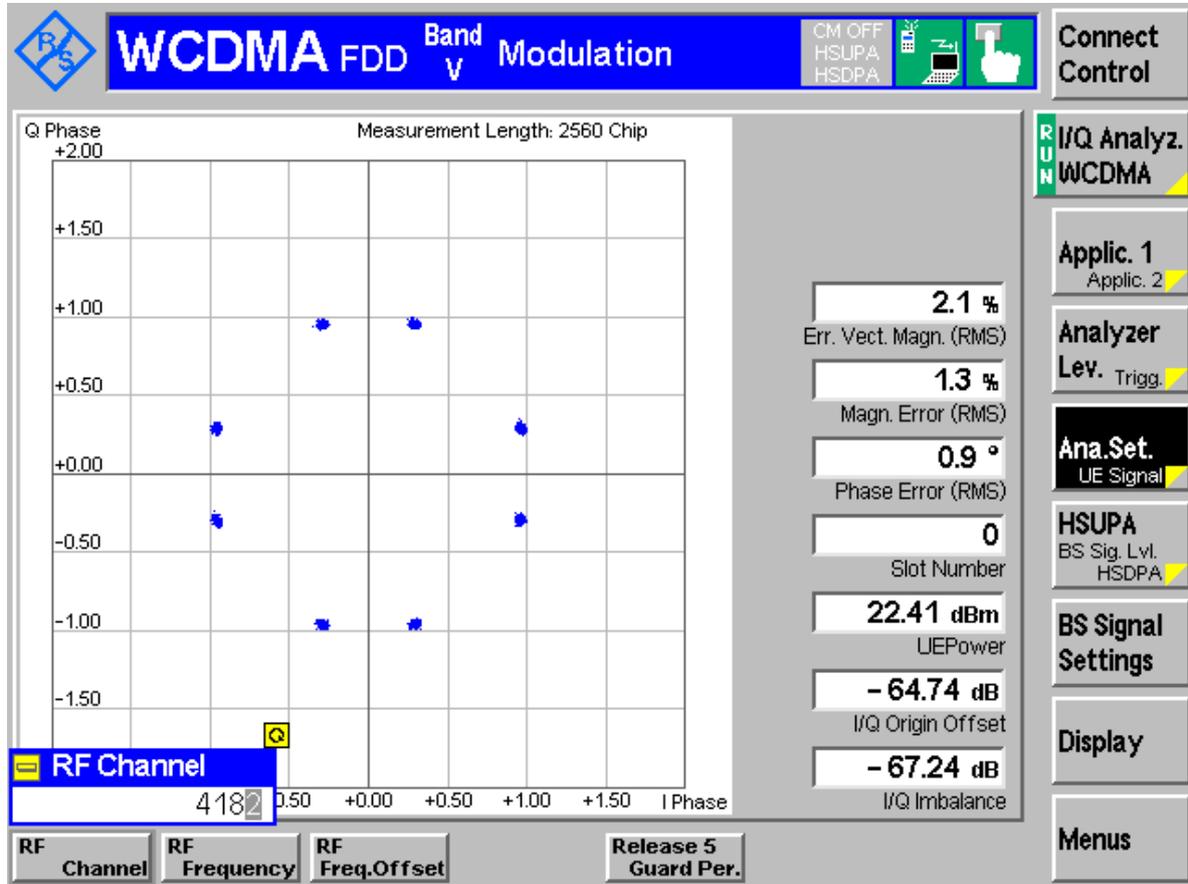


## Channel 192 (TM2:EDGE)





## Channel 4182 (TM3: WCDMA)



-----The END-----



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# Appendix C

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



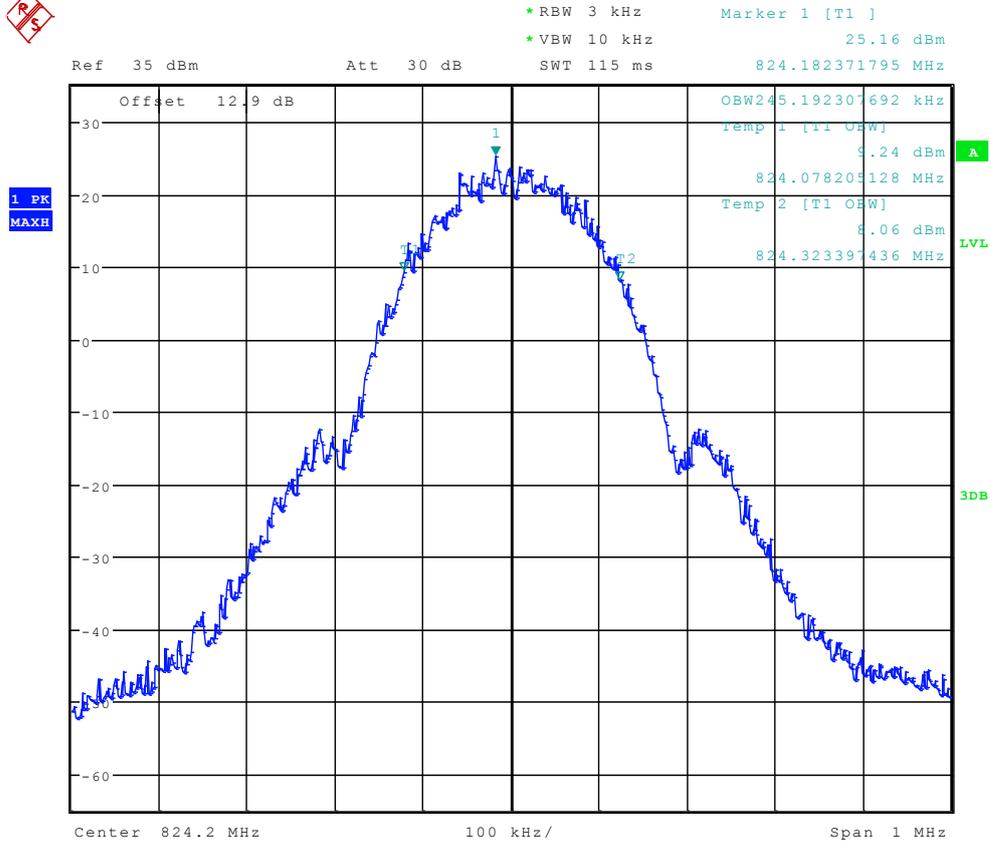
Result Table

Table 1 Measurement Results

Test Mode	RF Channel	Occupied Bandwidth [kHz]	Verdict
TM1	128	245.19	Pass
	192	248.40	Pass
	251	246.79	Pass
TM2	128	250.00	Pass
	192	241.99	Pass
	251	238.78	Pass
Test Mode	RF Channel	Occupied Bandwidth [MHz]	Verdict
TM3	4132	4.18	Pass
	4182	4.15	Pass
	4233	4.17	Pass



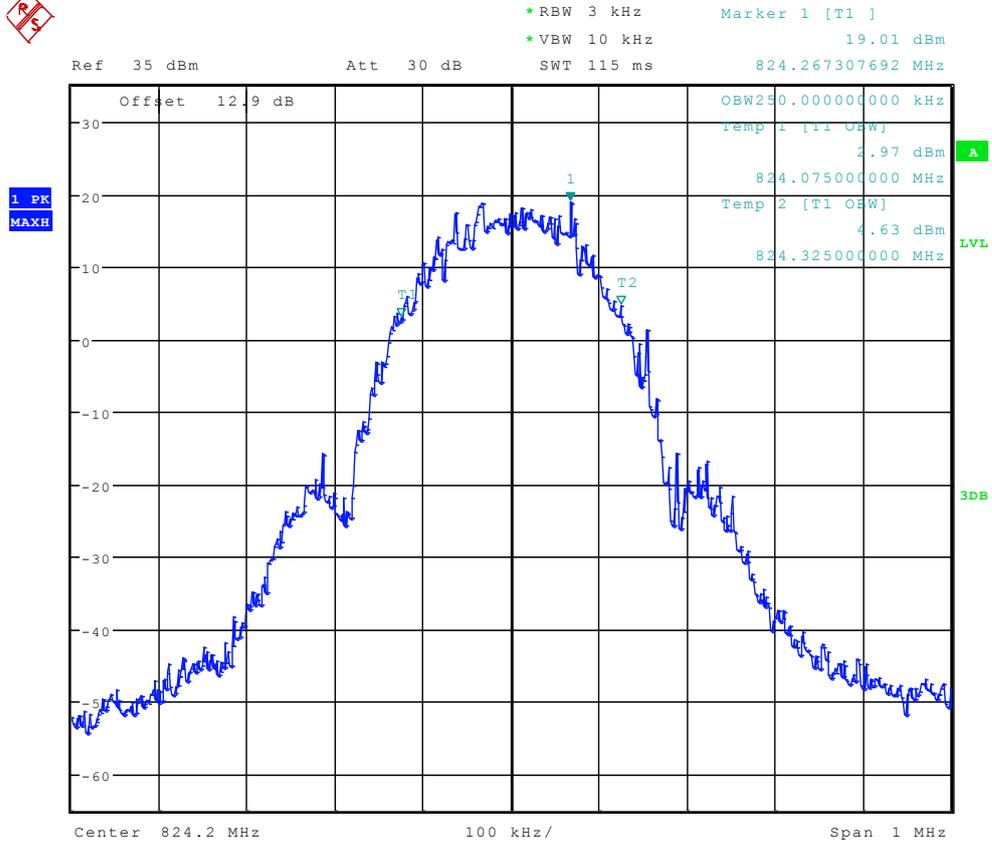
## Channel 128 (TM1:GPRS/GSM)



Date: 7.AUG.2012 09:15:41



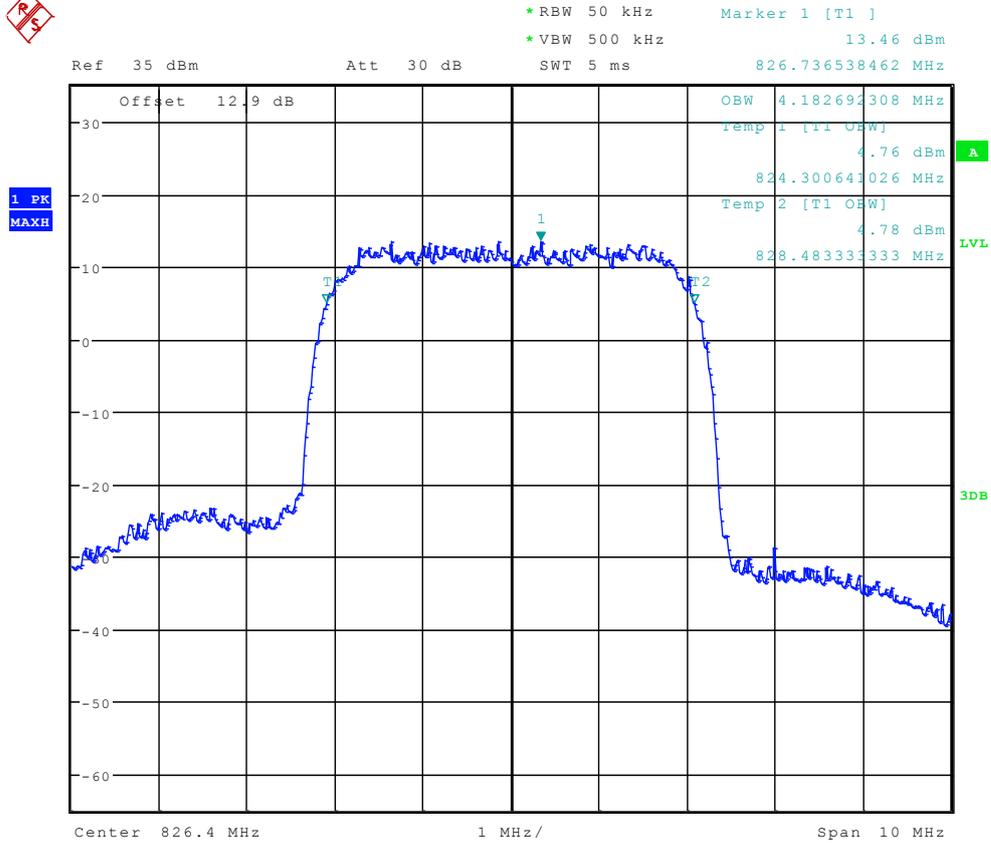
## Channel 128 (TM2:EDGE)



Date: 7.AUG.2012 09:24:23



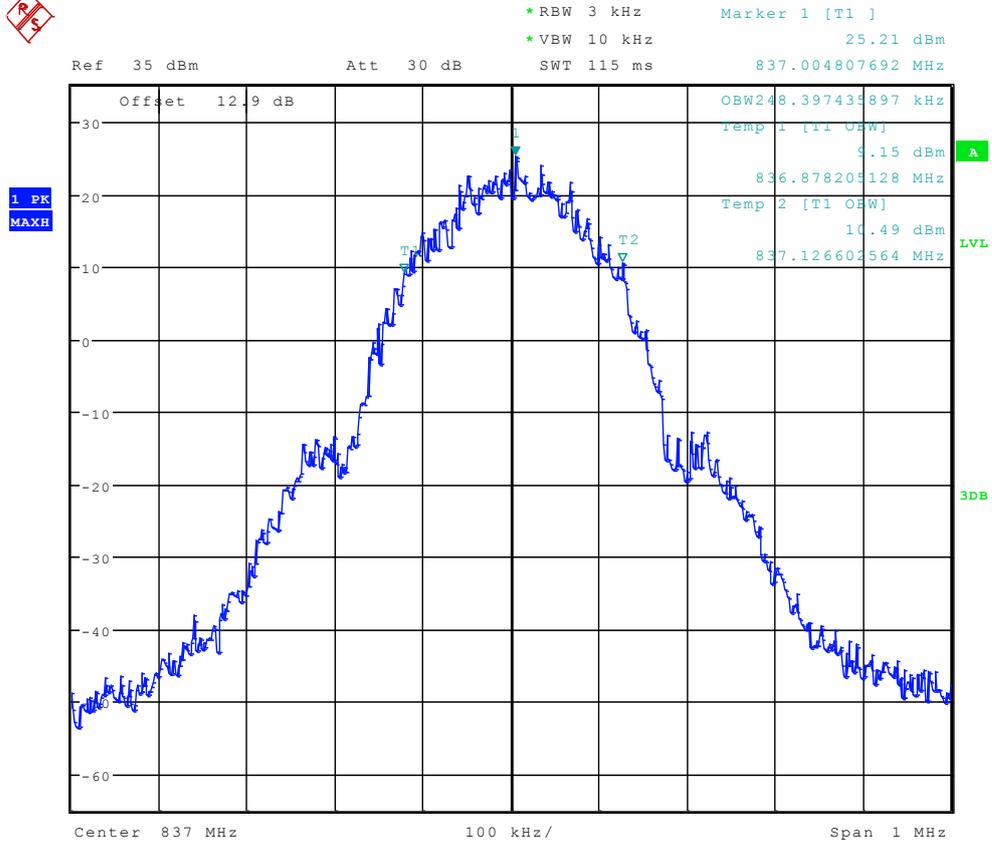
## Channel 4132 (TM3: WCDMA)



Date: 7.AUG.2012 09:31:27



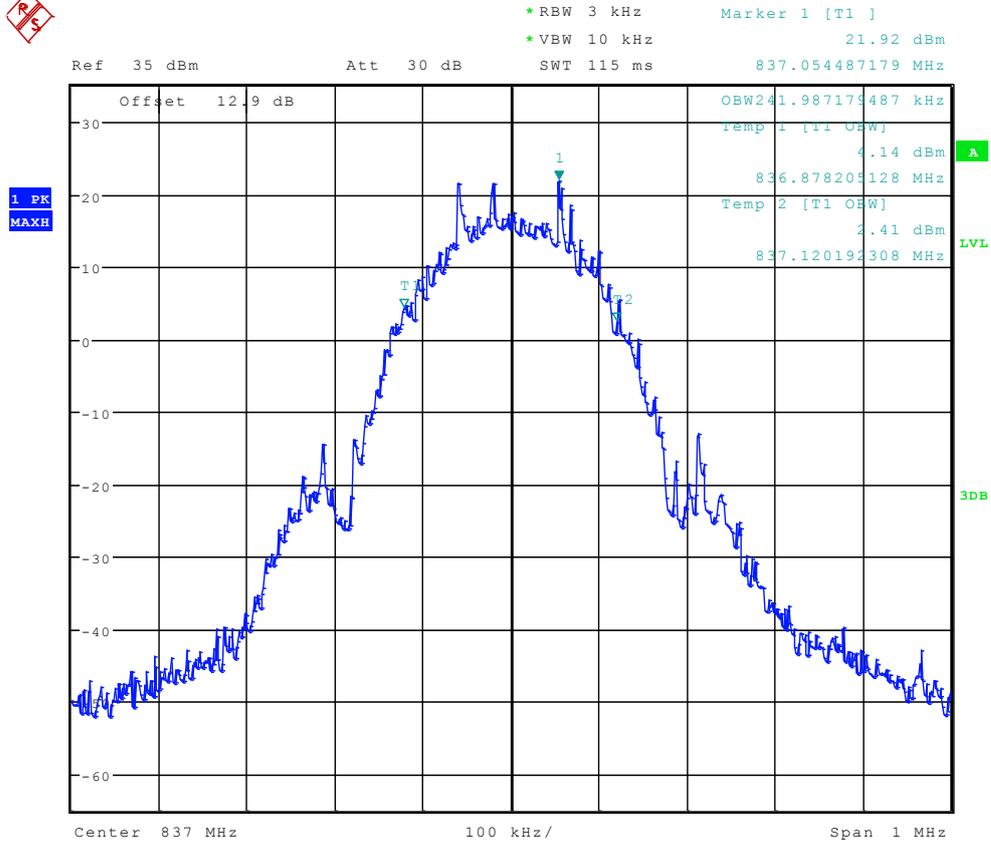
## Channel 192 (TM1:GPRS/GSM)



Date: 7.AUG.2012 09:15:54



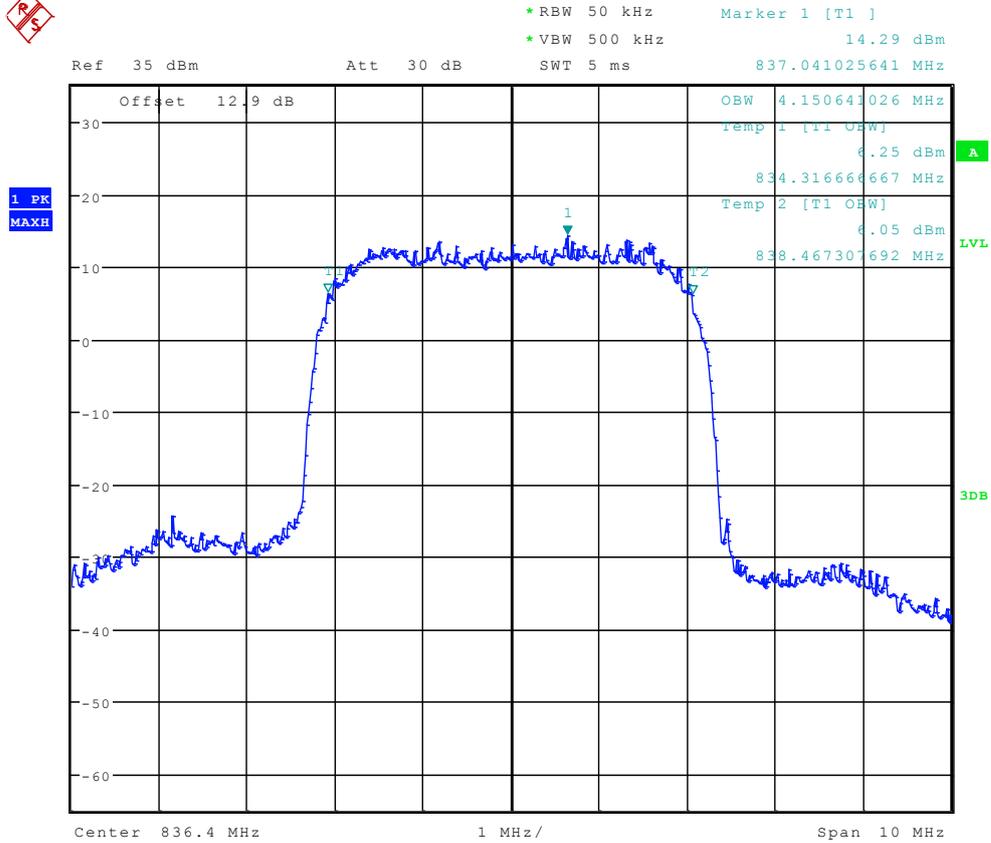
## Channel 192 (TM2:EDGE)



Date: 7.AUG.2012 09:24:45



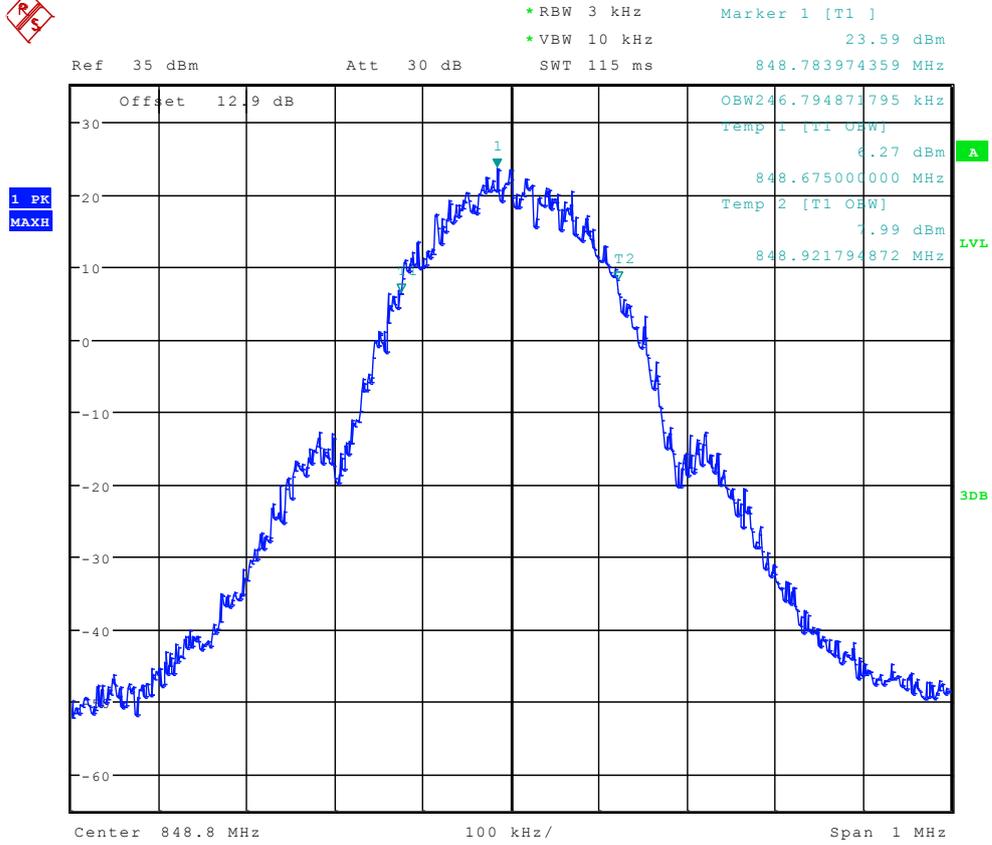
## Channel 4182 (TM3: WCDMA)



Date: 7.AUG.2012 09:31:40



## Channel 251 (TM1:GPRS/GSM)



Date: 7.AUG.2012 09:16:08







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# Appendix D

## Band Edges Compliance

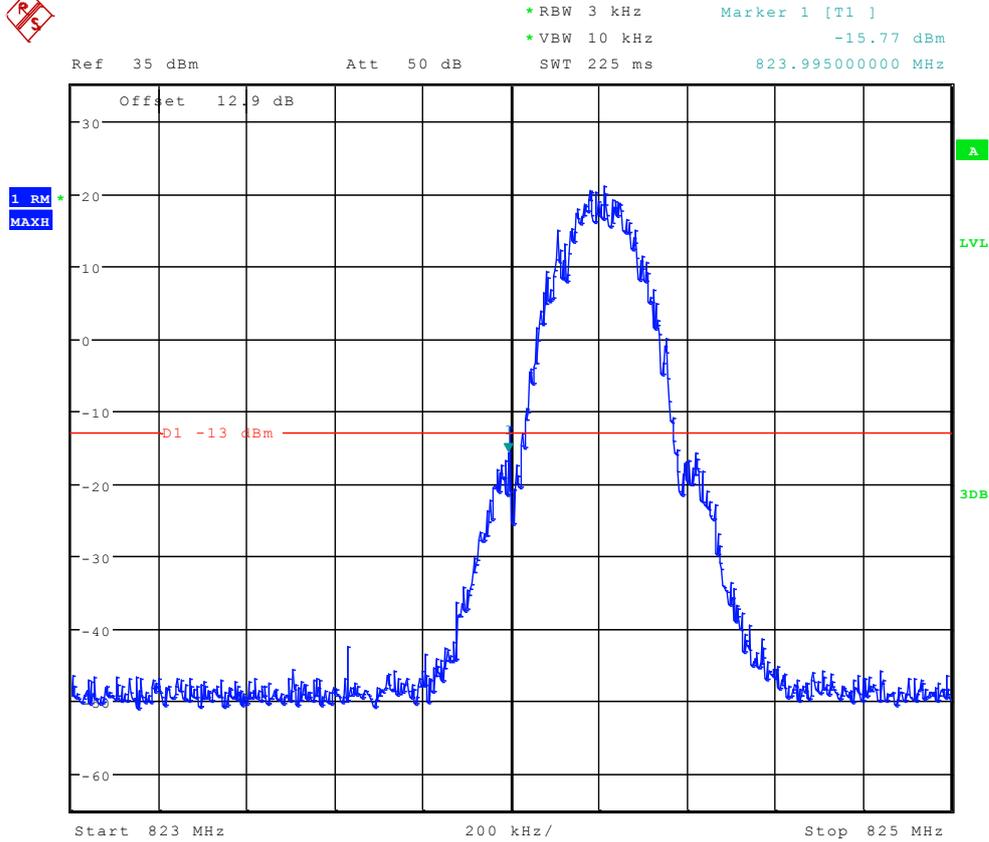
According to FCC Part 2.1051 & Part 22 Subpart H



# TM1:GPRS/GSM

## Left Edge

### Channel 128



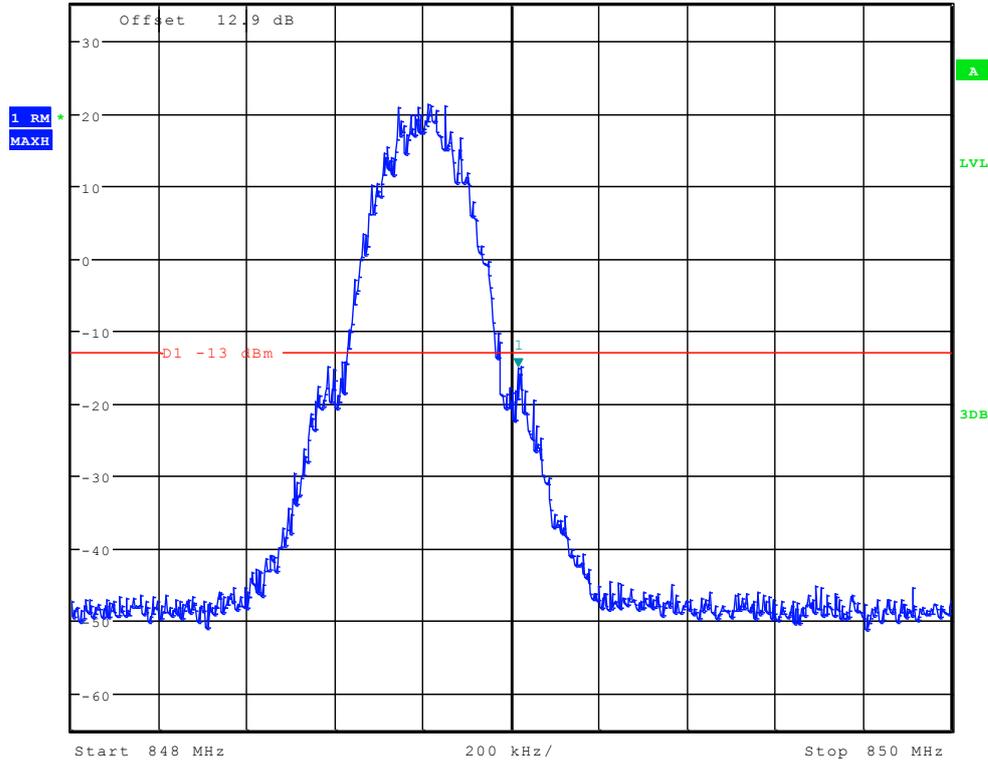
Date: 7.AUG.2012 09:19:18



## Right Edge Channel 251



Ref 35 dBm      Att 50 dB      RBW 3 kHz      Marker 1 [T1]      -15.02 dBm  
\* VBW 10 kHz      849.015000000 MHz  
SWT 225 ms



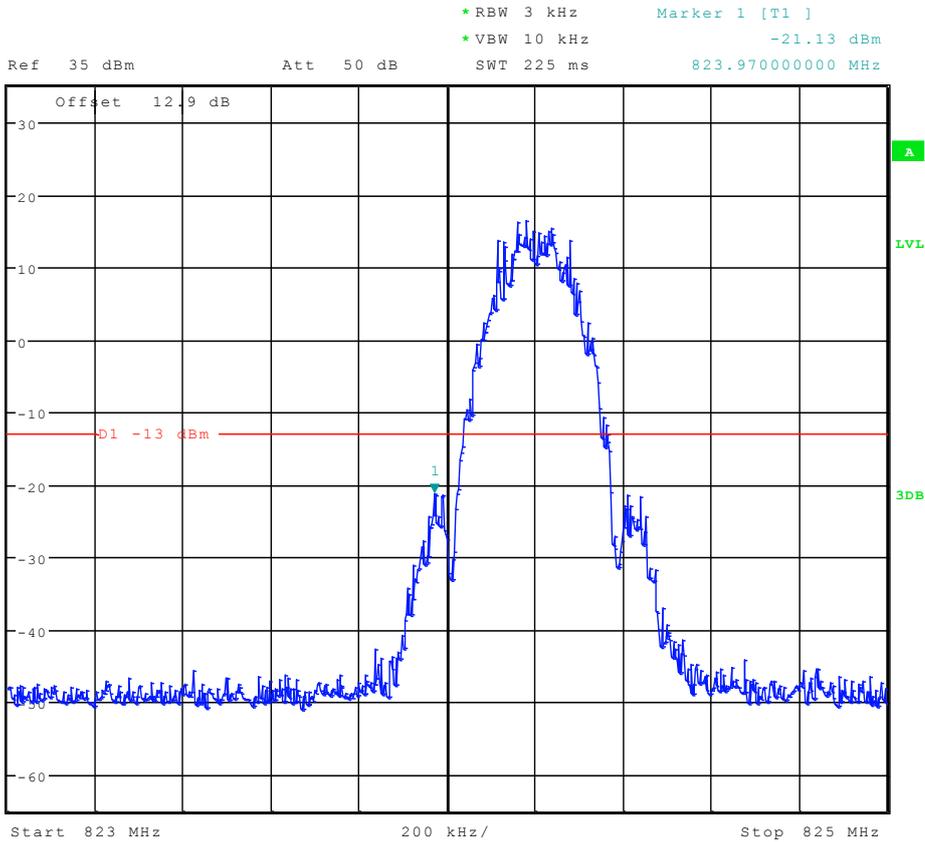
Date: 7.AUG.2012 09:19:39



# TM2:EDGE

## Left Edge

### Channel 128



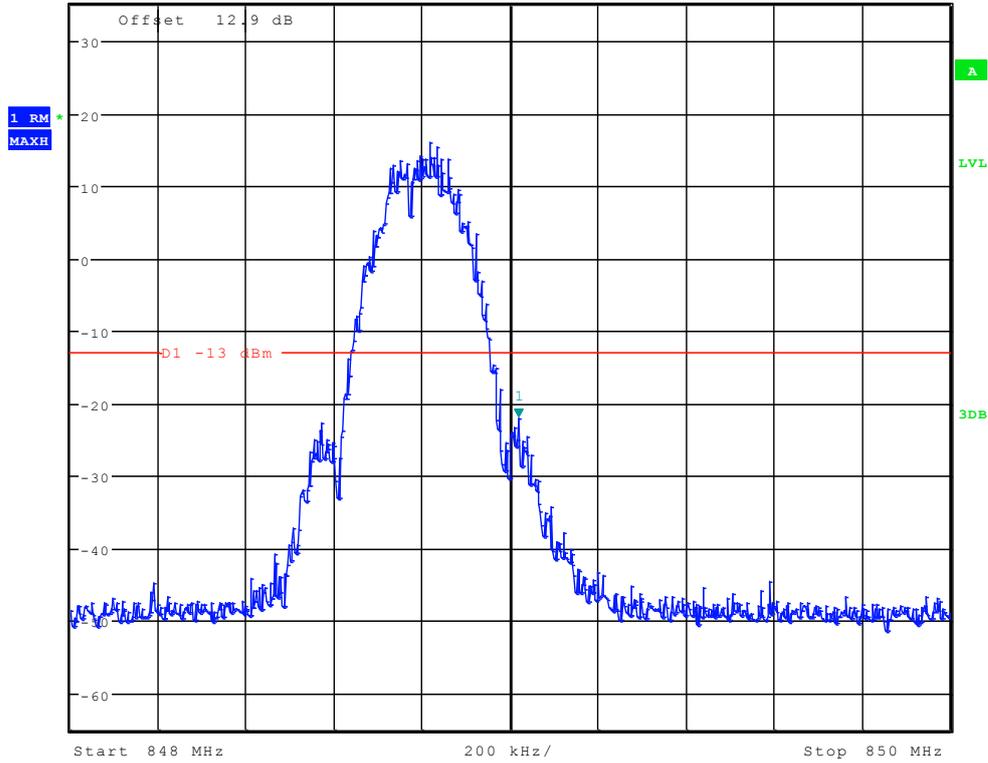
Date: 7.AUG.2012 09:28:53



## Right Edge Channel 251



Ref 35 dBm Att 50 dB SWT 225 ms 849.02000000 MHz  
 \*RBW 3 kHz Marker 1 [T1] -22.13 dBm  
 \*VBW 10 kHz



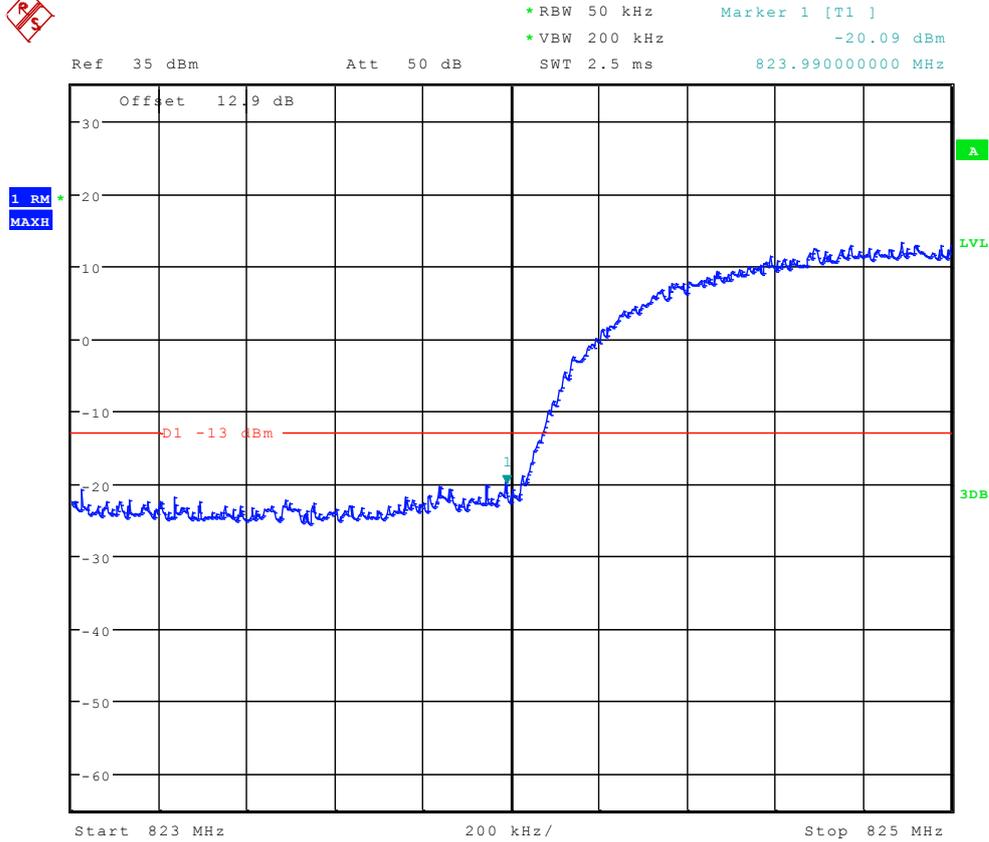
Date: 7.AUG.2012 09:29:10



# TM3: WCDMA

## Left Edge

### Channel 4132



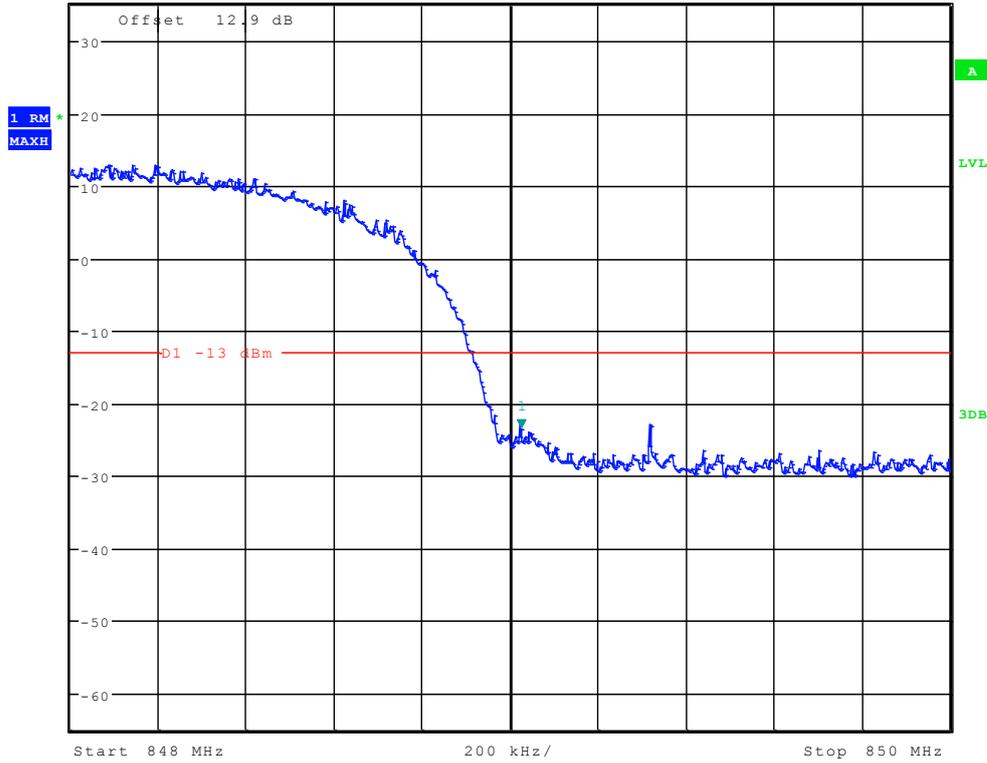
Date: 7.AUG.2012 09:35:30



## Right Edge Channel 4233



Ref 35 dBm Att 50 dB RBW 50 kHz Marker 1 [T1] -23.61 dBm  
\*VBW 200 kHz SWT 2.5 ms 849.025000000 MHz



Date: 7.AUG.2012 09:35:44

-----The END-----



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## **Appendix E**

# Spurious Emission at Antenna Terminal

According to FCC Part 2.1051 & Part 22.917

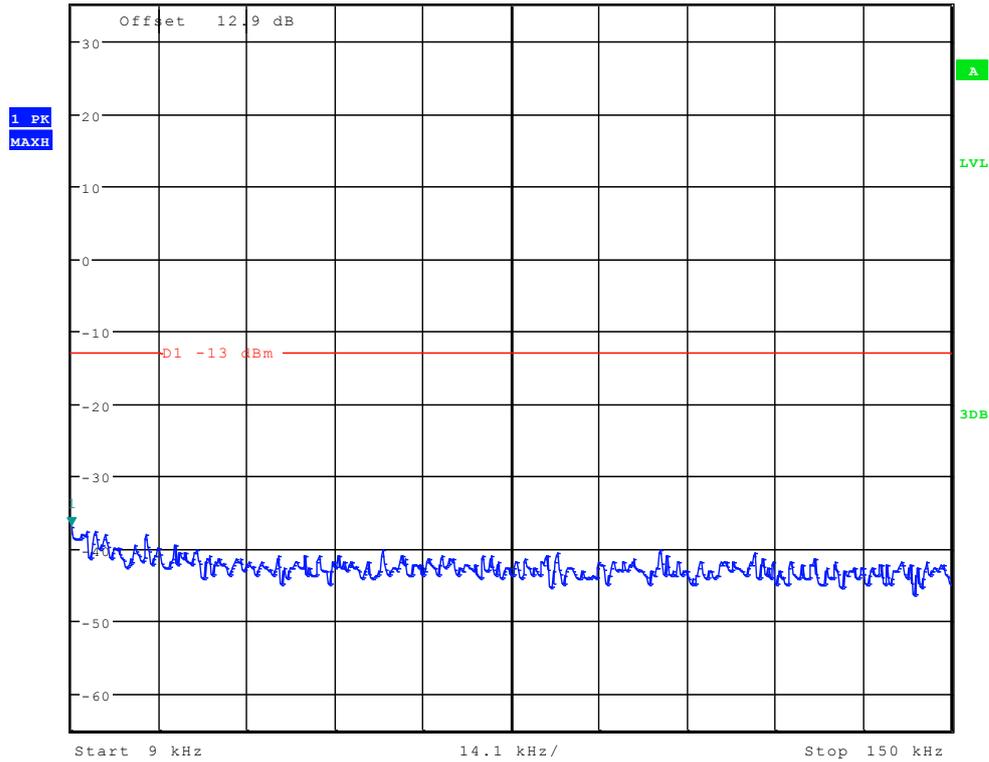


# TM1: GPRS/GSM

## Channel 128



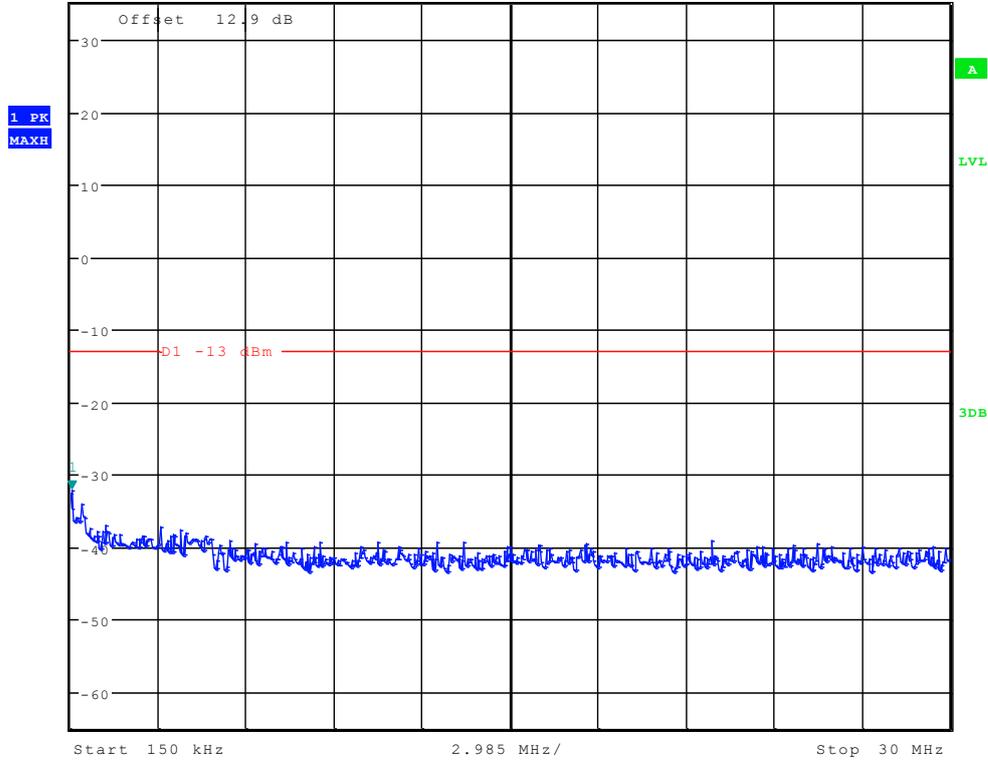
Ref 35 dBm      Att 50 dB      RBW 1 kHz      Marker 1 [T1]      -36.87 dBm  
\*VBW 10 kHz      SWT 145 ms      9.000000000 kHz



Date: 7.AUG.2012 09:16:23



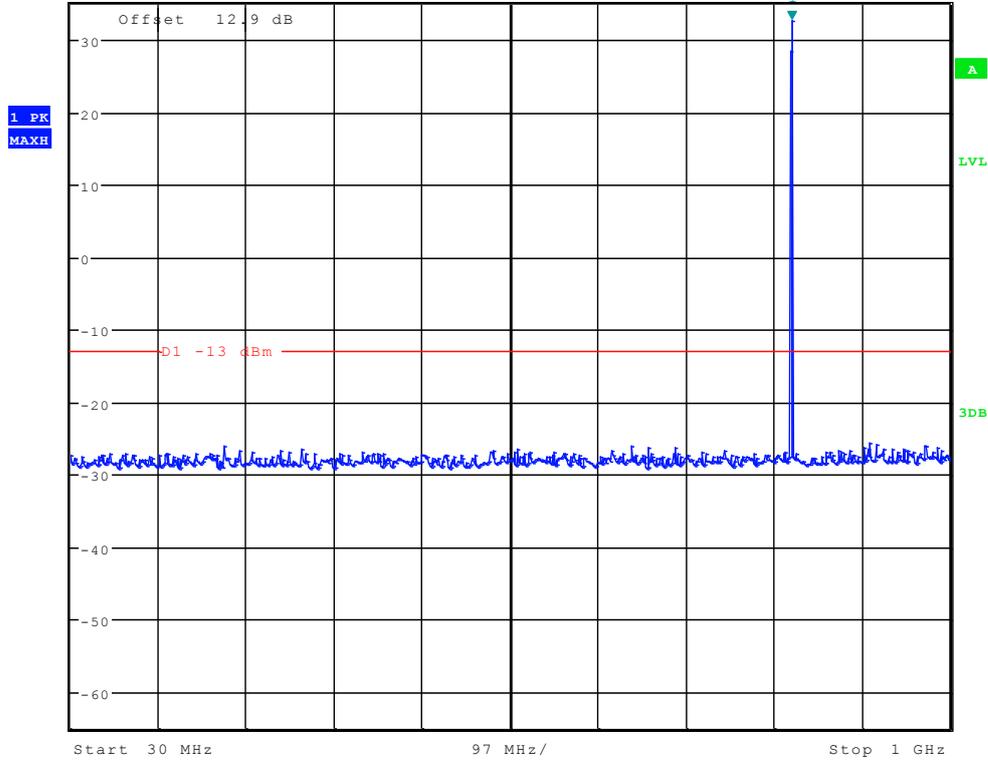
\*RBW 10 kHz      Marker 1 [T1 ]  
\*VBW 30 kHz      -32.22 dBm  
Ref 35 dBm      Att 50 dB      SWT 300 ms      197.836538462 kHz



Date: 7.AUG.2012 09:17:07



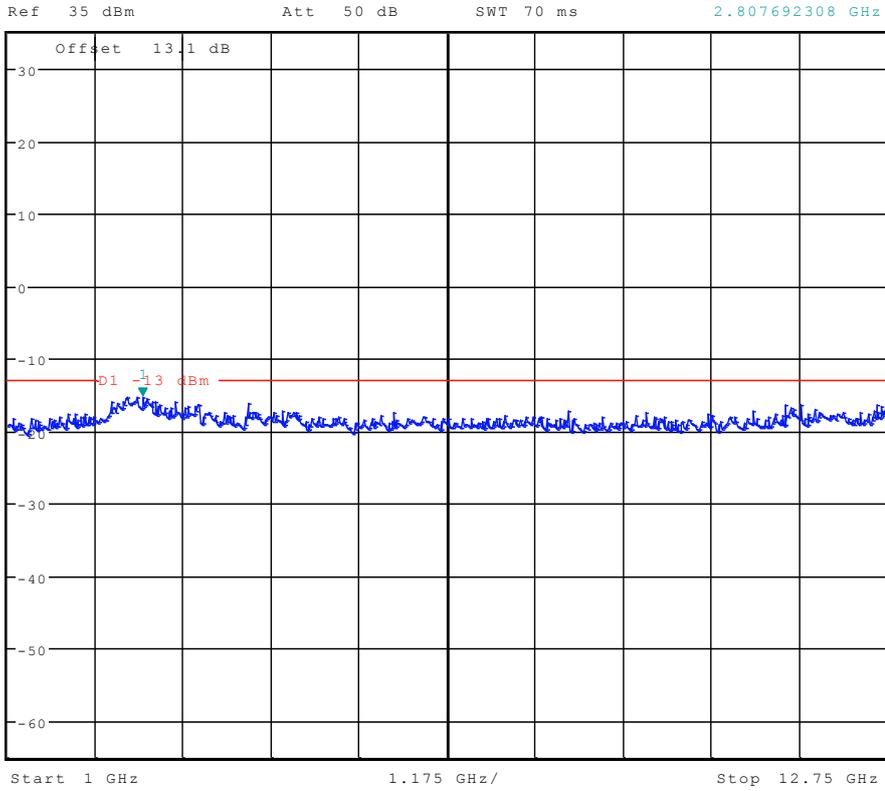
\*RBW 100 kHz      Marker 1 [T1 ]  
\*VBW 300 kHz      32.63 dBm  
Ref 35 dBm      Att 50 dB      SWT 100 ms      825.897435897 MHz



Date: 7.AUG.2012 09:17:50



\* RBW 1 MHz      Marker 1 [T1 ]  
\* VBW 3 MHz      -15.40 dBm  
SWT 70 ms      2.807692308 GHz



Date: 7.AUG.2012 09:18:34

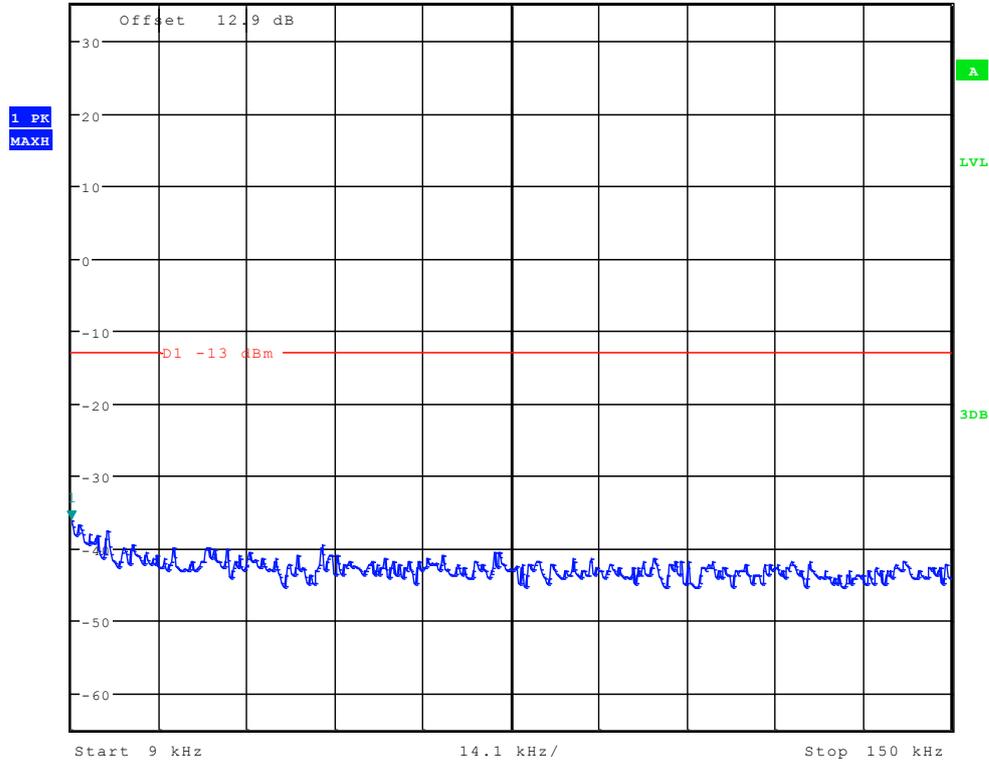


## Channel 192



\*RBW 1 kHz      Marker 1 [T1 ]  
\*VBW 10 kHz      -36.19 dBm  
SWT 145 ms      9.000000000 kHz

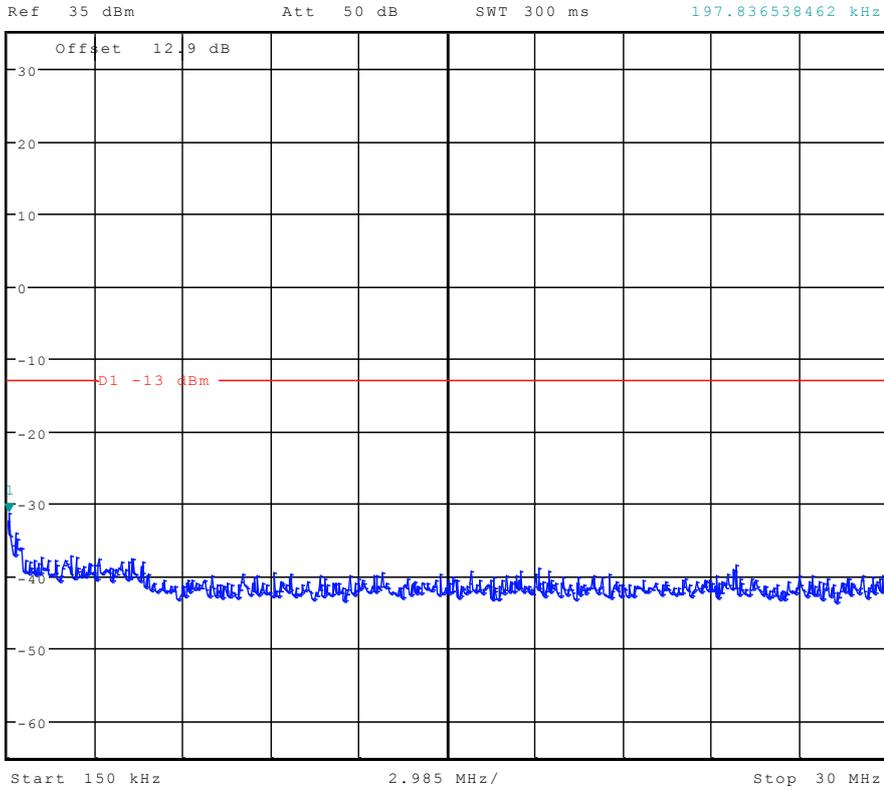
Ref 35 dBm      Att 50 dB



Date: 7.AUG.2012 09:16:37



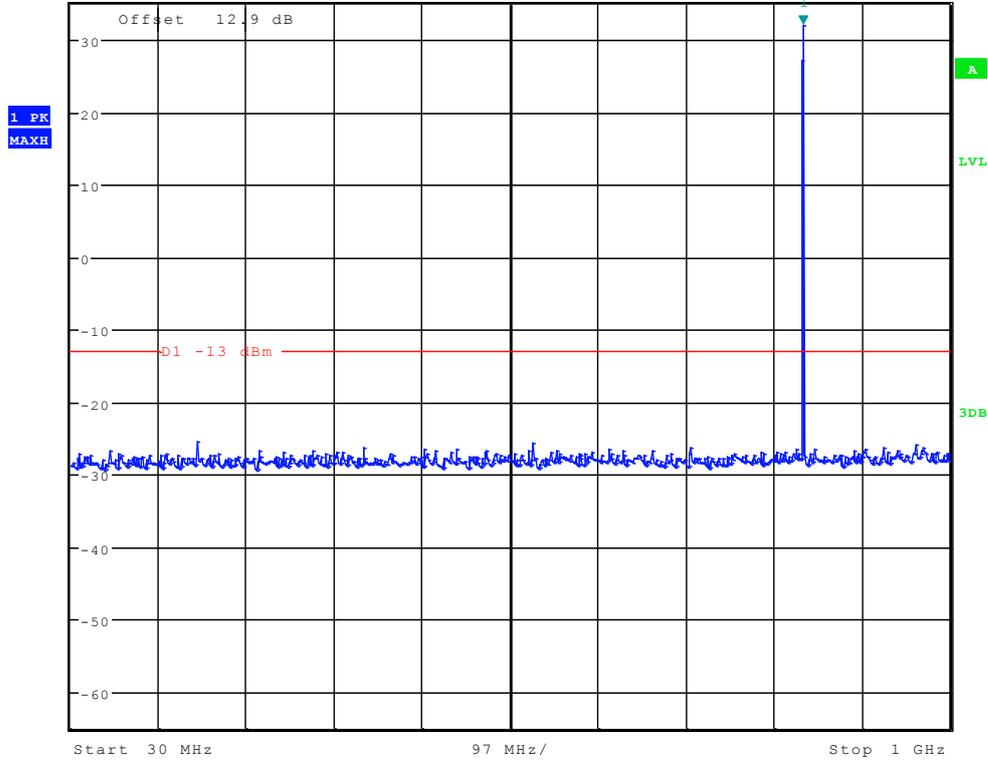
\*RBW 10 kHz      Marker 1 [T1 ]  
\*VBW 30 kHz      -31.32 dBm  
SWT 300 ms      197.836538462 kHz



Date: 7.AUG.2012 09:17:21



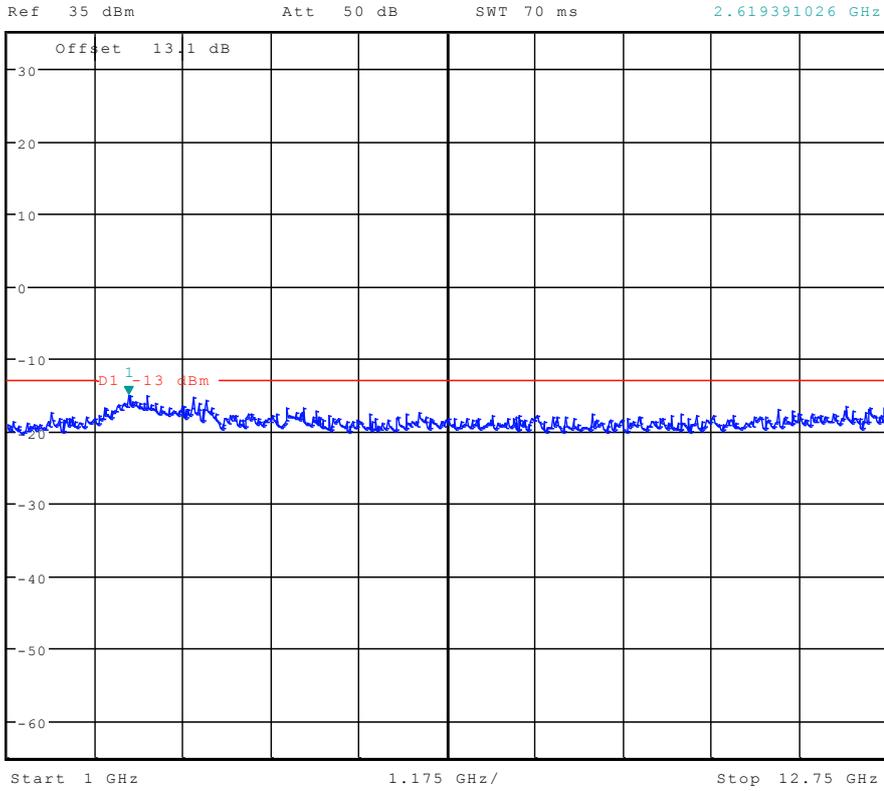
\*RBW 100 kHz      Marker 1 [T1 ]  
\*VBW 300 kHz      31.98 dBm  
Ref 35 dBm      Att 50 dB      SWT 100 ms      838.333333333 MHz



Date: 7.AUG.2012 09:18:05



\*RBW 1 MHz      Marker 1 [T1 ]  
\*VBW 3 MHz      -15.01 dBm  
SWT 70 ms      2.619391026 GHz



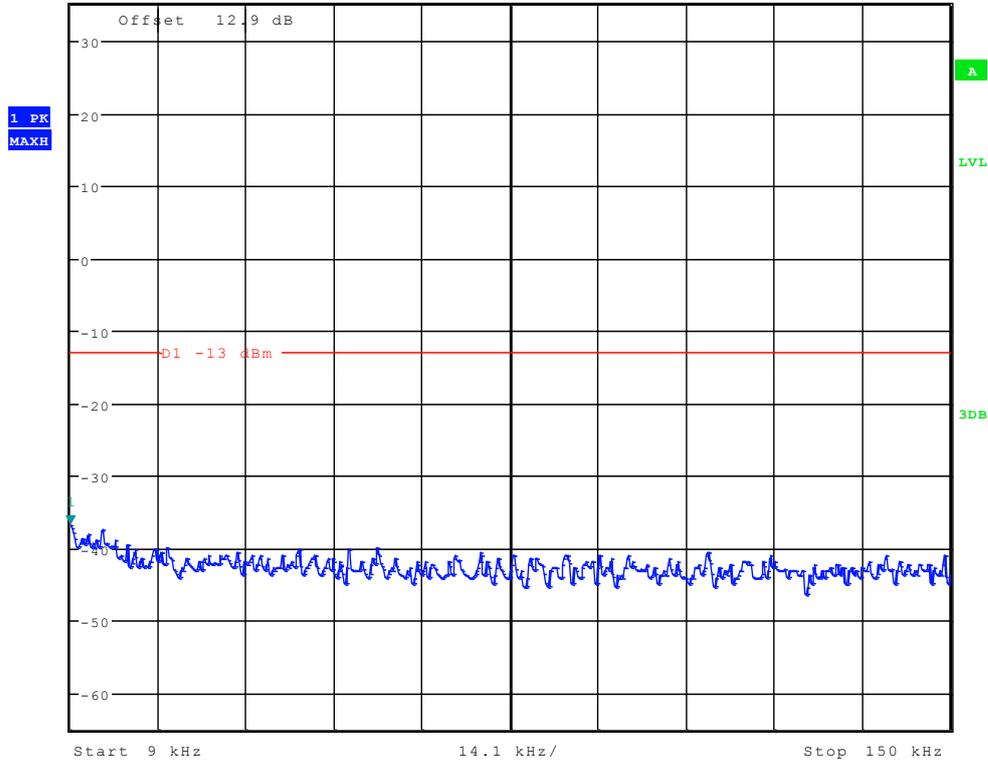
Date: 7.AUG.2012 09:18:49



## Channel 251



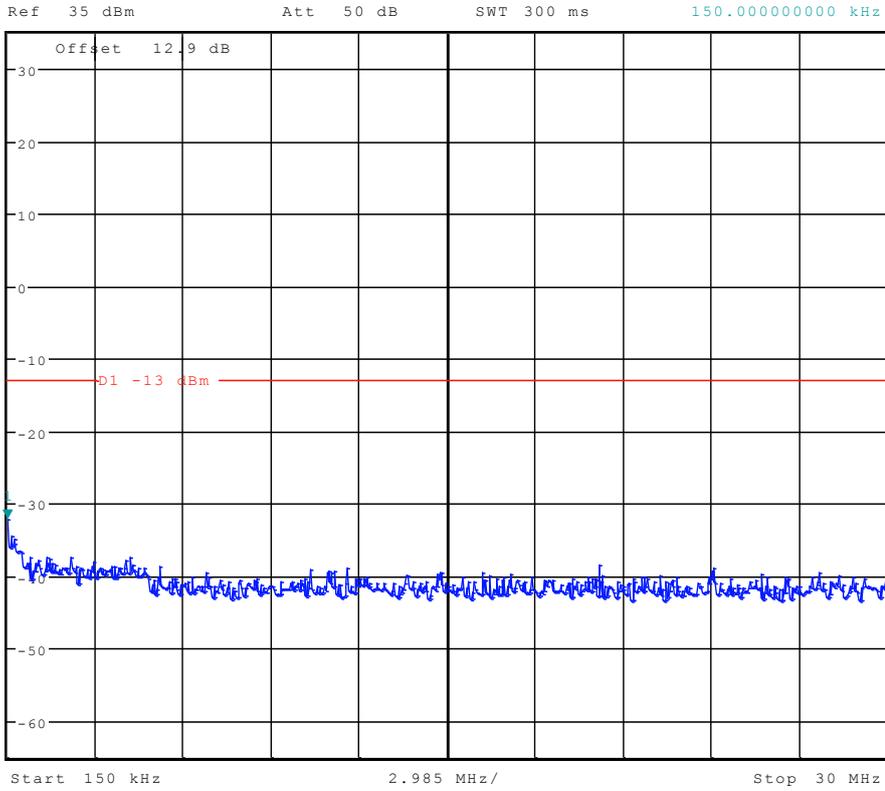
Ref 35 dBm      Att 50 dB      \*RBW 1 kHz      Marker 1 [T1]      \*VBW 10 kHz      -36.67 dBm  
SWT 145 ms      9.000000000 kHz



Date: 7.AUG.2012 09:16:52



\*RBW 10 kHz      Marker 1 [T1 ]  
\*VBW 30 kHz      -32.04 dBm  
SWT 300 ms      150.00000000 kHz

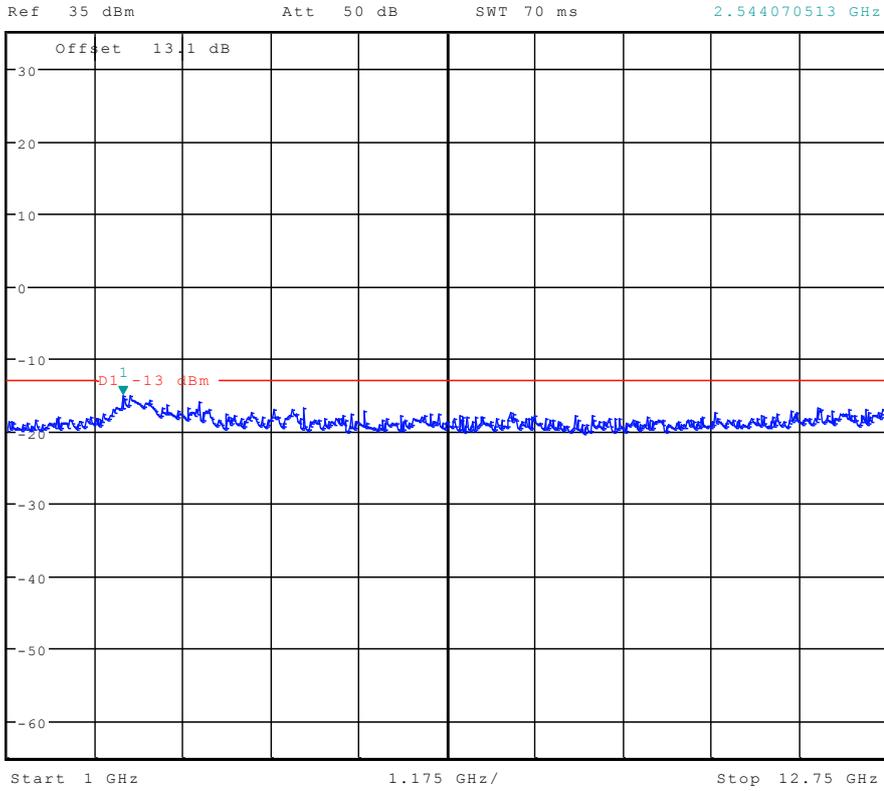


Date: 7.AUG.2012 09:17:35





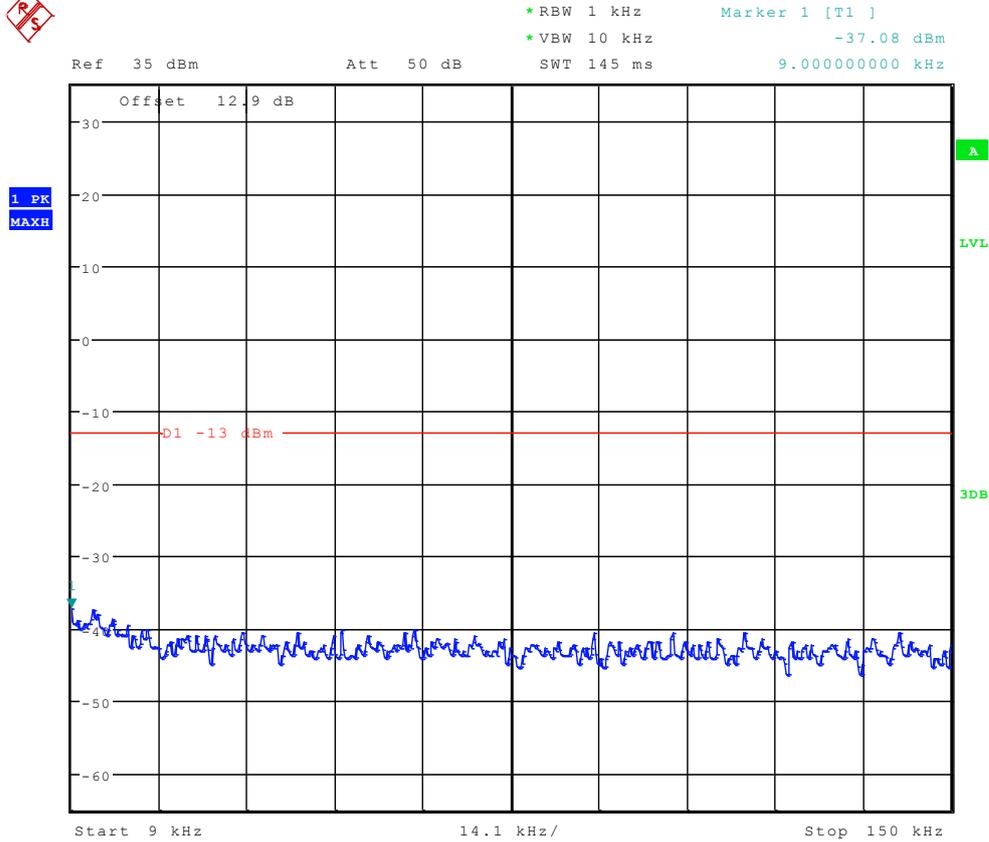
\* RBW 1 MHz      Marker 1 [T1 ]  
\* VBW 3 MHz      -15.07 dBm  
SWT 70 ms      2.544070513 GHz



Date: 7.AUG.2012 09:19:03



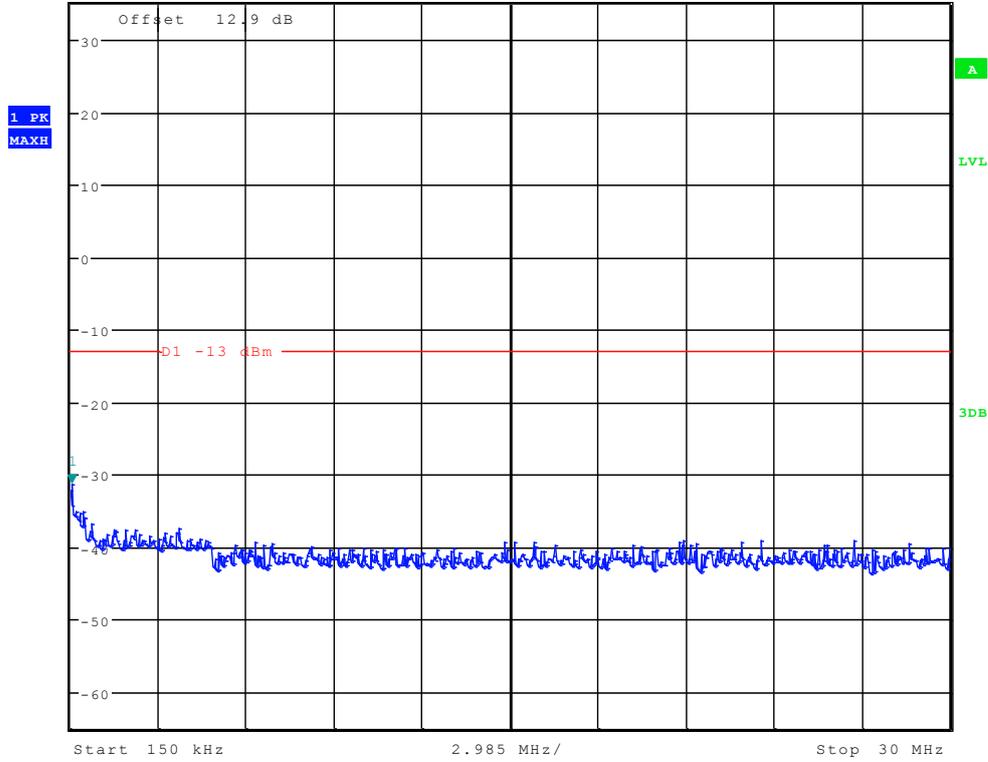
## TM2: EDGE Channel 128



Date: 7.AUG.2012 09:25:55



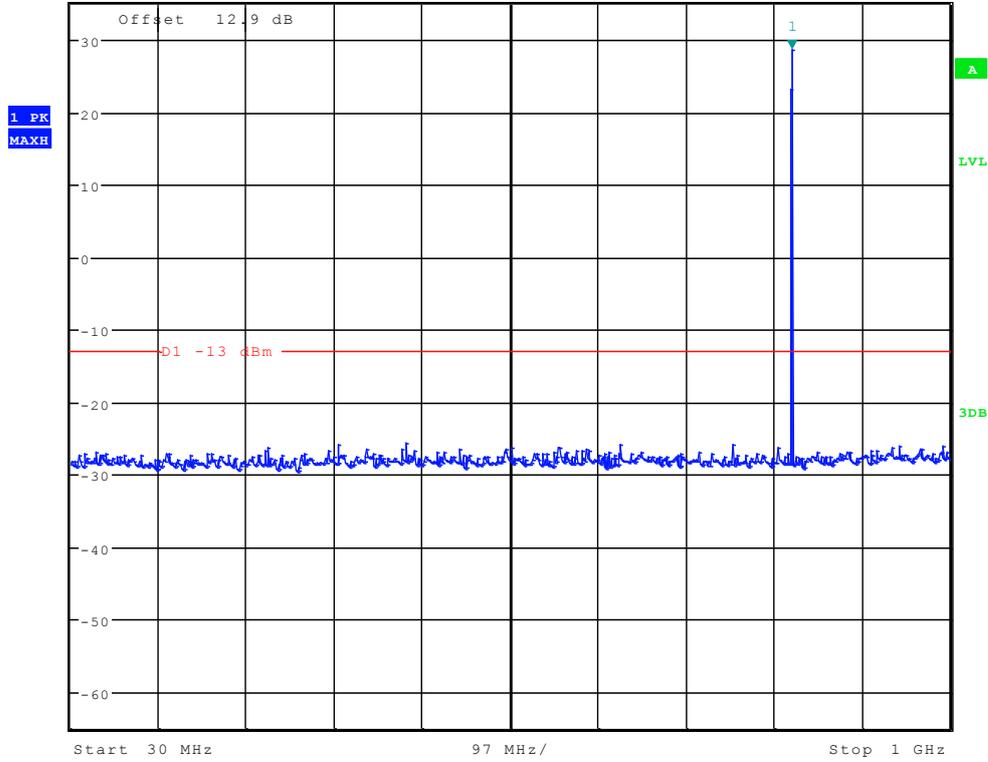
\*RBW 10 kHz      Marker 1 [T1 ]  
\*VBW 30 kHz      -31.32 dBm  
Ref 35 dBm      Att 50 dB      SWT 300 ms      197.836538462 kHz



Date: 7.AUG.2012 09:26:39



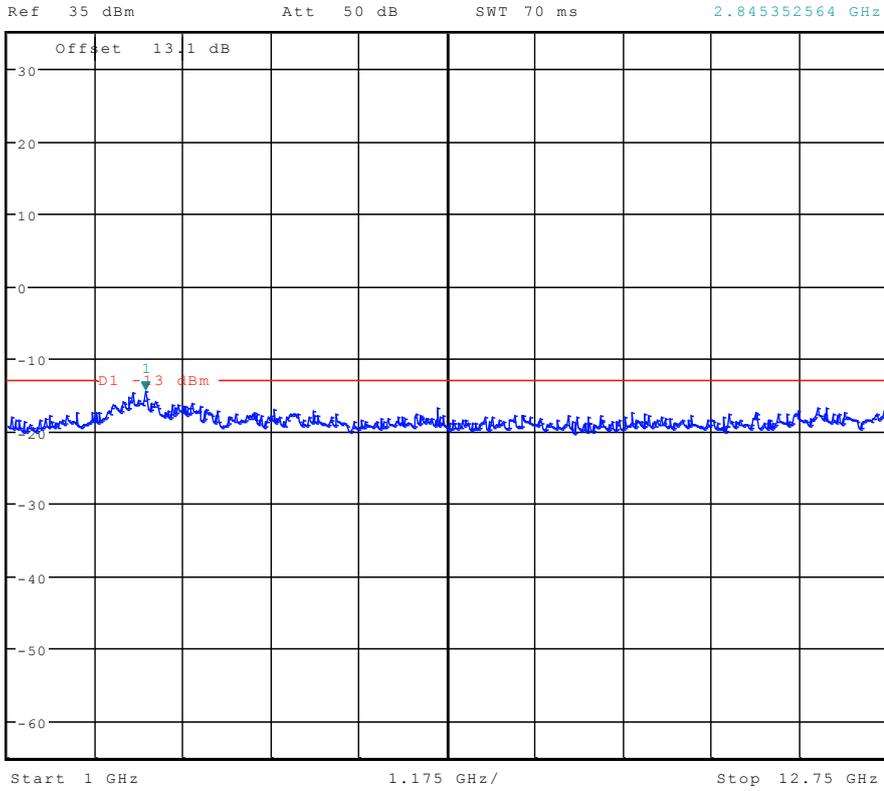
\*RBW 100 kHz      Marker 1 [T1 ]  
\*VBW 300 kHz      28.50 dBm  
Ref 35 dBm      Att 50 dB      SWT 100 ms      825.897435897 MHz



Date: 7.AUG.2012 09:27:22



\*RBW 1 MHz      Marker 1 [T1 ]  
\*VBW 3 MHz      -14.55 dBm  
SWT 70 ms      2.845352564 GHz



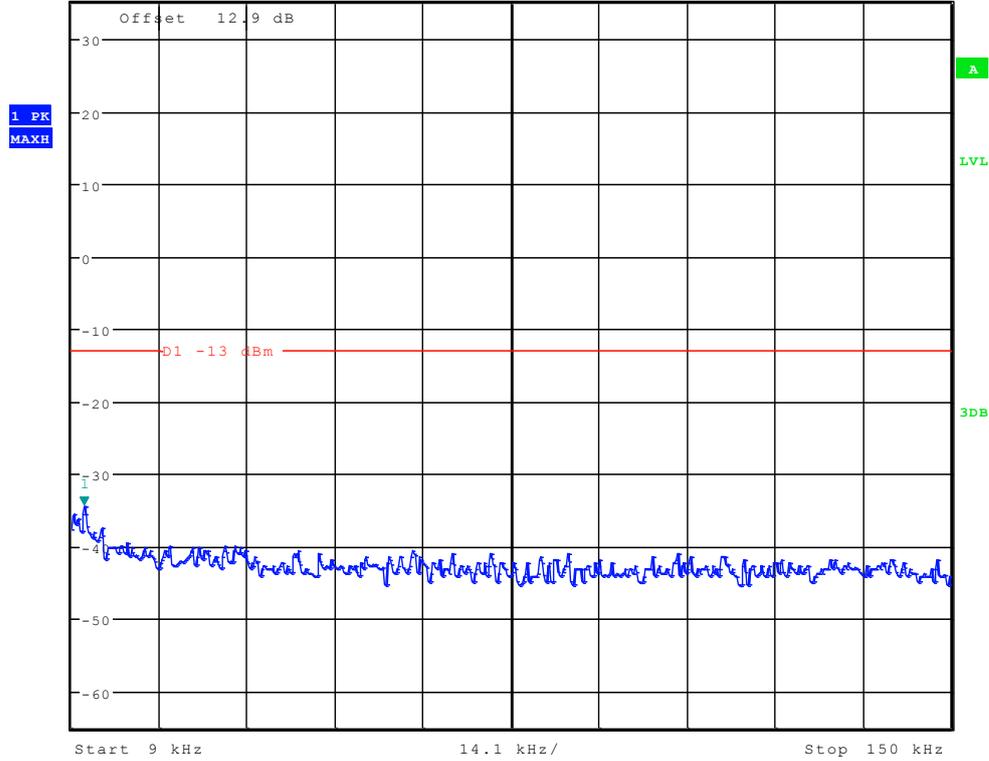
Date: 7.AUG.2012 09:28:06



## Channel 192



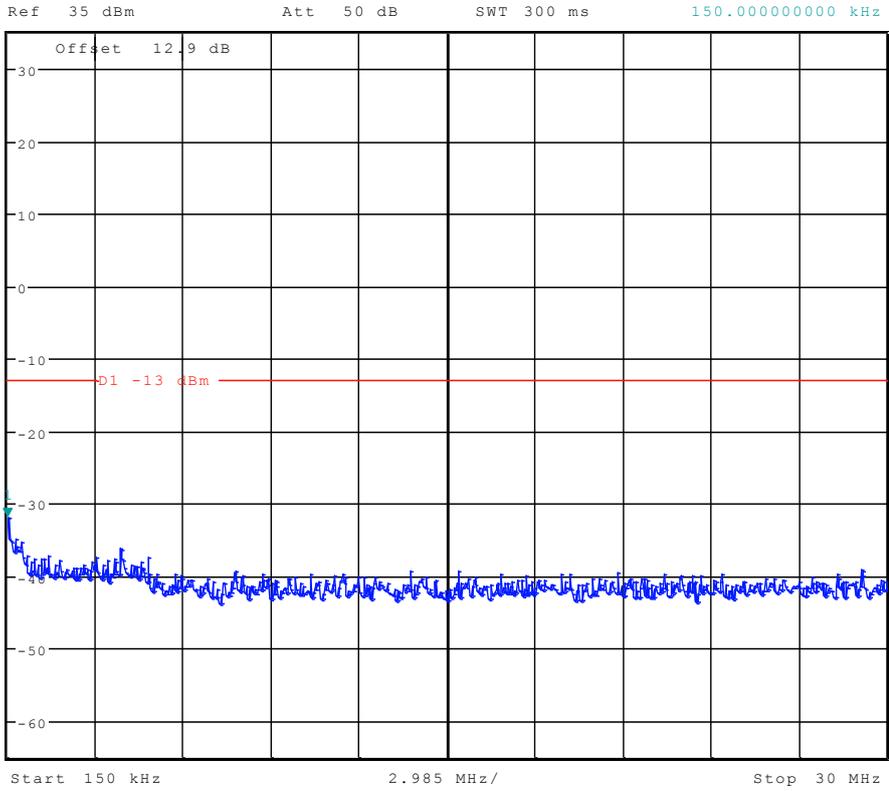
\*RBW 1 kHz      Marker 1 [T1 ]  
\*VBW 10 kHz      -34.50 dBm  
Ref 35 dBm      Att 50 dB      SWT 145 ms      11.033653846 kHz



Date: 7.AUG.2012 09:26:09



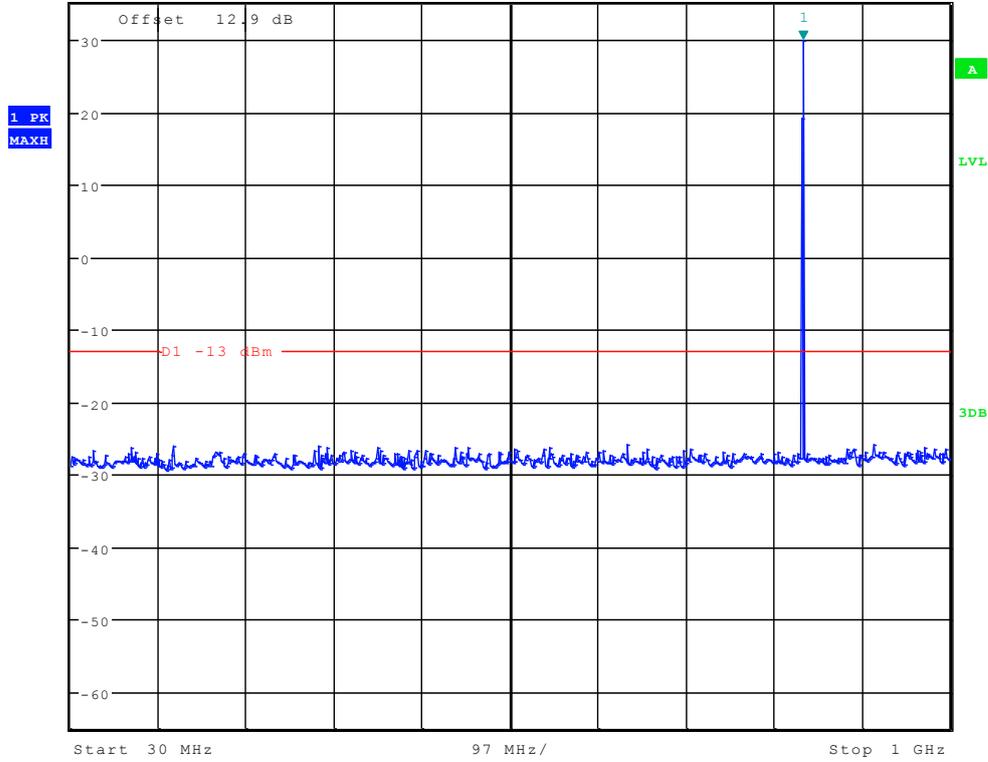
\*RBW 10 kHz      Marker 1 [T1 ]  
\*VBW 30 kHz      -31.87 dBm  
SWT 300 ms      150.00000000 kHz



Date: 7.AUG.2012 09:26:53



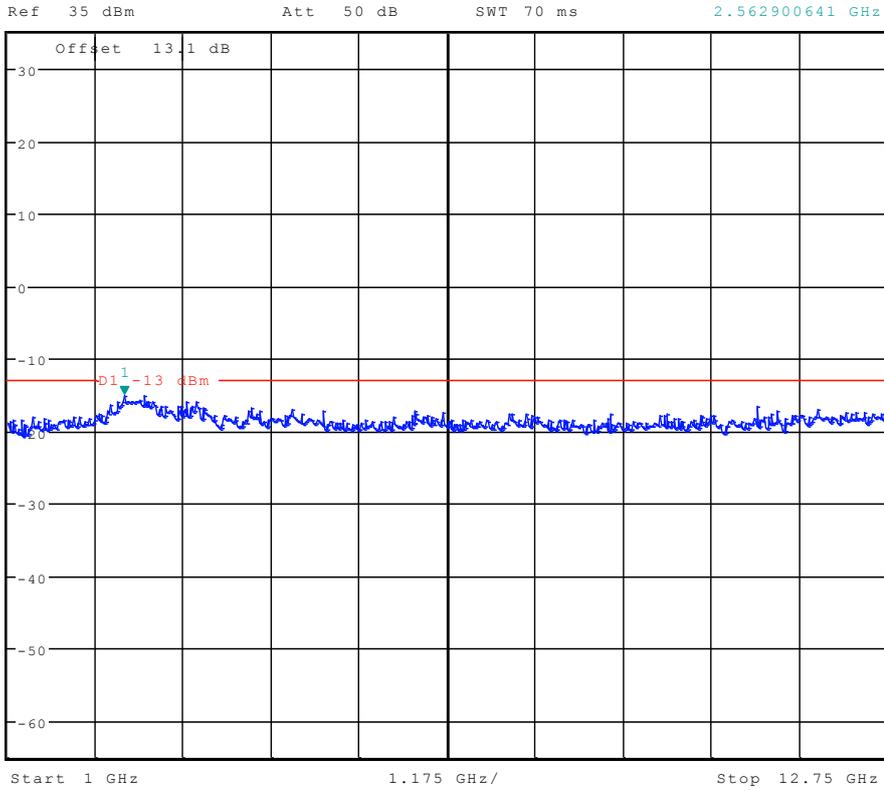
\*RBW 100 kHz      Marker 1 [T1 ]  
\*VBW 300 kHz      29.76 dBm  
Ref 35 dBm      Att 50 dB      SWT 100 ms      838.333333333 MHz



Date: 7.AUG.2012 09:27:37



\* RBW 1 MHz      Marker 1 [T1 ]  
\* VBW 3 MHz      -15.04 dBm  
SWT 70 ms      2.562900641 GHz



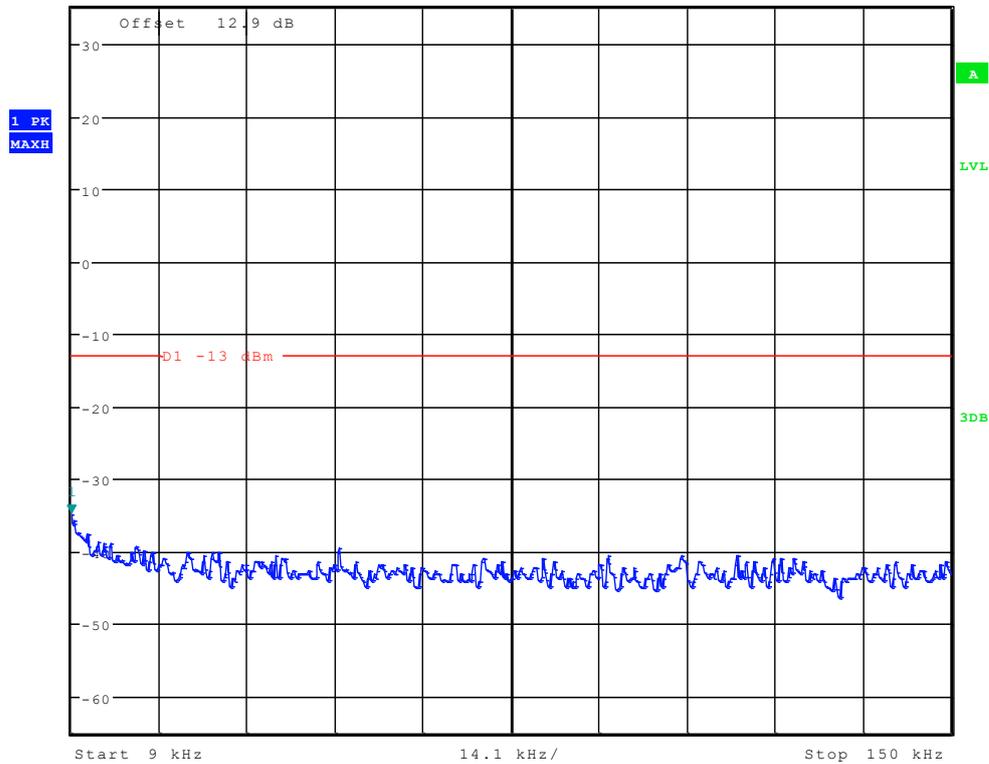
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## Channel 251



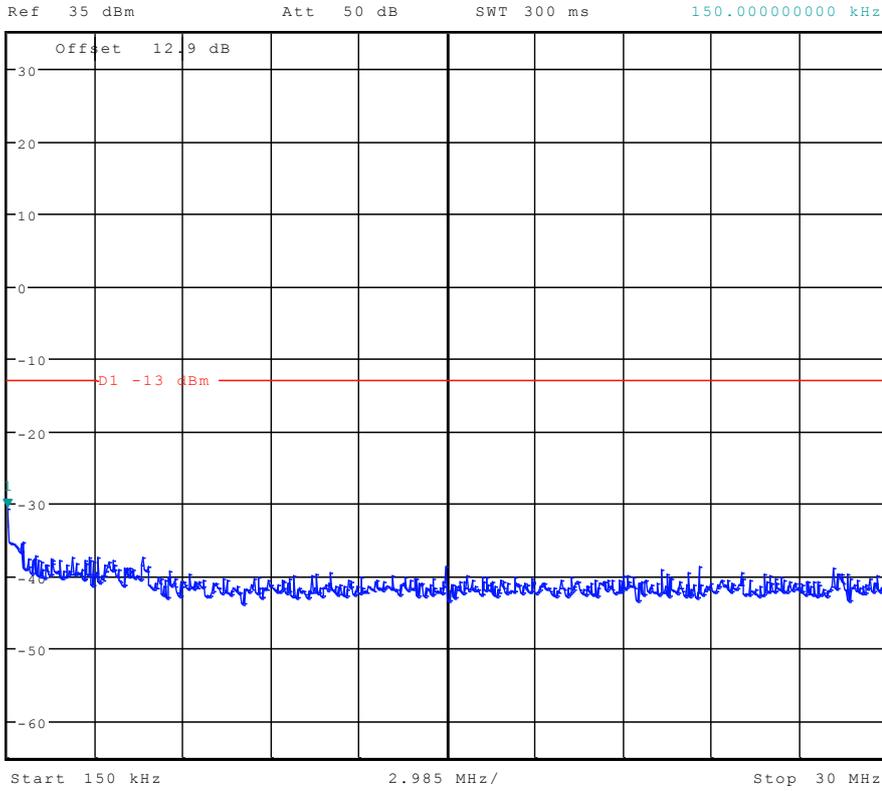
Ref 35 dBm      Att 50 dB      SWT 145 ms      \*RBW 1 kHz      Marker 1 [T1]      -34.89 dBm  
\*VBW 10 kHz      9.000000000 kHz



Date: 7.AUG.2012 09:26:24



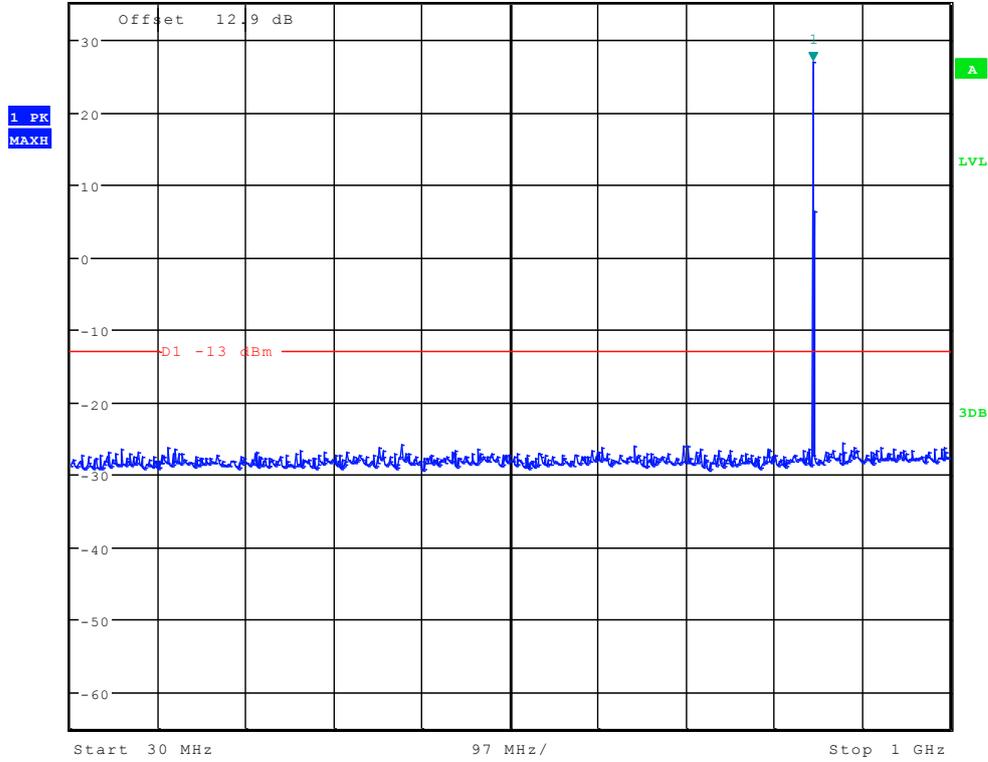
\*RBW 10 kHz      Marker 1 [T1 ]  
\*VBW 30 kHz      -30.75 dBm  
SWT 300 ms      150.00000000 kHz



Date: 7.AUG.2012 09:27:08



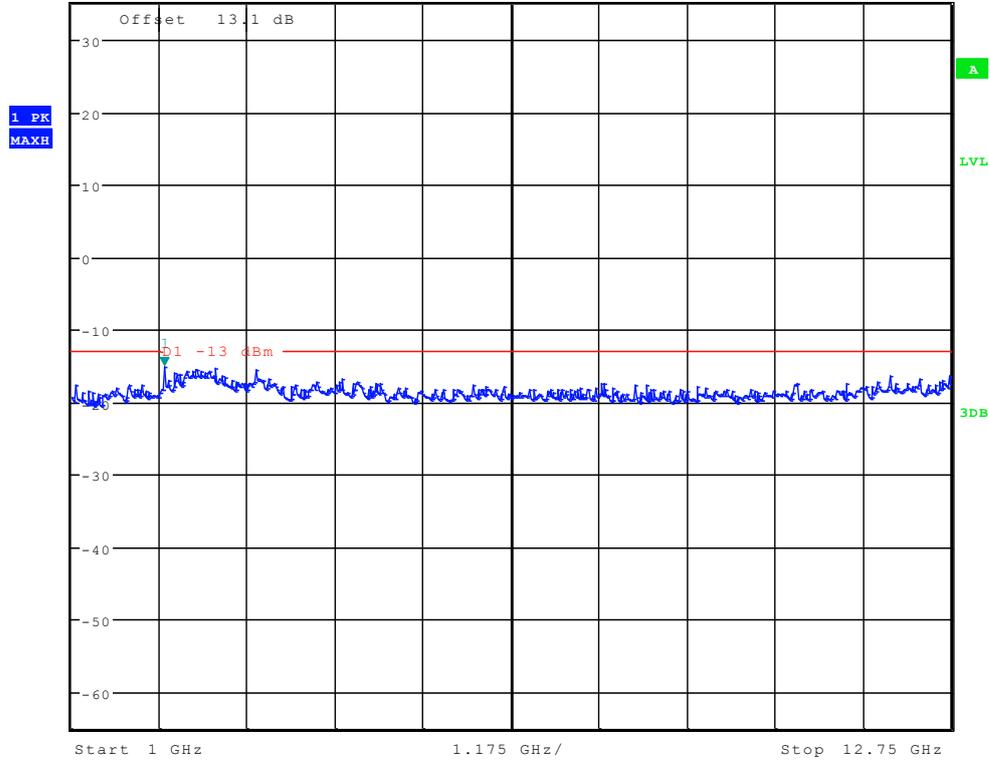
\* RBW 100 kHz      Marker 1 [T1 ]  
\* VBW 300 kHz      27.02 dBm  
Ref 35 dBm      Att 50 dB      SWT 100 ms      849.214743590 MHz



Date: 7.AUG.2012 09:27:51



\* RBW 1 MHz      Marker 1 [T1 ]  
\* VBW 3 MHz      -15.07 dBm  
Ref 35 dBm      Att 50 dB      SWT 70 ms      2.242788462 GHz



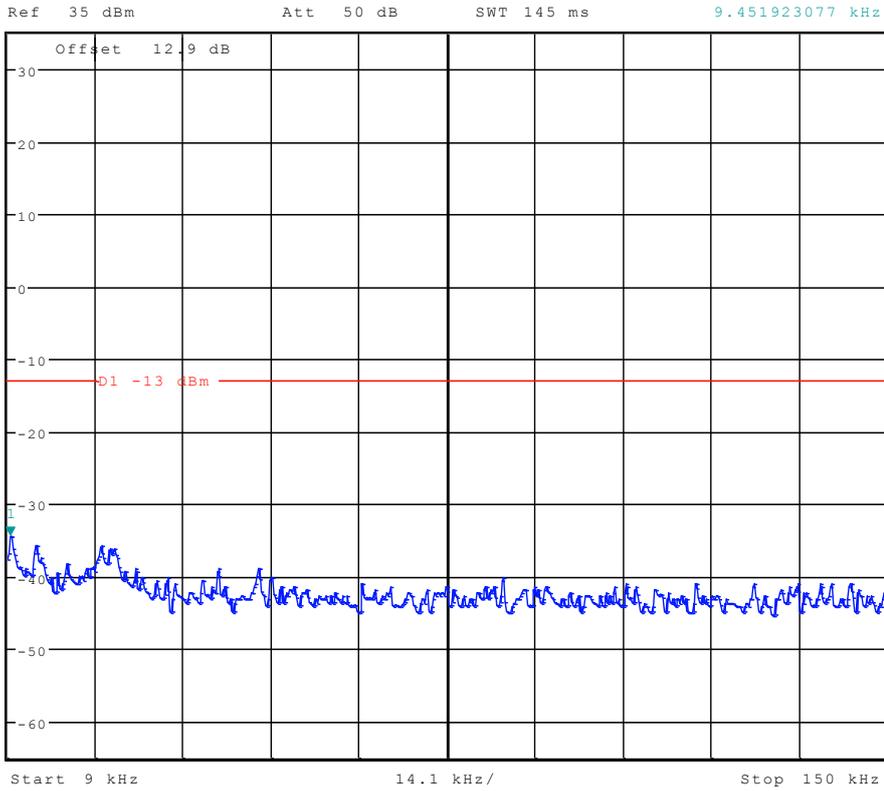
Date: 7.AUG.2012 09:28:35



# TM3: WCDMA Channel 4132



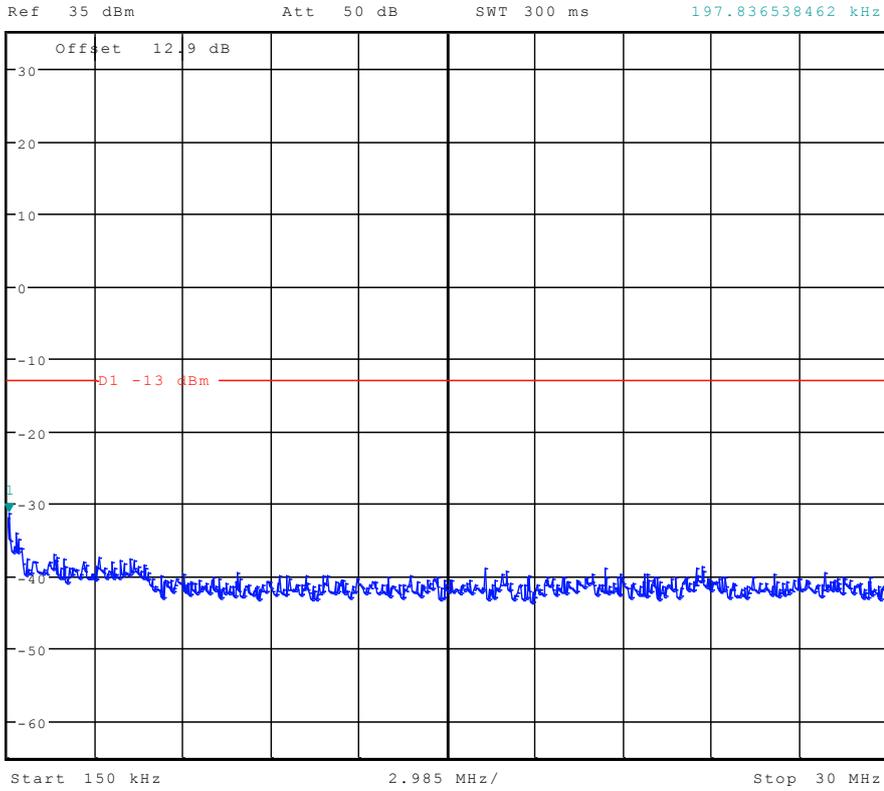
\*RBW 1 kHz      Marker 1 [T1 ]  
\*VBW 10 kHz      -34.50 dBm  
SWT 145 ms      9.451923077 kHz



Date: 7.AUG.2012 09:32:09



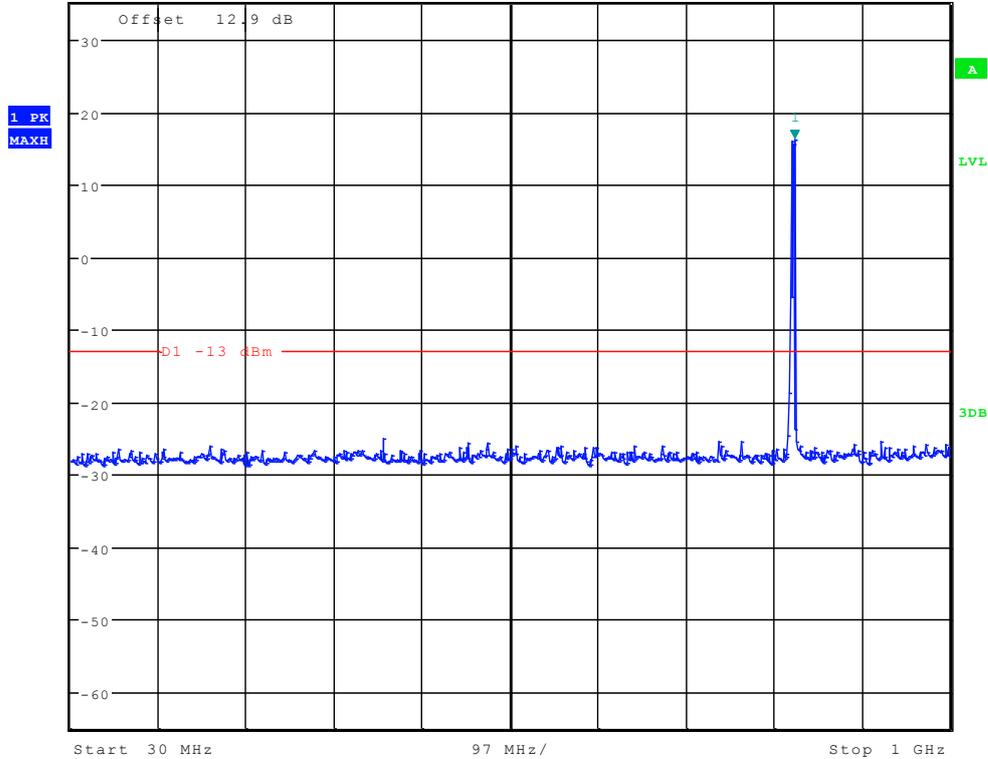
\*RBW 10 kHz      Marker 1 [T1 ]  
\*VBW 30 kHz      -31.32 dBm  
SWT 300 ms      197.836538462 kHz



Date: 7.AUG.2012 09:32:52



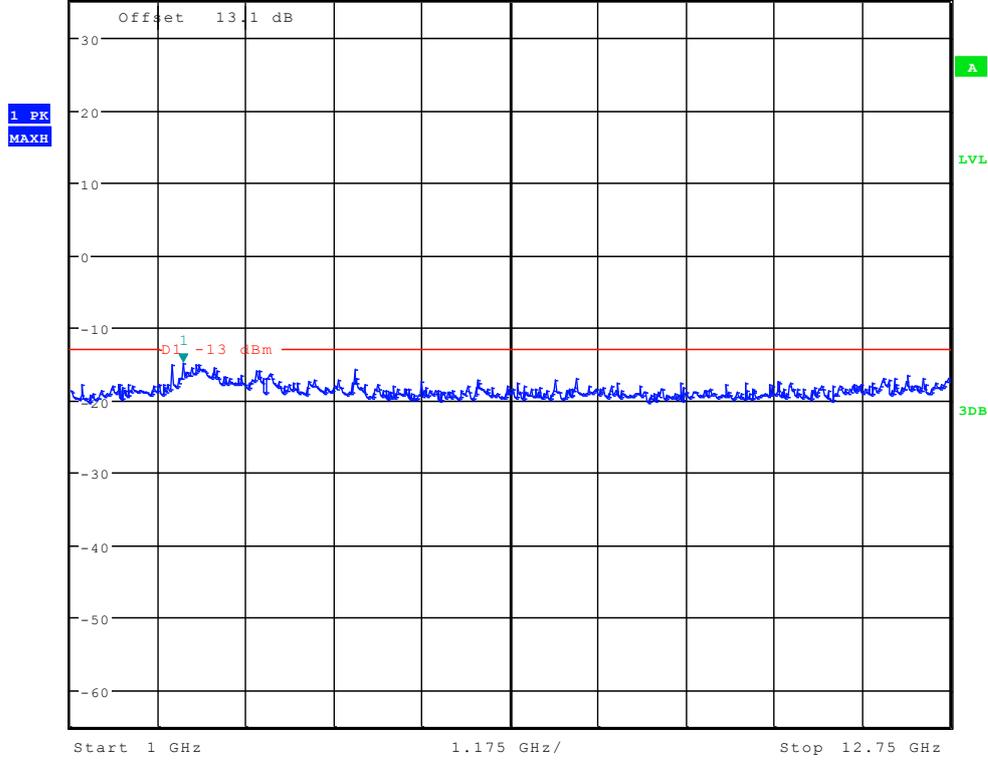
\*RBW 100 kHz      Marker 1 [T1 ]  
\*VBW 300 kHz      16.18 dBm  
Ref 35 dBm      Att 50 dB      SWT 100 ms      829.006410256 MHz



Date: 7.AUG.2012 09:33:56



\* RBW 1 MHz      Marker 1 [T1 ]  
\* VBW 3 MHz      -15.00 dBm  
Ref 35 dBm      Att 50 dB      SWT 70 ms      2.506410256 GHz



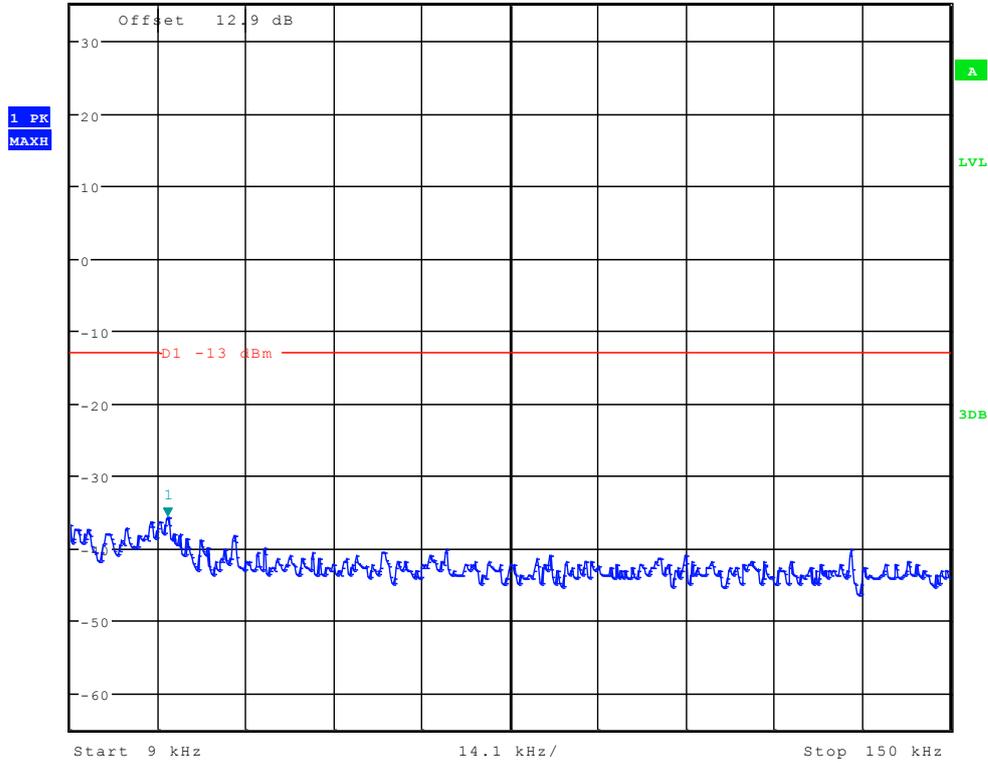
Date: 7.AUG.2012 09:34:40



## Channel 4182



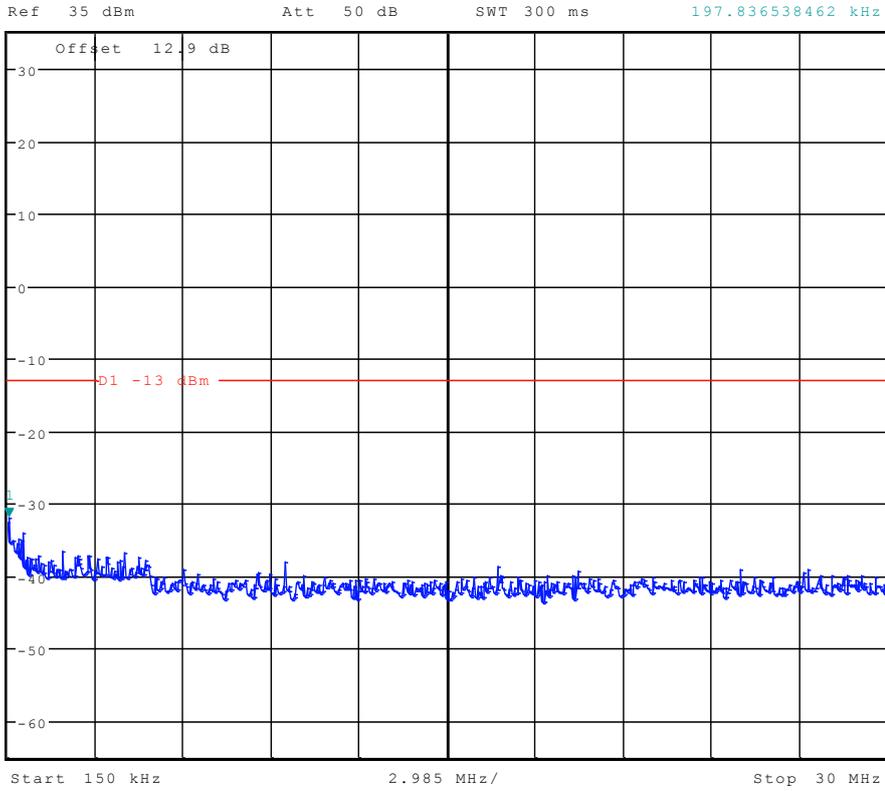
Ref 35 dBm      Att 50 dB      \*RBW 1 kHz      Marker 1 [T1]      \*VBW 10 kHz      -35.74 dBm  
SWT 145 ms      24.591346154 kHz



Date: 7.AUG.2012 09:32:23



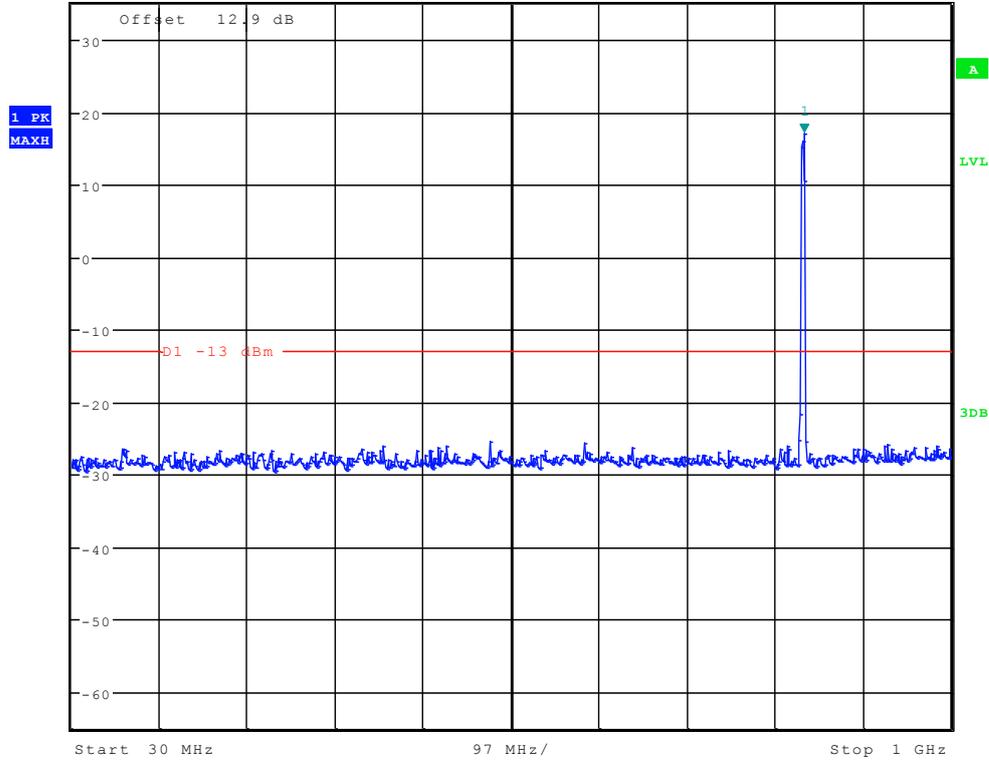
\*RBW 10 kHz      Marker 1 [T1 ]  
\*VBW 30 kHz      -31.87 dBm  
SWT 300 ms      197.836538462 kHz



Date: 7.AUG.2012 09:33:07



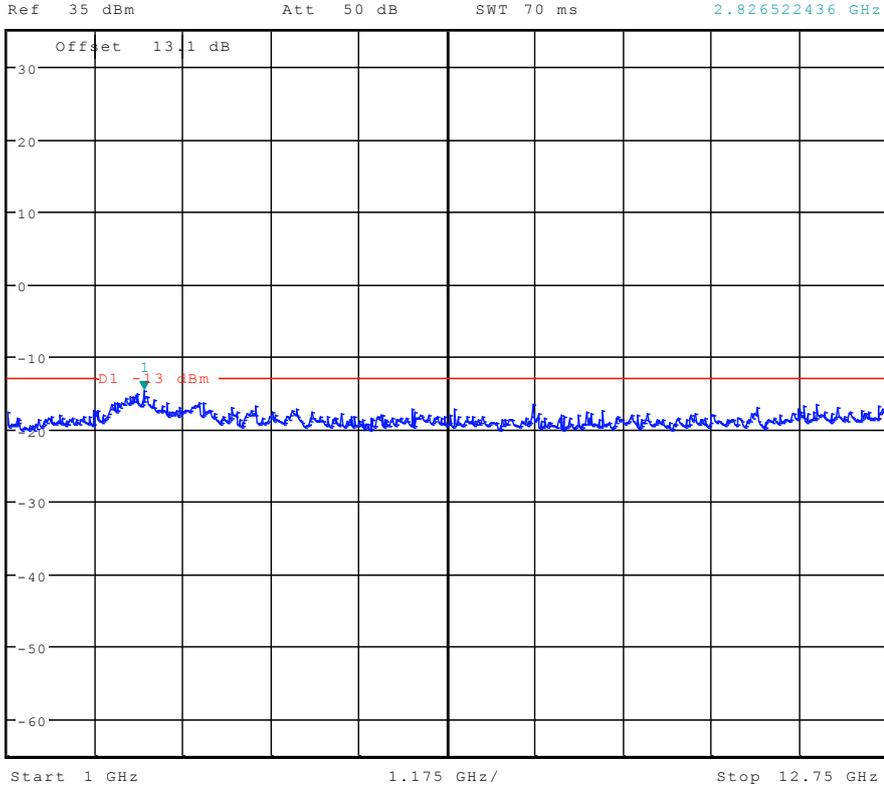
\*RBW 100 kHz      Marker 1 [T1 ]  
\*VBW 300 kHz      17.03 dBm  
Ref 35 dBm      Att 50 dB      SWT 100 ms      838.333333333 MHz



Date: 7.AUG.2012 09:34:10



\*RBW 1 MHz      Marker 1 [T1 ]  
\*VBW 3 MHz      -14.71 dBm  
SWT 70 ms      2.826522436 GHz



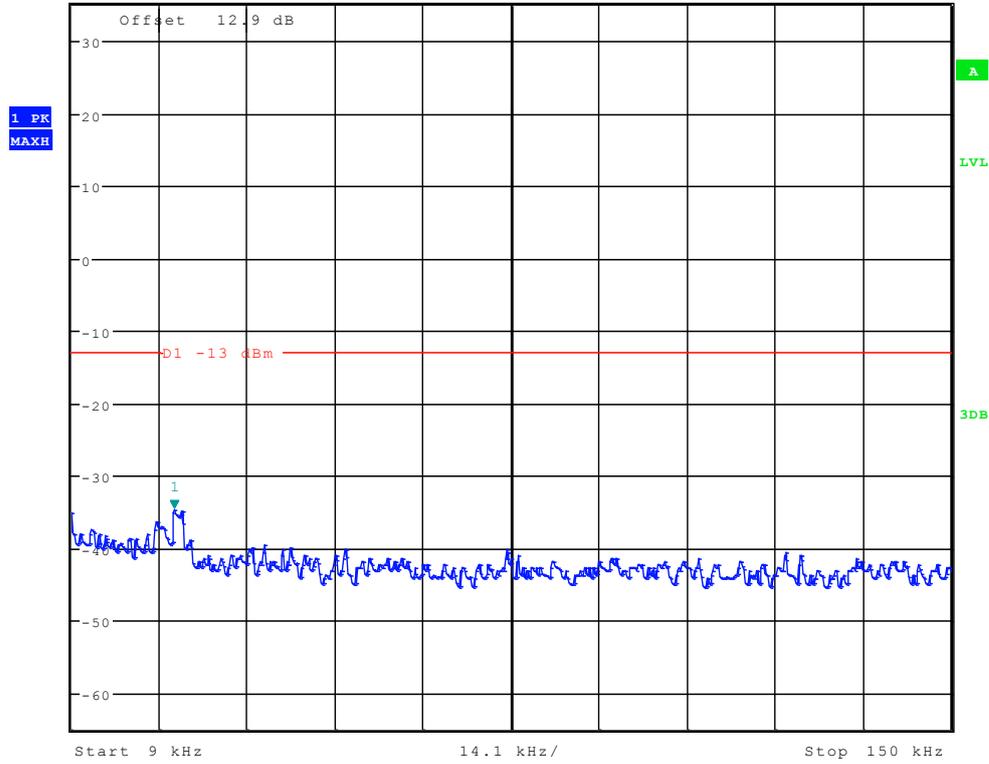
Date: 7.AUG.2012 09:34:54



# Channel 4233



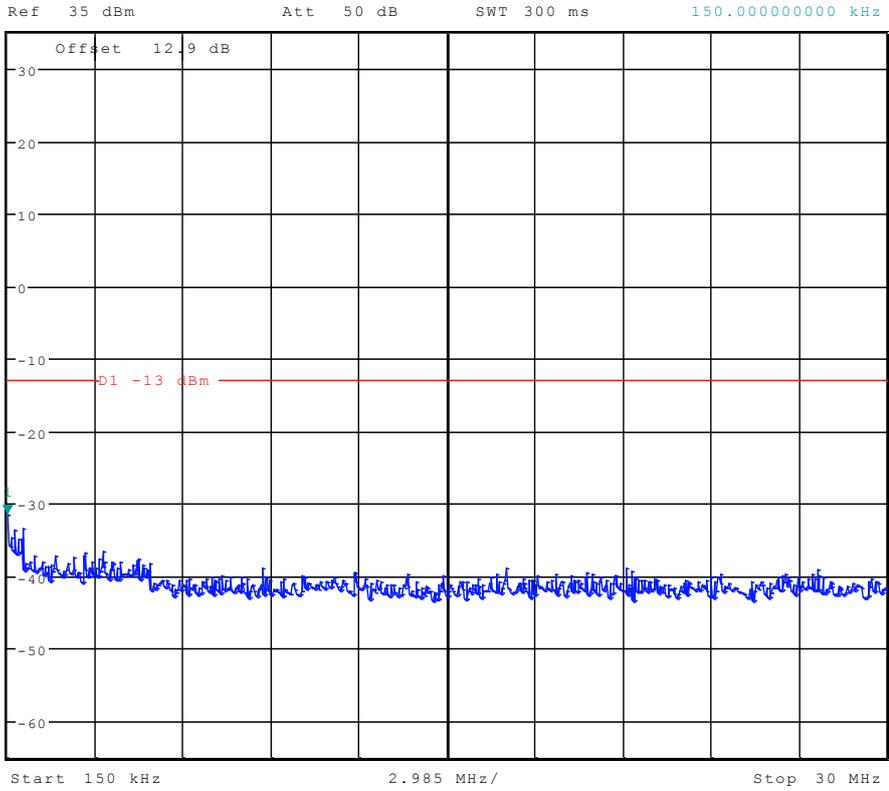
Ref 35 dBm      Att 50 dB      RBW 1 kHz      Marker 1 [T1]      -34.66 dBm  
\* VBW 10 kHz      SWT 145 ms      25.495192308 kHz



Date: 7.AUG.2012 09:32:37



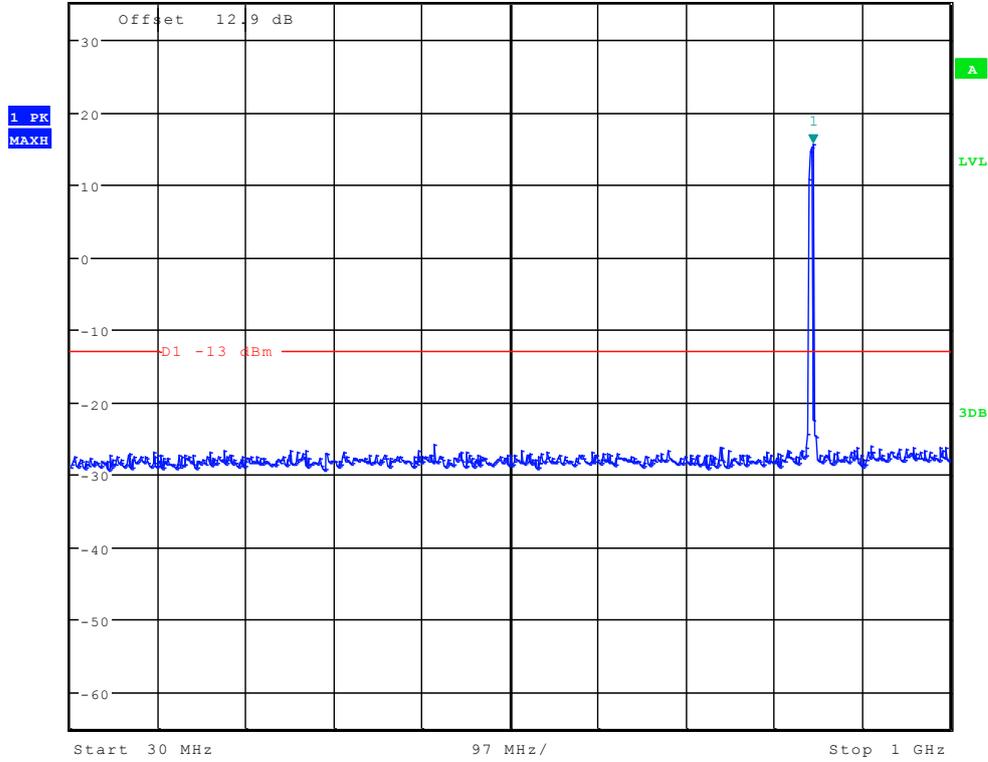
\*RBW 10 kHz      Marker 1 [T1 ]  
\*VBW 30 kHz      -31.59 dBm  
SWT 300 ms      150.00000000 kHz



Date: 7.AUG.2012 09:33:21



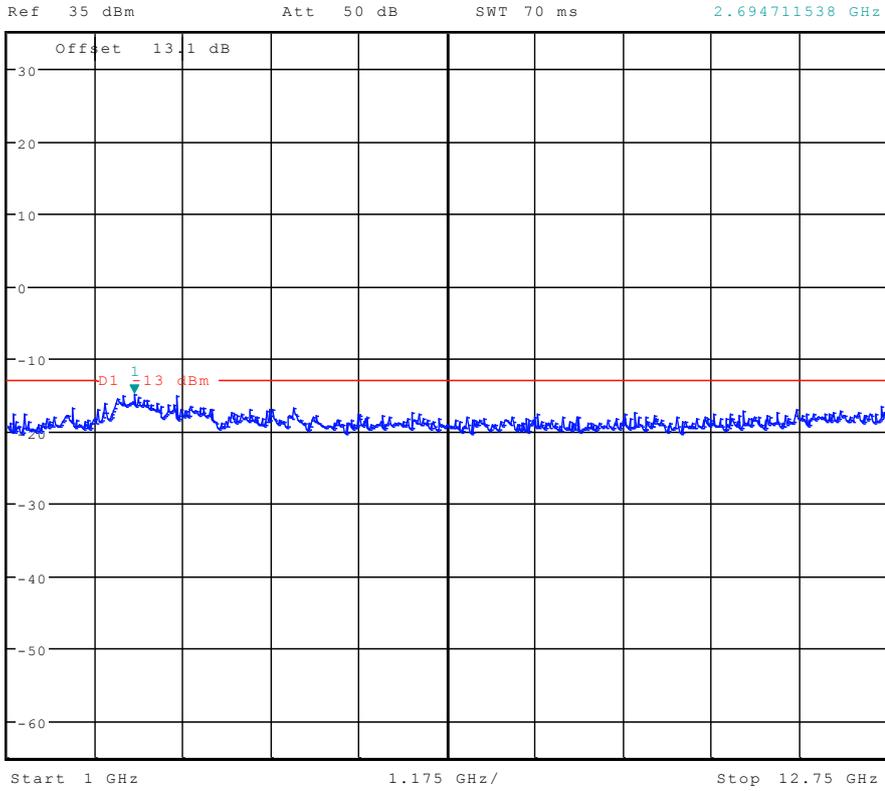
\* RBW 100 kHz      Marker 1 [T1 ]  
\* VBW 300 kHz      15.51 dBm  
Ref 35 dBm      Att 50 dB      SWT 100 ms      849.214743590 MHz



Date: 7.AUG.2012 09:34:24



\* RBW 1 MHz      Marker 1 [T1 ]  
\* VBW 3 MHz      -14.79 dBm  
SWT 70 ms      2.694711538 GHz



Date: 7.AUG.2012 09:35:08

-----The END-----

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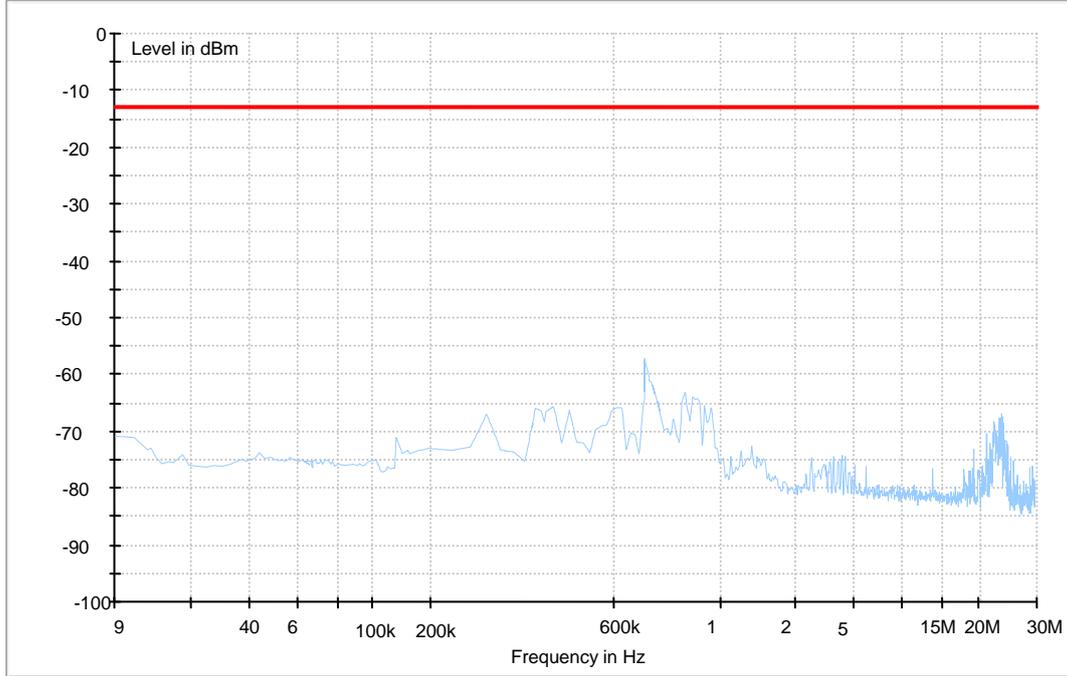
# Appendix F

## Radiated spurious emission According to FCC Part 2.1053 & Part 22.917

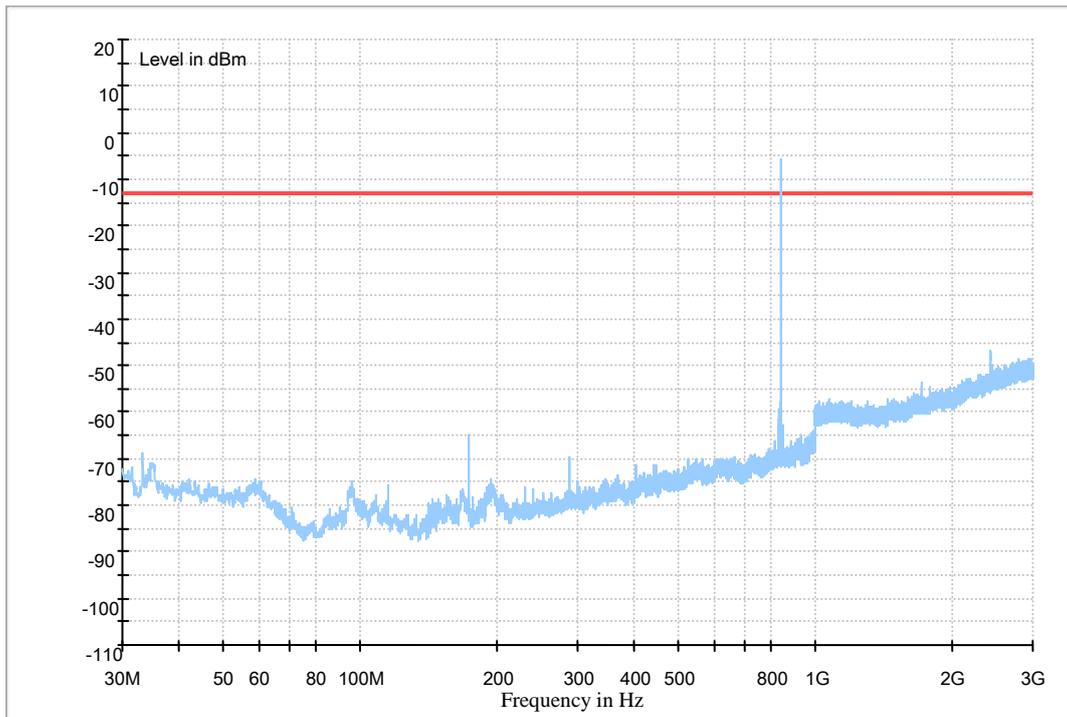
Note: 1. Simultaneous transmission was investigated and no new emissions were found.  
2. RBW  $\geq$  1MHz, VBW  $>$  3 x RBW.

## GSM 850

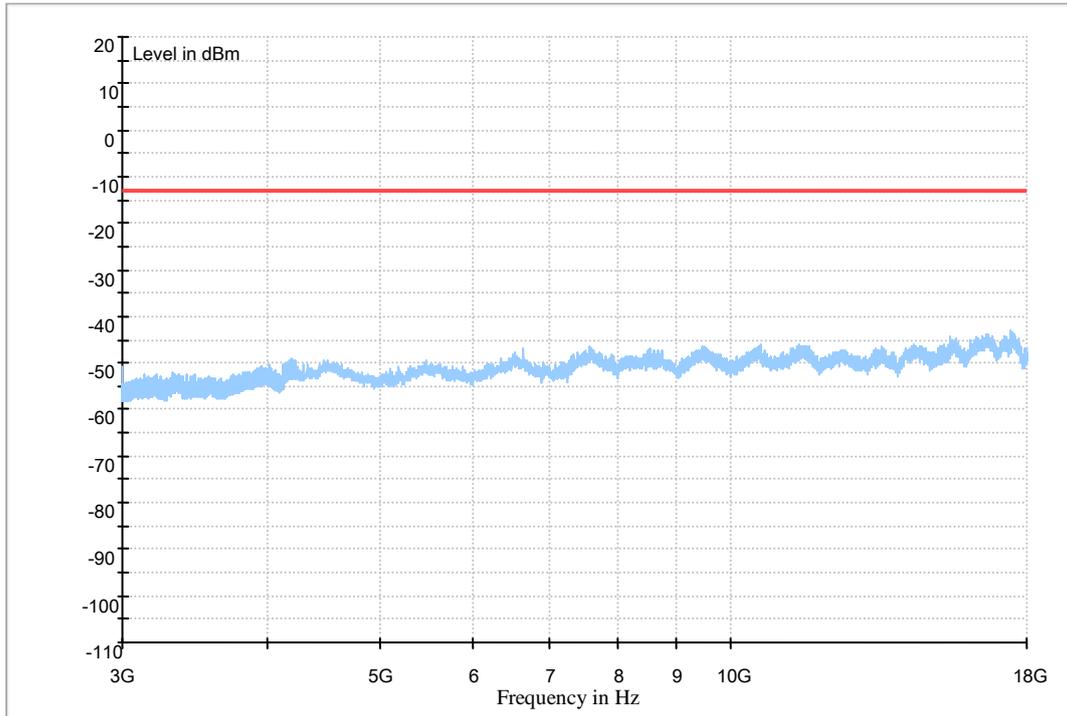
Traffic Mode (9kHz-30MHz)



Traffic Mode (30MHz-3GHz)

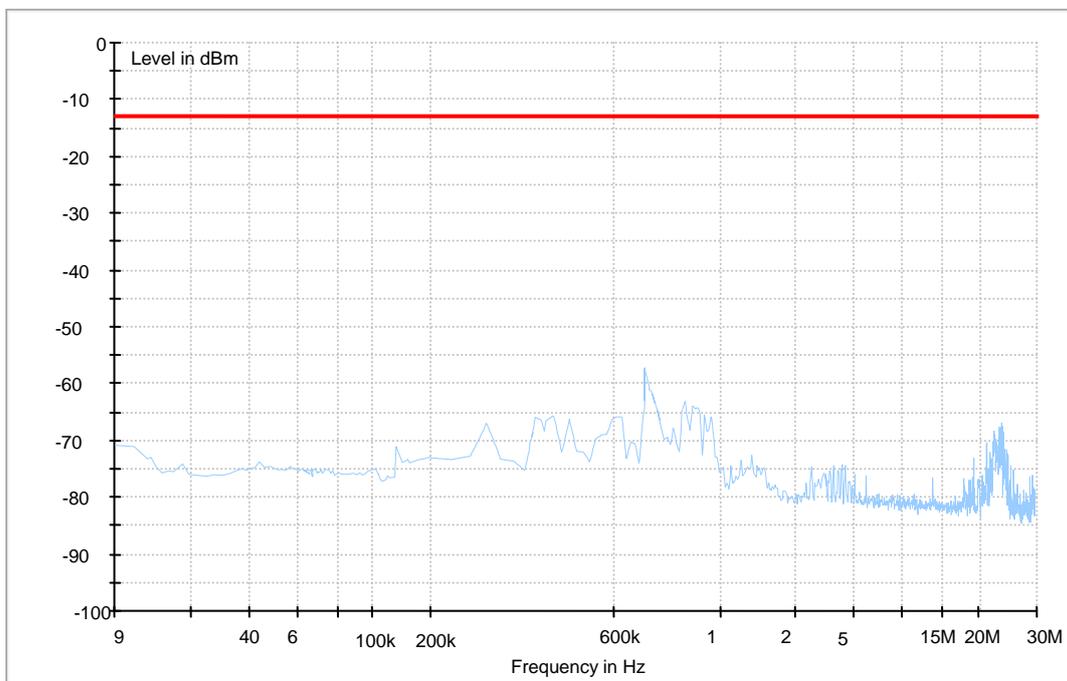


### Traffic Mode (3GHz-18GHz)

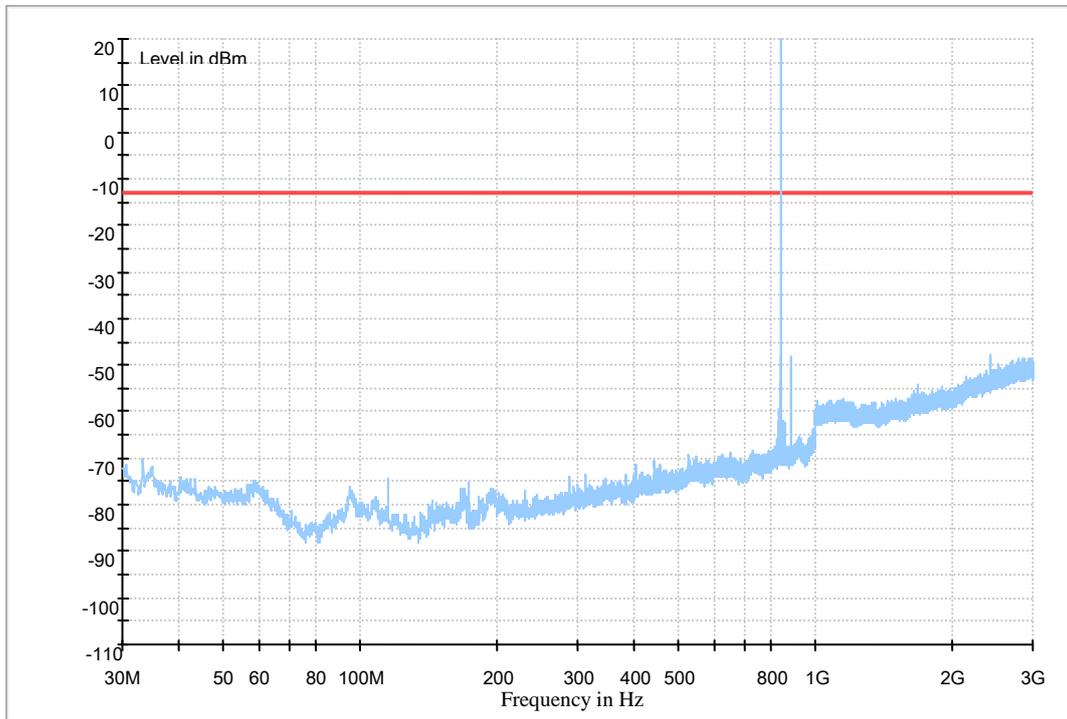


### GPRS 850

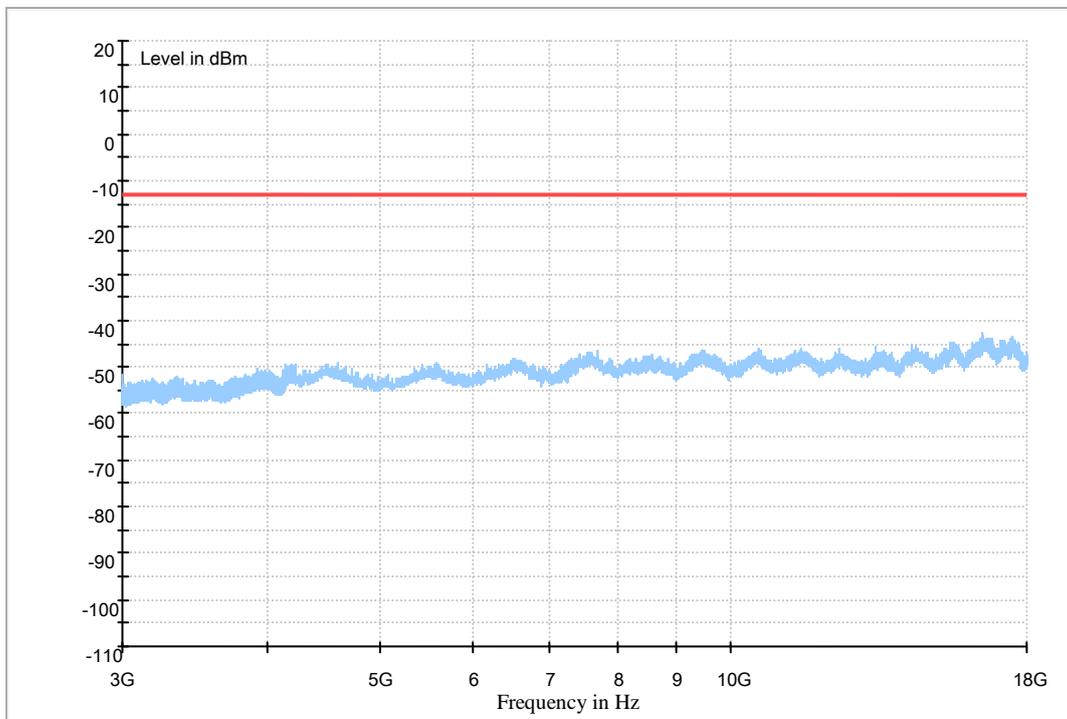
#### Traffic Mode (9kHz-30MHz)



Traffic Mode (30MHz-3GHz)

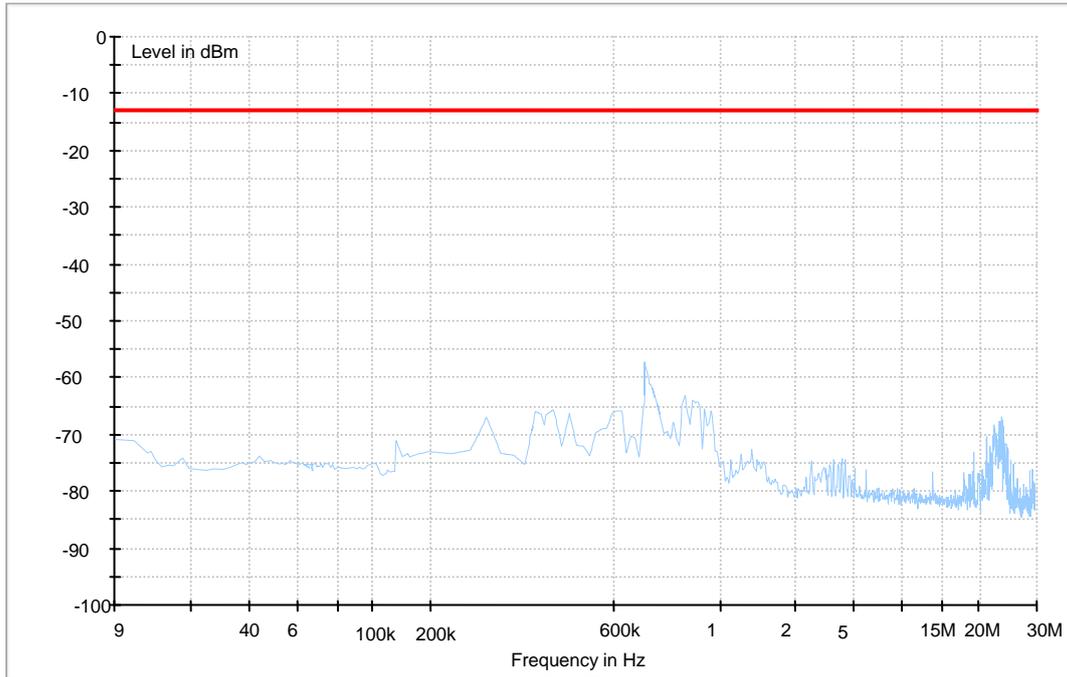


Traffic Mode (3GHz-18GHz)

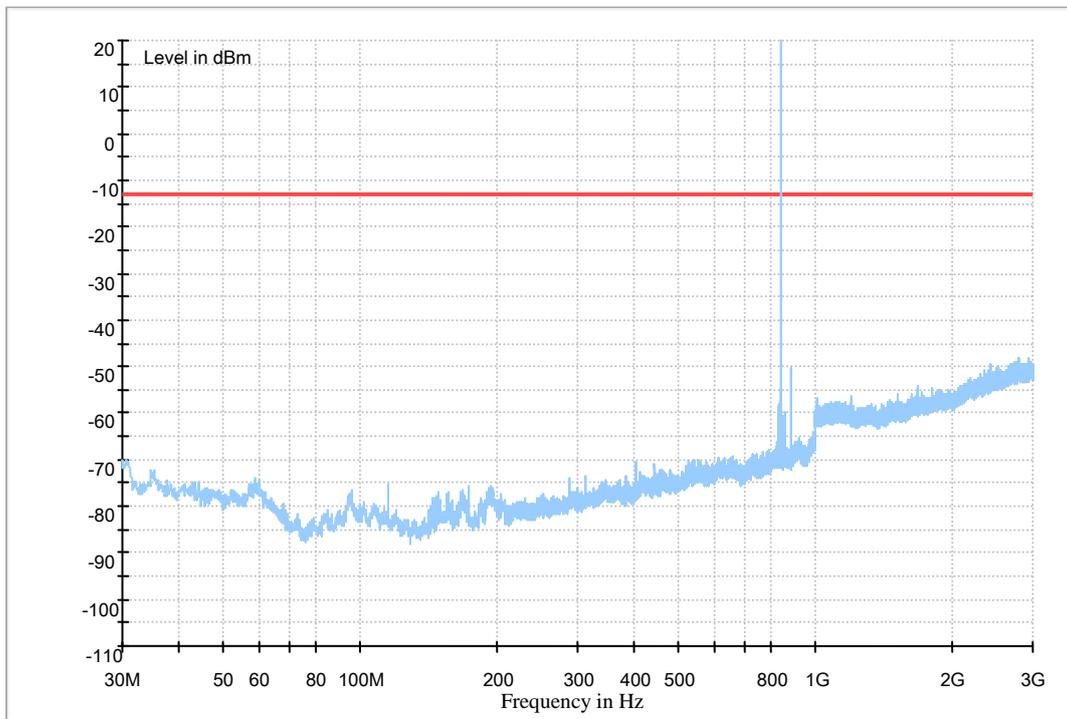


# EDGE 850

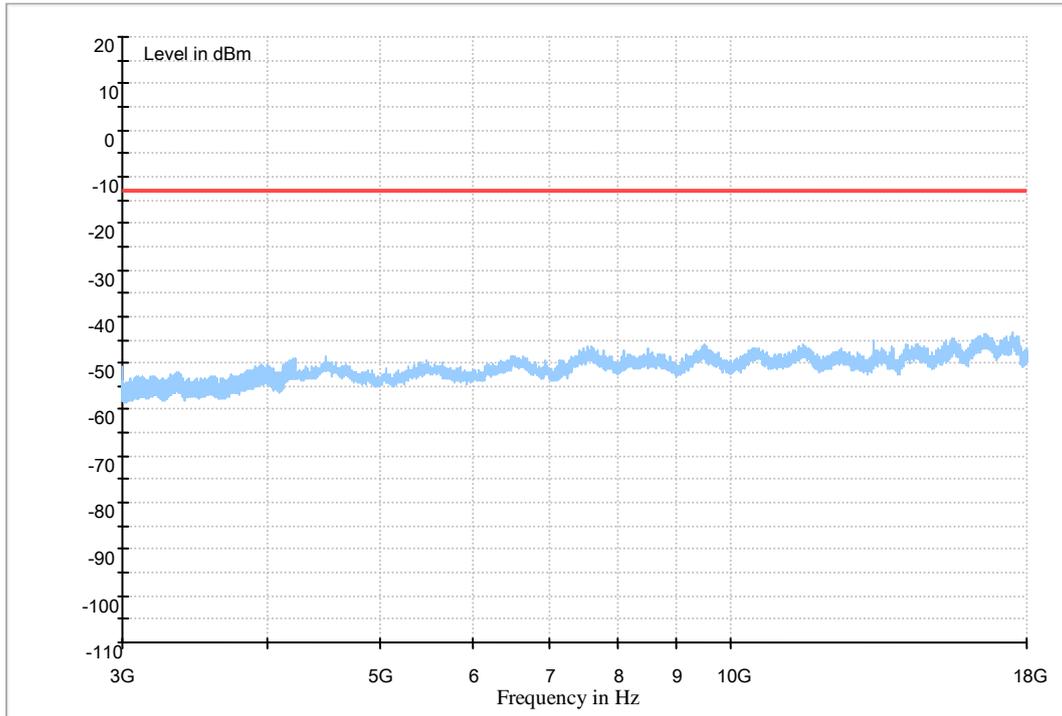
Traffic Mode (9kHz-30MHz)



Traffic Mode (30MHz-3GHz)

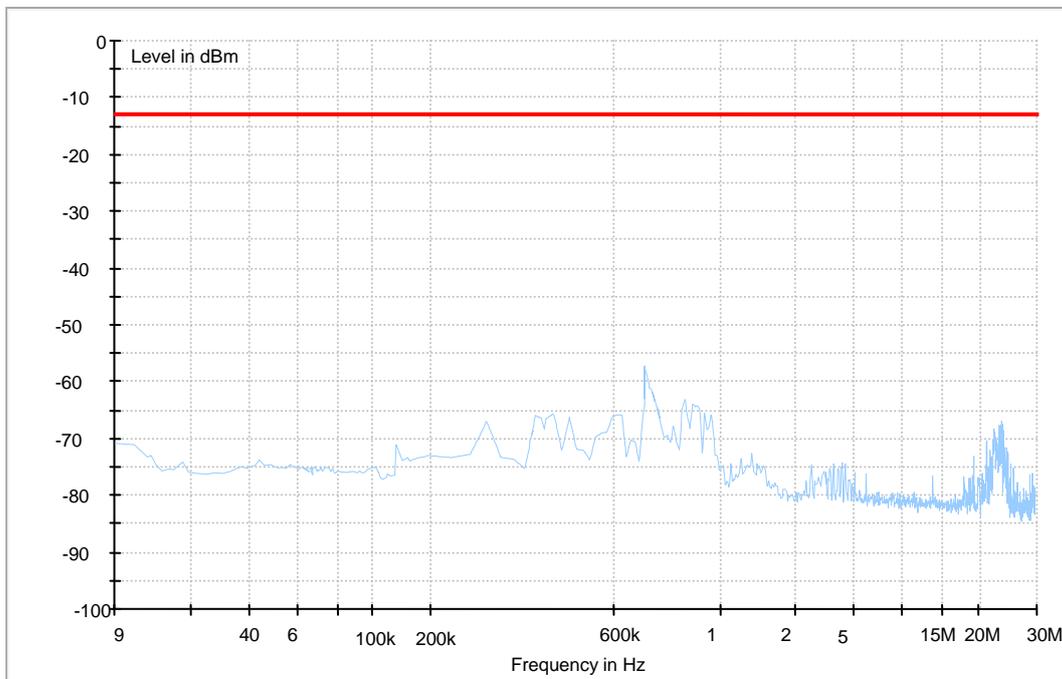


### Traffic Mode (3GHz-18GHz)

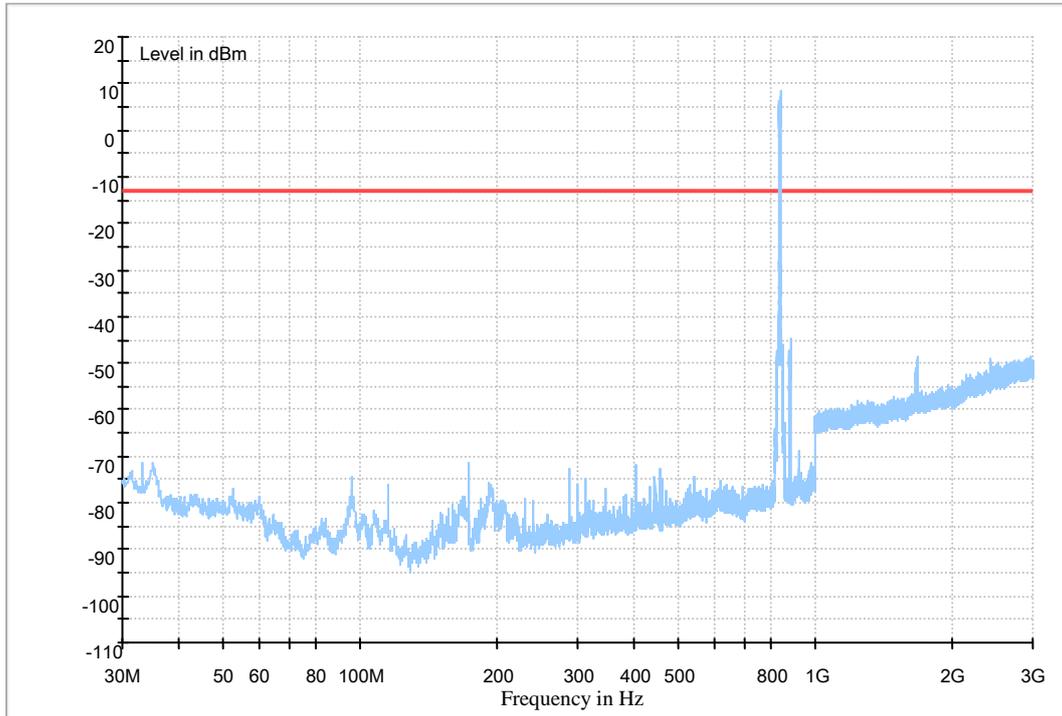


### WCDMA 850

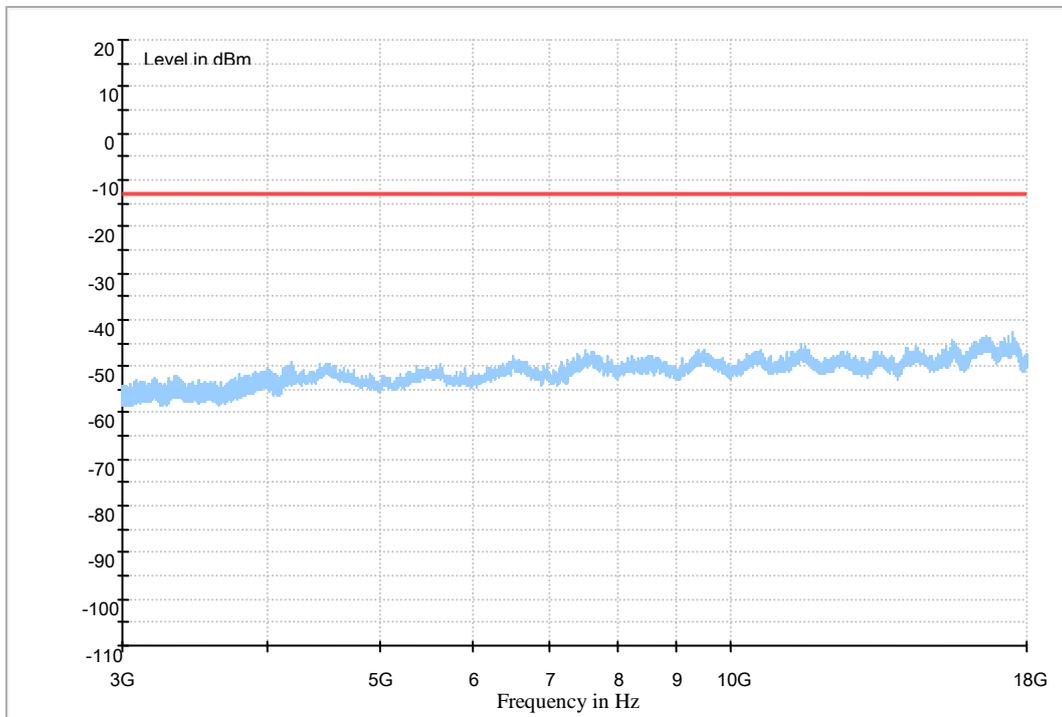
#### Traffic Mode (9kHz-30MHz)



Traffic Mode (30MHz-3GHz)

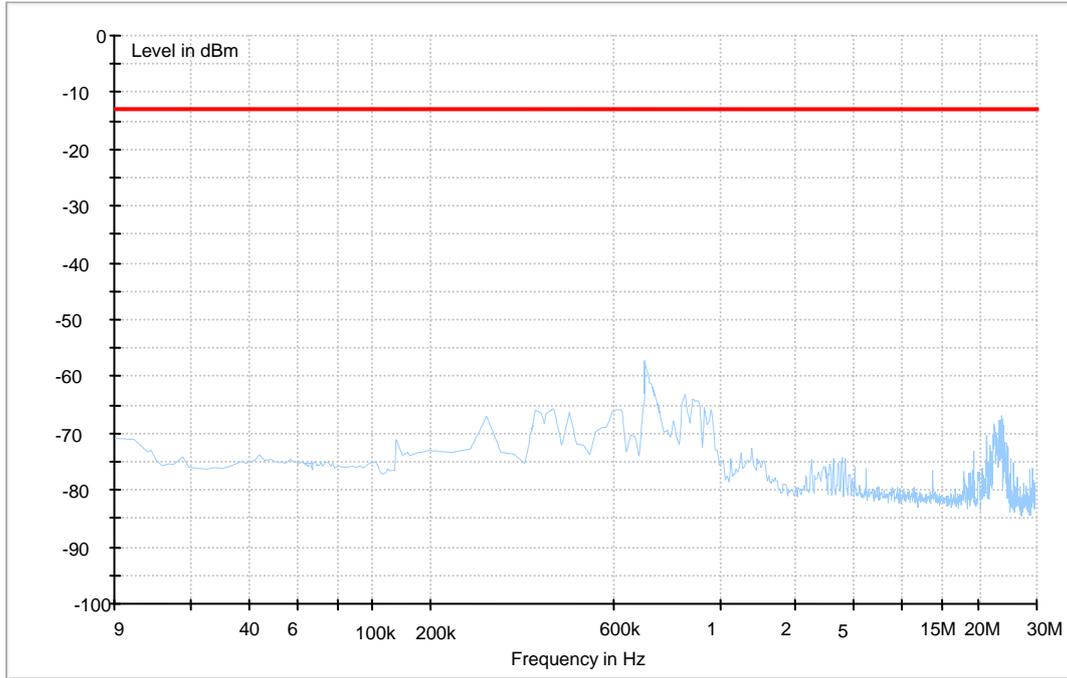


Traffic Mode (3GHz-18GHz)

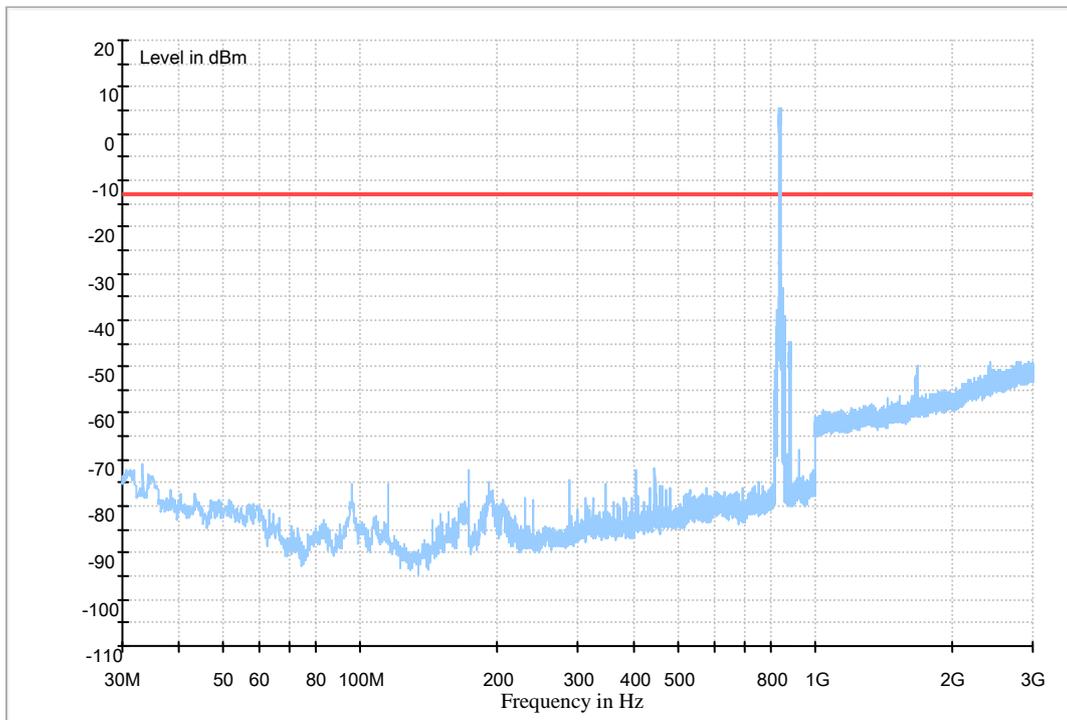


# HSDPA 850

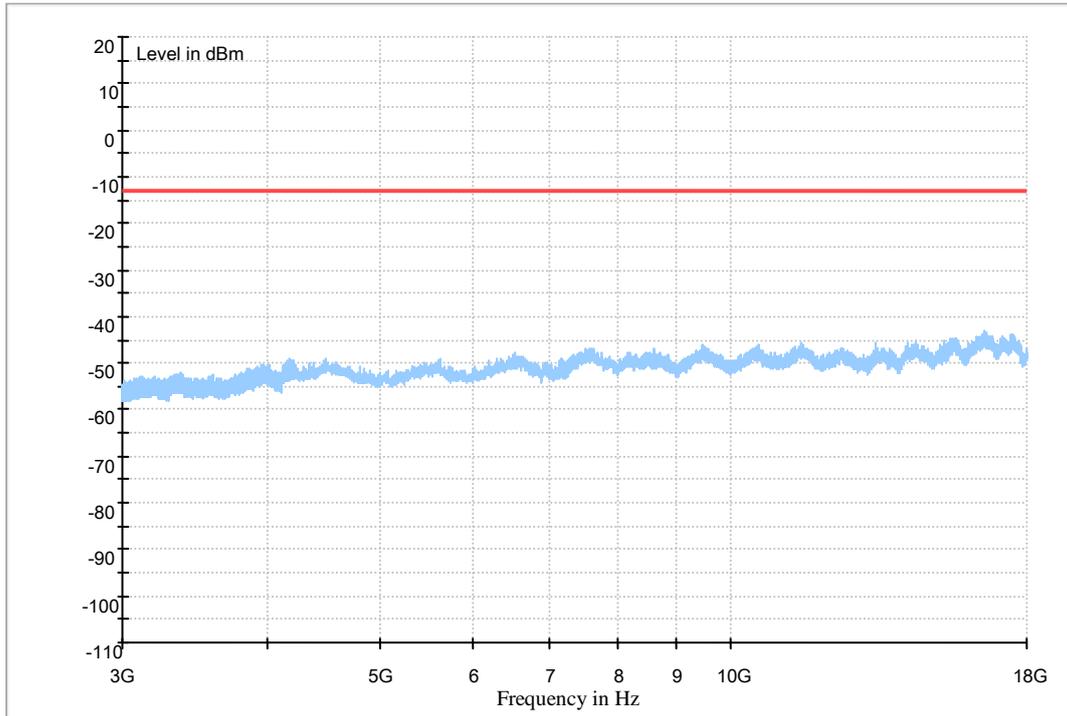
Traffic Mode (9kHz-30MHz)



Traffic Mode (30MHz-3GHz)

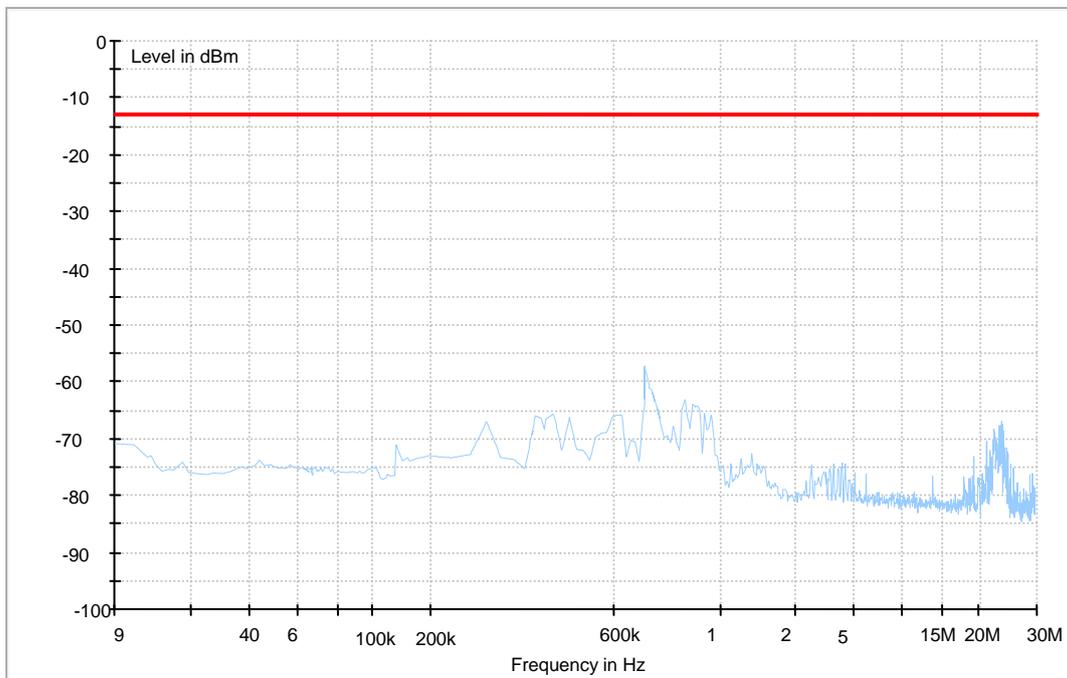


Traffic Mode (3GHz-18GHz)

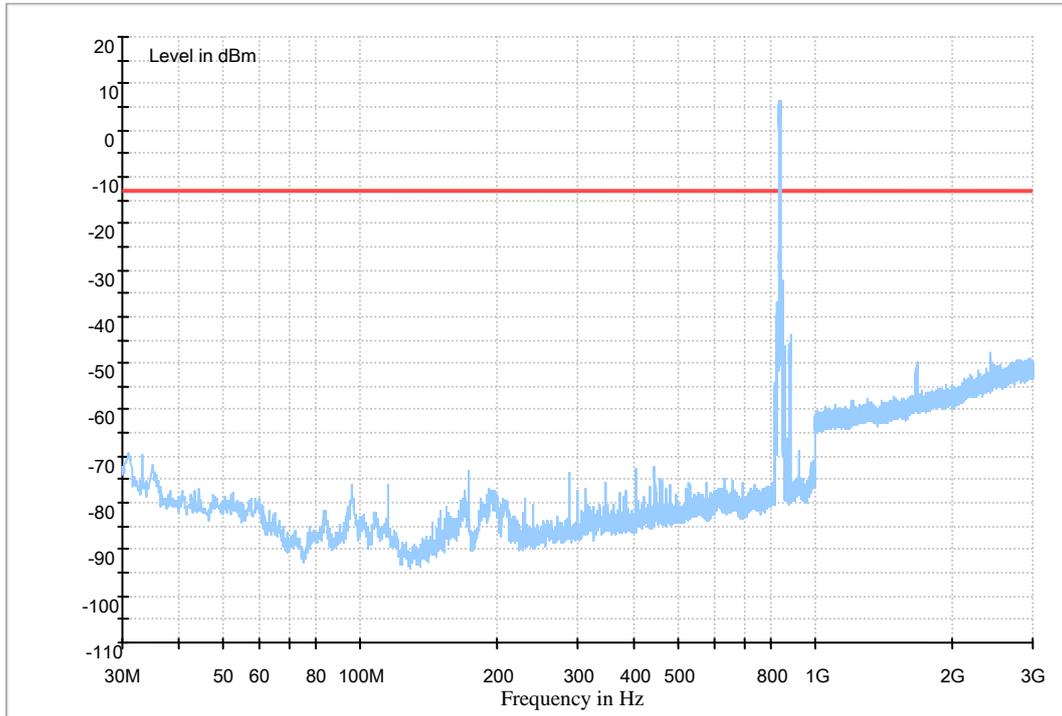


HSUPA 850

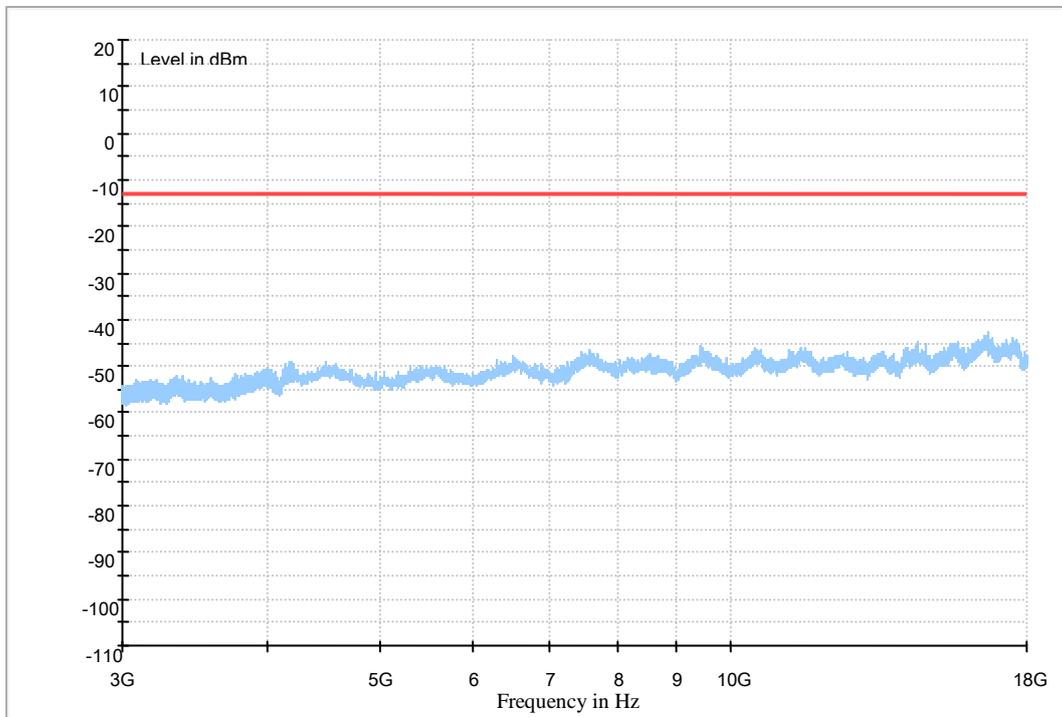
Traffic Mode (9kHz-30MHz)



Traffic Mode (30MHz-3GHz)



Traffic Mode (3GHz-18GHz)



-----The END-----



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# 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	VN	-30 °C	-23	-0.02748	---	±2.5	Pass
			-20 °C	26	0.03106	---	±2.5	Pass
			-10 °C	-11	-0.01314	---	±2.5	Pass
			0 °C	15	0.01792	---	±2.5	Pass
			10 °C	-18	-0.02151	---	±2.5	Pass
			20 °C	19	0.02270	---	±2.5	Pass
			30 °C	18	0.02151	---	±2.5	Pass
			40 °C	14	0.01673	---	±2.5	Pass
			50 °C	18	0.02151	---	±2.5	Pass
TM 2	M	VN	-30 °C	-12	-0.01434	---	±2.5	Pass
			-20 °C	20	0.02389	---	±2.5	Pass
			-10 °C	16	0.01912	---	±2.5	Pass
			0 °C	-21	-0.02509	---	±2.5	Pass
			10 °C	12	0.01434	---	±2.5	Pass
			20 °C	13	0.01553	---	±2.5	Pass
			30 °C	-11	-0.01314	---	±2.5	Pass
			40 °C	-24	-0.02867	---	±2.5	Pass
			50 °C	-8	-0.00956	---	±2.5	Pass
TM 3	M	VN	-30 °C	-18	-0.02151	---	±2.5	Pass
			-20 °C	-13	-0.01553	---	±2.5	Pass
			-10 °C	12	0.01434	---	±2.5	Pass
			0 °C	-19	-0.02270	---	±2.5	Pass
			10 °C	8	0.00956	---	±2.5	Pass
			20 °C	9	0.01075	---	±2.5	Pass
			30 °C	11	0.01314	---	±2.5	Pass
			40 °C	-16	-0.01912	---	±2.5	Pass
			50 °C	8	0.00956	---	±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	TN	VL	-15	-0.01792	---	±2.5	Pass
			VN	20	0.02389	---	±2.5	Pass
			VH	-21	-0.02509	---	±2.5	Pass
TM 2	M	TN	VL	-9	-0.01075	---	±2.5	Pass
			VN	-17	-0.02031	---	±2.5	Pass
			VH	-13	-0.01553	---	±2.5	Pass
TM 3	M	TN	VL	-10	-0.01195	---	±2.5	Pass
			VN	-21	-0.02509	---	±2.5	Pass
			VH	-15	-0.01792	---	±2.5	Pass

-----The END-----