



FCC RF Test Report

Product Name: LTE CPE

Model Number: B593u-501

Report No: SYBH(Z-RF)023062012-2001

FCC ID:QISB593U-501

IC ID:6369A-B593U501

Reliability Laboratory of Huawei Technologies Co., Ltd.

Huawei Base, Bantian, Longgang District, Shenzhen 518129, P.R. China
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Notice

1. The laboratory has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS), and accreditation number: L0310.
2. The laboratory has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements. The site recognition number is 97456.
3. The laboratory has been listed by industry Canada to perform electromagnetic emission measurement. The site recognition number is 6369A-2.
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Applicant:	Huawei Technologies Co., Ltd.
Address:	Huawei Base, Bantian, Longgang District, Shenzhen 518129, P.R. China
Date of Receipt Test Item:	Jun., 21, 2012
Start Date of Test:	July., 03, 2012
End Date of Test:	July., 09, 2012
Test Result:	Pass

Approved By Senior Engineer July, 12, 2012 Dai Linjun
 Date Name Signature

Reviewed By July, 12, 2012 Cousy Xu
 Date Name Signature

Operated By July, 12, 2012 Huang Qiuliang
 Date Name Signature



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1 General Information

1.1 Applied Standard	
Applied Rules:	47 CFR FCC Part 2:2011, Subpart J 47 CFR FCC Part 22:2011, Subpart H ANSI/TIA 603C:2004 RSS-Gen Issue 3 RSS-132 Issue 2
1.2 Test Location	
Test Location 1:	Reliability Laboratory of Huawei Technologies Co., Ltd.
Address:	Huawei Base, Bantian, Longgang District, Shenzhen 518129, P.R. China
1.3 Test Environmental Condition	
Ambient Temperature:	20 – 25 °C
Ambient Relative Humidity:	45 – 55 %
Atmospheric Pressure:	101 kPa

2 Summary

Table 1 Summary of results

Test Case	FCC Part No.	Requirements	Result
Cellular Band			
Transmitter Output Power	2.1046 & 22.913	ERP not exceed 7 W	Pass
Modulation Characteristics	2.1047	Digital modulation	Pass
Occupied Bandwidth	2.1049	(Not specified)	Pass
Band Edges Compliance	2.1051 & 917	Below -13 dBm/1%*EBW, in 1 MHz range	Pass
Spurious Emission at Antenna Terminals	2.1051 & 2.917	Below -13 dBm/100 kHz, 30 MHz to 10 th harmonics	Pass
Field Strength of Spurious Radiation	2.1053 & 22.917	Below -13 dBm/100 kHz	Pass
Frequency Stability	2.1055 & 22.355	Maintained within the tolerances of ± 1.5 ppm	Pass

Table 2 Summary of results

Test Case	IC Standard No.	Requirements	Result
Cellular Band			
Transmitter Output Power	RSS-Gen, §4.8; RSS-132, §4.4	EIRP not exceed 11.5 W	Pass
Modulation Characteristics	RSS-132, §4.2	Digital modulation	Pass
Occupied Bandwidth	RSS-Gen, §4.6	(Not specified)	Pass
Band Edges Compliance	RSS-Gen, §4.9; RSS-132, §4.5	Below -13 dBm/1%*EBW, in 1 MHz range	Pass
Spurious Emission at Antenna Terminals	RSS-Gen, §4.9; RSS-132, §4.5	Below -13 dBm/100 kHz (EBW \leq 4 MHz), 30 MHz to 5 th harmonics Below -13 dBm/1 MHz (EBW > 4 MHz), 30 MHz to 5 th harmonics	Pass
Field Strength of Spurious Radiation	RSS-Gen, §4.9; RSS-132, §4.5	Below -13 dBm/100 kHz (EBW \leq 4 MHz) Below -13 dBm/1 MHz (EBW > 4 MHz)	Pass
Frequency Stability	RSS-Gen, §4.7; RSS-132, §4.3	Maintained within the tolerances of ± 1.5 ppm	Pass
Receiver Spurious Emissions (Conducted)	RSS-Gen, §4.10; RSS-Gen, §6; RSS-132, §4.6	Below 2 nW/4 kHz (-57 dBm/4 kHz), for 30 MHz - 1000 MHz Below 5 nW/MHz (-53 dBm/MHz), for above 1 GHz	Pass

3 Product Description

3.1 Product Information

3.1.1 General Description

B593u-501 LTE/WCDMA/GSM three mode 10 bands CPE is subscriber equipment in the LTE/UMTS/GSM system and support wifi 802.11b/g/n. B593u-501 implement such functions as RF signal receiving/transmitting, LTE/WCDMA/GSM protocol processing, data service etc. Externally it provides USB interface (to connect to the printer etc.), USIM card interface , RJ45 Ethernet interface. B593u-501 has two internal antennas and two External Antenna, can automatic switch.

3.1.2 Board Information

Table 3 Board Information

LTE CPE		
B593u-501		
Board and Module		
Equipment Designation / Description	Hardware Version	Software Version
MAINBOARD	B593RW2A CL2EM930U501M	V100R003

3.1.3 Adapter Technical Data

AC/DCAdapter Model	HW-120200U1W
Manufacturer	FUHUA
Input Voltage	90Vac~270Vac 50/60Hz 0.8A
Output Voltage	+12V 2.0A
Rated Power	24W(max)

AC/DCAdapter Model	HW-120200U1W
Manufacturer	HuntKey
Input Voltage	90Vac~270Vac 50/60Hz 0.8A
Output Voltage	+12V 2.0A
Rated Power	24W(max)



4 Test Description

4.1 Supported Frequency Range

Characteristics	Description
Downlink	869 to 894 MHz
Uplink	824 to 849 MHz

4.2 Transmitter / Receiver Characteristics

Characteristics	Description
System Type	GSM UMTS
TX Output Power (per Antenna Port)	GSM system: 33dBm UMTS system: 24dBm
Channel Spacing(s) / Bandwidth(s)	GSM system: 200 kHz UMTS system: 5 MHz
Designation of Emissions	GSM system: 246KGXW (GMSK modulation), 246KG7W (8PSK modulation) UMTS system: 4M17F7W

4.3 Antenna Gain

Antenna Gain(dBi)	2
Antenna Gain(dBd)	-0.15

4.4 Power Supply

Specification	Description
Power Supply Type	Directly Connected to DC /AC Power Supply
Input to EUT (DC power)	DC Voltage Nominal: -12 V
Input to EUT (AC power)	AC Voltage Nominal: ~ 230 V (50/60 Hz) AC Voltage Range: ~ 90 V to 270 V

5 General Test Conditions / Configurations

5.1 RF Channels under Test

Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
TM1/TM2	TX	Channel 128	Channel 192	Channel 251
		824.2MHz	837.0MHz	848.8MHz
	RX	Channel 128	Channel 192	Channel 251
		869.2MHz	882.0MHz	893.8MHz
TM3/TM4/TM5	TX	Channel 4132	Channel 4182	Channel 4233
		826.4MHz	836.4MHz	846.6MHz
	RX	Channel 4357	Channel 4407	Channel 4458
		871.4MHz	881.4MHz	891.6MHz

5.2 Test Modes

Test Mode	Test Modes Description
TM1	GSM/GPRS, GMSK modulation
TM2	EDGE, 8PSK modulation
TM3	WCDMA, QPSK modulation
TM4	HSDPA, QPSK modulation
TM5	HSUPA, QPSK modulation

5.3 Test Environment

Environment Parameter	Selected Values During Tests	
Relative Humidity	Ambient	
Temperature	TN	Ambient
Voltage	VL	9.6V
	VN	12V
	VH	14.4V

NOTE: VL= lower extreme test voltage

VN= nominal voltage

VH= upper extreme test voltage

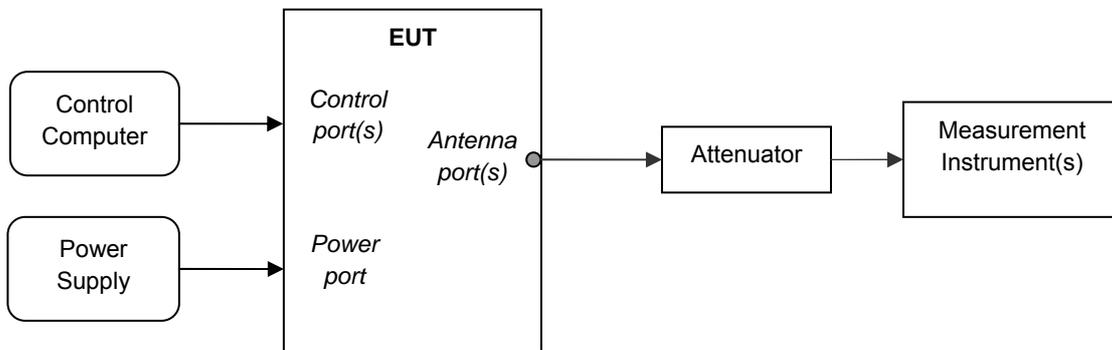
TN= normal temperature

5.4 Test Setup

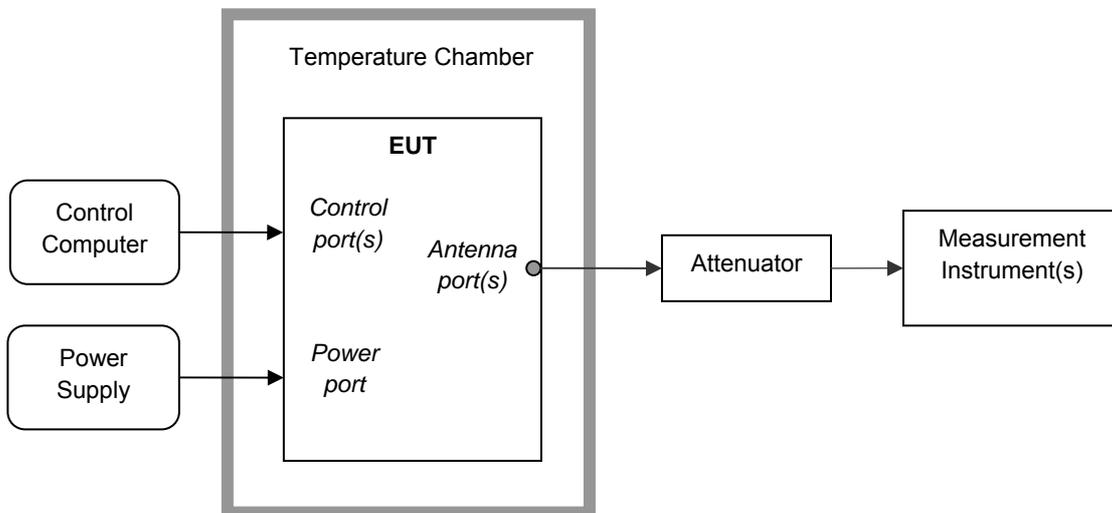
5.4.1 General Test Setup Configurations

Configuration	Description
Test Antenna Ports	Until otherwise declared, all TX tests are ONLY performed at the main Transmitter antenna port (e.g. TRXA, TXA and so on) of the EUT, and all RX tests are ONLY performed at the main Receiver antenna port (e.g. TRXA, RXA and so on) of the EUT.
Multiple RF Sources	Other than the tested RF source of the EUT, other RF source(s) are disabled or shutdown during measurements.

5.4.2 Test Setup 1



5.4.3 Test Setup 2



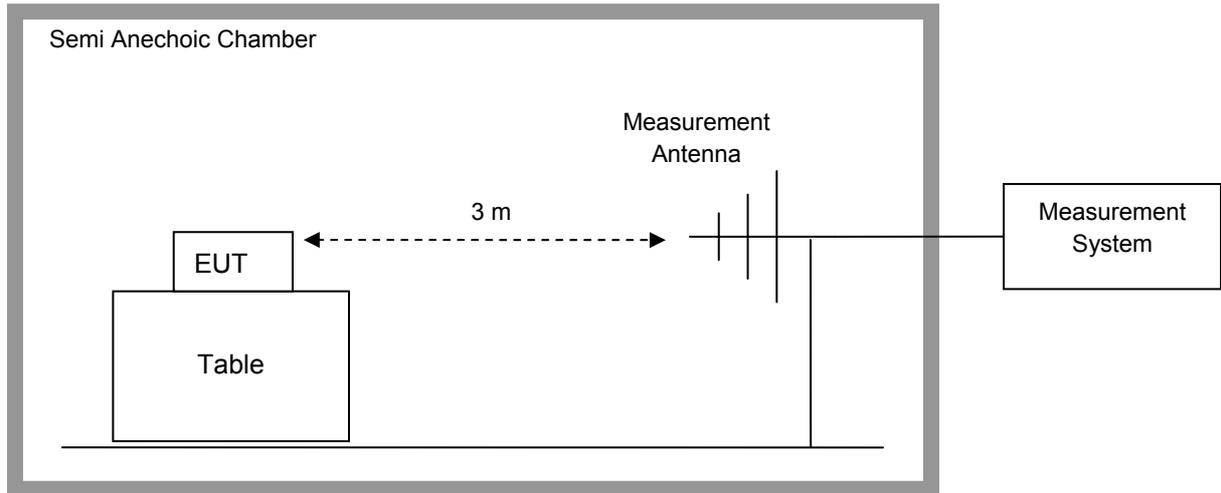
5.4.4 Test Setup 3

NOTE1: Effective radiated power (ERP) or Effective Isotropic radiated power (EIRP) refers to the EUT radiation power output, assuming all emissions are radiated from half-wave dipole antennas or horn antennas.

NOTE2: The EUT was set on insulator 80cm above the Ground Plane. The setup and test methods were according to ANSI-TIA-603C 2004. The measurements were carried through with a Rohde and Schwarz Test Receiver and control software.

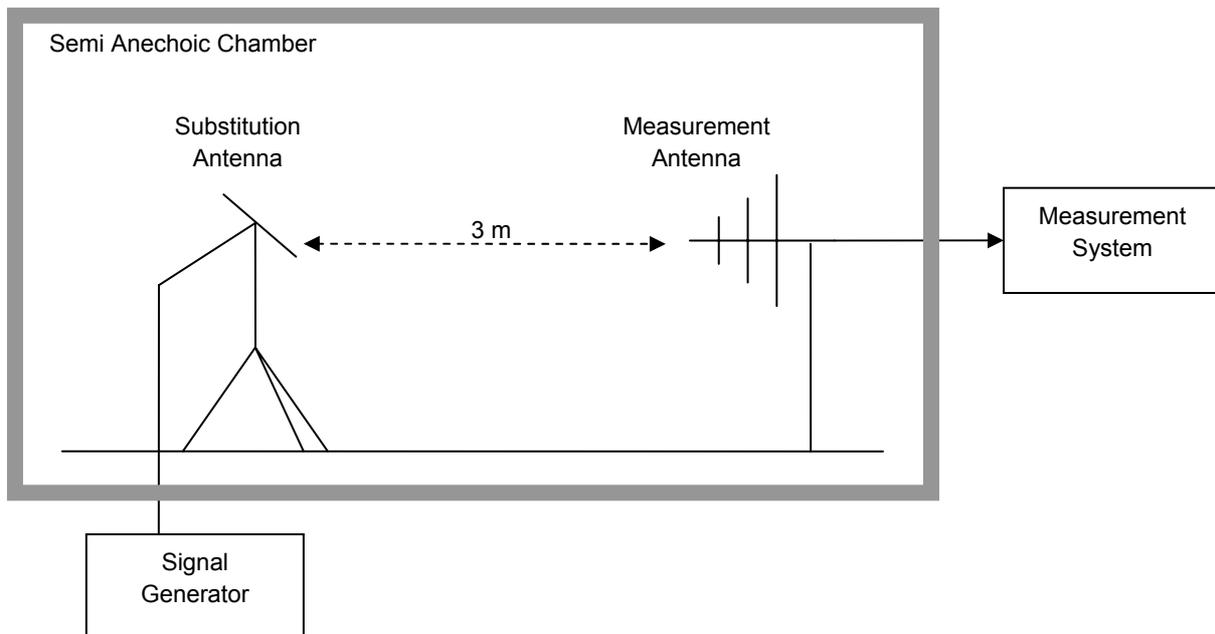
Step 1: Pre-test to find the Maximum ERP or EIRP

1. Connect the test system according to the following figure. EUT is running for 30 minutes before test, and measurement instruments are warming-up for 30 minutes.
2. Set up communication link between Universal radio communication tester and EUT, set EUT working frequency, and control EUT to transmit at maximum power.
3. Set the center frequency of the signal analyzer or receiver to the EUT's operating frequency, the RBW is equal to the emission bandwidth of the signal. Set RMS detector for the test, and the span is equal to 2 times of emission bandwidth, the other settings should remain automatic. Normally, the height range of antenna was 1m to 4m, the azimuth range of turntable was 0° to 360°. The receiver antenna has two polarizations V and H. A portable or small unlicensed wireless device shall be placed on a non-metallic test fixture or other non-metallic support during testing. The supporting fixture shall permit orientation of the EUT in each of three orthogonal (x, y, z) axis positions such that emissions from the EUT are maximized. Measure the EUT maximum RF power and record the result.
4. Changing EUT working frequency and measuring the RF power at channel T, M, B respectively.
Complete the test data.



Step 2: Substitution method to verify the maximum ERP or EIRP

1. Measurement setup is according to the following figure. EUT was substituted by antenna, and the polarization is identical with the test antenna; the signal generator was connected to the substitution antenna.
2. The radiated output power, measured by signal analyzer set, is the same as recorded in above item 5). Then this power level is matched by a signal from a calibrated signal generator which is substituted for EUT. The power supplied by the generator is then equal to the ERP or EIRP after corrected by the antenna gain and cable loss.



5.5 Test Conditions

Test Case	Test Conditions	
Transmitter Output Power	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Setup 1 & Test Setup 3
	RBW	> emission bandwidth
	VBW	> 3 x RBW.
	Detector	RMS
	RF Channels (TX)	L, M, H
	Test Mode	TM1/TM2/TM3/TM4/TM5
Modulation Characteristics	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Setup 1
	RF Channels (TX)	M
	Test Mode	TM1/TM2/TM3
Occupied Bandwidth	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Setup 1
	Detector	PK
	RF Channels (TX)	L, M, H
	Test Mode	TM1/TM2/TM3
Band Edges Compliance	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Setup 1
	Detector	RMS
	RF Channels (TX)	L, H
	Test Mode	TM1/TM2/TM3
Spurious Emission at Antenna Terminals	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Setup 1
	Detector	PK
	RF Channels (TX)	L, M, H
	Test Mode	TM1/TM2/TM3
Field Strength of Spurious Radiation	Test Configuration	Ambient Temperature & Rated Voltage
	Test Setup	Test Setup 3
	Detector	PK
	RF Channels (TX)	M
	Test Mode	TM1/TM2/TM3/TM4/TM5
Frequency Stability	Test Configuration	(1) -30 °C to +50 °C with step 10 °C at Rated Voltage; (2) 85%, 100% and 115% of Rated Voltage at Ambient



Test Case	Test Conditions	
		Temperature.
	Test Setup	Test Setup 2
	RF Channels (TX)	M
	Test Mode	TM1/TM2/TM3

6 Main Test Instruments

Table 4 Main Test Equipments

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until
Power supply	KEITHLEY	2303	1288003	Sept., 27, 2012
Universal Radio Communication Tester	R&S	CMU200	105822	Oct., 24, 2012
Wireless Communication Test set	Agilent	N4010A	MY49081592	Dec., 14, 2012
Universal Radio Communication Tester	Agilent	E5515C	MY50260239	Aug., 31, 2012
Spectrum Analyzer	Agilent	E4440A	MY49420179	Apr., 20, 2013
Signal Analyzer	R&S	FSQ31	200021	Sept., 27, 2012
Temperature Chamber	WEISS	WKL64	24600294	Jan., 03, 2013
Signal generator	Agilent	E8257D	MY49281095	Jul., 09, 2013
Vector Signal Generator	R&S	SMU200A	104162	Sept., 07, 2012
Test receiver	R&S	ESU26	100150	May., 24, 2013
Tunable Dipole	Schwarzbeck	D69250-UHAP/D69250-VHAP	919/1009	Dec., 13, 2012
Tunable Dipole	Schwarzbeck	D69250-UHAP/D69250-VHAP	979/917	Dec., 13, 2012
Horn Antenna	R & S	HF906	100683	May., 16, 2013
Horn Antenna	R & S	HF906	100684	May., 16, 2013
Broadband Antenna	Schwarzbeck	VULB 9163	9163-357	Sept., 15, 2012
Broadband Antenna	Schwarzbeck	VULB 9163	9163-356	Sept., 15, 2012

Note: All the equipments are calibrated once a year. When it's almost due, we will arrange calibration again before the calibration deadline.



7 Test Results

No.	Test Item	Test Result
1	Transmitter Output Power	Appendix A
2	Modulation Characteristics	Appendix B
3	Occupied Bandwidth	Appendix C
4	Band Edges Compliance	Appendix D
5	Spurious Emission at Antenna Terminals	Appendix E
6	Field Strength of Spurious Radiation	Appendix F
7	Frequency Stability	Appendix G
8	Receiver Spurious Emissions	Appendix H
9	Photos of Test Setup	Appendix I

NOTE: There is no test data in Appendix H, only Photos of Test Setup for Field Strength of Spurious Radiation.

8 Measurement Uncertainty

For a 95% confidence level (k=2), the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

Test Item		Extended Uncertainty
Transmitter Output Power	Power (dBm)	U =0.39 dB
Occupied Bandwidth	Magnitude (%)	U=0.2%
Band Edge Compliance	Disturbance Power (dBm)	U=2.0 dB
Conducted Spurious Emissions	Disturbance Power (dBm)	U=2.0 dB
Field Strength of Spurious Radiation	ERP (dBm)	U=4.6 dB (30 MHz – 1GHz) U=3.0 dB (above 1 GHz)
Frequency Stability	Frequency Accuracy (ppm)	U=0.21 ppm

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



FCC Test Report of B593u-501
FCC ID: QISB593U-501
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Appendix A

Transmitter Output Power

According to FCC Part 2.1046 & Part22.913 & RSS-132



Conducted Power of Transmitter

TEST CONDITIONS		RF Output Power (Conducted)					
		Channel128(L) 824.2MHz		Channel192(M) 837.0MHz		Channel251(H) 848.8MHz	
		dBm		dBm		dBm	
T_{nom} / V_{nom}		Measured	Limit	Measured	Limit	Measured	Limit
TM1		31.54	38.5	31.55	38.5	31.41	38.5
TM2		25.97	38.5	26.25	38.5	26.31	38.5
TEST CONDITIONS		Channel4132(L) 826.4MHz		Channel4182(M) 836.4MHz		Channel4233(H) 846.6MHz	
		dBm		dBm		dBm	
		T_{nom} / V_{nom}		Measured	Limit	Measured	Limit
TM3		21.34	38.5	21.22	38.5	21.09	38.5
TM4	Case1	21.28	38.5	21.18	38.5	21.08	38.5
	Case2	20.96	38.5	21.01	38.5	20.87	38.5
	Case3	20.47	38.5	20.78	38.5	20.33	38.5
	Case4	20.41	38.5	20.48	38.5	20.34	38.5
TM5	Case1	20.77	38.5	20.75	38.5	20.71	38.5
	Case2	20.74	38.5	20.73	38.5	20.64	38.5
	Case3	21.32	38.5	21.27	38.5	21.15	38.5
	Case4	21.24	38.5	21.22	38.5	21.13	38.5
	Case5	21.33	38.5	21.29	38.5	21.21	38.5

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



Peak-to-Average Ratio

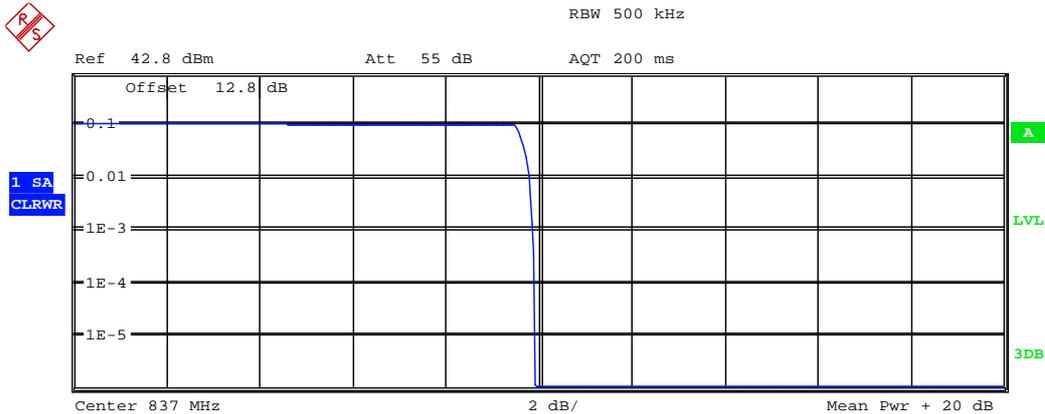
TEST CONDITIONS		Channel128(B)		Channel192(M)		Channel251(T)	
		824.2MHz		837.0MHz		848.8MHz	
		dBm		dBm		dBm	
T_{nom} / V_{nom}		Measured	Limit	Measured	Limit	Measured	Limit
TM1		9.74	13.0	9.87	13.0	9.77	13.0
TM2		12.78	13.0	12.85	13.0	12.69	13.0
TEST CONDITIONS		Channel4132(B)		Channel4182(M)		Channel4233(T)	
		826.4MHz		836.4MHz		846.6MHz	
		dBm		dBm		dBm	
T_{nom} / V_{nom}		Measured	Limit	Measured	Limit	Measured	Limit
TM3		3.22	13.0	3.24	13.0	3.21	13.0
TM4	Case1	3.16	13.0	3.18	13.0	3.12	13.0
	Case2	3.11	13.0	3.15	13.0	3.13	13.0
	Case3	3.08	13.0	3.05	13.0	3.03	13.0
	Case4	3.06	13.0	3.01	13.0	2.99	13.0
TM5	Case1	2.98	13.0	2.91	13.0	2.96	13.0
	Case2	2.95	13.0	2.93	13.0	2.94	13.0
	Case3	2.92	13.0	2.87	13.0	2.85	13.0
	Case4	2.88	13.0	2.82	13.0	2.81	13.0
	Case5	2.84	13.0	2.78	13.0	2.72	13.0



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



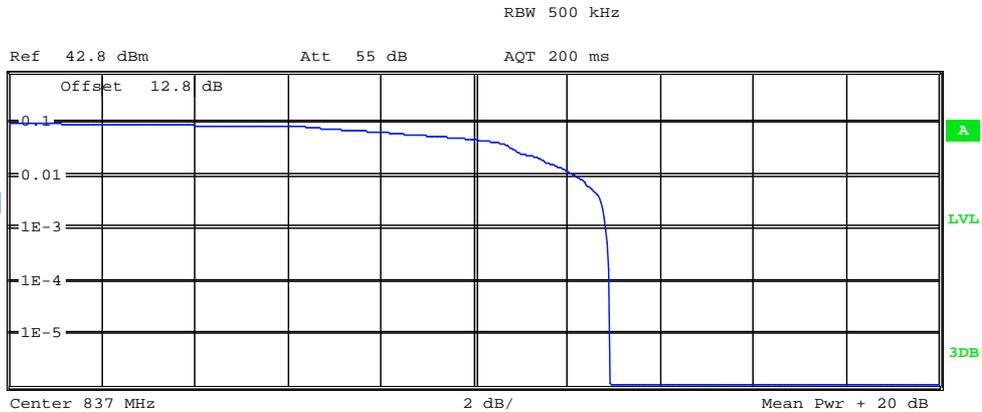
Complementary Cumulative Distribution Function
 NOF samples: 100000, Usable BW: 424kHz

Trace 1	
Mean	21.91 dBm
Peak	31.81 dBm
Crest	9.90 dB
10 %	9.49 dB
1 %	9.81 dB
.1 %	9.87 dB
.01 %	9.94 dB

Date: 29.JUN.2012 09:33:16



TM2



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

Trace 1

Mean	15.51 dBm
Peak	28.42 dBm
Crest	12.91 dB
10 %	2.40 dB
1 %	12.21 dB
.1 %	12.85 dB
.01 %	12.92 dB

Date: 29.JUN.2012 09:35:44

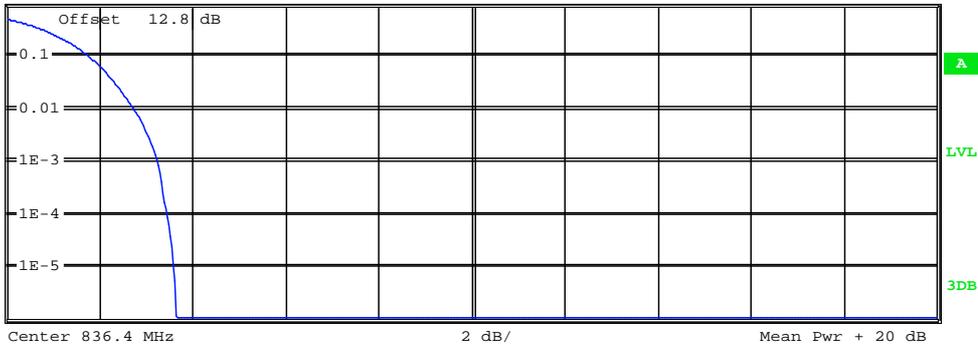


TM3/TM4/TM5



RBW 5 MHz

Ref 42.8 dBm Att 55 dB AQT 12.5 ms



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

Trace 1	
Mean	22.09 dBm
Peak	25.74 dBm
Crest	3.65 dB
10 %	1.76 dB
1 %	2.72 dB
.1 %	3.24 dB
.01 %	3.46 dB

Date: 29.JUN.2012 09:42:32



Effective Radiated Power of Transmitter (ERP)

Test Mode	Freq. [MHz]	Meas. Level [dBm]	Substitution Antenna Type	SGP [dBm]	Substitution Gain [dBi]	Cable Loss [dB]	Substitution Level (ERP)	FCC limit [dBm]	Result
							[dBm]		
TM1	824.2	29.24	Dipole Ant.	32.39	-2.75	0.6	29.04	38.5	Pass
TM1	837.0	29.25	Dipole Ant.	32.52	-2.87	0.6	29.05	38.5	Pass
TM1	848.8	29.11	Dipole Ant.	32.36	-2.85	0.6	28.91	38.5	Pass
TM2	824.2	23.67	Dipole Ant.	26.82	-2.75	0.6	23.47	38.5	Pass
TM2	837.0	23.95	Dipole Ant.	27.22	-2.87	0.6	23.75	38.5	Pass
TM2	848.8	24.01	Dipole Ant.	27.26	-2.85	0.6	23.81	38.5	Pass
TM3	826.4	19.04	Dipole Ant.	22.19	-2.75	0.6	18.84	38.5	Pass
TM3	836.4	18.92	Dipole Ant.	22.53	-2.87	0.6	19.06	38.5	Pass
TM3	846.6	18.79	Dipole Ant.	22.04	-2.85	0.6	18.59	38.5	Pass

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

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

b, SGP=Signal Generator Level

c, RBW > emission bandwidth, VBW > 3 x RBW.

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



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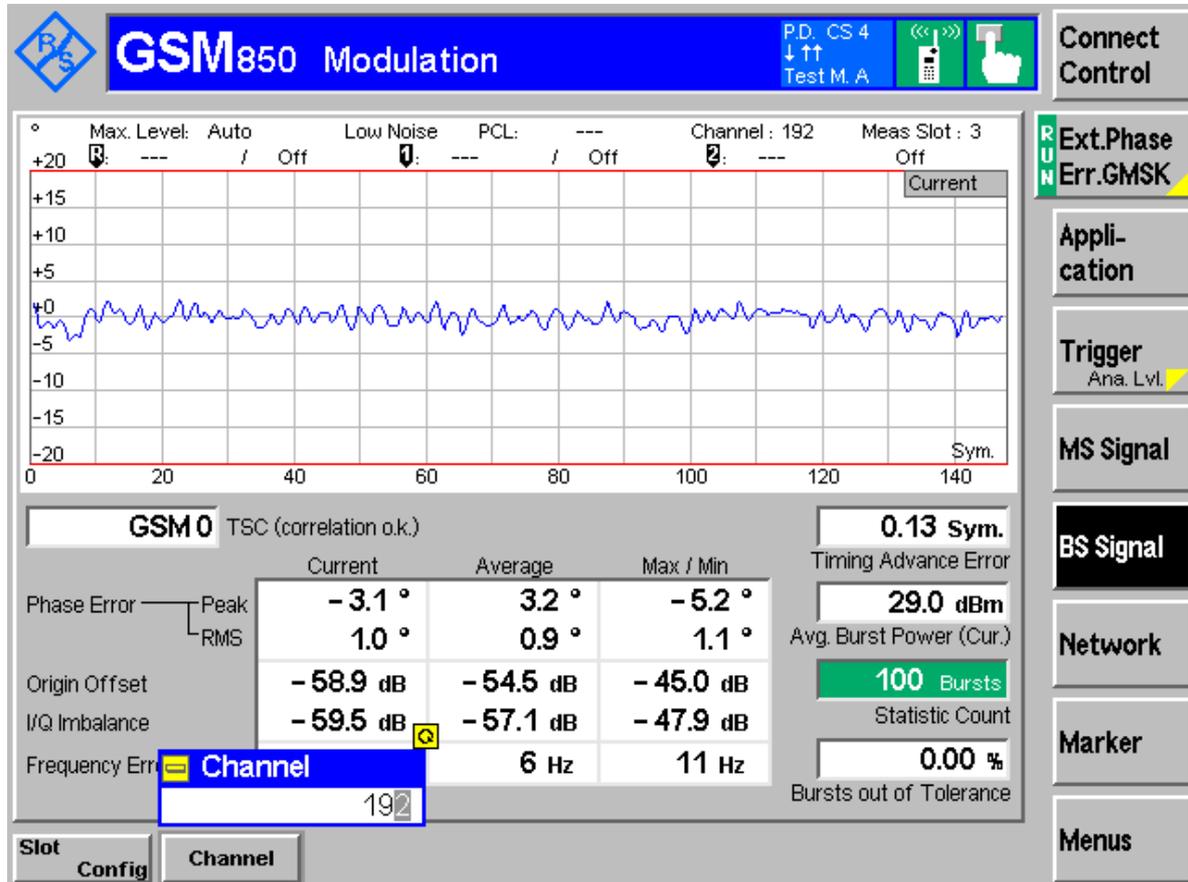
Appendix B

Modulation Characteristics

According to FCC Part 2.1047 & Part22 Subpart H & RSS-132

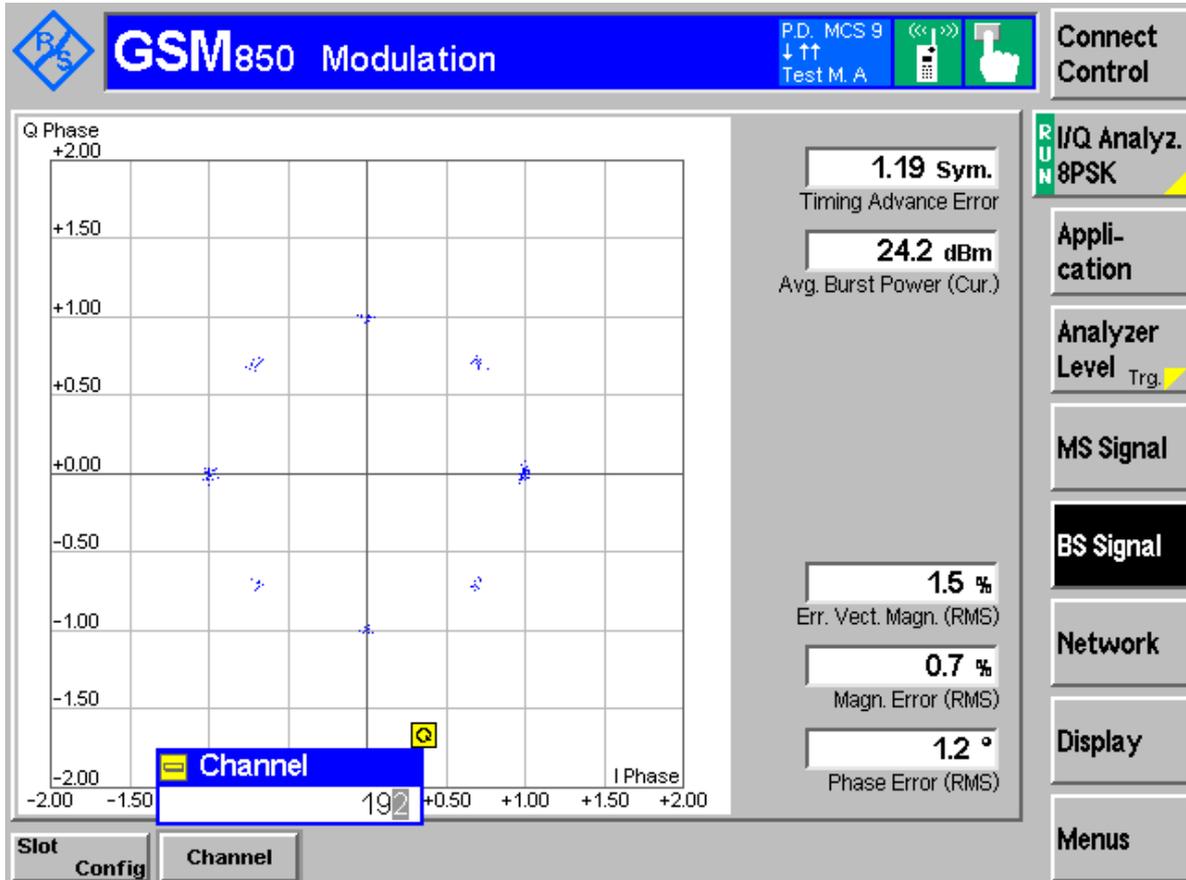


Channel 192 (TM1:GPRS/GSM)



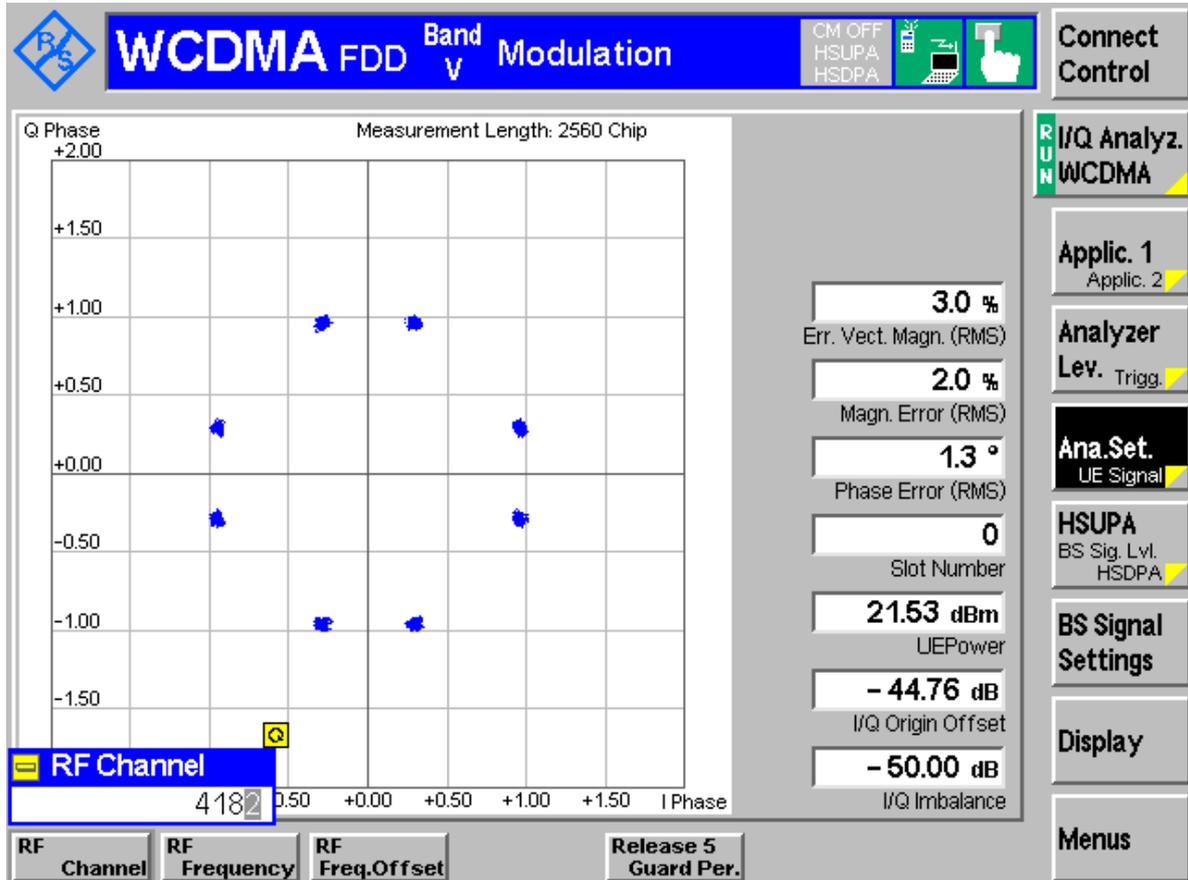


Channel 192 (TM2:EDGE)





Channel 4182 (TM3: WCDMA)



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



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Appendix C

Occupied Bandwidth

According to FCC Part 2.1049 & Part 22 Subpart H & RSS-132



Result Table

Table 1 Measurement Results

Test Mode	RF Channel	Occupied Bandwidth [kHz]	Verdict
TM1	128	244.95	Pass
	192	244.91	Pass
	251	243.57	Pass
TM2	128	241.53	Pass
	192	238.69	Pass
	251	243.99	Pass
Test Mode	RF Channel	Occupied Bandwidth [MHz]	Verdict
TM3	4132	4.14	Pass
	4182	4.12	Pass
	4233	4.13	Pass

26 dB Bandwidth

Test Mode	RF Channel	Occupied Bandwidth [kHz]	Verdict
TM1	128	320.29	Pass
	192	315	Pass
	251	316.06	Pass
TM2	128	294.84	Pass
	192	300.87	Pass
	251	308.61	Pass
Test Mode	RF Channel	Occupied Bandwidth [MHz]	Verdict
TM3	4132	4.63	Pass
	4182	4.63	Pass
	4233	4.62	Pass

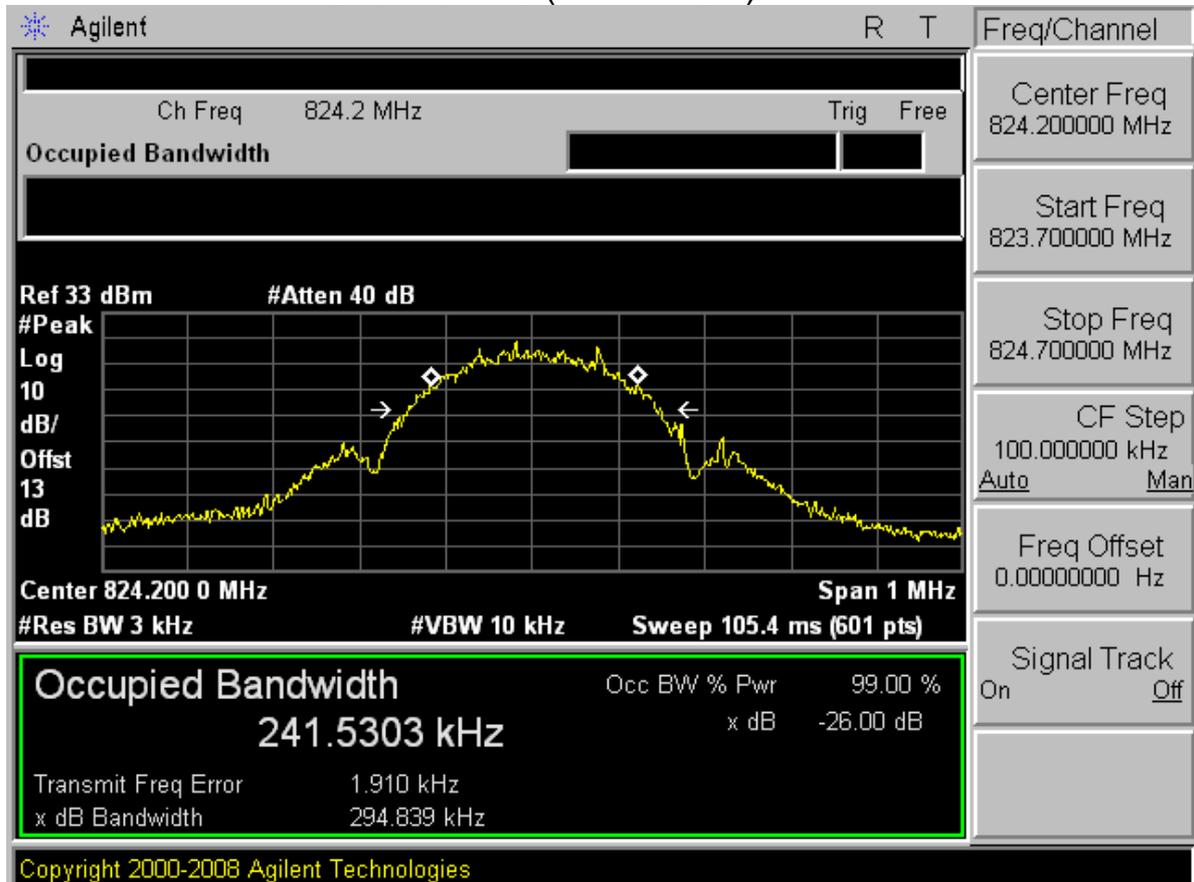


Channel 128 (TM1:GPRS/GSM)

Agilent		R	T	Freq/Channel
Ch Freq 824.2 MHz		Trig	Free	Center Freq 824.200000 MHz
Occupied Bandwidth				Start Freq 823.700000 MHz
Ref 33 dBm #Peak Log 10 dB/Offst 13 dB		#Atten 40 dB 		Stop Freq 824.700000 MHz
Center 824.200 0 MHz		Span 1 MHz		CF Step 100.000000 kHz Auto Man
#Res BW 3 kHz		#VBW 10 kHz Sweep 105.4 ms (601 pts)		Freq Offset 0.00000000 Hz
Occupied Bandwidth 244.9460 kHz		Occ BW % Pwr 99.00 % x dB -26.00 dB		Signal Track On Off
Transmit Freq Error -75.823 Hz		x dB Bandwidth 320.289 kHz		
Copyright 2000-2008 Agilent Technologies				

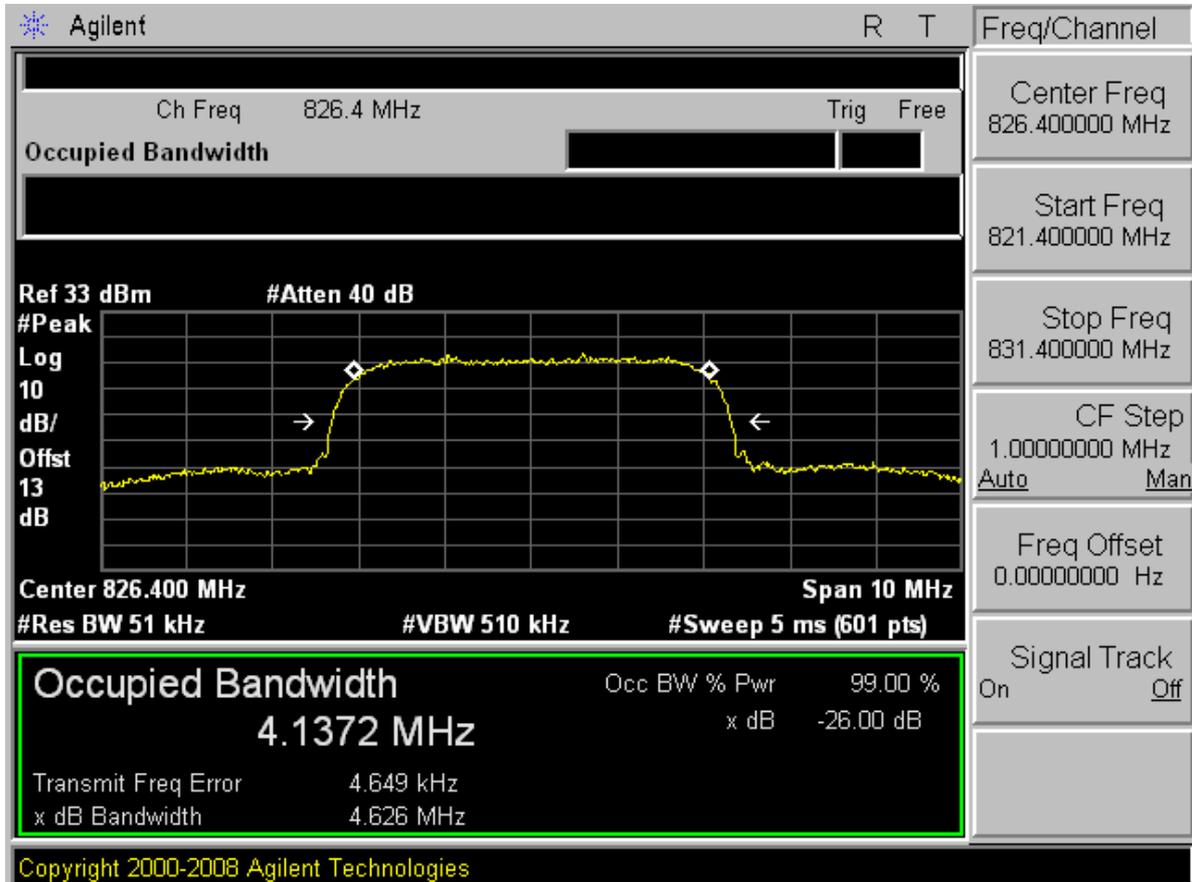


Channel 128 (TM2:EDGE)



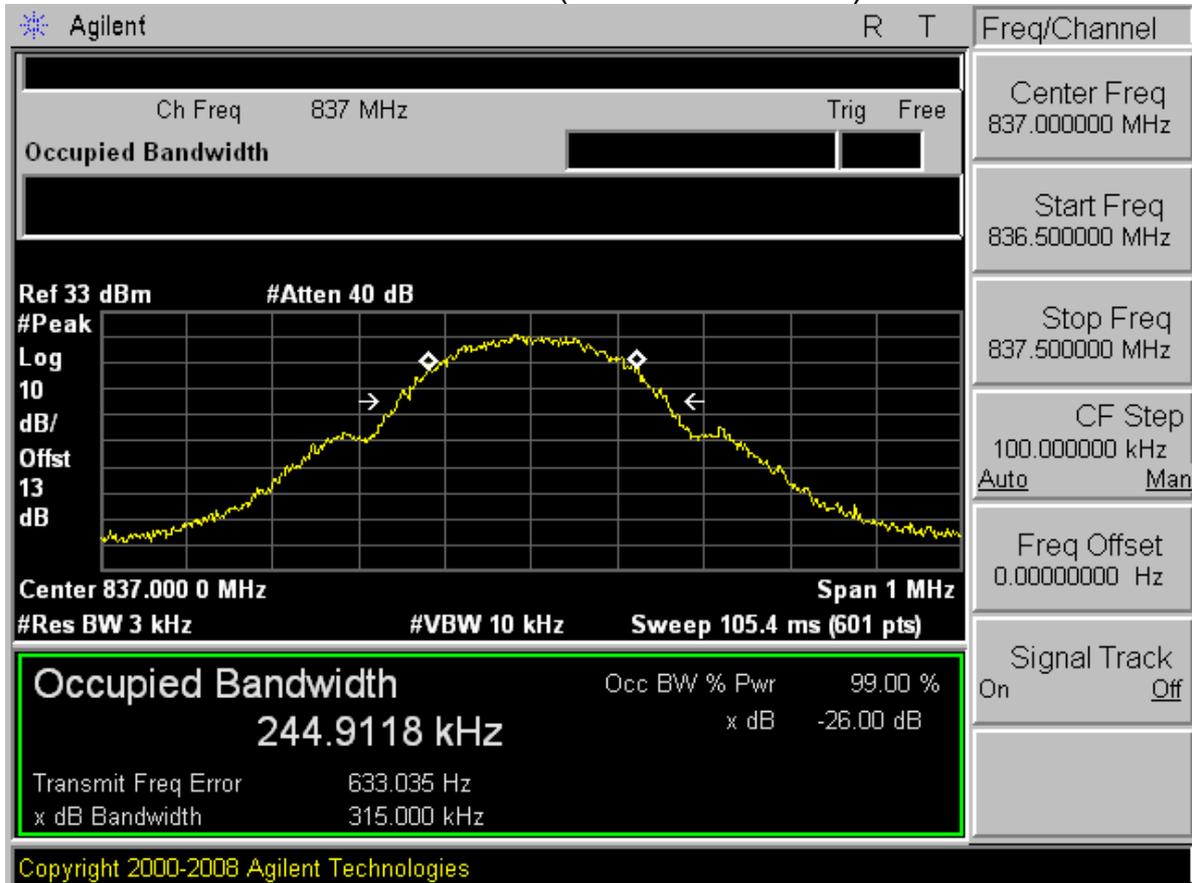


Channel 4132 (TM3: WCDMA)



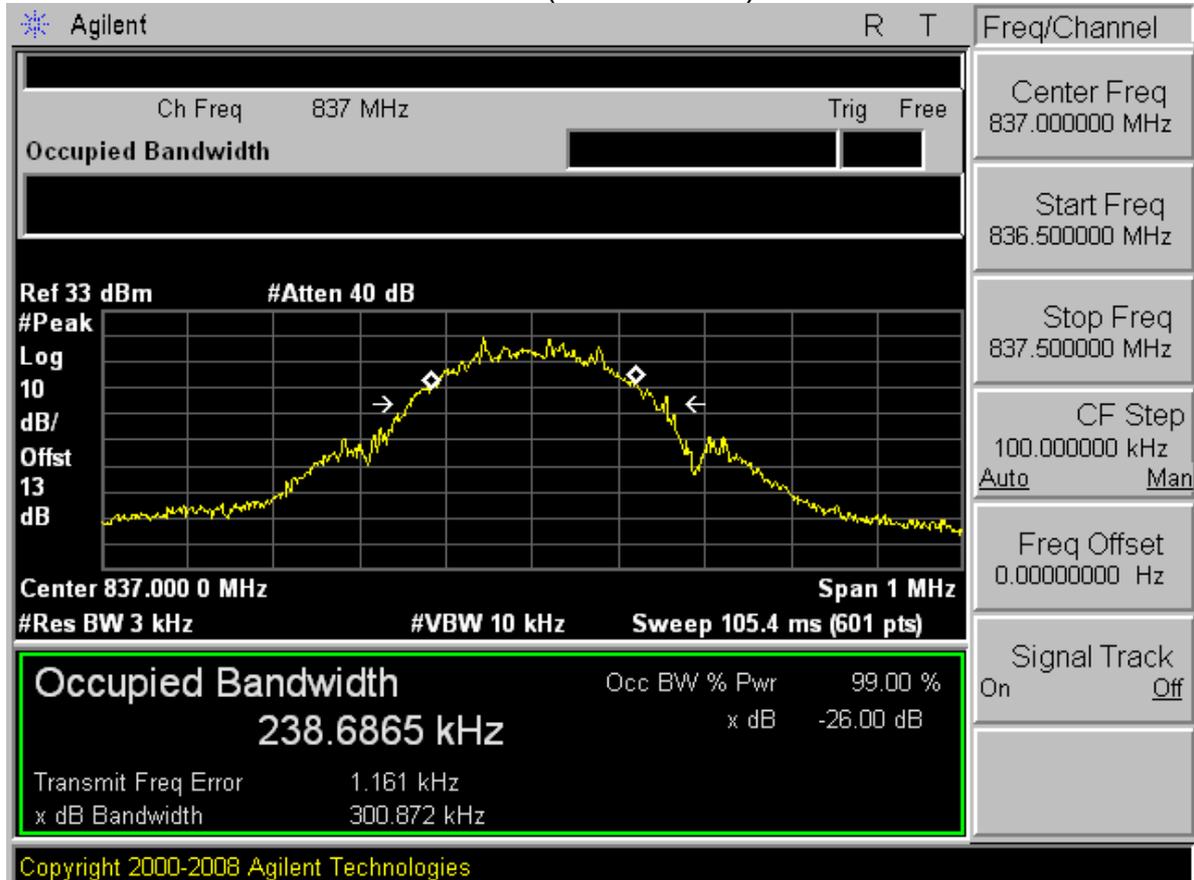


Channel 192 (TM1:GPRS/GSM)



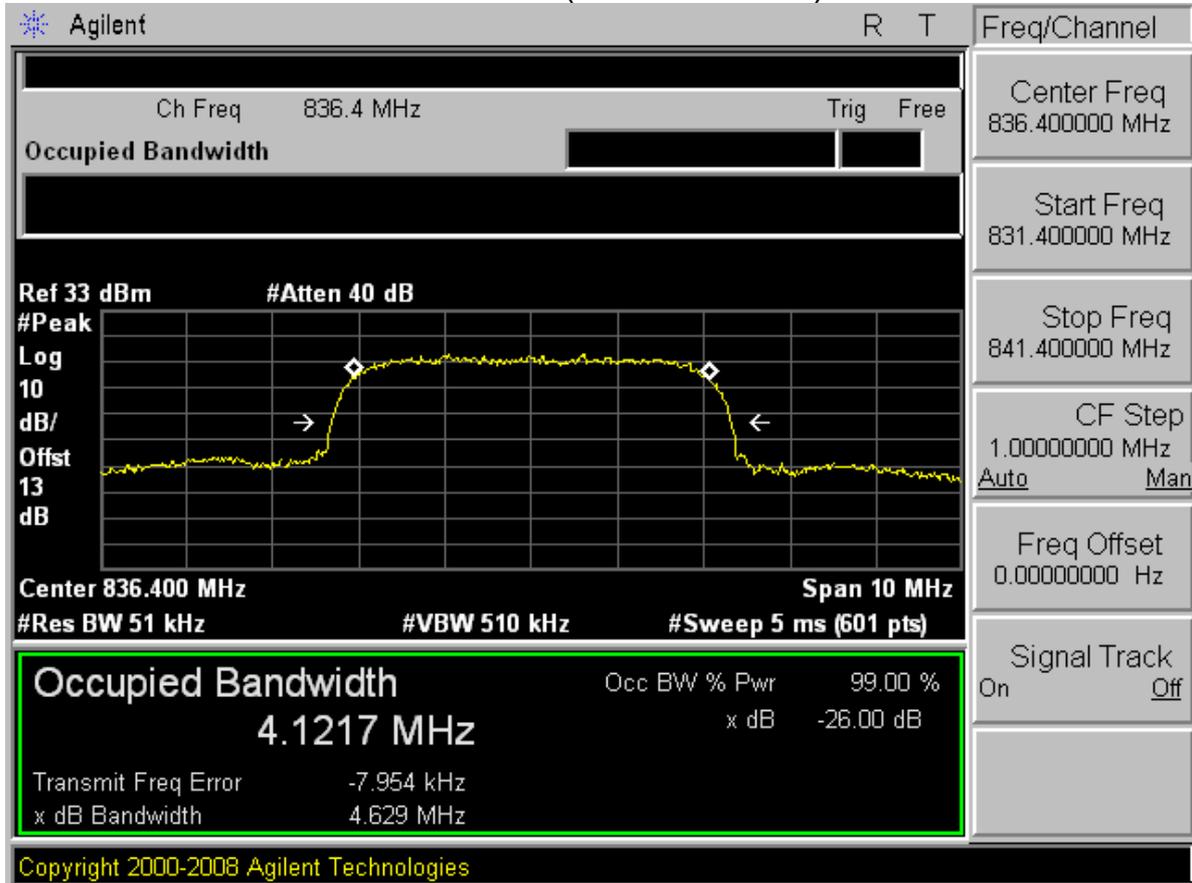


Channel 192 (TM2:EDGE)



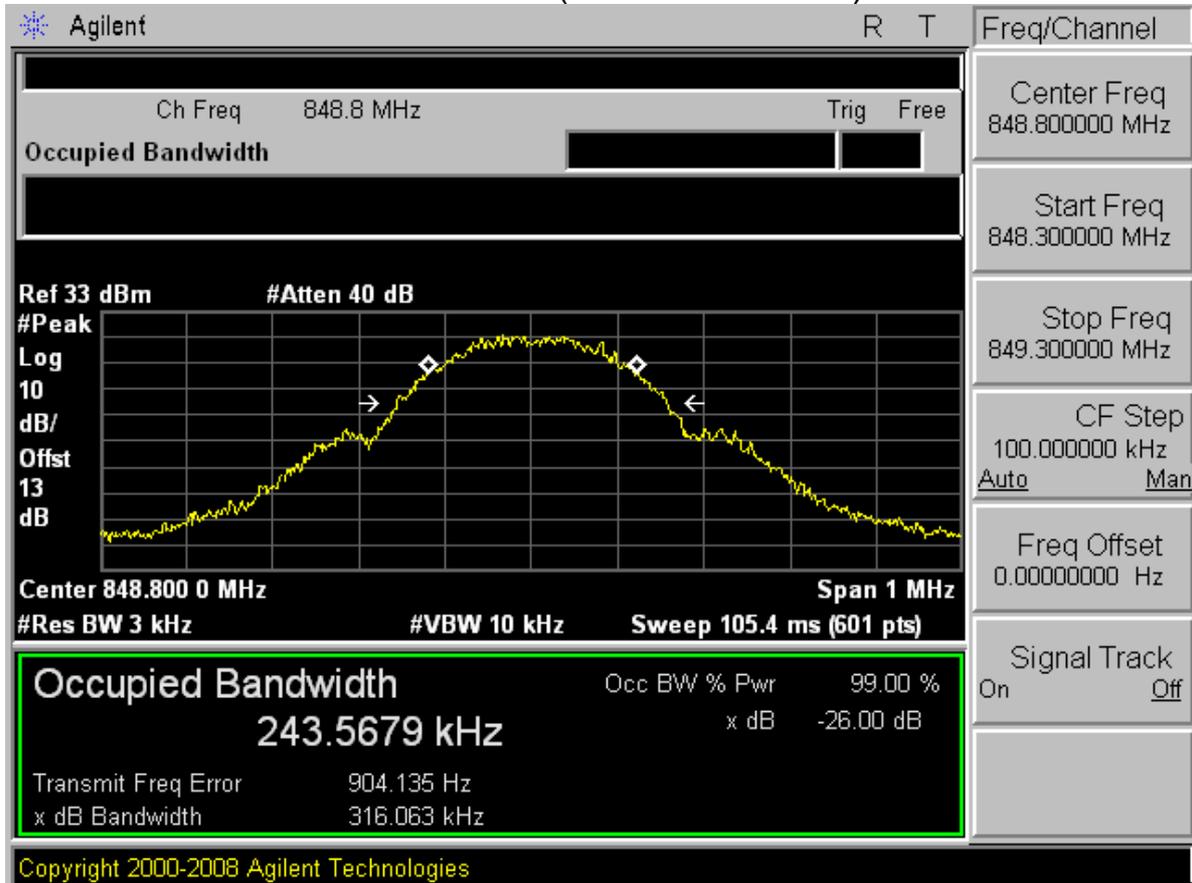


Channel 4182 (TM3: WCDMA)



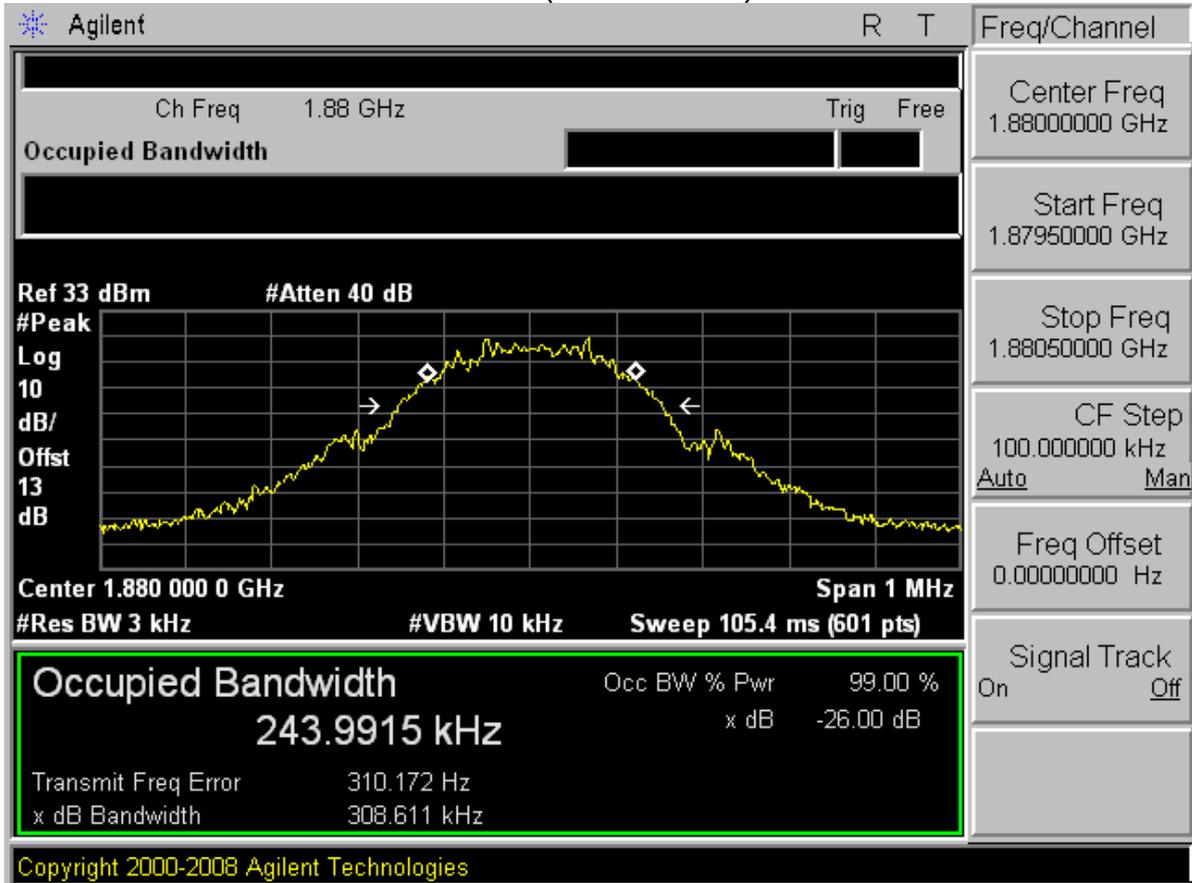


Channel 251 (TM1:GPRS/GSM)



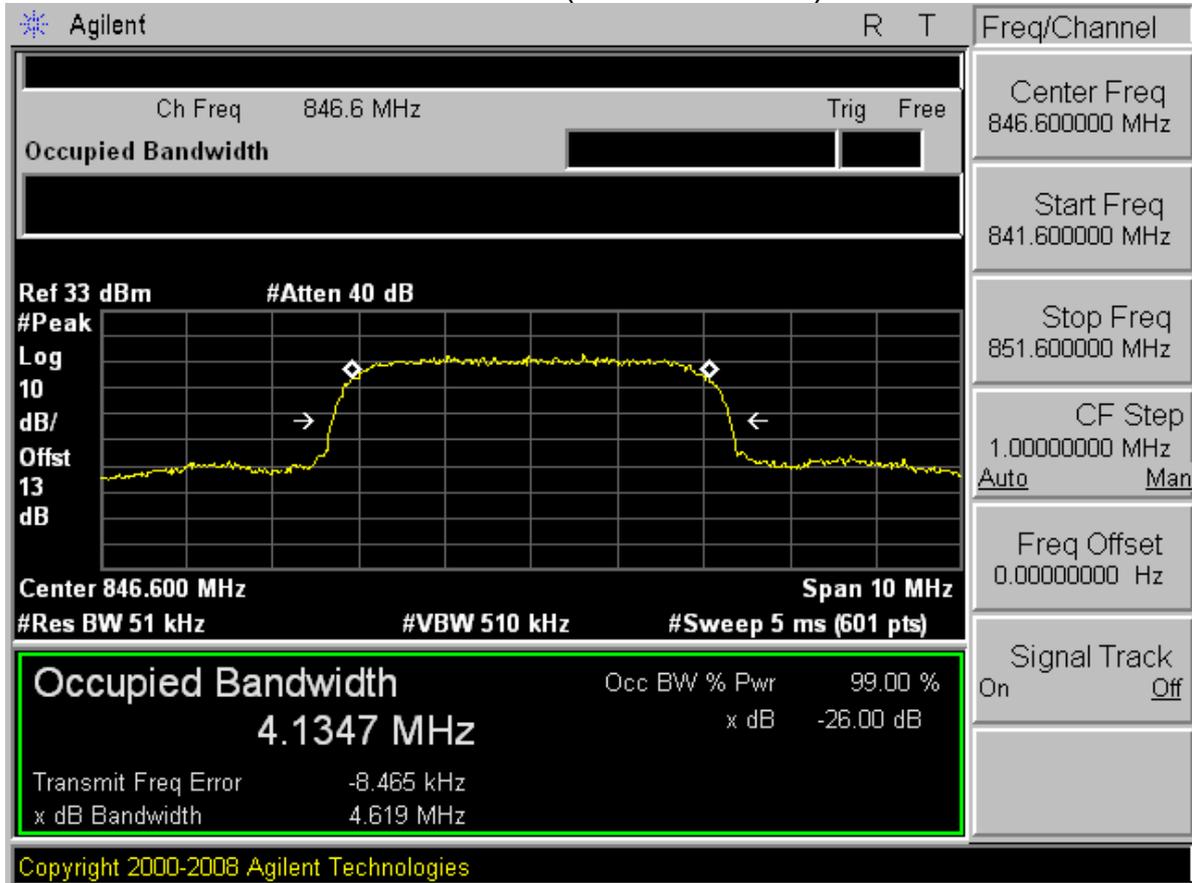


Channel 251 (TM2:EDGE)





Channel 4233 (TM3: WCDMA)



-----END-----



FCC Test Report of B593u-501
FCC ID: QISB593U-501
IC ID : 6369A-B593U501



Appendix D

Band Edges Compliance

According to FCC Part 2.1051 & Part 22 Subpart H & RSS-132



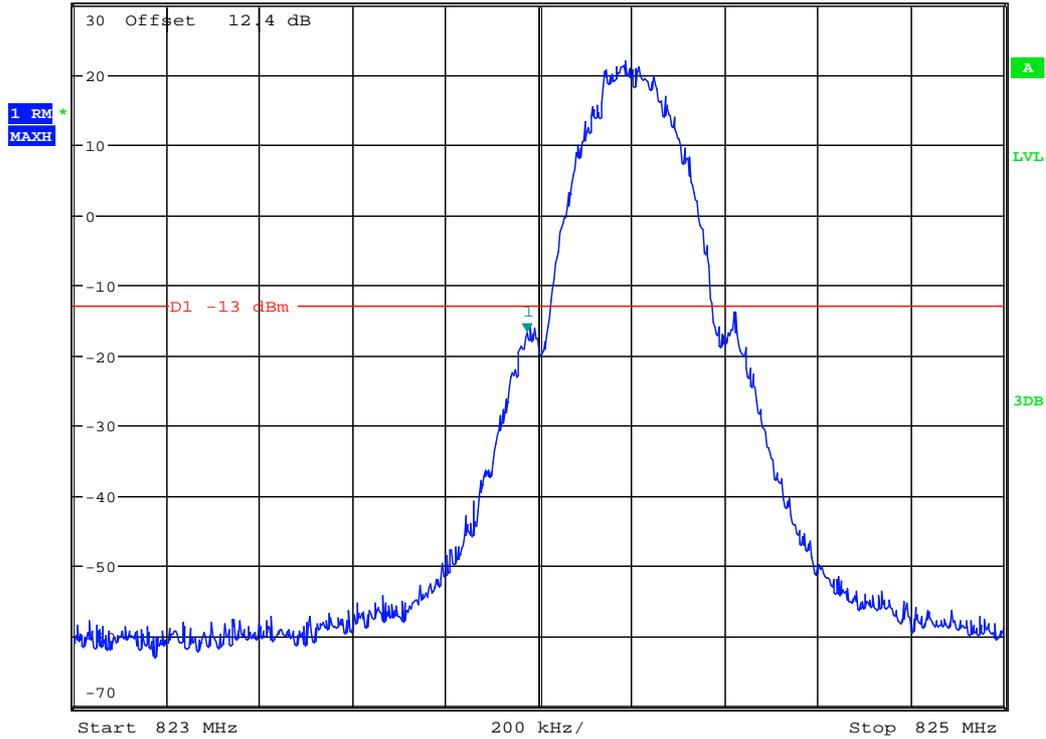
TM1:GPRS/GSM

Left Edge

Channel 128



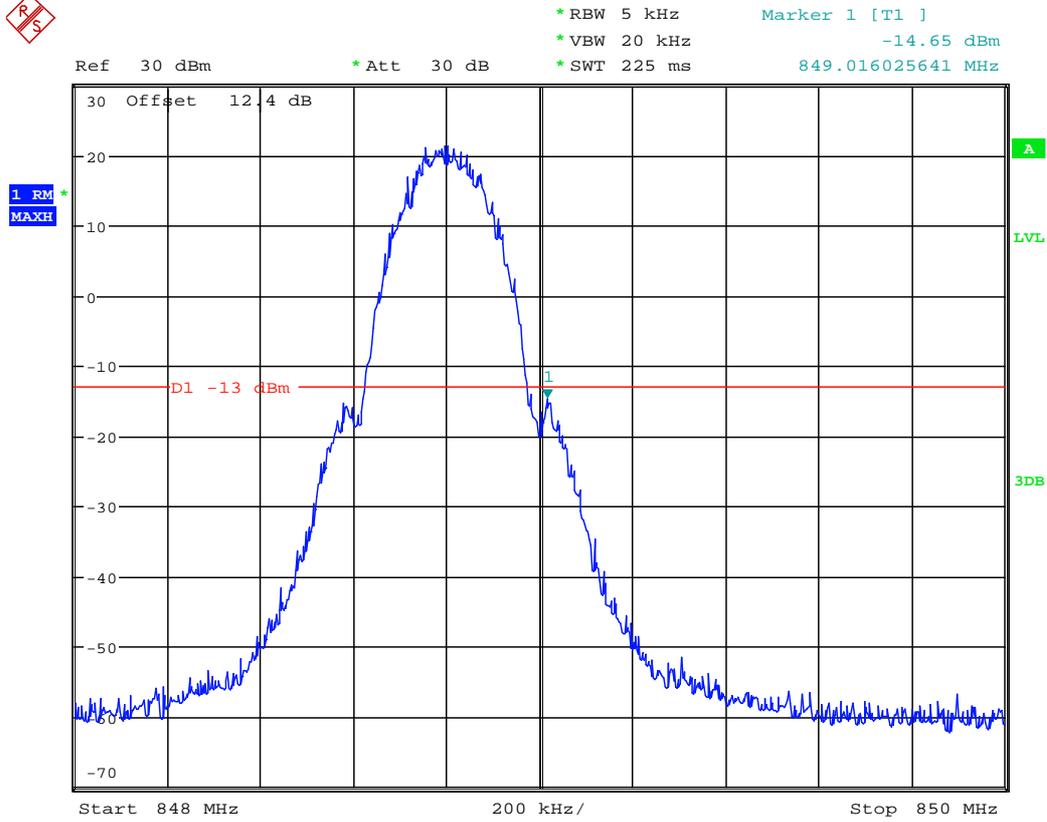
Ref 30 dBm * Att 30 dB * RBW 5 kHz Marker 1 [T1] -16.79 dBm
* VBW 20 kHz 823.974358974 MHz
* SWT 225 ms



Date: 16.JUL.2012 14:47:23



Right Edge Channel 251



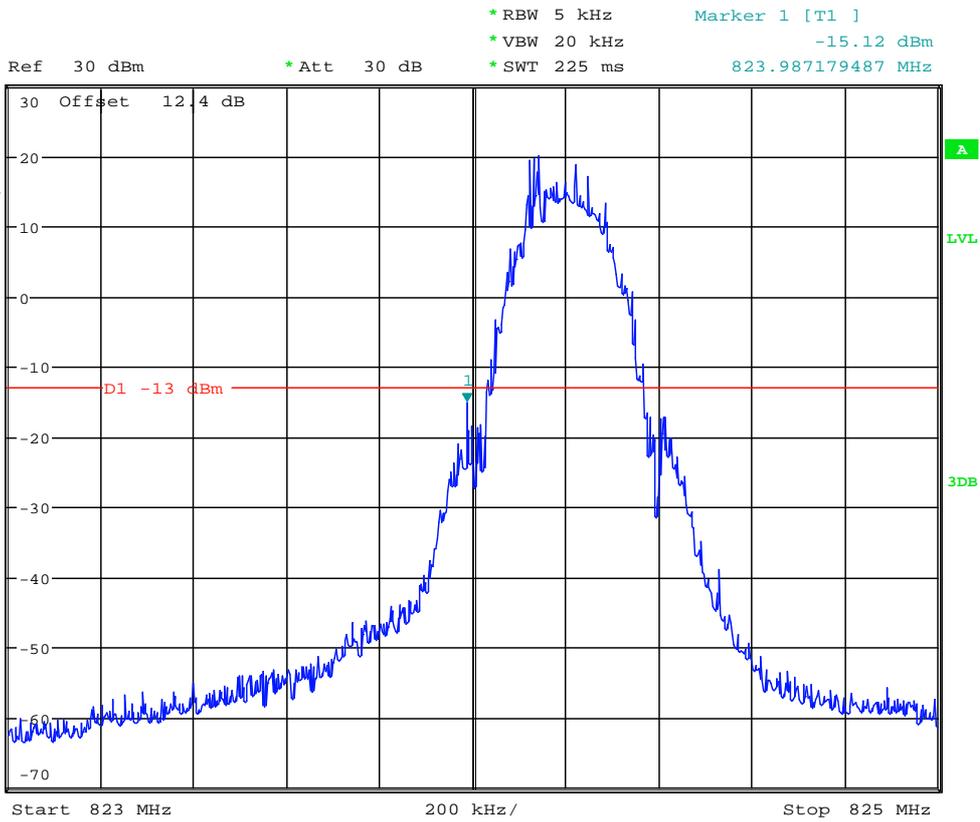
Date: 16.JUL.2012 14:48:55



TM2:EDGE

Left Edge

Channel 128



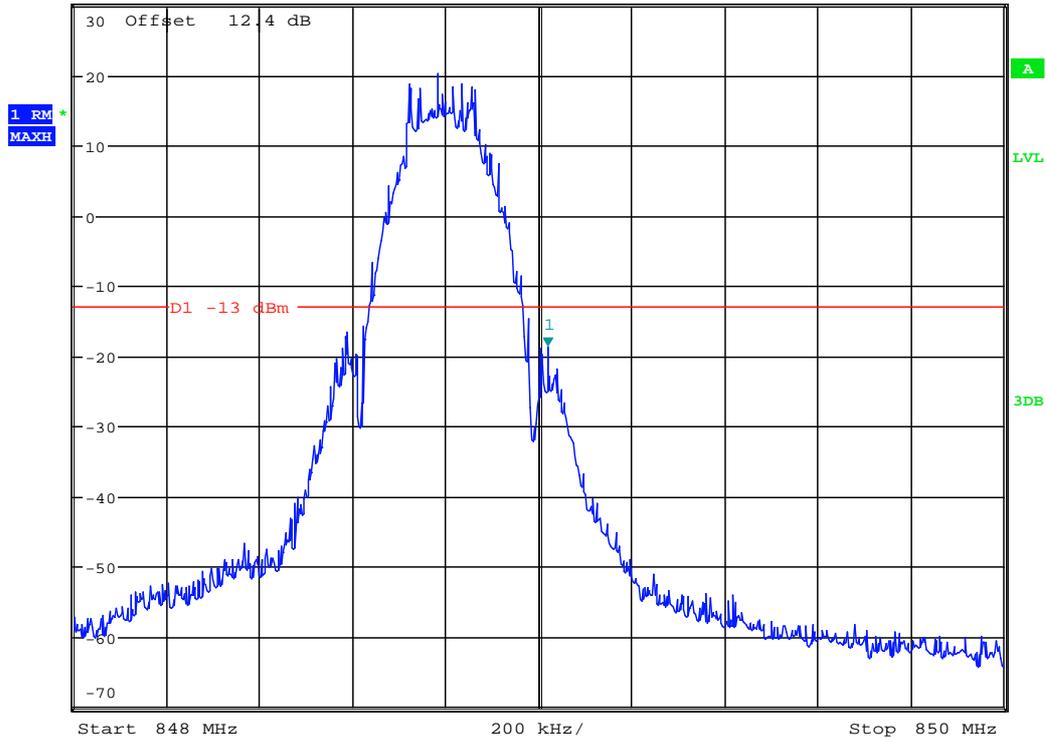
Date: 16.JUL.2012 14:53:46



Right Edge Channel 251



Ref 30 dBm * Att 30 dB * RBW 5 kHz Marker 1 [T1]
 * VBW 20 kHz -18.58 dBm
 * SWT 225 ms 849.019230769 MHz



Date: 16.JUL.2012 14:55:46



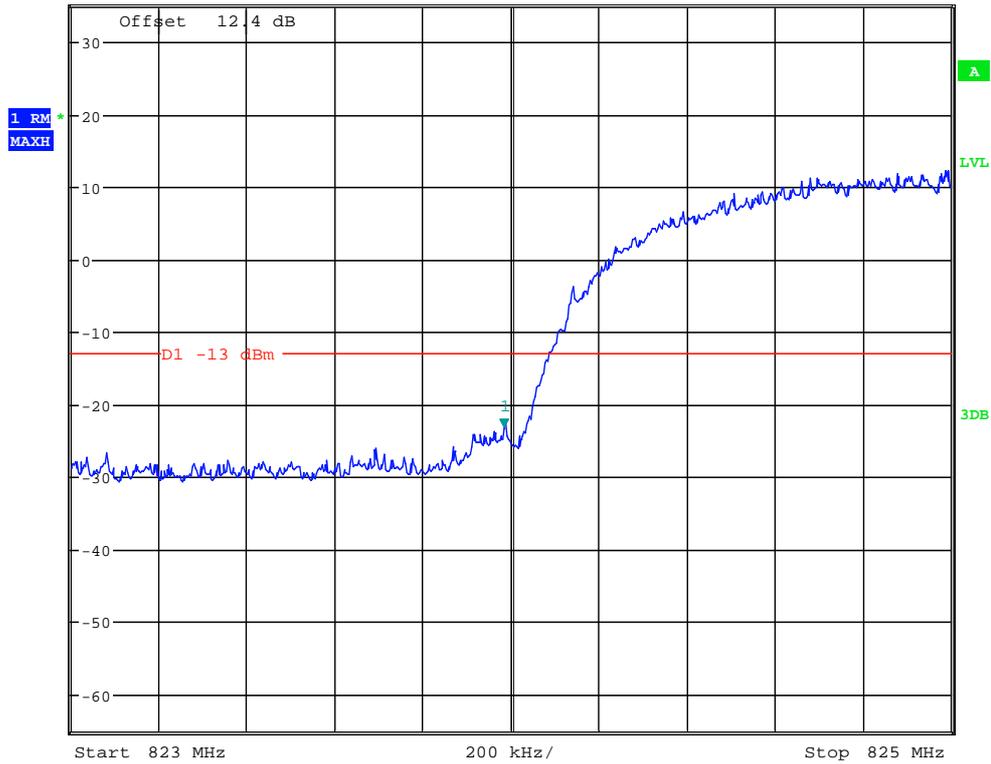
TM3: WCDMA

Left Edge

Channel 4132



Ref 35 dBm Att 50 dB RBW 50 kHz Marker 1 [T1] -23.28 dBm
*VBW 200 kHz SWT 2.5 ms 823.985000000 MHz



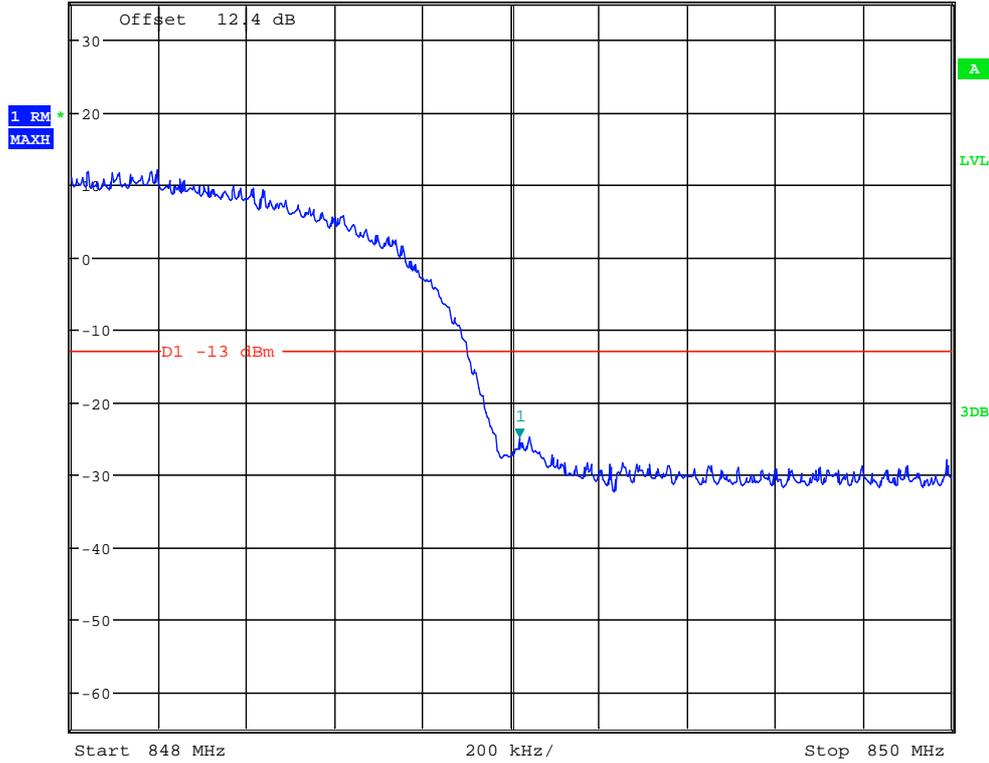
Date: 24.JUN.2012 15:09:41



Right Edge Channel 4233



Ref 35 dBm Att 50 dB RBW 50 kHz Marker 1 [T1] -24.91 dBm
 * VBW 200 kHz 849.02000000 MHz
 SWT 2.5 ms



Date: 24.JUN.2012 15:09:55

-----END-----



FCC Test Report of B593u-501
FCC ID: QISB593U-501
IC ID : 6369A-B593U501



Appendix E

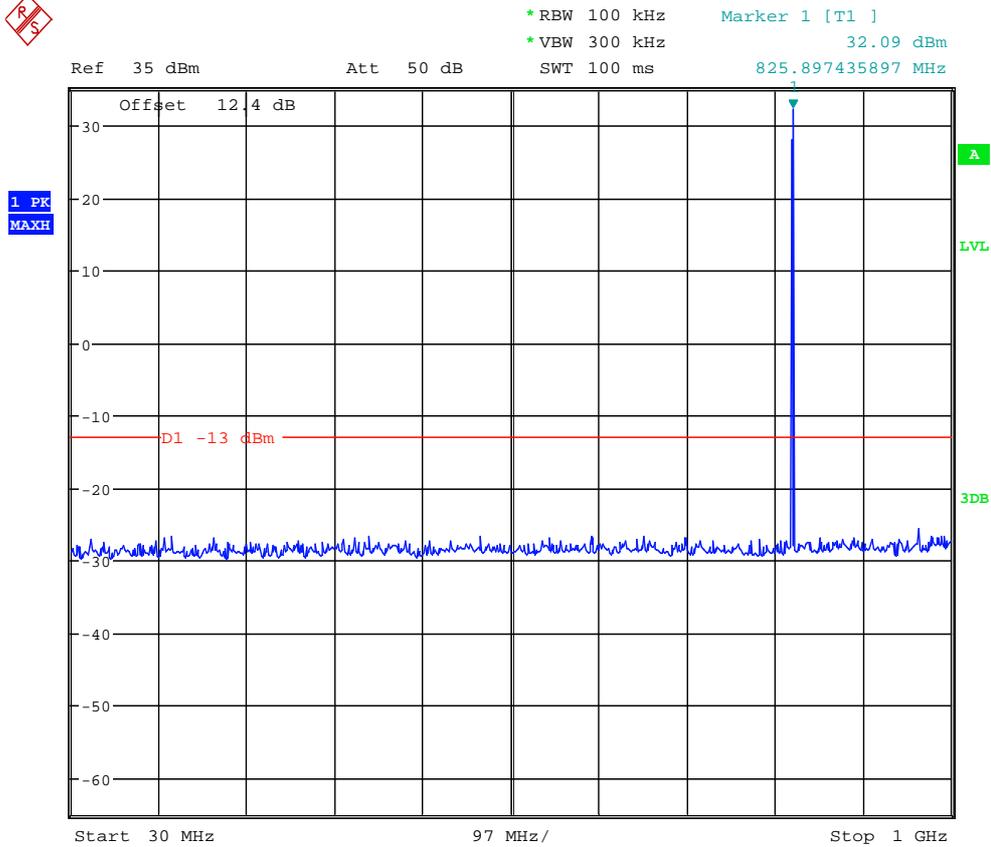
Spurious Emission at Antenna Terminal

According to FCC Part 2.1051 & Part 22 Subpart H& RSS-132



TM1:GPRS/GSM

Channel 128



Date: 24.JUN.2012 14:51:18



FCC Test Report of B593u-501
FCC ID: QISB593U-501
IC ID : 6369A-B593U501



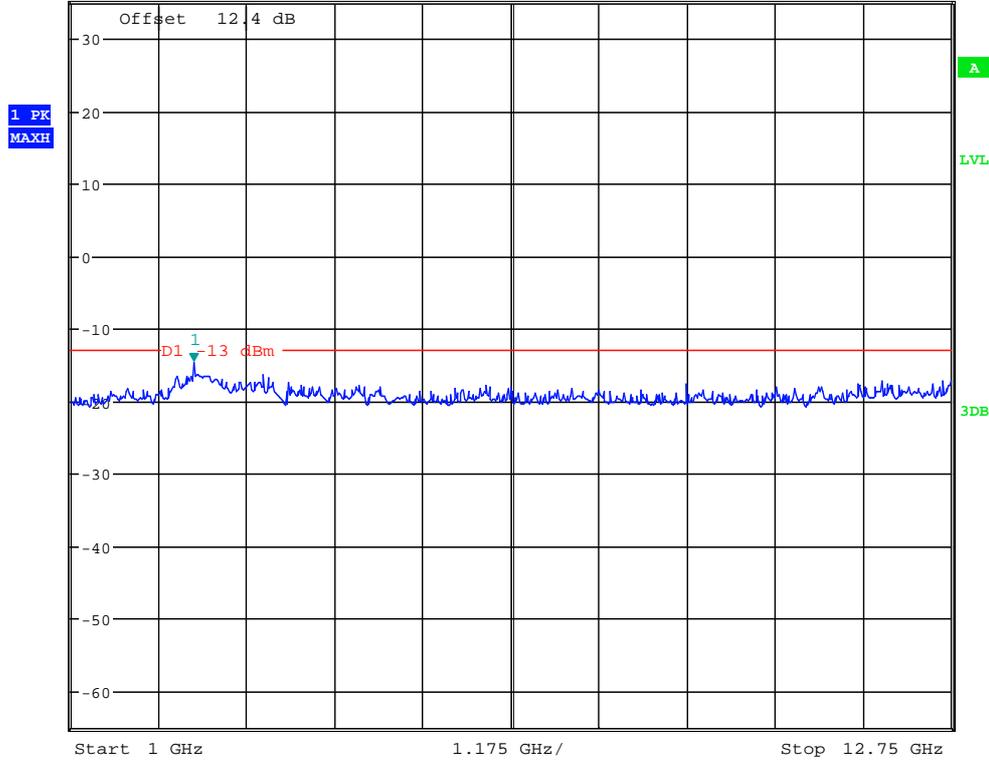
*RBW 1 MHz Marker 1 [T1]
*VBW 3 MHz -14.75 dBm
SWT 70 ms 2.638221154 GHz

Ref 35 dBm

Att 50 dB

SWT 70 ms

2.638221154 GHz



Date: 24.JUN.2012 14:52:01

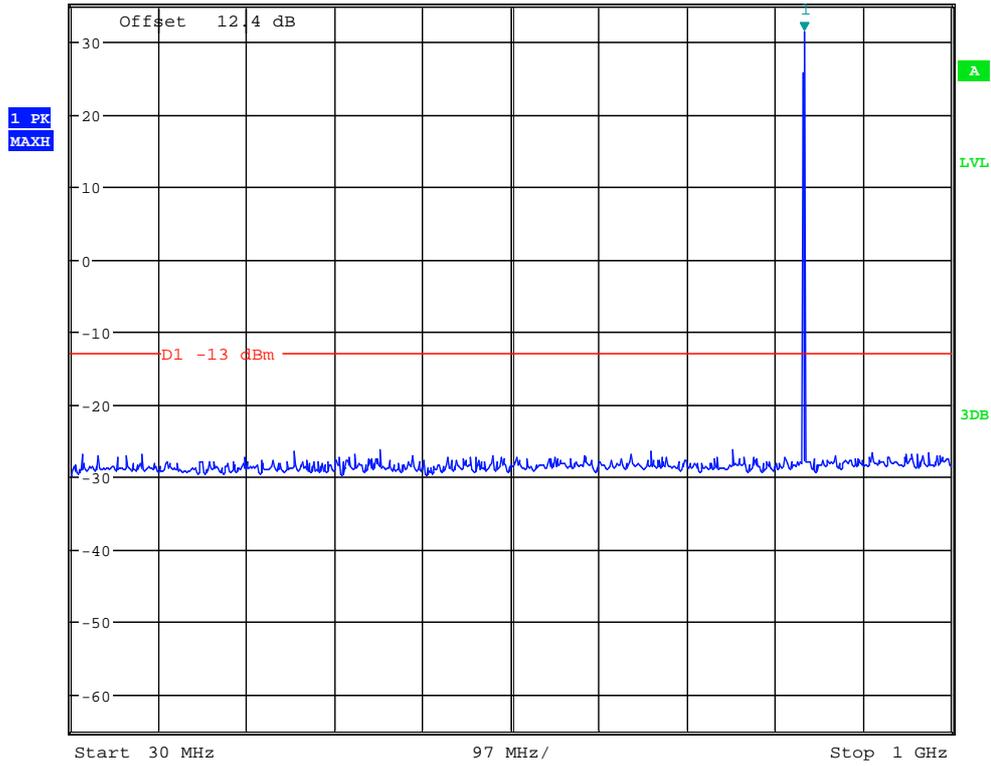


Channel 192



Ref 35 dBm Att 50 dB *RBW 100 kHz *VBW 300 kHz SWT 100 ms

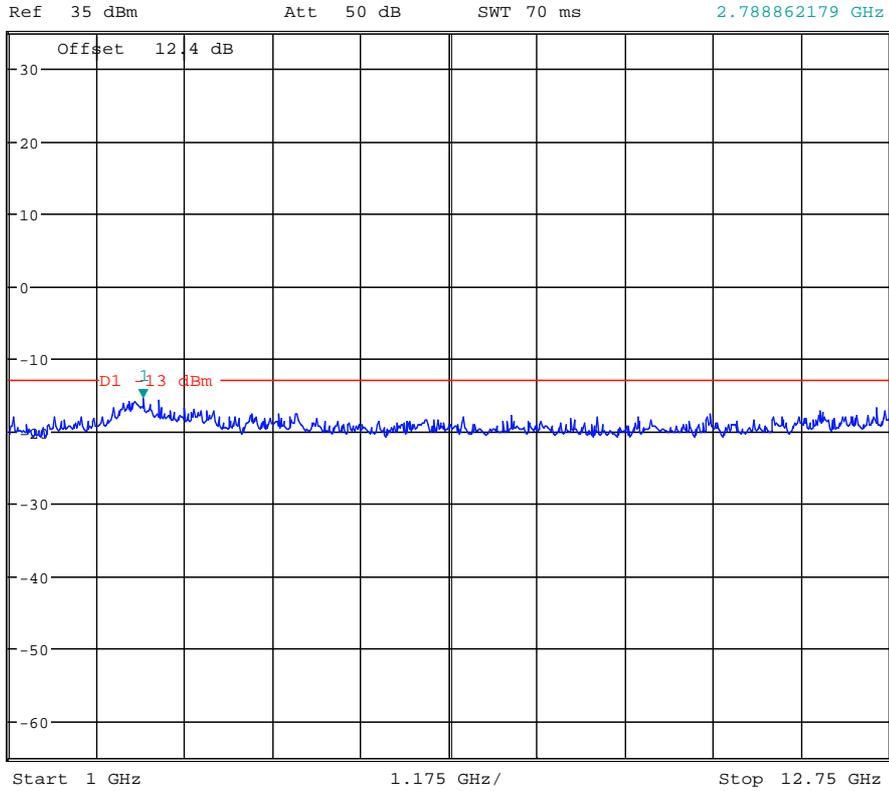
Marker 1 [T1] 31.35 dBm
838.333333333 MHz



Date: 24.JUN.2012 14:51:32



*RBW 1 MHz Marker 1 [T1]
*VBW 3 MHz -15.52 dBm
SWT 70 ms 2.788862179 GHz



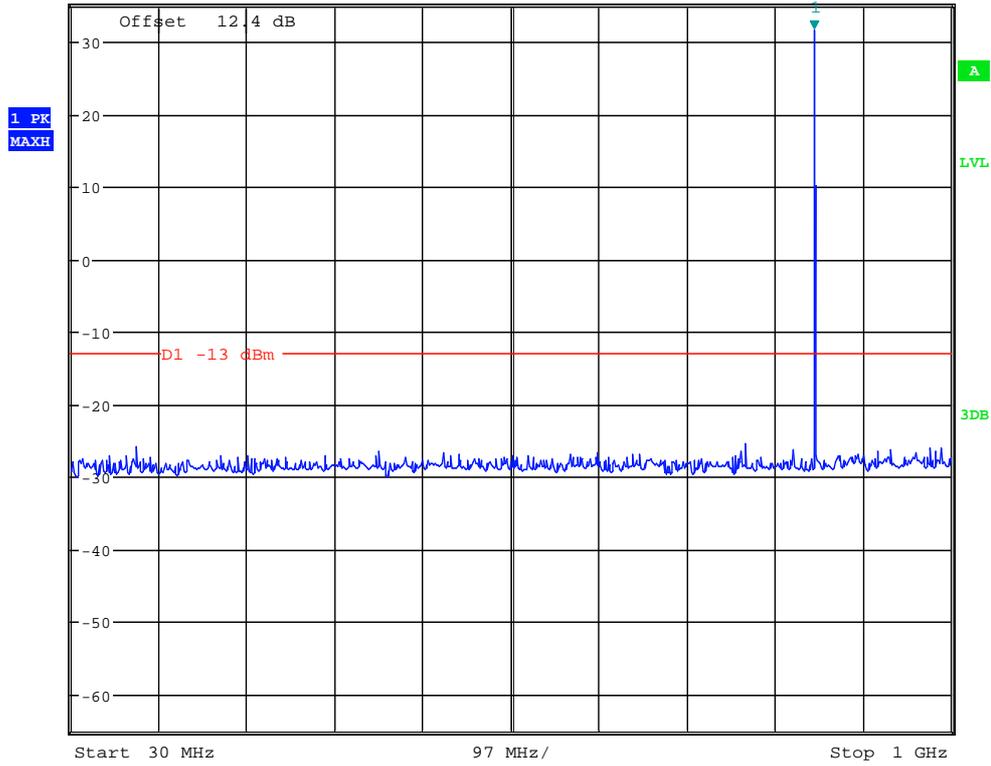
Date: 24.JUN.2012 14:52:16



Channel 251



*RBW 100 kHz Marker 1 [T1]
*VBW 300 kHz 31.50 dBm
Ref 35 dBm Att 50 dB SWT 100 ms 849.214743590 MHz



Date: 24.JUN.2012 14:51:46



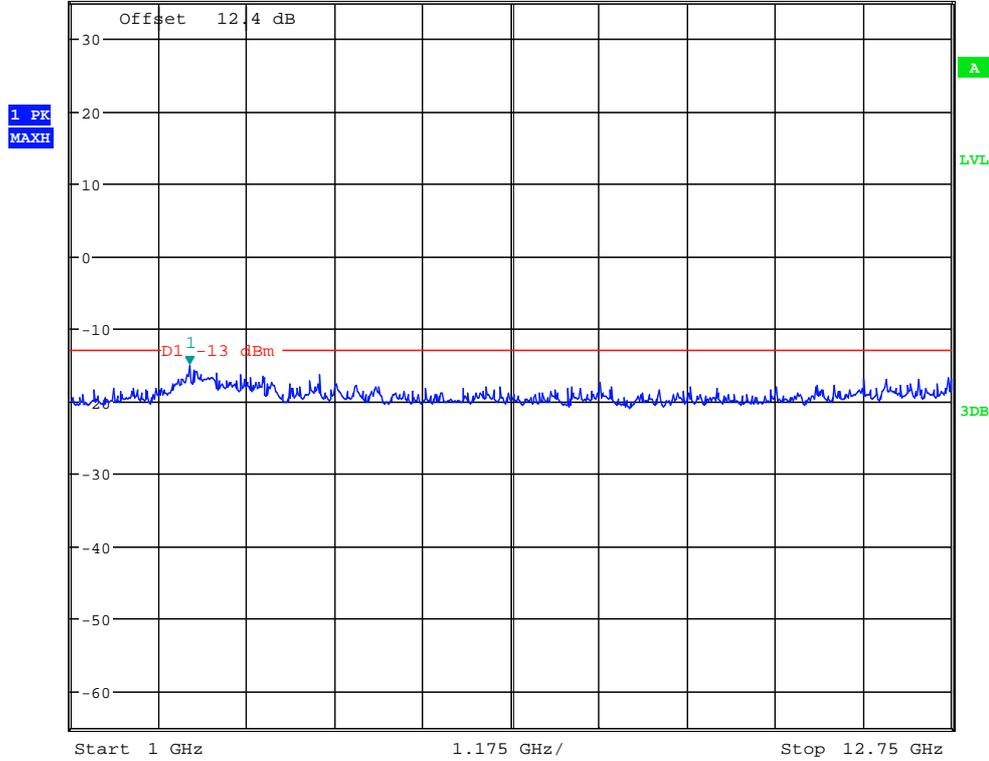
*RBW 1 MHz Marker 1 [T1]
*VBW 3 MHz -15.17 dBm
SWT 70 ms 2.581730769 GHz

Ref 35 dBm

Att 50 dB

SWT 70 ms

2.581730769 GHz



Date: 24.JUN.2012 14:52:30

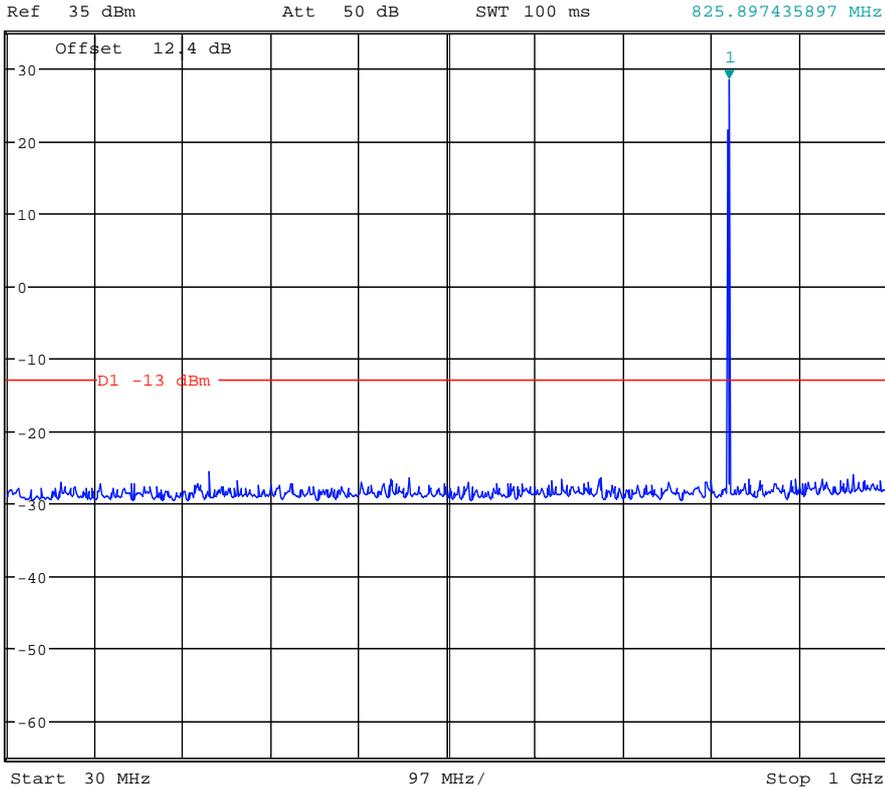


TM2:EDGE

Channel 128



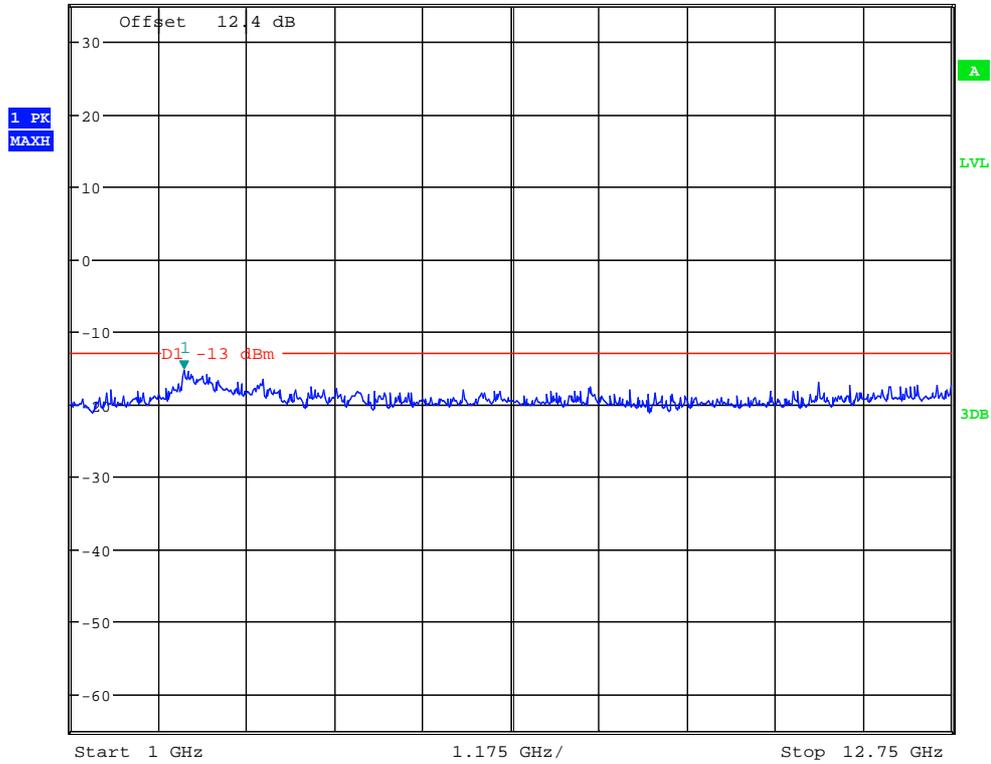
*RBW 100 kHz Marker 1 [T1]
*VBW 300 kHz 28.41 dBm
SWT 100 ms 825.897435897 MHz



Date: 24.JUN.2012 15:00:43



Ref 35 dBm Att 50 dB SWT 70 ms
*RBW 1 MHz Marker 1 [T1]
*VBW 3 MHz -15.42 dBm
2.506410256 GHz



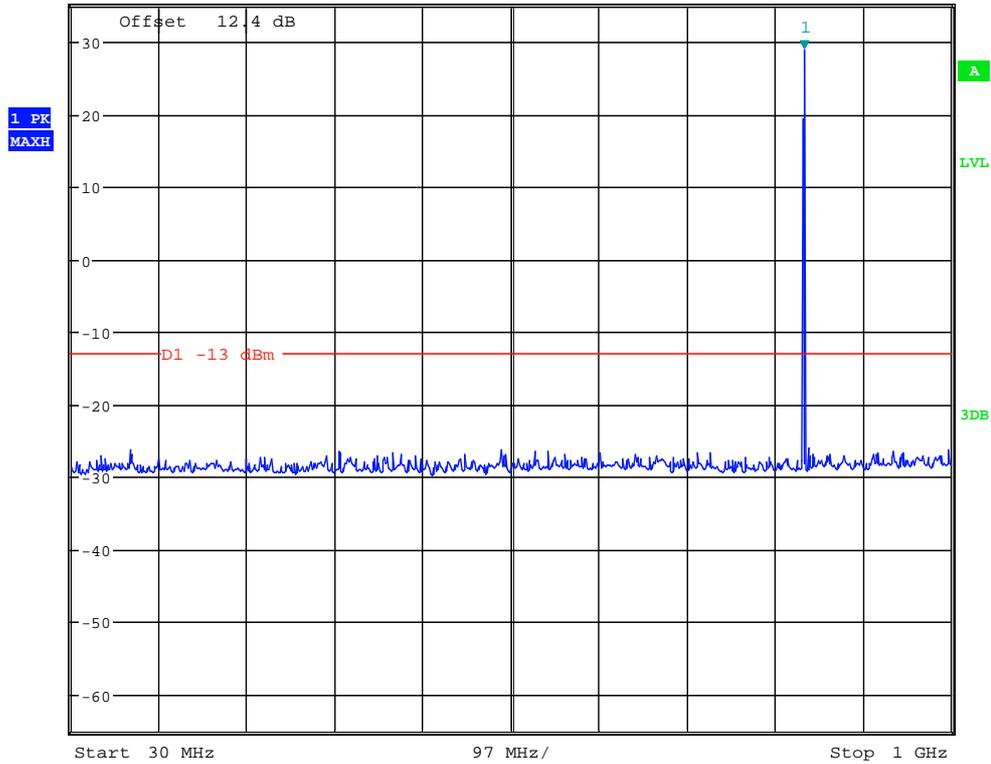
Date: 24.JUN.2012 15:01:27



Channel 192



* RBW 100 kHz Marker 1 [T1]
 * VBW 300 kHz 28.74 dBm
 Ref 35 dBm Att 50 dB SWT 100 ms 838.333333333 MHz



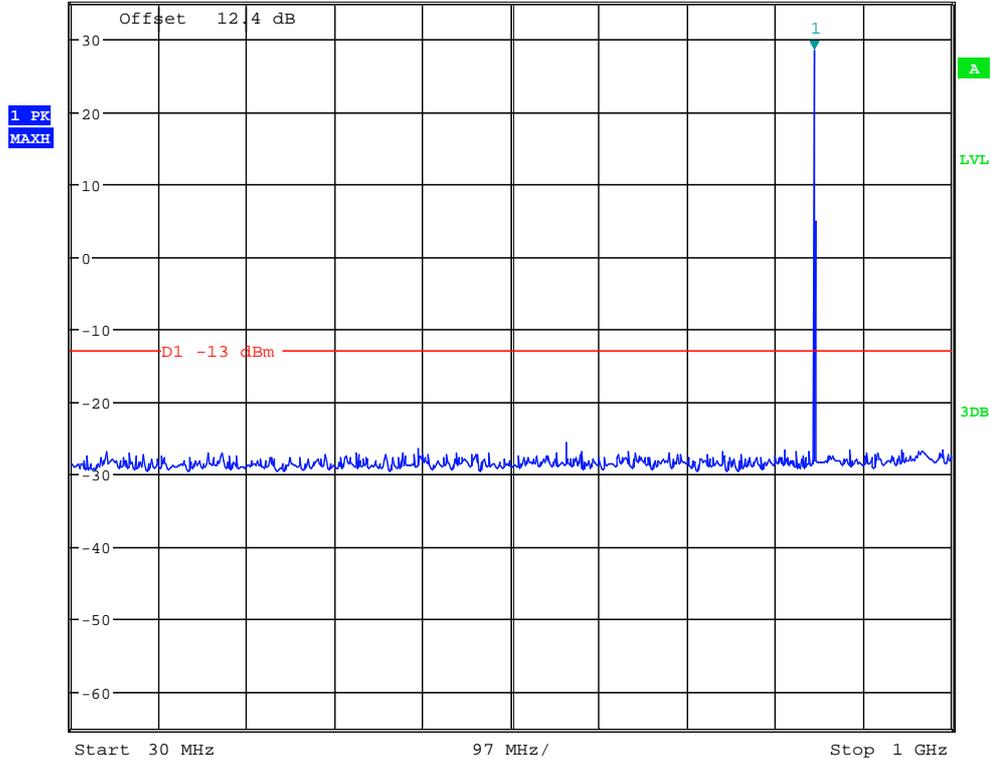
Date: 24.JUN.2012 15:00:58



Channel 251



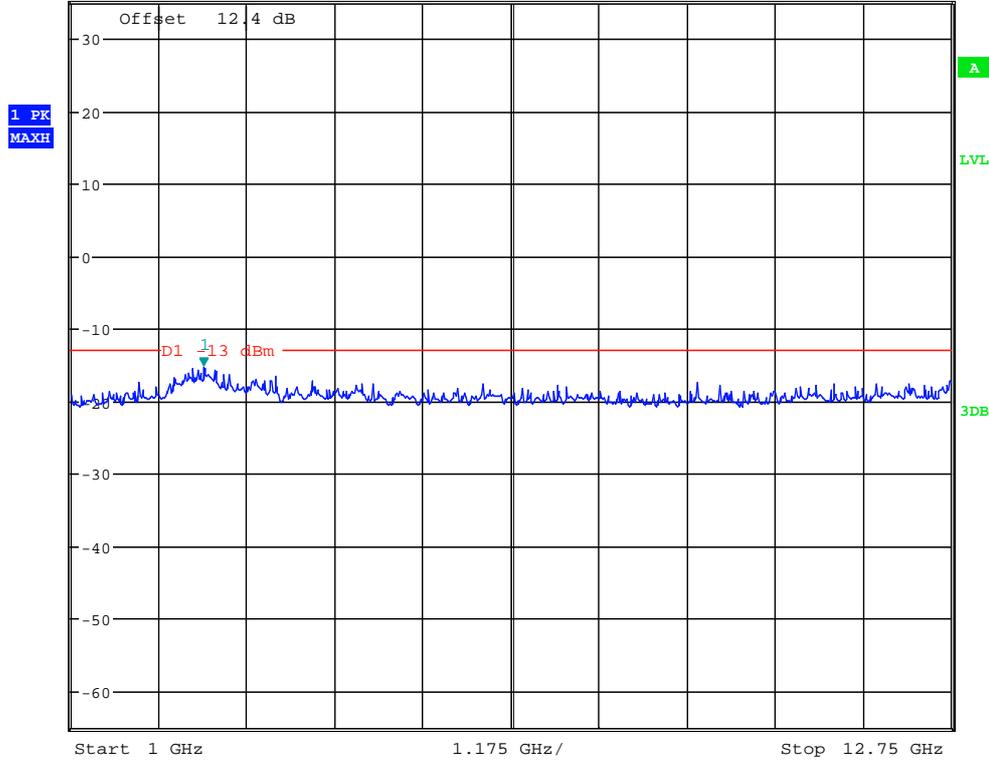
Ref 35 dBm Att 50 dB SWT 100 ms Marker 1 [T1] 28.44 dBm
*RBW 100 kHz *VBW 300 kHz 849.214743590 MHz



Date: 24.JUN.2012 15:01:12



*RBW 1 MHz Marker 1 [T1]
 *VBW 3 MHz -15.24 dBm
 Ref 35 dBm Att 50 dB SWT 70 ms 2.770032051 GHz



Date: 24.JUN.2012 15:01:56

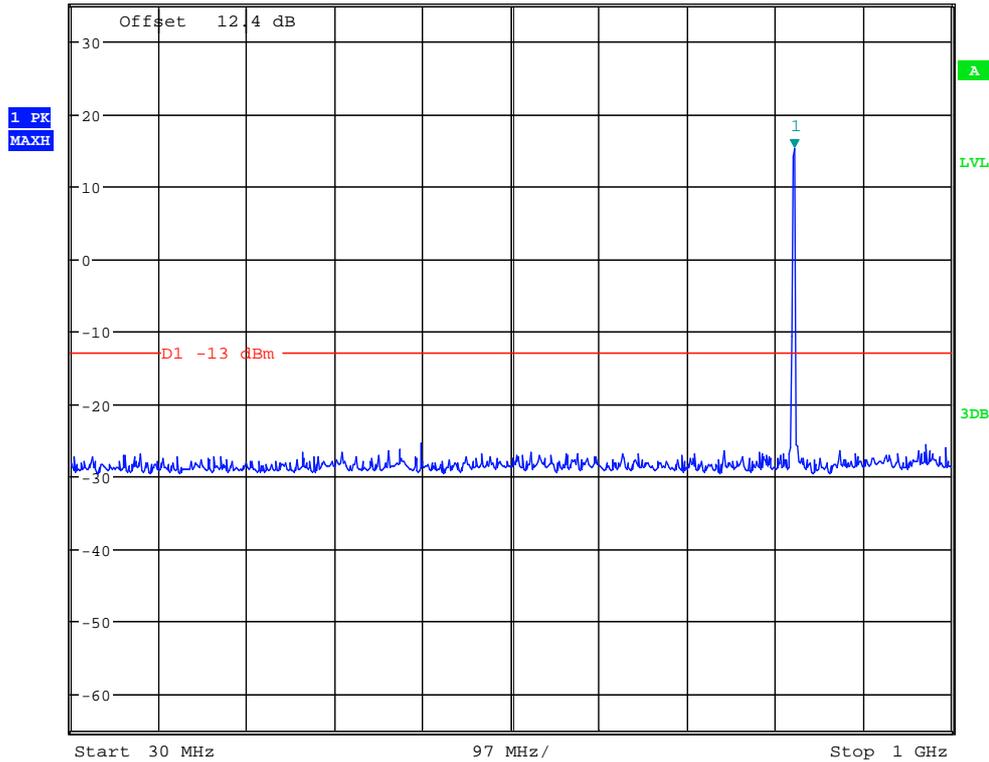


TM3: WCDMA

Channel 4132



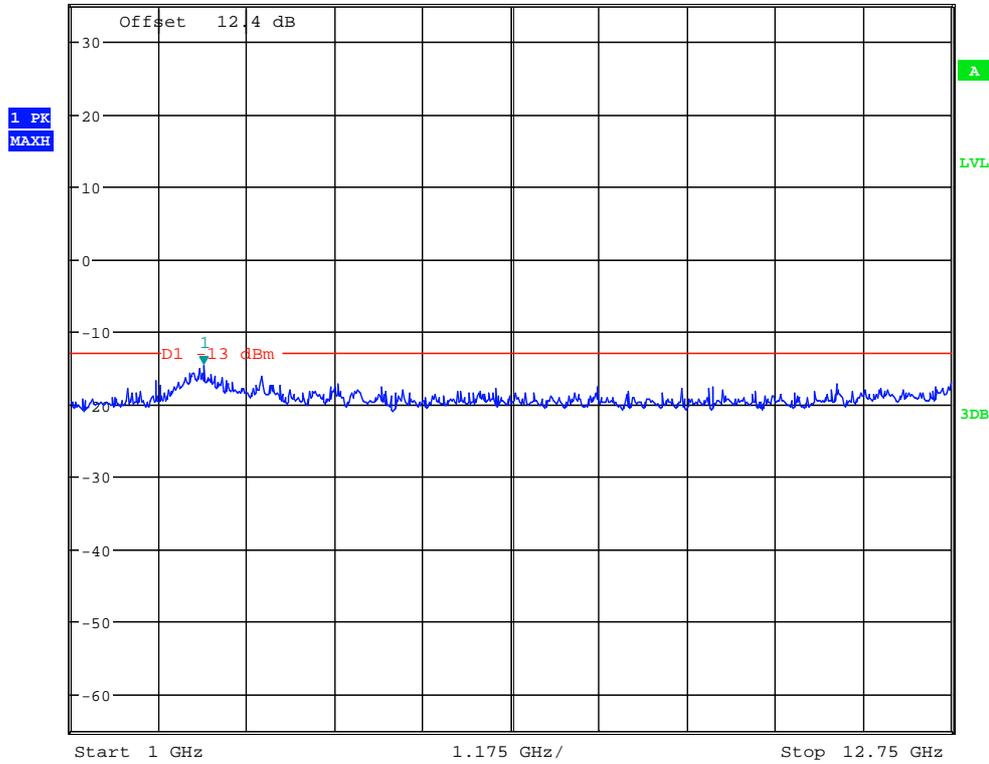
Ref 35 dBm Att 50 dB *RBW 100 kHz *VBW 300 kHz SWT 100 ms Marker 1 [T1] 15.18 dBm 827.451923077 MHz



Date: 24.JUN.2012 15:07:57



Ref 35 dBm Att 50 dB SWT 70 ms
*RBW 1 MHz Marker 1 [T1]
*VBW 3 MHz -14.77 dBm
2.770032051 GHz



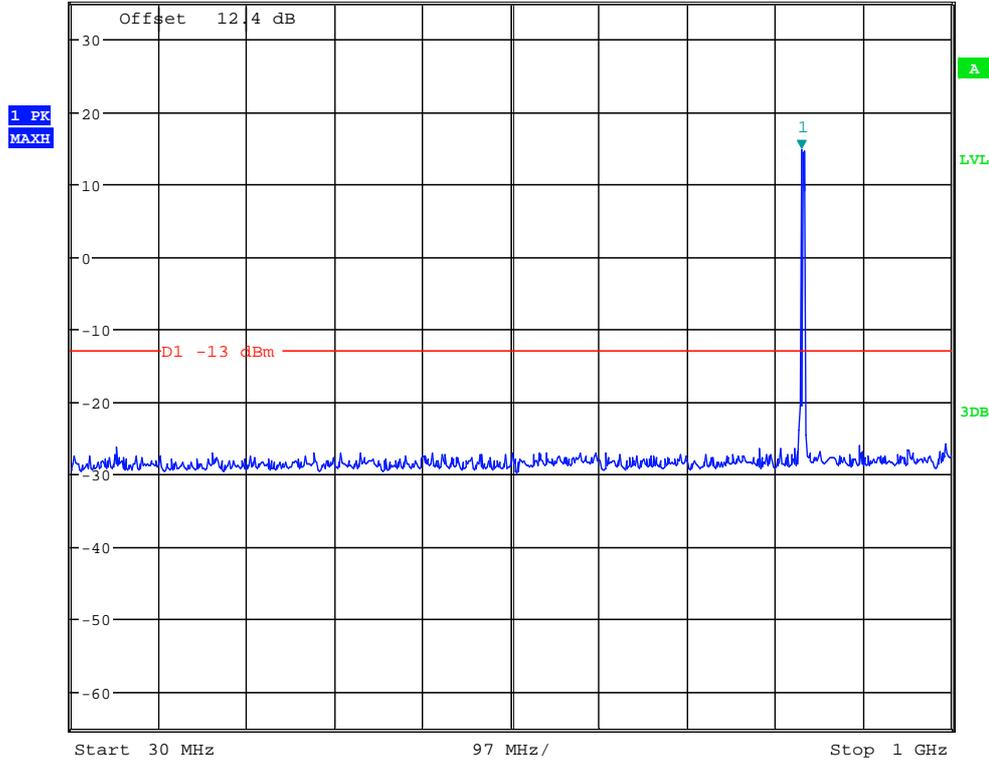
Date: 24.JUN.2012 15:08:41



Channel 4182



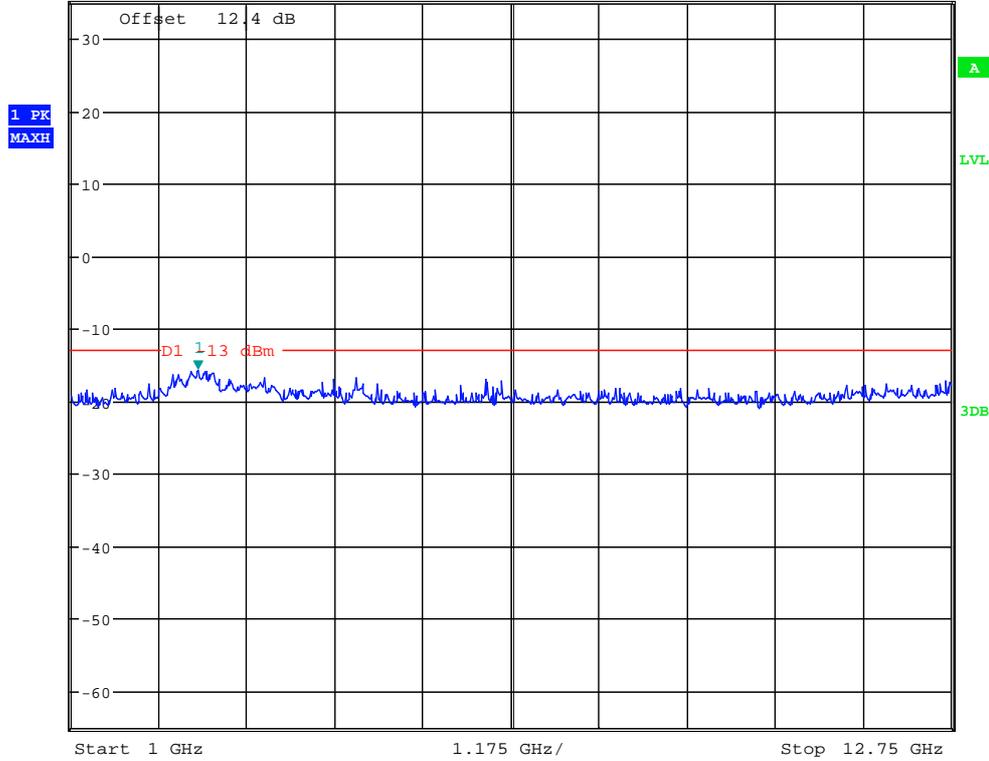
*RBW 100 kHz Marker 1 [T1]
 *VBW 300 kHz 14.79 dBm
 Ref 35 dBm Att 50 dB SWT 100 ms 835.224358974 MHz



Date: 24.JUN.2012 15:08:11



*RBW 1 MHz Marker 1 [T1]
 *VBW 3 MHz -15.78 dBm
 Ref 35 dBm Att 50 dB SWT 70 ms 2.694711538 GHz



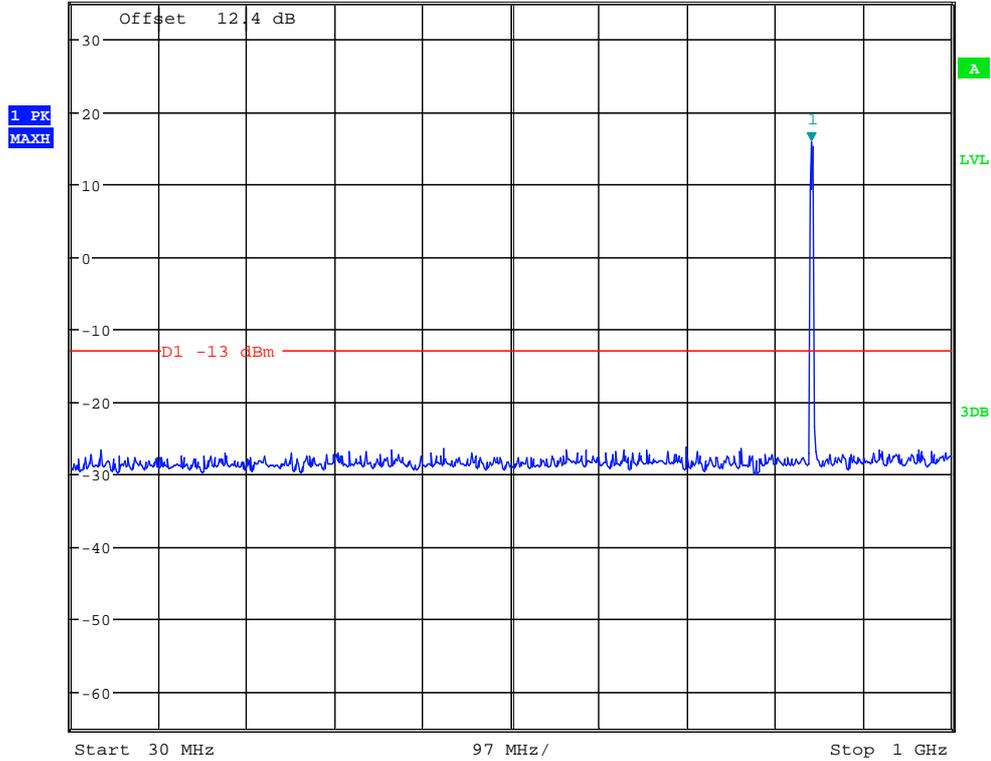
Date: 24.JUN.2012 15:08:55



Channel 4233



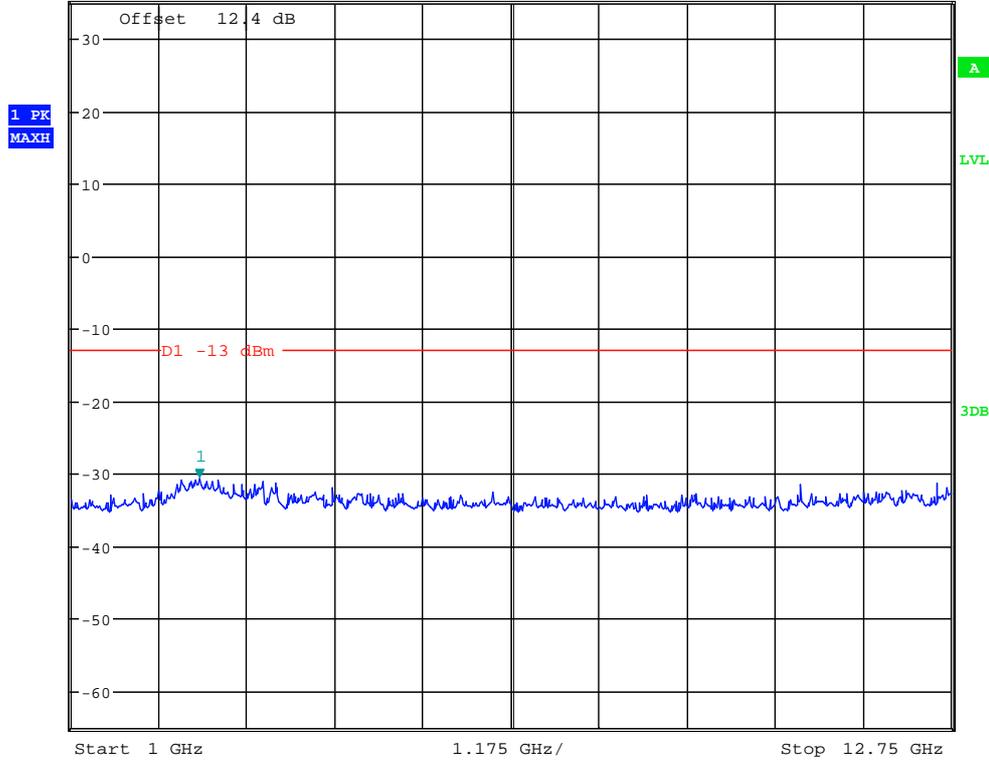
Ref 35 dBm Att 50 dB SWT 100 ms
*RBW 100 kHz *VBW 300 kHz
Marker 1 [T1] 15.78 dBm
846.105769231 MHz



Date: 24.JUN.2012 15:08:26



*RBW 1 MHz Marker 1 [T1]
 *VBW 3 MHz -30.75 dBm
 Ref 35 dBm *Att 35 dB SWT 70 ms 2.713541667 GHz



Date: 24.JUN.2012 15:09:27

-----END-----



Appendix F

Radiated spurious emission

According to FCC Part 2.1053 & Part22.917 & RSS-132

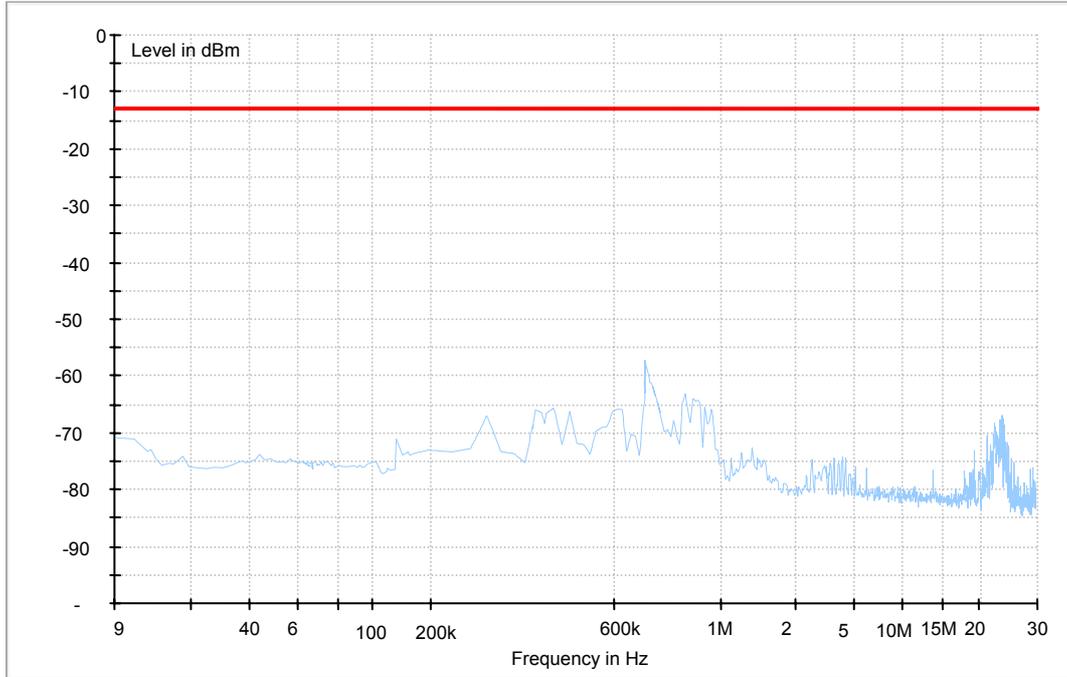


Note: 1. Simultaneous transmission was investigated and no new emissions were found.

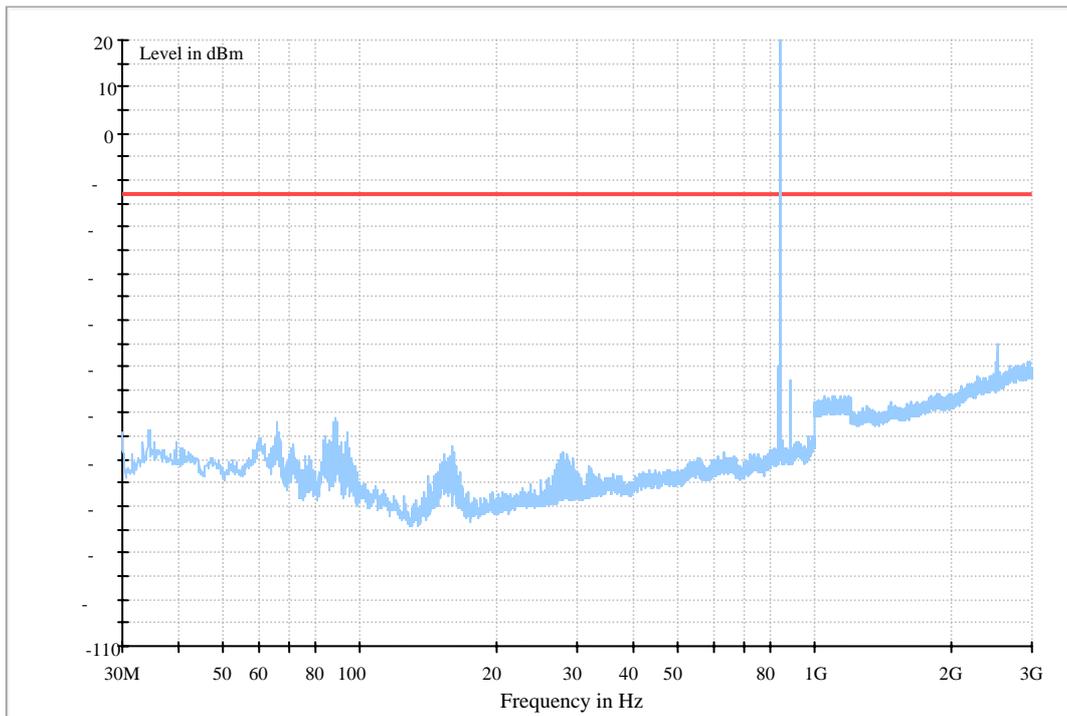
2. RBW \geq 1MHz, VBW $>$ 3 x RBW.

GPRS 850

Traffic Mode (9kHz-30MHz)

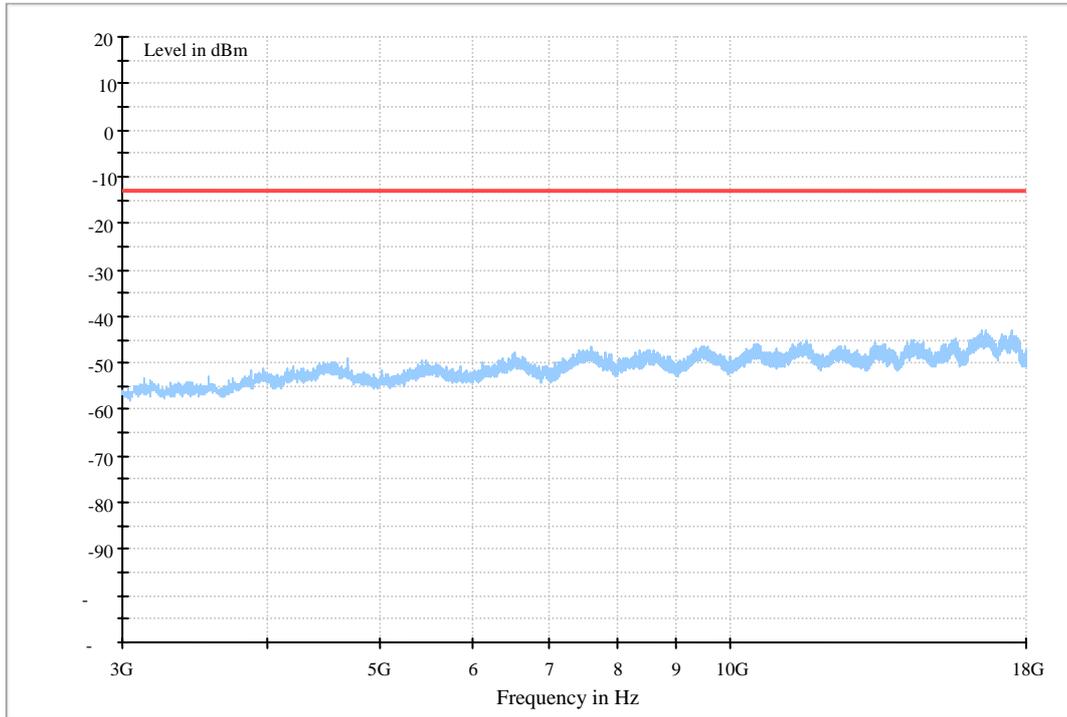


Traffic Mode (30MHz-3GHz)





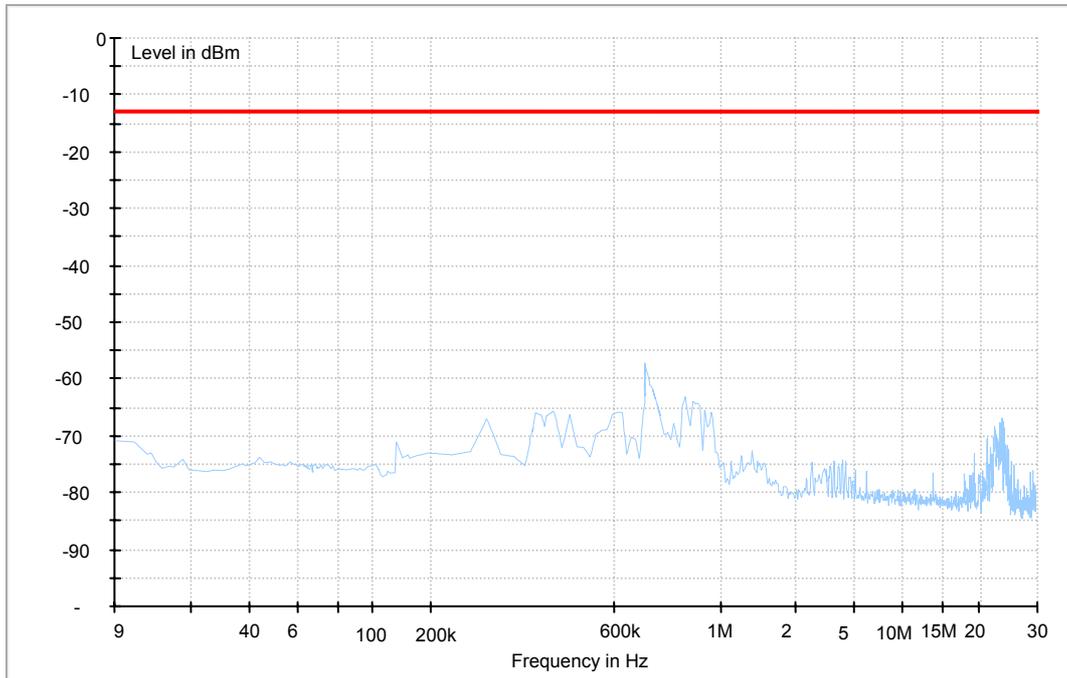
Traffic Mode (3GHz-18GHz)



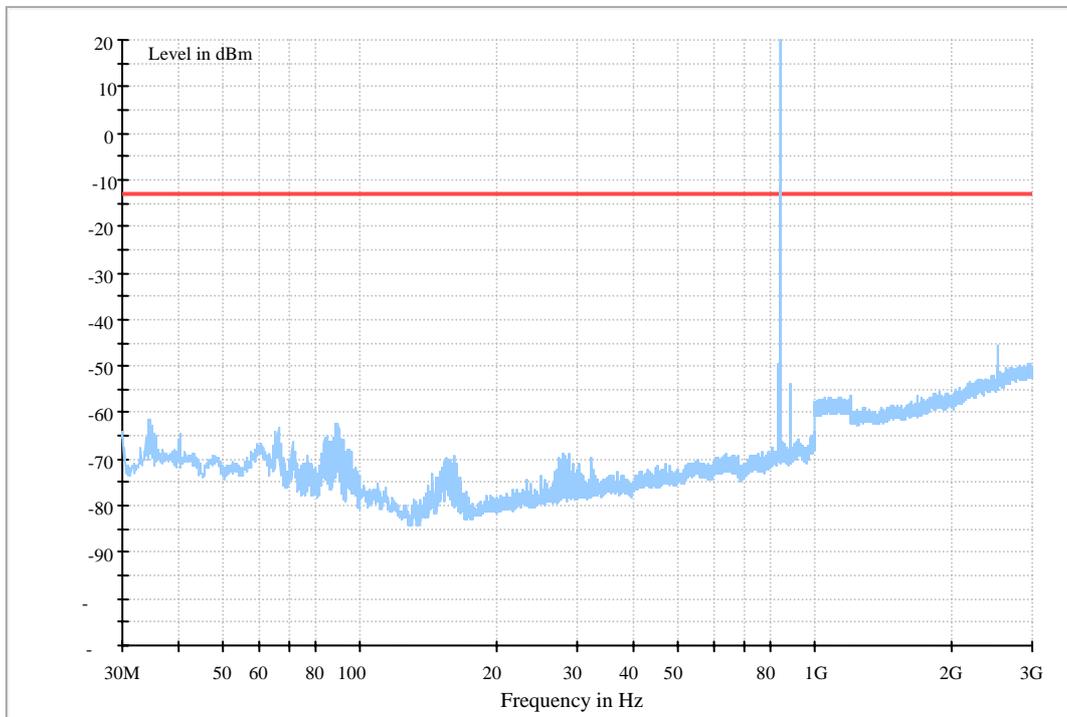


EDGE 850

Traffic Mode (9kHz-30MHz)

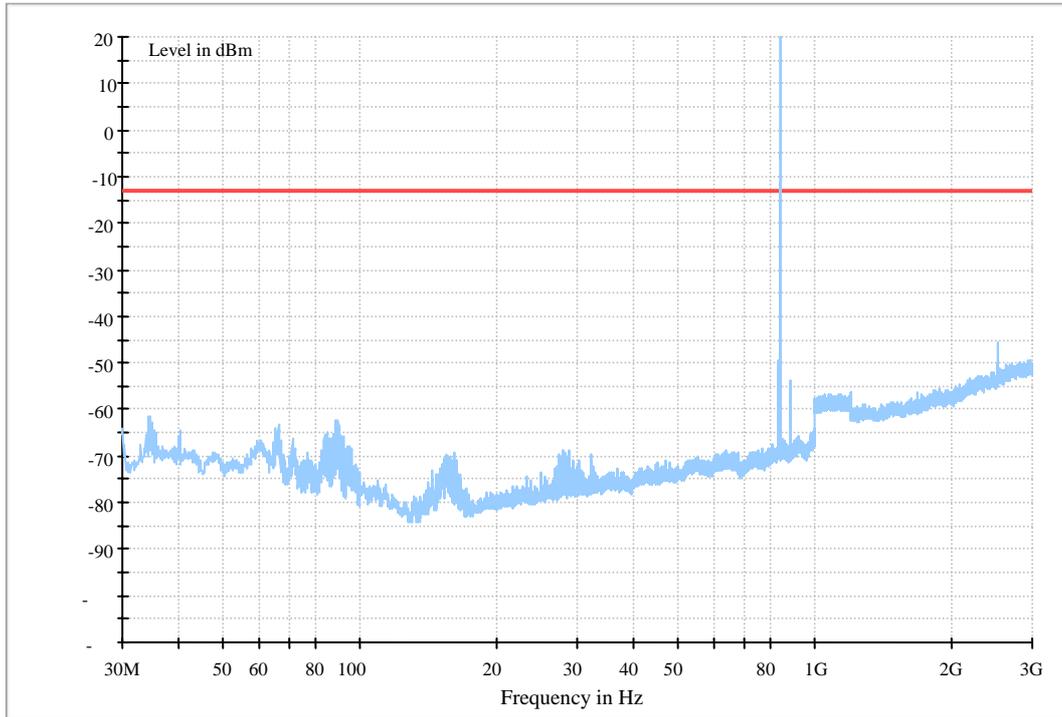


Traffic Mode (30MHz-3GHz)





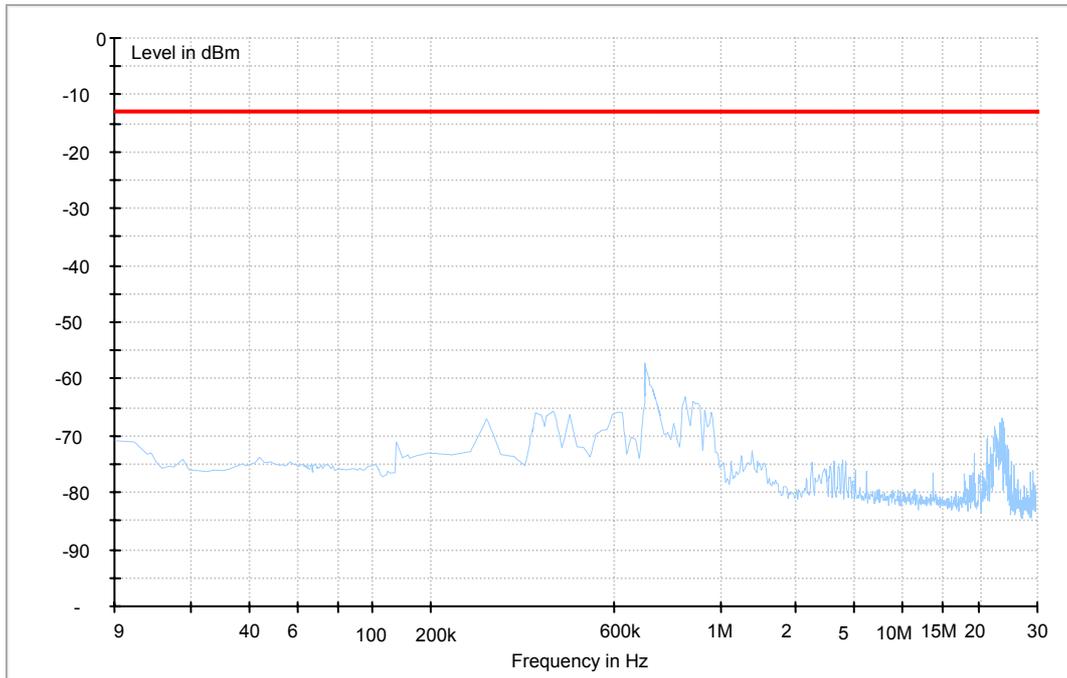
Traffic Mode (3GHz-18GHz)



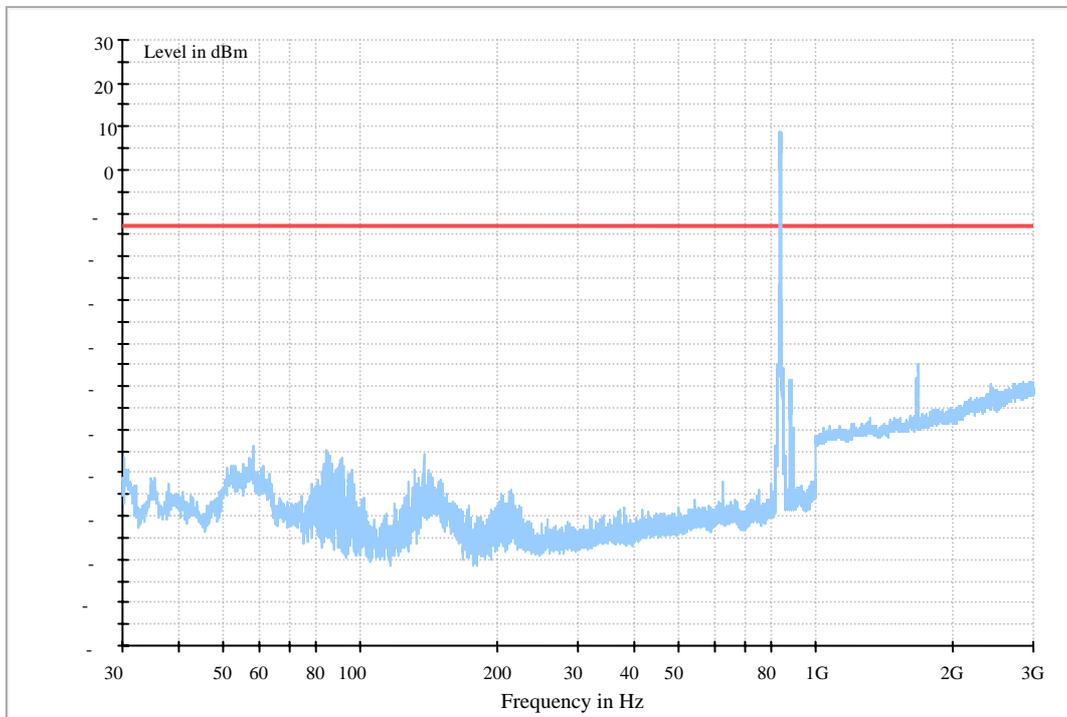


WCDMA 850

Traffic Mode (9kHz-30MHz)

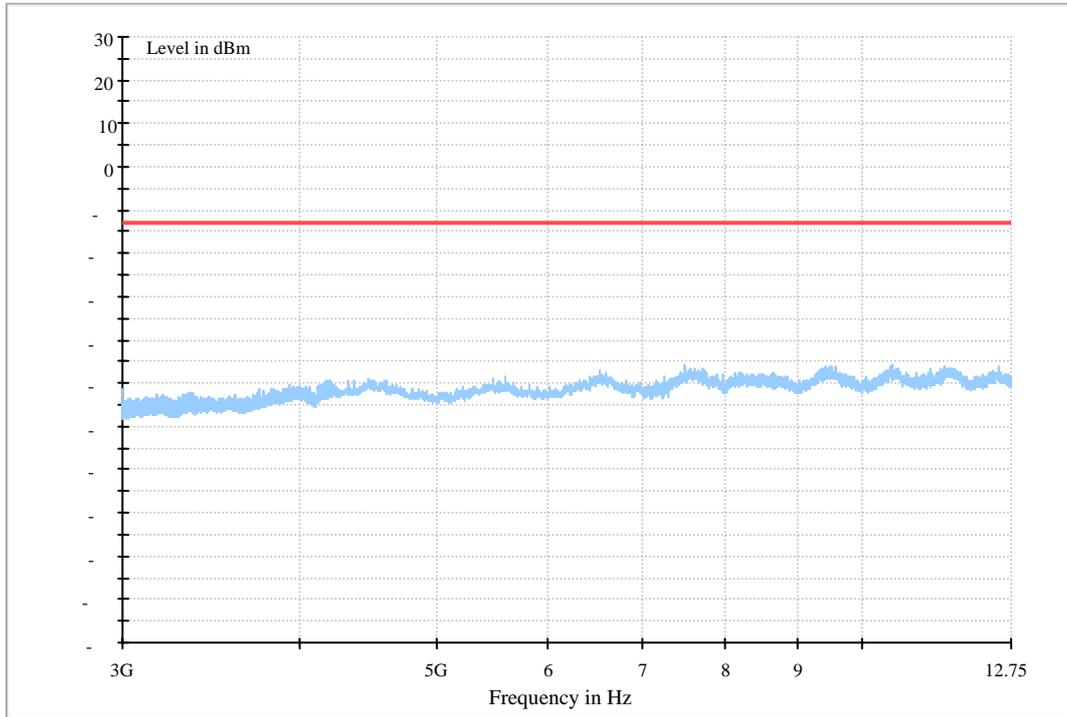


Traffic Mode (30MHz-3GHz)





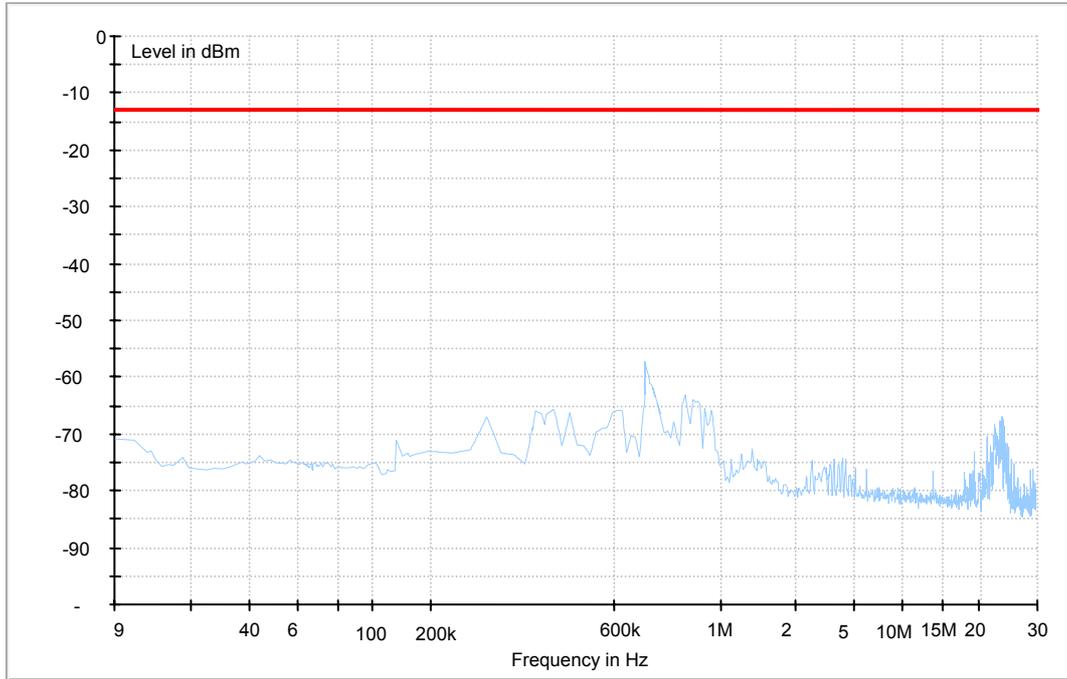
Traffic Mode (3GHz-18GHz)



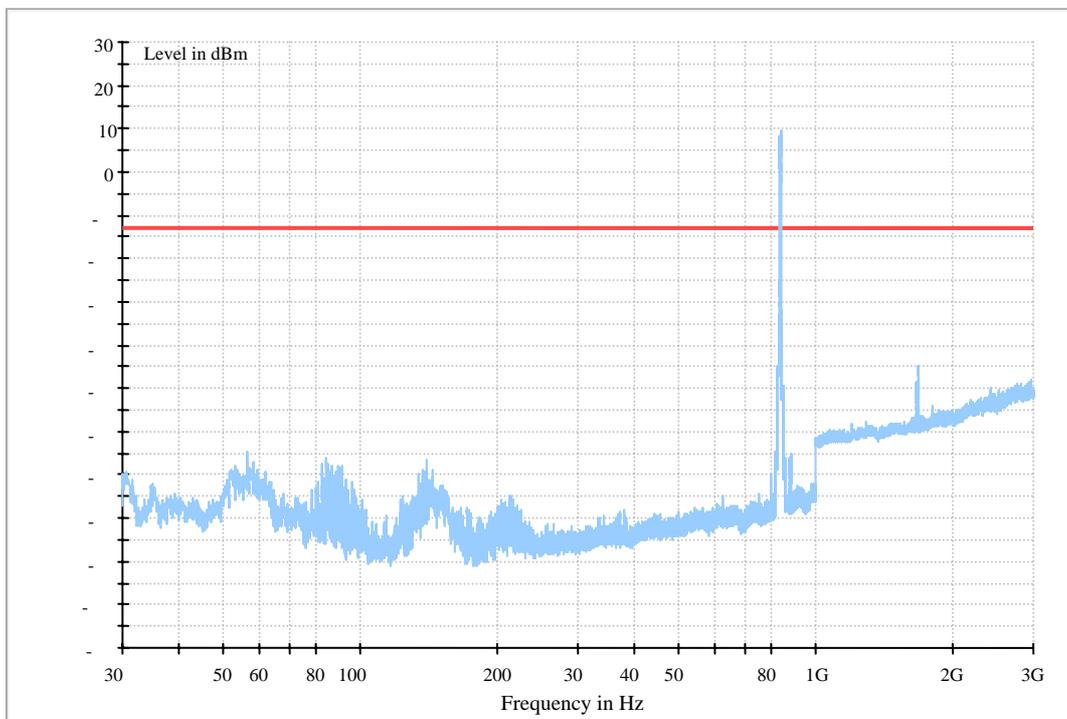


HSDPA 850

Traffic Mode (9kHz-30MHz)

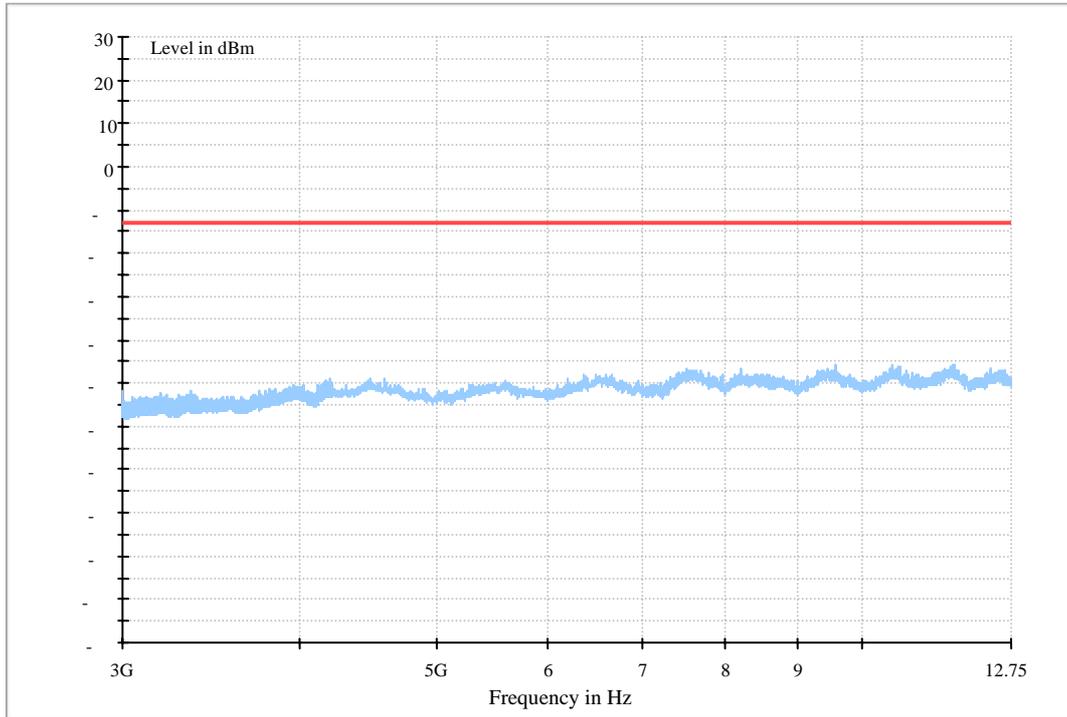


Traffic Mode (30MHz-3GHz)





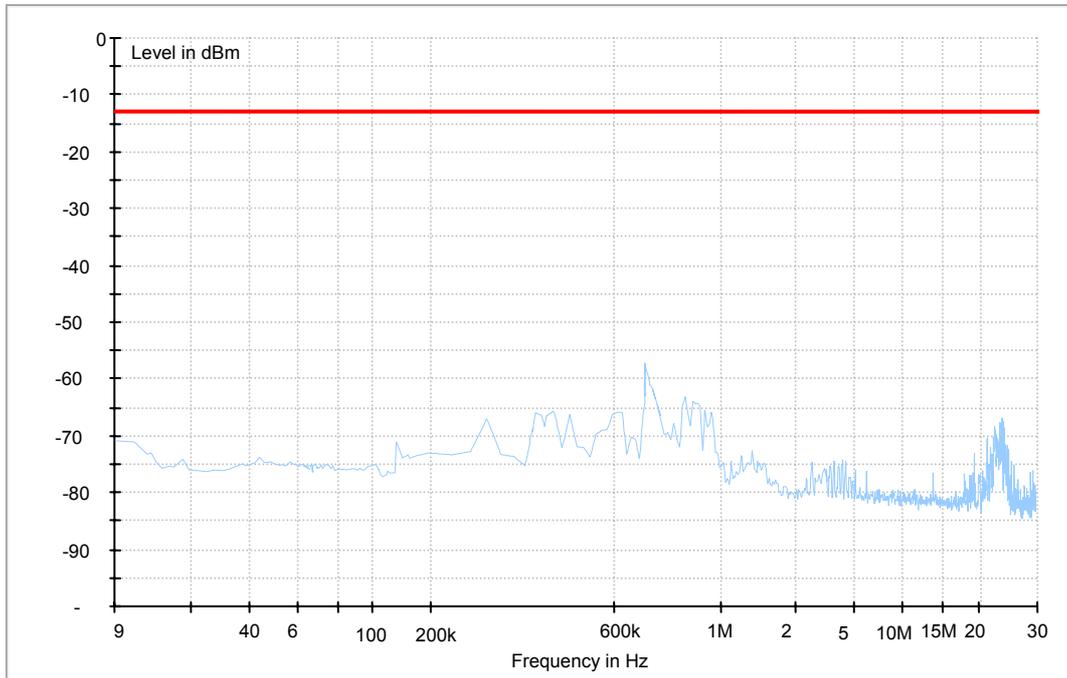
Traffic Mode (3GHz-18GHz)



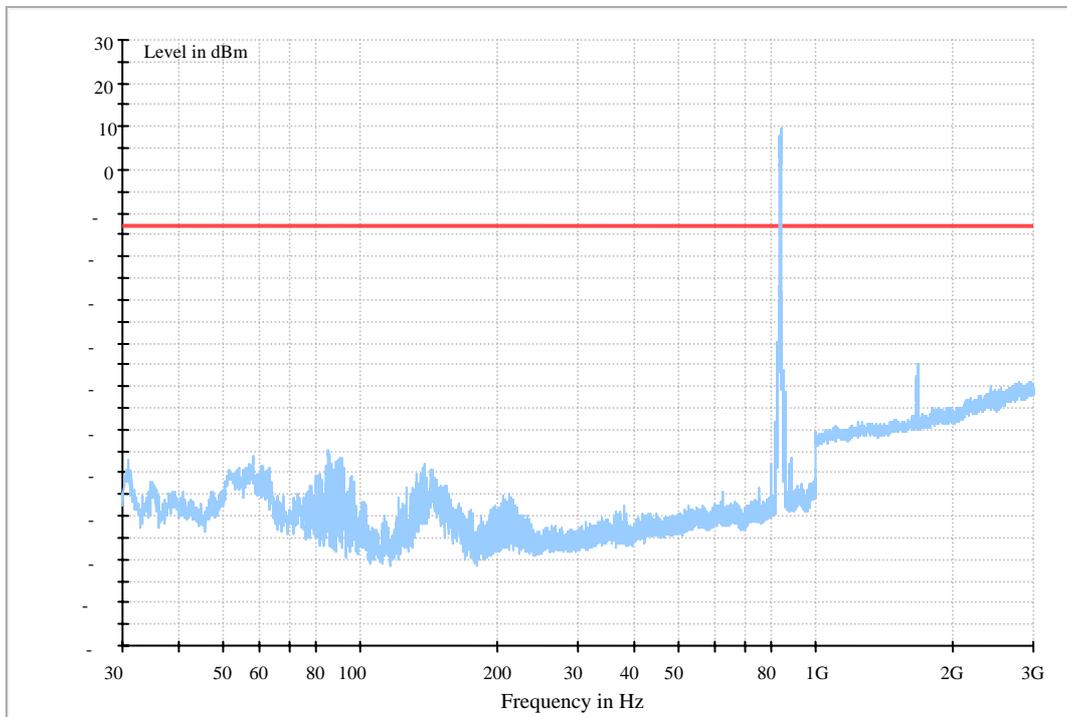


HSUPA 850

Traffic Mode (9kHz-30MHz)

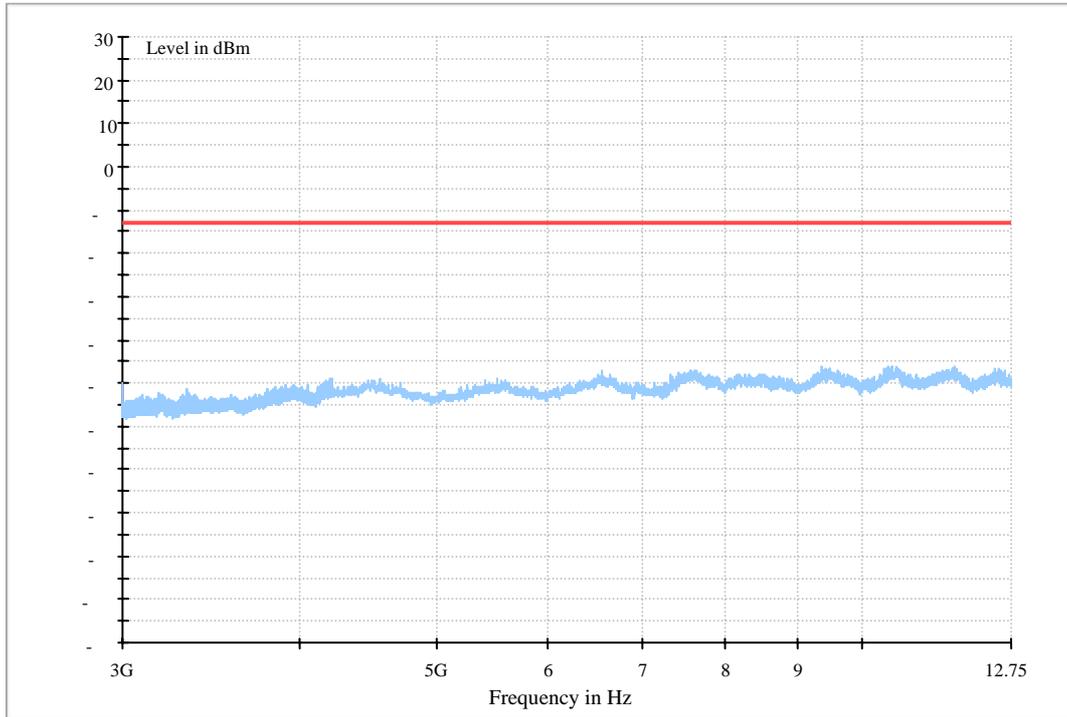


Traffic Mode (30MHz-3GHz)





Traffic Mode (3GHz-18GHz)





FCC Test Report of B593u-501
FCC ID: QISB593U-501
IC ID : 6369A-B593U501



Appendix G

Frequency Stability

According to FCC Part 2.1055 & Part 22.355 & RSS-132



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	-19	-0.0227	---	±2.5	Pass
			-20 °C	-15	-0.0179	---	±2.5	Pass
			-10 °C	22	0.02628	---	±2.5	Pass
			0 °C	19	0.0227	---	±2.5	Pass
			10 °C	-16	-0.0191	---	±2.5	Pass
			20 °C	-15	-0.0179	---	±2.5	Pass
			30 °C	17	0.02031	---	±2.5	Pass
			40 °C	16	0.01912	---	±2.5	Pass
			50 °C	14	0.01673	---	±2.5	Pass
TM 2	M	VN	-30 °C	18	0.02151	---	±2.5	Pass
			-20 °C	-20	-0.0239	---	±2.5	Pass
			-10 °C	14	0.01673	---	±2.5	Pass
			0 °C	17	0.02031	---	±2.5	Pass
			10 °C	-15	-0.0179	---	±2.5	Pass
			20 °C	-17	-0.0203	---	±2.5	Pass
			30 °C	-19	-0.0227	---	±2.5	Pass
			40 °C	15	0.01792	---	±2.5	Pass
			50 °C	25	0.02987	---	±2.5	Pass
TM 3	M	VN	-30 °C	16	0.01912	---	±2.5	Pass
			-20 °C	-12	-0.0143	---	±2.5	Pass
			-10 °C	17	0.02031	---	±2.5	Pass
			0 °C	15	0.01792	---	±2.5	Pass
			10 °C	-19	-0.0227	---	±2.5	Pass
			20 °C	13	0.01553	---	±2.5	Pass
			30 °C	-18	-0.0215	---	±2.5	Pass
			40 °C	-14	-0.0167	---	±2.5	Pass
			50 °C	19	0.0227	---	±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	18	0.02151	---	±2.5	Pass
			VN	-16	-0.0191	---	±2.5	Pass
			VH	14	0.01673	---	±2.5	Pass
TM 2	M	TN	VL	25	0.02987	---	±2.5	Pass
			VN	-19	-0.0227	---	±2.5	Pass
			VH	21	0.02509	---	±2.5	Pass
TM 3	M	TN	VL	15	0.01792	---	±2.5	Pass
			VN	23	0.02748	---	±2.5	Pass
			VH	-16	-0.0191	---	±2.5	Pass

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



FCC Test Report of B593u-501
FCC ID: QISB593U-501
IC ID : 6369A-B593U501



Appendix H

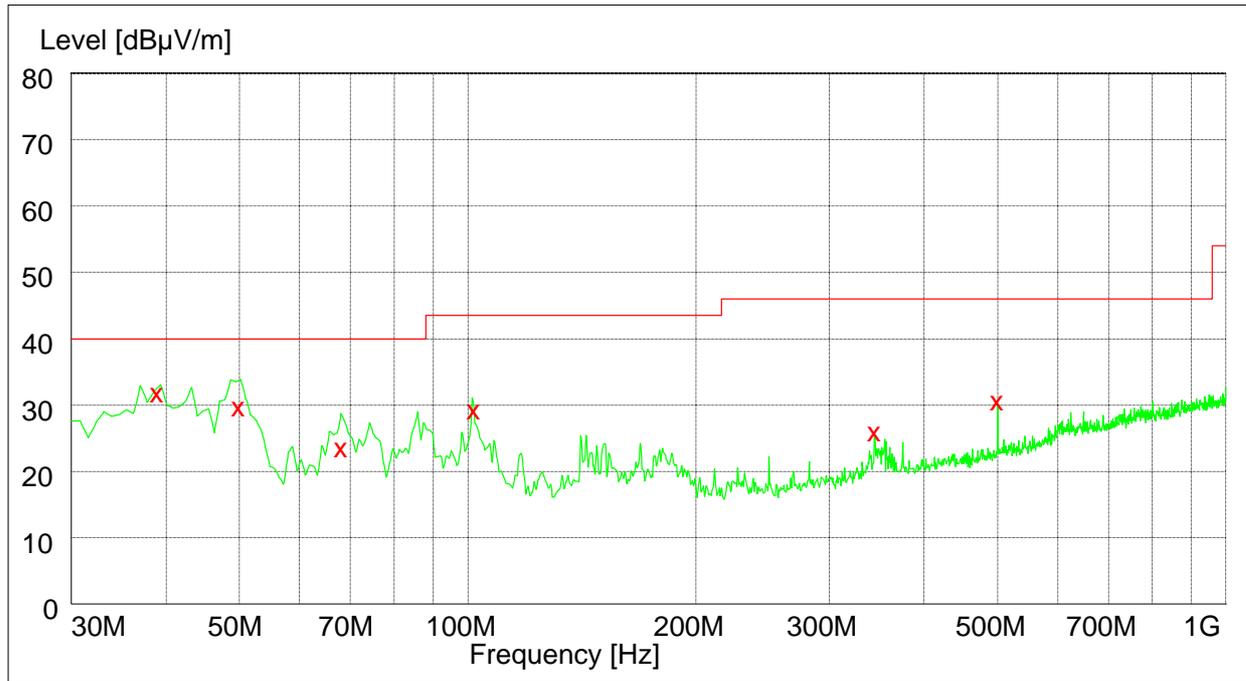
Receiver Spurious Emissions

According to RSS-132



This test was carried out in all the test modes, Here only the worst test result was shown.

30MHz-1GHz

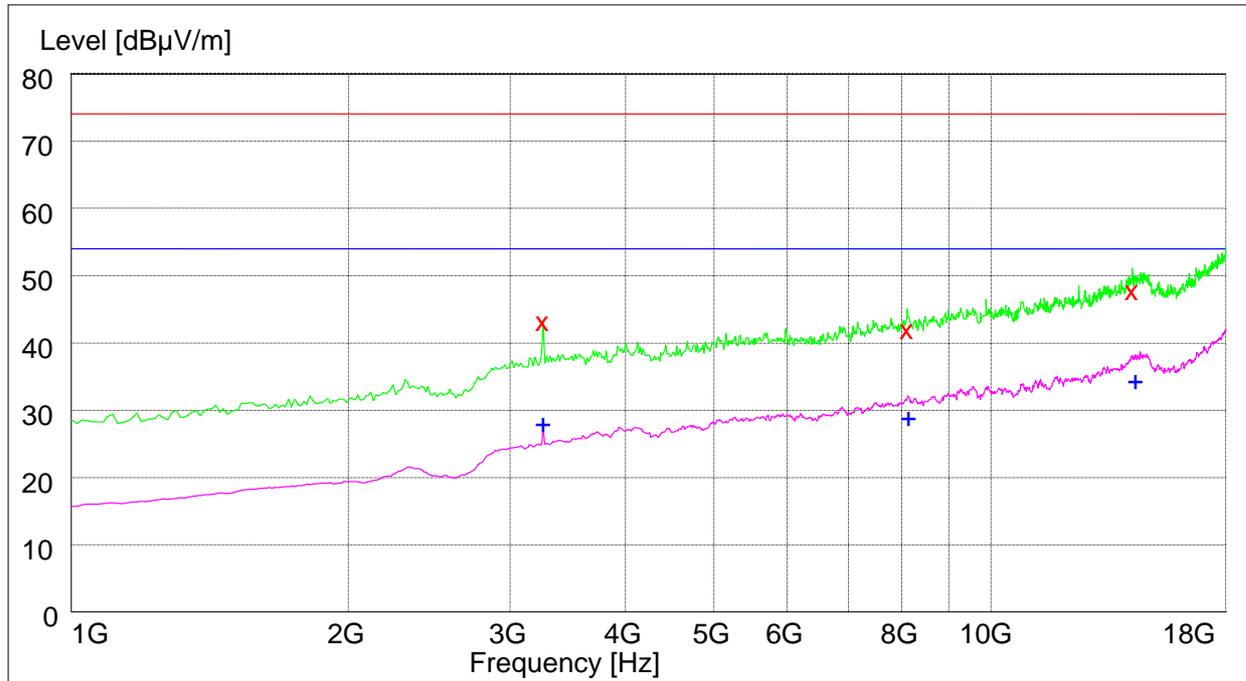


MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
38.940000	32.60	15.3	40.0	7.4	104.0	352.00	VERTICAL
49.860000	30.60	15.0	40.0	9.4	100.0	101.00	VERTICAL
68.220000	24.30	11.2	40.0	15.7	100.0	19.00	VERTICAL
101.880000	30.10	13.4	43.5	13.4	131.0	95.00	VERTICAL
344.400000	26.70	16.4	46.0	19.3	105.0	332.00	HORIZONTAL
499.980000	31.40	19.2	46.0	14.6	104.0	37.00	HORIZONTAL



1GHz-18GHz



MEASUREMENT RESULT: PK Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
3256.100000	44.00	-7.2	74.0	30.0	100.0	138.00	VERTICAL
8112.800000	42.80	4.9	74.0	31.2	200.0	359.00	HORIZONTAL
14240.400000	48.60	14.1	74.0	25.4	159.0	68.00	VERTICAL

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
3256.100000	28.90	-7.2	54.0	25.1	100.0	140.00	VERTICAL
8136.000000	29.80	5.1	54.0	24.2	200.0	300.00	VERTICAL
14345.600000	35.30	14.8	54.0	18.7	200.0	172.00	VERTICAL



Appendix I

Photos of Radiated Spurious Emissions



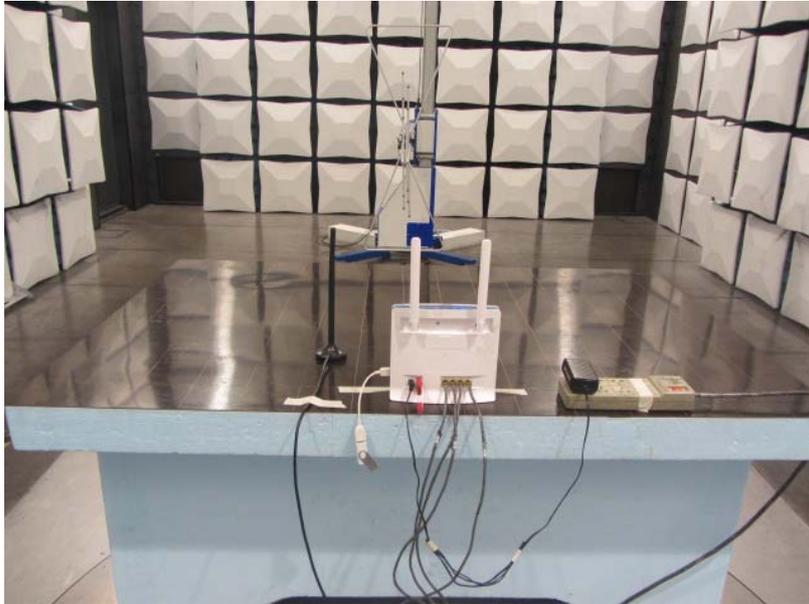
FCC Test Report of B593u-501
FCC ID: QISB593U-501
IC ID : 6369A-B593U501

IC Test Report of LTE CPE
IC ID: 6369A-B593U-501

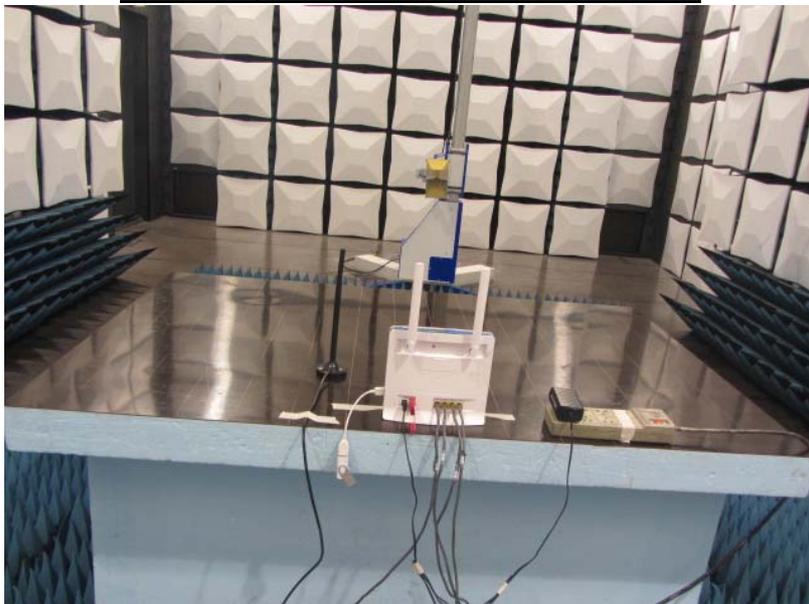
Photos of Test Setup



1 Receiver Spurious Emissions



Receiver Spurious Emissions (30MHz-1GHz)



Receiver Spurious Emissions (above 1GHz)