



# FCC RF Test Report

**Product Name: LTE CPE**

**Model Number: B593u-501**

**Report No: SYBH(Z-RF)023062012-2003**

**FCC ID:QISB593U-501**

**IC ID:6369A-B593U501**

**Reliability Laboratory of Huawei Technologies Co., Ltd.**

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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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5. The test report is invalid if not marked with the stamps or the signatures of the persons responsible for performing, revising and approving the test report.
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8. Normally, the test report is only responsible for the samples that have undergone the test.
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<b>Applicant:</b>	Huawei Technologies Co., Ltd.
<b>Address:</b>	Huawei Base, Bantian, Longgang District, Shenzhen 518129, P.R. China
<b>Date of Receipt Test Item:</b>	Jun., 21, 2012
<b>Start Date of Test:</b>	July., 03, 2012
<b>End Date of Test:</b>	July., 09, 2012
<b>Test Result:</b>	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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## General Information

<b>1.1 Applied Standard</b>	
Applied Rules:	
	47 CFR FCC Part 2:2011, Subpart J 47 CFR FCC Part 24:2011, Subpart E ANSI/TIA 603C:2004 IC RSS-Gen Issue 3 IC RSS-133 Issue 5
<b>1.2 Test Location</b>	
Test Location 1:	
Address:	
	Reliability Laboratory of Huawei Technologies Co., Ltd. Huawei Base, Bantian, Longgang District, Shenzhen 518129, P.R. China
<b>1.3 Test Environmental Condition</b>	
Ambient Temperature:	
Ambient Relative Humidity:	
Atmospheric Pressure:	
	20 – 25 °C 45 – 55 % 101 kPa

# 1 Summary

Table 1 Summary of results

Test Case	FCC Part No.	Requirements	Result
PCS Band			
Transmitter Output Power	2.1046 & 24.232	Peak EIRP not exceed 2 W	Pass
Modulation Characteristics	2.104	Digital modulation	Pass
Occupied Bandwidth	2.104	(Not specified)	Pass
Band Edges Compliance	2.1051 & 24.238	Below -13 dBm/1%*EBW, in 1 MHz range	Pass
Spurious Emission at Antenna Terminals	2.1051 & 24.238	Below -13 dBm/1 MHz, 30 MHz to 10 <sup>th</sup> harmonics	Pass
Field Strength of Spurious Radiation	2.1053 & 24.238	Below -13 dBm/1 MHz	Pass
Frequency Stability	2.1055 & 24.235	Stay within the authorized frequency block	Pass

Table 2 Summary of results

Test Case	IC Standard No.	Requirements	Result
PCS Band			
Transmitter Output Power	RSS-Gen, §4.8; RSS-133, §6.4	EIRP not exceed 2 W Peak-to-average ratio not exceed 13 dB	Pass
Modulation Characteristics	RSS-133, §6.2	Digital modulation	Pass
Occupied Bandwidth	RSS-Gen, §4.6	(Not specified)	Pass
Band Edges Compliance	RSS-Gen, §4.9; RSS-133, §6.5	Below -13 dBm/1%*EBW, in 1 MHz range	Pass
Spurious Emission at Antenna Terminals	RSS-Gen, §4.9; RSS-133, §6.5	Below -13 dBm/1 MHz, 30 MHz to 5 <sup>th</sup> harmonics	Pass
Field Strength of Spurious Radiation	RSS-Gen, §4.9; RSS-133, §6.5	Below -13 dBm/1 MHz	Pass
Frequency Stability	RSS-Gen, §4.7; RSS-133, §6.3	Maintained within the tolerances of ±1.0 ppm	Pass
Receiver Spurious Emissions (Conducted)	RSS-Gen, §4.10; RSS-Gen, §6; RSS-133, §6.6	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

## 2 Product Description

### 2.1 Product Information

#### 2.1.1 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.

#### 2.1.2 Board Information

Table 3 Board Information

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

#### 2.1.3 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)

### 3 Test Description

#### 3.1 Supported Frequency Range

Characteristics	Description
Downlink	1930 to 1990 MHz
Uplink	1850 to 1910 MHz

#### 3.2 Transmitter / Receiver Characteristics

Characteristics	Description
System Type	GSM UMTS
TX Output Power (per Antenna Port)	GSM system: 30dBm; UMTS system: 24dBm
Channel Spacing(s) / Bandwidth(s)	GSM system: 200 kHz UMTS system: 5 MHz
Designation of Emissions	GSM system: 250KGXW (GMSK modulation), 247KG7W (8PSK modulation) UMTS system: 4M16F0W

#### 3.3 Antenna Gain

Antenna Gain(dBi)	2
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#### 3.4 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

## 4 General Test Conditions / Configurations

### 4.1 RF Channels under Test

Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
TM1/TM2	TX	Channel 512	Channel 661	Channel 810
		1850.2MHz	1880.0MHz	1909.8MHz
	RX	Channel 512	Channel 661	Channel 810
		1930.2 MHz	1960.0 MHz	1989.8 MHz
TM3/TM4/TM5	TX	Channel 9262	Channel9400	Channel9538
		1852.4MHz	1880.0MHz	1907.6MHz
	RX	Channel 9662	Channel 9800	Channel 9938
		1932.4 MHz	1960.0 MHz	1987.6 MHz

### 4.2 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

### 4.3 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

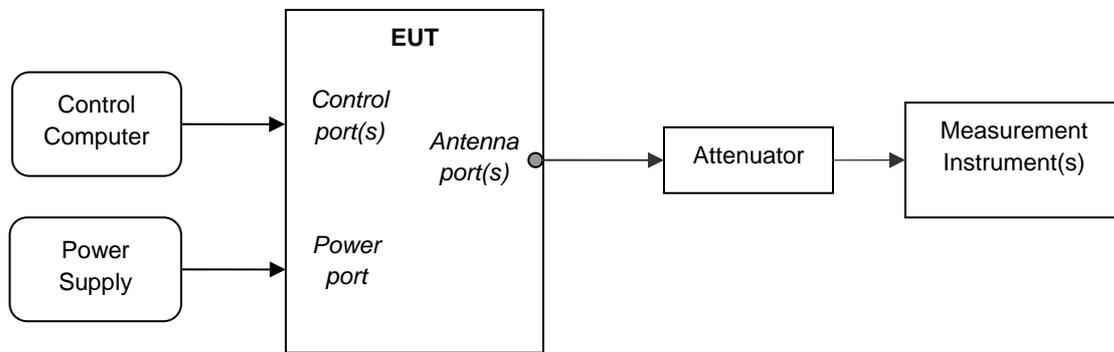
TN= normal temperature

## 4.4 Test Setup

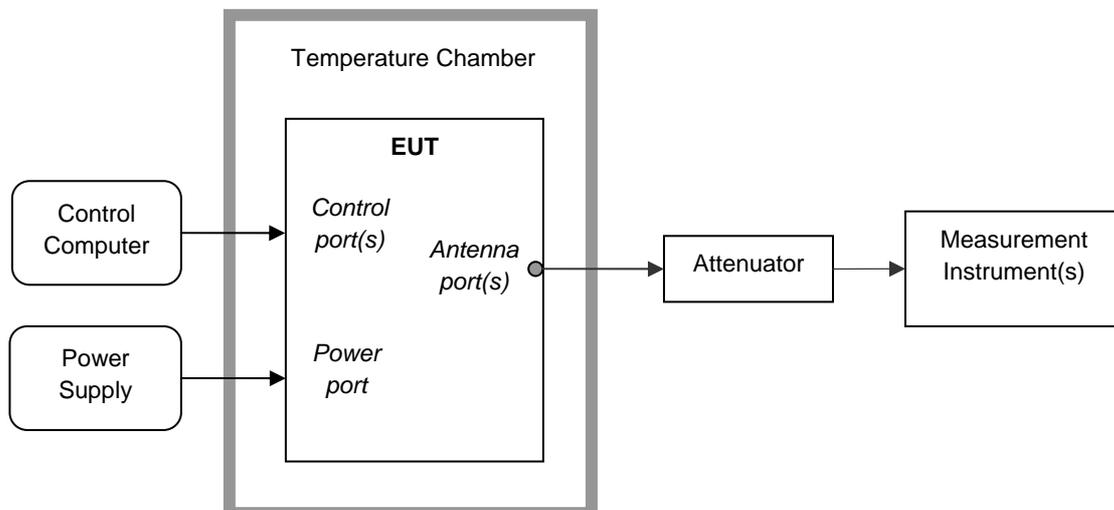
### 4.4.1 General Test Setup Configurations

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.

### 4.4.2 Test Setup 1



### 4.4.3 Test Setup 2



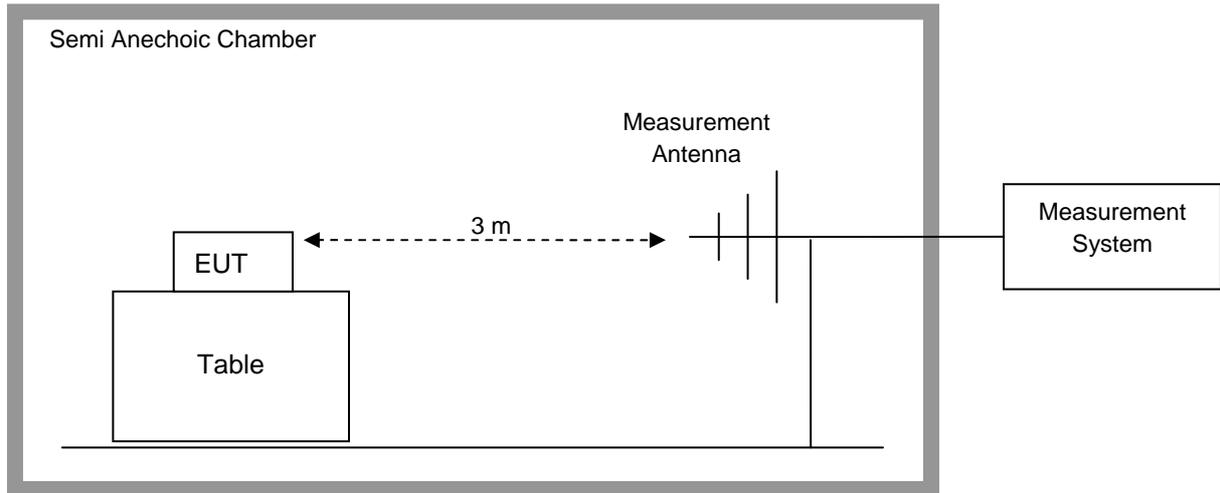
#### 4.4.4 Test Setup 3

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.

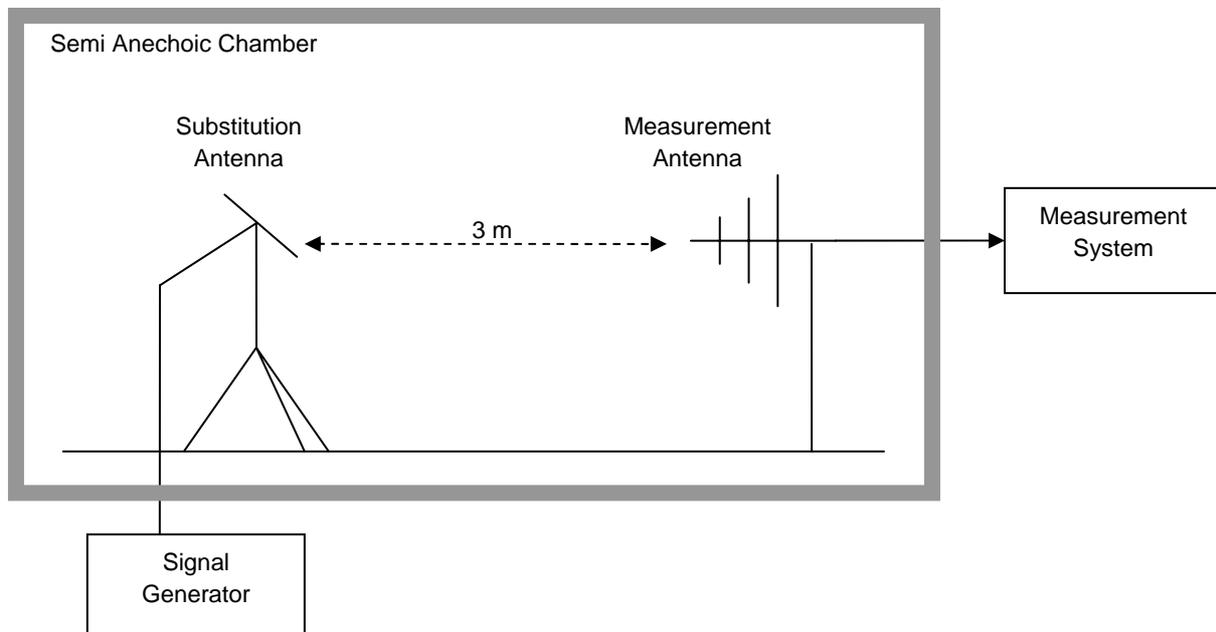
##### Step 1: Pre-test to find the Maximum ERP or EIRP

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 L, M, H 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.



## 4.5 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/TM4TM5
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/TM4TM5
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



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

## 5 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.

## 6 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.

## 7 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  
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# Appendix A

## Transmitter Output Power

According to FCC Part 2.1046 & Part24.232 & RSS-133



## Conducted Power of Transmitter

TEST CONDITIONS		RF Output Power (Conducted)					
		Channel512(L)		Channel661(M)		Channel810(H)	
		1850.2MHz		1880.0MHz		1909.8MHz	
		dBm		dBm		dBm	
$T_{nom} / V_{nom}$		Measured	Limit	Measured	Limit	Measured	Limit
TM1		28.23	33	28.08	33	28.57	33
TM2		24.53	33	24.39	33	24.43	33
TEST CONDITIONS		Channel9262(L)		Channel9400(M)		Channel9538(H)	
		1852.4MHz		1880.0MHz		1907.6MHz	
		dBm		dBm		dBm	
$T_{nom} / V_{nom}$		Measured	Limit	Measured	Limit	Measured	Limit
TM3		21.51	33	21.24	33	20.82	33
TM4	Case1	21.52	33	21.33	33	20.89	33
	Case2	21.54	33	21.28	33	20.94	33
	Case3	20.95	33	20.85	33	20.69	33
	Case4	21.02	33	20.86	33	20.62	33
TM5	Case1	21.01	33	20.89	33	20.33	33
	Case2	21.12	33	21.02	33	20.63	33
	Case3	21.69	33	21.41	33	20.86	33
	Case4	21.56	33	21.26	33	20.73	33
	Case5	21.58	33	21.27	33	20.74	33

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



## Peak-to-Average Ratio

Table 1 Measurement Results

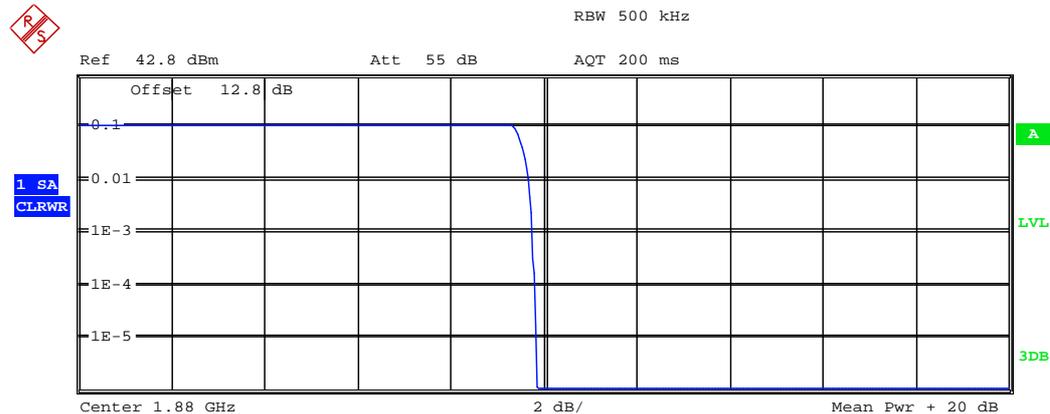
TEST CONDITIONS		Channel512(B)		Channel661(M)		Channel810(T)	
		1850.2MHz		1880.0MHz		1909.8MHz	
		dBm		dBm		dBm	
$T_{nom} / V_{nom}$		Measured	Limit	Measured	Limit	Measured	Limit
TM1		9.71	13.0	9.78	13.0	9.65	13.0
TM2		12.75	13.0	12.88	13.0	12.67	13.0
TEST CONDITIONS		Channel9262(B)		Channel9400(M)		Channel9538(T)	
		1852.4MHz		1880.0MHz		1907.6MHz	
		dBm		dBm		dBm	
$T_{nom} / V_{nom}$		Measured	Limit	Measured	Limit	Measured	Limit
TM3		3.02	13.0	3.04	13.0	3.01	13.0
TM4	Case1	2.79	13.0	2.74	13.0	2.98	13.0
	Case2	2.89	13.0	2.93	13.0	2.9	13.0
	Case3	2.69	13.0	2.67	13.0	2.82	13.0
	Case4	2.97	13.0	2.88	13.0	2.75	13.0
TM5	Case1	2.61	13.0	2.96	13.0	2.94	13.0
	Case2	2.63	13.0	2.78	13.0	2.68	13.0
	Case3	2.95	13.0	2.65	13.0	2.87	13.0
	Case4	2.66	13.0	2.76	13.0	2.91	13.0
	Case5	2.85	13.0	2.86	13.0	2.77	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



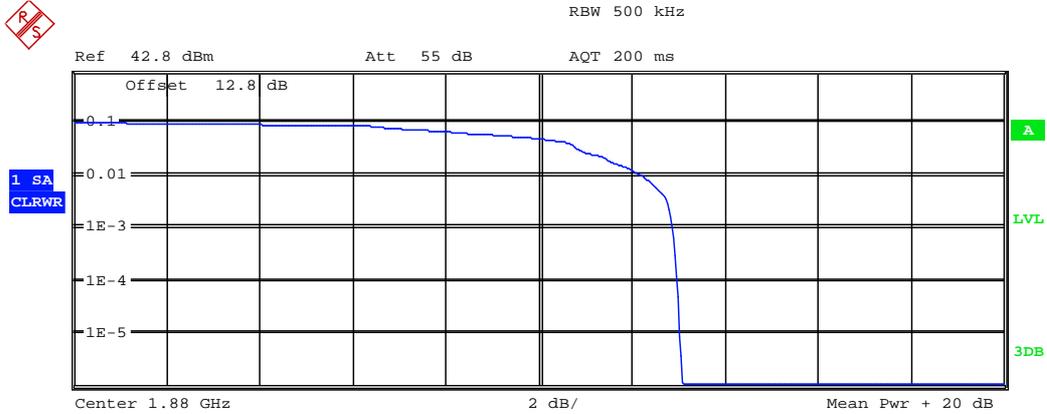
Complementary Cumulative Distribution Function  
 NOF samples: 100000, Usable BW: 424kHz

Trace 1	
Mean	18.38 dBm
Peak	28.21 dBm
Crest	9.83 dB
10 %	9.36 dB
1 %	9.68 dB
.1 %	9.78 dB
.01 %	9.81 dB

Date: 29.JUN.2012 09:28:15



## TM2



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

Trace 1

Mean	14.14 dBm
Peak	27.22 dBm
Crest	13.08 dB
10 %	2.37 dB
1 %	12.21 dB
.1 %	12.88 dB
.01 %	12.98 dB

Date: 29.JUN.2012 09:30:13

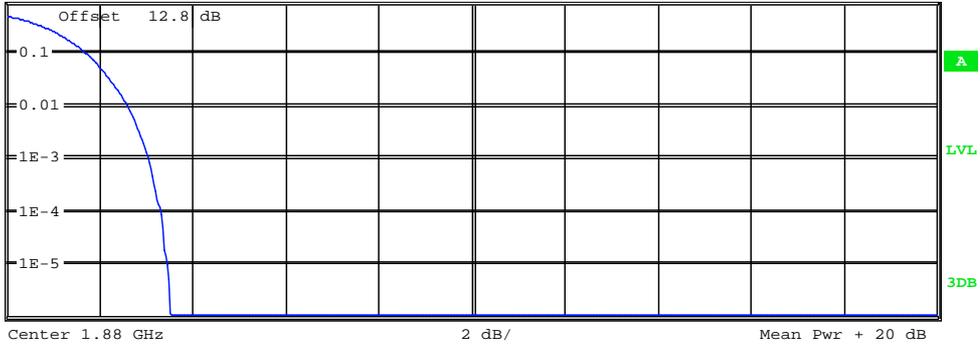


### TM3/TM4/TM5



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	21.59 dBm
Peak	25.11 dBm
Crest	3.52 dB
10 %	1.73 dB
1 %	2.60 dB
.1 %	3.04 dB
.01 %	3.33 dB

Date: 29.JUN.2012 09:43:24



## Effective Isotropic Radiated Power of Transmitter (EIRP)

Test Mode	Freq. [MHz]	Meas. Level [dBm]	Substitution Antenna Type	SGP [dBm]	Substitution Gain [dBi]	Cable Loss [dB]	Substitution Level (EIRP)	FCC limit [dBm]	Result
							[dBm]		
TM1	1850.2	30.23	Horn Ant.	26.53	4.5	1	30.03	33	Pass
TM1	1880.0	30.08	Horn Ant.	26.38	4.5	1	29.88	33	Pass
TM1	1909.8	30.57	Horn Ant.	26.57	4.8	1	30.37	33	Pass
TM2	1850.2	26.53	Horn Ant.	23.11	4.5	1	26.61	33	Pass
TM2	1880.0	26.39	Horn Ant.	22.69	4.5	1	26.19	33	Pass
TM2	1909.8	26.43	Horn Ant.	22.43	4.8	1	26.23	33	Pass
TM3	1852.4	23.51	Horn Ant.	19.81	4.5	1	23.31	33	Pass
TM3	1880.0	23.24	Horn Ant.	19.54	4.5	1	23.04	33	Pass
TM3	1907.6	22.82	Horn Ant.	19.07	4.8	1	22.87	33	Pass

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

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

b, SGP=Signal Generator Level

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

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



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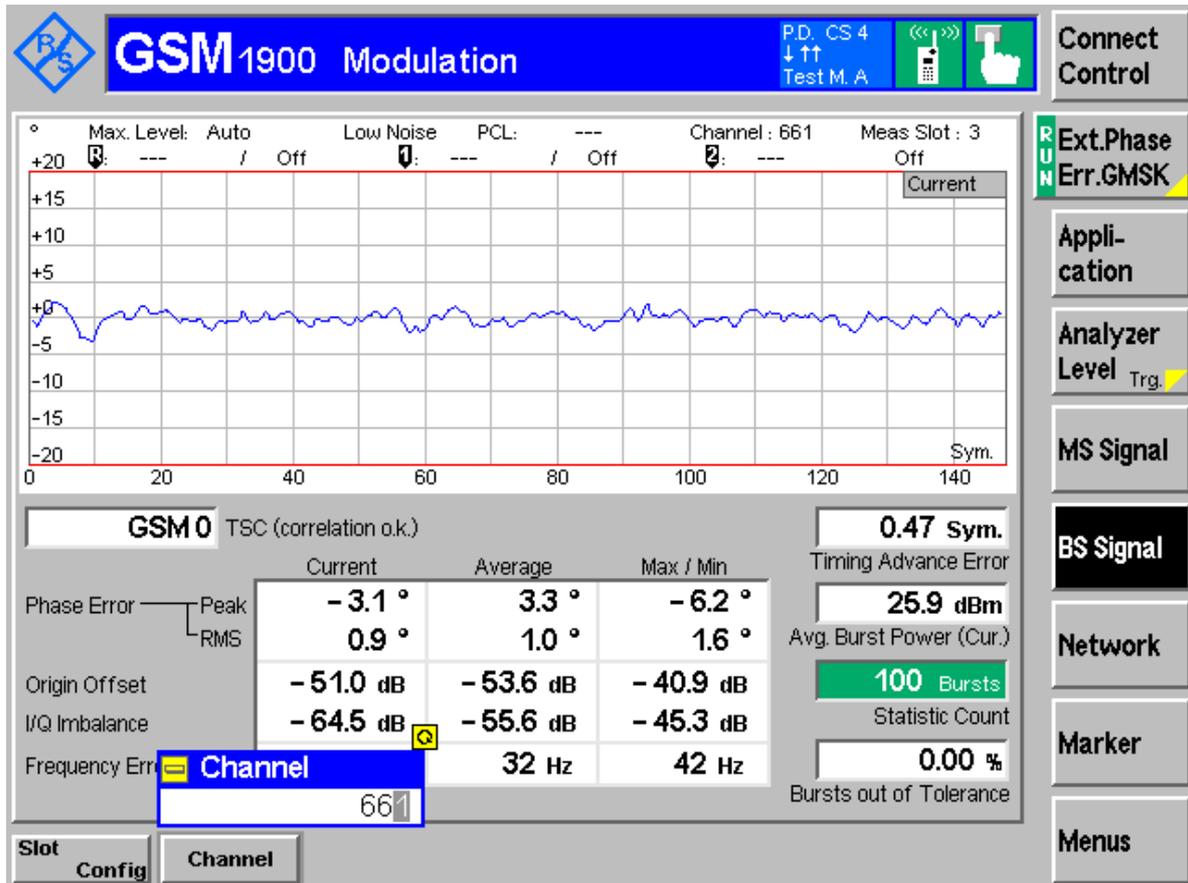
## **Appendix B**

# Modulation Characteristics

According to FCC Part 2.1047 & Part24 Subpart E& RSS-133

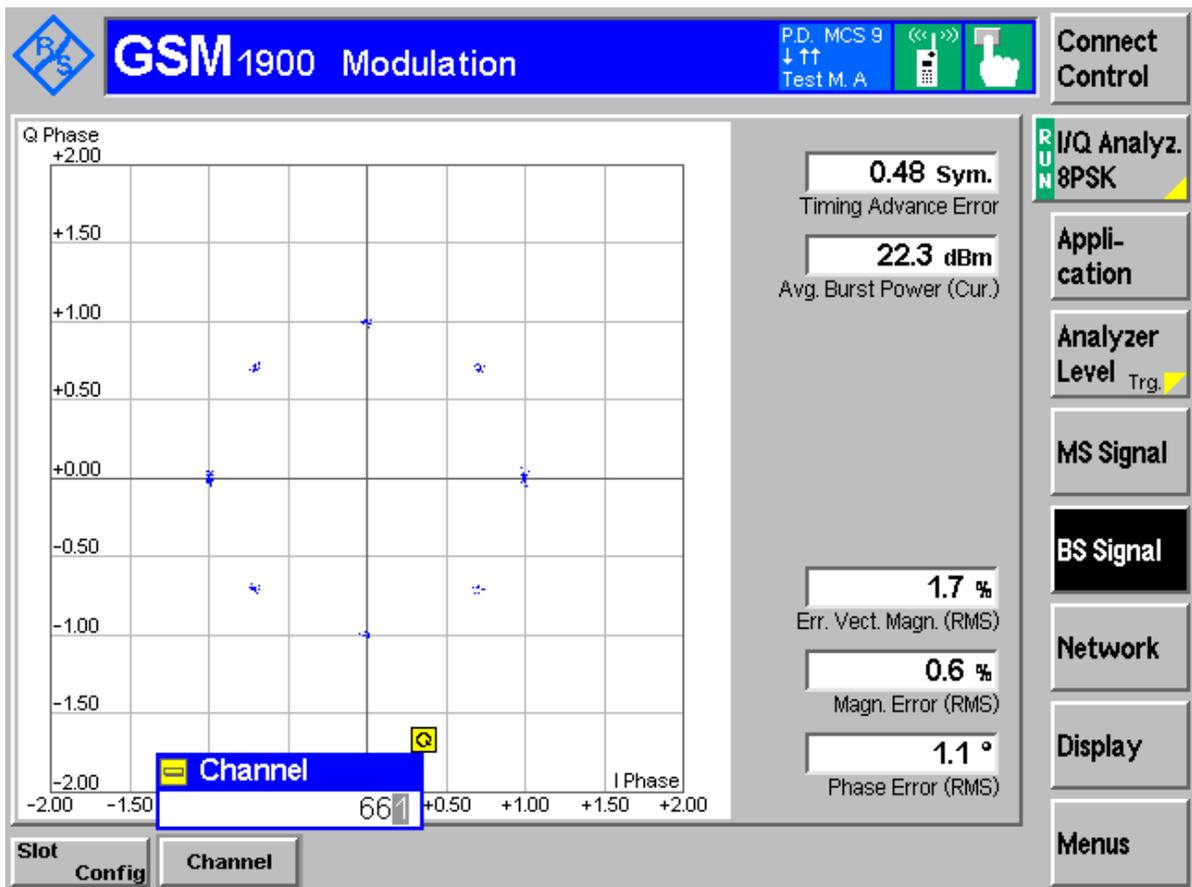


## TM1:GPRS/GSM Channel 661



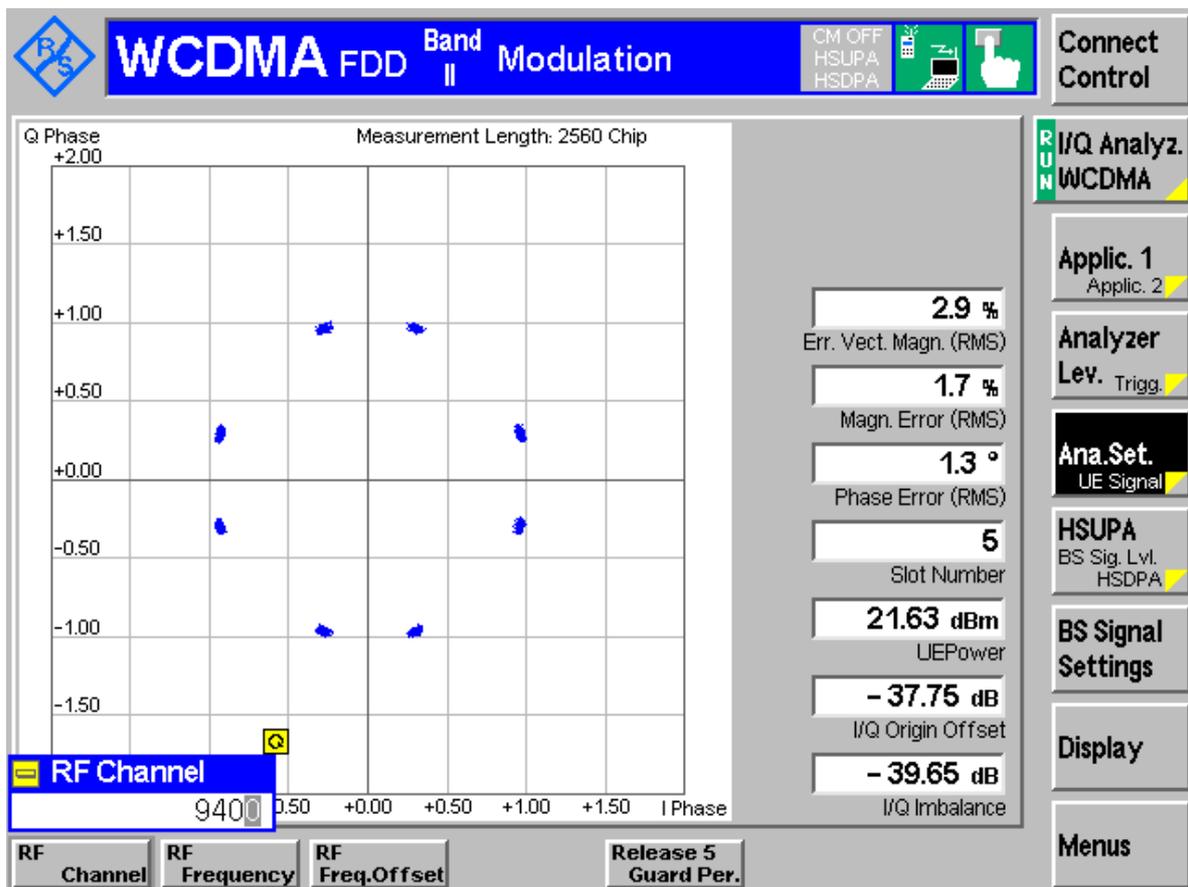


## TM2:EDGE Channel 661





## TM3: WCDMA Channel 9400



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



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# Appendix C

## Occupied Bandwidth

According to FCC Part 2.1049 & Part 24 Subpart E & RSS-133



Result Table

Table 1 Measurement Results

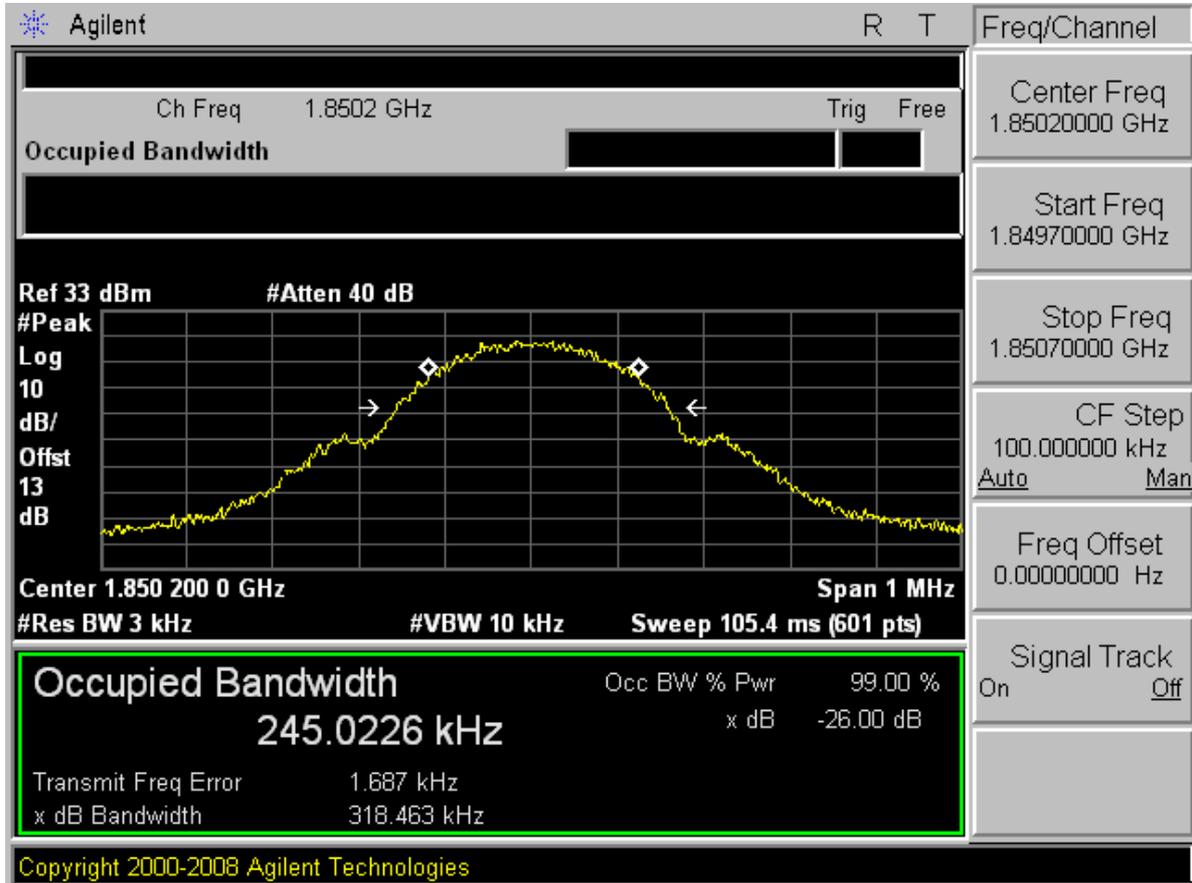
Test Mode	RF Channel	Occupied Bandwidth [kHz]	Verdict
TM1	512	245.02	Pass
	661	246.71	Pass
	810	244.99	Pass
TM2	512	235.12	Pass
	661	242.53	Pass
	810	241.69	Pass
Test Mode	RF Channel	Occupied Bandwidth [MHz]	Verdict
TM3	9262	4.15	Pass
	9400	4.14	Pass
	9538	4.14	Pass

26dB Bandwidth

Test Mode	RF Channel	Occupied Bandwidth [kHz]	Verdict
TM1	512	318.46	Pass
	661	315.73	Pass
	810	310.17	Pass
TM2	512	299.71	Pass
	661	317.24	Pass
	810	303.14	Pass
Test Mode	RF Channel	Occupied Bandwidth [MHz]	Verdict
TM3	9262	4.63	Pass
	9400	4.64	Pass
	9538	4.64	Pass

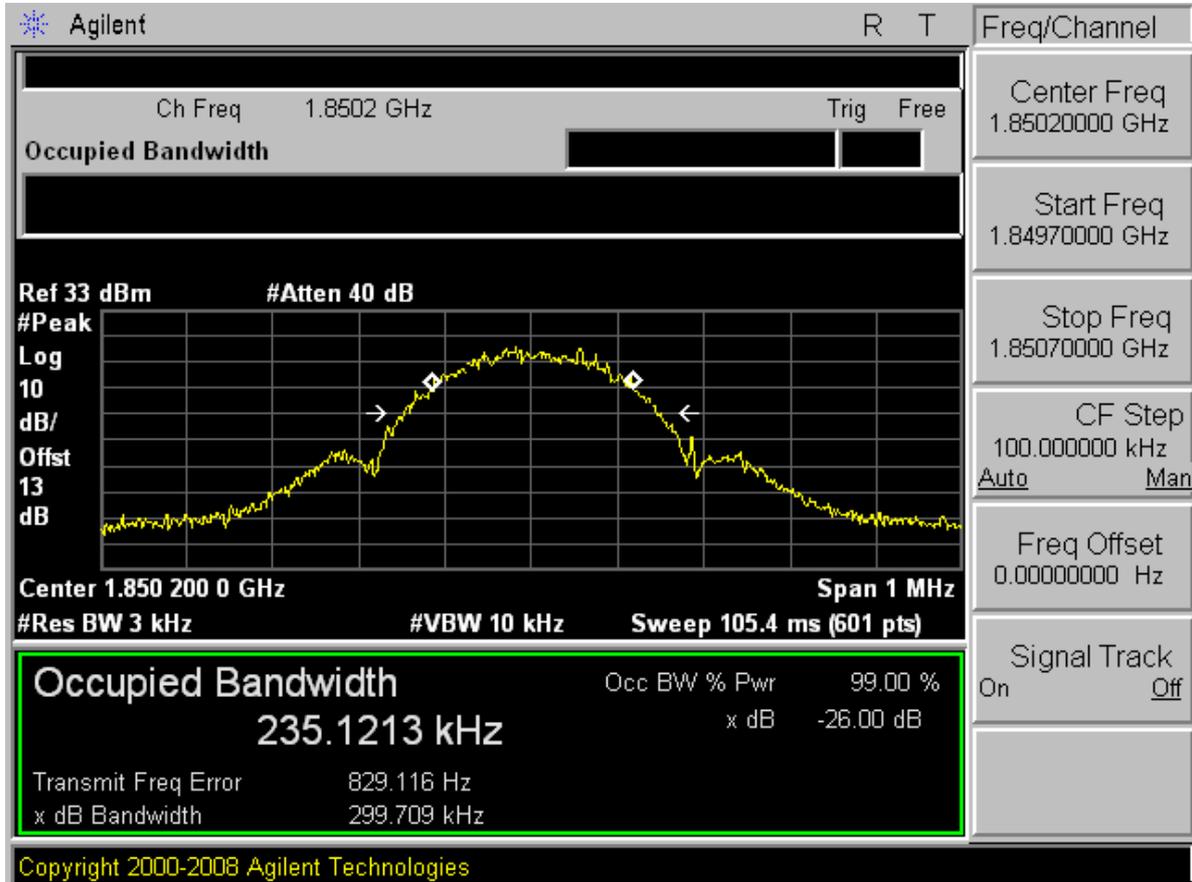


## TM1:GPRS/GSM Channel 512



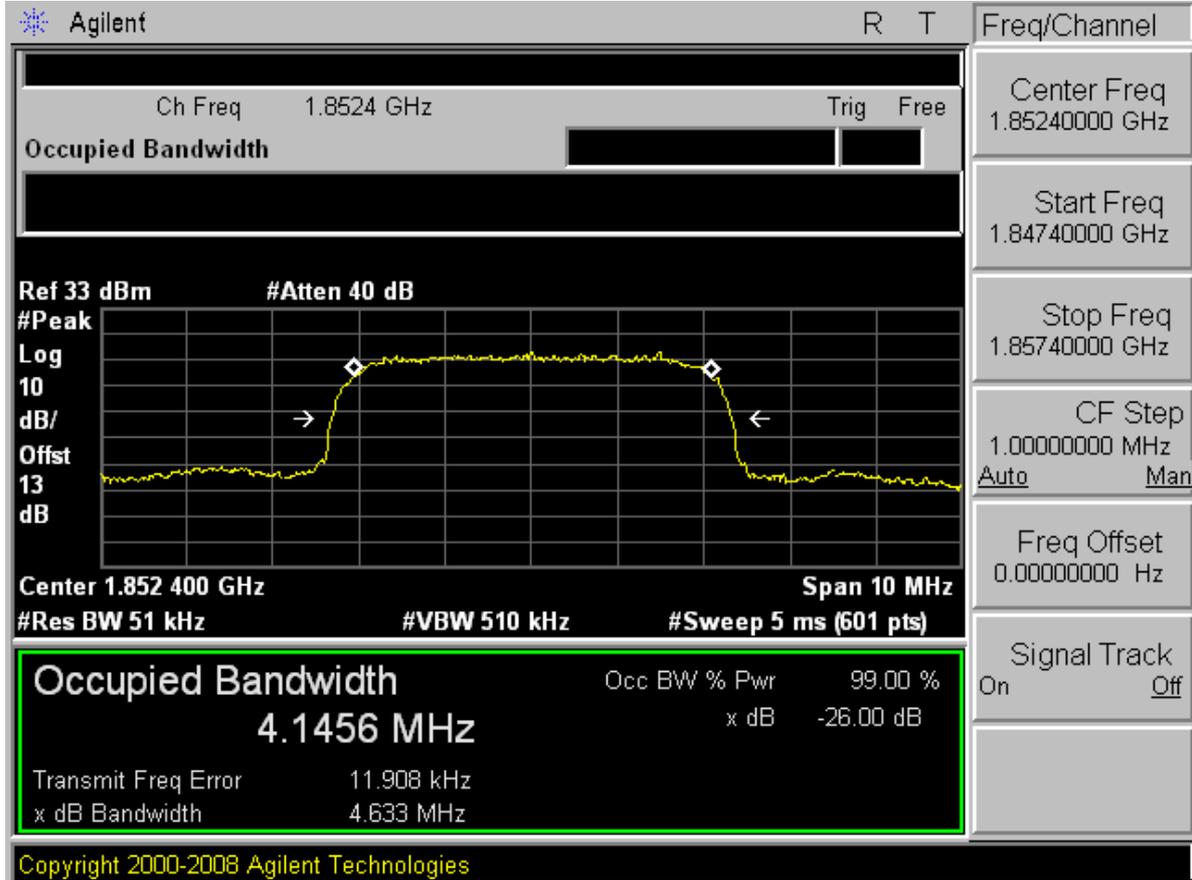


## TM2:EDGE Channel 512



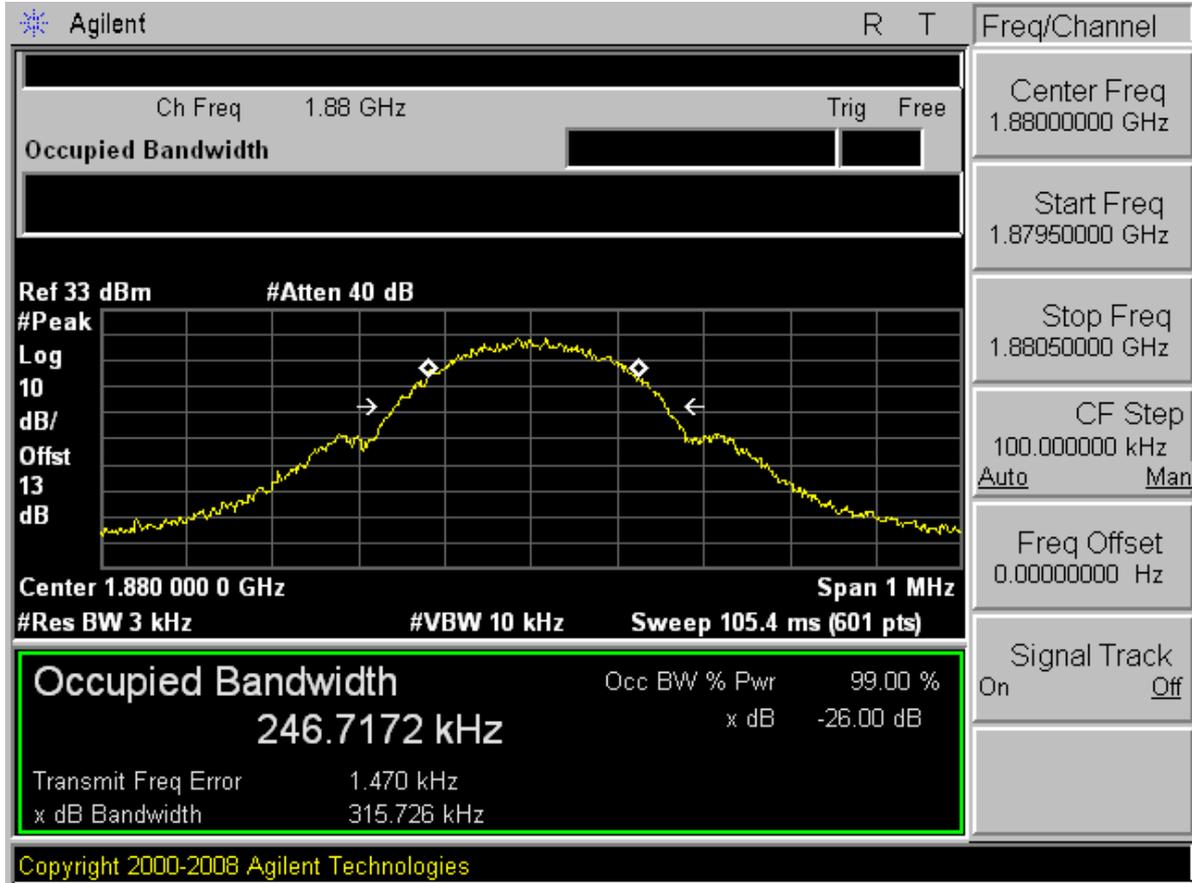


## TM3:WCDMA Channel 9262



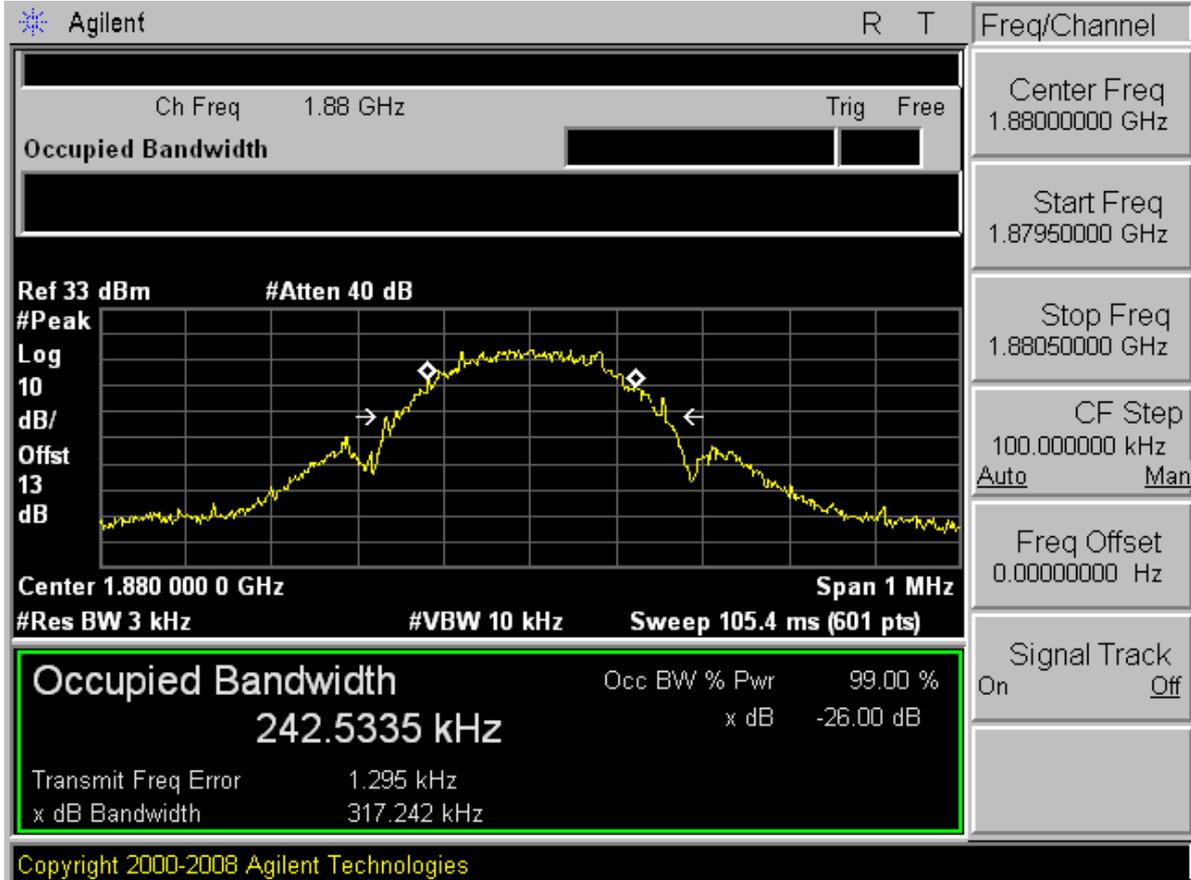


## TM1:GPRS/GSM Channel 661



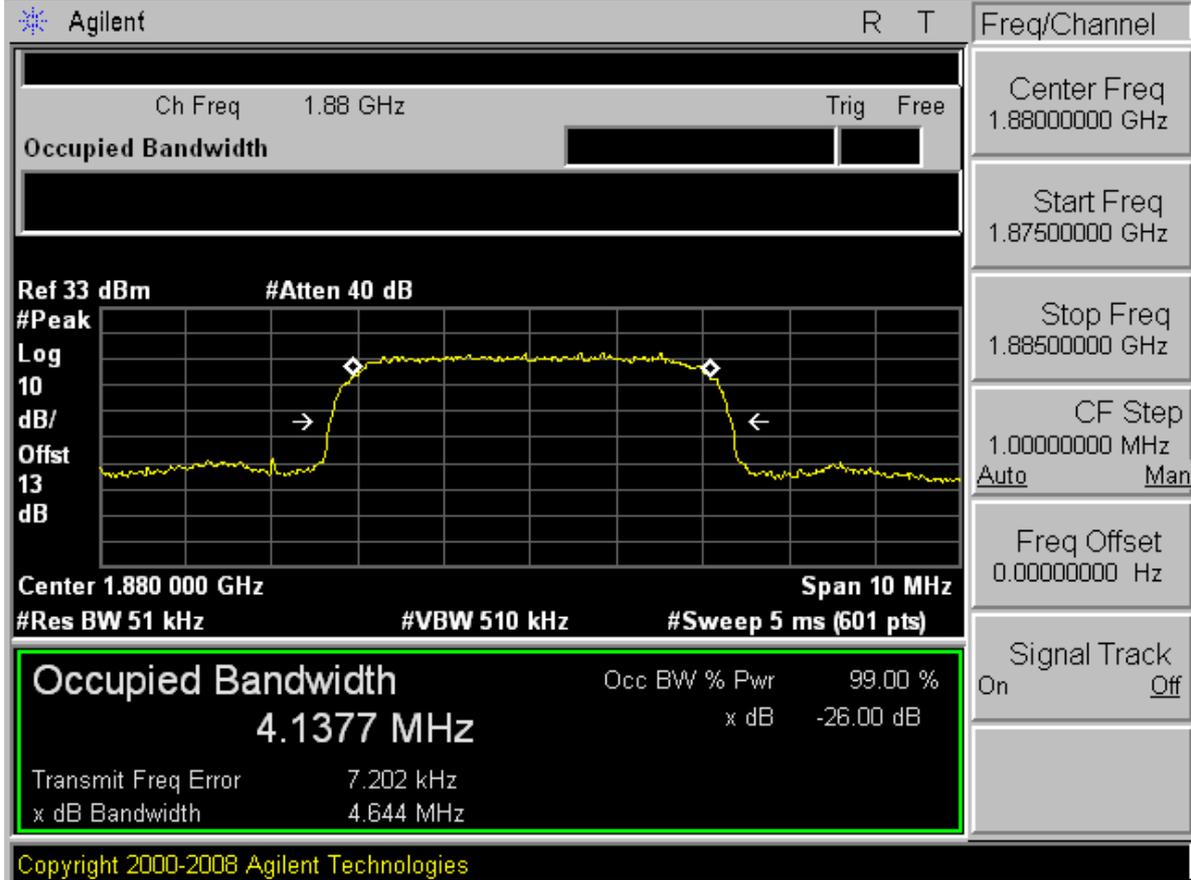


## TM2:EDGE Channel 661



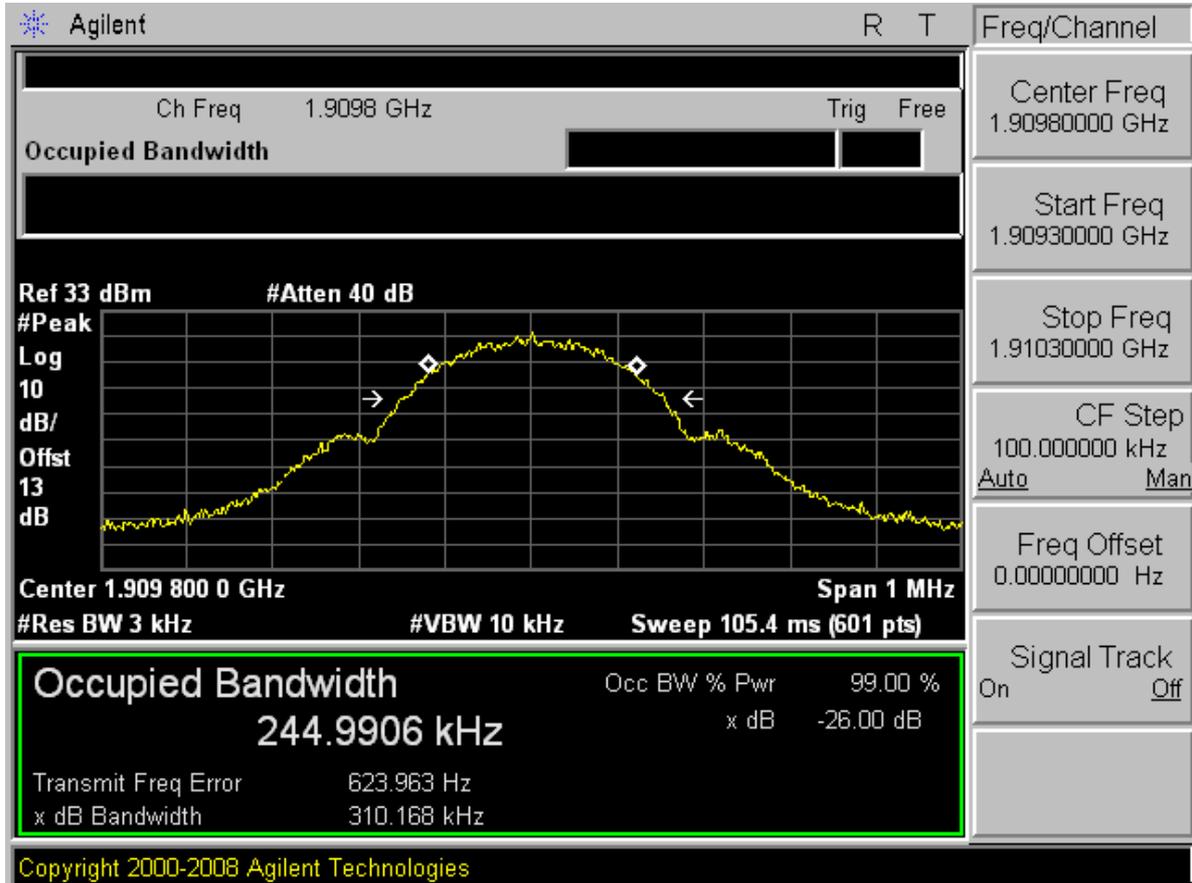


## TM3:WCDMA Channel 9400



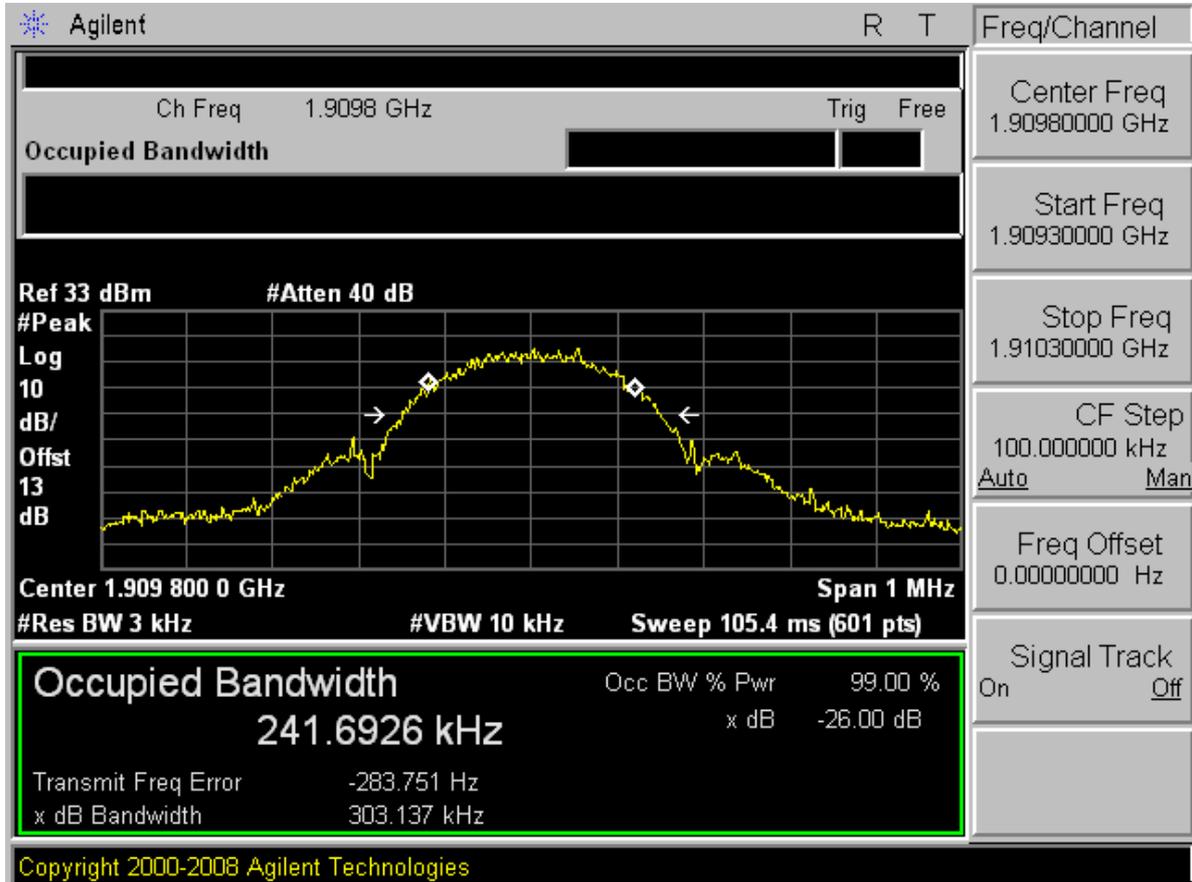


## TM1:GPRS/GSM Channel 810



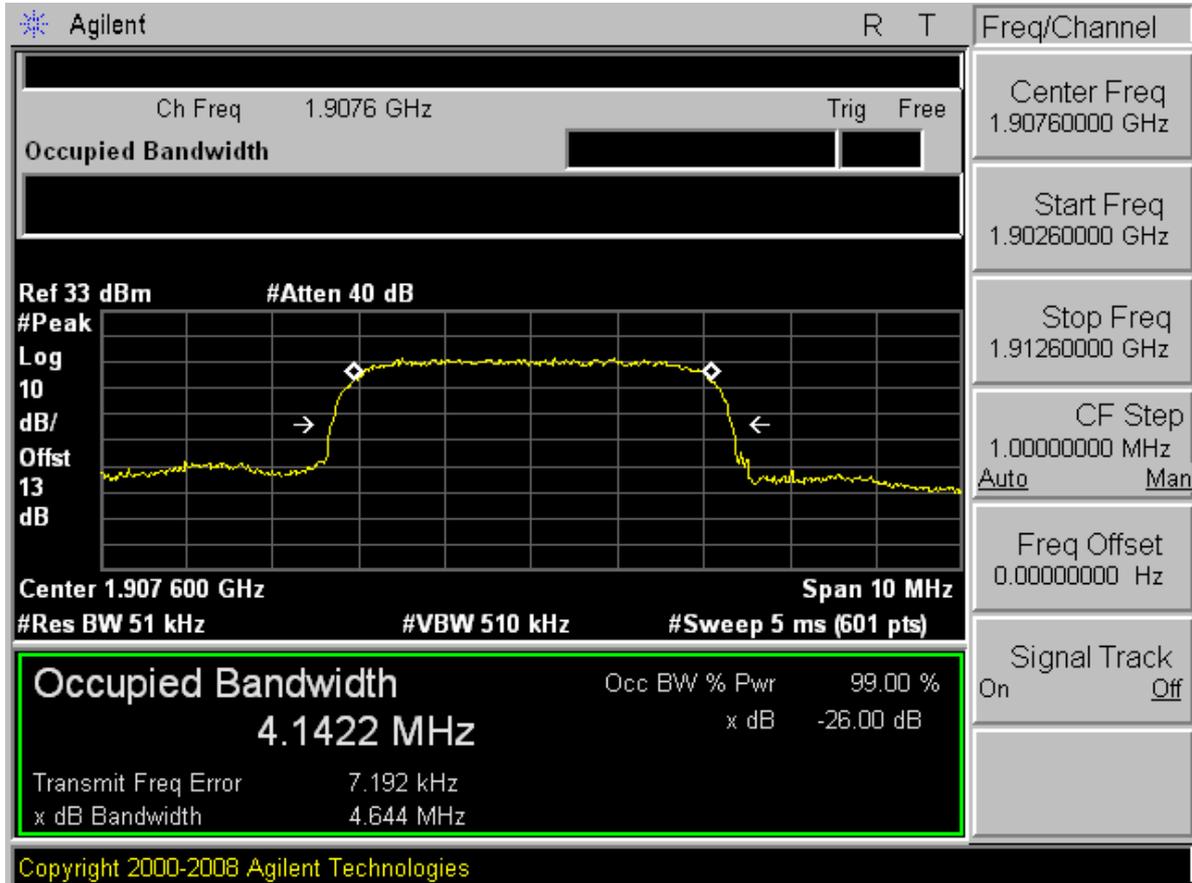


## TM2:EDGE Channel 810





## TM3:WCDMA Channel 9538



-----END-----



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



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# Appendix D

## Band Edges Compliance

According to FCC Part 2.1051 & 24.238 & RSS-133



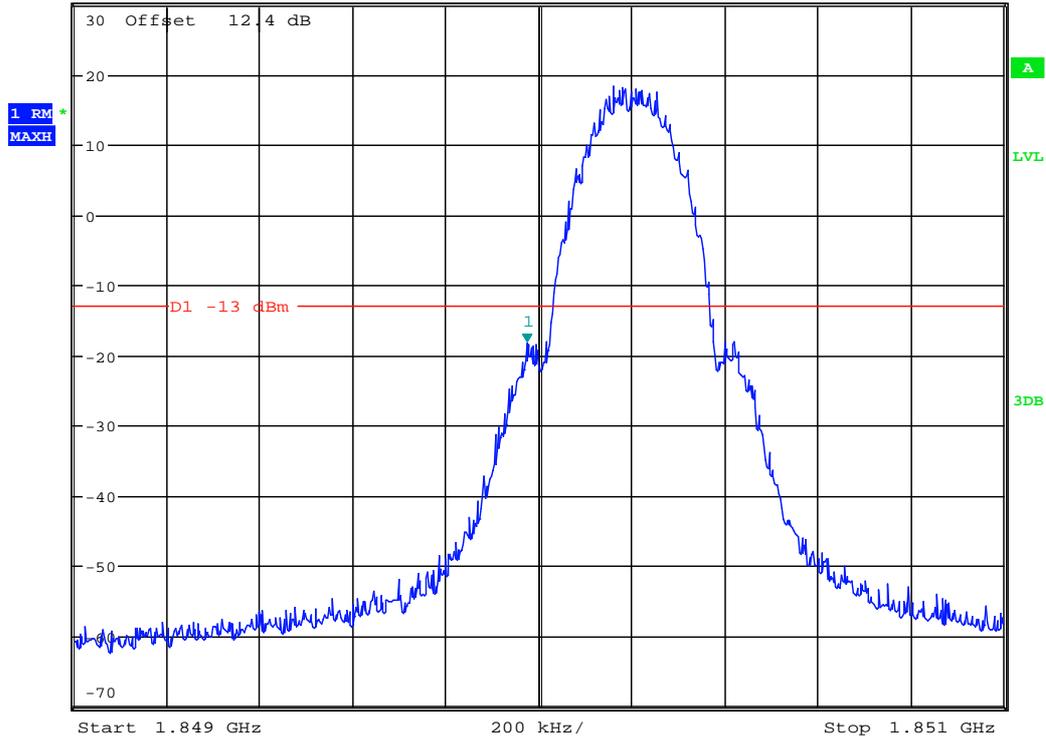
# TM1:GPRS/GSM

## Left Edge

### Channel 512



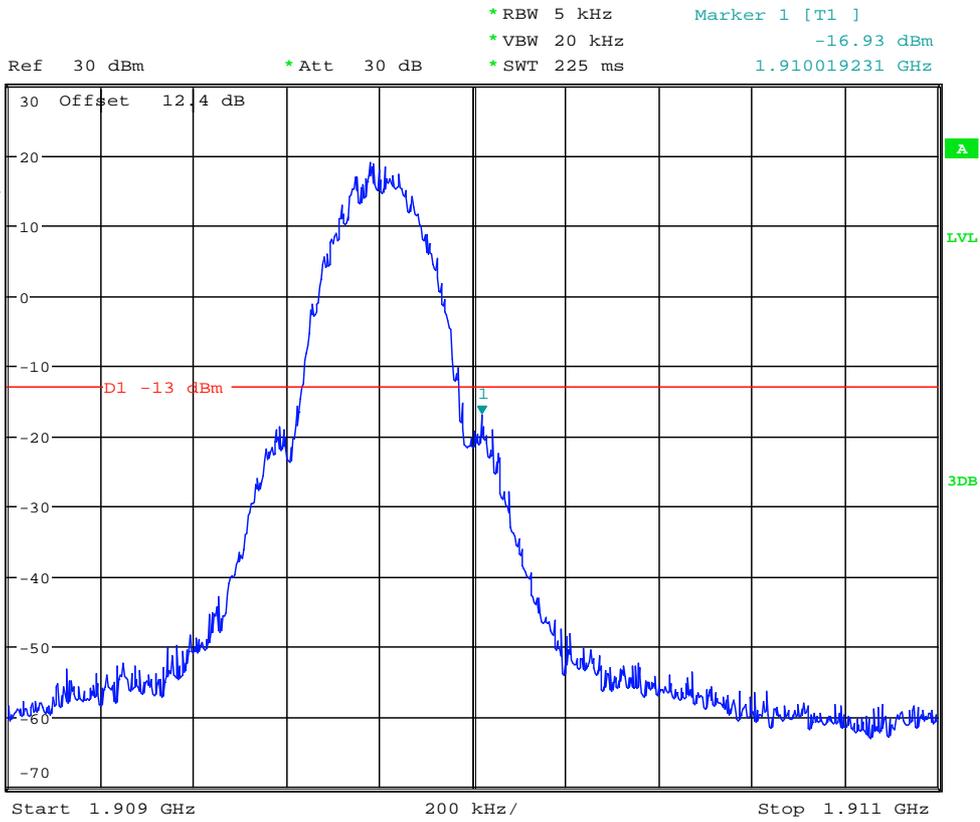
Ref 30 dBm \* Att 30 dB \* RBW 5 kHz \* VBW 20 kHz \* SWT 225 ms Marker 1 [T1 ]  
-18.30 dBm  
1.849974359 GHz



Date: 16.JUL.2012 15:00:33



## Right Edge Channel 810



Date: 16.JUL.2012 15:01:45



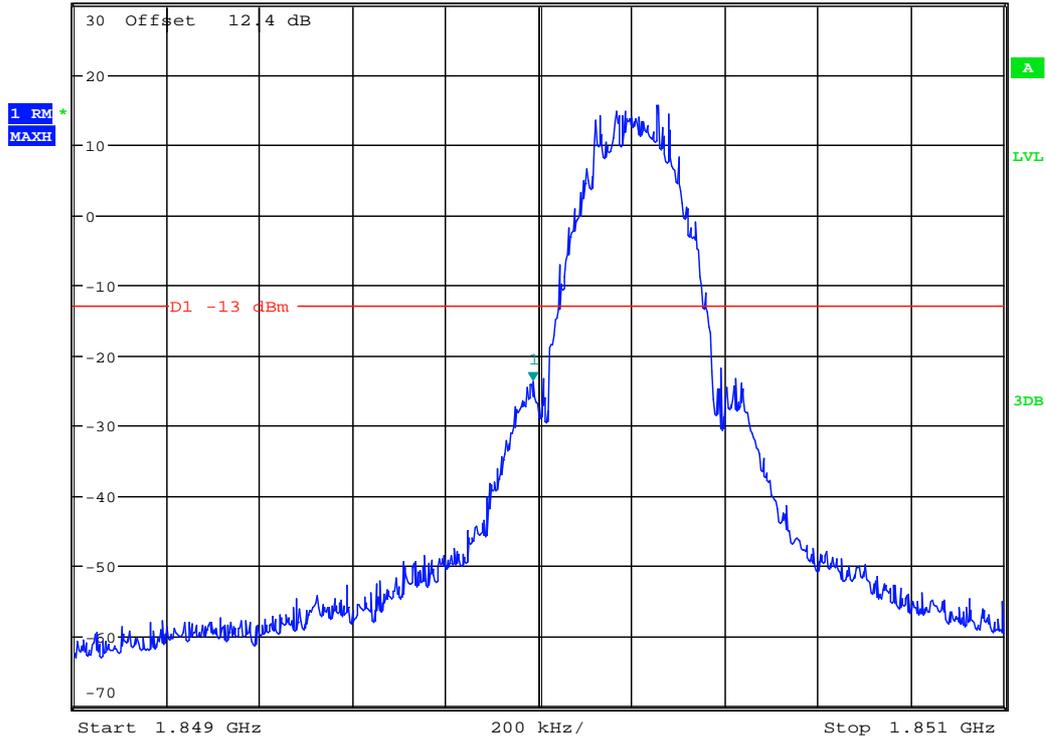
# TM2:EDGE

## Left Edge

### Channel 512



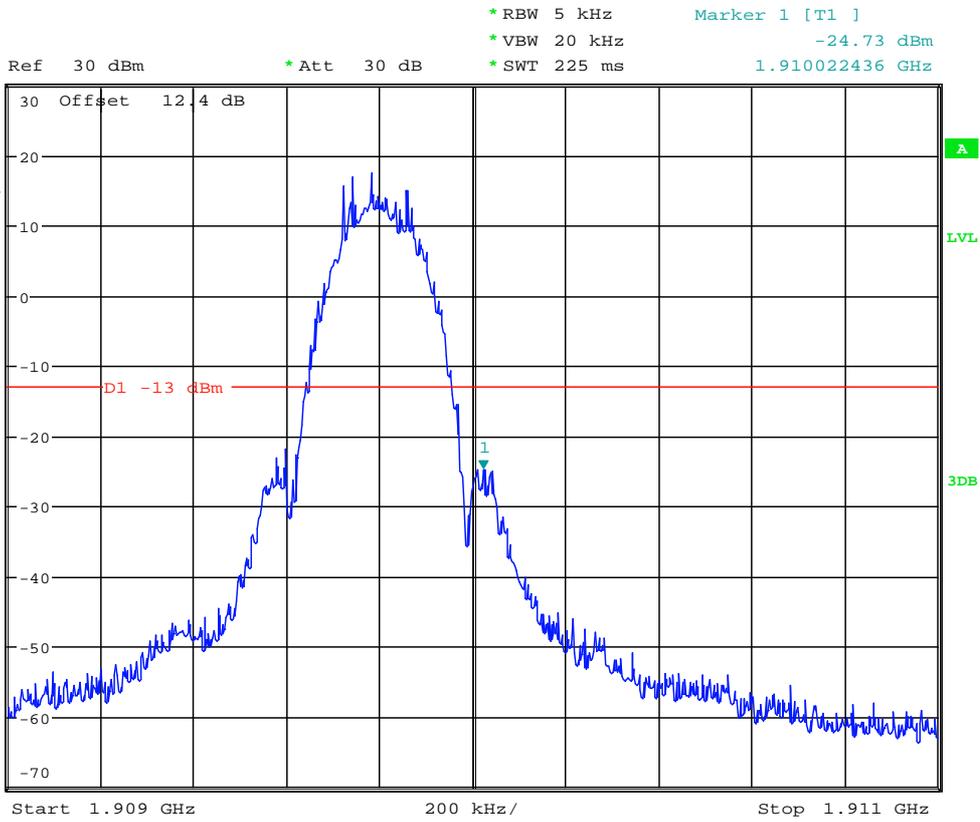
Ref 30 dBm      \* Att 30 dB      \* RBW 5 kHz      \* VBW 20 kHz      \* SWT 225 ms      Marker 1 [T1]      -23.58 dBm  
1.849987179 GHz



Date: 16.JUL.2012 15:05:48



## Right Edge Channel 810



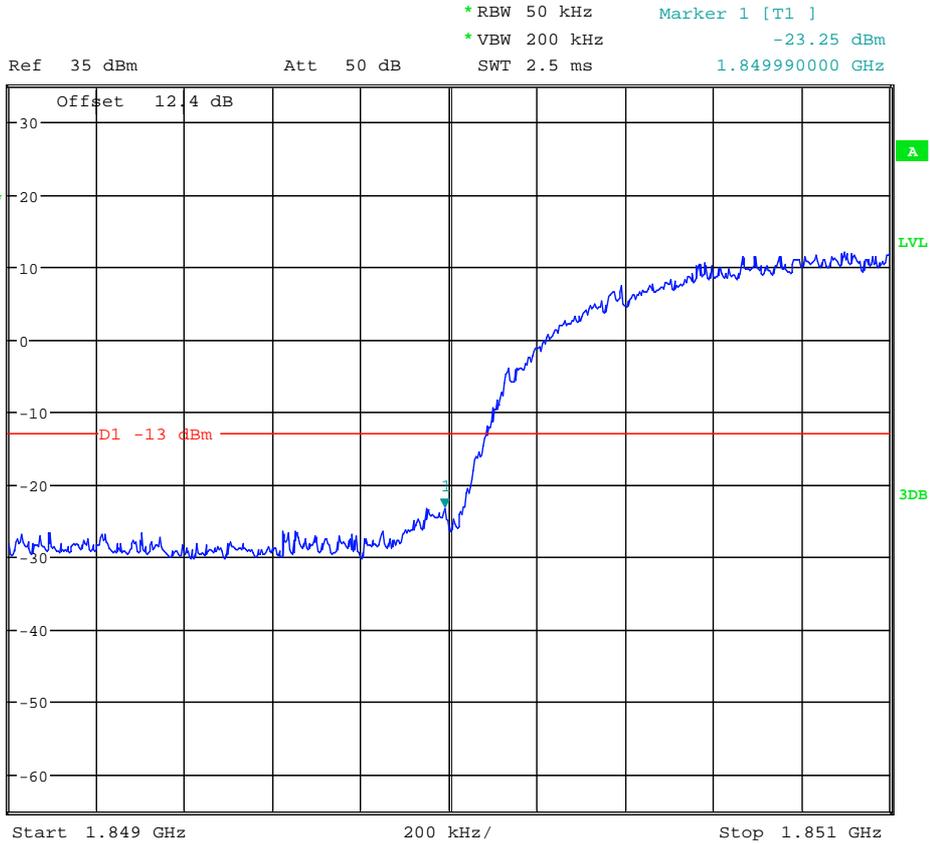
Date: 16.JUL.2012 15:07:19



# TM3: WCDMA

## Left Edge

### Channel 9262



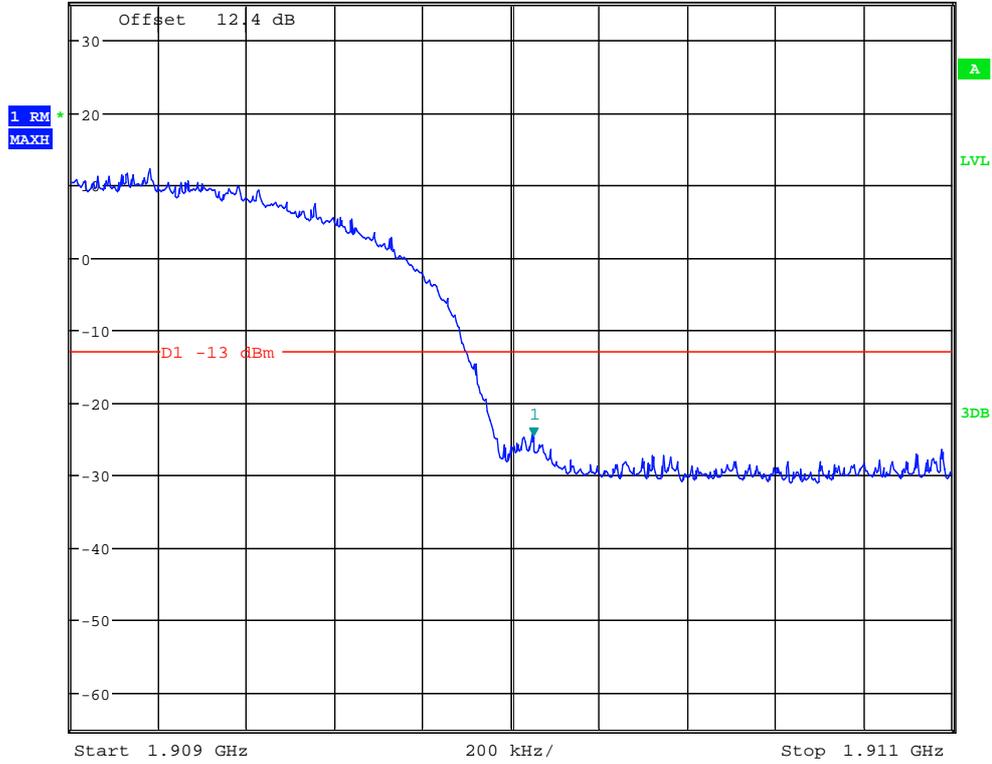
Date: 24.JUN.2012 15:32:02



## Right Edge Channel 9538



Ref 35 dBm      Att 50 dB      \*RBW 50 kHz      Marker 1 [T1]      -24.68 dBm  
\*VBW 200 kHz      SWT 2.5 ms      1.910050000 GHz



Date: 24.JUN.2012 15:32:16

-----END-----



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



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# Appendix E

## Spurious Emission at Antenna Terminal

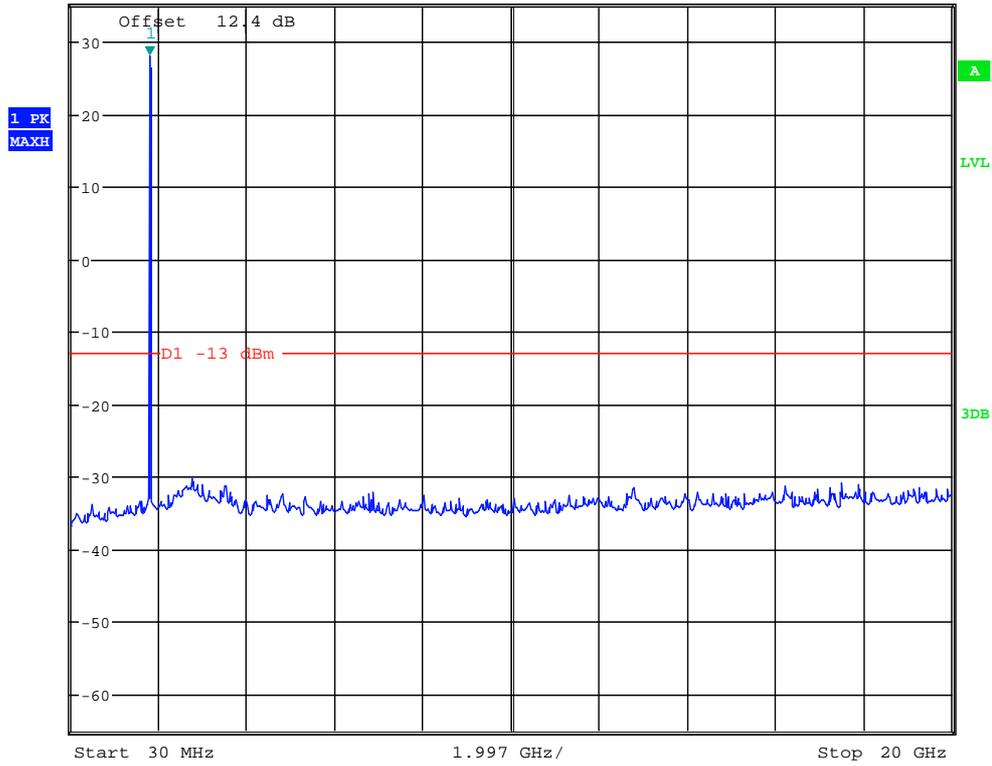
According to FCC Part 2.1051 & 24.238 & RSS-133



# TM1:GPRS/GSM Channel 512



Ref 35 dBm \* Att 35 dB \* RBW 1 MHz \* VBW 3 MHz SWT 115 ms Marker 1 [T1 ] 27.94 dBm  
1.822179487 GHz



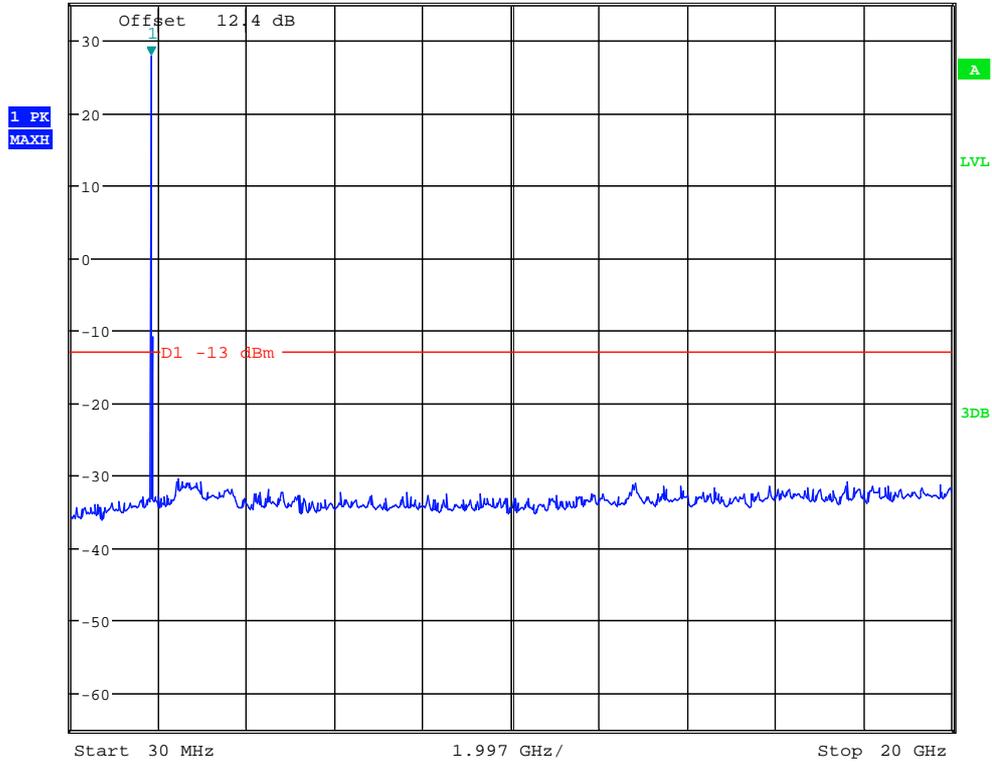
Date: 24.JUN.2012 15:15:42



## Channel 661



\*RBW 1 MHz      Marker 1 [T1 ]  
 \*VBW 3 MHz      27.67 dBm  
 Ref 35 dBm      \*Att 35 dB      SWT 115 ms      1.854182692 GHz



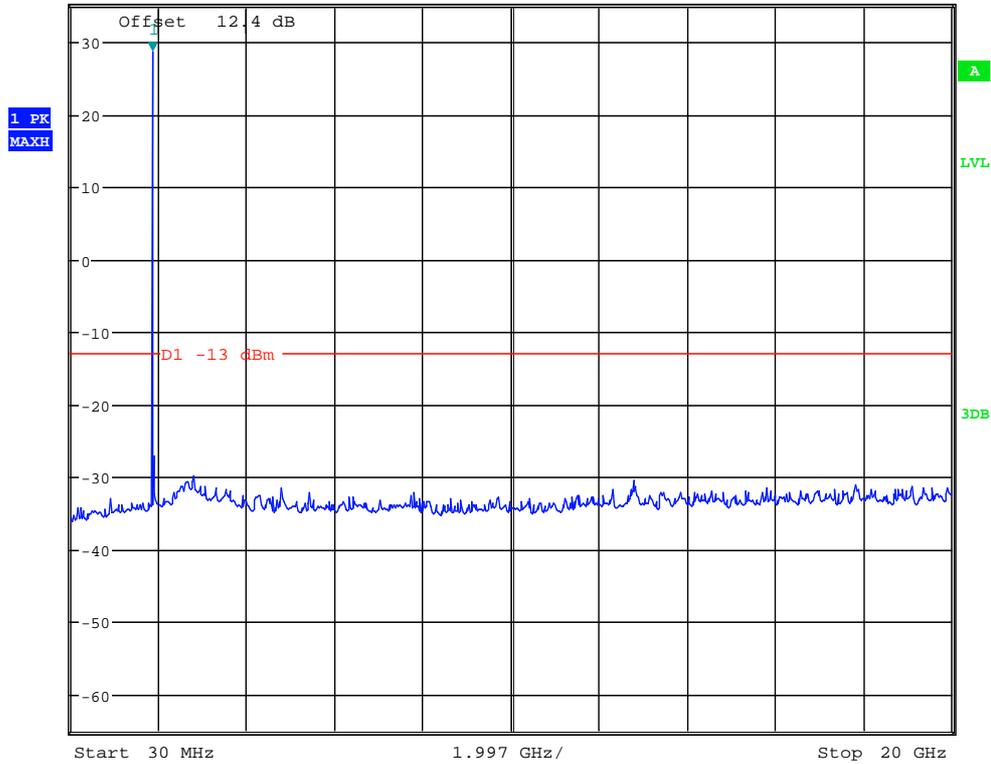
Date: 24.JUN.2012 15:15:56



# Channel 810



Ref 35 dBm      \* Att 35 dB      SWT 115 ms      Marker 1 [T1]      28.53 dBm  
\* RBW 1 MHz      \* VBW 3 MHz      1.886185897 GHz



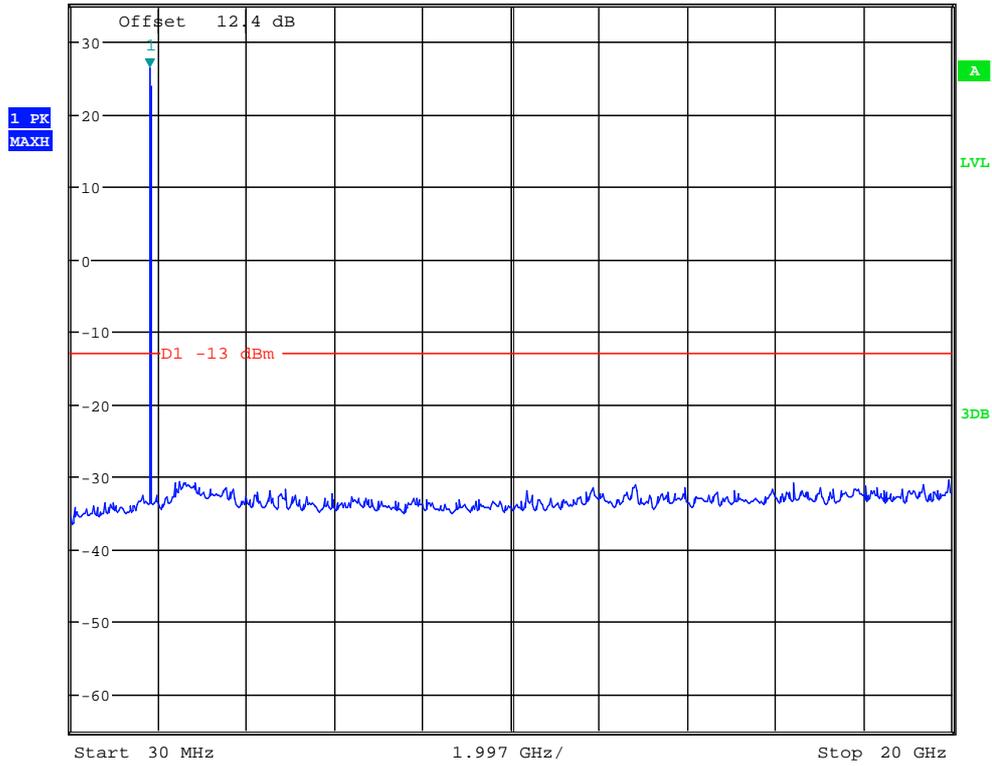
Date: 24.JUN.2012 15:16:11



# TM2:EDGE Channel 512



Ref 35 dBm      \* Att 35 dB      \* RBW 1 MHz      Marker 1 [T1 ]      26.31 dBm  
 \* VBW 3 MHz      1.822179487 GHz  
 SWT 115 ms



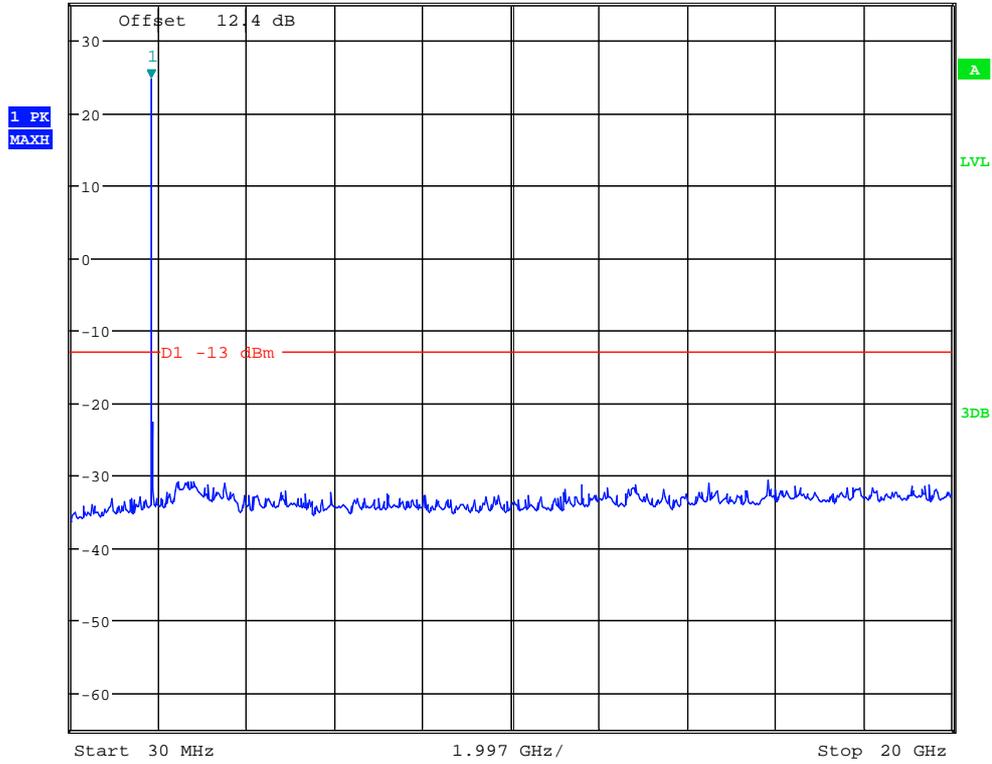
Date: 24.JUN.2012 15:25:39



## Channel 661



Ref 35 dBm      \* Att 35 dB      \* RBW 1 MHz      Marker 1 [T1 ]  
 \* VBW 3 MHz      24.60 dBm  
 SWT 115 ms      1.854182692 GHz



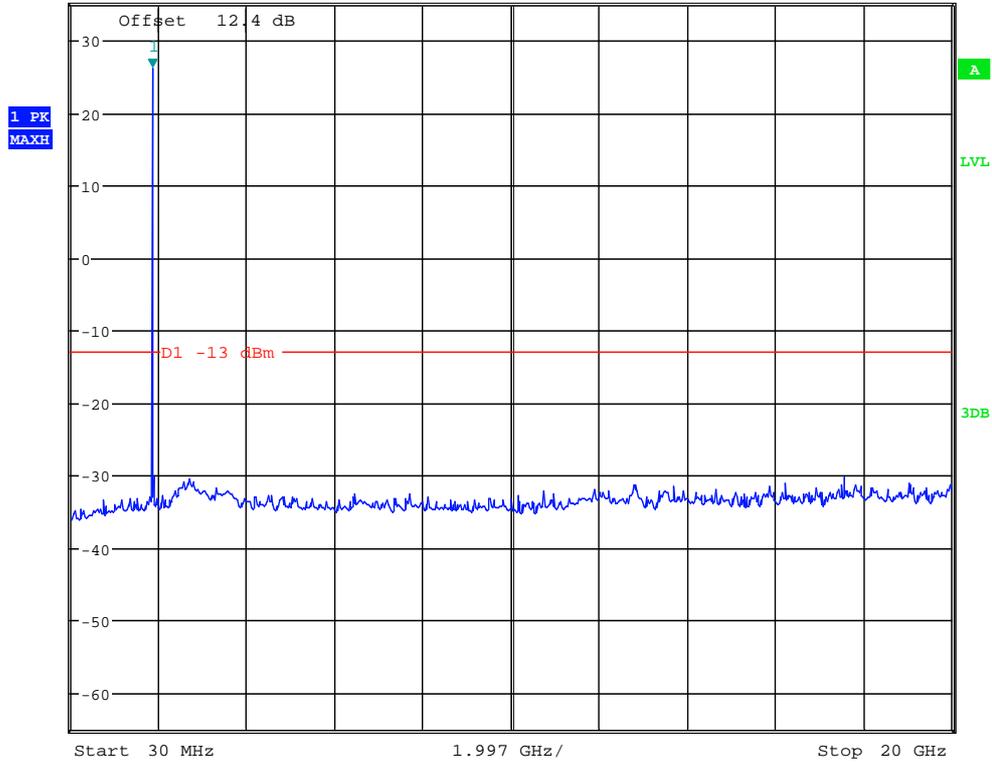
Date: 24.JUN.2012 15:25:53



## Channel 810



Ref 35 dBm      \* Att 35 dB      \* RBW 1 MHz      Marker 1 [T1 ]  
\* VBW 3 MHz      26.06 dBm  
SWT 115 ms      1.886185897 GHz



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

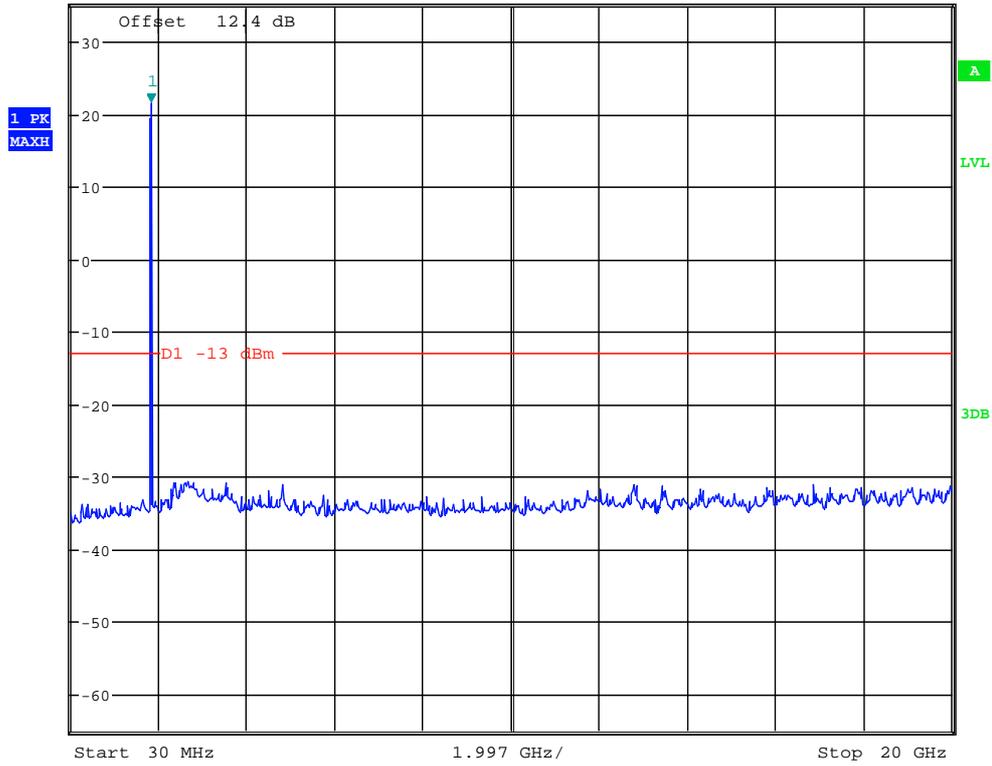


# TM3: WCDMA

## Channel 9262



Ref 35 dBm \* Att 35 dB \* RBW 1 MHz \* VBW 3 MHz SWT 115 ms Marker 1 [T1 ] 21.53 dBm  
1.854182692 GHz



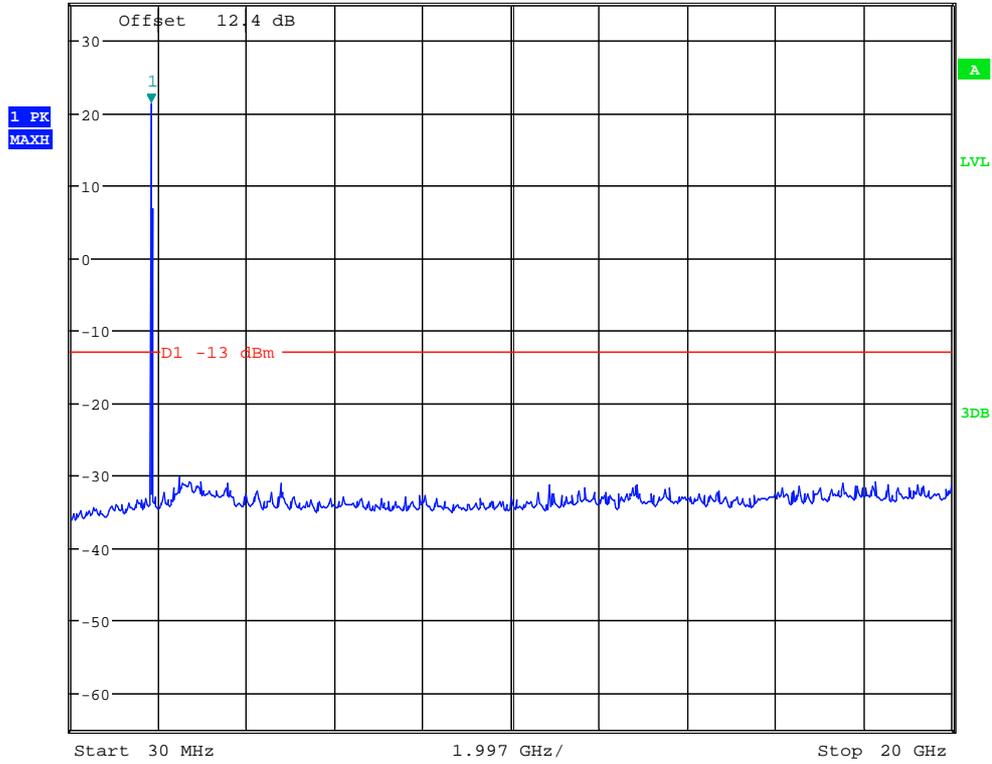
Date: 24.JUN.2012 15:31:19



## Channel 9400



\*RBW 1 MHz      Marker 1 [T1 ]  
\*VBW 3 MHz      21.21 dBm  
Ref 35 dBm      \*Att 35 dB      SWT 115 ms      1.854182692 GHz



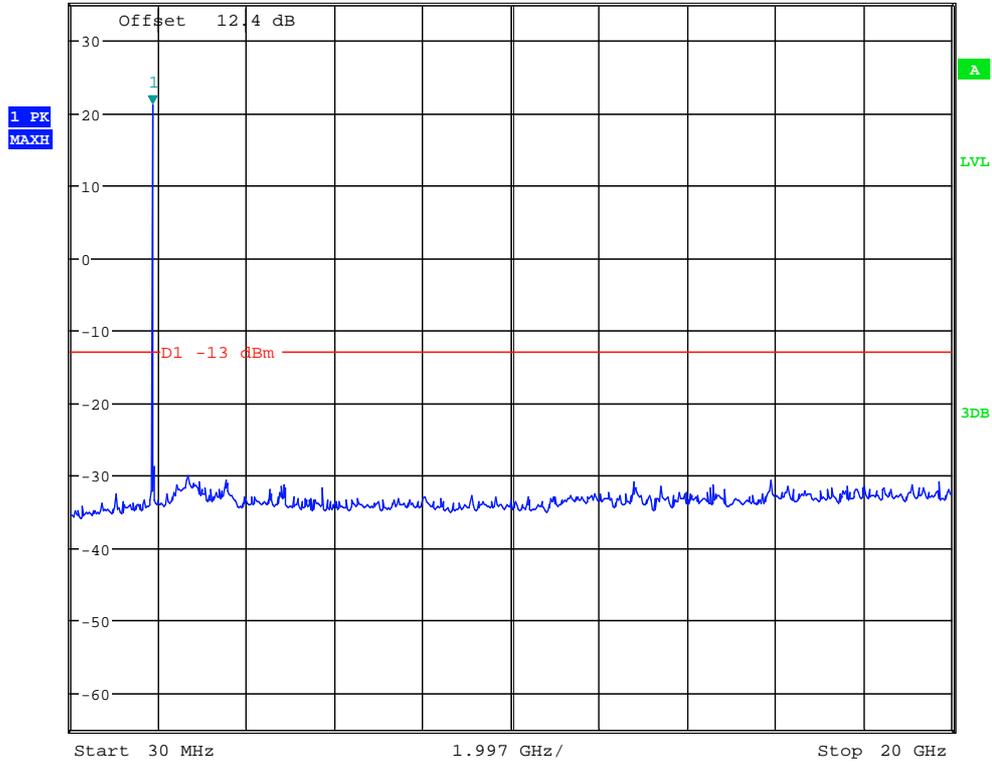
Date: 24.JUN.2012 15:31:33



## Channel 9538



Ref 35 dBm      \* Att 35 dB      \* RBW 1 MHz      Marker 1 [T1 ]  
 \* VBW 3 MHz      21.04 dBm  
 SWT 115 ms      1.886185897 GHz



Date: 24.JUN.2012 15:31:48

-----END-----



# **Appendix F**

## Radiated spurious emission

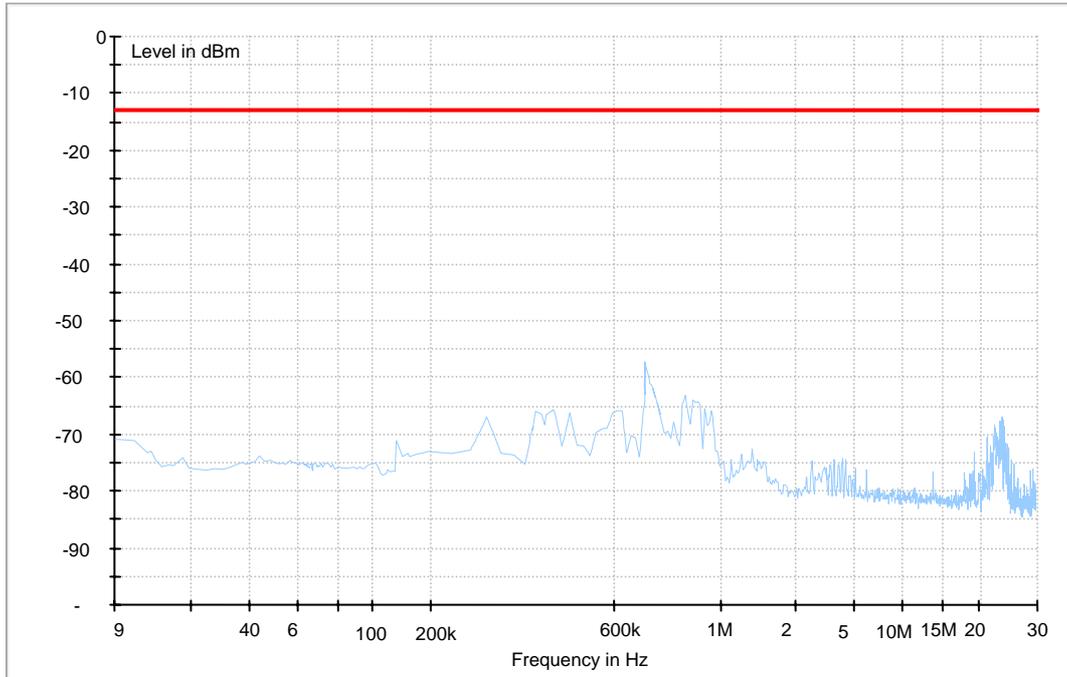
According to FCC Part 2.1053 & Part24.238 & RSS-133



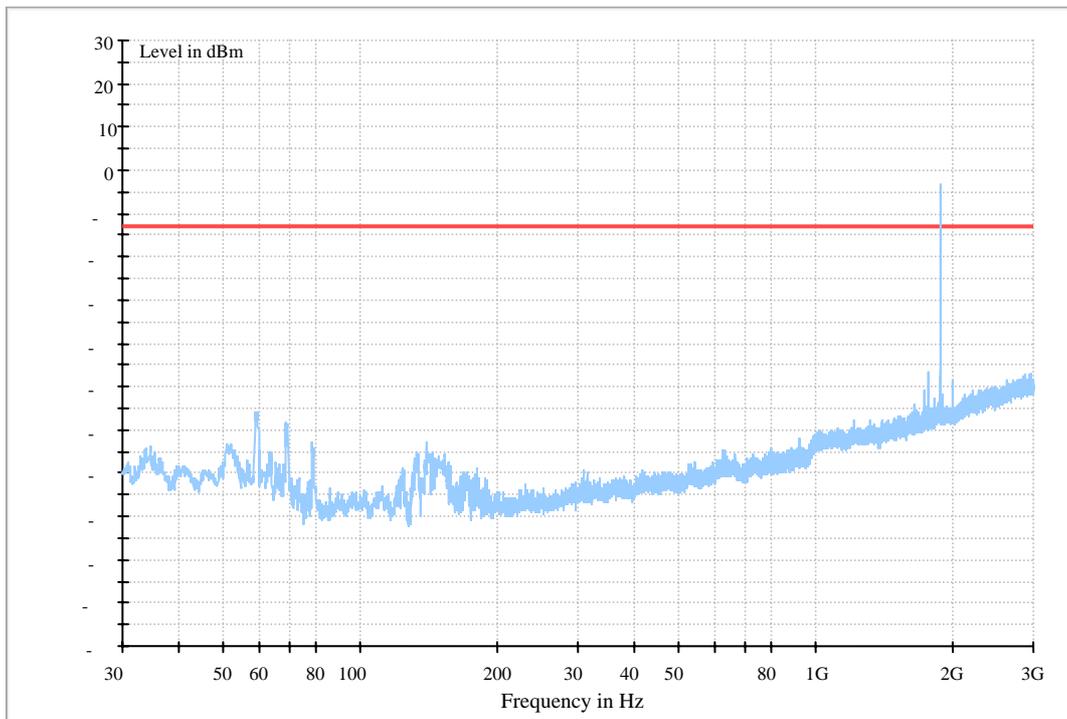
Note: 1. Simultaneous transmission was investigated and no new emissions were found.  
2.  $RBW \geq 1\text{MHz}$ ,  $VBW > 3 \times RBW$ .

## GPRS 1900

Traffic Mode (9kHz-30MHz)

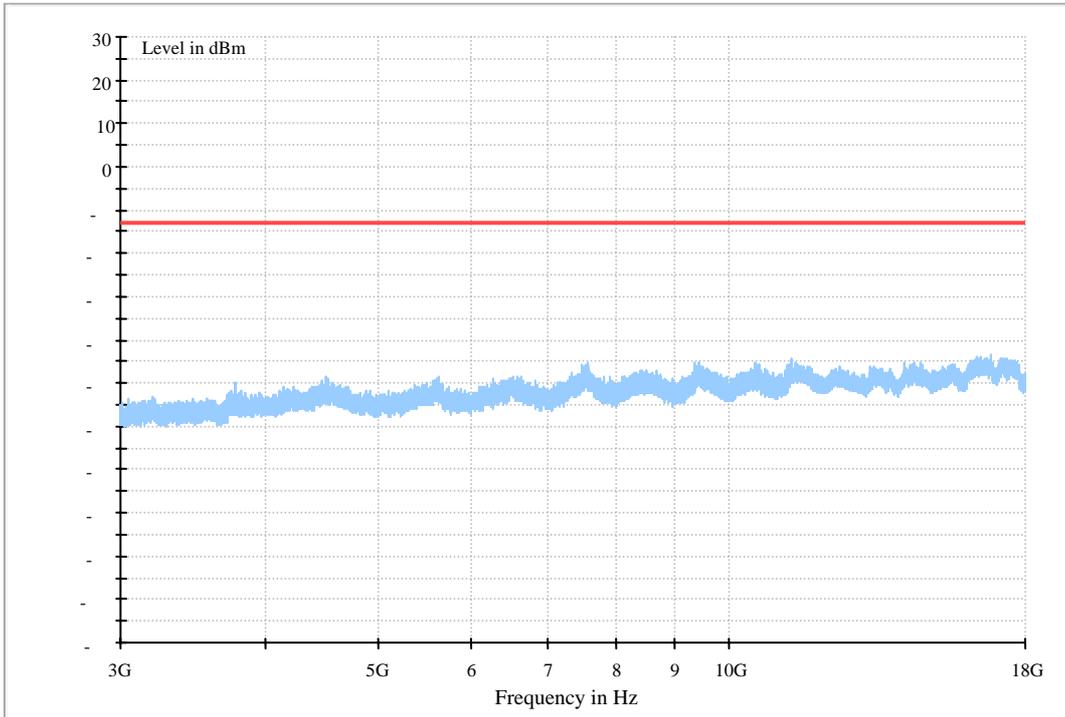


Traffic Mode (30MHz-3GHz)

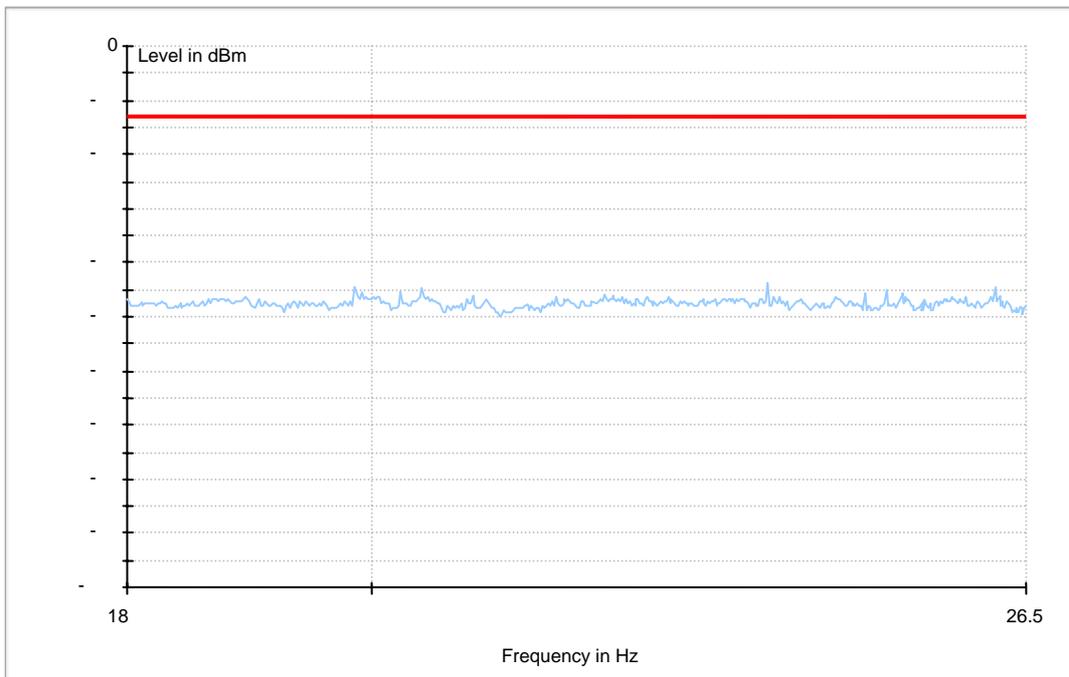




### Traffic Mode (3GHz-18GHz)



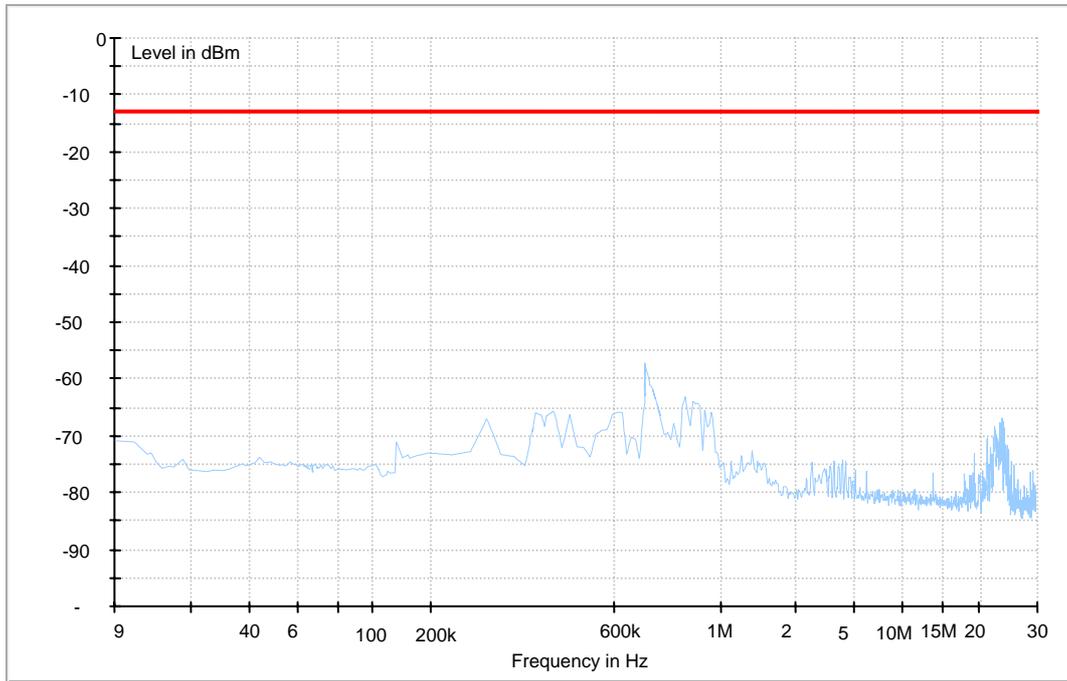
### Traffic Mode (18GHz-26.5GHz)



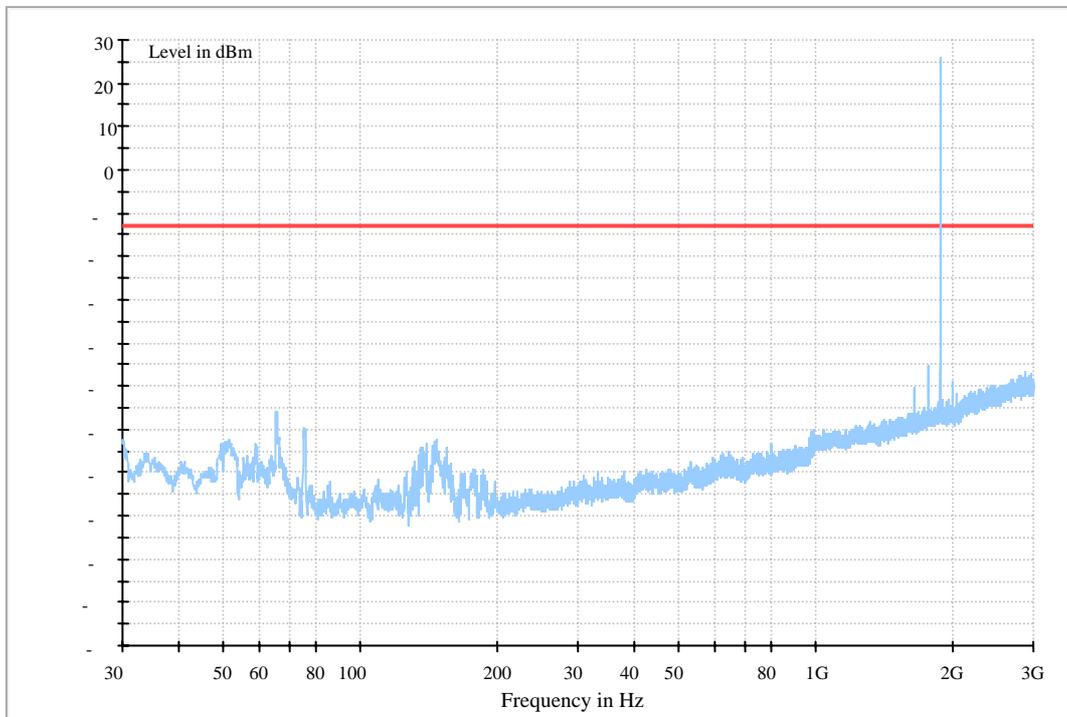


## EDGE 1900

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

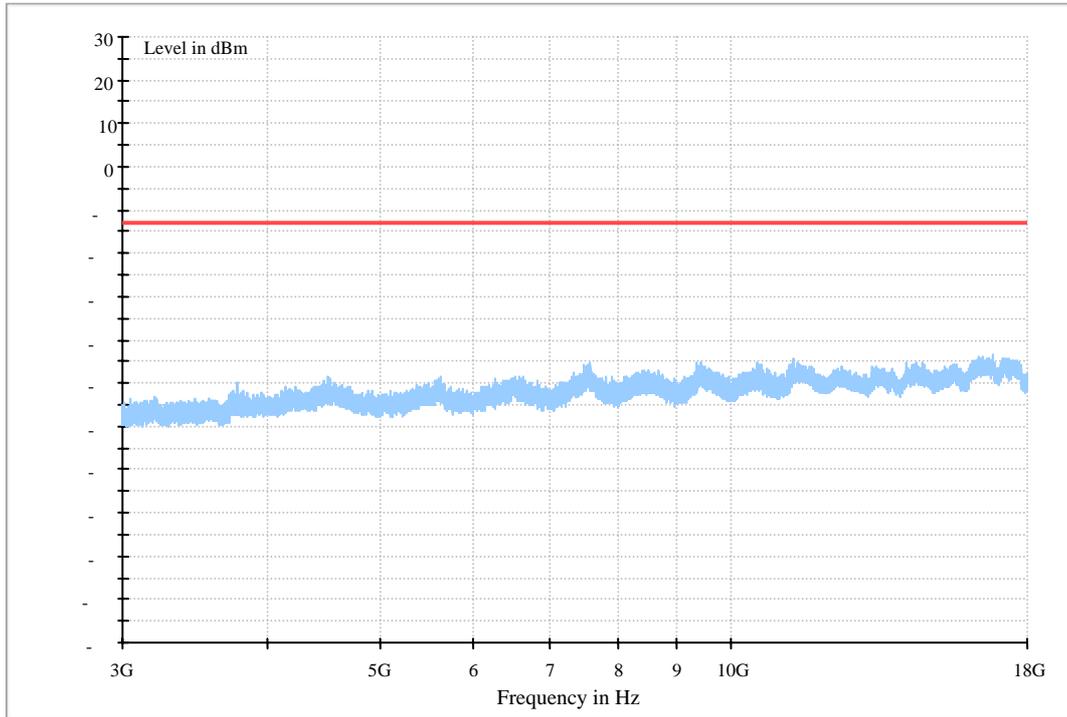


### Traffic Mode (30MHz-3GHz)

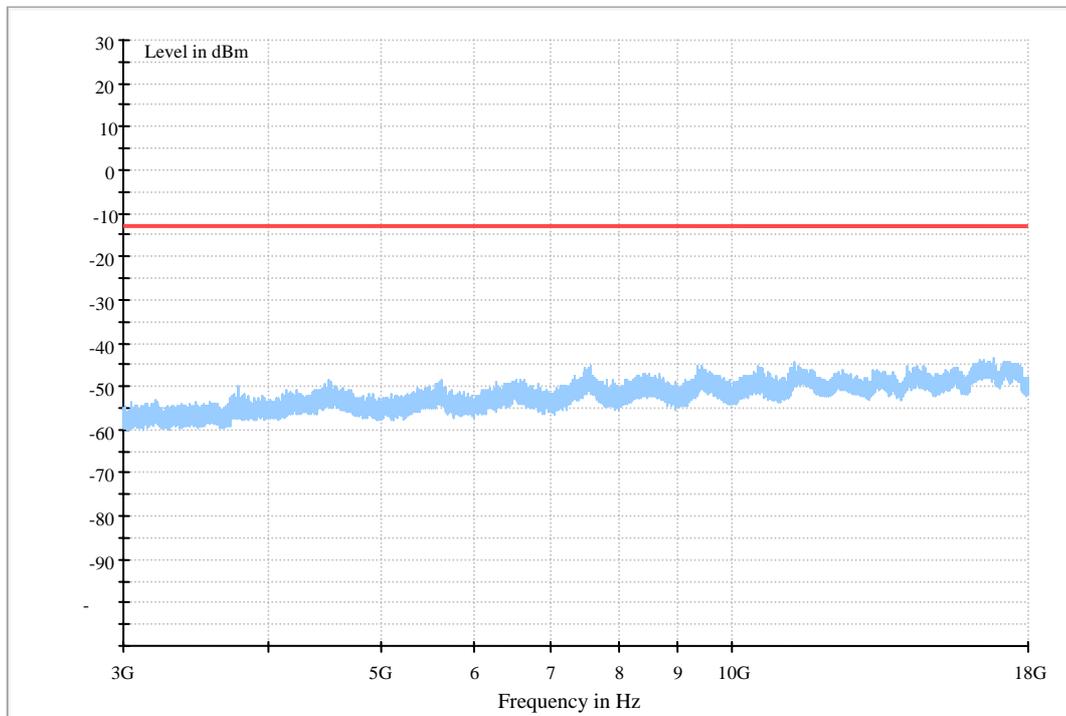




### Traffic Mode (3GHz-18GHz)



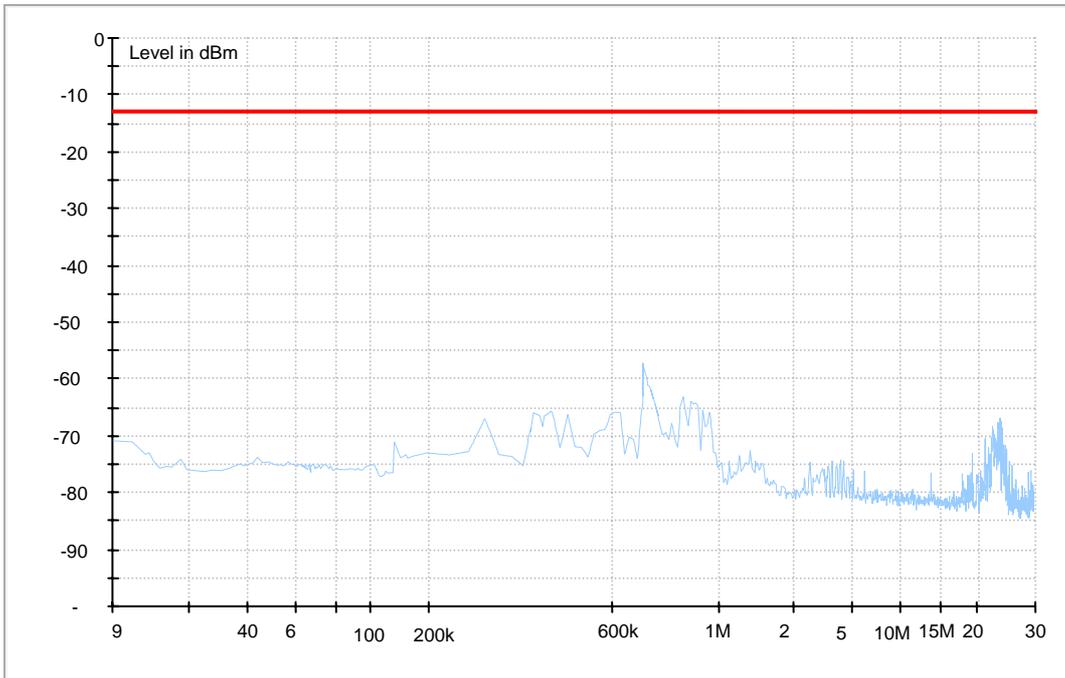
### Traffic mode (18GHz-26.5GHz)



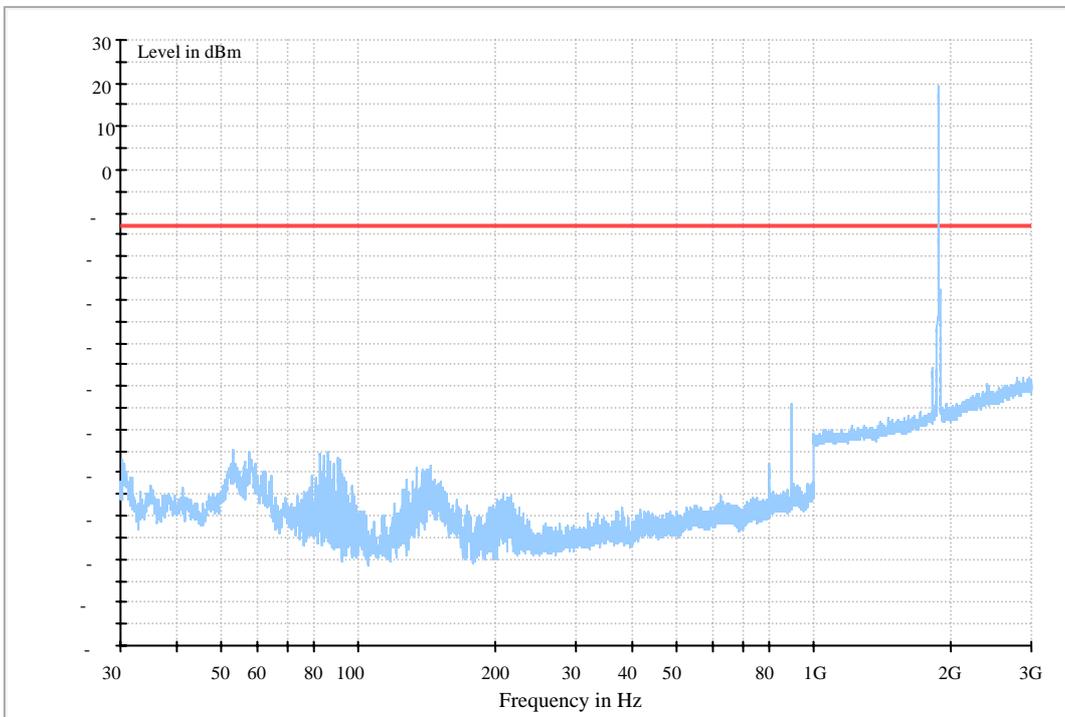


## WCDMA 1900

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

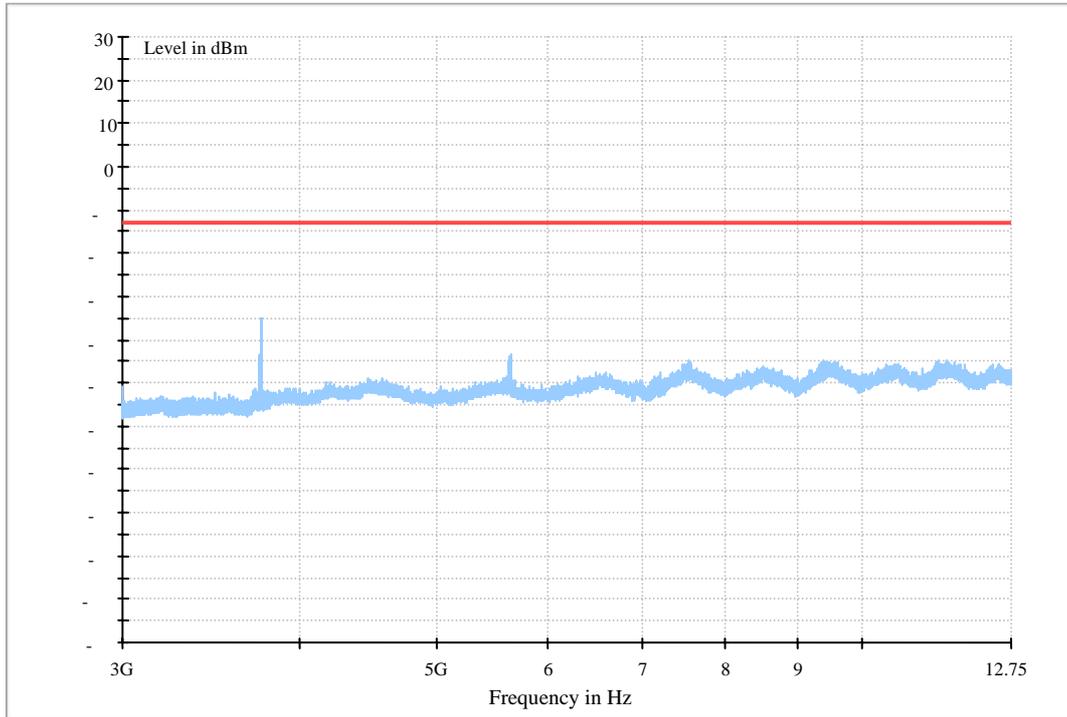


### Traffic Mode (30MHz-3GHz)

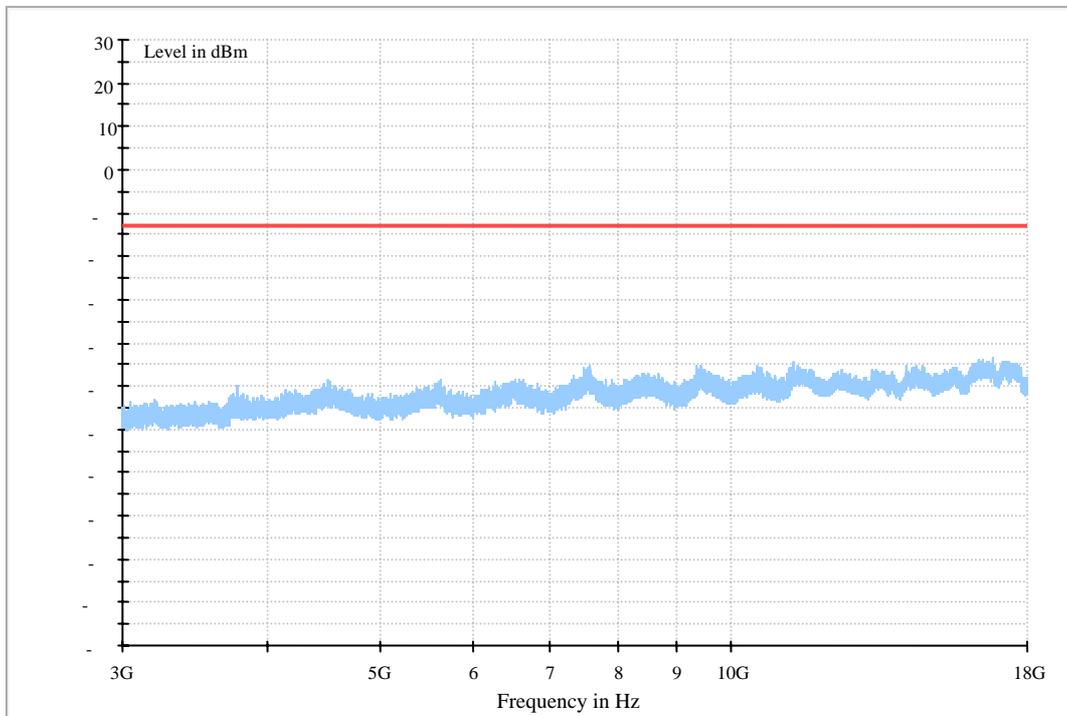




### Traffic Mode (3GHz-18GHz)



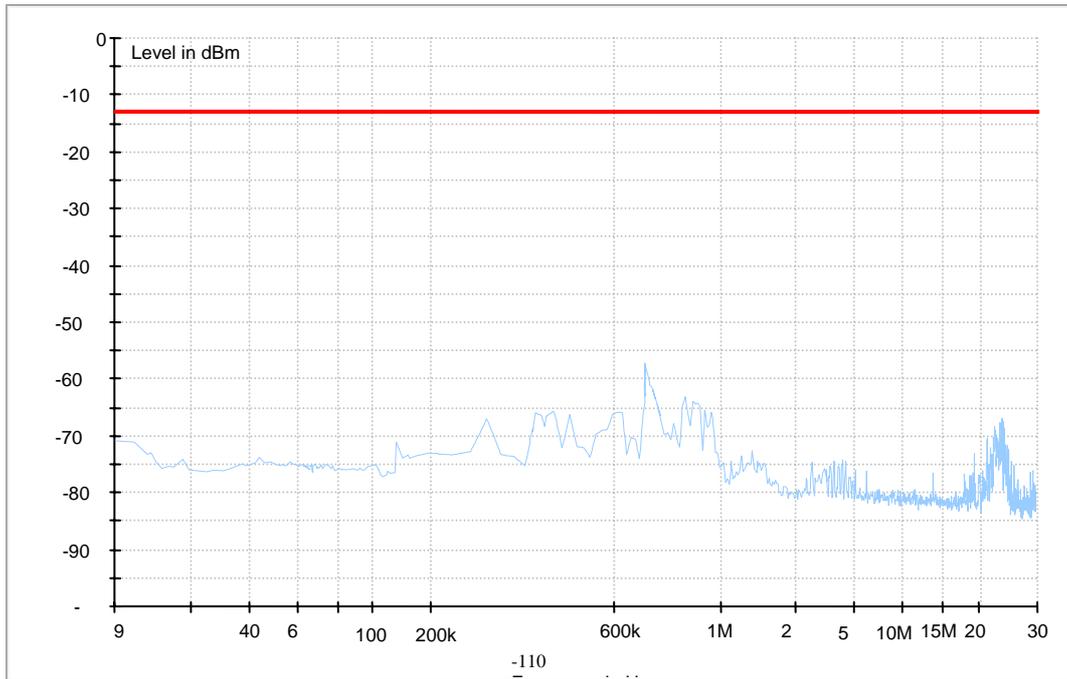
### Traffic Mode (18GHz-26.5GHz)



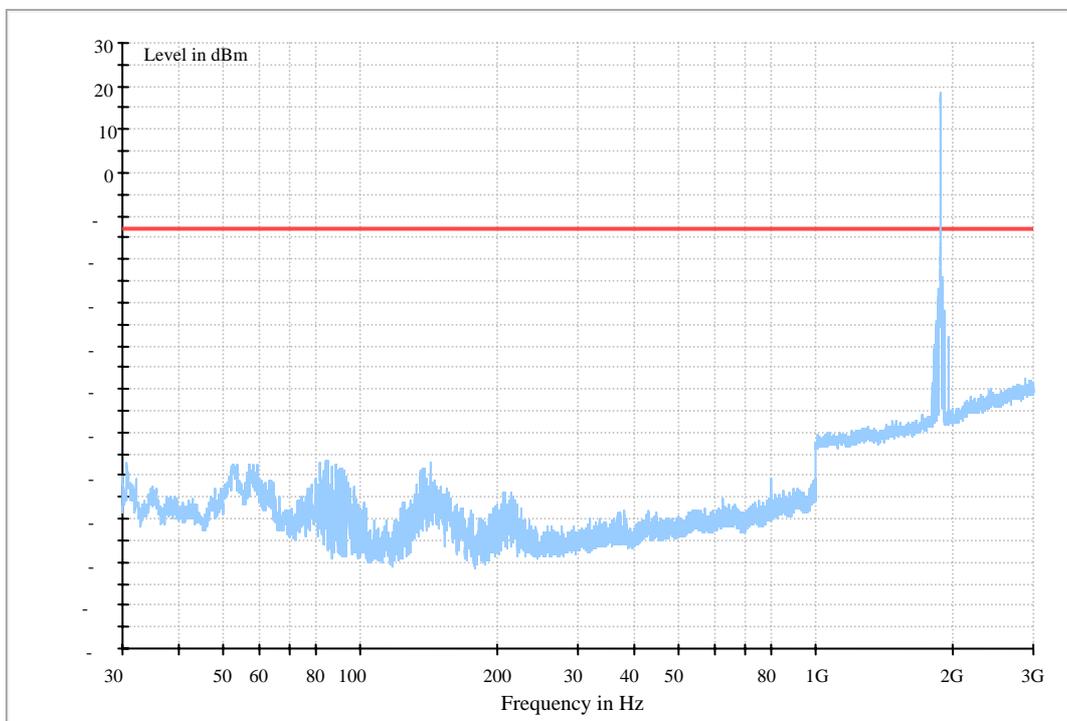


## HSDPA 1900

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

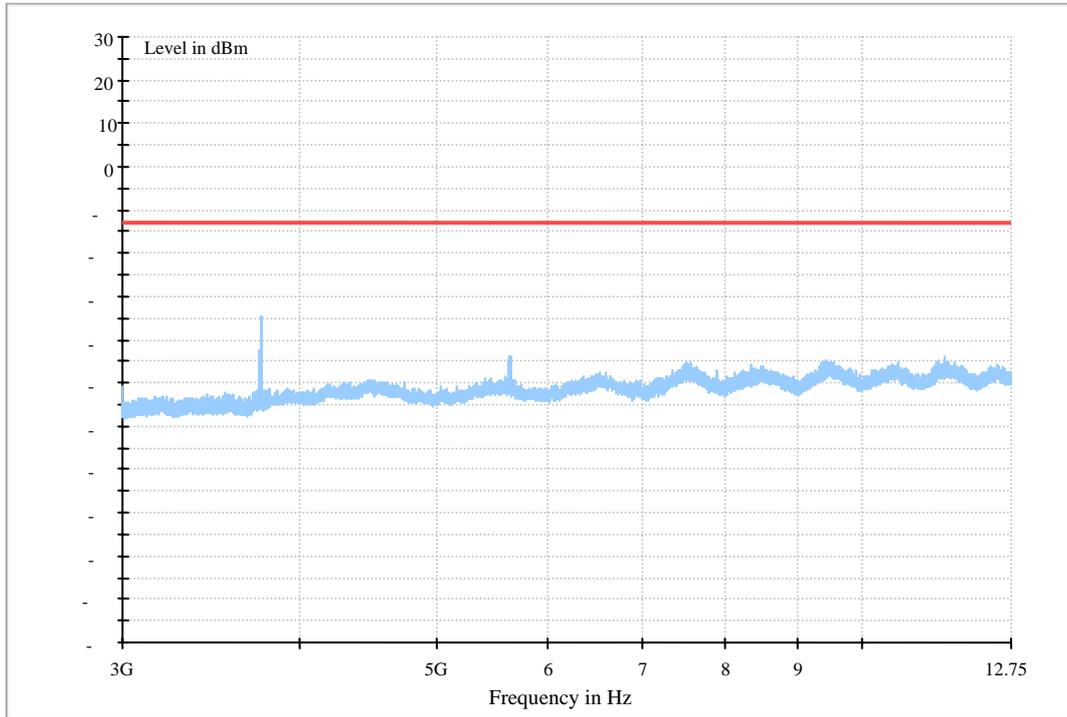


### Traffic Mode (30MHz-3GHz)

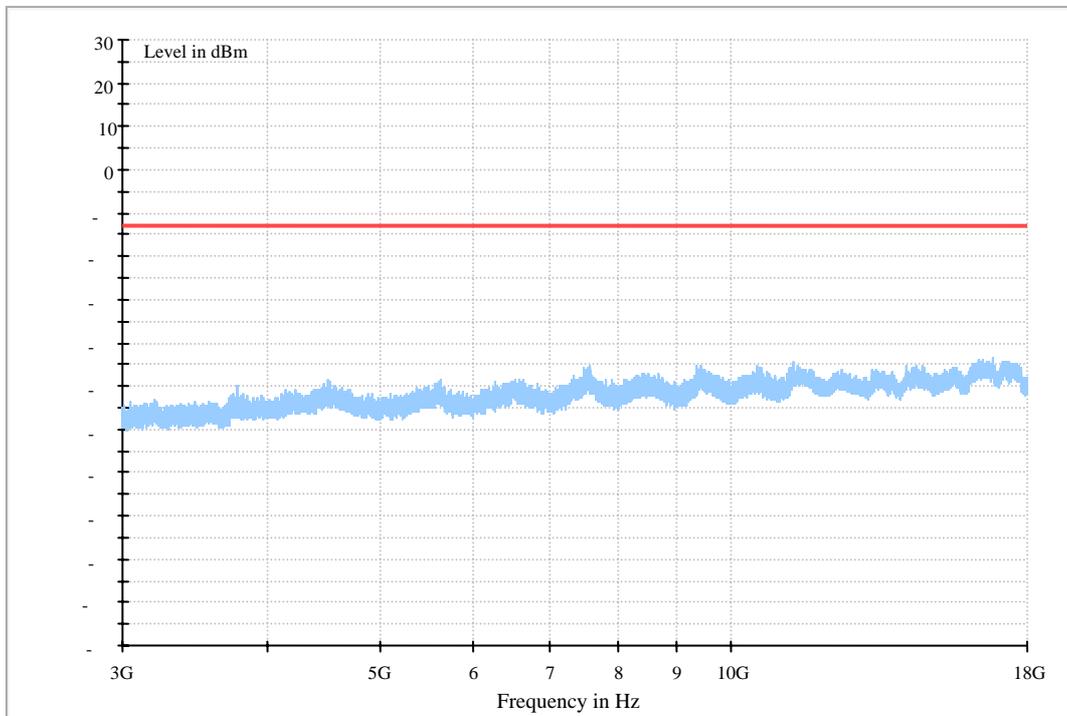




### Traffic Mode (3GHz-18GHz)



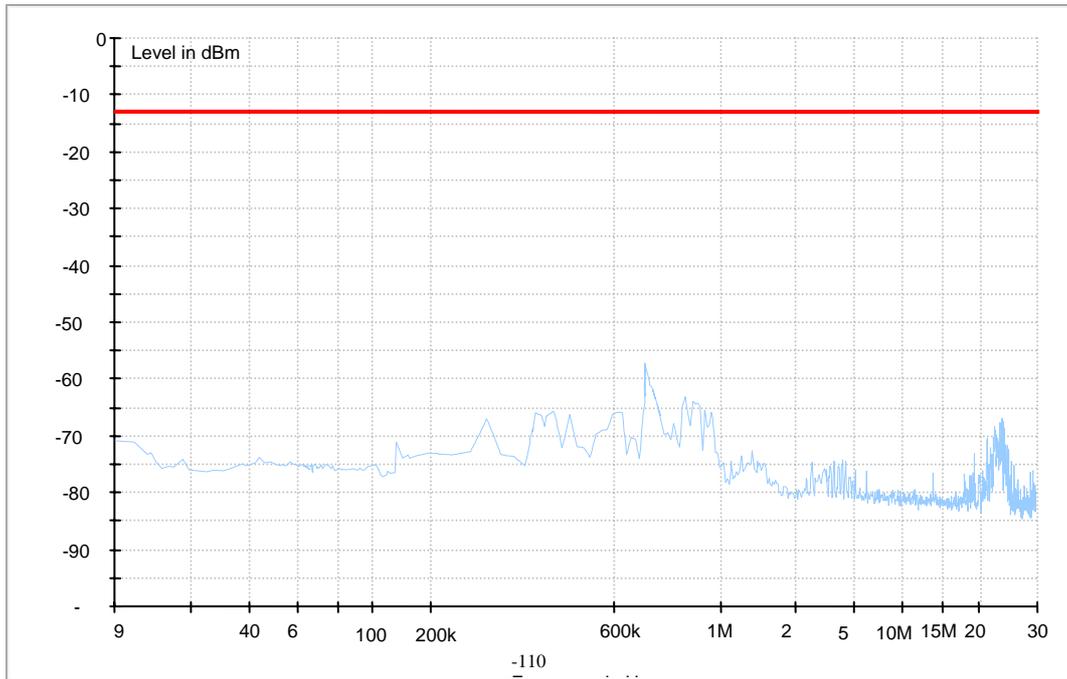
### Traffic Mode (18GHz-26.5GHz)



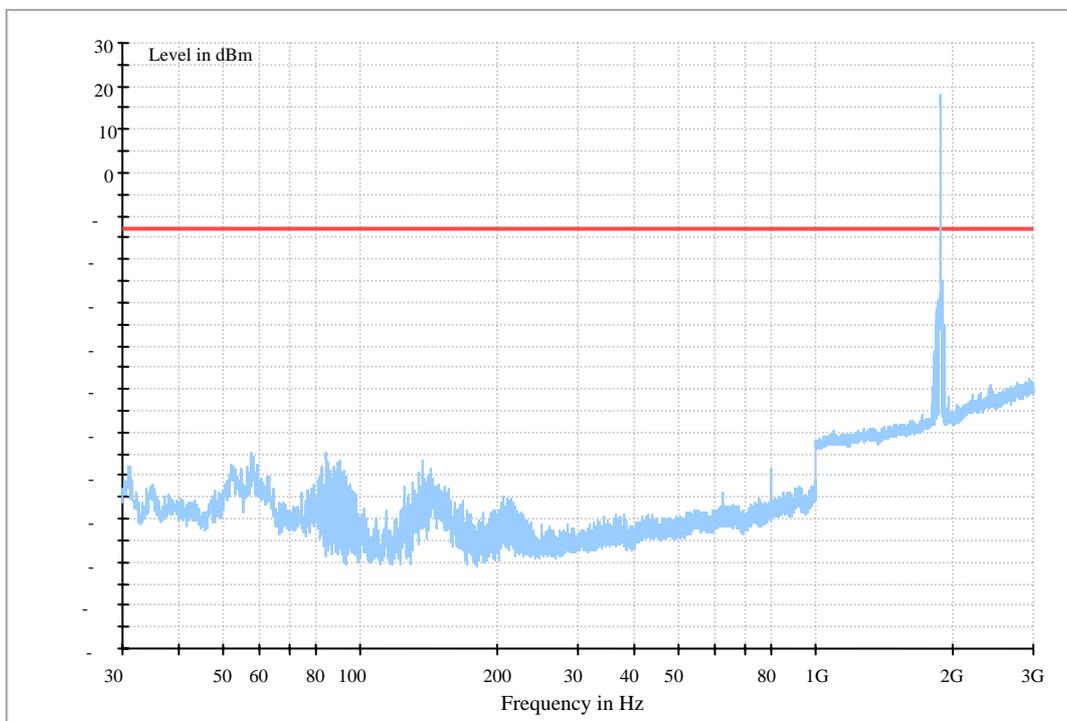


## HSUPA 1900

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

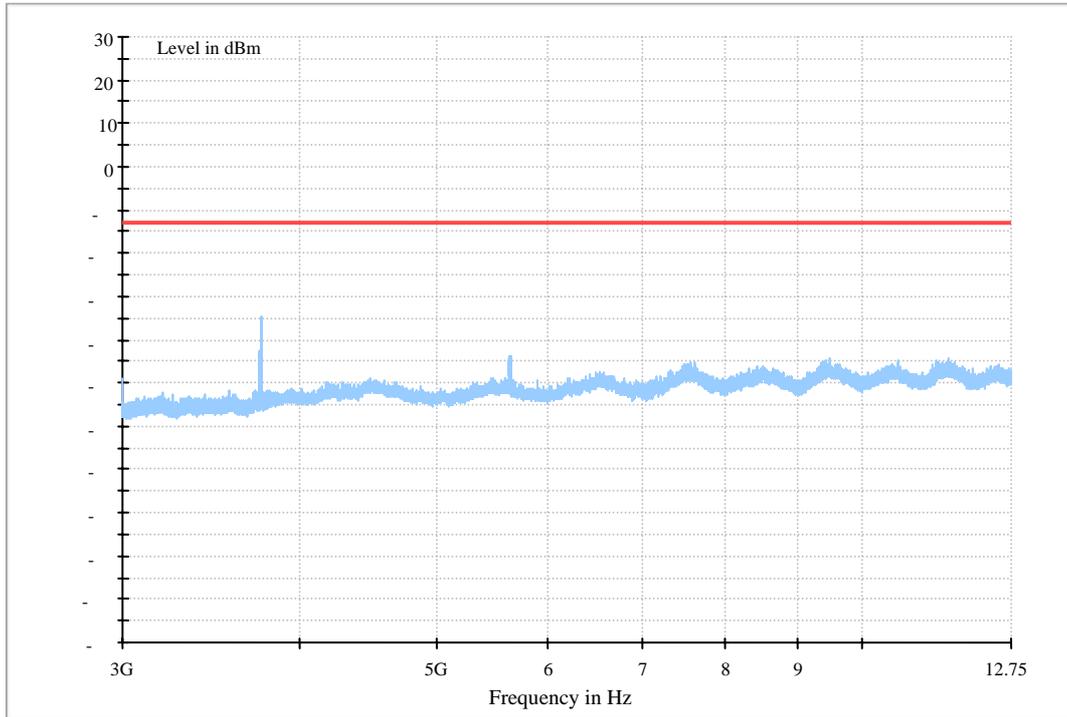


### Traffic Mode (30MHz-3GHz)

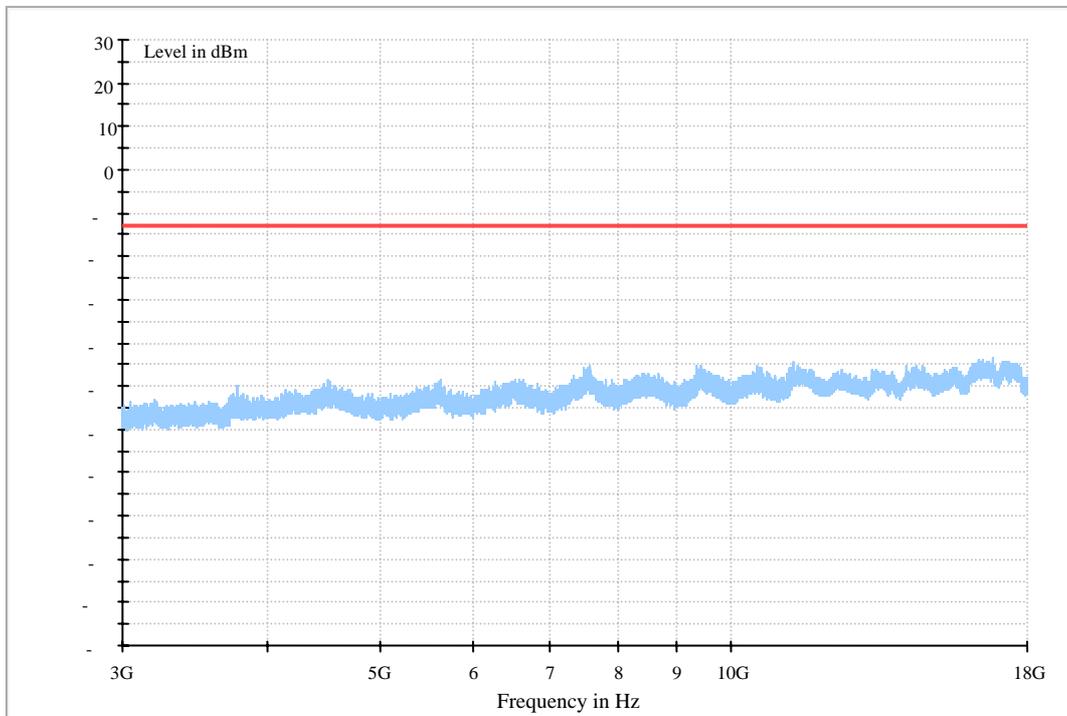




### Traffic Mode (3GHz-18GHz)



### Traffic Mode (18GHz-26.5GHz)





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



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# Appendix G

## Frequency Stability

According to FCC Part 2.1055& Part 24.235 & RSS-133



## 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	-15	-0.008	---	±2.5	Pass
			-20 °C	16	0.00851	---	±2.5	Pass
			-10 °C	12	0.00638	---	±2.5	Pass
			0 °C	18	0.00957	---	±2.5	Pass
			10 °C	-21	-0.0112	---	±2.5	Pass
			20 °C	14	0.00745	---	±2.5	Pass
			30 °C	-19	-0.0101	---	±2.5	Pass
			40 °C	12	0.00638	---	±2.5	Pass
			50 °C	-20	-0.0106	---	±2.5	Pass
TM 2	M	VN	-30 °C	-19	-0.0101	---	±2.5	Pass
			-20 °C	-17	-0.009	---	±2.5	Pass
			-10 °C	10	0.00532	---	±2.5	Pass
			0 °C	14	0.00745	---	±2.5	Pass
			10 °C	-18	-0.0096	---	±2.5	Pass
			20 °C	-15	-0.008	---	±2.5	Pass
			30 °C	17	0.00904	---	±2.5	Pass
			40 °C	-16	-0.0085	---	±2.5	Pass
			50 °C	18	0.00957	---	±2.5	Pass
TM 3	M	VN	-30 °C	10	0.00532	---	±2.5	Pass
			-20 °C	-20	-0.0106	---	±2.5	Pass
			-10 °C	-14	-0.0074	---	±2.5	Pass
			0 °C	12	0.00638	---	±2.5	Pass
			10 °C	-20	-0.0106	---	±2.5	Pass
			20 °C	13	0.00691	---	±2.5	Pass
			30 °C	8	0.00426	---	±2.5	Pass
			40 °C	11	0.00585	---	±2.5	Pass
			50 °C	9	0.00479	---	±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	13	0.00691	---	±2.5	Pass
			VN	15	0.00798	---	±2.5	Pass
			VH	-17	-0.009	---	±2.5	Pass
TM 2	M	TN	VL	16	0.00851	---	±2.5	Pass
			VN	-16	-0.0085	---	±2.5	Pass
			VH	8	0.00426	---	±2.5	Pass
TM 3	M	TN	VL	12	0.00638	---	±2.5	Pass
			VN	9	0.00479	---	±2.5	Pass
			VH	-22	-0.0117	---	±2.5	Pass

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



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



# Appendix H

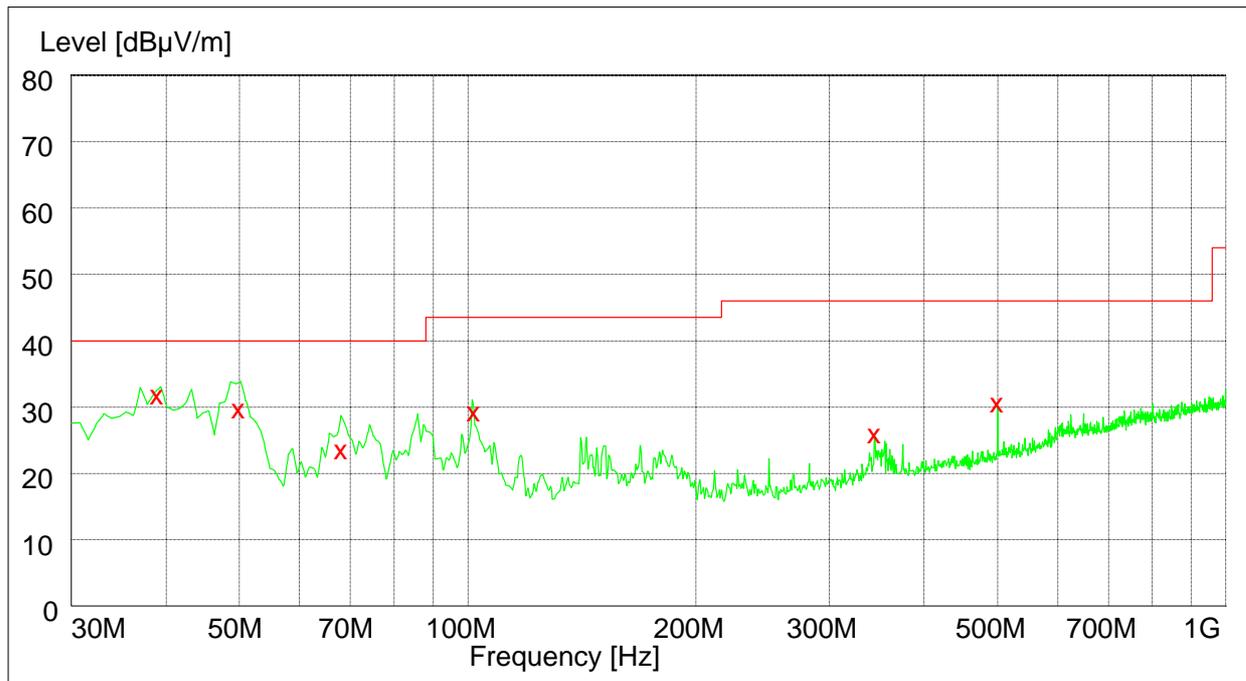
## Receiver Spurious Emissions

According to RSS-133



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

### 30MHz-1GHz

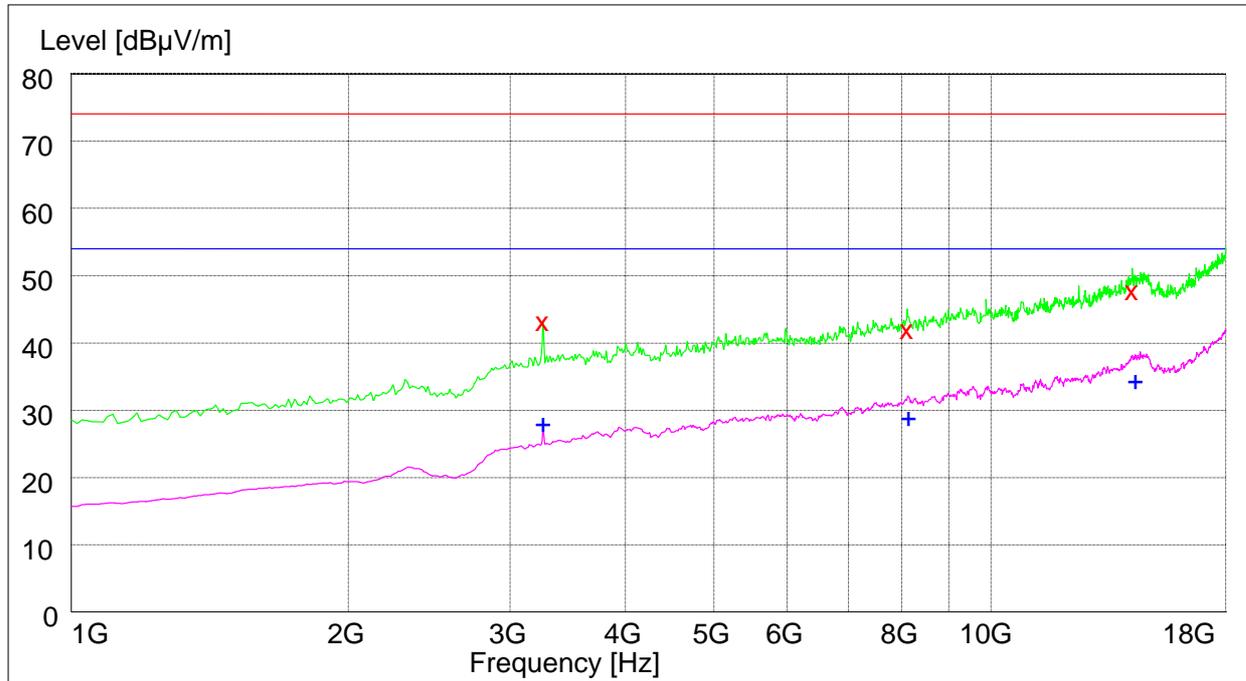


### MEASUREMENT RESULT: QP Detector

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 G

# Photos of Radiated Spurious Emissions



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

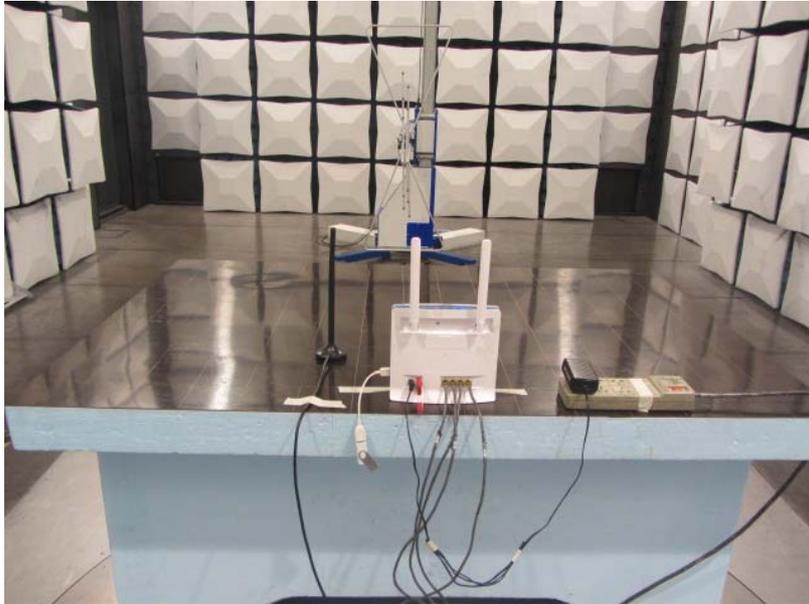
Security Level: Public

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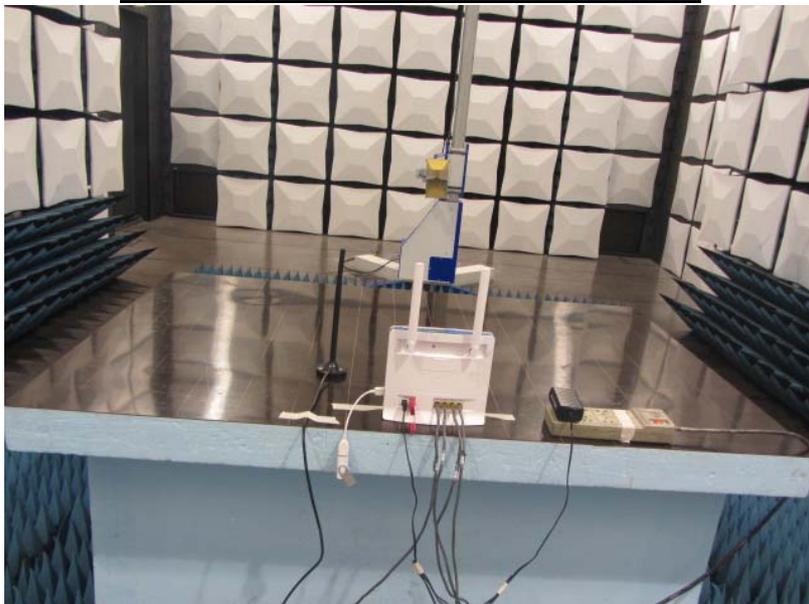
## Photos of Test Setup



# 1 Receiver Spurious Emissions



Receiver Spurious Emissions (30MHz-1GHz)



Receiver Spurious Emissions (above 1GHz)