



**FCC 47 CFR PART 22 SUBPART H AND PART 24 SUBPART E**

**TEST REPORT**

**For**

**Windows CE.NET Handheld Computer**

**Model: Z-2065**

**Trade Name: ZEBEX**

*Issued to*

**ZEBEX INDUSTRIES INC.**

**B1-1, No. 207, Sec 3, Beisin Road, Sindian City,  
Taipei 231, Taiwan, R.O.C.**

*Issued by*

**Compliance Certification Services Inc.**

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## 1. TEST RESULT CERTIFICATION

**Applicant:** ZEBEX INDUSTRIES INC.  
B1-1, No. 207, Sec 3, Beisin Road, Sindian City,  
Taipei 231, Taiwan, R.O.C.

**Equipment Under Test:** Windows CE.NET Handheld Computer

**Trade Name:** ZEBEX

**Model Number:** Z-2065

**Date of Test:** February 26 ~ March 14, 2010

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 22 Subpart H & Part 24 Subpart E	No non-compliance noted

### We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA/EIA-603-C: 2004 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rule FCC PART 22 Subpart H and PART 24 Subpart E.

The test results of this report relate only to the tested sample identified in this report.

*Approved by:*

Rex Lai  
Section Manager  
Compliance Certification Services Inc.

*Reviewed by:*

Gina Lo  
Section Manager  
Compliance Certification Services Inc.



## 2. EUT DESCRIPTION

<b>Product</b>	Windows CE.NET Handheld Computer
<b>Trade Name</b>	ZEBEX
<b>Model Number</b>	Z-2065
<b>Model Discrepancy</b>	N/A
<b>Power Supply</b>	1. Power from Adapter Powertron / PA1024-21 I/P: 100-240VAC, 50-60Hz, 0.6A O/P: 9V, 2.0A, 18W 2. VDC from Battery Rating: 3.7V, 5000mAH, 18.5Wh 3. Powered from host device via USB cable
<b>Frequency Range</b>	GPRS / EDGE: 850: 824 ~ 849 MHz GPRS / EDGE: 1900: 1850 ~ 1910 MHz
<b>Transmit Power (ERP &amp; EIRP Power)</b>	GPRS 850: 27.65 dBm (0.5821W) GPRS 1900: 25.74 dBm (0.3750W) EDGE 850: 21.95 dBm (0.1567W) EDGE 1900: 21.73 dBm (0.1489W)
<b>Modulation Technique</b>	GPRS: GMSK EDGE: 8PSK
<b>Type of Emission</b>	GPRS 850 MHz: 249KGXW--- GPRS 1900 MHz: 248KGXW--- EDGE 850 MHz: 243KG7W--- EDGE 1900 MHz: 247KG7W---
<b>Antenna Gain</b>	GPRS / EDGE 850 MHz: -0.02 dBi GPRS / EDGE 1900 MHz: 1.88 dBi
<b>Antenna Type</b>	PCB Antenna

**Remark:**

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: **JNF-Z-2065S** filing to comply with Part 22 and Part 24 of the FCC 47 CFR Rules.



### **3. TEST METHODOLOGY**

Both conducted and radiated testing were performed according to the procedures document on chapter 13 of ANSI C63.4: 2003, TIA/EIA-603-C: 2004 and FCC CFR 47, Part 2, PART 22 SUBPART H AND PART 24 SUBPART E

#### **3.1 EUT CONFIGURATION**

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

#### **3.2 EUT EXERCISE**

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

#### **3.3 GENERAL TEST PROCEDURES**

##### **Conducted Emissions**

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4: 2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

##### **Radiated Emissions**

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4: 2003.



### **3.4 DESCRIPTION OF TEST MODES**

The EUT (model: Z-2065) comes with adapter & battery for sale. After the preliminary test, the battery was found to emit the worst emissions and therefore had been tested under operating condition.

GPRS / EDGE 850:

Channel Low (CH128), Channel Mid (CH190) and Channel High (CH251) were chosen for full testing.

GPRS / EDGE 1900:

Channel Low (CH512), Channel Mid (CH661) and Channel High (CH810) were chosen for full testing.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode only.

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the worst case was recorded.



## **4. INSTRUMENT CALIBRATION**

### **4.1 MEASURING INSTRUMENT CALIBRATION**

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.



## 4.2 MEASUREMENT EQUIPMENT USED

### Equipment Used for Emissions Measurement

**Remark:** Each piece of equipment is scheduled for calibration once a year.

Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	03/04/2011
Power Meter	Agilent	E4416A	GB41291611	06/28/2010
Power Sensor	Agilent	E9327A	US40441097	06/28/2010
Temp. / Humidity Chamber	Terchy	MHG-150LF	930619	09/15/2010
DC Power Source	Agilent	E3640A	MY40001774	01/08/2011

3M Semi Anechoic Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US42510252	10/26/2010
EMI Test Receiver	R&S	ESCI	100064	02/04/2011
Pre-Amplifier	Mini-Circuits	ZFL-1000LN	SF350700823	01/13/2011
Pre-Amplifier	MITEQ	AFS44-00102650-42-10P-44	1415367	11/20/2010
Bilog Antenna	Sunol Sciences	JB3	A030105	09/11/2010
Horn Antenna	EMCO	3117	00055165	12/07/2010
Turn Table	CCS	CC-T-1F	N/A	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R
Site NSA	CCS	N/A	N/A	12/31/2010
Test S/W	LabVIEW 6.1 (CCS OATS EMI SW V2.7)			

Powerline Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESHS30	828144/003	12/06/2010
LISN	EMCO	3825/2	9106-1809	05/03/2010
LISN	SCHAFFNER	NNB 41	03/10013	12/03/2010
Test S/W	LABVIEW (V 6.1)			





### 4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Powerline Conducted Emission	+/-1.1559
3M Semi Anechoic Chamber / 30M~200M	+/-3.9944
3M Semi Anechoic Chamber / 200M~1000M	+/-3.9285
3M Semi Anechoic Chamber / 1G~8G	+/-2.4734
3M Semi Anechoic Chamber / 8G~18G	+/-2.4878
3M Semi Anechoic Chamber / 18G~26G	+/-2.6215
3M Semi Anechoic Chamber / 26G~40G	+/-2.8603

**Remark:** *This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .*



## **5. FACILITIES AND ACCREDITATIONS**

### **5.1 FACILITIES**

☐ No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.

Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

☒ No.11, Wugong 6th Rd., Wugu Industrial Park, Taipei Hsien 248, Taiwan

Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

☐ No.81-1, Lane 210, Bade 2nd Rd., Luchu Hsiang, Taoyuan Hsien 338, Taiwan

Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

### **5.2 EQUIPMENT**

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.




Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."



### 5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	 FCC MRA: TW1039
Taiwan	TAF	LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310 IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12.2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17 FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959 FCC Method -47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	 Testing Laboratory 1309
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	 IC 2324G-1 IC 2324G-2

*\* No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.*



## 6. SETUP OF EQUIPMENT UNDER TEST

### 6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix I for the actual connections between EUT and support equipment.

### 6.2 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1	Notebook PC	DELL	PP19L	GK102 A00	QDS-BRCM1021	N/A	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
2	LCD Monitor	DELL	2408WFPb	CN-OG293H-7426 1-95M-1KGS	FCC DoC	Shielded, 1.8m with 2 cores	Unshielded, 1.8m
3	320GB 2.5" HDD	Seagate	9ZA2MG-500	2GE1RKNC	FCC DoC	Shielded, 1.8m	N/A
4	USB Mouse	Logitech	M-UAG96B	HC8500L	FCC DoC	Shielded, 1.8m	N/A
5	SD Card	SANDISK	N/A	N/A	N/A	N/A	N/A
6	SIM Card	N/A	N/A	N/A	N/A	N/A	N/A
7	Test kit	N/A	N/A	N/A	N/A	N/A	N/A
8	Universal Radio Communication Tester (Remote)	R&S	CMU200	1100.000.8.02	N/A	N/A	Unshielded, 1.8m
9	Notebook PC (Remote)	IBM	1951-I3V(T60)	L3B2188	FCC DoC	N/A	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core

**Remark:**

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



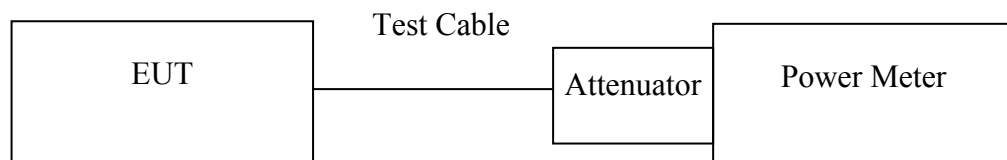
## 7. FCC PART 22 & 24 REQUIREMENTS

### 7.1 PEAK POWER

#### LIMIT

According to FCC §2.1046.

#### Test Configuration



*Remark: Measurement setup for testing on Antenna connector*

#### TEST PROCEDURE

The transmitter output was connected to a calibrated attenuator, the other end of which was connected to a power meter. Transmitter output was read off the power meter in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to the power meter reading.

#### TEST RESULTS

*No non-compliance noted.*

**Test Data**

Test Mode	CH	Frequency (MHz)	Peak Power (dBm)	Output Power W
GPRS 850 (Class 12)	128	824.20	32.70	1.8621
	190	836.40	32.40	1.7378
	251	848.80	32.10	1.6218
EDGE 850 (Class 12)	128	824.20	27.00	0.5012
	190	836.40	26.70	0.4677
	251	848.80	26.40	0.4365

Test Mode	CH	Frequency (MHz)	Peak Power (dBm)	Output Power W
GPRS 1900 (Class 12)	512	1850.20	29.60	0.9120
	661	1880.00	29.50	0.8913
	810	1909.80	29.60	0.9120
EDGE 1900 (Class 12)	512	1850.20	25.70	0.3715
	661	1880.00	25.60	0.3631
	810	1909.80	25.50	0.3548

**Remark:** The value of factor includes both the loss of cable and external attenuator

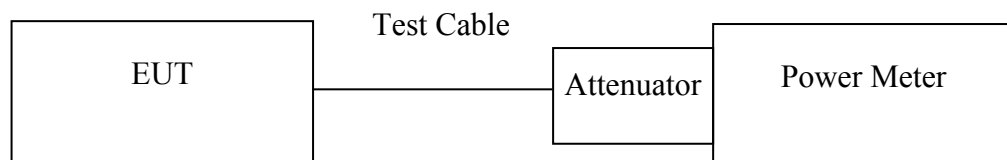


## 7.2 AVERAGE POWER

### LIMIT

For reporting purposes only.

### Test Configuration



*Remark: Measurement setup for testing on Antenna connector*

### TEST PROCEDURE

The transmitter output was connected to a calibrated attenuator, the other end of which was connected to a power meter. Transmitter output was read off the power meter in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to the power meter reading.

### TEST RESULTS

*No non-compliance noted.*



## **TEST RESULTS**

*No non-compliance noted.*

### **Test Data**

Test Mode	CH	Frequency (MHz)	AVG Power (dBm)	Output Power W
GPRS 850 (Class 12)	128	824.20	32.50	1.7783
	190	836.40	32.30	1.6982
	251	848.80	32.00	1.5849
EDGE 850 (Class 12)	128	824.20	26.90	0.4898
	190	836.40	26.60	0.4571
	251	848.80	26.20	0.4169

Test Mode	CH	Frequency (MHz)	AVG Power (dBm)	Output Power W
GPRS 1900 (Class 12)	512	1850.20	29.40	0.8710
	661	1880.00	29.30	0.8511
	810	1909.80	29.40	0.8710
EDGE 1900 (Class 12)	512	1850.20	25.60	0.3631
	661	1880.00	25.50	0.3548
	810	1909.80	25.40	0.3467

**Remark:** *The value of factor includes both the loss of cable and external attenuator*



## 7.3 ERP & EIRP MEASUREMENT

### LIMIT

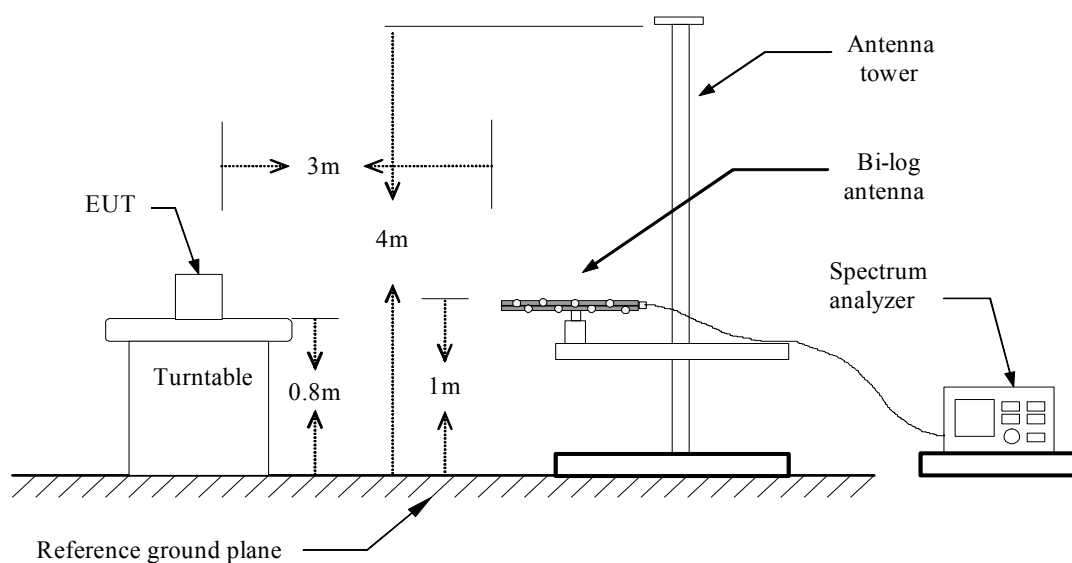
According to FCC §2.1046

FCC 22.913(a): The Effective Radiated Power (ERP) of mobile transmitters must not exceed 7 Watts.

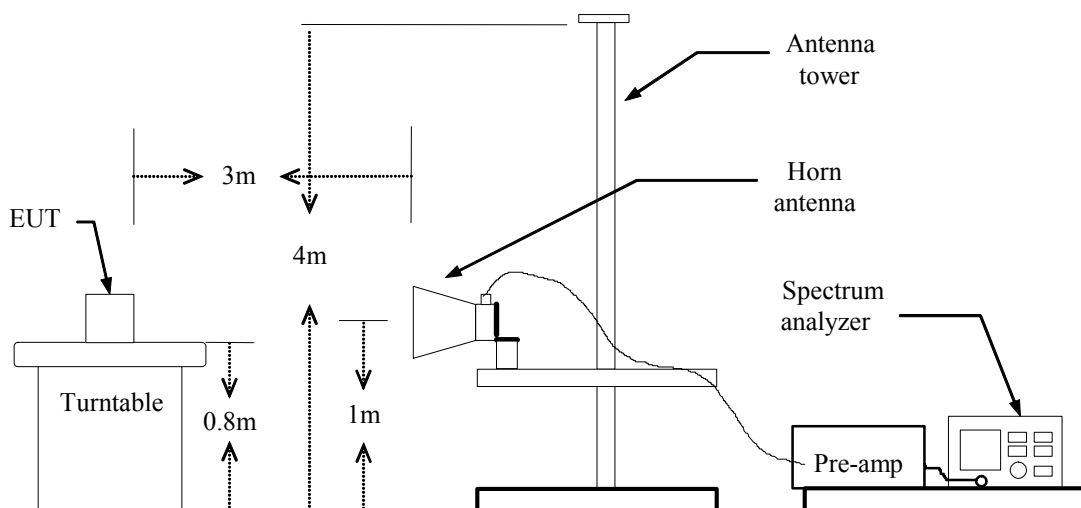
FCC 24.232(b): The equivalent Isotropic Radiated Power (EIRP) must not exceed 2 Watts.

### Test Configuration

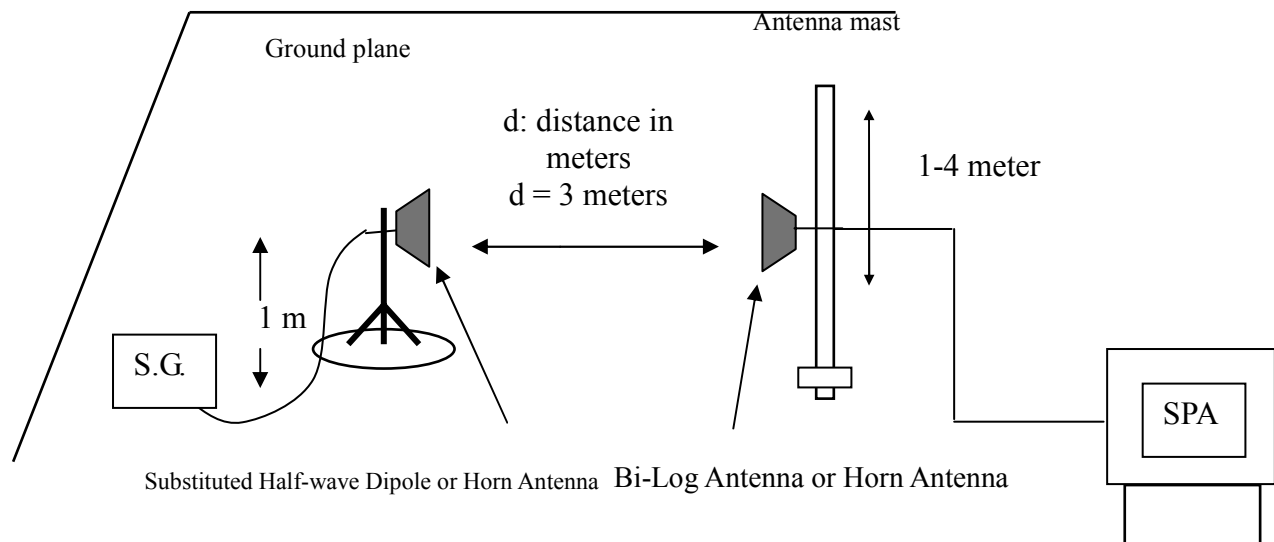
#### Below 1 GHz



#### Above 1 GHz



## For Substituted Method Test Set-UP



## TEST PROCEDURE

The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.

During the measurement of the EUT, the resolution bandwidth was set to 3MHz and the average bandwidth was set to 3MHz. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna. The reading was recorded and the field strength (E in dBuV/m) was calculated.

ERP in frequency band 824-849MHz, and EIRP in frequency band 1851.25 –1910MHz were measured using a substitution method. The EUT was replaced by half-wave dipole (824-849MHz) or horn antenna (1851.25-1910MHz) connected to a signal generator. The spectrum analyzer reading was recorded and ERP/EIRP was calculated as follows:

$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable (dB)}$$

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)}$$

## TEST RESULTS

*No non-compliance noted.*

**GPRS 850 TEST DATA (CLASS 12)**

EUT Pol.	Channel	Frequency (MHz)	Antenna Pol.	Reading level (dBuV)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
X	128	824.20	V	-16.58	34.62	18.03	38.50	-20.47
		824.20	H	-9.73	34.65	24.92	38.50	-13.58
	190	836.40	V	-14.66	34.53	19.87	38.50	-18.63
		836.40	H	-8.93	34.63	25.70	38.50	-12.80
	251	848.80	V	-15.22	34.64	19.41	38.50	-19.09
		848.80	H	-8.69	34.75	26.06	38.50	-12.44
Y	128	824.20	V	-16.04	34.62	18.58	38.50	-19.92
		824.20	H	-8.55	34.65	26.09	38.50	-12.41
	190	836.40	V	-14.10	34.53	20.43	38.50	-18.07
		836.40	H	-7.09	34.63	27.54	38.50	-10.96
	251	848.80	V	-13.12	34.64	21.52	38.50	-16.98
		848.80	H	-7.10	34.75	<b>*27.65</b>	38.50	-10.85
Z	128	824.20	V	-10.04	34.62	24.58	38.50	-13.92
		824.20	H	-13.28	34.65	21.36	38.50	-17.14
	190	836.40	V	-8.38	34.53	26.15	38.50	-12.35
		836.40	H	-13.68	34.63	20.95	38.50	-17.55
	251	848.80	V	-7.50	34.64	27.14	38.50	-11.36
		848.80	H	-13.68	34.75	21.07	38.50	-17.43

**GPRS 1900 TEST DATA (CLASS 12)**

EUT Pol.	Channel	Frequency (MHz)	Antenna Pol.	Reading level (dBuV)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
X	512	1850.20	V	-18.50	41.17	22.67	33.00	-10.33
		1850.20	H	-15.82	40.79	24.97	33.00	-8.03
	661	1880.00	V	-18.88	41.23	22.35	33.00	-10.65
		1880.00	H	-18.05	41.14	23.09	33.00	-9.91
	810	1909.80	V	-20.91	41.30	20.40	33.00	-12.60
		1909.80	H	-19.62	41.38	21.75	33.00	-11.25
Y	512	1850.20	V	-16.67	41.17	24.50	33.00	-8.50
		1850.20	H	-15.05	40.79	<b>*25.74</b>	33.00	-7.26
	661	1880.00	V	-18.52	41.23	22.71	33.00	-10.29
		1880.00	H	-16.39	41.14	24.75	33.00	-8.25
	810	1909.80	V	-20.82	41.30	20.48	33.00	-12.52
		1909.80	H	-18.45	41.38	22.93	33.00	-10.07
Z	512	1850.20	V	-16.72	41.17	24.45	33.00	-8.55
		1850.20	H	-18.93	40.79	21.86	33.00	-11.14
	661	1880.00	V	-16.59	41.23	24.63	33.00	-8.37
		1880.00	H	-19.18	41.14	21.97	33.00	-11.03
	810	1909.80	V	-18.11	41.30	23.19	33.00	-9.81
		1909.80	H	-20.59	41.38	20.79	33.00	-12.21

**EDGE 850 Test Data (Class 12)**

EUT Pol.	Channel	Frequency (MHz)	Antenna Pol.	Reading level (dBuV)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
X	128	824.27	V	-22.26	34.62	12.36	38.50	-26.14
		824.27	H	-15.16	34.65	19.49	38.50	-19.01
	190	836.64	V	-20.21	34.53	14.31	38.50	-24.19
		836.64	H	-14.56	34.63	20.07	38.50	-18.43
	251	848.79	V	-20.74	34.64	13.90	38.50	-24.60
		848.79	H	-14.15	34.75	20.60	38.50	-17.90
Y	128	824.27	V	-21.59	34.62	13.03	38.50	-25.47
		824.13	H	-13.81	34.65	20.83	38.50	-17.67
	190	836.73	V	-19.75	34.53	14.78	38.50	-23.72
		836.40	H	-12.72	34.63	21.92	38.50	-16.58
	251	849.02	V	-18.65	34.64	15.98	38.50	-22.52
		848.88	H	-12.80	34.75	<b>*21.95</b>	38.50	-16.55
Z	128	824.22	V	-15.76	34.62	18.86	38.50	-19.64
		824.13	H	-19.09	34.65	15.56	38.50	-22.94
	190	836.64	V	-13.90	34.53	20.62	38.50	-17.88
		836.55	H	-19.25	34.63	15.38	38.50	-23.12
	251	849.02	V	-12.93	34.64	21.70	38.50	-16.80
		848.70	H	-19.10	34.75	15.65	38.50	-22.85

**EDGE 1900 Test Data (Class 12)**

EUT Pol.	Channel	Frequency (MHz)	Antenna Pol.	Reading level (dBuV)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
X	512	1850.16	V	-22.44	41.17	18.73	33.00	-14.27
		1849.98	H	-19.24	40.79	21.55	33.00	-11.45
	661	1879.86	V	-22.75	41.23	18.48	33.00	-14.52
		1879.86	H	-21.41	41.14	19.73	33.00	-13.27
	810	1910.01	V	-24.65	41.30	16.65	33.00	-16.35
		1910.01	H	-23.31	41.38	18.06	33.00	-14.94
Y	512	1850.34	V	-20.29	41.17	20.89	33.00	-12.11
		1850.34	H	-19.06	40.79	<b>*21.73</b>	33.00	-11.27
	661	1880.04	V	-22.06	41.23	19.17	33.00	-13.83
		1880.31	H	-20.45	41.14	20.70	33.00	-12.30
	810	1910.01	V	-24.35	41.30	16.95	33.00	-16.05
		1910.01	H	-22.08	41.38	19.29	33.00	-13.71
Z	512	1849.98	V	-20.40	41.17	20.77	33.00	-12.23
		1850.16	H	-22.60	40.79	18.19	33.00	-14.81
	661	1880.04	V	-20.14	41.23	21.09	33.00	-11.91
		1880.04	H	-22.99	41.14	18.15	33.00	-14.85
	810	1880.04	V	-21.77	41.30	19.53	33.00	-13.47
		1909.56	H	-24.36	41.38	17.01	33.00	-15.99

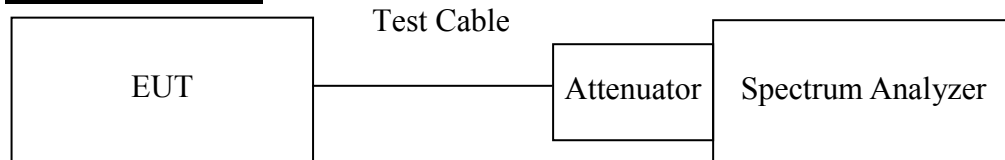


## 7.4 OCCUPIED BANDWIDTH MEASUREMENT

### LIMIT

According to §FCC 2.1049.

### Test Configuration



*Remark: Measurement setup for testing on Antenna connector*

### TEST PROCEDURE

The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW was set to about 1% of emission BW, VBW is set to 3 times the RBW, -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

### TEST RESULTS

*No non-compliance noted*

**Test Data**

Test Mode	CH	Frequency (MHz)	99% Bandwidth (kHz)
GPRS 850 (Class 12)	128	824.20	245.5361
	190	836.40	249.5935
	251	848.80	239.2360
EDGE 850 (Class 12)	128	824.20	244.5163
	190	836.40	242.7914
	251	848.80	248.8845

Test Mode	CH	Frequency (MHz)	99% Bandwidth (kHz)
GPRS 1900 (Class 12)	512	1850.20	241.5424
	661	1880.00	243.0411
	810	1909.80	240.3544
EDGE 1900 (Class 12)	512	1850.20	247.6620
	661	1880.00	243.5189
	810	1909.80	244.7407

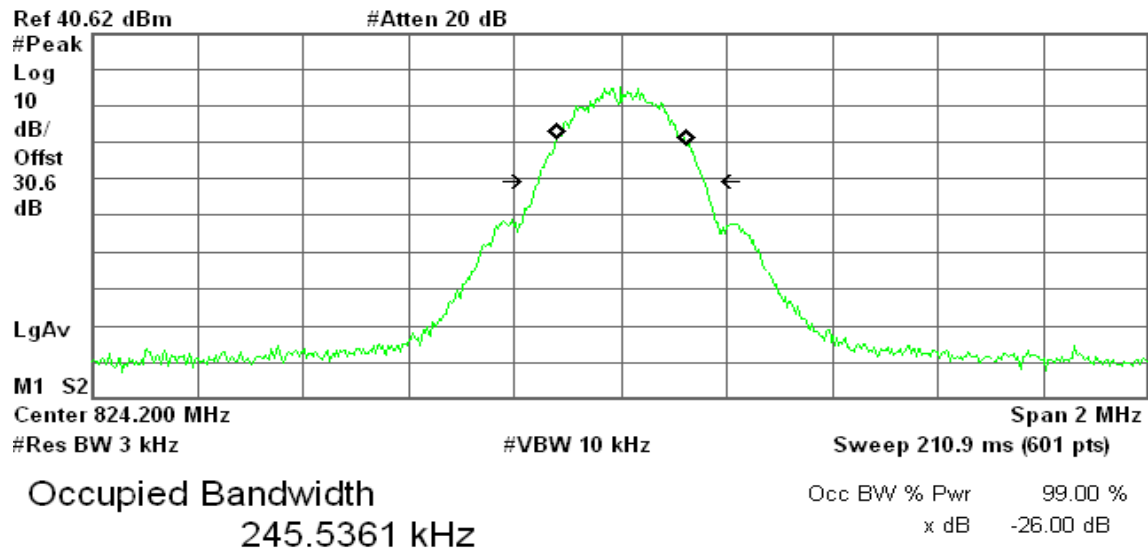


## Test Plot

### GPRS 850 (CH Low)

Agilent 15:03:14 Mar 3, 2010

R T

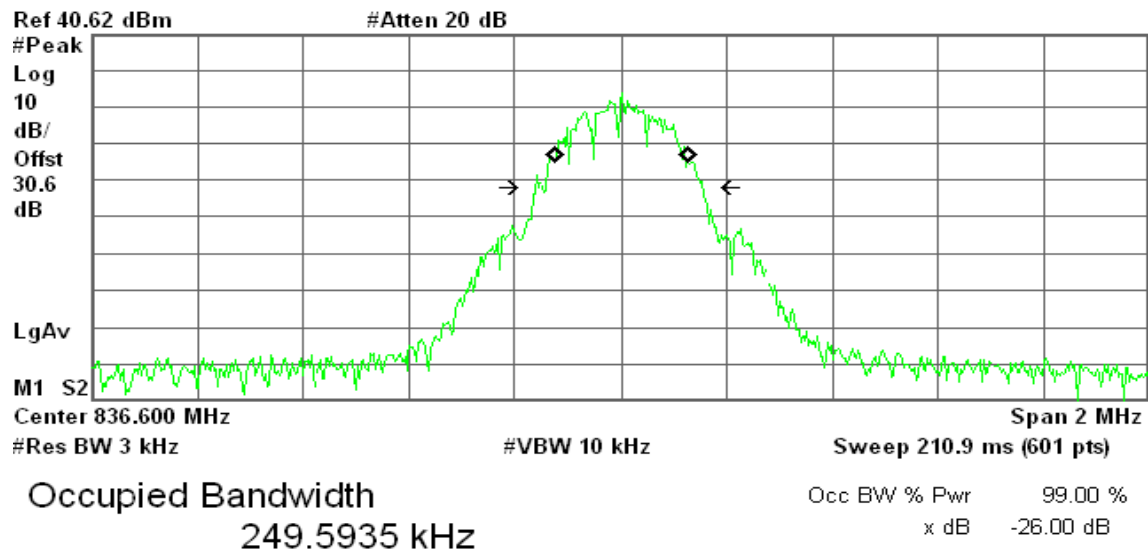


Transmit Freq Error 2.113 kHz  
x dB Bandwidth 311.253 kHz

### GPRS 850 (CH Mid)

Agilent 15:08:54 Mar 3, 2010

R T



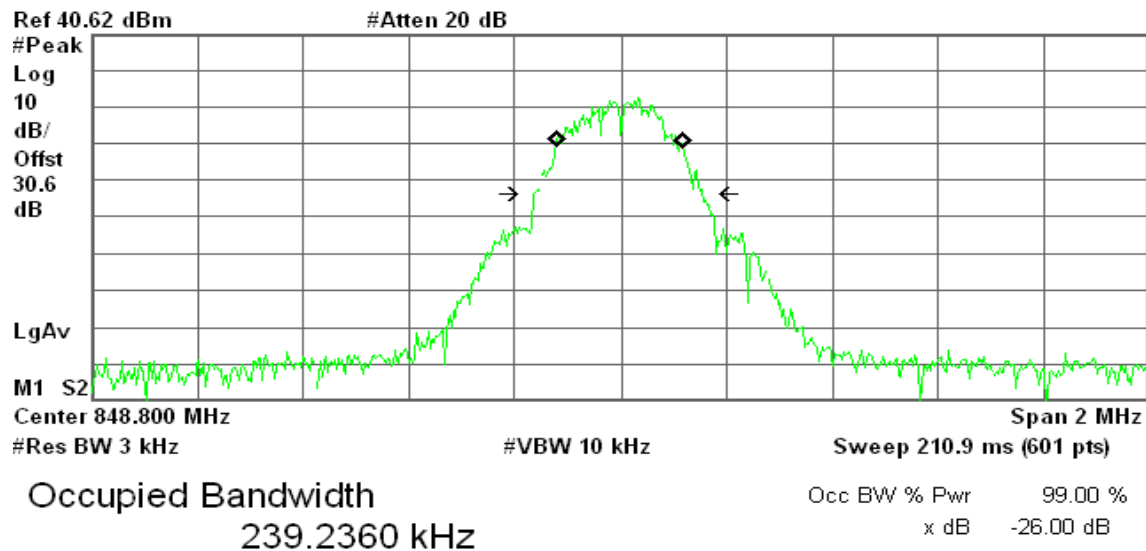
Transmit Freq Error 774.603 Hz  
x dB Bandwidth 314.662 kHz



## GPRS 850(CH High)

Agilent 15:09:44 Mar 3, 2010

R T

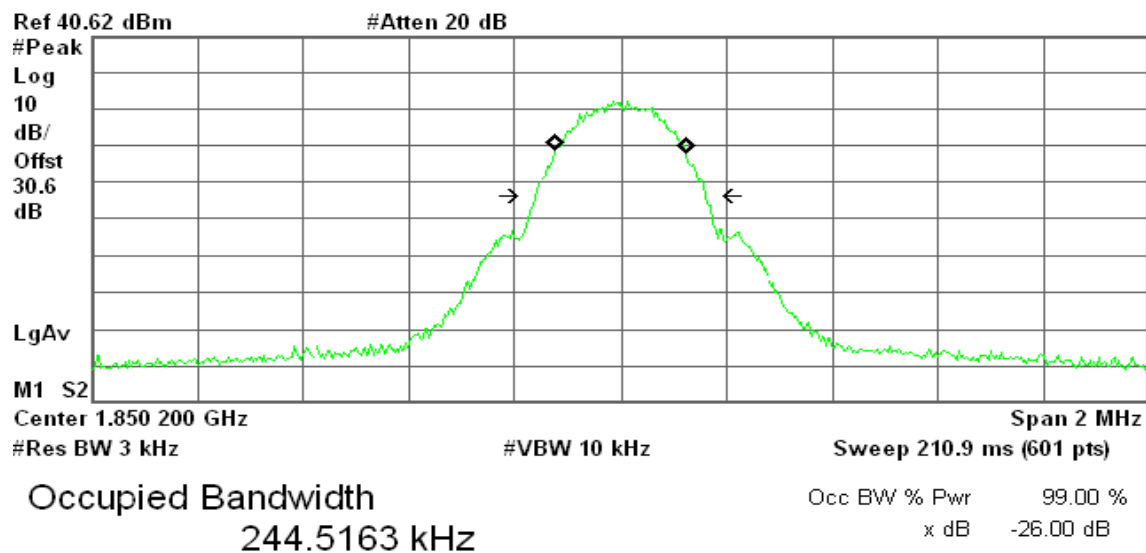


Transmit Freq Error -1.536 kHz  
x dB Bandwidth 315.595 kHz

## GPRS 1900 (CH Low)

Agilent 16:20:08 Mar 3, 2010

R T



Transmit Freq Error 211.060 Hz  
x dB Bandwidth 319.145 kHz

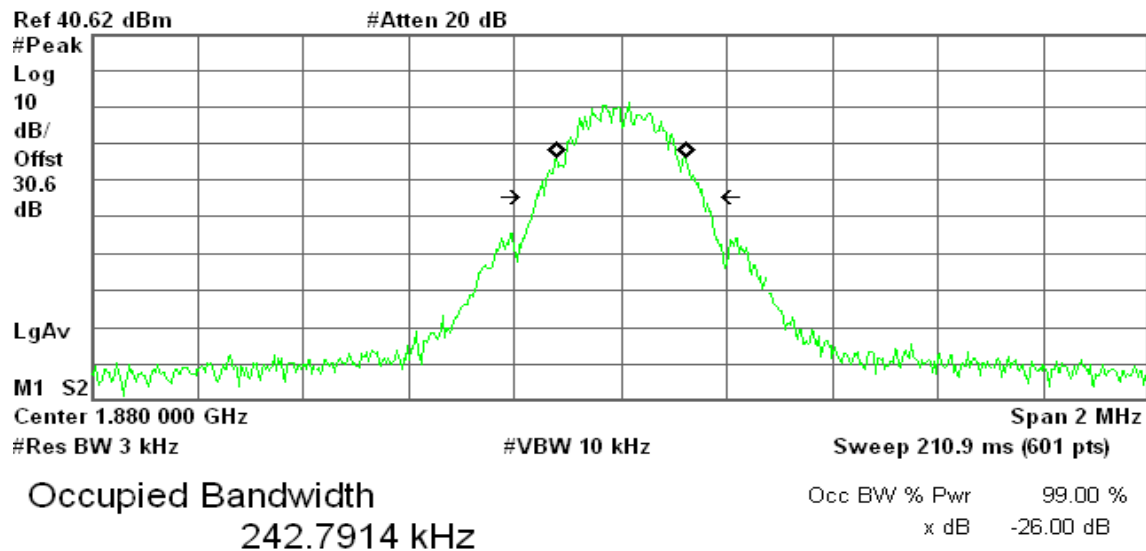




## GPRS 1900 (CH Mid)

Agilent 16:21:42 Mar 3, 2010

R T

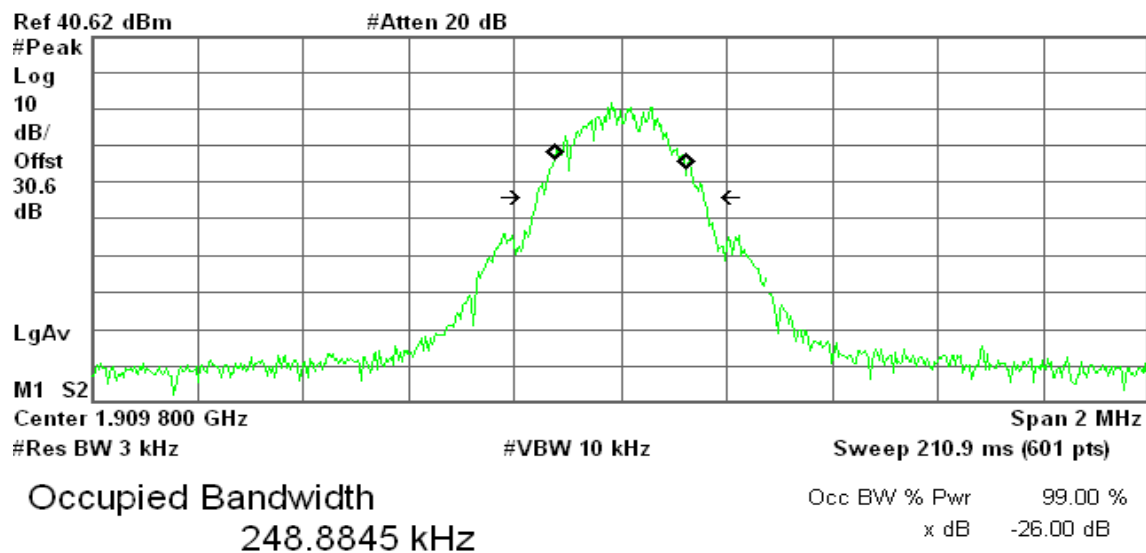


Transmit Freq Error 513.111 Hz  
Occupied Bandwidth 313.916 kHz

## GPRS 1900 (CH High)

Agilent 16:22:30 Mar 3, 2010

R T



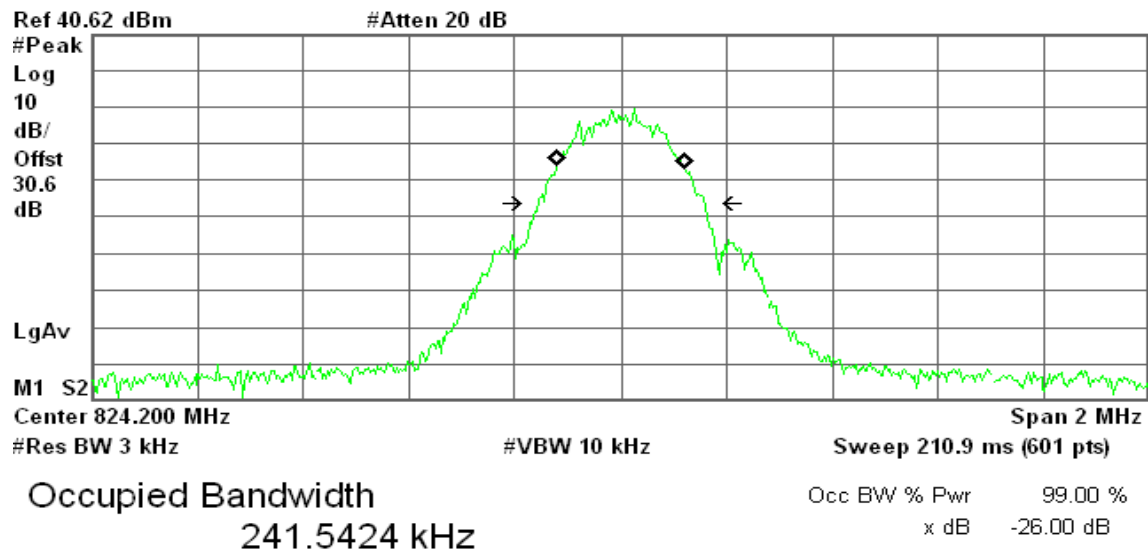
Transmit Freq Error 501.985 Hz  
x dB Bandwidth 313.849 kHz



## EDGE 850 (CH Low)

Agilent 15:40:00 Mar 3, 2010

R T

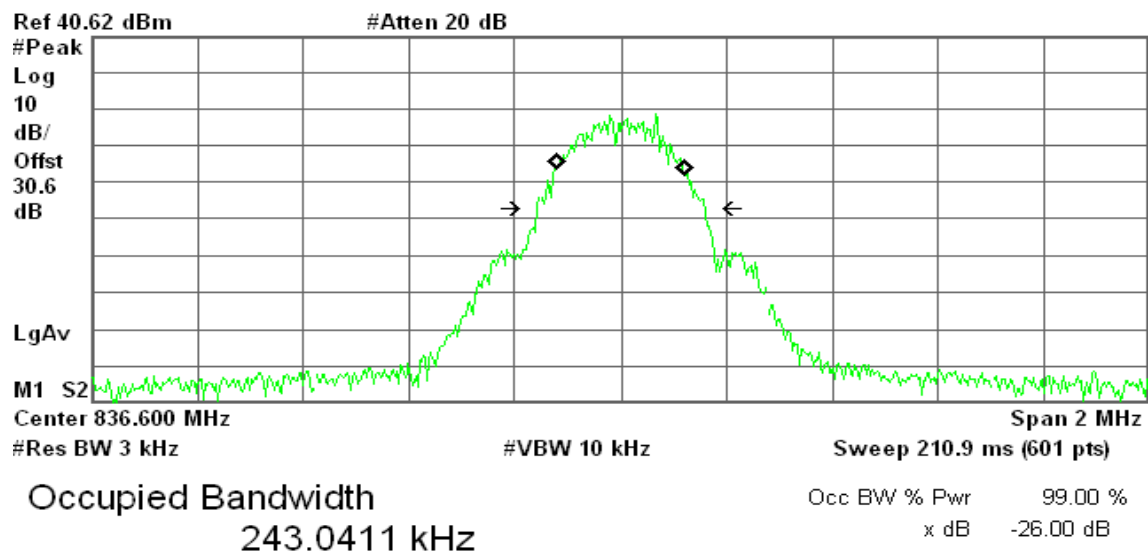


Transmit Freq Error 801.293 Hz  
x dB Bandwidth 313.857 kHz

## EDGE 850 (CH Mid)

Agilent 15:42:16 Mar 3, 2010

R T

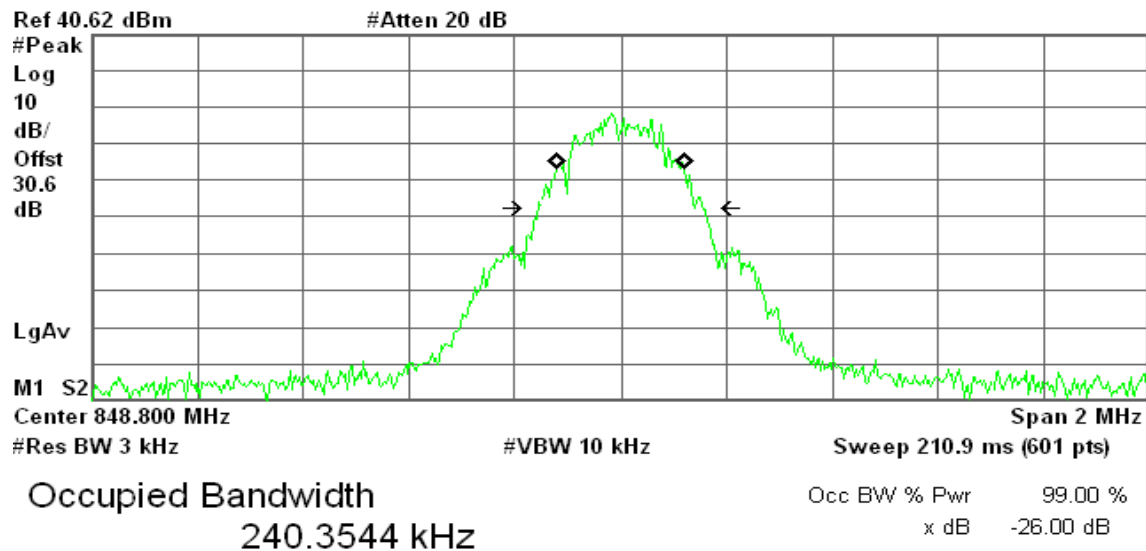


Transmit Freq Error 102.821 Hz  
Occupied Bandwidth 316.427 kHz

**EDGE 850 (CH High)**

\* Agilent 15:42:46 Mar 3, 2010

R T

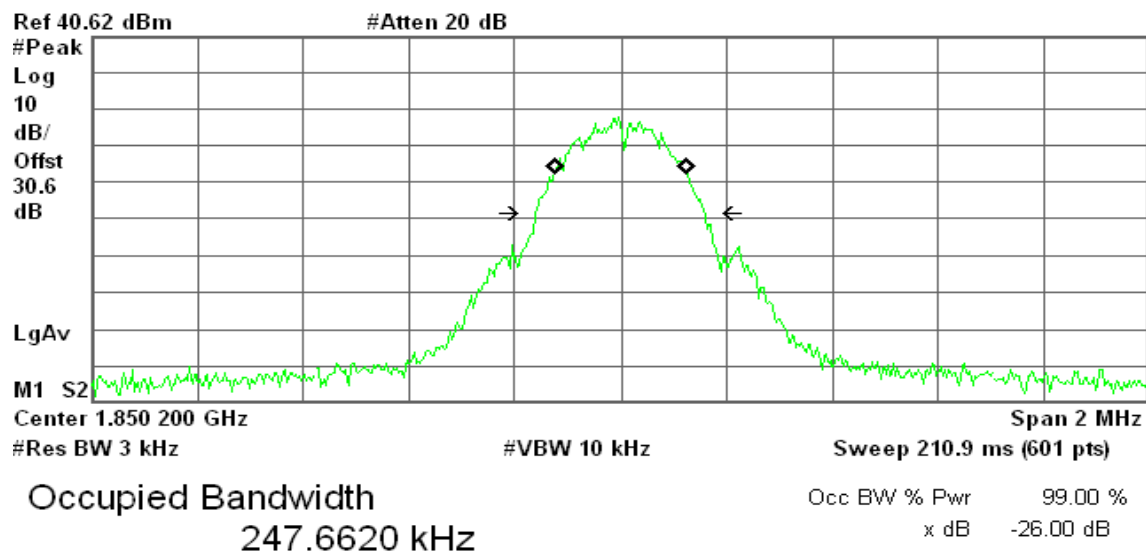


Transmit Freq Error -539.931 Hz  
x dB Bandwidth 310.915 kHz

**EDGE 1900 (CH Low)**

\* Agilent 16:32:09 Mar 3, 2010

R T



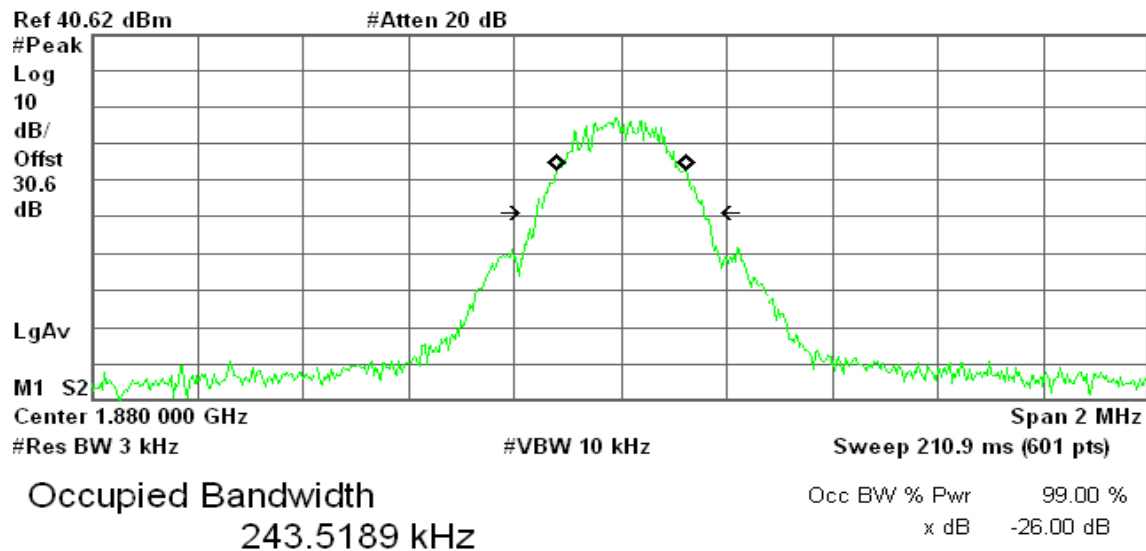
Transmit Freq Error -378.581 Hz  
x dB Bandwidth 318.180 kHz



## EDGE 1900 (CH Mid)

\* Agilent 16:33:07 Mar 3, 2010

R T

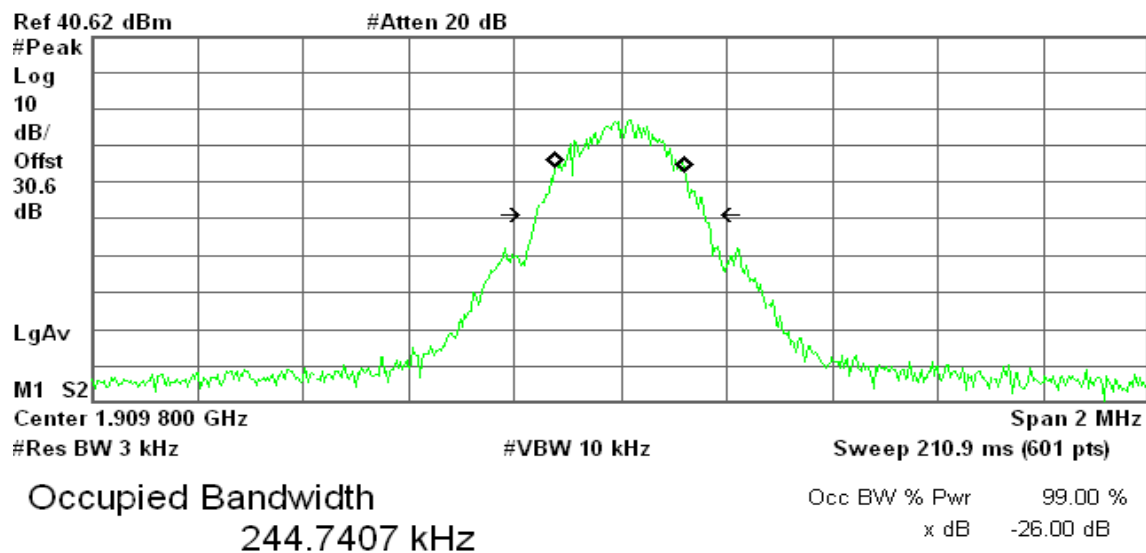


Transmit Freq Error 1.674 kHz  
x dB Bandwidth 315.357 kHz

## EDGE 1900 (CH High)

\* Agilent 16:35:44 Mar 3, 2010

R T



Transmit Freq Error -950.692 Hz  
x dB Bandwidth 316.333 kHz



## 7.5 OUT OF BAND EMISSION AT ANTENNA TERMINALS

### LIMIT

According to FCC §2.1051, FCC §22.917, FCC §24.238(a).

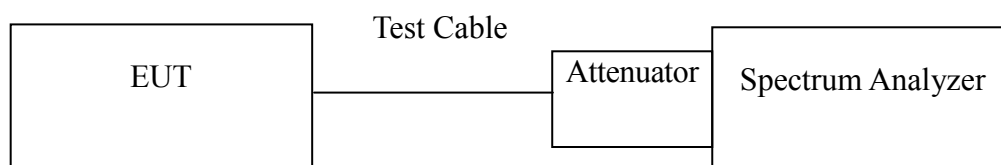
**Out of Band Emissions:** The mean power of emission must be attenuated below the mean power of the non-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least  $43 + 10 \log P$  dB.

**Mobile Emissions in Base Frequency Range:** The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitters operated must be attenuated to a level not exceed -80 dBm at the transmit antenna connector.

**Band Edge Requirements:** In the 1MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1% of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the Out of band Emission

### Test Configuration

Out of band emission at antenna terminals:



### TEST PROCEDURE

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.

For the out of band: Set the RBW, VBW = 1MHz, Start=30MHz, Stop= 20 th harmonic. Limit = -13dBm

Band Edge Requirements (824 MHz and 849 MHz /1850MHz and 1910MHz): In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions. Limit, -13dBm.

### TEST RESULTS

*No non-compliance noted.*

**Test Data**

Mode	CH	Location	Description
GPRS 850 (Class 12)	128	Figure 7-1	Conducted spurious emissions, 30MHz - 20GHz
	190	Figure 7-2	Conducted spurious emissions, 30MHz - 20GHz
	251	Figure 7-3	Conducted spurious emissions, 30MHz - 20GHz
GPRS 1900 (Class 12)	512	Figure 7-4	Conducted spurious emissions, 30MHz - 20GHz
	661	Figure 7-5	Conducted spurious emissions, 30MHz - 20GHz
	810	Figure 7-6	Conducted spurious emissions, 30MHz - 20GHz

Mode	CH	Location	Description
GPRS 850 (Class 12)	128	Figure 8-1	Band Edge emissions
	251	Figure 8-2	Band Edge emissions
GPRS 1900 (Class 12)	512	Figure 8-3	Band Edge emissions
	810	Figure 8-4	Band Edge emissions

Mode	CH	Location	Description
EDGE 850 (Class 12)	128	Figure 9-1	Conducted spurious emissions, 30MHz - 20GHz
	190	Figure 9-2	Conducted spurious emissions, 30MHz - 20GHz
	251	Figure 9-3	Conducted spurious emissions, 30MHz - 20GHz
EDGE 1900 (Class 12)	512	Figure 9-4	Conducted spurious emissions, 30MHz - 20GHz
	661	Figure 9-5	Conducted spurious emissions, 30MHz - 20GHz
	810	Figure 9-6	Conducted spurious emissions, 30MHz - 20GHz

Mode	CH	Location	Description
EDGE 850 (Class 12)	128	Figure 10-1	Band Edge emissions
	251	Figure 10-2	Band Edge emissions
EDGE 1900 (Class 12)	512	Figure 10-3	Band Edge emissions
	810	Figure 10-4	Band Edge emissions



## Test Plot

### GPRS 850

Figure 7-1: Out of Band emission at antenna terminals – GPRS CH Low

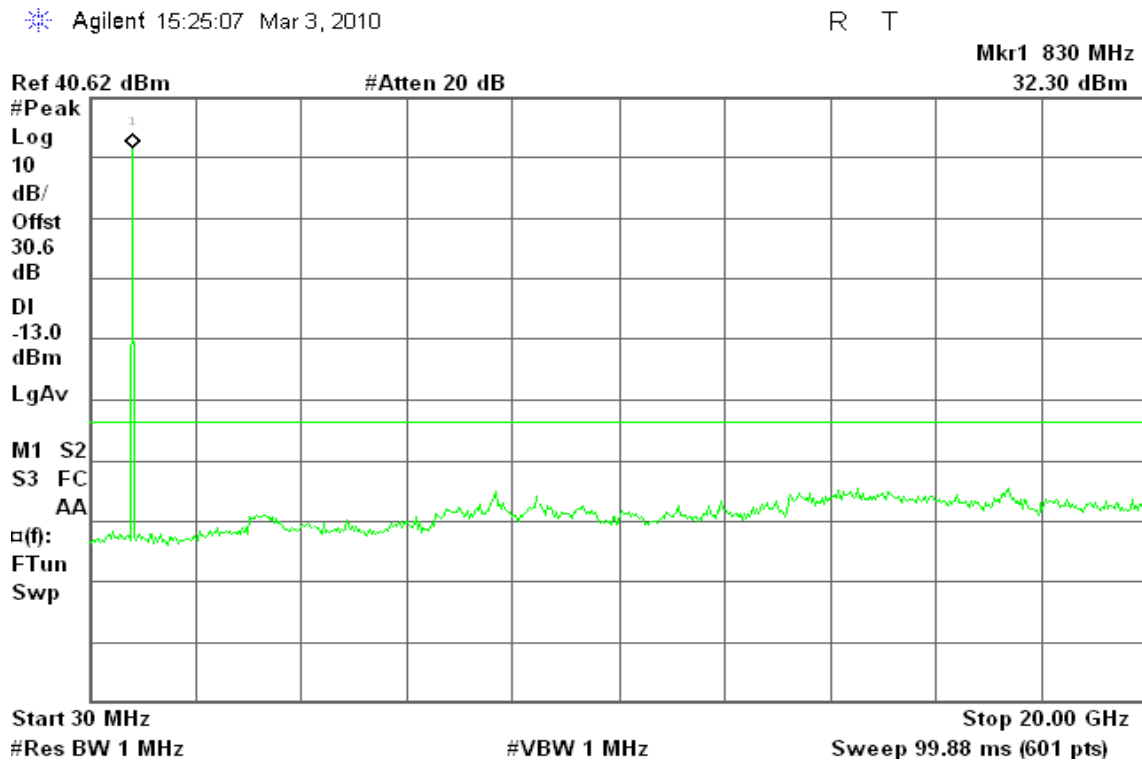


Figure 7-2: Out of Band emission at antenna terminals – GPRS CH Mid

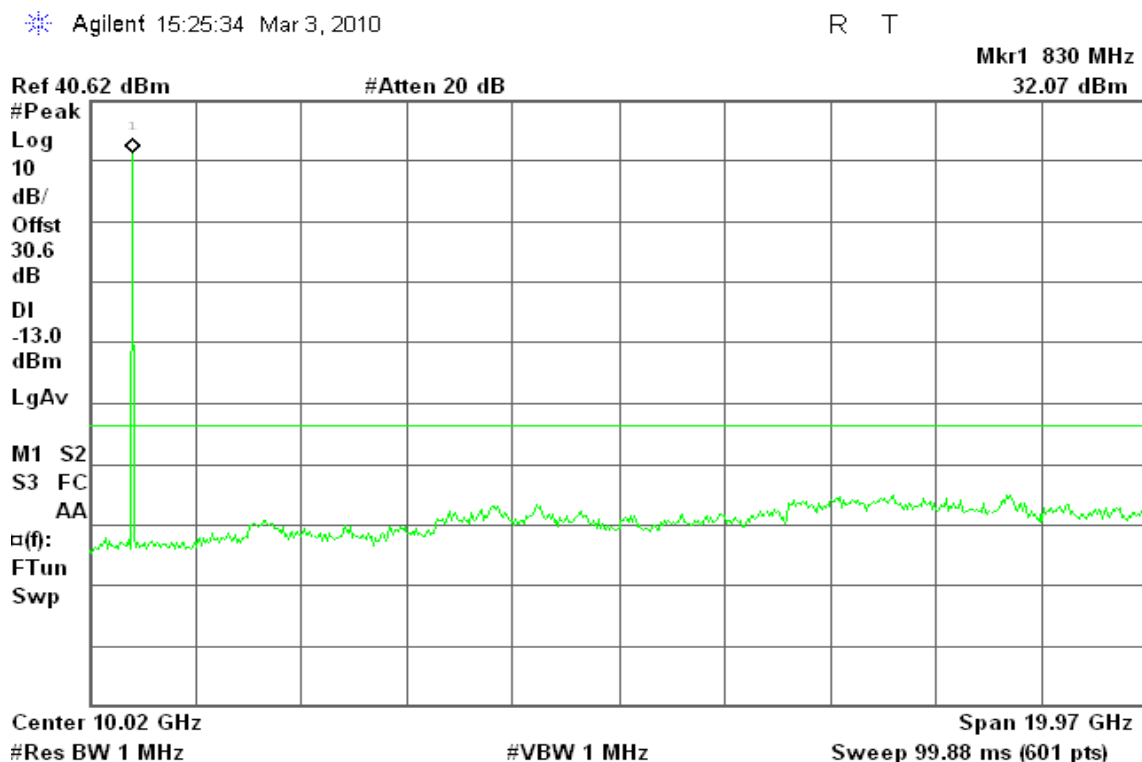
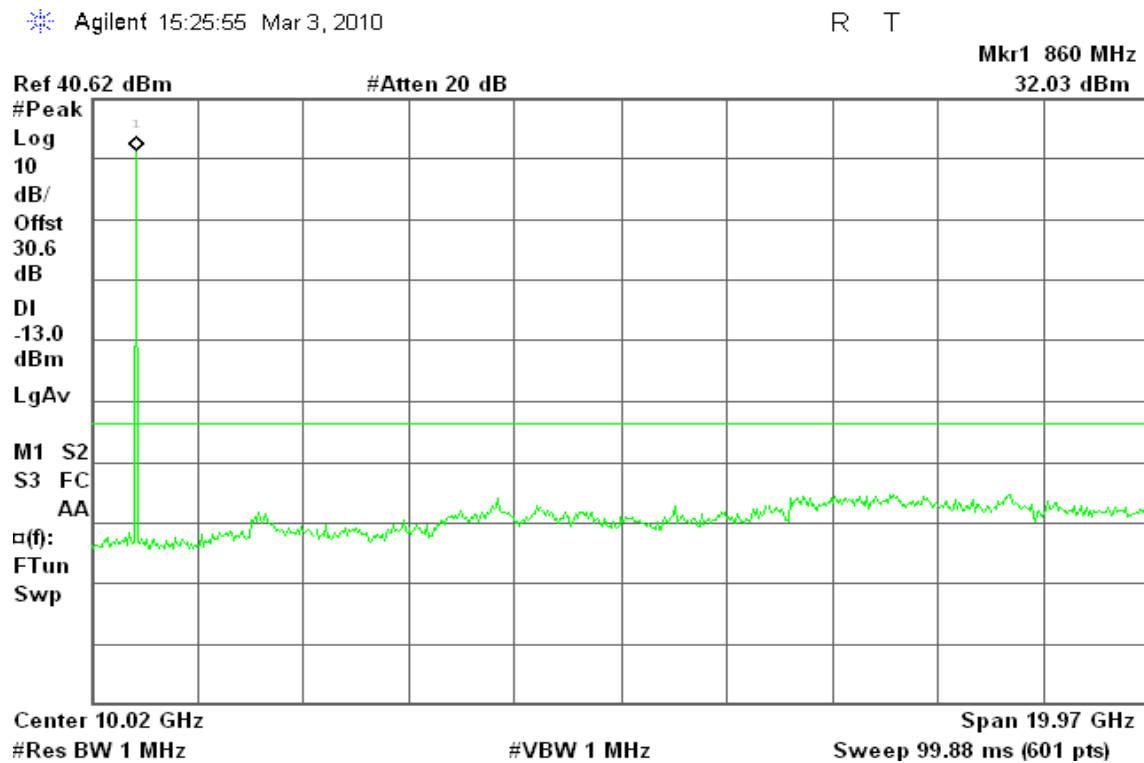




Figure 7-3: Out of Band emission at antenna terminals – GPRS CH High



## GPRS 1900

Figure 7-4: Out of Band emission at antenna terminals – GPRS CH Low

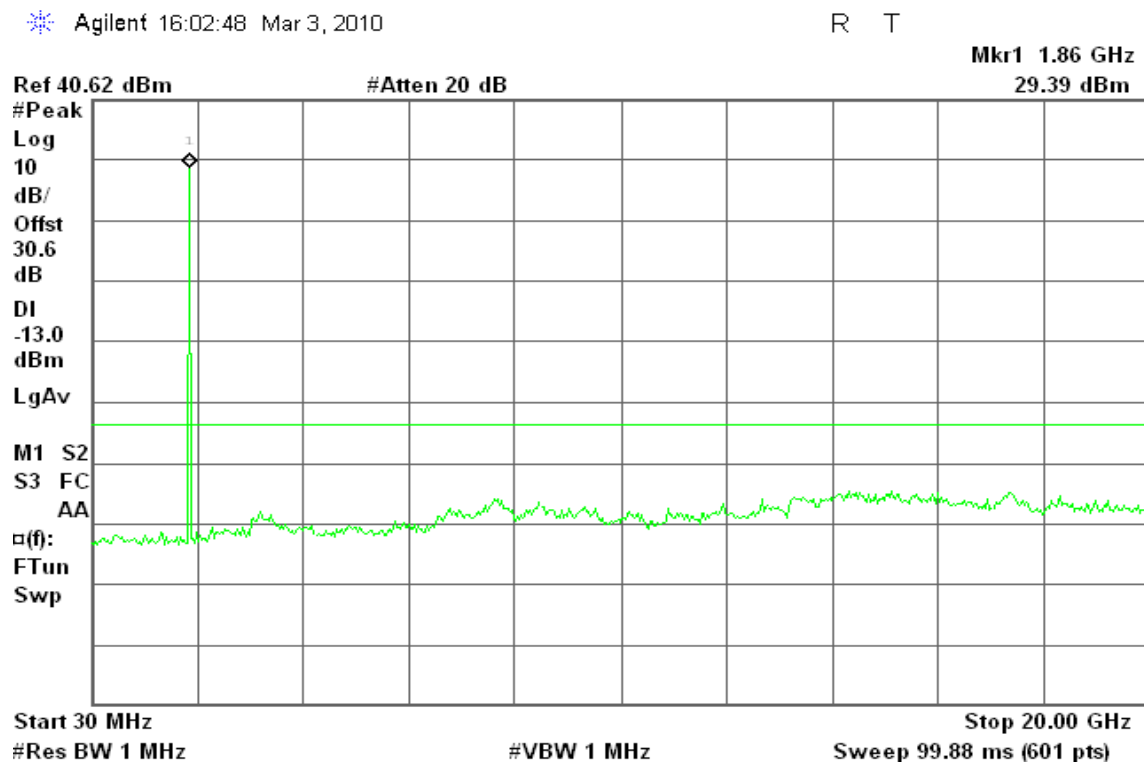






Figure 7-5: Out of Band emission at antenna terminals – GPRS CH Mid

Agilent 16:03:04 Mar 3, 2010

R T

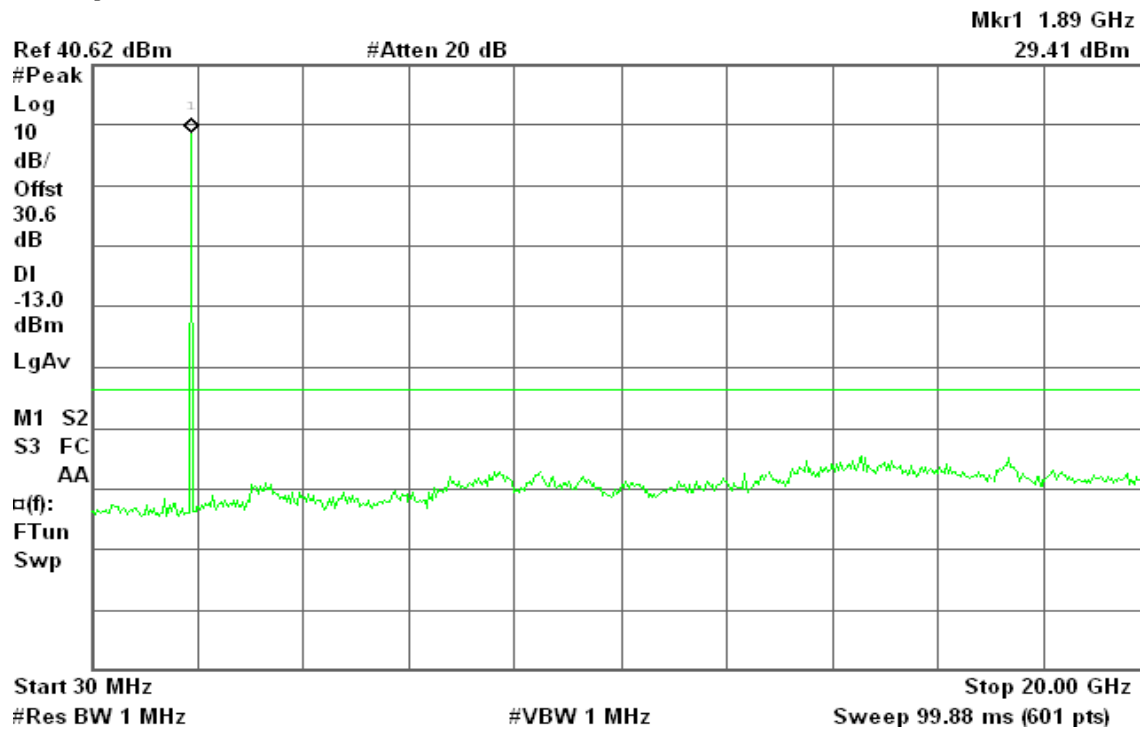
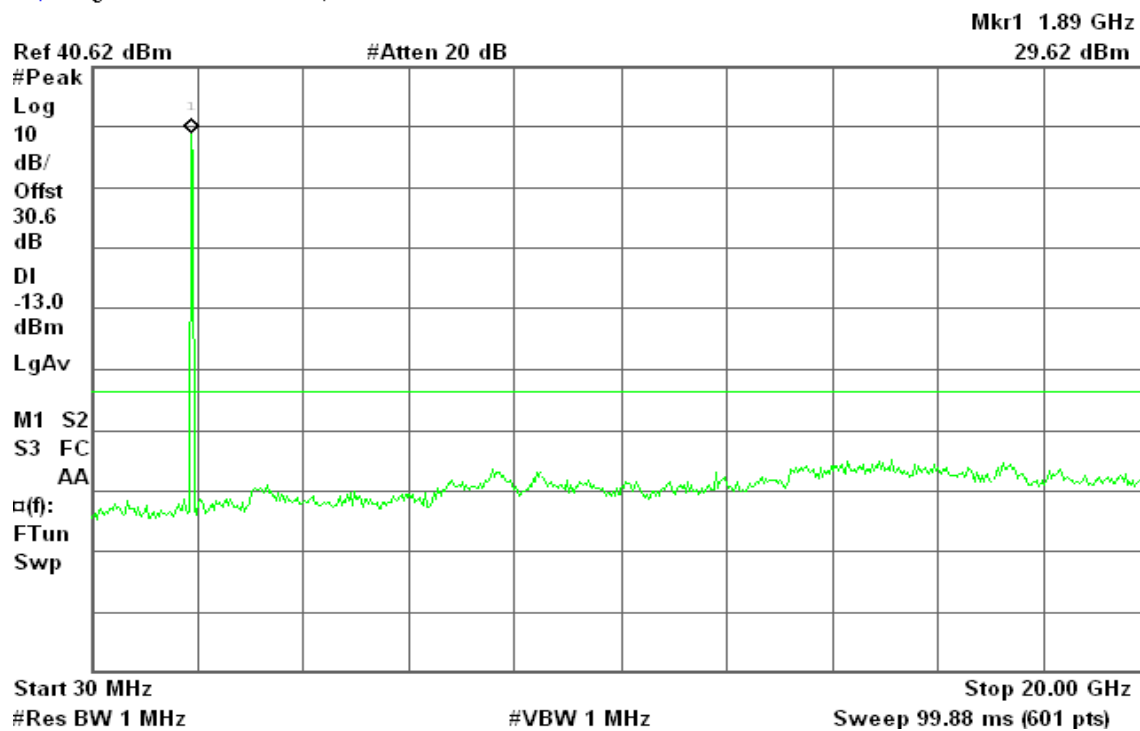


Figure 7-6: Out of Band emission at antenna terminals – GPRS CH High

Agilent 16:03:32 Mar 3, 2010

R T





## GPRS 850

Figure 8-1: Band Edge emissions – GPRS CH Low

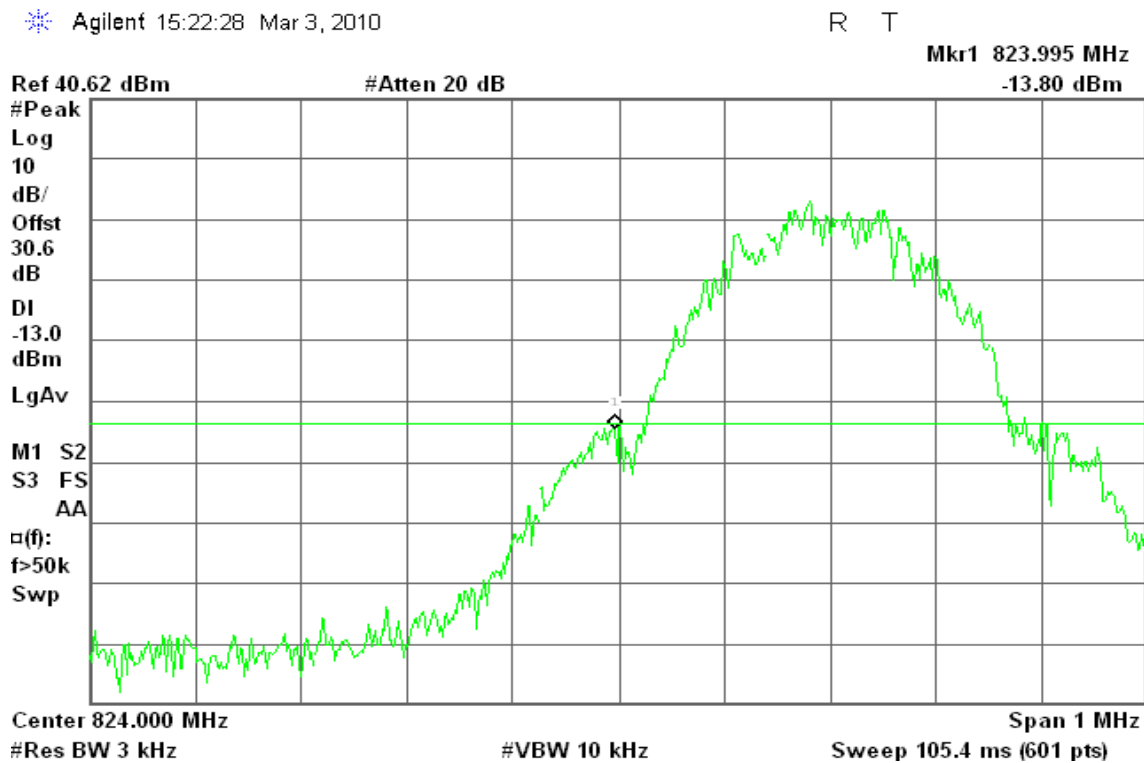
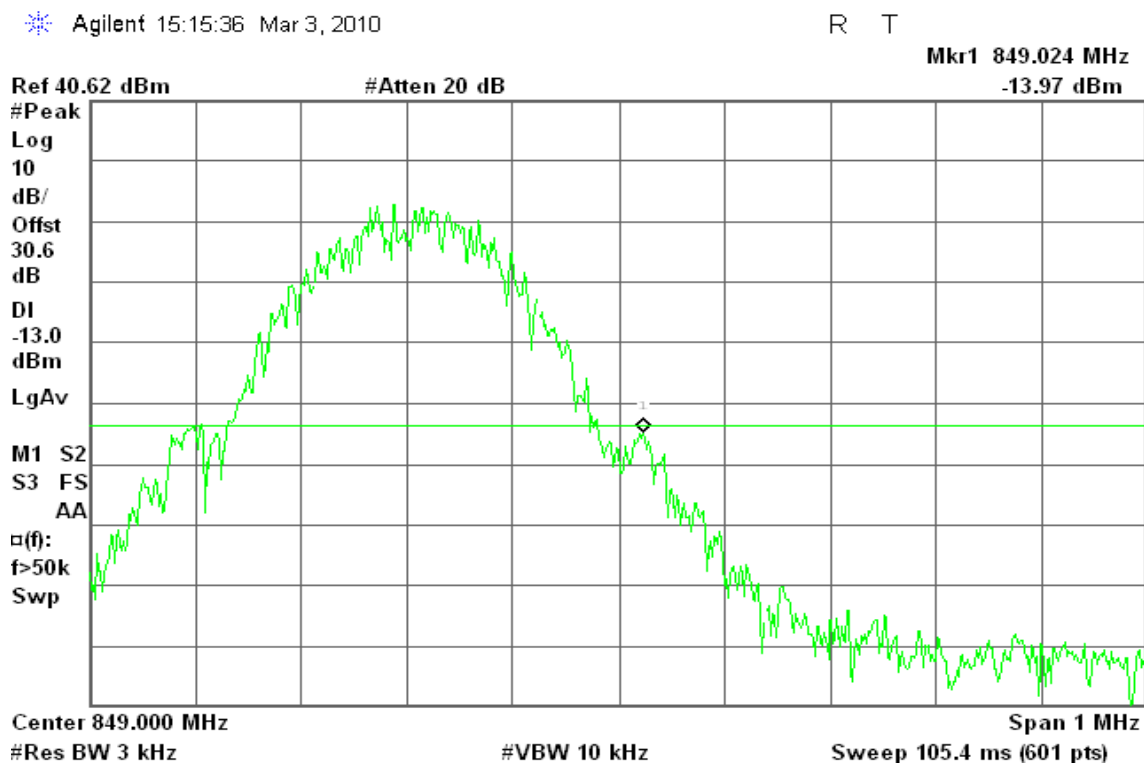


Figure 8-2: Band Edge emissions –GPRS CH High





## GPRS 1900

Figure 8-3: Band Edge emissions – GPRS CH Low

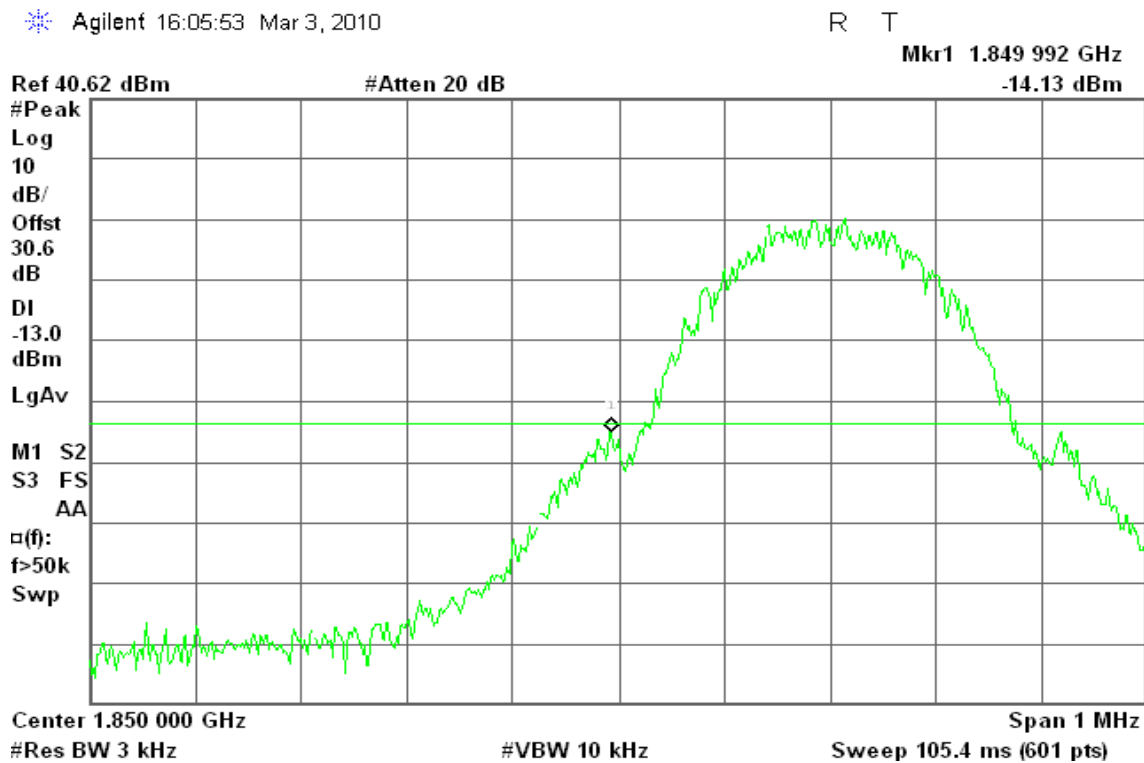
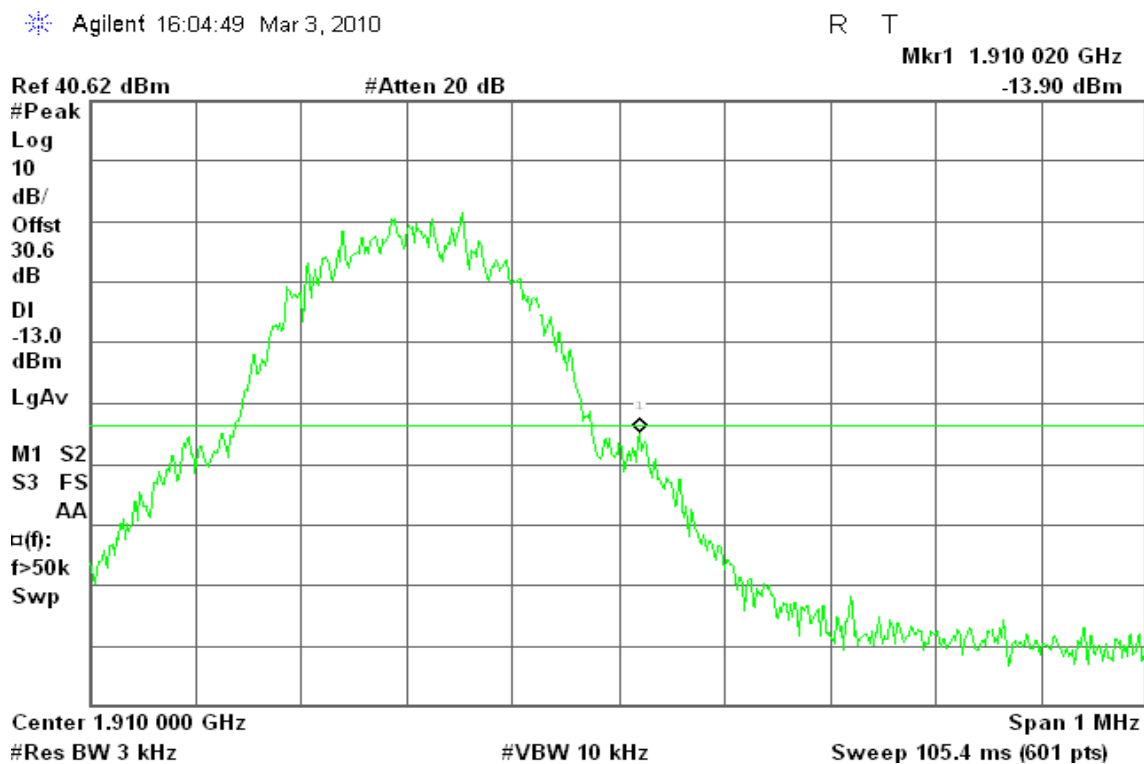


Figure 8-4: Band Edge emissions – GPRS CH High





## EDGE 850

Figure 9-1: Out of Band emission at antenna terminals –EDGE CH Low

Agilent 15:49:41 Mar 3, 2010

R T

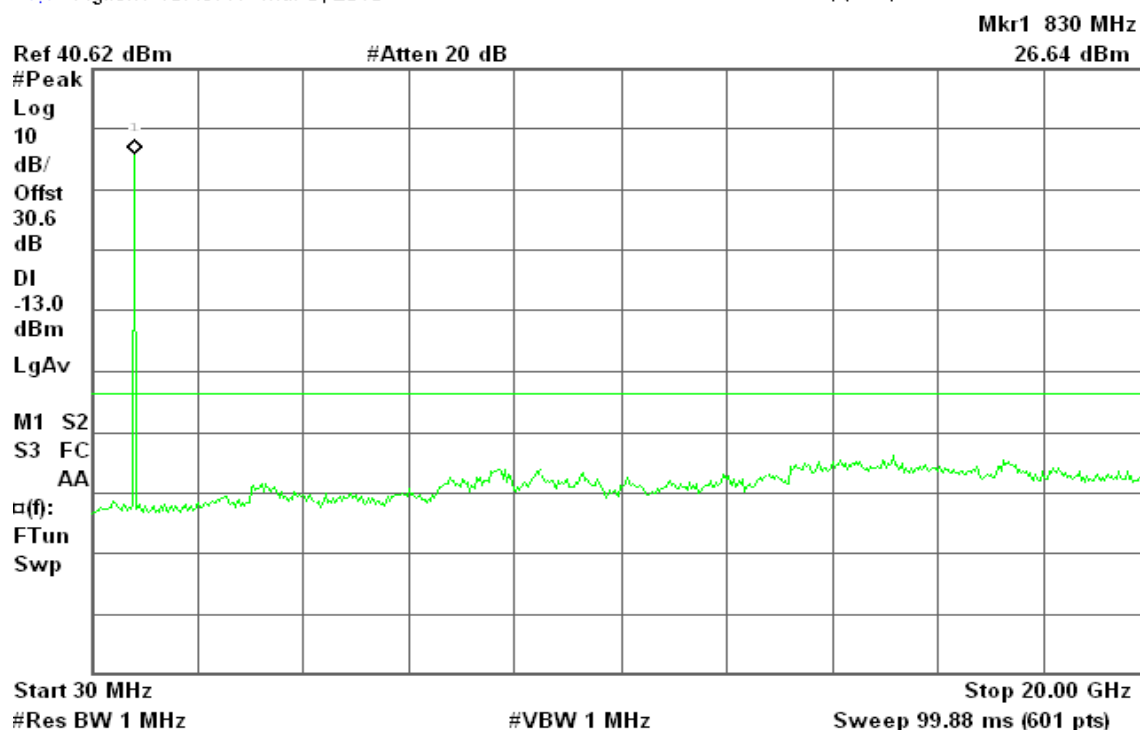


Figure 9-2: Out of Band emission at antenna terminals –EDGE CH Mid

Agilent 15:50:24 Mar 3, 2010

R T

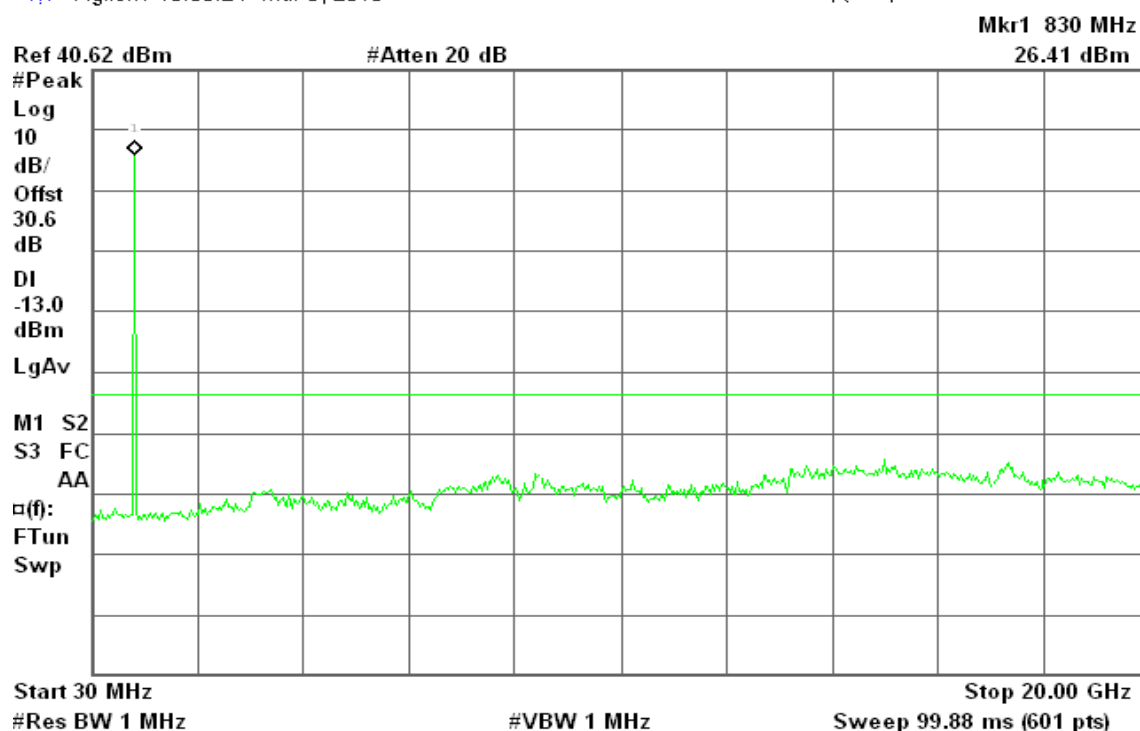
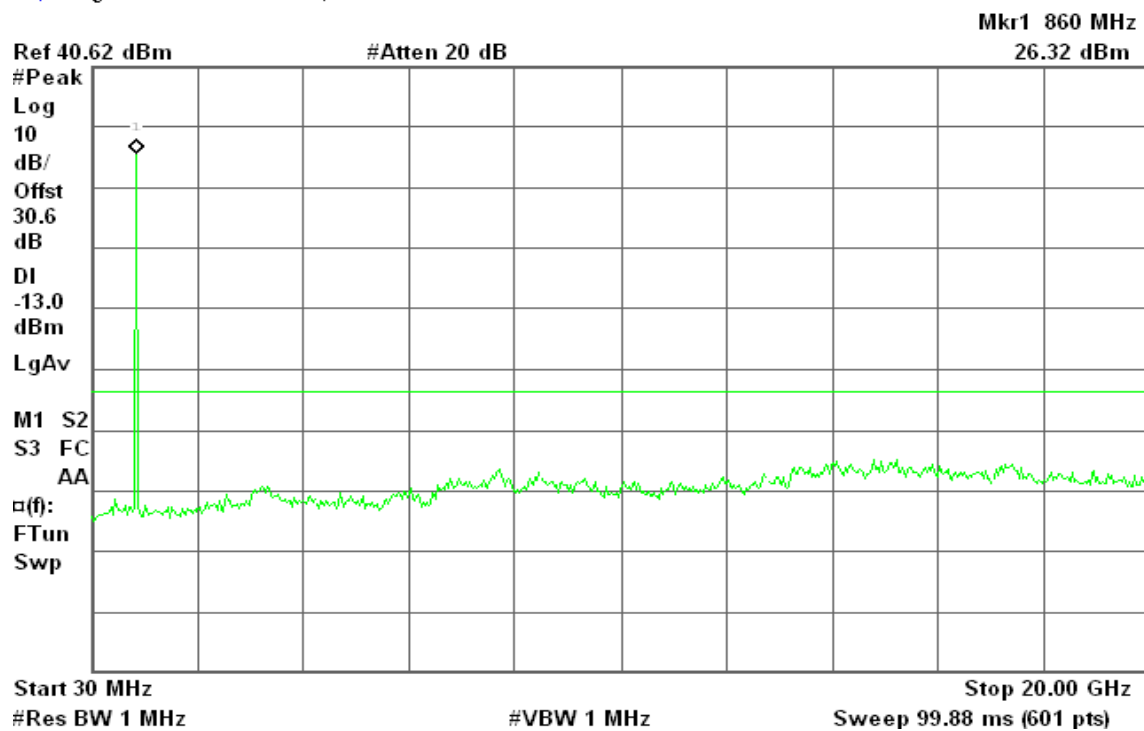




Figure 9-3: Out of Band emission at antenna terminals –EDGE CH High

Agilent 15:50:45 Mar 3, 2010

R T



## EDGE 1900

Figure 9-4: Out of Band emission at antenna terminals –EDGE CH Low

Agilent 16:38:40 Mar 3, 2010

R T

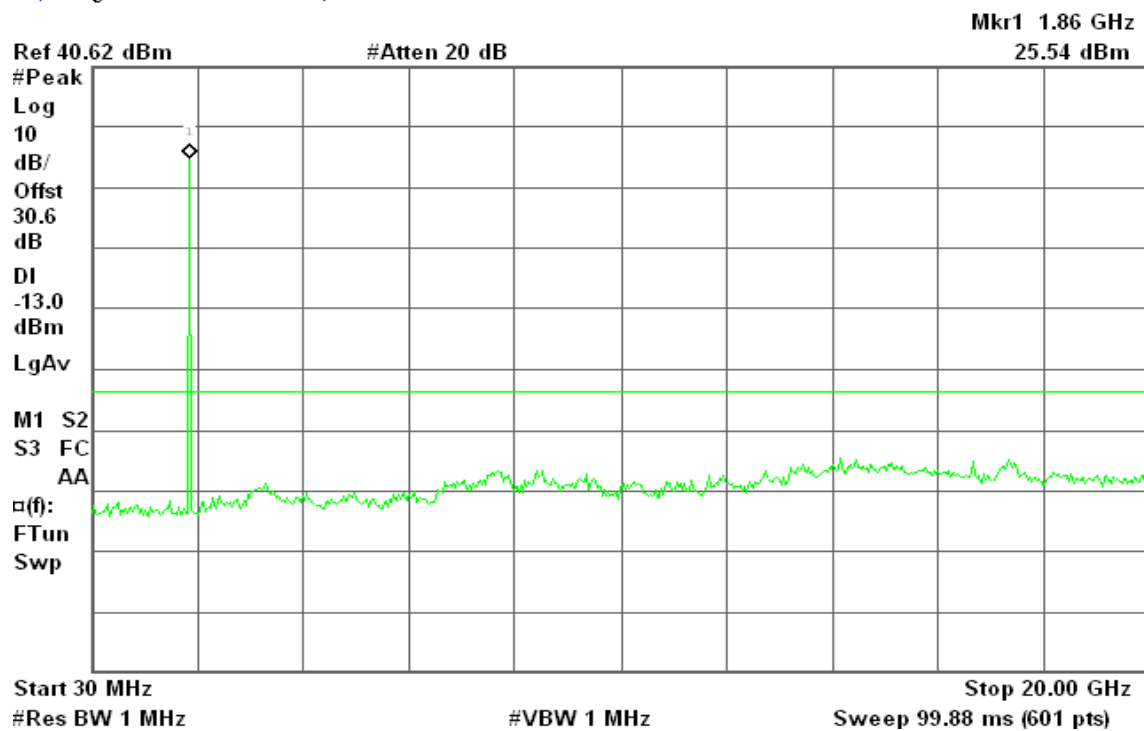




Figure 9-5: Out of Band emission at antenna terminals –EDGE CH Mid

Agilent 16:38:59 Mar 3, 2010

R T

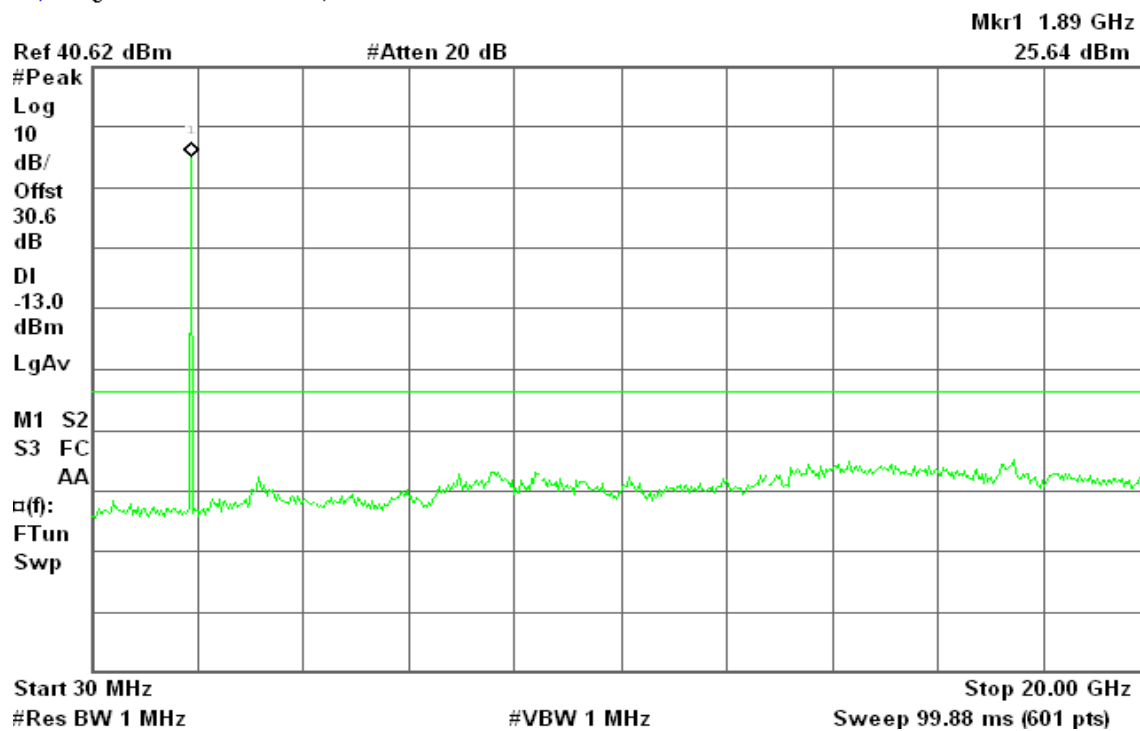
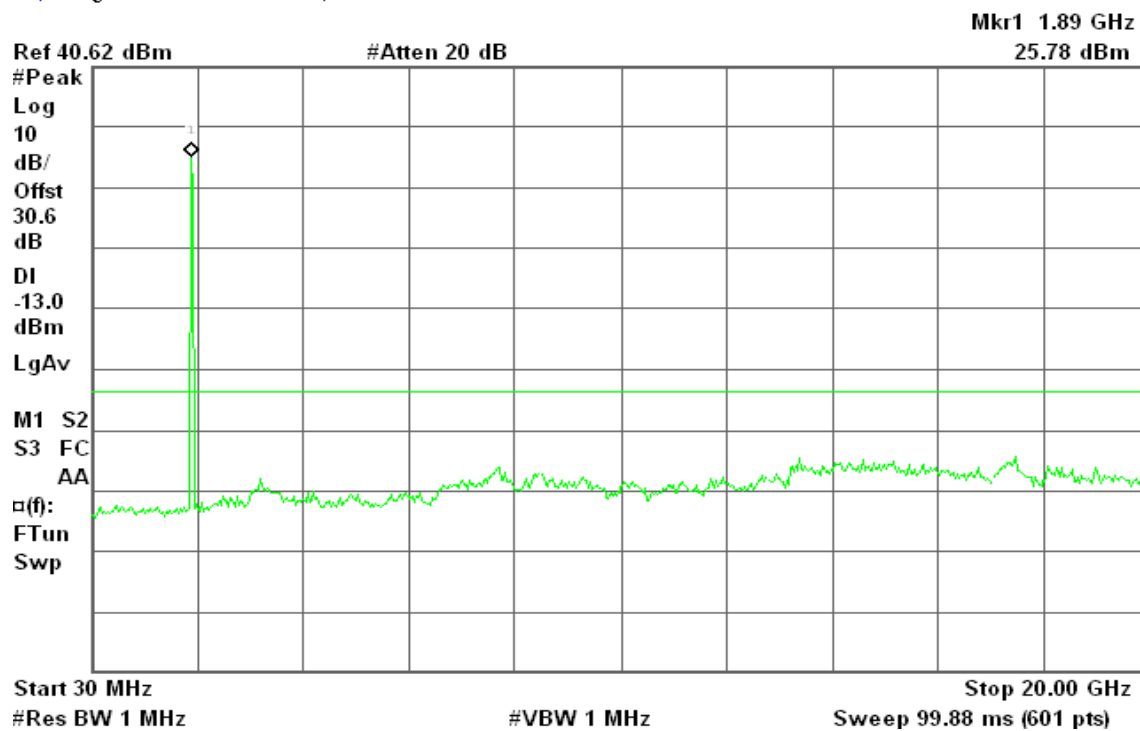


Figure 9-6: Out of Band emission at antenna terminals –EDGE CH High

Agilent 16:39:26 Mar 3, 2010

R T





## EDGE 850

Figure 10-1: Band Edge emissions – EDGE CH Low

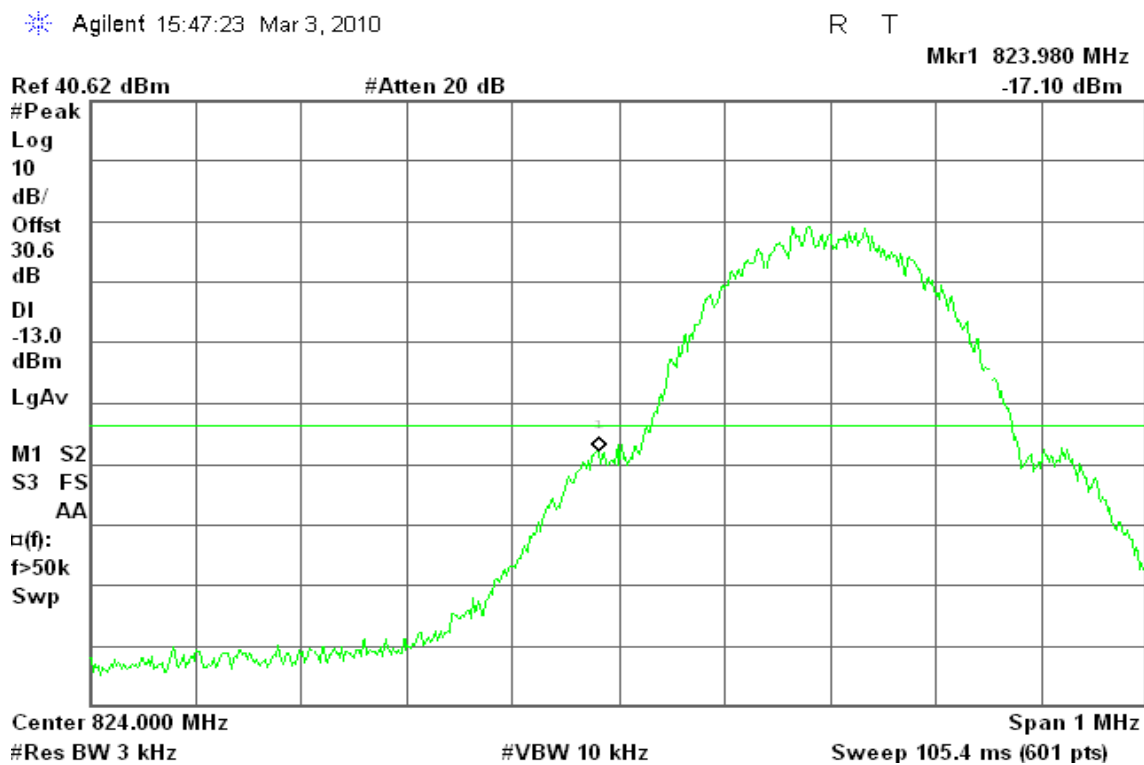
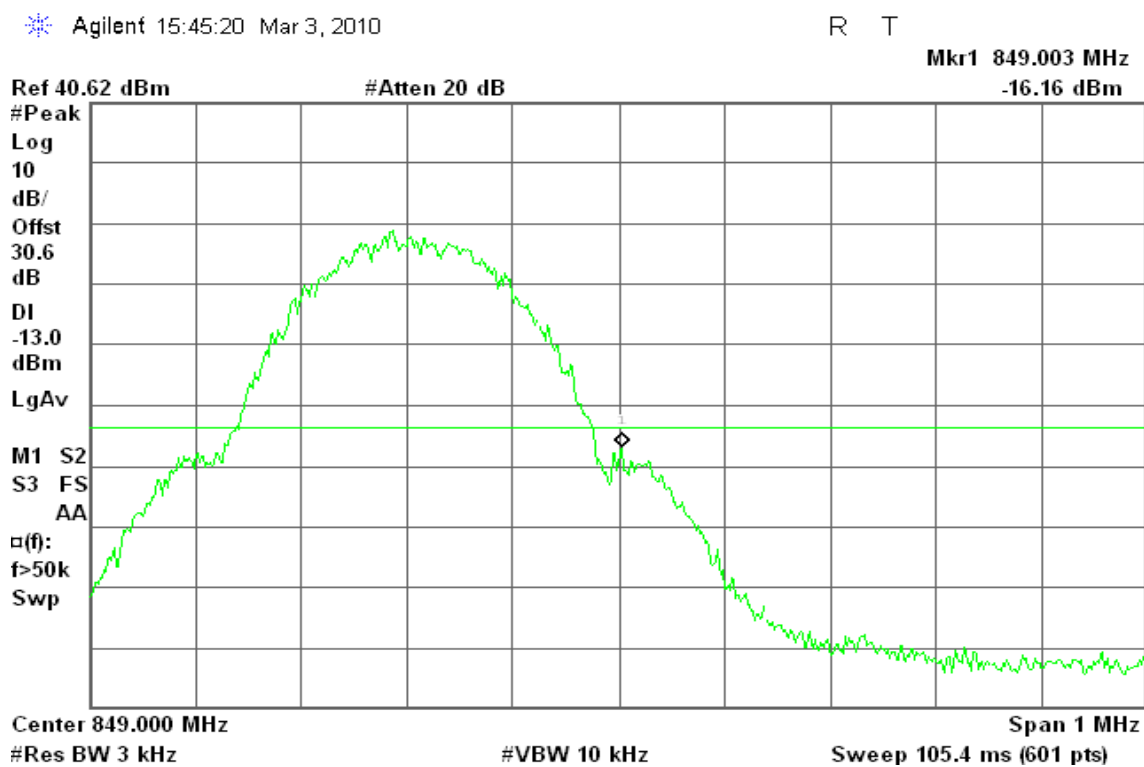


Figure 10-2: Band Edge emissions – EDGE CH High





## EDGE 1900

Figure 10-3: Band Edge emissions – EDGE CH Low

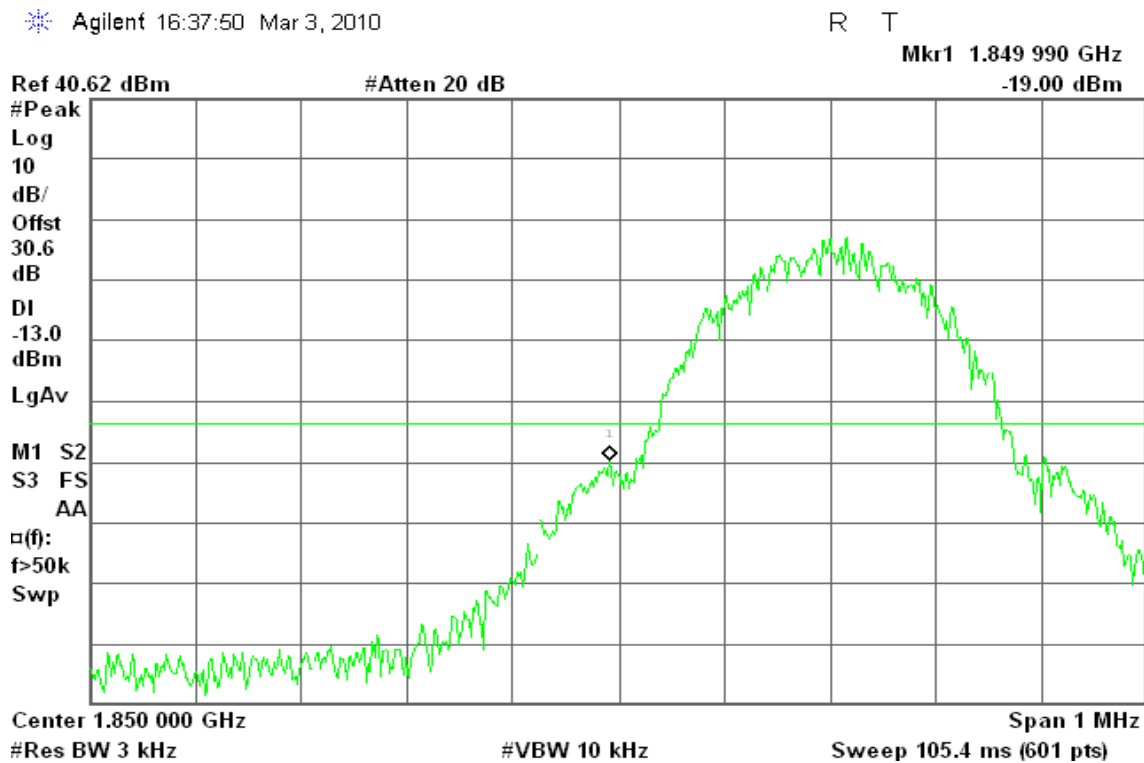
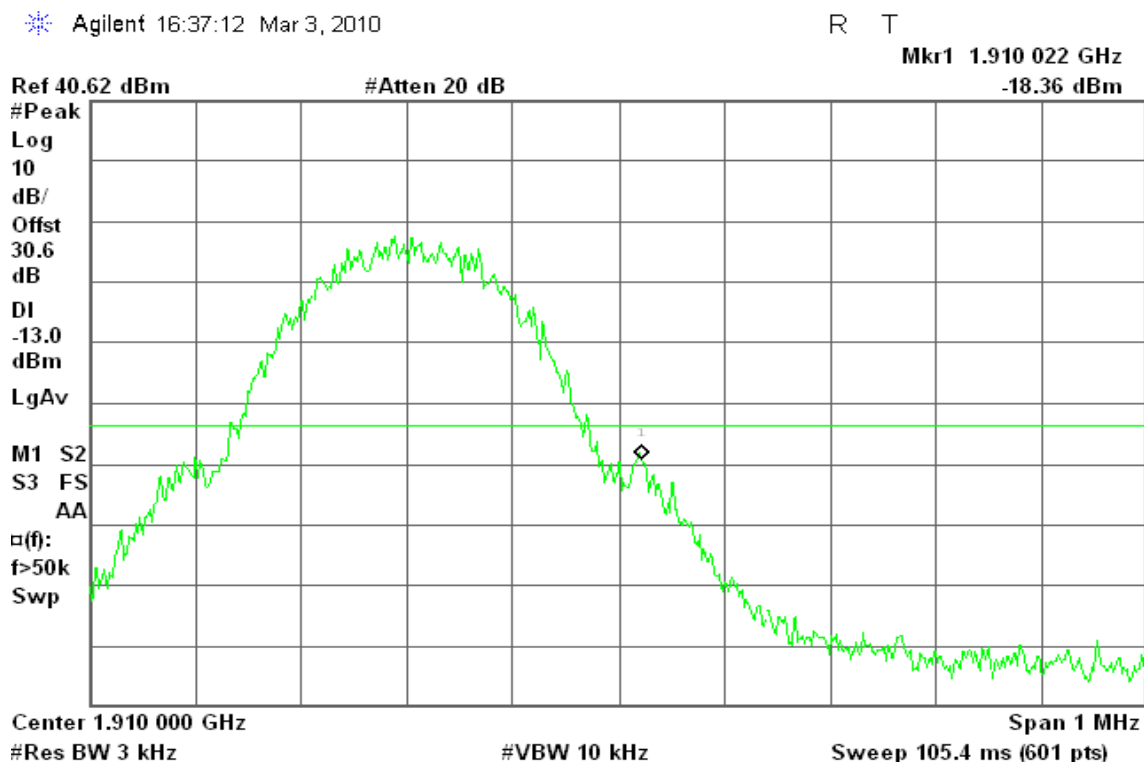


Figure 10-4: Band Edge emissions – EDGE CH High





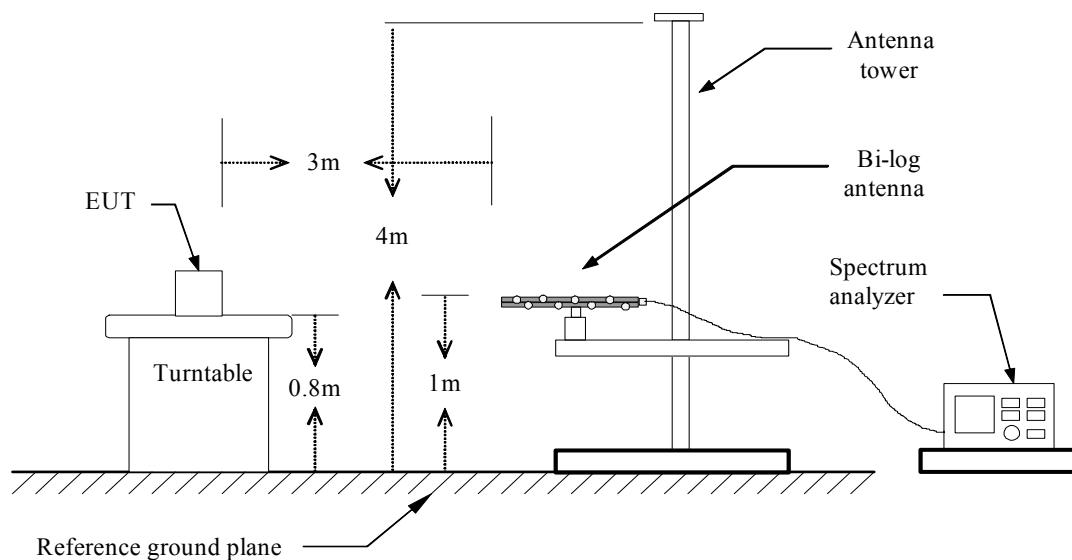
## 7.6 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

### LIMIT

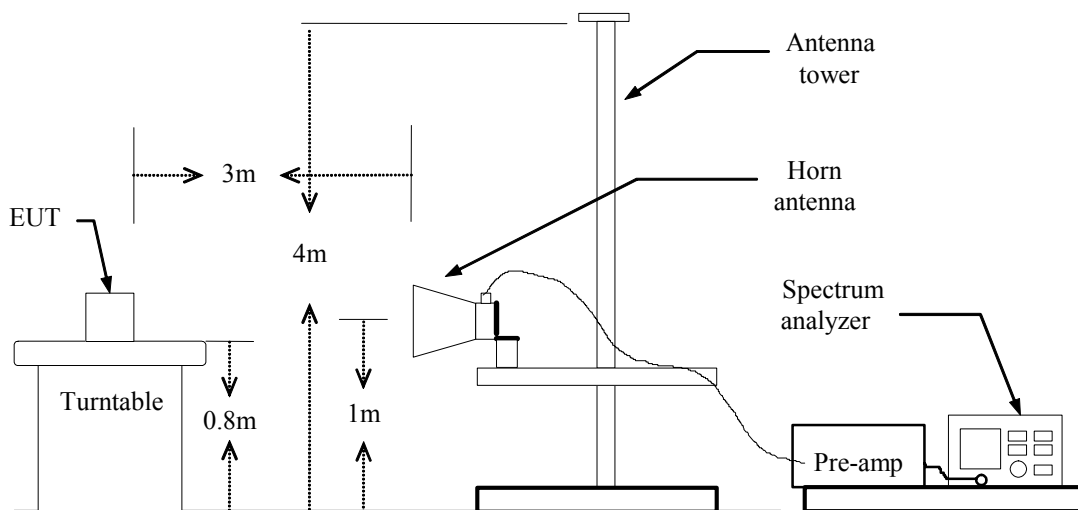
According to FCC §2.1053

### Test Configuration

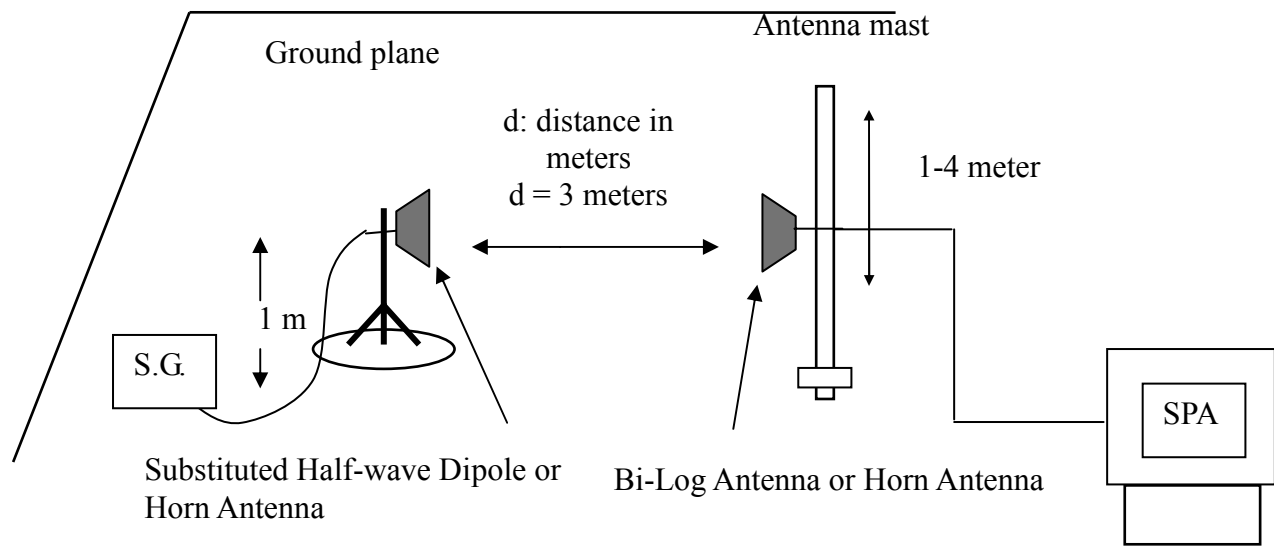
#### Below 1 GHz



#### Above 1 GHz



## Substituted Method Test Set-up



## TEST PROCEDURE

The EUT was placed on a non-conductive, the measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission were identified, the power of the emission was determined using the substitution method.

The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.

$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable (dB)}$$

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)}$$

## TEST RESULTS

*Refer to the attached tabular data sheets.*

**Radiated Spurious Emission Measurement Result / Below 1GHz****Operation Mode:** GPRS 850 / TX / CH 128**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
59.10	V	-48.01	-16.13	-64.14	-13.00	-51.14
99.84	V	-47.56	-18.10	-65.66	-13.00	-52.66
407.33	V	-56.39	-11.62	-68.01	-13.00	-55.01
512.09	V	-60.20	-8.54	-68.73	-13.00	-55.73
564.47	V	-63.12	-7.94	-71.06	-13.00	-58.06
923.37	V	-67.11	-3.68	-70.79	-13.00	-57.79
99.84	H	-46.43	-18.04	-64.47	-13.00	-51.47
182.29	H	-55.05	-14.28	-69.33	-13.00	-56.33
407.33	H	-53.61	-11.28	-64.89	-13.00	-51.89
540.22	H	-59.40	-8.29	-67.70	-13.00	-54.70
732.28	H	-60.66	-5.93	-66.60	-13.00	-53.60
813.76	H	-44.35	-4.94	-49.29	-13.00	-36.29

**Remark:**

1. The emission behaviour belongs to narrowband spurious emission.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser; with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** GPRS 850 / TX / CH 190**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
48.43	V	-46.78	-15.56	-62.33	-13.00	-49.33
130.88	V	-55.04	-12.79	-67.83	-13.00	-54.83
333.61	V	-57.11	-13.61	-70.72	-13.00	-57.72
588.72	V	-63.01	-7.84	-70.85	-13.00	-57.85
826.37	V	-47.04	-4.71	-51.74	-13.00	-38.74
967.99	V	-65.02	-3.14	-68.16	-13.00	-55.16
130.88	H	-47.17	-14.14	-61.32	-13.00	-48.32
319.06	H	-55.76	-14.22	-69.98	-13.00	-56.98
452.92	H	-59.39	-9.87	-69.25	-13.00	-56.25
540.22	H	-58.36	-8.29	-66.66	-13.00	-53.66
826.37	H	-44.70	-4.79	-49.49	-13.00	-36.49
967.99	H	-59.98	-3.31	-63.28	-13.00	-50.28

**Remark:**

1. The emission behaviour belongs to narrowband spurious emission.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** GPRS 850 / TX / CH 251**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
62.01	V	-48.44	-15.98	-64.42	-13.00	-51.42
116.33	V	-55.18	-14.58	-69.76	-13.00	-56.76
319.06	V	-58.52	-13.59	-72.12	-13.00	-59.12
541.19	V	-65.36	-8.23	-73.60	-13.00	-60.60
801.15	V	-65.28	-5.07	-70.35	-13.00	-57.35
838.01	V	-57.91	-4.68	-62.59	-13.00	-49.59
32.91	H	-46.53	-16.57	-63.10	-13.00	-50.10
129.91	H	-54.01	-14.09	-68.10	-13.00	-55.10
323.91	H	-56.44	-14.14	-70.58	-13.00	-57.58
540.22	H	-59.68	-8.29	-67.98	-13.00	-54.98
579.02	H	-58.39	-7.87	-66.25	-13.00	-53.25
838.01	H	-51.15	-4.73	-55.88	-13.00	-42.88

**Remark:**

1. The emission behaviour belongs to narrowband spurious emission.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** GPRS 1900 / TX / CH 512**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
47.46	V	-49.71	-14.82	-64.53	-13.00	-51.53
60.07	V	-50.69	-16.07	-66.75	-13.00	-53.75
96.93	V	-53.01	-18.93	-71.94	-13.00	-58.94
116.33	V	-56.49	-14.58	-71.06	-13.00	-58.06
177.44	V	-56.29	-15.10	-71.39	-13.00	-58.39
579.02	V	-64.58	-7.95	-72.52	-13.00	-59.52
47.46	H	-57.91	-13.40	-71.31	-13.00	-58.31
129.91	H	-51.07	-14.09	-65.16	-13.00	-52.16
182.29	H	-54.50	-14.28	-68.78	-13.00	-55.78
323.91	H	-53.87	-14.14	-68.01	-13.00	-55.01
540.22	H	-58.43	-8.29	-66.73	-13.00	-53.73
728.40	H	-58.40	-6.07	-64.47	-13.00	-51.47

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** GPRS 1900 / TX / CH 661**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
46.49	V	-50.74	-14.08	-64.82	-13.00	-51.82
60.07	V	-50.51	-16.07	-66.57	-13.00	-53.57
97.90	V	-51.95	-18.65	-70.60	-13.00	-57.60
149.31	V	-57.39	-13.10	-70.49	-13.00	-57.49
342.34	V	-61.78	-13.55	-75.33	-13.00	-62.33
593.57	V	-63.03	-7.77	-70.81	-13.00	-57.81
32.91	H	-42.61	-16.57	-59.18	-13.00	-46.18
129.91	H	-52.60	-14.09	-66.69	-13.00	-53.69
338.46	H	-54.92	-13.83	-68.76	-13.00	-55.76
540.22	H	-57.42	-8.29	-65.72	-13.00	-52.72
636.25	H	-61.90	-6.66	-68.57	-13.00	-55.57
723.55	H	-61.59	-6.24	-67.84	-13.00	-54.84

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** GPRS 1900 / TX / CH 810**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
48.43	V	-48.67	-15.56	-64.22	-13.00	-51.22
61.04	V	-50.27	-16.02	-66.30	-13.00	-53.30
182.29	V	-55.23	-15.30	-70.54	-13.00	-57.54
309.36	V	-59.25	-13.62	-72.86	-13.00	-59.86
616.85	V	-65.48	-7.05	-72.53	-13.00	-59.53
741.98	V	-67.80	-5.90	-73.70	-13.00	-60.70
30.97	H	-45.91	-18.15	-64.06	-13.00	-51.06
129.91	H	-53.61	-14.09	-67.70	-13.00	-54.70
182.29	H	-55.46	-14.28	-69.74	-13.00	-56.74
323.91	H	-55.81	-14.14	-69.94	-13.00	-56.94
540.22	H	-58.51	-8.29	-66.81	-13.00	-53.81
723.55	H	-62.01	-6.24	-68.25	-13.00	-55.25

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.



**Operation Mode:** EDGE 850 / TX / CH 128**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
32.91	V	-41.44	-16.62	-58.05	-13.00	-45.05
99.84	V	-47.98	-18.10	-66.07	-13.00	-53.07
167.74	V	-56.05	-14.52	-70.57	-13.00	-57.57
398.60	V	-58.24	-12.15	-70.39	-13.00	-57.39
512.09	V	-59.59	-8.54	-68.13	-13.00	-55.13
813.76	V	-44.80	-4.84	-49.64	-13.00	-36.64
31.94	H	-44.70	-17.36	-62.05	-13.00	-49.05
99.84	H	-46.56	-18.04	-64.61	-13.00	-51.61
129.91	H	-55.10	-14.09	-69.19	-13.00	-56.19
408.30	H	-54.35	-11.22	-65.58	-13.00	-52.58
540.22	H	-58.89	-8.29	-67.18	-13.00	-54.18
682.81	H	-61.28	-6.57	-67.84	-13.00	-54.84

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** EDGE 850 / TX / CH 190**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
32.91	V	-41.54	-16.62	-58.16	-13.00	-45.16
60.07	V	-49.39	-16.07	-65.46	-13.00	-52.46
130.88	V	-56.39	-12.79	-69.17	-13.00	-56.17
314.21	V	-57.91	-13.60	-71.52	-13.00	-58.52
579.02	V	-63.28	-7.95	-71.23	-13.00	-58.23
967.02	V	-63.79	-3.16	-66.95	-13.00	-53.95
130.88	H	-47.80	-14.14	-61.95	-13.00	-48.95
333.61	H	-54.57	-13.93	-68.51	-13.00	-55.51
540.22	H	-56.07	-8.29	-64.37	-13.00	-51.37
728.40	H	-58.85	-6.07	-64.92	-13.00	-51.92
825.40	H	-45.45	-4.80	-50.25	-13.00	-37.25
967.02	H	-62.93	-3.33	-66.26	-13.00	-53.26

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser; with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** EDGE 850 / TX / CH 251**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
47.46	V	-50.44	-14.82	-65.26	-13.00	-52.26
134.76	V	-57.60	-13.08	-70.68	-13.00	-57.68
187.14	V	-56.64	-15.34	-71.99	-13.00	-58.99
314.21	V	-59.13	-13.60	-72.74	-13.00	-59.74
540.22	V	-65.42	-8.25	-73.66	-13.00	-60.66
602.30	V	-64.45	-7.60	-72.05	-13.00	-59.05
33.88	H	-45.34	-15.77	-61.11	-13.00	-48.11
125.06	H	-53.52	-14.06	-67.58	-13.00	-54.58
323.91	H	-53.18	-14.14	-67.32	-13.00	-54.32
540.22	H	-57.63	-8.29	-65.92	-13.00	-52.92
728.40	H	-58.38	-6.07	-64.45	-13.00	-51.45
838.01	H	-59.94	-4.73	-64.67	-13.00	-51.67

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser; with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** EDGE 1900 / TX / CH 512**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
47.46	V	-49.98	-14.82	-64.80	-13.00	-51.80
60.07	V	-50.15	-16.07	-66.22	-13.00	-53.22
177.44	V	-56.08	-15.10	-71.18	-13.00	-58.18
328.76	V	-60.14	-13.60	-73.74	-13.00	-60.74
540.22	V	-65.57	-8.25	-73.82	-13.00	-60.82
616.85	V	-63.33	-7.05	-70.38	-13.00	-57.38
32.91	H	-41.56	-16.57	-58.12	-13.00	-45.12
129.91	H	-51.83	-14.09	-65.92	-13.00	-52.92
314.21	H	-56.98	-14.23	-71.21	-13.00	-58.21
540.22	H	-58.28	-8.29	-66.58	-13.00	-53.58
685.72	H	-61.77	-6.56	-68.33	-13.00	-55.33
723.55	H	-62.08	-6.24	-68.32	-13.00	-55.32

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser; with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** EDGE 1900 / TX / CH 661**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
47.46	V	-49.84	-14.82	-64.66	-13.00	-51.66
60.07	V	-49.59	-16.07	-65.65	-13.00	-52.65
167.74	V	-55.67	-14.52	-70.19	-13.00	-57.19
319.06	V	-59.84	-13.59	-73.43	-13.00	-60.43
540.22	V	-64.20	-8.25	-72.44	-13.00	-59.44
607.15	V	-66.18	-7.42	-73.60	-13.00	-60.60
32.91	H	-46.48	-16.57	-63.05	-13.00	-50.05
129.91	H	-53.37	-14.09	-67.46	-13.00	-54.46
253.10	H	-55.23	-14.85	-70.08	-13.00	-57.08
371.44	H	-56.39	-12.48	-68.87	-13.00	-55.87
540.22	H	-58.65	-8.29	-66.95	-13.00	-53.95
728.40	H	-57.14	-6.07	-63.21	-13.00	-50.21

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser; with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** EDGE 1900 / TX / CH 810**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
48.43	V	-49.97	-15.56	-65.53	-13.00	-52.53
172.59	V	-58.07	-14.77	-72.84	-13.00	-59.84
253.10	V	-58.50	-14.65	-73.15	-13.00	-60.15
314.21	V	-60.32	-13.60	-73.93	-13.00	-60.93
540.22	V	-64.99	-8.25	-73.23	-13.00	-60.23
728.40	V	-66.94	-6.02	-72.97	-13.00	-59.97
31.94	H	-49.72	-17.36	-67.08	-13.00	-54.08
129.91	H	-61.78	-14.09	-75.87	-13.00	-62.87
232.73	H	-65.58	-14.27	-79.84	-13.00	-66.84
540.22	H	-67.59	-8.29	-75.89	-13.00	-62.89
735.19	H	-69.12	-5.83	-74.95	-13.00	-61.95
799.21	H	-69.90	-5.19	-75.09	-13.00	-62.09

**Remark:**

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser; with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

**Above 1GHz****Operation Mode:** GPRS 850 / TX / CH 128**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization	Reading level (dBuV)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
1651.00	V	-20.02	1.61	-18.40	-13.00	-5.40
2470.00	V	-24.58	4.41	-20.17	-13.00	-7.17
3296.00	V	-31.20	8.35	-22.85	-13.00	-9.85
N/A						
1651.00	H	-18.49	1.42	-17.07	-13.00	-4.07
2470.00	H	-19.05	4.43	-14.62	-13.00	-1.62
4360.00	H	-32.05	8.76	-23.29	-13.00	-10.29
N/A						

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** GPRS 850 / TX / CH 190**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization	Reading level (dBuV)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
1672.00	V	-18.31	1.63	-16.69	-13.00	-3.69
2512.00	V	-26.56	4.62	-21.95	-13.00	-8.95
4787.00	V	-31.75	9.92	-21.83	-13.00	-8.83
6201.00	V	-31.54	11.68	-19.85	-13.00	-6.85
N/A						
1672.00	H	-19.71	1.40	-18.30	-13.00	-5.30
2512.00	H	-18.98	4.69	-14.29	-13.00	-1.29
5018.00	H	-30.79	10.14	-20.65	-13.00	-7.65
5487.00	H	-31.38	10.07	-21.31	-13.00	-8.31
N/A						

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.



**Operation Mode:** GPRS 850 / TX / CH 251**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization	Reading level (dBuV)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
1700.00	V	-17.13	1.64	-15.49	-13.00	-2.49
2547.00	V	-28.22	4.76	-23.46	-13.00	-10.46
3618.00	V	-32.39	9.30	-23.09	-13.00	-10.09
5942.00	V	-29.74	10.67	-19.08	-13.00	-6.08
7531.00	V	-33.44	17.08	-16.36	-13.00	-3.36
N/A						
1700.00	H	-19.78	1.38	-18.40	-13.00	-5.40
2547.00	H	-19.68	4.82	-14.86	-13.00	-1.86
3394.00	H	-29.11	8.76	-20.35	-13.00	-7.35
N/A						

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** GPRS 1900 / TX / CH 512**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization	Reading level (dBuV)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
3702.00	V	-38.68	9.11	-29.58	-13.00	-16.58
5550.00	V	-36.63	10.32	-26.30	-13.00	-13.30
7398.00	V	-46.71	16.59	-30.12	-13.00	-17.12
N/A						
3702.00	H	-24.69	8.89	-15.80	-13.00	-2.80
5550.00	H	-32.85	10.12	-22.73	-13.00	-9.73
7398.00	H	-45.63	16.51	-29.12	-13.00	-16.12
N/A						

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** GPRS 1900 / TX / CH 661**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization	Reading level (dBuV)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
3758.00	V	-36.96	8.98	-27.99	-13.00	-14.99
5641.00	V	-35.57	10.40	-25.17	-13.00	-12.17
7517.00	V	-56.68	17.04	-39.64	-13.00	-26.64
N/A						
3758.00	H	-42.18	8.76	-33.42	-13.00	-20.42
5641.00	H	-41.07	10.23	-30.84	-13.00	-17.84
7524.00	H	-54.73	16.93	-37.80	-13.00	-24.80
N/A						

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** GPRS 1900 / TX / CH 810**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization	Reading level (dBuV)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
3821.00	V	-36.24	8.83	-27.41	-13.00	-14.41
5732.00	V	-37.98	10.48	-27.50	-13.00	-14.50
7643.00	V	-60.44	17.38	-43.06	-13.00	-30.06
N/A						
3821.00	H	-37.70	8.62	-29.08	-13.00	-16.08
5732.00	H	-41.71	10.33	-31.38	-13.00	-18.38
7643.00	H	-60.58	17.25	-43.33	-13.00	-30.33
N/A						

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** EDGE 850 / TX / CH 128**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
1651.00	V	-41.37	1.61	-39.75	-13.00	-26.75
3723.00	V	-52.04	9.06	-42.99	-13.00	-29.99
N/A						
1651.00	H	-38.03	1.42	-36.61	-13.00	-23.61
N/A						

**Remark:**

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

**Operation Mode:** EDGE 850 / TX / CH 190**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
1672.00	V	-40.78	1.63	-39.16	-13.00	-26.16
4129.00	V	-51.95	8.63	-43.32	-13.00	-30.32
N/A						
1672.00	H	-37.93	1.40	-36.53	-13.00	-23.53
3478.00	H	-52.82	9.23	-43.59	-13.00	-30.59
N/A						

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** EDGE 850 / TX / CH 251**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
2666.00	V	-31.45	5.23	-26.22	-13.00	-13.22
5123.00	V	-31.80	10.39	-21.41	-13.00	-8.41
N/A						
3429.00	H	-32.15	8.96	-23.19	-13.00	-10.19
7020.00	H	-31.57	15.19	-16.38	-13.00	-3.38
N/A						

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser; with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** EDGE 1900 / TX / CH 512**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
3702.00	V	-44.81	9.11	-35.70	-13.00	-22.70
5550.00	V	-48.16	10.32	-37.84	-13.00	-24.84
7405.00	V	-61.46	16.62	-44.84	-13.00	-31.84
N/A						
3702.00	H	-44.28	8.89	-35.39	-13.00	-22.39
5550.00	H	-49.21	10.12	-39.08	-13.00	-26.08
7405.00	H	-62.16	16.53	-45.63	-13.00	-32.63
N/A						

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser; with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.



**Operation Mode:** EDGE 1900 / TX / CH 661**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
3758.00	V	-44.77	8.98	-35.79	-13.00	-22.79
5641.00	V	-49.65	10.40	-39.24	-13.00	-26.24
N/A						
3758.00	H	-45.08	8.76	-36.32	-13.00	-23.32
5641.00	H	-57.78	10.23	-47.55	-13.00	-34.55
7524.00	H	-60.59	16.93	-43.67	-13.00	-30.67
N/A						

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser; with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**Operation Mode:** EDGE 1900 / TX / CH 810**Test Date:** March 14, 2010**Temperature:** 24°C**Tested by:** Wolf Huang**Humidity:** 51 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Antenna Polarization (V/H)	Reading (dBm)	Correction Factor (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
3821.00	V	-43.58	8.83	-34.75	-13.00	-21.75
5732.00	V	-53.00	10.48	-42.51	-13.00	-29.51
7643.00	V	-61.66	17.38	-44.27	-13.00	-31.27
N/A						
3821.00	H	-43.32	8.62	-34.70	-13.00	-21.70
5732.00	H	-55.69	10.33	-45.36	-13.00	-32.36
7643.00	H	-63.01	17.25	-45.76	-13.00	-32.76
N/A						

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser; with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

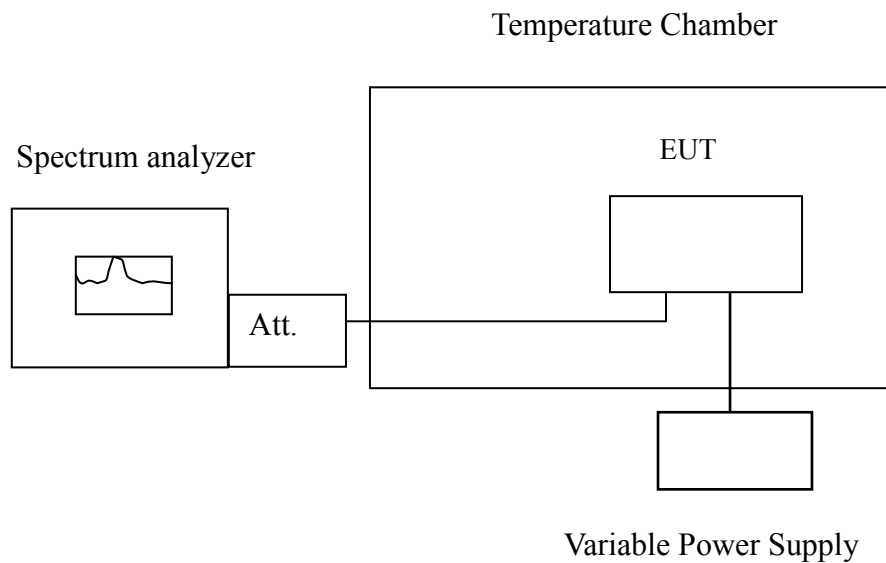
## 7.7 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

### LIMIT

According to FCC §2.1055, FCC §22.355, .FCC §24.235.

Frequency Tolerance: 2.5 ppm

### Test Configuration



**Remark:** Measurement setup for testing on Antenna connector



## **TEST PROCEDURE**

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

## **TEST RESULTS**

*No non-compliance noted.*

<b>Reference Frequency: GPRS Mid Channel 836.6 MHz @ 20°C</b>				
Limit: +/- 2.5 ppm = 2090 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
3.7	50	83660004	7	2090
	40	83659999	2	
	30	83659997	0	
	20	83659997	0	
	10	83660005	8	
	0	83659994	-3	
	-10	83660004	7	
	-20	83659997	0	
	-30	83659999	2	

<b>Reference Frequency: GPRS Mid Channel 1880 MHz @ 20°C</b>				
Limit: ± 2.5 ppm = 4700 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
3.7	50	1880000014	33	4700
	40	1880000008	27	
	30	1879999991	10	
	20	1879999981	0	
	10	1880000015	34	
	0	1879999985	4	
	-10	1880000013	32	
	-20	1880000012	31	
	-30	1880000009	28	



Reference Frequency: EDGE Mid Channel 836.6 MHz @ 20°C				
Limit: +/- 2.5 ppm = 2090 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
3.7	50	83660010	18	2090
	40	83659993	1	
	30	83660008	16	
	20	83659992	0	
	10	83660008	16	
	0	83659996	4	
	-10	83659991	-1	
	-20	83660012	20	
	-30	83660008	16	

Reference Frequency: EDGE Mid Channel 1880 MHz @ 20°C				
Limit: ± 2.5 ppm = 4700 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
3.7	50	1880000014	23	4700
	40	1880000008	17	
	30	1880000010	19	
	20	1879999991	0	
	10	1880000009	18	
	0	1880000007	16	
	-10	1880000004	13	
	-20	1880000015	24	
	-30	1880000019	28	

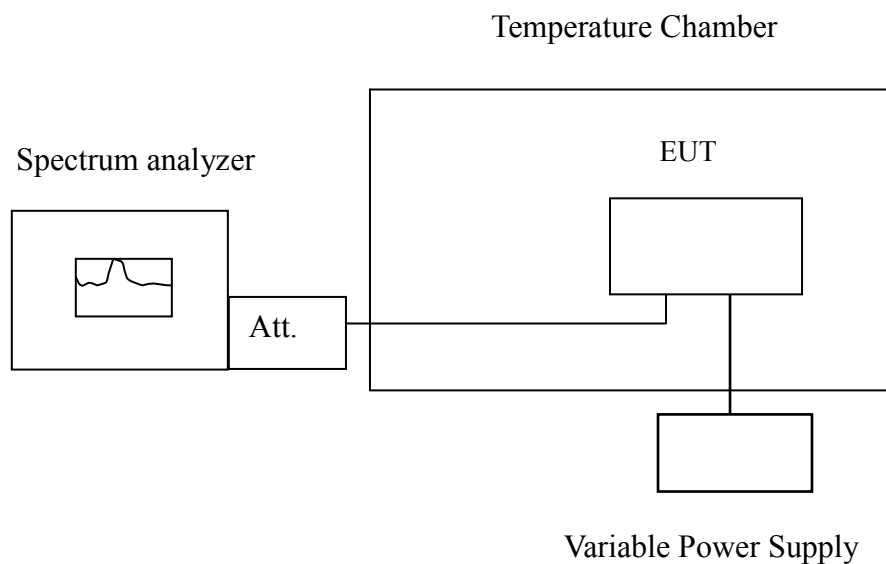


## 7.8 FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT

### LIMIT

According to FCC §2.1055, FCC §22.355, .FCC §24.235,

### Test Configuration



**Remark:** Measurement setup for testing on Antenna connector.



## **TEST PROCEDURE**

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation ( $\pm 15\%$ ) and endpoint, record the maximum frequency change.

## **TEST RESULTS**

*No non-compliance noted.*

Reference Frequency: GPRS Mid Channel 836.6 MHz @ 20°C				
Limit: $\pm 2.5$ ppm = 2090Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
4.255	20	83659994	-3	2090
3.7		83659997	0	
3.145		83659991	-6	
2.9END		83659870	-121	

Reference Frequency: GPRS Mid Channel 1880 MHz @ 20°C				
Limit: $\pm 2.5$ ppm = 4700 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
4.255	20	1879999985	4	4700
3.7		1879999981	0	
3.145		1879999979	-2	
2.9END		1879999550	-431	



Reference Frequency: EDGE Mid Channel 836.6 MHz @ 20°C				
Limit: $\pm 2.5$ ppm = 2090Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
4.255	20	83659996	4	2090
3.7		83659992	0	
3.145		83659990	-2	
2.9END		83659880	-110	

Reference Frequency: EDGE Mid Channel 1880 MHz @ 20°C				
Limit: $\pm 2.5$ ppm = 4700 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
4.255	20	1879999986	-5	4700
3.7		1879999991	0	
3.145		1879999982	-9	
2.9END		1879999590	-401	





## 7.9 POWERLINE CONDUCTED EMISSIONS

### **LIMIT**

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dB $\mu$ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

### **Test Configuration**

See test photographs attached in Appendix I for the actual connections between EUT and support equipment.

### **TEST PROCEDURE**

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

**TEST RESULTS**

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

**Operation Mode:** Normal Link

**Test Date:** February 26, 2010

**Temperature:** 22°C

**Tested by:** Leo Shi

**Humidity:** 45% RH

Freq. (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB)	QP Result (dBuV)	AV Result (dBuV)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.2000	43.92	41.02	0.18	44.10	41.20	63.61	53.61	-19.51	-12.41	L1
0.5400	43.24	42.44	0.06	43.30	42.50	56.00	46.00	-12.70	-3.50	L1
0.6700	44.04	43.94	0.06	44.10	44.00	56.00	46.00	-11.90	-2.00	L1
1.2100	37.75	37.25	0.05	37.80	37.30	56.00	46.00	-18.20	-8.70	L1
2.0200	33.15	32.05	0.05	33.20	32.10	56.00	46.00	-22.80	-13.90	L1
12.0000	41.33	38.43	0.67	42.00	39.10	60.00	50.00	-18.00	-10.90	L1
0.2000	43.70	40.60	0.20	43.90	40.80	63.61	53.61	-19.71	-12.81	L2
0.5400	43.02	42.22	0.08	43.10	42.30	56.00	46.00	-12.90	-3.70	L2
0.6700	44.22	43.42	0.08	44.30	43.50	56.00	46.00	-11.70	-2.50	L2
0.9400	38.02	37.62	0.08	38.10	37.70	56.00	46.00	-17.90	-8.30	L2
1.4800	35.72	35.12	0.08	35.80	35.20	56.00	46.00	-20.20	-10.80	L2
12.0000	36.99	34.09	0.71	37.70	34.80	60.00	50.00	-22.30	-15.20	L2

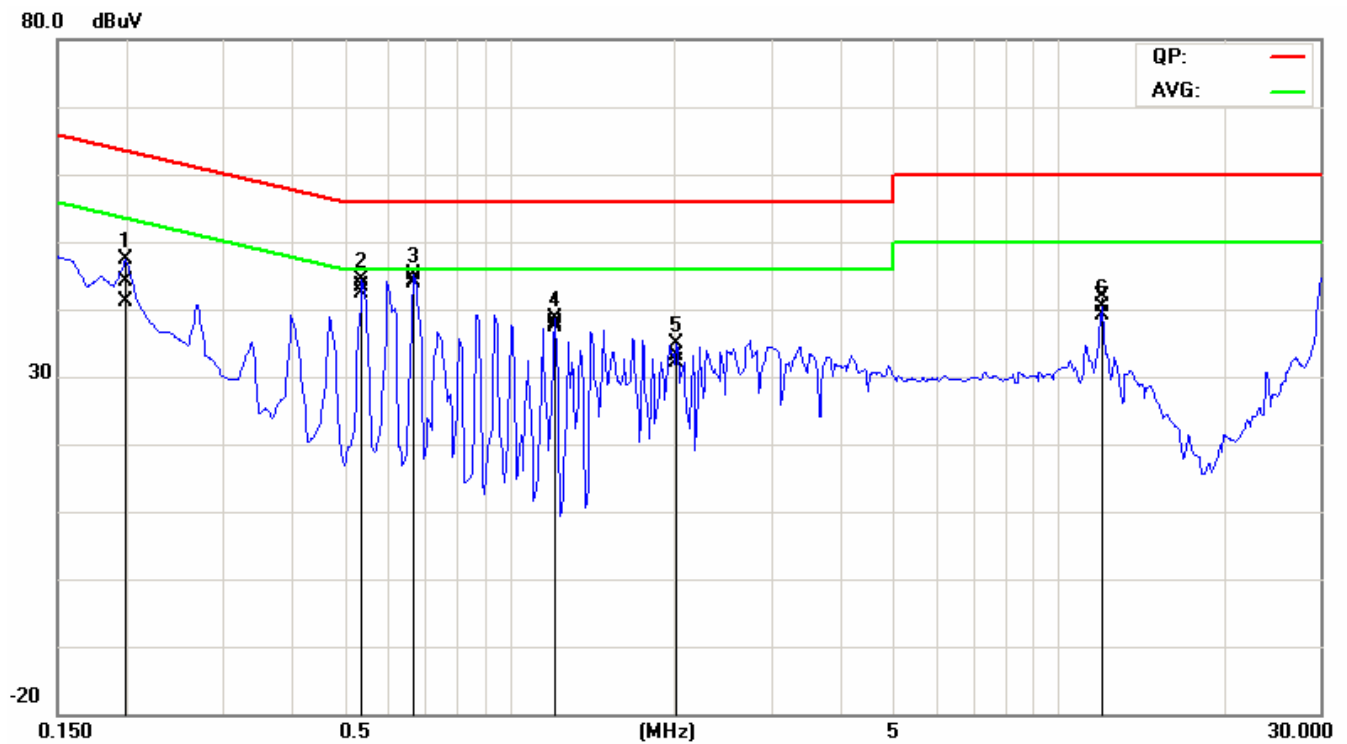
**Remark:**

1. Measuring frequencies from 0.15 MHz to 30MHz.
2. The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.
3. The IF bandwidth of SPA between 0.15MHz to 30MHz was 10kHz; the IF bandwidth of Test Receiver between 0.15MHz to 30MHz was 9kHz;
4. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)
5. "-" means Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

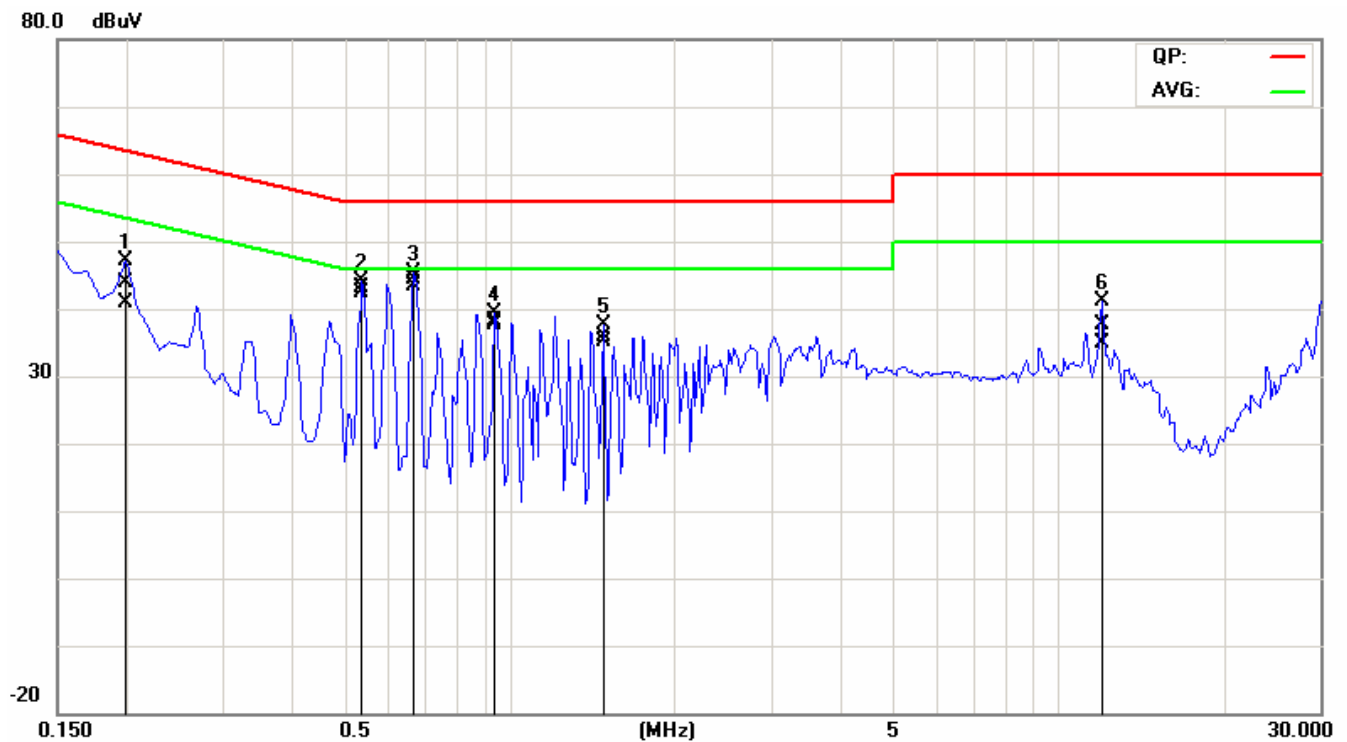


## Test Plots

### Conducted emissions (Line 1)



### Conducted emissions (Line 2)





## APPENDIX I

### RADIO FREQUENCY EXPOSURE

#### LIMIT

##### EUT Specification

<b>EUT</b>	Windows CE.NET Handheld Computer
<b>Frequency band (Operating)</b>	<input type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz <input type="checkbox"/> WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz <input type="checkbox"/> WLAN: 5.745GHz ~ 5.825GHz <input checked="" type="checkbox"/> Others: GPRS / EDGE 850MHz: 824 ~ 849 MHz
<b>Device category</b>	<input checked="" type="checkbox"/> Portable (<20cm separation) <input type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others
<b>Exposure classification</b>	<input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm <sup>2</sup> ) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm <sup>2</sup> )
<b>Antenna diversity</b>	<input checked="" type="checkbox"/> Single antenna <input type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
<b>Max. output power</b>	ERP: 27.65 dBm (582.1032mW)
<b>Antenna gain (Max)</b>	-0.02 dBi (Numeric gain: 0.99)
<b>Evaluation applied</b>	<input type="checkbox"/> MPE Evaluation <input checked="" type="checkbox"/> SAR Evaluation <input type="checkbox"/> N/A

##### ***Remark:***

- The maximum output power is 27.65dBm (582.1032mW) at 848.80MHz (with 0.99 numeric antenna gain.)*
- DTS device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance.*
- For mobile or fixed location transmitters, no SAR consideration applied. The maximum power density is 1.0 mW/cm<sup>2</sup> even if the calculation indicates that the power density would be larger.*

#### TEST RESULTS

*No non-compliance noted.*

***Remark:*** Please refer to the separated SAR report.

**EUT Specification**

<b>EUT</b>	Windows CE.NET Handheld Computer
<b>Frequency band (Operating)</b>	<input type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz <input type="checkbox"/> WLAN: 5.725GHz ~ 5.850GHz <input type="checkbox"/> WLAN: 5.15GHz ~ 5.35GHz <input checked="" type="checkbox"/> Others: <u>1850 ~ 1910 MHz</u>
<b>Device category</b>	<input checked="" type="checkbox"/> Portable (<20cm separation) <input type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others
<b>Exposure classification</b>	<input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm <sup>2</sup> ) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm <sup>2</sup> )
<b>Antenna diversity</b>	<input checked="" type="checkbox"/> Single antenna <input type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
<b>Max. output power</b>	ERP: 25.74 dBm (374.9730mW)
<b>Antenna gain (Max)</b>	1.88 dBi (Numeric gain: 1.54)
<b>Evaluation applied</b>	<input type="checkbox"/> MPE Evaluation <input checked="" type="checkbox"/> SAR Evaluation <input type="checkbox"/> N/A

**Remark:**

1. The maximum output power is 25.74dBm (374.9730mW) at 1850.20MHz (with 1.54 numeric antenna gain.)
2. DTS device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance.
3. For mobile or fixed location transmitters, no SAR consideration applied. The maximum power density is 1.0 mW/cm<sup>2</sup> even if the calculation indicates that the power density would be larger.

**TEST RESULTS**

No non-compliance noted.

**Remark:** Please refer to the separated SAR report.