

**TEST REPORT**

Report Number: 100753208LEX-005  
Project Number: G100753208

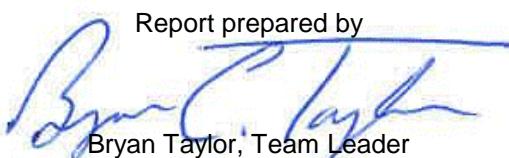
Report Issue Date: 5/29/2012

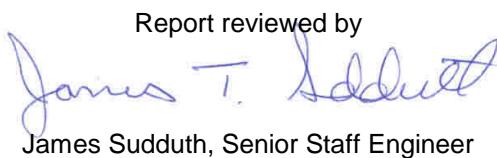
Product Name: Basestation  
FCCID: OWX-B1000  
FCC Standards: FCC Part 22 Subpart H  
FCC Part 24 Subpart E

Industry Canada Standards: RSS-132 Issue 2  
RSS-133 Issue 5

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Client:  
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## 1 Introduction and Conclusion

The tests indicated in Section 2 were performed on the product constructed as described in Section 3. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test method, a list of the actual test equipment used, documentation photos, results and raw data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested complied with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

The INTERTEK-Lexington Facility is located at 731 Enterprise Drive, Lexington Kentucky, 40510. The radiated emission test site is a 10-meter semi-anechoic chamber. The chamber meets the characteristics of CISPR 16-1 and ANSI C63.4. For measurements, a remotely controlled flush-mount metal-top turntable is used to rotate the EUT a full 360 degrees. A remote controlled non-conductive antenna mast is used to scan the antenna height from one to four meters. The test site is listed with the FCC under Registration Number 485103.

## 2 Test Summary

Page	Test full name	FCC Reference	Industry Canada	Result
7	Conducted Output Power	§2.1046 §24.232(d)	RSS-132 (4.4), RSS-133 (4.1), RSS-133 (6.4)	Pass
10	Occupied Bandwidth	§2.1049, §22.917(b)(d), and §24.238(a)	RSS-GEN (4.6.1), RSS-133 (2.3)	Pass
12	Conducted Spurious Emissions	§2.1049, §2.1051, §22.917(a)(b), and § 24.238(a)(b)	RSS-132 (4.5), RSS-133 (6.5.1)	Pass
24	Radiated Output Power	§ 22.913(a) and § 24.232(c)	RSS-132 (4.4), RSS-133 (6.4)	Pass
25	Radiated Spurious Emissions (Transmitter)	§2.1053, §22.917(a)(b), and §24.238(a)(b)	RSS-132 (4.5), RSS-133 (6.5)	Pass
30	Frequency Stability	§2.1055, §22.355, and §24.235	RSS-132 (4.3), RSS-133 (6.3)	Pass

### 3 Description of Equipment Under Test

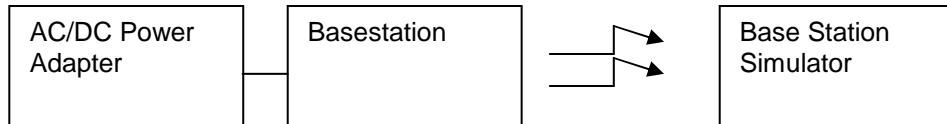
Equipment Under Test	
<b>Manufacturer</b>	Gryphex Electronic Monitoring
<b>Model Number</b>	Basestation
<b>Serial Number</b>	Test Sample 1
<b>FCC Identifier</b>	OWX-B1000
<b>Receive Date</b>	5/11/2012
<b>Test Start Date</b>	5/11/2012
<b>Test End Date</b>	5/30/2012
<b>Device Received Condition</b>	Good
<b>Test Sample Type</b>	Production
<b>Frequency Band</b>	824MHz - 849MHz (GSM 850 Band) 1850MHz – 1910MHz (GSM 1900 Band)
<b>Modulation Type</b>	GSM (GMSK), GPRS (GMSK)
<b>Transmission Control</b>	Base Station Simulator
<b>Maximum Output Power (Conducted)</b>	32.58dBm (GSM 850) 30.11dBm (GSM 1900)
<b>Test Channels</b>	128, 190, & 251 (GSM 850 Band) 512, 661, & 810 (GSM 1900 Band)
<b>Antenna Type</b>	Internal
<b>Operating Voltage</b>	115VAC/60Hz

#### Description of Equipment Under Test

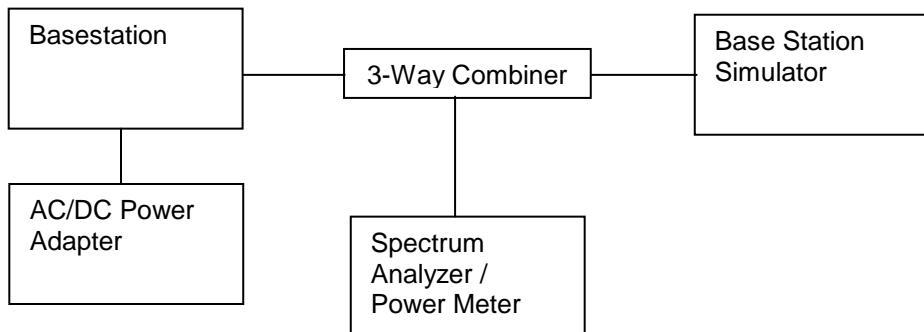
The Basestation was a base station for use as part of a house arrest system. The system is used to track offenders who have been placed under house arrest and monitor their whereabouts.

#### Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Transmitting a GSM signal
2	Receive / idle mode

**3.1 System setup including cable interconnection details, support equipment and simplified block diagram****3.2 EUT Block Diagram:**

Block Diagram for Radiated Tests



Block Diagram for Conducted Tests at the Antenna Port

**3.3 Cables:**

Cables					
Description	Length	Shielding	Ferrites	Connection	
				From	To
AC Power Cable	5 ft	None	None	AC Power Source	AC/DC Power Adapter
DC Power Cable	3 ft	None	Yes	AC/DC Power Adapter	Test Sample
RJ-11 Cable	10 ft	None	None	Test Sample	Un-Terminated

**3.4 Support Equipment:**

No support equipment was necessary for the evaluation.

## 4 Conducted Output Power

### 4.1 Test Limits

#### § 2.1046

For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in §2.1033(c)(8).

#### § 24.232 (d)

Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

### 4.2 Test Procedure

The transmitter output was connected to a coaxial cable, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The EUT was placed into a call and the burst average power was measured with a power meter dBm. The power output at the transmitter antenna port was determined by adding the value of the cable insertion loss to the power reading. Tests were performed at three frequencies (low, middle, and high channels) and on the highest power levels, which can be setup on the transmitters.

The peak-to-average ratio (PAR) was measured using a spectrum analyzer with a RBW wider than the EBW of the measured signal. The delta between the peak and average trace was recorded.

### 4.3 Test Equipment Used:

Description	Serial/ID Number	Manufacturer	Model	Cal. Date	Cal. Due
Wideband Radio Communication Tester	1201.002K50-103944-XP	Rohde & Schwarz	CMW 500	Calibration Not Required	Calibration Not Required
Environmental Chamber	29410	Thermotron	SE-1000-5-5	4/25/2012	4/25/2013
Spectrum Analyzer	3099	Rohde & Schwarz	FSP7	9/23/2012	9/23/2012
Power Meter	3166	Gigatronics	8541C	9/23/2011	9/23/2012
Power Sensor	3404	Gigatronics	80601A	9/23/2011	9/23/2012
RF Combiner	E18106	Weinschel Engineering	1506A	Time of Use	Time of Use
Directional Coupler	08736	Narda	4226-20	Time of Use	Time of Use

**4.4 Results:****Conducted Output Power at Nominal Temperature**

			Burst Average Power (dBm)	
Band	Channel	Frequency (MHz)	GPRS - 1 Tx Slot	GPRS - 2 Tx Slots
GSM 850	128	824.2	31.86	31.75
	190	836.6	31.95	31.85
	251	848.8	32	31.9
GSM 1900	512	1850.2	29.76	29.76
	661	1880	29.72	29.71
	810	1909.8	29.68	29.62

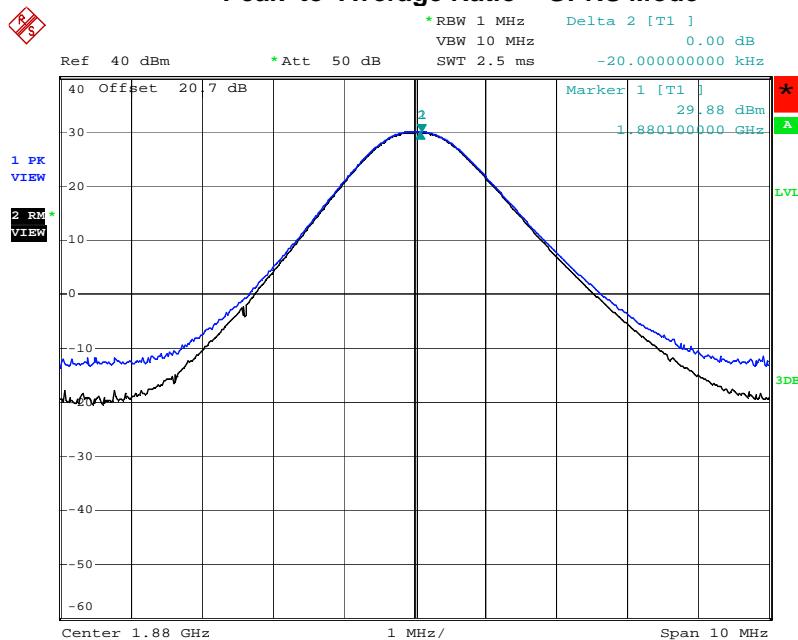
**Conducted Output Power at Temperature and Voltage Extremes**

Configuration	Temp	Input Voltage (VAC)	Burst Average Power (dBm)		
			Ch. 128	Ch. 190	Ch. 251
GSM850 - GPRS 1Tx Slot	-30	115	32.14	32.17	32.3
	20	115	32.51	32.6	32.65
	20	138	32.5	32.58	32.64
	20	93.5	32.5	32.58	32.64
	60	115	31.6	31.6	31.74

**Burst Average Power (dBm)**

Configuration	Temp	Input Voltage (VAC)	Ch. 512	Ch. 661	Ch. 810
GSM1900 - GPRS 1Tx Slot	-30	115	30.1	30.11	29.98
	20	115	29.76	29.72	29.68
	20	138	29.77	29.74	29.68
	20	93.5	29.77	29.73	29.68
	60	115	29.39	29.46	29.32

## Peak-to-Average Ratio – GPRS Mode



Date: 21.MAY.2012 10:33:23

## 5 Occupied Bandwidth

### 5.1 Test Limits

#### §2.1049:

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

### 5.2 Test Procedure

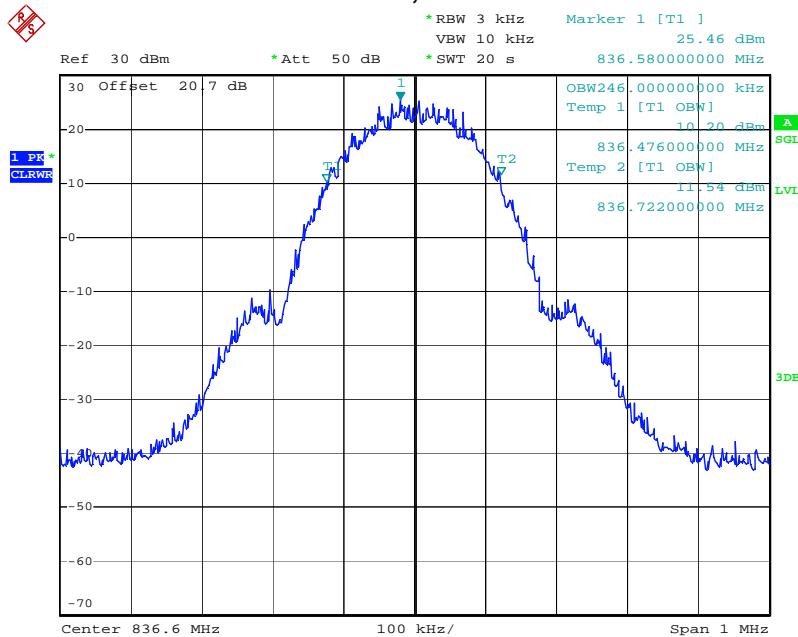
The EUT was connected to a spectrum analyzer using a coaxial cable and power divider. The EUT was placed into a call using base station simulator. The base station simulator was set to force the EUT to its maximum power setting. The occupied bandwidth function of the analyzer was used to automatically generate the occupied bandwidth plots below.

### 5.3 Test Equipment Used:

Description	Serial/ID Number	Manufacturer	Model	Cal. Date	Cal. Due
Spectrum Analyzer	3099	Rohde & Schwarz	FSP7	9/23/2012	9/23/2012
Wideband Radio Communication Tester	1201.002K50-103944-XP	Rohde & Schwarz	CMW 500	Calibration Not Required	Calibration Not Required
Directional Coupler	08736	Narda	4226-20	Time of Use	Time of Use

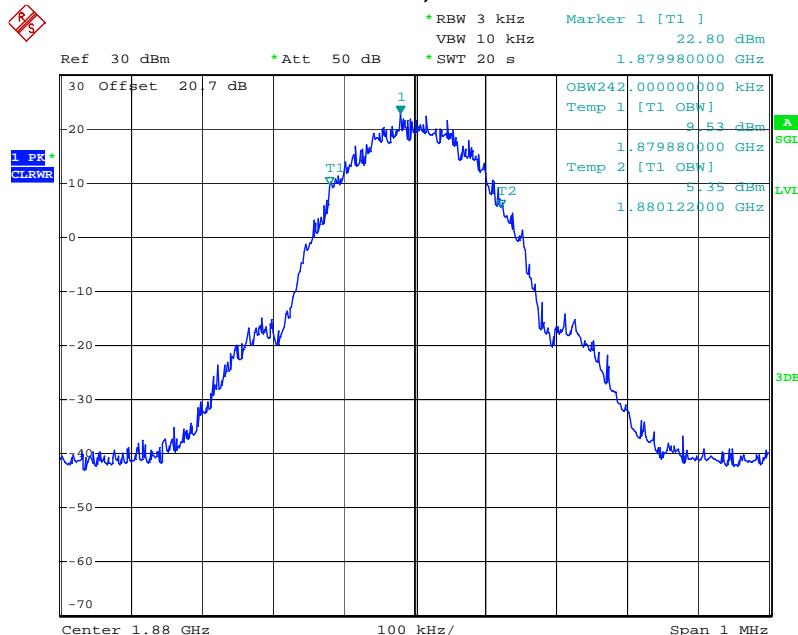
## 5.4 Results:

### GSM 850 Band, Mid Channel – GPRS



Date: 21.MAY.2012 10:44:37

### GSM 1900 Band, Mid Channel – GPRS



Date: 21.MAY.2012 10:42:17

## **6 Conducted Spurious Emissions at Antenna Terminals**

### **6.1 Test Limits**

#### **§ 2.1049**

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

(h) Transmitters employing digital modulation techniques—when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at the discretion of the user.

#### **§ 2.1051**

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in §2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

#### **§ 22.917**

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth ( i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

#### **§ 24.238**

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth ( i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

**6.2 Test Procedure**

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The base station simulator was set to force the EUT to its maximum power setting. The resolution bandwidth of the spectrum analyzer was set at 100kHz or 1MHz depending on the transmit band. Sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.

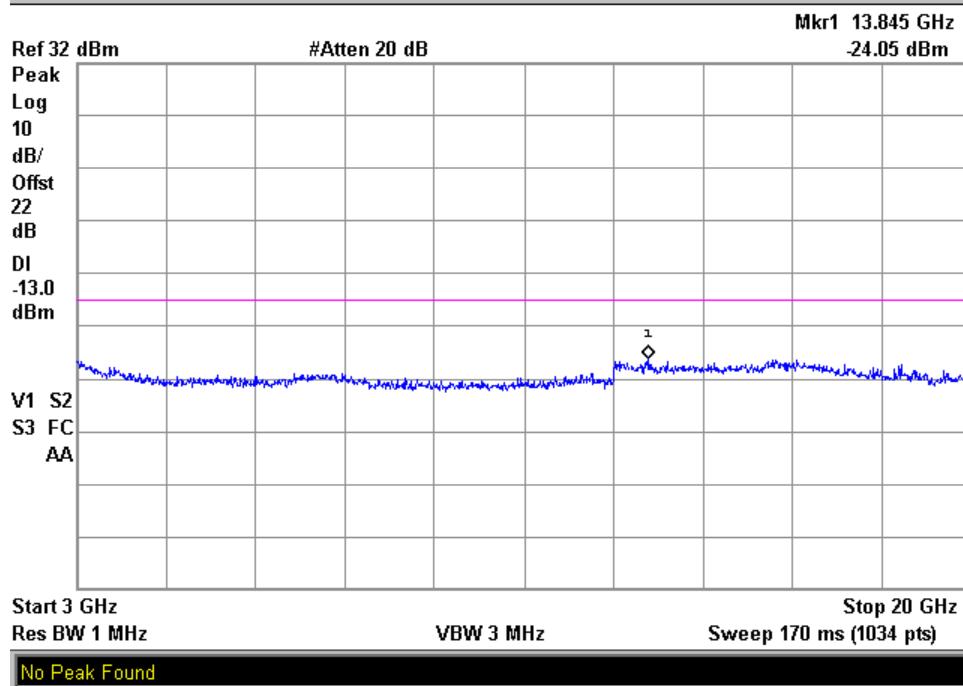
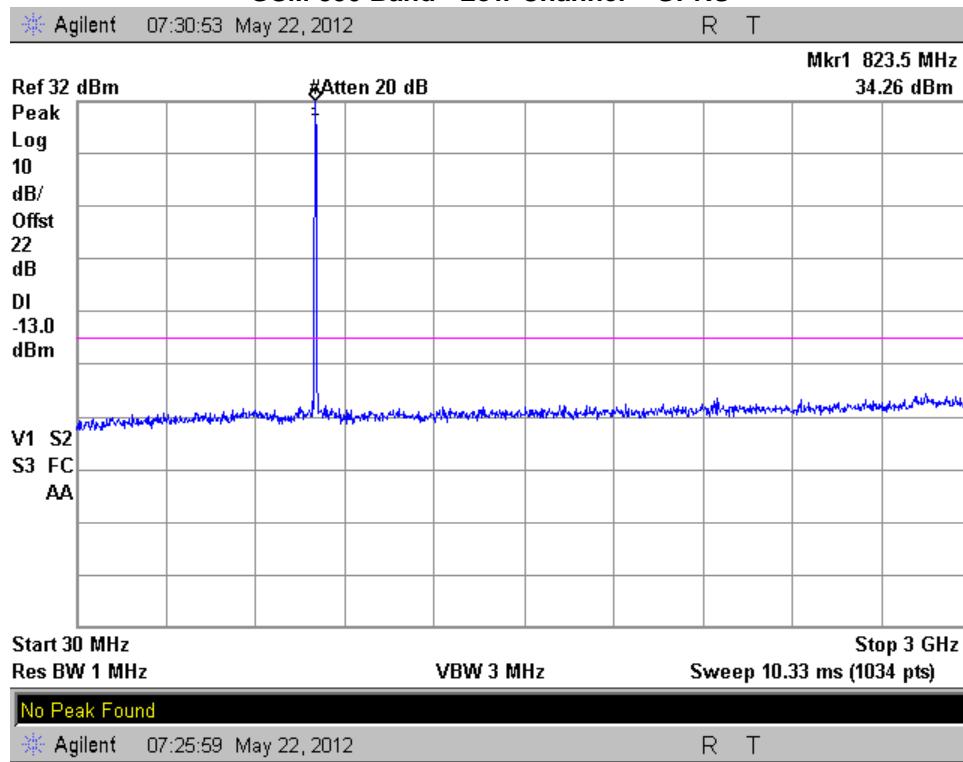
**6.3 Test Equipment Used:**

Description	Serial/ID Number	Manufacturer	Model	Cal. Date	Cal. Due
Spectrum Analyzer	3099	Rohde & Schwarz	FSP7	9/23/2012	9/23/2012
EMC Analyzer	2142	HP	E7405	9/23/2011	9/23/2012
Wideband Radio Communication Tester	1201.002K50-103944-XP	Rohde & Schwarz	CMW 500	Calibration Not Required	Calibration Not Required
Directional Coupler	08736	Narda	4226-20	Time of Use	Time of Use

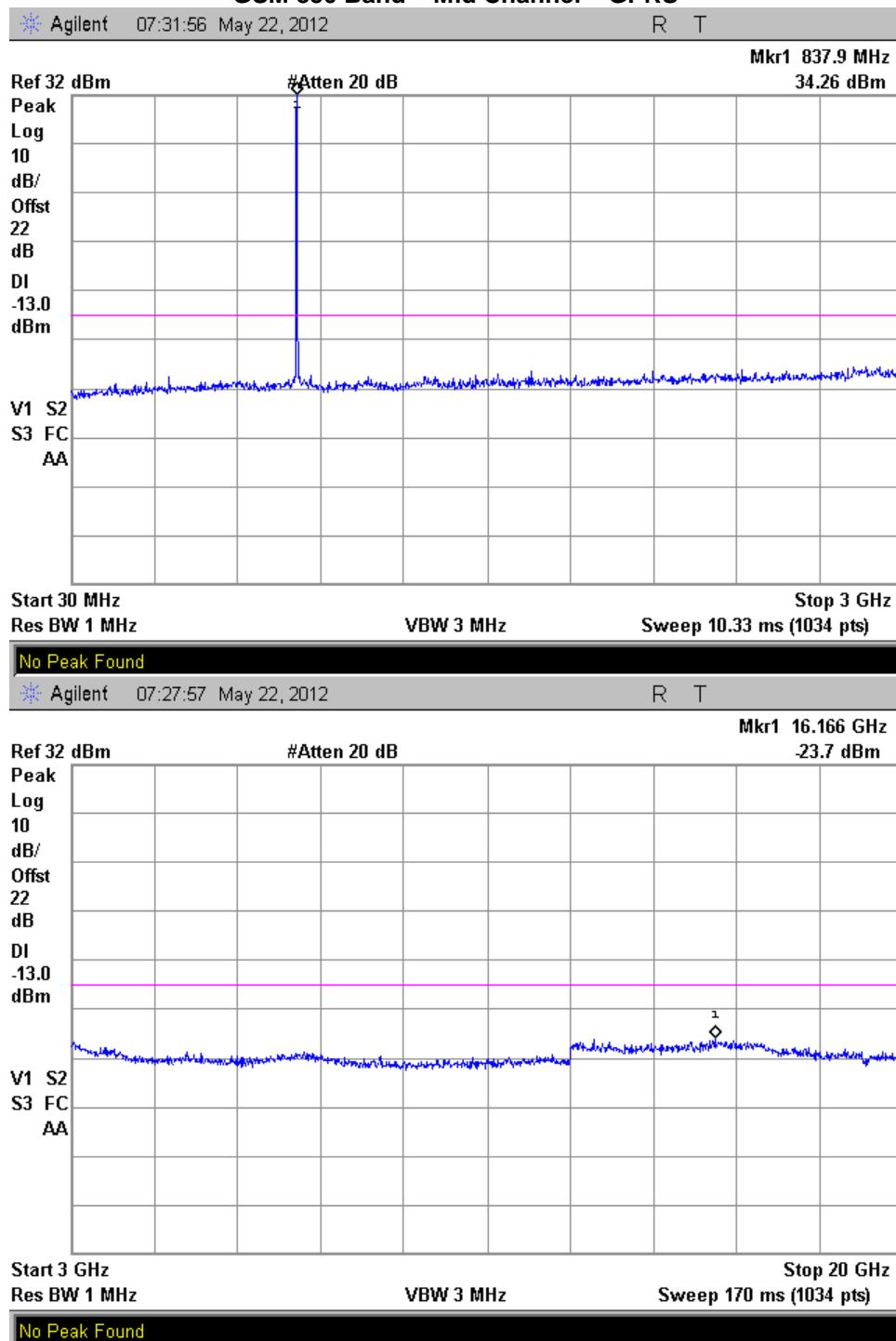
**6.4 Results:**

The following plots show that all spurious emissions are attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB. Plots for emissions within 1MHz of the band edge as well as for emission outside of this range are shown.

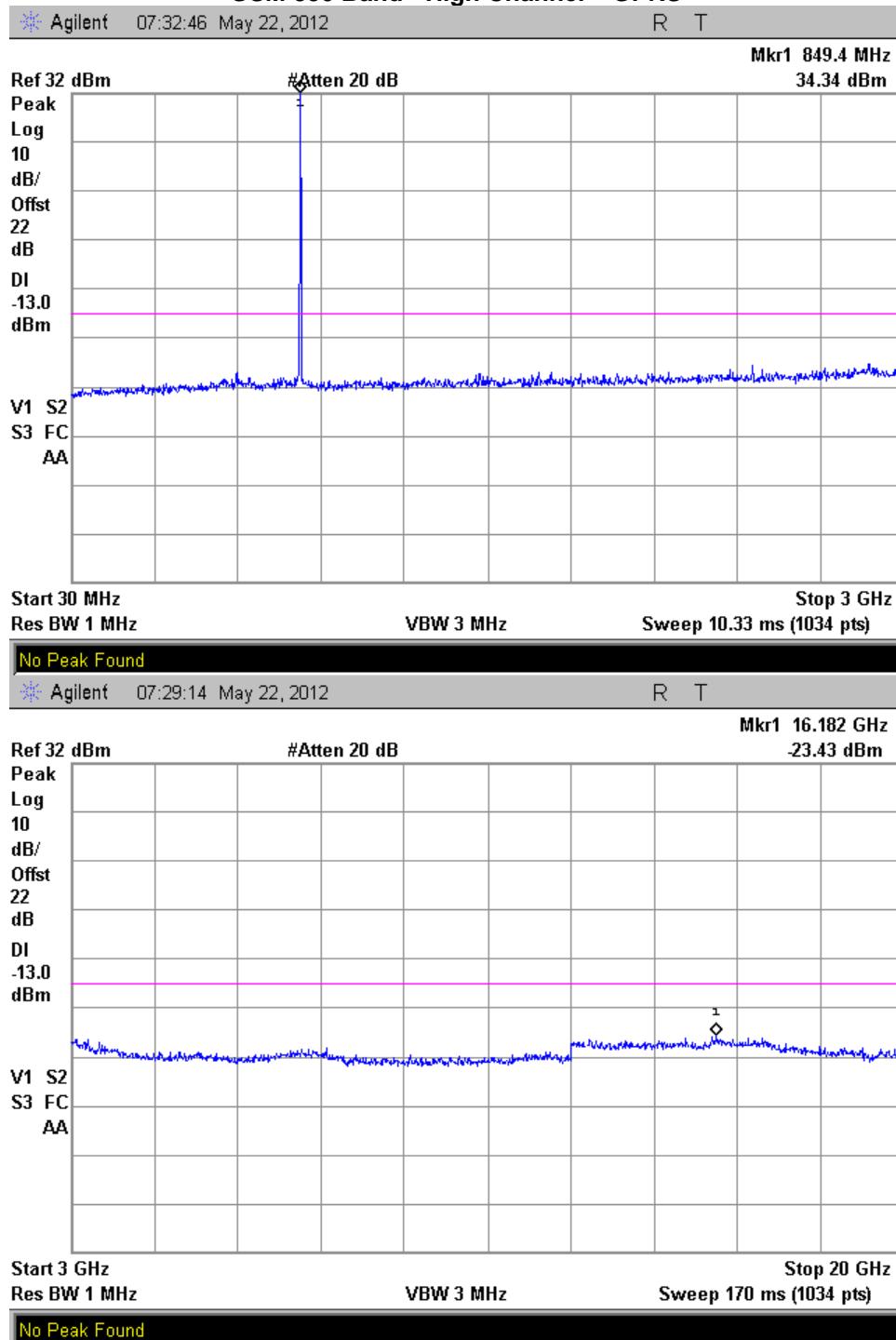
## GSM 850 Band - Low Channel – GPRS



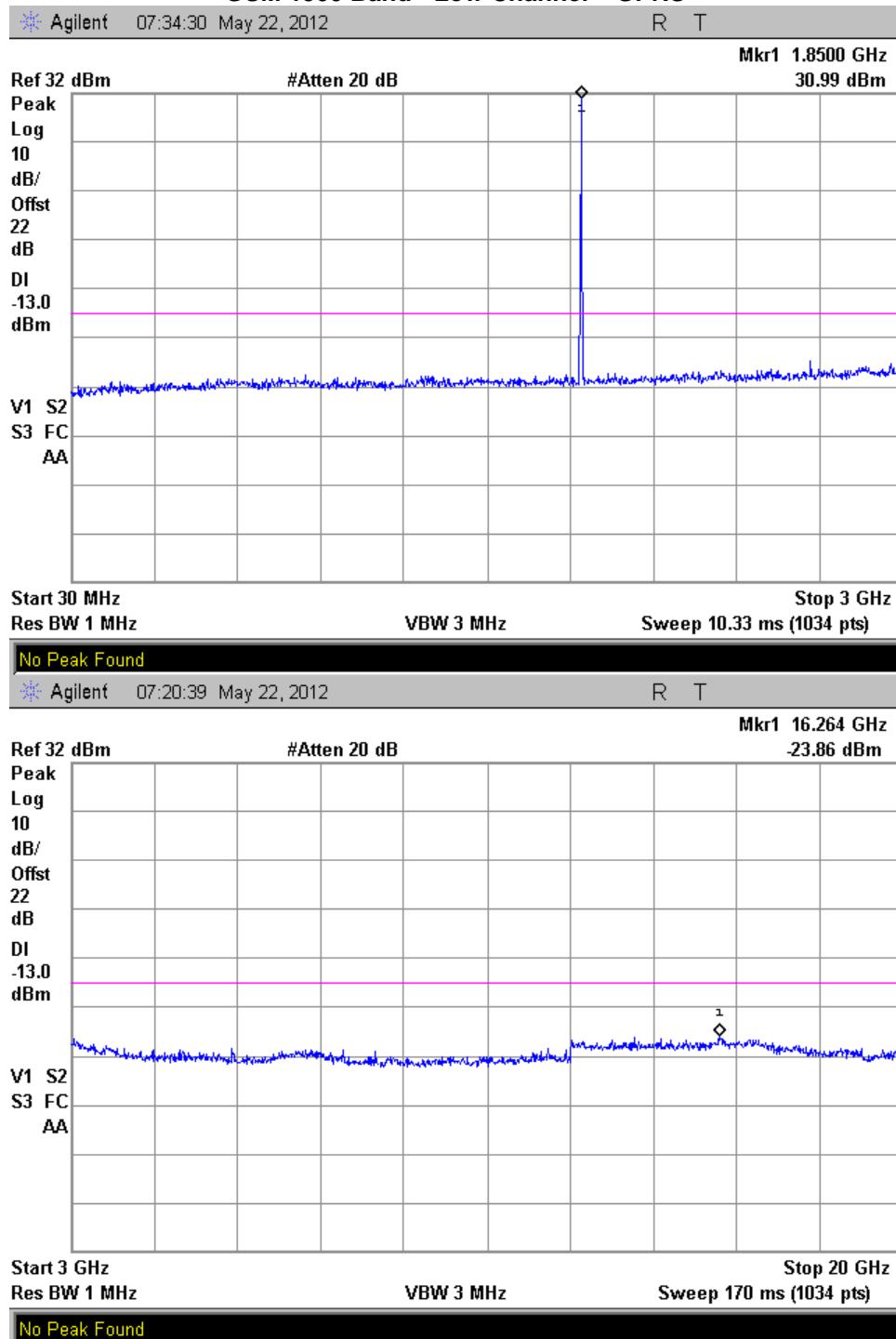
## GSM 850 Band – Mid Channel – GPRS



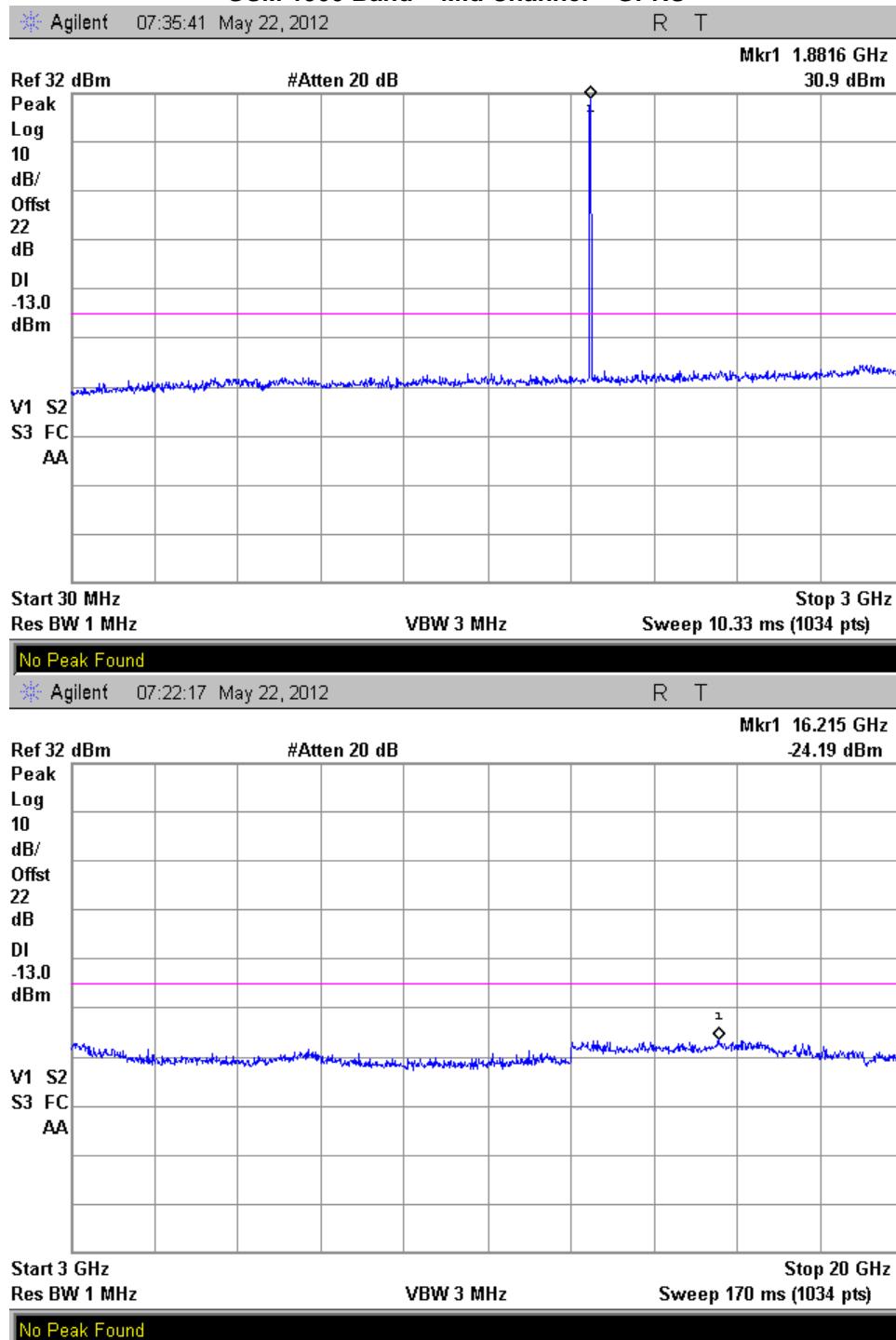
## GSM 850 Band - High Channel – GPRS



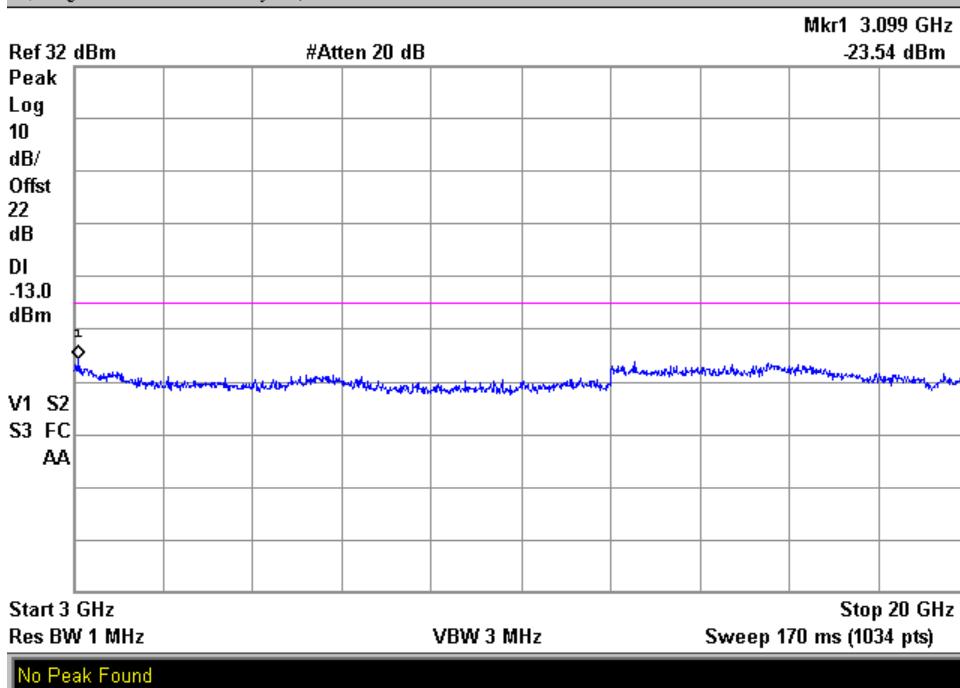
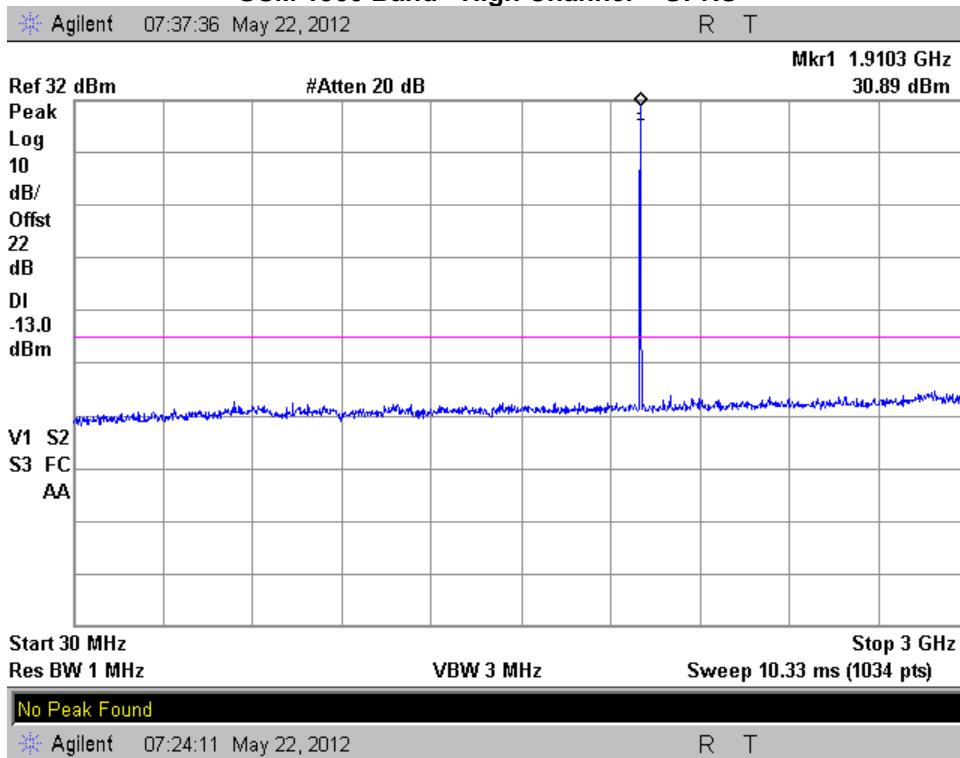
## GSM 1900 Band - Low Channel – GPRS

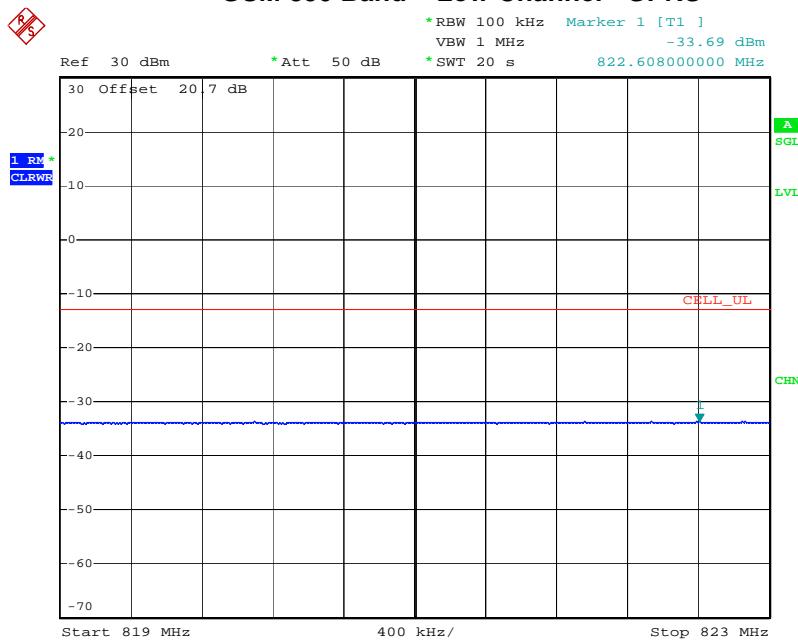


## GSM 1900 Band – Mid Channel – GPRS

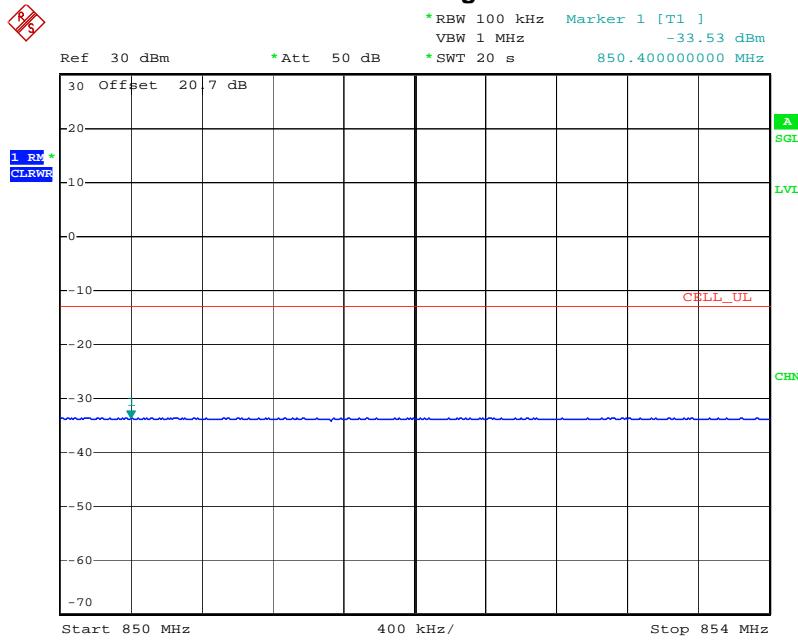


## GSM 1900 Band - High Channel – GPRS



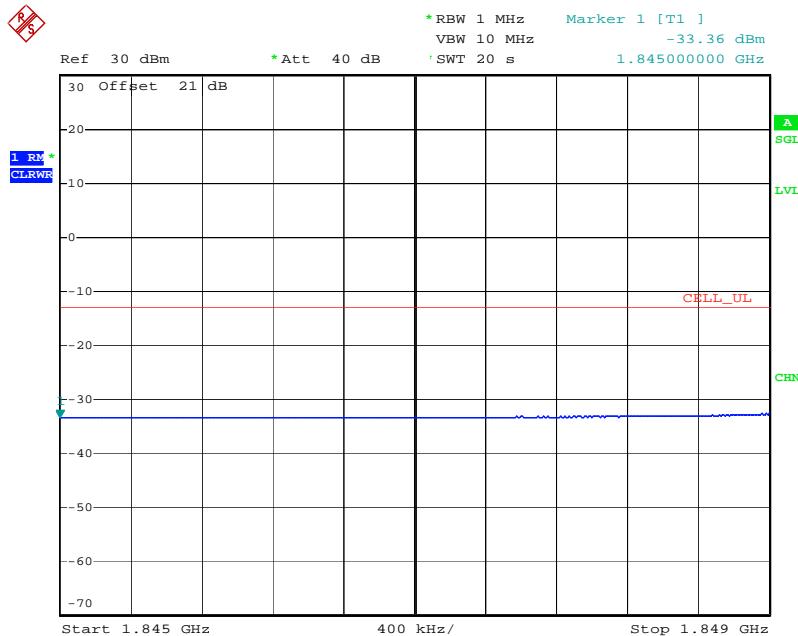
**Emissions within 4MHz of the block edge:****GSM 850 Band – Low Channel - GPRS**

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**GSM 850 Band – High Channel - GPRS**

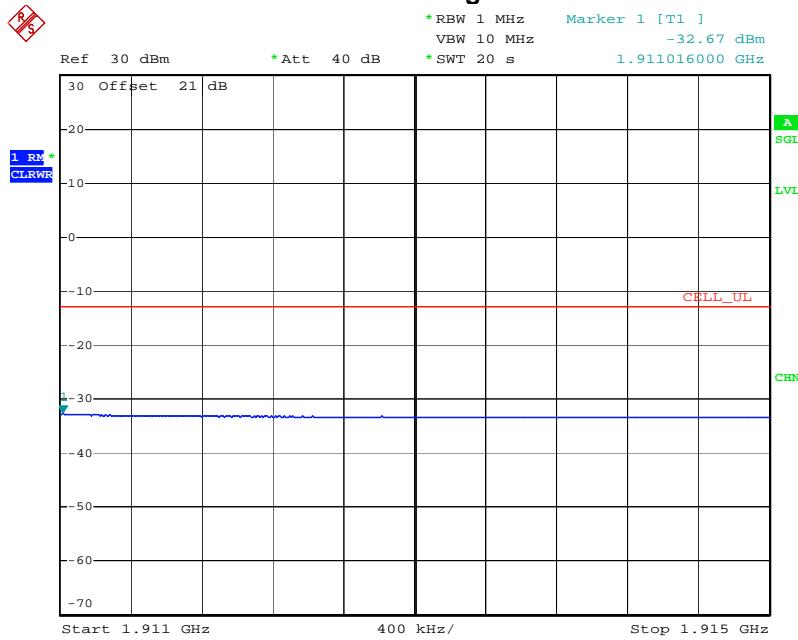
Date: 21.MAY.2012 11:02:53

## GSM 1900 Band – Low Channel - GPRS

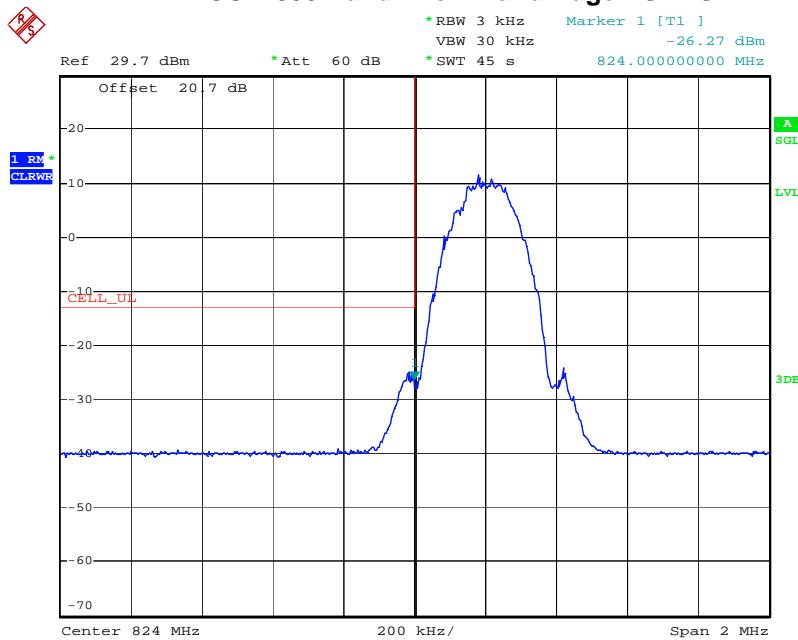


Date: 21.MAY.2012 11:13:39

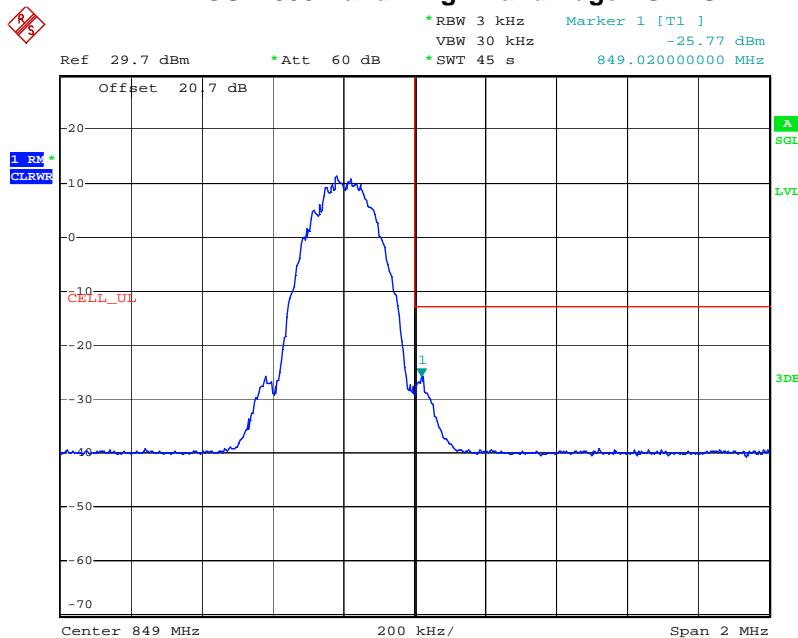
## GSM 1900 Band – High Channel – GPRS



Date: 21.MAY.2012 11:15:47

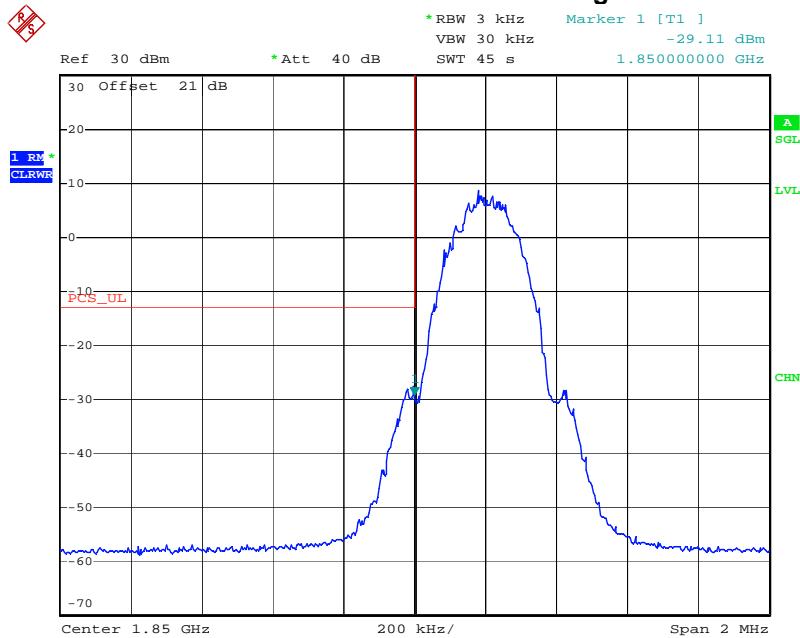
**Emissions within 1MHz of the band edge:****GSM 850 Band - Low Band Edge - GPRS**

Date: 21.MAY.2012 11:30:52

**GSM 850 Band - High Band Edge - GPRS**

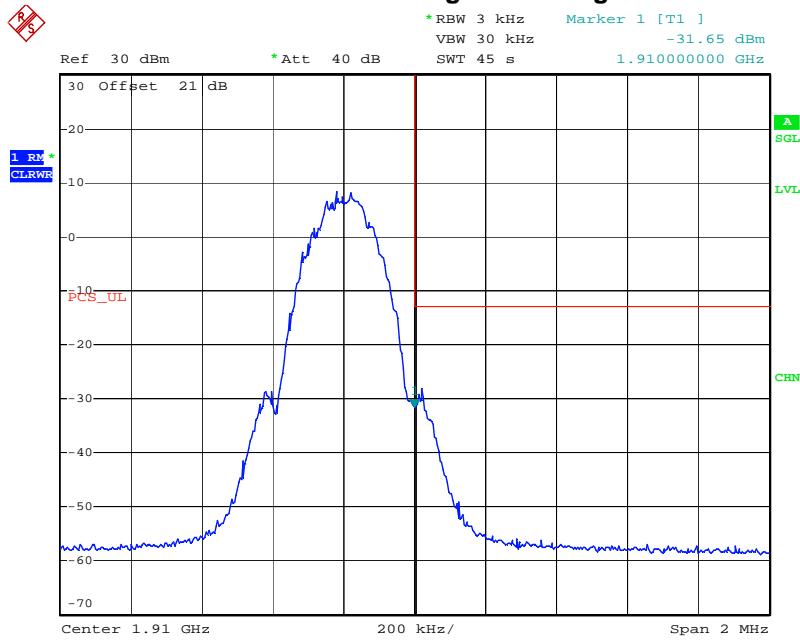
Date: 21.MAY.2012 11:33:57

## GSM 1900 Band - Low Band Edge - GPRS



Date: 21.MAY.2012 11:21:57

## GSM 1900 Band - High Band Edge - GPRS



Date: 21.MAY.2012 11:23:28

## 7 Radiated Output Power

### 7.1 Test Limits

#### § 22.913

(a) (2) The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

#### § 24.232

(c) Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

### 7.2 Test Procedure

The radiated output power was determined by using the substitution method from TIA-603C.

### 7.3 Results:

The Basestation meets the radiated power requirements of FCC §22.913 and §24.232.

Radiated Output Power Measurements									
Test Engineer: Bryan Taylor Test Date: 5/29/2012 Temp. / Humidity / 25.2C/51.9%/978.6 mbar Pressure: Bandwidth Settings: RBW = VBW = 1MHz Notes: Substitution Method From TIA-603C									
EUT Mode	Polarity	TX Frequency	Device Reading (dBm)	Sub. Reading (dBm)	Cable Loss (dB)	Tx Antenna Gain (dBd)	Signal Generator Output (dBm)	ERP (dBm)	EIRP (dBi)
GSM 850 128	H	824.70	-6.88	-50.56	2.29	4.05	-20.00	25.44	27.59
	V	824.70	-8.33	-49.82	2.29	4.05	-20.00	23.25	25.40
GSM 850 190	H	836.52	-5.67	-50.66	2.38	3.75	-20.00	26.36	28.51
	V	836.52	-7.40	-50.24	2.38	3.75	-20.00	24.21	26.36
GSM 850 251	H	848.31	-6.09	-50.55	2.38	3.85	-20.00	25.93	28.08
	V	848.31	-8.84	-50.29	2.38	3.85	-20.00	22.92	25.07
GSM 1900 512	H	1850.20	-11.91	-57.60	3.44	6.32	-20.00	28.57	30.72
	V	1850.20	-15.42	-58.96	3.44	6.32	-20.00	26.42	28.57
GSM 1900 661	H	1880.00	-11.32	-58.23	3.44	6.32	-20.00	29.79	31.94
	V	1880.00	-15.79	-59.13	3.44	6.32	-20.00	26.22	28.37
GSM 1900 810	H	1909.80	-13.53	-58.53	3.46	6.36	-20.00	27.90	30.05
	V	1909.80	-16.55	-59.42	3.46	6.36	-20.00	25.77	27.92

Calculations:  $F = [(A - B) + E] - C + D$ ;  $G = F + 2.15$

## 8 Radiated Spurious Emissions (Transmitter)

### 8.1 Test Limits

#### § 2.1053

(a) Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of §2.1049, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from halfwave dipole antennas.

#### § 22.917

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth ( i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

#### § 24.238

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth ( i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

## 8.2 Test Procedure

The EUT was placed on a non-conductive turntable. The measurement antenna was placed at a distance of 3 meters from the EUT. The EUT was forced to transmit at its maximum output power setting. During the tests, the antenna height and EUT azimuth were varied in order to identify the maximum level of emissions from the EUT.

The frequency range up to tenth harmonic was investigated in order to identify the spurious emission. Once the spurious emissions were identified, the power of the emission was determined using the substitution method described in TIA-603-C. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and at the spurious emissions frequency.

## 8.3 Test Equipment Used:

Description	Serial/ID Number	Manufacturer	Model	Cal. Date	Cal. Due
EMI Test Receiver	10887490.26	Rohde & Schwarz	ESI26	6/29/2011	6/29/2012
Preamplifier	987410	Miteq	AFS44-00102000-30-10P-44	9/12/2011	9/12/2012
Preamplifier	SF456200904	Mini-Circuits	ZX60-3018G-S+	9/12/2011	9/12/2012
Biconnilog Antenna	00051864	ETS	3142C	12/20/2011	12/20/2012
Horn Antenna	6556	ETS	3115	8/24/2011	8/24/2012
Horn Antenna	1096	Antenna Research	DRG-118/A	7/20/2011	7/20/2012
System Controller	121701-1	Sunol Sciences	SC99V	Calibration Not Required	Calibration Not Required
High Pass Filter	3986-01 DC0408	Microwave Circuits, Inc.	H3G020G2	Calibrate at Time Of Use	Calibrate at Time Of Use
Wideband Radio Communication Tester	1201.002K50-103944-XP	Rohde & Schwarz	CMW 500	Calibration Not Required	Calibration Not Required

**8.4 Results:**

All radiated spurious emissions were attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB which is equivalent to -13dBm.

**Worst Case Spurious Measurements – GSM 850 Band – GPRS Mode**

Radiated Spurious Emissions Measurement								
Test Engineer: B. Taylor Test Date: 5/26/2012 Temp. / Humidity / Pressure: 25.5C/52.5% / 988.8 mbar Bandwidth Settings: RBW = VBW = 1MHz								
Spurious emissions not reported here were below the measurement noise floor. Notes:								
Band/Channel	Spurious Frequency (MHz)	Polarity	Device Reading (dBm)	Signal Generator Level (dBm)	Cable Loss (dB)	Tx Antenna Gain (dBd)	Limit (dBm)	Radiated Spurious Emission Level (dBm)
GSM 850 Band; GPRS Mode; Low Channel (128)	1648.4	H	-66.33	-30.24	3.26	6.70	-13	-26.80
	1648.4	V	-70.4	-35.33	3.26	6.70	-13	-31.89
	2472.6	H	-70.9	-30.94	4.17	7.16	-13	-27.95
	2472.6	V	-75.31	-33.4	4.17	7.16	-13	-30.41
	3296.8	H	-51.48	-47.77	4.58	7.14	-13	-45.21
	3296.8	V	-50.76	-44.46	4.58	7.14	-13	-41.90
	4121	H	-50.64	-44.11	5.33	8.15	-13	-41.29
	4121	V	-49.94	-42.47	5.33	8.15	-13	-39.65
	4945.2	H	-57.24	-49.14	5.82	8.80	-13	-46.16
	4945.2	V	-58.5	-50.94	5.82	8.80	-13	-47.96
	5769.4	H	-61.34	-50.04	6.75	9.27	-13	-47.52
	5769.4	V	-58.78	-48.88	6.75	9.27	-13	-46.36
	6593.6	H	-63.41	-46.85	7.45	9.96	-13	-44.34
	6593.6	V	-58.5	-42.06	7.45	9.96	-13	-39.55
	7417.8	H	-71.79	-51.61	7.78	8.72	-13	-50.67
	7417.8	V	-70.46	-49.76	7.78	8.72	-13	-48.82
GSM 850 Band; GPRS Mode; Mid Channel (190)	8242	H	-67.6	-44.35	8.23	9.16	-13	-43.42
	8242	V	-63.39	-43.39	8.23	9.16	-13	-42.46
	1673.2	H	-66.92	-30.46	3.30	6.70	-13	-27.06
	1673.2	V	-66.75	-30.58	3.30	6.70	-13	-27.18
	2509.8	H	-69.51	-28.98	3.97	7.43	-13	-25.52
	2509.8	V	-73.41	-30.76	3.97	7.43	-13	-27.30
	3346.4	H	-47.62	-44.22	4.63	7.19	-13	-41.67
	3346.4	V	-48.24	-43.93	4.63	7.19	-13	-41.38
	4183	H	-50.2	-44.21	5.19	8.15	-13	-41.25
	4183	V	-49.85	-44.23	5.19	8.15	-13	-41.27
	5019.6	H	-59.24	-50.53	6.19	8.87	-13	-47.85
	5019.6	V	-57.11	-49.23	6.19	8.87	-13	-46.55
	5856.2	H	-58.54	-46.64	7.28	9.57	-13	-44.35
	5856.2	V	-56.26	-44.23	7.28	9.57	-13	-41.94
	6692.8	H	-67.95	-51.01	7.47	9.81	-13	-48.67
	6692.8	V	-60.67	-44.02	7.47	9.81	-13	-41.68
GSM 850 Band; GPRS Mode; High Channel (251)	7529.4	H	-71.72	-49.38	8.31	9.02	-13	-48.67
	7529.4	V	-73.48	-53.7	8.31	9.02	-13	-52.99
	8366	H	-71.19	-48.14	8.56	9.22	-13	-47.48
	8366	V	-70.13	-46.19	8.56	9.22	-13	-45.53
	1697.6	H	-68.45	-31.66	3.18	6.70	-13	-28.14
	1697.6	V	-68.74	-31.66	3.18	6.70	-13	-28.14
	2546.4	H	-74.34	-32.86	4.09	7.43	-13	-29.52
	2546.4	V	-73.92	-30.33	4.09	7.43	-13	-26.99
	3395.2	H	-44.12	-39.42	4.84	7.19	-13	-37.08
	3395.2	V	-46.67	-40.16	4.84	7.19	-13	-37.82
	4244	H	-53.86	-47.53	5.00	8.37	-13	-44.16
	4244	V	-48.94	-42.95	5.00	8.37	-13	-39.58
	5092.8	H	-60.67	-51.16	6.25	8.87	-13	-48.54
	5092.8	V	-57.12	-48.26	6.25	8.87	-13	-45.64
	5941.6	H	-61.48	-47.69	7.03	9.53	-13	-45.19
	5941.6	V	-55.96	-43.4	7.03	9.53	-13	-40.90
	6790.4	H	-66.03	-49.36	7.71	9.55	-13	-47.52
	6790.4	V	-67.78	-50.71	7.71	9.55	-13	-48.87
	7639.2	H	-66.8	-45.48	7.87	9.20	-13	-44.15
	7639.2	V	-63.51	-43.47	7.87	9.20	-13	-42.14
	8488	H	-72.15	-47.2	8.57	9.13	-13	-46.65
	8488	V	-70.74	-46.12	8.57	9.13	-13	-45.57

F=B-C+D

## Worst Case Spurious Measurements – GSM 1900 Band – GPRS Mode

## Radiated Spurious Emissions Measurement

Test Engineer: B. Taylor

Test Date: 5/25/2012

Temp. / Humidity /

26.7C/46.6%/ 985.4 mbar

Pressure:

Bandwidth Settings: RBW = VBW = 1MHz

Spurious emissions not reported here were below the measurement noise floor.

Notes:

Band/Channel	Spurious Frequency (MHz)	Polarity	A	B	C	D	E	F
			Device Reading (dBm)	Signal Generator Level (dBm)	Cable Loss (dB)	Tx Antenna Gain (dBd)	Limit (dBm)	Radiated Spurious Emission Level (dBm)
GSM 1900 Band; GPRS Mode; Low Channel (512)	3700.4	H	-36.13	-29.32	4.85	7.07	-13	-27.10
	3700.4	V	-34.98	-28	4.85	7.07	-13	-25.78
	5550.6	H	-59	-46.7	6.91	8.48	-13	-45.13
	5550.6	V	-56.64	-45.13	6.91	8.48	-13	-43.56
	7400.8	H	-61.16	-41.63	7.75	8.72	-13	-40.66
	7400.8	V	-63.69	-47.02	7.75	8.72	-13	-46.05
	9251	H	-67.22	-43.34	9.21	9.41	-13	-43.15
	9251	V	-66.88	-45.34	9.21	9.41	-13	-45.15
	11101.2	H	-73.91	-44.05	10.47	10.70	-13	-43.82
	11101.2	V	-72.59	-44.48	10.47	10.70	-13	-44.25
GSM 1900 Band; GPRS Mode; Mid Channel (661)	3760	H	-39.06	-31.82	5.20	7.07	-13	-29.95
	3760	V	-36.65	-29.75	5.20	7.07	-13	-27.88
	5640	H	-64.89	-53.02	7.09	8.84	-13	-51.27
	5640	V	-65.09	-54.01	7.09	8.84	-13	-52.26
	7520	H	-61.82	-42.22	8.01	9.02	-13	-41.21
	7520	V	-56.78	-38.68	8.01	9.02	-13	-37.67
	9400	H	-70.38	-45.16	9.15	9.52	-13	-44.79
	9400	V	-72.22	-49.89	9.15	9.52	-13	-49.52
	11280	H	-72.54	-42.7	10.16	10.65	-13	-42.22
	11280	V	-70.55	-42.89	10.16	10.65	-13	-42.41
GSM 1900 Band; GPRS Mode; High Channel (810)	3819.6	H	-45.14	-37.62	5.00	6.73	-13	-35.89
	3819.6	V	-45.39	-39.37	5.00	6.73	-13	-37.64
	5729.4	H	-60.64	-47.21	7.06	9.27	-13	-45.00
	5729.4	V	-60.68	-49.11	7.06	9.27	-13	-46.90
	7639.2	H	-70.94	-49.13	7.87	9.20	-13	-47.80
	7639.2	V	-65.35	-46.45	7.87	9.20	-13	-45.12
	9549	H	-72.49	-46.84	8.41	9.77	-13	-45.48
	9549	V	-69.25	-46.46	8.41	9.77	-13	-45.10
	11458.8	H	-63.04	-34.58	9.51	10.54	-13	-33.55
	11458.8	V	-63.52	-37.62	9.51	10.54	-13	-36.59

F=B-C+D

## 9 Frequency Stability

### 9.1 Test Limits

#### § 2.1055, §22.355, §24.235

The frequency stability of the transmitter was required to maintain a ±2.5ppm tolerance.

### 9.2 Test Procedure

The equipment under test was connected to an AC variac and the RF output was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for that purpose. After the temperature stabilized for approximately 30 minutes, the frequency error was read from the base station simulator. At 20C the input voltage was varied from 85% to 115% and the frequency stability vs input voltage was recorded.

### 9.3 Test Equipment Used:

Description	Serial/ID Number	Manufacturer	Model	Cal. Date	Cal. Due
Base Station Simulator	3101	Rohde & Schwarz	CMU200	6/1/2011	6/1/2012
Environmental Chamber	29410	Thermotron	SE-1000-5-5	4/25/2012	4/25/2013
Multimeter	3350	Fluke	115	8/23/2011	8/23/2012

**9.4 Results:**

The tables below show the frequency stability data for both Cell and PCS Bands. In both cases the test sample met the ±2.5ppm limit.

**Frequency Stability for GSM 850 Band – GPRS Mode**

**Operating Frequency:** 836,520,000 Hz

**Channel:** 190

**Reference Voltage:** 115 VAC

**Deviation Limit:** 2.5 ppm

**Notes:** Frequency Stability in GSM 850 Band, GPRS Mode

Voltage (%)	Voltage (VAC)	Temp (°C)	Frequency Error (Hz)	Deviation (%)	Deviation (ppm)
100%	115	-30	67.51	0.0000081	0.0807
100%	115	-20	55.5	0.0000066	0.0663
100%	115	-10	41.25	0.0000049	0.0493
100%	115	0	12.79	0.0000015	0.0153
100%	115	10	14.25	0.0000017	0.0170
100%	115	20	12.3	0.0000015	0.0147
100%	115	30	35.68	0.0000043	0.0427
100%	115	40	19.58	0.0000023	0.0234
100%	115	50	17.56	0.0000021	0.0210
100%	115	60	17.08	0.0000020	0.0204
115%	138	20	14.75	0.0000018	0.0176
85%	93.5	20	10.6	0.0000013	0.0127

**Frequency Stability for GSM 1900 Band – GPRS Mode**

**Operating Frequency:** 1,880,000,000 Hz

**Channel:** 661

**Reference Voltage:** 115 VAC

**Deviation Limit:** 2.5 ppm

**Notes:** Frequency Stability in GSM 1900 Band, GPRS Mode

Voltage (%)	Voltage (VAC)	Temp (°C)	Frequency Error (Hz)	Deviation (%)	Deviation (ppm)
100%	115	-30	71.22	0.0000038	0.0379
100%	115	-20	67.45	0.0000036	0.0359
100%	115	-10	65.01	0.0000035	0.0346
100%	115	0	66.61	0.0000035	0.0354
100%	115	10	57.12	0.0000030	0.0304
100%	115	20	54.5	0.0000029	0.0290
100%	115	30	55.79	0.0000030	0.0297
100%	115	40	53.29	0.0000028	0.0283
100%	115	50	56.6	0.0000030	0.0301
100%	115	60	54.89	0.0000029	0.0292
115%	138	20	51.23	0.0000027	0.0273
85%	93.5	20	53.45	0.0000028	0.0284

## 10 Measurement Uncertainty

The measured value related to the corresponding limit will be used to decide whether the equipment meets the requirements.

The measurement uncertainty figures were calculated and correspond to a coverage factor of  $k = 2$ , providing a confidence level of respectively 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian).

Measurement uncertainty Table

Parameter	Uncertainty	Notes
Radiated emissions, 30 to 1000 MHz	+3.9dB	
Radiated emissions, 1 to 18 GHz	+4.2dB	
Radiated emissions, 18 to 40 GHz	+4.3dB	
Power Port Conducted emissions, 150kHz to 30 MHz	+2.8dB	

**11 Revision History**

Revision Level	Date	Report Number	Notes
0	5/29/2012	100753208LEX-005	Original Issue