

# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

## INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 22 SUBPART H, PART 24 SUBPART E CLASS II PC REPORT

*For*

**Product Description:** Gobi2000 PCI Express Mini Card

**Trade Name:** N/A

**Model Name:** Gobi2000

**Model Difference:** N/A

**FCC ID:** PKRNVWE296

**Report No.:** EH/2010/B0003

**Issue Date:** Nov. 15, 2010

**FCC Rule Part:** 2, 22H & 24E

**Prepared for:** Novatel Wireless Inc  
6715-8th Street NE Suite 200, Calgary T2E 7H7,  
Canada

**Prepared by:** SGS Taiwan Ltd.  
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## CERTIFICATION OF COMPLIANCE

**Applicant:** Novatel Wireless Inc  
6715-8th Street NE Suite 200, Calgary T2E 7H7, Canada

**Product Description:** Gobi2000 PCI Express Mini Card

**Trade Name:** N/A

**FCC ID:** PKRNVWE296

**Model No.:** Gobi2000

**Model Difference:** N/A

**File Number:** EH/2010/B0003




**Date of test:** Nov. 02, 2010 ~ Nov. 09, 2010

**Date of EUT Received:** Nov. 02, 2010

**We hereby certify that:**

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory. 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 PART 22 subpart H, PART 24 subpart E.

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

<b>Test By:</b>		<b>Date:</b>	Nov. 15, 2010
	_____ <i>Brian Chang / Engineer</i>		_____
<b>Prepared By:</b>		<b>Date:</b>	Nov. 15, 2010
	_____ <i>Alex Hsieh / Sr. Engineer</i>		_____
<b>Approved By:</b>		<b>Date:</b>	Nov. 15, 2010
	_____ <i>Arno Hsieh / Asst. Supervisor</i>		_____

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## Version

Version No.	Date	Description
00	Nov. 15, 2010	Initial creation of document

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# 1. GENERAL INFORMATION

## 1.1 Product Description

### General of host:

Type Name:	Notebook Computer
Brand Name:	N/A
Model Name:	MARIO
Model Difference:	N/A
Power Supply:	14.8 Vdc re-chargeable battery or 100-240Vdc by AC/DC power adapter, model: HSTNN-LA18

### GSM / WCDMA / CDMA:

Modular report	Testing Lab.: QUALCOMM Incorporated Model Number: Gobi2000 Report Number: 80-VN379-203 Rev. A	
Brand Name	N/A	
Model Name	Gobi2000	
WWAN module FCC ID	J9CGOBI2000	
Cellular Phone Standards Frequency Range	GSM/GPRS/EDGE 850, Class 10	824.2 MHz - 848.8 MHz
	GSM/GPRS/EDGE 1900, Class 10	1850.2 MHz – 1909.8 MHz
	WCDMA/HSUPA/HSDPA Band II	1852.4 MHz– 1907.6 MHz
	WCDMA/HSUPA/HSDPA Band V	826.4 MHz - 846.6 MHz
	CDMA2000 Cellular	824.7 MHz – 848.31MHz
	CDMA2000 PCS	1851.25 MHz – 1908.75MHz

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Transmit power (Conducted Power) Listed in Original Grant / Type of Emission	22H(GMSK): 824.2 - 848.8 MHz: 248KGXW 24E(GMSK): 1850.2 – 1909.8 MHz: 250KGXW 22H(8PSK): 824.2 - 848.8 MHz: 248KG7W 24E(8PSK): 1850.2 – 1909.8 MHz: 250KG7W 22H(WCDMA): 826.4 - 846.6 MHz: 4M18F9W 24E(WCDMA): 1852.4 – 1907.5 MHz: 4M19F9W 22H(CDMA) 824.7 - 848.31 MHz: 1M28F9W 24E(CDMA): 1851.25 – 1908.75 MHz: 1M28F9W
Transmit power (Conducted Power) Listed in Test Report/Original Grant	22H(GMSK): 824.2 - 848.8 MHz: 1.919W /32.831dBm 24E(GMSK): 1850.2 – 1909.8 MHz: 0.874W /29.415dBm 22H(8PSK): 824.2 - 848.8 MHz: 0.555W /27.443dBm 24E(8PSK): 1850.2 – 1909.8 MHz: 0.396W /25.977dBm 22H(WCDMA): 826.4 - 846.6 MHz: 0.262W /24.183dBm 24E(WCDMA): 1852.4 – 1907.5 MHz: 0.256W /24.082dBm 22H(CDMA) 824.7 - 848.31 MHz: 0.29W /24.6dBm 24E(CDMA): 1851.25 – 1908.75 MHz: 0.291W /24.639dBm
IMEI	352636040013315
Class II Permissive change	Adding an MARIO Notebook Computer.

This test report applies for GPRS/EDGE 850, GPRS/EDGE 1900, WCDMA/HSUPA/HSDPA Band II. V bands, CDMA2000 Cellular and PCS bands.

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## 1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: PKRNVWE296** filing to comply with Section Part 22 subpart H, Part 24 subpart E of the FCC CFR 47 Rules.

## 1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures document on TIA/EIA-603-C-2004 and FCC CFR 47 2.1046, 2.1053.

## 1.4 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC Registration Number are: 990257 and 236194, Canada Registration Number: 4620A-4

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 29, Pau-Tou-Tsuo Valley Chia-Pau Tsuen, Linkou Hsiang, Taipei county, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 &10 meters) and FCC Registration Number: 94644.

## 1.5 Special Accessories

Not available for this EUT intended for grant.

## 1.6 Equipment Modifications

Not available for this EUT intended for grant.

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## 2. SYSTEM TEST CONFIGURATION

### 2.1 EUT Configuration

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

### 2.2 EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency which was for the purpose of the measurements.

### 2.3 Test Procedure

#### 2.3.1 Conducted Measurement at Antenna Port:

According to measurement procured TIA/EIA 603C, the EUT is placed on a turn table which is 0.8 m above ground plane. A low loss of RF cable was used to connect the antenna port of EUT to measurement equipment.

#### 2.3.2 Radiated Emissions (ERP/EIRP):

According to measurement procured TIA/EIA 603C, issue 2 of RSS-Gen and TIA/EIA IS-98 for Mobile stations. The EUT is placed on a turn table which is 0.8 m above ground plane. The turn table 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 max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements.

A standard antenna was used to replace the EUT and connect to the SG. Adjust the SG output level to reach the max emission level which were measured above.

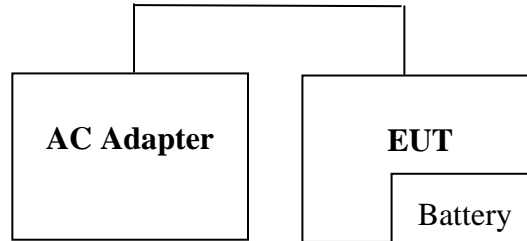
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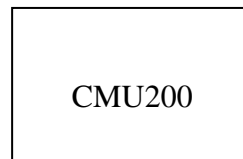
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## 2.4 Configuration of Tested System

**Fig. 1-1 Configuration for Radiated Emission**



**Fig. 1-2 Configuration (Remote Side, on the corner)**



**Table 2-1 Equipment Used in Tested System**

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1.	Universal Radio Communication Tester	R&S	CMU200	102189	Shielded	Un-shielded

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### 3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
24.232(C) 22.913(a)(2)	RF Power output / Maximum power reduction measurement	Compliant
§2.1046(a) §22.913(a)(2) §24.232(c)	ERP/ EIRP measurement	Compliant
§2.1053 §22.917(a) §24.238(a)	Field Strength of Spurious Radiation (TX)	Compliant

### 4. DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

Set EUT power control “all up bits” for all test mode through base station.

The Channel Low, Mid and High for each type of bands with rated data rate were chosen for above testing.

The field strength of ERP/EIRP power and spurious radiation emission were measured as EUT stand up position for both GPRS 850 and 1900 bands were reported which has worst data.

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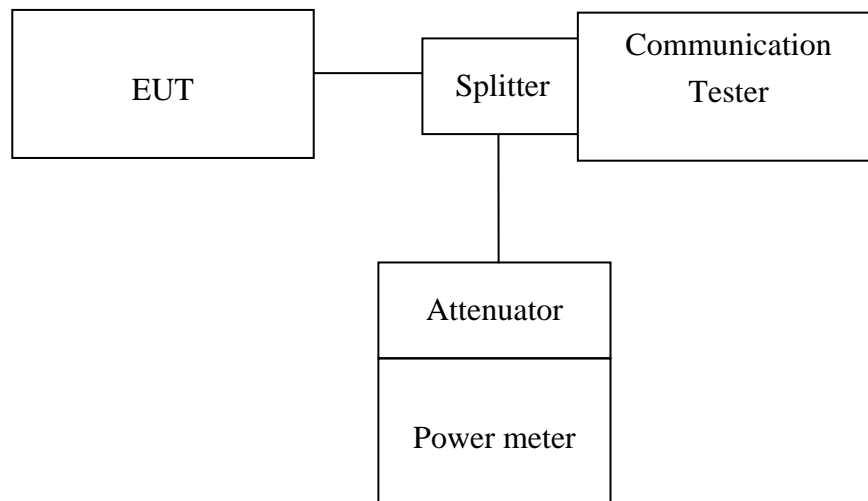
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## 5. RF POWER OUTPUT/ MAXIMUM POWER REDUCTION MEASUREMENT

### 5.1 Standard Applicable:

FCC 24.232(C) Peak Power Measurement, 22.913(a)(2)

### 5.2 Test Set-up:



*Note: Measurement setup for testing on Antenna connector*

### 5.3 Measurement 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. It was used for EUT and Base station setting.

### 5.4 Measurement Equipment Used:

Refer to section 2.4 in this report

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### 5.5 Measurement Result:

EUT Mode	Frequency (MHz)	CH	Path Loss (dB)	Average Power (1TS) (dBm)
GPRS 850 (Class 8)	824.20	128.00	0.50	32.50
	836.60	190.00	0.50	32.40
	848.80	251.00	0.50	32.30

EUT Mode	Frequency (MHz)	CH	Path Loss (dB)	Average Power (1TS) (dBm)
GPRS 1900 (Class 8)	1850.20	512.00	0.50	29.00
	1880.00	661.00	0.50	29.10
	1909.80	810.00	0.50	28.90

EUT Mode	Frequency (MHz)	CH	Path Loss (dB)	Average Power (1TS) (dBm)
EGPRS 850 (Class 8)	824.20	128.00	0.50	27.20
	836.60	190.00	0.50	27.10
	848.80	251.00	0.50	27.00

EUT Mode	Frequency (MHz)	CH	Path Loss (dB)	Average Power (1TS) (dBm)
EGPRS 1900 (Class 8)	1850.20	512.00	0.50	25.40
	1880.00	661.00	0.50	25.60
	1909.80	810.00	0.50	25.50

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EUT Mode	Frequency (MHz)	CH	Path Loss (dB)	Average Power
WCDMA Band II	1850.20	9262.00	0.50	23.70
	1880.00	9400.00	0.50	23.78
	1907.60	9538.00	0.50	23.59

EUT Mode	Frequency (MHz)	CH	Path Loss (dB)	Average Power
WCDMA Band V	826.40	4132.00	0.50	24.02
	836.60	4183.00	0.50	23.95
	846.60	4233.00	0.50	24.11

EUT Mode	Frequency (MHz)	CH	Path Loss (dB)	Average Power
HSUPA Band II	1850.20	9262.00	0.50	23.50
	1880.00	9400.00	0.50	23.48
	1907.60	9538.00	0.50	23.20

EUT Mode	Frequency (MHz)	CH	Path Loss (dB)	Average Power
HSUPA Band V	826.40	4132.00	0.50	23.88
	836.60	4183.00	0.50	23.76
	846.60	4233.00	0.50	23.45

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EUT Mode	Frequency (MHz)	CH	Path Loss (dB)	Average Power
CDMA BC0	824.70	1013.00	0.50	24.42
	836.52	383.00	0.50	24.43
	848.31	777.00	0.50	24.26

EUT Mode	Frequency (MHz)	CH	Path Loss (dB)	Average Power
CDMA BC1	1851.25	25.00	0.50	24.44
	1880.00	600.00	0.50	24.38
	1908.75	1175.00	0.50	24.34

EUT Mode	Frequency (MHz)	CH	Path Loss (dB)	Average Power
CDMA(EVDO) BC0	824.70	1013.00	0.50	24.32
	836.52	383.00	0.50	24.25
	848.31	777.00	0.50	24.26

EUT Mode	Frequency (MHz)	CH	Path Loss (dB)	Average Power
CDMA(EVDO) BC1	1851.25	25.00	0.50	24.40
	1880.00	600.00	0.50	24.31
	1908.75	1175.00	0.50	24.42

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## 6. ERP/EIRP MEASUREMENT

### 6.1 Standard Applicable

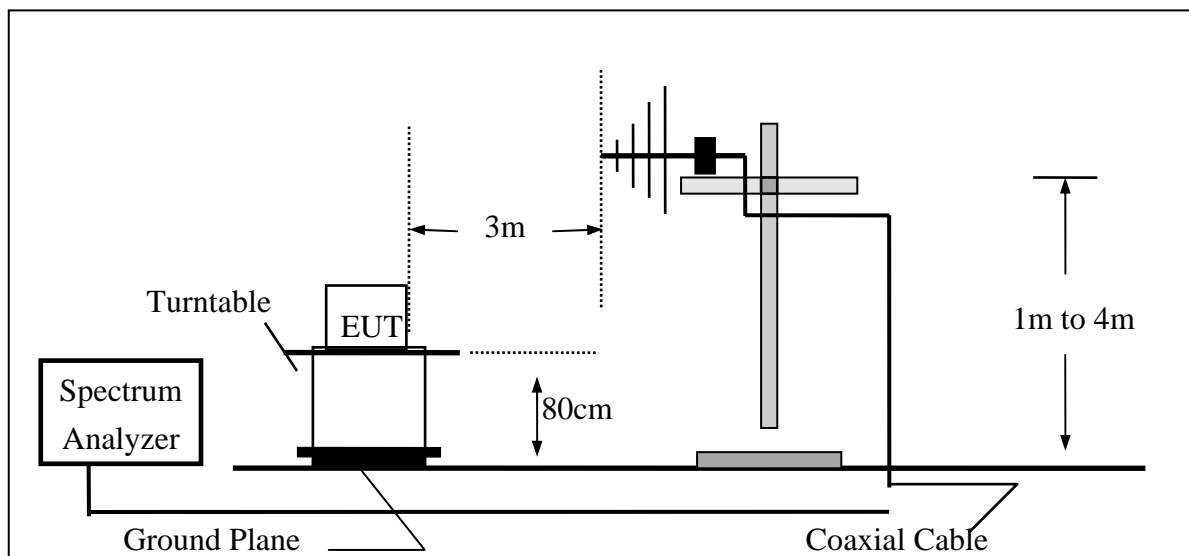
According to FCC §2.1046

FCC 22.913(a)(2) Mobile station are limited to 7W ERP.

FCC 24.232(c) Mobile station are limited to 2W EIRP.

### 6.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



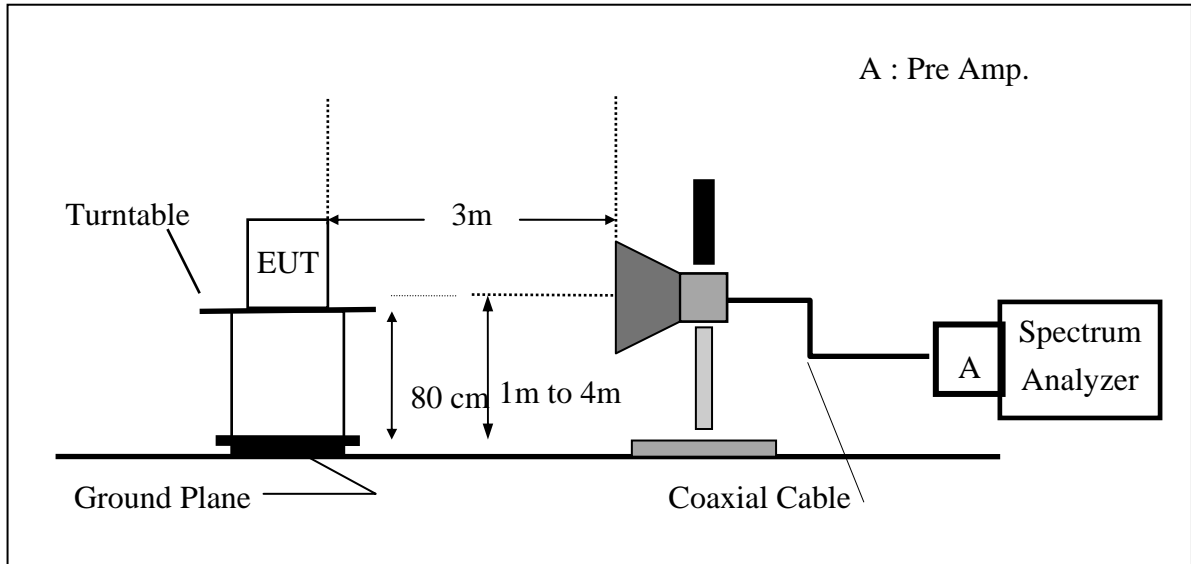
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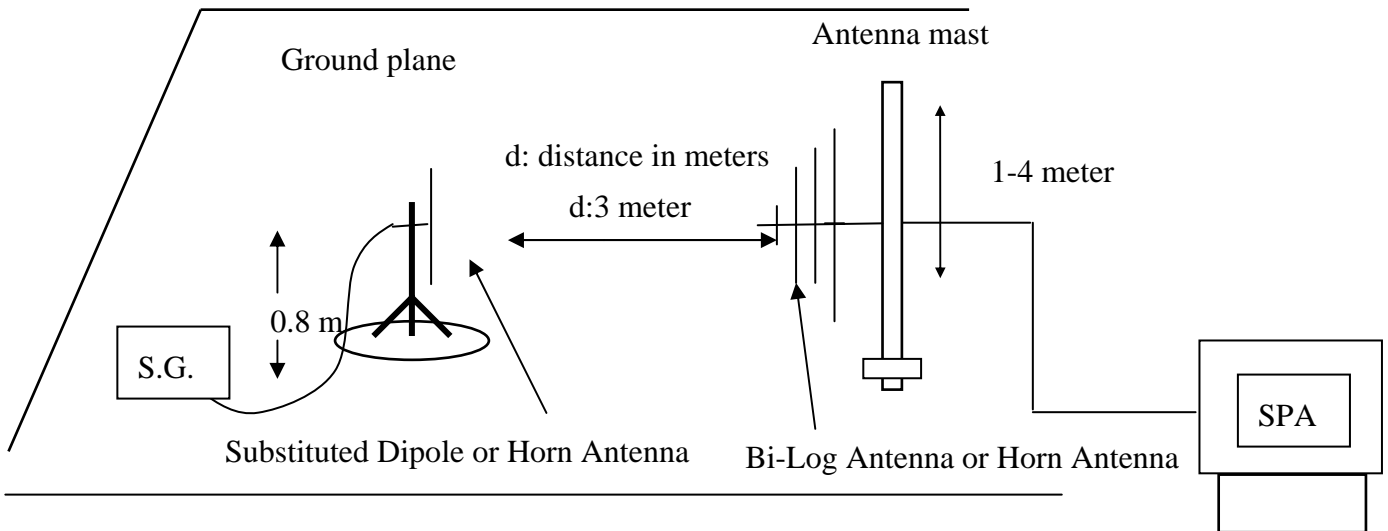
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(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



(C) Substituted Method Test Set-UP



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### 6.3 Measurement Procedure

The EUT was placed on an 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, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated.

ERP in frequency band 824.2 –848.80.8MHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follows:

EIRP in frequency band 1850.2 –1909.8MHz were measured using a substitution method. The EUT was replaced by a horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:

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

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

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## 6.4 Measurement Equipment Used:

ERP, EIRP MEASUREMENT EQUIPMENT List 966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	R&S	FSP 40	100034	02/12/2010	02/11/2011
Bilog Antenna	SCHWAZBECK	VULB9160	9160-3136	11/19/2009	11/18/2010
Dipole Antenna	SCHWAZBECK	VHAP	908/909	07/10/2010	07/09/2012
Dipole Antenna	SCHWAZBECK	UHAP	891/892	07/10/2010	07/09/2012
Hor.n antenna	SCHWAZBECK	BBHA 9120D	603	04/29/2009	04/28/2011
Horn antenna	SCHWAZBECK	BBHA 9120D	9120D-673	05/09/2010	05/08/2012
Signal Generator	R&S	SMR40	100210	02/10/2010	02/09/2012
Signal Generator	Agilent	E4438C	MY45093613	06/11/2010	06/10/2011
Pre-Amplifier	Agilent	8447D	1937A02834	11/28/2009	11/27/2010
Pre-Amplifier	Agilent	8449B	3008A01973	01/05/2010	01/04/2011
Attenuator	Mini-Circuit	BW-S20W5	001	07/05/2010	07/04/2011
Attenuator	Mini-Circuit	BW-S10W5	001	07/05/2010	07/04/2011
Attenuator	Mini-Circuit	BW-S6W5	001	07/05/2010	07/04/2011
Radio Communication Analyzer	R&S	CMU200	102189	05/13/2010	05/12/2012
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-10M	10m	01/05/2010	01/04/2011
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	01/05/2010	01/04/2011
Filter 800-1000	Micro-Tronics	BRM13462	1	01/05/2010	01/04/2011
Filter 1800-2000	Micro-Tronics	BRM13463	1	01/05/2010	01/04/2011
3m Site	SGS	966 chamber	N/A	11/08/2009	11/09/2010

## 6.5 Measurement Result

Refer to following pages for detail.

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**Measurement Result: (Portrait)**

EUT Mode	Frequency (MHz)	CH	EUT Pol.	Antenna Pol.	SPA Reading (dBuV)	S.G. Output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	ERP (dBm)	Limit (dBm)
GPRS 850	824.20	128	E2	V	127.16	40.77	-7.87	3.62	29.27	38.45
				H	128.40	42.13	-7.87	3.62	30.63	38.45
	836.60	190	E2	V	126.57	40.32	-7.88	3.65	28.79	38.45
				H	128.40	42.17	-7.88	3.65	<b>30.64</b>	38.45
	848.80	251	E2	V	125.91	39.79	-7.88	3.68	28.23	38.45
				H	128.08	41.89	-7.88	3.68	30.33	38.45

**Remark :**

- (1) The RBW,VBW of SPA for frequency  
RBW=300 KHz, VBW=1MHz

EUT Mode	Frequency (MHz)	CH	EUT Pol.	Antenna Pol.	SPA Reading (dBuV)	S.G. Output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)
GPRS 1900	1850.20	512	E2	V	123.55	19.16	9.90	5.56	23.50	33.00
				H	127.13	22.95	9.90	5.84	<b>27.01</b>	33.00
	1880.00	661	E2	V	123.33	18.97	9.99	5.61	23.35	33.00
				H	126.22	22.08	9.99	5.61	26.45	33.00
	1909.80	810	E2	V	122.85	18.52	10.08	5.66	22.94	33.00
				H	126.10	21.99	10.08	5.66	26.41	33.00

**Remark :**

- (1) The RBW,VBW of SPA for frequency  
RBW=300 KHz, VBW=1MHz

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EUT Mode	Frequency (MHz)	CH	EUT Pol.	Antenna Pol.	SPA Reading (dBuV)	S.G. Output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	ERP (dBm)	Limit (dBm)
EDGE 850	824.20	128	E2	V	124.54	38.15	-7.87	3.62	26.65	38.45
				H	126.81	40.54	-7.87	3.62	<b>29.04</b>	38.45
	836.60	190	E2	V	123.45	37.20	-7.88	3.65	25.67	38.45
				H	126.79	40.56	-7.88	3.65	29.03	38.45
	848.80	251	E2	V	123.84	37.72	-7.88	3.68	26.16	38.45
				H	126.45	40.26	-7.88	3.68	28.70	38.45

**Remark :**

- (1) The RBW,VBW of SPA for frequency  
RBW=300 KHz, VBW=1MHz

EUT Mode	Frequency (MHz)	CH	EUT Pol.	Antenna Pol.	SPA Reading (dBuV)	S.G. Output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)
EDGE 1900	1850.20	512	E2	V	126.11	21.72	9.90	5.56	26.06	33.00
				H	129.18	25.00	9.90	5.84	<b>29.06</b>	33.00
	1880.00	661	E2	V	125.26	20.90	9.99	5.61	25.28	33.00
				H	128.81	24.67	9.99	5.61	29.04	33.00
	1909.80	810	E2	V	123.98	19.65	10.08	5.66	24.07	33.00
				H	128.21	24.10	10.08	5.66	28.52	33.00

**Remark :**

- (1) The RBW,VBW of SPA for frequency  
RBW=300 KHz, VBW=1MHz

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EUT Mode	Frequency (MHz)	CH	EUT Pol.	Antenna Pol.	SPA Reading (dBuV)	S.G. Output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	ERP (dBm)	Limit (dBm)
WCDMA Band II	1852.40	9262	E2	V	123.69	19.31	9.90	5.56	23.64	33.00
				H	126.95	22.77	9.90	5.84	<b>26.83</b>	33.00
	1880.00	9400	E2	V	121.73	17.37	9.99	5.61	21.75	33.00
				H	125.70	21.56	9.99	5.61	25.93	33.00
	1907.60	9538	E2	V	121.42	17.09	10.07	5.66	21.50	33.00
				H	125.68	21.57	10.07	5.66	25.98	33.00

**Remark :**

- (1) The RBW,VBW of SPA for frequency  
RBW= 5MHz , VBW= 8MHz

EUT Mode	Frequency (MHz)	CH	EUT Pol.	Antenna Pol.	SPA Reading (dBuV)	S.G. Output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	ERP (dBm)	Limit (dBm)
WCDMA Band V	826.40	4132	E2	V	120.45	34.09	-7.88	3.63	22.58	38.45
				H	123.86	37.60	-7.88	3.63	<b>26.10</b>	38.45
	836.60	4183	E2	V	119.47	33.22	-7.88	3.65	21.69	38.45
				H	122.32	36.09	-7.88	3.65	24.56	38.45
	846.60	4233	E2	V	120.22	34.07	-7.88	3.67	22.52	38.45
				H	122.27	36.07	-7.88	3.67	24.52	38.45

**Remark :**

- (1) The RBW,VBW of SPA for frequency  
RBW= 5MHz , VBW= 8MHz

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EUT Mode	Frequency (MHz)	CH	EUT Pol.	Antenna Pol.	SPA Reading (dBuV)	S.G. Output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)
CDMA BC0	824.70	1013.00	E2	V	123.65	37.27	-7.87	3.62	25.77	38.45
				H	124.18	37.91	-7.87	3.62	26.41	38.45
	836.52	383.00	E2	V	122.06	35.80	-7.88	3.65	24.28	38.45
				H	125.14	38.91	-7.88	3.65	27.38	38.45
	848.31	777.00	E2	V	121.95	35.82	-7.88	3.68	24.27	38.45
				H	125.40	39.20	-7.88	3.68	<b>27.65</b>	38.45

**Remark :**

- (1) The RBW,VBW of SPA for frequency  
RBW= 5MHz , VBW= 8MHz

EUT Mode	Frequency (MHz)	CH	EUT Pol.	Antenna Pol.	SPA Reading (dBuV)	S.G. Output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)
CDMA BC1	1851.25	25.00	E2	V	119.61	15.22	9.90	5.56	19.56	33.00
				H	120.25	16.07	9.90	5.84	20.13	33.00
	1880.00	600.00	E2	V	119.32	14.96	9.99	5.61	19.34	33.00
				H	121.36	17.22	9.99	5.61	21.59	33.00
	1908.75	1175.00	E2	V	118.93	14.60	10.07	5.66	19.02	33.00
				H	122.92	18.81	10.07	5.66	<b>23.22</b>	33.00

**Remark :**

- (1) The RBW,VBW of SPA for frequency  
RBW= 5MHz , VBW= 8MHz

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## 7. FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT(TX)

### 7.1 Standard Applicable

According to FCC §2.1053,

FCC §22.917(a),§24.238(a) the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specified in the instruction manual and/ or alignment procedure, shall not be less than  $43 + 10 \log$  (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm)

### 7.2 EUT Setup (Block Diagram of Configuration)

Refer to section 6.2 for details

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### 7.3 Measurement 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.

ERP in frequency band 824.2 –848.80MHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follows:

EIRP in frequency band 1850.2 –1909.8MHz were measured using a substitution method. The EUT was replaced by a horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:

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

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

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

### 7.4 Measurement Equipment Used:

Refer to section 6.4 for details

### 7.5 Measurement Result

Refer to attach tabular data sheets.

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**Radiated Spurious Emission Measurement Result: GPRS 850 Mode**

Operation Mode	: TX CH Low Mode	Test Date:	Nov. 07, 2010
Fundamental Frequency	: 824.20 MHz	Test By:	Brian
Temperature	: 25°C	Pol:	Ver
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
90.14	46.41	V	-56.77	-7.75	1.27	-65.79	-13.00	-52.79
105.66	43.05	V	-58.35	-7.76	1.39	-67.50	-13.00	-54.50
298.69	42.86	V	-55.43	-7.92	2.17	-65.52	-13.00	-52.52
332.64	40.63	V	-57.22	-7.74	2.29	-67.25	-13.00	-54.25
453.89	38.46	V	-55.49	-7.70	2.67	-65.86	-13.00	-52.86
615.88	37.50	V	-51.86	-7.80	3.07	-62.73	-13.00	-49.73
824.00	80.92	V	-5.47	-7.87	3.62	-16.97	-13.00	-3.97
1648.40	46.34	V	-58.24	9.29	5.23	-54.18	-13.00	-41.18
2472.60	57.54	V	-43.47	10.08	6.53	-39.92	-13.00	-26.92
3296.80	---	V		12.17	7.71		-13.00	
4121.00	---	V		12.61	8.86		-13.00	
4945.20	---	V		12.65	9.74		-13.00	
5769.40	---	V		13.55	10.54		-13.00	
6593.60	---	V		12.05	11.30		-13.00	
7417.80	---	V		11.49	12.10		-13.00	
8242.00	---	V		11.48	12.71		-13.00	

Measurement uncertainty	30MHz - 80MHz: 5.04dB
	80MHz - 1000MHz: 3.76dB
	1GHz - 40GHz: 4.45dB

Remark :

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark"---" means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4  $ERP/EIRP (dBm) = SG \text{ Setting}(dBm) + Antenna \text{ Gain} (dBd/dBi) - Cable \text{ loss} (dB)$

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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Operation Mode	: TX CH Low Mode	Test Date:	Nov. 07, 2010
Fundamental Frequency	: 824.20 MHz	Test By:	Brian
Temperature	: 25°C	Pol:	Hor
Humidity	: 65%		

Freq. (MHz)	SPA Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
240.49	39.93	H	-59.75	-7.88	1.94	-69.57	-13.00	-56.57
250.19	40.05	H	-59.16	-7.89	1.99	-69.04	-13.00	-56.04
300.63	41.32	H	-56.33	-7.92	2.17	-66.42	-13.00	-53.42
332.64	43.00	H	-54.36	-7.74	2.29	-64.39	-13.00	-51.39
453.89	38.27	H	-55.59	-7.70	2.67	-65.96	-13.00	-52.96
615.88	35.81	H	-54.58	-7.80	3.07	-65.45	-13.00	-52.45
824.00	82.24	H	-4.03	-7.87	3.62	-15.53	-13.00	-2.53
1648.40	55.79	H	-48.61	9.29	5.23	-44.55	-13.00	-31.55
2472.60	57.24	H	-43.67	10.08	6.53	-40.12	-13.00	-27.12
3296.80	---	H		12.17	7.71		-13.00	
4121.00	---	H		12.61	8.86		-13.00	
4945.20	---	H		12.65	9.74		-13.00	
5769.40	---	H		13.55	10.54		-13.00	
6593.60	---	H		12.05	11.30		-13.00	
7417.80	---	H		11.49	12.10		-13.00	
8242.00	---	H		11.48	12.71		-13.00	

Measurement uncertainty	30MHz - 80MHz: 5.04dB
	80MHz - 1000MHz: 3.76dB
	1GHz - 40GHz: 4.45dB

Remark :

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark"---" means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4  $ERP/EIRP (dBm) = SG \text{ Setting}(dBm) + Antenna \text{ Gain} (dBd/dBi) - Cable \text{ loss} (dB)$

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**Radiated Spurious Emission Measurement Result: GPRS 850 Mode**

Operation Mode	: TX CH Mid Mode	Test Date:	Nov. 07, 2010
Fundamental Frequency	: 836.60 MHz	Test By:	Brian
Temperature	: 25°C	Pol:	Ver
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
90.14	46.27	V	-56.91	-7.75	1.27	-65.93	-13.00	-52.93
104.69	44.80	V	-56.69	-7.76	1.38	-65.83	-13.00	-52.83
300.63	42.92	V	-55.32	-7.92	2.17	-65.41	-13.00	-52.41
332.64	40.34	V	-57.51	-7.74	2.29	-67.54	-13.00	-54.54
518.88	36.76	V	-56.76	-7.74	2.86	-67.35	-13.00	-54.35
615.88	37.95	V	-51.41	-7.80	3.07	-62.28	-13.00	-49.28
1673.20	48.56	V	-56.00	9.36	5.27	-51.90	-13.00	-38.90
2509.80	59.20	V	-41.58	10.09	6.58	-38.08	-13.00	-25.08
3346.40	---	V		12.28	7.79		-13.00	
4183.00	---	V		12.62	8.93		-13.00	
5019.60	---	V		12.67	9.81		-13.00	
5856.20	---	V		13.68	10.62		-13.00	
6692.80	---	V		11.95	11.39		-13.00	
7529.40	---	V		11.45	12.20		-13.00	
8366.00	---	V		11.59	12.81		-13.00	

Measurement uncertainty	30MHz - 80MHz: 5.04dB
	80MHz - 1000MHz: 3.76dB
	1GHz - 40GHz: 4.45dB

Remark :

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark"---" means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dBd/dBi) – Cable loss (dB)

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**Radiated Spurious Emission Measurement Result: GPRS 850 Mode**

Operation Mode	: TX CH Mid Mode	Test Date:	Nov. 07, 2010
Fundamental Frequency	: 836.60 MHz	Test By:	Brian
Temperature	: 25°C	Pol:	Hor
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
250.19	40.97	H	-58.24	-7.89	1.99	-68.12	-13.00	-55.12
300.63	40.46	H	-57.19	-7.92	2.17	-67.28	-13.00	-54.28
332.64	42.43	H	-54.93	-7.74	2.29	-64.96	-13.00	-51.96
453.89	37.77	H	-56.09	-7.70	2.67	-66.46	-13.00	-53.46
613.94	35.97	H	-54.46	-7.80	3.07	-65.32	-13.00	-52.32
703.18	34.03	H	-54.19	-7.86	3.30	-65.36	-13.00	-52.36
1673.20	55.79	H	-48.59	9.36	5.27	-44.49	-13.00	-31.49
2509.80	57.24	H	-43.46	10.09	6.58	-39.96	-13.00	-26.96
3346.40	---	H		12.28	7.79		-13.00	
4183.00	---	H		12.62	8.93		-13.00	
5019.60	---	H		12.67	9.81		-13.00	
5856.20	---	H		13.68	10.62		-13.00	
6692.80	---	H		11.95	11.39		-13.00	
7529.40	---	H		11.45	12.20		-13.00	
8366.00	---	H		11.59	12.81		-13.00	

Measurement uncertainty	30MHz - 80MHz: 5.04dB
	80MHz - 1000MHz: 3.76dB
	1GHz - 40GHz: 4.45dB

Remark :

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark"---" means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4  $ERP/EIRP (dBm) = SG \text{ Setting}(dBm) + Antenna \text{ Gain} (dBd/dBi) - Cable \text{ loss} (dB)$

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**Radiated Spurious Emission Measurement Result: GPRS 850 Mode**

Operation Mode	: TX CH High Mode	Test Date:	Nov. 07, 2010
Fundamental Frequency	: 848.80 MHz	Test By:	Brian
Temperature	: 25°C	Pol:	Ver
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
90.14	47.08	V	-56.10	-7.75	1.27	-65.12	-13.00	-52.12
104.69	44.60	V	-56.89	-7.76	1.38	-66.03	-13.00	-53.03
300.63	42.39	V	-55.85	-7.92	2.17	-65.94	-13.00	-52.94
332.64	39.52	V	-58.33	-7.74	2.29	-68.36	-13.00	-55.36
453.89	38.29	V	-55.66	-7.70	2.67	-66.03	-13.00	-53.03
613.94	37.17	V	-52.22	-7.80	3.07	-63.08	-13.00	-50.08
850.00	79.11	V	-7.00	-7.88	3.68	-18.56	-13.00	-5.56
1697.60	48.56	V	-55.98	9.44	5.31	-51.85	-13.00	-38.85
2546.40	59.20	V	-41.44	10.20	6.63	-37.88	-13.00	-24.88
3395.20	---	V		12.38	7.87		-13.00	
4244.00	---	V		12.63	9.00		-13.00	
5941.60	---	V		13.81	10.70		-13.00	
6790.40	---	V		11.86	11.48		-13.00	
7639.20	---	V		11.40	12.27		-13.00	
8488.00	---	V		11.70	12.91		-13.00	

Measurement uncertainty	30MHz - 80MHz: 5.04dB
	80MHz - 1000MHz: 3.76dB
	1GHz - 40GHz: 4.45dB

Remark :

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark"---" means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4  $ERP/EIRP (dBm) = SG \text{ Setting}(dBm) + Antenna \text{ Gain} (dBd/dBi) - Cable \text{ loss} (dB)$

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**Radiated Spurious Emission Measurement Result: GPRS 850 Mode**

Operation Mode	: TX CH High Mode	Test Date:	Nov. 07, 2010
Fundamental Frequency	: 848.80 MHz	Test By:	Brian
Temperature	: 25°C	Pol:	Hor
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
140.58	52.26	H	-46.50	-7.79	1.55	-55.83	-13.00	-42.83
250.19	40.93	H	-58.28	-7.89	1.99	-68.16	-13.00	-55.16
300.63	41.27	H	-56.38	-7.92	2.17	-66.47	-13.00	-53.47
332.64	42.80	H	-54.56	-7.74	2.29	-64.59	-13.00	-51.59
453.89	38.33	H	-55.53	-7.70	2.67	-65.90	-13.00	-52.90
615.88	37.32	H	-53.07	-7.80	3.07	-63.94	-13.00	-50.94
850.00	81.35	H	-4.84	-7.88	3.68	-16.40	-13.00	-3.40
1697.60	56.83	H	-47.52	9.44	5.31	-43.39	-13.00	-30.39
2546.40	60.76	H	-39.84	10.20	6.63	-36.28	-13.00	-23.28
3395.20	---	H		12.38	7.87		-13.00	
4244.00	---	H		12.63	9.00		-13.00	
5092.80	---	H		12.74	9.88		-13.00	
5941.60	---	H		13.81	10.70		-13.00	
6790.40	---	H		11.86	11.48		-13.00	
7639.20	---	H		11.40	12.27		-13.00	
8488.00	---	H		11.70	12.91		-13.00	

Measurement uncertainty	30MHz - 80MHz: 5.04dB
	80MHz - 1000MHz: 3.76dB
	1GHz - 40GHz: 4.45dB

Remark :

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark"---" means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4  $ERP/EIRP (dBm) = SG \text{ Setting}(dBm) + Antenna \text{ Gain} (dBd/dBi) - Cable \text{ loss} (dB)$

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**Radiated Spurious Emission Measurement Result: GPRS 1900 Mode**

Operation Mode	: TX CH Low Mode	Test Date:	Nov. 07, 2010
Fundamental Frequency	: 1850.20MHz	Test By:	Brian
Temperature	: 25°C	Pol:	Ver
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
90.14	51.91	V	-51.27	-7.75	1.27	-60.29	-13.00	-47.29
96.93	48.88	V	-53.43	-7.76	1.33	-62.52	-13.00	-49.52
104.69	49.00	V	-52.49	-7.76	1.38	-61.63	-13.00	-48.63
298.69	43.73	V	-54.56	-7.92	2.17	-64.65	-13.00	-51.65
615.88	39.11	V	-50.25	-7.80	3.07	-61.12	-13.00	-48.12
681.84	36.54	V	-52.71	-7.84	3.24	-63.80	-13.00	-50.80
1850.00	78.11	V	-26.28	9.90	5.56	-21.94	-13.00	-8.94
3700.40	41.88	V	-56.05	12.61	8.31	-51.75	-13.00	-38.75
5550.60	37.77	V	-53.07	13.23	10.33	-50.17	-13.00	-37.17
7400.80	---	V		11.50	12.08		-13.00	
9251.00	---	V		11.92	13.50		-13.00	
11101.20	---	V		11.66	15.11		-13.00	
12951.40	---	V		13.63	16.60		-13.00	
14801.60	---	V		12.76	17.95		-13.00	
16651.80	---	V		15.92	19.14		-13.00	
18502.00	---	V		18.75	10.40		-13.00	

Measurement uncertainty	30MHz - 80MHz: 5.04dB
	80MHz - 1000MHz: 3.76dB
	1GHz - 40GHz: 4.45dB

Remark :

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark"---" means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4  $ERP/EIRP (dBm) = SG \text{ Setting}(dBm) + Antenna \text{ Gain} (dBd/dBi) - Cable \text{ loss} (dB)$

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**Radiated Spurious Emission Measurement Result: GPRS 1900 Mode**

Operation Mode	: TX CH Low Mode	Test Date:	Nov. 07, 2010
Fundamental Frequency	: 1850.20MHz	Test By:	Brian
Temperature	: 25°C	Pol:	Hor
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
99.84	44.07	H	-58.94	-7.76	1.36	-68.06	-13.00	-55.06
250.19	42.51	H	-56.70	-7.89	1.99	-66.58	-13.00	-53.58
300.63	41.87	H	-55.78	-7.92	2.17	-65.87	-13.00	-52.87
332.64	43.80	H	-53.56	-7.74	2.29	-63.59	-13.00	-50.59
453.89	38.61	H	-55.25	-7.70	2.67	-65.62	-13.00	-52.62
615.88	37.71	H	-52.68	-7.80	3.07	-63.55	-13.00	-50.55
1850.00	81.30	H	-22.88	9.90	5.56	-18.54	-13.00	-5.54
3700.40	39.57	H	-58.47	12.61	8.31	-54.17	-13.00	-41.17
5550.60	35.72	H	-55.33	13.23	10.33	-52.43	-13.00	-39.43
7400.80	---	H		11.50	12.08		-13.00	
9251.00	---	H		11.92	13.50		-13.00	
11101.20	---	H		11.66	15.11		-13.00	
12951.40	---	H		13.63	16.60		-13.00	
14801.60	---	H		12.76	17.95		-13.00	
16651.80	---	H		15.92	19.14		-13.00	
18502.00	---	H		18.75	10.40		-13.00	

Measurement uncertainty	30MHz - 80MHz: 5.04dB
	80MHz - 1000MHz: 3.76dB
	1GHz - 40GHz: 4.45dB

Remark :

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark"---" means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4  $ERP/EIRP (dBm) = SG \text{ Setting}(dBm) + Antenna \text{ Gain} (dBd/dBi) - Cable \text{ loss} (dB)$

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**Radiated Spurious Emission Measurement Result: GPRS 1900 Mode**

Operation Mode	: TX CH Mid Mode	Test Date:	Nov. 07, 2010
Fundamental Frequency	: 1880MHz	Test By:	Brian
Temperature	: 25°C	Pol:	Ver
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
90.14	51.34	V	-51.84	-7.75	1.27	-60.86	-13.00	-47.86
96.93	48.40	V	-53.91	-7.76	1.33	-63.00	-13.00	-50.00
104.69	48.72	V	-52.77	-7.76	1.38	-61.91	-13.00	-48.91
300.63	44.54	V	-53.70	-7.92	2.17	-63.79	-13.00	-50.79
613.94	37.56	V	-51.83	-7.80	3.07	-62.69	-13.00	-49.69
678.93	35.22	V	-54.00	-7.84	3.24	-65.08	-13.00	-52.08
3760.00	37.43	V	-60.23	12.60	8.39	-56.01	-13.00	-43.01
5640.00	41.49	V	-49.09	13.36	10.41	-46.14	-13.00	-33.14
7520.00	---	V		11.45	12.19		-13.00	
9400.00	---	V		11.93	13.61		-13.00	
11280.00	---	V		11.92	15.27		-13.00	
13160.00	---	V		13.33	16.71		-13.00	
15040.00	---	V		13.76	18.15		-13.00	
16920.00	---	V		15.27	19.32		-13.00	
18800.00	---	V		18.68	16.58		-13.00	

Measurement uncertainty	30MHz - 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz - 40GHz: 4.45dB

Remark :

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark”---“ means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4  $ERP/EIRP (dBm) = SG \text{ Setting}(dBm) + Antenna \text{ Gain} (dBd/dBi) - Cable \text{ loss} (dB)$

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**Radiated Spurious Emission Measurement Result: GPRS 1900 Mode**

Operation Mode	: TX CH Mid Mode	Test Date:	Nov. 07, 2010
Fundamental Frequency	: 1880MHz	Test By:	Brian
Temperature	: 25°C	Pol:	Hor
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
99.84	44.26	H	-58.75	-7.76	1.36	-67.87	-13.00	-54.87
250.19	42.03	H	-57.18	-7.89	1.99	-67.06	-13.00	-54.06
298.69	41.46	H	-56.24	-7.92	2.17	-66.33	-13.00	-53.33
332.64	44.08	H	-53.28	-7.74	2.29	-63.31	-13.00	-50.31
615.88	37.74	H	-52.65	-7.80	3.07	-63.52	-13.00	-50.52
678.93	35.24	H	-53.27	-7.84	3.24	-64.34	-13.00	-51.34
3760.00	38.45	H	-59.32	12.60	8.39	-55.11	-13.00	-42.11
5640.00	34.89	H	-55.86	13.36	10.41	-52.91	-13.00	-39.91
7520.00	---	H		11.45	12.19		-13.00	
9400.00	---	H		11.93	13.61		-13.00	
11280.00	---	H		11.92	15.27		-13.00	
13160.00	---	H		13.33	16.71		-13.00	
15040.00	---	H		13.76	18.15		-13.00	
16920.00	---	H		15.27	19.32		-13.00	
18800.00	---	H		18.68	16.58		-13.00	

Measurement uncertainty	30MHz - 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz - 40GHz: 4.45dB

Remark :

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark”---“ means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4  $ERP/EIRP (dBm) = SG \text{ Setting}(dBm) + Antenna \text{ Gain} (dBd/dBi) - Cable \text{ loss} (dB)$

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**Radiated Spurious Emission Measurement Result: GPRS 1900 Mode**

Operation Mode	: TX CH High Mode	Test Date:	Nov. 07, 2010
Fundamental Frequency	: 1909.8 MHz	Test By:	Brian
Temperature	: 25°C	Pol:	Ver
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
90.14	51.28	V	-51.90	-7.75	1.27	-60.92	-13.00	-47.92
96.93	48.14	V	-54.17	-7.76	1.33	-63.26	-13.00	-50.26
104.69	48.78	V	-52.71	-7.76	1.38	-61.85	-13.00	-48.85
300.63	42.98	V	-55.26	-7.92	2.17	-65.35	-13.00	-52.35
615.88	38.43	V	-50.93	-7.80	3.07	-61.80	-13.00	-48.80
678.93	35.84	V	-53.38	-7.84	3.24	-64.46	-13.00	-51.46
1910.00	76.58	V	-27.75	10.08	5.66	-23.33	-13.00	-10.33
3819.60	36.67	V	-60.72	12.60	8.47	-56.59	-13.00	-43.59
5729.40	39.47	V	-50.85	13.49	10.50	-47.85	-13.00	-34.85
7639.20	---	V		11.40	12.27		-13.00	
9549.00	---	V		11.95	13.74		-13.00	
11458.80	---	V		12.17	15.43		-13.00	
13368.60	---	V		12.97	16.82		-13.00	
15278.40	---	V		15.00	18.29		-13.00	
17188.20	---	V		14.47	19.52		-13.00	
19098.00	---	V		18.66	20.78		-13.00	

Measurement uncertainty	30MHz - 80MHz: 5.04dB
	80MHz - 1000MHz: 3.76dB
	1GHz - 40GHz: 4.45dB

Remark :

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark"---" means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4  $ERP/EIRP (dBm) = SG \text{ Setting}(dBm) + Antenna \text{ Gain} (dBd/dBi) - Cable \text{ loss} (dB)$

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**Radiated Spurious Emission Measurement Result: GPRS 1900 Mode**

Operation Mode	: TX CH High Mode	Test Date:	Nov. 07, 2010
Fundamental Frequency	: 1909.8 MHz	Test By:	Brian
Temperature	: 25°C	Pol:	Hor
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	ERP/EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
99.84	44.60	H	-58.41	-7.76	1.36	-67.53	-13.00	-54.53
250.19	42.41	H	-56.80	-7.89	1.99	-66.68	-13.00	-53.68
298.69	42.51	H	-55.19	-7.92	2.17	-65.28	-13.00	-52.28
332.64	43.94	H	-53.42	-7.74	2.29	-63.45	-13.00	-50.45
453.89	38.18	H	-55.68	-7.70	2.67	-66.05	-13.00	-53.05
615.88	37.11	H	-53.28	-7.80	3.07	-64.15	-13.00	-51.15
1910.00	79.39	H	-24.72	10.08	5.66	-20.30	-13.00	-7.30
3819.60	36.38	H	-61.13	12.60	8.47	-56.99	-13.00	-43.99
5729.40	34.45	H	-56.00	13.49	10.50	-53.01	-13.00	-40.01
7639.20	---	H		11.40	12.27		-13.00	
9549.00	---	H		11.95	13.74		-13.00	
11458.80	---	H		12.17	15.43		-13.00	
13368.60	---	H		12.97	16.82		-13.00	
15278.40	---	H		15.00	18.29		-13.00	
17188.20	---	H		14.47	19.52		-13.00	
19098.00	---	H		18.66	20.78		-13.00	

Measurement uncertainty	30MHz - 80MHz: 5.04dB
	80MHz - 1000MHz: 3.76dB
	1GHz - 40GHz: 4.45dB

Remark :

- 1 The emission behaviors belong to narrowband spurious emission.
- 2 Remark"---" means that the emission level is too low to be measured
- 3 The result basic equation calculation is as follows:
- 4  $ERP/EIRP (dBm) = SG \text{ Setting}(dBm) + Antenna \text{ Gain} (dBd/dBi) - Cable \text{ loss} (dB)$

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## 8. Maximum Permissible Exposure (MPE)

### 8.1. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended to comply with Section Part 22, subpart H and Part 24, subpart E of the FCC CFR 47 Rules. For 47 CFR 1.1310 Radio frequency Radiation Exposure requirement.

### 8.2. Special Accessories

Not available for this EUT intended for grant.

### 8.3. Equipment Modifications

Not available for this EUT intended for grant.

### 8.4. Limitation

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-15000	/	/	1.0	30

F = frequency in MHz

\* = Plane-wave equipment power density

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### 8.5. Maximum Permissible Exposure (MPE) Evaluation

In this application we seek approval to the Gobi2000. Based on the FCC OET Bulletin 65 Supplement C and 47 CFR §2.1091, we have concluded that the MC55i module will comply with the FCC rules on RF exposure for mobile devices in cellular band and PCS band. The following analysis will demonstrate such compliance. The analysis will be done in two US bands.

#### Operation in cellular band (824 – 849 MHz) (worse case)

The ERP of Gobi2000 in cellular band is 30.64 dBm max at GPRS mode. The resulted power density at a distance of 20 cm can be deducted as follows:

EUT Mode	Frequency (MHz)	CH	EUT Pol.	Antenna Pol.	SPA Reading (dBuV)	S.G. Output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	ERP (dBm)	Limit (dBm)
GPRS 850	824.20	1013	H	V	127.16	40.77	-7.87	3.62	29.27	38.45
				H	128.40	42.13	-7.87	3.62	30.63	38.45
	836.60	384	H	V	126.57	40.32	-7.88	3.65	28.79	38.45
				H	128.40	42.17	-7.88	3.65	<b>30.64</b>	38.45
	848.80	777	H	V	125.91	39.79	-7.88	3.68	28.23	38.45
				H	128.08	41.89	-7.88	3.68	30.33	38.45

$$\text{ERP} = 30.64 \text{ dBm} = 1158.77 \text{ mW}$$

$$\begin{aligned} \text{Power Density} &= \text{ERP} * \text{Duty Cycle} / (4 \pi R^2) \\ &= 1158.77 * 0.25 / (4 * \pi * 20^2) = 0.026 \text{ mW/cm}^2 \end{aligned}$$

where Duty Cycle is 0.25 for GPRS operation (class 10) and R is 20 cm.

The MPE limit for General Population/Uncontrolled Exposure is shown in the FCC OET Bulletin 65 Supplement C and can be calculated as follows:

$$\text{MPE limit} = 824/1500 = 0.55 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, therefore Gobi2000 in cellular band is compliant with the FCC rules on RF exposure.

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