





FCC PART 25
TEST AND MEASUREMENT REPORT
(C2PC)

For

Qualcomm Incorporated

5775 Morehouse Drive, San Diego, CA 92121, USA

FCC ID: J9CGSSDVM

Report Type: Class II Permissive Change	Product Type: Satellite Transmitter Module
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* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "*" Rev. 2

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R0907241-25	Original Report	2009-10-21

1 GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

The product, FCC ID: J9CGSSDVM is a Satellite Transmitter module which is integrated with *Second Wind Inc.*'s product, *model: NOMAD2*. The operating transmit frequency is: 1610-1625 MHz; receive frequency is: 2484-2499 MHz. The NOMAD2 is an advanced wind energy resource data logger and recorded data files can be sent daily by email via Globalstar satellite network. Also NOMAD2 is powered by 12 VDC battery or two standard 9V alkaline batteries.

1.2 Mechanical Description of EUT

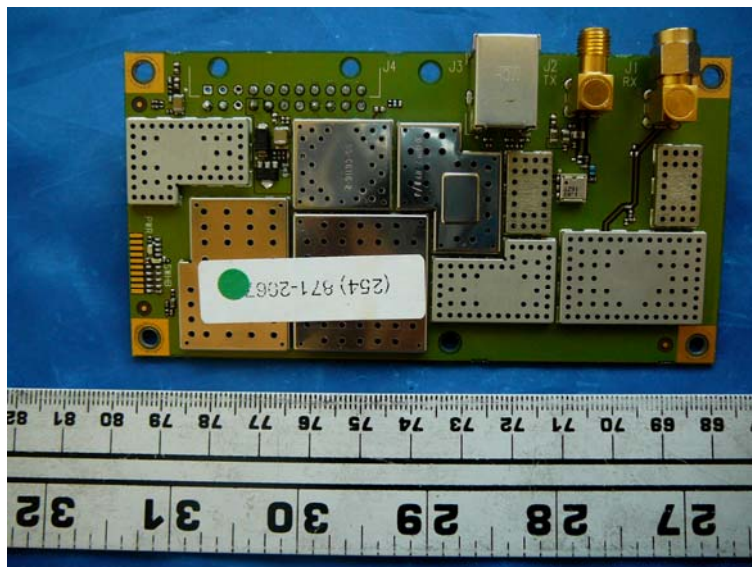
The *EUT* measures approximately 30.5 cm (L) x 15 cm (W) x 52 cm (H) and weighs 25.5 kg (include the antenna).

* The test data gathered are from typical production sample, serial number: R0907241-1, provided by BACL.

1.3 Antenna Description

The antenna used is external and mounted using fixed mounted screws.

1.4 EUT Photo



Please see Exhibit C for additional EUT photos

1.5 Objective

The objective is to determine continued compliance of the Satellite transmitter module (FCC ID: J9CGSSDVM) integrated with model NOMAD2 in accordance with FCC Part 25 Standard's requirements for Power output and Transmitter Spurious Emission.

1.6 Related Submittal(s)/Grant(s)

Qualcomm Incorporated's report, FCC ID: J9CGSSDVM, granted on 2007-05-09.

1.7 Test Methodology

All measurements contained in this report were conducted with TIA/EIA 603-C.

1.8 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the values ranging from ± 2.0 dB for Conducted Emissions tests and ± 4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

Detailed instrumentation measurement uncertainties can be found in BACL Corp. report QAP-018.

1.9 Test Facility

The test site used by BACL Corp. to conduct and collect safety measurement data is located at its facility in Sunnyvale, California, USA.

The test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11, 1997 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the test methods and procedures set forth in ANSI C63.4-2003 & TIA/EIA-603.

The Federal Communications Commission and Voluntary Control Council for Interference have the reports on file and they are listed under FCC registration number: 90464 and VCCI Registration No.: R-2463 and C-2698. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL Corp. is a National Institute of Standards and Technology (NIST) accredited laboratory under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm>.

2 SYSTEM TEST CONFIGURATION

2.1 Justification

The host system was configured for testing according to TIA/EIA 603-C.

The EUT was tested in the normal (native) operating mode to represent *worst*-case results during the final qualification test.

2.2 EUT Configuration

The EUT was configured in “Loop” mode (Transmit mode) in which the EUT sends data over the satellite.

2.3 Special Accessories

NA

2.4 Equipment Modifications

No modifications were made to the EUT.

2.5 Internal Configuration Details

Manufacturer	Description	Model/ Rev.	Serial Number
Second Wind Inc	Main Board	D	-
Second Wind	Modem GPS Board	E	-
Globalstar	Antenna	GAT-17PH	000022
Globalstar	Modem	GSP1720	K1J7191HY

2.6 Local Support Equipment List and Details

Manufacturers	Descriptions	Model No.	Serial Numbers
Anritsu	Global Star User Terminal Tester	MT8803G	MB08587
Panasonic	Battery	LC-R127R2P	-

3 SUMMARY OF TEST RESULTS

Results reported relate only to the product tested.

FCC Rules	Description of Test	Results
§25.209	Antenna Performance	*
§1.1307(b)(1) & §2.1091	RF Exposure	Compliant
§2.1047 (d)	Modulation Characteristics	*
§2.1051	Spurious Emission at Antenna Terminals	*
§2.1053 & §25.202(f)	Tx Spurious Emission	Compliant
§25.202(f)	Emission Limitations (Emission Mask)	*
§2.1049	Occupied Bandwidth	*
§2.1046 & §25.204	Power Output	Compliant
§25.204(a)	Power Limits	*
§25.216 (c) &/or (f)	Emission from Mobile Earth Station for Protection of Aeronautical Radio navigation-Satellite Service (e.i.r.p. density)	*
§2.1055 & §25.202(d)	Frequency Stability/ Tolerance	*
§15.107	AC Line Conducted Emission	*
§2.1057	Spectrum Investigated	*
§25.202(a)(4)(i)	1610 – 1626.5 GHz Authorized Frequency	*
§25.213	Protection of Radio astronomy	*

* Refer to the original FCC ID: J9CGSSDVM report.

4 FCC §1.1307 (b)(1) & §2.1091 - RF Exposure

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	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 ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

4.1 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

4.2 MPE Results

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>29.507</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>892.69</u>
<u>Prediction distance (cm):</u>	<u>25</u>
<u>Prediction frequency (MHz):</u>	<u>1612.65</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>4.5</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>2.82</u>
<u>Power density of prediction frequency at 20.0 cm (mW/cm²):</u>	<u>0.321</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1.0</u>

The predicted power density level at 25 cm is 0.321 mw/cm² which is below the uncontrolled exposure limit of 1.0 mW/cm². The EUT is used at least 25 cm away from user's body. It is determined as mobile equipment and complies with the MPE limit.

5 FCC §2.1046 & §25.204 – RF OUTPUT POWER

5.1 Applicable Standard

- a) In bands shared coequally with terrestrial radio communication services, the equivalent isotropically radiated power transmitted in any direction towards the horizon by an earth station, other than an ESV, operating in frequency bands between 1 and 15 GHz, shall not exceed the following limits except as provided for in paragraph (c) of this section:

+40 dBW in any 4 kHz band for $\Theta \leq 0^\circ$

+40 + 3 Θ dBW in any 4 kHz band for $0^\circ < \Theta \leq 5^\circ$

where Θ is the angle of elevation of the horizon viewed from the center of radiation of the antenna of the earth station and measured in degrees as positive above the horizontal plane and negative below it.

5.2 Measurement Procedure

The testing procedure was set according to TIA/EIA 603-C.

5.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-04-27

***Statement of Traceability:** BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

5.4 Test Environmental Conditions

Temperature:	21 °C
Relative Humidity:	33 %
ATM Pressure:	101.3kPa

* The testing was performed by Jack Liu on 2009-08-05.

5.5 Test Results

Channel	Frequency (MHz)	Conducted Output Power (dBm)
Low	1610.73	27.36
Mid	1615.65	27.78
High	1620.57	27.91

Note: The antenna maximum gain is 4.5 dBi.

6 FCC §2.1053 & §25.202 (f) – FIELD STRENGTH OF SPURIOUS RADIATION

6.1 Applicable Standard

Requirements: CFR 47, § 25.202(f). The mean power of emission shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: An amount equal to 43 dB plus 10 times the logarithm (to the base 10) of the transmitter power in watts;

In any event, when an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in paragraphs (f) (1), (2) and (3) of this section.

6.2 Measurement Procedure

The testing procedure was set according to TIA/EIA 603-C.

6.3 Test Equipment List and Details

Manufacturers	Descriptions	Model No.	Serial No.	Calibration Dates
Agilent	Pre amplifier	447D	2944A10187	2009-03-03
Sunol Science Corp	Combination Antenna	JB1 Antenna	A020106-1	2009-06-02
Rohde & Schwarz	EMI Test Receiver	ESCI	100338	2009-03-06
Sunol Science	System Controller	SC99V	122303-1	NCR
Ducommun Technologies	High Frequency Pre amplifier	ALN-09173030-01	990297-01R	2009-06-03
A.R.A Inc	Horn antenna	DRG-1181A	1132	2008-07-28
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-04-27
A. H. Systems	Antenna, Horn, DRG	SAS-200/571	261	2008-07-01

***Statement of Traceability:** BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

6.4 Test Environmental Conditions

Temperature:	22 °C
Relative Humidity:	30 %
ATM Pressure:	102.1 kPa

** The testing was performed by Jack Liu on 2009-08-06.*

6.5 Test Results Summary

According to the data in the following table, the EUT was found compliant with the Class B limits of FCC Standard §25.202, and had the worst margin reading(s) of:

-0.62 dB at 3231.3 MHz at the Middle Channel setting in the **Vertical** polarization

Low Channel

Indicated		Azimuth (degrees)	Test Antenna		Substituted					Limit (dB)	Margin (dB)
Frequency (MHz)	S.A. Reading (dBuV)		Height (cm)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)		
3221.46	46.75	6	216	V	3221.46	-23.3	9.5	0.52	-14.32	-13	-1.32
3221.46	40.64	60	223	H	3221.46	-32.2	9.5	0.52	-23.22	-13	-10.22

Middle Channel

Indicated		Azimuth (degrees)	Test Antenna		Substituted					Limit (dB)	Margin (dB)
Frequency (MHz)	S.A. Reading (dBuV)		Height (cm)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)		
3231.3	47.44	6	218	V	3231.3	-22.6	9.5	0.52	-13.62	-13	-0.62
3231.3	41.32	60	211	H	3231.3	-29.6	9.5	0.52	-20.62	-13	-7.62

High Channel

Indicated		Azimuth (degrees)	Test Antenna		Substituted					Limit (dB)	Margin (dB)
Frequency (MHz)	S.A. Reading (dBuV)		Height (cm)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)		
3241.14	46.43	5	213	V	3241.14	-23	9.5	0.52	-14.02	-13	-1.02
3241.14	40.64	61	221	H	3241.14	-32	9.5	0.52	-23.02	-13	-10.02