



FCC PART 22H, 24E
TEST AND MEASUREMENT REPORT



For

Motion Computing Incorporated

8601 Ranch Road 2222, Building 2,

Austin, TX 78730, USA

FCC ID: Q3QHSWG0BI2000

Report Type: Original Report	Product Type: Tablet PC with WWAN Module
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Report Number: <u>R1001201-2224</u>	
Report Date: <u>2009-04-07</u>	
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* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "*" 000-2

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1 GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

The product, FCC ID: Q3QHSWGOBI2000 is WWAN module embedded to tablet PC (model CFT-003), the module has features of CDMA2000/1xEVDO data at 850 MHz and 1900 MHz bands, CDMA/HSDPA/HSUPA data at 800MHz, 850 MHz, 900 MHz, 1800MHz, and 2100 MHz bands, GSM/GPRS/EDGE data at 850 MHz, 900 MHz, 1800 MHz and 1900 MHz bands.

Technologies and bands Supported:

Operating Band	Transmit (TX) Frequency Range	Receive (RX) Frequency Range
CDMA(1x/1xEVDO Rev 0, Rev A) Cell (band class 0) – used in US/CA PCS (band class 1) – used in US/CA	824~849 MHz 1850~1910 MHz	869~894 MHz 1930~1990 MHz
UMTS (WCDMA/HSDPA/HSUPA) Cell (band V) – used in US/CA PCS (band II) – used in US/CA Japan 800 (band VI) – used in Japan GSM (band VIII) – used in EU IMT (band I) – used in EU	824~849 MHz 1850~1910 MHz 830~840 MHz 880~915 MHz 1920~1980 MHz	869~894 MHz 1930~1990 MHz 875~885 MHz 925~960 MHz 2110~2170 MHz
GSM Band GPRS/EDGE 850 – used in US/CA GPRS/EGPRS 900 – used in EU GPRS/EGPRS 1800 – used in EU GPRS/EDGE 1900 – used in US/CA	824~849 MHz 880~915 MHz 1710~1785 MHz 1850~1910 MHz	869~894 MHz 925~960 MHz 1805~1880 MHz 1930~1990 MHz

1.2 Mechanical Description

The WWAN Module measures approximately 5cm (L) × 3cm (W) × 0.5cm (H), weight 11.5g.

* The test data gathered are from typical production sample, serial number: AS103464430010 provided by manufacturer.

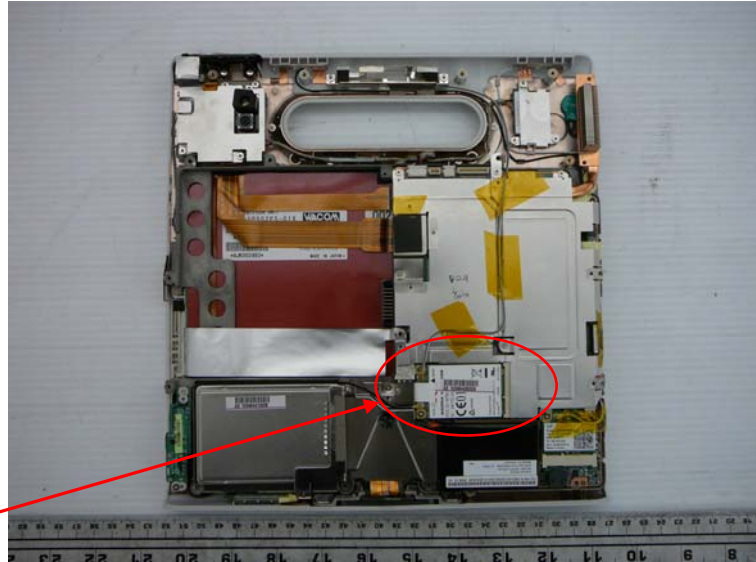
The tablet PC measures approximately 25.5cm (L) × 25.5cm (W) × 2.8cm (H), weight 1208g (without standard battery), and 1508g (with one standard battery).

* The test data gathered are from typical production sample, serial number: R1001201-7 assigned by BACL.

1.3 EUT Photo



WWAN
Module



WWAN Module
built into tablet PC

Additional Photos in Exhibit C

1.4 Objective

This type approval report is prepared on behalf of *Motion Computing Incorporated* in accordance with Part 2, Subpart J, Part 22 Subpart H, and Part 24 Subpart E of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules for RF output power (conducted and ERP, EIRP), field strength of spurious radiation.

This measurement and test report only pertains to the GSM/CDMA/WCDMA portion of the EUT.

1.5 Related Submittal(s)/Grant(s)

- (1) FCC Identifier: J9CGOBI2000; Name of Grantee: Qualcomm Incorporated
Report #: 80-VN379-203 Rev. A for Conducted Test Report
Report #: MH80-VN379-204 Rev. B for Radiated Test Report
- (2) FCC Identifier: N7NGOBI2; Name of Grantee: Sierra Wireless

The relevant test report, as well as other documents for this device can be found by performing a search in the FCC office of engineering and technology (OET) website, please refer to the above mentioned report regarding the test data for the following tests:

- Modulation Characteristics,
- Occupied Bandwidth,
- Antenna Port Spurious Emission, and
- Frequency Stability

1.6 Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

Part 22 Subpart H - Cellular Radiotelephone Service
Part 24 Subpart E – Broadband PCS

Applicable Standards: TIA/EIA-603-C, ANSI C63.4-2003.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.7 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.

1.8 Test Facility

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

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

The Federal Communications Commission, Industry Canada, and Voluntary Control Council for Interference has the reports on file and is listed under FCC registration number: 90464, IC registration number: 3062A, and VCCI Registration Number: C-2463 and R-2698. The test site has been approved by the FCC, IC, and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL 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 EUT was configured for testing according to TIA/EIA 603-C.

The final qualification test was performed with the EUT operating at normal mode.

2.2 EUT Exercise Software

Agilent 8960 Wireless Communication test set was used to activate the EUT.

Modulation: GPRS – GMSK; EDGE – 8PSK
CDMA 1X – BPSK; WCDMA Release 99 – BPSK

2.3 Special Accessories

N/A

2.4 Equipment Modifications

No modifications were made to the EUT

2.5 Remote Support Equipment

N/A

2.6 Local Support Equipment

Manufacturers	Descriptions	Models	Serial Numbers
Sun	Mouse	FID-638	0581MCN-0746NC2085

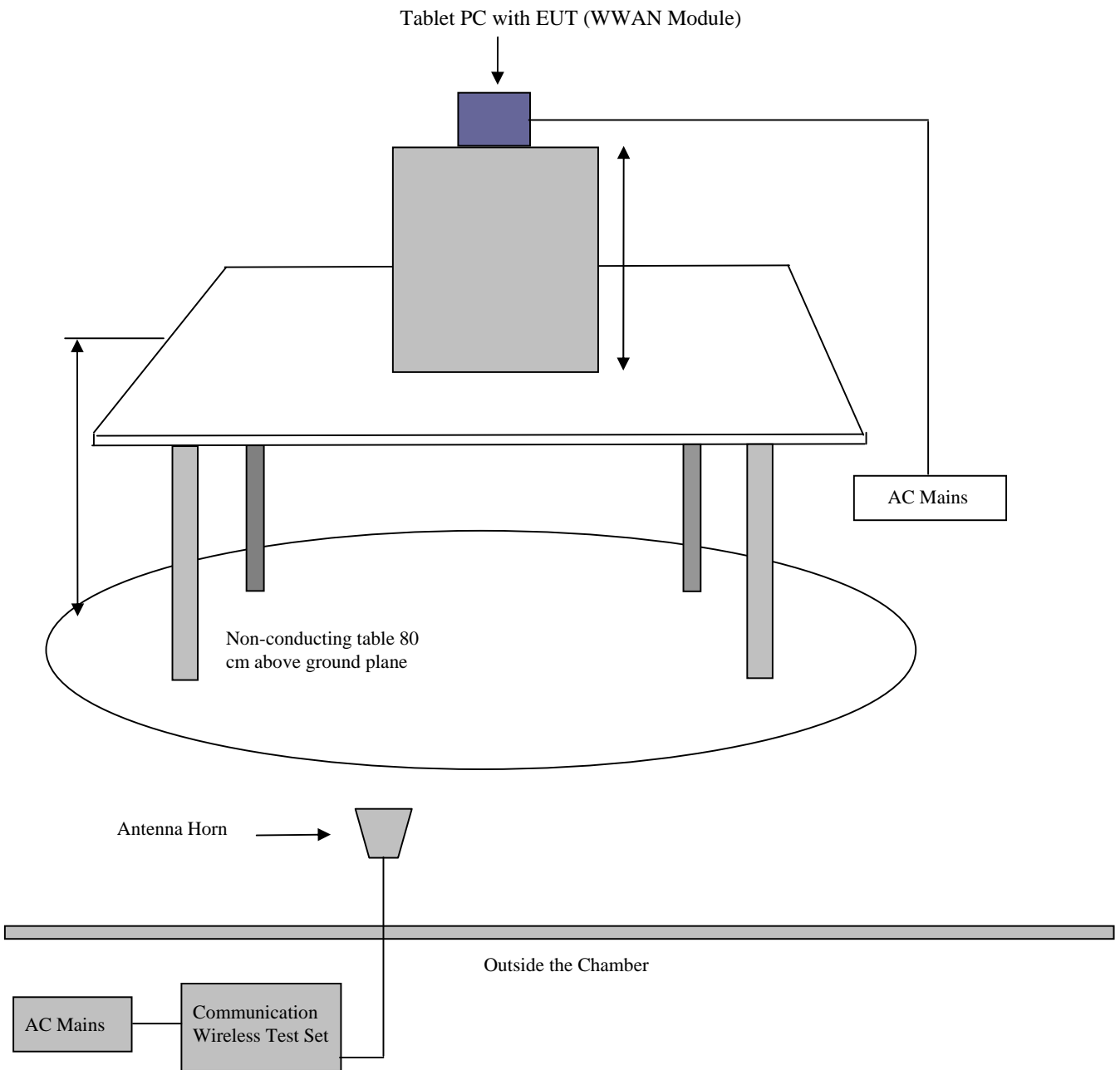
2.7 EUT Internal Configuration Details

Manufacturers	Descriptions	Models	Serial Numbers
Motion Computing	Tablet PC	C5	-
Hynix	RAM-DDR2 2G	2G*2	-
Intel Dual-Core	Processor	1.2G	-
Toshiba	HDD (MK1235GSL)	120G	89UNM88LM
-	Bluetooth Module	-	-
Intel WiFi	WiFi Module	622ANHMW	-
Sierra Wireless	GSM/CDMA/WCDMA Module	GOBI2	AS103464430

2.8 Power Supply and Line Filters

Manufacturer	Description	Model	Serial Number
Delta Electronics Inc	AC/DC Adapter	SADP-65NB	67BW9CX001T

2.9 Test Setup Block Diagram for Radiated Emissions Tests



3 SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§2.1046 §22.913 §24.232	RF Output Power	Compliant
§2.1047	Modulation Characteristics	N/A
§2.1049 §22.917 §24.238	Out of Band Emissions, Occupied Bandwidth	Refer to FCC ID: N7NGOBI2
§2.1051, §22.917 §24.238 (a)	Spurious Emissions at Antenna Terminals	Refer to FCC ID: N7NGOBI2
§ 2.1053 §22.917 (a) §24.238 (a)	Field Strength of Spurious Radiation	Compliant
§22.917 §24.238	Band Edge	Refer to FCC ID: N7NGOBI2
§2.1055 §22.355 §24.235	Frequency stability vs. temperature Frequency stability vs. voltage	Refer to FCC ID: N7NGOBI2
§2.1093	RF Exposure	Please See SAR report R1001201-SAR

4 FCC §2.1046, §22.913(a) & §24.232 – RF OUTPUT POWER

4.1 Applicable Standard

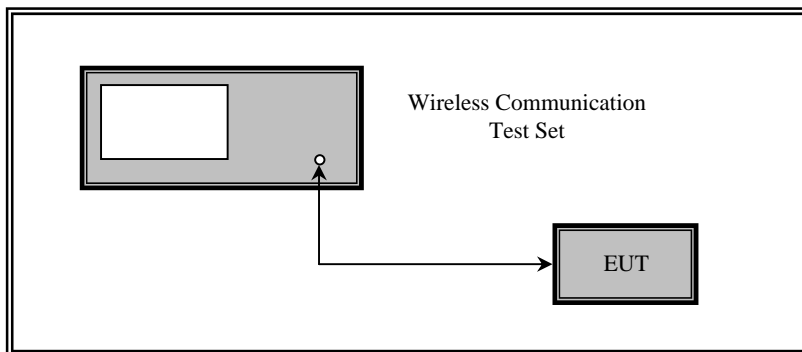
According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (a), in no case may the peak output power of a base station transmitter exceed 2 watt.

4.2 Test Procedure

Conducted:

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.



Radiated (ERP and EIRP):

TIA-603-C §2.2.17

4.3 Base Station Simulator Settings

1) FOR CDMA 2000 1xEV-DO

Measure the power at Channels 1013, 384 and 777 for US Cellular band; Channels 25, 600 and 1175 for US PCS band.

1xRTT

Use CDMA2000 Rev 6 protocol in the Agilent 8960, Method of measurement is according to TIA/EIA-98-F section 4.4.5.2

1xEV-DO

- 1) Use 1xEV-DO Rel 0 Protocol in the Agilent 8960 with the following settings:
 - a. FTAP
 - FTAP Rate = 307.2 kbps (2 Slot, QPSK)
 - b. RTAP
 - RTAP Rate = 9.6 kbps, 19.2 kbps, 38.4 kbps, 76.8 kbps and 153.6 kbps
- 2) Use 1xEV-DO Rev A protocol in the Agilent 8960 with the following settings:
 - a. FETAP
 - FETAP Rate to 307.2 kbps (2 Slot, QPSK)
 - b. RETAP
 - RTAP Rate = 153.6 kbps (Subtype 0)
= 409.6 kbps (Subtype 2)

2) For WCDMA/HSDPA/HSUPA

Configure the Agilent 8960 to support all WCDMA tests with respect to the 3GPP TS 34.121. Measure the Maximum Output Power at Channels 4132, 4182 and 4233 for US cellular band; Channels 9262, 9400 and 9538 for US PCS band.

Release 99

Method of measurements is according to 3GPP TS 34.121 sections 5.2.4

HSDPA Release 6

Method of measurements is according to 3GPP TS 34.121 section 5.2AA.4

HSUPA Release 6

Method of measurement is according to 3GPP TS 34.121 section 5.2B.4

3) For GSM/GPRS/EDGE

Configure the Agilent 8960 to support GMSK and 8PSK call respectively, and set one timeslot transmission for GMSK GPRS and 8PSK EDGE. Measure and record power outputs for both modulations at Channels 128, 190 and 251 for GSM 850 band; Channels 512, 661 and 810 for US PCS 1900 band.

4.4 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Number	Calibration Dates
Agilent	Analyzer, Communications Test Set	E5515C	GB44051221	2009-04-23
A.H Systems	Antenna, Horn	SAS-200/571	261	2009-09-23
Hewlett Packard	Pre amplifier	8447D	2944A06639	2009-06-05
Sunol Science Corp	Combination Antenna	JB3	A0020106-3	2009-05-05
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2009-04-29
Sunol Science Corp	System Controller	SC99V	122303-1	N/R
A.R.A Inc	Horn antenna	DRG-1181A	1132	2009-10-27
Agilent	PSA Series Spectrum Analyzer	E4440A	US45303156	2009-07-23
HP	Pre Amplifier	8449B	3147A00400	2010-02-01

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

4.5 Test Environmental Conditions

Temperature:	17~23° C
Relative Humidity:	35~63%
ATM Pressure:	101.2~103.5kPa

*Testing was performed by Jack Liu on 2010-02-02 ~ 2010-03-28.

4.6 Test Results

1) CDMA 1xRTT, 1xEV-DO Rev 0 and 1xEV-DO Rev A

Mode	Radio Configuration		Cellular Channels			PCS Channels		
			CH 1013 (dBm)	CH 384 (dBm)	CH 777 (dBm)	CH 25 (dBm)	CH 600 (dBm)	CH 1175 (dBm)
1xRTT	RC1	S02	24.40	24.45	24.44	24.46	24.49	24.34
	RC1	S055	24.56	24.43	24.46	24.40	24.49	24.36
	RC2	S09	24.50	24.48	24.50	24.45	24.40	24.33
	RC2	S055	24.54	24.49	24.51	24.39	24.47	24.31
	RC3	S02	24.54	24.45	24.51	24.35	24.54	24.36
	RC3	S055	24.61	24.53	24.52	24.51	24.55	24.46
	RC4	S02	24.56	24.46	24.49	24.31	24.50	24.40
	RC4	S055	24.53	24.48	24.50	24.41	24.52	24.21
	RC5	S09	24.47	24.47	24.40	24.38	24.50	24.33
	RC5	S055	24.50	24.46	24.51	24.44	24.53	24.48
1xEV-DO Rel 0	FTAP Rate = 307.2 kbps (2 slot QPSK)	RTAP Rate = 9.6 kbps	24.35	24.26	24.31	24.29	24.34	24.21
		RTAP Rate = 19.2 kbps	24.46	24.36	24.32	24.31	24.28	24.22
		RTAP Rate = 38.4 kbps	24.47	24.31	24.36	24.20	24.32	24.3
		RTAP Rate = 76.8 kbps	24.53	24.43	24.34	24.33	24.37	24.4
		RTAP Rate = 153.6 kbps	24.59	24.46	24.36	24.22	24.39	24.41
1xEV-DO Rev A	FETAP Rate = 307.2kbps (2 slot, ACK Channel is Transmitted at all the slots)	Subtype 0: RETAP payload size=1536 bits	24.44	24.37	24.31	24.10	24.21	24.12
		Subtype 2: RETAP payload size=4096 bits	24.50	24.46	24.36	24.18	24.26	24.2

Note: SAR is not required for 1xRTT since the maximum average output power of each RF channel is less than ¼ dB higher than that measured in Subtype 0 Physical Layer configurations for Rev 0.

2) WCDMA/HSDPA/HSUPA

Mode	3GPP Sub test	Band V Channels			Band II Channels			MPR
		CH 4132 (dBm)	CH 4182 (dBm)	CH 4233 (dBm)	CH 9262 (dBm)	CH 9400 (dBm)	CH 9538 (dBm)	
Rel 99	1	24.11	24.08	24.13	24.13	24.48	24.31	
Rel 6 HSDPA	1	23.99	23.79	23.80	24.00	23.84	23.93	0
	2	23.50	23.41	23.46	23.32	23.20	23.31	0
	3	23.31	23.03	23.16	23.31	23.07	23.15	0.5
	4	23.04	22.78	22.92	23.11	23.00	23.11	0.5
Rel 6 HSUPA	1	23.56	23.40	23.46	23.65	23.50	23.55	0
	2	21.98	21.81	21.93	21.78	21.40	21.39	2
	3	22.31	22.11	22.23	23.06	22.70	22.81	1
	4	22.20	21.92	22.11	21.97	21.80	21.93	2
	5	23.57	23.14	23.28	23.88	23.65	23.69	0

Note: HSPA Body SAR is not required for this device since the maximum average output power of each RF channel with HSPA active is lower than that measured without HSPA (Release 99)+ ¼ dB

3) GPRS/EDGE

Mode	Modulation	Cellular Channels			PCS Channels		
		CH 128 (dBm)	CH 190 (dBm)	CH 251 (dBm)	CH 512 (dBm)	CH 661 (dBm)	CH 810 (dBm)
GPRS	GMSK	32.29	32.29	32.31	28.97	29.27	29.76
EDGE	8PSK	27.87	27.88	27.90	25.45	25.70	26.21

Radiated Power (ERP or EIRP)

GPRS (850 MHz Band) Part 22H:

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Freq. (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Freq. (MHz)	S.G. Level (dBm)	Ant. Cord. (dBi)	Cable Loss (dB)			
824.2	103.54	217	100	V	824.2	30.06	0	0.21	29.85	38.45	-8.60
824.2	105.30	204	124	H	824.2	27.02	0	0.21	26.81	38.45	-11.64
836.6	102.87	217	100	V	836.6	29.09	0	0.21	28.88	38.45	-9.57
836.6	104.59	204	124	H	836.6	26.84	0	0.21	26.63	38.45	-11.82
848.8	102.59	217	100	V	848.8	29.32	0	0.21	29.11	38.45	-9.34
848.8	104.72	204	124	H	848.8	27.48	0	0.21	27.27	38.45	-11.18

EDGE (850 MHz Band) Part 22H:

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Freq. (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Freq. (MHz)	S.G. Level (dBm)	Ant. Cord. (dBi)	Cable Loss (dB)			
824.2	98.92	338	100	V	824.2	25.44	0	0.21	25.23	38.45	-13.22
824.2	101.85	204	206	H	824.2	23.57	0	0.21	23.36	38.45	-15.09
836.6	97.67	338	100	V	836.6	23.89	0	0.21	23.68	38.45	-14.77
836.6	101.23	204	206	H	836.6	23.48	0	0.21	23.27	38.45	-15.18
848.8	97.94	338	100	V	848.8	24.67	0	0.21	24.46	38.45	-13.99
848.8	101.04	204	206	H	848.8	23.8	0	0.21	23.59	38.45	-14.86

CDMA 1X (850 MHz Band) Part 22H:

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Freq. (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Freq. (MHz)	S.G. Level (dBm)	Ant. Cord. (dBi)	Cable Loss (dB)			
824.70	96.63	234	176	V	824.7	23.37	0	0.21	23.16	38.45	-15.29
824.70	97.31	205	121	H	824.7	18.96	0	0.21	18.75	38.45	-19.7
836.52	95.55	234	176	V	836.52	21.77	0	0.21	21.56	38.45	-16.89
836.52	96.16	205	121	H	836.52	18.41	0	0.21	18.2	38.45	-20.25
848.31	94.38	234	176	V	848.31	21.22	0	0.21	21.01	38.45	-17.44
848.31	96.42	205	121	H	848.31	19.14	0	0.21	18.93	38.45	-19.52

WCDMA Release 99 (850 MHz Band) Part 22H:

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Freq. (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Freq. (MHz)	S.G. Level (dBm)	Ant. Cord. (dBi)	Cable Loss (dB)			
826.4	94.38	225	100	V	826.4	20.9	0	0.21	20.69	38.45	-17.76
826.4	92.82	0	171	H	826.4	14.54	0	0.21	14.33	38.45	-24.12
836.4	92.23	225	100	V	836.4	18.45	0	0.21	18.24	38.45	-20.21
836.4	91.98	0	171	H	836.4	14.23	0	0.21	14.02	38.45	-24.43
846.6	93.69	225	100	V	846.6	20.42	0	0.21	20.21	38.45	-18.24
846.6	92.19	0	171	H	846.6	14.95	0	0.21	14.74	38.45	-23.71

GPRS (1900 MHz Band) Part 24E:

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Freq. (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Freq. (MHz)	S.G. Level (dBm)	Ant. Cord. (dBi)	Cable Loss (dB)			
1850.2	89.3	275	163	V	1850.2	15.97	8.1	0.66	23.41	33	-9.59
1850.2	94.08	349	146	H	1850.2	20.33	8.1	0.66	27.77	33	-5.23
1880.0	90.32	275	163	V	1880	17.48	8.1	0.66	24.92	33	-8.08
1880.0	95.29	349	143	H	1880	22.03	8.1	0.66	29.47	33	-3.53
1909.8	90.55	275	163	V	1909.8	18.48	8.1	0.66	25.92	33	-7.08
1909.8	95.41	349	143	H	1909.8	22.69	8.1	0.66	30.13	33	-2.87

EDGE (1900 MHz Band) Part 24E:

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Freq. (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Freq. (MHz)	S.G. Level (dBm)	Ant. Cord. (dBi)	Cable Loss (dB)			
1850.2	85.88	275	163	V	1850.2	12.55	8.1	0.66	19.99	33	-13.01
1850.2	90.48	349	143	H	1850.2	16.73	8.1	0.66	24.17	33	-8.83
1880.0	86.66	275	163	V	1880	13.82	8.1	0.66	21.26	33	-11.74
1880.0	91.54	349	143	H	1880	18.28	8.1	0.66	25.72	33	-7.28
1909.8	86.97	275	163	V	1909.8	14.9	8.1	0.66	22.34	33	-10.66
1909.8	91.77	349	143	H	1909.8	19.05	8.1	0.66	26.49	33	-6.51

CDMA 1X (1900 MHz Band) Part 24E:

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Freq. (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Freq. (MHz)	S.G. Level (dBm)	Ant. Cord. (dBi)	Cable Loss (dB)			
1851.25	88.32	275	163	V	1851.25	14.99	8.1	0.66	22.43	33	-10.57
1851.25	93.17	349	143	H	1851.25	19.42	8.1	0.66	26.86	33	-6.14
1880.0	88.48	275	163	V	1880	15.64	8.1	0.66	23.08	33	-9.92
1880.0	93.68	349	143	H	1880	20.42	8.1	0.66	27.86	33	-5.14
1908.75	87.16	275	163	V	1908.75	15.09	8.1	0.66	22.53	33	-10.47
1908.75	92.29	349	143	H	1908.75	19.57	8.1	0.66	27.01	33	-5.99

WCDMA Release 99 (1900 MHz Band) Part 24E:

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Freq. (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Freq. (MHz)	S.G. Level (dBm)	Ant. Cord. (dBi)	Cable Loss (dB)			
1852.4	86.45	275	163	V	1852.4	13.12	8.1	0.66	20.56	33	-12.44
1852.4	91.1	349	143	H	1852.4	17.35	8.1	0.66	24.79	33	-8.21
1880.0	86.93	275	163	V	1880	14.09	8.1	0.66	21.53	33	-11.47
1880.0	91.58	349	143	H	1880	18.32	8.1	0.66	25.76	33	-7.24
1907.5	86.2	275	163	V	1907.5	14.13	8.1	0.66	21.57	33	-11.43
1907.5	91.02	349	143	H	1907.5	18.3	8.1	0.66	25.74	33	-7.26

5 FCC §2.1047 - MODULATION CHARACTERISTIC

5.1 Applicable Standard

According to FCC §2.1047(d), Part 22H & 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

6 FCC §2.1049, §22.917, §22.905 & §24.238 - OCCUPIED BANDWIDTH

6.1 Applicable Standard

Requirements: FCC §2.1049, §22.901, §22.917 and §24.238.

6.2 Test Results

Refer to FCC ID: N7NG0BI2

7 FCC §2.1051, §22.917 & §24.238(a) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

7.1 Applicable Standard

Requirements: FCC §2.1051, §22.917 & §24.238(a).

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1057.

7.2 Test Results

Refer to FCC ID: N7NG0BI2

8 FCC §2.1053, §22.917 & §24.238 - RADIATED SPURIOUS EMISSIONS

8.1 Applicable Standard

Requirements: FCC §2.1053, §22.917, §24.238.

8.2 Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 log (TX Power in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log₁₀ (power out in Watts)

8.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Number	Calibration Dates
Agilent	Analyzer, Communications Test Set	E5515C	GB44051221	2009-04-23
A.H Systems	Antenna, Horn	SAS-200/571	261	2009-09-23
Hewlett Packard	Pre amplifier	8447D	2944A06639	2009-06-05
Sunol Science Corp	Combination Antenna	JB3	A0020106-3	2009-05-05
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2009-04-29
Sunol Science Corp	System Controller	SC99V	122303-1	N/R
A.R.A Inc	Horn antenna	DRG-1181A	1132	2009-10-27
Agilent	PSA Series Spectrum Analyzer	E4440A	US45303156	2009-07-23
HP	Pre Amplifier	8449B	3147A00400	2010-02-01

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

8.4 Test Environmental Conditions

Temperature:	17~23° C
Relative Humidity:	35~63%
ATM Pressure:	101.2~103.5kPa

*Testing was performed by Jack Liu on 2010-02-02 ~ 2010-03-28.

8.5 Summary of Test Results

Worst case reading as follows:

Mode: Transmitting		
Margin (dB)	Frequency (MHz)	Antenna Polarization (Horizontal/Vertical)
-7.81	3760	Horizontal

1) GPRS 850 MHz Band at High Channel (848.8 MHz)

30 MHz -10 GHz Radiated Spurious Emission measured at 3-meter

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Freq. (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Freq. (MHz)	S.G. Level (dBm)	Ant. Gain (dBi)	Cable Loss (dB)			
1697.6	68.74	177	100	V	1697.6	-40.74	7.9	1.34	-34.18	-13	-21.18
1697.6	63.44	215	100	H	1697.6	-45.95	7.9	1.34	-39.39	-13	-26.39
2546.4	51.86	0	100	V	2546.4	-44.91	7.9	1.66	-38.67	-13	-25.67
2546.4	51.53	295	100	H	2546.4	-46.09	7.9	1.66	-39.85	-13	-26.85

2) EDGE 850 MHz Band at High Channel (848.8 MHz)

30 MHz -10 GHz Radiated Spurious Emission measured at 3-meter

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Freq. (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Freq. (MHz)	S.G. Level (dBm)	Ant. Gain (dBi)	Cable Loss (dB)			
1697.6	50.89	177	100	V	1697.6	-58.59	7.9	1.34	-52.03	-13	-39.03
1697.6	49.61	215	100	H	1697.6	-59.78	7.9	1.34	-53.22	-13	-40.22

3) CDMA 1X 850 MHz Band at Middle Channel (836.52 MHz)

30 MHz -10 GHz Radiated Spurious Emission measured at 3-meter

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Freq. (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Freq. (MHz)	S.G. Level (dBm)	Ant. Gain (dBi)	Cable Loss (dB)			
1995	49.63	11	100	V	1995	-55.85	8.1	1.32	-49.07	-13	-36.07
1995	54.29	213	100	H	1995	-51.7	8.1	1.32	-44.92	-13	-31.92

4) WCDMA Release 99 850 MHz Band at High Channel (846.6 MHz)

30 MHz -10 GHz Radiated Spurious Emission measured at 3-meter

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Freq. (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Freq. (MHz)	S.G. Level (dBm)	Ant. Gain (dBi)	Cable Loss (dB)			
1693.2	52.3	259	155	V	1693.2	-57.18	7.9	1.34	-50.62	-13	-37.62
1693.2	57.43	51	181	H	1693.2	-51.96	7.9	1.34	-45.4	-13	-32.4

5) GPRS 1900 MHz Band at High Channel (1909.8 MHz)

30 MHz -20 GHz Radiated Spurious Emission measured at 3-meter

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Freq. (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Freq. (MHz)	S.G. Level (dBm)	Ant. Gain (dBi)	Cable Loss (dB)			
3819.6	52	17	100	V	3819.6	-46.88	9.5	1.68	-39.06	-13	-26.06
3819.6	53.39	157	100	H	3819.6	-46.17	9.5	1.68	-38.35	-13	-25.35

6) EDGE 1900 MHz Band at High Channel (1909.8 MHz)

30 MHz -20 GHz Radiated Spurious Emission measured at 3-meter

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Freq. (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Freq. (MHz)	S.G. Level (dBm)	Ant. Gain (dBi)	Cable Loss (dB)			
3819.6	48.54	17	100	V	3819.6	-50.34	9.5	1.68	-42.52	-13	-29.52
3819.6	50.68	157	100	H	3819.6	-48.88	9.5	1.68	-41.06	-13	-28.06

