



FCC PART 22H, 24E
TEST AND MEASUREMENT REPORT



For

Motion Computing Incorporated

8601 Ranch Road 2222, Building 2

Austin, TX 78730, USA

FCC ID: Q3QHWNVWUNDP-1

Report Type: Original Report	Product Type: Tablet PC with WWAN Module
Test Engineer: Jack Liu	
Report Number: R0901082-2224	
Report Date: 2009-05-01	
Reviewed By: Sr. RF Engineer	
Prepared By: (66)	Bay Area Compliance Laboratories Corp. 1274 Anvilwood Ave Sunnyvale, CA 94089, USA Tel: (408) 732-9162 Fax: (408) 732 9164

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP*, NIST, or any agency of the Federal Government.

* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "*" and

TABLE OF CONTENTS

1	GENERAL INFORMATION	4
1.1	PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	4
1.2	EUT PHOTO	4
1.3	MECHANICAL DESCRIPTION	5
1.4	OBJECTIVE	5
1.5	RELATED SUBMITTAL(S)/GRANT(S)	5
1.6	TEST METHODOLOGY	5
1.7	MEASUREMENT UNCERTAINTY	5
1.8	TEST FACILITY	6
2	SYSTEM TEST CONFIGURATION	7
2.1	JUSTIFICATION	7
2.2	EUT EXERCISE SOFTWARE	7
2.3	SPECIAL ACCESSORIES	7
2.4	EQUIPMENT MODIFICATIONS	7
2.5	REMOTE SUPPORT EQUIPMENT	7
2.6	LOCAL SUPPORT EQUIPMENT	7
2.7	EUT INTERNAL CONFIGURATION DETAILS	8
2.8	POWER SUPPLY AND LINE FILTERS	8
2.9	EXTERNAL I/O CABLING LIST AND DETAILS	8
2.10	TEST SETUP BLOCK DIAGRAM FOR RADIATED EMISSIONS TESTS	9
3	SUMMARY OF TEST RESULTS	10
4	§2.1046, §22.913(A) & §24.232 – RF OUTPUT POWER	11
4.1	APPLICABLE STANDARD	11
4.2	TEST PROCEDURE	11
4.3	BASE STATION SIMULATOR SETTINGS	11
4.4	TEST EQUIPMENT LIST AND DETAILS	12
4.5	SUMMARY OF TEST RESULTS	13
5	§2.1047 - MODULATION CHARACTERISTIC	18
5.1	APPLICABLE STANDARD	18
6	§2.1049, §22.917, §22.905 & §24.238 - OCCUPIED BANDWIDTH	19
6.1	APPLICABLE STANDARD	19
6.2	TEST RESULTS	19
7	§2.1051, §22.917 & §24.238(A) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS	20
7.1	APPLICABLE STANDARD	20
7.2	TEST RESULTS	20
8	§2.1053, §22.917 & §24.238 - RADIATED SPURIOUS EMISSIONS	21
8.1	APPLICABLE STANDARD	21
8.2	TEST PROCEDURE	21
8.3	TEST EQUIPMENT LIST AND DETAILS	21
8.4	SUMMARY OF TEST RESULTS	22
9	§22.917 & §24.238 – BAND EDGE	25
9.1	APPLICABLE STANDARD	25

9.2	TEST RESULTS	25
10	§2.1055 (A), §2.1055 (D), §22.355 & §24.235 - FREQUENCY STABILITY	26
10.1	APPLICABLE STANDARD	26
10.2	TEST RESULTS	26
11	§1.1307(B) & §2.1093 - RF EXPOSURE	27
11.1	APPLICABLE STANDARD	27
11.2	TEST RESULT	27
12	EXHIBIT A - FCC ID LABELING AND WARNING STATEMENT.....	28
12.1	APPLICABLE STANDARD	28
12.2	PROPOSED FCC ID LABEL	28
13	EXHIBIT B - TEST SETUP PHOTOGRAPHS	29
13.1	RADIATED EMISSIONS BELOW 1 GHZ- FRONT VIEW	29
13.2	RADIATED EMISSIONS BELOW 1 GHZ - REAR VIEW	29
13.3	RADIATED EMISSIONS ABOVE 1 GHZ- FRONT VIEW	30
13.4	RADIATED EMISSIONS ABOVE 1 GHZ - REAR VIEW	30
14	EXHIBIT C - EUT PHOTOGRAPHS.....	31
14.1	WWAN MODULE BUILT INTO THE HOST TABLET PC (T008)	31
14.2	WWAN MODULE FRONT VIEW	31
14.3	WWAN MODULE BOTTOM VIEW	32
14.4	HOST TABLET PC TOP SIDE VIEW	32
14.5	HOST TABLET PC BACK SIDE VIEW	33
14.6	HOST TABLET PC RIGHT SIDE VIEW.....	33
14.7	HOST TABLET PC LEFT SIDE VIEW.....	34
14.8	HOST TABLET PC BOTTOM SIDE VIEW	34
14.9	HOST TABLET PC BOTTOM SIDE VIEW	35
14.10	TABLET PC AC/DC POWER ADAPTER.....	35
14.11	HOST TABLET PC INTERNAL – MAIN BOARD TOP VIEW.....	36
14.12	HOST TABLET PC INTERNAL – MAIN BOARD BOTTOM VIEW	36
14.13	HOST TABLET PC INTERNAL -LCD BOARD ASSEMBLY (WITH ANTENNA) TOP VIEW	37
14.14	HOST TABLET PC INTERNAL -LCD BOARD ASSEMBLY BOTTOM VIEW	37
14.15	WWAN MODULE INTERNAL TOPVIEW.....	38
14.16	WWAN MODULE INTERNAL BOTTOMVIEW	38

1 GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

The product, FCC ID: Q3QHWNVWUNDP-1 is WWAN module embedded to tablet PC (model J3400 (T008), the module has features of CDMA2000/1xEVDO data at 850 MHz and 1900 MHz bands, WCDMA/HSDPA/HSUPA data at 850 MHz, 1900 MHz and 2100 MHz bands, GSM/GPRS/EDGE data at 850 MHz, 900 MHz, 1800 MHz and 1900 MHz bands.

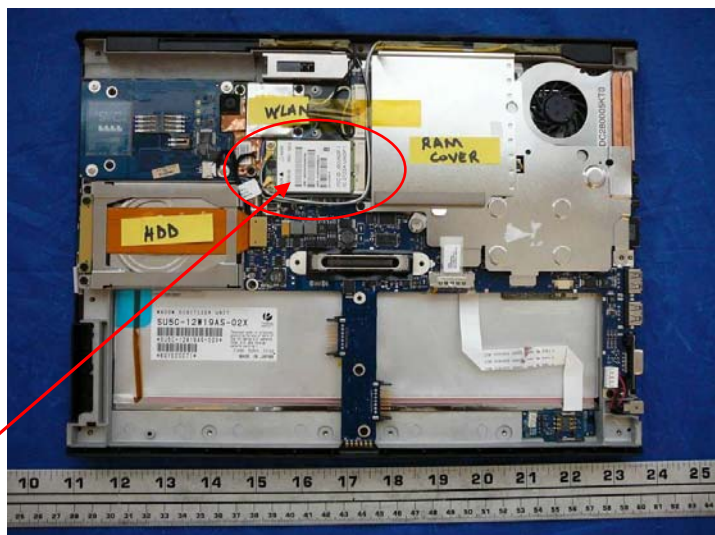
Technologies and bands Supported:

Frequency Bands	Operating Band	Transmit (TX) Frequency Range	Receive (RX) Frequency Range
Frequency Bands	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 IMT (band I) – used in EU	824 ~ 849 MHz 1850 ~ 1910 MHz 1920 ~ 1980 MHz	869 ~ 894 MHz 1930 ~ 1990 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 EUT Photo



WWAN Module



WWAN Module built into tablet PC

Additional Photos in Exhibit C

1.3 Mechanical Description

The EUT measures approximately 50 mm (L) × 30 mm (W) × 7 mm (H).

* The test data gathered are from typical production sample, serial number: B2085 Sample ID: 72251 provided by BACL.

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)

The Qualcomm module of GSM/CDMA/WCDMA Module installed in the EUT has been granted modular approval by the Federal Communications Commission under the FCC Part22H/24E with FCC ID: J9CUNDP-1, 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
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/EIA603-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.

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
Motion Computing Inc	Keyboard	MKB005	2135644300026
AKII Technology	AC/DC Adapter (DVD)	A10P1-05mp	-
Motion Computing Inc	DVD+-RW Drive	EDW087	CN-042020006-00381-781-000J Rev B00

2.7 EUT Internal Configuration Details

Manufacturers	Descriptions	Models	Serial Numbers
Motion Computing	Tablet PC	T008	00293593
RAM-DDR2	2G	2G*2	-
Intel Dual-Core	Processor	1.4G	-
Toshiba	HDD	120G	-
USI	Bluetooth Module	0826	-
Intel WiFi	WiFi Module	WiFi Link 5300	-
Novatel Wireless	GSM/CDMA/WCDMA Module	UNDP-1	-

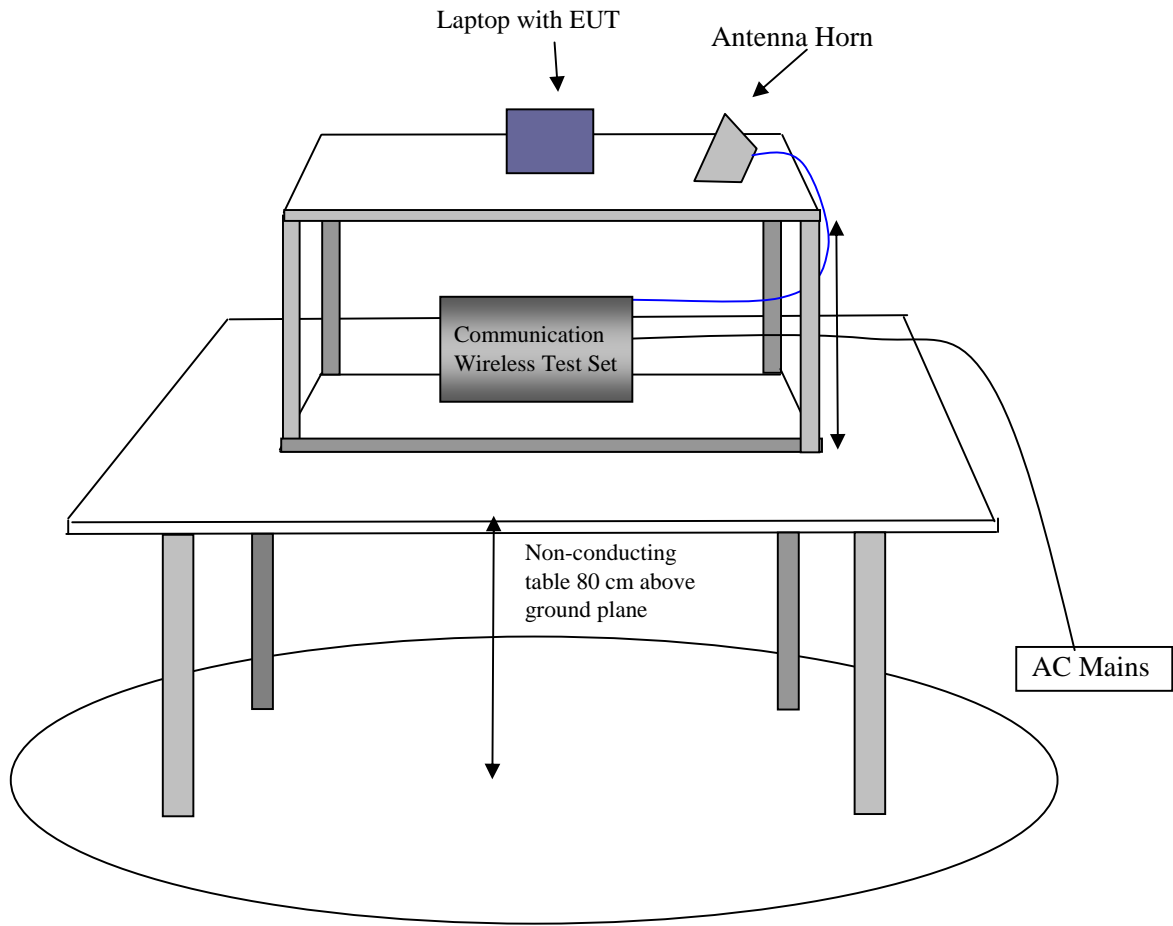
2.8 Power Supply and Line Filters

Manufacturer	Description	Model	Serial Number
Delta Electronic Inc	AC/DC Adapter	ADP-50HH REV.B	K0W0840034106

2.9 External I/O Cabling List and Details

Cable Descriptions	Length (m)	From	To
USB Cable	1.28	EUT	DVD+-RW Drive
-	-	-	-

2.10 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:J9CUNDP-1
§ 2.1051, § 22.917 § 24.238 (a)	Spurious Emissions at Antenna Terminals	Refer to FCC ID:J9CUNDP-1
§ 2.1053 § 22.917 (a) § 24.238 (a)	Field Strength of Spurious Radiation	Compliant
§ 22.917 § 24.238	Band Edge	Refer to FCC ID:J9CUNDP-1
§ 2.1055 § 22.355 § 24.235	Frequency stability vs. temperature Frequency stability vs. voltage	Refer to FCC ID:J9CUNDP-1
§ 2.1093	RF Exposure	Please See SAR report R0901082-SAR

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

4.1 Applicable Standard

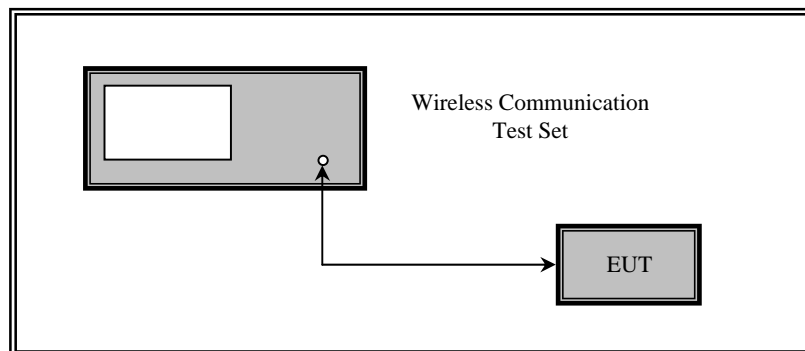
According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

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 Due Dates
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-04-28
Agilent	Analyzer, Communications Test Set	E5515C	GB44051221	2010-04-23
Sunol Sciences	Antenna	JB1	A103105-3	2009-03-25
A.R.A	Horn Antenna	DRG-118/A	1132	2009-07-28
A. H. Systems	Antenna, Horn, DRG	SAS-200/571	261	2009-07-01
HP	Pre-Amplifier	8449B	3008A01978	2009-10-21
HP	Pre-Amplifier	8447D	2944A06639	2009-12-19

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

4.5 Summary of Test Results

Environmental Conditions

Temperature:	21 °C
Relative Humidity:	50 %
ATM Pressure:	101.2 kPa

* Testing performed by Jack Liu on 2009-04-24

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	24.35	24.41	24.20	24.19	24.12	24.00
	RC1	S055	24.32	24.37	24.17	24.21	24.24	23.97
	RC2	S09	24.33	24.45	24.31	24.15	24.10	24.00
	RC2	S055	24.24	24.39	24.27	24.09	24.11	23.99
	RC3	S02	24.37	24.50	24.33	24.24	24.19	24.02
	RC3	S055	24.39	24.57	24.38	24.31	24.30	24.08
	RC4	S02	24.34	24.49	24.37	24.18	24.20	23.96
	RC4	S055	24.38	24.27	24.35	24.22	24.23	24.02
	RC5	S09	24.36	24.42	24.29	24.19	24.14	24.01
	RC5	S055	24.33	24.41	24.18	24.2	24.17	23.98
1xEV-DO Rev 0	FTAP Rate = 307.2 kbps (2 slot QPSK)	RTAP Rate = 9.6 kbps	24.39	24.43	24.40	24.21	24.26	23.90
		RTAP Rate = 19.2 kbps	24.37	24.40	24.33	24.11	24.13	23.84
		RTAP Rate = 38.4 kbps	24.41	24.39	24.28	24.19	24.22	23.88
		RTAP Rate = 76.8 kbps	24.38	24.42	24.36	24.22	24.20	23.81
		RTAP Rate = 153.6 kbps	24.56	24.64	24.51	24.41	24.38	23.92
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	24.41	24.54	24.36	24.33	24.44	24.17
		Subtype 2: RETAP payload size=4096 bits	24.35	24.53	24.20	24.30	24.39	24.12

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	24.14	24.21	24.12	24.15	24.32	24.16	
Rel 6 HSDPA	1	23.98	24.19	24.13	24.19	24.12	24.01	0
	2	23.82	23.99	23.98	24.14	24.03	24	0
	3	23.28	23.67	23.56	23.57	23.73	23.46	0.5
	4	23.27	23.66	23.49	23.45	23.58	23.39	0.5
Rel 6 HSUPA	1	23.79	24.03	23.81	24.02	24.01	23.97	0
	2	22.16	22.12	21.99	22.42	22.51	22.38	2
	3	22.68	22.79	22.56	22.87	22.91	22.69	1
	4	22.08	22.11	21.98	21.92	22.18	22.11	2
	5	23.97	23.99	23.85	24.09	24.13	24.01	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	32.63	32.48	32.23	29.41	29.26	29.35
EDGE	8PSK	27.25	27.22	27.08	25.96	25.80	25.88

Radiated Power (ERP and EIRP)

GPRS (850 MHz Band) Part 22H:

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain Correction (dBi)	Cable Loss (dB)			
824.2	105.78	81	178	V	824.2	32.30	0	0.21	32.09	38.45	-6.36
824.2	106.54	32	167	H	824.2	28.26	0	0.21	28.05	38.45	-10.40
836.6	107.18	83	179	V	836.6	33.40	0	0.21	33.19	38.45	-5.26
836.6	107.90	33	167	H	836.6	30.15	0	0.21	29.94	38.45	-8.51
848.8	108.01	82	171	V	848.8	33.74	0	0.21	33.53	38.45	-5.92
848.8	109.05	32	172	H	848.8	31.81	0	0.21	31.60	38.45	-6.85

EDGE (850 MHz Band) Part 22H:

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain Correction (dBi)	Cable Loss (dB)			
824.2	100.40	81	178	V	824.2	26.92	0	0.21	26.71	38.45	-11.74
824.2	101.10	31	170	H	824.2	22.82	0	0.21	22.61	38.45	-15.84
836.6	101.80	81	178	V	836.6	28.02	0	0.21	27.81	38.45	-10.64
836.6	102.46	32	170	H	836.6	24.71	0	0.21	24.50	38.45	-13.95
848.8	102.90	81	178	V	848.8	29.63	0	0.21	29.42	38.45	-9.03
848.8	104.27	33	169	H	848.8	27.03	0	0.21	26.82	38.45	-11.63

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

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain Correction (dBi)	Cable Loss (dB)			
824.70	94.25	180	110	V	824.70	20.99	0	0.21	20.78	38.45	-17.67
824.70	99.92	147	100	H	824.70	21.57	0	0.21	21.36	38.45	-17.09
836.52	94.16	183	110	V	836.52	20.38	0	0.21	20.17	38.45	-18.28
836.52	100.18	147	100	H	836.52	22.43	0	0.21	22.22	38.45	-16.23
848.31	97.23	183	110	V	848.31	24.07	0	0.21	23.86	38.45	-14.59
848.31	99.41	147	100	H	848.31	22.13	0	0.21	21.92	38.45	-16.53

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

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain Correction (dBi)	Cable Loss (dB)			
826.4	92.84	190	150	V	826.4	19.46	0	0.21	19.25	38.45	-19.20
826.4	97.83	41	100	H	826.4	19.70	0	0.21	19.49	38.45	-18.96
836.4	94.15	189	150	V	836.4	20.37	0	0.21	20.16	38.45	-18.29
836.4	99.24	43	105	H	836.4	21.49	0	0.21	21.28	38.45	-17.17
846.6	92.94	190	150	V	846.6	19.83	0	0.21	19.62	38.45	-18.83
846.6	98.11	43	101	H	846.6	20.85	0	0.21	20.64	38.45	-17.81

GPRS (1900 MHz Band) Part 24E:

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain Correction	Cable Loss (dB)			
1850.2	90.00	176	100	V	1850.2	17.30	9.5	0.38	26.42	33	-6.58
1850.2	92.21	132	125	H	1850.2	20.23	9.5	0.38	29.35	33	-3.65
1880.0	88.54	177	100	V	1880	16.76	9.0	0.38	25.38	33	-7.62
1880.0	90.90	132	130	H	1880	19.41	9.0	0.38	28.03	33	-4.97
1909.8	87.60	177	100	V	1909.8	16.95	9.0	0.38	25.57	33	-7.43
1909.8	90.91	131	130	H	1909.8	20.53	9.0	0.38	29.15	33	-3.85

EDGE (1900 MHz Band) Part 24E:

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain Correction	Cable Loss (dB)			
1850.2	86.60	176	100	V	1850.2	13.90	9.5	0.38	23.02	33	-9.98
1850.2	89.18	132	125	H	1850.2	17.20	9.5	0.38	26.32	33	-6.68
1880.0	83.99	177	100	V	1880.0	12.21	9.0	0.38	20.83	33	-12.17
1880.0	88.05	132	132	H	1880.0	16.56	9.0	0.38	25.18	33	-7.82
1909.8	83.14	177	100	V	1909.8	12.49	9.0	0.38	21.11	33	-11.89
1909.8	87.29	131	130	H	1909.8	16.91	9.0	0.38	25.53	33	-7.47

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

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain Correction	Cable Loss (dB)			
1851.25	87.82	177	116	V	1851.25	15.24	9.5	0.38	24.36	33	-8.64
1851.25	89.09	107	150	H	1851.25	17.24	9.5	0.38	26.36	33	-6.64
1880.00	86.88	177	114	V	1880.00	15.10	9.0	0.38	23.72	33	-9.28
1880.00	89.50	108	151	H	1880.00	18.01	9.0	0.38	26.63	33	-6.37
1908.75	86.13	178	116	V	1908.75	15.42	9.0	0.38	24.04	33	-8.96
1908.75	88.87	108	150	H	1908.75	18.38	9.0	0.38	27.00	33	-6.00

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

Indicated		Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain Correction	Cable Loss (dB)			
1852.4	82.97	175	100	V	1852.4	10.59	9.5	0.38	19.71	33	-13.29
1852.4	86.87	140	120	H	1852.4	15.09	9.5	0.38	24.21	33	-8.79
1880.0	83.05	174	100	V	1880.0	11.27	9.0	0.38	19.89	33	-13.11
1880.0	86.45	142	125	H	1880.0	14.96	9.0	0.38	23.58	33	-9.42
1907.5	82.99	175	100	V	1907.5	12.12	9.0	0.38	20.74	33	-12.26
1907.5	85.87	142	126	H	1907.5	15.23	9.0	0.38	23.85	33	-9.15

5 §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 §2.1049, §22.917, §22.905 & §24.238 - OCCUPIED BANDWIDTH

6.1 Applicable Standard

Requirements: CFR 47, Section 2.1049, Section 22.901, Section 22.917 and Section 24.238.

6.2 Test Results

Refer to FCC ID: J9CUNDP-1

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

7.1 Applicable Standard

Requirements: CFR 47, § 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: J9CUNDP-1

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

8.1 Applicable Standard

Requirements: CFR 47, § 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 Due Dates
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-04-28
Agilent	Analyzer, Communications Test Set	E5515C	GB44051221	2010-04-23
Sunol Sciences	Antenna	JB1	A103105-3	2009-03-25
A.R.A	Horn Antenna	DRG-118/A	1132	2009-07-28
A. H. Systems	Antenna, Horn, DRG	SAS-200/571	261	2009-07-01
HP	Pre-Amplifier	8449B	3008A01978	2009-10-21
HP	Pre-Amplifier	8447D	2944A06639	2009-12-19

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

8.4 Summary of Test Results

Environmental Conditions

Temperature:	21 °C
Relative Humidity:	50 %
ATM Pressure:	101.2 kPa

* Testing performed by Jack Liu on 2009-04-24

Worst case reading as follows:

Mode: Transmitting		
Margin (dB)	Frequency (MHz)	Antenna Polarization (Horizontal/Vertical)
-6.45	2509.2	Vertical

1) GPRS 850 MHz Band at Middle Channel (836.6 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)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)			
2509.8	56.67	219	100	V	2509.8	-36.81	9.4	1.37	-28.78	-13	-15.78
2509.8	52.92	112	100	H	2509.8	-46.29	9.4	1.37	-38.26	-13	-25.26
1673.2	56.32	15	200	V	1673.2	-50.68	9.3	1.05	-42.43	-13	-29.43
1673.2	51.48	161	100	H	1673.2	-53.71	9.3	1.05	-45.46	-13	-32.46

2) EDGE 850 MHz Band at Middle Channel (836.6 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)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)			
2509.8	45.69	219	130	V	2509.8	-47.79	9.4	1.37	-39.76	-13	-26.76
2509.8	42.73	112	100	H	2509.8	-56.48	9.4	1.37	-48.45	-13	-35.45

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)	
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain (dBi)				Cable Loss (dB)
1673.04	47.72	114	150	H	1673.04	-57.47	9.3	1.05	-49.22	-13	-36.22
1673.04	48.16	80	250	V	1673.04	-58.84	9.3	1.05	-50.59	-13	-37.59

4) WCDMA Release 99 850 MHz Band at Middle Channel (836.4 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)	
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain (dBi)				Cable Loss (dB)
2509.2	66.1	159	100	V	2509.2	-27.38	9.3	1.37	-19.45	-13	-6.45
2509.2	64.92	115	142	H	2509.2	-34.29	9.3	1.37	-26.36	-13	-13.36

5) GPRS 1900 MHz Band at Middle Channel (1880 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)	
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain (dBi)				Cable Loss (dB)
2395	52.59	193	150	V	2395	-48.33	9.6	1.33	-40.06	-13	-27.06
2395	47.48	130	150	H	2395	-56.93	9.6	1.33	-48.66	-13	-35.66

6) EDGE 1900 MHz Band at Middle Channel (1880 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)	
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain (dBi)				Cable Loss (dB)
2395	52.81	192	150	V	2395	-48.11	9.6	1.33	-39.84	-13	-26.84
2395	47.66	127	150	H	2395	-56.75	9.6	1.33	-48.48	-13	-35.48

7) CDMA 1X 1900 MHz Band at Middle Channel (1880 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)	
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain (dBi)				Cable Loss (dB)
3760	61.96	233	145	V	3760	-33.59	10.6	1.84	-24.83	-13	-11.83
3760	60.15	200	250	H	3760	-34.74	10.6	1.84	-25.98	-13	-12.98

8) WCDMA Release 99 1900 MHz Band Middle Channel (1880 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)	
Frequency (MHz)	S.A. Amp. (dBuV)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain (dBi)				Cable Loss (dB)
3760	61.29	249	130	V	3760	-34.26	10.6	1.84	-25.5	-13	-12.50
3760	55.65	167	244	H	3760	-39.24	10.6	1.84	-30.48	-13	-17.48

9 §22.917 & §24.238 – BAND EDGE

9.1 Applicable Standard

According to § 22.917, the power of any emissions 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.

According to §24.238, the power of any emissions 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.

9.2 Test Results

Refer to FCC ID: J9CUNDP-1

10 §2.1055 (a), §2.1055 (d), §22.355 & §24.235 - FREQUENCY STABILITY

10.1 Applicable Standard

Requirements: FCC § 2.1055 (a), § 2.1055 (d) & following:

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table C-1 of this section.

Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929	5.0	N/A	N/A
929 to 960	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

10.2 Test Results

Refer to FCC ID: J9CUNDP-1

11 §1.1307(b) & §2.1093 - RF EXPOSURE

11.1 Applicable Standard

FCC Part 1.1307 (b) and §2.1093.

11.2 Test Result

Compliant: The EUT is the portable device and thus requires SAR evaluation; please see BACL SAR Report R0901082-SAR for measurement and testing in details.