





FCC PART 22H, 24E & 27  
**TEST AND MEASUREMENT REPORT**

For

**Motion Computing Incorporated**

8601 Ranch Road 2222, Building 2,  
 Austin, TX 78730, USA

**FCC ID: Q3QHSMCMC8355**

<b>Report Type:</b> CIIPC Report	<b>Product Type:</b> Multiple Band WWAN Module
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<b>Report Number:</b> R1101193-222427	
<b>Report Date:</b> 2011-02-24	
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 \* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk “\*”

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## 1 GENERAL INFORMATION

### 1.1 Product Description for Equipment under Test (EUT)

This test and measurement report was prepared on behalf of Motion Computing Incorporated and their product FCC ID: Q3QHSMC8355, model: MC8355 which will henceforth be referred to as the EUT (Equipment Under Test). The EUT is a WWAN module that is embedded into the Motion Tablet PC (model: FWS-001), 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, 1700MHz, 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
<b>CDMA(1x/1xEVDO Rev 0, Rev A)</b> 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
<b>UMTS (WCDMA/HSDPA/HSUPA)</b> Cell (band V) – used in US/CA PCS (band II) – used in US/CA AWS(band IV) – 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 1710~1755MHz 830~840 MHz 880~915 MHz 1920~1980 MHz	869~894 MHz 1930~1990 MHz 2110~2155MHz 875~885 MHz 925~960 MHz 2110~2170 MHz
<b>GSM Band</b> 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

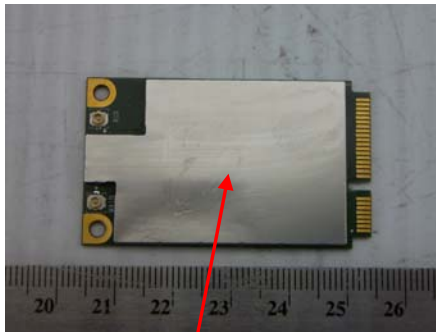
The WWAN Module measures approximately 5cm (L) × 3cm (W) × 0.5cm (H), weight 9g.

*The test data gathered are from typical production sample, IMEI number: 355096040017609 provided by manufacturer.*

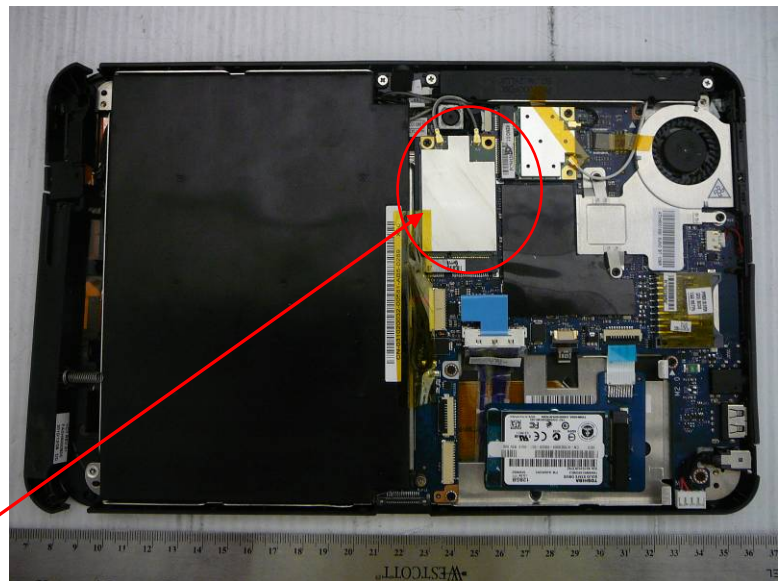
The tablet PC measures approximately 27cm (L) × 17.5cm (W) × 1.5cm (H), weight 968g (with standard battery).

*The test data gathered are from typical production sample, serial number: R1101193-4 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, Part 24 Subpart E, and Part 27 Subpart L of the Federal Communication Commissions rules.

This is class II permissive change report based on the antenna of WWAN module has been changed and the module has been built to Motion tablet PC FWS-001 (host). 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 ID: J9CGOBI3000; Name of Grantee: Qualcomm Incorporated  
Report #: 80-N2162-203 Rev. B for Conducted Test Report  
Report #: 10U13266-1 for Radiated Test Report

(2) FCC ID: N7NMC8355; 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

Part 27 Subpart L – MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

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  $\pm 2.0$  dB for Conducted Emissions tests and  $\pm 4.0$  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
-	-	-	-

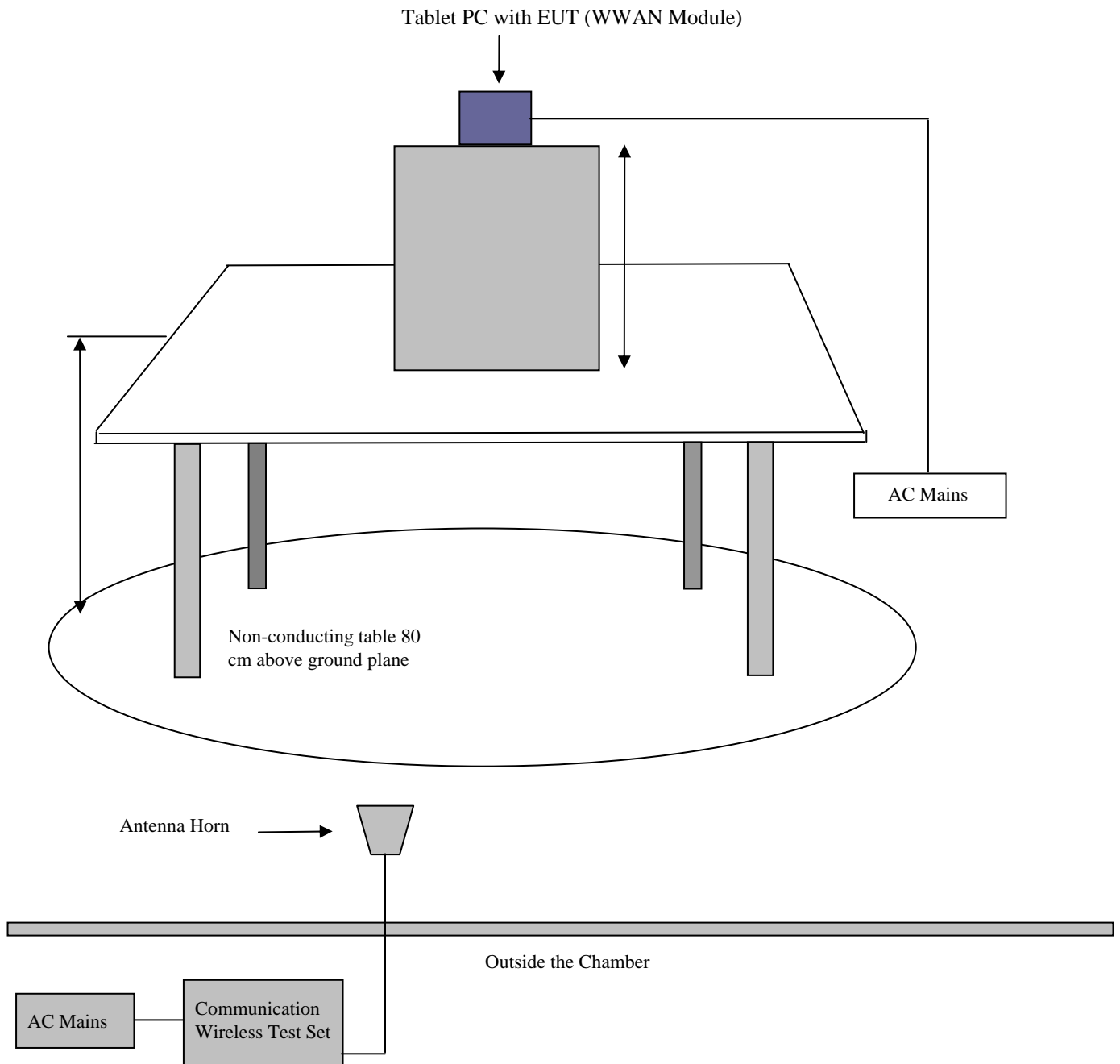
### 2.7 EUT Internal Configuration Details

Manufacturers	Descriptions	Models	Serial Numbers
Motion Computing	Tablet PC	FWS-001	-
Compal Electronics Inc.	Motherboard	PVX00 LA-6892P	-
Intel	Processor	1.5G	-
Toshiba	Solid State Drive	128G	X07S102KTF9Z
Atheros Communications	Bluetooth Module	AR5BBU12	-
RealTek	WiFi Module	RTL8191SU	74F06D1739CF 0B
Sierra Wireless	GSM/CDMA/WCDMA Module	MC8355	-

### 2.8 Power Supply and Line Filters

Manufacturer	Description	Model	Serial Number
Delta Electronics Inc	AC/DC Adapter	SADP-65NB	67LW038003A

### 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, §27.50(d)(4)	RF Output Power	Compliance
§2.1047	Modulation Characteristics	N/A
§2.1049, §22.917 §24.238, §27	Out of Band Emissions, Occupied Bandwidth	Compliance *
§2.1051, §22.917 §24.238 (a), §27.53	Spurious Emissions at Antenna Terminals	Compliance *
§ 2.1053, §22.917 (a) §24.238 (a), §27.53	Field Strength of Spurious Radiation	Compliant
§22.917, §24.238 §27.53(h)	Band Edge	Compliance *
§2.1055, §22.355 §24.235, §27.54	Frequency stability vs. temperature Frequency stability vs. voltage	Compliance *
§2.1093	RF Exposure Info	Compliance **

Note: \* Please refer to FCC ID: J9CGOBI3000 and FCC ID: N7NMC8355

\*\* Please refer to SAR Report: R1101193-SAR.

## 4 FCC §2.1046, §22.913(a), §24.232 & §27.50(d)(4) – 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.

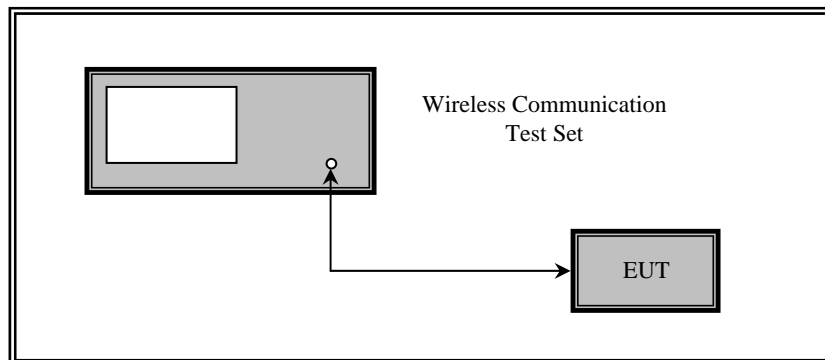
According to FCC §2.1046 and §24.232 (a), in no case may the peak output power of a base station transmitter exceed 2 watt.

According to FCC §2.1046 and §27.50 (d) (4), Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP. Fixed stations operating in this band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in this band must employ a means for limiting power to the minimum necessary for successful communications.

### 4.2 Test Procedures

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.

##### *1xEV-DO*

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	Communications Test Set	E5515C	GB44051221	2010-06-11
A.H Systems	Antenna, Horn	SAS-200/571	261	2010-09-23
Hewlett Packard	Pre amplifier	8447D	2944A06639	2010-06-18
Sunol Science Corp	Combination Antenna	JB3	A0020106-3	2010-06-16
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2010-03-24
Sunol Science Corp	System Controller	SC99V	122303-1	N/R
A.R.A Inc	Horn antenna	DRG-1181A	1132	2010-11-29
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09
Mini-Circuits	Pre Amplifier	ZVA-183-S	570400946	2010-05-10

*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

<b>Temperature:</b>	15~25° C
<b>Relative Humidity:</b>	30~63%
<b>ATM Pressure:</b>	101.2~103.5kPa

*Testing was performed by Jack Liu on 2011-01-18 ~ 2011-02-11.*

## 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	24.31	24.54	24.30	24.45	24.20	24.08
	RC1	S055	24.46	24.41	24.40	24.57	24.27	24.50
	RC2	S09	24.41	24.30	24.39	24.50	24.25	24.29
	RC2	S055	24.40	24.54	24.42	24.58	24.34	24.24
	RC3	S02	24.42	24.35	24.30	24.51	24.23	24.12
	RC3	S055	<b>24.65</b>	<b>24.63</b>	<b>24.54</b>	<b>24.76</b>	<b>24.34</b>	<b>24.44</b>
	RC4	S02	24.50	24.38	24.34	24.58	24.23	24.12
	RC4	S055	24.47	24.41	24.26	24.58	24.08	24.13
	RC5	S09	24.48	24.40	24.31	24.41	24.26	23.96
	RC5	S055	24.50	24.37	24.25	24.45	24.40	24.00
1xEV-DO Rel 0	FTAP Rate = 307.2 kbps (2 slot QPSK)	RTAP Rate = 9.6 kbps	24.40	24.23	24.20	24.33	24.30	24.45
		RTAP Rate = 19.2 kbps	24.43	24.38	24.16	24.38	24.41	24.40
		RTAP Rate = 38.4 kbps	24.34	24.46	24.33	24.30	24.27	24.36
		RTAP Rate = 76.8 kbps	24.44	24.31	24.18	24.36	24.10	24.33
		RTAP Rate = 153.6 kbps	<b>24.49</b>	<b>24.56</b>	<b>24.59</b>	<b>24.41</b>	<b>24.36</b>	<b>24.47</b>
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	24.33	24.45	24.43	24.38	24.39	24.44
		Subtype 2: RETAP payload size=4096 bits	<b>24.50</b>	<b>24.47</b>	<b>24.46</b>	<b>24.43</b>	<b>24.41</b>	<b>24.29</b>

## 2) WCDMA/HSDPA/HSUPA

Mode	3GPP Sub test	Band V Channels			Band IV Channels			Band II Channels			MPR
		CH 4132 (dBm)	CH 4182 (dBm)	CH 4233 (dBm)	CH 1312 (dBm)	CH 1427 (dBm)	CH 1513 (dBm)	CH 9262 (dBm)	CH 9400 (dBm)	CH 9538 (dBm)	
Rel 99	1	24.38	24.24	24.40	24.63	24.60	24.51	23.21	24.30	24.50	
Rel 6 HSDPA	1	23.50	23.66	23.84	23.44	23.60	23.61	23.28	23.71	24.19	0
	2	23.44	23.34	23.60	24.25	24.31	24.35	23.01	23.50	24.11	0
	3	23.43	23.38	23.96	23.99	24.11	24.00	21.00	22.95	23.81	0.5
	4	23.42	23.70	23.60	24.07	24.31	24.22	20.43	22.66	23.70	0.5
Rel 6 HSUPA	1	24.00	24.33	23.80	23.73	23.38	24.02	24.41	24.40	24.20	0
	2	23.90	23.87	23.71	23.00	23.14	23.05	23.56	23.78	24.34	2
	3	23.87	23.90	23.44	23.11	23.08	23.20	23.66	24.07	24.06	1
	4	24.01	23.90	23.87	23.30	23.17	23.31	24.21	24.11	24.37	2
	5	24.11	24.40	23.59	23.22	23.35	23.40	24.10	24.33	24.50	0

## 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 (1UL slot)	GMSK	32.79	32.98	32.38	29.82	29.71	29.96
GPRS (2UL slot)	GMSK	32.72	32.62	32.34	30.42	30.60	29.91
EDGE	8PSK	28.24	28.36	28.23	26.80	27.05	27.04

**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. (dB)	Cable Loss (dB)			
824.2	95.52	77	236	V	824.2	22.5	0	0.6	21.9	38.45	-16.55
824.2	97.67	143	166	H	824.2	22.79	0	0.6	22.19	38.45	-16.26
836.6	96.45	77	235	V	836.6	23.68	0	0.6	23.08	38.45	-15.37
836.6	98.56	143	165	H	836.6	22.86	0	0.6	22.26	38.45	-16.19
848.8	96.52	77	235	V	848.8	23.73	0	0.6	23.13	38.45	-15.32
848.8	98.66	143	165	H	848.8	22.33	0	0.6	21.73	38.45	-16.72

## 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. (dB)	Cable Loss (dB)			
824.2	95.9	78	238	V	824.2	22.88	0	0.6	22.28	38.45	-16.17
824.2	97.65	143	162	H	824.2	22.77	0	0.6	22.17	38.45	-16.28
836.6	96.26	77	232	V	836.6	23.49	0	0.6	22.89	38.45	-15.56
836.6	98.64	142	162	H	836.6	22.94	0	0.6	22.34	38.45	-16.11
848.8	96.48	79	214	V	848.8	23.69	0	0.6	23.09	38.45	-15.36
848.8	98.51	142	162	H	848.8	22.18	0	0.6	21.58	38.45	-16.87

## 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. (dB)	Cable Loss (dB)			
824.7	89.75	85	230	V	824.7	16.73	0	0.6	16.13	38.45	-54.58
824.7	91.88	130	171	H	824.7	17	0	0.6	16.4	38.45	-54.85
836.52	90.76	85	230	V	836.52	17.99	0	0.6	17.39	38.45	-55.84
836.52	91.51	130	171	H	836.52	15.81	0	0.6	15.21	38.45	-53.66
848.31	91.42	85	230	V	848.31	18.63	0	0.6	18.03	38.45	-56.48
848.31	91.72	130	177	H	848.31	15.39	0	0.6	14.79	38.45	-53.24

## 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. (dB)	Cable Loss (dB)			
826.4	88.36	88	221	V	826.4	15.34	0	0.6	14.74	38.45	-23.71
826.4	90.72	142	168	H	826.4	15.84	0	0.6	15.24	38.45	-23.21
836.4	89.65	88	221	V	836.4	16.88	0	0.6	16.28	38.45	-22.17
836.4	91.34	142	220	H	836.4	15.64	0	0.6	15.04	38.45	-23.41
846.6	90.46	88	221	V	846.6	17.67	0	0.6	17.07	38.45	-21.38
846.6	92.19	142	220	H	846.6	15.86	0	0.6	15.26	38.45	-23.19

## 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	90.68	72	147	V	1850.2	18.86	9.5	1.34	27.02	33	-5.98
1850.2	94.2	55	150	H	1850.2	21.52	9.5	1.34	29.68	33	-3.32
1880	90.91	73	190	V	1880	19.09	9	1.34	26.75	33	-6.25
1880	93.67	52	150	H	1880	20.99	9	1.34	28.65	33	-4.35
1909.8	89.67	76	150	V	1909.8	17.85	9	1.34	25.51	33	-7.49
1909.8	93.32	48	172	H	1909.8	20.64	9	1.34	28.3	33	-4.7

## 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	87.78	71	147	V	1850.2	15.96	9.5	1.34	24.12	33	-8.88
1850.2	90.03	53	173	H	1850.2	17.35	9.5	1.34	25.51	33	-7.49
1880	88.47	72	185	V	1880	16.65	9	1.34	24.31	33	-8.69
1880	90.05	53	149	H	1880	17.37	9	1.34	25.03	33	-7.97
1909.8	86.86	75	152	V	1909.8	15.04	9	1.34	22.7	33	-10.3
1909.8	89.79	48	172	H	1909.8	17.11	9	1.34	24.77	33	-8.23



## 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	85.87	92	192	V	1851.25	14.05	9	1.34	21.71	33	-11.29
1851.25	89.48	145	147	H	1851.25	16.8	9.5	1.34	24.96	33	-8.04
1880	86.29	90	188	V	1880	14.47	9	1.34	22.13	33	-10.87
1880	89.23	145	148	H	1880	16.55	9	1.34	24.21	33	-8.79
1908.75	86.7	62	159	V	1908.75	14.88	9	1.34	22.54	33	-10.46
1908.75	88.93	142	104	H	1908.75	16.25	9	1.34	23.91	33	-9.09

## 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	86.24	70	146	V	1852.4	14.42	9.5	1.34	22.58	33	-10.42
1852.4	88.84	45	154	H	1852.4	16.16	9.5	1.34	24.32	33	-8.68
1880	87.18	74	210	V	1880	15.36	9	1.34	23.02	33	-9.98
1880	89.33	47	149	H	1880	16.65	9	1.34	24.31	33	-8.69
1907.5	85.25	74	142	V	1907.5	13.43	9	1.34	21.09	33	-11.91
1907.5	88.59	44	168	H	1907.5	15.91	9	1.34	23.57	33	-9.43

## WCDMA Release 99 (1700 MHz Band) Part 27L:

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)			
1712.4	86.17	92	160	V	1712.4	14.35	9.5	1.34	22.51	30	-7.49
1712.4	86.43	48	141	H	1712.4	13.75	9.5	1.34	21.91	30	-8.09
1735.4	86.2	96	184	V	1735.4	14.38	9	1.34	22.04	30	-7.96
1735.4	87.1	41	147	H	1735.4	14.42	9	1.34	22.08	30	-7.92
1752.6	86.86	88	208	V	1752.6	15.04	9	1.34	22.7	30	-7.3
1752.6	87.11	44	144	H	1752.6	14.43	9	1.34	22.09	30	-7.91

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## **5 FCC §2.1047 - MODULATION CHARACTERISTIC**

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### **5.1 Applicable Standard**

According to FCC §2.1047(d), Part 22H & 24E & 27L there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

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## **6 FCC §2.1049, §22.917, §22.905, §24.238 & §27 - OCCUPIED BANDWIDTH**

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### **6.1 Applicable Standard**

Requirements: FCC §2.1049, §22.901, §22.917, §24.238 and §27.

### **6.2 Test Results**

Please refer to FCC ID: J9CGOBI3000 & FCC ID: N7NMC8355.

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## **7 FCC §2.1051, §22.917, §24.238(a) & §27.53 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS**

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### **7.1 Applicable Standard**

Requirements: FCC §2.1051, §22.917 & §24.238(a), §27.53.

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

### **7.2 Test Results**

Please refer to FCC ID: J9CGOBI3000 & FCC ID: N7NMC8355.

## 8 FCC §2.1053, §22.917, §24.238 & §27.53 - RADIATED SPURIOUS EMISSIONS

### 8.1 Applicable Standard

Requirements: FCC §2.1053, §22.917, §24.238, §24.55.

### 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 Log<sub>10</sub> (power out in Watts)

### 8.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Number	Calibration Dates
Agilent	Communications Test Set	E5515C	GB44051221	2010-06-11
A.H Systems	Antenna, Horn	SAS-200/571	261	2010-09-23
Hewlett Packard	Pre amplifier	8447D	2944A06639	2010-06-18
Sunol Science Corp	Combination Antenna	JB3	A0020106-3	2010-06-16
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2010-03-24
Sunol Science Corp	System Controller	SC99V	122303-1	N/R
A.R.A Inc	Horn antenna	DRG-1181A	1132	2010-11-29
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09
Mini-Circuits	Pre Amplifier	ZVA-183-S	570400946	2010-05-10

**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

<b>Temperature:</b>	15~25° C
<b>Relative Humidity:</b>	30~63%
<b>ATM Pressure:</b>	101.2~103.5kPa

Testing was performed by Jack Liu on 2011-01-18 ~ 2011-02-11.

## 8.5 Summary of Test Results

Worst case reading as follows:

<b>Mode: Transmitting</b>		
<b>Margin (dB)</b>	<b>Frequency (MHz)</b>	<b>Antenna Polarization (Horizontal/Vertical)</b>
-14.45	5640	Vertical

1) GPRS 850 MHz Band at Mid Channel (836.6 MHz)

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

<b>Indicated</b>		<b>Azimuth (degree)</b>	<b>Test Antenna</b>		<b>Substituted</b>				<b>Absolute Level (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>
<b>Freq. (MHz)</b>	<b>S.A. Amp. (dBuV)</b>		<b>Height (cm)</b>	<b>Polar (H/V)</b>	<b>Freq. (MHz)</b>	<b>S.G. Level (dBm)</b>	<b>Ant. Gain (dBi)</b>	<b>Cable Loss (dB)</b>			
1673.2	61.35	178	148	V	1673.2	-48.8	7.8	1.34	-42.34	-13	-29.34
1673.2	58.7	320	150	H	1673.2	-51.45	7.8	1.34	-44.99	-13	-31.99
2509.8	50.29	329	150	V	2509.8	-55.07	7.9	1.66	-48.83	-13	-35.83
2509.8	53.63	193	160	H	2509.8	-51.73	7.9	1.66	-45.49	-13	-32.49

2) EDGE 850 MHz Band at Mid Channel (836.6 MHz)

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

<b>Indicated</b>		<b>Azimuth (degree)</b>	<b>Test Antenna</b>		<b>Substituted</b>				<b>Absolute Level (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>
<b>Freq. (MHz)</b>	<b>S.A. Amp. (dBuV)</b>		<b>Height (cm)</b>	<b>Polar (H/V)</b>	<b>Freq. (MHz)</b>	<b>S.G. Level (dBm)</b>	<b>Ant. Gain (dBi)</b>	<b>Cable Loss (dB)</b>			
1673.2	60.63	186	126	V	1673.2	-49.52	7.8	1.34	-43.06	-13	-30.06
1673.2	58.45	320	109	H	1673.2	-51.7	7.8	1.34	-45.24	-13	-32.24
2509.8	48.83	271	114	V	2509.8	-56.53	7.9	1.66	-50.29	-13	-37.29
2509.8	48.54	215	119	H	2509.8	-56.82	7.9	1.66	-50.58	-13	-37.58

## 3) CDMA 1X 850 MHz Band at Low Channel (824.7 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)			
1649.4	48.13	158	150	V	1649.4	-62.02	7.8	1.34	-55.56	-13	-42.56
1649.4	48.16	53	150	H	1649.4	-61.99	7.8	1.34	-55.53	-13	-42.53

## 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	54.47	358	131	V	1693.2	-55.68	7.8	1.34	-49.22	-13	-36.22
1693.2	53.89	49	100	H	1693.2	-56.26	7.8	1.34	-49.8	-13	-36.8

## 5) GPRS 1900 MHz Band at Mid 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)
Freq. (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Freq. (MHz)	S.G. Level (dBm)	Ant. Gain (dBi)	Cable Loss (dB)			
3760	46.2	77	139	V	3760	-54.24	9.5	1.68	-46.42	-13	-33.42
3760	45.76	164	150	H	3760	-54.58	9.5	1.68	-46.76	-13	-33.76
5640	58.05	171	148	V	5640	-36.41	11.3	2.34	-27.45	-13	-14.45
5640	54.12	215	158	H	5640	-40.42	11.3	2.34	-31.46	-13	-18.46

## 6) EDGE 1900 MHz Band at Mid 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)
Freq. (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Freq. (MHz)	S.G. Level (dBm)	Ant. Gain (dBi)	Cable Loss (dB)			
3760	45.1	145	150	V	3760	-55.34	9.5	1.68	-47.52	-13	-34.52
3760	44.31	185	150	H	3760	-56.03	9.5	1.68	-48.21	-13	-35.21
5640	46.68	354	124	V	5640	-47.78	11.3	2.34	-38.82	-13	-25.82
5640	47.3	144	150	H	5640	-47.24	11.3	2.34	-38.28	-13	-25.28

## 7) CDMA 1X 1900 MHz Band at High Channel (1908.75 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 (cm)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)			
3817.5	48.07	204	141	V	3817.5	-52.37	9.5	1.68	-44.55	-13	-31.55
3817.5	46.15	311	249	H	3817.5	-54.19	9.5	1.68	-46.37	-13	-33.37
5726.25	53.65	33	150	V	5726.25	-40.81	11.3	2.34	-31.85	-13	-18.85
5726.25	54.13	300	235	H	5726.25	-40.41	11.3	2.34	-31.45	-13	-18.45

## 8) WCDMA Release 99 1900 MHz Band High Channel (1907.5 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)			
3814.8	50.73	14	126	V	3814.8	-49.71	9.5	1.68	-41.89	-13	-28.89
3814.8	51.93	208	148	H	3814.8	-48.41	9.5	1.68	-40.59	-13	-27.59
5722.2	48.56	67	110	V	5722.2	-45.9	11.3	2.34	-36.94	-13	-23.94
5722.2	46.99	330	150	H	5722.2	-47.55	11.3	2.34	-38.59	-13	-25.59

## 9) WCDMA Release 99 1700MHz Band Low Channel (1712.4 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)			
3424.8	43.49	182	142	V	3424.8	-56.95	10.9	1.68	-47.73	-13	-34.73
3424.8	47.12	214	118	H	3424.8	-53.22	10.9	1.68	-44	-13	-31



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## **9 FCC §22.917 & §24.238 & §27.53(h) – BAND EDGE**

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### **9.1 Applicable Standard**

According to FCC §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 FCC §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.

According to FCC §27.53 (h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log_{10}(P)$  dB.

### **9.2 Test Results**

Please refer to FCC ID: J9CGOBI3000 & FCC ID: N7NMC8355.

## 10 FCC §2.1055, §22.355, §24.235 & §27.54 - FREQUENCY STABILITY

### 10.1 Applicable Standard

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

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

According to FCC §27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

### 10.2 Test Results

Please refer to FCC ID: J9CGOBI3000 & FCC ID: N7NMC8355.

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## **11 FCC §1.1307(b) & §2.1093 - RF EXPOSURE INFORMATION**

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### **11.1 Applicable Standard**

FCC §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 R1101193-SAR for measurement and testing in details.