



FCC PART 22H

TEST REPORT

For

Shenzhen Cuckoo Wireless Co., Ltd.

Room # M405, WanJi Industrial Park, #39 on Kejizhong 2nd Road,
High-tech Industrial Park, Nanshan District, Shenzhen, Guangdong, China

FCC ID: ZVFBUGU201101

Report Type: Original Report	Product Type: Harvilon EV-DO Modem
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Report Number: <u>RSZ110809001-00</u>	
Report Date: <u>2011-08-28</u>	
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* This report contains data that are not covered by the NVLAP accreditation and are marked with an asterisk “★” (Rev.2)

TABLE OF CONTENTS

1 GENERAL INFORMATION.....	4
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	4
1.2 OBJECTIVE	4
1.3 RELATED SUBMITTAL(S)/GRANT(S)	4
1.4 TEST METHODOLOGY	4
1.5 TEST FACILITY	5
2 SYSTEM TEST CONFIGURATION.....	6
2.1 DESCRIPTION OF TEST CONFIGURATION	6
2.2 SPECIAL ACCESSORIES	6
2.3 EQUIPMENT MODIFICATIONS	6
2.4 LOCAL SUPPORT EQUIPMENT LIST AND DETAILS.....	6
2.5 BLOCK DIAGRAM OF TEST SETUP	6
3 SUMMARY OF TEST RESULTS	7
4 FCC §1.1307 & §2.1093 - RF EXPOSURE INFORMATION.....	8
4.1 APPLICABLE STANDARD.....	8
4.2 TEST RESULT	8
5 FCC §2.1047 - MODULATION CHARACTERISTIC	9
6 FCC §2.1046 & §22.913 (A) - RF OUTPUT POWER	10
6.1 APPLICABLE STANDARD.....	10
6.2 TEST PROCEDURE.....	10
6.3 TEST EQUIPMENT LIST AND DETAILS	10
6.4 TEST DATA.....	11
7 FCC §2.1049, §22.917& §22.905 - OCCUPIED BANDWIDTH.....	13
7.1 APPLICABLE STANDARD.....	13
7.2 TEST PROCEDURE.....	13
7.3 TEST EQUIPMENT LIST AND DETAILS	13
7.4 TEST DATA.....	13
8 FCC §2.1051 & §22.917(A) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS.....	21
8.1 APPLICABLE STANDARD.....	21
8.2 TEST PROCEDURE.....	21
8.3 TEST EQUIPMENT LIST AND DETAILS	21
8.4 TEST DATA.....	21
9 FCC §2.1053 & §22.917 - SPURIOUS RADIATED EMISSIONS	25
9.1 APPLICABLE STANDARD.....	25
9.2 TEST PROCEDURE.....	25
9.3 TEST EQUIPMENT LIST AND DETAILS	25
9.4 TEST DATA.....	26
10 FCC §22.917(A) - BAND EDGES	27
10.1 APPLICABLE STANDARD.....	27
10.2 TEST PROCEDURE.....	27
10.3 TEST EQUIPMENT LIST AND DETAILS	27
10.4 TEST DATA.....	27

11 FCC §2.1055 & §22.355 - FREQUENCY STABILITY.....	30
11.1 APPLICABLE STANDARD.....	30
11.2 TEST PROCEDURE.....	30
11.3 TEST EQUIPMENT LIST AND DETAILS.....	31
11.4 TEST DATA.....	31

1 GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

The *ShenZhen Cuckoo Wireless Co., Ltd*'s product, model number: *Harvilon ED269 (FCC ID: ZVFBUGU201101)*(the "EUT") in this report is a *Harvilon EVDO Modem*, which was measured approximately: 8.9 cm (L) x 2.8 cm (W) x 1.0 cm (H), rated input voltage: DC 5V from USB port.

** All measurement and test data in this report was gathered from production sample serial number: 1108017 (Assigned by BACL, Shenzhen). The EUT was received on 2011-08-09.*

1.2 Objective

This report is prepared on behalf of *ShenZhen Cuckoo Wireless Co., Ltd* in accordance with Part 2, Subpart J, Part 22 Subpart H of the Federal Communication Commissions rules.

The objective is to determine the compliance of EUT with FCC rules for output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, spurious radiated emission, frequency stability, band edge and radiated margin.

1.3 Related Submittal(s)/Grant(s)

N/A

1.4 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 - Public Mobile Services

Applicable Standards: TIA/EIA 603-C, ANSI C63.4-2009.

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

The uncertainty of any RF tests which use conducted method measurement is ± 0.96 dB, the uncertainty of any radiation on emissions measurement is ± 4.0 dB

1.5 Test Facility

The Test site used by Bay Area Compliance Laboratories Corp.(Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



The current scope of accreditations can be found at <http://ts.nist.gov/Standards/scopes/2007070.htm>

2 SYSTEM TEST CONFIGURATION

2.1 Description of Test Configuration

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 Special Accessories

N/A

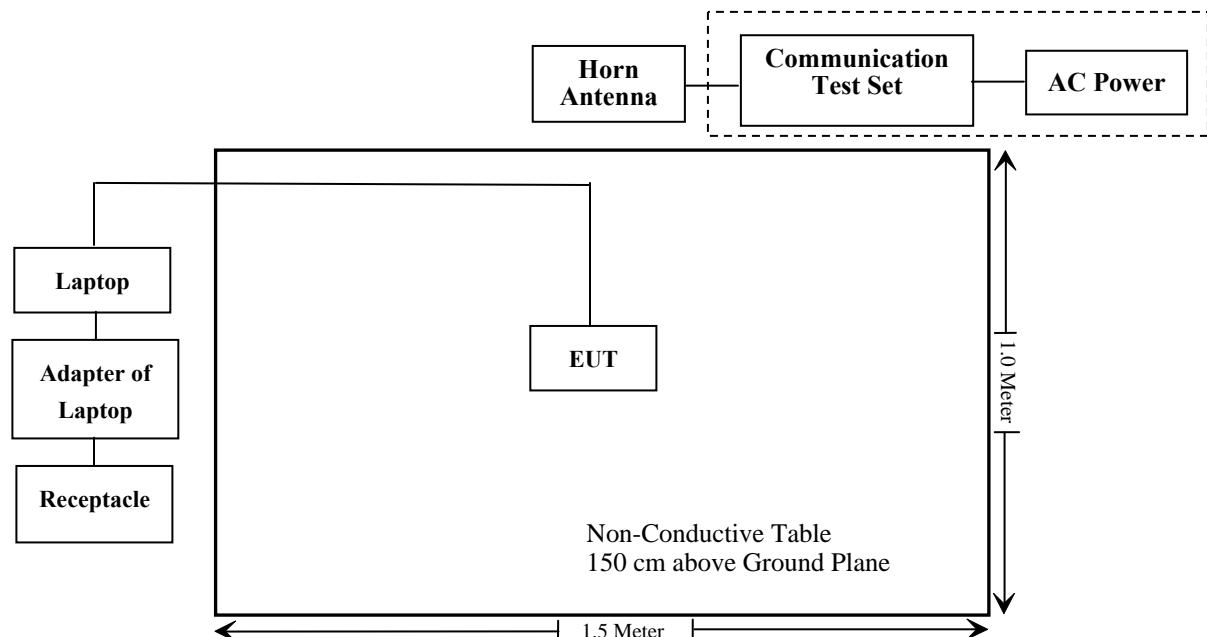
2.3 Equipment Modifications

No modifications were made to the EUT.

2.4 Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Agilent	Communication Test Set	E5515C	GB46160111
IBM	Laptop	T40	N/A

2.5 Block Diagram of Test Setup



3 SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 (b)(1), §2.1093	RF Exposure Information	Compliance
§2.1046; §22.913 (a)	RF Output Power	Compliance
§2.1047	Modulation Characteristics	N/A
§2.1049; §22.905 §22.917	99% & -26 dB Occupied Bandwidth	Compliance
§2.1051, §22.917 (a)	Spurious Emissions at Antenna Terminal	Compliance
§2.1053 §22.917 (a)	Field Strength of Spurious Radiation	Compliance
§22.917 (a)	Out of band emission, Band Edge	Compliance
§2.1055 §22.355	Frequency stability vs. temperature Frequency stability vs. voltage	Compliance

Note: * Please refer to SAR report released by BACL, report number: RSZ110809001-20.

4 FCC §1.1307 & §2.1093 - RF EXPOSURE INFORMATION

4.1 Applicable Standard

FCC §1.1307 and §2.1093.

4.2 Test Result

Compliance, please refer to the SAR report: RSZ110809001-20

5 FCC §2.1047 - MODULATION CHARACTERISTIC

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

6 FCC §2.1046 & §22.913 (a) - RF OUTPUT POWER

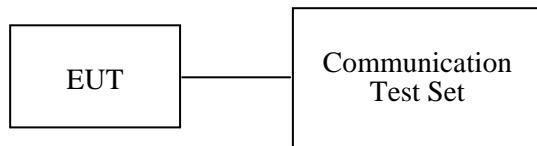
6.1 Applicable Standard

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

6.2 Test Procedure

Conducted method:

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



Radiated method (ERP and EIRP):

TIA 603-C section 2.2.17

6.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2011-07-05	2012-07-04
HP	Signal Generator	HP8657A	2849U00982	2010-10-28	2011-10-27
HP	Amplifier	HP8447D	2944A09795	2011-08-02	2012-08-02
COM POWER	Dipole Antenna	AD-100	041000	2010-09-25	2011-09-25

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

6.4 Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Back Huang on 2011-08-15.

1) Conducted Power:

Mode	Channel	Conducted Output Power (dBm)			
		1xEVDO Rev. 0 (FTAP)	1xEVDO Rev. 0 (RTAP)	1xEVDO Rev. A (FETAP)	1xEVDO Rev. A (RETAP)
CDMA 1xEV-DO	Low (1013)	23.98	24.07	23.97	23.95
	Mid (384)	23.95	24.05	24.01	24.00
	High (777)	23.96	23.97	23.95	23.99

Mode	FED	REV	Low CH (824.7 MHz)	Mid CH (836.52 MHz)	High CH (848.31 MHz)
CDMA 1xRTT	RC1	SO2 (Loopback)	24.08	23.89	24.17
		SO55 (Loopback)	24.12	23.85	24.18
	RC2	SO9 (Loopback)	24.06	23.91	24.15
		SO55 (Loopback)	24.01	23.88	24.19
	RC3	SO2 (Loopback)	24.08	23.92	24.17
		SO55 (Loopback)	24.10	23.90	24.14
		SO32 (+ F-SCH)	24.00	23.87	24.16
		SO32 (+ SCH)	24.06	23.86	24.20
	RC4	SO2 (Loopback)	24.03	23.87	24.14
		SO55 (Loopback)	24.11	23.89	24.12
		SO32 (+ F-SCH)	24.10	23.90	24.16
		SO32 (+ SCH)	24.10	23.90	24.16
	RC5	SO9 (Loopback)	24.06	23.85	24.18
		SO55 (Loopback)	24.08	23.83	24.15

2) ERP:

Indicated		Table Angle Degree	Test Antenna		Substituted			Antenna Gain Correction (dBd)	Cable Loss (dB)	Absolute Level (dBm)	Part 22H	
Frequency (MHz)	S.A. Reading (dB μ V)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Ant. Polar (H/V)				Limit (dBm)	Margin (dB)
824.7	120.15	171	1.3	H	824.7	23.87	H	0	0.5	23.37	38.45	15.08
824.7	116.04	152	1.5	V	824.7	19.63	V	0	0.5	19.13	38.45	19.32
836.52	120.36	249	1.2	H	836.52	24.02	H	0	0.5	23.52	38.45	14.93
836.52	116.18	213	1.6	V	836.52	19.67	V	0	0.5	19.17	38.45	19.28
848.31	120.86	138	1.5	H	848.31	24.52	H	0	0.5	24.02	38.45	14.43
848.31	116.72	204	1.7	V	848.31	20.28	V	0	0.5	19.78	38.45	18.67

7 FCC §2.1049, §22.917& §22.905 - OCCUPIED BANDWIDTH

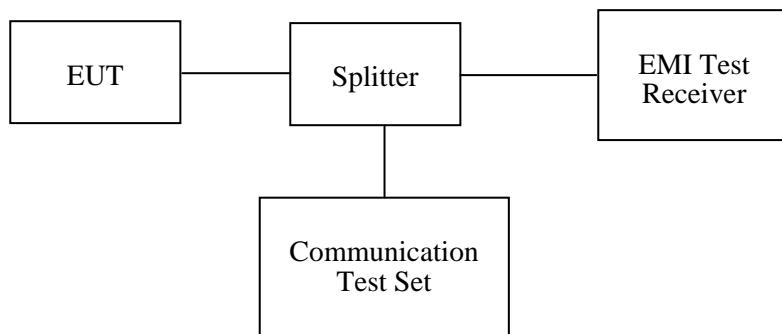
7.1 Applicable Standard

FCC §2.1049, §22.917, §22.905.

7.2 Test Procedure

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

The resolution bandwidth of the spectrum analyzer was set at 30 kHz and the 26 dB & 99% bandwidth was recorded.



7.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

7.4 Test Data

Environmental Conditions

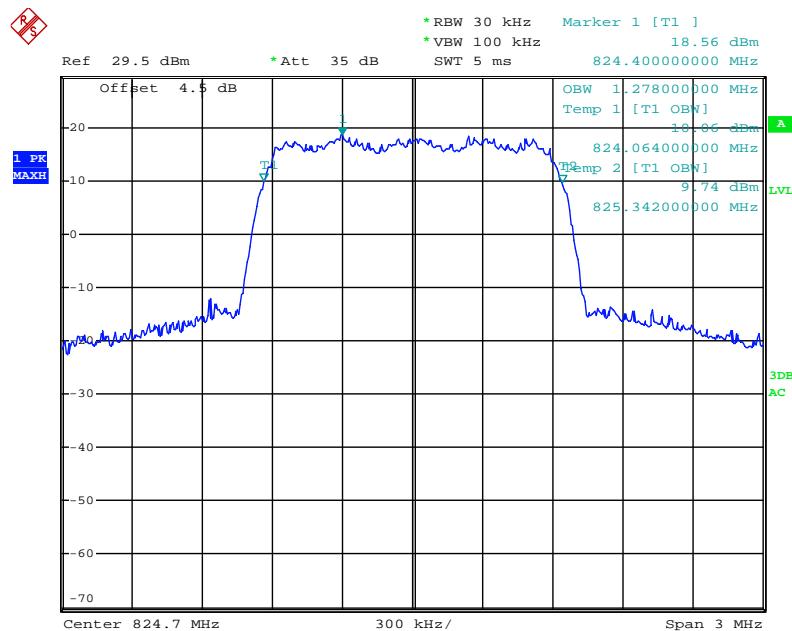
Temperature:	25 °C
Relative Humidity:	56%
ATM Pressure:	100.0kPa

The testing was performed by Back Huang on 2011-08-24.

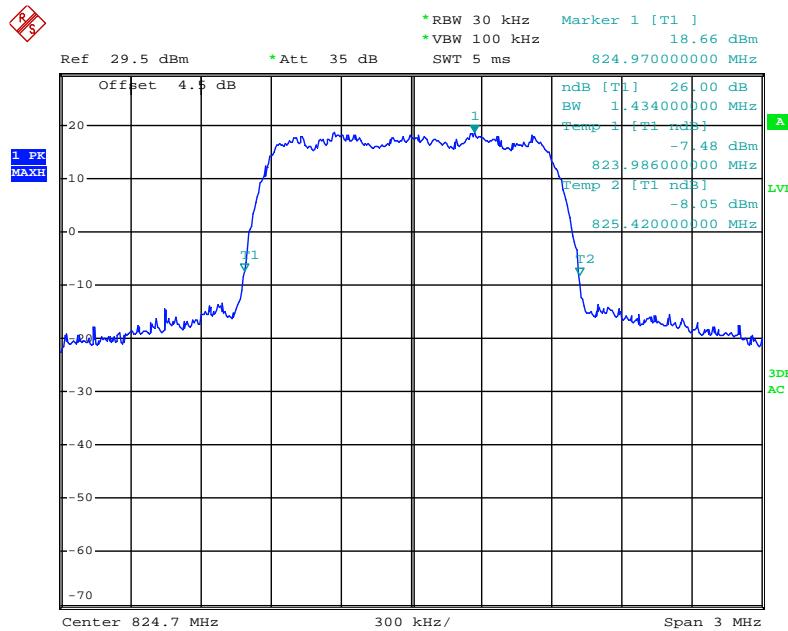
Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
1xEV-DO Rev. A	Low	824.7	1.278	1.434
	Middle	836.52	1.272	1.428
	High	848.31	1.272	1.434
1xRTT	Low	824.7	1.272	1.422
	Middle	836.52	1.278	1.434
	High	848.31	1.278	1.434

CDMA 1xEV-DO Rev. A

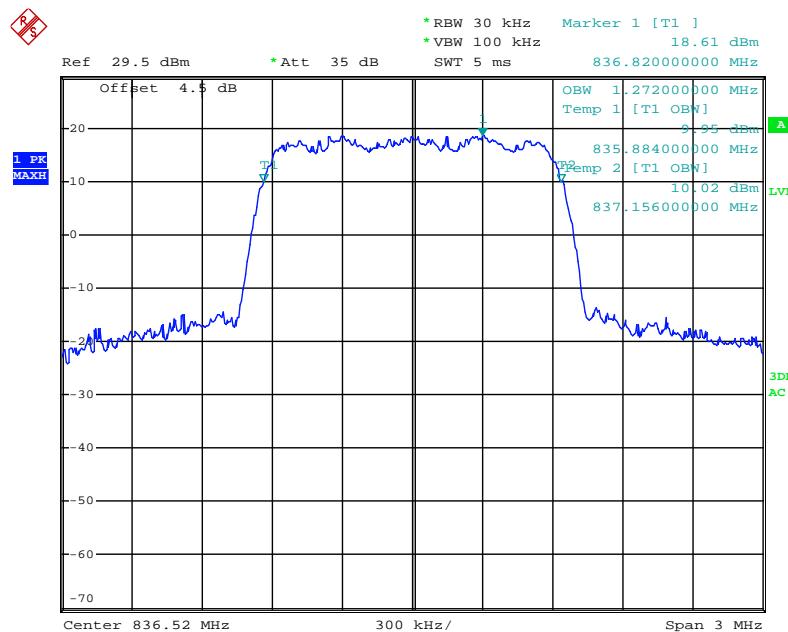
99% Occupied Bandwidth - Low Channel



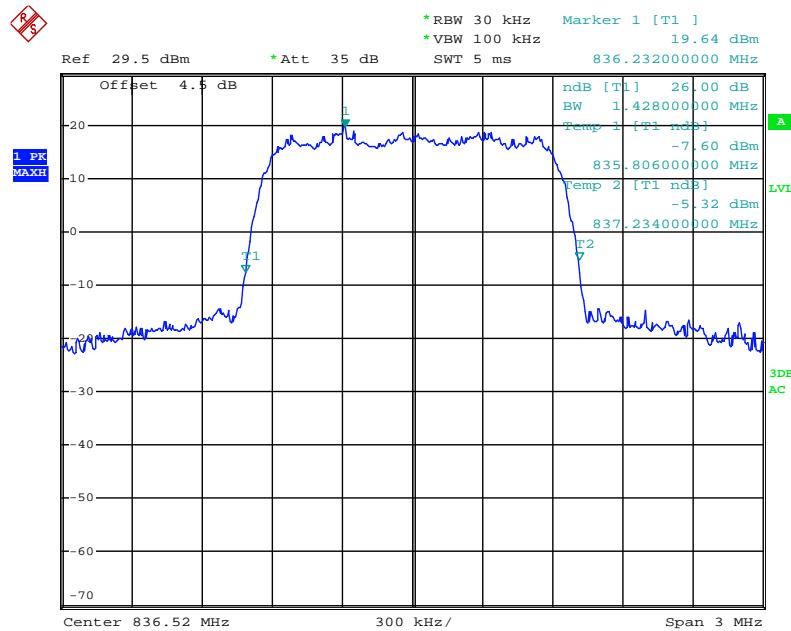
Date: 24.AUG.2011 18:05:43

26 dB Bandwidth-Low Channel

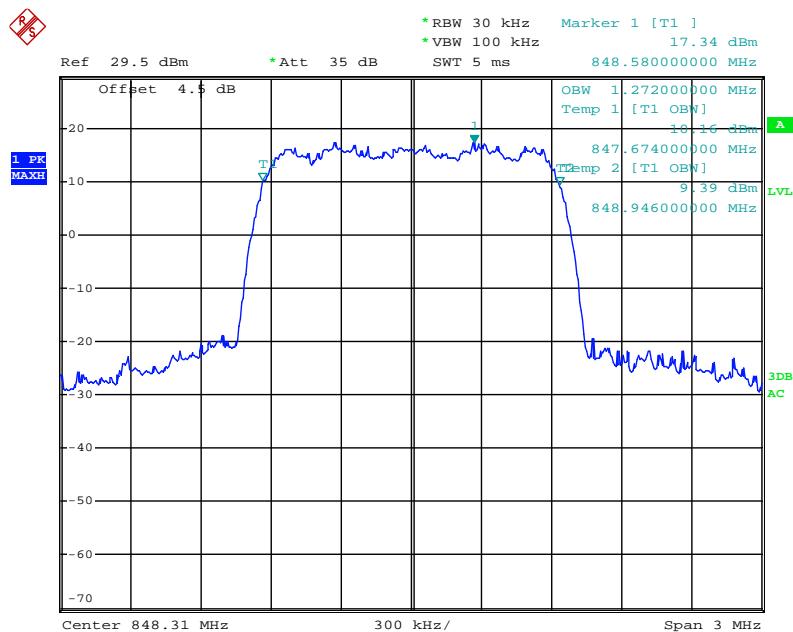
Date: 24.AUG.2011 18:03:26

99% Occupied Bandwidth-Middle Channel

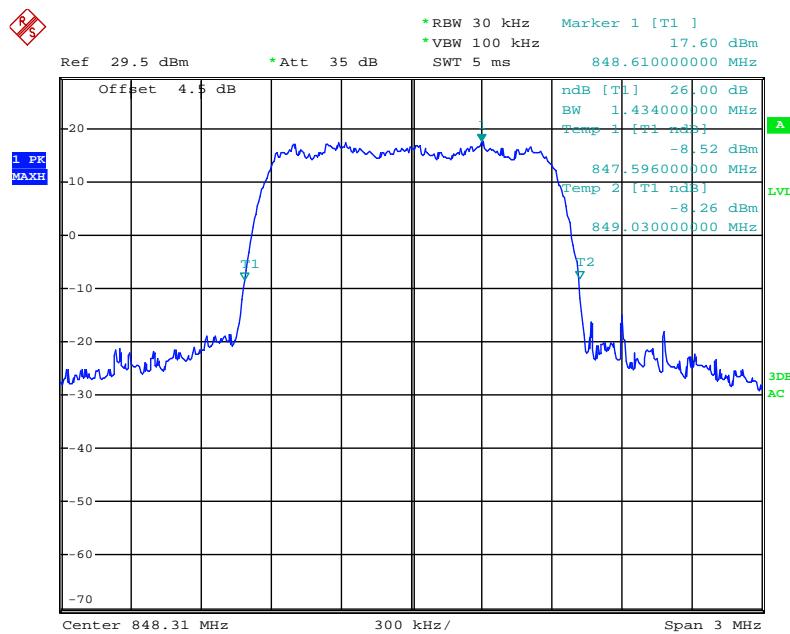
Date: 24.AUG.2011 18:06:58

26 dB Bandwidth-Middle Channel

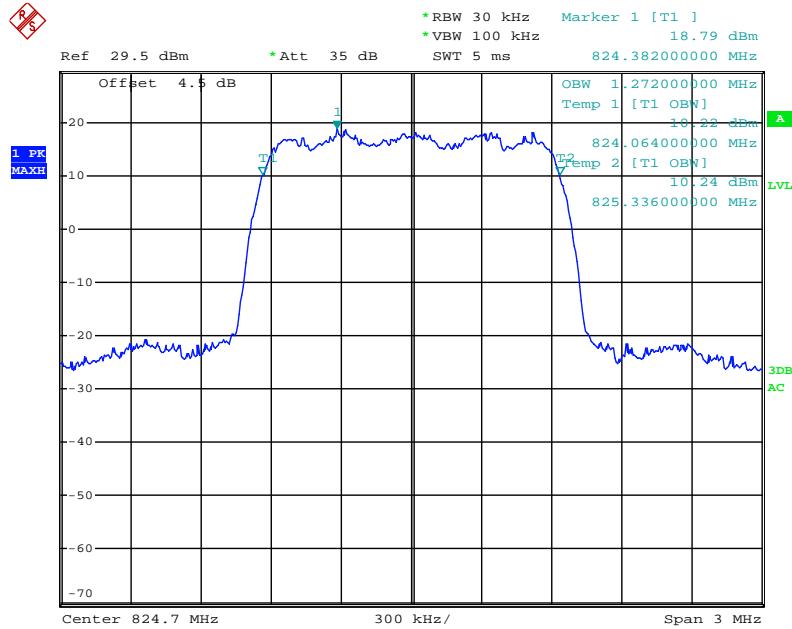
Date: 24.AUG.2011 18:07:55

99% Occupied Bandwidth-High Channel

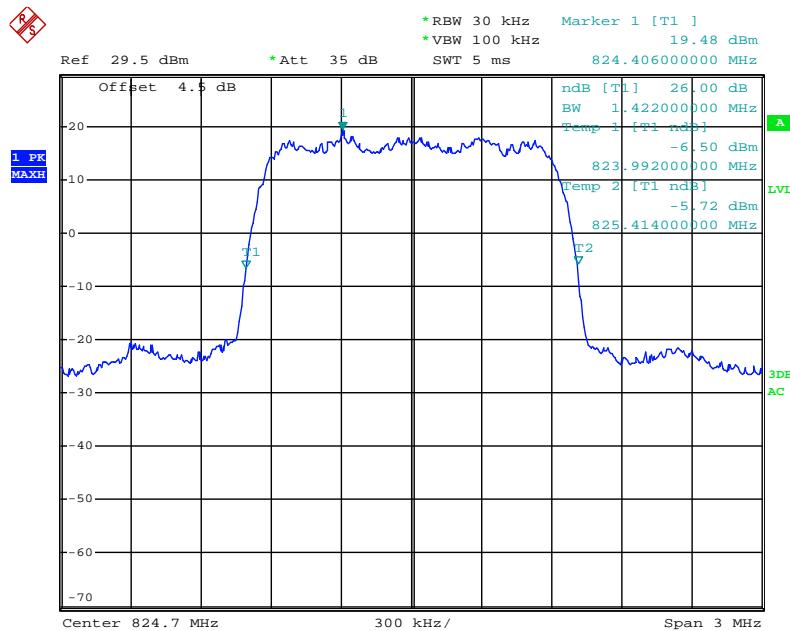
Date: 24.AUG.2011 18:13:05

26 dB Bandwidth-High Channel

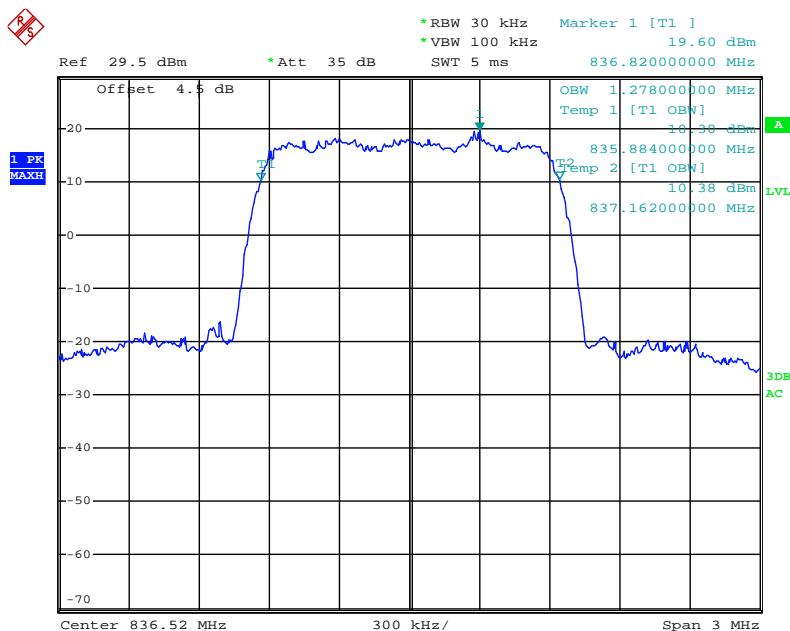
Date: 24.AUG.2011 18:11:08

CDMA 1xRTT**99% Occupied Bandwidth-Low Channel**

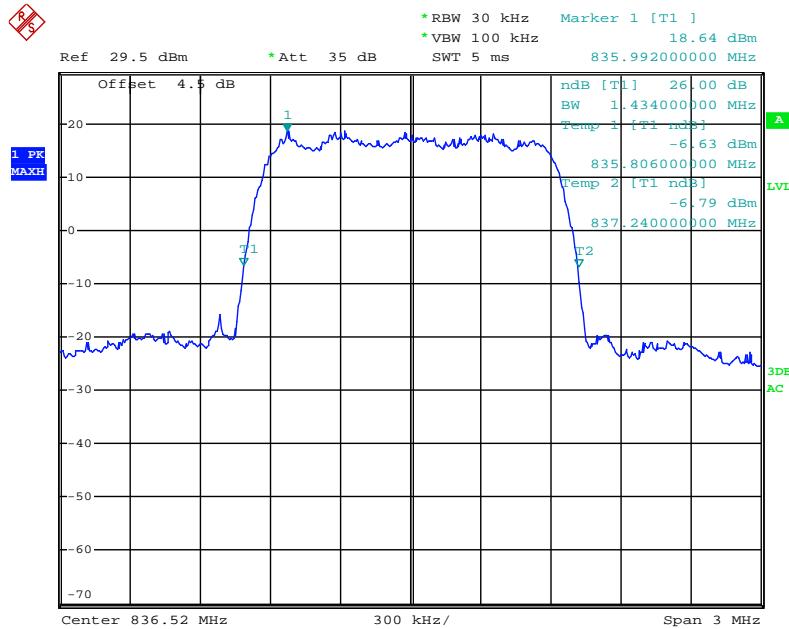
Date: 24.AUG.2011 13:17:37

26 dB Bandwidth-Low Channel

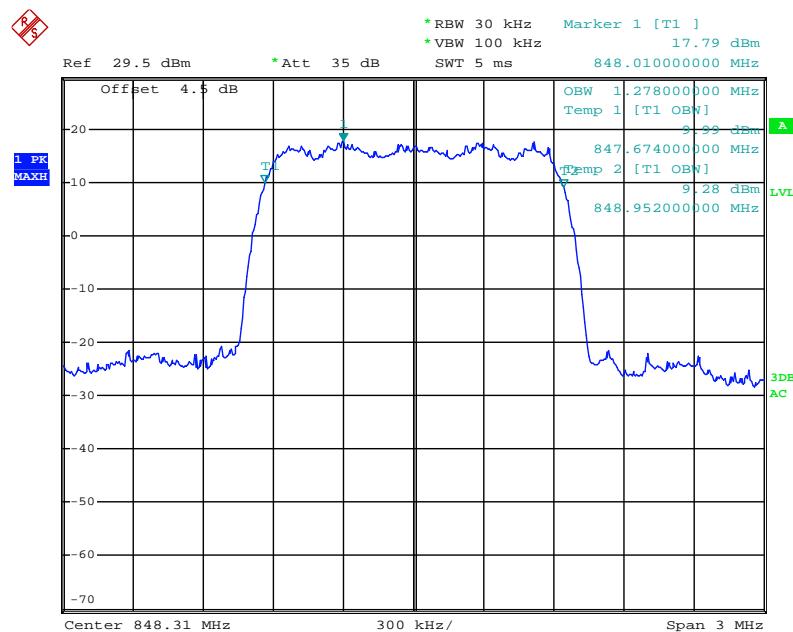
Date: 24.AUG.2011 13:15:42

99% Occupied Bandwidth-Middle Channel

Date: 24.AUG.2011 13:12:45

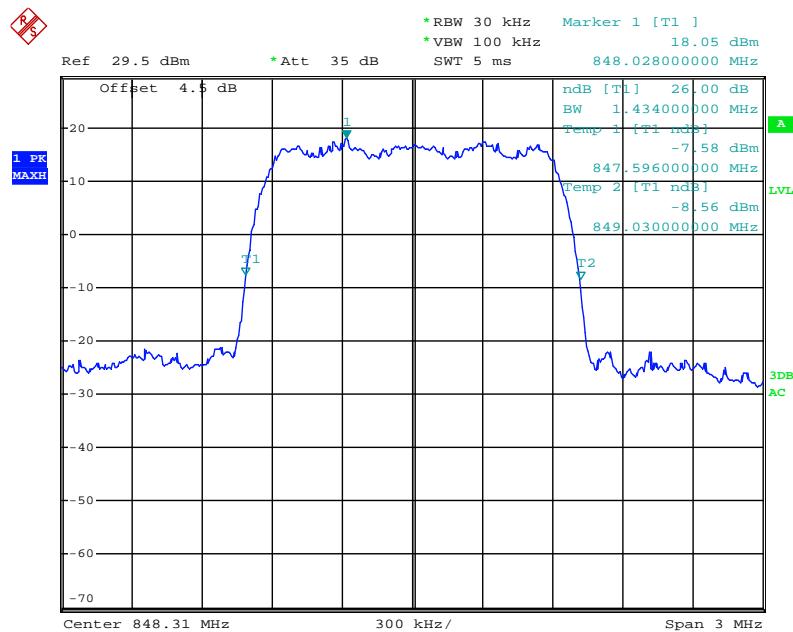
26 dB Bandwidth-Middle Channel

Date: 24.AUG.2011 13:14:18

99% Occupied Bandwidth-High Channel

Date: 24.AUG.2011 13:20:18

26 dB Bandwidth-High Channel



Date: 24.AUG.2011 13:22:06

8 FCC §2.1051& §22.917(a) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

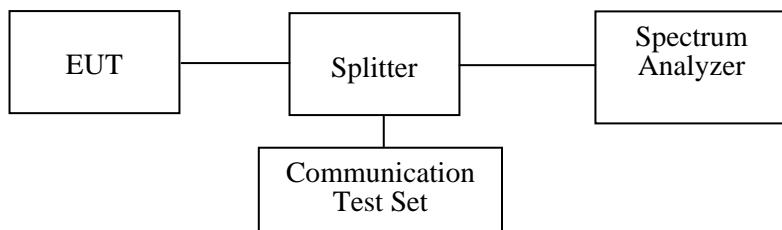
8.1 Applicable Standard

FCC §2.1051 & §22.917(a).

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in §2.1051.

8.2 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



8.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2011-07-08	2012-07-07

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

8.4 Test Data

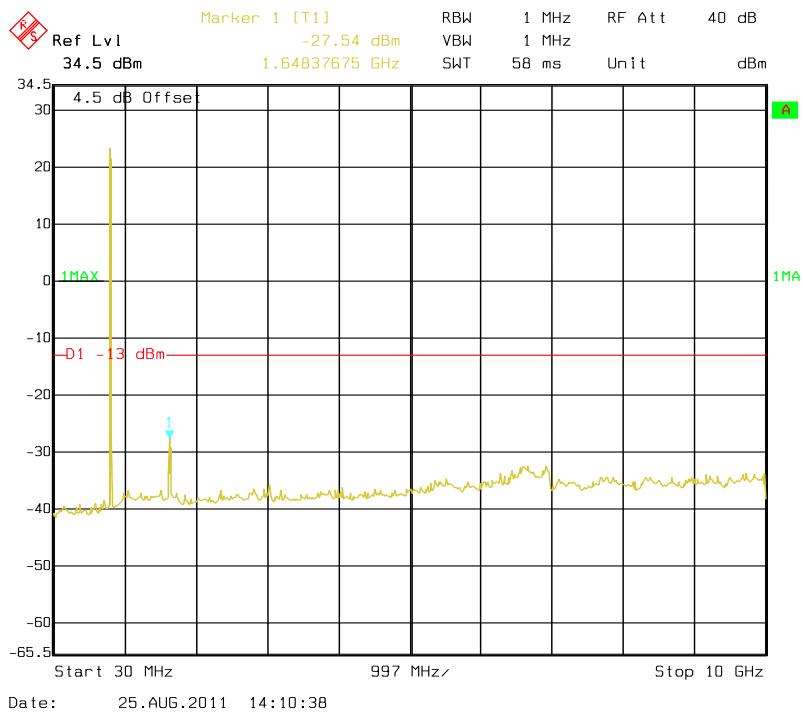
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

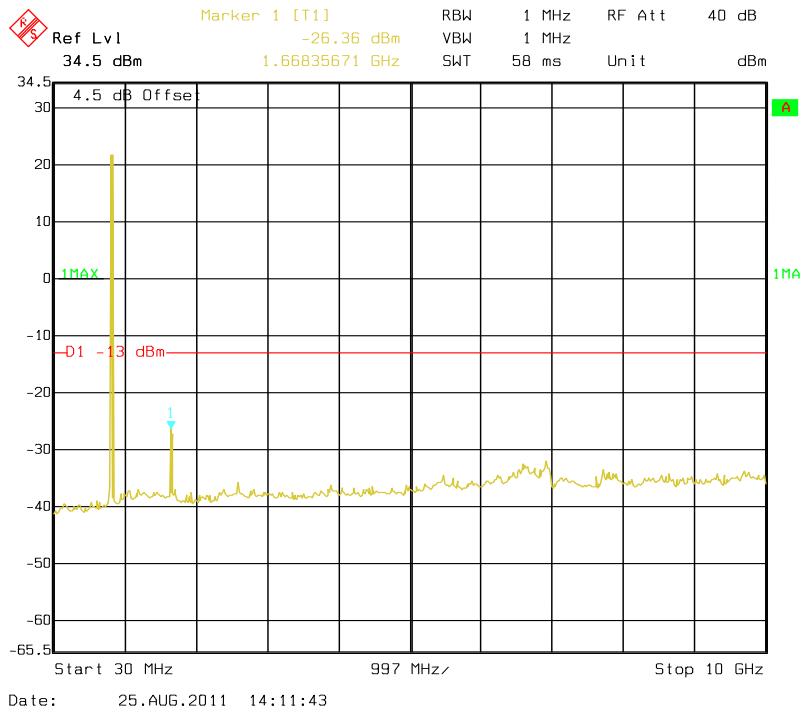
The testing was performed by Back Huang on 2011-08-24.

Please refer to the following plots.

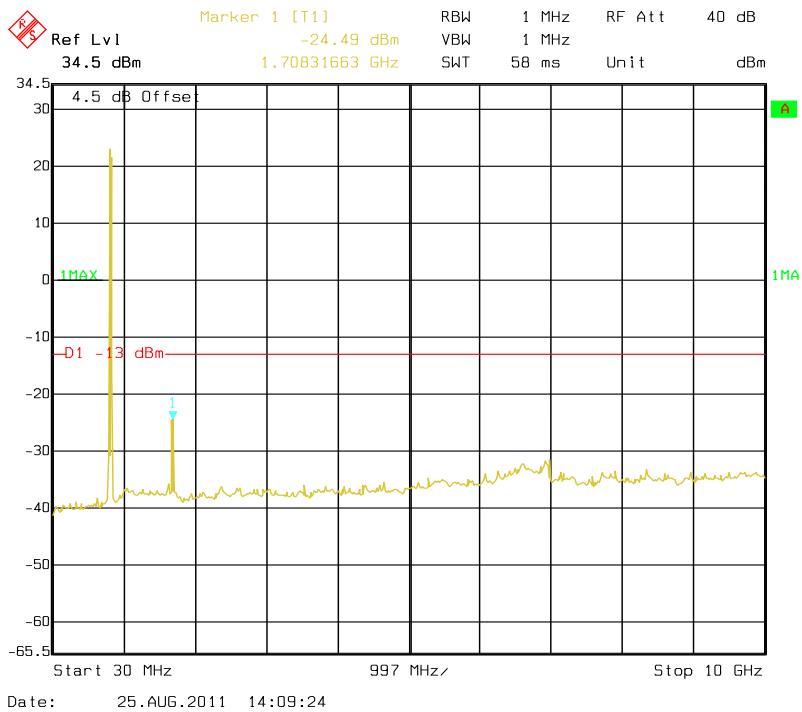
1xEV-DO-Low Channel



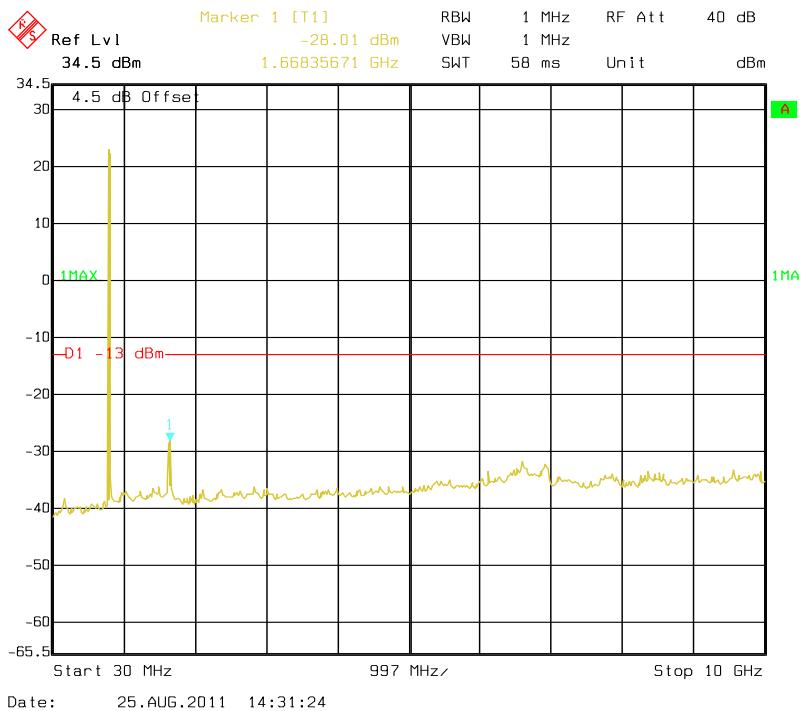
1xEV-DO-Middle Channel



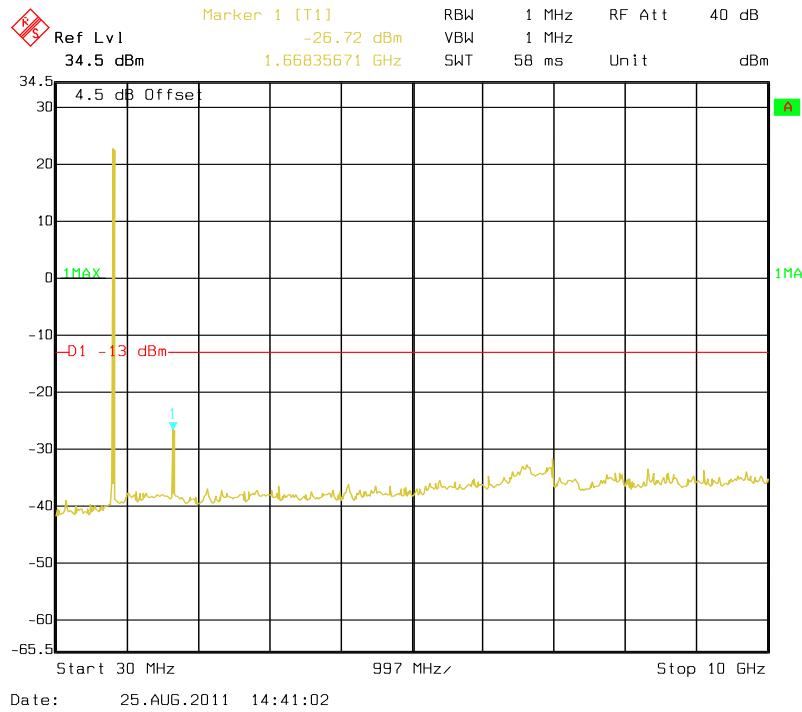
1xEV-DO-High Channel



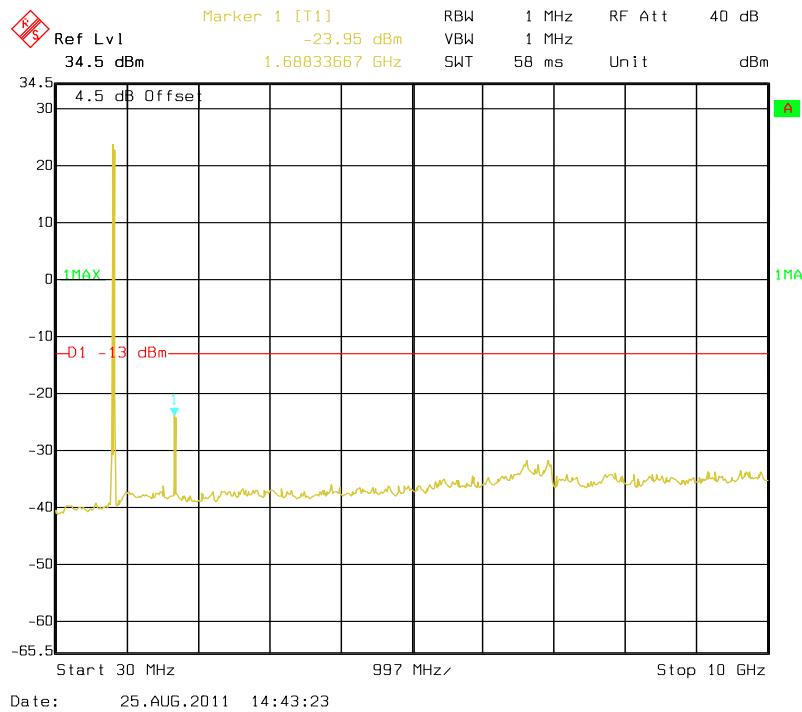
1xRTT-Low Channel



1xRTT-Middle Channel



1xRTT-High Channel



9 FCC §2.1053 & §22.917 - SPURIOUS RADIATED EMISSIONS

9.1 Applicable Standard

FCC §2.1053 & §22.917.

9.2 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 = $10 \log (\text{TX power in Watts}/0.001)$ – the absolute level

Spurious attenuation limit in dB = $43 + 10 \log_{10} (\text{power out in Watts})$

9.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Horn Antenna	DRH-118	A052604	2011-05-05	2012-05-04
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2011-07-05	2012-07-04
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2011-07-08	2012-07-07
Mini-Circuits	Amplifier	ZVA-213+	T-E27H	2011-03-08	2012-03-07
HP	Signal Generator	HP8657A	2849U00982	2010-10-28	2011-10-27
HP	Amplifier	HP8447D	2944A09795	2011-08-02	2012-08-02
HP	Synthesized Sweeper	8341B	2624A00116	2010-11-07	2011-11-06
COM POWER	Dipole Antenna	AD-100	041000	2010-09-25	2011-09-25
A.H. System	Horn Antenna	SAS-200/571	135	2011-05-17	2012-05-17

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

9.4 Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Back Huang on 2011-08-25.

Test mode: Transmitting

Below 1 GHz:

Indicated		Table Angle Degree	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Reading (dB μ V)		Height (m)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain (dBd)	Cable Loss (dB)			
CDMA 1x EV-DO Rev. A Middle Channel											
453.28	30.33	125	1.5	V	453.28	-66.1	0	0.45	-66.55	-13	53.55
453.28	31.61	189	1.5	H	453.28	-67.5	0	0.45	-67.95	-13	54.95
CDMA 1xRTT Middle Channel											
451.32	30.75	122	1.5	V	451.32	-66.5	0	0.45	-66.95	-13	53.95
451.32	31.23	187	1.4	H	451.32	-67.1	0	0.45	-67.55	-13	54.55

Above 1 GHz:

Indicated		Table Angle Degree	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Reading (dB μ V)		Height (m)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain (dBi)	Cable Loss (dB)			
CDMA 1x EV-DO Rev. A Middle Channel											
1673.04	58.15	247	1.5	H	1673.04	-40.91	6.2	2.75	-37.46	-13	24.46
1673.04	55.63	206	1.7	V	1673.04	-41.95	6.2	2.75	-38.50	-13	25.50
2509.56	34.32	221	1.6	H	2509.56	-61.96	7.3	3.66	-58.32	-13	45.32
2509.56	31.56	92	1.6	V	2509.56	-64.05	7.3	3.66	-60.41	-13	47.41
CDMA 1xRTT Middle Channel											
1673.04	58.73	246	1.6	H	3819.6	-40.33	6.2	2.75	-36.88	-13	23.88
1673.04	55.64	193	1.5	V	3819.6	-41.94	6.2	2.75	-38.49	-13	25.49
2509.56	34.18	174	1.6	H	5729.4	-62.11	7.3	3.66	-58.47	-13	45.47
2509.56	31.72	83	1.2	V	5729.4	-63.89	7.3	3.66	-60.25	-13	47.25

10 FCC §22.917(a) - BAND EDGES

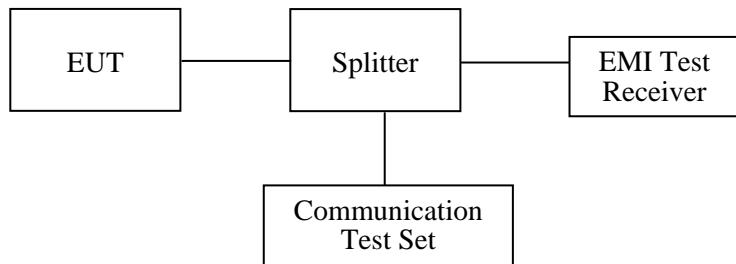
10.1 Applicable Standard

According to § 22.917(a), 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.

10.2 Test Procedure

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

The center of the spectrum analyzer was set to block edge frequency, RBW set to 10 kHz.



10.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

10.4 Test Data

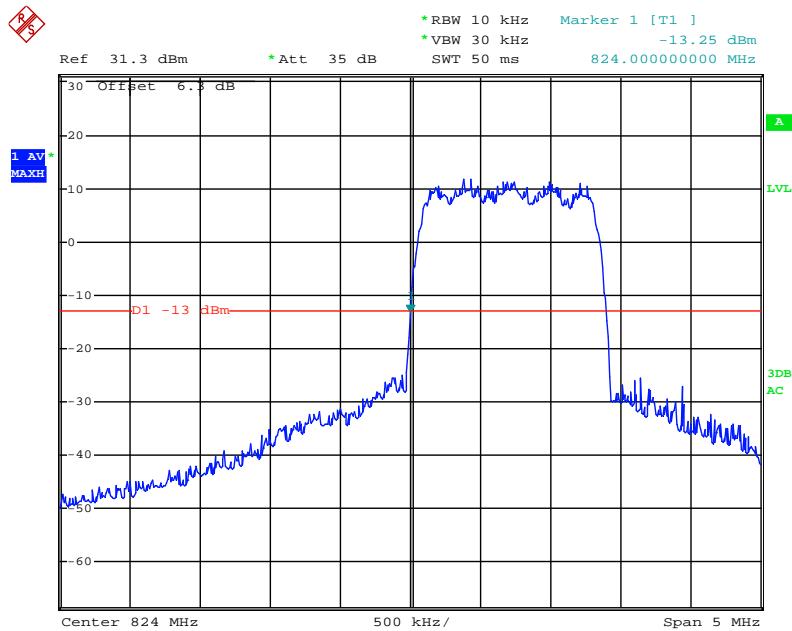
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Back Huang on 2011-08-24

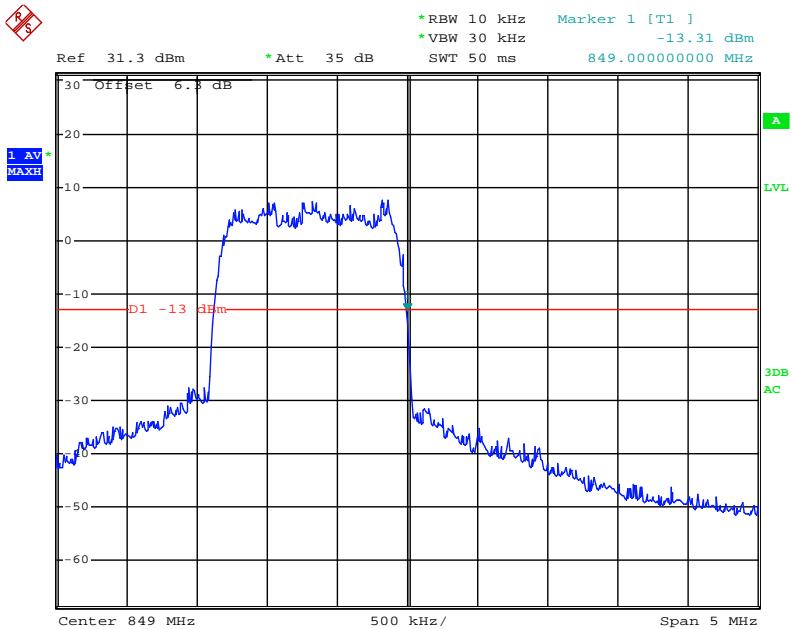
Please refer to the following plots.

Left Band Edge - 1xEV-DO



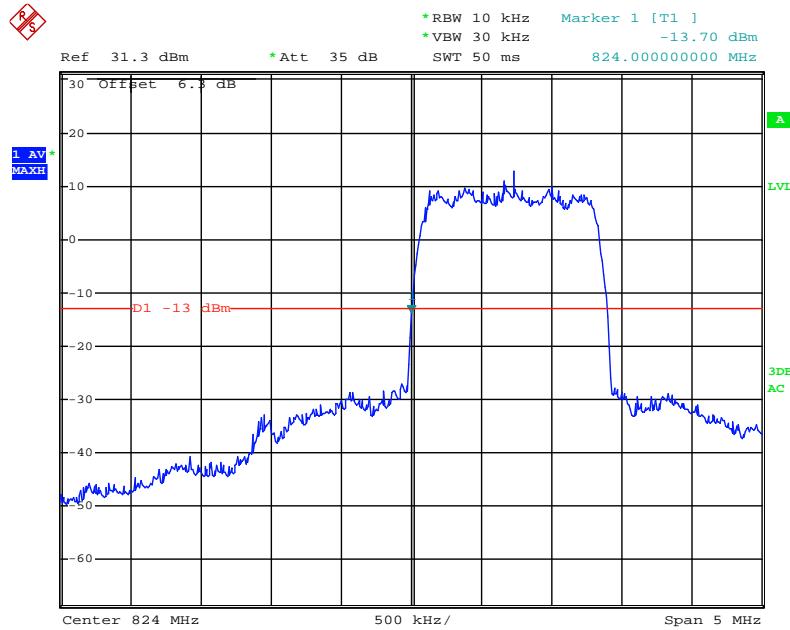
Date: 24.AUG.2011 18:19:08

Right Band Edge - 1xEV-DO



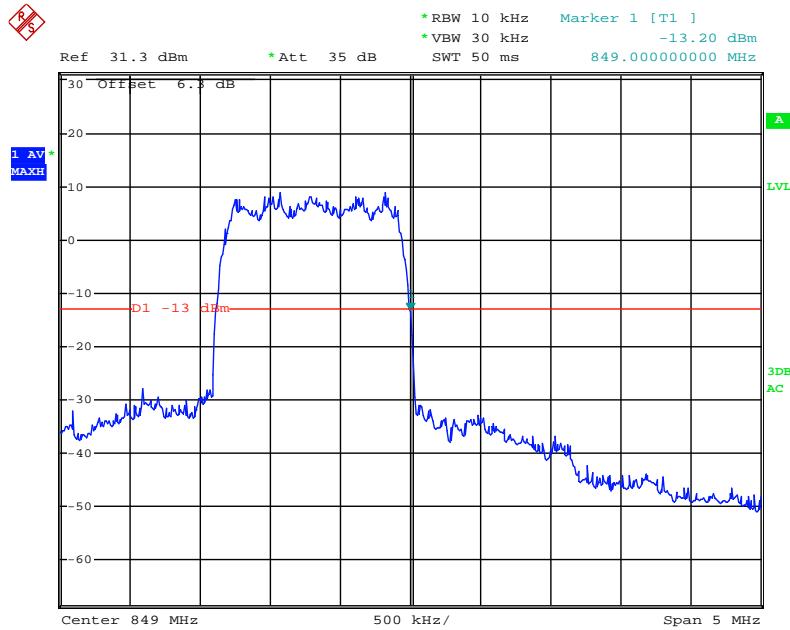
Date: 24.AUG.2011 18:22:27

Left Band Edge - 1xRTT



Date: 24.AUG.2011 13:34:12

Right Band Edge - 1xRTT



Date: 24.AUG.2011 13:35:43

11 FCC §2.1055 & §22.355 - FREQUENCY STABILITY

11.1 Applicable Standard

FCC §2.1055 (a), §2.1055 (d), §22.355

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

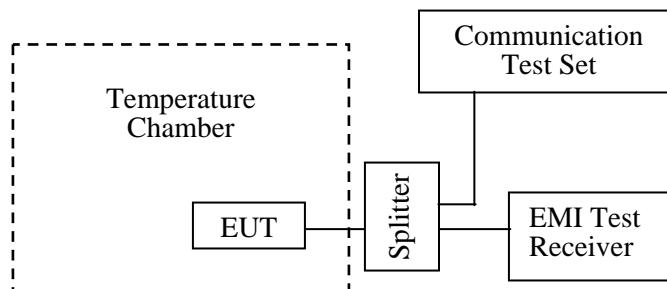
Frequency Range (MHz)	Base, fixed (ppm)	Mobile \leq 3 watts (ppm)	Mobile \leq 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929	5.0	N/A	N/A
929 to 960	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

11.2 Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: An external variable DC power supply was connected to the battery terminals of the equipment under test. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the battery end point. The output frequency was recorded for each battery voltage.



11.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
WUHUAN	Temperature & Humidity Chamber	HTP205	20021115	2011-06-04	2012-06-03
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

11.4 Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Back Huang on 2011-08-24.

CDMA 1x EV-DO Rev. A

Middle Channel, $f_0 = 836.52$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-20	5	29	0.034667	2.5
-10		-25	-0.029886	2.5
0		33	0.039449	2.5
10		28	0.033472	2.5
20		-14	-0.016736	2.5
30		17	0.020322	2.5
40		24	0.028690	2.5
50		18	0.021518	2.5

CDMA 1xRTT

Middle Channel, $f_o = 836.52$ MHz				
Temperature (°C)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-20	5	43	0.051403	2.5
-10		57	0.068139	2.5
0		65	0.077703	2.5
10		66	0.078898	2.5
20		34	0.040645	2.5
30		65	0.077703	2.5
40		58	0.069335	2.5
50		-54	-0.064553	2.5

******* END OF REPORT *******