

FCC PART 22H, PART 24E
MEASUREMENT AND TEST REPORT

For

ITALCOM GROUP

1728 Coral Way, Coral Gables, Miami, Florida, United States

FCC ID: YPVMIFIAMR510

Report Type: Original Report	Product Type: Mobile LTE WiFi Router
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Report Number: RSZ130204002-00B	
Report Date: 2013-03-28	
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Note: This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *ITALCOM GROUP*'s product, model number: *MiFi LTE (FCC ID: YPVMIFIAMR510)* or the "EUT" in this report is a *Mobile LTE WiFi Router*, which was measured approximately: 99.0 mm (L) x 55.3 mm (W) x 11.2 mm (H), rated with input voltage: DC 3.7V battery.

Frequency Range:

WCDMA850 Cellular Band: 824-849 MHz (Uplink), 869-894 MHz (Downlink)

WCDMA1900 PCS Band: 1850-1910 MHz (Uplink), 1930-1990 MHz (Downlink)

**All measurement and test data in this report was gathered from production sample serial number: 099323 (Assigned by applicant). The EUT supplied by applicant was received on 2013-02-04.*

Objective

This report is prepared on behalf of *ITALCOM GROUP* 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 output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, spurious radiated emission, frequency stability, band edge and radiated margin.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS and Part 27 PCT submission with FCC ID: YPVMIFIAMR510.

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

Part 24 Subpart E - Personal Communication Services

Applicable Standards: TIA/EIA 603-D, 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.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp.(Shenzhen) to collect test data is located in 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 C63.4-2003.

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.

SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing according to TIA/EIA-603-D.

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

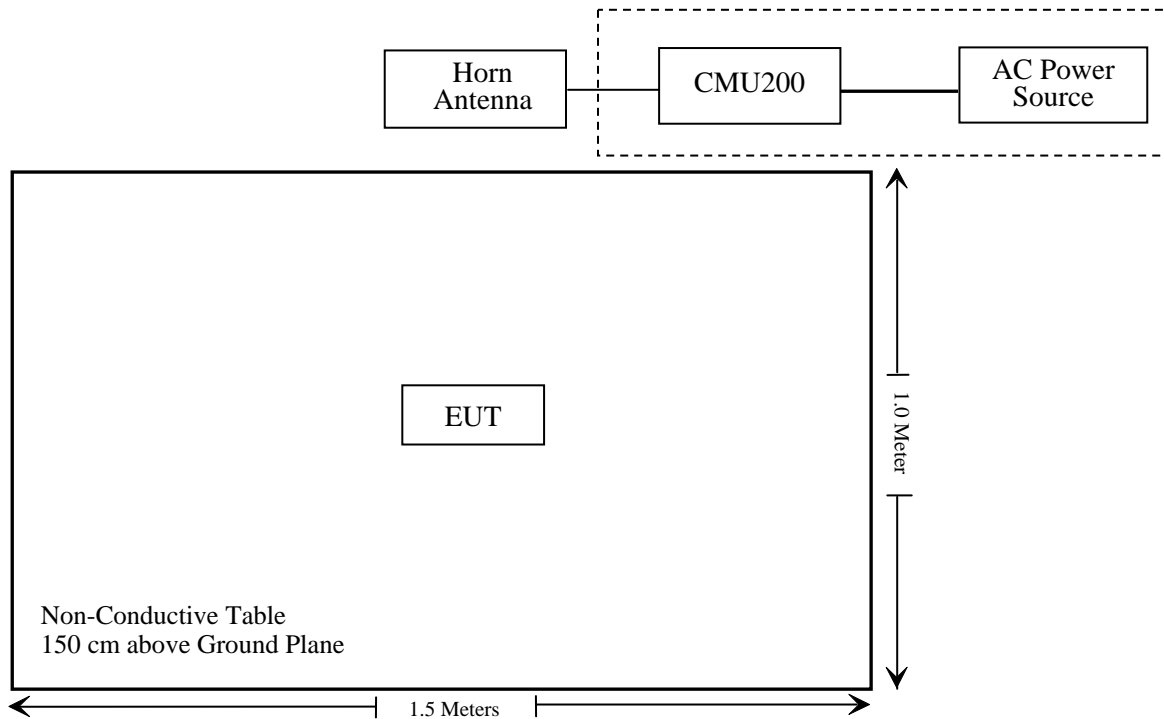
Equipment Modifications

No modifications were made to the EUT.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 (b), §2.1093	RF Exposure Information	Compliance
§2.1046; § 22.913 (a); § 24.232 (c)	RF Output Power	Compliance
§ 2.1047	Modulation Characteristics	N/A
§ 2.1049; § 22.905 § 22.917; § 24.238	99% & -26 dB Occupied Bandwidth	Compliance
§ 2.1051, § 22.917 (a); § 24.238 (a)	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053 § 22.917 (a); § 24.238 (a)	Field Strength of Spurious Radiation	Compliance
§ 22.917 (a); § 24.238 (a)	Out of band emission, Band Edge	Compliance
§ 2.1055; § 22.355; § 24.235	Frequency stability vs. temperature Frequency stability vs. voltage	Compliance

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

Applicable Standard

FCC§1.1307 and §2.1093.

Test Result

Compliance, please refer to the SAR report: RSZ130204002-20.

FCC §2.1047 - MODULATION CHARACTERISTIC

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

FCC § 2.1046, § 22.913 (a), § 24.232 (c) - RF OUTPUT POWER

Applicable Standards

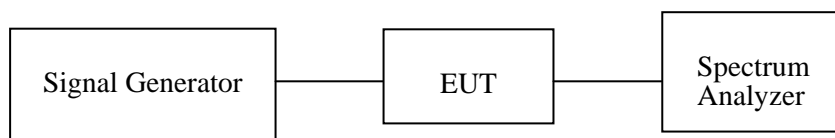
According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

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

Test Procedure

Conducted method:

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



Radiated method:

TIA 603-D section 2.2.17

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2012-08-08	2013-08-07
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2012-11-28	2013-11-27
HP	Synthesized Sweeper	8341B	2624A00116	2012-04-11	2013-04-10
COM POWER	Dipole Antenna	AD-100	041000	2012-06-06	2013-06-05
A.H. System	Horn Antenna	SAS-200/571	135	2013-02-11	2014-02-10
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2012-04-11	2013-04-10

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Gardon Zhang on 2013-03-27.

Conducted Power

Cellular Band (Part 22H)

WCDMA 850 Mode:

Test Mode		3GPP Sub Test	Peak Output Power (dBm)		
			Low Frequency (826.4 MHz)	Middle Frequency (836.6 MHz)	High Frequency (846.6 MHz)
Uplink	Rel 99	-	23.07	23.04	23.16
	Rel 6 HSDPA	1	23.01	22.98	23.03
		2	22.99	23.00	23.02
		3	23.02	23.03	23.04
		4	22.97	22.99	23.04
	Rel 6 HSUPA	1	22.95	22.97	23.02
		2	22.97	23.00	23.00
		3	22.94	22.96	23.03
		4	22.90	23.01	23.02
		5	22.96	23.00	23.01

PCS Band (Part 24E)

WCDMA 1900 Mode:

Test Mode		3GPP Sub Test	Peak Output Power (dBm)		
			Low Frequency (1852.4 MHz)	Middle Frequency (1880.0 MHz)	High Frequency (1907.6 MHz)
Uplink	Rel 99	-	22.78	22.57	22.66
	Rel 6 HSDPA	1	22.69	22.50	22.60
		2	22.72	22.49	22.58
		3	22.70	22.53	22.61
		4	22.71	22.51	22.60
	Rel 6 HSUPA	1	22.65	22.46	22.56
		2	22.63	22.48	22.52
		3	22.66	22.43	22.53
		4	22.63	22.45	22.56
		5	22.64	22.46	22.54

Radiated Power:

Frequency (MHz)	Receiver Reading (dB μ V)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H&24E
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)
Cellular Band									
836.6	95.07	287	1.0	H	23.9	0.69	0	23.21	38.45
836.6	87.68	0	1.3	V	16.5	0.69	0	15.81	38.45
PCS Band									
1880.0	88.05	25	1.6	H	15.8	1.03	9.40	24.17	33.01
1880.0	78.55	25	1.5	V	6.4	1.03	9.40	14.77	33.01

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

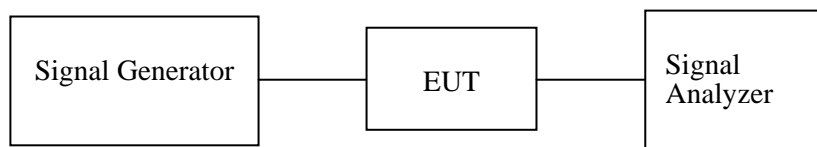
Applicable Standards

FCC §2.1049, §22.917, §22.905, and §24.238.

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 100 kHz (Cellular /PCS) and the 26 dB & 99% bandwidth was recorded.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2012-04-11	2013-04-10

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	55 %
ATM Pressure:	101.0kPa

The testing was performed by Gardon Zhang on 2013-03-26.

Cellular Band (Part 22H)

WCDMA 850 Mode:

Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
WCDMA (QPSK)				
Uplink	Middle	836.6	4.168	4.649
HSDPA (16QAM)				
Uplink	Middle	836.6	4.148	4.649
HSUPA (64QAM)				
Uplink	Middle	836.6	4.148	4.629

PCS Band (Part 24E)

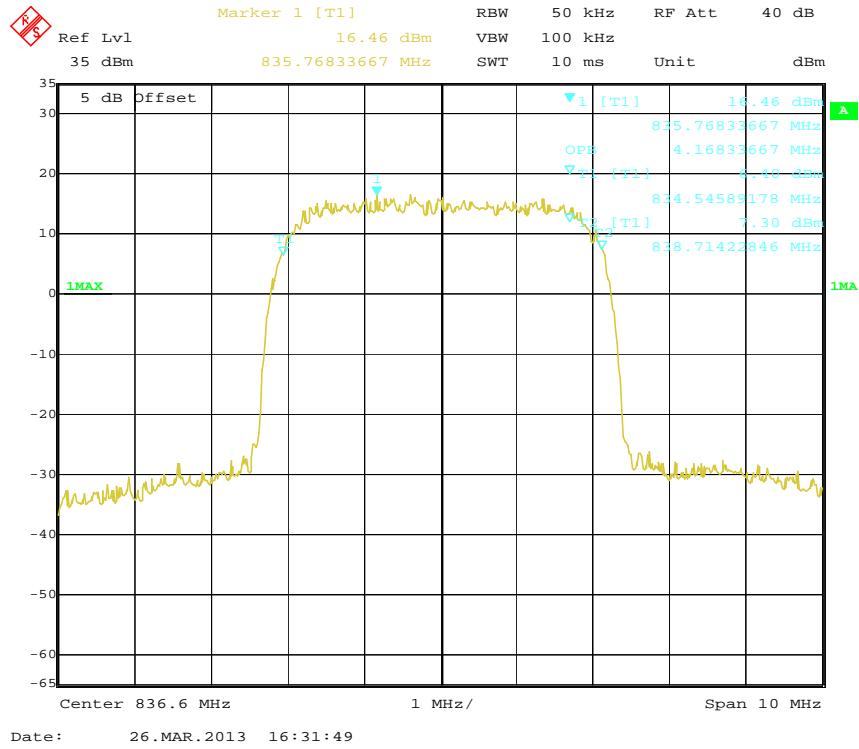
WCDMA 1900 Mode:

Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
WCDMA (QPSK)				
Uplink	Middle	1880.0	4.148	4.649
HSDPA (16QAM)				
Uplink	Middle	1880.0	4.148	4.649
HSUPA (64QAM)				
Uplink	Middle	1880.0	4.168	4.649

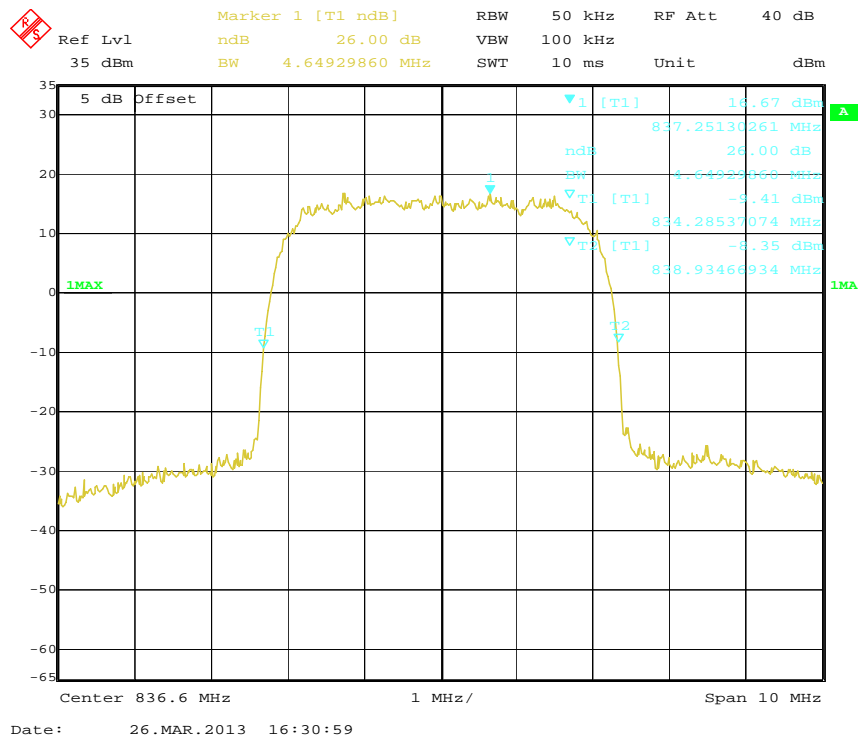
Cellular Band (Part 22H)

WCDMA 850 Mode:

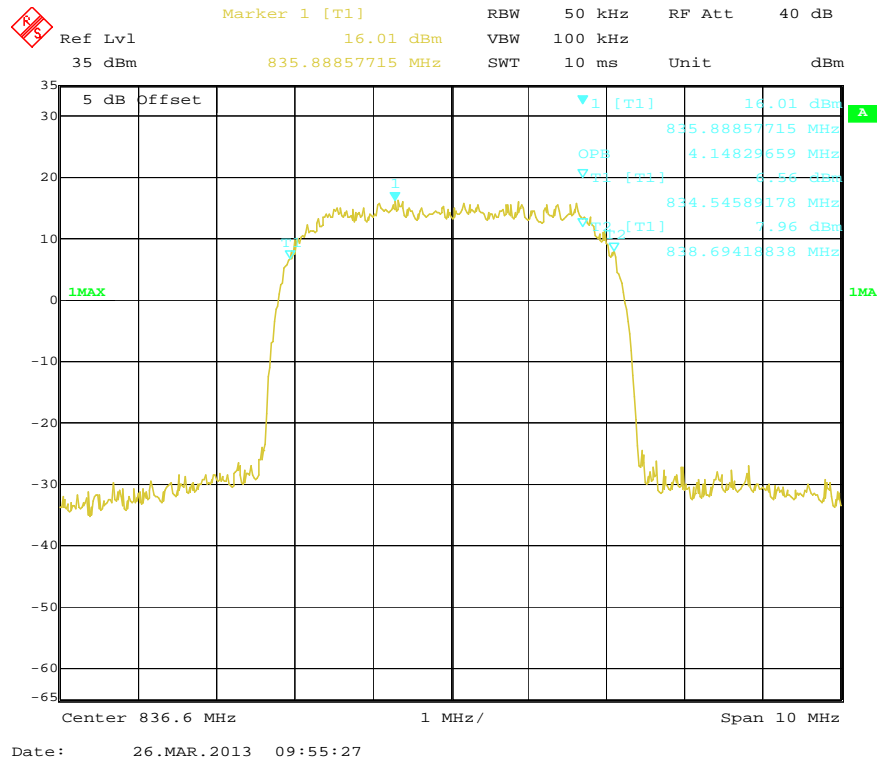
WCDMA (QPSK): 99% Occupied Bandwidth, Middle Channel



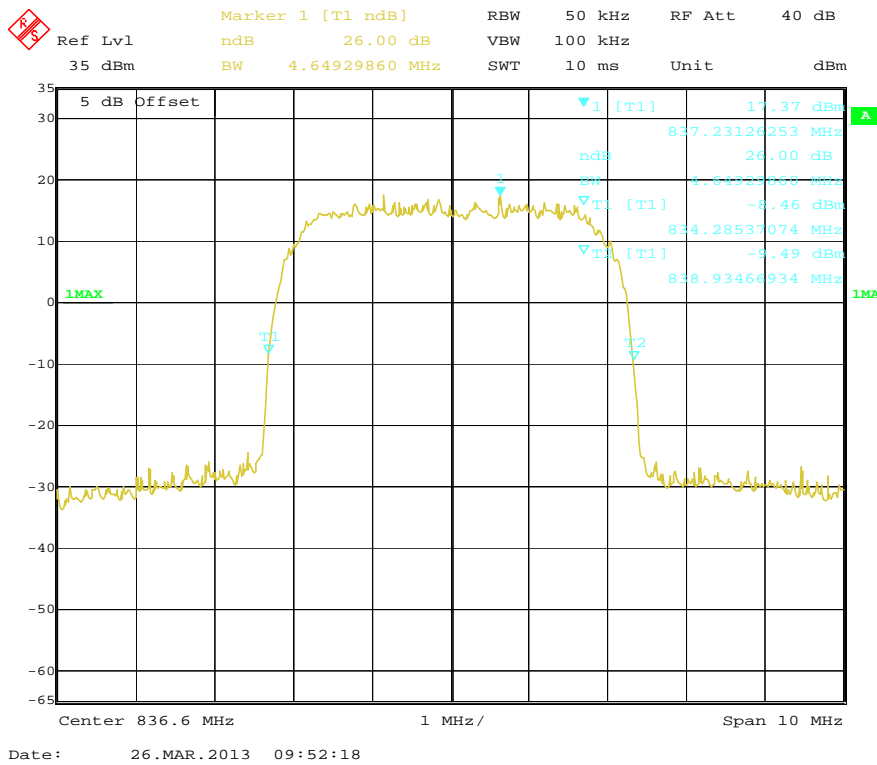
WCDMA (QPSK): 26dB Bandwidth, Middle Channel



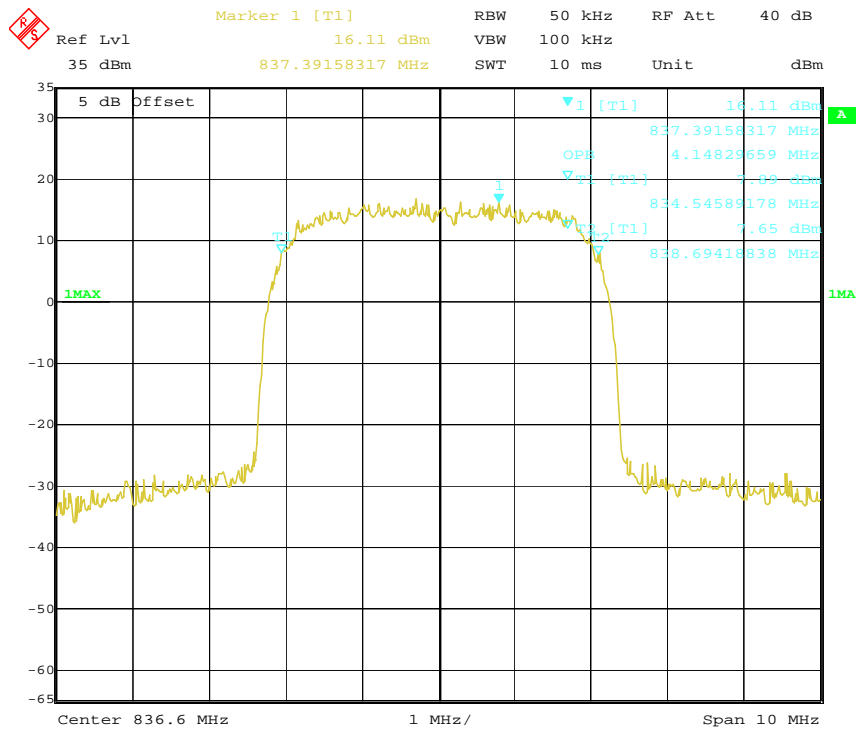
HSDPA (16QAM): 99% Occupied Bandwidth, Middle Channel



HSDPA (16QAM): 26dB Bandwidth, Middle Channel

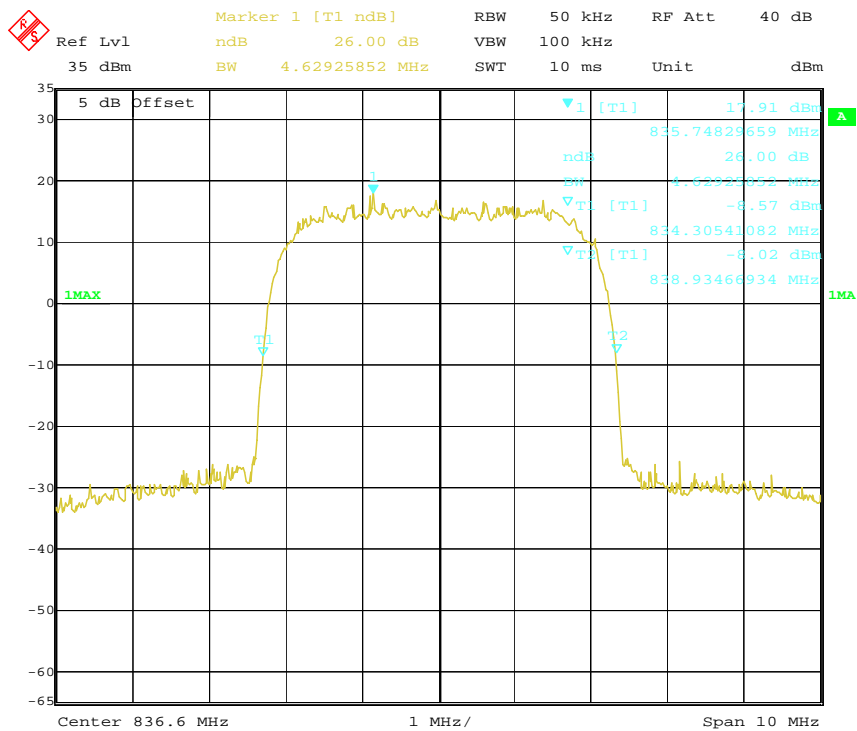


HSUPA (64QAM): 99% Occupied Bandwidth, Middle Channel



Date: 26.MAR.2013 09:54:44

HSUPA (64QAM): 26dB Bandwidth, Middle Channel

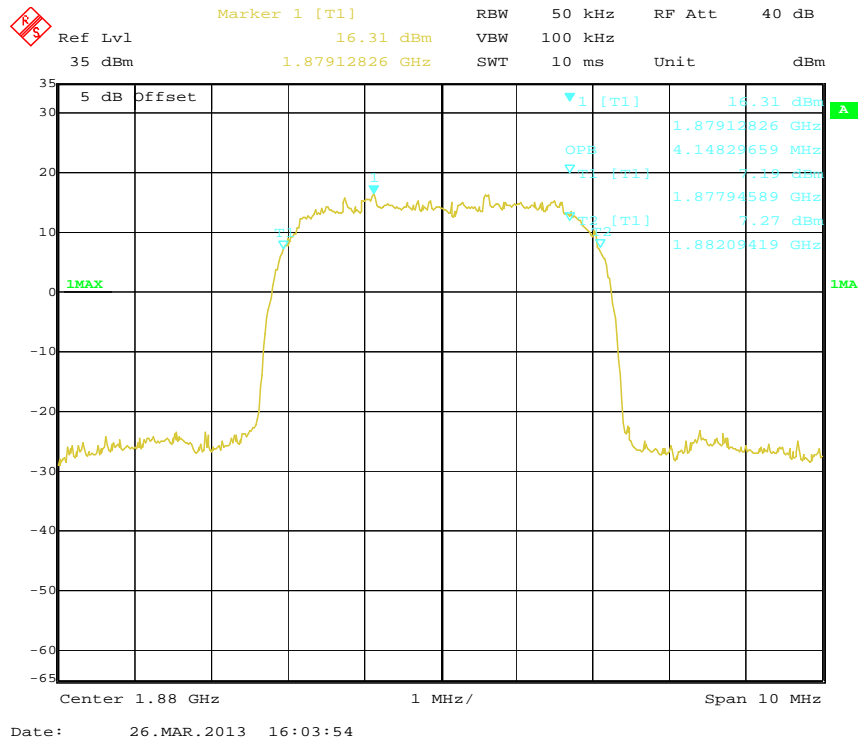


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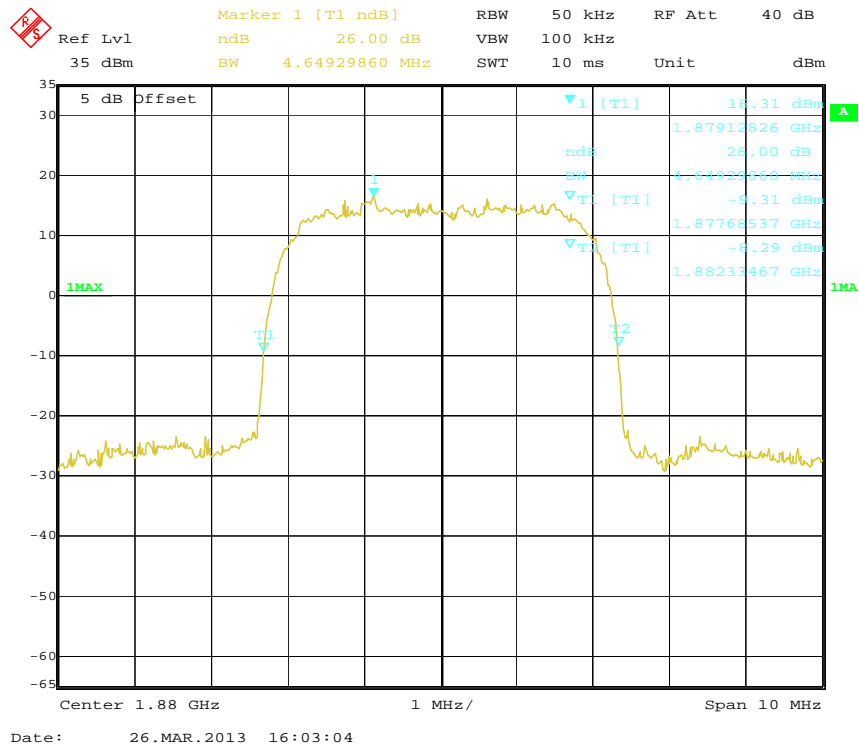
PCS Band (Part 24E)

WCDMA 1900 Mode:

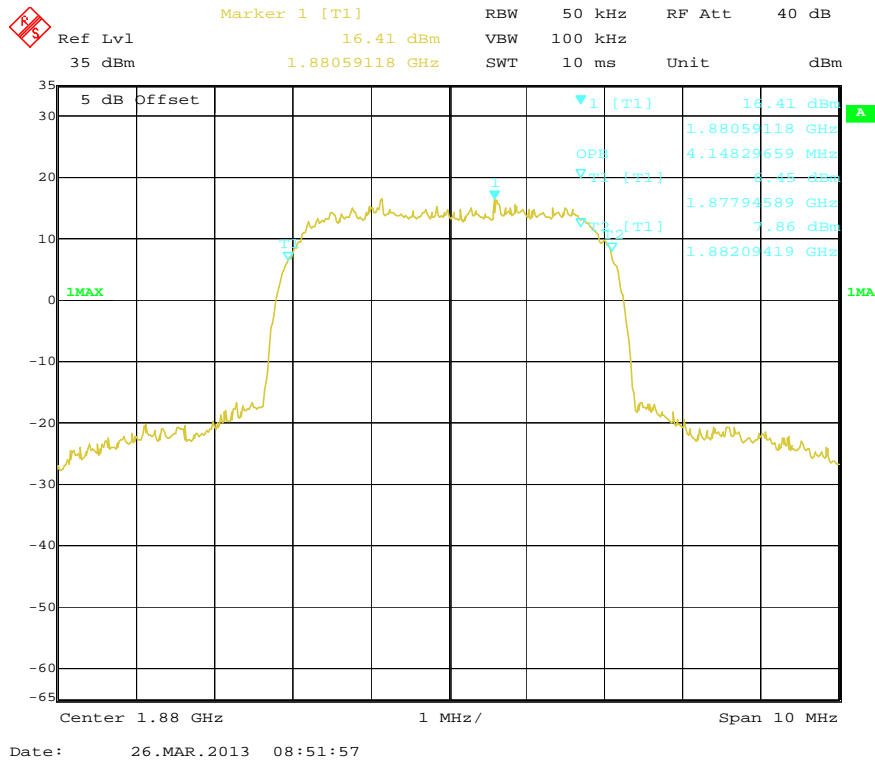
WCDMA (QPSK): 99% Occupied Bandwidth, Middle Channel



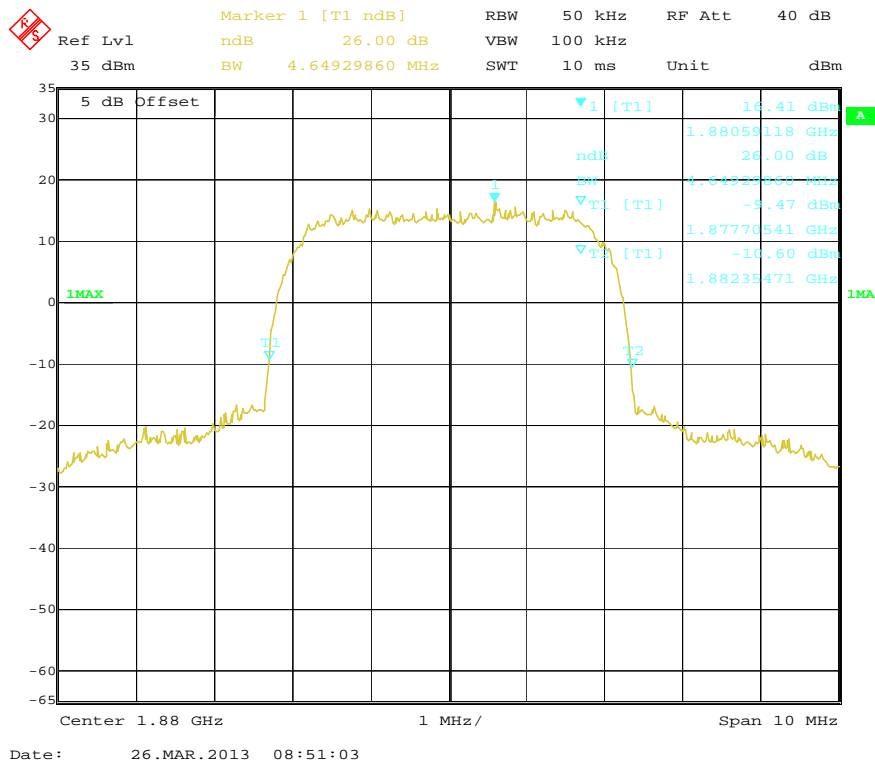
WCDMA (QPSK): 26dB Bandwidth, Middle Channel



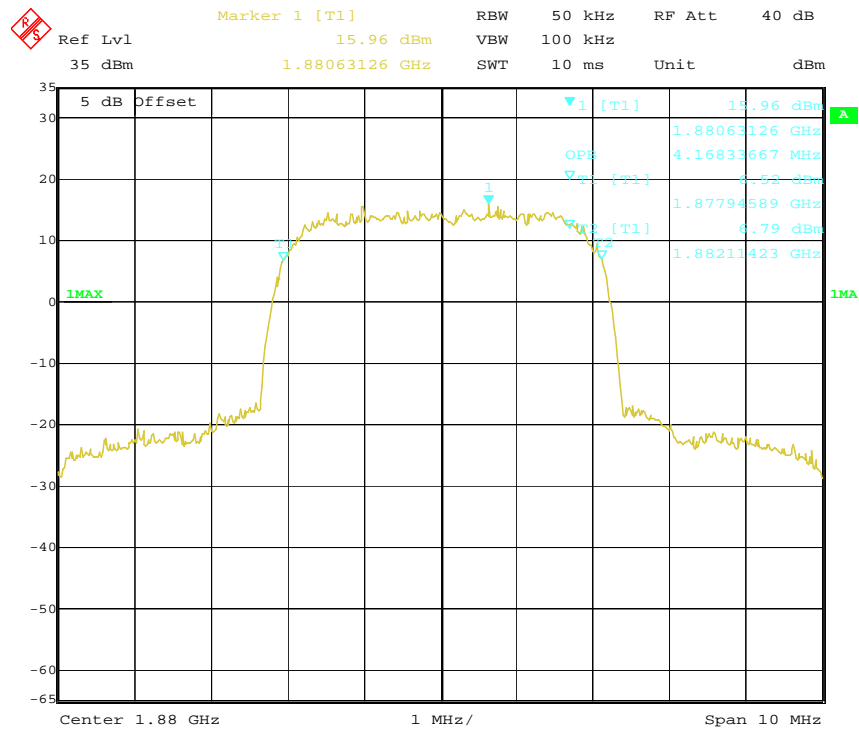
HSDPA (16QAM): 99% Occupied Bandwidth, Middle Channel



HSDPA (16QAM): 26dB Bandwidth, Middle Channel

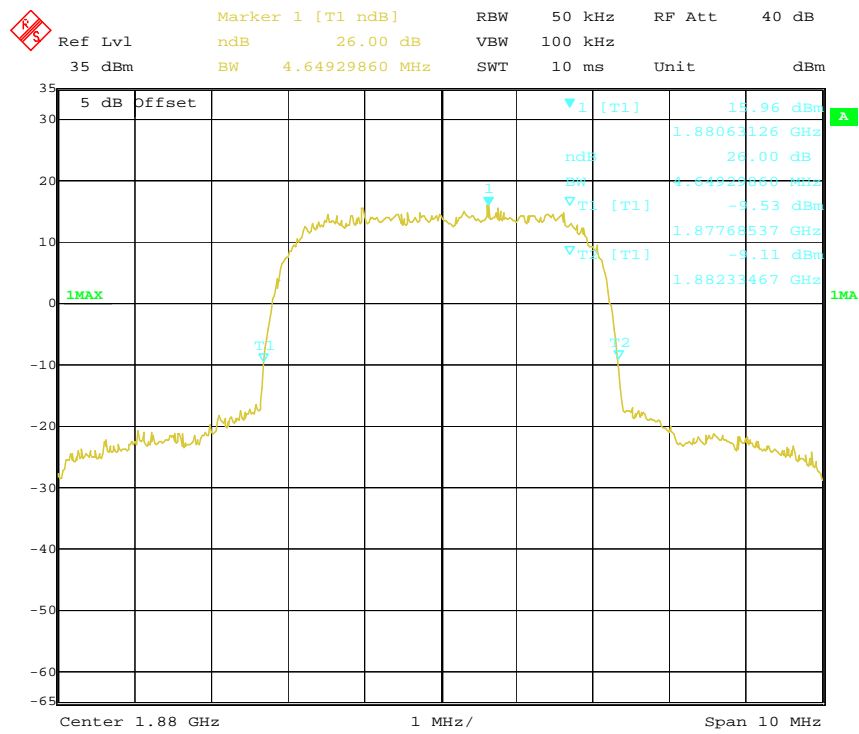


HSUPA (64QAM): 99% Occupied Bandwidth, Middle Channel



Date: 26.MAR.2013 08:53:53

HSUPA (64QAM): 26dB Bandwidth, Middle Channel



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

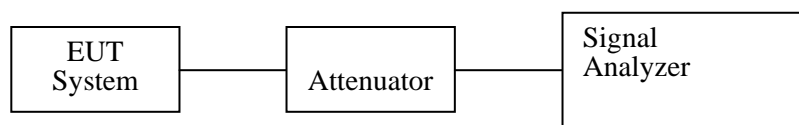
Applicable Standards

FCC §2.1051, §22.917(a) and §24.238(a).

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

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 1 MHz. sufficient scans were taken to show any out of band emissions up to 10th harmonic.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2012-04-11	2013-04-10

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

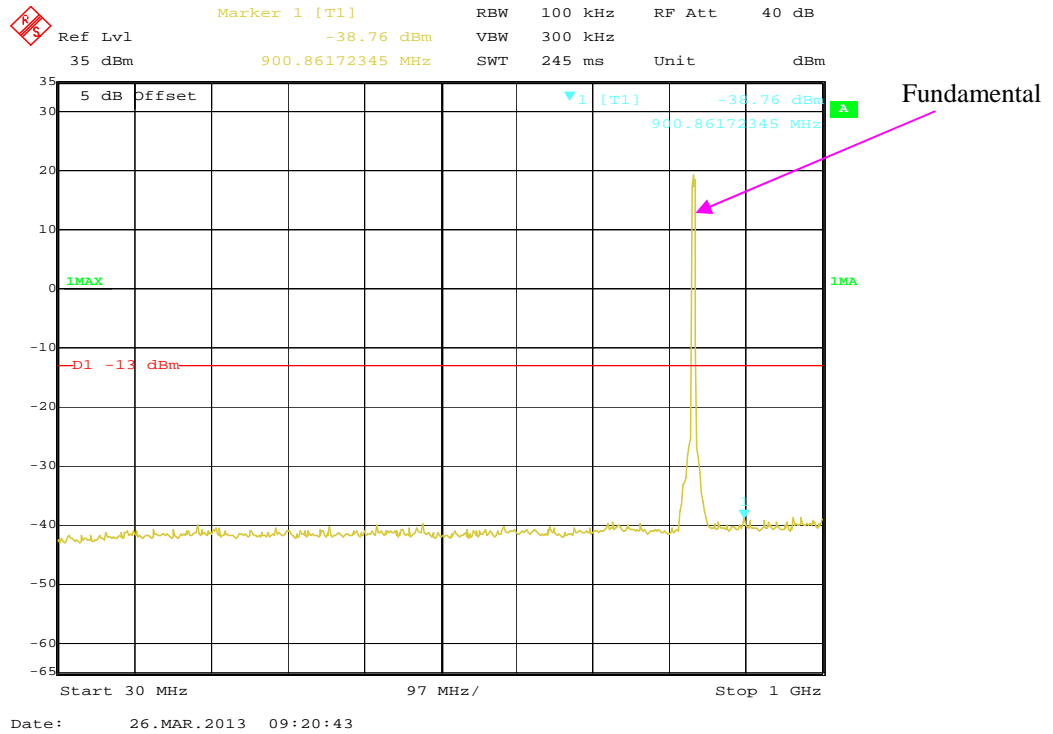
The testing was performed by Gardon Zhang on 2013-03-26.

Please refer to the following plots.

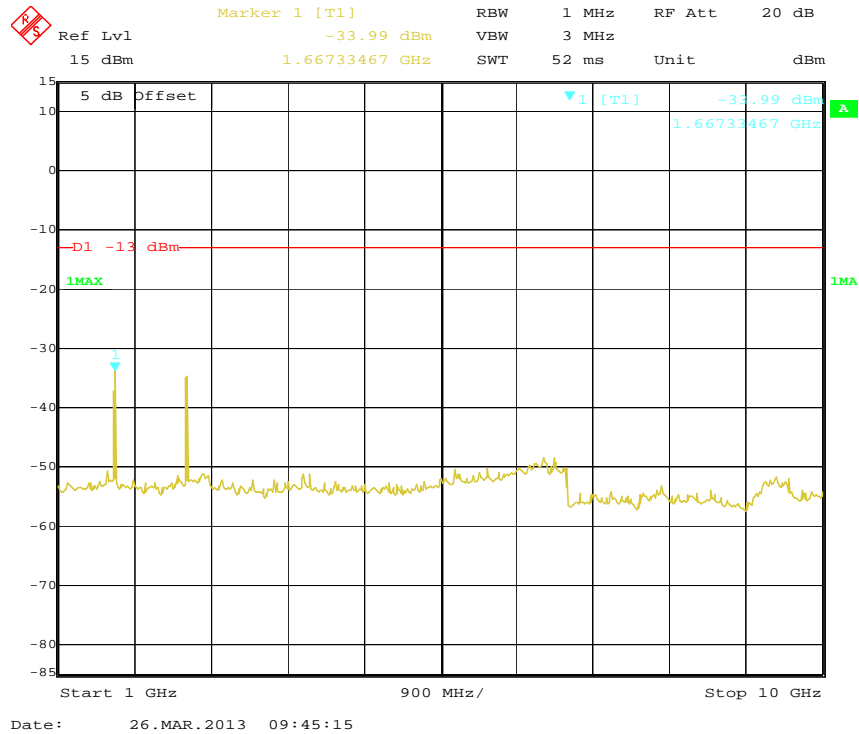
Cellular Band (Part 22H)

WCDMA 850 Mode (Uplink)

30 MHz-1 GHz



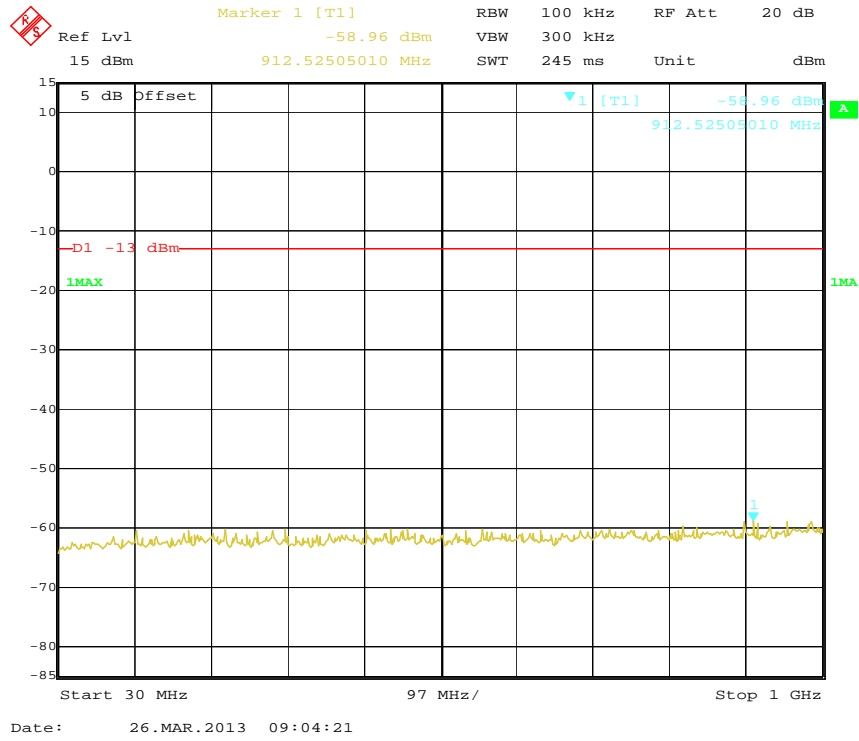
1 GHz-10 GHz



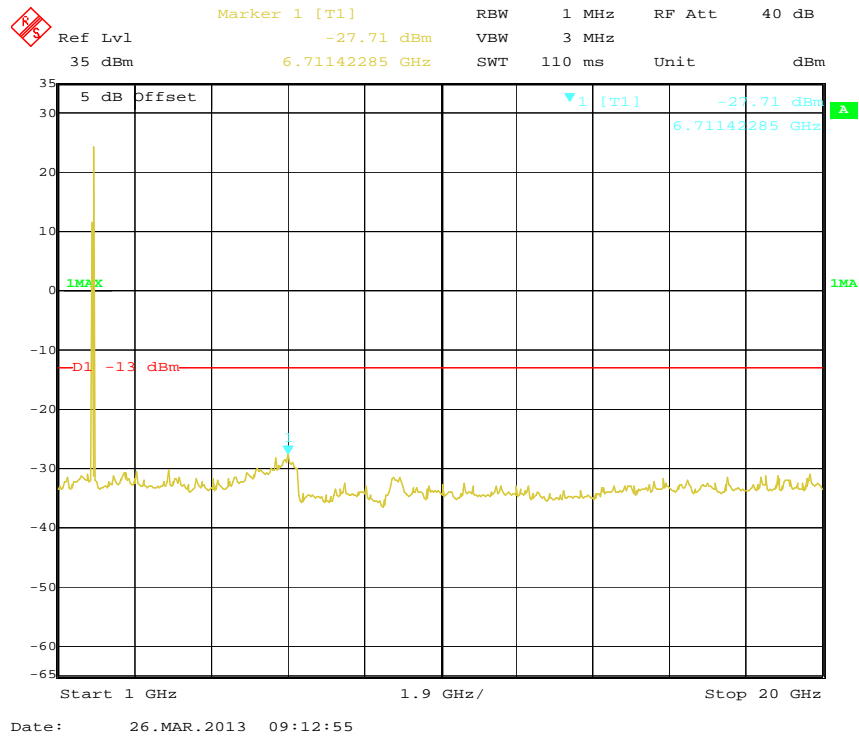
PCS Band (Part 24E)

WCDMA 1900 Mode (Uplink)

30 MHz-1 GHz



1 GHz -20 GHz



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

Applicable Standards

FCC § 2.1053, §22.917 and § 24.238.

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 lg (TX pwr in Watts/0.001) – the absolute level

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2014-11-30
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2014-11-27
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23
Mini-Circuits	Amplifier	ZVA-213+	N/A	2012-11-24	2013-11-23
HP	Amplifier	HP8447E	1937A01046	2012-08-09	2013-08-08
HP	Signal Generator	8341B	2624A00116	2012-05-17	2013-05-16
COM POWER	Dipole Antenna	AD-100	041000	2012-06-06	2013-06-05
A.H. System	Horn Antenna	SAS-200/571	135	2012-02-11	2015-02-10
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2014-11-30
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2012-04-11	2013-04-10

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	55 %
ATM Pressure:	100.0 kPa

The testing was performed by Gardon Zhang on 2013-03-28.

Test mode: Transmitting (worse case)

Cellular Band (Part 22H)

WCDMA 850 mode at middle channel (836.6MHz):

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H	
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
1693.2	46.12	68	1.5	H	-56.9	0.97	9.40	-48.47	-13	35.47
3386.4	34.16	36	1.7	V	-59.4	2.08	10.80	-50.68	-13	37.68
2539.8	40.50	74	1.6	H	-60.2	1.46	10.70	-50.96	-13	37.96
1693.2	40.67	113	1.7	V	-59.8	0.97	9.40	-51.37	-13	38.37
3386.4	34.04	88	1.6	H	-60.4	2.08	10.80	-51.68	-13	38.68
2509.8	33.97	108	1.8	V	-62.4	1.46	10.70	-53.16	-13	40.16

PCS Band (Part 24E)

WCDMA 1900 mode at low channel (1852.4MHz):

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 24E	
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
3704.8	51.98	116	1.7	H	-44.1	2.96	10.40	-36.66	-13	23.66
3704.8	49.21	116	1.5	V	-45.5	2.96	10.40	-38.06	-13	25.06
5557.2	43.47	73	1.8	H	-49.2	3.94	11.70	-41.44	-13	28.44
5557.2	40.07	73	1.7	V	-50.0	3.94	11.70	-42.24	-13	29.24
7409.6	33.70	105	1.7	V	-55.9	3.07	12.00	-46.97	-13	33.97
7409.6	31.03	105	1.6	H	-58.8	3.07	12.00	-49.87	-13	36.87

Note:

- 1) Absolute Level = SG Level - Cable loss + Antenna Gain
- 2) Margin = Limit- Absolute Level

FCC §22.917(a) & §24.238(a) - BAND EDGES

Applicable Standards

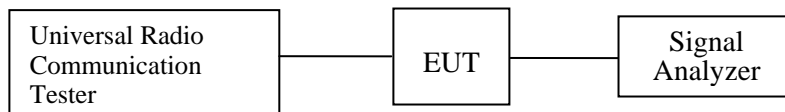
According to FCC § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to FCC §24.238(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.

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 50 kHz.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2012-04-11	2013-04-10

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Gardon Zhang on 2013-03-26.

Please refer to the following tables and plots.

Cellular Band (Part 22H)

WCDMA 850 mode:

Frequency Band	Emission (dBm)	Limit (dBm)
Left Band	-22.40	-13
Right Band	-30.46	-13

PCS Band (Part 24E)

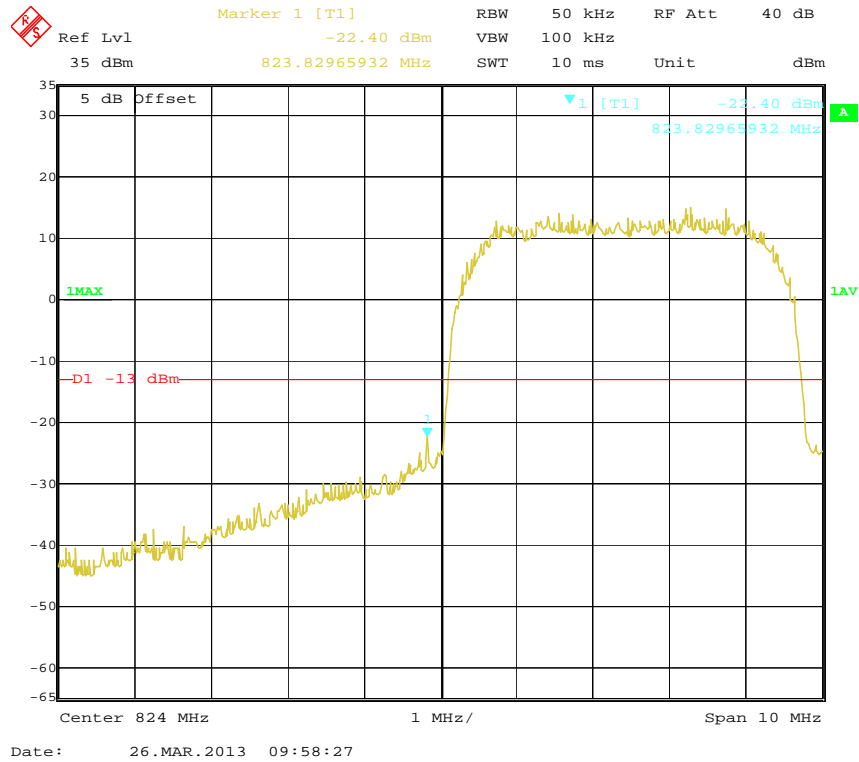
WCDMA 1900 mode:

Frequency Band	Emission (dBm)	Limit (dBm)
Left Band	-18.98	-13
Right Band	-19.82	-13

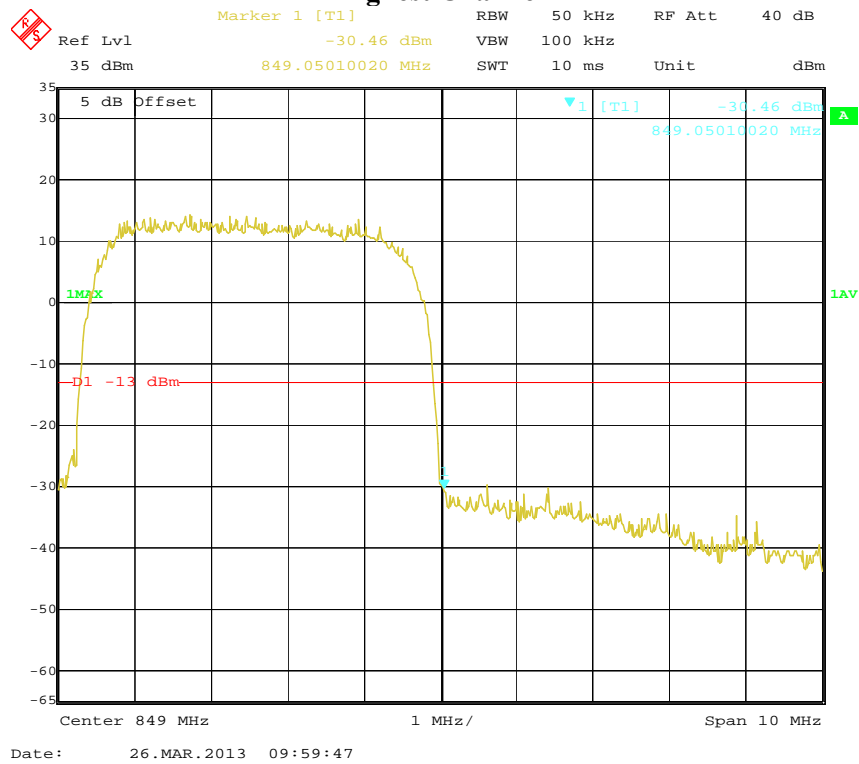
Cellular Band (FCC Part 22H)

WCDMA 850 mode

Lowest Channel



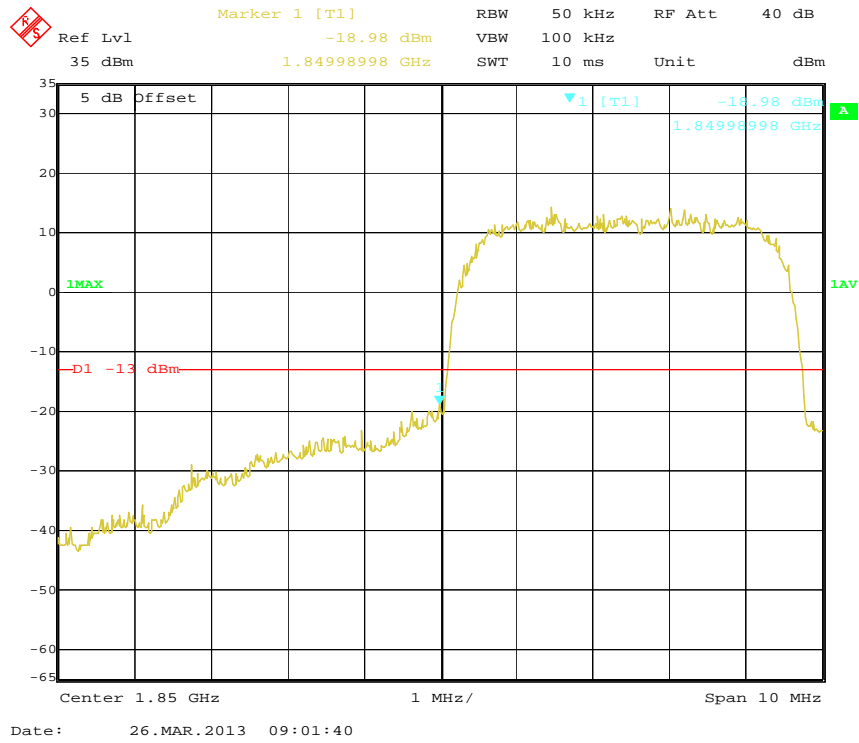
Highest Channel



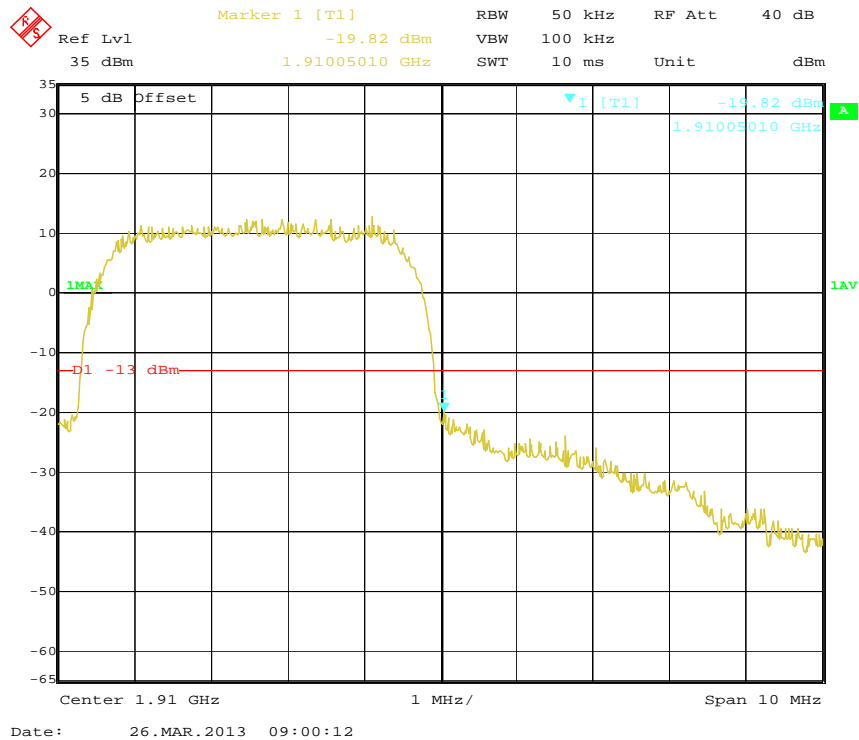
PCS Band (FCC Part 24E)

WCDMA 1900 mode

Lowest Channel



Highest Channel



FCC §2.1055, §22.355, §24.235 - FREQUENCY STABILITY

Applicable Standards

FCC § 2.1055 (a), § 2.1055 (d), §22.355, §24.235

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 ≤ 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

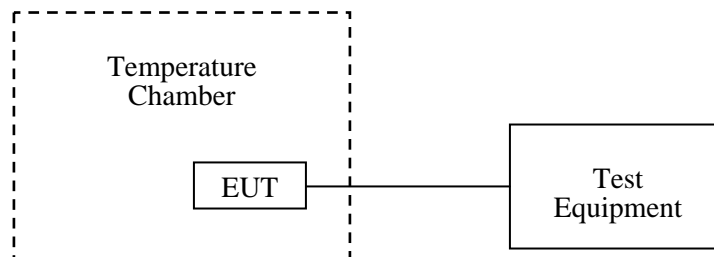
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
ESPEC	Temperature & Humidity Chamber	EL-10KA	09107726	2012-11-02	2013-11-01
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2012-04-11	2013-04-10

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	55 %
ATM Pressure:	101.0kPa

The testing was performed by Gardon Zhang on 2013-27.

Cellular Band (Part 22H)

Middle Channel, $f_0 = 836.6\text{MHz}$				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	9	0.0108	2.5
40		7	0.0084	2.5
30		8	0.0096	2.5
20		7	0.0084	2.5
10		5	0.0060	2.5
0		6	0.0072	2.5
-10		7	0.0084	2.5
-20		7	0.0084	2.5
-30		9	0.0108	2.5
20		V _{min.} = 4.2	7	0.0084
20	V _{max.} = 3.5	4	0.0048	2.5

PCS Band (Part 24E)

Middle Channel, $f_0 = 1880\text{ MHz}$				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
50	3.7	10	0.0053	N/A
40		10	0.0053	N/A
30		8	0.0043	N/A
20		7	0.0037	N/A
10		9	0.0048	N/A
0		8	0.0043	N/A
-10		10	0.0053	N/A
-20		9	0.0048	N/A
-30		6	0.0032	N/A
20		V _{min.} = 4.2	10	0.0053
20	V _{max.} = 3.5	6	0.0032	N/A

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