



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

For

Teleepoch Limited

5A, B1 Building, Digital Tech Zone, High Tech Park (South),
Nanshan District, Shenzhen, Guangdong, China

FCC ID: U46-CDM2035

Report Type: Original Report	Product Type: CDMA Mobile Phone
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Report Number: <u>R1201271-222427</u>	
Report Date: <u>2012-02-27</u>	
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* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk “*” (Rev.2)

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1201271-222427	Original Report	2012-02-27

1 GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

This test and measurement report was prepared on behalf of *TELEEPOCH Limited* and their product, *model: CDM2035C, FCC ID: U46-CDM2035* or the “EUT” as referred to in this report. The EUT is CDMA 1x Cell Phone with Bluetooth technologies.

Description	Specification
Frequency Band	Cellular Band: 824-849 MHz (TX) 869-894 MHz (RX) PCS Band: 1850~1910 MHz (TX) 1930~1990 MHz (RX) AWS Band: 1710-1755 MHz (TX) 2110-2155 MHz (RX)
CDMA Protocol	CDMA 1XRTT

1.2 Mechanical Description

The EUT measures approximately 50 mm (L) x 10 mm (W) x 110 mm (H) and weighs approximately 9 g.

The data gathered are from a typical production sample provided by the manufacturer with serial: D561548202000223 for conducted tests and D561548202000222 for radiated tests provided by the manufacture.

1.3 Objective

This type approval report is prepared on behalf of *TELEEPOCH Limited* 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.

The objective is to determine compliance with FCC rule for RF output power, modulation characteristic, occupied bandwidth, spurious emissions at antenna terminal, field strength of spurious radiation, frequency stability, band edge, and conducted and radiated margin.

This measurement and test report only pertains to the CDMA 1xRTT 850/1900/1700 MHz portion of the EUT.

1.4 Related Submittal(s)/Grant(s)

FCC Part 15.247 DSS submission with FCC ID: U46-CDM2035.

1.5 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 – PCS
Part 27 – AWS

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.

1.6 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.

1.7 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 (HP E5155C) Wireless Communication test set was used to activate the EUT.
CDMA 2000

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 Internal Configuration

Manufacturer	Description	Model	Serial Number
PCD	PCB Board	CDM2035C	D56154820200021

2.7 Power Supply and Line Filters

Manufacturer	Description	Model	Serial Number
PCD Switching Adapter	AC/DC Adapter	A26-50500	CNR2080

2.8 Interface Ports and Cabling

Cable Description	Length (m)	From	To
RF Cable	< 1	EUT	Spectrum Analyzer

3 SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§2.1046, §22.913(a), §24.232, §27.50(d)	RF Output Power	Compliant
§2.1047	Modulation Characteristics	N/A ¹
§2.1049(h), §22.917, §24.238, §27.53(c)	Out of Band Emissions, Occupied Bandwidth	Compliant
§2.1051, §22.917, §24.238, §27.53(c)	Spurious Emissions at Antenna Terminals	Compliant
§2.1053, §22.917, §24.238, §27.53(c)	Field Strength of Spurious Radiation	Compliant
§22.917, §24.238, §27.53(c)	Band Edge	Compliant
§2.1055, §22.355, §24.235, §27.54	Frequency stability	Compliant
§2.1093, §27.52	RF Exposure Information (SAR)	Compliant ²

Note: ¹ According to FCC §2.1047(d), Part 22H & 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

² According to §1.1310 and §2.1093 SAR Evaluation is required, please refer to SAR report R1201271-SAR.

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

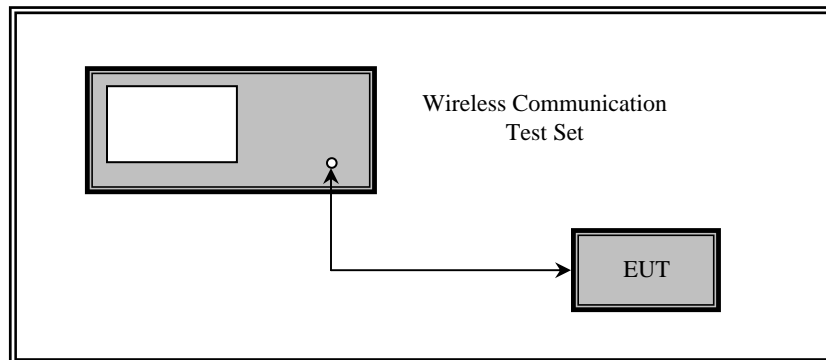
According to FCC §2.1046 and §24.232 (a), in no case may the peak output power of a base station transmitter exceed 2 watts.

According to FCC §27.50 (d), Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.

4.2 Test Procedure

Conducted:

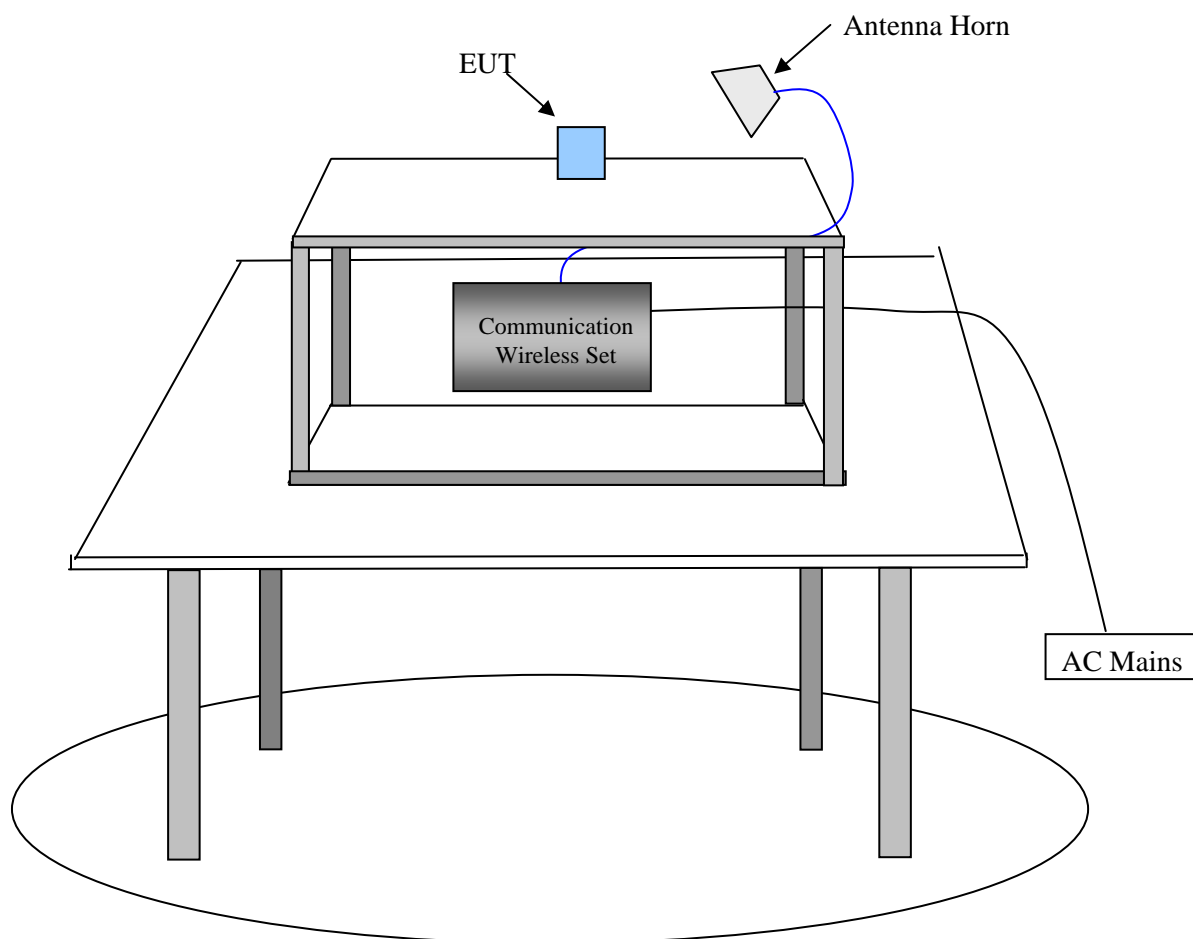
The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.



Radiated (ERP and EIRP):

TIA-603-C §2.2.17

4.3 Test Setup Block Diagram



4.4 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
A. H. Systems	Antenna, Horn	3115	9511-4627	2011-08-09
Mini Circuits	Pre-Amplifier	ZVA-183-S	570400946	2011-05-09
HP	Pre-Amplifier	8447D	2944A06639	2011-06-18
Sunol Sciences	Antenna	JB1	A020106-1	2011-05-11
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10
Agilent	Analyzer, Communications	E5515C	GB44051221	2010-06-11 ¹

Note 1: Two year calibration cycle.

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

4.5 Test Environmental Conditions

Temperature:	20-24 °C
Relative Humidity:	32-35 %
ATM Pressure:	101.4-101.6kPa

The testing was performed by Quinn Jiang on 2012-02-06 to 2012-02-09 at RF test site and 5 meter chamber 3.

4.6 Test Results

Conducted Output Power:

Cellular Band:

Mode	FED	REV	Low CH (824.70 MHz)	Middle CH (836.52 MHz)	High CH (848.31MHz)	Limit (dBm)
CDMA2000 1xRTT	RC1	RC1(S02)	24.33	24.10	24.08	38.45
	RC1	RC1(S055)	24.30	24.01	24.18	38.45
	RC2	RC2(S09)	24.31	24.01	24.04	38.45
	RC2	RC2(S055)	24.25	24.08	24.00	38.45
	RC3	RC3(S02)	24.26	24.10	24.22	38.45
	RC3	RC3(S055)	24.35	24.13	24.26	38.45
	RC4	RC3(S02)	24.29	24.00	23.64	38.45
	RC4	RC3(S055)	24.10	23.99	23.98	38.45
	RC5	RC4(S09)	24.30	24.03	24.00	38.45
	RC5	RC4(S055)	24.29	23.95	24.11	38.45

PCS Band:

Mode	FED	REV	Low CH (1851.25 MHz)	Middle CH (1880.00 MHz)	High CH (1908.75 MHz)	Limit (dBm)
CDMA2000 1xRTT	RC1	RC1(S02)	24.75	24.55	24.44	33
	RC1	RC1(S055)	24.76	24.55	24.55	33
	RC2	RC2(S09)	24.75	24.61	24.48	33
	RC2	RC2(S055)	24.71	24.59	24.53	33
	RC3	RC3(S02)	24.76	24.59	24.50	33
	RC3	RC3(S055)	24.80	24.63	24.59	33
	RC4	RC3(S02)	24.78	24.55	24.45	33
	RC4	RC3(S055)	24.75	24.62	24.55	33
	RC5	RC4(S09)	24.75	24.55	24.49	33
	RC5	RC4(S055)	24.76	24.60	24.46	33

AWS Band:

Mode	FED	REV	Low CH (1711.25 MHz)	Middle CH (1732.5 MHz)	High CH (1753.75 MHz)	Limit (dBm)
CDMA2000 1xRTT	RC1	RC1(S02)	24.36	23.82	24.41	30
	RC1	RC1(S055)	24.44	23.76	24.41	30
	RC2	RC2(S09)	24.41	23.73	24.40	30
	RC2	RC2(S055)	24.48	23.74	24.41	30
	RC3	RC3(S02)	24.40	24.12	24.39	30
	RC3	RC3(S055)	24.49	24.16	24.43	30
	RC4	RC3(S02)	24.46	23.64	24.41	30
	RC4	RC3(S055)	24.48	23.70	24.42	30
	RC5	RC4(S09)	24.49	23.60	24.41	30
	RC5	RC4(S055)	24.48	23.63	24.40	30

Radiated Power (ERP and EIRP):

ERP: Cellular Band Part 22H (Middle Channel)

Indicated		Test Antenna Polar (H/V)	Substituted				Absolute Level (dBm)	Part 22H	
Freq. (MHz)	Amp. (dBuV)		Freq. (MHz)	Level (dBm)	Antenna Gain (dBd)	Cable Loss (dB)		Limit (dBm)	Margin (dB)
836.52	102.19	V	836.52	17.63	0	0.5	17.13	38.45	-21.32
836.52	112.35	H	836.52	26.22	0	0.5	25.72	38.45	-12.73

EIRP: PCS Band Part 24E (Middle Channel)

Indicated		Test Antenna Polar (H/V)	Substituted				Absolute Level (dBm)	Part 24E	
Freq. (MHz)	Amp. (dBuV)		Freq. (MHz)	Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)		Limit (dBm)	Margin (dB)
1880	81.25	V	1880	9.25	8.74	1.0	16.99	33	-16.01
1880	88.13	H	1880	16.83	8.61	1.0	24.44	33	-8.56

EIRP: AWS Band Part 27 (Middle Channel)

Indicated		Test Antenna Polar (H/V)	Substituted				Absolute Level (dBm)	Part 27	
Freq. (MHz)	Amp. (dBuV)		Freq. (MHz)	Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)		Limit (dBm)	Margin (dB)
1732.5	81.39	V	1732.5	8.39	9.07	0.9	16.56	30	-13.44
1732.5	89.01	H	1732.5	16.51	9.16	0.9	24.77	30	-5.23

5 FCC §2.1049, §22.917, §22.905, §24.238 & §27.53 - OCCUPIED BANDWIDTH

5.1 Applicable Standard

Requirements: FCC §2.1049, §22.901, §22.917, §24.238, and §27.53 (c).

5.2 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 bandwidth was recorded.

5.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10
Agilent	Analyzer, Communications	E5515C	GB44051221	2010-06-11 ¹

Note 1: Two year calibration cycle.

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

5.4 Test Environmental Conditions

Temperature:	20-24 °C
Relative Humidity:	32-35 %
ATM Pressure:	101.4-101.6kPa

The testing was performed by Quinn Jiang on 2012-02-06 to 2012-02-09 at RF test site.

5.5 Test Results & Plots

Please refer to the following tables and plots.

Cellular Band

Channel	Frequency (MHz)	26 dB Occupied Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
CDMA 1xRTT			
Middle	836.52	1.438	1.2750

PCS Band

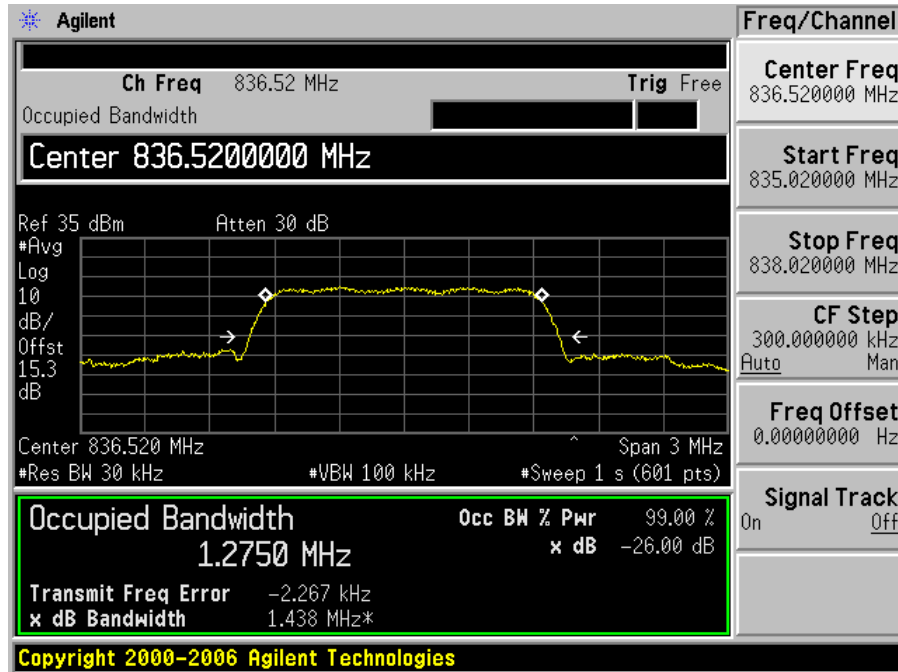
Channel	Frequency (MHz)	26 dB Occupied Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
CDMA 1xRTT			
Middle	1880.00	1.439	1.2755

AWS Band

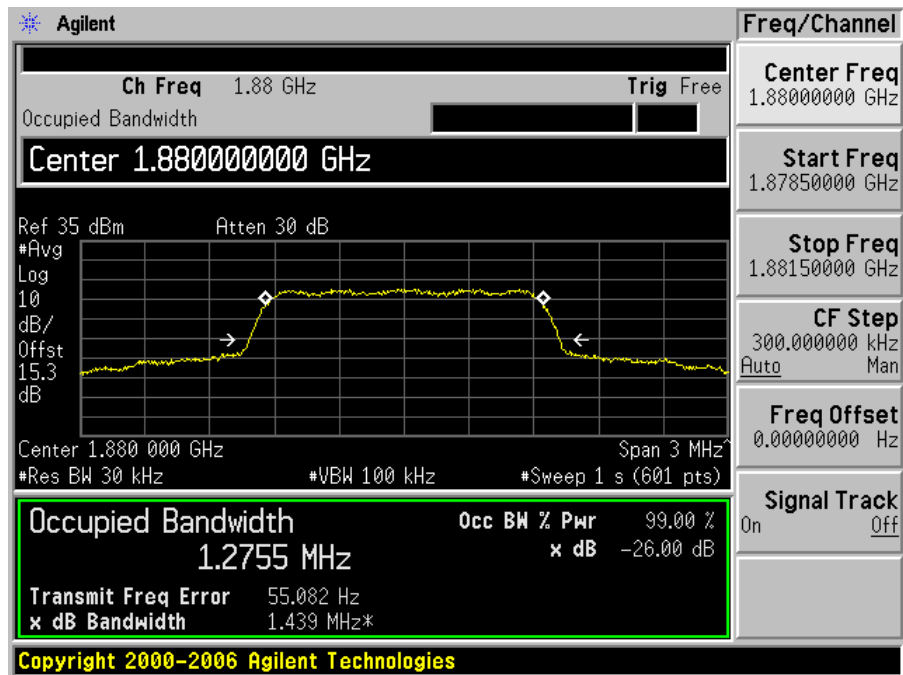
Channel	Frequency (MHz)	26 dB Occupied Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
CDMA 1xRTT			
Middle	1732.5	1.457	1.2760

Plots of Occupied Bandwidth

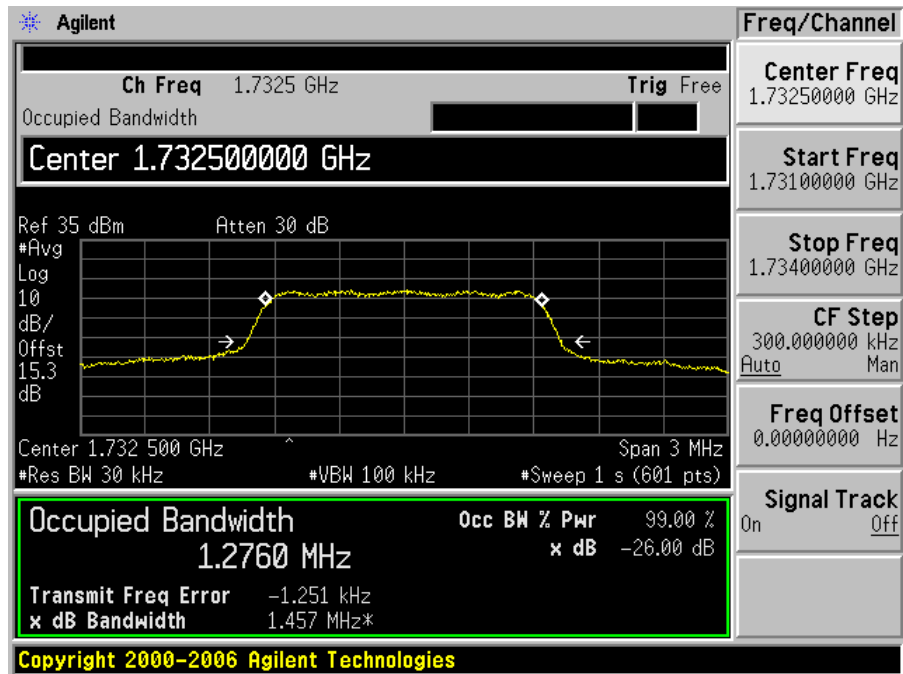
Cellular Band, Middle Channel



PCS Band, Middle Channel



AWS Band, Middle Channel



6 FCC §2.1051, §22.917, §24.238 & §27.53 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

6.1 Applicable Standard

Requirements: FCC §2.1051, §22.917, §24.238 & 27.53.

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

6.2 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.

6.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10
Agilent	Analyzer, Communications	E5515C	GB44051221	2010-06-11 ¹

Note 1: Two year calibration cycle.

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

6.4 Test Environmental Conditions

Temperature:	20-24 °C
Relative Humidity:	32-35 %
ATM Pressure:	101.4-101.6kPa

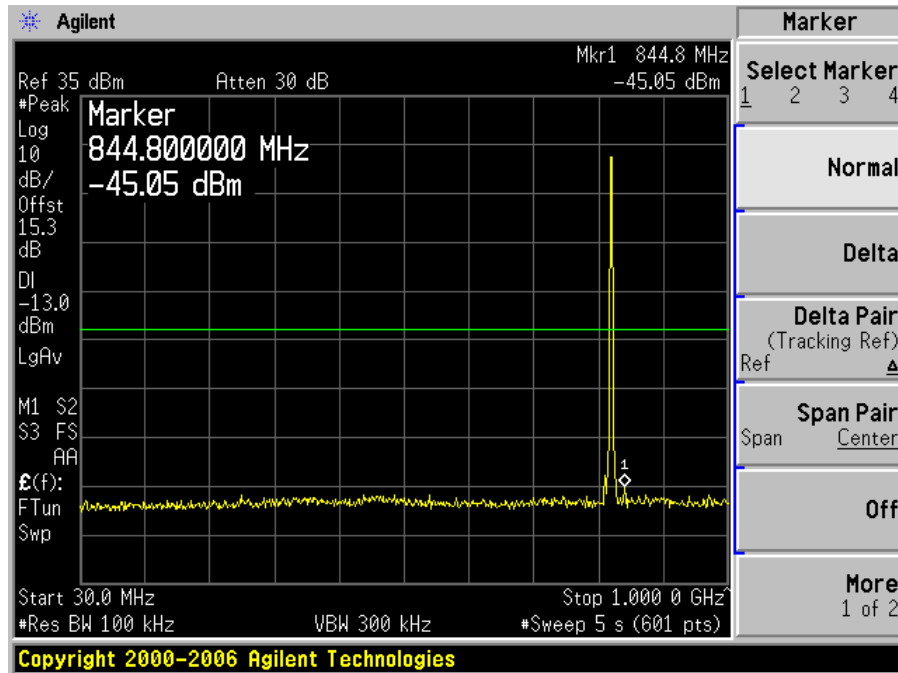
The testing was performed by Quinn Jiang on 2012-02-06 to 2012-02-09 at RF test site.

6.5 Test Results & Plots

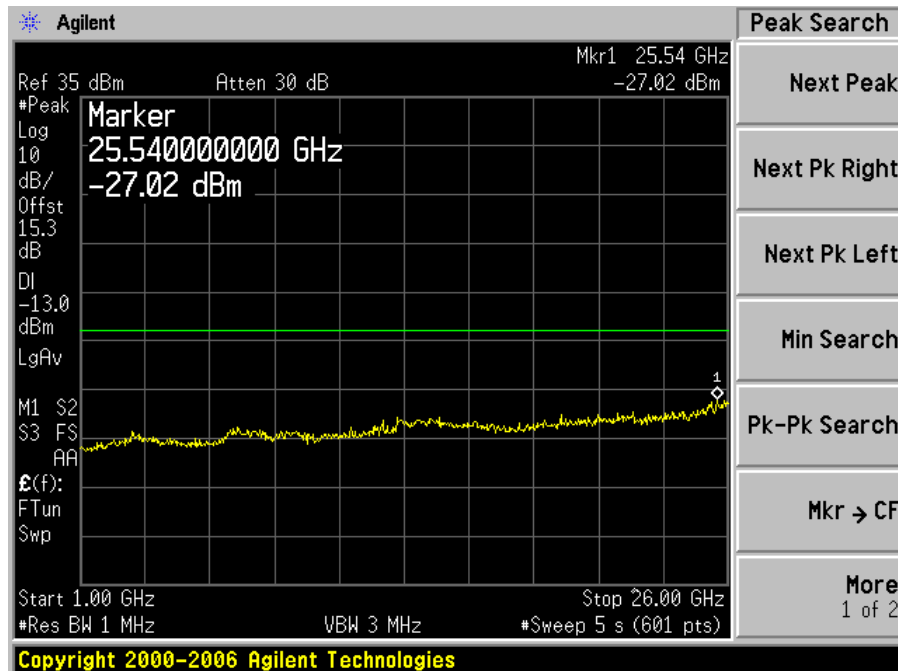
Please refer to the following plots.

Plots of Spurious Emissions for Cellular Band:**Low Channel**

Plot 1a: 30 MHz – 1 GHz

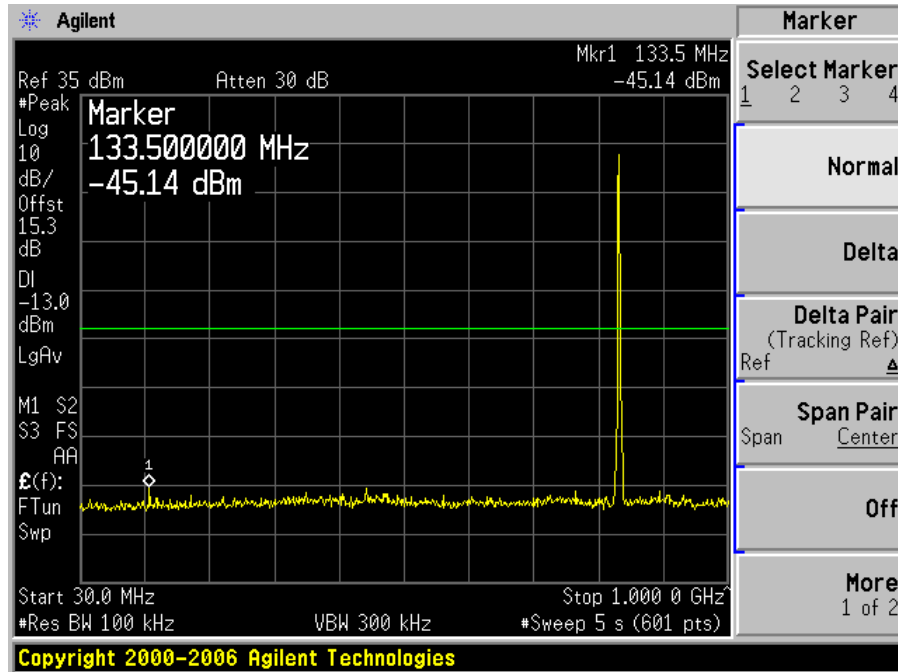


Plot 2a: 1 GHz – 26 GHz

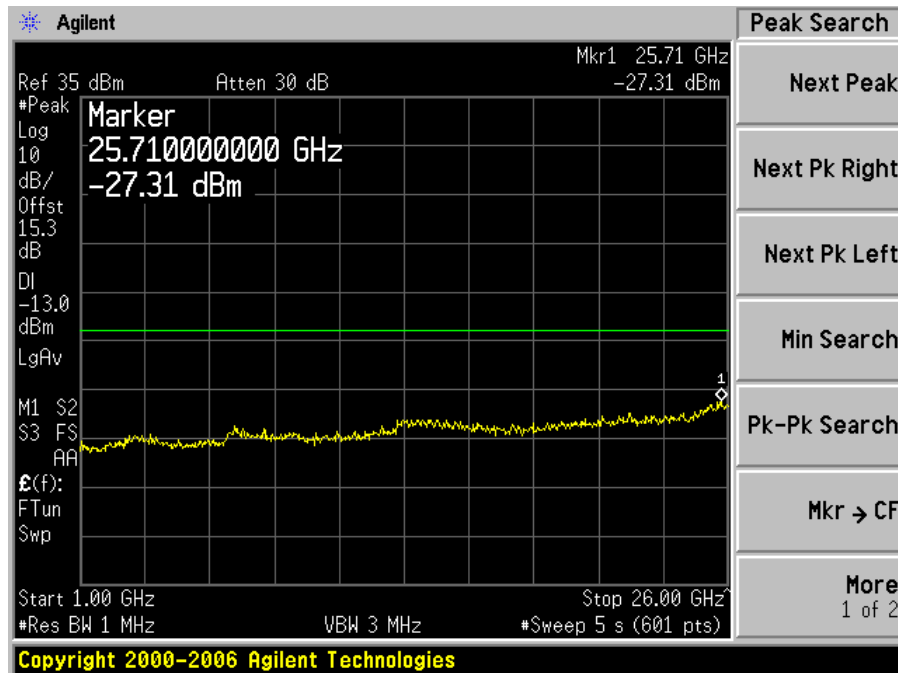


Middle Channel

Plot 1b: 30 MHz – 1 GHz

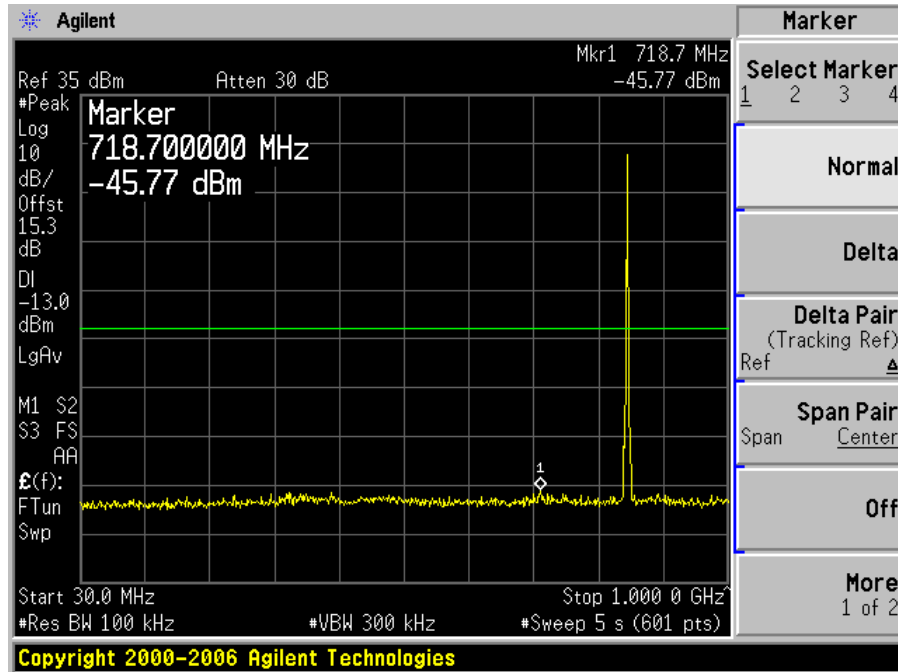


Plot 2b: 1 GHz – 26 GHz

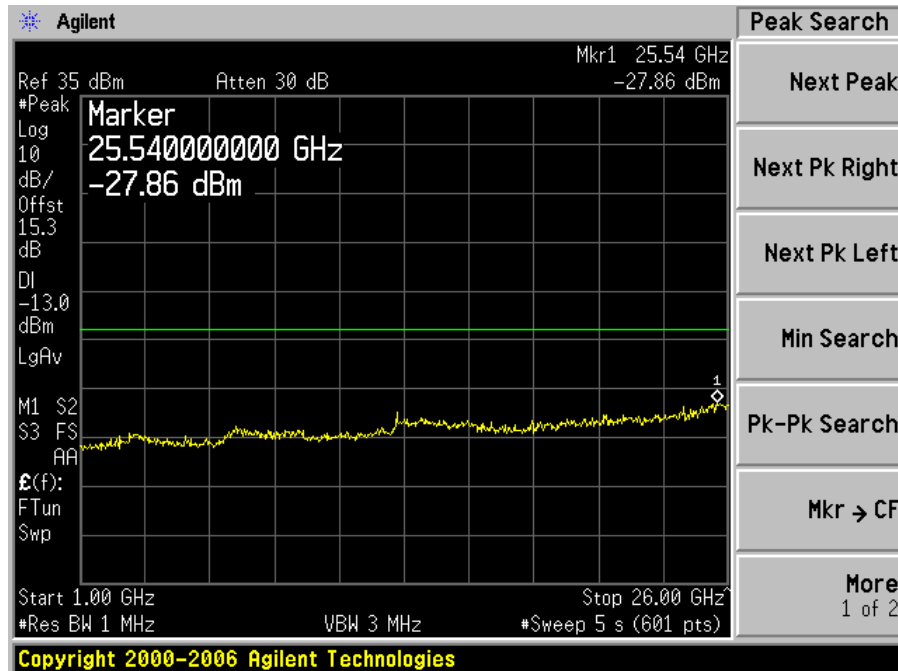


High Channel

Plot 1c: 30 MHz – 1 GHz

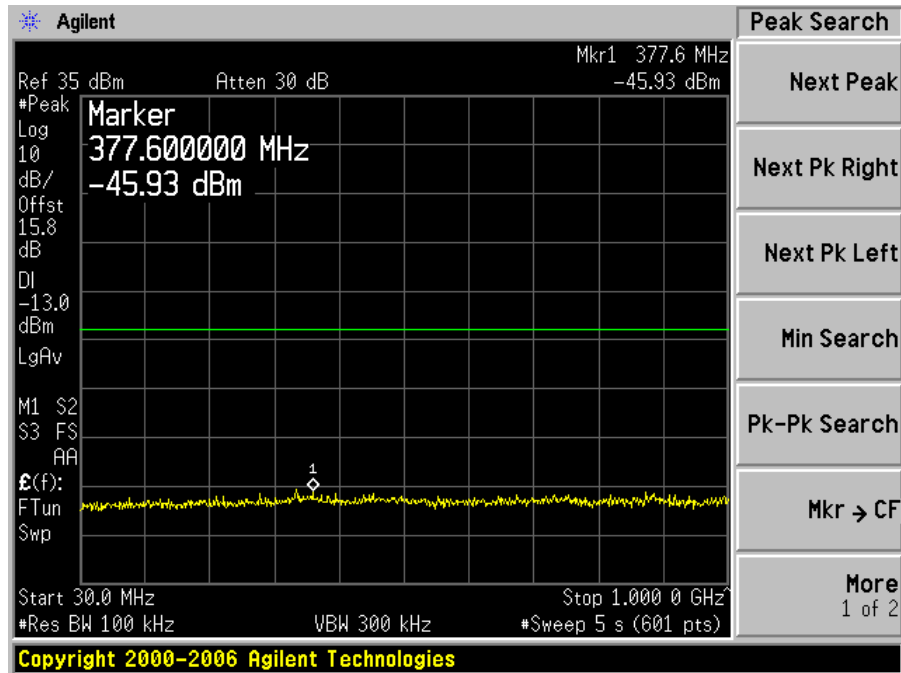


Plot 2c: 1 GHz – 26 GHz

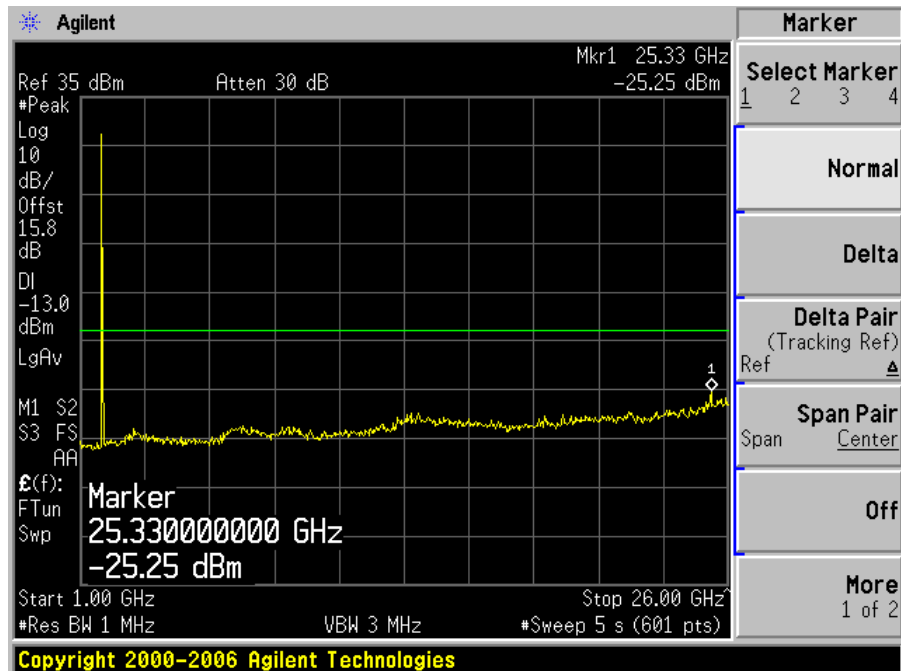


Plots of Spurious Emissions for PCS Band:**Low Channel**

Plot 1d: 30 MHz – 1 GHz

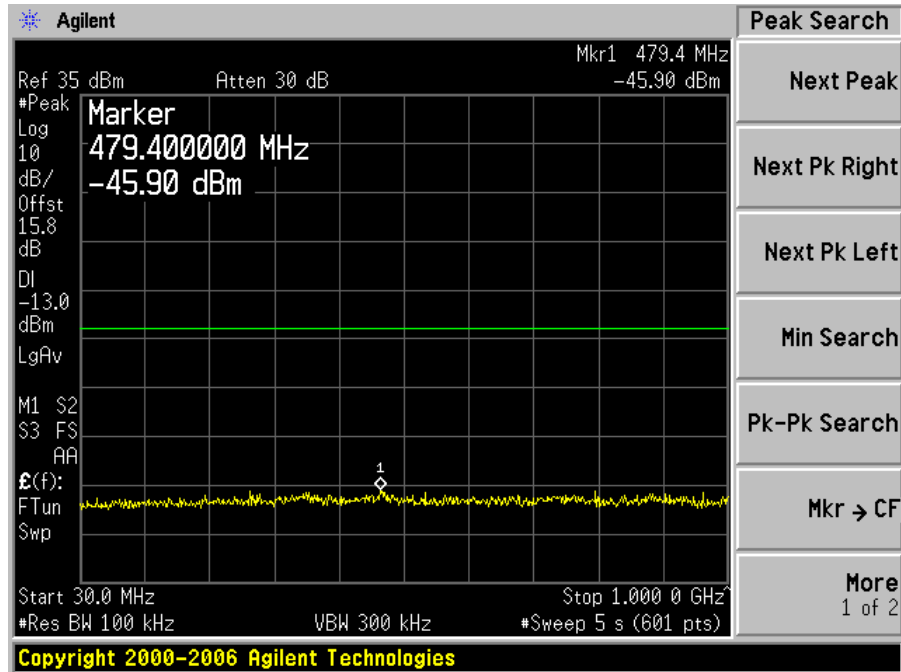


Plot 2d: 1 GHz –26 GHz

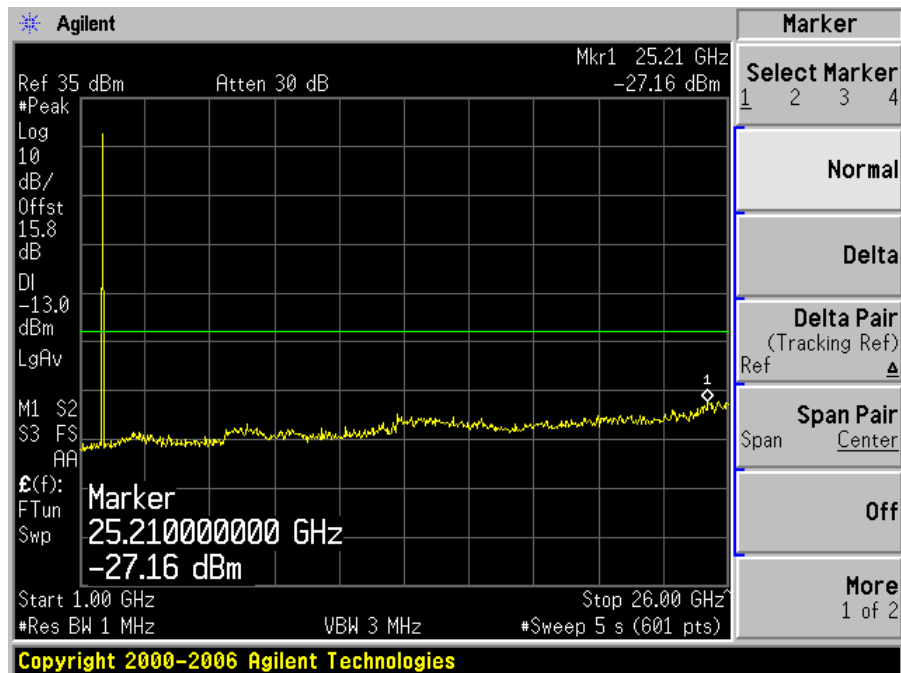


Middle Channel

Plot 1e: 30 MHz – 1 GHz

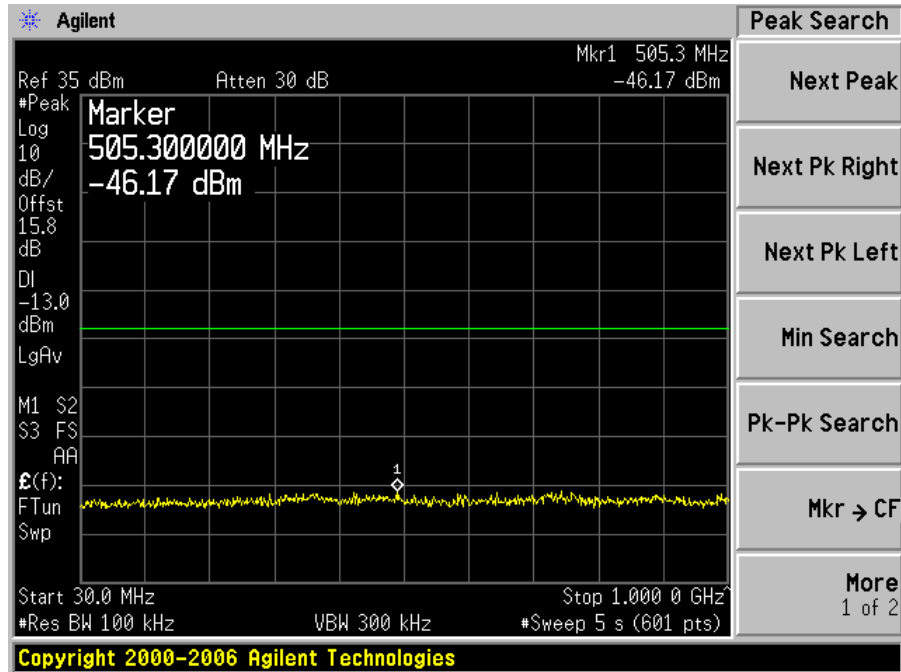


Plot 2e: 1 GHz –26 GHz

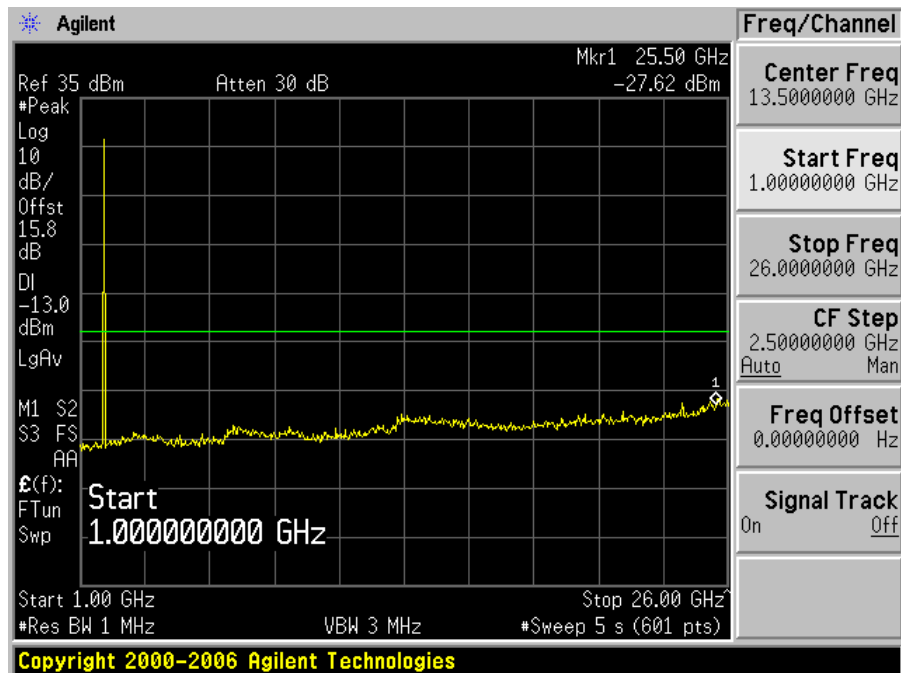


High Channel

Plot 1f: 30 MHz – 1 GHz

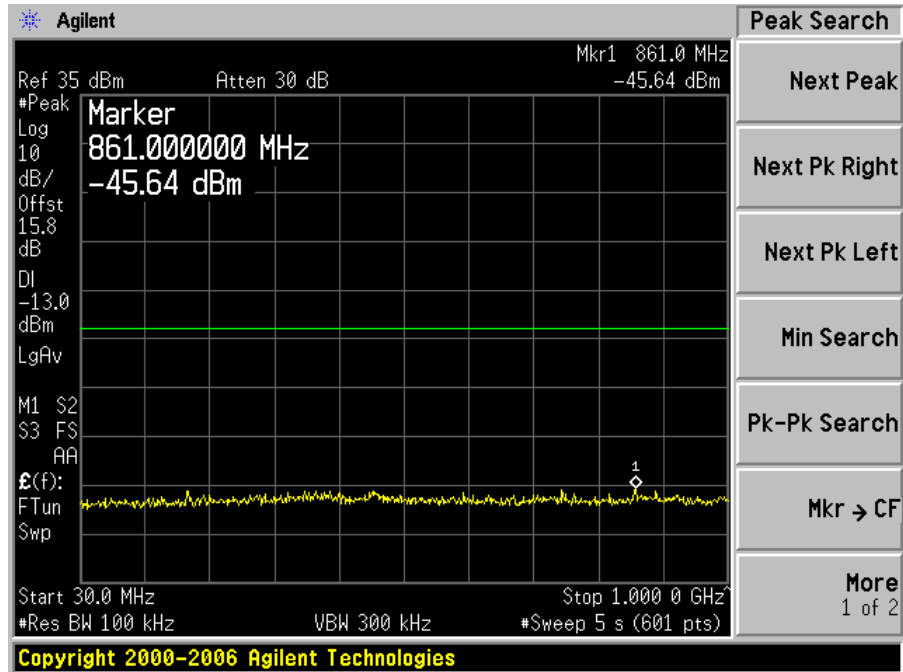


Plot 2f: 1 GHz –26 GHz

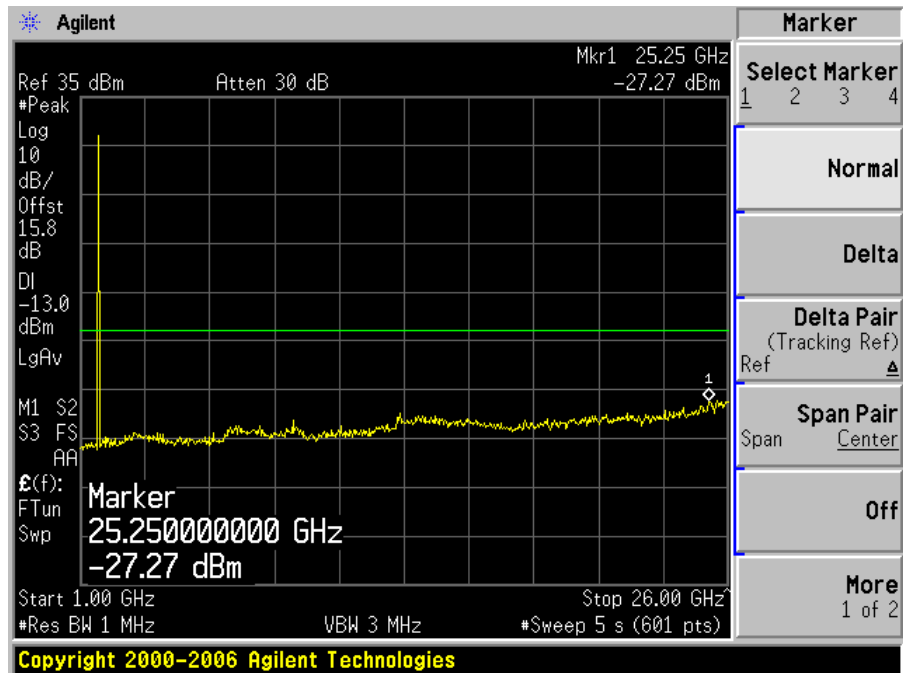


Plots of Spurious Emissions for AWS Band:**Low Channel**

Plot 1d: 30 MHz – 1 GHz

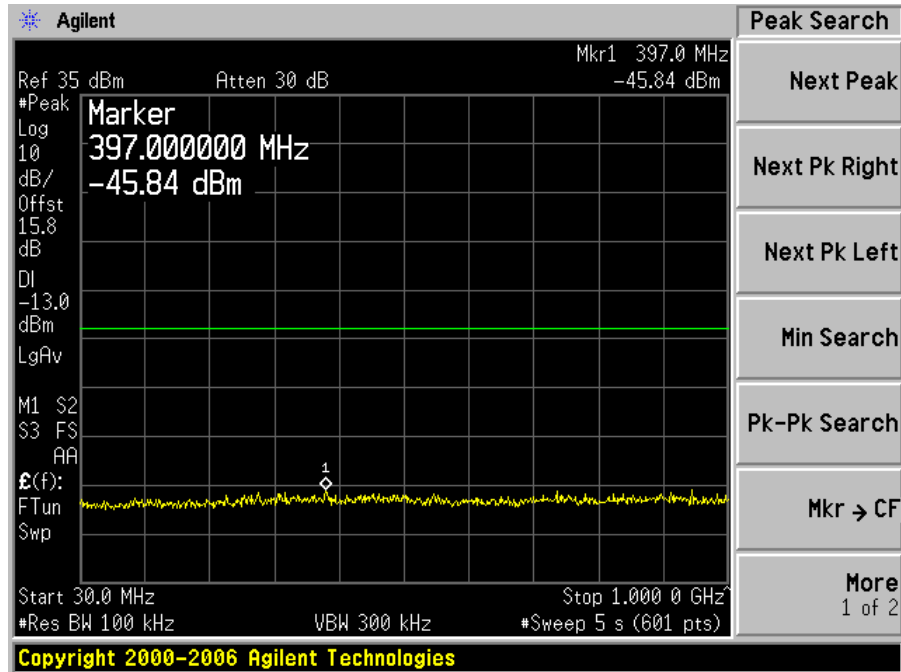


Plot 2d: 1 GHz –26 GHz

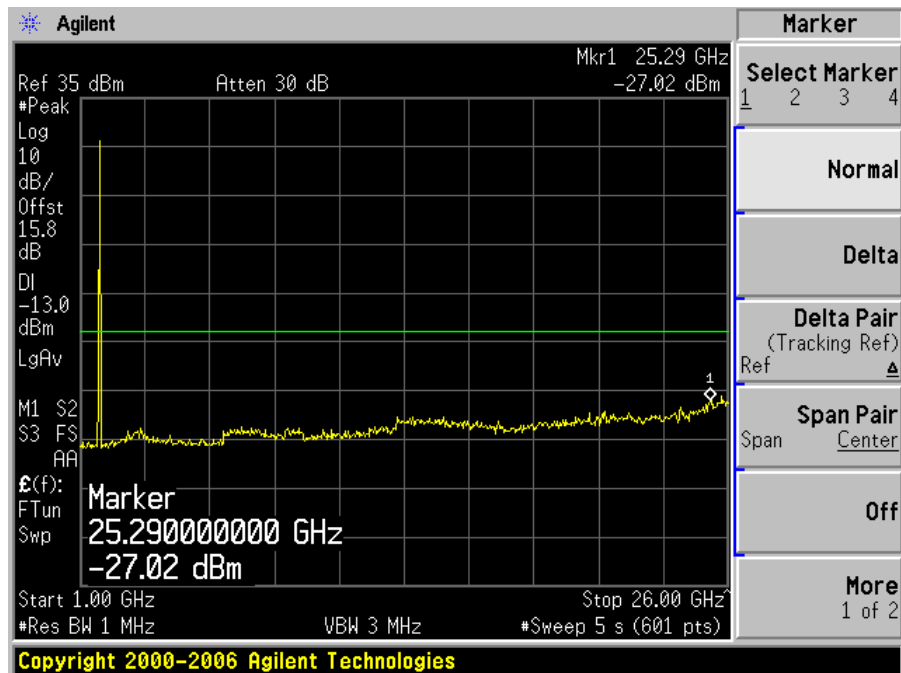


Middle Channel

Plot 1e: 30 MHz – 1 GHz

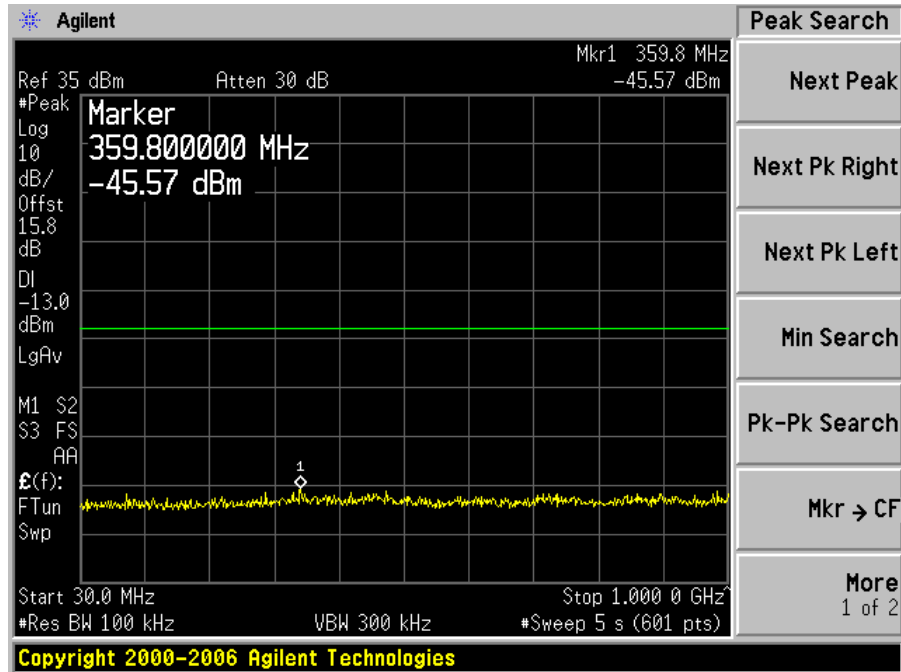


Plot 2e: 1 GHz –26 GHz

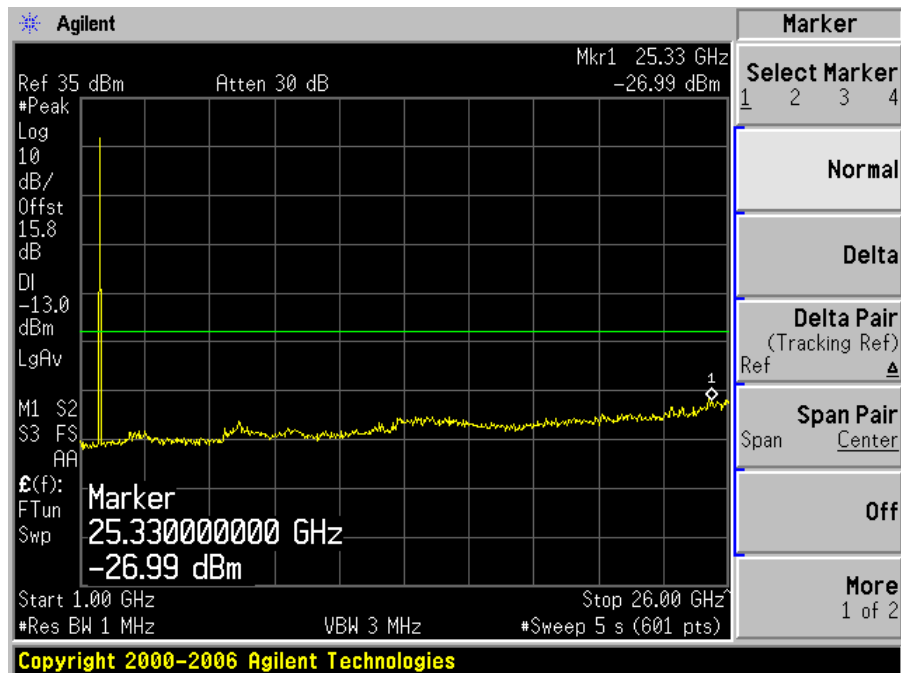


High Channel

Plot 1f: 30 MHz – 1 GHz



Plot 2f: 1 GHz –26 GHz



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

7.1 Applicable Standard

Requirements: FCC §2.1053, §22.917, §24.238, & §27.53.

7.2 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 = $43 + 10 \log_{10} (\text{power out in Watts})$

7.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
A.H Systems	Antenna, Horn	SAS-200/571	261	2012-01-18
Mini-Circuits	Pre-amplifier	ZVA-183-S	667400960	2011-05-08
Hewlett Packard	Pre-amplifier	8447D	2944A10187	2011-03-08
Sunol Science Corp	Combination Antenna	JB1	A020106-1	2011-05-17
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100338	2011-09-14
Sunol Science Corp	System Controller	SC99V	122303-1	N/R
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10
Eaton	Antenna, Horn	96001	Mar-07	2011-10-03
HP	Generator, Signal	83650B	3614A00276	2010-06-21 ¹
Agilent	Analyzer, Communications	E5515C	GB44051221	2010-06-11 ¹

Note 1: Two year calibration cycle.

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

7.4 Test Environmental Conditions

Temperature:	20-24 °C
Relative Humidity:	32-35 %
ATM Pressure:	101.4-101.6kPa

The testing was performed by Quinn Jiang on 2012-02-10 in 5 meter chamber 3.

7.5 Test Results

Cellular Band:

30 MHz -10 GHz Radiated Emission at 3-meter (Middle Channel, 836.52 MHz)

Indicated		Turntable Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Part 22H	
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)		Limit (dBm)	Margin (dB)
1673.04	43.03	238	150	H	1673.04	-60.62	9.29	1.34	-52.67	-13	-39.67
1673.04	47.86	184	141	V	1673.04	-55.79	8.88	1.34	-48.25	-13	-35.25

Note: All other emissions levels are at the noise floor.

PCS Band:

30 MHz -20 GHz Radiated Emission at 3-meter (Middle Channel, 1880 MHz)

Indicated		Turntable Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Part 24E	
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)		Limit (dBm)	Margin (dB)
3760	49.96	120	181	H	3760	-45.65	9.29	1.68	-38.04	-13	-25.04
3760	50.2	222	170	V	3760	-45.41	9.45	1.68	-37.64	-13	-24.64

Note: All other emissions levels are at the noise floor.

AWS Band:

30 MHz -20 GHz Radiated Emission at 3-meter (Middle Channel, 1732.5 MHz)

Indicated		Turntable Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	Part 27	
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)		Limit (dBm)	Margin (dB)
3465	46.06	190	100	H	3465	-51.45	9.9	1.68	-43.23	-13	-30.23
5197.5	45.8	200	105	H	5197.5	-46.92	10.78	2.34	-38.48	-13	-25.48
5197.5	45.76	132	114	V	5197.5	-46.96	10.74	2.34	-38.56	-13	-25.56

Note: All other emissions levels are at the noise floor.

8 FCC §22.917 & §22.917 & §24.238 & §27.53 – BAND EDGE

8.1 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, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB.

8.2 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.

8.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10
Agilent	Analyzer, Communications	E5515C	GB44051221	2010-06-11 ¹

Note 1: Two year calibration cycle.

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

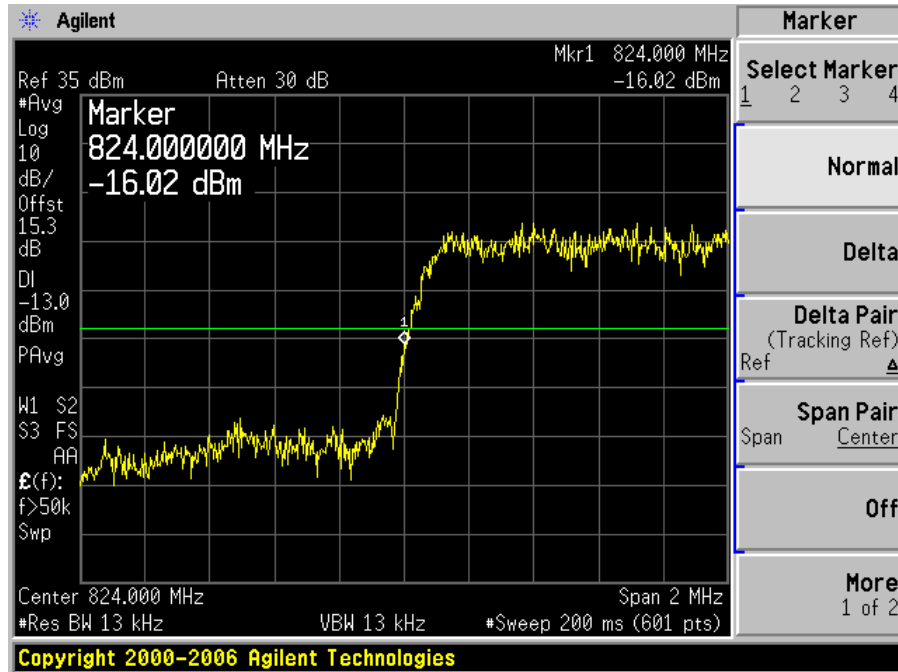
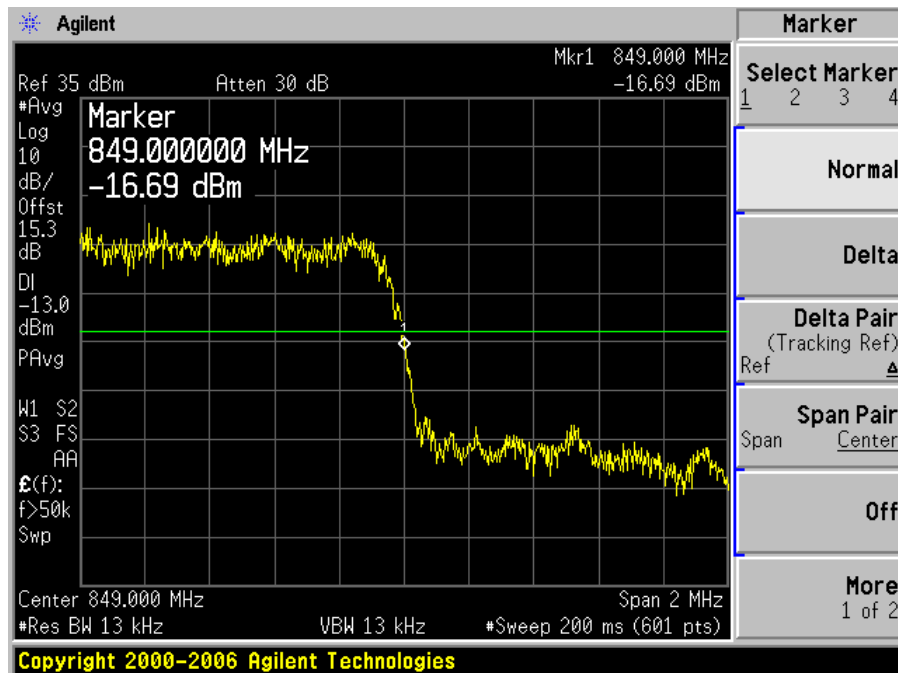
8.4 Test Environmental Conditions

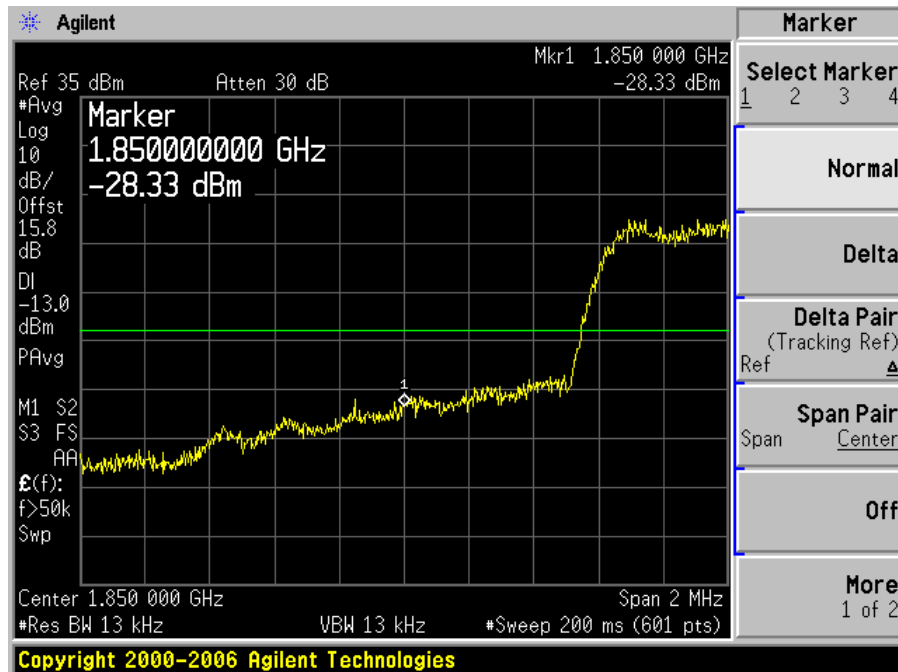
Temperature:	20-24 °C
Relative Humidity:	32-35 %
ATM Pressure:	101.4-101.6kPa

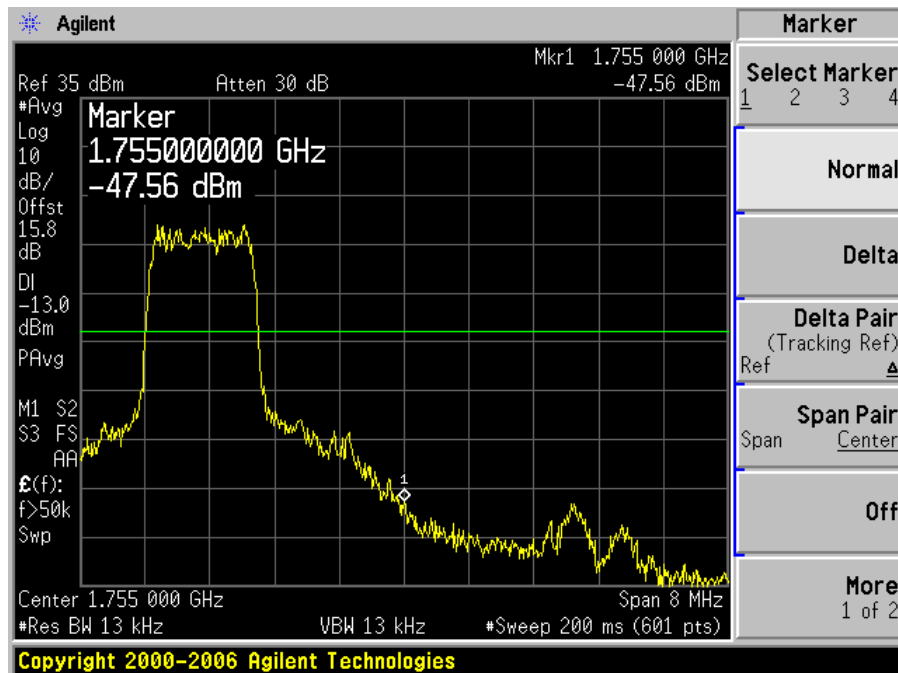
The testing was performed by Quinn Jiang on 2012-02-06 to 2012-02-09 at RF test site.

8.5 Test Results & Plots

Please refer to the following plots.

Plots of Band Edge for Cellular Band:**Lowest Channel****Highest Channel**

Plots of Band Edge for PCS Band:**Lowest Channel****Highest Channel**

Plots of Band Edge for AWS Band:**Lowest Channel****Highest Channel**

9 FCC §2.1055, §22.355, §24.235 & §27.54 - FREQUENCY STABILITY

9.1 Applicable Standard

Requirements: FCC §2.1055 & 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 & §27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

9.2 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.

9.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Tenney	Temperature oven	TUJR	27445-06	2011-07-08
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10
Agilent	Analyzer, Communications	E5515C	GB44051221	2010-06-11 ¹

Note 1: Two year calibration cycle.

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

9.4 Test Environmental Conditions

Temperature:	20-24 °C
Relative Humidity:	32-35 %
ATM Pressure:	101.4-101.6kPa

The testing was performed by Quinn Jiang on 2012-02-06 to 2012-02-09 at RF test site.

9.5 Test Results

Cellular Band

Reference Frequency: 836.52 MHz, Limit: 2.5 ppm				
Test Environment		Frequency Measure with Time Elapsed		
Temperature (°C)	Power Supplied (Vdc)	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
Frequency Stability versus Temperature				
50	3.7	836.519500	-0.597714	2.5
40	3.7	836.521000	1.195429	2.5
30	3.7	836.520500	0.597714	2.5
20	3.7	836.520000	0.000000	2.5
10	3.7	836.518500	-1.793143	2.5
0	3.7	836.518500	-1.793143	2.5
-10	3.7	836.518500	-1.793143	2.5
-20	3.7	836.520000	0.000000	2.5
-30	3.7	836.521000	1.195429	2.5
Frequency Stability versus Voltage				
20	3.33	836.518500	-1.793143	2.5
20	4.07	836.520000	0.000000	2.5

PCS Band

Reference Frequency: 1880.0 MHz				
Test Environment		Frequency Measure with Time Elapsed		
Temperature (°C)	Power Supplied (Vdc)	Measured Frequency (MHz)	Frequency Error (ppm)	Results
Frequency Stability versus Temperature				
50	3.7	1880.001000	0.531915	Pass
40	3.7	1879.999500	-0.265957	Pass
30	3.7	1879.999000	-0.531915	Pass
20	3.7	1880.000500	0.265957	Pass
10	3.7	1879.998000	-1.063830	Pass
0	3.7	1879.998000	-1.063830	Pass
-10	3.7	1879.997000	-1.595745	Pass
-20	3.7	1880.001000	0.531915	Pass
-30	3.7	1879.999500	-0.265957	Pass
Frequency Stability versus Voltage				
20	3.33	1879.998000	-1.063830	Pass
20	4.07	1879.998000	-1.063830	Pass

AWS Band

Reference Frequency: 1732.5 MHz				
Test Environment		Frequency Measure with Time Elapsed		
Temperature (°C)	Power Supplied (Vdc)	Measured Frequency (MHz)	Frequency Error (ppm)	Results
Frequency Stability versus Temperature				
50	3.7	1732.5003	0.17316017	Pass
40	3.7	1732.4996	-0.23088023	Pass
30	3.7	1732.5005	0.28860029	Pass
20	3.7	1732.4995	-0.28860029	Pass
10	3.7	1732.4993	-0.4040404	Pass
0	3.7	1732.4997	-0.17316017	Pass
-10	3.7	1732.4991	-0.51948052	Pass
-20	3.7	1732.5011	0.63492063	Pass
-30	3.7	1732.4993	-0.4040404	Pass
Frequency Stability versus Voltage				
20	3.33	1732.4991	-0.51948052	Pass
20	4.07	1732.4997	-0.17316017	Pass

10 FCC §1.1307(b) (1) & §2.1093 - RF EXPOSURE INFORMATION

10.1 Applicable Standard

According to FCC §1.1310, §2.1093 SAR Evaluation is required.

10.2 Test Result

Please refer to SAR Report R1201271-SAR.