FCC PART 22H, 24E
IC RSS-132, ISSUE 3, JAN 2013
IC RSS-133, ISSUE 6, JAN 2013

TEST AND MEASUREMENT REPORT

For

AnyDATA Corporation

5 Oldfield, Irvine, CA 92618, USA

FCC ID: P4M-ACT611
IC: 4594B-ACT611

Report Type:	**Product Type:**
Original Report	WCDMA Vehicle Tracker

Prepared By:	Chen Ge Test Engineer
Report Number:	R1401022-2224
Report Date:	2014-06-04
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TABLE OF CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1401022-2224	Original Report	2014-06-02
Rev A	R1401022-2224	Technical Updates	2014-06-04

1 General Description

1.1 Product Description for Equipment Under Test (EUT)

This test and measurement report was prepared on behalf of *AnyDATA Corporation*, and their product FCC ID: P4M-ACT611, IC: 4594B-ACT611, model: ACT611, or the "EUT" as referred to in this report, is a WCDMA vehicle tracker operates in Cellular and PCS band.

1.2 Mechanical Description of EUT

The "EUT" measures approximately *80 mm (L) x 45mm (W) x 22mm (H)*, and weighs approximately *66.5*g.

The test data gathered are from typical production sample, serial number: 20140227000306K for radiated and 20140227000308K for conducted provided by the manufacturer.

1.3 Objective

This type approval report is prepared on behalf of AnyDATA Corporation in accordance with Part 2, Subpart J, Part 22 Subpart H, and Part 24 Subpart E, of the Federal Communication Commission's rules and IC RSS-132: Cellular Telephones Employing New Technologies Operating in the Bands 824-849 MHz and 869-894 MHz; RSS-133: 2 GHz Personal Communications Services

The objective is to determine compliance with FCC/IC rules 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.

1.4 Related Submittal(s)/Grant(s)

N/A

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:

FCC Part 22 Subpart H; IC RSS 132 – Cellular Radiotelephone Service
FCC Part 24 Subpart E; IC RSS 133 – Broadband PCS

Applicable Standards: TIA/EIA 603-C

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 CISPR16-4-2: 2011, 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.

1.7 Test Facility

Bay area compliance Laboratories Corp. (BACL) is:
1- An independent Commercial Test Laboratory accredited to **ISO 17025: 2005** by **A2LA**, in the fields of: Electromagnetic Compatibility & Telecommunications covering Emissions, Immunity, Radio, RF Exposure, Safety and Telecom. This includes NEBS (Network Equipment Building System), Wireless RF, Telecommunications Terminal Equipment (TTE); Network Equipment; Information Technology Equipment (ITE); Medical Electrical Equipment; Industrial, Commercial, and Medical Test Equipment; Professional Audio and Video Equipment; Electronic (Digital) Products; Industrial and Scientific Instruments; Cabled Distribution Systems and Energy Efficiency Lighting.

2- An ENERGY STAR Recognized Laboratory, for the LM80 Testing, a wide variety of Luminares and Computers.

3- A NIST Designated Phase-I and Phase-II CAB including: ACMA (Australian Communication and Media Authority), BSMI (Bureau of Standards, Metrology and Inspection of Taiwan), IDA (Infocomm Development Authority of Singapore), IC(Industry Canada), Korea (Ministry of Communications Radio Research Laboratory), NCC (Formerly DGT; Directorate General of Telecommunication of Chinese Taipei) OFTA (Office of the Telecommunications Authority of Hong Kong), Vietnam, VCCI - Voluntary Control Council for Interference of Japan and a designated EU CAB (Conformity Assessment Body) (Notified Body) for the EMC and R&TTE Directives.

4- A Product Certification Body accredited to **ISO Guide 65: 1996** by **A2LA** to certify:
1- Unlicensed, Licensed radio frequency devices and Telephone Terminal Equipment for the FCC. Scope A1, A2, A3, A4, B1, B2, B3, B4 & C.
2. Radio Standards Specifications (RSS) in the Category I Equipment Standards List and All Broadcasting Technical Standards (BETS) in Category I Equipment Standards List for Industry Canada.
3. Radio Communication Equipment for Singapore.
4. Radio Equipment Specifications, GMDSS Marine Radio Equipment Specifications, and Fixed Network Equipment Specifications for Hong Kong.
5. Japan MIC Telecommunication Business Law (A1, A2) and Radio Law (B1, B2 and B3).
6. Audio/Video, Battery Charging Systems, Computers, Displays, Enterprise Servers, Imaging Equipment, Set-Top Boxes, Telephony, Televisions, Ceiling Fans, CFLs (Including GU24s),Decorative Light Strings, Integral LED Lamps, Luminaires, Residential Ventilating Fans.

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 site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have 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 test site also complies with the test methods and procedures set forth in CISPR 22:2008 §10.4 for measurements below 1 GHz and §10.6 for measurements above 1 GHz as well as ANSI C63.4-2009, ANSI C63.4-2009, TIA/EIA-603 & CISPR 24:2010.

The Federal Communications Commission and Voluntary Control Council for Interference have the reports on file and they are listed under FCC registration number: 90464 and VCCI Registration No.: A-0027. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL Corp. is an American Association for Laboratory Accreditation (A2LA) accredited laboratory (Lab Code 3297-02). The current scope of accreditations can be found at

http://www.a2la.org/scopepdf/3297-02.pdf?CFID=1132286&CFTOKEN=e42a3240dac3f6ba-6DE17DCB-1851-9E57-477422F667031258&jsessionid=8430d44f1f47cf2996124343c704b367816b

2 EUT 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

The test utility used was AnyDATA Modem, provided by AnyDATA Corporation, and was verified by BACL Ken Bai and Chen Ge to comply with the standard requirements being tested against.

2.3 Equipment Modifications

No modifications were made to the EUT.

2.4 Special Equipment

No special equipment used during testing.

2.5 Local Support Equipment

Manufacturer	Description	Model No.	Serial No.
Dell	Laptop	PP11L	CN-0D4571-48643-57F-7162

2.6 EUT Internal Configuration Details

Manufacturers	Descriptions	Models	Serial Numbers
AnyDATA Corporation	STN Board	ACT231 STN V1.2	SEA02649
AnyDATA Corporation	WCDMA Board	ACT613 MAIN V1.2	MEB00024

2.7 Interface Ports and Cabling

Cable Description	Length (m)	From	To
Power Cable	<3	EUT	DC/AC
USB Cable	<3	EUT	Laptop
RF Cable	1	EUT	PSA

2.8 Power Supply List and Details

Manufacturer	Description	Model	Serial Number
HON-KWANG	AC/DC Adapter	HK-Q106-A12	-

3 Summary of Test Results

FCC/IC Rules	Description of Tests	Results
FCC §2.1046 §22.913(a), §24.232 IC RSS-132 §5.4 IC RSS-133 §6.4	RF Output Power	Compliant
IC RSS-132 §5.1 IC RSS-133 §6.1	Frequency Plan	Compliance
FCC §2.1047 IC RSS-132 §5.2 IC RSS-133 §6.2	Modulation Characteristics	Compliant
FCC §2.1049 §22.917, §24.238 RSS-Gen §4.6	Occupied Bandwidth	Compliant
FCC §2.1053 §22.917, §24.238 IC RSS-132 §5.5 IC RSS-133 §6.5	Spurious Radiated Emissions	Compliant
FCC §2.1051 §22.917, §24.238 ICRSS-132 §5.5 IC RSS-133 §6.5	Spurious Emissions at Antenna Terminals	Compliant
FCC §22.917, §24.238 IC RSS-132 §5.5 IC RSS-133 §6.5	Band Edge	Compliant
FCC §2.1055 §22.355, §24.235 IC RSS-132 §5.3 IC RSS-133 §6.3	Frequency Stability	Compliant
FCC §2.1091 IC RSS-102	RF Exposure Information	Compliant
FCC §15.109 IC RSS-Gen §4.10, §6	Receiver Spurious Emission	Compliant

4 IC RSS-132 §5.1, RSS-133 §6.1 – Frequency Plan

4.1 Applicable Standards

According to RSS-132 §5.1, the frequency bands 824-849 MHz and 869-894 MHz are divided into sub-bands as described in SRSP-503.

According to RSS-133 §6.1, the frequency plan can be found in Standard Radio System Plan 510 (SRSP-510).

4.2 Test Results

According to the test data, channeling arrangement meets all relevant conditions specified in SRSP-503 and SRSP-510.

5 FCC §2.1047 & IC RSS-132 §5.2, RSS-133 §6.2 – Type of Modulation

5.1 Applicable Standards

According to FCC §2.1047(d), Part 22H & 24E there is no specific requirement for digital modulation.

According to RSS-132 §5.2 and RSS-133 §6.2, Equipment certified under this Standard shall use digital modulation.

5.2 Test Results

The EUT uses digital modulation.

6 FCC §2.1055, §22.355, §24.235 & IC RSS-132 §5.3, RSS-133 §6.3 – Frequency Stability

6.1 Applicable Standards

Requirements: FCC §2.1055 (a), §2.1055 (d) & 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 RSS-132 §5.3, the carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations and ±1.5 ppm for base stations.

According to RSS-133 §6.3, the carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations and ±1.0 ppm for base stations.

6.2 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/AC 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.

6.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Cycle
Agilent	Wireless Communication Test Set	E5515C	GB44051221	2013-06-28	2 years
Agilent	Spectrum Analyzer	E4440A	US42221851	2013-04-05	1 year
Tenney	Environmental Chamber	TUJR	27445-06	2013-07-09	1 year

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

6.4 Test Environmental Conditions

Temperature:	23 °C
Relative Humidity:	40 %
ATM Pressure:	101.29 kPa

The testing was performed by Ken Bai on 2014-03-13 at RF Site.

6.5 Test Results

WCDMA, 824-849 Band

AC Main: 120V/60Hz

Reference Frequency: 836 MHz, Limit: 2.5 ppm				
Test Environment		**Frequency Measure with Time Elapsed**		
Temperature (°C)	**Power Supplied (Vac)**	**Measured Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
Frequency Stability versus Temperature				
50	120	79	0.094	2.5
40	120	81	0.096	2.5
30	120	81	0.096	2.5
20	120	77	0.092	2.5
0	120	81	0.096	2.5
-20	120	77	0.092	2.5
-30	120	77	0.092	2.5
Frequency Stability versus Voltage				
20	102	77	0.092	2.5
20	138	83	0.099	2.5

DC: 12V

Reference Frequency: 836 MHz, Limit: 2.5 ppm				
Test Environment		**Frequency Measure with Time Elapsed**		
Temperature (°C)	**Power Supplied (Vdc)**	**Measured Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
Frequency Stability versus Temperature				
50	12	81	0.096	2.5
40	12	77	0.092	2.5
30	12	81	0.097	2.5
20	12	75	0.090	2.5
0	12	75	0.090	2.5
-20	12	77	0.092	2.5
-30	12	81	0.097	2.5
Frequency Stability versus Voltage				
20	10.2	77	0.092	2.5
20	13.8	81	0.097	2.5

WCDMA, 1850-1910 MHz Band

AC Main: 120V/60Hz

Reference Frequency: 1880 MHz				
Test Environment		Frequency Measure with Time Elapsed		
Temperature (°C)	Power Supplied (Vac)	Measured Error (Hz)	Frequency Error (ppm)	Result
Frequency Stability versus Temperature				
50	120	129	0.069	Compliance
40	120	125	0.067	Compliance
30	120	125	0.067	Compliance
20	120	135	0.072	Compliance
0	120	135	0.072	Compliance
-20	120	131	0.070	Compliance
-30	120	131	0.070	Compliance
Frequency Stability versus Voltage				
20	102	131	0.070	Compliance
20	138	129	0.069	Compliance

DC: 12V

Reference Frequency: 1880 MHz				
Test Environment		Frequency Measure with Time Elapsed		
Temperature (°C)	Power Supplied (Vdc)	Measured Error (Hz)	Frequency Error (ppm)	Result
Frequency Stability versus Temperature				
50	12	135	0.072	Compliance
40	12	131	0.070	Compliance
30	12	130	0.069	Compliance
20	12	131	0.070	Compliance
0	12	135	0.072	Compliance
-20	12	131	0.070	Compliance
-30	12	130	0.069	Compliance
Frequency Stability versus Voltage				
20	10.2	135	0.072	Compliance
20	13.8	131	0.070	Compliance

HSDPA, 824-849 Band

AC Main: 120V/60Hz

Reference Frequency: 836 MHz, Limit: 2.5 ppm				
Test Environment		**Frequency Measure with Time Elapsed**		
Temperature (°C)	**Power Supplied (Vac)**	**Measured Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
Frequency Stability versus Temperature				
50	120	63	0.076	2.5
40	120	79	0.094	2.5
30	120	79	0.094	2.5
20	120	82	0.099	2.5
0	120	79	0.094	2.5
-20	120	75	0.090	2.5
-30	120	86	0.103	2.5
Frequency Stability versus Voltage				
20	102	82	0.099	2.5
20	138	79	0.094	2.5

DC: 12V

Reference Frequency: 836 MHz, Limit: 2.5 ppm				
Test Environment		**Frequency Measure with Time Elapsed**		
Temperature (°C)	**Power Supplied (Vdc)**	**Measured Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
Frequency Stability versus Temperature				
50	12	79	0.094	2.5
40	12	75	0.090	2.5
30	12	75	0.090	2.5
20	12	86	0.103	2.5
0	12	63	0.076	2.5
-20	12	79	0.094	2.5
-30	12	82	0.099	2.5
Frequency Stability versus Voltage				
20	10.2	79	0.094	2.5
20	13.8	63	0.076	2.5

HSDPA, 1850-1910 MHz Band

AC Main: 120V/60Hz

Reference Frequency: 1880 MHz				
Test Environment		Frequency Measure with Time Elapsed		
Temperature (°C)	Power Supplied (Vac)	Measured Error (Hz)	Frequency Error (ppm)	Result
Frequency Stability versus Temperature				
50	120	129	0.070	Compliance
40	120	139	0.074	Compliance
30	120	136	0.072	Compliance
20	120	129	0.069	Compliance
0	120	139	0.074	Compliance
-20	120	138	0.073	Compliance
-30	120	139	0.074	Compliance
Frequency Stability versus Voltage				
20	102	127	0.069	Compliance
20	138	131	0.070	Compliance

DC: 12V

Reference Frequency: 1880 MHz				
Test Environment		Frequency Measure with Time Elapsed		
Temperature (°C)	Power Supplied (Vdc)	Measured Error (Hz)	Frequency Error (ppm)	Result
Frequency Stability versus Temperature				
50	12	135	0.075	Compliance
40	12	129	0.070	Compliance
30	12	136	0.072	Compliance
20	12	129	0.069	Compliance
0	12	133	0.072	Compliance
-20	12	127	0.068	Compliance
-30	12	125	0.066	Compliance
Frequency Stability versus Voltage				
20	10.2	133	0.072	Compliance
20	13.8	129	0.070	Compliance

7 FCC §2.1046, §22.913(a), §24.232 & IC RSS-132 §5.4, RSS-133 §6.4 – RF Output Power

7.1 Applicable Standards

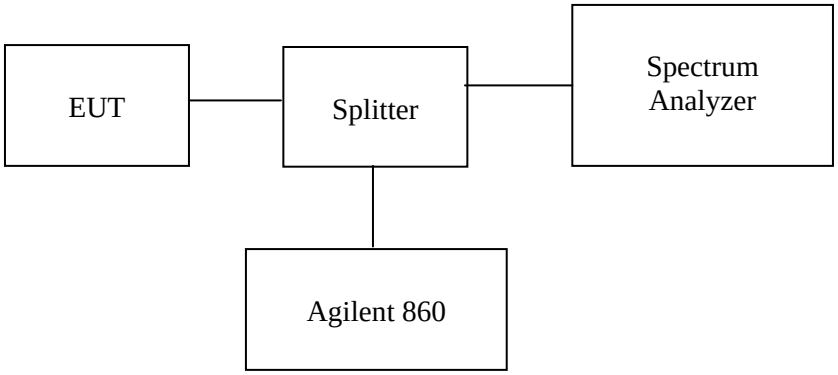
FCC FCC §22.913 (a), §24.232

IC RSS-132 §5.4, RSS-133 §6.4

7.2 Test Procedure

Conducted:

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



Radiated method:

TIA 603-C section 2.2.17

7.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Cycle
Agilent	Wireless Communication Test Set	E5515C	GB44051221	2013-06-28	2 years
Sunol Science Corp	System Controller	SC99V	122303-1	N/R	N/R
Agilent	Pre-amplifier	8449B	3008A01978	2014-02-04	1 year
EMCO	Horn Antenna	3315	9511-4627	2013-10-17	1 year
Agilent	Spectrum Analyzer	E4440A	MY44303352	2014-05-10	1 year

Statement of Traceability*: BACL Corp. attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.*

7.4 Test Environmental Conditions

Temperature:	23-27 °C
Relative Humidity:	41-43 %
ATM Pressure:	101.65-101.73 kPa

The conducted testing was performed by Chen Ge on 2014-05-27 at RF site.
The radiated testing was performed by Chen Ge on 2014-05-28 at 5m chamber 3.

7.5 Test Results

Conducted Output Power:

Cellular Band, Part 22H/RSS-132

Mode	3GPP Sub test	Low CH (826.4 MHz)	Middle CH (836 MHz)	High CH (846.6 MHz)	Limit (dBm)
WCDMA	1	24.23	24.03	24.34	38.45
HSDPA	1	23.68	23.82	24.06	38.45
	2	23.51	23.75	23.98	38.45
	3	23.64	23.77	23.87	38.45
	4	23.56	23.54	23.79	38.45

PCS Band, Part 24E/RSS-133

Mode	3GPP Sub test	Low CH (1852.4 MHz)	Middle CH (1880 MHz)	High CH (1907.6 MHz)	Limit (dBm)
WCDMA	1	23.47	23.56	23.74	33
HSDPA	1	23.02	23.23	22.97	33
	2	22.97	23.14	22.85	33
	3	22.87	23.20	22.92	33
	4	22.96	23.18	22.87	33

ERP/EIRP:

Worst case:

Cellular Band, Part 22H/RSS-132: WCDMA

Indicated		Turntable Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Cord. (dB)	Cable Loss (dB)	Absolute Level (dBm)		
826.4	88.26	152	150	V	826.4	25.26	0	1.07	24.19	38.45	-14.26
826.4	87.03	151	150	H	826.4	24.03	0	1.07	22.96	38.45	-15.49
836	87.68	152	150	V	836	24.68	0	1.07	23.61	38.45	-14.83
836	87.11	153	150	H	836	24.11	0	1.07	23.04	38.45	-15.41
846.6	89.39	155	150	V	846.6	26.39	0	1.07	25.32	38.45	-13.13
846.6	86.72	150	150	H	846.6	23.72	0	1.07	22.65	38.45	-15.8

PCS Band, Part 24E/RSS-133: WCDMA

Indicated		Turntable Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Cord. (dB)	Cable Loss (dB)	Absolute Level (dBm)		
1852.4	88.36	82	150	V	1852.4	17.36	8.189	1.53	24.019	33	-8.981
1852.4	87.07	169	150	H	1852.4	16.07	8.189	1.53	22.729	33	-10.271
1880	89.55	29	150	V	1880	18.55	8.189	1.53	25.209	33	-7.791
1880	88.37	163	150	H	1880	17.37	8.189	1.53	24.029	33	-8.971
1907.6	87.34	179	150	V	1907.6	16.34	8.189	1.53	22.999	33	-10.001
1907.6	85.98	194	153	H	1907.6	14.98	8.189	1.53	21.639	33	-11.361

8 FCC §2.1053, §22.917, §24.238 & IC RSS-132 §5.5, RSS-133 §6.5 - Spurious Radiated Emissions

8.1 Applicable Standards

FCC §2.1053, §22.917 and §24.238

RSS-132 §5.5, RSS-133 §6.5

8.2 Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 log (TX Power in Watts/0.001) – the absolute level
Spurious attenuation limit in dB = 43 + 10 Log10 (power out in Watts)

8.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Cycle
Agilent	Spectrum Analyzer	E4446A	MY48250238	2013-08-29	1 year
Agilent	Communication Tester	E5515C	GB44051221	2013-06-28	2 year
Sunol Science Corp	System Controller	SC99V	122303-1	N/R	N/R
Sunol Science Corp	Combination Antenna	JB3	A020106-3	2013-07-11	1 Year
Eaton	Horn antenna	96001	3/1/1907	2013-10-17	1 Year
Agilent	Signal Generator	E4438C	MY45091309	2013-05-30	1 Year
Hewlett Packard	Pre-amplifier	8447D	2944A06639	2013-06-09	1 Year
EMCO	Horn antenna	3115	9511-4627	2014-01-7	1 Year
Mini-Circuits	Pre Amplifier	ZVA-183-S	570400946	2013-05-09	1 Year

***Statement of Traceability**: BACL Corp. attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.*

8.4 Test Environmental Conditions

Temperature:	25° C
Relative Humidity:	42 %
ATM Pressure:	101.1 kPa

The testing was performed by Chen Ge on 2014-03-27 at 5 meter chamber #2.

8.5 Test Results

WCDMA, 824-849 MHz Band

30 MHz -10 GHz Radiated Emission at 3-meter (Middle Channel, 836 MHz)

Indicated		Turntable Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	FCC/IC	
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)
704.5	40.29	131	150	V	704.5	-71.03	0	0.92	-71.95	-13	-58.95
704.5	40.66	50	150	H	704.5	-71.55	0	0.92	-72.47	-13	-59.47
1654.2	61.19	78	150	V	1654.2	-47.46	8.524	1.48	-40.416	-13	-27.416
1654.2	61.91	69	150	H	1654.2	-46.01	8.487	1.48	-39.003	-13	-26.003
6681.4	50.99	52	150	V	6681.4	-42.33	11.28	3.12	-34.17	-13	-21.17
6681.4	51.54	12	150	H	6681.4	-43	11.274	3.12	-34.846	-13	-21.846

WCDMA, 1850-1910 MHz Band

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

Indicated		Turntable Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	FCC/IC	
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)
708	40.39	81	150	V	708	-71.82	0	0.92	-72.74	-13	-59.74
708	41.56	45	150	H	708	-69.73	0	0.92	-70.65	-13	-57.65
3706.2	70.12	186	150	V	3706.2	-37.53	10.479	2.34	-29.391	-13	-16.391
3706.2	64.21	157	150	H	3706.2	-44.33	10.491	2.34	-36.179	-13	-23.179
5559.4	61.17	0	150	V	5559.4	-32.48	10.599	2.91	-24.791	-13	-11.791
5559.4	50.74	12	150	H	5559.4	-40.83	10.555	2.91	-33.185	-13	-20.185
7405	51.32	187	150	V	7405	-36.22	10.342	3.3	-29.178	-13	-16.178
7405	50.71	0	150	H	7405	-35.53	10.347	3.3	-28.483	-13	-15.483

HSDPA, 824-849 MHz Band

30 MHz -10 GHz Radiated Emission at 3-meter (Middle Channel, 836 MHz)

Indicated		Turntable Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	FCC/IC	
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)
713.2	41.36	63	150	V	713.2	-68.27	0	0.92	-69.19	-13	-56.19
713.2	41.87	151	150	H	713.2	-66.65	0	0.92	-67.57	-13	-54.57
1960.1	60.35	251	150	V	1960.1	-44.97	8.524	1.48	-37.926	-13	-24.926
1960.1	60.58	331	150	H	1960.1	-44.56	8.487	1.48	-37.553	-13	-24.553
6680.6	51.65	15	150	V	6680.6	-38.56	11.28	3.12	-30.4	-13	-17.4
6680.6	51.87	36	150	H	6680.6	-37.67	11.274	3.12	-29.516	-13	-16.516

HSDPA, 1850-1910 MHz Band

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

Indicated		Turntable Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	FCC/IC	
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)
715.6	42.36	72	150	V	715.6	-68.21	0	0.92	-69.13	-13	-56.13
715.6	44.36	68	150	H	715.6	-66.05	0	0.92	-66.97	-13	-53.97
3120.5	66.65	124	150	V	3120.5	-39.67	10.479	2.34	-31.531	-13	-18.531
3120.5	65.87	165	150	H	3120.5	-40.67	10.491	2.34	-32.519	-13	-19.519
5559.4	63.52	77	150	V	5559.4	-28.73	10.599	2.91	-21.041	-13	-8.041
5559.4	52.74	0	150	H	5559.4	-38.83	10.555	2.91	-31.185	-13	-18.185
715.6	42.36	72	150	V	715.6	-68.21	0	0.92	-69.13	-13	-56.13
715.6	44.36	68	150	H	715.6	-66.05	0	0.92	-66.97	-13	-53.97

9 FCC §2.1053, §22.917, §24.238 & IC RSS-132 §5.5, RSS-133 §6.5 - Spurious Emissions at Antenna Terminals

9.1 Applicable Standards

FCC §2.1053, §22.917 and §24.238

RSS-132 §5.5, RSS-133 §6.5

9.2 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 10^{th} harmonic.

9.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Cycle
Agilent	Spectrum Analyzer	E4446A	MY48250238	2013-08-29	1 year
Agilent	Communication Tester	E5515C	GB44051221	2013-06-28	2 year

***Statement of Traceability**: BACL Corp. attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.*

9.4 Test Environmental Conditions

Temperature:	25° C
Relative Humidity:	42 %
ATM Pressure:	101.1 kPa

The testing was performed by Ken Bai on 2014-03-13 at RF Site.

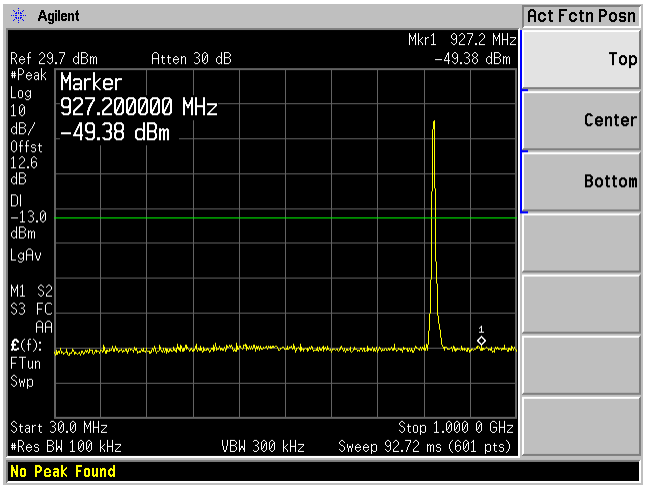
9.5 Test Results

Please refer to the following plots.

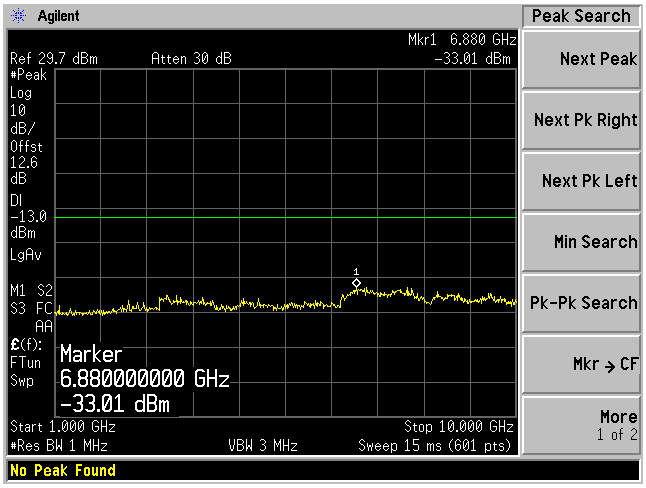
WCDMA, 824-849 MHz Band

Low Channel

30 MHz – 1 GHz

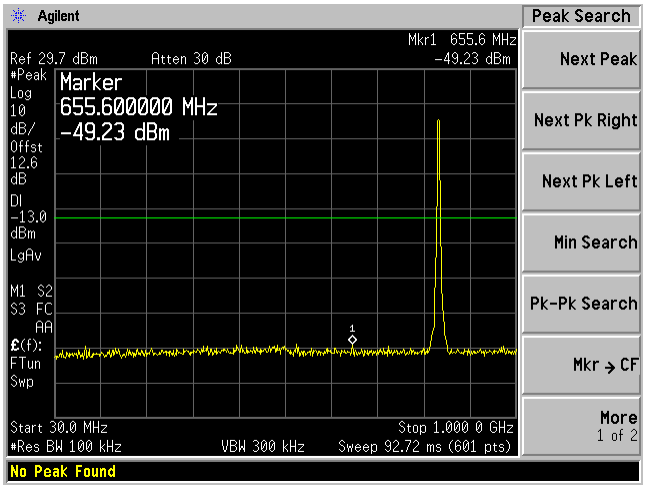


1 GHz – 10 GHz

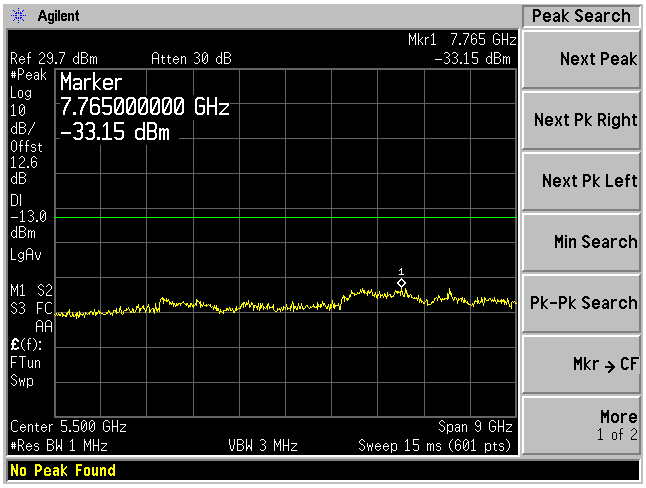


Middle Channel

30 MHz – 1 GHz

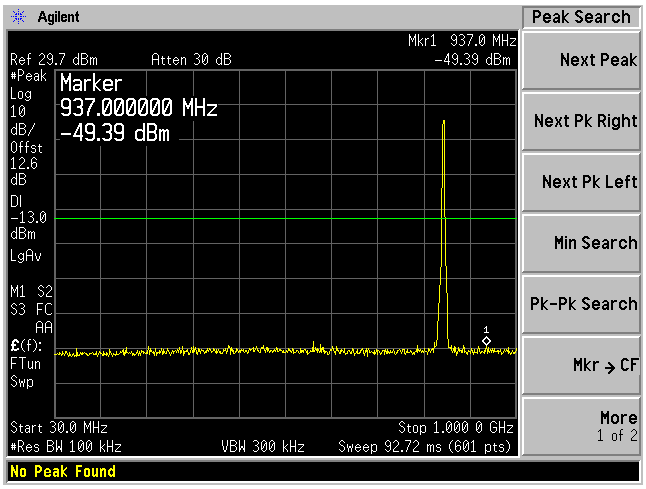


1 GHz – 10 GHz

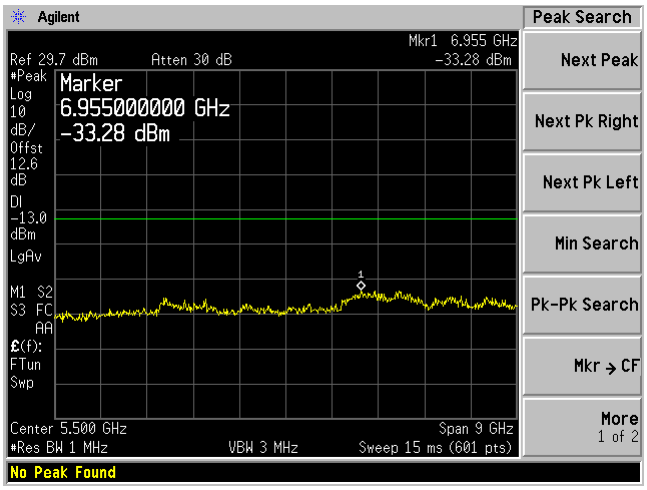


High Channel

30 MHz – 1 GHz



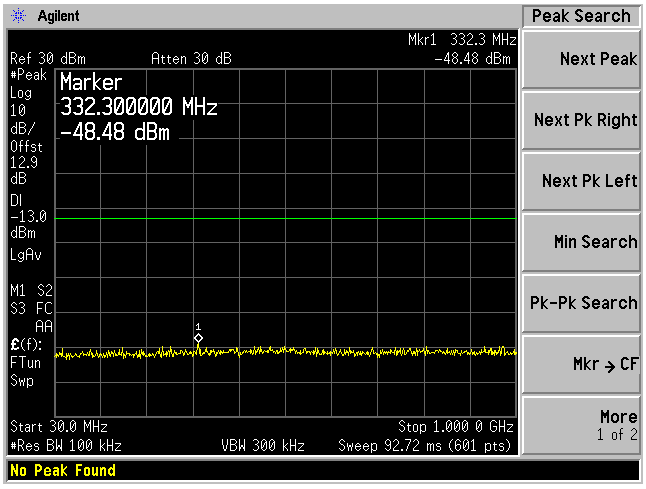
1 GHz – 10 GHz



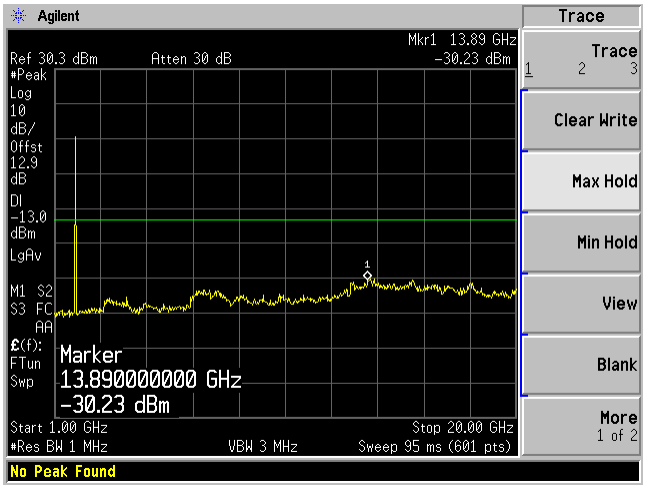
WCDMA, 1850-1910 MHz Band

Low Channel

30 MHz – 1 GHz

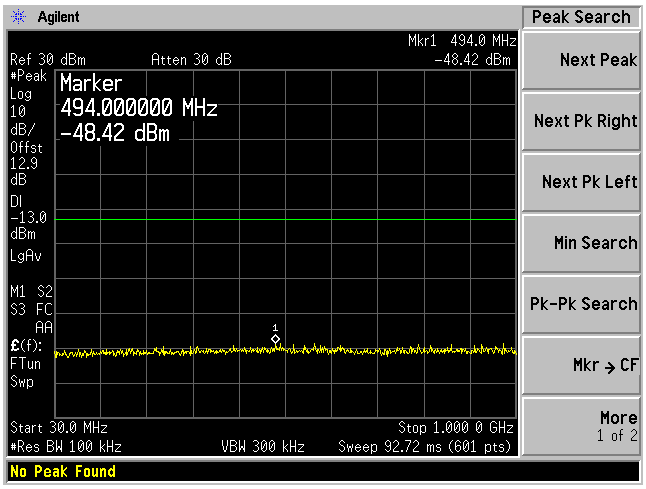


1 GHz – 20 GHz

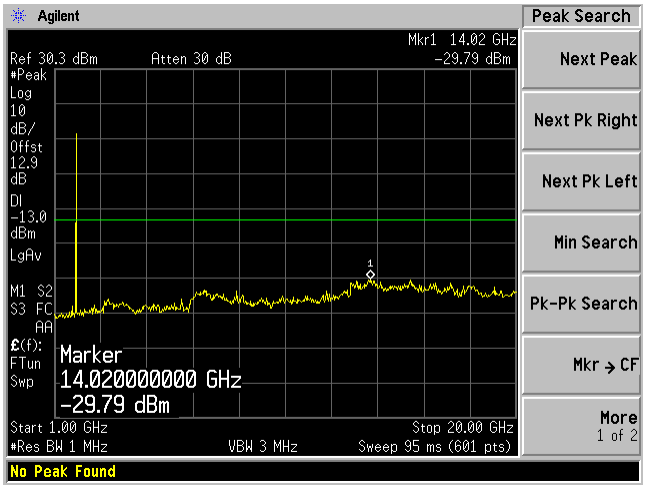


Middle Channel

30 MHz – 1 GHz

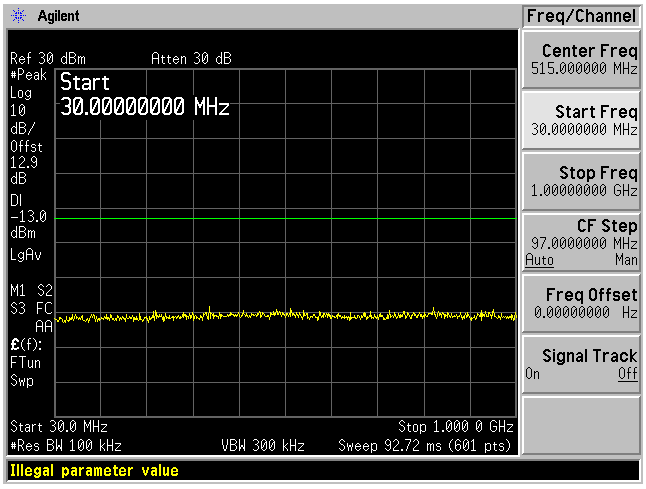


1 GHz – 20 GHz

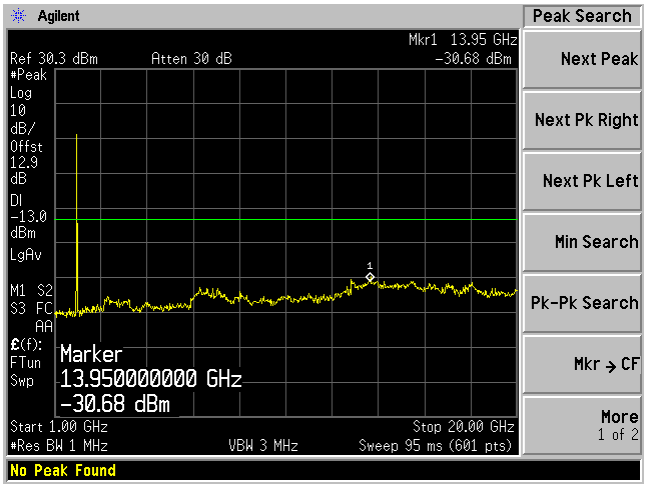


High Channel

30 MHz – 1 GHz



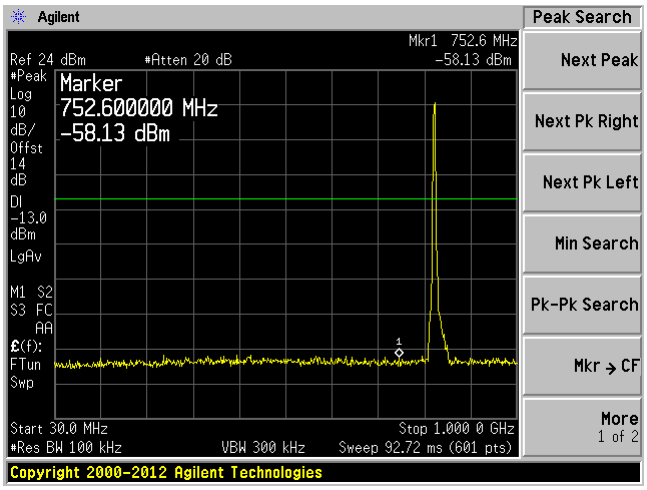
1 GHz – 20 GHz



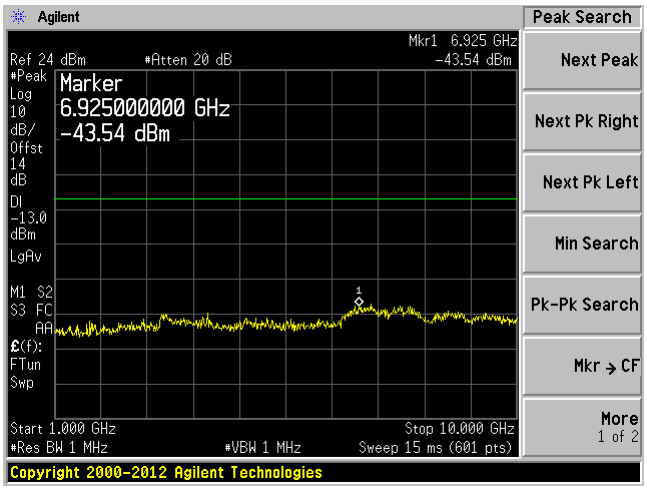
HSDPA, 824-849 MHz Band

Low Channel

30 MHz – 1 GHz

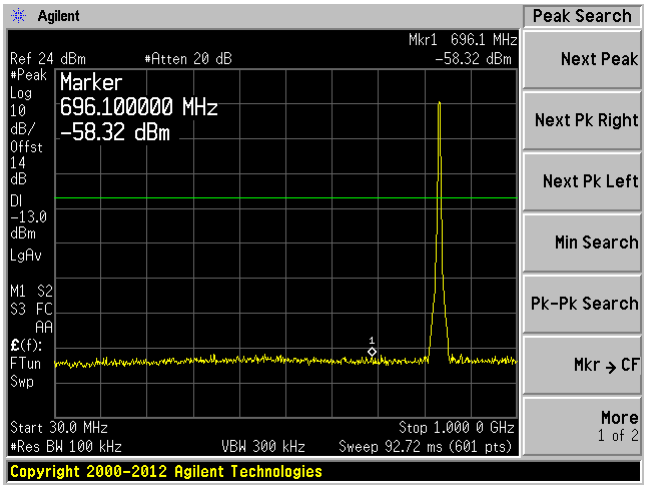


1 GHz – 10 GHz

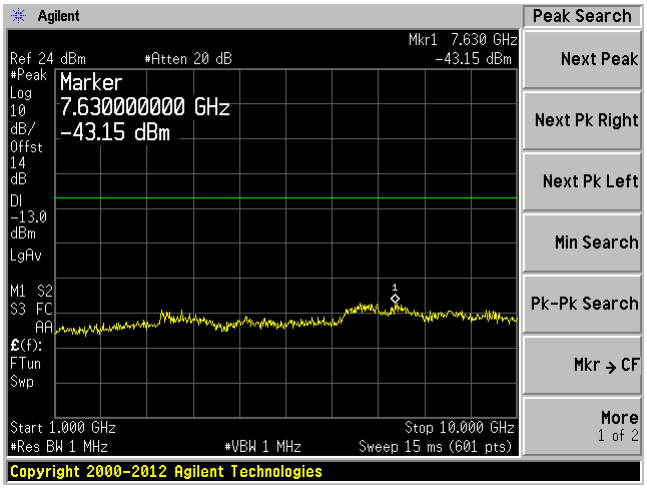


Middle Channel

30 MHz – 1 GHz

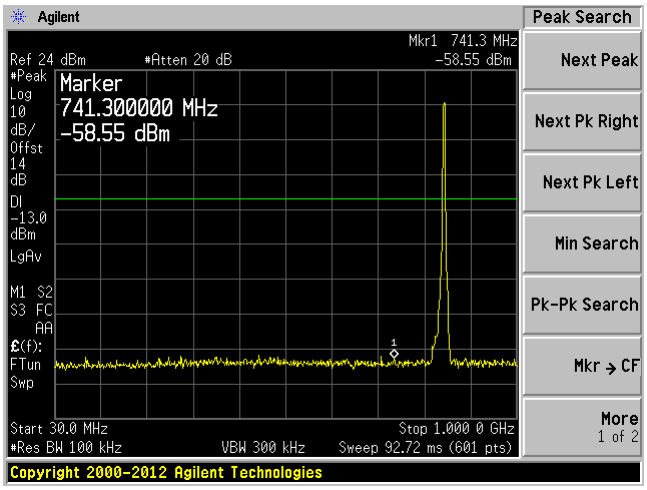


1 GHz – 10 GHz

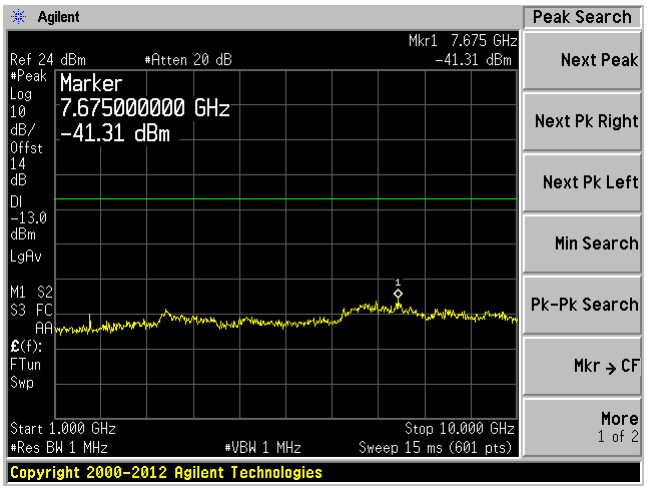


High Channel

30 MHz – 1 GHz



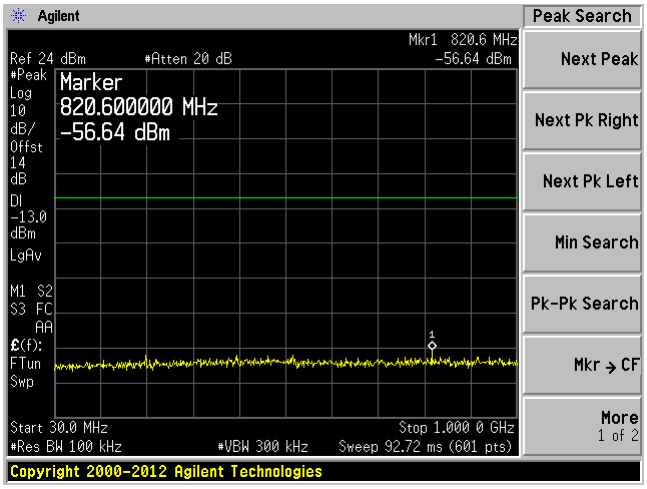
1 GHz – 10 GHz



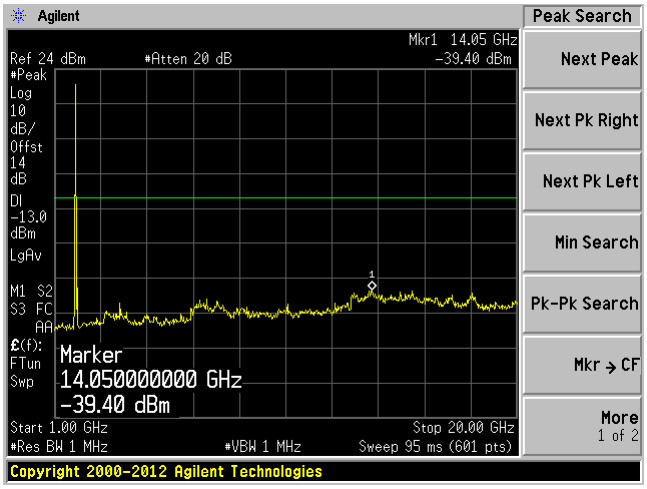
HSDPA, 1850-1910 MHz Band

Low Channel

30 MHz – 1 GHz

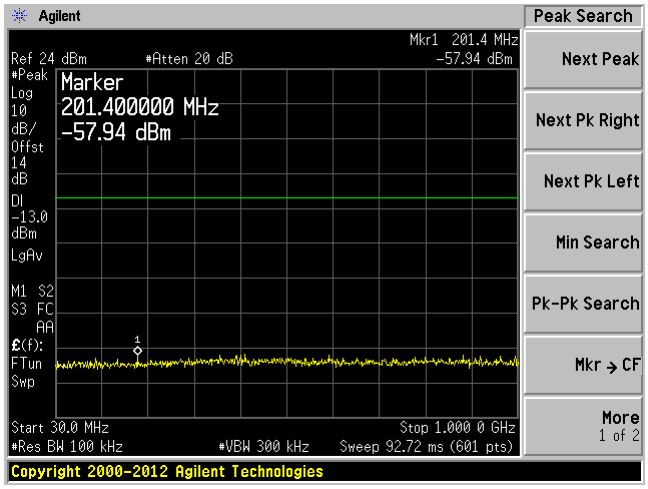


1 GHz – 20 GHz

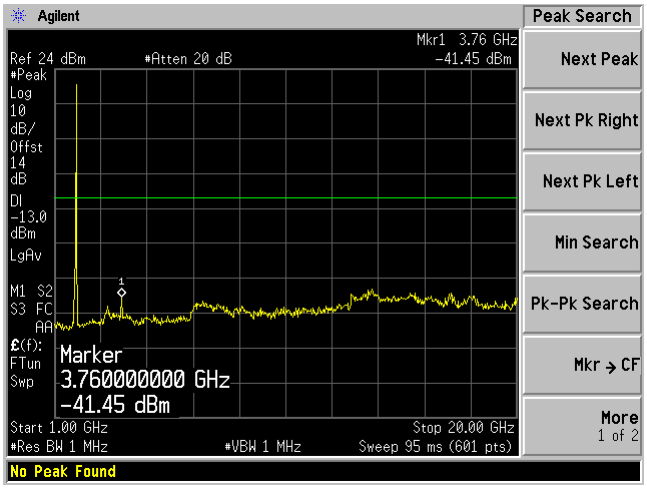


Middle Channel

30 MHz – 1 GHz

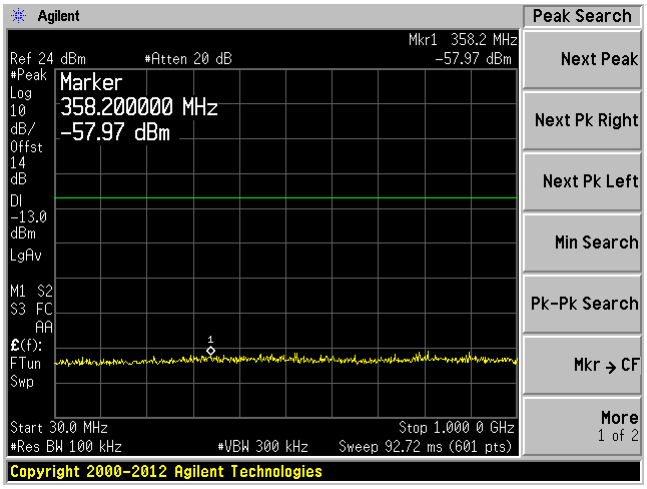


1 GHz – 20 GHz

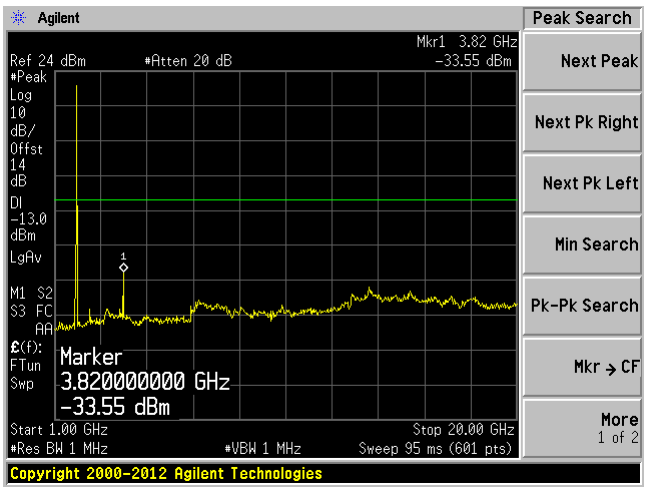


High Channel

30 MHz – 1 GHz



1 GHz – 20 GHz



10 FCC §2.1053, §22.917, §24.238 & IC RSS-132 §5.5, RSS-133 §6.5 – Band Edge

10.1 Applicable Standards

FCC §2.1053, §22.917 and §24.238

RSS-132 §5.5, RSS-133 §6.5

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.

10.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Cycle
Agilent	Spectrum Analyzer	E4446A	MY48250238	2013-08-29	1 year
Agilent	Wireless Communication Test Set	E5515C	GB44051221	2013-06-28	2 years

***Statement of Traceability**: BACL Corp. attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.*

10.4 Test Environmental Conditions

Temperature:	25° C
Relative Humidity:	42 %
ATM Pressure:	102.1 kPa

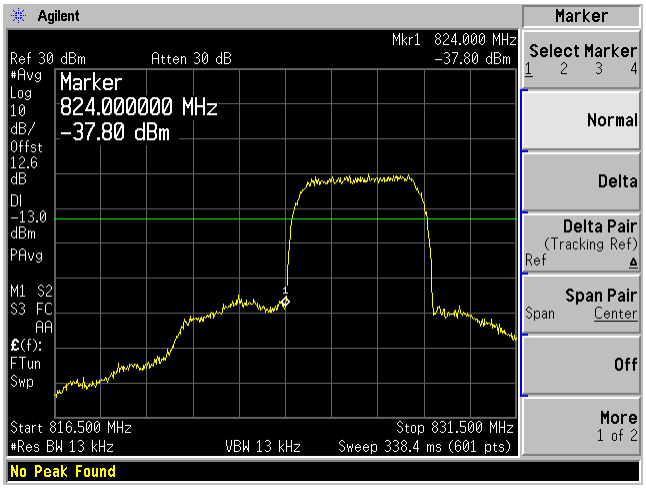
The testing was performed by Ken Bai on 2014-03-13 at RF Site.

10.5 Test Results

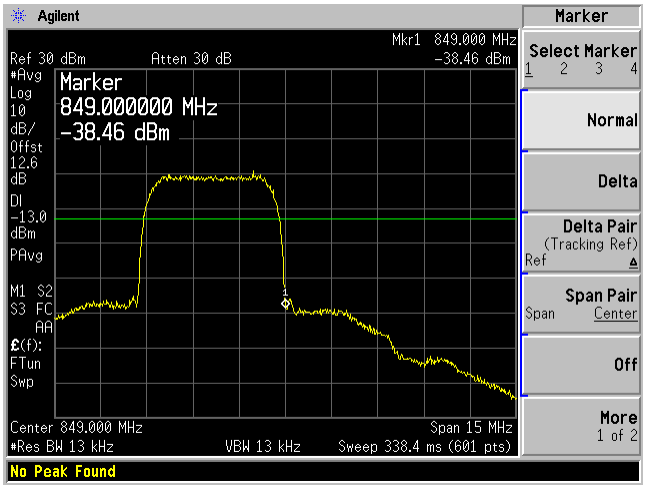
Please refer to the following plots.

WCDMA, 824-849 MHz Band

Lowest Channel

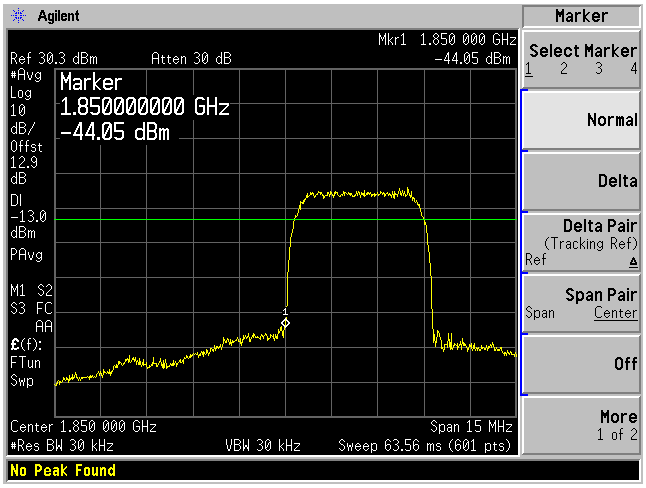


Highest Channel

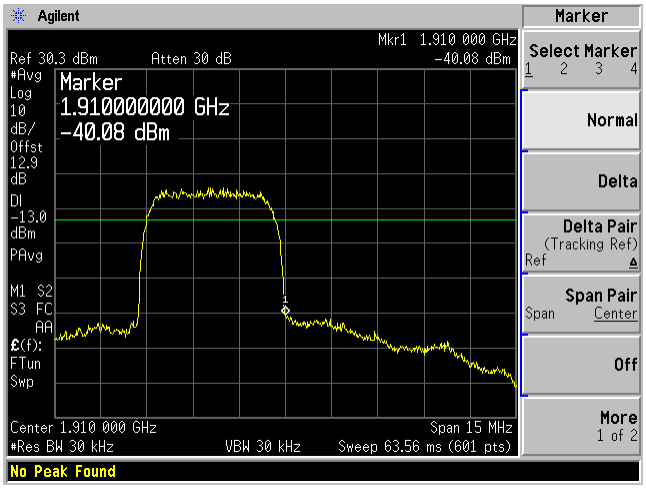


WCDMA, 1850-1910 MHz Band

Lowest Channel

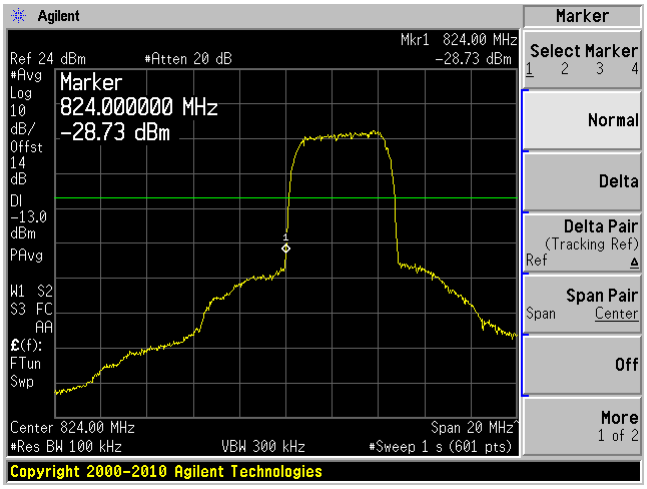


Highest Channel

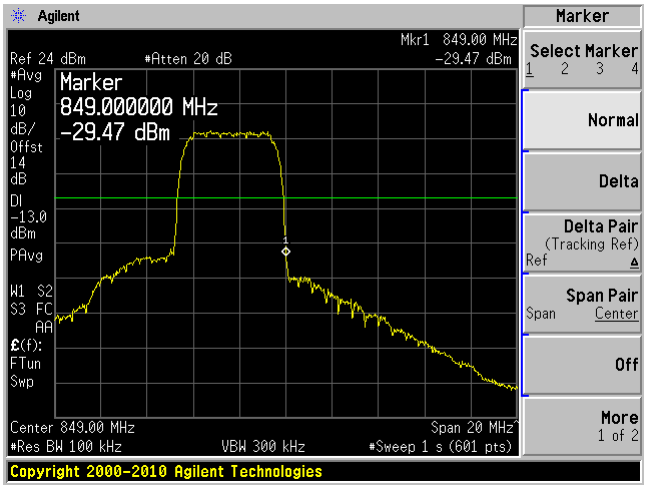


HSDPA, 824-849 MHz Band

Lowest Channel

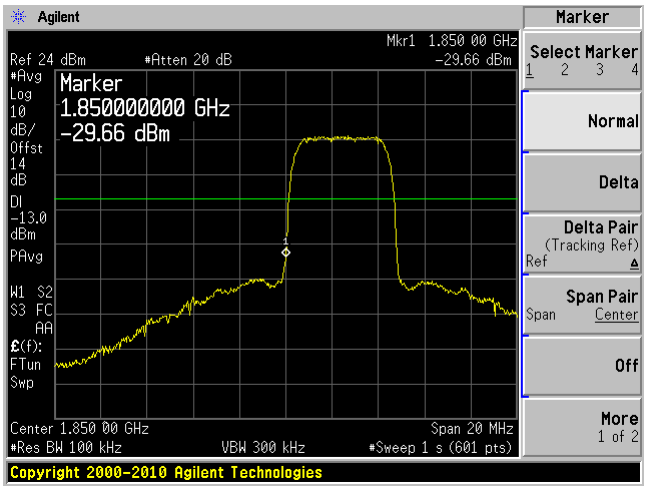


Highest Channel

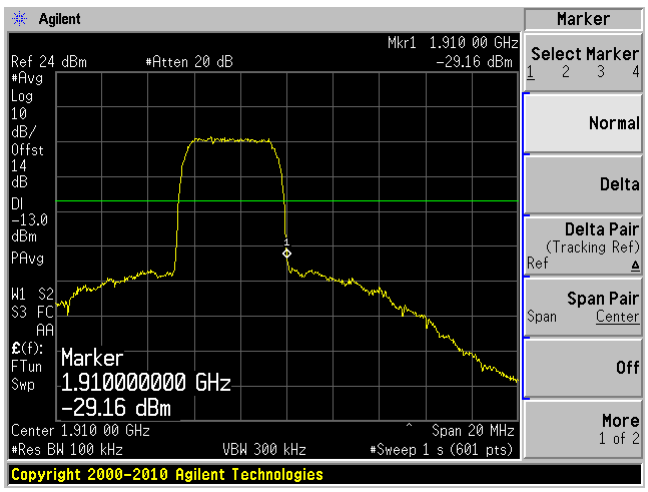


HSDPA, 1850-1910 MHz Band

Lowest Channel



Highest Channel



11 FCC §2.1049, §22.917, §24.238 & IC RSS-Gen §4.6 – Occupied Bandwidth

11.1 Applicable Standard

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

According to RSS-Gen §4.6.1

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% bandwidth, as calculated or measured.

11.2 Test Procedure

Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.

Measure the frequency difference of two frequencies that indicated 99% Bandwidth.

Repeat above procedures until all frequencies measured were complete.

11.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Cycle
Agilent	Spectrum Analyzer	E4446A	MY48250238	2013-08-29	1 year
Agilent	Wireless Communication Test Set	E5515C	GB44051221	2013-06-28	2 years

***Statement of Traceability**: BACL Corp. attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.*

11.4 Test Environmental Conditions

Temperature:	24 °C
Relative Humidity:	41 %
ATM Pressure:	103.1 kPa

The testing was performed by Ken Bai on 2014-03-13 at RF Site.

11.5 Test Results

WCDMA

Channel	Frequency (MHz)	26 dB Occupied Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
824-849 MHz Band			
Low	826.4	4.634	4.1570
Middle	836	4.660	4.1577
High	846.6	4.638	4.1689
1850-1910 MHz Band			
Low	1852.4	4.624	4.1519
Middle	1880	4.617	4.1342
High	1907.6	4.632	4.1448

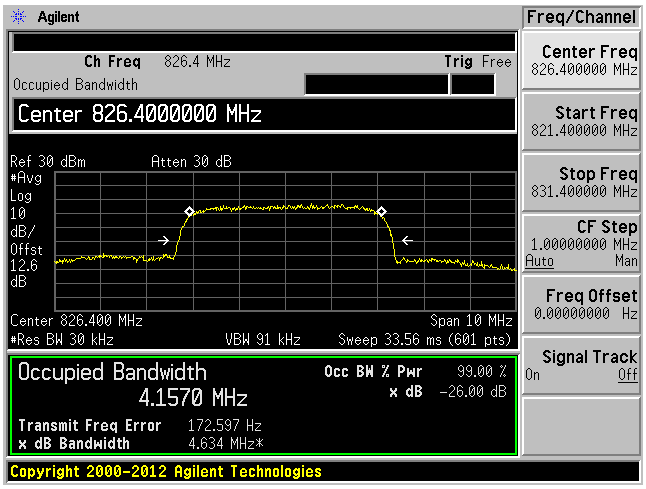
HSDPA

Channel	Frequency (MHz)	26 dB Occupied Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
824-849 MHz Band			
Low	826.4	4.673	4.1678
Middle	836	4.712	4.1892
High	846.6	4.684	4.1709
1850-1910 MHz Band			
Low	1852.4	4.680	4.1602
Middle	1880	4.672	4.1621
High	1907.6	4.674	4.1487

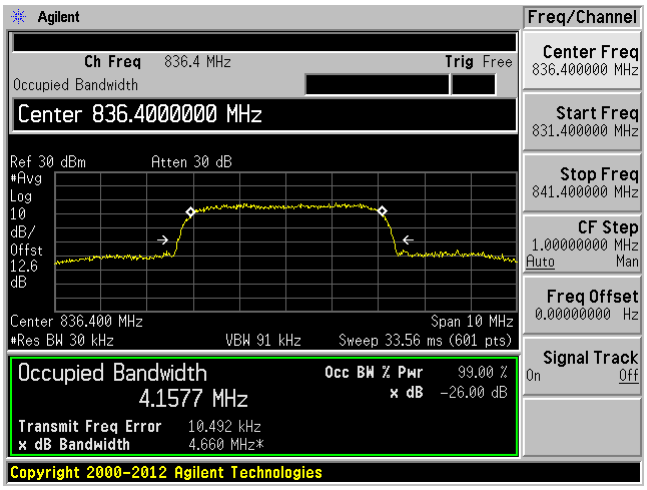
Please refer to the following plots.

Occupied Bandwidth, WCDMA, 824-849 MHz Band

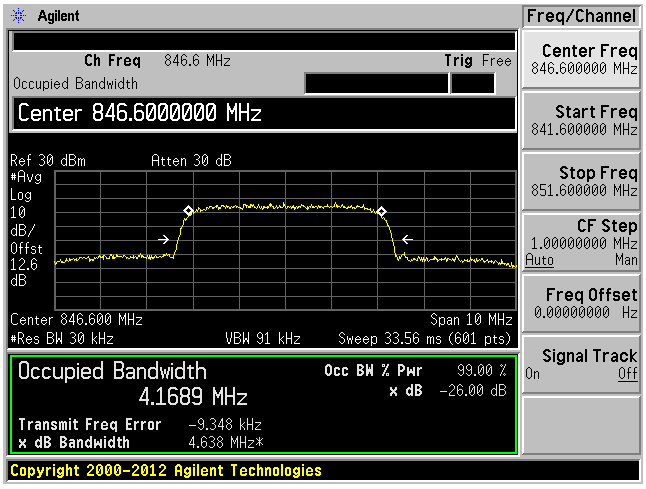
Low Channel



Middle Channel

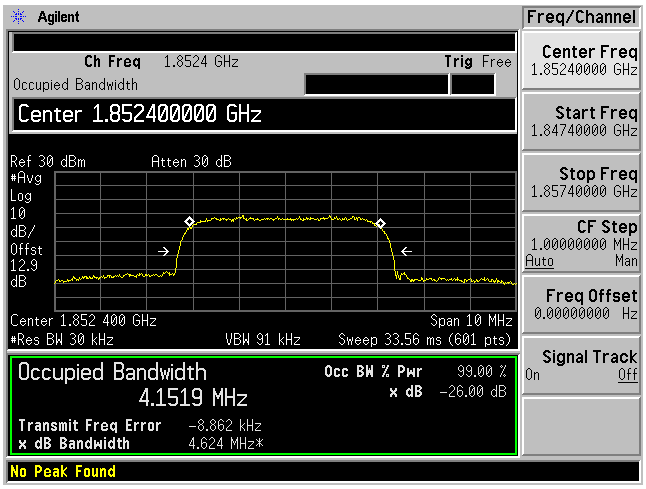


High Channel

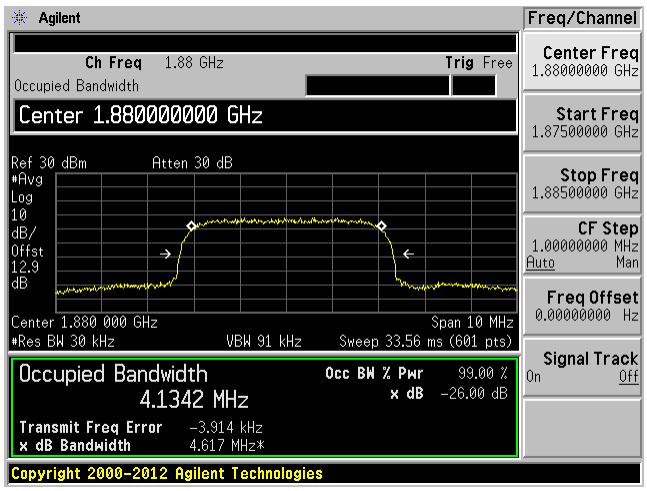


Occupied Bandwidth, WCDMA, 1850-1910 MHz Band

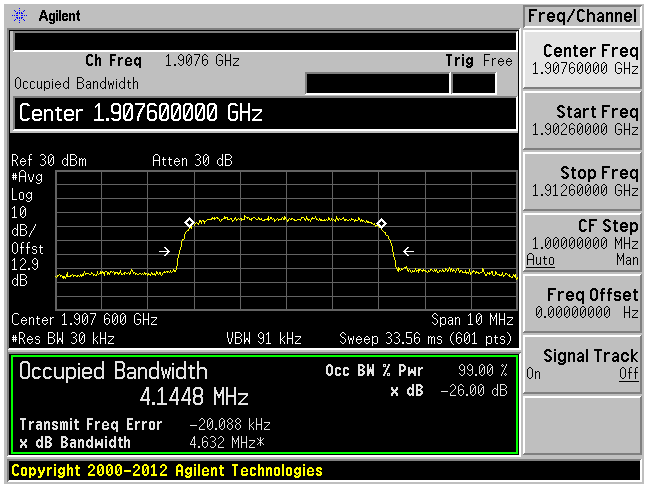
Low Channel



Middle Channel

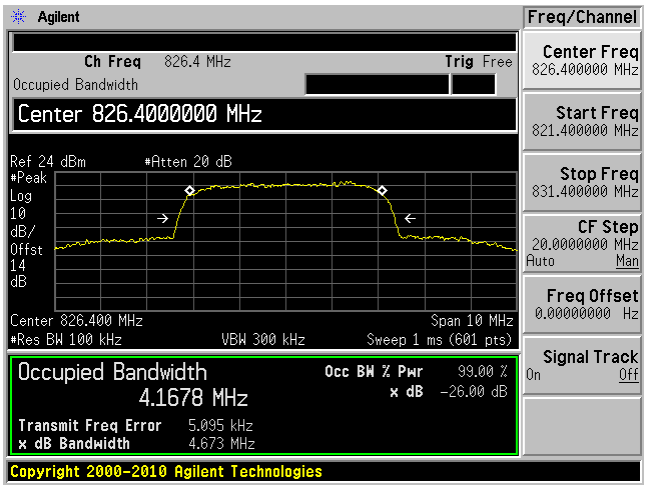


High Channel

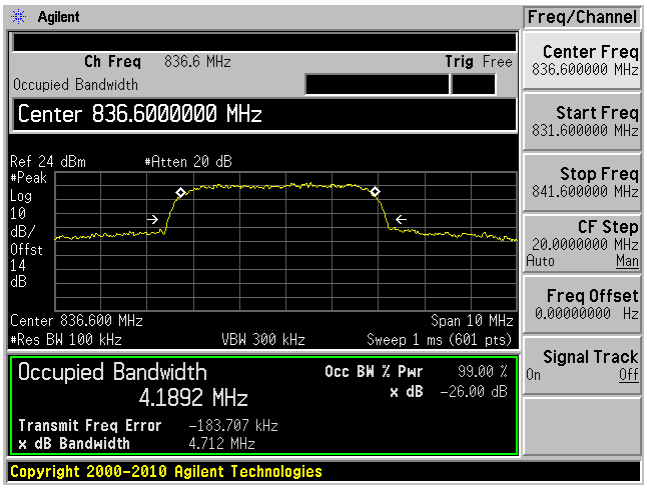


Occupied Bandwidth, HSDPA, 824-849 MHz Band

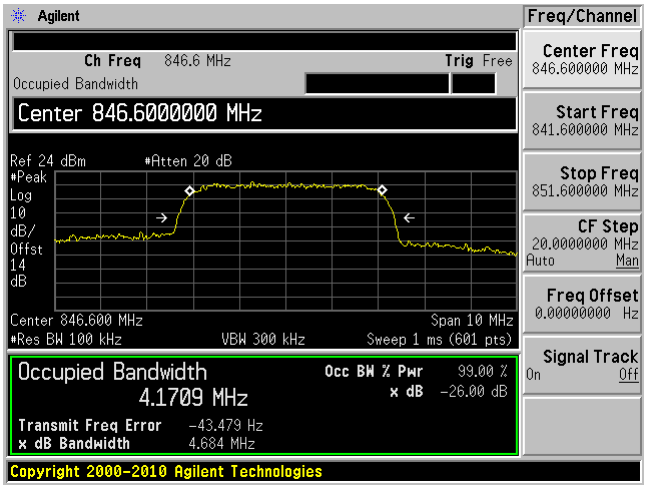
Low Channel



Middle Channel

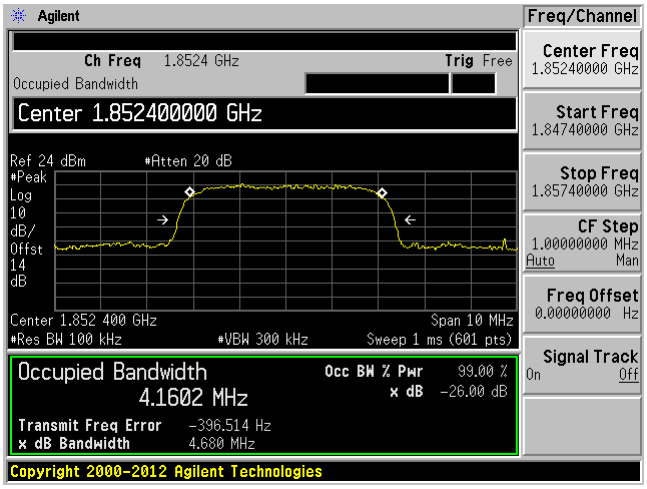


High Channel

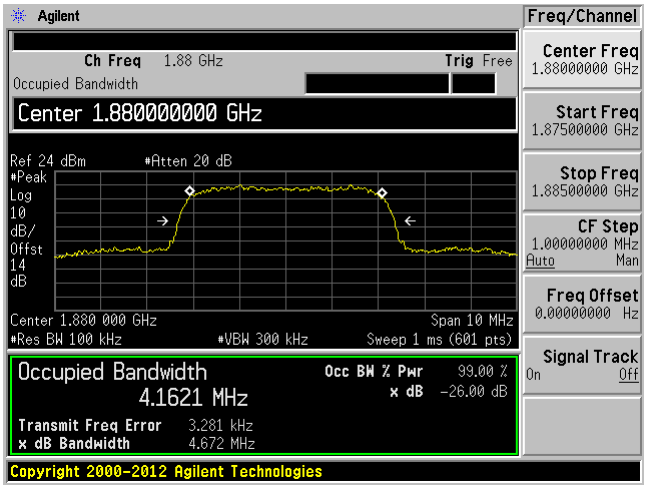


Occupied Bandwidth, HSDPA, 1850-1910 MHz Band

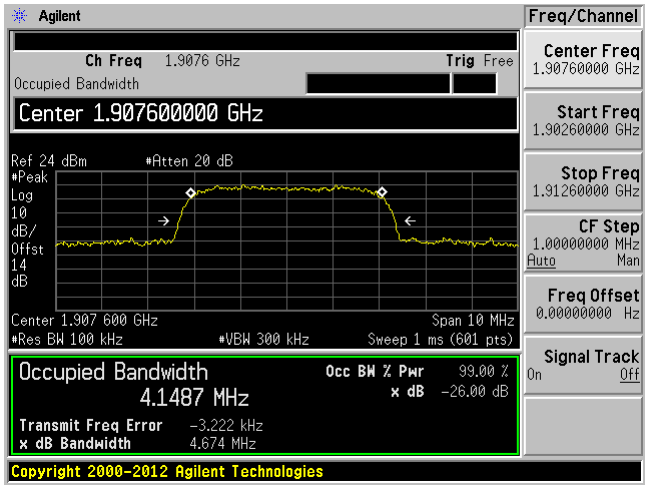
Low Channel



Middle Channel



High Channel



12 FCC §15.109 & IC RSS-Gen §4.10, §6 – Receiver Radiated Spurious Emissions

12.1 Applicable Standards

FCC §15.109 and IC RSS-Gen §4.10, §6

12.2 EUT Setup

The radiated emissions tests were performed in the 3 meter chamber, using the setup in accordance with ANSI C63.4-2009.

12.3 Test Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations.

All data were recorded in the peak detection mode. Quasi-peak readings was performed only when an emissions was found to be marginal (within -4 dB of specification limits), and are distinguished with a "**QP**" in the data table.

12.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corrected Amplitude = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude - Limit

12.5 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Cycle
Agilent	Spectrum Analyzer	E4446A	MY48250238	2013-08-29	1 year
Sunol Science Corp	System Controller	SC99V	122303-1	N/R	N/R
Sunol Science Corp	Combination Antenna	JB3	A020106-3	2013-07-11	1 year
Hewlett Packard	Pre-amplifier	8447D	2944A06639	2013-06-09	1 year
EMCO	Horn antenna	3115	9511-4627	2014-01-7	1 year
Mini-Circuits	Pre-amplifier	ZVA-183-S	570400946	2013-05-09	1 year

Statement of Traceability: BACL attests that all calibrations have been performed per the A2LA requirements, traceable to NIST.

12.6 Test Environmental Conditions

Temperature:	26 °C
Relative Humidity:	41 %
ATM Pressure:	101.3 kPa

The testing was performed by Ken Bai on 2014-03-15 at 5 meter chamber #2.

12.7 Summary of Test Results

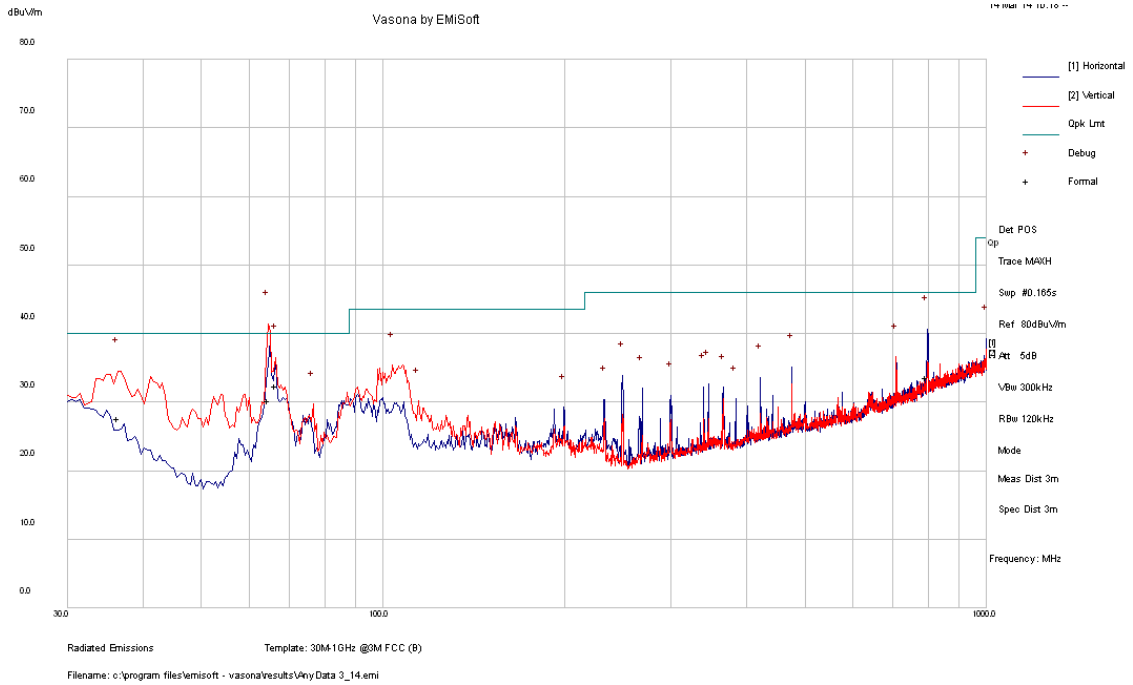
According to the test data, the EUT complied with the FCC Part 15.109 and IC RSS-Gen, with the closest margins from the limit listed below:

Mode: Receiving			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Range**
-7.58	66.50825	Vertical	30 MHz-1 GHz
-27.57	1330	Vertical	Above 1 GHz

Please refer to the following table and plots for specific test result details

12.8 Test Results and Plots

1) 30 MHz -1 GHz, measured at 3 meters



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
64.58375	30.33	264	V	117	40	-9.67	QP
66.50825	32.42	329	V	128	40	-7.58	QP
796.5393	33.71	100	H	60	46	-12.29	QP
36.47025	27.6	100	V	12	40	-12.4	QP

2) Above 1 GHz, measured at 3 meters

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
1330	46.29	100	V	102	74	-28.03	Peak
1330	44.8	100	H	167	74	-29.54	Peak
1330	26.75	100	V	102	54	-27.57	Ave
1330	26.25	100	H	167	54	-28.09	Ave
1830	40.35	100	V	0	74	-32.78	Peak
1830	40.02	100	H	77	74	-33.01	Peak
1830	23.39	100	V	0	54	-29.74	Ave
1830	23.28	100	H	77	54	-29.75	Ave

13 FCC §2.1091 & IC RSS-102 – RF Exposure

13.1 Applicable Standards

According to FCC §2.1091 and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minutes)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	* (100)	30
1.34-30	824/f	2.19/f	* ($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

Note: f = frequency in MHz
* = Plane-wave equivalent power density

Before equipment certification is granted, the procedure of IC RSS-102 must be followed concerning the exposure of humans to RF fields.

According to IC RSS-102 Issue 2 section 4.1, RF limits used for general public will be applied to the EUT.

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m^2)	Time Averaging (min)
0.003 - 1	280	2.19	-	6
1 - 10	280 / f	2.19 / f	-	6
10 - 30	28	2.19 / f	-	6
30 – 300	28	0.073	2*	6
300 – 1 500	$1.585\ f^{0.5}$	$0.0042\ f^{0.5}$	f / 150	6
1 500 – 15 000	61.4	0.163	10	6
15 000 – 150 000	61.4	0.163	10	$616000 / f^{1.2}$
150 000- 300 000	$0.158\ f^{0.5}$	$4.21 \times 10\ -4\ f^{0.5}$	$6.67 \times 10^{-5}\ f$	$616000 / f^{1.2}$

Note: *f* is frequency in MHz
* = Power density limit is applicable at frequencies greater than 100 MHz

13.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

13.3 MPE Results

824-849 MHz Band

Maximum peak output power at antenna input terminal (dBm):	24.34
Maximum peak output power at antenna input terminal (mW):	271.6439
Prediction distance (cm):	20
Prediction frequency (MHz):	846.6
Maximum Antenna Gain, typical (dBi):	-3.0
Maximum Antenna Gain (numeric):	0.5
Power density of prediction frequency at 20 cm (mW/cm^2):	0.027085
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	0.5655
Power density of prediction frequency at 20 cm (W/m^2):	0.270851
MPE limit for uncontrolled exposure at prediction frequency (W/m^2):	5.655

1850-1910 MHz Band

Maximum peak output power at antenna input terminal (dBm):	23.74
Maximum peak output power at antenna input terminal (mW):	236.592
Prediction distance (cm):	20
Prediction frequency (MHz):	1907.6
Maximum Antenna Gain, typical (dBi):	-3.0
Maximum Antenna Gain (numeric):	0.5
Power density of prediction frequency at 20 cm (mW/cm^2):	0.02359
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0
Power density of prediction frequency at 20 cm (W/m^2):	0.235901
MPE limit for uncontrolled exposure at prediction frequency (W/m^2):	10.0

The device is compliant with the requirement MPE limit for uncontrolled exposure at 20 cm distance.