FCC PART 22H, 24E
IC RSS-132, ISSUE 2, SEP 2005
IC RSS-133, ISSUE 5, FEB 2009

TEST AND MEASUREMENT REPORT

For

AnyDATA Corporation

5 Oldfield, Irvine, CA 92618, USA

FCC ID: P4M-ACT231
IC: 4594A-ACT231

Report Type:	**Product Type:**
Original Report	CDMA Vehicle Tracker with Bluetooth and RKE Function

Prepared By:	Wei Sun
Report Number:	R1207094-2224
Report Date:	2012-08-24
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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1207094-2224	Original Report	2012-08-24

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-ACT231, IC: 4594A-ACT231, model: *ACT231* or the "EUT" as referred on this report is a vehicle tracker with Bluetooth and RKE function.

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: 201206224815710 (6C4C727D) for radiated and 201206224815710(6C4C727E) 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 Commissions 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)

FCC Part 15.247 and RSS-210 report No.: R1207094-247
FCC Part 15.231 and RSS-210 report No.: R1207094-231

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 CISPR16-4-2:2003, 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

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 C63.4-2003, 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 EUT was communication with Agilent E5515C communication tester during all testing. E5515C communication test was calibrated please refer to equipment list for each section.

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	RKE Board	ACT231 TRANS V1.0	E170968
AnyDATA Corporation	STN Board	ACT231 STN V0.3	0.194V-0
AnyDATA Corporation	CDMA Board	ACT231 MAIN V0.3	5234V-0

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 §4.4 IC RSS-133 §6.4	RF Output Power	Compliant
IC RSS-132 §4.1 IC RSS-133 §6.1	Channeling Arrangements Frequency Plan	Compliance
FCC §2.1047 IC RSS-132 §4.2 IC RSS-133 §6.2	Modulation Characteristics	Compliant
FCC §2.1049 §22.917, §24.238 RSS-Gen	Occupied Bandwidth / Out of Band Emissions	Compliant
FCC §2.1053 §22.917, §24.238 IC RSS-132 §4.5 IC RSS-133 §6.5	Spurious Radiated Emissions	Compliant
FCC §2.1051 §22.917, §24.238 ICRSS-132 §4.5 IC RSS-133 §6.5	Spurious Emissions at Antenna Terminals	Compliant
FCC §22.917, §24.238 IC RSS-132 §4.5 IC RSS-133 §6.5	Band Edge	Compliant
FCC §2.1055 §22.355, §24.235 IC RSS-132 §4.3 IC RSS-133 §6.3	Frequency Stability	Compliant
FCC§2.1091 RSS-102	RF Exposure Information	Compliant
FCC §15.109 IC RSS-Gen §4.10, §6	Receiver Spurious Emission	Compliant

4 IC RSS-132 §4.1, RSS-133 §6.1 – Channeling Arrangements & Frequency Plan

4.1 Applicable Standard

According to RSS-132 §4.1, Equipment certified under this Standard may employ any channeling arrangement that which is deemed suitable by the service provider, however, such a channeling arrangement shall meet all relevant conditions specified 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.

5 FCC §2.1047 & IC RSS-132 §4.2, RSS-133 §6.2 – Modulation Characteristic

5.1 Applicable Standard

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

According to RSS-132 §4.2, Equipment certified under this Standard shall use digital modulation; however supervisory and other control function signals may use any type of modulation technique. The type of modulation used shall be reported.

According to RSS-133 §6.2, the devices may employ any type of modulation techniques. The type of modulation used shall be reported.

5.2 Test Results

The EUT uses digital modulation.

6 FCC §2.1055, §22.355, §24.235 & IC RSS-132 §4.3, RSS-133 §6.3 – Frequency Stability

6.1 Applicable Standard

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 §4.3,

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.

In lieu of meeting the above stability values, the test report may show that the frequency stability is sufficient to ensure that the emission bandwidth stays within the operating frequency block, when tested to the temperature and supply voltage variations specified in RSS-Gen.

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 Interval
Everfine	DC Power Supply	WY305	809024	/	/
Fluke	DMM, True-RMS	179	78490059	2012-05-20	1 year
BMI	AC Power Supply	3030A	35558	2011-08-26	1 year
Espec	Temp/Humidity Chamber	ESL-4CA	18010	2012-02-10	1 year
Agilent	Spectrum Analyzer	E4440A	MY44303352	2012-05-10	1 year
Agilent	Communication Tester	E5515C	GB44051221	2012-06-28	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:	24 °C
Relative Humidity:	41%
ATM Pressure:	103.1kPa

The testing was performed by Wei Sun on 2012-07-24 at RF Site.

6.5 Test Results

Cellular Band, Part 22H, RSS-132

AC Main: 120V/60Hz

Reference Frequency: 836.52 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	120	75	0.090	2.5
40	120	83	0.099	2.5
30	120	79	0.094	2.5
20	120	75	0.090	2.5
0	120	83	0.099	2.5
-20	120	83	0.099	2.5
-30	120	75	0.090	2.5
Frequency Stability versus Voltage				
20	102	83	0.099	2.5
20	138	85	0.102	2.5

DC: 12V

Reference Frequency: 836.52 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	60	0.072	2.5
30	12	79	0.094	2.5
20	12	85	0.102	2.5
0	12	79	0.094	2.5
-20	12	86	0.103	2.5
-30	12	81	0.097	2.5
Frequency Stability versus Voltage				
20	10.2	86	0.103	2.5
20	13.8	85	0.102	2.5

PCS Band, Part 24E, RSS-133

AC Main: 120V/60Hz

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	120	137	0.073	Compliance
40	120	129	0.069	Compliance
30	120	139	0.074	Compliance
20	120	201	0.107	Compliance
0	120	137	0.073	Compliance
-20	120	139	0.074	Compliance
-30	120	127	0.068	Compliance
Frequency Stability versus Voltage				
20	102	129	0.069	Compliance
20	138	127	0.068	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	139	0.074	Compliance
40	12	138	0.073	Compliance
30	12	130	0.069	Compliance
20	12	129	0.069	Compliance
0	12	138	0.073	Compliance
-20	12	137	0.073	Compliance
-30	12	129	0.069	Compliance
Frequency Stability versus Voltage				
20	10.2	131	0.070	Compliance
20	13.8	137	0.073	Compliance

7 FCC §2.1046, §22.913(a), §24.232 & IC RSS-132 §4.4, RSS-133 §6.4 – RF Output Power

7.1 Applicable Standard

According to FCC §22.913 (a), the maximum effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts.

According to FCC §24.232 , Mobile/portable stations are limited to 2 watts EIRP peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

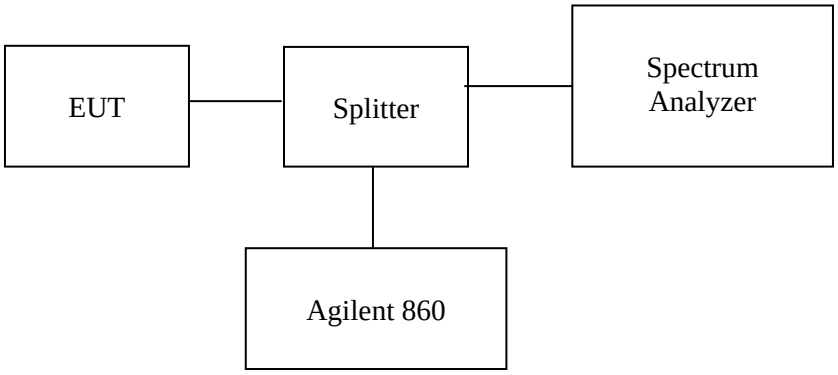
According to RSS-132 §4.4, the transmitter output power shall not exceed the limits given in SRSP-503 §5.1.3, the maximum ERP shall be 6.3 watts for mobile stations.

According to RSS-133 §6.4, the average equivalent isotropically radiated power (e.i.r.p.) for transmitters shall not exceed the limits given in SRSP-510. Moreover, base station transmitters operating in the band 1930-1995 MHz shall not have output power exceeding 100 watts.

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 Interval
Sunol Science Corp	System Controller	SC99V	122303-1	N/R	-
Sunol Science Corp	Combination Antenna	JB3	A020106-2	2011-08-10	1 year
Hewlett Packard	Pre-amplifier	8447D	2944A10187	2012-03-08	1 year
A.H. Systems	Horn antenna	SAS-200/571	261	2012-01-18	1 year
Mini-Circuits	Pre-amplifier	ZVA-183-S	667400960	2012-05-08	1 year
HP	Signal Generator	8648C	3426A00417	2011-08-18	1 year
Agilent	Spectrum Analyzer	E4440A	MY44303352	2012-05-10	1 year
Agilent	Communication Tester	E5515C	GB44051221	2012-06-28	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 °C
Relative Humidity:	40%
ATM Pressure:	101.29kPa

The testing was performed by Wei Sun on 2012-08-02 at 5 meter chamber #2.

7.5 Test Results

Conducted:

Cellular Band, Part 22H/RSS-132

Mode	FED	REV	Low CH (824.7 MHz)	Middle CH (836.52 MHz)	High CH (848.31MHz)	Limit (dBm)
CDMA2000 1xRTT	RC1	RC1 (S02)	24.06	23.91	24.07	38.45
	RC1	RC1 (S055)	24.03	23.87	24.08	38.45
	RC2	RC2 (S09)	24.05	23.91	24.03	38.45
	RC2	RC2 (S055)	24.08	23.88	24.07	38.45
	RC3	RC3 (S02)	24.08	23.90	24.12	38.45
	RC3	**RC3 (S055)**	**24.08**	**23.91**	**24.14**	**38.45**
	RC4	RC3 (S02)	24.03	23.92	24.14	38.45
	RC4	RC3 (S055)	24.01	23.91	24.10	38.45
	RC5	RC4 (S09)	23.99	23.90	24.09	38.45
	RC5	RC4 (S055)	24.07	23.75	24.06	38.45

PCS Band, Part 24E/RSS-133

Mode	FED	REV	Low CH (1851.25 MHz)	Middle CH (1880.0 MHz)	High CH (1908.75 MHz)	Limit (dBm)
CDMA2000 1xRTT	RC1	RC1 (S02)	24.71	24.75	24.13	33
	RC1	RC1 (S055)	24.75	24.83	23.99	33
	RC2	RC2 (S09)	24.70	24.79	24.10	33
	RC2	RC2 (S055)	24.69	24.91	24.21	33
	RC3	RC3 (S02)	24.75	24.87	24.24	33
	RC3	**RC3 (S055)**	**24.76**	**24.97**	**24.24**	**33**
	RC4	RC3 (S02)	24.71	24.92	24.13	33
	RC4	RC3 (S055)	24.75	24.91	24.24	33
	RC5	RC4 (S09)	24.68	24.76	24.15	33
	RC5	RC4 (S055)	24.70	24.91	24.17	33

ERP/EIRP:

Cellular Band, Part 22H/RSS-132: RC3 (S055)

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)		
824.7	88.65	275	115	V	824.7	25.44	0	1.29	24.15	38.45	-14.3
824.7	87.23	211	155	H	824.7	24.33	0	1.29	23.04	38.45	-15.41
836.52	93.21	280	175	V	836.52	25.46	0	1.29	24.17	38.45	-10.28
836.52	93.29	264	166	H	836.52	24.41	0	1.29	23.12	38.45	-15.33
848.31	88.96	283	132	V	848.31	23.34	0	1.29	22.05	38.45	-16.4
848.31	90.78	284	160	H	848.31	25.71	0	1.29	**24.42**	38.45	-11.03

PCS Band, Part 24E/RSS-133: RC3 (S055)

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)		
1851.25	88.88	123	117	V	1851.25	15.99	8.74	2.37	22.36	33	-10.64
1851.25	91.57	283	155	H	1851.25	18.78	8.74	2.37	25.15	33	-7.85
1880	91.08	232	157	V	1880	18.96	8.74	2.37	**25.33**	33	-7.67
1880	90.27	206	134	H	1880	17.99	8.74	2.37	24.36	33	-8.64
1908.75	88.38	133	142	V	1908.75	16.59	8.74	2.37	22.96	33	-10.04
1908.75	90.75	134	190	H	1908.75	18.94	8.74	2.37	25.31	33	-7.69

8 FCC §2.1053, §22.917, §24.238 & IC RSS-132 §4.5, RSS-133 §6.5 - Spurious Radiated Emissions

8.1 Applicable Standard

Requirements:

FCC §2.1053, §22.917 and §24.238

RSS-132 §4.5, 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 Interval
Sunol Science Corp	System Controller	SC99V	122303-1	N/R	-
Sunol Science Corp	Combination Antenna	JB3	A020106-2	2011-08-10	1 year
Hewlett Packard	Pre-amplifier	8447D	2944A10187	2012-03-08	1 year
A.H. Systems	Horn antenna	SAS-200/571	261	2012-01-18	1 year
Mini-Circuits	Pre-amplifier	ZVA-183-S	667400960	2012-05-08	1 year
HP	Signal Generator	8648C	3426A00417	2011-08-18	1 year
Agilent	Spectrum Analyzer	E4440A	MY44303352	2012-05-10	1 year
Agilent	Communication Tester	E5515C	GB44051221	2012-06-28	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:	23 °C
Relative Humidity:	40%
ATM Pressure:	101.29kPa

The testing was performed by Wei Sun on 2012-08-02 at 5 meter chamber #2.

8.5 Test Results

Cellular Band, Part 22H/RSS-132: RC3 (S055)

30 MHz -10 GHz Radiated Emission at 3-meter (Middle Channel, 836.52 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)
3702.5	29.26	0	100	V	3702.5	-45.81	10.14	3.92	-39.59	-13	-26.59
3702.5	29.65	0	100	H	3702.5	-44.58	10.14	3.92	-38.36	-13	-25.36
5553.75	27.54	0	100	V	5553.75	-47.56	11.01	5.63	-42.18	-13	-29.18
5553.75	27.59	0	100	H	5553.75	-46.63	11.01	5.63	-41.25	-13	-28.25
7405	27.49	0	100	V	7405	-47.7	11.54	6.54	-42.7	-13	-29.7
7405	27.2	0	100	H	7405	-47.43	11.54	6.54	-42.43	-13	-29.43

PCS Band, Part 24E/RSS-133: RC3 (S055)

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)
3760	42.13	54	155	V	3760	-33.02	9.96	4	-27.06	-13	-14.06
3760	44.69	122	155	H	3760	-29.42	9.96	4	-23.46	-13	-10.46
5640	27.5	0	100	V	5640	-47.57	11.33	5.63	-41.87	-13	-28.87
5640	27.6	0	100	H	5640	-46.62	11.33	5.63	-40.92	-13	-27.92
7520	27.09	0	100	V	7520	-48.1	11.68	6.54	-42.96	-13	-29.96
7520	27.11	0	100	H	7520	-47.52	11.68	6.54	-42.38	-13	-29.38

9 FCC §2.1053, §22.917, §24.238 & IC RSS-132 §4.5, RSS-133 §6.5 - Spurious Emissions at Antenna Terminals

9.1 Applicable Standard

Requirements:

FCC §2.1053, §22.917 and §24.238

RSS-132 §4.5, 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 Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2012-05-10	1 year
Agilent	Communication Tester	E5515C	GB44051221	2012-06-28	1 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:	24 °C
Relative Humidity:	41%
ATM Pressure:	103.1kPa

The testing was performed by Wei Sun on 2012-07-24 at RF Site.

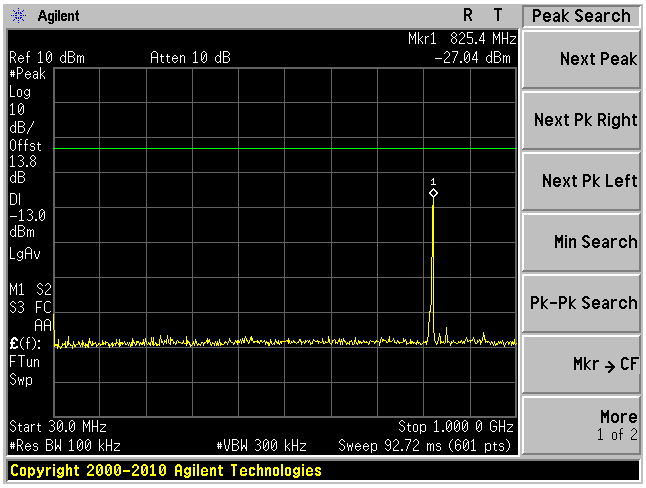
9.5 Test Results

Please refer to the following plots.

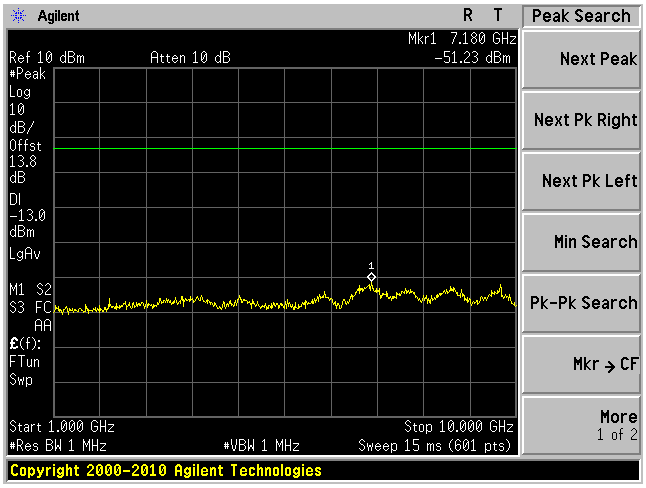
Plots of Spurious Emissions for Part 22H/RSS-132: RC3 (S055)

Low Channel

30 MHz – 1 GHz

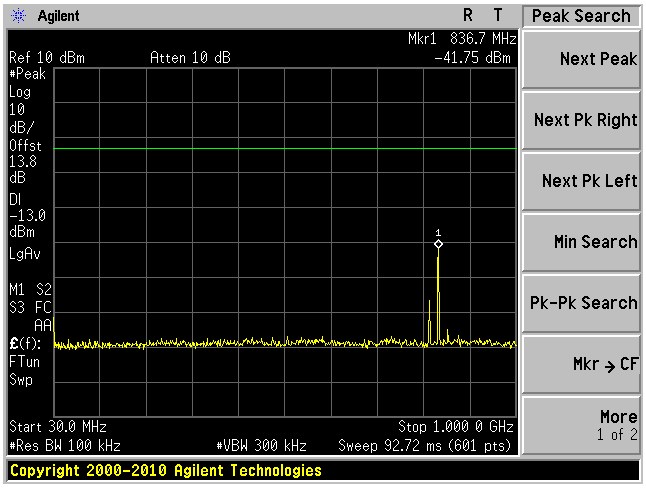


1 GHz – 10 GHz

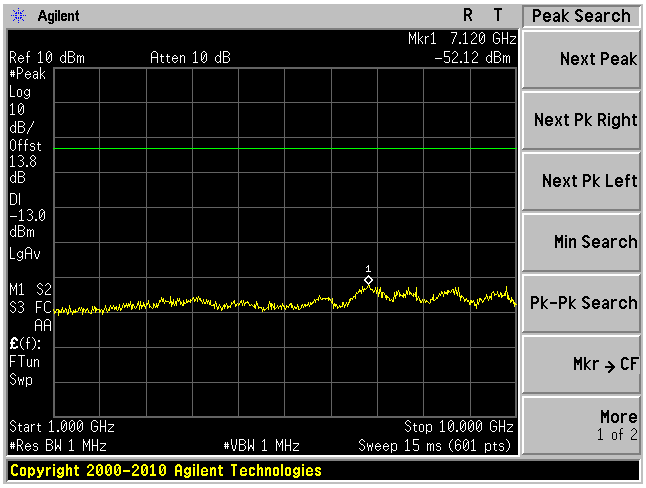


Middle Channel

30 MHz – 1 GHz

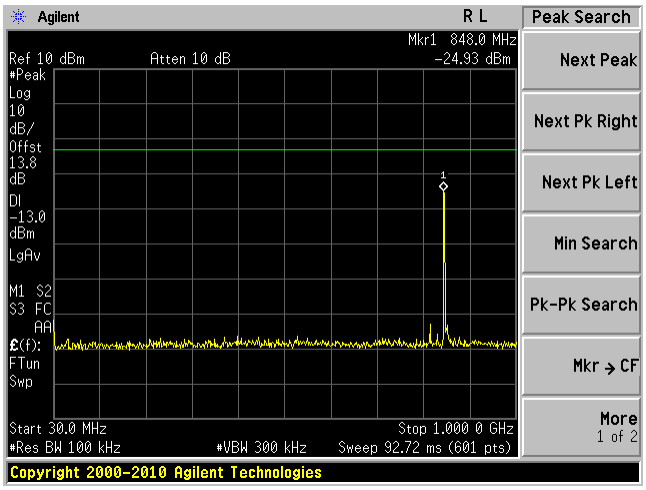


1 GHz – 10 GHz

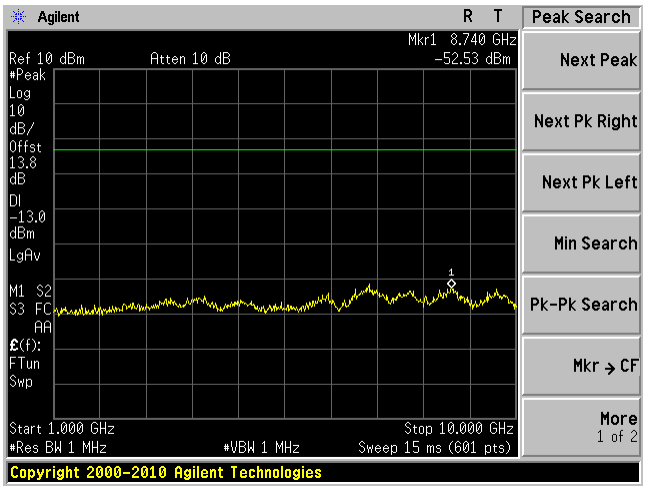


High Channel

30 MHz – 1 GHz



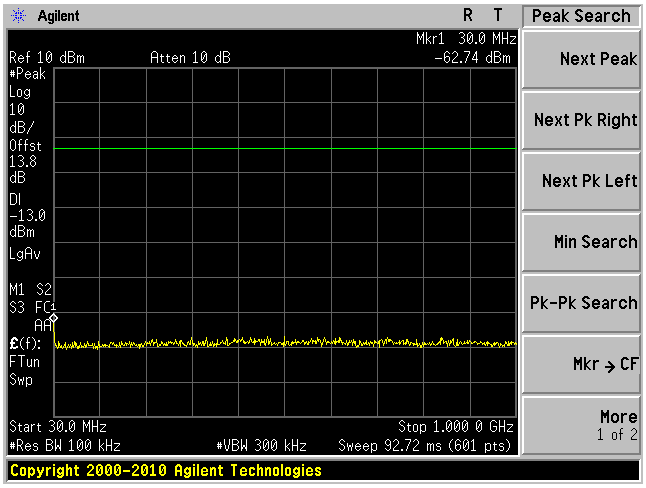
1 GHz – 10 GHz



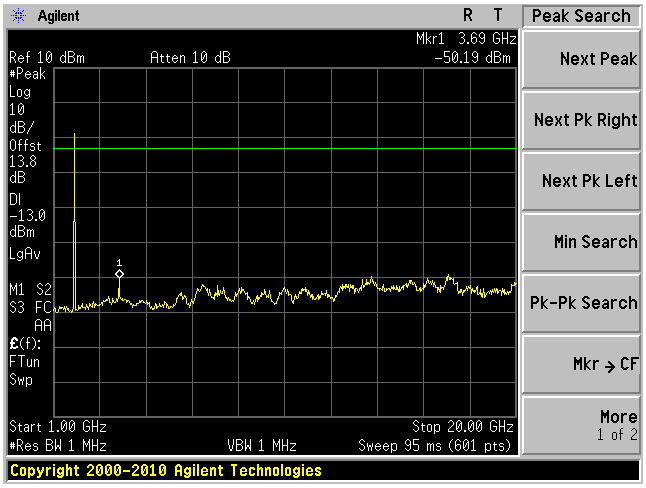
Plots of Spurious Emissions for Part 24E/RSS-133: RC3 (S055)

Low Channel

30 MHz – 1 GHz

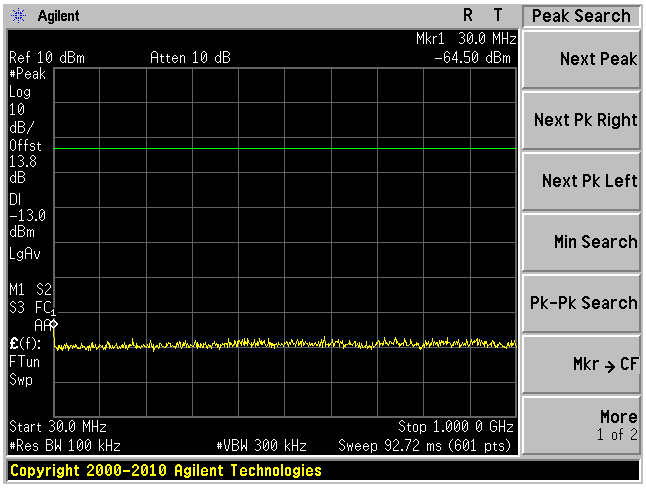


1 GHz – 20 GHz

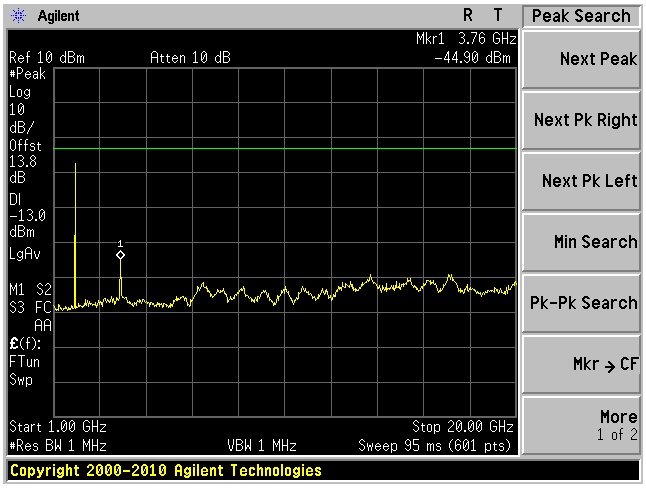


Middle Channel

30 MHz – 1 GHz

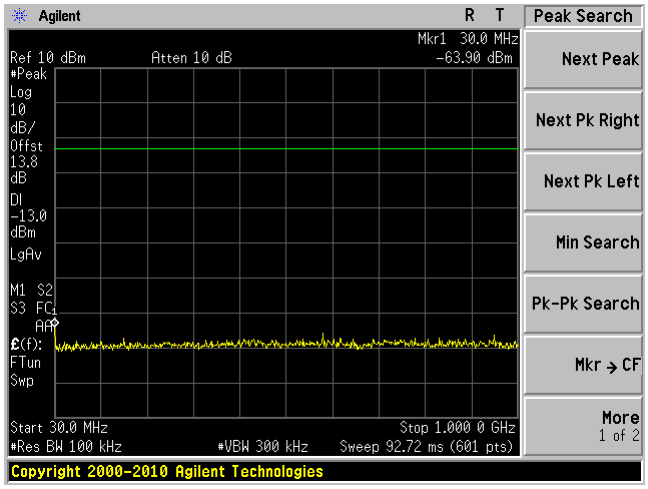


1 GHz – 20 GHz

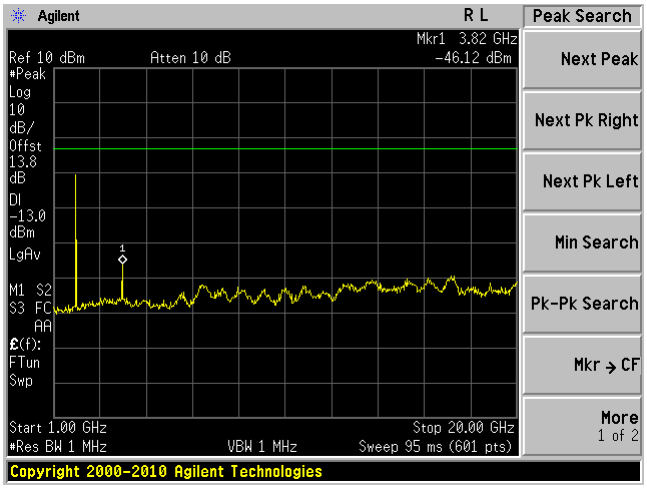


High Channel

30 MHz – 1 GHz



1 GHz – 20 GHz



10 FCC §2.1053, §22.917, §24.238 & IC RSS-132 §4.5, RSS-133 §6.5 – Band Edge

10.1 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 emission 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 RSS-132 §4.5, 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 Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2012-05-10	1 year
Agilent	Communication Tester	E5515C	GB44051221	2012-06-28	1 year

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

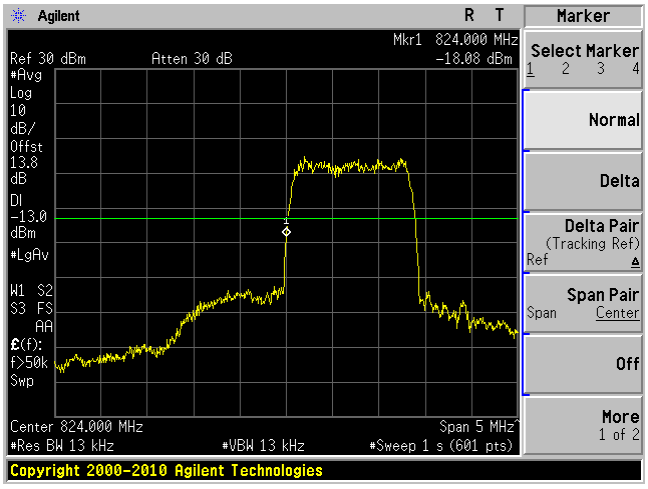
The testing was performed by Wei Sun on 2012-07-24 at RF Site.

10.5 Test Results

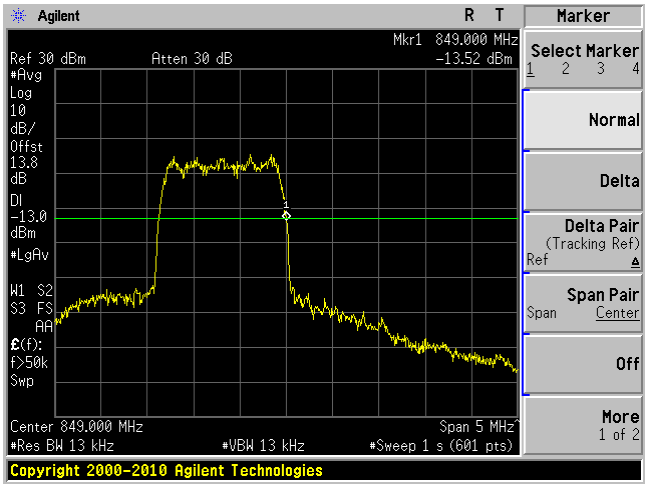
Please refer to the following plots.

Plots of Spurious Emissions for Part 22H/RSS-132: RC3 (S055)

Lowest Channel

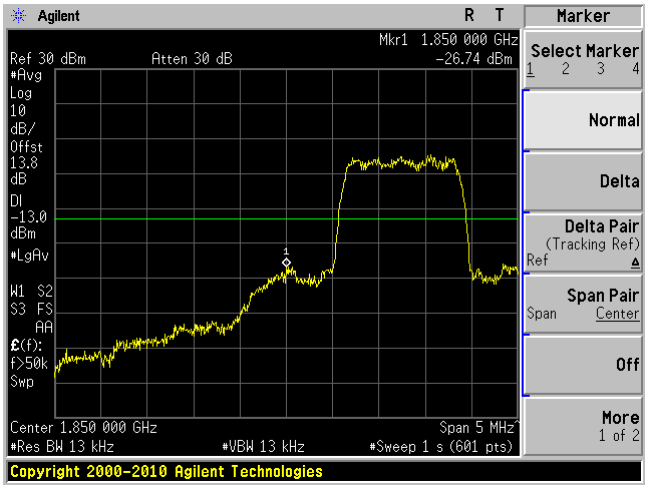


Highest Channel

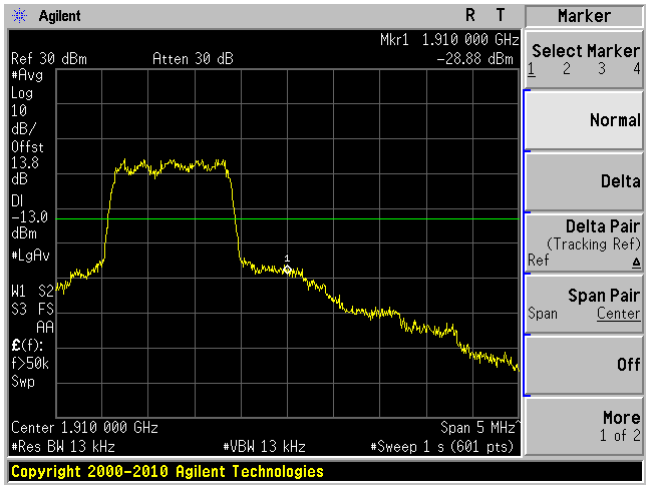


Plots of Spurious Emissions for Part 24E/RSS-133: RC3 (S055)

Lowest Channel



Highest Channel



11 FCC §2.1049, §22.917, §24.238 & IC RSS-Gen §4.6.1 – 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 Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2012-05-10	1 year
Agilent	Communication Tester	E5515C	GB44051221	2012-06-28	1 year

***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:	103.1kPa

The testing was performed by Wei Sun on 2012-07-24 at RF Site.

11.5 Test Results

Cellular Band, Part 22H/RSS-132

Channel	Frequency (MHz)	26 dB Occupied Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
CDMA 1xRTT			
Low	824.7	1.435	1.2781
Middle	836.52	1.441	1.2785
High	848.31	1.440	1.2786

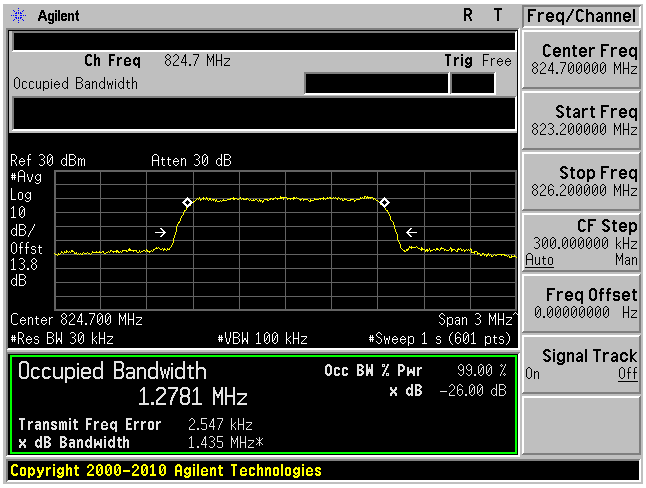
PCS Band, Part 24E/RSS-133

Channel	Frequency (MHz)	26 dB Occupied Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
CDMA 1xRTT			
Low	1851.25	1.445	1.2828
Middle	1880.00	1.431	1.2773
High	1908.75	1.458	1.2862

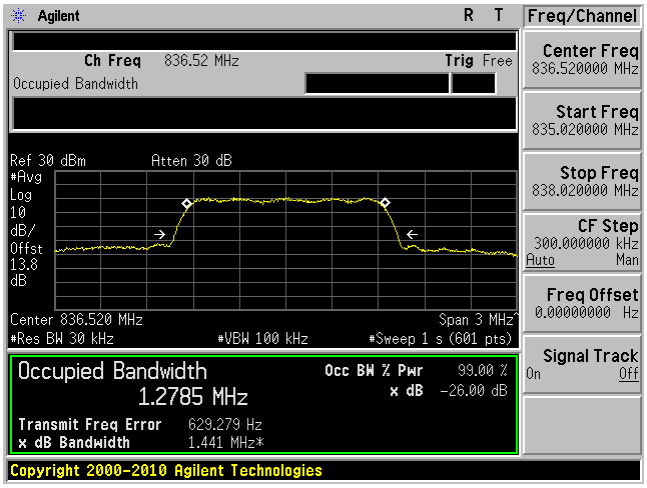
Please refer to the following plots.

Plots of Occupied Bandwidth for Part 22H/RSS-132: RC3 (S055)

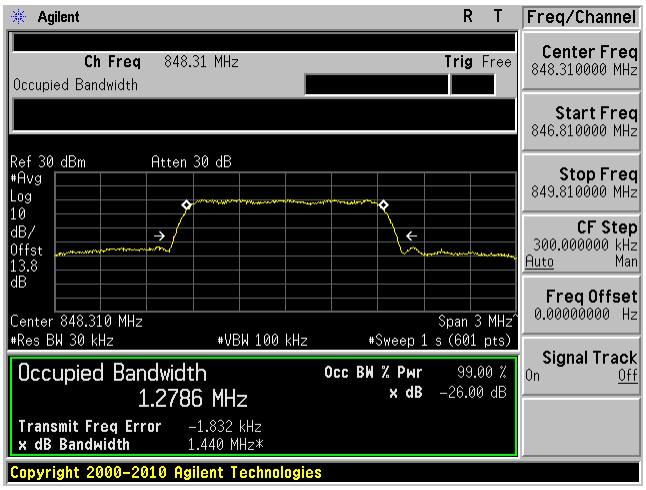
Low Channel



Middle Channel

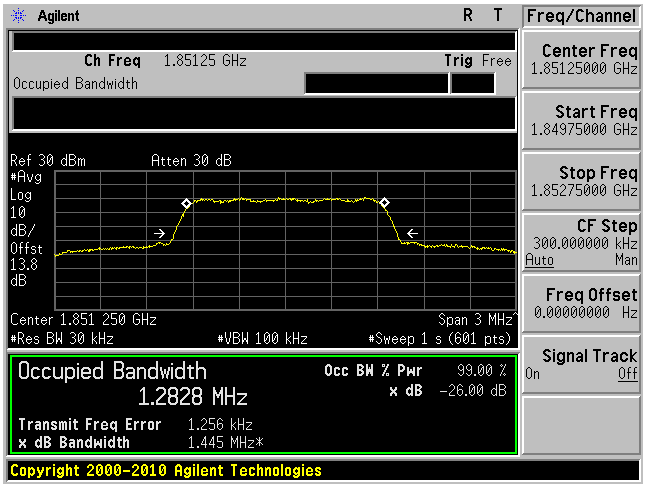


High Channel

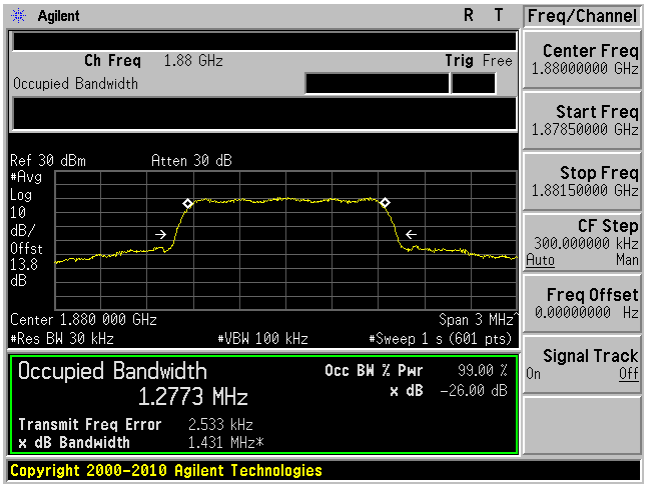


Plots of Occupied Bandwidth for Part 24E/RSS-133: RC3 (S055)

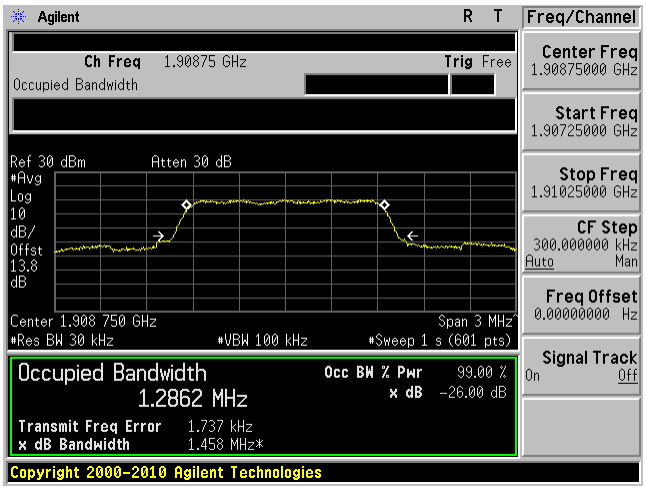
Low Channel



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 No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2012-05-10	1 year
Sunol Science Corp	System Controller	SC99V	122303-1	N/R	-
Sunol Science Corp	Combination Antenna	JB3	A020106-2	2011-08-10	1 year
Hewlett Packard	Pre-amplifier	8447D	2944A10187	2012-03-08	1 year
A.H. Systems	Horn antenna	SAS-200/571	261	2012-01-18	1 year
Mini-Circuits	Pre-amplifier	ZVA-183-S	667400960	2012-05-08	1 year
HP	Signal Generator	8648C	3426A00417	2011-08-18	1 year
Wisewave	Horn antenna	ARH-4223-02	10555-02	2010-06-14 [1]	3 years

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

12.6 Test Environmental Conditions

Temperature:	24 °C
Relative Humidity:	49%
ATM Pressure:	101.9kPa

The testing was performed by Wei Sun on 2012-07-23 at 5 meter chamber #2.

12.7 Summary of Test Results

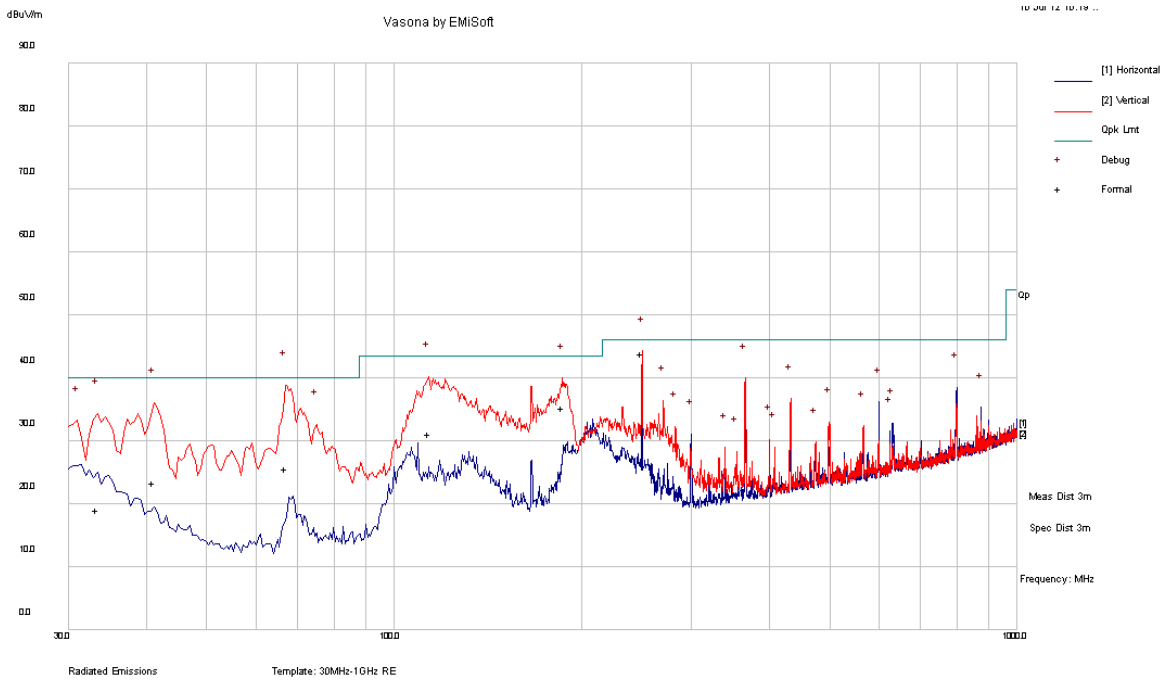
According to the test data,, the EUT complied with the FCC Part 15.109 and IC RSS-Gen, with the closest margins from the limit listed below:

Mode: Receiving			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Range (MHz)**
-2.10	249.9968	Vertical	30-12750

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

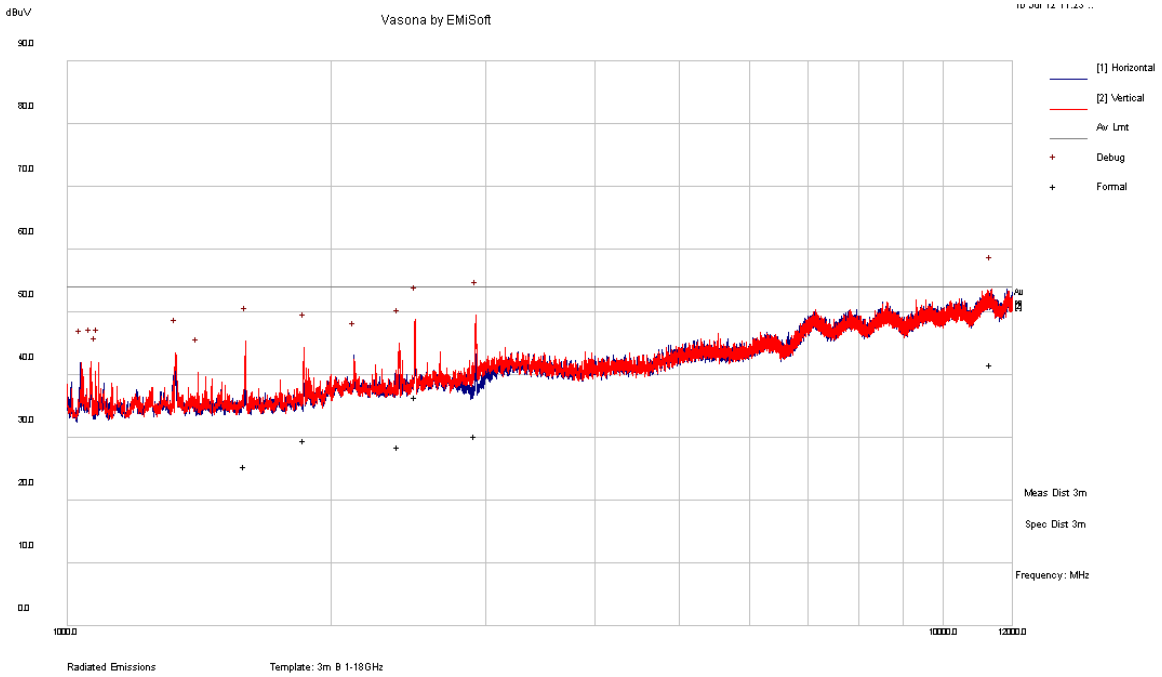
12.8 Test Results

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



Frequency (MHz)	Corrected Amplitude (dB)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
249.9968	43.9	100	V	172	46	-2.10	QP
186.285	35.31	110	V	119	43.5	-8.19	QP
113.5448	31.08	105	V	93	43.5	-12.42	QP
66.94875	25.54	195	V	90	40	-14.46	QP
41.00825	23.43	170	V	88	40	-16.57	QP
33.3615	19.05	135	V	194	40	-20.95	QP

2) 1 – 25 GHz, measured at 3 meters



Frequency (MHz)	Corrected Amplitude (dB)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
11350.92	41.59	155	V	33	54	-12.41	Ave.
2497.446	36.56	100	V	352	54	-17.44	Ave.
2926.212	30.23	100	V	52	54	-23.77	Ave.
1865.138	29.58	119	V	360	54	-24.42	Ave.
2389.46	28.58	108	V	360	54	-25.42	Ave.
1597.073	25.5	142	V	304	54	-28.50	Ave.

13 FCC §1.1307(b)(1), §2.1091 & IC RSS-102 §4 – RF Exposure Information

13.1 Applicable Standard

According to FCC §15.247(i), §1.1307(b)(1) and IC RSS-102, 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

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

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

Cellular Band

Maximum peak output power at antenna input terminal (dBm):	24.14
Maximum peak output power at antenna input terminal (mW):	259.42
Prediction distance (cm):	20
Prediction frequency (MHz):	848.31
Maximum Antenna Gain, typical (dBi):	-3.0
Maximum Antenna Gain (numeric):	0.5
Power density of prediction frequency at 20 cm (mW/cm^2):	0.0258
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	0.5655
Power density of prediction frequency at 20 cm (W/m^2):	0.258
MPE limit for uncontrolled exposure at prediction frequency (W/m^2):	5.655

PCS Band

Maximum peak output power at antenna input terminal (dBm):	24.97
Maximum peak output power at antenna input terminal (mW):	314.05
Prediction distance (cm):	20
Prediction frequency (MHz):	1880
Maximum Antenna Gain, typical (dBi):	-3.0
Maximum Antenna Gain (numeric):	0.5
Power density of prediction frequency at 20 cm (mW/cm^2):	0.0312
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0
Power density of prediction frequency at 20 cm (W/m^2):	0.312
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.