Lab Code: 200167-0

FCC PART 15, SUBPART C
IC RSS-210, ISSUE 7

TEST AND MEASUREMENT REPORT

For

The Coast Distribution System, Inc.

7930 Sw Burns Way, Unit C,
Wilsonville, OR 97070, USA

FCC ID: XV5KE888
IC: 6282B-KE888

Report Type:	**Product Type:**
Original Report	Remote Starter

Test Engineer:	Kevin Li
Report Number:	R0912041-231
Report Date:	2010-03-08
Reviewed By:	Boni Baniqued EMC/RF Supervisor
Prepared By: **(84)**	Bay Area Compliance Laboratories Corp. 1274 Anvilwood Ave. Sunnyvale, CA 94089, U.S.A. Tel: (408) 732-9162 Fax: (408) 732-9164

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R0912041-231	Original Report	2010-03-08

1 GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

This test and measurement report was prepared on behalf of *The Coast Distribution System Inc.* and their product, model: *KE-888* or the "EUT" as referred to in this report. The EUT is a Remote Controller.

1.2 Mechanical Description

The EUT measures approximately 5 (L) x 3 cm (W) x 0.8 cm (H) weight 52g.

**All measurement and test data in this report was gathered from production sample serial number: A03475.*

1.3 EUT Photo

Additional Photos in Exhibit C

1.4 Objective

This report is prepared on behalf of *The Coast Distribution System, Inc.* in accordance with Part 2, Subpart J, and Part 15, Subparts B and C of the Federal Communication Commissions rules and IC RSS-210, Issue 7, June 2007.

1.5 Related Submittal(s)/Grant(s)

No Related Submittals

1.6 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4 –2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. All radiated and conducted emissions measurements were performed at BACL.

1.7 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in 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 range from $\pm$2.0 for Conducted Emissions tests and $\pm$4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL.

Detailed instrumentation measurement uncertainties can be found in BACL report QAP-018.

1.8 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, 1997 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the test methods and procedures set forth in ANSI C63.4-2003 & TIA/EIA-603.

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.: R-2463 and C-2698. 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 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 ANSI C63.4-2003.

2.2 EUT Exercise Software

The system was configured for testing in a typical fashion (as normally used by a typical user).

2.3 Special Accessories

The special accessories were provided by Bay Area Compliance Laboratories Corp.

2.4 Equipment Modifications

No modifications were made to the unit tested.

2.5 Special Equipment

N/A

2.6 Local Support Equipment

N/A

2.7 EUT Internal Configuration Details

Manufacturer	Description	Model No.	Serial No.
The Coast Distribution System, Inc.	PCB Board	Z10876	-

2.8 External I/O Cabling List and Details

N/A

3 SUMMARY OF TEST RESULTS

FCC &IC Rules	Requirements	Result
FCC §15.203, IC RSS-Gen §7.1.4	Antenna Requirement	Compliant
FCC §15.205, §15.209 IC RSS-210 §2.2, §A1.1	Restricted Bands of Operation	Compliant
FCC §15.207 IC RSS-Gen §7.2.2	Conducted Emissions	N/A *
FCC §15.231(a)(1); IC RSS-210 §A1.1.1	5 Second Manual Deactivation	Compliant
FCC §15.231(b); IC RSS-210 §A1.1.2	Field Strength of Emissions	Compliant
FCC §15.231(c); IC RSS-210 §A1.1.3	Emission Bandwidth	Compliant

Note: * Battery operation.

4 FCC §15.203 & IC RSS-GEN §7.1.4 – ANTENNA REQUIREMENT

4.1 Applicable Standard

According to FCC §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

And according to FCC §15.247 (b) (4), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

As per IC RSS-Gen §7.1.4: Transmitter Antenna, a transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest-gain antenna of each combination of transmitter and antenna type for which certification is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type and having equal or lesser gain as an antenna that had been successfully tested for certification with the transmitter, will also be considered certified with the transmitter, and may be used and marketed with the transmitter. The manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.

4.2 Test Result

This product has an integral helical antenna which is soldered on the PCB board, fulfilling the requirement of this section.

☒ **Compliant** ☐ **N/A**

5 FCC §15.231(A)(1) & IC RSS-210 §A1.1.1 – DEACTIVATION TIME

5.1 Applicable Standard

As Per FCC §15.231(a) (1), manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

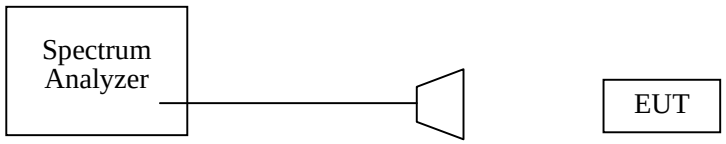
As per IC §RSS-210 A1.1.1 (a) A manually operated transmitter shall employ a push-to-operate switch and be under manual control at all transmission times. When released, the transmitter shall cease transmission (holdover time of up to 5 seconds is permitted).

5.2 Test Equipment List and Details

Manufacturer	Description	Model Number	Serial Number	Calibration Date
Agilent	Analyzer, Spectrum	E4440A	MY44303352	2009-04-27

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

5.3 Test Setup Diagram



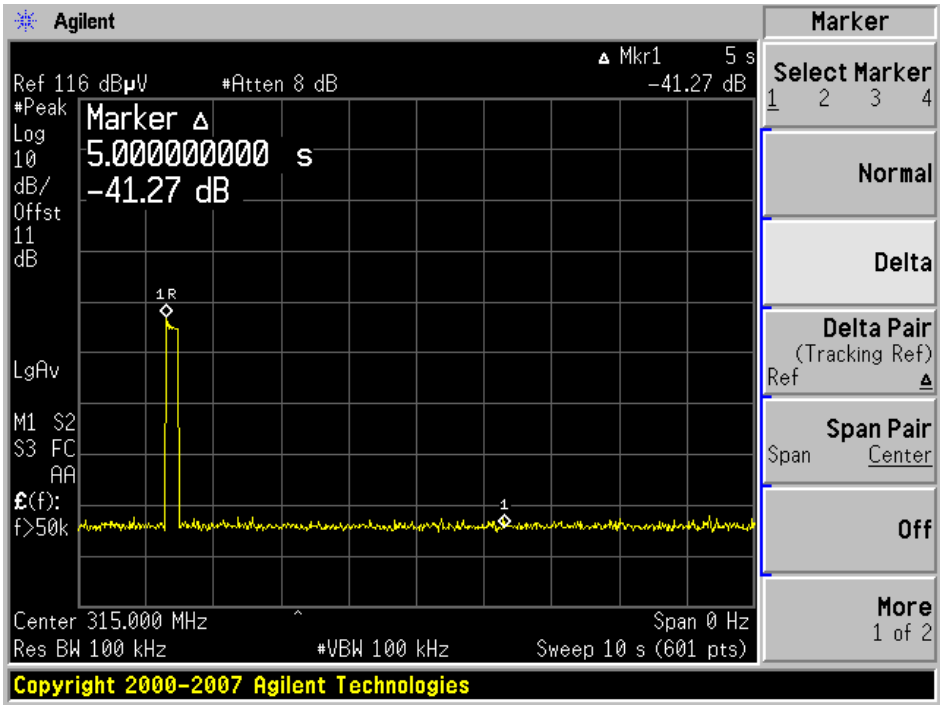
5.4 Test Environmental Conditions

Temperature:	21 °C
Relative Humidity:	56 %
ATM Pressure:	100.8 kPa

** The testing was performed by Kevin Li on 2009-12-09*

5.5 Test Result

Pass; please refer to the following plot:



6 FCC §15.231(B) & IC RSS-210 §A1.1.2 – FIELD STRENGTH OF EMISSIONS

6.1 Applicable Standard

As per FCC §15.231(b): In addition to the provisions of FCC§15.205, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	1,250 to 3,750**	125 to 375**
174-260	3,750	375
260-470	3,750 to 12,500**	375 to 1,250**
Above 470	12,500	1,250

***Linear interpolations*

As Per FCC §15.209 (a) except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

*** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.*

As Per IC RSS-210 §A1.1.2 (1), the field strength of emissions from momentarily operated intentional radiators shall not exceed the limits in Table below.

Table: Permissible Field Strength Limits for Momentarily Operated Devices

Fundamental Frequency (MHz), excluding restricted band frequencies of Table 1	**Field Strength of Fundamental (Note 1) uV/m @ 3 meters, (Watts, e.i.r.p.)**	**Field Strength of Unwanted Emissions (Note 1) uV/m @ 3 meters**
40.66-40.70	See section A2.7	
70-130	1,250 (470 nW)	125
130-174	1,250 to 3,750*	125 to 375
174-260 (Note 2)	3,750 (4.2uW)	375
260-470 (Note 2)	3,750 to 12,500*	375 to 1,250
Above 470	12,500 (47 uW)	1,250

As Per IC RSS-210 §2.6, the field strength of emissions can not exceed the general field strength limits in the tables below.

Frequency (Fundamental or Spurious)	**Field Strength (microvolts/meter)**	**Magnetic H-Field (microampers/m)**	**Measurement Distance (metters)**
9 – 490 kHz	2400/F(F in kHz)	2400/337F (F in kHz)	300
490 – 1705 kHz	24000/F(F in kHz)	24000/377F(F in kHz)	30
1.705 – 30 MHz	30	N/A	30

Frequency (MHz)	**Field Strength (microvolt/meter) at 3 meters (Watts, e.i.r.p.)**	
	Transmitters	**Receivers**
30 - 88	100 (3 nW)	100 (3 nW)
88 - 216	150 (6.8 nW)	150 (6.8 nW)
216 - 960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

6.2 Test Setup

The radiated emission tests were performed in the closed chamber 3-meter test site, using the setup in accordance with ANSI C63.4 - 2003. The specification used was the FCC Part 15C and IC RSS-210 limits.

The spacing between the peripherals was 10 centimeters.

The EUT was placed on the center of the back edge on the test table.

6.3 Test Equipment List and Details

Manufacturer	Description	Model Number	Serial Number	Cal. Date
Mini-Circuits	Amplifier, Pre	ZKL-2	7786100643	2009-03-03
IFI	Amplifier, Traveling Wave Tube	ST181-20	E012-0101	2009-12-04
Sunol Sciences	Combination Antenna	JB1 Antenna	A020106-3	2009-05-05
Agilent	Analyzer, Spectrum	8565EC	3946A00131	2009-04-20

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

6.4 Test Procedure

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

According to §15.231, Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emission, based on the average value of the measured emissions. As an alternative, compliance with the limits may be based on the use of measurement instrumentation with a CISPR quasi-peak detector.

6.5 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 -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude –Limit

6.6 Test Environmental Conditions

Temperature:	21 °C
Relative Humidity:	56 %
ATM Pressure:	100.8 kPa

**The testing was performed by Kevin Li on 2009-12-09*

6.7 Summary of Test Results

According to the data in the following table, the EUT complied with the FCC §15.231(b) and IC RSS-210 §A1.1.2 standards and had the worst margin reading of:

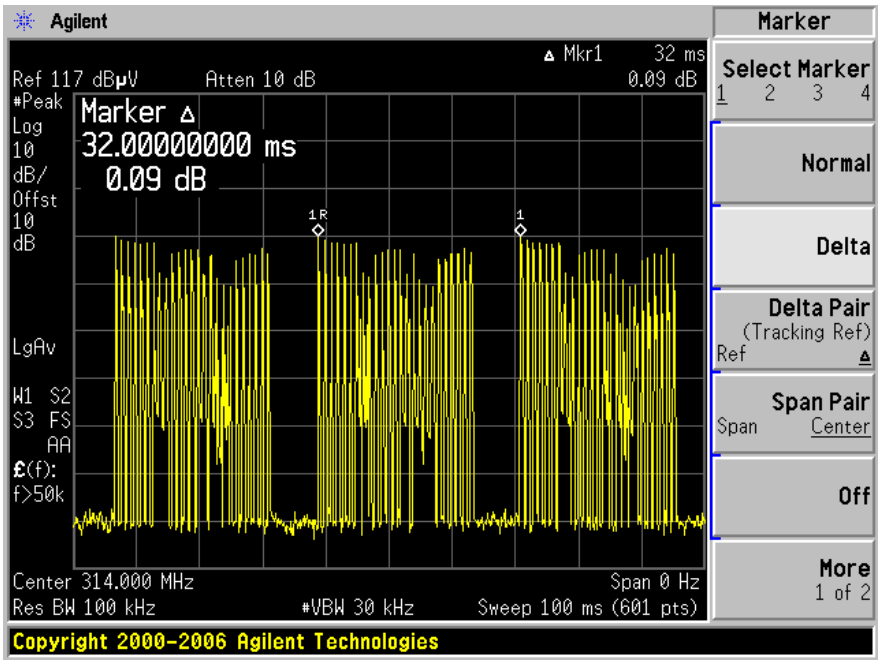
-0.62 dB at 1260 MHz in the HORIZONTAL polarization.

Freq. (MHz)	S.A. Reading (dBuV)	Table Azimuth (Degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Duty Cycle Factor (dB)	Cord. Reading (dBuV/m)	FCC & IC		Remarks
			Height (cm)	Polar (V/H)	Factor (dB/m)					Limit (dBuV/m)	Margin (dB)	
315	74.18	315	100	V	13.7	0.18	21.32	0	66.74	95.6	-28.86	PK
315	92.56	272	100	H	13.7	0.18	21.32	0	85.12	95.6	-10.48	PK
315	74.18	315	100	V	13.7	0.18	21.32	-10.5	56.24	75.6	-19.36	AV
315	92.56	272	100	H	13.7	0.18	21.32	-10.5	74.62	75.6	-0.98	AV
630	64.64	170	100	V	13.7	0.18	21.32	0	57.2	75.6	-18.4	PK
630	72.3	250	100	H	13.7	0.18	21.32	0	64.86	75.6	-10.74	PK
630	64.64	170	100	V	13.7	0.18	21.32	-10.5	46.7	55.6	-8.90	AV
630	72.3	250	100	H	13.7	0.18	21.32	-10.5	54.36	55.6	-1.24	AV
945	56.07	340	100	V	22.3	0.33	19.86	0	58.84	75.6	-16.76	PK
945	62.64	21	100	H	22.3	0.33	19.86	0	65.41	75.6	-10.19	PK
945	56.07	340	100	V	22.3	0.33	19.86	-10.5	48.34	55.6	-7.26	AV
945	62.64	21	100	H	22.3	0.33	19.86	-10.5	54.91	55.6	-0.69	AV
1260	71.51	157	100	V	25	4.10	37	0	63.61	74	-10.39	PK
1260	71.78	275	100	H	25	4.10	37	0	63.88	74	-10.12	PK
1260	71.51	157	100	V	25	4.10	37	-10.5	53.11	54	-0.89	AV
1260	71.78	275	100	H	25	4.10	37	-10.5	53.38	54	-0.62	AV
1890	57.02	163	100	V	28	5.16	35.92	0	54.26	75.6	-21.34	PK
1890	62.73	153	100	H	28	5.16	35.92	0	59.97	75.6	-15.63	PK
1890	57.02	163	100	V	28	5.16	35.92	-10.5	43.76	55.6	-11.84	AV
1890	62.73	153	100	H	28	5.16	35.92	-10.5	49.47	55.6	-6.13	AV

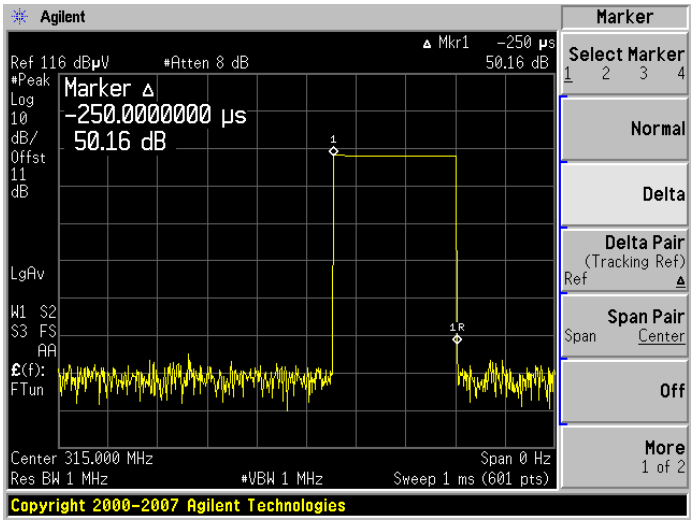
Note: Average = Peak + Duty Cycle

Duty Cycle Plots:

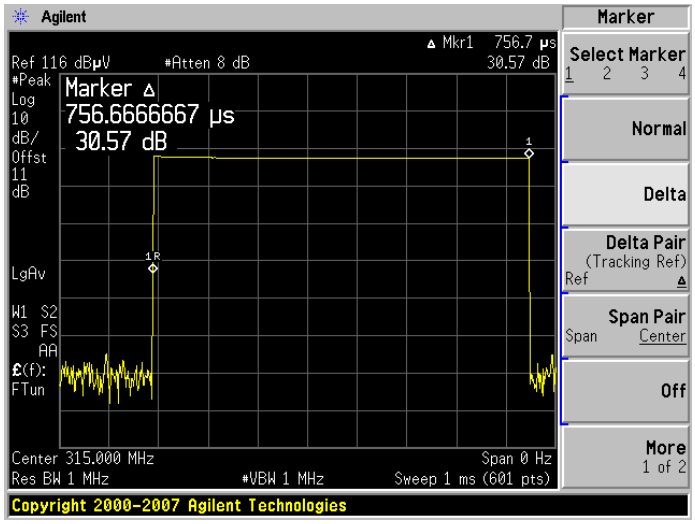
Tp



Ton-1



Ton-2



Duty Cycle Factor = $20 \log_{10}(\text{Ton/Tp}) = 20 \log_{10}[(20*0.25+6*0.756)/32\text{ms}] = -10.5$ dB

7 FCC §15.231(c) & IC RSS-210 §A1.1.3 – EMISSIONS BANDWIDTH

7.1 Applicable Standard

As per FCC §15.231(c), the bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

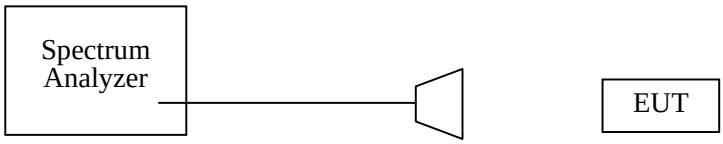
As per IC RSS-210 A1.1.3, For the purpose of Section A1.1, the 99% bandwidth shall be no wider than 0.25% of the centre frequency for devices operating between 70-900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the centre frequency.

7.2 Test Equipment List and Details

Manufacturer	Description	Model Number	Serial Number	Calibration Date
Agilent	Analyzer, Spectrum	E4440A	MY44303352	2009-04-27

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

7.3 Test Setup Diagram



7.4 Test Environmental Conditions

Temperature:	21 °C
Relative Humidity:	55 %
ATM Pressure:	100.8 kPa

** The testing was performed by Kevin Li on 2009-12-14*

7.5 Test Result

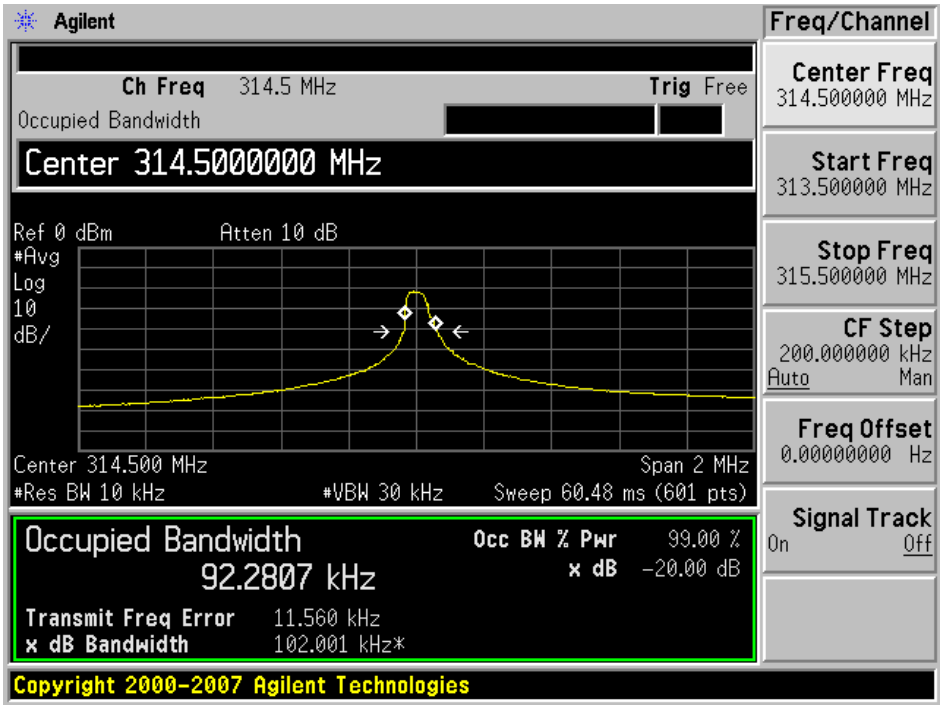
Fund. Frequency (MHz)	20 dB Bandwidth Emission (kHz)	FCC Limit (kHz)	Result
314.5	102.001	787.5	Compliant

Note: Limit = Fundamental Frequency X 0.25% = 315.00 MHz×0.25%= 787.5 kHz

Fund. Frequency (MHz)	99% Bandwidth Emission (kHz)	IC Limit (kHz)	Result
314.5	92.2807	787.5	Compliant

Note: Limit = Fundamental Frequency X 0.25% = 315.00 MHz×0.25%= 787.5 kHz

Please refer to the following plot for test result details



8 IC RSS-210 §2.6, RSS-GEN §4.10-RECEIVER SPURIOUS EMISSIONS

8.1 Applicable Standard

According to RSS-Gen §4.10, the receiver shall be operated in the normal receive mode near the mid-point of the band over which the receiver is designed to operate.

Unless otherwise specified in the applicable RSS, the radiated emission measurement is the standard measurement method (with the device's antenna in place) to measure receiver spurious emissions.

For either method, the search for spurious emissions shall be from the lowest frequency internally generated or used in the receiver (e.g. local oscillator, intermediate or carrier frequency), or 30 MHz, whichever is the higher, to at least 3 times the highest tunable or local oscillator frequency, whichever is the higher, without exceeding 40 GHz.

For emissions below 1 GHz, measurements shall be performed using a CISPR quasi-peak detector and the related measurement bandwidth. As an alternative to CISPR quasi-peak measurement, compliance with the emission limit can be demonstrated using measuring equipment employing a peak detector with the same measurement bandwidth as that for CISPR quasi-peak measurements. Above 1 GHz, measurements shall be performed using an average detector and a resolution bandwidth of 300 kHz to 1 MHz.

According to RSS-210 §2.6, Tables 2 and 3 show the general field strength limits of unwanted emissions, where applicable, for transmitters and receivers operating in accordance with the provisions specified in this RSS. Transmitters whose wanted emissions are also within the limits shown in Tables 2 and 3 may operate in any of the frequency bands of Tables 2 and 3, other than the restricted bands of Table 1 and the TV bands, and shall be certified under RSS-210.

Table 2: General Field Strength Limits for Transmitters and Receivers at Frequencies above 30 MHz **(Note)**

Frequency (MHz)	Field Strength Microvolts/m at 3 meters (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

Note: Transmitting devices are not permitted in Table 1 bands or in TV bands (54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz, and 614-806 MHz). Prohibition of operation in TV bands does not apply to momentary devices, or to medical telemetry devices in the band 174-216 MHz, and to perimeter protection systems in the bands 54-72 and 76-88 MHz. The perimeter protection devices are to meet Table 3 field strengths limits.

Table 3: General Field Strength Limits for Transmitters at Frequencies below 30 MHz (Transmit)

Frequency (fundamental or spurious)	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/377F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	24,000/377F (F in kHz)	30
1.705-30 MHz	30	N/A	30

Note: The emission limits for the bands 9-90 kHz and 110-490 kHz are based on measurements employing an average detector.

8.2 Test Procedure

The radiated emissions tests were performed in the 3 meter chamber, using the setup in accordance with ANSI C63.4-2003.

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.

8.3 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 for Class B. The equation for margin calculation is as follows:

Margin = Corrected Amplitude - Class B Limit

8.4 Test Equipment List and Details

Manufacturer	Description	Model Number	Serial Number	Cal. Date
HP	Pre amplifier	8447D	2944A06639	2009-06-05
Sunol Science Corp.	Combination Antenna	JB1 Antenna	A103105-3	2009-03-25
Agilent	Spectrum Analyzer	E4440A	MY44303352	2009-04-27
A. H. Systems	Antenna, Horn	SAS-200/571	261	2009-09-23
HP	Pre amplifier	8447D	2944A06639	2009-06-05

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

8.5 Test Environmental Conditions

Temperature:	18~21 °C
Relative Humidity:	30~35 %
ATM Pressure:	101.2-102.2kPa

**The testing was performed by Kevin Li from 2009-12-15.*

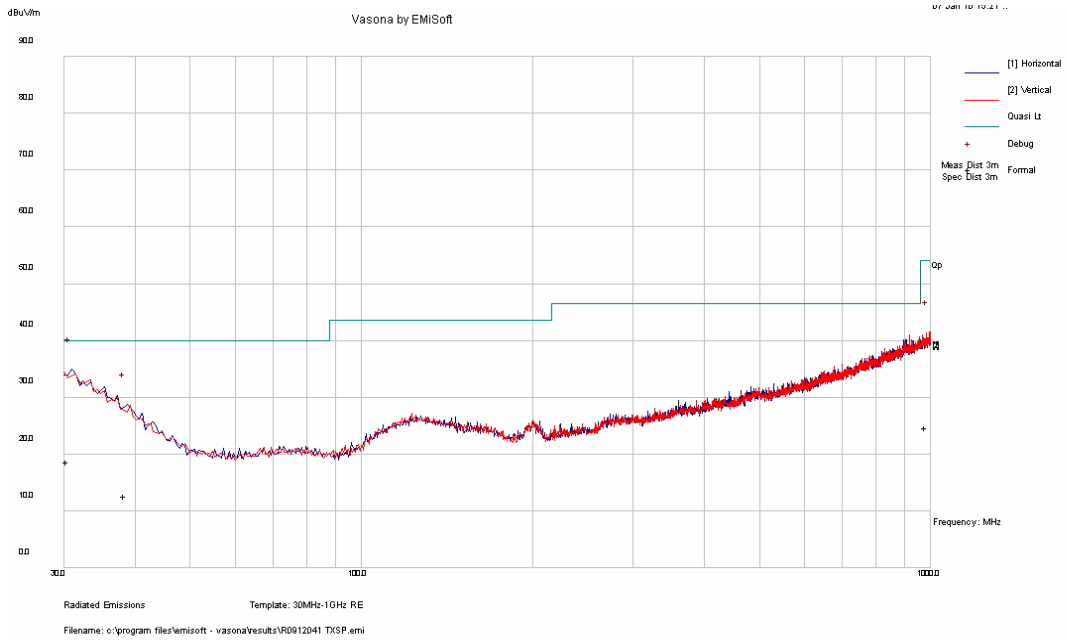
8.6 Summary of Test Results

According to the test data,, the EUT complied with the with the RSS-210, with the closest margins from the limit listed below:

Unwanted Emissions and Receiving Spurious Emission, (30-1000 MHz):

Mode: Receiving			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Range (MHz)**
-21.38	30.83896	Vertical	30 to 1000

8.7 Radiated Spurious Emission Data and Plot



Quasi-Peak Measurements

Frequency (MHz)	**Corrected Amplitude (dBµV/m)**	**Antenna Height (cm)**	**Antenna Polarity (H/V)**	**Turntable Azimuth (degrees)**	**Limit (dBµV/m)**	**Margin (dB)**
30.83896	18.62	100	V	182	40	-21.38
38.83416	12.62	98	V	176	40	-27.38
994.1022	24.68	237	H	278	54	-29.32