



FCC PART 15B TEST AND MEASUREMENT REPORT



For

AOR USA, INC.

20655 S. Western Ave., Suite 112,

Torrance, CA 90501, USA

FCC ID: NVJAR5001D
Model: AR5001D

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Report Type: Original Report | Product Type: Digital Processing Communications Receiver |
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DOCUMENT REVISION HISTORY

| Revision Number | Report Number | Description of Revision | Date of Revision |
|-----------------|---------------|-------------------------|------------------|
| 0 | R1207099 | Original Report | 2012-08-01 |

1 General Information

1.1 Product Description for Equipment under Test (EUT)

This test and measurement report has been prepared on behalf of *AOR USA, INC* on their product model, *AR5001D*, *FCC ID: NVJAR5001D* or the EUT (Equipment Under Test) as referred to in the rest of this report. The EUT is a Digital Processing Communications Receiver, frequency range from 40 kHz to 3.15 GHz except US Cellular Frequencies.

1.2 Mechanical Description of EUT

The EUT measures approximately 30cm (L) x 21m (W) x 9cm (H) and weighs approximately 5 kg.

The data gathered are from a production sample provided by the manufacturer, serial number: 09350141

1.3 Objective

This report is prepared on behalf of *AOR USA, INC* in accordance with Part 15, Subparts A and B of the Federal Communications Commission rules.

The objective is to determine compliance with Part 15 of the FCC Rules Class B limits for conducted and radiated emission requirements for Information Technology Equipment as well as FCC 15.121 for additional cellular band rejection requirement for scanning receiver.

1.4 Related Submittal(s)/Grant(s)

N/A

1.5 Test Methodology

All measurements contained in this report were conducted in accordance 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 tests were performed at Bay Area Compliance Laboratories Corp.

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.: R-3729, C-4176, G-469, and T-1206. 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 System Test Configuration

2.1 Justification

The EUT was configured in accordance to ANSI C63.4-2003 Standards.

2.2 EUT Exercise Software

EUT was set to scanning mode, FM mode, AM mode, CW mode and SSB mode etc. During the test the signal from the signal generator with the modulated/CW signal was send to the antenna port of the EUT.

2.3 Equipment Modifications

N/A

2.4 Local Support Equipment

| Manufacturers | Descriptions | Models | Serial Numbers |
|---------------|------------------|--------|----------------|
| HP | Signal Generator | 8648C | 3847M001143 |

2.5 EUT Internal Configuration Details

| Manufacturers | Descriptions | Models | Serial Numbers |
|---------------|------------------|--------|----------------|
| AOR | Controller Block | AR2300 | 071109-3 |
| AOR | Decoder | AR2300 | 080210-5 |

2.6 External I/O Cabling List and Details

| Cable Descriptions | Length (m) | From | To |
|--------------------|------------|--------------|------------------|
| BNC Cable | 3 | EUT ANT 1 | Signal Generator |
| BNC Cable | 3 | EUT ANT 2/HF | Signal Generator |

2.7 Power Supply List and Details

| Manufacturer | Description | Model | Serial Number |
|--------------|--------------|--------|---------------|
| SINPRO | Power Supply | AA2300 | 057369470938 |

3 Summary of Test Results

| FCC Rules | Descriptions of Test | Result (s) |
|-----------|-------------------------------------------|------------|
| §15.107 | Conducted Emissions | Compliant |
| §15.109 | Radiated Spurious Emissions | Compliant |
| §15.121 | Scanning Receiver Cellular Band Rejection | Compliant |

4 FCC §15.107 – AC Line Conducted Emissions

4.1 Applicable Standards

As per FCC §15.107: Conducted Limits

(a) Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Table 1- Limits for conducted disturbance at the mains ports of class B ITE

| Frequency range (MHz) | Limits (dB μ V) | |
|--------------------------|---------------------|----------|
| | Quasi-peak | Average |
| 0.15 to 0.50 | 66 to 56 | 56 to 46 |
| 0.5 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |

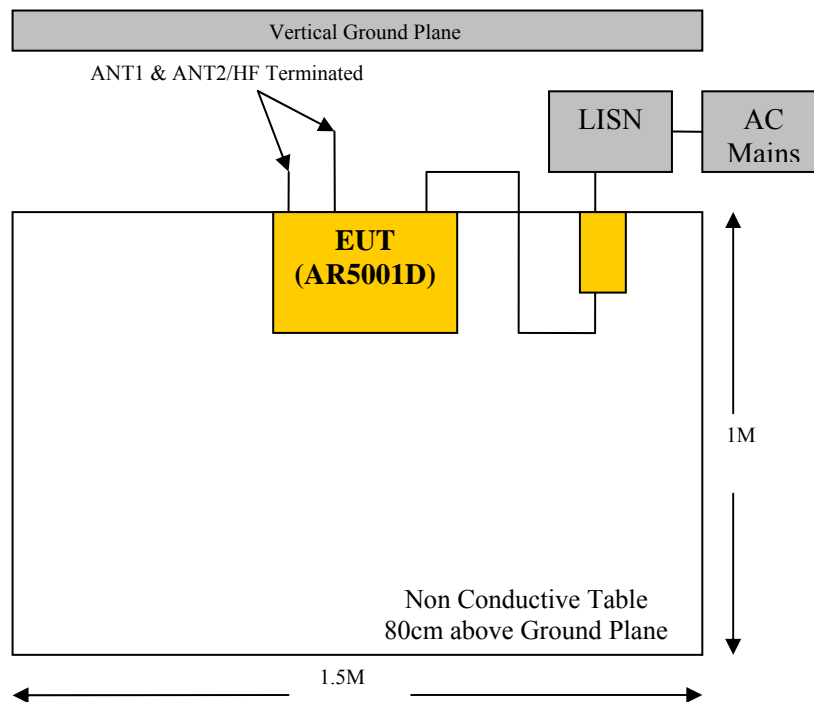
4.2 EUT Setup

The conducted emissions tests were performed in the 5-meter test chamber, using the setup in accordance with FCC Part 15 measurement procedures. The specifications used were in accordance with FCC Part 15B, Class B limits.

The spacing between the peripherals was 10 cm.
The external I/O cables were draped along the test table and bundled as required.

The EUT was connected to a 120 V, 60 Hz AC line power source and the EUT was set to scanning mode represent the worst case during the testing for conducted emissions.

4.3 Test Setup Block Diagram



4.4 Test Procedure

During the conducted emissions test, the power cord of the EUT was connected to the main outlet of the LISN.

Maximization procedure was performed on the six (6) highest emission readings from the EUT.

4.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Cable Loss (CL) and the Attenuator Factor (Atten) to indicated Amplitude (Ai) reading. The basic equation is as follows:

$$CA = A_i + CL + \text{Atten}$$

For example, a corrected amplitude of 46 dBuV = Indicated Reading (32.5 dBuV) + Cable Loss (3.5 dB) + Attenuator (10 dB)

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

$$\text{Margin} = \text{Corrected Amplitude} - \text{Class B Limit}$$

4.6 Test Equipment List and Details

| Manufacturers | Descriptions | Models | Serial Numbers | Calibration Dates |
|-------------------|-------------------|-------------------|--------------------|-----------------------------|
| Rohde & Schwarz | EMI Test Receiver | ESCI 1166.5950k03 | 100338 | 2011-09-14 |
| Solar Electronics | LISN | 9252-R-24-BNC | 511205 | 2012-06-25 |
| TTE | High Pass Filter | K7133 | H962-150K-50-21378 | 2012-05-30 |
| HP | Signal Generator | 8648C | 3847M001143 | 2010-11-22 ^{Note1} |

Note1: Based on a two-year calibration cycle

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

4.7 Test Environmental Conditions

| | |
|---------------------------|----------|
| Temperature: | 22° C |
| Relative Humidity: | 44% |
| ATM Pressure: | 102.1kPa |

Testing was performed by Charles Vergonio on 2012-07-12 in 10 meter chamber1.

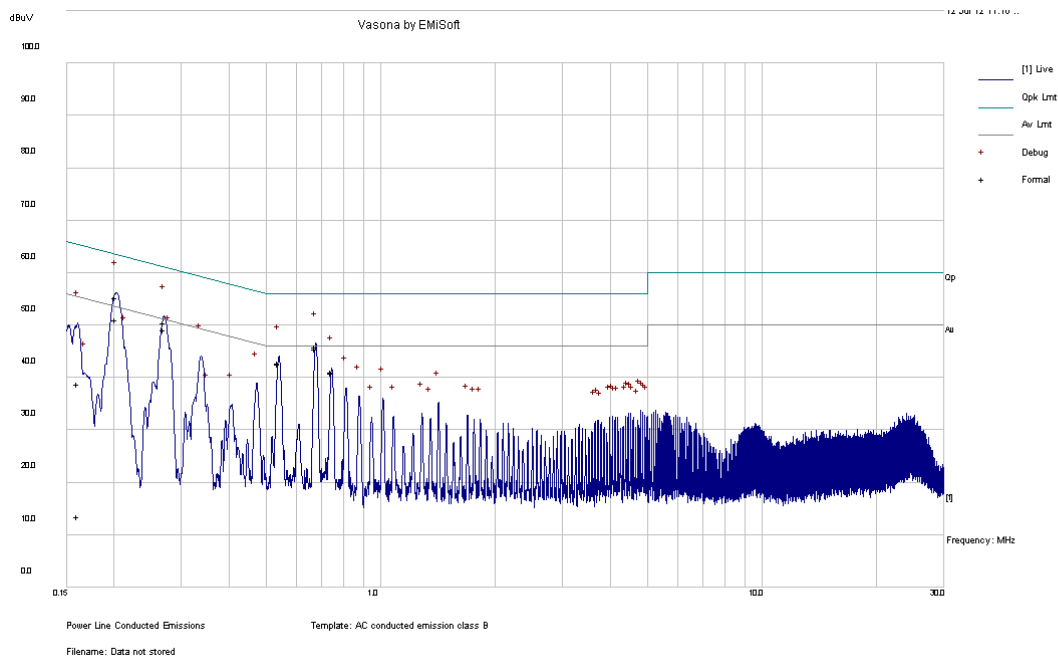
4.8 Summary of Test Results

According to the recorded data, the EUT complied with FCC Part 15B Class B limits, and had the worst margin reading of:

| Mode: 120 V/60 Hz – Scanning Mode (Worst Case) | | | |
|------------------------------------------------|-----------------|--------------------------|--------------------|
| Margin (dB) | Frequency (MHz) | Conductor (Line/Neutral) | Range (MHz) |
| -0.64 | 0.67535 | Neutral | 0.15 MHz to 30 MHz |

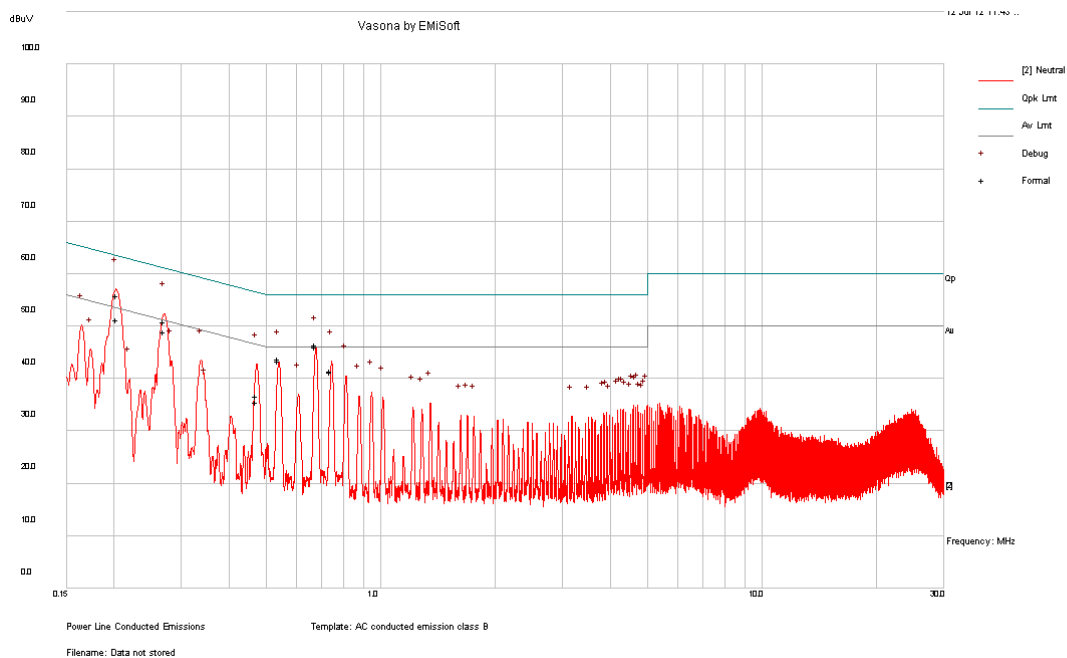
4.9 Conducted Emissions Test Plots and Data

120 V, 60 Hz – Line



| Frequency (MHz) | Corrected Amplitude (dBuV) | Conductor (Line/Neutral) | Limit (dBuV) | Margin (dB) | Detector |
|-----------------|----------------------------|--------------------------|--------------|-------------|------------|
| 0.20259 | 55.27 | Line | 63.5 | -8.24 | Quasi-Peak |
| 0.675027 | 45.54 | Line | 56 | -10.46 | Quasi-Peak |
| 0.270699 | 50.5 | Line | 61.1 | -10.60 | Quasi-Peak |
| 0.539073 | 42.69 | Line | 56 | -13.31 | Quasi-Peak |
| 0.742887 | 40.84 | Line | 56 | -15.16 | Quasi-Peak |
| 0.160514 | 38.86 | Line | 65.44 | -26.58 | Quasi-Peak |

| Frequency (MHz) | Corrected Amplitude (dBuV) | Conductor (Line/Neutral) | Limit (dBuV) | Margin (dB) | Detector |
|-----------------|----------------------------|--------------------------|--------------|-------------|----------|
| 0.675027 | 44.91 | Line | 46 | -1.09 | Average |
| 0.270699 | 49.09 | Line | 51.1 | -2.01 | Average |
| 0.20259 | 51.13 | Line | 53.5 | -2.38 | Average |
| 0.539073 | 42.88 | Line | 46 | -3.12 | Average |
| 0.742887 | 41.06 | Line | 46 | -4.94 | Average |
| 0.160514 | 13.57 | Line | 55.44 | -41.87 | Average |

120 V, 60 Hz – Neutral

| Frequency (MHz) | Corrected Amplitude (dBuV) | Conductor (Line/Neutral) | Limit (dBuV) | Margin (dB) | Detector |
|-----------------|----------------------------|--------------------------|--------------|-------------|------------|
| 0.202968 | 55.91 | Neutral | 63.49 | -7.58 | Quasi-Peak |
| 0.271113 | 50.82 | Neutral | 61.08 | -10.26 | Quasi-Peak |
| 0.67535 | 45.04 | Neutral | 56 | -10.96 | Quasi-Peak |
| 0.741948 | 41.32 | Neutral | 56 | -14.68 | Quasi-Peak |
| 0.540081 | 43.47 | Neutral | 56 | -12.53 | Quasi-Peak |
| 0.472836 | 36.68 | Neutral | 56.46 | -19.79 | Quasi-Peak |

| Frequency (MHz) | Corrected Amplitude (dBuV) | Conductor (Line/Neutral) | Limit (dBuV) | Margin (dB) | Detector |
|-----------------|----------------------------|--------------------------|--------------|-------------|----------|
| 0.67535 | 45.36 | Neutral | 46 | -0.64 | Average |
| 0.271113 | 49.01 | Neutral | 51.08 | -2.07 | Average |
| 0.202968 | 51.26 | Neutral | 53.49 | -2.23 | Average |
| 0.540081 | 43.7 | Neutral | 46 | -2.30 | Average |
| 0.741948 | 41.54 | Neutral | 46 | -4.46 | Average |
| 0.472836 | 35.58 | Neutral | 46.46 | -10.89 | Average |

5 FCC §15.109 – Radiated Emissions

5.1 Applicable Standard

As per FCC §15.109: Radiated Emission Limits

(a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

| Frequency (MHz) | Field Strength ($\mu\text{V/m}$) |
|--------------------|---------------------------------------|
| 30-88 | 100 |
| 88-216 | 150 |
| 216-960 | 200 |
| Above 960 | 500 |

(g) As an alternative to the radiated emission limits shown in paragraphs (a) and (b) of this section, digital devices may be shown to comply with the standards contained in Third Edition of the International Special Committee on Radio Interference (CISPR), Pub. 22, “Information Technology Equipment—Radio Disturbance Characteristics—Limits and Methods of Measurement.”

Note: The CISPR 22 §6 Standard, Class B limits are applied to the test data hereinafter.

5.2 Test Setup

The radiated emissions tests were performed in the 10-meter test chamber, using the setup in accordance with ANSI C63.4-2003 measurement procedures. The specifications used were in accordance with FCC 15.109 Class B limits.

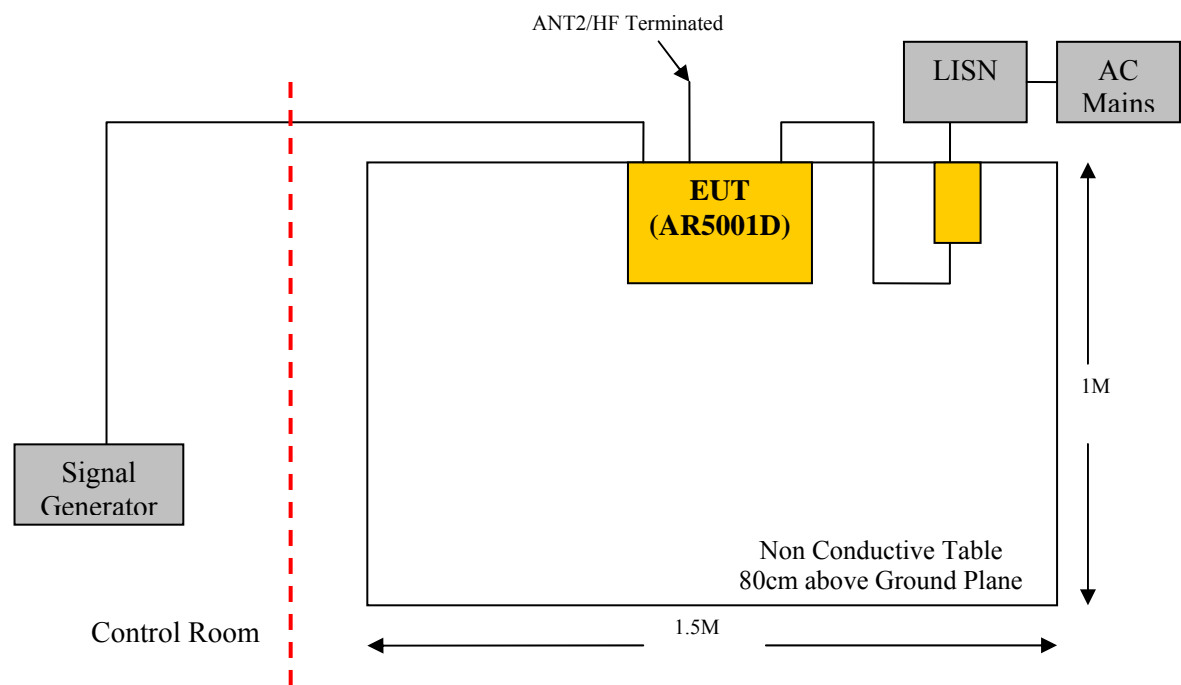
The spacing between the peripherals was 10 cm.

The external I/O cables were draped along the test table and bundled as required.

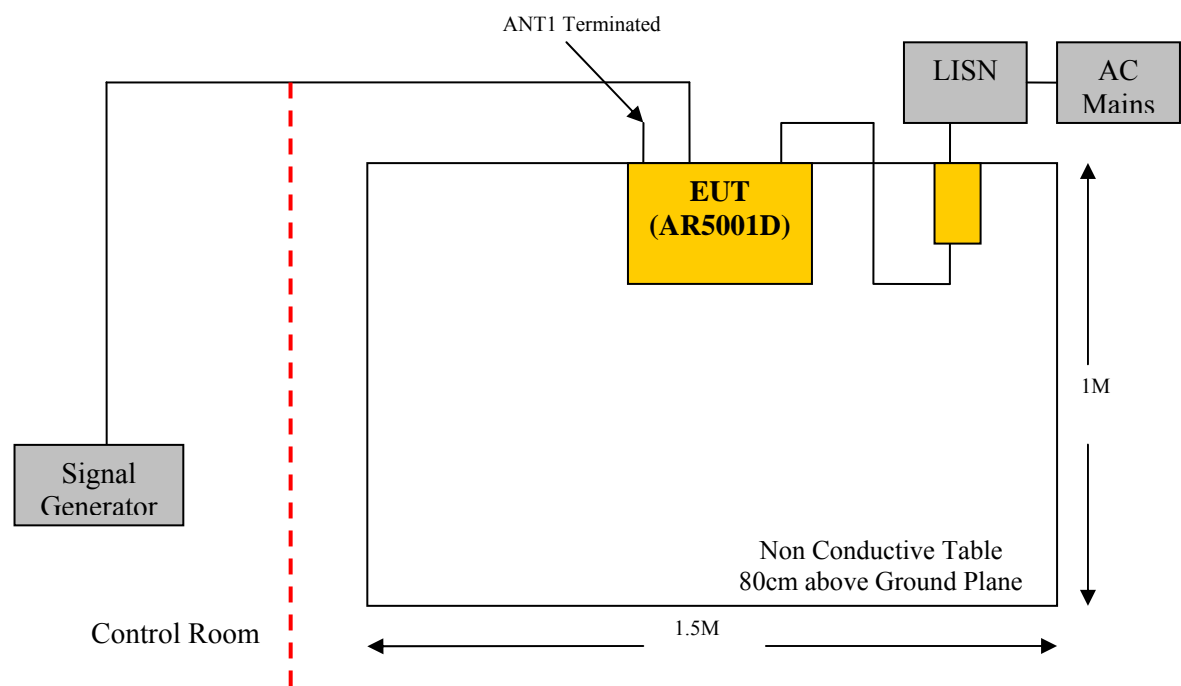
The EUT was connected to a 120 V, 60 Hz AC line power source and the EUT was set to all the possibility scanning mode during the test including AM mode, FM mode(Below 25MHz), FM mode (Above 25MHz), CW mode (Below 25MHz), CW mode (Above 25Mhz), SSB mode and scanning mode.

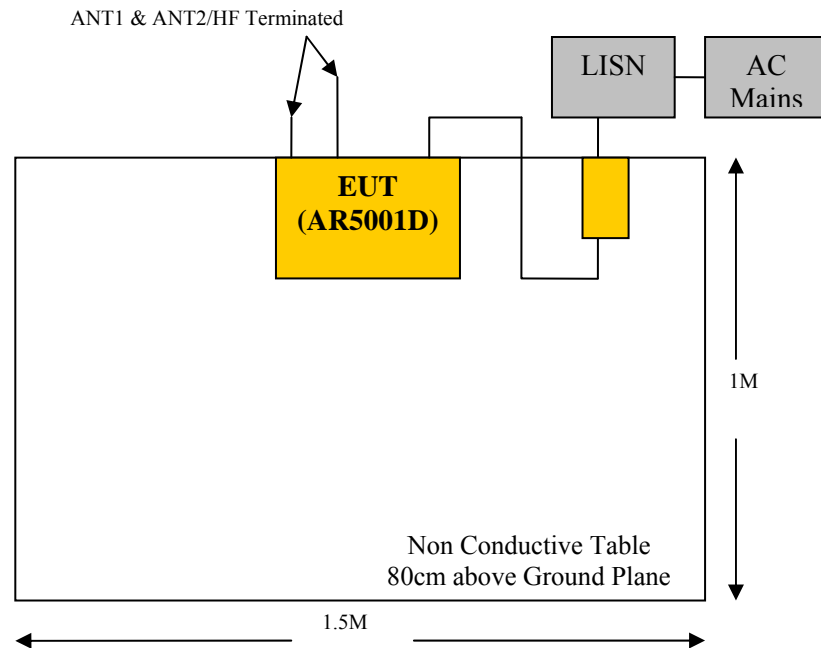
5.3 Test Setup Block Diagram

Mode: FM, CW & SSB Modulation Mode



Mode: AM, FM & CW Modulation Mode



Mode: Scanning Mode**5.4 Test Procedure**

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

All data was recorded in the peak detection mode. Quasi-peak readings were performed only when an emission was found to be marginal (within -4 dB of specification limits).

5.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) to indicated Amplitude (Ai) reading. The basic equation is as follows:

$$CA = Ai + AF + CL + Atten - Ga$$

For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 dB)

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

$$\text{Margin} = \text{Corrected Amplitude} - \text{Class B Limit}$$

5.6 Test Equipment List and Details

| Manufacturers | Descriptions | Models | Serial Numbers | Calibration Dates |
|--------------------|---------------------|----------------------|----------------|-----------------------------|
| Hewlett Packard | Pre-amplifier | 8447D | 2944A07030 | 2012-04-11 |
| Rohde & Schwarz | EMI Test Receiver | ESCI 1166.5950K03 | 100044 | 2012-04-14 |
| Sunol Science Corp | System Controller | SC99V | 122303-1 | N/R |
| Sunol Science Corp | Combination Antenna | JB3 | A020106-2 | 2011-08-10 |
| HP | Pre-amplifier | 8449B | 3147A00400 | 2012-02-03 |
| Agilent | Spectrum Analyzer | E4440A | MY44303352 | 2012-05-11 |
| A.R.A Inc. | Horn antenna | DRG-1181A | 1132 | 2012-01-04 |
| HP | Signal Generator | 8648C | 3847M001143 | 2010-11-22 ^{Note1} |

Note1: Based on a two-year calibration cycle

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

5.7 Test Environmental Conditions

| | |
|---------------------------|----------------|
| Temperature: | 22-23° C |
| Relative Humidity: | 43-44% |
| ATM Pressure: | 102.1-101.3kPa |

Testing was performed by Charles Vergonio on 2012-07-12 to 2012-07-13 in 10 meter chamber1.

5.8 Summary of Test Results

According to the recorded data, the EUT complied with FCC §15.109 Standard, Class B limits, and had the worst margin reading of:

Scanning Mode:

| Mode: 30 MHz to 1 GHz | | | |
|-----------------------|-----------------|------------------------------------|----------------|
| Margin (dB) | Frequency (MHz) | Polarization (Horizontal/Vertical) | Range (MHz) |
| -17.74 | 999.488 | Horizontal | 30 to 1000 MHz |

| Mode: Above 1 GHz | | | |
|-------------------|-----------------|------------------------------------|-------------------|
| Margin (dB) | Frequency (MHz) | Polarization (Horizontal/Vertical) | Range (MHz) |
| -8.49 | 14895.07 | Horizontal | 1000 to 15000 MHz |

AM Mode:

| Mode: 30 MHz to 1 GHz | | | |
|-----------------------|-----------------|------------------------------------|----------------|
| Margin (dB) | Frequency (MHz) | Polarization (Horizontal/Vertical) | Range (MHz) |
| -5.76 | 999.492 | Horizontal | 30 to 1000 MHz |

FM Mode 1 below 25 MHz:

| Mode: 30 MHz to 1 GHz | | | |
|-----------------------|-----------------|------------------------------------|----------------|
| Margin (dB) | Frequency (MHz) | Polarization (Horizontal/Vertical) | Range (MHz) |
| -6.19 | 999.514 | Horizontal | 30 to 1000 MHz |

FM Mode 2 above 25 MHz:

| Mode: 30 MHz to 1 GHz | | | |
|-----------------------|-----------------|------------------------------------|----------------|
| Margin (dB) | Frequency (MHz) | Polarization (Horizontal/Vertical) | Range (MHz) |
| -4.80 | 999.518 | Horizontal | 30 to 1000 MHz |

| Mode: Above 1 GHz | | | |
|-------------------|-----------------|------------------------------------|------------------|
| Margin (dB) | Frequency (MHz) | Polarization (Horizontal/Vertical) | Range (MHz) |
| -33.96 | 1404.197 | Vertical | 1000 to 5000 MHz |

CW Mode 1 below 25 MHz:

| Mode: 30 MHz to 1 GHz | | | |
|------------------------------|----------------------------|-----------------------------------------------|------------------------|
| Margin (dB) | Frequency (MHz) | Polarization (Horizontal/Vertical) | Range (MHz) |
| -5.12 | 999.49 | Horizontal | 30 to 1000 MHz |

CW Mode 2 above 25 MHz:

| Mode: 30 MHz to 1 GHz | | | |
|------------------------------|----------------------------|-----------------------------------------------|------------------------|
| Margin (dB) | Frequency (MHz) | Polarization (Horizontal/Vertical) | Range (MHz) |
| -6.75 | 999.494 | Horizontal | 30 to 1000 MHz |

| Mode: Above 1 GHz | | | |
|--------------------------|----------------------------|-----------------------------------------------|------------------------|
| Margin (dB) | Frequency (MHz) | Polarization (Horizontal/Vertical) | Range (MHz) |
| -10.00 | 3991.953 | Horizontal | 1000 to 5000 MHz |

SSB Mode:

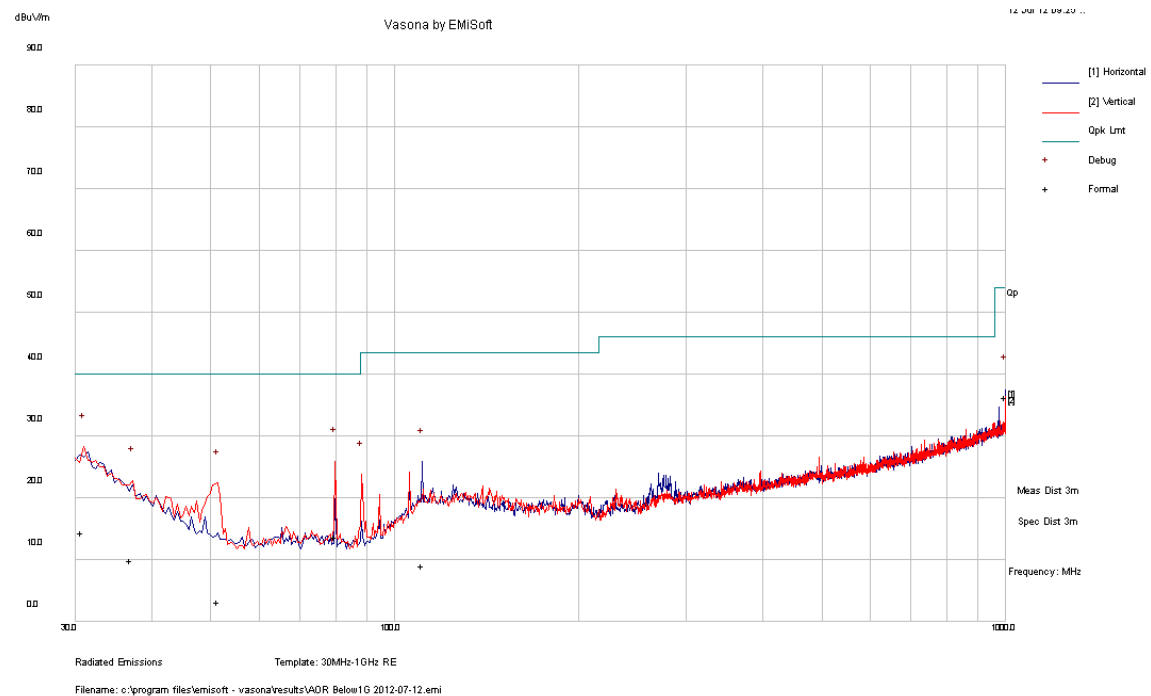
| Mode: 30 MHz to 1 GHz | | | |
|------------------------------|----------------------------|-----------------------------------------------|------------------------|
| Margin (dB) | Frequency (MHz) | Polarization (Horizontal/Vertical) | Range (MHz) |
| -16.02 | 30.26025 | Horizontal | 30 to 1000 MHz |

| Mode: Above 1 GHz | | | |
|--------------------------|----------------------------|-----------------------------------------------|------------------------|
| Margin (dB) | Frequency (MHz) | Polarization (Horizontal/Vertical) | Range (MHz) |
| -9.95 | 3992.003 | Horizontal | 1000 to 15000 MHz |

5.9 Radiated Spurious Emissions Test Plots and Data

Scanning Mode:

30-1000 MHz measured at 3 meters distance



| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Test Antenna | | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) | Detector |
|--------------------|------------------------------------|----------------|-------------------|-----------------------------------|-------------------|----------------|----------|
| | | Height (cm) | Polarity (H/V) | | | | |
| 999.488 | 36.26 | 100 | H | 57 | 54 | -17.74 | QP |
| 30.72075 | 14.48 | 283 | V | 52 | 40 | -25.52 | QP |
| 79.988 | 13.74 | 356 | V | 252 | 40 | -26.26 | QP |
| 37.063 | 9.92 | 303 | V | 174 | 40 | -30.08 | QP |
| 111.0365 | 9.13 | 105 | H | 139 | 43.5 | -34.37 | QP |
| 51.3375 | 3.21 | 206 | V | 87 | 40 | -36.79 | QP |

Vasona by EMIsoft

dBuV

90.0

80.0

70.0

60.0

50.0

40.0

30.0

20.0

10.0

0.0

1000.0

15000.0

Frequency: MHz

[1] Horizontal

[2] Vertical

Ave Lmt

+

Debug

Meas Dist 3m

Spec Dist 3m

Radiated Emissions

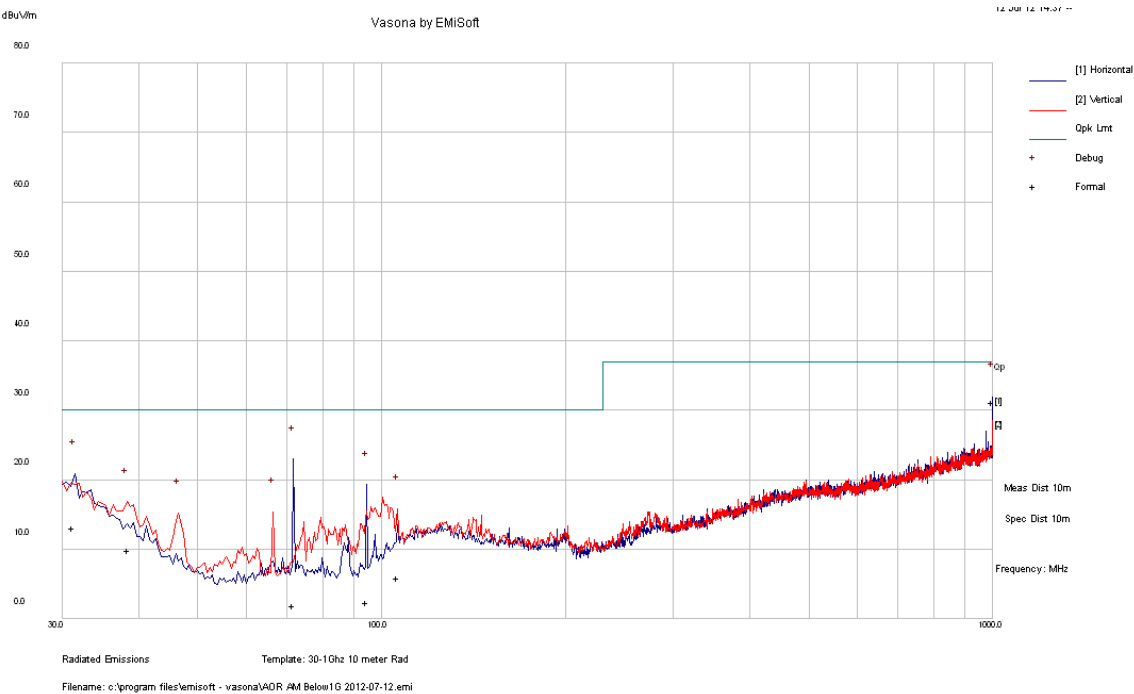
Template: 3m @ 1-18GHz

Filename: Data not stored

| Frequency (MHz) | Corrected Amplitude (dBμV/m) | Test Antenna | | Turntable Azimuth (degrees) | Limit (dBμV/m) | Margin (dB) | Detector |
|--------------------|------------------------------------|----------------|-------------------|-----------------------------------|-------------------|----------------|----------|
| | | Height (cm) | Polarity (H/V) | | | | |
| 14895.07 | 45.51 | 143 | H | 279 | 54 | -8.49 | Ave. |
| 3991.993 | 44.5 | 101 | H | 236 | 54 | -9.50 | Ave. |
| 1998.924 | 41.86 | 97 | V | 360 | 54 | -12.14 | Ave. |
| 1000 | 34.83 | 97 | H | 40 | 54 | -19.17 | Ave. |
| 3034.035 | 27.75 | 115 | V | 349 | 54 | -26.25 | Ave. |
| 2407.988 | 26.6 | 139 | V | 101 | 54 | -27.40 | Ave. |

AM Mode:

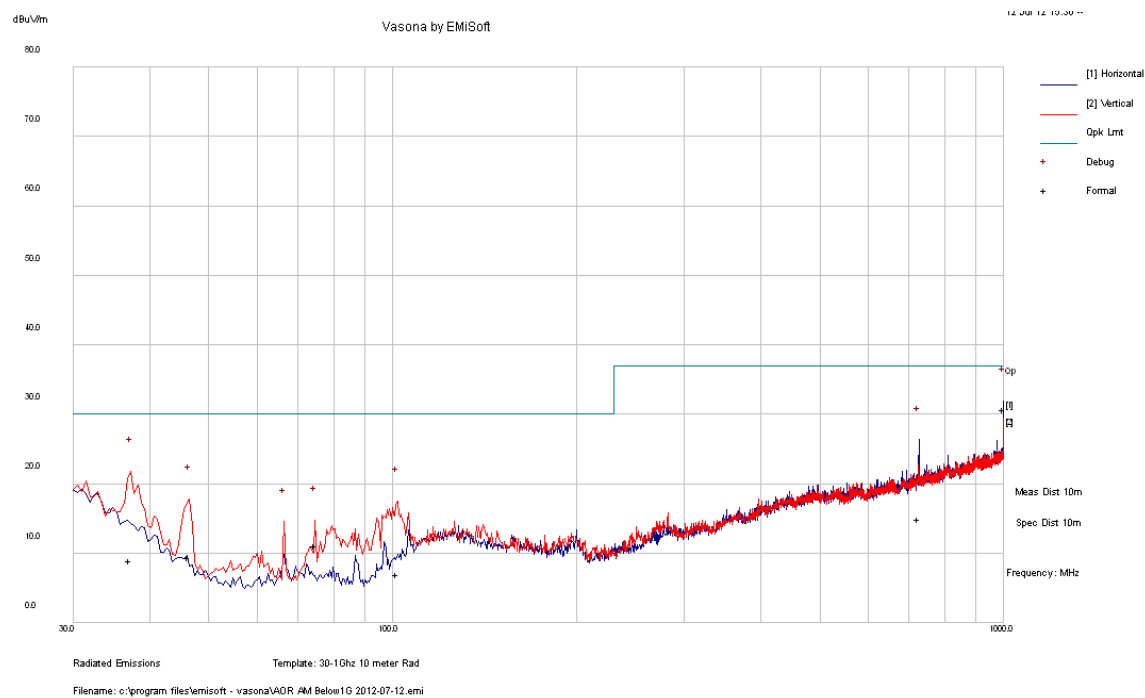
30-1000 MHz measured at 10 meters distance



| Frequency (MHz) | Corrected Amplitude (dBμV/m) | Test Antenna | | Turntable Azimuth (degrees) | Limit (dBμV/m) | Margin (dB) | Detector |
|--------------------|------------------------------------|----------------|-------------------|-----------------------------------|-------------------|----------------|----------|
| | | Height (cm) | Polarity (H/V) | | | | |
| 999.492 | 31.24 | 96 | H | 88 | 37 | -5.76 | QP |
| 31.28525 | 13.18 | 109 | H | 126 | 30 | -16.82 | QP |
| 38.46575 | 9.87 | 232 | V | 311 | 30 | -20.13 | QP |
| 106.229 | 5.89 | 113 | V | 68 | 30 | -24.11 | QP |
| 94.644 | 2.35 | 98 | H | 302 | 30 | -27.65 | QP |
| 71.651 | 1.96 | 111 | H | 248 | 30 | -28.04 | QP |

FM Mode 1:

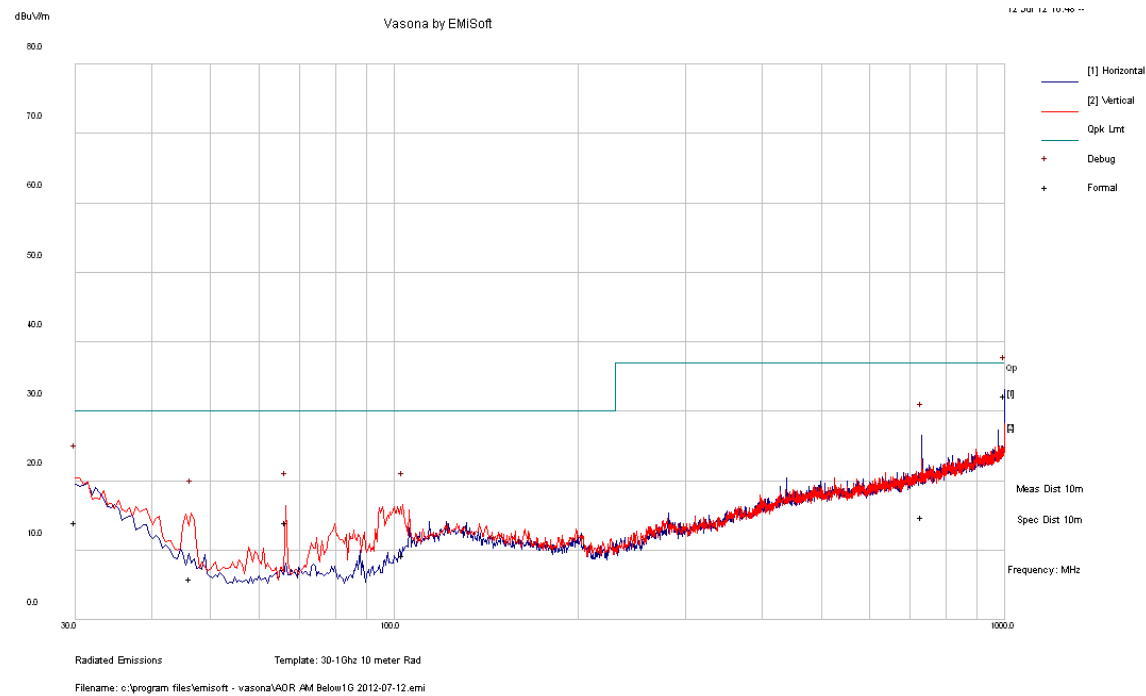
30-1000 MHz measured at 10 meters distance



| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Test Antenna | | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) | Detector |
|--------------------|------------------------------------|----------------|-------------------|-----------------------------------|-------------------|----------------|----------|
| | | Height (cm) | Polarity (H/V) | | | | |
| 999.514 | 30.81 | 103 | H | 90 | 37 | -6.19 | QP |
| 74.5215 | 11.06 | 401 | V | 264 | 30 | -18.94 | QP |
| 46.40575 | 9.36 | 104 | V | 348 | 30 | -20.64 | QP |
| 37.1835 | 8.98 | 361 | V | 32 | 30 | -21.02 | QP |
| 726.058 | 14.87 | 352 | H | 114 | 37 | -22.13 | QP |
| 101.5603 | 7.04 | 204 | V | 208 | 30 | -22.96 | QP |

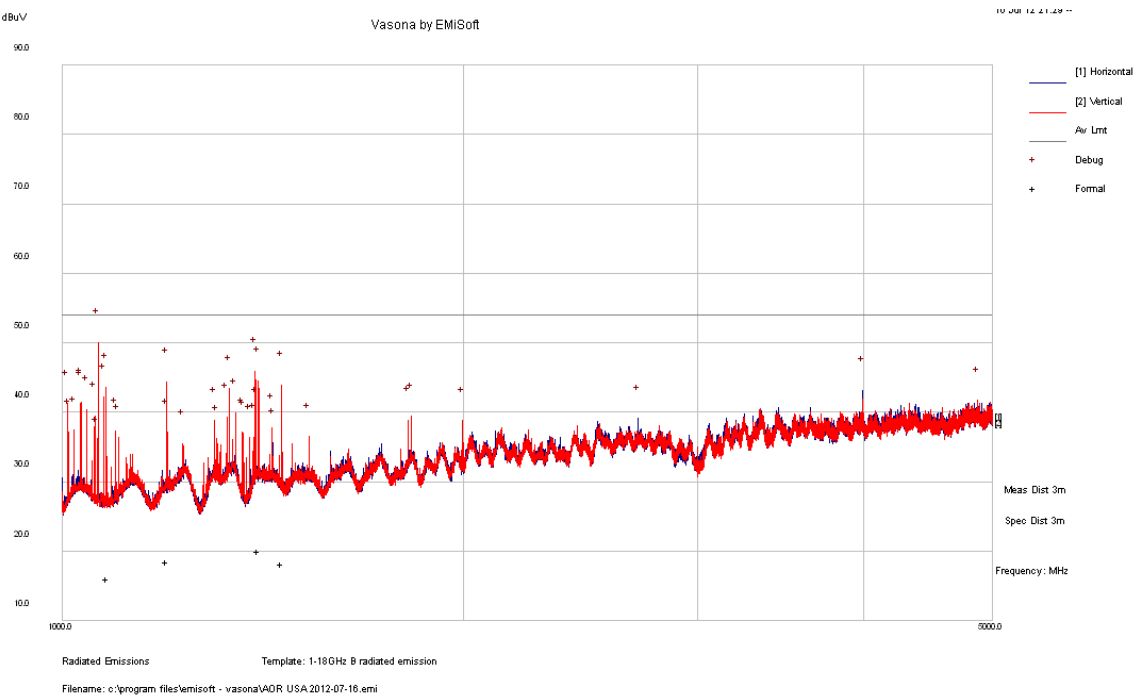
FM Mode 2:

30-1000 MHz measured at 10 meters distance



| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Test Antenna | | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) | Detector |
|--------------------|------------------------------------|----------------|-------------------|-----------------------------------|-------------------|----------------|----------|
| | | Height (cm) | Polarity (H/V) | | | | |
| 999.518 | 32.2 | 98 | H | 324 | 37 | -4.80 | QP |
| 30.00612 | 14.1 | 189 | V | 156 | 30 | -15.9 | QP |
| 66.58725 | 14.03 | 365 | V | 84 | 30 | -15.97 | QP |
| 103.4585 | 9.21 | 378 | V | 180 | 30 | -20.79 | QP |
| 731.3603 | 14.8 | 339 | H | 62 | 37 | -22.20 | QP |
| 46.33025 | 5.94 | 126 | V | 196 | 30 | -24.06 | QP |

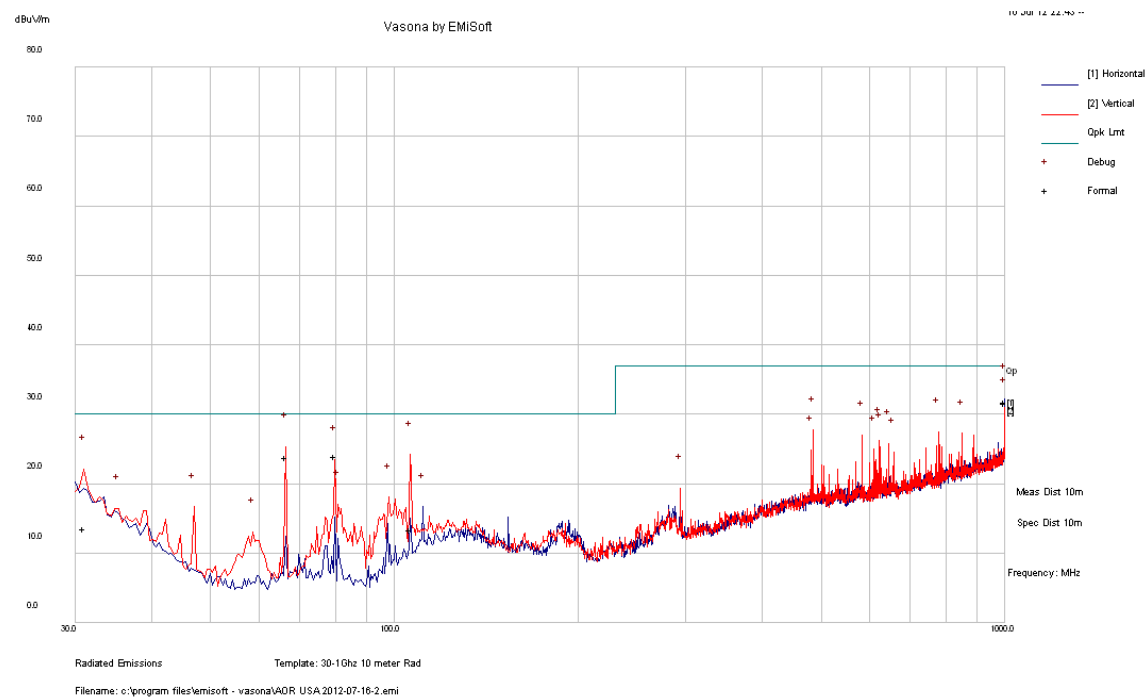
Above 1 GHz measured at 3 meters distance



| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Test Antenna | | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) | Detector |
|-----------------|------------------------------|--------------|----------------|-----------------------------|----------------|-------------|----------|
| | | Height (cm) | Polarity (H/V) | | | | |
| 1404.197 | 20.04 | 142 | V | 338 | 54 | -33.96 | Ave. |
| 1398.509 | 19.4 | 196 | V | 188 | 54 | -34.60 | Ave. |
| 1198.896 | 18.48 | 170 | V | 70 | 54 | -35.52 | Ave. |
| 1461.046 | 18.27 | 138 | V | 244 | 54 | -35.73 | Ave. |
| 1065.779 | 16.23 | 152 | V | 242 | 54 | -37.77 | Ave. |
| 1080.094 | 15.99 | 180 | V | 352 | 54 | -38.01 | Ave. |

CW Mode 1:

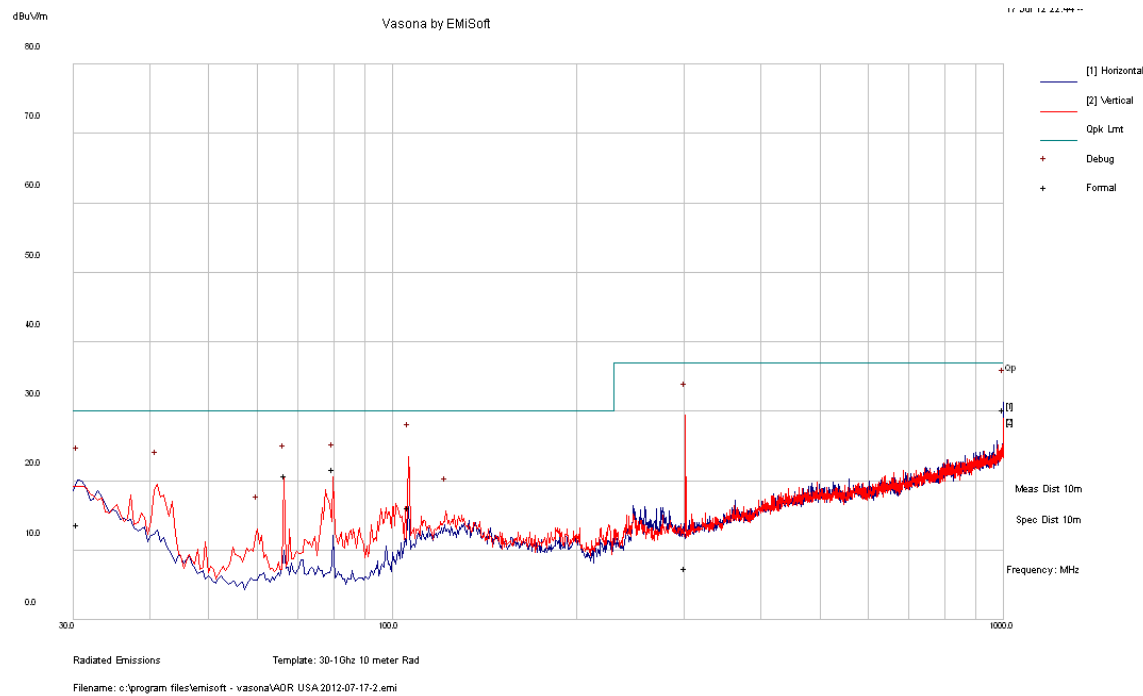
30-1000 MHz measured at 10 meters distance



| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Test Antenna | | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) | Detector |
|--------------------|------------------------------------|----------------|-------------------|-----------------------------------|-------------------|----------------|----------|
| | | Height (cm) | Polarity (H/V) | | | | |
| 999.49 | 31.88 | 98 | H | 298 | 37 | -5.12 | QP |
| 999.492 | 31.73 | 113 | H | 300 | 37 | -5.27 | QP |
| 80.00625 | 24.05 | 133 | V | 302 | 30 | -5.95 | QP |
| 66.3925 | 23.83 | 329 | V | 51 | 30 | -6.17 | QP |
| 31.012 | 13.54 | 311 | V | 210 | 30 | -16.46 | QP |
| 106.3943 | 13.35 | 142 | V | 106 | 30 | -16.65 | QP |

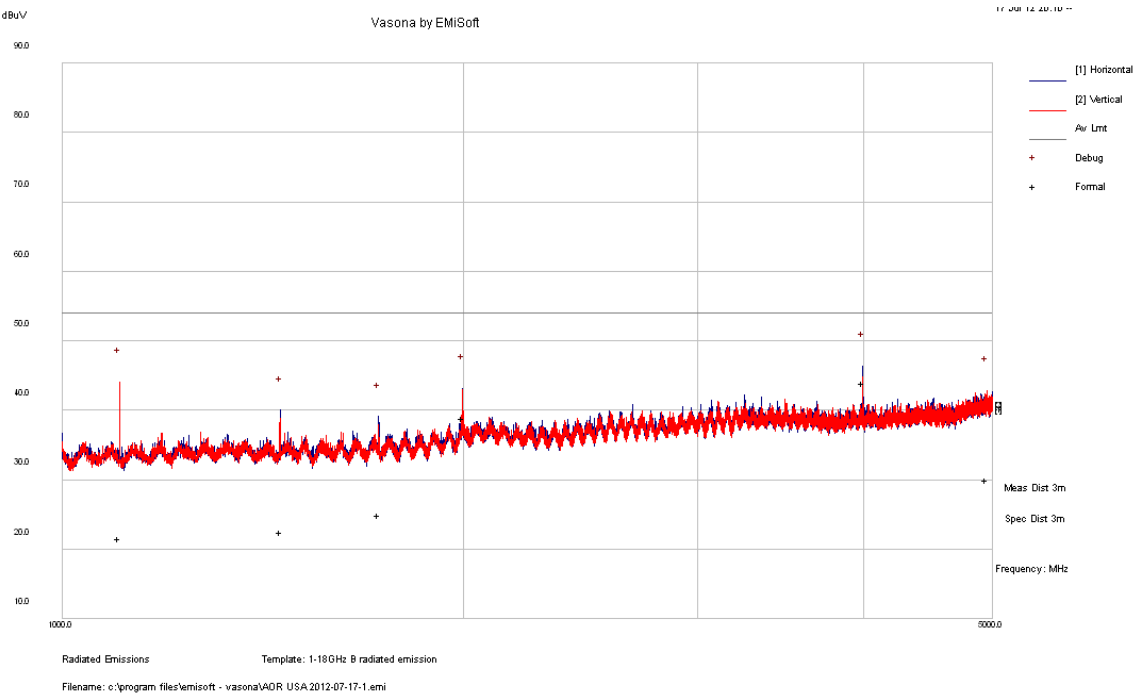
CW Mode 2:

30-1000 MHz measured at 10 meters distance



| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Test Antenna | | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) | Detector |
|--------------------|------------------------------------|----------------|-------------------|-----------------------------------|-------------------|----------------|----------|
| | | Height (cm) | Polarity (H/V) | | | | |
| 999.494 | 30.25 | 107 | H | 360 | 37 | -6.75 | QP |
| 80 | 21.62 | 281 | V | 370 | 30 | -8.38 | QP |
| 66.6155 | 20.72 | 281 | V | 62 | 30 | -9.28 | QP |
| 106.3933 | 16.13 | 383 | V | 308 | 30 | -13.87 | QP |
| 30.5125 | 13.77 | 149 | H | 8 | 30 | -16.23 | QP |
| 300.9118 | 7.43 | 315 | V | 241 | 37 | -29.57 | QP |

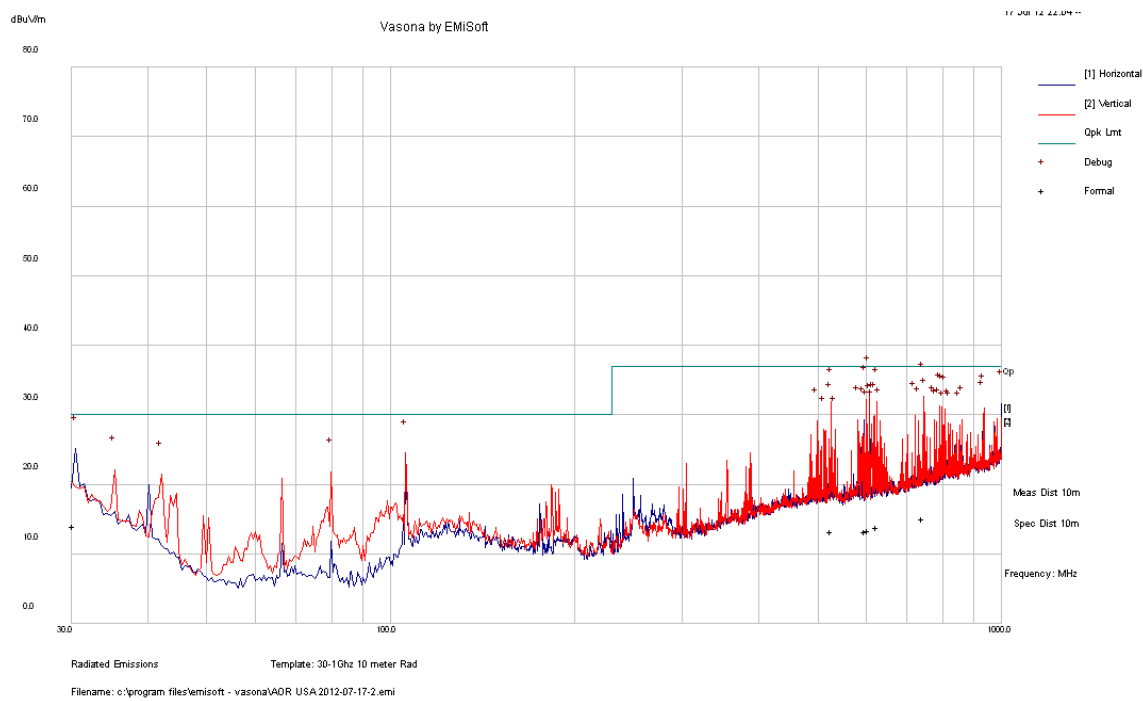
Above 1 GHz measured at 3 meters distance



| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Test Antenna | | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) | Detector |
|--------------------|------------------------------------|----------------|-------------------|-----------------------------------|-------------------|----------------|----------|
| | | Height (cm) | Polarity (H/V) | | | | |
| 3991.953 | 44 | 99 | H | 160 | 54 | -10.00 | Ave. |
| 1999.096 | 38.95 | 99 | H | 272 | 54 | -15.05 | Ave. |
| 4948.001 | 30.02 | 162 | V | 86 | 54 | -23.98 | Ave. |
| 1727.303 | 24.98 | 101 | H | 298 | 54 | -29.02 | Ave. |
| 1459.781 | 22.49 | 124 | H | 126 | 54 | -31.51 | Ave. |
| 1103.089 | 21.55 | 190 | V | 342 | 54 | -32.45 | Ave. |

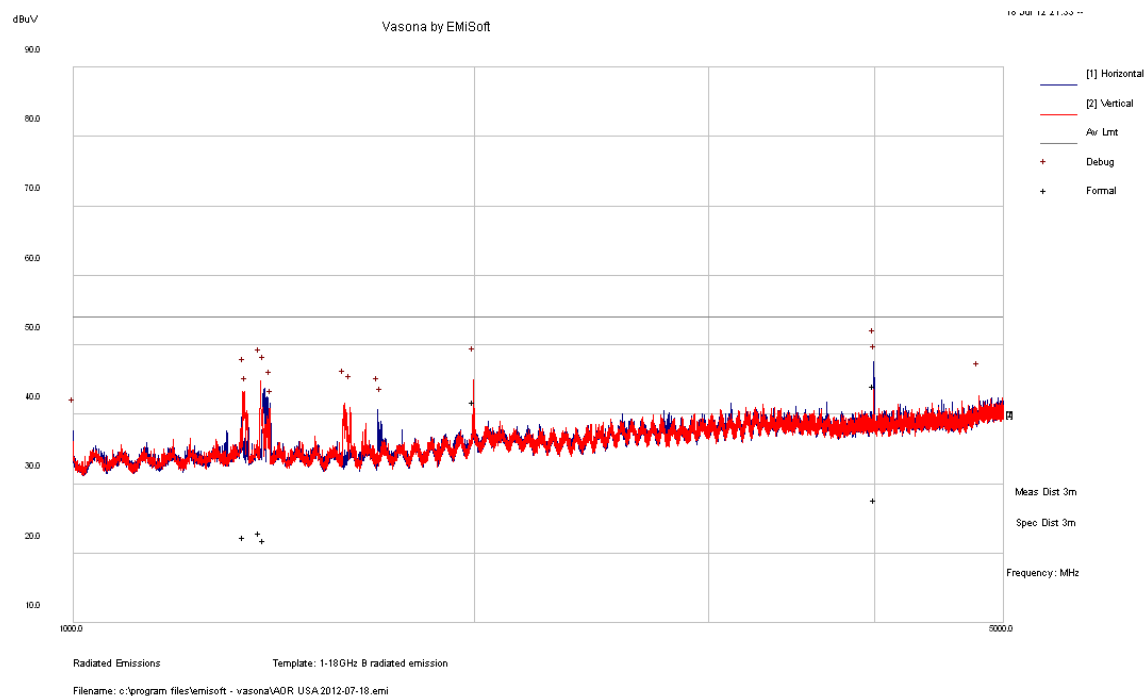
SSB Mode:

30-1000 MHz measured at 10 meters distance



| Frequency (MHz) | Corrected Amplitude (dBµ V/m) | Test Antenna | | Turntable Azimuth (degrees) | Limit (dBµ V/m) | Margin (dB) | Detector |
|--------------------|-------------------------------------|----------------|-------------------|-----------------------------------|--------------------|----------------|----------|
| | | Height (cm) | Polarity (H/V) | | | | |
| 30.26025 | 13.98 | 350 | H | 128 | 30 | -16.02 | QP |
| 744.123 | 15.17 | 176 | V | 262 | 37 | -21.83 | QP |
| 624.969 | 13.87 | 243 | V | 120 | 37 | -23.13 | QP |
| 606.8645 | 13.43 | 333 | V | 112 | 37 | -23.57 | QP |
| 526.0548 | 13.29 | 395 | V | 179 | 37 | -23.71 | QP |
| 599.2325 | 13.23 | 224 | V | 94 | 37 | -23.77 | QP |

Above 1 GHz measured at 3 meters distance



| Frequency (MHz) | Corrected Amplitude (dBμV/m) | Test Antenna | | Turntable Azimuth (degrees) | Limit (dBμV/m) | Margin (dB) | Detector |
|--------------------|------------------------------------|----------------|-------------------|-----------------------------------|-------------------|----------------|----------|
| | | Height (cm) | Polarity (H/V) | | | | |
| 3992.003 | 44.05 | 127 | H | 236 | 54 | -9.95 | Ave. |
| 1999.118 | 41.84 | 158 | V | 356 | 54 | -12.16 | Ave. |
| 4000.13 | 27.69 | 127 | H | 354 | 54 | -26.31 | Ave. |
| 1380.225 | 22.89 | 183 | V | 22 | 54 | -31.11 | Ave. |
| 1342.479 | 22.37 | 195 | V | 142 | 54 | -31.63 | Ave. |
| 1391.848 | 21.94 | 181 | H | 94 | 54 | -32.06 | Ave. |

6 FCC §15.121 – Scanning Receiver Cellular Band Rejection

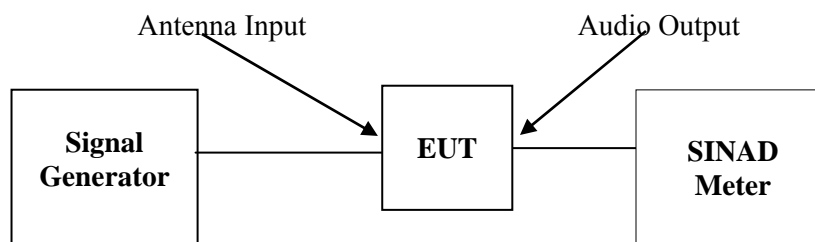
6.1 Applicable Standard

As per FCC §15.121: Scanning receivers and frequency converters used with scanning receivers
(b) Except as provided in paragraph (c) of this section, scanning receivers shall reject any signals from the Cellular Radiotelephone Service frequency bands that are 38 dB or lower based upon a 12 dB SINAD measurement, which is considered the threshold where a signal can be clearly discerned from any interference that may be present.

6.2 Test Setup

The EUT is placed in scan mode. Each of the cellular frequencies listed in the table below is injected into the antenna input of the EUT one by one. At each frequency input signal tested, the frequencies at which the EUT stops at are recorded in the data table.

Once this is completed, we measure the scanner's sensitivity to image and spurious responses to cellular band signals.



6.3 Test Procedure

Connect the Signal Generator to the EUT antenna input port, and SINAD Meter to the EUT Audio output port. The EUT is placed in scan mode. Each of the cellular frequencies listed in the table below is injected into the antenna input of the EUT one by one. At each frequency input signal tested, the frequencies at which the EUT stops at are recorded in the data table.

Once this is completed, we measure the scanner's sensitivity to image and spurious responses to cellular band signals.

In order to comply with 15.121 (b), when the scanner is tuned to any of the 'received' frequencies tested, its 12 dB SINAD sensitivity to any image and spurious signals in the cellular bands must be at least 38 dB poorer than its primary sensitivity as measured.

6.4 Test Equipment List and Details

| Manufacturer | Description | Model NO. | Serial Number | Calibration Date |
|--------------------|------------------|-----------|---------------|-----------------------------|
| Helper Instruments | SINAD Meter | SL-105 | 56800 | 2012-07-13 |
| HP | Signal Generator | 8648C | 3847M001143 | 2010-11-22 ^{Note1} |

Note1: Based on two year calibration cycle

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

6.5 Test Environmental Conditions

| | |
|---------------------------|-----------|
| Temperature: | 25 ° C |
| Relative Humidity: | 45 % |
| ATM Pressure: | 101.2 kPa |

**Testing was performed by Charles Vergonio on 2012-07-20.*

6.6 Test Results

| Cellular Frequency (MHz) | Image Rejection Ratio (dB) |
|--------------------------|----------------------------|
| 824 | > 38 |
| 836 | > 38 |
| 848 | > 38 |
| 869 | > 38 |
| 881 | > 38 |
| 894 | > 38 |

** Image Rejection Ratio = Scanner's sensitivity to image signal – Scanner's primary sensitivity measured*

Note: Scanning Receiver rejects signals from 823.995–849.005 MHz Uplink and 868.995–894.005 MHz Downlink Cellular frequency bands. Therefore there is no specified rejection ratio recorded, the signal generator was set to the level 38 poor then the scanner's sensitivity signal level for all the frequency above.