Excellence in Compliance Testing

Certification Test Report

FCC ID: SK9CRUG1
IC: 864G-CRUG1

FCC Rule Part: 15.249
IC Radio Standards Specification: RSS-210

ACS Report Number: 09-0255-15C-DXX

Manufacturer: Itron, Inc.
Model: C2SOR

Test Begin Date: August 7, 2009
Test End Date: September 15, 2009

Report Issue Date: September 28, 2009

FOR THE SCOPE OF ACCREDITATION UNDER LAB Code 200612-0

This report is not be used to claim certification, approval, or endorsement by NVLAP, NIST or any government agency.

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This report contains 19 pages

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Internal Photographs
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1.0 GENERAL

1.1 Purpose

The purpose of this report is to demonstrate compliance with Part 15 Subpart C of the FCC's Code of Federal Regulations and Industry Canada's Radio Standards Specification RSS-210.

1.2 Product Description

1.2.1 General

The C2SOR is an ANSI C12.22 relay that routes meter data traffic from a proprietary 900 MHz RFLAN mesh network to a Collection Engine server via a wide area network IP backhaul. The C2SOR performs C12.22 aptitle and routing translations on the data it is routing. The C2SOR also contains two short range Zigbee radios that are used for wireless device configuration.

Manufacturer Information:
Itron, Inc.
313 North Highway 11
West Union SC 29696

Test Sample Serial Number(s):
FCC Meter #1

Test Sample Condition:
Test sample was in good working condition with no defects.

Detailed photographs of the EUT are filed separately with this filing.

1.2.2 Intended Use

The C2SOR is an ANSI C12.22 relay that routes meter data traffic from a proprietary 900 MHz RFLAN mesh network to a Collection Engine server via a wide area network IP backhaul. The C2SOR also contains two short range Zigbee radios that are used for wireless device configuration.

1.3 Test Methodology and Considerations

The EUT was tested in a configuration typical of normal use.

This device is considered a composite device by definition. The 900 MHz LAN and high power 2.4 GHz Zigbee radios operate under CFR 47 Part 15.247 and IC RSS-210. The low power 2.4 GHz Zigbee radio operates under CFR 47 Part 15.249 and IC RSS-210. This report addresses Part 15.249 and RSS 210 for the low power 2.4 GHz Zigbee radio only. Separate reports will be issued for Part 15.247 and RSS 210 in reference to the 900 MHz LAN and high power 2.4GHz Zigbee radios.

The C2SOR also includes either pre-approved GSM cellular modem FCC ID: N7NMC8790 / IC: 2417C-MC8790 or pre-approved CDMA cellular modem FCC ID: N7N-MC5725 / IC: 2417C-MC5725 but not both.

All radio including the cellular modem can transmit simultaneously therefore radiated inter-modulation products were performed and found to be in compliance.

See test setup photographs for additional information.

2.0 TEST FACILITIES

2.1 Location

The radiated and conducted emissions test sites are located at the following address:

Advanced Compliance Solutions
5015 B.U. Bowman Drive
Buford, GA 30518
Phone: (770) 831-8048
Fax: (770) 831-8598

2.2 Laboratory Accreditations/Recognitions/Certifications

The Semi-Anechoic Chamber Test Site, Open Area Test Site (OATS) and Conducted Emissions Site have been fully described, submitted to, and accepted by the FCC, Industry Canada and the Japanese Voluntary Control Council for Interference by information technology equipment. In addition, ACS is compliant to ISO/IEC 17025 as certified by the National Institute of Standards and Technology under their National Voluntary Laboratory Accreditation Program. The following certification numbers have been issued in recognition of these accreditations and certifications:

FCC Registration Number: 894540
Industry Canada Lab Code: IC 4175A-1
VCCI Member Number: 1831

- VCCI OATS Registration Number R-1526
- VCCI Conducted Emissions Site Registration Number: C-1608

NVLAP Lab Code: 200612-0

2.3 Radiated Emissions Test Site Description

2.3.1 Semi-Anechoic Chamber Test Site

The Semi-Anechoic Chamber Test Site consists of a 20' x 30' x 18' shielded enclosure. The chamber is lined with Toyo Ferrite Grid Absorber, model number FFG-1000. The ferrite tile grid is 101 x 101 x 19mm thick and weighs approximately 550 grams. These tiles are mounted on steel panels and installed directly on the inner walls of the chamber.

The turntable is 150cm in diameter and is located 160cm from the back wall of the chamber. The chamber is grounded via 1 - 8' copper ground rod, installed at the center of the back wall, it is bound to the ground plane using 3/4" stainless steel braided cable.

The turntable is all steel, flush mounted table installed in an all steel frame. The table is remotely operated from inside the control room located 25' from the range. The turntable is electrically bonded to the surrounding ground plane via steel fingers installed on the edge of the turn table. The steel fingers make constant contact with the ground plane during operation.

Behind the turntable is a 3' x 6' x 4' deep shielded pit used for support equipment if necessary. The pit is equipped with 1 - 4" PVC chases from the turntable to the pit that allow for cabling to the EUT if necessary. The underside of the turntable can be accessed from the pit so cables can be supplied to the EUT from the pit.

A diagram of the Semi-Anechoic Chamber Test Site is shown in Figure 2.3-1 below:

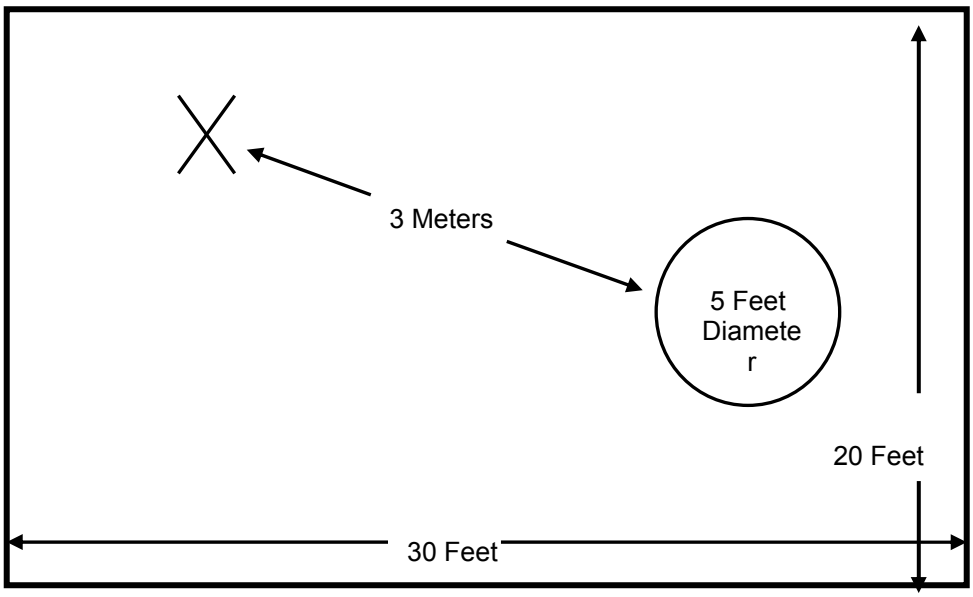

Figure 2.3-1: Semi-Anechoic Chamber Test Site

2.3.2 Open Area Tests Site (OATS)

The open area test site consists of a 40' x 66' concrete pad covered with a perforated electro-plated galvanized sheet metal. The perforations in the sheet metal are 1/8" holes that are staggered every 3/16". The individual sheets are placed to overlap each other by 1/4" and are riveted together to provide a continuous seam. Rivets are spaced every 3" in a 3 x 20 meter perimeter around the antenna mast and EUT area. Rivets in the remaining area are spaced as necessary to properly secure the ground plane and maintain the electrical continuity.

The entire ground plane extends 12' beyond the turntable edge and 16' beyond the antenna mast when set to a 10 meter measurement distance. The ground plane is grounded via 4 - 8' copper ground rods, each installed at a corner of the ground plane and bound to the ground plane using 3/4" stainless steel braided cable.

The turntable is an all aluminum 10' flush mounted table installed in an all aluminum frame. The table is remotely operated from inside the control room located 40' from the range. The turntable is electrically bonded to the surrounding ground plane via steel fingers installed on the edge of the turn table. The steel fingers make constant contact with the ground plane during operation.

Adjacent to the turntable is a 7' x 7' square and 4' deep concrete pit used for support equipment if necessary. The pit is equipped with 5 - 4" PVC chases from the pit to the control room that allow for cabling to the EUT if necessary. The underside of the turntable can be accessed from the pit so cables can be supplied to the EUT from the pit. The pit is covered with 2 sheets of 1/4" diamond style re-enforced steel sheets. The sheets are painted to match the perforated steel ground plane; however the underside edges have been masked off to maintain the electrical continuity of the ground plane. All reflecting objects are located outside of the ellipse defined in ANSI C63.4.

A diagram of the Open Area Test Site is shown in Figure 2.3-2 below:

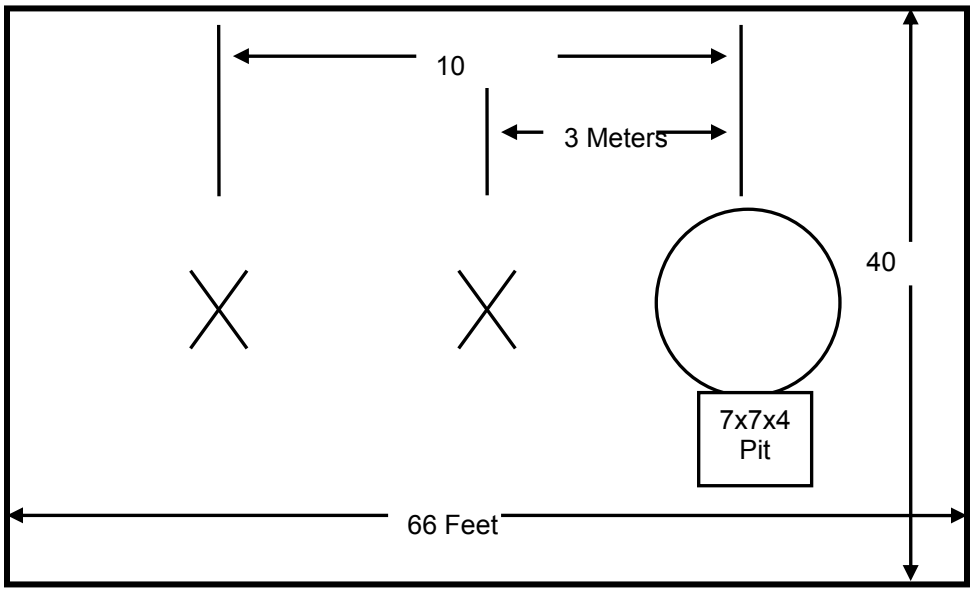

Figure 2.3-2: Open Area Test Site

2.4 Conducted Emissions Test Site Description

The AC mains conducted EMI site is located in the main EMC lab. It consists of an 8' x 8' solid aluminum horizontal group reference plane (GRP) bonded every 3" to an 8' X 8' vertical ground plane.

The site is of sufficient size to test table top and floor standing equipment in accordance with section 6.1.4 of ANSI C63.4.

A diagram of the room is shown below in figure 4.1.3-1:

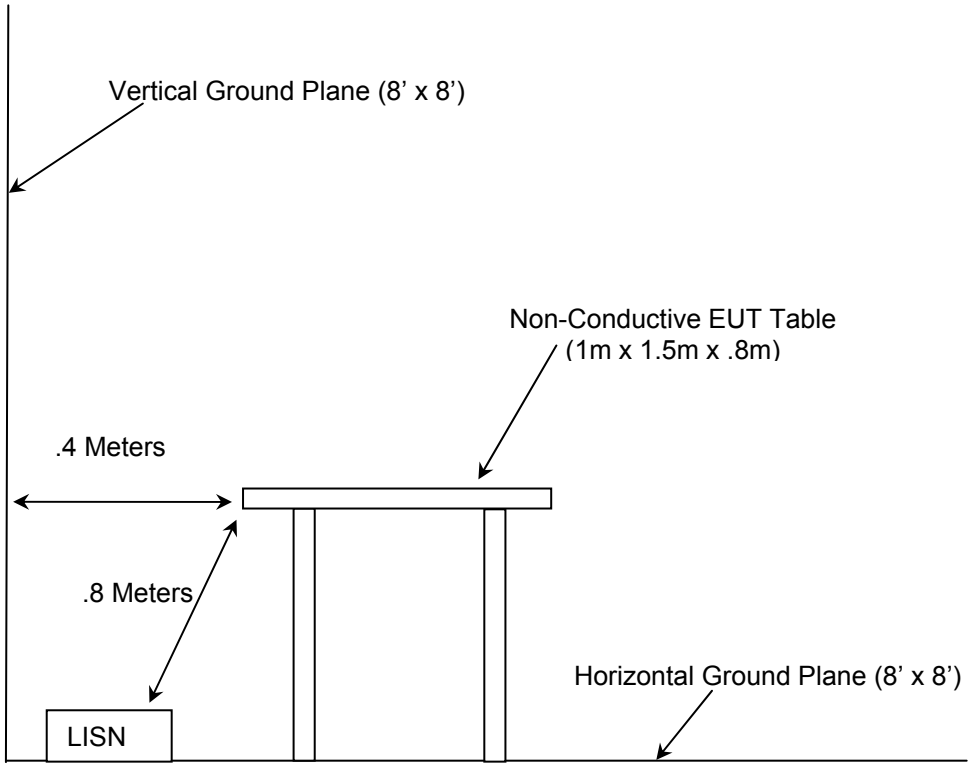

Figure 2.4-1: AC Mains Conducted EMI Site

3.0 APPLICABLE STANDARD REFERENCES

The following standards were used:

- ANSI C63.4-2003: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9KHz to 40GHz
- US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures, 2009
- US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators, 2009
- Industry Canada Radio Standards Specification: RSS-210 - Low-power License-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment, Issue 7 June 2007
- Industry Canada Radio Standards Specification: RSS-GEN – General Requirements and Information for the Certification of Radiocommunication Equipment, Issue2, June 2007.

4.0 LIST OF TEST EQUIPMENT

The calibration interval of test equipment is annually or the manufacturer's recommendations. Where the calibration interval deviates from the annual cycle based on the instrument manufacturer's recommendations, it shall be stated below.

Table 4-1: Test Equipment

Equipment Calibration Information					
ACS#	**Mfg.**	**Eq. type**	**Model**	**S/N**	**Cal. Due**
3	Rohde & Schwarz	Spectrum Analyzers	ESMI-Display	839379/011	02-02-2010
4	Rohde & Schwarz	Spectrum Analyzers	ESMI-Receiver	833827/003	02-02-2010
22	Agilent	Amplifiers	8449B	3008A00526	10-22-2009
30	Spectrum Technologies	Antennas	DRH-0118	970102	05-08-2010
40	Electro-Metrics	Antennas	3104	3211	01-22-2010
152	EMCO	LISN	3825/2	9111-1905	03-25-2010
167	ACS	Cable Set	Chamber EMI Cable Set	167	02-06-2010 (See Note1)
291	Florida RF Cables	Cables	SMRE-200W-12.0-SMRE	None	11-24-2009 (See Note1)
292	Florida RF Cables	Cables	SMR-290AW-480.0-SMR	None	11-24-2009 (See Note1)
321	Hewlett Packard	Amplifiers	HPC 8447D	1937A02809	10-08-2009
324	ACS	Cables	Belden	8214	07-15-2010
338	Hewlett Packard	Amplifier	8449B	3008A01111	10-22-2009
412	Electro Metrics	Antennas	LPA-25	1241	07-23-2010
422	Florida RF	Cables	SMS-200AW-72.0-SMR	805	02-05-2010 (See Note1)

Note1: Items characterized on an annual cycle. The date shown indicates the next characterization due date.
Note2: Items verified on an annual cycle. The date shown indicates the next verification due date.

5.0 SUPPORT EQUIPMENT

Table 5-1: Support Equipment

Item	Equipment Type	Manufacturer	Model Number	Serial Number
1	Meter Base Enclosure	Milbank MFG.	3R	NA
2	EUT	Itron Electricity Metering	C2SOR	FCC Meter #1
3	Voltage Transformer	Sangamo Weston, Inc.	Type T-6A	8108966

6.0 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAMS

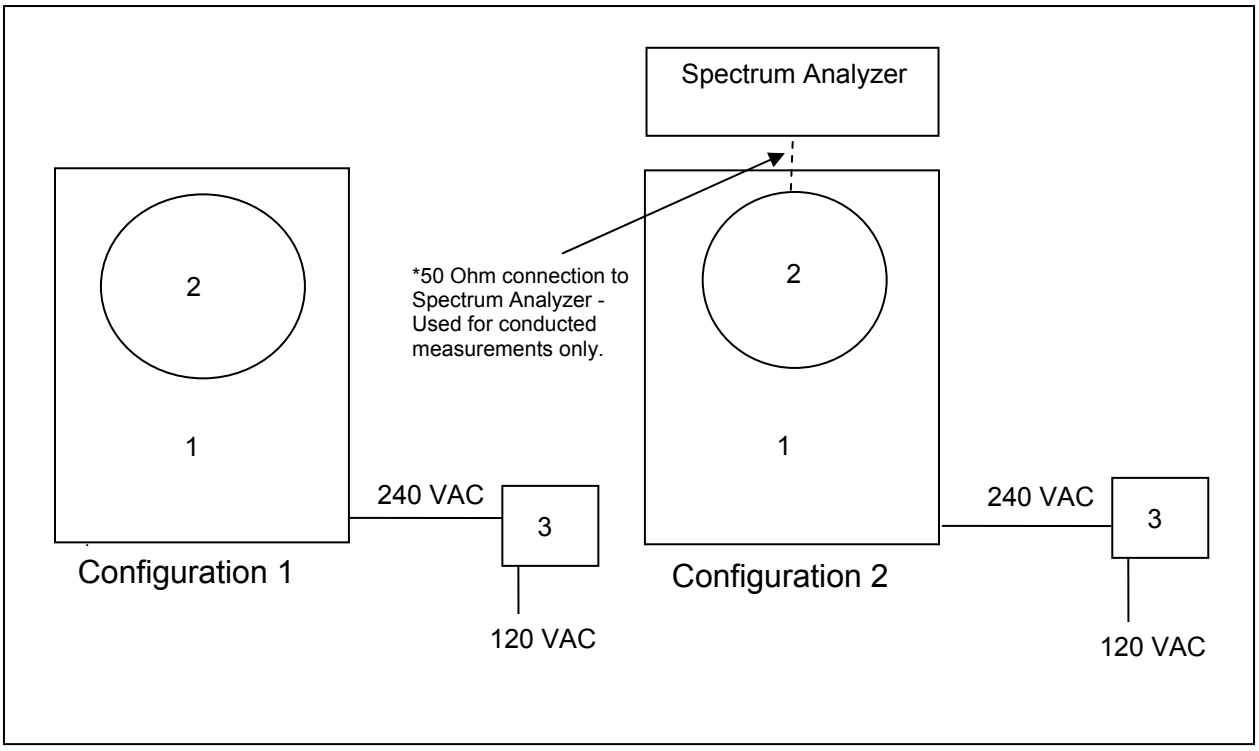

Figure 6-1: EUT Test Setup

*See Test Setup photographs for additional detail.

7.0 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

7.1 Antenna Requirement – FCC: Section 15.203

The C2SOR includes a 2.4GHz patch antenna with a measured gain of 3 dBi.

7.2 Power Line Conducted Emissions – FCC: Section 15.207 IC: RSS-Gen 7.2.2

7.2.1 Test Methodology

ANSI C63.4 sections 6 and 7 were the guiding documents for this evaluation. Conducted emissions were performed from 150kHz to 30MHz with the spectrum analyzer's resolution bandwidth set to 9kHz and the video bandwidth set to 30kHz. The calculation for the conducted emissions is as follows:

Corrected Reading = Analyzer Reading + LISN Loss + Cable Loss
Margin = Applicable Limit - Corrected Reading

7.2.2 Test Results

Results of the test are shown below in and Table 7.2.2-1 to 7.2.2-4 and figures 7.2.2-1 to 7.2.2-4.

Table 7.2.2-1: Line 1 Conducted EMI Results – GSM Modem

Frequency (MHz)	Level (dBuV)	Transducer (dB)	Limit (dBuV)	Margin (dB)	Line	PE	Detector
0.264	40.50	10.0	61	20.50	L1	GND	QP
0.462	10.80	10.0	57	46.20	L1	GND	QP
0.534	34.90	10.0	56	21.10	L1	GND	QP
0.828	43.40	10.0	56	12.60	L1	GND	QP
1.056	34.60	10.0	56	21.40	L1	GND	QP
1.062	35.40	10.0	56	20.60	L1	GND	QP
1.254	20.00	10.0	56	36.00	L1	GND	QP
1.650	39.10	10.0	56	16.90	L1	GND	QP
2.526	40.10	10.0	56	15.90	L1	GND	QP
3.306	33.40	9.9	56	22.60	L1	GND	QP
0.240	12.60	9.9	52	39.40	L1	GND	AVG
0.462	7.50	10.0	47	39.50	L1	GND	AVG
0.504	19.70	10.0	46	26.30	L1	GND	AVG
0.828	43.40	10.0	46	2.60	L1	GND	AVG
1.008	18.90	10.0	46	27.10	L1	GND	AVG
1.122	7.60	10.0	46	38.40	L1	GND	AVG
1.200	24.80	10.0	46	21.20	L1	GND	AVG
1.650	35.30	10.0	46	10.70	L1	GND	AVG
2.520	34.90	10.0	46	11.10	L1	GND	AVG
3.306	32.00	9.9	46	14.00	L1	GND	AVG

Table 7.2.2-2: Line 2 Conducted EMI Results – GSM Modem

Frequency (MHz)	Level (dBuV)	Transducer (dB)	Limit (dBuV)	Margin (dB)	Line	PE	Detector
0.828	43.90	10.0	56	12.10	L2	GND	QP
1.314	12.00	10.0	56	44.00	L2	GND	QP
1.404	18.40	10.0	56	37.60	L2	GND	QP
1.650	36.00	10.0	56	20.00	L2	GND	QP
1.974	37.40	10.0	56	18.60	L2	GND	QP
2.112	36.70	10.0	56	19.30	L2	GND	QP
2.316	17.50	10.0	56	38.50	L2	GND	QP
2.484	39.50	10.0	56	16.50	L2	GND	QP
2.496	40.60	10.0	56	15.40	L2	GND	QP
2.628	37.40	10.0	56	18.60	L2	GND	QP
0.828	44.20	10.0	46	1.80	L2	GND	AVG
1.314	34.10	10.0	46	11.90	L2	GND	AVG
1.446	33.70	10.0	46	12.30	L2	GND	AVG
1.650	37.00	10.0	46	9.00	L2	GND	AVG
2.028	10.50	10.0	46	35.50	L2	GND	AVG
2.148	9.50	10.0	46	36.50	L2	GND	AVG
2.244	27.50	10.0	46	18.50	L2	GND	AVG
2.472	20.40	10.0	46	25.60	L2	GND	AVG
2.496	33.30	10.0	46	12.70	L2	GND	AVG
2.628	31.50	10.0	46	14.50	L2	GND	AVG

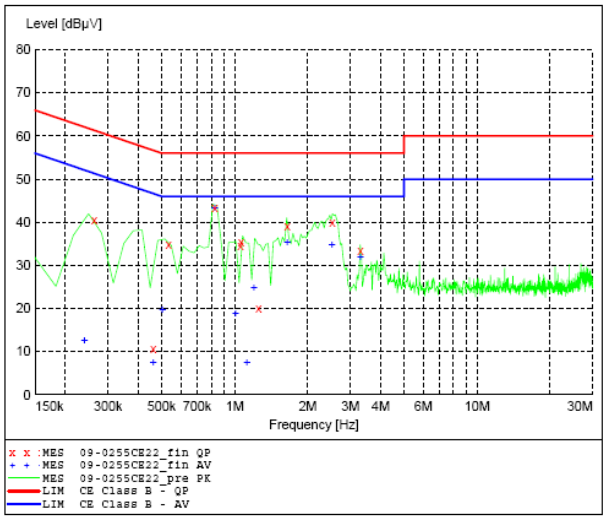

Figure 7.2.2-1: Line 1 Conducted EMI Results – GSM Modem

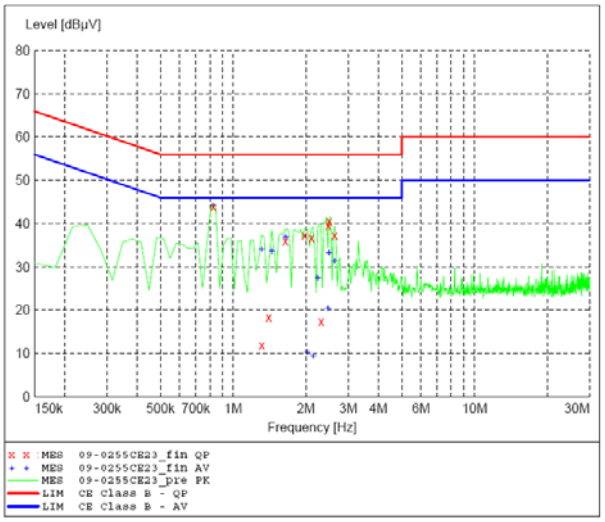

Figure 7.2.2-2: Line 2 Conducted EMI Results – GSM Modem

Table 7.2.2-3: Line 1 Conducted EMI Results – CDMA Modem

Frequency (MHz)	Level (dBuV)	Transducer (dB)	Limit (dBuV)	Margin (dB)	Line	PE	Detector
0.882	42.40	10.0	56	13.60	L1	GND	QP
1.206	33.90	10.0	56	22.10	L1	GND	QP
1.608	35.20	10.0	56	20.80	L1	GND	QP
1.740	35.70	10.0	56	20.30	L1	GND	QP
1.872	35.80	10.0	56	20.20	L1	GND	QP
2.004	36.80	10.0	56	19.20	L1	GND	QP
2.142	37.60	10.0	56	18.40	L1	GND	QP
2.274	37.20	10.0	56	18.80	L1	GND	QP
2.406	37.50	10.0	56	18.50	L1	GND	QP
2.538	37.00	9.9	56	19.00	L1	GND	QP
0.882	42.30	9.9	46	3.70	L1	GND	AVG
1.206	30.80	10.0	46	15.20	L1	GND	AVG
1.602	32.10	10.0	46	13.90	L1	GND	AVG
1.734	28.80	10.0	46	17.20	L1	GND	AVG
1.872	31.70	10.0	46	14.30	L1	GND	AVG
2.004	32.20	10.0	46	13.80	L1	GND	AVG
2.142	32.00	10.0	46	14.00	L1	GND	AVG
2.280	26.90	10.0	46	19.10	L1	GND	AVG
2.406	32.40	10.0	46	13.60	L1	GND	AVG
2.538	32.00	9.9	46	14.00	L1	GND	AVG

Table 7.2.2-4: Line 2 Conducted EMI Results – CDMA Modem

Frequency (MHz)	Level (dBuV)	Transducer (dB)	Limit (dBuV)	Margin (dB)	Line	PE	Detector
0.882	43.20	10.0	56	12.80	L2	GND	QP
1.338	36.20	10.0	56	19.80	L2	GND	QP
1.584	25.20	10.0	56	30.80	L2	GND	QP
1.746	36.30	10.0	56	19.70	L2	GND	QP
1.872	36.70	10.0	56	19.30	L2	GND	QP
2.010	36.40	10.0	56	19.60	L2	GND	QP
2.274	38.10	10.0	56	17.90	L2	GND	QP
2.412	39.40	10.0	56	16.60	L2	GND	QP
2.640	28.90	10.0	56	27.10	L2	GND	QP
2.754	10.70	10.0	56	45.30	L2	GND	QP
0.882	43.30	10.0	46	2.70	L2	GND	AVG
1.338	33.20	10.0	46	12.80	L2	GND	AVG
1.560	8.60	10.0	46	37.40	L2	GND	AVG
1.740	32.60	10.0	46	13.40	L2	GND	AVG
1.872	32.80	10.0	46	13.20	L2	GND	AVG
2.010	31.70	10.0	46	14.30	L2	GND	AVG
2.274	33.00	10.0	46	13.00	L2	GND	AVG
2.412	33.10	10.0	46	12.90	L2	GND	AVG
2.640	28.20	10.0	46	17.80	L2	GND	AVG
2.718	7.90	10.0	46	38.10	L2	GND	AVG

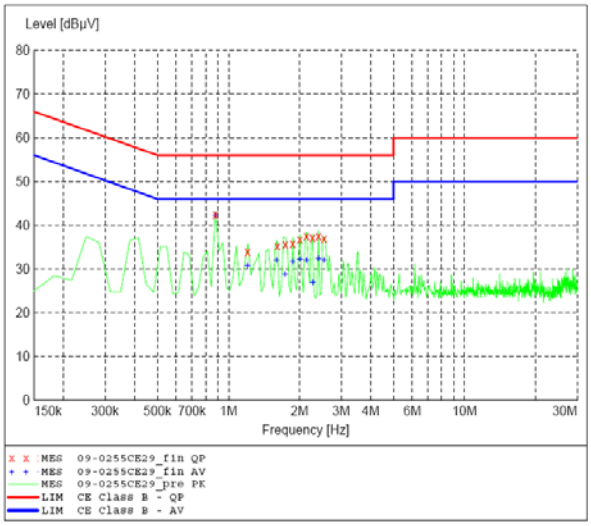

Figure 7.2.2-3: Line 1 Conducted EMI Results – CDMA Modem

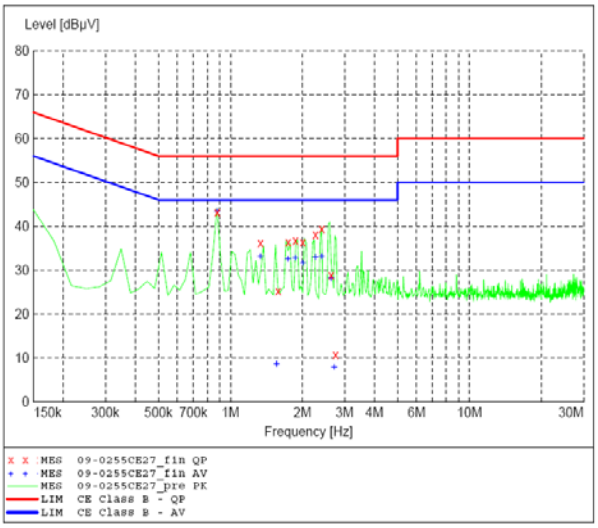

Figure 7.2.2-4: Line 2 Conducted EMI Results – CDMA Modem

7.3 Radiated Emissions – FCC: Section 15.109(Unintentional Radiation) IC: RSS-210 2.6

7.3.1 Test Methodology

Radiated emissions tests were performed over the frequency range of 30MHz to 12.5GHz. Measurements of the radiated field strength were made at a distance of 3m from the boundary of the equipment under test (EUT) and the receiving antenna. The antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. Radiated measurements above 30MHz and below 1GHz were made with the Spectrum Analyzer's resolution bandwidth set to 120 KHz using a Quasi-peak detector. Above 1GHz, peak and average measurements are taken with the RBW and VBW were set to 1MHz and 3MHz respectively.

7.3.2 Test Results

Results of the test are given in Table 7.3.2-1 below:

Table 7.3.2-1 – Radiated Emissions (Unintentional)

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg	(H/V)	(dB)	pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
97.091	---------	45.41	V	-14.72	---------	30.69	--------	43.5	---------	12.81
136.203	---------	42.90	V	-14.13	---------	28.77	--------	43.5	---------	14.73
239.991	---------	47.22	H	-13.30	---------	33.92	--------	46.0	---------	12.08
452.96	---------	45.11	V	-7.61	---------	37.50	--------	46.0	---------	8.50
494.917	---------	44.42	V	-6.25	---------	38.17	--------	46.0	---------	7.83
511.677	---------	40.18	H	-5.27	---------	34.91	--------	46.0	---------	11.09

* Note: All emissions above 511.677MHz were not detected above the noise floor of the measurement equipment and therefore attenuated below the permissible limit.

7.4 Occupied Bandwidth FCC: Section 15.215 IC: RSS-GEN 4.6.1

7.4.1 Test Methodology

The spectrum analyzer span was set to 2 to 3 times the estimated bandwidth of the emission. The RBW was to ≥ 1% of the estimated emission bandwidth. The trace was set to max hold with a peak detector active. Bandwidth is determined at the points 20 dB down from the modulated carrier. The 99% bandwidth was also measured and reported in Section 7.4.2 below.

7.4.2 Test Results

The maximum 20 dB bandwidth was determined to be 2660.0 kHz. The frequency band designated under Part 15.249 is 2400 - 2483.5MHz, therefore the 20dB bandwidth is contained within the frequency band designated under this rule part. Results are shown below in Table 7.4.2-1 and Figures 7.4.2-1 through 7.4.2-6.

Table 7.4.2-1 – Occupied Bandwidth

Frequency (MHz)	20dB Bandwidth (kHz)	99% OBW (kHz)
2405	2640.0	2420.0
2440	2630.0	2430.0
2475	2660.0	2440.0

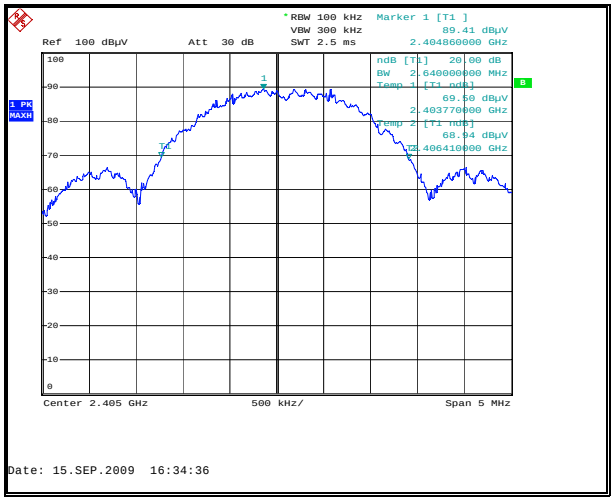

Figure 7.4.2-1: 20dB Bandwidth Low Channel

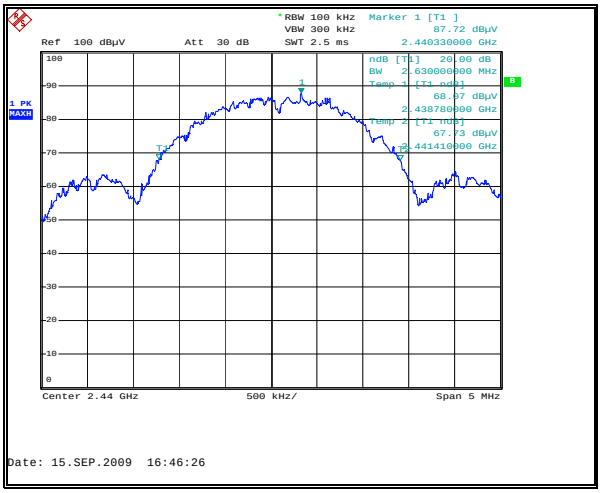

Figure 7.4.2-2: 20dB Bandwidth Mid Channel

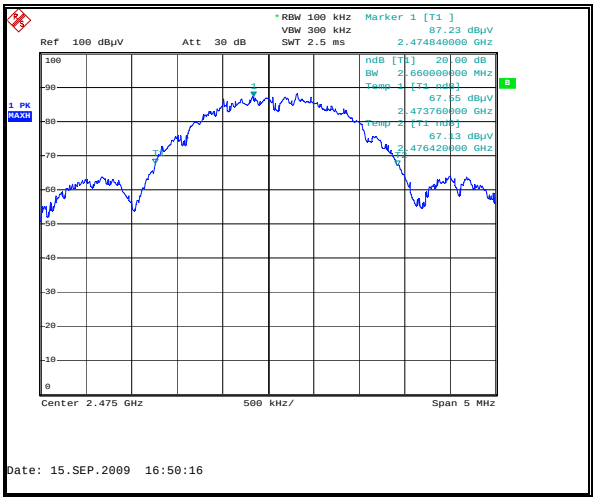

Figure 7.4.2-3: 20dB Bandwidth High Channel

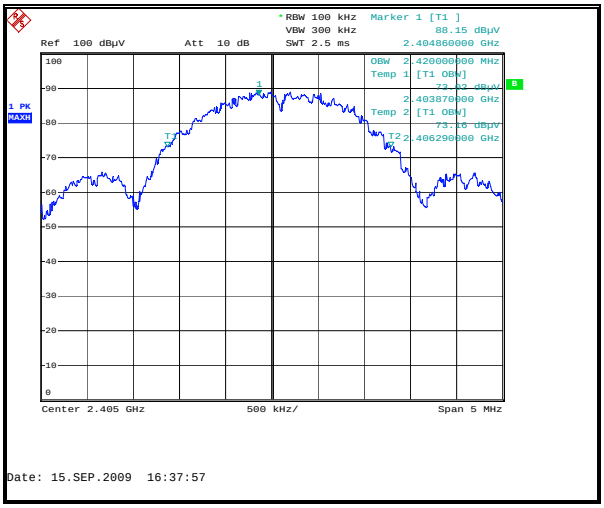

Figure 7.4.2-4: 99%OBW Low Channel

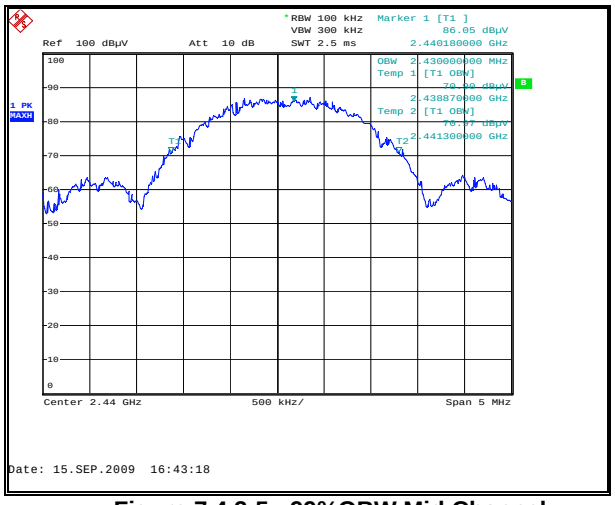

Figure 7.4.2-5: 99%OBW Mid Channel

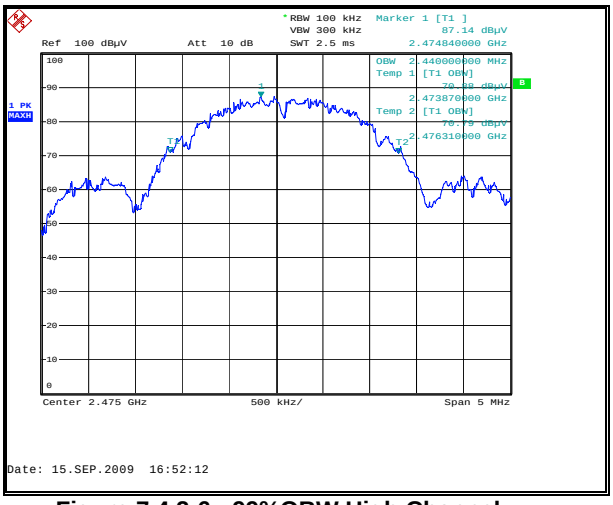

Figure 7.4.2-6: 99%OBW High Channel

7.5 Fundamental Field Strength – FCC: Section 15.249(a) IC: RSS-210 A2.9(a)

7.5.1 Test Methodology

Radiated emissions tests were made on the 3 channels in the 2400MHz to 2483.5MHz frequency range, the low channel being 2405 MHz, the middle channel being 2440 MHz, and the high channel being 2475 MHz.

The EUT was rotated through 360° and the receive antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. Peak and average measurements were made using a resolution bandwidth (RBW) of 1MHz and a video bandwidth (VBW) of 3MHz.

7.5.2 Duty Cycle Correction

For average radiated measurements, the measured level was reduced by a factor 11.37dB to account for the duty cycle of the EUT. The duty cycle was determined to be 27% or 27ms within a 100ms period. The duty cycle correction factor is determined using the formula: 20log (0.27) = 11.37dB. Additional justification of the duty cycle can be found in the Theory of Operation supplied with this filing.

7.5.3 Test Results

Results are shown below in table 7.5.3-1 below:

Table 7.5.3-1: Fundamental Field Strength

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg	(H/V)	(dB)	pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
Low Channel										
2405	89.23	89.23	H	0.94	90.17	78.80	114.0	94.0	23.83	15.20
2405	86.44	86.44	V	0.94	87.38	76.01	114.0	94.0	26.62	17.99
Middle Channel										
2440	88.16	88.16	H	1.35	89.51	78.13	114.0	94.0	24.49	15.87
2440	83.39	83.39	V	1.35	84.74	73.36	114.0	94.0	29.26	20.64
High Channel										
2475	90.03	90.03	H	1.35	91.38	80.00	114.0	94.0	22.62	14.00
2475	86.61	86.61	V	1.35	87.96	76.58	114.0	94.0	26.04	17.42

7.5.4 Sample Calculation:

$R_C = R_U + CF_T$

Where:

CF_T = Total Correction Factor (AF+CA+AG)-DC (Average Measurements Only)
R_U = Uncorrected Reading
R_C = Corrected Level
AF = Antenna Factor
CA = Cable Attenuation
AG = Amplifier Gain
DC = Duty Cycle Correction Factor

Example Calculation

PEAK:
Corrected Level: 89.23 + 0.94 = 90.17dBuV
Margin: 114dBuV – 90.17dBuV = 23.83dB

AVERAGE:
Corrected Level: 89.23 + 0.94 - 11.37= 78.80dBuV
Margin: 94dBuV – 78.80dBuV = 15.20dB

7.6 Band-Edge Compliance and Spurious Emissions – FCC: Section 15.249 IC: RSS-210 A2.9

7.6.1 Band-Edge Compliance – FCC: Section 15.249(d) IC: RSS-210 A2.9(b)

7.6.1.1 Test Methodology

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

The EUT was investigated at the low and high channels of operation to determine band-edge compliance. Band-edge compliance for the lower and upper band-edge was determined using the radiated mark-delta method as outlined in FCC DA 00-705. The radiated field strength of the fundamental emission was first determined and then the mark-delta method was used to determine the field strength of the band-edge emissions as compared to the emission limits of 15.209.

7.6.1.2 Test Results

Band-edge compliance is displayed in Tables 7.6.1.2-1 to 7.6.1.2-2 and Figures 7.6.1.2-1 – 7.6.1.2-2.

Table 7.6.1.2-1: Lower Band-edge Marker Delta Method

Frequency (MHz)	Uncorrected Level (dBuV)		Antenna Polarity	Correction Factors	Fundamental Level (dBuV/m)		Marker-Delta	Band-Edge Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg	(H/V)	(dB)	pk	Qpk/Avg	(dB)	pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
2405	89.23	89.23	H	0.94	90.17	78.80	39.27	50.90	39.53	74.0	54.0	23.10	14.47
2405	86.44	86.44	V	0.94	87.38	76.01	39.61	47.77	36.40	74.0	54.0	26.23	17.60

Table 7.6.1.2-2: Upper Band-edge Marker Delta Method

Frequency (MHz)	Uncorrected Level (dBuV)		Antenna Polarity	Correction Factors	Fundamental Level (dBuV/m)		Marker-Delta	Band-Edge Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg	(H/V)	(dB)	pk	Qpk/Avg	(dB)	pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
2475	90.03	90.03	H	1.35	91.38	80.00	37.82	53.56	42.18	74.0	54.0	20.44	11.82
2475	86.61	86.61	V	1.35	87.96	76.58	38.63	49.33	37.95	74.0	54.0	24.67	16.05

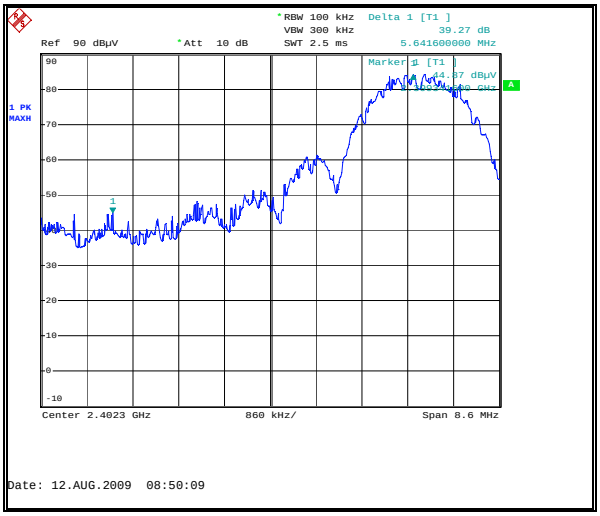

Figure 7.6.1.2-1 Lower Band-edge –Hpol

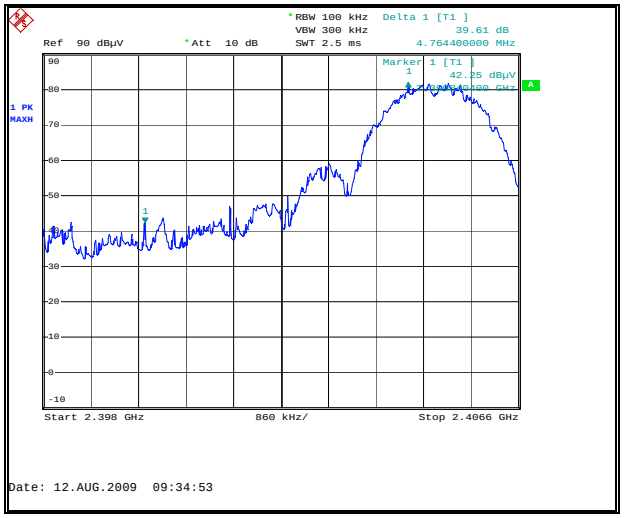

Figure 7.6.1.2-2 Lower Band-edge – Vpol

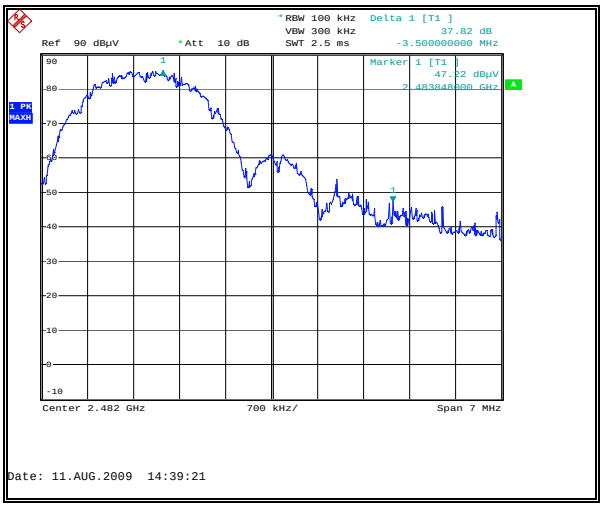

Figure 7.6.1.2-3 Upper Band-edge –Hpol

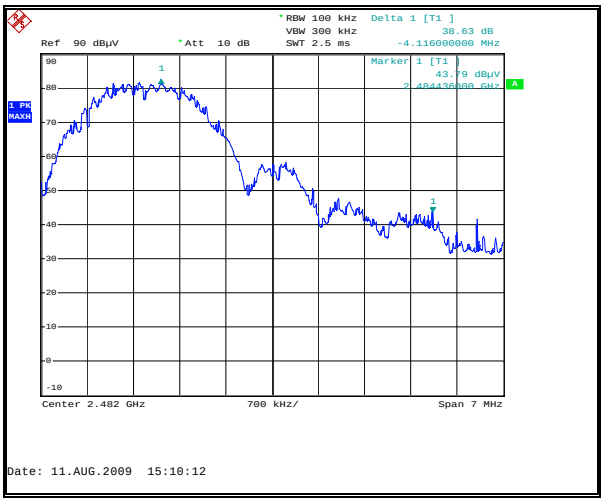

Figure 7.6.1.2-4 Upper Band-edge - Vpol

7.6.2 Radiated Spurious Emissions – FCC: Section 15.249(a), (c) IC:RSS-210 A2.9(a)

7.6.2.1 Test Methodology

Radiated emissions tests were made over the frequency range of 30MHz to 25 GHz, 10 times the highest fundamental frequency.

The EUT was rotated through 360° and the receive antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. For frequencies below 1000MHz, quasi-peak measurements were made using a resolution bandwidth RBW of 120 kHz and a video bandwidth VBW of 300 kHz. For frequencies above 1000MHz, peak measurements made with RBW of 1 MHz and VBW of 3 MHz. The average emissions were determined by applying the duty cycle correction of the EUT to the peak measurements for comparison to the average limit.

7.6.2.2 Test Results

The magnitude of all emissions for low, mid, and high channel were below the noise floor of the measuring spectrum analyzer.

8.0 CONCLUSION

In the opinion of ACS, Inc. the C2SOR manufactured by Itron Inc.meet the requirements of FCC Part 15 subpart C and IC RSS-210.

END REPORT