PCTEST ENGINEERING LABORATORY, INC.
6660-B Dobbin Road, Columbia, MD 21045 USA
Tel. 410.290.6652 / Fax 410.290.6554
http://www.pctestlab.com

CERTIFICATE OF COMPLIANCE
FCC PART 15.247 Certification

Applicant Name:
Siemens Transportation Systems
150 avenue de la Republique
92320 Chatillon
France

Date of Testing:
September 25, 2008
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Test Report Serial No.:
0809251421.QSC

FCC ID:	**QSCCARBORNE2**
APPLICANT:	**Siemens Transportation Systems**

Model(s):	CRE
EUT Type:	Transportation Control System
Max. RF Output Power:	276mW (24.41dBm) Conducted power to antenna connection including 2dB pad and cable loss. (Reference Table 6-3)
Frequency Range:	2408 - 2474 MHz (DSSS)
FCC Classification:	Digital Transmission System (DTS)
FCC Rule Part(s):	Part 15.247
Test Device Serial No.:	None

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C-63.4-2003.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Grant Conditions: Power output listed is conducted.

PCTEST certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862.

Randy Ortanez
President

ACCREDITED
TESTING LABORATORY
CERTIFICATE #2041.01

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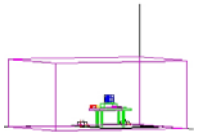


MEASUREMENT REPORT
FCC Part 15.247

§ 2.1033 General Information

APPLICANT:	Siemens Transportation Systems
APPLICANT ADDRESS:	150 avenue de la Republique
	92320 Chatillon, France
TEST SITE:	PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS:	6660-B Dobbin Road, Columbia, MD 21045 USA
FCC RULE PART(S):	Part 15.247
MODEL NAME:	CRE
FCC ID:	QSCCARBORNE2
Test Device Serial No.:	None ☐ Production ☒ Pre-Production ☐ Engineering
FCC CLASSIFICATION:	Digital Transmission System (DTS)
DATE(S) OF TEST:	September 25, 2008
TEST REPORT S/N:	0809251421.QSC

Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21045, U.S.A.

- PCTEST facility is an FCC registered (PCTEST Reg. No. 90864) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (IC-2451).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing Aid Compatibility (HAC) testing, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (IC-2451) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.

1.0 INTRODUCTION

1.1 Evaluation Procedure

The measurement procedure described in the American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz (ANSI C63.4-2003) and FCC procedure dated March 23, 2005 entitled "Measurements of Digital Transmission Systems Operating Under Section 15.247" were used in the measurement of the **Carborne Unit Transportation Control System FCC ID: QSCCARBORNE2.**

Deviation from measurement procedure…….....None

1.2 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.

1.3 PCTEST Test Location

The map at the right shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity are, the Baltimore-Washington Internt'l (BWI) airport, the city of Baltimore and the Washington, DC area. (*see Figure 1-1*).

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility in New Concept Business Park, Guilford Industrial Park, Columbia, Maryland. The site address is 6660-B Dobbin Road, Columbia, MD 21045. The test site is one of the highest points in the Columbia area with an elevation of 390 feet above mean sea level. The site coordinates are 39° 11'15" N latitude and 76° 49'38" W longitude. The facility is 1.5 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. There are no FM or TV transmitters within 15 miles of the site. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2003 on January 27, 2006 and Industry Canada.

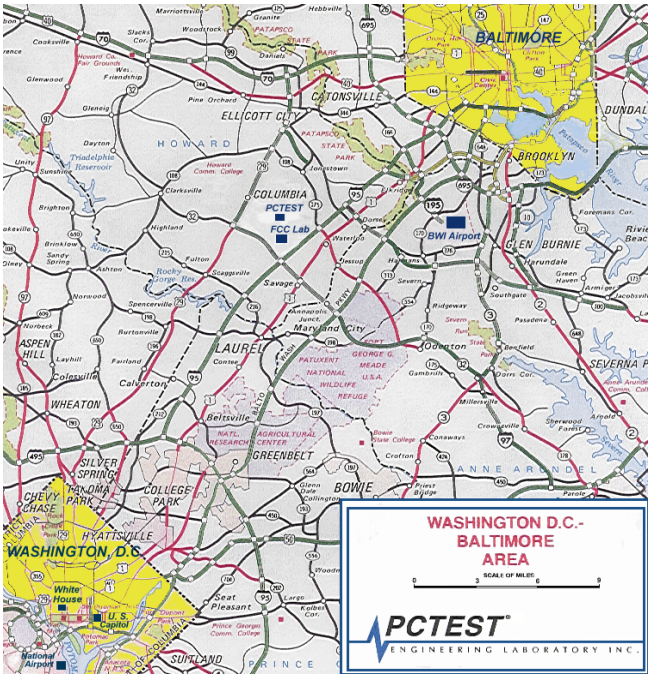


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Carborne Unit Transportation Control System FCC ID: QSCCARBORNE2**. The EUT consisted of the following component(s):

Manufacturer / Model	FCC ID	Description
Carborne Unit / Model: CRE	QSCCARBORNE2	Transportation Control System
ELHYTE / Model: P2409	N/A	9dBi Horn Antenna

Table 2-1. EUT Equipment Description

The Carborne transceiver is powered via the railway DC power system.

2.2 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

2.3 Labeling Requirements

Per 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the trade name and FCC ID must be displayed on the device per Section 15.19(b)(2).

Please see attachment for FCC ID label and label location.

3.0 DESCRIPTION OF TEST

3.1 Conducted Emissions

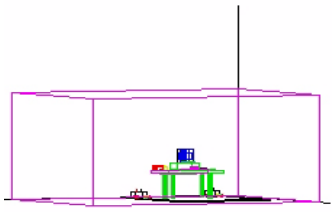


Figure 3-1. Shielded Enclosure Line-Conducted Test Facility

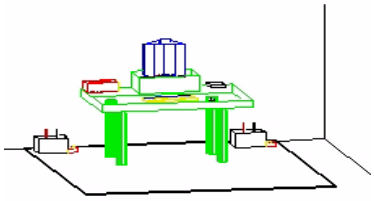


Figure 3-2. Line Conducted Emission Test Set-Up

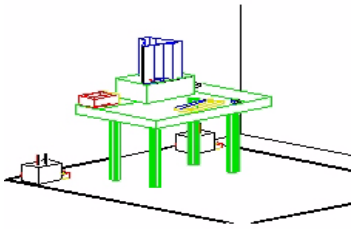


Figure 3-3. Wooden Table & Bonded LISNs

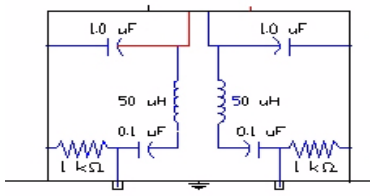


Figure 3-4. LISN Schematic Diagram

The line-conducted facility is located inside a 16'x20'x10' shielded enclosure, manufactured by Ray Proof Series 81 (*see Figure 3-1*). The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 65-5. A 1m x 1.5m wooden table 80cm high is placed 40cm away from the vertical wall and 1.5m away from the sidewall of the shielded room (*see Figure 3-2*). Solar Electronics and EMCO Model 3725/2 (10kHz-30MHz) 50Ω/50μH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room (*see Figure 3-3).* The EUT is powered from the Solar LISN and the support equipment is powered from the EMCO LISN. Power to the LISNs are filtered by a high-current high-insertion loss Ray Proof power line filter (100dB 14Hz-10GHz). The purpose of the filter is to attenuate ambient signal interference and this filter is also bonded to the shielded enclosure. All electrical cables are shielded by braided tinned copper zipper tubing with an inner diameter of ½". If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply line(s) will be connected to the Solar LISN. The LISN schematic diagram is shown (*see Figure 3-4*). All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion). Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT.

The spectrum was scanned from 150kHz to 30MHz with a spectrum analyzer. The detector function was set to CISPR quasi-peak and average mode. The bandwidth of the analyzer was set to 10kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission. Each emission was maximized by: switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment, and powering the monitor from the floor mounted outlet box and the computer aux AC outlet, if applicable; whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in the test setup photographs. Each EME reported was calibrated using the Agilent E8257D (250kHz – 20GHz) PSG Signal Generator.

3.2 Radiated Emissions

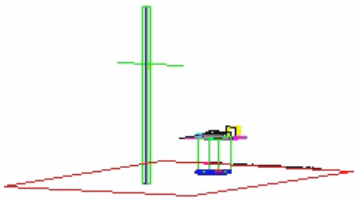


Figure 3-5. 3-Meter Test Site

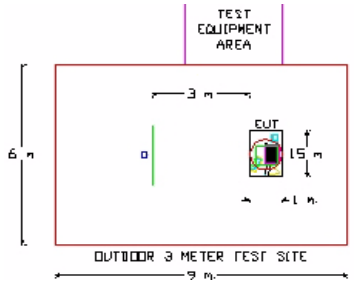


Figure 3-6. Dimensions of Outdoor Test Site

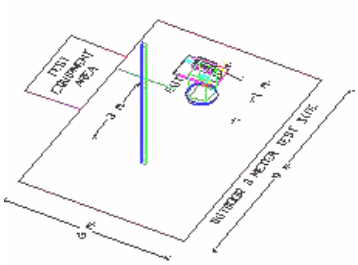


Figure 3-7. Turntable and System Setup

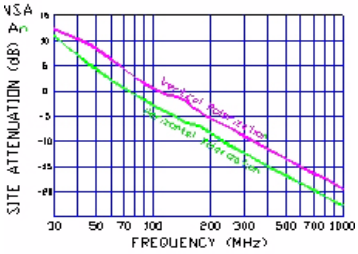


Figure 3-8. Normalized Site Attenuation Curves (H&V)

Preliminary measurements were made indoors at 1-meter using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, and turntable azimuth with respect to the antenna was noted for each frequency found. The spectrum was scanned from 30 to 200 MHz using a bi-conical antenna and from 200 to 1000 MHz using a log-spiral antenna. Above 1 GHz, linearly polarized double ridge horn antennas were used.

Final measurements were made outdoors at 3-meter test range using Roberts™ Dipole antennas or horn antennas (*see Figure 3-5*). The test equipment was placed on a wooden and plastic bench situated on a 1.5m x 2m area adjacent to the measurement area (*see Figure 3-6*). Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The detector function was set to CISPR quasi-peak mode and the bandwidth of the spectrum analyzer was set to 100kHz for frequencies below 1GHz or 1MHz for frequencies above 1GHz. Above 1GHz the detector function was set to average mode (RBW = 1MHz, VBW = 10Hz).

The half-wave dipole antenna was tuned to the frequency found during preliminary radiated measurements. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8-meter high non-metallic 1 x 1.5 meter table (*see Figure 3-7*). The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turntable containing the system was rotated and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment, and powering the monitor from the floor mounted outlet box and the computer aux AC outlet, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in the test setup photographs. Each EME reported was calibrated using the Agilent E8257D (250kHz – 20GHz) PSG Signal Generator. The Theoretical Normalized Site Attenuation Curves for both horizontal and vertical polarization are shown in Figure 3-8.

4.0 ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:
"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 antenna(s) of the Transportation Control System are professionally installed by the manufacturer and are fixed mounted in a rail car**.**

Conclusion:

The **Carborne Unit Transportation Control System FCC ID: QSCCARBORNE2** unit complies with the requirement of §15.203.

5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST).

Manufacturer	Model	Description	Calibration Date	Cal Interval	Calibration Due	Serial No.
-	No.165	(30MHz - 1000MHz) RG58 Coax Cable	N/A		N/A	N/A
-	No.166	(1000-26500MHz) Microwave RF Cable	N/A		N/A	N/A
-	No.167	(100kHz - 100MHz) RG58 Coax Cable	N/A		N/A	N/A
Agilent	11713A	Attenuation/Switch Driver	12/13/07	Annual	12/13/08	3439A02645
Agilent	8447D	Broadband Amplifier	N/A		N/A	1937A03348
Agilent	8447D	Broadband Amplifier	N/A		N/A	2443A01900
Agilent	8449B	(1-26.5GHz) Pre-Amplifier	12/13/07	Annual	12/12/08	3008A00985
Agilent	85650A	Quasi-Peak Adapter	3/13/08	Annual	3/13/09	2043A00301
Agilent	8566B	(100Hz–22GHz) Spectrum Analyzer	12/13/07	Annual	12/13/08	3638A08713
Agilent	8566B	Opt. 462 Impulse Bandwidth	12/13/07	Annual	12/12/08	3701A22204
Agilent	E4407B	ESA Spectrum Analyzer	3/13/08	Annual	3/13/09	US39210313
Agilent	E4448A	(3Hz-50GHz) Spectrum Analyzer	1/24/08	Annual	1/24/09	US42510244
Agilent	E8257D	(250kHz-20GHz) Signal Generator	3/8/07	Biennial	3/8/09	MY45470194
Emco	3115	Horn Antenna (1-18GHz)	9/24/07	Biennial	9/23/09	9704-5182
Emco	3115	Horn Antenna (1-18GHz)	10/4/07	Biennial	10/3/09	9205-3874
Emco	3121C-DB4	Dipole Antenna	1/23/07	Biennial	1/22/09	00023951
MiniCircuits	VHF-3100+	High Pass Filter	N/A		N/A	30721
Rohde & Schwarz	NRVD	Dual Channel Power Meter	12/12/06	Biennial	12/11/08	101695
Rohde & Schwarz	NRVS	Single Channel Power Meter	7/3/07	Biennial	7/2/09	835360/0079
Rohde & Schwarz	NRV-Z32	Peak Power Sensor (100uW-2W)	12/21/06	Biennial	12/20/08	100155
Rohde & Schwarz	NRV-Z33	Peak Power Sensor (1mW-20W)	11/28/06	Biennial	11/27/08	100004
Rohde & Schwarz	NRV-Z53	Power Sensor	7/3/07	Biennial	7/2/09	846076/0007
Solar Electronics	8012-50-R-24-BNC	LISN	11/8/07	Biennial	11/8/09	0310233
Sunol	DRH-118	Horn Antenna (1 - 18GHz)	5/9/07	Biennial	5/8/09	A050307

Table 5-1. Annual Test Equipment Calibration Schedule

6.0 TEST RESULTS

6.1 Summary

Company Name: Siemens Transportation Systems

FCC ID: QSCCARBORNE2

FCC Classification: Digital Transmission System (DTS)

Antenna Tested: 9 dBi Horn Antenna

FCC Part Section(s)	RSS 210 Section	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER MODE (TX)						
15.247(a)(2)	RSS-210 [A8.2 (1)]	6dB Bandwidth	> 500kHz	CONDUCTED	Pass	Section 6.2
15.247(b)(3)	RSS-210 [A8.4 (4)]	Transmitter Output Power	< 1 Watt		Pass	Sections 6.3
15.247(e)	RSS-210 [A8.2 (2)]	Transmitter Power Spectral Density	< 8dBm / 3kHz Band		Pass	Section 6.4
15.247(d)	RSS-210 [A8.5]	Band Edge / Out-of-Band Emissions	Conducted < 20dBc		Pass	Sections 6.5, 6.6
15.205 15.209	RSS-210 [A8.5]	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209 (RSS-210 table 3 limits)	RADIATED	Pass	Sections 6.7, 6.8
15.207	RSS-Gen [7.2.2]	AC Conducted Emissions 150kHz – 30MHz	< FCC 15.207 limits or < RSS-Gen table 2 limits	LINE CONDUCTED	N/A	N/A
RF EXPOSURE						
2.1091 / 2.1093	RSS-102	MPE	1 mW/cm² (MPE) @ 20cm	MPE	Pass	MPE Report

Table 6-1. Summary of Test Results

6.2 6dB Bandwidth Measurement

§15.247(a)(2); RSS-210(A8.2 (1))

The bandwidth at 6dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the receive antenna while the EUT is operating in transmission mode at the appropriate frequencies. ***The minimum permissible 6dB bandwidth is 500 kHz.***

Frequency [MHz]	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
2408	3.620	0.500	Pass
2441	3.340	0.500	Pass
2474	3.320	0.500	Pass

Table 6-2. Conducted Bandwidth Measurements

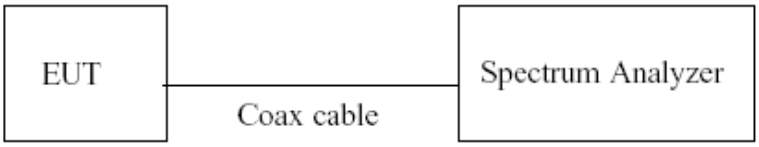


Figure 6-1. Test Instrument & Measurement Setup

Plot 6-1. 6dB Bandwidth Plot (2408 MHz – Low Channel)

Plot 6-2. 6dB Bandwidth Plot (2441 MHz – Mid Channel)

Plot 6-3. 6dB Bandwidth Plot (2474MHz – High Channel)

6.3 Output Power Measurement

§15.247(b)(3); RSS-210(A8.4 (4))

A transmitter antenna terminal of EUT is connected to the input of a RF power sensor. Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies. ***The maximum permissible conducted output power is 1 Watt.***

The CRE is installed with a fixed length coax and attenuator. The loss of the coax cable and attenuator are added to the output power along with the gain of the horn antenna to determine the EIRP.

Frequency (MHz)	Conducted Power at RF Terminal (dBm)	Limit (dBm)	Status (Pass/Fail)	Cable Loss (dB)	Atten. (dB)	Antenna Gain (dBi)	EIRP Total (dBm)	Limit (dBm)	Status (Pass/Fail)
2408	**27.02**	30	Pass	1.04	2	9	32.98	36	Pass
2441	**27.45**	30	Pass	1.04	2	9	33.41	36	Pass
2474	**27.23**	30	Pass	1.04	2	9	33.19	36	Pass

Table 6-3. Conducted Output Power Measurements

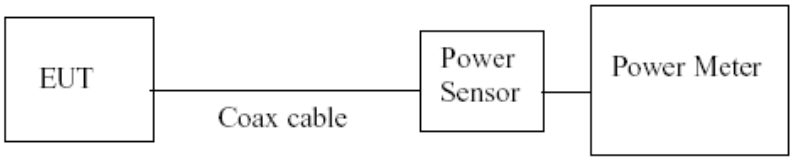


Figure 6-2. Test Instrument & Measurement Setup

6.4 Power Spectral Density

§15.247(e); RSS-210(A8.2 (2))

The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies. ***The maximum permissible power spectral density is 8 dBm in any 3 kHz band.***

Frequency [MHz]	Measured Power Spectral Density [dBm]	Maximum Permissible Power Density [dBm / 3kHz]	Margin [dB]
2408	3.931	8.0	-4.1
2441	5.084	8.0	-2.9
2474	5.035	8.0	-3.0

Table 6-4. Conducted Power Density Measurements

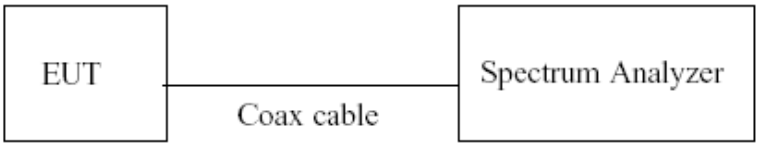
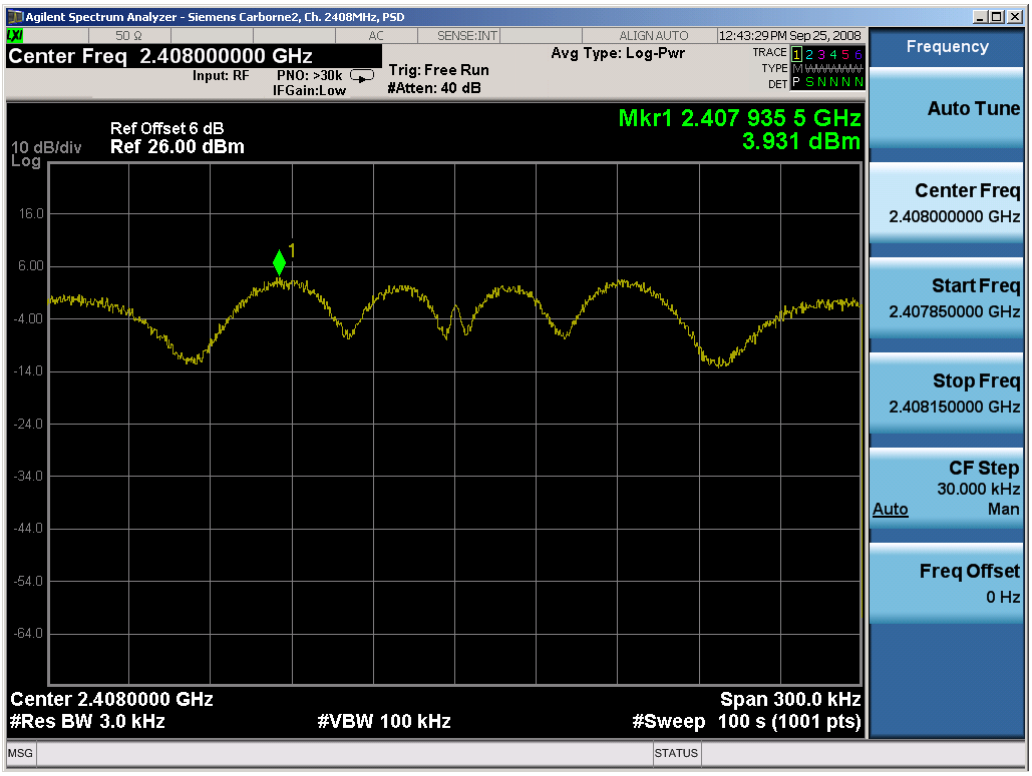
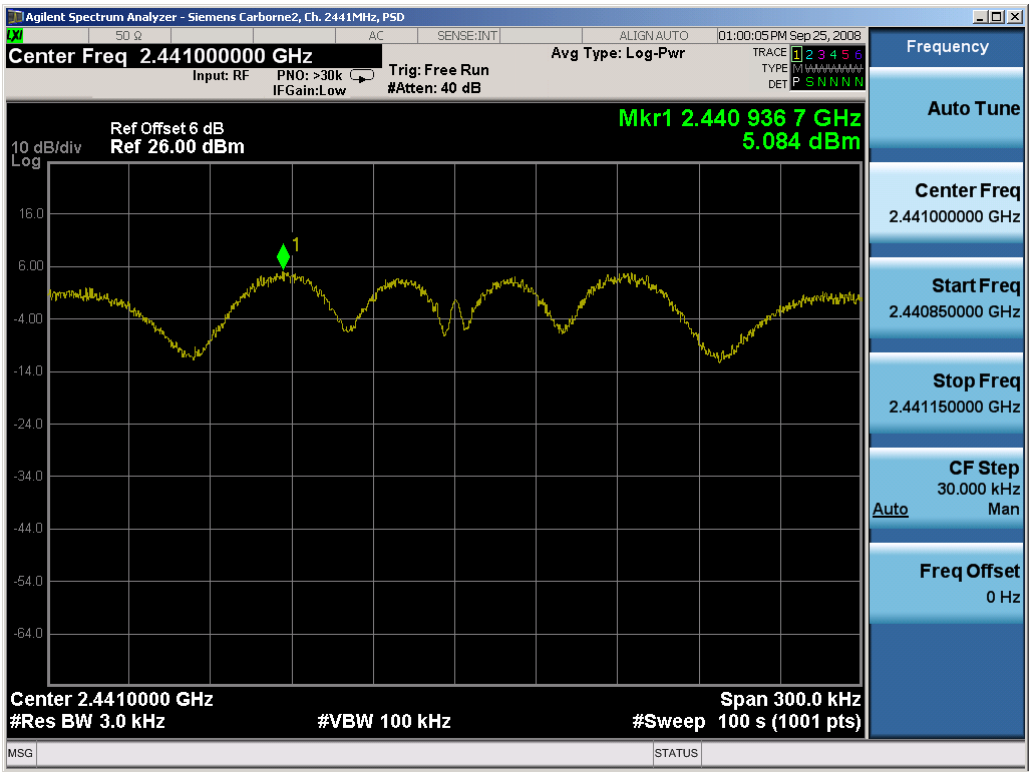


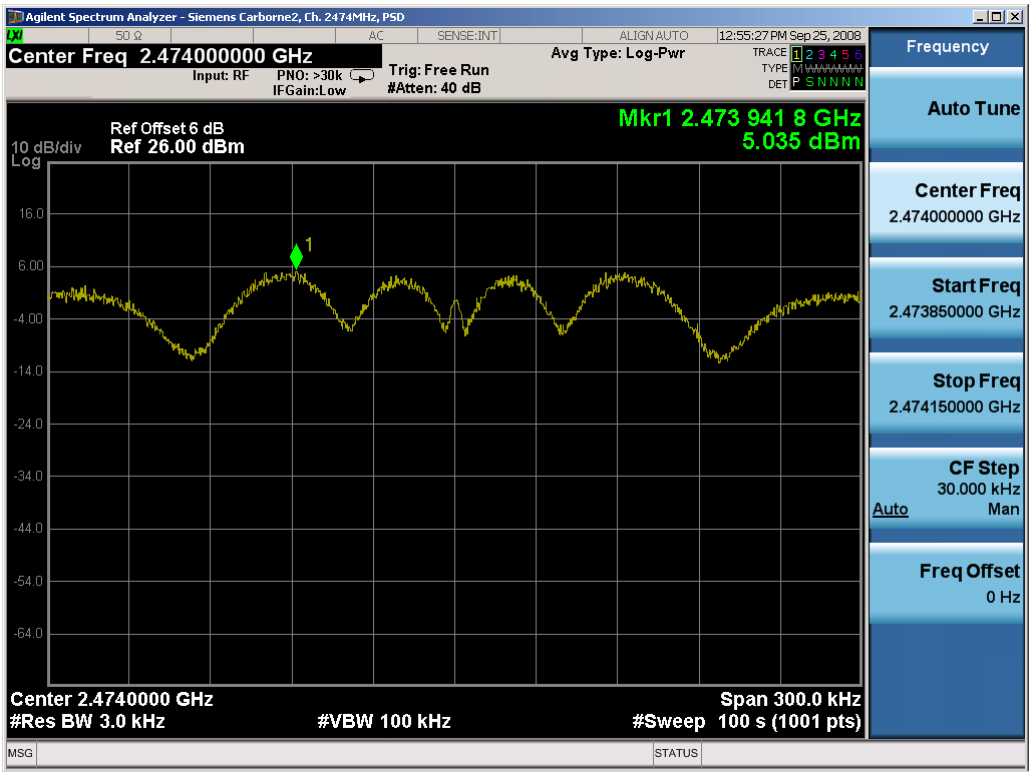
Figure 6-3. Test Instrument & Measurement Setup



Plot 6-4. Power Spectral Density Plot (2408MHz – Low Channel)



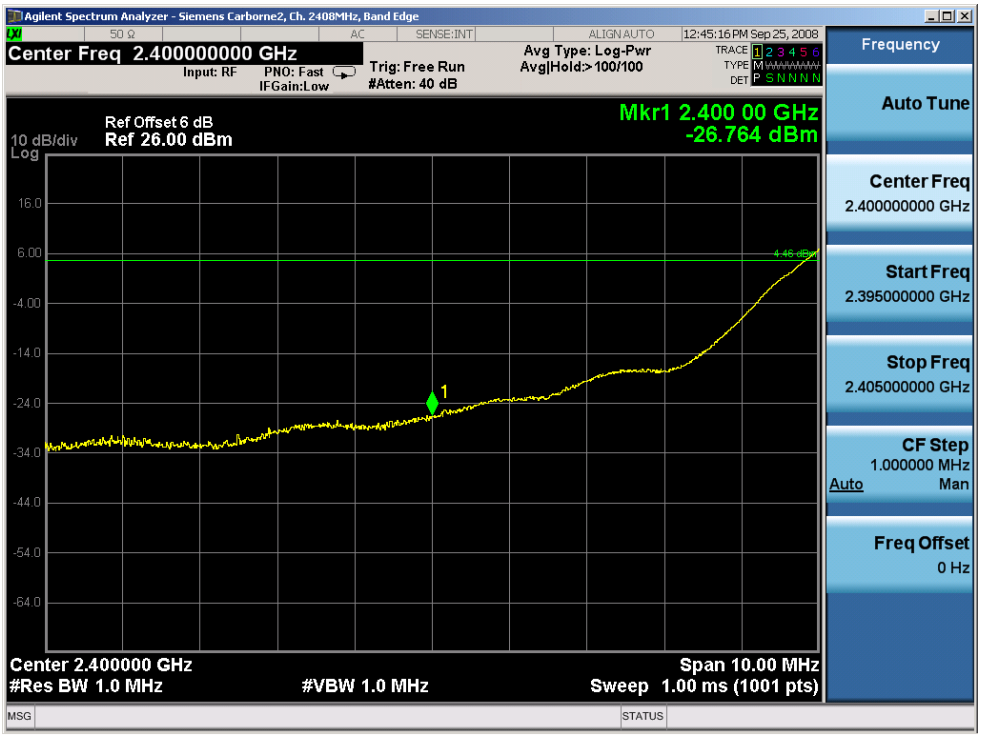
Plot 6-5. Power Spectral Density Plot (2441MHz – Mid Channel)



Plot 6-6. Power Spectral Density Plot (2474MHz – High Channel)

6.5 Conducted Emissions at the Band Edge

§15.247(d); RSS-210(A8.5)

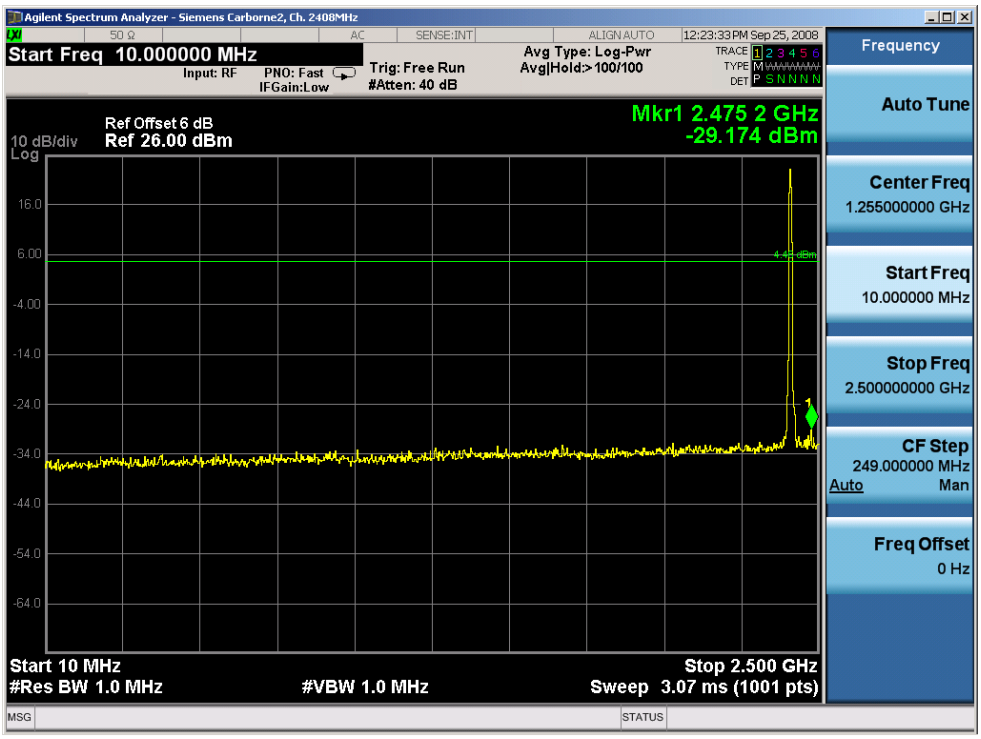


Plot 6-7. Band Edge Plot at 2400MHz (Low Channel – 2408MHz)

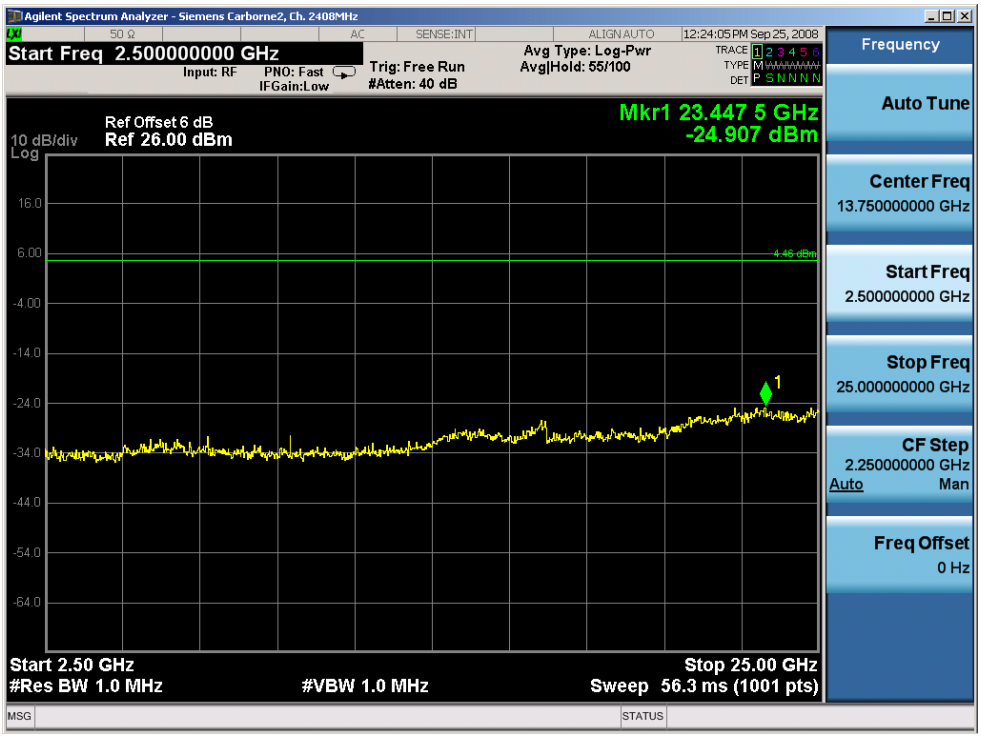
Plot 6-8. Band Edge Plot at 2483.5MHz (High Channel – 2474MHz)

6.6 Conducted Spurious Emissions

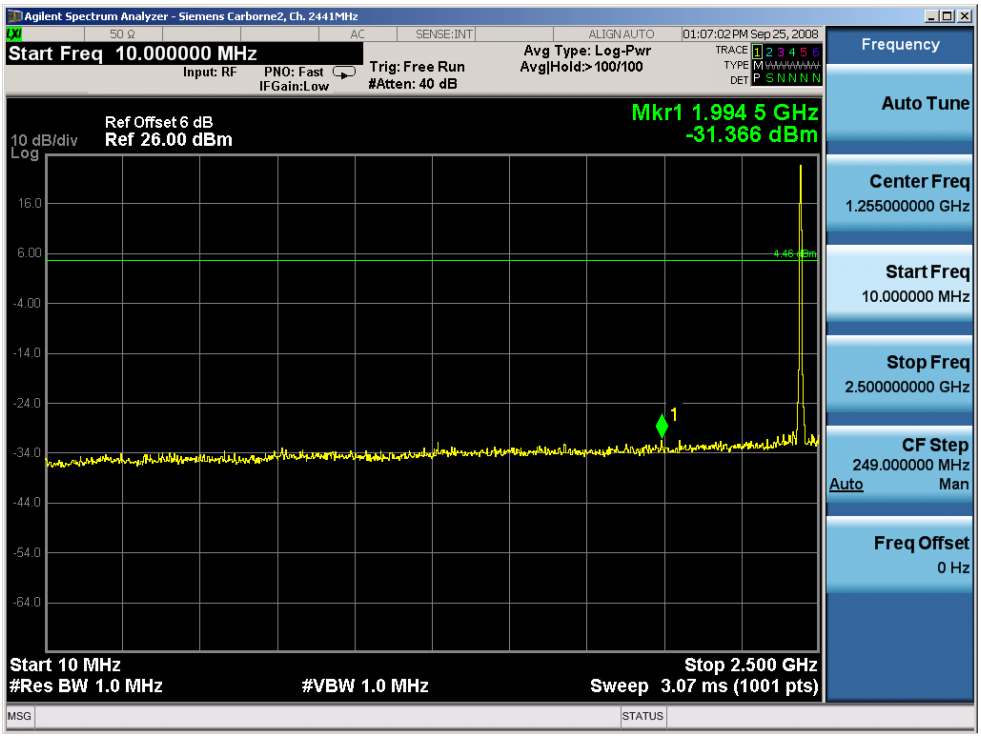
§15.247(d); RSS-210(A8.5)



Plot 6-9. Conducted Spurious Plot (Low Channel)

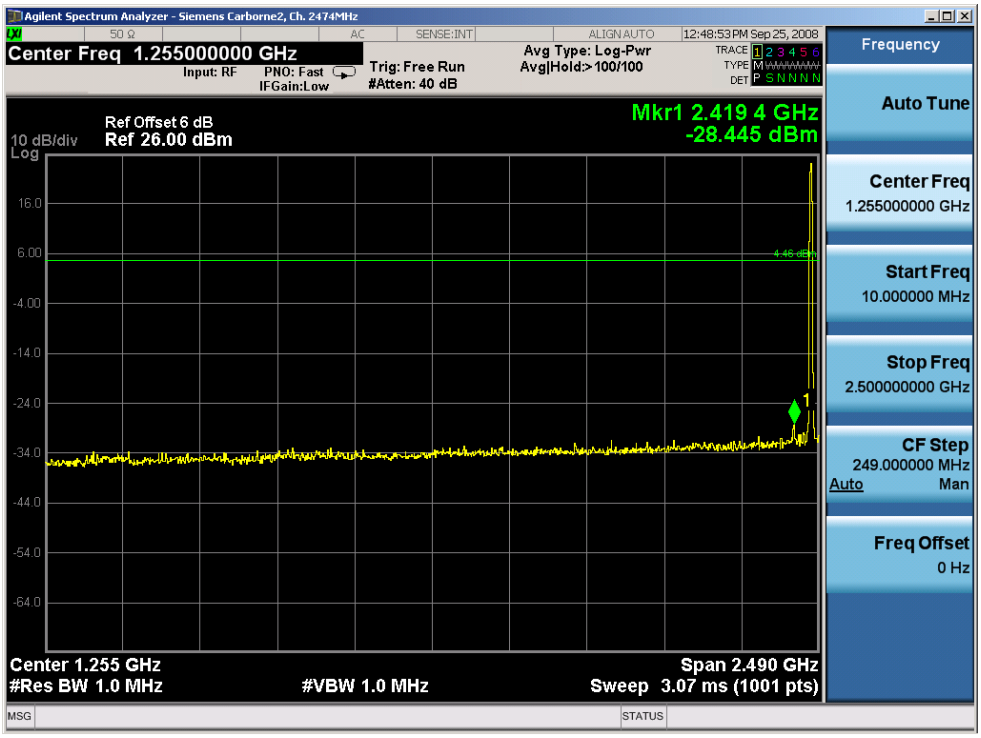


Plot 6-10. Conducted Spurious Plot (Low Channel)



Plot 6-11. Conducted Spurious Plot (Mid Channel)

Plot 6-12. Conducted Spurious Plot (Mid Channel)



Plot 6-13. Conducted Spurious Plot (High Channel)

Plot 6-14. Conducted Spurious Plot (High Channel)

6.7 Radiated Spurious Emission Measurements

§15.247(d) / §15.205 & §15.209; RSS-210(A8.5)

The EUT was tested from 9kHz up to the tenth harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. Above 1 GHz, average measurements were taken using RBW= 1MHz, VBW= 10Hz, and linearly polarized horn antennas. All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table 6-5 per Section 15.209

Frequency	Field Strength [μV/m]	Measured Distance [Meters]
0.009 – 0.490 MHz	2400/F (kHz)	300
0.490 – 1.705 MHz	24000/F (kHz)	30
1.705 – 30.00 MHz	30	30
30.00 – 88.00 MHz	100	3
88.00 – 216.0 MHz	150	3
216.0 – 960.0 MHz	200	3
Above 960.0 MHz	500	3

Table 6-5. Radiated Limits

Sample Calculation

- Field Strength Level $_{[dB\mu V/m]}$ = Analyzer Level $_{[dBm]}$ + 107 + AFCL $_{[dB]}$

Notes:

- AFCL = Antenna Factor $_{[dB]}$ + Cable Loss $_{[dB]}$

Radiated Spurious Emission Measurements (Cont'd)

§15.247(d) / §15.205 & §15.209; RSS-210(A8.5)

Channel: Low

Operating Frequency: 2408MHz

Distance of Measurements: 3 Meters

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol [H/V]	AFCL [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4816.00	-98.30	Avg	V	38.18	46.88	53.98	-7.10
4816.00	-90.10	Peak	V	38.18	55.08	73.98	-18.90
12040.00	-135.00	Avg	H	47.22	19.22	53.98	-34.76
12040.00	-125.00	Peak	H	47.22	29.22	73.98	-44.76

Table 6-6. Radiated Measurements @ 3 meters

NOTES:

1. All emissions shown lie in the restricted bands specified in §15.205 and RSS-210 section 2.7, Table 1 and are below the limit shown in Table 6-5.

2. Average Measurements > 1GHz using RBW = 1MHz VBW = 10Hz

3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.

4. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.

5. The spectrum is measured from 9kHz to the 10^{th} harmonic and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.

6. Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.

7. Above 960MHz the limit is 500 μV/m (54dBμ/m) at 3 meters radiated.

Radiated Spurious Emission Measurements (Cont'd)

§15.247(d) / §15.205 & §15.209; RSS-210(A8.5)

Channel: Mid

Operating Frequency: 2441MHz

Distance of Measurements: 3 Meters

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol [H/V]	AFCL [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4882.00	-94.50	Avg	V	38.26	50.76	53.98	-3.22
4882.00	-86.70	Peak	V	38.26	58.56	73.98	-15.42
7323.00	-98.08	Avg	H	42.13	51.05	53.98	-2.93
7323.00	-80.30	Peak	H	42.13	68.83	73.98	-5.15
12205.00	-135.00	Avg	H	47.28	19.28	53.98	-34.70
12205.00	-125.00	Peak	H	47.28	29.28	73.98	-44.70

Table 6-7. Radiated Measurements @ 3 meters

NOTES:

1. All emissions shown lie in the restricted bands specified in §15.205 and RSS-210 section 2.7, Table 1 and are below the limit shown in Table 6-5.

2. Average Measurements > 1GHz using RBW = 1MHz VBW = 10Hz

3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.

4. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.

5. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.

6. Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.

7. Above 960MHz the limit is 500 μV/m (54dBμ/m) at 3 meters radiated.

Radiated Spurious Emission Measurements (Cont'd)

§15.247(d) / §15.205 & §15.209; RSS-210(A8.5)

Channel: High

Operating Frequency: 2474MHz

Distance of Measurements: 3 Meters

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol [H/V]	AFCL [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4948.00	-95.90	Avg	V	38.33	49.43	53.98	-4.55
4948.00	-84.80	Peak	V	38.33	60.53	73.98	-13.45
7422.00	-98.40	Avg	H	42.34	50.94	53.98	-3.04
7422.00	-84.70	Peak	H	42.34	64.64	73.98	-9.34
12370.00	-135.00	Avg	H	47.33	19.33	53.98	-34.65
12370.00	-125.00	Peak	H	47.33	29.33	73.98	-44.65

Table 6-8. Radiated Measurements @ 3 meters

NOTES:

1. All emissions shown lie in the restricted bands specified in §15.205 and RSS-210 section 2.7, Table 1 and are below the limit shown in Table 6-5.

2. Average Measurements > 1GHz using RBW = 1MHz VBW = 10Hz

3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.

4. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.

5. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.

6. Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.

7. Above 960MHz the limit is 500 μV/m (54dBμ/m) at 3 meters radiated.

6.8 Radiated Restricted Band Edge Measurements

§15.205 / §15.209; RSS-210(A8.5)

Channel: High

Operating Frequency: 2474MHz

Distance of Measurements: 3 Meters

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol [H/V]	AFCL [dB]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
2483.50	-92.80	Avg	V	32.27	0.00	46.47	53.98	-7.51
2483.50	-83.80	Peak	V	32.27	0.00	55.47	73.98	-18.51
2483.94	-91.37	Avg	V	32.27	0.00	47.90	53.98	-6.08
2483.94	-82.00	Peak	V	32.27	0.00	57.27	73.98	-16.71
2484.70	-92.24	Avg	V	32.27	0.00	47.03	53.98	-6.95
2484.70	-82.43	Peak	V	32.27	0.00	56.84	73.98	-17.14

Table 6-9. Radiated Restricted Band Edge Measurements at 3-meters

NOTES:

1. All emissions shown lie in the restricted bands specified in §15.205 and RSS-210 section 2.7, Table 1 and are below the limit shown in Table 6-5.

2. Average Measurements > 1GHz using RBW = 1MHz VBW = 10Hz

3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.

4. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.

5. The spectrum is measured from 9kHz to the 10^{th} harmonic and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.

6. Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.

7. Above 960MHz the limit is 500 μV/m (54dBμ/m) at 3 meters radiated.

7.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Carborne Unit Transportation Control System FCC ID: QSCCARBORNE2** is in compliance with Part 15C of the FCC Rules.