Nemko Test Report:	10210985RUS1Rev2
Applicant:	Stemco LP 300 Industrial Blvd. Longview, TX 75062 USA
Equipment Under Test: (E.U.T.)	Tractor Interface Module
FCC ID:	SRA-821
IC ID:	7413A-821
In Accordance With:	**FCC Part 15, Subpart C, 15.247 and RSS-210, Issue 8** Digital Transmission Systems
Tested By:	Nemko USA, Inc. 802 N. Kealy Lewisville, Texas 75057-3136

TESTED BY: _____ **DATE:** **15 July 2011**

David Light, Senior Wireless Engineer

APPROVED BY: _____ **DATE:** **29 August 2011**

Tom Tidwell, Reviewer

Number of Pages: 23

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Section 1. Summary of Test Results

Manufacturer: Stemco LP

Model No.: Tractor Interface Module

Serial No.: None

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart C, Paragraph 15.247 and Industry Canada RSS-210, Issue 8 for Digital Transmission Systems. Radiated tests were conducted is accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC and Industry Canada.

☒	New Submission	☒	Production Unit
☐	Class II Permissive Change	☐	Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.
See " Summary of Test Data".

NVLAP Lab Code 100426-0

Summary Of Test Data

NAME OF TEST	PARA. NO.	RSS PARA. NO.	RESULT
Powerline Conducted Emissions	15.207(a)	RSS-GEN	NA
Minimum 6 dB Bandwidth	15.247(a)(2)	A8.2(a)	Complies
Maximum Peak Power Output	15.247(b)(3)	A8.4(4)	Complies
Spurious Emissions (Antenna Conducted)	15.247(d)	A8.5	Not tested
Spurious Emissions (Restricted Bands)	15.247(d)/15.209(a)	RSS-GEN	Complies
Peak Power Spectral Density	15.247(e)	A8.2(b)	Complies
Receiver Spurious Emissions	-	RSS-GEN	Complies

Footnotes:

1) The EUT is battery powered.
2) The EUT has an integral antenna.

Note: All tests were performed radiated. The conducted power and spectral density was calculated from the EIRP using the manufacturers stated antenna gain of 3 dBi maximum.

Section 2. Equipment Under Test (E.U.T.)

General Equipment Information

Frequency Band (MHz):	902-928	2400-2483.5	5725-5850
	☐	☒	☐

Operating Frequency of Test Sample: 2403 to 2479 MHz

6 dB Bandwidth: 889.8 kHz maximum

User Frequency Adjustment: Software controlled

Description of EUT

2.4 GHz wireless transceiver.

Section 3. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 15.247(a)(2)
TESTED BY: David Light	DATE: 11 July 2011

Test Results: Complies.

Measurement Data: See 6 dB BW plot
Measured 6 dB bandwidth: 889.8 kHz

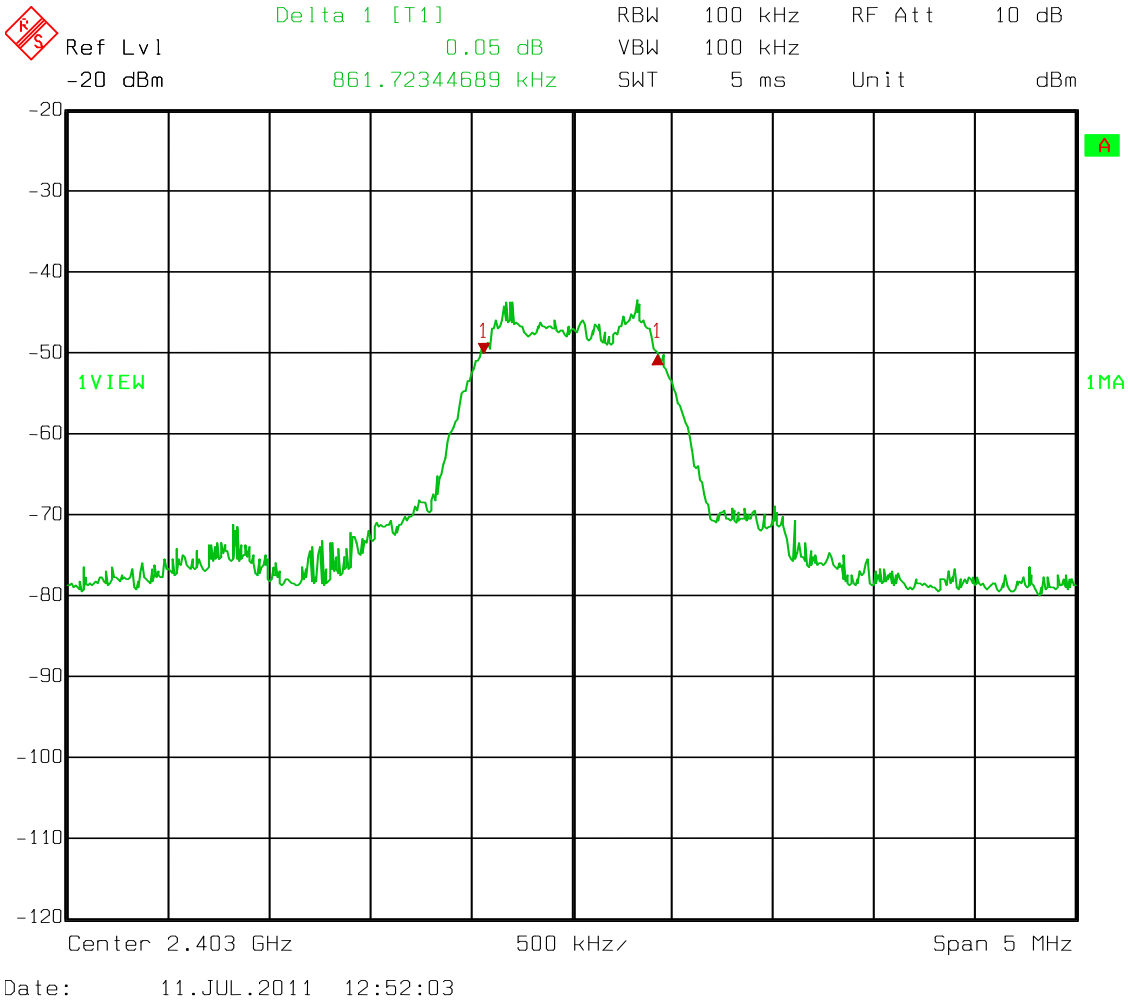
Test Conditions: 49 %RH
22 °C

Measurement Uncertainty: +/-1x10^{-7} ppm

Test Equipment Used: 1767-993-1484-1485

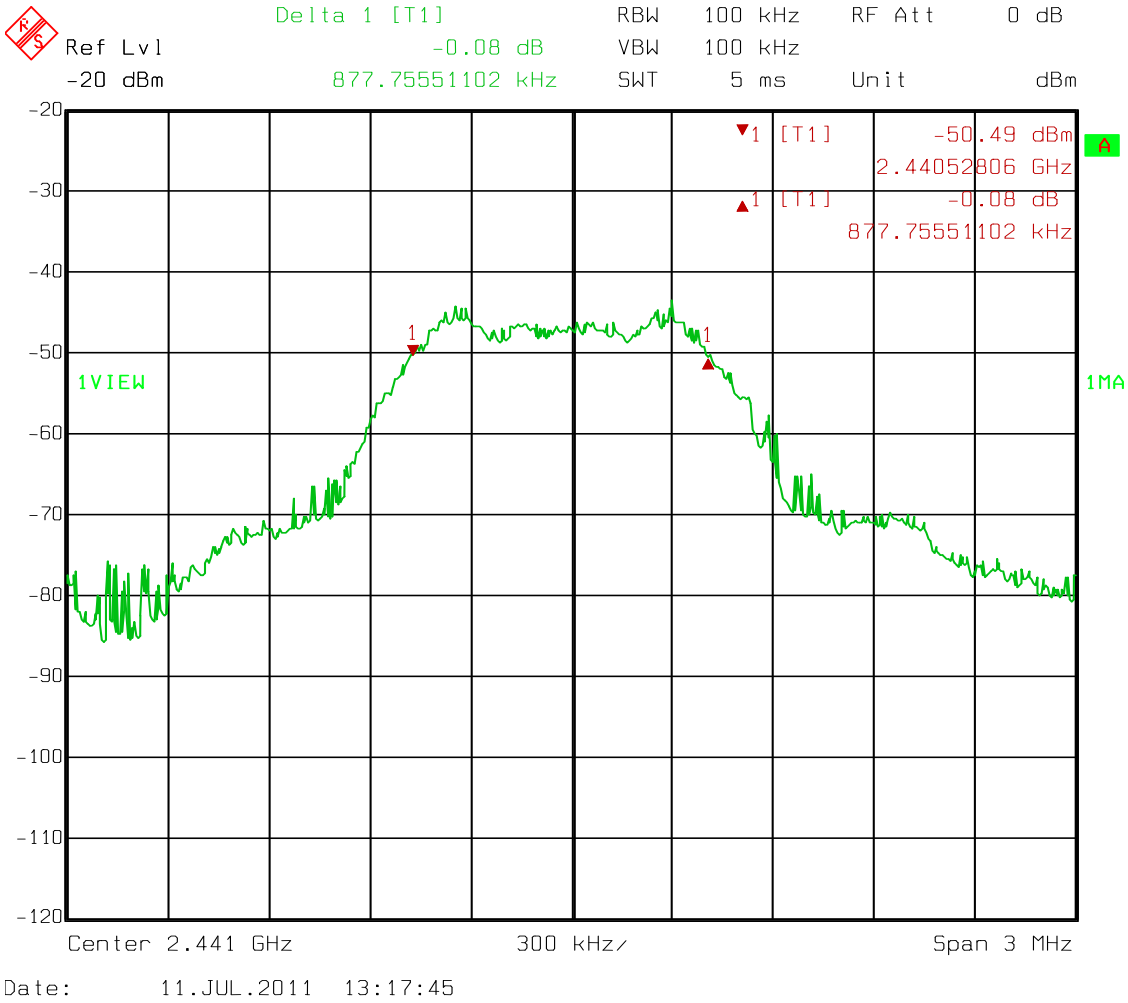
Test Data – Occupied Bandwidth

Low Channel



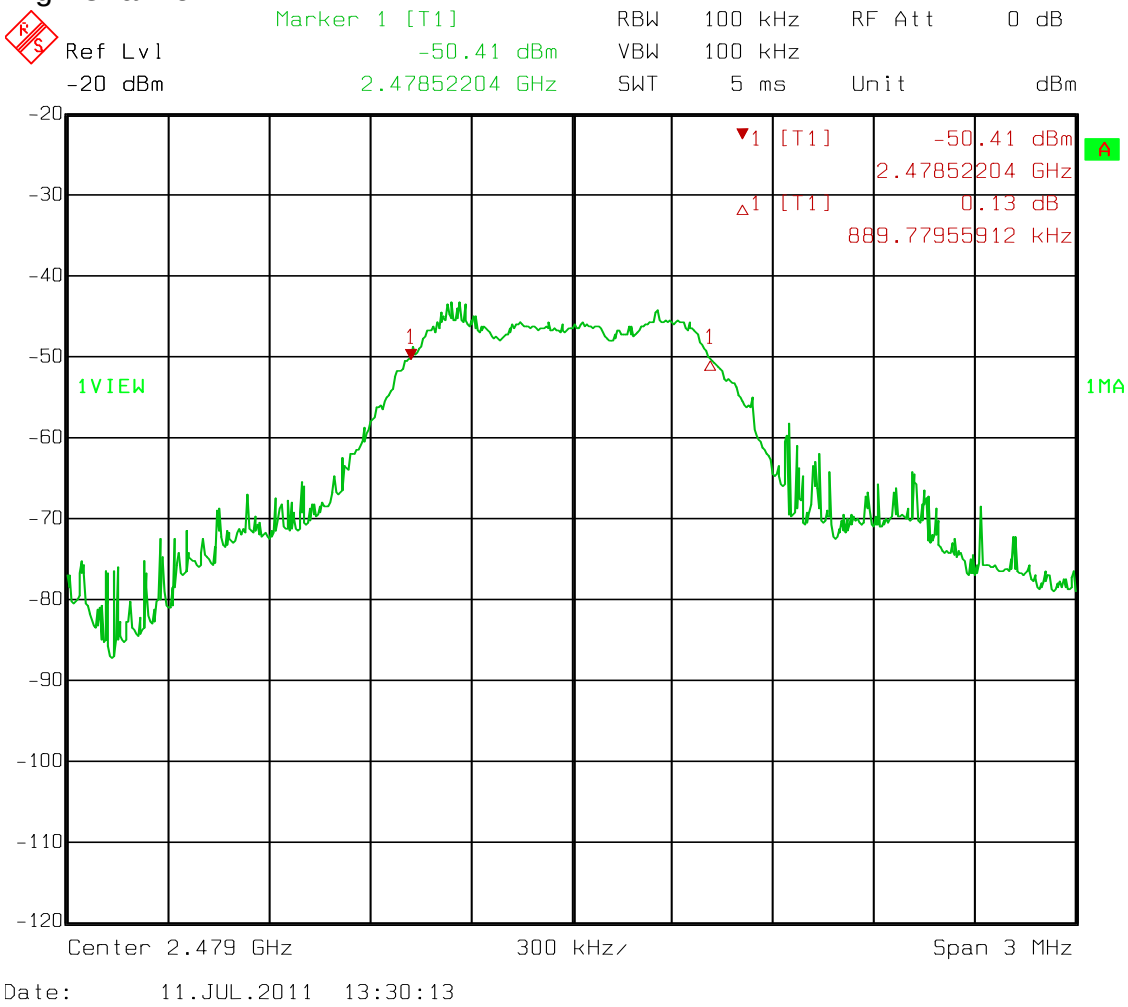
Test Data – Occupied Bandwidth

Mid Channel



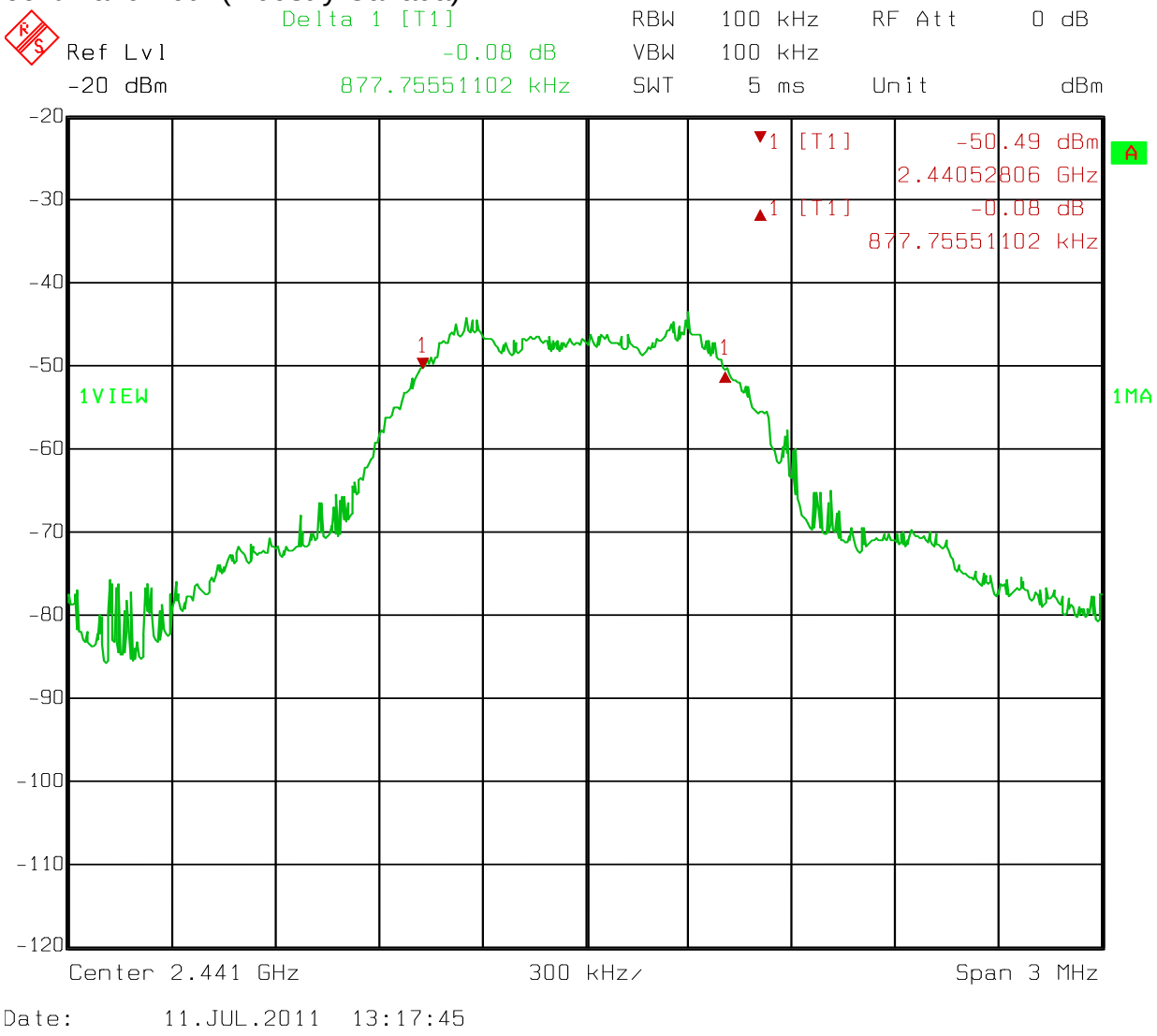
Test Data – Occupied Bandwidth

High Channel



Test Data – Occupied Bandwidth

99% Bandwidth (Industry Canada)



Section 4. Maximum Peak Output Power

NAME OF TEST: Maximum Peak Output power	PARA. NO.: 15.247(b)(3)
TESTED BY: David Light	DATE: 11 July 2011

Test Results: Complies.

Measurement Data:

Freq (MHz)	EIRP (dBm)	Gain (dBi)	Output Power (dBm)	Output Power (mW)
2403	8.0	3	5.0	3.14
2441	6.9	3	3.9	2.44
2479	6.7	3	3.7	2.33

Frequency (MHz)	Measured Level (dBuV/m)	AF (dB/m)	Preamp Gain (dB)	Cable Loss (dB)	Corrected Level (dBuV/m@3m)	Corrected Level (uV/m)	EIRP (W)	EIRP (mW)	EIRP (dBm)
2403	67.8	29	0	6.4	103.2	144543.98	0.0063	6.3	8.0
2441	66.7	29	0	6.4	102.1	127350.31	0.0049	4.9	6.9
2479	66.5	29	0	6.4	101.9	124451.46	0.0046	4.6	6.7

	RBW	VBW	Detector
	2 MHz	2 MHz	Peak

Test Conditions: 48 %RH
22 °C

Measurement Uncertainty: +/-1.7 dB

Test Equipment Used: 1767-1484-1485-1993

☐ This device was tested at +/- 15% input power per 15.31(e), with no variation in output power.

☒ For battery powered equipment, the device was tested with a fresh battery per 15.31(e).

☒ The device was tested on three channels per 15.31(l).

Section 5. Spurious Emissions

NAME OF TEST: Spurious Emissions	PARA. NO.: 15.247 (d)
TESTED BY: David Light	DATE: 13 July 2011

Test Results: Complies.

Measurement Data: See attached table.

Test Conditions: 48 %RH
22 °C

Measurement Uncertainty: +/-1.7 dB

Test Equipment Used: 1464-1484-1485-1480-993-1025-1016

Notes:

☐ For handheld devices, the EUT was tested on three orthogonal axis'

☒ The device was tested from 30 MHz to the tenth harmonic of the highest fundamental frequency per 15.33

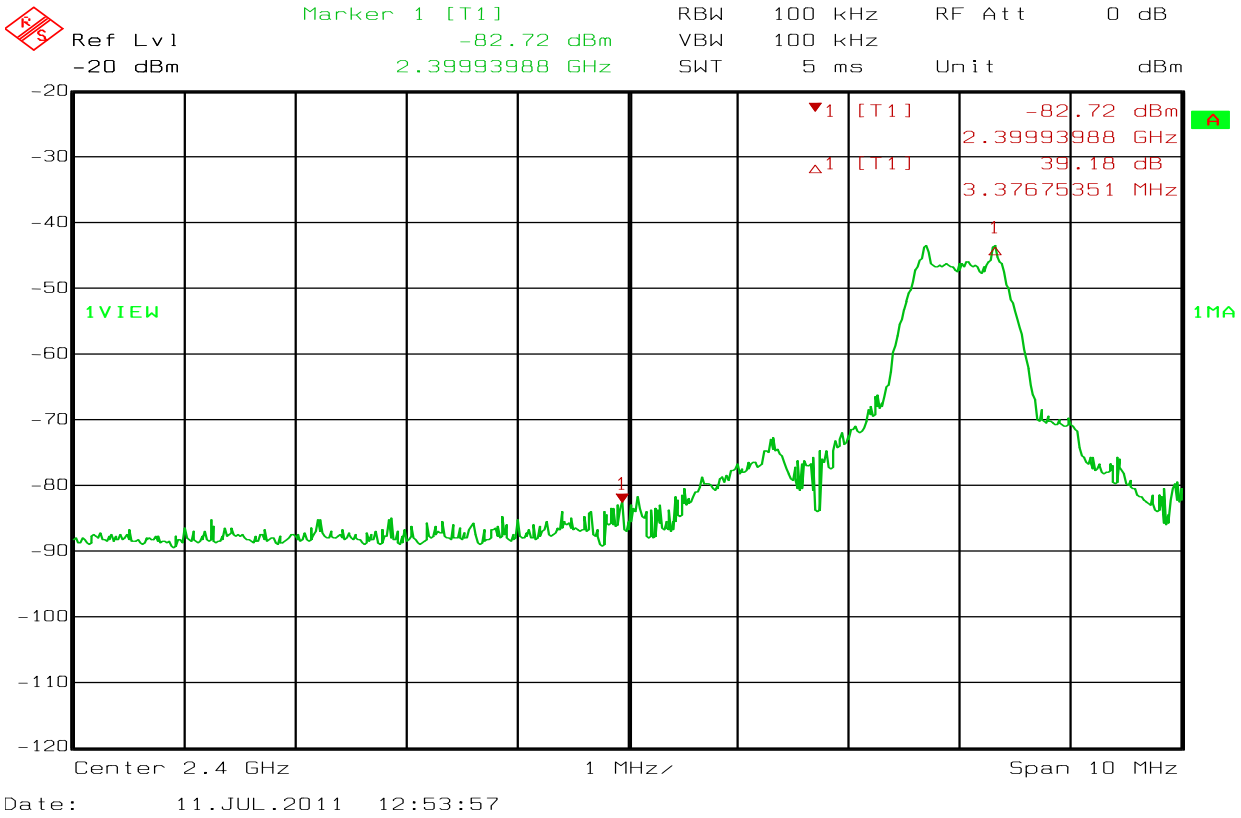
☒ The device was tested on three channels per 15.31(l).

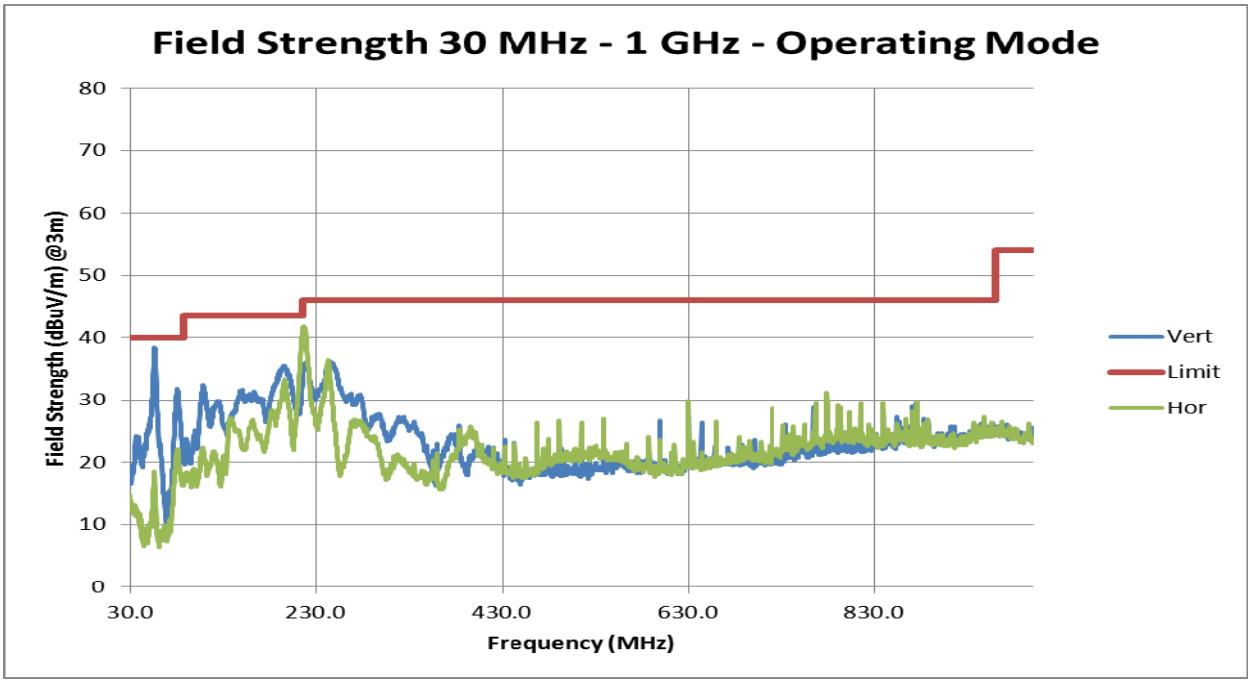
☐ No emissions were detected within 20 dB of the specification limit therefore none are reported per 15.31(o). Band edge data is presented below.

Measured Frequency	RBW	VBW	Detector
<1000 MHz	100 kHz	100 kHz	Peak
>1000 MHz	1 MHz	1 MHz	Peak
>1000 MHz Avg.	1 MHz	10 Hz	Peak

Note: For average readings the video bandwidth is narrowed to 10 Hz. If the peak reading exceeds the average limit, the VBW is reduced and an average measurement is taken and compared to the average limit.

Spurious Emissions





Low Channel

Meas. Freq. (MHz)	Ant. Pol. (H/V)	Atten. (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail Unc.	Comment
											Low Channel
2310	V	0	40	28.8	6.0	32.0	42.8	74.0	-31.2	Pass	Noise Floor
2310	V	-32	40	28.8	6.0	32.0	10.8	54.0	-43.2	Pass	Noise Floor
2390	V	0	42	28.9	6.1	32.0	45.0	74.0	-29.0	Pass	Noise Floor
2390	V	-32	42	28.9	6.1	32.0	13.0	54.0	-41.0	Pass	Noise Floor
4806	V	0	60.8	33.8	4.3	31.5	67.4	74.0	-6.6	Pass	
4806	V	-37.1	60.8	33.8	4.3	31.5	30.3	54.0	-23.7	Pass	
7209	V	0	55	35.9	5.3	31.3	64.9	74.0	-9.1	Pass	
7209	V	-37.1	55	35.9	5.3	31.3	27.8	54.0	-26.2	Pass	
9612	V	0	47.3	37.2	6.2	33.2	57.5	74.0	-16.5	Pass	
9612	V	-37.1	47.3	37.2	6.2	33.2	20.4	54.0	-33.6	Pass	
2310	V	0	40	28.8	6.0	32.0	42.8	74.0	-31.2	Pass	Noise Floor
2310	V	-32	40	28.8	6.0	32.0	10.8	54.0	-43.2	Pass	Noise Floor
2390	V	0	42	28.9	6.1	32.0	45.0	74.0	-29.0	Pass	Noise Floor
2390	V	-32	42	28.9	6.1	32.0	13.0	54.0	-41.0	Pass	Noise Floor
4806	H	0	62.8	33.8	4.3	31.5	69.4	74.0	-4.6	Pass	
4806	H	-37.1	62.8	33.8	4.3	31.5	32.3	54.0	-21.7	Pass	
7209	H	0	56.3	35.9	5.3	31.3	66.2	74.0	-7.8	Pass	
7209	H	-37.1	56.3	35.9	5.3	31.3	29.1	54.0	-24.9	Pass	
9612	H	0	45.7	37.2	6.2	33.2	55.9	74.0	-18.1	Pass	
9612	H	-37.1	45.7	37.2	6.2	33.2	18.8	54.0	-35.2	Pass	

Spurious Emissions

Mid Channel

Meas. Freq. (MHz)	Ant. Pol. (H/V)	Atten. (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail Unc.	Comment
											Mid Channel
4882	V	0	59.8	33.8	4.3	31.5	66.4	74.0	-7.6	Pass	
4882	V	-37.1	59.8	33.8	4.3	31.5	29.3	54.0	-24.7	Pass	
7323	V	0	56.3	35.9	5.3	31.3	66.2	74.0	-7.8	Pass	
7323	V	-37.1	56.3	35.9	5.3	31.3	29.1	54.0	-24.9	Pass	
9764	V	0	46.5	37.2	6.2	33.2	56.7	74.0	-17.3	Pass	
9764	V	-37.1	46.5	37.2	6.2	33.2	19.6	54.0	-34.4	Pass	
4882	H	0	61.6	33.8	4.3	31.5	68.2	74.0	-5.8	Pass	
4882	H	-37.1	61.6	33.8	4.3	31.5	31.1	54.0	-22.9	Pass	
7323	H	0	55.3	35.9	5.3	31.3	65.2	74.0	-8.8	Pass	
7323	H	-37.1	55.3	35.9	5.3	31.3	28.1	54.0	-25.9	Pass	
9764	H	0	45	37.2	6.2	33.2	55.2	74.0	-18.8	Pass	
9764	H	-37.1	45	37.2	6.2	33.2	18.1	54.0	-35.9	Pass	

High Channel

Meas. Freq (MHz)	Ant Pol (H/V	Atten (dB	Meter Readin (dBuV	Antenna Facto (dB	Pat Los (dB	R Gai (dB	Corrected Readin (dBuV/m	Spec limit (dBuV/m	CR/S Diff (dB	Pas Fai Unc	Comment
											High Channel
2483.5	V	0	33.5	29	3.1	0.0	65.6	74.0	-8.4	Pass	Peak Noise Floor
2483.5	V	-37.1	33.5	29	3.1	0.0	28.5	54.0	-25.5	Pass	Average Noise Floor
4958	V	0	58.6	33.8	4.3	31.5	65.2	74.0	-8.8	Pass	
4958	V	-37.1	58.6	33.8	4.3	31.5	28.1	54.0	-25.9	Pass	
7437	V	0	54.7	35.9	5.3	31.3	64.6	74.0	-9.4	Pass	
7437	V	-37.1	54.7	35.9	5.3	31.3	27.5	54.0	-26.5	Pass	
9916	V	0	47.3	37.2	6.2	33.2	57.5	74.0	-16.5	Pass	
9916	V	-37.1	47.3	37.2	6.2	33.2	20.4	54.0	-33.6	Pass	
2483.5	H	0	33.5	29	3.1	0.0	65.6	74.0	-8.4	Pass	Peak Noise Floor
2483.5	H	-37.1	33.5	29	3.1	0.0	28.5	54.0	-25.5	Pass	Peak Noise Floor
4958	H	0	59.1	33.8	4.3	31.5	65.7	74.0	-8.3	Pass	
4958	H	-37.1	59.1	33.8	4.3	31.5	28.6	54.0	-25.4	Pass	
7437	H	0	49	35.9	5.3	31.3	58.9	74.0	-15.1	Pass	
7437	H	-37.1	49	35.9	5.3	31.3	21.8	54.0	-32.2	Pass	

Section 6. Peak Power Spectral Density

NAME OF TEST: Peak Power Spectral Density	PARA. NO.: 15.247(e)
TESTED BY: David Light	DATE: 11 July 2011

Test Results: Complies.

Measurement Data: ..

Frequency Measured (MHz)	EIRP (dBm)	Gain (dBi)	Density (dBm)
2403	-12.4	3	-15.4
2441	-12.3	3	-15.3
2479	-11.3	3	-14.3

Test Conditions: 49 %RH
23 °C

Measurement Uncertainty: +/-1.7 dB

Test Equipment Used: 1767-1484-1485-993

RBW (kHz)	VBW (kHz)	Span (MHz)	Sweep Time	Detector
3	3	1	360 s	Peak

Section 7 - Receiver Spurious Emissions

NAME OF TEST: Receiver Spurious Emissions	PARA. NO.: RSS-GEN
TESTED BY: David Light	DATE: 11 July 2011

Test Results: Complies.

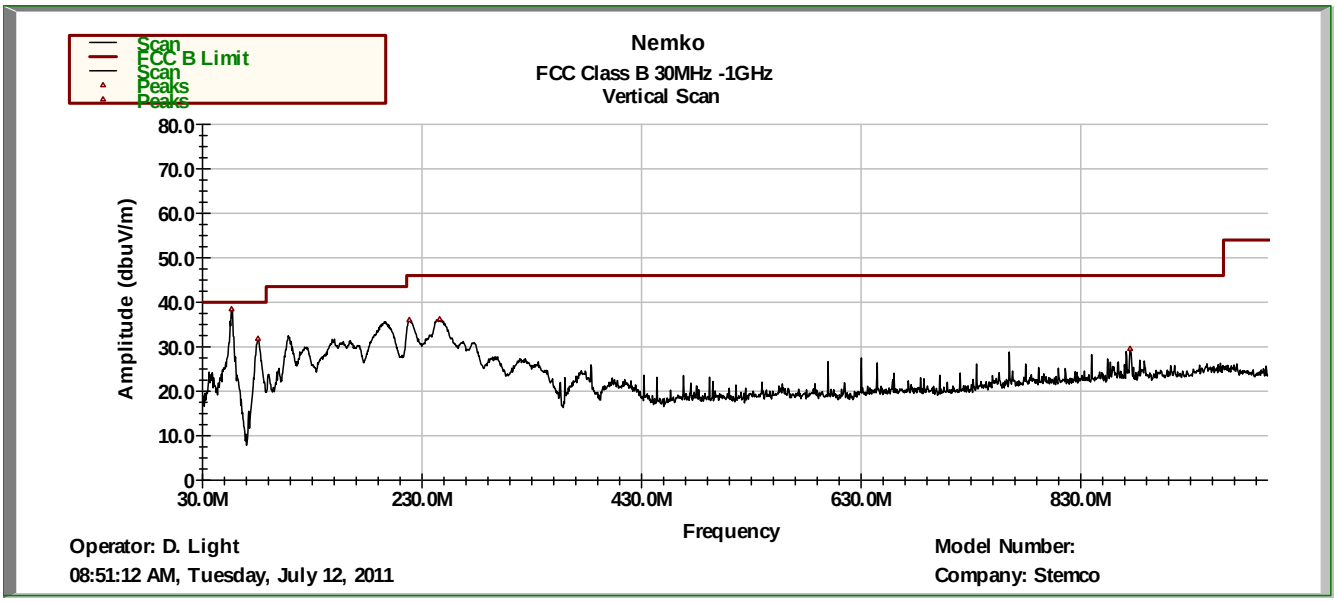
Measurement Data: ..

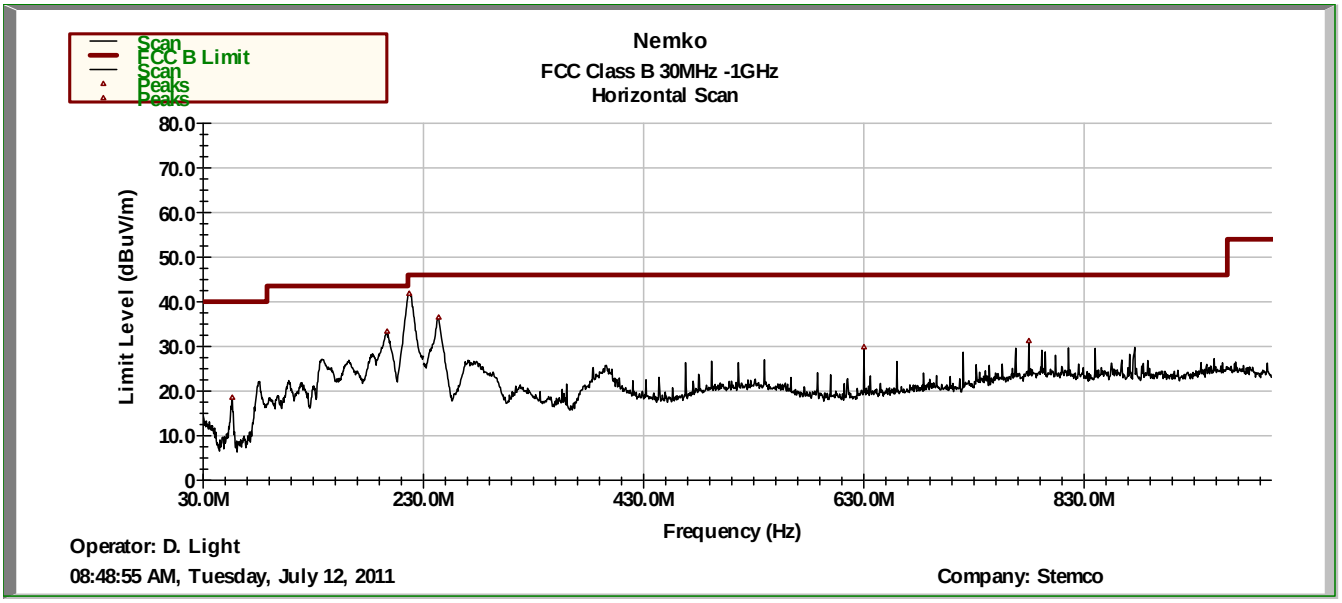
Test Conditions: 49 %RH
23 °C

Measurement Uncertainty: +/-1.7 dB

Test Equipment Used: 1464-1484-1485-1480-993-1025-1016

Vertical scan



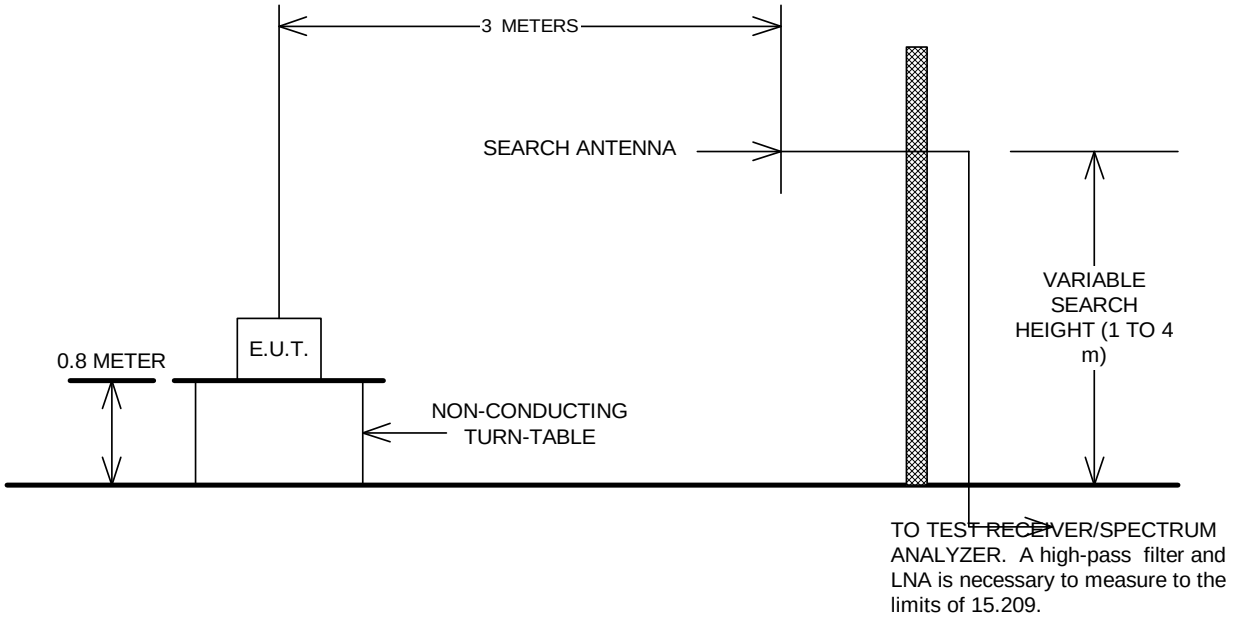


Section 7. Test Equipment List

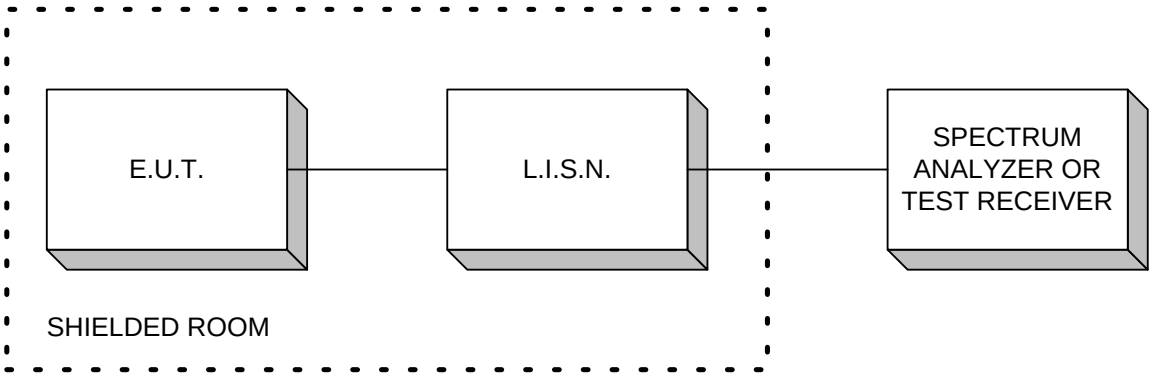
Asset Tag	Description	Manufacturer	Model	Serial #	Last Cal	Next Cal
993	Antenna, Horn	A.H. Systems	SAS-200/571	162	09-Sep-2009	09-Sep-2011
1016	Preamplifier	Hewlett Packard	8449A	2749A00159	13-July-2011	13-July-2012
1025	Preamplifier, 25dB	Nemko USA, Inc.	LNA25	399	23-Feb-2011	23-Feb-2012
1464	Spectrum Analyzer	Hewlett Packard	8563E	3551A04428	16-May-2011	16-May-2013
1480	Antenna, Bilog	Schaffner-Chase	CBL6111C	2572	19-Jan-2011	19-Jan-2012
1484	Cable	Storm	PR90-010-072		13-July-2011	13-July-2012
1485	Cable	Storm	PR90-010-216		13-July-2011	13-July-2012
1767	Receiver	Rohde & Schwartz	ESIB26	837491/0002	01-Dec-2010	01-Dec-2011

ANNEX A - TEST DIAGRAMS

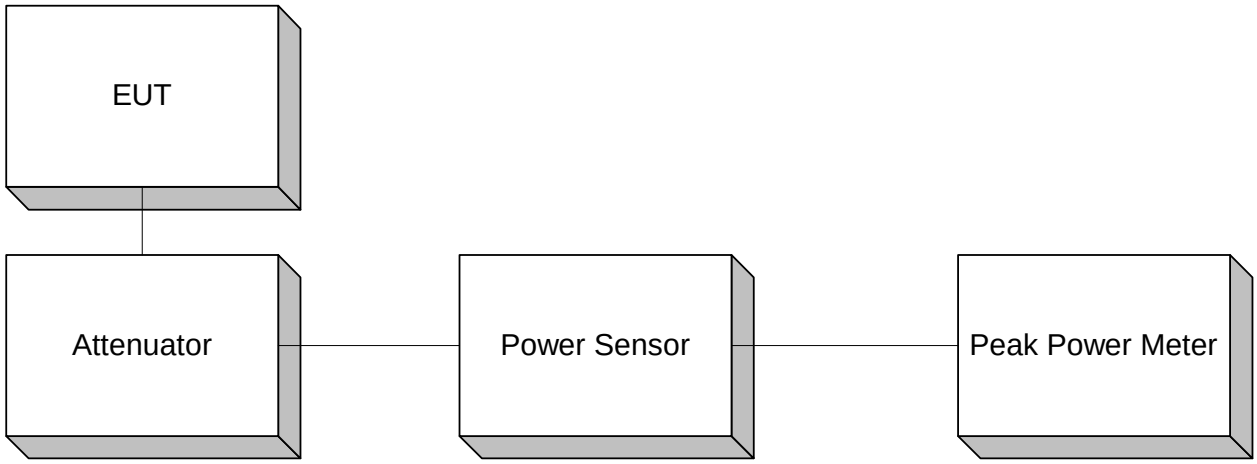
Test Site for Radiated Emissions



Conducted Emissions



Peak Power At Antenna Terminals



Note: A spectrum analyzer may be substituted for Peak Power Meter given that the measurement bandwidth is sufficient to capture the 60 dB bandwidth of the transmitter.

Minimum 6 dB Bandwidth
Peak Power Spectral Density
Spurious Emissions (conducted)