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FCC PART 15.249 & IC RSS-210 UNLICENSED INTENTIONAL RADIATOR TEST REPORT

Applicant	SAAB DEFENSE AND SECURITY USA LLC
Address	2602 CHALLENGER TECH PARK SUITE 130
	ORLANDO FL 32826 USA
FCC ID	R4APDDNG
IC	4660D-PDDNG
Model Number	PDDNG
Product Description	MAN WORN VEST TRANSMITTER
Date Sample Received	6/6/2016
Final Test Date	6/14/2016
Tested By	Tim Royer
Approved By	Sid Sanders

Report Number	Version Number	Description	Issue Date
1058AUT16TestReport	Rev1	Initial Issue	6/14/2016

**THE ATTACHED REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL
WITHOUT THE WRITTEN APPROVAL OF TIMCO ENGINEERING, INC.**

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GENERAL REMARKS

The attached report shall not be reproduced except in full without the written permission of Timco Engineering Inc.

Summary

The device under test does:

- Fulfill the general approval requirements as identified in this test report and was selected by the customer.
- Not fulfill the general approval requirements as identified in this test report

Attestations

This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025 requirements.

I attest that the necessary measurements were made at:

Timco Engineering Inc.
849 NW State Road 45
Newberry, FL 32669




Tested by: _____

Name and Title: Tim Royer, Project Manager/Testing Engineer

Date: 6/14/2016

Reviewed and approved by: _____

Name and Title: Sid Sanders, Engineer

Date: 6/28/2016




GENERAL INFORMATION

EUT Specification

Regulatory Standards	FCC Title 47 CFR Part 15.249 IC RSS-210 Issue 8 A2.9 & RSS-GEN Issue 4		
FCC ID	R4APDDNG		
IC	4660D-PDDNG		
Model	PDDNG		
EUT Description	MAN WORN VEST TRANSMITTER		
Modulation Types	Mode 1: EUT was powered and operated in a normal operational mode		
Operating Frequency	TX: 915 MHz	RX: 902 – 928 MHz	
EUT Power Source	<input type="checkbox"/> 110–120Vac/50– 60Hz		
	<input type="checkbox"/> DC Power		
	<input checked="" type="checkbox"/> Battery Operated Exclusively		
Test Item	<input type="checkbox"/> Prototype	<input checked="" type="checkbox"/> Pre-Production	<input type="checkbox"/> Production
Type of Equipment	<input type="checkbox"/> Fixed	<input type="checkbox"/> Mobile	<input checked="" type="checkbox"/> Portable
Antenna Connector	None		
Antenna	Integral		
Test Conditions	Temperature: 24-26°C Relative humidity: 50-65%		
Measurement Standard	ANSI C63.10-2013 ANSI C63.4-2014 (Radiated Site Validation)		

Test Supporting Equipment

Device	Manufacturer	Model	S/N	Supplied By	Used For
N/A					

RESULTS SUMMARY

FCC Rule Part No.	IC Standard Ref.	Requirement	Test Item	Result
2.1049	RSS-GEN 6.6	Occupied Bandwidth	99% Bandwidth	Pass
15.249(a)(c)	RSS-210 § A2.9(a)	Fundamental and Harmonics	Radiated Spurious Emissions	Pass
15.249(d)(e)	RSS-247 § 5.5	Spurious Emissions	Bandedge	Pass
			Radiated Spurious Emissions	Pass
15.207(a)	RSS-GEN § 8.8	AC Conducted Emissions	AC Powerline Conducted Emissions	N/A

Notes:

OCCUPIED BANDWIDTH

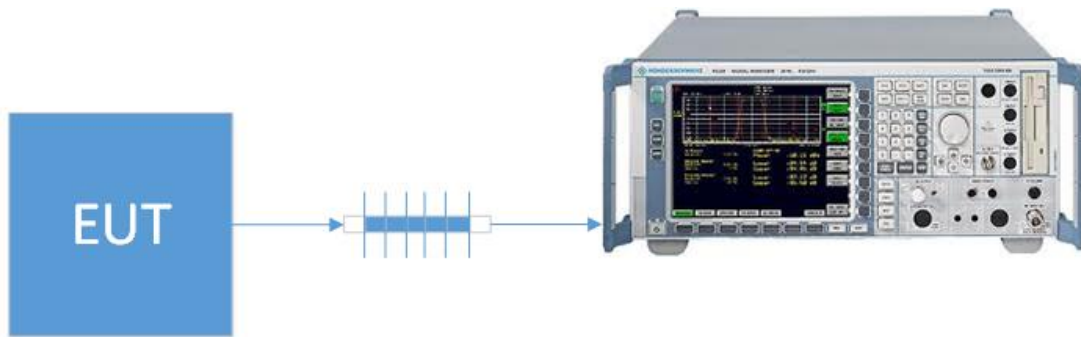
Rules Part No.: FCC 2.1049, IC RSS GEN § 6.6

FCC Requirements: Reporting only

IC Requirements: Reporting Only

Test Method: ANSI C63.10 § 6.9.3 Occupied bandwidth-99% procedure

Setup:



Test Data: Mode 1 99% Occupied Bandwidth Measurement Table

Tuned Frequency (MHz)	BW (KHz)
915	192.3

RESULTS: Meets Requirements

OCCUPIED BANDWIDTH

Test Data: Mode 1 99% Occupied Bandwidth Plot



14.Jun 16 09:47

Ref 50 dBμV

*Att 0 dB

*RBW 5 kHz

*VBW 20 kHz

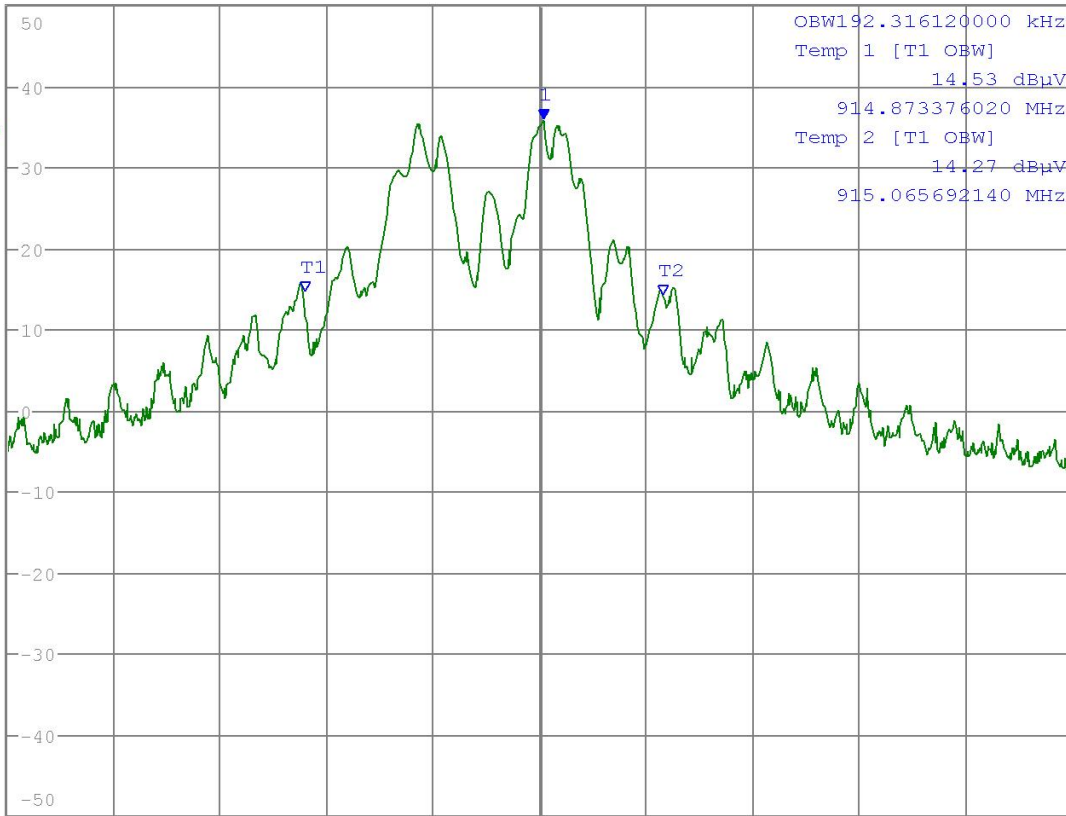
SWT 50 ms

Marker 1 [T1]

35.75 dBμV

915.001428090 MHz

1 RM *
VIEW



Center 915 MHz

57.1236 kHz/

Span 571.236 kHz

LNA
PS
6DB
AC

Date: 14.JUN.2016 09:47:20

RESULTS: Meets Requirements

Applicant: SAAB DEFENSE AND SECURITY USA LLC
 FCC ID: R4APDDNG
 IC: 4660D-PDDNG
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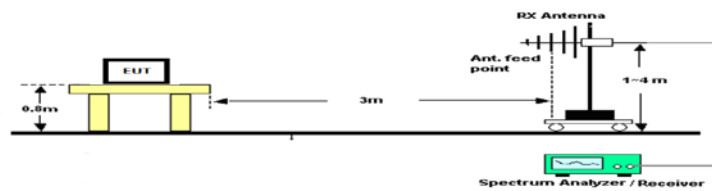
BANDEDGE

Rule Part No.: FCC 15.249(d), IC RSS 210 § A2.9(b)

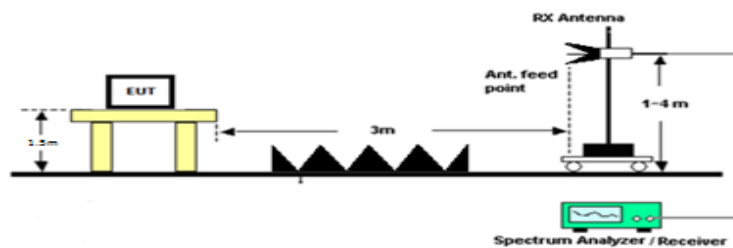
Requirements: Emissions must be at least 50 dB down from the highest emission level Within the authorized band as measured with a 100 kHz RBW, or to the limits of 15.209.

Test Method: ANSI C63.10 § 6.10.4 Authorized band-edge relative method

Setup: Emissions 30 – 1000 MHz



Emissions above 1 GHz



Test Data: Mode 1 Bandedge Measurement Table

Bandedge	Tuned Frequency (MHz)	Measured Level (dBc)	Limit (dBc)	Margin (dB)
Lower	915	-52.23	50	2.23
Upper	915	52.41	50	2.41

Results Meet Requirements

BANDEDGE

Test Data: Mode 1 Lower Band Edge Plot



14.Jun 16 09:56

Ref -35 dBm

*Att 0 dB

*RBW 100 kHz

*VBW 300 kHz

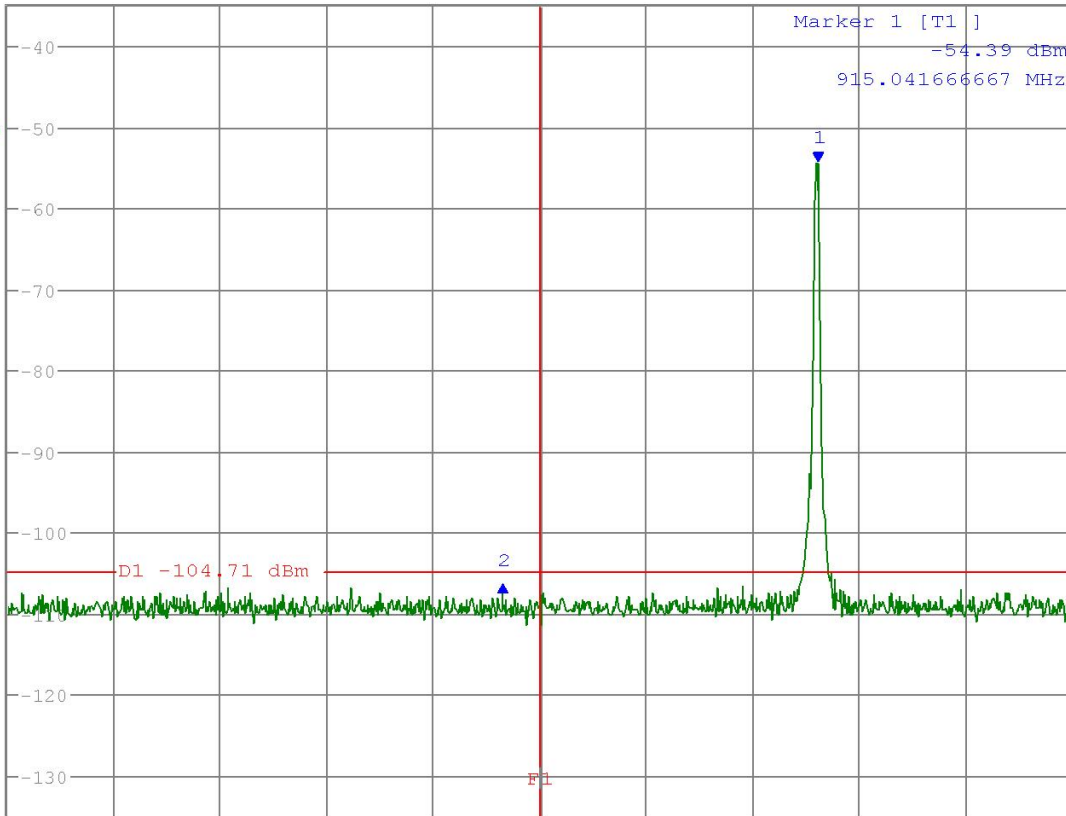
SWT 15 ms

Delta 2 [T1]

-52.23 dB

-14.826923077 MHz

1 RM
VIEW



Center 902 MHz

5 MHz/

Span 50 MHz

Date: 14.JUN.2016 09:56:53

RESULTS: Meets Requirements

Applicant: SAAB DEFENSE AND SECURITY USA LLC
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BANDEDGE

Test Data: Mode 1 Upper Band Edge Plot



14.Jun 16 09:59

Ref -35 dBm

*Att 0 dB

*RBW 100 kHz

*VBW 300 kHz

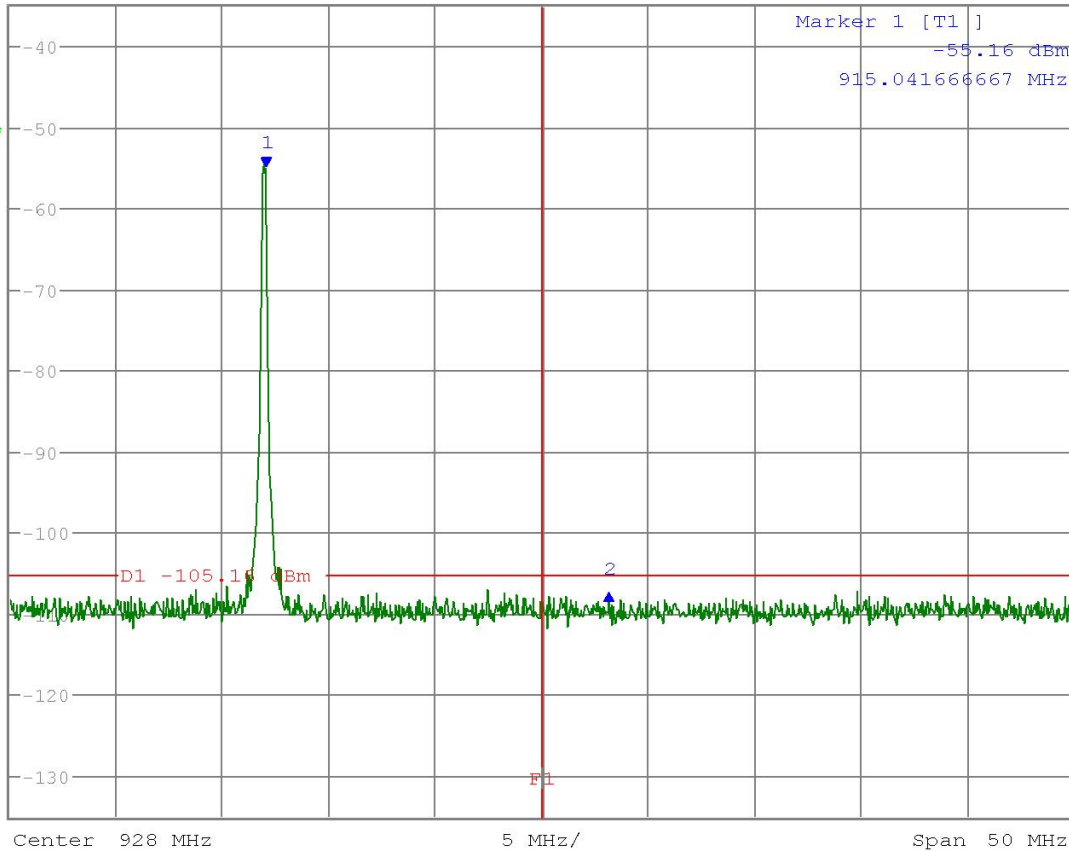
SWT 15 ms

Delta 2 [T1]

-52.41 dB

16.08333333 MHz

1 RM
VIEW



LNA
PS

6DB
AC

Date: 14.JUN.2016 09:59:45

RESULTS: Meets Requirements

Applicant: SAAB DEFENSE AND SECURITY USA LLC
 FCC ID: R4APDDNG
 IC: 4660D-PDDNG
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RADIATED SPURIOUS EMISSIONS

Rules Part No.: FCC part 15.249 (d)(e), IC RSS 210 § A2.9(b)

Requirements: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 50 dB below the fundamental output or to the limits of 15.209 whichever is lesser

FCC part 15.209 General Emission Limits

Frequency	Limits
FCC Part 15.209, IC RSS-GEN 8.9	
9 to 490 kHz	2400/F (kHz) μ V/m @ 300 meters
490 to 1705 kHz	24000/F (kHz) μ V/m @ 30 meters
1705 kHz to 30 MHz	29.54 dB μ V/m @ 30 meters
30 – 88	40.0 dB μ V/m @ 3 meters
80 – 216	43.5 dB μ V/m @ 3 meters
216 – 960	46.0 dB μ V/m @ 3 meters
Above 960	54.0 dB μ V/m @ 3 meters

Test Method: ANSI C63.4 § Annex D Validation of radiated emissions standard test sites
 ANSI C63.10 § 6.3 Common requirements radiated emissions
 ANSI C63.10 § 6.4 Emissions below 30 MHz
 ANSI C63.10 § 6.5 Emissions between 30 & 1000 MHz
 ANSI C63.10 § 6.6 Emissions above 1 GHz

Field Strength Calculation:

The field strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dB μ V) to the antenna correction factor supplied by the antenna manufacturer plus the coax loss. The antenna correction factors are stated in terms of dB. The gain of the preselector was accounted for in the spectrum analyzer meter reading.

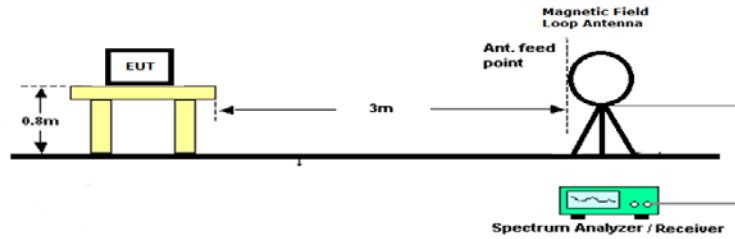
Example:

Freq (MHz)	Meter Reading	+ ACF	+ CL = FS
33	20 dB μ V	+ 10.36 dB	+ 0.5 = 30.86 dB μ V/m @ 3m

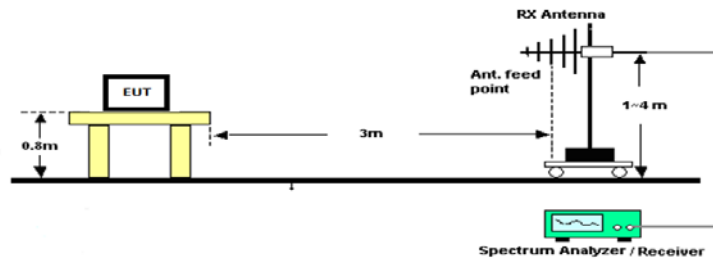
RADIATED SPURIOUS EMISSIONS

Setup:

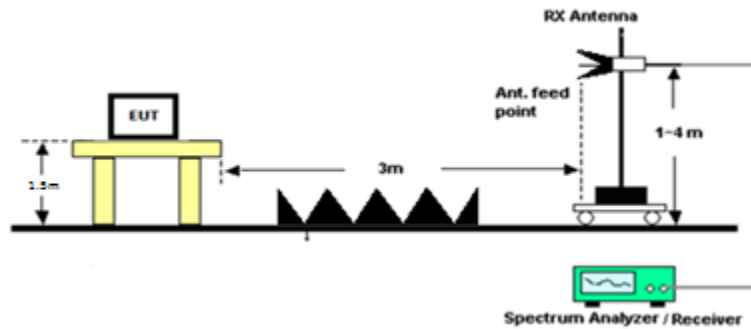
Emissions below 30 MHz



Emissions 30 – 1000 MHz



Emissions above 1 GHz



RADIATED SPURIOUS EMISSIONS

Notes: The EUT was checked in three orthogonal planes as required, a setup photo is provided to show the orientation of the worst case position.

Only emissions within 20dB of the limit are reported.

The spectrum was measured from 9 KHz to 10 GHz

Test Data: Mode 1 Field Strength at 3 Meters Measurement Table

Tuned Freq MHz	Emission Frequency MHz	Detector	Meter Reading dBu V	Antenna Polarity	Coax Loss dB	Correction Factor dB/m	Field Strength dBu V/m	Margin
914.96	0.02	PK	5.10	V	0.17	15.25	20.52	27.08
914.96	22.63	PK	0.86	V	0.80	9.78	11.44	18.06
914.96	41.33	PK	1.26	V	0.73	13.03	15.02	24.98
914.96	55.50	PK	1.46	H	0.88	9.05	11.39	28.61
914.96	58.76	PK	1.34	V	0.91	7.87	10.12	29.88
914.96	107.52	PK	1.30	V	1.21	10.40	12.91	30.59
914.96	153.03	PK	1.28	H	1.42	16.60	19.30	24.20
914.96	215.33	PK	12.01	H	1.68	10.69	24.38	19.12
914.96	215.90	PK	13.54	V	1.68	10.68	25.90	17.60
914.96	242.82	PK	16.32	V	1.81	11.43	29.56	16.44
914.96	263.33	PK	9.41	H	1.90	12.70	24.01	21.99
914.96	296.66	PK	7.30	V	2.02	13.30	22.62	23.38
914.96	326.56	PK	7.98	V	2.10	13.60	23.68	22.32
914.96	377.85	PK	8.09	V	2.22	14.70	25.01	20.99
914.96	388.97	PK	8.72	H	2.25	14.86	25.83	20.17
914.96	407.33	PK	6.70	V	2.30	15.30	24.30	21.70
914.96	431.33	PK	4.93	V	2.38	17.40	24.71	21.29
914.96	540.26	PK	3.70	H	2.68	17.09	23.47	22.53
914.96	540.30	PK	4.68	V	2.68	17.09	24.45	21.55
914.96	841.88	PK	2.54	V	3.33	22.41	28.28	17.72
914.96	914.96	PK	51.68	V	3.47	22.50	77.65	16.35
914.96	914.96	PK	56.92	H	3.47	22.50	82.89	11.11

Results Meet Requirements

RADIATED SPURIOUS EMISSIONS

Notes: Only emissions found within 20dB of the limit are reported from 9 KHz to the 10th harmonic of the fundamental

* Indicates noise floor only

Test Data: Mode 1 Field Strength at 3 Meters Measurement Table

Tuned Freq MHz	Emission Frequency MHz	Detector	Meter Reading dBu V	Antenna Polarity	Coax Loss dB	Correction Factor dB/m	Field Strength dBu V/m	Margin
914.96	1830.00	PK	1.25	V	4.93	30.92	37.10	16.90
914.96	1830.00	PK	10.35	H	4.93	30.92	46.20	7.80
914.96	2745.00	PK	3.12	V	6.08	32.48	41.67	12.33
914.96	2745.00	PK	6.27	H	6.08	32.48	44.83	9.17
914.96	3660.00	PK	9.25	V	7.01	33.62	49.88	4.12
914.96	4575.00	PK	9.29	V	7.87	33.88	51.04	2.96
914.96	4575.00	PK	6.67	H	7.87	33.88	48.42	5.58
914.96	5489.00	PK	9.51	V	8.66	34.40	52.57	1.43
914.96	5489.00	AV	6.93	H	8.66	34.40	49.99	4.01
914.96	5489.00	PK	10.00	H	8.66	34.40	53.06	20.94
914.96	6405.00	AV	8.02	V	9.38	35.70	53.10	0.90
914.96	6405.00	PK	17.99	V	9.38	35.70	63.07	10.93
914.96	6405.00	PK	9.02	H	9.38	35.70	54.10	19.90
914.96	6405.00	AV	6.13	H	9.38	35.70	51.21	2.79
914.96	6405.00	PK	6.21	V	9.38	35.70	51.29	2.71
914.96	7320.00	AV	6.54	V	10.00	35.60	52.14	1.86
914.96	7320.00	PK	9.64	V	10.00	35.60	55.24	18.76
914.96	7320.00	AV	6.72	H	10.00	35.60	52.32	1.68
914.96	7320.00	PK	9.02	H	10.00	35.60	54.62	19.38
914.96	8234.90	PK	9.39	V	10.59	35.77	55.75	18.25
914.96	8234.90	AV	2.00	V	10.59	35.77	48.36	5.64
914.96	8235.00	PK	9.05	H	10.59	35.77	55.41	18.59
914.96	8235.00	AV	6.39	H	10.59	35.77	52.75	1.25
914.96	9145.00	PK	9.76	V	11.12	36.05	56.93	17.07
914.96	9145.00	AV	6.12	V	11.12	36.05	53.29	0.71
914.96	9150.00	AV	6.61	H	11.12	36.05	53.78	0.22
914.96	9150.00	PK	9.05	H	11.12	36.05	56.22	17.78

Results Meet Requirements

EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
Antenna: Biconnical 1057	Eaton	94455-1	1057	11/18/15	11/18/17
Antenna: Log-Periodic 1243	Eaton	96005	1243	02/09/16	02/09/18
Antenna: Passive Loop	EMC Test Systems	EMCO 6512	9706-1211	07/09/15	07/09/17
CHAMBER	Panashield	3M	N/A	01/05/16	12/31/17
Antenna: Double- Ridged Horn/ETS Horn 2	ETS-Lindgren	3117	00041534	02/25/15	02/25/17
EMI Test Receiver R & S ESU 40 Chamber	Rohde & Schwarz	ESU 40	100320	04/01/16	04/01/18

***EMI RECEIVER SOFTWARE VERSION**

The receiver firmware used was version 4.43 Service Pack 3

END OF TEST REPORT