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FCC PART 15.247

TEST REPORT

APPLICANT	AED ELECTRONICS INC.
	5756 ROYALMOUNT AVENUE
	MONTREAL QUEBEC H4P 1K5 CANADA
FCC ID	RAN90164
PRODUCT DESCRIPTION	Thermostat Transceiver
DATE SAMPLE RECEIVED	May 15, 2006
DATE TESTED	June 6, 2006
TESTED BY	Nam Nguyen
APPROVED BY	Mario de Aranzeta
TIMCO REPORT NO.	A\AED\1025AUTestReport
TEST RESULTS	☒ PASS ☐ FAIL

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



Certificate # 0955-01

TABLE OF CONTENTS

STATEMENT OF COMPLIANCE.....	3
GENERAL INFORMATION	4
EMC EQUIPMENT LIST	5
TEST PROCEDURE	6
POWER LINE CONDUCTED INTERFERENCE.....	7
POWER OUTPUT	9
NUMBER OF HOPPING CHANNELS	10
DWELL TIME OF A HOPPING CHANNEL.....	11
CARRIER FREQUENCY SEPARATION	12
20 dB BANDWIDTH	13
RADIATED SPURIOUS EMISSIONS INTO ADJACENT RESTRICTED BAND.....	14
FIELD STRENGTH OF SPURIOUS EMISSIONS.....	15

STATEMENT OF COMPLIANCE

This equipment has been tested in accordance with the standards identified in the referenced test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report and demonstrate that the equipment complies with the appropriate standards. No modifications were made to the equipment during testing in order to demonstrate compliance with these standards.

I attest that the necessary measurements were made by me or under my supervision, at:
Timco Engineering, Inc. located at 849 N.W. State Road 45, Newberry, Florida 32669 USA.

Authorized by: Mario de Aranzeta

Function: Engineer

Date: August 18, 2006

Tested by: Nam Nguyen

GENERAL INFORMATION

DUT Specification

The test results relate only to the items tested.	
DUT Description	FHSS Transceiver
FCC ID	RAN90164
Model Number	See manufacturer list
Serial Number	N/A
Operating Frequency	903 – 915 MHz
No. of Channels	64
DUT Power Source	☒ 110–120Vac/50– 60Hz
	☐ DC Power
	☐ Battery Operated Exclusively
Test Item	☐ Prototype
	☒ Pre-Production
	☐ Production
Type of Equipment	☒ Fixed
	☐ Mobile
	☐ Portable
Antenna	Wire monopole
Antenna Connector	None, permanently attached antenna

Test Facility: The test sites used by Timco Engineering Inc. for radiated and conducted emissions are located at 849 NW State Road 45 Newberry, FL 32669 USA.

Test Condition: The DUT was tested in the laboratory in an environment with normal temperature and humidity. The temperature was 26°C with a relative humidity of 50%.

Modification to the DUT: No modification was made to the DUT during testing.

Test Exercise (e.g software description, test signal, etc.): The DUT was placed in continuous transmit mode of operation.

Applicable Standards: TIA 603
FCC CFR 47 Part 15.247

EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3-Meter OATS	TEI	N/A	N/A	Listed 1/11/06	1/10/09
Antenna: Biconnical	Eaton	94455-1	1057	CAL 12/12/05	12/12/07
Antenna: Biconnical	Eaton	94455-1	1096	CAL 8/17/04	8/17/06
Antenna: Biconnical	Electro- Metrics	BIA-25	1171	CAL 4/29/05	4/29/07
Antenna: Double- Ridged Horn	Electro- Metrics	RGA-180	2319	CAL 12/29/04	12/29/06
LISN	Electro- Metrics	ANS-25/2	2604	CAL 8/27/04	8/27/06
LISN	Electro- Metrics	EM-7820	2682	CAL 4/28/05	4/28/07
Antenna: Log- Periodic	Eaton	96005	1243	CAL 12/14/05	12/14/07

TEST PROCEDURE

Power Line Conducted Interference: The procedure used was ANSI STANDARD C63.4-2003 using a 50uH LISN. Both lines were observed with the UUT transmitting. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

Bandwidth 20 dB: The measurements were made with the spectrum analyzer's resolution bandwidth (RBW) = 1 MHz and the video bandwidth (VBW) = 3 MHz and the span set as shown on plot.

Power Output: The RF power output was measured at the antenna feed point using a peak power meter.

Antenna Conducted Emissions: The RBW = 100 kHz, VBW = 300 kHz and the span set to 10.0 MHz and the spectrum was scanned from 30 MHz to the 10th Harmonic of the fundamental. Above 1 GHz the resolution bandwidth was 1 MHz and the VBW = 3 MHz and the span to 50 MHz.

Radiation Interference: The test procedure used was ANSI STANDARD C63.4-2003 using an Agilent spectrum receiver with pre-selector. The bandwidth (RBW) of the spectrum receiver was 100 kHz up to 1 GHz and 1 MHz above 1 GHz with an appropriate sweep speed. The VBW above 1 GHz was 3 MHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna.

Carrier Frequency Separation & Number Of Channels: A near field probe was used to sense the signal of the UUT. The UUT was made to hop its full range. The spectrum analyzer was set to view the frequency range and placed in the memory mode.

Carrier Frequency Dwell Time: A near field probe was used to sense the signal of the UUT. The UUT was made to hop its full range. The spectrum analyzer was set to view the frequency range from and the center of the hopping range was centered on the spectrum analyzer. The span was then set to ZERO (0) and the SWEEP TIME was set to 20 seconds. Then by analyzing the plot of the total ON TIME of the UUT during the 20 seconds it was determined the dwell time.

Formula Of Conversion Factors: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. 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 dBuV	+ 10.36 dB/m +3 dB	= 33.36 dBuV/m @ 3m

POWER LINE CONDUCTED INTERFERENCE

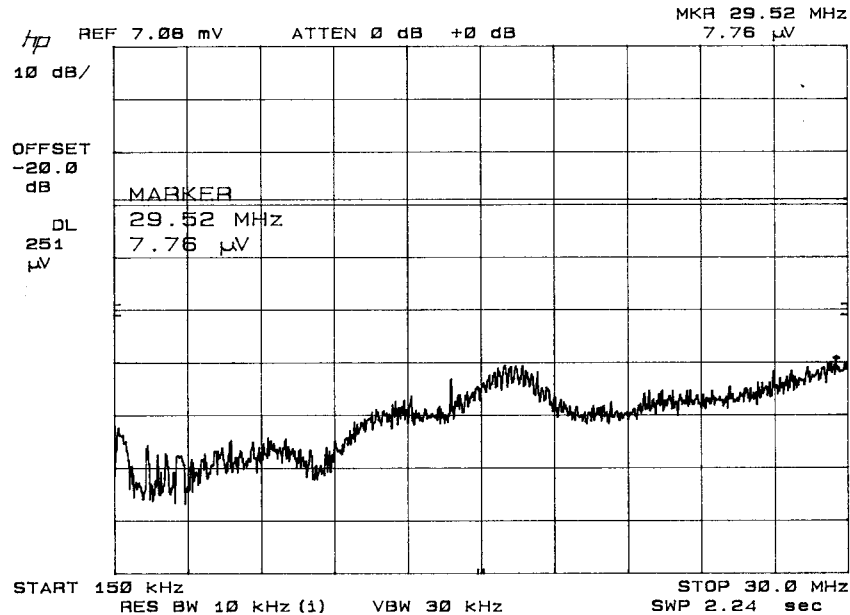
Rules Part No.: Part 15.207

Requirements:

Frequency (MHz)	Quasi Peak Limits (dBuV)	Average Limits (dBuV)
0.15 – 0.5	66 – 56	56 – 46
0.5 – 5.0	56	46
5.0 – 30	60	50

Test Procedure: ANSI Standard C63.4-2003.
 The spectrum was scanned from 0.15 to 30 MHz.

Test Data: Line 1



cont'd

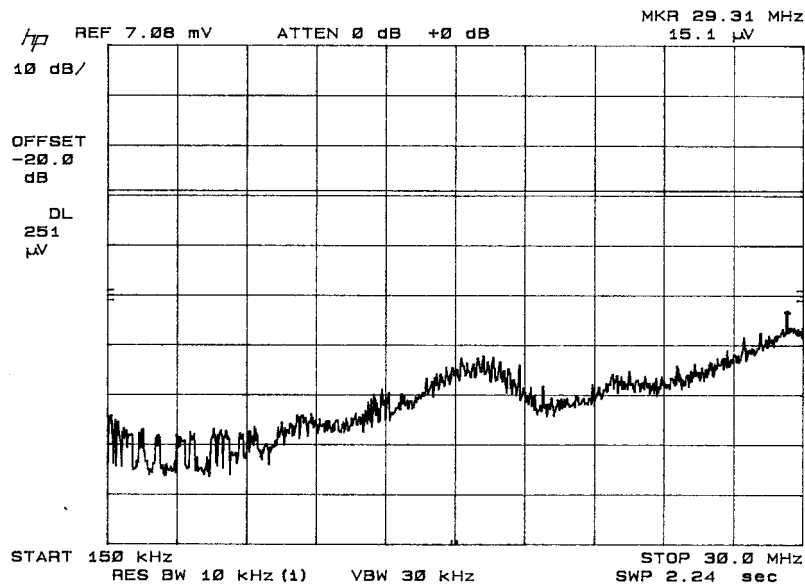
Rules Part No.: Part 15.207

Requirements:

Frequency (MHz)	Quasi Peak Limits (dBuV)	Average Limits (dBuV)
0.15 – 0.5	66 – 56	56 – 46
0.5 – 5.0	56	46
5.0 – 30	60	50

Test Procedure: ANSI Standard C63.4-2003.
 The spectrum was scanned from 0.15 to 30 MHz.

Test Data: Line 2



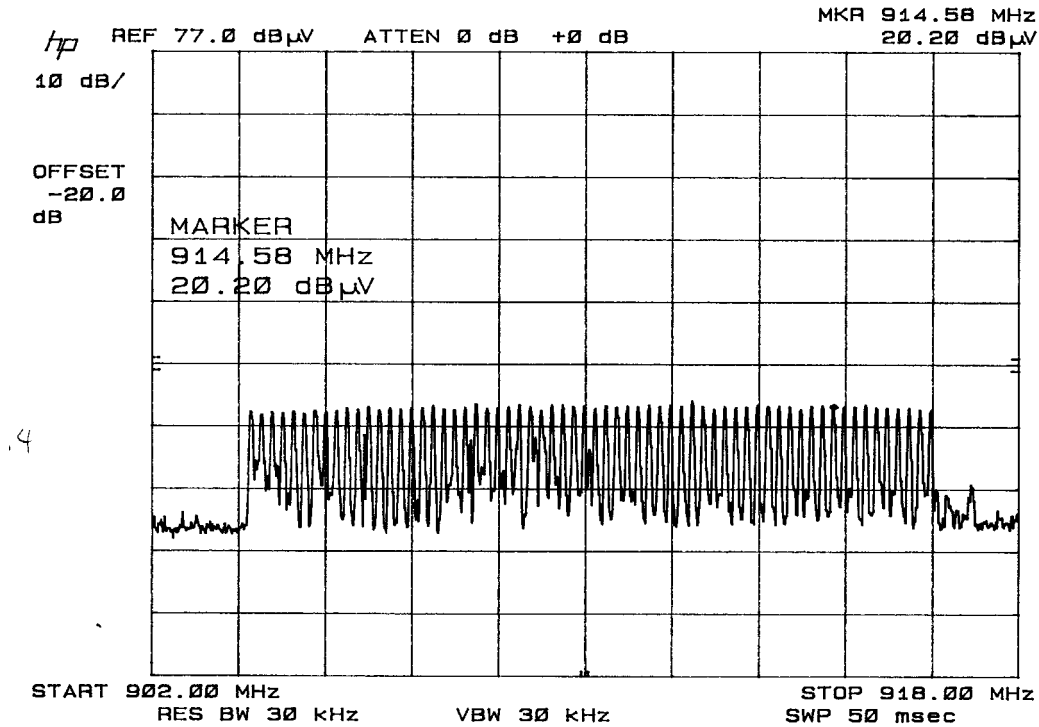
POWER OUTPUT**Rule Part No.:** 15.247(b)(1)**Requirements:** 1.0 Watt or +30 dBm**Method of Measurement:** The device under test has an integral antenna and the power was measured on a radiated basis.**Test Data:**

	Frequency (MHz)	Measured Power (mW) EIRP
Low Channel	903.5	13
Middle Channel	908.8	16
High Channel	914.9	14

NUMBER OF HOPPING CHANNELS

Rules Part No.: 15.247(a)(1)

Test Data: There are 64 hopping channels

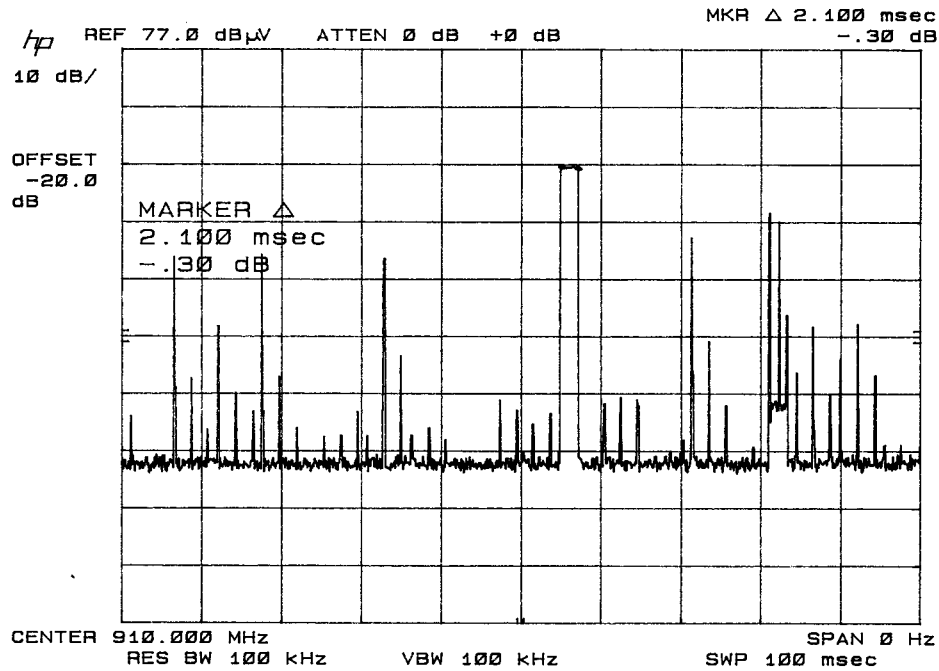


DWELL TIME OF A HOPPING CHANNEL

Rules Part No.: 15.247(a)(1)(i)

Requirements: The dwell time is 2.1 milliseconds.

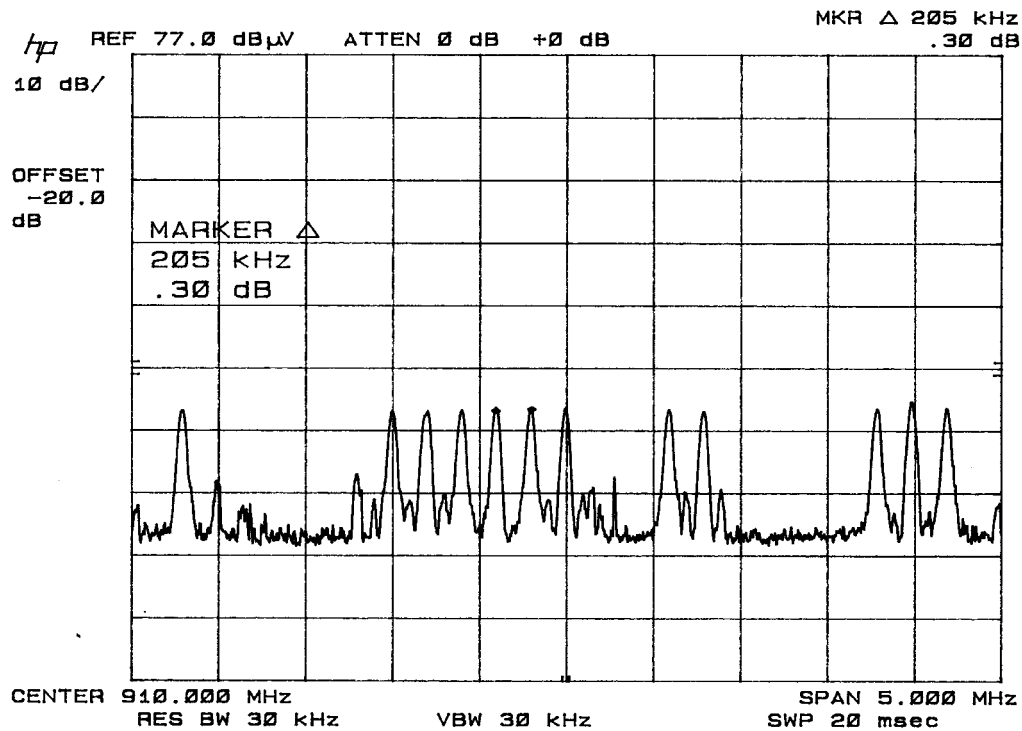
The device transmits one packet ever 15 seconds.



CARRIER FREQUENCY SEPARATION

Rules Part No.: 15.247(a)(1)(i)

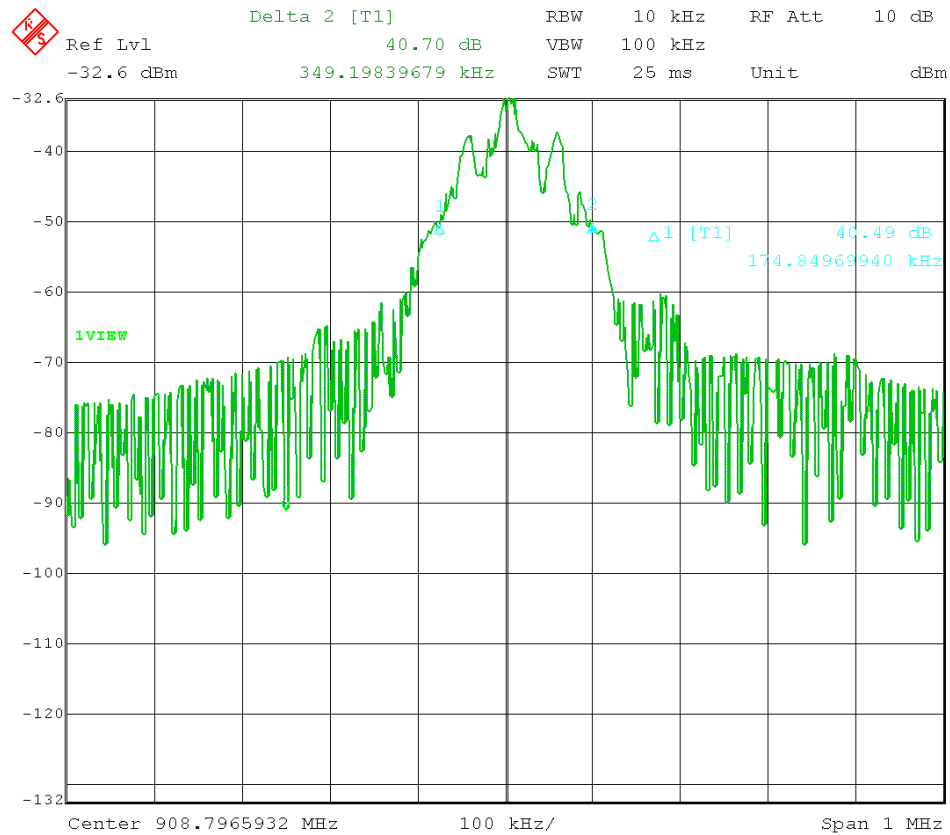
Test Data: 205 kHz



20 dB BANDWIDTH

Rule Part No.: 15.247(a)(1)(iii)

Requirements: The 20 dB bandwidth measured was 175 kHz.

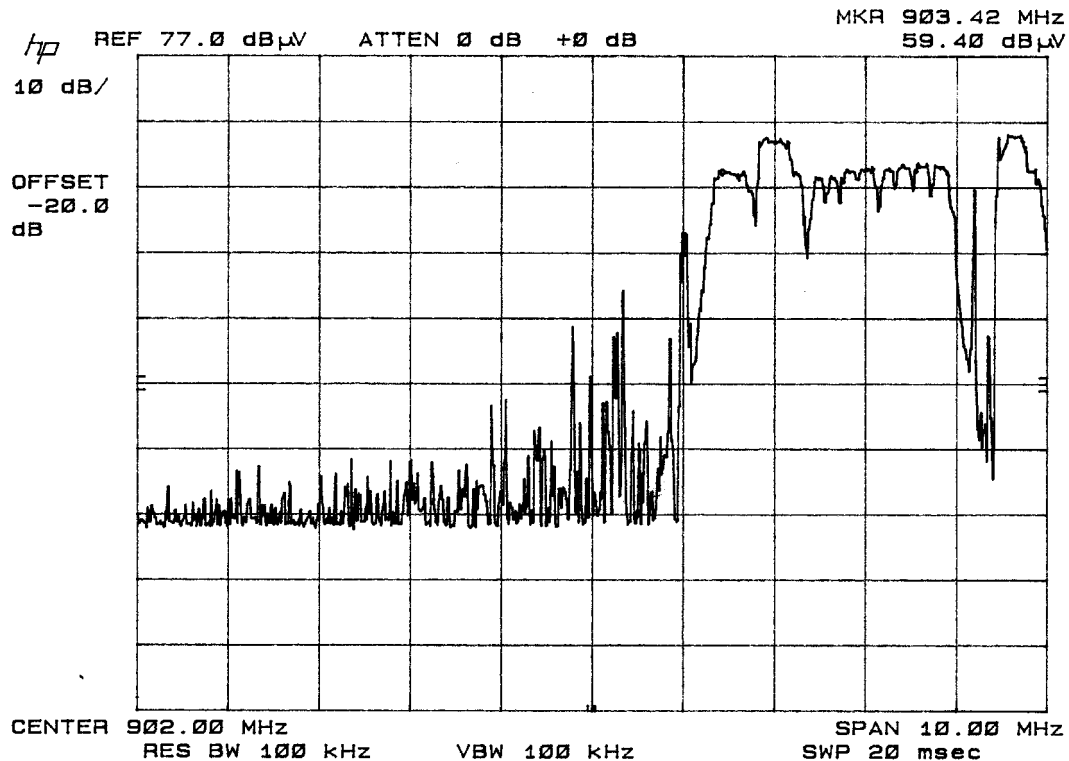


RADIATED SPURIOUS EMISSIONS INTO ADJACENT RESTRICTED BAND

Rules Part No.: 15.205

Requirements: Emissions that fall in the restricted bands (15.205). These emissions must be less than or equal to 500 uV/m (54 dBuV/m).

Test Procedure: An in band field strength measurement of the fundamental Emission using the RBW and detector function required by C63.4-2003 and FCC Rules. The procedure was repeated with an average detector and a plot made. The calculated field strength in the adjacent restricted band is presented below.



FIELD STRENGTH OF SPURIOUS EMISSIONS

Rules Part No.: 15.247(c), 15.205 & 15.209(b)

Requirements:

Field Strength of Fundamental:	Field Strength of Harmonics	S15.209 30 - 88 MHz 40 dBuV/m @3M
902-928MHz		88 -216 MHz 43.5
2.4-2.4835GHz	127.37dBuV/m	216 -960 MHz 46
127.38dBuV/m @3m	54 dBuV/m @3m	ABOVE 960 MHz 54dBuV/m

Emissions radiated outside of the specified frequency bands, shall be attenuated by at least 20 dB below the level of the fundamental or to the general radiated emission limits in 15.209, whichever is the lesser attenuation.

Emissions that fall in the restricted bands (15.205) must be less than 54dBuV/m.

Test Data: To the tenth harmonic

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV/m	Ant. Polarity V/H	Coax Loss dB	Correction Factor dB/m	Field Strength dBuV/m
903.5	457.35	29.3	V	1.26	16.82	47.38
903.5	959.80	14.7	V	2.04	22.79	39.53
903.5	451.70	28.9	V	1.25	16.65	46.80
903.5	800.30	10.0	V	1.90	21.00	32.90
903.5	804.00	10.8	V	1.90	21.04	33.74
903.5	847.00	11.4	V	1.92	21.95	35.27
903.5	903.50	81.4	V	1.96	22.67	106.03
903.5	2,710.00	28.3	V	3.40	32.85	64.55 Peak
903.5	2,710.00	28.3	V	3.40	32.85	48.55 Average
903.5	4,517.00	7.4	V	4.76	34.11	46.27
908.8	454.40	29.7	V	1.25	16.73	47.68
908.8	908.75	82.8	V	1.96	22.61	107.37
908.8	965.50	16.6	V	2.05	22.80	41.45
908.8	1,817.60	28.1	V	2.75	30.11	60.96
908.8	2,726.00	28.5	V	3.41	32.87	64.78 Peak
908.8	2,726.00	28.5	V	3.41	32.87	48.78 Average
908.8	4,544.00	6.0	V	4.77	34.14	44.91
914.9	457.30	29.3	V	1.26	16.82	47.38
914.9	914.85	82.0	V	1.97	22.60	106.57
914.9	972.30	14.4	V	2.06	22.85	39.31
914.9	1,829.60	25.7	V	2.76	30.18	58.64
914.9	2,744.30	27.5	V	3.42	32.89	63.81 Peak
914.9	2,744.30	27.5	V	3.42	32.89	47.81 Average
914.9	4,574.00	6.0	V	4.79	34.16	44.95

Pulse correction factor is 16 dB