



Test Report - FCC PART 90

Prepared For: CODAN RADIO COMMUNICATIONS

Approved for Release By:

Signature: Bruno Clavier

Name & Title: Bruno Clavier, General Manager

Date of Signature 2/11/2021

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Timco Engineering, Inc., an IIA Company
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1. Customer Information

Customer: CODAN RADIO COMMUNICATIONS
Address: 43 Erie St
VICTORIA BC V8V 1P8
CANADA

Technical Contact: Nathan Wren
Telephone: (778) 747-0466
Email address: nathan.wren@codancomms.com



1.1 Part 90 Test Result Summary

The following test procedure and guidance were used for measuring FCC PART 90 (PRIVATE LAND MOBILE RADIO SERVICES) known as Licensed Land Mobile; ANSI C63.26-2015. Full test results are available in this report.

Applicable Clauses from Part 2		
FCC Clauses	Description of the requirements	Result: (Pass, Fail, N/A)
2.202	Bandwidth & Emission	N/A
2.1033 (c)(8)	Power at the Final Amplifier	N/A
2.1046 (a)	RF Output Power	N/A
2.1047	Modulation characteristics	N/A
2.1049	Occupied Bandwidth	N/A
2.1051	Spurious emissions at antenna terminals	Pass
2.1053	Field strength of spurious radiation	N/A
2.1055	Frequency stability	N/A

Applicable Clauses from Part 90		
FCC Clauses	Description of the requirements	Result: (Pass, Fail, N/A)
90.205 (r)	Transmitter Power	Pass
90.207 (n)	Emission designator	N/A
90.209 (b) (5) footnote 2	Bandwidth limitations	N/A
90.210 (n)	Emission masks, In-band	N/A
90.210 (n)	Emission masks, Out-of-band	N/A
90.213 (a) footnote 10	Frequency stability	N/A
90.214	Transient Frequency Behavior	N/A
90.221	Adjacent channel power limits	N/A

No additions to the test methods were needed. There were no deviations, or exclusions from the test methods. No test results are from external providers or from the customer. The test results relate only to the items tested. Timco does not offer opinions and interpretations, only a pass/fail statement.



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2. Location of Testing

2.1 Test Laboratory

Timco Engineering Inc. is a subsidiary of Industrial Inspection & Analysis, Inc. ("IIA").

Testing was performed at Timco's permanent laboratory located at 849 NW State Road 45, Newberry, Florida 32669

FCC test firm # 578780

FCC Designation # US1070

FCC site registration is under A2LA certificate # 0955.01

ISED Canada test site registration # 2056A

EU Notified Body # 1177

For all designations see A2LA scope # 0955.01

2.1 Testing was performed, reviewed by

Dates of Testing: 2/11/2021

Signature:

Name & Title:

Franklin Rose, RF Test Engineer

Date of Signature

2/11/2021

Signature:

Sr. EMC Engineer
 EMC-003838-NE



Name & Title:

Tim Royer, EMC Engineer

Date of Signature

2/11/2021



3. Test Sample(s) (EUT/DUT)

The test sample was received: 2/11/2021

3.1 Description of the EUT

A description as well as unambiguous identification of the EUT(s) tested. Where more than one sample is required for technical reasons (such as the use of connected units for the purpose of conducted output power testing where the product units will have integral antennas), each specific test shall identify which unit was tested.

Identification	
Brief Description	Amplifier
Type of Modular	N/A
FCC ID	H4JAMP-4-150
Model(s) #	AMP-4-150-30-00
Firmware version	N/A
Software version	N/A
Serial Number	N/A

Technical Characteristics	
Technology	Fixed Amplifier
Frequency Range	(138 – 144)(148-174) MHz
RF O/P Power (Max.)	30 W
Modulation	N/A
Bandwidth & Emission Class	N/A
Duty Cycle	N/A
Antenna Connector	N/A
Voltage Rating (AC or Batt.)	13.8 V DC

Antenna Characteristics			
Antenna	Frequency Range	Mode / BW	Antenna Gain
1	n/a	n/a	0 dBi
2			



3.2 Configuration of EUT

Test Modes				
Mode (#)	Mode (Type)	Test Frequencies	BW (nominal)	Emission Designator
1		156 MHz 162 MHz 174 MHz		

Operating conditions during Testing:

The device was operated without the provided antenna(s).

No other modifications of the device under test (including firmware, specific software settings, and input/output signal levels to the EUT) were made.

Peripherals used during Testing:

No peripherals used.

3.3 Test Setup of EUT

Equipment, antenna, and cable arrangement. The setup of the equipment and cable or wire placement on the test site that produces the highest radiated and the highest ac power line conducted emissions shall be shown clearly and described. Information on the orientation of portable equipment during testing shall be included. Drawings or photographs may be used for this purpose.

Test Setups are included in the test report.



4. Test methods & Applicable Regulatory Limits

4.1 Test methods/Standards/Guidance:

Test procedures and guidance for measuring Licensed Part 90 Licensed device:

- 1) ANSI C63.26-2015

4.2 Applied Limits and Regulatory Limits:

- 1) FCC CFR 47 Part 90

5. Measurement Uncertainty

Parameter	Uncertainty (dB)
Conducted Emissions	± 3.14 dB
Radiated Emissions (9kHz – 30 MHz)	± 3.08 dB
Radiated Emissions (30 – 200 MHz)	± 2.16 dB
Radiated Emissions (200 – 1000 MHz)	± 2.15 dB
Radiated Emissions (1 GHz – 18 GHz)	± 2.14 dB
Radiated Emissions (18 GHz – 40 GHz)	± 2.31 dB
Note: The uncertainties provided in this table represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of K=2.	

6. Environmental Conditions

6.1 Temperature & Humidity

Measurements performed at the test site did not exceed the following:

Temperature	23 C +/- 5%
Humidity	55% +/- 5%
Note: Specific environmental conditions that are applicable to a specific test are available in the test result section.	



7. List of Test Equipment and Test Facility

The test equipment used identified by type, manufacturer, serial number, or other identification and the date on which the next calibration or service check is due.

Description of the firmware or software used to operate EUT for testing purposes.

A complete list of all test equipment used shall be included with the test report. The manufacturer's model and serial numbers, and date of last calibration, and calibration interval shall be included. Measurement cable loss, measuring instrument bandwidth and detector function, video bandwidth, if appropriate, and antenna factors shall also be included where applicable.

7.1 List of Test Equipment

Type	Device	Manufacturer	Model	SN #	Current Cal	Cal Due
Audio Analyzer	Audio Analyzer	HP	8903B	3011A13084	2/20/18	2/19/2021
Function Generator	Function Generator	Standford	DS340	25200	2/21/18	2/20/2021
Modulation Analyzer	Modulation Analyzer	HP	8901A	3050A05856	4/23/20	4/23/2023
Oscilloscope	Oscilloscope	LeCroy	LT364	00414	3/28/19	3/27/2022
Signal Generator	Signal Generator HP 8648C	HP	8648C	3847A04696	9/11/20	9/11/2023
Signal Generator	Signal Generator R&S SMU-200A	Rohde & Schwarz	SMU200A	103195	4/23/18	4/22/2021
Multimeter	Digital Multimeter	Fluke	77	35053830	9/9/20	9/9/2023
Frequency Counter	Frequency Counter	HP	5385A	2730A03025	9/9/20	9/9/2023
Antenna	Active Loop	ETS-Lindgren	6502	00062529	10/20/20	10/20/2023
Antenna	Biconical 1057	Eaton	94455-1	1057	10/16/20	10/16/2023
Antenna, NSA	Log-Periodic 1243	Eaton	96005	1243	4/20/18	4/19/2021
Antenna	Double-Ridged Horn/ETS Horn 1	ETS-Lindgren	3117	00035923	2/25/20	2/24/2023
CHAMBER	CHAMBER	Panashield	3M	N/A	3/12/19	3/11/2021
Pre-amp	Pre-amp	RF-LAMBDA	RLNA00M45GA	NA	2/27/19	2/26/2022
Receiver	EMI Test Receiver R&S ESU 40	Rohde & Schwarz	ESU 40	100320	8/28/18	8/27/2021
Frequency Counter	Frequency Counter Small	HP	5385A	3242A07460	9/9/20	9/9/2023
Thermometer	Type K J Thermometer	Martel	303	080504494	1/6/18	1/5/2021
Receiver	Service Monitor 3920	Aeroflex	3920	299001542	1/10/18	1/9/2021

Software	Author	Version	Validation Or
ESU Firmware	Rohde & Schwarz	4.43 SP3; BIOS v5.1-24-3	2018
RSCommander	Rohde & Schwarz	1.6.4	2014
ScopeExplorer	LeCroy	v2.25.0.0	2009
Field Strength	Timco	v4.10.7.0	2016



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8. Test Results

The results of the test are usually indicated in the form of tables, spectrum analyzer plots, charts, sample calculations, as appropriate for each test procedure.

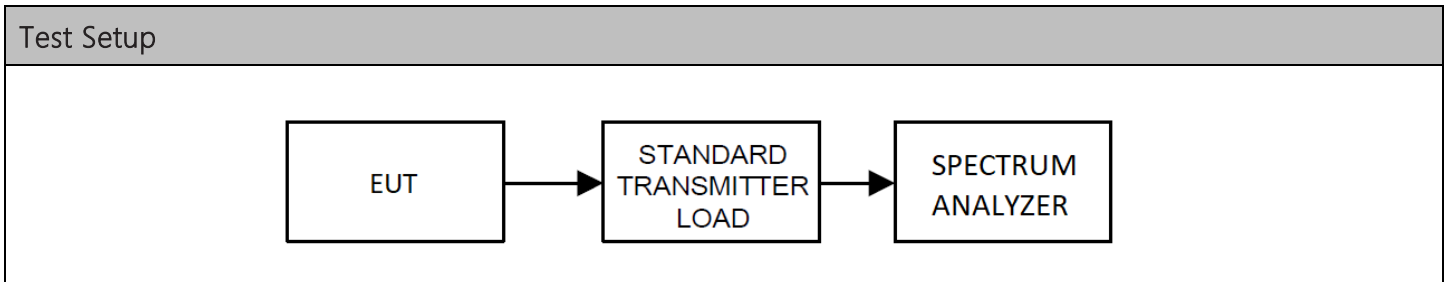
A description and/or a block diagram of the test setup is usually provided.

The measurement results, along with the appropriate limits for comparison, may be presented in tabular or graphical form. In addition, any variation in the measurement environment may be reported if applicable (e.g., a significant change of temperature that could affect the cable loss and amplifier response).

Unless noted otherwise in the referenced standard, the measurements of **ac power-line conducted emissions and conducted power output** will be reported in units of dB μ V. Unless noted otherwise in the referenced standard, the measurements of **radiated emissions** will be reported in units of decibels, referenced to one microvolt per meter (dB μ V/m) for electric fields, or to one ampere per meter (dBA/m) for magnetic fields, at the distance specified in the appropriate standards or requirements. The measurements of antenna-conducted power for receivers may be reported in units of dB μ V if the impedance of the measuring instrument is also reported. Otherwise, antenna-conducted power will be reported in units of decibels referenced to one milliwatt (dBm). All formulas for data conversions and conversion factors, if used, will be included in this measurement report.

8.1 RF Output Power

Limits from FCC Parts 2.1046(a), and 90.205 (r); and test procedure from ANSI C63.26-2015.

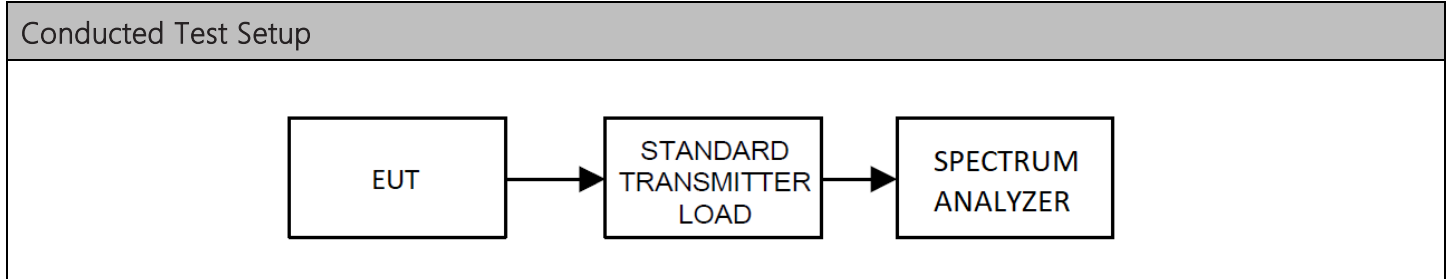


Test Results, Mode 1			
Mode	Tuned Frequency (MHz)	Power Output (dBm)	Power Output (W)
1	156	44.92	31.04
1	162	44.76	29.92
1	174	44.44	27.8

Note: Power output with measurement uncertainty in section 5 fall within the Tune Up tolerance of 31 W to 33.7W

8.2 Emission Limitations, Out-of-Band

Limits from FCC Parts 2.1051, and 90.210; and test procedure from ANSI C63.26-2015.

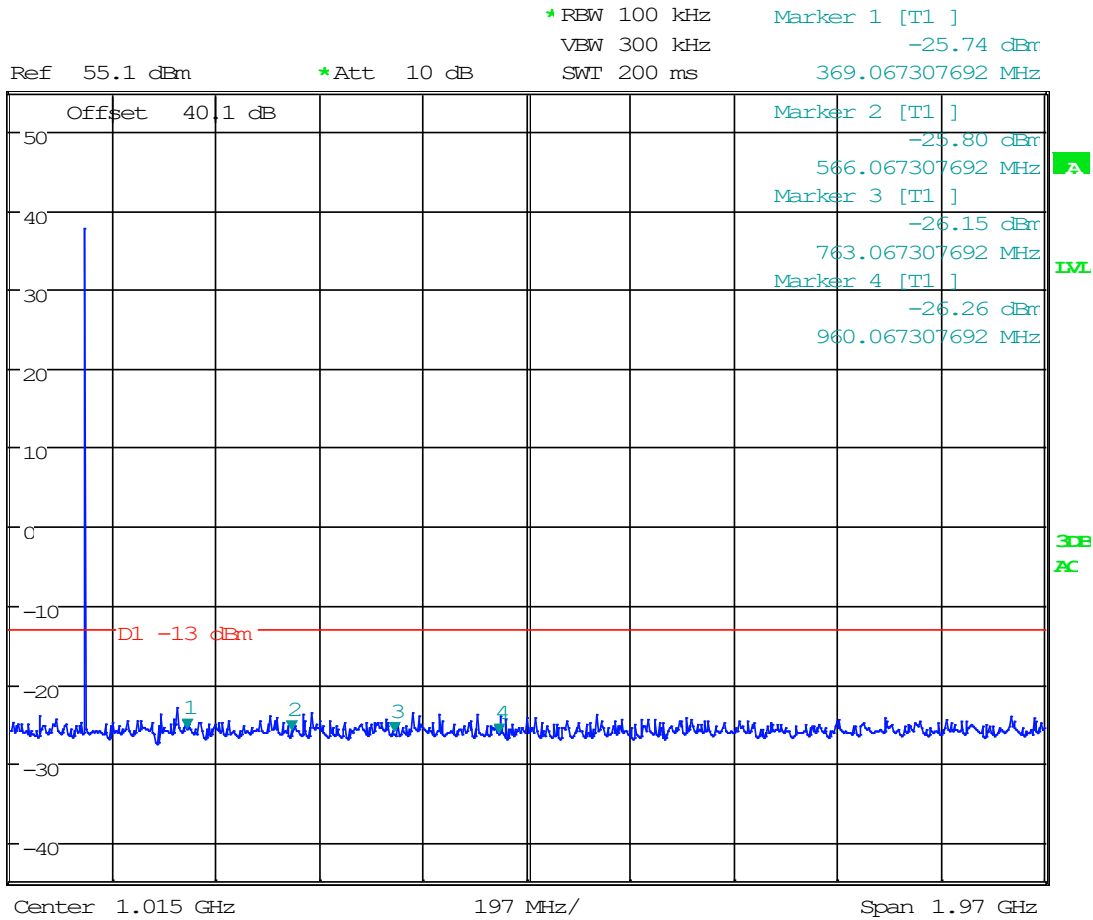




8.2.1 Conducted Emissions, 174 MHz



1. RBW
 VTPW



Date: 10.FEB.2021 21:08:25



9. History of Test Report Changes

Test Report #	Revision #	Description	Date of Issue
TR_0280-21_FCC_PT90_1	1	Initial release	2/11/2021
TR_0280-21_FCC_PT90_2	2	Updated page 11	3/31/2021
TR_0280-21_FCC_PT90_3	3	Added note regarding tune-up tolerance on Page 11	04/16/2021



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END OF TEST REPORT
