



Test Report - FCC PART 95

Prepared For: Midland Radio Corporation

Approved for Release By:

Signature: Bruno Clavier

Name & Title: Bruno Clavier, General Manager

Date of Signature

(YYYY-MM-DD): 2021-06-16

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Timco Engineering, Inc., an IIA Company
849 NW State Road 45, Newberry, Florida 32669
(352) 472-5500 / testing@timcoengr.com

1. Customer Information

Applicant: Midland Radio Corporation
Address: 5900 Parretta Drive
Kansas City, MO 64120-2134

1.1 Test Result Summary

The following test procedure and guidance were used for measuring FCC PART 95 (PERSONAL RADIO SERVICES); ANSI C63.26-2015. Full test results are available in this report.

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.

The Following is for Test item FCC ID: MMAMXT400

Applicable Clauses from Part 2		
FCC Part 2 Clauses	Description of the requirements	Result: (Pass, Fail, N/A)
2.202	Bandwidth & Emission	Pass
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	Pass
2.1051	Spurious emissions at antenna terminals	n/a
2.1053	Field strength of spurious radiation	n/a
2.1055	Frequency stability	n/a



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Applicable Clauses from Part 95 Subpart E		
FCC Part 95 Clauses	Description of the requirements	Result: (Pass, Fail, N/A)
95.1767	GMRS transmitting power limits.	n/a
95.1771	GMRS emission types.	n/a
95.1773	GMRS authorized bandwidths.	Pass
95.1775	GMRS modulation requirements.	Pass
95.1777	GMRS tone transmissions.	n/a
95.1779	GMRS unwanted emissions limits.	Pass



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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

2.2 Testing was performed, reviewed by

Dates of Testing: June 16, 2021

Signature: _____

Sr. EMC Engineer
EMC-003838-NE



Name & Title: Tim Royer, EMC Engineer

Date of Signature

(YYYY-MM-DD): 2021-06-16



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

The test sample was received: June 16, 2021

3.1 Definitions

General Mobile Radio Service (GMRS). A mobile two-way voice communication service, with limited data applications, for facilitating activities of individual licensees and their family members, including, but not limited to, voluntary provision of assistance to the public during emergencies and natural disasters.



3.2 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	
FCC ID:	MMAMXT400
Brief Description	MOBILE GMRS TRANSCEIVER
Type of Modular	n/a
Model(s) #	MXT400
Serial Number	n/a

Technical Characteristics	
Technology	Licensed Non-Broadcast Station Transmitter
Frequency Range	462.55 – 467.725 MHz
RF O/P Power (Max.)	462.5625 – 462.725 MHz: 5 W 462.55 – 462.725 MHz: 40 W
Modulation	n/a
Bandwidth & Emission Class	16K0F3E
Number of Channels	Variable.
Duty Cycle	100%
Antenna Connector	n/a
Voltage Rating (AC or Batt.)	0 dBi

Antenna Characteristics				
Antenna Name	Frequency Range	Antenna Type	Dimensions	Antenna Gain
n/a	n/a	n/a	n/a	n/a

Note: This EUT does not include antenna(s).



3.3 Configuration of EUT

Test Modes		
Band	Link Direction	Test Frequencies
462.5625 – 462.725 MHz	12.5kHz Channel	n/a
		n/a
		n/a
462.55 – 462.725 MHz	16kHz Channel	462.55 MHz

Operating conditions during Testing:

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:

None.

3.4 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 95 Licensed device:

- 1) ANSI C63.26-2015

4.2 Applied Limits and Regulatory Limits:

- 1) FCC CFR 47 Part 95 Subpart E

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

Device	Manufacturer	Model	SN #	Current Cal	Cal Due
Signal Generator R&S SMU-200A	Rohde & Schwarz	SMU200A	103195	4/23/19	4/22/2022
Sweep/Signal Generator	Anritsu	68369B	985112	1/19/21	1/19/2024
Digital Multimeter	Fluke	77	35053830	9/9/20	9/9/2023
R&S 18 GHz USB Peak Power Sensor	Rohde & Schwarz	NRP-Z85	1411.7501.02-102085-VV	2/4/19	2/3/2022
Active Loop	ETS-Lindgren	6502	00062529	10/20/20	10/20/2023
Biconical 1057	Eaton	94455-1	1057	10/16/20	10/16/2023
Log-Periodic 1243	Eaton	96005	1243	5/4/21	5/3/2024
Double-Ridged Horn/ETS Horn 1	ETS-Lindgren	3117	00035923	2/25/20	2/24/2023
CHAMBER	Panashield	3M	N/A	3/12/19	3/11/2022
Frequency Counter Small	HP	5385A	3242A07460	9/9/20	9/9/2023
Type K J Thermometer	Martel	303	080504494	1/18/20	1/17/2023
EMI Test Receiver R&S ESU 40	Rohde & Schwarz	ESU 40	100320	8/28/18	8/27/2021

Type	Device	Manufacturer	Model	SN #	Last Verified
Attenuator	N 20dB 20W DC-4G	Narda	766-20	0605	1/6/21
Attenuator	N 20dB 2W DC-13G	Narda	757C	30201	1/6/21
Coaxial Cable	BMBM-0061-01 RG400	Pasternack	PE3582LF-24	BMBM-0061-01	1/6/21
Coaxial Cable	BMBM-0061-02 RG400	Pasternack	PE3582LF-24	BMBM-0061-02	1/6/21
Coaxial Cable	BMBM-0061-03 RG400	Pasternack	PE3582LF-24	BMBM-0061-03	1/6/21
Coaxial Cable	BMBM-0061-04 RG400	Pasternack	PE3582LF-24	BMBM-0061-04	1/6/21
Coaxial Cable	BMBM-0122-01 RG400	Pasternack	PE3582LF-48	BMBM-0122-01	1/6/21
Coaxial Cable	BMBM-0122-02 RG400	Pasternack	PE3582LF-48	BMBM-0122-02	1/6/21
Coaxial Cable	BMBM-0122-03 RG400	Pasternack	PE3582LF-48	BMBM-0122-03	1/6/21
Coaxial Cable	BMBM-0122-04 RG400	Pasternack	PE3582LF-48	BMBM-0122-04	1/6/21
Coaxial Cable	Chamber 3 cable set (backup)	Micro-Coax	Chamber 3 cable set (backup)	KMKM-0244-02 ; KMKM-0670-0	1/6/21
Combiner	Splitter/Combiner 1-1000MHz	Mini-Circuits	ZFSC-4-1-BNC+	U115700825	1/6/21
Combiner	Splitter/Combiner 1-1000MHz	Mini-Circuits	ZFSC-4-1-BNC+	U115700826	1/6/21
Noise Source	Noise Source 10MHz - 18GHz	Agilent	346B	MY44421884	1/6/21
Terminator	Terminator N 20W DC-18G	Narda	8205	#14	1/6/21
Test Equipment Adapter	Type R&S to NF			Test Equipment Adapter 04	1/6/21

Software	Author	Version
ESU Firmware	Rohde & Schwarz	4.43 SP3; BIOS v5.1-24-3
RSCommander	Rohde & Schwarz	1.6.4
Field Strength	Timco	v4.10.7.0

**The EMI Test Receiver R&S ESU 40 used to take plots for this report the date was not setup within the equipment. All plots below were taken in May and June of 2021. **



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.



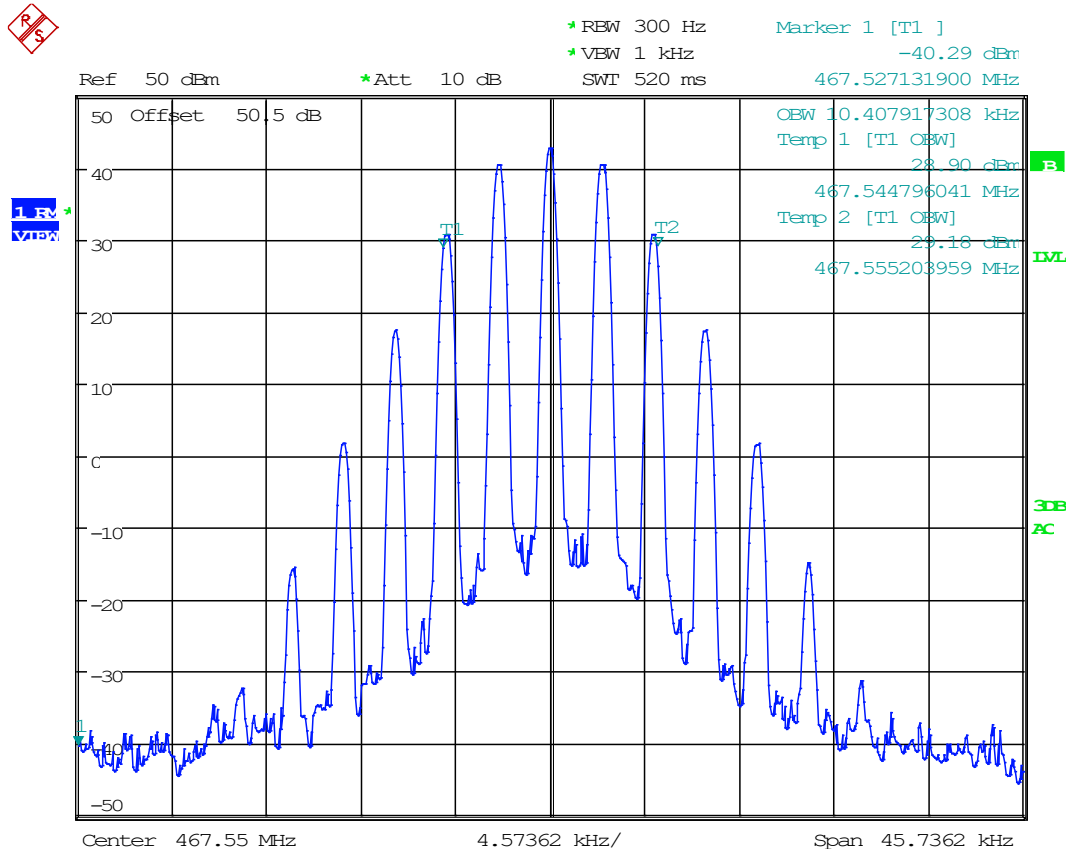
8.1 Bandwidth & Emission

Limits from FCC Parts 2.1049, and 95.1773 & 95.1775, and test procedure from ANSI C63.26-2015.

Test Results, Authorized Bandwidth		
Rule Part	Operating Range	Authorized Bandwidth
Part 95	462.55 – 462.725 MHz	20 kHz

Test Results, Occupied Bandwidth		
Tuned Frequency (MHz)	Occupied Bandwidth (kHz)	Bandwidth Type
467.55	10.4	F3E

8.1.1 Bandwidth Plot, 99%, 467.55 MHz

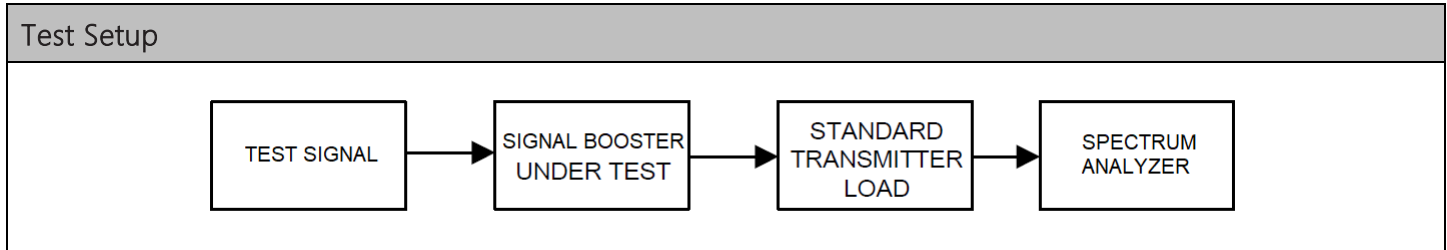


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8.2 8.4 Emission Limitations, In-Band

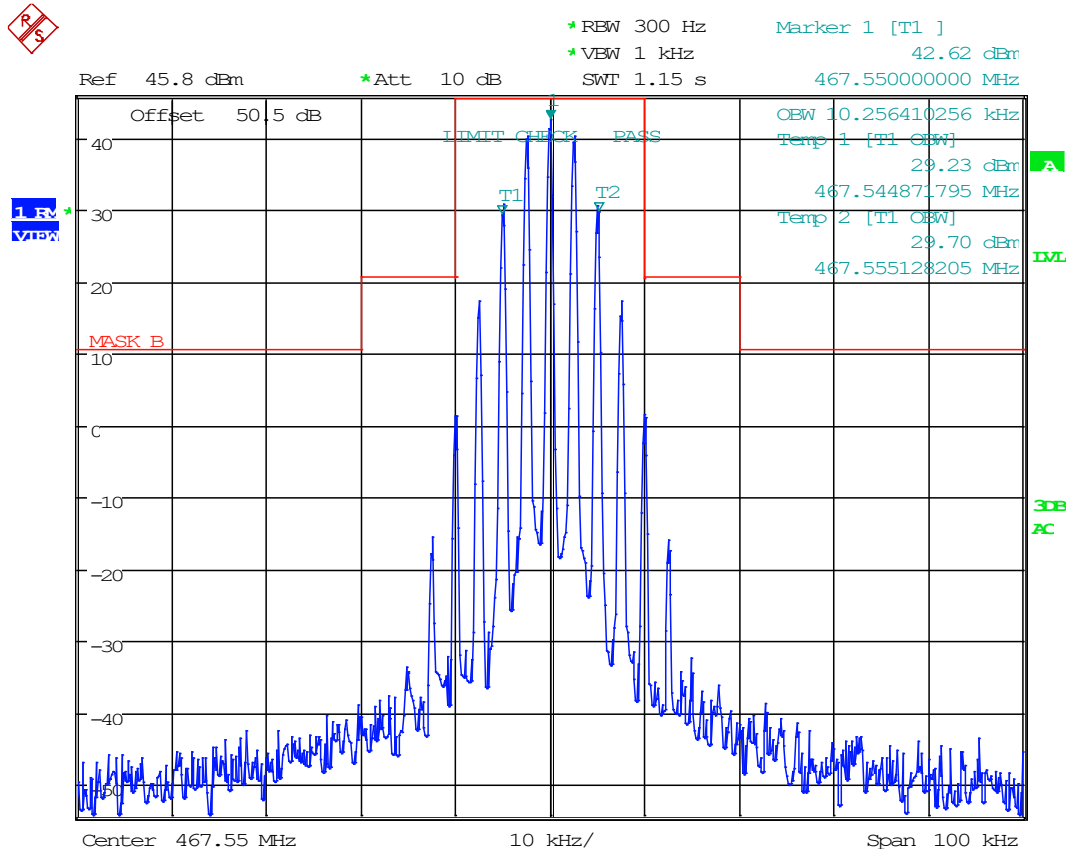
Limits from FCC Parts 2.1051, 95.1773, 95.1779 and test procedure from ANSI C63.26-2015.





Conducted Emissions Spectrum Plots

8.2.1 467.55 MHz Emissions Mask



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9. History of Test Report Changes

Test Report #	Revision #	Description	Date of Issue
TR-2947-21_FCC_PT95_1	1	Initial release	June 16, 2021



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END OF TEST REPORT
