

Test Report

Prepared for: BK Technologies, Inc

Model: KNG-M150LP-2

Description: VHF Mobile Radio

FCC ID: K95KNGM150LP-2
ISED ID: 2116A-KNGM150LP-2

To

FCC_ Part 22, 80, 90
ISED_RSS-119 issue 12 (May 2015)

Date of Issue: April 18, 2023

On the behalf of the applicant:

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Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	5/1/2023	Greg Corbin	Original Document
2.0	5/8/20223	Greg Corbin	Corrected rated and max power stated on page 9 per manufacturer information

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Test Result Summary

Specification		Test Name	Pass, Fail, N/A	Comments
FCC	ISED			
2.1046 90.205(s) 22.565(a) 80.215	RSS-119_5.4	Carrier Output Power (Conducted)	Pass	
2.1051 90.210 22.359(a) 80.211(f)(3)	RSS-119_5.8.3	Unwanted Emissions (Transmitter Conducted)	Pass	
2.1051 90.210 22.359(a) 80.211(f)(3)	RSS-119_5.8.3	Field Strength of Spurious Radiation	Pass	
2.1049 90.210(b)(d) 80.211(f)	RSS-119_5.5	Emission Masks	Pass	
2.1049(c)(1) 22.359(b) 80.211(f)	RSS-GEN_6.7	Occupied Bandwidth	Pass	
2.1047(a) 80.213(e)	N/A	Audio Low Pass Filter (Voice Input)	Pass	
2.1047(a)	N/A	Audio Frequency Response	Pass	
2.1047(a) 80.213(a)	N/A	Modulation Limiting	Pass	
2.1055 90.213 90.539(c) 22.355 80.209(a)	RSS-119_5.3	Frequency Stability (Temperature Variation)	Pass	
2.1055 90.213 90.539(c) 22.355 80.209(a)	RSS-119_5.3	Frequency Stability (Voltage Variation)	Pass	
90.214	RSS-119_5.9	Transient Frequency Behavior	Pass	
2.202	N/A	Necessary Bandwidth Calculation	Pass	

Statements of conformity are reported as:

- Pass - the measured value is below the acceptance limit, *acceptance limit = test limit*.
- Fail - the measured value is above the acceptance limit, *acceptance limit = test limit*.

ANAB

Compliance Testing, LLC, has been accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to the joint ISO-ILAC-IAF Communiqué dated January 2009).

The tests results contained within this test report all fall within our scope of accreditation, unless noted below.

Please refer to <http://www.compliancetesting.com/labscope.html> for current scope of accreditation.



FCC Site Reg. #349717

IC Site Reg. #2044A-2

Test and Measurement Data

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II, Part 2, Subpart J, Sections 2.947, 2.1033(c), 2.1041, 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, ANSI C63.26-2015, FCC Part 22, Part 74, Part 80, Part 90, RSS-119 and RSS-GEN.

Standard Test Conditions and Engineering Practices

Except as noted herein, the following conditions and procedures were observed during the testing.

In accordance with ANSI/TIA 603C, and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104°F) unless the particular equipment requirements specified testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Environmental Conditions		
Temp (°C)	Humidity (%)	Pressure (mbar)
24.8 – 27.6	22.2 – 28.6	963 – 974.5

Measurement results, unless otherwise noted, are worst-case measurements.

EUT Description

Model: KNG-M150LP-2

Description: VHF Mobile Radio

Firmware: 2.7.5.4

Software: 5.7.2

DSP: 5.7.0

Serial Number:

SN: 34 was used for all conducted RF test data.

SN: 32 was used for radiated RF test data.

PMN: KNGM150LP-2

HVIN: KNGM150LP-2

Additional Information:

The EUT is a VHF mobile radio operating from 136 – 174 MHz with FM, C4FM, and TDMA modulations.

EUT Operation during Tests

The EUT is battery powered with the nominal voltage set to 13.8 vdc.

The output power was set to maximum for all tests.

The low, mid, high frequency for FCC Part 90 and ISSED RSS-119 was tested as well as 1 frequency in each band for FCC Part 22, 80.

Table 1 – Frequency Range, Modulation Type and Emission Designators

Frequency Band (MHz)	FCC Rule Section	FCC, ISED	Test Frequency (MHz)	12.5k FM	P25 Phase 1 C4FM	P25 Phase 2 H-CPM
FCC (Part 90) 150.8 -174 (Part 22) 152.03 – 158.07 (Part 80) 157.2 – 157.425 (Part 80) 161.8 – 162.025 ISED 138 – 174	90 EF	FCC (EF), ISED	138.025	11K0F3E	8K10F1E 8K10F1D	8K10F1W
	90	FCC, ISED	150.8125	11K0F3E	8K10F1E 8K10F1D	8K10F1W
	22, 90	FCC, ISED	158.07	11K0F3E	8K10F1E 8K10F1D	8K10F1W
	80, 90	FCC, ISED	161.80	11K0F3E	8K10F1E 8K10F1D	8K10F1W
	90	FCC, ISED	173.975	11K0F3E	8K10F1E 8K10F1D	8K10F1W

Antenna Gain

Model	Frequency Range (MHz)		Gain (dBi)
MWV1365S	VHF	136 – 174	Unity (0 dBi)

Accessories:

Qty	Description	Manufacturer	Model	S/N
1	PTT Microphone	BK	KAA0290S	N/A
1	Speaker	BK	KAA0261	N/A

Cables: None

Modifications: None

Carrier Output Power (Conducted)

Engineer: Greg Corbin

Test Date: 4/11/23

Measurement Procedure

The Equipment Under Test (EUT) was connected to a spectrum analyzer through a 30 dB Power attenuator. All cable and attenuator losses were input into the spectrum analyzer as a reference level offset to ensure accurate readings were obtained.

Output power was recorded in CW, C4FM, TDMA modes of operation.

CW was measured with peak detector with max hold.

C4FM was measured using the Channel Power integration tool in the spectrum analyzer.

TDMA was measured using a average detector with max hold per ANSI C63.25-2015 section 5.2.4.3.3.

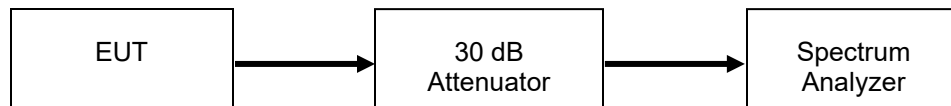
Manufacturer Rated Power (VHF)= 50 watts (46.990 dBm)

Manufacturer maximum allowed power = 56 watts (47.480 dBm)

ISED RSS-119 Output Power Limit = ± 1 dB of manufacturer rated power.

FCC Output Power Limit = 60 w (20% of manufacturer rated power)

Test Setup



Transmitter Peak Output Power_ CW

FCC ISED	Tuned Frequency	Output Power	Output Power	Result
	MHz	(dBm)	(watts)	
FCC (EF), ISED	138.0250	47.44	55.463	Pass
FCC, ISED	150.8125	47.44	55.463	Pass
FCC, ISED	158.0700	47.4	54.954	Pass
FCC, ISED	161.8000	47.43	55.335	Pass
FCC, ISED	173.9750	47.37	54.576	Pass

Transmitter Peak Output Power_ C4FM

FCC ISED	Tuned Frequency	Output Power	Output Power	Result
	MHz	(dBm)	(watts)	
FCC (EF), ISED	138.0250	47.42	55.208	Pass
FCC, ISED	150.8125	47.4	54.954	Pass
FCC, ISED	158.0700	47.37	54.576	Pass
FCC, ISED	161.8000	47.4	54.954	Pass
FCC, ISED	173.9750	47.35	54.325	Pass

Transmitter Peak Output Power_ TDMA

FCC ISED	Tuned Frequency	Output Power	Output Power	Result
	MHz	(dBm)	(watts)	
FCC (EF), ISED	138.0250	47.44	55.463	Pass
FCC, ISED	150.8125	47.43	55.335	Pass
FCC, ISED	158.0700	47.39	54.828	Pass
FCC, ISED	161.8000	47.41	55.081	Pass
FCC, ISED	173.9750	47.37	54.576	Pass

Conducted Spurious Emissions

Engineer: Greg Corbin

Test Date: 4/13/23

Test Procedure

The EUT was connected directly to a spectrum analyzer to verify that the EUT met the requirements for spurious emissions.

The frequency range from 30 MHz to the 10th harmonic of the fundamental transmitter was observed and plotted.

The conducted spurious emissions was recorded for FM, C4FM, TDMA modes of operation.

The EUT was set to transmit at maximum power.

For 30 – 1000 MHz, a notch filter was used at the RX antenna output for the fundamental signal and the RX pre-amplifier was bypassed.

For 1 – 2 GHz, a 1GHz highpass filter was used at the RX antenna output.

The RBW was set to 100 kHz for measurements below 1 GHz and 1 MHz for measurements above 1 GHz.

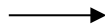
The VBW was set to 3 times the RBW.

Note: A marker was placed on the fundamental frequency. Only the fundamental TX signal exceeded the limit as shown in the spectrum analyzer screenshots.

The specification limit was set for -20 dBm for comparison to the emission mask “D” limit.

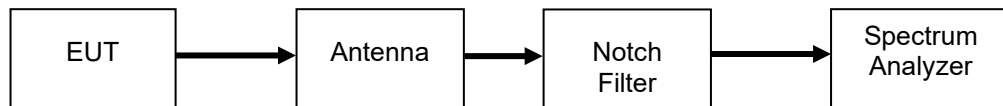
The following formula was used for calculating the limits:

For the VHF band, the radiated spurious limit = $P_1 - (50 + 10\log(P_2)) = -20\text{dBm}$

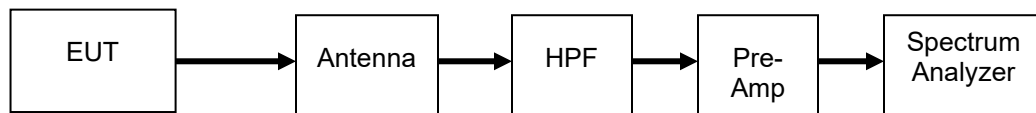


Conducted Emissions Test Setup

30 – 1000 MHz



1 – 2 GHz



Conducted Spurious Emissions Summary Test Table_ FM

FCC ISED	Tuned Frequency (MHz)	Spurious Frequency (MHz)	Measured Spurious Level (dBm)	Specification Limit (dBm)	Result
FCC (EF), ISED	138.0250	1210.48	-29.8	-20	Pass
FCC, ISED	150.8125	1519.32	-30.1	-20	Pass
FCC, ISED	158.0700	1420.096	-30.6	-20	Pass
FCC, ISED	161.8000	1383.17	30.3	-20	Pass
FCC, ISED	173.9750	1988.27	-29.8	-20	Pass

Conducted Spurious Emissions Summary Test Table_ C4FM

FCC ISED	Tuned Frequency (MHz)	Spurious Frequency (MHz)	Measured Spurious Level (dBm)	Specification Limit (dBm)	Result
FCC (EF), ISED	138.0250	1713.37	-30.4	-20	Pass
FCC, ISED	150.8125	1519.33	-30.1	-20	Pass
FCC, ISED	158.0700	1646.54	-29.7	-20	Pass
FCC, ISED	161.8000	1209.52	-30.7	-20	Pass
FCC, ISED	173.9750	1749.98	-30.1	-20	Pass

Conducted Spurious Emissions Summary Test Table_ TDMA

FCC ISED	Tuned Frequency (MHz)	Spurious Frequency (MHz)	Measured Spurious Level (dBm)	Specification Limit (dBm)	Result
FCC (EF), ISED	138.0250	1985.48	-28.9	-20	Pass
FCC, ISED	150.8125	1903.27	-30.8	-20	Pass
FCC, ISED	158.0700	1980	-30.5	-20	Pass
FCC, ISED	161.8000	1352.40	-29.7	-20	Pass
FCC, ISED	173.9750	1295.38	-31.2	-20	Pass

Annex A Conducted Spurious Emission

Refer to Annex A for Conducted Spurious Emission plots

Field Strength of Spurious Radiation

Engineer: Greg Corbin

Test Date: 5/1/2023

Test Procedure

The EUT was tested in a semi-anechoic chamber with the turntable set 3m from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the requirements for Radiated Emissions. The EUT was tested by rotating it 360 degrees with the antenna in both the vertical and horizontal orientation while raised from 1 to 4 meters to ensure that the signal levels were maximized. All cable and antenna correction factors were input into the spectrum analyzer ensuring an accurate measurement in ERP/EIRP with the resultant power in dBm.

The EUT was set to transmit at maximum power with the RF output terminated in a 50 ohm termination.

Radiated spurious emissions was recorded with the EUT in CW, C4FM, TDMA mode of operation.

For 30 – 1000 MHz, a notch filter was used at the RX antenna output for the fundamental signal and the RX pre-amplifier was bypassed.

For 1 – 2 GHz, a 1GHz highpass filter was used at the RX antenna output.

The receive path pre-amplifier was bypassed for this test.

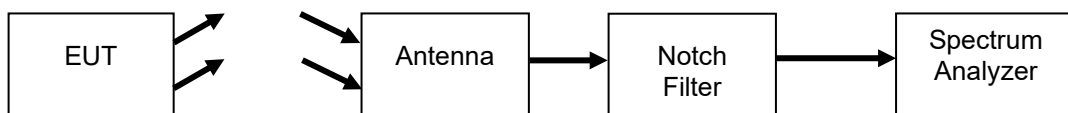
The RBW was set to 100 kHz for measurements below 1 GHz and 1 MHz for measurements above 1 GHz.
The VBW was set to 3 times the RBW.

The following formula was used for calculating the limits:

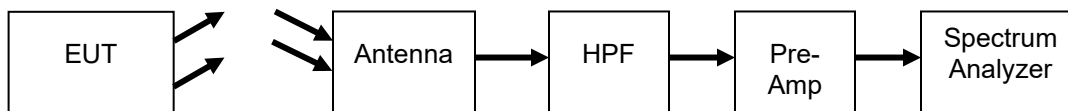
For the VHF band, the radiated spurious limit = $P_1 - (50 + 10\log(P_2)) = -20\text{dBm}$

Radiated Emissions Test Setup

30 – 1000 MHz



1 – 2 GHz



Radiated Spurious Emissions Summary Test Table_ CW

FCC ISED	Tuned Frequency (MHz)	Spurious Frequency (MHz)	Measured Spurious Level (dBm)	Specification Limit (dBm)	Result
FCC (EF), ISED	138.0250	936.5	-33.2	-20	Pass
FCC, ISED	150.8125	904.8	-33.3	-20	Pass
FCC, ISED	158.0700	948.4	-32.9	-20	Pass
FCC, ISED	161.8000	995.8	-33.3	-20	Pass
FCC, ISED	173.9750	869.8	-31.0	-20	Pass

Radiated Spurious Emissions Summary Test Table_ C4FM

FCC ISED	Tuned Frequency (MHz)	Spurious Frequency (MHz)	Measured Spurious Level (dBm)	Specification Limit (dBm)	Result
FCC (EF), ISED	138.0250	828.2	-32.2	-20	Pass
FCC, ISED	150.8125	934.2	-33.7	-20	Pass
FCC, ISED	158.0700	948.5	-32.6	-20	Pass
FCC, ISED	161.8000	809.0	-32.6	-20	Pass
FCC, ISED	173.9750	869.9	-31.6	-20	Pass

Radiated Spurious Emissions Summary Test Table_ TDMA

FCC ISED	Tuned Frequency (MHz)	Spurious Frequency (MHz)	Measured Spurious Level (dBm)	Specification Limit (dBm)	Result
FCC (EF), ISED	138.0250	1656.3	-33.2	-20	Pass
FCC, ISED	150.8125	904.9	-32.9	-20	Pass
FCC, ISED	158.0700	948.4	-31.6	-20	Pass
FCC, ISED	161.8000	809.0	-33.4	-20	Pass
FCC, ISED	173.9750	869.9	-31.0	-20	Pass

Annex B Radiated Spurious Emission

Refer to Annex B for Radiated Spurious Emission plots

Emission Masks (Occupied Bandwidth)

Engineer: Greg Corbin

Test Date: 4/13/23

Measurement Procedure

The EUT was connected directly to a spectrum analyzer to verify that the EUT meets the required emissions mask. A reference level plot is provided to verify that the peak power was established prior to testing the mask.

For FM modulation the transmitter was modulated with a 2.5 kHz tone at a level 16 dB higher than that required to produce 50% of the maximum frequency deviation.

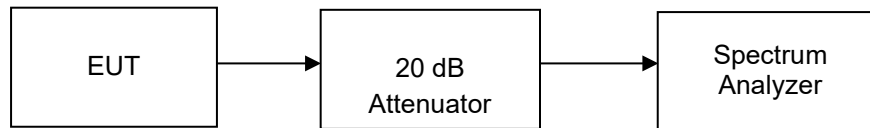
For C4FM modulation the internal C4FM standard test pattern was used.

For TDMA modulation, the internal TDMA standard test pattern was used.

The 99% and -26 dB Occupied Bandwidth was recorded for each frequency with FM, C4FM, and TDMA modulation.

Mask D was used for the VHF band.

Test Setup



Annex C Occupied Bandwidth

Refer to Annex C for Occupied Bandwidth plots.

Annex D Emission Mask

Refer to Annex D for Emission Mask plots.

Transient Frequency Behavior

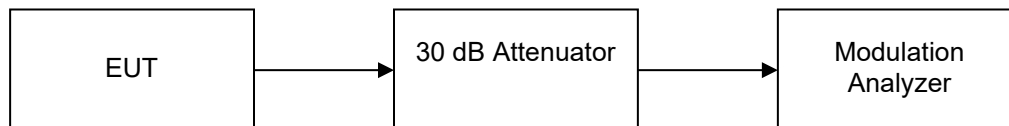
Engineer: Greg Corbin

Test Date: 4/14/23

Measurement Procedure

The EUT was connected directly to a modulation analyzer through a 30 dB attenuator to verify that the EUT meets the required Transient Frequency Behavior response per the specification. The modulation analyzer is a real time spectrum analyzer with integrated demodulation, audio measurement capabilities, and timing analysis. The turn on and turn off transient timing was measured and recorded.

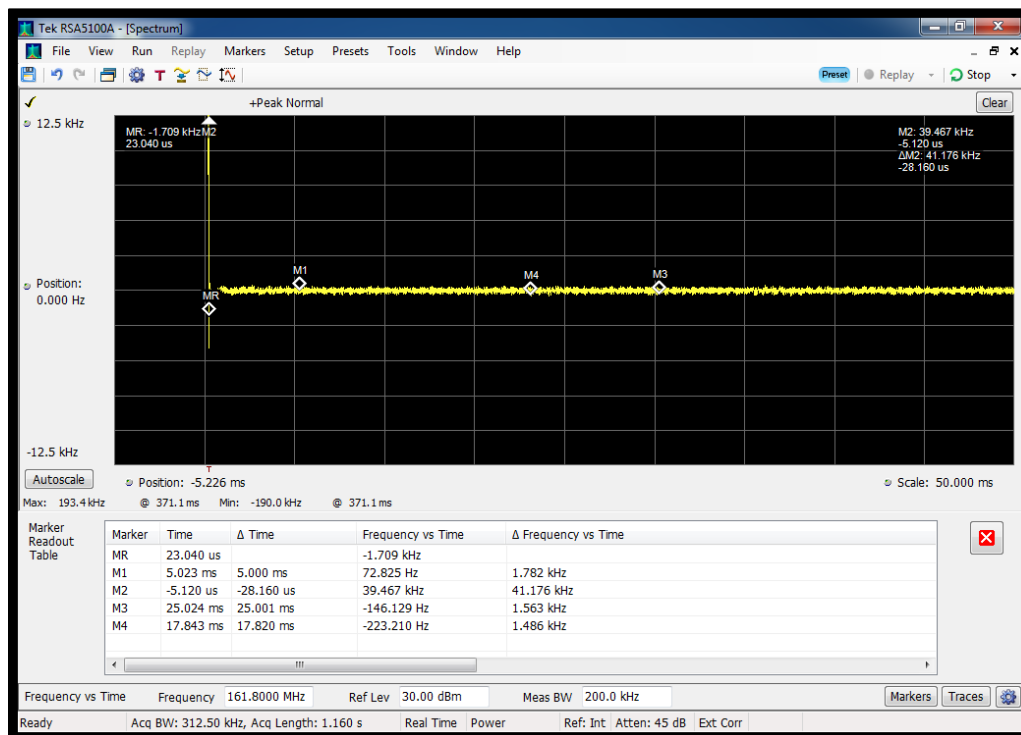
Test Setup



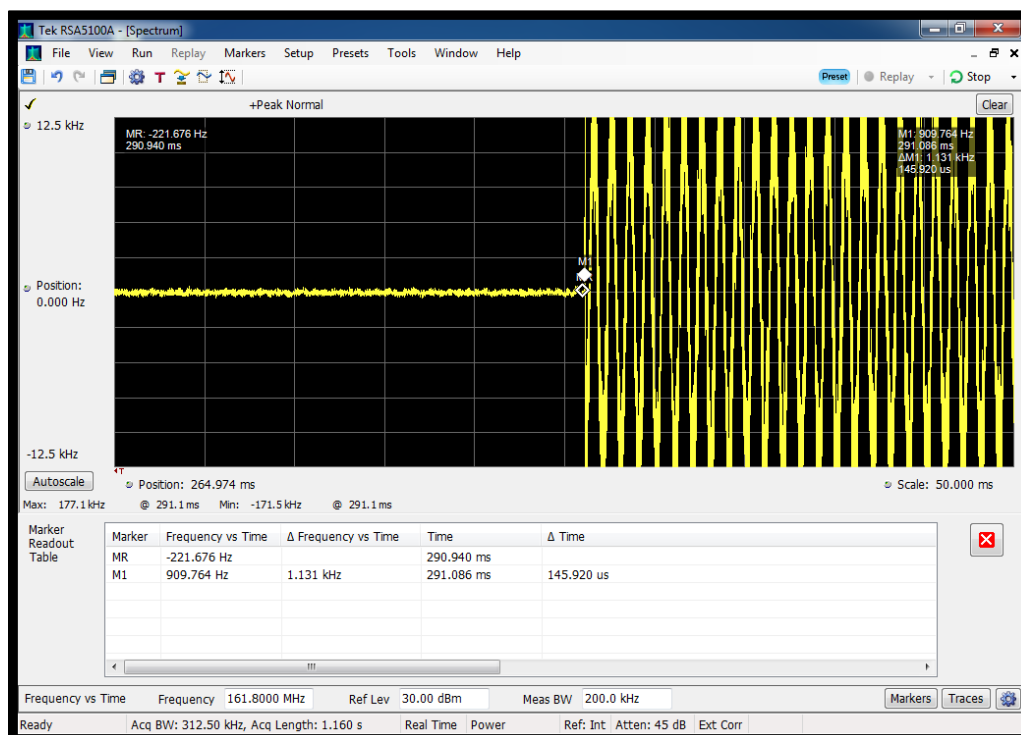
Transient Frequency Behavior Summary Table – VHF_ 161.8 MHz

12.5 kHz CH spacing - VHF – 161.80 MHz				
Time reference	time - referenced from t _{on}	Measured value	Limit	Pass / Fail
	(ms)	(kHz)	(kHz)	
t ₁	5	-1.709	± 12.5	Pass
t ₂	20	0.223	± 6.5	Pass
t ₃	5	1.131	± 12.5	Pass

Transient Frequency Behavior_Ton



Transient Frequency Behavior_Toff



Audio Low Pass Filter (Voice Input)

Engineer: Greg Corbin

Test Date: 4/17/2023

Measurement Procedure

The EUT was connected directly to a modulation analyzer through an attenuator. The audio source was tuned across the required audio frequency range and the audio low pass filter response was measured and plotted. The modulation analyzer is a real time spectrum analyzer with integrated demodulation, audio measurement capabilities, and timing analysis.

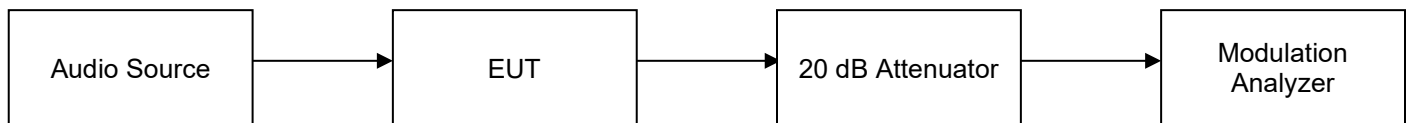
Use the Modulation Analyzer Audio Spectrum screen to measure the amplitude of the audio signal.

Set the audio frequency and measure the audio spectrum level using the marker function. This is performed by setting the marker equal to the audio input frequency.

Record the spectrum level for 100 Hz to 20 kHz and plot the results.

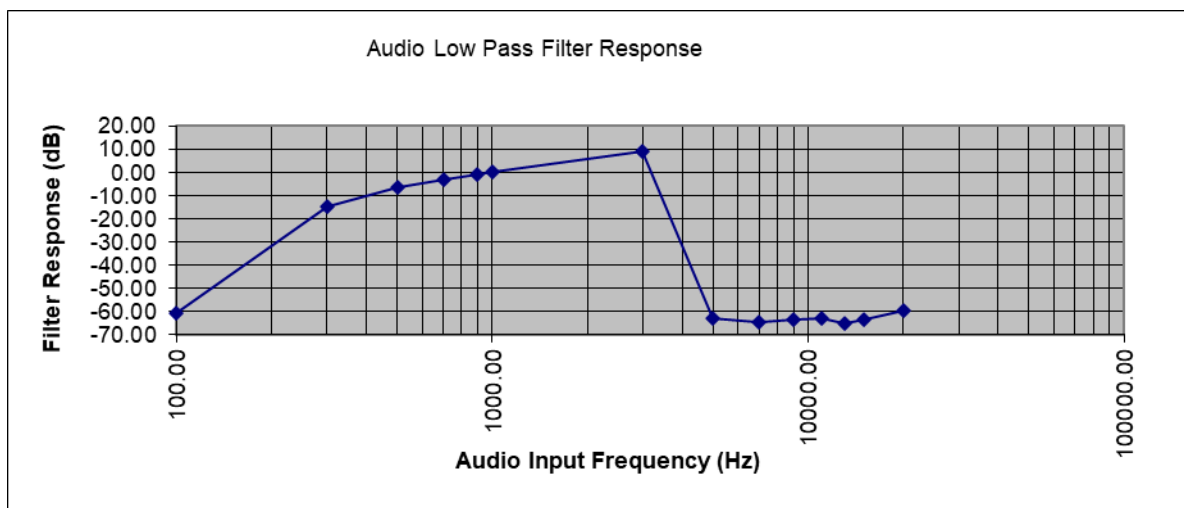
The Audio Low pass filter was measured for each band of operation, VHF, UHF, 700 and 800 bands.

Test Setup



Audio Low Pass Filter Test Results

161.8 MHz



Audio Frequency Response

Engineer: Greg Corbin

Test Date: 4/17/2023

Measurement Procedure

The EUT was connected directly to a modulation analyzer through an attenuator. The audio source was tuned across the required audio frequency range and the audio frequency response was measured and plotted. The modulation analyzer is a real time spectrum analyzer with integrated demodulation, audio measurement capabilities, and timing analysis.

Set the audio frequency for 1 kHz and adjust the level for 20% deviation according to the manufacturer's instructions.

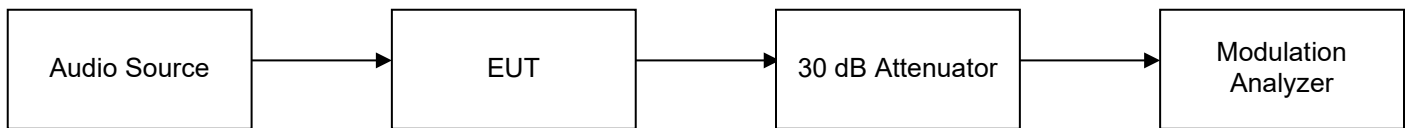
Use the Modulation Analyzer Audio Summary screen to measure RMS deviation.

Set the audio input frequency to the frequencies specified and measure the RMS deviation.

Record the audio spectrum level for 100 Hz to 5 kHz and plot the results.

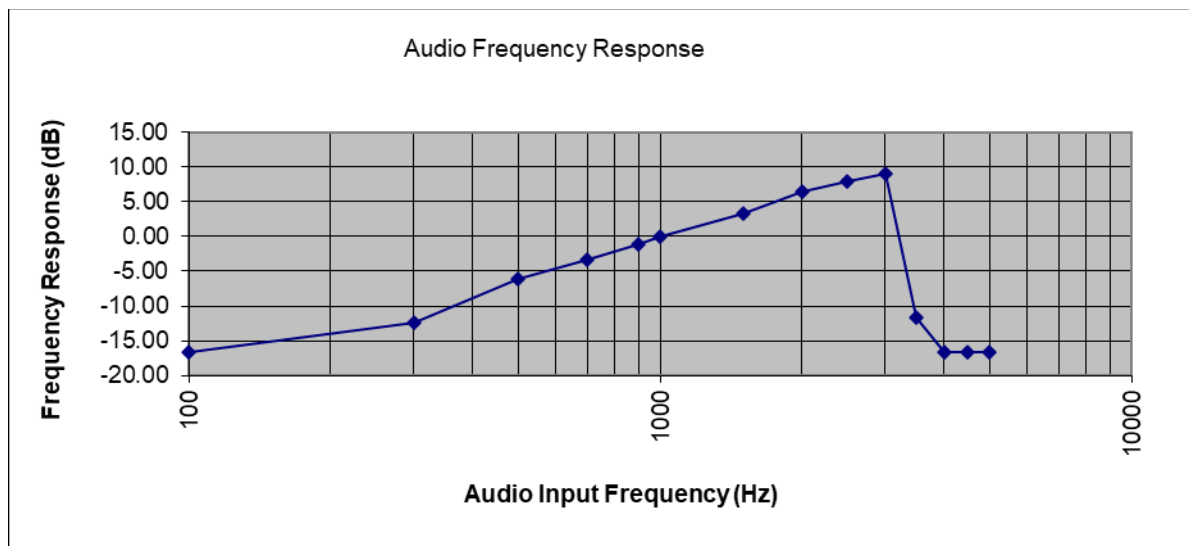
The Audio Frequency Response was measured for each band of operation, VHF, UHF, 700 and 800 bands.

Test Setup



Audio Frequency Response Test Results

161.8 MHz



Modulation Limiting

Engineer: Greg Corbin

Test Date: 4/17/2023

Measurement Procedure

The EUT was connected directly to a modulation analyzer through an attenuator. The audio source was tuned across the required audio frequency range and the modulation limiting response was measured and plotted. The modulation analyzer is a real time spectrum analyzer with integrated demodulation, audio measurement capabilities, and timing analysis.

Set the audio input to 1 kHz and adjust the level for 60% deviation as per the manufacturer's instruction.

Increase the deviation by 20 dB. Use the peak / -peak readings for this setting.

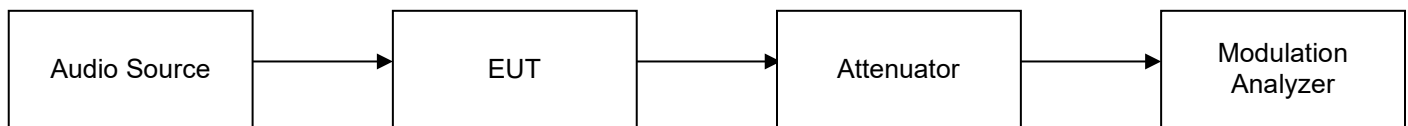
Use the Modulation Analyzer Audio Summary screen to measure + pk / - pk deviation.

Set the audio input frequency to the frequencies specified and measure the positive and negative peak deviation.

Record the positive and negative peak deviation for 100 Hz to 5 kHz and plot the results.

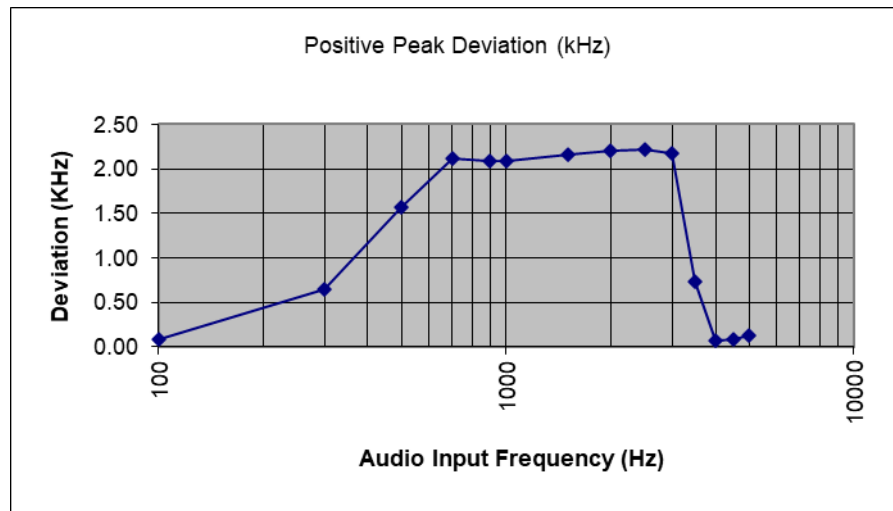
The Modulation Limiting was measured for each band of operation, VHF, UHF, 700 and 800 bands.

Test Setup

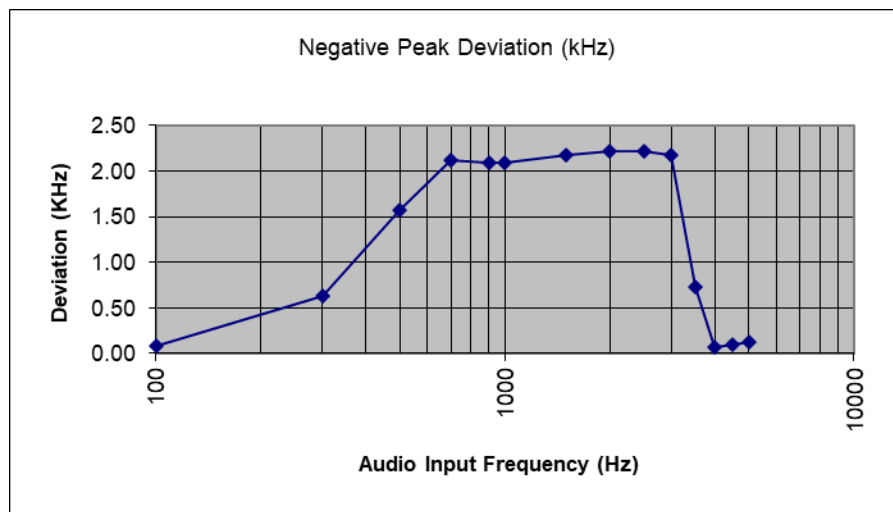


Modulation Limiting Test Results

161.8 MHz_ Positive Peaks



161.8 MHz_ Negative Peaks



Frequency Stability (Temperature Variation)

Engineer: Greg Corbin

Test Date: 2/24/2023

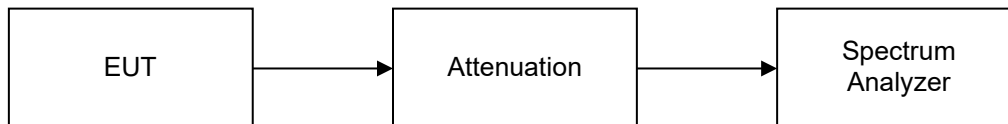
Measurement Procedure

The EUT was placed in an environmental test chamber and the RF output was connected directly to a spectrum analyzer. The temperature was varied from -30°C to 50°C in 10°C increments.

After a sufficient time for temperature stabilization the RF output frequency was measured.

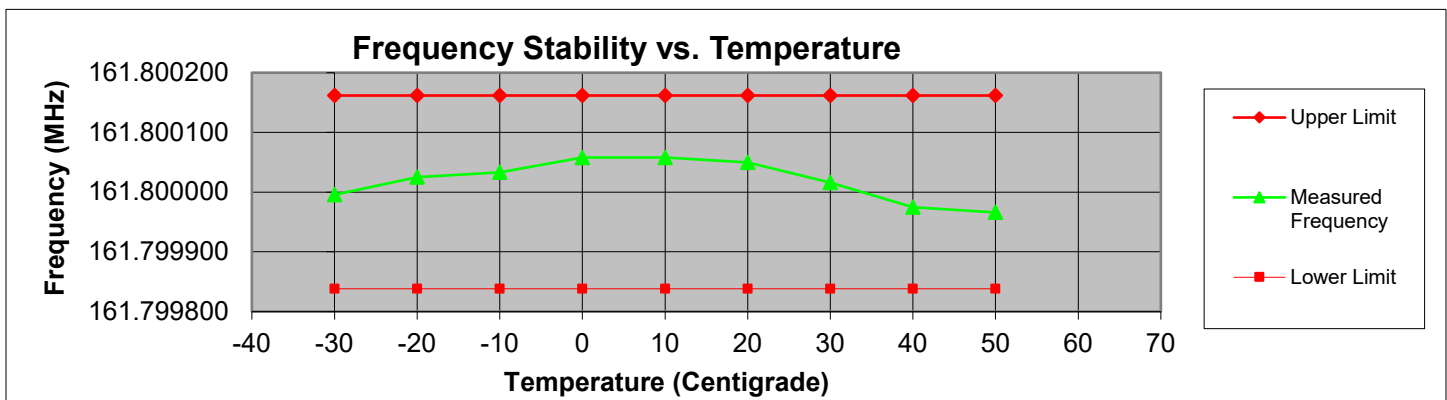
At 20°C the power supply voltage to the EUT was varied from 85% to 115% of the nominal value and the RF output was measured.

Measurement Setup



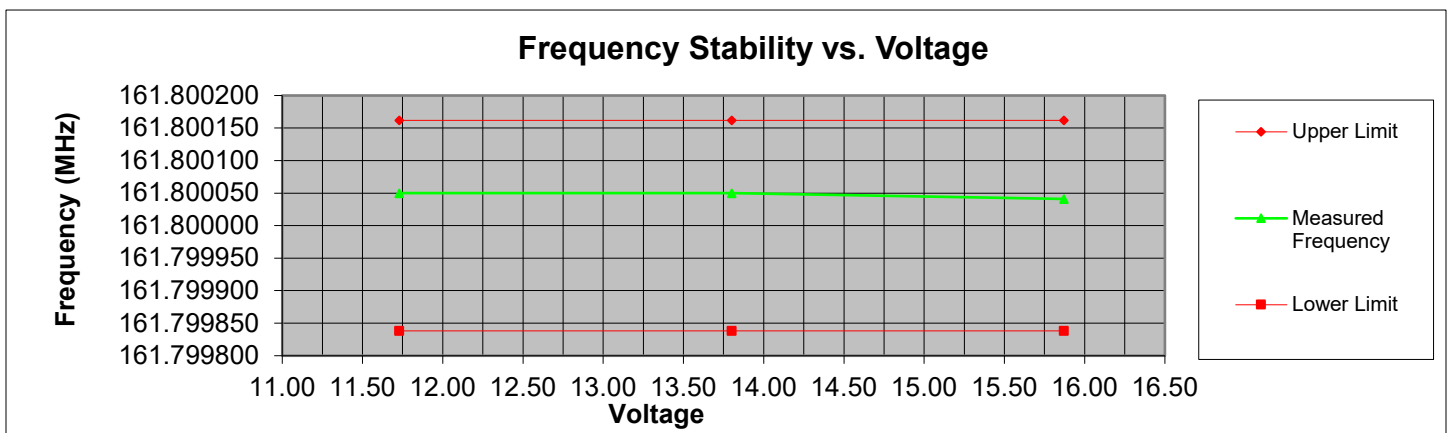
Frequency Stability vs Temperature

Tuned Frequency	Temperature	Tolerance	Measured Frequency	Upper Limit	Lower Limit	Upper Margin	Lower Margin
(MHz)	(deg C)	(PPM)	(MHz)	(MHz)	(MHz)	(MHz)	(MHz)
161.800	-30	1.0	161.799996	161.800162	161.799838	-0.000166	0.000158
161.800	-20	1.0	161.800025	161.800162	161.799838	-0.000137	0.000187
161.800	-10	1.0	161.800033	161.800162	161.799838	-0.000129	0.000195
161.800	0	1.0	161.800058	161.800162	161.799838	-0.000104	0.000220
161.800	10	1.0	161.800058	161.800162	161.799838	-0.000104	0.000220
161.800	20	1.0	161.800050	161.800162	161.799838	-0.000112	0.000212
161.800	30	1.0	161.800016	161.800162	161.799838	-0.000146	0.000178
161.800	40	1.0	161.799975	161.800162	161.799838	-0.000187	0.000137
161.800	50	1.0	161.799966	161.800162	161.799838	-0.000196	0.000128



Frequency Stability vs Voltage

Tuned Frequency	Tolerance	Voltage	Measured Frequency	Upper Limit	Lower Limit	Upper Margin	Lower Margin
(MHz)	(PPM)	(PPM)	(MHz)	(MHz)	(MHz)	(MHz)	(MHz)
161.800	1.0	11.73	161.800050	-0.000112	0.000212	161.800162	161.799838
161.800	1.0	13.80	161.800050	-0.000112	0.000212	161.800162	161.799838
161.800	1.0	15.87	161.800041	-0.000121	0.000203	161.800162	161.799838



Necessary Bandwidth Calculations

Engineer: Greg Corbin

Test Date: 4/21/2023

Modulation = 11K0F3E	
Necessary Bandwidth Calculation:	
Maximum Modulation (M), kHz	= 3
Maximum Deviation (D), kHz	= 2.5
Constant Factor (K)	= 1
Necessary Bandwidth (BN), kHz	= $(2 \times M) + (2 \times D \times K)$
	= 11.0

Modulation = 8K10F1E	
Necessary Bandwidth Calculation:	
Maximum Modulation (M), kHz	= 1.55
Maximum Deviation (D), kHz	= 2.5
Constant Factor (K)	= 1
Necessary Bandwidth (BN), kHz	= $(2 \times M) + (2 \times D \times K)$
	= 8.3

Modulation = 8K10F1D / 8K10F1W	
Necessary Bandwidth Calculation:	
Data Rate (R) Kbps	= 2.35
Maximum Deviation (D), kHz	= 2.5
Necessary Bandwidth (BN), kHz	= $2.4D + 1.0R$
	= 8.3

Measurement Uncertainty

Measurement Uncertainty for Compliance Testing is listed in the table below.

The reported expanded uncertainty has been estimated at a 95% confidence level (k=2)

Measurement Type	Expanded Uncertainty
Conducted Emissions, AC Powerline	± 3.28 dB
Radiated Emissions_30 – 1000 MHz	± 4.82 dB
Radiated Emissions_1 – 18 GHz	± 5.73 dB
Frequency Error	± 22 Hz
Conducted RF Power	± 0.98 dB
Conducted Spurious Emission	± 2.49 dB
AC Voltage	± 2.3 %
DC Voltage	± 0.12 %
Temperature	± 1.0 deg C
Humidity	± 4.32 %

Test Equipment Utilized

Description	Manufacturer	Model #	CT Asset #	Last Cal Date	Cal Due Date
Bi-Log Antenna	Chase	CBL6111C	i00267	8/10/22	8/10/24
Horn Antenna	ARA	DRG-118/A	i00271	8/11/22	8/11/24
Temp./humidity/pressure monitor	Omega Engineering	iBTHX-W-5	i00686	1/5/23	1/5/24
Temperature Chamber	Tenney	Tenney II Benchmaster	i00287	Verified on: 4/12/23	
Data Logger	Fluke	Hydra Data Bucket	i00343	6/23/22	6/23/23
Vector Signal Generator	Agilent	E4438C	i00348	6/14/22	6/14/23
Spectrum Analyzer	Textronix	RSA5126A	i00424	10/11/22	10/11/23
3 Meter Semi-Anechoic Chamber	Panashield	3 Meter Semi-Anechoic Chamber	i00428	7/17/20	7/17/23
Highpass Filter (1 GHz)	K&L	7IH40-980/T6000-O/O	i00432	Verified on: 4/24/23	
Voltmeter	Fluke	179	i00488	6/8/22	6/8/23
MXE EMI receiver	Keysight	N9038A	i00552	2/23/23	2/23/24
Attenuator, 20 dB, 50W	Mini-Circuits	BW- N20W50+	i00611	Verified on: 4/11/23	
Preamplifier	Eravant	SBB-0115034018-2F2F-E3	i00650	Verified on: 4/21/23	
Spectrum Analyzer	Agilent	PSA E4448A	i00688	11/9/22	11/9/23
Tunable Band Reject Filter	Telonic Berkeley	TTR 190-3EE	S/N: 970276-5	Verified on: 4/24/23	

In addition to the above listed equipment, standard RF connectors and cables were utilized in the testing of the described equipment. Prior to testing these components were tested to verify proper operation.

END OF TEST REPORT