



FCC PART 90

TEST REPORT REV 2

APPLICANT	RELM WIRELESS CORP. – BK RADIO
	7100 TECHNOLOGY DRIVE
	WEST MELBOURNE FLORIDA 32904 USA
FCC ID	K95KNGM150LP
IC ID	2116A-KNGM150LP
MODEL NUMBER	KNG-M150LP
PRODUCT DESCRIPTION	VHF MOBILE RADIO
DATE TESTED	03/14/16
TESTED BY	Ken Wharton
APPROVED BY	Brian Jones
TOTAL PAGES	33
TEST RESULTS	☒ PASS ☐ FAIL

APPLICANT: RELM WIRELESS CORP. – BK RADIO

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GENERAL REMARKS

The attached report shall not be reproduced except in full without the written permission of Relm Wireless Corp. – BK Radio.

Summary

The device under test does:

- ☒ fulfill the general approval requirements as identified in this test report
☐ not fulfill the general approval requirements as identified in this test report

Attestations

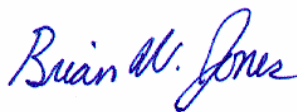
This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.

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, under my supervision, at:

RELM WIRELESS CORP. – BK RADIO
Engineering Lab
7100 Technology Dr
West Melbourne, FL 32904

Authorized Signatory Name:



Brian W. Jones
VP Engineering

Date: March 18, 2016

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GENERAL INFORMATION***DUT Specification***

DUT Description	VHF MOBILE RADIO
FCC ID	K95KNGM150LP
Model Number	KNG-M150LP
Operating Frequency	136-174MHz
Max. Output Power	58.5 Watts
Type of Emission	11K0F3E/8K10F1E/8K10F1D
Modulation	FM
DUT Power Source	☐ 110–120Vac/50– 60Hz
	☒ DC Power 12V
	☐ Battery Operated Exclusively
Test Item	☐ Prototype
	☐ Pre-Production
	☒ Production
Type of Equipment	☐ Fixed
	☒ Mobile
	☐ Portable
Test Conditions	The temperature was 26°C with a relative humidity of 50%.
Modification to the DUT	None
Test Exercise	The DUT was placed in continuous transmit mode.
Applicable Standards	TIA-102.CCAA, TIA-102.CCAB, FCC CFR 47 Part 90
Test Facility	Relm Wireless Corp.

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EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
Power Meter	Rohde & Schwartz	NRT	102293	09/17/15	09/17/16
Power Sensor	Rohde & Schwartz	NRT-Z14	100013	11/11/15	11/11/16
Spectrum Analyzer	Hewlett Packard	8561A	2912A00261	11/19/15	11/19/16
Power Supply	Hewlett Packard	6652A	3640A03085	04/08/15	04/08/16
Modulation Analyzer	Hewlett Packard	8901B	2449A00481	02/20/16	02/20/17
Signal Analyzer	Hewlett Packard	3561A	294507771	11/19/15	11/19/16
Com Test Set	Hewlett Packard	8920B	US37423693	03/02/16	03/02/17
Oscilloscope	LeCroy	LC334A	2693	05/02/15	05/02/16
RF Signal Generator	Hewlett Packard	8657A	2929A01132	11/19/15	11/19/16
Spectrum Analyzer	Rohde & Schwartz	ROHFSP13	100719	03/03/16	03/03/17

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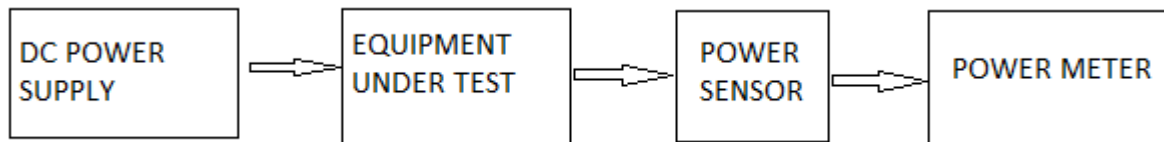
TEST SETUP

(Note: Although TIA603-D: 2010 is the current standard, TIA 603-E: 2014 is imminent)

1. RF Output Power

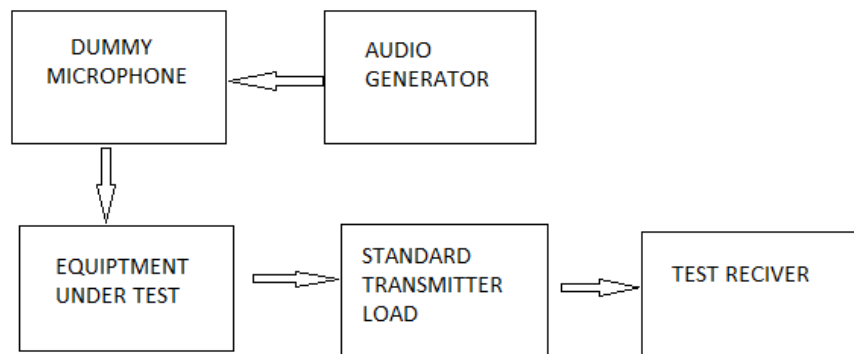
Test Method: TIA/EIA-603-D 2.2.1

Equipment Used: Rohde & Schwarz NRT Power Meter (09-17-16), Rohde & Schwarz NRT-Z14 Power Sensor (11-11-16), Hewlett-Packard 6652A DC Power Supply (04-8-16).

**2. Audio Frequency Response**

Test Method: TIA/EIA-603-D 2.2.6

Equipment Used: HP 8920B RF Communication Test Set Modulation Analyzer/Audio Generator (03-02-17).



APPLICANT: RELM WIRELESS CORP. – BK RADIO

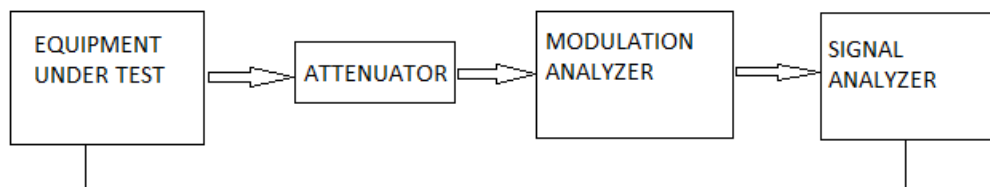
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3. Low Pass Filter Response

Test Method: TIA/EIA-603-D 2.2.15

Equipment Used: HP 8901B Set Modulation Analyzer (02-20-17), Hewlett Packard 3561A Signal Analyzer (11-19-16). No filters were used on the modulation analyzer.

**4. Occupied Bandwidth /Emission Mask**

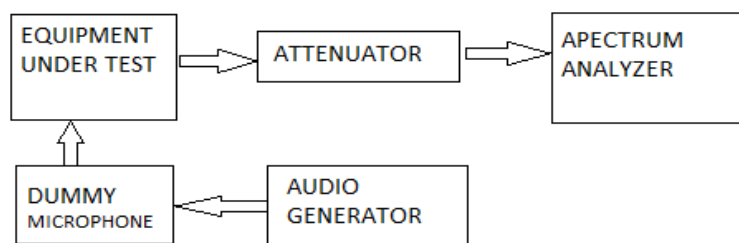
No Modulation

11K0F3E

8K10F1D

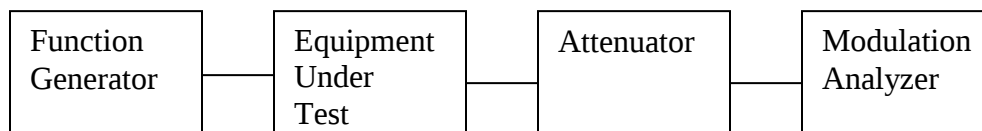
Test Method: TIA/EIA-603-D 2.2.11

Equipment Used: HP 8561A Spectrum Analyzer (11-19-16), HP 8920B RF Communication Test Set Audio Generator (03-02-17).

**5. Modulation Limiting**

Test Method: TIA/EIA-603-D 2.2.3

Equipment Used: HP 8920B RF Communication Test Set Modulation Analyzer (03-02-17), HP 8920B RF Communication Test Set Function Generator (03-02-17)



APPLICANT: RELM WIRELESS CORP. – BK RADIO

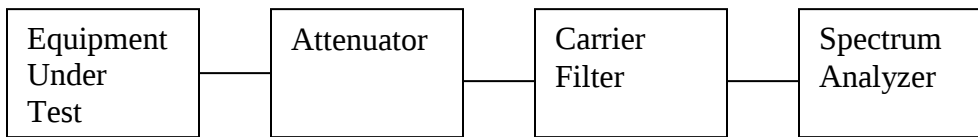
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6. Conducted Spurious Emissions

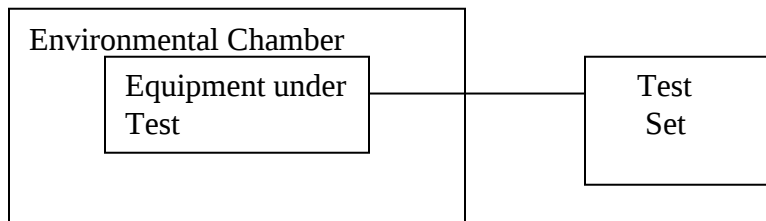
Test Method: TIA/EIA-603-D 2.2.12

Equipment Used: HP 8561A Spectrum Analyzer (11-19-16)

**7. Frequency Stability**

Test Method: TIA/EIA-603-D 2.2.2

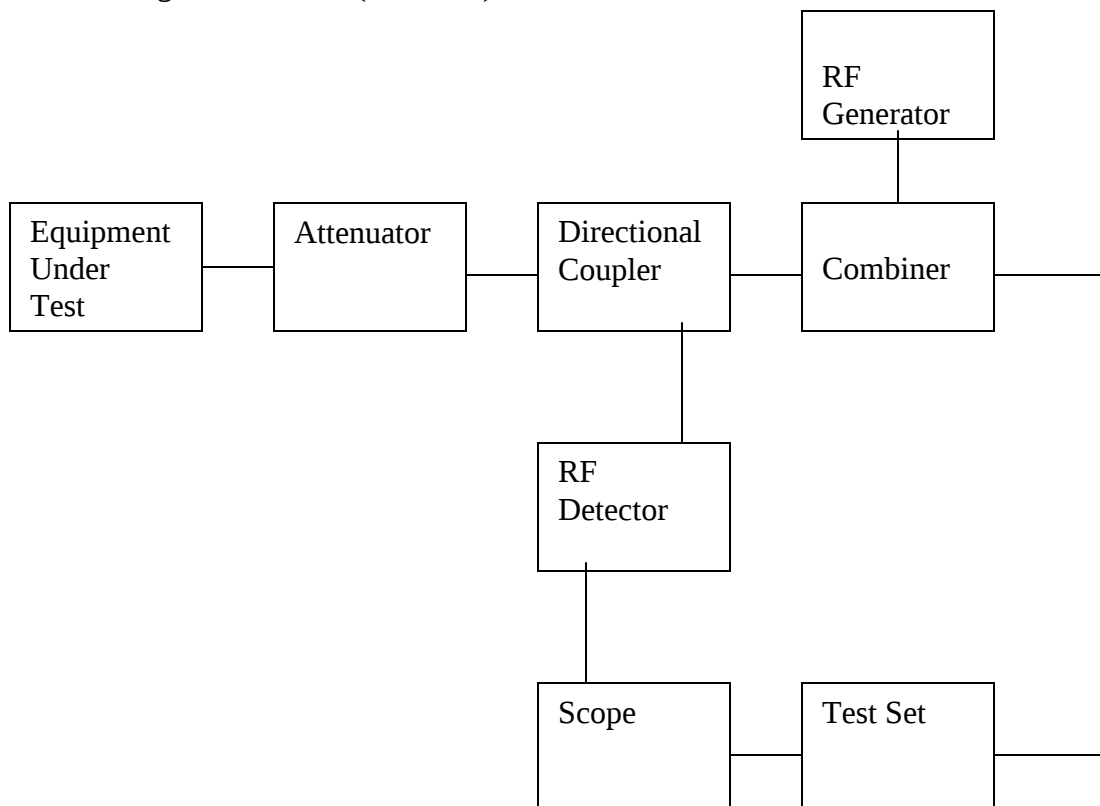
Equipment Used: HP 8920B RF Communication Test Set (03-02-17)



8. Transient Frequency Behavior

Test Method: TIA/EIA-603-D 2.2.19

Equipment Used: HP 8901B Modulation Analyzer (02-20-17), LeCroy LC334A Scope (05-02-16), HP 8657A Signal Generator (11-19-16)



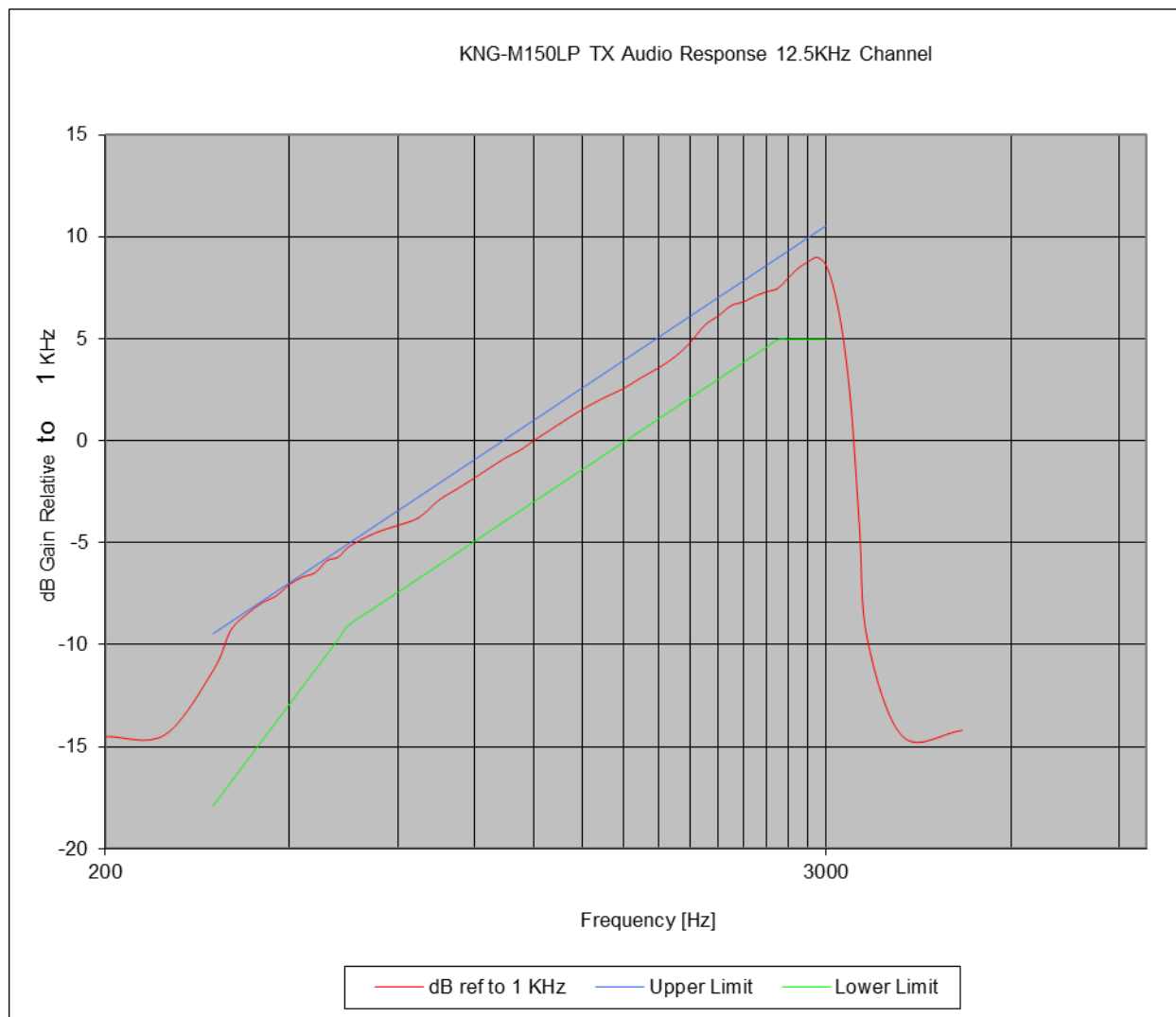
#1 RF Output Power

MHz	RF Power Out (Watts)	Current (Amps)	Voltage (Volts)
154	57.1	9.8	13.8
163	57.9	10.4	13.8
174	58.5	10.3	13.8

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#2 Audio Frequency Response**12.5 KHz TX Audio Response 163MHz**

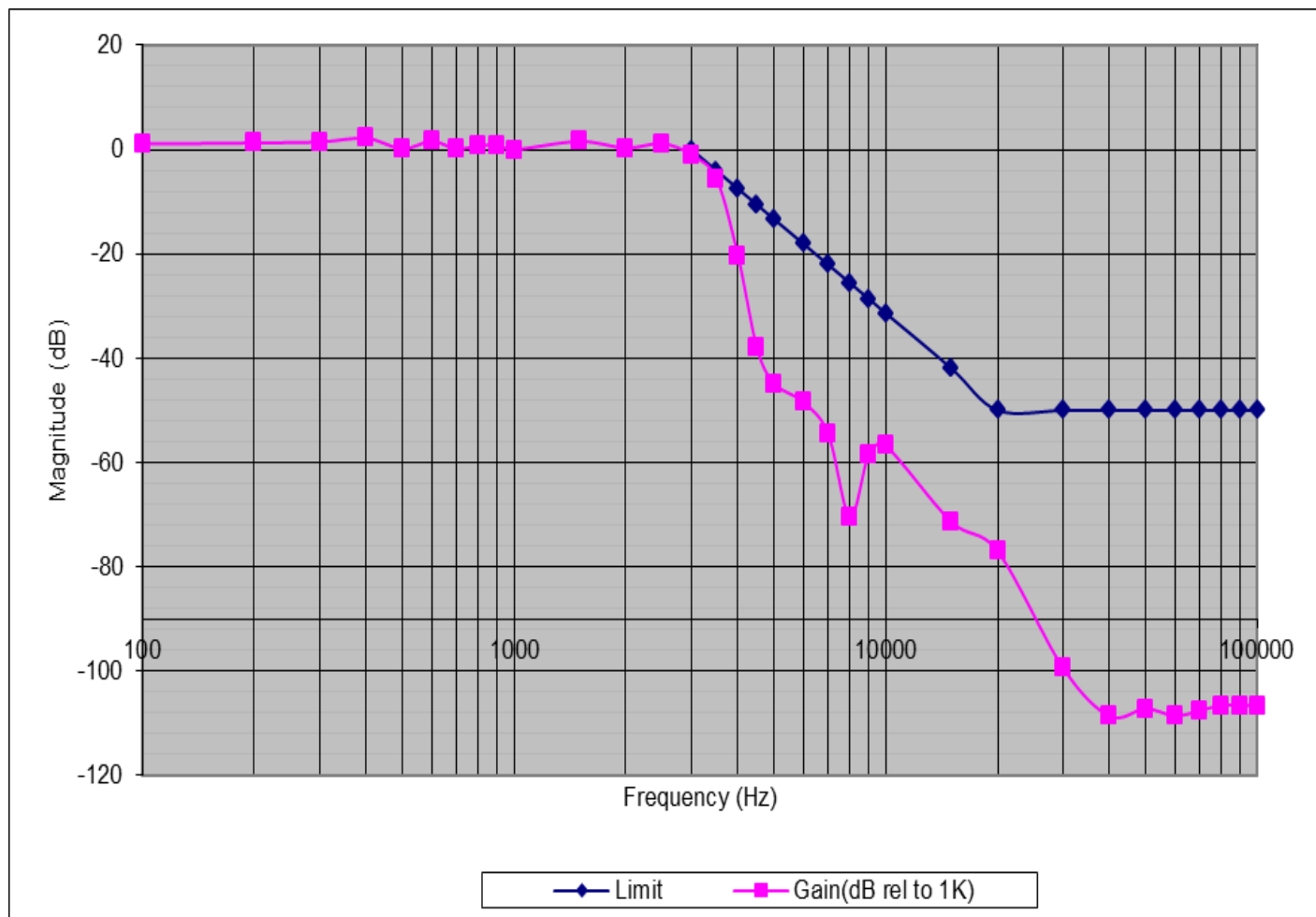
APPLICANT: RELM WIRELESS CORP. – BK RADIO

FCC ID: K95KNGM15L0P

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#3 Low Pass Filter Response

KNG-M150LP Low Pass Filter Response

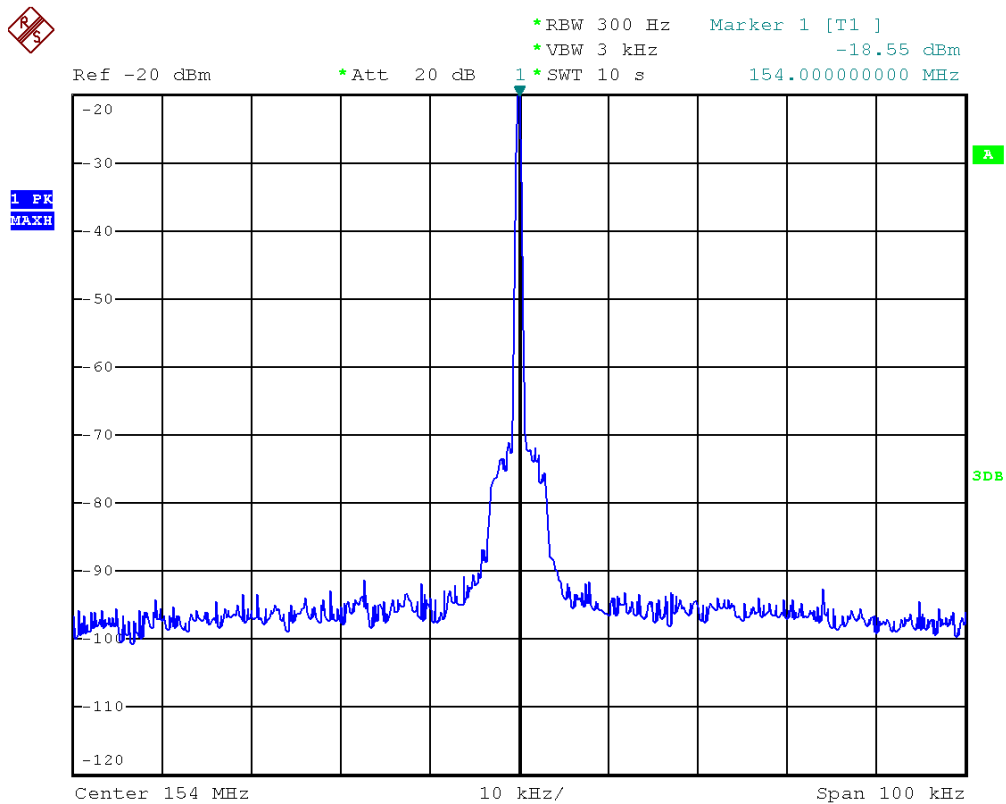


APPLICANT: RELM WIRELESS CORP. – BK RADIO

FCC ID: K95KNGM15L0P

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#4 Occupied Bandwidth No Modulation

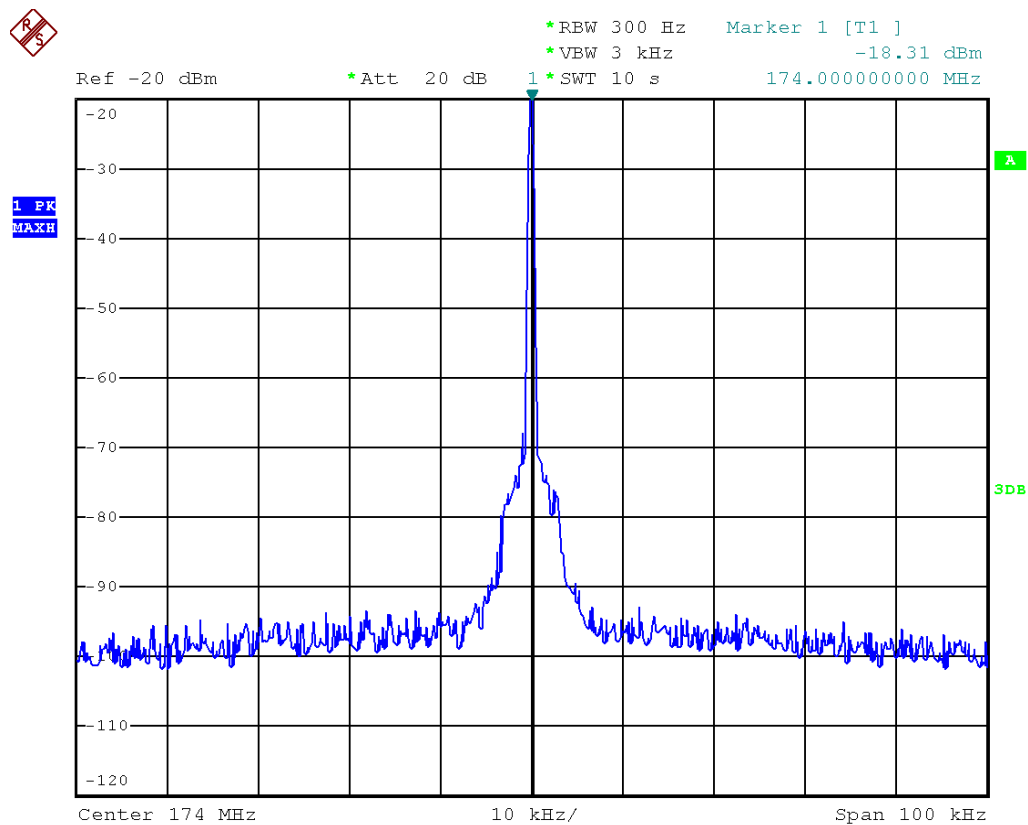


APPLICANT: RELM WIRELESS CORP. – BK RADIO

FCC ID: K95KNGM150LP

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#4 Occupied Bandwidth No Modulation



APPLICANT: RELM WIRELESS CORP. – BK RADIO

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#4 Occupied Bandwidth Analog Voice 11K0F3E Mask D**Standard Audio Modulation (12.5 kHz Channelization, Analog Voice):**

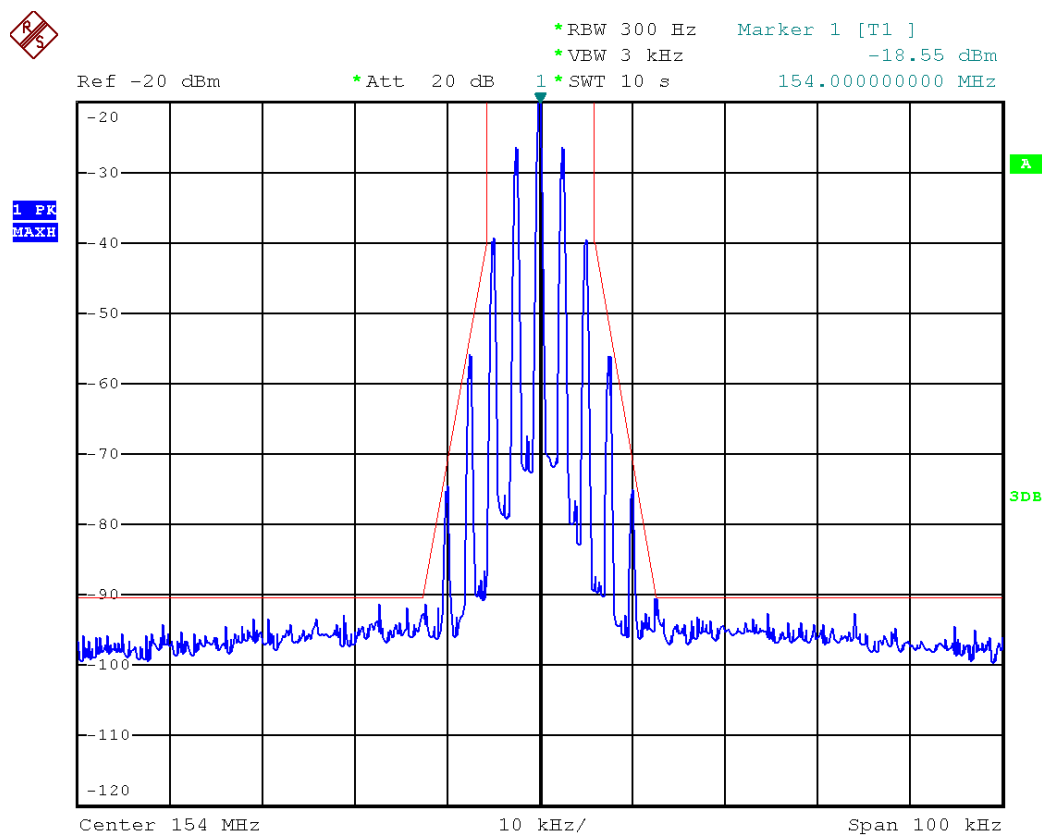
Emission Designator 11K0F3E

The maximum modulating frequency is 3.0 kHz with 2.5 kHz deviation.

$$BW = 2(M+D) = 2*(3.0 \text{ kHz} + 2.5 \text{ kHz}) = 11\text{kHz} \text{ ---- } 11\text{K0}$$

F3E portion of the designator indicates voice.

The entire designator for 12.5 kHz channelization analog voice is 11K0F3E

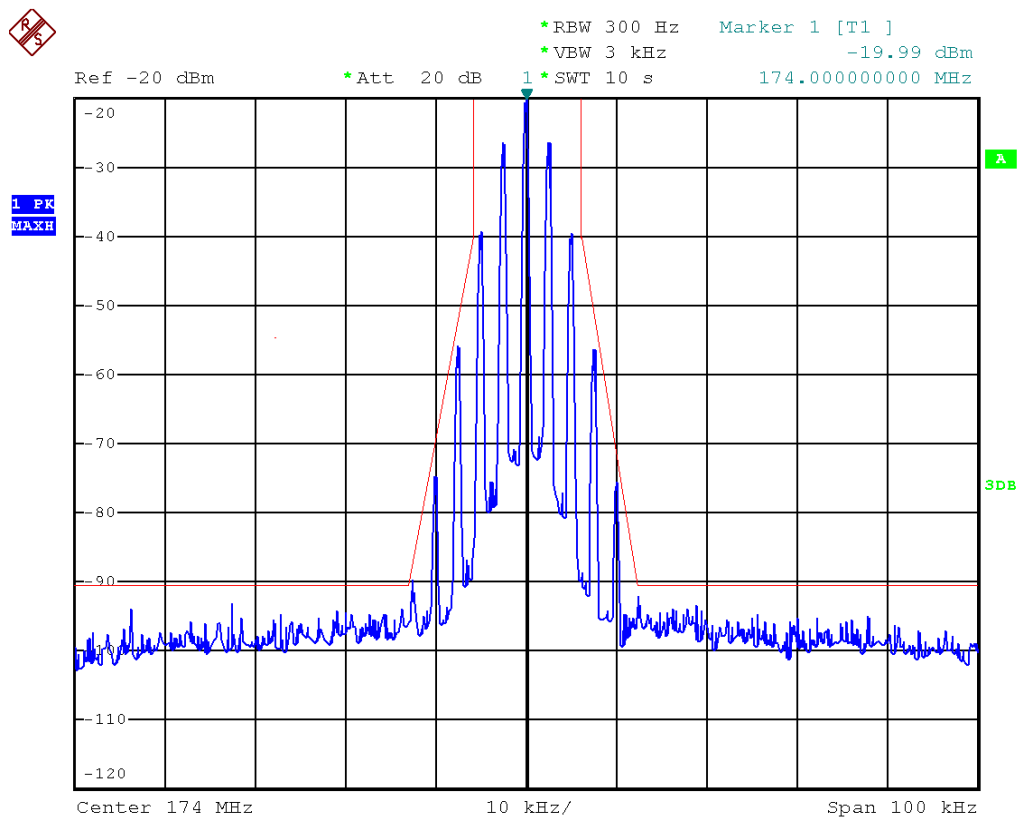


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#4 Occupied Bandwidth Analog Voice 11K0F3E Mask D



APPLICANT: RELM WIRELESS CORP. – BK RADIO

FCC ID: K95KNGM15L0P

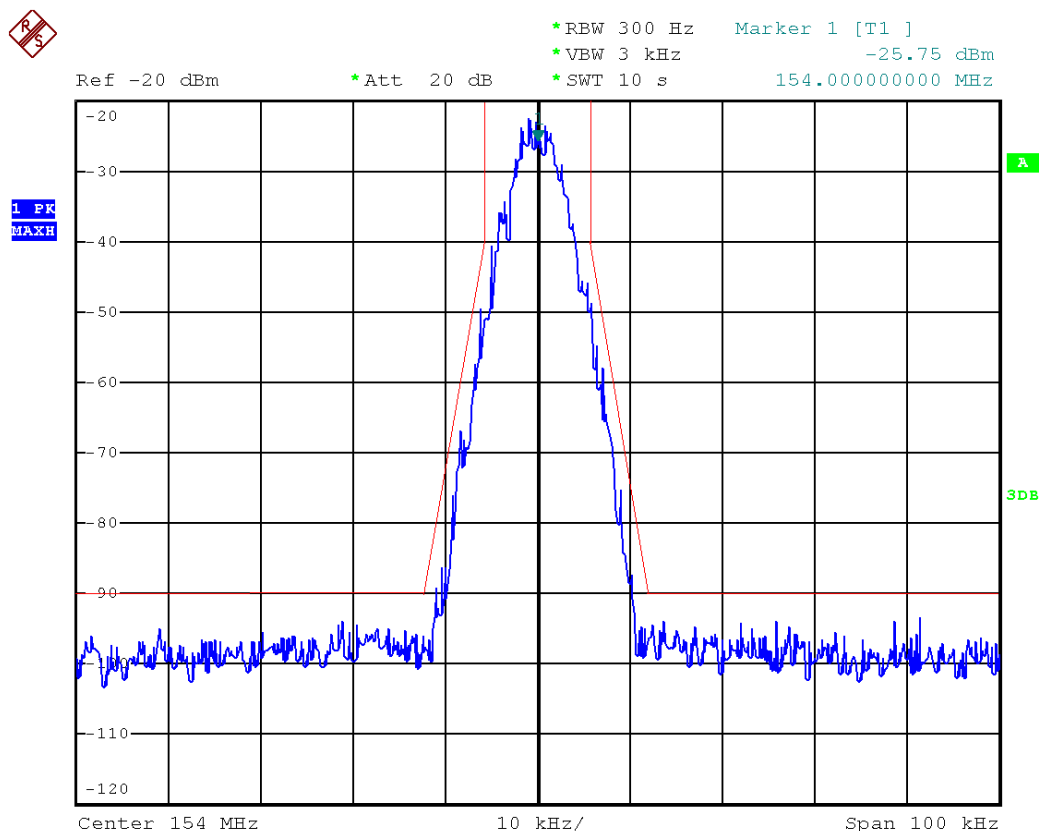
REPORT: \\TIMCO-FILE\CUS_2016\R\RELM_K95\1079XUT15\RELM FCC PT90_TEST REPORT
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#4 Occupied Bandwidth Digital Data 8K10F1D Mask D**Digital (12.5 kHz Channelization, Digital Data):**

Emission Designator 8K10F1D

The 99% energy rule (title 47CFR 2.989) was used for digital mode and is more accurate than Carson's rule. It basically states that 99% of the modulation energy falls within X kHz, in this case, 8.10 kHz. Measurements were performed in accordance with TIA/EIA TSB102.CAAB Section 2.2.5.2.

F1D portion of the designator indicates digital data 8K10F1D.

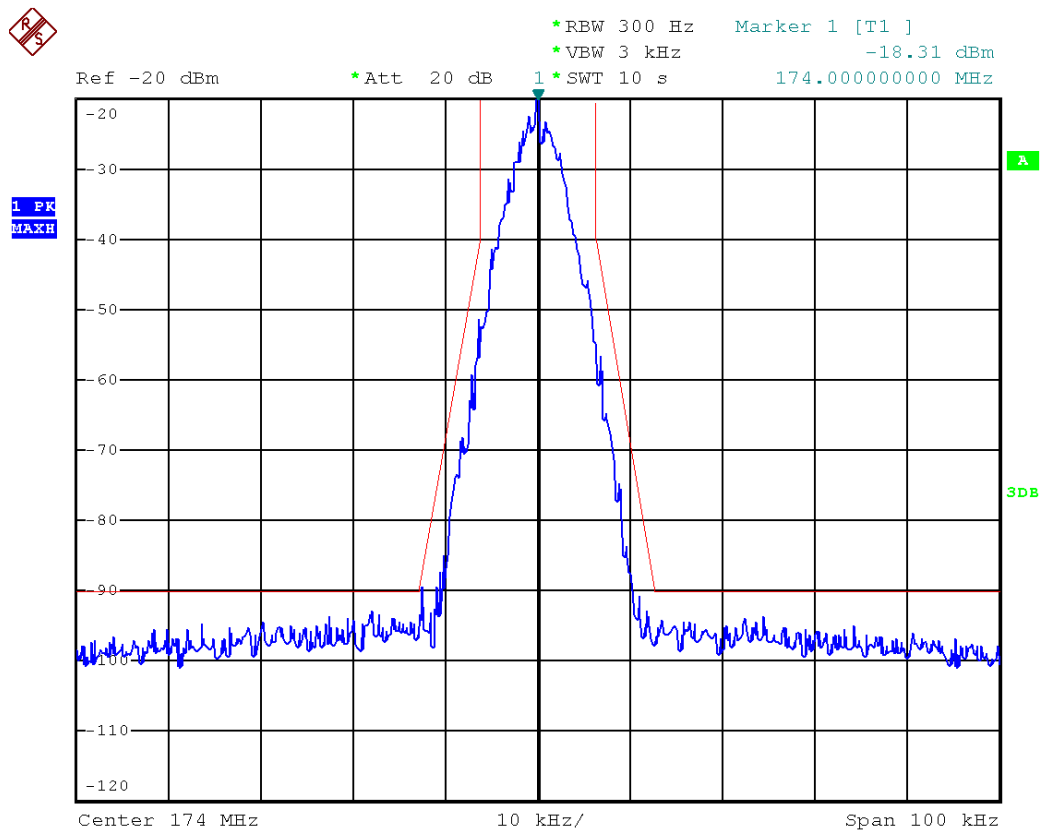


APPLICANT: RELM WIRELESS CORP. – BK RADIO

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#4 Occupied Bandwidth Digital Data 8K10F1D Mask D



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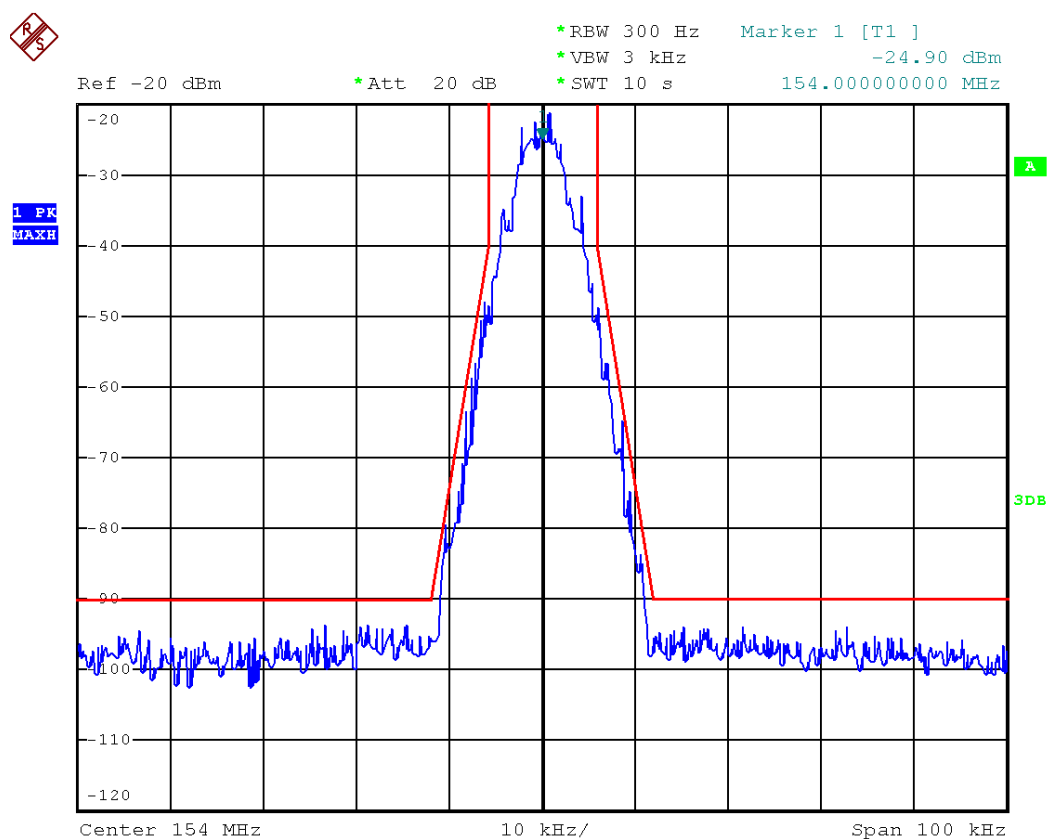
#4 Occupied Bandwidth Digital Data 8K10F1E Mask D

Digital (12.5 KhZ Channelization, Digital Voice):

Emission Designator 8K10F1E

The 99% energy rule (title 47CFR 2.989) was used for digital mode and is more accurate than Carson's rule. It basically states that 99% of the modulation energy falls within X kHz, in this case, 8.10 kHz. Measurements were performed in accordance with TIA/EIA TSB102.CAAB Section 2.2.5.2.

F1E portion of the designator indicates digital data 8K10F1E.

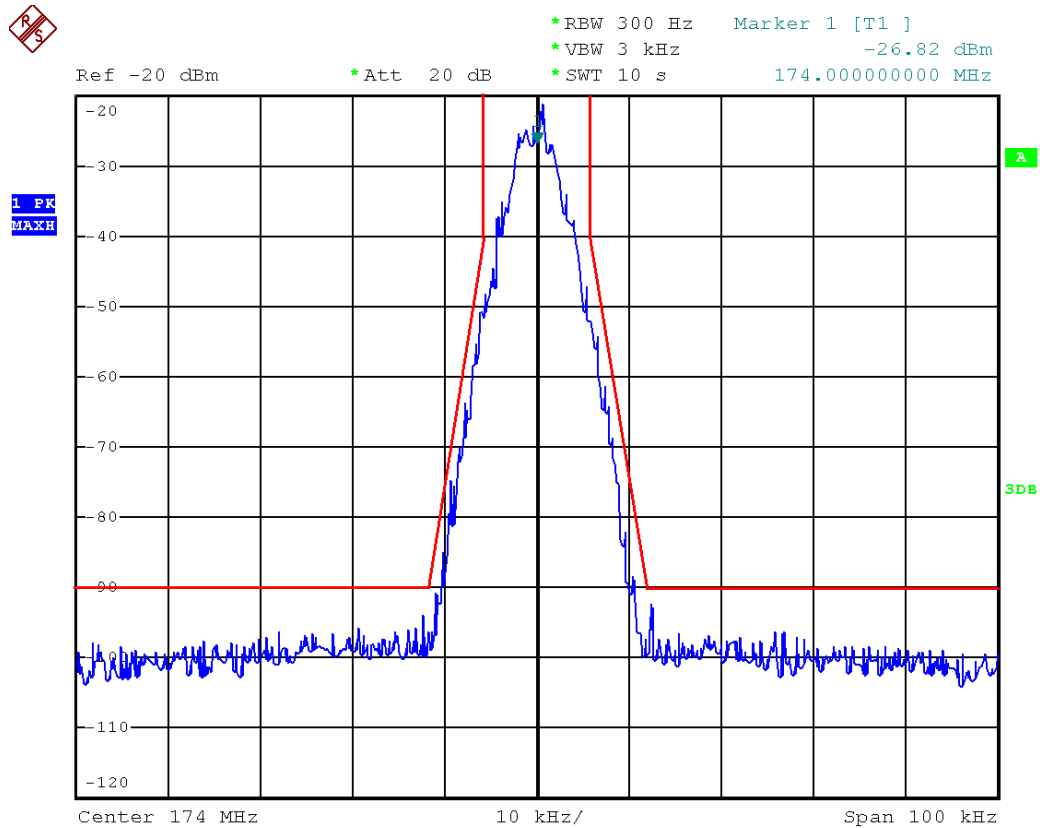


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#4 Occupied Bandwidth Digital Data 8K10F1E Mask D



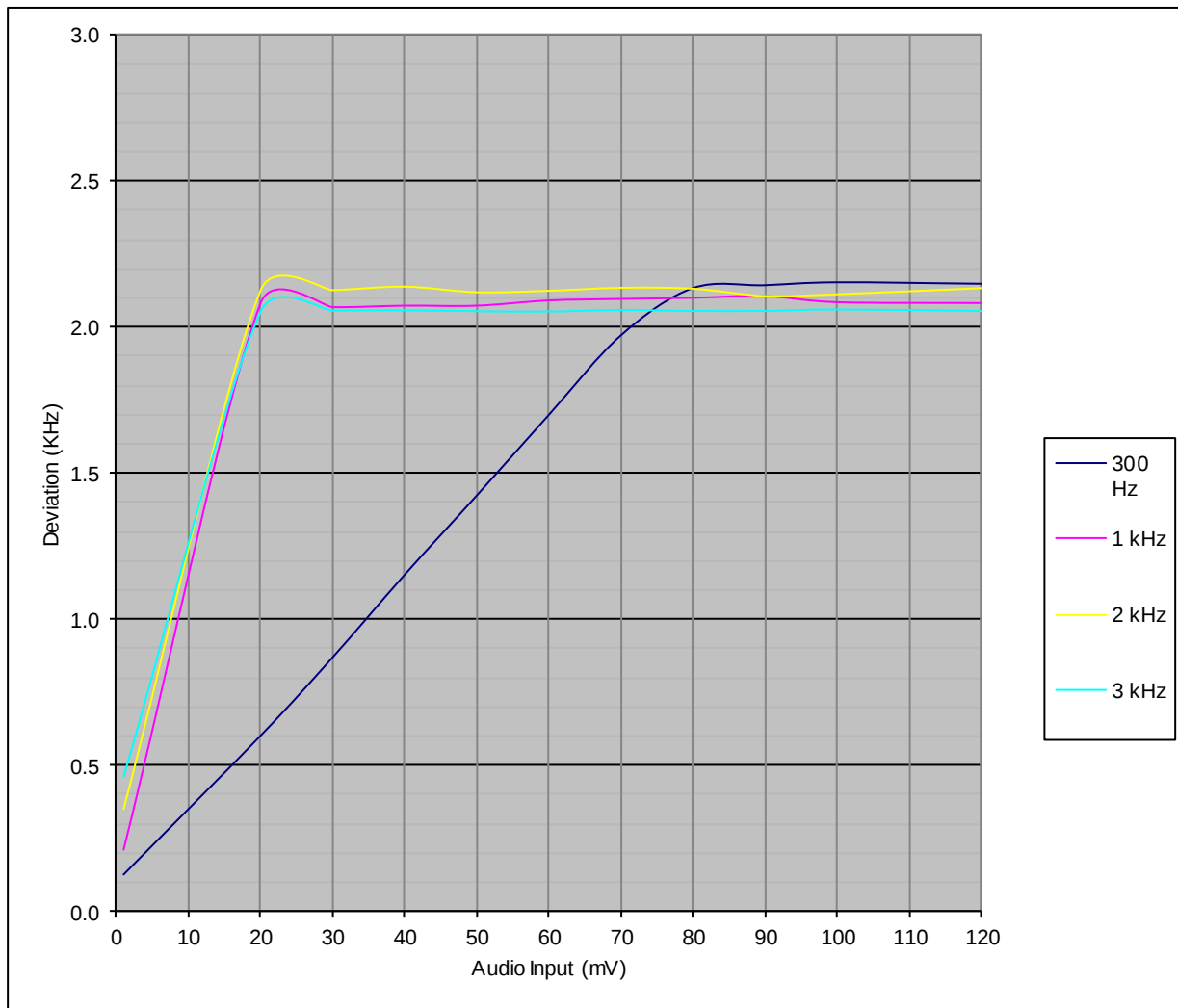
APPLICANT: RELM WIRELESS CORP. – BK RADIO

FCC ID: K95KNGM15L0P

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#5 Modulation Limiting

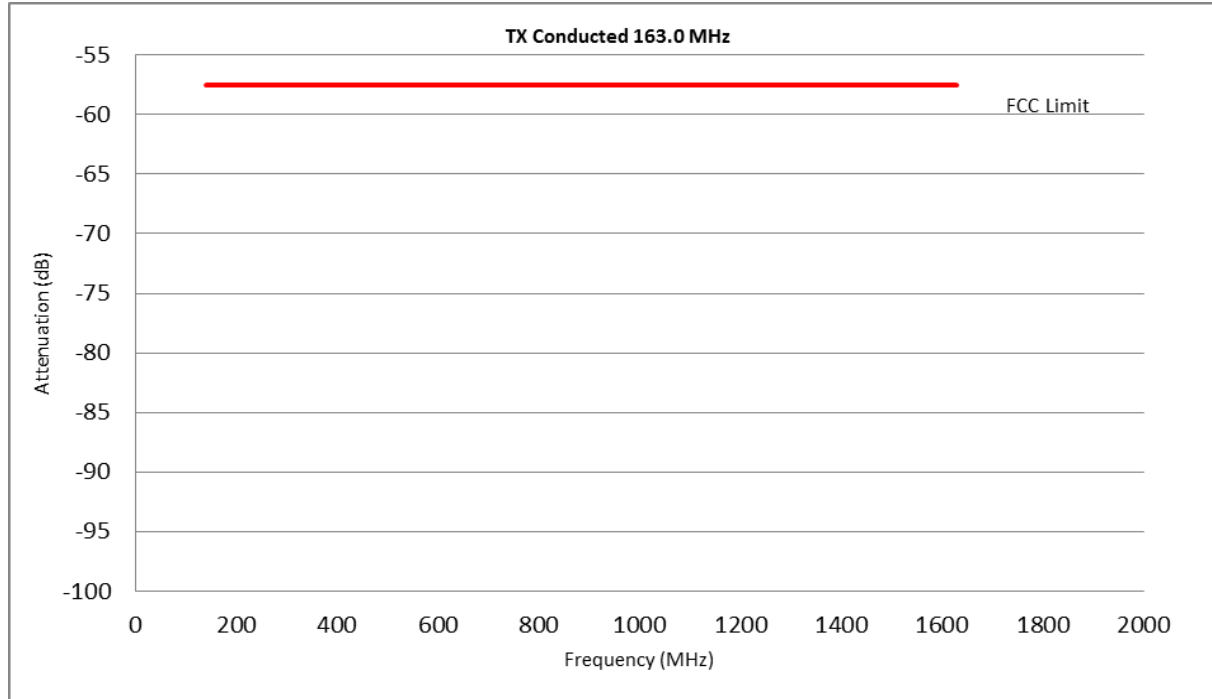
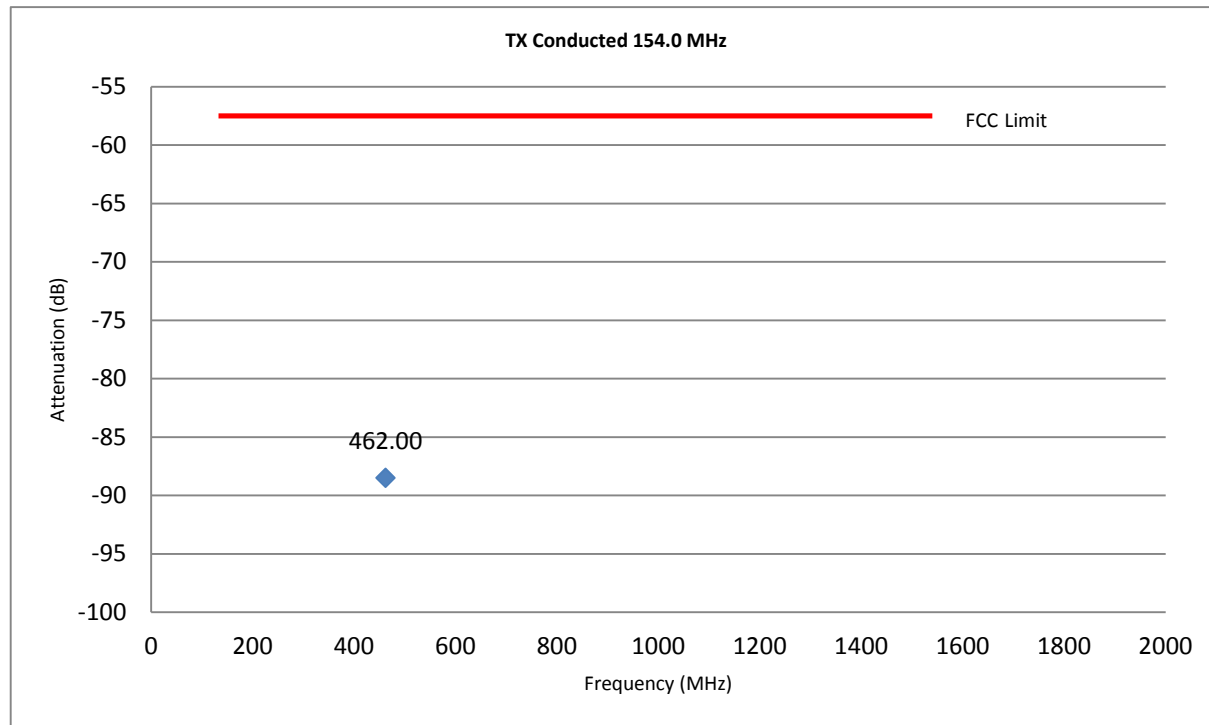
12.5KHz Channel 163.0MHz



APPLICANT: RELM WIRELESS CORP. – BK RADIO

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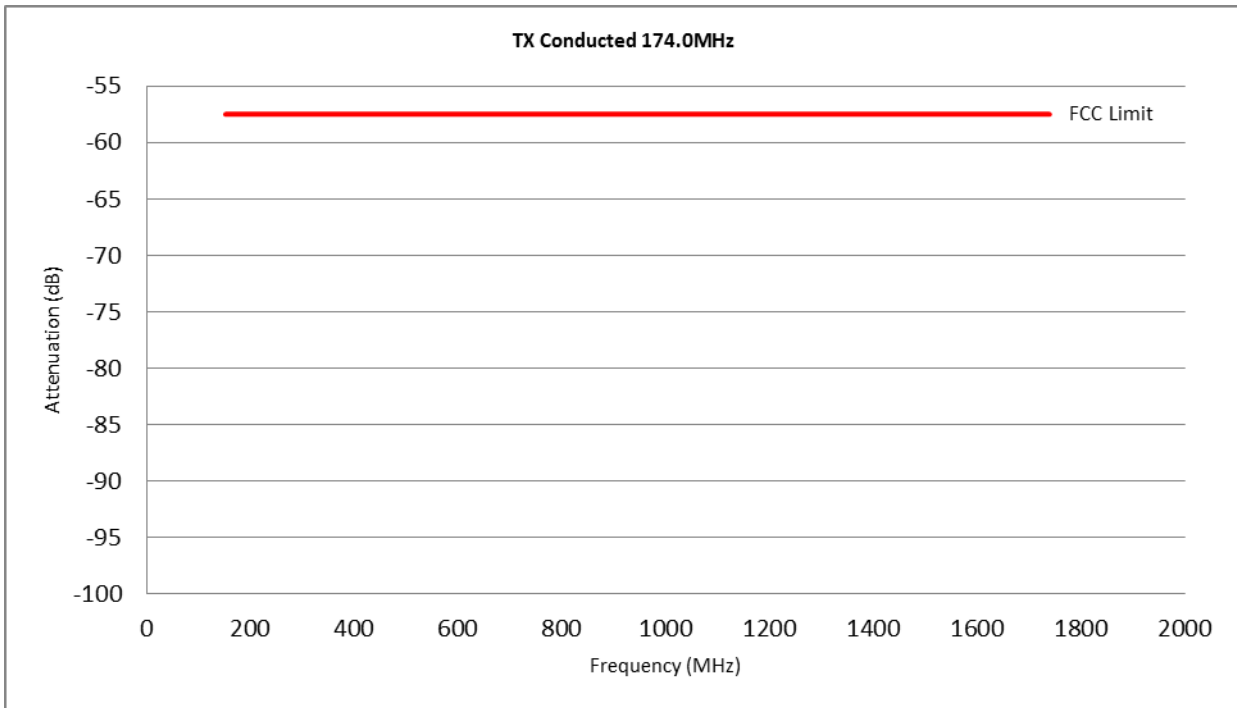
#6 Conducted Spurious Emissions

Note: No spurious emissions found.

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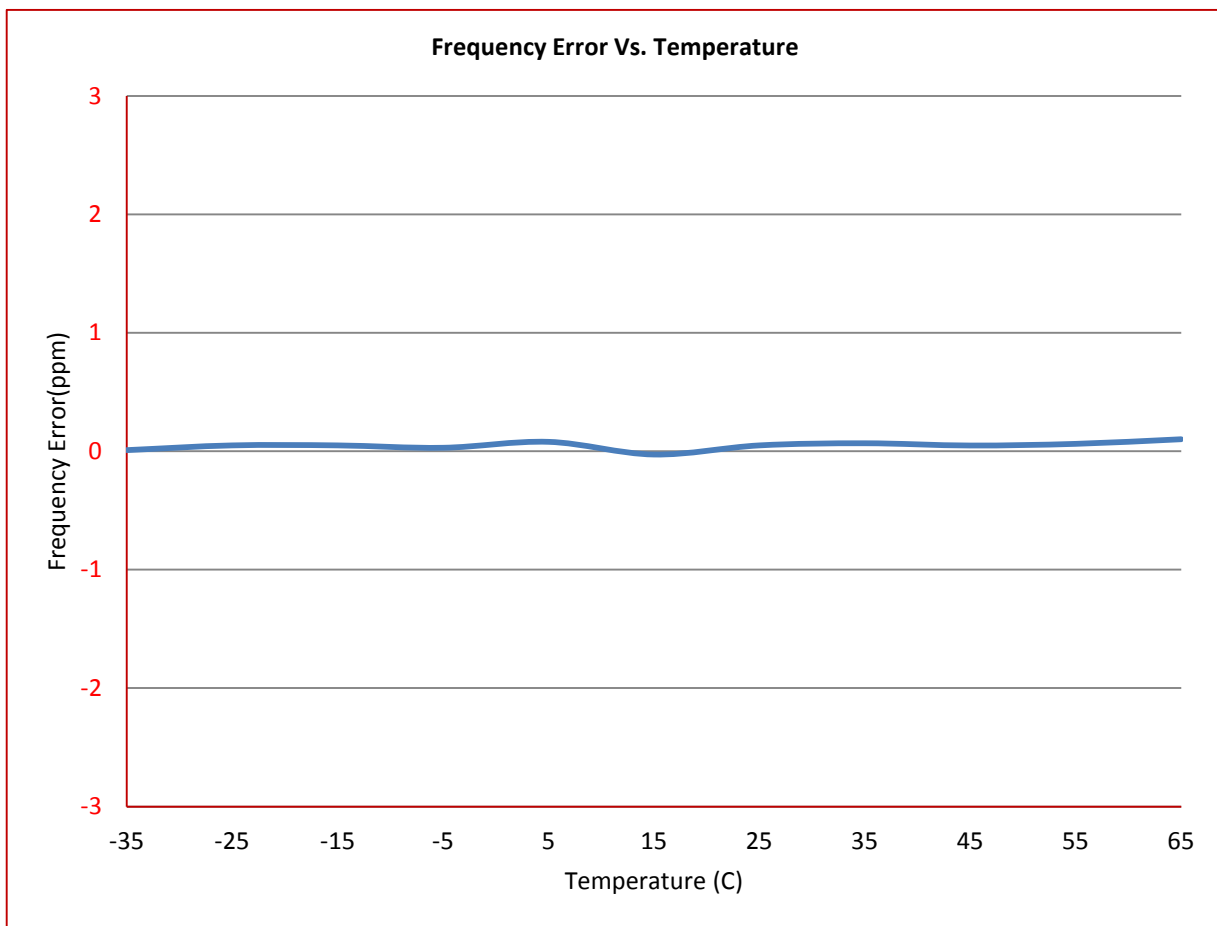


Note: No spurious emissions found.

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#7 Frequency Stability**Channel Frequency 163 MHz**

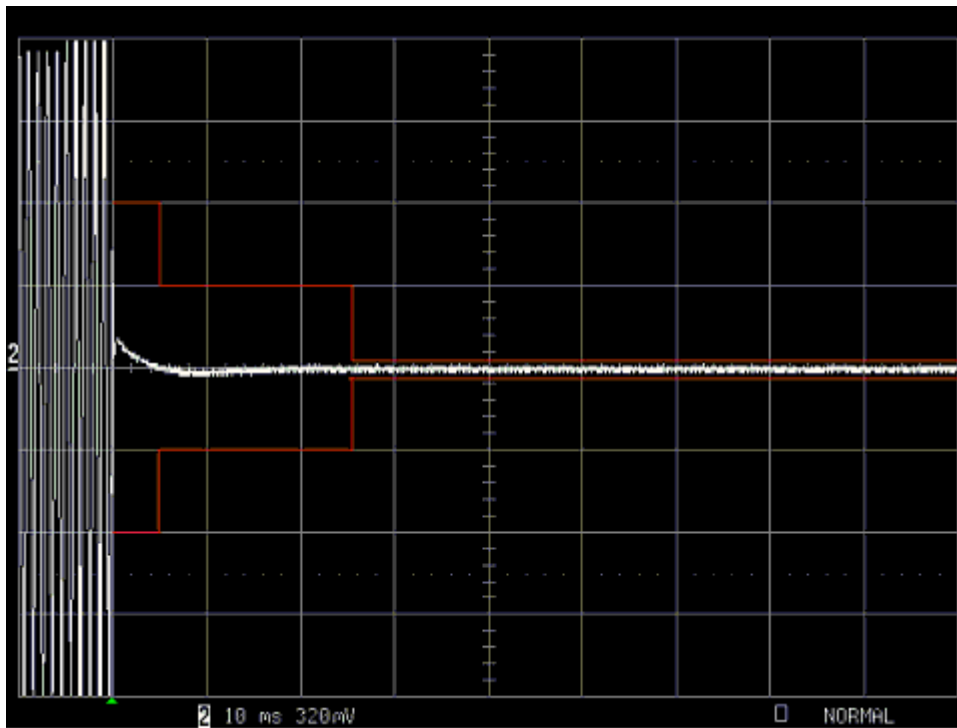
APPLICANT: RELM WIRELESS CORP. – BK RADIO

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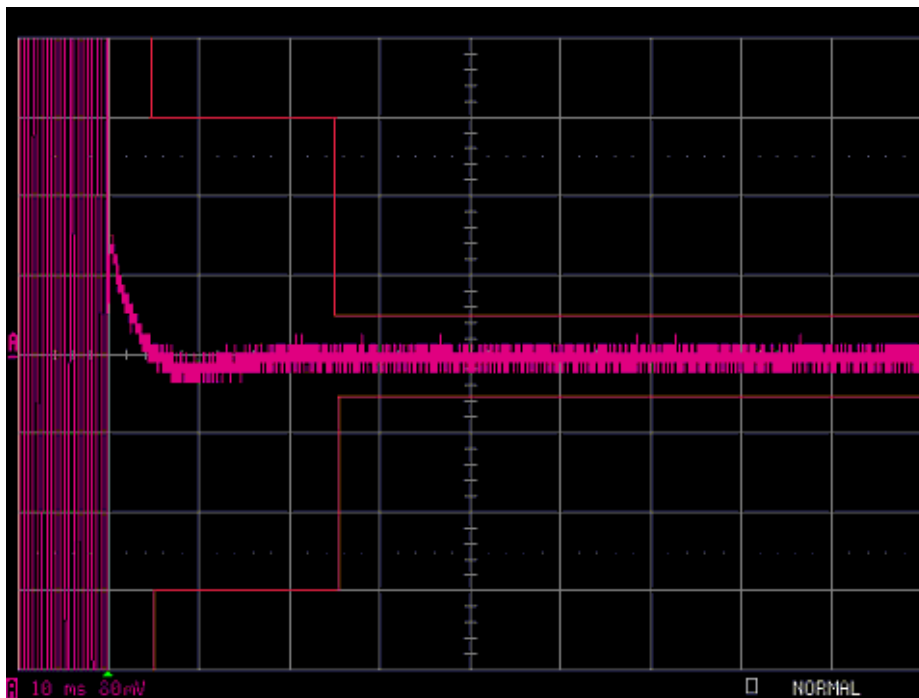
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#8 Transmitter Transient Frequency Behavior

12.5Khz Channel 154.0MHz TX ON



12.5 Khz Channel 154.0MHz TX ON ZOOMED

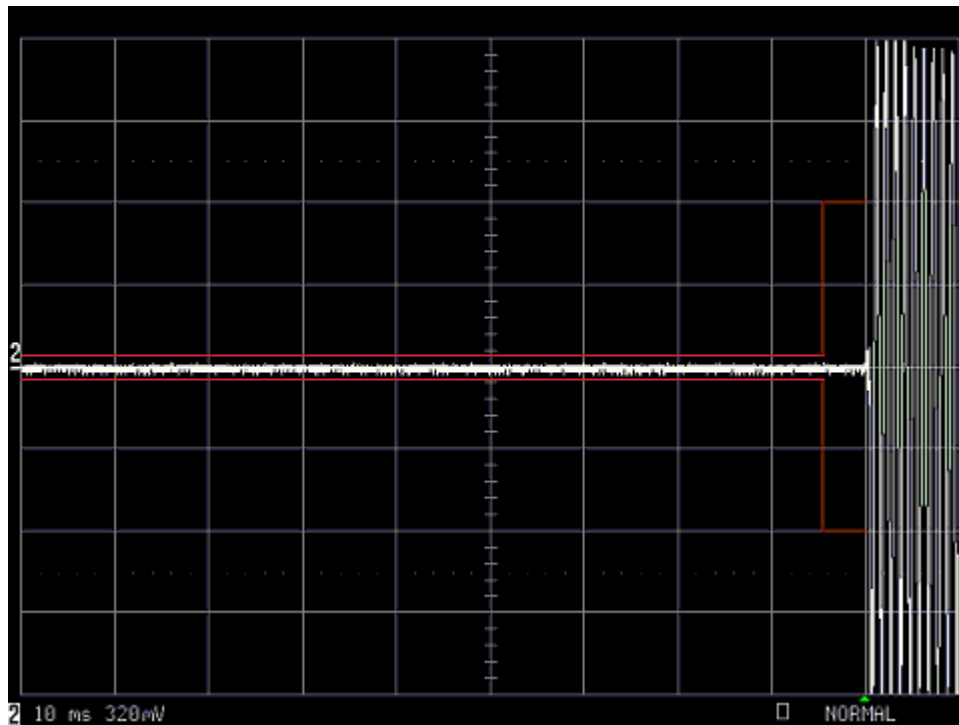


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12.5Khz Channel 154.0MHz TX OFF



END OF TEST REPORT

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