

## C2PC Test Report

Prepared for: Wulfsberg Electronics Division

Model: NPX138N

Description: VHF/FM Radio Transceiver

Serial Number: C115608

FCC ID: GOL3YH-NPX138

To

FCC Part 90 and Part 22

Date of Issue: May 29, 2025

On the behalf of the applicant:

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Project No: p2550007



Greg Corbin  
Project Test Engineer

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All results contained herein relate only to the sample tested.

### Test Report Revision History

| Revision | Date      | Revised By  | Reason for Revision |
|----------|-----------|-------------|---------------------|
| 1.0      | 5/29/2025 | Greg Corbin | Original Document   |
|          |           |             |                     |

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## Test Result Summary

| Specification                    | Test Name                                   | Pass, Fail, N/A | Comments |
|----------------------------------|---|-----------------|----------|
| 2.1046<br>90.205(s)<br>22.565(a) | Carrier Output Power (Conducted)            | Pass            |          |
| 2.1051<br>90.210<br>22.359(a)    | Unwanted Emissions (Transmitter Conducted)  | Pass            |          |
| 2.1049<br>90.210(b)(d)           | Emission Mask                               | Pass            |          |
| 2.1055<br>90.213<br>22.355       | Frequency Stability (Temperature Variation) | Pass            |          |
| 2.1055<br>90.213<br>22.355       | Frequency Stability (Voltage Variation)     | 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.



**ANAB Cert #: AT-2901**

**FCC Site Reg. 750616**

**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 90.

### 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<br>(°C)             | Humidity<br>(%) | Pressure<br>(mbar) |
| 25.9 – 29.3              | 21.2 – 23.4     | 964.6 – 969.5      |

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

### EUT Description

**Model:** NPX138N

**Description:** VHF/FM Radio Transceiver

**Part Number:** 192-NPX138N-070-01 Rev C

**Serial Number:** C115608

**Build Standard:** NPX138N-070BS, Rev G with ATP changes per ECR 300100

### Additional Information:

This test report contains test data to support a Class II Permissive Change due to part end of life notice.

The TCXO oscillator was replaced.

The manufacturer has attested that the specifications for the replacement part are similar, that the parts are pin for pin compatible, that there were no changes to the PCB layout and that the output power and frequency stability remained the same.

The EUT mobile radio operating from 138 – 174 MHz using FM modulation.

### EUT Operation during Tests

The EUT is battery powered with 28 vdc.

The output power was set to maximum for all tests.

Conducted output power, conducted spurious emissions, emission masks, and frequency stability were recorded to show that there was no change in radio performance from the original certification.

The EUT has narrowband (NB) and wideband (WB) capability.

150 – 174 MHz is restricted to NB.

138.025 MHz was tested with both NB and WB signals.

155.0 MHz and 173.975 MHz were tested with NB signals only.

The following table provided by the manufacturer lists the model variants associated with the NPX138N. The RF circuitry is the same for all the model variants.

#### NPX138N Model Variants

| Model   | P/N            | Variant Description  |
|---------|----------------|--|
| NPX138N | NPX138N-070-01 | Model Tested, PANEL MOUNT MULTIMODE VHF FM TRANSCEIVER W/SYTH GUARD RECEIVER, NARROWBAND |
| NPX138N | NPX138N-000    | VHF - FM Panel Mount (138-174 MHz)   |
| NPX138N | NPX138N-000-00 | PANEL MOUNT MULTIMODE VHF FM TRANSCEIVER   |
| NPX138N | NPX138N-000-01 | PANEL MOUNT MULTIMODE VHF FM TRANSCEIVER, NARROWBAND                                     |
| NPX138N | NPX138N-050    | PANEL MOUNT MULTI MODE VHF FM TRANSCEIVER WITH GUARD RECEIVER                            |
| NPX138N | NPX138N-050A   | PANEL MOUNT TRANSCEIVER WITH CUSTOM GUARD RECEIVER                                       |
| NPX138N | NPX138N-060    | Panel Mount Transceiver with Custom Guard Receiver                                       |
| NPX138N | NPX138N-070    | VHF - FM Panel Mount w/Synth Guard Receiver  |
| NPX138N | NPX138N-070-00 | PANEL MOUNT MULTIMODE VHF FM TRANSCEIVER W/SYNTH GUARD RECEIVER                          |
| NPX138N | NPX138N-150    | Panel Mount Multimode VHF FM Transceiver With Guard Receiver and 14 VDC Panel Lighting   |
| NPX138N | NPX138N-200    | PANEL MOUNT FM TRANSCEIVER, NPX138N-000, NVIS A legend                                   |
| NPX138N | NPX138N-200-00 | PANEL MOUNT FM TRANSCEIVER W/NVIS COMPATIBLE FACEPLATE                                   |
| NPX138N | NPX138N-200-01 | PANEL MOUNT FM TRANSCEIVER W/NVIS COMPATIBLE FACEPLATE, NARROWBAND                       |
| NPX138N | NPX138N-2A0    | NPX138N-000, with NVIS A legend, LED Dimmer, Night/Day pin 15                            |
| NPX138N | NPX138N-2A0-00 | NVIS COMPATIBLE WITH DAY/NIGHT PIN 15  |
| NPX138N | NPX138N-2A0-01 | NVIS COMPATIBLE WITH DAY/NIGHT PIN 15, NARROWBAND  |
| NPX138N | NPX138N-270    | NPX138N-070 with NVIS A legend, w/Synth Guard Receiver                                   |
| NPX138N | NPX138N-270-00 | PANEL MOUNT FM TRANSCEIVER, NVIS COMPATIBLE, W/SYNTH GUARD RECEIVER                      |
| NPX138N | NPX138N-270-01 | PANEL MOUNT FM TRANSCEIVER, NVIS COMPATIBLE, W/SYNTH GUARD RECEIVER, NARROWBAND          |
| NPX138N | NPX138N-300    | NPX138N-000 with NVIS B legend   |
| NPX138N | NPX138N-300-00 | PANEL MOUNT FM TRANSCEIVER W/NVIS GREEN B COMPATIBLE FACEPLATE                           |

|         |                |  |
|---------|----------------|--|
| NPX138N | NPX138N-300-01 | PANEL MOUNT FM TRANSCEIVER W/NVIS GREEN B COMPATIBLE FACEPLATE, NARROWBAND                           |
| NPX138N | NPX138N-500    | NPX138N-000 with 5Vdc lighting   |
| NPX138N | NPX138N-500-00 | PANEL MOUNT MULTIMODE VHF FM TRANSCEIVER WITH 5VDC PANEL LIGHTING                                    |
| NPX138N | NPX138N-500-01 | PANEL MOUNT MULTIMODE VHF FM TRANSCEIVER WITH 5VDC LIGHTING, NARROWBAND                              |
| NPX138N | NPX138N-700    | NPX138N-000 with NVG Friendly lighting   |
| NPX138N | NPX138N-700-00 | PANEL MOUNT MULTIMODE VHF FM TRANSCEIVER, NVG FRIENDLY LIGHTING                                      |
| NPX138N | NPX138N-700-01 | PANEL MOUNT MULTIMODE VHF FM TRANSCEIVER, NVG FRIENDLY LIGHTING, NARROWBAND                          |
| NPX138N | NPX138N-750    | NVG Compatible Panel Mount Multimode VHF FM Transceiver With Guard Receiver                          |
| NPX138N | NPX138N-770    | NPX138N-070 with NVG Friendly lighting, w/Synth Guard Receiver                                       |
| NPX138N | NPX138N-770-00 | PANEL MOUNT MULTIMODE VHF FM TRANSCEIVER, NVG FRIENDLY LIGHTING W/SYNC GUARD RECEIVER                |
| NPX138N | NPX138N-770-01 | PANEL MOUNT MULTIMODE VHF FM TRANSCEIVER, NVG FRIENDLY LIGHTING W/SYNC GUARD RECEIVER, NARROWBAND    |
| NPX138N | NPX138N-900    | NPX138N-000 with NVIS A legend, 5VDC lighting, Day/Night pin 15                                      |
| NPX138N | NPX138N-900-00 | PANEL MOUNT FM TRANSCEIVER, NVIS A LEGEND, 5VDC LIGHTING, DAY/NIGHT PIN 15                           |
| NPX138N | NPX138N-900-01 | PANEL MOUNT FM TRANSCEIVER, NVIS A LEGEND, 5VDC LIGHTING, DAY/NIGHT PIN 15, NARROWBAND               |
| NPX138N | NPX138N-970    | PANEL MOUNT FM TRANSCEIVER, SYNTHETIC GUARD RECIEVER, NVIS A LEGEND, 5VDC LIGHTING, DAY/NIGHT PIN 15 |

|     | <b>Accessories:</b> |              |        |      |
|-----|---------------------|--------------|--------|------|
| Qty | Description         | Manufacturer | Model  | S/N  |
| 1   | Test Fixture        | CanyonAero   | TS-NPX | 1006 |

|     | <b>Cables:</b>      |         |              |     |
|-----|---------------------|---------|--------------|-----|
| Qty | Description         | Length  | From         | To  |
| 1   | Multi-pin I/O Cable | 1 meter | Test Fixture | EUT |

|  |                            |
|--|----------------------------|
|  | <b>Modifications: None</b> |
|--|----------------------------|

## Carrier Output Power (Conducted)

**Engineer:** Greg Corbin

**Test Date:** 5/28/25

### Measurement Procedure

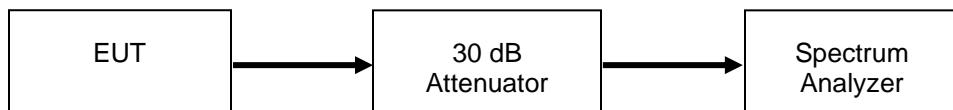
The Equipment Under Test (EUT) was connected to a spectrum analyzer through a 30 dB Power attenuator. All cable and attenuator losses were input into the spectrum analyzer as a reference level offset to ensure accurate readings were obtained.

CW output power was recorded with peak detector set to max hold.

Manufacturer Rated Power =VHF= 10 watts (40 dBm)

FCC Output Power Limit = 12 w (120% of manufacturer rated power)

### Test Setup



### Transmitter Peak Output Power

| Tuned Frequency | Output Power<br>(dBm) | Output Power<br>(watts) | Result |
|-----------------|-----------------------|-------------------------|--------|
|                 |                       |                         |        |
| 138.025 - NB    | 40.22                 | 10.5                    | Pass   |
| 138.025 - WB    | 40.33                 | 10.8                    | Pass   |
| 155.000 - NB    | 40.28                 | 10.7                    | Pass   |
| 173.975 - NB    | 40.26                 | 10.6                    | Pass   |

## Conducted Spurious Emissions

**Engineer:** Greg Corbin

**Test Date:** 5/28/2025

### Test Procedure

The EUT was connected directly to a spectrum analyzer to verify that the EUT met the requirements for spurious emissions. The resolution bandwidth set for 100 kHz or 1 MHz as required per the rule section and the reference level was adjusted to ensure the system had sufficient dynamic range to measure spurious emissions.

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

The conducted spurious emissions were recorded with FM modulation applied.

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

Note: A marker was placed on the fundamental frequency and the highest spurious emission.

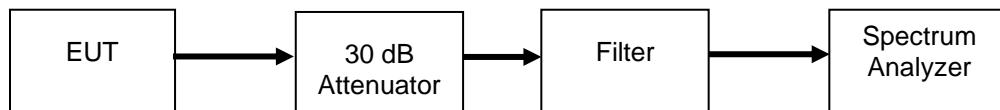
A Peak detector set to max hold was used.

The # of trace points were set to 10400.

A notch filter tuned to the fundamental frequency was used for 30 – 1000 MHz.

A 1 GHz highpass filter was used for 1 – 2 GHz.

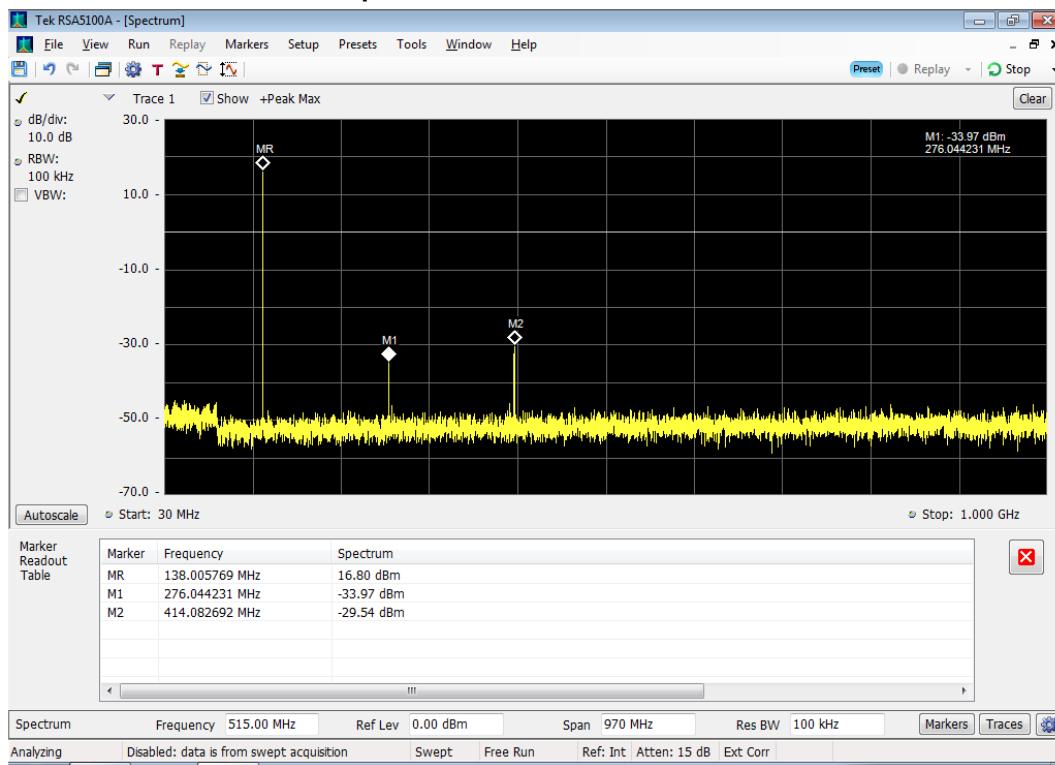
### Test Setup



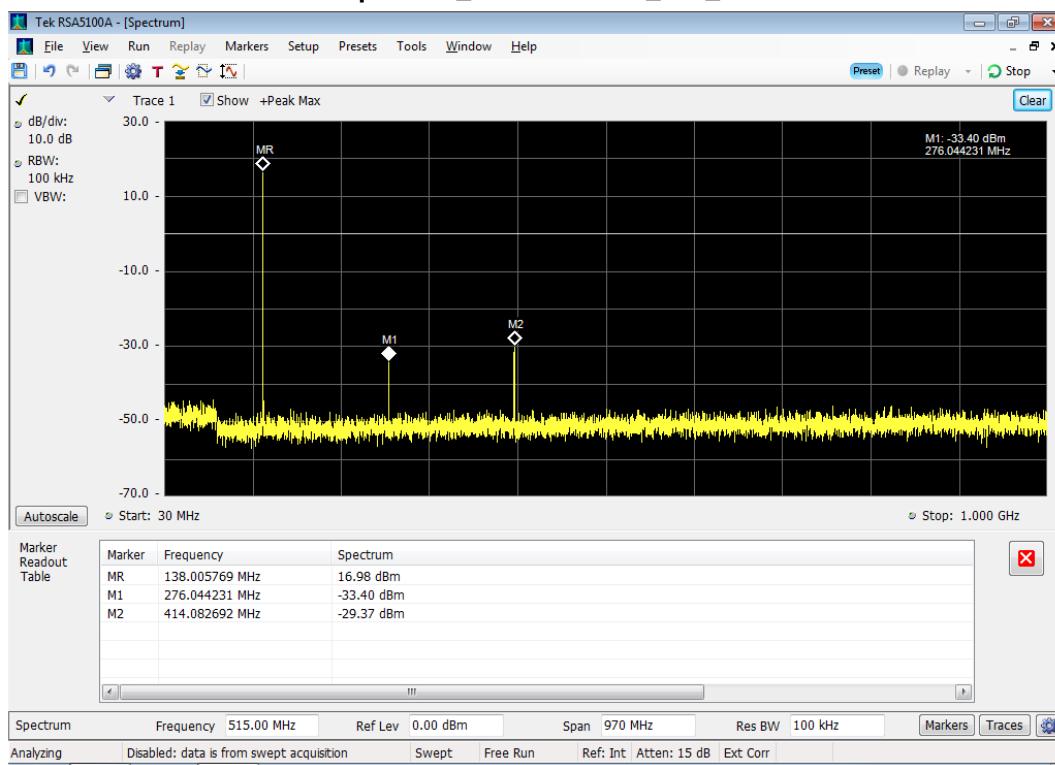
### Conducted Spurious Emissions Summary Test Table

| Frequency Range | Tuned Frequency | Spurious Frequency | Measured Spurious Level | Specification Limit | Result |
|-----------------|-----------------|--------------------|-------------------------|---------------------|--------|
| MHz             | MHz             | MHz                | dBm                     | dBm                 |        |
| 30 - 1000       | 138.025 (NB)    | 414.082            | -29.5                   | -20                 | Pass   |
| 30 - 1000       | 138.025 (WB)    | 414.082            | -29.4                   | -20                 | Pass   |
| 30 - 1000       | 155.000         | 309.994            | -28.5                   | -20                 | Pass   |
| 30 - 1000       | 173.975         | 347.954            | -35.5                   | -20                 | Pass   |
| 1000 - 2000     | 138.025 (NB)    | 1518.173           | -35.4                   | -20                 | Pass   |
| 1000 - 2000     | 138.025 (WB)    | 1932.307           | -35.5                   | -20                 | Pass   |
| 1000 - 2000     | 155.000         | 1860.000           | -32.6                   | -20                 | Pass   |
| 1000 - 2000     | 173.975         | 1567.769           | -27.5                   | -20                 | Pass   |

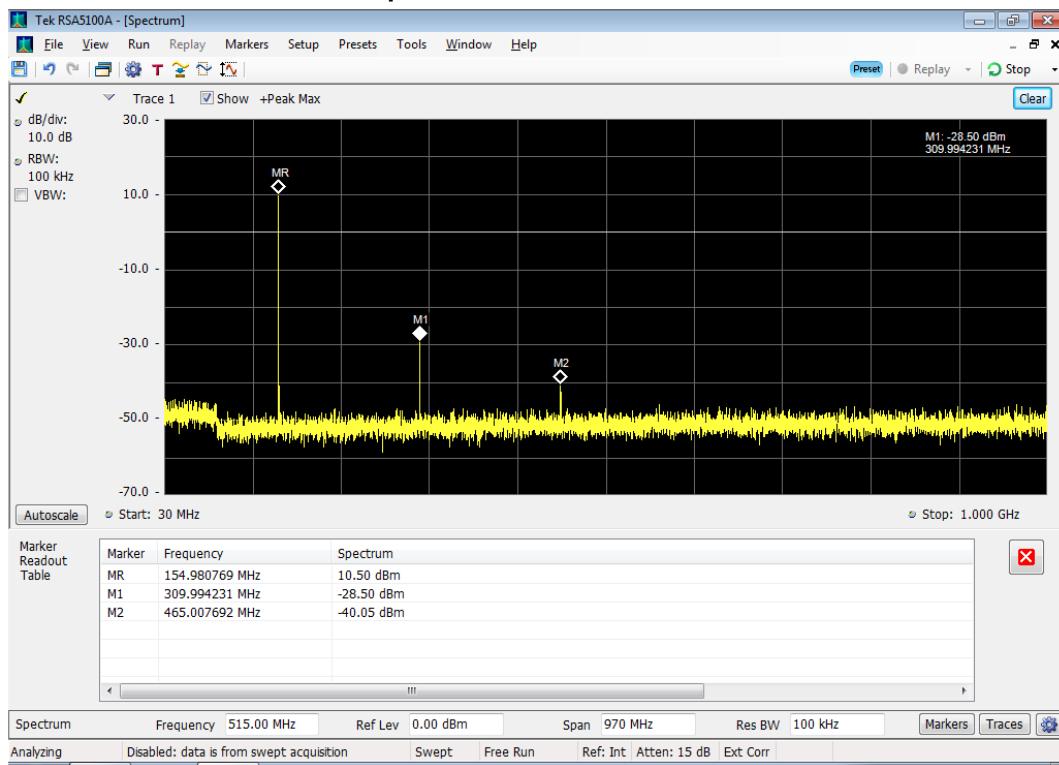
### Conducted Spurious\_30 - 1000 MHz\_NB\_138.025 MHz



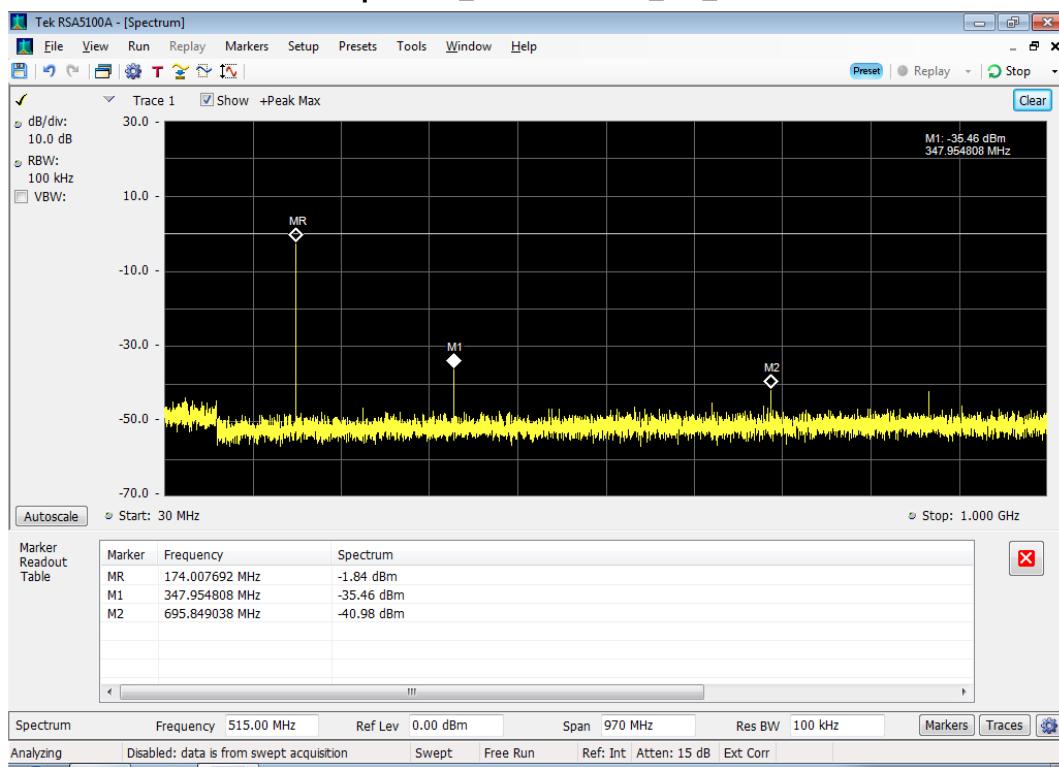
### Conducted Spurious\_30 - 1000 MHz\_WB\_138.025 MHz



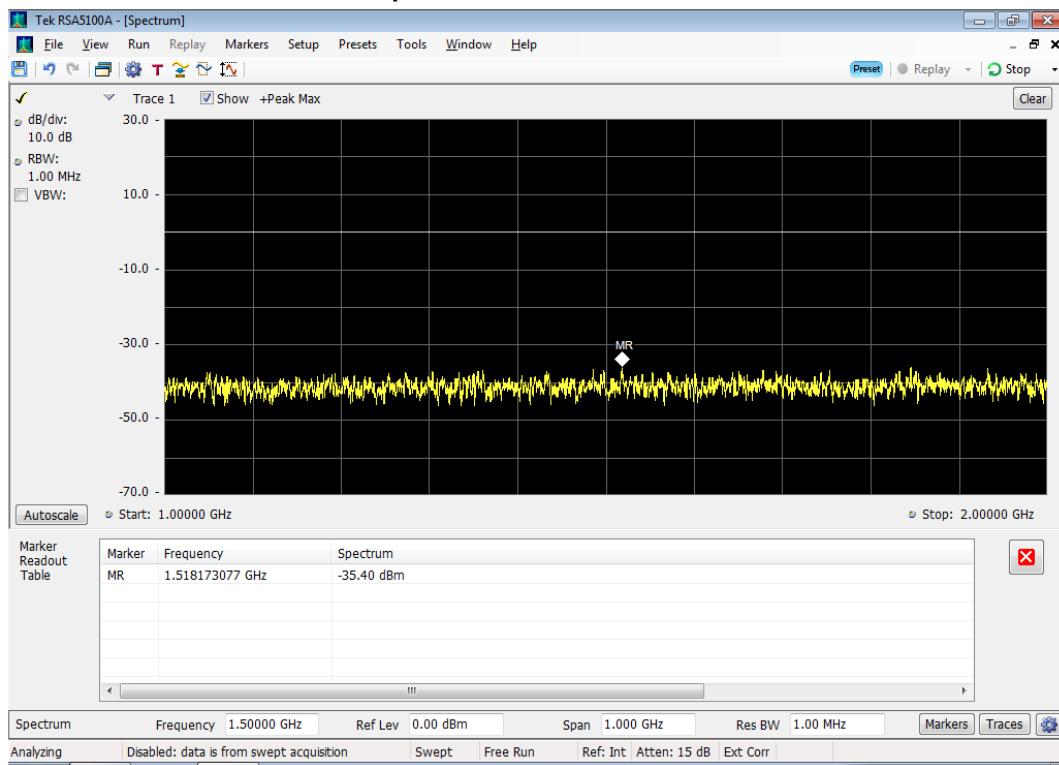
### Conducted Spurious\_30 - 1000 MHz\_NB\_155 MHz



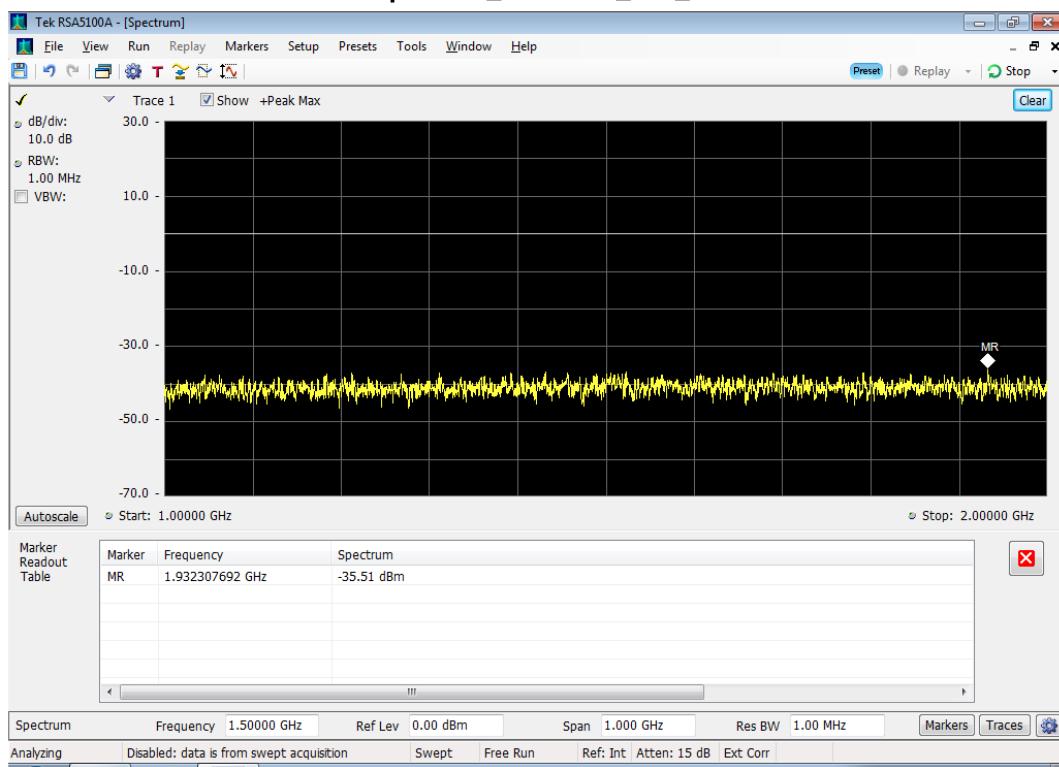
### Conducted Spurious\_30 - 1000 MHz\_NB\_173.975 MHz



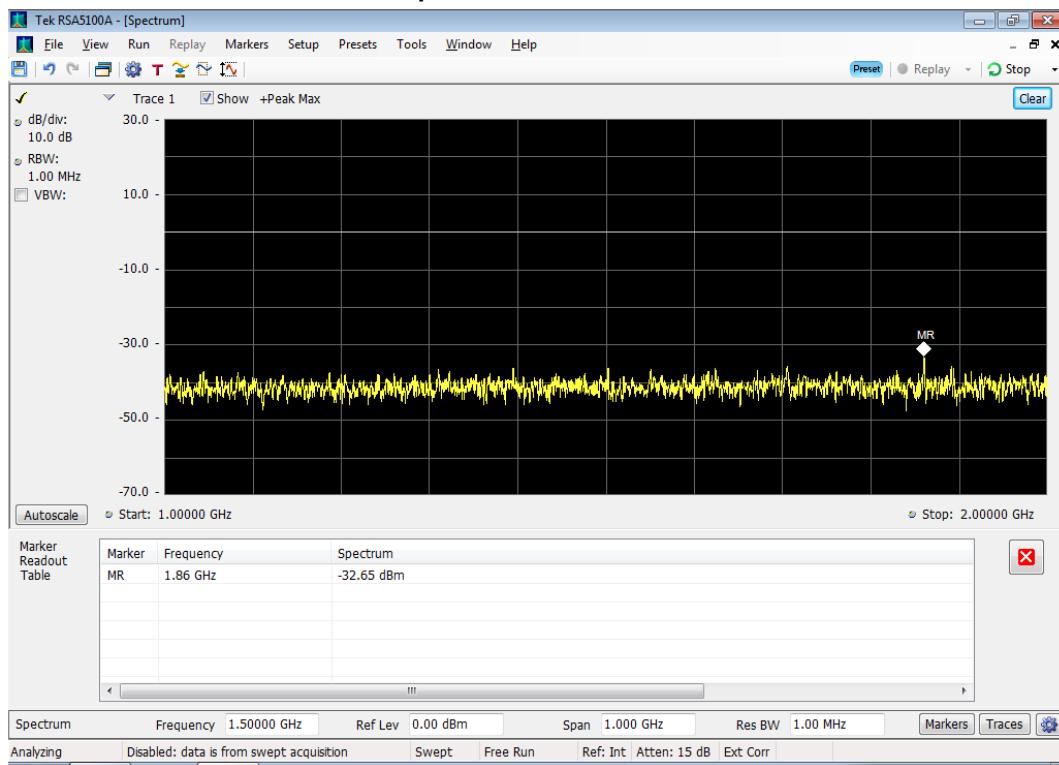
### Conducted Spurious\_1 - 2 GHz\_NB\_138.025 MHz



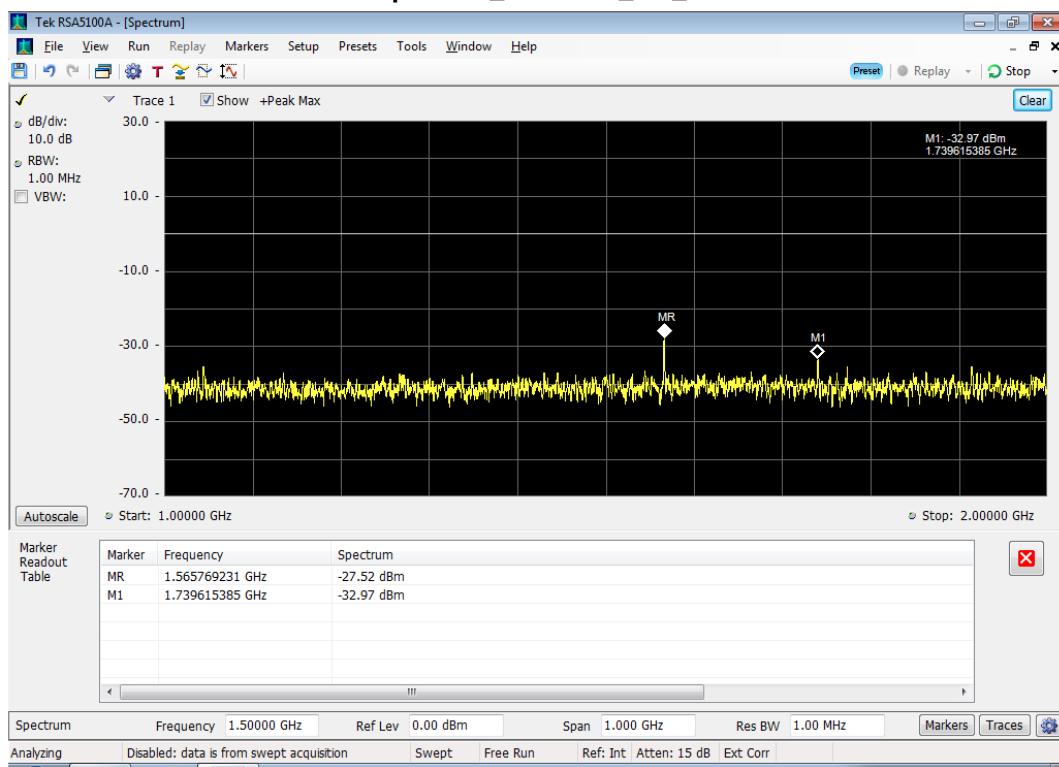
### Conducted Spurious\_1 - 2 GHz\_WB\_138.025 MHz



### Conducted Spurious\_1 - 2 GHz\_NB\_155 MHz



### Conducted Spurious\_1 - 2 GHz\_NB\_173.975 MHz



## Emission Masks

**Engineer:** Greg Corbin

**Test Date:** 5/28/2025

## Measurement Procedure

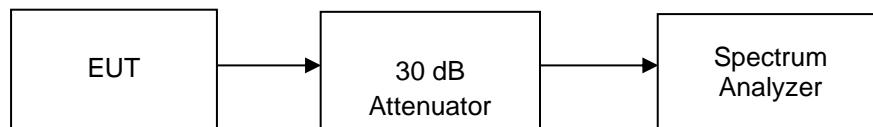
The EUT was connected directly to a spectrum analyzer to verify that the EUT meets the required emissions mask.

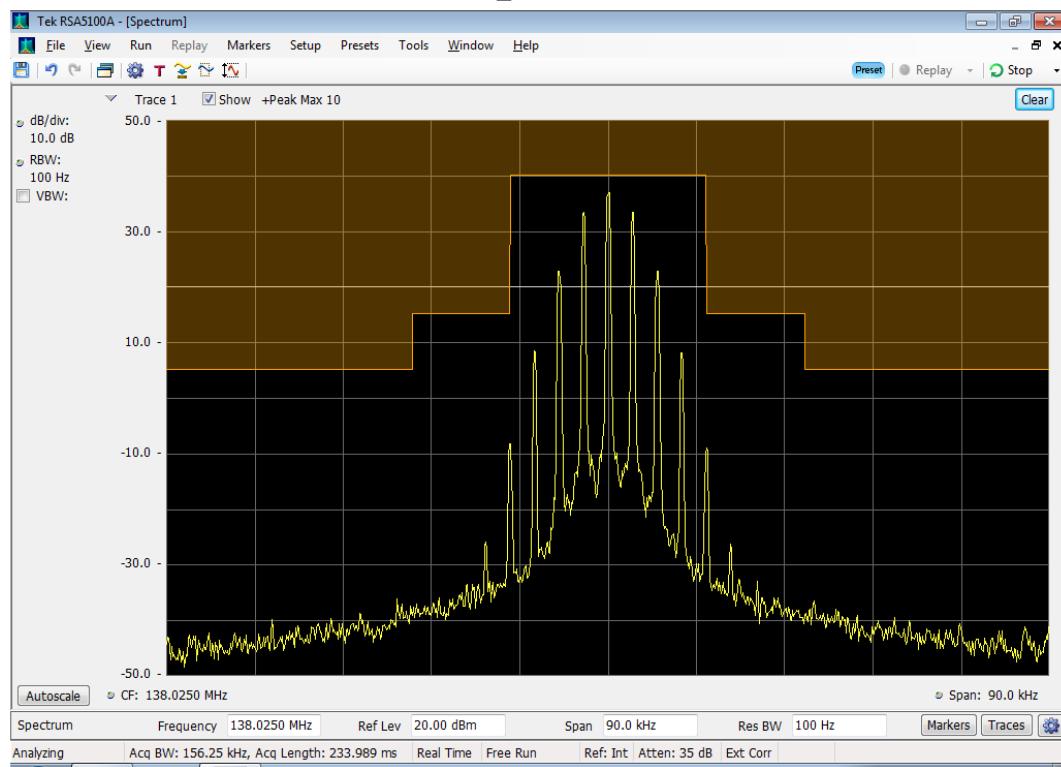
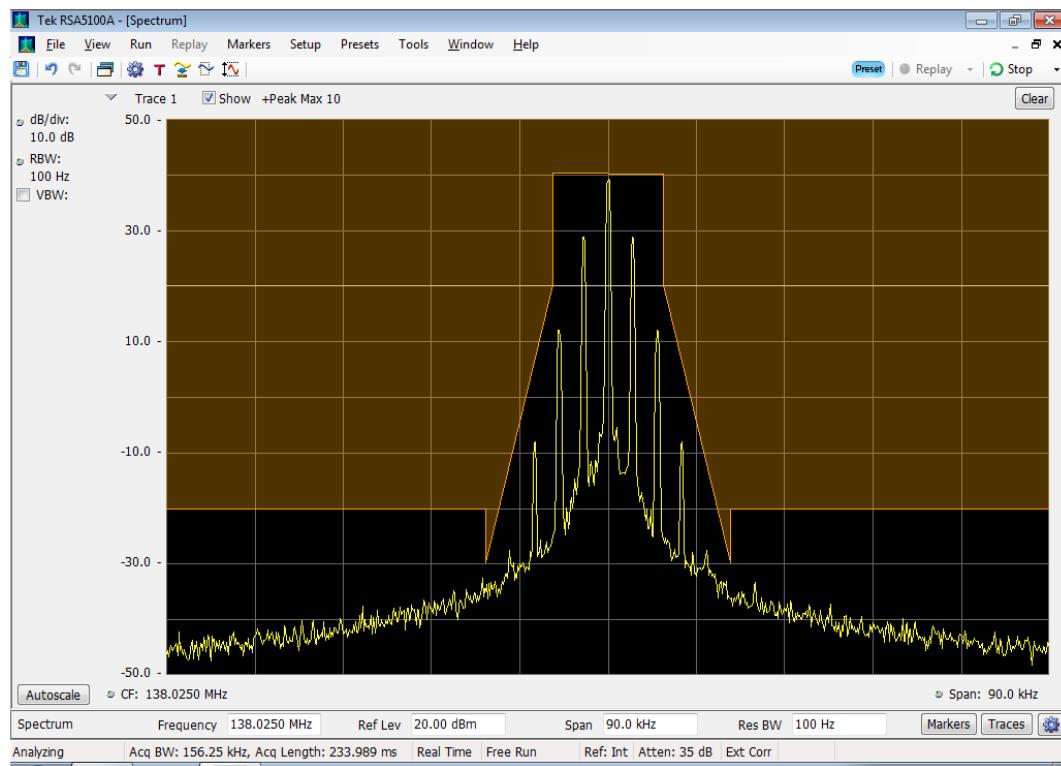
For FM modulation the transmitter was modulated with a 2.5 kHz tone at a level 16 dB higher than that required to produce 50% of the maximum frequency deviation.

Mask B was used for WB.

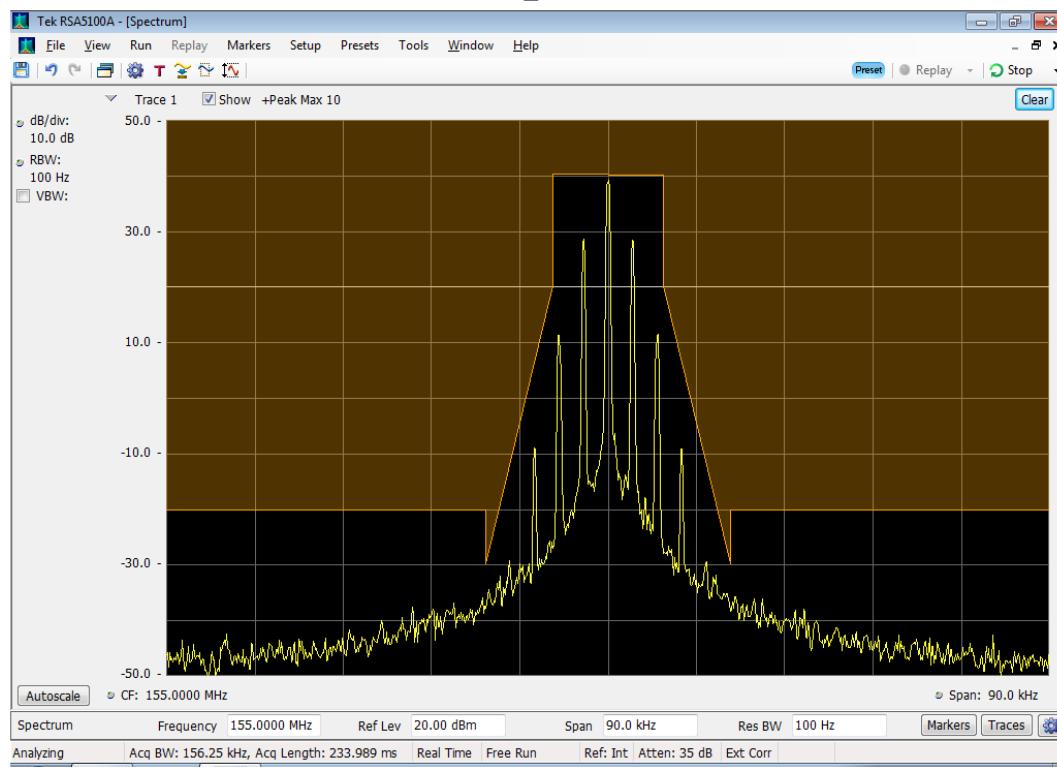
Mask D was used for NB.

## Test Setup

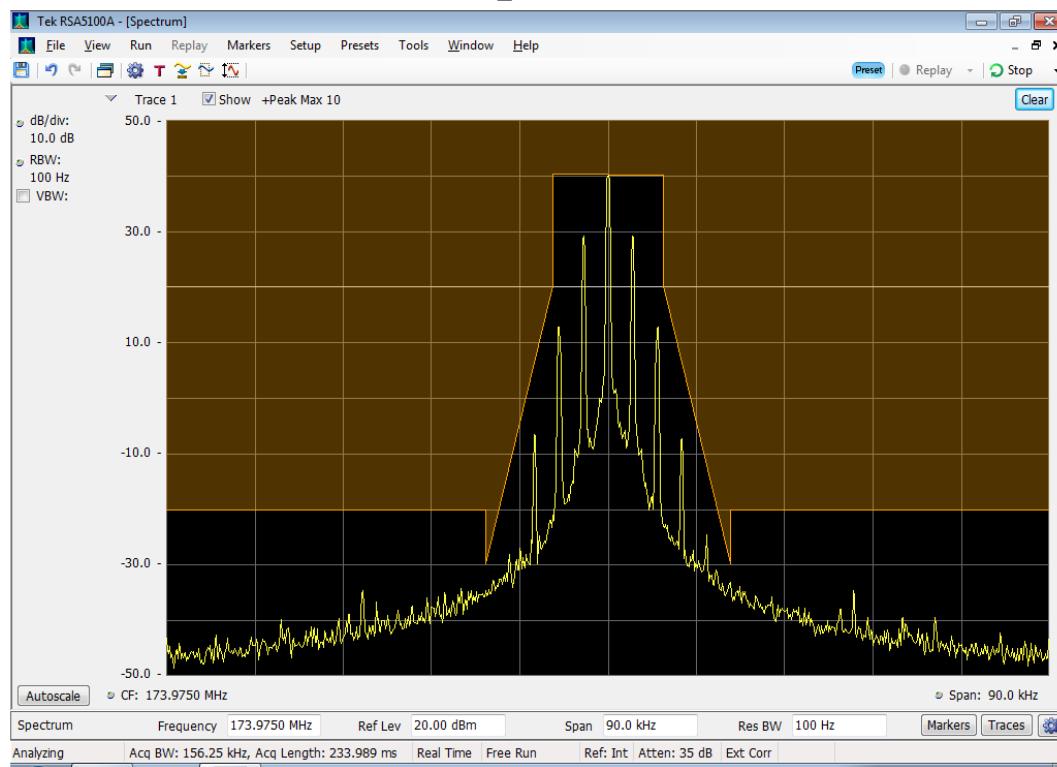


**Mask B\_138.025 MHz**

**Mask D\_138.025 MHz**


### Mask D\_155 MHz



### Mask D\_173.975 MHz



## Frequency Stability (Temperature Variation)

**Engineer:** Greg Corbin

**Test Date:** 5/28/225

### Measurement Procedure

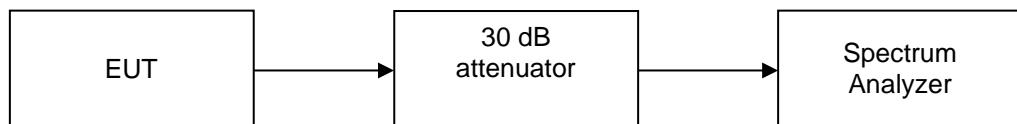
The EUT was placed in an environmental test chamber and the RF output was connected directly to a spectrum analyzer. The temperature was varied from -30°C to 50°C in 10°C increments.

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

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

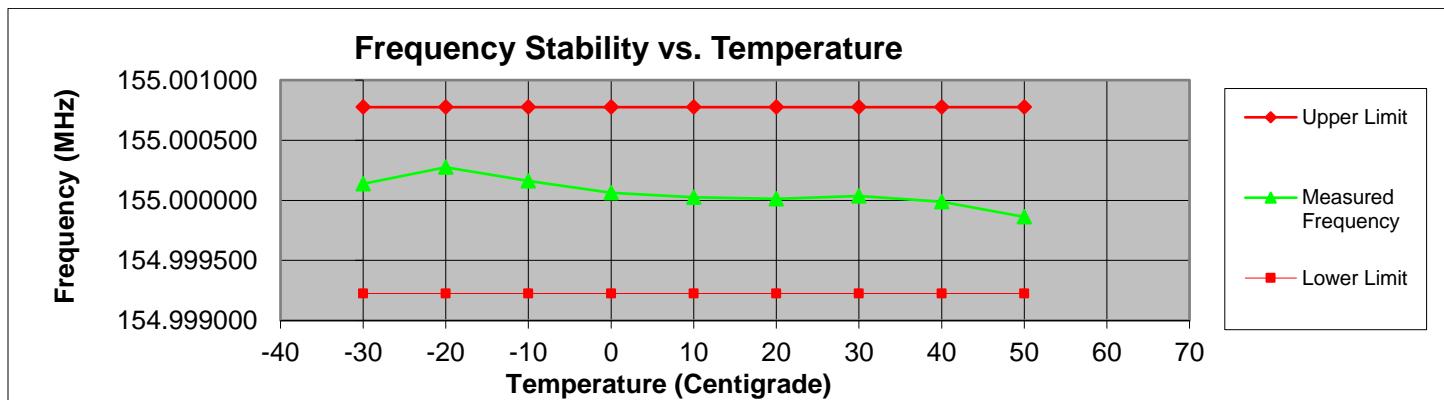
The transmitter is powered by 28 vdc.

### Measurement Setup



### Frequency Stability vs Temperature

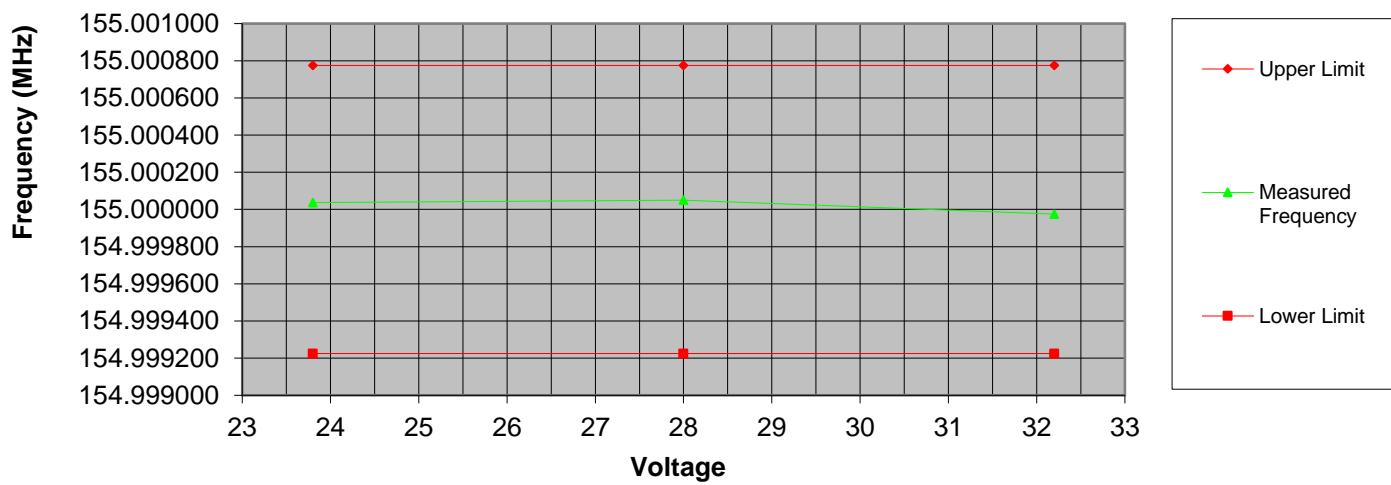
| Tuned Frequency | Tolerance | Temperature | Measured Frequency | Upper Limit | Lower Limit | Upper Margin | Lower Margin |
|-----------------|-----------|-------------|--------------------|-------------|-------------|--------------|--------------|
| (MHz)           | (PPM)     | (deg C)     | (MHz)              | (MHz)       | (MHz)       | (MHz)        | (MHz)        |
| 155.000         | 5         | -30         | 155.000137         | 155.000775  | 154.999225  | -0.000638    | 0.000912     |
|                 |           | -20         | 155.000275         | 155.000775  | 154.999225  | -0.000500    | 0.001050     |
|                 |           | -10         | 155.000162         | 155.000775  | 154.999225  | -0.000613    | 0.000937     |
|                 |           | 0           | 155.000062         | 155.000775  | 154.999225  | -0.000713    | 0.000837     |
|                 |           | 10          | 155.000025         | 155.000775  | 154.999225  | -0.000750    | 0.000800     |
|                 |           | 20          | 155.000012         | 155.000775  | 154.999225  | -0.000763    | 0.000787     |
|                 |           | 30          | 155.000037         | 155.000775  | 154.999225  | -0.000738    | 0.000812     |
|                 |           | 40          | 154.999987         | 155.000775  | 154.999225  | -0.000788    | 0.000762     |
|                 |           | 50          | 154.999862         | 155.000775  | 154.999225  | -0.000913    | 0.000637     |



### Frequency Stability vs Voltage

| Tuned Frequency<br>(MHz) | Tolerance<br>(PPM) | Voltage<br>$\pm 15\%$ | Measured Frequency<br>(MHz) | Upper Limit<br>(MHz) | Lower Limit<br>(MHz) | Upper Margin<br>(MHz) | Lower Margin<br>(MHz) |
|--------------------------|--------------------|-----------------------|-----------------------------|----------------------|----------------------|-----------------------|-----------------------|
| 155.000                  | 5                  | 23.80                 | 155.000037                  | 155.000775           | 154.999225           | -0.000738             | 0.000812              |
|                          |                    | 28.00                 | 155.000050                  | 155.000775           | 154.999225           | -0.000725             | 0.000825              |
|                          |                    | 32.20                 | 154.999975                  | 155.000775           | 154.999225           | -0.000800             | 0.000750              |

### Frequency Stability vs. Voltage



### Measurement Uncertainty

Measurement Uncertainty ( $U_{lab}$ ) for Compliance Testing is listed in the table below.

| Measurement                      | $U_{lab}$                |
|----------------------------------|--------------------------|
| Radio Frequency                  | $\pm 3.3 \times 10^{-8}$ |
| RF Power, conducted              | $\pm .54$ dB             |
| RF Power Density, conducted      | $\pm 1.0$ dB             |
| Conducted Emissions              | $\pm 0.94$ dB            |
| Radiated Emissions 9kHz-30MHz    | $\pm 2.76$ dB            |
| Radiated Emissions 30MHz-1000MHz | $\pm 4.25$ dB            |
| Radiated Emissions – 1GHz-18GHz  | $\pm 4.49$ dB            |
| Temperature                      | $\pm 1.5$ deg C          |
| Humidity                         | $\pm 4.3$ %              |
| DC voltage                       | $\pm 0.20$ VDC           |
| AC Voltage                       | $\pm 1.2$ VAC            |

The reported expanded uncertainty +/-  $U_{lab}$ (dB) has been estimated at a 95% confidence level (k=2)

$U_{lab}$  is less than or equal to  $U_{ETSI}$  therefore

- Compliance is deemed to occur if no measured disturbance exceeds the disturbance limit
- Non-Compliance is deemed to occur if any measured disturbance exceeds the disturbance limit

### Test Equipment Utilized

| Description                         | Manufacturer      | Model #             | CT Asset # | Last Cal Date        | Cal Due Date |
|-------------------------------------|-------------------|---------------------|------------|----------------------|--------------|
| Temp./humidity/pressure monitor     | Omega Engineering | iBTHX-W-5           | i00686     | 1/25/2025            | 1/25/2026    |
| Spectrum Analyzer                   | Textronix         | RSA5126A            | i00424     | 6/25/2024            | 6/25/2025    |
| Voltmeter                           | Fluke             | 179                 | i00488     | 6/19/24              | 6/19/25      |
| Attenuator, 30 dB, 50W              | Mini-Circuits     | BW- N30W50+         | i00459     | Verified on: 4/28/25 |              |
| Highpass Filter (1 GHz)             | K&L               | 7IH40-980/T6000-O/O | i00432     | Verified on: 4/28/25 |              |
| Notch filter, tunable 125 – 250 MHz | Telonic Berkeley  | TTR 190-3EE         | i00692     | Verified on: 4/28/25 |              |
| Data Logger                         | Fluke             | Hydra Data Bucket   | i00343     | 1/25/2025            | 1/25/2026    |

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 REP