

# FCC and ISED Canada Radio Testing of the

Sensus Metering Systems Inc.  
IDTB007

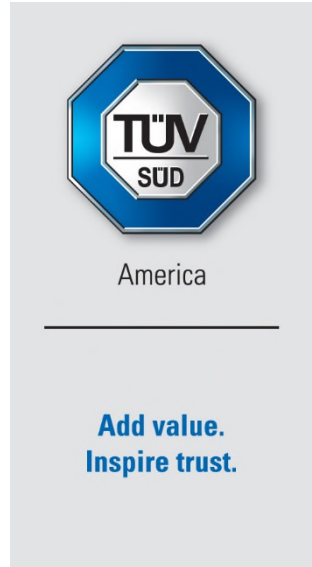
In accordance with FCC 47 CFR Part 24 Subpart D, Part 101 Subpart C and ISED Canada's Radio Standards Specifications RSS-119, RSS-134

Prepared for: Sensus Metering Systems Inc.  
639 Davis Drive  
Morrisville, NC 27560

FCC ID: SDBIDTB007  
IC: 2220A-IDTB007

## COMMERCIAL-IN-CONFIDENCE

Document Number: TP72187705.201 | Version Number: 02



RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Authorized Signatory	Peter Walsh	2023 -September-26	
Testing	Thierry Jean-Charles	2023-September-26	

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service document control rules.

FCC Accreditation  
Designation Number US1063 Tampa, FL Test Laboratory

Innovation, Science, and Economic Development Canada  
Accreditation  
Site Number 2087A-2 Tampa, FL Test Laboratory

**EXECUTIVE SUMMARY**  
Samples of this product were tested and found to be in compliance with FCC Part 24 Subpart D, Part 101 Subpart C and ISED Canada's RSS-119, RSS-134.

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# 1 Report Summary

## 1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	2023-August-30
2	Corrected antenna gain information and typos.	2023-September-26

## 1.2 Introduction

The purpose of this report is to demonstrate compliance with the FCC's Code of Federal Regulations Part 24 Subpart D, Part 101 Subpart C and Innovation Science and Economic Development Canada's Radio Standards Specification RSS-119, RSS-134 for the tests documented herein.



Applicant	Sensus Metering Systems Inc.
Manufacturer	Sensus Metering Systems Inc.
Applicant's Email Address	James.Francisco@xylem.com
Model Number(s)	IDTB007
Serial Number(s)	825545076715755, KDS TCXO, RF Conducted 825545076715645, TXC TCXO, RF Conducted 825545076715758, KDS TCXO, Radiated Emissions 825545076715860, TXC TCXO, Radiated Emissions 825545076715791, TXC TCXO, Radiated Emissions
FCC ID	SDBIDTB007
ISED Certification Number	2220A-IDTB007
Hardware Version(s)	Rev D
Software Version(s)	7.C.1.6
Number of Samples Tested	5
Test Specification/Issue/Date	US Code of Federal Regulations (CFR): Title 47, Part 24, Subpart D: Personal Communications Services – 2023 US Code of Federal Regulations (CFR): Title 47, Part 101, Subpart C: Fixed Microwave Services -2023 Industry Canada Radio Standards Specification: RSS-119 - Land Mobile and Fixed Equipment Operating in the Frequency Range 27.41-960 MHz, Issue 12, May 2015, Amendment (April 1, 2022) Industry Canada Radio Standards Specification: RSS-134 - 900 MHz Narrowband Personal Communication Service, Issue 2, February 2016
Test Plan/Issue/Date	2023-February-08
Order Number	72187705
Date	2023-February-24
Date of Receipt of EUT	2023-June-15
Start of Test	2023-June-16
Finish of Test	2023-July-27
Name of Engineer(s)	Thierry Jean-Charles
Related Document(s)	US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures - 2023 Innovation, Science and Economic Development Canada Radio Standards Specification: RSS-GEN - General



Requirements for Compliance of Radio Apparatus, Issue 5,  
Amendment 1, March 2019

ANSI C63.26: 2015: American National Standard for  
Compliance Testing of Transmitters Used in Licensed Radio  
Services.



### 1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with 24 Subpart D, Part 101 Subpart C and ISED Canada's RSS-119, RSS-134 is shown below.

**Table 1.3-1: Test Result Summary**

Test Parameter	Test Plan (Yes/No)	Test Results	FCC 47 CFR Rule Part	ISED Canada's RSS	Test Report Page No.
RF Power Output	Yes	Pass	2.1046; 24.132; 101.113(a)	RSS-Gen 6.12; RSS-119 5.4; RSS-134 4.3(a), (b)	13
Out of Band Unwanted Emissions	Yes	Pass	2.1051; 24.133 a(1), a(2); 101.111 a(5),a(6)	RSS-Gen 6.13; RSS-119 5.8.3, 5.8.6; RSS-134 4.4	22
Occupied Bandwidth	Yes	Pass	2.1049; 101.109	RSS-Gen 6.7	46
Spurious Emissions at Antenna Terminals	Yes	Pass	2.1051; 24.133 a(1), a(2); 101.111 a(5),a(6)	RSS-Gen 6.13; RSS-119 5.8.3, 5.8.6; RSS-134 4.4	77
Field Strength of Spurious Radiation	Yes	Pass	2.1053; 24.133 a(1), a(2); 101.111 a(5),a(6)	RSS-Gen 6.13; RSS-119 5.8.3, 5.8.6; RSS-134 4.4	84
Frequency Stability	Yes	Pass	2.1055; 24.135; 101.107	RSS-Gen 6.11; RSS-119 5.3; RSS-134 4.5	99



## 1.4 Product Information

### 1.4.1 Technical Description

The equipment under test was the Stratus IQ+ Radio Module model IDTB007. The device is a transceiver module consisting of a standard FlexNet protocol with FEM controlled output capable of 1W nominal conducted output power. The modular design enables Sensus to locate the transceiver in several standard S form meters retailed to Utilities.

#### Technical Details

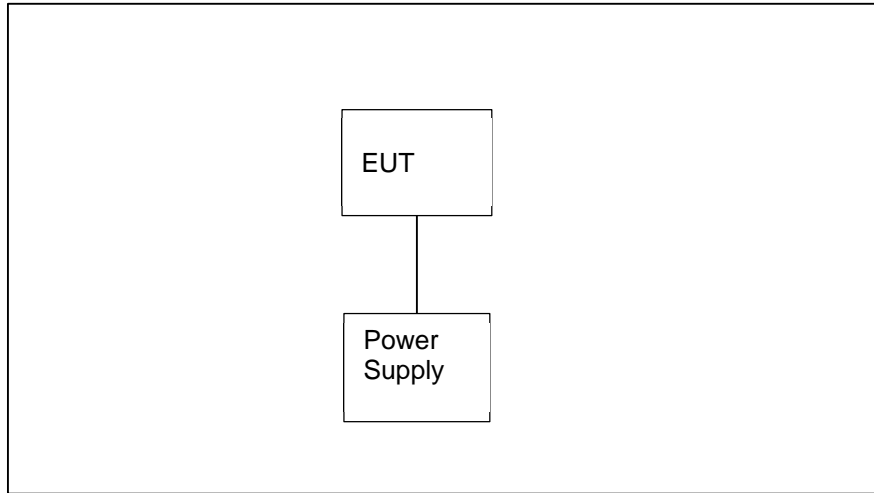
Mode of Operation	Flexnet Radio
Frequency Range:	901 - 960 MHz
Antenna Type/Gain:	Printed Monopole Antenna, 2 dBi
Input Power:	4.2 VDC

The IDTB007 transmitters produce 14 distinct modulation formats. The emissions designators for the modulation types used by the IDTB007 transmitters are as follows:

#### EMISSIONS DESIGNATORS:

Normal Mode	9K60F2D (7-FSK)
Double Density Mode	9K60F2D (13-FSK)
C&I Mode (Half-Baud)	4K80F2D (7-FSK)
Priority	4K80F2D (13-FSK)
2SFSK (Half Baud)	5K00F1D (2-SFSK)
4SFSK (Half Baud)	5K60F1D (4-SFSK)
8SFSK (Half Baud)	5K90F1D (8-SFSK)
2SFSK	10K0F1D (2-SFSK)
4SFSK	11K3F1D (4-SFSK)
8SFSK	11K9F1D (8-SFSK)
MPass Mode (5 kbps)	5K90F1D (2-GFSK)
MPass Mode (10 kbps)	11K8F1D (2-GFSK)
M4Pass (10 kbps)	4K70F1D (4-GFSK)
M4Pass (20 kbps)	9K30F1D (4-GFSK)

A full description and detailed product specification details are available from the manufacturer.



**Table 1.4.1-1 – Cable Descriptions**

Cable/Port	Description
Power Leads	2.2 m, Not Shielded, EUT to DC Power Supply

**Table 1.4.1-2 – Support Equipment Descriptions**

Make/Model	Description
Hewlett Packard / 6291A	DC Power Supply, S/N: 1928A05628

**Note: The EUT is a standalone module. The power supply and leads were used for testing purposes.**





Declaration of Build Status

EQUIPMENT DESCRIPTION	
Model Name/Number	Stratus IQ+ Radio Module
Part Number	7002811250000
Hardware Version	Rev D
Software Version	F.C.16
FCC ID (if applicable)	SDBIDTB007
ISED ID (if applicable)	2220A-IDTB007
Technical Description (Please provide a brief description of the intended use of the equipment)	Electric meter radio module.

UN-INTENTIONAL RADIATOR	
Highest frequency generated or used in the device or on which the device operates or tunes	3838.047MHz
Lowest frequency generated or used in the device or on which the device operates or tunes	32.768kHz
Class A Digital Device (Use in commercial, industrial or business environment) <input type="checkbox"/>	
Class B Digital Device (Use in residential environment only) <input checked="" type="checkbox"/>	

Power Source			
AC	Single Phase	Three Phase	Nominal Voltage
	<input type="checkbox"/>	<input type="checkbox"/>	
External DC	Nominal Voltage		Maximum Current
	4.2V		1.2A
Battery	Nominal Voltage		Battery Operating End Point Voltage

EXTREME CONDITIONS			
Maximum temperature	+85	°C	Minimum temperature
			-40 °C

Ancillaries
Please list all ancillaries which will be used with the device.
N/A

I hereby declare that the information supplied is correct and complete.

Name: James Francisco

Position held: Staff Regulatory Engineer

Date: August 9, 2023



**1.4.2 Modes of Operation**

The tested mode of operation was the Flexnet radio in continuous transmit mode. The EUT was configured using the Sensus Flexnet Spotlight V2.0.0.37 software tool. The TX output power of the radio was not configurable.

**1.4.3 Monitoring of Performance**

The following performance attributes were monitored:

1. Transmitter Output Power
2. Transmitter Emissions Masks
3. Transmitter Occupied Bandwidth
4. Transmitter Spurious Emissions at the Antenna Port
5. Transmitter Radiated Spurious Emissions
6. Transmitter Frequency Stability over Temperature and Voltage

The EUT offers two TCXO alternate parts (KDS, TXC). Full testing was performed on one TCXO variant while spot check measurements were performed on the second variant as deemed applicable.

The EUT was configured with power leads for testing purposes. The radiated emissions evaluation was performed on the EUT standalone. The RF conducted measurements were performed for the EUT place inside of a fixture for programming purposes.

The EUT is designed to operate in multiple bands under the requirements of CFR 47 Parts 24 and 101. The following is a list of the frequency bands of operation sorted based on the FCC rule parts in which the band is associated.

CFR Title 47 Rule Part	ISED Canada RSS	Frequency Band of Operation (MHz)
24D	134	901.0 - 902.0
24D	134	930.0 - 931.0
24D	134	940.0 - 941.0
101	119	928.85 - 929.0
101	119	932.0 - 932.5
101	119	941.0 - 941.5
101	119	952.0 – 953.0
101	N/A	959.85 - 960.0



Based on the requirements set forth in accordance 47 CFR 2.1046-2.1057 as stated above, the methodology in selecting the places to test in the available bands of operation is outlined in the following table.

CFR Title 47 Rule Part	ISED Canada RSS	Frequency Band of Operation (MHz)	Location in the Range of Operation	Approx. Test Freq.
24D	134	901.0 - 902.0	Middle	901.5000
101	119	928.85 - 929.0	Middle	928.9250
24D	134	930.0 - 931.0	Middle	930.5000
101	119	932.0 - 932.5	Middle	932.2500
24D	134	940.0 - 941.0	1 near top and 1 near bottom	940.0125
101	119	941.0 - 941.5		941.4875
101	119	952.0 – 953.0	Middle	952.5
101	N/A	959.85 – 960.0	Middle	959.9250

#### 1.4.4 Performance Criteria

The parameters evaluated are summarized below.

**Table 1.4.4-1 - Performance Criteria**

Parameter	Requirement
RF Output Power	FCC 47 CFR Part 2.1046; 24.132; 101.113(a) ISED Canada RSS-119 5.4; RSS-134 4.3(a),(b)
Out-of-Band Unwanted Emissions	FCC 47 CFR Parts: 2.1051; 24.133 a(1), a(2); 101.111 a(6) ISED Canada RSS-119 5.8.3, 5.8.6; RSS-134 4.4
Occupied Bandwidth	ISED Canada RSS-GEN 6.7
Unwanted Emissions at the Antenna Terminal	FCC 47 CFR Parts: 2.1051; 24.133 a(1), a(2); 101.111 a(5),a(6) ISED Canada RSS-119 5.8.3, 5.8.6; RSS-134 4.4
Radiated Spurious Emissions	FCC 47 CFR Parts: 2.1053; 24.133 a(1), a(2); 101.111 a(5), a(6) ISED Canada RSS-119 5.8.3, 5.8.6; RSS-134 4.4
Frequency Stability	FCC Parts: 2.1055; 24.135 ISED Canada RSS-134 4.5



**1.5 Deviations from the Standard**

No deviations from the applicable test standard were made during testing.

**1.6 EUT Modification Record**

The table below details modifications made to the EUT during the test program. The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
None			

**1.7 Test Location**

TÜV SÜD Product Service conducted the following tests at our Tampa FL Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
DC Powered Operating		
RF Power Output	Thierry Jean-Charles	A2LA
Out of Band Emissions	Thierry Jean-Charles	A2LA
Occupied Bandwidth	Thierry Jean-Charles	A2LA
Spurious Emissions at the Antenna Terminal	Thierry Jean-Charles	A2LA
Field Strength of Spurious Radiation	Thierry Jean-Charles	A2LA
Frequency Stability	Thierry Jean-Charles	A2LA

Office Address:

TÜV SÜD America, Inc.  
 5610 W. Sligh Ave, Suite 100  
 Tampa, FL 33634  
 USA



## 2 Test Details

### 2.1 RF Power Output

#### 2.1.1 Specification Reference

FCC 47 CFR Part 2.1046; 24.132; 101.113(a)  
ISED Canada RSS-119 5.4; RSS-134 4.3(a),(b)

#### 2.1.2 Equipment Under Test and Modification State

TXC TCXO, SN: 825545076715645  
KDS TCXO, SN: 825545076715755

#### 2.1.3 Date of Test

2023-June-30 to 2023-July-06

#### 2.1.4 Test Method

The RF output of the equipment under test was directly connected to the input of the Spectrum Analyzer through 30 dB of passive attenuation. The resolution and video bandwidths of the spectrum analyzer were set at sufficient levels, >> signal bandwidth.

#### 2.1.5 Environmental Conditions

Ambient Temperature	27.1 °C
Relative Humidity	36.7 %
Atmospheric Pressure	1013.3 mbar



**2.1.6 Test Results**

**Table 2.1.6-1 – FCC Part 24.132 Limits**

Station Type	Frequency Range (MHz)	E.R.P. Limits (Watts)	E.R.P. Limits (dBm)
Stations	901 - 902	7	38.45
Mobile Stations	930 – 931 940 – 941	7	38.45
Base Stations	930 – 931 940 – 941	3500	65.44

**Table 2.1.6-2 – FCC Part 101.113 Limits**

Frequency Range (MHz)	E.I.R.P. Limits Fixed (dBW)	E.I.R.P. Limits Mobile (dBW)
928 - 929	17	
932 – 932.5	17	
941 – 941.5	30	14
952 - 960	40	14

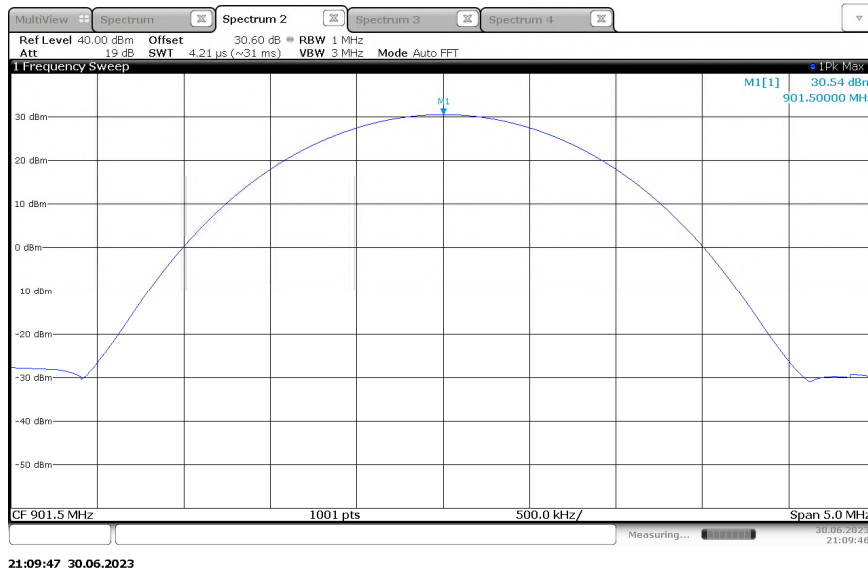


FCC 47 CFR Part 2.1046; 24.132; ISED Canada RSS-134 4.3(a),(b)

TXC TCXO

**Table 2.1.6-3 - RF Output Power – TXC TCXO – FCC 47 CFR Part 24.132; ISED Canada RSS-134 4.3**

Frequency MHz	Power (dBm)	Antenna Gain (dBi)	ERP (dBm)	Limit (dBm)	Margin (dB)
901.5	30.54	2	30.39	38.45	8.06



**Figure 2.1.6-1 - RF Output Power – TXC TCXO – 901.5 MHz**

KDS TCXO

**Table 2.1.6-4 - RF Output Power – KDS TCXO – FCC 47 CFR Part 24.132; ISED Canada RSS-134 4.3**

Frequency MHz	Power (dBm)	Antenna Gain (dBi)	ERP (dBm)	Limit (dBm)	Margin (dB)
901.5	30.93	2	30.78	38.45	7.67
930.5	30.76	2	30.61	38.45	7.84
940.0125	31.13	2	30.98	38.45	7.47

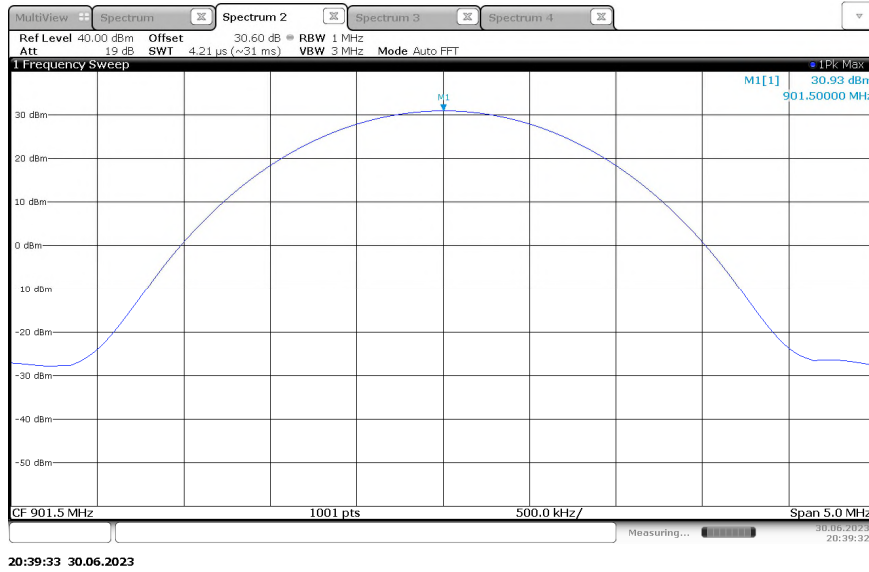


Figure 2.1.6-2 - RF Output Power – KDS TCXO – 901.5 MHz

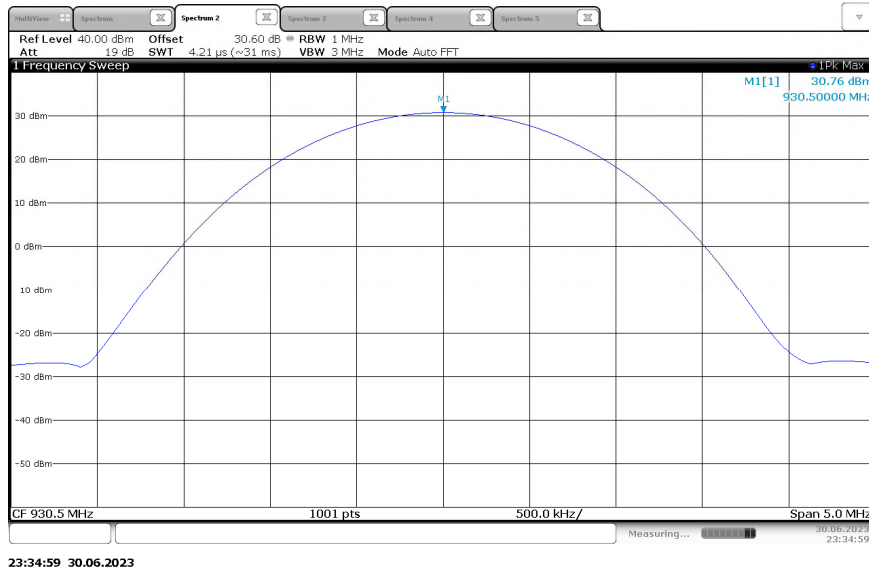


Figure 2.1.6-3 - RF Output Power – KDS TCXO – 930.5 MHz



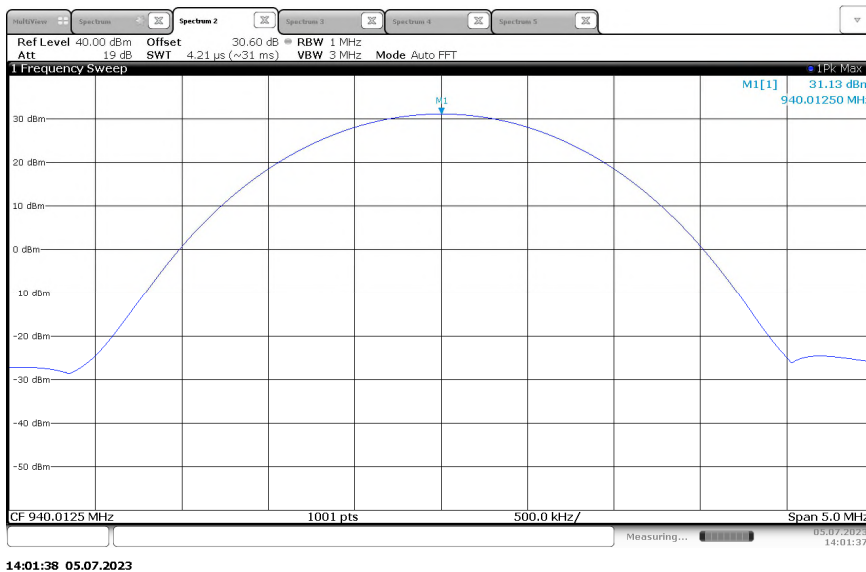


Figure 2.1.6-4 - RF Output Power – KDS TCXO – 940.0125 MHz

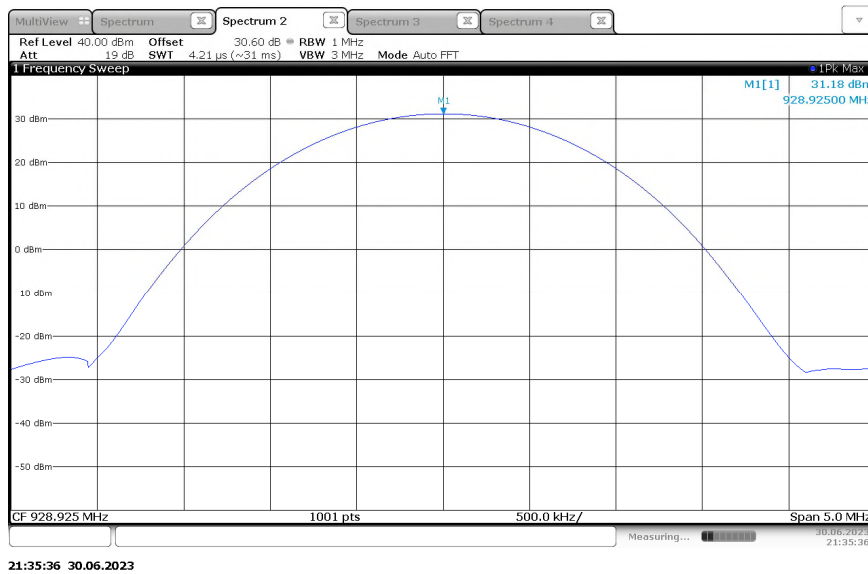


FCC 47 CFR Part 2.1046; 101.113(a); ISED Canada RSS-119 5.4

KDS TCXO

**Table 2.1.6-5 - RF Output Power – KDS TCXO – FCC 47 CFR Part 101.113(a); ISED Canada RSS-119 5.4**

Frequency MHz	Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
928.925	31.18	2	33.18	47	13.82
932.25	31.07	2	33.07	47	13.93
941.4875	31.05	2	33.05	44	10.95
952.5	31.46	2	33.46	44	10.54
959.925	31.27	2	33.27	44	10.73



**Figure 2.1.6-5 - RF Output Power – KDS TCXO – 928.925 MHz**

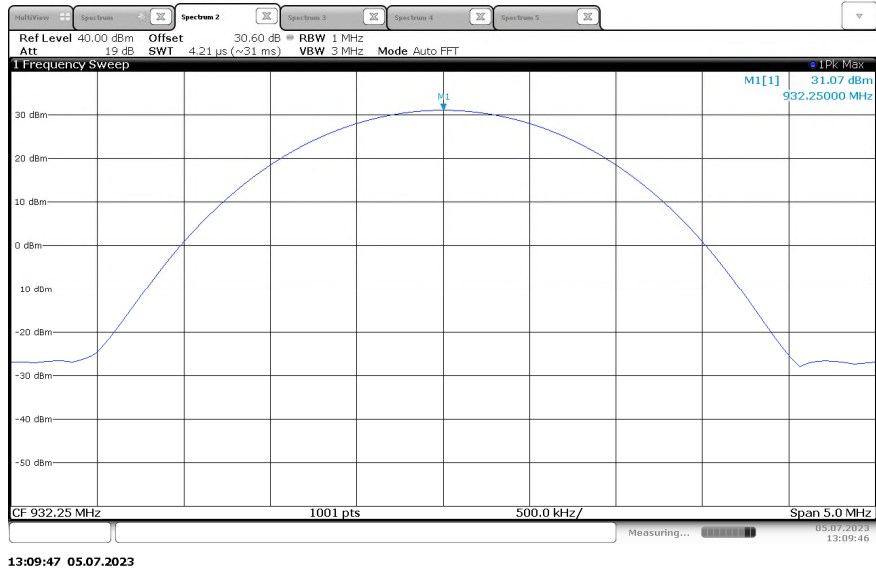


Figure 2.1.6-6 - RF Output Power – KDS TCXO – 932.25 MHz

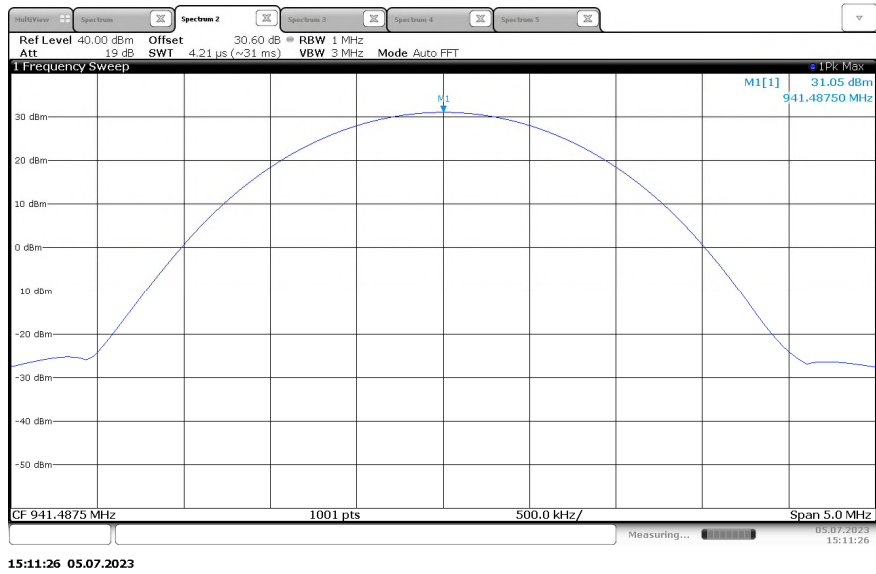


Figure 2.1.6-7 - RF Output Power – KDS TCXO – 941.4875 MHz

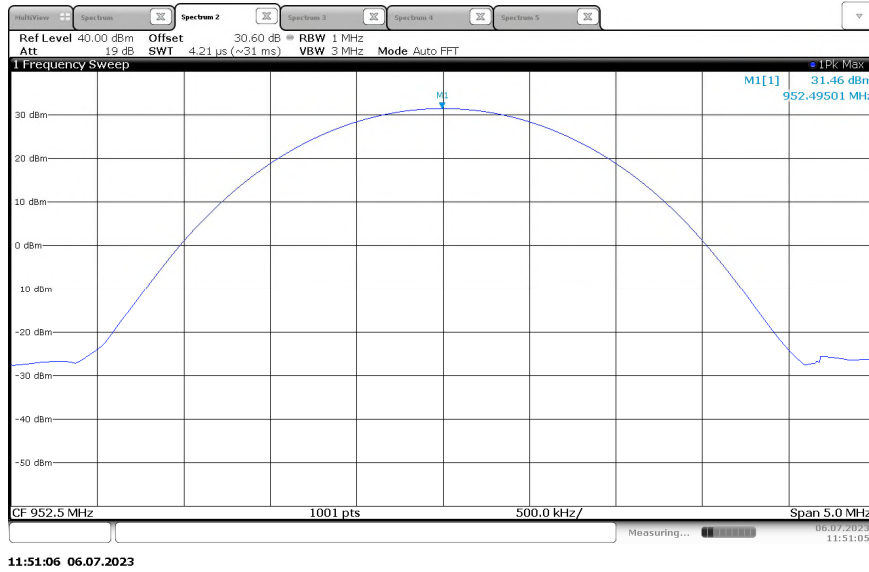


Figure 2.1.6-8 - RF Output Power – KDS TCXO – 952.5 MHz

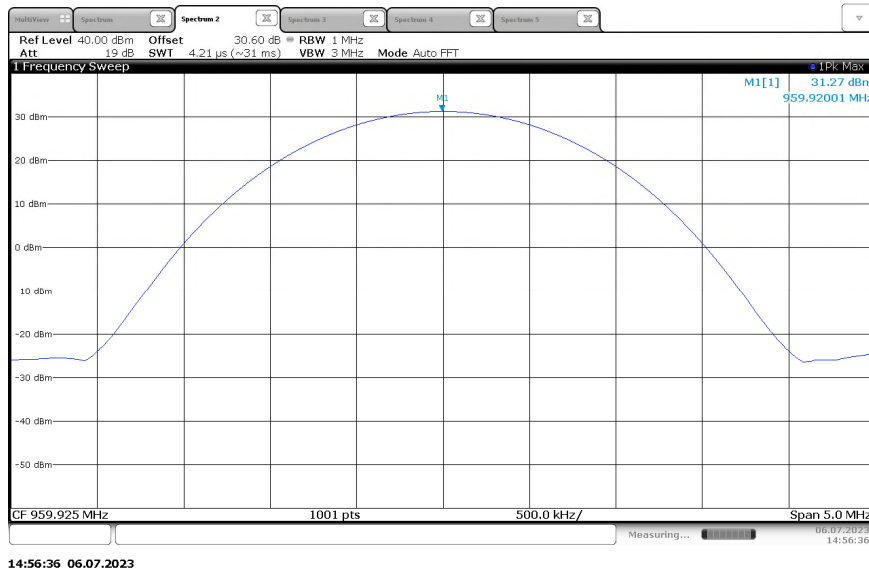


Figure 2.1.6-9 - RF Output Power – KDS TCXO – 959.925 MHz



**2.1.7 Test Location and Test Equipment Used**

This test was carried out in TÜV SÜD America, Inc., 5610 W. Sligh Ave, Suite 100, Tampa, FL 33634, USA.

Instrument	Manufacturer	Type No	TE No	Software / Firmware Revision	Calibration Period (months)	Calibration Due
Digital MultiMeter	Fluke	115	BEMC02108	N/A	12	25-Jan-2024
Duratest 175 Cable 26.5GHz	Teledyne Storm Products	921-0101-036	BEMC02112	N/A	12	12-Oct-2023
Signal & Spectrum Analyzer	Rohde & Schwarz	FSW43	DEMC3085	2.90 SP1	12	08-Jun-2024
DC Power Supply	Xantrex	XHR60-18	TEMC00001	N/A	N/A	NCR
30 dB Fixed Attenuator	Mini-Circuits	BW-S30W5+	TEMC00264	N/A	12	15-Apr-2024

TU - Traceability Unscheduled  
 O/P MON - Output Monitored with Calibrated Equipment  
 N/A - Not Applicable  
 NCR – No Calibration Required



## **2.2 Out of Band Unwanted Emissions**

### **2.2.1 Specification Reference**

FCC 47 CFR Parts: 2.1051; 24.133 a(1), a(2); 101.111 a(5), a(6)  
ISED Canada RSS-119 5.8.3, 5.8.6; RSS-134 4.4

### **2.2.2 Equipment Under Test and Modification State**

KDS TCXO, SN: 825545076715755

### **2.2.3 Date of Test**

2023-July-07 to 2023-July-10

### **2.2.4 Test Method**

The RF output of the equipment under test was directly connected to the input of the Spectrum Analyzer through a 30 dB passive attenuator. The spectrum analyzer resolution and video bandwidths were set to 300 Hz and 3000 Hz, respectively. The internal correction factors of the spectrum analyzer were employed to correct for any cable or attenuator losses. Results of the test are shown below for all modes of operation.

### **2.2.5 Environmental Conditions**

Ambient Temperature	27.1 °C
Relative Humidity	37 %
Atmospheric Pressure	1012.6 mbar



## 2.2.6 Test Results

### DC Powered Operating

FCC 47 CFR Parts: 2.1051; 24.133 a(1), a(2); ISED Canada RSS-134 4.4

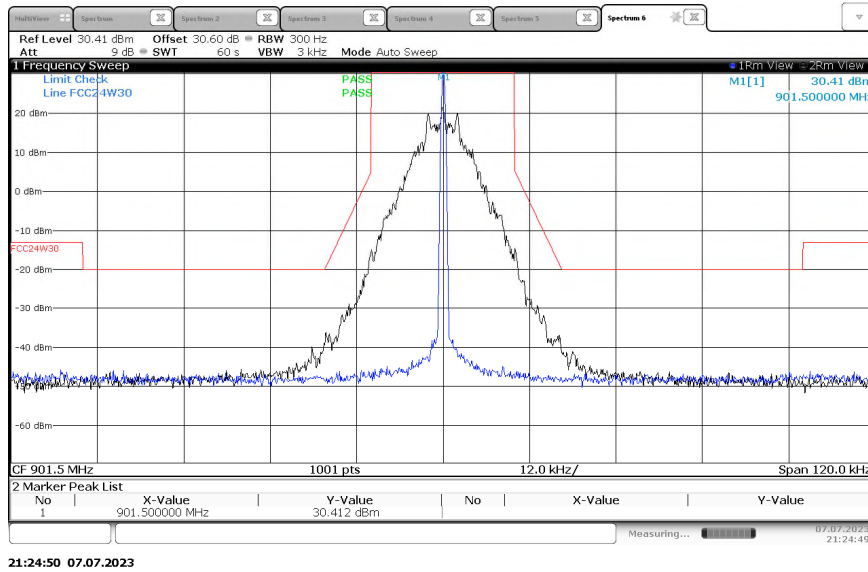


Figure 2.2.6-1 - Emissions Mask – KDS TCXO – 901.5 MHz - 25 kHz Channel Spacing- Normal Mode

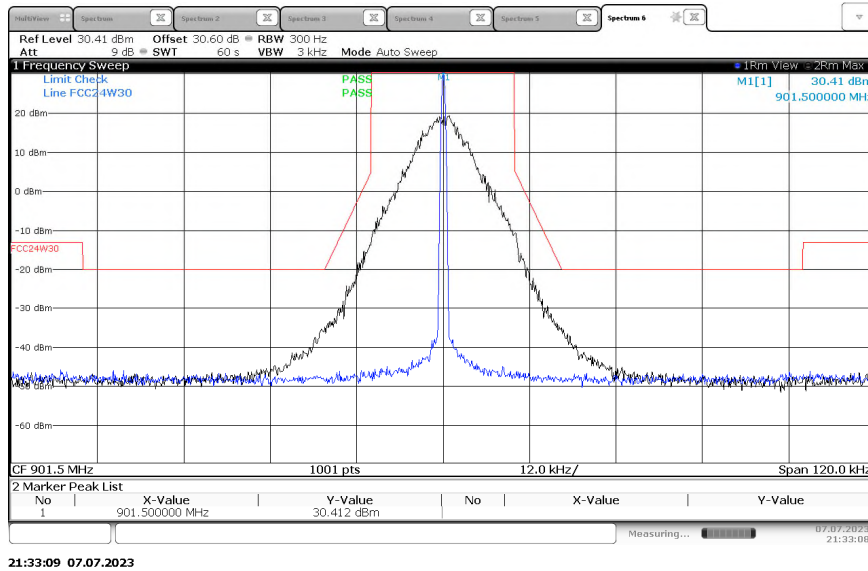


Figure 2.2.6-2 - Emissions Mask – KDS TCXO – 901.5 MHz - 25 kHz Channel Spacing- Double Density Mode

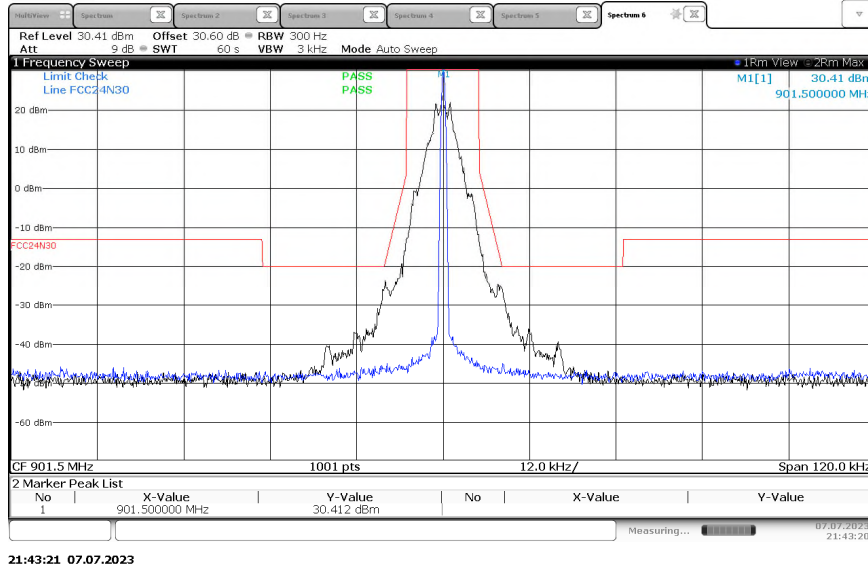


Figure 2.2.6-3 - Emissions Mask – KDS TCXO – 901.5 MHz - 12.5 kHz Channel Spacing - C&I Mode



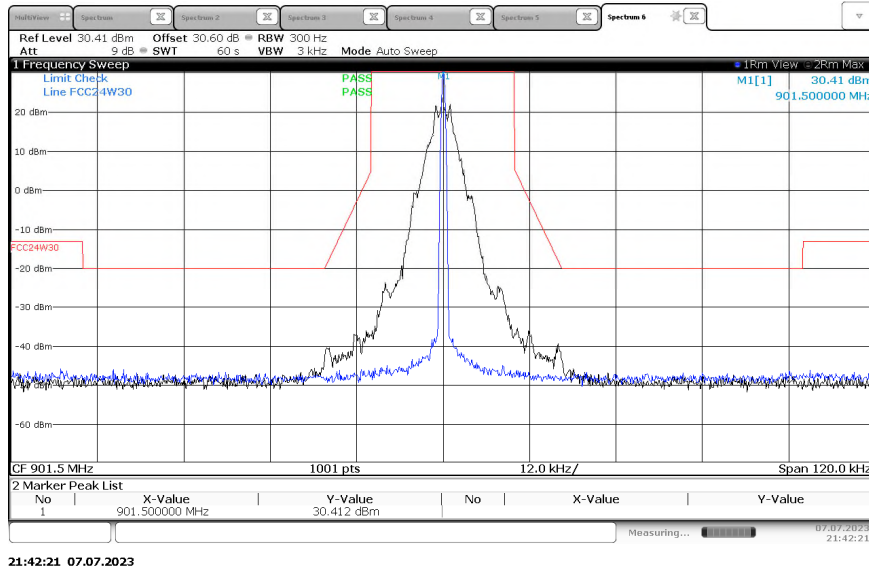


Figure 2.2.6-4 - Emissions Mask – KDS TCXO – 901.5 MHz - 25 kHz Channel Spacing- C&I Mode

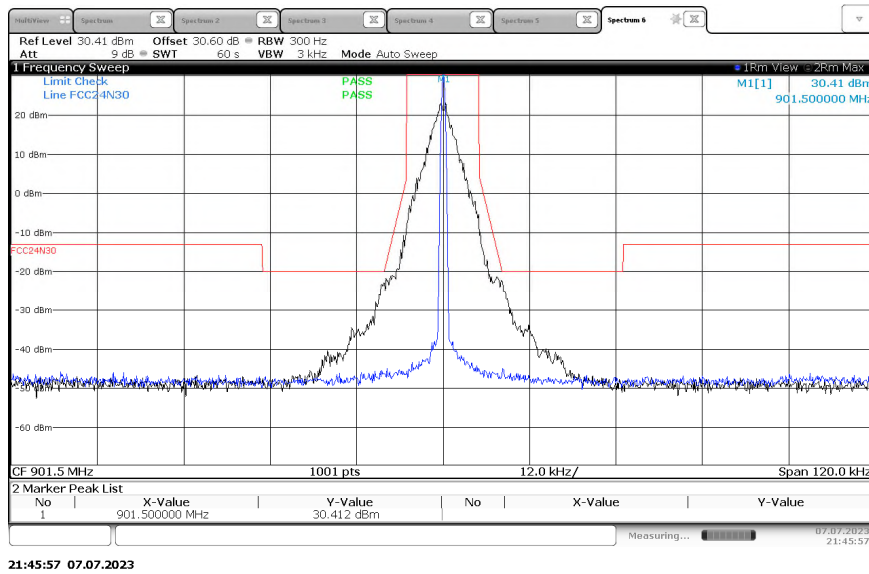


Figure 2.2.6-5 - Emissions Mask – KDS TCXO – 901.5 MHz - 12.5 kHz Channel Spacing - Priority Mode

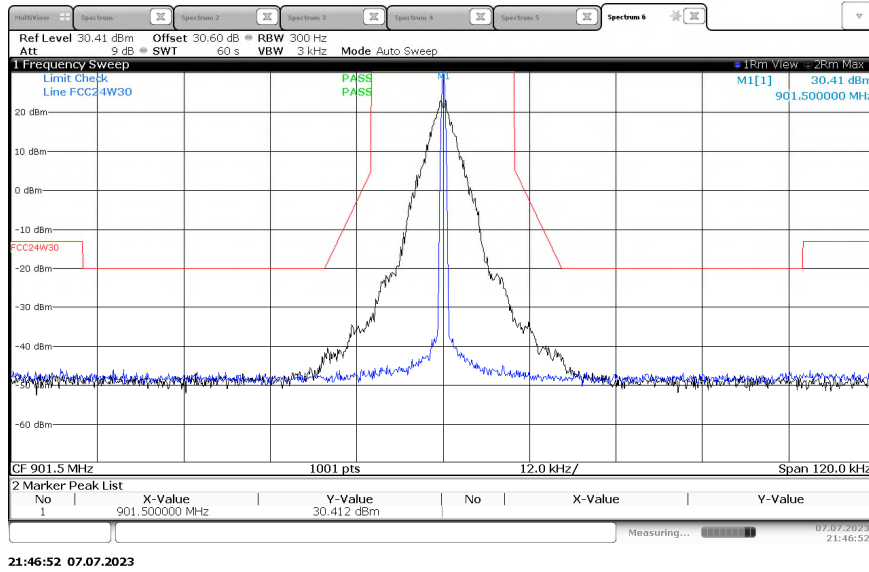


Figure 2.2.6-6 - Emissions Mask – KDS TCXO – 901.5 MHz - 25 kHz Channel Spacing- Priority Mode

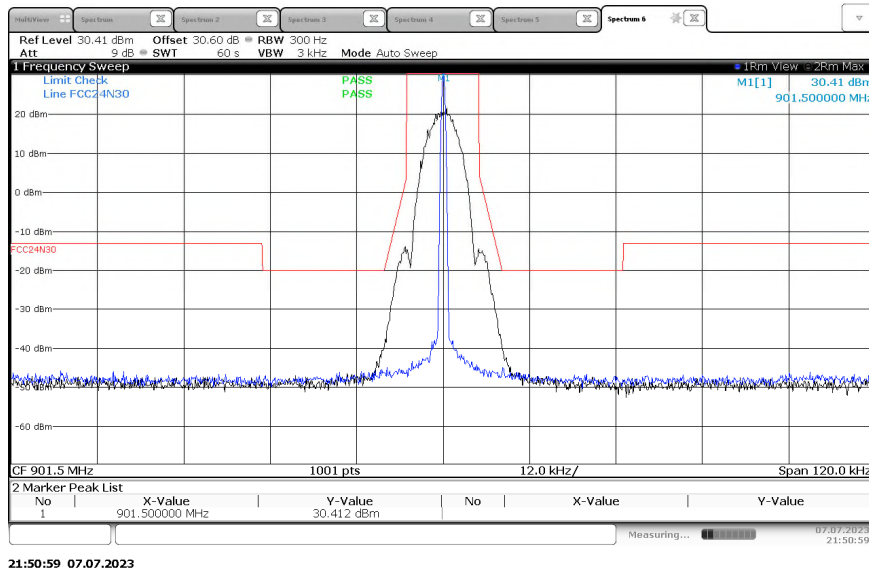
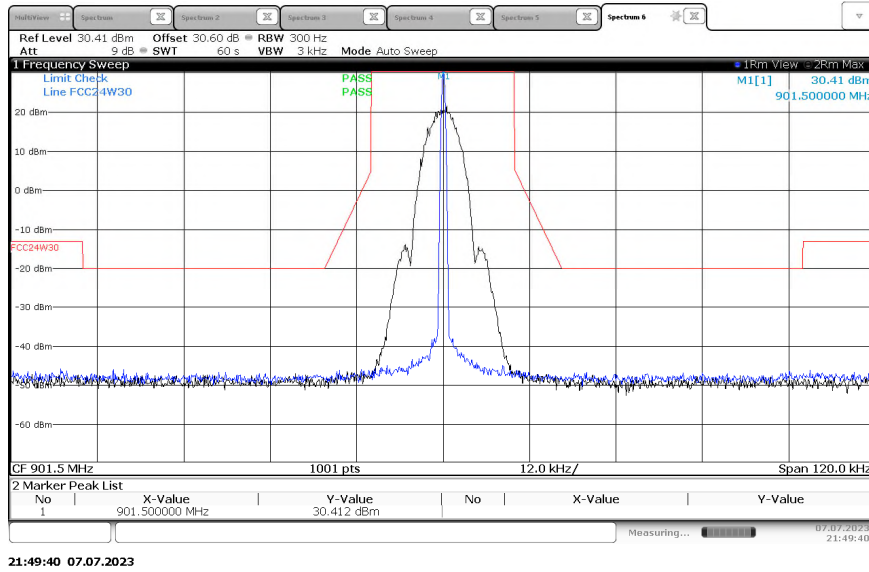
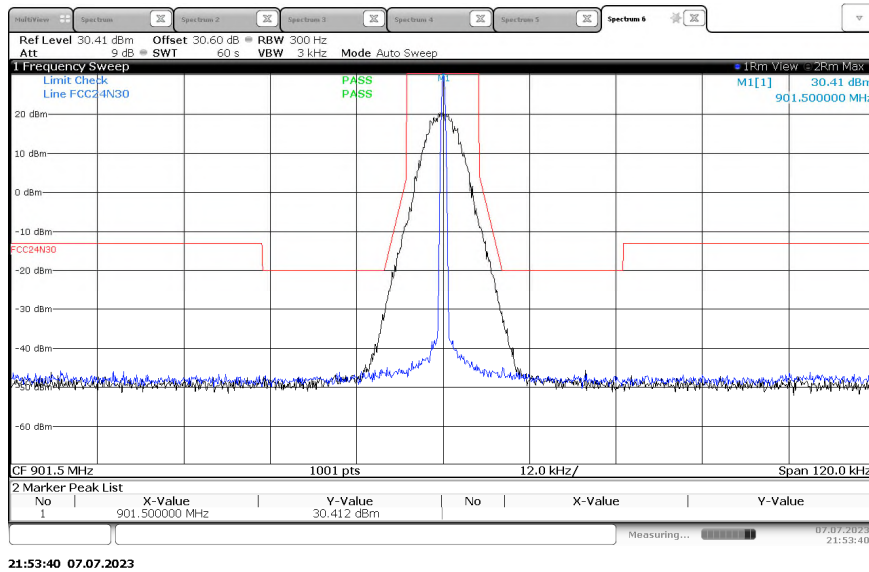


Figure 2.2.6-7 - Emissions Mask – KDS TCXO – 901.5 MHz - 12.5 kHz Channel Spacing - 2FSK (Half Baud) Mode



**Figure 2.2.6-8 - Emissions Mask – KDS TCXO – 901.5 MHz - 25 kHz Channel Spacing- 2FSK (Half Baud) Mode**



**Figure 2.2.6-9 - Emissions Mask – KDS TCXO – 901.5 MHz - 12.5 kHz Channel Spacing - 4FSK (Half Baud) Mode**

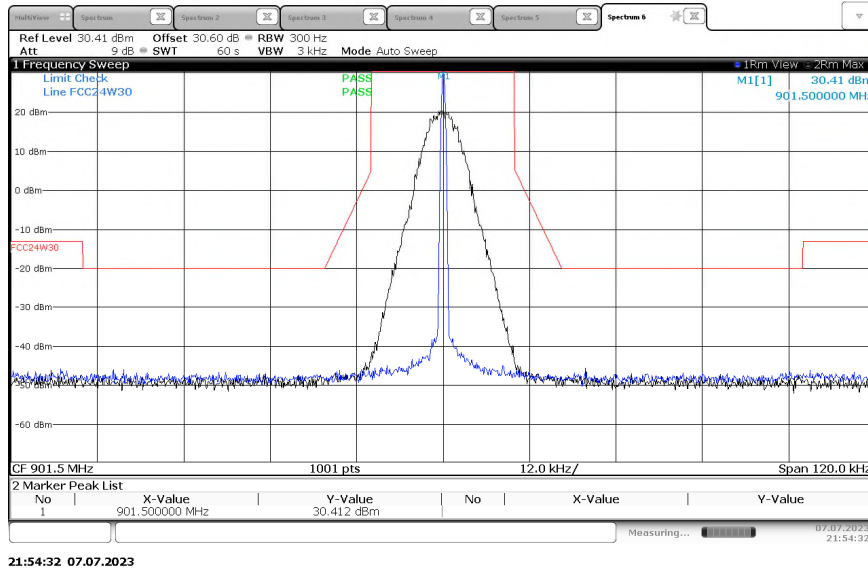


Figure 2.2.6-10 - Emissions Mask – KDS TCXO – 901.5 MHz - 25 kHz Channel Spacing- 4FSK (Half Baud) Mode

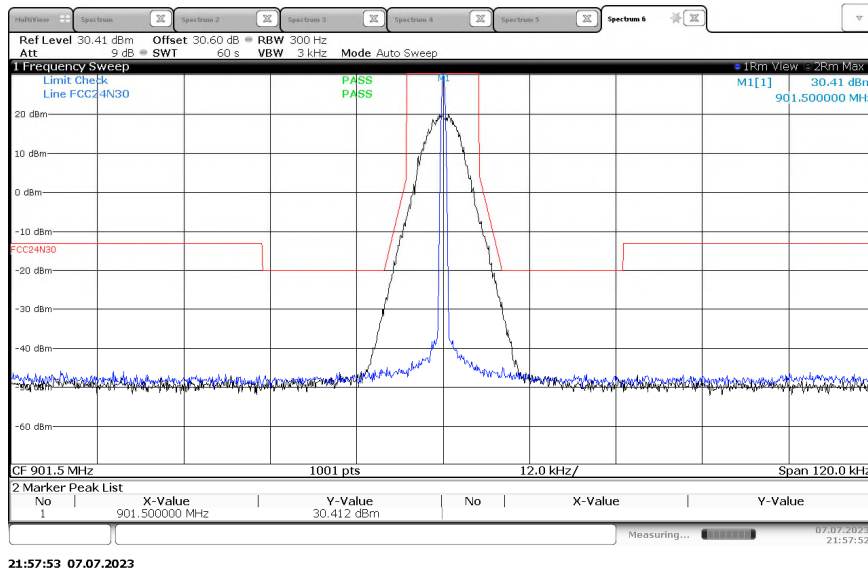


Figure 2.2.6-11 - Emissions Mask – KDS TCXO – 901.5 MHz - 12.5 kHz Channel Spacing - 8FSK (Half Baud) Mode

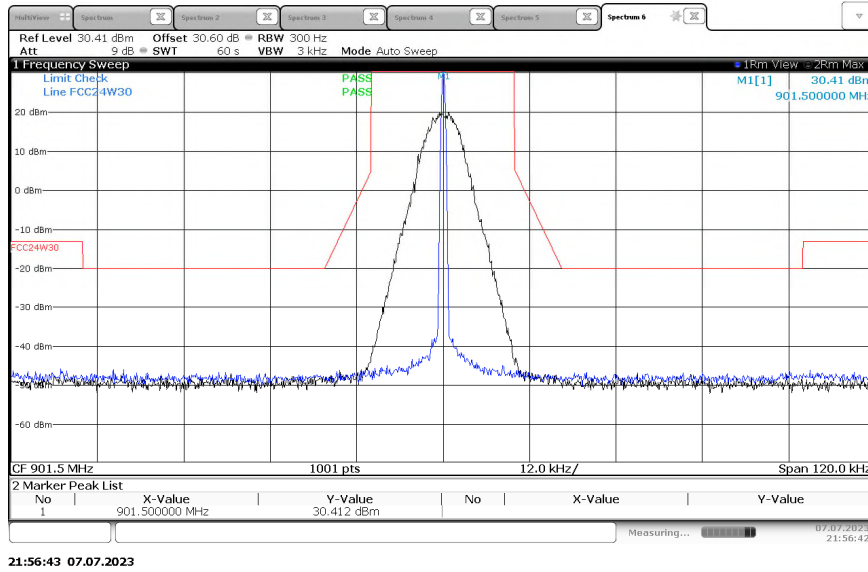


Figure 2.2.6-12 - Emissions Mask – KDS TCXO – 901.5 MHz - 25 kHz Channel Spacing- 8FSK (Half Baud) Mode

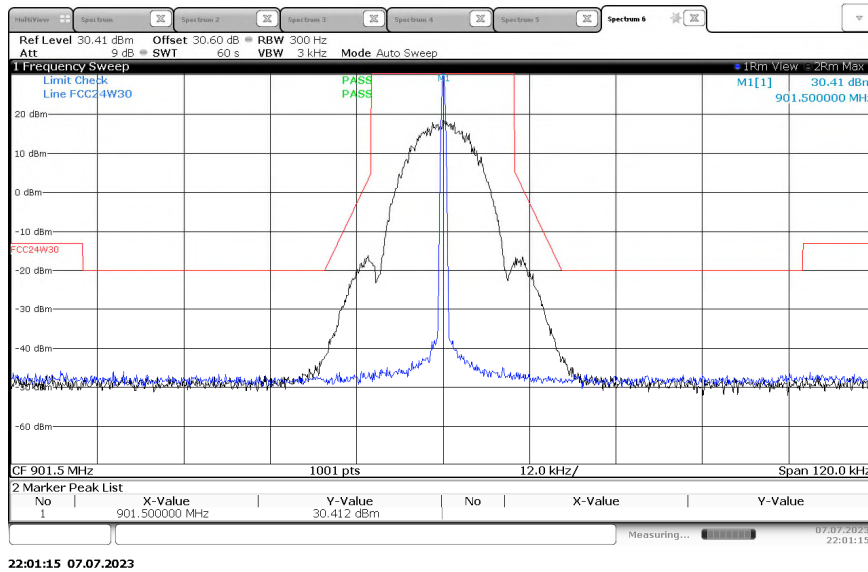


Figure 2.2.6-13 - Emissions Mask – KDS TCXO – 901.5 MHz - 25 kHz Channel Spacing- 2FSK Mode

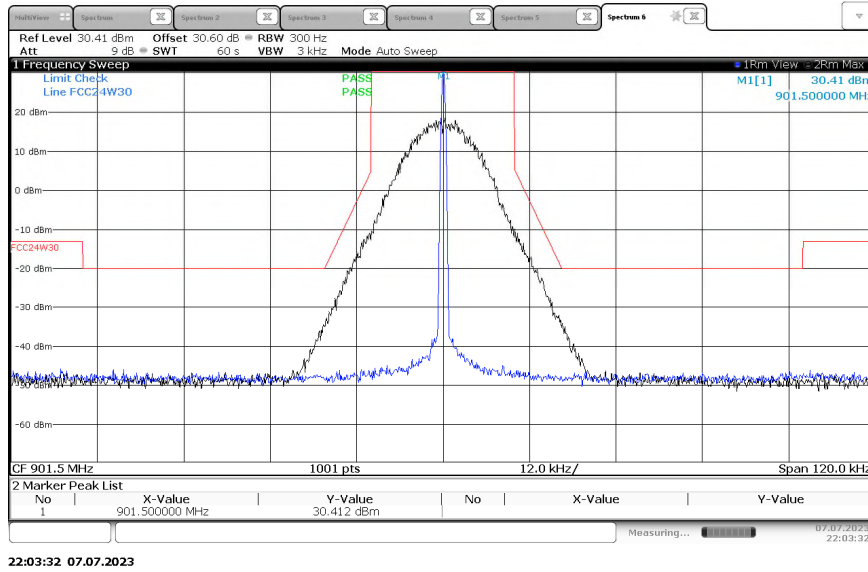


Figure 2.2.6-14 - Emissions Mask – KDS TCXO – 901.5 MHz - 25 kHz Channel Spacing- 4FSK Mode

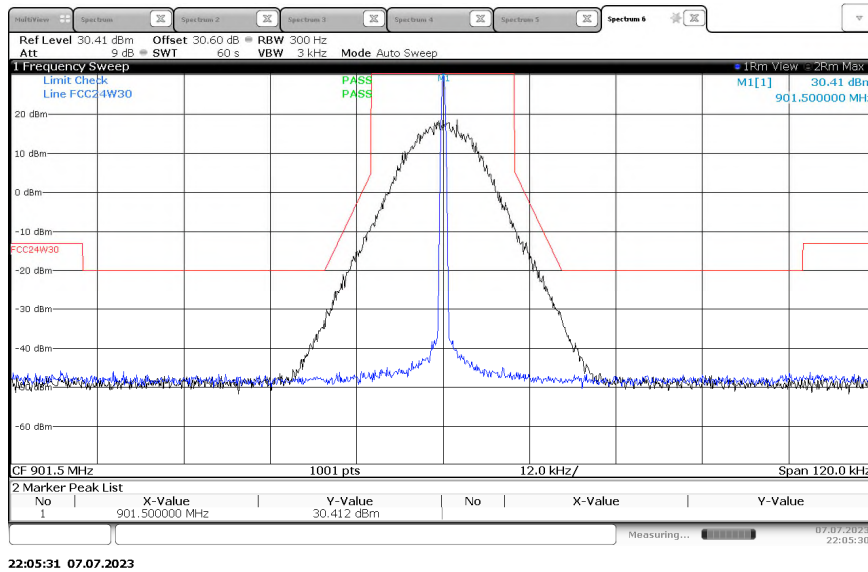


Figure 2.2.6-15 - Emissions Mask – KDS TCXO – 901.5 MHz - 25 kHz Channel Spacing- 8FSK Mode



FCC 47 CFR Parts: 2.1051; 101.111 a(5), a(6); ISED Canada RSS-119 5.8.6

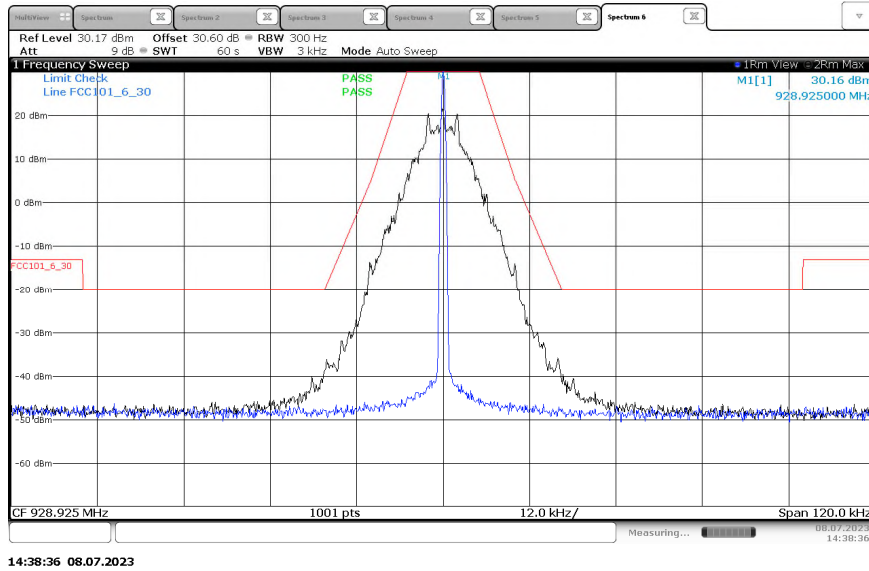


Figure 2.2.6-16 - Emissions Mask – KDS TCXO – 928.925 MHz - 25 kHz Channel Spacing- Normal Mode

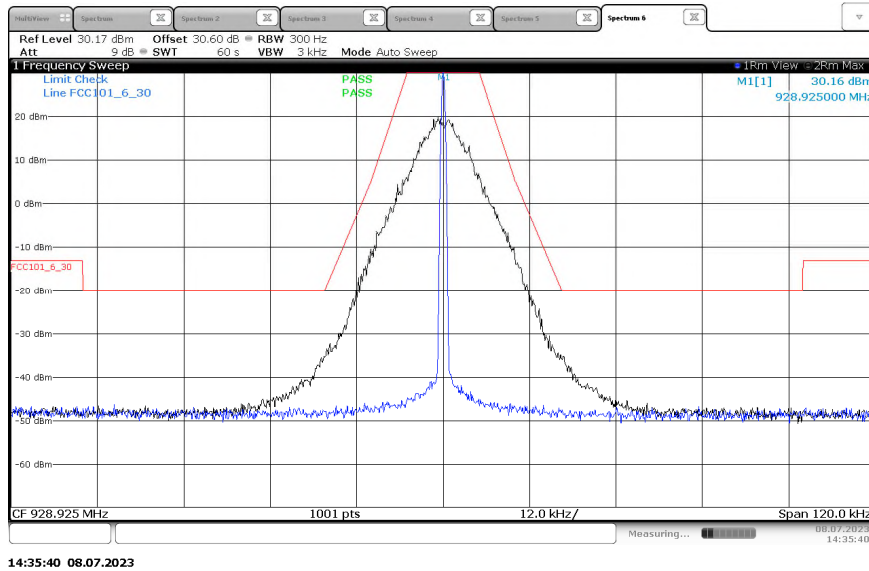


Figure 2.2.6-17 - Emissions Mask – KDS TCXO – 928.925 MHz - 25 kHz Channel Spacing- Double Density Mode





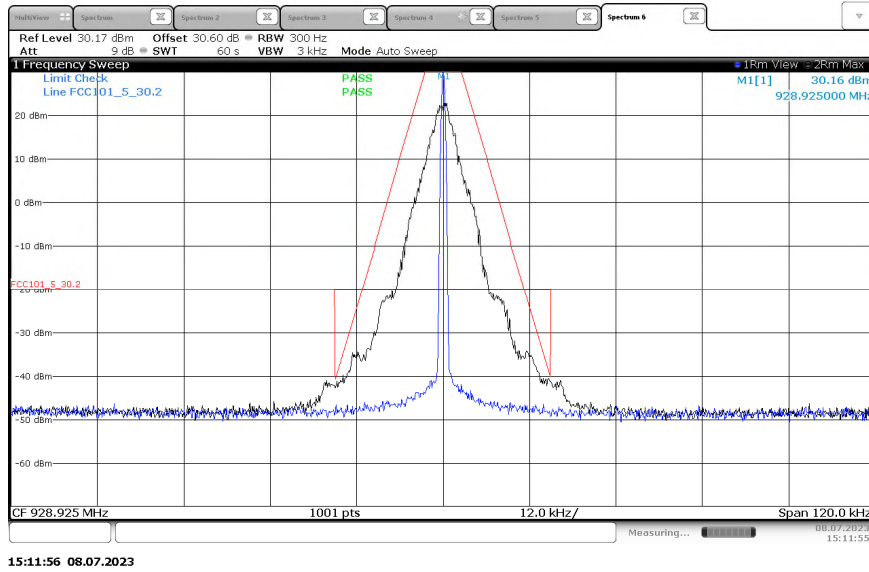


Figure 2.2.6-20 - Emissions Mask – KDS TCXO – 928.925 MHz - 12.5 kHz Channel Spacing - Priority Mode

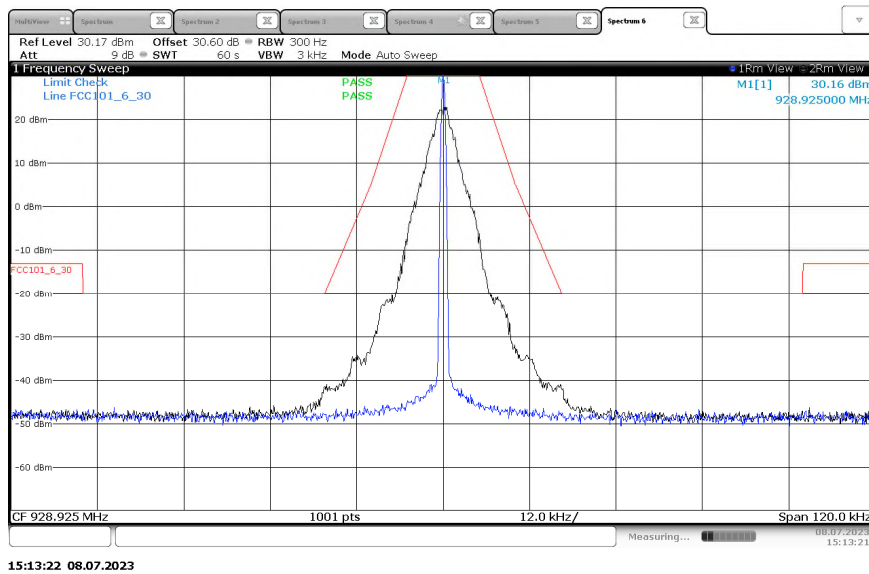


Figure 2.2.6-21 - Emissions Mask – KDS TCXO – 928.925 MHz - 25 kHz Channel Spacing- Priority Mode

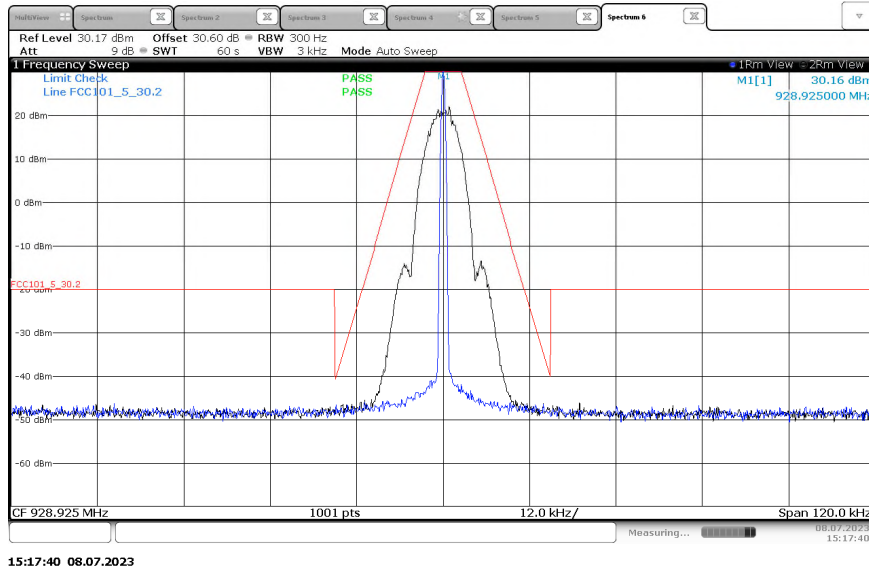


Figure 2.2.6-22 - Emissions Mask – KDS TCXO – 928.925 MHz - 12.5 kHz Channel Spacing - 2SFSK (Half Baud) Mode

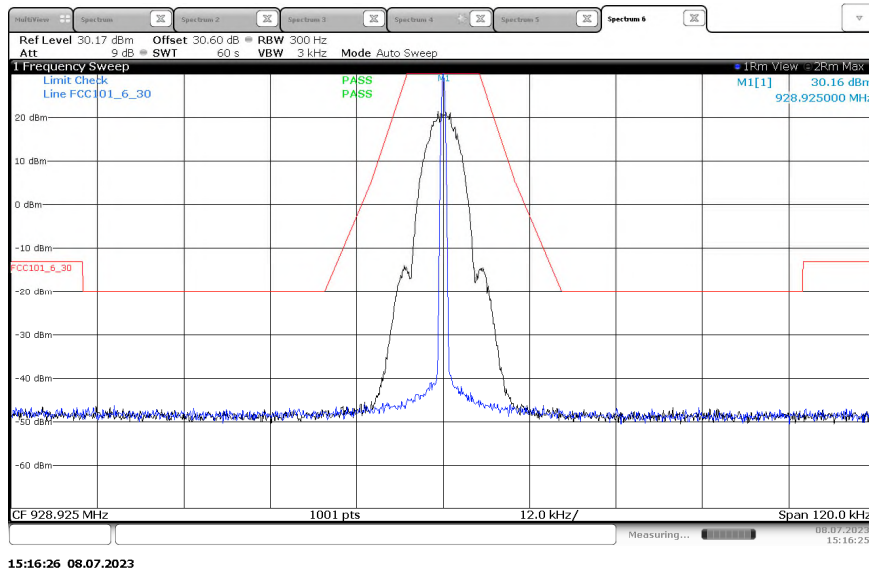


Figure 2.2.6-23 - Emissions Mask – KDS TCXO – 928.925 MHz - 25 kHz Channel Spacing- 2SFSK (Half Baud) Mode

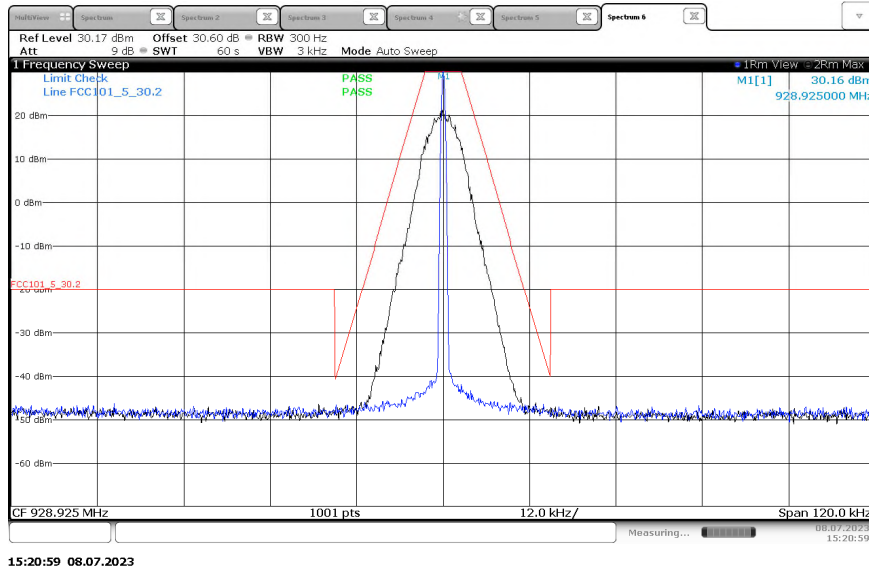


Figure 2.2.6-24 - Emissions Mask – KDS TCXO – 928.925 MHz - 12.5 kHz Channel Spacing - 4FSK (Half Baud) Mode

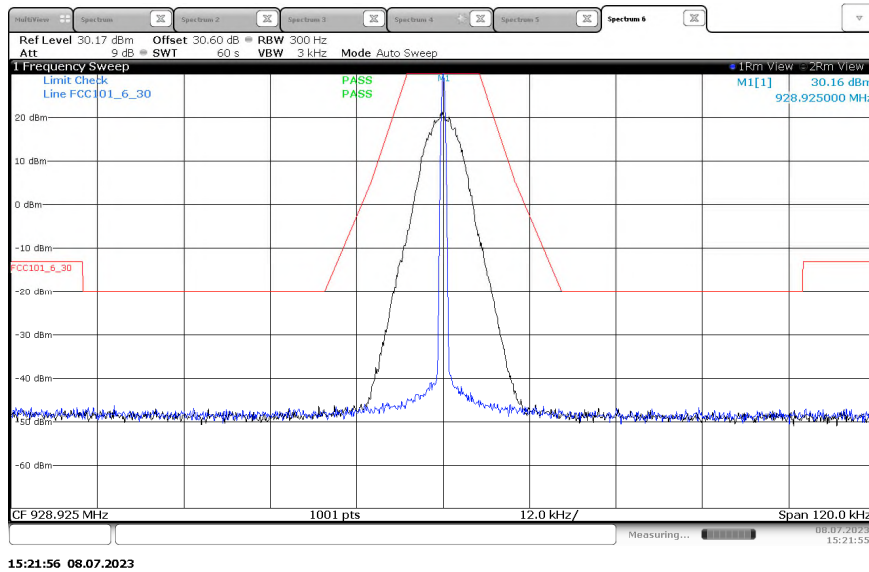


Figure 2.2.6-25 - Emissions Mask – KDS TCXO – 928.925 MHz - 25 kHz Channel Spacing- 4FSK (Half Baud) Mode

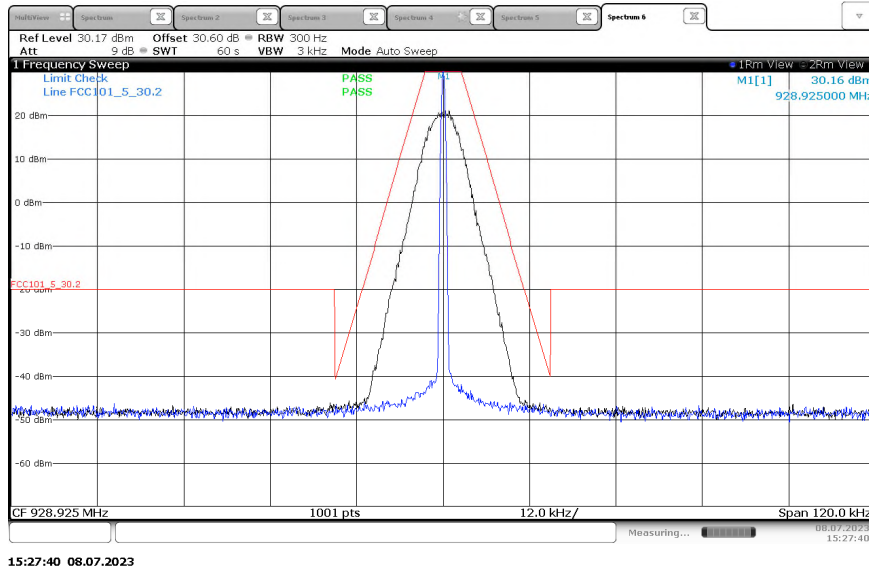


Figure 2.2.6-26 - Emissions Mask – KDS TCXO – 928.925 MHz - 12.5 kHz Channel Spacing - 8FSK (Half Baud) Mode

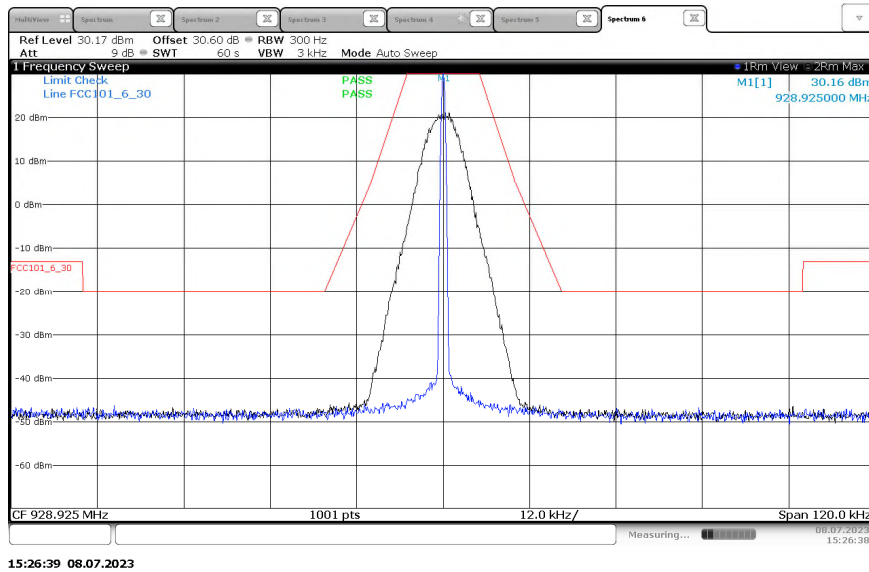


Figure 2.2.6-27 - Emissions Mask – KDS TCXO – 928.925 MHz - 25 kHz Channel Spacing- 8FSK (Half Baud) Mode

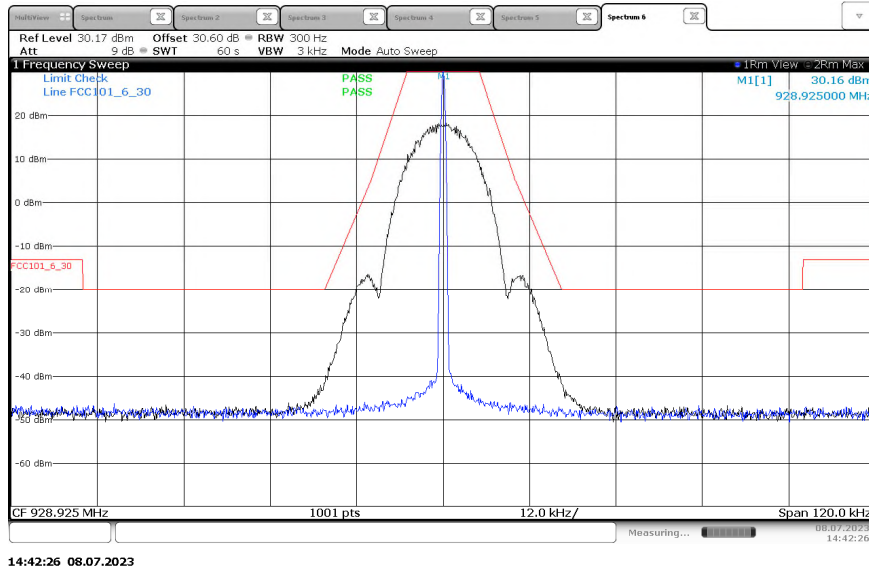


Figure 2.2.6-28 - Emissions Mask – KDS TCXO – 928.925 MHz - 25 kHz Channel Spacing- 2FSK Mode

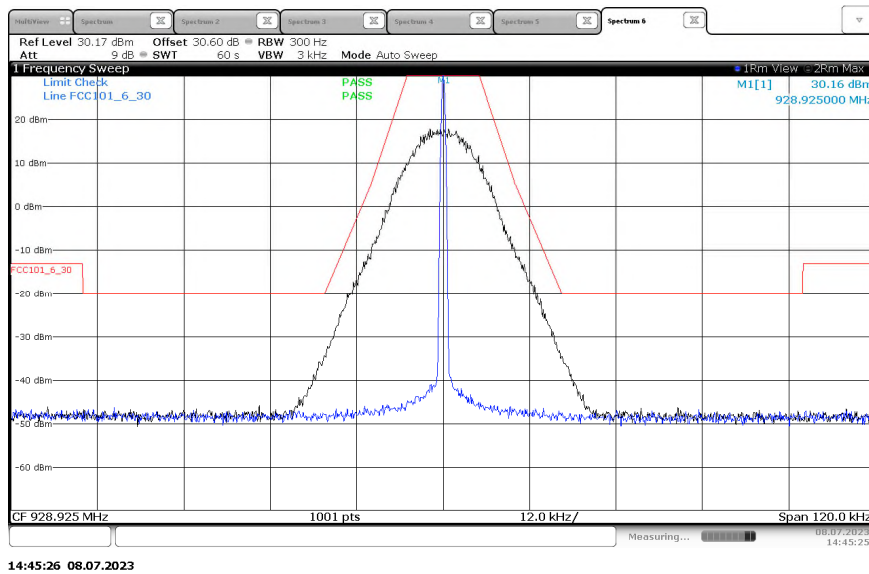


Figure 2.2.6-29 - Emissions Mask – KDS TCXO – 928.925 MHz - 25 kHz Channel Spacing- 4FSK Mode

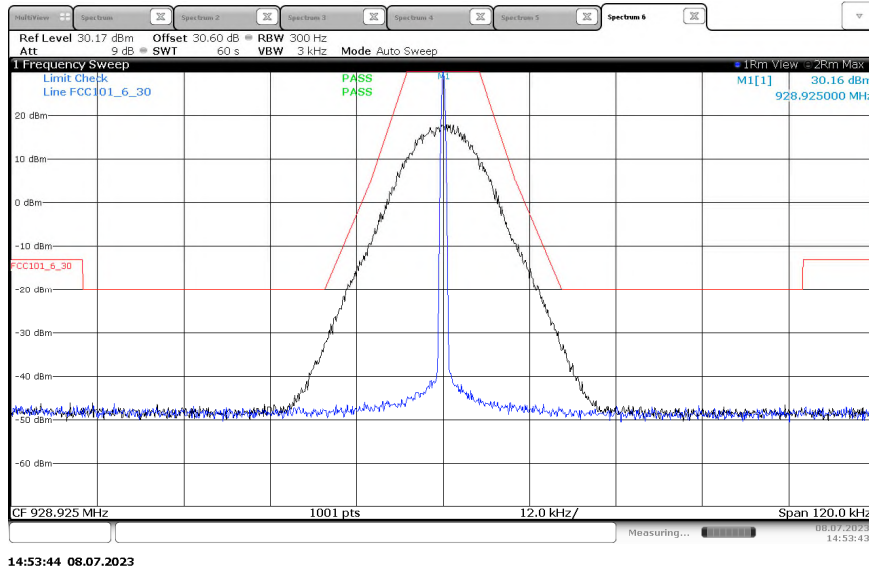


Figure 2.2.6-30 - Emissions Mask – KDS TCXO – 928.925 MHz - 25 kHz Channel Spacing- 8FSK Mode



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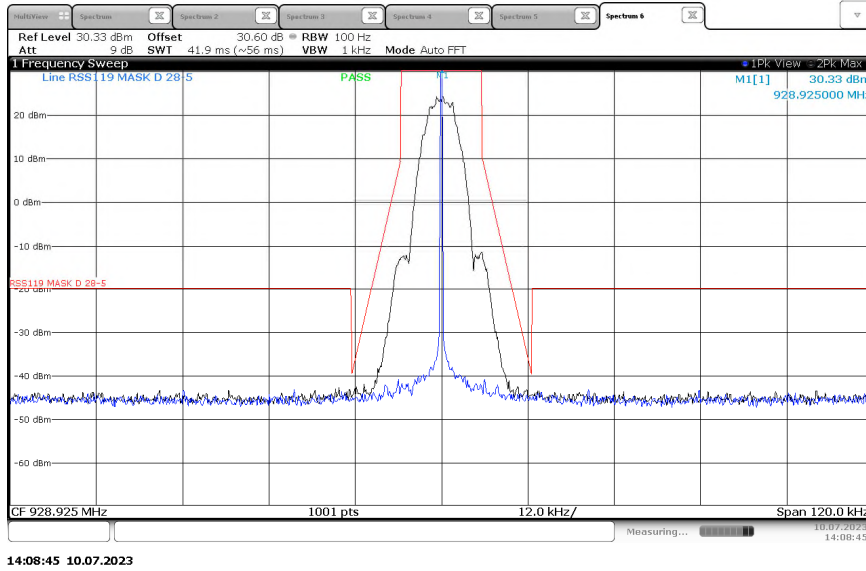


Figure 2.2.6-31 - Emissions Mask – KDS TCXO – 928.925 MHz - 12.5 kHz Channel Spacing - 2FSK (Half Baud) Mode

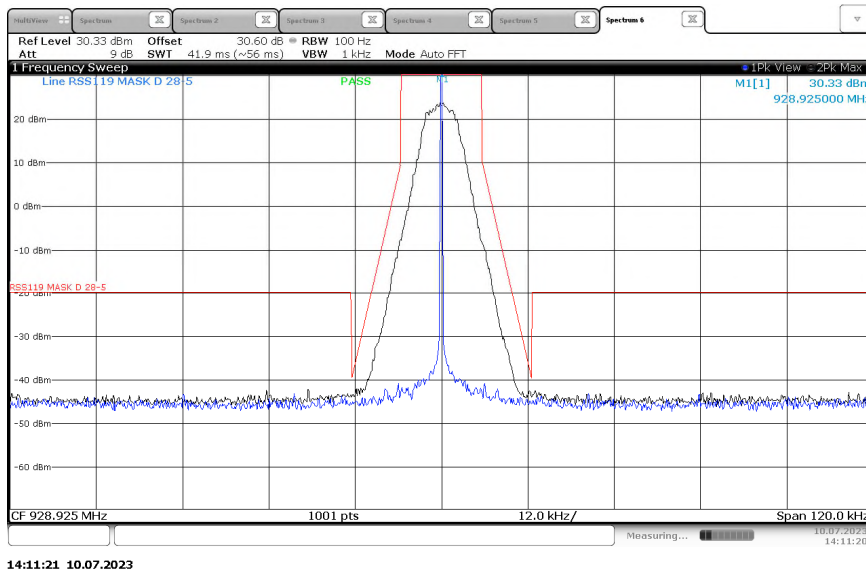


Figure 2.2.6-32 - Emissions Mask – KDS TCXO – 928.925 MHz - 12.5 kHz Channel Spacing - 4FSK (Half Baud) Mode

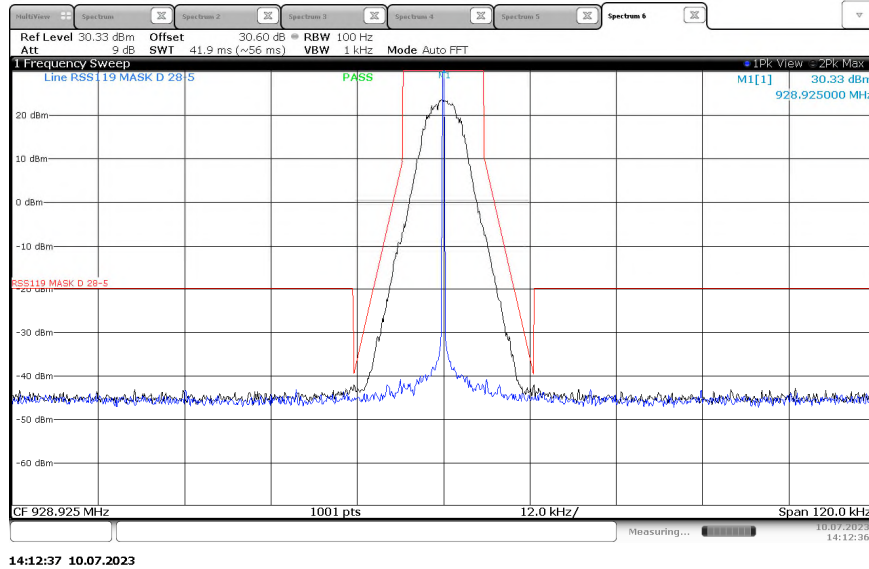


Figure 2.2.6-33 - Emissions Mask – KDS TCXO – 928.925 MHz - 12.5 kHz Channel Spacing - 8FSK (Half Baud) Mode

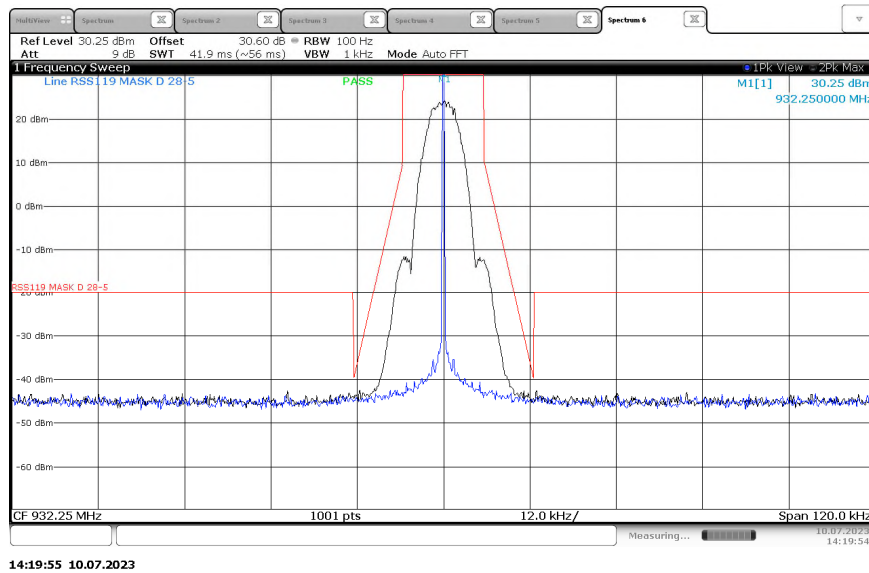


Figure 2.2.6-34 - Emissions Mask – KDS TCXO – 932.25 MHz - 12.5 kHz Channel Spacing - 2FSK (Half Baud) Mode



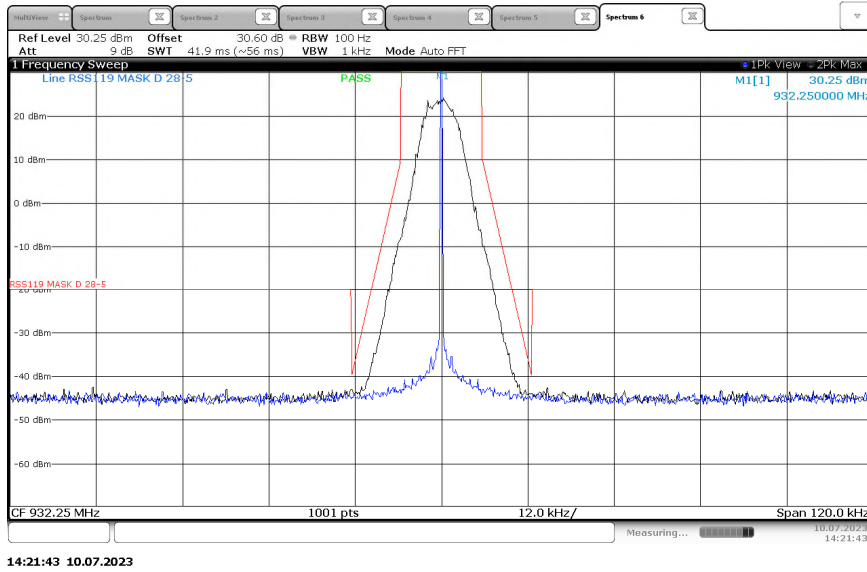


Figure 2.2.6-35 - Emissions Mask – KDS TCXO – 932.25 MHz - 12.5 kHz Channel Spacing - 4FSK (Half Baud) Mode

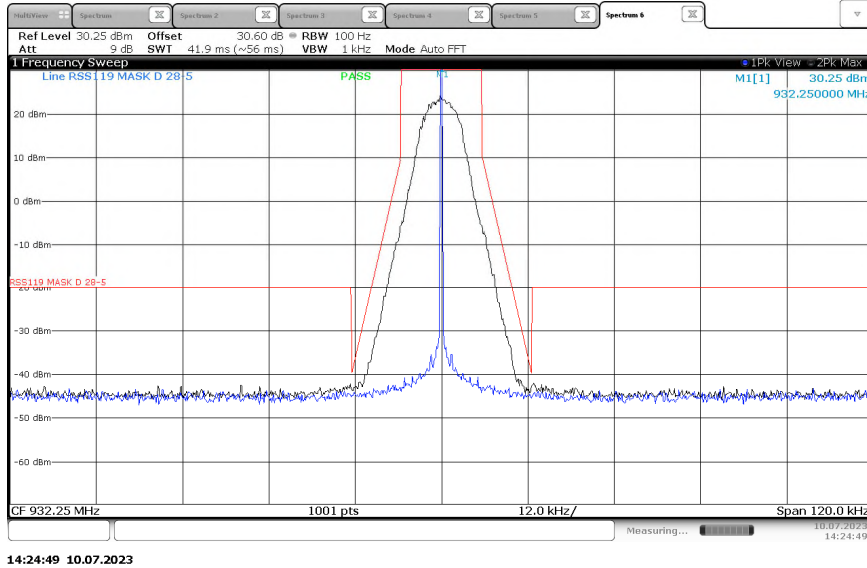


Figure 2.2.6-36 - Emissions Mask – KDS TCXO – 932.25 MHz - 12.5 kHz Channel Spacing - 8FSK (Half Baud) Mode

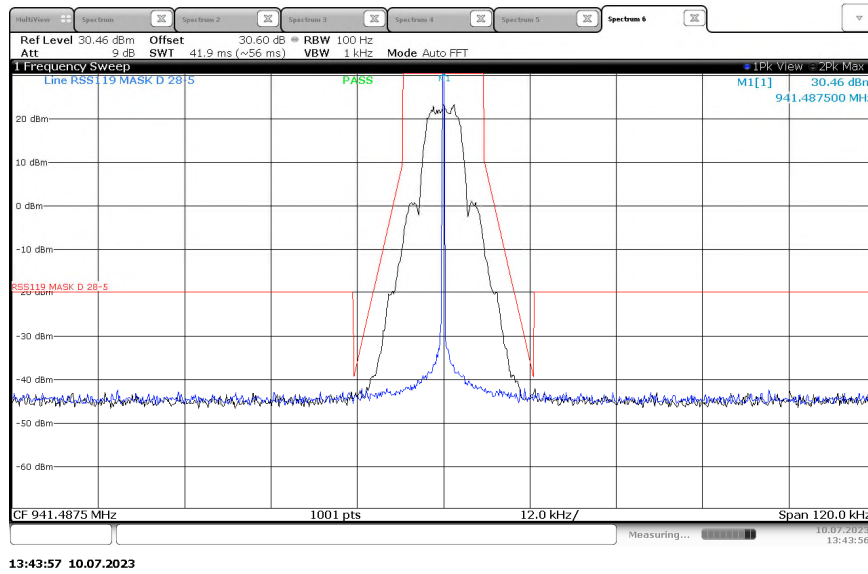


Figure 2.2.6-37 - Emissions Mask – KDS TCXO – 941.4875 MHz - 12.5 kHz Channel Spacing - mPass5k Mode

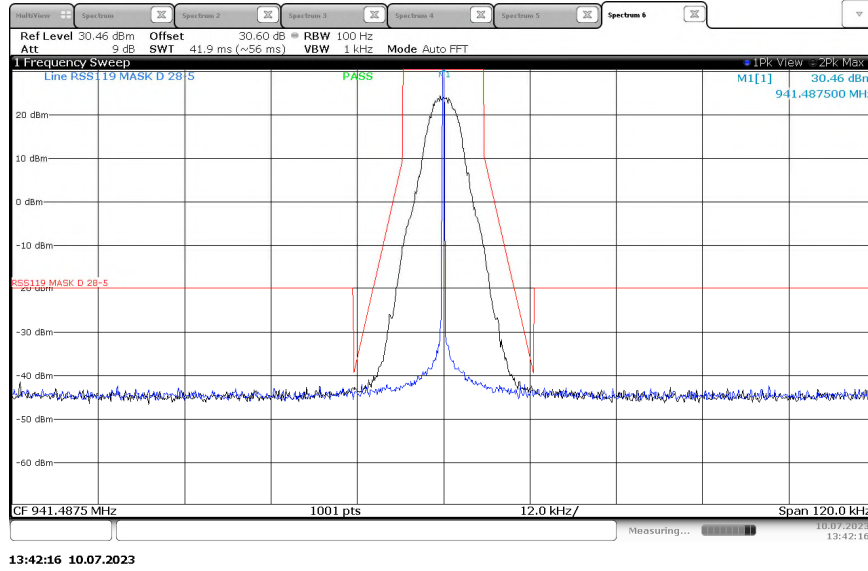


Figure 2.2.6-38 - Emissions Mask – KDS TCXO – 941.4875 MHz - 12.5 kHz Channel Spacing - m4Pass10 Mode

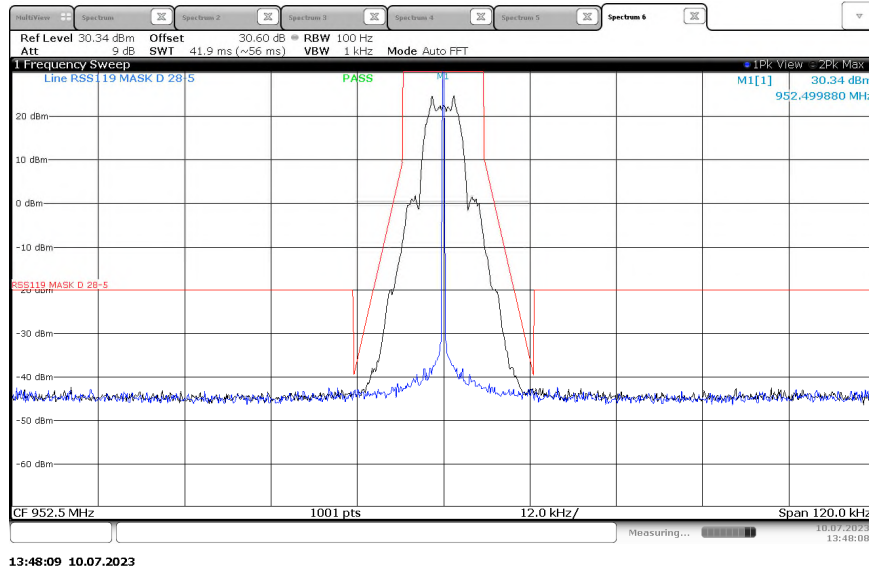


Figure 2.2.6-39 - Emissions Mask – KDS TCXO – 952.5 MHz - 12.5 kHz Channel Spacing - mPass5k Mode

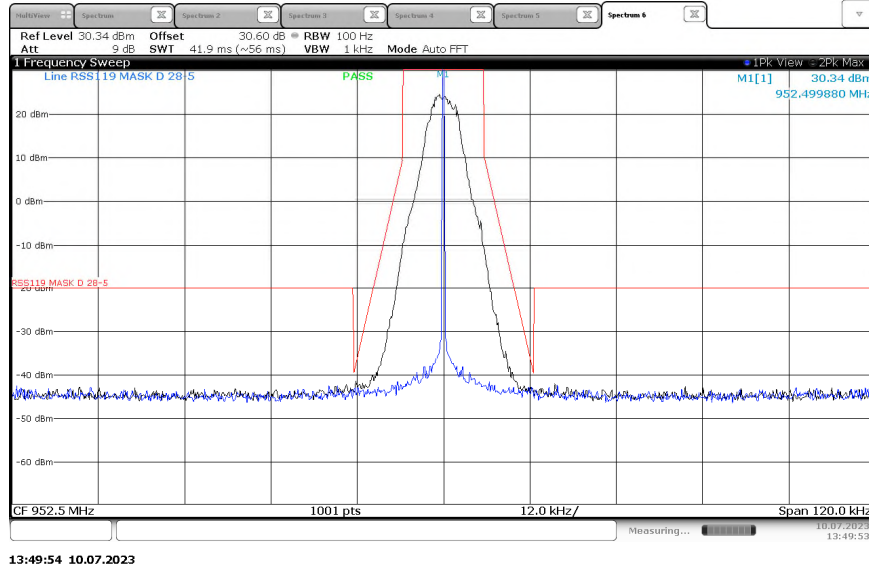


Figure 2.2.6-40 - Emissions Mask – KDS TCXO – 952.5 MHz - 12.5 kHz Channel Spacing - m4Pass10 Mode

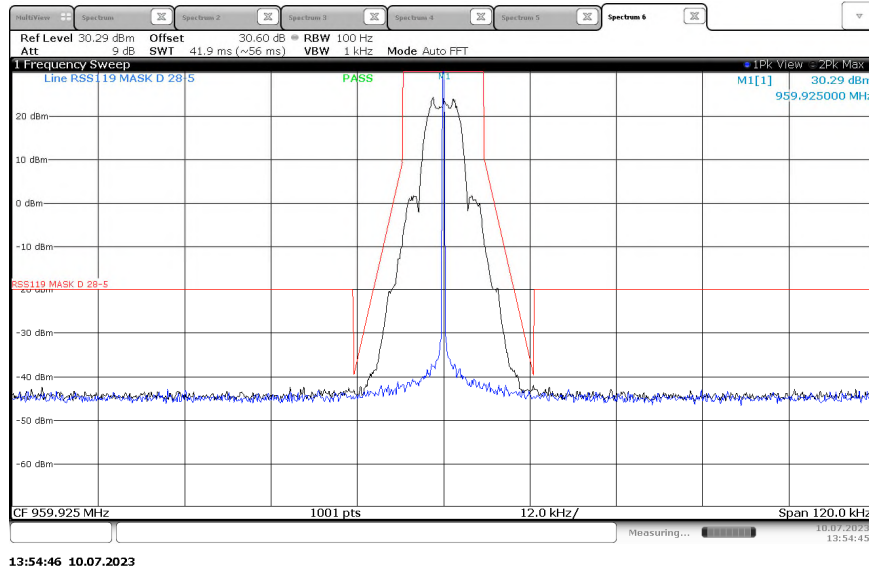


Figure 2.2.6-41 - Emissions Mask – KDS TCXO – 959.925 MHz - 12.5 kHz Channel Spacing - mPass5k Mode

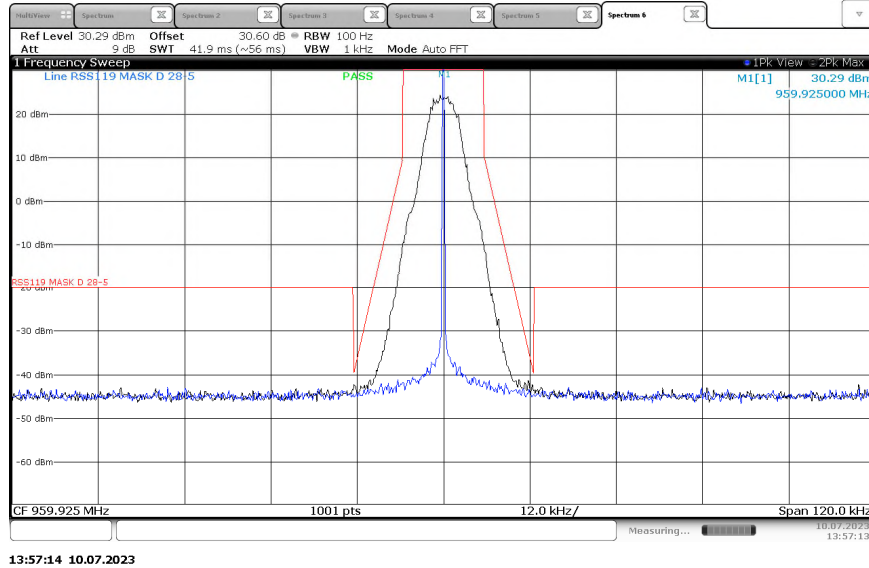


Figure 2.2.6-42 - Emissions Mask – KDS TCXO – 959.925 MHz - 12.5 kHz Channel Spacing - m4Pass10 Mode



**2.2.7 Test Location and Test Equipment Used**

This test was carried out in TÜV SÜD America, Inc., 5610 W. Sligh Ave, Suite 100, Tampa, FL 33634, USA.

Instrument	Manufacturer	Type No	TE No	Software / Firmware Revision	Calibration Period (months)	Calibration Due
Digital MultiMeter	Fluke	115	BEMC02108	N/A	12	25-Jan-2024
Duratest 175 Cable 26.5GHz	Teledyne Storm Products	921-0101-036	BEMC02112	N/A	12	12-Oct-2023
Signal & Spectrum Analyzer	Rohde & Schwarz	FSW43	DEMC3085	2.90 SP1	12	08-Jun-2024
DC Power Supply	Xantrex	XHR60-18	TEMC00001	N/A	N/A	NCR
30 dB Fixed Attenuator	Mini-Circuits	BW-S30W5+	TEMC00264	N/A	12	15-Apr-2024

TU - Traceability Unscheduled  
 O/P MON - Output Monitored with Calibrated Equipment  
 N/A - Not Applicable  
 NCR – No Calibration Required



## **2.3 Occupied Bandwidth**

### **2.3.1 Specification Reference**

FCC Section 2.1049; ISED Canada RSS-GEN 6.7

### **2.3.2 Equipment Under Test and Modification State**

KDS TCXO, SN: 825545076715755

### **2.3.3 Date of Test**

2023-June-30 to 2023-July-06

### **2.3.4 Test Method**

The RF output of the equipment under test was directly connected to the input of the Spectrum Analyzer through suitable of passive attenuation. The internal correction factors of the spectrum analyzer were employed to correct for any cable and attenuator losses.

The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts. The nominal IF filter 3 dB bandwidth (RBW) is in the range of 1% to 5% of the OBW, and the VBW was set  $\geq 3 \times$  RBW. The reference level was set to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. The measurements were made using the spectrum analyzer's 99% BW function.

### **2.3.5 Environmental Conditions**

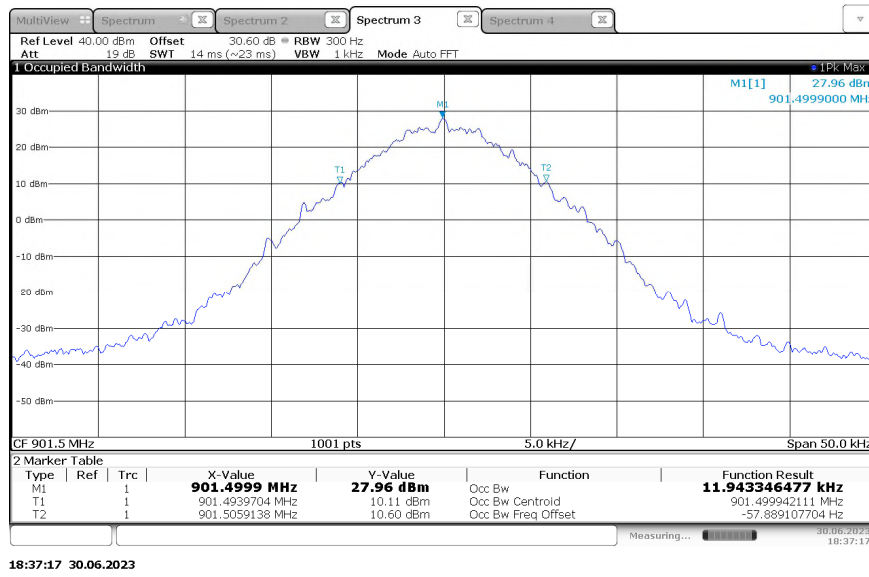
Ambient Temperature	27.1 °C
Relative Humidity	36.7 %
Atmospheric Pressure	1013.3 mbar

### **2.3.6 Test Results**



**Table 2.3.6-1 - 99% Bandwidth – KDS TCXO – 901.5 MHz**

Frequency (MHz)	ISED Canada Rule Part	Mode	99% Bandwidth (kHz)
901.5	RSS-134	Normal	11.943
901.5	RSS-134	DD	14.307
901.5	RSS-134	C&I	6.187
901.5	RSS-134	Priority	7.164
901.5	RSS-134	2SFSK-HB	5.957
901.5	RSS-134	4SFSK-HB	6.955
901.5	RSS-134	8SFSK-HB	7.329
901.5	RSS-134	2SFSK	11.870
901.5	RSS-134	4SFSK	13.994
901.5	RSS-134	8SFSK	14.798



**Figure 2.3.6-1 - 99% Bandwidth – KDS TCXO – 901.5 MHz - Normal Mode**

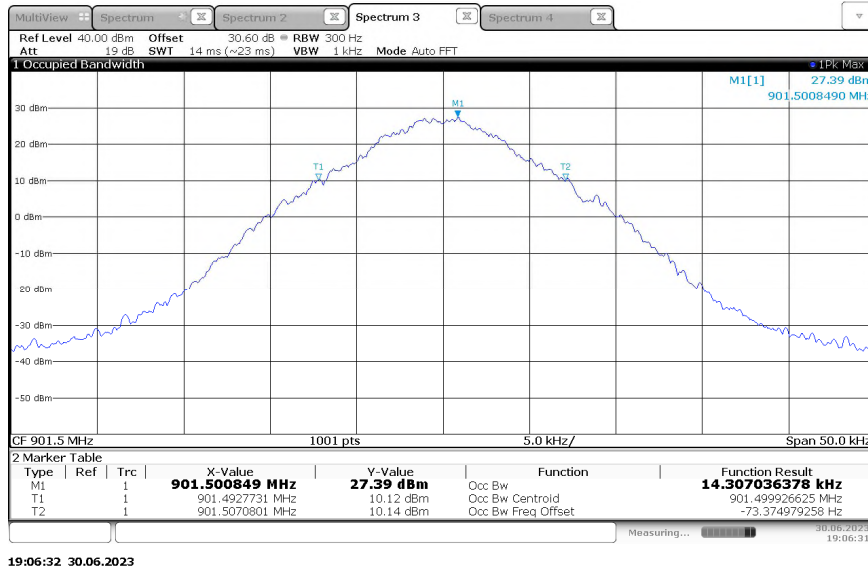


Figure 2.3.6-2 - 99% Bandwidth – KDS TCXO – 901.5 MHz - Double Density Mode

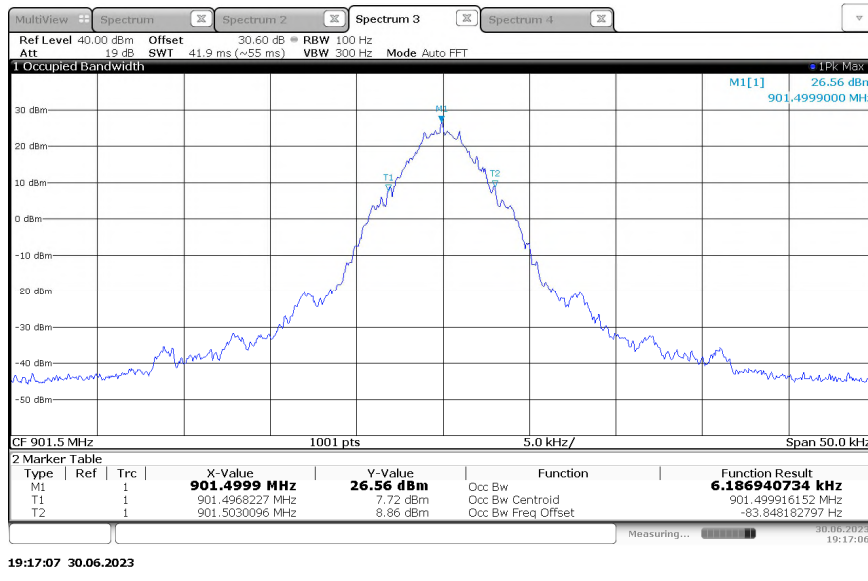


Figure 2.3.6-3 - 99% Bandwidth – KDS TCXO – 901.5 MHz - C&I Mode



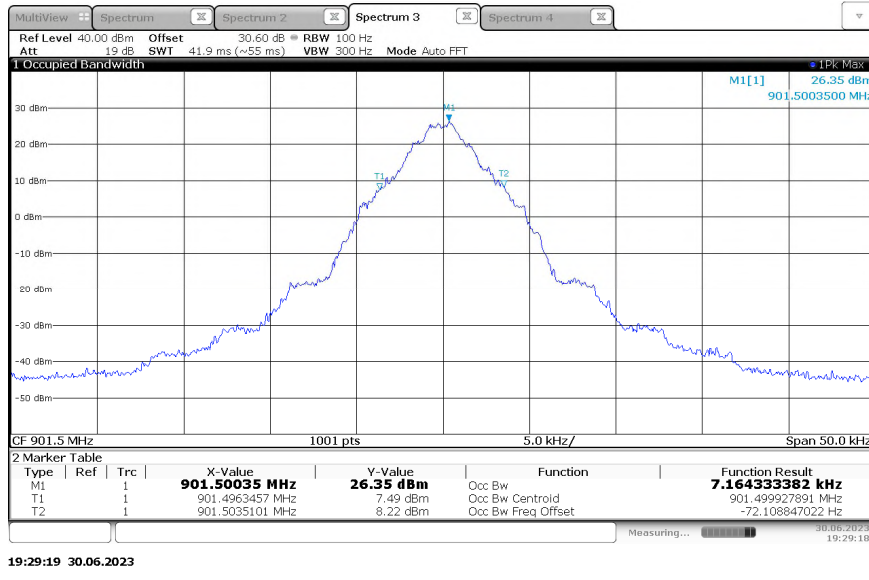


Figure 2.3.6-4 - 99% Bandwidth – KDS TCXO – 901.5 MHz - Priority Mode

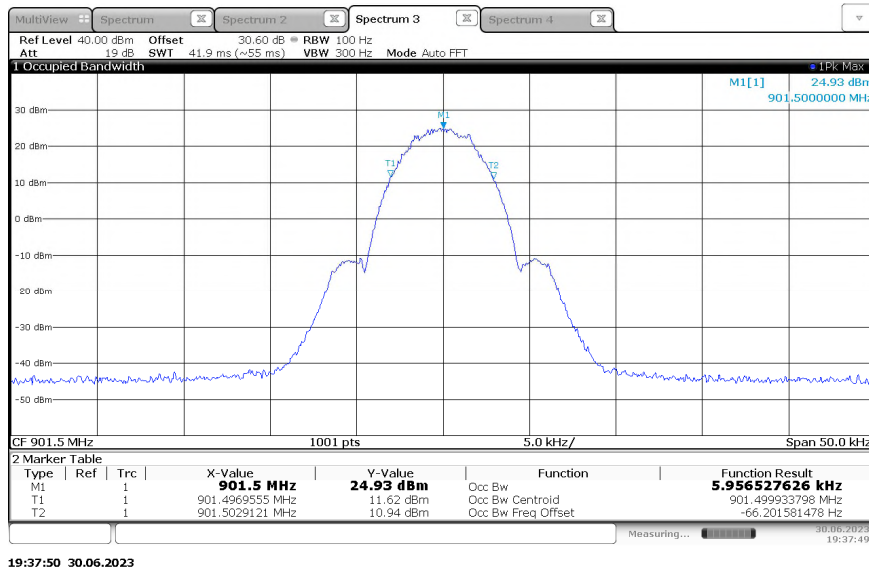


Figure 2.3.6-5 - 99% Bandwidth – KDS TCXO – 901.5 MHz - 2FSK (Half Baud) Mode

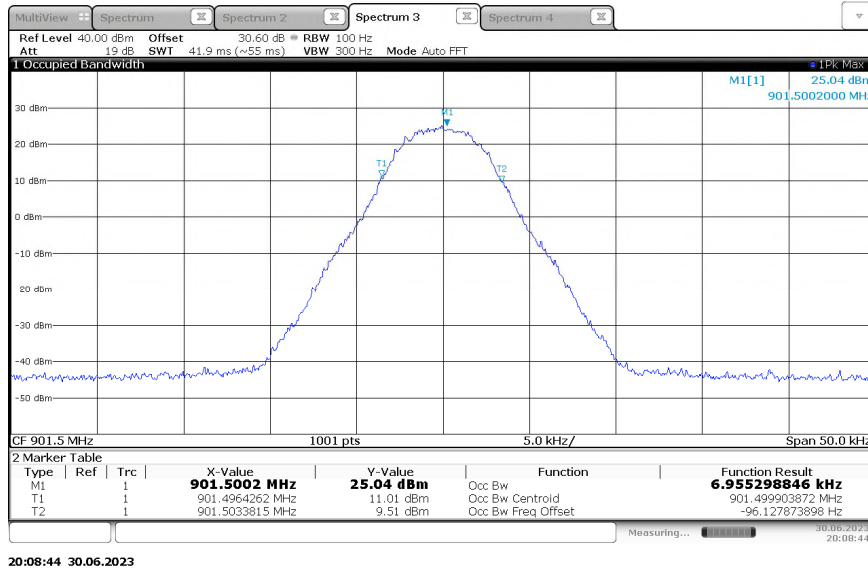


Figure 2.3.6-6 - 99% Bandwidth – KDS TCXO – 901.5 MHz - 4FSK (Half Baud) Mode

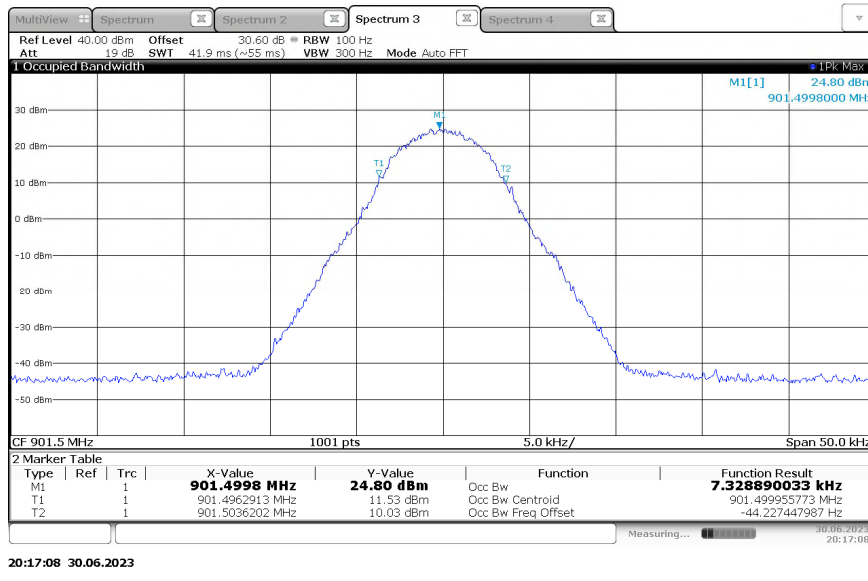


Figure 2.3.6-7 - 99% Bandwidth – KDS TCXO – 901.5 MHz - 8FSK (Half Baud) Mode

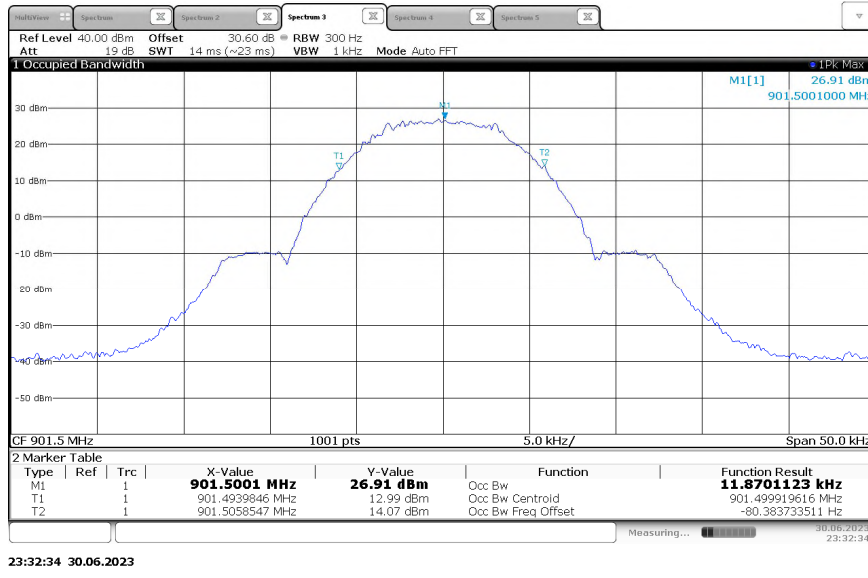


Figure 2.3.6-8 - 99% Bandwidth – KDS TCXO – 901.5 MHz - 2SFSK Mode

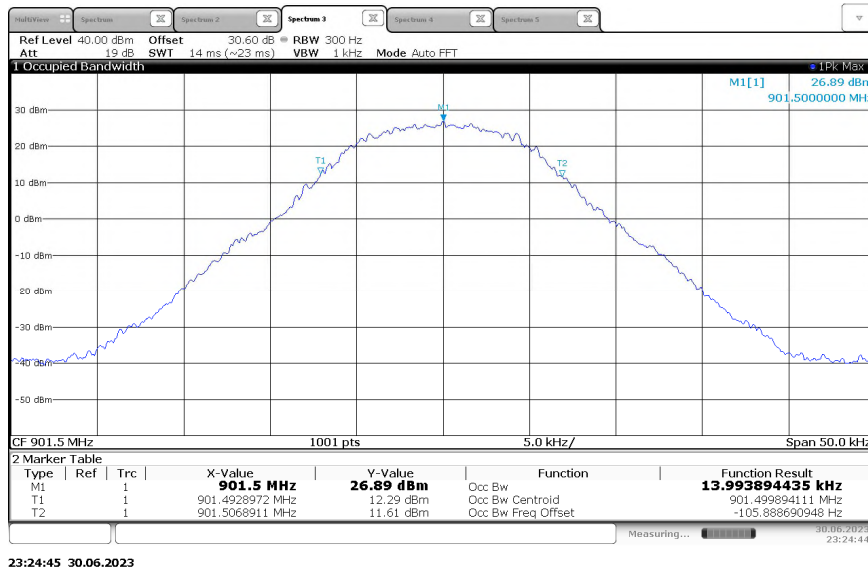


Figure 2.3.6-9 - 99% Bandwidth – KDS TCXO – 901.5 MHz - 4SFSK Mode

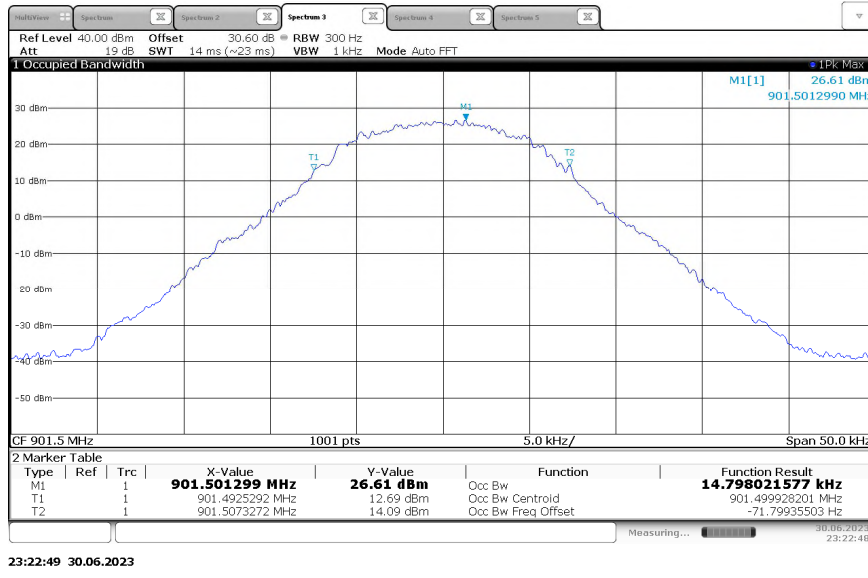


Figure 2.3.6-10 - 99% Bandwidth – KDS TCXO – 901.5 MHz - 8FSK Mode

Table 2.3.6-2 - 99% Bandwidth – KDS TCXO – 928.925 MHz

Frequency (MHz)	ISED Canada Rule Part	Mode	99% Bandwidth (kHz)
928.925	RSS-119	Normal	11.945
928.925	RSS-119	DD	14.450
928.925	RSS-119	C&I	6.132
928.925	RSS-119	Priority	7.068
928.925	RSS-119	2SFSK-HB	5.936
928.925	RSS-119	4SFSK-HB	6.973
928.925	RSS-119	8SFSK-HB	7.281
928.925	RSS-119	2SFSK	11.872
928.925	RSS-119	4SFSK	14.017
928.925	RSS-119	8SFSK	14.748

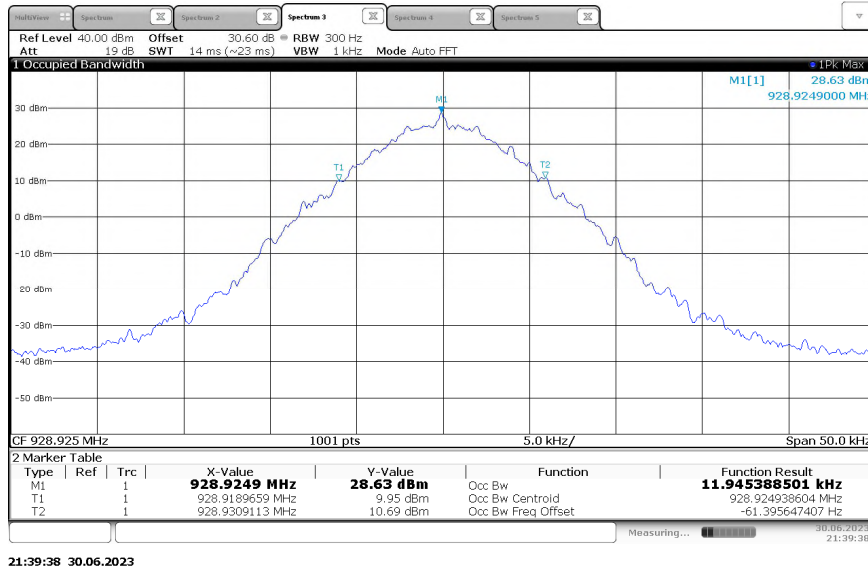


Figure 2.3.6-11 - 99% Bandwidth – KDS TCXO – 928.925 MHz - Normal Mode

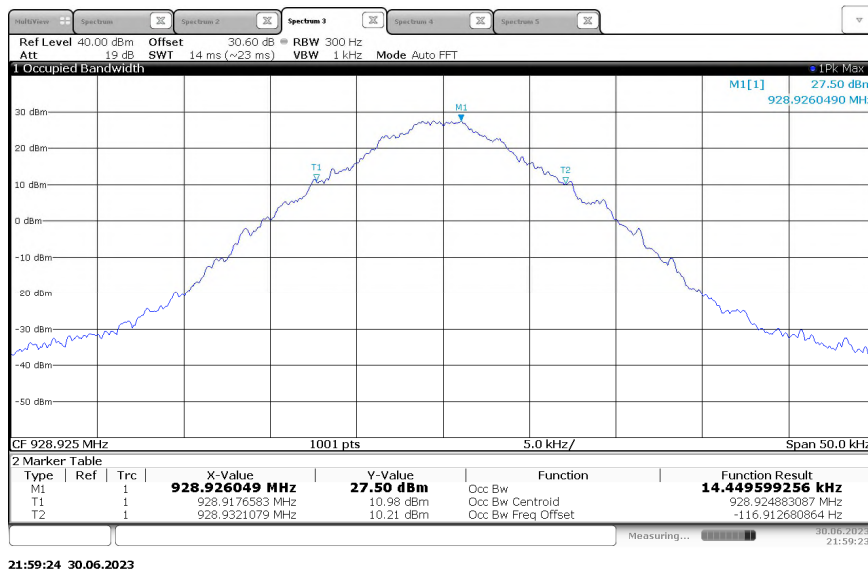


Figure 2.3.6-12 - 99% Bandwidth – KDS TCXO – 928.925 MHz - Double Density Mode

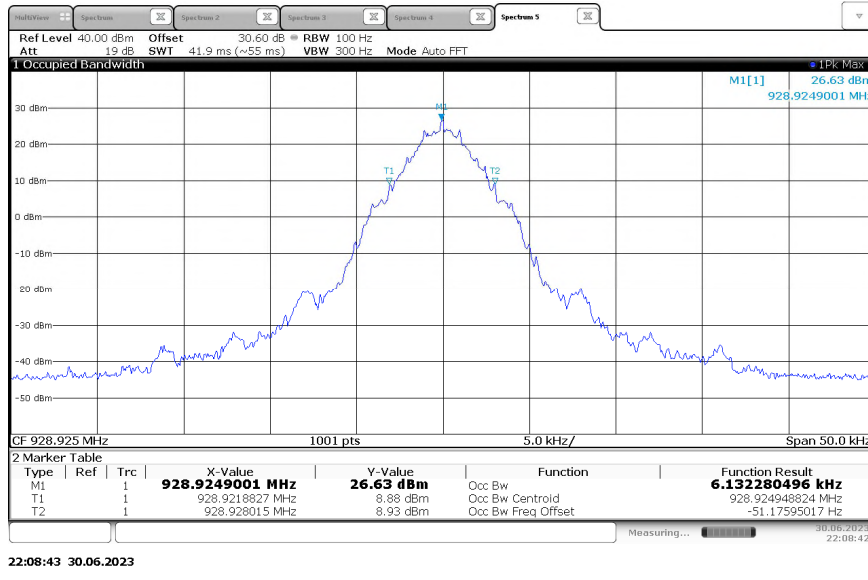


Figure 2.3.6-13 - 99% Bandwidth – KDS TCXO – 928.925 MHz - C&I Mode

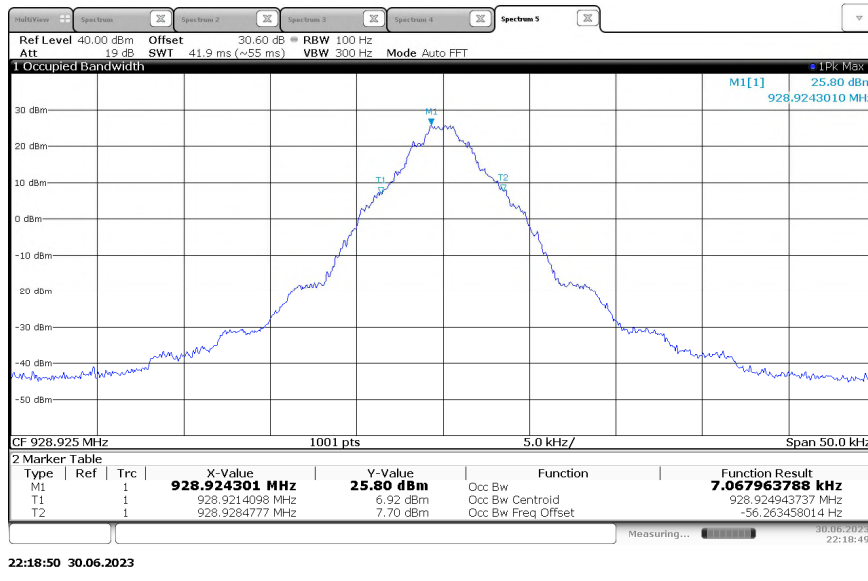


Figure 2.3.6-14 - 99% Bandwidth – KDS TCXO – 928.925 MHz - Priority Mode

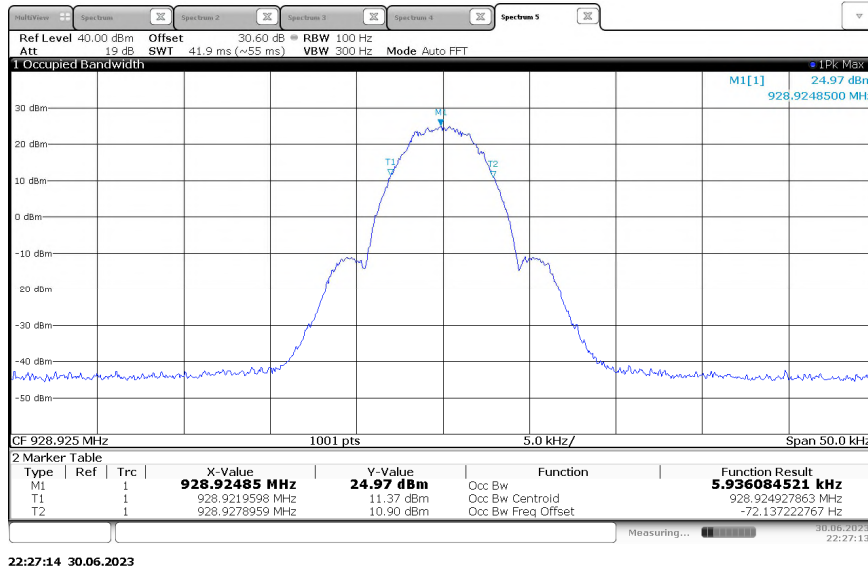


Figure 2.3.6-15 - 99% Bandwidth – KDS TCXO – 928.925 MHz - 2FSK (Half Baud) Mode

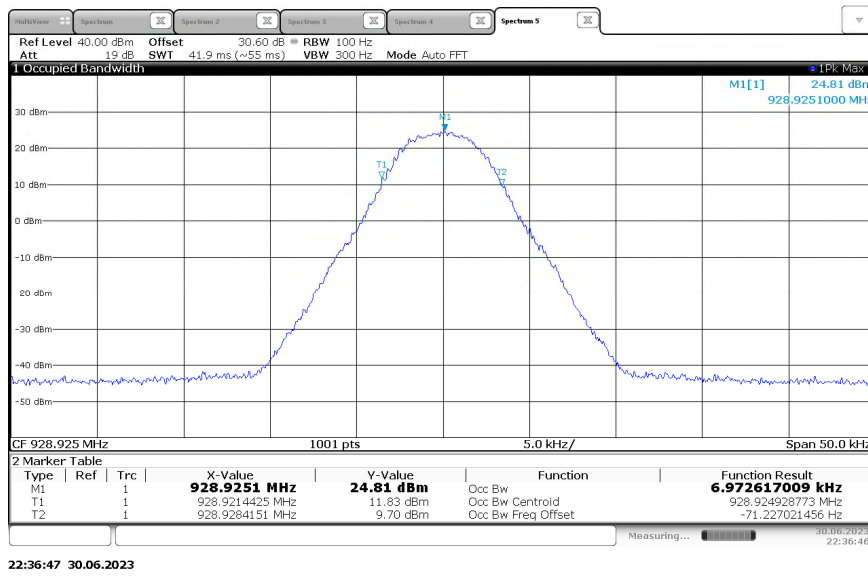


Figure 2.3.6-16 - 99% Bandwidth – KDS TCXO – 928.925 MHz - 4FSK (Half Baud) Mode

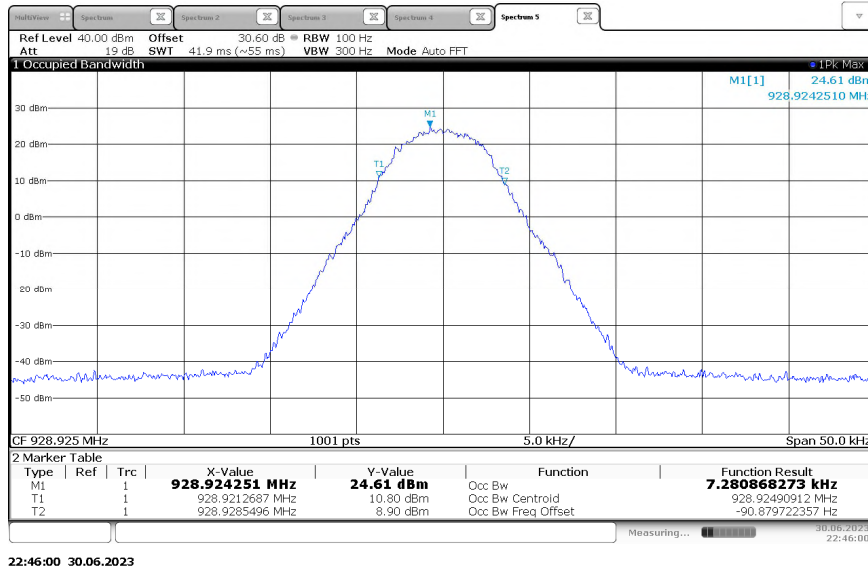


Figure 2.3.6-17 - 99% Bandwidth – KDS TCXO – 928.925 MHz - 8FSK (Half Baud) Mode



Figure 2.3.6-18 - 99% Bandwidth – KDS TCXO – 928.925 MHz - 2FSK Mode



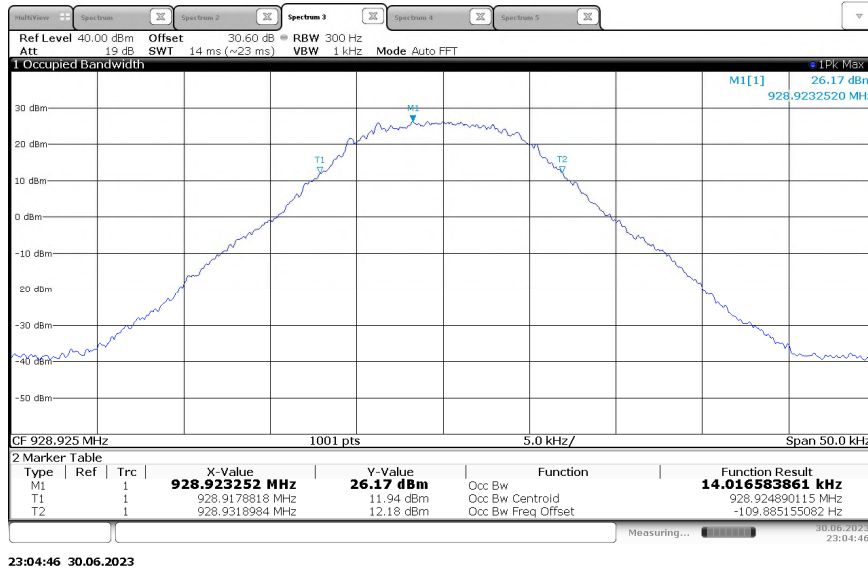


Figure 2.3.6-19 - 99% Bandwidth – KDS TCXO – 928.925 MHz - 4FSK Mode

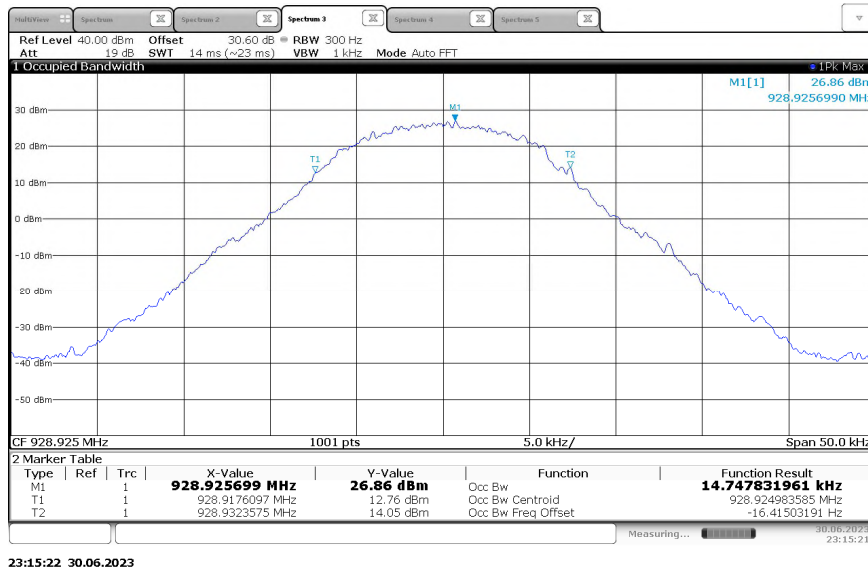
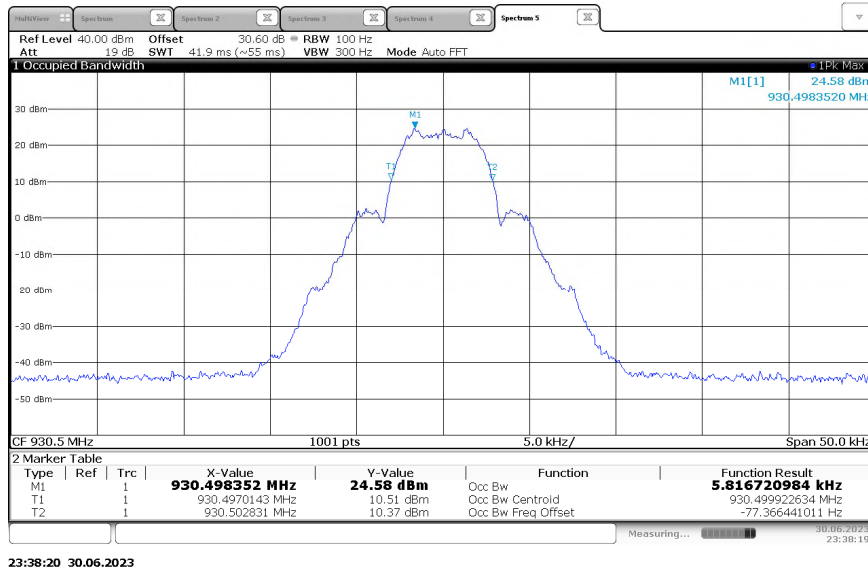


Figure 2.3.6-20 - 99% Bandwidth – KDS TCXO – 928.925 MHz - 8FSK Mode



**Table 2.3.6-3 - 99% Bandwidth – KDS TCXO – 930.5 MHz**

Frequency (MHz)	ISED Canada Rule Part	Mode	99% Bandwidth (kHz)
930.5	RSS-134	mPass5K	5.817
930.5	RSS-134	mPass10k	11.743
930.5	RSS-134	m4Pass10k	6.043
930.5	RSS-134	m4Pass20k	12.102



**Figure 2.3.6-21 - 99% Bandwidth – KDS TCXO – 930.5 MHz - mPass5k Mode**

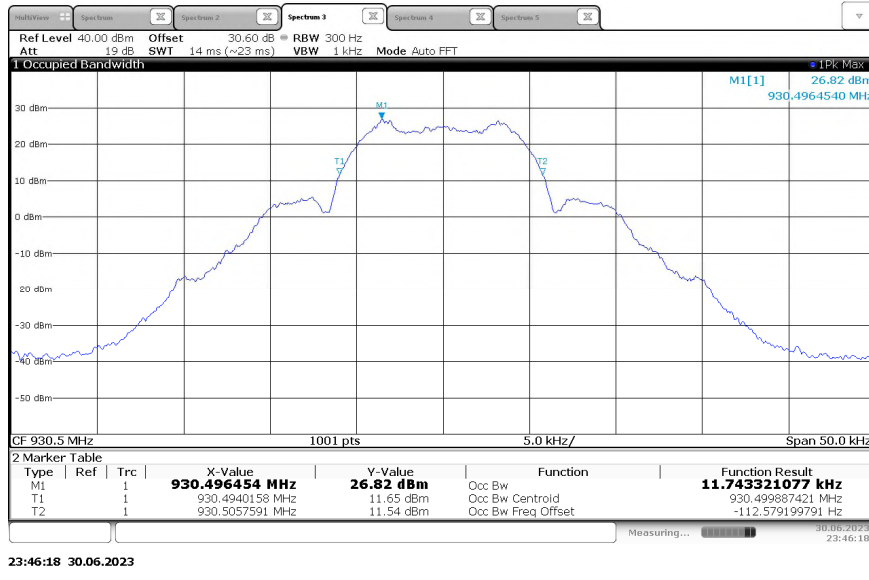


Figure 2.3.6-22 - 99% Bandwidth – KDS TCXO – 930.5 MHz - mPass10k Mode

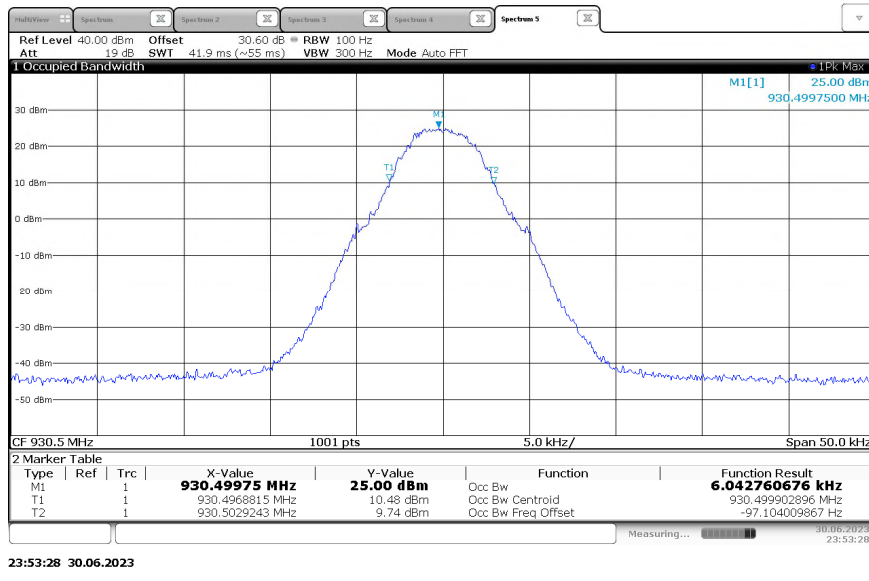


Figure 2.3.6-23 - 99% Bandwidth – KDS TCXO – 930.5 MHz - m4Pass10 Mode

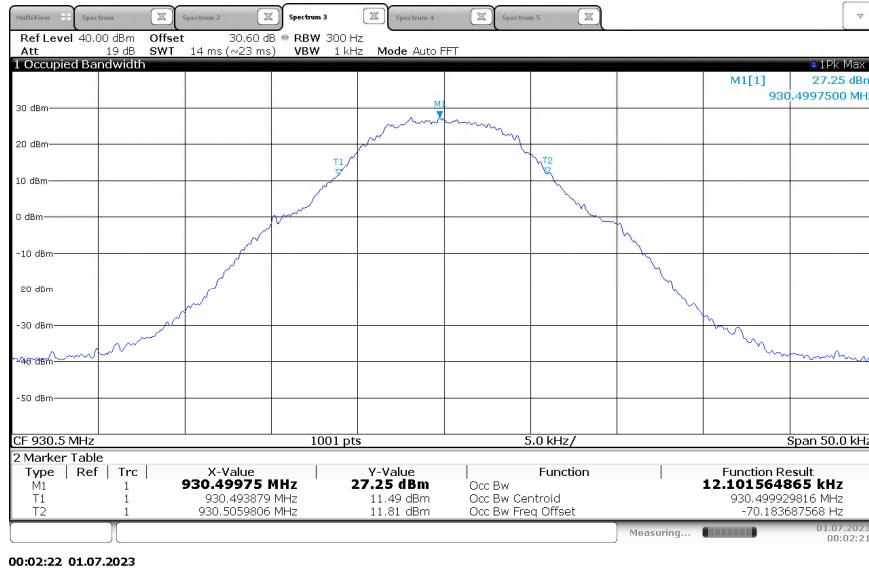


Figure 2.3.6-24 - 99% Bandwidth – KDS TCXO – 930.5 MHz - m4Pass20k Mode

Table 2.3.6-4 - 99% Bandwidth – KDS TCXO – 932.25 MHz

Frequency (MHz)	ISED Canada Rule Part	Mode	99% Bandwidth (kHz)
932.25	RSS-119	Normal	12.012
932.25	RSS-119	DD	14.132
932.25	RSS-119	C&I	6.138
932.25	RSS-119	Priority	7.032
932.25	RSS-119	2SFSK-HB	5.975
932.25	RSS-119	4SFSK-HB	7.003
932.25	RSS-119	8SFSK-HB	7.280
932.25	RSS-119	2SFSK	11.854
932.25	RSS-119	4SFSK	13.928
932.25	RSS-119	8SFSK	14.802

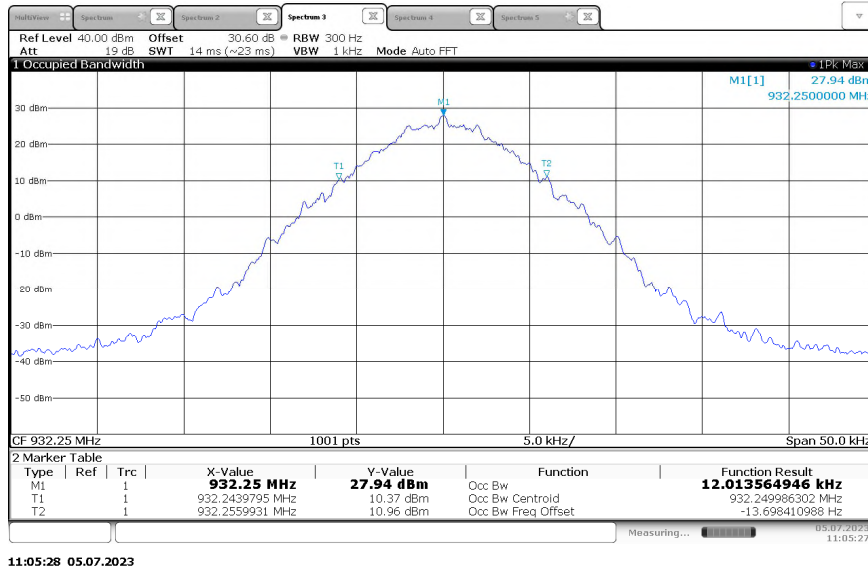


Figure 2.3.6-25 - 99% Bandwidth – KDS TCXO – 932.25 MHz - Normal Mode

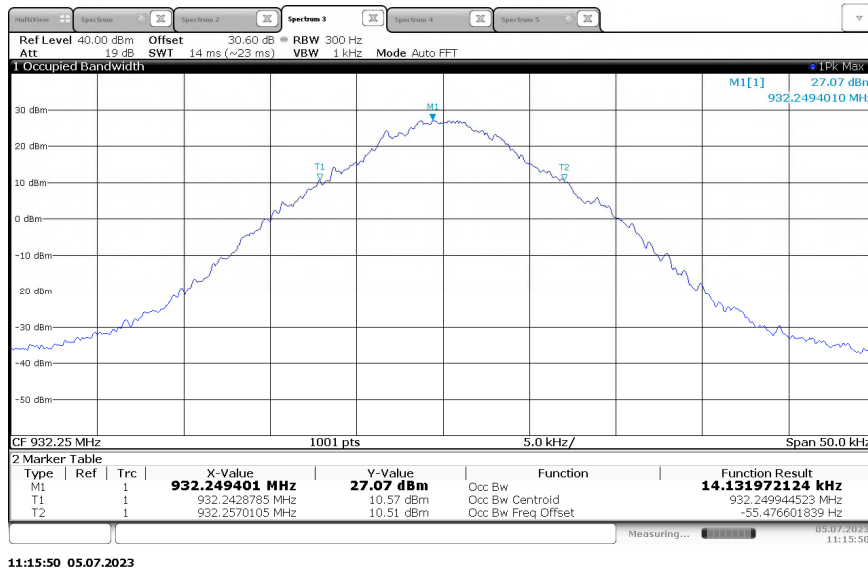


Figure 2.3.6-26 - 99% Bandwidth – KDS TCXO – 932.25 MHz - Double Density Mode

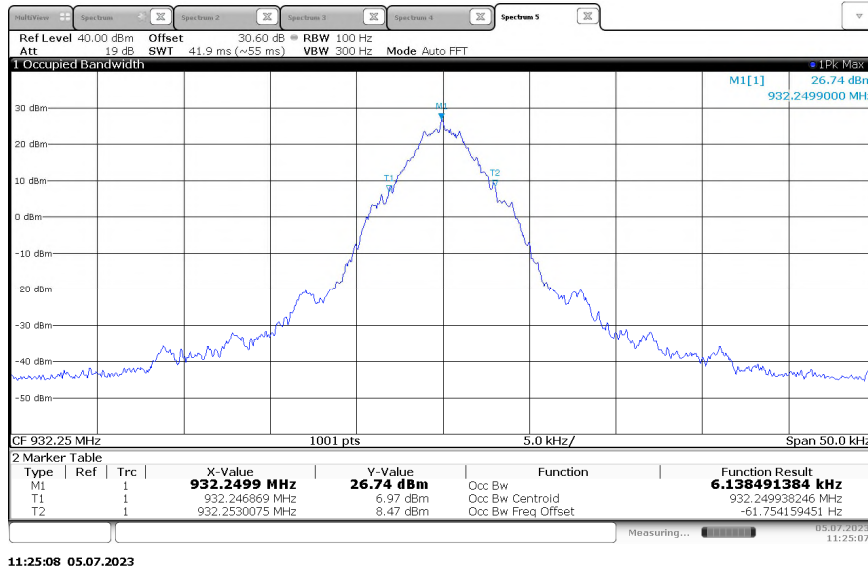


Figure 2.3.6-27 - 99% Bandwidth – KDS TCXO – 932.25 MHz - C&I Mode

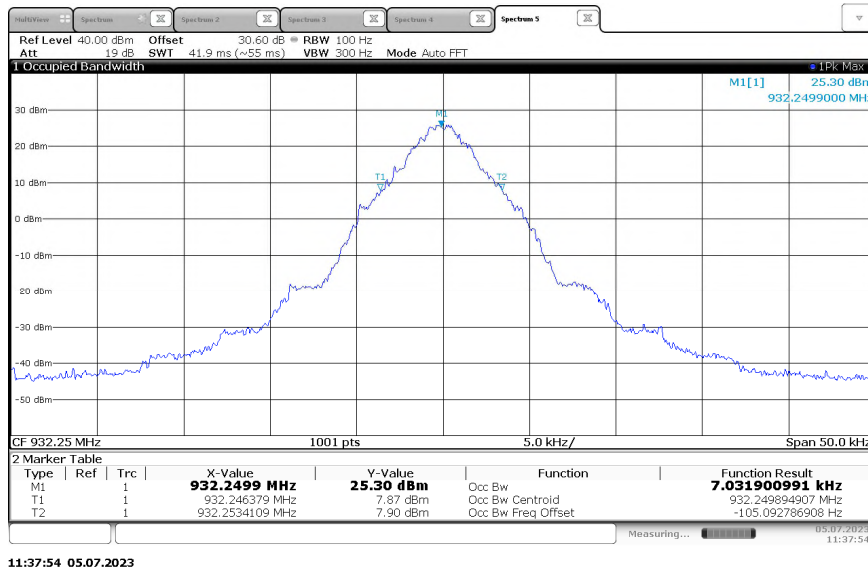


Figure 2.3.6-28 - 99% Bandwidth – KDS TCXO – 932.25 MHz - Priority Mode

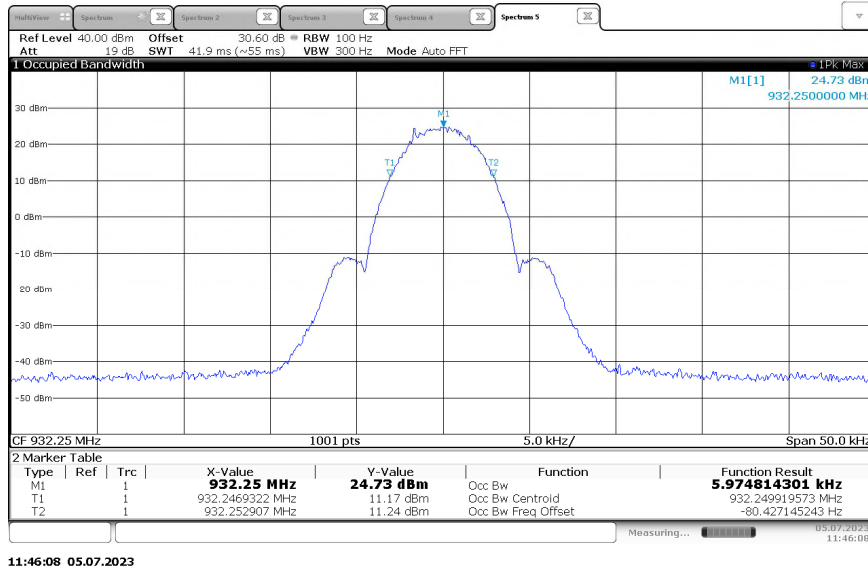


Figure 2.3.6-29 - 99% Bandwidth – KDS TCXO – 932.25 MHz - 2SFSK (Half Baud) Mode

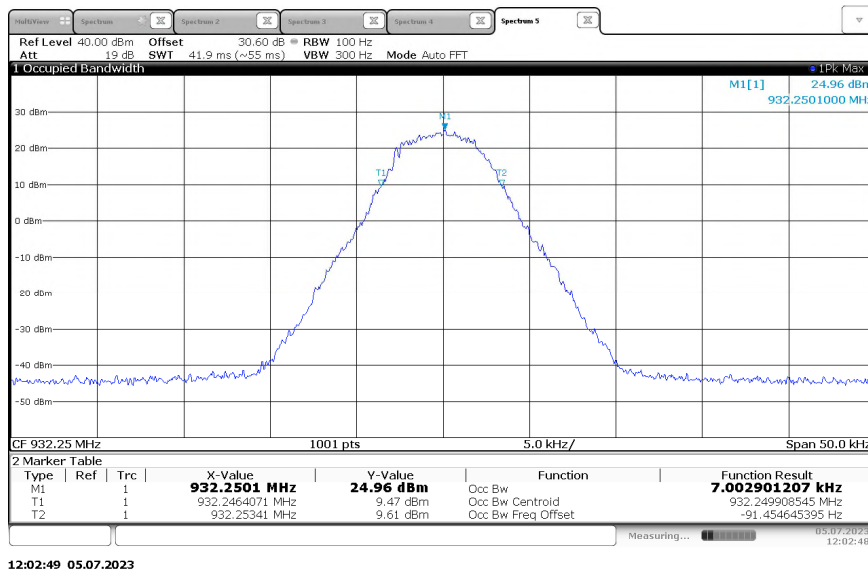


Figure 2.3.6-30 - 99% Bandwidth – KDS TCXO – 932.25 MHz - 4SFSK (Half Baud) Mode

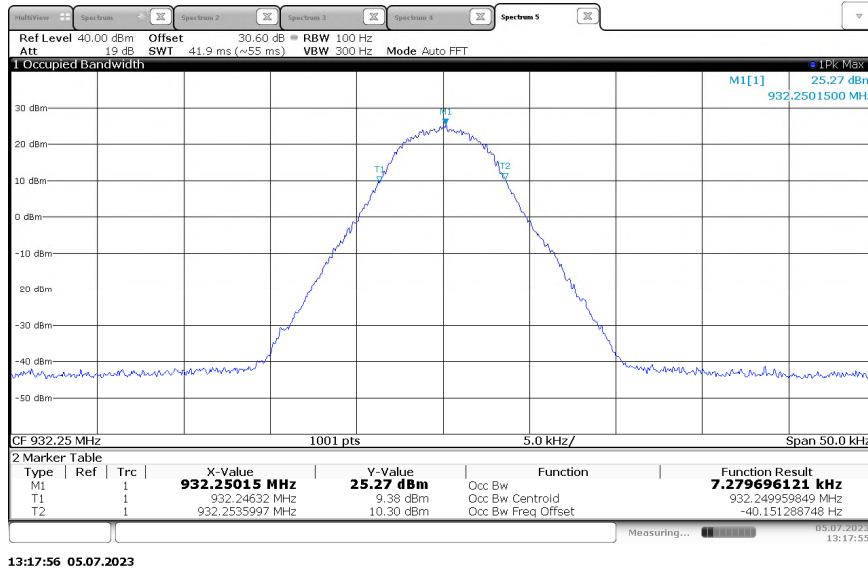


Figure 2.3.6-31 - 99% Bandwidth – KDS TCXO – 932.25 MHz - 8FSK (Half Baud) Mode

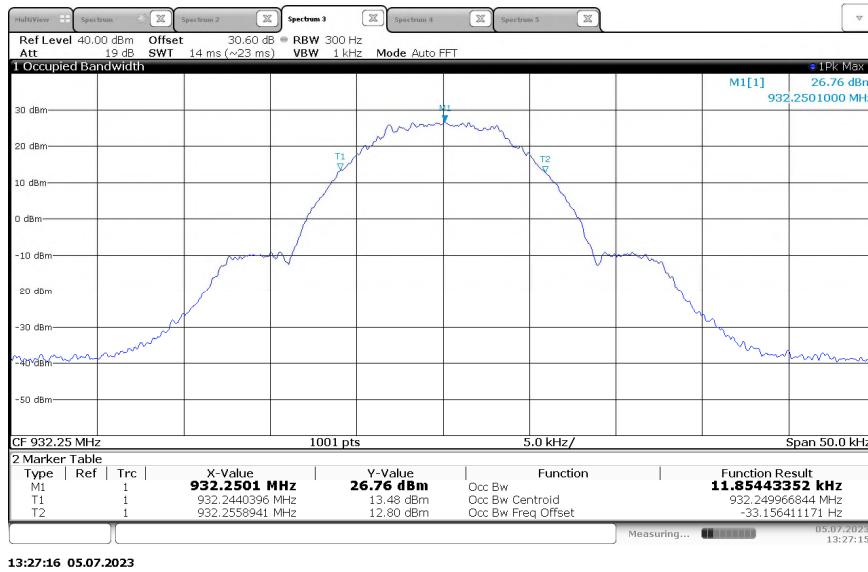


Figure 2.3.6-32 - 99% Bandwidth – KDS TCXO – 932.25 MHz - 2FSK Mode



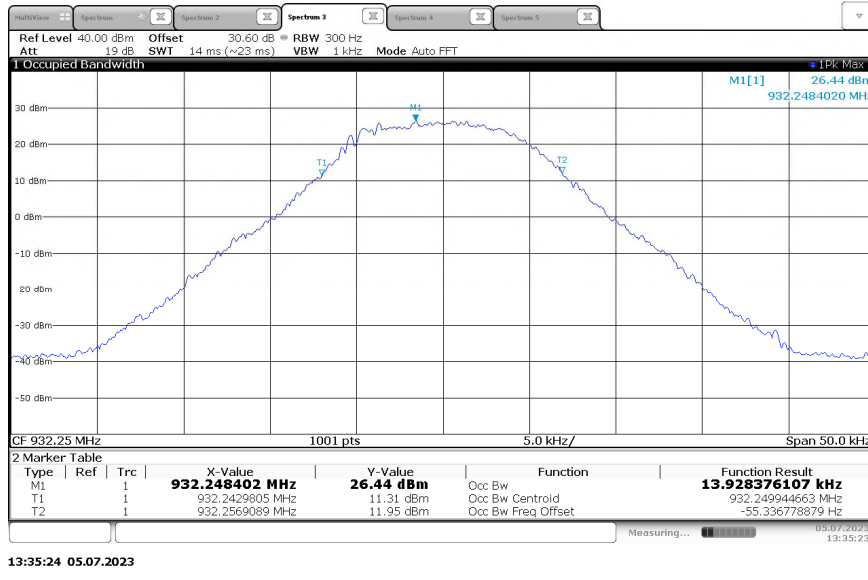


Figure 2.3.6-33 - 99% Bandwidth – KDS TCXO – 932.25 MHz - 4FSK Mode

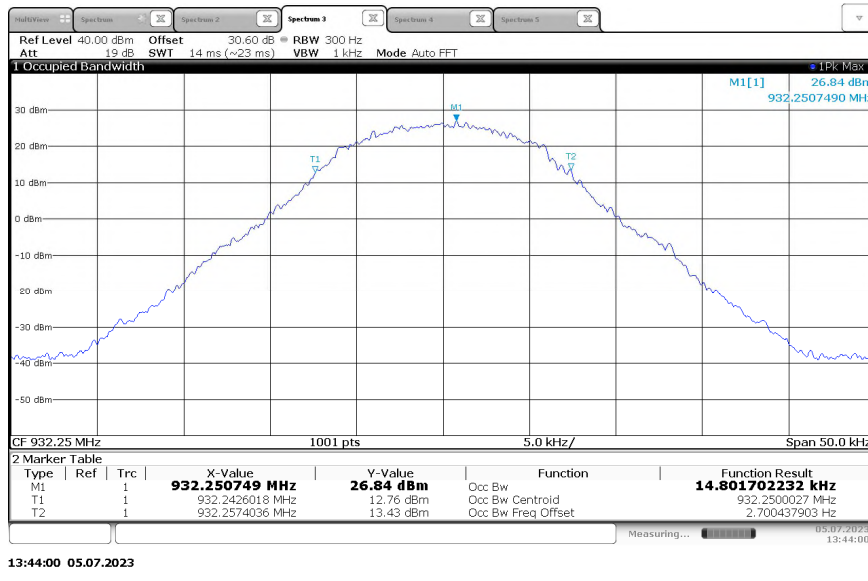
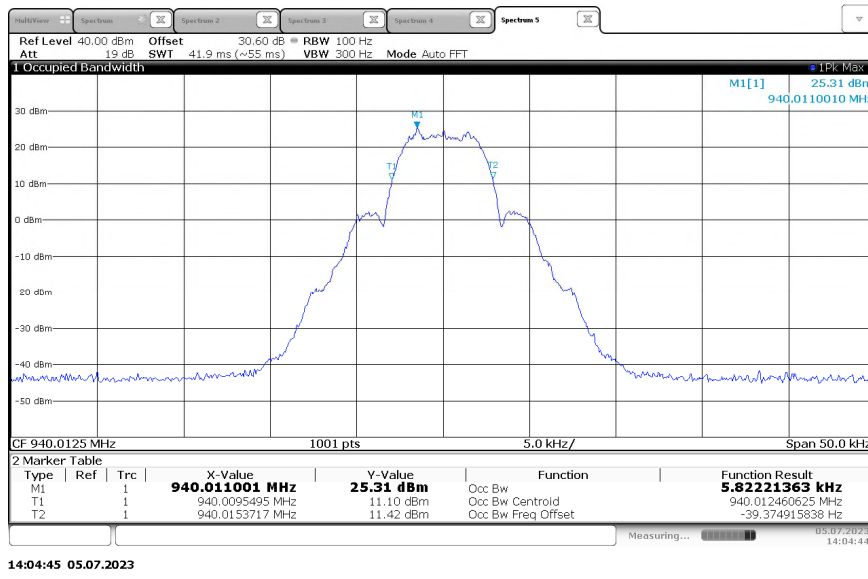


Figure 2.3.6-34 - 99% Bandwidth – KDS TCXO – 932.25 MHz - 8FSK Mode



**Table 2.3.6-5 - 99% Bandwidth – KDS TCXO – 940.0125 MHz**

Frequency (MHz)	ISED Canada Rule Part	Mode	99% Bandwidth (kHz)
940.0125	RSS-134	mPass5k	5.822
940.0125	RSS-134	mPass10k	11.720
940.0125	RSS-134	m4Pass10k	6.078
940.0125	RSS-134	m4Pass20k	12.089



**Figure 2.3.6-35 - 99% Bandwidth – KDS TCXO – 940.0125 MHz - mPass5k Mode**

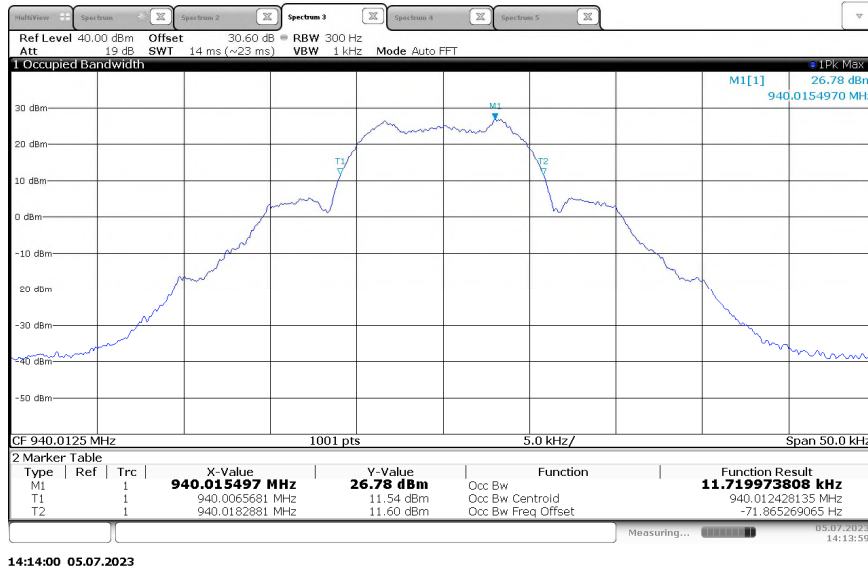


Figure 2.3.6-36 - 99% Bandwidth – KDS TCXO – 940.0125 MHz - mPass10k Mode

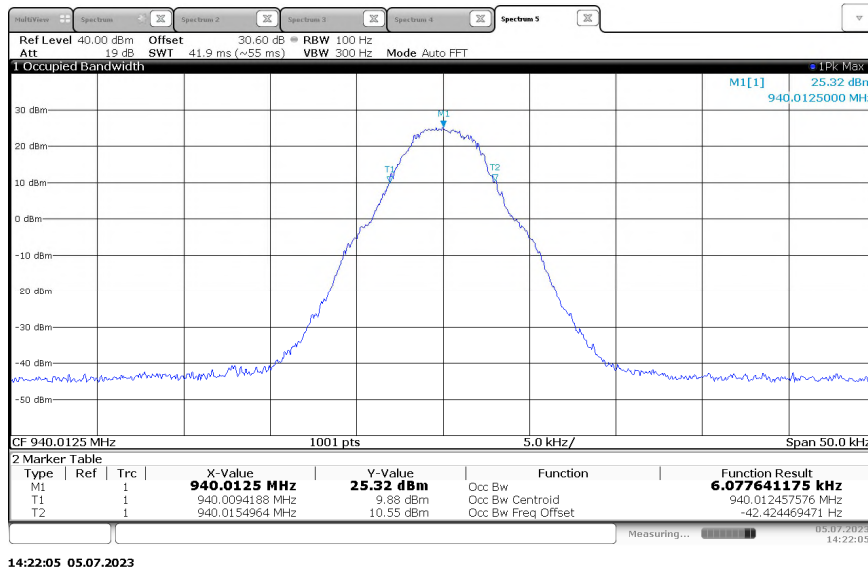


Figure 2.3.6-37 - 99% Bandwidth – KDS TCXO – 940.0125 MHz - m4Pass10 Mode

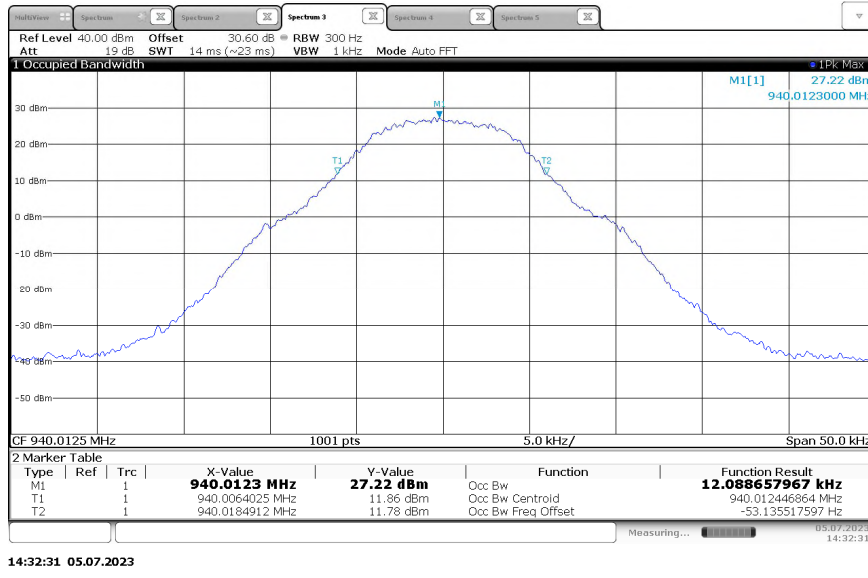


Figure 2.3.6-38 - 99% Bandwidth – KDS TCXO – 940.0125 MHz - m4Pass20k Mode

Table 2.3.6-6 - 99% Bandwidth – KDS TCXO – 941.4875 MHz

Frequency (MHz)	ISED Canada Rule Part	Mode	99% Bandwidth (kHz)
941.4875	RSS-119	mPass5k	5.814
941.4875	RSS-119	mPass10k	11.742
941.4875	RSS-119	m4Pass10k	6.063
941.4875	RSS-119	m4Pass20k	12.048

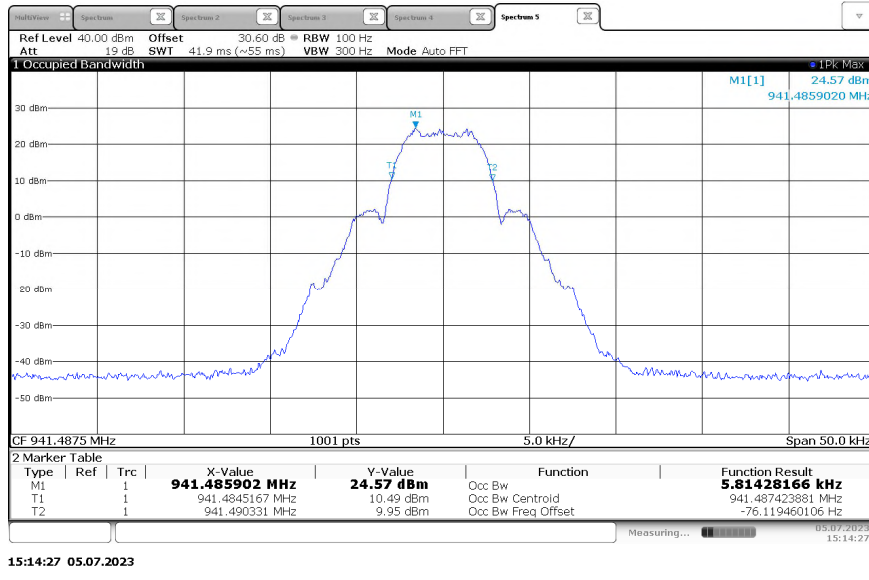


Figure 2.3.6-39 - 99% Bandwidth – KDS TCXO – 941.4875 MHz - mPass5k Mode

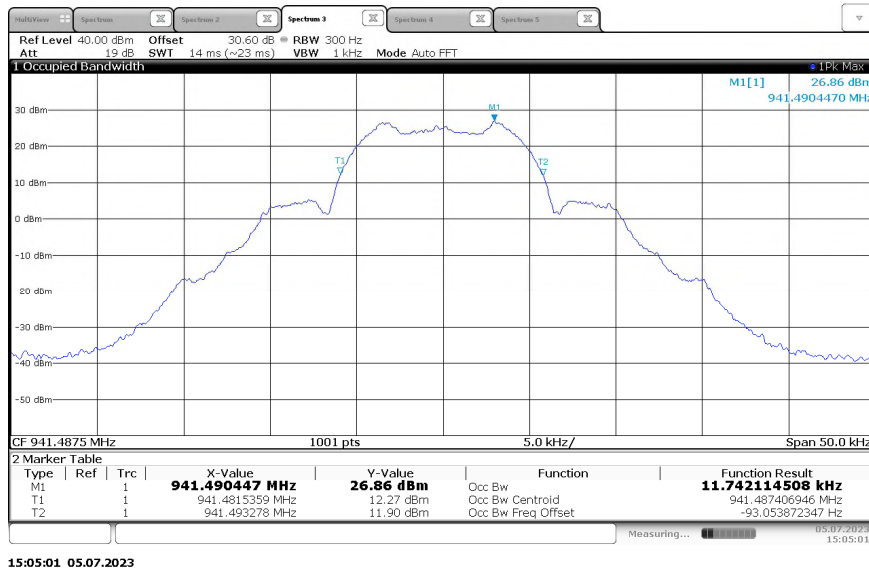


Figure 2.3.6-40 - 99% Bandwidth – KDS TCXO – 941.4875 MHz - mPass10k Mode

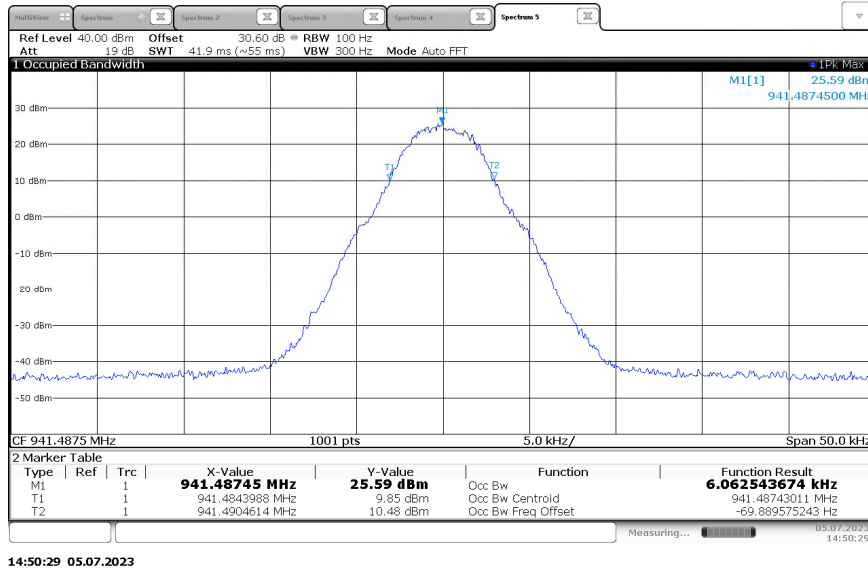


Figure 2.3.6-41 - 99% Bandwidth – KDS TCXO – 941.4875 MHz - m4Pass10 Mode

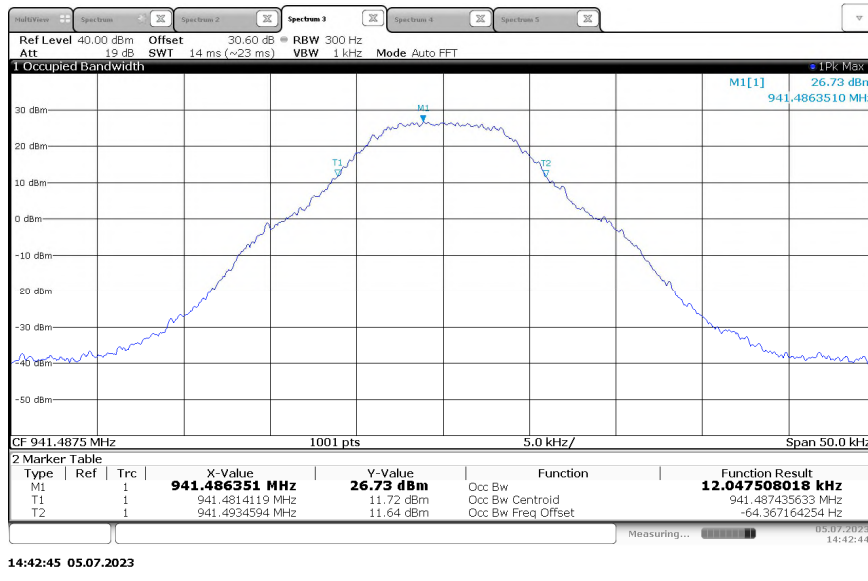
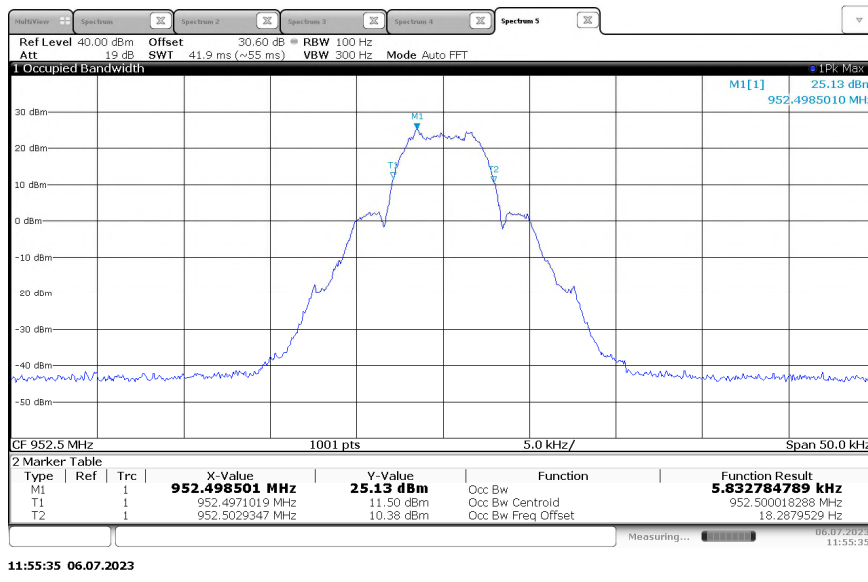


Figure 2.3.6-42 - 99% Bandwidth – KDS TCXO – 941.4875 MHz - m4Pass20k Mode



**Table 2.3.6-7 - 99% Bandwidth – KDS TCXO – 952.5 MHz**

Frequency (MHz)	ISED Canada Rule Part	Mode	99% Bandwidth (kHz)
952.5	RSS-119	mPass5k	5.833
952.5	RSS-119	mPass10k	11.705
952.5	RSS-119	m4Pass10k	6.112
952.5	RSS-119	m4Pass20k	12.202



**Figure 2.3.6-43 - 99% Bandwidth – KDS TCXO – 952.5 MHz - mPass5k Mode**

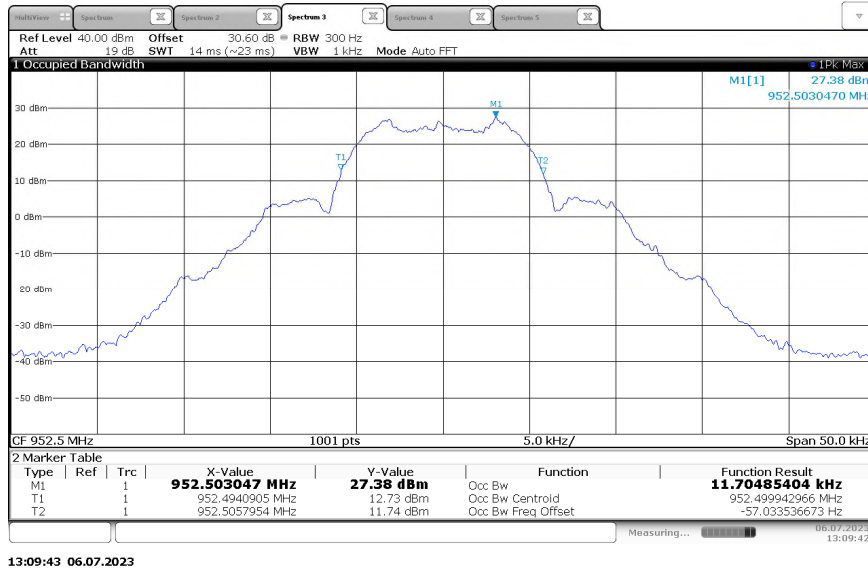


Figure 2.3.6-44 - 99% Bandwidth – KDS TCXO – 952.5 MHz - mPass10k Mode

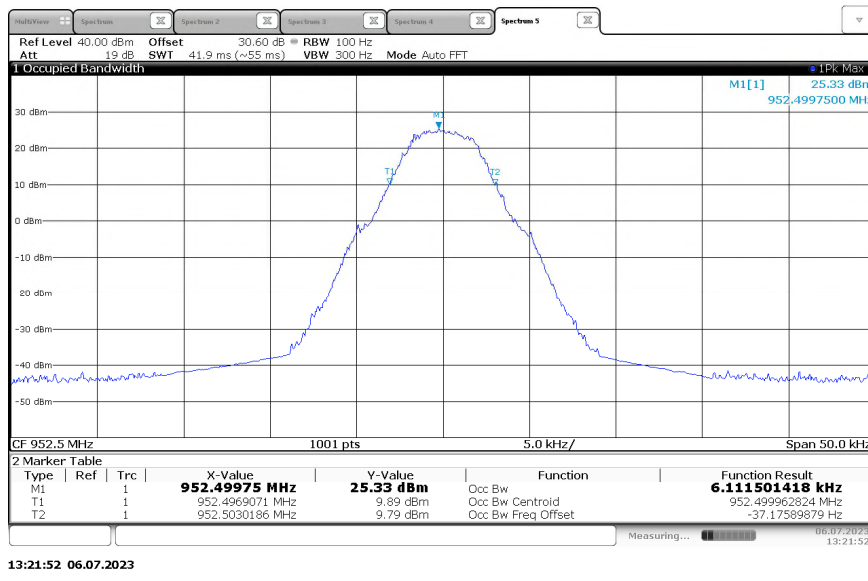


Figure 2.3.6-45 - 99% Bandwidth – KDS TCXO – 952.5 MHz - m4Pass10 Mode



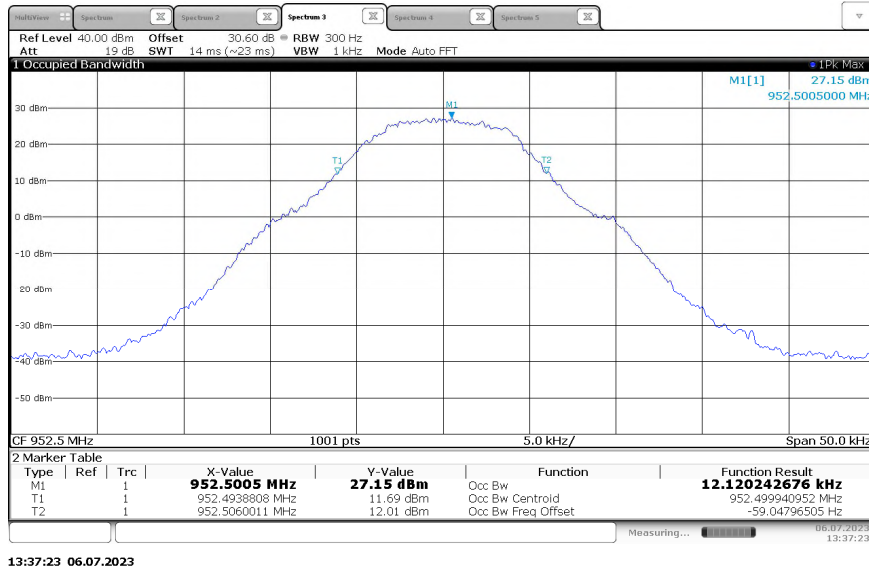


Figure 2.3.6-46 - 99% Bandwidth – KDS TCXO – 952.5 MHz - m4Pass20k Mode

Table 2.3.6-8 - 99% Bandwidth – KDS TCXO – 959.925 MHz

Frequency (MHz)	ISED Canada Rule Part	Mode	99% Bandwidth (kHz)
959.925	N/A	mPass5k	5.823
959.925	N/A	mPass10k	11.773
959.925	N/A	m4Pass10k	6.061
959.925	N/A	m4Pass20k	12.182

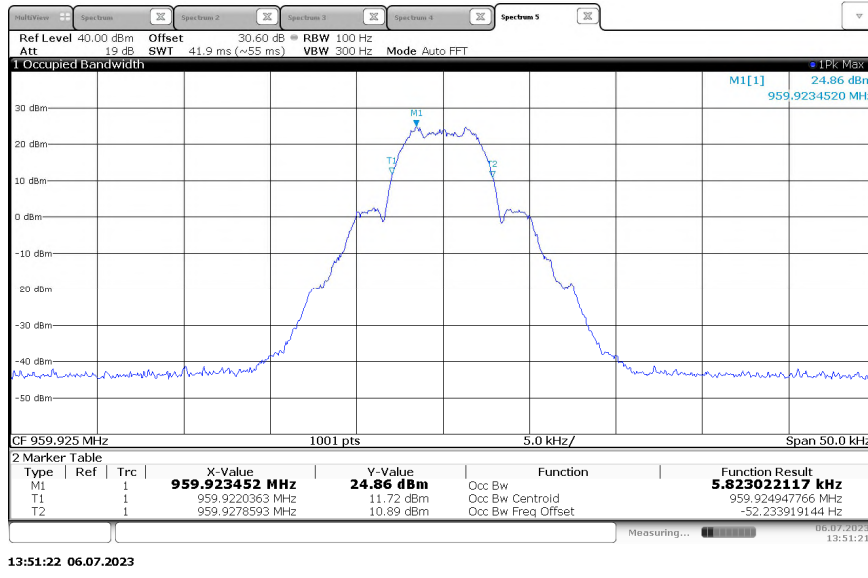


Figure 2.3.6-47 - 99% Bandwidth – KDS TCXO – 959.925 MHz - mPass5k Mode

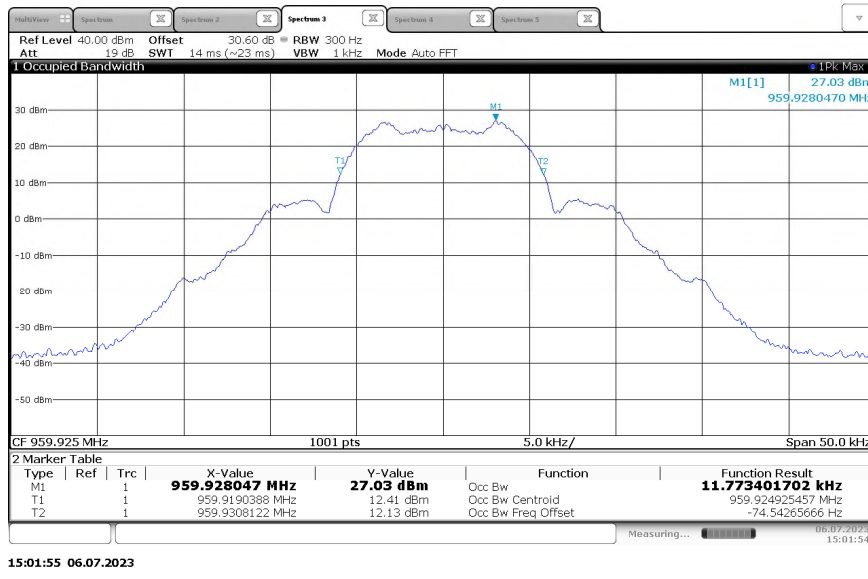


Figure 2.3.6-48 - 99% Bandwidth – KDS TCXO – 959.925 MHz - mPass10k Mode

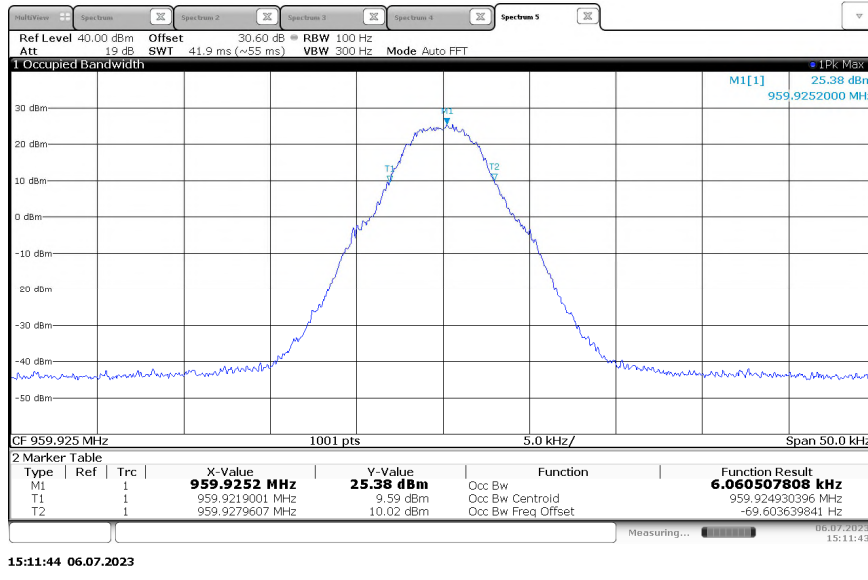


Figure 2.3.6-49 - 99% Bandwidth – KDS TCXO – 959.925 MHz - m4Pass10 Mode

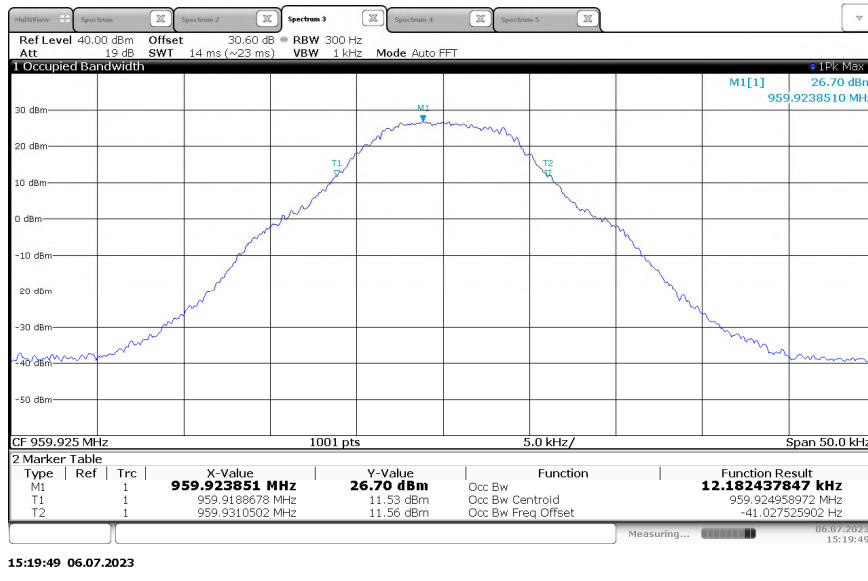


Figure 2.3.6-50 - 99% Bandwidth – KDS TCXO – 959.925 MHz - m4Pass20k Mode



**2.3.7 Test Location and Test Equipment Used**

This test was carried out in TÜV SÜD America, Inc., 5610 W. Sligh Ave, Suite 100, Tampa, FL 33634, USA.

Instrument	Manufacturer	Type No	TE No	Software / Firmware Revision	Calibration Period (months)	Calibration Due
Digital MultiMeter	Fluke	115	BEMC02108	N/A	12	25-Jan-2024
Duratest 175 Cable 26.5GHz	Teledyne Storm Products	921-0101-036	BEMC02112	N/A	12	12-Oct-2023
Signal & Spectrum Analyzer	Rohde & Schwarz	FSW43	DEMC3085	2.90 SP1	12	08-Jun-2024
DC Power Supply	Xantrex	XHR60-18	TEMC00001	N/A	N/A	NCR
30 dB Fixed Attenuator	Mini-Circuits	BW-S30W5+	TEMC00264	N/A	12	15-Apr-2024

TU - Traceability Unscheduled  
 O/P MON - Output Monitored with Calibrated Equipment  
 N/A - Not Applicable  
 NCR – No Calibration Required



## **2.4 Spurious Emissions at Antenna Terminals**

### **2.4.1 Specification Reference**

FCC 47 CFR Parts: 2.1051; 24.133 a(1), a(2); 101.111 a(5), a(6)  
ISED Canada RSS-119 5.8.3, 5.8.6; RSS-134 4.4

### **2.4.2 Equipment Under Test and Modification State**

TXC TCXO, SN: 825545076715755  
KDS TCXO, SN: 825545076715645

### **2.4.3 Date of Test**

2023-June-30 to 2023-July-06

### **2.4.4 Test Method**

The RF output of the equipment under test was directly connected to the input of the Spectrum Analyzer through a 30 dB passive attenuator. The spectrum analyzer resolution bandwidth was set to 100 kHz below 1000 MHz and 1 MHz above 1000 MHz. The internal correction factors of the spectrum analyzer were employed to correct for any cable or attenuator. The spectrum was investigated in accordance with CFR 47 Part 2.1057.

### **2.4.5 Environmental Conditions**

Ambient Temperature	27.1 °C
Relative Humidity	36.7 %
Atmospheric Pressure	1013.3 mbar

### **2.4.6 Test Results**

DC Powered Operating



FCC 47 CFR Parts: 2.1053; 24.133 a(1), a(2); ISED Canada RSS-134 4.4

TXC TCXO

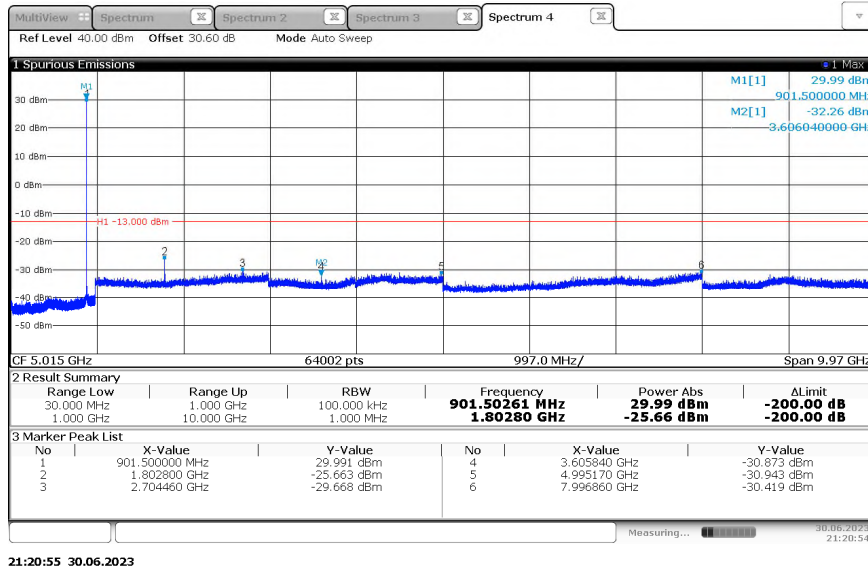


Figure 2.4.6-1 - Transmitter Conducted Spurious Emissions – TXC TCXO – 901.5 MHz - Normal Mode



KDS TCXO

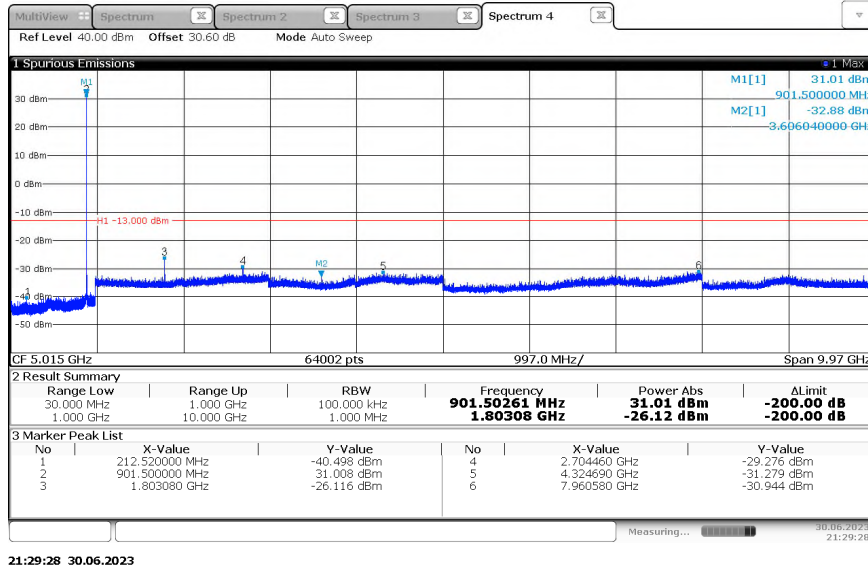


Figure 2.4.6-2 - Transmitter Conducted Spurious Emissions – KDS TCXO – 901.5 MHz - Normal Mode

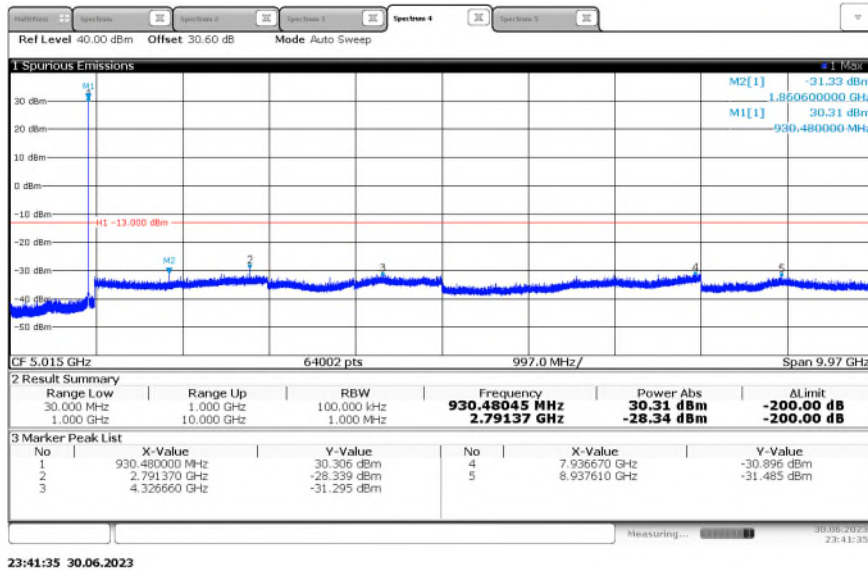


Figure 2.4.6-3 - Transmitter Conducted Spurious Emissions – KDS TCXO – 930.5 MHz - mPass5k Mode

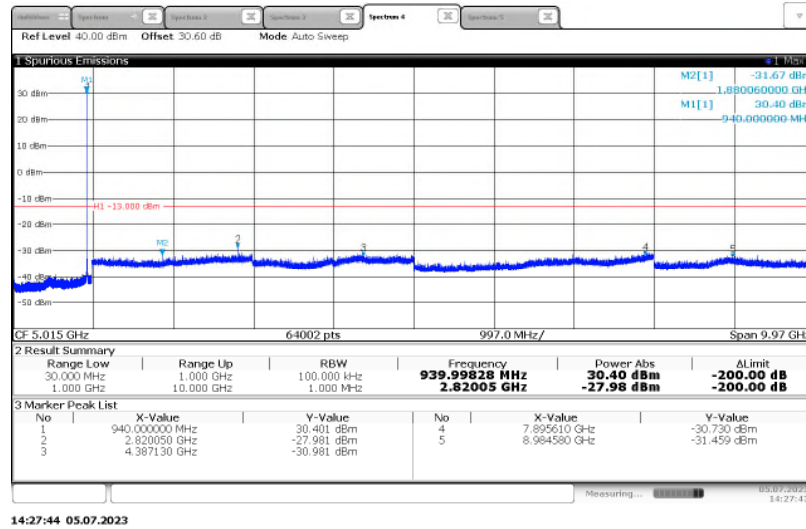


Figure 2.4.6-4 - Transmitter Conducted Spurious Emissions – KDS TCXO – 940.0125 MHz - mPass5k Mode

FCC 47 CFR Parts: 101.111 a(5),a(6), ISED Canada RSS-119 5.8.3, 5.8.6

The FCC 47 CFR Parts: 101.111 a(5) and ISED Canada RSS-119 5.8.3 limits were applied as the most stringent limits.

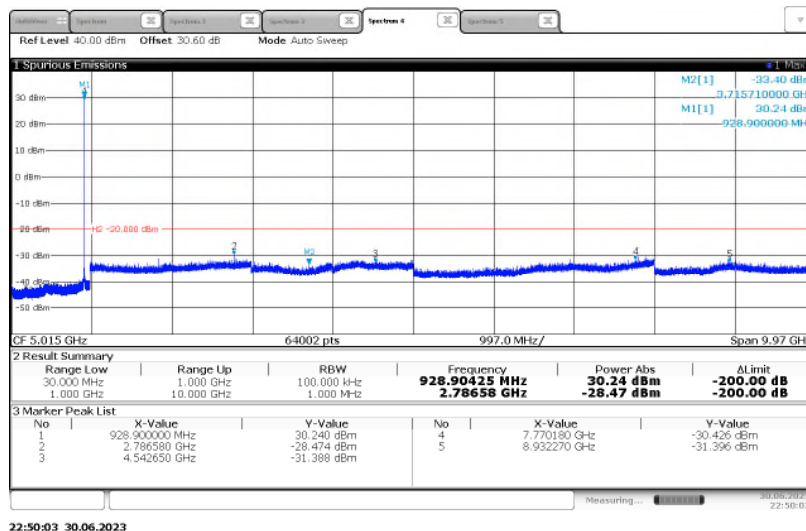


Figure 2.4.6-5 - Transmitter Conducted Spurious Emissions – KDS TCXO – 928.925 MHz - Normal Mode



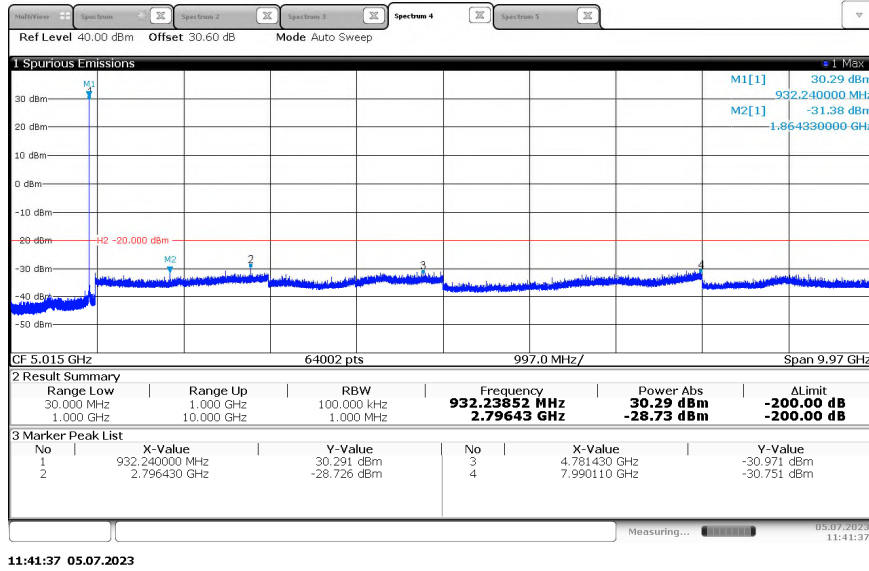


Figure 2.4.6-6 - Transmitter Conducted Spurious Emissions – KDS TCXO – 932.25 MHz - Normal Mode

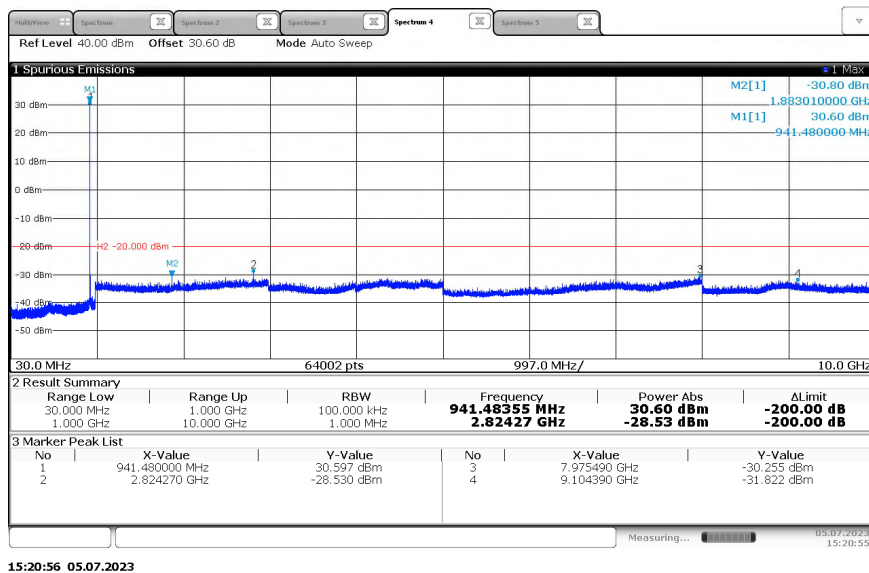


Figure 2.4.6-7 - Transmitter Conducted Spurious Emissions – KDS TCXO – 941.4875 MHz - mPass5k Mode

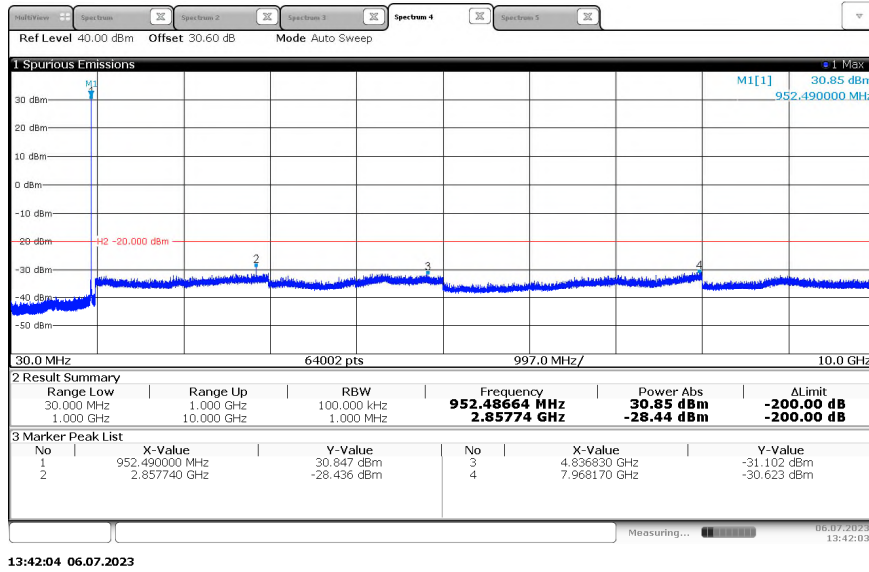


Figure 2.4.6-8 - Transmitter Conducted Spurious Emissions – KDS TCXO – 952.5 MHz - mPass5k Mode

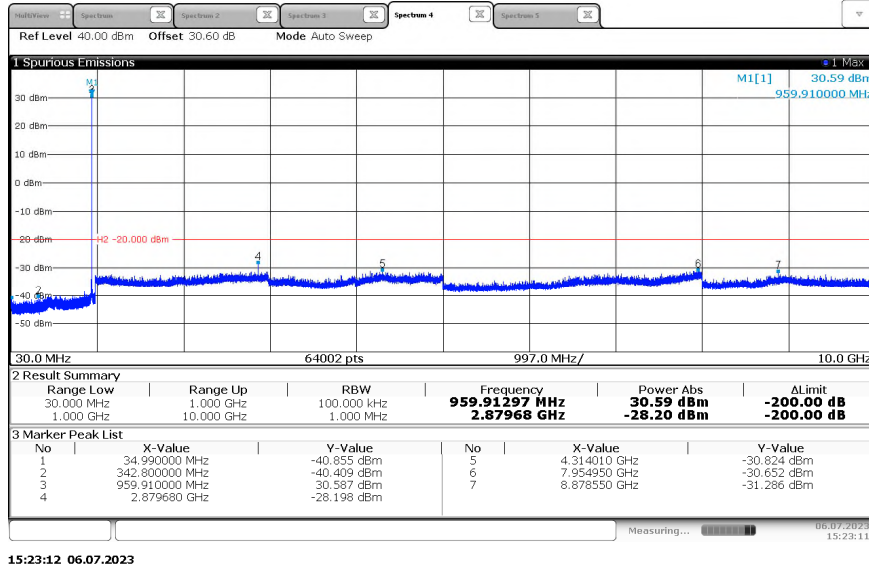


Figure 2.4.6-9 - Transmitter Conducted Spurious Emissions – KDS TCXO – 959.925 MHz - mPass5k Mode



**2.4.7 Test Location and Test Equipment Used**

This test was carried out in TÜV SÜD America, Inc., 5610 W. Sligh Ave, Suite 100, Tampa, FL 33634, USA.

Instrument	Manufacturer	Type No	TE No	Software / Firmware Revision	Calibration Period (months)	Calibration Due
Digital MultiMeter	Fluke	115	BEMC02108	N/A	12	25-Jan-2024
Duratest 175 Cable 26.5GHz	Teledyne Storm Products	921-0101-036	BEMC02112	N/A	12	12-Oct-2023
Signal & Spectrum Analyzer	Rohde & Schwarz	FSW43	DEMC3085	2.90 SP1	12	08-Jun-2024
DC Power Supply	Xantrex	XHR60-18	TEMC00001	N/A	N/A	NCR, O/P MON
30 dB Fixed Attenuator	Mini-Circuits	BW-S30W5+	TEMC00264	N/A	12	15-Apr-2024

TU - Traceability Unscheduled  
 O/P MON - Output Monitored with Calibrated Equipment  
 N/A - Not Applicable  
 NCR – No Calibration Required



## 2.5 Field Strength of Spurious Radiation

### 2.5.1 Specification Reference

FCC 47 CFR Parts: 2.1053; 24.133 a(1), a(2); 101.111 a(5), a(6)  
ISED Canada RSS-119 5.8.3, 5.8.6; RSS-134 4.4

### 2.5.2 Equipment Under Test and Modification State

TXC TCXO, SN: 825545076715791  
TXC TCXO, SN: 825545076715860  
KDS TCXO, SN: 825545076715758

### 2.5.3 Date of Test

2023-June-23 to 2023-July-26

### 2.5.4 Test Method

The EUT was evaluated in accordance to ANSI C63.26:2015 Section 5.5.3 Measurement of Spurious Emissions using Substitution Method.

Radiated emissions tests were made over the frequency range of 30 MHz to 10 times the highest fundamental frequency. The equipment under test is placed in the Semi-Anechoic Chamber on a RF transparent table at the turntable center. For each spurious emission, the antenna mast is raised and lowered from one (1) to four (4) meters and the turntable is rotated 360° and the maximum reading on the spectrum analyzer is recorded. This was repeated for both horizontal and vertical polarizations of the receive antenna.

The equipment under test is then replaced with a substitution antenna fed by a signal generator. The signal generator's frequency is set to that of the spurious emission recorded from the equipment under test. The antenna mast is raised and lowered from one (1) to four (4) meters to obtain a maximum reading on the spectrum analyzer. The output of the signal generator is then adjusted until the reading on the spectrum analyzer matches that obtained from the equipment under test. The signal generator level is recorded. The power in dBm of each spurious emission is calculated by correcting the signal generator level for the cable loss and gain of the substitution antenna referenced to a dipole. The spectrum was investigated in accordance to FCC CFR 47 Part 2.1057.

The magnitude of all spurious emissions not reported were attenuated below the noise floor of the measurement system and therefore not specified in this report. Results are shown below.

### 2.5.5 Environmental Conditions

Ambient Temperature	24.3 °C
Relative Humidity	46 %
Atmospheric Pressure	1012.7 mbar



**2.5.6 Test Results**

DC Powered Operating

FCC Part 24.133a(1),(a2); ISED Canada RSS-134 4.4

TXC TCXO

**Table 2.5.6-1 - Transmitter Radiated Spurious Emissions – TXC TCXO – 901.5 MHz - Normal Mode**

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1803	-54.81	H	-56.17	-13.00	43.17
2704.5	-53.06	H	-50.90	-13.00	37.90
3606	-61.41	H	-63.02	-13.00	50.02
4507.5	-60.83	H	-59.08	-13.00	46.08
5409	-59.41	H	-52.20	-13.00	39.20
6310.5	-65.13	H	-62.80	-13.00	49.80
7212	-63.10	H	-59.07	-13.00	46.07
8113.5	-62.70	H	-54.18	-13.00	41.18
9015	-63.34	H	-54.28	-13.00	41.28
<b>Vertical Polarization</b>					
1803	-52.44	V	-52.59	-13.00	39.59
2704.5	-54.26	V	-52.03	-13.00	39.03
3606	-61.56	V	-62.14	-13.00	49.14
4507.5	-62.11	V	-60.65	-13.00	47.65
5409	-59.87	V	-52.09	-13.00	39.09
6310.5	-64.48	V	-57.43	-13.00	44.43
8113.5	-61.65	V	-53.24	-13.00	40.24
9015	-61.84	V	-53.96	-13.00	40.96



**Table 2.5.6-2 - Transmitter Radiated Spurious Emissions – TXC TCXO – 930.5 MHz - mPass5k Mode**

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1861	-53.06	H	-53.22	-13.00	40.22
2791.5	-55.29	H	-54.69	-13.00	41.69
3722	-60.21	H	-59.96	-13.00	46.96
4652.5	-57.57	H	-52.17	-13.00	39.17
5583	-62.83	H	-57.73	-13.00	44.73
6513.5	-65.96	H	-62.08	-13.00	49.08
1861	-57.12	V	-59.08	-13.00	46.08
2791.5	-55.17	V	-54.19	-13.00	41.19
3722	-59.60	V	-58.53	-13.00	45.53
4652.5	-62.61	V	-61.51	-13.00	48.51
5583	-61.74	V	-56.35	-13.00	43.35
6513.5	-65.09	V	-58.72	-13.00	45.72
7444	-63.75	V	-59.87	-13.00	46.87
8374.5	-62.74	V	-59.65	-13.00	46.65
9305	-65.35	V	-60.11	-13.00	47.11



**Table 2.5.6-3 - Transmitter Radiated Spurious Emissions – TXC TCXO – 940.0125 MHz - mPass5k Mode**

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1880.025	-55.76	H	-57.08	-13.00	44.08
2820.0375	-53.62	H	-52.01	-13.00	39.01
3760.05	-60.29	H	-60.68	-13.00	47.68
4700.0625	-62.02	H	-60.43	-13.00	47.43
5640.075	-63.88	H	-60.06	-13.00	47.06
6580.0875	-65.81	H	-62.56	-13.00	49.56
1880.025	-56.90	V	-57.85	-13.00	44.85
2820.0375	-53.22	V	-51.02	-13.00	38.02
3760.05	-60.93	V	-62.28	-13.00	49.28
4700.0625	-61.70	V	-60.18	-13.00	47.18
5640.075	-62.50	V	-58.50	-13.00	45.50
6580.0875	-65.61	V	-63.72	-13.00	50.72
8460.1125	-63.48	V	-65.57	-13.00	52.57
9400.125	-65.28	V	-57.47	-13.00	44.47



FCC 47 CFR Parts: 101.111 a(5),a(6), ISED Canada RSS-119 5.8.3, 5.8.6

The FCC 47 CFR Parts: 101.111 a(5) and ISED Canada RSS-119 5.8.3 limits were applied as the most stringent limits.

**Table 2.5.6-4 - Transmitter Radiated Spurious Emissions – TXC TCXO – 928.925 MHz - Normal Mode**

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1857.85	-54.87	H	-55.14	-20.00	35.14
2786.775	-55.21	H	-54.38	-20.00	34.38
3715.7	-60.79	H	-61.07	-20.00	41.07
4644.625	-62.17	H	-60.81	-20.00	40.81
5573.55	-62.49	H	-59.67	-20.00	39.67
6502.475	-65.07	H	-60.35	-20.00	40.35
7431.4	-64.19	H	-60.93	-20.00	40.93
1857.85	-57.28	V	-59.86	-20.00	39.86
2786.775	-55.75	V	-54.93	-20.00	34.93
3715.7	-59.84	V	-61.19	-20.00	41.19
4644.625	-63.03	V	-61.19	-20.00	41.19
5573.55	-62.25	V	-58.88	-20.00	38.88
6502.475	-65.53	V	-60.39	-20.00	40.39
7431.4	-63.47	V	-61.95	-20.00	41.95
8360.325	-63.38	V	-57.53	-20.00	37.53
9289.25	-62.25	V	-54.46	-20.00	34.46





**Table 2.5.6-5 - Transmitter Radiated Spurious Emissions – TXC TCXO – 932.25 MHz - Normal Mode**

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1864.5	-55.05	H	-56.22	-20.00	36.22
2796.75	-54.56	H	-49.31	-20.00	29.31
3729	-60.27	H	-60.36	-20.00	40.36
4661.25	-56.83	H	-51.32	-20.00	31.32
5593.5	-62.48	H	-57.24	-20.00	37.24
6525.75	-66.00	H	-64.99	-20.00	44.99
8390.25	-64.17	H	-57.49	-20.00	37.49
1864.5	-54.72	V	-55.34	-20.00	35.34
2796.75	-55.21	V	-54.17	-20.00	34.17
3729	-59.31	V	-58.94	-20.00	38.94
4661.25	-61.74	V	-62.96	-20.00	42.96
5593.5	-61.66	V	-56.13	-20.00	36.13
6525.75	-65.40	V	-65.75	-20.00	45.75
8390.25	-62.92	V	-57.47	-20.00	37.47
9322.5	-66.01	V	-60.32	-20.00	40.32



**Table 2.5.6-6 - Transmitter Radiated Spurious Emissions – TXC TCXO – 941.4875 MHz - mPass5k Mode**

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1882.975	-55.87	H	-56.93	-20.00	36.93
2824.4625	-53.77	H	-51.32	-20.00	31.32
3765.95	-60.67	H	-63.14	-20.00	43.14
4707.4375	-61.82	H	-62.41	-20.00	42.41
5648.925	-63.37	H	-59.23	-20.00	39.23
6590.4125	-66.56	H	-61.49	-20.00	41.49
1882.975	-56.25	V	-56.91	-20.00	36.91
2824.4625	-53.51	V	-50.81	-20.00	30.81
3765.95	-60.10	V	-60.18	-20.00	40.18
4707.4375	-62.55	V	-60.04	-20.00	40.04
5648.925	-61.72	V	-56.97	-20.00	36.97
6590.4125	-65.11	V	-62.10	-20.00	42.10
7531.9	-63.05	V	-61.76	-20.00	41.76
8473.3875	-63.57	V	-58.75	-20.00	38.75
9414.875	-63.73	V	-58.01	-20.00	38.01



**Table 2.5.6-7 - Transmitter Radiated Spurious Emissions – TXC TCXO – 952.5 MHz - mPass5k Mode**

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1905	-57.44	H	-59.86	-20.00	39.86
2857.5	-53.86	H	-51.29	-20.00	31.29
3810	-60.86	H	-63.81	-20.00	43.81
4762.5	-62.43	H	-60.76	-20.00	40.76
5715	-64.43	H	-61.88	-20.00	41.88
6667.5	-65.32	H	-61.93	-20.00	41.93
8572.5	-64.43	H	-57.15	-20.00	37.15
1905	-58.27	V	-61.86	-20.00	41.86
2857.5	-52.84	V	-49.26	-20.00	29.26
3810	-59.28	V	-59.22	-20.00	39.22
4762.5	-61.87	V	-59.28	-20.00	39.28
5715	-61.44	V	-56.78	-20.00	36.78
6667.5	-65.06	V	-58.96	-20.00	38.96
8572.5	-62.41	V	-52.81	-20.00	32.81
9525	-64.21	V	-59.76	-20.00	39.76



**Table 2.5.6-8 - Transmitter Radiated Spurious Emissions – TXC TCXO – 959.925 MHz - mPass5k Mode**

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1919.85	-56.89	H	-59.75	-20.00	39.75
2879.775	-53.73	H	-50.68	-20.00	30.68
3839.7	-60.39	H	-62.59	-20.00	42.59
4799.625	-61.07	H	-56.13	-20.00	36.13
5759.55	-64.10	H	-58.91	-20.00	38.91
1919.85	-55.65	V	-57.65	-20.00	37.65
2879.775	-53.06	V	-49.98	-20.00	29.98
3839.7	-59.47	V	-57.27	-20.00	37.27
4799.625	-60.42	V	-56.22	-20.00	36.22
5759.55	-62.54	V	-56.89	-20.00	36.89



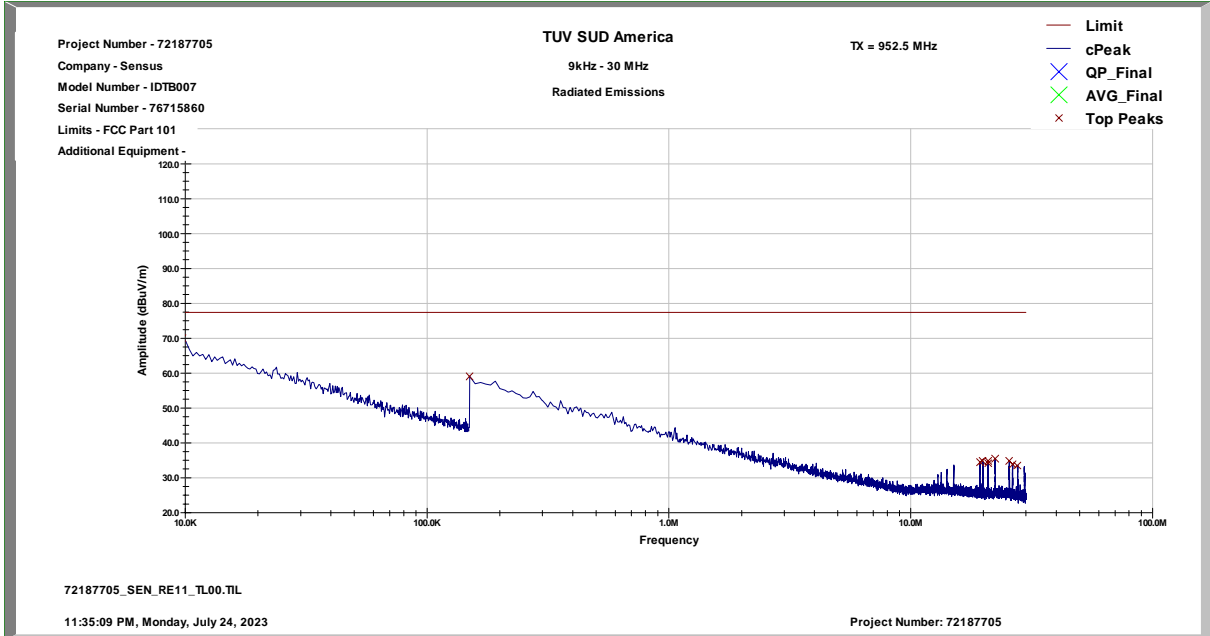
KDS TCXO

**Table 2.5.6-9 - Transmitter Radiated Spurious Emissions – KDS TCXO – 928.925 MHz - Normal Mode**

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1803	-49.06	H	-48.76	-13.00	35.76
2704.5	-54.15	H	-51.99	-13.00	38.99
3606	-60.44	H	-62.05	-13.00	49.05
4507.5	-60.89	H	-59.14	-13.00	46.14
5409	-59.72	H	-52.51	-13.00	39.51
6310.5	-65.85	H	-63.52	-13.00	50.52
1803	-53.00	V	-53.15	-13.00	40.15
2704.5	-55.08	V	-53.95	-13.00	40.95
3606	-60.14	V	-60.72	-13.00	47.72
4507.5	-61.13	V	-59.67	-13.00	46.67
5409	-60.37	V	-52.59	-13.00	39.59
6310.5	-65.59	V	-58.54	-13.00	45.54
8113.5	-63.04	V	-54.63	-13.00	41.63



### Representative Radiated Emissions Pre-Scan Plots



**Figure 2.5.6-1 - Transmitter Radiated Spurious Emissions – TXC TCXO – 952.5 MHz - mPass5k Mode – 9 kHz – 30 MHz – Horizontal Polarization**

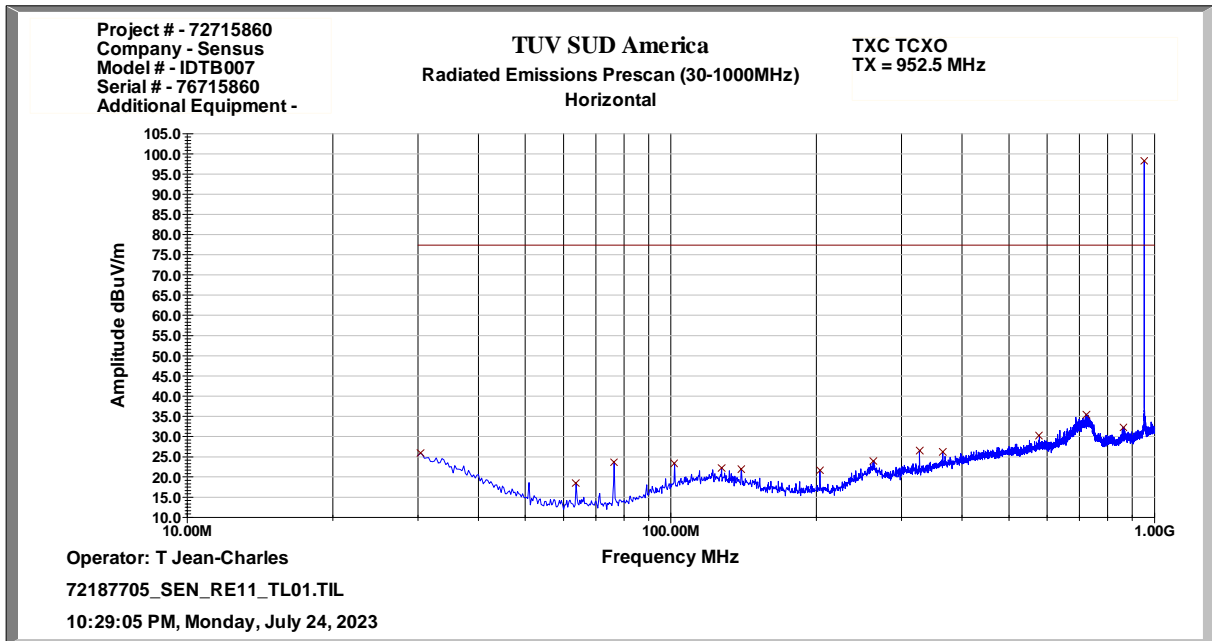


Figure 2.5.6-2 - Transmitter Radiated Spurious Emissions – TXC TCXO – 952.5 MHz - mPass5k Mode – 30 MHz – 1 GHz – Horizontal Polarization

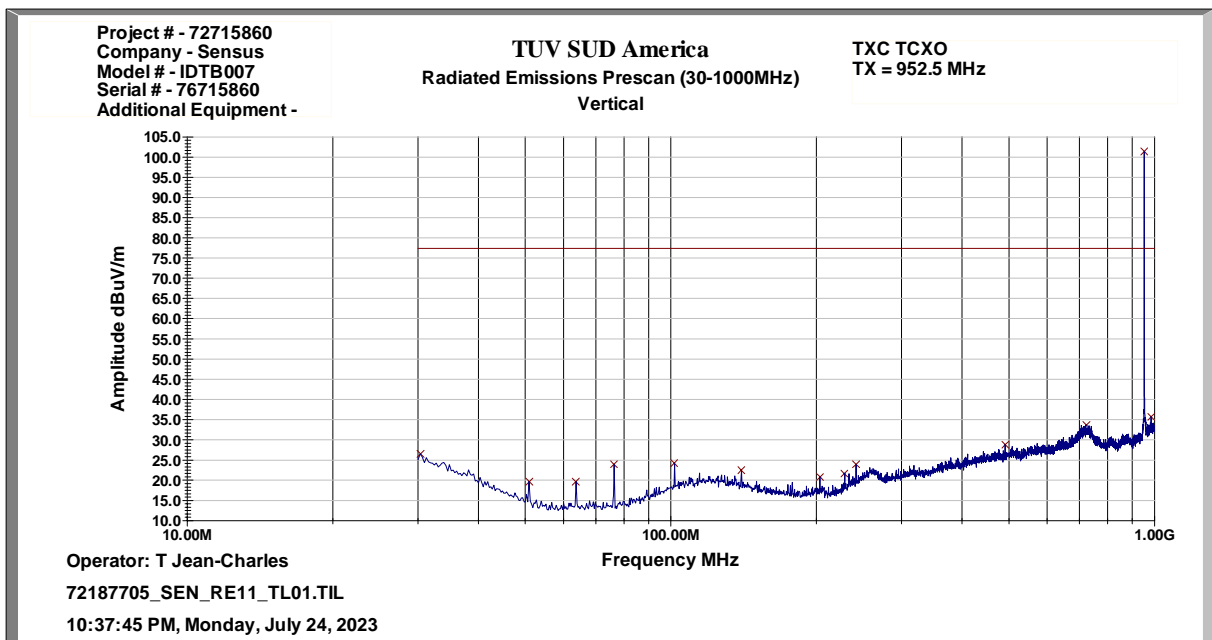
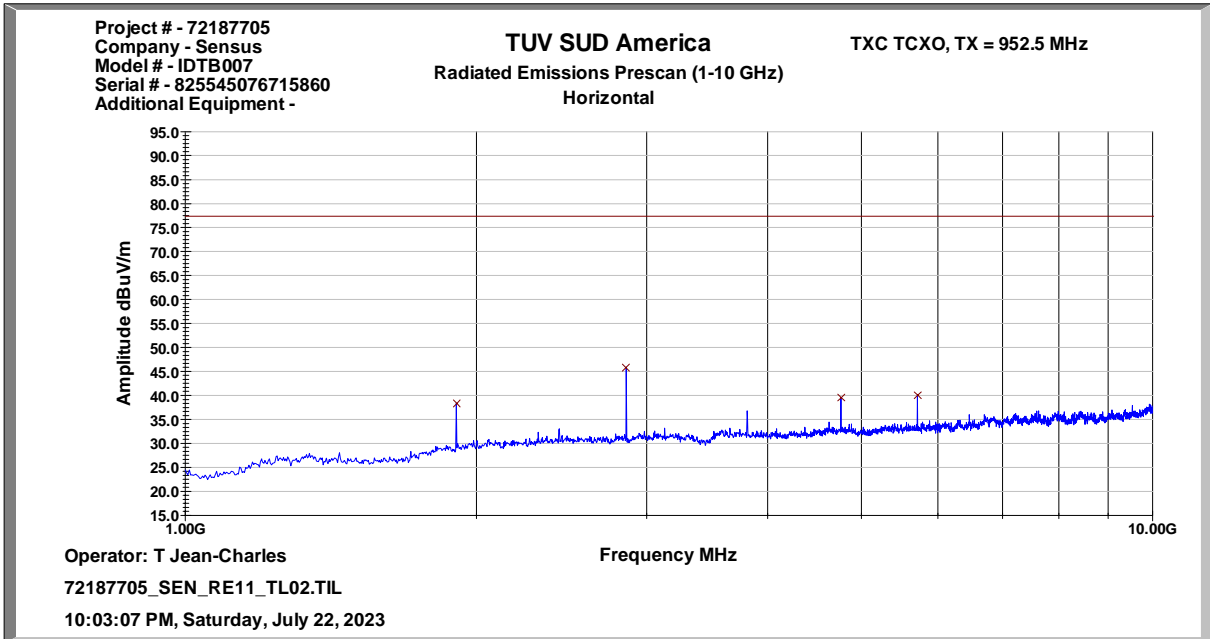
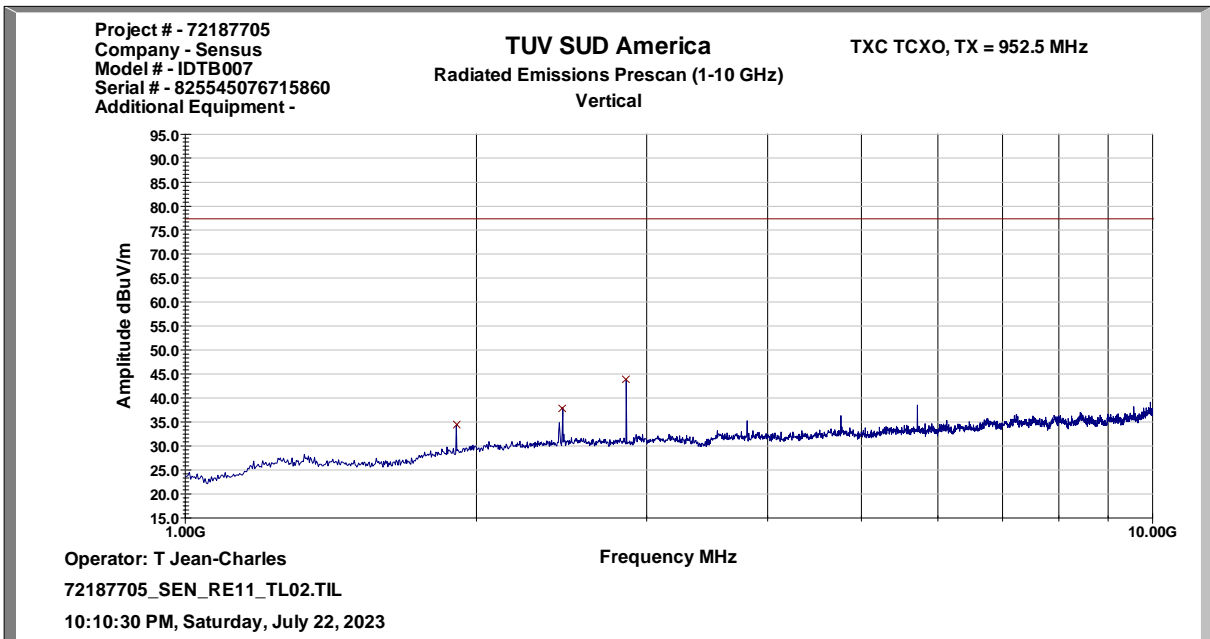


Figure 2.5.6-3 - Transmitter Radiated Spurious Emissions – TXC TCXO – 952.5 MHz - mPass5k Mode – 30 MHz – 1 GHz – Vertical Polarization



**Figure 2.5.6-4 - Transmitter Radiated Spurious Emissions – TXC TCXO – 952.5 MHz - mPass5k Mode – 1 GHz – 10 GHz – Horizontal Polarization**



**Figure 2.5.6-5 - Transmitter Radiated Spurious Emissions – TXC TCXO – 952.5 MHz - mPass5k Mode – 1 GHz – 10 GHz – Vertical Polarization**





## 2.5.7 Sample Calculations

$$\text{ERP} = \text{Pgen} - \text{Cables Loss} + \text{Substitution Antenna Gain [dBd]}$$

Where:

ERP is the EUT radiated Power in dBm

Pgen is the signal generator setting [dBm]

Cable Loss is the Transmit cable loss [dB]

Substitution Antenna Gain [dBd] =  $10 \text{ Log (antenna numeric gain) } - 2.15$ .

### **Example Calculation (E.I.R.P):**

Radiated Power  $-53 - 5.71 + 8.314 = -50.396 \text{ dBm}$

Margin:  $-13 - -50.396 = 37.396 \text{ dB}$

### **Example Calculation (E.R.P):**

Radiated Power  $-53 - 5.71 + 8.314 - 2.15 = -52.546 \text{ dBm}$

Margin:  $-13 - -52.546 = 39.546 \text{ dB}$



**2.5.8 Test Location and Test Equipment Used**

This test was carried out in TÜV SÜD America, Inc., 5610 W. Sligh Ave, Suite 100, Tampa, FL 33634, USA.

Instrument	Manufacturer	Type No	TE No	Software / Firmware Revision	Calibration Period (months)	Calibration Due
100Hz-26.5GHz EMC analyzer/HYZ	Hewlett Packard	E7405A	BEMC00523	A.14.06	12	24-Jan-2024
Notch Filter	Trilithic, Inc.	7NM867/122-X1-AA	BEMC02069	N/A	12	19-Dec-2023
Tile Automation Software	ETS Lindgren	TILE4! - Version 4.2.A	BEMC02095	4.2A	N/A	NCR
Synthesized Signal Generator 0.05 - 26 GHz	Hewlett Packard	8673D	BEMC02126	N/A	24	07-Jun-2024
PE-P160 40 GHz Cable	Pasternack	PE360-396	BEMC02147	N/A	12	30-May-2024
BI LOG PERIODIC, ANTENNA	Schaffner	CBL6112B	TEMC00005	N/A	24	01-Nov-2023
Loop Antenna	Com Power	AL-130	TEMC00025	N/A	24	14-Oct-2023
EMC Chamber	Panashield	N/A	TEMC00031	N/A	36	28-Jan-2024
Double Ridge Guide Horn	ETS Lindgren	3117	TEMC00061	N/A	24	11-Feb-2024
Microwave Preamplifier	Com-Power Corporation	PAM-118A	TEMC00160	N/A	12	18-Feb-2024
1.2 GHz High Pass Filter	Micro-Tronics	HPM50108-01	TEMC00175	N/A	12	25-Feb-2024
A81-0303 18 GHz Cable Set	Teledyne Storm Products	A81-0303-360/96	TEMC00201	N/A	12	18-Feb-2024

TU - Traceability Unscheduled  
 O/P MON – Output Monitored with Calibrated Equipment  
 N/A - Not Applicable  
 NCR – No Calibration Required



## **2.6 Frequency Stability**

### **2.6.1 Specification Reference**

FCC Section 2.1055; FCC Section 24.135  
ISED Canada RSS-134 4.5

### **2.6.2 Equipment Under Test and Modification State**

TXC TCXO, SN: 825545076715645  
KDS TCXO, SN: 825545076715755

### **2.6.3 Date of Test**

2023-June-26 to 2023-June-30

### **2.6.4 Test Method**

The equipment under test is placed inside an environmental chamber. The RF output is directly coupled to the input of the measurement equipment and a power supply is attached to the primary supply voltage.

Frequency measurements were made at the extremes of the of temperature range -30° C to +50° C and at intervals of 10° C at normal supply voltage. Sufficient time to stabilize all components of the equipment was allowed at each frequency measurement. At a temperature 20° C the supply voltage was reduced to the battery operating endpoint. The maximum variation of frequency was recorded.

### **2.6.5 Environmental Conditions**

Ambient Temperature	25 °C
Relative Humidity	39.9 %
Atmospheric Pressure	1010.3 mbar



2.6.6 Test Results

TXC TCXO

## Frequency Stability

**Frequency (MHz):** 901.5  
**Deviation Limit (PPM):** 1  
**Nominal Voltage (VDC):** 4.2

Temperature C	Frequency MHz	Frequency Error (PPM)	Voltage (%)	Voltage (VDC)
-30 C	901.500105	-0.189	100%	4.20
-20 C	901.500085	-0.211	100%	4.20
-10 C	901.500050	-0.250	100%	4.20
0 C	901.500165	-0.122	100%	4.20
10 C	901.500150	-0.139	100%	4.20
20 C	901.500275	0.000	100%	4.20
30 C	901.500280	0.006	100%	4.20
40 C	901.500195	-0.089	100%	4.20
50 C	901.500350	0.083	100%	4.20
20 C	901.500180	-0.105	85%	3.57
20 C	901.500290	0.017	115%	4.83

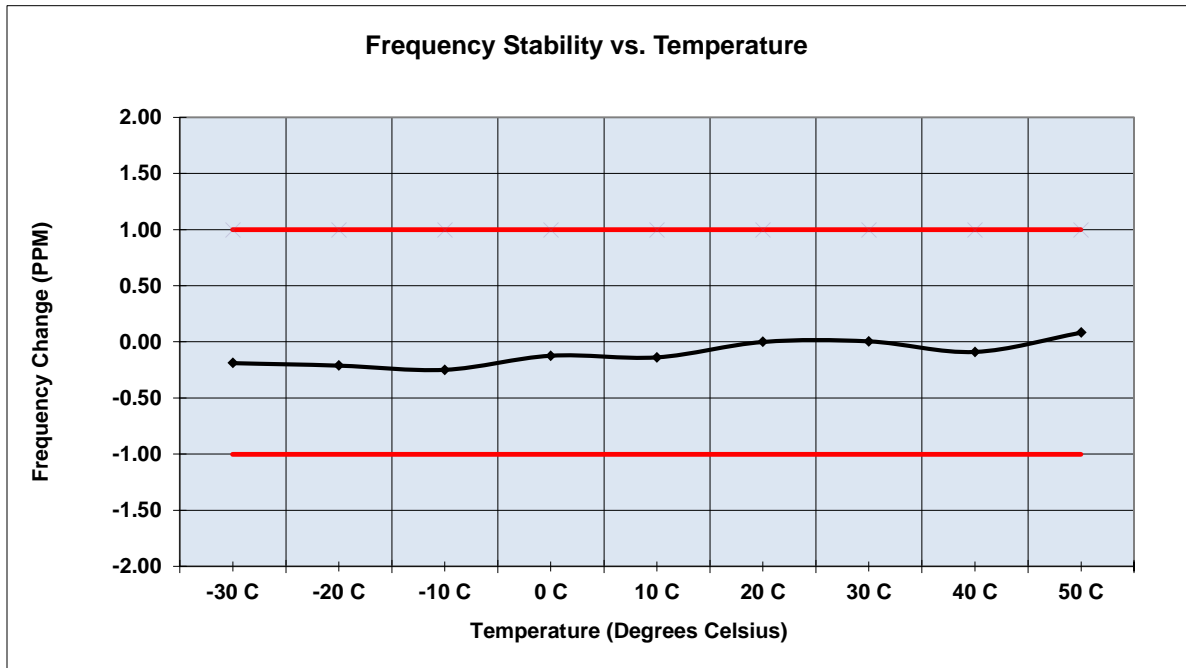


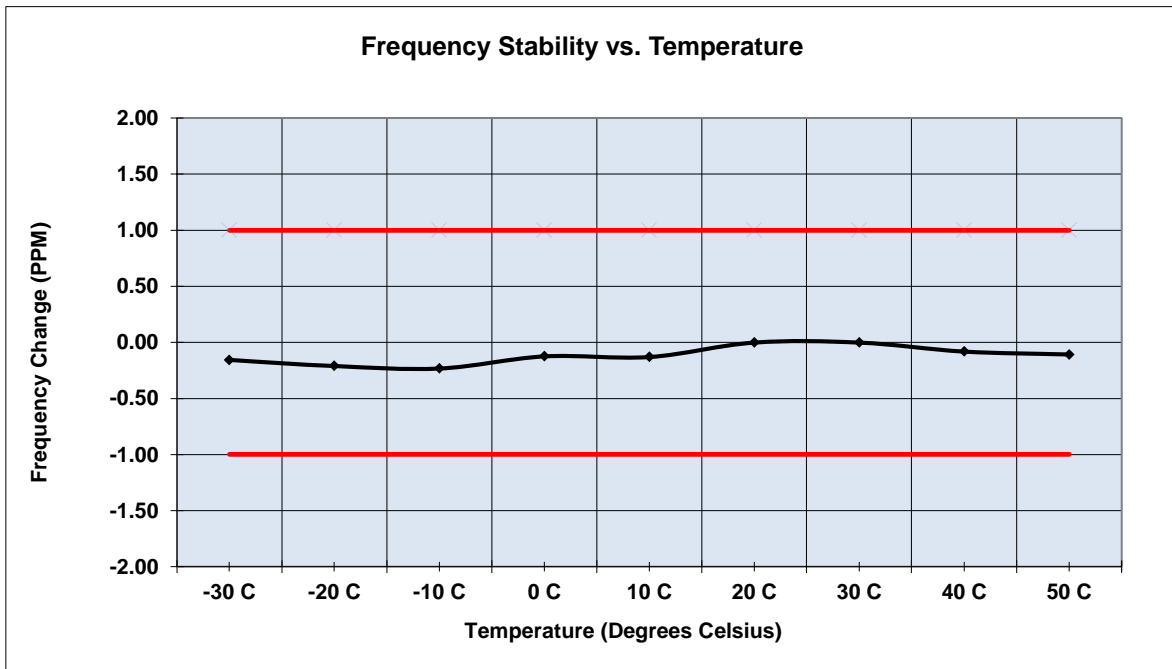
Figure 2.6.6-1 - Frequency Stability – TXC TCXO – 901.5 MHz



## Frequency Stability

**Frequency (MHz):** 930.5  
**Deviation Limit (PPM):** 1  
**Nominal Voltage (VDC):** 4.2

Temperature C	Frequency MHz	Frequency Error (PPM)	Voltage (%)	Voltage (VDC)
-30 C	930.500115	-0.156	100%	4.20
-20 C	930.500065	-0.210	100%	4.20
-10 C	930.500045	-0.231	100%	4.20
0 C	930.500145	-0.124	100%	4.20
10 C	930.500140	-0.129	100%	4.20
20 C	930.500260	0.000	100%	4.20
30 C	930.500260	0.000	100%	4.20
40 C	930.500185	-0.081	100%	4.20
50 C	930.500160	-0.107	100%	4.20
20 C	930.500170	-0.097	85%	3.57
20 C	930.500300	0.043	115%	4.83



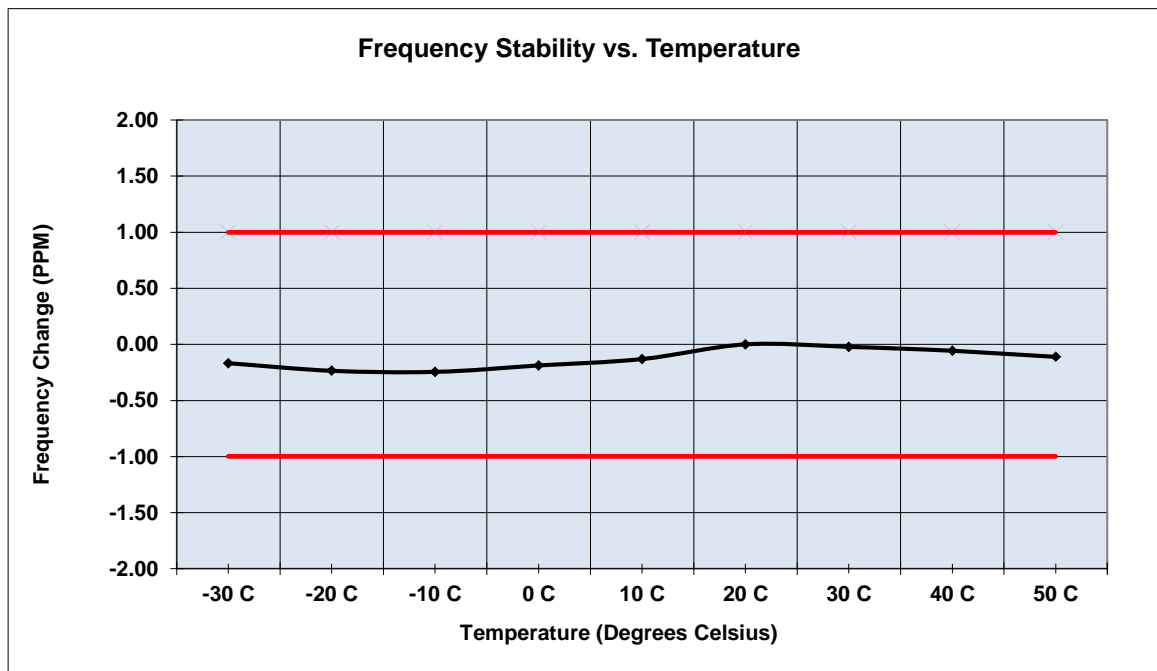
**Figure 2.6.6-2 - Frequency Stability – TXC TCXO – 930.5 MHz**



## Frequency Stability

**Frequency (MHz):** 959.925  
**Deviation Limit (PPM):** 1  
**Nominal Voltage (VDC):** 4.2

Temperature C	Frequency MHz	Frequency Error (PPM)	Voltage (%)	Voltage (VDC)
-30 C	959.925115	-0.167	100%	4.20
-20 C	959.925050	-0.234	100%	4.20
-10 C	959.925040	-0.245	100%	4.20
0 C	959.925095	-0.188	100%	4.20
10 C	959.925150	-0.130	100%	4.20
20 C	959.925275	0.000	100%	4.20
30 C	959.925255	-0.021	100%	4.20
40 C	959.925220	-0.057	100%	4.20
50 C	959.925170	-0.109	100%	4.20
20 C	959.925180	-0.099	85%	3.57
20 C	959.925295	0.021	115%	4.83



**Figure 2.6.6-3 - Frequency Stability – TXC TCXO – 959.925 MHz**



KDS TCXO

## Frequency Stability

**Frequency (MHz):** 901.5  
**Deviation Limit (PPM):** 1  
**Nominal Voltage (VDC):** 4.2

Temperature C	Frequency MHz	Frequency Error (PPM)	Voltage (%)	Voltage (VDC)
-30 C	901.500375	0.499	100%	4.20
-20 C	901.500476	0.611	100%	4.20
-10 C	901.500295	0.410	100%	4.20
0 C	901.500200	0.305	100%	4.20
10 C	901.500050	0.139	100%	4.20
20 C	901.499925	0.000	100%	4.20
30 C	901.499910	-0.017	100%	4.20
40 C	901.499875	-0.055	100%	4.20
50 C	901.499960	0.039	100%	4.20
20 C	901.499885	-0.044	85%	3.57
20 C	901.499935	0.011	115%	4.83

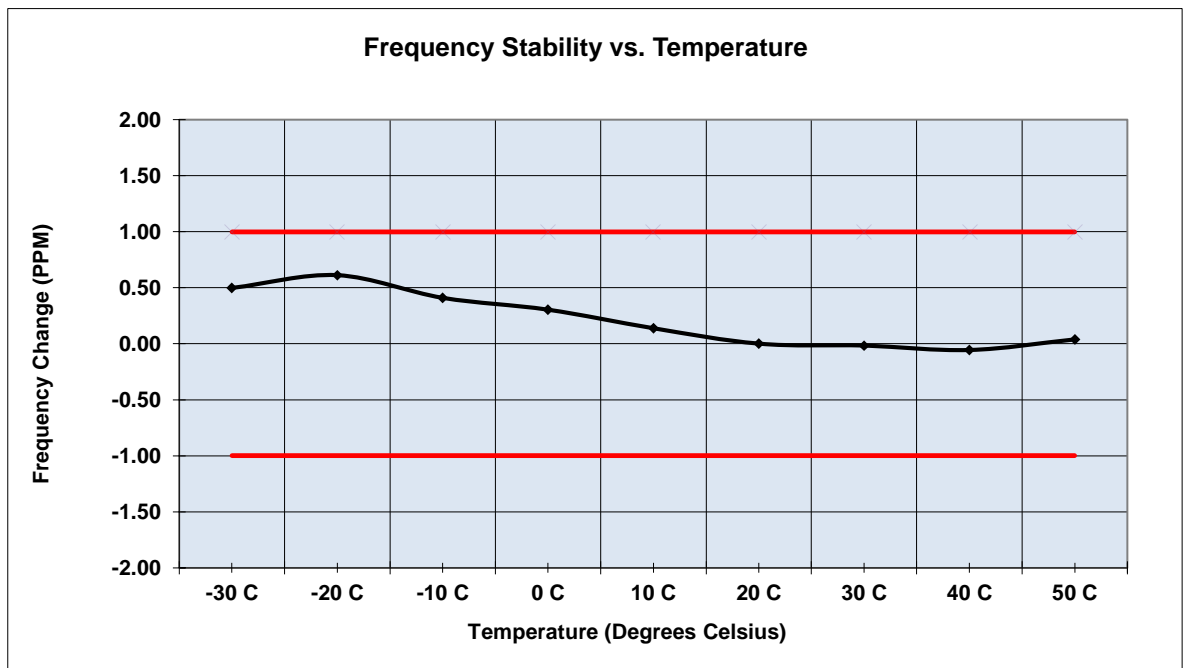


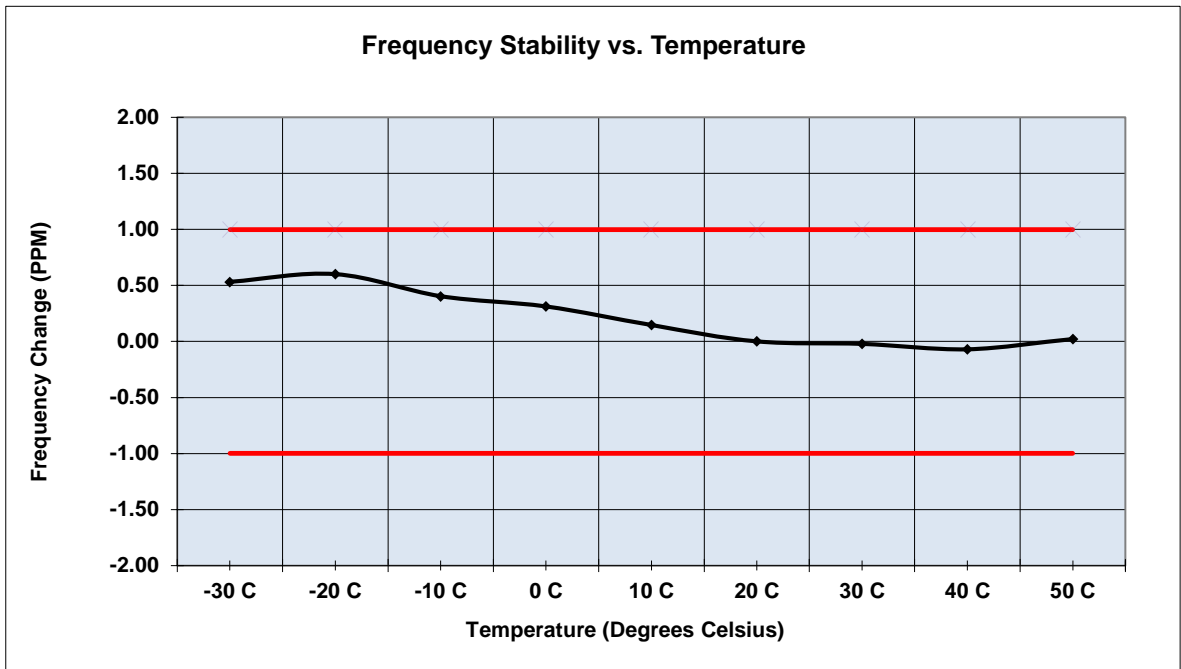
Figure 2.6.6-4 - Frequency Stability – KDS TCXO – 901.5 MHz



## Frequency Stability

**Frequency (MHz):** 930.5  
**Deviation Limit (PPM):** 1  
**Nominal Voltage (VDC):** 4.2

Temperature C	Frequency MHz	Frequency Error (PPM)	Voltage (%)	Voltage (VDC)
-30 C	930.500440	0.532	100%	4.20
-20 C	930.500505	0.602	100%	4.20
-10 C	930.500320	0.403	100%	4.20
0 C	930.500235	0.312	100%	4.20
10 C	930.500080	0.145	100%	4.20
20 C	930.499945	0.000	100%	4.20
30 C	930.499925	-0.021	100%	4.20
40 C	930.499880	-0.070	100%	4.20
50 C	930.499965	0.021	100%	4.20
20 C	930.499895	-0.054	85%	3.57
20 C	930.499950	0.005	115%	4.83



**Figure 2.6.6-5 - Frequency Stability – KDS TCXO – 930.5 MHz**

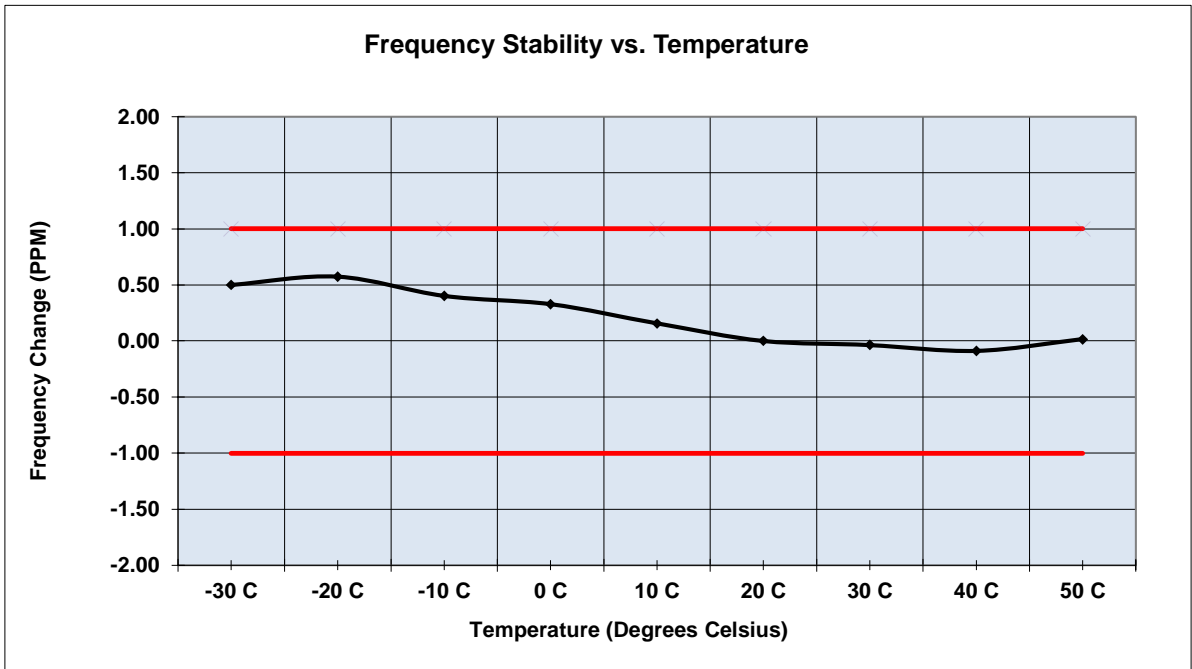




## Frequency Stability

**Frequency (MHz):** 959.925  
**Deviation Limit (PPM):** 1  
**Nominal Voltage (VDC):** 4.2

Temperature C	Frequency MHz	Frequency Error (PPM)	Voltage (%)	Voltage (VDC)
-30 C	959.925430	0.500	100%	4.20
-20 C	959.925500	0.573	100%	4.20
-10 C	959.925335	0.401	100%	4.20
0 C	959.925265	0.328	100%	4.20
10 C	959.925100	0.156	100%	4.20
20 C	959.924950	0.000	100%	4.20
30 C	959.924915	-0.036	100%	4.20
40 C	959.924865	-0.089	100%	4.20
50 C	959.924965	0.016	100%	4.20
20 C	959.924895	-0.057	85%	3.57
20 C	959.924950	0.000	115%	4.83



**Figure 2.6.6-6 - Frequency Stability – KDS TCXO – 959.925 MHz**



**2.6.7 Test Location and Test Equipment Used**

This test was carried out in TÜV SÜD America, Inc., 5610 W. Sligh Ave, Suite 100, Tampa, FL 33634, USA.

Instrument	Manufacturer	Type No	TE No	Software / Firmware Revision	Calibration Period (months)	Calibration Due
Digital Thermometer	Omega Engineering, Inc.	MDSS41-TC	BEMC00002	N/A	24	21-Sep-2023
Digital MultiMeter	Fluke	115	BEMC02108	N/A	12	25-Jan-2024
Signal & Spectrum Analyzer	Rohde & Schwarz	FSW43	DEMC3085	2.90 SP1	12	08-Jun-2024
DC Power Supply	Xantrex	XHR60-18	TEMC00001	N/A	N/A	NCR, O/P MON
Temperature Test Chamber	Sun Electronic Systems, Inc.	EC127	TEMC00242	5.10	N/A	NCR, O/P MON
30 dB Fixed Attenuator	Mini-Circuits	BW-S30W5+	TEMC00264	N/A	12	15-Apr-2024
Flexible Test Cable	Mini-Circuits	ULC-8FT-SMSM+	TEMC00268	N/A	12	21-Mar-2024

TU - Traceability Unscheduled  
 O/P MON – Output Monitored with Calibrated Equipment  
 N/A - Not Applicable  
 NCR - No Calibration Required



### 3 Test Equipment Information

#### 3.1 General Test Equipment Used

Instrument	Manufacturer	Type No	TE No	Software / Firmware Revision	Calibration Period (months)	Calibration Due
Digital Thermometer	Omega Engineering, Inc.	MDSS41-TC	BEMC00002	N/A	24	21-Sep-2023
100Hz-26.5GHz EMC analyzer/HYZ	Hewlett Packard	E7405A	BEMC00523	A.14.06	12	24-Jan-2024
Notch Filter	Trilithic, Inc.	7NM867/122-X1-AA	BEMC02069	N/A	12	19-Dec-2023
Tile Automation Software	ETS Lindgren	TILE4! - Version 4.2.A	BEMC02095	4.2A	N/A	NCR
Digital MultiMeter	Fluke	115	BEMC02108	N/A	12	25-Jan-2024
Duratest 175 Cable 26.5GHz	Teledyne Storm Products	921-0101-036	BEMC02112	N/A	12	12-Oct-2023
Synthesized Signal Generator 0.05 - 26 GHz	Hewlett Packard	8673D	BEMC02126	N/A	24	07-Jun-2024
PE-P160 40 GHz Cable	Pasternack	PE360-396	BEMC02147	N/A	12	30-May-2024
Signal & Spectrum Analyzer	Rohde & Schwarz	FSW43	DEMC3085	2.90 SP1	12	08-Jun-2024
DC Power Supply	Xantrex	XHR60-18	TEMC00001	N/A	N/A	NCR
BI LOG PERIODIC, ANTENNA	Schaffner	CBL6112B	TEMC00005	N/A	24	01-Nov-2023
Loop Antenna	Com Power	AL-130	TEMC00025	N/A	24	14-Oct-2023
EMC Chamber	Panashield	N/A	TEMC00031	N/A	36	28-Jan-2024
Double Ridge Guide Horn	ETS Lindgren	3117	TEMC00061	N/A	24	11-Feb-2024
Microwave Preamplifier	Com-Power Corporation	PAM-118A	TEMC00160	N/A	12	18-Feb-2024
1.2 GHz High Pass Filter	Micro-Tronics	HPM50108-01	TEMC00175	N/A	12	25-Feb-2024
A81-0303 18 GHz Cable Set	Teledyne Storm Products	A81-0303-360/96	TEMC00201	N/A	12	18-Feb-2024
Temperature Test Chamber	Sun Electronic Systems, Inc.	EC127	TEMC00242	5.10	N/A	NCR
30 dB Fixed Attenuator	Mini-Circuits	BW-S30W5+	TEMC00264	N/A	12	15-Apr-2024
Flexible Test Cable	Mini-Circuits	ULC-8FT-SMSM+	TEMC00268	N/A	12	21-Mar-2024



TU - Traceability Unscheduled  
O/P MON - Output Monitored with Calibrated Equipment  
N/A - Not Applicable  
NCR - No Calibration Required

## 4 Diagram of Test Set-ups

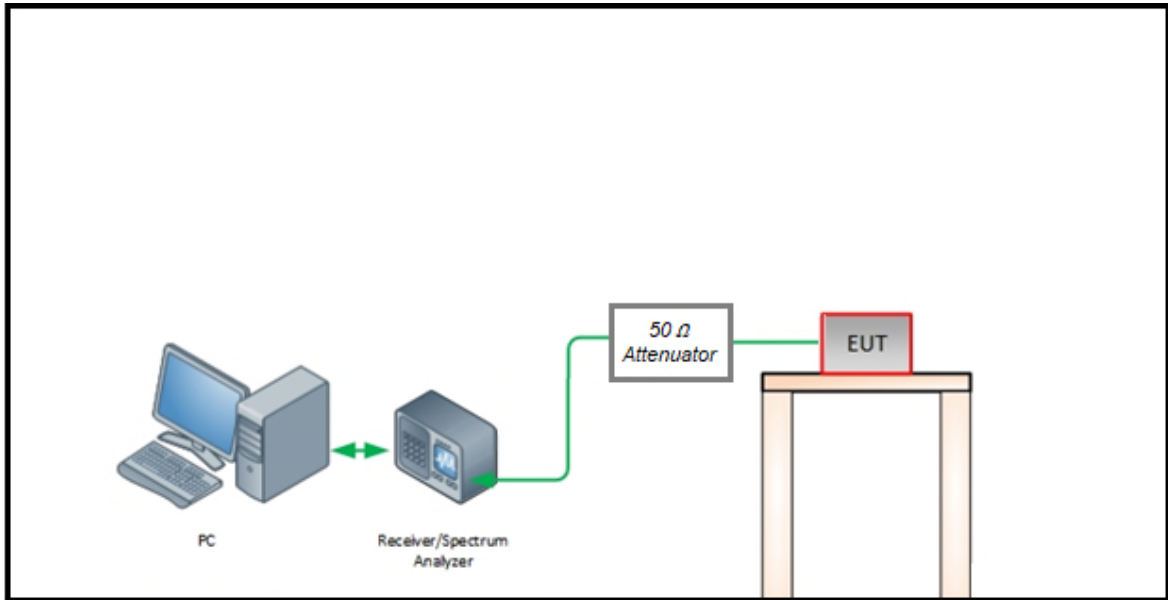


Figure 4-1 - RF Conducted Emissions Test Setup up, General Measurements

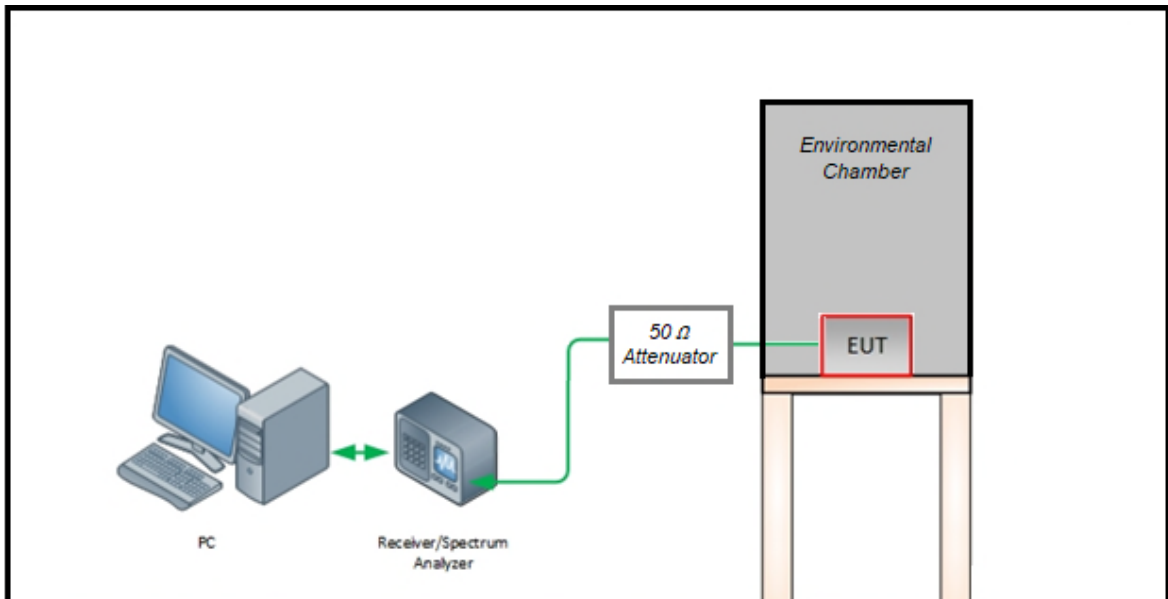


Figure 4-2 - RF Conducted Emissions Test Setup up, Extreme Conditions

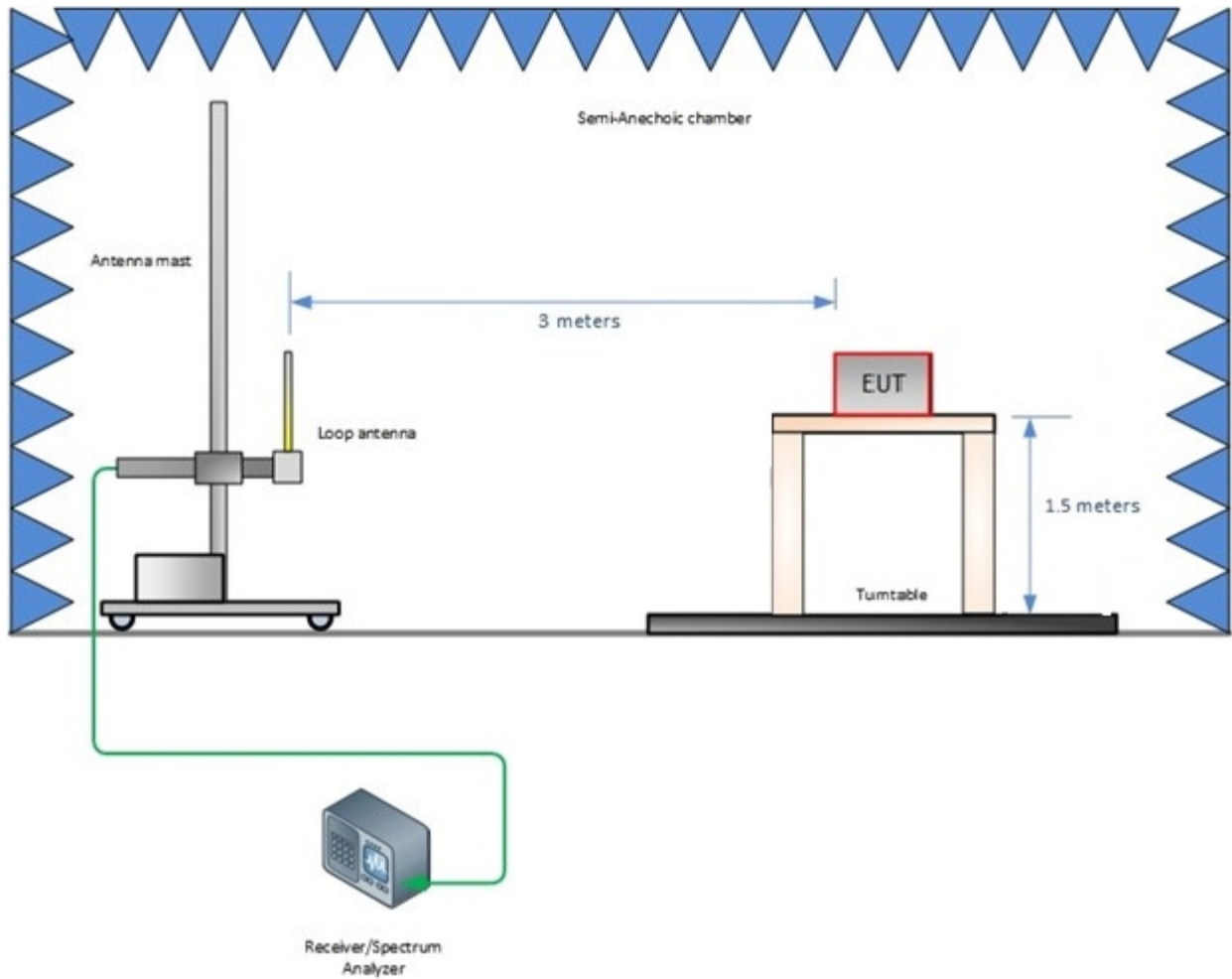


Figure 4-3 - Radiated Emissions Test Setup up to 30 MHz

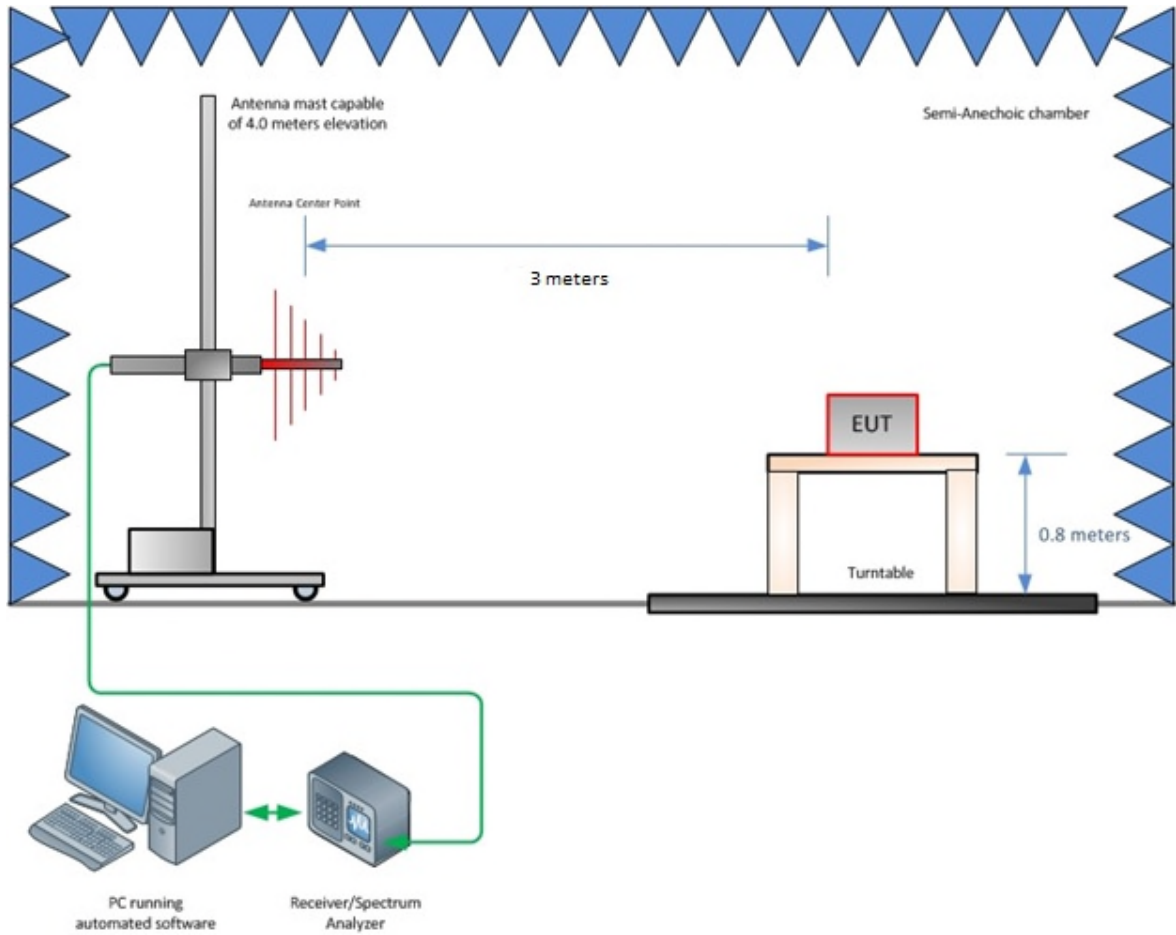
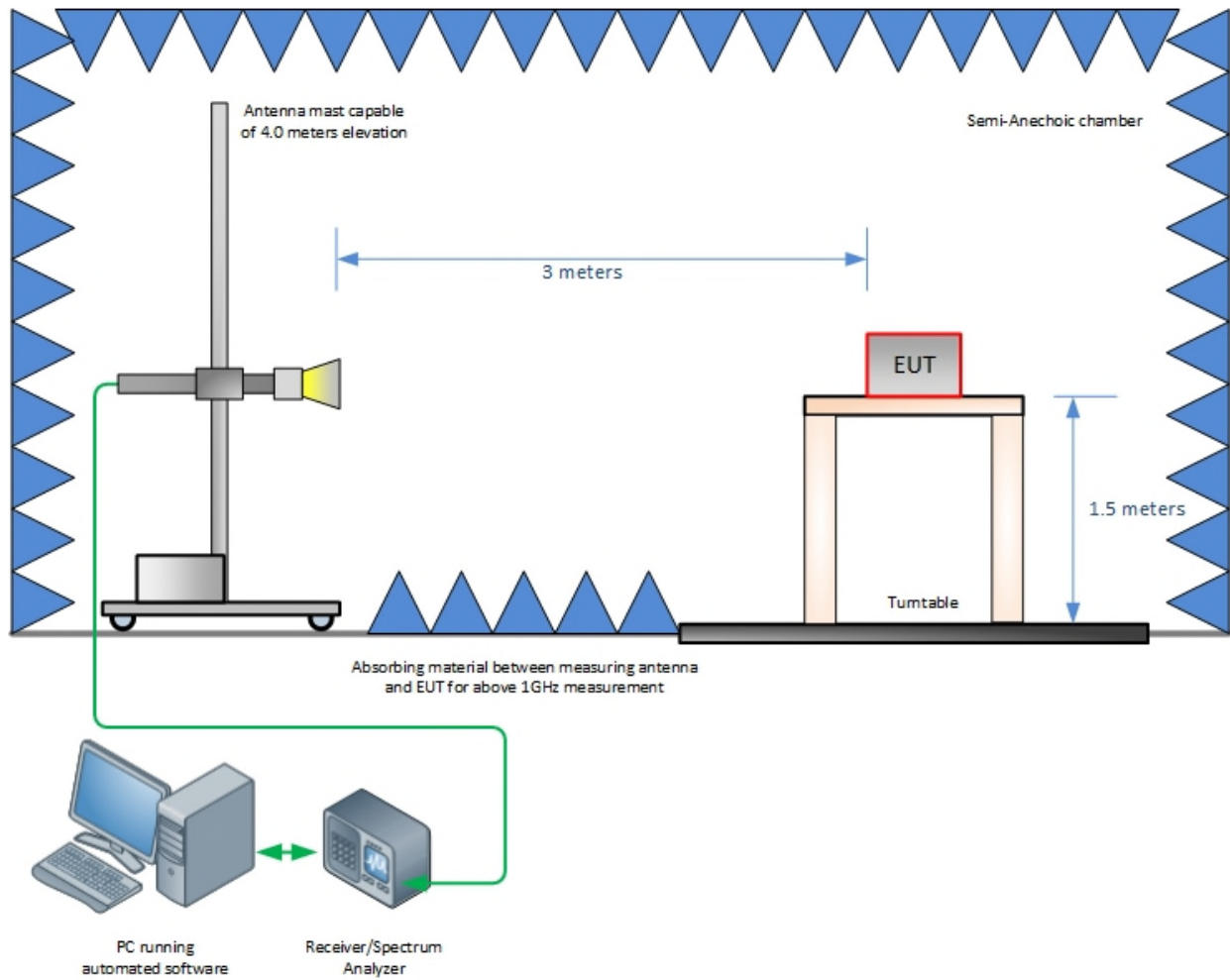


Figure 4-4 - Radiated Emissions Test Setup up to 1 GHz



**Figure 4-5 - Radiated Emissions Test Setup above 1 GHz**



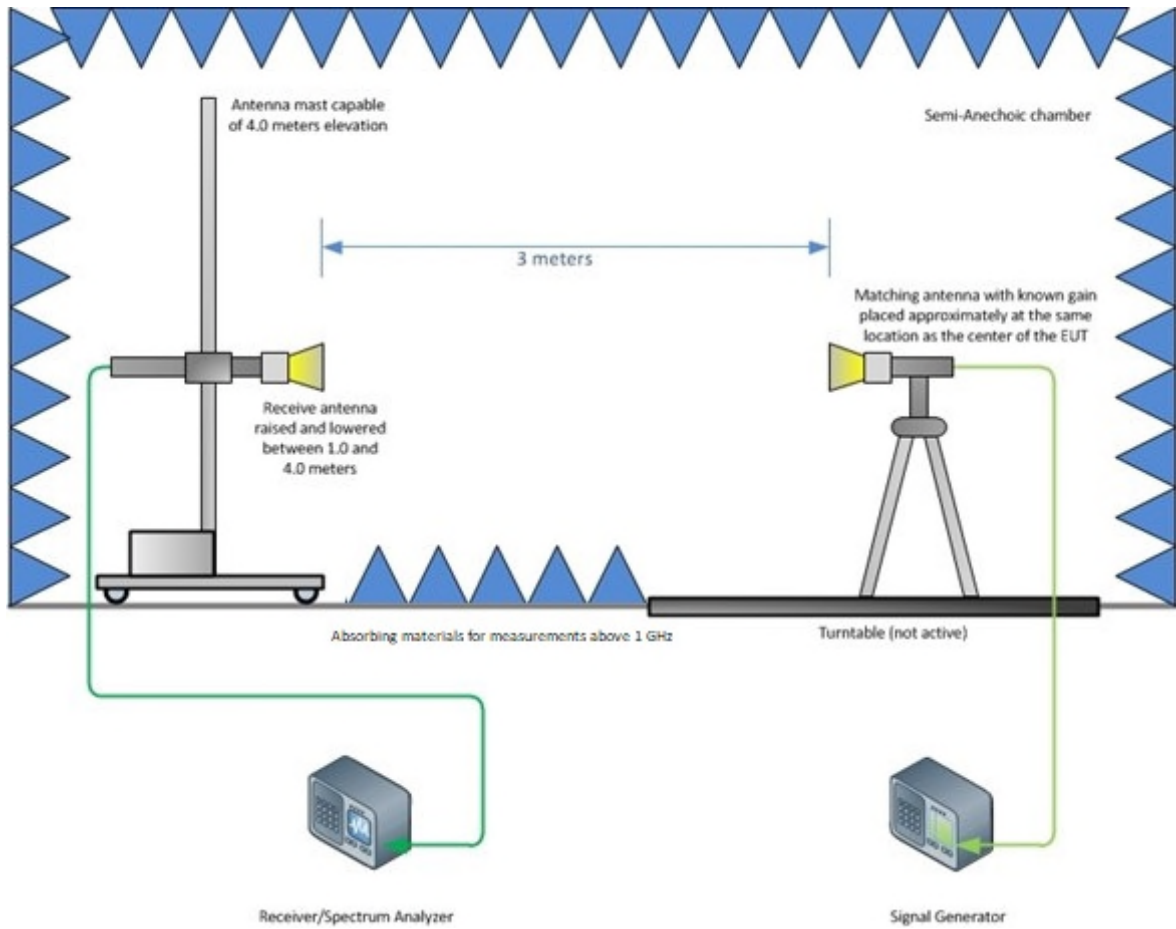


Figure 4-6 - Substitution Test Setup above 1 GHz

## 5 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

**Table 5-1 - Values of  $U_{\text{CISPR}}$  and  $U_{\text{Lab}}$**

Measurement	$U_{\text{CISPR}}$	$U_{\text{Lab}}$
Conducted disturbance (mains port) (9 kHz – 150 kHz) (150 kHz – 30 MHz)	3.8 dB 3.4 dB	3.71 dB 3.31 dB
Conducted disturbance (telecom port) (150 kHz – 30 MHz 55 dB LCL) (150 kHz – 30 MHz 65 dB LCL) (150 kHz – 30 MHz 75 dB LCL)	5.0 dB 5.0 dB 5.0 dB	4.11 dB 4.50 dB 4.94 dB
Radiated disturbance (electric field strength on an open area test site or alternative test site) (30 MHz – 1 000 MHz) (1 – 6 GHz) (6-18 GHz)	6.3 dB 5.2 dB 5.5 dB	5.85 dB 4.48 dB 4.48 dB

### Notes:

$U_{\text{CISPR}}$  resembles a value of measurement uncertainty for a specific test, which was determined by considering uncertainties associated with the quantities listed in CISPR 16-4-2:2011.



## 6 Accreditation, Disclaimers and Copyright

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