



Test Report - FCC Part 90

Applicant: Ritron, Inc.

Approved for Release By:

Signature: Bruno Clavier

Name & Title: Bruno Clavier, General Manager

Date of Signature 1/3/2023

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849 NW State Road 45, Newberry, Florida 32669
(352) 472-5500 / testing@timcoengr.com

CUSTOMER INFORMATION

Applicant: Ritron, Inc.
Address: 505 West Carmel Drive
P.O. Box 1998
Carmel, IN 46032, United States

1.1 Part 90 Test Result Summary

The following test procedure and guidance were used for measuring FCC PART 90 (PRIVATE LAND MOBILE RADIO SERVICES) known as Licensed Land Mobile; ANSI C63.26-2015. Full test results are available in this report.

Applicable Clauses from Part 2		
FCC Clauses	Description of the requirements	Result: (Pass, Fail, N/A)
2.202	Bandwidth & Emission	Pass
2.1033 (c)(8)	Power at the Final Amplifier	Reported
2.1046 (a)	RF Output Power	Pass
2.1047	Modulation characteristics	n/a
2.1049	Occupied Bandwidth	Pass
2.1051	Spurious emissions at antenna terminals	Pass
2.1053	Field strength of spurious radiation	Pass
2.1055	Frequency stability	Pass

Applicable Clauses from Part 90		
FCC Clauses	Description of the requirements	Result: (Pass, Fail, N/A)
90.205 (r)	Transmitter Power	Pass
90.207 (n)	Emission designator	Reported
90.209 (b) (5) footnote 2	Bandwidth limitations	Pass
90.210 (n)	Emission masks, In-band	Pass
90.210 (n)	Emission masks, Out-of-band	Pass
90.213 (a) footnote 10	Frequency stability	Pass
90.214	Transient Frequency Behavior	Pass
90.221	Adjacent channel power limits	n/a

No additions to the test methods were needed. There were no deviations, or exclusions from the test methods. No test results are from external providers or from the customer. The test results relate only to the items tested. Timco does not offer opinions and interpretations, only a pass/fail statement.



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2. Location of Testing

2.1 Test Laboratory

Timco Engineering Inc. is a subsidiary of Industrial Inspection & Analysis, Inc. ("IIA").

Testing was performed at Timco's permanent laboratory located at 849 NW State Road 45, Newberry, Florida 32669

FCC test firm # 578780

FCC Designation # US1070

FCC site registration is under A2LA certificate # 0955.01

ISED Canada test site registration # 2056A

EU Notified Body # 1177

For all designations see A2LA scope # 0955.01

2.1 Testing was performed, reviewed by

Dates of Testing: 12/09/2022-12/12/2022

Signature:

Sr. EMC Engineer
EMC-003838-NE



Name & Title:

Tim Royer, EMC Engineer

Date of Signature

1/3/2023

Signature:

Name & Title:

Kristoffer Costa, EMC Technician

Date of Signature

1/3/2023



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

The test sample was received: 12/07/2022

3.1 Description of the EUT

A description as well as unambiguous identification of the EUT(s) tested. Where more than one sample is required for technical reasons (such as the use of connected units for the purpose of conducted output power testing where the product units will have integral antennas), each specific test shall identify which unit was tested.

Identification	
FCC ID:	AIERIT53-16006
Brief Description	VHF Transceiver
Model(s) #	DTX-160-0BN6I-NXDN
Firmware version	N/A
Software version	N/A
Serial Number	A100123456

Technical Characteristics	
Frequency Range	136 MHz- 174 MHz
RF O/P Power (Max.)	38.43 dBm/ 6.96 W
Modulation	FM
Bandwidth & Emission Class	10K0F3E, 4K00F1E, 8K30F1E
Number of Channels	N/A
Duty Cycle	100%
Antenna Connector	BNC
Voltage Rating (AC or Batt.)	12.5 VDC

Antenna Characteristics			
Antenna	Frequency Range	Mode / BW	Antenna Gain
1	n/a	n/a	0 dBi

- Note: Information such as antenna gain, firmware/software numbers are provided by manufacturer and cannot be validated by the test lab.



3.2 Configuration of EUT

Test Modes				
Mode (#)	Mode (Type)	Test Frequencies (MHz)	BW (nominal) (kHz)	Emission Designator
1	Transmit	155.025 163 172	6.25 12.5	10K0F3E, 4K00F1E, 8K30F1E

Operating conditions during Testing:

The device was operated without the provided antenna(s).

No other modifications of the device under test (including firmware, specific software settings, and input/output signal levels to the EUT) were made.

Peripherals used during Testing:

A laptop was used to program the EUT.

3.3 Test Setup of EUT

Equipment, antenna, and cable arrangement. The setup of the equipment and cable or wire placement on the test site that produces the highest radiated and the highest ac power line conducted emissions shall be shown clearly and described. Information on the orientation of portable equipment during testing shall be included. Drawings or photographs may be used for this purpose.

Test Setups are included in the test report.



4. Test methods & Applicable Regulatory Limits

4.1 Test methods/Standards/Guidance:

Test procedures and guidance for measuring Licensed Part 90 Licensed device:

- 1) ANSI C63.26-2015

4.2 Applied Limits and Regulatory Limits:

- 1) FCC CFR 47 Part 90

5. Measurement Uncertainty

Parameter	Uncertainty (dB)
Conducted Emissions	± 3.14 dB
Radiated Emissions (9kHz – 30 MHz)	± 3.08 dB
Radiated Emissions (30 – 200 MHz)	± 2.16 dB
Radiated Emissions (200 – 1000 MHz)	± 2.15 dB
Radiated Emissions (1 GHz – 18 GHz)	± 2.14 dB
Radiated Emissions (18 GHz – 40 GHz)	± 2.31 dB
Note: The uncertainties provided in this table represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of K=2.	

6. Environmental Conditions

6.1 Temperature & Humidity

Measurements performed at the test site did not exceed the following:

Parameter	Measurement
Temperature	23 C +/- 5%
Humidity	55% +/- 5%
Barometric Pressure	30.05 in Hg
Note: Specific environmental conditions that are applicable to a specific test are available in the test result section.	



7. List of Test Equipment and Test Facility

The test equipment used identified by type, manufacturer, serial number, or other identification and the date on which the next calibration or service check is due.

Description of the firmware or software used to operate EUT for testing purposes.

A complete list of all test equipment used shall be included with the test report. The manufacturer's model and serial numbers, and date of last calibration, and calibration interval shall be included. Measurement cable loss, measuring instrument bandwidth and detector function, video bandwidth, if appropriate, and antenna factors shall also be included where applicable.

7.1 List of Test Equipment

Test Equipment						
Type	Device	Manufacturer	Model	SN#	Current Cal	Cal Due
Antenna	Biconical 1057	Eaton	94455-1	1057	10/16/20	10/16/2023
Antenna, NSA	Log-Periodic 1243	Eaton	96005	1243	5/4/21	5/3/2024
Antenna	Double-Ridged Horn/ETS Horn 1	ETS-Lindgren	3117	00035923	2/25/20	2/24/2023
CHAMBER	CHAMBER	Panashield	3M	N/A	3/12/19	12/21/2023
Pre-amp	Pre-amp	RF-LAMBDA	RLNA00M45GA	NA	2/27/19	7/26/2025
Receiver	EMI Test Receiver R&S ESU 40	Rohde & Schwarz	ESU 40	100320	5/27/21	5/26/2024
Receiver	EMI Test Receiver R&S ESW44	Rohde & Schwarz	ESW44	103049	10/13/21	10/12/2024
Function Generator	Function Generator	Standford	DS340	25200	1/13/21	1/13/2024
Signal Generator	Signal Generator HP 8648C	HP	8648C	35537A01679	3/29/19	8/03/2025
Thermometer	Type K J Thermometer	Martel	303	080504494	1/18/20	1/17/2023
Frequency Counter	Frequency Counter Small	HP	5385A	3242A07460	9/9/20	9/9/2023

Software			
Software	Author	Version	Validation on
ESU Firmware	Rohde & Schwarz	4.43 SP3; BIOS v5.1-24-3	2018
RSCCommander	Rohde & Schwarz	1.6.4	2014
ScopeExplorer	LeCroy	v2.25.0.0	2009
Field Strength	Timco	v4.10.7.0	2016



8. Test Results

The results of the test are usually indicated in the form of tables, spectrum analyzer plots, charts, sample calculations, as appropriate for each test procedure.

A description and/or a block diagram of the test setup is usually provided.

The measurement results, along with the appropriate limits for comparison, may be presented in tabular or graphical form. In addition, any variation in the measurement environment may be reported if applicable (e.g., a significant change of temperature that could affect the cable loss and amplifier response).

Unless noted otherwise in the referenced standard, the measurements of **ac power-line conducted emissions and conducted power output** will be reported in units of dB μ V. Unless noted otherwise in the referenced standard, the measurements of **radiated emissions** will be reported in units of decibels, referenced to one microvolt per meter (dB μ V/m) for electric fields, or to one ampere per meter (dBA/m) for magnetic fields, at the distance specified in the appropriate standards or requirements. The measurements of antenna-conducted power for receivers may be reported in units of dB μ V if the impedance of the measuring instrument is also reported. Otherwise, antenna-conducted power will be reported in units of decibels referenced to one milliwatt (dBm). All formulas for data conversions and conversion factors, if used, will be included in this measurement report.

Example:

Freq (MHz)	Meter Reading	+ ACF	+CL	= FS
33	20 dB μ V	+ 10.36 dB/m	+0.40 dB	=30.36 dB μ V/m @ 3m

$EIRP = P_{cond} \text{ (dBm)} + dBi$



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8.1 Power at the Final Amplifier

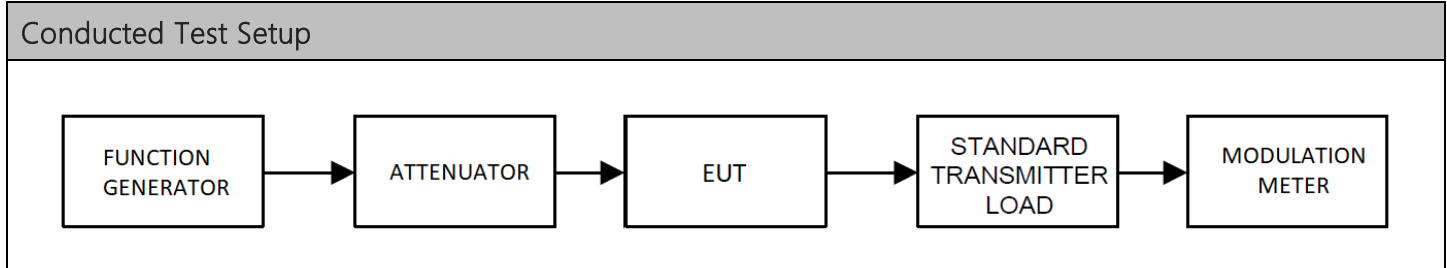
Limits from FCC Part 2.1033 (c)(8). No method of measurement is specified.

Test Results		
EUT Operating Voltage (V)	EUT Current (A)	Power at the Final Amplifier (W)
12.5	6	75

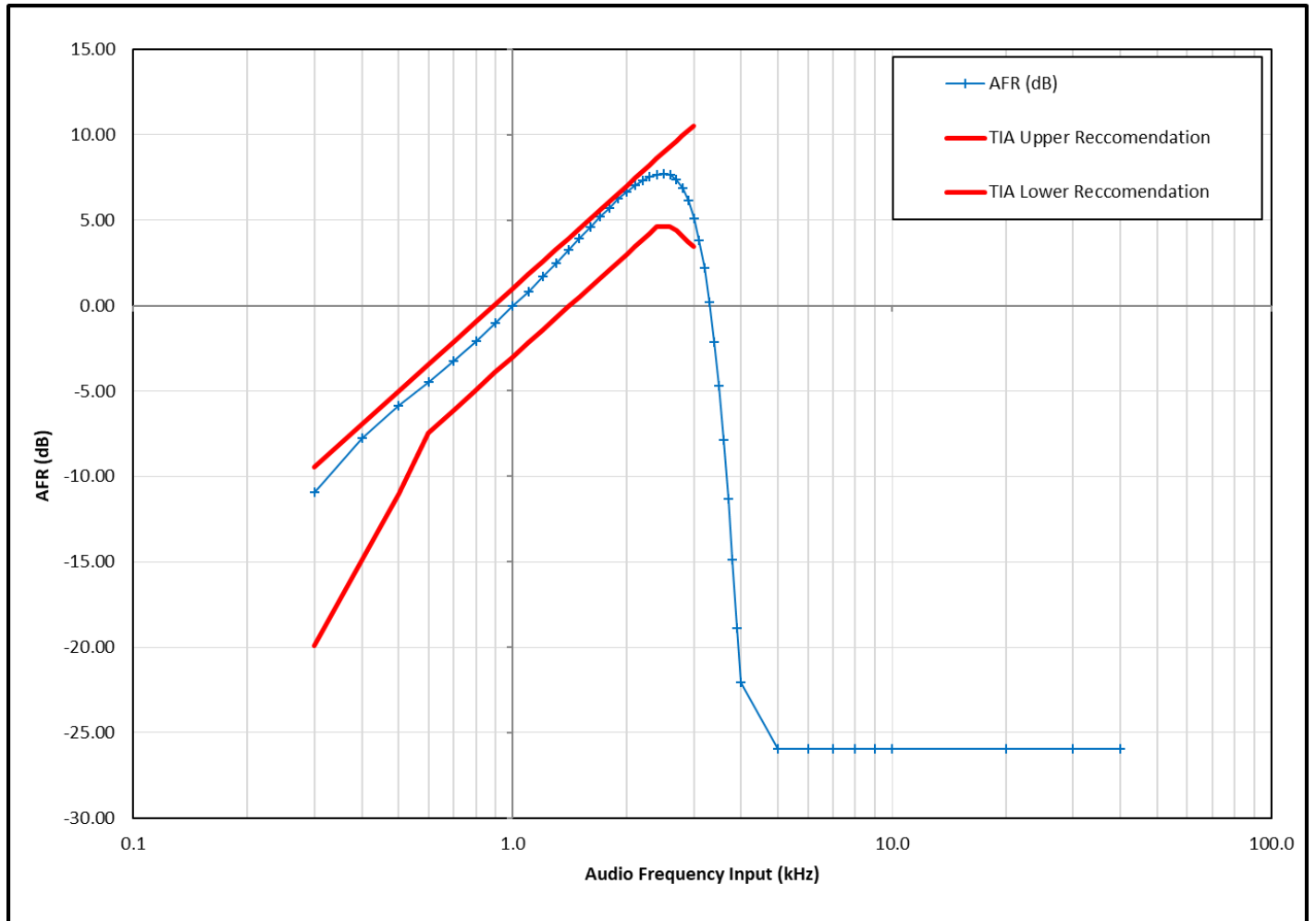


8.2 Modulation Characteristics

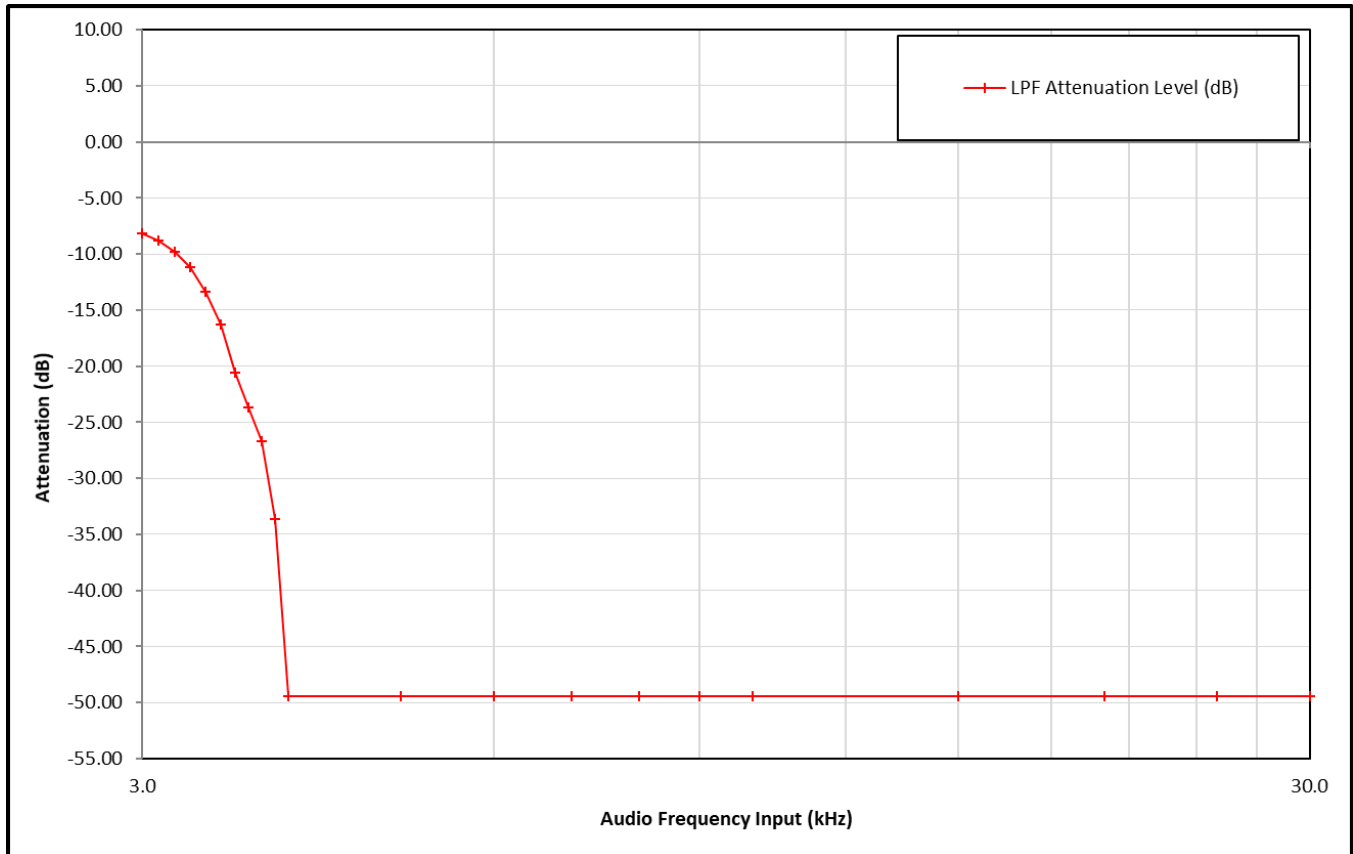
Limits from FCC Parts 2.1047, 80.213 (g), and 87.141; and test procedure from ANSI C63.26-2015



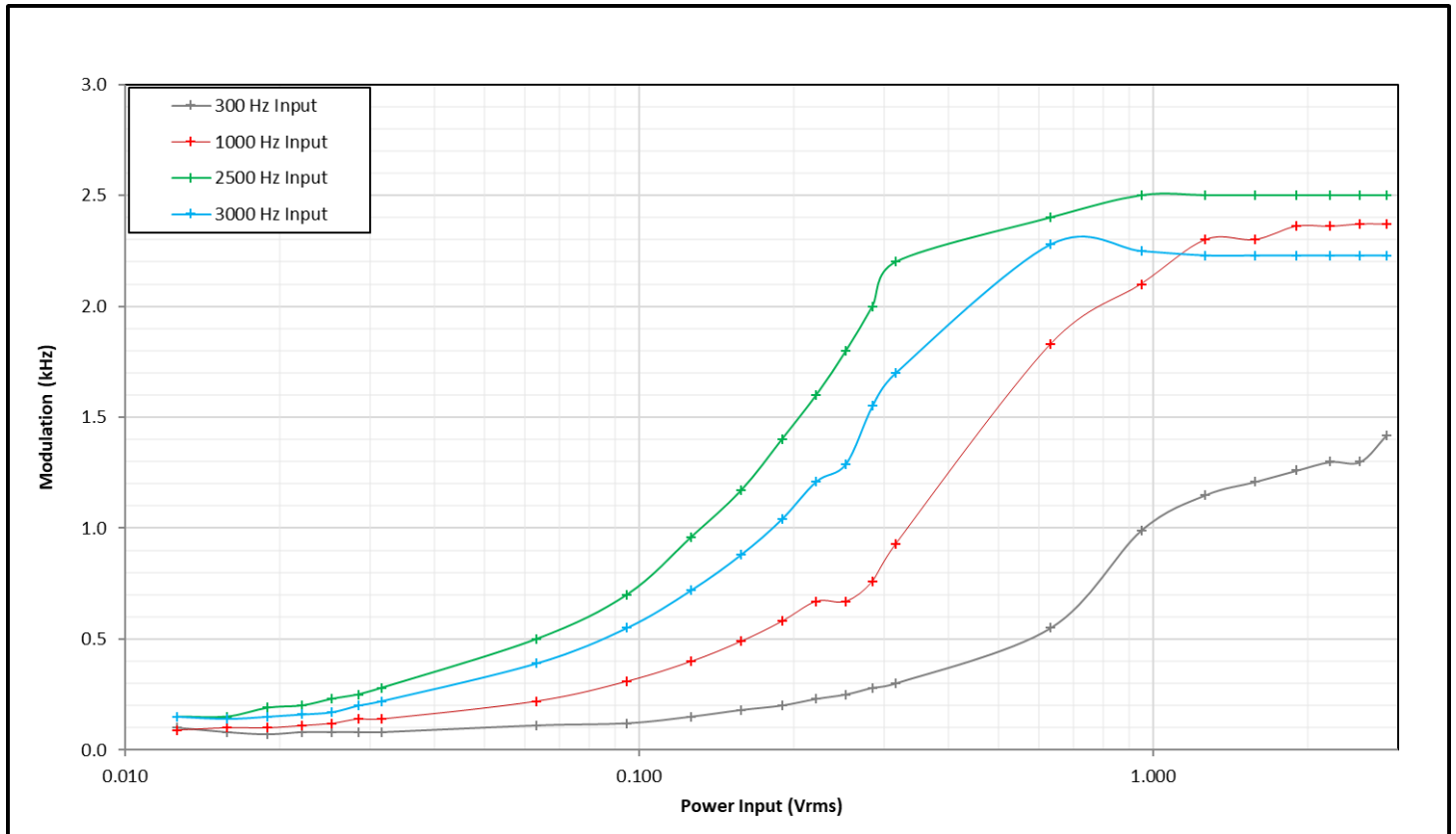
8.2.1 Audio Frequency Response



8.2.2 Low Pass Filter Response

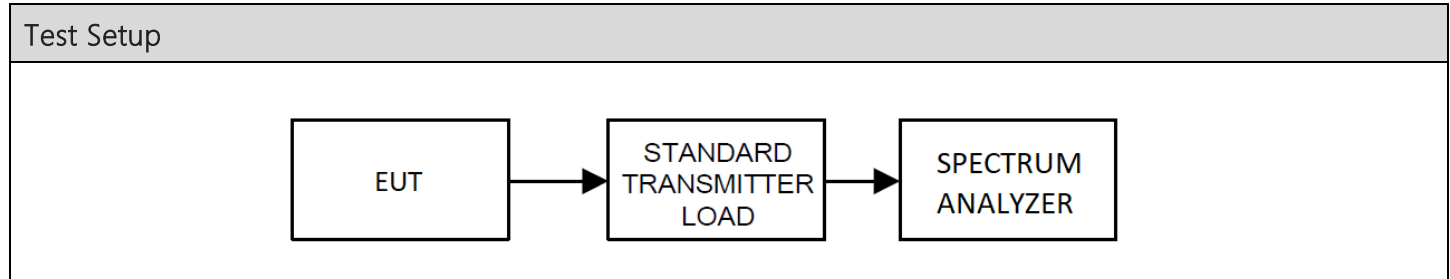


8.2.3 Modulation Limiting



8.3 RF Output Power

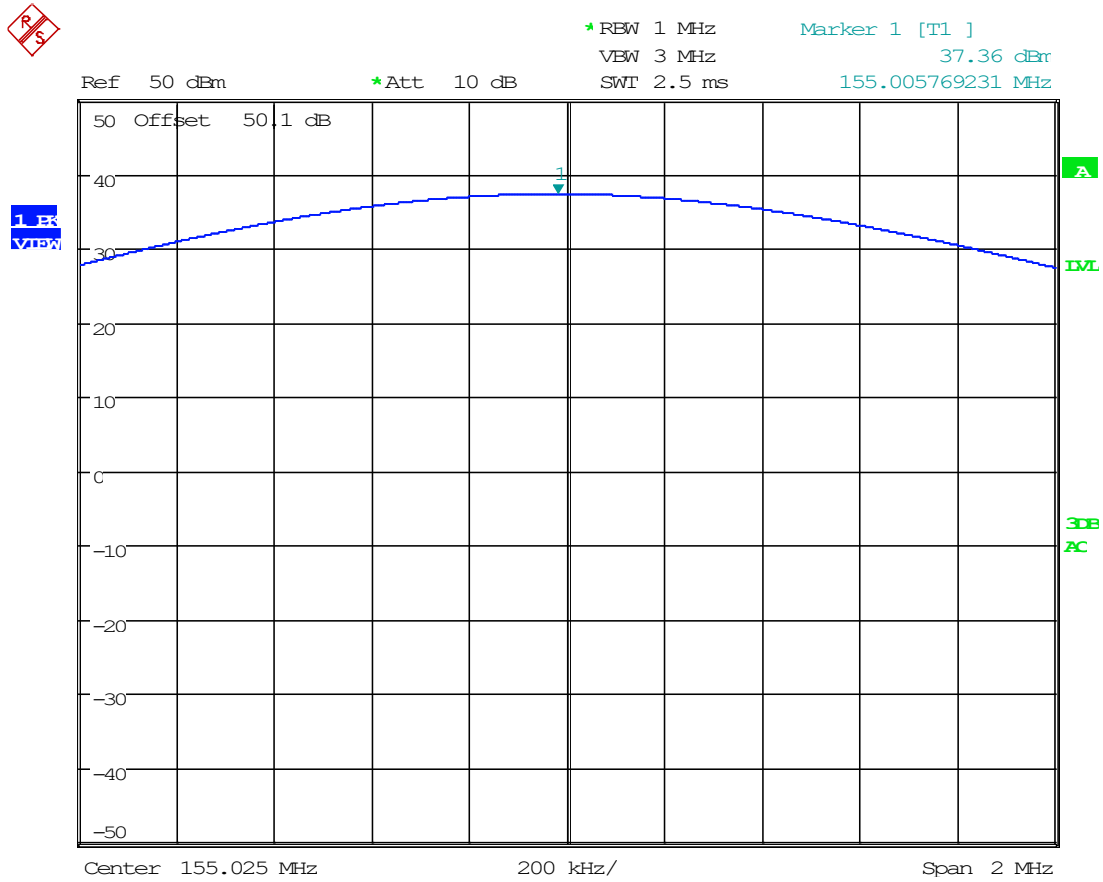
Limits from FCC Parts 2.1046(a), and 90.205 (r); and test procedure from ANSI C63.26-2015.



Test Results, Mode 1		
Tuned Frequency (MHz)	Power Output (dBm)	Power Output (W)
155.025	37.36	5.445
163	38.43	6.96
172	38.14	6.516

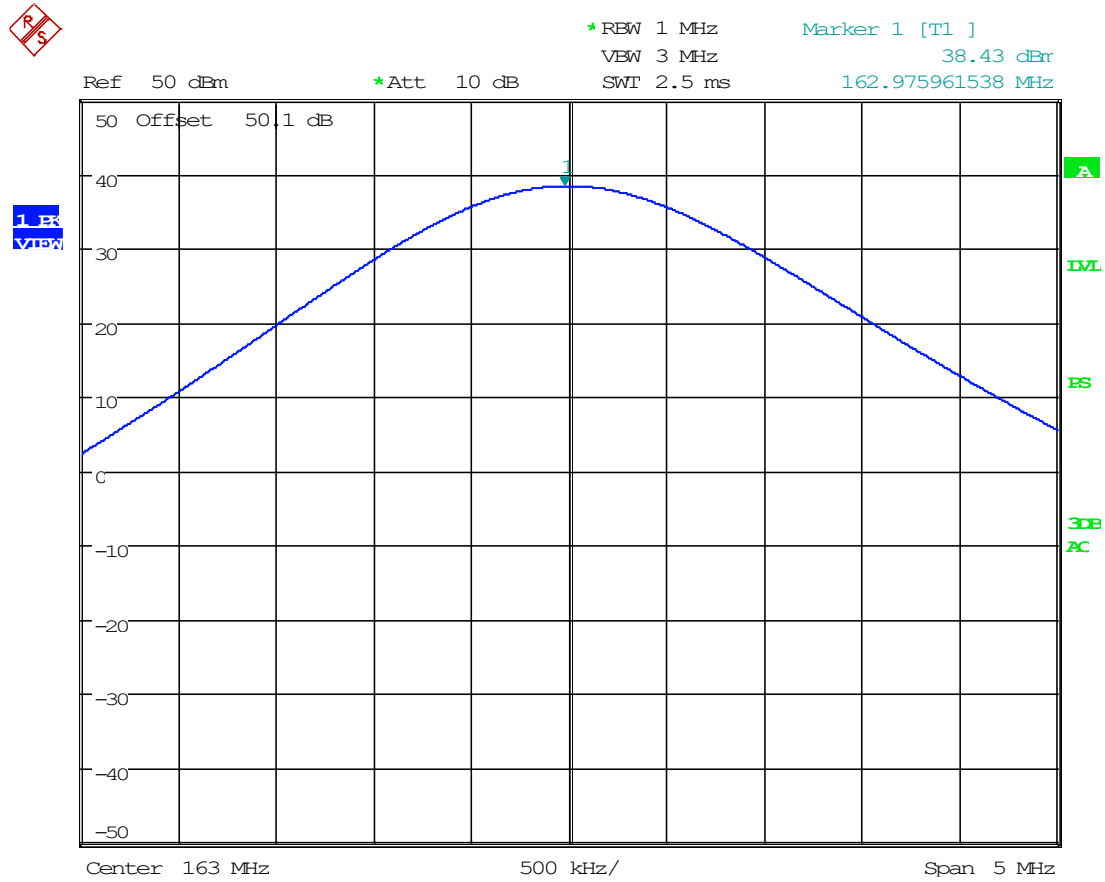


8.3.1 RF Power Output Plot, 155.025 MHz



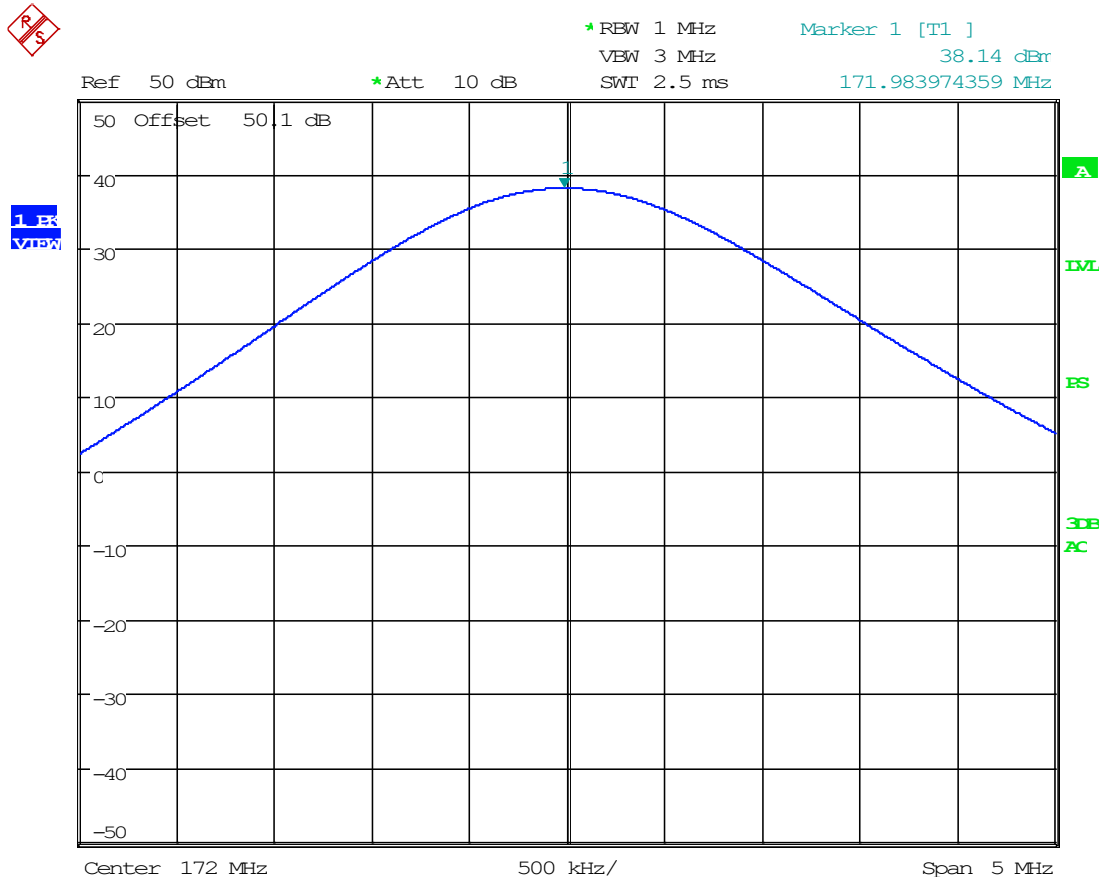
Date: 8.DEC.2022 11:03:29

8.3.2 RF Power Output Plot, 163 MHz



Date: 9.DEC.2022 10:35:46

8.3.3 RF Power Output Plot, 172 MHz



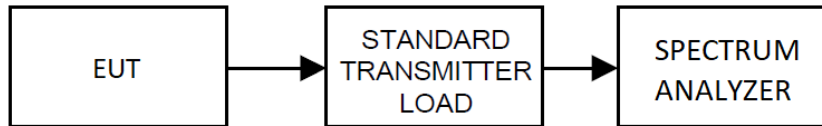
Date: 9.DEC.2022 10:34:43



8.4 Bandwidth & Emission

Limits from FCC Parts 2.1049, and 90.207 & 90.209, and test procedure from ANSI C63.26-2015.

Test Setup



Test Results, Authorized Bandwidth

Rule Part	Operating Range (MHz)	Authorized Bandwidth (kHz)
Part 90	150- 174	6.25
Part 90	150- 174	12.5



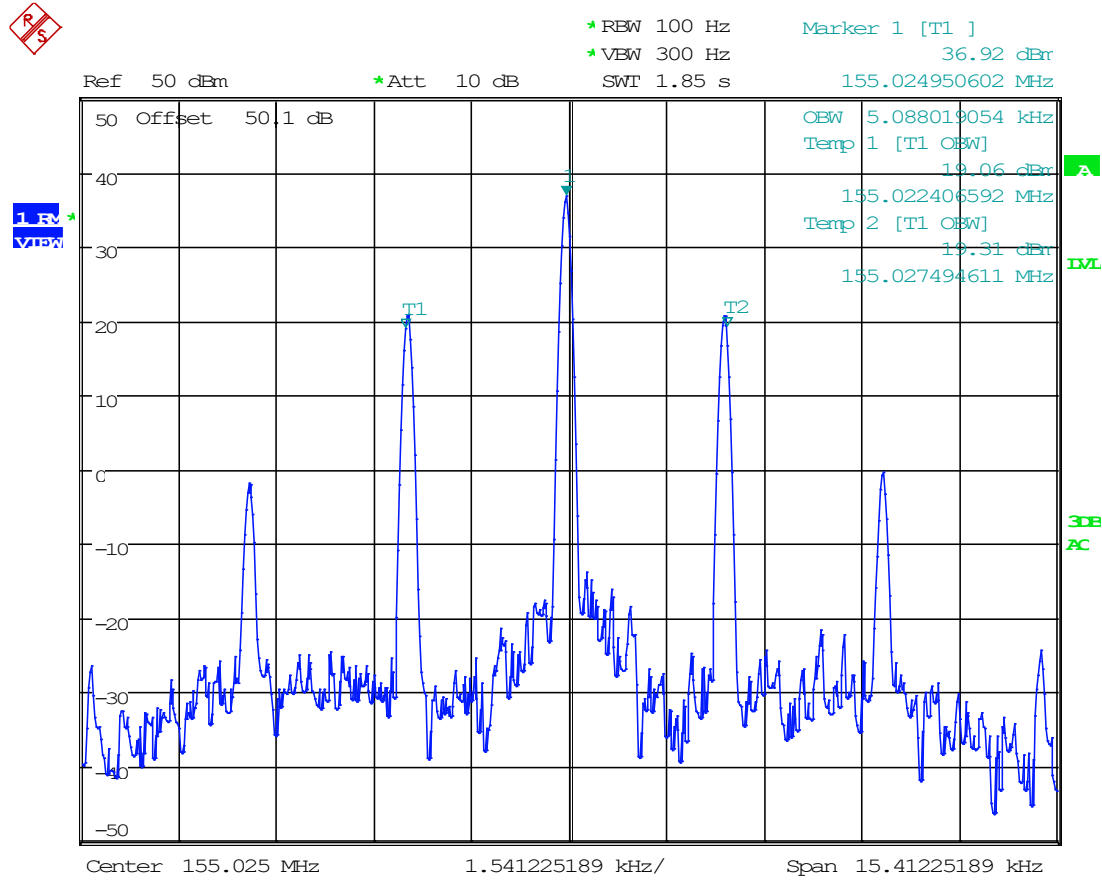
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Test Results, Occupied Bandwidth				
Tuned Frequency (MHz)	Mode	Emission Designator	Occupied Bandwidth (kHz)	Bandwidth Type
155.025	12.5 kHz Analog	10K0F3E	5.088	99%
	12.5 kHz NXDN	8K30F1E	7.835	99%
	6.25 NXDNSN	4K00F1E	3.617	99%
163	12.5 kHz Analog	10K0F3E	5.104	99%
	12.5 kHz NXDN	8K30F1E	7.473	99%
	6.25 NXDNSN	4K00F1E	3.469	99%
172	12.5 kHz Analog	10K0F3E	5.104	99%
	12.5 kHz NXDN	8K30F1E	7.473	99%
	6.25 NXDNSN	4K00F1E	3.312	99%

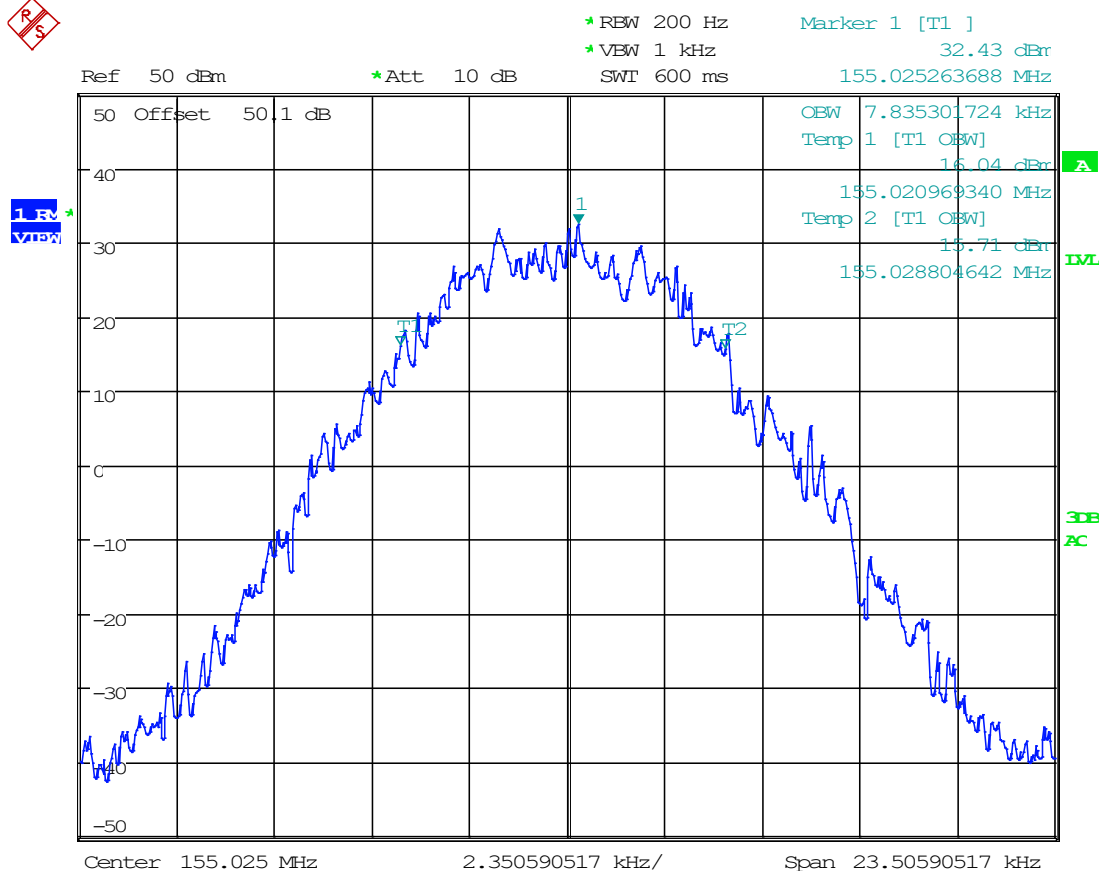


Occupied Bandwidth, Spectrum Plots

8.4.1 99% Bandwidth Plot, 12.5 kHz FM, 155.025 MHz



Date: 8.DEC.2022 12:07:00

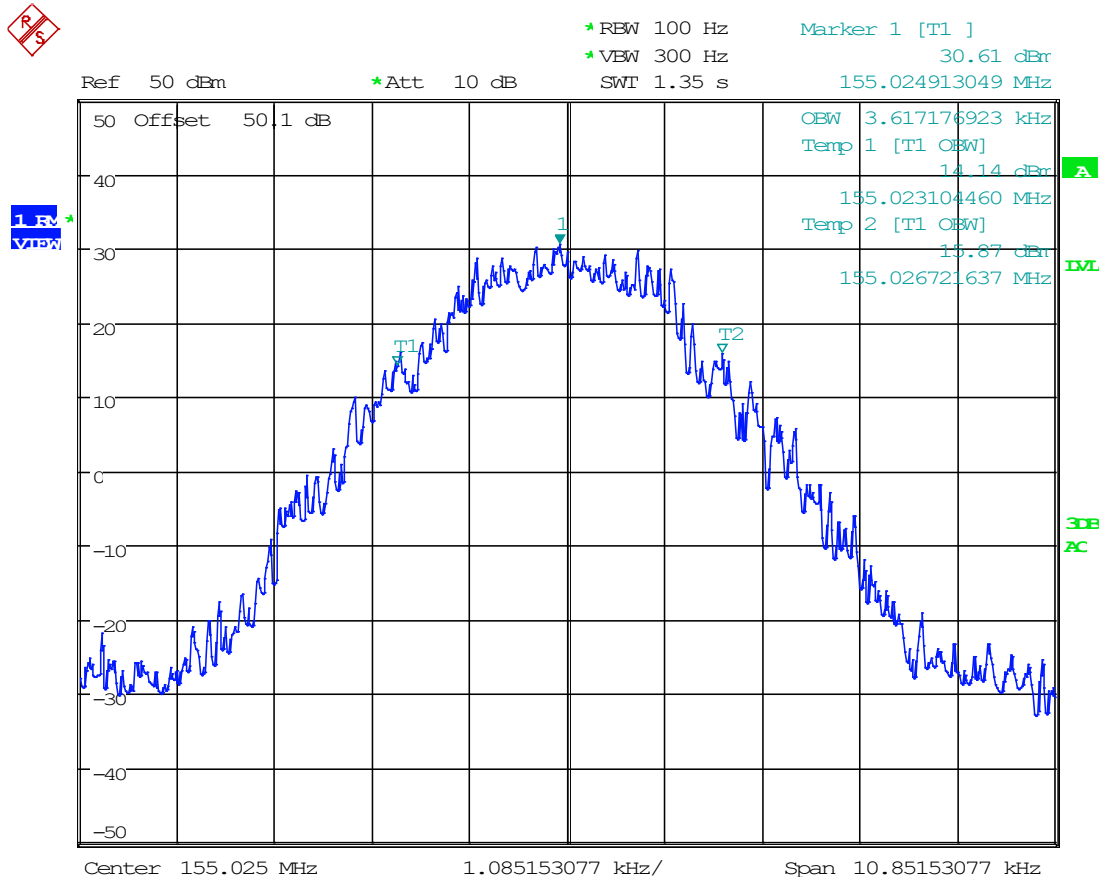


Date: 8.DEC.2022 11:27:27



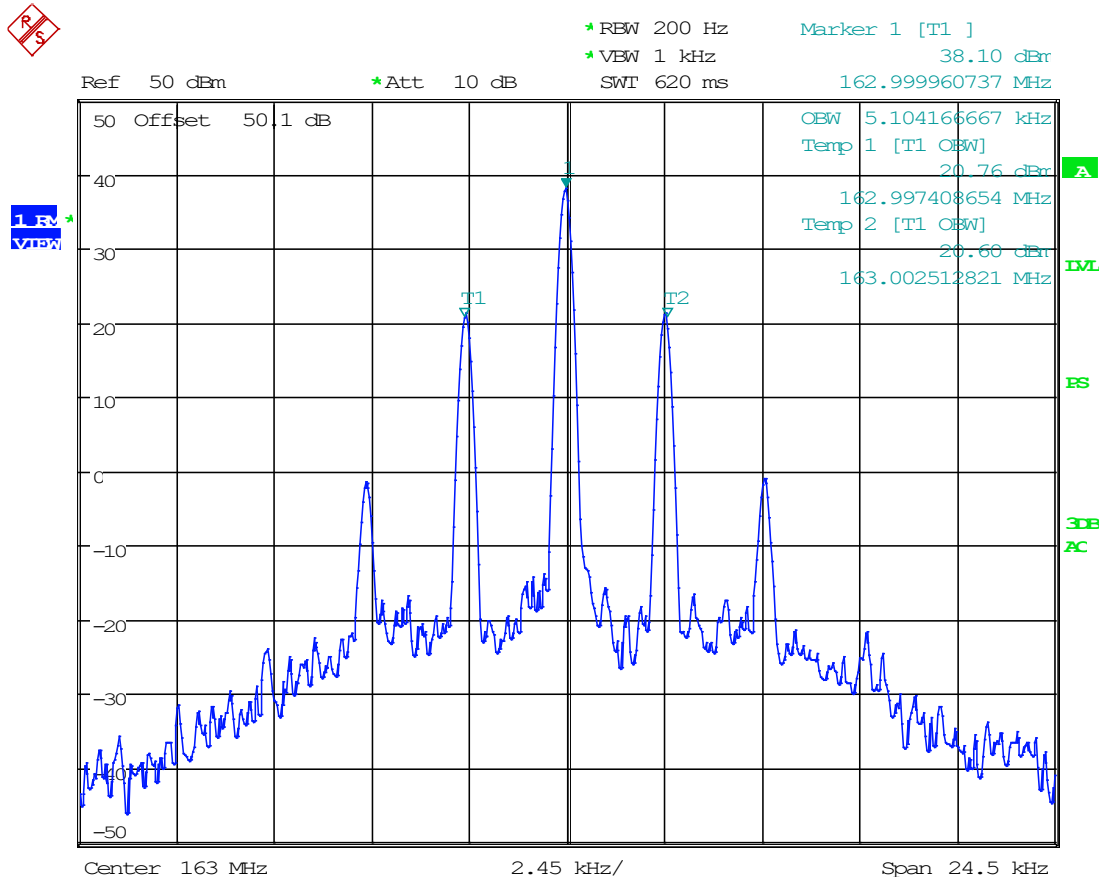
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8.4.3 99% Bandwidth Plot, 6.25 NXDNSN, 155.025 MHz



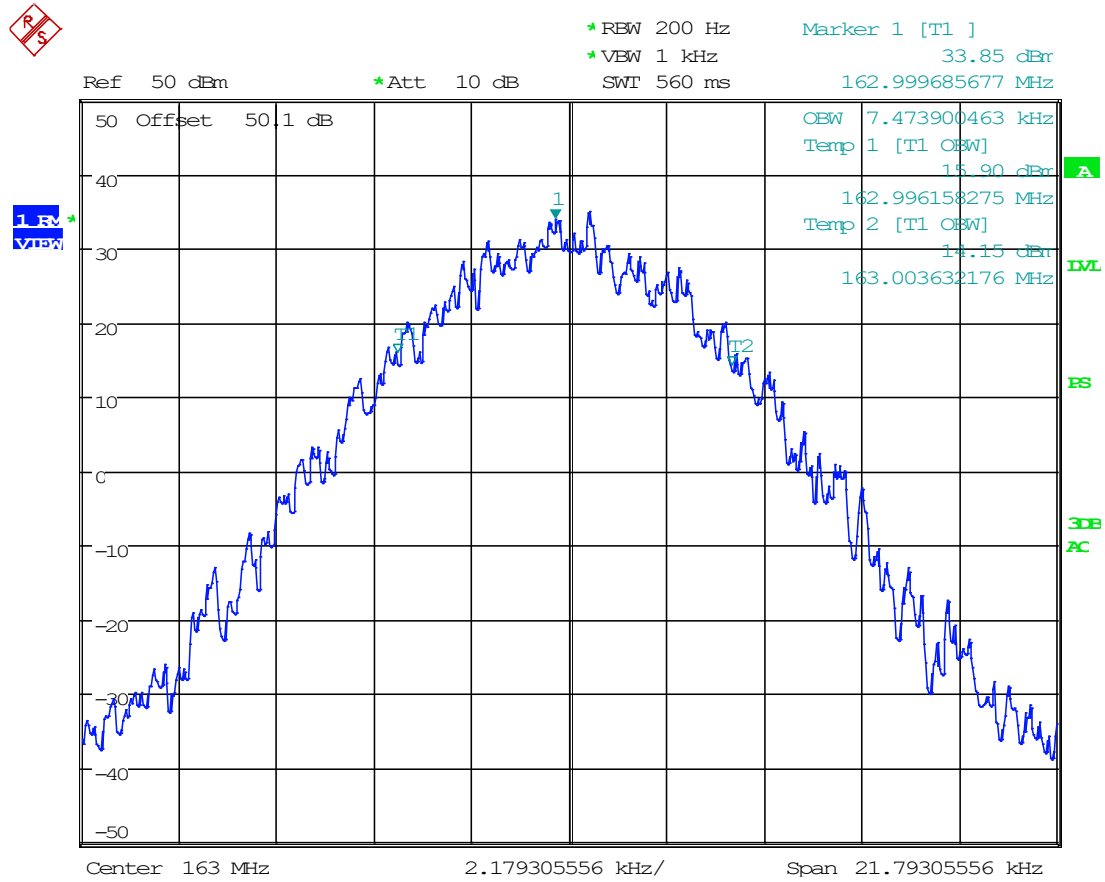
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8.4.4 99% Bandwidth Plot, 12.5 kHz FM, 163 MHz



Date: 9.DEC.2022 10:39:40

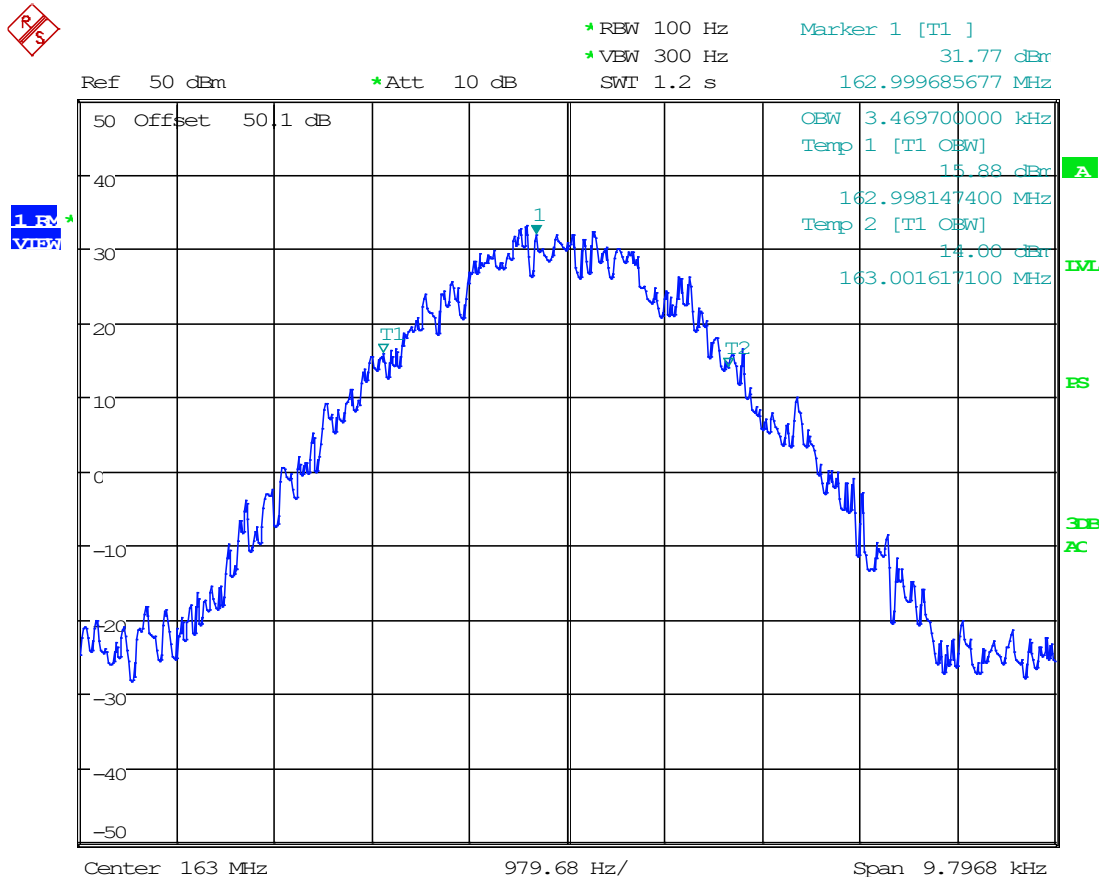
8.4.5 99% Bandwidth Plot, 12.5 kHz NXDN, 163 MHz



Date: 9.DEC.2022 10:42:38

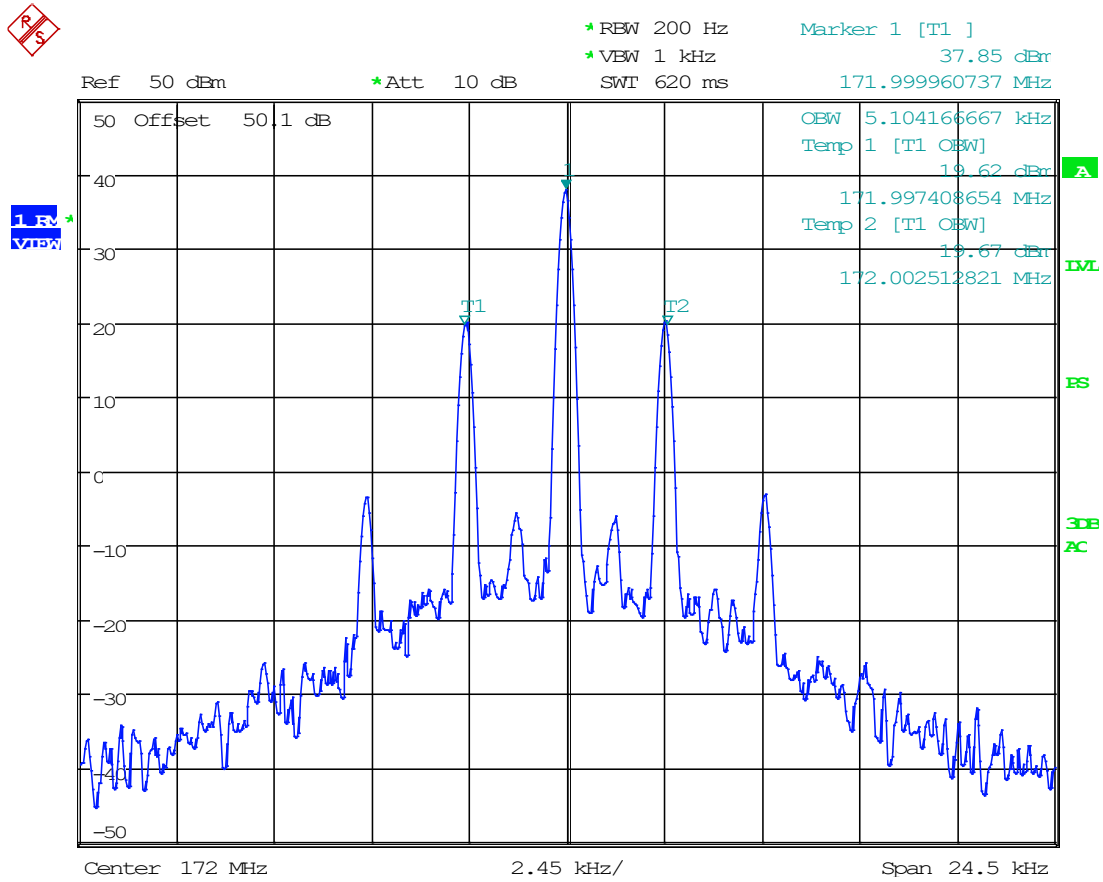


8.4.6 99% Bandwidth Plot, 6.25 NXDNSN, 163 MHz



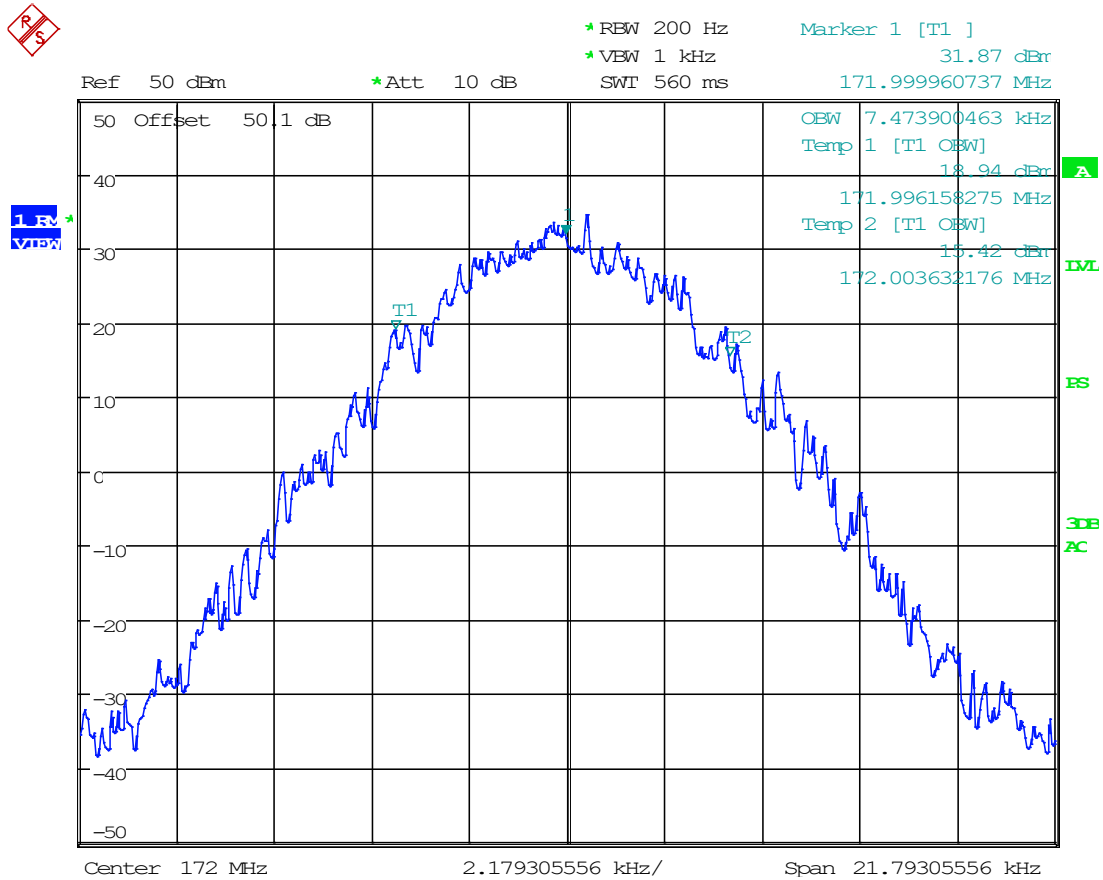
Date: 9.DEC.2022 10:44:46

8.4.7 99% Bandwidth Plot, 12.5 kHz FM, 172 MHz



Date: 9.DEC.2022 10:40:52

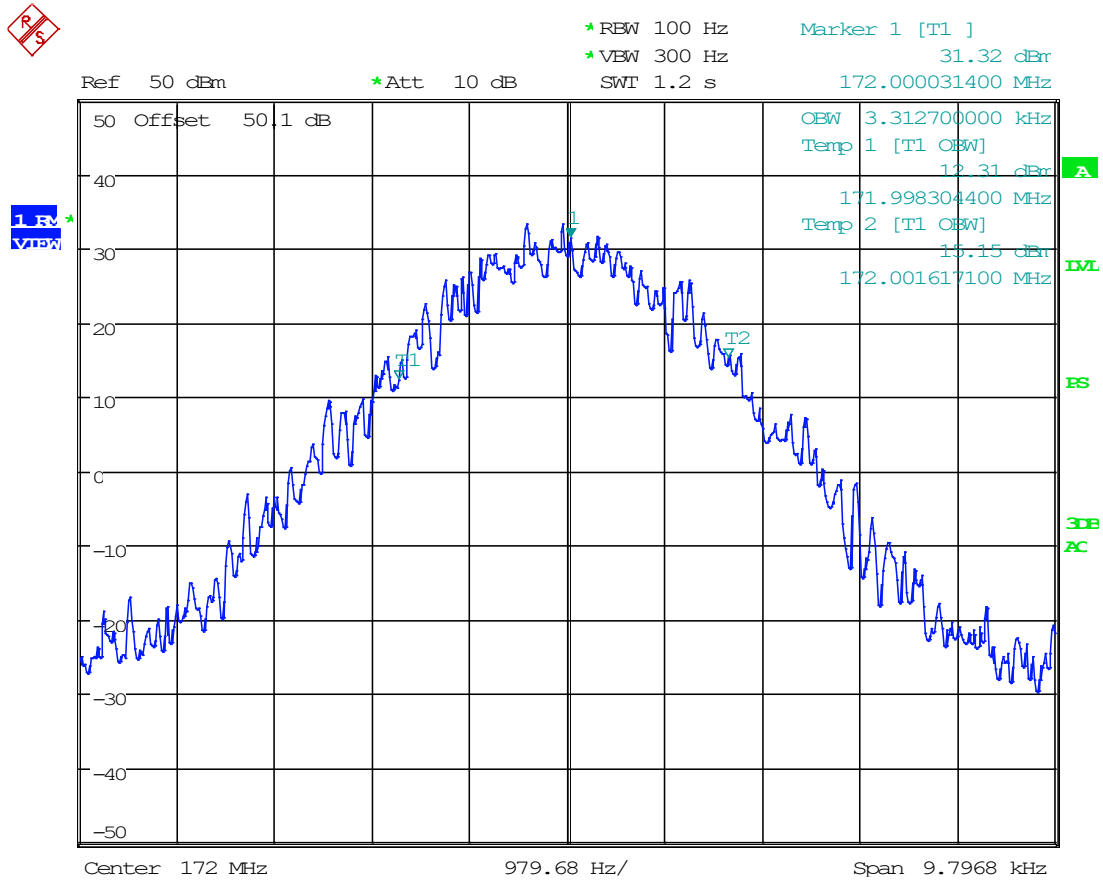
8.4.8 99% Bandwidth Plot, 12.5 kHz NXDN, 172 MHz



Date: 9.DEC.2022 10:42:01



8.4.9 99% Bandwidth Plot, 6.25 NXDNSN, 172 MHz



Date: 9.DEC.2022 10:45:27

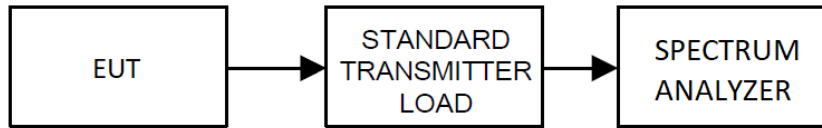


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8.5 Emission Limitations, In-Band

Limits from FCC Part 90.210; and test procedure from ANSI C63.26-2015.

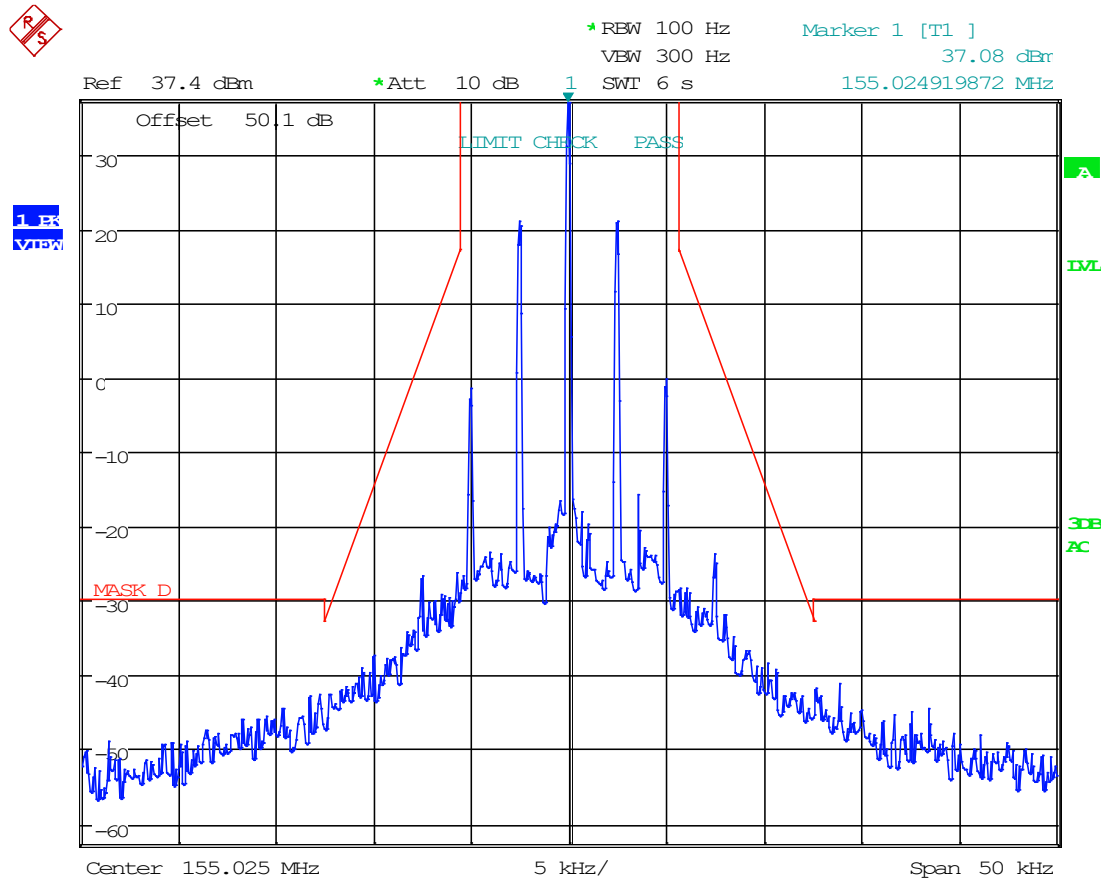
Conducted Test Setup





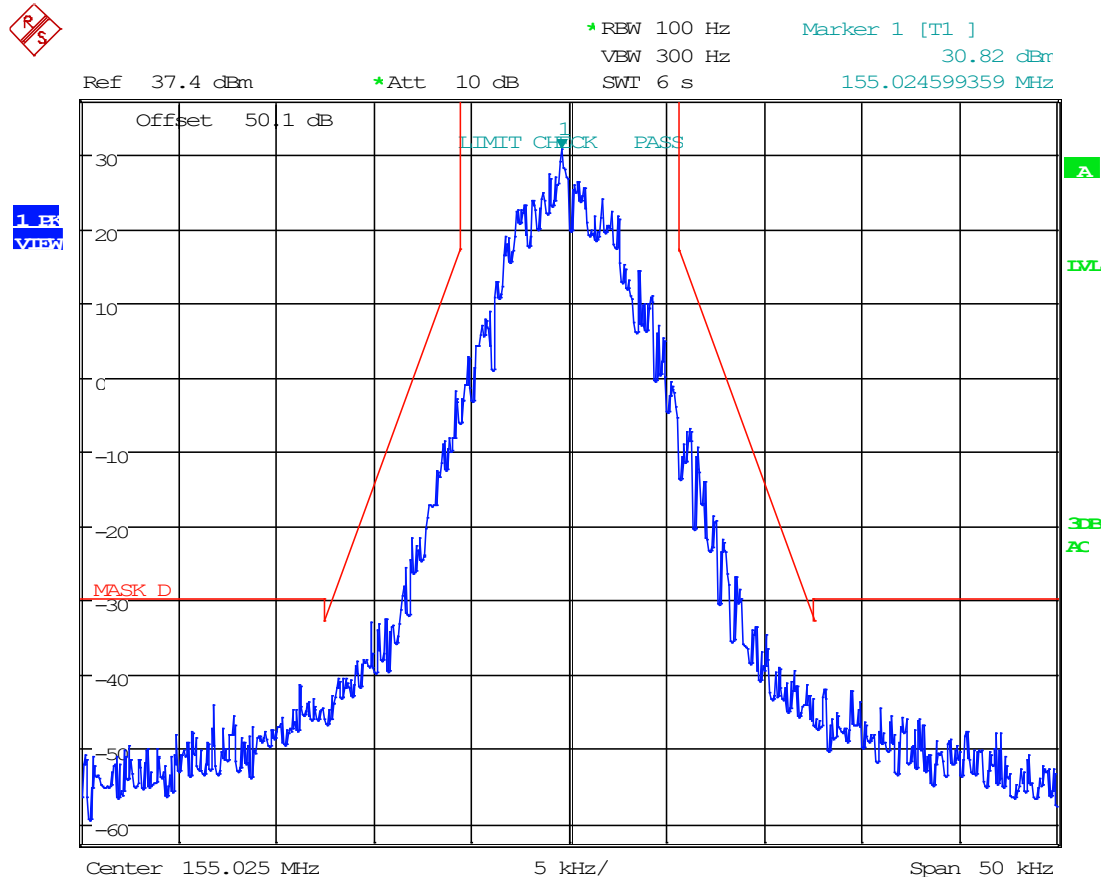
Conducted Emissions Mask, Spectrum Plots

8.5.1 Emission Mask, 12.5 kHz FM, 155.025 MHz



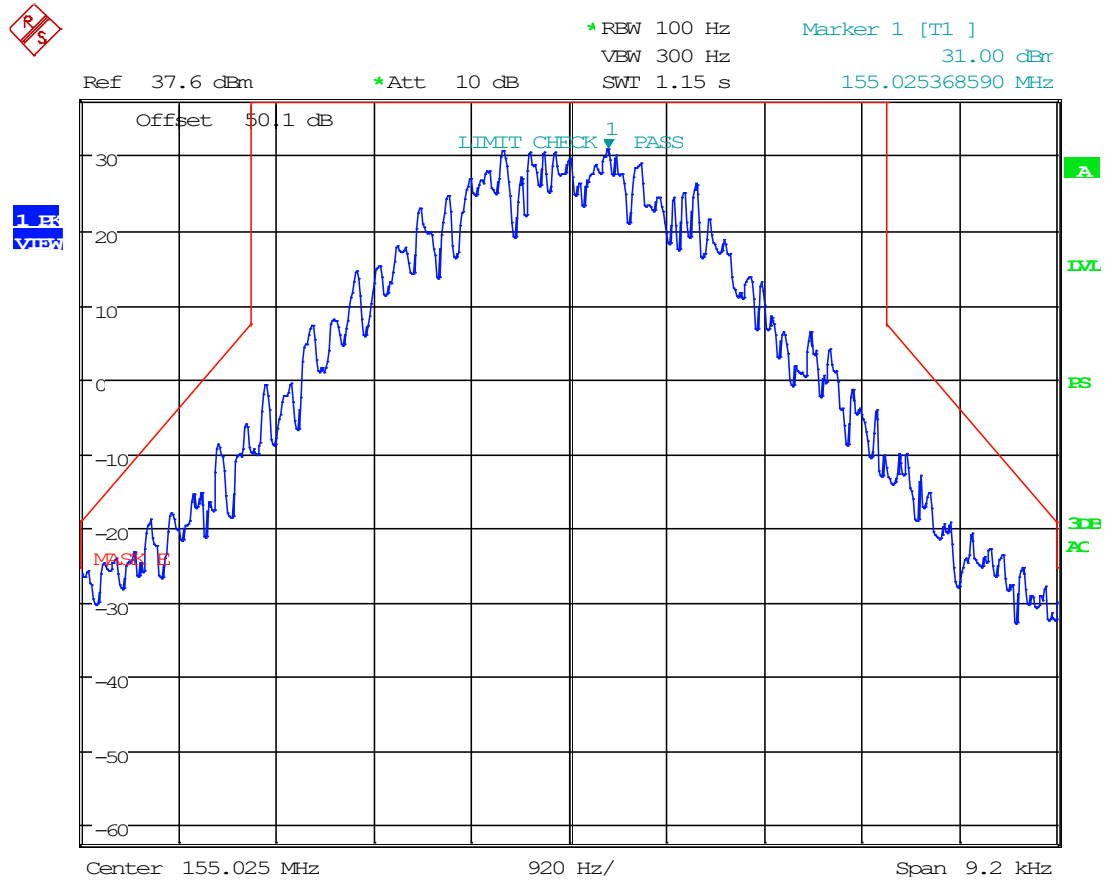
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8.5.2 Emission Mask, 12.5 kHz NXDN, 155.025 MHz



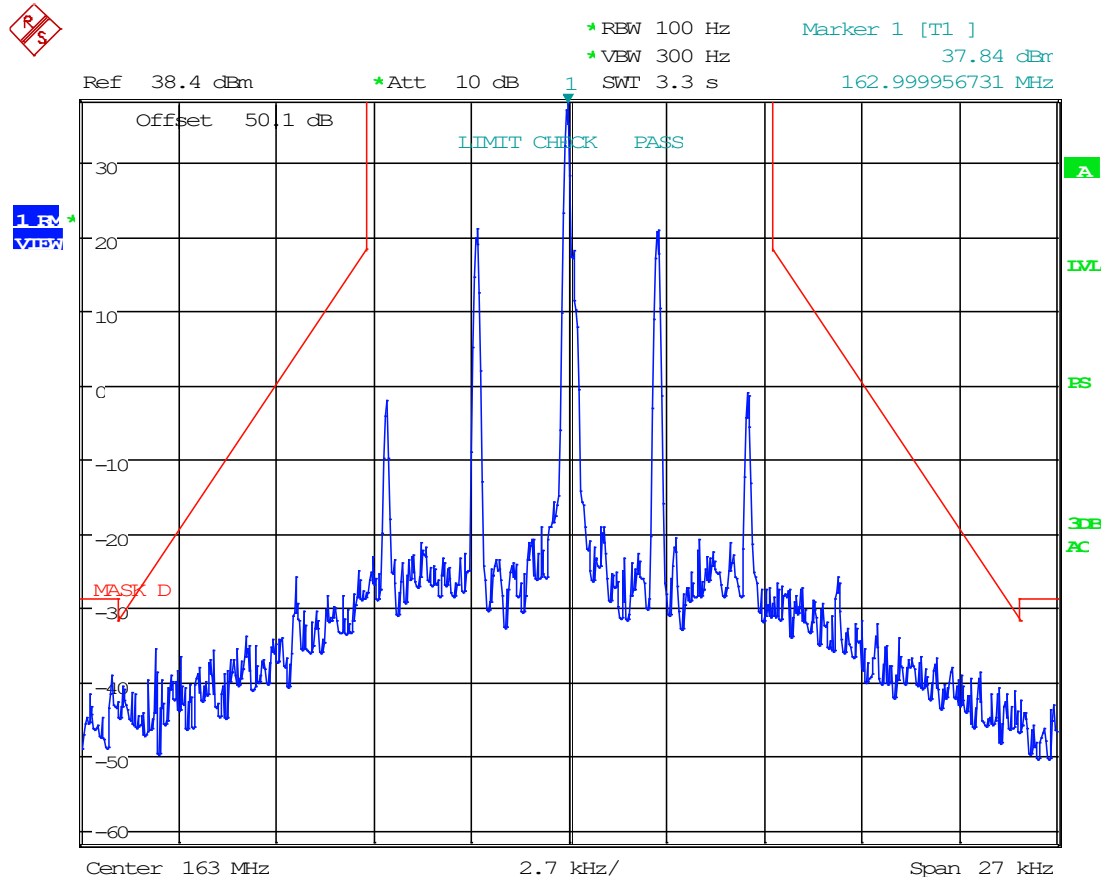
Date: 8.DEC.2022 14:24:01

8.5.3 Emission Mask, 6.25 NXDNSN, 155.025 MHz



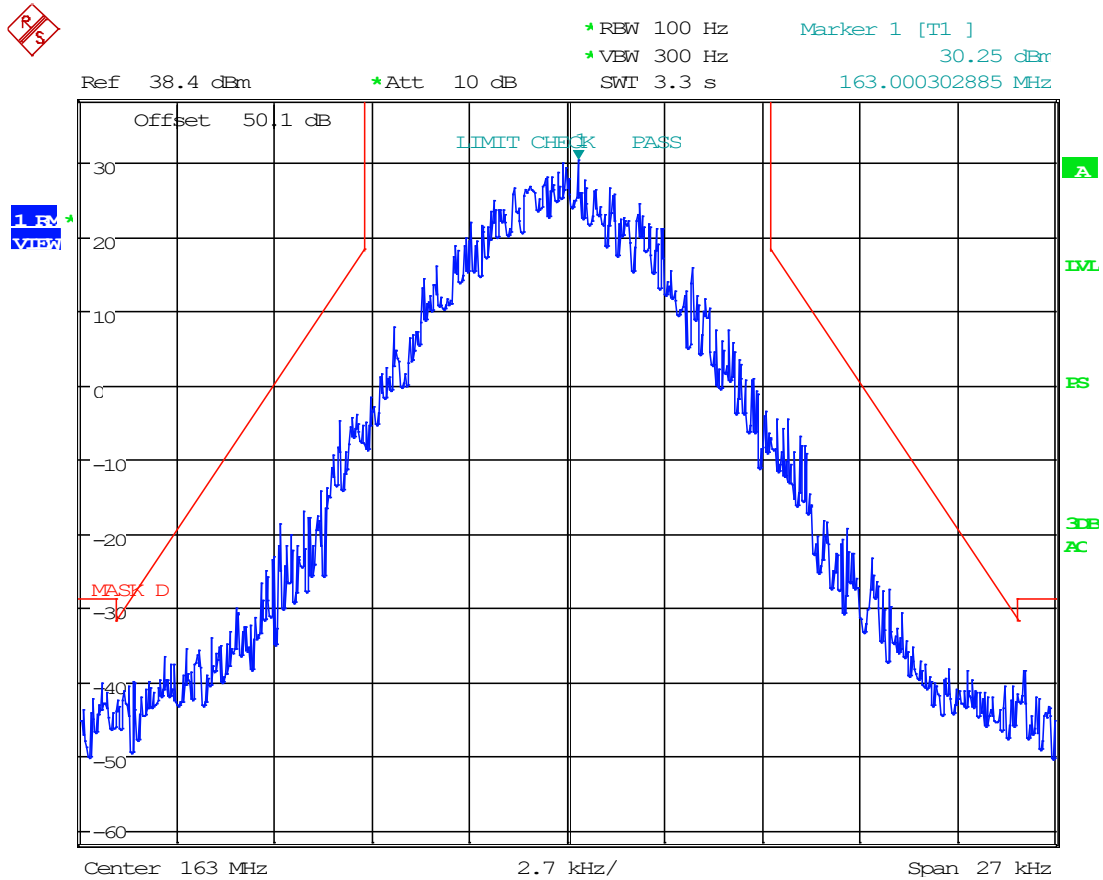
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8.5.4 Emission Mask, 12.5 kHz FM, 163 MHz



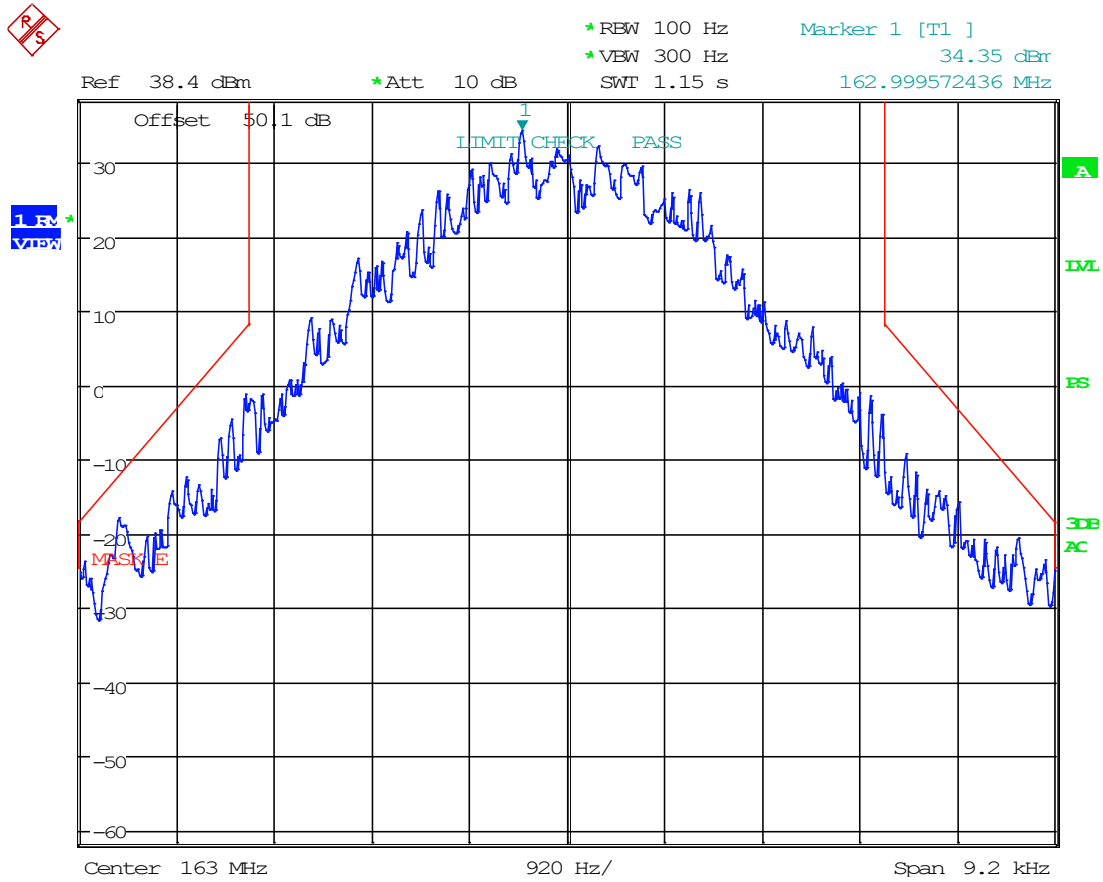
Date: 9.DEC.2022 11:34:10

8.5.5 Emission Mask, 12.5 kHz NXDN, 163 MHz



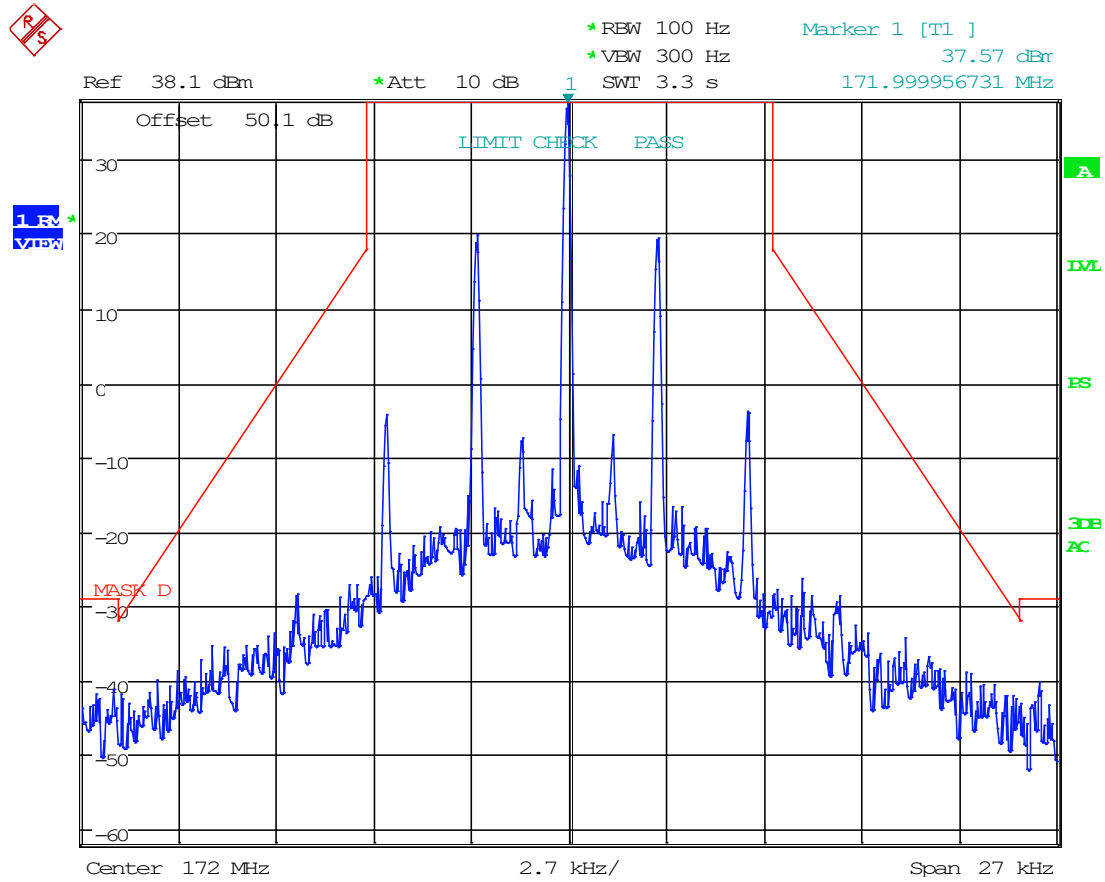
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8.5.6 Emission Mask, 6.25 NXDNSN, 163 MHz



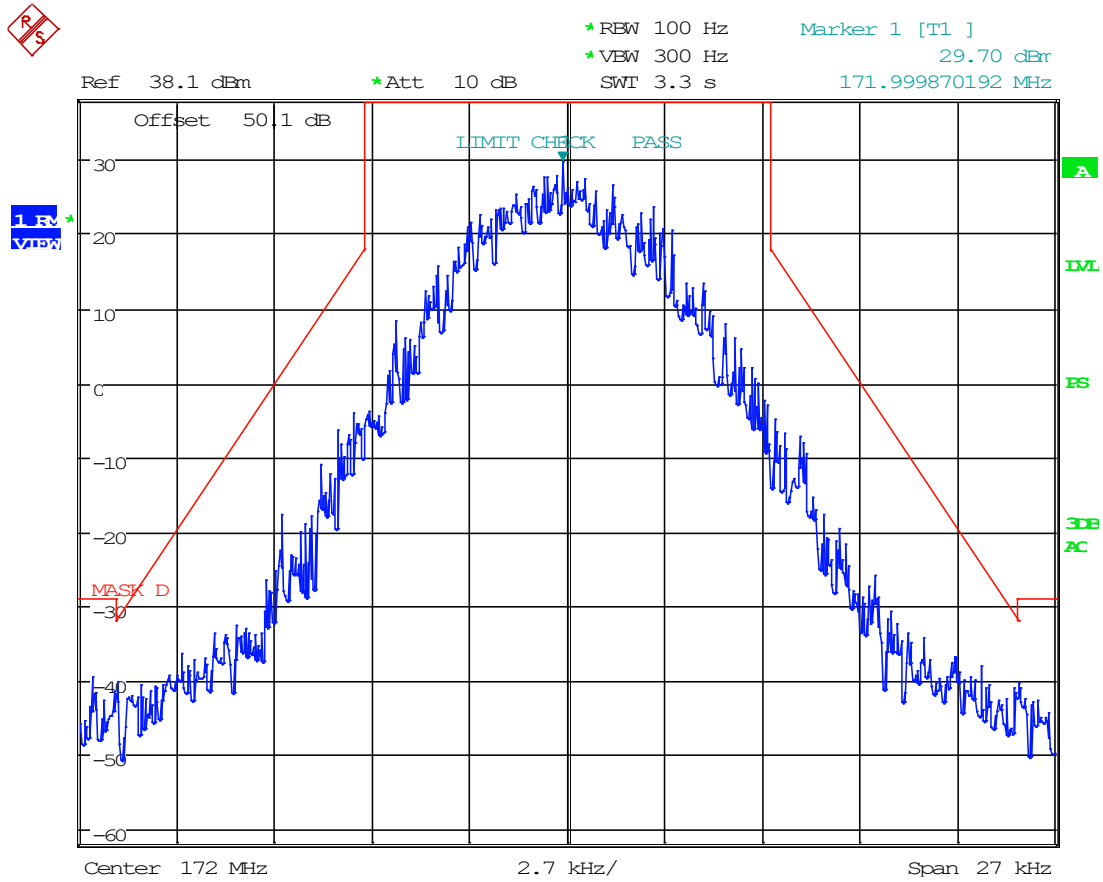
Date: 9.DEC.2022 11:40:31

8.5.7 Emission Mask, 12.5 kHz FM, 172 MHz

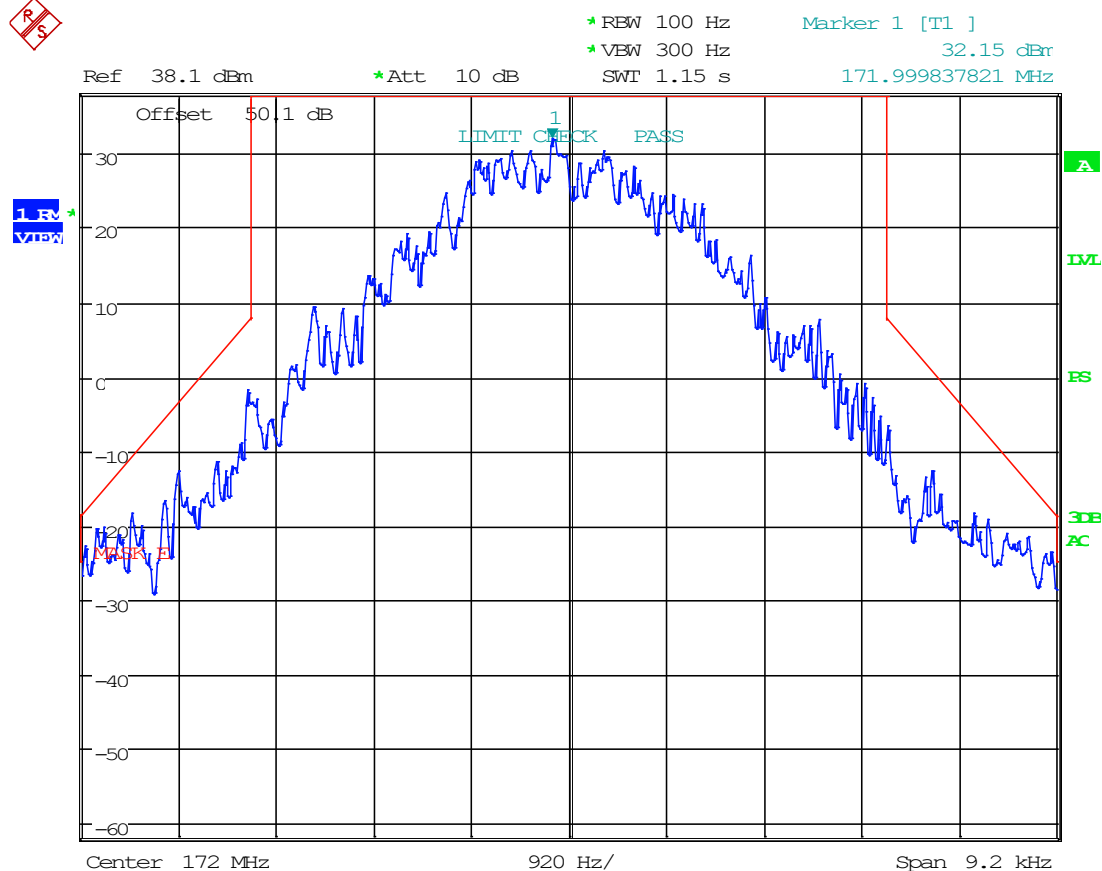


Date: 9.DEC.2022 11:32:51

8.5.8 Emission Mask, 12.5 kHz NXDN, 172 MHz



Date: 9.DEC.2022 11:37:15



Date: 9.DEC.2022 11:39:27

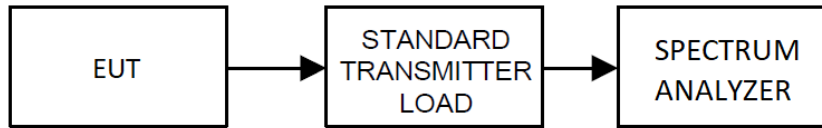


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8.6 Emission Limitations, Out-of-Band

Limits from FCC Parts 2.1051, and 90.210; and test procedure from ANSI C63.26-2015.

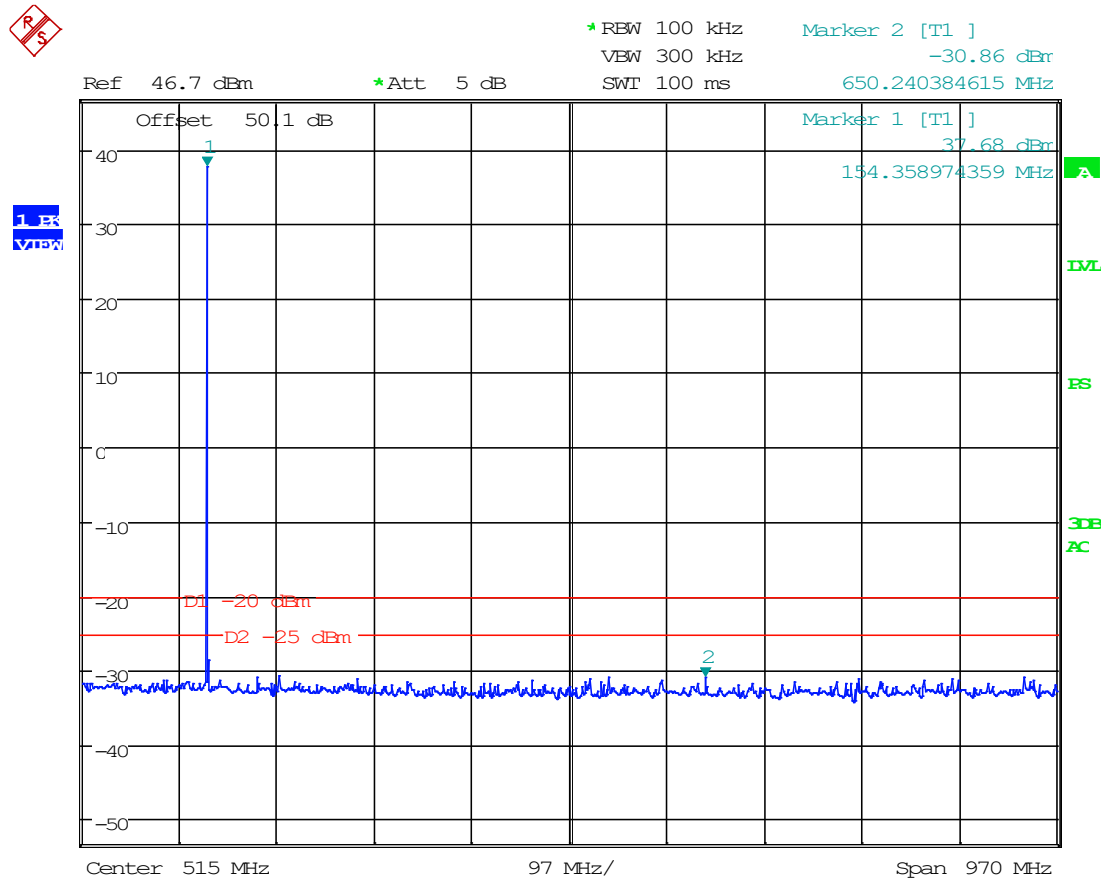
Conducted Test Setup





Conducted Emissions Spectrum Plots

8.6.1 Conducted Emissions Below 1GHz, 155.025 MHz



Date: 9.DEC.2022 11:55:31



Offset 30.8 dB

Ref 27.4 dBm

*Att 5 dB

SWT 45 ms

Delta 2 [T1]

-0.23 dB

2.067548077 GHz

Marker 1 [T1]

-40.64 dBm

4.299038462 GHz

D2 -20 dBm

D1 -25 dBm

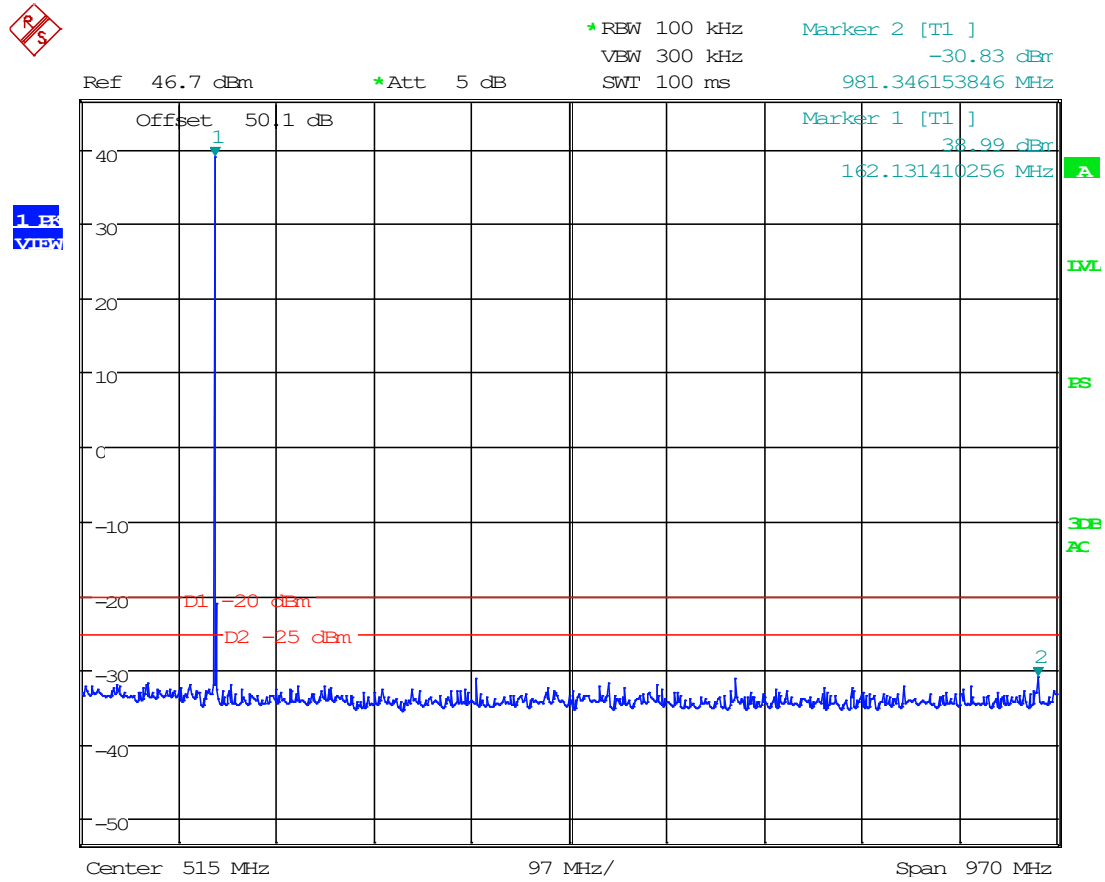
Center 4.525 GHz

705 MHz/

Span 7.05 GHz

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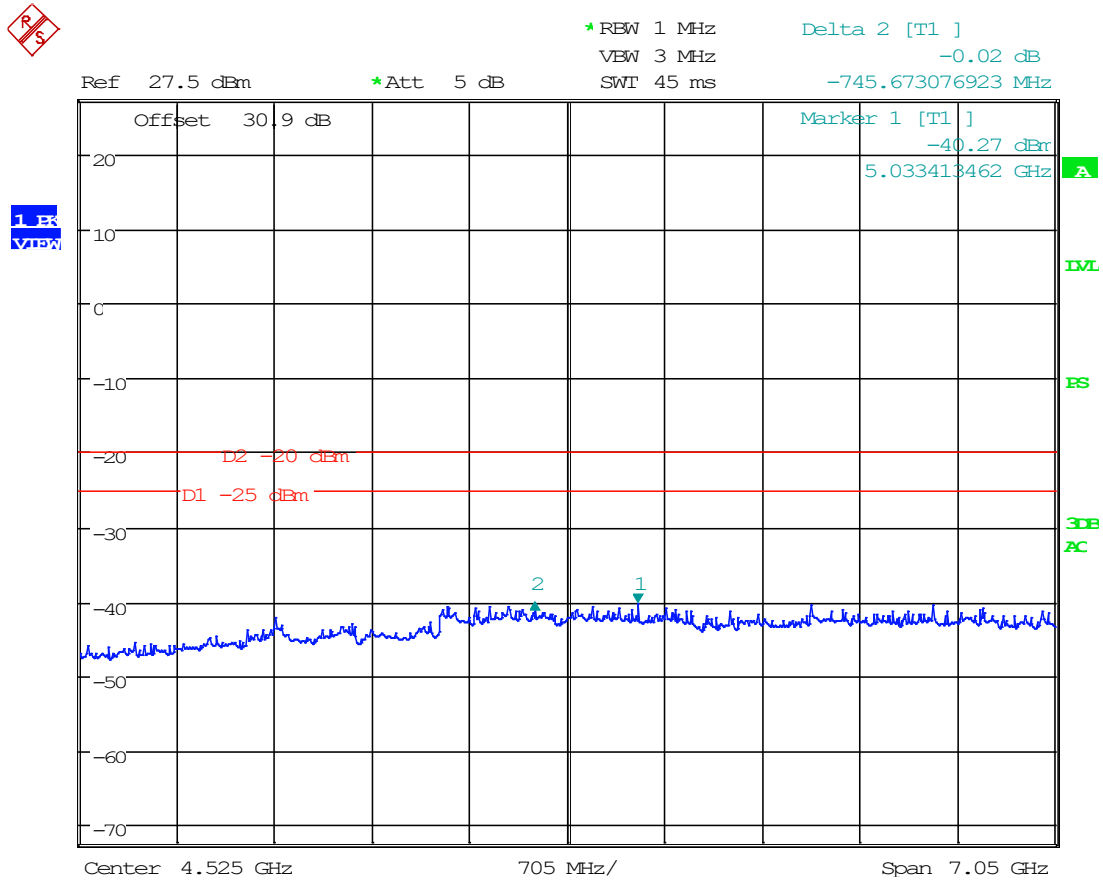
8.6.3 Conducted Emissions Below 1GHz, 163 MHz



Date: 9.DEC.2022 11:59:32

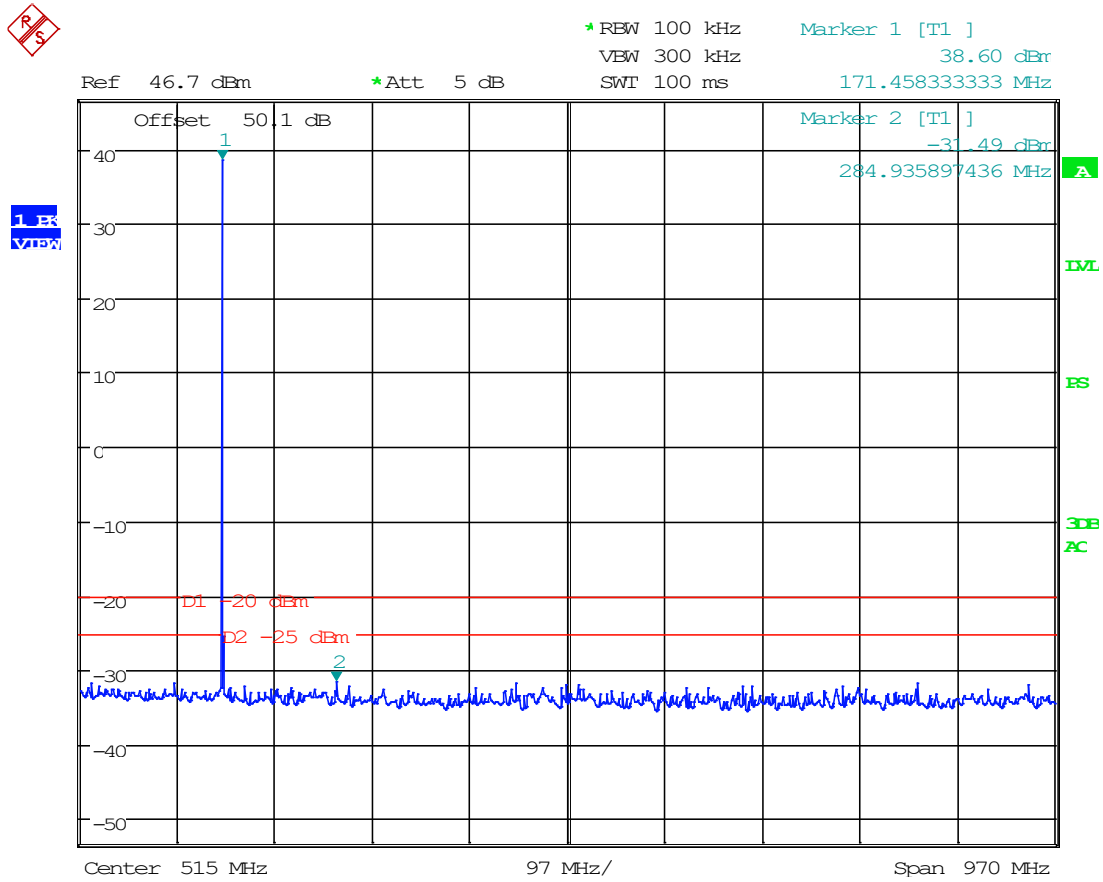


8.6.4 Conducted Emissions Above 1GHz, 163 MHz



Date: 12.DEC.2022 08:44:47

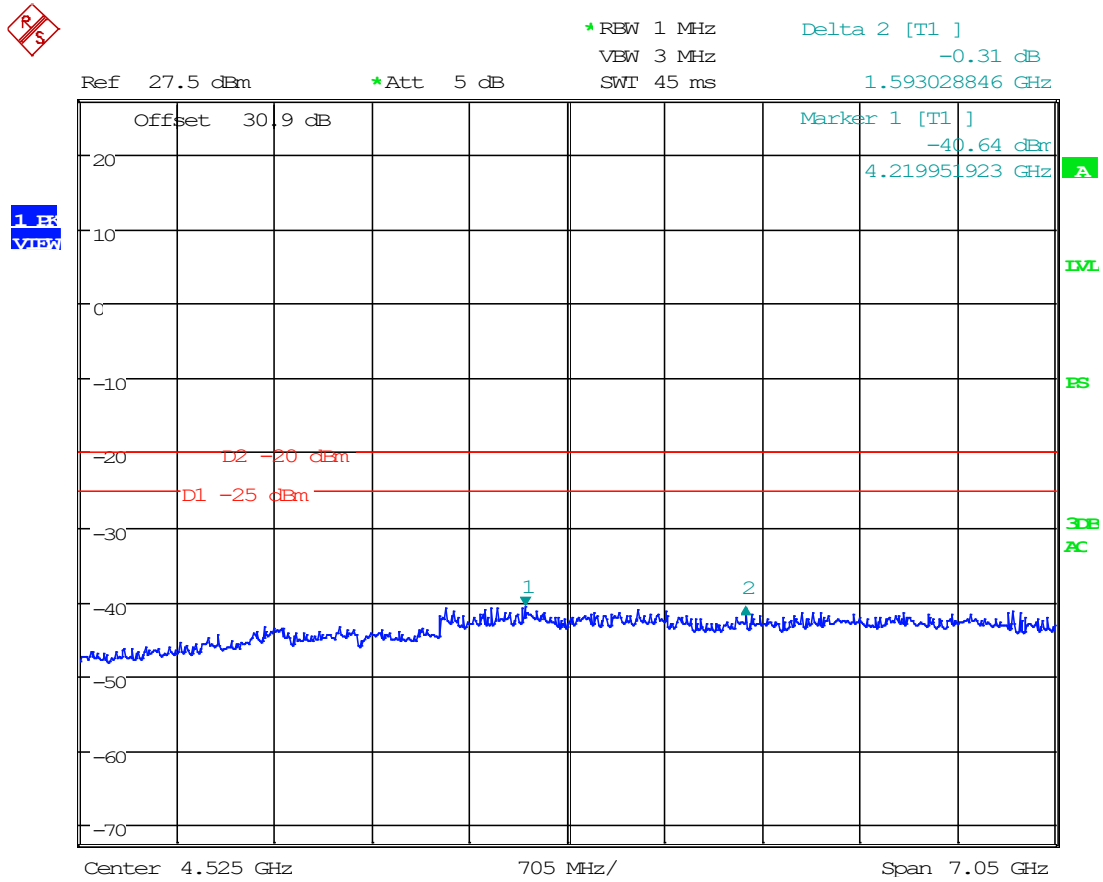
8.6.5 Conducted Emissions Below 1GHz, 172 MHz



Date: 9.DEC.2022 12:00:30



8.6.6 Conducted Emissions Above 1GHz, 172 MHz

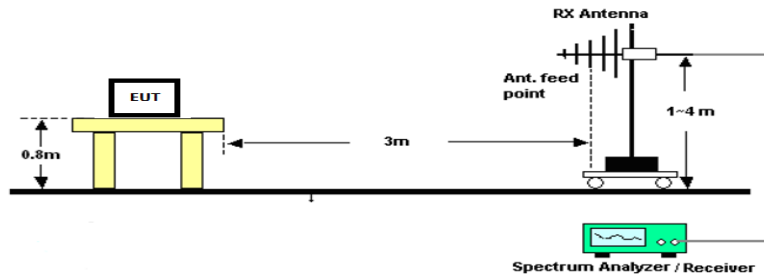


Date: 12.DEC.2022 08:47:55

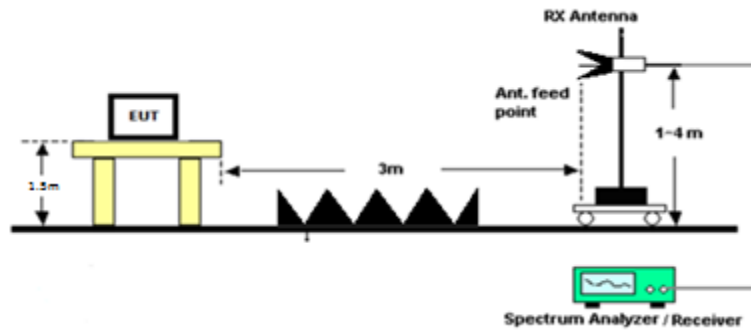
8.7 Radiated Emissions

Limits from FCC Parts 2.1053 and 90.210 (n); and test procedure from ANSI C63.26-2015.

Radiated Test Setup, 30 – 1000 MHz



Radiated Test Setup, Above 1000 MHz





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Radiated Emissions, Tabular Data

8.7.1 Radiated Emissions, 155.025 MHz

Tuned Frequency (MHz)	Emission Frequency (MHz)	Detector	Meter Reading (dBuV)	Antenna Polarity	Coax Loss (dB)	Antenna Correction Factor (dB/m)	Distance (m)	Field Strength (dBuV/m)	ERP (dBm)	Spurious Limit (dBm)	Margin (dB)
155.03	310.05	PK	46.60	H	2.08	14.90	3.00	63.58	-33.80	-25.00	8.80
155.03	310.05	PK	40.80	V	2.08	14.90	3.00	57.78	-39.60	-25.00	14.60
155.03	465.08	PK	25.00	H	2.51	16.11	3.00	43.62	-53.76	-25.00	28.76
155.03	465.08	PK	20.10	V	2.51	16.11	3.00	38.72	-58.66	-25.00	33.66
155.03	620.10	PK	19.50	H	2.90	18.80	3.00	41.20	-56.18	-25.00	31.18
155.03	620.10	PK	16.40	V	2.90	18.80	3.00	38.10	-59.28	-25.00	34.28
155.03	775.13	PK	25.90	H	3.29	21.90	3.00	51.09	-46.29	-25.00	21.29
155.03	775.13	PK	18.70	V	3.29	21.90	3.00	43.89	-53.49	-25.00	28.49
155.03	930.15	PK	22.80	H	3.58	22.31	3.00	48.69	-48.69	-25.00	23.69
155.03	930.15	PK	23.40	V	3.58	22.31	3.00	49.29	-48.09	-25.00	23.09
155.03	1085.18	PK	4.60	H	3.83	27.05	3.00	35.48	-61.90	-25.00	36.90
155.03	1085.18	PK	5.30	V	3.83	27.05	3.00	36.18	-61.20	-25.00	36.20
155.03	1240.20	PK	1.10	H	4.06	28.34	3.00	33.50	-63.88	-25.00	38.88
155.03	1240.20	PK	1.10	V	4.06	28.34	3.00	33.50	-63.88	-25.00	38.88
155.03	1395.23	PK	1.80	H	4.31	28.49	3.00	34.60	-62.78	-25.00	37.78
155.03	1395.23	PK	1.20	V	4.31	28.49	3.00	34.00	-63.38	-25.00	38.38
155.03	1550.25	PK	4.00	H	4.57	27.76	3.00	36.33	-61.05	-25.00	36.05
155.03	1550.25	PK	3.80	V	4.57	27.76	3.00	36.13	-61.25	-25.00	36.25



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8.7.2 Radiated Emissions, 163 MHz

Tuned Frequency (MHz)	Emission Frequency (MHz)	Detector	Meter Reading (dBuV)	Antenna Polarity	Coax Loss (dB)	Antenna Correction Factor (dB/m)	Distance (m)	Field Strength (dBuV/m)	ERP (dBm)	Spurious Limit (dBm)	Margin (dB)
163.00	326.00	PK	33.00	H	2.09	13.70	3.00	48.79	-48.59	-25.00	23.59
163.00	326.00	PK	30.90	V	2.09	13.70	3.00	46.69	-50.69	-25.00	25.69
163.00	489.00	PK	16.30	H	2.62	16.80	3.00	35.72	-61.66	-25.00	36.66
163.00	489.00	PK	16.60	V	2.62	16.80	3.00	36.02	-61.36	-25.00	36.36
163.00	652.00	PK	23.10	H	2.97	19.44	3.00	45.51	-51.87	-25.00	26.87
163.00	652.00	PK	18.30	V	2.97	19.44	3.00	40.71	-56.67	-25.00	31.67
163.00	815.00	PK	26.60	H	3.39	20.50	3.00	50.49	-46.89	-25.00	21.89
163.00	815.00	PK	22.00	V	3.39	20.50	3.00	45.89	-51.49	-25.00	26.49
163.00	978.00	PK	19.60	H	3.68	22.54	3.00	45.82	-51.56	-25.00	26.56
163.00	978.00	PK	18.10	V	3.68	22.54	3.00	44.32	-53.06	-25.00	28.06
163.00	1141.00	PK	-0.10	H	3.91	27.31	3.00	31.11	-66.26	-25.00	41.26
163.00	1141.00	PK	-0.10	V	3.91	27.31	3.00	31.11	-66.26	-25.00	41.26
163.00	1304.00	PK	4.30	H	4.18	28.68	3.00	37.17	-60.21	-25.00	35.21
163.00	1304.00	PK	4.30	V	4.18	28.68	3.00	37.17	-60.21	-25.00	35.21
163.00	1467.00	PK	1.40	H	4.40	27.97	3.00	33.78	-63.60	-25.00	38.60
163.00	1467.00	PK	1.20	V	4.40	27.97	3.00	33.58	-63.80	-25.00	38.80
163.00	1630.00	PK	2.10	H	4.71	28.39	3.00	35.20	-62.18	-25.00	37.18
163.00	1630.00	PK	1.80	V	4.71	28.39	3.00	34.90	-62.48	-25.00	37.48



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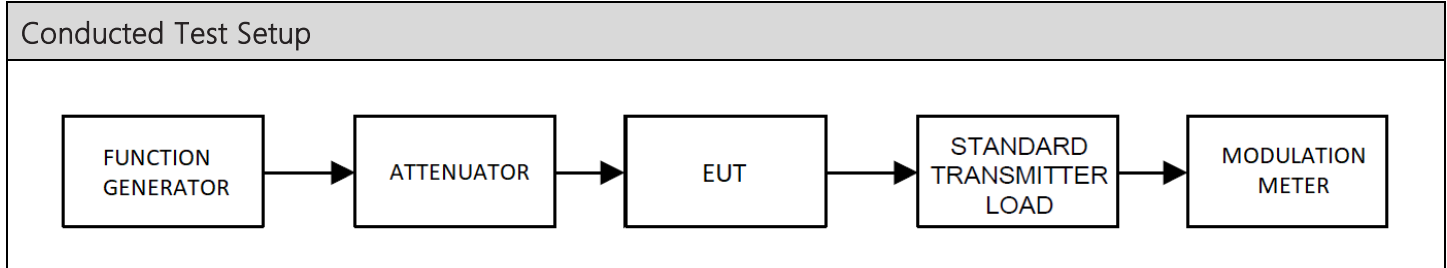
8.7.3 Radiated Emissions, 172 MHz

Tuned Frequency (MHz)	Emission Frequency (MHz)	Detector	Meter Reading (dBuV)	Antenna Polarity	Coax Loss (dB)	Antenna Correction Factor (dB/m)	Distance (m)	Field Strength (dBuV/m)	ERP (dBm)	Spurious Limit (dBm)	Margin (dB)
172.00	344.00	PK	24.90	H	2.12	13.70	3.00	40.72	-56.66	-25.00	31.66
172.00	344.00	PK	25.10	V	2.12	13.70	3.00	40.92	-56.46	-25.00	31.46
172.00	516.00	PK	23.10	H	2.71	17.60	3.00	43.41	-53.97	-25.00	28.97
172.00	516.00	PK	22.20	V	2.71	17.60	3.00	42.51	-54.87	-25.00	29.87
172.00	688.00	PK	17.50	H	3.07	20.52	3.00	41.09	-56.29	-25.00	31.29
172.00	688.00	PK	15.00	V	3.07	20.52	3.00	38.59	-58.79	-25.00	33.79
172.00	860.00	PK	22.80	H	3.49	22.20	3.00	48.49	-48.89	-25.00	23.89
172.00	860.00	PK	18.80	V	3.49	22.20	3.00	44.49	-52.89	-25.00	27.89
172.00	1032.00	PK	0.30	H	3.75	26.88	3.00	30.93	-66.45	-25.00	41.45
172.00	1032.00	PK	-0.40	V	3.75	26.88	3.00	30.23	-67.15	-25.00	42.15
172.00	1204.00	PK	4.90	H	4.01	28.08	3.00	36.99	-60.39	-25.00	35.39
172.00	1204.00	PK	4.20	V	4.01	28.08	3.00	36.29	-61.09	-25.00	36.09
172.00	1376.00	PK	-0.60	H	4.30	28.61	3.00	32.31	-65.07	-25.00	40.07
172.00	1376.00	PK	-1.70	V	4.30	28.61	3.00	31.21	-66.17	-25.00	41.17
172.00	1548.00	PK	4.70	H	4.56	27.76	3.00	37.02	-60.36	-25.00	35.36
172.00	1548.00	PK	3.90	V	4.56	27.76	3.00	36.22	-61.16	-25.00	36.16
172.00	1720.00	PK	-1.30	H	4.81	29.33	3.00	32.84	-64.54	-25.00	39.54
172.00	1720.00	PK	-2.30	V	4.81	29.33	3.00	31.84	-65.54	-25.00	40.54



8.8 Modulation Characteristics

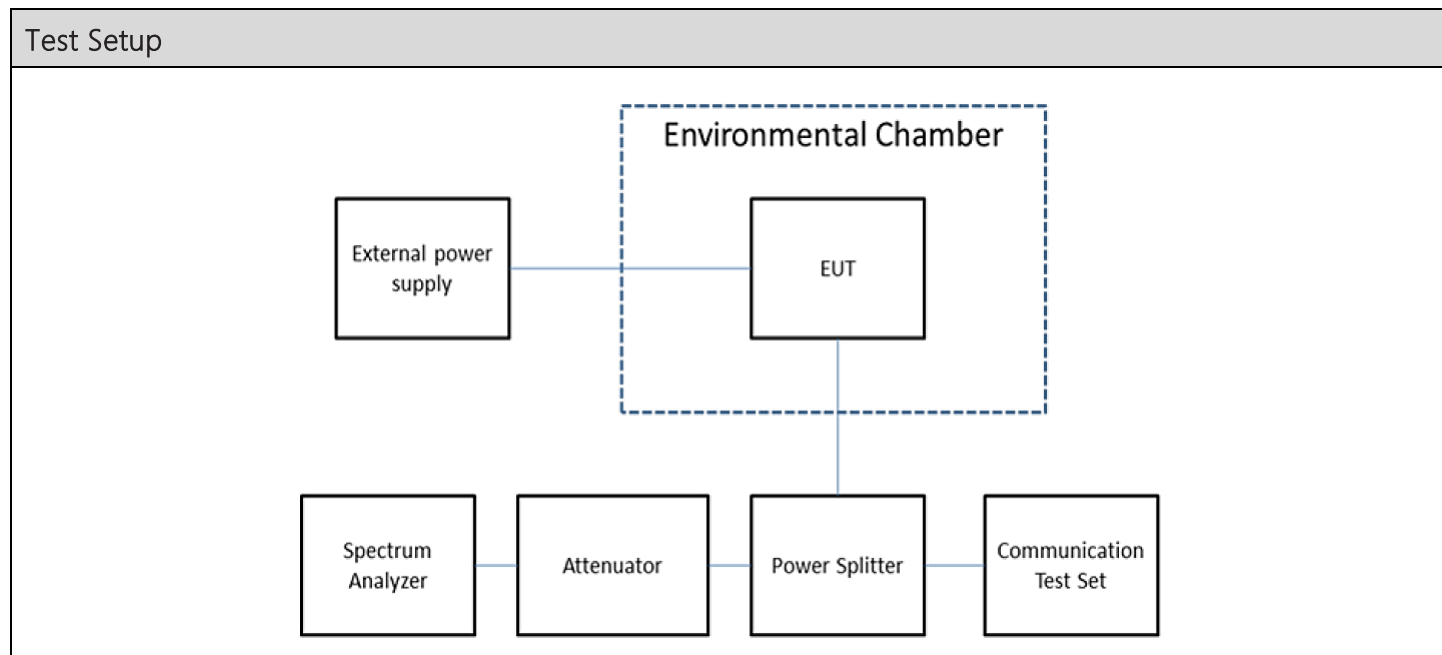
Limits from FCC Parts 2.1047 and test procedure from ANSI C63.26-2015



N/A

8.9 Frequency Stability

Limits from FCC Parts 2.1055, and 90.213; and test procedure from ANSI C63.26-2015.



Test Results, Mode 1		
Tuned Frequency (MHz)	Max Deviation (kHz)	Limit (ppm)
138.025	0.1	5

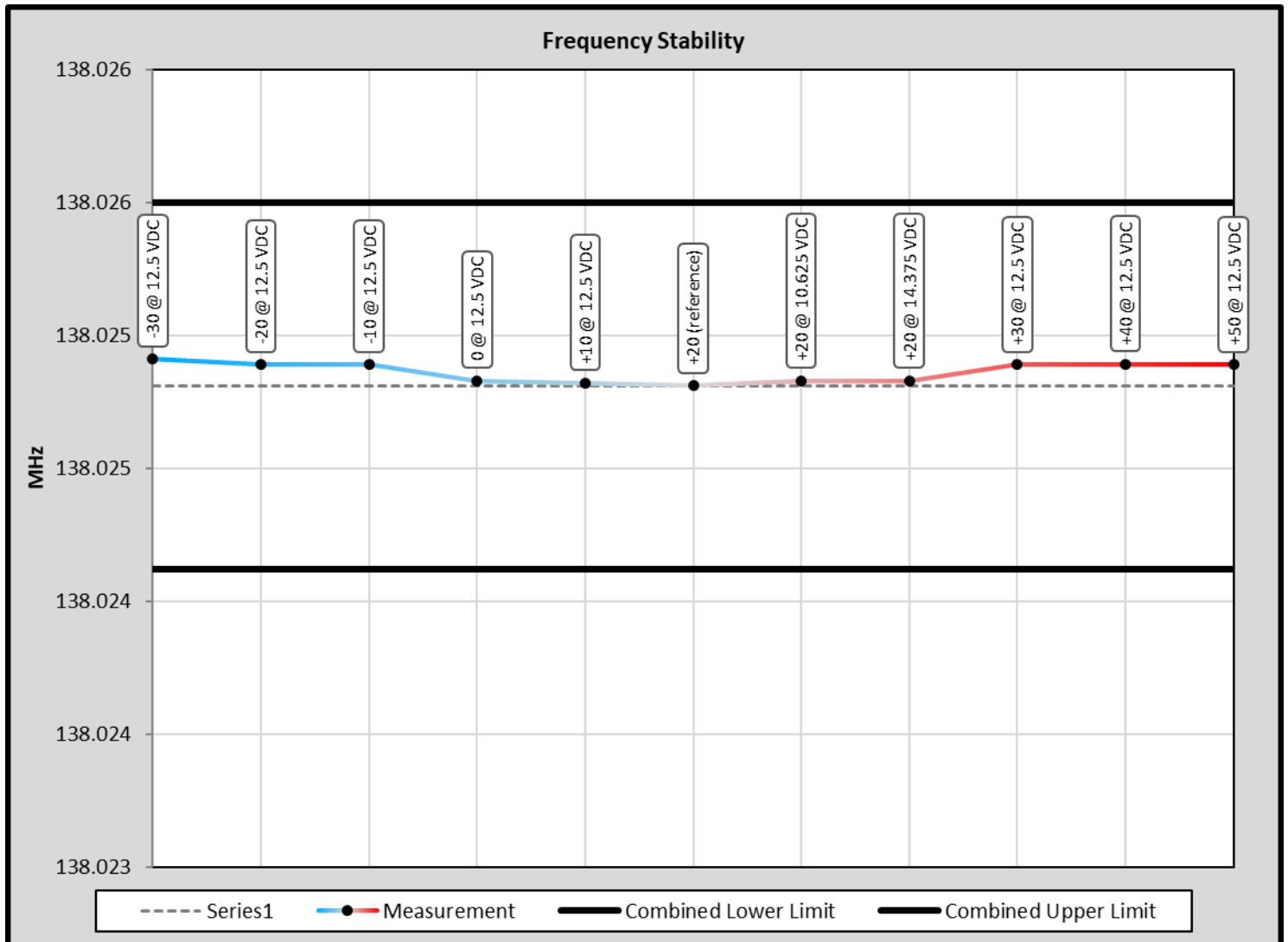


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8.9.1 Frequency Stability Data

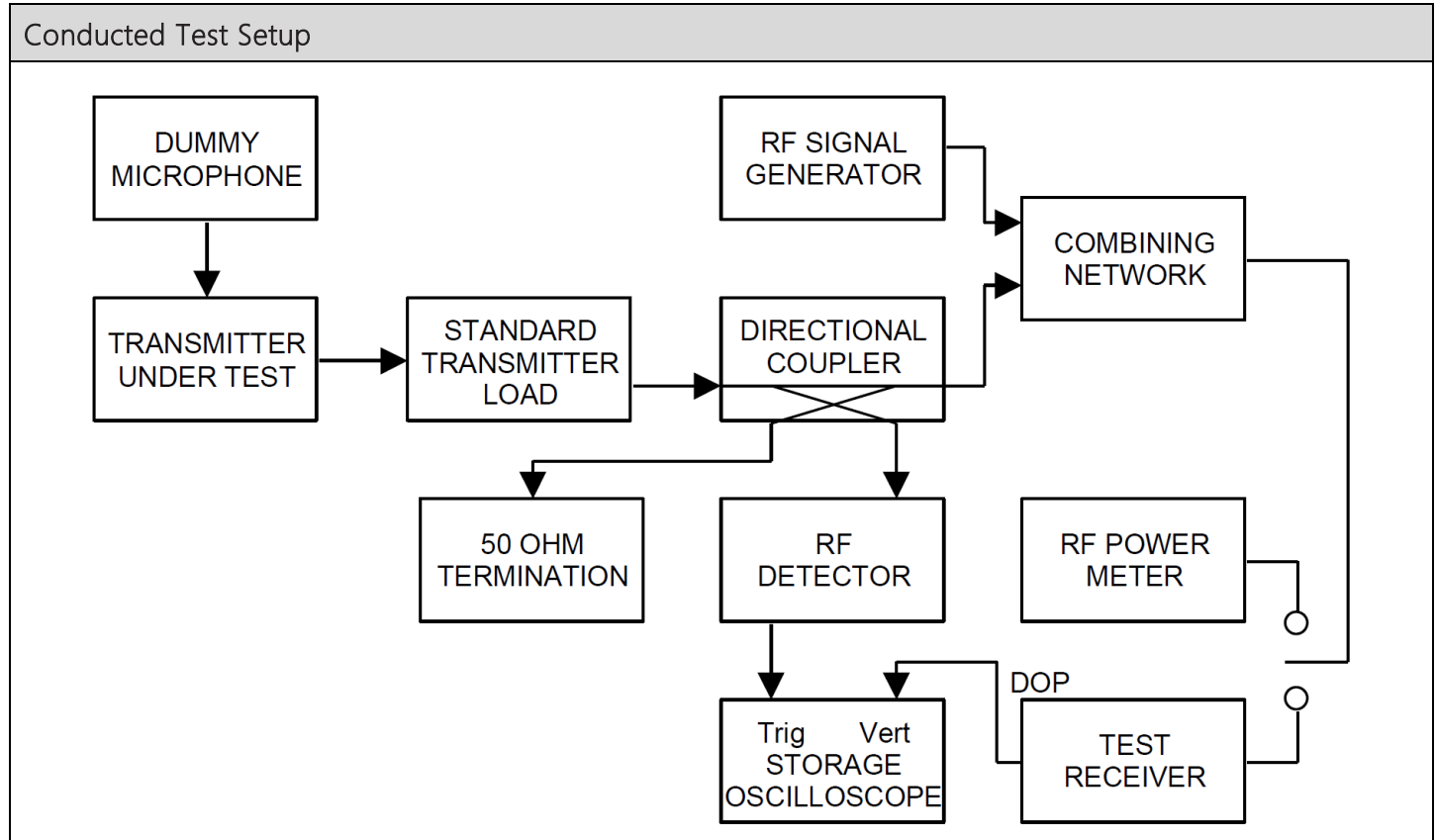
FCC Part 90 Limit	5.0	ppm	
FCC Part 90 Limit, as ppb	5000	ppb (Parts per Billion)	
FCC Part 90 Limit, as %	0.00050	%	
Strictest Combined Limit, as Hz	690.124	Hz	
Combined Lower Limit	138.024120	MHz	
Combined Upper Limit	138.025500	MHz	
Rated Supply Voltage	12.5	☐ AC ☒ DC	
Temperature / Voltage Variation			
Temperature (°C)	Supplied Voltage (V)	Frequency (MHz)	Deviation (kHz)
-30	12.5	138.024910	-0.100
-20	12.5	138.024890	-0.080
-10	12.5	138.024890	-0.080
0	12.5	138.024830	-0.020
+10	12.5	138.024820	-0.010
+20 (reference)	12.5	138.024810	0.000
+20	10.6	138.024830	-0.020
+20	14.4	138.024830	-0.020
+30	12.5	138.024890	-0.080
+40	12.5	138.024891	-0.081
+50	12.5	138.024890	-0.080

8.9.2 Frequency Stability Plot

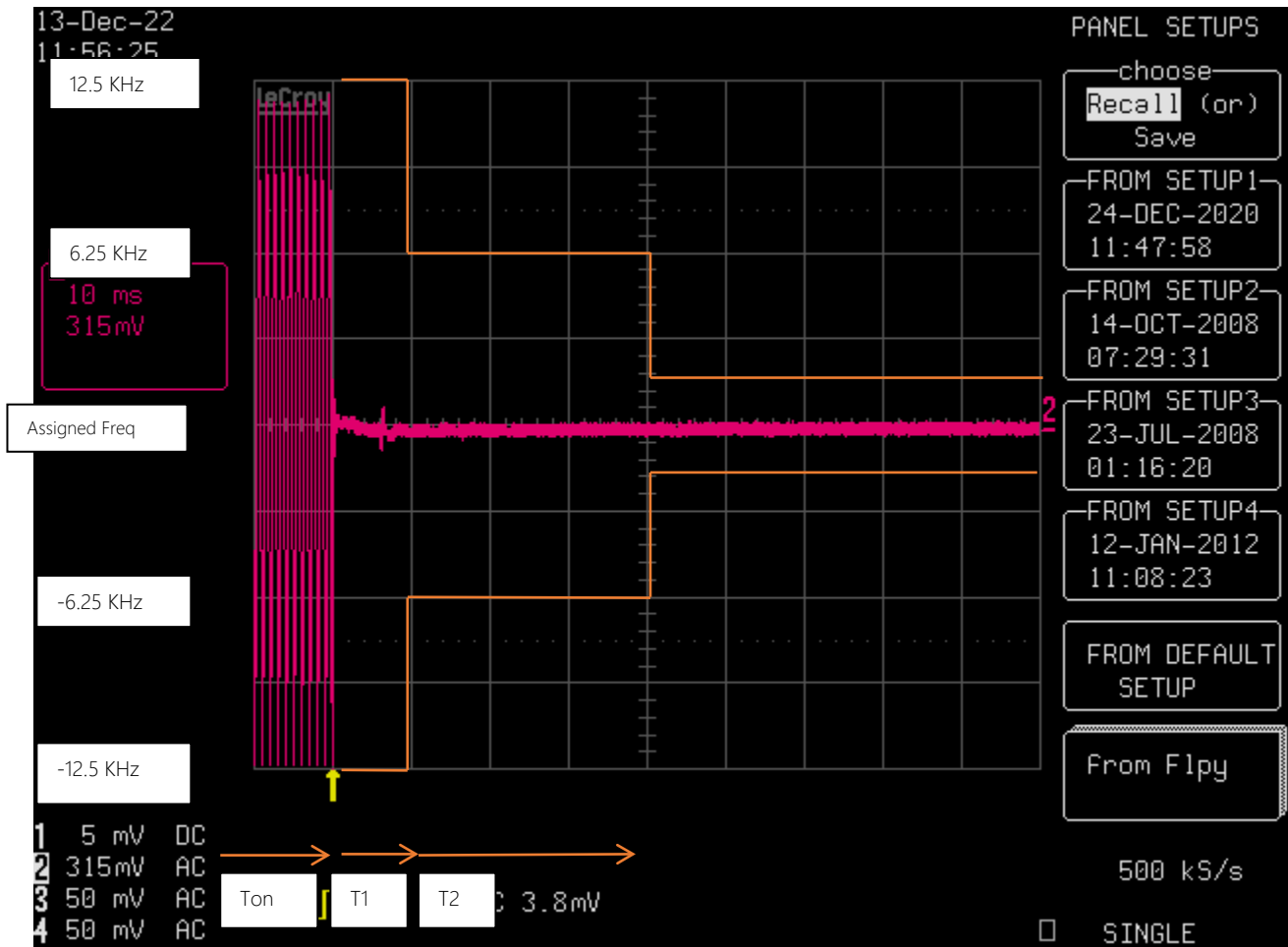


8.10 Transient Frequency Behavior

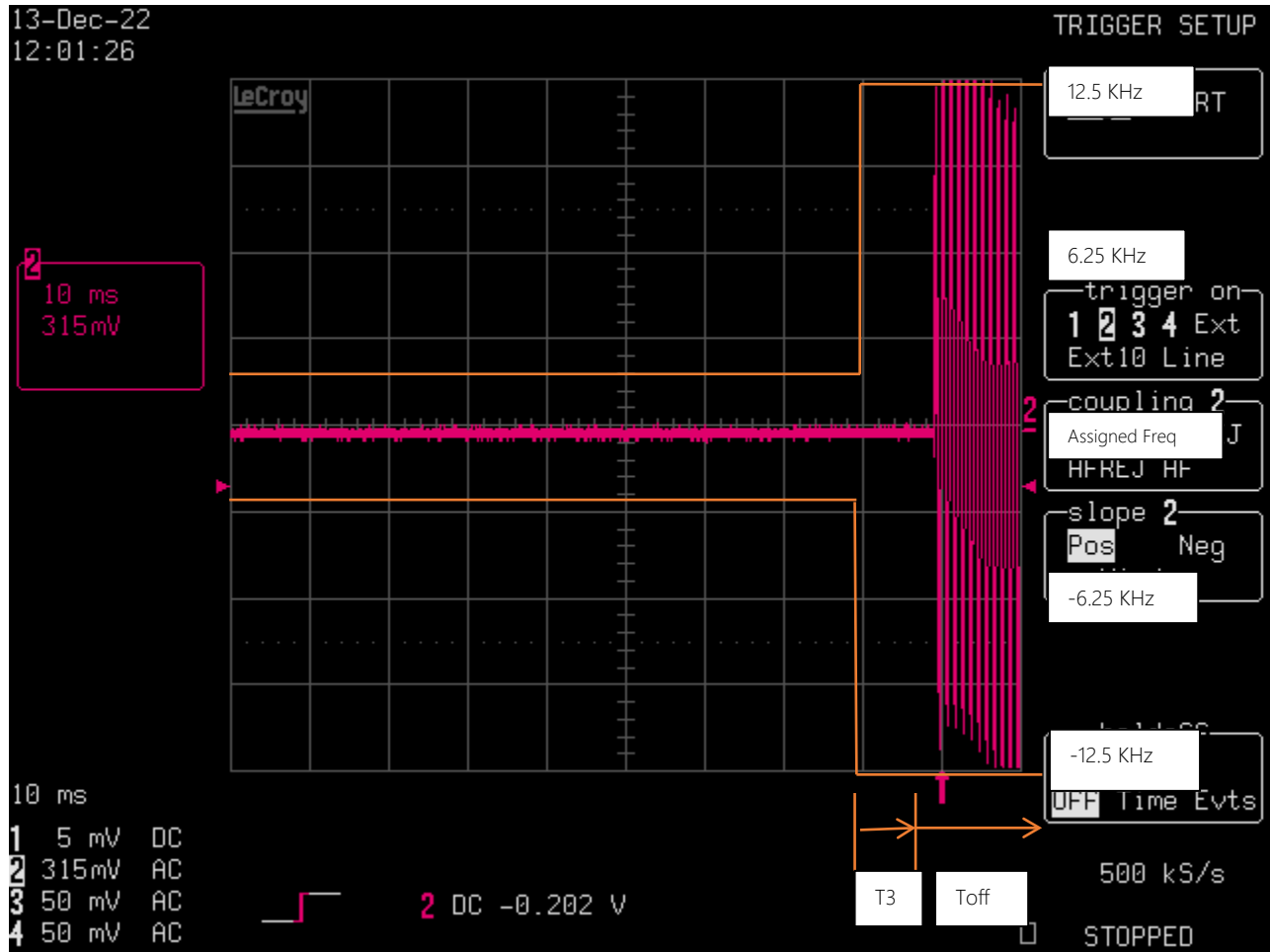
Limits from FCC Part 90.214; and test procedure from ANSI C63.26-2015.



8.10.1 Transient Frequency Behavior, 12.5 kHz, Keyed-on



8.10.2 Transient Frequency Behavior, 12.5 kHz, Keyed-off



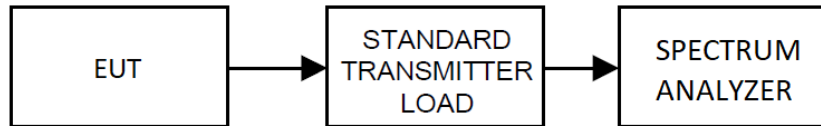


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8.11 Adjacent channel power limits

Limits from FCC Part 90.221, and test procedure from ANSI C63.26-2015.

Conducted Test Setup



n/a. The EUT does not operate in a band requiring ACP.



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9. ANNEX-A - Photographs of the EUT

Photographs of the EUT and any manufacturer supplied accessories to be used with the EUT are in separate supplementary documents labelled EXTERNAL PHOTOS and INTERNAL PHOTOS.

10. ANNEX-B – Test Setup Photographs

Test setup photographs are located in a separate supplementary ANNEX-B document.

11. History of Test Report Changes

Test Report #	Revision #	Description	Date of Issue
TR_5594-22_FCC 90_	1	Initial release	12/13/2022
	2	Updated Pages 12 - 15	1/3/2023



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END OF TEST REPORT
