Test Report Serial Number:	**45461787 R2.0**
Test Report Date:	**10 January 2023**
Project Number:	**1606**

EMC Test Report - New Filing

Applicant:

President Electronics USA
1007 Collier Center Way
Naples, FL, 34110
USA

FCC ID:	IC Registration Number
2AEOCUT569	**20240-UT569**
Product Model Number / HVIN	Product Name / PMN
MC KINLEY II FCC	**MC KINLEY II FCC**

In Accordance With:

FCC 47 CFR Part 95 Subpart D, Part 15 Subpart B
Licensed Non-Broadcast Station Transmitter (TNB)
RSS-GEN, RSS-236 Issue 2
Citizen Band (26.960 to 27.410 MHz)

Approved By:

Ben Hewson, President
Celltech Labs Inc.
21-364 Lougheed Rd.
Kelowna, BC, V1X 7R8
Canada

Test Lab Certificate: 2470.01 **IC Registration 3874A** **FCC Registration: CA3874**

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1.0 REVISION HISTORY

Revision History					
Samples Tested By:	Art Voss, P.Eng.		**Date(s) of Evaluation:**	2 - 13 November 2022	
Report Prepared By:	Art Voss, P.Eng.		**Report Reviewed By:**	Art Voss	
Report Revision	**Description of Revision**		**Revised Section**	**Revised By**	**Revision Date**
1.0	Initial Release		n/a	Art Voss	23 December 2022
2.0	Corrected FCC/IC ID and PMN		All	Art Voss	10 January 2023

2.0 CLIENT AND DUT INFORMATION

Client Information		
Applicant Name (FCC)	**President Electronics USA**	
Applicant Address (FCC)	1007 Collier Center Way	
	Naples, FL, 34110	
	USA	
DUT Information		
Device Identifier(s):	**FCC ID:**	**2AEOCUT569**
	IC ID:	**20240-UT569**
Device Type:	Mobile 4W AM / FM / 12W AM SSB CBRS Transceiver	
Device Model(s) / HVIN:	MC KINLEY II FCC	
Device Marketing Name / PMN:	MC KINLEY II FCC	
Firmware Version ID Number / FVIN:	-	
Host Marketing Name / HMN:	-	
Test Sample Serial No.:	#2	
Equipment Class (FCC):	Licensed Non-Broadcast Station Transmitter (TNB)	
Transmit Frequency Range:	26.965MHz - 27.405MHz	
Test Channels:	40 Channels	
Manuf. Max. Rated Output Power:	AM Double-SideBand, FM: 4W (36dBm)	
	AM Single-SideBand: 12W (40.8dBm)	
Manuf. Max. Rated BW:	AM Double-SideBand, FM: 8kHz	
	AM Single-SideBand: 4kHz	
Antenna Make and Model:	n/a	
Antenna Type and Gain:	0dBi (Typical), 3dBi (Max)	
Modulation:	AM / FM / AM Upper-SideBand / AM Lower-SideBand	
Mode:	Simplex	
DUT Power Source:	12 - 24VDC	
DUT Dimensions [WxLxH]	172mm x 148mm x 52mm	
Deviation(s) from standard/procedure:	None	
Modification of DUT:	None	

3.0 SCOPE

Preface:

This Certification Report was prepared on behalf of:

President Electronics USA

,(the '*Applicant*"), in accordance with the applicable Federal Communications Commission (FCC) CFR 47 and Innovation, Scientific and Economic Development (ISED) Canada rules parts and regulations (the '*Rules*'). The scope of this investigation was limited to only the equipment, devices and accessories (the '*Equipment*') supplied by the *Applicant*. The tests and measurements performed on this *Equipment* were only those set forth in the applicable *Rules* and/or the Test and Measurement Standards they reference. The *Rules* applied and the Test and Measurement Standards used during this evaluation appear in the Normative References section of this report. The limits set forth in the technical requirements of the applicable *Rules* were applied to the measurement results obtained during this evaluation and ,unless otherwise noted, these limits were used as the Pass/Fail criteria. The Pass/Fail statements made in this report apply to only the tests and measurements performed on only the *Equipment* tested during this evaluation. Where applicable and permissible, information including test and measurement data and/or results from previous evaluations of same or similar equipment, devices and/or accessories may be cited in this report.

Device Description:

The MC KINLEY II FCC is Mobile 4W AM / FM and 12W AM Single-SideBand (SSB) CBRS Transceiver. The MC KINLEY II is capable of transmitting in AM Double-SideBand (A3E) and AM Lower and Upper Carrier Suppressed Side Band (J3E) modes as well as FM (F3E) mode.

Application:

This is an application for a New Certification, Single.

Regulatory Requirement:

As per FCC 47 CFR 2 Subpart I and the Radiocommunication Regulations of Canada, Equipment Authorization is required for this *Equipment* by means of Certification in accordance with FCC 47 CFR §95 Subpart D, CBRS, RSS-236 Iss. 2 and ANSI C63.26.

Scope of Work:

The scope of this investigation is limited only to the evaluation of the MC KINLEY II FCC to determine compliance to the *Rules* identified herein.

RF Exposure:

As per FCC 47 CFR §2.1091 and Canada Health Safety Code 6, an RF Exposure (MPE) evaluation is required for this *Equipment* and the results of the RF Exposure (MPE) evaluation appear in a separate report. Since this equipment is capable of multiple transmission modes, only the highest power mode is considered.

4.0 TEST RESULT SUMMARY

TEST SUMMARY						
Referenced Standard(s):		**FCC CFR Title 47 Parts 2, 95D, 15B**				
Section	**Description of Test**	**Procedure Reference**	**Applicable Rule Part(s) FCC**	**Applicable Rule Part(s) ISEDC**	**Test Date**	**Result**
7.0	Conducted Power (Fundamental) Compliance to §2.1033(c)(8)	ANSI/TIA/EIA-382-A ANSI/TIA-603-E ANSI C63.26:2015 ANSI C63.4:2014	§2.1046 §2.1033(c)(8) §95.967	RSS-Gen RSS-236 4.6	5 Nov 2022	**Complies**
8.0	Modulation Response	ANSI/TIA/EIA-382-A ANSI/TIA-603-E ANSI C63.26:2015 ANSI C63.4:2014	§2.1047 §95.975 §95.977	RSS-Gen	7 Nov 2022	**Complies**
9.0	Occupied Bandwidth	ANSI/TIA/EIA-382-A ANSI C63.26:2015 ANSI C63.4:2014	§2.1049 §95.973	RSS-Gen RSS-236 4.9	7 Nov 2022	**Complies**
	Emission Mask	ANSI/TIA/EIA-382-A ANSI C63.26:2015 ANSI C63.4:2014	§2.1049 §95.979	RSS-Gen RSS-236 4.10	7 Nov 2022	**Complies**
10.0	Conducted TX Spurious Emissions	ANSI/TIA/EIA-382-A ANSI C63.26:2015 ANSI C63.4:2014	§2.1051 §95.979	RSS-Gen RSS-236 4.10	7, 12 Nov 2022	**Complies**
11.0	Radiated TX Spurious Emissions	ANSI/TIA/EIA-382-A ANSI C63.26:2015 ANSI C63.4:2014	§2.1053 §95.979	RSS-Gen RSS-236 4.10	2, 3 Nov 2022	**Complies**
12.0	Radiated Receiver Emissions	ANSI C63.26:2015 ANSI C63.4:2014	§15 Subpart B §15.109(d)	ICES-003 RSS-Gen	2, 3 Nov 2022	**Complies**
13.0	Frequency Stability	ANSI/TIA/EIA-382-A ANSI C63.26:2015 ANSI C63.4:2014	§2.1055 §95.965	RSS-Gen	13 Nov 2022	**Complies**

Test Station Day Log

Date	Ambient Temp (°C)	Relative Humidity (%)	Barometric Pressure (kPa)	Test Station	Tests Performed Section(s)
2 Nov 2022	0.0	87	101.5	**OATS**	**11, 12**
3 Nov 2022	-2.0	80	102.4	**OATS**	**11,12**
5 Nov 2022	23.4	16	102.9	**EMC**	**7**
7 Nov 2022	23.5	16	103.4	**EMC**	**8,9,10**
12 Nov 2022	22.3	15	102.9	**EMC**	**10**
13 Nov 2022	14.8	65	103.6	**TC**	**13**

EMC - EMC Test Bench
OATS - Open Area Test Site
LISN - LISN Test Area
IMM - Immunity Test Area
SAC - Semi-Anechoic Chamber
TC - Temperature Chamber
ESD - ESD Test Bench
RI - Radiated Immunity Chamber

I attest that the data reported herein is true and accurate within the tolerance of the Measurement Instrument Uncertainty; that all tests and measurements were performed in accordance with accepted practices or procedures; and that all tests and measurements were performed by me or by trained personnel under my direct supervision. The results of this investigation are based solely on the test sample(s) provided by the client which were not adjusted, modified or altered in any manner whatsoever, except as required to carry out specific tests or measurements. This test report has been completed in accordance with ISO/IEC 17025.

Art Voss, P.Eng.
Technical Manager
Celltech Labs Inc.

23 December 2022
Date

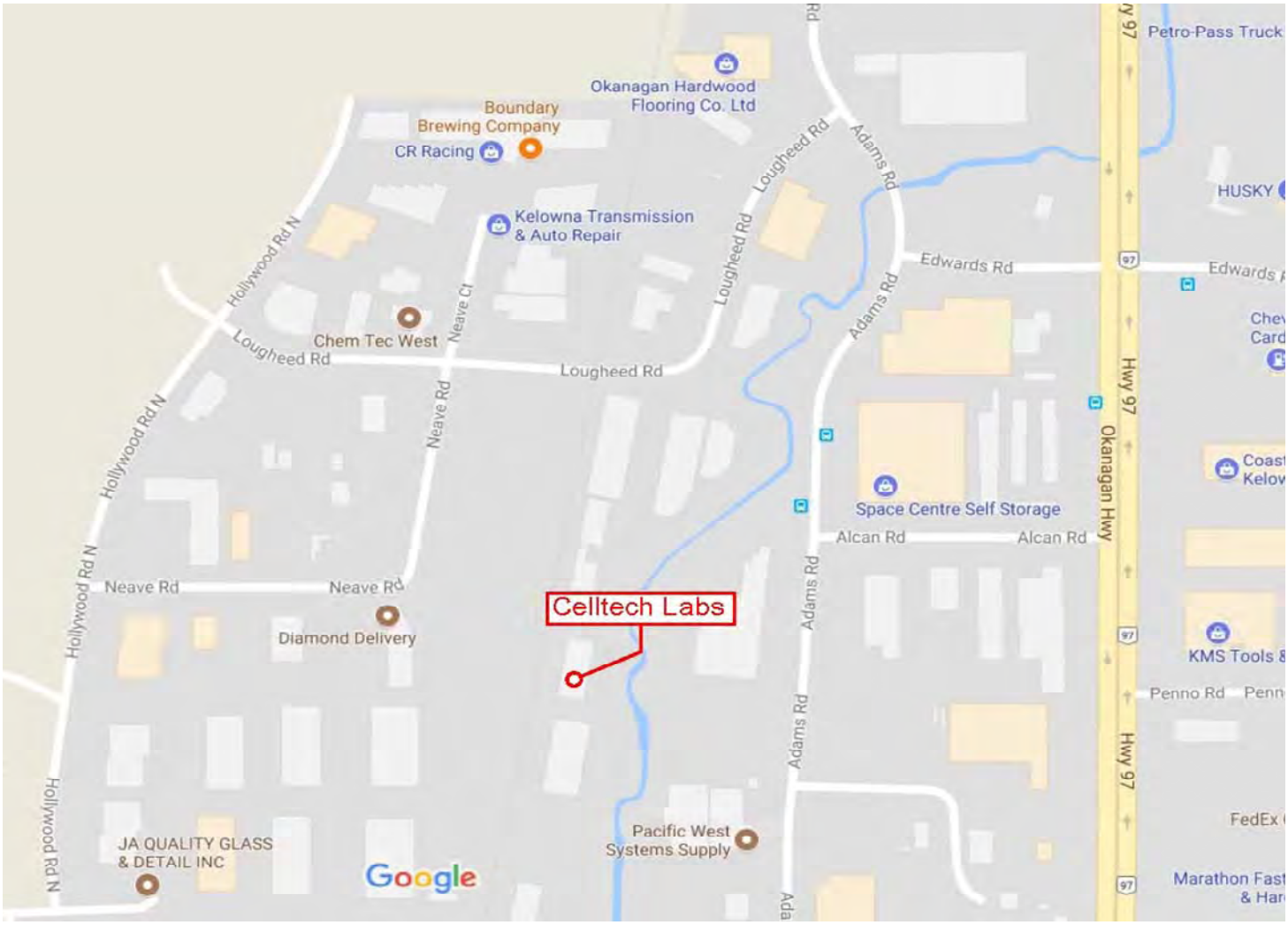
5.0 NORMATIVE REFERENCES

Normative References	
ISO/IEC 17025:2017	General requirements for the competence of testing and calibration laboratories
ANSI C63.4-2014	American National Standard of Procedures for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electric and Electronic Equipment in the Range of 9kHz to 40GHz
ANSI C63.26-2015	American National Standard of Procedures for Compliance Testing of Transmitters Used in Licensed Radio Services
ANSI/TIA-382-A	Minimum Standards - Citizens Band Radio Service Amplitude Modulated (AM) Transceivers Operating in the 27 MHz Band (Revision of EIA-382)
ANSI/TIA-603-E	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards (Revision of TIA-603-D)
CFR Title 47: Part 2:	Code of Federal Regulations Telecommunication Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
CFR Title 47: Part 15: Subpart B:	Code of Federal Regulations Telecommunication Radio Frequency Devices Unintentional Radiators
CFR Title 47: Part 95: Subpart D:	Code of Federal Regulations Telecommunication Personal Radio Service Citizens Band Radio Service (CBRS)
ISED RSS-Gen Issue 5A1: March 2019	Innovation, Science and Economic Development Canada Spectrum Management and Telecommunications Radio Standards Specification General Requirements and Information for the Certification of Radiocommunication Equipment
ISED ICES-003 Issue 6: Jan 2016	Innovation, Science and Economic Development Canada Spectrum Management and Telecommunications Radio Standards Specification Information Technology Equipment (Including Digital Apparatus) — Limits and Methods of Measurement
ISED RSS-236 Issue 2: Sep-22	Innovation, Science and Economic Development Canada Spectrum Management and Telecommunications Radio Standards Specification General Radio Service Equipment Operating in the Band 26.960 to 27.410 MHz (Citizens Band)

6.0 FACILITIES AND ACCREDITATIONS

Facility and Accreditation:

The facilities used to evaluate this device outlined in this report are located at 21-364 Lougheed Road, Kelowna, British Columbia, Canada V1X 7R8. The radiated emissions site (OATS) conforms to the requirements set forth in ANSI C63.4 and is filed and listed with the FCC under Test Firm Registration Number CA3874 and Industry Canada under Test Site File Number IC 3874A. Celltech is accredited to ISO 17025, through accrediting body A2LA and with certificate 2470.01.



7.0 CONDUCTED POWER

Test Procedure	
Normative Reference	FCC 47 CFR §2.1046, §2.1033(c)(8), §95.967, RSS-236 EIA/TIA-382-A, TIA-603-E

Limits	
47 CFR §95.967	(a) When transmitting amplitude modulated (AM) voice signals or frequency modulated (FM) voice signals, the mean carrier power must not exceed 4 Watts.
	(b) When transmitting single sideband (SSB) voice signals, the peak envelope power must not exceed 12 Watts.
RSS-236 4.6	The transmitter output power shall not exceed 4.0 watts for DSB mode of operation or FM signals. For SSB, the RF peak envelope power output shall not exceed 12 watts.

General Procedure	
EIA/TIA-382-A	**19. TRANSMITTER CARRIER POWER OUTPUT** Transmitter Carrier Power Output for this service is the power (rms) available at the output terminals of the transmitter when the output terminals are connected to a standard output load. This measurement shall be performed without modulation, at standard test. conditions.
TIA-603-E	**2.2.1 Conducted Carrier Output Power Rating** The conducted carrier power output rating for a transmitter is the power available at the output terminals of the transmitter when the output terminals are connected to the standard transmitter load.
RSS-236 4.5.1	**4.5.1 Measurement methods for SSB** When measuring fundamental emissions, the transmitter shall be modulated with a two-tone audio input signal. The test signals shall consist of two sinusoidal tones at the frequencies of 500 Hz +/- 5% and 2400 Hz +/- 5%, which, when simultaneously applied to the audio input of an SSB transmitter, result in equal amplitude radio frequency output signals. The peak envelope power is then twice the average power.

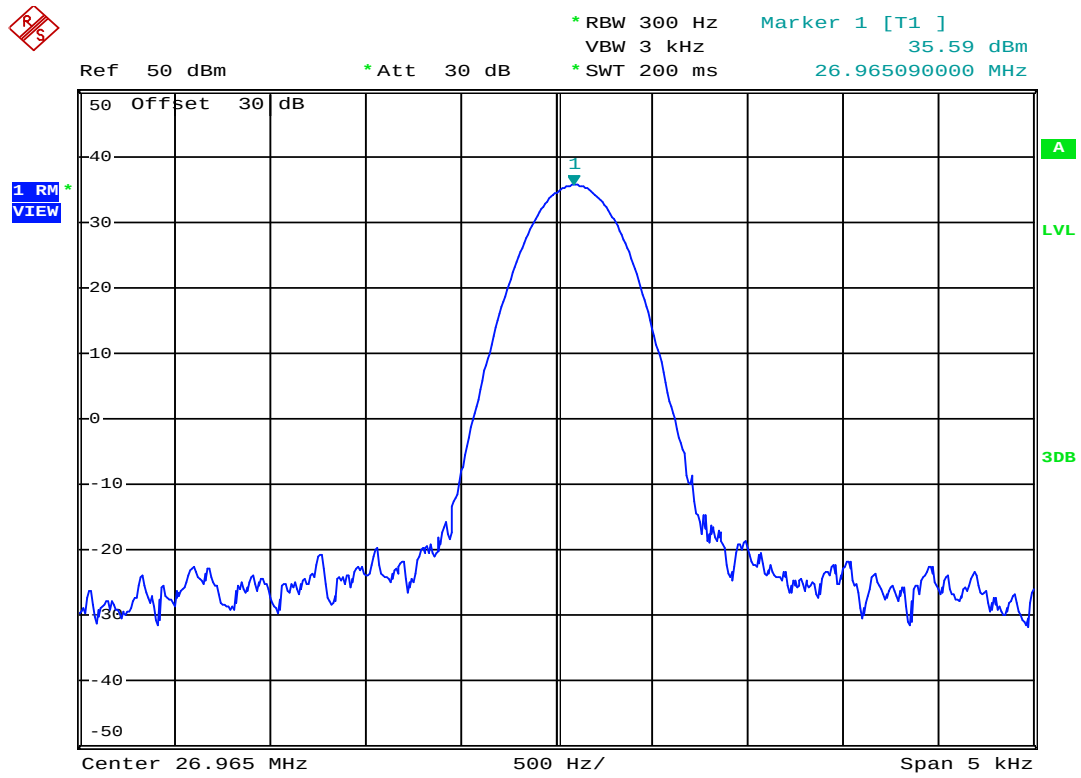
Test Setup	Appendix A - Figure A.1

Measurement Procedure

The DUT was connected to a Spectrum Analyzer (SA) via a 30dB attenuator connected to the DUT's antenna port. The SA was configured as above using the Automatic 6dB Cursor Bandwidth measurement. The output power of the DUT was set to the manufacturer's highest output power setting at the Low, Mid and High frequency channels as permitted by the device. The DUT was set to transmit at its maximum Duty Cycle.

Plot 7.1 – Conducted Output Power, Channel 1, AM DSB

Conducted Power:

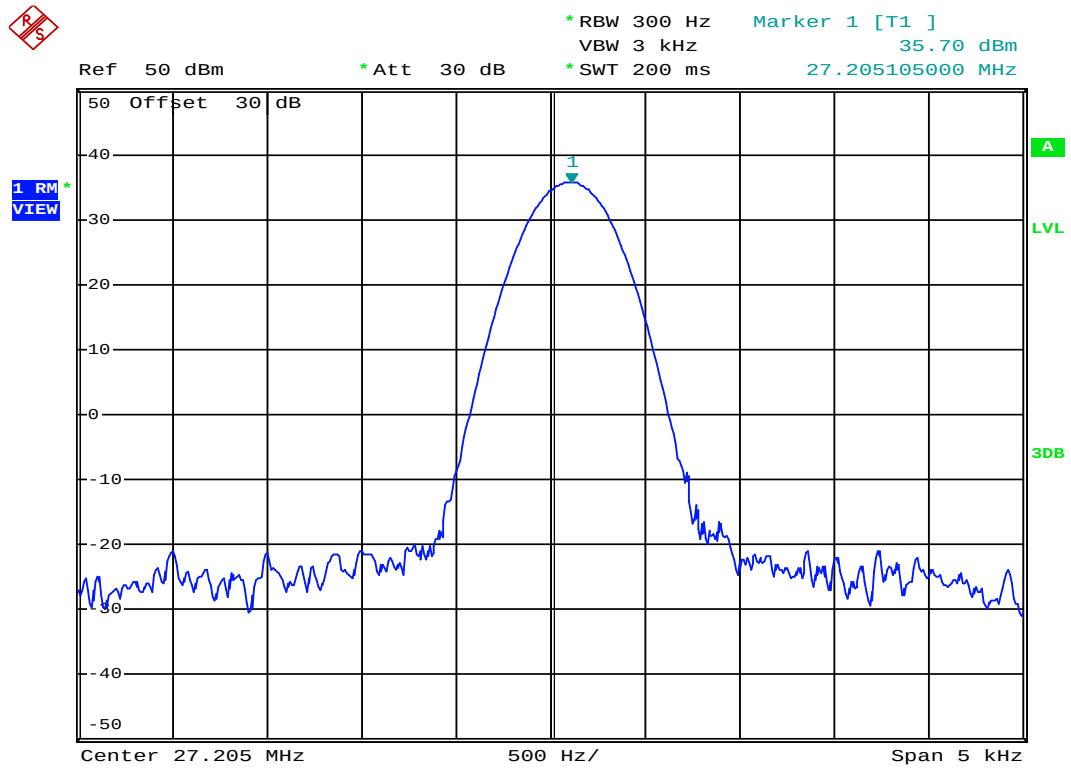


Date: 5.NOV.2022 13:32:11

Channel Number	Channel Frequency (MHz)	Modulation	Conducted Power (dBm)
1	26.965	AM	35.59

Plot 7.2 – Conducted Output Power, Channel 20, AM DSB

Conducted Power:

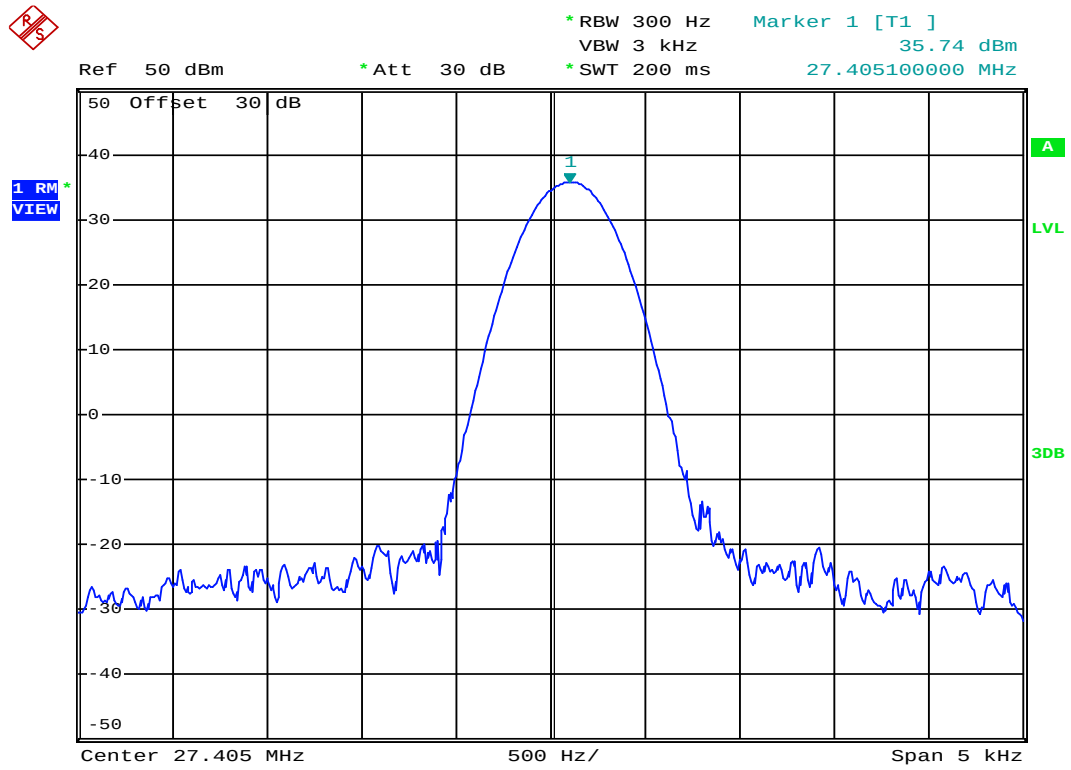


Date: 5.NOV.2022 13:34:33

Channel Number	Channel Frequency (MHz)	Modulation	Conducted Power (dBm)
20	27.205	AM	35.70

Plot 7.3 – Conducted Output Power, Channel 40, AM DSB

Conducted Power:

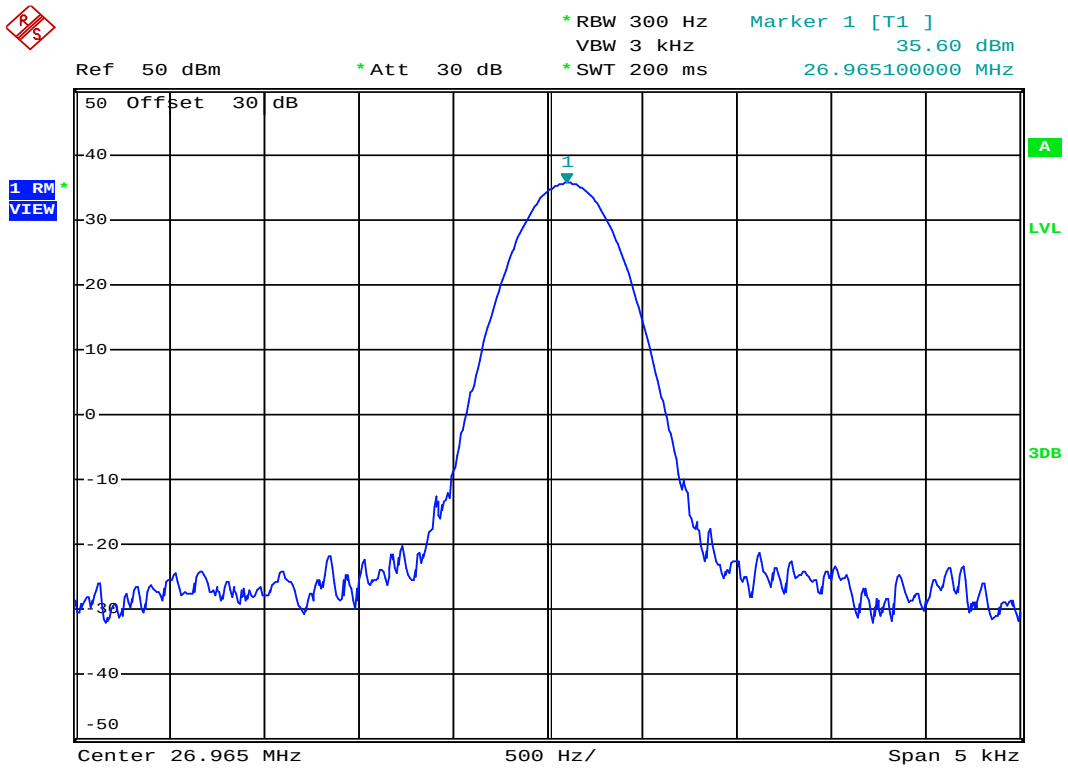


Date: 5.NOV.2022 13:33:31

Channel Number	Channel Frequency (MHz)	Modulation	Conducted Power (dBm)
40	27.405	AM	35.74

Plot 7.4 – Conducted Output Power, Channel 1, FM

Conducted Power:

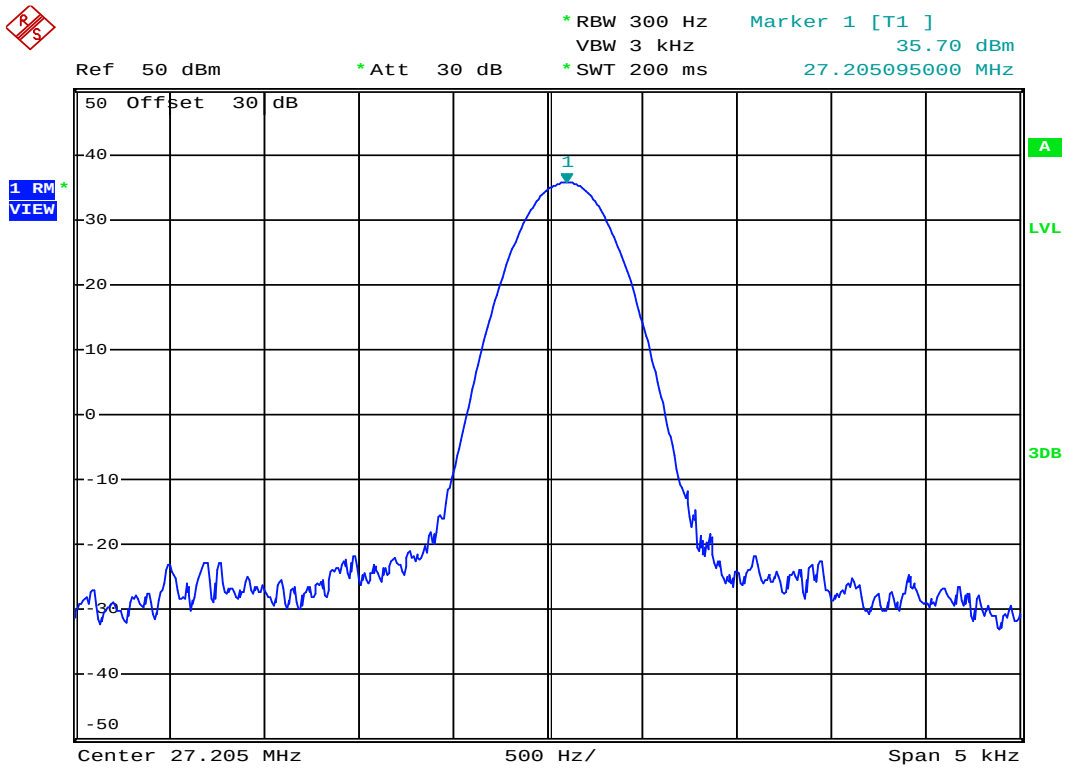


Date: 5.NOV.2022 13:37:01

Channel Number	Channel Frequency (MHz)	Modulation	Conducted Power (dBm)
1	26.965	FM	35.60

Plot 7.5 – Conducted Output Power, Channel 20, FM

Conducted Power:

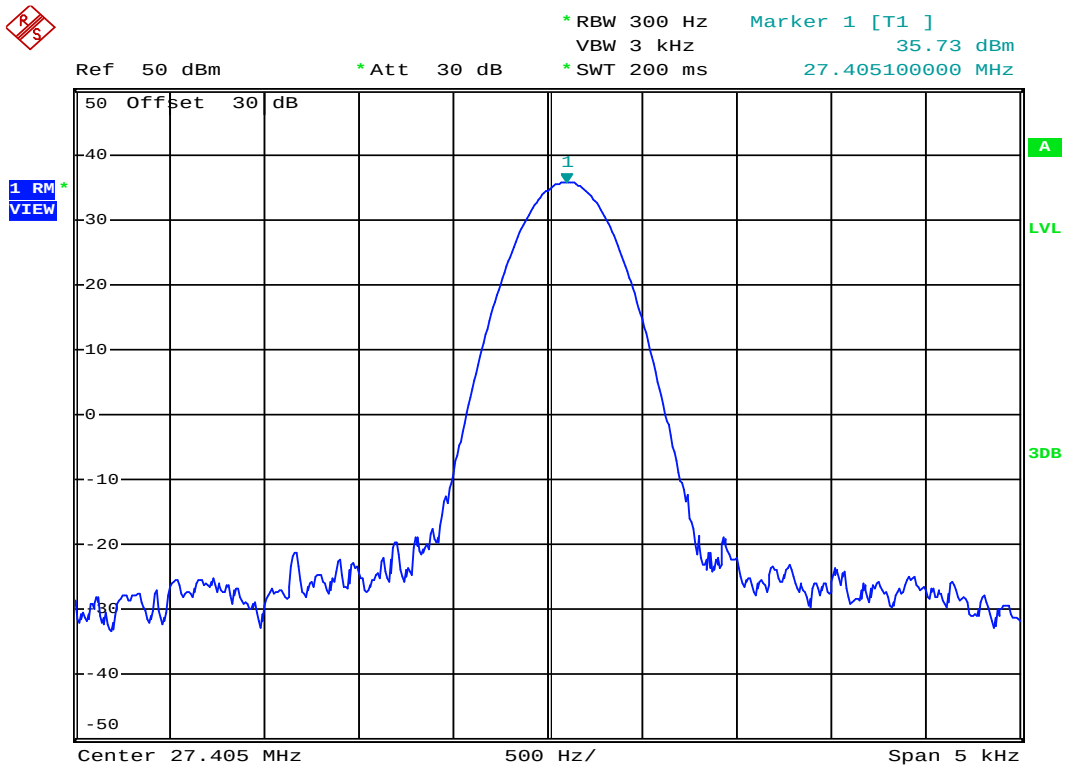


Date: 5.NOV.2022 13:35:32

Channel Number	Channel Frequency (MHz)	Modulation	Conducted Power (dBm)
20	27.205	FM	35.70

Plot 7.6 – Conducted Output Power, Channel 40, FM

Conducted Power:

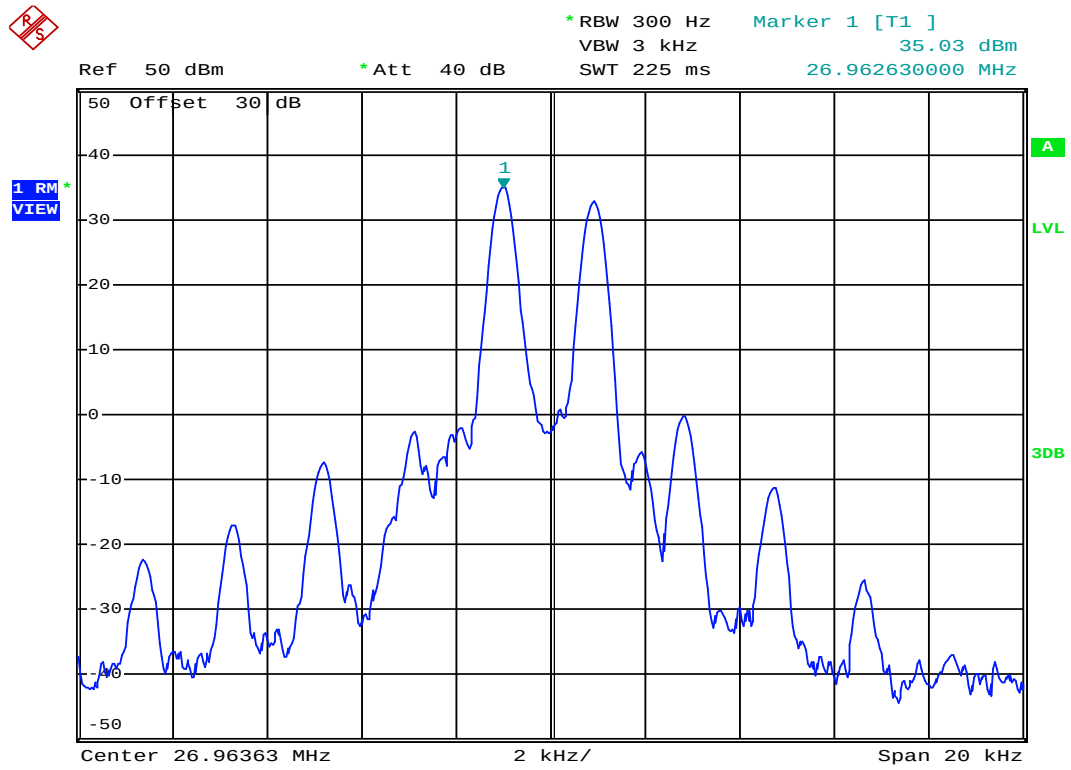


Date: 5.NOV.2022 13:36:21

Channel Number	Channel Frequency (MHz)	Modulation	Conducted Power (dBm)
40	27.405	FM	35.73

Plot 7.7 – Conducted Output Power, Channel 1, AM Lower-SideBand, Two-Tone Input

Conducted Power: Lower Side Band, Two-Tone Input

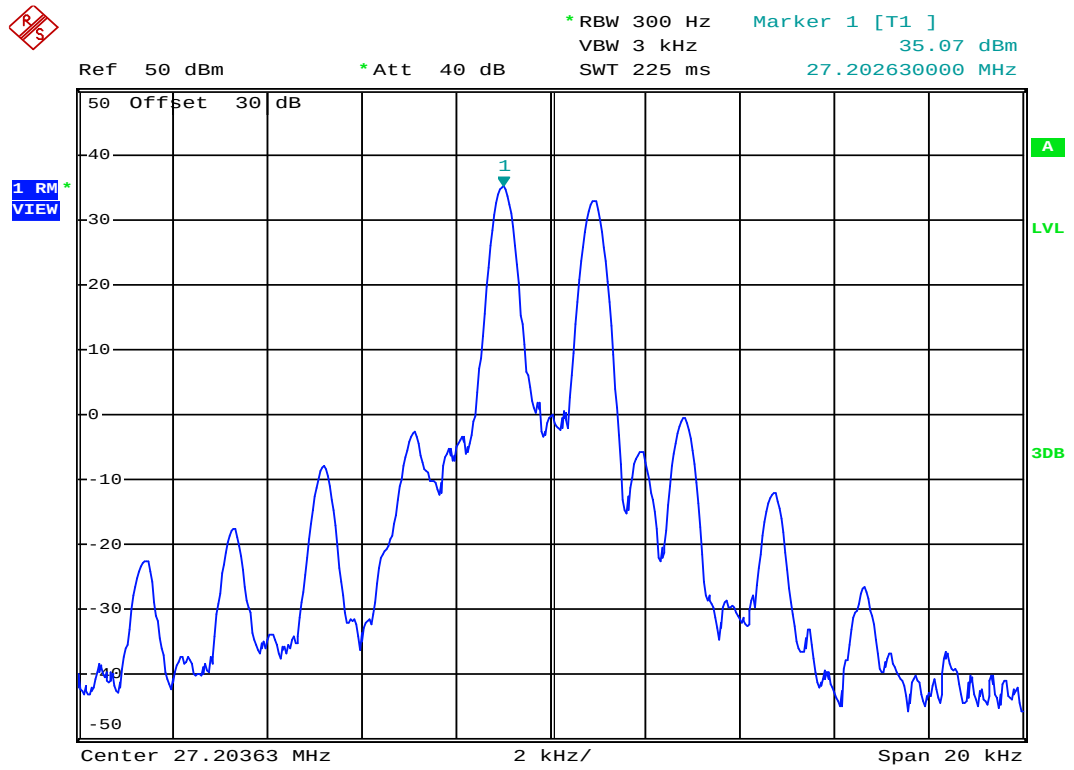


Date: 7.NOV.2022 16:21:41

	Channel Number	Channel Frequency (MHz)	Modulation	Conducted Power (dBm)
Lower Side Band Two-Tone Input	1	26.965	AM	35.03

Plot 7.8 – Conducted Output Power, Channel 20, AM Lower-SideBand, Two-Tone Input

Conducted Power: Lower Side Band, Two-Tone Input

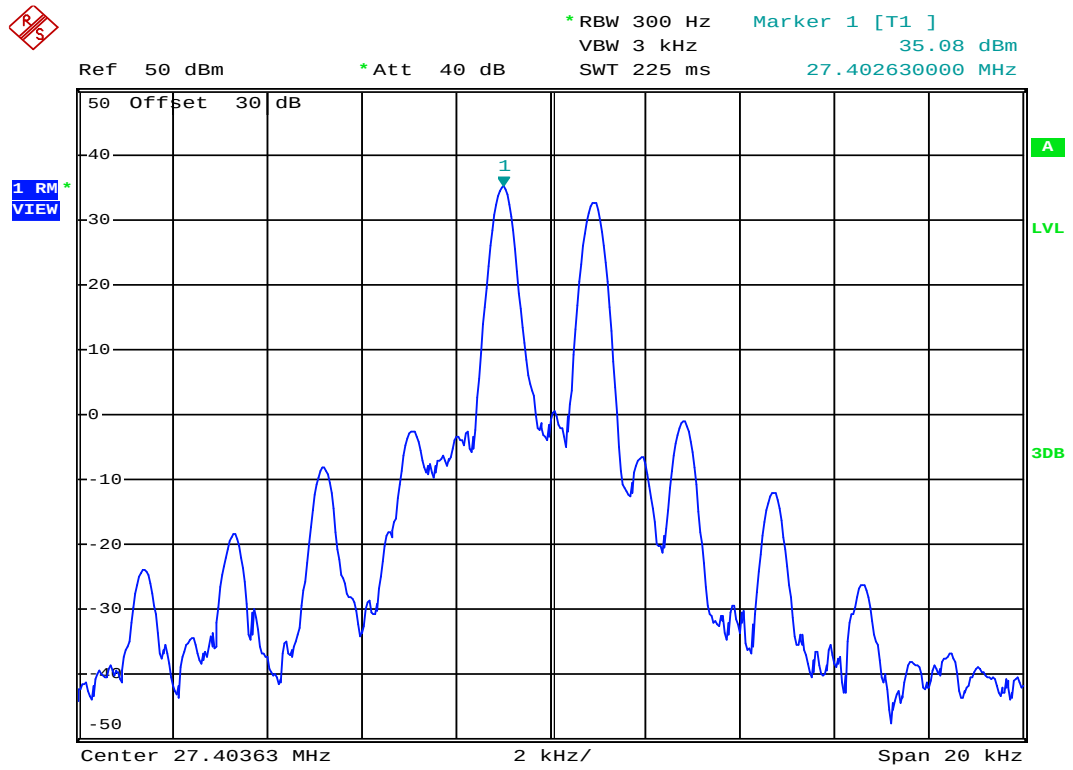


Date: 7.NOV.2022 16:20:17

	Channel Number	Channel Frequency (MHz)	Modulation	Conducted Power (dBm)
Lower Side Band Two-Tone Input	20	27.205	AM	35.07

Plot 7.9 – Conducted Output Power, Channel 40, AM Lower-SideBand, Two-Tone Input

Conducted Power: Lower Side Band, Two-Tone Input

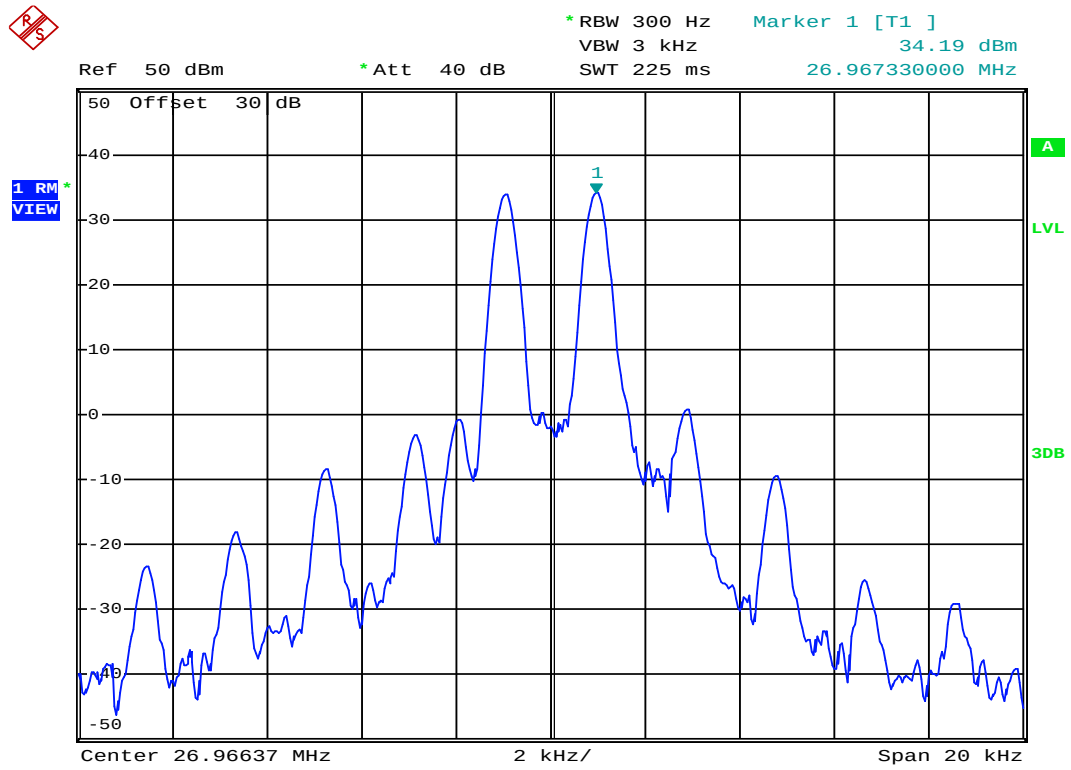


Date: 7.NOV.2022 16:21:00

	Channel Number	Channel Frequency (MHz)	Modulation	Conducted Power (dBm)
Lower Side Band Two-Tone Input	40	27.405	AM	35.08

Plot 7.10 – Conducted Output Power, Channel 1, AM Upper-SideBand, Two-Tone Input

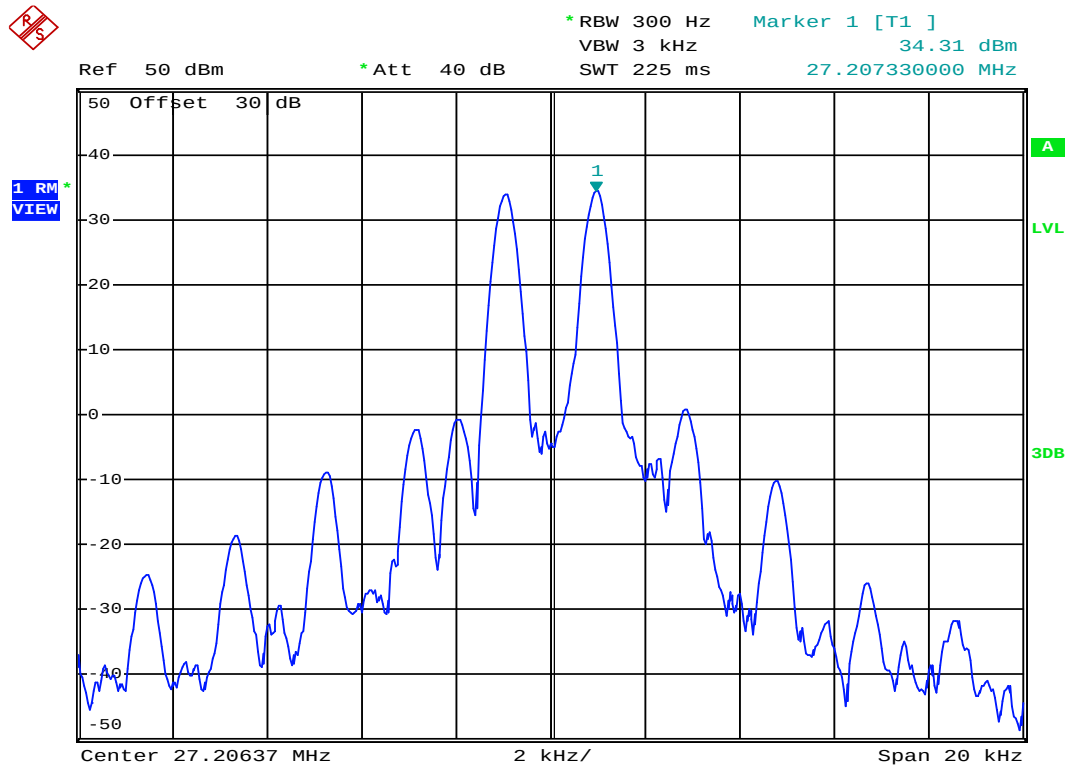
Conducted Power: Upper Side Band, Two-Tone Input



	Channel Number	Channel Frequency (MHz)	Modulation	Conducted Power (dBm)
Upper Side Band Two-Tone Input	1	26.965	AM	34.19

Plot 7.11 – Conducted Output Power, Channel 20, AM Upper-SideBand, Two-Tone Input

Conducted Power: Upper Side Band, Two-Tone Input

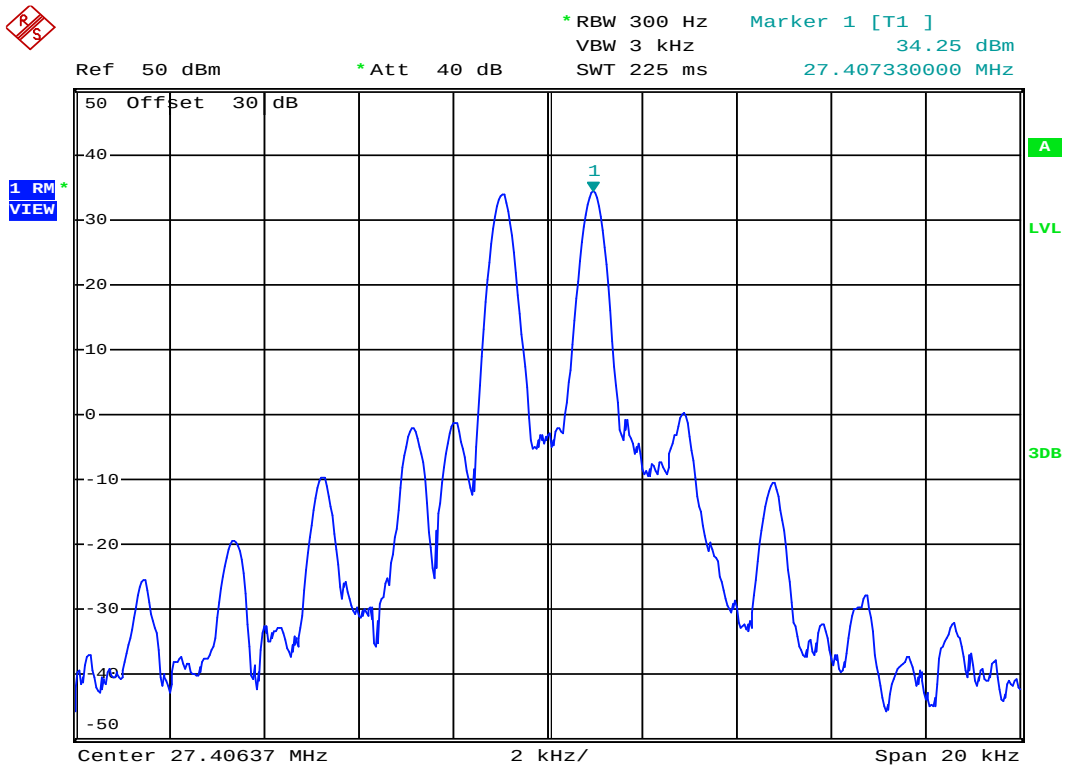


Date: 7.NOV.2022 16:17:17

	Channel Number	Channel Frequency (MHz)	Modulation	Conducted Power (dBm)
Upper Side Band Two-Tone Input	20	27.205	AM	34.31

Plot 7.12 – Conducted Output Power, Channel 40, AM Upper-SideBand, Two-Tone Input

Conducted Power: Upper Side Band, Two-Tone Input



	Channel Number	Channel Frequency (MHz)	Modulation	Conducted Power (dBm)
Upper Side Band Two-Tone Input	40	27.405	AM	34.25

Plot 7.13 – Two-Tone Input Signal

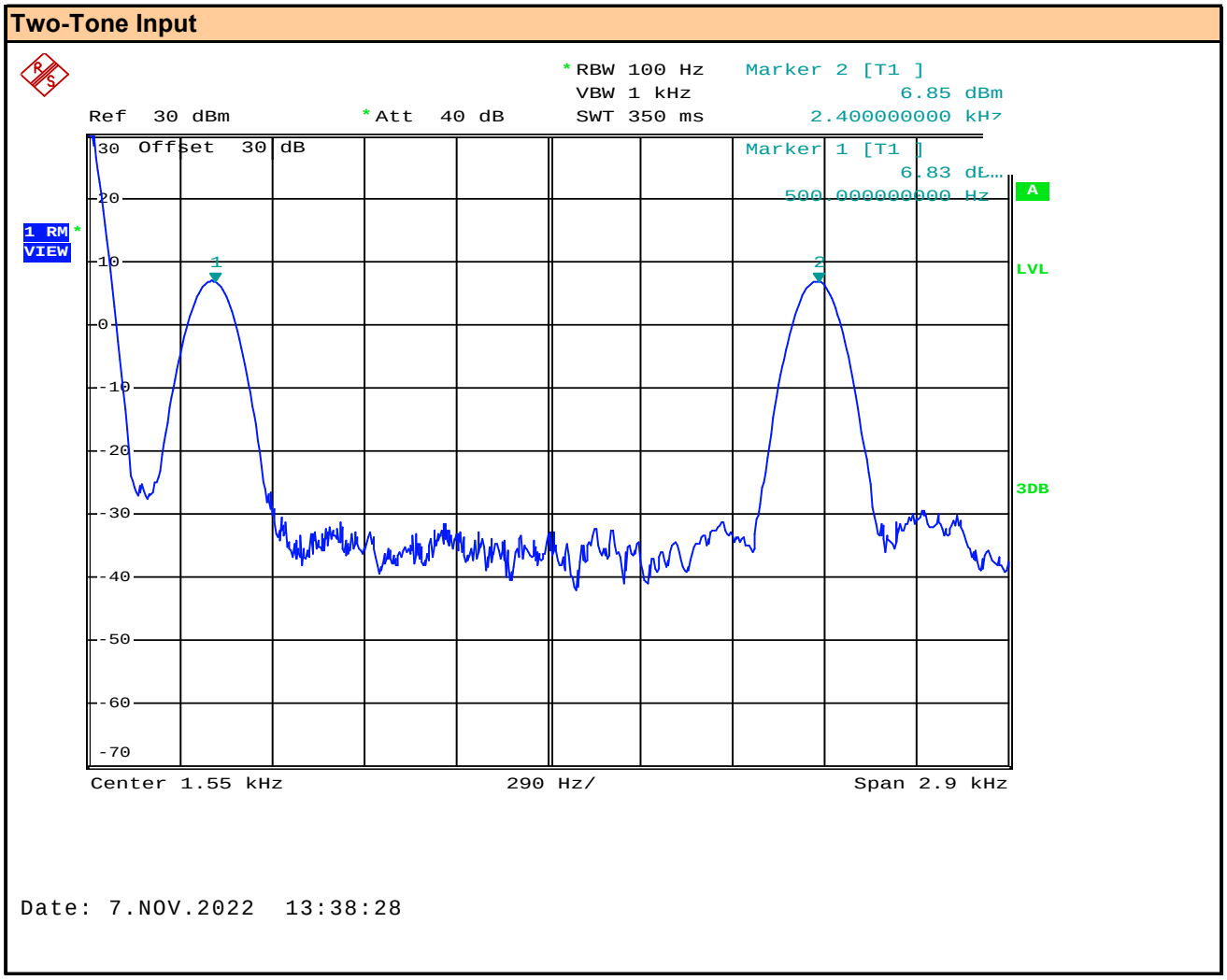


Table 7.1 – Summary of Two-Tone Input Signal

Two-Tone Audio Input	
Tone 1 Frequency:	500Hz
Tone 1 Amplitude:	6.83dBm
Tone 2 Frequency:	2400Hz
Tone 2 Amplitude:	6.85dBm

Table 7.2 – Summary of Conducted Power Measurements (RMS), AM DSB, FM

Conducted Power Measurement Results:						
Channel Number	Frequency (MHz)	Modulation	Side Band	Measured Power [P_{Meas}] (dBm)	Limit [P_{Lim}] (dBm)	Margin (dB)
1	26.965	AM	-	35.59	36	0.41
20	27.205			35.70		0.30
40	27.405			35.74		0.26
1	26.965	FM		35.60		0.40
20	27.205			35.70		0.30
40	27.405			35.73		0.27
					Result:	Complies

Conducted Margin = P_{Limit} - P_{Meas}

Table 7.3 – Summary of Conducted Power Measurements (RMS), AM SSB

Conducted Power Measurement Results: Peak Envelope Power							
Channel Number	Frequency (MHz)	Modulation	Side Band	Measured Power [P_{Meas}] (dBm)	Peak Envelope Power [PEP] (dBm)	Limit [P_{Lim}] (dBm)	Margin (dB)
1	26.965	AM	Lower	35.03	38.03	40.8	2.77
20	27.205			35.07	38.07		2.73
40	27.405			35.08	38.08		2.72
1	26.965		Upper	34.19	37.19		3.61
20	27.205			34.31	37.31		3.49
40	27.405			34.25	37.25		3.55
						Result:	Complies

Conducted Margin = P_{Limit} - P_{Meas}

Peak Envelope Power [PEP] = Measured Power X 2 (+3dB) = [P_{Meas}] + 3dB

Table 7.4 – Compliance to §2.1033(c)(8) – 27.6VDC, AM DSB, FM, AM SSB

FCC CFR 47 §2.1033(c)(8): Power to Transmitter: AM	
Measured Receiver Current:	IRx = 0.25A
Measured Total Current:	ITx = 1.21A
Transmitter Current (ITx - IRx):	IXmitter = 0.96A
Power to Transmitter:	(27.6VDC)(0.96) = 26.5W
Result:	Complies

FCC CFR 47 §2.1033(c)(8): Power to Transmitter: FM	
Measured Receiver Current:	IRx = 0.25A
Measured Total Current:	ITx = 1.22A
Transmitter Current (ITx - IRx):	IXmitter = 0.97A
Power to Transmitter:	(27.6VDC)(0.97) = 26.8W
Result:	Complies

FCC CFR 47 §2.1033(c)(8): Power to Transmitter: AM LSB	
Measured Receiver Current:	IRx = 0.25A
Measured Total Current:	ITx = 1.36A
Transmitter Current (ITx - IRx):	IXmitter = 1.11A
Power to Transmitter:	(27.6VDC)(1.11) = 30.6W
Result:	Complies

FCC CFR 47 §2.1033(c)(8): Power to Transmitter: AM USB	
Measured Receiver Current:	IRx = 0.25A
Measured Total Current:	ITx = 1.36A
Transmitter Current (ITx - IRx):	IXmitter = 1.11A
Power to Transmitter:	(27.6VDC)(1.11) = 30.6W
Result:	Complies

8.0 MODULATION RESPONSE

Test Conditions	
Normative Reference	**FCC 47 CFR §2.1047, §95.975**

Limits	
47 CFR §2.1047	a) Voice modulated communication equipment. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted.
47 CFR §95.975	Each CBRS transmitter type must be designed such that the modulation characteristics are in compliance with the rules in this section. (a) When emission type A3E is transmitted with voice modulation, the modulation percentage must be at least 85%, but not more than 100%. (b) When emission type A3E is transmitted by a CBRS transmitter having a transmitter output power of more than 2.5 W, the transmitter must contain a circuit that automatically prevents the modulation percentage from exceeding 100%. (c) When emission type F3E is transmitted the peak frequency deviation shall not exceed ±2 kHz.
RSS-236 4.9	When emission type A3E is transmitted by a CB transmitter having a total power of greater than 2.5 W, the CB transmitter must automatically prevent the modulation from exceeding 100%. When emission type F3E is transmitted by a CB transmitter the peak frequency deviation shall not exceed ±2 kHz.

Measurement Procedure	
TIA 382 25.2	**Transmitter Audio Frequency Response** Operate the transmitter under standard test conditions and monitor the output with a modulation monitor or calibrated test receiver. The audio input signal applied through a suitable impedance matching network, as specified by the manufacturer, shall be adjusted to obtain 50% modulation at the maximum audio frequency response of the transmitter, and this point shall be taken as the 0 dB reference level. Vary the modulating frequency from 100 Hz to 10,000 Hz and record the input levels necessary to maintain a constant 50% modulation. Graph the audio level in dB relative to the 0 dB reference level as a function of the modulating frequency. Record any audio frequency where it is impossible to perform the measurement.
TIA-603-E	**2.2.6 Audio Frequency Response** 2.2.6.2.1 Constant deviation test method (300 Hz to 3000 Hz) a) Connect the equipment as illustrated. b) Set the test receiver to measure peak positive deviation. Set the audio bandwidth for ≤50 Hz to ≥15,000 Hz. Turn the de-emphasis function off. c) Set the DMM to measure rms voltage. d) Adjust the transmitter per the manufacturer's procedure for full rated system deviation. e) Apply a 1000 Hz tone and adjust the audio frequency generator to produce 20% of the rated system deviation. f) Set the test receiver to measure rms deviation and record the deviation reading. g) Record the DMM reading as V_{REF} . h) Set the audio frequency generator to the desired test frequency between 300 Hz and 3000 Hz. i) Vary the audio frequency generator output level until the deviation reading that was recorded in step f) is obtained. j) Record the DMM reading as V_{FREQ} . k) Calculate the audio frequency response at the present frequency as: audio frequency response= $20\text{Log}(V_{FREQ}/V_{REF})$
ANSI C63-26	**5.3 Modulation characteristics** **5.3.1 General** (c) Single-sideband and independent-sideband radiotelephone transmitters that employ a device or circuit to limit peak envelope power. A curve showing the peak envelope output power versus the modulation input voltage shall be supplied. Radiotelephone transmitters equipped with a device to limit modulation or peak envelope power shall be modulated as follows. For single-sideband and independent-sideband transmitters, the input level of the modulating signal shall be 10 dB greater than that necessary to produce rated peak envelope power.
Test Setup	Appendix A Figure A.2

Statement - Compliance to §95.977

§95.977 CBRS tone transmissions.
In addition to the tones permitted under §95.377, CBRS transmitter types may be designed to transmit brief tones to indicate the beginning or end of a transmission.

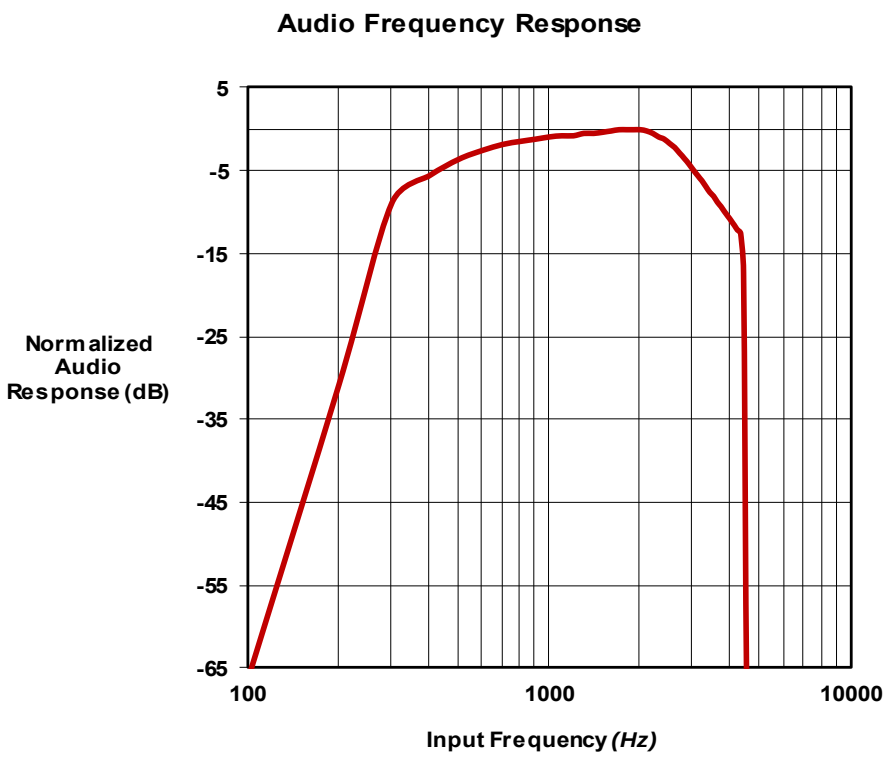
This device is capable of transmitting a brief (less than one second) audio tone, “Roger Beep”, when the PTT button is released on the microphone indicating end of transmission. This function is user selectable and complies with the requirements of §95.377. See User’s Manual.

Plot 8.1 – Audio Frequency and Low Pass Filter Response, AM, DSB

Audio Frequency and Low Pass Filter Response (AM)

Measured Audio Response		
Freq	Audio Response (@ 50% MI)	
(Hz)	*(mV)*	*(dB)**
100	6000.00	-66.466
200	100.00	-30.903
400	5.40	-5.551
600	3.80	-2.499
800	3.35	-1.404
1000	3.15	-0.869
1200	3.10	-0.730
1400	3.00	-0.446
1600	2.90	-0.151
1800	**2.85**	**0.000**
2000	2.85	0.000
2200	3.00	-0.446
2400	3.25	-1.141
2600	3.65	-2.149
2800	4.25	-3.471
3000	5.00	-4.883
3200	5.80	-6.172
3400	6.80	-7.553
3600	7.80	-8.745
3800	8.90	-9.891
4000	10.10	-10.990
4200	11.50	-12.117
4400	20.80	-17.264
4500	6000.00	-66.466
10000	6000.00	-66.466
*** Normalize to 1800Hz**		

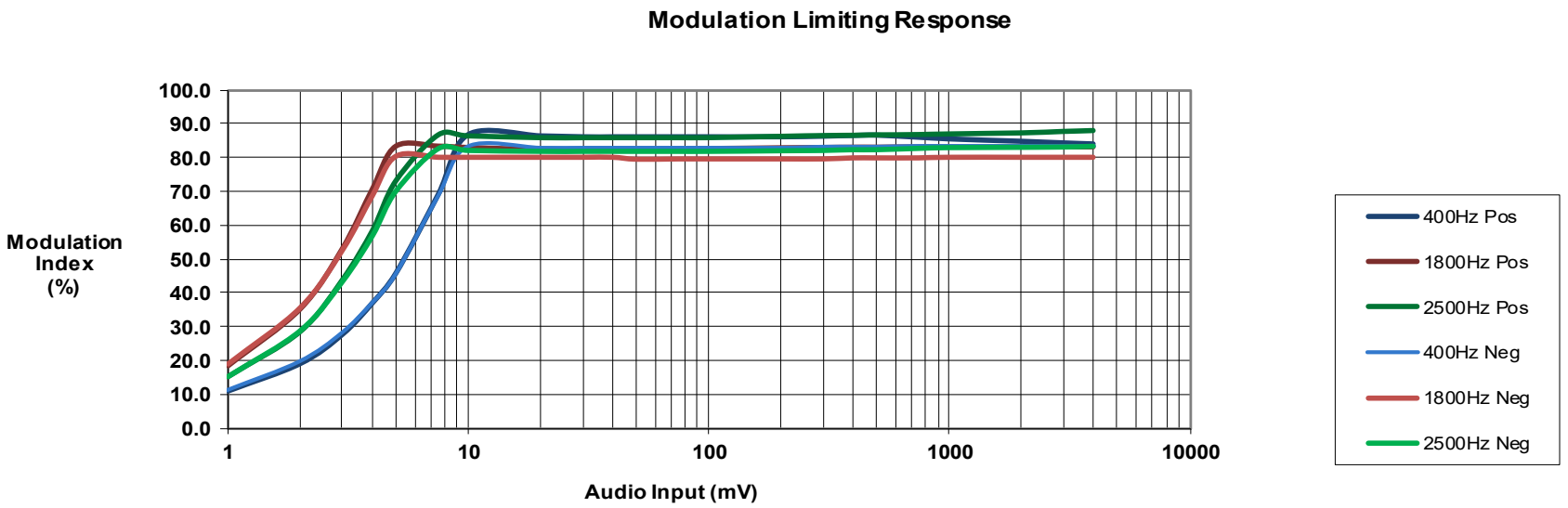
Note: 50% MI could not be achieved above 4400Hz.



Audio Frequency at -6dB Attenuation:	**3250Hz**
Result:	**Complies**

Plot 8.2 – Modulation Limiting Response, AM

Modulation Limiting Response (AM)



Measured Modulation Response [Modulation Index (%)]

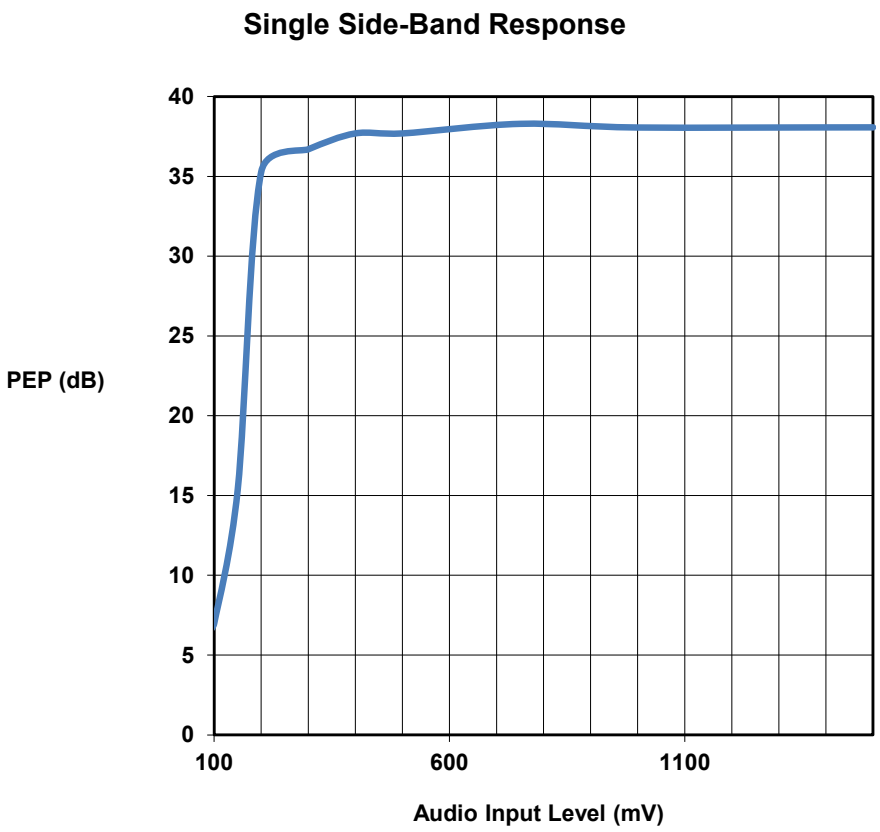
Freq (Hz)	Audio Input (mV)																						
	1	2	3	4	5	7.5	10	20	30	40	50	75	100	200	300	400	500	750	1000	2000	3000	4000	Deviation
400	10.7	18.8	27.5	36.8	45.5	68.8	86.5	86.1	85.8	85.8	85.8	85.8	85.8	85.8	86.0	86.2	86.3	85.7	85.2	84.5	84.0	83.7	
1800	18.4	35.3	53.3	71.0	83.5	83.5	83.1	82.5	82.5	82.5	82.5	82.7	82.8	83.0	83.1	83.2	83.2	83.3	83.3	83.3	83.3	83.3	Positive
2500	15.4	28.7	44.0	58.5	73.0	86.5	86.2	85.7	85.7	85.7	85.7	85.7	85.7	86.1	86.3	86.4	86.5	86.6	86.8	87.1	87.5	87.8	
400	11.0	19.5	28.0	36.8	45.2	68.2	83.1	82.7	82.7	82.7	82.7	82.7	82.7	82.7	83.0	83.0	83.0	83.2	83.2	83.2	83.2	83.2	
1800	18.9	35.6	52.8	69.0	80.5	80.2	80.2	80.2	80.2	80.2	79.6	79.7	79.7	79.7	79.7	80.0	80.0	80.0	80.2	80.2	80.2	80.2	Negative
2500	15.4	28.9	43.5	57.0	70.0	82.5	82.0	81.7	81.7	81.7	81.7	81.7	81.7	81.9	82.0	82.2	82.2	82.6	82.8	82.9	83.0	83.2	

Audio Frequency @ Maximum Response (f_{MAX}):	1800Hz
Audio Input @ Maximum Response (V_{MAX}):	2.85mV
V_{MAX} + 40dB:	285mV
Maximum Measured Modulation Index:	87.8%
Result:	Complies

Plot 8.3 – Audio Frequency versus Peak Envelope Power (PEP)

Audio Frequency Response

Single Side Band Audio Response 500H & 2.4kHz	
Input *(mV)*	**PEP *(dB)***
1	3.2
10	3.4
20	3.8
30	4.6
40	4.8
50	4.9
60	5.0
70	6.0
80	6.4
90	6.5
100	7.0
150	15.4
200	35.3
300	36.7
400	37.7
500	37.7
750	38.3
1000	38.1
1500	38.1

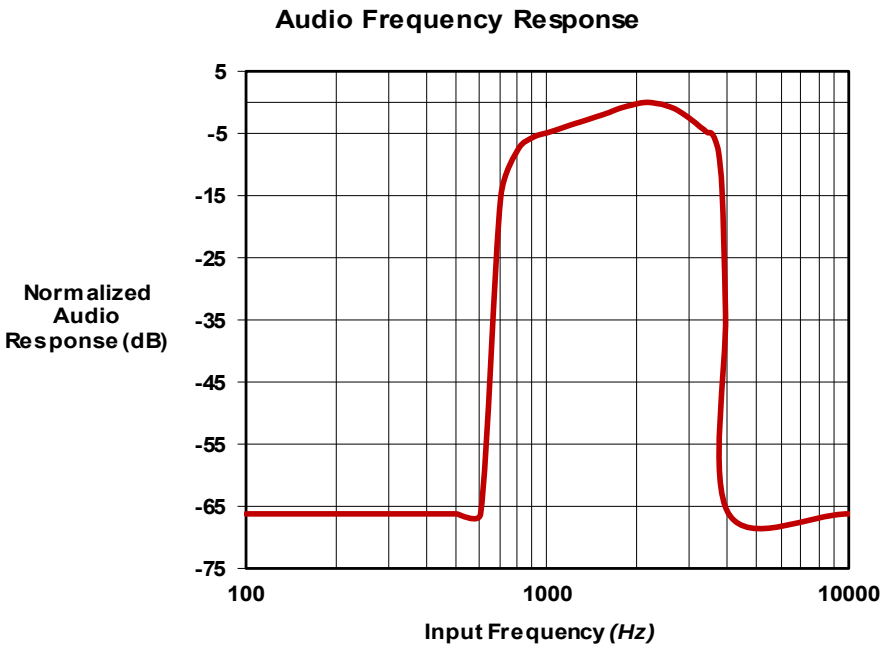


Maximum Peak Envelope Power:	**38.1dBm (6.5W)**
Limit:	**40.8dBm (12W)**
	Complies

Plot 8.4 – Audio Frequency and Low Pass Filter Response, FM

Audio Frequency and Low Pass Filter Response (FM)

Measured Audio Response		
Freq	Audio Response (@ 20% Deviation)	
(Hz)	*(mV)*	*(dB)**
100	6000.00	-66.167
300	6000.00	-66.167
500	6000.00	-66.167
700	17.00	-15.213
900	5.60	-5.567
1100	4.80	-4.228
1300	4.20	-3.069
1500	3.75	-2.084
1700	3.35	-1.104
1900	3.10	-0.431
2100	**2.95**	**0.000**
2300	3.00	-0.146
2500	3.15	-0.570
2700	3.40	-1.233
2900	3.80	-2.199
3100	4.30	-3.273
3300	4.85	-4.318
3500	5.20	-4.924
3700	7.50	-8.105
3800	15.00	-14.125
3900	150.00	-34.125
4000	6000.00	-66.167
10000	6000.00	-66.167
*** Normalize to 2100Hz**		

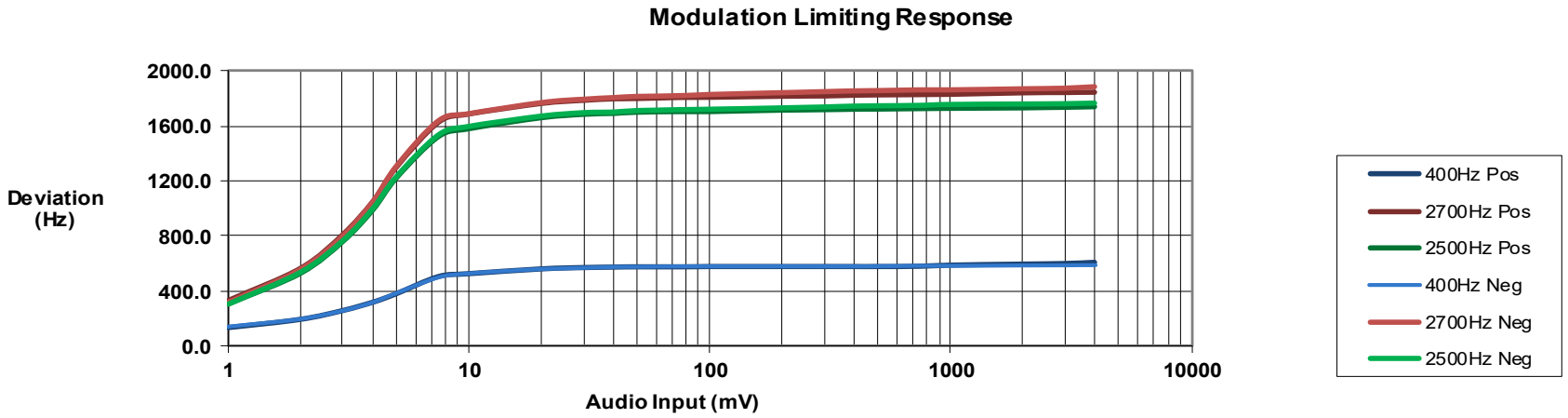


Note: 20% Deviation (+/-400Hz) could not be achieved above 4000Hz.

Audio Frequency at -6dB Attenuation:	**3650Hz**
Result:	**Complies**

Plot 8.5 – Modulation Limiting Response, FM

Modulation Limiting Response (FM)



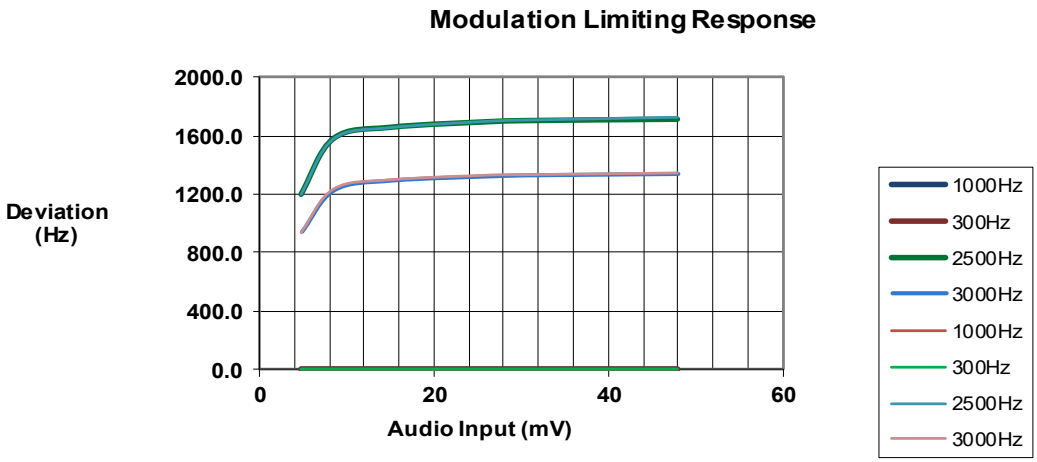
Measured Modulation Response: Frequency Deviation (Hz)

Freq (Hz)	Audio Input (mV)																						Deviation
	1	2	3	4	5	7.5	10	20	30	40	50	75	100	200	300	400	500	750	1000	2000	3000	4000	
400	140	200	264	325	386	510	530	565	575	578	580	580	582	582	582	582	582	584	592	600	604	612	Positive
2700	330	565	812	1054	1302	1630	1688	1765	1788	1799	1801	1809	1810	1818	1820	1825	1827	1830	1832	1843	1845	1847	
2500	310	535	765	995	1225	1525	1580	1660	1685	1692	1700	1705	1705	1715	1718	1722	1723	1726	1728	1732	1736	1740	
400	145	200	260	320	385	500	528	560	568	575	576	579	579	579	579	579	580	583	583	585	587	588	Negative
2700	320	560	804	1053	1310	1640	1690	1770	1795	1806	1815	1820	1829	1842	1850	1855	1857	1863	1863	1870	1875	1885	
2500	305	538	770	1004	1235	1540	1600	1675	1700	1705	1715	1722	1725	1735	1742	1748	1750	1753	1760	1763	1765	1770	

Audio Frequency @ Maximum Response (f_{MAX}):	2100Hz
Audio Input @ Maximum Response (V_{MAX}):	2.95mV
V_{MAX} + 40dB:	295mV
Maximum Measured Deviation:	1885Hz
Result:	Complies

Plot 8.6 – Modulation Limiting Response, FM (ANSI C63.26)

Modulation Limiting Response (FM): ANSI C63.26



Measured Modulation Response: Frequency Deviation (Hz)							
Freq (Hz)	Audio Input (mV) +0dB 4.8	+5dB 8.54	+10dB 15.18	+15dB 26.99	+16dB 30.29	+20dB 48.00	Deviation
1000	0	0	0	0	0	0	Positive
300	0	0	0	0	0	0	
2500	1195	1578	1655	1694	1700	1710	
3000	945	1230	1295	1325	1330	1340	
1000	0	0	0	0	0	0	Negative
300	0	0	0	0	0	0	
2500	1200	1575	1650	1695	1700	1720	
3000	943	1235	1296	1328	1330	1341	
Audio Input @ 1000Hz @ 60% Deviation (+/- 1.2kHz) (V_{0dB}):							4.8 mV
Maximum Measured Deviation:							1720 Hz
Result:							Complies

Note: 60% Deviation could not be achieved at 300Hz and 1000Hz.

9.0 OCCUPIED BANDWIDTH AND EMISSION MASKS

Test Conditions	
Normative Reference	**FCC 47 CFR §2.1049, §95.973**

Limits	
47 CFR §95.973	Each CBRS transmitter type must be designed such that the occupied bandwidth does not exceed the authorized bandwidth for the emission type under test. (a) AM and FM. The authorized bandwidth for emission types A3E and F3E is 8 kHz.
RSS-236 4.9	The authorized bandwidth for emission type A1D or A3E is 8 kHz.
47 CFR §95.979	Each CBRS transmitter type must be designed to comply with the applicable unwanted emissions limits in this section. (a) Attenuation requirements. The power of unwanted emissions must be attenuated below the transmitter output power in Watts (P) as specified in the applicable paragraphs listed in the following table: For A3E and F3E (1), (3), (5), (6) (1) 25 dB (decibels) in the frequency band 4 kHz to 8 kHz removed from the channel center frequency; (3) 35 dB in the frequency band 8 kHz to 20 kHz removed from the channel center frequency; (5) 53 + 10 log (P) dB in any frequency band removed from the channel center frequency by more than 250% of the authorized bandwidth. (6) 60 dB in any frequency band centered on a harmonic (i.e., an integer multiple of two or more times) of the carrier frequency.
RSS-236 4.10	For A1D and A3E: _ At least 25 dB on any frequency removed from the center of the authorized bandwidth by more than 50% up to and including 100% of the authorized bandwidth. _ At least 35 dB on any frequency removed from the center of the authorized bandwidth by more than 100% up to and including 250% of the authorized bandwidth. _ At least 53 + 10 log10 (T) dB on any frequency removed from the center of the authorized bandwidth by more than 250%. _ At least 60 dB on any frequency twice or greater than twice the fundamental frequency.

Measurement Procedure
TIA 382 23.2 Transmitter Modulation Occupied Bandwidth
The transmitter is modulated by a sinusoidal audio signal applied to the microphone input jack. First, the frequency is adjusted to deliver 50% modulation at the highest audio response level (minimum applied audio level). Then the audio signal level is increased 16 dB and the audio frequency is readjusted to 2500 Hz The analyzer is adjusted to display each of the discrete modulation sidebands and their respective harmonic products within +/- 50 kHz of the carrier frequency.

Test Setup	Appendix A Figure A.1

Test Conditions	
Normative Reference	**FCC 47 CFR §2.1049, §95.973**

Limits	
47 CFR §95.973	Each CBRS transmitter type must be designed such that the occupied bandwidth does not exceed the authorized bandwidth for the emission type under test. (b) SSB. The authorized bandwidth for emission types J3E, R3E, and H3E is 4 kHz.
RSS-236 4.9	The authorized bandwidth for emission types H3E, J3E and R3E is 4 kHz.
47 CFR §95.979	Each CBRS transmitter type must be designed to comply with the applicable unwanted emissions limits in this section. (a) Attenuation requirements. The power of unwanted emissions must be attenuated below the transmitter output power in Watts (P) as specified in the applicable paragraphs listed in the following table: For H3E, J3E and R3E (2), (4), (5), (6) (2) 25 dB in the frequency band 2 kHz to 6 kHz removed from the channel center frequency; (4) 35 dB in the frequency band 6 kHz to 10 kHz removed from the channel center frequency; (5) 53 + 10 log (P) dB in any frequency band removed from the channel center frequency by more than 250% of the authorized bandwidth. (6) 60 dB in any frequency band centered on a harmonic (i.e., an integer multiple of two or more times) of the carrier frequency.
RSS-236 4.10	For H3E, J3E and R3E: _ At least 25 dB on any frequency removed from the center of the authorized bandwidth by more than 50%, up to and including 150% of the authorized bandwidth, the power of unwanted emissions is to be measured with a reference bandwidth of 300 Hz _ At least 35 dB on any frequency removed from the center of the authorized bandwidth by more than 150%, up to and including 250% of the authorized bandwidth, the power of unwanted emissions is to be measured with a reference bandwidth of 300 Hz. _ At least 53 + 10 log10 (T) dB on any frequency removed from the center of the authorized bandwidth by more than 250%. _ At least 60 dB on any frequency twice or greater than twice the fundamental frequency.

Measurement Procedure

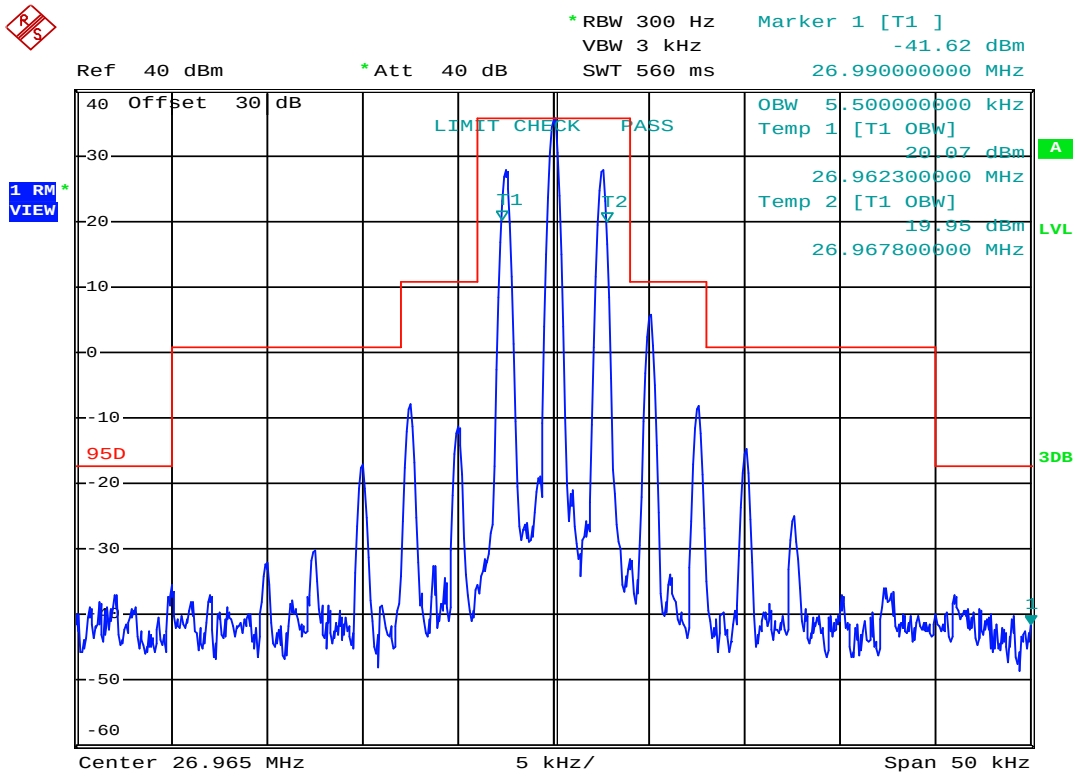
TIA 382 23.2 Transmitter Modulation Occupied Bandwidth

The transmitter is modulated by a two-tone sinusoidal audio signal applied to the microphone input jack. First, the frequency is adjusted to deliver 50% modulation at the highest audio response level (minimum applied audio level). Then the audio signal level is increased 16 dB and the audio frequency is readjusted to 2500 Hz The analyzer is adjusted to display each of the discrete modulation sidebands and their respective harmonic products within +/- 50 kHz of the carrier frequency.

Test Setup	Appendix A Figure A.1

Plot 9.1 – Occupied Bandwidth, Channel 1, AM, DSB

Occupied Bandwidth / Emissions Mask:

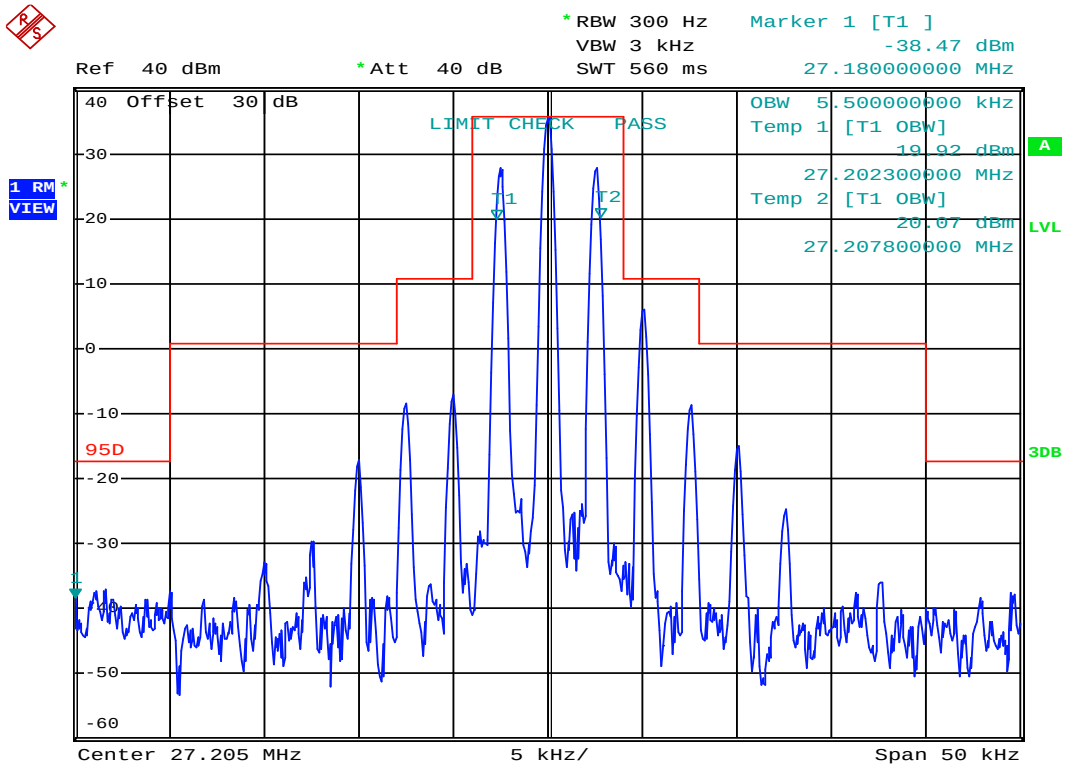


Date: 7.NOV.2022 13:56:27

DUT Channel	Channel Frequency (MHz)	DUT Modulation	Occupied Bandwidth (kHz)
1	26.965	AM	5.50

Plot 9.2 – Occupied Bandwidth, Channel 20, AM, DSB

Occupied Bandwidth / Emissions Mask:

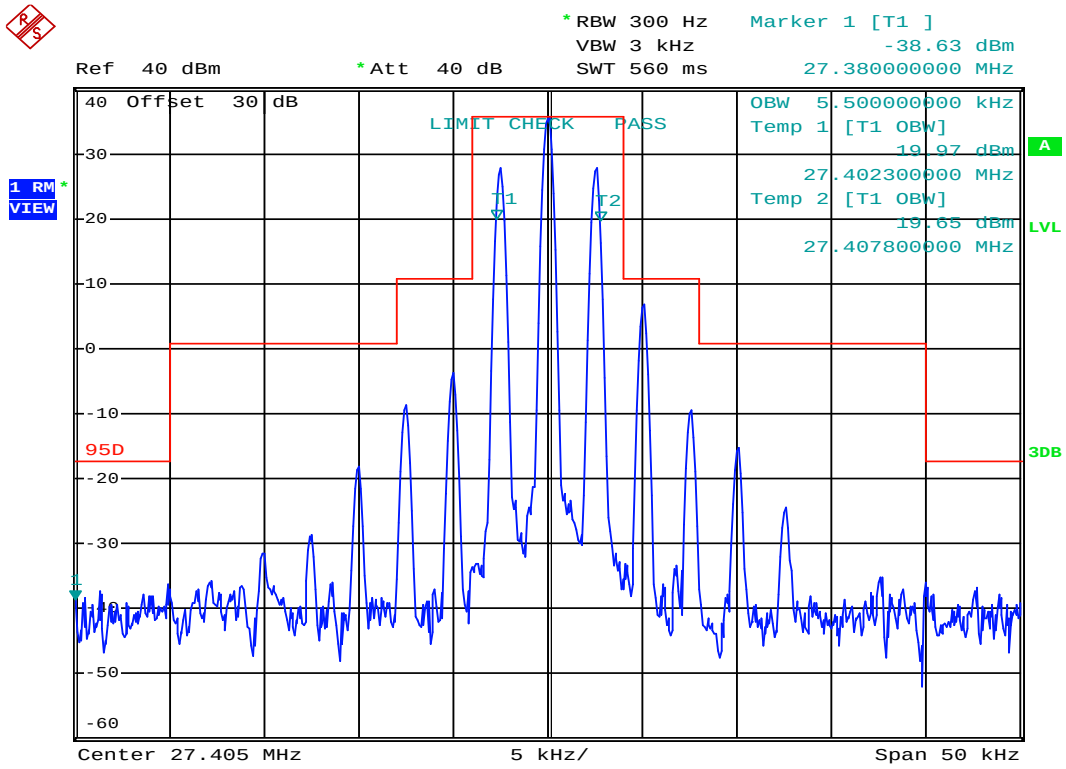


Date: 7.NOV.2022 13:57:09

DUT Channel	Channel Frequency *(MHz)*	DUT Modulation	Occupied Bandwidth *(kHz)*
20	27.205	AM	5.50

Plot 9.3 – Occupied Bandwidth, Channel 40, AM, DSB

Occupied Bandwidth / Emissions Mask:

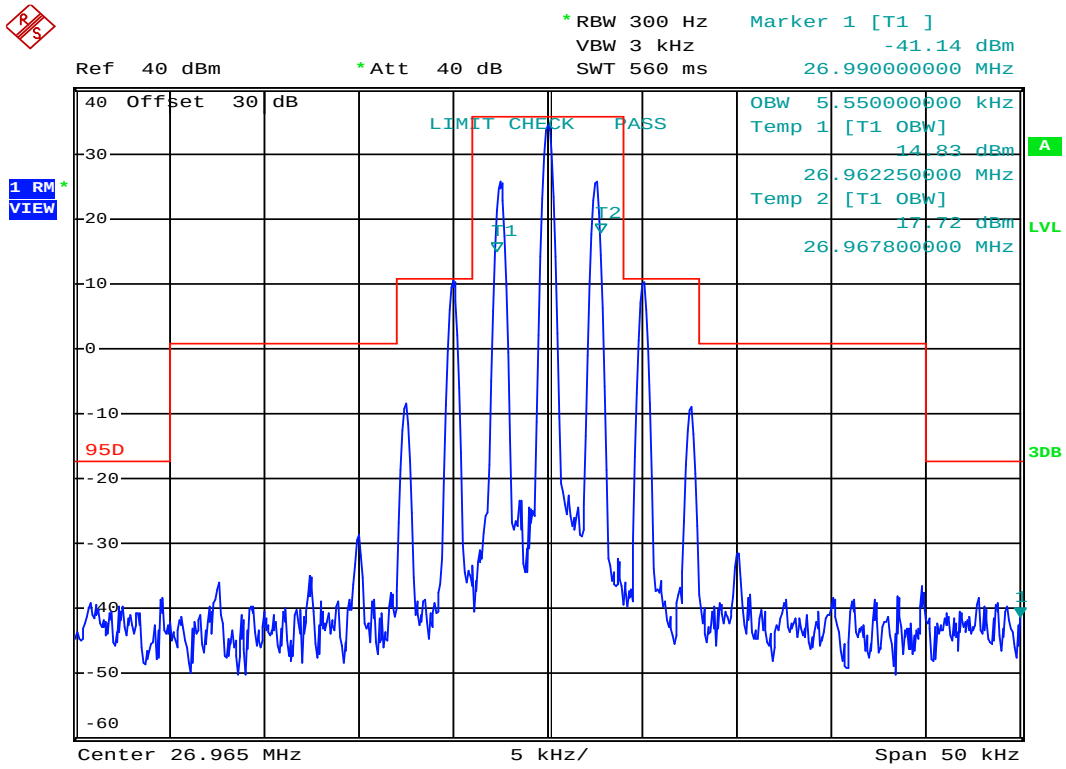


Date: 7.NOV.2022 13:55:59

DUT Channel	Channel Frequency *(MHz)*	DUT Modulation	Occupied Bandwidth *(kHz)*
40	27.405	AM	5.50

Plot 9.4 – Occupied Bandwidth, Channel 1, FM

Occupied Bandwidth / Emissions Mask:

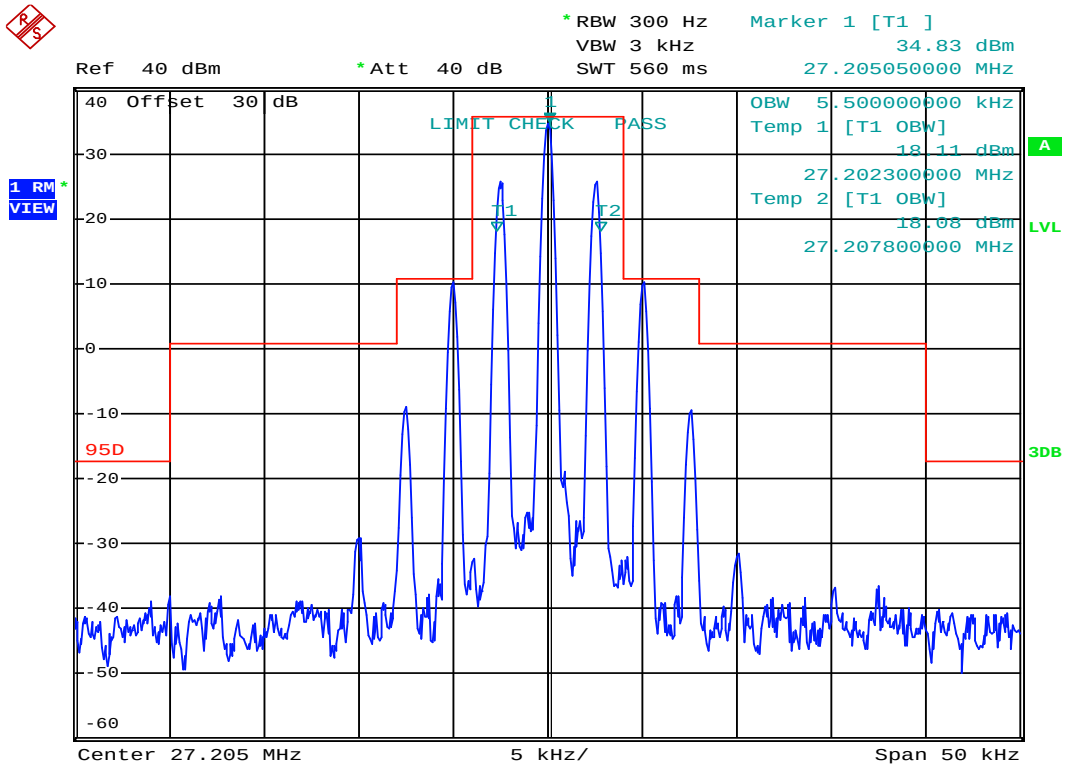


Date: 7.NOV.2022 13:53:10

DUT Channel	Channel Frequency *(MHz)*	DUT Modulation	Occupied Bandwidth *(kHz)*
1	26.965	FM	5.55

Plot 9.5 – Occupied Bandwidth, Channel 20, FM

Occupied Bandwidth / Emissions Mask:

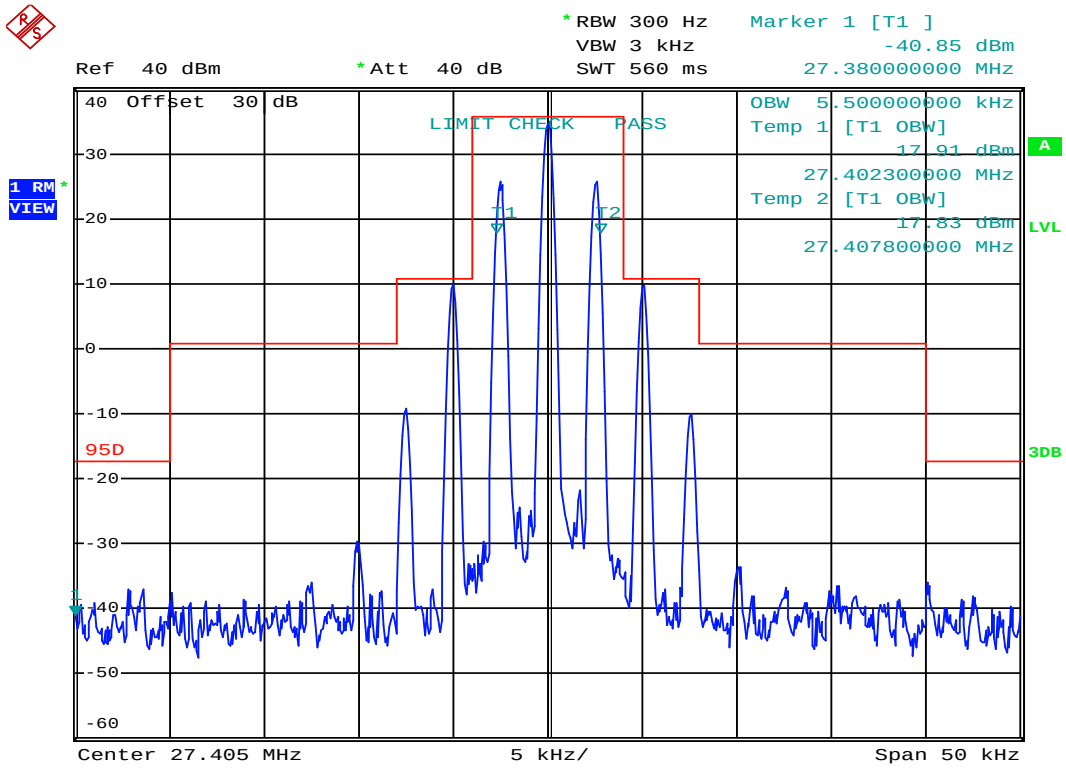


Date: 7.NOV.2022 13:52:20

DUT Channel	Channel Frequency *(MHz)*	DUT Modulation	Occupied Bandwidth *(kHz)*
20	27.205	FM	5.50

Plot 9.6 – Occupied Bandwidth, Channel 40, FM

Occupied Bandwidth / Emissions Mask:

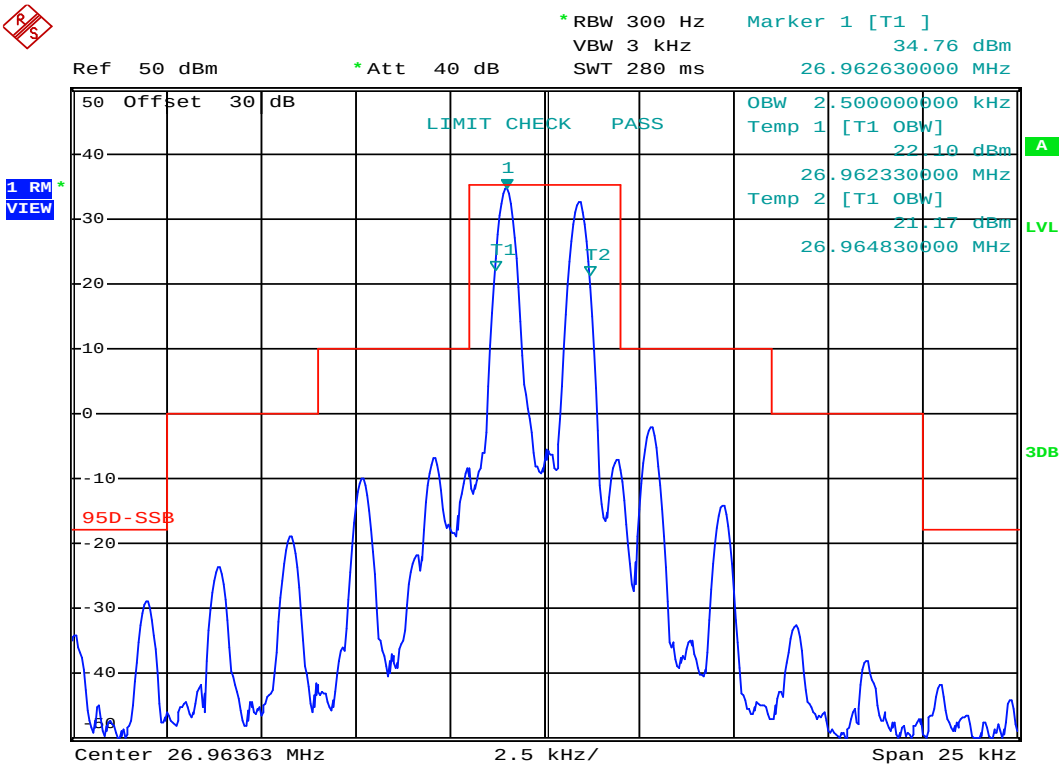


Date: 7.NOV.2022 13:53:42

DUT Channel	Channel Frequency *(MHz)*	DUT Modulation	Occupied Bandwidth *(kHz)*
40	27.405	FM	5.50

Plot 9.7 – Occupied Bandwidth, Channel 1, AM, Lower SideBand, Two-Tone Input

Occupied Bandwidth / Emissions Mask: Lower Side Band, Two-Tone

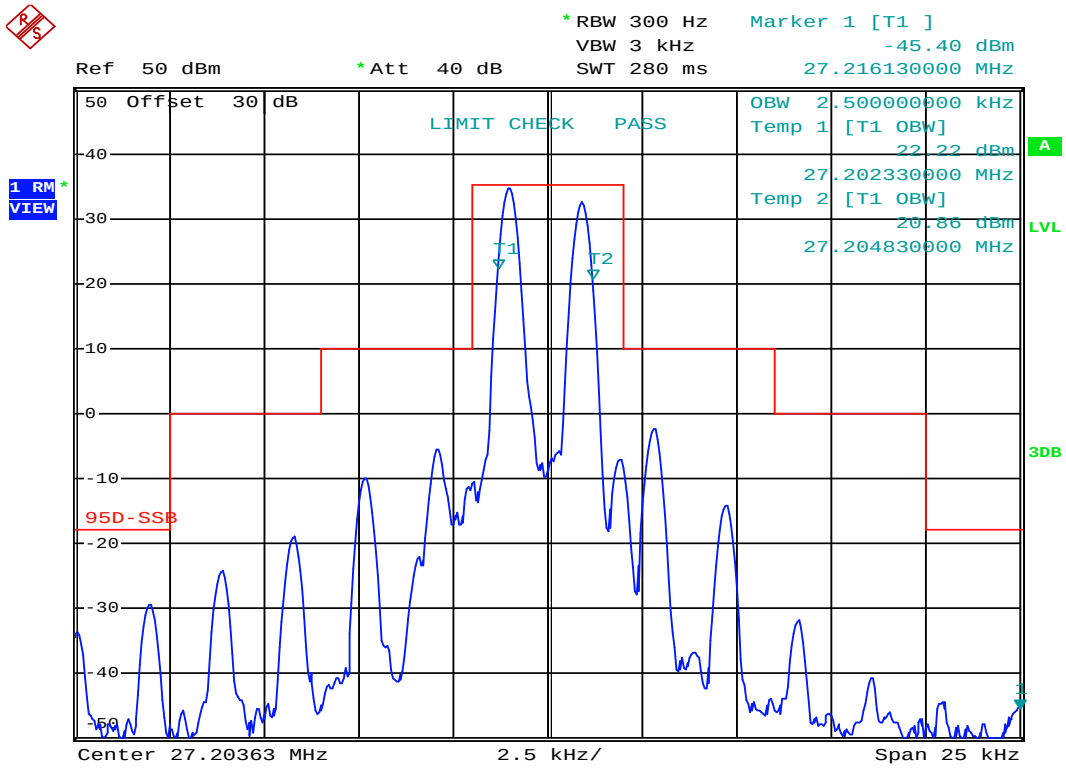


Date: 7.NOV.2022 16:24:02

	DUT Channel	Channel Frequency (MHz)	DUT Modulation	Occupied Bandwidth (kHz)
Lower Side Band Two-Tone Input	1	26.965	AM	2.50

Plot 9.8 – Occupied Bandwidth, Channel 20, AM, Lower SideBand, Two-Tone Input

Occupied Bandwidth / Emissions Mask: Lower Side Band, Two-Tone

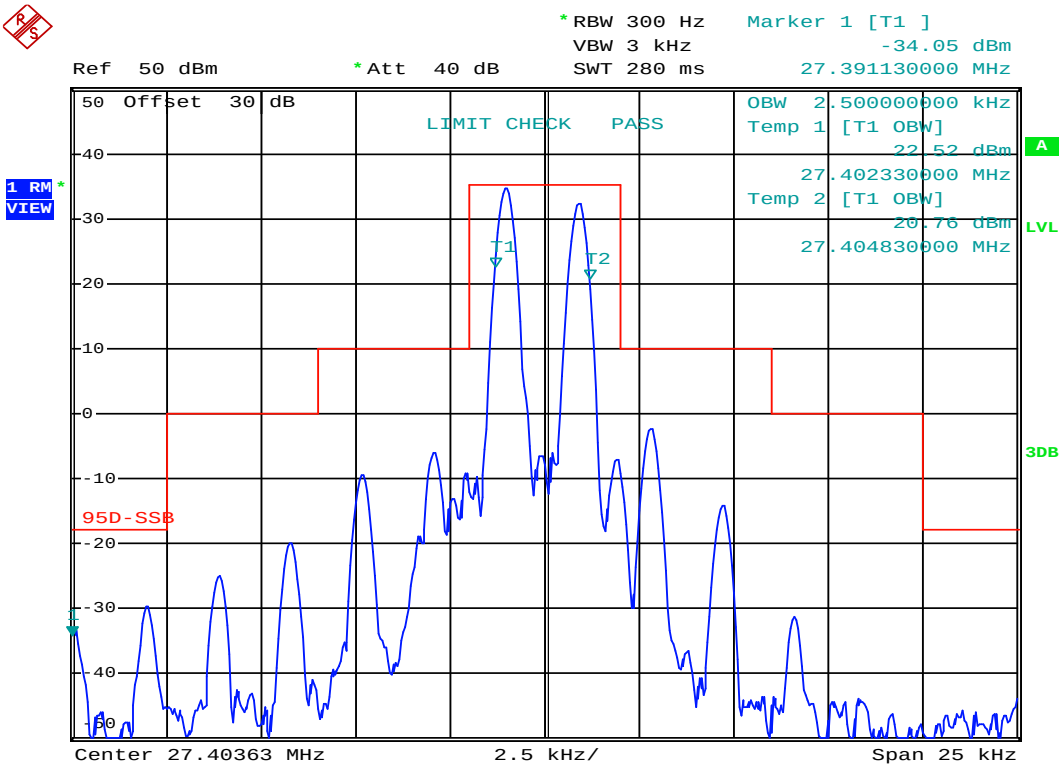


Date: 7.NOV.2022 16:25:33

	DUT Channel	Channel Frequency *(MHz)*	DUT Modulation	Occupied Bandwidth *(kHz)*
Lower Side Band **Two-Tone Input**	20	27.205	AM	**2.50**

Plot 9.9 – Occupied Bandwidth, Channel 40, AM, Lower SideBand, Two-Tone Input

Occupied Bandwidth / Emissions Mask: Lower Side Band, Two-Tone

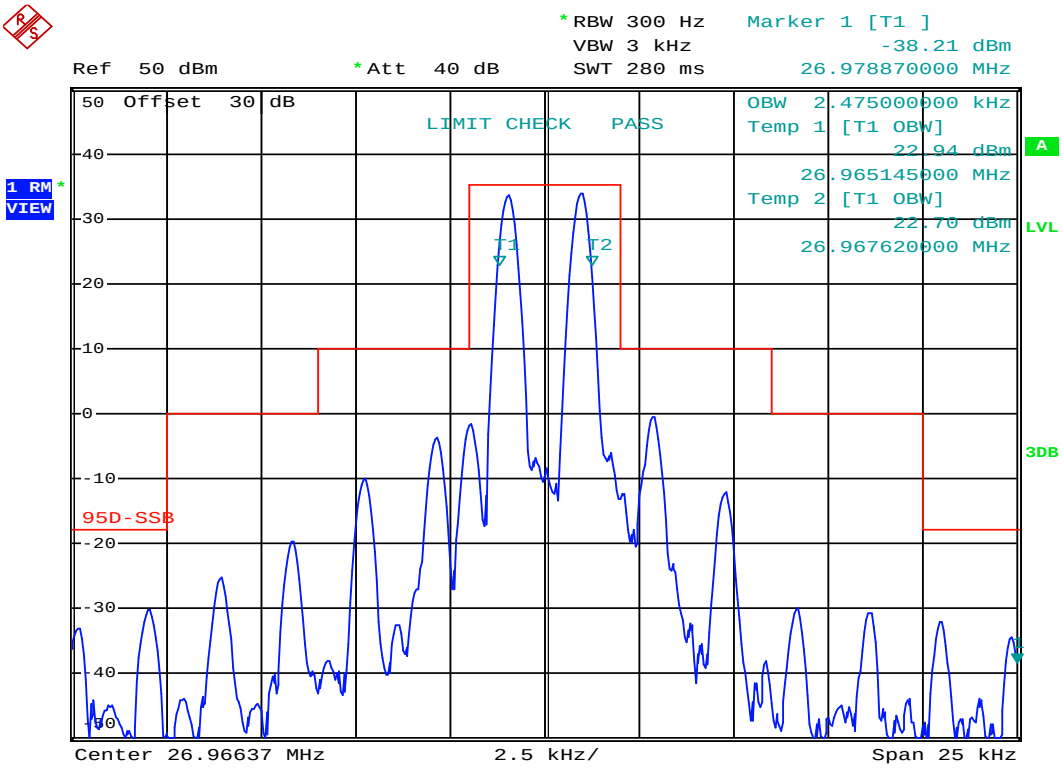


Date: 7.NOV.2022 16:24:48

	DUT Channel	Channel Frequency (MHz)	DUT Modulation	Occupied Bandwidth (kHz)
Lower Side Band Two-Tone Input	40	27.405	AM	2.50

Plot 9.10 – Occupied Bandwidth, Channel 1, AM, Upper SideBand, Two-Tone Input

Occupied Bandwidth / Emissions Mask: Upper Side Band, Two-Tone

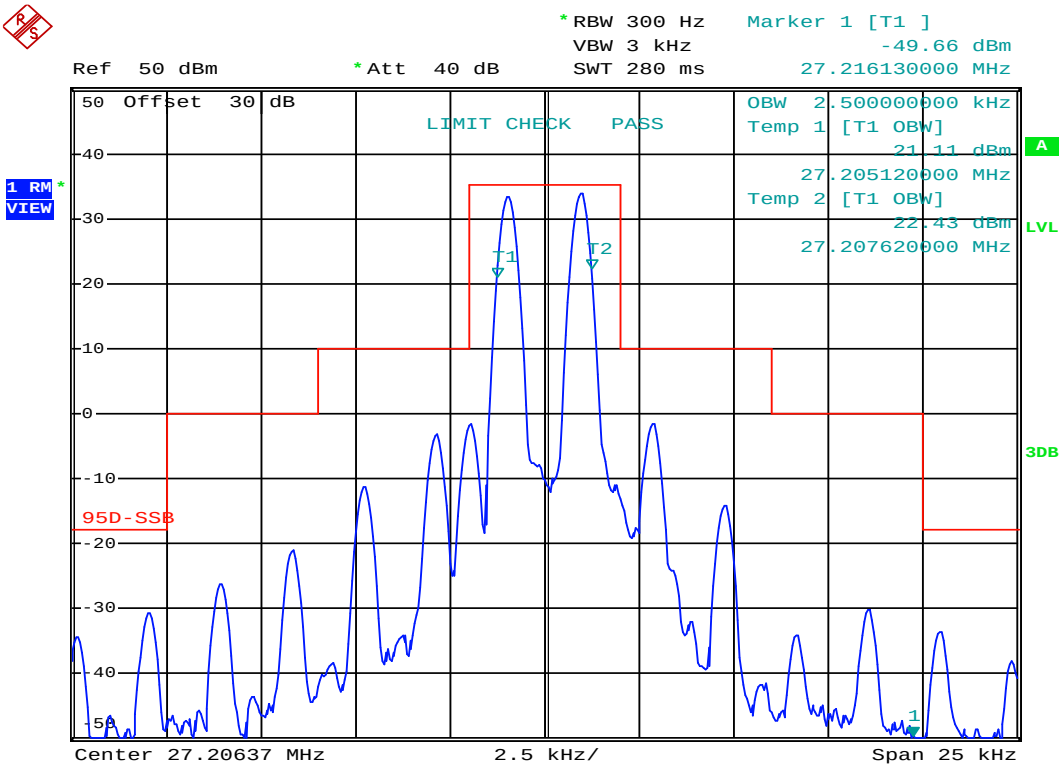


Date: 7.NOV.2022 16:27:20

	DUT Channel	Channel Frequency *(MHz)*	DUT Modulation	Occupied Bandwidth *(kHz)*
Upper Side Band Two-Tone Input	1	26.965	AM	**2.48**

Plot 9.11 – Occupied Bandwidth, Channel 20, AM, Upper SideBand, Two-Tone Input

Occupied Bandwidth / Emissions Mask: Upper Side Band, Two-Tone

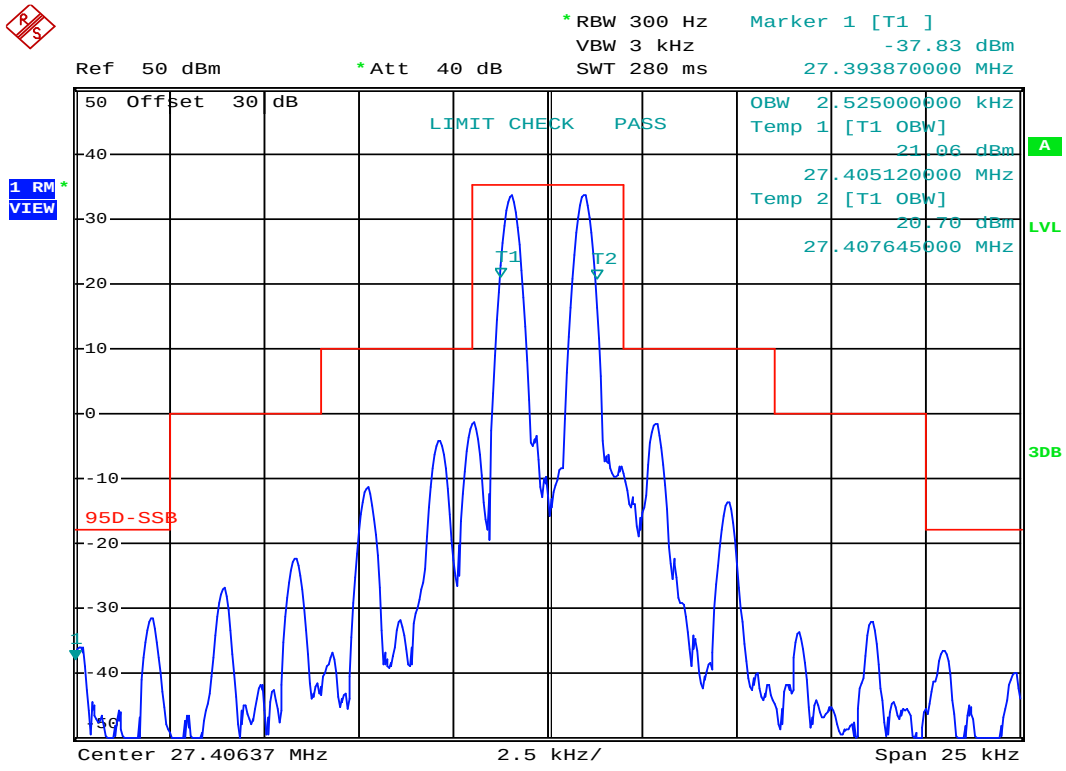


Date: 7.NOV.2022 16:26:38

	DUT Channel	Channel Frequency (MHz)	DUT Modulation	Occupied Bandwidth (kHz)
Upper Side Band Two-Tone Input	20	27.205	AM	2.50

Plot 9.12 – Occupied Bandwidth, Channel 40, AM, Upper SideBand, Two-Tone Input

Occupied Bandwidth / Emissions Mask: Upper Side Band, Two-Tone



Date: 7.NOV.2022 16:28:06

	DUT Channel	Channel Frequency *(MHz)*	DUT Modulation	Occupied Bandwidth *(kHz)*
Upper Side Band Two-Tone Input	40	27.405	AM	**2.53**

Table 9.1 - Summary of Occupied Bandwidth and Emission Mask Results

Occupied Bandwidth / Emmisions Mask Results:							
Channel Number	Channel Frequency (MHz)	Modulation	Measured Occupied Bandwidth (kHz)	Side Band	Limit (kHz)	Emission Designator	Emissions Mask Results
1	26.965	AM	5.50	-	8.0	5K50A3E	Pass
20	27.205		5.50			5K50A3E	Pass
40	27.405		5.50			5K50A3E	Pass
1	26.965	FM	5.55			5K55F3E	Pass
20	27.205		5.50			5K50F3E	Pass
40	27.405		5.50			5K50F3E	Pass
1	26.965	AM	2.50	Lower	4.0	2K50J3E	Pass
20	27.205		2.50			2K50J3E	Pass
40	27.405		2.50			2K50J3E	Pass
1	26.965	AM	2.48	Upper		2K48J3E	Pass
20	27.205		2.50			2K50J3E	Pass
40	27.405		2.53			2K53J3E	Pass
						Results:	Complies

10 CONDUCTED OUT OF BAND SPURIOUS EMISSIONS

Test Conditions	
Normative Reference	**FCC 47 CFR §2.1049, §95.973**

Limits	
47 CFR §95.973	Each CBRS transmitter type must be designed such that the occupied bandwidth does not exceed the authorized bandwidth for the emission type under test. (a) AM and FM. The authorized bandwidth for emission types A3E and F3E is 8 kHz.
RSS-236 4.9	The authorized bandwidth for emission type A1D or A3E is 8 kHz.
47 CFR §95.979	Each CBRS transmitter type must be designed to comply with the applicable unwanted emissions limits in this section. (a) Attenuation requirements. The power of unwanted emissions must be attenuated below the transmitter output power in Watts (P) as specified in the applicable paragraphs listed in the following table: For A3E and F3E (1), (3), (5), (6) (1) 25 dB (decibels) in the frequency band 4 kHz to 8 kHz removed from the channel center frequency; (3) 35 dB in the frequency band 8 kHz to 20 kHz removed from the channel center frequency; (5) 53 + 10 log (P) dB in any frequency band removed from the channel center frequency by more than 250% of the authorized bandwidth. (6) 60 dB in any frequency band centered on a harmonic (i.e., an integer multiple of two or more times) of the carrier frequency.
RSS-236 4.10	For A1D and A3E: _ At least 25 dB on any frequency removed from the center of the authorized bandwidth by more than 50% up to and including 100% of the authorized bandwidth. _ At least 35 dB on any frequency removed from the center of the authorized bandwidth by more than 100% up to and including 250% of the authorized bandwidth. _ At least 53 + 10 log10 (T) dB on any frequency removed from the center of the authorized bandwidth by more than 250%. _ At least 60 dB on any frequency twice or greater than twice the fundamental frequency.

Measurement Procedure

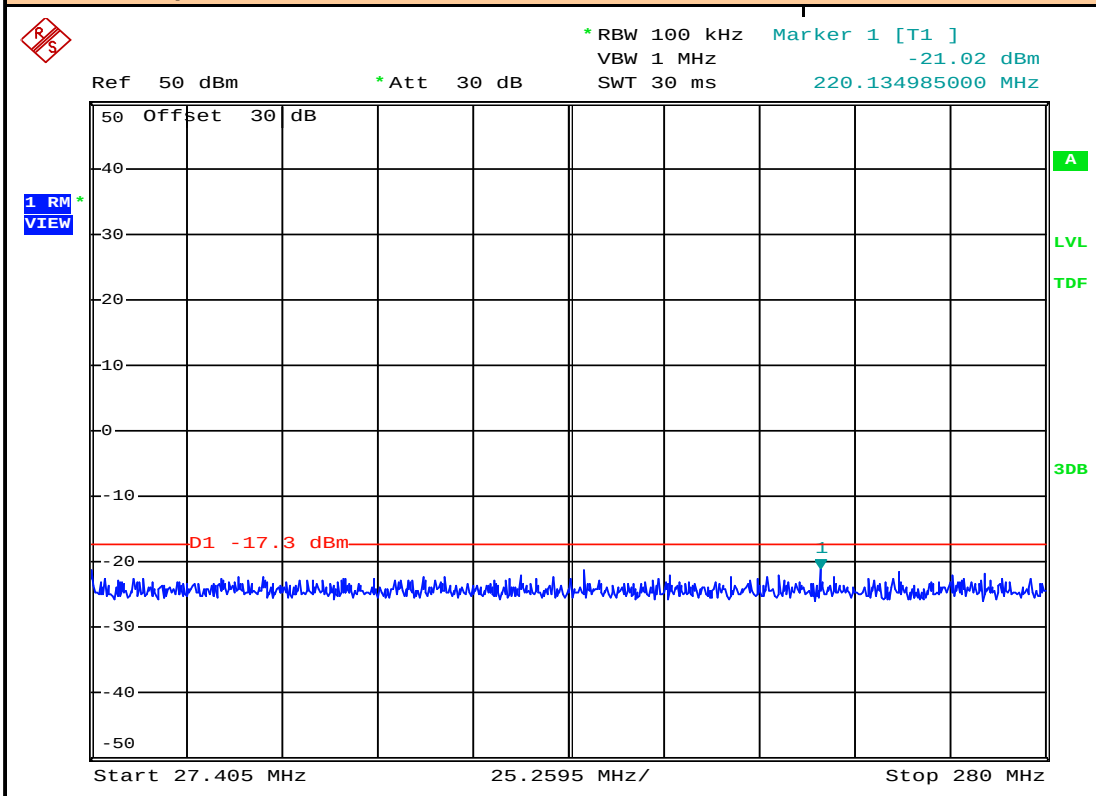
TIA 382 23.2 Transmitter Modulation Occupied Bandwidth

The transmitter is modulated by a sinusoidal audio signal applied to the microphone input jack. First, the frequency is adjusted to deliver 50% modulation at the highest audio response level (minimum applied audio level). Then the audio signal level is increased 16 dB and the audio frequency is readjusted to 2500 Hz The analyzer is adjusted to display each of the discrete modulation sidebands and their respective harmonic products within +/- 50 kHz of the carrier frequency.

Test Setup	Appendix A Figure A.1

Plot 10.1 – Conducted Out of Band Emissions, 27MHz – 280MHz, Channel 20, AM, DSB

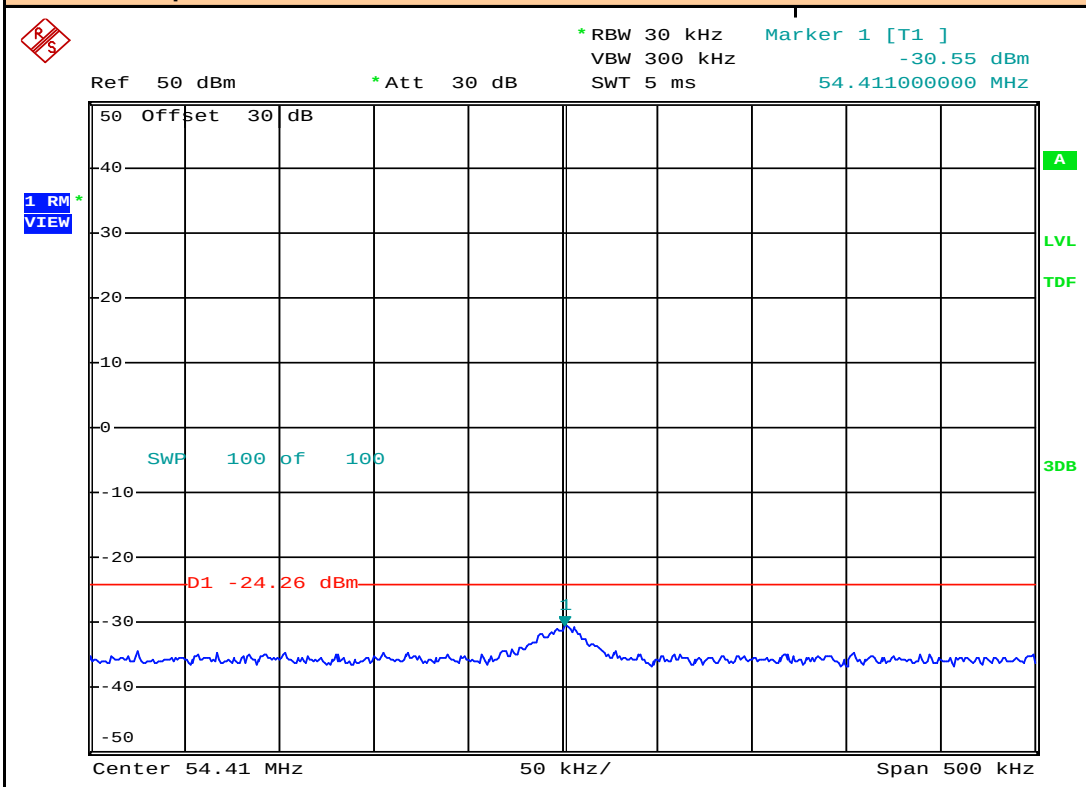
Conducted Spurious Emissions:



Channel Number	Channel Frequency (MHz)	Modulation	Emission Frequency (MHz)	Measured Emission (dBm)
20	27.205	AM	-	-

Plot 10.2 – Conducted Out of Band Emissions, 2nd Harmonic, Channel 20, AM, DSB

Conducted Spurious Emissions:

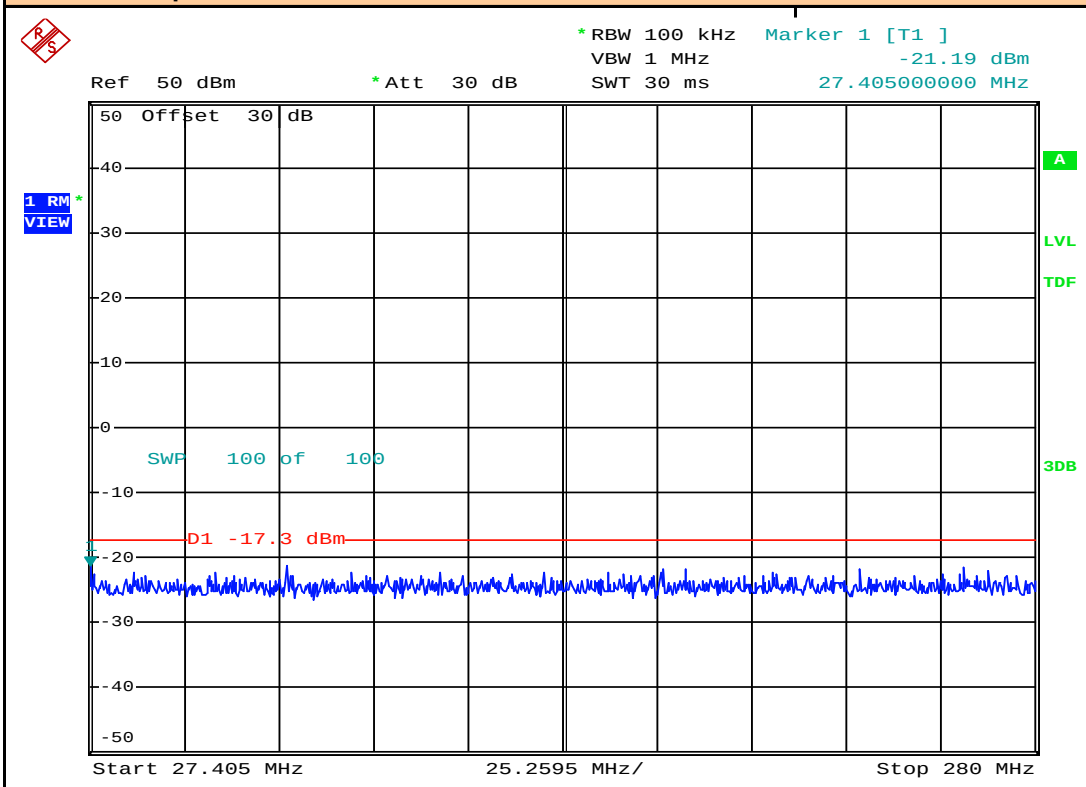


Date: 12.NOV.2022 15:48:40

Channel Number	Channel Frequency (MHz)	Modulation	Emission Frequency (MHz)	Measured Emission (dBm)
20	27.205	AM	54.41	-30.55

Plot 10.3 – Conducted Out of Band Emissions, 27MHz – 280MHz, Channel 20, FM

Conducted Spurious Emissions:

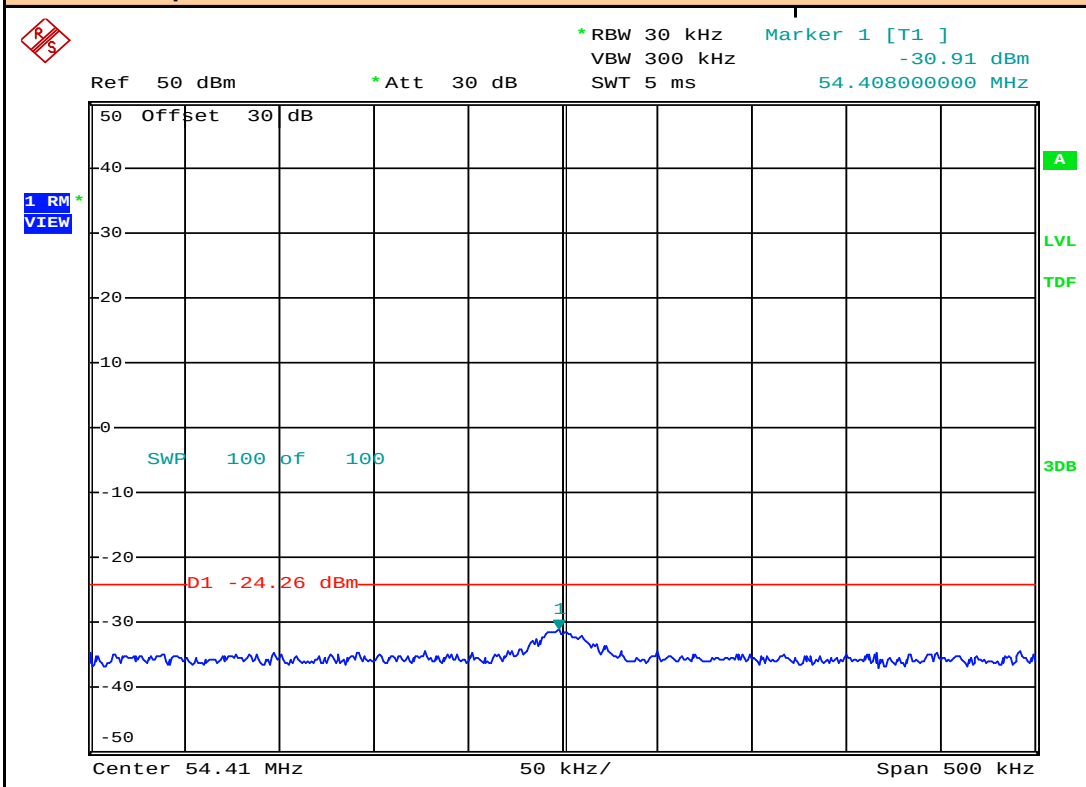


Date: 12.NOV.2022 15:51:55

Channel Number	Channel Frequency (MHz)	Modulation	Emission Frequency (MHz)	Measured Emission (dBm)
20	27.205	FM	-	-

Plot 10.4 – Conducted Out of Band Emissions, 2nd Harmonic, Channel 20, FM

Conducted Spurious Emissions:

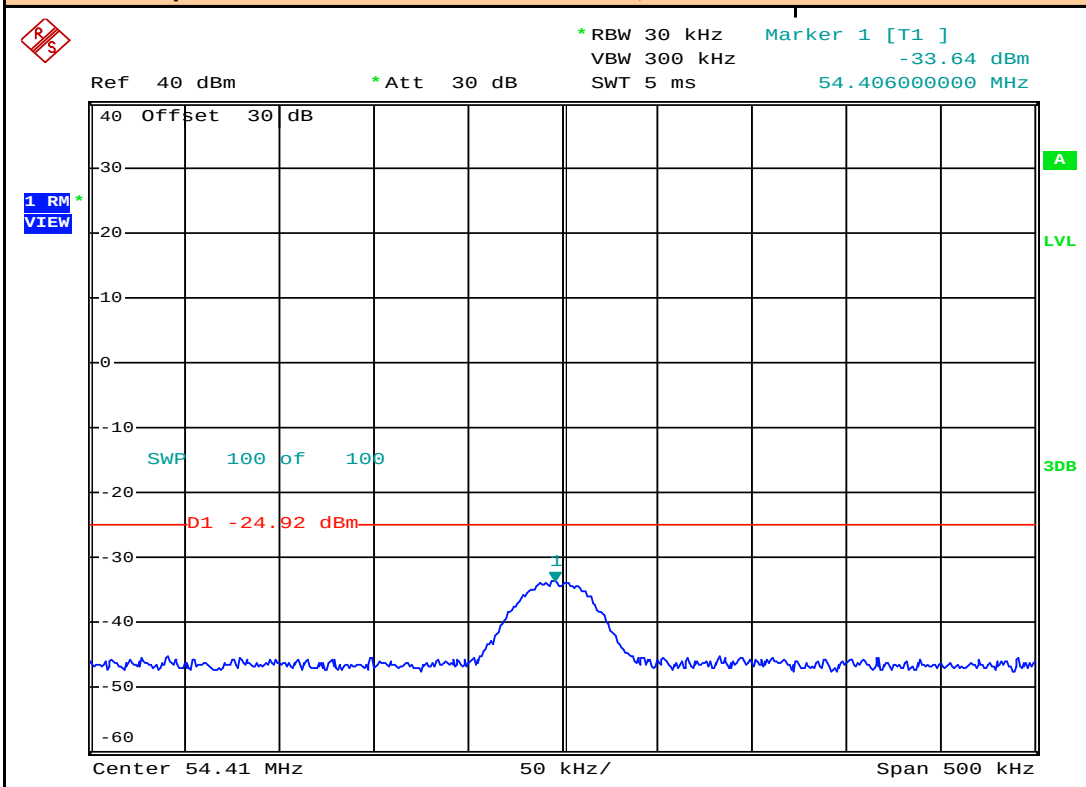


Date: 12.NOV.2022 15:53:23

Channel Number	Channel Frequency (MHz)	Modulation	Emission Frequency (MHz)	Measured Emission (dBm)
20	27.205	FM	54.41	-30.91

Plot 10.5 – Conducted Out of Band Emissions, 2nd Harmonic, Channel 20, AM Lower SideBand, Two-Tone Input

Conducted Spurious Emissions: Lower Side Band, Two-Tone

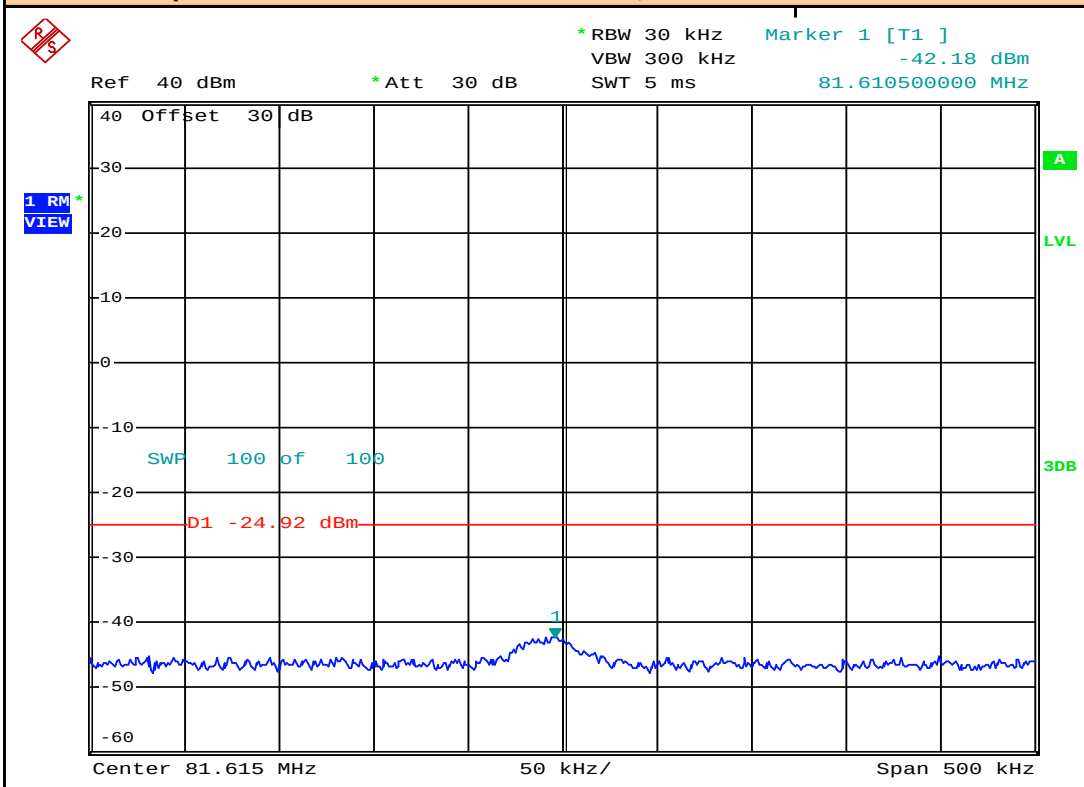


Date: 7.NOV.2022 16:58:29

Channel Number	Channel Frequency (MHz)	Modulation	Emission Frequency (MHz)	Measured Emission (dBm)
20	27.205	AM	54.41	-33.64

Plot 10.6 – Conducted Out of Band Emissions, 3rd Harmonic, Channel 20, AM Lower SideBand, Two-Tone Input

Conducted Spurious Emissions: Lower Side Band, Two-Tone

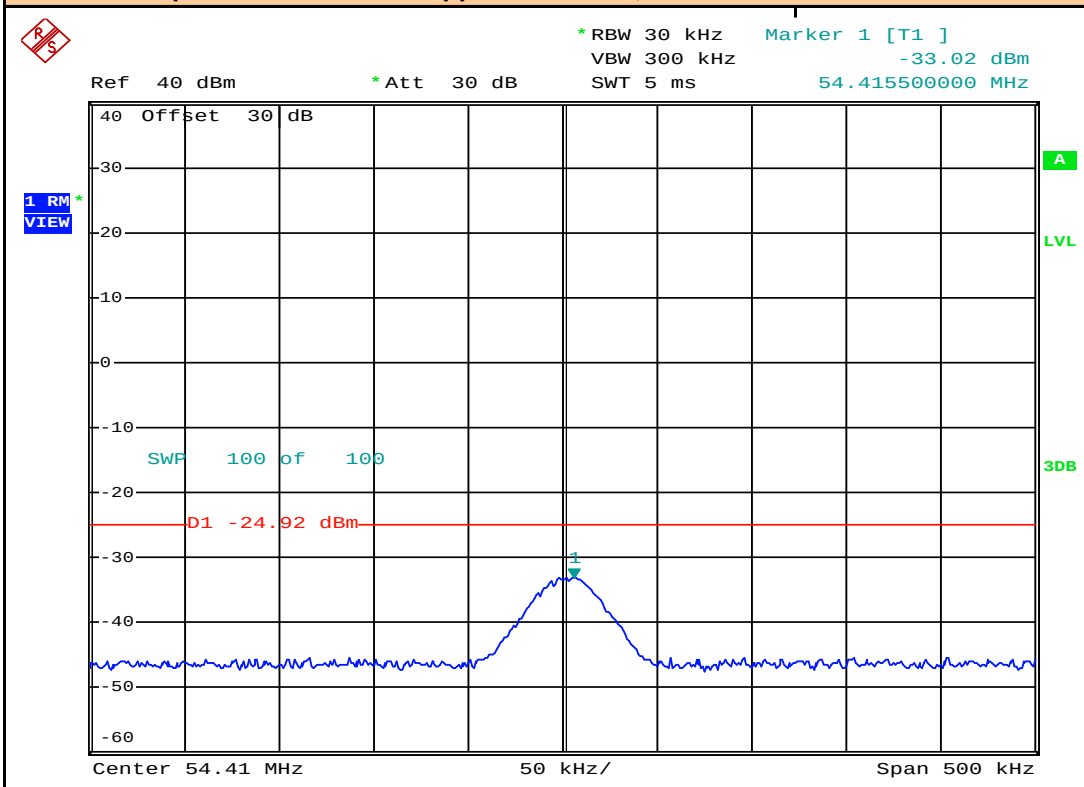


Date: 7.NOV.2022 16:58:54

Channel Number	Channel Frequency (MHz)	Modulation	Emission Frequency (MHz)	Measured Emission (dBm)
20	27.205	AM	81.61	-42.18

Plot 10.7 – Conducted Out of Band Emissions, 2nd Harmonic, Channel 20, AM Upper SideBand, Two-Tone Input

Conducted Spurious Emissions: Upper Side Band, Two-Tone

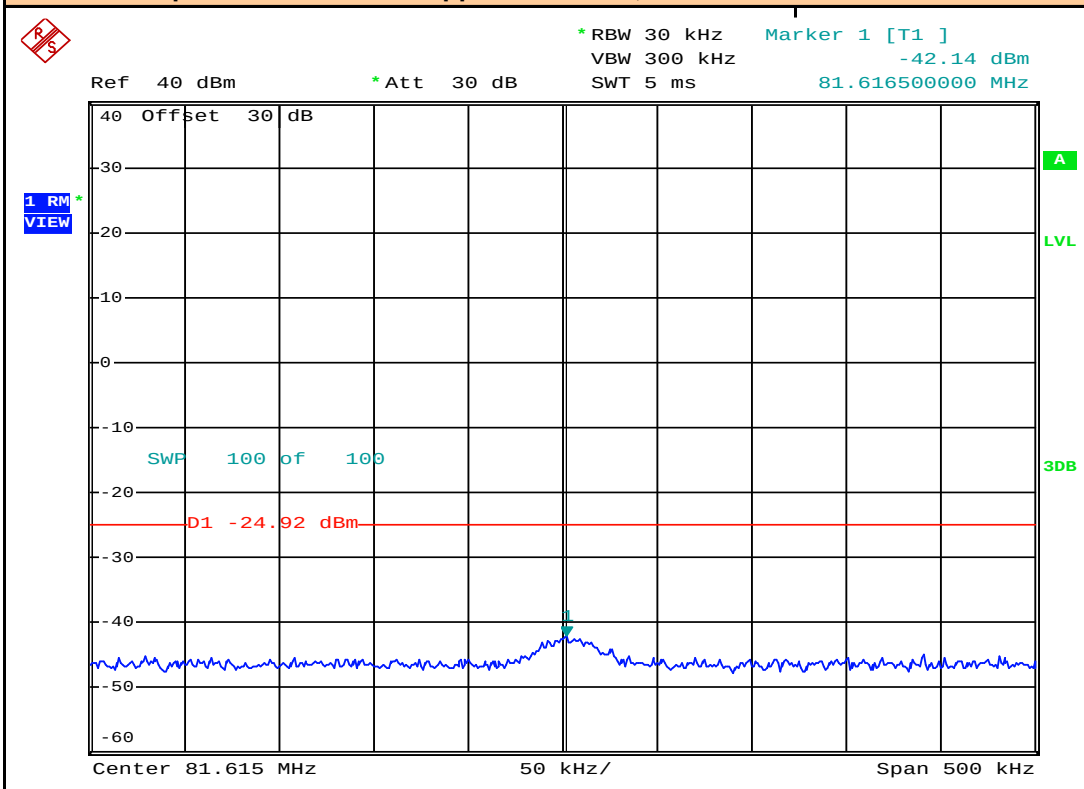


Date: 7.NOV.2022 16:56:28

Channel Number	Channel Frequency (MHz)	Modulation	Emission Frequency (MHz)	Measured Emission (dBm)
20	27.205	AM	54.41	-33.02

Plot 10.8 – Conducted Out of Band Emissions, 3rd Harmonic, Channel 20, AM Upper SideBand, Two-Tone Input

Conducted Spurious Emissions: Upper Side Band, Two-Tone



Date: 7.NOV.2022 16:57:01

Channel Number	Channel Frequency (MHz)	Modulation	Emission Frequency (MHz)	Measured Emission (dBm)
20	27.205	AM	81.61	-42.14

Table 10.1 – Summary of Conducted Out of Band Emissions

Conducted Spurious Emissons Measurement Results:								
Channel Number	Frequency (MHz)	Modulation	Fundamental Power [P_{Fund}] (dBm)	Emission Frequency (MHz)	Measured Emission [P_{Meas}] (dBm)	Attenuation [Att] (dBm)	Limit (dB)	Margin (dB)
20	27.205	AM	35.70	54.41	-30.55	66.25	60.0	6.25
		FM	35.70	54.41	-30.91	66.61		6.61
		AM LSB	35.07	54.41	-33.64	68.71		8.71
			35.07	81.61	-42.18	77.25		17.25
		AM USB	34.31	54.41	-33.02	67.33		7.33
			34.31	81.61	-42.14	76.45		16.45
								Complies

Attenuation [Att] = Fundamental Power [Pf_{und}] - Measured Emission [P_{meas}]
Margin = [Att] - Limit

11.0 RADIATED SPURIOUS TX EMISSIONS

Test Conditions	
Normative Reference	**FCC 47 CFR §95.979, RSS-236, ANSI C63.10**

Limits	
47 CFR §95.979 RSS-Gen RSS-236	Each CBRS transmitter type must be designed to comply with the applicable unwanted emissions limits in this section. (a) Attenuation requirements. The power of unwanted emissions must be attenuated below the transmitter output power in Watts (P) as specified in the applicable paragraphs listed in the following table: For A3E, F3E (1), (3), (5), (6) (1) 25 dB (decibels) in the frequency band 4 kHz to 8 kHz removed from the channel center frequency; (3) 35 dB in the frequency band 8 kHz to 20 kHz removed from the channel center frequency; (5) 53 + 10 log (P) dB in any frequency band removed from the channel center frequency by more than 250% of the authorized bandwidth. (6) 60 dB in any frequency band centered on a harmonic (i.e., an integer multiple of two or more times) of the carrier frequency. (c) Measurement conditions and procedures. Subject to additional measurement standards and procedures established pursuant to part 2, subpart J, the following conditions and procedures must be used. (1) The unwanted emissions limits requirements in this section must be met both with and without the connection of permitted attachments, such as external speakers, microphones, power cords and/or antennas.

Measurement Procedure

TIA 382 22.2 Transmitter Radiated Spurious and Harmonic Emissions

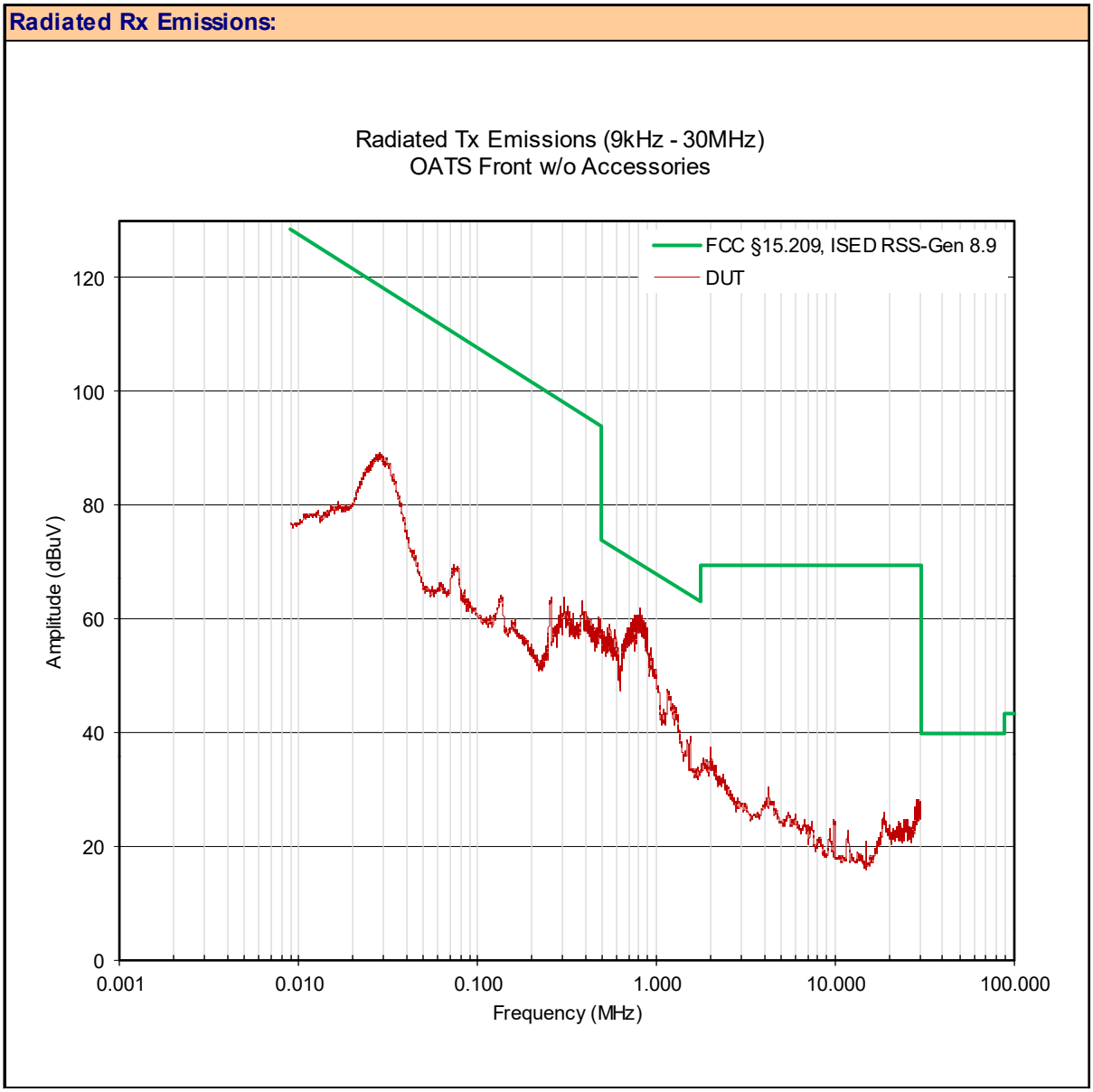
The transmitter shall be terminated in a nonradiating dummy load and shall be keyed but not modulated.

For each spurious frequency, raise and lower the receiver antenna to obtain a maximum reading on the FIM with the antenna at horizontal polarity. Then the turntable should be rotated to further increase this maximum reading. Repeat this procedure of raising and lowering the antenna and rotating the turntable until the highest possible signal has been obtained. The effect of the simulated accessory connections shall be noted, so that the measurement series producing the maximum radiation level can be recorded. Measurements were repeated with and without approved accessories.

Test Setup	Appendix A Figure A.3

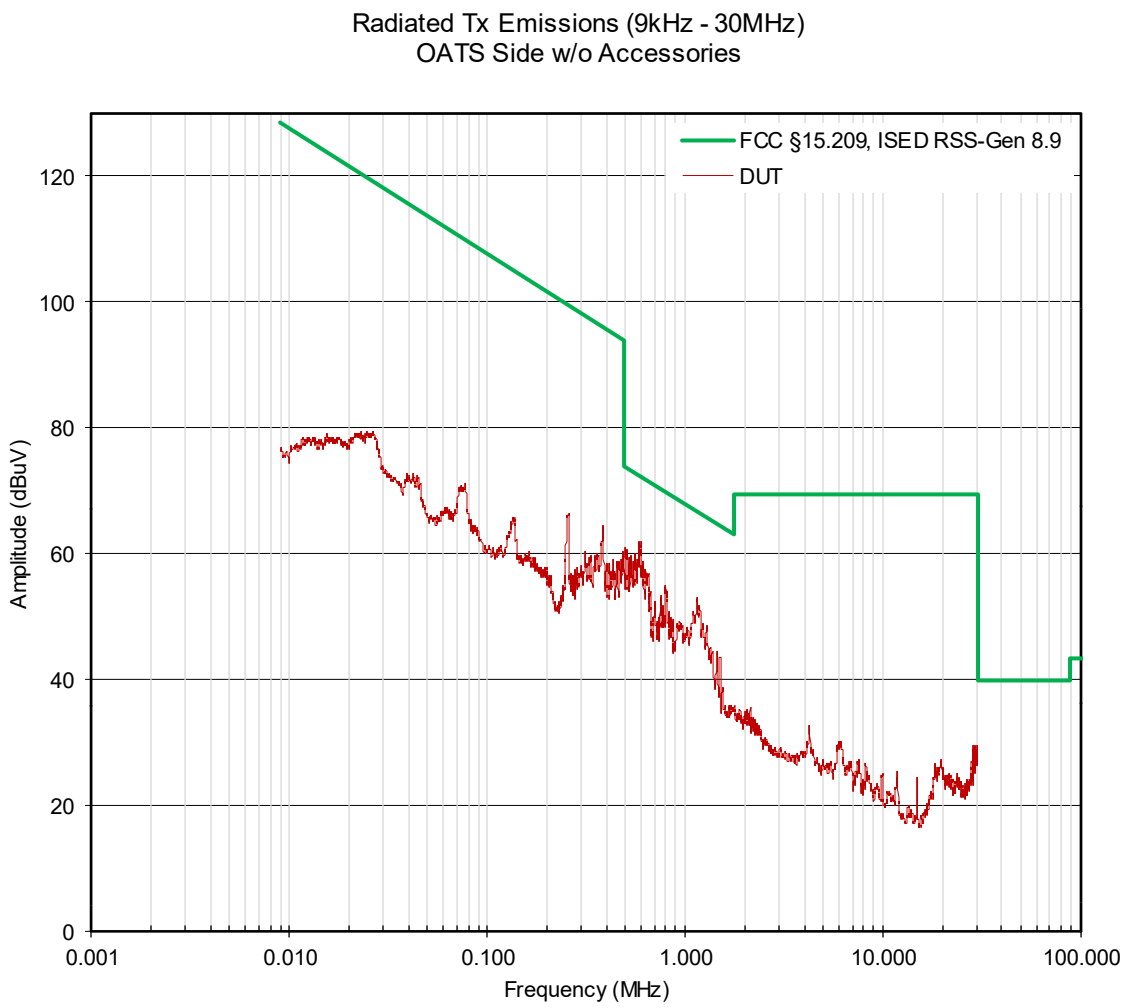
Plot 11.1 – Radiated Spurious Emissions OATS, 9kHz - 30MHz, without Accessories, Front

Radiated Rx Emissions:



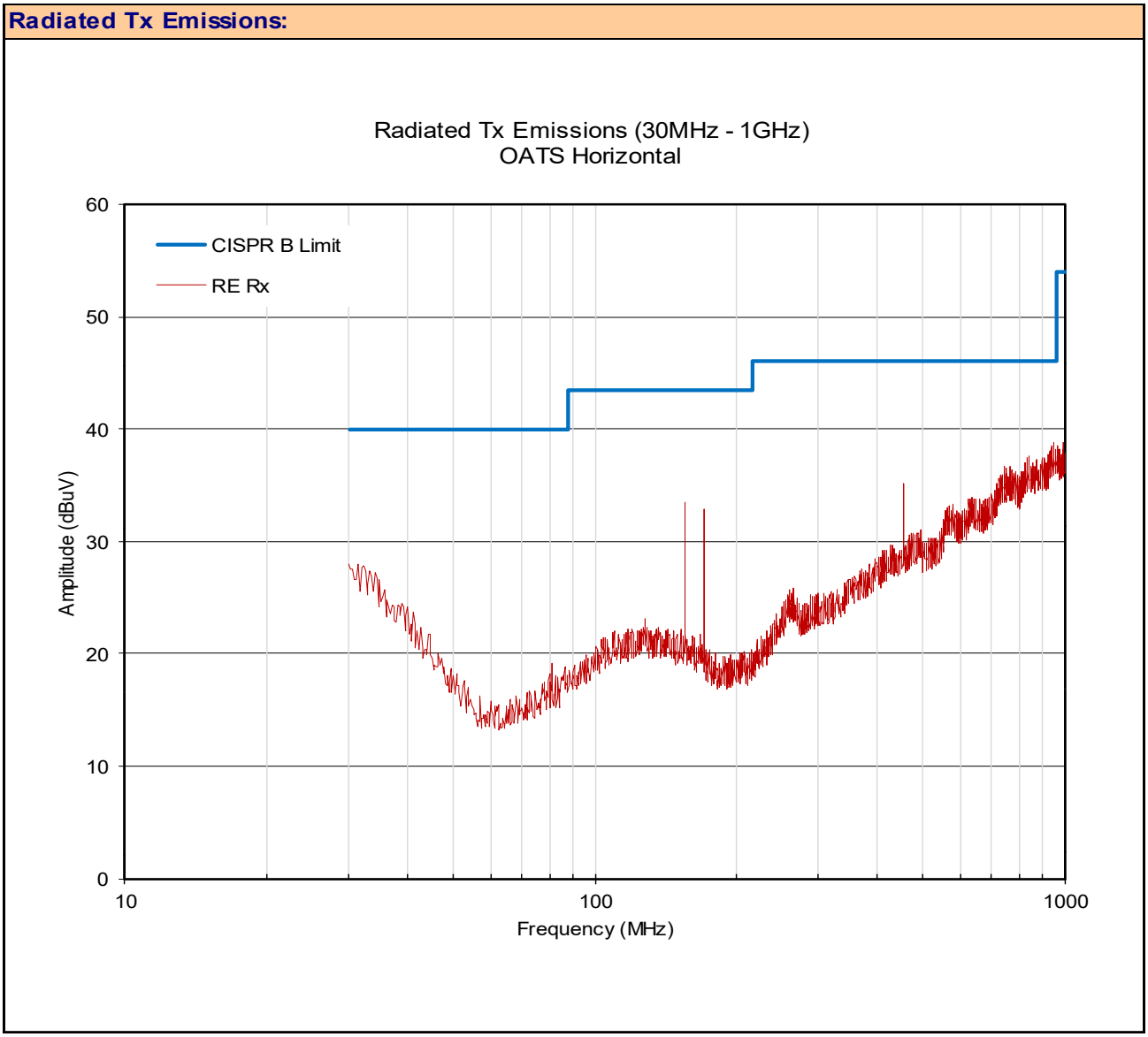
Plot 11.2 – Radiated Spurious Emissions OATS, 9kHz - 30MHz, without Accessories, Side

Radiated Rx Emissions:



Plot 11.3 – Radiated Spurious Emissions OATS, 30 - 1000MHz, without Accessories, Horizontal

Radiated Tx Emissions:



Plot 11.4 – Radiated Spurious Emissions OATS, 30 - 1000MHz, without Accessories, Vertical

Radiated Tx Emissions:

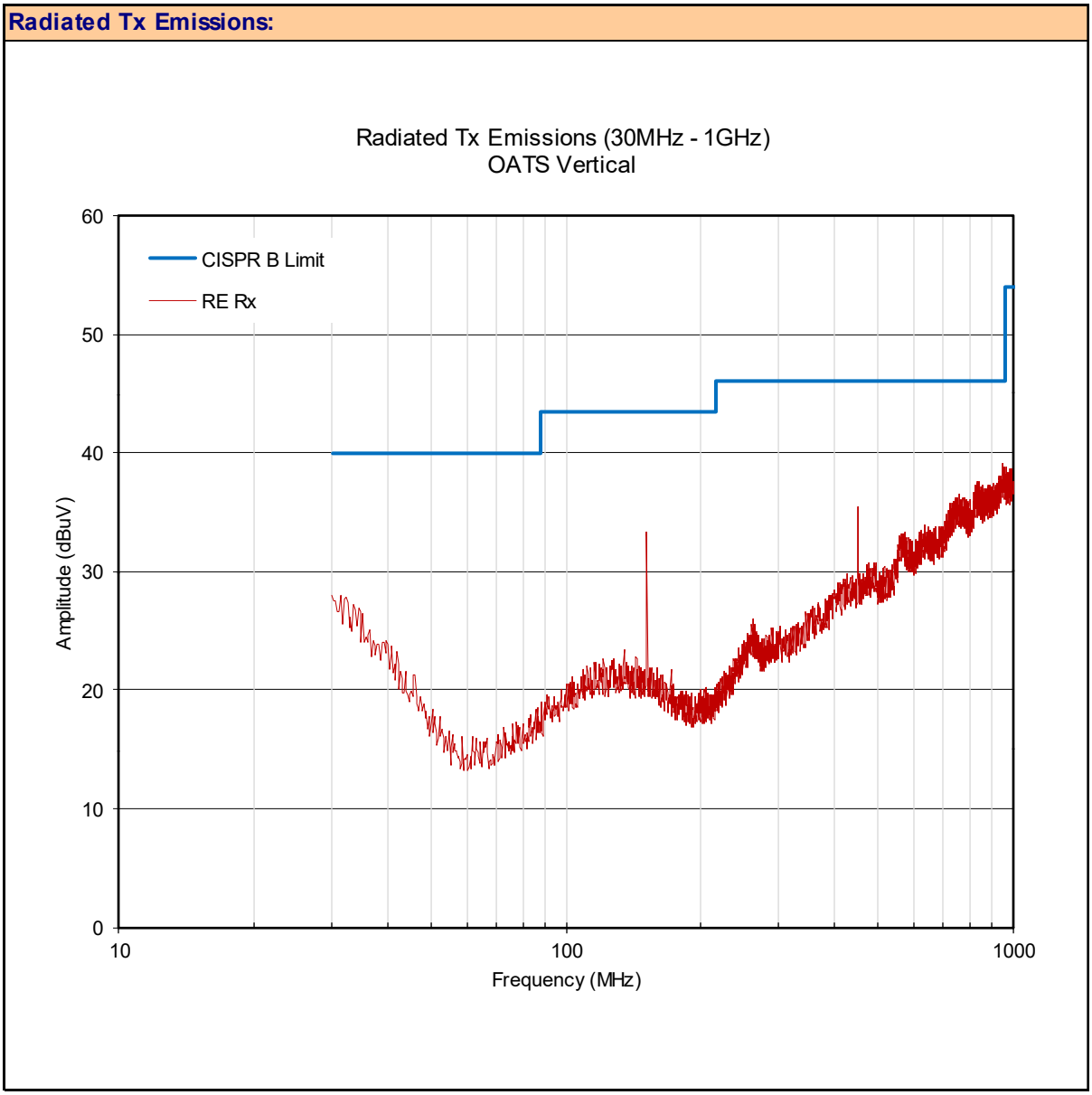


Table 11.1 – Summary of Radiated Tx Emissions < 30MHz, without Accessories

Summary of Radiated Tx Emissions (Restricted Band)										
Measured Frequency Range (MHz)	Channel Frequency (MHz)	Antenna Polarization	Emission Frequency	Measured Emission [E_{Meas}] (dBuV)	Antenna ACF [ACF] (dB)	Cable Loss [L_C] (dB)	Amplifier Gain [G_A] (dB)	Corrected Emission [E_{Corr}] (dBuV/m)	Limit (dBuV)	Margin (dB)
9kHz - 30MHz	27.205	Front	804.00	50.91	10.39	0.50	0.00 (3)	61.8 (2)	69.5	**7.7**
		Side	589.00	50.62	10.78	0.50	0.00 (3)	61.9 (2)	72.2	**10.3**
								Results:	**Complies**	

(1) No Emissions Detected (ND) above ambient or within 20dB of the limit
(2) Antenna ACF, Cable Loss and Amplifier Gain corrected in Spectrum Analyzer Transducer Factor
(3) External Amplier not used

$E_{Corr} = E_{Meas} + ACF + L_C - G_A$

Summary of Radiated Tx Emissions ISED RSS-Gen 6.5 (Below 30MHz)										
Measured Frequency Range (MHz)	Channel Frequency (MHz)	Antenna Polarization	Emission Frequency	Measured Emission [E_{Meas}] (dBuV)	Antenna ACF [ACF^H] (dB/Ωm)	Cable Loss [L_C] (dB)	Amplifier Gain [G_A] (dB)	Corrected Emission [H_{Corr}] (dBuA/m)	Limit (dBuA/m)	Margin (dB)
9kHz - 30MHz	27.205	Front	804.00	50.91	-41.11	0.50	0.00 (3)	10.3	18.0	**7.7**
		Side	589.00	50.62	-40.72	0.50	0.00 (3)	10.4	20.7	**10.3**

(1) No Emissions Detected (ND) above ambient or within 20dB of the limit
(2) Antenna ACF, Cable Loss and Amplifier Gain corrected in Spectrum Analyzer Transducer Factor
(3) External Amplier not used

$H_{Corr}(dBuA/m) = E_{Meas}(dBuV) + ACF^H(dB/\Omega m) + L_C - G_A$

Where ACF^H is the Magnetic Antenna Correction Factor

$ACF^H(dB/\Omega m) = Z_0(dB\Omega) - ACF^E(dB/m)$

Where $Z_0 = 120\pi\Omega = 377\Omega$, $Z_0(dB\Omega) = 20Log(377) = 51.5dB\Omega$

Table 11.2 – Summary of Radiated Tx Emissions > 30MHz, without Accessories

Summary of Radiated Tx Emissions											
Measured Frequency Range (MHz)	Channel Frequency (MHz)	Antenna Polarization	Emission Frequency	Measured Emission [E_{Meas}] (dBuV)	Antenna ACF [ACF] (dB)	Cable Loss [L_C] (dB)	Amplifier Gain [G_A] (dB)	Corrected Emission [E_{Corr}] (dBuV/m)	Limit (dBuV)	Margin (dB)
30-1000MHz	27.205	Horizontal *	155.82 MHz	16.73	15.70	0.99	0.00 (3)	33.4 (2)	43.5	**10.1**
30-1000MHz	27.205	Horizontal *	170.67 MHz	17.11	14.70	0.99	0.00 (3)	32.8 (2)	43.5	**10.7**
30-1000MHz	27.205	Horizontal *	454.00 MHz	10.99	22.30	1.91	0.00 (3)	35.2 (2)	46.0	**10.8**
								Results:	**Complies**	

(1) No Emissions Detected (ND) above ambient or within 20dB of the limit
(2) Antenna ACF, Cable Loss and Amplifier Gain corrected in Spectrum Analyzer Transducer Factor
(3) External Amplier not used

$E_{Corr} = E_{Meas} + ACF^E + L_C - G_A$

Where ACF^E is the Electric Antenna Correction Factor
* Without Manufacturer's Accessories, ** With Manufacturer's Accessories

Summary of Radiated Tx Emissions											
Measured Frequency Range (MHz)	Channel Frequency (MHz)	Antenna Polarization	Emission Frequency	Measured Emission [E_{Meas}] (dBuV)	Antenna ACF [ACF] (dB)	Cable Loss [L_C] (dB)	Amplifier Gain [G_A] (dB)	Corrected Emission [E_{Corr}] (dBuV/m)	Limit (dBuV)	Margin (dB)
30-1000MHz	27.205	Vertical *	151.23 MHz	14.64	17.70	0.99	0.00 (3)	33.3 (2)	43.5	**10.2**
30-1000MHz	27.205	Vertical *	450.50 MHz	11.30	22.30	1.91	0.00 (3)	35.5 (2)	46.0	**10.5**
								Results:	**Complies**	

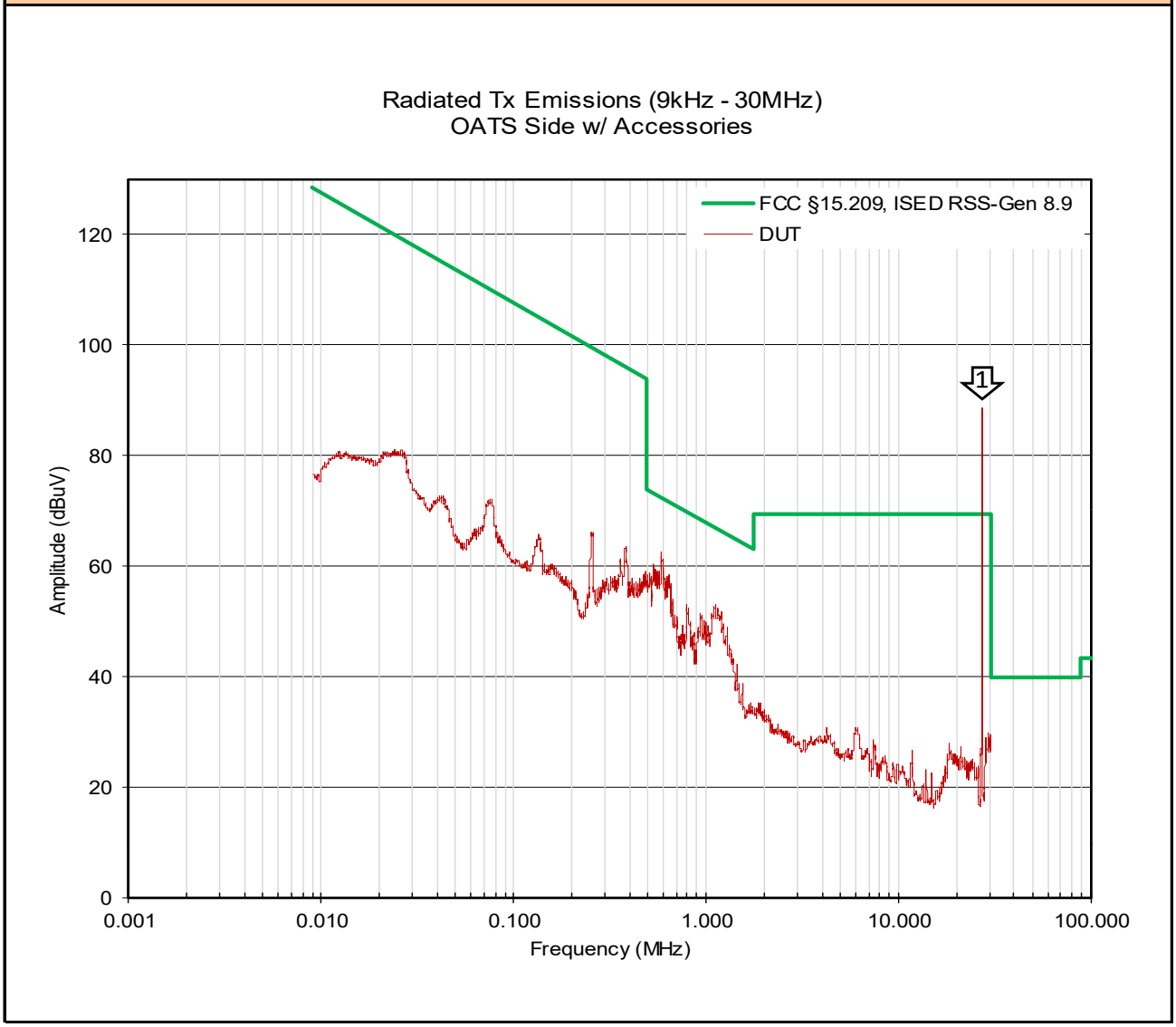
(1) No Emissions Detected (ND) above ambient or within 20dB of the limit
(2) Antenna ACF, Cable Loss and Amplifier Gain corrected in Spectrum Analyzer Transducer Factor
(3) External Amplier not used

$E_{Corr} = E_{Meas} + ACF^E + L_C - G_A$

Where ACF^E is the Electric Antenna Correction Factor
* Without Manufacturer's Accessories

Plot 11.5 – Radiated Spurious Emissions OATS, 9kHz - 30MHz, with Accessories, Front

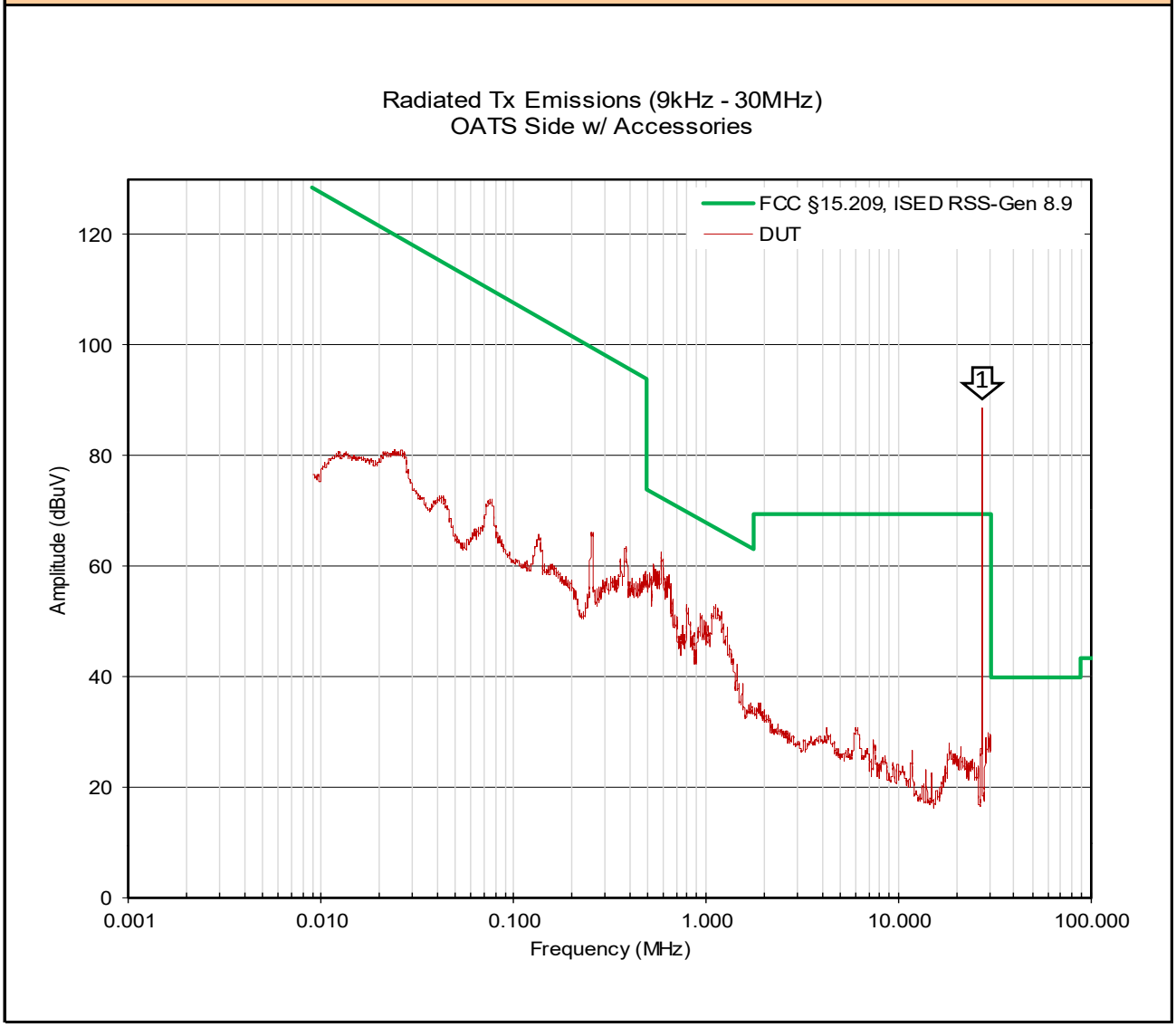
Radiated Rx Emissions:



Marker 1 = Fundamental

Plot 11.6 – Radiated Spurious Emissions OATS, 9kHz - 30MHz, with Accessories, Side

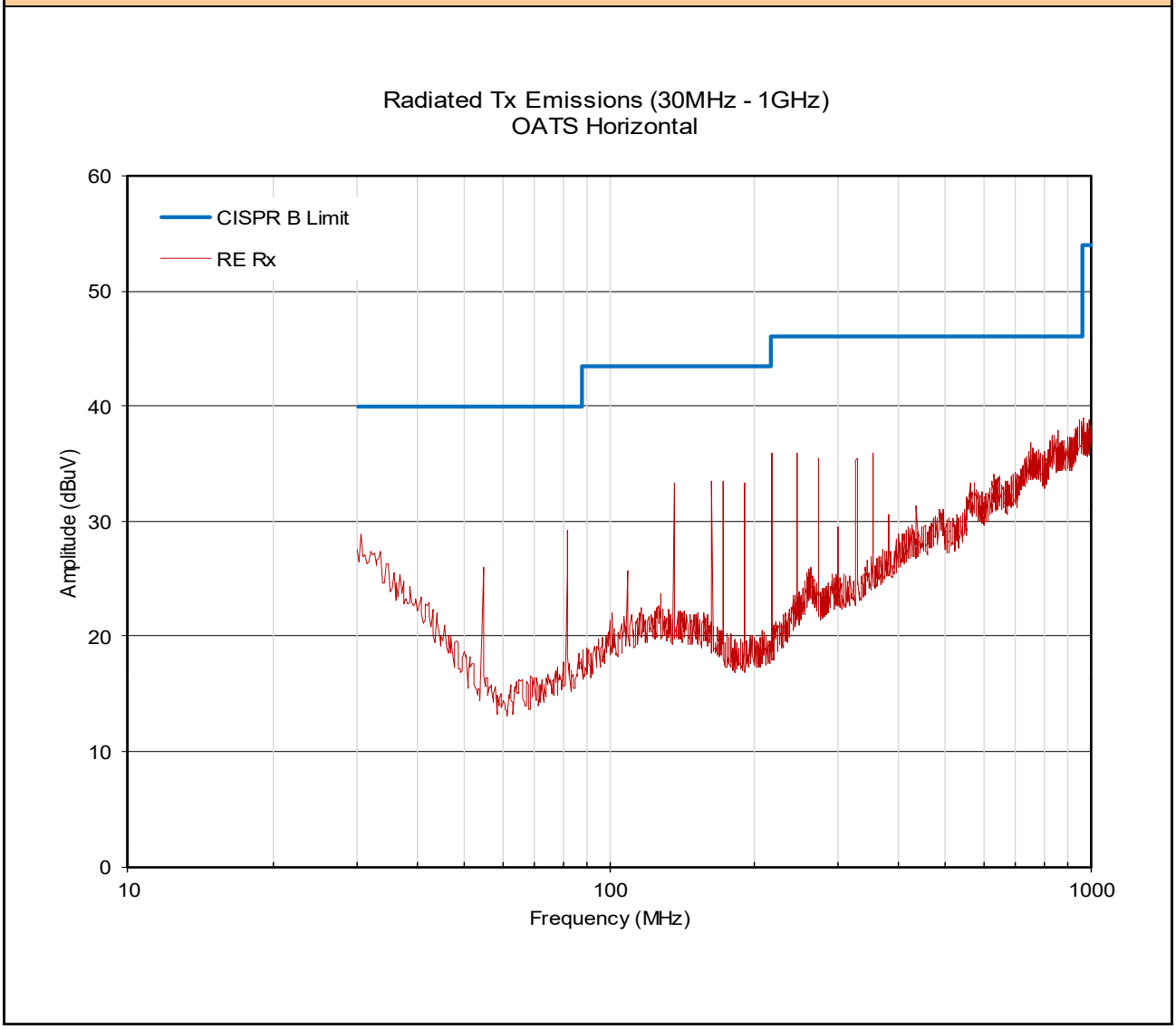
Radiated Rx Emissions:



Marker 1 = Fundamental

Plot 11.7 – Radiated Spurious Emissions OATS, 30 - 1000MHz, with Accessories, Horizontal

Radiated Tx Emissions:



Plot 11.8 – Radiated Spurious Emissions OATS, 30 - 1000MHz, with Accessories, Vertical

Radiated Tx Emissions:

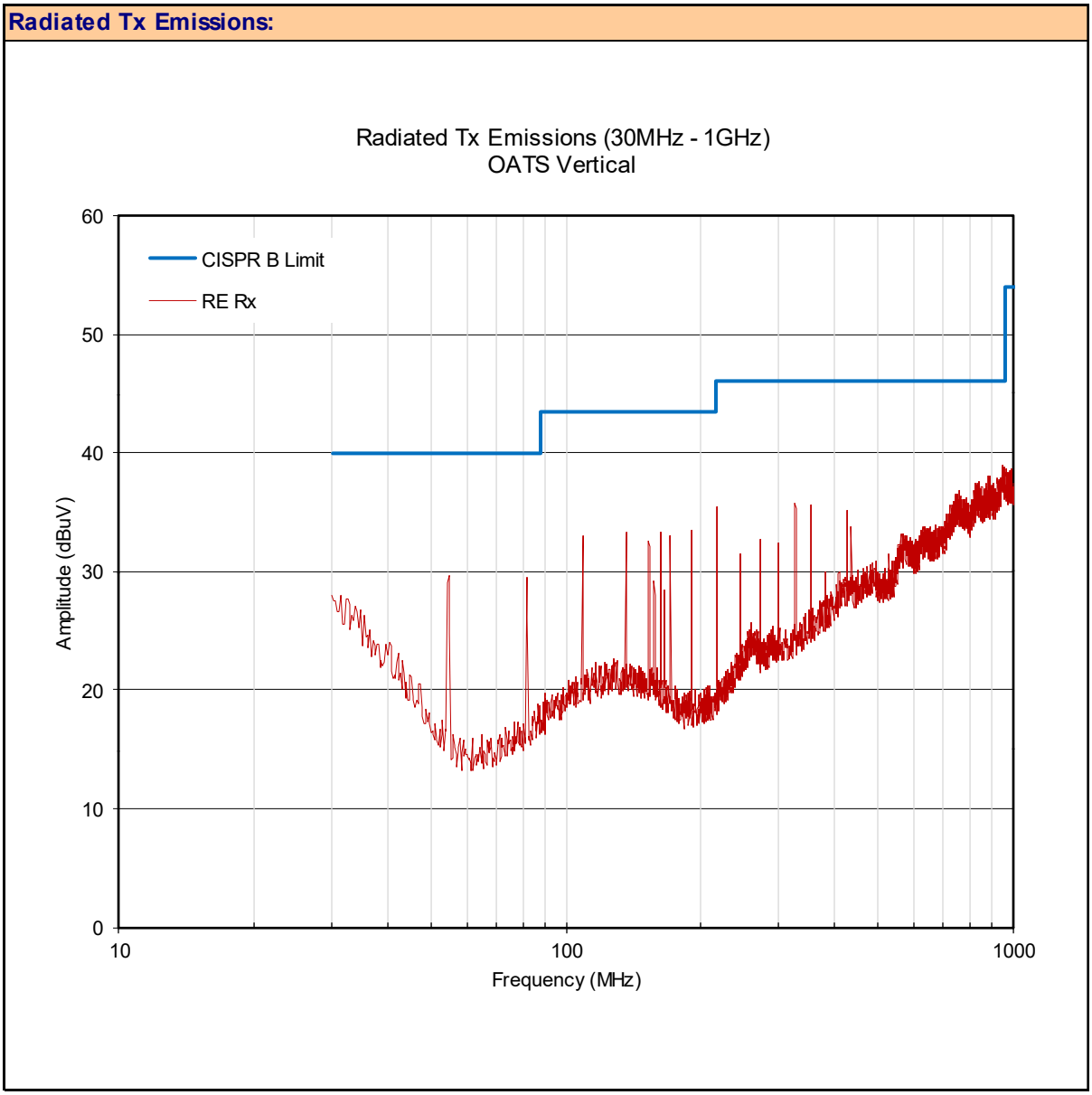


Table 11.3 – Summary of Radiated Tx Emissions < 30MHz, with Accessories

Summary of Radiated Tx Emissions (Restricted Band)										
Measured Frequency Range (MHz)	Channel Frequency (MHz)	Antenna Polarization	Emission Frequency	Measured Emission [E_{Meas}] (dBuV)	Antenna ACF [ACF] (dB)	Cable Loss [L_C] (dB)	Amplifier Gain [G_A] (dB)	Corrected Emission [E_{Corr}] (dBuV/m)	Limit (dBuV)	Margin (dB)
9kHz - 30MHz	27.205	Front	815.00	48.91	10.39	0.50	0.00 (3)	59.8 (2)	69.4	**9.6**
		Side	589.00	50.62	10.78	0.50	0.00 (3)	61.9 (2)	72.2	**10.3**
								Results:	**Complies**	

(1) No Emissions Detected (ND) above ambient or within 20dB of the limit
(2) Antenna ACF, Cable Loss and Amplifier Gain corrected in Spectrum Analyzer Transducer Factor
(3) External Amplier not used

$E_{Corr} = E_{Meas} + ACF + L_C - G_A$

Summary of Radiated Tx Emissions ISED RSS-Gen 6.5 (Below 30MHz)										
Measured Frequency Range (MHz)	Channel Frequency (MHz)	Antenna Polarization	Emission Frequency	Measured Emission [E_{Meas}] (dBuV)	Antenna ACF [ACF^H] (dB/Ωm)	Cable Loss [L_C] (dB)	Amplifier Gain [G_A] (dB)	Corrected Emission [H_{Corr}] (dBuA/m)	Limit (dBuA/m)	Margin (dB)
9kHz - 30MHz	27.205	Front	815.00	48.91	-41.11	0.50	0.00 (3)	8.3	17.9	**9.6**
		Side	589.00	50.62	-40.72	0.50	0.00 (3)	10.4	20.7	**10.3**

(1) No Emissions Detected (ND) above ambient or within 20dB of the limit
(2) Antenna ACF, Cable Loss and Amplifier Gain corrected in Spectrum Analyzer Transducer Factor
(3) External Amplier not used

$H_{Corr}(dBuA/m) = E_{Meas}(dBuV) + ACF^H(dB/\Omega m) + L_C - G_A$

Where ACF^H is the Magnetic Antenna Correction Factor

$ACF^H(dB/\Omega m) = Z_0(dB\Omega) - ACF^E(dB/m)$

Where $Z_0 = 120\pi\Omega = 377\Omega$, $Z_0(dB\Omega) = 20Log(377) = 51.5dB\Omega$

Table 11.4 – Summary of Radiated Tx Emissions > 30MHz, with Accessories

Summary of Radiated Tx Emissions										
Measured Frequency Range (MHz)	Channel Frequency (MHz)	Antenna Polarization	Emission Frequency	Measured Emission [E_{Meas}] (dBuV)	Antenna ACF [ACF] (dB)	Cable Loss [L_C] (dB)	Amplifier Gain [G_A] (dB)	Corrected Emission [E_{Corr}] (dBuV/m)	Limit (dBuV)	Margin (dB)
30-1000MHz	27.205	Horizontal **	54.57 MHz	13.78	11.50	0.77	0.00 (3)	26.1 (2)	40.0	**13.9**
30-1000MHz	27.205	Horizontal **	81.84 MHz	15.90	12.60	0.77	0.00 (3)	29.3 (2)	40.0	**10.7**
30-1000MHz	27.205	Horizontal **	108.84 MHz	8.84	15.90	0.99	0.00 (3)	25.7 (2)	43.5	**17.8**
30-1000MHz	27.205	Horizontal **	136.38 MHz	15.81	16.60	0.99	0.00 (3)	33.4 (2)	43.5	**10.1**
30-1000MHz	27.205	Horizontal **	163.65 MHz	17.25	15.20	0.99	0.00 (3)	33.4 (2)	43.5	**10.1**
30-1000MHz	27.205	Horizontal **	172.56 MHz	17.90	14.40	0.99	0.00 (3)	33.3 (2)	43.5	**10.2**
30-1000MHz	27.205	Horizontal **	172.83 MHz	18.08	14.40	0.99	0.00 (3)	33.5 (2)	43.5	**10.0**
30-1000MHz	27.205	Horizontal **	190.65 MHz	18.67	13.70	0.99	0.00 (3)	33.4 (2)	43.5	**10.1**
30-1000MHz	27.205	Horizontal **	217.92 MHz	20.50	14.00	1.35	0.00 (3)	35.8 (2)	46.0	**10.2**
30-1000MHz	27.205	Horizontal **	245.19 MHz	17.60	16.90	1.35	0.00 (3)	35.8 (2)	46.0	**10.2**
30-1000MHz	27.205	Horizontal **	272.46 MHz	16.32	17.80	1.35	0.00 (3)	35.5 (2)	46.0	**10.5**
30-1000MHz	27.205	Horizontal **	299.46 MHz	9.63	18.50	1.35	0.00 (3)	29.5 (2)	46.0	**16.5**
30-1000MHz	27.205	Horizontal **	325.90 MHz	15.04	18.70	1.64	0.00 (3)	35.4 (2)	46.0	**10.6**
30-1000MHz	27.205	Horizontal **	326.60 MHz	15.05	18.70	1.64	0.00 (3)	35.4 (2)	46.0	**10.6**
30-1000MHz	27.205	Horizontal **	353.20 MHz	14.81	19.50	1.64	0.00 (3)	35.9 (2)	46.0	**10.1**
								Results:	**Complies**	

(1) No Emissions Detected (ND) above ambient or within 20dB of the limit
(2) Antenna ACF, Cable Loss and Amplifier Gain corrected in Spectrum Analyzer Transducer Factor
(3) External Amplier not used

$E_{Corr} = E_{Meas} + ACF^E + L_C - G_A$

Where ACF^E is the Electric Antenna Correction Factor
** With Manufacturer's Accessories

Table 11.4 – Summary of Radiated Tx Emissions > 30MHz, with Accessories (Cont)

Summary of Radiated Tx Emissions										
Measured Frequency Range (MHz)	Channel Frequency (MHz)	Antenna Polarization	Emission Frequency	Measured Emission [E_{Meas}] (dBuV)	Antenna ACF [ACF] (dB)	Cable Loss [L_C] (dB)	Amplifier Gain [G_A] (dB)	Corrected Emission [E_{Corr}] (dBuV/m)	Limit (dBuV)	Margin (dB)
30-1000MHz	27.205	Vertical **	54.57 MHz	17.40	11.50	0.77	0.00 (3)	29.7 (2)	40.0	**10.3**
30-1000MHz	27.205	Vertical **	81.57 MHz	16.38	12.40	0.77	0.00 (3)	29.5 (2)	40.0	**10.5**
30-1000MHz	27.205	Vertical **	109.11 MHz	16.07	16.00	0.99	0.00 (3)	33.1 (2)	43.5	**10.4**
30-1000MHz	27.205	Vertical **	136.11 MHz	15.74	16.60	0.99	0.00 (3)	33.3 (2)	43.5	**10.2**
30-1000MHz	27.205	Vertical **	153.39 MHz	15.59	16.00	0.99	0.00 (3)	32.6 (2)	43.5	**10.9**
30-1000MHz	27.205	Vertical **	157.71 MHz	12.59	15.60	0.99	0.00 (3)	29.2 (2)	43.5	**14.3**
30-1000MHz	27.205	Vertical **	163.38 MHz	17.10	15.20	0.99	0.00 (3)	33.3 (2)	43.5	**10.2**
30-1000MHz	27.205	Vertical **	171.21 MHz	17.42	14.60	0.99	0.00 (3)	33.0 (2)	43.5	**10.5**
30-1000MHz	27.205	Vertical **	190.38 MHz	18.78	13.70	0.99	0.00 (3)	33.5 (2)	43.5	**10.0**
30-1000MHz	27.205	Vertical **	217.92 MHz	20.15	14.00	1.35	0.00 (3)	35.5 (2)	43.5	**8.0**
30-1000MHz	27.205	Vertical **	245.19 MHz	13.21	16.90	1.35	0.00 (3)	31.5 (2)	46.0	**14.5**
30-1000MHz	27.205	Vertical **	272.19 MHz	13.63	17.80	1.35	0.00 (3)	32.8 (2)	46.0	**13.2**
30-1000MHz	27.205	Vertical **	299.46 MHz	12.62	18.50	1.35	0.00 (3)	32.5 (2)	46.0	**13.5**
30-1000MHz	27.205	Vertical **	325.90 MHz	14.63	19.50	1.64	0.00 (3)	35.8 (2)	46.0	**10.2**
30-1000MHz	27.205	Vertical **	353.20 MHz	14.55	19.50	1.64	0.00 (3)	35.7 (2)	46.0	**10.3**
30-1000MHz	27.205	Vertical **	426.00 MHz	11.18	22.10	1.91	0.00 (3)	35.2 (2)	46.0	**10.8**
								Results:	**Complies**	

(1) No Emissions Detected (ND) above ambient or within 20dB of the limit
(2) Antenna ACF, Cable Loss and Amplifier Gain corrected in Spectrum Analyzer Transducer Factor
(3) External Amplier not used

$E_{Corr} = E_{Meas} + ACF^E + L_C - G_A$

Where ACF^E is the Electric Antenna Correction Factor
** With Manufacturer's Accessories

12.0 RADIATED SPURIOUS RX EMISSIONS

Test Procedure	
Normative Reference	**FCC 47 CFR §15.109, ICES-003(6.2)** **ANSI C63.4:2014**

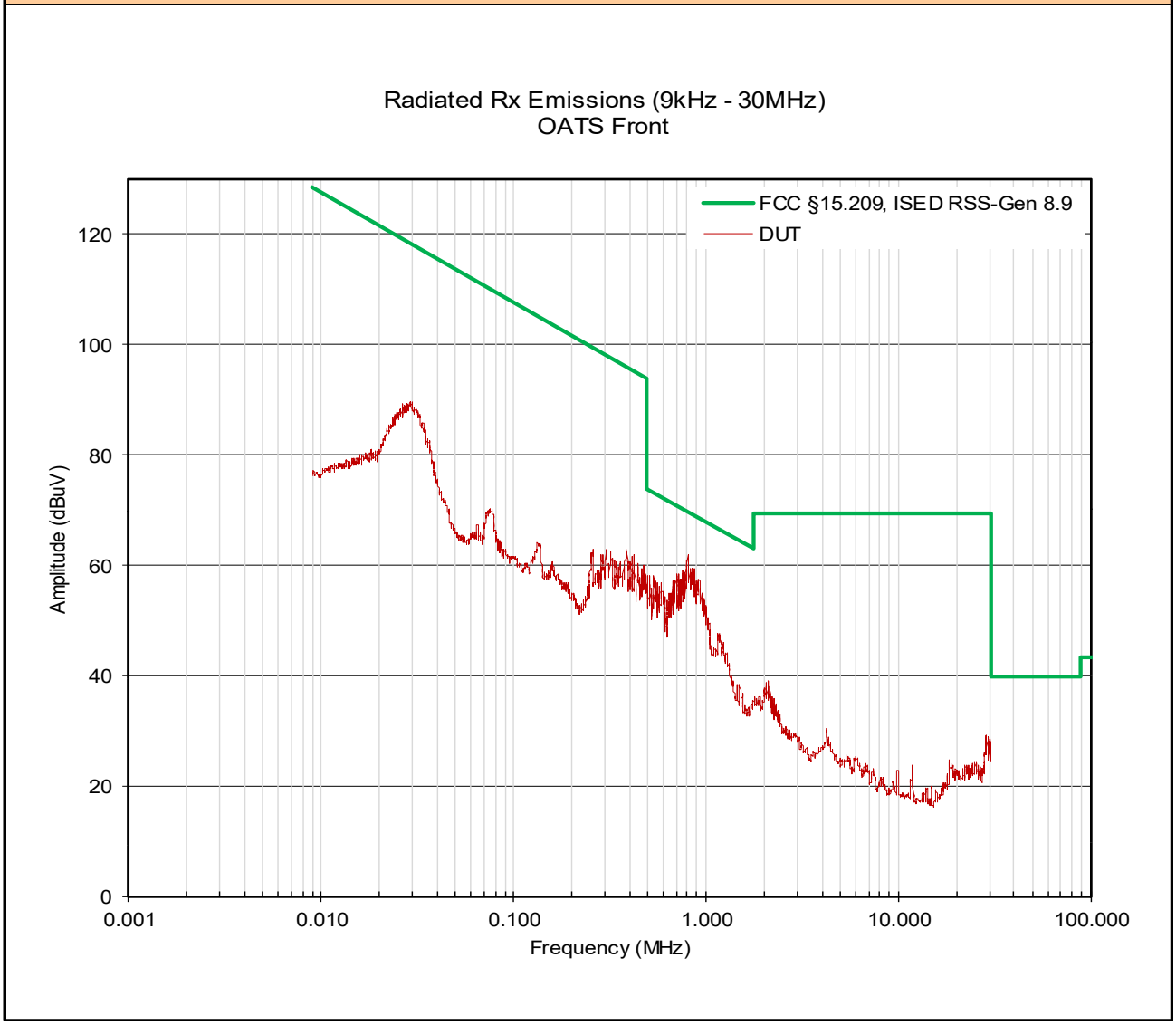
Limits	
47 CFR §15.109	(a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values: 30-88MHz: 40dBuV/m 88-216MHz: 43.5dBuV/m 216-960MHz: 46dBuV/m > 960MHz: 54dBuV/m
ICES-003(6.2.1) RSS-Gen 8.9	6.2.1 - Radiated Emissions Limits Below 1 GHz Class B: ITE that does not meet the conditions for Class A operation shall comply with the Class B radiated limits set out in Table 5 determined at a distance of 3 metres. 30-88MHz: 40dBuV/m 88-216MHz: 43.5dBuV/m 216-960MHz: 46dBuV/m > 960MHz: 54dBuV/m

Test Setup	**Appendix A** **Figure A.3**

Measurement Procedure
The DUT was set up as per ANSI C63.4:2014. Emissions were scanned between 30MHz and 1000MHz. The turntable was rotated 360 degrees and the antenna was elevated to 4m to optimize the measured emissions.

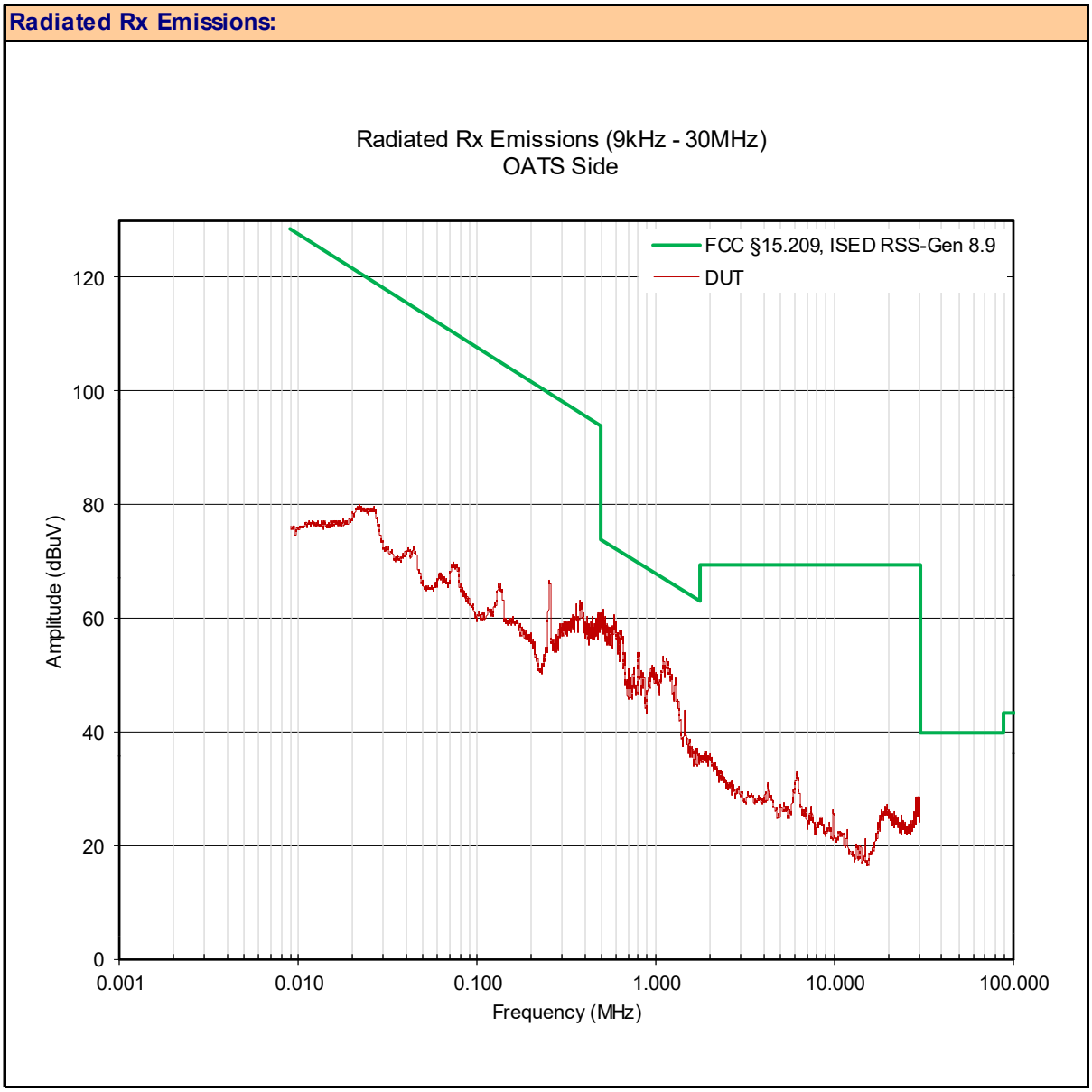
Plot 12.1 – Radiated Rx Emissions OATS, 9kHz - 30MHz, Front

Radiated Rx Emissions:



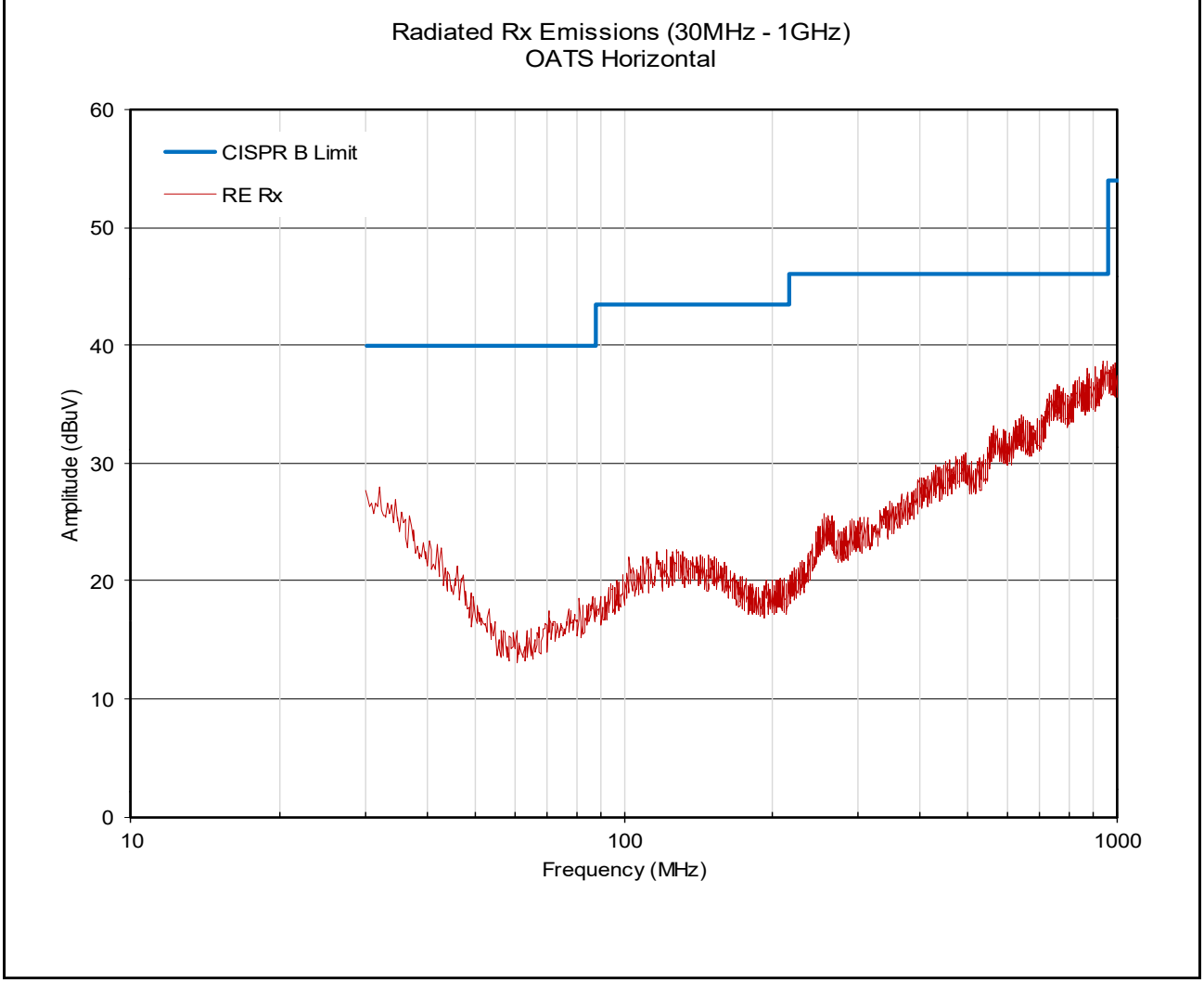
Plot 12.2 – Radiated Rx Emissions OATS, 9kHz - 30MHz, Side

Radiated Rx Emissions:



Plot 12.3– Radiated Spurious Emissions OATS, 30 - 1000MHz, Horizontal

Radiated Rx Emissions:



Plot 12.4– Radiated Spurious Emissions OATS, 30 - 1000MHz, Vertical

Radiated Rx Emissions:

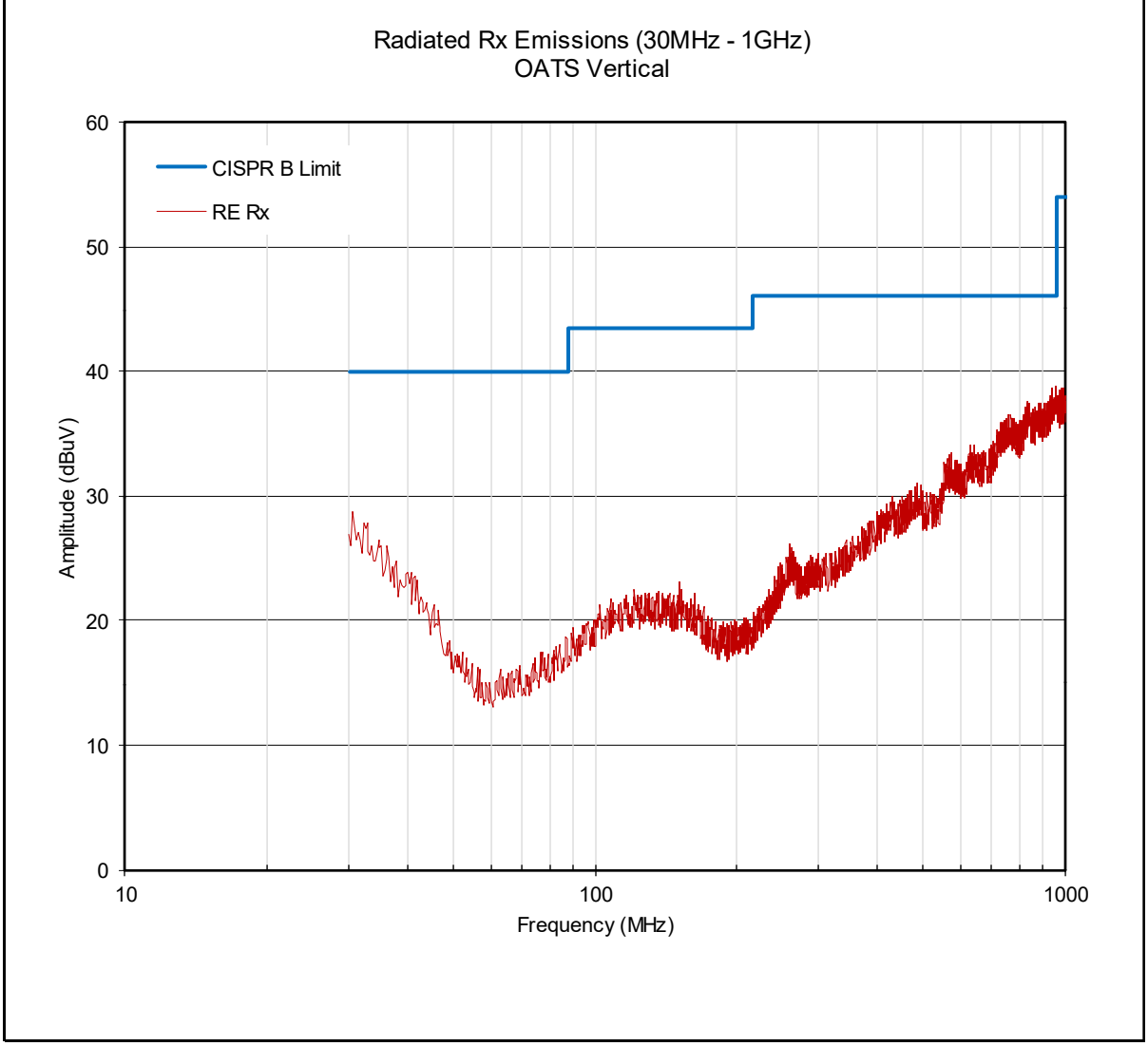


Table 12.1 – Summary of Radiated Rx Emissions

Summary of Radiated Rx Emissions (Restricted Band)										
Measured Frequency Range (MHz)	Channel Frequency (MHz)	Antenna Polarization	Emission Frequency	Measured Emission [E_{Meas}] (dBuV)	Antenna ACF [ACF] (dB)	Cable Loss [L_C] (dB)	Amplifier Gain [G_A] (dB)	Corrected Emission [E_{Corr}] (dBuV/m)	Limit (dBuV)	Margin (dB)
9kHz - 30MHz	-	Front	804kHz	- (1)	0.00	0.00	0.00 (3)	61.1 (2)	69.5	**8.4**
9kHz - 30MHz	-	Side	512kHz	- (1)	0.00	0.00	0.00 (3)	61.4 (2)	73.4	**12.0**
30-1000MHz	-	Horizontal	ND	ND (1)	0.00	0.00	0.00 (3)	ND (2)	56.9	**n/a**
30-1000MHz	-	Vertical	ND	ND (1)	0.00	0.00	0.00 (3)	ND (2)	56.9	**n/a**
								Results:		**Complies**

(1) No Emissions Detected (ND) above ambient or within 20dB of the limit
(2) Antenna ACF, Cable Loss and Amplifier Gain corrected in Spectrum Analyzer Transducer Factor
(3) External Amplier not used

$E_{Corr} = E_{Meas} + ACF + L_C - G_A$

13.0 FREQUENCY STABILITY

Test Conditions	
Normative Reference	**FCC 47 CFR §2.1055, §95.965, RSS-Gen, ANSI C63.10**

Limits	
47 CFR §95.965	Each CBRS transmitter type must be designed such that the transmit carrier frequency (or in the case of SSB transmissions, the reference frequency) remains within 50 parts-per-million of the channel center frequencies specified in §95.963 under all normal operating conditions.

Measurement Procedure

47 CFR §2.1055 Frequency Stability

(a) The frequency stability shall be measured with variation of ambient temperature as follows:

(1) From -30° to +50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.

(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10° centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement.

(d) The frequency stability shall be measured with variation of primary supply voltage as follows:

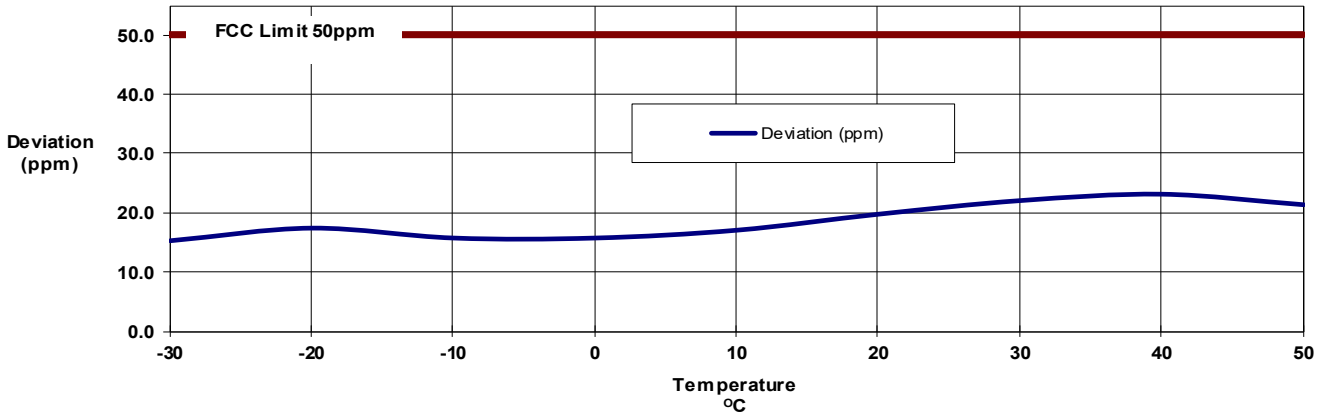
(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

Test Setup	Appendix A Figure A.4

Table 13.1 – Summary of Frequency Stability Results (AM)

Frequency Stability

Nominal Frequency (MHz):	27.205
Nominal Channel BW (KHz):	CW
Nominal Voltage (VDC):	13.8
Nominal Temperature (°C):	20



Frequency Stability Measurements (Temperature)

Temp (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Deviation (Hz)	Deviation [Absolute] (ppm)
-30		27.20458680	-413	15.19
-20		27.20452870	-471	17.32
-10		27.20457440	-426	15.64
0		27.20457410	-426	15.66
10	**27.205000**	27.20453810	-462	16.98
20		27.20446410	-536	19.70
30		27.20440170	-598	21.99
40		27.20437230	-628	23.07
50		27.20442100	-579	21.28
			Maximum Deviation:	23.07
			Maximum Limit:	50.00
			Result:	Complies

Frequency Stability Measurements (Voltage)

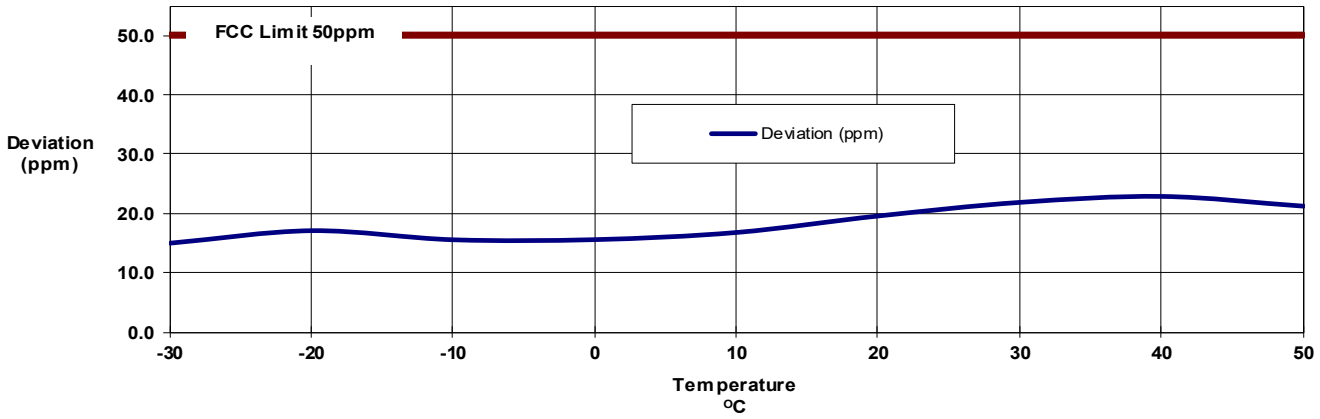
Voltage (VDC)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Deviation (Hz)	Deviation [Absolute] (ppm)
27.6 (115%)		27.20446575	-534	19.64
13.8	**27.205000**	27.20446410	-536	19.70
11.73 (85%)		27.20446850	-531	19.54
		Maximum Deviation:		19.70
		Maximum Limit:		50.00
		Result:		Complies

This device is capable of operating at 12VDC and 24VDC.

Table 13.2 – Summary of Frequency Stability Results (FM)

Frequency Stability

Nominal Frequency (MHz):	27.205
Nominal Channel BW (KHz):	CW
Nominal Voltage (VDC):	13.8
Nominal Temperature (°C):	20



Frequency Stability Measurements (Temperature)

Temp (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Deviation (Hz)	Deviation [Absolute] (ppm)
-30	27.205000	27.20458960	-410	15.09
-20		27.20453310	-467	17.16
-10		27.20457440	-426	15.64
0		27.20457370	-426	15.67
10		27.20454090	-459	16.88
20		27.20446560	-534	19.64
30		27.20440320	-597	21.94
40		27.20437610	-624	22.93
50		27.20442090	-579	21.29
			Maximum Deviation:	22.93
			Maximum Limit:	50.00
			Result:	Complies

Frequency Stability Measurements (Voltage)

Voltage (VDC)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Deviation (Hz)	Deviation [Absolute] (ppm)
27.6 (115%)	27.205000	27.20457630	-424	15.57
13.8		27.20446560	-534	19.64
11.73 (85%)		27.20448620	-514	18.89
			Maximum Deviation:	19.64
			Maximum Limit:	50.00
			Result:	Complies

This device is capable of operating at 12VDC and 24VDC.

APPENDIX A – TEST SETUP DRAWINGS AND EQUIPMENT

Table A.1 – Setup - Conducted Measurements Equipment

Equipment List			
Asset Number	Manufacturer	Model Number	Description
00241	R&S	FSU40	Spectrum Analyzer

Figure A.1 – Test Setup Conducted Measurements

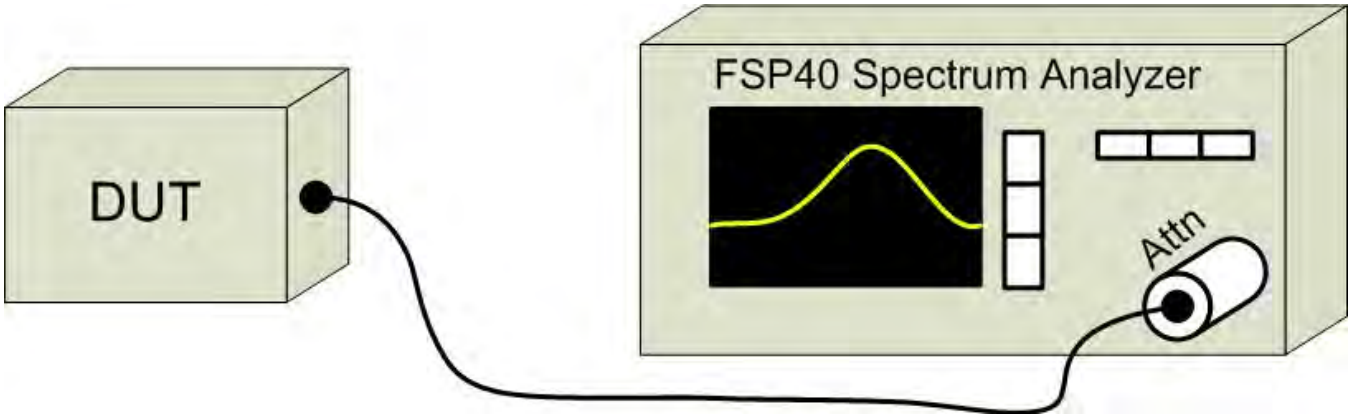


Table A.2 – Setup - Audio Modulation Equipment

Equipment List			
Asset Number	**Manufacturer**	**Model Number**	**Description**
00028	HP	8901A	Modulation Analyzer
00027	HP	8903B	Audio Analyzer/Generator

Figure A.2 – Test Setup Audio Modulation Response Measurements

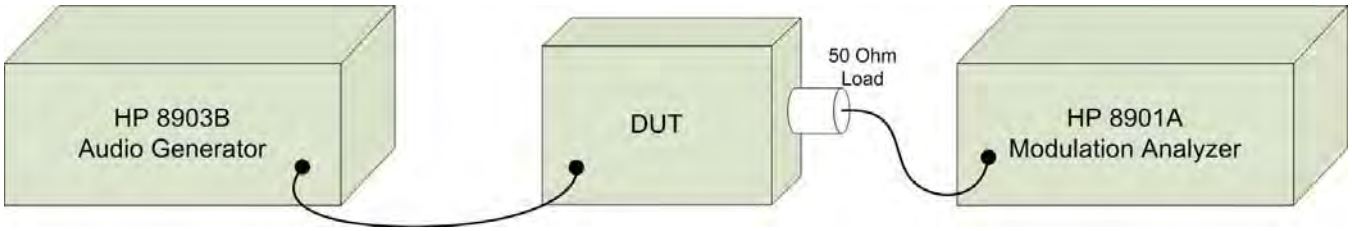


Table A.3 – Setup - Radiated Emissions Equipment

Equipment List			
Asset Number	**Manufacturer**	**Model Number**	**Description**
00051	HP	8566B	Spectrum Analyzer
00049	HP	85650A	Quasi-peak Adapter
00047	HP	85685A	RF Preselector
00072	EMCO	2075	Mini-mast
00073	EMCO	2080	Turn Table
00071	EMCO	2090	Multi-Device Controller
00265	Miteq	JS32-00104000-58-5P	Microwave L/N Amplifier
00241	R&S	FSU40	Spectrum Analyzer
00050	Chase	CBL-6111A	Bilog Antenna
00275	Coaxis	LMR400	25m Cable
00276	Coaxis	LMR400	4m Cable
00278	TILE	34G3	TILE Test Software
00034	ETS	3115	Double Ridged Guide Horn

CNR: Calibration Not Required
COU: Calibrate On Use

Figure A.3 – Test Setup Radiated Emissions Measurements Below 30MHz

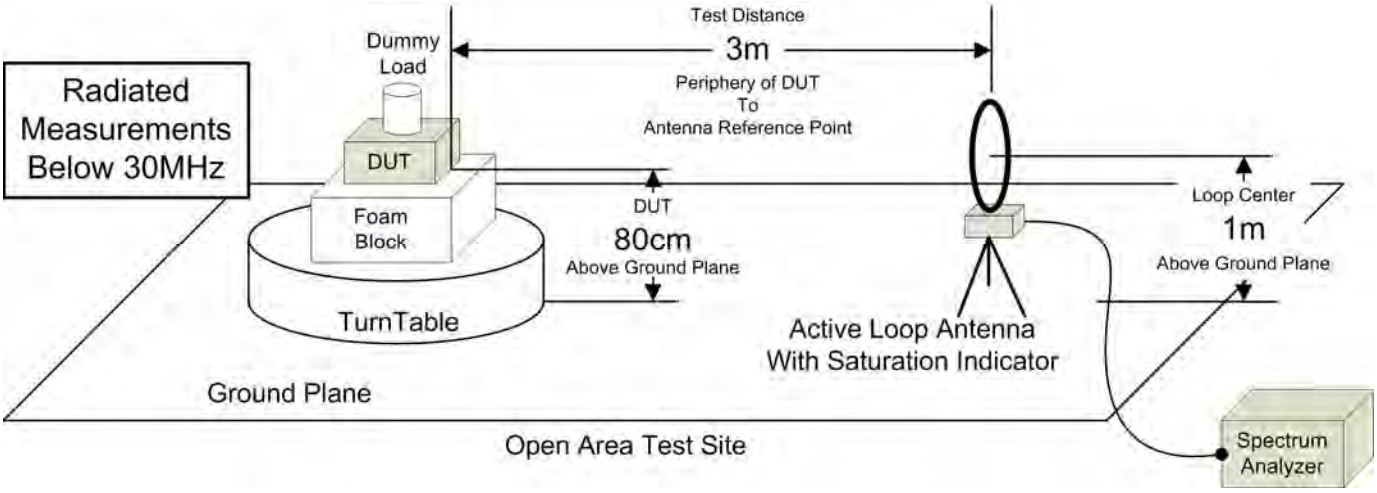


Figure A.4 – Test Setup Radiated Emissions Measurements 30-1000MHz

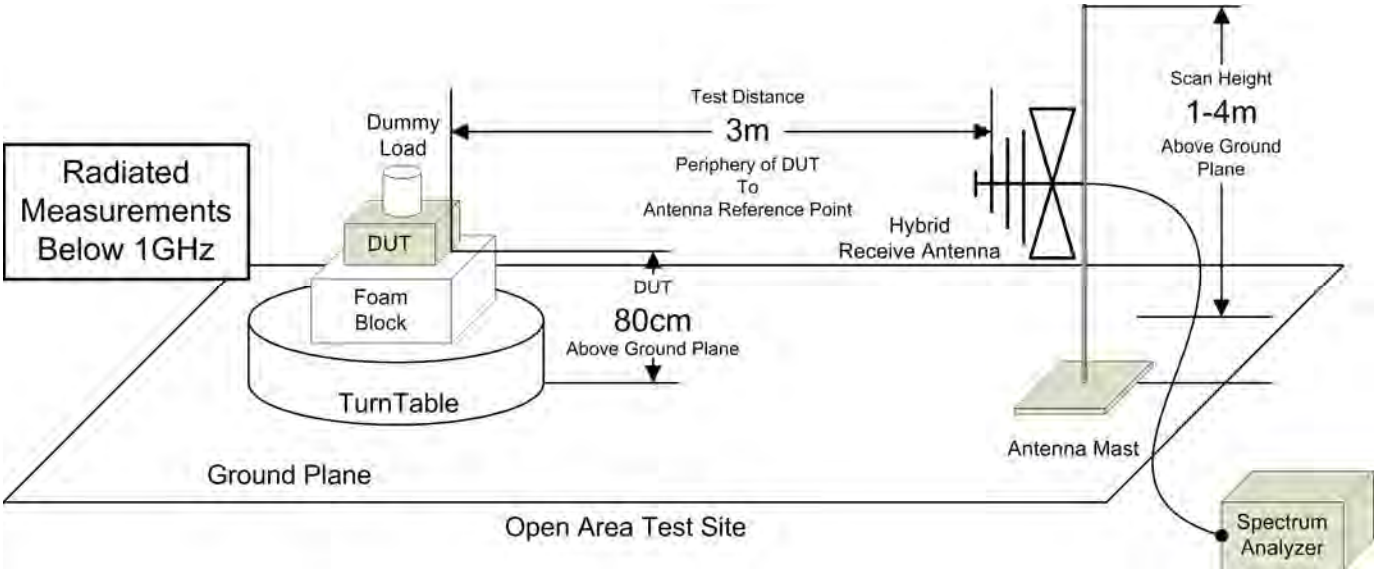


Figure A.5 – Test Setup Radiated Emissions Measurements 30-1000MHz

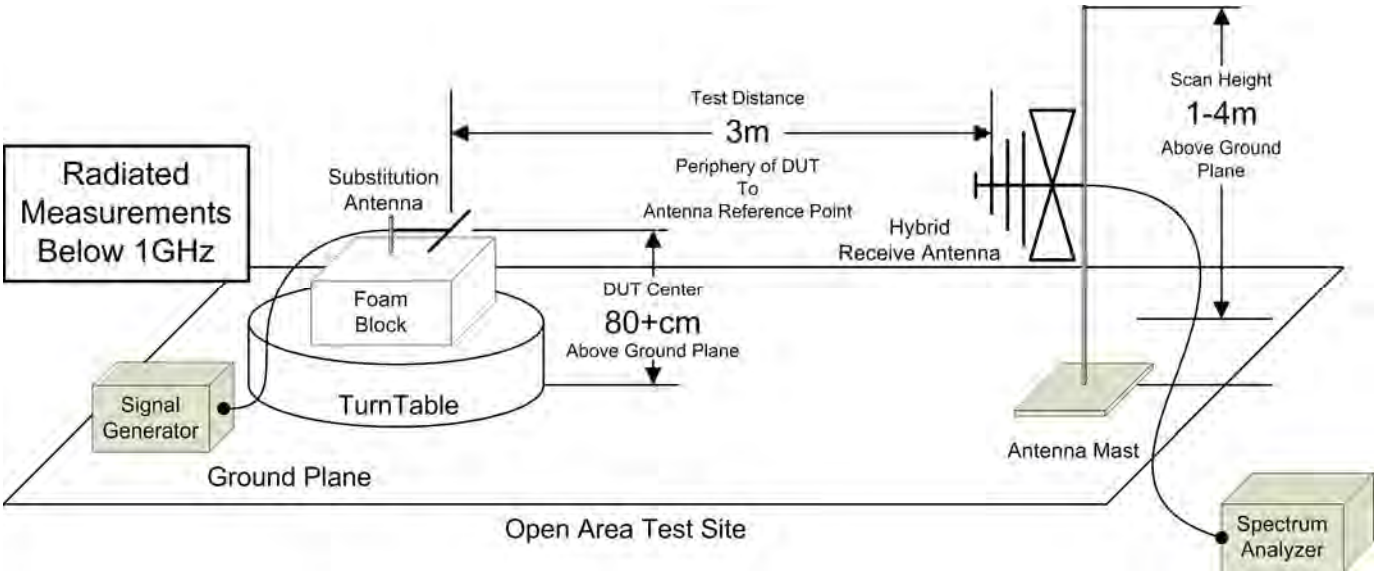
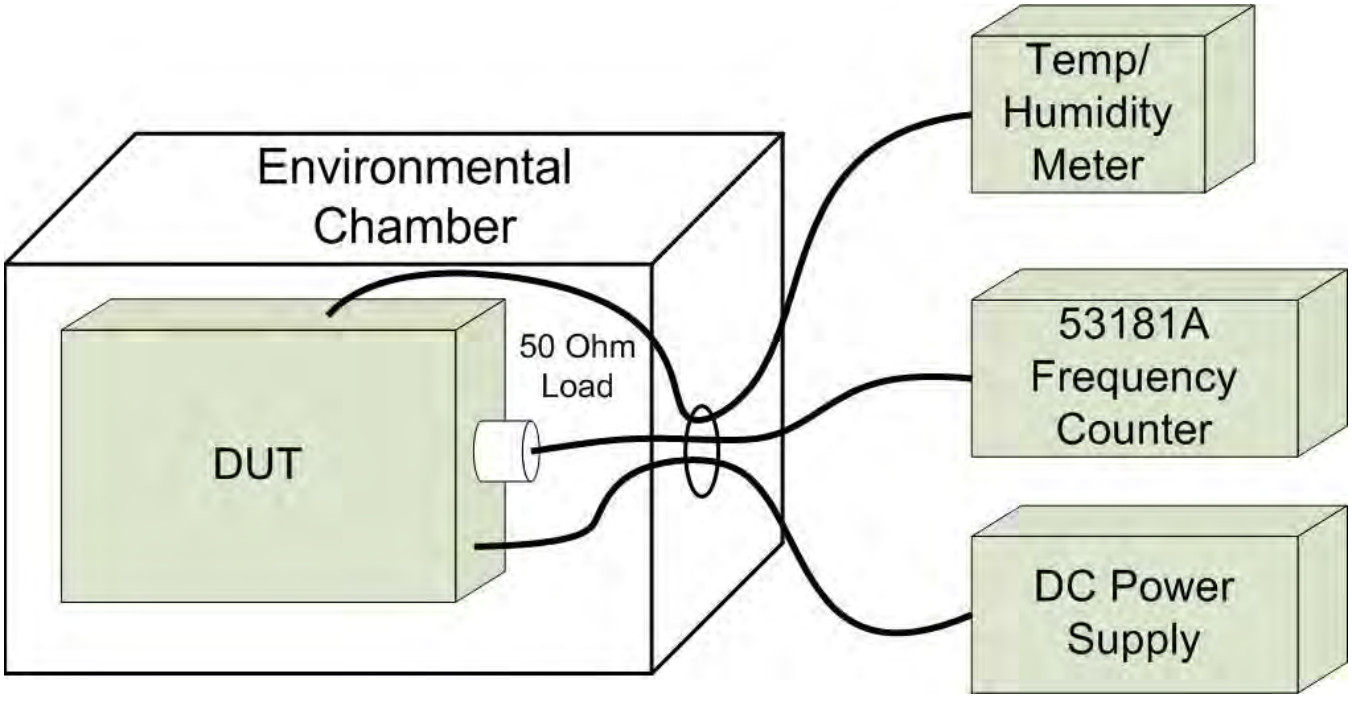


Table A.4 – Setup - Frequency Stability Measurement Equipment

Equipment List			
Asset Number	**Manufacturer**	**Model Number**	**Description**
n/a	ESPEC	ECT-2	Environmental Chamber
00003	HP	53181A	Frequency Counter
n/a	HP	E3611A	Power Supply
00234	VWR	61161-378	Temp/Humidity Meter

Figure A.6 – Test Setup Frequency Stability Measurements



APPENDIX B – EQUIPMENT LIST AND CALIBRATION

Equipment List							
Asset Number	Manufacturer	Model Number	Serial Number	Description	Last Calibrated	Calibration Interval	Calibration Due
00050	Chase	CBL-6111A	1607	Bilog Antenna	16 Nov 2020	Triennial	16 Nov 2023
00085	EMCO	6502	9203-2724	Loop Antenna	6 Sep 2022	Triennial	6 Sep 2025
00333	HP	85685A	3010A01095	RF Preselector	23 Jun 2020	Triennial	30 Jun 2023
00049	HP	85650A	2043A00162	Quasi-peak Adapter	23 Jun 2020	Triennial	23 Jun 2023
00051	HP	8566B	2747A05510	Spectrum Analyzer	23 Jun 2020	Triennial	23 Jun 2023
00223	HP	8901A	3749A07154	Modulation Analyzer	10 Dec 2020	Triennial	10 Dec 2023
00224	HP	8903B	3729A18691	Audio Analyzer	11 Dec 2020	Triennial	11 Dec 2023
00241	R&S	FSU40	100500	Spectrum Analyzer	10 Aug 2021	Triennial	10 Aug 2024
00003	HP	53181A	3736A05175	Frequency Counter	23 Jun 2020	Triennial	23 Jun 2023
00250	Circuit Test	DMR-1800	TE182	Digital Multi-Meter - DVM	23 Jun 2020	Triennial	23 Jun 2023
00071	EMCO	2090	9912-1484	Multi-Device Controller	n/a	n/a	n/a
00072	EMCO	2075	0001-2277	Mini-mast	n/a	n/a	n/a
00073	EMCO	2080	0002-1002	Turn Table	n/a	n/a	n/a
00081	ESPEC	ECT-2	0510154-B	Environmental Chamber	NCR	n/a	CNR
00234	VWR	61161-378	140320430	Temp/Humidity Meter	New	Triennial	New
00201	HP	E3611A	KR83015294	DC Power Supply	COU	n/a	COU
00263	Koaxis	KP10-1.00M-TD	263	1m Armoured Cable	COU	n/a	COU
00263B	Koaxis	KP10-1.00M-TD	263B	1m Armoured Cable	COU	n/a	COU
00275	TMS	LMR400	n/a	25m Cable	COU	n/a	COU
00278	TILE	34G3	n/a	TILE Test Software	NCR	n/a	NCR

NCR: No Calibration Required
COU: Calibrate On Use

APPENDIX C – MEASUREMENT INSTRUMENT UNCERTAINTY

CISPR 16-4 Measurement Uncertainty (U_{LAB})
This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence interval using a coverage factor of k=2
Radiated Emissions 30MHz - 200MHz
U_{LAB} = 5.14dB U_{CISPR} = 6.3dB
Radiated Emissions 200MHz - 1000MHz
U_{LAB} = 5.90dB U_{CISPR} = 6.3dB
Radiated Emissions 1GHz - 6GHz
U_{LAB} = 4.80dB U_{CISPR} = 5.2dB
Radiated Emissions 6GHz - 18GHz
U_{LAB} = 5.1dB U_{CISPR} = 5.5dB
Power Line Conducted Emissions 9kHz to 150kHz
U_{LAB} = 2.96dB U_{CISPR} = 3.8dB
Power Line Conducted Emissions 150kHz to 30MHz
U_{LAB} = 3.12dB U_{CISPR} = 3.4dB

	If the calculated uncertainty U_{lab} is **less** than U_{CISPR} then:
1	Compliance is deemed to occur if **NO** measured disturbance exceeds the disturbance limit
2	Non-Compliance is deemed to occur if **ANY** measured disturbance **EXCEEDS** the disturbance limit
	If the calculated uncertainty U_{lab} is **greater** than U_{CISPR} then:
3	Compliance is deemed to occur if **NO** measured disturbance, increased by (U_{lab} - U_{CISPR}), exceeds the disturbance limit
4	Non-Compliance is deemed to occur if **ANY** measured disturbance, increased by (U_{lab} - U_{CISPR}), **EXCEEDS** the disturbance limit

Other Measurement Uncertainties (U_{LAB})
RF Conducted Emissions 9kHz - 40GHz
U_{LAB} = 1.0dB U_{CISPR} = n/a
Frequency/Bandwidth 9kHz - 40GHz
U_{LAB} = 0.1ppm U_{CISPR} = n/a
Temperature
U_{LAB} = 1^{O}C U_{CISPR} = n/a

END OF REPORT

