TEST REPORT

Application No.:	SZCR2412004832AT
Applicant:	GME Pty Ltd
Address of Applicant:	17 Gibbon Rd, Winston Hills NSW 2153, Australia
Manufacturer:	GME Pty Ltd
Address of Manufacturer:	17 Gibbon Rd, Winston Hills NSW 2153, Australia
Factory:	GME Pty Ltd
Address of Factory:	17 Gibbon Rd, Winston Hills NSW 2153, Australia
Equipment Under Test (EUT):	
EUT Name:	GME XRS-330C-U, GME XRS-390C-U
Item No.:	XRS-330C-U, XRS-390C-U ♣
♣	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
FCC ID:	TXJ-XRS330CU
Standard(s) :	47 CFR Part 95, Subpart E
Date of Receipt:	2024-12-30
Date of Test:	2024-12-30 to 2025-03-07
Date of Issue:	2025-03-10
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu
EMC Laboratory Manager

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Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2025-03-10		Original

Authorized for issue by:				
		Edison Li **Edison Li/Project Engineer**		
		Eric Fu **Eric Fu/Reviewer**		

2 Test Summary

Radio Spectrum Technical Requirement				
Item	**Standard**	**Method**	**Requirement**	**Result**
Antenna Requirement	47 CFR Part 95, Subpart E, ANSI/TIA 603-E-2016	N/A	47 CFR Part 95, Subpart E 95.1741 & 95.317	Pass

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
GMRS frequency accuracy	47 CFR Part 95, Subpart E, ANSI/TIA 603-E-2016, ANSI C63.26-2015	ANSI/TIA-603-E:2016 ANSI C63.26-2015	47 CFR FCC Part95.1765 & FCC Part2.1055;	Pass
Effective Radiated Power (ERP)			47 CFR FCC Part95.1767 & FCC Part2.1046;	Pass
Transmitter output power			47 CFR FCC Part95.1767 & FCC Part2.1046;	Pass
GMRS authorized bandwidths			47 CFR FCC Part 95.1773 & FCC Part2.1049;	Pass
GMRS modulation requirements			47 CFR FCC Part 95.1775 & FCC Part2.1047;	Pass
GMRS Emission Mask			47 CFR FCC Part 95.1779 & FCC Part2.1051;	Pass
GMRS unwanted emissions			47 CFR FCC Part 95.1779 & FCC Part2.1051;	Pass
Radiated Spurious Emissions			47 CFR FCC Part 95.1779 & FCC Part2.1053;	Pass

Note:

E.U.T./EUT means Equipment Under Test.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.

Model No.: XRS-330C-U, XRS-390C-U

Only the model XRS-330C-U was tested, since according to the declaration from the applicant, the electrical circuit design, layout, components used, internal wiring and functions were identical for all the above models, with only difference on model No..

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	10-16V DC
Cable Loss (for RF conducted test):	0.6dB
Operation Frequency:	See below table
Modulation Type:	FM
Emission Type:	F3E
Channel Number:	23
Channel Spacing:	12.5KHz
Series Number:	XRS-330C-U:40912570
Firmware:	v1.67
HW:	7
Antenna Type:	Omni-directional antenna
Antenna Gain:	AE4704B-U antenna:2.1dBi, AE4705B-U antenna:6.7dBi, AE4702B-U antenna:6.6dBi, AE4707B-U antenna:2.1dBi

Remark:The information in this section is provided by the applicant or manufacturer, SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

Channel Lists:

Channel Number	Tx Frequency (MHz)	Tx Power (W)	Remark
1	462.5625	5	462 MHz Interstitial Channels
2	462.5875	5	
3	462.6125	5	
4	462.6375	5	
5	462.6625	5	
6	462.6875	5	
7	462.7125	5	
8	462.550	5	462 MHz Main Channels
9	462.575	5	
10	462.600	5	
11	462.625	5	
12	462.650	5	
13	462.675	5	
14	462.700	5	
15	462.725	5	
16	467.550	5	467 MHz Main Channels
17	467.575	5	
18	467.600	5	
19	467.625	5	
20	467.650	5	
21	467.675	5	
22	467.700	5	
23	467.725	5	

Selected Test Channel:

Channel Number	Tx Frequency (MHz)	Tx Power (W)	Remark
4	462.6375	5	462 MHz Interstitial Channels
8	462.550	5	462 MHz Main Channels
15	462.725	5	
16	467.550	5	467 MHz Main Channels
19	467.625	5	
23	467.725	5	

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
RF Cable (RF Conducted)	SGS	N/A(Cable loss:0.6dB)	N/A
Load	SGS	N/A	N/A

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Bandwidth	3%
RF conducted tests	0.75dB
Effective (Isotropic) Radiated Power Output Data	0.75dB
Radiated Spurious Emissions	4.5dB below 1GHz; 4.8dB above 1GHz
Frequency stability	7.25 x 10-8

Remark:
The U_{lab} (lab Uncertainty) is less than $U_{cispr/ETSI}$ (CISPR/ETSI Uncertainty), so the test results
– compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
– non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI (Member No. 1937)

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen EMC laboratory have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC –Designation Number: CN1336

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1336. Test Firm Registration Number: 787754.

• Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

5 Equipment List

RF Conducted Test					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Shielding Room	SAEMC	MSR733	SEM001-09	2022/5/14	2025/5/13
DC Power Supply	Chroma	62012P-80-60	SEM011-11	2024/8/14	2025/8/13
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-17	2024/3/27	2025/3/26
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2024/8/15	2025/8/14
Measurement Software	TST PASS	TST PASS V2.0	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-01	2024-07-06	2025-07-05
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	2024/3/27	2025/3/26
Programmable Temperature & Humidity Chamber	Votsch Industrietechnik GmbH	VT 4002	SEM002-15	2024/3/19	2025/3/18
Audio Analyzer	Rohde & Schwarz	UPV	SEM008-03	2024/8/16	2025/8/15
CELL SITE TEST SET	HP	8921A	SEM010-18	2025/1/7	2026/1/6

Effective Radiated Power (ERP)					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Loop Antenna	ETS-Lindgren	6502	SEM003-08	2023/11/20	2025/11/19
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2023/6/19	2026/6/18
MXE EMI Receiver	Agilent Technologies	N9038A	SEM004-15	2024/8/14	2025/8/13
BiConiLog Antenna	ETS-LINDGREN	3142C	SEM003-01	2023/9/16	2025/9/15
Pre-Amplifier	Agilent Technologies	8447D	SEM005-01	2024/3/14	2025/3/13
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2024-07-06	2025-07-05
Alternative Antenna	SCHWARZBECK	VULB9168	SEM003-44	2023/6/18	2025/6/17
Alternative Antenna	ETS-LINDGREN	3117	SEM003-11	2023/9/16	2025/9/15

Radiated Spurious Emissions Below 1GHz					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2023/6/19	2026/6/18
MXE EMI Receiver	Agilent Technologies	N9038A	SEM004-15	2024/8/14	2025/8/13
BiConiLog Antenna	ETS-LINDGREN	3142C	SEM003-01	2023/9/16	2025/9/15
Pre-Amplifier	Agilent Technologies	8447D	SEM005-01	2024/3/14	2025/3/13
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2024-07-06	2025-07-05
Alternative Antenna	SCHWARZBECK	VULB9168	SEM003-44	2023/6/18	2025/6/17

Radiated Spurious Emissions Above 1GHz					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
3m Fully-Anechoic Chamber	AUDIX	N/A	SEM001-02	2024/5/11	2027/5/10
Signal Analyzer	Rohde & Schwarz	FSV40	SEM008-04	2024/3/15	2025/3/14
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2023/7/23	2025/7/22
Microwave system amplifier	Agilent	83017A	SEM005-25	2024-09-14	2025-09-13
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2024-07-06	2025-07-05
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2024/8/10	2025/8/9
Alternative Antenna	ETS-LINDGREN	3117	SEM003-11	2023/9/16	2025/9/15

General used equipment					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Humidity/ Temperature Indicator	deli	8838	SEM002-32	2024/7/24	2025/7/23
Humidity/ Temperature Indicator	deli	8838	SEM002-33	2024/7/24	2025/7/23
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2024/3/18	2025/3/17

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 95, Subpart E 95.1741 & 95.317

6.1.2 Requirement

95.1741 Requirement:

GMRS station antennas must meet the requirements in § 95.317 regarding menaces to air navigation. See § 95.317 and consult part 17 of the FCC's Rules for more information (47 CFR part 17).

95.317 Requirement:

(a) Each antenna structure used for a Personal Radio Service station is subject to the antenna structure rules set forth in part 17 of this chapter. In particular, the owner of an antenna structure that is more than 60.96 m (200 ft) in height above ground level (see § 17.7 of this chapter for specific criteria) may be required to notify the FAA and register the antenna structure with the FCC.

(b) Further, stations located on or near a military or public-use airport with an antenna structure that is more than 6.10 meters (20 feet) high may have to obey additional restrictions. The highest point of the antenna must not exceed one meter above the airport elevation for every hundred meters of distance from the nearest point of the nearest airport runway. Differences in ground elevation between the antenna and the airport runway may complicate this formula. For stations near an airport, see http://appsint.fcc.gov/UlsApp/AsrSearch/towairSearch.jsp to figure the maximum allowable height of the antenna. Consult part 17 of the FCC's Rules for more information (47 CFR part 17).

6.1.3 Conclusion

EUT Antenna:

The antenna is a removable external antenna and no consideration of replacement. The antenna gain for AE4704B-U antenna:2.1dBi, AE4705B-U antenna:6.7dBi, AE4702B-U antenna:6.6dBi, AE4707B-U antenna:2.1dBi.

7 Radio Spectrum Matter Test Results

7.1 GMRS frequency accuracy

Test Requirement 47 CFR FCC Part 95.1765

Test Method: ANSI C63.26-2015 Clause 5.6

Limit: (a) The carrier frequency of each GMRS transmitter transmitting an emission with an occupied bandwidth greater than 12.5 kHz must remain within 5 parts-per-million (ppm) of the channel center frequencies listed in § 95.1763 under normal operating conditions.

(b) The carrier frequency of each GMRS transmitter transmitting an emission with an occupied bandwidth of 12.5 kHz or less must remain within 2.5 ppm of the channel center frequencies listed in § 95.1763 under normal operating conditions.

7.1.1 E.U.T. Operation

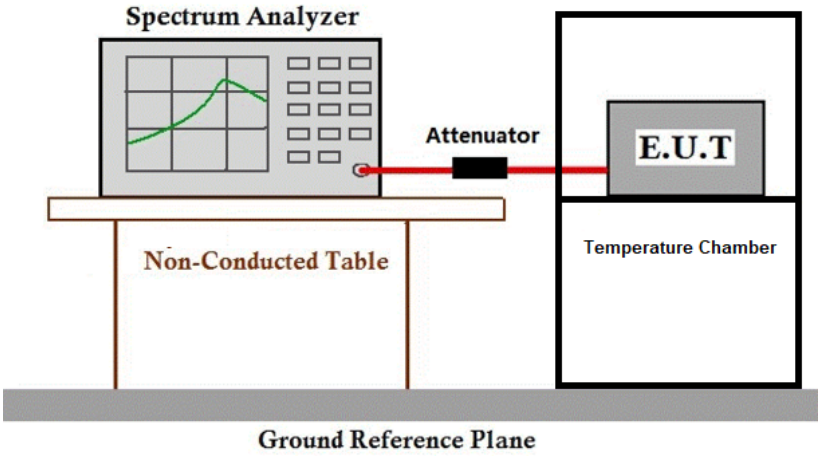
Operating Environment:

Temperature: 21.6 °C Humidity: 53.9 % RH Atmospheric Pressure: 1020 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Transmission continuously without modulation
Pre-scan	01	Transmission continuously with required modulation

7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

ANSI C63.26-2015 Clause 5.6.3 Procedure for frequency stability testing

Frequency stability is a measure of the frequency drift due to temperature and supply voltage variations, with reference to the frequency measured at +20 ℃ and rated supply voltage.

The operating carrier frequency shall be set up in accordance with the manufacturer's published operation and instruction manual prior to the commencement of these tests. No adjustment of any frequency determining circuit element shall be made subsequent to this initial set-up. Frequency stability is tested:

a) At 10 ℃ intervals of temperatures between -30 ℃ and +50 ℃ at the manufacturer's rated supply voltage, and

b) At +20 ℃ temperature and ±15% supply voltage variations. If a product is specified to operate over a range of input voltage then the -15% variation is applied to the lowermost voltage and the +15% is applied to the uppermost voltage.

During the test all necessary settings, adjustments and control of the EUT have to be performed without disturbing the test environment, i.e., without opening the environmental chamber. The frequency stabilities can be maintained to a lesser temperature range provided that the transmitter is automatically inhibited from operating outside the lesser temperature range. For handheld equipment that is only capable of operating from internal batteries and the supply voltage cannot be varied, the frequency stability tests shall be performed at the nominal battery voltage and the battery end point voltage specified by the manufacturer. An external supply voltage can be used and set at the internal battery nominal voltage, and again at the battery operating end point voltage which shall be specified by the equipment manufacturer.

If an unmodulated carrier is not available, the mean frequency of a modulated carrier can be obtained by using a frequency counter with gating time set to an appropriately large multiple of bit periods (gating time depending on the required accuracy). Full details on the choice of values shall be included in the test report.

ANSI C63.26-2015 Clause 5.6.4 Frequency stability over variations in temperature

Frequency measurements shall be made at the extremes of the specified temperature range and at intervals required by the standard. 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. The short term transient effects on the frequency of the transmitter due to keying and any heating element cycling normally occurring at each temperature level also shall be shown. The portion or portions of the transmitter containing the frequency determining and stabilizing circuitry, power supplies and active support electronics needed for operation and externally located with the transmitter need be subjected to the temperature variation test. Remotely located power supplies that are weather protected shall as a minimum be subject to the voltage variation test. Refer to the specific regulatory requirement for frequency stability temperature variation. The following procedures shall be used for frequency stability tests.

a) Supply the EUT with a nominal 60 Hz ac voltage, dc voltage, or install a new or fully charged battery in the EUT.

b) If possible a dummy load should be connected to the EUT because an antenna near the metallic walls of an environmental test chamber could affect the output frequency of the EUT. If the EUT is equipped with a permanently attached, adjustable-length antenna, the EUT should be placed in the center of the chamber with the antenna adjusted to the shortest length possible.

c) Turn on the EUT, and tune it to the center frequency of the operating band.

d) Couple the transmitter output to the measuring instrument through a suitable attenuator and coaxial cable. If connection to the EUT output is not possible, make the measurement by connecting an antenna to the measuring instrument with a suitable length of coaxial cable and placing the measuring antenna near the EUT (e.g., 15cm away).

NOTE—An instrument that has an adequate level of accuracy as specified by the procuring or regulatory authority is the recommended measuring instrument.

e) Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument, but is strong enough to allow measurement of the operating or fundamental frequency of the EUT).

Adjust the detector bandwidth and span settings to achieve a resolution capable of accurate frequency measurements over the applicable frequency stability limits.

f) Turn the EUT off, and place it inside the environmental temperature chamber. For devices that have oscillator heaters, energize only the heater circuit.

g) Set the temperature control on the chamber to the highest temperature specified in the regulatory requirements for the type of device, and allow the oscillator heater and the chamber temperature to stabilize. Unless otherwise instructed by the regulatory authority, this temperature should be 50 ℃.

h) While maintaining a constant temperature inside the environmental chamber, turn on the EUT and allow sufficient time for the EUT temperature to stabilize.

i) Measure the frequency.

j) Switch off the EUT, but do not switch off the oscillator heater.

k) Lower the chamber temperature to the next level that is required by the standard and allow the temperature inside the chamber to stabilize. Unless otherwise instructed by the regulators, this temperature step should be 10 ℃.

l) Repeat step h) through step k) down to the lowest specified temperature. Unless otherwise instructed by the regulators, this temperature should be 30 ℃.

When the frequency stability limit is stated as being sufficient such that the fundamental emissions stay within the authorized bands of operation, a reference point shall be established at the applicable unwanted emissions limit using a RBW equal to the RBW required by the unwanted emissions specification of the applicable regulatory standard. These reference points measured using the lowest and highest channel of operation shall be identified as fL and fH respectively. The worst-case frequency offset determined in the above methods shall be added or subtracted from the values of fL and fH and the resulting frequencies must remain within the band.

m) The following additional information is required for equipment incorporating heater type crystal oscillators to be used in mobile stations except for battery powered, hand carried, and portable equipment having mean output power lower than the threshold specified.

1) Measurement data showing variation in transmitter output frequency from a cold start and the elapsed time necessary for the frequency to stabilize within the applicable tolerance. Tests shall be made after temperature stabilization at each of the ambient temperature levels required by the standard.

2) Beginning at each temperature level specified, the frequency shall be measured within 60s after application of primary power to the transmitter and at intervals of no more than 60s thereafter until 10 min have elapsed or until sufficient measurements are obtained to indicate clearly that the frequency has stabilized within the applicable tolerance, whichever time period is greater.

3) The elapsed time necessary for the frequency to stabilize within the applicable tolerance from each beginning temperature level as determined from the tests specified in this paragraph shall be specified in the instruction book for the transmitter furnished to the user.

4) When it is impracticable to subject the complete transmitter to this test because of its physical dimensions or power rating, only its frequency determining and stabilizing portions need be tested.

ANSI C63.26-2015 Clause 5.6.5 Frequency stability when varying supply voltage

Unless otherwise specified, these tests shall be made at ambient room temperature (+15 ℃ to +25 ℃).

a) Couple the transmitter output to the measuring instrument through a suitable attenuator and coaxial cable. If connection to the EUT output is not possible make the measurement by connecting an antenna to the measuring instrument with a suitable length of coaxial cable and placing the measuring antenna near the EUT (e.g., 15 cm away)

b) Supply the EUT with nominal ac or dc voltage. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

c) Turn on the EUT, and couple its output to a frequency counter or other frequency-measuring instrument.

d) Tune the EUT to the center frequency of the operating band. Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument, but is strong enough to allow measurement of the operating or fundamental frequency of the EUT). Adjust the detector bandwidth and span settings to achieve a resolution capable of accurate frequency measurements over the applicable frequency stability limits.

NOTE—An instrument that has an adequate level of accuracy as specified by the procuring or regulatory authority is the recommended measuring instrument.

e) Measure the frequency.

f) Unless otherwise specified, vary primary supply voltage from 85% to 115% of the nominal value for other than hand carried battery equipment.

g) For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.

h) Repeat the frequency measurement.

NOTE—For band-edge compliance, it can be required to make these measurements at the low and high channel of the operating band.

Please Refer to Appendix for Details

7.2 Effective Radiated Power (ERP)

Test Requirement	47 CFR FCC Part95.1767 & FCC Part2.1046;
Test Method:	ANSI/TIA-603-E:2016 Clause 2.2.17.2
Measurement Distance:	3m
Limit:	462 MHz interstitial channels. The effective radiated power (ERP) of mobile, hand-held portable and base stations transmitting on the 462 MHz interstitial channels must not exceed 5 Watts.

7.2.1 E.U.T. Operation

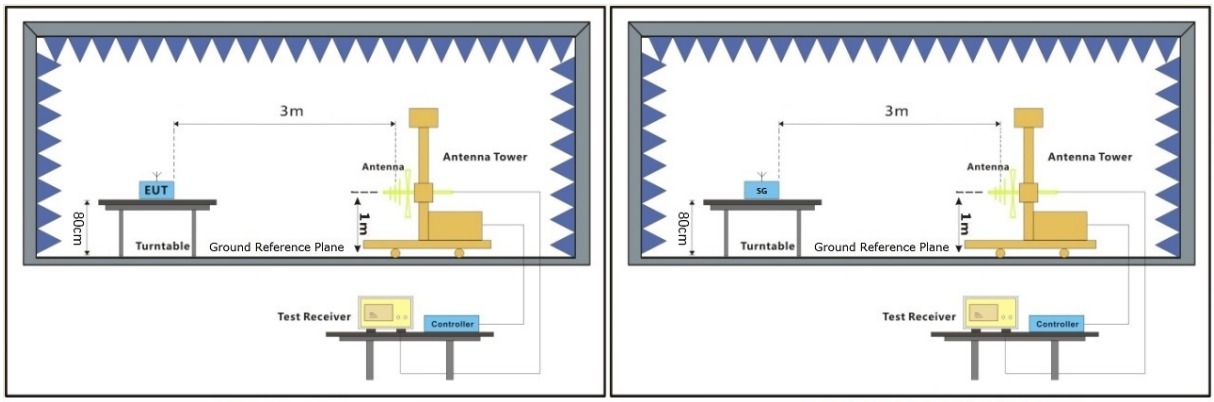
Operating Environment:

Temperature: 21.6 °C Humidity: 53.9 % RH Atmospheric Pressure: 1020 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Transmission continuously without modulation
Pre-scan	01	Transmission continuously with required modulation

7.2.3 Test Setup Diagram



EUT Substiute Antenna+Signal Generator

7.2.4 Measurement Procedure and Data

ANSI/TIA-603-E:2016 Clause 2.2.17.2

a) Connect the equipment as illustrated. Mount the equipment with the manufacturer specified antenna in a vertical orientation on a manufacturer specified mounting surface located on a non-conducting rotating platform of a RF anechoic chamber (preferred) or a standard radiation site.

b) Key the transmitter, then rotate the EUT 360o azimuthally and record spectrum analyzer power level (LVL) measurements at angular increments that are sufficiently small to permit resolution of all peaks. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading at each angular increment. (Note: several batteries may be needed to offset the effect of battery voltage droop, which should not exceed 5% of the manufactured specified battery voltage during transmission).

c) Replace the transmitter under test with a vertically polarized half-wave dipole (or an antenna whose gain is known relative to an ideal half-wave dipole). The center of the antenna should be at the same location as the center of the antenna under test.

d) Connect the antenna to a signal generator with a known output power and record the path loss (in dB) as LOSS. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading.

LOSS = Generator Output Power (dBm) – Analyzer reading (dBm)

e) Determine the effective radiated output power at each angular position from the readings in steps b) and d) using the following equation:

ERP (dBm) = LVL (dBm) + LOSS (dB)

f) The maximum ERP is the maximum value determined in the preceding step.

When calculating ERP, in addition to knowing the antenna radiation and matching characteristics, it is necessary to know the loss values of all elements (e.g. transmission line attenuation, mismatches, filters, combiners) interposed between the point where transmitter output power is measured, and the point where power is applied to the antenna. ERP can then be calculated as follows:

ERP (dBm) = Output Power (dBm) - Losses (dB) + Antenna Gain (dBd)

where:

dBd refers to gain relative to an ideal dipole.

Please Refer to Appendix for Details

7.3 Transmitter output power

Test Requirement: 47 CFR FCC Part 95.1767 & FCC Part2.1046;

Test Method: ANSI C63.26-2015 Clause 5.2.3.3

Limit: 462/467 MHz main channels. The limits in this paragraph apply to stations transmitting on any of the 462 MHz main channels or any of the 467 MHz main channels. Each GMRS transmitter type must be capable of operating within the allowable power range. GMRS licensees are responsible for ensuring that their GMRS stations operate in compliance with these limits.

(1) The transmitter output power of mobile, repeater and base stations must not exceed 50 Watts.

(2) The transmitter output power of fixed stations must not exceed 15 Watts.

7.3.1 E.U.T. Operation

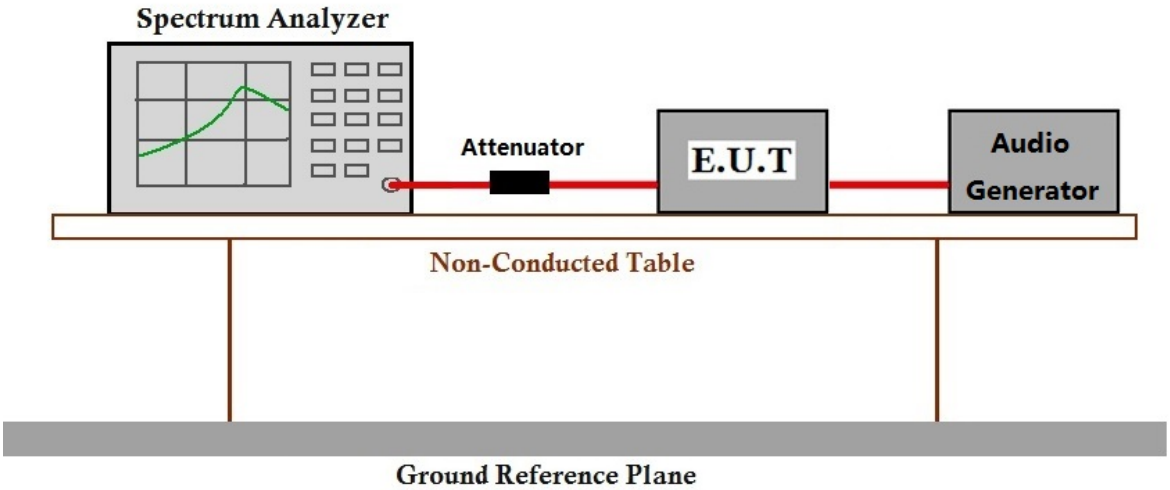
Operating Environment:

Temperature: 21.6 °C Humidity: 53.9 % RH Atmospheric Pressure: 1020 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Transmission continuously without modulation
Pre-scan	01	Transmission continuously with required modulation

7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

This procedure can be used to measure the peak power in either a CW-like or noise-like narrowband RF signal. The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW ≧ 3*RBW.

a) Set the RBW ≧ OBW.
b) Set VBW ≧ 3*RBW.
c) Set span ≧ 2*OBW.
d) Sweep time ≧ 10*(number of points in sweep)*(transmission symbol period).
e) Detector = peak.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use the peak marker function to determine the peak amplitude level.

Please Refer to Appendix for Details

7.4 GMRS authorized bandwidths

Test Requirement: 47 CFR FCC Part 95.1773 & FCC Part2.1049;

Test Method: ANSI/TIA-603-E:2016 Clause 2.2.11, ANSI C63.26-2015 Clause 5.4.4

Limit:

(a) Main channels. The authorized bandwidth is 20 kHz for GMRS transmitters operating on any of the 462 MHz main channels (see § 95.1763(a)) or any of the 467 MHz main channels (see § 95.1763(c)).

(b) Interstitial channels. The authorized bandwidth is 20 kHz for GMRS transmitters operating on any of the 462 MHz interstitial channels (see § 95.1763(b)) and is 12.5 kHz for GMRS transmitters operating on any of the 467 MHz interstitial channels (see § 95.1763(d)).

(c) Digital data transmissions. Digital data transmissions are limited to the 462 MHz main channels and interstitial channels in the 462 MHz and 467 MHz bands.

7.4.1 E.U.T. Operation

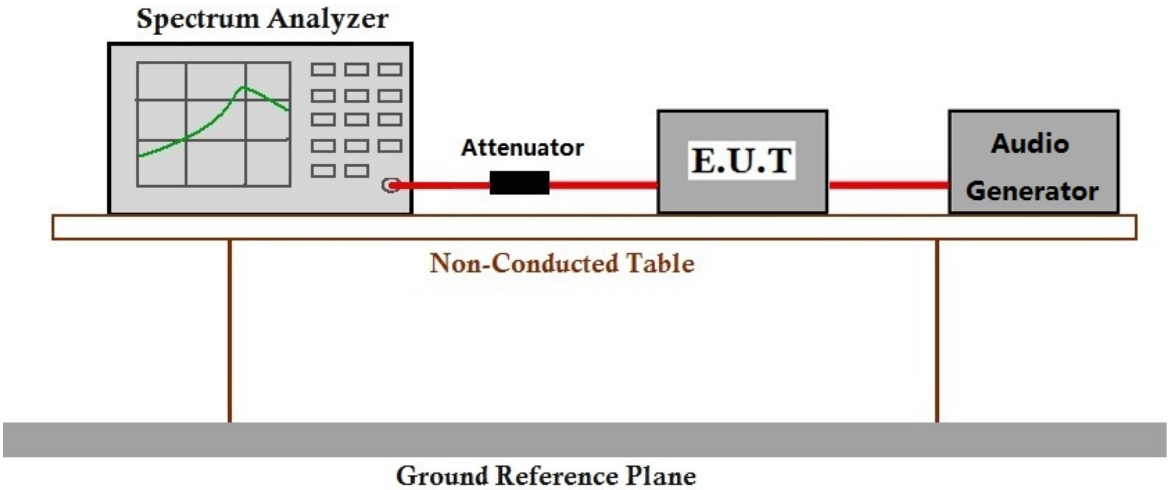
Operating Environment:

Temperature: 21.6 °C Humidity: 53.9 % RH Atmospheric Pressure: 1020 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Pre-scan	00	Transmission continuously without modulation
Final test	01	Transmission continuously with required modulation

7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

The OBW is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

The following procedure shall be used for measuring (99%) power bandwidth:

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (typically a span of 1.5 × OBW is sufficient).

b) The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≧ 3*RBW.

c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.

NOTE—Step a), step b), and step c) may require iteration to adjust within the specified tolerances.

d) Set the detection mode to peak, and the trace mode to max-hold.

e) If the instrument does not have a 99% OBW function, recover the trace data points and sum directly in linear power terms. Place the recovered amplitude data points, beginning at the lowest frequency, in a running sum until 0.5% of the total is reached. Record that frequency as the lower OBW frequency. Repeat the process until 99.5% of the total is reached and record that frequency as the upper OBW frequency. The 99% power OBW can be determined by computing the difference these two frequencies.

f) The OBW shall be reported and plot(s) of the measuring instrument display shall be provided with the test report. The frequency and amplitude axis and scale shall be clearly labeled. Tabular data can be reported in addition to the plot(s).

ANSI/TIA-603-E:2016 Clause 2.2.11

d) Modulate the transmitter with a 2500 Hz sine wave at an input level 16 dB greater than that necessary to produce 50% of rated system deviation. The input level shall be established at the frequency of maximum response of the audio modulating circuit. Transmitters employing digital modulation techniques that bypass the limiter and the audio low-pass filter shall be modulated as specified by the manufacturer.

Please Refer to Appendix for Details

7.5 GMRS Emission Mask

Test Requirement 47 CFR FCC Part 95.1779 & FCC Part2.1051;

Test Method: ANSI/TIA-603-E:2016 Clause 2.2.11, ANSI C63.26-2015 Clause 5.7.3

Limit:

Emission types filter	Attenuation requirements
A1D, A3E, F1D, G1D, F2D, F3E, G3E with audio filter	(1), (2), (7)
A1D, A3E, F1D, G1D, F3E, G3E without audio filter	(3), (4), (7)
H1D, J1D, R1D, H3E, J3E, R2E	(5), (6), (7)

(1) 25 dB (decibels) on any frequency removed from the center of the authorized bandwidth by more than 50% up to and including 100% of the authorized bandwidth.

(2) 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.

(3) 83 log (fd ÷ 5) dB on any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5 kHz up to and including 10 kHz.

(4) 116 log (fd ÷ 6.1) dB or 50 + 10 log (P) dB, whichever is the lesser attenuation, on any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz), of more than 10 kHz up to and including 250% of the authorized bandwidth.

(5) 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.

(6) 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.

(7) 43 + 10 log (P) dB on any frequency removed from the center of the authorized bandwidth by more than 250%.

7.5.1 E.U.T. Operation

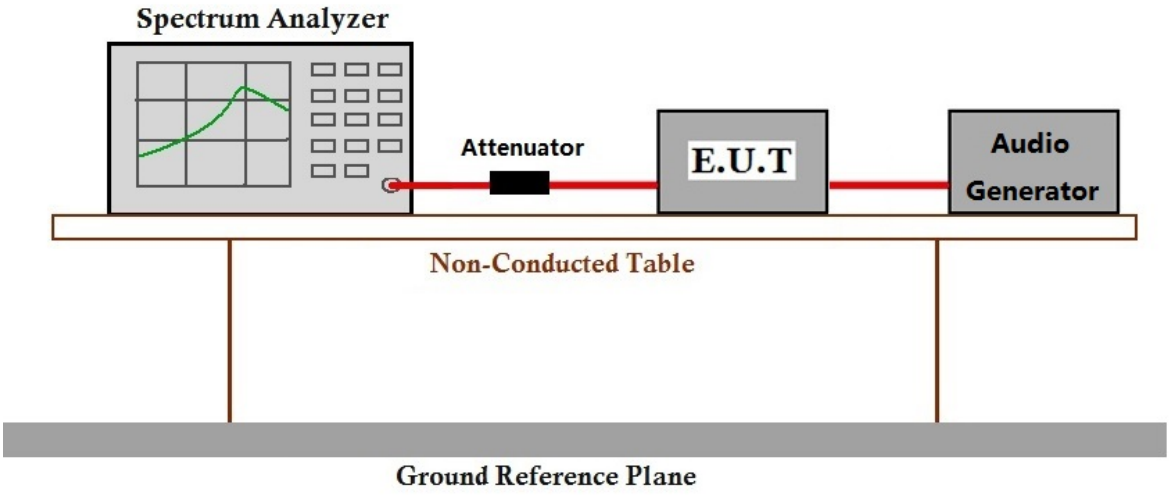
Operating Environment:

Temperature: 21.6 °C Humidity: 53.9 % RH Atmospheric Pressure: 1020 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Pre-scan	00	Transmission continuously without modulation
Final test	01	Transmission continuously with required modulation

7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

a) Set the spectrum analyzer center frequency to the block, band, or channel edge frequency.

b) Set the span wide enough to capture the fundamental emission closest to the authorized block or band edge, and to include all modulation products that spill into the immediately adjacent frequency band. In some cases, it may be possible to set the center frequency and span so as to encompass the fundamental emission and the unwanted out-of-band (band-edge) emissions on either side of the authorized block, band, or channel. This can be accomplished with a single (slow) sweep, if adequate overload protection and sufficient dynamic range can be maintained.

c) Set the number of points in sweep≧ 2*span/RBW.

d) Sweep time should be auto for peak detection. For rms detection the sweep time should be set as follows:

1) If the device can be configured to transmit continuously (duty cycle≧98%), set the (sweep time) > (number of points in sweep) × (symbol period) (e.g., by a factor of 10 × symbol period × number of points). Increasing the sweep time (i.e., slowing the sweep speed) will allow for averaging over multiple symbols

2) If the device cannot transmit continuously (duty cycle < 98%), a gated sweep shall be used when possible (i.e., gate triggered such that the analyzer only sweeps when the device is transmitting at full power), set the sweep time > (number of points in sweep) × (symbol period) but the sweep time shall always be maintained at a value that is less than or equal to the minimum transmission time.

3) If the device cannot be configured to transmit continuously (duty cycle < 98%) and a free-running sweep must be used, set the sweep time so that the averaging is performed over multiple on/off cycles by setting the sweep time > (number of points in sweep) × (transmitter period) (i.e., the transmit on-time + the off-time). The spectrum analyzer readings shall subsequently be corrected by [10 log (1/duty cycle)]. This assumes that the transmission period and duty cycle is relatively constant (duty cycle variation ≤ ±2%).

4) If the device cannot be configured to transmit continuously and a free-running sweep must be used, and if the transmissions exhibit a non-constant duty cycle (duty cycle variations > ±2%), set the sweep time so that the averaging is performed over the on-period by setting the sweep time > (symbol period) × (number of points), while also maintaining the sweep time < (transmitter on-time). The trace mode shall be set to max hold, since not every display point will be averaged only over just the on-time. Thus, multiple sweeps (e.g., 100) in maximum hold are necessary to ensure that the maximum power is measured.

e) The test report shall include the plots of the measuring instrument display and the measured data.

f) See Annex I for example emission mask plots.

ANSI/TIA-603-E:2016 Clause 2.2.11

d) Modulate the transmitter with a 2500 Hz sine wave at an input level 16 dB greater than that necessary to produce 50% of rated system deviation. The input level shall be established at the frequency of maximum response of the audio modulating circuit. Transmitters employing digital modulation techniques that bypass the limiter and the audio low-pass filter shall be modulated as specified by the manufacturer.

Please Refer to Appendix for Details

7.6 GMRS modulation requirements

Test Requirement: 47 CFR FCC Part 95.1775 & FCC Part2.1047;

Test Method: ANSI/TIA-603-E:2016 Clause 2.4.10 /2.2.15, ANSI C63.26-2015 Clause 5.3.2, ANSI C63.26-2015 Clause 5.3.3.2

Limit:

(a) Main channels. The peak frequency deviation for emissions to be transmitted on the main channels must not exceed ± 5 kHz.

(b) 462 MHz interstitial channels. The peak frequency deviation for emissions to be transmitted on the 462 MHz interstitial channels must not exceed ± 5 kHz.

(c) 467 MHz interstitial channels. The peak frequency deviation for emissions to be transmitted on the 467 MHz interstitial channels must not exceed ± 2.5 kHz, and the highest audio frequency contributing substantially to modulation must not exceed 3.125 kHz.

(d) Overmodulation. Each GMRS transmitter type, except for a mobile station transmitter type with a transmitter power output of 2.5 W or less, must automatically prevent a higher than normal audio level from causing overmodulation.

(e) Audio filter. Each GMRS transmitter type must include audio frequency low pass filtering, unless it complies with the applicable paragraphs of § 95.1779 (without filtering).

(1) The filter must be between the modulation limiter and the modulated stage of the transmitter.

(2) At any frequency (f in kHz) between 3 and 20 kHz, the filter must have an attenuation of at least 60 log (f/3) dB more than the attenuation at 1 kHz. Above 20 kHz, it must have an attenuation of at least 50 dB more than the attenuation at 1 kHz.

7.6.1 E.U.T. Operation

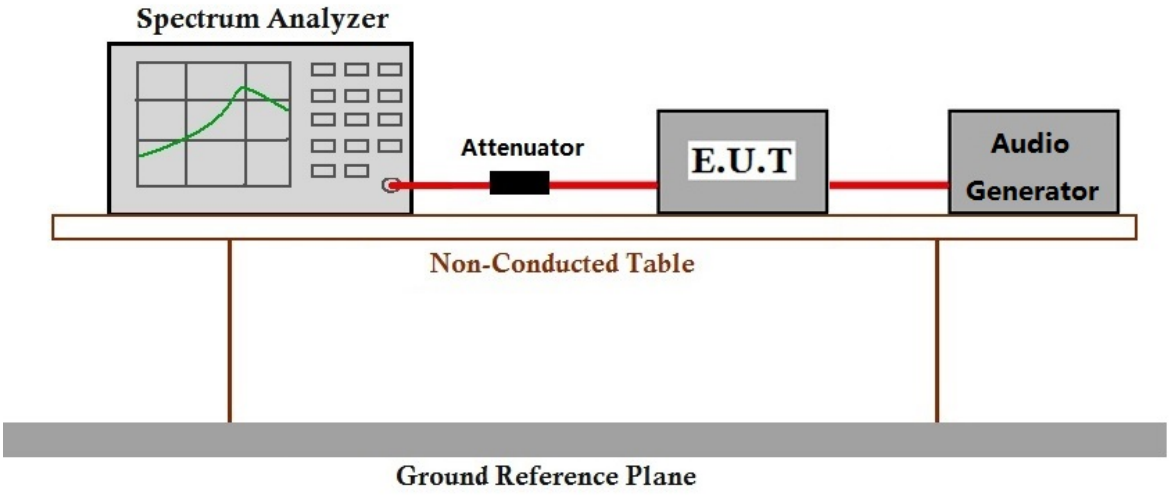
Operating Environment:

Temperature: 21.6 °C Humidity: 53.9 % RH Atmospheric Pressure: 1020 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Pre-scan	00	Transmission continuously without modulation
Final test	01	Transmission continuously with required modulation

7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

ANSI C63.26-2015 Clause 5.3.2 Modulation limiting test methodology

Modulation limiting is the ability of a transmitter circuit to limit the transmitter from producing deviations in excess of a rated system deviation.

a) Connect the equipment as illustrated in Figure 1.

b) Adjust the transmitter per the manufacturer's procedure for full rated system deviation.

c) Set the test receiver to measure peak positive deviation. Set the audio bandwidth for ≤ 0.25 Hz to ≧15 000 Hz. Turn the de-emphasis function off.

d) Apply a 1000 Hz modulating signal to the transmitter from the audio frequency generator, and adjust the level to obtain 60% of full rated system deviation. This is the 0 dB reference level.

e) Increase the level from the audio generator by 20 dB in 5 dB increments recording the deviation as measured from the test receiver in each step. Verify that the audio level used to make the OBW measurement is included in the sweep.

f) Repeat for step e) at 300 Hz, 2500 Hz and 3000 Hz at a minimum using the 0 dB reference level obtained in step d).

g) Set the test receiver to measure peak negative deviation and repeat step d) through step f).

h) The values recorded in step f) and step g) are the modulation limiting.

i) Plot the data set as a percentage of deviation relative to the 0 dB reference point versus input voltage.

ANSI C63.26-2015 Clause 5.3.3.2 Audio frequency response test methodology—Constant Input

a) Connect the equipment as illustrated in Figure 3.

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) Adjust the transmitter per the manufacturer's procedure for full rated system deviation.

d) Apply a 1000 Hz tone and adjust the audio frequency generator to produce 20% of the rated system deviation.

e) Set the test receiver to measure rms deviation and record the deviation reading as DEV_{REF}.

f) Set the audio frequency generator to the desired test frequency between 300 Hz and 3000 Hz.

g) Record the test receiver deviation reading as DEV_{FREQ}.

h) Calculate the audio frequency response at the present frequency as follows in Equation (4):

audio frequency response =20log (DEV_{FREQ}/DEV_{REF})

i) Repeat step f) through step h) for all the desired test frequencies.

ANSI/TIA-603-E:2016 Clause 2.4.10

a) Connect the equipment as illustrated.

b) Adjust the transmitter per the manufacturer's procedure for full rated system deviation with the subaudible signaling enabled.

c) Set the test receiver to measure peak positive deviation. Set the audio bandwidth for ≤0.25 Hz to ≧ 15,000 Hz. Turn the de-emphasis function off.

d) Apply a 1000 Hz modulating signal to the transmitter from the audio frequency generator,and adjust the level to obtain 60% of full rated system deviation.

e) Increase the level from the audio frequency generator by 20 dB in one step (rise time between the 10% and 90% points shall be 0.1 second maximum).

f) Measure both the instantaneous and steady-state deviation at and after the time of increasing the audio input level.

g) With the level from the audio frequency generator held constant at the level obtained in step e), slowly vary the audio frequency from 300 Hz to 3000 Hz and observe the steady-state deviation. Record the maximum deviation.

h) Set the test receiver to measure peak negative deviation and repeat steps d) through g).

i) The values recorded in steps g) and h) are the transmitter modulation limiting.

ANSI/TIA-603-E:2016 Clause 2.2.15 Audio Low Pass Filter Response

a) Connect the equipment as illustrated.

b) Connect the audio frequency generator as close as possible the input of the post limiter low pass filter within the transmitter under test.

c) Connect the audio spectrum analyzer to the output of the post limiter low pass filter within the transmitter under test.

d) Apply a 1000 Hz tone from the audio frequency generator and adjust the level per manufacturer's specifications.

e) Record the dB level of the 1000 Hz spectral line on the audio spectrum analyzer as LEV_{REF}.

f) Set the audio frequency generator to the desired test frequency between 3000 Hz and the upper low pass filter limit.

g) Record audio spectrum analyzer levels, at the test frequency in step f).

h) Record the dB level on the audio spectrum analyzer as LEV_{FREQ}.

i) Calculate the audio frequency response at the test frequency as:

low pass frequency response = LEV_{FREQ} - LEV_{REF}

j) Repeat steps f) through i) for all the desired test frequencies.

Please Refer to Appendix for Details

7.7 GMRS unwanted emissions

Test Requirement 47 CFR FCC Part 95.1779 & FCC Part2.1051;

Test Method: ANSI C63.26-2015 Clause 5.7.4

Limit:

Emission types filter	Attenuation requirements
A1D, A3E, F1D, G1D, F2D, F3E, G3E with audio filter	(1), (2), (7)
A1D, A3E, F1D, G1D, F3E, G3E without audio filter	(3), (4), (7)
H1D, J1D, R1D, H3E, J3E, R2E	(5), (6), (7)

(1) 25 dB (decibels) on any frequency removed from the center of the authorized bandwidth by more than 50% up to and including 100% of the authorized bandwidth.

(2) 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.

(3) 83 log (fd ÷ 5) dB on any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5 kHz up to and including 10 kHz.

(4) 116 log (fd ÷ 6.1) dB or 50 + 10 log (P) dB, whichever is the lesser attenuation, on any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz), of more than 10 kHz up to and including 250% of the authorized bandwidth.

(5) 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.

(6) 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.

(7) 43 + 10 log (P) dB on any frequency removed from the center of the authorized bandwidth by more than 250%.

7.7.1 E.U.T. Operation

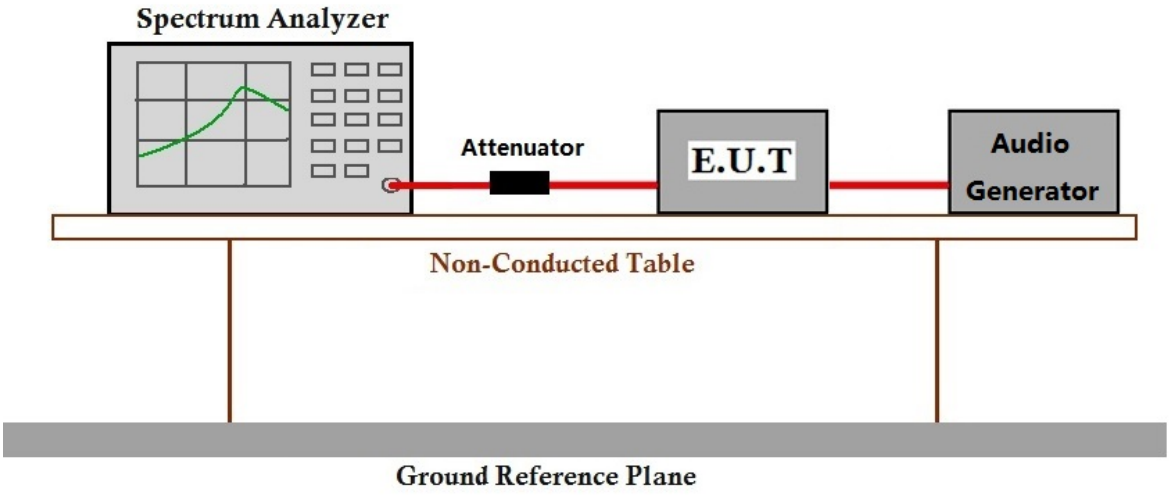
Operating Environment:

Temperature: 21.6 °C Humidity: 53.9 % RH Atmospheric Pressure: 1020 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Transmission continuously without modulation
Pre-scan	01	Transmission continuously with required modulation

7.7.3 Test Setup Diagram



7.7.4 Measurement Procedure and Data

ANSI C63.26-2015 Clause 5.7.4 Spurious unwanted emission measurements

a) Set the spectrum analyzer start frequency to the lowest frequency generated by the EUT, without going below 9 kHz, and the stop frequency to the lower frequency covered by the measurements previously performed in 5.7.3. As an alternative, the stop frequency can be set to the value specified in 5.1.1, depending on the EUT operating range, if the resulting plot can clearly demonstrate compliance for all frequencies not addressed by the out-of-band emissions measurements performed as per 5.7.3.

b) When using an average power (rms) detector, ensure that the number of points in the sweep ≧2*(span / RBW). This may require that the measurement range defined by the start and stop frequencies be subdivided, depending on the spectrum analyzer capabilities. This requirement does not apply to peak-detected power measurements. When average power is specified by the applicable regulation, a peak-detector can be utilized for preliminary measurements to accommodate wider frequency spans. Any emissions found in the preliminary measurement to exceed the applicable limit(s) shall be further examined using a power averaging (rms) detector with the minimum number of measurement points as defined above.

c) The sweep time should be set to auto-couple for performing peak-detector measurements. For measurements that use a power averaging (rms) detector, the sweep time shall be set as described for out-of-band emissions measurements in item d) of 5.7.3.

d) Identify and measure the highest spurious emission levels in each frequency range. It is not necessary to re-measure the out-of-band emissions as a part of this test. Record the frequencies and amplitudes corresponding to the measured emissions and capture the data plots.

e) Repeat step b) through step d) for the upper spurious emission frequency range if not already captured by a wide span measurement performed as per the alternative provided in step a). The upper frequency for this measurement is defined in 5.1.1 as a function of the EUT operating range.

f) Compare the results with the corresponding limit in the applicable regulation.

g) The test report shall include the data plots of the measuring instrument display and the measured data.

Please Refer to Appendix for Details

7.8 Radiated Spurious Emissions

Test Requirement 47 CFR FCC Part 95.1779 & FCC Part2.1053;

Test Method: ANSI/TIA-603-E:2016 Clause 2.2.12

Measurement Distance: 3m

Limit:

Emission types filter	Attenuation requirements
A1D, A3E, F1D, G1D, F2D, F3E, G3E with audio filter	(1), (2), (7)
A1D, A3E, F1D, G1D, F3E, G3E without audio filter	(3), (4), (7)
H1D, J1D, R1D, H3E, J3E, R2E	(5), (6), (7)

(1) 25 dB (decibels) on any frequency removed from the center of the authorized bandwidth by more than 50% up to and including 100% of the authorized bandwidth.

(2) 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.

(3) 83 log (fd ÷ 5) dB on any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5 kHz up to and including 10 kHz.

(4) 116 log (fd ÷ 6.1) dB or 50 + 10 log (P) dB, whichever is the lesser attenuation, on any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz), of more than 10 kHz up to and including 250% of the authorized bandwidth.

(5) 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.

(6) 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.

(7) 43 + 10 log (P) dB on any frequency removed from the center of the authorized bandwidth by more than 250%.

7.8.1 E.U.T. Operation

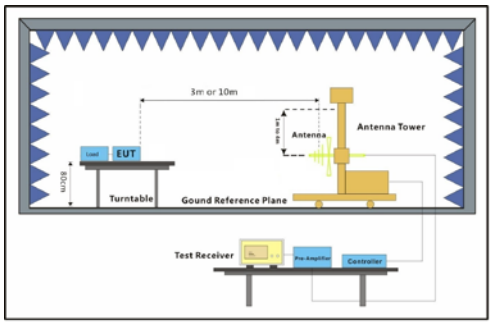
Operating Environment:

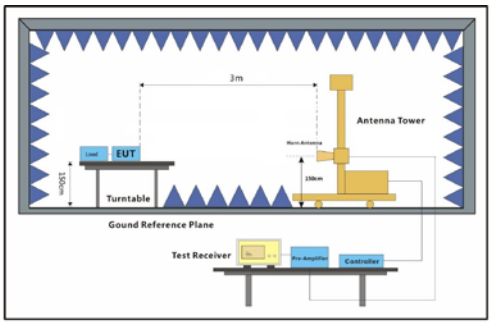
Temperature: 21.6 °C Humidity: 53.9 % RH Atmospheric Pressure: 1020 mbar

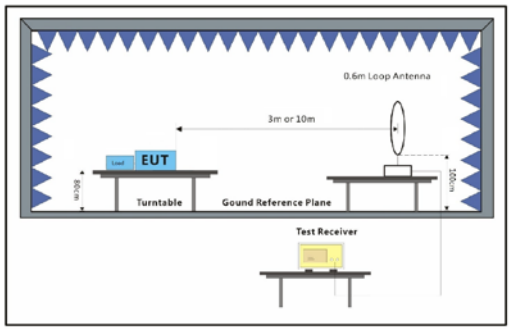
7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	Transmission continuously without modulation
Pre-scan	01	Transmission continuously with required modulation

7.8.3 Test Setup Diagram







7.8.4 Measurement Procedure and Data

ANSI/TIA-603-E:2016 Clause 2.2.12

a) Connect the equipment as illustrated.

b) Adjust the spectrum analyzer for the following settings:

1) Resolution Bandwidth = 10 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1GHz.

2) Video Bandwidth = 300 kHz for spurious emissions below 1 GHz, and 3 MHz for spurious emissions above 1 GHz.

3) Sweep Speed slow enough to maintain measurement calibration.

4) Detector Mode = Positive Peak.

c) Place the transmitter to be tested on the turntable in the standard test site, or an FCC listed site compliant with ANSI C63.4-2001 clause 5.4. The transmitter is transmitting into a nonradiating load that is placed on the turntable. The RF cable to this load should be of minimum length. For transmitters with integral antennas, the tests are to be run with the unit operating into the integral antenna.

d) For each spurious measurement the test antenna should be adjusted to the correct length for the frequency involved. This length may be determined from a calibration ruler supplied with the equipment. Measurements shall be made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, except for the region close to the carrier equal to ± the test bandwidth.

e) Key the transmitter.

f) For each spurious frequency, raise and lower the test antenna from 1 m to 4m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Then the turntable should be rotated 360° to determine the maximum reading. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.

g) Repeat step f) for each spurious frequency with the test antenna polarized vertically.

h) Reconnect the equipment as illustrated.

i) Keep the spectrum analyzer adjusted as in step b).

j) Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At the lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.

k) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends horizontally polarized, and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.

l) Repeat step k) with both antennas vertically polarized for each spurious frequency.

m) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps k) and l) by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula:

Pd(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dB)

where:

Pd is the dipole equivalent power and

Pg is the generator output power into the substitution antenna.

n) The Pd levels record in step m) are the absolute levels of radiated spurious emissions in dBm. The radiated spurious emissions in dB can be calculated by the following:

Radiated spurious emissions (dB) =10*log(TX power in watts/0.001)- the levels in step m)

NOTE: It is permissible to use other antennas provided they can be referenced to a dipole.

Please Refer to Appendix for Details

8 Test Setup Photo

Refer to Setup Photo for SZCR2412004832AT

9 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for SZCR2412004832AT

10 Appendix

1. GMRS frequency accuracy.

Assigned Frequency: 462.550MHz					
Voltage(V)	Temperature (℃)	Measured Frequency(MHz)	Frequency Deviation(ppm)	FCC Limit (ppm)	Result
12	-30	462.55003	-0.0649	±2.5	Pass
	-20	462.55001	-0.0216		
	-10	462.55004	-0.0865		
	0	462.55002	-0.0432		
	10	462.55008	-0.1730		
	20	462.55006	-0.1297		
	30	462.55002	-0.0432		
	40	462.55002	-0.0432		
	50	462.55005	-0.1081		
10.8	25	462.55004	-0.0865		
13.2	25	462.55005	-0.1081		

Assigned Frequency: 462.725MHz					
Voltage(V)	Temperature (℃)	Measured Frequency(MHz)	Frequency Deviation(ppm)	FCC Limit (ppm)	Result
12	-30	462.72503	-0.0648	±2.5	Pass
	-20	462.72503	-0.0648		
	-10	462.72502	-0.0432		
	0	462.72504	-0.0864		
	10	462.72505	-0.1081		
	20	462.72501	-0.0216		
	30	462.72503	-0.0648		
	40	462.72503	-0.0648		
	50	462.72505	-0.1081		
10.8	25	462.72505	-0.1081		
13.2	25	462.72502	-0.0432		

Assigned Frequency: 462.6375MHz					
Voltage(V)	Temperature (℃)	Measured Frequency(MHz)	Frequency Deviation(ppm)	FCC Limit (ppm)	Result
12	-30	462.63754	-0.0865	±2.5	Pass
	-20	462.63756	-0.1297		
	-10	462.63755	-0.1081		
	0	462.63752	-0.0432		
	10	462.63751	-0.0216		
	20	462.63755	-0.1081		
	30	462.63758	-0.1729		
	40	462.63757	-0.1513		
	50	462.63758	-0.1729		
10.8	25	462.63759	-0.1945		
13.2	25	462.63752	-0.0432		

Assigned Frequency: 467.550MHz					
Voltage(V)	Temperature (℃)	Measured Frequency(MHz)	Frequency Deviation(ppm)	FCC Limit (ppm)	Result
12	-30	467.55003	-0.0642	±2.5	Pass
	-20	467.55003	-0.0642		
	-10	467.55004	-0.0856		
	0	467.55001	-0.0214		
	10	467.55002	-0.0428		
	20	467.55004	-0.0856		
	30	467.55004	-0.0856		
	40	467.55003	-0.0642		
	50	467.55001	-0.0214		
10.8	25	467.55002	-0.0428		
13.2	25	467.55005	-0.1069		

Assigned Frequency: 467.625MHz					
Voltage(V)	Temperature (℃)	Measured Frequency(MHz)	Frequency Deviation(ppm)	FCC Limit (ppm)	Result
12	-30	467.62498	0.0428	±2.5	Pass
	-20	467.62505	-0.1069		
	-10	467.62497	0.0642		
	0	467.62504	-0.0855		
	10	467.62503	-0.0642		
	20	467.62506	-0.1283		
	30	467.62505	-0.1069		
	40	467.62499	0.0214		
	50	467.625015	-0.0321		
10.8	25	467.62508	-0.1711		
13.2	25	467.62494	0.1283		

Assigned Frequency: 467.725MHz					
Voltage(V)	Temperature (℃)	Measured Frequency(MHz)	Frequency Deviation(ppm)	FCC Limit (ppm)	Result
12	-30	467.72503	-0.0641	±2.5	Pass
	-20	467.72503	-0.0641		
	-10	467.72502	-0.0428		
	0	467.72502	-0.0428		
	10	467.72504	-0.0855		
	20	467.72504	-0.0855		
	30	467.72503	-0.0641		
	40	467.72501	-0.0214		
	50	467.72501	-0.0214		
10.8	25	467.72501	-0.0214		
13.2	25	467.72502	-0.0428		

2. Effective Radiated Power (ERP)

Test data for AE4704B-U antenna:

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
462.6375	31.23	36.99	-5.76	28.256	1.42	2.244	Horizontal	Pass
462.6375	32.87	36.99	-4.12	29.896	1.42	2.244	Vertical	Pass

Test data for AE4705B-U antenna:

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
462.6375	26.17	36.99	-10.82	23.196	1.42	2.244	Horizontal	Pass
462.6375	35.68	36.99	-1.31	32.706	1.42	2.244	Vertical	Pass

Test data for AE4702B-U antenna:

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
462.6375	26.12	36.99	-10.87	27.45	1.42	2.244	Horizontal	Pass
462.6375	35.66	36.99	-1.33	36.99	1.42	2.244	Vertical	Pass

Test data for AE4707B-U antenna:

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
462.6375	25.37	36.99	-11.62	26.70	1.42	2.244	Horizontal	Pass
462.6375	34.11	36.99	-2.88	35.44	1.42	2.244	Vertical	Pass

Note:

For getting the ERP (Efficient Radiated Power) in substitution method, the following formula should be taken to calculate it:

EIRP(dBm) = SGP(dBm) - Cable Loss(dB) + Substitution Gain(dBi)

ERP = EIRP- 2.15

SGP=Signal Generator Power

RBW > emission bandwidth, VBW > 3 x RBW, Detector: RMS

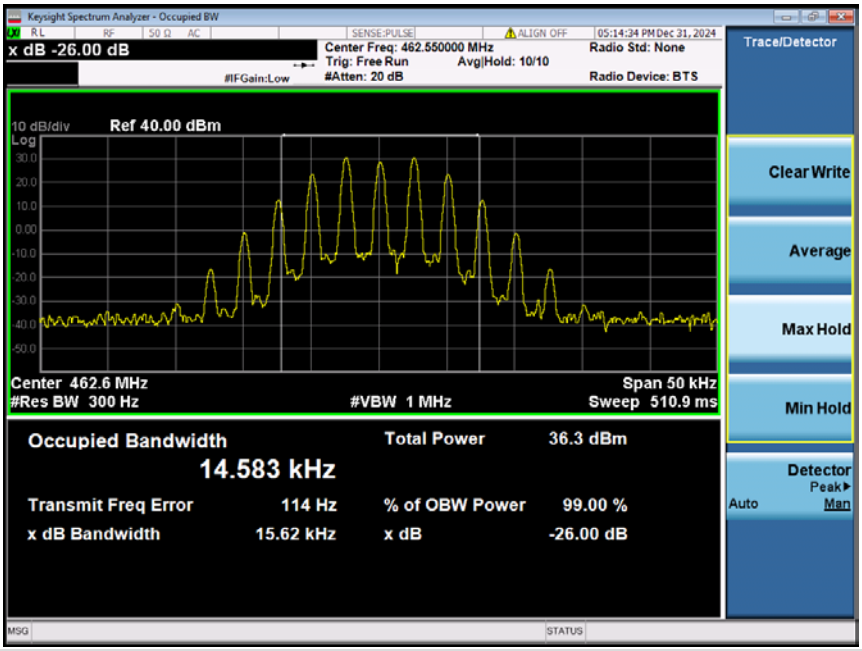
3. GMRS transmitting power(Conducted Power)

Band	Frequency (MHz)	Channel Spacing(KHz)	Conducted Power (dBm)	Conducted Power Limit(dBm)	Result
462MHz main channels	462.550	20	35.329	46.99	Pass
	462.725	20	35.356	46.99	Pass
467MHz main channels	467.550	20	35.835	46.99	Pass
	467.625	20	35.849	46.99	Pass
	467.725	20	35.852	46.99	Pass

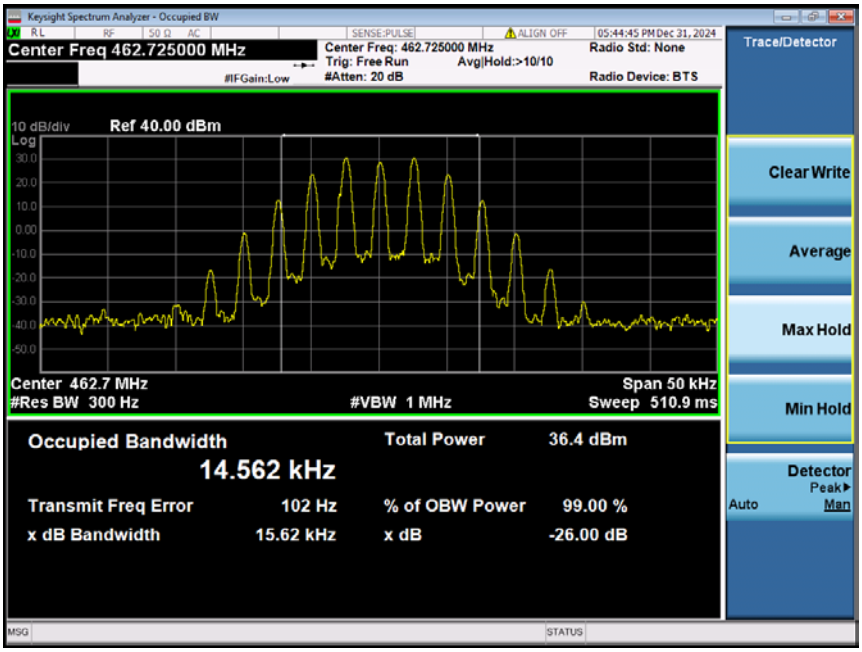
4. GMRS authorized bandwidths

Test Band	Tx Frequency (MHz)	GMRS authorized bandwidths (99% OBW, KHz)	Limit (KHz)	Result
462 MHz Main Channels	462.550	14.583	20	Pass
	462.725	14.562	20	
462 MHz Interstitial Channels	462.6375	14.593	20	Pass
467 MHz Main Channels	467.550	14.140	20	Pass
	467.625	14.525	20	
	467.725	14.134	20	

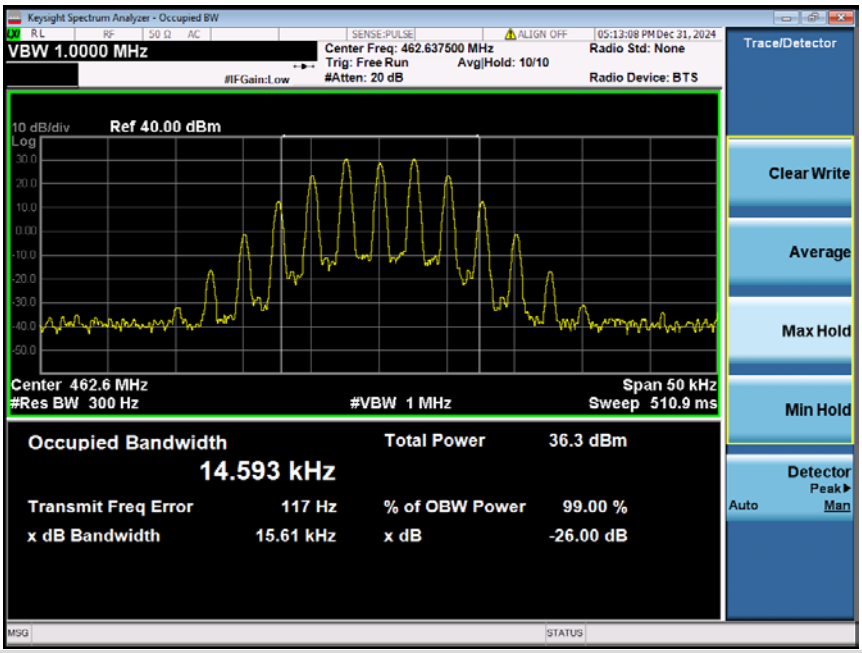
FM mode, Assigned Frequency: 462.55MHz



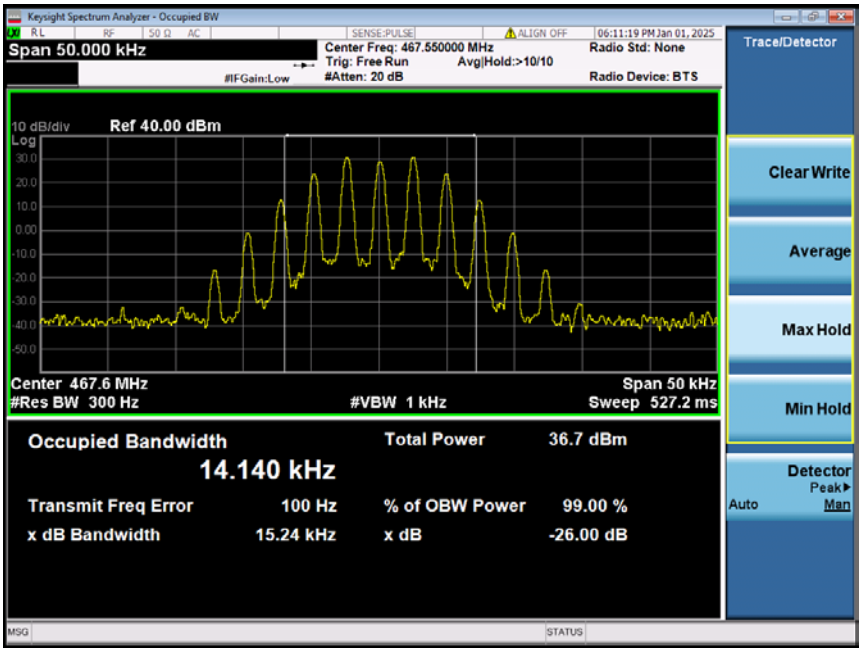
FM mode, Assigned Frequency: 462.725MHz



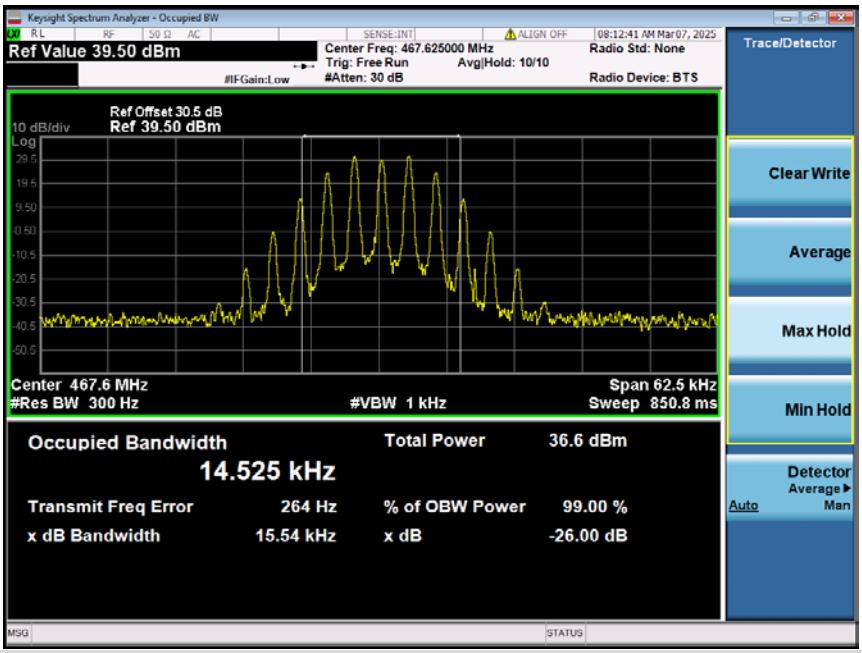
FM mode, Assigned Frequency: 462.6375MHz



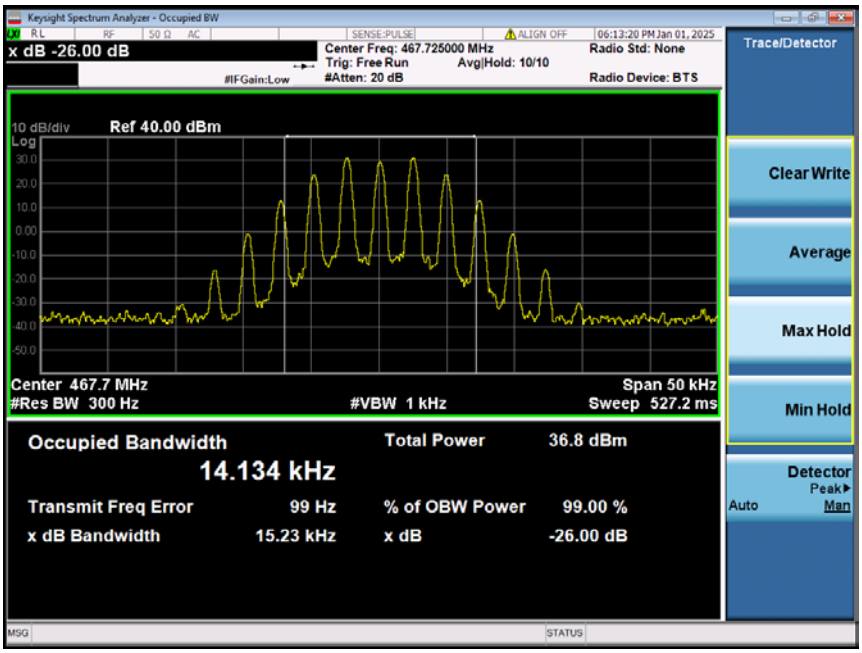
FM mode, Assigned Frequency: 467.55MHz



FM mode, Assigned Frequency: 467.625MHz

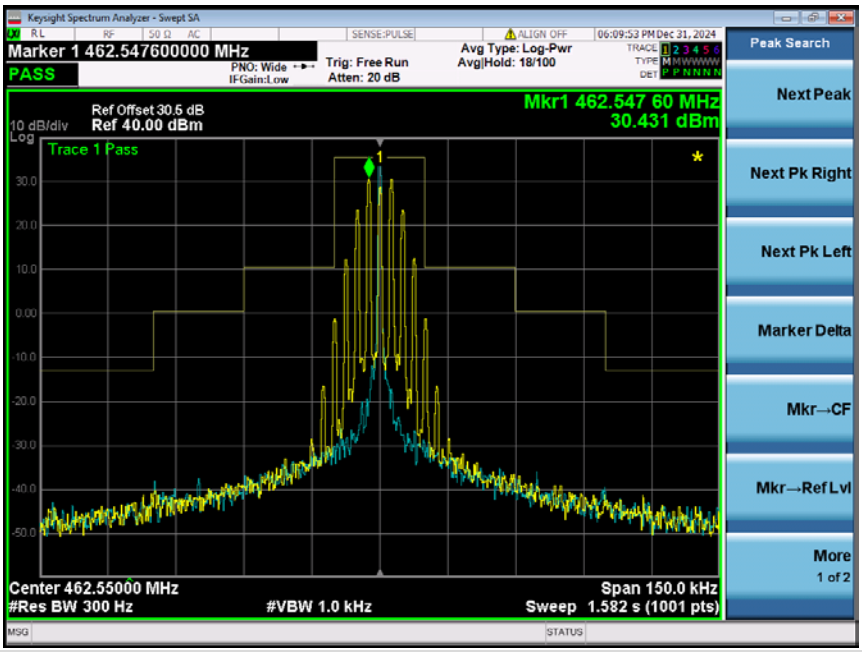


FM mode, Assigned Frequency: 467.725MHz

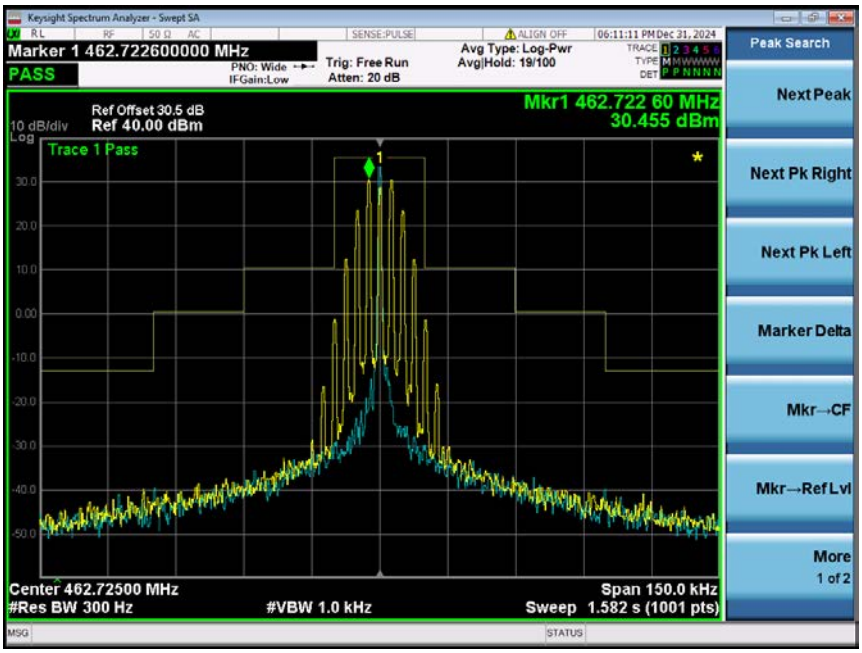


5. GMRS Emission Mask

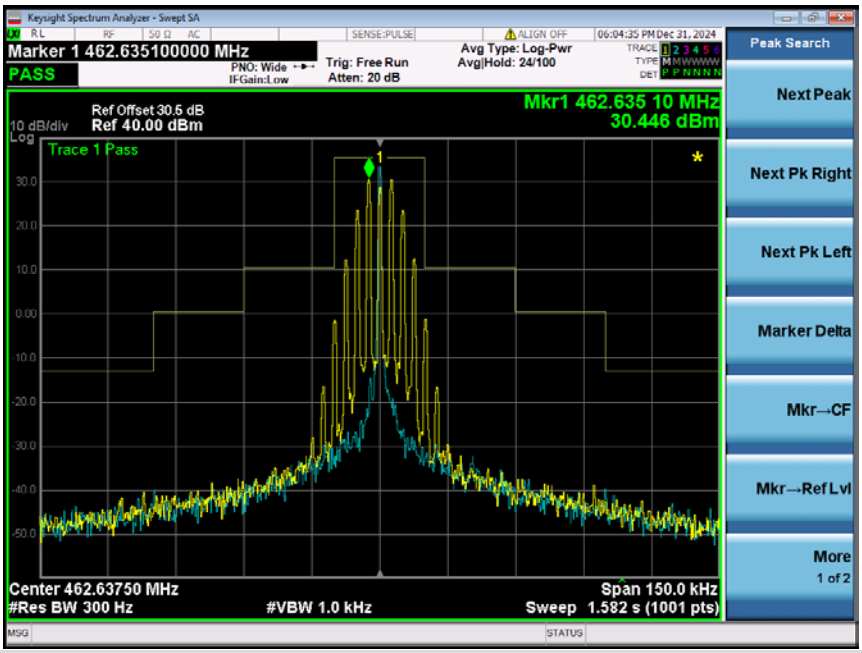
FM mode, Assigned Frequency: 462.55MHz



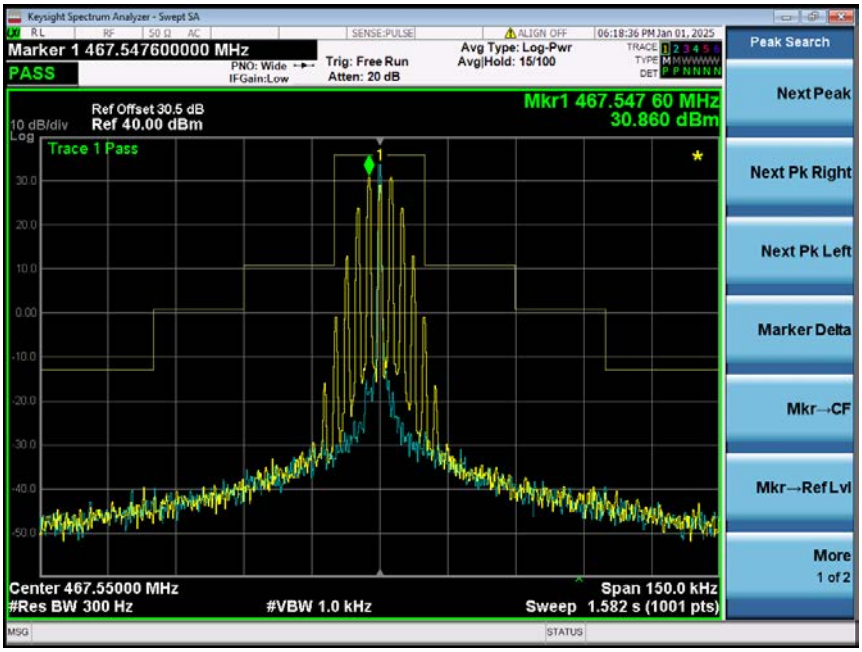
FM mode, Assigned Frequency: 462.725MHz



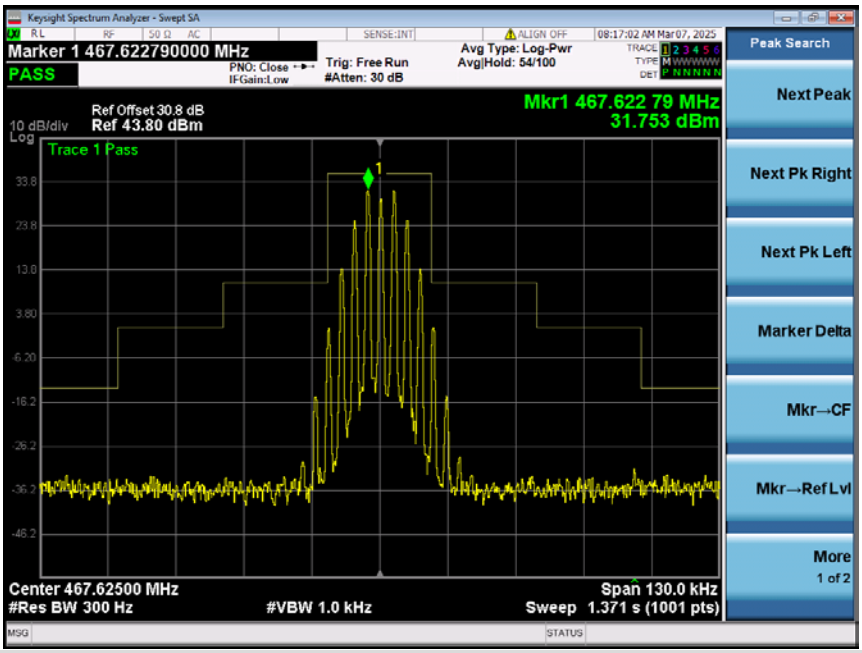
FM mode, Assigned Frequency: 462.6375MHz



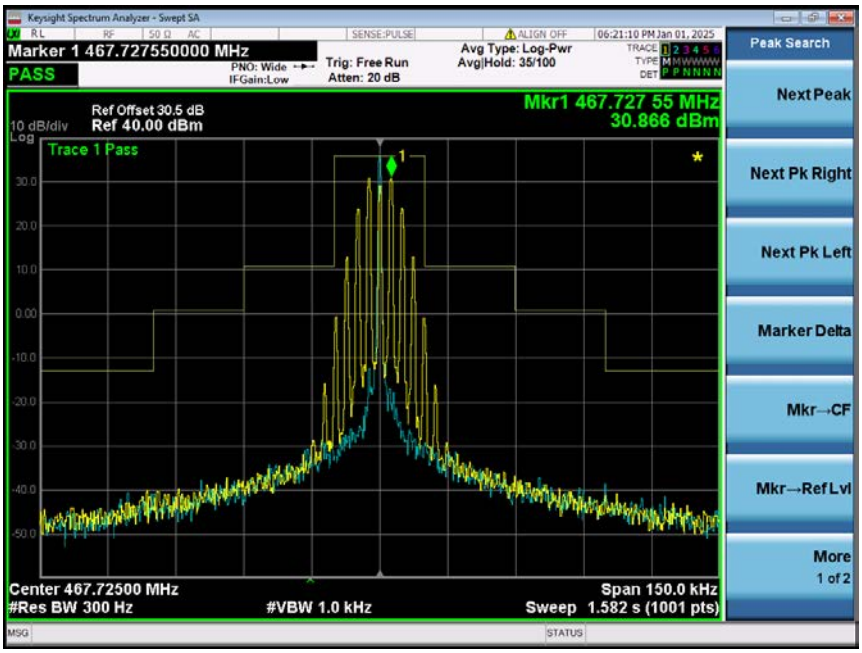
FM mode, Assigned Frequency: 467.55MHz



FM mode, Assigned Frequency: 467.625MHz



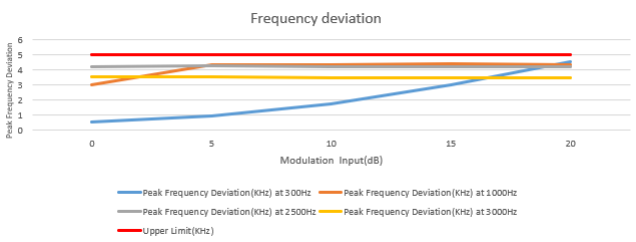
FM mode, Assigned Frequency: 467.725MHz

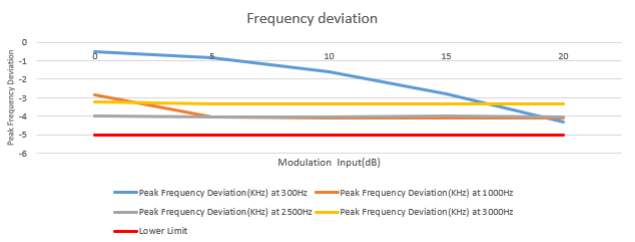


6. GMRS modulation requirements

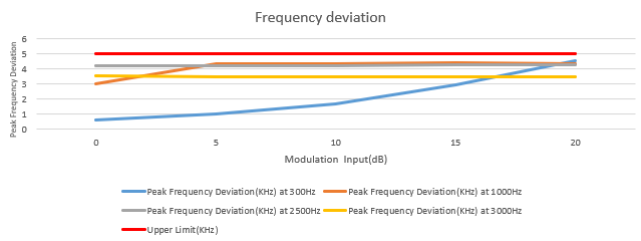
a. Frequency deviation

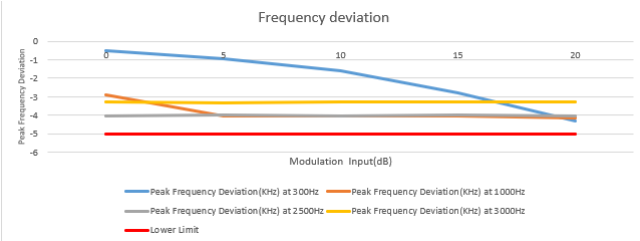
Channel: 462.550MHz					
Modulation Input(dB)	Peak Frequency Deviation(KHz) at 300Hz	Peak Frequency Deviation(KHz) at 1000Hz	Peak Frequency Deviation(KHz) at 2500Hz	Peak Frequency Deviation(KHz) at 3000Hz	Limit (KHz)
0	0.555	3.021	4.197	3.500	5.00
5	0.943	4.348	4.254	3.496	5.00
10	1.694	4.325	4.212	3.454	5.00
15	3.000	4.364	4.206	3.441	5.00
20	4.528	4.340	4.184	3.483	5.00
0	-0.501	-2.847	-3.980	-3.252	-5.00
5	-0.856	-4.060	-4.067	-3.326	-5.00
10	-1.586	-4.091	-4.039	-3.309	-5.00
15	-2.791	-4.119	-3.980	-3.312	-5.00
20	-4.293	-4.083	-4.027	-3.331	-5.00



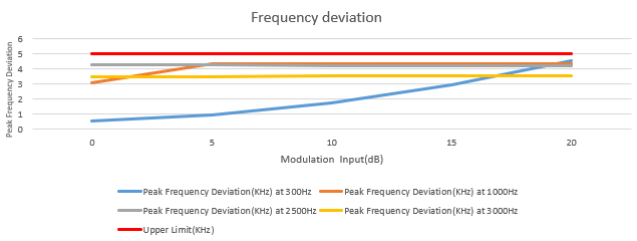


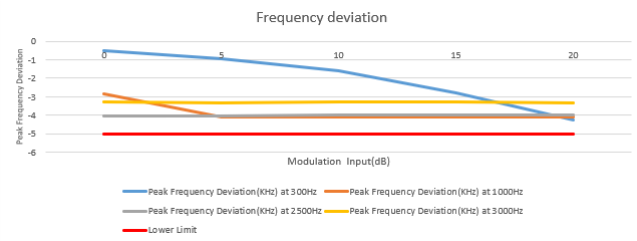
Channel: 462.725MHz					
Modulation Input(dB)	Peak Frequency Deviation(KHz) at 300Hz	Peak Frequency Deviation(KHz) at 1000Hz	Peak Frequency Deviation(KHz) at 2500Hz	Peak Frequency Deviation(KHz) at 3000Hz	Limit (KHz)
0	0.563	3.008	4.195	3.499	5.00
5	0.978	4.334	4.207	3.470	5.00
10	1.651	4.305	4.194	3.455	5.00
15	2.923	4.379	4.254	3.465	5.00
20	4.497	4.336	4.262	3.478	5.00
0	-0.524	-2.880	-4.028	-3.296	-5.00
5	-0.933	-4.043	-3.997	-3.306	-5.00
10	-1.590	-4.065	-4.017	-3.256	-5.00
15	-2.814	-4.063	-3.998	-3.261	-5.00
20	-4.319	-4.125	-4.014	-3.280	-5.00



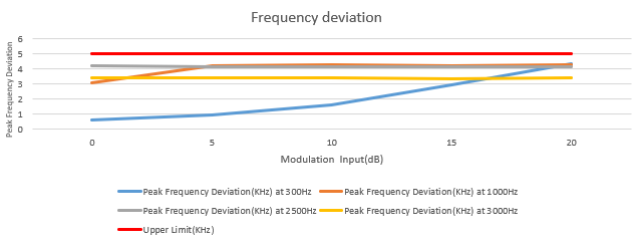


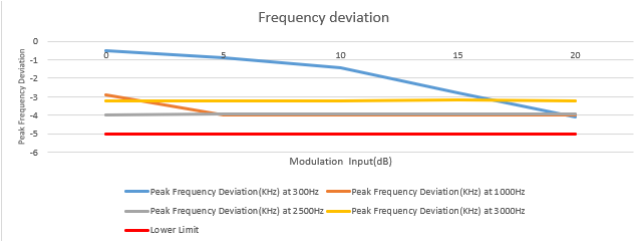
Channel: 462.6375MHz					
Modulation Input(dB)	Peak Frequency Deviation(KHz) at 300Hz	Peak Frequency Deviation(KHz) at 1000Hz	Peak Frequency Deviation(KHz) at 2500Hz	Peak Frequency Deviation(KHz) at 3000Hz	Limit (KHz)
0	0.548	3.052	4.244	3.484	5.00
5	0.953	4.355	4.244	3.457	5.00
10	1.699	4.341	4.222	3.506	5.00
15	2.942	4.356	4.221	3.508	5.00
20	4.526	4.308	4.185	3.515	5.00
0	-0.500	-2.852	-4.014	-3.304	-5.00
5	-0.925	-4.068	-4.046	-3.328	-5.00
10	-1.602	-4.075	-3.999	-3.267	-5.00
15	-2.777	-4.101	-3.991	-3.272	-5.00
20	-4.268	-4.092	-4.011	-3.314	-5.00



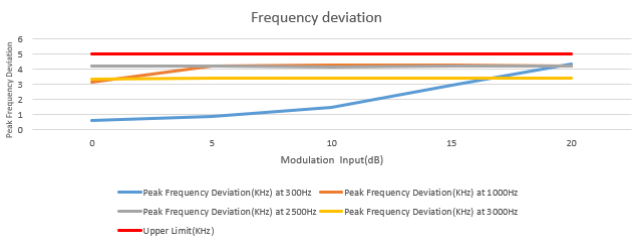


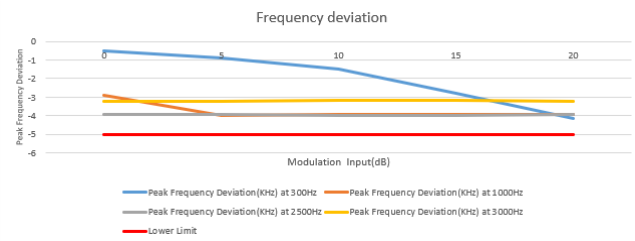
Channel: 467.550MHz					
Modulation Input(dB)	Peak Frequency Deviation(KHz) at 300Hz	Peak Frequency Deviation(KHz) at 1000Hz	Peak Frequency Deviation(KHz) at 2500Hz	Peak Frequency Deviation(KHz) at 3000Hz	Limit (KHz)
0	0.578	3.069	4.171	3.365	5.00
5	0.912	4.190	4.106	3.392	5.00
10	1.568	4.224	4.095	3.401	5.00
15	2.903	4.213	4.145	3.356	5.00
20	4.357	4.232	4.131	3.370	5.00
0	-0.504	-2.912	-3.988	-3.218	-5.00
5	-0.903	-3.991	-3.922	-3.227	-5.00
10	-1.446	-3.965	-3.954	-3.225	-5.00
15	-2.819	-3.982	-3.934	-3.193	-5.00
20	-4.104	-3.978	-3.948	-3.208	-5.00



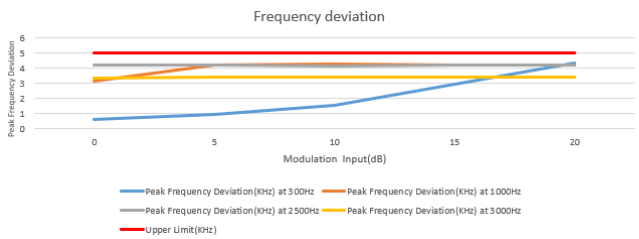


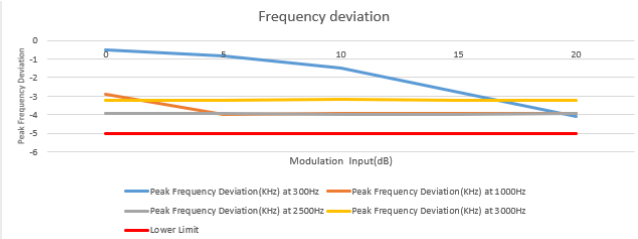
Channel: 467.625MHz					
Modulation Input(dB)	Peak Frequency Deviation(KHz) at 300Hz	Peak Frequency Deviation(KHz) at 1000Hz	Peak Frequency Deviation(KHz) at 2500Hz	Peak Frequency Deviation(KHz) at 3000Hz	Limit (KHz)
0	0.5864	3.096	4.172	3.361	5.00
5	0.8794	4.177	4.187	3.420	5.00
10	1.4884	4.234	4.164	3.386	5.00
15	2.9294	4.226	4.177	3.362	5.00
20	4.3524	4.201	4.179	3.381	5.00
0	-0.5356	-2.892	-3.947	-3.218	-5.00
5	-0.8676	-3.959	-3.919	-3.209	-5.00
10	-1.4666	-3.952	-3.976	-3.166	-5.00
15	-2.8106	-3.927	-3.984	-3.198	-5.00
20	-4.1276	-3.951	-3.913	-3.219	-5.00





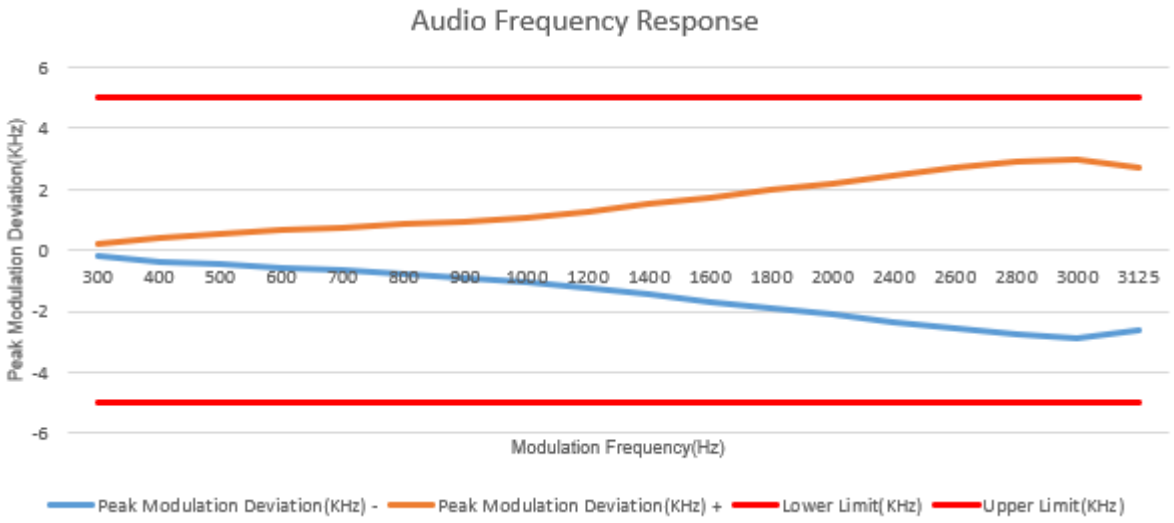
Channel: 467.725MHz					
Modulation Input(dB)	Peak Frequency Deviation(KHz) at 300Hz	Peak Frequency Deviation(KHz) at 1000Hz	Peak Frequency Deviation(KHz) at 2500Hz	Peak Frequency Deviation(KHz) at 3000Hz	Limit (KHz)
0	0.589	3.091	4.164	3.358	5.00
5	0.889	4.172	4.173	3.412	5.00
10	1.491	4.229	4.150	3.383	5.00
15	2.932	4.221	4.169	3.359	5.00
20	4.354	4.196	4.171	3.378	5.00
0	-0.533	-2.897	-3.955	-3.221	-5.00
5	-0.865	-3.964	-3.927	-3.212	-5.00
10	-1.464	-3.957	-3.984	-3.169	-5.00
15	-2.808	-3.930	-3.992	-3.201	-5.00
20	-4.121	-3.956	-3.926	-3.229	-5.00





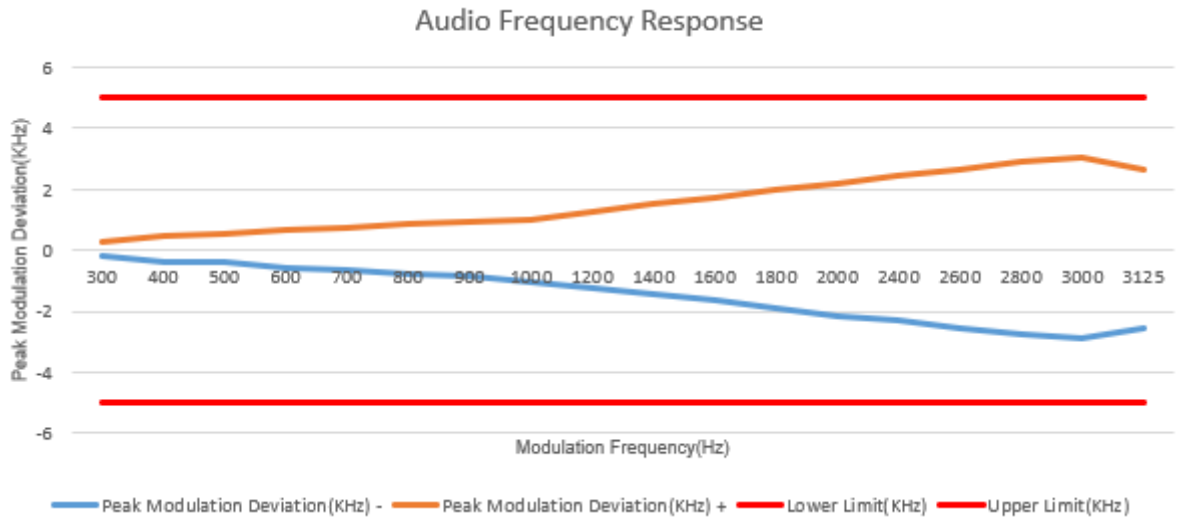
b.Audio Frequency Response
Channel 462.550MHz

Modulation Frequency(Hz)	Peak Modulation Deviation(KHz)		Upper Limit (dB)	Lower Limit (dB)
	-	+		
300	-0.192	0.243	-5	+5
400	-0.352	0.380	-5	+5
500	-0.430	0.542	-5	+5
600	-0.559	0.653	-5	+5
700	-0.667	0.746	-5	+5
800	-0.788	0.850	-5	+5
900	-0.913	0.965	-5	+5
1000	-1.019	1.041	-5	+5
1200	-1.249	1.291	-5	+5
1400	-1.412	1.542	-5	+5
1600	-1.689	1.753	-5	+5
1800	-1.868	1.985	-5	+5
2000	-2.078	2.175	-5	+5
2400	-2.337	2.446	-5	+5
2600	-2.558	2.688	-5	+5
2800	-2.731	2.898	-5	+5
3000	-2.882	2.976	-5	+5
3125	-2.593	2.684	-5	+5



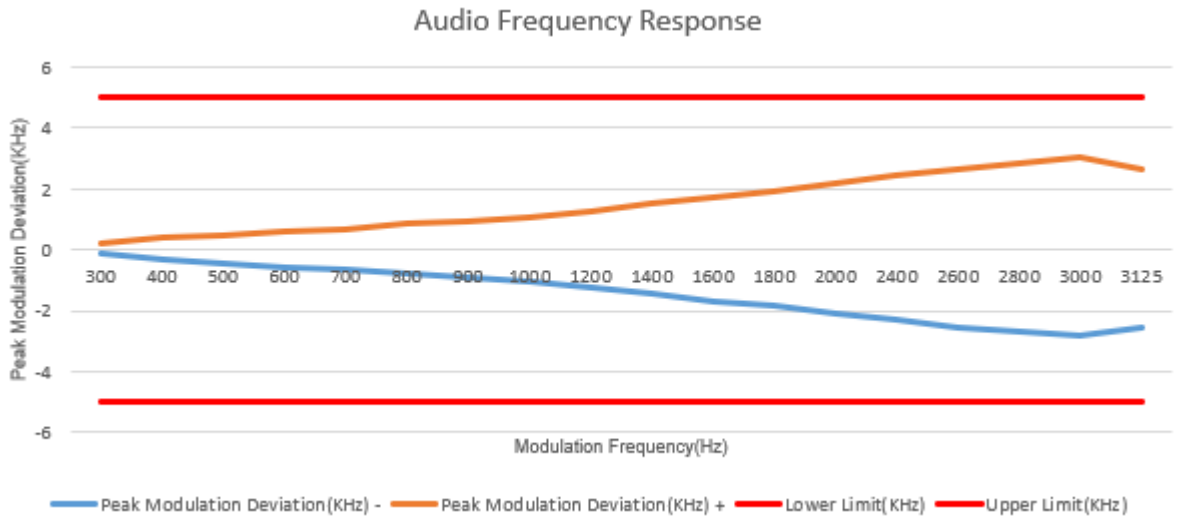
Channel 462.725MHz

Modulation Frequency(Hz)	Peak Modulation Deviation(KHz)		Upper Limit (dB)	Lower Limit (dB)
	-	+		
300	-0.197	0.249	-5	+5
400	-0.367	0.457	-5	+5
500	-0.391	0.556	-5	+5
600	-0.560	0.656	-5	+5
700	-0.662	0.745	-5	+5
800	-0.782	0.851	-5	+5
900	-0.864	0.918	-5	+5
1000	-1.043	1.013	-5	+5
1200	-1.215	1.289	-5	+5
1400	-1.429	1.510	-5	+5
1600	-1.629	1.739	-5	+5
1800	-1.874	2.001	-5	+5
2000	-2.142	2.189	-5	+5
2400	-2.303	2.450	-5	+5
2600	-2.555	2.645	-5	+5
2800	-2.760	2.882	-5	+5
3000	-2.910	3.036	-5	+5
3125	-2.570	2.679	-5	+5



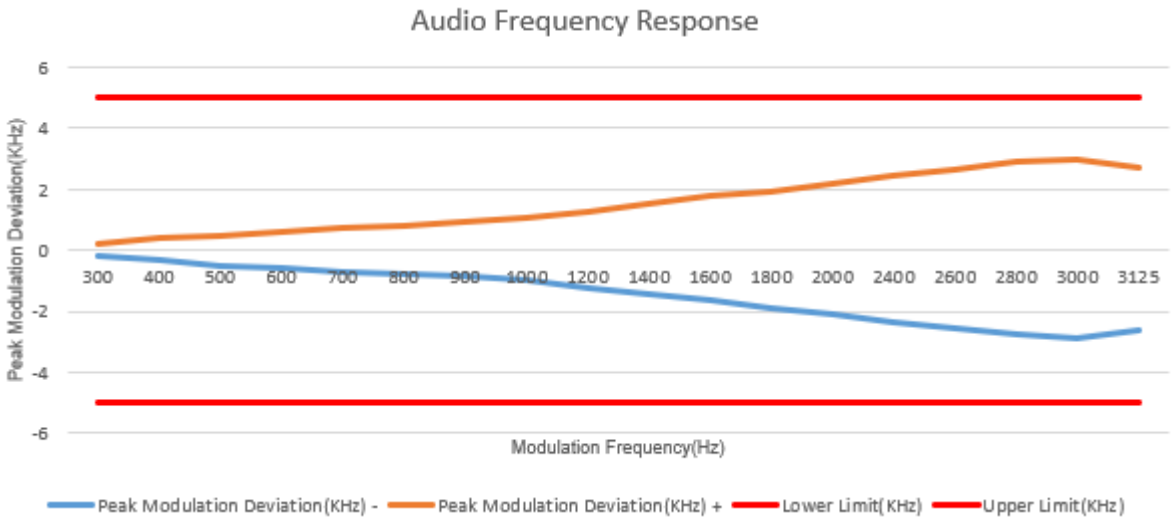
Channel 462.6375MHz

Modulation Frequency(Hz)	Peak Modulation Deviation(KHz)		Upper Limit (dB)	Lower Limit (dB)
	-	+		
300	-0.124	0.186	-5	+5
400	-0.310	0.409	-5	+5
500	-0.428	0.484	-5	+5
600	-0.577	0.600	-5	+5
700	-0.678	0.688	-5	+5
800	-0.808	0.857	-5	+5
900	-0.888	0.935	-5	+5
1000	-1.057	1.043	-5	+5
1200	-1.252	1.249	-5	+5
1400	-1.433	1.512	-5	+5
1600	-1.674	1.733	-5	+5
1800	-1.818	1.946	-5	+5
2000	-2.089	2.164	-5	+5
2400	-2.324	2.446	-5	+5
2600	-2.566	2.644	-5	+5
2800	-2.702	2.877	-5	+5
3000	-2.824	3.016	-5	+5
3125	-2.585	2.673	-5	+5



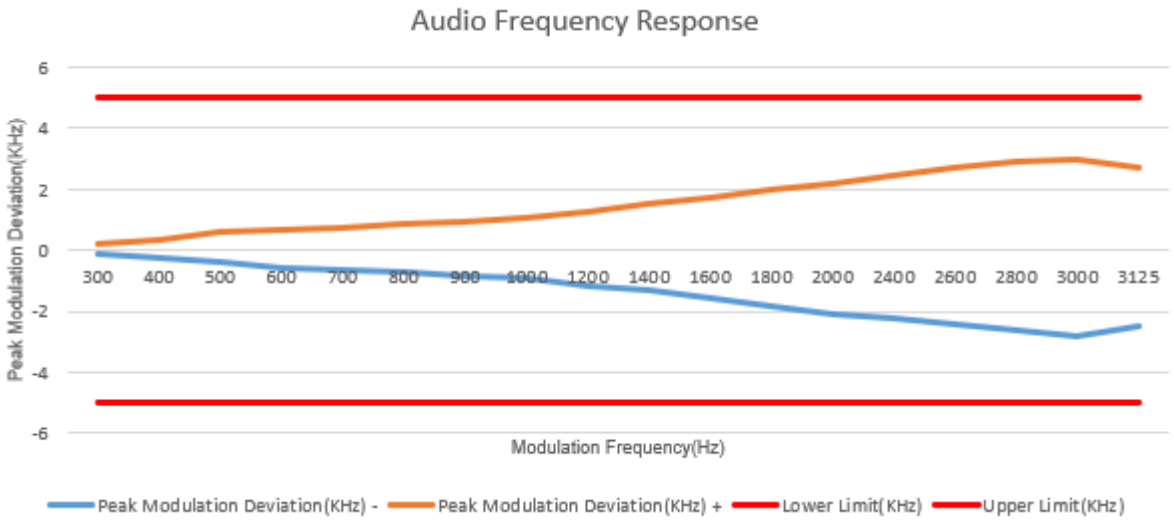
Channel 467.550MHz

Modulation Frequency(Hz)	Peak Modulation Deviation(KHz)		Upper Limit (dB)	Lower Limit (dB)
	-	+		
300	-0.189	0.243	-5	+5
400	-0.336	0.414	-5	+5
500	-0.486	0.467	-5	+5
600	-0.587	0.580	-5	+5
700	-0.692	0.770	-5	+5
800	-0.791	0.825	-5	+5
900	-0.842	0.945	-5	+5
1000	-0.965	1.084	-5	+5
1200	-1.217	1.284	-5	+5
1400	-1.449	1.534	-5	+5
1600	-1.666	1.767	-5	+5
1800	-1.926	1.935	-5	+5
2000	-2.067	2.191	-5	+5
2400	-2.366	2.419	-5	+5
2600	-2.555	2.653	-5	+5
2800	-2.729	2.886	-5	+5
3000	-2.879	3.001	-5	+5
3125	-2.607	2.698	-5	+5



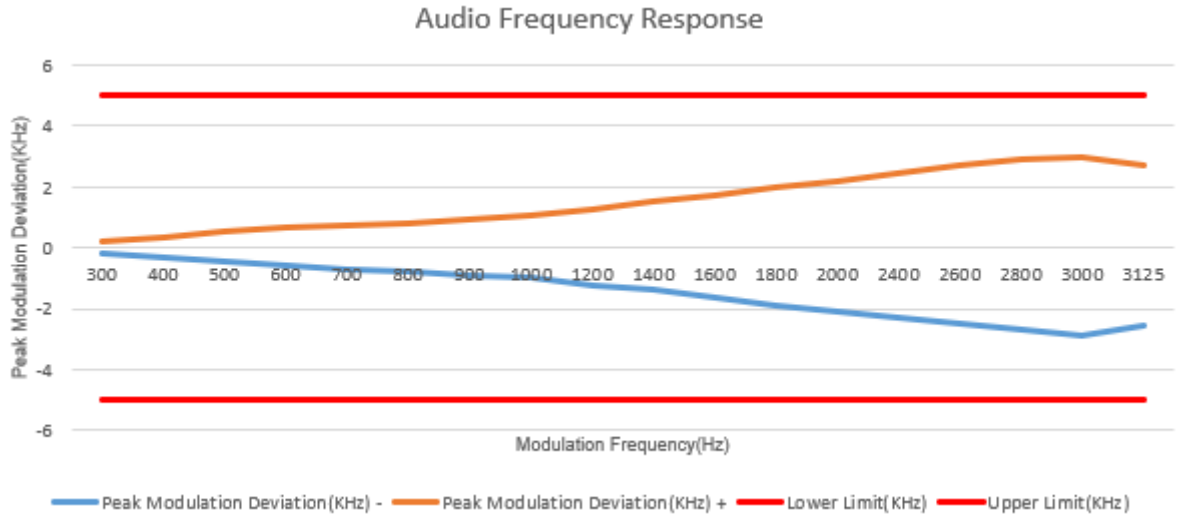
Channel 467.625MHz

Modulation Frequency(Hz)	Peak Modulation Deviation(KHz)		Upper Limit (dB)	Lower Limit (dB)
	-	+		
300	-0.099	0.244	-5	+5
400	-0.264	0.37	-5	+5
500	-0.415	0.573	-5	+5
600	-0.552	0.648	-5	+5
700	-0.63	0.757	-5	+5
800	-0.72	0.838	-5	+5
900	-0.849	0.935	-5	+5
1000	-0.928	1.045	-5	+5
1200	-1.167	1.266	-5	+5
1400	-1.333	1.549	-5	+5
1600	-1.601	1.733	-5	+5
1800	-1.818	1.998	-5	+5
2000	-2.068	2.2	-5	+5
2400	-2.232	2.452	-5	+5
2600	-2.453	2.699	-5	+5
2800	-2.649	2.888	-5	+5
3000	-2.808	2.994	-5	+5
3125	-2.508	2.711	-5	+5



Channel 467.725MHz

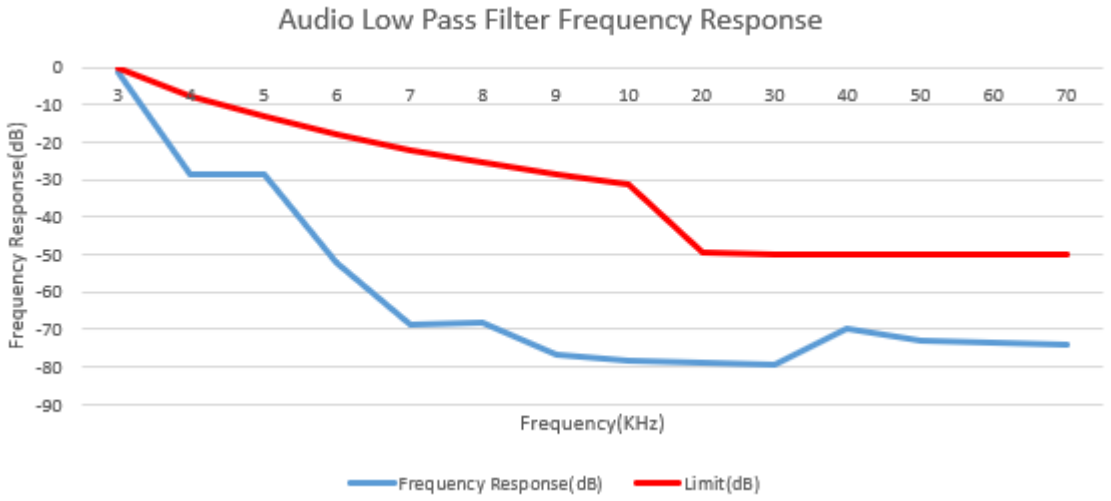
Modulation Frequency(Hz)	Peak Modulation Deviation(KHz)		Upper Limit (dB)	Lower Limit (dB)
	-	+		
300	-0.157	0.233	-5	+5
400	-0.317	0.363	-5	+5
500	-0.468	0.561	-5	+5
600	-0.605	0.641	-5	+5
700	-0.683	0.750	-5	+5
800	-0.773	0.836	-5	+5
900	-0.902	0.928	-5	+5
1000	-0.985	1.038	-5	+5
1200	-1.220	1.259	-5	+5
1400	-1.386	1.549	-5	+5
1600	-1.654	1.726	-5	+5
1800	-1.876	1.991	-5	+5
2000	-2.121	2.193	-5	+5
2400	-2.285	2.445	-5	+5
2600	-2.506	2.692	-5	+5
2800	-2.704	2.881	-5	+5
3000	-2.861	2.980	-5	+5
3125	-2.566	2.704	-5	+5



c. Audio Low Pass Filter Frequency Response

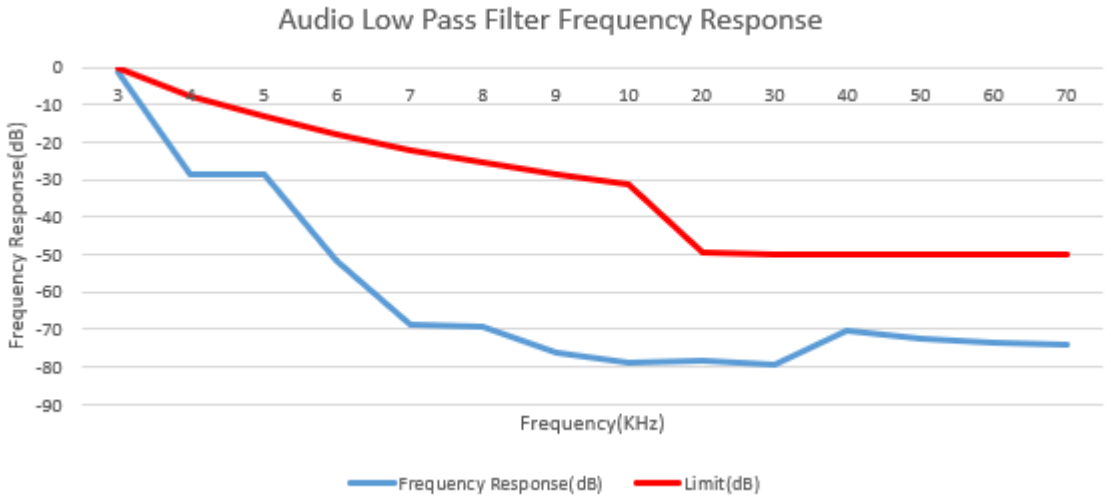
Channel 462.550MHz

Frequency(KHz)	Response (dB)	Limit (dB)
3	-1.45	0
4	-28.39	-7.50
5	-28.81	-13.31
6	-51.95	-18.06
7	-68.78	-22.08
8	-68.27	-25.56
9	-76.61	-28.63
10	-78.45	-31.37
20	-78.61	-50
30	-79.62	-50
40	-70.01	-50
50	-72.87	-50
60	-73.27	-50
70	-73.84	-50



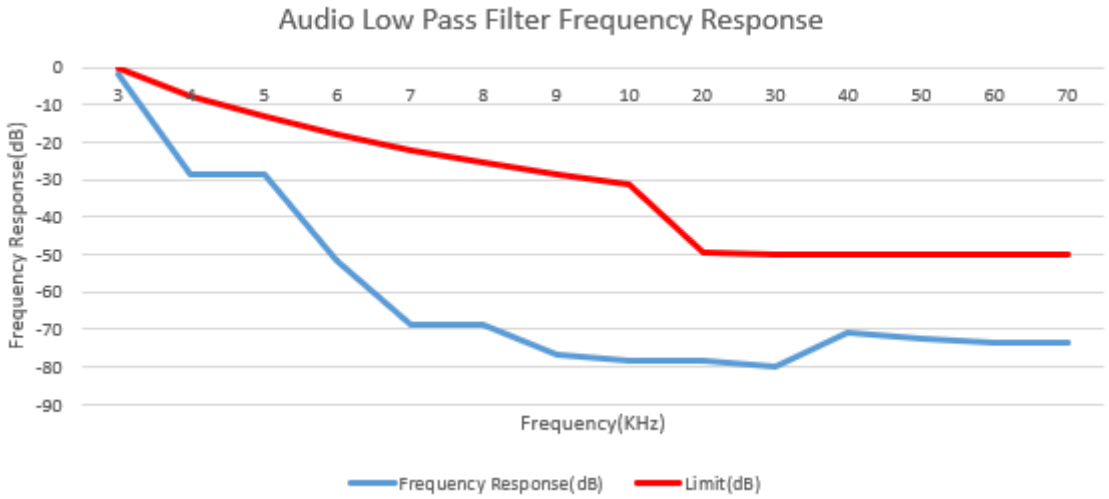
Channel 462.725MHz

Frequency(KHz)	Response (dB)	Limit (dB)
3	-1.34	0
4	-28.39	-7.50
5	-28.48	-13.31
6	-51.61	-18.06
7	-68.87	-22.08
8	-69.03	-25.56
9	-76.10	-28.63
10	-78.61	-31.37
20	-78.40	-50
30	-79.26	-50
40	-70.31	-50
50	-72.62	-50
60	-73.58	-50
70	-74.03	-50



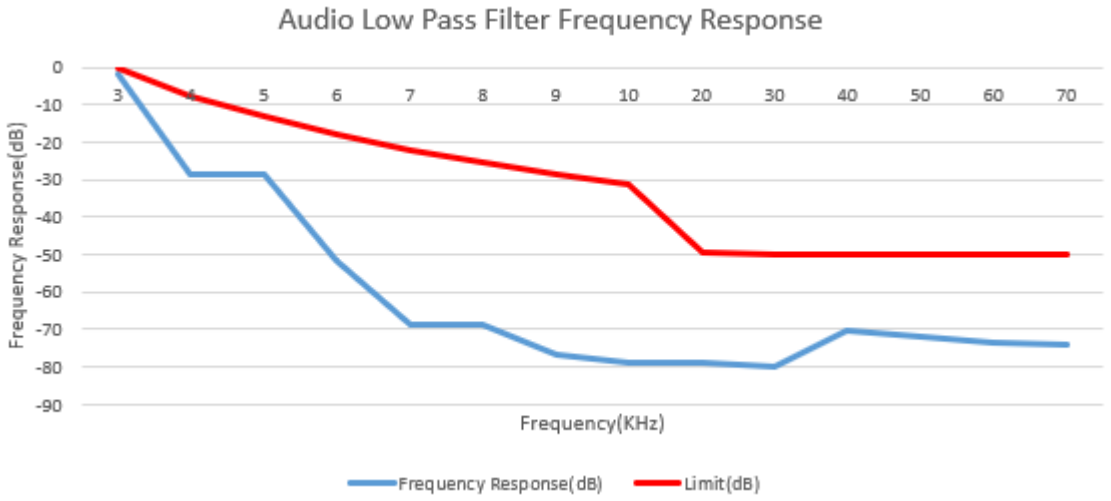
Channel 462.6375MHz

Frequency(KHz)	Response (dB)	Limit (dB)
3	-1.78	0
4	-28.48	-7.50
5	-28.56	-13.31
6	-51.52	-18.06
7	-68.94	-22.08
8	-68.47	-25.56
9	-76.69	-28.63
10	-78.29	-31.37
20	-78.50	-50
30	-79.79	-50
40	-70.69	-50
50	-72.68	-50
60	-73.38	-50
70	-73.76	-50



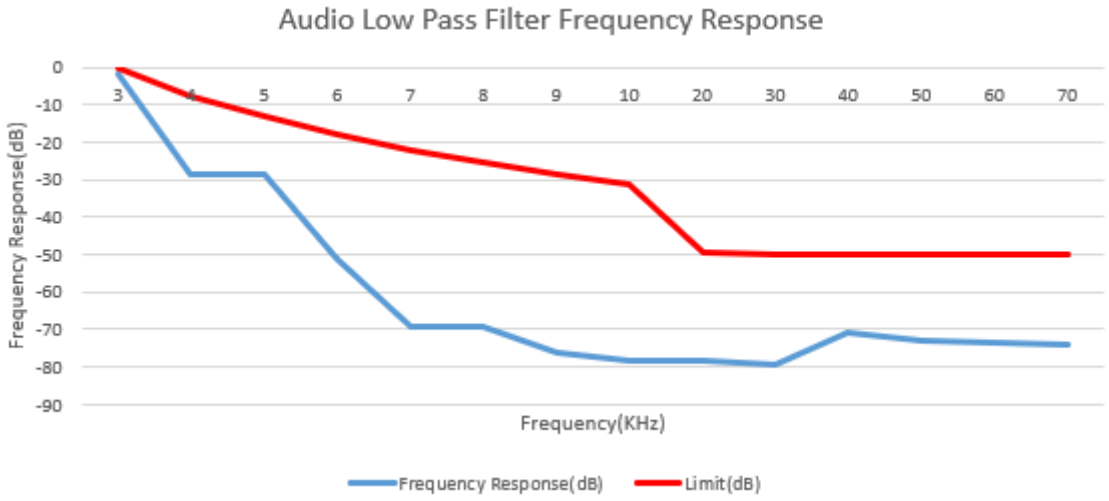
Channel 467.550MHz

Frequency(KHz)	Response (dB)	Limit (dB)
3	-1.92	0
4	-28.39	-7.50
5	-28.45	-13.31
6	-51.68	-18.06
7	-68.79	-22.08
8	-68.51	-25.56
9	-76.58	-28.63
10	-78.87	-31.37
20	-78.62	-50
30	-79.87	-50
40	-70.34	-50
50	-72.16	-50
60	-73.39	-50
70	-73.79	-50



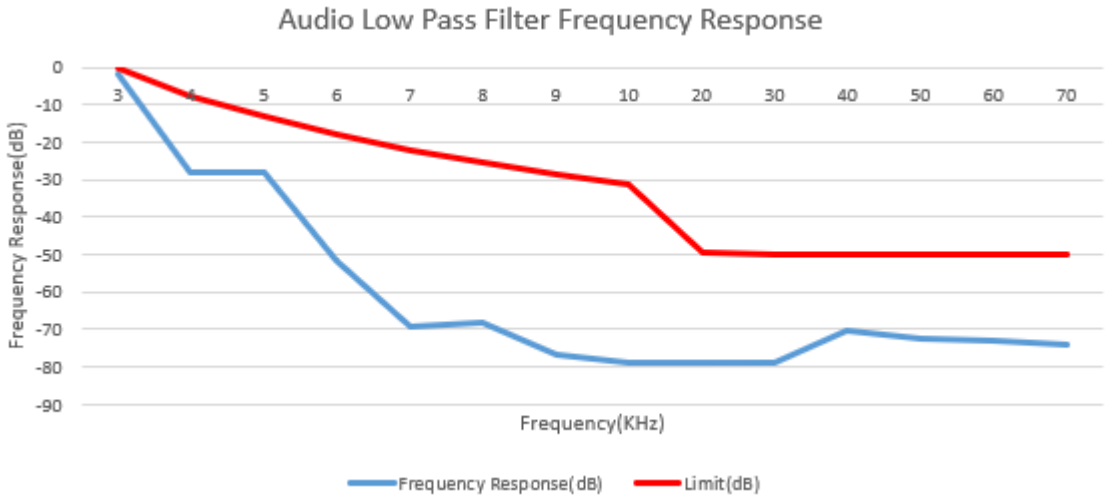
Channel 467.625MHz

Frequency(KHz)	Response (dB)	Limit (dB)
3	-1.84	0
4	-28.56	-7.50
5	-28.75	-13.31
6	-51.17	-18.06
7	-69.44	-22.08
8	-69.21	-25.56
9	-76.44	-28.63
10	-78.27	-31.37
20	-78.39	-50
30	-79.62	-50
40	-70.84	-50
50	-72.89	-50
60	-73.57	-50
70	-74.24	-50



Channel 467.725MHz

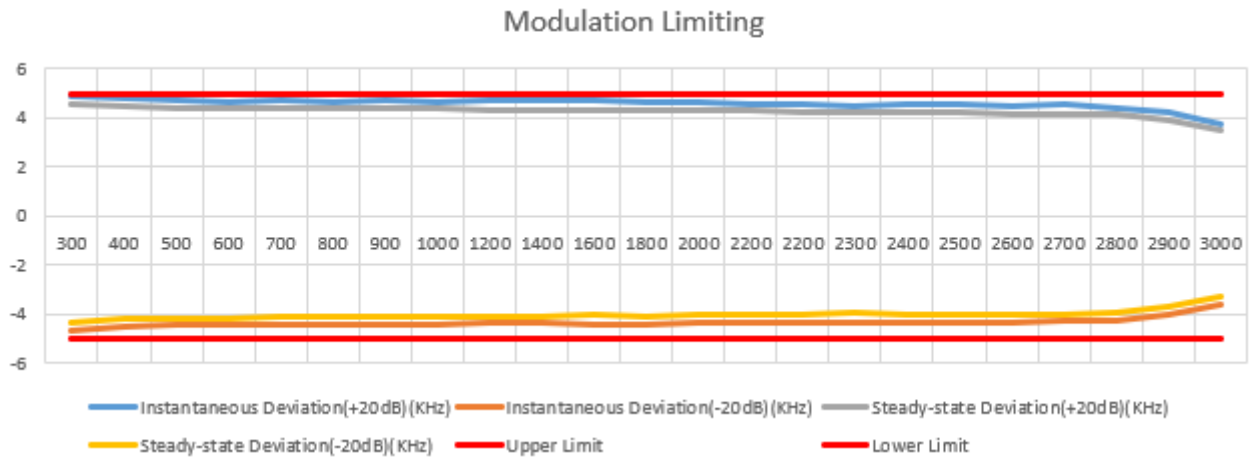
Frequency(KHz)	Response (dB)	Limit (dB)
3	-1.70	0
4	-28.02	-7.50
5	-28.29	-13.31
6	-51.73	-18.06
7	-69.01	-22.08
8	-68.28	-25.56
9	-76.76	-28.63
10	-78.67	-31.37
20	-78.70	-50
30	-79.02	-50
40	-70.12	-50
50	-72.51	-50
60	-73.09	-50
70	-73.99	-50



d. Modulation Limiting

Channel 462.550MHz

Audio Frequency(Hz)	Instantaneous		Steady-state		Limit (KHz)
	Deviation (+20dB)(KHz)	Deviation (-20dB)(KHz)	Deviation (+20dB)(KHz)	Deviation (-20dB)(KHz)	
300	4.864	-4.646	4.524	-4.310	±5
400	4.792	-4.504	4.431	-4.184	±5
500	4.717	-4.457	4.359	-4.177	±5
600	4.673	-4.426	4.405	-4.159	±5
700	4.676	-4.426	4.377	-4.085	±5
800	4.644	-4.436	4.375	-4.141	±5
900	4.738	-4.395	4.358	-4.066	±5
1000	4.632	-4.436	4.374	-4.078	±5
1200	4.694	-4.382	4.317	-4.131	±5
1400	4.710	-4.371	4.313	-4.099	±5
1600	4.706	-4.432	4.327	-4.041	±5
1800	4.659	-4.391	4.329	-4.063	±5
2000	4.639	-4.363	4.295	-4.060	±5
2200	4.565	-4.379	4.279	-4.007	±5
2200	4.545	-4.369	4.244	-4.053	±5
2300	4.496	-4.342	4.222	-3.979	±5
2400	4.563	-4.366	4.218	-4.056	±5
2500	4.530	-4.356	4.253	-4.011	±5
2600	4.491	-4.319	4.177	-3.982	±5
2700	4.531	-4.307	4.162	-4.004	±5
2800	4.392	-4.228	4.108	-3.943	±5
2900	4.263	-4.053	3.898	-3.715	±5
3000	3.750	-3.636	3.501	-3.264	±5



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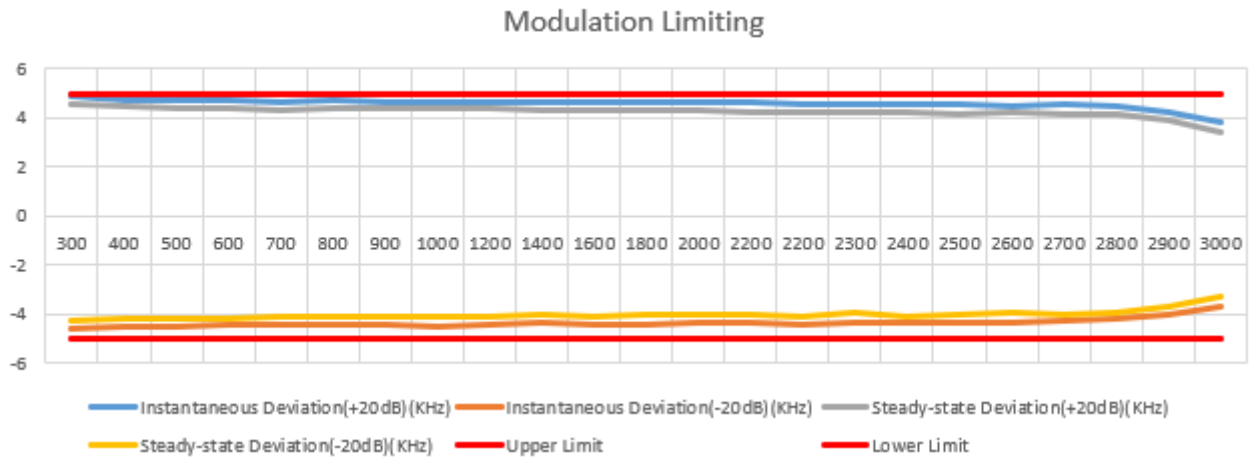
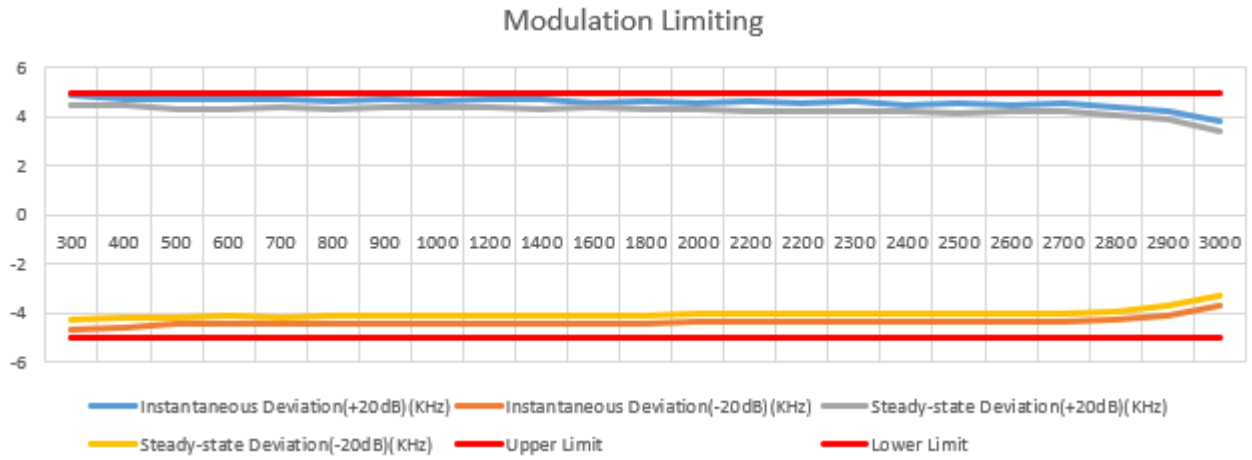
Channel 462.725MHz

Audio Frequency(Hz)	Instantaneous		Steady-state		Limit (KHz)
	Deviation (+20dB)(KHz)	Deviation (-20dB)(KHz)	Deviation (+20dB)(KHz)	Deviation (-20dB)(KHz)	
300	4.909	-4.595	4.575	-4.280	±5
400	4.742	-4.516	4.440	-4.195	±5
500	4.755	-4.471	4.408	-4.162	±5
600	4.690	-4.461	4.360	-4.146	±5
700	4.656	-4.450	4.319	-4.084	±5
800	4.720	-4.401	4.366	-4.101	±5
900	4.664	-4.464	4.380	-4.098	±5
1000	4.641	-4.472	4.360	-4.072	±5
1200	4.652	-4.393	4.369	-4.099	±5
1400	4.667	-4.377	4.336	-4.051	±5
1600	4.662	-4.419	4.298	-4.071	±5
1800	4.597	-4.436	4.290	-4.007	±5
2000	4.671	-4.361	4.295	-3.996	±5
2200	4.623	-4.354	4.221	-4.009	±5
2200	4.558	-4.403	4.217	-4.065	±5
2300	4.552	-4.362	4.211	-3.976	±5
2400	4.563	-4.356	4.249	-4.067	±5
2500	4.570	-4.317	4.171	-4.060	±5
2600	4.506	-4.326	4.196	-3.965	±5
2700	4.549	-4.286	4.144	-4.025	±5
2800	4.467	-4.211	4.141	-3.911	±5
2900	4.198	-4.019	3.887	-3.718	±5
3000	3.833	-3.654	3.402	-3.290	±5



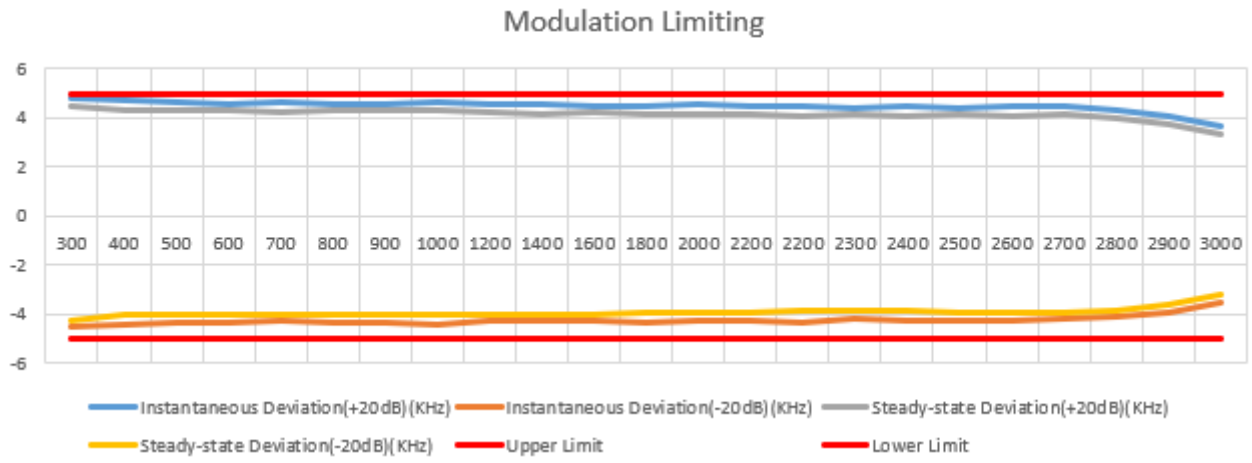
Channel 462.6375MHz

Audio Frequency(Hz)	Instantaneous		Steady-state		Limit (KHz)
	Deviation (+20dB)(KHz)	Deviation (-20dB)(KHz)	Deviation (+20dB)(KHz)	Deviation (-20dB)(KHz)	
300	4.888	-4.681	4.487	-4.292	±5
400	4.732	-4.554	4.450	-4.210	±5
500	4.705	-4.449	4.340	-4.185	±5
600	4.722	-4.414	4.326	-4.142	±5
700	4.688	-4.429	4.350	-4.148	±5
800	4.675	-4.443	4.344	-4.089	±5
900	4.686	-4.431	4.376	-4.135	±5
1000	4.674	-4.453	4.401	-4.078	±5
1200	4.677	-4.434	4.375	-4.102	±5
1400	4.709	-4.394	4.344	-4.098	±5
1600	4.578	-4.398	4.365	-4.077	±5
1800	4.603	-4.397	4.307	-4.069	±5
2000	4.559	-4.365	4.313	-4.015	±5
2200	4.606	-4.323	4.216	-4.054	±5
2200	4.549	-4.328	4.207	-4.047	±5
2300	4.609	-4.368	4.213	-4.055	±5
2400	4.482	-4.321	4.265	-4.043	±5
2500	4.569	-4.354	4.171	-4.018	±5
2600	4.511	-4.332	4.257	-3.999	±5
2700	4.519	-4.317	4.187	-4.009	±5
2800	4.423	-4.287	4.103	-3.902	±5
2900	4.244	-4.073	3.924	-3.698	±5
3000	3.818	-3.656	3.396	-3.272	±5



Channel 467.550MHz

Audio Frequency(Hz)	Instantaneous		Steady-state		Limit (KHz)
	Deviation (+20dB)(KHz)	Deviation (-20dB)(KHz)	Deviation (+20dB)(KHz)	Deviation (-20dB)(KHz)	
300	4.759	-4.530	4.453	-4.238	±5
400	4.714	-4.429	4.345	-4.037	±5
500	4.619	-4.330	4.306	-4.037	±5
600	4.561	-4.328	4.302	-4.008	±5
700	4.643	-4.299	4.216	-4.049	±5
800	4.565	-4.311	4.288	-4.005	±5
900	4.562	-4.314	4.293	-3.991	±5
1000	4.609	-4.393	4.301	-4.007	±5
1200	4.559	-4.285	4.233	-4.013	±5
1400	4.542	-4.266	4.177	-4.020	±5
1600	4.488	-4.297	4.190	-3.984	±5
1800	4.495	-4.313	4.162	-3.924	±5
2000	4.545	-4.287	4.134	-3.946	±5
2200	4.478	-4.257	4.176	-3.918	±5
2200	4.476	-4.310	4.100	-3.887	±5
2300	4.408	-4.222	4.122	-3.863	±5
2400	4.510	-4.230	4.070	-3.882	±5
2500	4.397	-4.268	4.117	-3.901	±5
2600	4.463	-4.269	4.059	-3.913	±5
2700	4.477	-4.195	4.113	-3.918	±5
2800	4.311	-4.116	4.008	-3.872	±5
2900	4.092	-3.959	3.775	-3.603	±5
3000	3.686	-3.543	3.336	-3.202	±5



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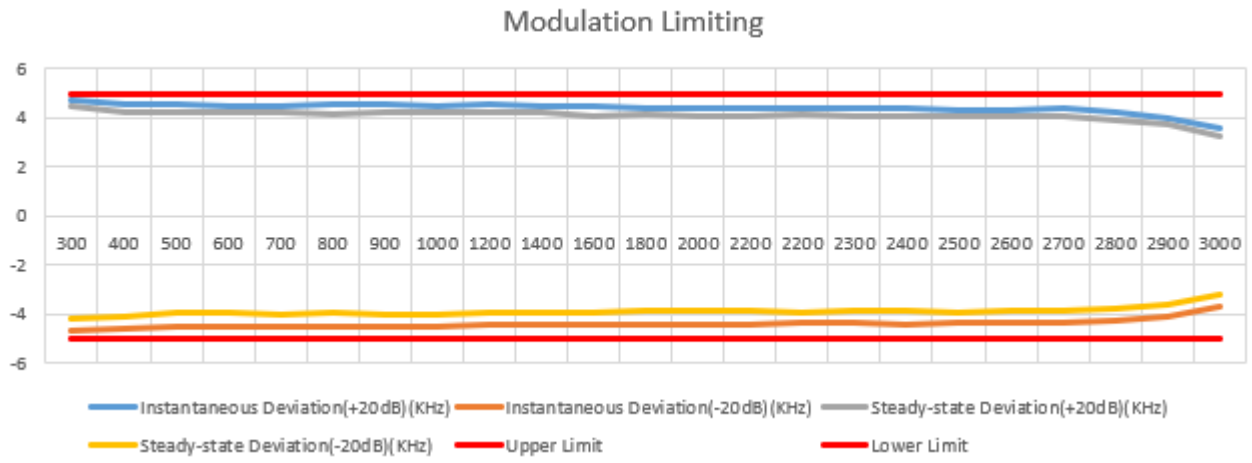
Channel 467.625MHz

Audio Frequency(Hz)	Instantaneous		Steady-state		Limit (KHz)
	Deviation (+20dB)(KHz)	Deviation (-20dB)(KHz)	Deviation (+20dB)(KHz)	Deviation (-20dB)(KHz)	
300	4.693	-4.673	4.433	-4.214	±5
400	4.575	-4.566	4.247	-4.072	±5
500	4.585	-4.502	4.2	-3.958	±5
600	4.484	-4.503	4.202	-3.955	±5
700	4.482	-4.488	4.223	-3.999	±5
800	4.542	-4.474	4.174	-3.948	±5
900	4.52	-4.475	4.186	-3.997	±5
1000	4.488	-4.472	4.223	-3.993	±5
1200	4.532	-4.463	4.222	-3.919	±5
1400	4.443	-4.464	4.186	-3.936	±5
1600	4.452	-4.461	4.094	-3.937	±5
1800	4.429	-4.393	4.183	-3.87	±5
2000	4.405	-4.394	4.093	-3.877	±5
2200	4.408	-4.421	4.076	-3.894	±5
2200	4.424	-4.362	4.104	-3.913	±5
2300	4.403	-4.326	4.07	-3.873	±5
2400	4.384	-4.403	4.03	-3.866	±5
2500	4.341	-4.361	4.039	-3.908	±5
2600	4.331	-4.324	4.034	-3.852	±5
2700	4.367	-4.351	4.074	-3.866	±5
2800	4.231	-4.23	3.911	-3.76	±5
2900	3.987	-4.089	3.697	-3.602	±5
3000	3.578	-3.664	3.264	-3.166	±5



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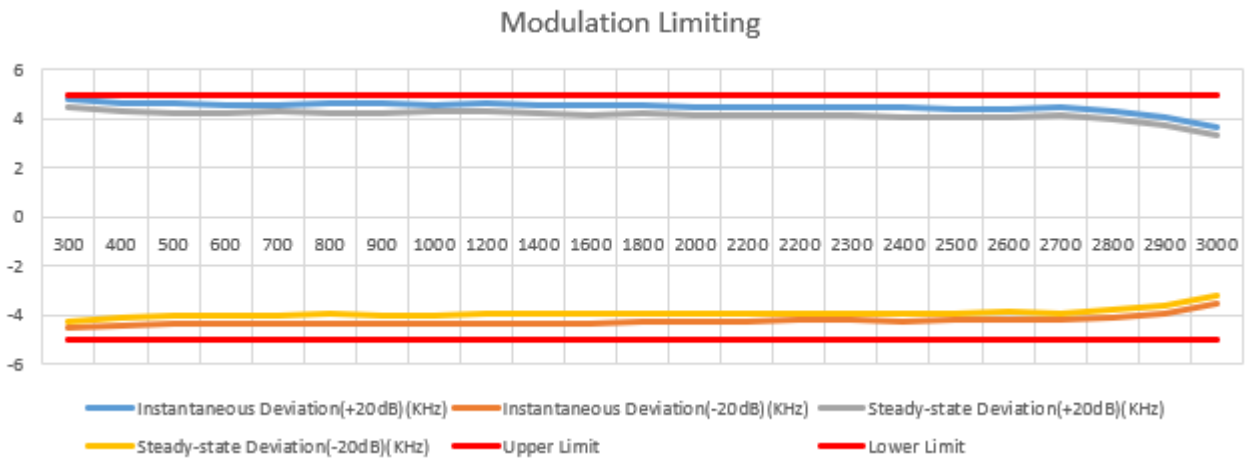
Channel 467.725MHz

Audio Frequency(Hz)	Instantaneous		Steady-state		Limit (KHz)
	Deviation (+20dB)(KHz)	Deviation (-20dB)(KHz)	Deviation (+20dB)(KHz)	Deviation (-20dB)(KHz)	
300	4.772	-4.536	4.495	-4.253	±5
400	4.659	-4.429	4.309	-4.111	±5
500	4.669	-4.365	4.262	-3.997	±5
600	4.568	-4.360	4.264	-3.994	±5
700	4.566	-4.351	4.285	-4.038	±5
800	4.620	-4.337	4.236	-3.980	±5
900	4.604	-4.338	4.248	-4.036	±5
1000	4.572	-4.335	4.285	-4.032	±5
1200	4.616	-4.326	4.284	-3.958	±5
1400	4.527	-4.327	4.248	-3.975	±5
1600	4.536	-4.324	4.156	-3.976	±5
1800	4.513	-4.256	4.245	-3.909	±5
2000	4.489	-4.257	4.155	-3.916	±5
2200	4.490	-4.280	4.138	-3.933	±5
2200	4.508	-4.225	4.166	-3.950	±5
2300	4.487	-4.189	4.132	-3.912	±5
2400	4.468	-4.266	4.092	-3.905	±5
2500	4.425	-4.224	4.101	-3.947	±5
2600	4.415	-4.187	4.096	-3.891	±5
2700	4.450	-4.214	4.136	-3.905	±5
2800	4.315	-4.093	3.973	-3.799	±5
2900	4.071	-3.952	3.759	-3.641	±5
3000	3.662	-3.527	3.326	-3.205	±5



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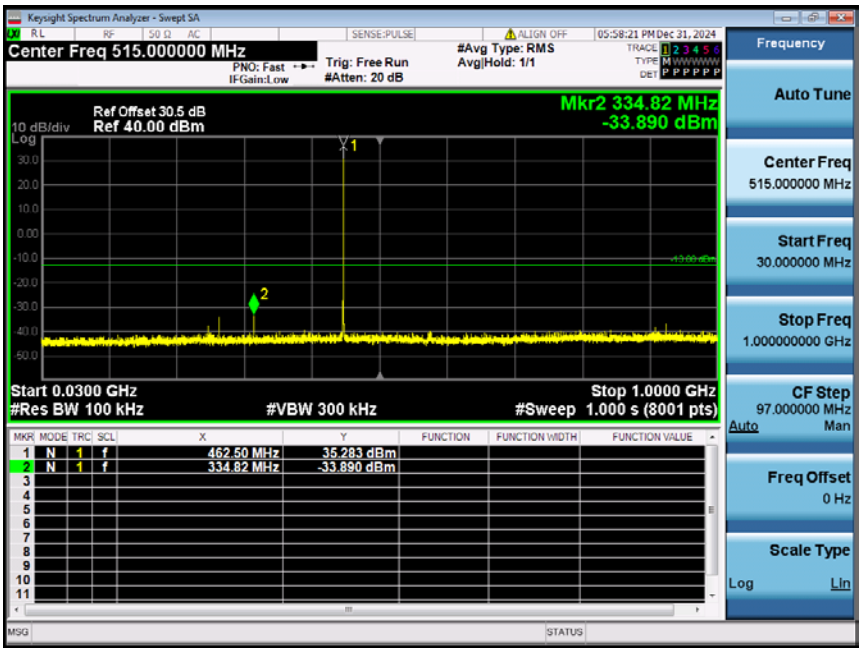
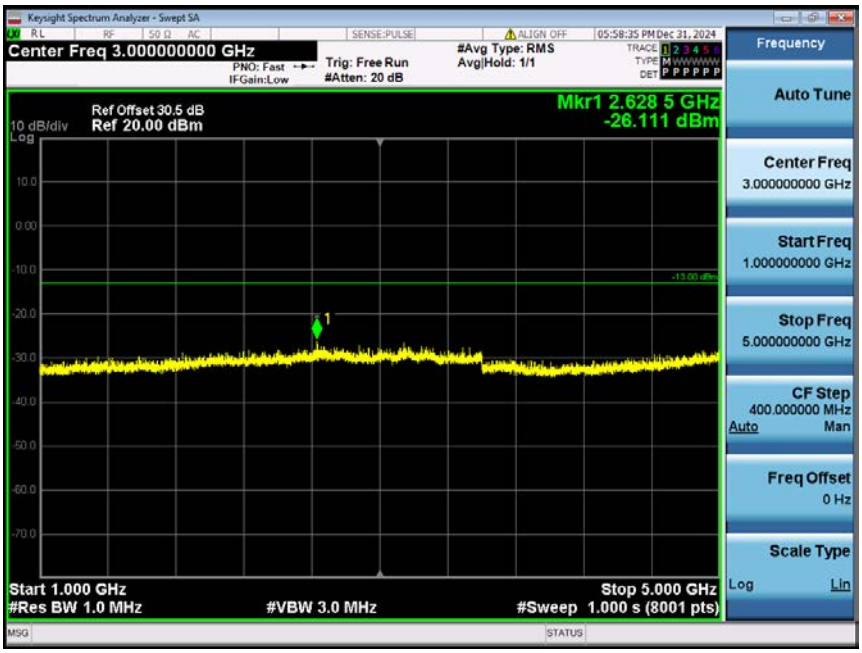
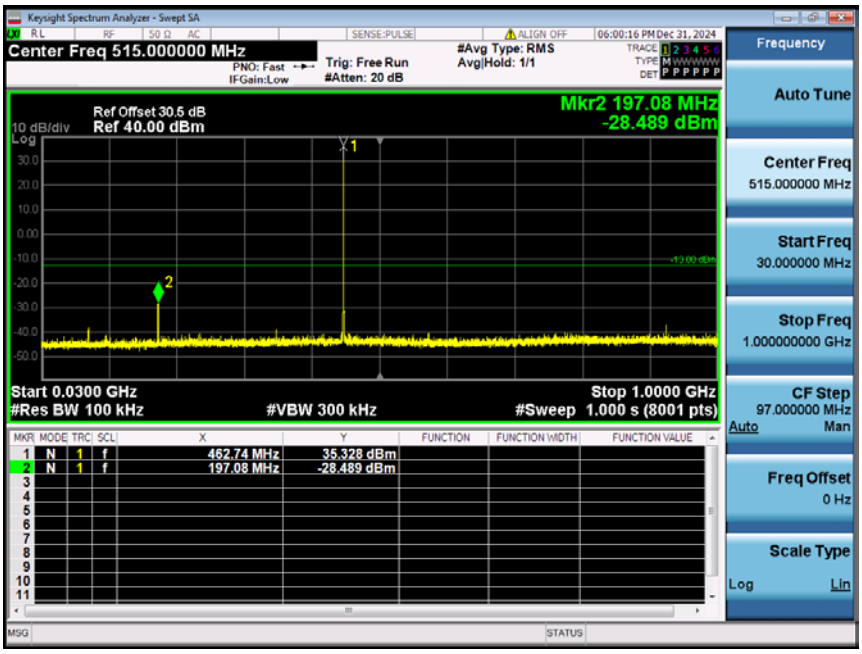
6. GMRS unwanted emissions

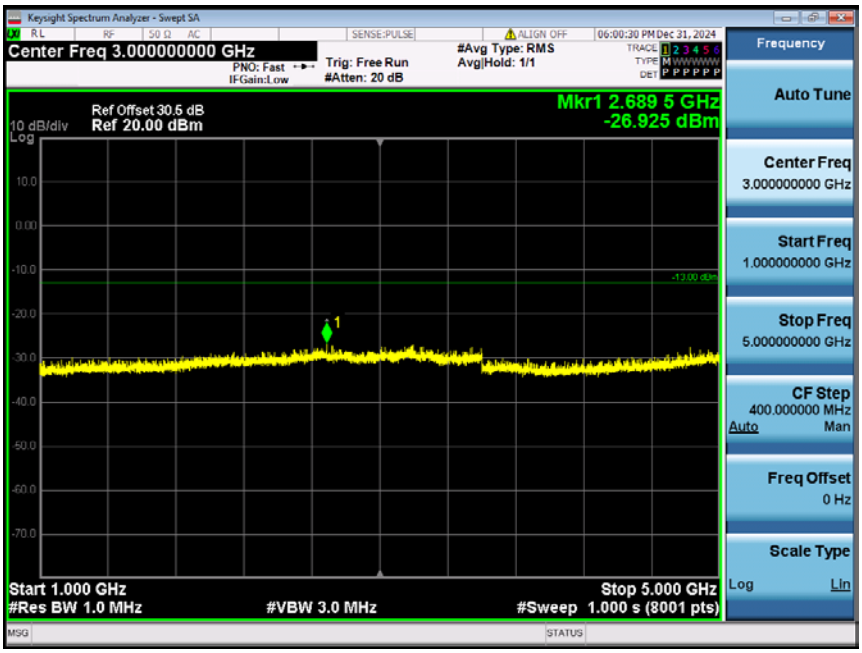
FM mode, Assigned Frequency: 462.55MHz



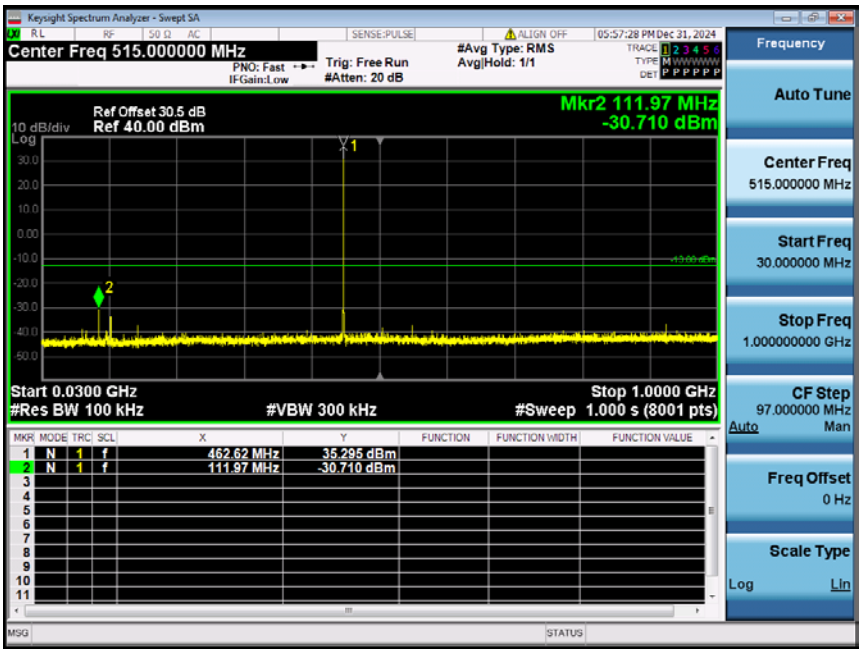


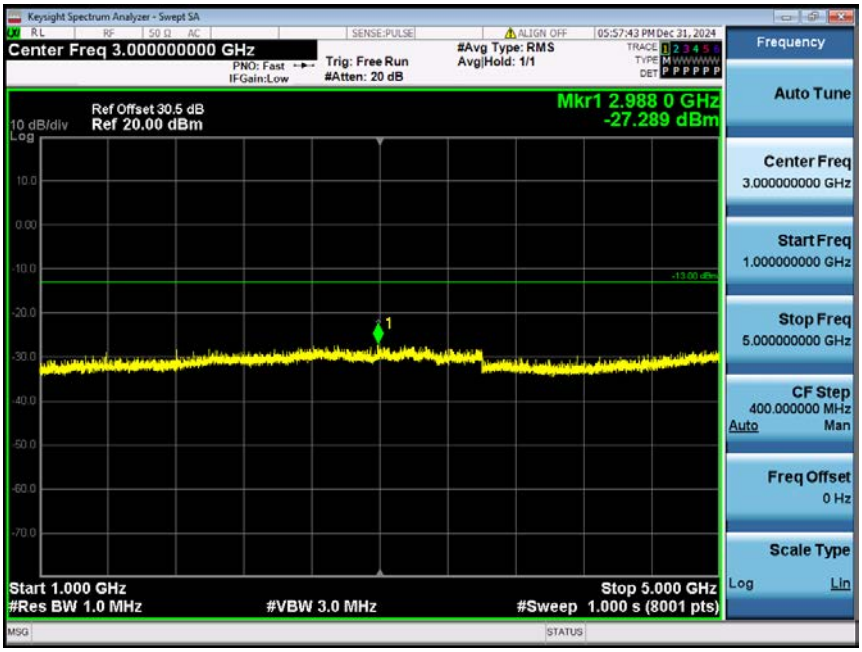
FM mode, Assigned Frequency: 462.725MHz



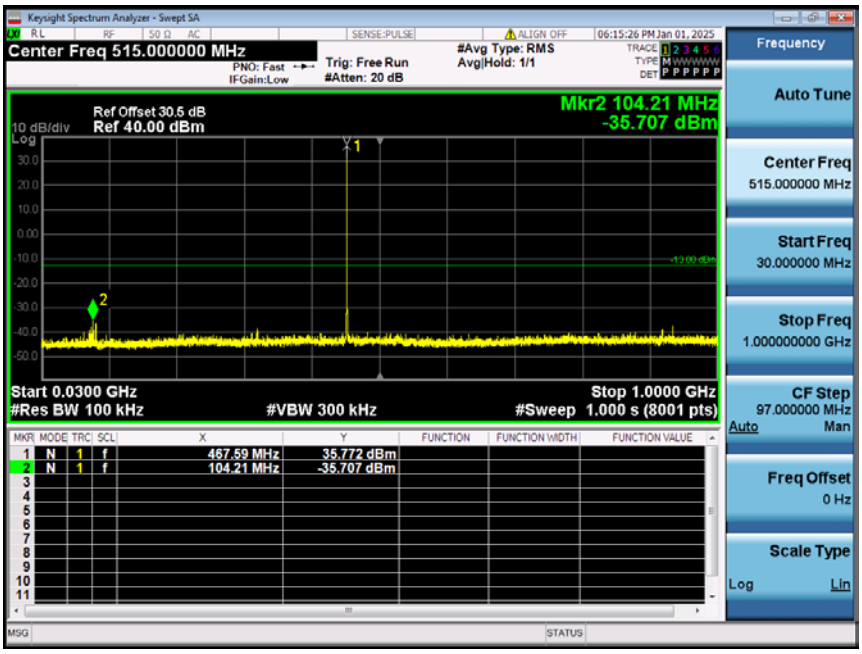


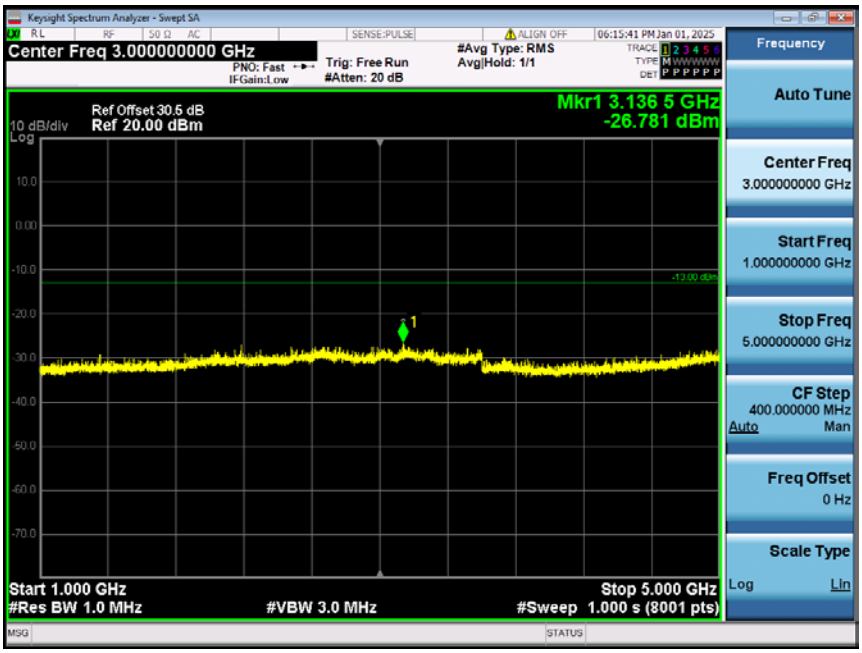
FM mode, Assigned Frequency: 462.6375MHz



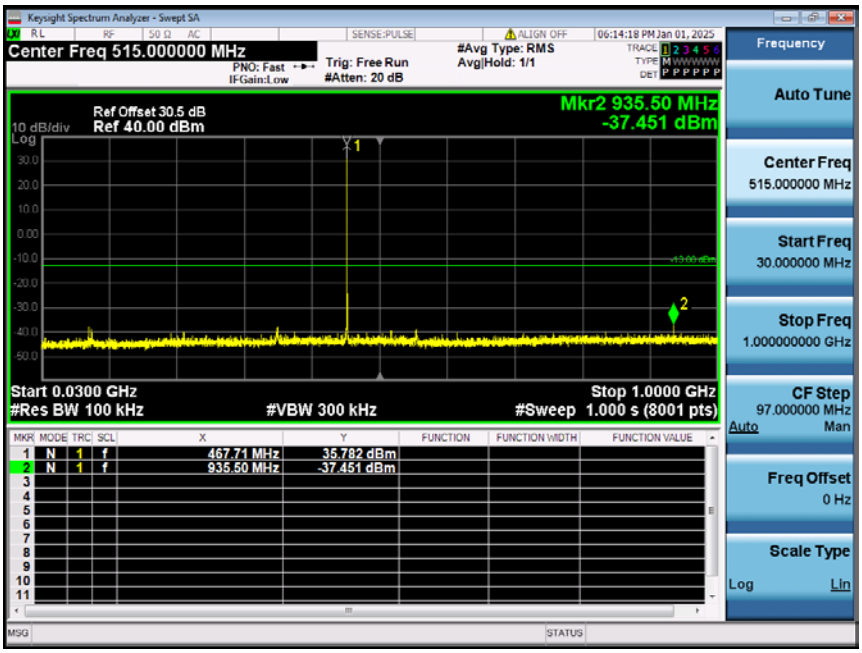


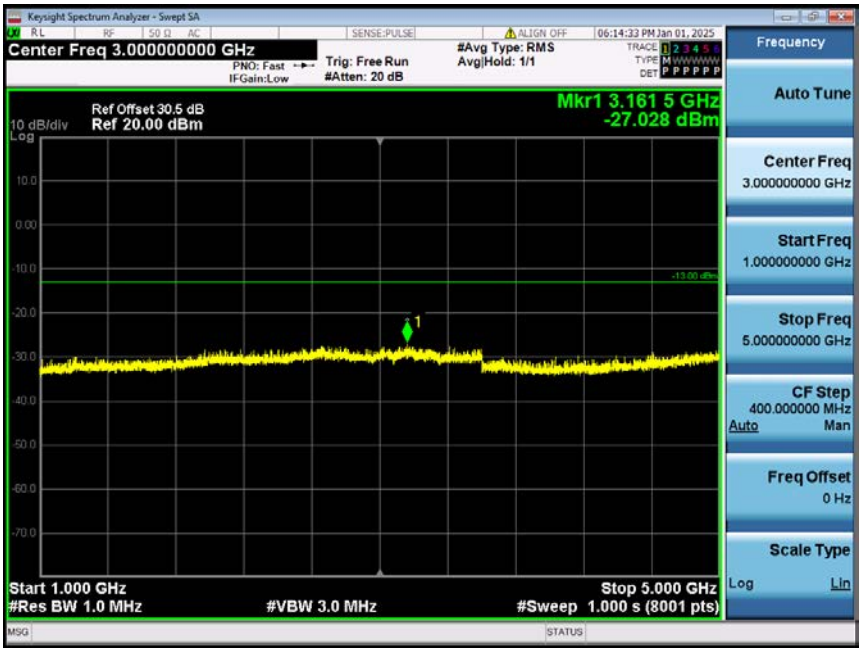
FM mode, Assigned Frequency: 467.55MHz





FM mode, Assigned Frequency: 467.725MHz





7. Radiated Spurious Emissions

Test data for 462.550MHz

Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
40.70	-55.94	-13.00	-42.94	-38.43	0.42	-14.94	Vertical	Pass
65.34	-62.03	-13.00	-49.03	-55.57	0.52	-3.79	Vertical	Pass
157.01	-57.33	-13.00	-44.33	-50.61	0.77	-3.80	Vertical	Pass
251.18	-55.84	-13.00	-42.84	-55.26	0.96	2.53	Vertical	Pass
616.37	-47.25	-13.00	-34.25	-48.40	1.58	4.87	Vertical	Pass
916.07	-43.88	-13.00	-30.88	-41.97	1.78	2.03	Vertical	Pass
47.00	-55.02	-13.00	-42.02	-40.65	0.45	-11.77	Horizontal	Pass
101.29	-62.55	-13.00	-49.55	-56.74	0.63	-3.02	Horizontal	Pass
159.78	-57.97	-13.00	-44.97	-55.77	0.79	0.74	Horizontal	Pass
262.90	-55.46	-13.00	-42.46	-54.16	0.99	1.83	Horizontal	Pass
612.06	-47.76	-13.00	-34.76	-45.58	1.61	1.58	Horizontal	Pass
903.31	-43.94	-13.00	-30.94	-42.32	1.76	2.28	Horizontal	Pass

Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
1387.91	-28.29	-13.00	-15.29	-30.86	2.31	4.88	Vertical	Pass
1850.55	-33.85	-13.00	-20.85	-35.88	2.72	4.75	Vertical	Pass
2313.19	-39.53	-13.00	-26.53	-41.92	3.10	5.49	Vertical	Pass
2775.83	-35.33	-13.00	-22.33	-38.33	3.58	6.58	Vertical	Pass
3238.46	-34.58	-13.00	-21.58	-38.72	3.64	7.78	Vertical	Pass
3701.10	-39.27	-13.00	-26.27	-45.35	3.03	9.11	Vertical	Pass
1387.91	-31.36	-13.00	-18.36	-33.93	2.31	4.88	Horizontal	Pass
1850.55	-35.15	-13.00	-22.15	-37.18	2.72	4.75	Horizontal	Pass
2313.19	-40.21	-13.00	-27.21	-42.60	3.10	5.49	Horizontal	Pass
2775.83	-45.51	-13.00	-32.51	-48.51	3.58	6.58	Horizontal	Pass
3238.46	-39.34	-13.00	-26.34	-43.48	3.64	7.78	Horizontal	Pass
3701.10	-45.51	-13.00	-32.51	-51.59	3.03	9.11	Horizontal	Pass

Test data for 462.725MHz

Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
41.28	-55.29	-13.00	-42.29	-37.86	0.42	-14.86	Vertical	Pass
69.60	-63.85	-13.00	-50.85	-57.59	0.53	-3.58	Vertical	Pass
147.92	-57.27	-13.00	-44.27	-50.03	0.75	-4.34	Vertical	Pass
229.29	-54.79	-13.00	-41.79	-54.25	0.92	2.53	Vertical	Pass
517.25	-49.56	-13.00	-36.56	-52.73	1.54	6.86	Vertical	Pass
925.76	-26.19	-13.00	-13.19	-24.07	1.80	1.83	Vertical	Pass
46.83	-56.11	-13.00	-43.11	-41.69	0.45	-11.82	Horizontal	Pass
99.53	-62.19	-13.00	-49.19	-56.47	0.63	-2.94	Horizontal	Pass
161.47	-57.37	-13.00	-44.37	-55.24	0.80	0.82	Horizontal	Pass
251.18	-55.72	-13.00	-42.72	-54.38	0.96	1.78	Horizontal	Pass
612.06	-47.94	-13.00	-34.94	-46.50	1.61	2.32	Horizontal	Pass
925.76	-29.67	-13.00	-16.67	-27.55	1.80	1.83	Horizontal	Pass

Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
1387.65	-25.49	-13.00	-12.49	-28.06	2.31	4.88	Vertical	Pass
1850.20	-32.95	-13.00	-19.95	-34.98	2.72	4.75	Vertical	Pass
2312.75	-36.53	-13.00	-23.53	-38.92	3.10	5.49	Vertical	Pass
2775.30	-35.43	-13.00	-22.43	-38.43	3.58	6.58	Vertical	Pass
3237.85	-32.78	-13.00	-19.78	-36.92	3.64	7.78	Vertical	Pass
3700.40	-41.48	-13.00	-28.48	-47.56	3.03	9.11	Vertical	Pass
1387.65	-28.56	-13.00	-15.56	-31.13	2.31	4.88	Horizontal	Pass
1850.20	-33.55	-13.00	-20.55	-35.58	2.72	4.75	Horizontal	Pass
2312.75	-36.81	-13.00	-23.81	-39.20	3.10	5.49	Horizontal	Pass
2775.30	-44.81	-13.00	-31.81	-47.81	3.58	6.58	Horizontal	Pass
3237.85	-36.44	-13.00	-23.44	-40.58	3.64	7.78	Horizontal	Pass
3700.40	-44.71	-13.00	-31.71	-50.79	3.03	9.11	Horizontal	Pass

Test data for 467.725MHz

Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
40.70	-55.79	-13.00	-42.79	-38.28	0.42	-14.94	Vertical	Pass
106.76	-62.63	-13.00	-49.63	-58.11	0.65	-1.72	Vertical	Pass
162.61	-57.26	-13.00	-44.26	-50.87	0.78	-3.46	Vertical	Pass
252.06	-55.93	-13.00	-42.93	-55.35	0.96	2.53	Vertical	Pass
614.21	-47.60	-13.00	-34.60	-48.79	1.58	4.92	Vertical	Pass
932.27	-44.12	-13.00	-31.12	-41.86	1.82	1.70	Vertical	Pass
47.16	-56.17	-13.00	-43.17	-41.84	0.45	-11.72	Horizontal	Pass
86.50	-64.85	-13.00	-51.85	-55.74	0.67	-6.29	Horizontal	Pass
158.11	-56.71	-13.00	-43.71	-47.92	0.77	-5.87	Horizontal	Pass
243.38	-56.50	-13.00	-43.50	-55.14	0.95	1.74	Horizontal	Pass
670.49	-47.68	-13.00	-34.68	-45.92	1.64	2.03	Horizontal	Pass
925.76	-25.02	-13.00	-12.02	-22.90	1.80	1.83	Horizontal	Pass

Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
1403.18	-25.04	-13.00	-12.04	-27.75	2.30	5.01	Vertical	Pass
1870.90	-34.55	-13.00	-21.55	-36.48	2.76	4.69	Vertical	Pass
2338.63	-34.19	-13.00	-21.19	-36.64	3.07	5.52	Vertical	Pass
2806.35	-35.04	-13.00	-22.04	-38.00	3.74	6.71	Vertical	Pass
3274.08	-37.00	-13.00	-24.00	-41.16	3.65	7.81	Vertical	Pass
3741.80	-39.47	-13.00	-26.47	-45.52	3.08	9.13	Vertical	Pass
1403.18	-39.11	-13.00	-26.11	-41.82	2.30	5.02	Horizontal	Pass
1870.90	-40.72	-13.00	-27.72	-42.65	2.76	4.69	Horizontal	Pass
2338.63	-45.78	-13.00	-32.78	-48.23	3.07	5.52	Horizontal	Pass
2806.35	-40.97	-13.00	-27.97	-43.93	3.74	6.71	Horizontal	Pass
3274.08	-40.02	-13.00	-27.02	-44.18	3.65	7.81	Horizontal	Pass
3741.80	-39.61	-13.00	-26.61	-45.66	3.08	9.13	Horizontal	Pass

Note: Margin = Emission level – Limit

Remark:

1) Only record the worst case in the report.
2) The disturbance above points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

- End of the Report -