

FCC PART 95

MEASUREMENT AND TEST REPORT

For

Quanzhou Wouxun Electronics Co., Ltd.

Jiangnan High Technology Industry Park, No.928 Nanhuan Road, Quanzhou, Fujian, China

FCC ID: WVTWOUXUN16

Report Type: Original Report	Product Type: Two-way radios
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Reviewed By:	Jimmy Xiao <i>Jimmy Xiao</i>
Test Laboratory:	RF Engineer Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

Product	Two-way radios
Tested Model	KG-805
Multiple Model	KG-805G, KG-703E, KG-801E, KG-879, KG-869, KG-659E, KG-978, KG-939, KG-998, KG-918, KG-828, KG-988, KG-958, KG-959, KG-969, KG-968, KG-928, KG-UV8H, KG-UV9DPlus, KG-UV9P, KG-839, KG-979, KG-989, KG-999, KG-916, KG-926, KG-936, KG-956, KG-966, KG-976, KG-986, KG-996, KG-826, KG-836, KG-856, KG-866, KG-876, KG-886, KG-896, KG-838, KG-858, KG-868, KG-878, KG-888, KG-898
Model Differences	Refer to the DOS letter
Frequency Range	462.5500-462.7250MHz 467.5675-467.7125MHz
The Maximum ERP	37.08dBm
Modulation Technique	FM
Antenna Specification	SMA External Antenna,2.15dBi
Voltage Range	DC 7.4V by battery or DC 12.0 V from Adapter by charger
Date of Test	2020-02-23 to 2020-03-04
Sample serial number	RXM200107050-RF-S1(Assigned by BACL, Shenzhen)
Received date	2020/01/07
Sample/EUT Status	Good condition
Adapter Information	Model:DSX-120050L-US Input :100-240V ,0.3A Output:12V,0.5A

Objective

This report is prepared on behalf of *Quanzhou Wouxun Electronics Co., Ltd.* in accordance with Part 2 and Part 95, Subpart A & Subpart E of the Federal Communication Commissions rules.

Related Submittal(s)/Grant(s)

No related submittal(s).

Test Methodology

All tests and measurements indicated in this document were performed in accordance with Part 95 Subpart A, Subpart E of the Federal Communication Commissions rules with TIA-603-D, Land Mobile FM or PM-Communications Equipment-Measurement and Performance Standards.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		±5%
RF Output Power with Power meter		±0.73dB
RF conducted test with spectrum		±1.6dB
Emissions, Radiated	Below 1GHz	±4.75dB
	Above 1GHz	±4.88dB
Temperature		±1 °C
Humidity		±6%
Supply voltages		±0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 342867, the FCC Designation No. : CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

Description of Channel List

462MHz main channels

Channel No.	Channel Frequency (MHz)	Channel No.	Channel Frequency (MHz)
1	462.5500	2	462.5750
3	462.6000	4	462.6250
5	462.6500	6	462.6750
7	462.7000	8	462.7250

462MHz interstitial channels

Channel No.	Channel Frequency (MHz)	Channel No.	Channel Frequency (MHz)
1	462.5625	2	462.5875
3	462.6125	4	462.6375
5	462.6625	6	462.6875
7	462.7125	8	/

467MHz interstitial channels

Channel No.	Channel Frequency (MHz)	Channel No.	Channel Frequency (MHz)
1	467.5675	2	467.5875
3	467.6125	4	467.6375
5	467.6625	6	467.6875
7	467.7125	8	/

Equipment Modifications

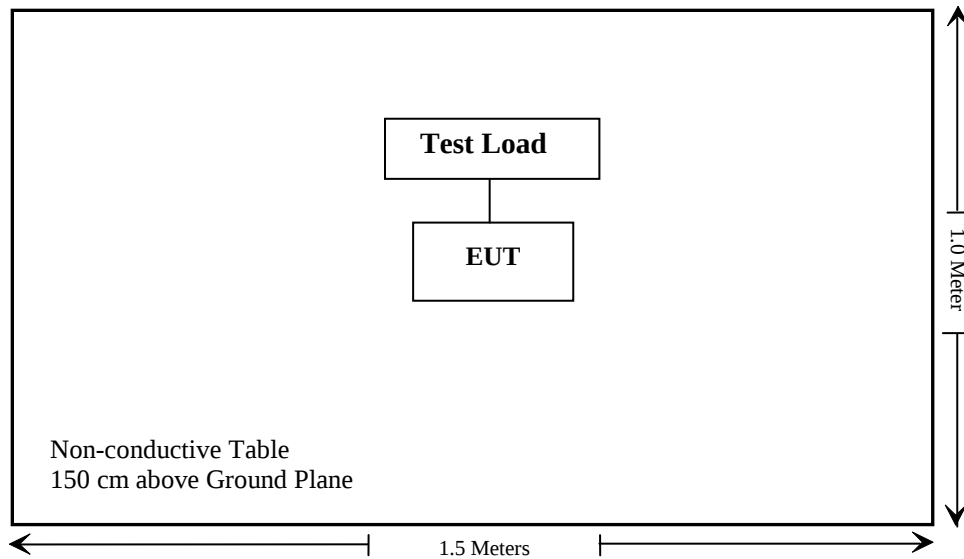
No modification was made to the EUT tested.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Unknown	Test Load	Unknown	Unknown

Block Diagram of Test Setup

Spurious emission test:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§2.1093	RF Exposure	Compliance
§95.1787(a)(4)	Antenna Requirement	Not Applicable
§2.1046, §95.1767	RF Output Power	Compliance
§2.1047, §95.1775	Modulation Characteristic	Compliance
§2.1049, §95.1773, §95.1779	Authorized Bandwidth & Emission Mask	Compliance
§2.1051, §95.1779	Spurious Emission at Antenna Terminal	Compliance
§2.1053, §95.1779	Spurious Radiated Emissions	Compliance
§2.1055(d), §95.1765	Frequency Stability	Compliance

Not Applicable: the EUT has no digital data transmissions function.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Sunol Sciences	Horn Antenna	DRH-118	A052604	2017/12/22	2020/12/21
Rohde & Schwarz	Signal Analyzer	FSEM	845987/005	2017/12/22	2020/12/21
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017/12/22	2020/12/21
COM-POWER	Pre-amplifier	PA-122	181919	2019/11/29	2020/11/28
Sonoma instrument	Pre-amplifier	310 N	186238	2019/4/20	2020/4/20
Agilent	Signal Generator	N5183A	MY51040755	2019/12/3	2020/12/3
COM POWER	Dipole Antenna	AD-100	41000	NCR	NCR
A.H. System	Horn Antenna	SAS-200/571	135	2018/9/1	2021/8/31
R&S	EMI Test Receiver	ESR3	102455	2019/7/9	2020/7/8
UTiFLEX MICRO-COAX	RF Cable	UFA147A-2362-100100	MFR64639 231029-003	2019/11/12	2020/11/12
Ducommun Technologies	RF Cable	104PEA	218124002	2019/11/12	2020/11/12
Ducommun technologies	RF Cable	RG-214	1	2019/11/12	2020/11/12
Ducommun technologies	RF Cable	RG-214	2	2019/11/12	2020/11/12
Unknown	Notch Filter	SKU 5G3	ATR0205-04-13	NCR	NCR
RF Conducted test					
WEINSCHEL	30dB Attenuator	53-30-43	PG633	Each Time	
HP Agilent	RF Communication Test Set	8920B	3325U00859	2020/1/15	2021/1/15
HP	Microwave frequency counter	5343A	2232A00827	2019/8/29	2022/8/29
Fluke	Digital Multimeter	287	19000011	2019/07/25	2020/07/24
ESPEC	Temperature & Humidity Chamber	EL-10KA	9107726	2019/12/25	2020/12/24
Long Wei	DC Power Supply	TPR-6420D	398363	NCR	NCR
Unknown	Notch Filter	SKU 5G3	ATR0205-04-13	Each Time	
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200982	2019/3/2	2020/3/2
Ducommun Technologies	RF Cable	RG-214	3	Each Time	

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §1.1307(b) & §2.1093 - RF EXPOSURE

Applicable Standard

According to FCC §1.1307(b) and §2.1093, portable device operates Part 95 should be subjected to routine environmental evaluation for RF exposure prior or equipment authorization or use.

Result: Compliance.

Please refer to SAR Report Number: RXM200107050-20.

FCC §2.1046 & §95.1767 - RF OUTPUT POWER

Applicable Standard

Per FCC §2.1046, and §95.1767, This section contains transmitting power limits for GMRS stations. The maximum transmitting power depends on which channels are being used and the type of station.

(a) 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.

(b) 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.

(c) 467 MHz interstitial channels. The effective radiated power (ERP) of hand-held portable units transmitting on the 467 MHz interstitial channels must not exceed 0.5 Watt. Each GMRS transmitter type capable of transmitting on these channels must be designed such that the ERP does not exceed 0.5 Watt.

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the emissions were measured by the substitution.

Test Data

Environmental Conditions

Temperature:	22~24 °C
Relative Humidity:	53-57 %
ATM Pressure:	101.0 kPa

The testing was performed by Zero Yan on 2020-03-04.

Test Mode: Transmitting

Indicated		Table Angle Degree	Test Ant.		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Reading (dBμV)		Height (m)	Polar (H/V)	Substituted level (dBm)	Cable Loss (dB)	Ant. Gain (dB)			
462.625MHz main channels										
462.625	95.04	245	2.1	H	20.2	1.32	0	18.88	47	28.12
462.625	108.91	99	2.4	V	38.4	1.32	0	37.08	47	9.92
462.6375MHz interstitial channels										
462.6375	95.33	240	2.5	H	20.5	1.32	0	19.18	37	17.82
462.6375	107.97	312	2.0	V	37.5	1.32	0	36.18	37	0.82
467.6375MHz interstitial channels										
467.6375	83.94	22	2.3	H	8.5	1.28	0	7.22	27	19.78
467.6375	97.46	174	1.0	V	25.8	1.28	0	24.52	27	2.48

Test Result: Compliance.

FCC §2.1047 & §95.1775 - MODULATION CHARACTERISTIC

Applicable Standard

Per FCC §2.1047 and §95.1775: Each GMRS transmitter type must be designed to satisfy the modulation requirements in this section. Operation of GMRS stations must also be in compliance with these requirements.

(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.

Test Procedure

Test Method: TIA/EIA-603-D

Test Data

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	53 %
ATM Pressure:	101.0 kPa

The testing was performed by Gavin Guo on 2020-03-03.

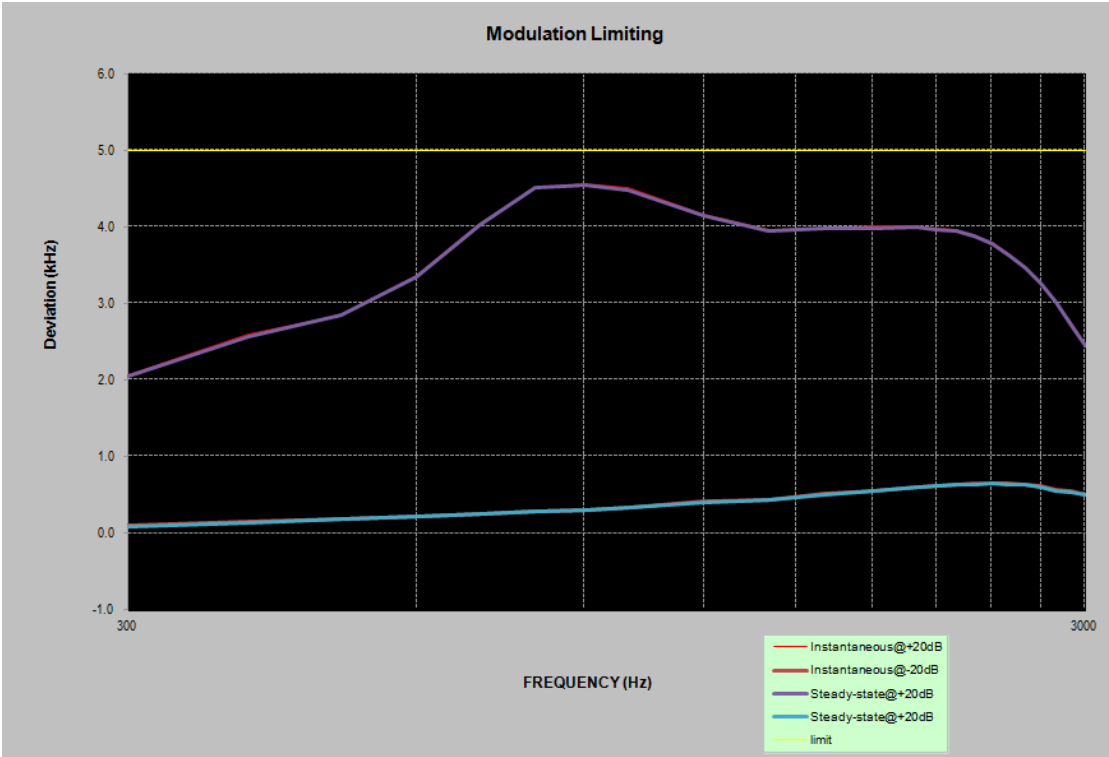
Please refer to the following tables and plots.

Test Mode: Transmitting

MODULATION LIMITING

Carrier Frequency: 462.625MHz

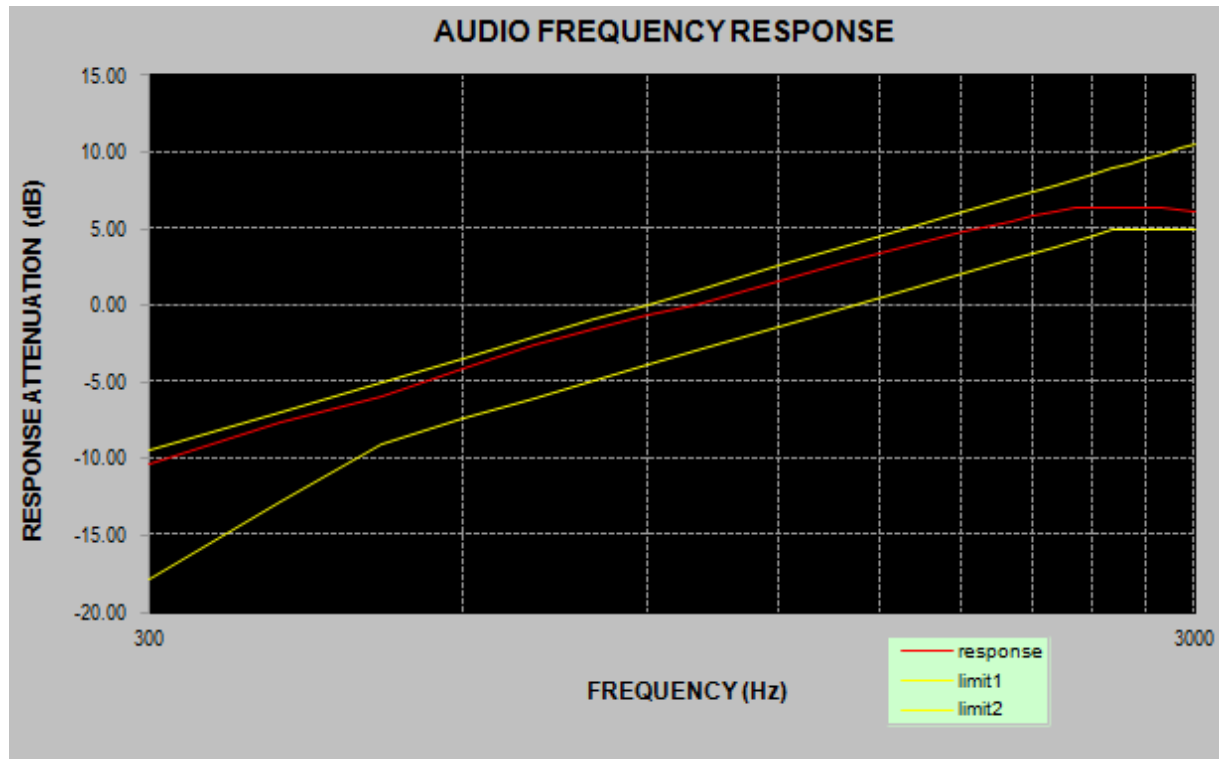
Audio Frequency (Hz)	Instantaneous		Steady-state		FCC Limit [kHz]
	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	
300	2.068	0.094	2.051	0.087	5.0
400	2.592	0.147	2.573	0.141	5.0
500	2.851	0.191	2.841	0.180	5.0
600	3.358	0.220	3.355	0.211	5.0
700	4.040	0.257	4.035	0.251	5.0
800	4.519	0.283	4.509	0.279	5.0
900	4.564	0.304	4.544	0.297	5.0
1000	4.510	0.339	4.487	0.328	5.0
1200	4.170	0.412	4.152	0.400	5.0
1400	3.967	0.440	3.949	0.429	5.0
1600	3.975	0.512	3.975	0.506	5.0
1800	4.006	0.552	3.981	0.551	5.0
2000	4.015	0.608	3.995	0.607	5.0
2100	3.987	0.623	3.967	0.611	5.0
2200	3.961	0.635	3.944	0.626	5.0
2300	3.884	0.643	3.882	0.630	5.0
2400	3.792	0.647	3.777	0.646	5.0
2500	3.650	0.654	3.631	0.639	5.0
2600	3.483	0.626	3.458	0.626	5.0
2700	3.267	0.612	3.264	0.602	5.0
2800	3.017	0.570	3.013	0.558	5.0
2900	2.743	0.544	2.721	0.533	5.0
3000	2.463	0.506	2.450	0.504	5.0



Audio Frequency Response

Carrier Frequency: 462.625 MHz

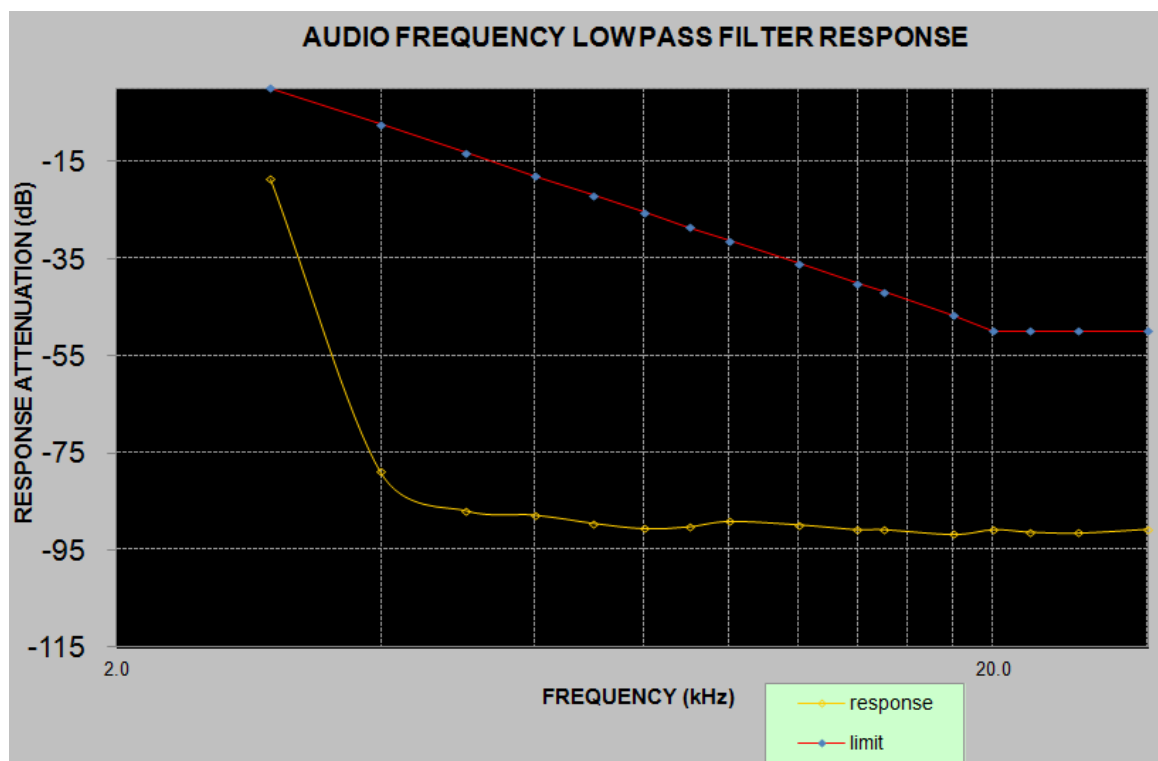
Audio Frequency (Hz)	Response Attenuation (dB)
300	-10.29
400	-7.58
500	-5.92
600	-4.11
700	-2.63
800	-1.48
900	-0.59
1000	0.00
1200	1.63
1400	2.89
1600	3.86
1800	4.80
2000	5.52
2100	5.85
2200	6.12
2300	6.32
2400	6.43
2500	6.41
2600	6.42
2700	6.37
2800	6.33
2900	6.22
3000	6.08



Audio frequency lows pass filter response

Carrier Frequency: 462.625 MHz

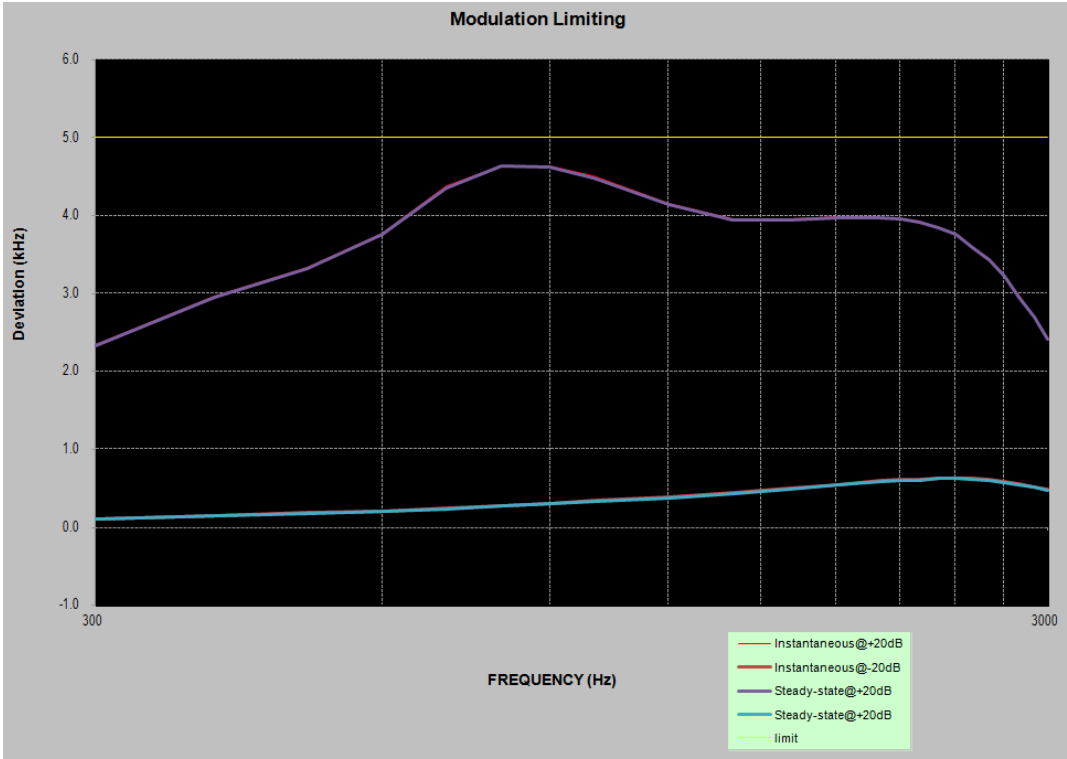
Audio Frequency (kHz)	Response Attenuation (dB)	Limit (dB)
1.0	0.0	/
3.0	-18.7	0.0
4.0	-78.9	-7.5
5.0	-86.9	-13.3
6.0	-87.8	-18.1
7.0	-89.5	-22.1
8.0	-90.6	-25.6
9.0	-90.2	-28.6
10.0	-89.1	-31.4
12.0	-89.8	-36.1
14.0	-90.8	-40.1
15.0	-90.8	-41.9
18.0	-91.8	-46.7
20.0	-90.8	-50.0
22.0	-91.3	-50.0
25.0	-91.5	-50.0
30.0	-90.7	-50.0



MODULATION LIMITING

Carrier Frequency: 462.6375MHz

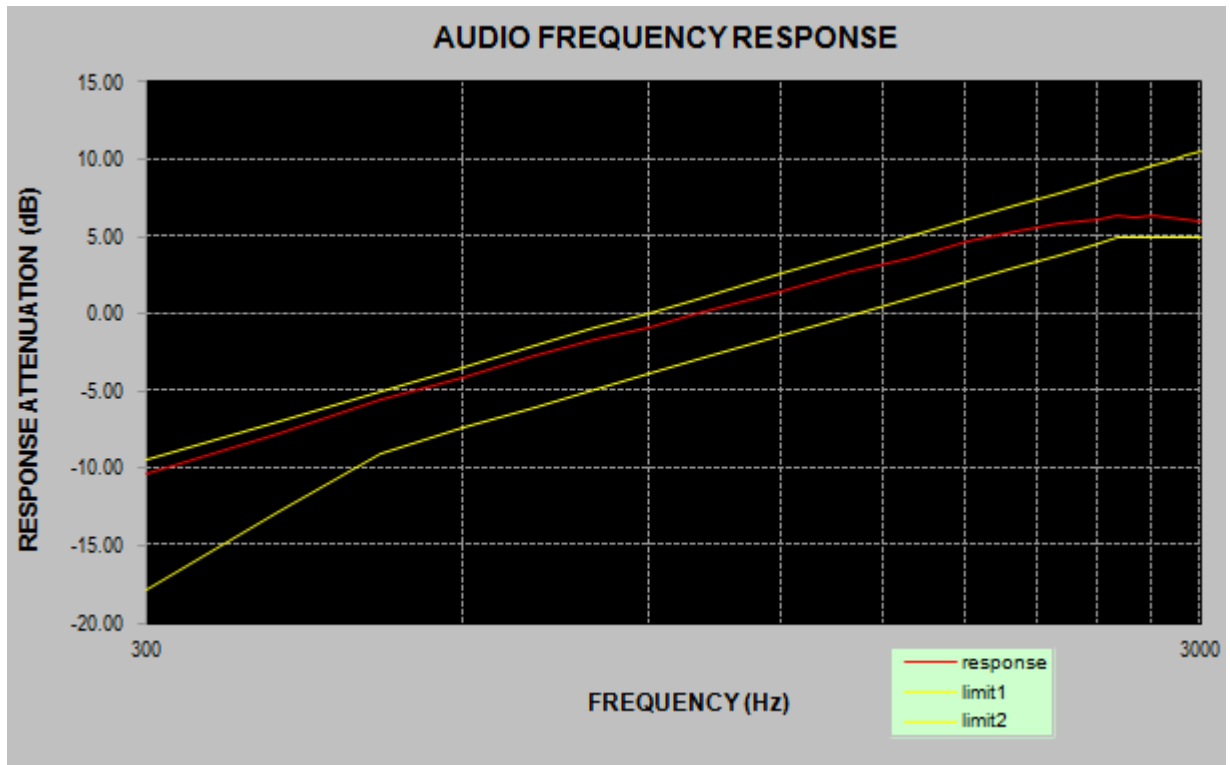
Audio Frequency (Hz)	Instantaneous		Steady-state		FCC Limit [kHz]
	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	
300	2.345	0.104	2.336	0.101	5.0
400	2.969	0.153	2.960	0.152	5.0
500	3.338	0.186	3.315	0.179	5.0
600	3.774	0.212	3.760	0.205	5.0
700	4.377	0.256	4.352	0.241	5.0
800	4.645	0.284	4.637	0.271	5.0
900	4.644	0.306	4.625	0.299	5.0
1000	4.510	0.345	4.487	0.338	5.0
1200	4.162	0.388	4.141	0.379	5.0
1400	3.957	0.441	3.940	0.435	5.0
1600	3.961	0.501	3.941	0.489	5.0
1800	3.982	0.545	3.970	0.542	5.0
2000	3.980	0.596	3.979	0.583	5.0
2100	3.961	0.611	3.959	0.609	5.0
2200	3.926	0.617	3.922	0.609	5.0
2300	3.851	0.629	3.851	0.627	5.0
2400	3.756	0.633	3.754	0.628	5.0
2500	3.612	0.625	3.592	0.622	5.0
2600	3.441	0.611	3.438	0.610	5.0
2700	3.221	0.592	3.219	0.581	5.0
2800	2.975	0.558	2.955	0.552	5.0
2900	2.704	0.524	2.702	0.515	5.0
3000	2.424	0.485	2.410	0.481	5.0



Audio Frequency Response

Carrier Frequency: 462.6375 MHz

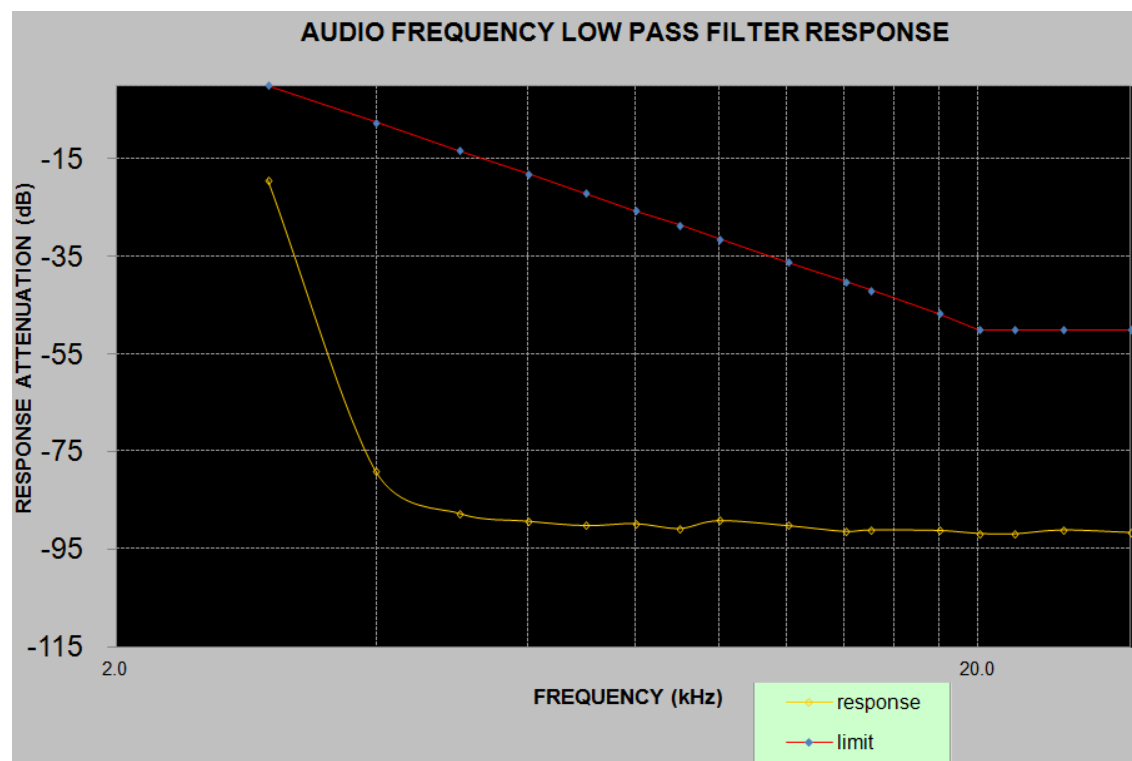
Audio Frequency (Hz)	Response Attenuation (dB)
300	-10.31
400	-7.77
500	-5.50
600	-4.07
700	-2.69
800	-1.65
900	-0.87
1000	0.00
1200	1.47
1400	2.69
1600	3.69
1800	4.63
2000	5.33
2100	5.63
2200	5.85
2300	6.05
2400	6.15
2500	6.32
2600	6.25
2700	6.32
2800	6.19
2900	6.10
3000	5.99



Audio frequency lows pass filter response

Carrier Frequency: 462.6375 MHz

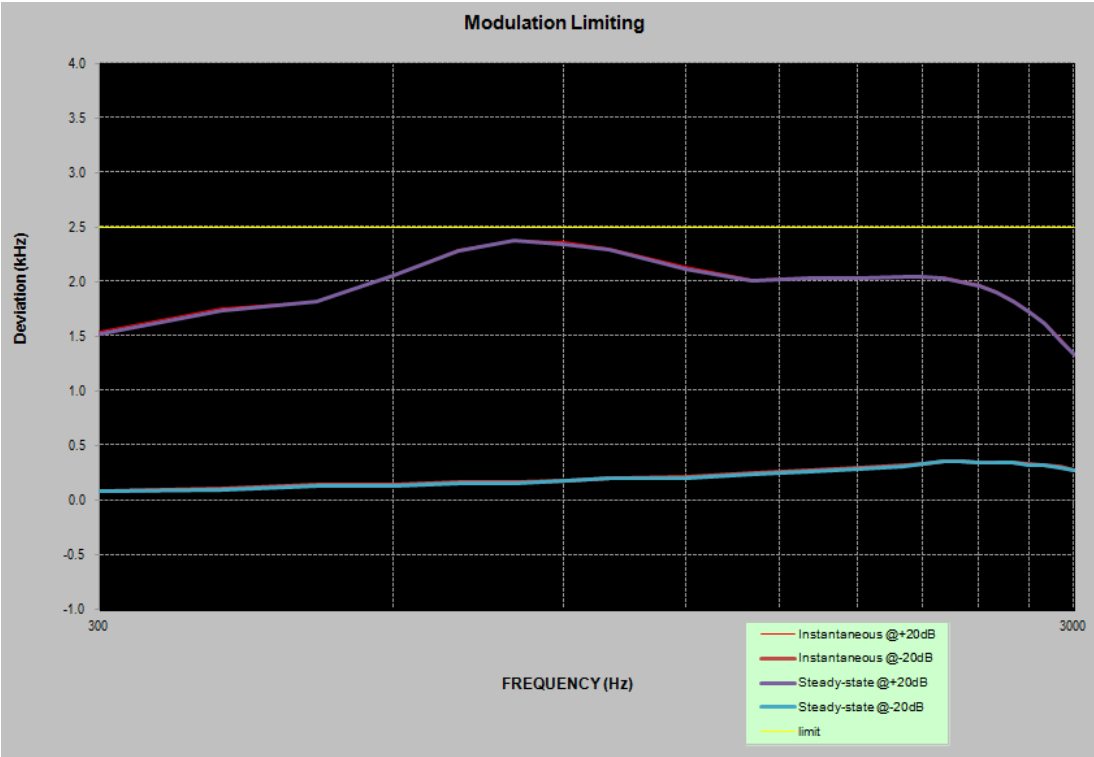
Audio Frequency (kHz)	Response Attenuation (dB)	Limit (dB)
1.0	0.0	/
3.0	-19.3	0.0
4.0	-79.0	-7.5
5.0	-87.7	-13.3
6.0	-89.3	-18.1
7.0	-90.2	-22.1
8.0	-89.8	-25.6
9.0	-90.8	-28.6
10.0	-89.2	-31.4
12.0	-90.2	-36.1
14.0	-91.4	-40.1
15.0	-91.1	-41.9
18.0	-91.2	-46.7
20.0	-91.8	-50.0
22.0	-91.9	-50.0
25.0	-91.1	-50.0
30.0	-91.6	-50.0



MODULATION LIMITING

Carrier Frequency: 467.6375MHz

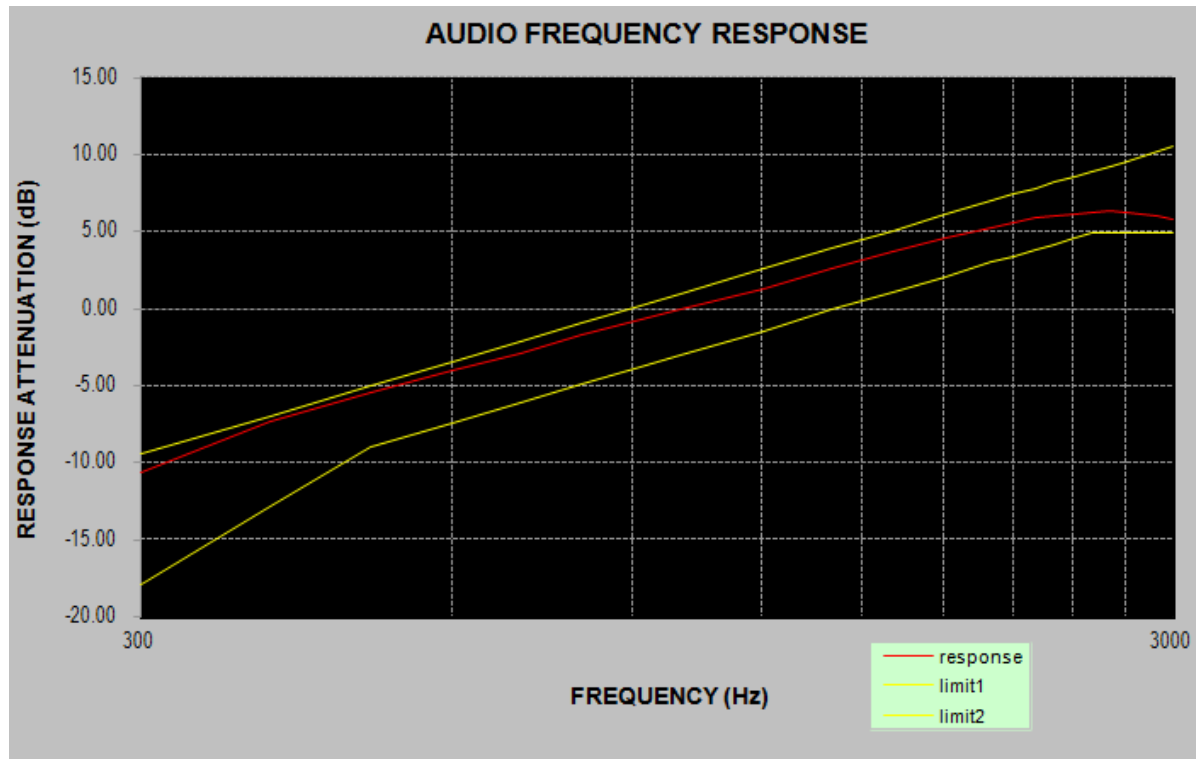
Audio Frequency (Hz)	Instantaneous		Steady-state		FCC Limit [kHz]
	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	
300	1.543	0.084	1.524	0.082	2.5
400	1.758	0.104	1.740	0.096	2.5
500	1.819	0.139	1.819	0.132	2.5
600	2.057	0.146	2.053	0.135	2.5
700	2.291	0.163	2.289	0.159	2.5
800	2.384	0.162	2.378	0.154	2.5
900	2.364	0.181	2.348	0.173	2.5
1000	2.311	0.202	2.297	0.198	2.5
1200	2.138	0.213	2.123	0.206	2.5
1400	2.020	0.248	2.012	0.236	2.5
1600	2.035	0.273	2.033	0.265	2.5
1800	2.048	0.303	2.033	0.291	2.5
2000	2.052	0.325	2.047	0.313	2.5
2100	2.048	0.336	2.041	0.336	2.5
2200	2.044	0.359	2.038	0.352	2.5
2300	2.013	0.353	1.993	0.352	2.5
2400	1.975	0.351	1.965	0.345	2.5
2500	1.915	0.349	1.903	0.343	2.5
2600	1.830	0.347	1.817	0.344	2.5
2700	1.732	0.332	1.726	0.326	2.5
2800	1.626	0.327	1.613	0.320	2.5
2900	1.483	0.306	1.463	0.294	2.5
3000	1.331	0.278	1.328	0.272	2.5



Audio Frequency Response

Carrier Frequency: 467.6375 MHz

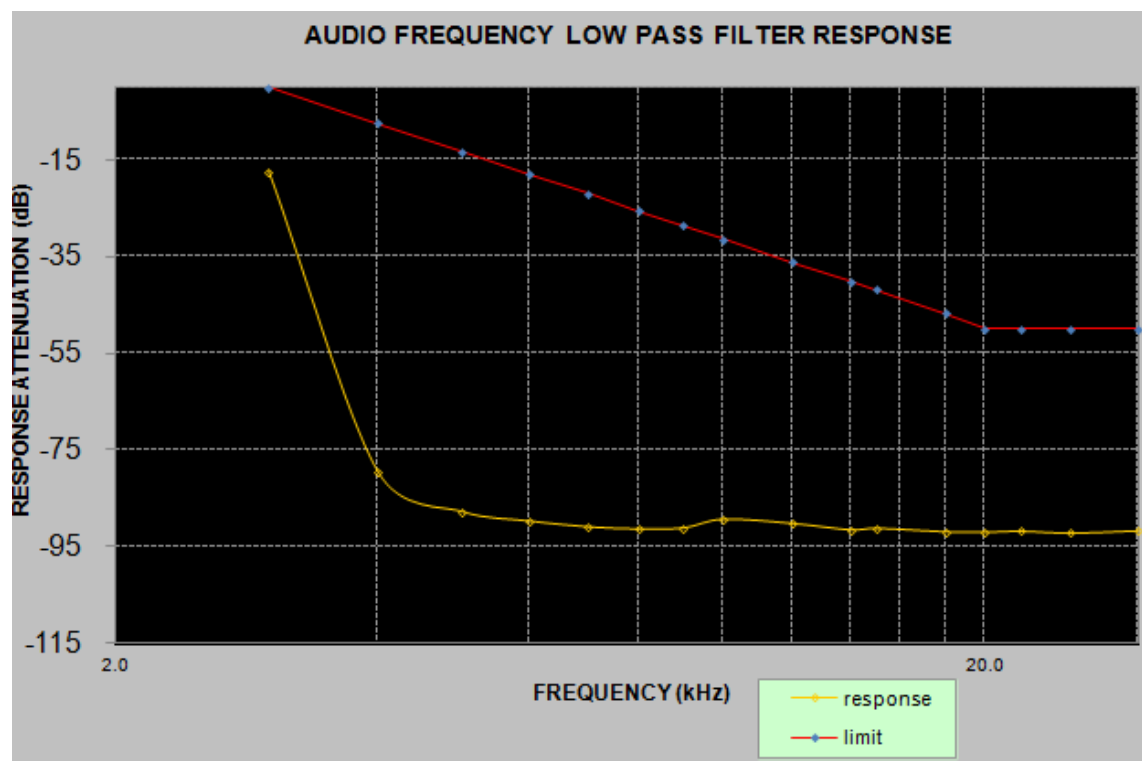
Audio Frequency (Hz)	Response Attenuation (dB)
300	-10.66
400	-7.35
500	-5.45
600	-4.04
700	-2.91
800	-1.69
900	-0.80
1000	0.00
1200	1.33
1400	2.65
1600	3.72
1800	4.58
2000	5.31
2100	5.60
2200	5.90
2300	5.99
2400	6.10
2500	6.22
2600	6.32
2700	6.24
2800	6.10
2900	6.06
3000	5.82



Audio frequency lows pass filter response

Carrier Frequency: 467.6375 MHz

Audio Frequency (kHz)	Response Attenuation (dB)	Limit (dB)
1.0	0.0	/
3.0	-17.5	0.0
4.0	-79.4	-7.5
5.0	-87.7	-13.3
6.0	-89.7	-18.1
7.0	-90.9	-22.1
8.0	-91.3	-25.6
9.0	-91.1	-28.6
10.0	-89.3	-31.4
12.0	-90.2	-36.1
14.0	-91.5	-40.1
15.0	-91.2	-41.9
18.0	-91.9	-46.7
20.0	-92.0	-50.0
22.0	-91.8	-50.0
25.0	-92.2	-50.0
30.0	-91.7	-50.0



FCC §2.1049 & §95.1773 & §95.1779(a)(c) - AUTHORIZED BANDWIDTH AND EMISSION MASK

Applicable Standard

According to §95.1773. Each GMRS transmitter type must be designed such that the occupied bandwidth does not exceed the authorized bandwidth for the channels used. Operation of GMRS stations must also be in compliance with these requirements.

(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.

According to §95.1779. Each GMRS transmitter type must be designed to comply with the applicable unwanted emissions limits in this section.

(a) Emission masks. Emission masks applicable to transmitting equipment in the GMRS are defined by the requirements in the following table. The numbers in the attenuation requirements column refer to rule paragraph numbers under paragraph (b) of this section.

Emission types filter	Attenuation requirements
-----------------------	--------------------------

(b) Attenuation requirements. The power of unwanted emissions must be attenuated below the transmitter output power in Watts (P) by at least:

(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.

(b) Attenuation requirements. The power of unwanted emissions must be attenuated below the transmitter output power in Watts (P) by at least:

(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.

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

(c) Measurement bandwidths. The power of unwanted emissions in the frequency bands specified in paragraphs (b)(1) through (4) of this section is measured with a reference bandwidth of 300 Hz. The power of unwanted emissions in the frequency range specified in paragraph (b)(5) of this section is measured with a reference bandwidth of at least 30 kHz.

Test Procedure

TIA-603-D, section 2.2.11

Test Data**Environmental Conditions**

Temperature:	26°C
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Gavin Guo on 2020-02-23.

Test Mode: Transmitting

Item	Frequency (MHz)	OBW (kHz)	26dB Bandwidth (kHz)	Limit (kHz)	Result
GMRS	462.6250	10.673	15.673	20	Pass
GMRS	462.6375	10.673	15.673	20	Pass
GMRS	467.6375	10.192	10.769	12.5	Pass

Emission Designator Per CFR 47 §2.201& §2.202&, $B_n = 2M + 2D$:

The maximum modulating frequency is 3.0 kHz with a 2.5 kHz deviation.

$BW = 2(M+D) = 2*(3.0 \text{ kHz} + 2.5 \text{ kHz}) = 11 \text{ kHz} \rightarrow 11K0$

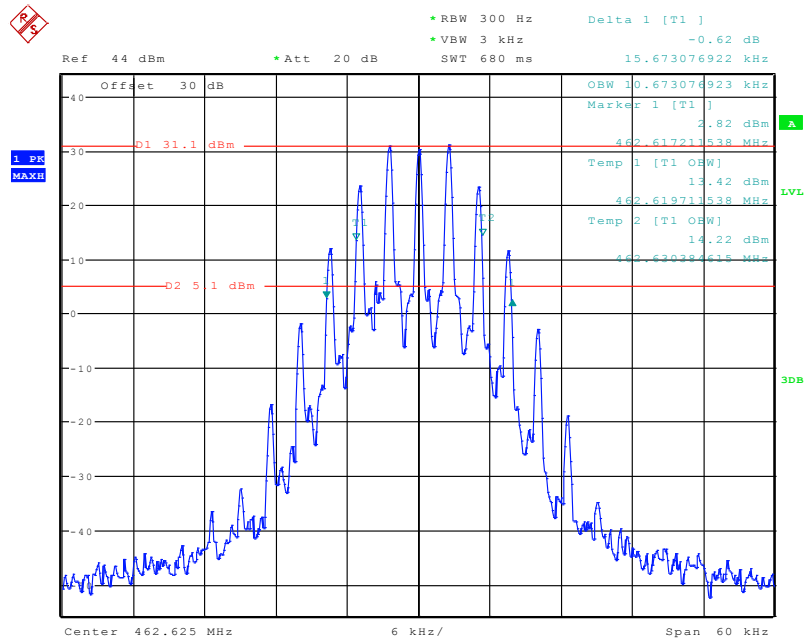
F3E portion of the designator represents an FM voice transmission Therefore, the entire designator for 12.5 kHz channel spacing FM mode is 11K0F3E.

The maximum modulating frequency is 3.0 kHz with a 5.0 kHz deviation.

$BW = 2(M+D) = 2*(3.0 \text{ kHz} + 5.0 \text{ kHz}) = 16 \text{ kHz} \rightarrow 16K0$

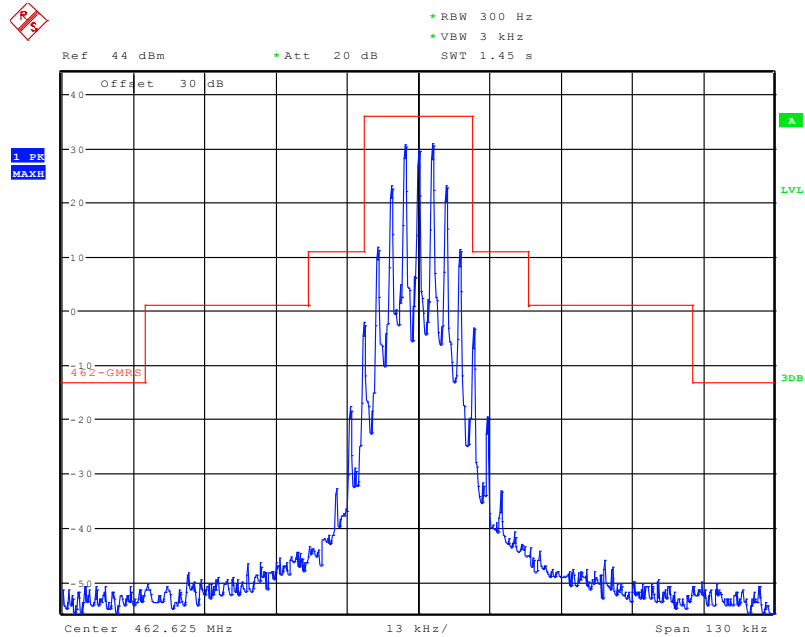
F3E portion of the designator represents an FM voice transmission Therefore, the entire designator for 12.5 kHz channel spacing FM mode is 16K0F3E.

OBW, 462.625 MHz



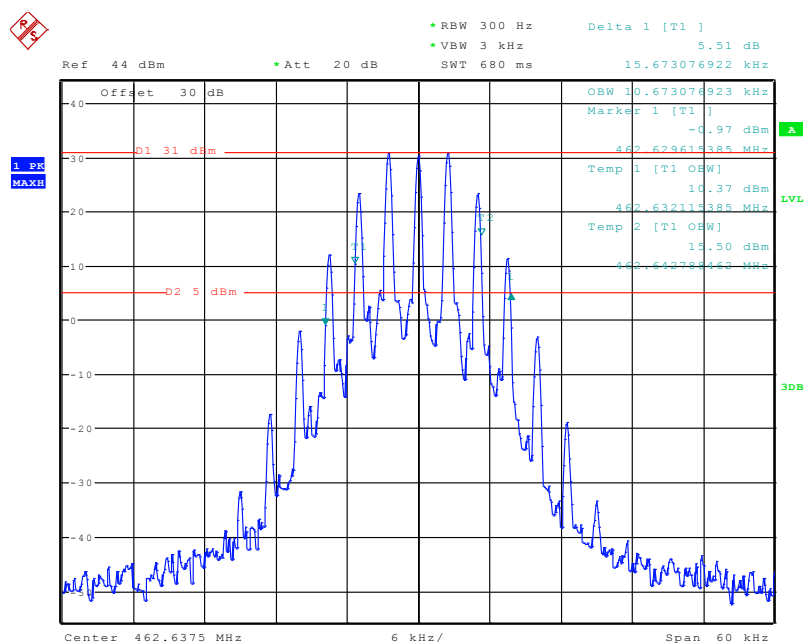
Date: 23.FEB.2020 14:02:05

Emission Mask, 462.625 MHz



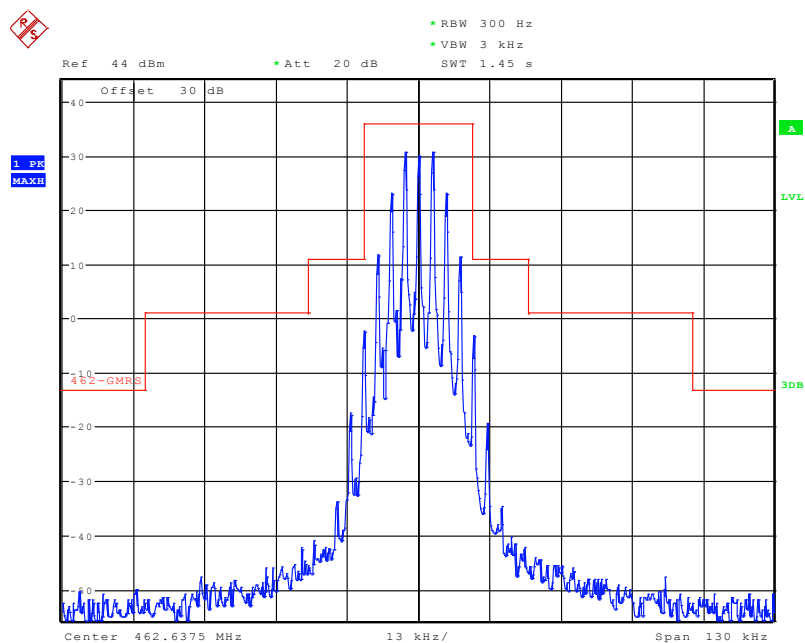
Date: 23.FEB.2020 14:24:16

OBW, 462.6375 MHz



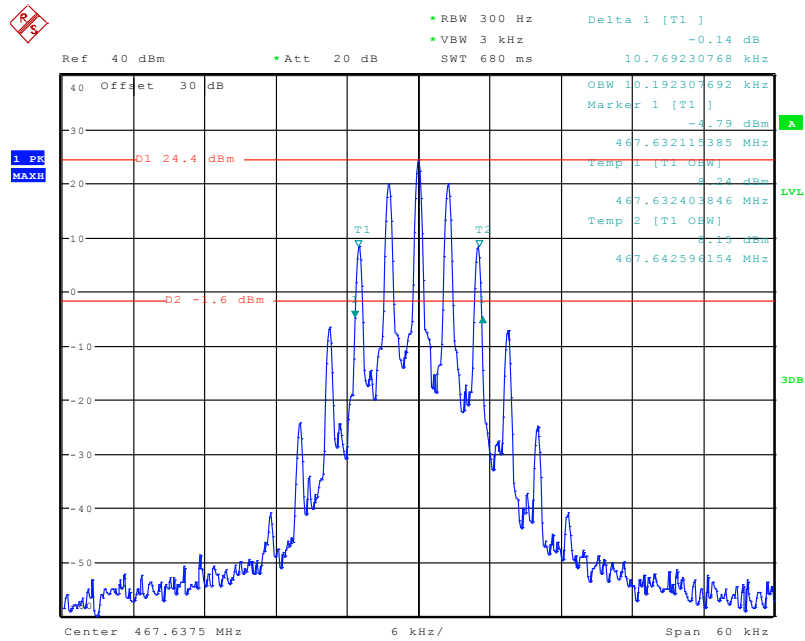
Date: 23.FEB.2020 13:52:18

Emission Mask, 462.6375 MHz



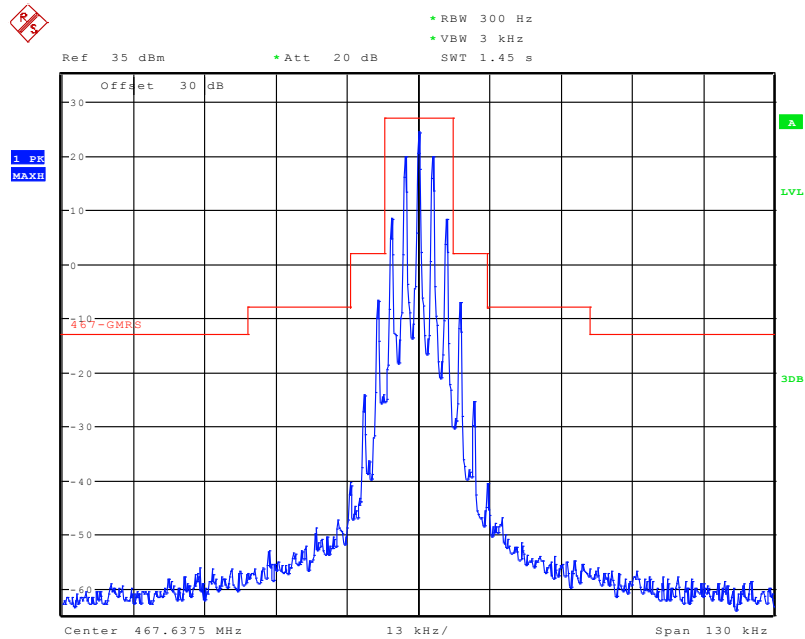
Date: 23.FEB.2020 14:15:56

OBW, 467.6375 MHz



Date: 23.FEB.2020 13:59:11

Emission Mask, 467.6375 MHz



Date: 23.FEB.2020 14:53:46

FCC §2.1051 & §95.1779 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

According to §95.1779. Each GMRS transmitter type must be designed to comply with the applicable unwanted emissions limits in this section.

(b) Attenuation requirements. The power of unwanted emissions must be attenuated below the transmitter output power in Watts (P) by at least:

(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.

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

(c) Measurement bandwidths. The power of unwanted emissions in the frequency bands specified in paragraphs (b)(1) through (4) of this section is measured with a reference bandwidth of 300 Hz. The power of unwanted emissions in the frequency range specified in paragraph (b)(5) of this section is measured with a reference bandwidth of at least 30 kHz.

(d) Measurement conditions. The requirements in this section apply to each GMRS transmitter type both with and without the connection of permitted attachments, such as an external speaker, microphone, power cord and/or antenna.

Test Procedure

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz for below 1GHz, and 1MHz for above 1GHz. sufficient scans were taken to show any out of band emissions up to 10th harmonic.

Test Data

Environmental Conditions

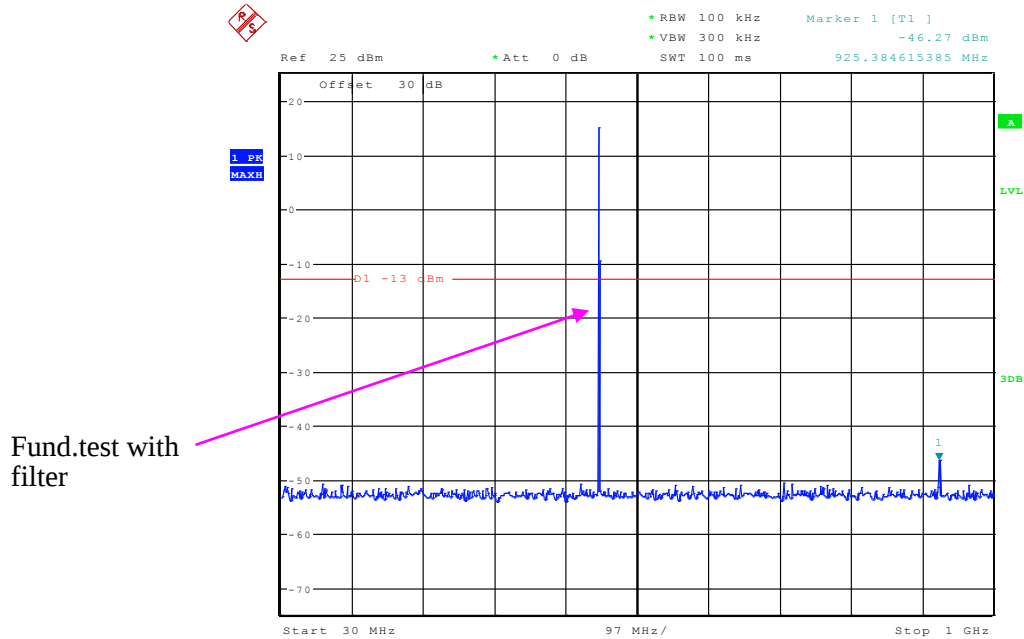
Temperature:	26 °C
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Gavin Guo on 2020-02-23.

Test Mode: Transmitting

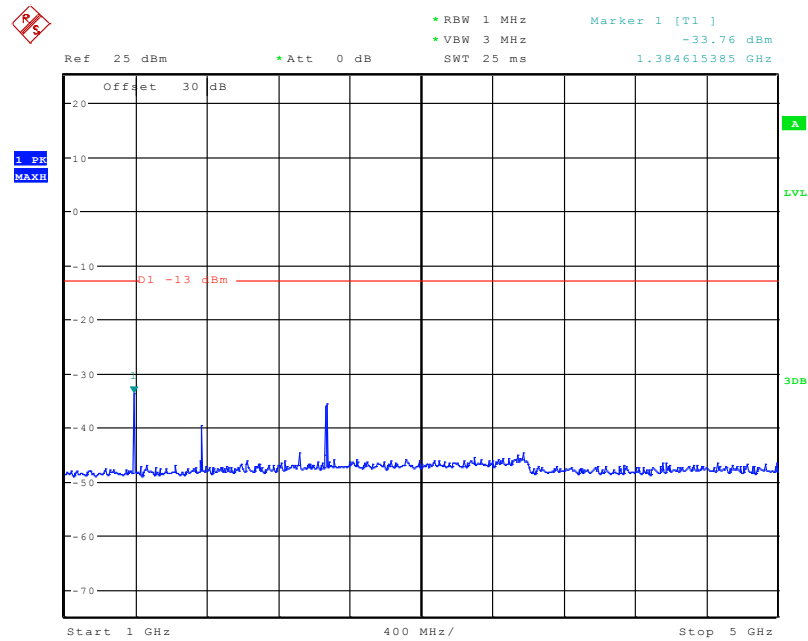
Please refer to the following plots.

30 MHz – 1 GHz, 462.625 MHz



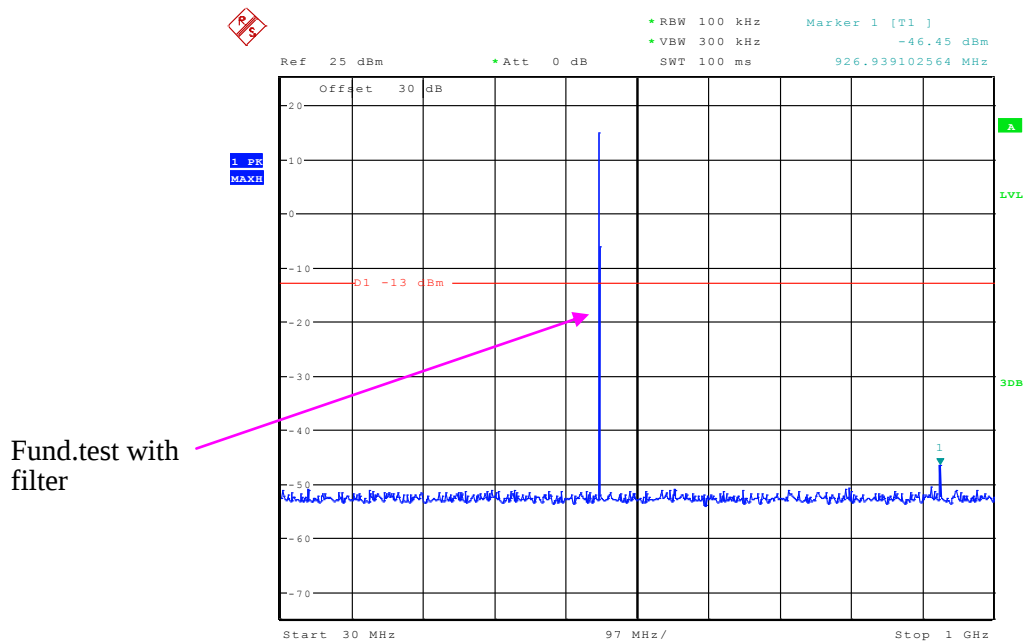
Date: 23.FEB.2020 15:11:49

1 GHz – 5.0 GHz, 462.625 MHz



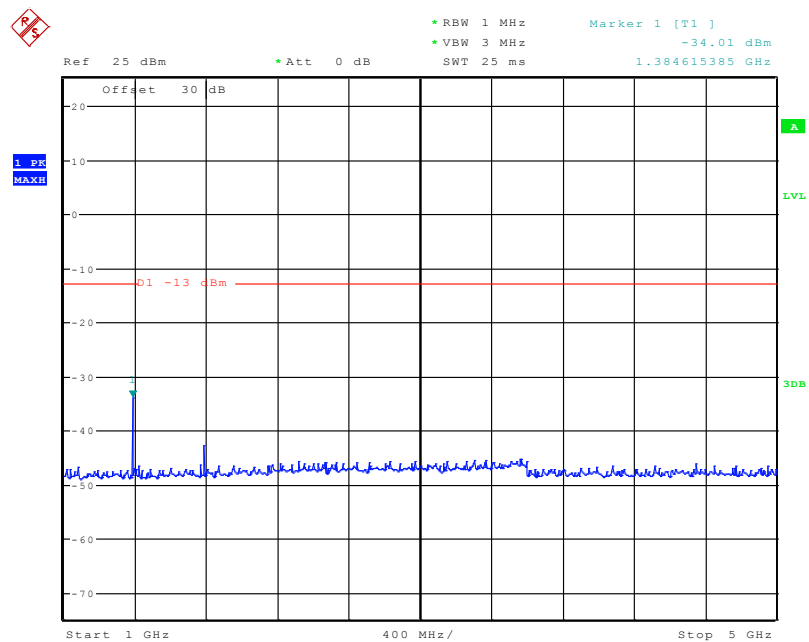
Date: 23.FEB.2020 15:15:24

30 MHz – 1 GHz, 462.6375 MHz



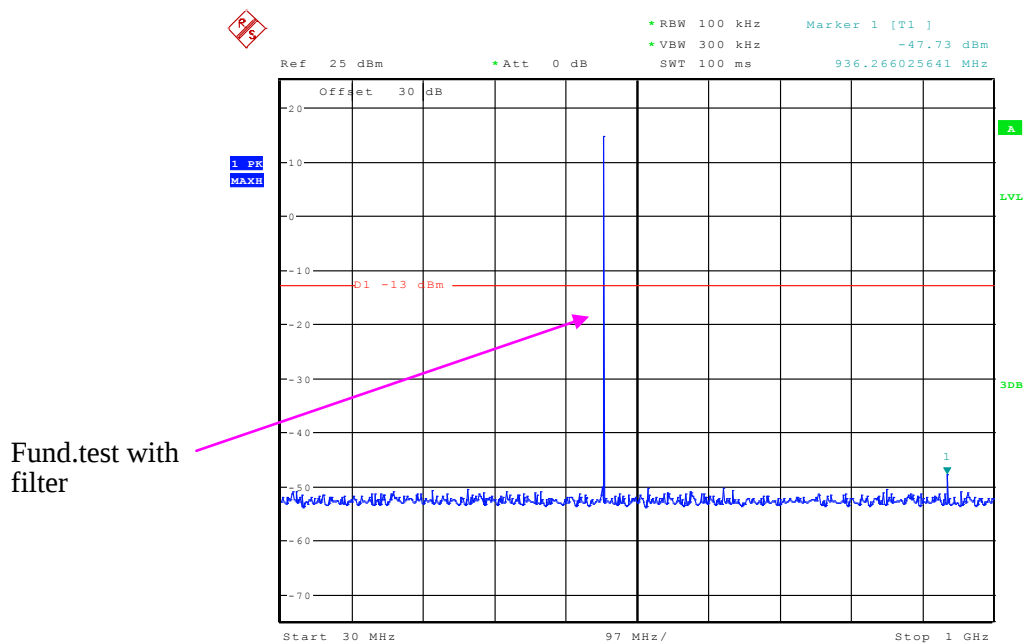
Date: 23.FEB.2020 15:07:22

1 GHz – 5.0 GHz, 462.6375 MHz



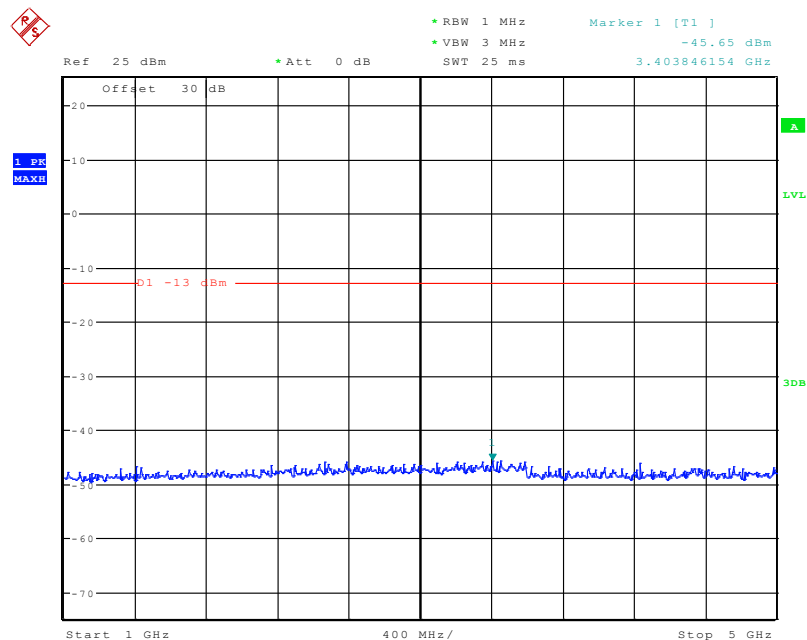
Date: 23.FEB.2020 15:17:54

30 MHz – 1 GHz, 467.6375 MHz



Date: 23.FEB.2020 15:09:21

1 GHz – 5.0 GHz, 467.6375 MHz



Date: 23.FEB.2020 15:16:46

FCC §2.1053 & §95.1779- RADIATED SPURIOUS EMISSION

Applicable Standard

FCC §2.1053 and §95.1779. Each GMRS transmitter type must be designed to comply with the applicable unwanted emissions limits in this section.

(b) Attenuation requirements. The power of unwanted emissions must be attenuated below the transmitter output power in Watts (P) by at least:

(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.

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

(c) Measurement bandwidths. The power of unwanted emissions in the frequency bands specified in paragraphs (b)(1) through (4) of this section is measured with a reference bandwidth of 300 Hz. The power of unwanted emissions in the frequency range specified in paragraph (b)(5) of this section is measured with a reference bandwidth of at least 30 kHz.

(d) Measurement conditions. The requirements in this section apply to each GMRS transmitter type both with and without the connection of permitted attachments, such as an external speaker, microphone, power cord and/or antenna.

Test Procedure

The transmitter was placed on a wooden turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = $10 \lg (\text{TXpwr in Watts}/0.001)$ -the absolute level

Spurious attenuation limit in dB = $43 + 10 \lg_{10} (\text{power out in Watts})$

Test Data

Environmental Conditions

Temperature:	22~24°C
Relative Humidity:	53 ~57%
ATM Pressure:	101.0 kPa

The testing was performed by Zero Yan and Alan He on 2020-03-04.

Test Mode: Transmitting

Indicated		Table Angle Degree	Test Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	Receiver Reading (dBuV)		Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
462.625MHz main channels										
925.25	39.08	23	1.0	H	-61.5	1.37	0.0	-62.87	-13	49.87
925.25	41.86	213	1.3	V	-57.5	1.37	0.0	-58.87	-13	45.87
1387.88	57.74	9	1.8	H	-50.6	1.60	7.90	-44.30	-13	31.30
1387.88	67.99	357	2.0	V	-40.6	1.60	7.90	-34.30	-13	21.30
1850.50	45.42	160	1.9	H	-57.8	1.30	9.40	-49.70	-13	36.70
1850.50	46.82	217	1.3	V	-56.7	1.30	9.40	-48.60	-13	35.60
2313.13	51.99	180	1.2	H	-54.0	1.30	10.00	-45.30	-13	32.30
2313.13	48.98	97	2.2	V	-56.9	1.30	10.00	-48.20	-13	35.20
462.6375MHz interstitial channels										
925.275	36.68	23	1.0	H	-63.9	1.37	0.0	-65.27	-13	52.27
925.275	41.74	213	1.3	V	-57.6	1.37	0.0	-58.97	-13	45.97
1387.91	56.15	191	2.4	H	-52.1	1.60	7.90	-45.80	-13	32.80
1387.91	66.22	246	1.1	V	-42.3	1.60	7.90	-36.00	-13	23.00
1850.55	45.94	287	1.7	H	-57.3	1.30	9.40	-49.20	-13	36.20
1850.55	45.80	224	2.4	V	-57.7	1.30	9.40	-49.60	-13	36.60
2313.19	51.07	282	1.7	H	-54.9	1.30	10.00	-46.20	-13	33.20
2313.19	47.90	300	1.8	V	-58.0	1.30	10.00	-49.30	-13	36.30
467.6375MHz interstitial channels										
935.275	36.26	23	1.0	H	-64.3	1.37	0.0	-65.67	-13	52.67
935.275	38.64	213	1.3	V	-60.7	1.37	0.0	-62.07	-13	49.07
1402.91	45.93	296	2.2	H	-62.4	1.60	7.90	-56.10	-13	43.10
1402.91	58.32	117	1.9	V	-50.2	1.60	7.90	-43.90	-13	30.90
1870.55	45.07	154	1.7	H	-58.2	1.30	9.40	-50.10	-13	37.10
1870.55	42.57	167	1.6	V	-60.9	1.30	9.40	-52.80	-13	39.80
2338.19	45.48	47	1.3	H	-60.5	1.30	10.00	-51.80	-13	38.80
2338.19	42.99	58	1.3	V	-62.9	1.30	10.00	-54.20	-13	41.20

Note:

- 1) Absolute Level = Substituted Level - Cable loss + Antenna Gain
- 2) Margin = Limit- Absolute Level

FCC §2.1055 (d) & §95.1765 - FREQUENCY STABILITY

Applicable Standard

According to FCC §2.1055(a) (1), the frequency stability shall be measured with variation of ambient temperature from -30 °C to +50 °C, and according to FCC 2.1055(d) (2), the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point which is specified by the manufacturer.

According to FCC §95.1765, Each GMRS transmitter type must be designed to comply with the frequency accuracy requirements in this section under normal operating conditions. Operators of GMRS stations must also ensure compliance with these requirements.

(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.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a Frequency Counter via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the Frequency Counter.

Frequency Stability vs. Voltage (item 1 or item 2 will be chosen according to different condition) :

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

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

The output frequency was recorded for each voltage.

Test Data

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Gavin Guo on 2020-03-03.

Test Mode: Transmitting

Reference Frequency: 462.625 MHz, Limit: ± 2.5 ppm			
Environment Temperature (°C)	Voltage Supplied (V _{DC})	Measurement Frequency (MHz)	Frequency Error (ppm)
Frequency Stability Ver. Temperature			
50	7.4	462.624793	-0.45
40	7.4	462.624798	-0.44
30	7.4	462.624805	-0.42
20	7.4	462.624816	-0.40
10	7.4	462.624803	-0.43
0	7.4	462.624811	-0.41
-10	7.4	462.624792	-0.45
-20	7.4	462.624788	-0.46
-30	7.4	462.624791	-0.45
Frequency Stability Ver. Input Voltage			
20	6.4	462.624813	-0.40
20	8.1	462.624819	-0.39

Reference Frequency: 462.6375 MHz, Limit: ± 2.5 ppm			
Environment Temperature (°C)	Voltage Supplied (V _{DC})	Measurement Frequency (MHz)	Frequency Error (ppm)
Frequency Stability Ver. Temperature			
50	7.4	462.637363	-0.30
40	7.4	462.637372	-0.28
30	7.4	462.637370	-0.28
20	7.4	462.637378	-0.26
10	7.4	462.637376	-0.27
0	7.4	462.637371	-0.28
-10	7.4	462.637366	-0.29
-20	7.4	462.637368	-0.29
-30	7.4	462.637364	-0.29
Frequency Stability Ver. Input Voltage			
20	6.4	462.637380	-0.26
20	8.1	462.637372	-0.28

Reference Frequency: 467.6375 MHz, Limit: ± 2.5 ppm			
Environment Temperature (°C)	Voltage Supplied (V _{DC})	Measurement Frequency (MHz)	Frequency Error (ppm)
Frequency Stability Ver. Temperature			
50	7.4	467.637331	-0.36
40	7.4	467.637338	-0.35
30	7.4	467.637346	-0.33
20	7.4	467.637342	-0.34
10	7.4	467.637340	-0.34
0	7.4	467.637348	-0.33
-10	7.4	467.637333	-0.36
-20	7.4	467.637327	-0.37
-30	7.4	467.637329	-0.37
Frequency Stability Ver. Input Voltage			
20	6.4	467.637347	-0.33
20	8.1	467.637345	-0.33

***** END OF REPORT *****