TESTING LABORATORY
CERTIFICATE#4323.01

FCC PART 95

TEST REPORT

For

Quanzhou Wouxun Electronics Co., Ltd.

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

FCC ID: WVTWOUXUN21

Report Type:	**Product Type:**
Original Report	TWO-WAY RADIOS

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Report Number:	RXM201020050-00BM1
Report Date:	2021-02-18
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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	RXM201020050-00B	Original Report	2021-01-19
1	RXM201020050-00BM1	Revised Report (See Note)	2021-02-18

Note: Updated per TCB review's comments.

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	Quanzhou Wouxun Electronics Co., Ltd.
Tested Model	KG-989
Series Model	KG-978,KG-916,KG-866,KG-839,KG-939,KG-998,KG-988,KG-828, KG-968,KG-958,KG-928,KG-969,KG-918,KG-959,KG-T56,KG-T58, KG-T59,KG-T52,KG-T53,KG-T55,KG-T57,KG-T60,KG-T61,KG-T62, KG-T63,KG-T65,KG-T66,KG-T67,KG-T68,KG-T69,KG-989G, KG-879G.
Model Difference	See Declaration letter
Product Type	TWO-WAY RADIOS
Modulation Mode	FM
Maximum Output Power (ERP)	462.5500-462.7250MHz: 36.06dBm 462.5625-462.7125MHz: 36.10dBm 467.5500-467.7250MHz: 36.02dBm 467.5675-467.7125MHz: 26.54dBm
Operation Frequency	462.5500-462.7250MHz 462.5625-462.7125MHz 467.5500-467.7250MHz 467.5675-467.7125MHz
Power Supply	DC 7.4V from Li-ion batterypack and DC 8.4V charging by charger
*Antenna Gain	2.15 dBi

Adapter information:
Model: DSX-120050L-US
Input: AC 100-240V, 50/60Hz, 0.3A
Output: DC 12V, 0.5A

Note: The Antenna Gain was provided by the applicant.

**All measurement and test data in this report was gathered from production sample serial number: 20201020050. (Assigned by the BACL. The EUT supplied by the applicant was received on 2020-10-20)*

Objective

This test 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)

FCC Part 15B CSR Submittal with FCC ID: WVTWOUXUN21.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with Part 95 Subpart A and Subpart E –GENERAL MOBILE RADIO SERVICE of the Federal Communication Commissions rules with ANSI C63.26-2015.

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

Measurement Uncertainty

Item	Uncertainty
Occupied Channel Bandwidth	±5%
RF output power, conducted	±0.61dB
Unwanted Emissions, radiated	30MHz~1GHz: 5.85dB 1G~26.5GHz: 5.23dB
Unwanted Emissions, conducted	±1.5dB
Temperature	±1.0℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01 and CAB identifier CN0004 under the ISED requirement. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The EUT was configured for testing in an engineering mode which was provided by the manufacturer.

Test channel list as below:

462 MHz main channels

Channel	Frequency (MHz)	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

462 MHz interstitial channels

Channel	Frequency (MHz)	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	/

467 MHz main channels

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	467.5500	2	467.5750
3	467.6000	4	467.6250
5	467.6500	6	467.6750
7	467.7000	8	467.7250

467 MHz interstitial channels

Channel	Frequency (MHz)	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

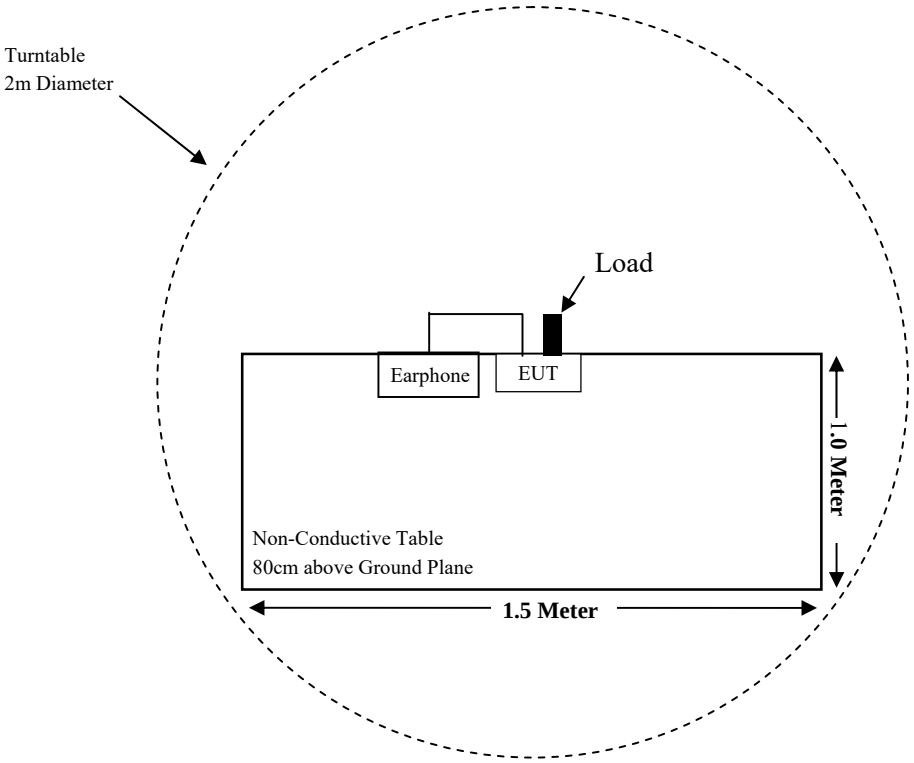
Manufacturer	Description	Model	Serial Number
Wouxun	Earphone	/	/
Huaxiang	50OhmCoaxial Load	4.3/10TF20-8	17011301

External I/O Cable

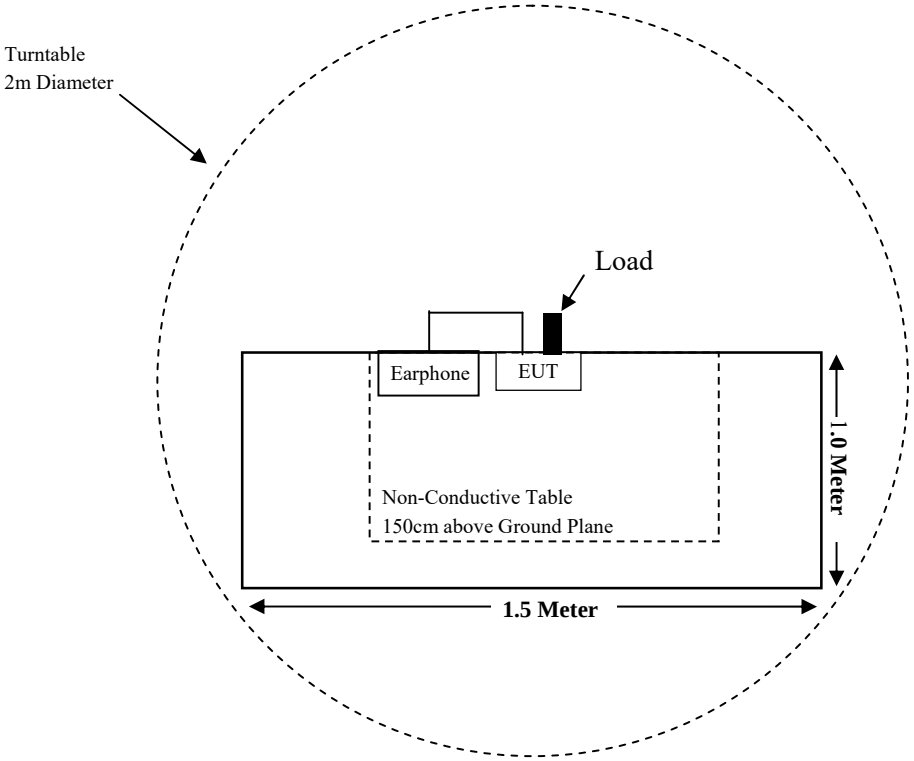
Cable Description	Length (m)	From/Port	To
Audio Cable	1.2	EUT	Earphone

Block Diagram of Test Setup

For Radiated Emissions(Below 1GHz):



For Radiated Emissions(Above 1GHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§2.1093	RF Exposure	Compliant
§95.1787(a)(4)	Antenna Requirement	Not Applicable (See Note 1)
§2.1046, §95.1767	RF Output Power	Compliant
§2.1047, §95.1775	Modulation Characteristic	Compliant
§2.1049, §95.1773, §95.1779	Authorized Bandwidth & Emission Mask	Compliant
§2.1051, §95.1779	Spurious Emission at Antenna Terminal	Compliant
§2.1053, §95.1779	Spurious Radiated Emissions	Compliant
§2.1055(d), §95.1765	Frequency Stability	Compliant

Note 1: The EUT has no digital data transmissions function.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test（Chamber 1#）					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2019-12-14	2020-12-13
Sunol Sciences	Broadband Antenna	JB3	A090413-1	2017-12-26	2020-12-25
Sunol Sciences	Bilog antenna	JB3	A060217	2020-08-04	2023-08-03
HP	Signal Generator	N5183A	MY51040755	2019-12-14	2020-12-13
Sonoma Instrunent	Pre-amplifier	310N	171205	2020-08-14	2021-08-13
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-8	008	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2020-08-15	2021-08-14
Radiated Emission Test（Chamber 2#）					
HP	Signal Generator	N5183A	MY51040755	2019-12-14	2020-12-13
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2020-04-01	2021-03-31
ETS-LINDGREN	Horn Antenna	3115	9207-3900	2020-07-14	2023-07-13
ETS-LINDGREN	Horn Antenna	3115	6229	2020-01-10	2023-01-09
A.H.Systems,inc	Amplifier	PAM-0118P	512	2020-02-20	2021-02-19
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-11	011	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2020-08-15	2021-08-14
RF Conducted Test					
Rohde & Schwarz	Signal Analyzer	FSV40	101116	2020-08-05	2021-08-04
Narda	Attenuator	10dB	010	2020-08-15	2021-08-14
BACL	Temperature & Humidity Chamber	BTH-150	30023	2019-12-20	2020-12-19
ZHAOXIN	DC Power Supply	RXN-605D	DC002	2020-10-10	2021-10-09
HP	RF communication test SET.	8920B	079	2020-04-01	2021-03-31
Wouxun	RF Cable	Wouxun C01	C01	Each Time	/

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

FCC §2.1093 - RF EXPOSURE

Applicable Standard

According to§2.1093 and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

Measurement Result

Please refer to SAR Report: RXM201020050-20

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 transmitting with antenna attach
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:	25.3 ℃
Relative Humidity:	51 %
ATM Pressure:	101.2 kPa

The testing was performed by CK Huang on 2020-11-02.

Test Result: Compliant.

Test Mode: Transmitting

ERP:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBuV)	Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)			
Frequency:462.6250MHz								
462.625	H	105.93	38.33	0.55	-1.72	36.06	47	10.94
462.625	V	105.04	37.44	0.55	-1.72	35.17	47	11.83
Frequency:462.6375MHz								
462.6375	H	106.02	38.38	0.55	-1.73	36.10	37	0.90
462.6375	V	105.14	37.50	0.55	-1.73	35.22	37	1.78
Frequency:467.6250MHz								
467.625	H	106.43	38.33	0.55	-1.76	36.02	47	10.98
467.625	V	106.10	38.00	0.55	-1.76	35.69	47	11.31
Frequency:467.6375MHz								
467.6375	H	96.95	28.85	0.55	-1.76	26.54	27	0.46
467.6375	V	95.80	27.70	0.55	-1.76	25.39	27	1.61

Note:
Absolute Level = Substituted Level - Cable loss + Antenna Gain
Margin = Limit- Absolute Level.

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.
For equipment operating on channels 12.5kHz spaced channels in thefrequency range 406-512 MHz. At frequencies from 3000 Hz through 20,000 Hz the attenuation shall be greater than the attenuation at 1000 Hz by at least: 100 log10 (*f* / 3000) dB

Test Procedure

Test Method: ANSI C63.26-2015

Test Data

Environmental Conditions

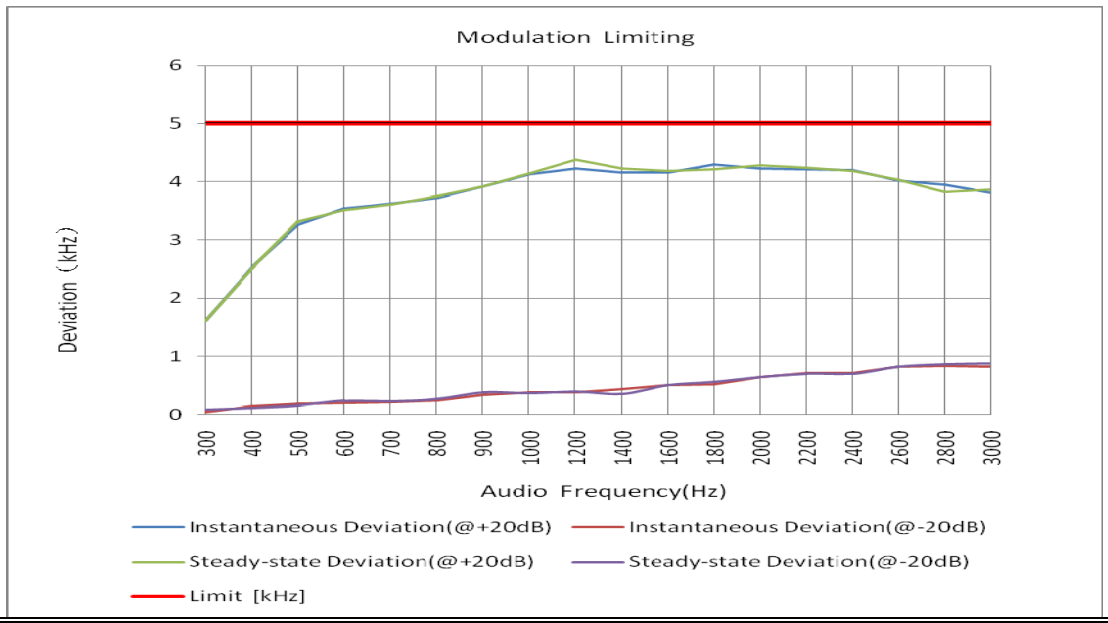
Temperature:	25.3 ℃
Relative Humidity:	51 %
ATM Pressure:	101.2 kPa

The testing was performed by CK Huang on 2020-11-02.

Test Mode: Transmitting

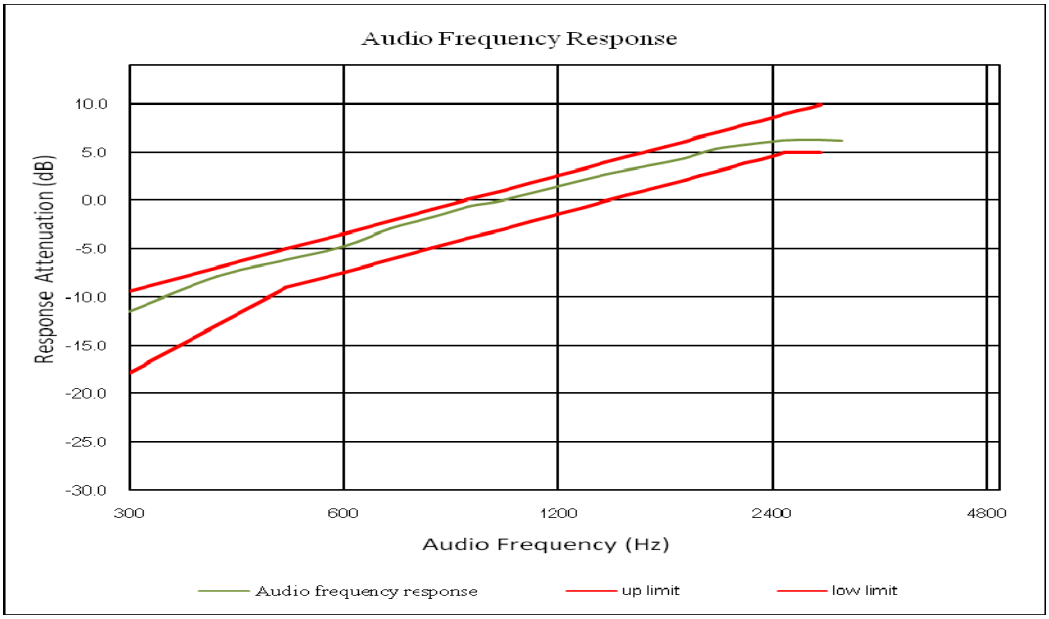
MODULATION LIMITING

Carrier Frequency: 462.6250MHz					
Audio Frequency (Hz)	Instantaneous		Steady-state		Limit (kHz)
	Deviation (@+20dB) (kHz)	Deviation (@-20dB) (kHz)	Deviation (@+20dB) (kHz)	Deviation (@-20dB) (kHz)	
300	1.605	0.041	1.608	0.083	5.0
400	2.526	0.150	2.513	0.123	5.0
500	3.263	0.181	3.320	0.158	5.0
600	3.537	0.203	3.515	0.236	5.0
700	3.633	0.221	3.615	0.230	5.0
800	3.726	0.247	3.749	0.265	5.0
900	3.918	0.346	3.923	0.386	5.0
1000	4.123	0.379	4.138	0.364	5.0
1200	4.228	0.388	4.379	0.401	5.0
1400	4.162	0.432	4.223	0.358	5.0
1600	4.154	0.511	4.178	0.502	5.0
1800	4.293	0.527	4.212	0.559	5.0
2000	4.230	0.650	4.282	0.646	5.0
2200	4.207	0.718	4.241	0.703	5.0
2400	4.191	0.714	4.189	0.702	5.0
2600	4.018	0.828	4.026	0.821	5.0
2800	3.953	0.846	3.815	0.863	5.0
3000	3.812	0.834	3.860	0.884	5.0



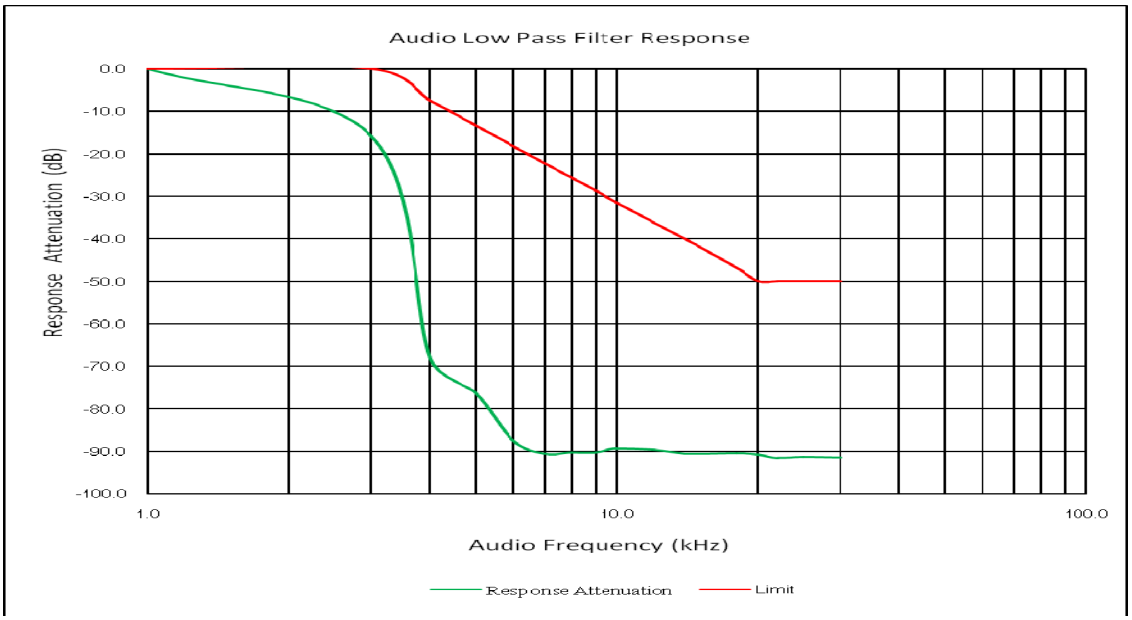
Audio Frequency Response

Carrier Frequency: 462.6250MHz	
Audio Frequency (Hz)	**Response Attenuation (dB)**
300	-11.45
400	-7.87
500	-6.12
600	-4.73
700	-2.86
800	-1.71
900	-0.57
1000	0.00
1200	1.45
1400	2.68
1600	3.53
1800	4.32
2000	5.33
2200	5.76
2400	6.16
2600	6.25
2800	6.27
3000	6.19



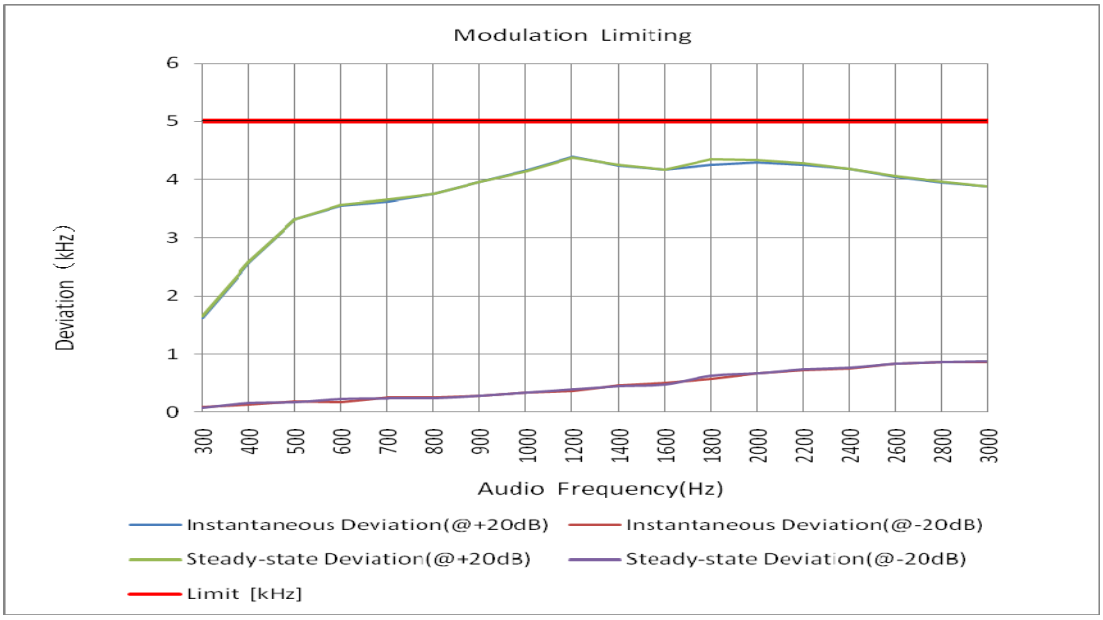
Audio Low Pass Filter Response

Carrier Frequency: 462.6250MHz		
Audio Frequency (kHz)	**Response Attenuation （dB）**	**Limit (dB)**
1.0	0	/
3.0	-15.9	0
4.0	-68.2	-7.5
5.0	-76.1	-13.3
6.0	-87.3	-18.1
7.0	-90.5	-22.1
8.0	-90.3	-25.6
9.0	-90.3	-28.6
10.0	-89.3	-31.4
12.0	-89.6	-36.1
14.0	-90.5	-40.1
15.0	-90.6	-41.9
18.0	-90.4	-46.7
20.0	-90.7	-50
22.0	-91.5	-50
25.0	-91.3	-50
30.0	-91.4	-50



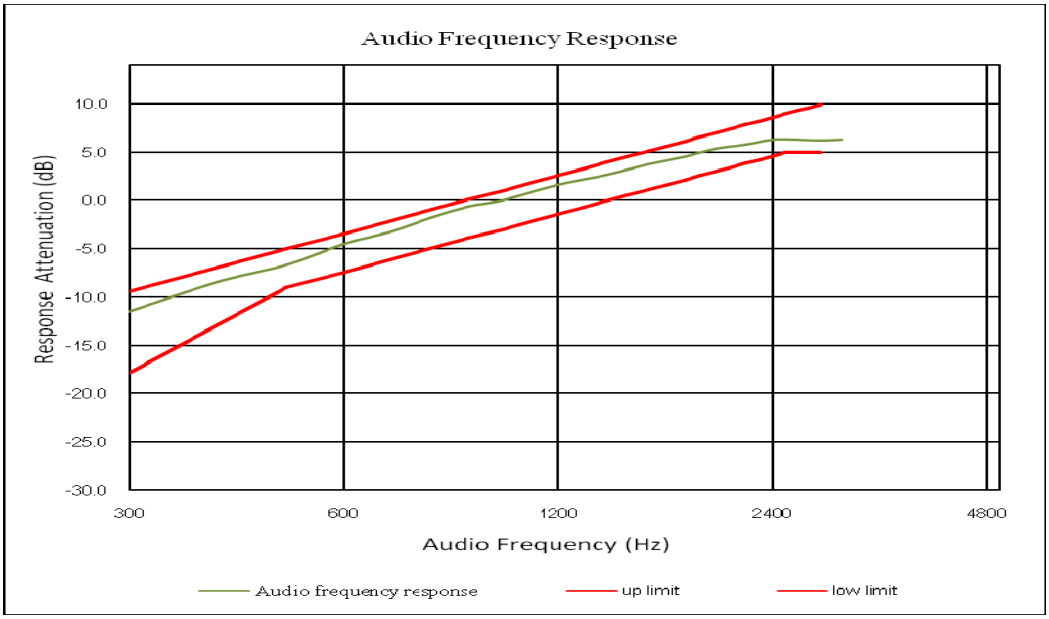
MODULATION LIMITING

Carrier Frequency: 462.6375MHz					
Audio Frequency (Hz)	Instantaneous		Steady-state		Limit (kHz)
	Deviation (@+20dB) (kHz)	Deviation (@-20dB) (kHz)	Deviation (@+20dB) (kHz)	Deviation (@-20dB) (kHz)	
300	1.622	0.083	1.649	0.069	5.0
400	2.567	0.132	2.580	0.156	5.0
500	3.322	0.184	3.321	0.176	5.0
600	3.555	0.179	3.568	0.231	5.0
700	3.625	0.253	3.654	0.238	5.0
800	3.754	0.256	3.753	0.246	5.0
900	3.955	0.278	3.956	0.291	5.0
1000	4.152	0.345	4.144	0.342	5.0
1200	4.388	0.369	4.376	0.402	5.0
1400	4.238	0.461	4.249	0.450	5.0
1600	4.174	0.511	4.176	0.479	5.0
1800	4.259	0.576	4.357	0.634	5.0
2000	4.295	0.668	4.341	0.672	5.0
2200	4.257	0.736	4.285	0.738	5.0
2400	4.189	0.758	4.185	0.776	5.0
2600	4.039	0.846	4.058	0.835	5.0
2800	3.947	0.873	3.955	0.864	5.0
3000	3.870	0.869	3.872	0.885	5.0



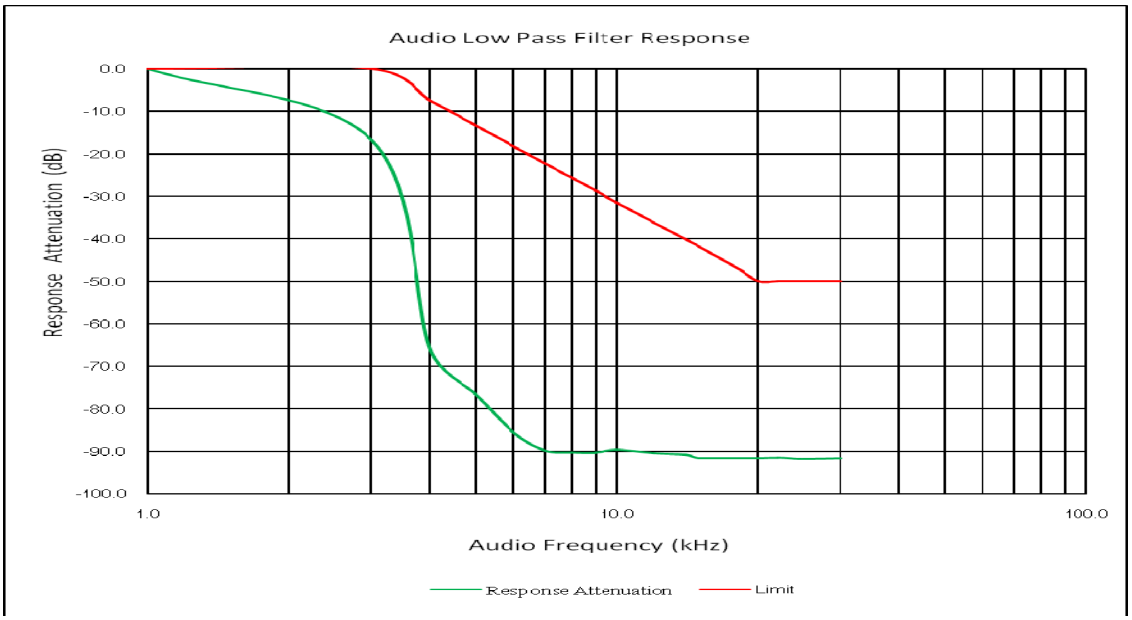
Audio Frequency Response

Carrier Frequency: 462.6375MHz	
Audio Frequency (Hz)	**Response Attenuation (dB)**
300	-11.47
400	-8.45
500	-6.67
600	-4.52
700	-3.24
800	-1.69
900	-0.64
1000	0.00
1200	1.60
1400	2.65
1600	3.71
1800	4.53
2000	5.38
2200	5.75
2400	6.28
2600	6.26
2800	6.21
3000	6.25



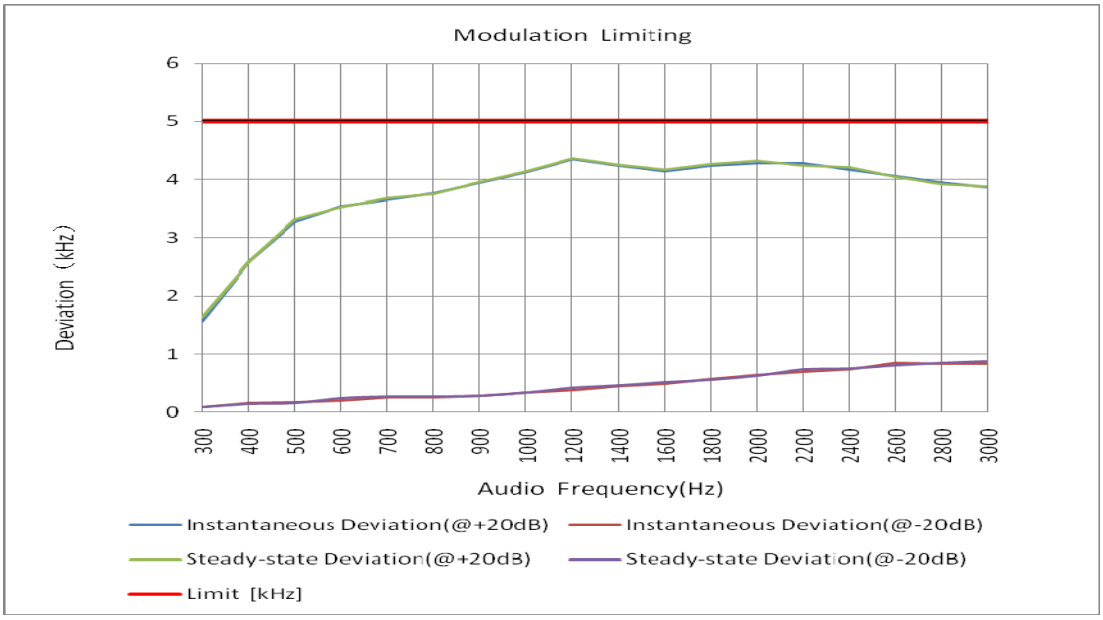
Audio Low Pass Filter Response

Carrier Frequency: 462.6375MHz		
Audio Frequency (kHz)	**Response Attenuation （dB）**	**Limit (dB)**
1.0	0	/
3.0	-16.8	0
4.0	-66.2	-7.5
5.0	-76.4	-13.3
6.0	-85.4	-18.1
7.0	-89.7	-22.1
8.0	-90.2	-25.6
9.0	-90.3	-28.6
10.0	-89.6	-31.4
12.0	-90.4	-36.1
14.0	-90.8	-40.1
15.0	-91.5	-41.9
18.0	-91.5	-46.7
20.0	-91.5	-50
22.0	-91.4	-50
25.0	-91.8	-50
30.0	-91.6	-50



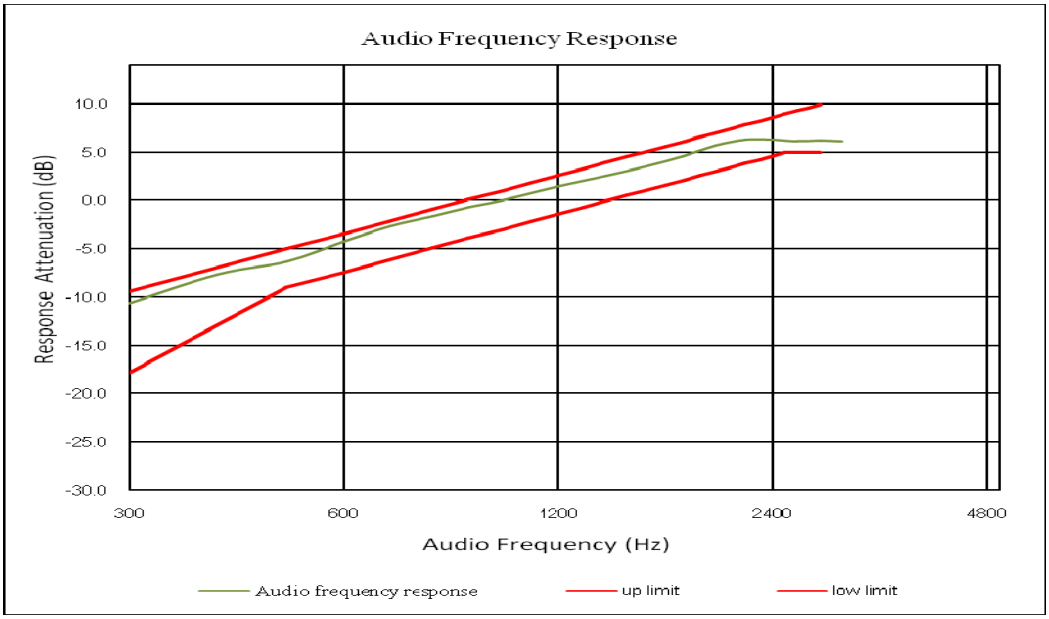
MODULATION LIMITING

Carrier Frequency: 467.6250MHz					
Audio Frequency (Hz)	Instantaneous		Steady-state		Limit (kHz)
	Deviation (@+20dB) (kHz)	Deviation (@-20dB) (kHz)	Deviation (@+20dB) (kHz)	Deviation (@-20dB) (kHz)	
300	1.569	0.085	1.638	0.093	5.0
400	2.576	0.156	2.585	0.143	5.0
500	3.272	0.175	3.316	0.159	5.0
600	3.536	0.194	3.532	0.243	5.0
700	3.654	0.263	3.679	0.264	5.0
800	3.767	0.262	3.753	0.274	5.0
900	3.946	0.291	3.954	0.289	5.0
1000	4.127	0.347	4.141	0.344	5.0
1200	4.349	0.387	4.364	0.428	5.0
1400	4.238	0.457	4.246	0.469	5.0
1600	4.141	0.496	4.172	0.523	5.0
1800	4.238	0.572	4.269	0.568	5.0
2000	4.285	0.642	4.319	0.637	5.0
2200	4.287	0.696	4.245	0.737	5.0
2400	4.165	0.738	4.207	0.756	5.0
2600	4.058	0.853	4.049	0.812	5.0
2800	3.952	0.838	3.924	0.859	5.0
3000	3.857	0.848	3.876	0.878	5.0



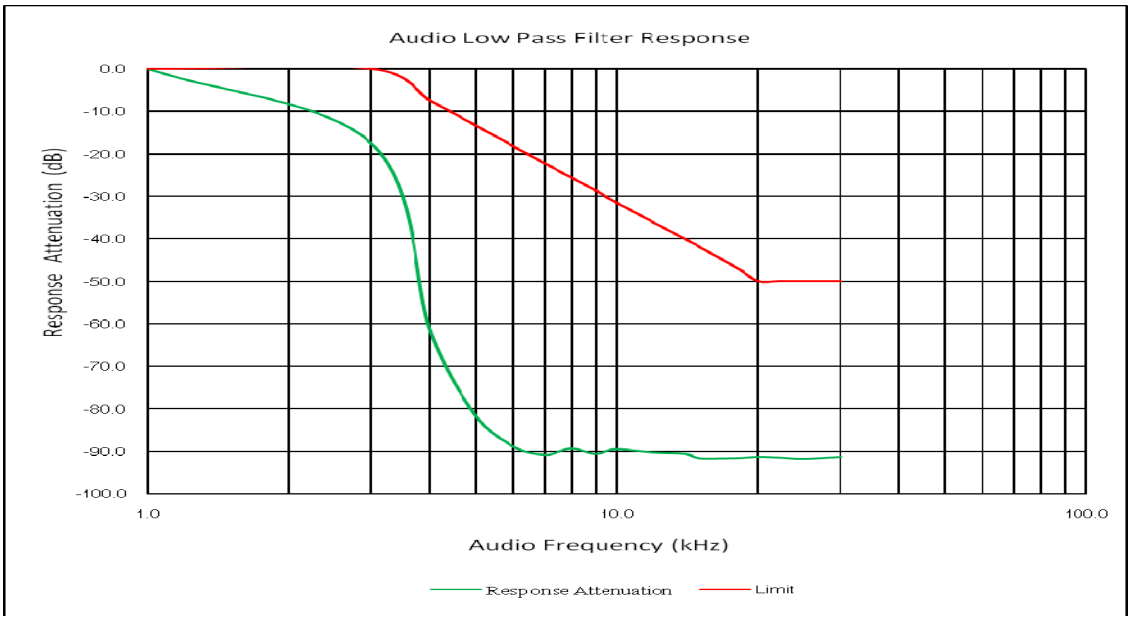
Audio Frequency Response

Carrier Frequency: 467.6250MHz	
Audio Frequency (Hz)	**Response Attenuation (dB)**
300	-10.62
400	-7.65
500	-6.33
600	-4.28
700	-2.65
800	-1.61
900	-0.70
1000	0.00
1200	1.46
1400	2.56
1600	3.55
1800	4.62
2000	5.68
2200	6.27
2400	6.25
2600	6.15
2800	6.18
3000	6.13



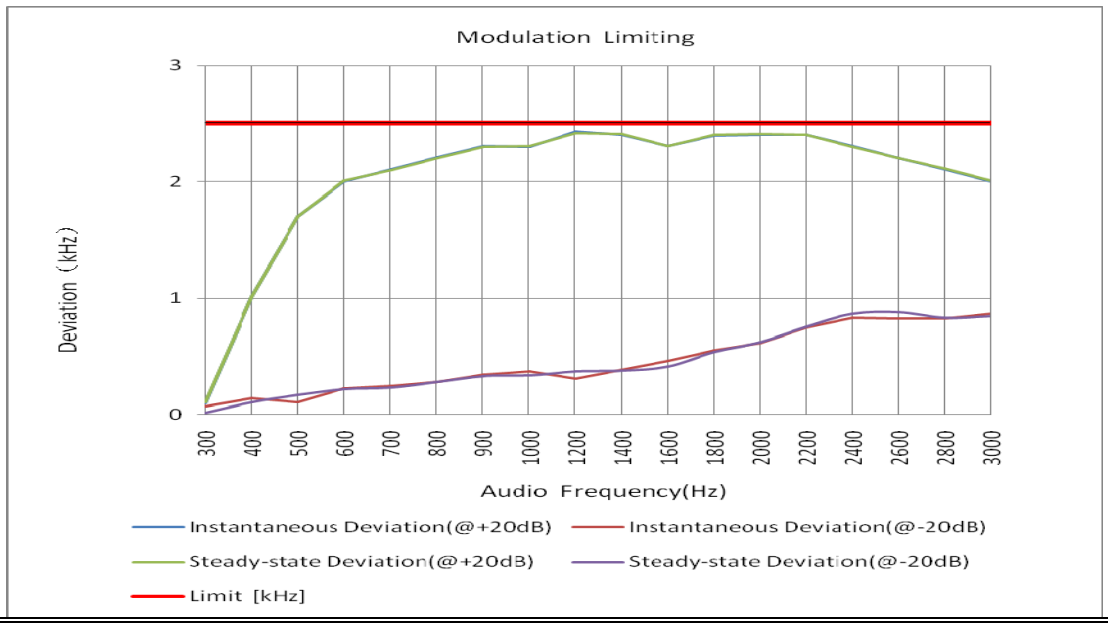
Audio Low Pass Filter Response

Carrier Frequency: 467.6250MHz		
Audio Frequency (kHz)	**Response Attenuation （dB）**	**Limit (dB)**
1.0	0	/
3.0	-17.6	0
4.0	-61.7	-7.5
5.0	-81.5	-13.3
6.0	-88.7	-18.1
7.0	-90.8	-22.1
8.0	-89.3	-25.6
9.0	-90.5	-28.6
10.0	-89.4	-31.4
12.0	-90.2	-36.1
14.0	-90.5	-40.1
15.0	-91.6	-41.9
18.0	-91.5	-46.7
20.0	-91.3	-50
22.0	-91.4	-50
25.0	-91.7	-50
30.0	-91.3	-50



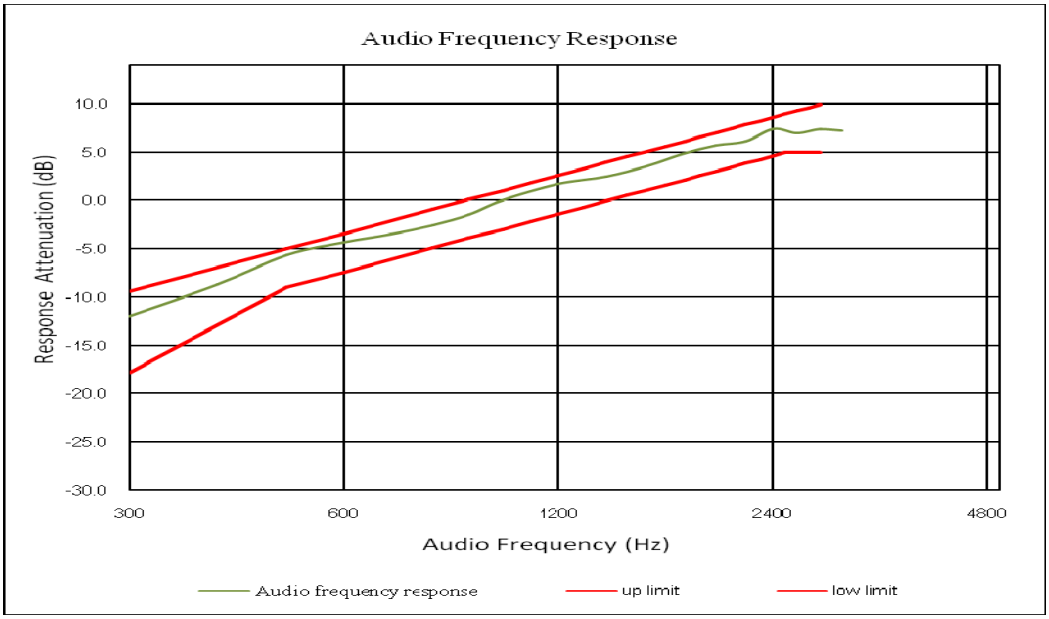
MODULATION LIMITING

Carrier Frequency: 467.6375MHz					
Audio Frequency (Hz)	Instantaneous		Steady-state		Limit (kHz)
	Deviation (@+20dB) (kHz)	Deviation (@-20dB) (kHz)	Deviation (@+20dB) (kHz)	Deviation (@-20dB) (kHz)	
300	0.103	0.071	0.107	0.017	2.5
400	1.010	0.145	1.009	0.109	2.5
500	1.705	0.109	1.705	0.167	2.5
600	2.002	0.225	2.005	0.221	2.5
700	2.103	0.245	2.101	0.234	2.5
800	2.207	0.278	2.204	0.283	2.5
900	2.305	0.346	2.300	0.333	2.5
1000	2.302	0.374	2.309	0.338	2.5
1200	2.432	0.308	2.422	0.374	2.5
1400	2.402	0.385	2.409	0.380	2.5
1600	2.306	0.465	2.309	0.414	2.5
1800	2.401	0.554	2.402	0.542	2.5
2000	2.403	0.616	2.409	0.626	2.5
2200	2.407	0.746	2.408	0.755	2.5
2400	2.306	0.832	2.301	0.868	2.5
2600	2.201	0.826	2.203	0.882	2.5
2800	2.102	0.822	2.110	0.831	2.5
3000	2.001	0.864	2.006	0.846	2.5



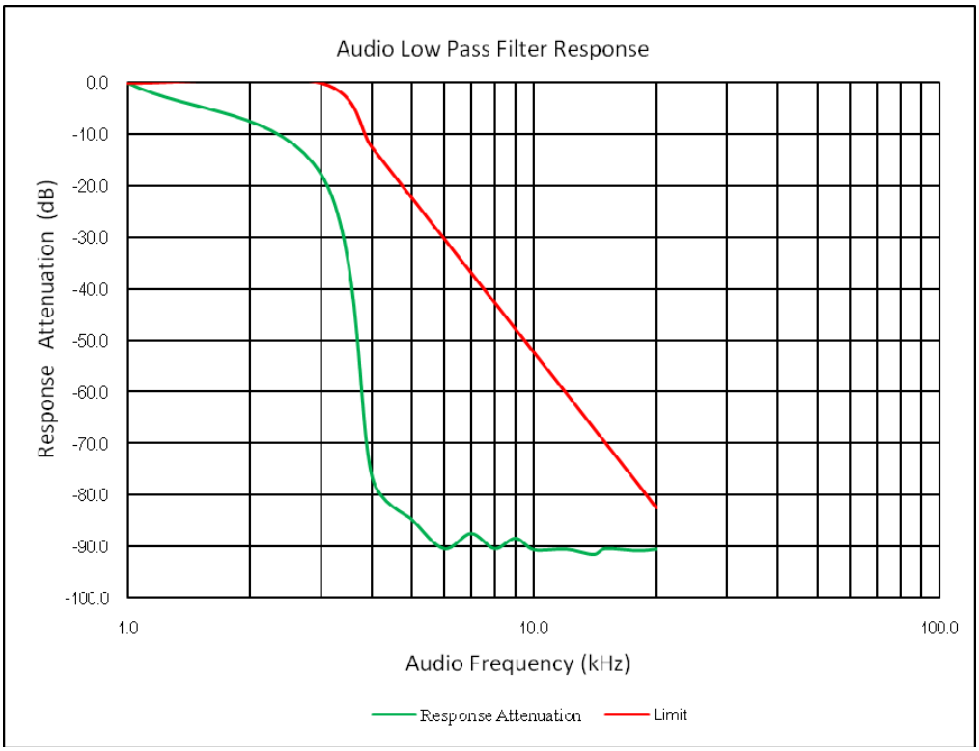
Audio Frequency Response

Carrier Frequency: 467.6375MHz	
Audio Frequency (Hz)	**Response Attenuation (dB)**
300	-12.01
400	-8.69
500	-5.65
600	-4.33
700	-3.49
800	-2.52
900	-1.49
1000	0.00
1200	1.69
1400	2.47
1600	3.57
1800	4.84
2000	5.69
2200	6.12
2400	7.42
2600	7.01
2800	7.39
3000	7.22



Audio Low Pass Filter Response

Carrier Frequency: 467.6375MHz		
Audio Frequency (kHz)	**Response Attenuation （dB）**	**Limit (dB)**
1.0	0	/
3.0	-17.8	0
4.0	-76.5	-12.5
5.0	-84.6	-22.2
6.0	-90.3	-30.1
7.0	-87.4	-36.8
8.0	-90.3	-42.6
9.0	-88.3	-47.7
10.0	-90.5	-52.3
12.0	-90.4	-60.2
14.0	-91.4	-66.9
15.0	-90.3	-69.9
18.0	-90.7	-77.8
20.0	-90.4	-82.5



FCC §2.1049, §95.1773, §95.1779 - AUTHOURIZED 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
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) Filtering noted for GMRS transmitters refers to the requirement in §95.1775(e).

(2) Unwanted emission power may be measured as either mean power or peak envelope power, provided that the transmitter output power is measured the same way.

(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

ANSI C63.26-2015

Test Data

Environmental Conditions

Temperature:	24.3℃~24.5 ℃
Relative Humidity:	51%~53 %
ATM Pressure:	101.3 kPa~101.5 kPa

The testing was performed by CK Huang on 2021-01-06 and 2021-01-19.

Test Mode: Transmitting

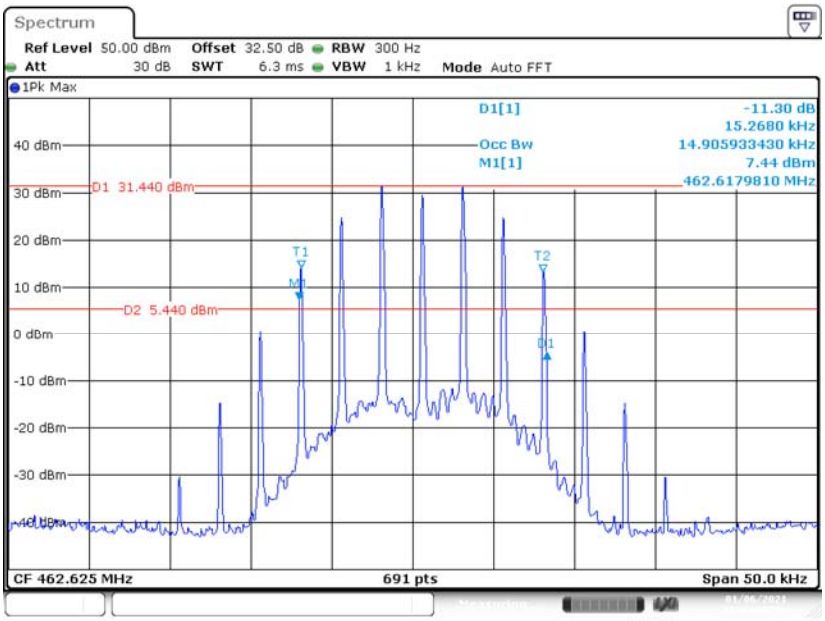
Modulation	fc (MHz)	99%Occupied Bandwidth (kHz)	26dB Bandwidth (kHz)	Limit (kHz)
FM	462.6250	14.906	15.268	20
	462.6375	14.906	15.253	20
	467.6250	14.906	15.268	20
	467.6375	9.768	10.420	12.5

Note: Emission bandwidth was based on calculation method instead of measurement.
Emission Designator
Per CFR 47 §2.201& §2.202, BW = 2M + 2D

The maximum modulating frequency is 3.0 kHz with a 5.0 kHz deviation.
BW = 2(M+D) = 2*(3.0 kHz + 5.0 kHz) = 16 kHz → 16K0
F3E portion of the designator represents an FM voice transmission Therefore, the entire designator for 25kHz channel spacing FM mode is 16K0F3E.

The maximum modulating frequency is 3.0 kHz with a 2.5 kHz deviation.
BW = 2(M+D) = 2*(3.0 kHz + 2.5 kHz) = 11 kHz → 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.

462.6250 MHz



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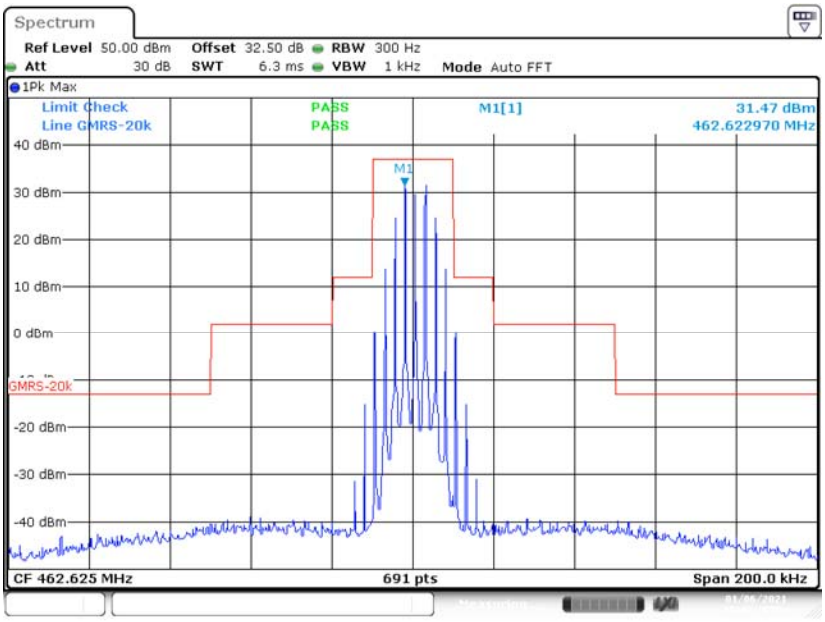

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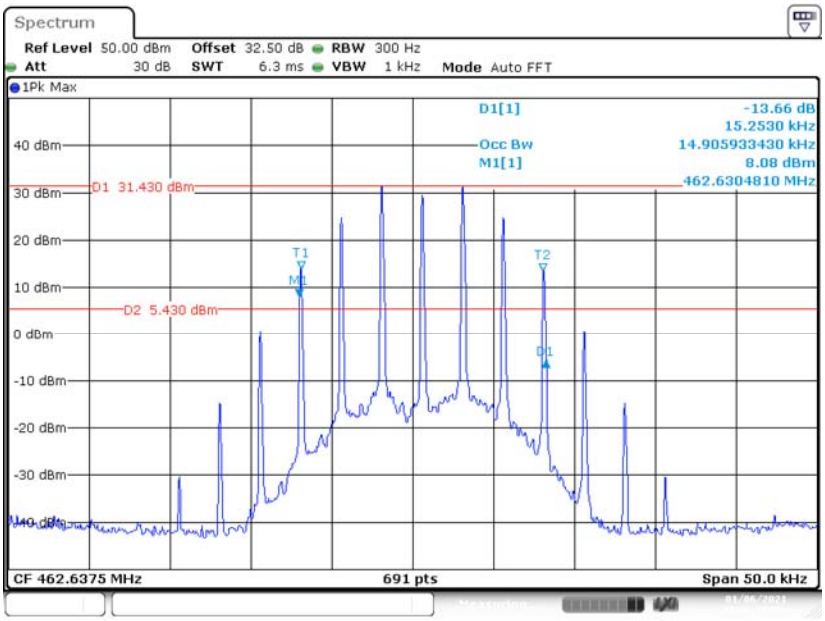
462.6375 MHz



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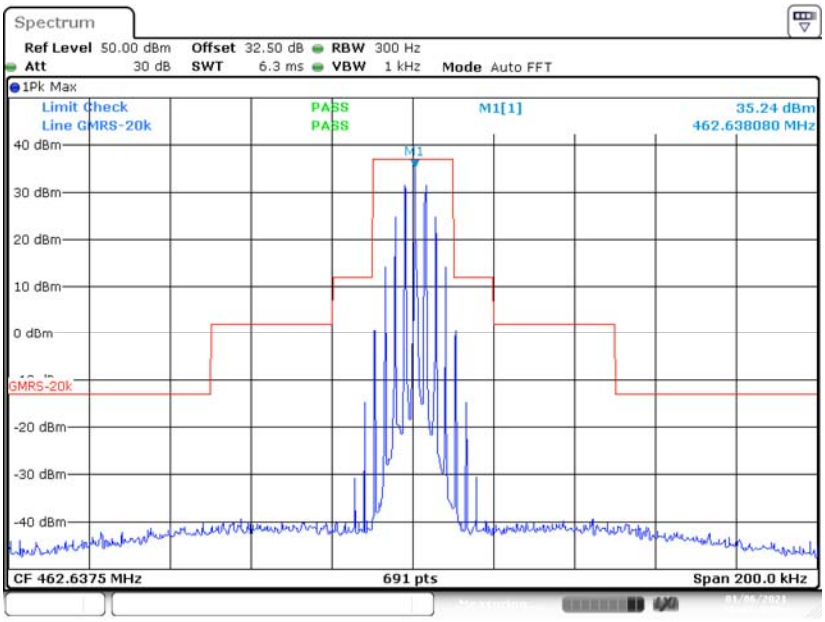

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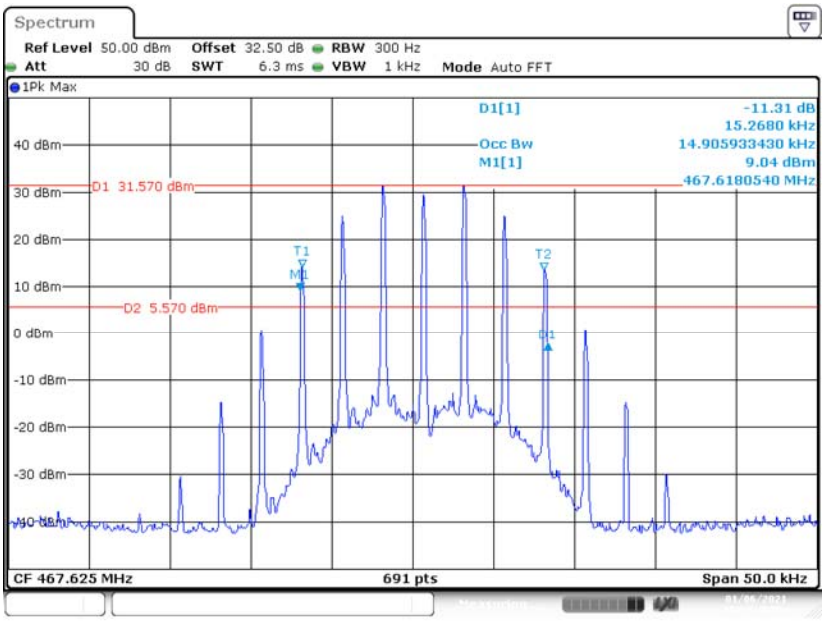
467.6250 MHz



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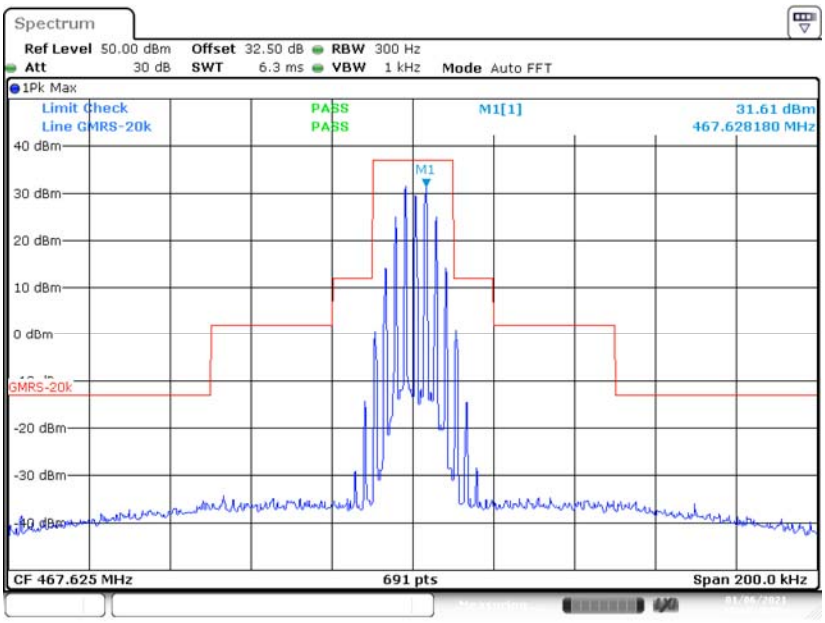

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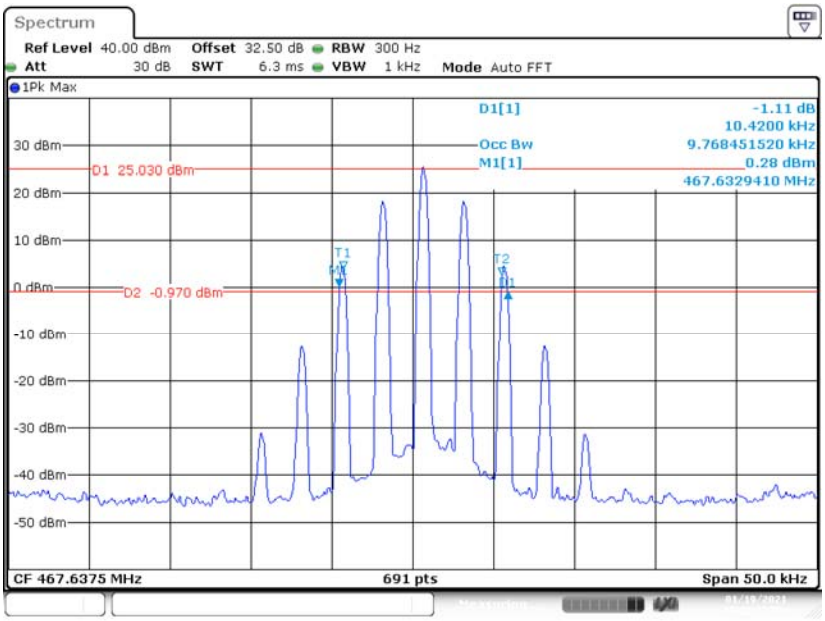
467.6375 MHz



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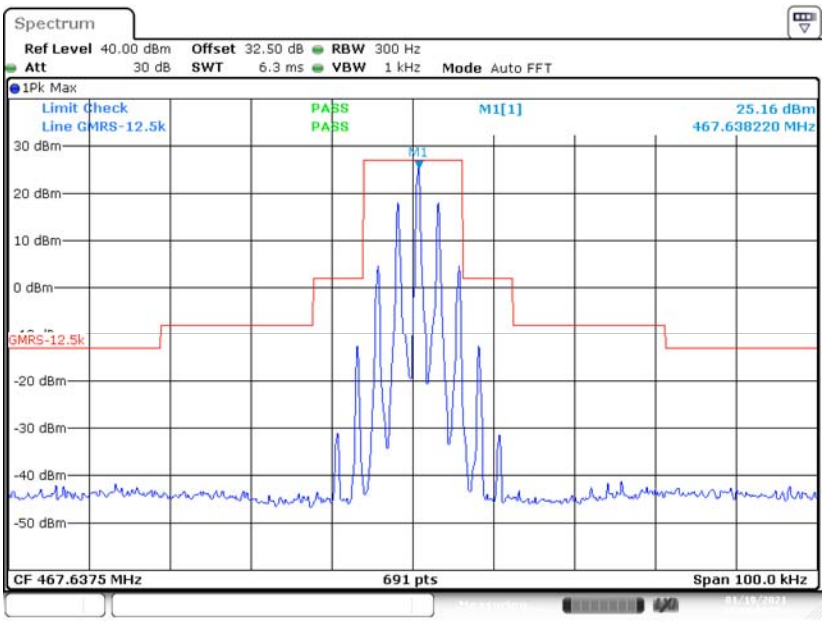


Date: 19.JAN.2021 18:11:00

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

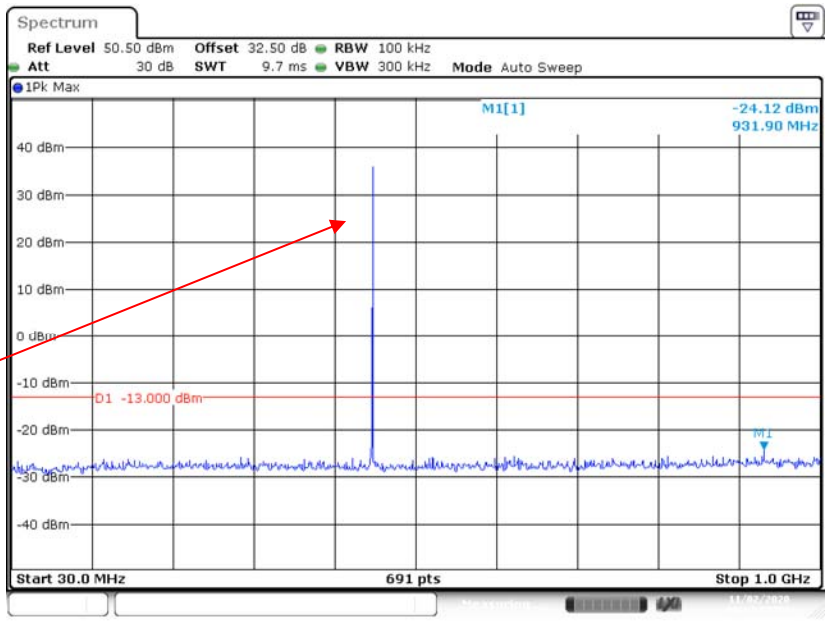
Temperature:	24.5 ℃
Relative Humidity:	53 %
ATM Pressure:	101.6 kPa

The testing was performed by CK Huang on 2020-11-02.

Test Mode: Transmitting

Please refer to the following plots.

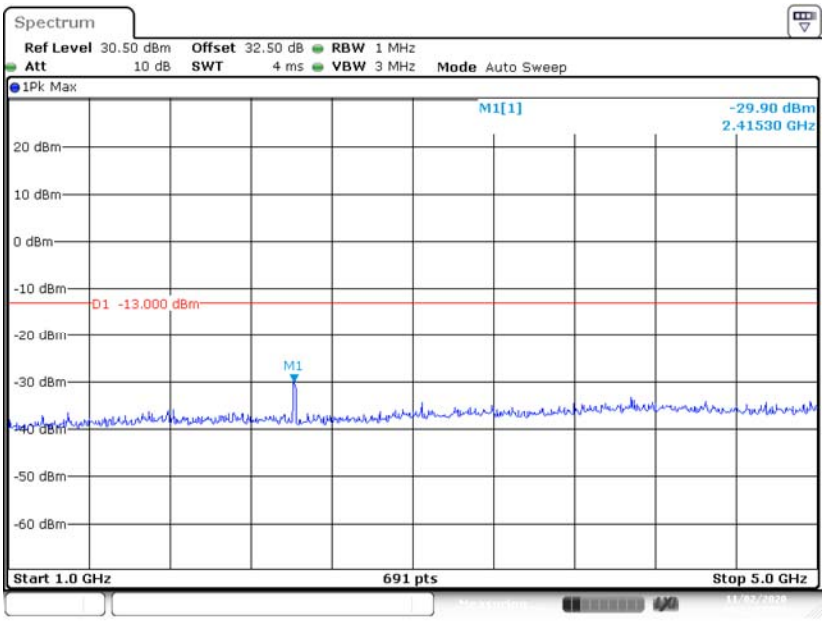
462.6250 MHz, 30 MHz – 1 GHz



Fundamental

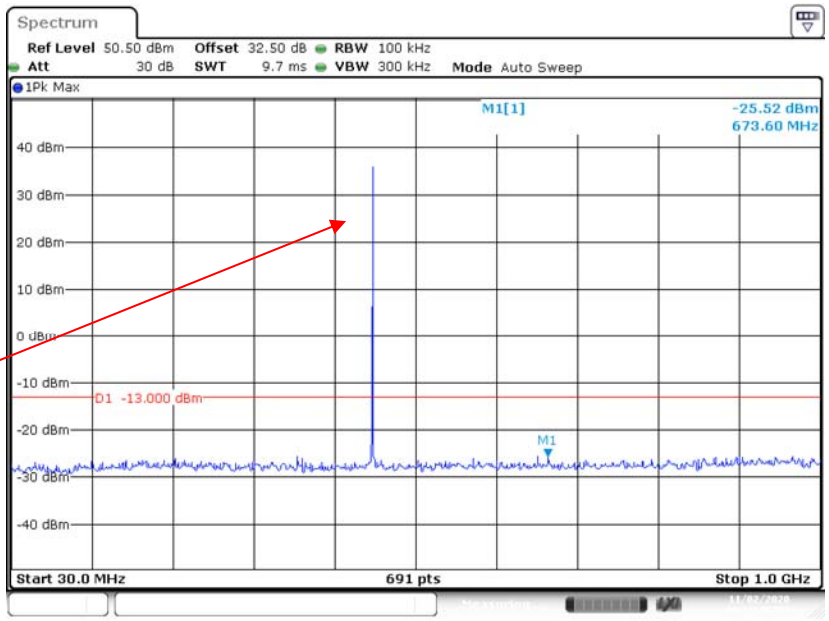
Date: 2.NOV.2020 21:17:44

462.6250 MHz, 1 GHz - 5 GHz



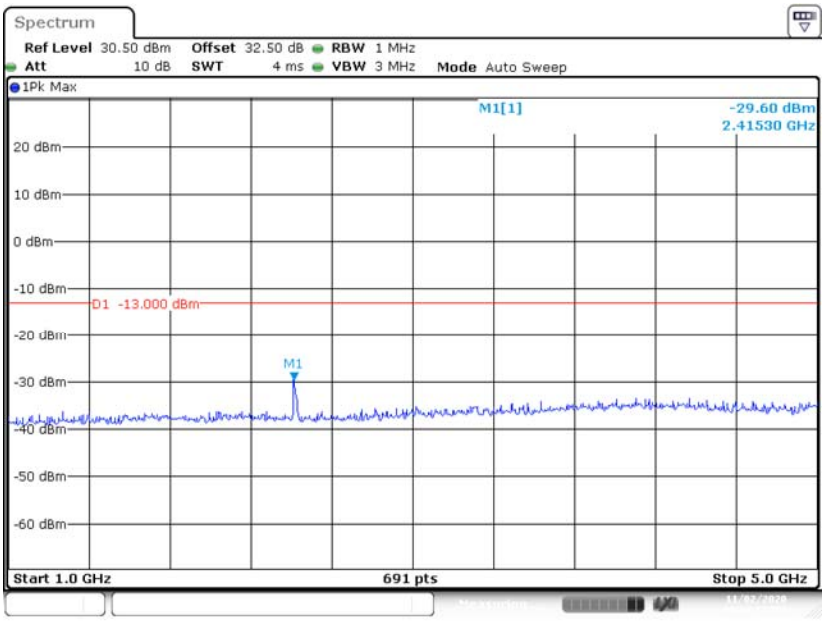
Date: 2.NOV.2020 21:21:55

462.6375 MHz, 30 MHz – 1 GHz

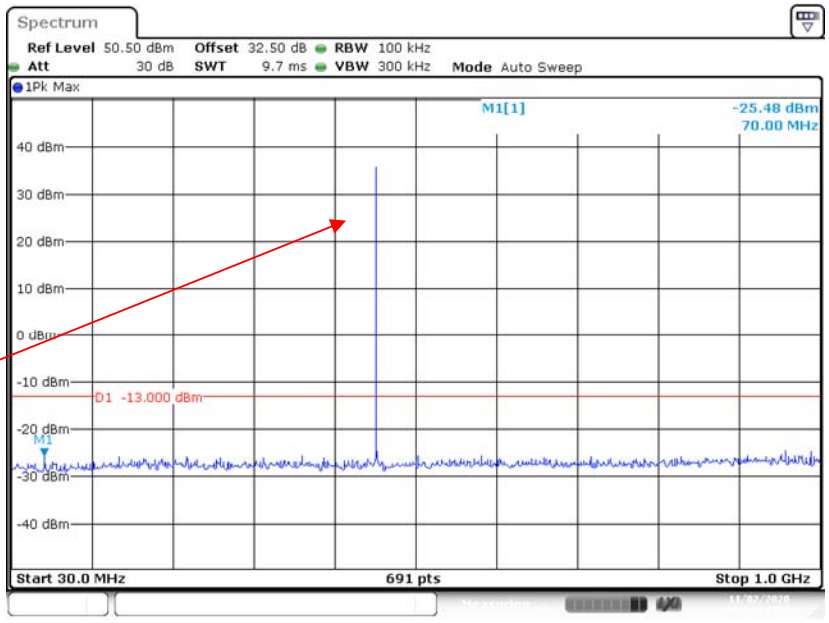


Fundamental

462.6375 MHz, 1 GHz - 5 GHz



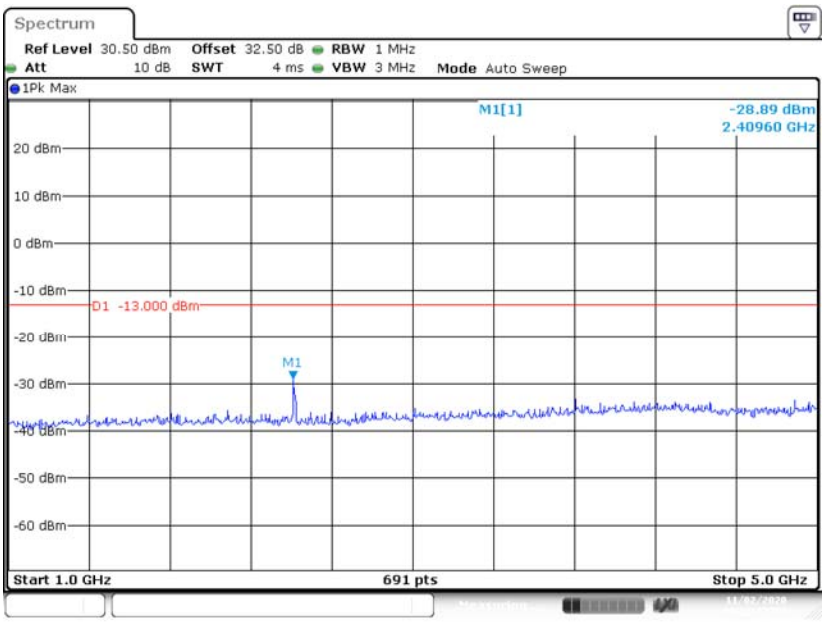
467.6250 MHz, 30 MHz – 1 GHz



Fundamental

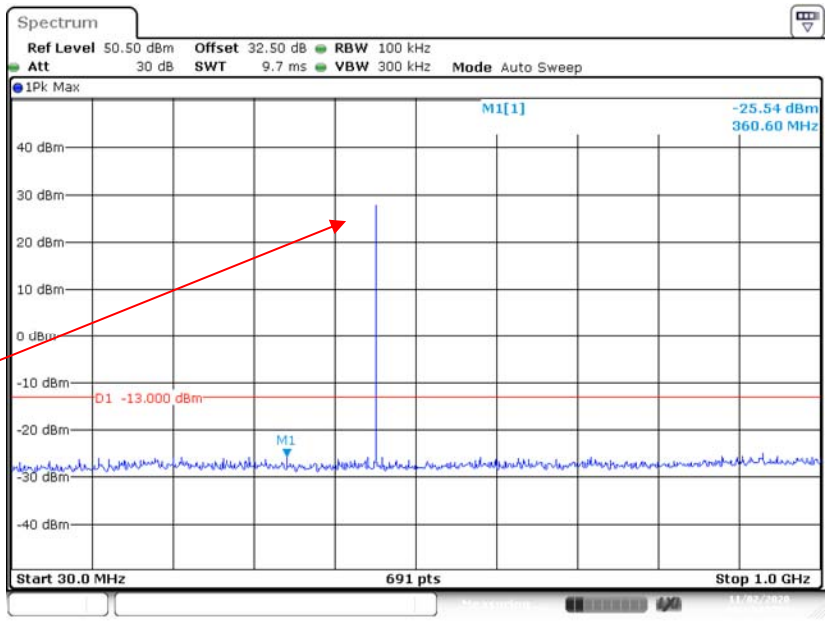
Date: 2.NOV.2020 21:14:25

467.6250 MHz, 1 GHz - 5 GHz



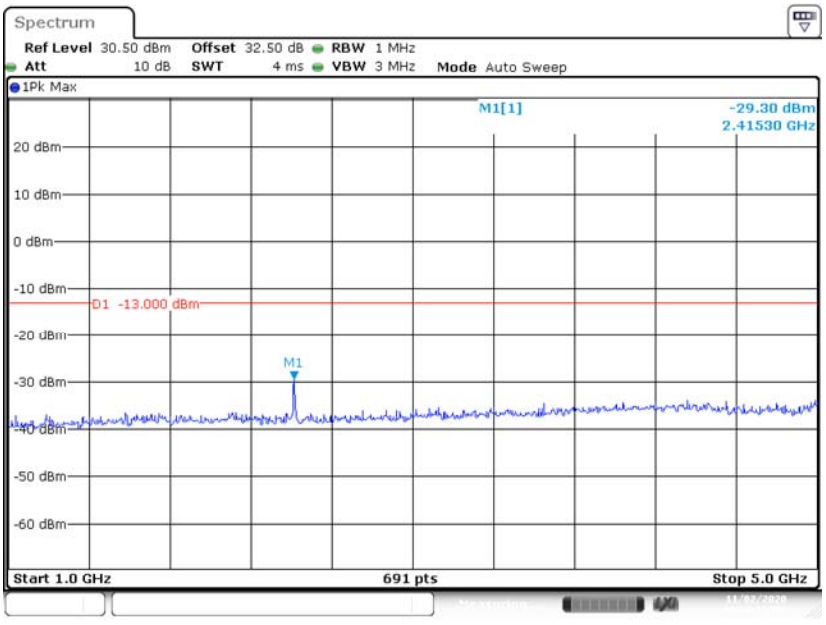
Date: 2.NOV.2020 21:22:42

467.6375 MHz, 30 MHz – 1 GHz



Fundamental

467.6375 MHz, 1 GHz - 5 GHz



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 1g (TXpwr in Watts/0.001)-the absolute level
Spurious attenuation limit in dB = 43+10 Log10 (power out in Watts)

Test Data

Environmental Conditions

Temperature:	25.3 ℃
Relative Humidity:	51 %
ATM Pressure:	101.2 kPa

The testing was performed by CK Huang on 2020-11-02.

Test Mode: Transmitting

30MHz-5GHz:

Frequency (MHz)	Receiver Reading (dBuV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd /dBi)			
FM, Frequency：462.6250MHz										
925.25	56.16	316	150	H	-41.50	0.64	-1.05	-43.19	-13	30.19
925.25	54.66	32	150	V	-43.00	0.64	-1.05	-44.69	-13	31.69
2313.13	44.95	236	150	H	-56.18	0.88	9.69	-47.37	-13	34.37
2313.13	43.63	224	150	V	-57.50	0.88	9.69	-48.69	-13	35.69
4626.25	70.25	276	150	H	-36.65	1.04	10.00	-27.69	-13	14.69
4626.25	69.25	56	150	V	-37.65	1.04	10.00	-28.69	-13	15.69
FM, Frequency：462.6375MHz										
925.28	57.45	165	150	H	-40.21	0.64	-1.05	-41.90	-13	28.90
925.28	56.66	131	150	V	-41.00	0.64	-1.05	-42.69	-13	29.69
2313.19	42.69	94	150	H	-58.44	0.88	9.69	-49.63	-13	36.63
2313.19	41.93	90	100	V	-59.20	0.88	9.69	-50.39	-13	37.39
4626.38	71.18	154	100	H	-35.72	1.04	10.00	-26.76	-13	13.76
4626.38	69.95	303	100	V	-36.95	1.01	10.00	-27.96	-13	14.96

Frequency (MHz)	Receiver Reading (dBuV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd /dBi)			
FM, Frequency：467.6250MHz										
935.25	57.71	90	150	H	-40.05	0.64	-1.09	-41.78	-13	28.78
935.25	56.53	81	150	V	-41.23	0.64	-1.09	-42.96	-13	29.96
2338.13	41.96	141	150	H	-59.15	0.88	9.74	-50.29	-13	37.29
2338.13	40.56	267	150	V	-60.55	0.88	9.74	-51.69	-13	38.69
4676.25	70.86	34	150	V	-35.92	1.04	10.04	-26.92	-13	13.92
4676.25	70.09	123	150	V	-36.69	1.04	10.04	-27.69	-13	14.69
FM, Frequency：467.6375MHz										
935.28	62.33	132	200	H	-35.43	0.64	-1.09	-37.16	-13	24.16
935.28	60.80	336	200	V	-36.96	0.64	-1.09	-38.69	-13	25.69
1870.55	56.20	137	200	H	-55.61	0.84	8.79	-47.66	-13	34.66
1870.55	55.17	321	200	V	-56.64	0.84	8.79	-48.69	-13	35.69
4676.38	49.09	292	200	V	-57.69	1.04	10.04	-48.69	-13	35.69
4676.38	49.09	282	200	V	-57.69	1.04	10.04	-48.69	-13	35.69

Note:
Absolute Level = Substituted Level - Cable loss + Antenna Gain
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 ºC to +50 ºC, 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:	25.3 ℃
Relative Humidity:	51 %
ATM Pressure:	101.2 kPa

The testing was performed by CK Huang on 2020-11-02.

Test Mode: Transmitting (unmodulation)

Reference Frequency：462.6250MHz				
Temerature (℃)	**Voltage (V_{DC})**	**Reading (MHz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	7.4	462.62599	2.14	±2.5
-20		462.62589	1.92	
-10		462.62565	1.41	
0		462.6259	1.95	
10		462.62559	1.28	
20		462.62591	1.97	
30		462.62546	0.99	
40		462.62559	1.28	
50		462.62588	1.90	
20	8.1	462.62526	0.56	
20	6.4	462.62530	0.65	

Reference Frequency：462.6375MHz				
Temerature (℃)	**Voltage (V_{DC})**	**Reading (MHz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	7.4	462.63759	0.19	±2.5
-20		462.63718	-0.69	
-10		462.63737	-0.28	
0		462.63713	-0.80	
10		462.63744	-0.13	
20		462.63753	0.06	
30		462.63789	0.84	
40		462.63720	-0.65	
50		462.63769	0.41	
20	8.1	462.63710	-0.86	
20	6.4	462.63777	0.58	

Reference Frequency：467.6250MHz				
Temerature (℃)	**Voltage (V_{DC})**	**Reading (MHz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	7.4	467.62548	1.03	±2.5
-20		467.62519	0.41	
-10		467.62585	1.82	
0		467.62508	0.17	
10		467.62546	0.98	
20		467.62551	1.09	
30		467.62584	1.80	
40		467.62560	1.28	
50		467.62593	1.99	
20	8.1	467.62530	0.64	
20	6.4	467.62504	0.09	

Reference Frequency：467.6375MHz				
Temerature (℃)	**Voltage (V_{DC})**	**Reading (MHz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	7.4	467.63724	-0.56	±2.5
-20		467.63798	1.03	
-10		467.63793	0.92	
0		467.63739	-0.24	
10		467.6374	-0.21	
20		467.63795	0.96	
30		467.63743	-0.15	
40		467.63703	-1.01	
50		467.63703	-1.01	
20	8.1	467.63735	-0.32	
20	6.4	467.63759	0.19	

Declarations

1: BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk '*'. Customer model name, addresses, names, trademarks etc. are not considered data.

2: Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

3: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

4: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

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