

TEST REPORT

Applicant Name: Cobra Electronics Corporation
Address: 1701 Golf Road, Suite 3-900 Rolling Meadows Illinois United States 60008
Report Number: 2401X96989E-RF-00
FCC ID: BBOTB450

Test Standard (s)

FCC PART 95

Sample Description

Product Type: Two-way radio
Model No.: TrailBlazer 450
Multiple Model(s) No.: TrailBlazer 455, 0190005-1, 0190005-2
Trade Mark: Cobra
Date Received: 2024/09/29
Issue Date: 2024/12/11

Test Result:	Pass [▲]
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▲ In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

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Bruce Lin
RF Engineer

Approved By:

Michelle Zeng

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RF Supervisor

Note: The information marked # is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Customer model name, addresses, names, trademarks etc. are included.

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	2401X96989E-RF-00	Original Report	2024/12/11

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Two-way radio
Tested Model	TrailBlazer 450
Multiple Model(s)	TrailBlazer 455, 0190005-1, 0190005-2
TX Frequency Range	462MHz Main channels: 462.5500-462.7250MHz 462MHz Interstitial channels: 462.5625-462.7125MHz 467MHz Main channels: 467.5500-467.7250MHz 467MHz Interstitial channels: 467.5625-467.7125MHz
Maximum Conducted Output Power	462MHz Main channels: 33.02 dBm 462MHz Interstitial channels: 33.02 dBm 467MHz Main channels: 32.28 dBm 467MHz Interstitial channels: 25.74 dBm
Modulation Technique	FM
Antenna Specification [#]	2dBi (It is provided by the applicant)
Voltage Range	DC 3.7V from Battery or DC 5V from USB Port
Sample serial number	2S6T-2 for Radiated Emissions Test 2S6T-1 for RF Conducted Test (Assigned by BAACL, Shenzhen)
Sample/EUT Status	Good condition
Adapter Information	N/A
Note: The multiple models are electrically identical with the test model except for model name and sales channel. Please refer to the declaration letter [#] for more detail, which was provided by manufacturer.	

Objective

This report is in accordance with Part 2 and Part 95, Subpart A & Subpart E of the Federal Communication Commissions rules.

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-E 2016, Land Mobile FM or PM-Communications Equipment-Measurement and Performance Standards, and ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services.

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		109.2kHz(k=2, 95% level of confidence)
RF Frequency		56.6Hz(k=2, 95% level of confidence)
RF output power, conducted		0.86dB(k=2, 95% level of confidence)
Unwanted Emission, conducted		1.60dB(k=2, 95% level of confidence)
AC Power Lines Conducted Emissions	9kHz-150kHz	3.63dB(k=2, 95% level of confidence)
	150kHz-30MHz	3.66dB(k=2, 95% level of confidence)
Audio Frequency Response		0.1dB
Low Pass Filter Response		1.2dB
Modulation Limiting		1%
Radiated Emissions	9kHz - 30MHz	3.60dB(k=2, 95% level of confidence)
	30MHz~200MHz (Horizontal)	5.32dB(k=2, 95% level of confidence)
	30MHz~200MHz (Vertical)	5.43dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Horizontal)	5.77dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Vertical)	5.73dB(k=2, 95% level of confidence)
	1GHz - 6GHz	5.34dB(k=2, 95% level of confidence)
	6GHz - 18GHz	5.40dB(k=2, 95% level of confidence)
18GHz - 40GHz		5.64dB(k=2, 95% level of confidence)
Temperature		±1°C
Humidity		±1%
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 5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 715558, the FCC Designation No. : CN5045.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

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	/	/

467MHz main channels

Channel No.	Channel Frequency (MHz)	Channel No.	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

467MHz interstitial channels

Channel No.	Channel Frequency (MHz)	Channel No.	Channel Frequency (MHz)
1	467.5625	2	467.5875
3	467.6125	4	467.6375
5	467.6625	6	467.6875
7	467.7125	/	/

Note: The EUT transmit on these 467MHz main channels only when communicating through a repeater station or making brief test transmissions in accordance with § 95.319(c), and which testing is compliant to this report and will do not cause interference to the communications of other stations.

Special Accessories

No special accessories was used

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

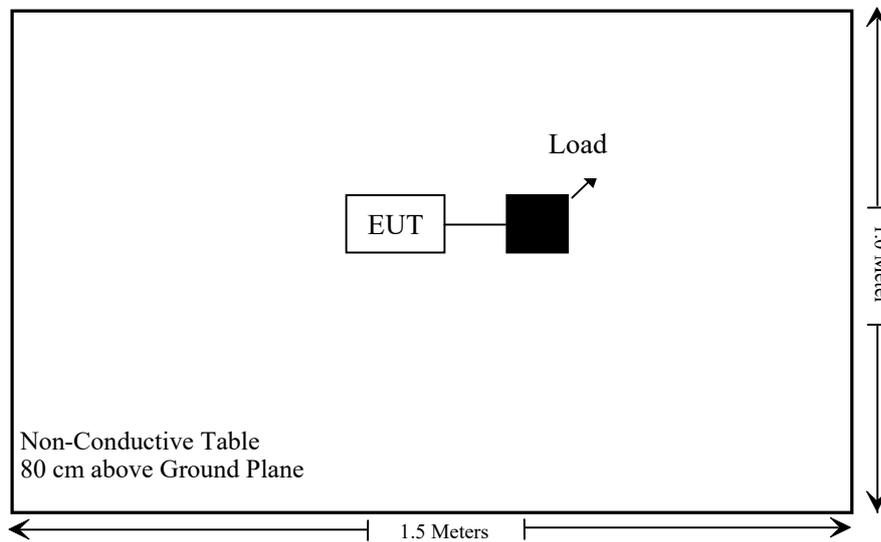
Manufacturer	Description	Model	Serial Number
Unknown	Load	Unknown	Unknown

External I/O Cable

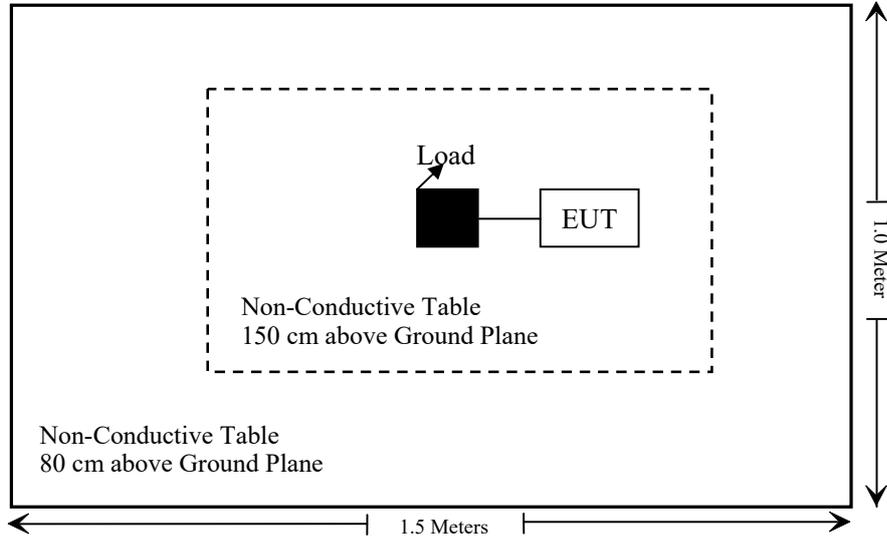
Cable Description	Length (m)	From Port	To
Un-shielding Detachable RF Cable	0.9	EUT	Load

Block Diagram of Test Setup

For Radiated Emissions below 1GHz:



For Radiated Emission above 1GHz



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§2.1093	RF Exposure Information [#]	Compliant
§95.1787	GMRS additional requirements	Not Applicable
§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	Conducted Spurious at Antenna Terminals	Compliant
§2.1053, §95.1779	Spurious Radiated Emissions	Compliant
§2.1055(d), §95.1765	Frequency Stability	Compliant

Not Applicable: The product has not digital data transmissions function.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR3	102455	2024/01/16	2025/01/15
Sonoma instrument	Pre-amplifier	310 N	186238	2024/05/21	2025/05/20
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2023/07/20	2026/07/19
Unknown	Cable	Chamber A Cable 1	N/A	2024/06/18	2025/06/17
Unknown	Cable	XH500C	J-10M-A	2024/06/18	2025/06/17
Agilent	Signal Generator	N5183A	MY50140588	2023/12/18	2024/12/17
COM-POWER	Dipole Antenna	AD-100	721027	NCR	NCR
Rohde & Schwarz	Spectrum Analyzer	FSV40	101605	2024/03/27	2025/03/26
COM-POWER	Pre-amplifier	PA-122	181919	2024/06/18	2025/06/17
Schwarzbeck	Horn Antenna	BBHA9120D(1201)	1143	2023/07/26	2026/07/25
The Electro-Mechanics Co.	Horn Antenna	3115	9107-3694	2024/06/06	2027/06/05
Unknown	RF Cable	KMSE	735	2024/06/18	2025/06/17
Unknown	RF Cable	UFA147	219661	2024/06/18	2025/06/17
Unknown	RF Cable	XH750A-N	J-10M	2024/06/18	2025/06/17
Agilent	Signal Generator	N5183A	MY50140588	2023/12/18	2024/12/17
JD	Multiplex Switch Test Control Set	DT7220FSU	DQ77926	2024/06/18	2025/06/17
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSU26	200982	2023/12/18	2024/12/17
BACL	Temperature & Humidity Chamber	BTH-150-40	30145	2024/01/16	2025/01/15
HP	RF Communication test set	8920B	US36141849	2024/01/16	2025/01/15
instek	DC Power Supply	GPS-3030DD	EM832096	NCR	NCR
Fluke	Digital Multimeter	287	19000011	2024/05/21	2025/05/20
JFW	30dB Attenuator	50FH-030-100 RF	F-03-EM032	2024/06/27	2025/06/26

* **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).

§2.1093 - RF EXPOSURE INFORMATION

Applicable Standard

§2.1093

Test Result

Compliant, please refer to the SAR report: 2402X96989E-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.

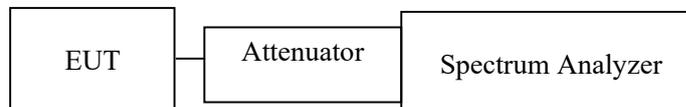
(b) 462 MHz interstitial channels. The effective radiated power (ERP) of mobile, hand-held portable and base stations transmitting on the 462 MHz interstitial channels must not exceed 5 Watts.

(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

C63.26-2015, Clause 5.2.3.3

Conducted RF Output Power:



Note: The path loss from EUT to Spectrum Analyzer has included in the result.

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

- a) Set the RBW \geq OBW.
- b) Set VBW $\geq 3 \times$ RBW.
- c) Set span $\geq 2 \times$ OBW.
- d) Sweep time $\geq 10 \times$ (number of points in sweep) \times (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.

Test Data

Environmental Conditions

Temperature:	24.5~25.3 °C
Relative Humidity:	47~55 %
ATM Pressure:	101 kPa

The testing was performed by Cheeb Huang from 2024-10-22 to 2024-11-15.

Test Mode: Transmitting (Un-modulation)

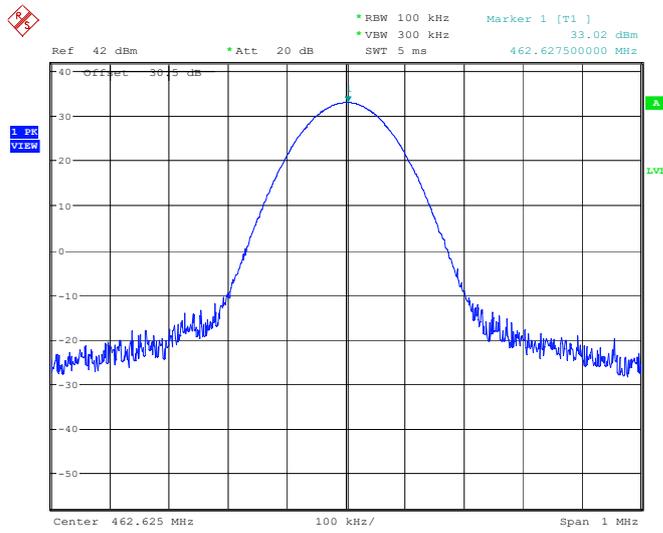
Test Result: Compliant

Please refer to the following tables and plots.

Test Bands	Test Frequency (MHz)	Conducted Output power (dBm)	Conducted Output Power Limit (dBm)	ERP (dBm)	ERP Limit (dBm)
462 MHz Main	462.625	33.02	≤47.00	32.87	/
462 MHz interstitial	462.6375	33.02	/	32.87	≤37.00
467 MHz Main	467.625	32.28	≤47.00	32.13	/
467 MHz interstitial	467.6375	25.74	/	25.59	≤27.00

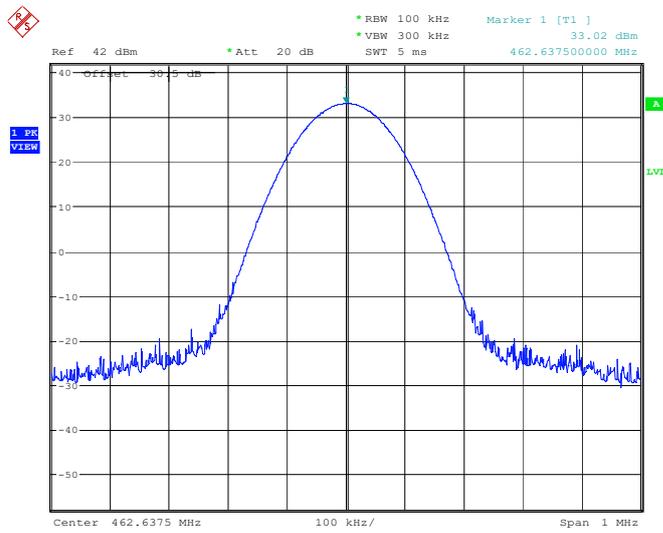
ERP=Conducted Output Power+ Antenna Gain(dBd)
 Antenna gain=2.0dBi=-0.15dBd (0dBi=-2.15dBd)

462.625 MHz



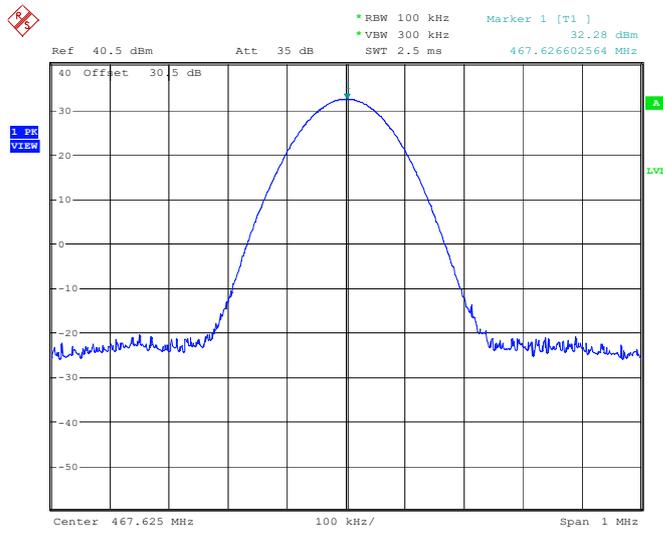
ProjectNo.:2401X96989E-RF Tester:Cheeb Huang
Date: 22.OCT.2024 15:33:37

462.6375 MHz



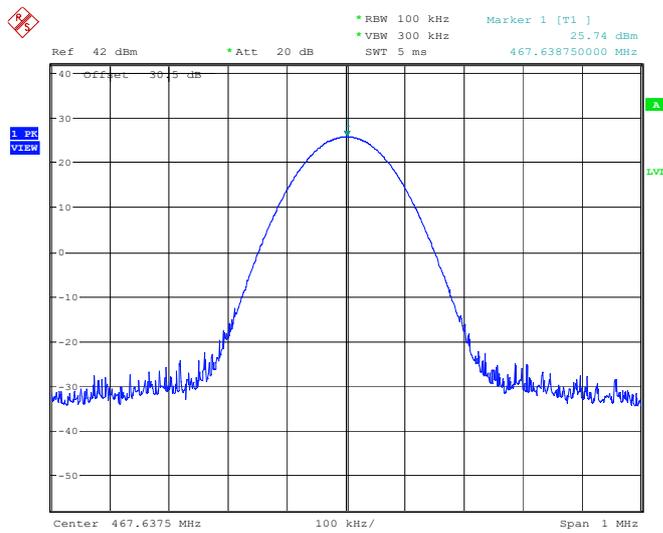
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Date: 22.OCT.2024 15:32:33

467.625 MHz



ProjectNo.:2401X96989E-RF Tester:Cheeb Huang
Date: 15.NOV.2024 11:58:13

467.6375 MHz



ProjectNo.:2401X96989E-RF Tester:Cheeb Huang
Date: 22.OCT.2024 15:32:59

FCC §2.1047 & §95.1775 - MODULATION CHARACTERISTIC

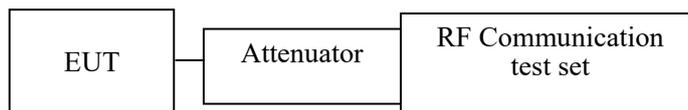
Applicable Standard

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) Over modulation. 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 over modulation.
- (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

EUT Setup Block Diagram



Test Method: C63.26-2015, Clause 5.3.2 and Clause 5.3.3.2

Test Data**Environmental Conditions**

Temperature:	24.5~25.3°C
Relative Humidity:	47~55 %
ATM Pressure:	101 kPa

The testing was performed by Cheeb Huang from 2024-10-28 to 2024-11-06.

Test Mode: Transmitting

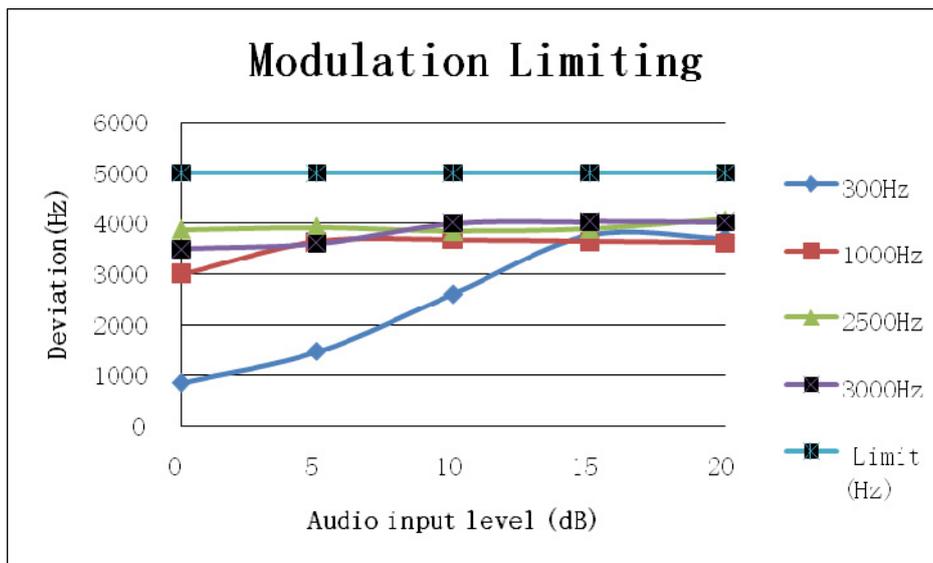
Please refer to the following tables and plots.

MODULATION LIMITING

Carrier Frequency: 462.625MHz

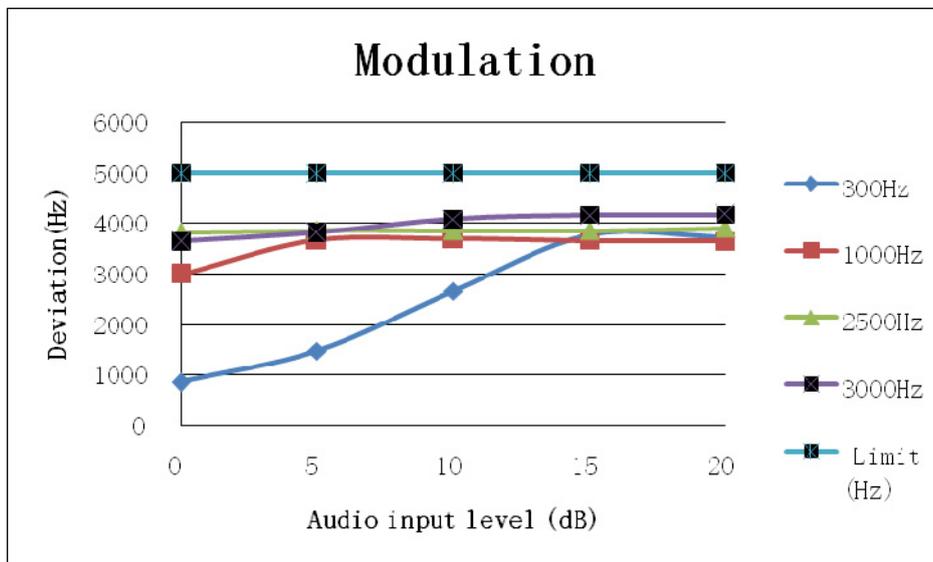
Peak+ deviation

Audio input level (dB)	Deviation (Hz)				Limit (Hz)
	300Hz	1000Hz	2500Hz	3000Hz	
20	3710	3624	4089	4023	5000
15	3776	3646	3890	4035	5000
10	2609	3679	3845	4007	5000
5	1471	3643	3927	3606	5000
0	860	3000	3880	3500	5000



Peak- deviation

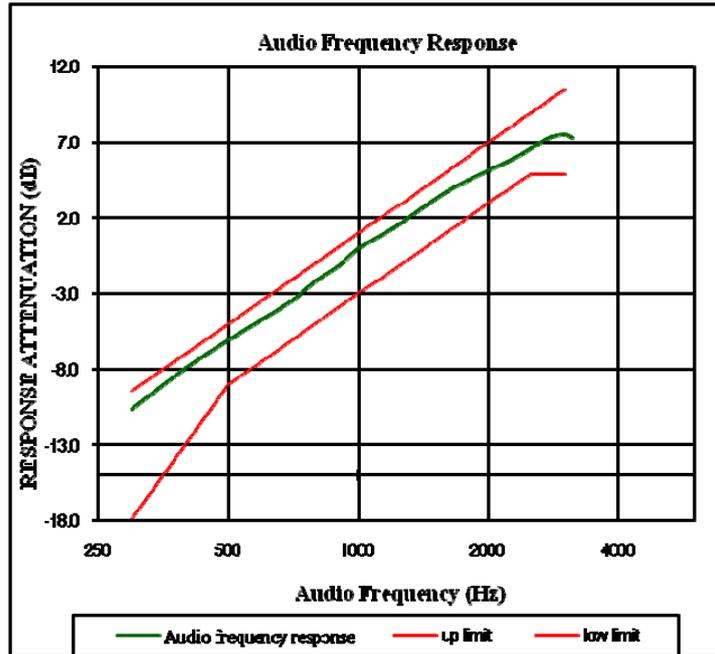
Audio input level (dB)	Deviation (Hz)				Limit (Hz)
	300Hz	1000Hz	2500Hz	3000Hz	
20	3723	3650	3910	4170	5000
15	3779	3663	3859	4166	5000
10	2666	3690	3852	4089	5000
5	1489	3670	3860	3814	5000
0	865	3000	3829	3641	5000



Audio Frequency Response

Carrier Frequency: 462.625MHz

Audio Frequency (Hz)	Response (dB)
300	-10.63
400	-7.89
500	-6.09
600	-4.72
700	-3.47
800	-2.14
900	-1.17
1000	0.00
1200	1.34
1400	2.65
1600	3.76
1800	4.51
2000	5.16
2200	5.74
2400	6.30
2600	6.92
2800	7.39
3000	7.54
3125	7.35

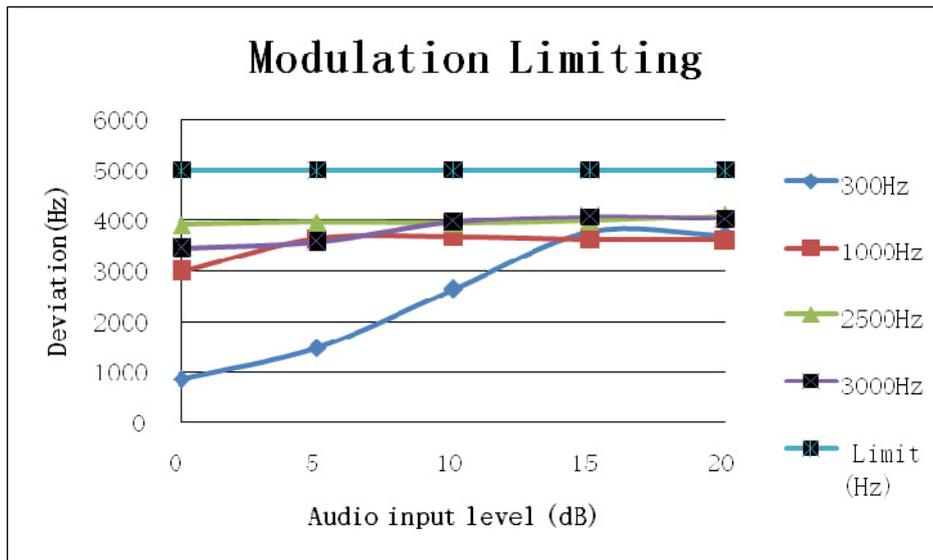


MODULATION LIMITING

Carrier Frequency: 462.6375MHz

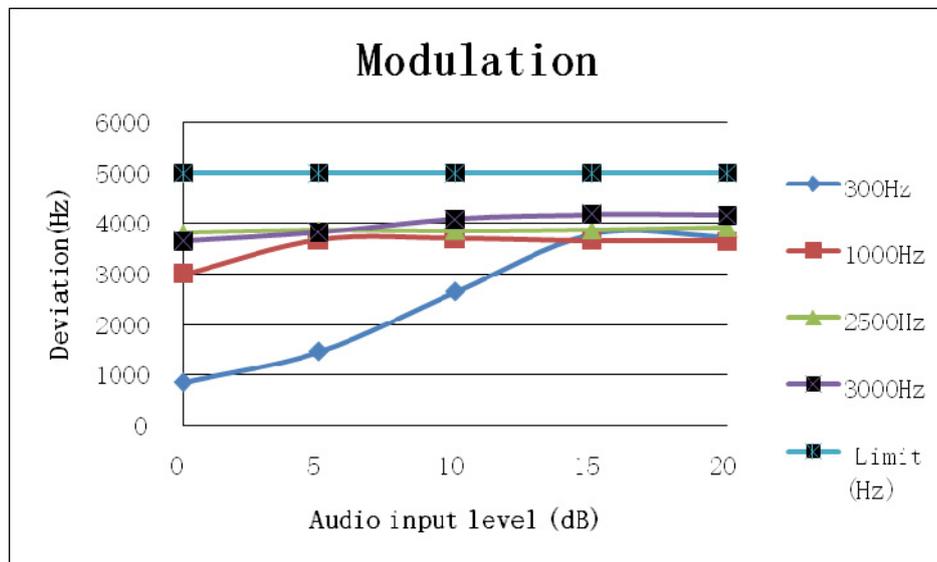
Peak+ deviation

Audio input level (dB)	Deviation (Hz)				Limit (Hz)
	300Hz	1000Hz	2500Hz	3000Hz	
20	3707	3625	4098	4040	5000
15	3776	3640	3993	4075	5000
10	2648	3679	3953	3978	5000
5	1489	3644	3961	3589	5000
0	865	3000	3921	3462	5000



Peak- deviation

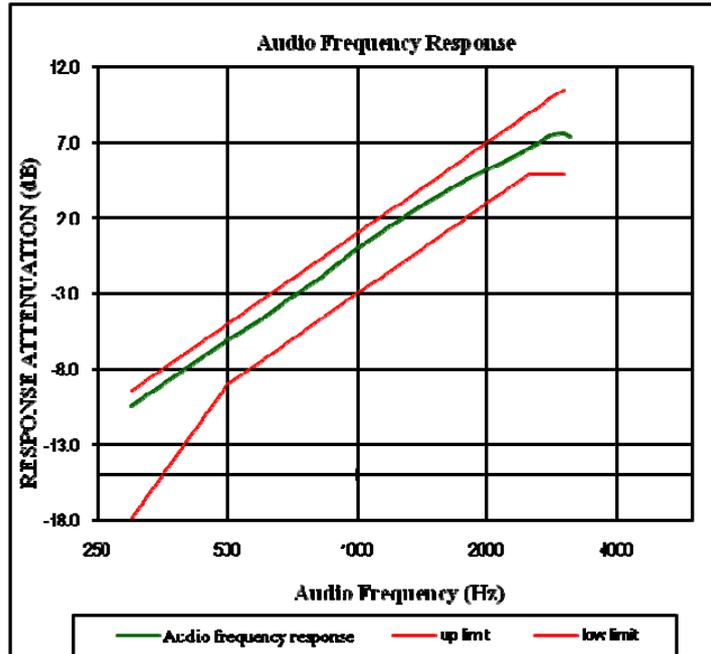
Audio input level (dB)	Deviation (Hz)				Limit (Hz)
	300Hz	1000Hz	2500Hz	3000Hz	
20	3721	3644	3918	4159	5000
15	3781	3653	3874	4180	5000
10	2647	3700	3851	4089	5000
5	1473	3675	3870	3814	5000
0	860	3000	3822	3642	5000



Audio Frequency Response

Carrier Frequency: 462.6375MHz

Audio Frequency (Hz)	Response (dB)
300	-10.40
400	-7.96
500	-6.09
600	-4.70
700	-3.31
800	-2.17
900	-1.05
1000	0.00
1200	1.50
1400	2.75
1600	3.77
1800	4.57
2000	5.22
2200	5.76
2400	6.37
2600	6.91
2800	7.44
3000	7.57
3125	7.38

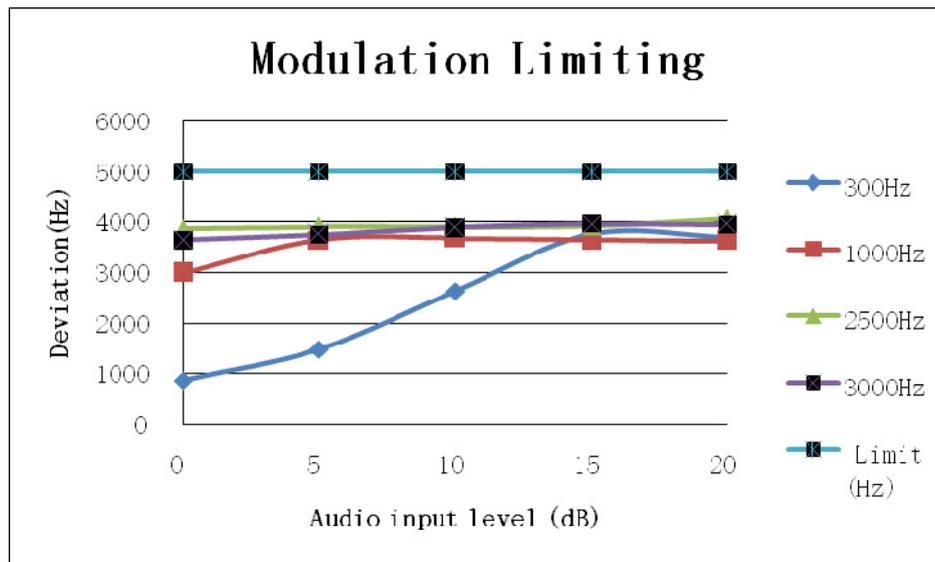


MODULATION LIMITING

Carrier Frequency: 467.625MHz

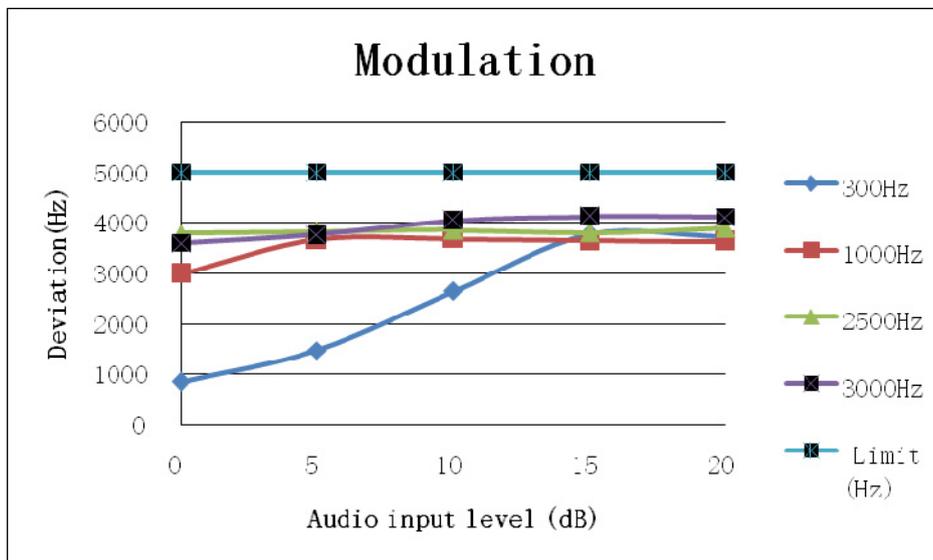
Peak+ deviation

Audio input level (dB)	Deviation (Hz)				Limit (Hz)
	300Hz	1000Hz	2500Hz	3000Hz	
20	3712	3630	4060	3950	5000
15	3775	3645	3930	3971	5000
10	2640	3688	3904	3887	5000
5	1482	3652	3908	3752	5000
0	873	3000	3871	3641	5000



Peak- deviation

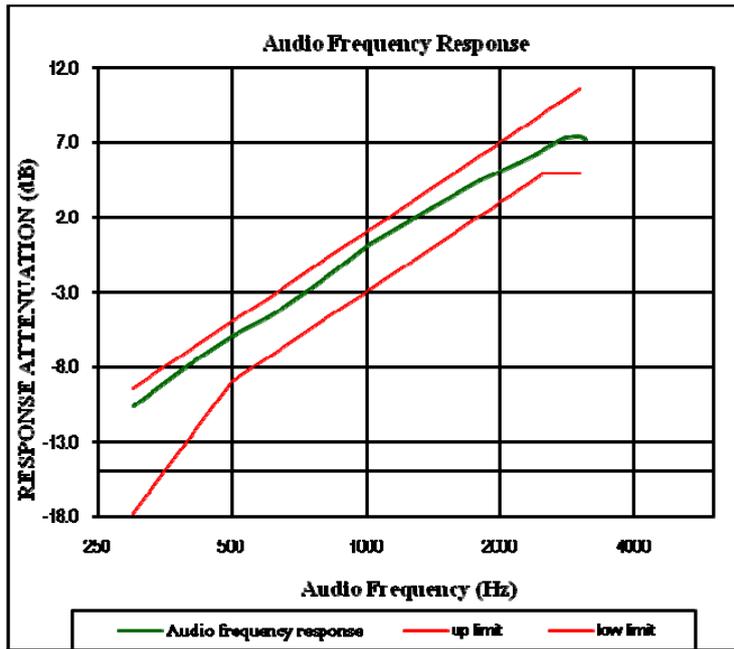
Audio input level (dB)	Deviation (Hz)				Limit (Hz)
	300Hz	1000Hz	2500Hz	3000Hz	
20	3720	3629	3890	4117	5000
15	3776	3641	3812	4130	5000
10	2650	3680	3861	4053	5000
5	1486	3672	3828	3767	5000
0	862	3000	3795	3600	5000



Audio Frequency Response

Carrier Frequency: 467.625MHz

Audio Frequency (Hz)	Response (dB)
300	-10.60
400	-7.89
500	-5.99
600	-4.72
700	-3.41
800	-2.20
900	-1.02
1000	0.00
1200	1.42
1400	2.65
1600	3.61
1800	4.46
2000	5.05
2200	5.62
2400	6.19
2600	6.77
2800	7.27
3000	7.38
3125	7.13

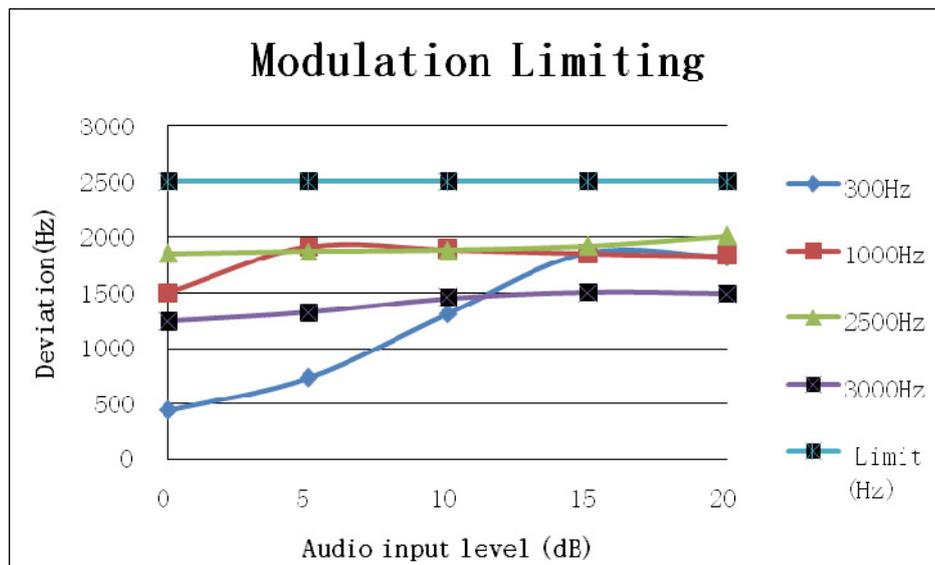


MODULATION LIMITING

Carrier Frequency: 467.6375MHz

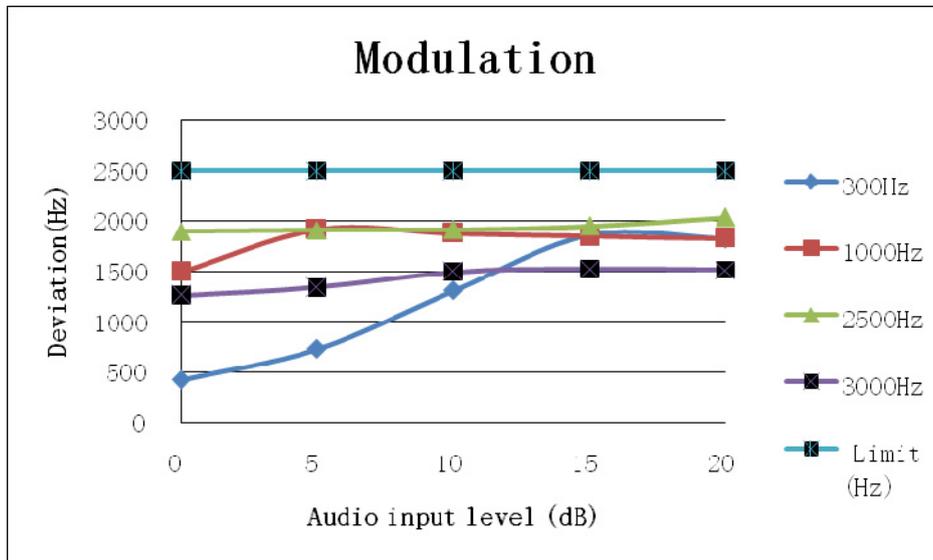
Peak+ deviation

Audio input level (dB)	Deviation (Hz)				Limit (Hz)
	300Hz	1000Hz	2500Hz	3000Hz	
20	1820	1830	2013	1492	2500
15	1858	1846	1920	1502	2500
10	1311	1890	1880	1450	2500
5	732	1914	1870	1320	2500
0	439	1500	1852	1243	2500



Peak- deviation

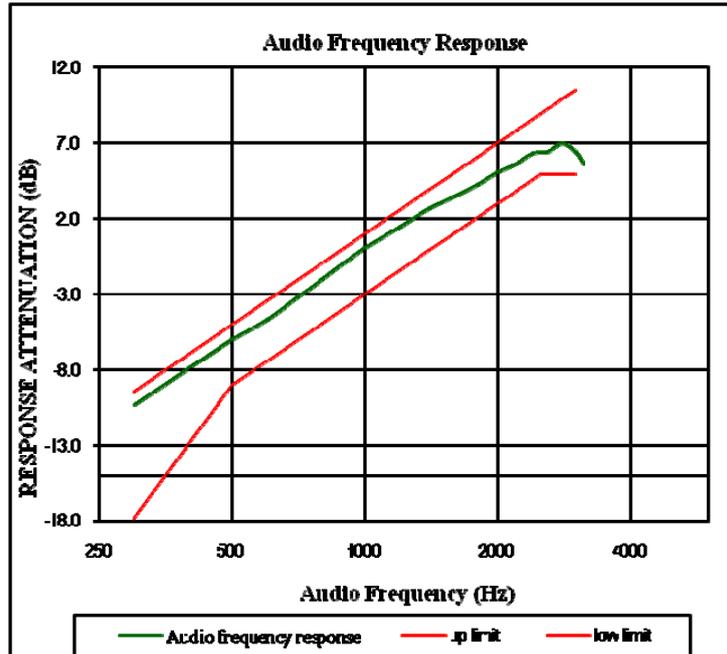
Audio input level (dB)	Deviation (Hz)				Limit (Hz)
	300Hz	1000Hz	2500Hz	3000Hz	
20	1826	1832	2036	1517	2500
15	1860	1846	1952	1528	2500
10	1314	1880	1918	1500	2500
5	739	1917	1910	1342	2500
0	430	1500	1900	1266	2500



Audio Frequency Response

Carrier Frequency: 467.6375MHz

Audio Frequency (Hz)	Response (dB)
300	-10.34
400	-7.92
500	-6.06
600	-4.70
700	-3.25
800	-2.07
900	-0.88
1000	0.00
1200	1.48
1400	2.66
1600	3.44
1800	4.21
2000	5.00
2200	5.58
2400	6.35
2600	6.45
2800	6.94
3000	6.38
3125	5.57



FCC §2.1049 & §95.1773&§95.1779(a)(c) - 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.

(3) $83 \log (fd \div 5)$ 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.

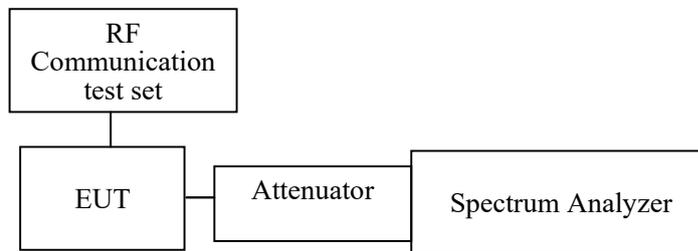
(4) $116 \log (fd \div 6.1)$ dB or $50 + 10 \log (P)$ dB, whichever is the lesser attenuation, on any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz), of more than 10 kHz up to and including 250% of the authorized bandwidth.

- (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%.

(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

C63.26-2015, Clause 5.4.4



Note: The path loss from EUT to Spectrum Analyzer has included in the result.

Test Data

Environmental Conditions

Temperature:	24.5~25.3 °C
Relative Humidity:	47~55 %
ATM Pressure:	101 kPa

The testing was performed by Cheeb Huang from 2024-10-22 to 2024-12-11.

Test Mode: Transmitting

Test Bands	Test Frequency (MHz)	99% Occupied Bandwidth (kHz)	Limit (kHz)
462 MHz Main	462.625	11.250	≤20
462 MHz interstitial	462.6375	11.375	≤20
467 MHz Main	467.625	11.058	≤20
467 MHz interstitial	467.6375	9.250	≤12.5

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

Emission Designator 11K0F3E

In this case, 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.

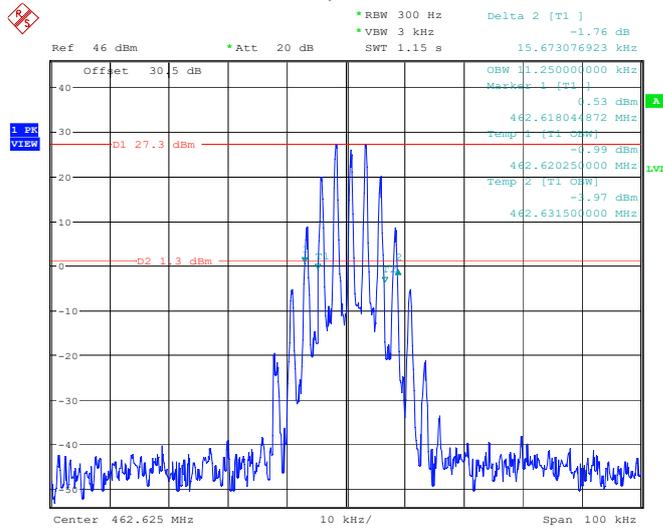
Emission Designator 16K0F3E

In this case, 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.

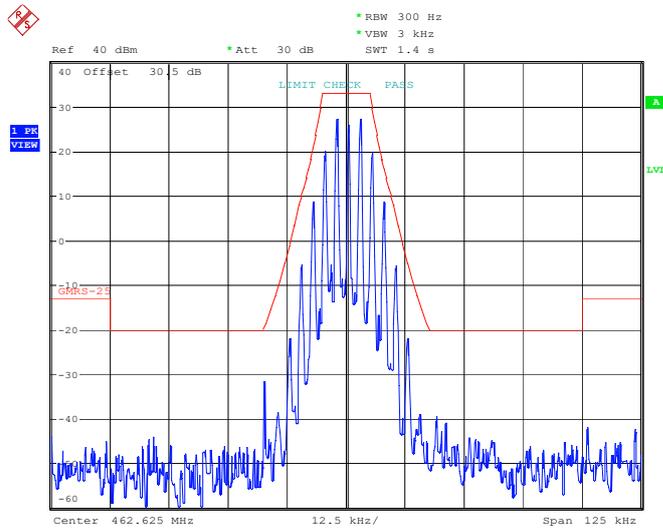
Emission Mask test was according to Attenuation requirements (3), (4), (7), low pass filter is not required. Please refer to the below Plots.

OBW, 462.6250MHz



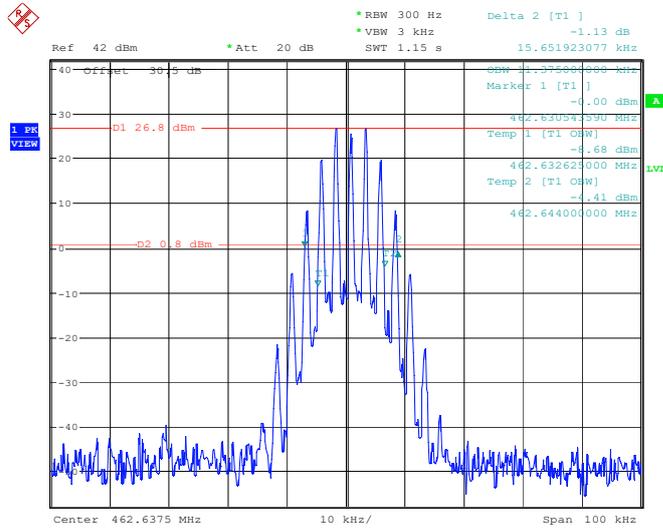
ProjectNo.:2401X96989E-RF Tester:Cheeb Huang
 Date: 22.OCT.2024 16:26:47

Emission Mask, 462.6250MHz



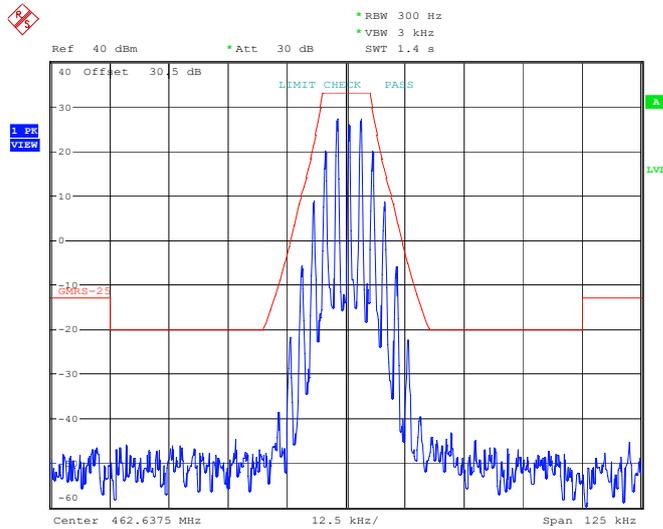
ProjectNo.:2401X96989E-RF Tester:Cheeb Huang
 Date: 11.DEC.2024 11:45:41

OBW, 462.6375MHz



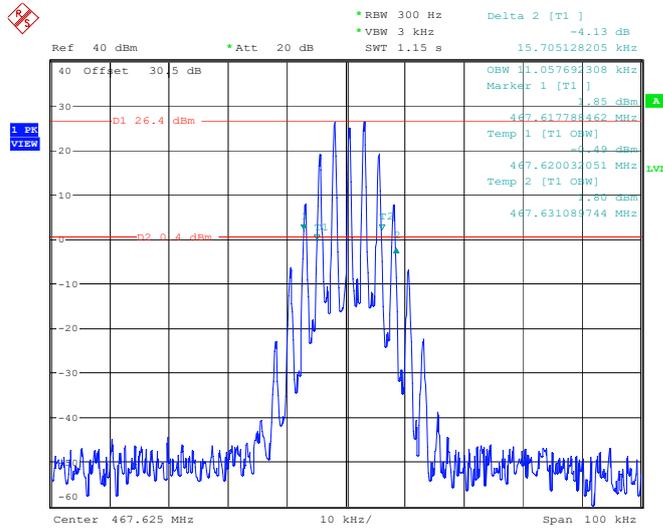
ProjectNo.:2401X96989E-RF Tester:Cheeb Huang
Date: 22.OCT.2024 16:16:24

Emission Mask, 462.6375MHz



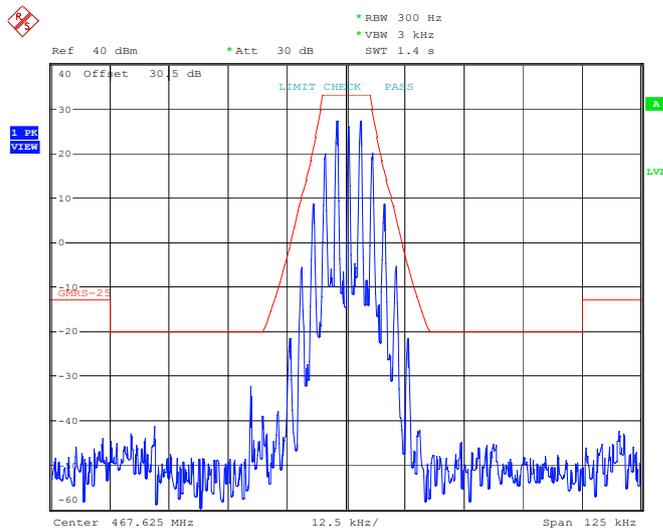
ProjectNo.:2401X96989E-RF Tester:Cheeb Huang
Date: 11.DEC.2024 11:37:59

OBW, 467.6250MHz



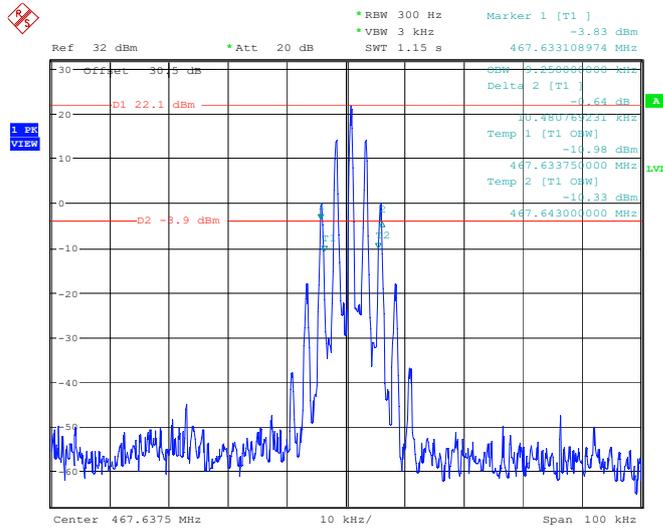
ProjectNo.:2401X96989E-RF Tester:Cheeb Huang
Date: 19.NOV.2024 11:37:56

Emission Mask, 467.6250MHz



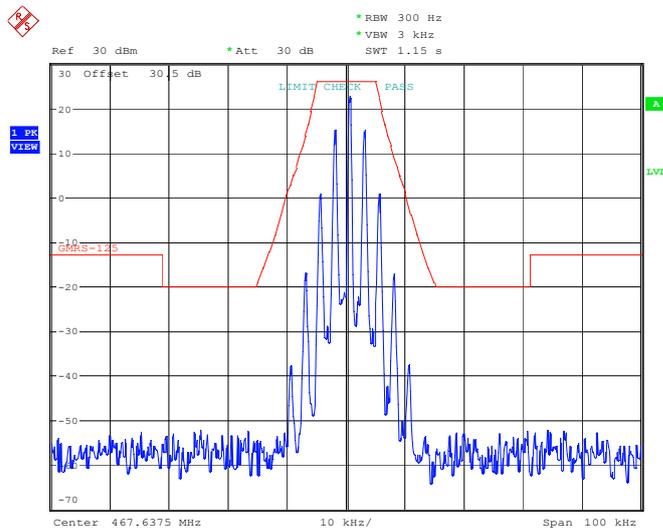
ProjectNo.:2401X96989E-RF Tester:Cheeb Huang
Date: 11.DEC.2024 11:43:09

OBW, 467.6375MHz



ProjectNo.:2401X96989E-RF Tester:Cheeb Huang
Date: 22.OCT.2024 16:23:42

Emission Mask, 467.6375MHz



ProjectNo.:2401X96989E-RF Tester:Cheeb Huang
Date: 11.DEC.2024 11:32:06

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

Applicable Standard

FCC §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.

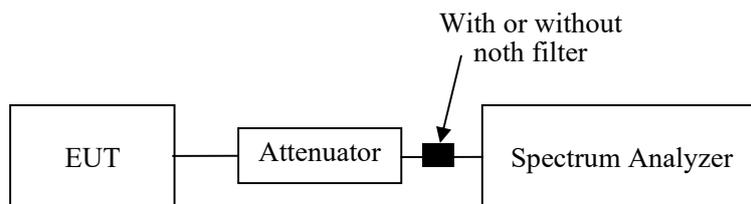
(7) $43 + 10 \log(P)$ dB on any frequency removed from the center of the authorized bandwidth by more than 250%.

(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

C63.26-2015, Clause 5.7.4



Note: the path loss (cable loss and attenuator) has included into the plot.

Test Data

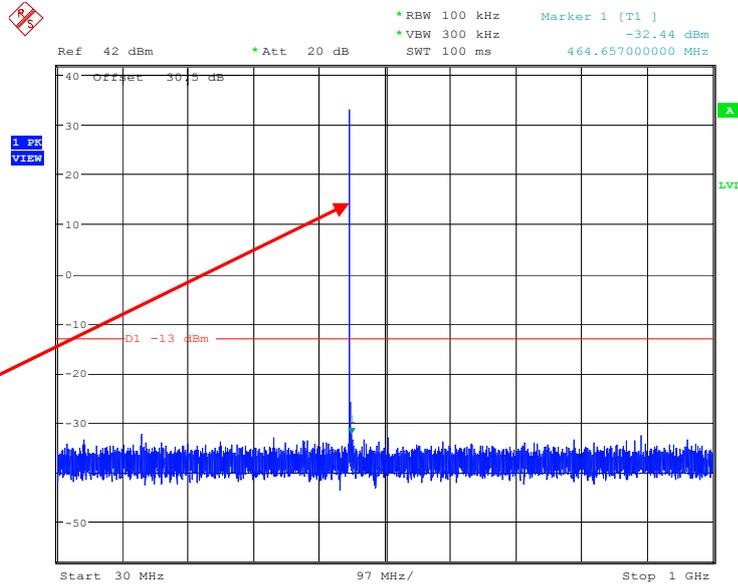
Environmental Conditions

Temperature:	24.5~25.3 °C
Relative Humidity:	47~55 %
ATM Pressure:	101 kPa

The testing was performed by Cheeb Huang from 2024-10-22 to 2024-11-15.

Test Mode: Transmitting (un-modulation)

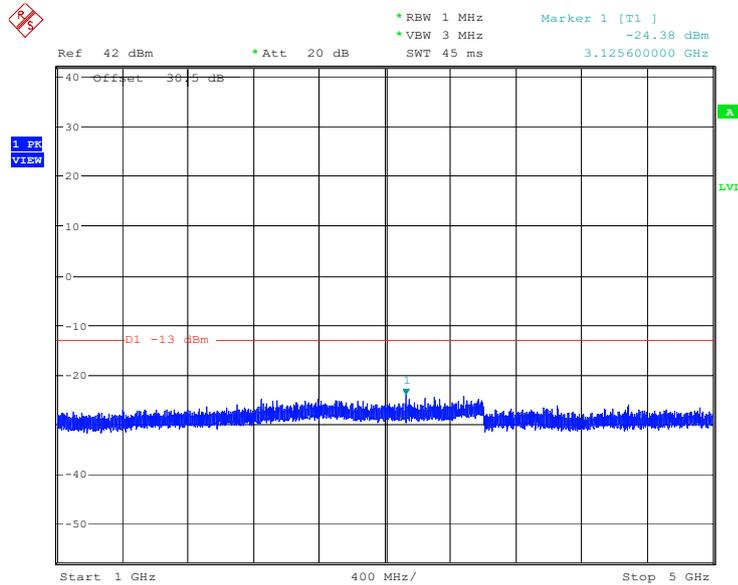
30 MHz – 1GHz (462.6250 MHz)



Fundamental test

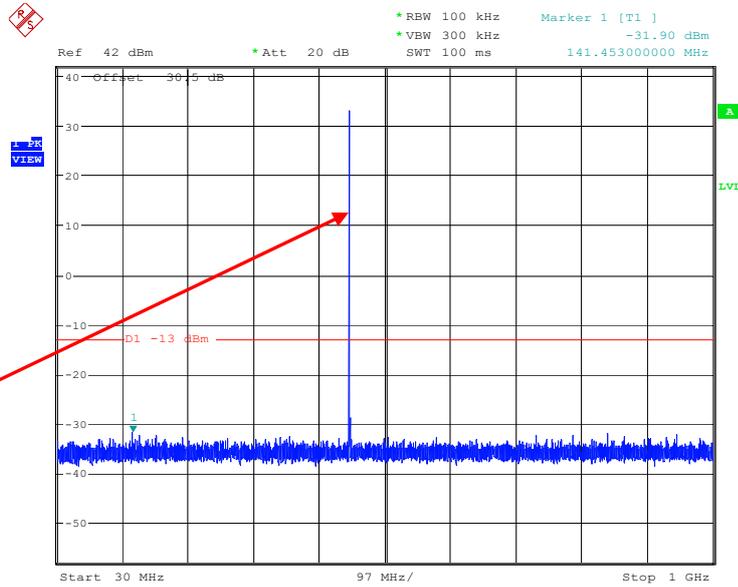
ProjectNo.:2401X96989E-RF Tester:Cheeb Huang
Date: 22.OCT.2024 15:42:33

1GHz -5GHz (462.6250 MHz)



ProjectNo.:2401X96989E-RF Tester:Cheeb Huang
Date: 22.OCT.2024 15:43:18

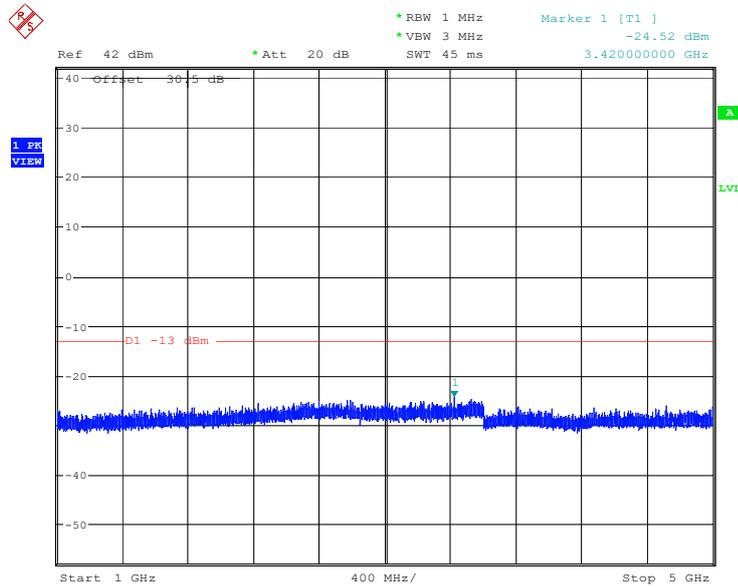
30 MHz – 1GHz (462.6375 MHz)



Fundamental test

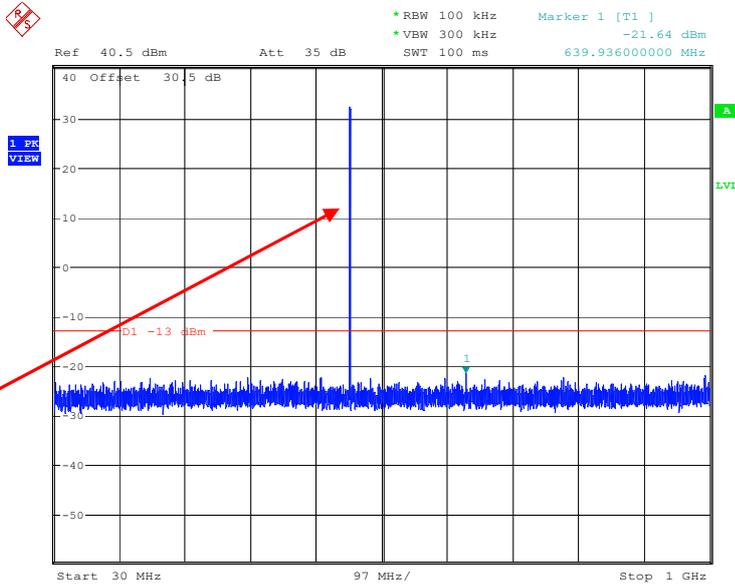
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Date: 22.OCT.2024 15:37:05

1GHz -5GHz (462.6375 MHz)



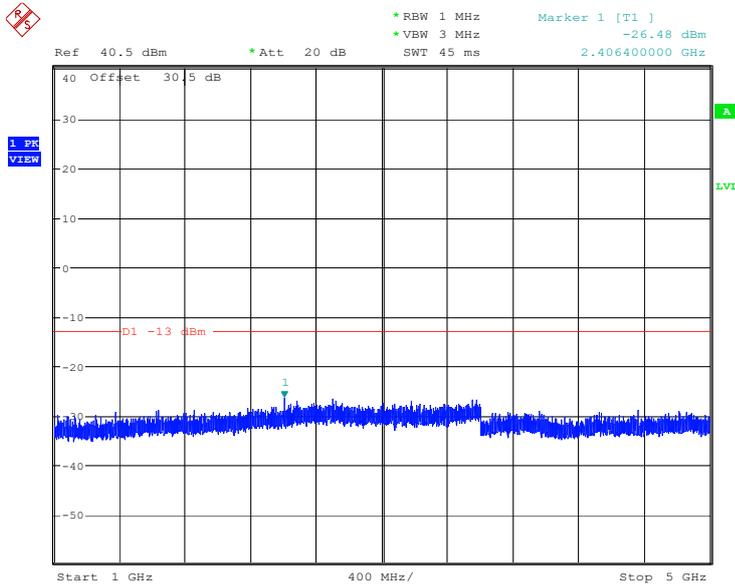
ProjectNo.:2401X96989E-RF Tester:Cheeb Huang
Date: 22.OCT.2024 15:44:17

30 MHz – 1GHz (467.6250 MHz)



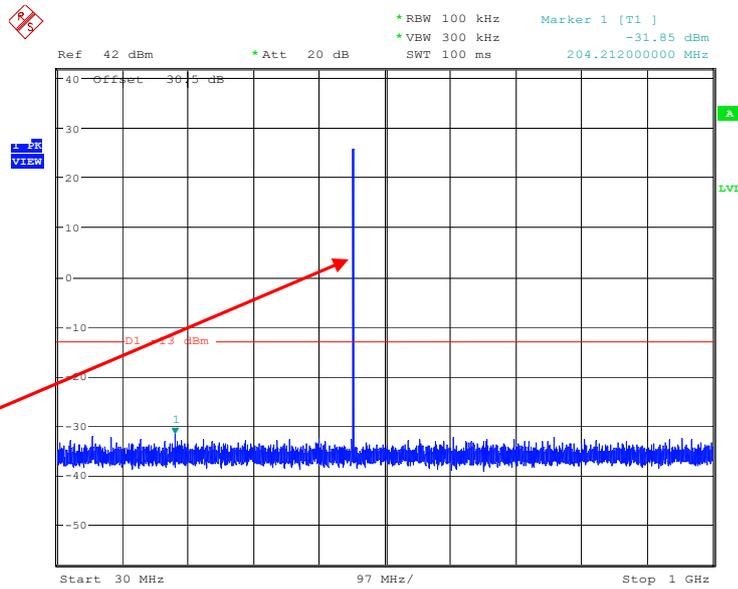
ProjectNo.:2401X96989E-RF Tester:Cheeb Huang
Date: 15.NOV.2024 12:01:48

1GHz -5GHz (467.6250 MHz)



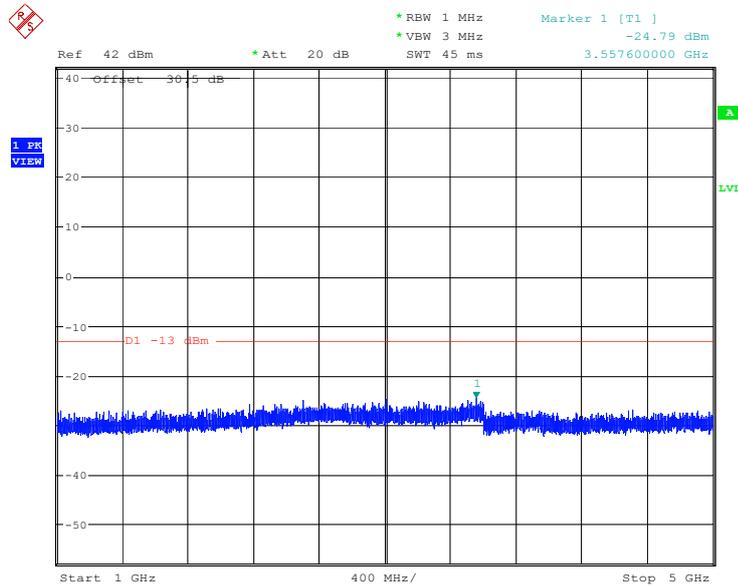
ProjectNo.:2401X96989E-RF Tester:Cheeb Huang
Date: 15.NOV.2024 12:03:12

30 MHz – 1GHz (467.6375 MHz)



ProjectNo.:2401X96989E-RF Tester:Cheeb Huang
Date: 22.OCT.2024 15:38:12

1GHz -5GHz (467.6375 MHz)



ProjectNo.:2401X96989E-RF Tester:Cheeb Huang
Date: 22.OCT.2024 15:44:39

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 non-conducting 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 a 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 = $43 + 10 \text{Log}_{10}(\text{power out in Watts})$

Test Data

Environmental Conditions

Temperature:	25~25.2 °C
Relative Humidity:	50~56 %
ATM Pressure:	101 kPa

The testing was performed by Anson Su on 2024-10-18 for below 1GHz and Karl Xu on 2024-10-22 for above 1GHz.

Test Mode: Transmitting (Un-modulation)

Note: Pre-scan in the X, Y and Z axes of orientation, the worst case Y-axis of orientation was recorded.

Frequency (MHz)	Receiver Reading (dBm)	Polar (H/V)	Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi/dBd)			
frequency:462.6250MHz								
925.25	75.19	H	-21.2	1.33	0.0	-22.53	-13	9.53
925.25	82.57	V	-13.5	1.33	0.0	-14.83	-13	1.83
1387.88	77.87	H	-29.8	0.80	7.90	-22.70	-13	9.70
1387.88	82.12	V	-26.3	0.80	7.90	-19.20	-13	6.20
1850.50	75.13	H	-32.3	1.00	8.00	-25.30	-13	12.30
1850.50	77.38	V	-30.7	1.00	8.00	-23.70	-13	10.70
2313.13	69.58	H	-37.8	1.10	9.40	-29.50	-13	16.50
2313.13	67.83	V	-39.6	1.10	9.40	-31.30	-13	18.30
2775.75	66.49	H	-40.1	1.20	9.20	-32.10	-13	19.10
2775.75	62.44	V	-43.9	1.20	9.20	-35.90	-13	22.90
3238.38	60.91	H	-45.1	1.20	7.60	-38.70	-13	25.70
3238.38	54.66	V	-51.1	1.20	7.60	-44.70	-13	31.70
3701.00	62.30	H	-43.1	1.30	11.00	-33.40	-13	20.40
3701.00	58.46	V	-46.8	1.30	11.00	-37.10	-13	24.10
4163.63	58.32	H	-46.1	1.40	10.80	-36.70	-13	23.70
4163.63	49.47	V	-54.9	1.40	10.80	-45.50	-13	32.50
4626.25	51.68	H	-51.9	1.50	10.50	-42.90	-13	29.90
4626.25	51.01	V	-52.6	1.50	10.50	-43.60	-13	30.60
frequency: 462.6375MHz								
925.275	74.47	H	-21.9	1.33	0.0	-23.23	-13	10.23
925.275	76.63	V	-19.4	1.33	0.0	-20.73	-13	7.73
1387.91	85.42	H	-22.3	0.80	7.90	-15.20	-13	2.20
1387.91	78.13	V	-30.3	0.80	7.90	-23.20	-13	10.20
1850.55	76.78	H	-30.6	1.00	8.00	-23.60	-13	10.60
1850.55	75.60	V	-32.4	1.00	8.00	-25.40	-13	12.40
2313.19	70.89	H	-36.4	1.10	9.40	-28.10	-13	15.10
2313.19	67.48	V	-40.0	1.10	9.40	-31.70	-13	18.70
2775.83	67.35	H	-39.2	1.20	9.20	-31.20	-13	18.20
2775.83	61.81	V	-44.5	1.20	9.20	-36.50	-13	23.50
3238.46	61.54	H	-44.5	1.20	7.60	-38.10	-13	25.10
3238.46	56.03	V	-49.7	1.20	7.60	-43.30	-13	30.30
3701.10	60.04	H	-45.4	1.30	11.00	-35.70	-13	22.70
3701.10	55.02	V	-50.2	1.30	11.00	-40.50	-13	27.50
4163.74	59.40	H	-45.0	1.40	10.80	-35.60	-13	22.60
4163.74	51.92	V	-52.4	1.40	10.80	-43.00	-13	30.00
4626.38	54.98	H	-48.6	1.50	10.50	-39.60	-13	26.60
4626.38	52.68	V	-50.9	1.50	10.50	-41.90	-13	28.90

Frequency (MHz)	Receiver Reading (dBm)	Polar (H/V)	Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi/dBd)			
frequency: 467.6250MHz								
935.25	73.17	H	-23.2	1.33	0.0	-24.53	-13	11.53
935.25	78.03	V	-18.0	1.33	0.0	-19.33	-13	6.33
1402.88	76.44	H	-31.3	0.80	7.90	-24.20	-13	11.20
1402.88	79.47	V	-28.9	0.80	7.90	-21.80	-13	8.80
1870.50	73.39	H	-34.0	1.00	8.00	-27.00	-13	14.00
1870.50	78.65	V	-29.4	1.00	8.00	-22.40	-13	9.40
2338.13	65.5	H	-41.8	1.10	9.40	-33.50	-13	20.50
2338.13	61.03	V	-46.4	1.10	9.40	-38.10	-13	25.10
2805.75	58.52	H	-48.0	1.20	9.20	-40.00	-13	27.00
2805.75	49.7	V	-56.6	1.20	9.20	-48.60	-13	35.60
3273.38	59.42	H	-46.6	1.30	8.80	-39.10	-13	26.10
3273.38	57.09	V	-48.6	1.30	8.80	-41.10	-13	28.10
3741.00	57.65	H	-47.8	1.30	11.00	-38.10	-13	25.10
3741.00	55.24	V	-50.0	1.30	11.00	-40.30	-13	27.30
4208.63	56.52	H	-47.9	1.40	10.80	-38.50	-13	25.50
4208.63	50.61	V	-53.7	1.40	10.80	-44.30	-13	31.30
4676.25	53.35	H	-50.0	1.50	10.30	-41.20	-13	28.20
4676.25	52.31	V	-51.0	1.50	10.30	-42.20	-13	29.20
frequency: 467.6375MHz								
935.275	72.34	H	-24.0	1.33	0.0	-25.33	-13	12.33
935.275	77.59	V	-18.5	1.33	0.0	-19.83	-13	6.83
1402.91	83.54	H	-24.2	0.80	7.90	-17.10	-13	4.10
1402.91	80.69	V	-27.7	0.80	7.90	-20.60	-13	7.60
1870.55	79.38	H	-28.0	1.00	8.00	-21.00	-13	8.00
1870.55	79.16	V	-28.9	1.00	8.00	-21.90	-13	8.90
2338.19	79.52	H	-27.8	1.10	9.40	-19.50	-13	6.50
2338.19	68.85	V	-38.6	1.10	9.40	-30.30	-13	17.30
2805.83	72.03	H	-34.5	1.20	9.20	-26.50	-13	13.50
2805.83	68.26	V	-38.1	1.20	9.20	-30.10	-13	17.10
3273.46	69.09	H	-36.9	1.30	8.80	-29.40	-13	16.40
3273.46	63.40	V	-42.3	1.30	8.80	-34.80	-13	21.80
3741.10	59.34	H	-46.1	1.30	11.00	-36.40	-13	23.40
3741.10	63.32	V	-41.9	1.30	11.00	-32.20	-13	19.20
4208.74	56.22	H	-48.2	1.40	10.80	-38.80	-13	25.80
4208.74	58.57	V	-45.8	1.40	10.80	-36.40	-13	23.40
4676.38	55.88	H	-47.7	1.50	10.50	-38.70	-13	25.70
4676.38	51.42	V	-52.2	1.50	10.50	-43.20	-13	30.20

Note:

Absolute Level = Reading Level + Substituted Factor

Substituted Factor contains: Substituted Level - Cable loss+ Antenna Gain

Margin = Absolute Level - Limit

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.

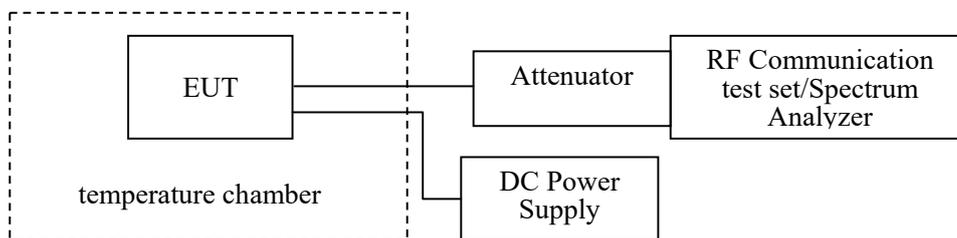
According to FCC §95.1765, Each GMRS transmitter type must be designed to comply with the frequency accuracy requirements in this section under normal operating conditions. Operators of GMRS stations must also ensure compliance with these requirements.

(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

EUT Setup Block Diagram



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:	24.5~25.3°C
Relative Humidity:	47~55 %
ATM Pressure:	101 kPa

The testing was performed by Cheeb Huang from 2024-10-28 to 2024-11-06.

Test Mode: Transmitting (Un-modulation)

Test Frequency (MHz)	Temperature (°C)	Voltage (V _{DC})	Measured Frequency (MHz)	Frequency Error (ppm)	limit (ppm)
462.625	-30	3.7	462.625708	1.5304	≤2.5
	-20	3.7	462.625825	1.7833	≤2.5
	-10	3.7	462.625841	1.8179	≤2.5
	0	3.7	462.625668	1.4439	≤2.5
	10	3.7	462.625849	1.8352	≤2.5
	20	3.7	462.625756	1.6342	≤2.5
	30	3.7	462.625667	1.4418	≤2.5
	40	3.7	462.625856	1.8503	≤2.5
	50	3.7	462.625744	1.6082	≤2.5
	20	3.2	462.625747	1.6147	≤2.5
	20	4.2	462.625849	1.8352	≤2.5
462.6375	-30	3.7	462.63837	1.8805	≤2.5
	-20	3.7	462.638273	1.6709	≤2.5
	-10	3.7	462.638286	1.6990	≤2.5
	0	3.7	462.638238	1.5952	≤2.5
	10	3.7	462.638373	1.8870	≤2.5
	20	3.7	462.63831	1.7508	≤2.5
	30	3.7	462.638223	1.5628	≤2.5
	40	3.7	462.63823	1.5779	≤2.5
	50	3.7	462.638356	1.8503	≤2.5
	20	3.2	462.638279	1.6838	≤2.5
	20	4.2	462.638274	1.6730	≤2.5

Test Frequency (MHz)	Temperature (°C)	Voltage (V _{DC})	Measured Frequency (MHz)	Frequency Error (ppm)	limit (ppm)
467.625	-30	3.7	467.625694	1.4841	≤2.5
	-20	3.7	467.625827	1.7685	≤2.5
	-10	3.7	467.625789	1.6872	≤2.5
	0	3.7	467.625702	1.5012	≤2.5
	10	3.7	467.625717	1.5333	≤2.5
	20	3.7	467.625678	1.4499	≤2.5
	30	3.7	467.625844	1.8049	≤2.5
	40	3.7	467.625809	1.7300	≤2.5
	50	3.7	467.625694	1.4841	≤2.5
	20	3.2	467.625724	1.5482	≤2.5
	20	4.2	467.625847	1.8113	≤2.5
467.6375	-30	3.7	467.638251	1.6059	≤2.5
	-20	3.7	467.638143	1.3750	≤2.5
	-10	3.7	467.638121	1.3280	≤2.5
	0	3.7	467.638303	1.7171	≤2.5
	10	3.7	467.63831	1.7321	≤2.5
	20	3.7	467.638186	1.4669	≤2.5
	30	3.7	467.638149	1.3878	≤2.5
	40	3.7	467.638126	1.3386	≤2.5
	50	3.7	467.638257	1.6188	≤2.5
	20	3.2	467.638194	1.4841	≤2.5
	20	4.2	467.638264	1.6337	≤2.5

Note: the extreme voltage was provided by applicant.

EUT PHOTOGRAPHS

Please refer to the attachment 2401X96989E-RF External photo and 2401X96989E-RF Internal photo.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2401X96989E-RF Test Setup photo.

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