Shenzhen Huatongwei International Inspection Co., Ltd.
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TEST REPORT

Report Reference No. ..... :	**TRE16010149**	**R/C……: 74845**
FCC ID ..... :	**AZ489FT4928**	
Applicant's name ..... :	**Motorola Solutions, Inc**	
Address.....:	8000, West Sunrise Blvd. Fort Lauderdale, Florida 33322, US.	
Manufacturer.....:	**AUCTUS TECHNOLOGIES**	
Address.....:	17F,3rd Zhong Ke Building Chin China Academy of Science&Tech Nanshan ShenZhen,China	
Test item description ..... :	**Two Ways Radio of GMRS,FRS**	
Trade Mark .....:	Motorola	
Model/Type reference.....:	T200	
Listed Model(s) .....:	T200,T200TP	
Standard ..... :	**FCC Part 95/FCC Part 2**	
Date of receipt of test sample……..:	Mar 21, 2016	
Date of testing……:	Mar 22, 2016 –Mar 24, 2016	
Date of issue……...:	Feb 26, 2016	
Date of revise……...:	Mar 28, 2016	
Result..... ……...:	**PASS**	

Compiled by (position+printed name+signature)..:	File administrators Shayne Zhu	Shayne Zhu
Supervised by (position+printed name+signature)..:	Project Engineer Cary Luo	Cary Luo
Approved by (position+printed name+signature)..:	RF Manager Hans Hu	Hans Hu

Testing Laboratory Name ..... :	**Shenzhen Huatongwei International Inspection Co., Ltd.**
Address.....:	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1. TEST STANDARDS AND TEST DESCRIPTION

1.1. Test Standards

The tests were performed according to following standards:
FCC Rules Part 95: 2016 PERSONAL RADIO SERVICES
TIA/EIA 603 D: June 2010 Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.
FCC Part 2: 2016 Frequency allocations and radio treaty matters, general rules and regulations.

1.2. Test Description

Transmitter Requirement			
Test item	Standards requirement	Result	
		Pass	N/A
Maximum Transmitter Power	FCC Part 95.639(a) &(d)	☒	
Modulation Characteristic	FCC Part 95.637(a)	☒	
Emission Bandwidth	FCC Part 95.633(a)&(c)	☒	
Emission Mask	FCC Part 95.635(b)(1)(3)(7)	☒	
Transmitter Radiated Spurious Emission	FCC Part 95.635(b)	☒	
Frequency Stability	FCC Part 95.621(b)	☒	

Note:
The test measurements were made in accordance with the above-mentioned departmental standard(s), and the equipment identified in this application has been subject to all the applicable test conditions specified in the departmental standards and all of the requirements of the standards have been met.

Report version:
1. Revised date: 2016-03-25 Clause 4.1
2. Revised date: 2016-03-25 Clause 4.4

We retested all the data of Maximum Transmitter Power and Transmitter Radiated Spurious Emission. The Q202 position is changed from 0.5W power transistor to 1W power transistor. The Q203 position is changed form 0 ohm resistor to 0.5w power transistor, as well as changed around the two power transistor components .Other data were the same as the original report.

2. SUMMARY

2.1. Client Information

Applicant:	Motorola Solutions, Inc
Address:	8000, West Sunrise Blvd. Fort Lauderdale, Florida 33322, US.
Manufacturer:	AUCTUS TECHNOLOGIES
Address:	17F,3rd Zhong Ke Building Chin China Academy of Science&Tech Nanshan ShenZhen,China

2.2. Product Description

Name of EUT:	Two Ways Radio of GMRS,FRS	
Trade mark:	Motorola	
Model/Type reference:	T200	
Listed mode(s):	T200,T200TP	
Power supply:	① DC 3.6V	② DC 4.5V
Battery information:	① MODEL:PMNN4477A 800mAh	② -
Charger information:	-	
Adapter information:	MODEL:PS000132A11 INPUT:100~240Va.c 50/60HZ 0.15A OUTPUT: 5Vd.c 500mA	
Operation Frequency Range:	GMRS/FRS:	462.5625MHz~462.7125MHz
	GMRS:	462.5500MHz~462.7250MHz
	FRS:	467.5625MHz~467.7125MHz
Rated Output Power:	GMRS/FRS:	0.4W(26.02dBm)
	GMRS:	
	FRS:	
Modulation Type:	GMRS/FRS:	FM
	GMRS:	
	FRS:	
Channel Separation:	GMRS/FRS:	12.5kHz
	GMRS:	
	FRS:	
Emission Designator:	GMRS/FRS:	5K28F3E
	GMRS:	5K20F3E
	FRS:	5K20F3E
Maximum Transmitter Power (ERP):	GMRS/FRS:	26.47 dBm
	GMRS:	26.14 dBm
	FRS:	26.72 dBm
Antenna Type:	Integral	
Antenna Gain	2.1dBi	

2.3. Test frequency list

Mode	Modulation	Operation Frequency Range(MHz)	Test Frequency (MHz)
GMRS/FRS	FM	462.5625~462.7125	462.6375(CH4)
GMRS	FM	462.5500~462.7250	462.6500(CH19)
FRS	FM	467.5625~467.7125	467.6375(CH11)

Note:

1) The Product channel frequency table:

Channel	Frequency	Description	Channel	Frequency	Description
1	462.5625 MHz	GMRS/FRS	12	467.6625 MHz	FRS
2	462.5875 MHz	GMRS/FRS	13	467.6875 MHz	FRS
3	462.6125 MHz	GMRS/FRS	14	467.7125 MHz	FRS
4	462.6375 MHz	GMRS/FRS	15	462.5500 MHz	GMRS
5	462.6625 MHz	GMRS/FRS	16	462.5750 MHz	GMRS
6	462.6875 MHz	GMRS/FRS	17	462.6000 MHz	GMRS
7	462.7125 MHz	GMRS/FRS	18	462.6250 MHz	GMRS
8	467.5625 MHz	FRS	19	462.6500 MHz	GMRS
9	467.5875 MHz	FRS	20	462.6750 MHz	GMRS
10	467.6125 MHz	FRS	21	462.7000 MHz	GMRS
11	467.6375 MHz	FRS	22	462.7250 MHz	GMRS

2)In section 15.31(m), regards to the operating frequency range 1 MHz or less, the middle frequency of channel were selected to perform the test, please see the above listed frequency for testing.

2.4. EUT operation mode

Test mode	Transmitting	Receiving	GMRS/FRS	GMRS	FRS
TX1	√		√		
TX2	√			√	
TX3	√				√

√: is operation mode.

2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

○	Power Cable	Length (m) :	-
		Shield :	Unshielded
		Detachable :	Undetachable
○	Multimeter	Manufacturer :	-
		Model No. :	-

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Laboratory:Shenzhen Huatongwei International Inspection Co., Ltd.
Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China
Phone: 86-755-26748019 Fax: 86-755-26748089

3.2. Test Facility

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

CNAS-Lab Code: L1225
Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: February 28, 2015. Valid time is until February 27, 2018.

A2LA-Lab Cert. No. 3902.01
Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until December 31, 2016.

FCC-Registration No.: 317478
Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 317478, Renewal date Jul. 18, 2014, valid time is until Jul. 18, 2017.

IC-Registration No.: 5377A&5377B
The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A on Dec. 31, 2013, valid time is until Dec. 31, 2016.
Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377B on Dec.03, 2014, valid time is until Dec.03, 2017.

ACA
Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

VCCI
The 3m Semi-anechoic chamber (12.2m×7.95m×6.7m) of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2484. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 29, 2015.
Radiated disturbance above 1GHz measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-292. Date of Registration: Dec. 24, 2013. Valid time is until Dec. 23, 2016.
Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-2726. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 19, 2015.
Telecommunication Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-1837. Date of Registration: May 07, 2013. Valid time is until May 06, 2016.

DNV
Shenzhen Huatongwei International Inspection Co., Ltd. has been found to comply with the requirements of DNV towards subcontractor of EMC and safety testing services in conjunction with the EMC and Low voltage Directives and in the voluntary field. The acceptance is based on a formal quality Audit and follow-ups according to relevant parts of ISO/IEC Guide 17025 (2005), in accordance with the requirements of the DNV Laboratory Quality Manual towards subcontractors. Valid time is until Aug. 24, 2016.

3.3. Environmental conditions

Normal Conditon	
Relative humidity:	20 % to 75 %.
Air Pressure:	950~1050mba
Voltage:	① DC 3.6V,② DC 4.5V

3.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Frequency stability	25 Hz	(1)
Transmitter power Radiated	2.20 dB	(1)
Radiated Emission 30~1000MHz	4.65 dB	(1)
Emission Bandwidth	---------	(1)
Emission Mask	---------	(1)
Modulation Characteristic	---------	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

3.5. Equipments Used during the Test

Modulation Characteristic				
Name of Equipment	Manufacturer	Model	Serial Number	Last Cal.
RF COMMUNICATION TEST SET	HP	8920A	3813A10206	2015/11/2

Frequency Stability				
Name of Equipment	Manufacturer	Model	Serial Number	Last Cal.
RF COMMUNICATION TEST SET	HP	8920A	3813A10206	2015/11/2
Signal Generator	Rohde&Schwarz	SMT03	100059	2015/11/2
Climate Chamber	ESPEC	EL-10KA	05107008	2015/11/2

Maximum Transmitter Power & Transmitter Radiated Spurious Emission				
Name of Equipment	Manufacturer	Model	Serial Number	Last Cal.
Ultra-Broadband Antenna	Rohde&Schwarz	HL562	100015	2015/11/2
EMI Test Receiver	Rohde&Schwarz	ESI 26	100009	2015/11/2
RF Test Panel	Rohde&Schwarz	TS / RSP	335015/ 0017	N/A
HORN ANTENNA	Rohde&Schwarz	HF906	100039	2015/12/2
Turntable	ETS	2088	2149	N/A
Antenna Mast	ETS	2075	2346	N/A
EMI Test Software	Rohde&Schwarz	ES-K1 V1.71	N/A	N/A
RF COMMUNICATION TEST SET	HP	8920A	3813A10206	2015/11/2
Ultra-Broadband Antenna	ShwarzBeck	VULB9163	538	2015/11/2
Ultra-Broadband Antenna	ShwarzBeck	VULB9163	539	2015/11/2
HORN ANTENNA	ShwarzBeck	9120D	1012	2015/11/2
HORN ANTENNA	ShwarzBeck	9120D	1011	2015/11/2
TURNTABLE	MATURO	TT2.0	----	N/A
ANTENNA MAST	MATURO	TAM-4.0-P	----	N/A

Emission Bandwidth & Emission Mask				
Name of Equipment	Manufacturer	Model	Serial Number	Last Cal.
Receiver	Rohde&Schwarz	ESI 26	100009	2015/11/2
Attenuator	R&S	ESH3-22	100449	2015/11/2
RF COMMUNICATION TEST SET	HP	8920A	3813A10206	2015/11/2
Spectrum Analzyer	Rohde&Schwarz	FSP40	1164.4391.40	2015/11/2

The calibration interval was one year.

4. TEST CONDITIONS AND RESULTS

4.1. Maximum Transmitter Power(Effective Radiated Power)

Applicants for licenses must request and use no more power than the actual power necessary for satisfactory operation.

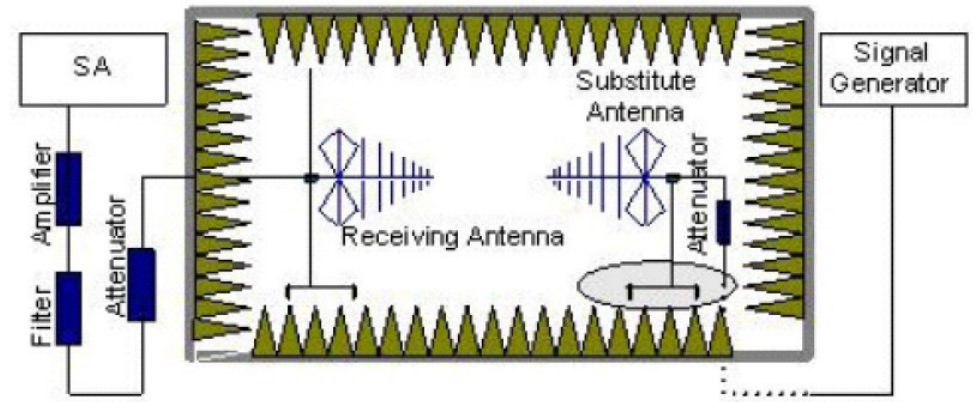
LIMIT

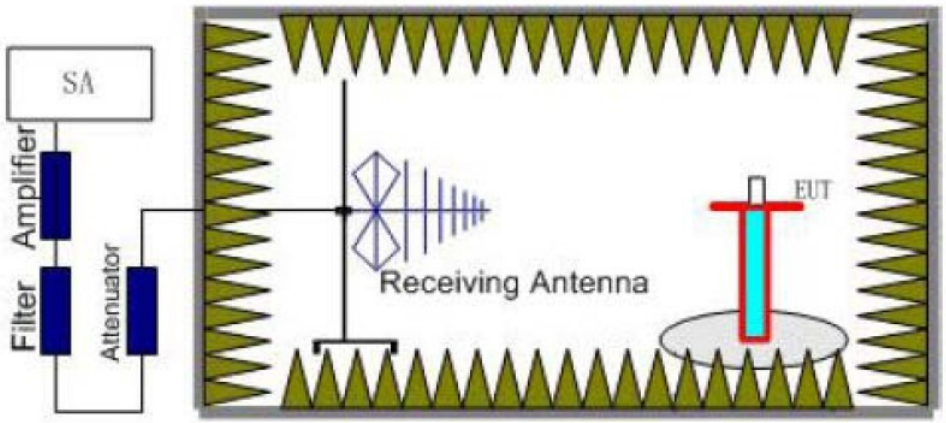
FCC Part 95.639(a):
A GMRS transmitter may transmit with a maximum power of 5.0 W e.r.p.
FCC Part 95.639(d):
FRS:The maximum permissible transmitter output power under any operating conditions is 0.5 W effective radiated power (e.r.p.). The radio shall be equipped with an integral antenna.

TEST PROCEDURE

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1. 0 m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in six channels were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=100kHz,VBW=300kHz for 30MHz to 1GHz, And the maximum value of the receiver should be recorded as (Pr).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
   The measurement results are obtained as described below:
   Power(EIRP)=PMea- PAg - Pcl - Ga
   We used SMF100A micowave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substituation test; The measurement results are amend as described below:
   Power(EIRP)=PMea- Pcl - Ga
6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
7. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

TEST CONFIGURATION





TEST MODE:

Please reference to the section 2.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Please refer to the below test data:

DC 3.6V

Operation Mode	Test Frequency (MHz)	Measured ERP (dBm)	Difference (dB)	Limit (dBm)	Result
TX1	462.6375	25.35	-1.65	27.00	Pass
TX2	462.6500	25.16	-11.84	37.00	
TX3	467.6375	26.06	-0.94	27.00	

Note:1) All the TX1(GMRS/FRS) channels meet the power requirement of 0.5W ERP.

2)All the TX3(FRS) channels meet the power requirement of 0.5W ERP.

DC 4.5V

Operation Mode	Test Frequency (MHz)	Measured ERP (dBm)	Difference (dB)	Limit (dBm)	Result
TX1	462.6375	26.47	-0.53	27.00	Pass
TX2	462.6500	26.14	-10.86	37.00	
TX3	467.6375	26.72	-0.28	27.00	

Note:1) All the TX1(GMRS/FRS) channels meet the power requirement of 0.5W ERP.

2)All the TX3(FRS) channels meet the power requirement of 0.5W ERP.

4.2. Emission Bandwidth

The Emission bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits.

LIMIT

FCC Part 95.633(a):
GMRS:

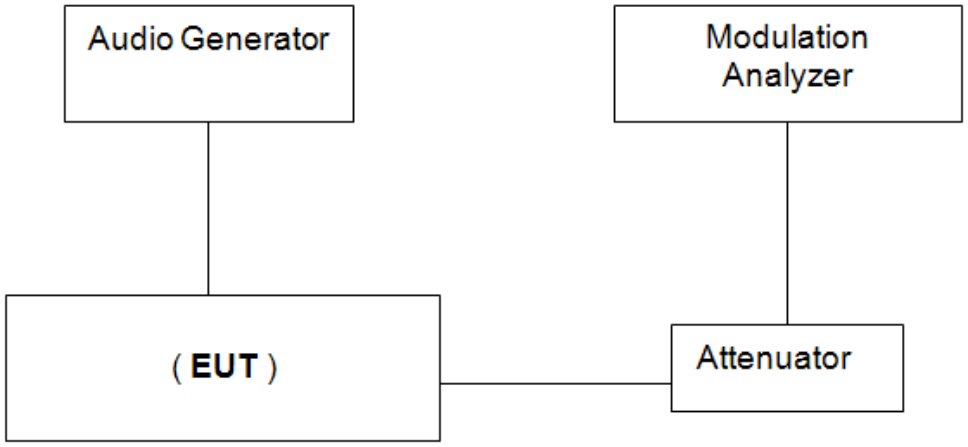
The authorized bandwidth for emission types H1D, J1D, R1D, H3E, J3E and R3E is 4 kHz; for emission types A1D and A3E, it is 8 kHz; and for emission types F1D, G1D, F3E, G3E and F2D, it is 20 kHz.

FCC Part 95.633(c):

FRS:

The authorized bandwidth for an FRS unit is 12.5 kHz.

TEST CONFIGURATION



TEST PROCEDURE

1 The EUT was modulated by 2.5kHz Sine wave audio signal; the level of the audio signal employed is 16 dB greater than that necessary to produce 50% of rated system deviation. Rated system deviation is 2.5 kHz.
2 Set EUT as normal operation.
Set SPA Center Frequency = fundamental frequency, RBW=300Hz, VBW=1kHz, span=20kHz for 12.5kHz channel spacing.
3 Set SPA Max hold. Mark peak, Set 26dB Occupied Bandwidth.

TEST MODE:

Please reference to the section 2.4

TEST RESULTS

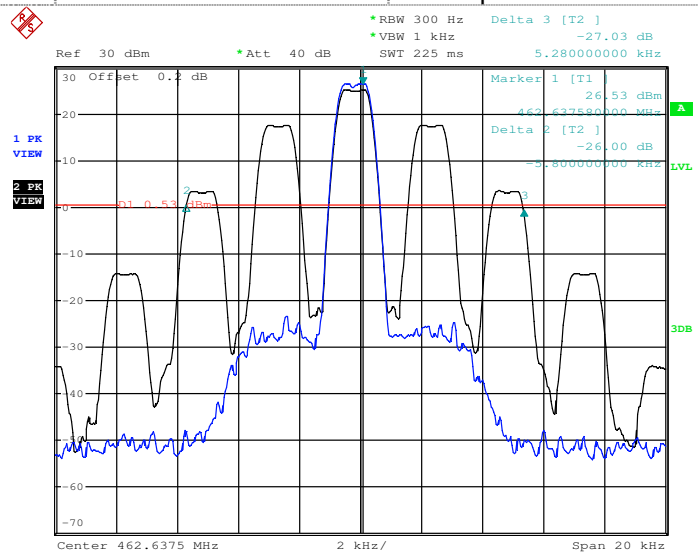
☒ **Passed** ☐ **Not Applicable**

Please refer to the below test data:

Operation Mode	Test Frequency (MHz)	26dB Occupied Bandwidth (kHz)	Limit (kHz)	Result
TX1	462.6375	5.28	≤20.0	Pass
TX2	462.6500	5.20	≤20.0	
TX3	467.6375	5.20	≤12.5	

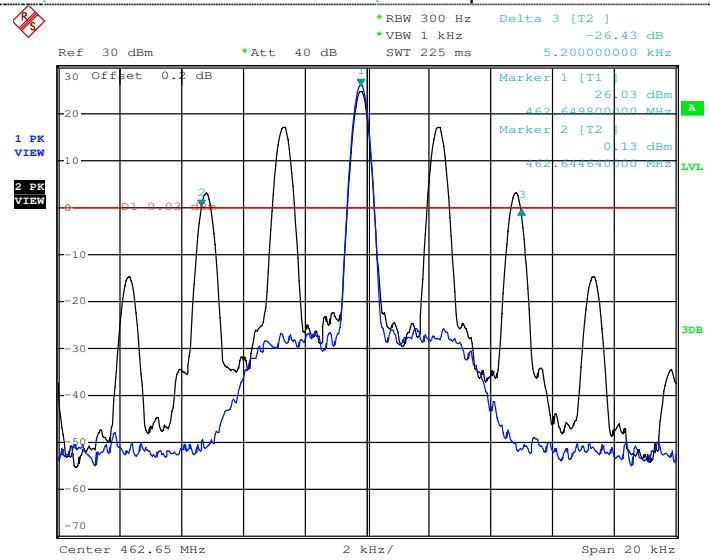
Test plot as follows:

Modulation Type	FM	Operation Mode	TX1



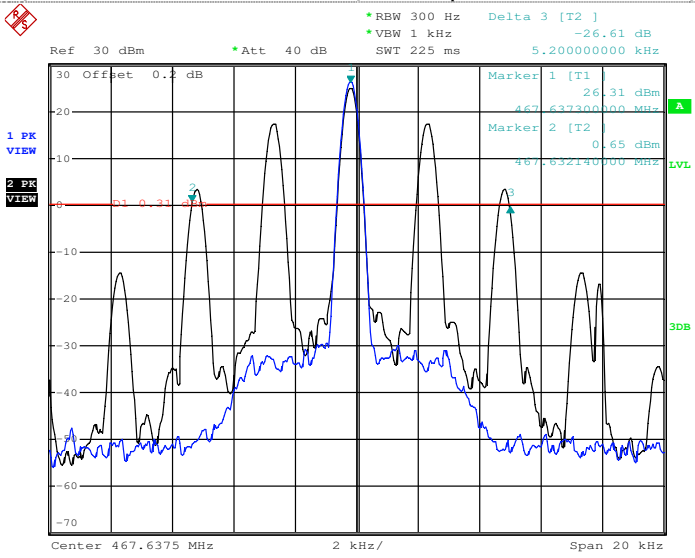
462.6375MHz

Modulation Type	FM	Operation Mode	TX2



462.6500MHz

Modulation Type	FM	Operation Mode	TX3



467.6375MHz

4.3. Emission Mask

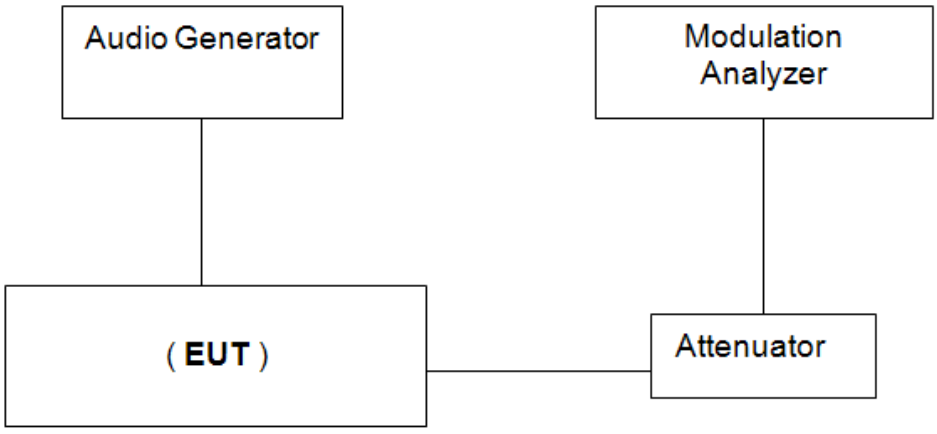
Transmitters used in the radio services governed by this part must comply with the emission masks outlined in this section.

LIMIT

FCC Part 95.635(b)(1)(3)(7):
GMRS&FRS:
Unwanted emissions shall be attenuated below the unmodulated carrier power in accordance with the following:

(1) At least 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.
(3) At least 35 dB on any frequency removed from the center of the authorized bandwidth by more than 100% up to and including 250% of the authorized bandwidth.
(7) At least 43 + 10 $\log_{10}$ (T) dB on any frequency removed from the center of the authorized bandwidth by more than 250%.

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was modulated by 2.5kHz Sine wave audio signal; the level of the audio signal employed is 16 dB greater than that necessary to produce 50% of rated system deviation. Rated system deviation is 2.5 kHz .
2. Set EUT as normal operation.
   Set SPA Center Frequency = fundamental frequency, RBW=300Hz, VBW=1kHz,span=62.5kHz.

TEST MODE:

Please reference to the section 2.4

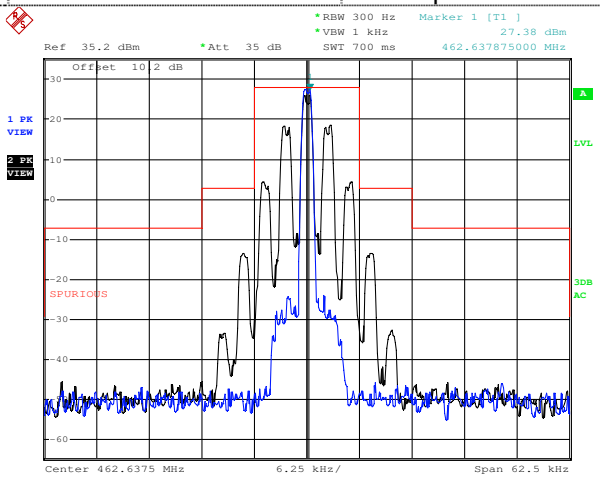
TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Please refer to the below test data:

Test plot as follows:

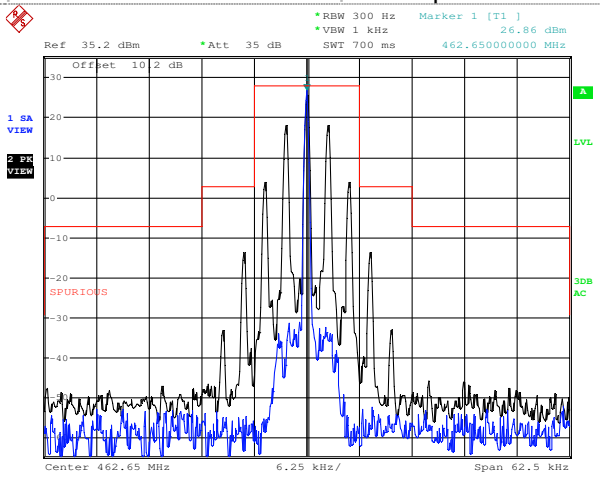
Modulation Type	FM	Operation Mode	TX1



Date: 27.JAN.2016 14:03:36

462.6375MHz

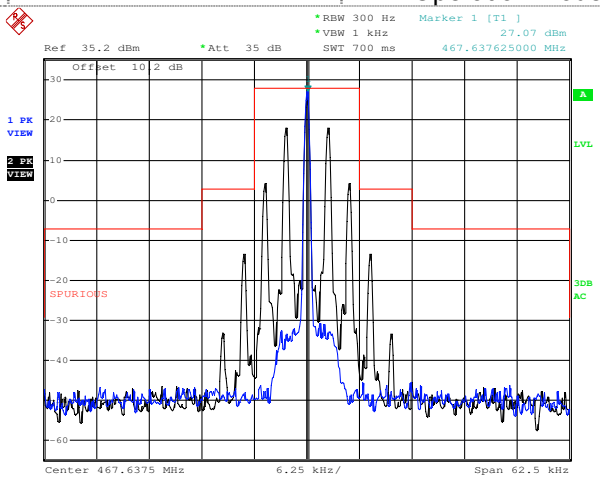
Modulation Type	FM	Operation Mode	TX2



Date: 27.JAN.2016 14:05:27

462.6500MHz

Modulation Type	FM	Operation Mode	TX3



Date: 27.JAN.2016 14:04:42

467.6375MHz

4.4. Transmitter Radiated Spurious Emission

Radiated spurious emissions are emissions from the equipment when transmitting into a nonradiating load on a frequency or frequencies that are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

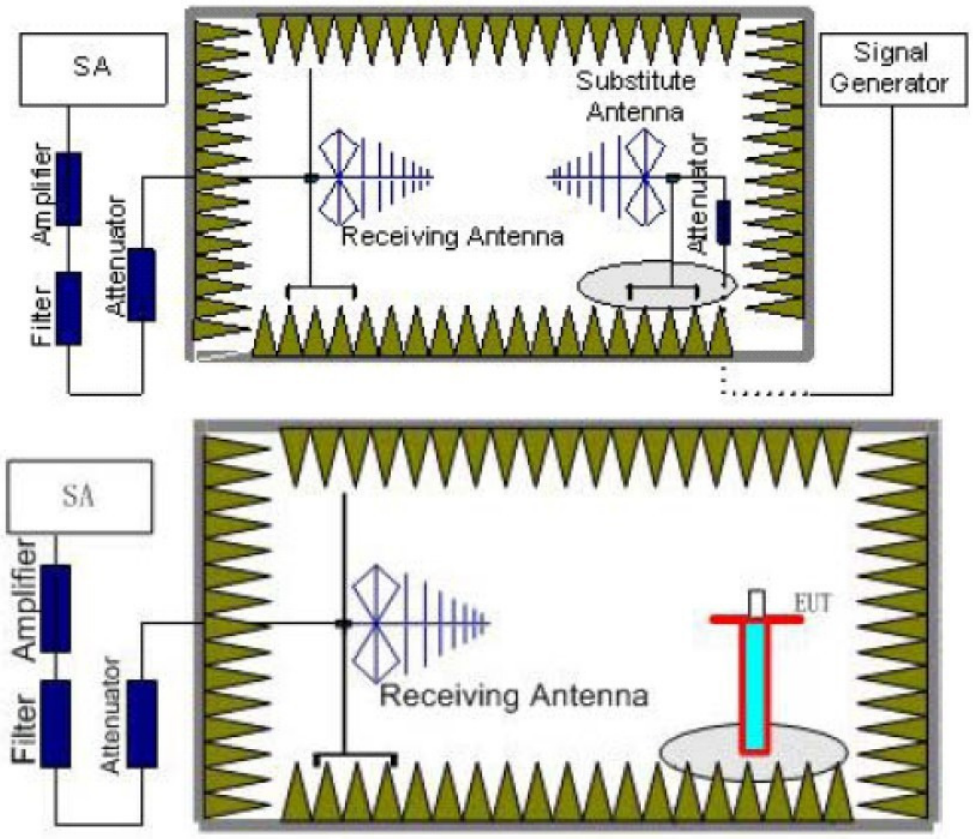
LIMIT

FCC Part 95.635(b) (12.5 kHz Bandwidth only):
On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz at least:
50 + 10 log (Pwatts) = 50 + 10 $\log_{10}$ (0.37) =45.68dB
Note: In general, the worse case attenuation requirement shown above was applied.
Calculation: Limit (dBm) =EL-50-10log10 (TP)

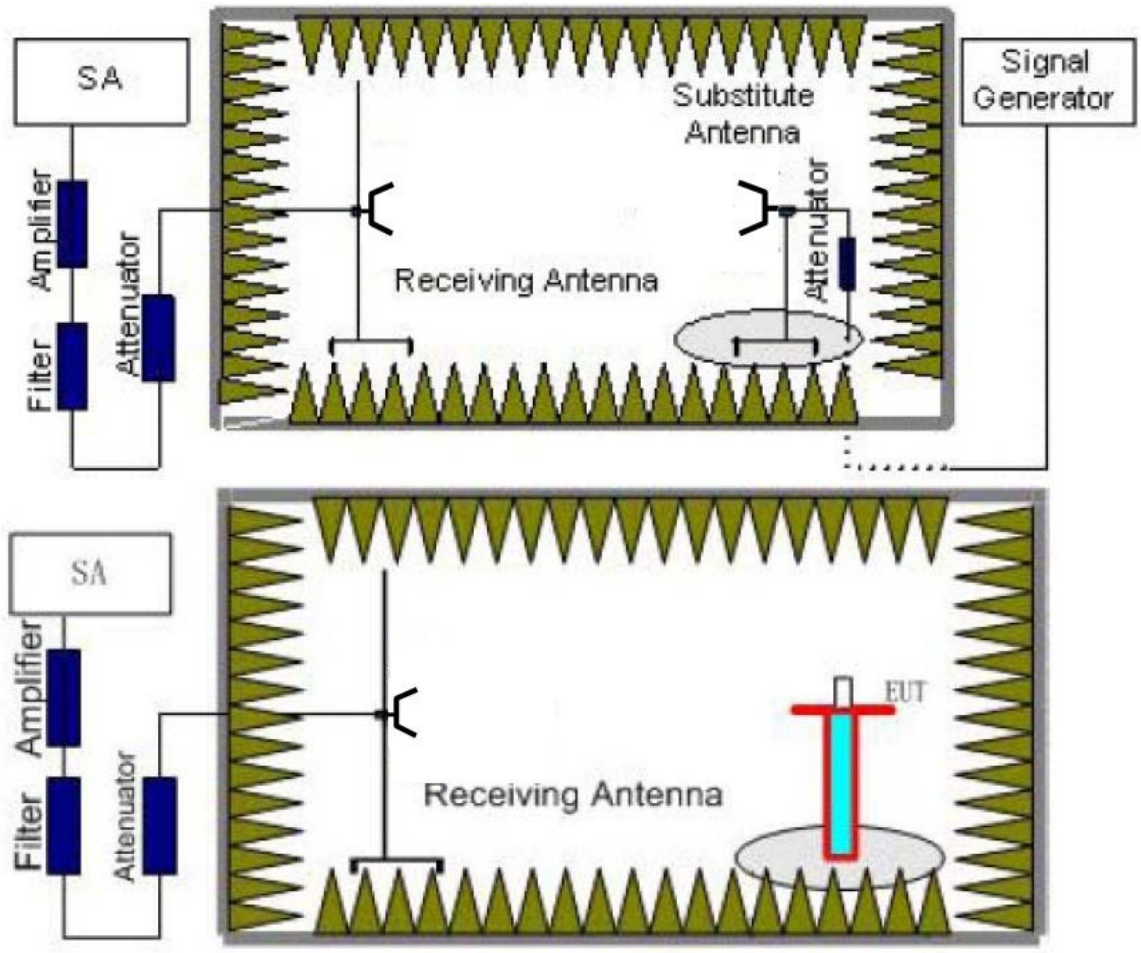
Notes: EL is the emission level of the Output Power expressed in dBm,
In this application, the EL is 26.02 dBm.
Limit (dBm) =26.02-50-10$\log_{10}$ (0.37) = -20dBm

TEST CONFIGURATION

Below 1GHz:



Above 1GHz:



TEST PROCEDURE

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1. 0 m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in six channels were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz for above 1GHz and RBW=100kHz,VBW=300kHz for 30MHz to 1GHz, And the maximum value of the receiver should be recorded as (P_r).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}) ,the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.
   The measurement results are obtained as described below:
   Power(EIRP)=P_{Mea}- P_{Ag} - P_{cl} - G_a
   We used SMF100A micowave signal generator which signal level can up to 33dBm,so we not used power

Amplifier for substituation test; The measurement results are amend as described below:
Power(EIRP)=P_{Mea}- P_{cl} - G_a

6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
7. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

TEST MODE:

Please reference to the section 2.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

DC 3.6V:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G.Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
TX1:462.6375 MHz								
1387.9125	H	65.41	-32.25	0	3.34	-35.59	-20	15.59
1387.9125	V	67.45	-29.42	0	3.34	-32.76	-20	12.76
1850.55	H	55.74	-42.63	9.1	4.16	-37.69	-20	17.69
1850.55	V	60.42	-39.32	9.1	4.16	-34.38	-20	14.38
2313.1875	H	52.16	-49.46	11.8	5.51	-43.17	-20	23.17
2313.1875	V	57.05	-45.09	11.8	5.51	-38.8	-20	18.8
TX2:462.6500 MHz								
1387.95	H	64.63	-31.78	0	3.66	-35.44	-20	15.44
1387.95	V	68.21	-29.61	0	3.66	-33.27	-20	13.27
1850.6	H	56.38	-44.24	8.65	4.21	-39.8	-20	19.8
1850.6	V	60.89	-40.77	8.65	4.21	-36.33	-20	16.33
2313.25	H	52.76	-48.71	11.12	5.68	-43.27	-20	23.27
2313.25	V	58.09	-43.90	11.12	5.68	-38.46	-20	18.46
TX3:467.6375 MHz								
1402.9125	H	68.79	-28.87	0	3.34	-32.21	-20	12.21
1402.9125	V	72.32	-24.55	0	3.34	-27.89	-20	7.89
1870.55	H	56.02	-42.35	9.1	4.16	-37.41	-20	17.41
1870.55	V	61.12	-38.62	9.1	4.16	-33.68	-20	13.68
2338.1875	H	54.68	-46.94	11.8	5.51	-40.65	-20	20.65
2338.1875	V	58.11	-44.03	11.8	5.51	-37.74	-20	17.74

Note:
Absolute Level=SG Level-Cable loss+Antenna Gain
Margin=Limit-Absulute Level

DC 4.5V:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G.Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
TX1:462.6375 MHz								
1387.9125	H	66.24	-31.42	0	3.34	-34.76	-20	14.76
1387.9125	V	68.78	-28.09	0	3.34	-31.43	-20	11.43
1850.55	H	56.17	-42.20	9.1	4.16	-37.26	-20	17.26
1850.55	V	61.25	-38.49	9.1	4.16	-33.55	-20	13.55
2313.1875	H	54.36	-47.26	11.8	5.51	-40.97	-20	20.97
2313.1875	V	58.41	-43.73	11.8	5.51	-37.44	-20	17.44
TX2:462.6500 MHz								
1387.95	H	65.87	-30.54	0	3.66	-34.2	-20	14.2
1387.95	V	69.51	-28.31	0	3.66	-31.97	-20	11.97
1850.6	H	57.46	-43.16	8.65	4.21	-38.72	-20	18.72
1850.6	V	61.26	-40.40	8.65	4.21	-35.96	-20	15.96
2313.25	H	53.25	-48.22	11.12	5.68	-42.78	-20	22.78
2313.25	V	59.24	-42.75	11.12	5.68	-37.31	-20	17.31
TX3:467.6375 MHz								
1402.9125	H	69.74	-27.92	0	3.34	-31.26	-20	11.26
1402.9125	V	73.02	-23.85	0	3.34	-27.19	-20	7.19
1870.55	H	57.21	-41.16	9.1	4.16	-36.22	-20	16.22
1870.55	V	62.57	-37.17	9.1	4.16	-32.23	-20	12.23
2338.1875	H	55.61	-46.01	11.8	5.51	-39.72	-20	19.72
2338.1875	V	59.32	-42.82	11.8	5.51	-36.53	-20	16.53

Note:
Absolute Level=SG Level-Cable loss+Antenna Gain
Margin=Limit-Absulute Level

4.5. Modulation Charcateristics

Voice modulated communication equipment. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted.

LIMIT

FCC Part 95.637(b),FCC part 2.1047(a)

Method of Measurement:

FCC Part 95.637(a),FCC part 2.1047(a)

1. Modulation Limit:

1) Configure the EUT as shown in figure, adjust the audio input for 60% of rated system deviation at 1kHz using this level as a reference (0dB) and vary the input level from –20 to +20dB. Record the frequency deviation obtained as a function of the input level.
2) Repeat step 1 with input frequency changing to 300, 1004, 1500 and 2500Hz in sequence.

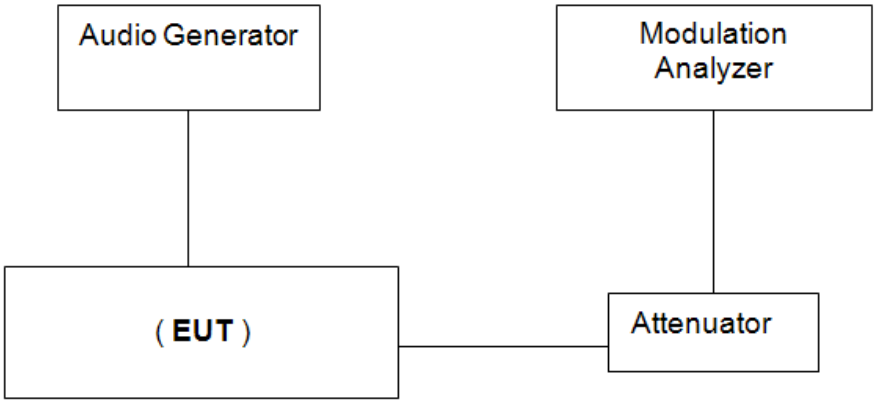
2. Audio Frequency Response:

1) Configure the EUT as shown in figure .
2) Adjust the audio input for 20% of rated system deviation at 1kHz using this level as a reference.
3) Vary the Audio frequency from 100Hz to 5 kHz and record the frequency deviation.
4) Audio Frequency Response $=20\log_{10}(V_{FREQ}/V_{REF})$.

3. Audio Low Pass Filter Response:

1) Configure the EUT as shown in figure .
2) Apply a 1000 Hz tone from the audio signal generator and adjust the level per manufacturer's specifications. Record the dB level of the 1000 Hz tone as LEV_{REF}.
3) Set the audio signal generator to the desired test frequency between 3000 Hz and the upper low pass filter limit. Record the dB level at the test frequency as $LEV_{FREQ.}$
4) Calculate the audio frequency response at the test frequency as:
low pass filter response = LEV_{FREQ} - LEV_{REF}

TEST CONFIGURATION



TEST MODE:

Please reference to the section 2.4

TEST RESULTS

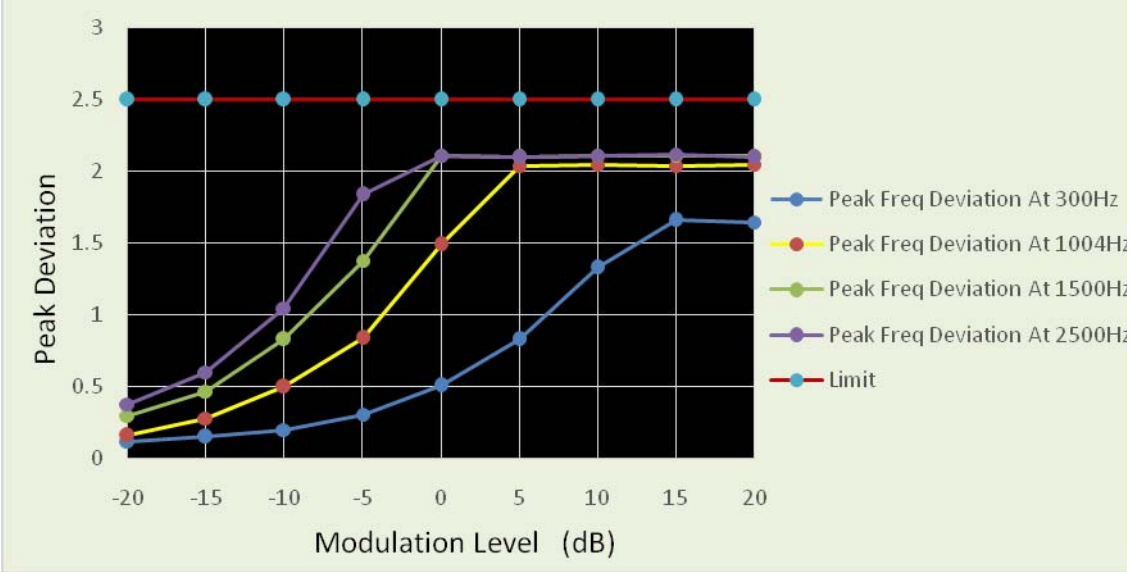
☒ **Passed** ☐ **Not Applicable**

Please refer to the below test data:

a).Modulation Limit:

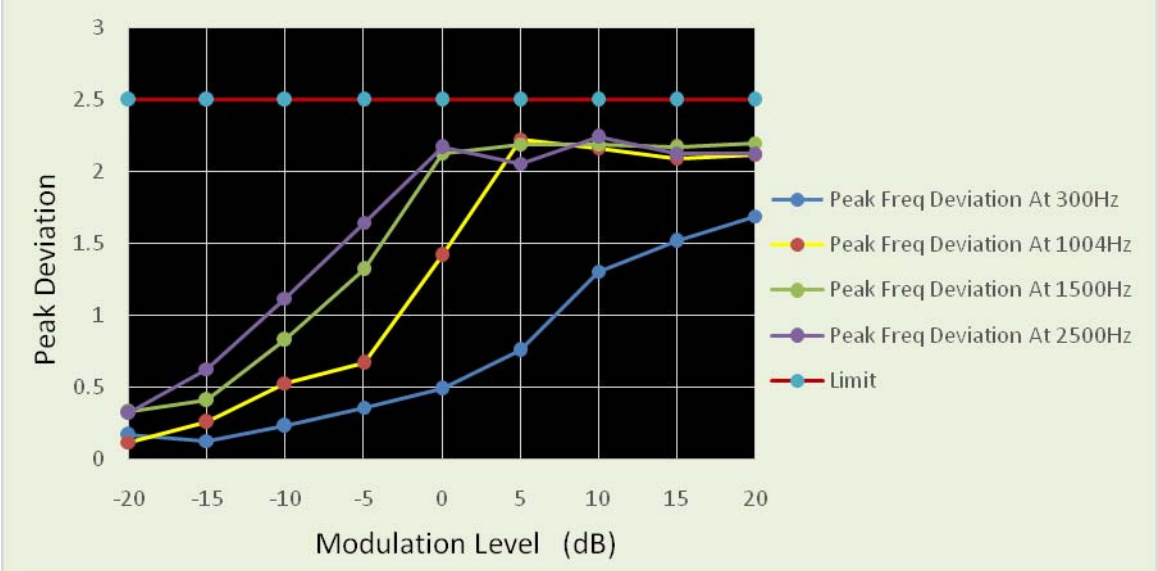
TX1:462.6375MHz						
Modulation Level (dB)	Peak Freq. Deviation At 300Hz (kHz)	Peak Freq. Deviation At 1004Hz (kHz)	Peak Freq. Deviation At 1500Hz (kHz)	Peak Freq. Deviation At 2500 Hz (kHz)	Limit (kHz)	Result
-20	0.12	0.16	0.3	0.38	2.5	Pass
-15	0.15	0.28	0.47	0.6		
-10	0.2	0.5	0.83	1.05		
-5	0.31	0.84	1.38	1.84		
0	0.51	1.49	2.11	2.11		
5	0.83	2.04	2.1	2.1		
10	1.33	2.05	2.11	2.11		
15	1.66	2.04	2.11	2.12		
20	1.65	2.05	2.11	2.1		

Test plot as follows:



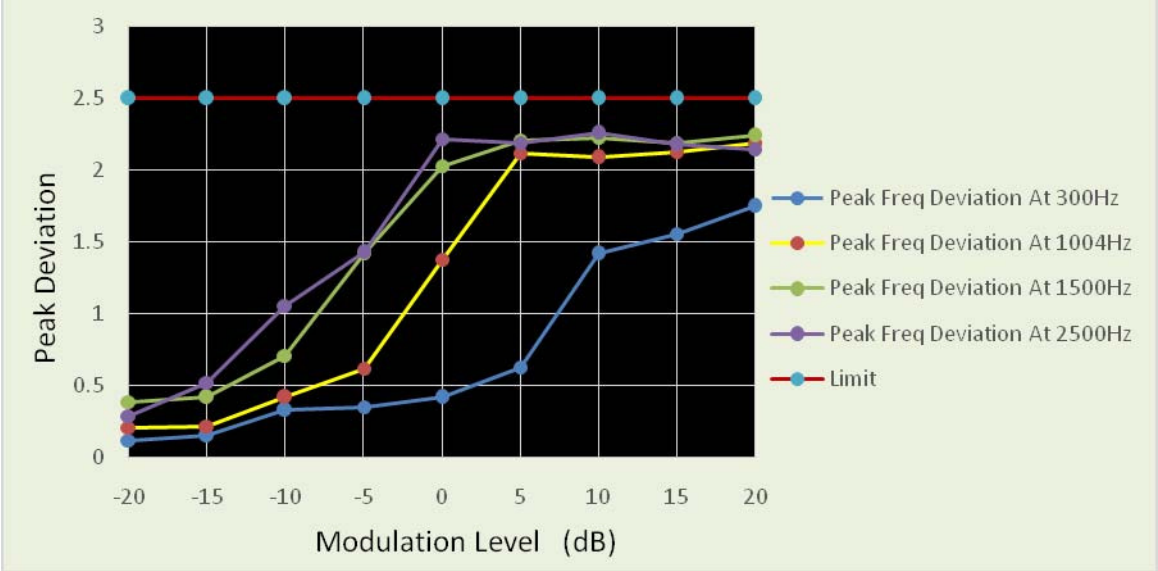
TX2:462.65MHz						
Modulation Level (dB)	Peak Freq. Deviation At 300Hz (kHz)	Peak Freq. Deviation At 1004Hz (kHz)	Peak Freq. Deviation At 1500Hz (kHz)	Peak Freq. Deviation At 2500 Hz (kHz)	Limit (kHz)	Result
-20	0.17	0.12	0.33	0.32	2.5	Pass
-15	0.13	0.26	0.41	0.63		
-10	0.23	0.53	0.83	1.12		
-5	0.36	0.67	1.32	1.65		
0	0.49	1.42	2.13	2.17		
5	0.76	2.23	2.19	2.06		
10	1.31	2.16	2.19	2.24		
15	1.52	2.09	2.17	2.13		
20	1.69	2.12	2.2	2.13		

Test plot as follows:



TX3:467.6375MHz						
Modulation Level (dB)	Peak Freq. Deviation At 300Hz (kHz)	Peak Freq. Deviation At 1004Hz (kHz)	Peak Freq. Deviation At 1500Hz (kHz)	Peak Freq. Deviation At 2500 Hz (kHz)	Limit (kHz)	Result
-20	0.12	0.21	0.39	0.29	2.5	Pass
-15	0.15	0.22	0.42	0.52		
-10	0.33	0.42	0.71	1.06		
-5	0.35	0.62	1.42	1.43		
0	0.42	1.38	2.03	2.22		
5	0.63	2.12	2.21	2.19		
10	1.42	2.09	2.23	2.26		
15	1.56	2.13	2.19	2.18		
20	1.75	2.19	2.24	2.15		

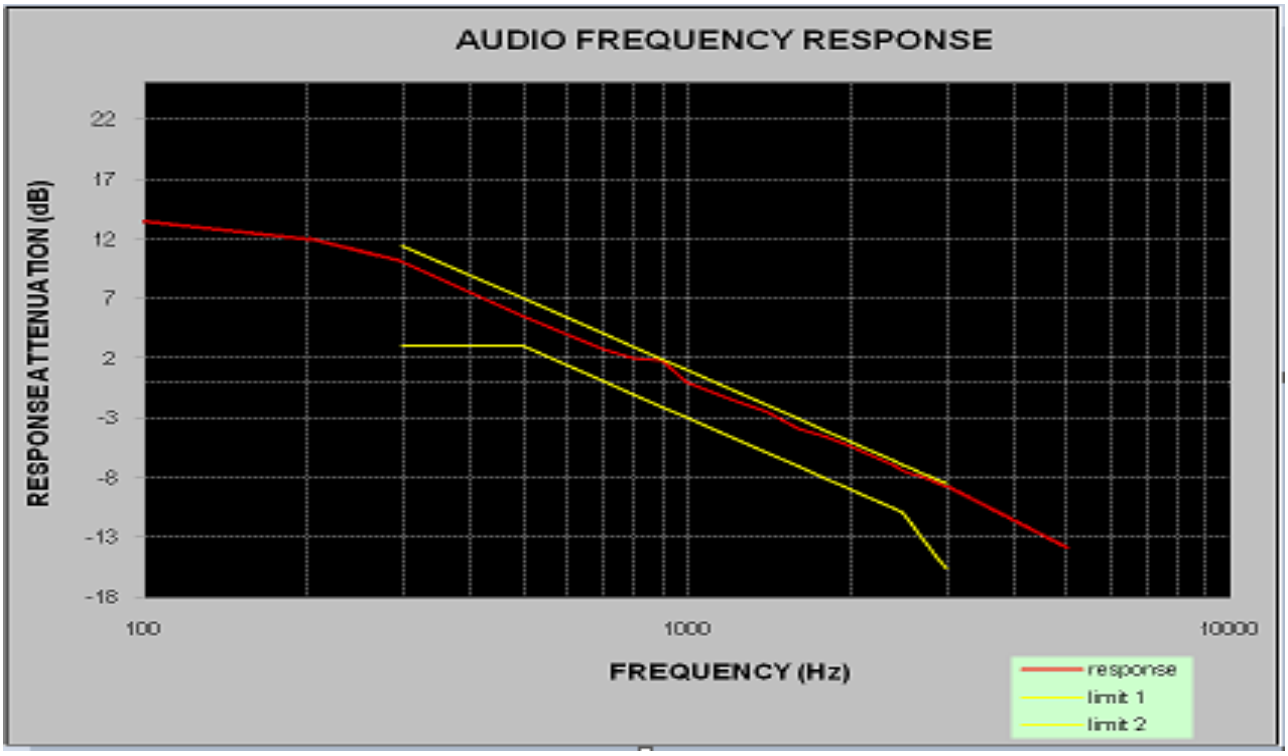
Test plot as follows:



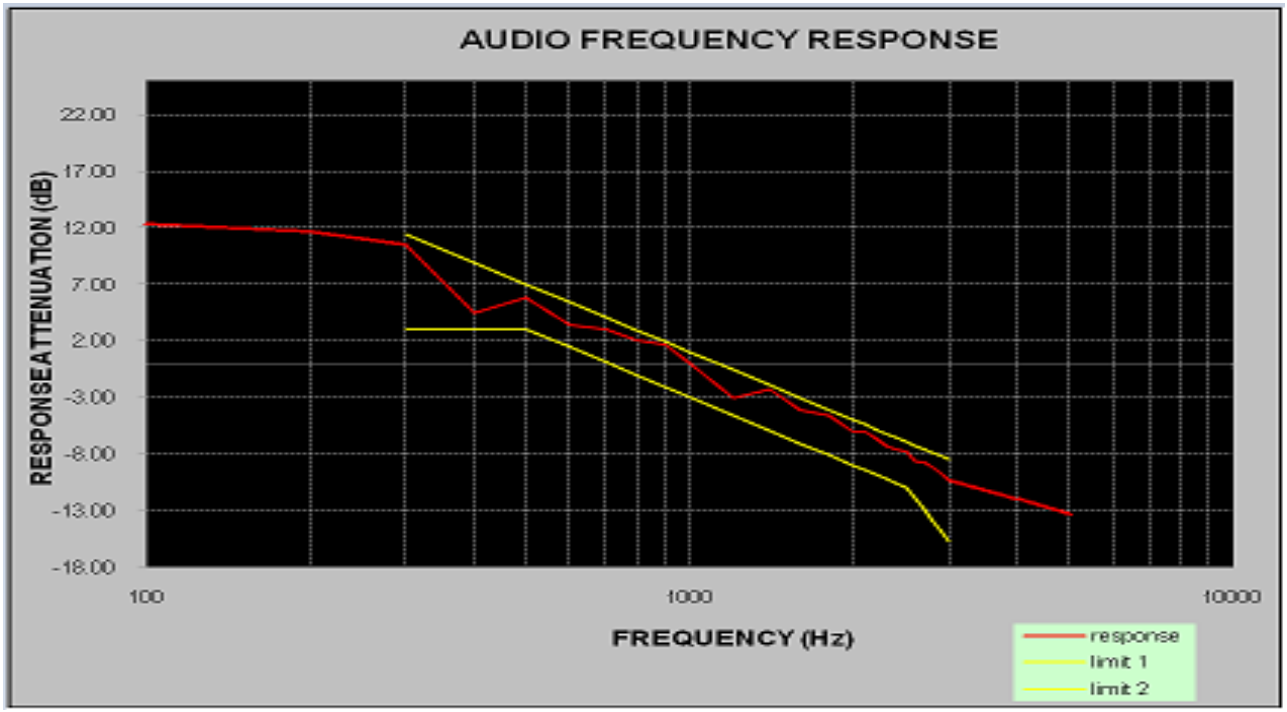
b). Audio Frequency Response:

TX1:462.6375MHz			
Frequency (Hz)	Audio Frequency Response (dB)	Frequency (Hz)	Audio Frequency Response (dB)
100	14.06	2000	-5.39
200	12.01	2100	-5.81
300	10.1	2200	-6.24
400	7.51	2300	-6.56
500	5.46	2400	-6.94
600	3.95	2500	-7.43
700	2.77	2600	-7.69
800	1.94	2700	-7.96
900	1.76	2800	-8.23
1000	0	2900	-8.52
1200	-1.41	3000	-8.81
1400	-2.5	4000	-10.32
1600	-3.91	5000	-14.35
1800	-4.62		

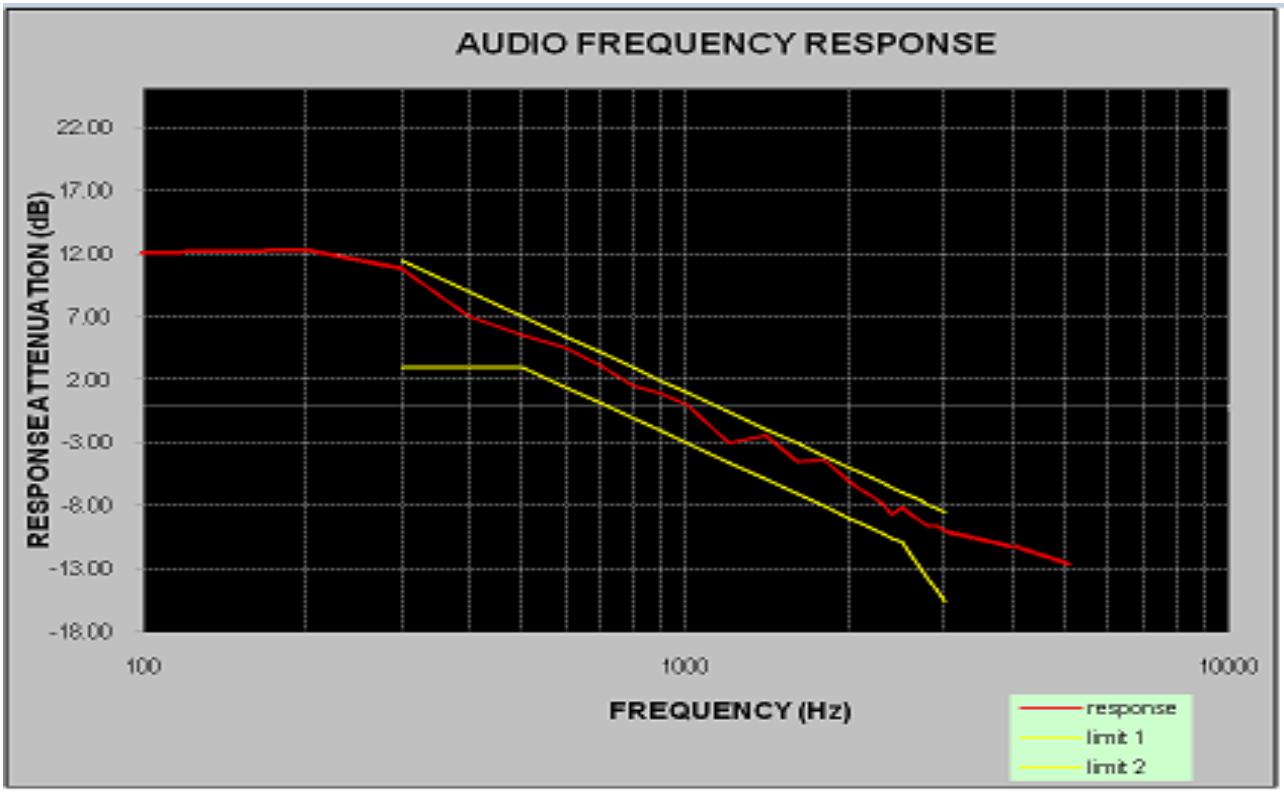
Test plot as follows:



TX2:462.6500MHz			
Frequency (Hz)	Audio Frequency Response (dB)	Frequency (Hz)	Audio Frequency Response (dB)
100	12.68	2000	-6.02
200	11.21	2100	-6.02
300	10.46	2200	-6.64
400	4.44	2300	-7.31
500	5.83	2400	-7.63
600	3.41	2500	-7.80
700	3.02	2600	-8.69
800	2.07	2700	-8.75
900	1.63	2800	-9.14
1000	0.00	2900	-9.68
1200	-3.08	3000	-10.26
1400	-2.33	4000	-11.89
1600	-4.13	5000	-13.12
1800	-4.58		



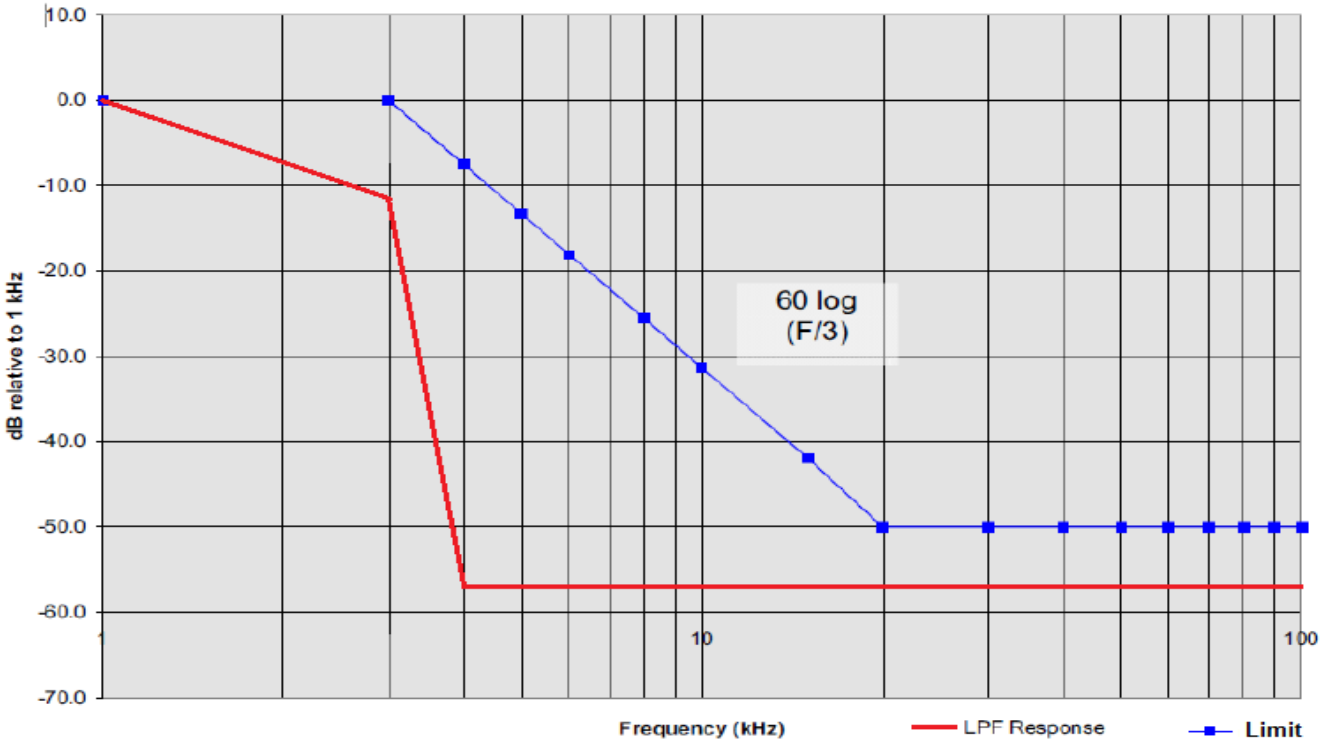
TX3:467.6375MHz			
Frequency (Hz)	Audio Frequency Response (dB)	Frequency (Hz)	Audio Frequency Response (dB)
100	12.03	2000	-6.13
200	12.36	2100	-6.79
300	10.69	2200	-7.29
400	6.94	2300	-7.83
500	5.49	2400	-8.75
600	4.54	2500	-8.16
700	3.02	2600	-8.75
800	1.49	2700	-9.19
900	0.91	2800	-9.59
1000	0.00	2900	-9.65
1200	-3.04	3000	-10.07
1400	-2.46	4000	-11.74
1600	-4.49	5000	-12.67
1800	-4.41		



c)Audio Low Pass Filter Response:

Operation Mode	Audio Frequency (kHz)	Response Attenuation (dB)	Limit	Result
TX2 (462.6500MHz)	1	0	0	Pass
	3	-12.5	0	
	4	-57.4	-7.5	
	5	-57.4	-13.3	
	6	-57.4	-18.1	
	8	-57.4	-25.6	
	10	-57.4	-31.4	
	15	-57.4	-41.9	
	20	-57.4	-50	
	30	-57.4	-50	
	40	-57.4	-50	
	50	-57.4	-50	
	60	-57.4	-50	
	70	-57.4	-50	
	80	-57.4	-50	
	90	-57.4	-50	
	100	-57.4	-50	

Test plot as follows:


10.0
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
dB relative to 1 kHz
60 log
(F/3)
10
100
Frequency (kHz)
LPF Response
Limit

4.6. Frequency Stability

The carrier frequency stability is the ability of the transmitter to maintain an assigned carrier frequency.

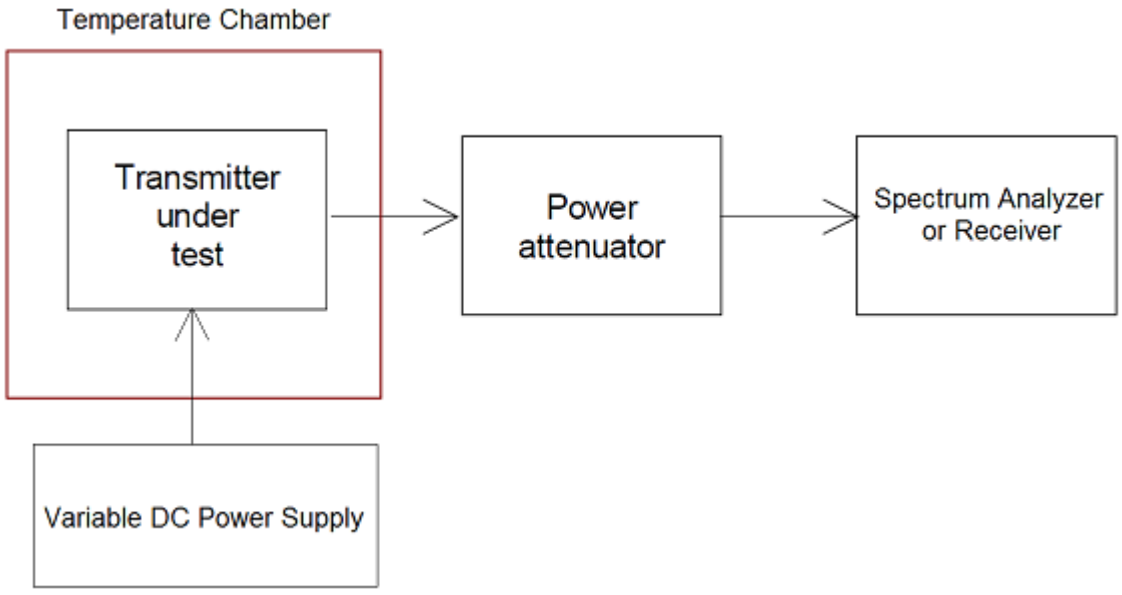
LIMIT

FCC Part 95.621(b):
GMRS:
The carrier frequency tolerance shall be better than ±5 ppm.
FRS:
The carrier frequency tolerance shall be better than ±2.5 ppm.

TEST PROCEDURE

1. According to FCC Part 2 Section 2.1055 (a)(1), the frequency stability shall be measured with variation of ambient temperature from -30℃ to +50℃ centigrade.
2. According to FCC Part 2 Section 2.1055 (d) (2), for battery powered equipment, the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point, which is specified by the manufacture.
3. Vary primary supply voltage from 85 to 115 percent of the nominal value.
4. The EUT was set in the climate chamber and connected to an external DC power supply. The RF output was directly connected to Spectrum Analyzer The coupling loss of the additional cables was recorded and taken in account for all the measurements. After temperature stabilization (approx. 20 min for each stage), the frequency for the lower, the middle and the highest frequency range was recorded. For Frequency stability Vs. Voltage the EUT was connected to a DC power supply and the voltage was adjusted in the required ranges. The result was recorded.

TEST CONFIGURATION



TEST MODE:

Please reference to the section 2.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Please refer to the below test data:

Test conditions		Frequency error (ppm)			Limit (ppm)	Result
Voltage(V)	Temp(℃)	462.6375MHz (TX1)	462.6500 (TX2)	467.6375MHz (TX3)		
3.6	-30	0.36	0.19	0.32	±2.5(TX1) ±5.0(TX2) ±2.5(TX3)	Pass
	-20	0.37	0.18	0.30		
	-10	0.34	0.19	0.30		
	0	0.34	0.18	0.31		
	10	0.36	0.19	0.31		
	20	0.37	0.20	0.32		
	30	0.40	0.20	0.33		
	40	0.42	0.21	0.34		
	50	0.43	0.22	0.37		
3.06 (85% Rated)	20	0.35	0.19	0.30		
4.14(115% Rated)	20	0.40	0.21	0.35		

Test conditions		Frequency error (ppm)			Limit (ppm)	Result
Voltage(V)	Temp(℃)	462.6375MHz (TX1)	462.6500 (TX2)	467.6375MHz (TX3)		
4.5	-30	0.32	0.18	0.25	±2.5(TX1) ±5.0(TX2) ±2.5(TX3)	Pass
	-20	0.18	0.22	0.32		
	-10	0.32	0.23	0.19		
	0	0.32	0.24	0.26		
	10	0.21	0.31	0.34		
	20	0.23	0.22	0.32		
	30	0.28	0.24	0.31		
	40	0.36	0.27	0.16		
	50	0.38	0.22	0.27		
3.83(85% Rated)	20	0.31	0.34	0.22		
5.18(115% Rated)	20	0.25	0.24	0.18		

Test conditions		Operation Mode	Test Frequency (MHz)	Measured (ppm)	Limit (ppm)	Result
Voltage(V)	Temp(℃)					
3.6	25	TX1	462.5625	0.21	±2.5	Pass
			462.5875	0.23		
			462.6125	0.24		
			462.6375	0.31		
			462.6625	0.17		
			462.6875	0.32		
			462.7125	0.33		
3.6	25	TX2	462.5500	0.19	±5.0	Pass
			462.5750	0.16		
			462.6000	0.26		
			462.6250	0.32		
			462.6500	0.21		
			462.6750	0.18		
			462.7000	0.27		
			462.7250	0.21		
3.6	25	TX3	467.5625	0.16	±2.5	Pass
			467.5875	0.23		
			467.6215	0.24		
			467.6375	0.23		
			467.6625	0.26		
			467.6875	0.29		
			467.7125	0.34		

Test conditions		Operation Mode	Test Frequency (MHz)	Measured (ppm)	Limit (ppm)	Result
Voltage(V)	Temp(℃)					
4.5	25	TX1	462.5625	0.16	±2.5	Pass
			462.5875	0.21		
			462.6125	0.34		
			462.6375	0.25		
			462.6625	0.26		
			462.6875	0.28		
			462.7125	0.29		
4.5	25	TX2	462.5500	0.25	±5.0	Pass
			462.5750	0.24		
			462.6000	0.32		
			462.6250	0.21		
			462.6500	0.35		
			462.6750	0.18		
			462.7000	0.22		
			462.7250	0.27		
4.5	25	TX3	467.5625	0.15	±2.5	Pass
			467.5875	0.19		
			467.6215	0.24		
			467.6375	0.22		
			467.6625	0.32		
			467.6875	0.14		
			467.7125	0.26		

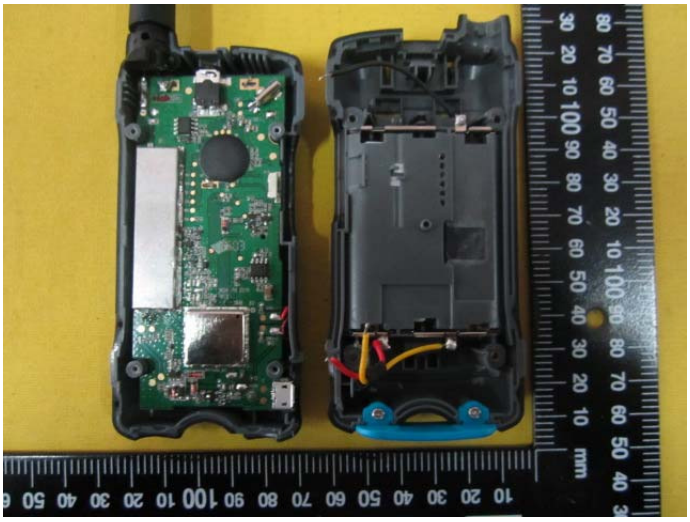
5. Test Setup Photos of the EUT

6. External and Internal Photos of the EUT

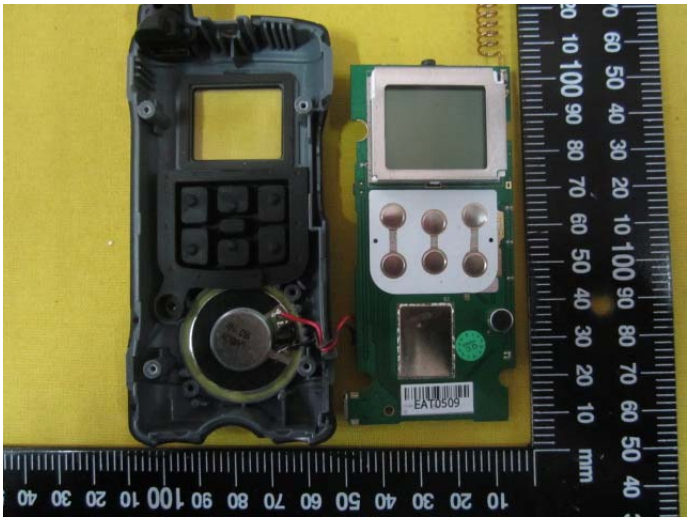
External photos of the EUT

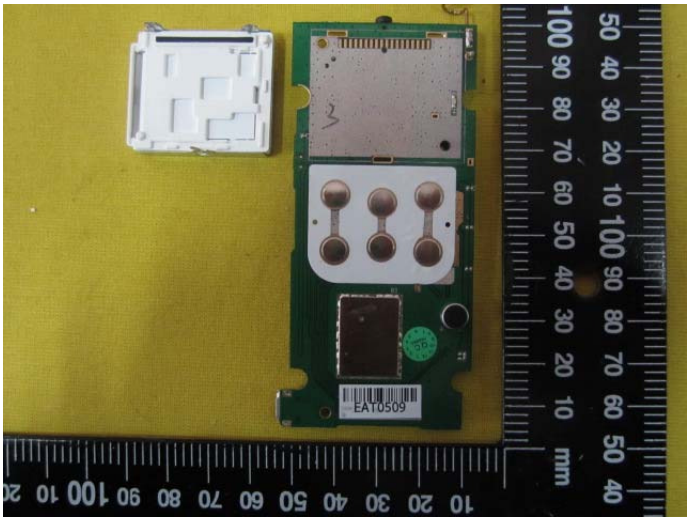
Internal photos of the EUT

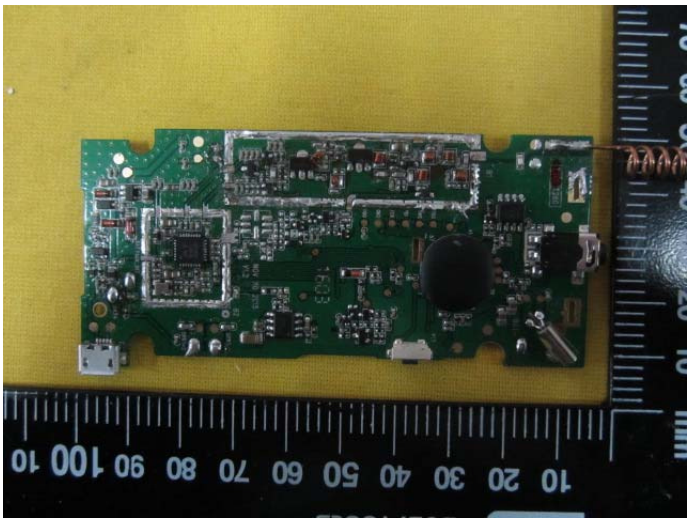

3.6V NICKEL-METAL HYDRIDE BATTERY
BATTERIE AU NICKEL METAL HYDRURE DE 3.6V
3.6Vcc BATERÍA DE HIDRURO DE METAL-NIQUEL
3.6V BATERIA DE NÍQUEL METAL HIDRETO
CELL ORIGIN CHINA. FINISHED IN CHINA.

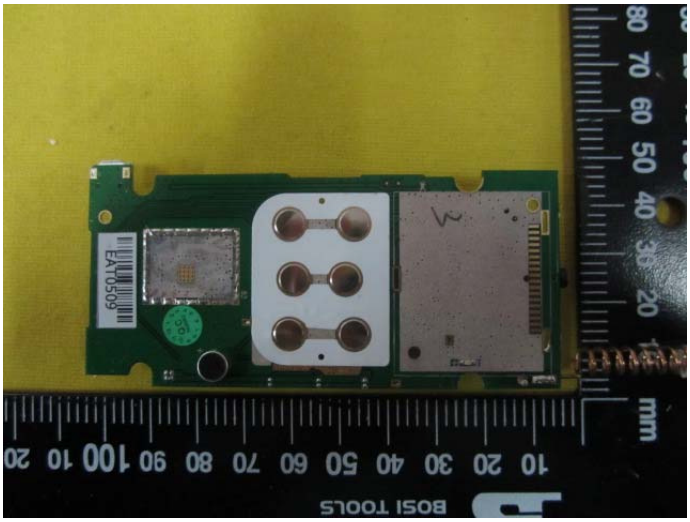



Energizer
Energizer
Energizer









.....End of Report.....