A2LA Cert. No. 5463.01

TEST REPORT

Report Number	:	TZ0035240913FRF18
Product Name	:	educational toy
Model/Type reference	:	Refer to section 1.2 of this report
FCC ID	:	2BLBV-850
Prepared for	:	SHANTOU CHENGHAI DISTRICT MIDI ELECTRONICS FACTORY CHENGHAI DISTRICT, SHANTOU CITY, GUANGDONG PROVINCE, CHINA

Prepared By	:	Shenzhen Tongzhou Testing Co.,Ltd. 1st Floor, Building 1, Haomai High-tech Park, Huating Road 387, Dalang Street, Longhua, Shenzhen, China
Standards	:	FCC CFR Title 47 Part 95, ANSI/TIA-603-E: 2016
Date of Test	:	2024/9/11 ~ 2024/9/21
Date of Issue	:	2024/9/23

Prepared by	:	Lena Wen (File administrators)	Lena Wen
Reviewed by	:	Hugo Chen (Technical Manager)	Hugo Chen
Approved by	:	Andy Zhang (General Manager)	Andy Zhang

** Report Revise Record **

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	2024/9/23	Valid	Initial release

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1. Client Information

Applicant	:	SHANTOU CHENGHAI DISTRICT MIDI ELECTRONICS FACTORY
Address	:	CHENGHAI DISTRICT, SHANTOU CITY, GUANGDONG PROVINCE, CHINA
Manufacturer	:	SHANTOU CHENGHAI DISTRICT MIDI ELECTRONICS FACTORY
Address	:	CHENGHAI DISTRICT, SHANTOU CITY, GUANGDONG PROVINCE, CHINA

1.2. Description of Device (EUT)

Product Name	:	educational toy
Trade Mark	:	N/A
Model Number	:	850,610,611,612,613,614,615,616,617,618,619,620,621,622,623,624,625,626,627,628,629,630,631,632,633,634,635,636,637,638,639,640,641,642,643,644,645,646,647,648,649,650,810,811,812,813,814,815,816,817,818,819,820,821,822,823,824,825,826,827,828,829,830,831,832,833,834,835,836,837,838,839,840,841,842,843,844,845,846,847,848,849,910,911,912,913,914,915,916,917,918,919,920,921,922,923,924,925,926
Model Declaration	:	All the same except for the model name and color.
Test Model	:	850
Power Supply	:	DC 4.5V by battery
Hardware version	:	V1.0
Software version	:	V1.0

1.3. Wireless Function Tested in this Report

FRS		
Operation Frequency	:	462.5625MHz(FRS)
Modulation Type	:	FM
Emission Designator	:	11K0F3E
Maximum Output Power	:	0.01W

Note 1: Antenna position refer to EUT Photos.
Note 2: the above information was supplied by the applicant.

1.4. Description of Test Facility

FCC

Designation Number: CN1275

Test Firm Registration Number: 167722

Shenzhen Tongzhou Testing Co.,Ltd has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA

Certificate Number: 5463.01

Shenzhen Tongzhou Testing Co.,Ltd has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

IC

ISED#: 22033

CAB identifier: CN0099

Shenzhen Tongzhou Testing Co.,Ltd has been listed by Innovation, Science and Economic Development Canada to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4 and CISPR 16-1-4:2010

1.5. 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 ETSI TR 100 028 " Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics" and is documented in the Shenzhen Tongzhou Testing Co.,Ltd. quality system acc. to 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 Tongzhou Testing Co.,Ltd. is reported:

Item	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	3.10 dB	(1)
Radiated Emission	1~18GHz	3.70 dB	(1)
Radiated Emission	18-40GHz	3.90 dB	(1)
Conducted Disturbance	0.15~30MHz	1.63 dB	(1)
Conducted Power	9KHz~18GHz	0.61 dB	(1)
Spurious RF Conducted Emission	9KHz~40GHz	1.22 dB	(1)
Band Edge Compliance of RF Emission	9KHz~40GHz	1.22 dB	(1)
Occuiped Bandwidth	9KHz~40GHz	-	(1)
Frequency Error	9KHz~40GHz	1 x 10-7	(1)

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

1.6. EUT operation mode

EUT operation mode no.	Description of operation mode	Additional information
Op 1	FM+BW12.5KHz+GMRS+TX	The equipment is set with FM modulation and 12.5KHz bandwidth at FRS mode for transmitter, powered by DC 4.50V
Note: 1. The sample will states RX and standby at same time according to half duplex work principle.		

1.7. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID:2BLBV-850** filing to comply with FCC Part 2, FCC Part 95 of the FCC CFR 47 Rules.

1.8. Modifications

No modifications were implemented to meet testing criteria.

1.9. Additional Comments

According to § 95.1763 GMRS channels.
The GMRS is allotted 30 channels—16 main channels and 14 interstitial channels. GMRS stations may transmit on any of the channels as indicated below.
(a) ***462 MHz main channels.*** Only mobile, hand-held portable, repeater, base and fixed stations may transmit on these 8 channels. The channel center frequencies are: 462.5500, 462.5750, 462.6000, 462.6250, 462.6500, 462.6750, 462.7000, and 462.7250 MHz.
(b) ***462 MHz interstitial channels.*** Only mobile, hand-held portable and base stations may transmit on these 7 channels. The channel center frequencies are: 462.5625, 462.5875, 462.6125, 462.5625, 462.6625, 462.6875, and 462.7125 MHz.
(c) ***467 MHz main channels.*** Only mobile, hand-held portable, control and fixed stations may transmit on these 8 channels. Mobile, hand-held portable and control stations may transmit on these channels only when communicating through a repeater station or making brief test transmissions in accordance with § 95.319(c). The channel center frequencies are: 467.5500, 467.5750, 467.6000, 467.6250, 467.6500, 467.6750, 467.7000, and 467.7250 MHz.
(d) ***467 MHz interstitial channels.*** Only hand-held portable units may transmit on these 7 channels. The channel center frequencies are: 467.5625, 467.5875, 467.6125, 462.5625, 467.6625, 467.6875, and 467.7125 MHz.

According to§ 95.563 FRS channels.
The FRS is allotted 22 channels, each having a channel bandwidth of 12.5 kHz. All of the FRS channels are also allotted to the General Mobile Radio Service (GMRS) on a shared basis. The FRS channel center frequencies are set forth in the following table:

Channel No.	Center frequency (MHz)
1	462.5625
2	462.5875
3	462.6125
4	462.6375
5	462.6625
6	462.6875
7	462.7125
8	467.5625
9	467.5875
10	467.6125
11	467.6375
12	467.6625
13	467.6875
14	467.7125
15	462.5500
16	462.5750
17	462.6000
18	462.6250
19	462.6500
20	462.6750
21	462.7000
22	462.7250

FCC rules for FCC Part 95 test frequency requirements

According to FCC rules: Except where otherwise specified, measurements shall be performed for each frequency band of operation for which the radio apparatus is to be certified, with the device operating at the frequencies in each band of operation shown in Table below. The frequencies selected for measurements shall be reported in the test report.

Table Frequency Range of Operation

Frequency Range Over Which the Device Operates (in each Band)	Number of Measurement Frequencies Required	Location of Measurement Frequency in Band of Operation
1 MHz or less	1	middle
1 MHz to 10 MHz	2	1 near high end,1 near low end
Greater than 10 MHz	3	1 near high end,1 near middle, 1 near low end

The application will programmable channels and power by software (not open to end-user, only open to agency), test labs can only tune knob to change channels;

The application provide test channels as follows;

Modulation	Channel separation	Channel number	Frequency (MHz)
FRS/FM	12.5 KHz	Ch1	462.5625

1.10. 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 Tongzhou Testing 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 Tongzhou Testing Co.,Ltd. laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	3.10 dB	(1)
Radiated Emission	1~18GHz	3.70 dB	(1)
Radiated Emission	18-40GHz	3.90 dB	(1)
Conducted Disturbance	0.15~30MHz	1.63 dB	(1)
Conducted Power	9KHz~18GHz	0.61 dB	(1)
Spurious RF Conducted Emission	9KHz~40GHz	1.22 dB	(1)
Band Edge Compliance of RF Emission	9KHz~40GHz	1.22 dB	(1)
Occuiped Bandwidth	9KHz~40GHz	-	(1)
Frequency Error	9KHz~40GHz	1×10^{-7}	(1)

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2. SUMMARY OF TEST RESULTS

For FRS

FCC Rules	Description of Test	Test Sample	Result
§95.567 §2.1046	Maximum Transmitter Power	TZ0035240913–1#	Compliant
§95.575 §2.1047	Modulation Characteristic	TZ0035240913–1#	Compliant
§95.573 §2.1049	Occupied Bandwidth	TZ0035240913–1#	Compliant
§95.579 §2.1053	Emission mask	TZ0035240913–1#	Compliant
§95.579 §2.1053	Unwated Emission	TZ0035240913–1#	Compliant
§95.565 §2.1055	Frequency Stability	TZ0035240913–1#	Compliant

3. EQUIPMENTS USED DURING THE TEST

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1	EMI Test Receiver	R&S	ESCI-7	100849/003	2024/1/4	2025/1/3
2	Signal Generator (SG B)	Keysight	N5182A	MY4620709	2024/1/4	2025/1/3
3	Signal Generator(SG C)	R&S	SML03	102924/0013	2024/1/4	2025/1/3
4	Climate Chamber	KRUOMR	KRM-1000	KRM16072901	2024/1/4	2025/1/3
5	RF COMMUNICATION TEST SET(SG A)	HP	8921A	3430A01131	2024/1/4	2025/1/3
6	Wideband Antenna	schwarzbeck	VULB 9163	958	2022/11/13	2025/11/12
7	Wideband Antenna	Sunol	JB3	A020115	2022/11/13	2025/11/12
8	Amplifier	schwarzbeck	BBV 9743	209	2024/1/4	2025/1/3
9	Amplifier	Tonscend	TSAMP-0518SE	--	2024/1/4	2025/1/3
10	Horn Antenna	schwarzbeck	BBHA 9120D	01989	2022/11/13	2025/11/12
11	Horn Antenna	schwarzbeck	9120D-1141	1574	2022/11/13	2025/11/12
12	50Ω RF Load	MKRF	RFA001	RFA001	2024/1/4	2025/1/3
13	Attenuator	JS	RFA004	RFA004	2024/1/4	2025/1/3
14	Controller	MF	MF7802	N/A	N/A	N/A
15	MXA Signal Analyzer	Keysight	N9020A	MY52091623	2024/1/4	2025/1/3
16	Test Software	Tonscend	JS36-RSE	V5.0.0.0	N/A	N/A
17	Digital Radio Test Set	AEROFLEX	3920	299001967	2024/1/4	2025/1/3

4. TEST CONDITIONS AND RESULTS

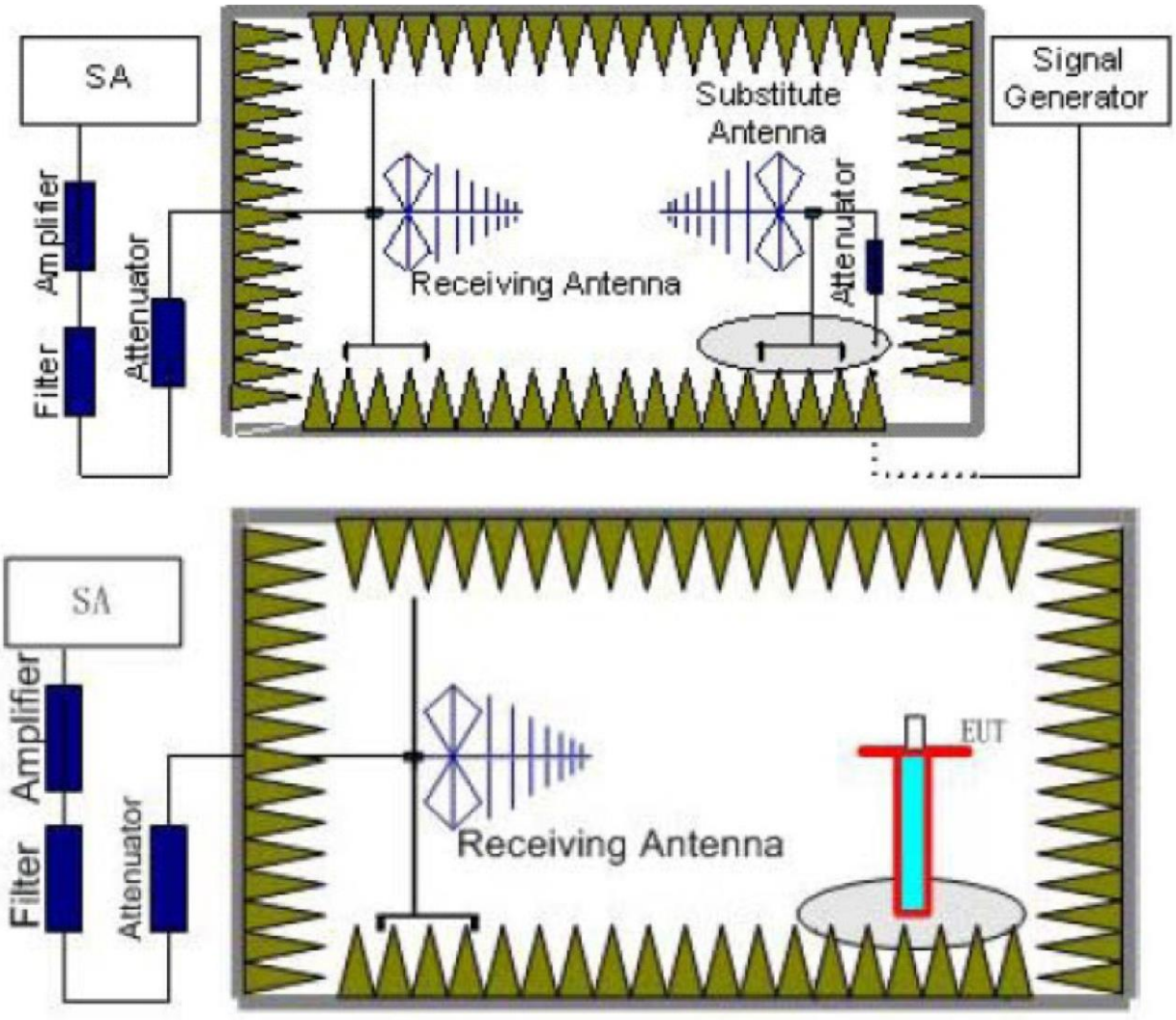
4.1. RF POWER OUTPUT

4.1.1. LIMIT

FRS Requirement

Accrding to§ 95.567 FRS transmit power limit
Each FRS transmitter type must be designed such that the effective radiated power (ERP) on channels 8 through 14 does not exceed 0.5 Watts and the ERP on channels 1 through 7 and 15 through 22 does not exceed 2.0 Watts.

4.1.2. TEST CONFIGURATION



4.1.3. 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 (P_{Ag}) should be recorded after test.

The measurement results are obtained as described below:

Power(EIRP)=P_{Mea}- P_{Ag} - P_{cl} + Ga

If used 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} + 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.

4.1.4. TEST RESULTS

Channel	Frequency (MHz)	P_{Mea} (dBm)	Amplifier Gain (dBi)	Path Loss	Antenna Gain	Correction (dB)	ERP (dBm)	Limit (dBm)	Polarization
1	462.5625	-41.8	31.23	1.02	4.71	2.15	-9.03	33.02	H
1	462.5625	-29.15	31.23	1.02	4.71	2.15	3.62	33.02	V

4.2. Modulation Characteristics

4.2.1. LIMIT

FRS Requirement

According to CFR47 section § 95.575 FRS modulation limits.
Each FRS transmitter type must be designed such that the peak frequency deviation does not exceed 2.5 kHz, and the highest audio frequency contributing substantially to modulation must not exceed 3.125 kHz.

4.2.2. TEST CONFIGURATION

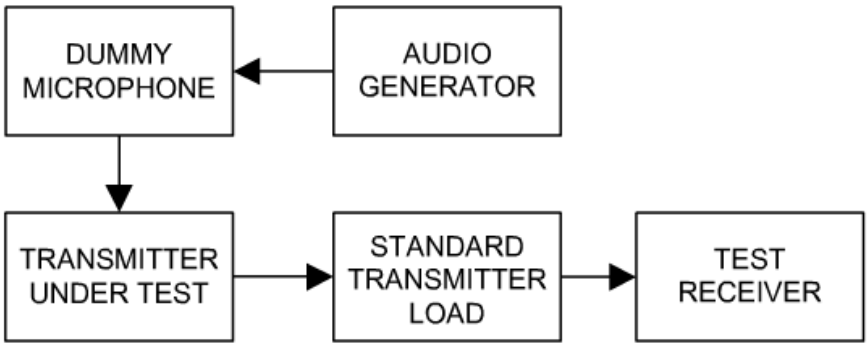


Figure 1: Modulation Limit&Audio Frequency Response

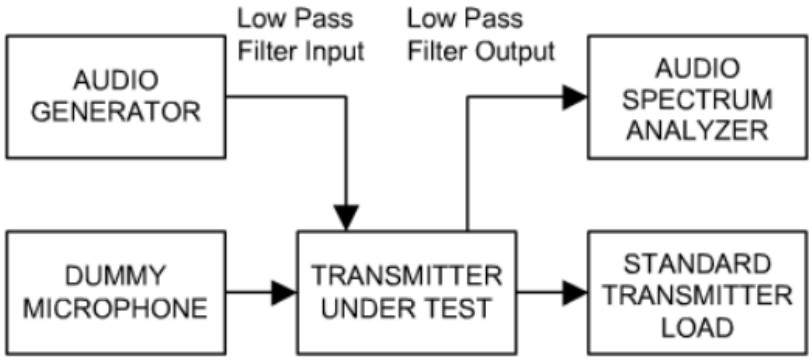


Figure 2: Audio Low Pass Filter Response

4.2.3. TEST PROCEDURE

Modulation Characteristics

1 Configure the EUT as shown in figure 1, adjust the audio input for60% of rated system deviation at 1 KHz 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 Hz, 500 Hz, 1000 Hz, 1500 Hz, 2500Hz and 3000 Hz in sequence.

3 Recorded the frequency deviation.

4 The Peak frequency deviation must not exceed:
FRS: +/- 2.5 KHz
GMRS: +/- 5 KHz

Modulation Frequency Response

1 Configure the EUT as shown in figure 1.

2 Set the audio signal generator frequency to the sound pressure level at the microphone of the EUT.
3 The frequency of the audio signal generator is changed from 100Hz to 5 KHz.
4 Recorded the frequency deviation.
5 Calculate the audio frequency response at each frequency as:

Response=20long$_{10}$ (DEV_{FREQ}/DEV_{REF})

DEV_{FREQ} = Frequency Deviation at 100 – 5000Hz

DE_{VREF} = Frequency Deviation at 1000 Hz

Audio Frequency Response

1 Configure the EUT as shown in figure 1.
2 Adjust the audio input for rated system deviation at 1 KHz using this level as a reference (0dB).
3 Vary the Audio frequency from 1 KHz to 100 KHz and record the frequency deviation.

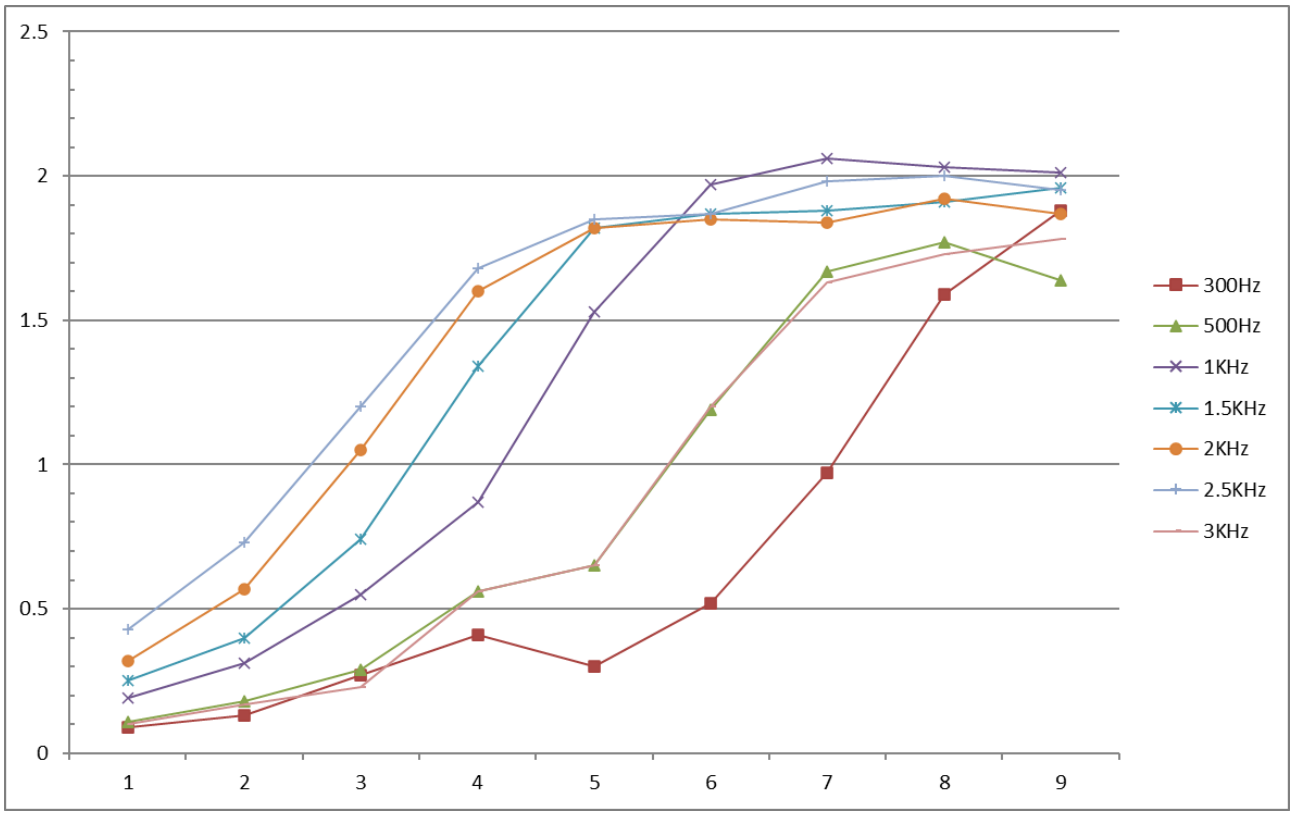
Audio FrequencyResponse =20log$_{10}$ (Deviationof test frequency/Deviation of 1 KHz reference).

4.2.4. TEST RESULTS

Modulation Characteristics

FRS @ 12.5 KHz Channel Separation @ Channel 1

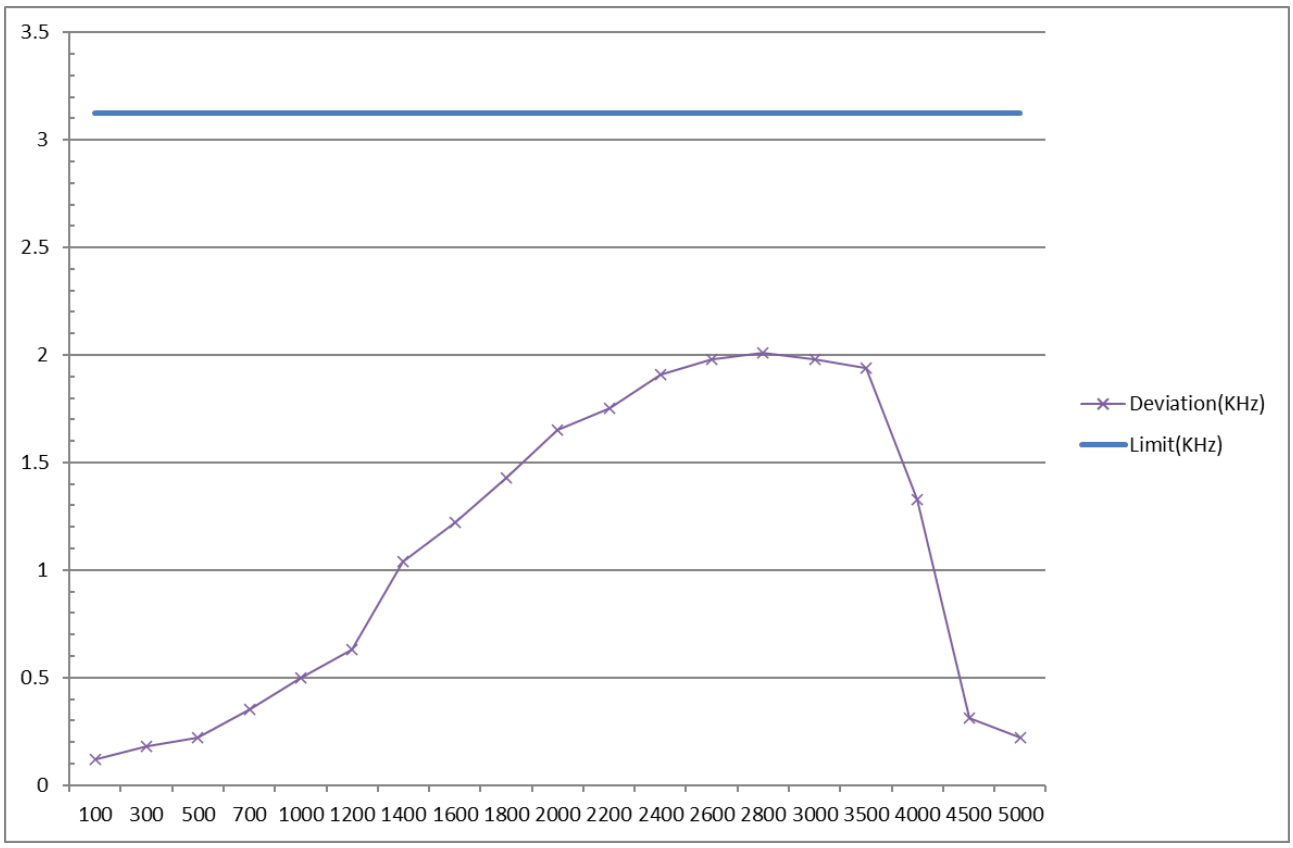
Channel 1,Frequency 462.5625MHz									
Modulation Input(dBC)	Peak Frequency Deviation (KHz)							Limit(KHz)	Result
	300Hz	500Hz	1KHz	1.5KHz	2KHz	2.5KHz	3KHz		
-20	0.09	0.11	0.19	0.25	0.32	0.43	0.1	2.5	Pass
-15	0.13	0.18	0.31	0.4	0.57	0.73	0.17	2.5	Pass
-10	0.27	0.29	0.55	0.74	1.05	1.2	0.23	2.5	Pass
-5	0.41	0.56	0.87	1.34	1.6	1.68	0.56	2.5	Pass
0	0.3	0.65	1.53	1.82	1.82	1.85	0.65	2.5	Pass
5	0.52	1.19	1.97	1.87	1.85	1.87	1.2	2.5	Pass
10	0.97	1.67	2.06	1.88	1.84	1.98	1.63	2.5	Pass
15	1.59	1.77	2.03	1.91	1.92	2	1.73	2.5	Pass
20	1.88	1.64	2.01	1.96	1.87	1.95	1.78	2.5	Pass



Modulation Frequency Response

FRS @ 12.5 KHz Channel Separation @ Channel 1

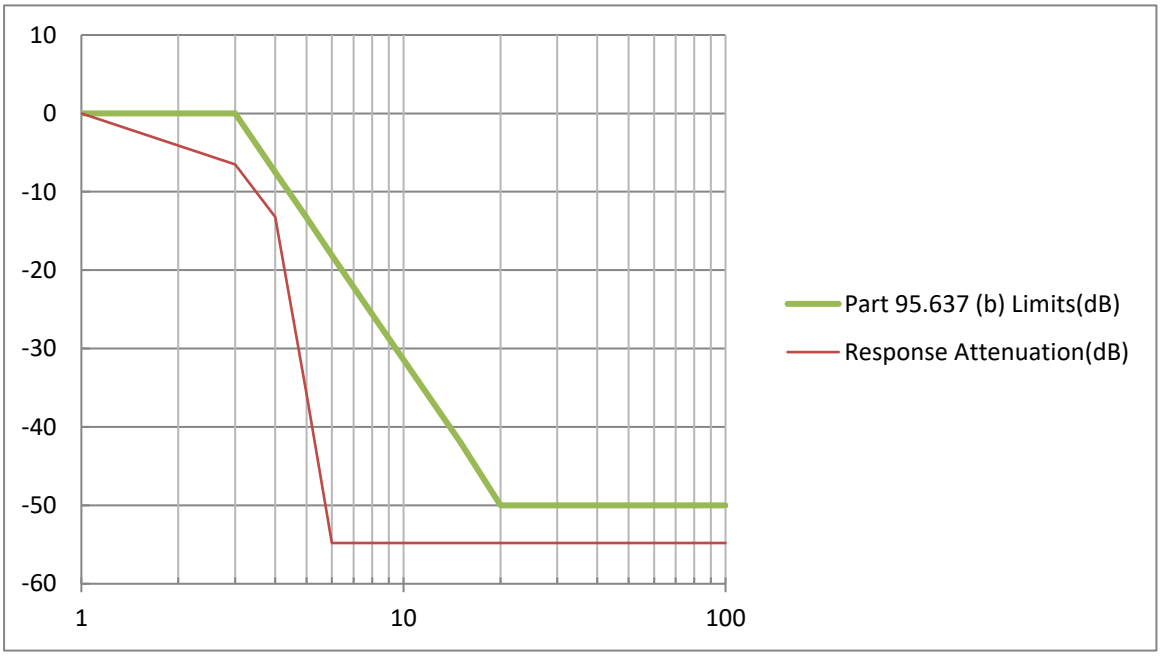
Audio Frequency (KHz)	Frequency Deviation (KHz)	Limit (KHz)	Result
100	0.12	3.125	Pass
300	0.18	3.125	Pass
500	0.22	3.125	Pass
700	0.35	3.125	Pass
1000	0.5	3.125	Pass
1200	0.63	3.125	Pass
1400	1.04	3.125	Pass
1600	1.22	3.125	Pass
1800	1.43	3.125	Pass
2000	1.65	3.125	Pass
2200	1.75	3.125	Pass
2400	1.91	3.125	Pass
2600	1.98	3.125	Pass
2800	2.01	3.125	Pass
3000	1.98	3.125	Pass
3500	1.94	3.125	Pass
4000	1.33	3.125	Pass
4500	0.31	3.125	Pass
5000	0.22	3.125	Pass



Audio Frequency Response

FRS @ 12.5 KHz Channel Separation @ Channel 1

Audio Frequency (KHz)	dB relative to 1 KHz	Part 95.637 (b) Limits
1	0	0.0
3	-6.5	0.0
4	-13.2	-7.5
5	-35.8	-13.3
6	-54.8	-18.1
8	-54.8	-25.6
10	-54.8	-31.4
15	-54.8	-41.9
20	-54.8	-50.0
30	-54.8	-50.0
40	-54.8	-50.0
50	-54.8	-50.0
60	-54.8	-50.0
70	-54.8	-50.0
80	-54.8	-50.0
90	-54.8	-50.0
100	-54.8	-50.0



4.3. Occupied Bandwidth and Emission Mask

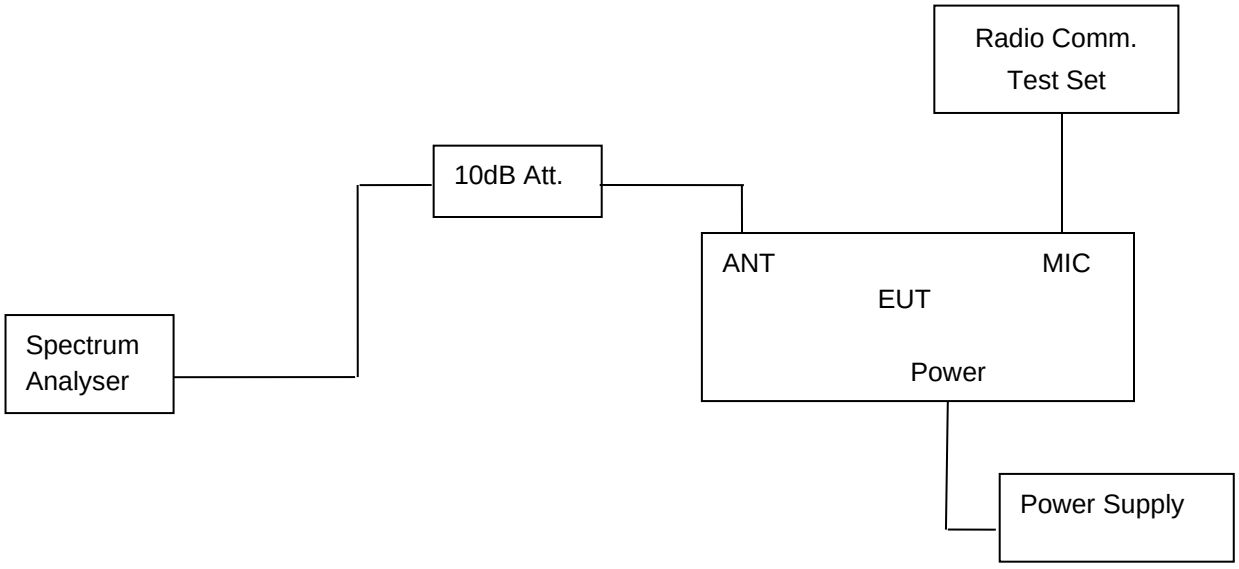
4.3.1. LIMIT

FRS Requirement

Accroding to § 95.573 FRS authorized bandwidth.
Each FRS transmitter type must be designed such that the occupied bandwidth does not exceed 12.5 kHz.

Accroding to § 95.579 FRS unwanted emissions limits.
Each FRS transmitter type must be designed to satisfy the applicable unwanted emissions limits in this paragraph.
(a) Attenuation requirements. The power of unwanted emissions must be attenuated below the carrier power output in Watts (P) by at least:
(1) 25 dB (decibels) in the frequency band 6.25 kHz to 12.5 kHz removed from the channel center frequency.
(2) 35 dB in the frequency band 12.5 kHz to 31.25 kHz removed from the channel center frequency.
(3) 43 + 10 log (P) dB in any frequency band removed from the channel center frequency by more than 31.25 kHz.
(b) Measurement bandwidths. The power of unwanted emissions in the frequency bands specified in paragraphs (a)(1) and (2) of this section is measured with a reference bandwidth of 300 Hz. The power of unwanted emissions in the frequency range specified in paragraph (a)(3) is measured with a reference bandwidth of at least 30 kHz.
(c) Measurement conditions. The requirements in this section apply to each FRS transmitter type both with and without the connection of permitted attachments, such as an external speaker, microphone and/or power cord.

4.3.2. TEST CONFIGURATION



4.3.3. TEST PROCEDURE

1 The EUT was placed on a turn table which is 0.8m above ground plane.
2 The EUT was modulated by 2.5 KHz 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.
3 Set EUT work at continuous transmitting.
4 Set SPA Centre Frequency = fundamental frequency, RBW=100Hz, VBW= 300 Hz, span =25 KHz.
5 Set SPA Max hold. Mark peak, Set 99% Occupied Bandwidth and 26dB Occupied Bandwidth.
6 Set SPA Centre Frequency = fundamental frequency, RBW=300Hz, VBW= 1000 Hz, span =62.5 KHz.

7 Set the Emission mask limit and check the result.

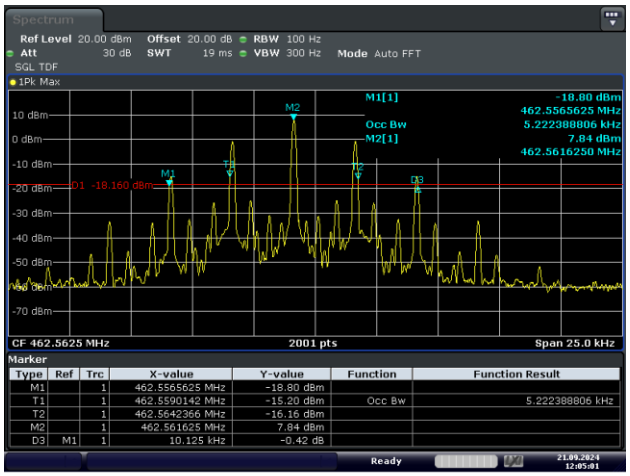
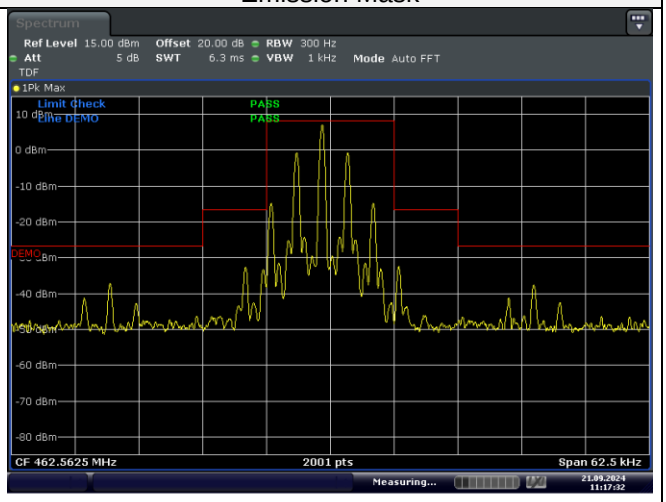
4.3.4. TEST RESULTS

Occupied Bandwidth					
Modulation Type	Channel Separation	Operation Mode	Test Channel	TestFrequency (MHz)	26dB Occupied Bandwidth(KHz)
FRS/FM	12.5KHz	Op 1	CH1	462.5625	10.125
Limit			FRS		≤12.5 KHz
Test Results			PASS		

Emission Mask					
Modulation Type	Channel Separation	Operation Mode	Test Channel	Test Frequency (MHz)	RBW (Hz)
FRS/FM	12.5KHz	Op 1	CH1	462.5625	300
Test Results			**PASS**		

Note:

1. *All measured including cable loss and attenuation.*
2. *Please refer to following test plots;*

Occupied Bandwidth	Emission Mask
	
Channel 1 / 462.5625 MHz	Channel 1 / 462.5625 MHz

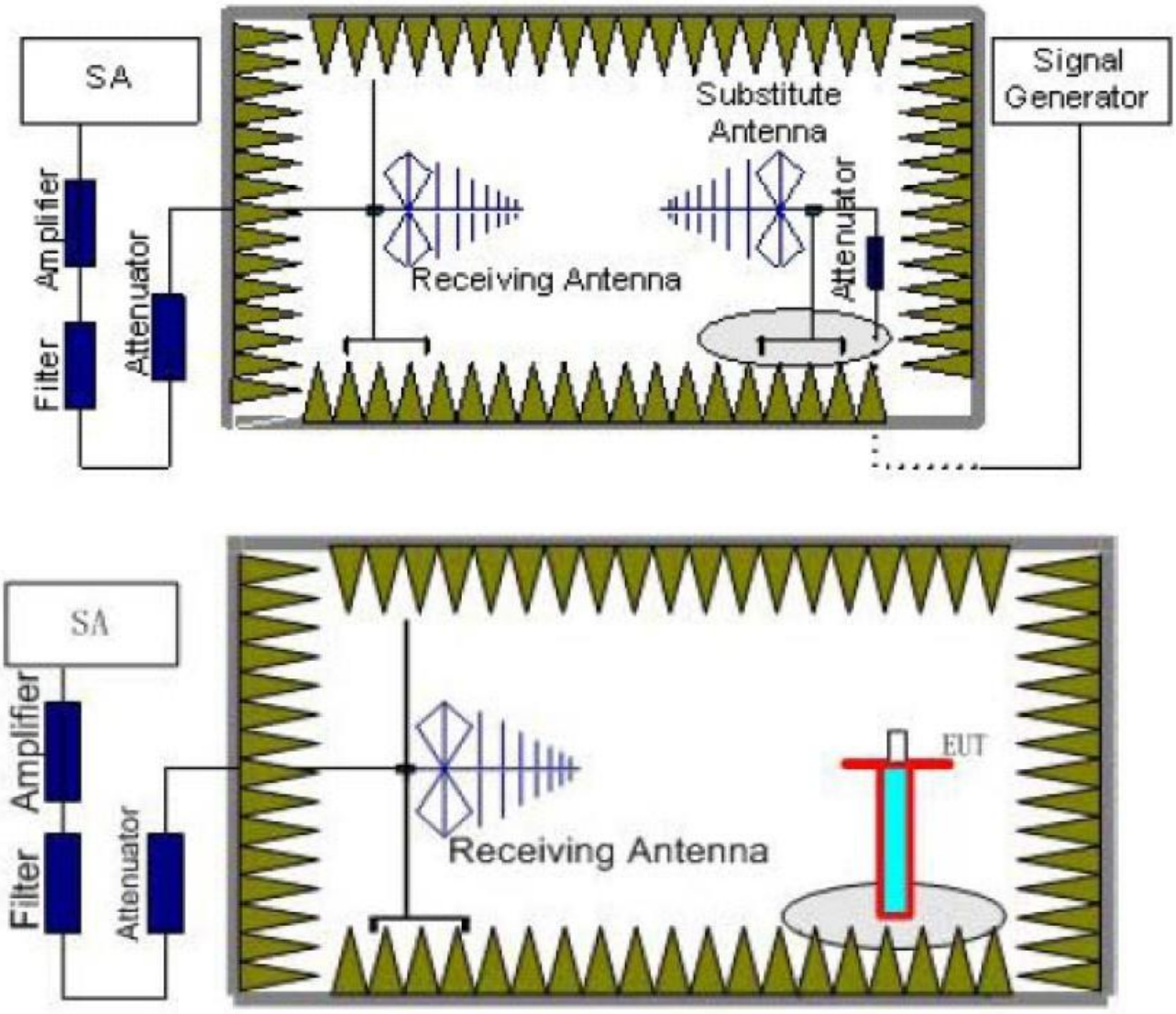
4.4. Field Strength Spurious Emissions

4.4.1. LMIT

FRS Requirement

Accroding to § 95.579 FRS unwanted emissions limits.
43 + 10 log (P) dB in any frequency band removed from the channel center frequency by more than 31.25 kHz.

4.4.2. TEST CONFIGURATION



4.4.3. TEST PROCEDURE

1. EUT was placed on a 1.50 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 1.50 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 analyser 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 analyser 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 isconnected 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

It can omit power amplifier if signal generator level meets requirement;

This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.

6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

Working Frequency	Subrange (GHz)	RBW	VBW	Sweep time (s)
GMRS/FM/Op1	0.00009~0.15	1KHz	3KHz	30
	0.00015~0.03	10KHz	30KHz	10
	0.03~1	100KHz	300KHz	10
	1~5	1 MHz	3 MHz	5
FRS/FM/Op2	0.00009~0.15	1KHz	3KHz	30
	0.00015~0.03	10KHz	30KHz	10
	0.03~1	100KHz	300KHz	10
	1~5	1 MHz	3 MHz	5

4.4.4. TEST RESULTS

Note:

1. In general, the worst case attenuation requirement shown above was applied.
2. The measurement frequency range from 9KHz to 6 GHz.
3. EIRP for measure frequency above 1 GHz and ERP for below 1 GHz.
4. *** means that the emission level is too low to be measured or at least 20 dB down than the limit.

Operation Mode:Op 1				Channel Separation:12.5KHz			
Channel Separation:12.5KHz				Test Frequency: 462.5625MHz			
Frequency (MHz)	P_{Mea} (dBm)	Path Loss	Antenna Gain	Correction (dB)	Values (dBm)	Limit (dBm)	Polarization
925.13	-50.25	0.34	8.56	2.15	-44.18	-13.00	H
1387.69	-42.47	0.78	5.73	0.00	-37.52	-13.00	H
1850.25	-49.49	0.4	6.37	0.00	-43.52	-13.00	H
…	…	…	…	…	…	…	H
925.13	-43.48	0.34	8.56	2.15	-37.41	-13.00	V
1387.69	-41.65	0.78	5.73	0.00	-36.70	-13.00	V
1850.25	-52.24	0.4	6.37	0.00	-46.27	-13.00	V
…	…	…	…	…	…	…	V

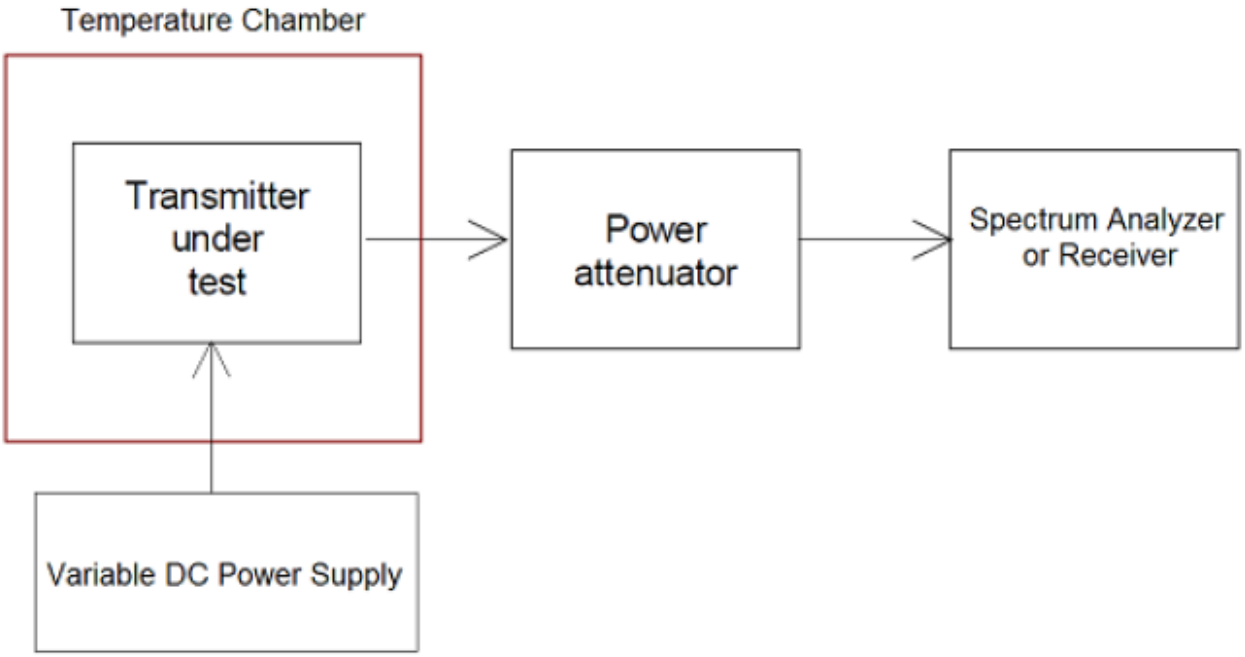
4.5. Frequency Stability

4.5.1. LIMIT

FRS Requirement

According to §95.565 FRS frequency accuracy
Each FRS transmitter type must be designed such that the carrier frequencies remain within ±2.5 parts-per-million of the channel center frequencies specified in §95.563 during normal operating conditions.

4.5.2. TEST CONFIGURATION



4.5.3. TEST PROCEDURE

The EUT was set in the climate chamber and connected to an external DC power supply. The RF output was directly connected to frequency meter. 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.

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 +60℃centigrade.
2. According to FCC Part 2 Section 2.1055 (a) (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; if manufacturer declares extreme voltage within 85 to 115 percent of the nominal value, measured at extreme voltage declared by manufacturer.

4.

4.5.4. TEST RESULTS

Test conditions	Temp(℃)	Frequency error (ppm)		
Voltage Condition		462.5625MHz	/	/
NV	-20	0.48	/	/
	-10	0.47	/	/
	0	0.46	/	/
	10	0.44	/	/
	20	0.36	/	/
	30	0.45	/	/
	40	0.51	/	/
	50	0.51	/	/
LV	20	0.41	/	/
HV	20	0.46	/	/
Limit(ppm)		2.50	/	/
Result		PASS	/	/

NV: Normal Voltage 4.5V
LV: Low Voltage 3.6V
HV: High Voltage 4.8V

5. TEST SETUP PHOTOGRAPHS

Please refer to separated files for Test Setup Photos of the EUT.

6. EXTERNAL PHOTOS OF THE EUT

Please refer to separated files for External Photos of the EUT.

7. INTERIOR PHOTOS OF THE EUT

Please refer to separated files for Internal Photos of the EUT.

----------THE END OF REPORT----------