Shenzhen Global Test Service Co.,Ltd.
No.7-101 and 8A-104,Building 7 and 8,DCC Cultural and Creative Garden No.98,Pingxin North Road,Shangmugu,Pinghu Street, Longgang District,Shenzhen,Guangdong,China

TEST REPORT

FCC Part 95

Report Reference No.....:	**GTS20210506012-1-1**
FCC ID.....:	**2AT9H-UUT51818**
Compiled by (position+printed name+signature) .:	File administrators Jimmy Wang
Supervised by (position+printed name+signature) .:	Test Engineer Aaron Tan
Approved by (position+printed name+signature) .:	Manager Jason Hu
Date of issue.....:	May 06, 2021
Testing Laboratory Name .....:	**Shenzhen Global Test Service Co.,Ltd.**
Address .....:	No.7-101 and 8A-104,Building 7 and 8,DCC Cultural and Creative Garden No.98,Pingxin North Road,Shangmugu,Pinghu Street, Longgang District,Shenzhen,Guangdong,China
Applicant's name .....:	**Shenzhen Unison Technology Co., Ltd**
Address .....:	QiaoHongShen 219,Building A,YinTiAn Industrial Park,XiXiang Twon, Bao'An District,ShenZhen,518000,China
Test specification .....:	
Standard .....:	**FCC Part 95**

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Test item description.....:	**Walkie Talkie**
Trade Mark .....:	UniTalkies
Manufacturer .....:	Shenzhen Unison Technology Co., Ltd
Model/Type reference.....:	UT518
Listed Models .....:	UT508, UT528
Ratings .....:	DC 6.0V From Battery
Modulation .....:	FM
Hardware version .....:	V1.0
Software version .....:	V1.0
Frequency.....	FRS :462.5500MHz~462.7250MHz; FRS :462.5625MHz~462.7125MHz; FRS :467.5625MHz~467.7125MHz
Result.....:	**PASS**

TEST REPORT

Equipment under Test	:	Walkie talkie
Model /Type	:	UT518
Listed Models	:	UT508, UT528
Applicant	:	Shenzhen Unison Technology Co., Ltd
Address	:	QiaoHongShen 219,Building A,YinTiAn Industrial Park,XiXiang Twon, Bao'An District,ShenZhen,518000,China
Manufacturer	:	Shenzhen Unison Technology Co., Ltd
Address	:	QiaoHongShen 219,Building A,YinTiAn Industrial Park,XiXiang Twon, Bao'An District,ShenZhen,518000,China

Test result	**Pass ***

Contents

1 SUMMARY 4

1.1 TEST STANDARDS 4
1.2 TEST DESCRIPTION 4
1.3 ADDRESS OF THE TEST LABORATORY 4
1.4 TEST FACILITY 4
1.5 STATEMENT OF THE MEASUREMENT UNCERTAINTY 4

2 GENERAL INFORMATION 6

2.1 GENERAL REMARKS 6
2.2 ENVIRONMENTAL CONDITIONS 6
2.3 GENERAL DESCRIPTION OF EUT 6
2.4 DESCRIPTION OF TEST MODES AND TEST FREQUENCY 6
2.5 EQUIPMENTS USED DURING THE TEST 8
2.6 RELATED SUBMITTAL(S) / GRANT (S) 8
2.7 MODIFICATIONS 8

3 TEST CONDITIONS AND RESULTS 9

3.1 MAXIMUM TRANSMITTER POWER 9
3.2 OCCUPIED BANDWIDTH AND EMISSION MASK 12
3.3 MODULATION LIMIT 16
3.4 AUDIO FREQUENCY RESPONSE 18
3.5 FREQUENCY STABILITY 20
3.6 TRANSMITTER RADIATED SPURIOUS EMISSION 22

4 TEST SETUP PHOTOS OF THE EUT 25

5 EXTERNAL AND INTERNAL PHOTOS OF THE EUT 26

1 SUMMARY

1.1 TEST STANDARDS

The tests were performed according to following standards:
FCC Rules Part 95 : PERSONAL RADIO SERVICES
ANSI/TIA-603-E-2016: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.
FCC Part 2: FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS
ANSI C63.26-2015 : IEEE/ANSI Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

1.2 Test Description

Description of Test Item	Standard clause	Verdict
Maximum Transmitter Power	FCC Part 95.567	PASS
Modulation Characteristic	FCC Part 2.1047 FCC Part 95.575	PASS
Occupied Bandwidth and Emission Mask	FCC Part 2.1049 FCC Part 95.573 FCC Part 95.579	PASS
Radiated Spurious Emission	FCC Part 95.579	PASS
Frequency Stability	FCC Part 2.1055 FCC Part 95.565	PASS

1.3 Address of the test laboratory

Shenzhen Global Test Service Co.,Ltd.
No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

1.4 Test Facility

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

FCC-Registration No.: 165725

Shenzhen Global Test Service 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.

A2LA-Lab Cert. No.: 4758.01

Shenzhen Global Test Service 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.

CNAS-Lab Code: L8169

Shenzhen Global Test Service Co.,Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories. Date of Registration: Dec. 11, 2015. Valid time is until Dec. 10, 2024.

1.5 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 TR-100028-01”Electromagnetic compatibilityand Radio spectrum Matters (ERM);Uncertainties in the measurementof mobile radio equipment characteristics;Part 1”and TR-100028-02 “Electromagnetic compatibilityand Radio spectrum Matters (ERM);Uncertainties in the measurementof mobile radio equipment characteristics;Part 2 “ and is documented in the Shenzhen Global Test Service 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 Global Test Service Co.,Ltd.is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10 dB	(1)
Radiated Emission	1~18GHz	4.32 dB	(1)
Radiated Emission	18-40GHz	5.54 dB	(1)
Conducted Disturbance	0.15~30MHz	3.12 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)
Occupied Bandwidth	9KHz~40GHz	-	(1)

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

2 GENERAL INFORMATION

2.1 General Remarks

Date of receipt of test sample	:	Mar. 20, 2021
Testing commenced on	:	Mar. 20, 2021
Testing concluded on	:	May 06, 2021

2.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.3 General Description of EUT

Name of EUT	Walkie talkie
Model Number	UT518
Power Supply	DC 6.0V from battery
Frequency Range	FRS :462.5500MHz~462.7250MHz; FRS :462.5625MHz~462.7125MHz; FRS :467.5625MHz~467.7125MHz
Rate Power	0.5W
Modulation Type	FM
Channel Separation	12.5KHz
Antenna Type	Integral antenna
Antennal Gain	1.00dBi
Sample ID:	GTS20210507004-1-1-1#(Engineer sample) GTS20210507004-1-1-2#(Normal sample)

Note: For more details, refer to the user's manual of the EUT.

2.4 Description of Test Modes and Test Frequency

The EUT has been tested under typical operating condition. As, test modes selected as below by the technical parameters of the EUT:

Operation Mode No.	Modulation	Channel Separation	Condition	
	FM	12.5KHz	TX	RX
1	☒	☒	☒	
2	☒	☒		☒

Frequency list

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	462.5625	12	467.6625
2	462.5875	13	467.6875
3	462.6125	14	467.7125
4	462.6375	15	462.5500
5	462.6625	16	462.5750
6	462.6875	17	462.6000
7	462.7125	18	462.6250

8	467.5625	19	462.6500
9	467.5875	20	462.6750
10	467.6125	21	462.7000
11	467.6375	22	462.7250

Note1: In section 15.31(m), regards to the operating frequency range less than 1MHz, only one point centered in the frequency range of operation selected to measure.

Note2: The line display in grey was the channel selected for test.

2.5 Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.08	2020/09/19	2021/09/18
LISN	R&S	ESH2-Z5	893606/008	2020/09/19	2021/09/18
EMI Test Receiver	R&S	ESPI3	101841-cd	2020/09/19	2021/09/18
EMI Test Receiver	R&S	ESCI7	101102	2020/09/19	2021/09/18
Spectrum Analyzer	Agilent	N9020A	MY48010425	2020/09/19	2021/09/18
Spectrum Analyzer	R&S	FSV40	100019	2020/09/19	2021/09/18
Vector Signal generator	Agilent	N5181A	MY49060502	2020/09/19	2021/09/18
Signal generator	Agilent	E4421B	3610AO1069	2020/09/19	2021/09/18
Climate Chamber	ESPEC	EL-10KA	A20120523	2020/09/19	2021/09/18
Controller	EM Electronics	Controller EM 1000	N/A	N/A	N/A
Horn Antenna	Schwarzbeck	BBHA 9120D	01622	2020/09/19	2021/09/18
Active Loop Antenna	Beijing Da Ze Technology Co.,Ltd.	ZN30900C	15006	2020/10/11	2021/10/10
Bilog Antenna	Schwarzbeck	VULB9163	000976	2020/05/26	2021/05/25
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	791	2020/09/19	2021/09/18
Amplifier	Schwarzbeck	BBV 9743	#202	2020/09/19	2021/09/18
Amplifier	Schwarzbeck	BBV9179	9719-025	2020/09/19	2021/09/18
Amplifier	EMCI	EMC051845B	980355	2020/09/19	2021/09/18
Temperature/Humidity Meter	Gangxing	CTH-608	02	2020/09/19	2021/09/18
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	KL142031	2020/09/19	2021/09/18
High-Pass Filter	K&L	41H10-1375/U12750-O/O	KL142032	2020/09/19	2021/09/18
RF Cable(below 1GHz)	HUBER+SUHNER	RG214	RE01	2020/09/19	2021/09/18
RF Cable(above 1GHz)	HUBER+SUHNER	RG214	RE02	2020/09/19	2021/09/18
Data acquisition card	Agilent	U2531A	TW53323507	2020/09/19	2021/09/18
Power Sensor	Agilent	U2021XA	MY5365004	2020/09/19	2021/09/18
Test Control Unit	Tonscend	JS0806-1	178060067	2020/06/19	2021/06/18
Automated filter bank	Tonscend	JS0806-F	19F8060177	2020/06/19	2021/06/18
Radio Communication Tester	HP	8920A	116250	2020-09-20	2021-09-19
EMI Test Software	Tonscend	JS1120-1	Ver 2.6.8.0518	/	/
EMI Test Software	Tonscend	JS1120-3	Ver 2.5.77.0418	/	/
EMI Test Software	Tonscend	JS32-CE	Ver 2.5	/	/
EMI Test Software	Tonscend	JS32-RE	Ver 2.5.1.8	/	/

Note: The Cal.Interval was one year.

2.6 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended to comply with FCC Part 95 Rules.

2.7 Modifications

No modifications were implemented to meet testing criteria.

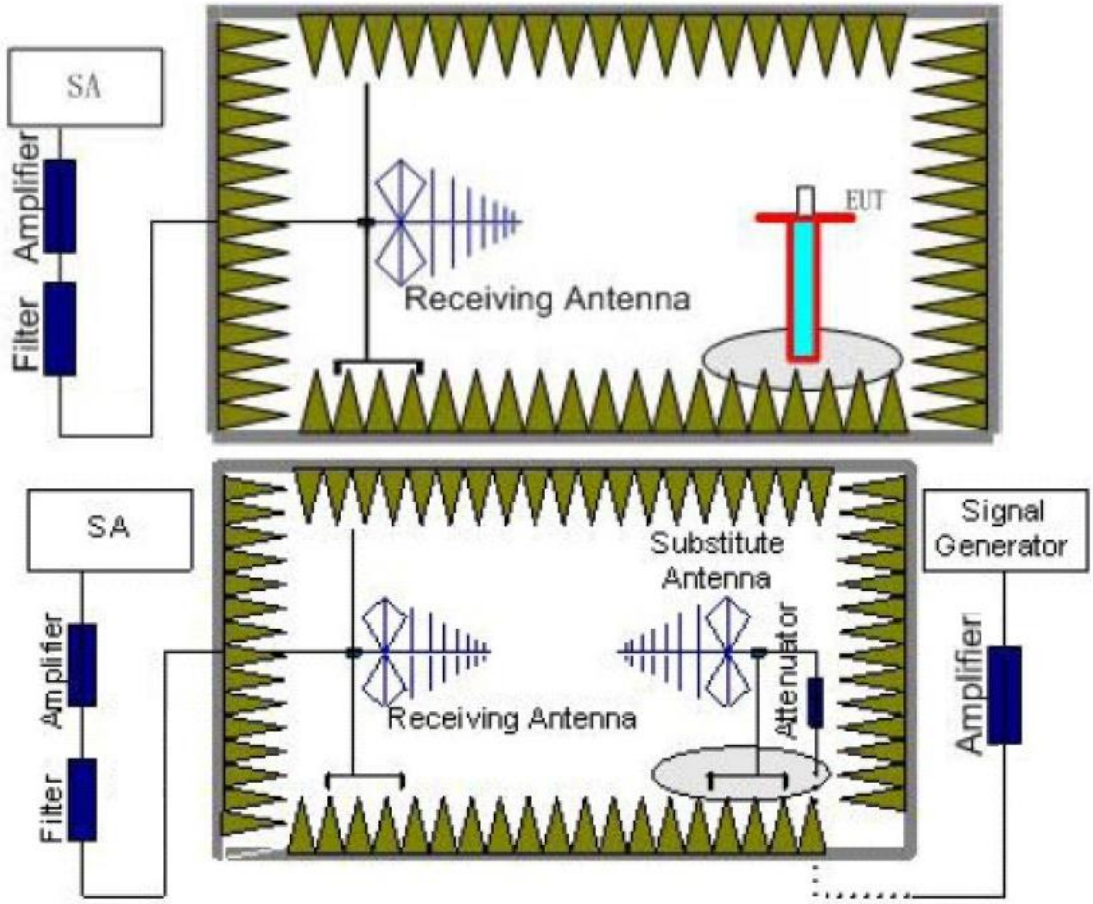
3 TEST CONDITIONS AND RESULTS

3.1 Maximum Transmitter Power

LIMITS

According to FCC Part 95.567:
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.

TEST CONFIGURATION



Measurement Procedure

1. EUT was placed on a 0.8 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 1.0m. 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 test transmit frequencies 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, 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. An amplifier may 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
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 RESULTS

Remark;
The field strength of radiation emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The data show in this report only with the worst case setup. After exploratory measurement the worst case of Z axis and receiver antenna at vertical polarization was reported.

Test Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dBi)	Correction (dB)	P_{Ag} (dB)	ERP (dBm)	ERP (W)	Limit (W)	Polarization
462.6375	-12.30	2.08	7.69	2.15	34.59	25.75	0.3758	2.0	V
467.6375	-12.40	2.13	7.75	2.15	34.62	25.69	0.3707	0.5	V
462.6500	-12.49	2.08	7.69	2.15	34.59	25.56	0.3597	2.0	V

Remark:

1. *EIRP=P_{Mea}(dBm) +P_{Ag}(dB) -P_{cl}(dB) +G_a(dBi)*
2. *ERP = EIRP – 2.15dBi as EIRP by subtracting the gain of the dipole.*

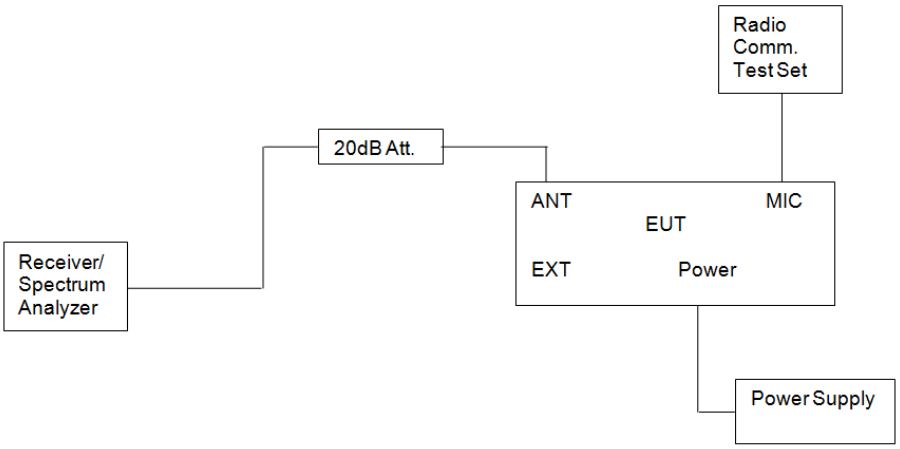
3.2 Occupied Bandwidth and Emission Mask

LIMITS

According to FCC 95.573:
Each FRS transmitter type must be designed such that the occupied bandwidth does not exceed 12.5 kHz.

According to FCC 95.579:
At least 25dB (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.
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.
At least 43 + 10 log10 (T) dB on any frequency removed from the center of the authorized bandwidth by more than 250 %.

TEST CONFIGURATION



TEST PROCEDURE

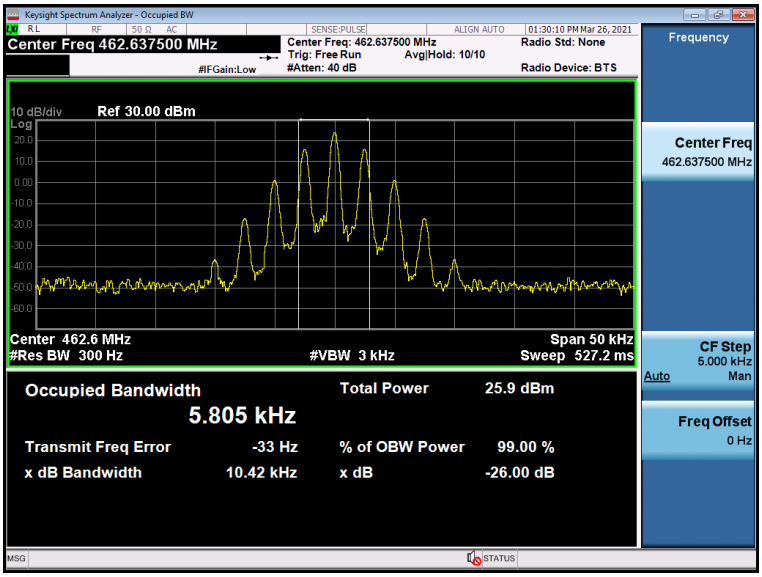
1 The EUT was modulated by 2.5 KHz Sine wave audio signal; the level of the audio signal employed is 16 dB greater than that necessary to produce 50% of rated system deviation. Rated system deviation is 2.5 kHz (12.5 kHz channel spacing) and 5 kHz (25 kHz channel spacing).
2 Set SPA Center Frequency = fundamental frequency, RBW=300Hz, VBW= 3 KHz, span =50 KHz.
3 Set SPA Max hold. Mark peak, Set 99% Occupied Bandwidth and 26dB Occupied Bandwidth.

TEST RESULTS

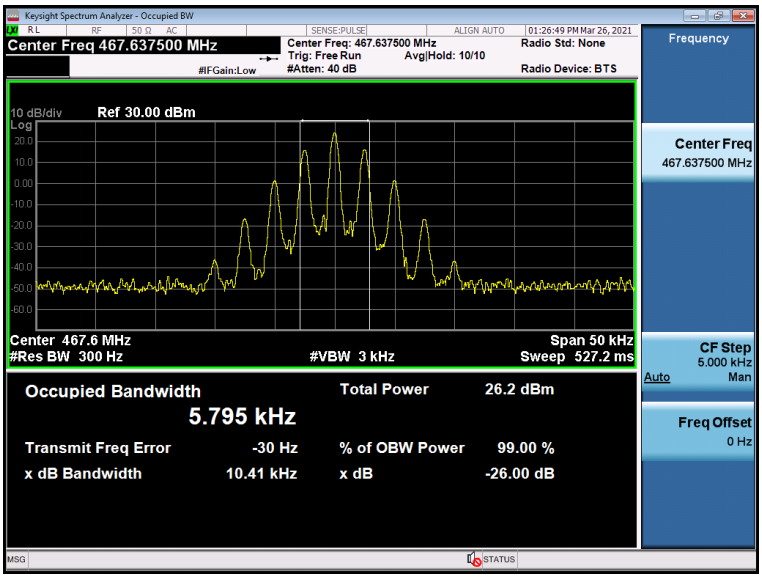
Occupied Bandwidth:

Modulation	Channel	26dB bandwidth (kHz)	Limit (KHz)	Result
FM	CH4	10.42	12.5	Pass
	CH11	10.41	12.5	Pass
	CH19	10.41	12.5	Pass

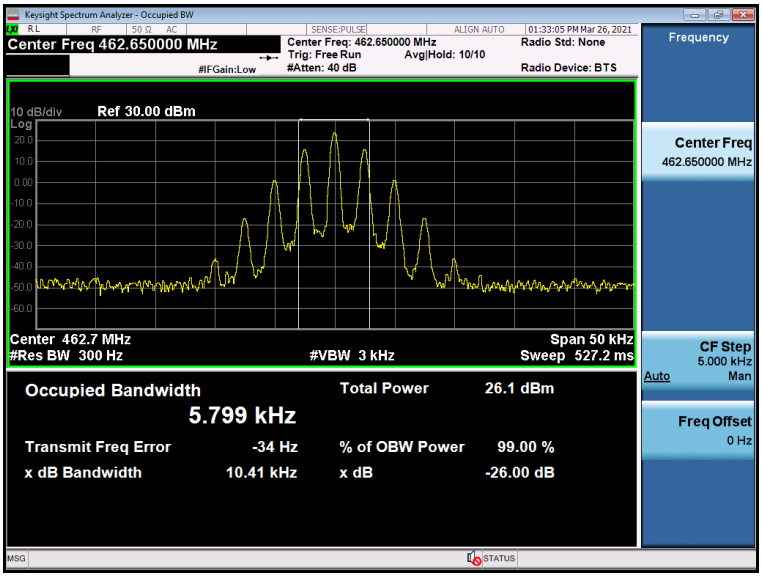
CH4



CH11

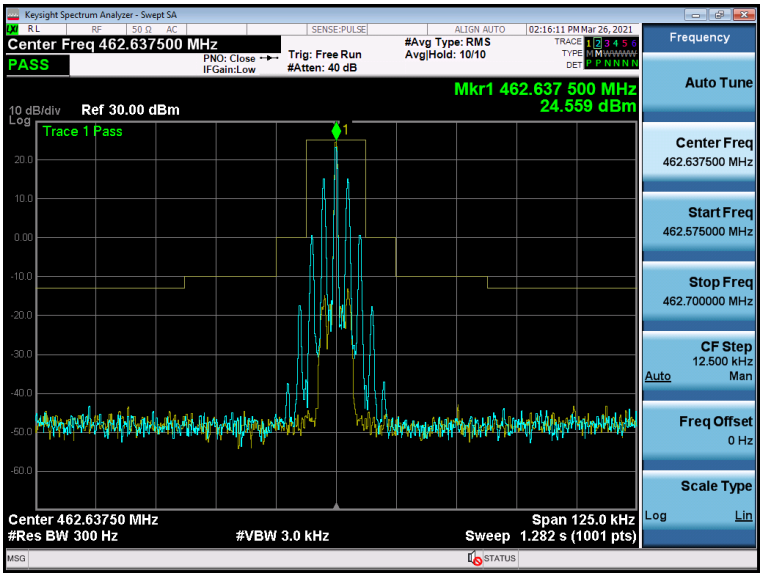


CH19

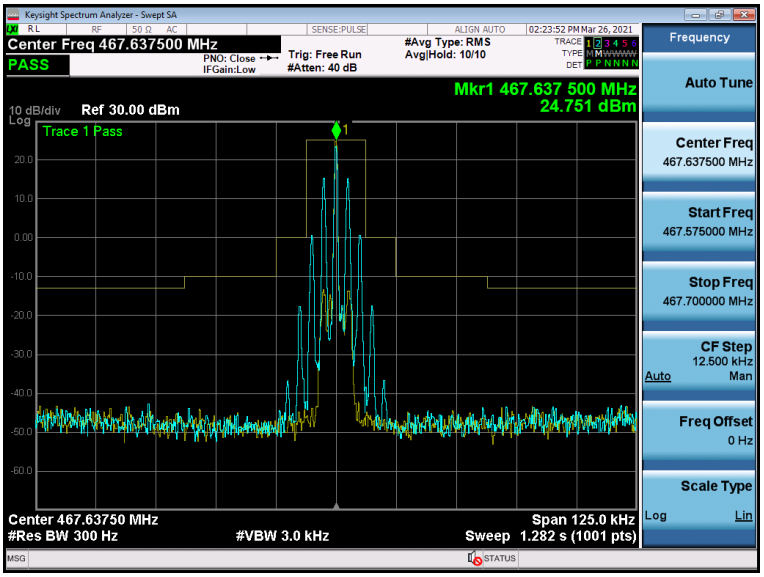


Emission Mask:

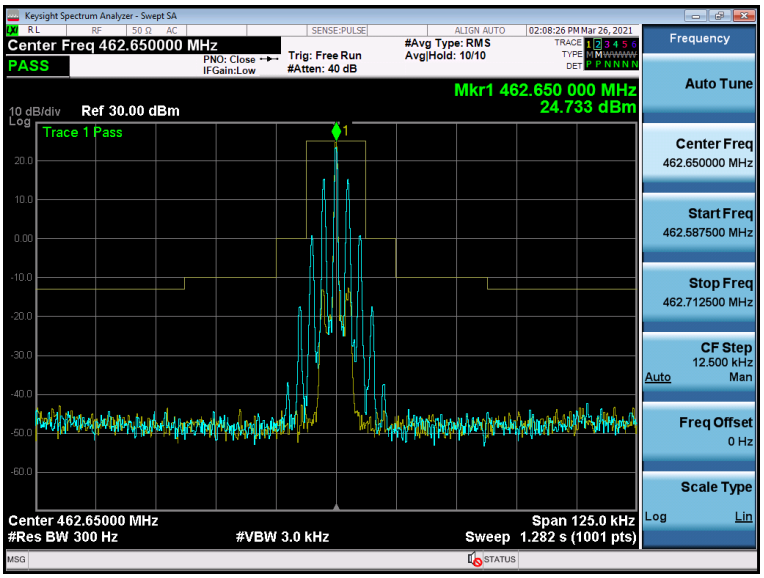
CH4



CH11


Keysight Spectrum Analyzer - Swept SA
Center Freq 467.637500 MHz
PASS
PNO: Close
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 10/10
02:23:52 PM Mar 26, 2021
Mkr1 467.637 500 MHz
24.751 dBm
10 dB/div
Ref 30.00 dBm
Log
Trace 1 Pass
Center 467.63750 MHz
#Res BW 300 Hz
#VBW 3.0 kHz
Span 125.0 kHz
Sweep 1.282 s (1001 pts)
Frequency
Auto Tune
Center Freq
467.637500 MHz
Start Freq
467.575000 MHz
Stop Freq
467.700000 MHz
CF Step
12.500 kHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

CH19


Keysight Spectrum Analyzer - Swept SA
Center Freq 462.650000 MHz
PASS
PNO: Close
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 10/10
02:08:26 PM Mar 26, 2021
Mkr1 462.650 000 MHz
24.733 dBm
10 dB/div
Ref 30.00 dBm
Log
Trace 1 Pass
Center 462.65000 MHz
#Res BW 300 Hz
#VBW 3.0 kHz
Span 125.0 kHz
Sweep 1.282 s (1001 pts)
Frequency
Auto Tune
Center Freq
462.650000 MHz
Start Freq
462.587500 MHz
Stop Freq
462.712500 MHz
CF Step
12.500 kHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

3.3 Modulation Limit

LIMITS

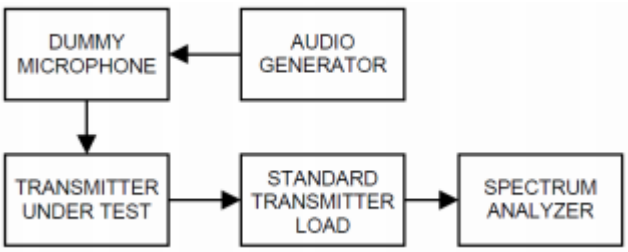
FCC Part 95.575, FCC Part 2.1047(b) Each FRS transmitter type must be designed such that the peak frequency deviation does not exceed 2.5 kHz, and the highest audio frequency contributing substantially to modulation must not exceed 3.125 kHz.

TEST PROCEDURE

Modulation Limit

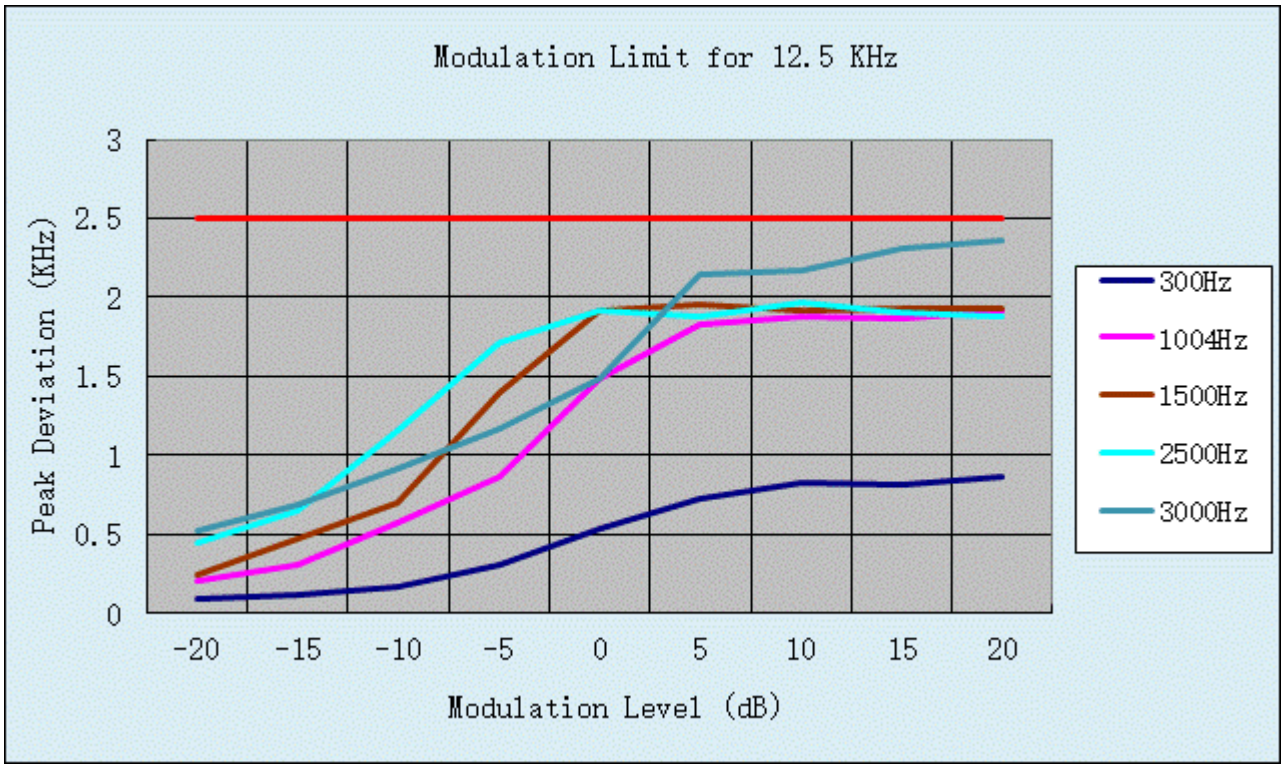
1) Connect the equipment as illustrated.
2) Adjust the transmitter per the manufacturer's procedure for full rated system deviation.
3) Set the test receiver to measure peak positive deviation. Set the audio bandwidth for ≤0.25 Hz to ≥15,000 Hz. Turn the de-emphasis function off.
4)Apply a 1000 Hz modulating signal to the transmitter from the audio frequency generator, and adjust the level to obtain 60% of full rated system deviation.
5) Apply Input Modulation Signal to EUT according to Section 3.4 and vary the input level from –20 to +20dB.
6) Measure both the instantaneous and steady-state deviation at and after the time of increasing the audio input level
7)With the level from the audio frequency generator held constant at the level obtained in step e), slowly vary the audio frequency from 300 Hz to 3000 Hz and observe the steady-state deviation. Record the maximum deviation.
8) Set the test receiver to measure peak negative deviation and repeat steps d) through g).
9) The values recorded in steps g) and h) are the modulation limiting.

TEST CONFIGURATION



TEST RESULTS

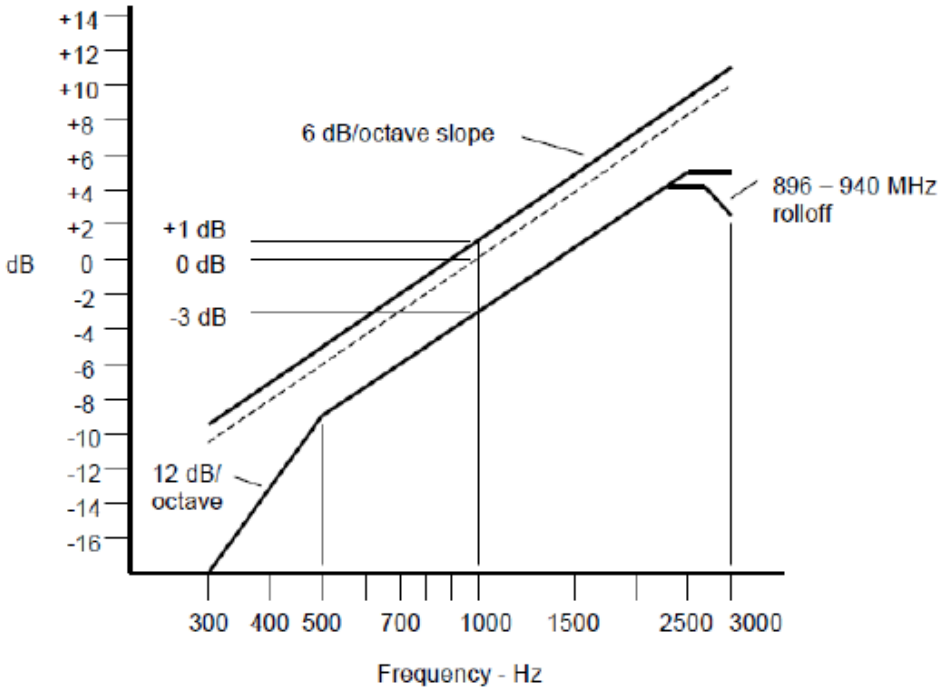
Modulation Level(dB)	Peak Freq. Deviation At 300 Hz(KHz)	Peak Freq. Deviation At 1004 Hz(KHz)	Peak Freq. Deviation At 1500 Hz(KHz)	Peak Freq. Deviation At 2500 Hz(KHz)	Peak Freq. Deviation At 3000 Hz(KHz)
-20	0.09	0.21	0.24	0.45	0.52
-15	0.12	0.30	0.47	0.65	0.69
-10	0.17	0.57	0.70	1.16	0.91
-5	0.30	0.86	1.39	1.71	1.17
0	0.54	1.48	1.91	1.91	1.49
+5	0.73	1.83	1.95	1.88	2.15
+10	0.82	1.88	1.91	1.97	2.17
+15	0.81	1.87	1.93	1.90	2.31
+20	0.86	1.92	1.93	1.88	2.36


Modulation Limit for 12.5 KHz
Peak Deviation (KHz)
3
2.5
2
1.5
1
0.5
0
-20
-15
-10
-5
0
5
10
15
20
Modulation Level (dB)
300Hz
1004Hz
1500Hz
2500Hz
3000Hz

3.4 Audio Frequency Response

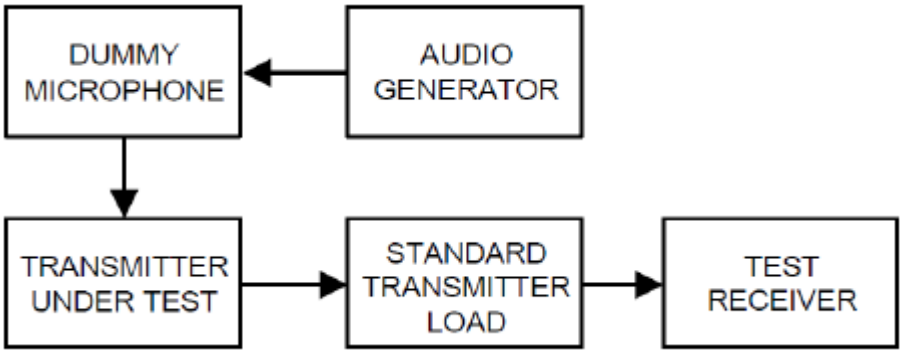
LIMIT

FCC Part 95.575),FCC Part 2.1047(a): 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. 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.



An additional 6 dB per octave attenuation is allowed from 2500 Hz to 3000 Hz in equipment operating in the 25 MHz to 869 MHz range.

TEST CONFIGURATION



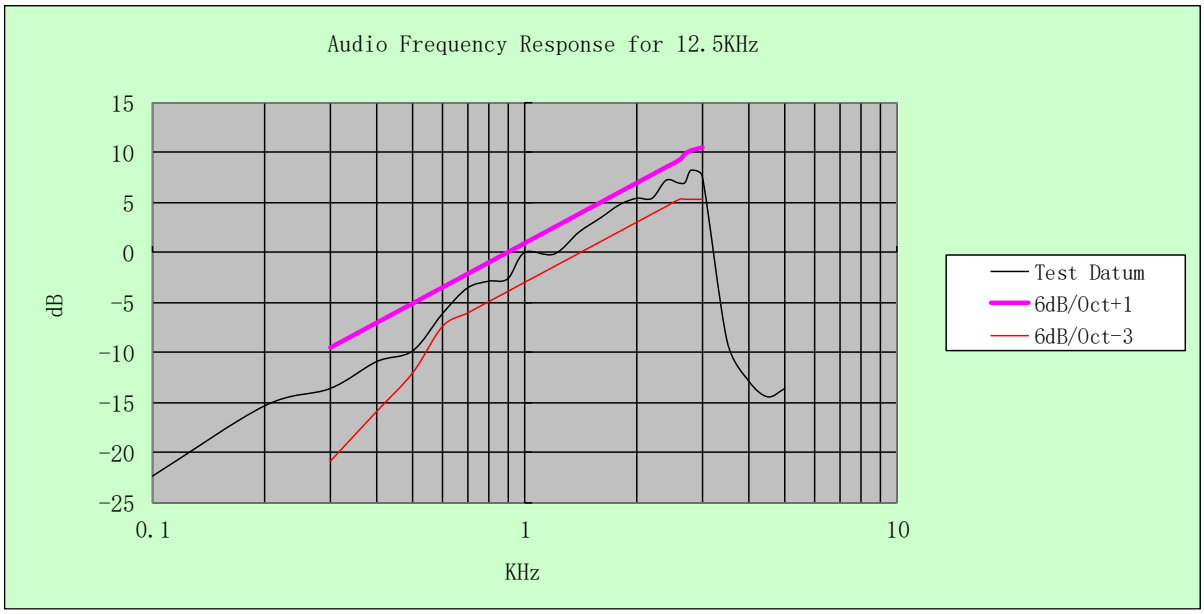
TEST PROCEDURE

1) Connect the equipment as illustrated.
2) Set the test receiver to measure peak positive deviation. Set the audio bandwidth for 50 Hz to 15,000 Hz. Turn the de-emphasis function off.
3) Set the DMM to measure rms voltage.
4) Adjust the transmitter per the manufacturer's procedure for full rated system deviation.
5) Apply Input Modulation Signal to EUT.
6) Set the test receiver to measure rms deviation and record the deviation reading.
7) Record the DMM reading as V_{REF} .
8) Set the audio frequency generator to the desired test frequency between 300 Hz and 3000 Hz.
9) Vary the audio frequency generator output level until the deviation reading that was recorded in

step 6) is obtained.
10) Record the DMM reading as V_{FREQ}
11) Calculate the audio frequency response at the present frequency as: audio frequency response=20log10 (V_{FREQ}/V_{REF}).
12) Repeat steps 8) through 11) for all the desired test frequencies

TEST RESULTS

Frequency (KHz)	Frequency Deviation (KHz)	1KHz Reference Deviation (KHz)	Audio Frequency Response (dB)
0.1	0.04	0.53	-22.44
0.2	0.09	0.53	-15.40
0.3	0.11	0.53	-13.66
0.4	0.15	0.53	-10.96
0.5	0.17	0.53	-9.88
0.6	0.26	0.53	-6.19
0.7	0.35	0.53	-3.60
0.8	0.38	0.53	-2.89
0.9	0.39	0.53	-2.66
1.0	0.53	0.53	0.00
1.2	0.52	0.53	-0.17
1.4	0.67	0.53	2.04
1.6	0.79	0.53	3.47
1.8	0.92	0.53	4.79
2.0	0.99	0.53	5.43
2.2	0.99	0.53	5.43
2.4	1.22	0.53	7.24
2.6	1.18	0.53	6.95
2.7	1.19	0.53	7.03
2.8	1.37	0.53	8.25
3.0	1.28	0.53	7.66
3.5	0.19	0.53	-8.91
4.0	0.12	0.53	-12.90
4.5	0.10	0.53	-14.49
5.0	0.11	0.53	-13.66



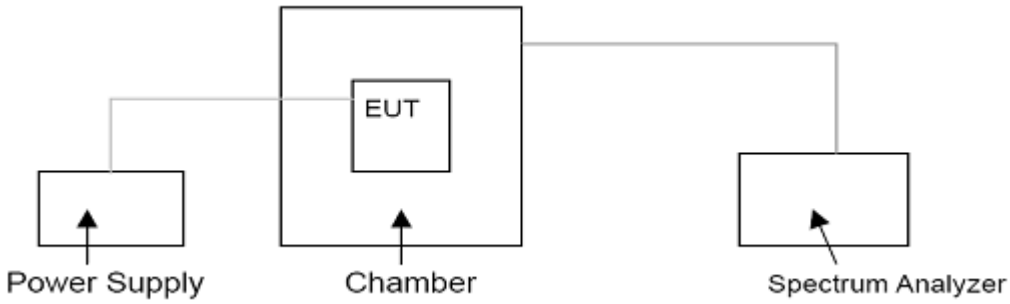
3.5 Frequency Stability

LIMITS

According to FCC 95.565

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.

TEST CONFIGURATION



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 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 RESULTS

Reference Frequency: 462.6375MHz					
Voltage (V)	Temperature (℃)	Frequency error (Hz)	Frequency Tolerance (ppm)	Limit (ppm)	Result
6.00	-30	9.52	0.021	±2.5	Pass
	-20	-34.32	-0.074		
	-10	48.24	0.104		
	0	-30.68	-0.066		
	10	18.27	0.039		
	20	17.69	0.038		
	30	31.97	0.069		
	40	-20.67	-0.045		
	50	-38.41	-0.083		
6.90	25	-6.92	-0.015		
5.10	25	-24.10	-0.052		

Reference Frequency: 467.6375MHz					
Voltage (V)	Temperature (℃)	Frequency error (Hz)	Frequency Tolerance (ppm)	Limit (ppm)	Result
6.00	-30	-4.22	-0.009	±2.5	Pass
	-20	-49.91	-0.107		
	-10	41.20	0.088		
	0	-42.40	-0.091		
	10	-1.87	-0.004		
	20	37.62	0.080		
	30	44.28	0.095		
	40	1.17	0.003		
	50	26.76	0.057		
6.90	25	-40.95	-0.088		
5.10	25	23.98	0.051		

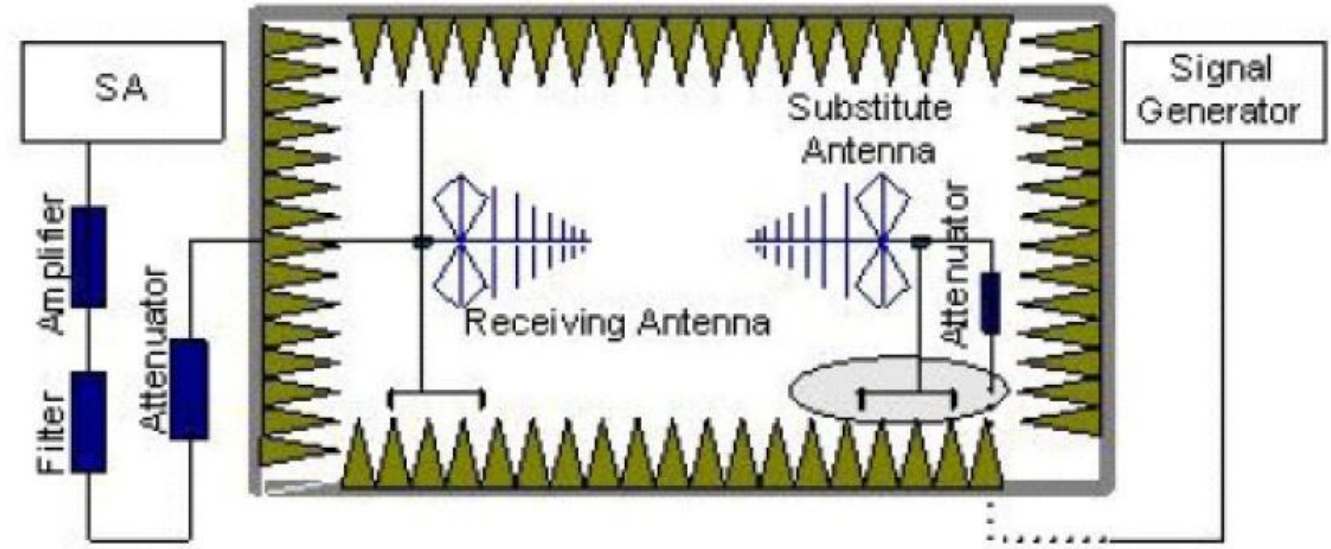
Reference Frequency: 462.6500MHz					
Voltage (V)	Temperature (℃)	Frequency error (Hz)	Frequency Tolerance (ppm)	Limit (ppm)	Result
6.00	-30	38.04	0.082	±2.5	Pass
	-20	-5.76	-0.012		
	-10	27.18	0.059		
	0	-19.96	-0.043		
	10	-47.38	-0.102		
	20	49.70	0.107		
	30	-42.24	-0.091		
	40	14.85	0.032		
	50	-6.24	-0.013		
6.90	25	32.30	0.070		
5.10	25	12.81	0.028		

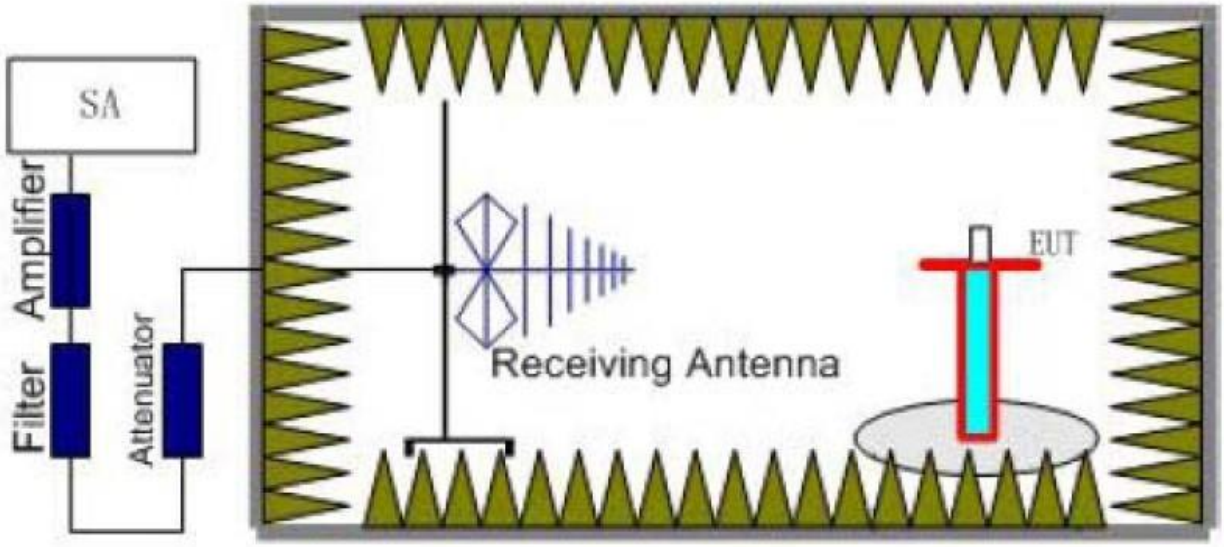
3.6 Transmitter Radiated Spurious Emission

Limit

The unwanted emission should be attenuated below TP by at least 43+10log(Transmit Power) dB and unwanted emissions falling within the restricted bands of RSS-Gen shall be attenuated to the limits provided in this section or to the general field strength limits shown in RSS-Gen, whichever are less stringent.

TEST CONFIGURATION





TEST PROCEDURE

a. EUT was placed on a 0.8 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 1.0m. 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 test transmit frequencies were measured with peak detector.
b. 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.
c. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum 100 kHz below 1GHz and 1MHz above 1GHz, Sweep from 30MHz to the 10th harmonic of the fundamental frequency; and recorded the level of the concerned spurious emission point as (P_r).
d. The EUT then 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.
   The measurement results are obtained as described below:

$$\text{Power}_{(EIRP)} = P_{Mea} - P_{cl} + G_a$$

   Where;
   P_{Mea} is the recorded signal generator level
   P_{cl} is the cable loss connect between instruments
   G_a Substitution Antenna Gain
e. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
f. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.
g. Test site anechoic chamber refer to ANSI C63.

TEST RESULTS

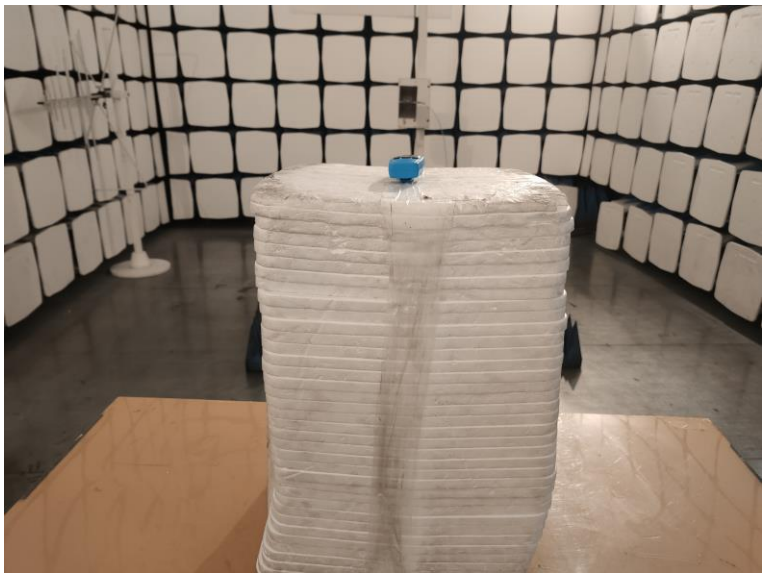
Remark: The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency; and worst spurious emissions recorded as below:

Test Frequency (MHz)	Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Distance (m)	G_a Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Pol.
462.6375	925.25	-32.02	3.54	3.00	12.87	-22.69	-13.00	9.69	V
	1387.75	-36.95	4.21	3.00	15.48	-25.68	-13.00	12.68	V
	1850.50	-28.48	4.52	3.00	17.32	-15.68	-13.00	2.68	V
	2313.25	-28.81	5.24	3.00	18.76	-15.29	-13.00	2.29	V
	--	--	--	--	--	--	--	--	--
467.6375	935.28	-30.78	3.57	3.00	12.90	-21.45	-13.00	8.45	V
	1042.91	-34.63	4.25	3.00	15.53	-23.35	-13.00	10.35	V
	1870.55	-32.56	4.60	3.00	17.46	-19.70	-13.00	6.70	V
	2338.20	-34.20	5.37	3.00	18.92	-20.65	-13.00	7.65	V
	--	--	--	--	--	--	--	--	--
462.6500	925.10	-31.39	3.54	3.00	12.87	-22.06	-13.00	9.06	V
	1387.70	-35.85	4.21	3.00	15.48	-24.58	-13.00	11.58	V
	1850.25	-32.74	4.52	3.00	17.32	-19.94	-13.00	6.94	V
	2313.50	-36.02	5.24	3.00	18.76	-22.50	-13.00	9.50	V
	--	--	--	--	--	--	--	--	--

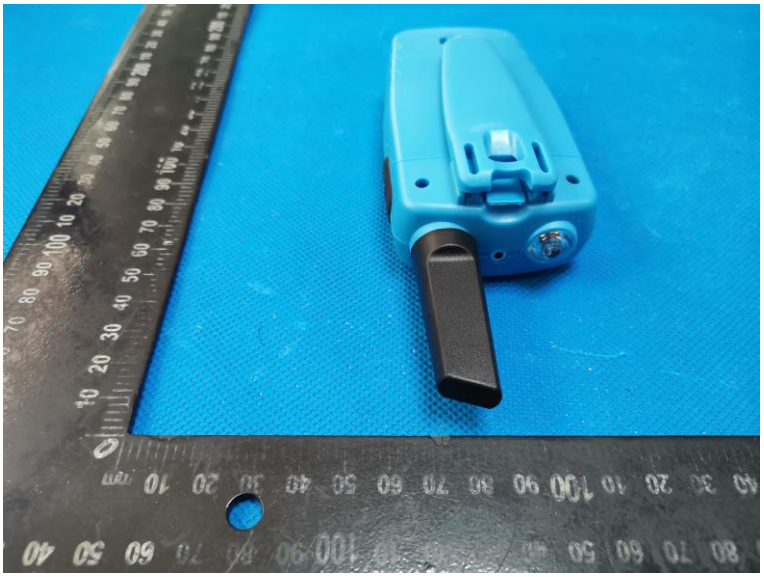
Remark:

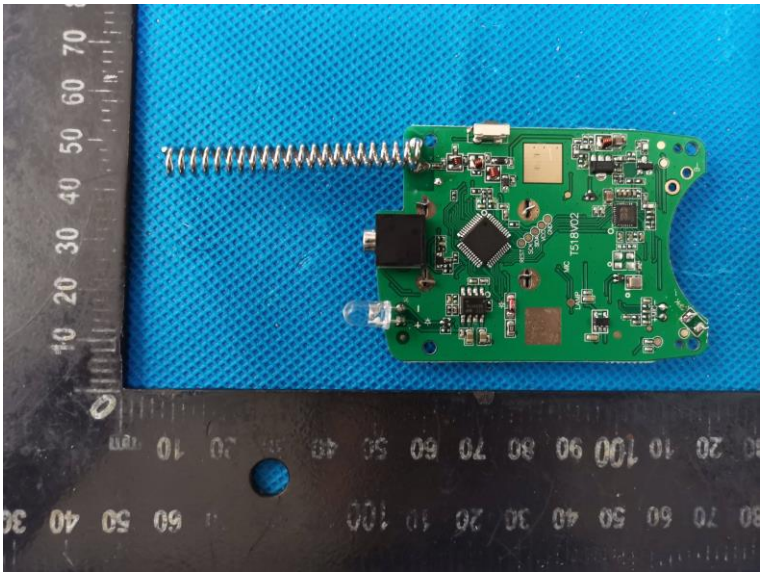
1. *EIRP=P_{Mea}(dBm)-P_{cl}(dB) +G_a(dBi)*
2. *-- Means other points for values lower than limits and not recorded.*
3. *Margin = Limit – EIRP*

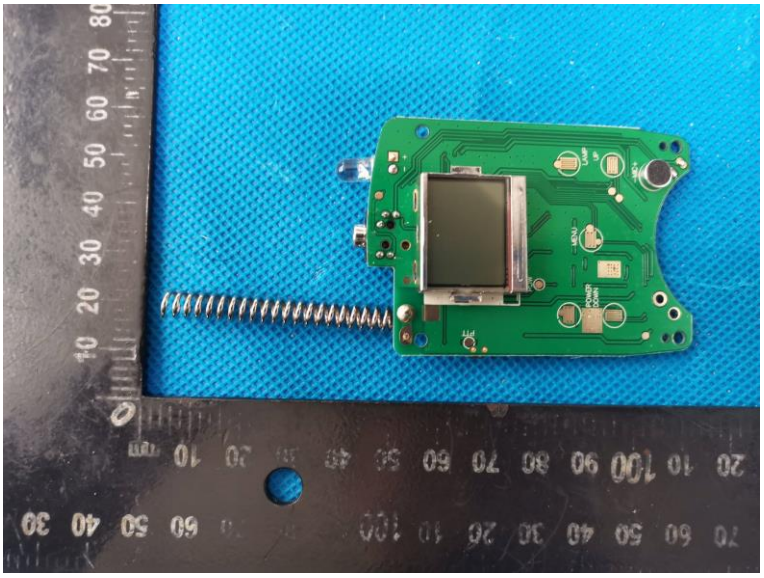
4 Test Setup Photos of the EUT



5 External and Internal Photos of the EUT







********** End of Report **********