FCC PART 95

TEST REPORT

For

Shenzhen Haiguoda Technology Co., Ltd.

3/F, Building 5, Longbi Industrial Zone Bantian, Longgang District, Shenzhen,Guangdong, China

FCC ID: 2BPRC-E22

Report Type:	**Product Name:**
Original Report	Walkie Talkie

Report Number:	2407Z62682E-RF-01
Report Date:	2024-11-25
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REPORT REVISION HISTORY

Number of Revisions	Report No.	Version	Issue Date	Description
0	2407Z62682E-RF-01	R1V1	2024-11-25	Initial Release

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant:	Shenzhen Haiguoda Technology Co., Ltd.
Product Name:	Walkie Talkie
Tested Model:	E22
Multiple Model(s):	E23, E33, E560
Power Supply:	DC 3.7V from Battery or DC 5V from Adapter
Maximum Output Power (ERP):	462.5500-462.7250MHz: 32.18dBm 467.5625-467.7125MHz: 26.08dBm
Operation Frequency:	462.5500-462.7250MHz 467.5625-467.7125MHz
Modulation Mode:	FM
Channel Spacing:	12.5kHz
Emission Designator:	11K0F3E
EUT Received Status:	Good
Note: *1. The Multiple models is identify with the Tested model except for the model name and color, please refer to declaration letter for more detail.* *2. All measurement and test data in this report was gathered from production sample serial number: 2U3U-1 (Assigned by the BACL (Xiamen). The EUT supplied by the applicant was received on 2024-11-06).*	

★Antenna Information

Antenna Manufacturer	Antenna Type	Antenna Connector	Input Impedance (Ohm)	Antenna Gain /Frequency Range
Shenzhen Haiguoda Technology Co., Ltd.	Spring	Integral	50	1.8 dBi (-0.35dBd) / 400-480MHz
Note: The Antenna information is provided by applicant.				

Objective

This test report is prepared for *Shenzhen Haiguoda Technology Co., Ltd.* in accordance with Part 2 and Part 95, Subpart B of the Federal Communication Commissions rules.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with Part 95 Subpart B of the Federal Communication Commissions rules with ANSI C63.26:2015, American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services.

Measurement Uncertainty

Item		U_{lab}
Unwanted Emissions, radiated	9kHz-30MHz	2.59dB
	30MHz~200MHz	4.38dB
	200MHz~1GHz	4.50dB
	1GHz~6GHz	4.58dB
Occupied Channel Bandwidth		0.053kHz
RF output power, conducted		0.624 dB
Unwanted Emissions, conducted		2.52 dB
Radiated Spurious power		3.7 dB
Duty Cycle		1%
Frequency Error(RF Frequency)		0.082×10^{6}
Audio Frequency		3.96%
Modulation Limiting		1.01%
Temperature		1.0℃
Humidity		5%
DC and low frequency voltages		0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Xiamen) to collect test data is located on Unit 102, No. 902 Meifeng South Road, Binhai West Avenue, Science and Technology Innovation Park, Torch High tech Zone XiaMen.

Bay Area Compliance Laboratories Corp. (Xiamen) Lab is accredited to ISO/IEC 17025 by A2LA (Certificate Number: 7134.01) and the lab has been recognized as the FCC accredited lab under the KDB 974614 D01, the FCC Designation No. : CN1384.

SYSTEM TEST CONFIGURATION

Test Mode and Voltage

The system was configured for testing in a typical mode (as normally used by a typical user).	
Test mode:	Transmitting
Test voltage:	DC 3.7V from Battery

Description of Test Configuration

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

Test channel list as below, EUT was tested with channel 4 and 11.

Channel Number	Frequency (MHz)	Channel Number	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

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

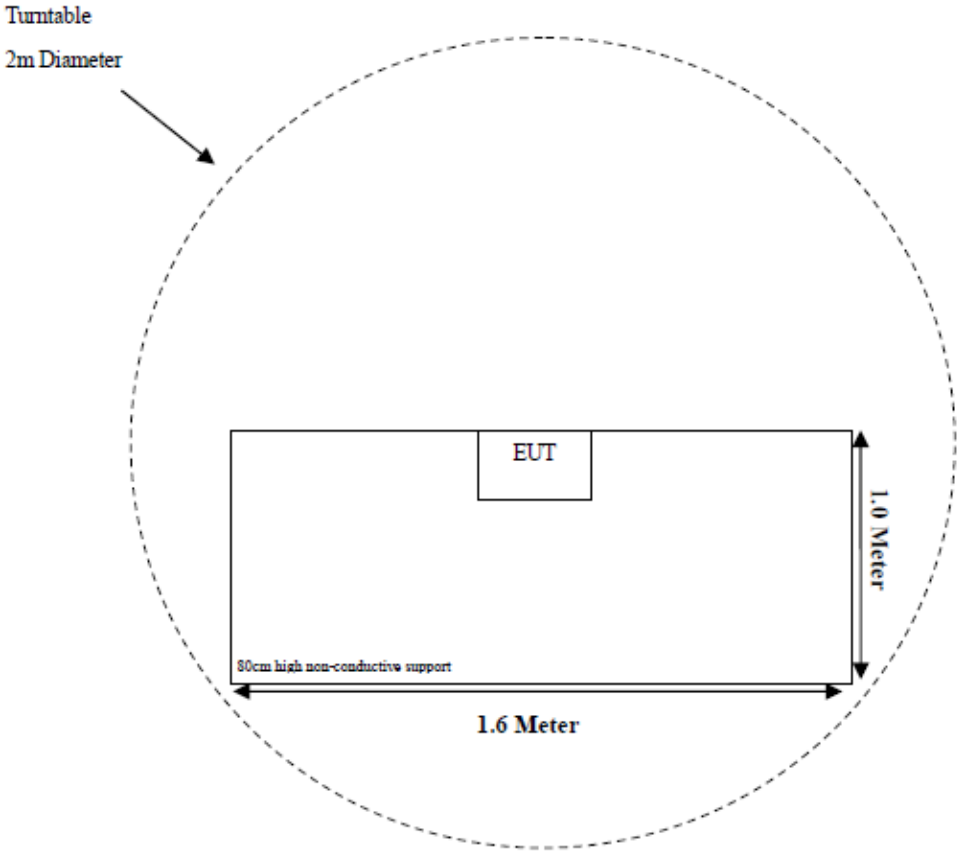
Manufacturer	Description	Model	Serial Number
/	/	/	/

External I/O Cable

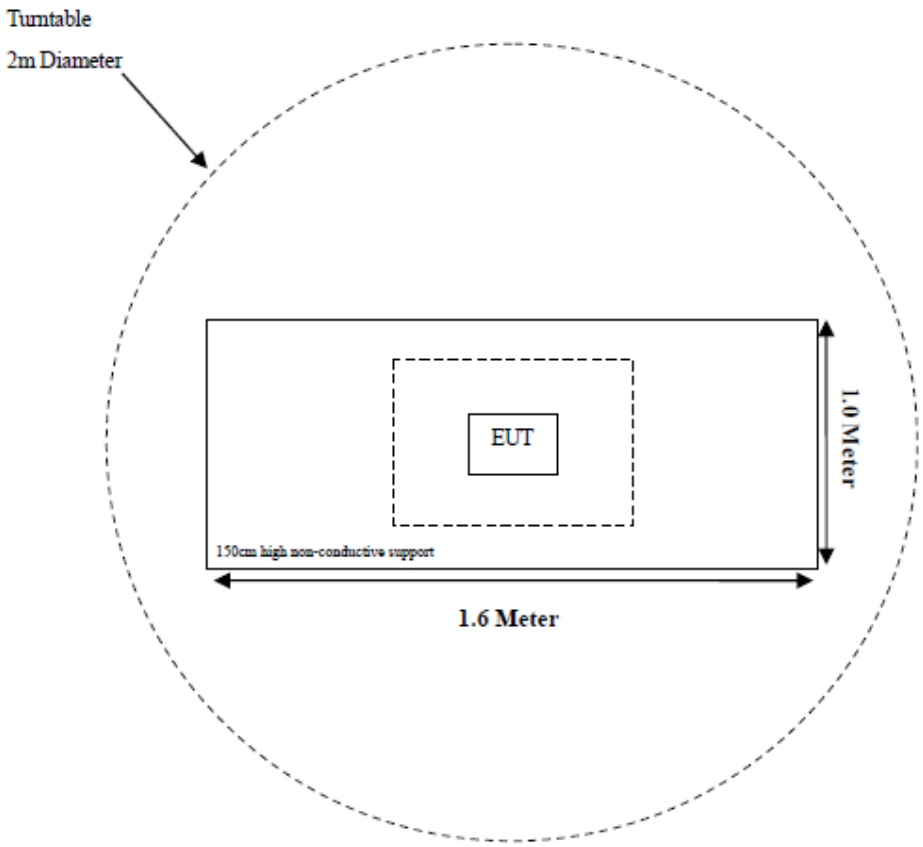
Cable Description	Length(m)	From Port	To
/	/	/	/

Block Diagram of Test Setup

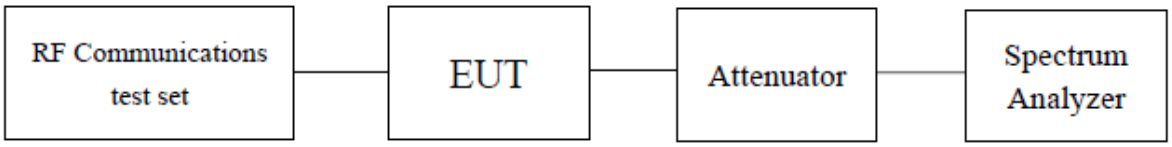
For Radiated Emissions(Below 1GHz):



For Radiated Emissions(Above 1GHz):



For RF Conducted:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§2.1046, §95.567	FRS Transmit Power	Compliant
§2.1047, §95.575	FRS Modulation Limits	Compliant
§2.1049, §95.573, §95.579	Authorized Bandwidth & Emission Mask	Compliant
§2.1053, §95.579	Radiated Spurious Emission	Compliant
§2.1055(d), §95.565	FRS Frequency Accuracy	Compliant
§95.587	FRS Additional Requirment	Compliant
§95.571	FRS Emission Types	Compliant

TEST EQUIPMENT LIST

Test Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emissions					
Hybrid Antenna	Sunol Sciences	JB6	A122022-5	2023/07/27	2026/07/26
Amplifier	Sonoma	310B	120903	2024/03/29	2025/03/28
EMI Test Receiver	Rohde & Schwarz	ESR	103103	2024/03/29	2025/03/28
Coaxial Cable	XINHANGWEIBO	XH400T-N-4M	CC002	2024/03/29	2025/03/28
Coaxial Cable	XINHANGWEIBO	XH460B-N-2M	CC006	2024/03/29	2025/03/28
Coaxial Cable	XINHANGWEIBO	XH460B-N-12M	CC007	2024/03/29	2025/03/28
Spectrum Analyzer	Rohde & Schwarz	FSU	100405	2024/03/29	2025/03/28
Double Ridge Guide Horn Antenna	A.H.Systems	SAS-571	1980	2023/07/28	2026/07/27
Preamplifier	A.H.Systems	PAM-0118P	489	2024/03/29	2025/03/28
Coaxial Cable	XINHANGWEIBO	XH800A-N-6M	CC003	2024/03/29	2025/03/28
Coaxial Cable	XINHANGWEIBO	XH800A-N-1M	CC005	2024/03/29	2025/03/28
Dipole Antenna	COM-POWER	3121C	9209-860	N/A	N/A
Double Ridge Guide Horn Antenna	A.R.A	DRG-118/A	1057	2023/07/28	2026/07/27
Microwave Analog Signal Generator	Agilent	N5181A	MY48180319	2024/03/29	2025/03/28
Band Elimination Filter	HX Microwave	HXLBQ-DZA266LC	24031602-2	2024/03/29	2025/03/28
RF Conducted Test					
Spectrum Analyzer	Rohde & Schwarz	FSU	100405	2024/03/29	2025/03/28
Coaxial Cable	WEIHE	WH316	RFCC002	Each time	Each time
Attenuator	Electronic Corporation	300-WA-FFN-30	1172435	2024/03/29	2025/03/28
DC Power Supply	MAISHENG	MS-606DS	1027453694	N/A	N/A
Multimeter	deli	DL8490	23930192	2024/03/29	2025/03/28
RF Communications test set	HP	8920A	3524A07202	2024/04/26	2025/04/25
constant temperature and humidity testing machine	BACL	BTH-150	30211	2024/03/29	2025/03/28

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

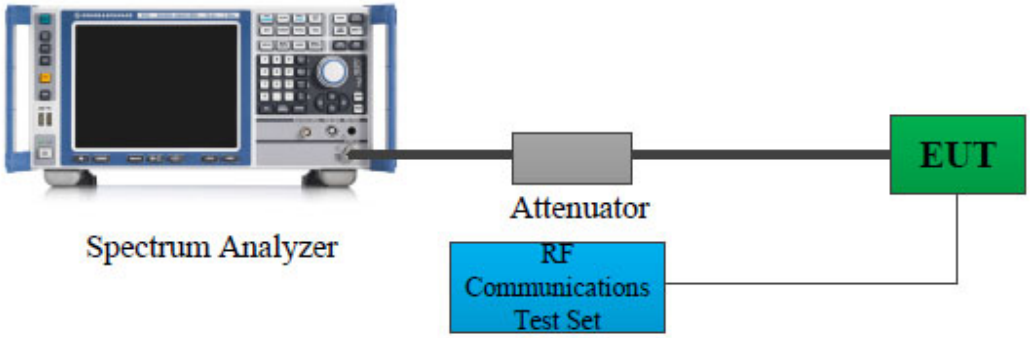
FCC §2.1046, §95.567 – FRS TRANSMIT POWER

Applicable Standard

Acorrding to FCC §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.

EUT Setup Block Diagram



Note:The Insertion Loss of the RF cable, Attenuators was offset into the Spectrum Analyzer.

Test Procedure

C63.26-2015, Clause 5.2.3.3

This procedure can be used to measure the peak power in either a CW-like or noise-like narrowband RF signal. The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW ≥ 3 × RBW.
a) Set the RBW ≥ OBW.
b) Set VBW ≥ 3 × RBW.
c) Set span ≥ 2 × OBW.
d) Sweep time ≥ 10 × (number of points in sweep) × (transmission symbol period).
e) Detector = peak.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use the peak marker function to determine the peak amplitude level

ERP=Conducted Output Power+ Antenna Gain (dBd)

Test Data

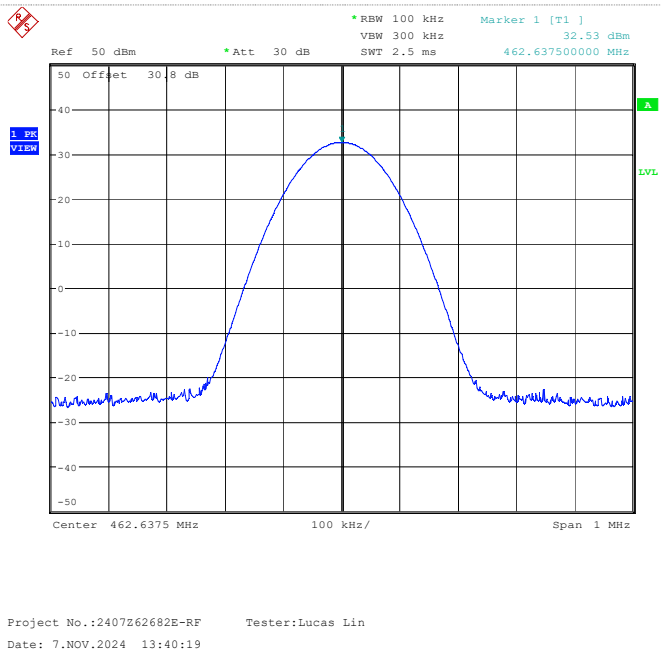
Test Mode:	Transmitting	Test Engineer:	Lucas Lin
Test Date:	2024-11-07	Test Result:	Pass

Environment Conditions:					
Temperature: (℃)	24.4	Relative Humidity: (%)	44	ATM Pressure: (kPa)	100.1

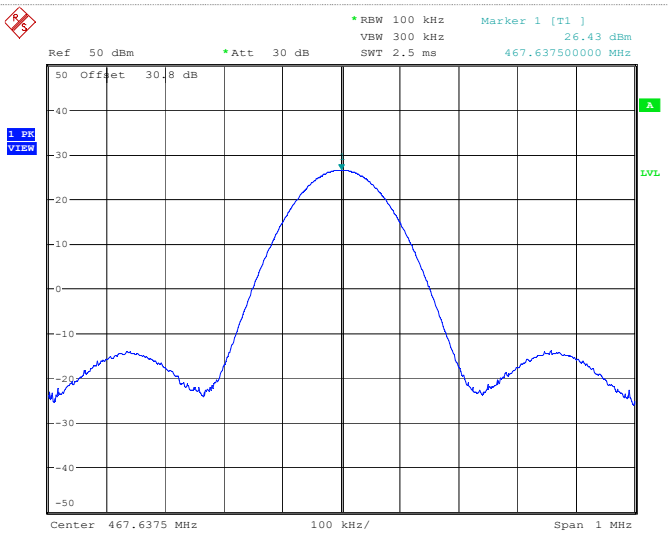
Please refer to below plots:

Test Frequency (MHz)	Conducted Output power (dBm)	Antenna Gain (dBd)	ERP (dBm)	ERP Limit (dBm)
462.6375	32.53	-0.35	32.18	⩽33
467.6375	26.43	-0.35	26.08	⩽27

462.6375MHz



467.6375MHz



Project No.:2407Z62682E-RF Tester:Lucas Lin

Date: 7.NOV.2024 13:41:59

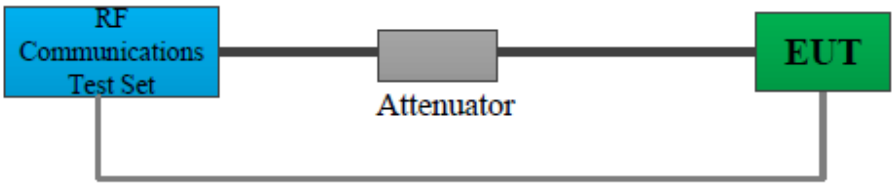
FCC §2.1047, §95.575 – FRS MODULATION LIMITS

Applicable Standard

Per FCC §2.1047 and §95.575:

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 Setup Block Diagram



Modulation limiting Test and Audio frequency response Test

Test Procedure

C63.26-2015, Clause 5.3.2 Modulation limiting test methodology

Modulation limiting is the ability of a transmitter circuit to limit the transmitter from producing deviations in excess of a rated system deviation.

a) Connect the equipment as illustrated in Figure 1.
b) Adjust the transmitter per the manufacturer's procedure for full rated system deviation.
c) Set the test receiver to measure peak positive deviation. Set the audio bandwidth for ≤0.25 Hz to ≥ 15000Hz. Turn the de-emphasis function off.
d) 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. This is the 0 dB reference level.
e) Increase the level from the audio generator by 20 dB in 5 dB increments recording the deviation as measured from the test receiver in each step. Verify that the audio level used to make the OBW measurement is included in the sweep.
f) Repeat for step e) at 300 Hz, 2500 Hz and 3000 Hz at a minimum using the 0 dB reference level obtained in step d).
g) Set the test receiver to measure peak negative deviation and repeat step d) through step f).
h) The values recorded in step f) and step g) are the modulation limiting.
i) Plot the data set as a percentage of deviation relative to the 0 dB reference point versus input voltage.

C63.26-2015, Clause 5.3.3.2 Audio frequency response test methodology—Constant Input

a) Connect the equipment as illustrated in Figure 3.
b) Set the test receiver to measure peak positive deviation. Set the audio bandwidth for ≤50 Hz to ≥ 15000Hz. Turn the de-emphasis function off.

c) Adjust the transmitter per the manufacturer's procedure for full rated system deviation.
d) Apply a 1000 Hz tone and adjust the audio frequency generator to produce 20% of the rated system deviation.
e) Set the test receiver to measure rms deviation and record the deviation reading as DEVREF.
f) Set the audio frequency generator to the desired test frequency between 300 Hz and 3000 Hz.

Test Data

Test Mode:	Transmitting	**Test Engineer:**	Lucas Lin
Test Date:	2024-11-07	**Test Result:**	Pass

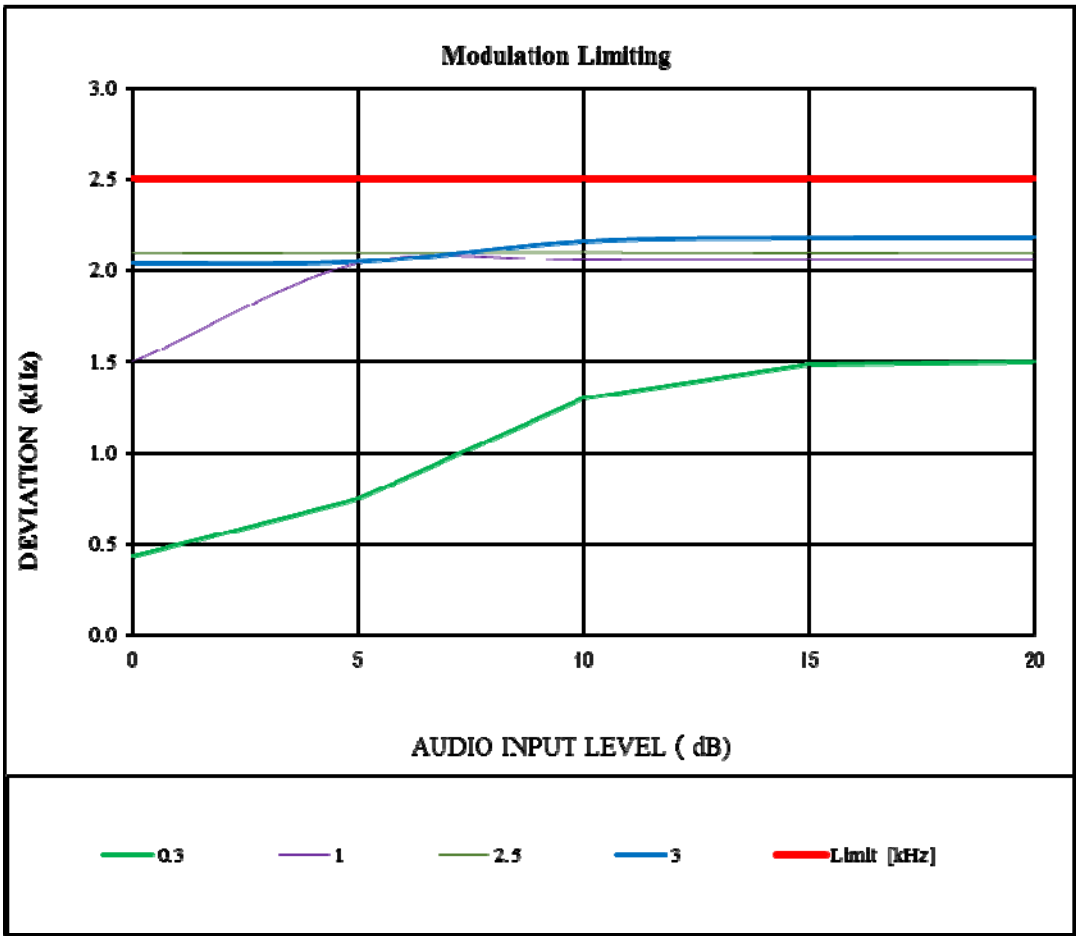
Enviroment Conditions:					
Temperature: (℃)	24.4	Relative Humidity: (%)	44	ATM Pressure: (kPa)	100.1

Please refer to below table:

Modulation Limiting

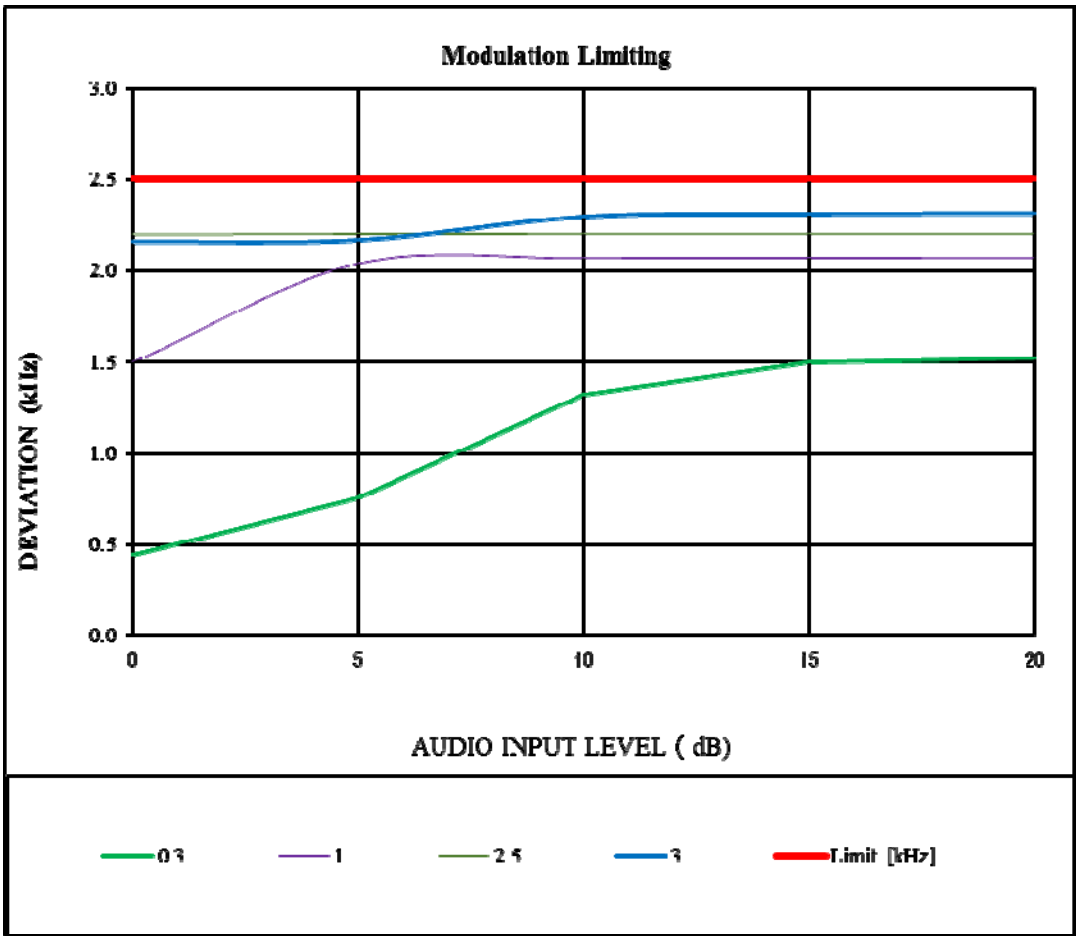
PK+

FM 12.5kHz	Carrier Frequency: 462.6375MHz				
Audio Input Level（dB)	Deviation (kHz)				Limit (kHz)
	0.3	1.0	2.5	3.0	
20	1.496	2.061	2.103	2.183	2.5
15	1.482	2.062	2.101	2.181	2.5
10	1.303	2.060	2.104	2.162	2.5
5	0.747	2.040	2.103	2.049	2.5
0	0.436	1.500	2.099	2.039	2.5



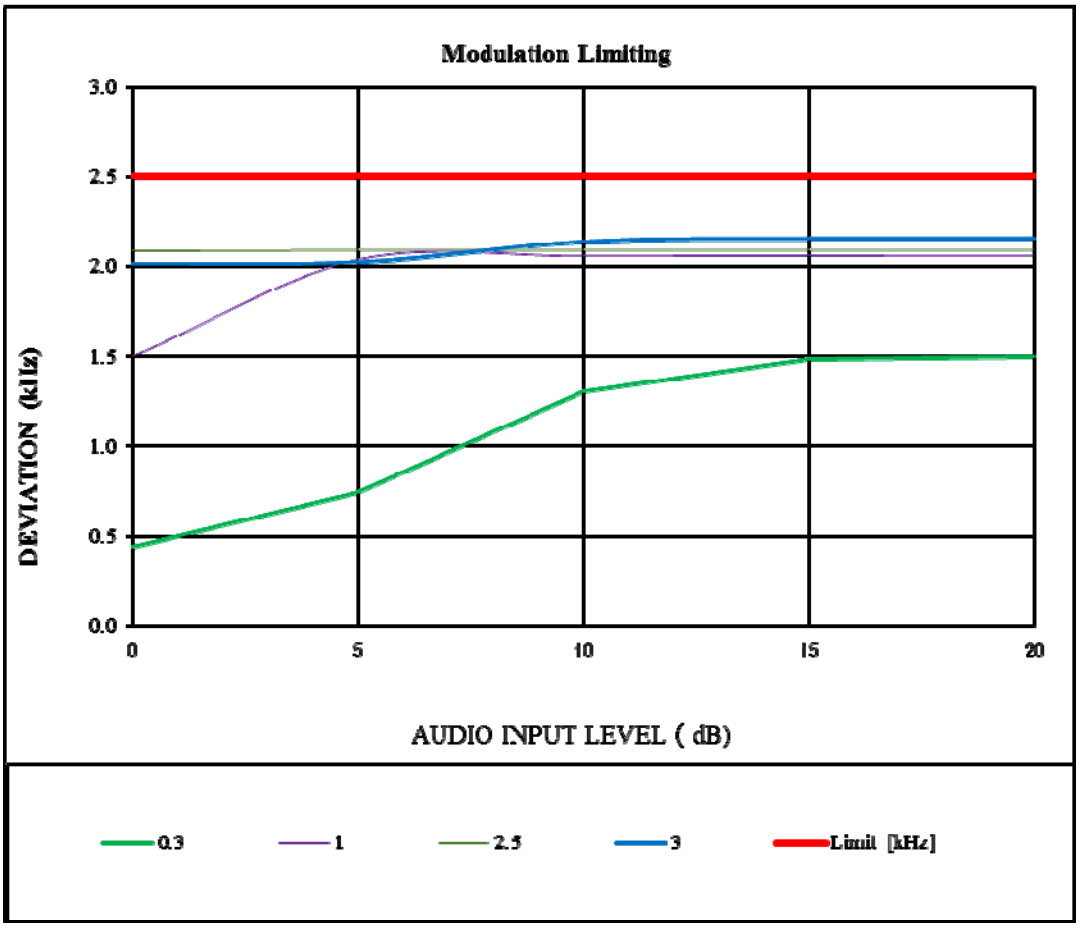
PK-

FM 12.5kHz	Carrier Frequency: 462.6375MHz				
Audio Input Level（dB)	Deviation (kHz)				Limit (kHz)
	0.3	1.0	2.5	3.0	
20	1.518	2.072	2.202	2.316	2.5
15	1.499	2.073	2.201	2.313	2.5
10	1.319	2.071	2.202	2.298	2.5
5	0.755	2.042	2.203	2.168	2.5
0	0.442	1.500	2.199	2.159	2.5



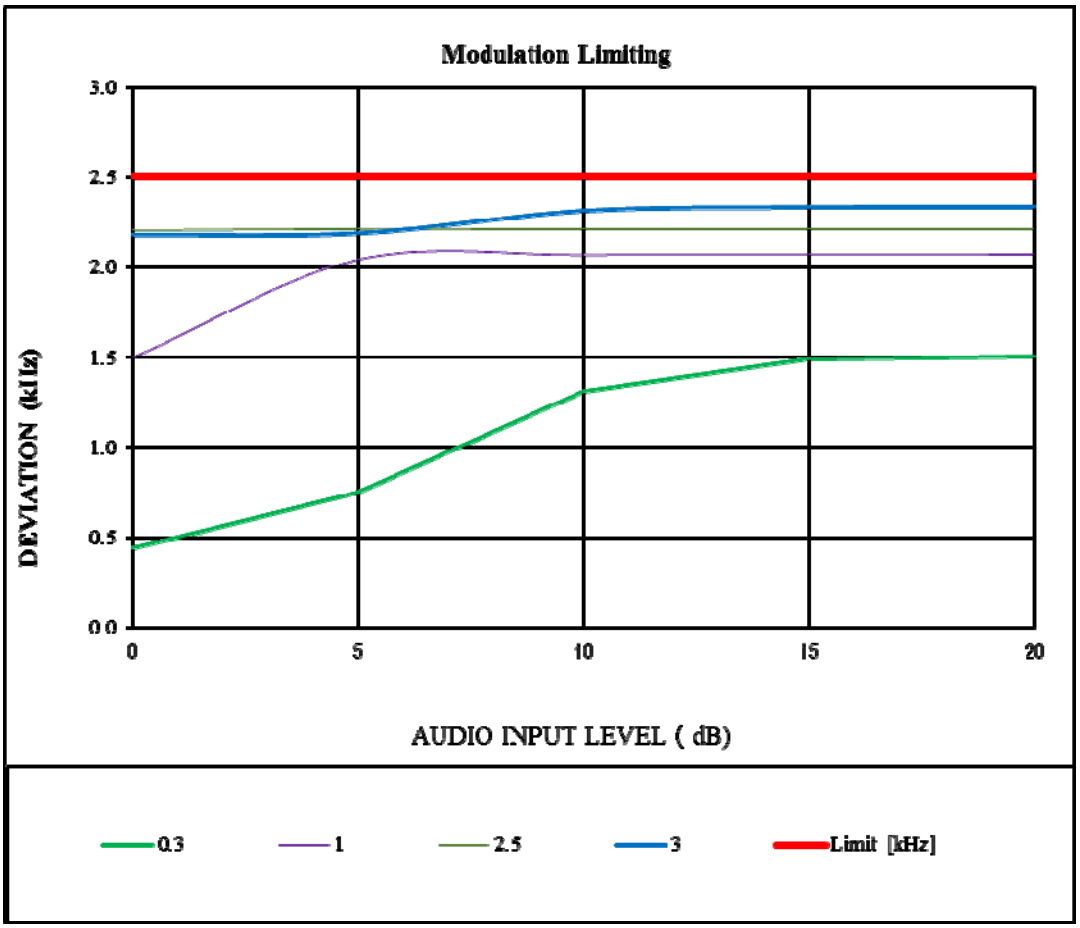
PK+

FM 12.5kHz	Carrier Frequency: 467.6375MHz				
Audio Input Level（dB)	Deviation (kHz)				Limit (kHz)
	0.3	1.0	2.5	3.0	
20	1.499	2.059	2.091	2.156	2.5
15	1.486	2.060	2.091	2.155	2.5
10	1.303	2.058	2.092	2.138	2.5
5	0.746	2.039	2.092	2.023	2.5
0	0.436	1.500	2.088	2.013	2.5



PK-

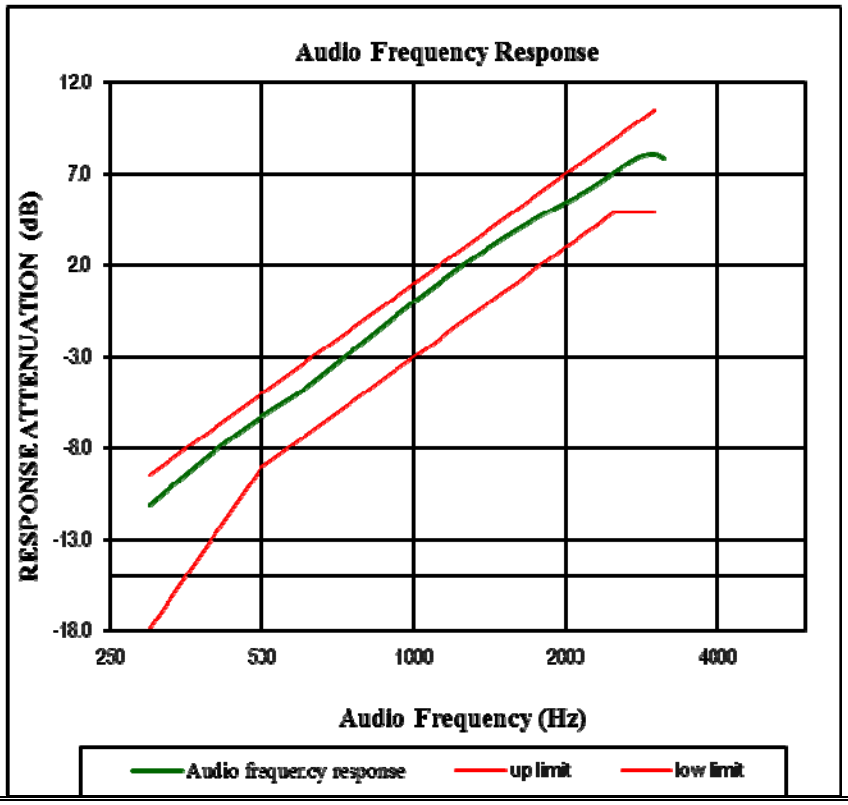
FM 12.5kHz	Carrier Frequency: 467.6375MHz				
Audio Input Level（dB)	Deviation (kHz)				Limit (kHz)
	0.3	1.0	2.5	3.0	
20	1.505	2.074	2.212	2.338	2.5
15	1.491	2.072	2.214	2.336	2.5
10	1.310	2.071	2.213	2.316	2.5
5	0.751	2.045	2.214	2.189	2.5
0	0.435	1.500	2.207	2.180	2.5



Audio Frequency Response

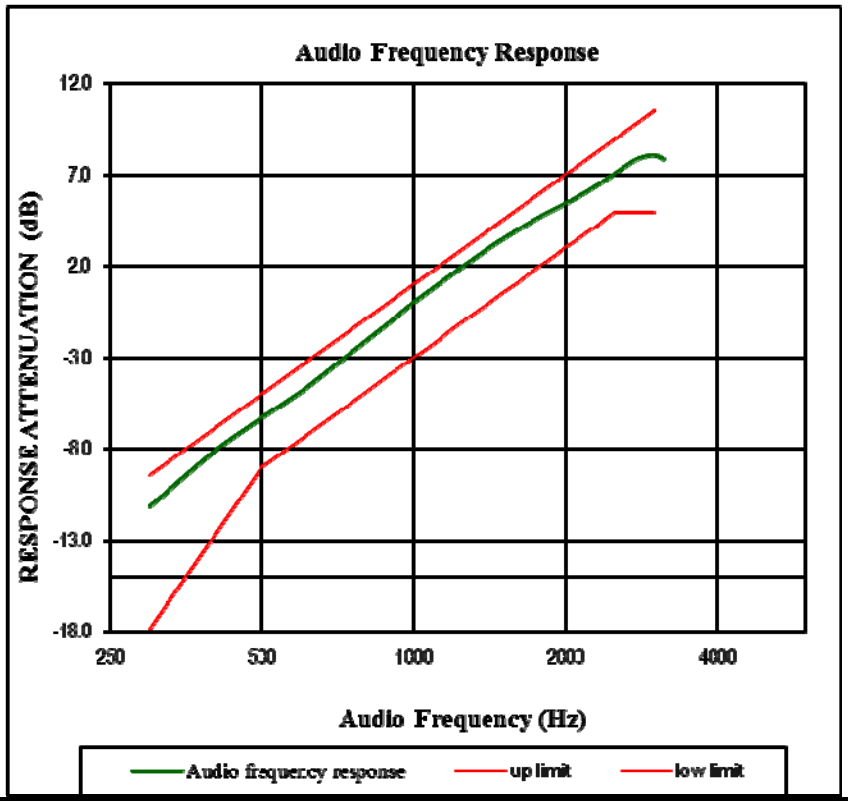
Carrier Frequency: 462.6375MHz

Audio Frequency	Response Attenuation
Hz	dB
300	-11.09
400	-8.21
500	-6.26
600	-4.84
700	-3.39
800	-2.12
900	-0.98
1000	0.00
1200	1.64
1400	2.94
1600	3.97
1800	4.78
2000	5.43
2200	6.06
2400	6.74
2600	7.41
2800	7.95
3000	8.11
3125	7.88



Carrier Frequency: 467.6375MHz

Audio Frequency	Response Attenuation
Hz	dB
300	-11.14
400	-8.19
500	-6.31
600	-4.85
700	-3.41
800	-2.14
900	-1.03
1000	0.00
1200	1.61
1400	2.93
1600	3.95
1800	4.77
2000	5.41
2200	6.05
2400	6.71
2600	7.37
2800	7.90
3000	8.06
3125	7.84



FCC §2.1049, §95.573, §95.579 - AUTHOURIZED BANDWIDTH AND EMISSION MASK

Applicable Standard

According to §95.573

Each FRS transmitter type must be designed such that the occupied bandwidth does not exceed 12.5 kHz.

According to §95.579

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.

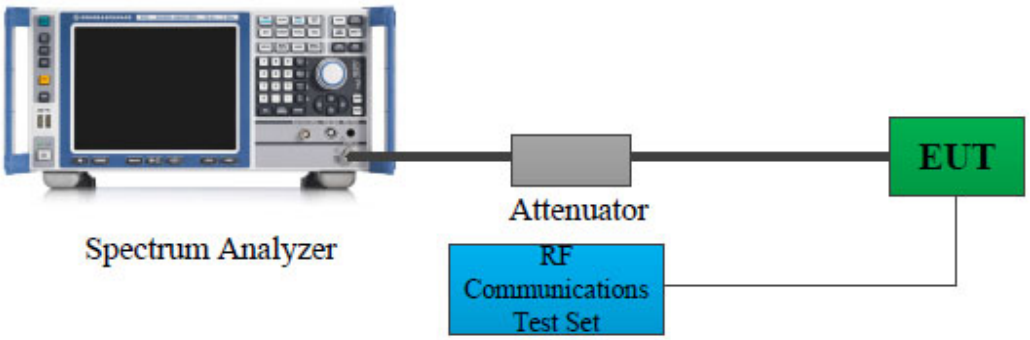
(2) 35 dB in the frequency band 12.5 kHz to 31.25 kHz removed from the channel center frequency.

(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.

EUT Setup Block Diagram



Note:The Insertion Loss of the RF cable, Attenuators was offset into the Spectrum Analyzer.

Test Procedure

C63.26-2015, Clause 5.4.4

The OBW is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

The following procedure shall be used for measuring (99%) power bandwidth:

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (typically a span of 1.5 × OBW is sufficient).

b) The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW.

c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.

NOTE—Step a), step b), and step c) may require iteration to adjust within the specified tolerances.

d) Set the detection mode to peak, and the trace mode to max-hold.

e) If the instrument does not have a 99% OBW function, recover the trace data points and sum directly in linear power terms. Place the recovered amplitude data points, beginning at the lowest frequency, in a running sum until 0.5% of the total is reached. Record that frequency as the lower OBW frequency. Repeat the process until 99.5% of the total is reached and record that frequency as the upper OBW frequency. The 99% power OBW can be determined by computing the difference these two frequencies.

f) The OBW shall be reported and plot(s) of the measuring instrument display shall be provided with the test report. The frequency and amplitude axis and scale shall be clearly labeled. Tabular data can be reported in addition to the plot(s).

According to ANSI C63.26-2015 Section 5.7.3:

f) See Annex I for example emission mask plots.

Test Data

Test Mode:	Transmitting	**Test Engineer:**	Lucas Lin
Test Date:	2024-11-07~2024-11-08	**Test Result:**	Pass

Enviroment Conditions:					
Temperature: (℃)	24.4-24.7	Relative Humidity: (%)	44-46	ATM Pressure: (kPa)	100.1

Please refer to below table:

Test Frequency (MHz)	99% Occupied Bandwidth (kHz)	20 dB Bandwidth (kHz)	Limit (kHz)
462.6375	5.128	5.288	⩽12.5
467.6375	5.128	5.288	⩽12.5

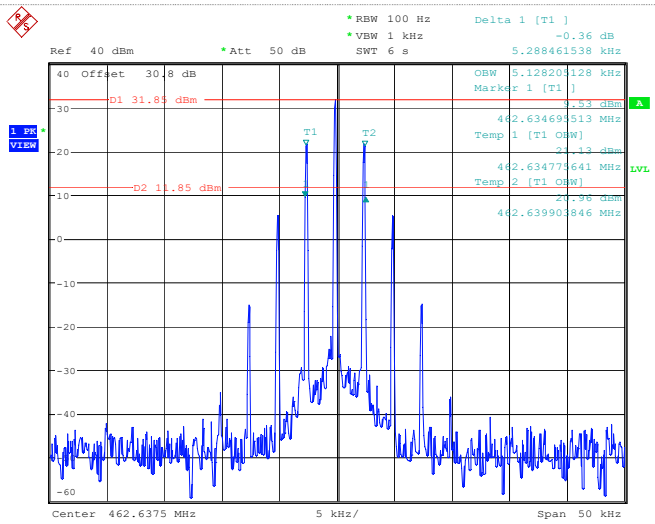
Note:
Emission bandwidth was based on calculation method instead of measurement.
Emission Designator
Per CFR 47 §2.201& §2.202, BW = 2M + 2D

For FM Mode (Channel Spacing: 12.5 kHz)
Emission Designator 11K0F3E
In this case, the maximum modulating frequency is 3.0 kHz with a 2.5 kHz deviation.
BW = 2(M+D) = 2*(3.0 kHz + 2.5 kHz) = 11 kHz = 11K0

F3E portion of the designator represents an FM voice transmission
Therefore, the entire designator for 12.5 kHz channel spacing FM mode is 11K0F3E.

462.6375MHz

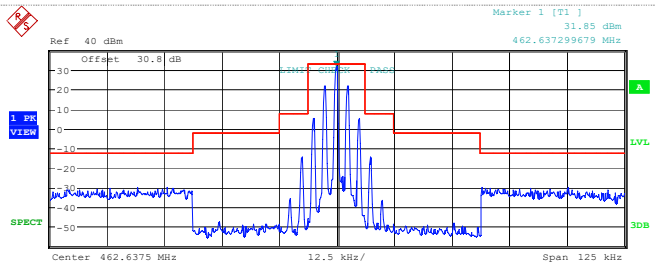
99% Occupied Bandwidth & 20dB Bandwidth



Project No.:2407Z62682E-RF Tester:Lucas Lin

Date: 7.NOV.2024 14:22:00

Emission Mask



Tx Channel

Bandwidth 12.5 kHz Power 34.70 dBm

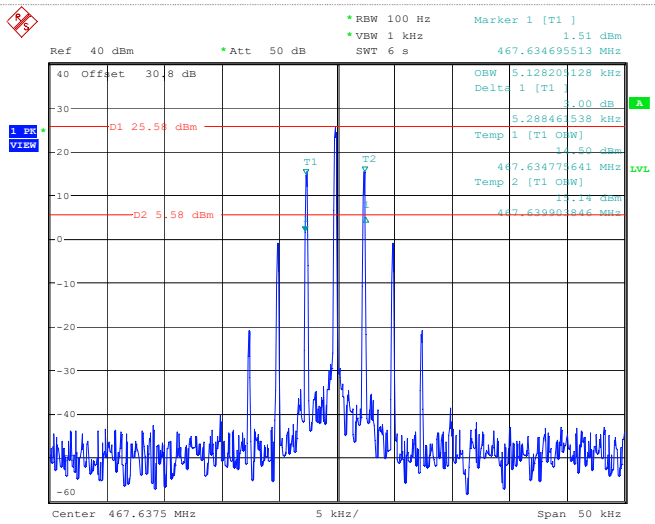
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	PwrRel [dBc]	ΔLimit [dB]
-62.500 k	-31.250 k	30.00 k	462.600441 M	-30.06	-64.77	-17.06
-31.250 k	-12.500 k	300.00	462.611859 M	-47.76	-82.46	-45.29
-12.500 k	-6.250 k	300.00	462.629888 M	-14.91	-49.62	-22.44
6.250 k	12.500 k	300.00	462.644712 M	-14.90	-49.60	-22.43
12.500 k	31.250 k	300.00	462.662740 M	-48.27	-82.97	-45.80
31.250 k	62.500 k	30.00 k	462.687780 M	-30.13	-64.84	-17.13

Project No.:2407Z62682E-RF Tester:Lucas Lin

Date: 8.NOV.2024 14:59:54

467.6375MHz

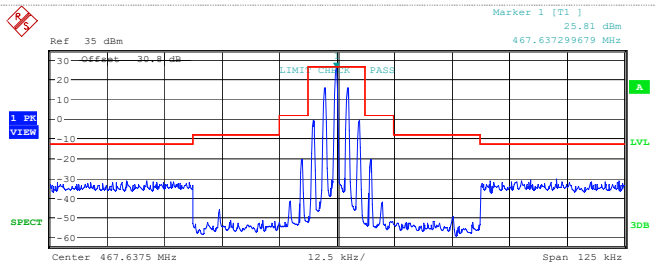
99% Occupied Bandwidth & 20dB Bandwidth



Project No.:2407Z62682E-RF Tester:Lucas Lin

Date: 7.NOV.2024 14:14:46

Emission Mask



Tx Channel

Bandwidth 12.5 kHz Power 28.64 dBm

Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	PwrRel [dBc]	ΔLimit [dB]
-62.500 k	-31.250 k	30.00 k	467.596034 M	-31.99	-60.63	-18.99
-31.250 k	-12.500 k	300.00	467.611859 M	-46.63	-75.26	-38.06
-12.500 k	-6.250 k	300.00	467.629888 M	-20.95	-49.59	-22.38
6.250 k	12.500 k	300.00	467.644712 M	-20.98	-49.61	-22.41
12.500 k	31.250 k	300.00	467.662740 M	-50.20	-78.84	-41.63
31.250 k	62.500 k	30.00 k	467.685176 M	-30.98	-59.62	-17.98

Project No.:2407Z62682E-RF Tester:Lucas Lin

Date: 8.NOV.2024 15:02:49

FCC §2.1053 & §95.579 - RADIATED SPURIOUS EMISSION

Applicable Standard

FCC §2.1053 and §95.579

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.

Test Prosedure:

ANSI C63.26-2015 Section 5.5.3

a) Place the EUT in the center of the turntable. The EUT shall be configured to transmit into the standard non-radiating load (for measuring radiated spurious emissions), connected with cables of minimal length unless specified otherwise. If the EUT uses an adjustable antenna, the antenna shall be positioned to the length that produces the worst case emission at the fundamental operating frequency.

b) Each emission under consideration shall be evaluated:

1) Raise and lower the measurement antenna in accordance 5.5.2, as necessary to enable detection of the maximum emission amplitude relative to measurement antenna height.

2) Rotate the EUT through 360° to determine the maximum emission level relative to the axial position.

3) Return the turntable to the azimuth where the highest emission amplitude level was observed.

4) Vary the measurement antenna height again through 1 m to 4 m again to find the height associated with the maximum emission amplitude.

5) Record the measured emission amplitude level and frequency using the appropriate RBW.

c) Repeat step b) for each emission frequency with the measurement antenna oriented in both the horizontal and vertical polarizations to determine the orientation that gives the maximum emissions amplitude.

d) Set-up the substitution measurement with the reference point of the substitution antenna located as near as possible to where the center of the EUT radiating element was located during the initial EUT measurement.

e) Maintain the previous measurement instrument settings and test set-up, with the exception that the EUT is removed and replaced by the substitution antenna.

f) Connect a signal generator to the substitution antenna; locate the signal generator so as to minimize any potential influences on the measurement results. Set the signal generator to the frequency where emissions are detected, and set an output power level such that the radiated signal can be detected by the measurement instrument, with sufficient dynamic range relative to the noise floor.

g) For each emission that was detected and measured in the initial test [i.e., in step b) and step c)]:

   1) Vary the measurement antenna height between 1 m to 4 m to maximize the received (measured) signal amplitude.

   2) Adjust the signal generator output power level until the amplitude detected by the measurement instrument equals the amplitude level of the emission previously measured directly in step b) and step c).

   3) Record the output power level of the signal generator when equivalence is achieved in step 2).

h) Repeat step e) through step g) with the measurement antenna oriented in the opposite polarization.

i) Calculate the emission power in dBm referenced to a half-wave dipole using the following equation:

$$Pe = Ps(dBm) - \text{cable loss (dB)} + \text{antenna gain (dBd)}$$

where

Pe = equivalent emission power in dBm
Ps = source (signal generator) power in dBm

NOTE—dBd refers to the measured antenna gain in decibels relative to a half-wave dipole.

j) Correct the antenna gain of the substitution antenna if necessary to reference the emission power to a half-wave dipole. When using measurement antennas with the gain specified in dBi, the equivalent dipole-referenced gain can be determined from: gain (dBd) = gain (dBi) − 2.15 dB. If necessary, the antenna gain can be calculated from calibrated antenna factor information

k) Provide the complete measurement results as a part of the test report.

EUT Setup Block Diagram

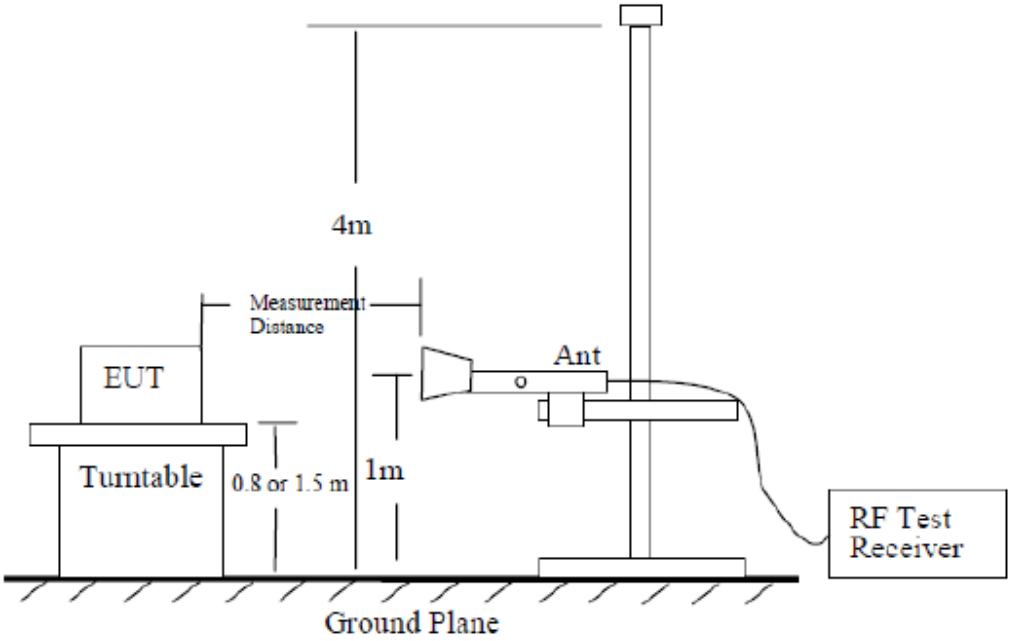


Figure 6 —Test site-up for radiated ERP and/or EIRP measurements

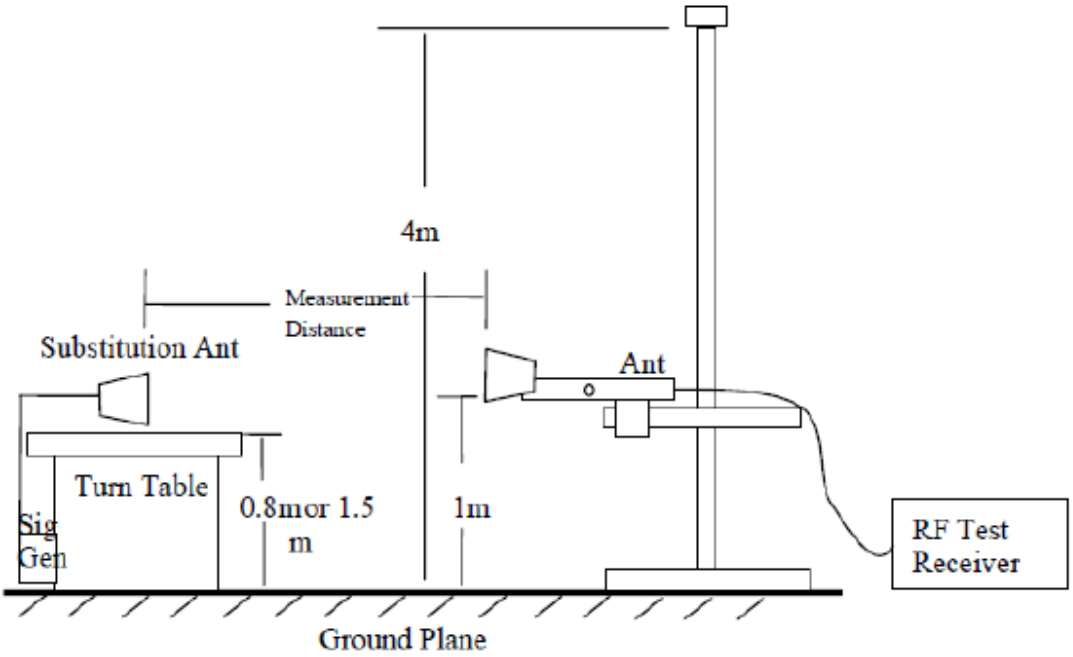


Figure 7 —Substitution method set-up for radiated emission

Test Data

Test Mode:	Transmitting	**Test Engineer:**	Lucas Lin
Test Date:	2024-11-12	**Test Result:**	Pass

Enviroment Conditions:					
Temperature: (℃)	24.5	Relative Humidity: (%)	53	ATM Pressure: (kPa)	100.1

Please refer to below table:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
FM, Frequency：462.6375MHz								
925.275	H	53.02	-36.05	0.00	0.42	-36.47	-13.00	23.47
925.275	V	55.16	-33.72	0.00	0.42	-34.14	-13.00	21.14
1387.913	H	73.33	-36.86	7.65	1.52	-30.73	-13.00	17.73
1387.913	V	75.58	-34.51	7.65	1.52	-28.38	-13.00	15.38
1850.550	H	65.91	-38.33	6.69	1.72	-33.36	-13.00	20.36
1850.550	V	68.77	-36.15	6.69	1.72	-31.18	-13.00	18.18
2313.188	H	68.37	-31.30	3.75	1.91	-29.46	-13.00	16.46
2313.188	V	65.03	-36.25	3.75	1.91	-34.41	-13.00	21.41
2775.825	H	78.18	-21.11	3.85	2.09	-19.35	-13.00	6.35
2775.825	V	67.76	-32.26	3.85	2.09	-30.50	-13.00	17.50
3238.463	H	67.34	-32.68	4.09	2.26	-30.85	-13.00	17.85
3238.463	V	69.59	-30.34	4.09	2.26	-28.51	-13.00	15.51
3701.100	H	67.59	-31.85	6.00	2.39	-28.24	-13.00	15.24
3701.100	V	61.96	-38.40	6.00	2.39	-34.79	-13.00	21.79
4163.738	H	55.19	-43.68	7.88	2.51	-38.31	-13.00	25.31
4163.738	V	48.95	-50.31	7.88	2.51	-44.94	-13.00	31.94
4626.375	H	57.94	-41.51	10.61	2.65	-33.55	-13.00	20.55
4626.375	V	56.48	-40.31	10.61	2.65	-32.35	-13.00	19.35

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
FM, Frequency: 467.6375MHz								
935.275	H	60.52	-28.97	0.00	0.42	-29.39	-13.00	16.39
935.275	V	65.31	-24.00	0.00	0.42	-24.42	-13.00	11.42
1402.913	H	75.67	-34.49	7.71	1.53	-28.31	-13.00	15.31
1402.913	V	76.80	-33.25	7.71	1.53	-27.07	-13.00	14.07
1870.550	H	69.24	-34.67	6.17	1.73	-30.23	-13.00	17.23
1870.550	V	66.19	-38.45	6.17	1.73	-34.01	-13.00	21.01
2338.188	H	71.67	-27.83	3.65	1.92	-26.10	-13.00	13.10
2338.188	V	64.84	-36.32	3.65	1.92	-34.59	-13.00	21.59
2805.825	H	78.21	-21.18	3.90	2.10	-19.38	-13.00	6.38
2805.825	V	70.27	-29.72	3.90	2.10	-27.92	-13.00	14.92
3273.463	H	69.71	-30.31	4.58	2.27	-28.00	-13.00	15.00
3273.463	V	68.84	-31.11	4.58	2.27	-28.80	-13.00	15.80
3741.100	H	69.87	-29.46	5.92	2.40	-25.94	-13.00	12.94
3741.100	V	63.88	-36.53	5.92	2.40	-33.01	-13.00	20.01
4208.738	H	50.57	-48.37	8.12	2.53	-42.78	-13.00	29.78
4208.738	V	46.66	-52.20	8.12	2.53	-46.61	-13.00	33.61
4676.375	H	54.31	-45.15	11.01	2.66	-36.80	-13.00	23.80
4676.375	V	53.19	-43.81	11.01	2.66	-35.46	-13.00	22.46

Note 1: The unit of antenna gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.
Note 2: Absolute Level = Substituted Level - Cable loss + Antenna Gain
Margin = Limit- Absolute Level.

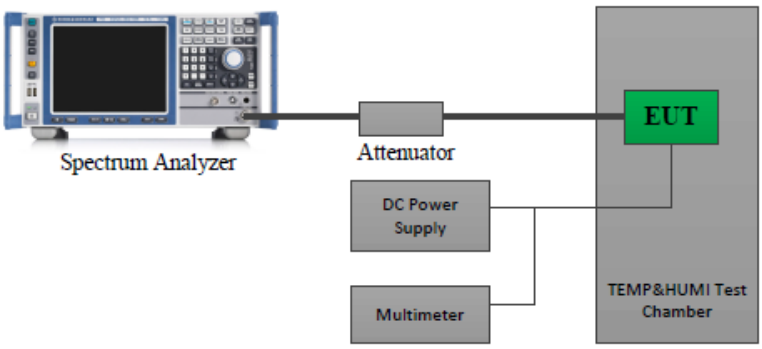
FCC§2.1055 (d), §95.565 – FRS FREQUENCY ACCURACY

Applicable Standard

According to FCC §95.565

Each FRS transmitter type must be designed such that the carrier frequencies remain within ± 2.5 partsper-million of the channel center frequencies specified in § 95.563 during normal operating conditions.

EUT Setup Block Diagram



Test Procedure

C63.26-2015, Clause 5.6

Frequency stability is a measure of the frequency drift due to temperature and supply voltage variations, with reference to the frequency measured at +20°C and rated supply voltage. The operating carrier frequency shall be set up in accordance with the manufacturer's published operation and instruction manual prior to the commencement of these tests. No adjustment of any frequency determining circuit element shall be made subsequent to this initial set-up. Frequency stability is tested:

a) At 10°C intervals of temperatures between −30°C and +50°C at the manufacturer's rated supply voltage, and

b) At +20°C temperature and ±15% supply voltage variations. If a product is specified to operate over a range of input voltage then the −15% variation is applied to the lowermost voltage and the +15% is applied to the uppermost voltage. During the test all necessary settings, adjustments and control of the EUT have to be performed without disturbing the test environment, i.e., without opening the environmental chamber. The frequency stabilities can be maintained to a lesser temperature range provided that the transmitter is automatically inhibited from operating outside the lesser temperature range. For handheld equipment that is only capable of operating from internal batteries and the supply voltage cannot be varied, the frequency stability tests shall be performed at the nominal battery voltage and the battery end point voltage specified by the manufacturer. An external supply voltage can be used and set at the internal battery nominal voltage, and again at the battery operating end point voltage which shall be specified by the equipment manufacturer.

If an unmodulated carrier is not available, the mean frequency of a modulated carrier can be obtained by using a frequency counter with gating time set to an appropriately large multiple of bit periods (gating time depending on the required accuracy). Full details on the choice of values shall be included in the test report.

Test Data

Test Mode:	Transmitting	**Test Engineer:**	Lucas Lin
Test Date:	2024-11-07	**Test Result:**	Pass

Enviroment Conditions:					
Temperature: (℃)	24.4	Relative Humidity: (%)	44	ATM Pressure: (kPa)	100.1

Please refer to test table:

Test Frequency (MHz)	Temperature (℃)	Voltage (V)	Measured Frequency (MHz)	Frequency Error (ppm)	limit (ppm)
462.6375	-30	3.7	462.6372456	-0.5499	≤2.5
	-20	3.7	462.6372792	-0.4773	≤2.5
	-10	3.7	462.6372816	-0.4721	≤2.5
	0	3.7	462.6372888	-0.4565	≤2.5
	10	3.7	462.6372968	-0.4392	≤2.5
	20	3.7	462.6373077	-0.4157	≤2.5
	30	3.7	462.6372882	-0.4578	≤2.5
	40	3.7	462.6372352	-0.5724	≤2.5
	50	3.7	462.6372023	-0.6435	≤2.5
	20	3.4	462.6372762	-0.4837	≤2.5
	20	4.2	462.6372697	-0.4978	≤2.5

Test Frequency (MHz)	Temperature (℃)	Voltage (V)	Measured Frequency (MHz)	Frequency Error (ppm)	limit (ppm)
467.6375	-30	3.7	467.6372688	-0.4944	≤2.5
	-20	3.7	467.6372812	-0.4679	≤2.5
	-10	3.7	467.6372865	-0.4566	≤2.5
	0	3.7	467.6372901	-0.4489	≤2.5
	10	3.7	467.6372974	-0.4332	≤2.5
	20	3.7	467.6373077	-0.4112	≤2.5
	30	3.7	467.6372878	-0.4538	≤2.5
	40	3.7	467.6372703	-0.4912	≤2.5
	50	3.7	467.6372297	-0.5780	≤2.5
	20	3.4	467.6372858	-0.4580	≤2.5
	20	4.2	467.6372745	-0.4822	≤2.5

Note: the voltage range was declared by manufacturer.

§95.571 – FRS EMISSION TYPES

Applicable Standard

FCC §95.571

Each FRS transmitter type must be designed such that it can transmit only the following emission types: F3E, G3E, F2D, and G2D.

Judgement

The emission type is F3E Only.

§95.587 – FRS ADDITIONAL REQUIREMENT

Applicable Standard

FCC §95.587

Each FRS transmitter type must be designed to meet the following additional requirements.

(a) Transmit frequency capability. FRS transmitter types must not be capable of transmitting on any frequency or channel other than those listed in § 95.563.

(b) Antenna. The antenna of each FRS transmitter type must meet the following requirements.
(1) The antenna must be a non-removable integral part of the FRS transmitter type.
(2) The gain of the antenna must not exceed that of a half-wave dipole antenna.
(3) The antenna must be designed such that the electric field of the emitted waves is vertically polarized when the unit is operated in the normal orientation.

(c) Digital data transmissions. FRS transmitter types having the capability to transmit digital data must be designed to meet the following requirements.
(1) FRS units may transmit digital data containing location information, or requesting location information from one or more other FRS or GMRS units, or containing a brief text message to another specific FRS or GMRS unit or units.
(2) Digital data transmissions may be initiated by a manual action or command of the operator or on an automatic or periodic basis, and FRS units may be designed to automatically respond with location data upon receiving an interrogation request from another
(3) Digital data transmissions must not exceed one second in duration.
(4) Digital data transmissions must not be sent more frequently than one digital data transmission within a thirty-second period, except that an FRS unit may automatically respond to more than one interrogation request received within a thirty-second period.

(d) Packet mode. FRS transmitter types must not be capable of transmitting data in the store-and-forward packet operation mode.

(e) Effective September 30, 2019, no person shall manufacture or import hand-held portable radio equipment capable of operating under this subpart (FRS) and other licensed or licensed-by-rule services in this chapter (part 15 unlicensed equipment authorizations are permitted if consistent with part 15 rules).

Judgment

Transmit frequency capability: Compliant, please refer to **Description of Test Configuration**.

Antenna: Compliant, please refer to ★**Antenna Information**.

Digital Data transmissions: Not Applicable, no digital modulation function.

Packet mode: Not Applicable, no digital modulation function.

No capable of FRS combined other licensed: Compliance, Only FRS function.

EUT PHOTOGRAPHS

Please refer to the attachment 2407Z62682E-RF-EXP EUT EXTERNAL PHOTOGRAPHS and 2407Z62682E-RF-INP EUT INTERNAL PHOTOGRAPHS.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2407Z62682E-RF-TSP TEST SETUP PHOTOGRAPHS.

Declarations

1. Bay Area Compliance Laboratories Corp. (Xiamen) is not responsible for authenticity of any information provided by the applicant. Information from the applicant that may affect test results are marked with an asterisk "★".

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

3. Unless required by the rule provided by the applicant or product regulations, then decision rule in this report did not consider the uncertainty.

4. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor k=2 with the 95% confidence interval.

5. This report cannot be reproduced except in full, without prior written approval of Bay Area Compliance Laboratories Corp. (Xiamen).

6. This report is valid only with a valid digital signature. The digital signature may be available only under the adobe software above version 7.0.

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