



TESTING LABORATORY  
CERTIFICATE #4820.01



# FCC PART 95 MEASUREMENT AND TEST REPORT

For

## Shenzhen ChangTaiWei Electronic CO.,LTD

5/F.,6 Block, XinGu Industrial zone, GuShu Village, XiXiang Town, BaoAn District, Shenzhen City,  
GuangDong Province, China

**FCC ID: 2ACVFK-12**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Walkie Talkie
<b>Report Number:</b> ATC210520-18385E-RF	
<b>Report Date:</b> 2021-07-01	
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## GENERAL INFORMATION

### Product Description for Equipment Under Test (EUT)

Product	Walkie Talkie
Tested Model	K-12
Frequency Range	462.5500~462.7250MHz 467.5625~467.7125MHz
Transmit Power (ERP)	462.5500~462.7250MHz: 25.84dBm 467.5625~467.7125MHz: 22.61dBm
Channel Spacing	12.5kHz
Modulation Technique	FM
Antenna Specification*	0dBi(It is provided by the applicant)
Voltage Range	DC 4.5V from batteries or DC 5V from adapter
Sample serial number	ATC210520-18385E-RF-S1(Assigned by BAACL, Dongguan)
Received date	2021-05-20
Sample/EUT Status	Good condition
Adapter information	Model: W&T-AD1806a050120UU Input: AC 100-240V, 50/60Hz, 0.25A Output: DC 5.0V, 1.2A

### Objective

This test report is in accordance with Part 2 and Part 95, Subpart A & 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 A, Subpart B of the Federal Communication Commissions rules with TIA-603-E, Land Mobile FM or PM-Communications Equipment-Measurement and Performance Standards.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Dongguan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

## Measurement Uncertainty

Parameter	Uncertainty
Occupied Channel Bandwidth	±5%
RF Output Power with Power meter	0.61dB
RF conducted test with spectrum	3.12 dB (150 kHz to 30 MHz)
Unwanted Emissions, radiated	30M~200MHz: 4.55 dB, 200M~1GHz: 5.92 dB, 1G~6GHz: 4.98 dB, 6G~18GHz: 5.89 dB, 18G~26.5G: 5.47 dB, 26.5G~40G: 5.63 dB
Temperature	±1°C
Humidity	5%
Supply voltages	0.4%

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

## Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.12, Pulong East 1<sup>st</sup> Road, Tangxia Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218, the FCC Designation No. : CN1220.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0022.

**SYSTEM TEST CONFIGURATION**

**Description of Test Configuration**

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

FRS Channel List

Channel No.	Channel Frequency (MHz)	Channel No.	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

**Equipment Modifications**

No modification was made to the EUT tested.

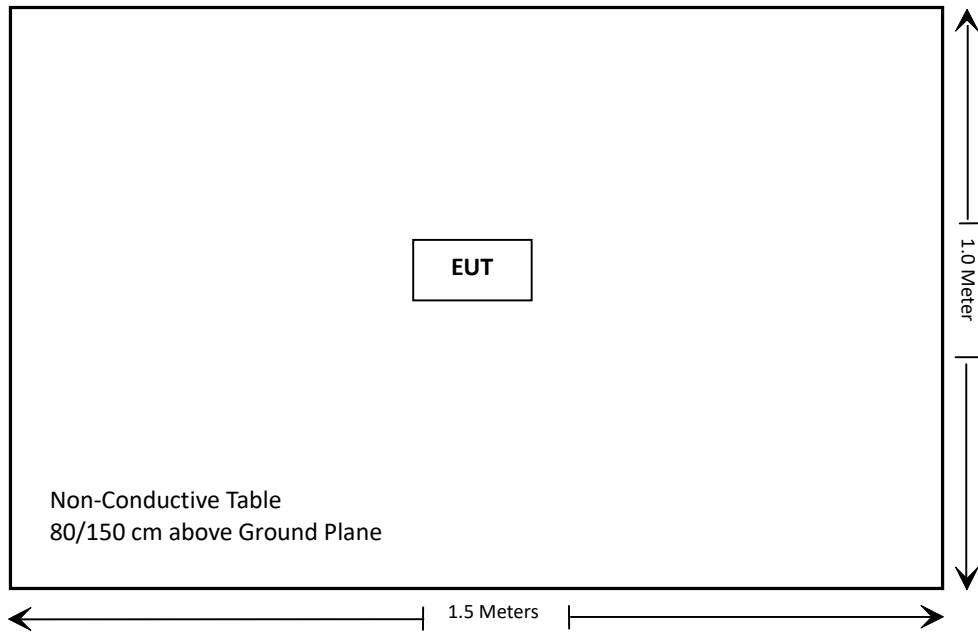
**Support Equipment List and Details**

Manufacturer	Description	Model	Serial Number
/	/	/	/

**External I/O Cable**

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

**Block Diagram of Test Setup**



**SUMMARY OF TEST RESULTS**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Results</b>
§2.1093	RF Exposure	Compliance
§95.587(b)(1)(2)(3)	Antenna Requirement	Compliance
§2.1046, §95.567	RF Output Power	Compliance
§2.1047, §95.575	Modulation Characteristic	Compliance
§2.1049, §95.573, §95.579	Authorized Bandwidth & Emission Mask	Compliance
§2.1053, §95.579	Radiated Spurious Emission	Compliance
§2.1055(d), §95.565	Frequency Stability	Compliance

**TEST EQUIPMENT LIST**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
<b>Radiated Emission Test</b>					
Sunol Sciences	Antenna	JB3	A060611-1	2020-11-10	2023-11-10
Sunol Sciences	Antenna	JB3	A060611-2	2020-08-25	2023-08-25
R&S	EMI Test Receiver	ESR3	102453	2020-09-12	2021-09-12
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2020-09-05	2021-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2020-09-05	2021-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2020-09-05	2021-09-05
HP	Amplifier	8447D	2727A05902	2020-09-05	2021-09-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2020-07-07	2021-07-07
TDK RF	Horn Antenna	HRN-0118	130 084	2018-10-12	2021-10-12
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2020-09-05	2021-09-05
Mini-Circuit	Amplifier	ZVA-213-S+	54201245	2020-09-05	2021-09-05
Agilent	Signal Generator	E8247C	MY43321350	2020-09-05	2021-09-05
<b>RF Conducted test</b>					
HP	RF Communication test set	8920A	3438A05201	2020-07-07	2021-07-07
R&S	Spectrum Analyzer	FSV40	101474	2021-01-09	2022-01-09
ESPEC	Constant temperature and humidity Tester	ESX-4CA	018 463	2021-02-24	2022-02-23
Pro instrument	DC Power Supply	Pps3300	3300012	NCR	NCR
UNI-T	Multimeter	UT39A	M130199938	2020-07-23	2021-07-23

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



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## **§2.1093 - RF EXPOSURE INFORMATION**

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### **Applicable Standard**

§2.1093.

### **Test Result**

Compliance, please refer to the SAR report: ATC210520-18385E-20.

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## **FCC §95.587(b)(1)(2)(3) – ANTENNA REQUIREMENT**

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### **Applicable Standard**

According to FCC § 95.587, (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.

### **Antenna Description**

The EUT has an integral vertically polarized antenna arrangement and the antenna gain is 0dBi, fulfill the requirement of this section. Please refer to the EUT photos.

**Result:** Compliance.

## FCC §2.1046 & §95.567 - RF OUTPUT POWER

### Applicable Standard

Per FCC §2.1046, and §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 Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the emissions were measured by the substitution.

### Test Data

#### Environmental Conditions

Temperature:	24 °C
Relative Humidity:	58 %
ATM Pressure:	101.0 kPa

The testing was performed by JOE Qiao on 2021-06-15.

Test Mode: Transmitting

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB $\mu$ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
462.6375	H	105.23	23.90	0	0.67	23.23	33.00	9.77
462.6375	V	104.89	26.51	0	0.67	25.84	33.00	7.16
467.6375	H	101.24	20.04	0	0.68	19.36	27.00	7.64
467.6375	V	101.52	23.29	0	0.68	22.61	27.00	4.39

**Test Result:** Compliance.

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**FCC §2.1047 & §95.575 - MODULATION CHARACTERISTIC**

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**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 Procedure**

Test Method: TIA/EIA-603-E

**Test Data****Environmental Conditions**

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	52 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by JOE Qiao on 2021-06-18.*

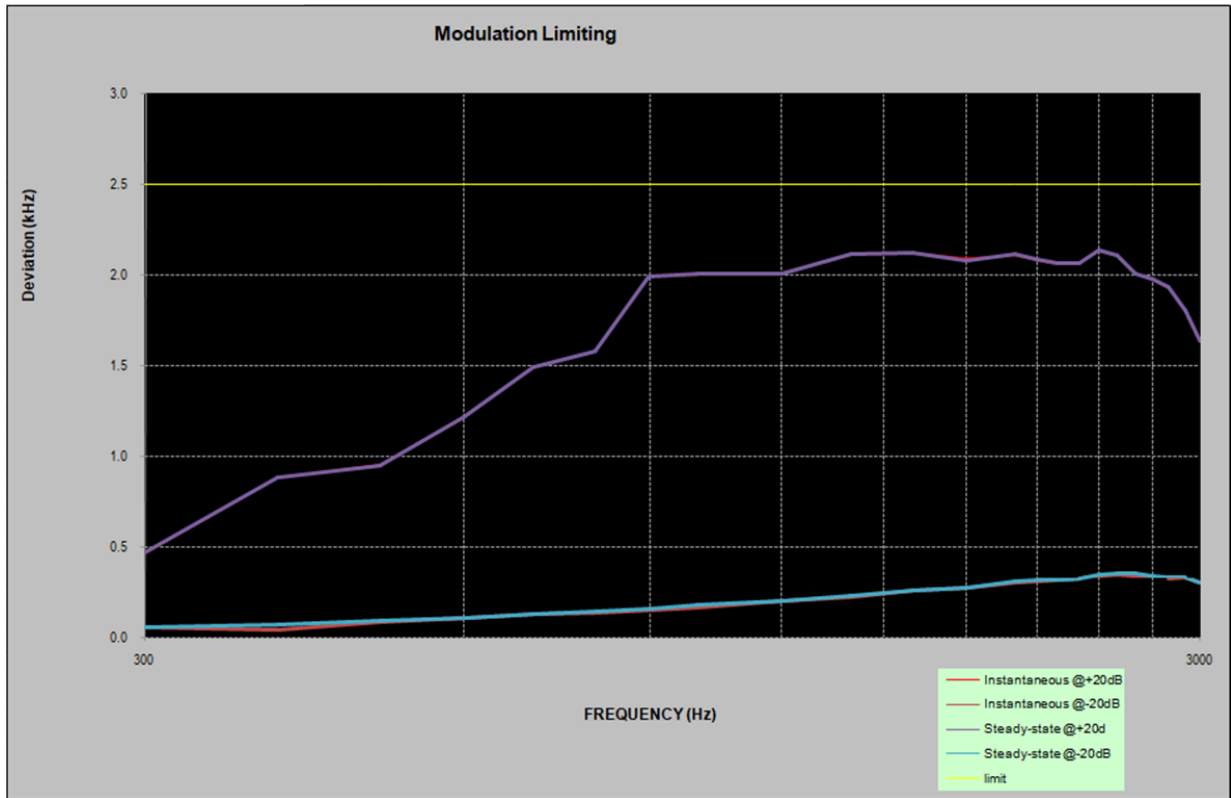
*Please refer to the following tables and plots.*

*Test Mode: Transmitting*

**MODULATION LIMITING**

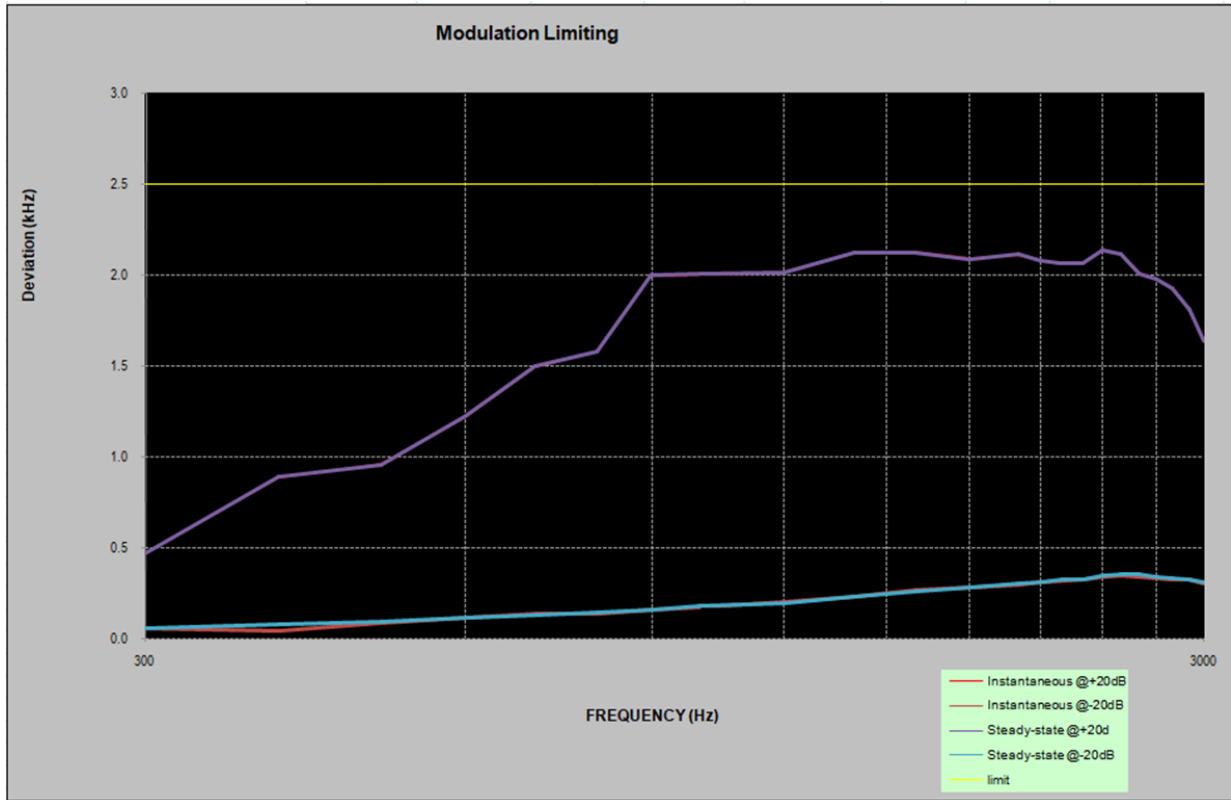
Carrier Frequency: 462.6375MHz

Audio Frequency (Hz)	Instantaneous		Steady-state		Limit [kHz]
	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	
300	0.462	0.052	0.470	0.056	2.500
400	0.880	0.038	0.883	0.072	2.500
500	0.952	0.084	0.948	0.090	2.500
600	1.210	0.106	1.217	0.108	2.500
700	1.488	0.127	1.492	0.124	2.500
800	1.574	0.135	1.575	0.138	2.500
900	1.986	0.152	1.991	0.154	2.500
1000	1.995	0.162	2.003	0.175	2.500
1200	2.003	0.196	2.005	0.199	2.500
1400	2.112	0.222	2.115	0.228	2.500
1600	2.123	0.256	2.120	0.255	2.500
1800	2.089	0.272	2.078	0.274	2.500
2000	2.102	0.301	2.112	0.306	2.500
2100	2.075	0.308	2.083	0.312	2.500
2200	2.054	0.313	2.058	0.316	2.500
2300	2.062	0.323	2.061	0.319	2.500
2400	2.128	0.338	2.135	0.341	2.500
2500	2.110	0.341	2.104	0.348	2.500
2600	2.002	0.339	2.006	0.355	2.500
2700	1.968	0.330	1.973	0.336	2.500
2800	1.922	0.325	1.928	0.333	2.500
2900	1.801	0.328	1.802	0.327	2.500
3000	1.635	0.301	1.636	0.303	2.500



Carrier Frequency: 467.6375MHz

Audio Frequency (Hz)	Instantaneous		Steady-state		Limit [kHz]
	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	
300	0.465	0.054	0.471	0.051	2.500
400	0.882	0.041	0.885	0.073	2.500
500	0.961	0.085	0.951	0.092	2.500
600	1.213	0.113	1.219	0.111	2.500
700	1.492	0.131	1.494	0.128	2.500
800	1.577	0.136	1.576	0.139	2.500
900	1.988	0.153	1.993	0.155	2.500
1000	1.999	0.171	2.002	0.178	2.500
1200	2.011	0.197	2.010	0.195	2.500
1400	2.116	0.226	2.118	0.231	2.500
1600	2.125	0.261	2.123	0.256	2.500
1800	2.094	0.279	2.084	0.278	2.500
2000	2.108	0.295	2.114	0.301	2.500
2100	2.076	0.306	2.079	0.309	2.500
2200	2.055	0.318	2.059	0.319	2.500
2300	2.067	0.325	2.065	0.324	2.500
2400	2.132	0.336	2.134	0.343	2.500
2500	2.114	0.343	2.112	0.351	2.500
2600	2.010	0.338	2.004	0.348	2.500
2700	1.972	0.328	1.975	0.335	2.500
2800	1.925	0.321	1.926	0.330	2.500
2900	1.803	0.325	1.805	0.326	2.500
3000	1.638	0.304	1.637	0.305	2.500

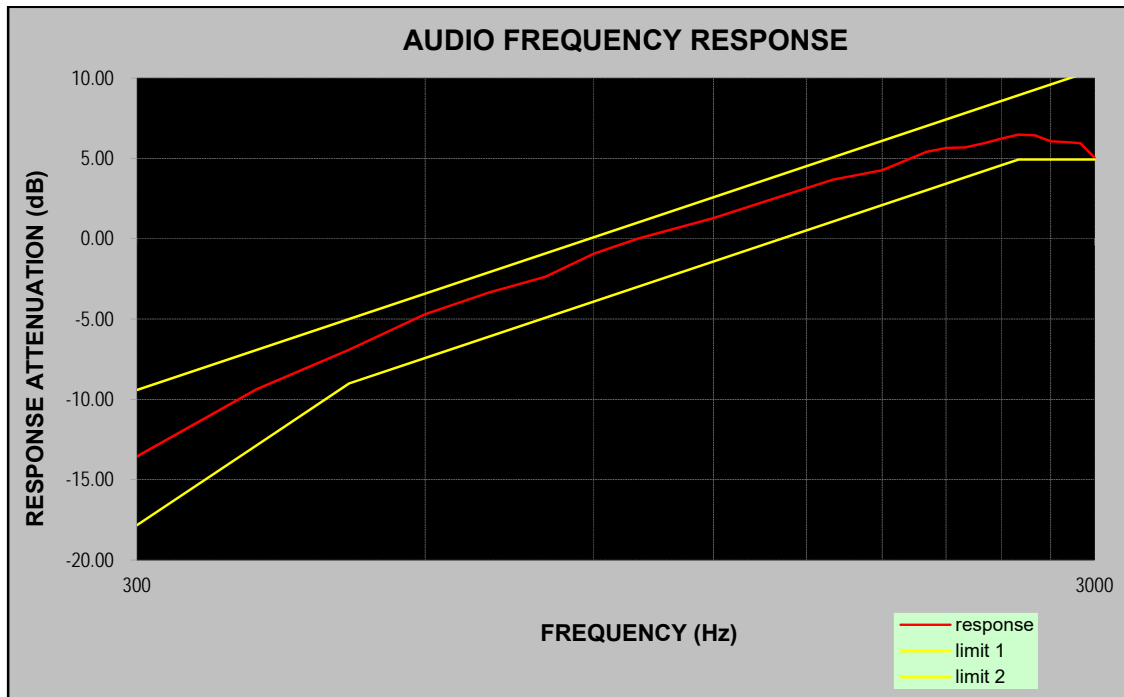




**Audio Frequency Response**

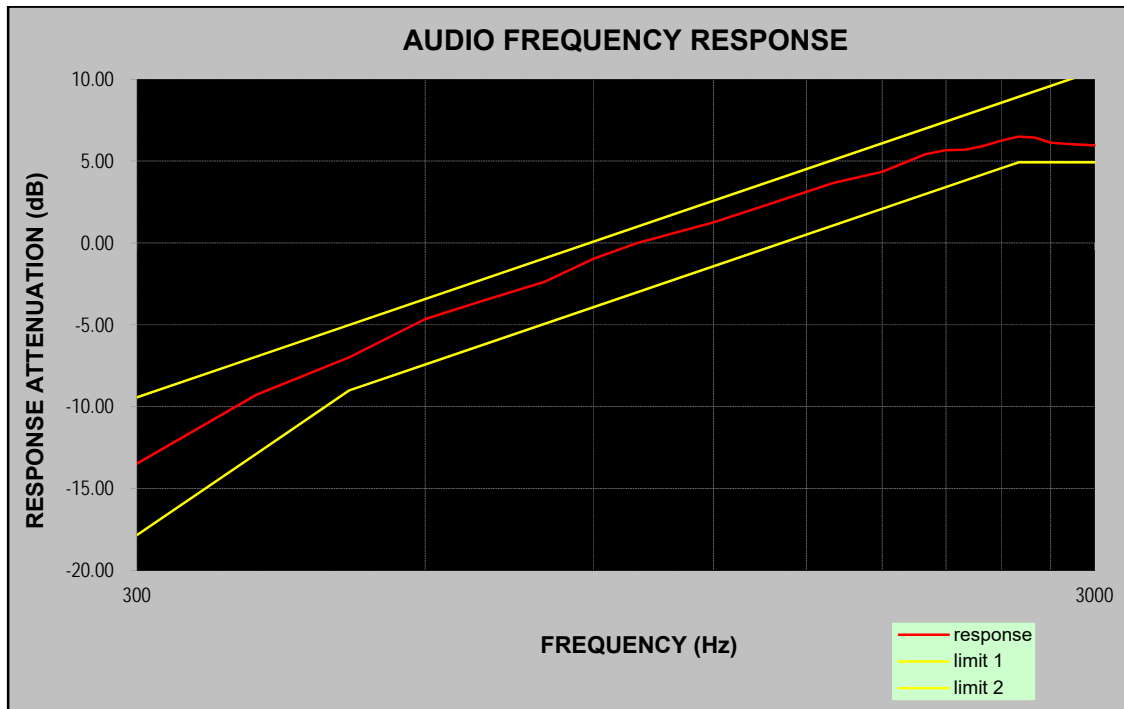
Carrier Frequency: 462.6375MHz

<b>Audio Frequency (Hz)</b>	<b>Response Attenuation (dB)</b>
300	-13.56
400	-9.37
500	-6.90
600	-4.70
700	-3.35
800	-2.38
900	-0.93
1000	0
1200	1.29
1400	2.57
1600	3.68
1800	4.27
2000	5.39
2100	5.65
2200	5.68
2300	5.94
2400	6.24
2500	6.48
2600	6.43
2700	6.06
2800	6.01
2900	5.94
3000	5.05



Carrier Frequency: 467.6375MHz

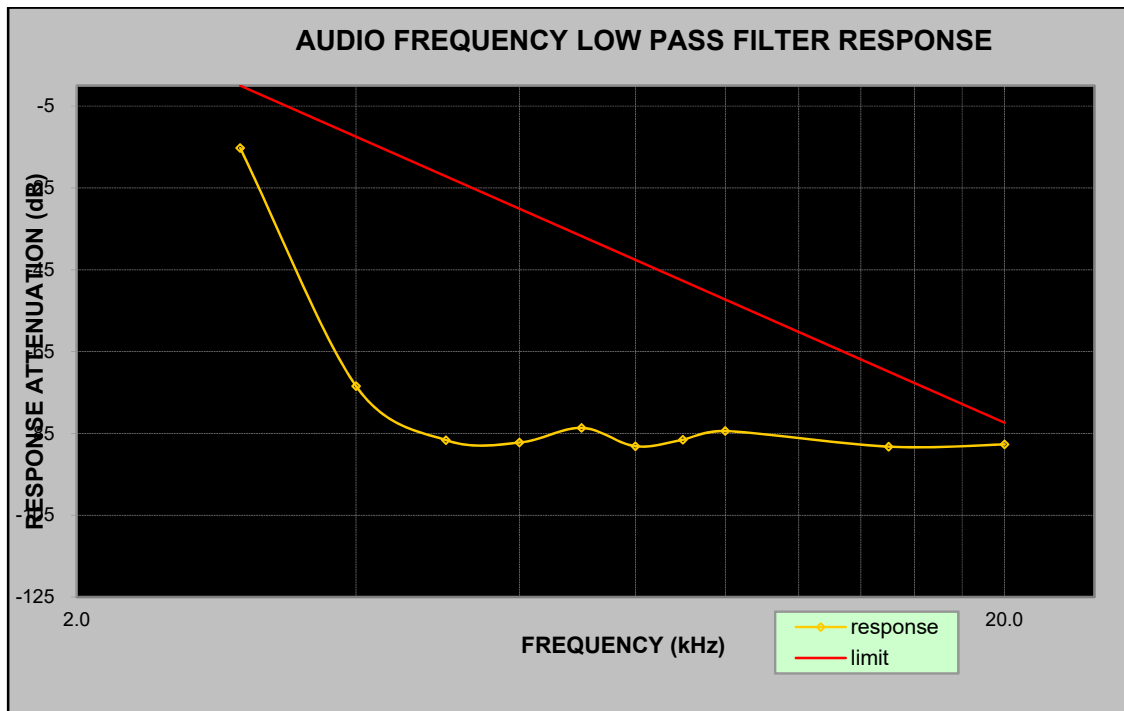
<b>Audio Frequency (Hz)</b>	<b>Response Attenuation (dB)</b>
300	-13.47
400	-9.27
500	-6.97
600	-4.64
700	-3.40
800	-2.36
900	-0.95
1000	0
1200	1.26
1400	2.54
1600	3.66
1800	4.35
2000	5.44
2100	5.67
2200	5.70
2300	5.93
2400	6.26
2500	6.49
2600	6.44
2700	6.12
2800	6.06
2900	6.00
3000	5.97



**Audio frequency lows pass filter response**

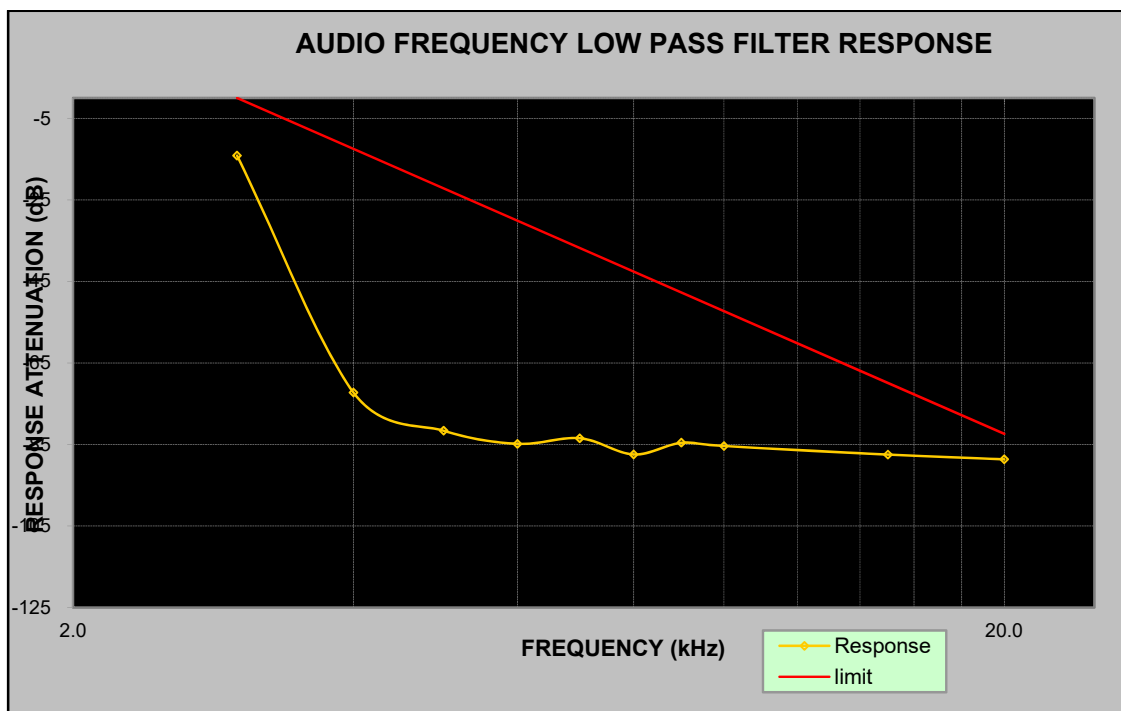
Carrier Frequency: 462.6375MHz

Audio Frequency (kHz)	Response Attenuation (dB)	Limit (dB)
1.0	0	/
3.0	-15.24	0
4.0	-73.45	-12.5
5.0	-86.64	-22.2
6.0	-87.24	-30.1
7.0	-83.64	-36.8
8.0	-88.14	-42.6
9.0	-86.55	-47.7
10.0	-84.43	-52.3
15.0	-88.24	-69.9
20.0	-87.68	-82.4



Carrier Frequency: 467.6375MHz

Audio Frequency (kHz)	Response Attenuation (dB)	Limit (dB)
1.0	0	/
3.0	-14.13	0
4.0	-72.25	-12.5
5.0	-81.62	-22.2
6.0	-84.83	-30.1
7.0	-83.46	-36.8
8.0	-87.44	-42.6
9.0	-84.56	-47.7
10.0	-85.39	-52.3
15.0	-87.47	-69.9
20.0	-88.64	-82.4



## FCC §2.1049 & §95.573 & §95.579 - AUTHORIZED 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.

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.

### Test Procedure

TIA-603-E, section 2.2.11

### Test Data

#### Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

*The testing was performed by JOE Qiao on 2021-06-30.*

*Test Mode: Transmitting*

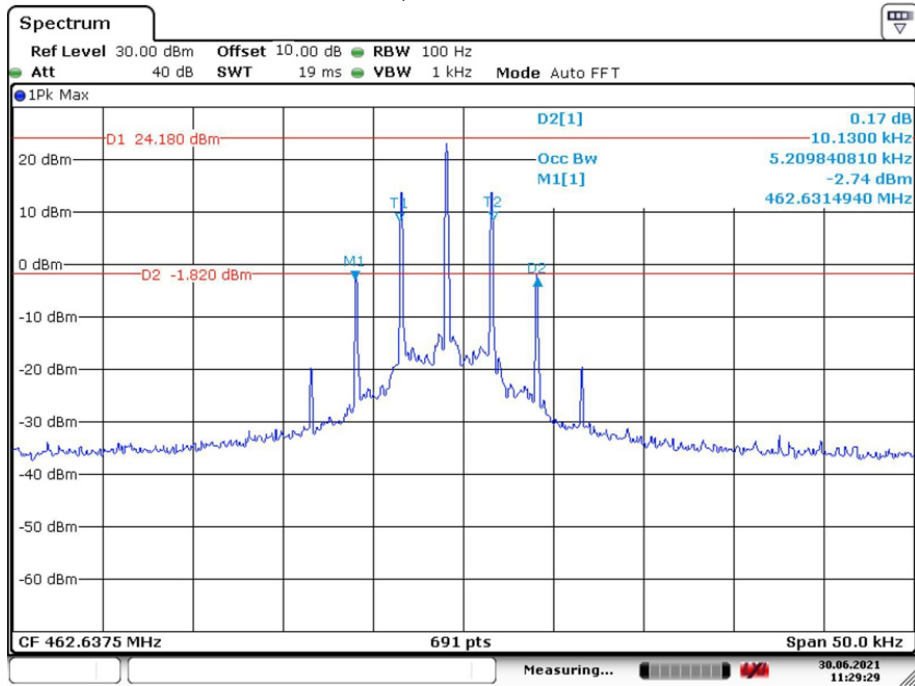
Modulation	Channel Separation (kHz)	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26dB Emissions Bandwidth (kHz)
Analog	12.5	462.6375	5.21	10.13
Analog	12.5	467.6375	5.21	10.13

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

Emission Designator 11K0F3E In this case, the maximum modulating frequency is 3.0 kHz with a 2.5 kHz deviation.  $BW = 2(M+D) = 2*(3.0 \text{ kHz} + 2.5 \text{ kHz}) = 11 \text{ kHz} \rightarrow 11K0$   
 F3E portion of the designator represents an FM voice transmission Therefore, the entire designator for 12.5 kHz channel spacing FM mode is 11K0F3E.

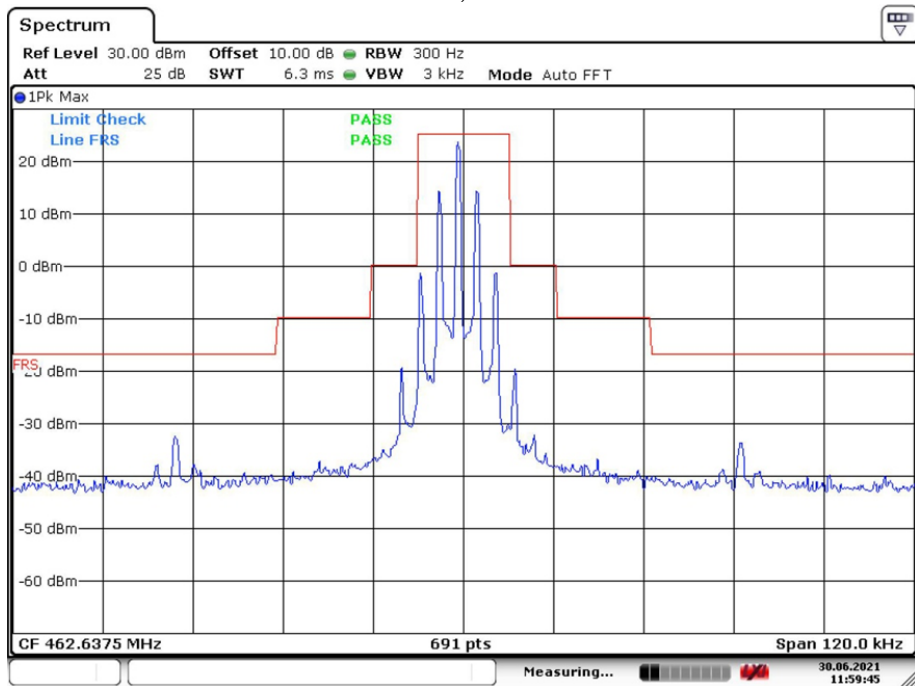


**OBW, 462.6375 MHz**



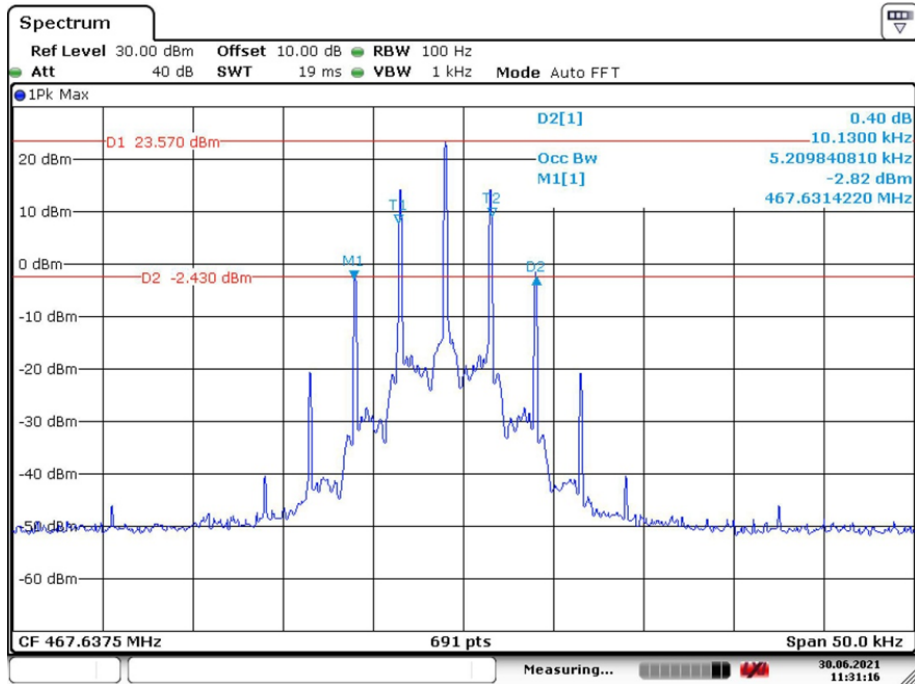
Date: 30.JUN.2021 11:29:29

**Emission Mask, 462.6375 MHz**



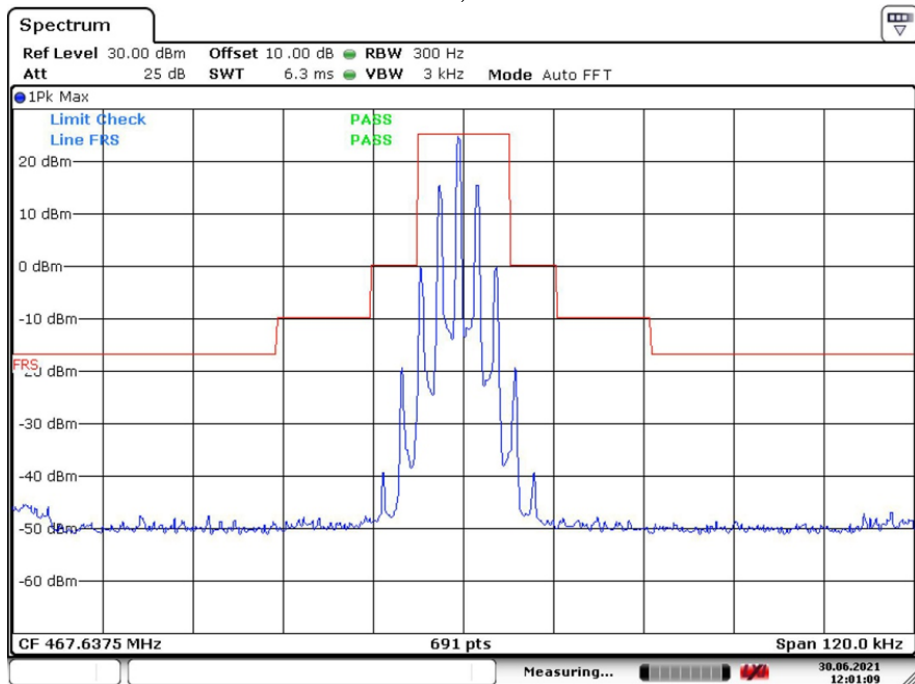
Date: 30.JUN.2021 11:59:46

### OBW, 467.6375 MHz



Date: 30.JUN.2021 11:31:16

### Emission Mask, 467.6375 MHz



Date: 30.JUN.2021 12:01:10

## 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 Procedure

The transmitter was placed on a wooden turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB =  $10 \lg (\text{TXpwr in Watts}/0.001)$ -the absolute level  
Spurious attenuation limit in dB =  $43 + 10 \text{Log}_{10} (\text{power out in Watts})$

### Test Data

#### Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by JOE Qiao on 2021-06-15.

Test Mode: Transmitting

Frequency (MHz)	Polar (H/V)	Turntable Angle Degree	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
				Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
462.6375MHz									
925.27	H	45	81.54	-14.55	0	0.97	-15.52	-13.00	2.52
1387.91	H	68	59.48	-44.90	9.53	1.21	-36.58	-13.00	23.58
1850.55	H	168	62.45	-42.42	11.05	1.20	-32.57	-13.00	19.57
2313.19	H	154	51.43	-52.63	11.94	1.20	-41.89	-13.00	28.89
2775.83	H	225	50.37	-52.80	12.31	1.38	-41.87	-13.00	28.87
3238.46	H	351	50.34	-52.03	12.30	1.55	-41.28	-13.00	28.28
3701.10	H	164	54.51	-46.78	12.24	1.55	-36.09	-13.00	23.09
4163.74	H	154	48.55	-51.41	12.66	1.48	-40.23	-13.00	27.23
4626.38	H	134	47.06	-51.65	13.30	1.51	-39.86	-13.00	26.86
925.27	V	184	84.31	-13.61	0.00	0.97	-14.58	-13.00	1.58
1387.91	V	166	59.33	-45.16	9.53	1.21	-36.84	-13.00	23.84
1850.55	V	154	64.15	-40.66	11.05	1.20	-30.81	-13.00	17.81
2313.19	V	133	52.66	-52.27	11.94	1.20	-41.53	-13.00	28.53
2775.83	V	154	50.1	-53.65	12.31	1.38	-42.72	-13.00	29.72
3238.46	V	164	50.69	-50.90	12.30	1.55	-40.15	-13.00	27.15
3701.10	V	311	53.8	-46.92	12.24	1.55	-36.23	-13.00	23.23
4163.74	V	43	47.98	-52.65	12.66	1.48	-41.47	-13.00	28.47
4626.38	V	164	48.73	-50.17	13.30	1.51	-38.38	-13.00	25.38

Frequency (MHz)	Polar (H/V)	Turntable Angle Degree	Receiver Reading (dB $\mu$ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
				Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
467.6375MHz									
935.27	H	46	76.58	-19.09	0	0.94	-20.03	-13.00	7.03
1402.91	H	84	60.58	-43.99	9.59	1.23	-35.63	-13.00	22.63
1870.55	H	136	63.1	-41.69	11.11	1.19	-31.77	-13.00	18.77
2338.19	H	145	54.97	-49.98	11.97	1.20	-39.21	-13.00	26.21
2805.83	H	251	50.53	-53.07	12.32	1.40	-42.15	-13.00	29.15
3273.46	H	249	51.65	-49.78	12.29	1.56	-39.05	-13.00	26.05
3741.1	H	265	54.56	-46.22	12.25	1.53	-35.50	-13.00	22.50
4208.74	H	152	47.09	-53.39	12.76	1.49	-42.12	-13.00	29.12
4676.38	H	169	47.19	-51.46	13.26	1.50	-39.70	-13.00	26.70
1870.55	V	246	64.39	-40.47	11.11	1.19	-30.55	-13.00	17.55
2338.19	V	254	51.36	-52.65	11.97	1.20	-41.88	-13.00	28.88
2805.83	V	184	49.92	-53.20	12.32	1.40	-42.28	-13.00	29.28
3273.46	V	56	50.11	-52.19	12.29	1.56	-41.46	-13.00	28.46
3701.10	V	46	52.64	-48.52	12.25	1.53	-37.80	-13.00	24.80
4163.74	V	211	47.08	-52.77	12.76	1.49	-41.50	-13.00	28.50
4626.38	V	105	47.94	-50.60	13.26	1.50	-38.84	-13.00	25.84

**Note 1:** The unit of antenna gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.

**Note 2:** Absolute Level = SG Level - Cable loss + Antenna Gain  
Margin = Limit- Absolute Level

## **FCC§2.1055 (d) & §95.565 - FREQUENCY STABILITY**

### **Applicable Standard**

According to FCC §2.1055(a) (1), the frequency stability shall be measured with variation of ambient temperature from –30 °C to +50 °C, and according to FCC 2.1055(d) (2), the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point which is specified by the manufacturer.

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

### **Test Procedure**

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a Frequency Counter via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the Frequency Counter.

Frequency Stability vs. Voltage (item 1 or item 2 will be chosen according to different condition) :

1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.

The output frequency was recorded for each voltage.

### **Test Data**

#### **Environmental Conditions**

<b>Temperature:</b>	20 °C
<b>Relative Humidity:</b>	52 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by JOE Qiao on 2021-06-15.*

*Test Mode: Transmitting*

Reference Frequency:462.6375MHz, Limit:2.5 ppm,12.5kHz			
Environment Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Measurement Frequency (MHz)	Frequency Error (ppm)
Frequency Stability Ver. Temperature			
50	4.5	462.637559	0.127
40	4.5	462.637562	0.134
30	4.5	462.637561	0.131
20	4.5	462.637568	0.149
10	4.5	462.637573	0.157
0	4.5	462.637572	0.156
-10	4.5	462.637558	0.125
-20	4.5	462.637567	0.145
-30	4.5	462.637561	0.132
Frequency Stability Ver. Input Voltage			
20	4.0	462.637557	0.123
20	5.0	462.637563	0.136

Reference Frequency:467.6375 MHz, Limit:2.5 ppm,12.5kHz			
Environment Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Measurement Frequency (MHz)	Frequency Error (ppm)
Frequency Stability Ver. Temperature			
50	4.5	467.637554	0.115
40	4.5	467.637551	0.109
30	4.5	467.637563	0.135
20	4.5	467.637558	0.124
10	4.5	467.637561	0.130
0	4.5	467.637572	0.154
-10	4.5	467.637568	0.145
-20	4.5	467.637553	0.113
-30	4.5	467.637554	0.115
Frequency Stability Ver. Input Voltage			
20	4.0	467.637574	0.158
20	5.0	467.637572	0.154

Note: the battery operating end point voltage is 4.0V which was provided by the applicant.

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