FCC PART 95

MEASUREMENT AND TEST REPORT

For

Tekk International Inc.

1916 Linn St North Kansas City, Missouri, United States

FCC ID: U59XM-700

Report Type:	**Product Type:**
Original Report	two way radio

Report Number:	RSZ170502006-00B
Report Date:	2017-05-19
Reviewed By:	Oscar Ye RF Engineer
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road, Kunshan, Jiangsu province, China Tel: +86-0512-86175000 Fax: +86-0512-88934268 www.baclcorp.com.cn

TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Tekk International Inc.*'s product, model number: *XM-700(FCC ID: U59XM-700)* or the "EUT" in this report was a *two way radio,* which was measured approximately: 112.5 mm (L) x 59.0 mm (W) x 37.0 mm (H), rated input voltage: DC 7.4V Li-ion Battery or 12V from adapter.

Adapter information:
Model: JST-A2PA01
Input: 100-240V DC 50-60Hz, 0.3A
Output: 12V, 500mA

** All measurement and test data in this report was gathered from production sample serial number: 1700892 (Assigned by BACL, Kunshan). The EUT supplied by the applicant was received on 2017-05-02.*

Objective

This report is prepared on behalf of *Tekk International Inc.* in accordance with Part 2 and Part 95, Subpart J & Subpart E of the Federal Communication Commissions rules.

Related Submittal(s)/Grant(s)

No related submittal(s).

Test Methodology

All tests and measurements indicated in this document were performed in accordance with Part 95 Subpart J of the Federal Communication Commissions rules with TIA-603-D, Land Mobile FM or PM-Communications Equipment-Measurement and Performance Standards.

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

Measurement Uncertainty

Item		Uncertainty
RF conducted test with spectrum		±0.9dB
Radiated emission	30MHz~1GHz	±5.91dB
	Above 1G	±4.92dB
Occupied Bandwidth		±0.5kHz
Temperature		±1.0℃
Humidity		±6%

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Test site at Bay Area Compliance Laboratories Corp. (Kunshan) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 06, 2014. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 815570. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

Note:

Transmitter channel frequencies are 151.820 MHz, 151.880 MHz, 151.940 MHz, 154.570 MHz and 154.600 MHz.

Equipment Modifications

No modification was made to the EUT tested.

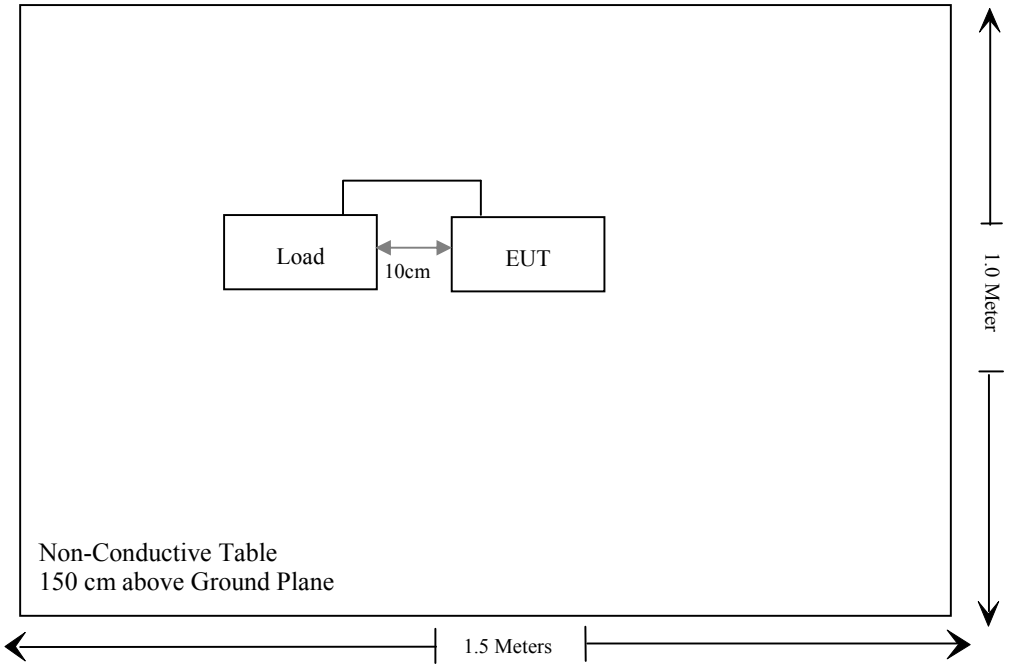
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
N/A	50 ohm Load	N/A	N/A

External I/O Cable

Cable Description	Length (m)	From / Port	To
Shielding Detachable RF Cable	0.8	Load	EUT

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§1.1307(b) & §2.1093	RF Exposure	Compliance
§2.1046, §95.639(h)	RF Output Power	Compliance
§2.1049, §95.633(f), §95.635(e)	Authorized Bandwidth & Emission Mask	Compliance
§2.1051, §95.635(e)	Spurious Emission at Antenna Terminal	Compliance
§2.1053, §95.635(e)	Spurious Radiated Emissions	Compliance
§2.1055(d), §95.632(c)	Frequency Stability	Compliance

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Sonoma Instrunent	Amplifier	330	171377	2016-12-12	2017-12-12
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2016-11-25	2017-11-25
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2016-01-09	2019-01-08
Sunol Sciences	Broadband Antenna	JB3	A090314-1	2016-01-09	2019-01-08
Narda	Pre-amplifier	AFS42-00101800	2001270	2016-09-08	2017-09-08
EMCO	Horn Antenna	3116	9510-2384	2015-11-07	2018-11-06
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2016-11-25	2017-11-25
ETS	Horn Antenna	3115	6229	2016-12-12	2019-12-12
ETS	Horn Antenna	3115	9311-4159	2016-01-11	2019-01-10
R&S	Auto test Software	EMC32	V 09.10.0	NCR	NCR
haojintech	Coaxial Cable	Cable-1	001	2016-12-12	2017-12-12
haojintech	Coaxial Cable	Cable-2	002	2016-12-12	2017-12-12
haojintech	Coaxial Cable	Cable-3	003	2016-12-12	2017-12-12
MICRO-COAX	Coaxial Cable	Cable-4	004	2016-12-12	2017-12-12
MICRO-COAX	Coaxial Cable	Cable-5	005	2016-12-12	2017-12-12
MICRO-COAX	Coaxial Cable	Cable-7	007	2016-12-12	2017-12-12
HP	Signal Generator	8341B	2624A00116	2016-08-29	2017-08-29
RF Conducted test					
BACL	TS 8997 Cable-01	T-KS-EMC086	T-KS-EMC086	2016-12-09	2017-12-08
BACL	RF cable	KS-LAB-012	KS-LAB-012	2016-12-15	2017-12-14
WEINSCHEL	10dB Attenuator	5328	N/A	2016-06-18	2017-06-18
Rohde & Schwarz	OSP120 BASE UNIT	OSP120	101247	2016-07-04	2017-07-03
Rohde & Schwarz	Signal Analyzer	FSIQ26	836131/009	2016-09-21	2017-09-21
HEWLETT PACKARD	RF Communications Test SET	8920A	3438A05201	2016-09-21	2017-09-21
HONOVA	Power Splitter	ZFRSC-14-S+	019411452	2016-06-12	2017-06-12

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

FCC §1.1307(b) & §2.1093 - RF EXPOSURE

Applicable Standard

According to FCC §1.1307(b) and §2.1093, protable device operates Part 95 should be subjected to rountine environmental evaluation for RF exposure prior or equipment authorization or use.

Result: Compliance.

Please refer to SAR Report Number: RSZ170502006-20.

FCC §2.1046, §95.639(h) - RF OUTPUT POWER

Applicable Standard

Per FCC §95.639 (h) No MURS unit, under any condition of modulation, shall exceed 2 Watts transmitter power output.

Test Procedure

Conducted RF Output Power:

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

Spectrum Analyzer Setting:

R B/W	Video B/W
100 kHz	300 kHz

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	100.0 kPa

The testing was performed by Poboo Li on 2017-05-15.

Test Mode: Transmitting

Frequency (MHz)	Power Level	Output Power (dBm)	Output Power (W)	Limit (W)	Result
151.82	H	32.82	1.91	2	Pass
	L	29.44	0.88	2	Pass
151.88	H	32.81	1.91	2	Pass
	L	29.42	0.87	2	Pass
151.94	H	32.80	1.91	2	Pass
	L	29.42	0.87	2	Pass
154.57	H	32.83	1.92	2	Pass
	L	29.25	0.84	2	Pass
154.60	H	32.83	1.92	2	Pass
	L	29.24	0.84	2	Pass

Note:
The Rated High power is 2W.
The Rated Low power is 1W.

FCC §2.1049 & §95.633(f) & §95.635(e)- AUTHOURIZED BANDWIDTH AND EMISSION MASK

Applicable Standard

According to §95.633(f), the authorized bandwidth for any emission type transmitted by a MURS transmitter is specified as follows:

(1) Emissions on frequencies 151.820 MHz, 151.880 MHz, and 151.940 MHz are limited to 11.25 kHz.

(2) Emissions on frequencies 154.570 and 154.600 MHz are limited to 20.0 kHz.

(3) Provided, however, that all A3E emissions are limited to 8 kHz.

According to §95.635(e), for transmitters designed to operate in the MURS, transmitters shall comply with the following:

Frequency	Mask with audio low pass filter	Mask without audio low pass filter
151.820 MHz, 151.880 MHz and 151.940 MHz	(1)	(1)
154.570 MHz and 154.600 MHz	(2)	(3)

(1) Emission Mask 1—For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

(i) On any frequency from the center of the authorized bandwidth f_o to 5.625 kHz removed from f_o: Zero dB.

(ii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.625 kHz but no more than 12.5 kHz: at least 7.27(f_d–2.88 kHz) dB.

(iii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz: at least 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation.

(2) Emission Mask 2—For transmitters designed to operate with a 25 kHz channel bandwidth that are equipped with an audio low-pass filter, the power of any emission must be below the unmodulated carrier power (P) as follows:

(i) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: at least 25 dB.

(ii) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: at least 35 dB.

(iii) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: at least 43 + 10 log (P) dB.

(3) Emission Mask 3—For transmitters designed to operate with a 25 kHz channel bandwidth that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier output power (P) as follows:

(i) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5 kHz, but not more than 10 kHz: at least 83 log (f_d /5) dB.

(ii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 10 kHz, but not more than 250 percent of the authorized bandwidth: at least 29 log (f_d ^{2}/11) dB or 50 dB, whichever is the lesser attenuation.

(iii) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: at least 43 + 10 log (P) dB.

Test Procedure

TIA-603-D, section 2.2.11

Test Data

Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

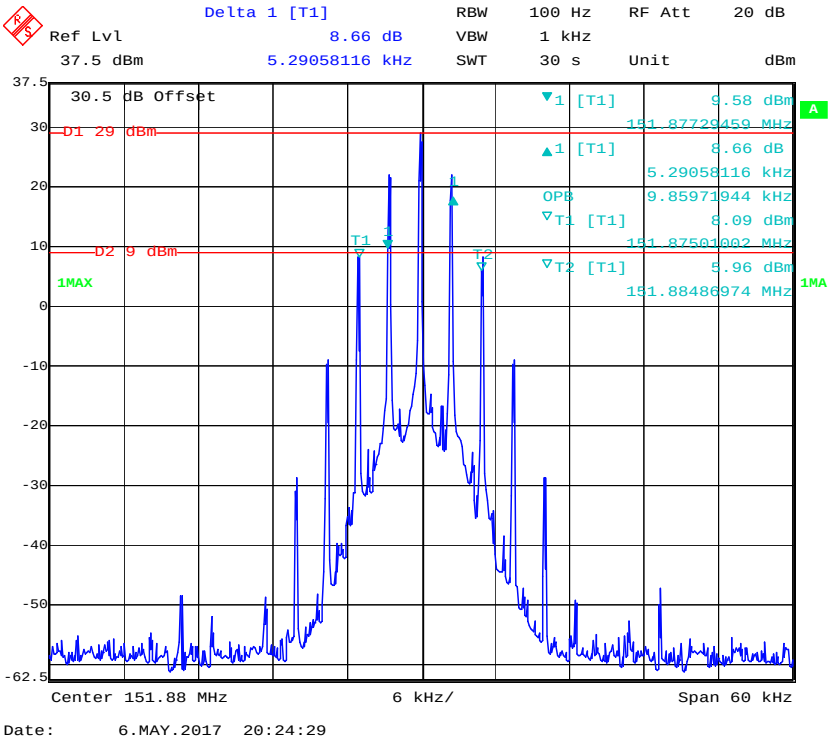
The testing was performed by Poboo Li on 2017-05-06.

Test Mode: Transmitting

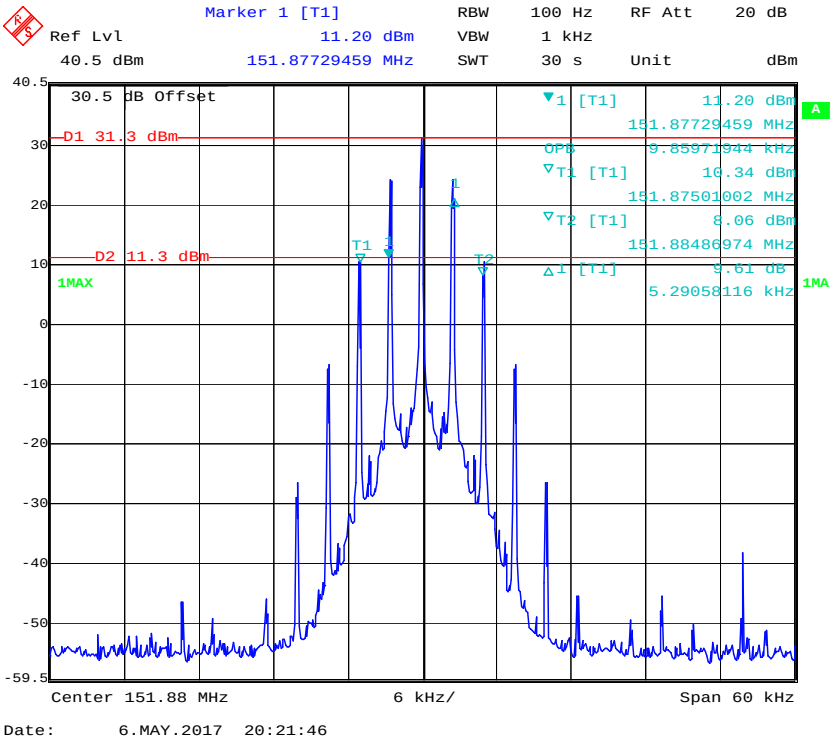
Frequency (MHz)	Power Level	20dB Bandwidth (kHz)	99% Occupied Bandwidth (kHz)	Limit (kHz)	Result
151.88	H	5.29	9.86	11.25	Pass
	L	5.29	9.86	11.25	Pass
154.60	H	15.03	14.67	20.00	Pass
	L	15.39	14.67	20.00	Pass

99% Occupied Bandwidth & 20 dB Emissions Bandwidth:

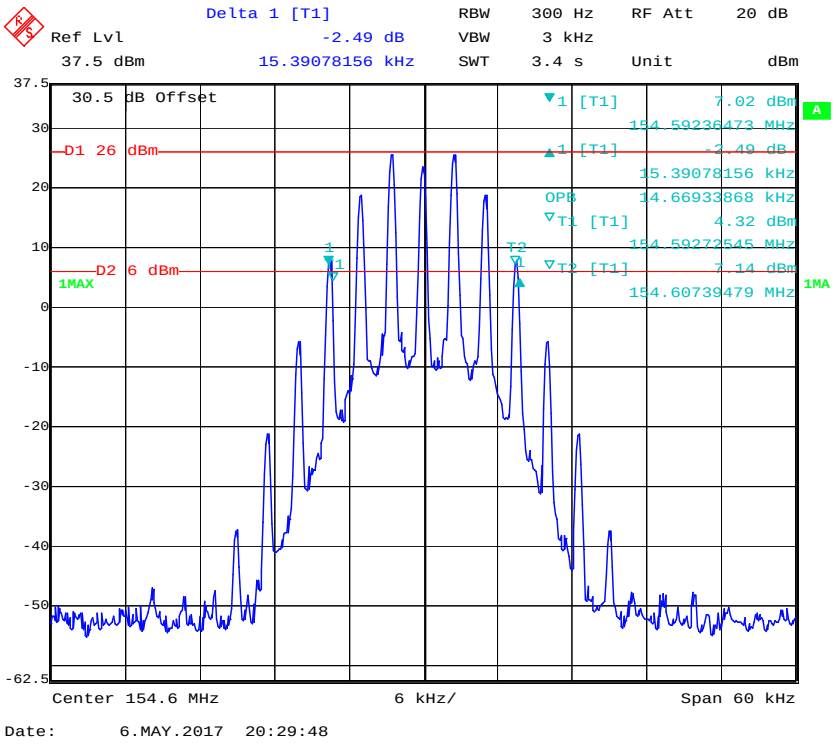
151.88 MHz (Low Power Level)



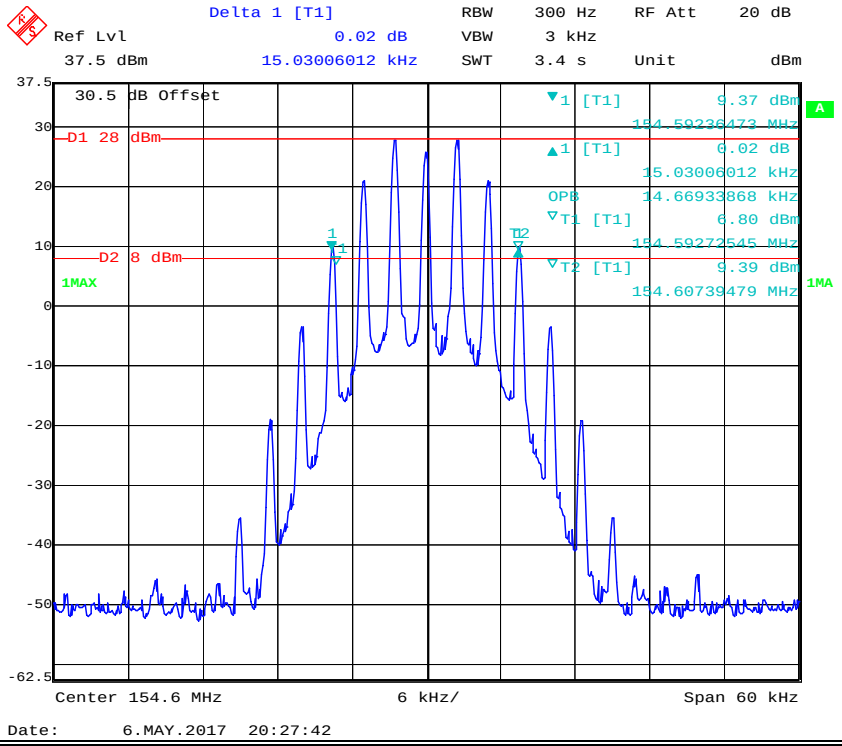
151.88 MHz (High Power Level)



154.60 MHz (Low Power Level)

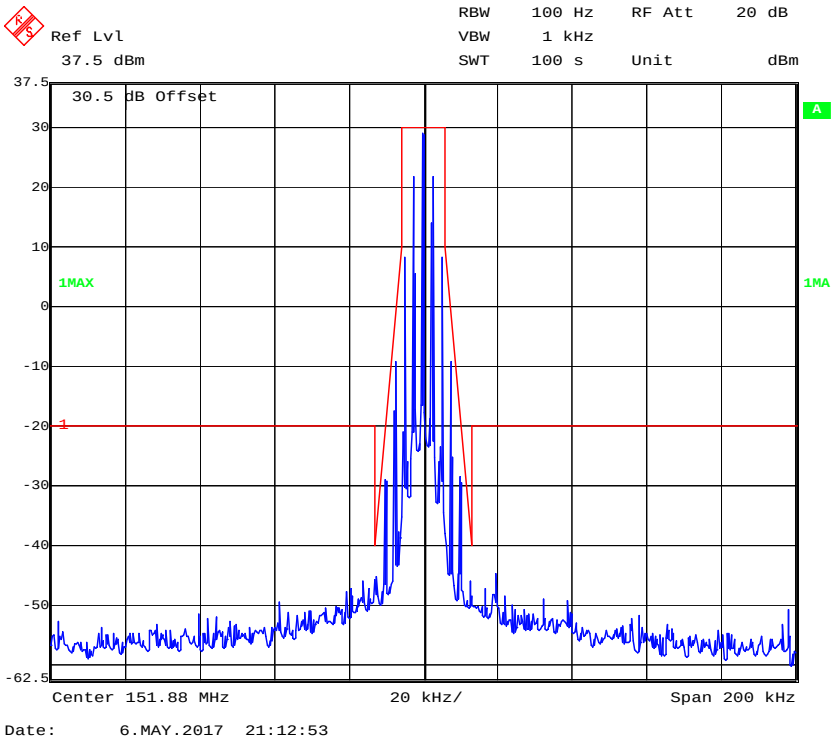


154.60 MHz (High Power Level)

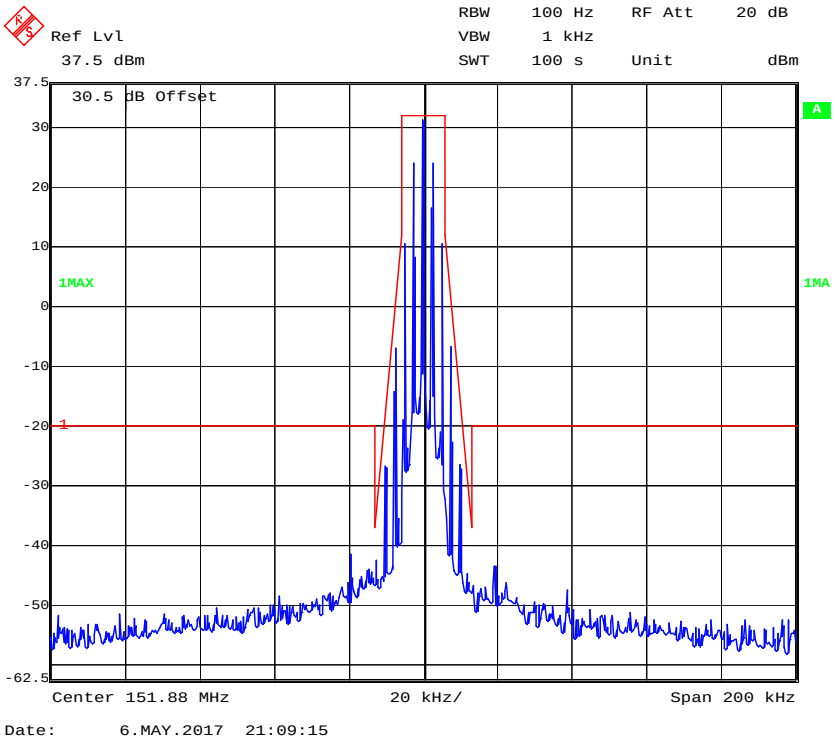


Emission Mask:

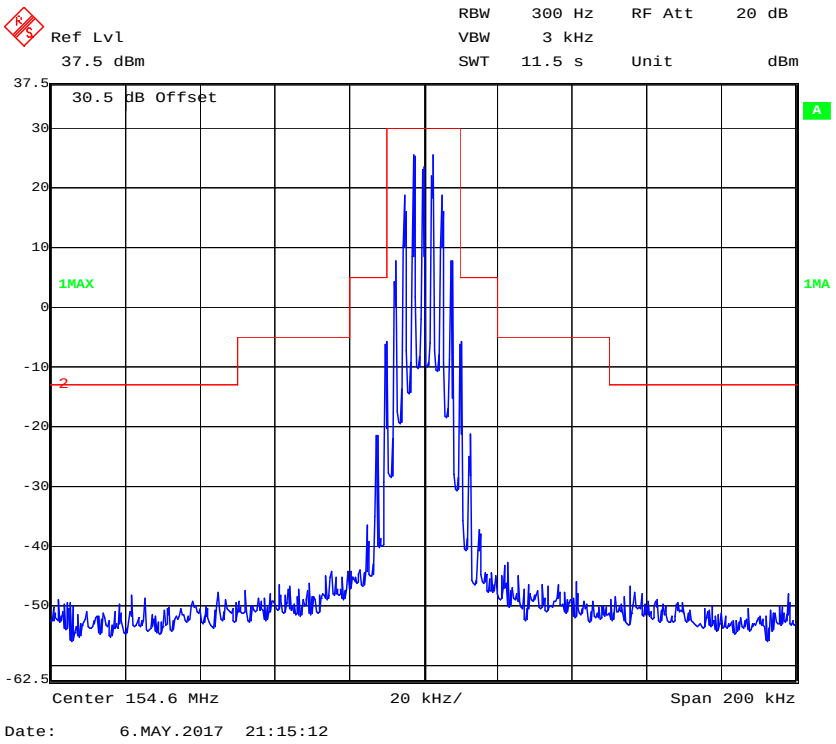
151.88 MHz (Low Power Level)



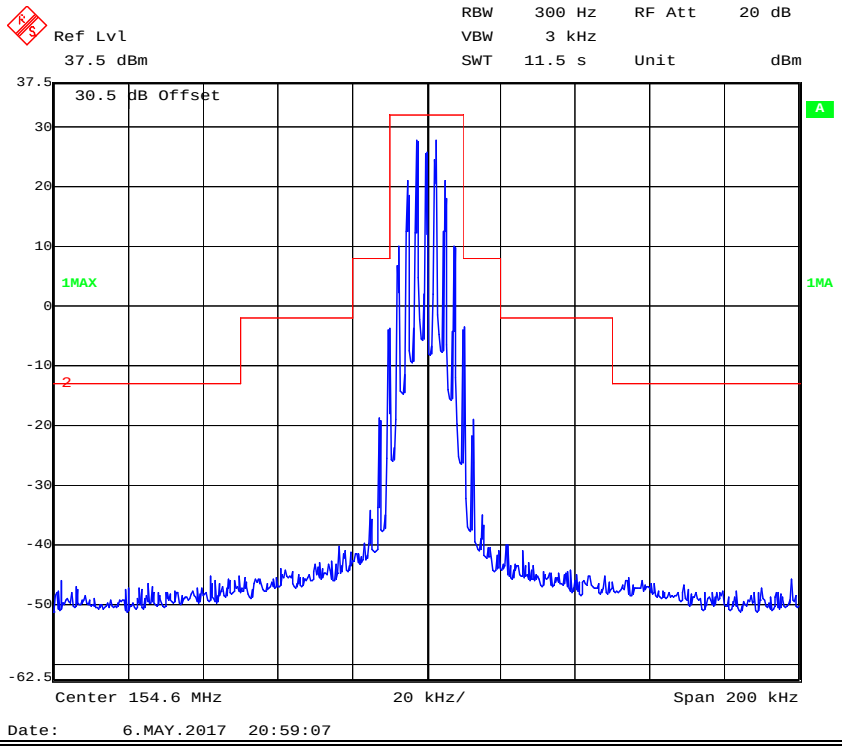
151.88 MHz (High Power Level)



154.60 MHz (Low Power Level)



154.60 MHz (High Power Level)



FCC §2.1051 & §95.635(e) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

According to §95.635(e), for transmitters designed to operate in the MURS, transmitters shall comply with the following:

Spurious emissions in dB =10 1g (TXpwr in Watts/0.001)-the absolute level
For 151.820 MHz, 151.880 MHz and 151.940 MHz:
Spurious attenuation limit in dB = 50+10 Log_{10} (power out in Watts)
For 154.570 MHz and 154.600 MHz:
Spurious attenuation limit in dB = 43+10 Log_{10} (power out in Watts)

Test Procedure

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz for below 1GHz, and 1MHz for above 1GHz. sufficient scans were taken to show any out of band emissions up to 10th harmonic.

Test Data

Environmental Conditions

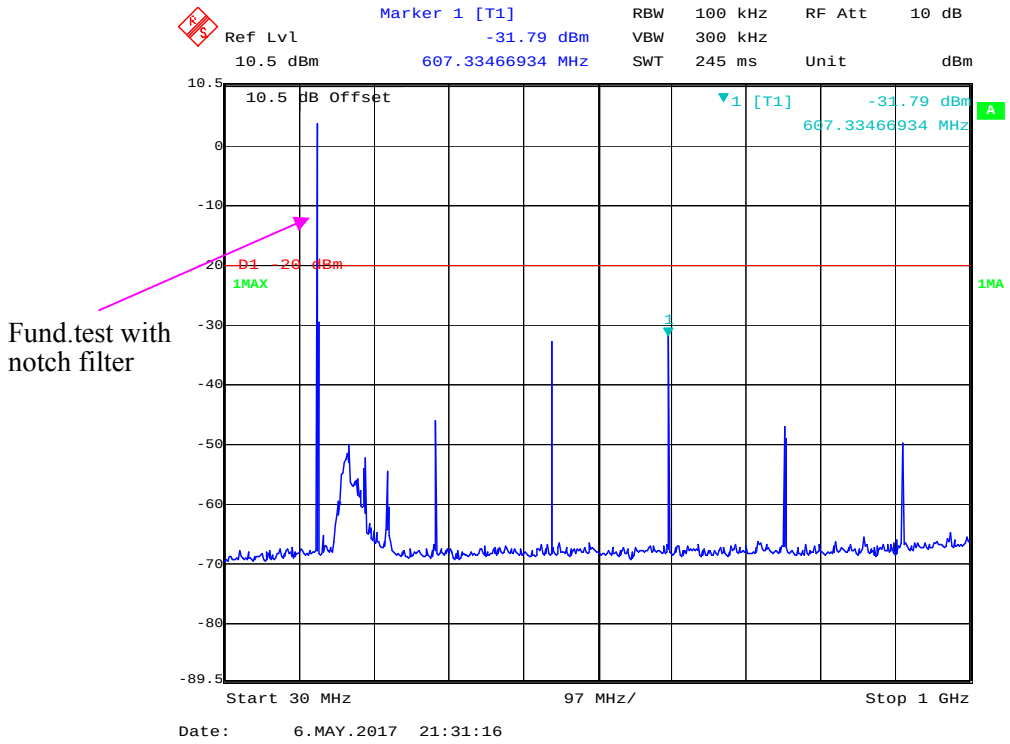
Temperature:	26 ℃
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Poboo Li on 2017-05-06.

Test Mode: Transmitting

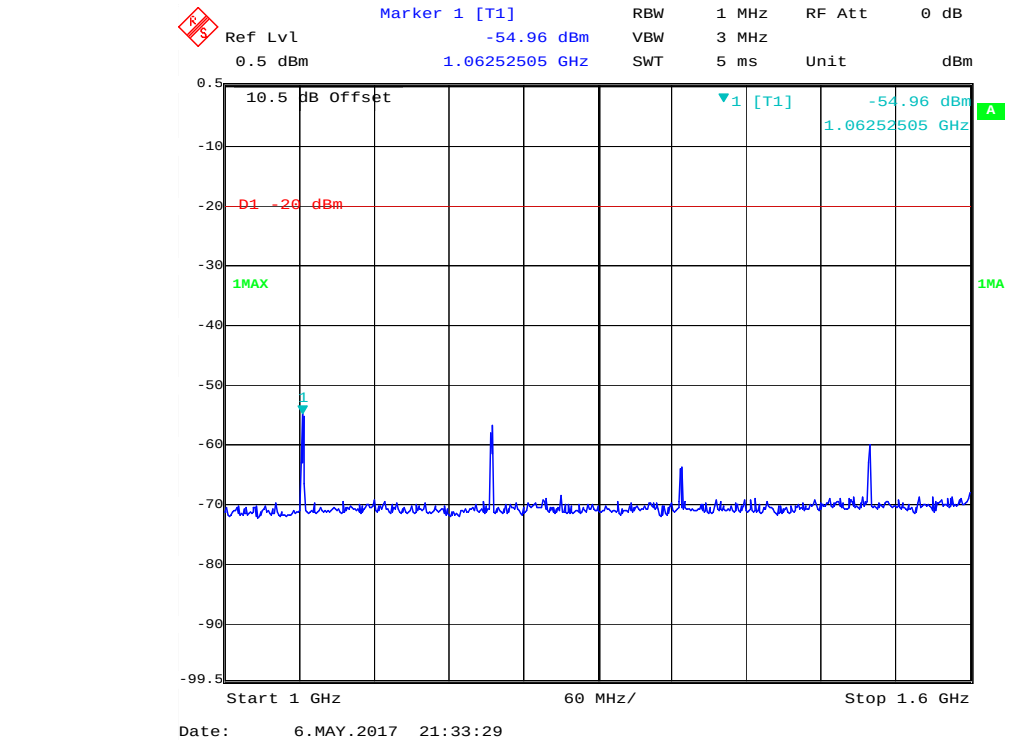
Please refer to the following plots.

30 MHz – 1 GHz, 151.88 MHz

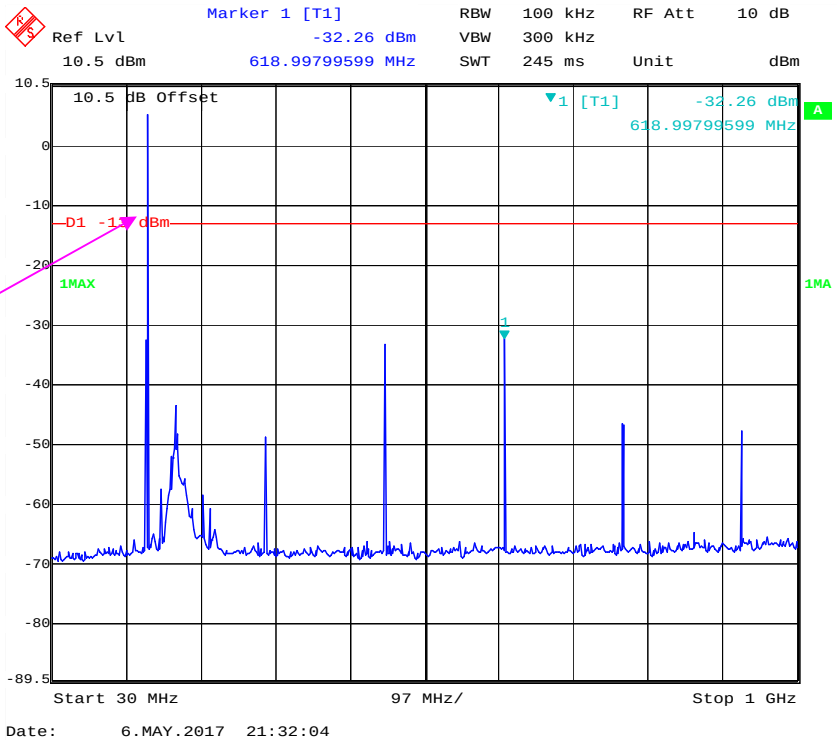


Fund.test with notch filter

1 GHz – 1.6 GHz, 151.88 MHz

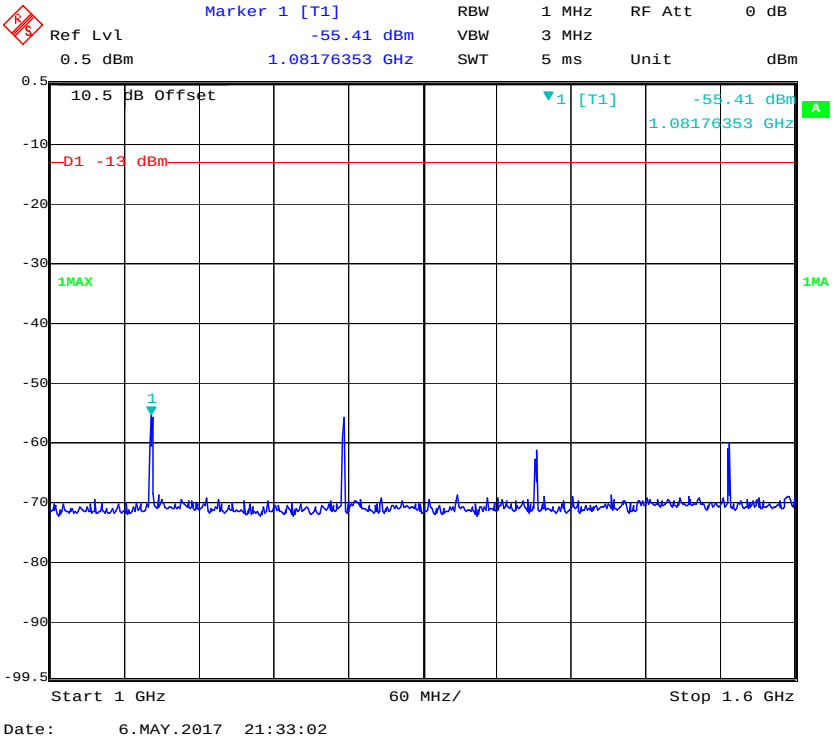


30 MHz – 1 GHz, 154.60 MHz



Fund.test with notch filter

1 GHz – 1.6 GHz, 154.60 MHz



FCC §2.1053 & §95.635(e) - RADIATED SPURIOUS EMISSION

Applicable Standard

FCC §2.1053 and §95.635(e)

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.

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 1g (TXpwr in Watts/0.001)-the absolute level
For 151.820 MHz, 151.880 MHz and 151.940 MHz:
Spurious attenuation limit in dB = 50+10 Log_{10} (power out in Watts)
For 154.570 MHz and 154.600 MHz:
Spurious attenuation limit in dB = 43+10 Log_{10} (power out in Watts)

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Poboo Li on 2017-05-15.

Test Mode: Transmitting

Channel: 151.88MHz

Indicated		Table Angle Degree	Test Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	Receiver Reading (dBuV)		Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
303.76	50.57	263	1.2	H	-59.2	0.2	3.85	-55.55	-20	35.55
303.76	59.08	161	1.6	V	-48.1	0.2	3.85	-44.45	-20	24.45
455.64	55.25	105	1.6	H	-50.2	0.23	4.05	-46.38	-20	26.38
455.64	55.59	110	2.1	V	-46.6	0.23	4.05	-42.78	-20	22.78
607.52	49.68	131	2.4	H	-49.7	0.24	5.35	-44.59	-20	24.59
607.52	39.71	187	1.7	V	-62.2	0.24	5.35	-57.09	-20	37.09
1063.16	37.87	282	1.7	H	-67.1	0.29	7.08	-60.31	-20	40.31
1063.16	39.99	187	1.9	V	-66.8	0.29	7.08	-60.01	-20	40.01

Channel: 154.60 MHz

Indicated		Table Angle Degree	Test Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	Receiver Reading (dBuV)		Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
309.2	49.27	153	1.6	H	-60.5	0.2	3.85	-56.85	-13	43.85
309.2	62.58	350	2.3	V	-44.6	0.2	3.85	-40.95	-13	27.95
463.8	50.55	19	1.5	H	-54.9	0.23	4.05	-51.08	-13	38.08
463.8	49.29	336	1.4	V	-52.9	0.23	4.05	-49.08	-13	36.08
618.4	37.38	145	1.6	H	-62.0	0.24	5.35	-56.89	-13	43.89
618.4	46.91	200	1.3	V	-55.0	0.24	5.35	-49.89	-13	36.89
1082.20	38.57	45	1.3	H	-66.4	0.29	7.08	-59.61	-13	46.61
1082.20	40.39	242	2.1	V	-66.4	0.29	7.08	-59.61	-13	46.61

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

FCC§2.1055 (d), §95.632(c) - FREQUENCY STABILITY

Applicable Standard

According to FCC §2.1055(a) (1), the frequency stability shall be measured with variation of ambient temperature from –30 ºC to +50 ºC, 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 §95.632(c), MURS transmitters must maintain a frequency stability of 5.0 ppm, or 2.0 ppm if designed to operate with a 6.25 kHz bandwidth.

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:

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

Temperature:	25 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Poboo Li on 2017-05-15.

Test Mode: Transmitting

MURS: 151.88 MHz

Reference Frequency: 151.88 MHz, Limit: ±5 ppm			
Environment Temperature (℃)	**Voltage Supplied (V_{DC})**	**Measurement Frequency (MHz)**	**Frequency Error (ppm)**
Frequency Stability Ver. Temperature			
50	7.4	151.880625	4.115
40	7.4	151.880617	4.062
30	7.4	151.880638	4.201
20	7.4	151.880601	3.957
10	7.4	151.880629	4.141
0	7.4	151.880641	4.220
-10	7.4	151.880626	4.122
-20	7.4	151.880637	4.194
-30	7.4	151.880657	4.326
Frequency Stability Ver. Input Voltage			
20	6.5	151.880669	4.405

MURS: 154.60 MHz

Reference Frequency: 154.60 MHz, Limit: ±5 ppm			
Environment Temperature (℃)	**Voltage Supplied (V_{DC})**	**Measurement Frequency (MHz)**	**Frequency Error (ppm)**
Frequency Stability Ver. Temperature			
50	7.4	154.600621	4.017
40	7.4	154.600634	4.101
30	7.4	154.600615	3.978
20	7.4	154.600601	3.887
10	7.4	154.600624	4.036
0	7.4	154.600639	4.133
-10	7.4	154.600657	4.250
-20	7.4	154.600632	4.088
-30	7.4	154.600626	4.049
Frequency Stability Ver. Input Voltage			
20	6.5	154.600674	4.360

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