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TEST REPORT

Report Reference No. ..... :	**TRE1801017701**	R/C…….: 58088
FCC ID ..... :	**2ANWO-HOTSHOT**	
Applicant's name ..... :	**HOT SHOT SYSTEMS INC.**	
Address.....:	1005 E. 17TH, HAYS, Kansas, United States	
Manufacturer.....:	HOT SHOT SYSTEMS INC.	
Address.....:	1005 E. 17TH, HAYS, Kansas, United States	
Test item description ..... :	**TR-1000**	
Trade Mark .....:	Hot Shot TR-1000	
Model/Type reference.....:	TR-1000	
Listed Model(s) .....:	-	
Standard ..... :	**FCC Part 95**	
Date of receipt of test sample……...:	Jan. 25, 2018	
Date of testing……..……:	Jan. 25, 2018 –Feb. 06, 2018	
Date of issue……..……...:	Feb. 06, 2018	
Result.....……...:	**PASS**	
Compiled by (position+printed name+signature)..:	File administrators Shayne Zhu	Shayne Zhu
Supervised by (position+printed name+signature)..:	Project Engineer Cary Luo	Cary Luo
Approved by (position+printed name+signature)..:	RF Manager Hans Hu	Hans Hu
Testing Laboratory Name ..... :	**Shenzhen Huatongwei International Inspection Co., Ltd.**	
Address.....:	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China	

Contents

1. TEST STANDARDS AND REPORT VERSION

1.1. Test Standards

The tests were performed according to following standards:
FCC Rules Part 2: Frequency allocations and radio treaty matters; General rules and regulations
FCC Rules Part 95E:PERSONAL RADIO SERVICES- General Mobile Radio Service
TIA/EIA 603 D: June 2010 Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.
ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

1.2. Report version information

Revision No.	Date of issue	Description
N/A	2018-02-06	Original

2. Test Description

Transmitter Requirement			
Test item	Standards requirement	Result	
		Pass	N/A
Maximum Transmitter Power	FCC Part 95.2767, FCC Part 2.1046	☒	
Occupied Bandwidth	FCC Part 95.2773, FCC Part 2.1049	☒	
Emission Mask	FCC Part 95.2779, FCC Part 2.1049	☒	
Frequency Stability	FCC Part 95.2765, FCC Part 2.1055	☒	
Audio Low Pass Filter Response	FCC Part 95.2775		☒
Transmitter Radiated Spurious Emission	FCC Part 95.2779,FCC Part 2.1053	☒	
Spurious Emission On Antenna Port	FCC Part 95.2779,FCC Part 2.1053	☒	

3. SUMMARY

3.1. Client Information

Applicant:	HOT SHOT SYSTEMS INC
Address:	1005 E. 17TH, HAYS, Kansas, United States
Manufacturer:	HOT SHOT SYSTEMS INC
Address:	1005 E. 17TH, HAYS, Kansas, United States

3.2. Product Description

Name of EUT:	TR-1000
Trade mark:	Hot Shot TR-1000
Model/Type reference:	TR-1000
Listed model(s):	-
Power supply:	-
Battery information:	-
Charger information:	-
Adapter information:	-
Operation Frequency Range:	151.82 MHz, 151.88 MHz, 151.94 MHz, 154.57 MHz,154.60MHz
Rated Output Power:	2W (33.01dBm)
Modulation Type:	FM(Analog)
Channel Separation:	☒ 12.5kHz ☒ 25kHz
Emission Designator*:	☒ 12.5kHz Channel Separation: 11K0F3E ☒ 25kHz Channel Separation: 16K0F3E
Antenna Type:	External
Maximum Transmitter Power:	1.45W for 12.5kHz Channel Separation 1.89W for 25kHz Channel Separation

Note:

(1) *1 According to FCC Part 2.202 requirements, the Necessary Bandwidth is calculated as follows:

- For FM Voice Modulation

  Channel Spacing = 12.5 KHz, D = 2.5 KHz max, K = 1, M = 3 KHz

  Bn = 2M + 2DK = 2*3 + 2*2.5*1 = **11 KHz**

  Emission designation: 11K0F3E

  Channel Spacing = 25 KHz, D = 5 KHz max, K = 1, M = 3 KHz

  Bn = 2M + 2DK = 2*3 + 2*5*1 = **16 KHz**

  Emission designation: 16K0F3E

(2) The device only supports voice communication.

3.3. Test frequency list

Mode	Modulation	Channel Separation(kHz)	Test Frequency (MHz)	
Analog	FM	12.5	CH_L	151.82
			CH_{M1}	151.88
			CH_{M2}	151.94
		25	CH_{M2}	154.57
			CH_H	154.60

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3.4. EUT operation mode

Test mode	Transmitting	Analog	
		12.5kHz	25kHz
TX1	√	√	
TX2	√		√

√: is operation mode.

3.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

○	Power Cable	Length (m) :	/
		Shield :	Unshielded
		Detachable :	Undetachable
○	Multimeter	Manufacturer :	/
		Model No. :	/

4. TEST ENVIRONMENT

4.1. Address of the test laboratory

Laboratory: Shenzhen Huatongwei International Inspection Co., Ltd.
Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China
Phone: 86-755-26748019 Fax: 86-755-26748089

4.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:
CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No.: 3902.01

Shenzhen Huatongwei International Inspection 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.

FCC-Registration No.: 762235

Shenzhen Huatongwei International Inspection 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. Registration 762235.

IC-Registration No.: 5377B-1

Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377B-1.

ACA

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

4.3. Environmental conditions

Normal Conditon	
Relative humidity:	20 % to 75 %.
Air Pressure:	950~1050mba
Voltage:	AC 120V/60Hz

4.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Huatongwei International Inspection 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 Huatongwei laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Frequency stability	25 Hz	(1)
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	1.60 dB	(1)
Conducted Emission 9KHz-30MHz	3.39 dB	(1)
Radiated Emission 30~1000MHz	4.65 dB	(1)
Radiated Emission 1~18GHz	5.16 dB	(1)
Radiated Emission 18-40GHz	5.54 dB	(1)
Occupied Bandwidth	35 Hz	(1)
FM deviation	25 Hz	(1)
Audio level	0.62 dB	(1)
Low Pass Filter Response	0.76 dB	(1)

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

4.5. Equipments Used during the Test

All conducted test items					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. (mm/dd/yy)
1	RF Communication Test Set	HP	8920A	3813A10206	11/11/2017
2	Digital intercom COMM.TESRER	Aeroflex	3920B	1001682041	11/11/2017
3	Signal Generator	R&S	SML02	100507	11/11/2017
4	Signal Generator	IFR	2032	203002\100	11/11/2017
5	RF Control Unit	Tonscend	JS0806-2	N/A	11/11/2017
6	Spectrum Analyzer	R&S	FSW26	103440	11/11/2017
7	Climate Chamber	ESPEC	GPL-2	----	11/10/2017
8	Attenuator	Chengdu E-Microwave	EMCAXX-10RNZ-3	----	11/11/2017
9	High-Pass Filter	OCEN	OSP-HPF26300P20-LC	----	N/A
10	High-Pass Filter	OCEN	OSP-HPF60300P20-LC	----	N/A
11	Variable DC Power Supply	GWINSTEK	SPS-2415	----	N/A
12	Storage Oscilloscope	Tektronix	TDS3054B	B033027	11/11/2017

Radiated Spurious Emissions					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. (mm/dd/yy)
1	Horn Antenna	SCHWARZBECK	9120D	1011	3/27/2017
2	Spectrum Analyzer	R&S	FSP40	100597	11/11/2017
3	Broadband Preamplifer	SCHWARZBECK	BBV 9718	9718-248	10/18/2017
4	Turntable	Maturo Germany	TT2.0-1T	N/A	N/A
5	Antenna Mast	Maturo Germany	CAM-4.0-P-12	N/A	N/A
6	Test Software	R&S	E3	N/A	N/A
7	Ultra-Broadband Antenna	SCHWARZBECK	VULB9163	538	4/5/2017
8	Pre-amplifer	SCHWARZBECK	BBV 9743	9743-0022	10/18/2017
9	RF Connection Cable	HUBER+SUHNER	3m 18GHz S Serisa	N/A	11/21/2017
10	RF Connection Cable	HUBER+SUHNER	3m 3GHz S Serisa	N/A	11/21/2017
11	RF Connection Cable	HUBER+SUHNER	3m 3GHz RG Serisa	N/A	11/21/2017
12	RF Connection Cable	HUBER+SUHNER	6m 18GHz S Serisa	N/A	11/21/2017
13	RF Connection Cable	HUBER+SUHNER	6m 18GHz S Serisa	N/A	N/A
14	RF Connection Cable	HUBER+SUHNER	3m 18GHz S Serisa	N/A	N/A
15	High-Pass Filter	Anritsu	MP526D	6220878392	11/11/2017
16	High-Pass Filter	OCEN	OSP-HPF26300P20-LC	----	N/A
17	High-Pass Filter	OCEN	OSP-HPF60300P20-LC	----	N/A

18	RF Connection Cable	HUBER+SUHNER	MULTIFLEX 141	N/A	11/21/2017

Conducted Disturbance					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. (mm/dd/yy)
1	EMI Test Receiver	R&S	ESCI	101247	11/11/2017
2	Artificial Mains	SCHWARZBECK	NNLK 8121	573	11/11/2017
3	Pulse Limiter	R&S	ESH3-Z2	101488	11/11/2017
4	Test Software	R&S	ES-K1	N/A	N/A
5	RF Connection Cable	HUBER+SUHNER	EF400	N/A	11/21/2017
6	2-Line V-Network	R&S	ESH3-Z5	100049	11/11/2017

The Cal. Interval was one year.

5. TEST CONDITIONS AND RESULTS

5.1. Maximum Transmitter Power

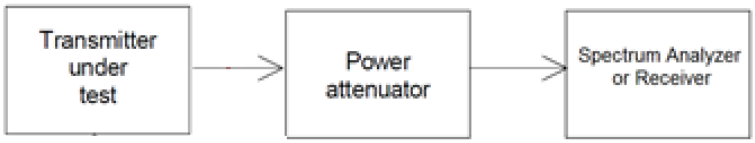
Applicants for licenses must request and use no more power than the actual power necessary for satisfactory operation.

LIMIT

FCC Part 95.2741， FCC Part 2.1046

The highest point of any MURS station antenna must not be more than 18.3 meters (60 feet) above the ground or 6.10 meters (20 feet) above the highest point of the structure on which it is mounted. MURS station antennas must also meet the requirements in §95.317 regarding menaces to air navigation. See 47 CFR 95.317 and consult part 17 of the FCC's Rules for more information (47 CFR part 17).

TEST CONFIGURATION



TEST PROCEDURE

Measurements shall be made to establish the radio frequency power delivered by the transmitter the standard output termination. The power output shall be monitored and recorded and no adjustment shall be made to the transmitter after the test has begun, except as noted bellow:
If the power output is adjustable, measurements shall be made for the highest and lowest power levels.
Connect the equipment as illustrated.

TEST MODE:

Please reference to the section 3.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Please refer to the below test data:

Operation Mode	Test Frequency (MHz)	Measured power (dBm)	Measured power (W)	Limit (W)	Result
TX1	CH_L	31.35	1.36	<2	Pass
	CH_{M1}	31.61	1.45		
	CH_{M2}	31.57	1.44		
TX2	CH_{M3}	32.77	1.89		
	CH_H	32.77	1.89		

5.2. Occupied Bandwidth

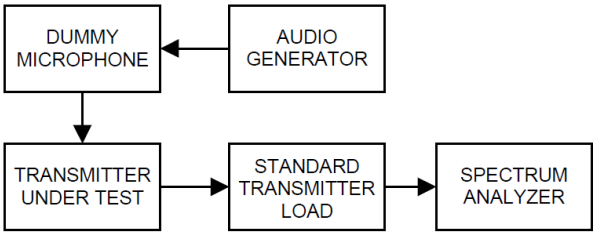
The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits.

LIMIT

FCC Part 95.2773, FCC Part 2.1049

Each MURS transmitter type must be designed to meet the emission bandwidth limitations in this section.
(a) The occupied bandwidth of emissions transmitted on the center frequencies 151.820 MHz, 151.880 MHz, and 151.940 MHz must not exceed 11.25 kHz.
(b) The occupied bandwidth of emissions transmitted on the center frequencies 154.570 MHz and 154.600 MHz must not exceed 20.0 kHz.
(c) The occupied bandwidth of type A3E emissions must not exceed 8.0 kHz.

TEST CONFIGURATION



TEST PROCEDURE

1 The EUT was modulated by 2.5kHz sine wave audio signal; the level of the audio signal employed is 16dB greater than that necessary to produce 50% of rated system deviation.
2 Spectrum set as follow:
Centre frequency = fundamental frequency, span=50kHz for 12.5kHz channel spacing,
RBW=100Hz, VBW=300Hz, Sweep = auto,
Detector function = peak, Trace = max hold
3 Set 99% Occupied Bandwidth and 26dB Occupied Bandwidth
4 Measure and record the results in the test report.

TEST MODE:

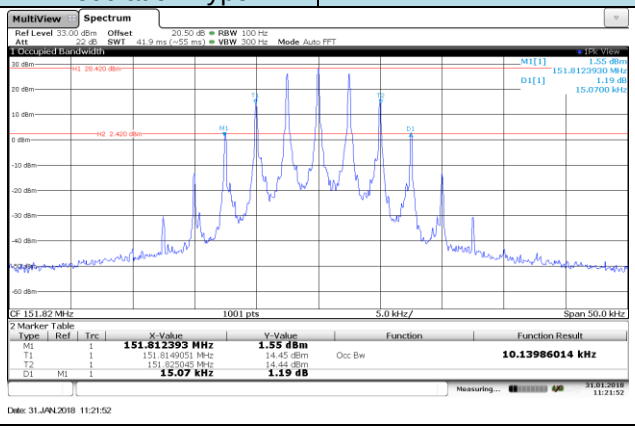
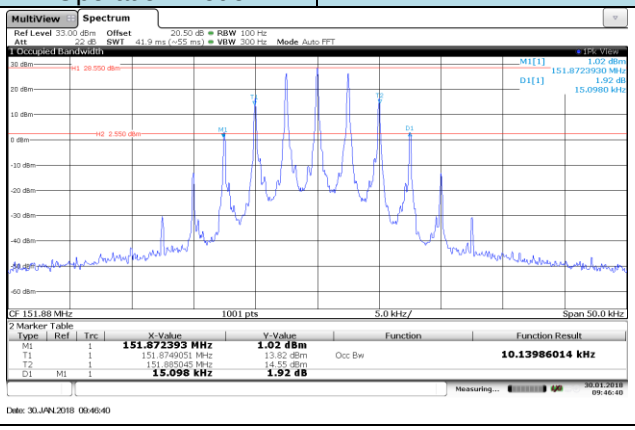
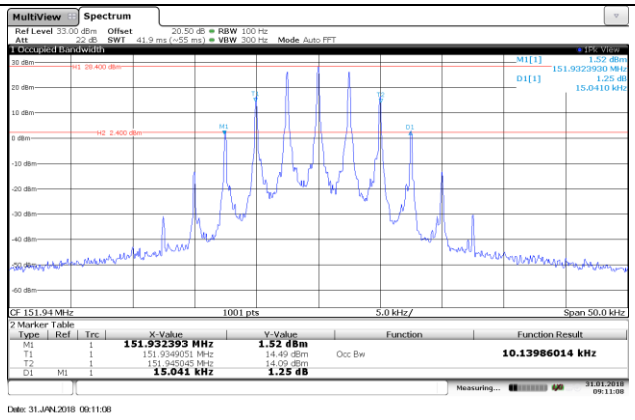
Please reference to the section 3.4

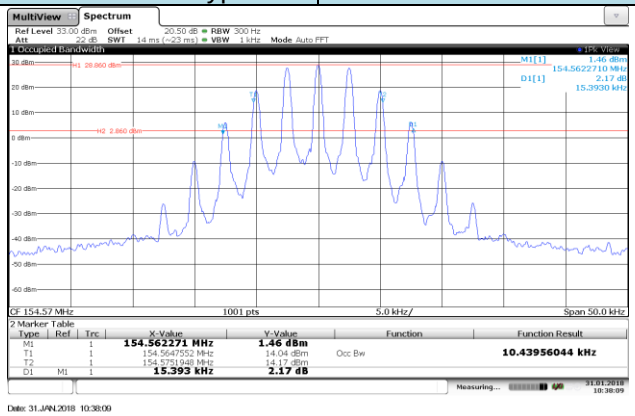
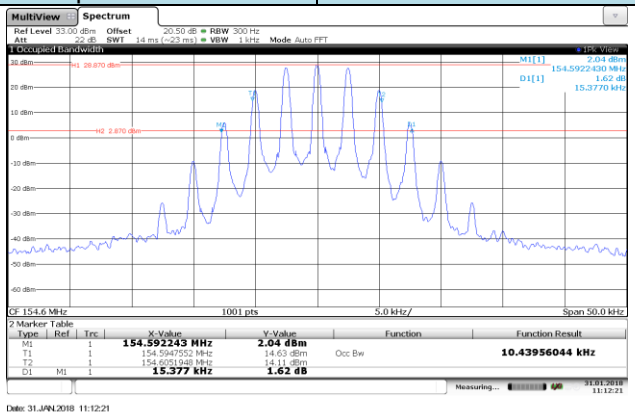
TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Operation Mode	Test Frequency (MHz)	Occupied Bandwidth (kHz)		99% Occupied Bandwidth Limit(kHz)	Result
		99%	26dB		
TX1	CH_L	10.140	15.070	≤11.25	Pass
	CH_{M1}	10.140	15.098		
	CH_{M2}	10.140	15.041		
TX2	CH_{M3}	10.440	15.393	≤20.00	
	CH_H	10.440	15.377		

Test plot as follows:

Modulation Type	FM	Operation Mode	TX1
			
CH_L		CH_{M1}	
		Not plot	
CH_{M2}		-	

Modulation Type	FM	Operation Mode	TX2
			
CH_{M3}		CH_H	

5.3. Emission Mask

Transmitters used in the radio services governed by this part must comply with the emission masks outlined in this section.

LIMIT

FCC Part 95.2779,FCC Part 2.1049

(a) Emission masks. Emission masks applicable to transmitting equipment in the MURS are defined by the requirements in the following table. The numbers in the paragraphs column refer to attenuation requirement rule paragraph numbers under paragraph (b) of this section. The words “audio filter” refer to the audio filter described in §95.2775.

Channel center frequencies (MHz)	Paragraphs
151.820, 151.880 and 151.940	(1), (2).
154.570 & 154.600, with audio filter	(3), (4), (7).
154.570 & 154.600, without audio filter	(5), (6), (7).

(1) Each MURS transmitter type that transmits F3E or G3E emissions on 154.570 MHz or 154.600 MHz and incorporates an audio filter satisfying the requirements of §95.2775 in its design may comply with the less stringent unwanted emissions attenuation requirements set forth in paragraphs (b)(3), (4), and (7) of this section.

(2) Each MURS transmitter type that transmits on 154.570 MHz or 154.600 MHz, but does not incorporate an audio filter satisfying the requirements of §95.2775 in its design, must comply with the unwanted emissions attenuation requirements set forth in paragraphs (b)(5) through (7) of this section.

(b) Attenuation requirements. The power of unwanted emissions must be attenuated below the transmitter output power in Watts (P) by at least:

(1) 7.27(f_d−2.88 kHz) dB on any frequency removed from the channel center frequency by a displacement frequency (fd in kHz) that is more than 5.625 kHz, but not more than 12.5 kHz.

(2) 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation, on any frequency removed from the channel center frequency by more than 12.5 kHz.

(3) 25 dB on any frequency removed from the channel center frequency by more than 10 kHz, but not more than 20 kHz.

(4) 35 dB on any frequency removed from the channel center frequency by more than 20 kHz, but not more than 50 kHz.

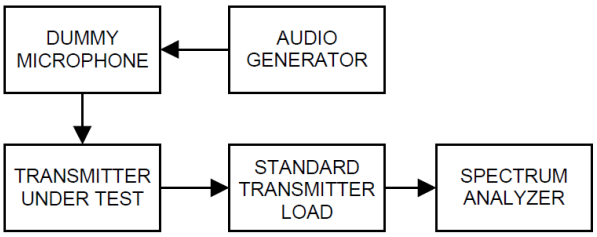
(5) 83 log (f_d ÷ 5) dB on any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) that is more than 5 kHz, but not more than 10 kHz.

(6) 29 log (f_d^2 ÷ 11) dB or 50 dB, whichever is the lesser attenuation on any frequency removed from the channel center frequency by a displacement frequency (fd in kHz) that is more than 10 kHz, but not more than 50 kHz.

(7) 43 + 10 log(P) dB on any frequency removed from the channel center frequency by more than 50 kHz.

(c) Measurement bandwidths. The power of unwanted emissions in the frequency bands specified in paragraphs (b)(1) and (3) through (6) of this section is measured with a reference bandwidth of 300 Hz. The power of unwanted emissions in the frequency ranges specified in paragraphs (b)(2) and (7) of this section is measured with a reference bandwidth of at least 30 kHz.

TEST CONFIGURATION



TEST PROCEDURE

1 Connect the equipment as illustrated.

2 Spectrum set as follow:
Centre frequency = fundamental frequency, span=120kHz ,RBW=300Hz, VBW=1kHz,
Sweep = auto, Detector function = peak, Trace = max hold

3 Key the transmitter, and set the level of the unmodulated carrier to a full scale reference line. This is the 0dB reference for the measurement.

4 Modulate the transmitter with a 2500 Hz sine wave at an input level 16 dB greater than that necessary to

produce 50% of rated system deviation. The input level shall be established at the frequency of maximum response of the audio modulating circuit. Transmitters employing digital modulation techniques that bypass the limiter and the audio low-pass filter shall be modulated as specified by the manufacturer

5 Measure and record the results in the test report.

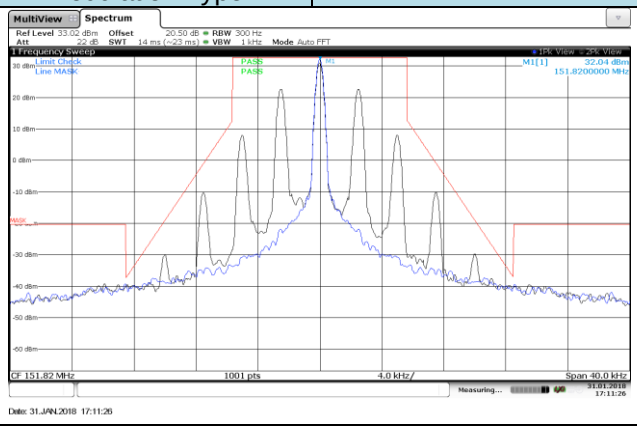
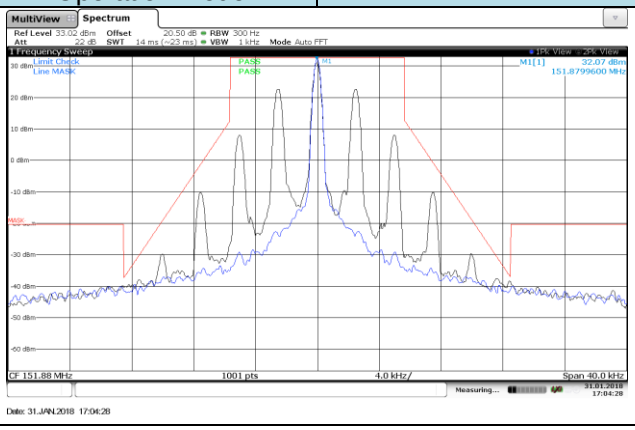
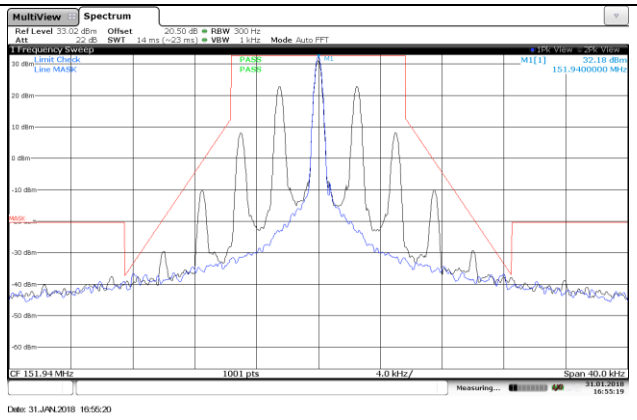
TEST MODE:

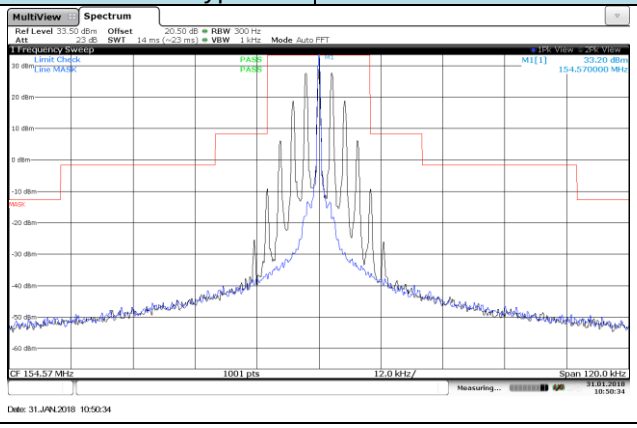
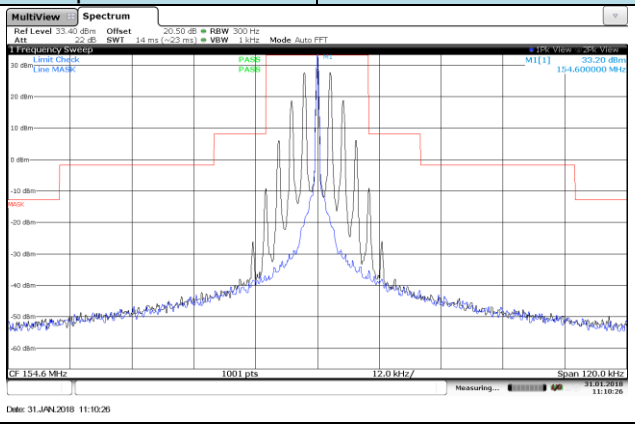
Please reference to the section 3.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Note: The device with audio filter.

Modulation Type	FM	Operation Mode	TX1
			
CH_L		CH_{M1}	
		Not plot	
CH_{M2}		-	

Modulation Type	FM	Operation Mode	TX2
			
CH_{M3}		CH_H	

5.4. Frequency Stability Test

The carrier frequency stability is the ability of the transmitter to maintain an assigned carrier frequency.

LIMIT

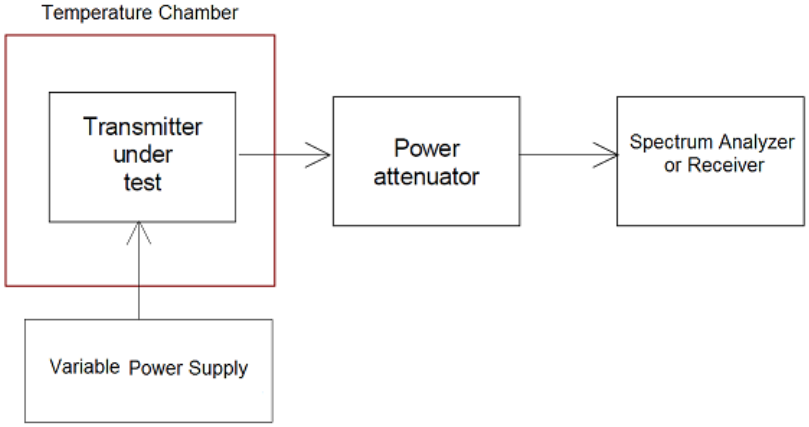
FCC Part 95.2765,FCC Part 2.1055

Each MURS transmitter type must be designed to meet the applicable frequency tolerance and stability requirements of this section.

(a) MURS transmitters that operate with an emission bandwidth of 6.25 kHz or less must be designed such that the carrier frequencies remain within ±2.0 parts-per-million (ppm) of the channel center frequencies specified in §95.2763 during normal operating conditions.

(b) MURS transmitters that operate with an emission bandwidth greater than 6.25 kHz must be designed such that the carrier frequencies remain within ±5.0 ppm of the channel center frequencies specified in §95.2763 during normal operating conditions.

TEST CONFIGURATION



TEST PROCEDURE

1. According to FCC Part 2 Section 2.1055 (a)(1), the frequency stability shall be measured with variation of ambient temperature from -30℃ to +50℃.
2. According to FCC Part 2 Section 2.1055 (d) (2), for battery powered equipment, the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point, which is specified by the manufacture.
3. Vary primary supply voltage from 85 %to 115% of power supply.
4. The EUT was set in the climate chamber and connected to an external AC 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 MODE:

Please reference to the section 3.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

TX1						
Test conditions		Frequency error (ppm)			Limit (ppm)	Result
Voltage(V)	Temp(℃)	CH_L	CH_{M1}	CH_{M2}		
120	-30	0.196	0.077	0.087	±5	Pass
	-20	0.120	0.106	0.126		
	-10	0.182	0.129	0.170		
	0	0.210	0.170	0.031		
	10	0.185	0.127	0.184		
	20	0.119	0.086	0.099		
	30	0.117	0.121	0.148		
	40	0.104	0.136	0.105		
	50	0.022	0.129	0.028		
102 (85% Rated)	20	0.146	0.064	0.181		
138 (115% Rated)	20	0.176	0.150	0.143		

TX2					
Test conditions		Frequency error (ppm)		Limit (ppm)	Result
Voltage(V)	Temp(℃)	CH_{M3}	CH_H		
120	-30	0.136	0.168	±5	Pass
	-20	0.051	0.103		
	-10	0.033	0.154		
	0	0.148	0.102		
	10	0.126	0.070		
	20	0.006	0.019		
	30	0.216	0.105		
	40	0.006	0.168		
	50	0.024	0.014		
102 (85% Rated)	20	0.107	0.116		
138 (115% Rated)	20	0.066	0.097		

5.5. Audio Low Pass Filter Response

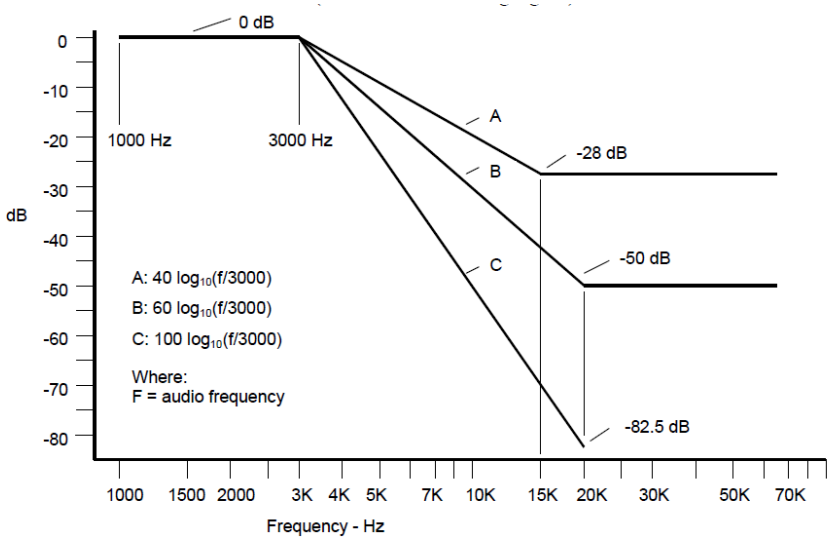
The audio low pass filter response is the frequency response of the post limiter low pass filter circuit above 3000 Hz.

LIMIT

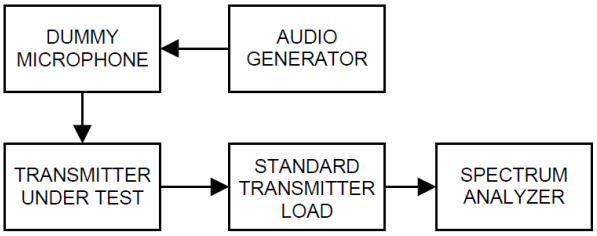
FCC Part 95.2775:

(a) The audio filter must be between the modulation limiter and the modulated stage of the transmitter.

(b) At any frequency (f in kHz) between 3 and 15 kHz, the filter must have an attenuation of at least 40 log (f/3) dB more than the attenuation at 1 kHz. Above 15 kHz, it must have an attenuation of at least 28 dB more than the attenuation at 1 kHz.



TEST CONFIGURATION



TEST PROCEDURE

1) Configure the EUT as shown in figure .
2) Apply a 1000Hz tone from the audio signal generator and adjust the level per manufacturer's specifications. Record the dB level of the 1000 Hz tone as LEV_{REF}.
3) Set the audio signal generator to the desired test frequency between 3000 Hz and the upper low pass filter limit. Record the dB level at the test frequency as $LEV_{FREQ.}$
4) Calculate the audio frequency response at the test frequency as:
   low pass filter response = LEV_{FREQ} - LEV_{REF}

TEST MODE:

Please reference to the section 3.4

TEST RESULTS

☐ **Passed** ☒ **Not Applicable**

This device does not support voice communication.

5.6. Spurious Emission on Antenna Port

Conducted spurious emissions are emissions at the antenna terminals on a frequency or frequencies that are outside a band sufficient to ensure transmission of information of required quality for the class of communication desired

LIMIT

FCC Part 95.2779 (b)(2):

50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation, on any frequency removed from the channel center frequency by more than 12.5 kHz.

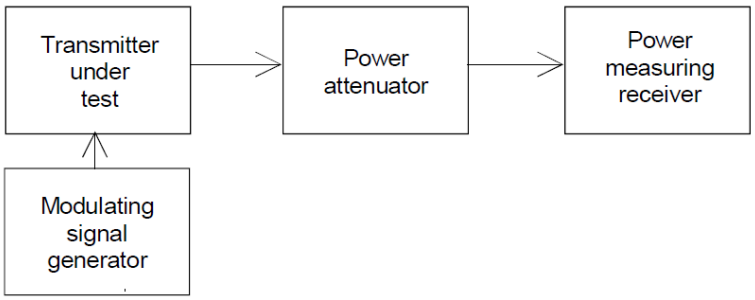
Limit (dBm) = P(dBm)-50-10 log (Pwatts) = -20dBm

FCC Part 95.2779 (b)(7)

43 + 10 log(P) dB on any frequency removed from the channel center frequency by more than 50 kHz

Limit (dBm) = P(dBm)-43-10 log (Pwatts) = -13dBm

TEST CONFIGURATION



TEST PROCEDURE

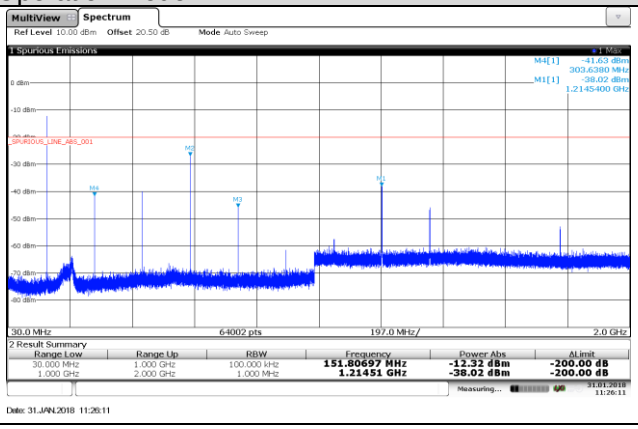
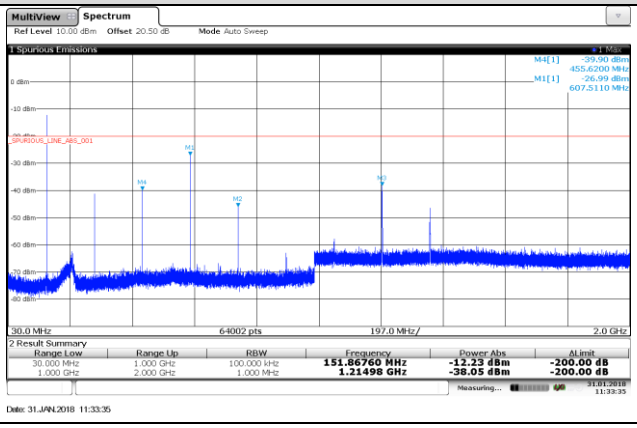
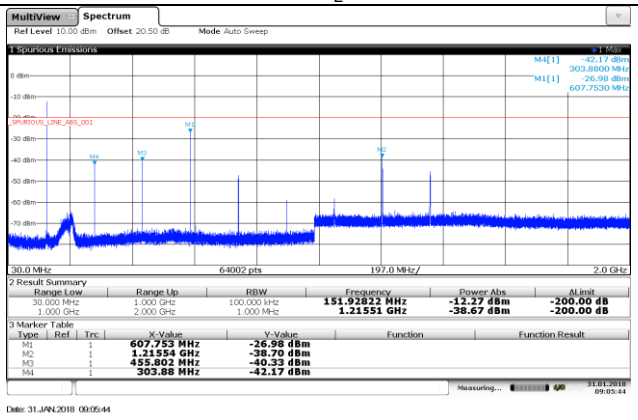
1. The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation.
2. The resolution bandwidth of the spectrum analyzer was set to 100 kHz. Sufficient scans were taken to show any out of band emission up to 10th. Harmonic for the lower and the highest frequency range.
3. Set RBW 100 kHz, VBW 300 kHz in the frequency band 30MHz to 1GHz,while set RBW=1MHz.VBW=3MHz from the 1GHz to 10th Harmonic.
4. The audio input was set the unmodulated carrier, the resulting picture is print out for each channel separation.

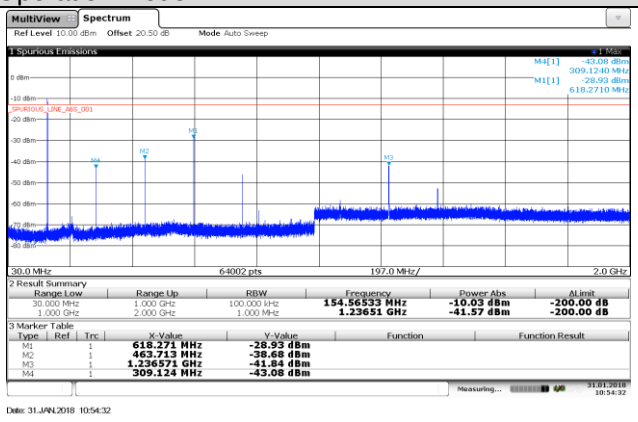
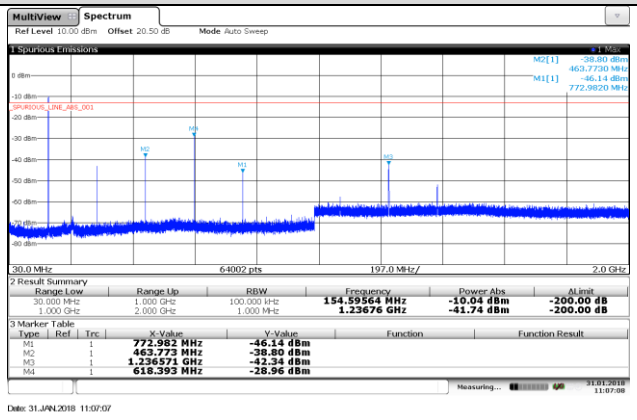
TEST MODE:

Please reference to the section 3.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Operation Mode	TX1
	
CH_L	CH_{M1}
	No plot
CH_{M2}	

Operation Mode	TX2
	
CH_{M3}	CH_H

5.7. Transmitter Radiated Spurious Emission

Radiated spurious emissions are emissions from the equipment when transmitting into a nonradiating load on a frequency or frequencies that are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

LIMIT

FCC Part 95.2779 (b)(2):

50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation, on any frequency removed from the channel center frequency by more than 12.5 kHz.

Limit (dBm) = P(dBm)-50-10 log (Pwatts) = -20dBm

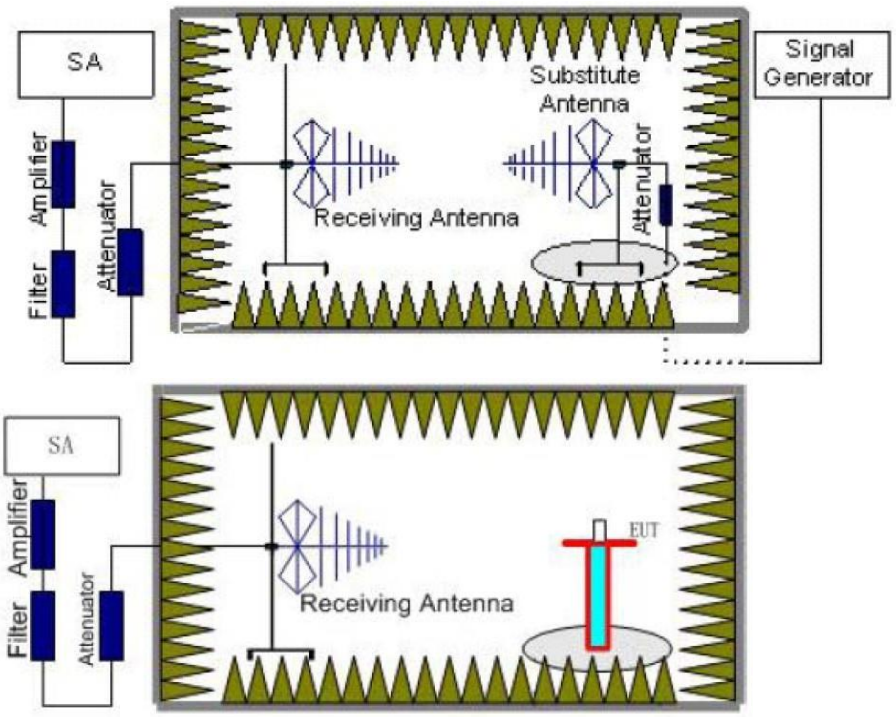
FCC Part 95.2779 (b)(7)

43 + 10 log(P) dB on any frequency removed from the channel center frequency by more than 50 kHz

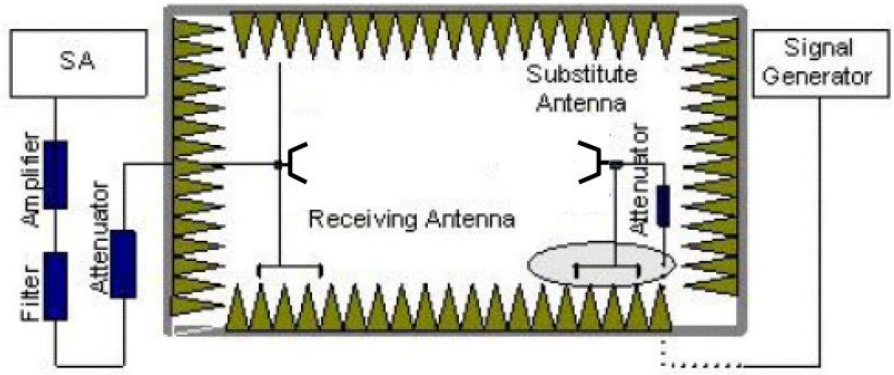
Limit (dBm) = P(dBm)-43-10 log (Pwatts) = -13dBm

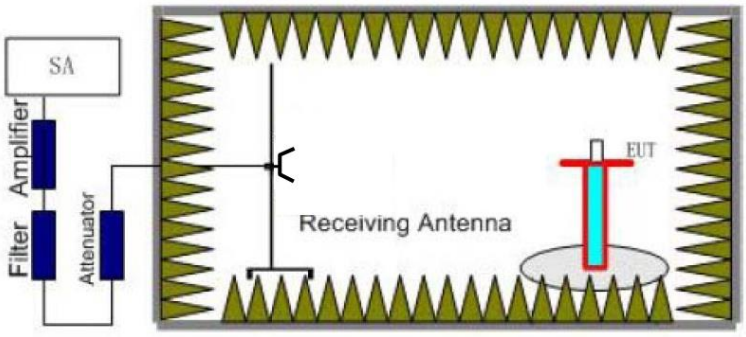
TEST CONFIGURATION

Below 1GHz:



Above 1GHz:





TEST PROCEDURE

1. Standard Transmitter Load with a 50Ω input impedance and an output impedance matched to the test equipment.
2. 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. 0 m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in six channels were measured with peak detector.
3. 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.
4. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz for above 1GHz and RBW=100kHz,VBW=300kHz for 30MHz to 1GHz, And the maximum value of the receiver should be recorded as (Pr).
5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
   The measurement results are obtained as described below:
   Power(EIRP)=PMea- PAg - Pcl - Ga
   We used SMF100A micowave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substituation test; The measurement results are amend as described below:
   Power(EIRP)=PMea- Pcl - Ga
7. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
8. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

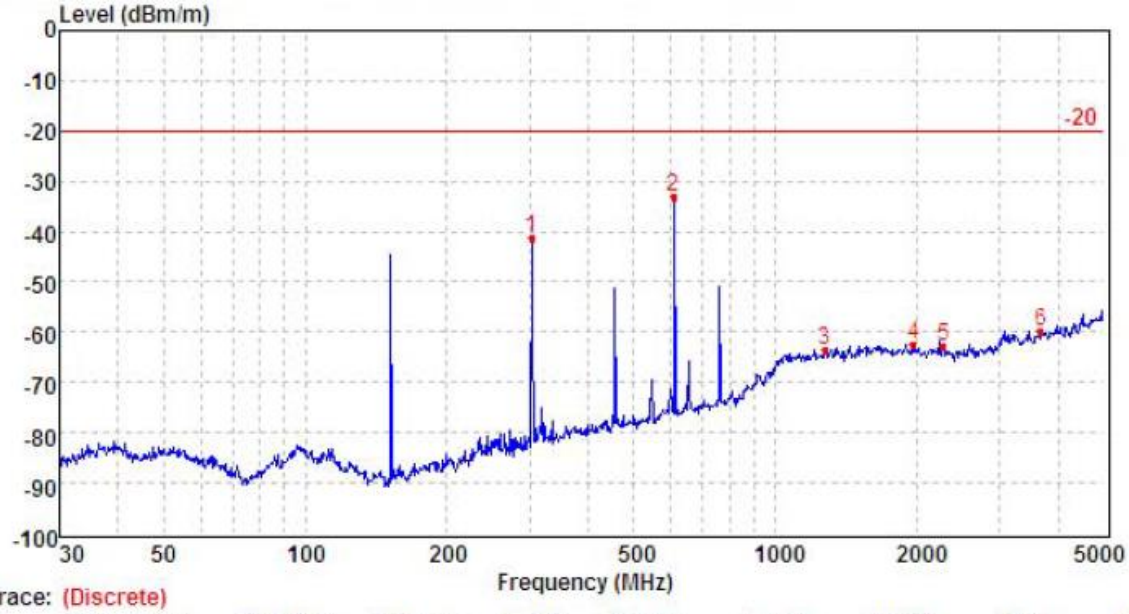
TEST MODE:

Please reference to the section 3.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

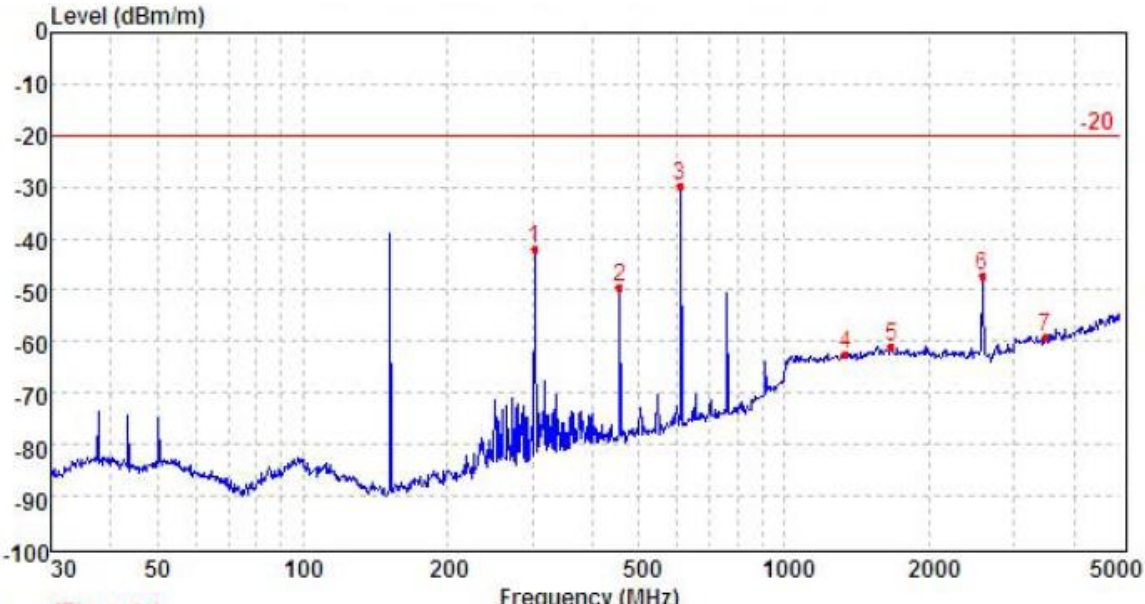
TX1			
Test Frequency:	CH_L	Polarity:	Horizontal



Trace: (Discrete)

Mark	Frequency MHZ	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	303.40	-40.45	26.22	1.99	29.15	-41.39	-20.00	-21.39	Peak
2	608.70	-38.67	31.68	2.94	29.04	-33.09	-20.00	-13.09	Peak
3	1277.16	-71.03	39.37	4.79	36.53	-63.40	-20.00	-43.40	Peak
4	1972.27	-72.44	41.00	6.23	37.28	-62.49	-20.00	-42.49	Peak
5	2279.67	-73.79	41.83	6.57	37.56	-62.95	-20.00	-42.95	Peak
6	3676.77	-74.05	44.13	8.36	38.25	-59.81	-20.00	-39.81	Peak

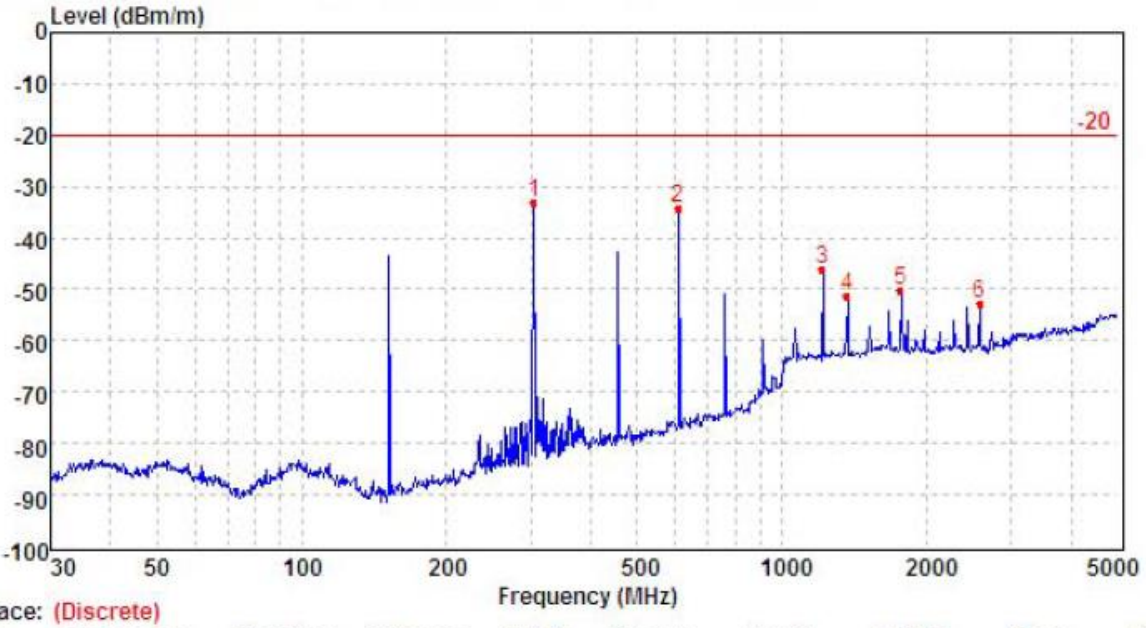
Test Frequency:	CH_L	Polarity:	Vertical



Trace: (Discrete)

Mark	Frequency MHZ	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	303.40	-41.00	26.22	1.99	29.15	-41.94	-20.00	-21.94	Peak
2	456.22	-52.14	29.12	2.51	29.02	-49.53	-20.00	-29.53	Peak
3	608.70	-35.19	31.68	2.94	29.04	-29.61	-20.00	-9.61	Peak
4	1342.49	-70.26	39.57	4.90	36.49	-62.28	-20.00	-42.28	Peak
5	1673.67	-70.35	40.43	5.71	36.87	-61.08	-20.00	-41.08	Peak
6	2580.44	-58.71	42.53	6.90	37.85	-47.13	-20.00	-27.13	Peak
7	3492.21	-72.51	43.77	8.10	38.42	-59.06	-20.00	-39.06	Peak

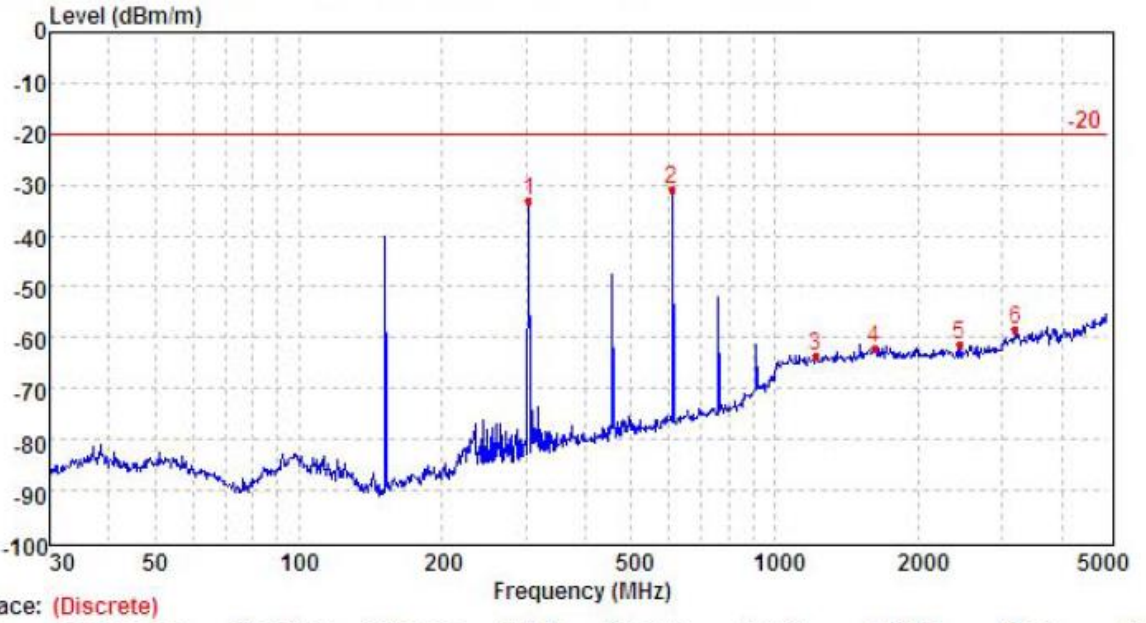
TX1			
Test Frequency:	CH_{M1}	Polarity:	Horizontal



Trace: (Discrete)

Mark	Frequency MHZ	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	304.47	-32.32	26.28	2.00	29.15	-33.19	-20.00	-13.19	Peak
2	608.70	-39.79	31.68	2.94	29.04	-34.21	-20.00	-14.21	Peak
3	1215.00	-53.20	39.15	4.69	36.56	-45.92	-20.00	-25.92	Peak
4	1366.47	-59.27	39.65	4.94	36.48	-51.16	-20.00	-31.16	Peak
5	1764.97	-59.73	40.61	5.89	37.07	-50.30	-20.00	-30.30	Peak
6	2580.44	-64.37	42.53	6.90	37.85	-52.79	-20.00	-32.79	Peak

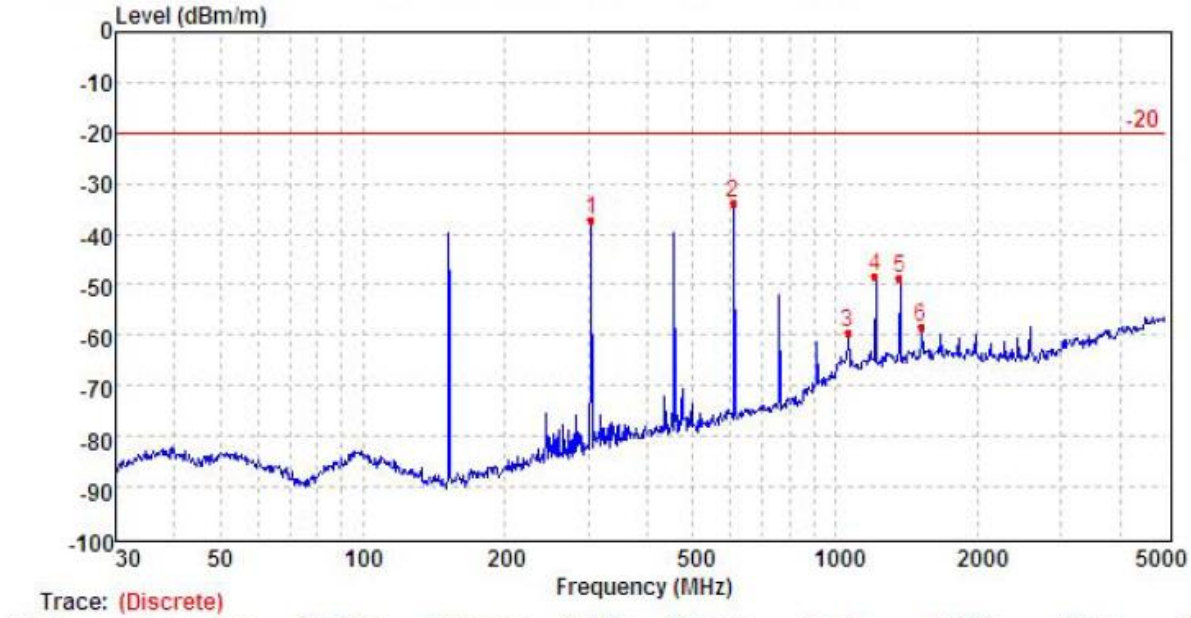
Test Frequency:	CH_{M1}	Polarity:	Vertical



Trace: (Discrete)

Mark	Frequency MHZ	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	304.47	-32.26	26.28	2.00	29.15	-33.13	-20.00	-13.13	Peak
2	608.70	-36.54	31.68	2.94	29.04	-30.96	-20.00	-10.96	Peak
3	1220.88	-70.86	39.18	4.70	36.56	-63.54	-20.00	-43.54	Peak
4	1620.66	-71.23	40.32	5.61	36.76	-62.06	-20.00	-42.06	Peak
5	2439.10	-72.62	42.21	6.80	37.89	-61.50	-20.00	-41.50	Peak
6	3201.51	-71.53	43.50	7.72	38.20	-58.51	-20.00	-38.51	Peak

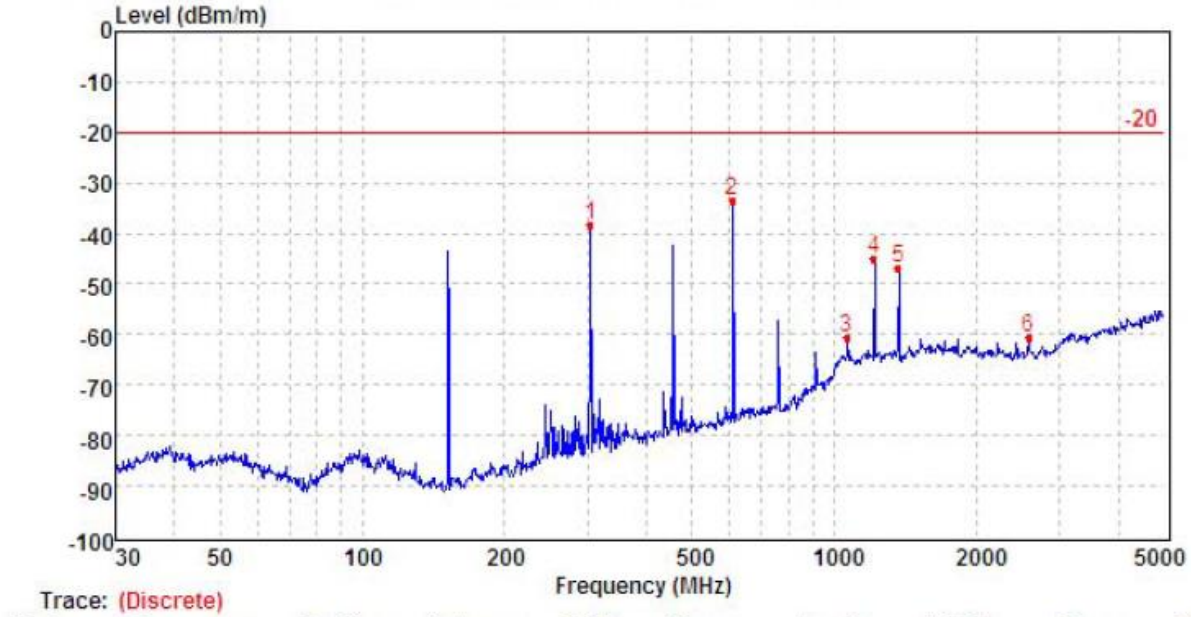
TX1			
Test Frequency:	CH_{M2}	Polarity:	Horizontal



Trace: (Discrete)

Mark	Frequency MHZ	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	304.47	-36.38	26.28	2.00	29.15	-37.25	-20.00	-17.25	Peak
2	608.70	-39.32	31.68	2.94	29.04	-33.74	-20.00	-13.74	Peak
3	1063.07	-65.63	38.59	4.35	36.64	-59.33	-20.00	-39.33	Peak
4	1215.00	-55.70	39.15	4.69	36.56	-48.42	-20.00	-28.42	Peak
5	1366.47	-56.93	39.65	4.94	36.48	-48.82	-20.00	-28.82	Peak
6	1519.61	-67.18	40.09	5.34	36.62	-58.37	-20.00	-38.37	Peak

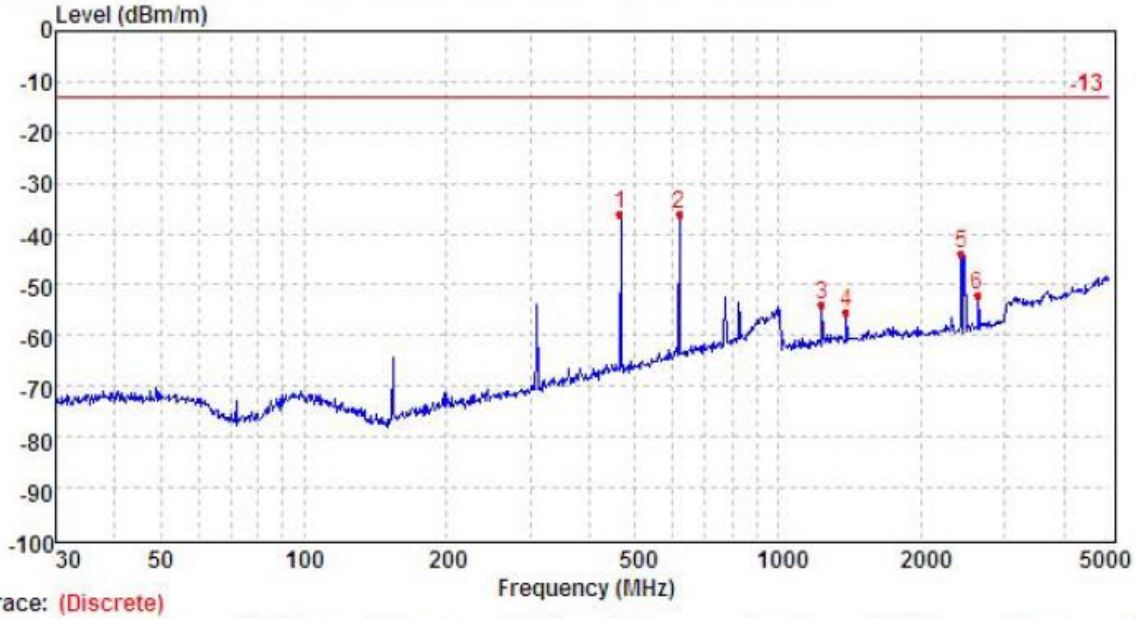
Test Frequency:	CH_{M2}	Polarity:	Vertical



Trace: (Discrete)

Mark	Frequency MHZ	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	304.47	-37.45	26.28	2.00	29.15	-38.32	-20.00	-18.32	Peak
2	608.70	-39.12	31.68	2.94	29.04	-33.54	-20.00	-13.54	Peak
3	1063.07	-66.78	38.59	4.35	36.64	-60.48	-20.00	-40.48	Peak
4	1215.00	-52.10	39.15	4.69	36.56	-44.82	-20.00	-24.82	Peak
5	1366.47	-54.80	39.65	4.94	36.48	-46.69	-20.00	-26.69	Peak
6	2584.59	-72.09	42.53	6.90	37.84	-60.50	-20.00	-40.50	Peak

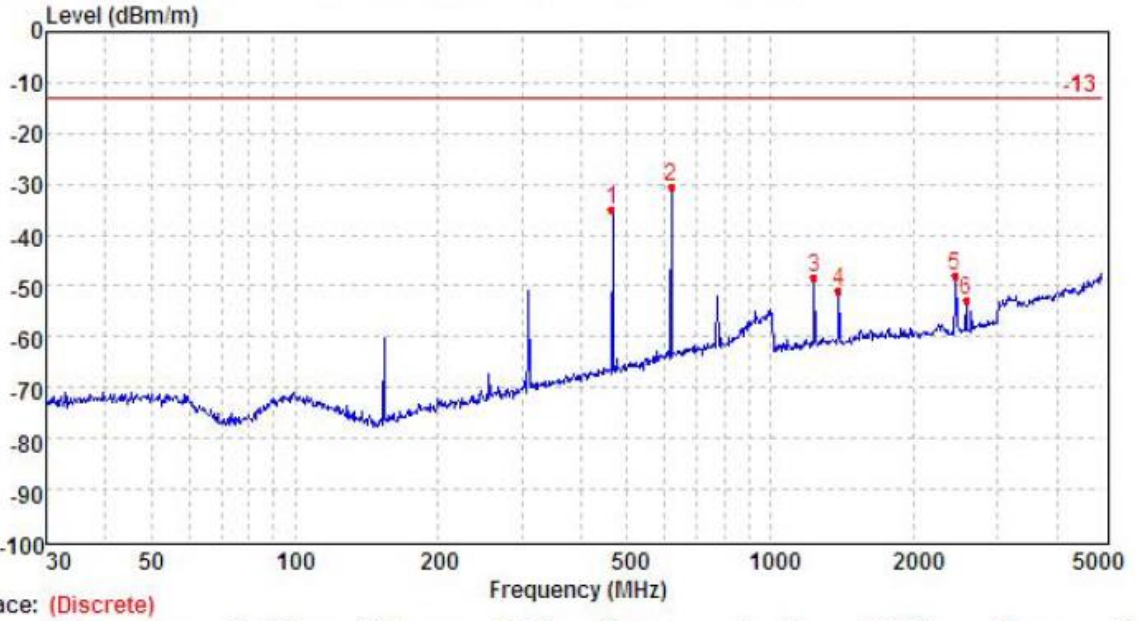
TX2			
Test Frequency:	CH_{M3}	Polarity:	Horizontal



Trace: (Discrete)

Mark	Frequency MHZ	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	464.31	-38.96	29.25	2.53	29.02	-36.20	-13.00	-23.20	Peak
2	619.50	-41.64	31.73	2.98	28.97	-35.90	-13.00	-22.90	Peak
3	1236.70	-61.29	39.23	4.72	36.55	-53.89	-13.00	-40.89	Peak
4	1390.88	-63.55	39.73	4.98	36.47	-55.31	-13.00	-42.31	Peak
5	2435.18	-55.04	42.21	6.79	37.89	-43.93	-13.00	-30.93	Peak
6	2630.76	-63.79	42.63	6.98	37.92	-52.10	-13.00	-39.10	Peak

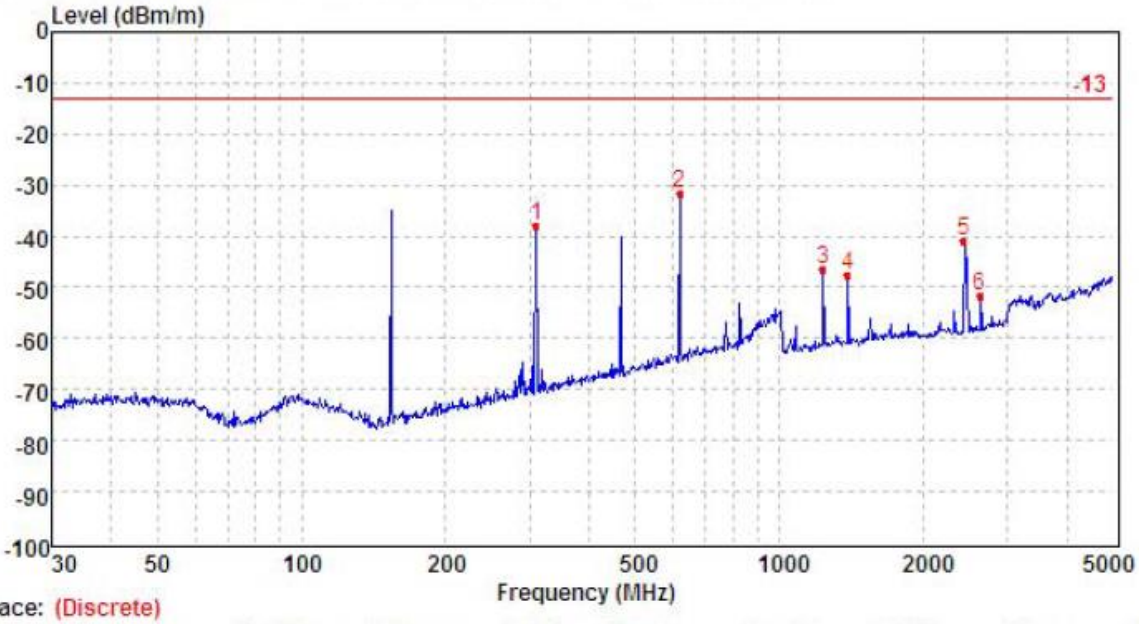
Test Frequency:	CH_{M3}	Polarity:	Vertical



Trace: (Discrete)

Mark	Frequency MHZ	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	464.31	-37.63	29.25	2.53	29.02	-34.87	-13.00	-21.87	Peak
2	619.50	-36.18	31.73	2.98	28.97	-30.44	-13.00	-17.44	Peak
3	1236.70	-55.57	39.23	4.72	36.55	-48.17	-13.00	-35.17	Peak
4	1390.88	-59.04	39.73	4.98	36.47	-50.80	-13.00	-37.80	Peak
5	2446.96	-58.94	42.25	6.80	37.89	-47.78	-13.00	-34.78	Peak
6	2584.59	-64.43	42.53	6.90	37.84	-52.84	-13.00	-39.84	Peak

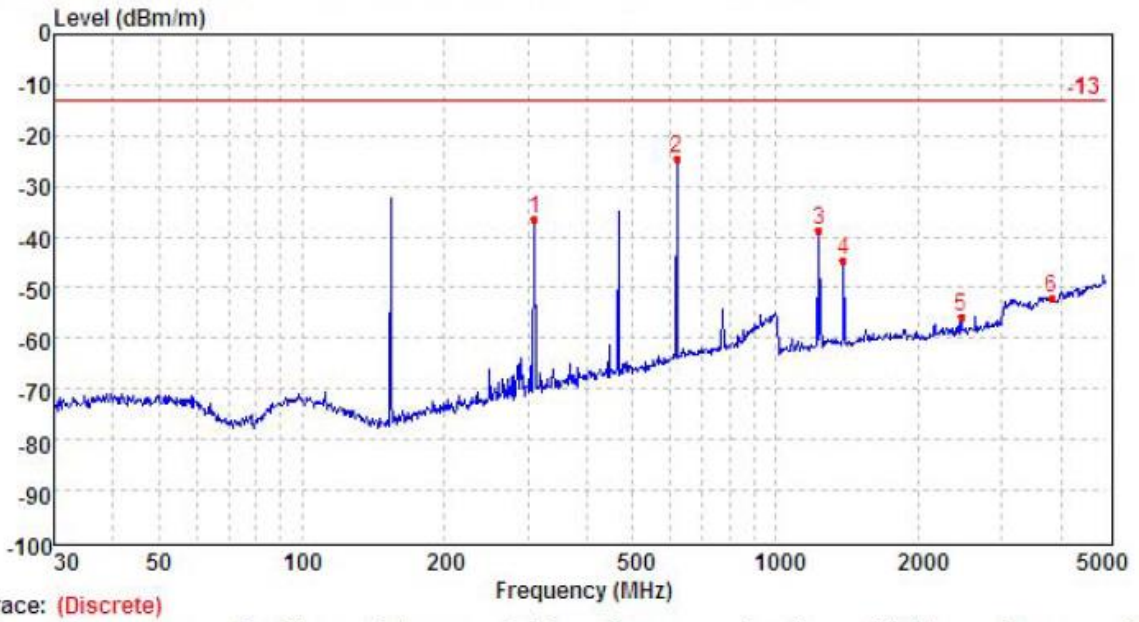
TX2			
Test Frequency:	CH_H	Polarity:	Horizontal



Trace: (Discrete)

Mark	Frequency MHZ	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	309.87	-37.16	26.44	2.01	29.13	-37.84	-13.00	-24.84	Peak
2	619.50	-37.37	31.73	2.98	28.97	-31.63	-13.00	-18.63	Peak
3	1236.70	-53.74	39.23	4.72	36.55	-46.34	-13.00	-33.34	Peak
4	1390.88	-55.70	39.73	4.98	36.47	-47.46	-13.00	-34.46	Peak
5	2435.18	-52.08	42.21	6.79	37.89	-40.97	-13.00	-27.97	Peak
6	2626.53	-63.18	42.60	6.97	37.91	-51.52	-13.00	-38.52	Peak

Test Frequency:	CH_H	Polarity:	Vertical

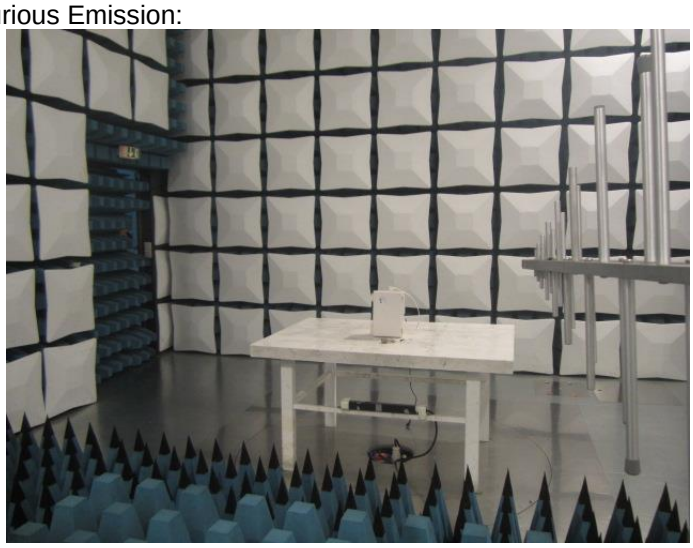


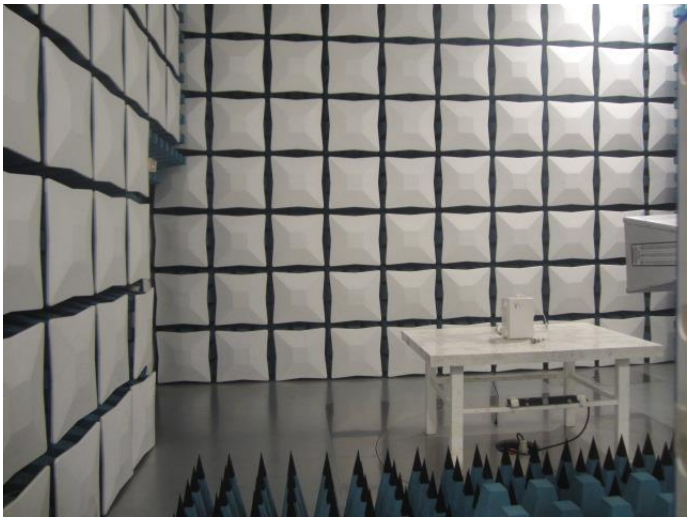
Trace: (Discrete)

Mark	Frequency MHZ	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	309.87	-35.65	26.44	2.01	29.13	-36.33	-13.00	-23.33	Peak
2	619.50	-30.13	31.73	2.98	28.97	-24.39	-13.00	-11.39	Peak
3	1236.70	-46.11	39.23	4.72	36.55	-38.71	-13.00	-25.71	Peak
4	1390.88	-52.92	39.73	4.98	36.47	-44.68	-13.00	-31.68	Peak
5	2462.77	-66.93	42.29	6.81	37.88	-55.71	-13.00	-42.71	Peak
6	3827.73	-66.66	44.41	8.54	38.21	-51.92	-13.00	-38.92	Peak

6. Test Setup Photos of the EUT

Transmitter Radiated Spurious Emission:

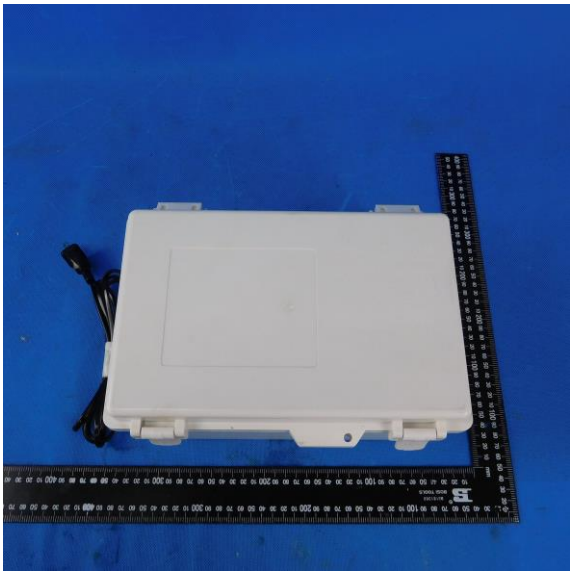


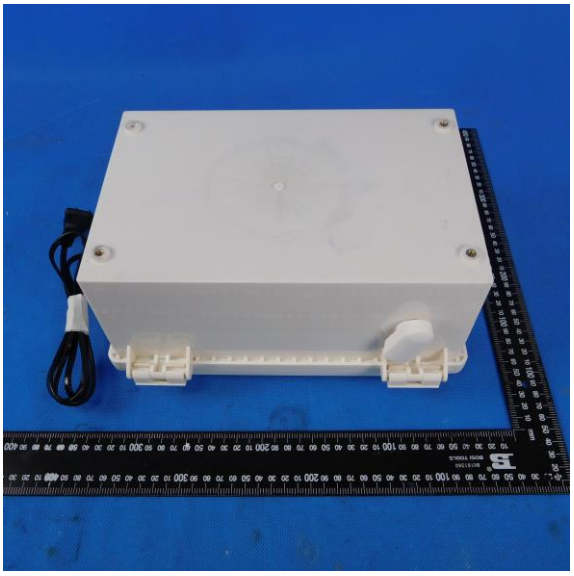


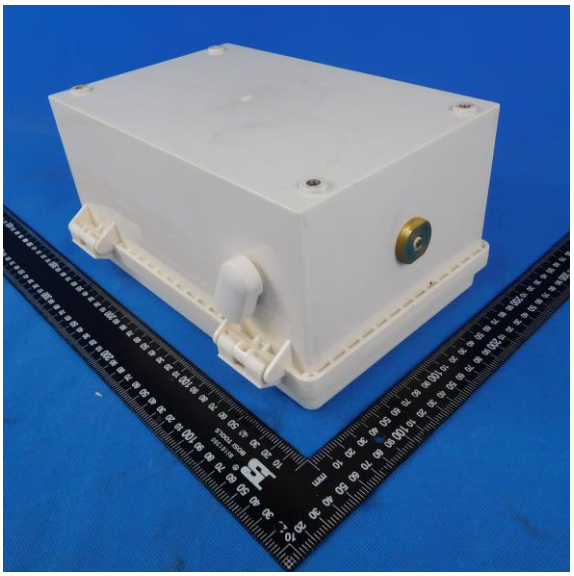
Frequency stability:

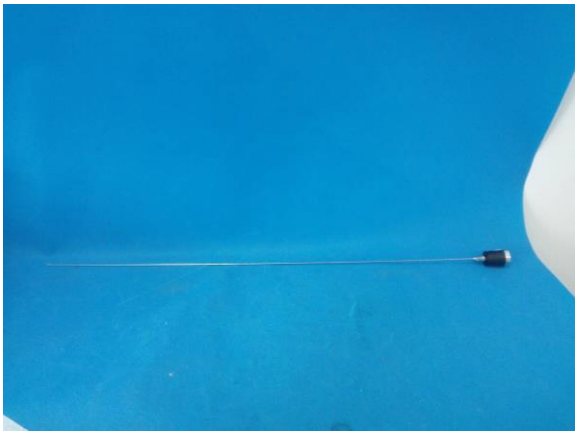
7. External and Internal Photos of the EUT

External Photos of the EUT

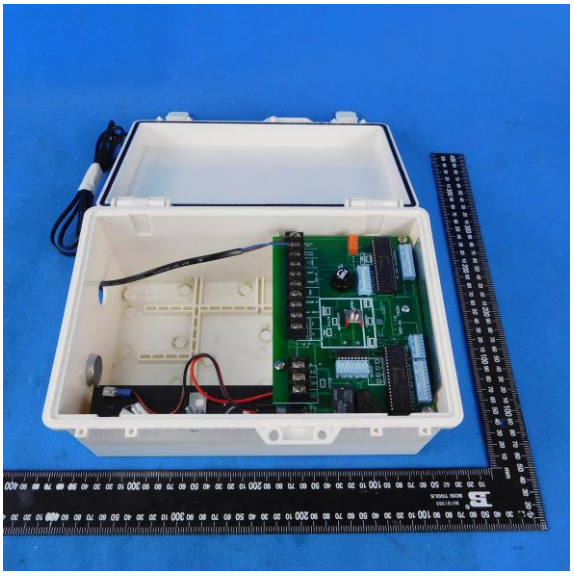


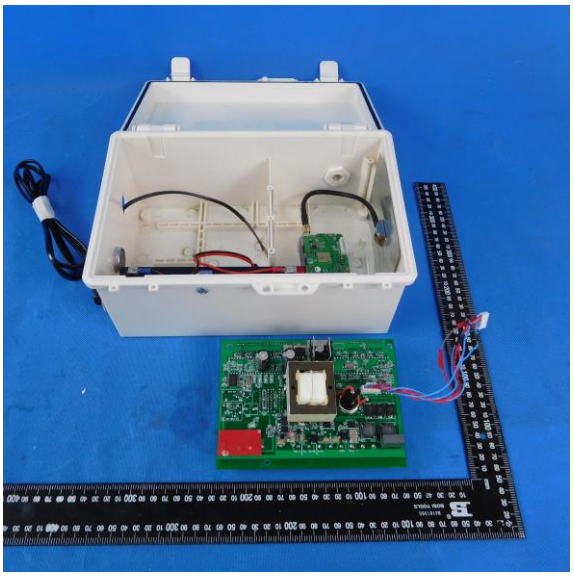


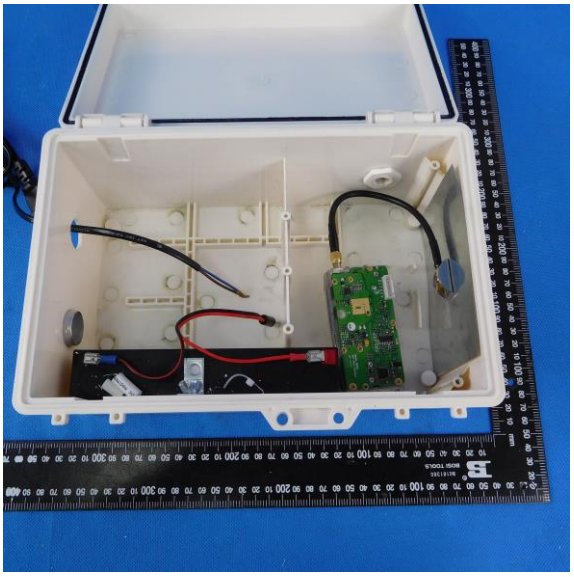


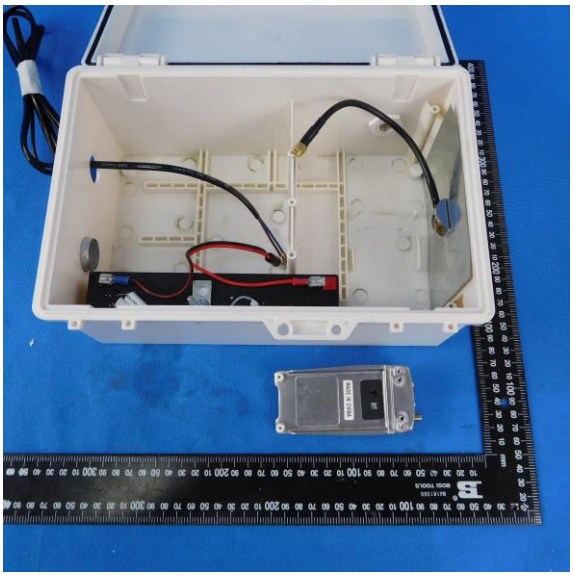


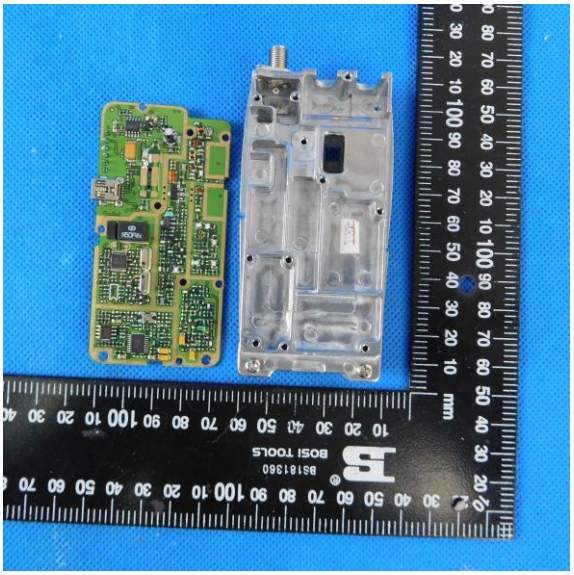
Internal Photos of the EUT

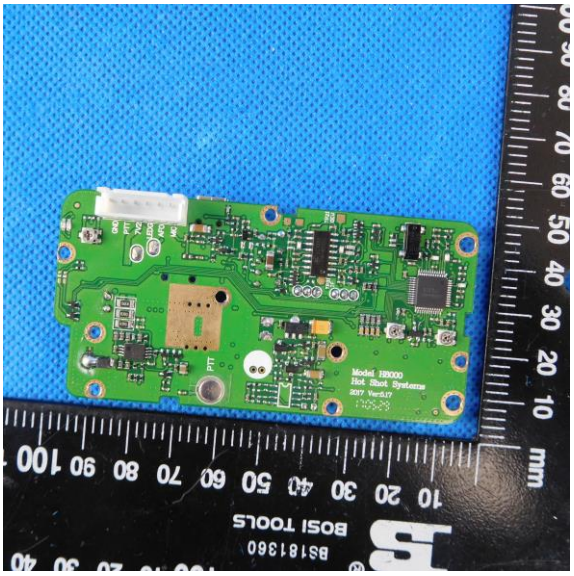


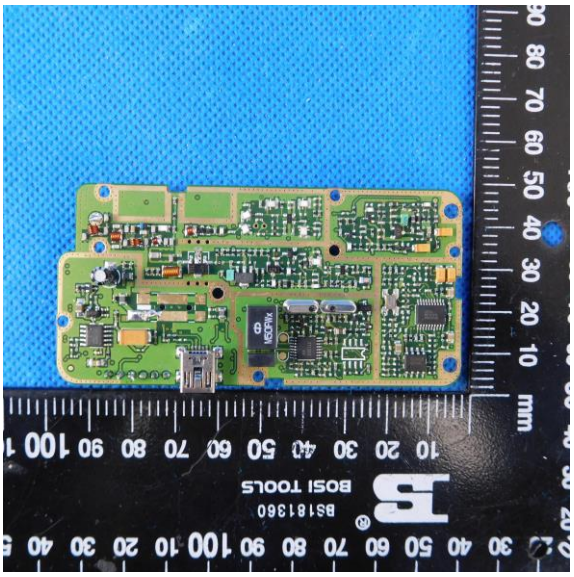


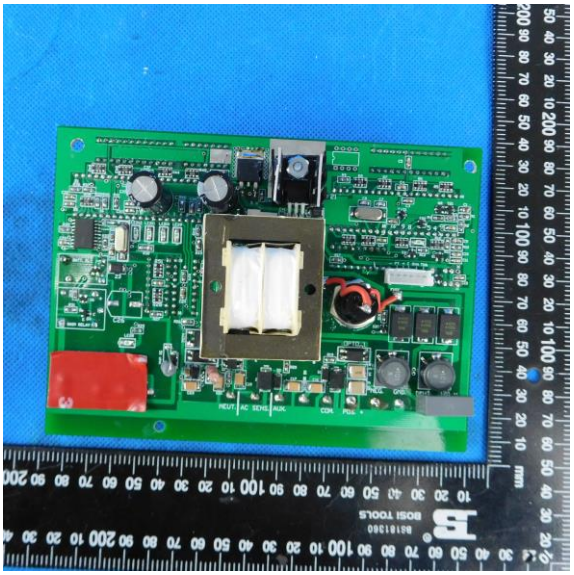


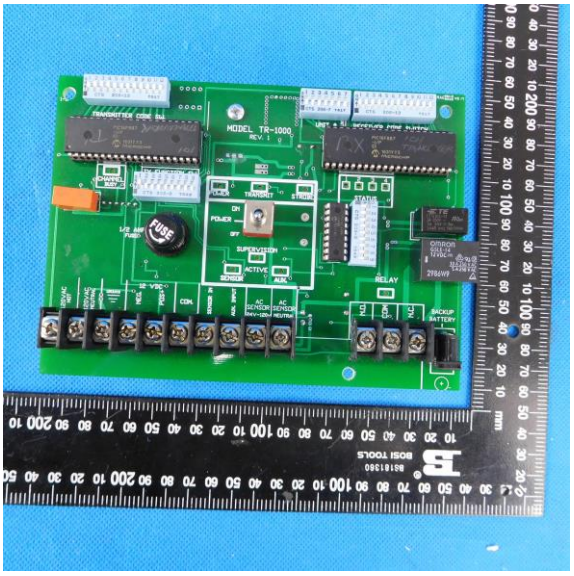












----------End of Report----------