Shenzhen Huatongwei International Inspection Co., Ltd.
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TEST REPORT

Report No. ..... :	**CHTEW19060141**
Project No. ..... :	**SHT1905091801EW**
FCC ID .....:	**2AGRS-RS36M**
Applicant's name .....:	**QuanzhouRisenElectronicsCo.,Ltd**
Address .....:	No.26, Zishan Rd, Jiangnan High-tech Zone, Licheng District, Quanzhou, Fujian
Manufacturer.....:	QuanzhouRisenElectronicsCo.,Ltd
Address.....:	No.26, Zishan Rd, Jiangnan High-tech Zone, Licheng District, Quanzhou, Fujian
Test item description .....:	**VHF Marine Handheld Radio**
Trade Mark.....:	Recent, Radioddity, rugged radios
Model/Type reference .....:	RS-36M
Listed Model(s).....:	RV6, VMR-5H
Standard.....:	**FCC CFR Title 47 Part 2** **FCC CFR Title 47 Part 80**
Date of receipt of test sample.....:	Jun.11, 2019
Date of testing.....:	Jun.11, 2019- Jun.20, 2019
Date of issue.....:	Jun.21, 2019
Result ....:	**PASS**

Report verification :

Compiled by (position+printed name+signature) . :	File administrators Echo Wei	Echo Wei
Supervised by (position+printed name+signature) . :	Project Engineer Edward Pan	Edward Pan
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 80: STATIONS IN THE MARITIME SERVICES
ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
ANSI/TIA-603-E(2016): Land Mobile FM or PM Communications Equipment and Performance Standards

1.2. Report revised information

Revised No.	Date of issued	Description
N/A	2019-06-21	Original

2 TEST DESCRIPTION

Test Item	Section in CFR 47	Result	Test Engineer
Conducted Carrier Output Power	Part 80.215 Part 2.1046(a)	Pass	Yongkang He
99% Occupied Bandwidth & 26dB bandwidth	Part 80.205 Part 2.1049	Pass	Yongkang He
Emission Mask	Part 80.211(f) Part 2.1049	Pass	Yongkang He
Modulation Limit	Part 2.1047(b) Part 80.213	Pass	Yongkang He
Audio Frequency Response	Part 2.1047(a) Part 80.213(e)	Pass	Yongkang He
Frequency Stability V.S. Temperature	Part 80.209 Part 2.1055	Pass	Yongkang He
Frequency Stability V.S. Voltage	Part 80.209 Part 2.1055	Pass	Yongkang He
Transmit Conducted Spurious Emission	Part 80.211(f)(3) Part 2.1051	Pass	Baojin Ling
Transmit Radiated Spurious Emission	Part 80.211(f)(3) Part 2.1053	Pass	Baojin Ling

3 SUMMARY

3.1 Client Information

Applicant:	QuanzhouRisenElectronicsCo.,Ltd
Address:	No.26, Zishan Rd, Jiangnan High-tech Zone, Licheng District, Quanzhou, Fujian
Manufacturer:	QuanzhouRisenElectronicsCo.,Ltd
Address:	No.26, Zishan Rd, Jiangnan High-tech Zone, Licheng District, Quanzhou, Fujian

3.2 Product Description

Name of EUT:	VHF Marine Handheld Radio		
Trade mark:	Recent, Radioddity, rugged radios		
Model/Type reference:	RS-36M		
Listed model(s):	RV6, VMR-5H		
Power supply:	DC 3.7V		
Battery information:	Model:BP-M002 Voltage:3.7Vd.c. Capacity:1500mAh		
Adapter information:	Model:VMR-5H Input:100-240Va.c., 50/60Hz 0.2A Output:6Vd.c.,0.5A		
Hardware version:	6PM7-5705-HMA		
Software version:	M-5705HM-A0703		
RF Specification			
Support Frequency Range:	TX: 156.025-157.425MHz		
	RX: 156.000-163.425MHz		
Rated Output Power:	☒ High Power: 5W	☒ Low Power: 1W	
Modulation Type:	Analog:	FM	
Channel Separation:	Analog:	☐ 12.5kHz	☒ 25kHz
Emission Designator: *[1]	Analog:	16K0F3E	
Antenna Type:	Rubber spiral antenna		

Note:

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

- For FM Voice Modulation

  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

3.3 Test frequency list

According to ANSI C63.26 section 5.1.2.1:
Measurements of transmitters shall be performed and, if required, reported for each frequency band in which the EUT can be operated with the device transmitting at the number of frequencies in each band specified in Table 2.

Frequency range over which EUT operates	Number of frequencies	Location in frequency range of operation
1 MHz or less	1	Middle
1 MHz to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

Frequency Bands (MHz)	Test Channel	Test Frequency (MHz)
156.000-163.425	CH_L	156.050(CH01A)
	CH_M	156.800(CH16)
	CH_H	157.425(CH88)

Note:

- US weather Channel:

Channel	Frequency(MHz)	Restrictions
WX1	162.550	RX ONLY
WX2	162.400	RX ONLY
WX3	162.475	RX ONLY
WX4	162.425	RX ONLY
WX5	162.450	RX ONLY
WX6	162.500	RX ONLY
WX7	162.525	RX ONLY
WX8	161.650	RX ONLY
WX9	161.775	RX ONLY
WX10	163. 725	RX ONLY

3.4 Operation mode

Test mode	Transmitting	Receiving	Power level		Analog Voice/PM	RX-US Weather
			High	Low	25kHz	
TX-AWH	√		√		√	
TX-AWL	√			√	√	
RX-AW		√			√	
RX-US Weather (CH10)		√				

Note:
√: is operation mode.

Modulation Type	Description
UM	Un-modulation
AM2	Apply a 1000 Hz tone and adjust the audio frequency generator to produce 20% of the rated system deviation.
AM6	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, then increase the level from the audio generator by 20 dB
AM5	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.

Pre-scan above all test mode, found below test mode which it was worse case mode, so only show the test data for worse case mode on the test report.

Test item	Modulation Type	Test mode (Worse case mode)
Conducted Output Power	UM	TX-AWH, TX-AWL
99% Occupied Bandwidth & 26dB bandwidth	AM6	TX-AWH, TX-AWL
Emission Mask	AM5	TX-AWH, TX-AWL
Modulation Limit	AM6	TX-AWH
Audio Frequency Response	AM2	TX-AWH
Frequency Stability VS Temperature	UM	TX-AWH, TX-AWL
Frequency Stability VS Voltage	UM	TX-AWH
Transmit Conducted Spurious Emission	AM5	TX-AWH
Transmit Radiated Spurious Emission	AM5	TX-AWH
Radiated Emission(15.109)		RX-US Weather (CH10)
AC Power Line Conducted Emission(15.107)		RX-US Weather(CH10)

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

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 byCertification 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

Atmospheric Contions	
Temperature:	21℃ to 25℃
Relative Humidity:	20 % to 75 %.
Atmospheric Pressure:	860 mbar to 1060 mbar
Norminal Test Voltage:	V_N = DC 3.7V
Extrem Test Voltage @115%V_N:	V_H = DC 4.25V
Extrem Test Voltage @85%V_N:	V_L = DC 3.15V

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 & Occupied Bandwidth	15Hz for <1GHz 70Hz for >1GHz	(1)
Conducted Output Power	0.51dB	(1)
ERP / EIRP / RSE	2.66dB for <1GHz 3.44dB for >1GHz	(1)
Conducted Emission 9KHz-30MHz	3.02dB	(1)
Radiated Emission 30~1000MHz	4.90dB	(1)
Radiated Emission 1~18GHz	4.96dB	(1)
FM deviation	25 Hz	(1)
Audio level	0.62 dB	(1)
Low Pass Filter Response	0.76 dB	(1)
Modulation Limiting	0.42 %	(1)
Transient Frequency Behavior	6.8 %	(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

●	TS8613 Test system					
Used	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Spectrum Analyzer	Agilent	N9020A	MY50510187	2018/09/29	2019/09/28
●	Signal & Spectrum Analyzer	R&S	FSW26	103440	2018/10/28	2019/10/27
●	RF Communication Test Set	HP	8920A	3813A10206	2018/10/28	2019/10/27
●	Digital intercom communication tester	Aeroflex	3920B	1001682041	2018/10/28	2019/10/27
●	Signal Generator	R&S	SML02	100507	2018/10/27	2019/10/26
●	Signal Generator	IFR	2032	203002\100	2018/11/11	2019/11/10
●	RF Control Unit	Tonscend	JS0806-2	N/A	N/A	N/A
●	Fliter-VHF	Microwave	N26460M1	498702	2019/03/19	2020/03/18
○	Fliter-UHF	Microwave	N25155M2	498704	2019/03/19	2020/03/18
○	Power Divider	Microwave	OPD1040-N-4	N/A	2018/11/15	2019/11/14
○	Attenuator	JFW	50FH-030-100	N/A	2018/11/15	2019/11/14
○	Attenuator	JFW	50-A-MFN-20	0322	2018/11/15	2019/11/14
●	Test software	HTW	Radio ATE	N/A	N/A	N/A

●	Auxiliary Equipment					
Used	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Climate chamber	ESPEC	GPL-2	N/A	2018/11/08	2019/11/07
●	DC Power Supply	Gwinstek	SPS-2415	GER835793	2018/10/28	2019/10/27

●	Radiated Spurious Emission					
Used	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Semi-Anechoic Chamber	Albatross projects	SAC-3m-01	N/A	2018/09/30	2021/09/29
●	Spectrum Analyzer	R&S	FSP40	100597	2018/10/27	2019/10/26
●	Loop Antenna	R&S	HFH2-Z2	100020	2017/11/20	2020/11/19
●	Ultra-Broadband Antenna	SCHWARZBECK	VULB9163	538	2017/04/05	2020/04/04
●	Horn Antenna	SCHWARZBECK	9120D	1011	2017/04/01	2020/03/31
○	Horn Antenna	SCHWARZBECK	BBHA9170	25841	2017/03/27	2020/03/26
○	Pre-amplifier	BONN	BLWA0160-2M	1811887	2018/11/14	2019/11/13
●	Pre-amplifier	CD	PAP-0102	12004	2018/11/14	2019/11/13
●	Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-248	2019/05/23	2020/05/22
●	RF Connection Cable	HUBER+SUHNER	RE-7-FH	N/A	2018/11/15	2019/11/14
●	RF Connection Cable	HUBER+SUHNER	RE-7-FL	N/A	2018/11/15	2019/11/14
●	EMI Test Software	Audix	E3	N/A	N/A	N/A
●	Turntable	MATURO	TT2.0	N/A	N/A	N/A
●	Antenna Mast	MATURO	TAM-4.0-P	N/A	N/A	N/A

5 TEST CONDITIONS AND RESULTS

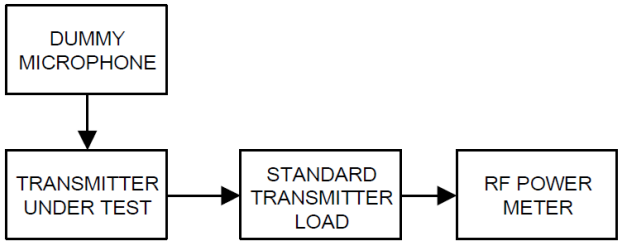
5.1 Conducted Carrier Output Power

LIMIT

FCC Part 80.215， FCC Part 2.1046

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

TEST CONFIGURATION



TEST PROCEDURE

(1) Connect the equipment as illustrated
(2) Correct for all losses in the RF path
(3) Measure the transmitter output power
(4) If the power output is adjustable, measurements shall be made for the highest and lowest power levels.

TEST MODE

Please reference to the section 3.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Please refer to appendix A on the section 8 appendix report

5.2 99% Occupied Bandwidth & 26dB Bandwidth

LIMIT

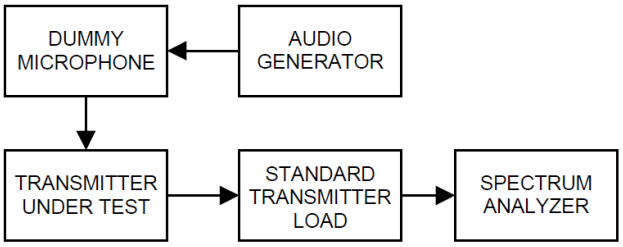
FCC Part 80.205, FCC Part 2.1049

Class of emission	Emission designator	Authorized bandwidth (kHz)
A1A	160HA1A	0.4
A1B[1]	160HA1B	0.4
A1D[12]	16K0A1D	20.0
A2A	2K66A2A	2.8
A2B[1]	2K66A2B	2.8
A2D[12]	16K0A2D	20.0
A3E	6K00A3E	8.0
A3N[2]	2K66A3N	2.8
A3X[3]	3K20A3X	25.0
F1B[4]	280HF1B	0.3
F1B[5]	300HF1B	0.5
F1B[6]	16KOF1B	20.0
F1C	2K80F1C	3.0
F1D[12]	16K0F1D	20.0
F2B[6]	16KOF2B	20.0
F2C[7]	16KOF2C	20.0
F2D[12]	16K0F2D	20.0
F3C	2K80F3C	3.0
F3C[7]	16KOF3C	20.0
F3E[8]	16KOF3E	20.0

[8]Applicable only when maximum frequency deviation is 5 kHz. See also paragraph (b) of this section.

TEST CONFIGURATION

Test setup for Analog:



TEST PROCEDURE

(1) Connect the equipment as illustrated

(2) Spectrum set as follow:

Centre frequency = 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)

RBW = 1% to 5% of the anticipated OBW, VBW ≥ 3 × RBW, Sweep = auto,

Detector function = peak, Trace = max hold

(3) Set 99% Occupied Bandwidth and 26dB 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**

Please refer to appendix B on the section 8 appendix report

5.3 Emission Mask

LIMIT

FCC Part 80.211(f),FCC Part 2.1049

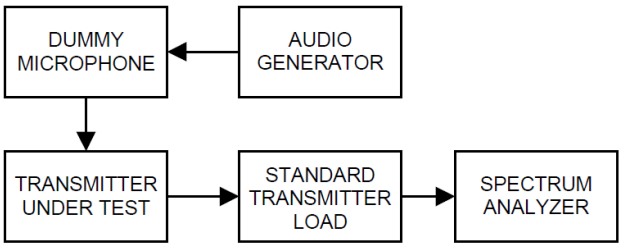
(1) On any frequency removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: At least 25 dB;

(2) On any frequency removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: At least 35 dB; and

(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 plus 10log10 (mean power in watts) dB.

TEST CONFIGURATION

Test setup for Analog:



TEST PROCEDURE

1) Connect the equipment as illustrated.
2) Spectrum set as follow:
   Centre frequency = fundamental frequency, span=120kHz for 12.5kHz channel spacing,
   RBW=100Hz, VBW=1000Hz, 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) Apply Input Modulation Signal to EUT according to Section 3.4
5) Measure and record the results in the test report.

TEST MODE

Please reference to the section 3.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

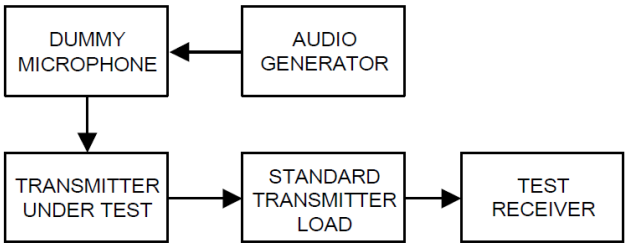
Please refer to appendix C on the section 8 appendix report

5.4 Modulation Limit

LIMIT

FCC Part 80.213,FCC Part 2.1047(b)
5kHz for 25 KHz Channel Spacing System

TEST CONFIGURATION



TEST PROCEDURE

1) Connect the equipment as illustrated.
2) Adjust the transmitter per the manufacturer's procedure for full rated system deviation.
3) Set the test receiver to measure peak positive deviation. Set the audio bandwidth for ≤0.25 Hz to ≥15,000 Hz. Turn the de-emphasis function off.
4) Apply Input Modulation Signal to EUT according to Section 3.4 and vary the input level from –20 to +20dB.
5) Measure both the instantaneous and steady-state deviation at and after the time of increasing the audio input level
6) Repeat step 4-5 with input frequency changing to 300Hz, 1004Hz, 1500Hz and 2500Hz in sequence.

TEST MODE

Please reference to the section 3.4

TEST RESULTS

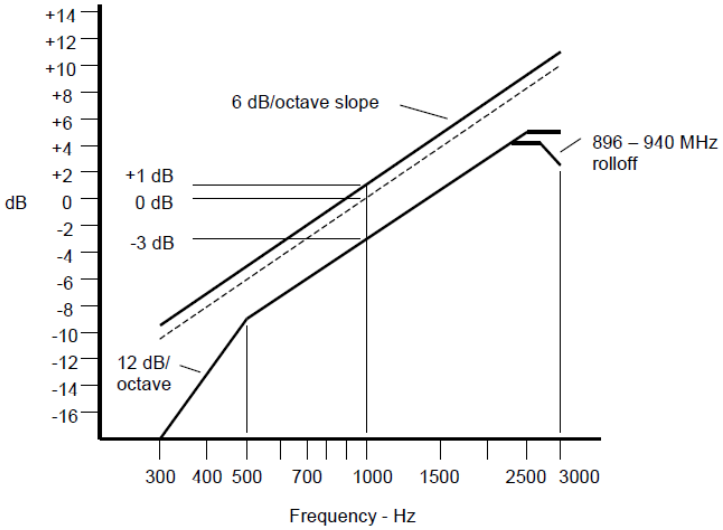
☒ **Passed** ☐ **Not Applicable**

Please refer to appendix D on the section 8 appendix report

5.5 Audio Frequency Response

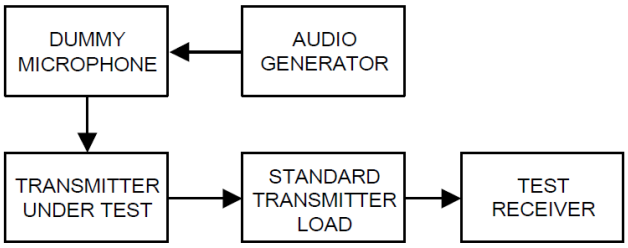
LIMIT

FCC Part 80.213(e) ,FCC Part 2.1047(a):
Voice modulated communication equipment. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.



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

TEST CONFIGURATION



TEST PROCEDURE

1) Connect the equipment as illustrated.
2) Set the test receiver to measure peak positive deviation. Set the audio bandwidth for 50 Hz to 15,000 Hz. Turn the de-emphasis function off.
3) Set the DMM to measure rms voltage.
4) Adjust the transmitter per the manufacturer's procedure for full rated system deviation.
5) Apply Input Modulation Signal to EUT according to Section 3.4
6) Set the test receiver to measure rms deviation and record the deviation reading.
7) Record the DMM reading as V_{REF} .
8) Set the audio frequency generator to the desired test frequency between 300 Hz and 3000 Hz.
9) Vary the audio frequency generator output level until the deviation reading that was recorded in step 6) is obtained.
10) Record the DMM reading as V_{FREQ}
11) Calculate the audio frequency response at the present frequency as:
audio frequency response=$20\log_{10}$ (V_{FREQ}/V_{REF}).
12) Repeat steps 8) through 11) for all the desired test frequencies

TEST MODE

Please reference to the section 3.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Please refer to appendix E on the section 8 appendix report

5.6 Frequency stability VS Temperature

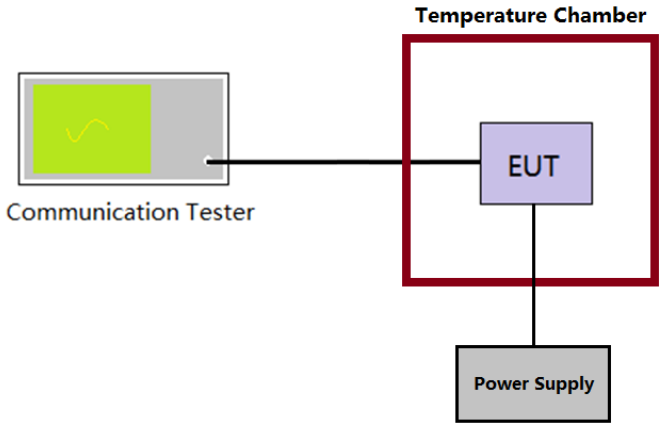
LIMIT

FCC Part 80.209， FCC Part 2.1055

Frequency bands and categories of stations	Tolerances[1]
(5) Band 156-162 MHz:	
(i) Coast stations:	
For carriers licensed to operate with a carrier power:	
Below 3 watts	10.
3 to 100 watts	5.[7]
(ii) Ship stations	10.[4]
(iii) Survival craft stations operating on 121.500 MHz	50.
(iv) EPIRBs:	
Operating on 121.500 and 243.000 MHz	50.
Operating on 156.750 and 156.800 MHz.[6]	10.
(6) Band 216-220 MHz:	
(i) Coast stations:	
For all emissions	5.
(ii) Ship stations:	
For all emissions	5.
(7) Band 400-466 MHz:	
(i) EPIRBs operating on 406-406.1 MHz	5.
(ii) On-board stations	5.
(iii) Radiolocation and telecommand stations.	5.
(8) Band 1626.5-1646.5 MHz:	
(i) Ship earth stations	5.

[7]For transmitters operated at private coast stations with antenna heights less than 6 meters (20 feet) above ground and output power of 25 watts or less the frequency tolerance is 10 parts in 10^6.

TEST CONFIGURATION



TEST PROCEDURE

1) The EUT output port was connected to communication tester.

2) The EUT was placed inside the temperature chamber.

3) Turn EUT off and set the chamber temperature to –30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency as MCF_{MHz}.

4) Calculate the ppm frequency error by the following:
ppm error=$(MCF_{MHz}/ACF_{MHz}-1)*10^6$
where
MCF_{MHz} *is the Measured Carrier Frequency in MHz*
ACF_{MHz} *is the Assigned Carrier Frequency in MHz*

5) Repeat step 3 measure with 10°C increased per stage until the highest temperature of +50°C reached.

TEST MODE

Please reference to the section 3.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Please refer to appendix F on the section 8 appendix report

5.7 Frequency stability VS Voltage

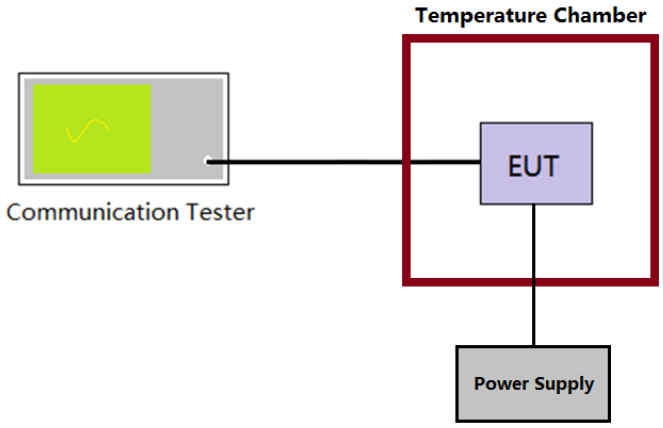
LIMIT

FCC Part 80.209， FCC Part 2.1055

Frequency bands and categories of stations	Tolerances[1]
(5) Band 156-162 MHz:	
(i) Coast stations:	
For carriers licensed to operate with a carrier power:	
Below 3 watts	10.
3 to 100 watts	5.[7]
(ii) Ship stations	10.[4]
(iii) Survival craft stations operating on 121.500 MHz	50.
(iv) EPIRBs:	
Operating on 121.500 and 243.000 MHz	50.
Operating on 156.750 and 156.800 MHz.[6]	10.
(6) Band 216-220 MHz:	
(i) Coast stations:	
For all emissions	5.
(ii) Ship stations:	
For all emissions	5.
(7) Band 400-466 MHz:	
(i) EPIRBs operating on 406-406.1 MHz	5.
(ii) On-board stations	5.
(iii) Radiolocation and telecommand stations.	5.
(8) Band 1626.5-1646.5 MHz:	
(i) Ship earth stations	5.

[7]For transmitters operated at private coast stations with antenna heights less than 6 meters (20 feet) above ground and output power of 25 watts or less the frequency tolerance is 10 parts in 10^6.

TEST CONFIGURATION



TEST PROCEDURE

1) The EUT output port was connected to communication tester.

2) The EUT was placed inside the temperature chamber at 25°C

3) Record the carrier frequency of the transmitter as MCF_{MHZ}

4) Calculate the ppm frequency error by the following:
ppm error=$(MCF_{MHz}/ACF_{MHz}-1)*10^6$
where
MCF_{MHz} *is the Measured Carrier Frequency in MHz*
ACF_{MHz} *is the Assigned Carrier Frequency in MHz*

5) Repeat step 3 measure with varied ±15% of the nominal value measured at the input to the EUT

TEST MODE

Please reference to the section 3.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Please refer to appendix G on the section 8 appendix report

5.8 Transmit Conducted Spurious Emission

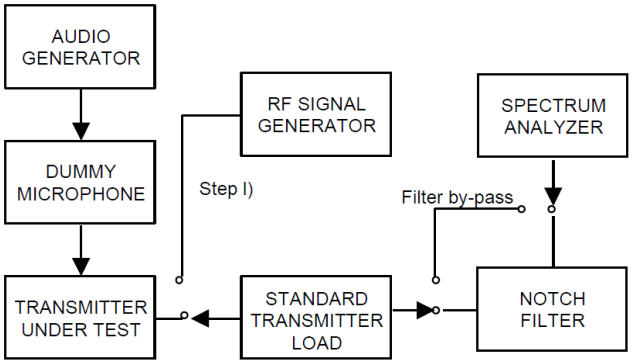
LIMIT

FCC Part 80.211(f)(3), FCC Part 2.1051

FCC Rules	Attenuation Limit (dBc)
§ 80.211(f)(3)	At least 43 +10log10 (mean power in watts) dB

43 + 10 log (Pwatts)
Calculation: Limit (dBm) =EL-43-10log10 (TP)
Notes: EL is the emission level of the Output Power expressed in dBm,
In this application, the EL is P(dBm).
Limit (dBm) = P(dBm)-43-10 log (Pwatts) = -13 dBm

TEST CONFIGURATION



TEST PROCEDURE

1. Connect the equipment as illustrated, with the notch filter by-passed.
2. Apply Input Modulation Signal to EUT according to Section 3.4
3. Adjust the spectrum analyzer for the following settings:
   Below 1GHz: RBW=100kHz, VBW=300kHz
   Above 1GHz: RBW=1MHz, VBW=3MHz
   Detector=Peak, Sweep time=Auto, Trace=Max hold
4. Scan frequency range up to 10th harmonic.
5. Record the frequencies and levels of spurious emissions

TEST MODE

Please reference to the section 3.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Please refer to appendix H on the section 8 appendix report

5.9 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

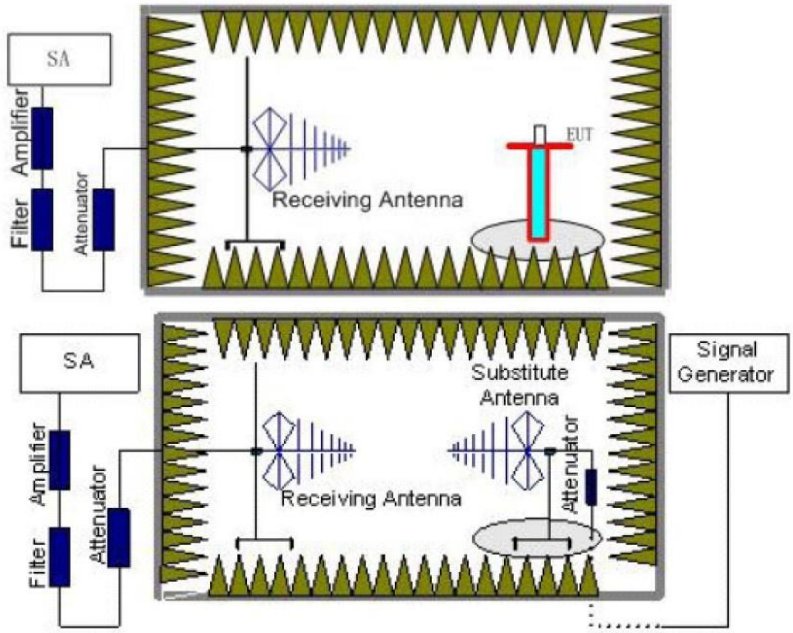
FCC Part 80.211(f)(3), FCC Part 2.1051

FCC Rules	Attenuation Limit (dBc)
§ 80.211(f)(3)	At least 43 +10log10 (mean power in watts) dB

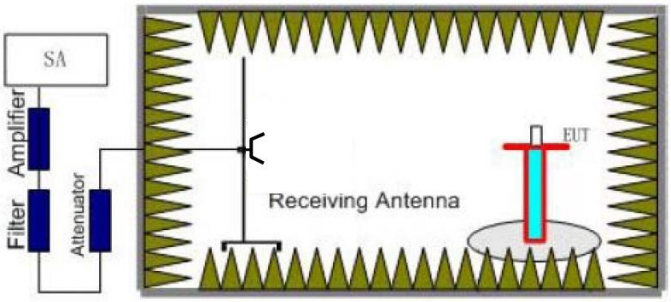
43 + 10 log (Pwatts)
Calculation: Limit (dBm) =EL-43-10log10 (TP)
Notes: EL is the emission level of the Output Power expressed in dBm,
In this application, the EL is P(dBm).
Limit (dBm) = P(dBm)-43-10 log (Pwatts) = -13 dBm

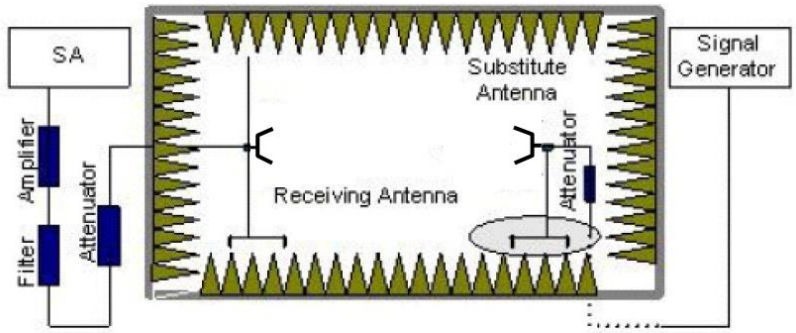
TEST CONFIGURATION

Below 1GHz:



Above 1GHz:





TEST PROCEDURE

1. Place the EUT in the center of the turntable.
   a) For radiated emissions measurements performed at frequencies less than or equal to 1 GHz, the EUT shall be placed on a RF-transparent table at a nominal height of 80 cm above the reference ground plane
   b) For radiated measurements performed at frequencies above 1 GHz, the EUT shall be placed on an RF transparent table at a nominal height of 1.5 m above the ground plane.
2. Unless the EUT uses an integral antenna, the EUT shall be terminated with a non-radiating transmitter load. In cases where the EUT uses an adjustable antenna, the antenna shall be adjusted through typical positions and lengths to maximize emissions levels.
3. The EUT shall be tested while operating on the frequency per manufacturer specification. Set the transmitter to operate in continuous transmit mode.
4. Receiver or Spectrum set as follow:
   Below 1GHz, RBW=100kHz, VBW=300kHz, Detector=Peak, Sweep time=Auto
   Above 1GHz, RBW=1MHz, VBW=3MHz, Detector=Peck, Sweep time=Auto
5. Each emission under consideration shall be evaluated:
   a) Raise and lower the measurement antenna from 1 m to 4 m, as necessary to enable detection of the maximum emission amplitude relative to measurement antenna height.
   b) Rotate the EUT through 360° to determine the maximum emission level relative to the axial position.
   c) Return the turntable to the azimuth where the highest emission amplitude level was observed.
   d) Vary the measurement antenna height again through 1 m to 4 m again to find the height associated with the maximum emission amplitude.
   e) Record the measured emission amplitude level and frequency
6. Repeat step 5 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.
7. 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.
8. Maintain the previous measurement instrument settings and test set-up, with the exception that the EUT is removed and replaced by the substitution antenna.
9. 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.
10. For each emission that was detected and measured in the initial test
    a) Vary the measurement antenna height between 1 m to 4 m to maximize the received (measured) signal amplitude.
    b) 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 5 and step 6.
    c) Record the output power level of the signal generator when equivalence is achieved in step b).
11. Repeat step 8 through step 10 with the measurement antenna oriented in the opposite polarization.
12. Calculate the emission power in dBm referenced to a half-wave dipole using the following equation:
    Pe = Ps(dBm) − cable loss (dB) + 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.
13. 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

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

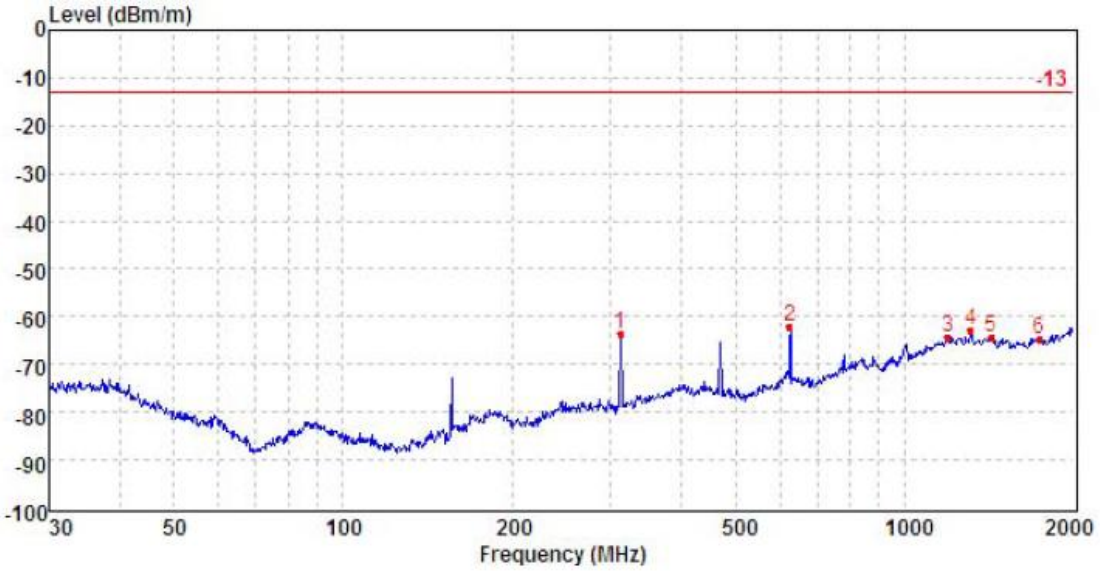
TEST MODE

Please reference to the section 3.4

TEST RESULTS

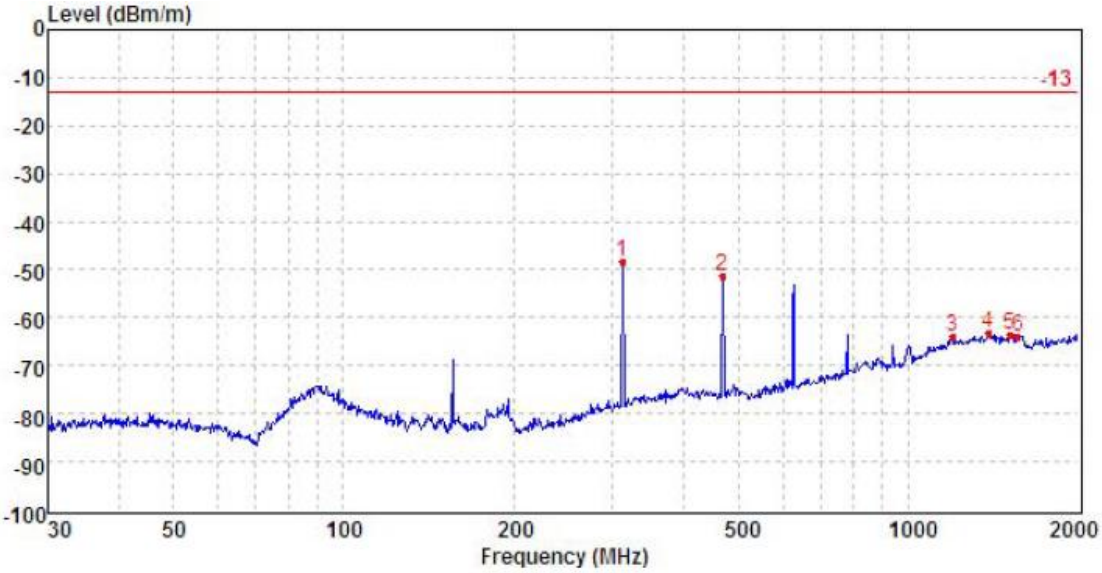
☒ **Passed** ☐ **Not Applicable**

TEST MODE	TX-AWH	Test Channel:	CH_L	Polarity:	Horizontal



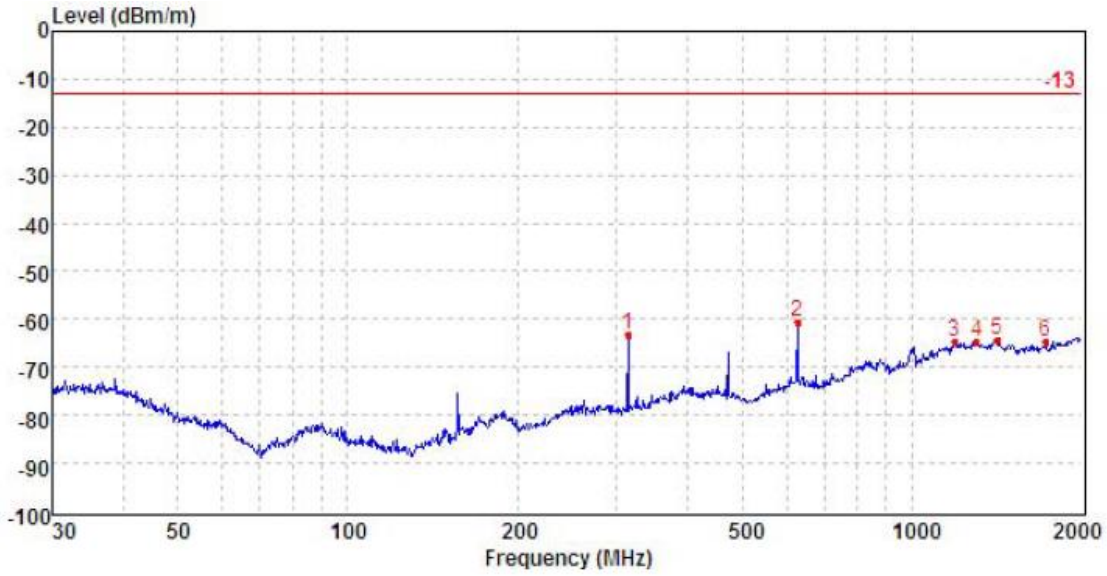
Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	312.06	-64.42	23.39	7.92	30.27	-63.38	-13.00	-50.38	Peak
2	626.07	-68.76	28.85	8.90	31.24	-62.25	-13.00	-49.25	Peak
3	1194.99	-68.71	36.65	5.51	37.65	-64.20	-13.00	-51.20	Peak
4	1314.03	-68.29	36.98	5.82	37.45	-62.94	-13.00	-49.94	Peak
5	1429.99	-69.89	36.97	6.09	37.56	-64.39	-13.00	-51.39	Peak
6	1739.90	-69.78	36.50	6.62	37.93	-64.59	-13.00	-51.59	Peak

TEST MODE	TX-AWH	Test Channel:	CH_L	Polarity:	Vertical



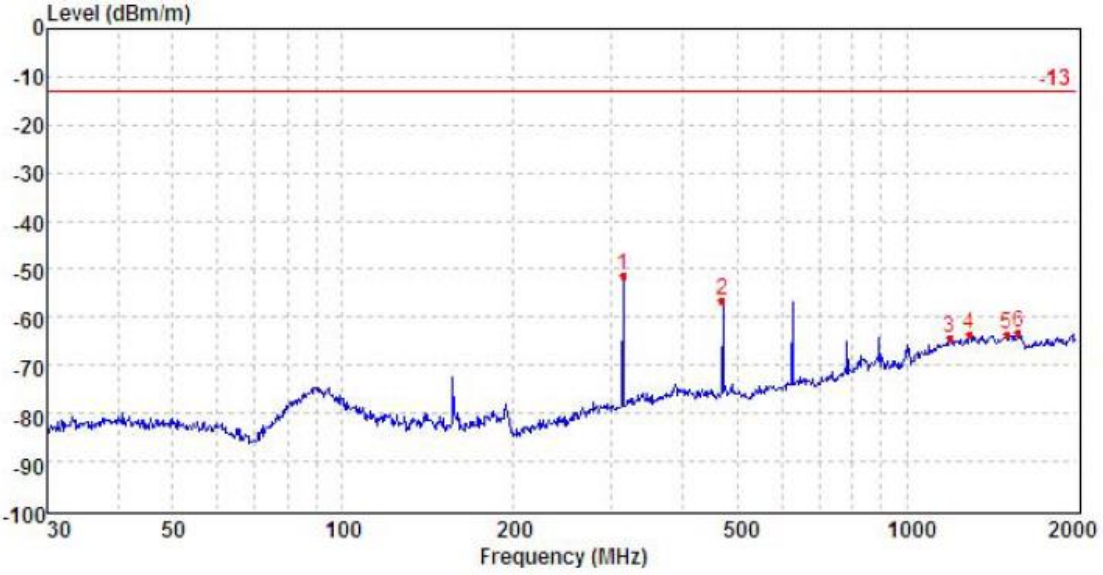
Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	312.06	-49.90	23.96	7.92	30.27	-48.29	-13.00	-35.29	Peak
2	469.24	-55.13	25.90	8.44	30.59	-51.38	-13.00	-38.38	Peak
3	1197.48	-68.66	36.79	5.52	37.65	-64.00	-13.00	-51.00	Peak
4	1386.07	-69.42	37.70	6.00	37.46	-63.18	-13.00	-50.18	Peak
5	1511.52	-69.74	37.76	6.24	37.67	-63.41	-13.00	-50.41	Peak
6	1562.66	-70.24	37.76	6.33	37.63	-63.78	-13.00	-50.78	Peak

TEST MODE	TX-AWH	Test Channel:	CH_M	Polarity:	Horizontal



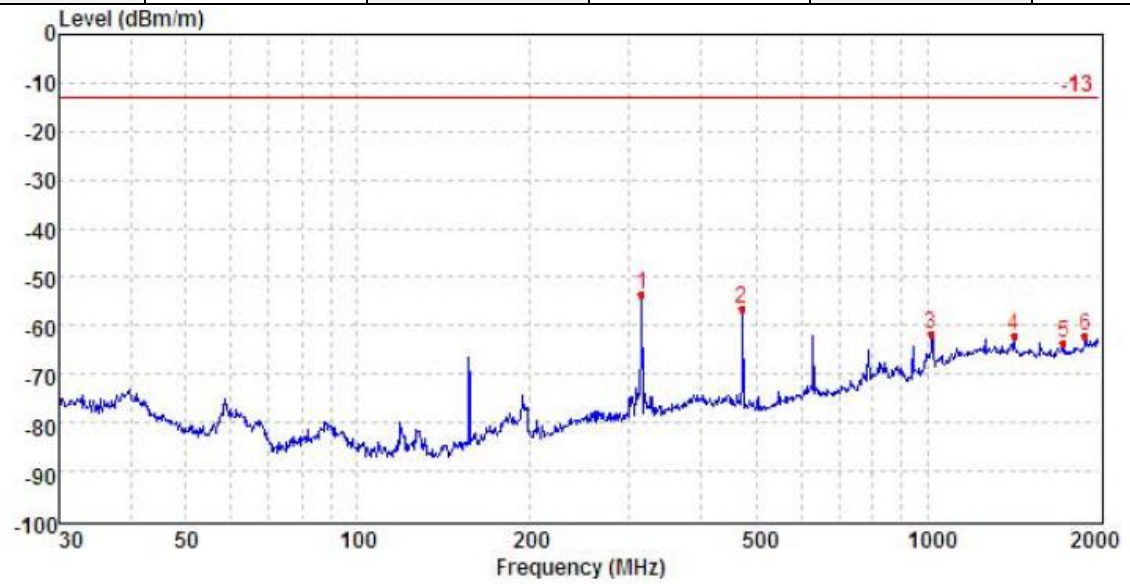
Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	314.26	-64.36	23.43	7.93	30.26	-63.26	-13.00	-50.26	Peak
2	628.27	-67.25	28.91	8.91	31.25	-60.68	-13.00	-47.68	Peak
3	1190.86	-69.13	36.58	5.50	37.65	-64.70	-13.00	-51.70	Peak
4	1304.96	-69.74	36.96	5.80	37.52	-64.50	-13.00	-51.50	Peak
5	1419.12	-70.01	37.04	6.07	37.56	-64.46	-13.00	-51.46	Peak
6	1725.48	-69.99	36.45	6.60	37.90	-64.84	-13.00	-51.84	Peak

TEST MODE	TX-AWH	Test Channel:	CH_M	Polarity:	Vertical



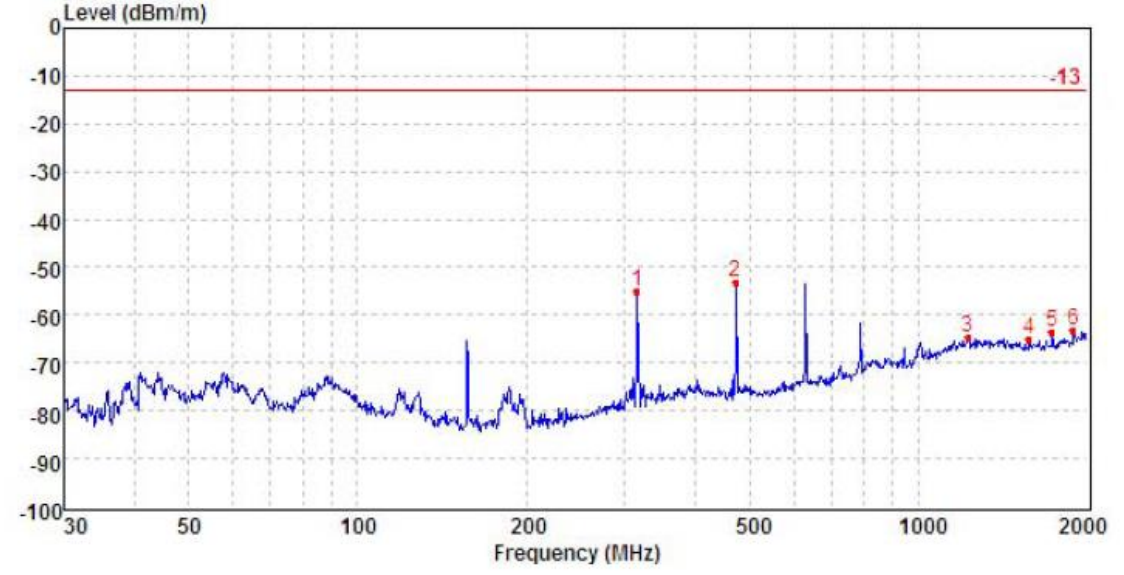
Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	314.26	-53.13	24.03	7.93	30.26	-51.43	-13.00	-38.43	Peak
2	470.89	-60.26	26.01	8.45	30.61	-56.41	-13.00	-43.41	Peak
3	1190.86	-68.69	36.67	5.50	37.65	-64.17	-13.00	-51.17	Peak
4	1290.56	-68.99	37.27	5.76	37.58	-63.54	-13.00	-50.54	Peak
5	1505.25	-69.83	37.76	6.23	37.66	-63.50	-13.00	-50.50	Peak
6	1574.62	-69.87	37.76	6.35	37.61	-63.37	-13.00	-50.37	Peak

TEST MODE	TX-AWH	Test Channel:	CH_H	Polarity:	Horizontal



Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	315.37	-54.76	23.46	7.93	30.26	-53.63	-13.00	-40.63	Peak
2	472.55	-60.56	26.10	8.46	30.62	-56.62	-13.00	-43.62	Peak
3	1014.66	-62.45	33.54	5.05	37.89	-61.75	-13.00	-48.75	Peak
4	1417.16	-67.81	37.05	6.07	37.56	-62.25	-13.00	-49.25	Peak
5	1731.47	-68.68	36.47	6.61	37.91	-63.51	-13.00	-50.51	Peak
6	1889.49	-68.73	37.82	6.91	38.04	-62.04	-13.00	-49.04	Peak

TEST MODE	TX-AWH	Test Channel:	CH_H	Polarity:	Vertical



Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	315.37	-56.90	24.06	7.93	30.26	-55.17	-13.00	-42.17	Peak
2	472.55	-57.31	26.13	8.46	30.62	-53.34	-13.00	-40.34	Peak
3	1227.74	-69.46	36.98	5.60	37.65	-64.53	-13.00	-51.53	Peak
4	1575.71	-71.55	37.76	6.35	37.61	-65.05	-13.00	-52.05	Peak
5	1731.47	-68.42	36.31	6.61	37.91	-63.41	-13.00	-50.41	Peak
6	1889.49	-69.56	37.32	6.91	38.04	-63.37	-13.00	-50.37	Peak

5.10 AC Power Line Conducted Emission

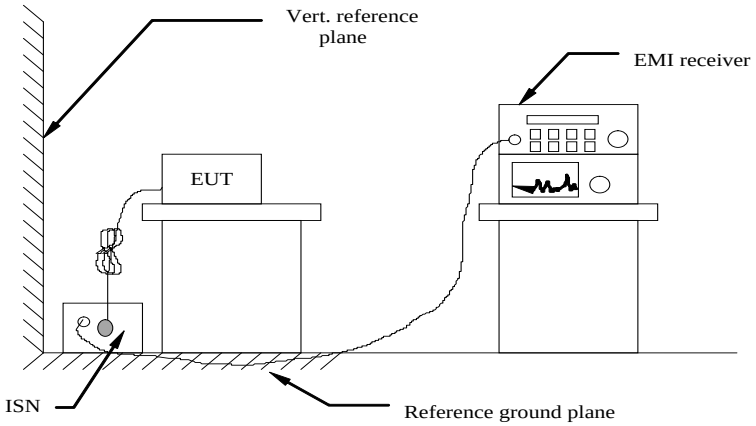
The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm / 50 u Henry as specified by section 5.1 of ANSI C63.4. Cables and peripherals were moved to find the maximum emission levels for each frequency.

Limit

FCC part 15.107(a)

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

TEST CONFIGURATION



TEST PROCEDURE

1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4
2 Support equipment, if needed, was placed as per ANSI C63.4
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4 If a EUT received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5 All support equipments received AC power from a second LISN, if any
6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7 Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8 During the above scans, the emissions were maximized by cable manipulation.

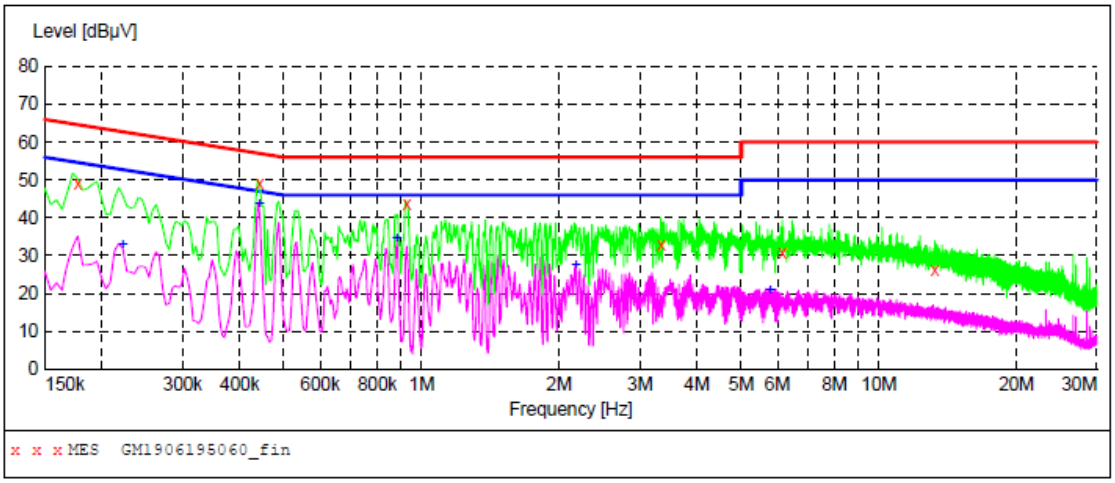
TEST MODE

Please reference to the section 3.4

TEST RESULTS

☐ **Passed** ☒ **Not Applicable**

Polarity:	L



MEASUREMENT RESULT: "GM1906195060_fin"

6/19/2019 2:50PM

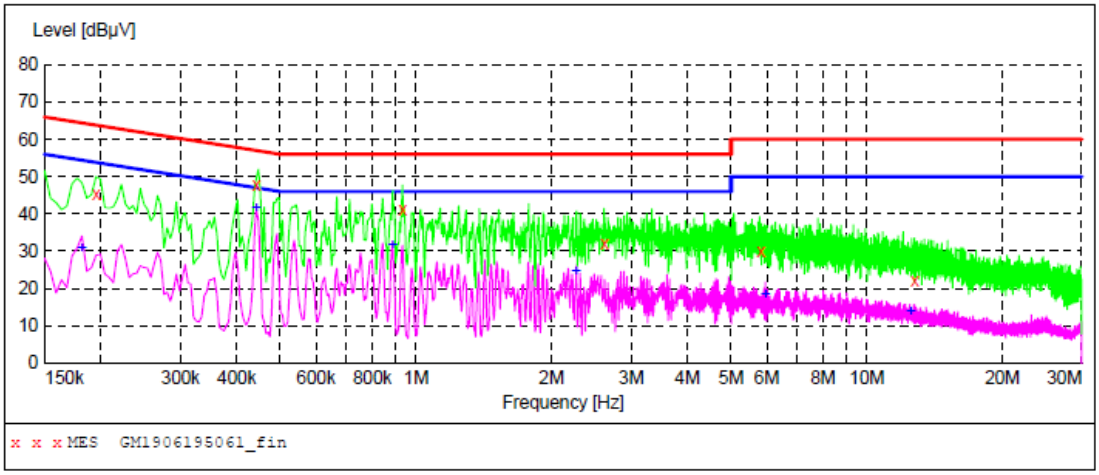
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.177000	49.20	9.9	65	15.4	QP	L1	GND
0.442500	49.20	9.9	57	7.8	QP	L1	GND
0.928500	43.60	9.9	56	12.4	QP	L1	GND
3.340500	32.70	10.0	56	23.3	QP	L1	GND
6.148500	30.90	10.0	60	29.1	QP	L1	GND
13.267500	26.40	10.2	60	33.6	QP	L1	GND

MEASUREMENT RESULT: "GM1906195060_fin2"

6/19/2019 2:50PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.222000	34.90	9.9	53	17.8	AV	L1	GND
0.442500	43.70	9.9	47	3.3	AV	L1	GND
0.883500	35.20	9.9	46	10.8	AV	L1	GND
2.175000	28.30	10.0	46	17.7	AV	L1	GND
5.784000	20.80	10.0	50	29.2	AV	L1	GND

Polarity:	N



MEASUREMENT RESULT: "GM1906195061_fin"

6/19/2019 2:53PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.195000	45.10	9.9	64	18.7	QP	N	GND
0.442500	47.80	9.9	57	9.2	QP	N	GND
0.933000	41.30	9.9	56	14.7	QP	N	GND
2.616000	32.10	10.0	56	23.9	QP	N	GND
5.824500	29.80	10.0	60	30.2	QP	N	GND
12.781500	22.00	10.1	60	38.0	QP	N	GND

MEASUREMENT RESULT: "GM1906195061_fin2"

6/19/2019 2:53PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.181500	30.80	9.9	54	23.6	AV	N	GND
0.442500	41.70	9.9	47	5.3	AV	N	GND
0.888000	31.80	9.9	46	14.2	AV	N	GND
2.265000	24.70	10.0	46	21.3	AV	N	GND
5.950500	18.50	10.0	50	31.5	AV	N	GND
12.498000	13.70	10.1	50	36.3	AV	N	GND

5.11 Radiated Emission

LIMIT

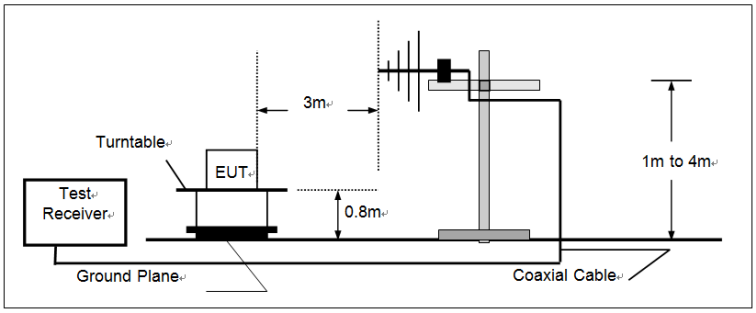
For unintentional device, according to § 15.109(a) except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of emission (MHz)	Field strength (microvolts/meter)
30-88	100
88-216	150
216-960	200
Above 960	500

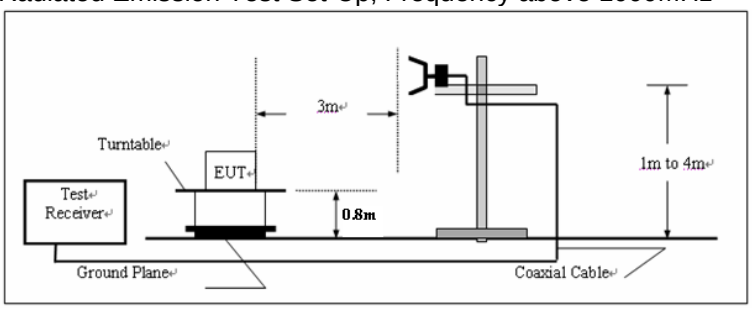
For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

TEST CONFIGURATION

(A) Radiated Emission Test Set-Up, Frequency below 1000MHz



(B) Radiated Emission Test Set-Up, Frequency above 1000MHz



TEST PROCEDURE

1 The EUT was placed on a turn table which is 0.8m above ground plane.
2 Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT
3 And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4 Repeat above procedures until all frequency measurements have been completed.

TEST MODE

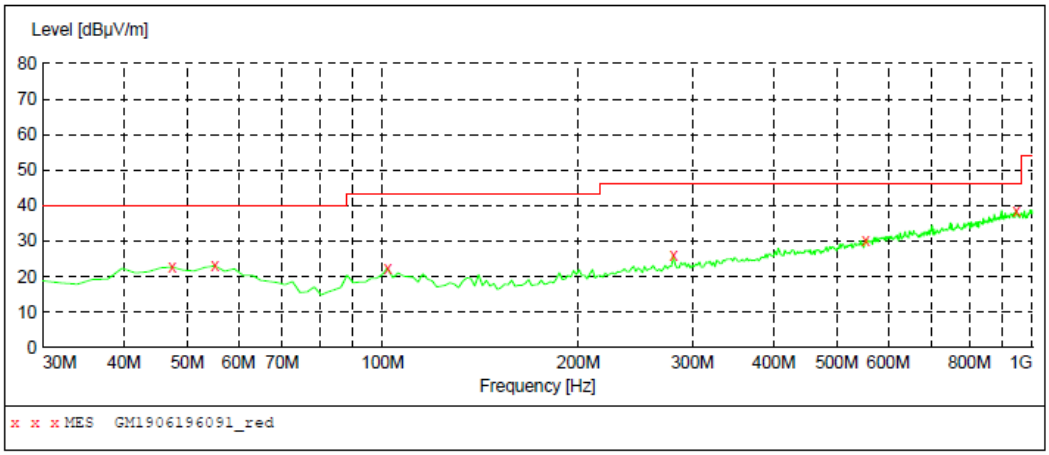
Please reference to the section 3.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Note:
The EUT shall be scanned from 30 MHz to the 5th harmonic of the highest oscillator frequency in the digital devices or 1 GHz whichever is higher.

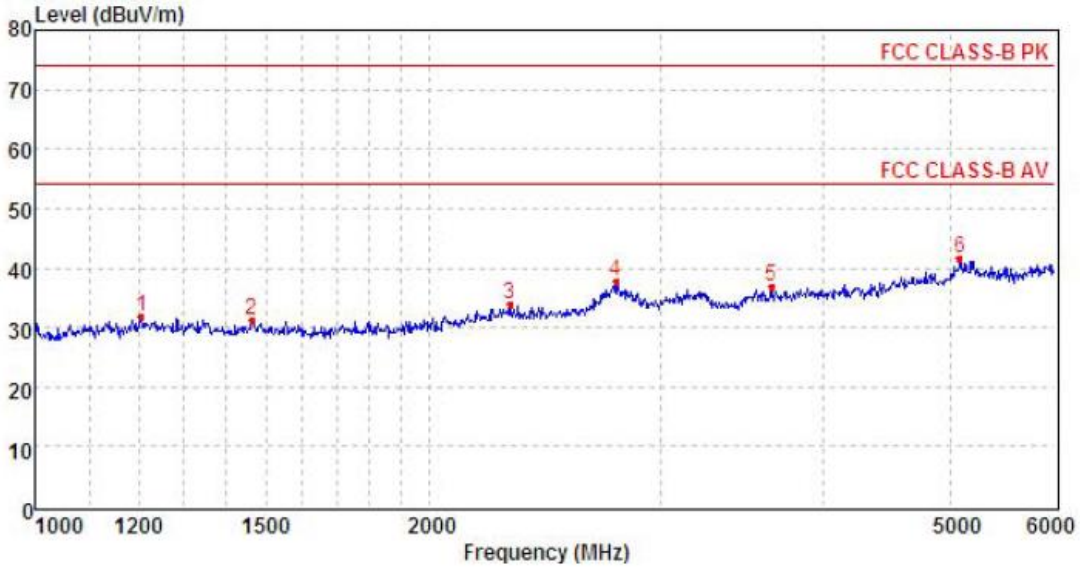
Polarity:	Horizontal



MEASUREMENT RESULT: "GM1906196091_red"

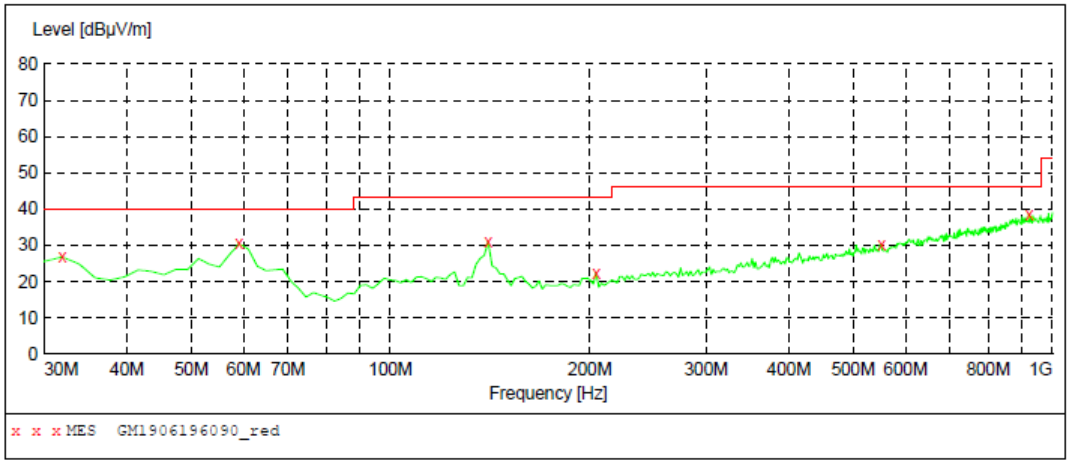
6/19/2019 8:32PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	22.70	-4.9	40.0	17.3	QP	300.0	26.00	HORIZONTAL
55.220000	23.10	-5.3	40.0	16.9	QP	300.0	26.00	HORIZONTAL
101.780000	22.40	-6.6	43.5	21.1	QP	300.0	296.00	HORIZONTAL
280.260000	25.90	-4.0	46.0	20.1	QP	100.0	66.00	HORIZONTAL
553.800000	30.20	3.0	46.0	15.8	QP	300.0	157.00	HORIZONTAL
945.680000	38.60	10.8	46.0	7.4	QP	100.0	244.00	HORIZONTAL



Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1204.84	37.60	26.29	5.54	37.65	31.78	74.00	-42.22	Peak
2	1464.69	36.77	25.83	6.16	37.59	31.17	74.00	-42.83	Peak
3	2304.72	36.33	28.08	7.72	38.16	33.97	74.00	-40.03	Peak
4	2776.81	35.47	28.10	8.87	34.79	37.65	74.00	-36.35	Peak
5	3646.07	35.44	29.30	9.99	37.92	36.81	74.00	-37.19	Peak
6	5079.06	32.94	31.82	12.03	35.22	41.57	74.00	-32.43	Peak

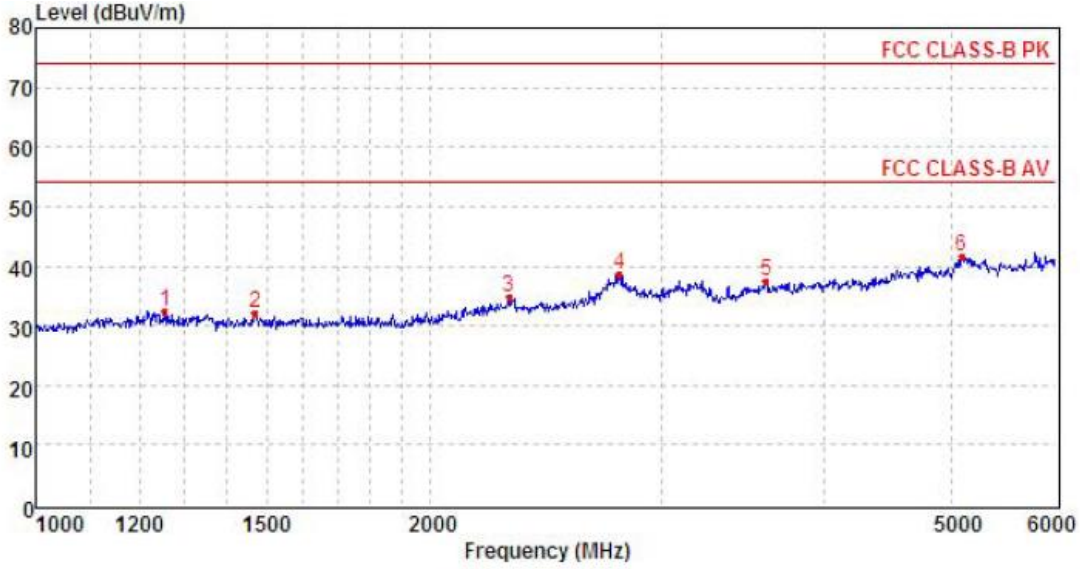
Polarity:	Vertical



MEASUREMENT RESULT: "GM1906196090_red"

6/19/2019 8:28PM

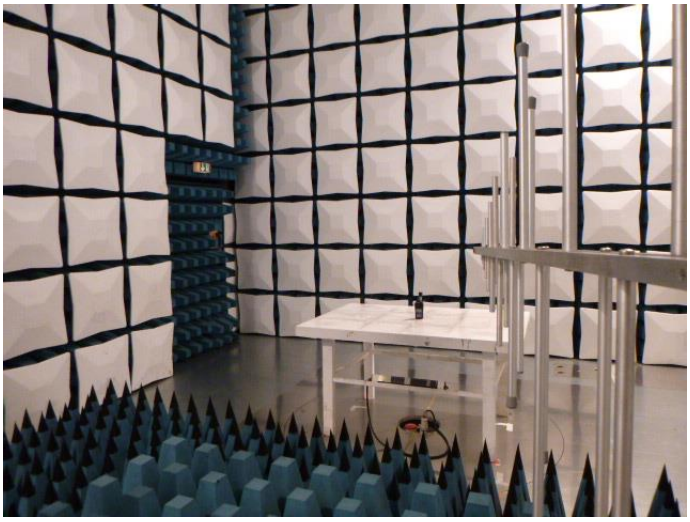
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarizatio
31.940000	26.80	-9.3	40.0	13.2	QP	100.0	13.00	VERTICAL
59.100000	30.40	-5.9	40.0	9.6	QP	100.0	322.00	VERTICAL
140.580000	31.00	-10.0	43.5	12.5	QP	100.0	179.00	VERTICAL
204.600000	22.40	-6.5	43.5	21.1	QP	100.0	232.00	VERTICAL
551.860000	30.20	3.0	46.0	15.8	QP	100.0	27.00	VERTICAL
922.400000	38.70	10.7	46.0	7.3	QP	100.0	39.00	VERTICAL

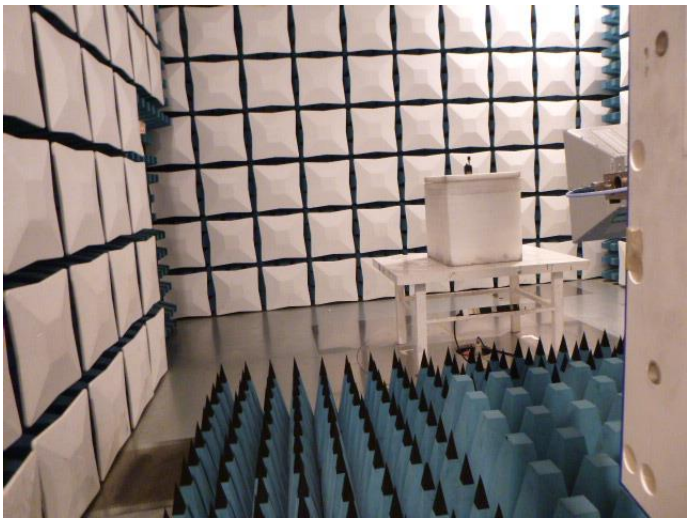


Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1255.53	38.09	26.24	5.67	37.65	32.35	74.00	-41.65	Peak
2	1469.95	37.74	25.83	6.17	37.60	32.14	74.00	-41.86	Peak
3	2296.48	37.08	28.08	7.72	38.14	34.74	74.00	-39.26	Peak
4	2786.78	36.61	28.10	8.89	34.85	38.75	74.00	-35.25	Peak
5	3607.08	35.97	29.30	10.00	37.86	37.41	74.00	-36.59	Peak
6	5088.17	32.85	31.85	12.03	35.18	41.55	74.00	-32.45	Peak

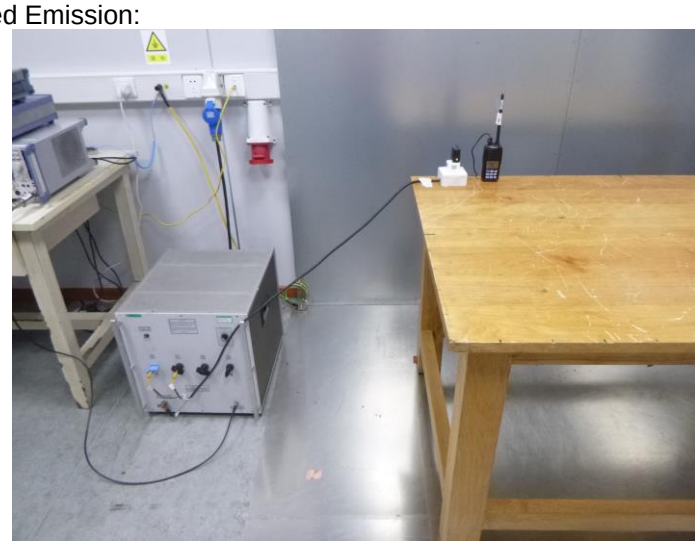
6 TEST SETUP PHOTOS OF THE EUT

Transmitter Radiated Spurious Emission:

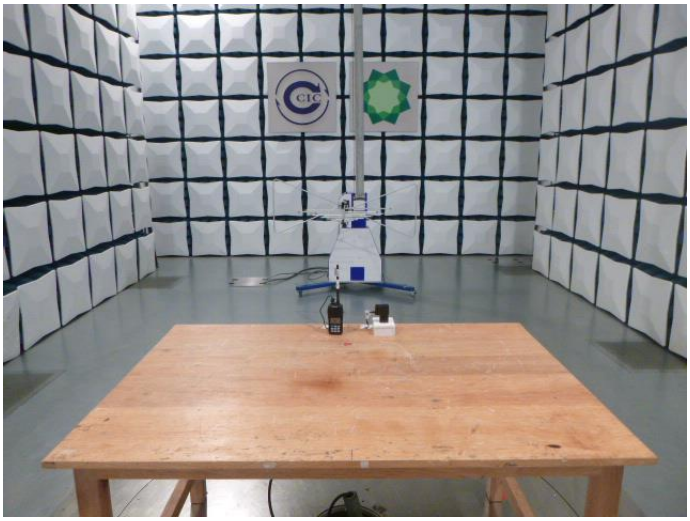


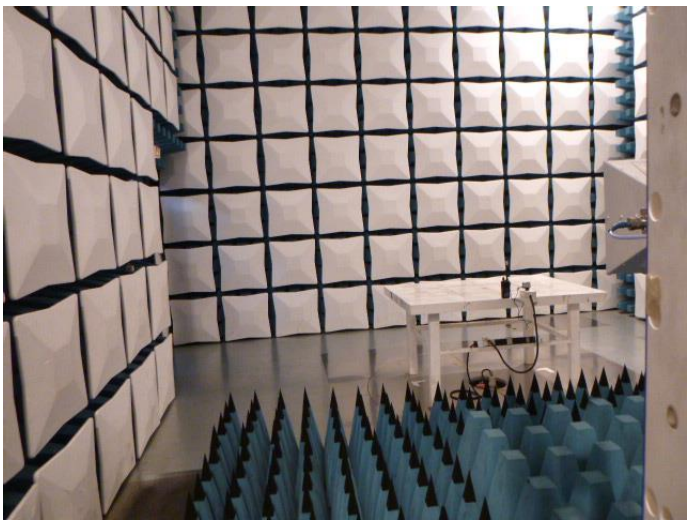


AC Power Line Conducted Emission:



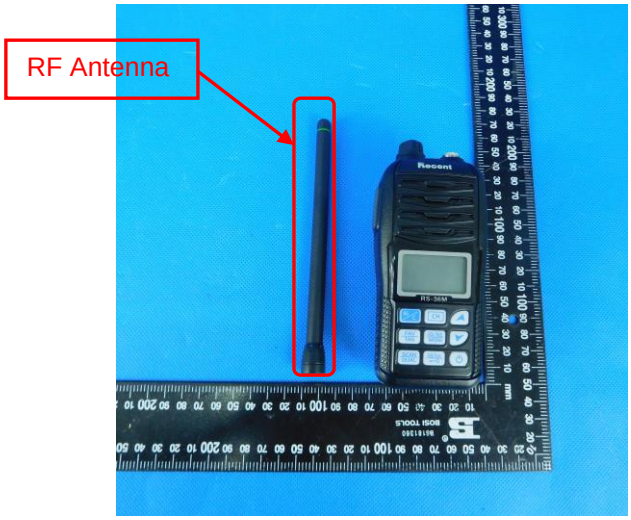
Radiated Emission:

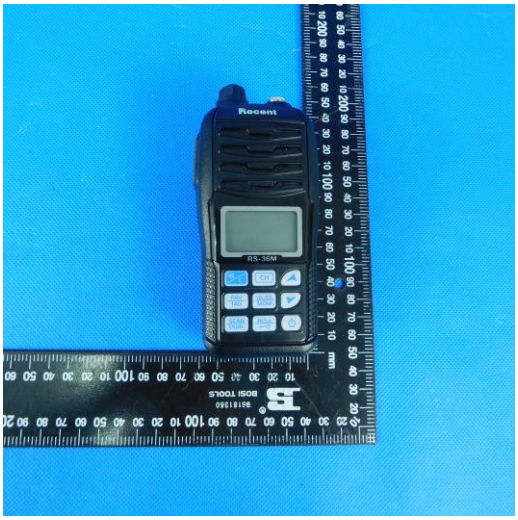


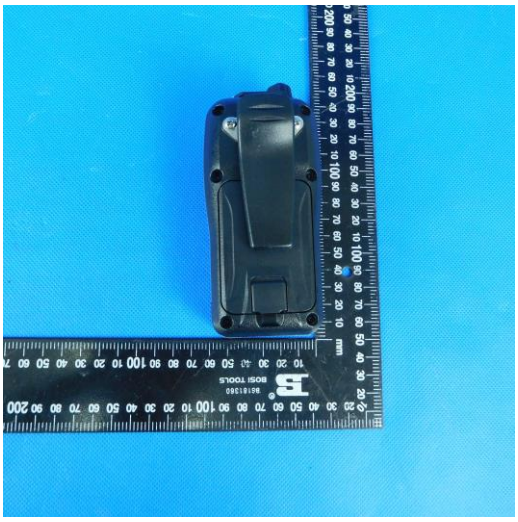


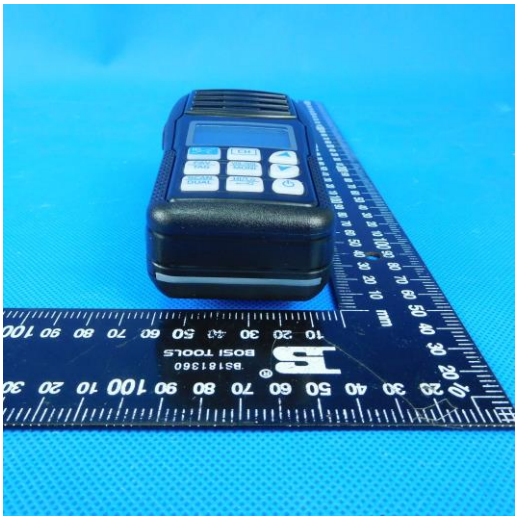
7 EXTERNAL AND INTERNAL PHOTOS OF THE EUT

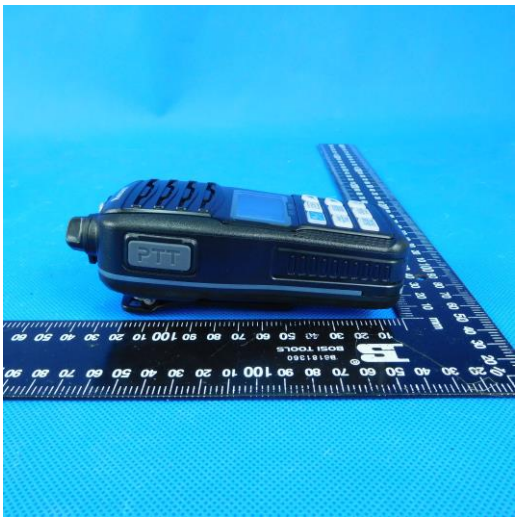
External Photos of the EUT

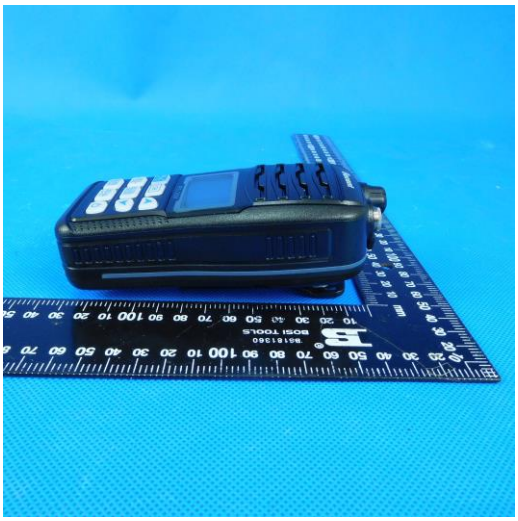








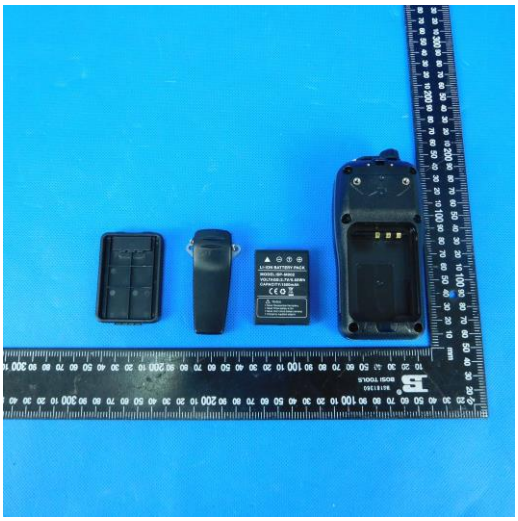

PTT

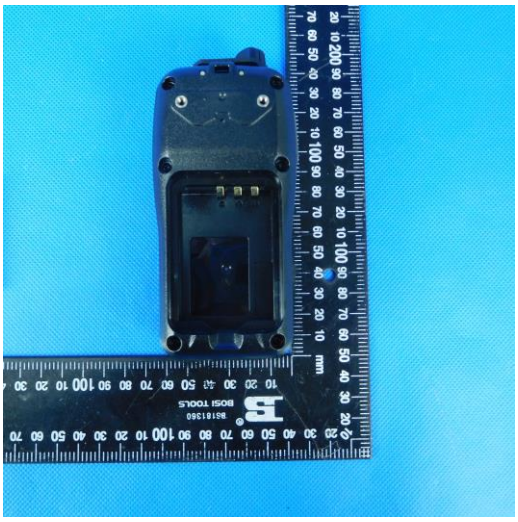


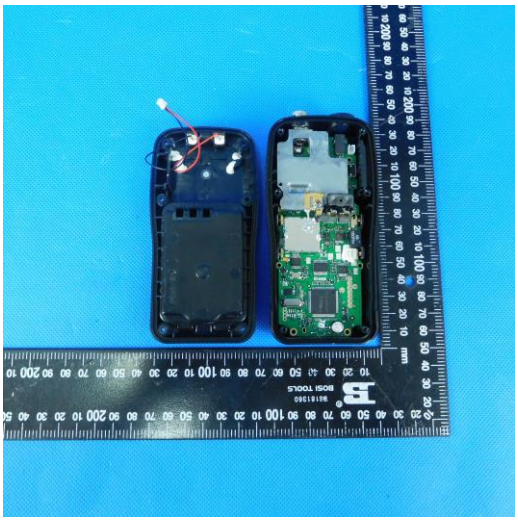

LI-ION BATTERY PACK
MODEL:BP-M002
VOLTAGE:3.7V/5.55Wh
CAPACITY:1500mAh
Notice
• Never Disassemble the battery
• Never throw battery in fire
• Never short circuit battery terminal
• Charge by supplied adaptor

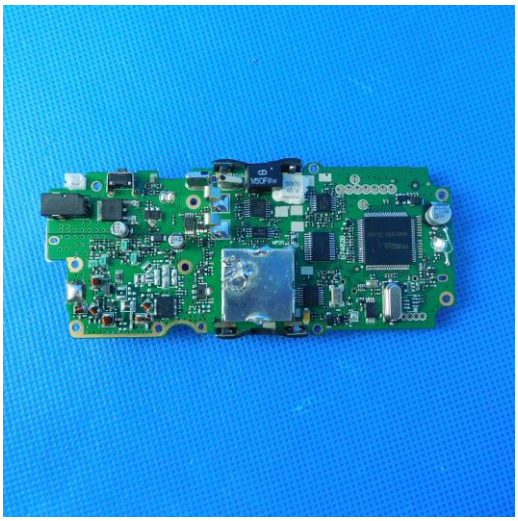

SWITCHING ADAPTER

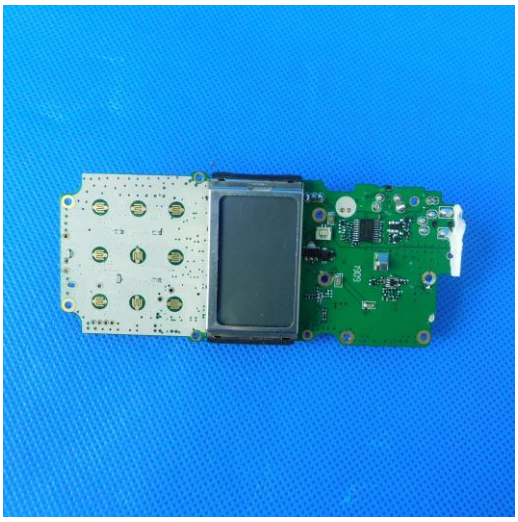
Internal Photos of the EUT

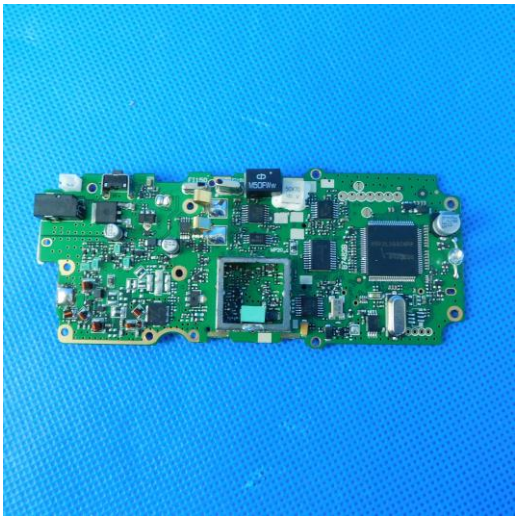


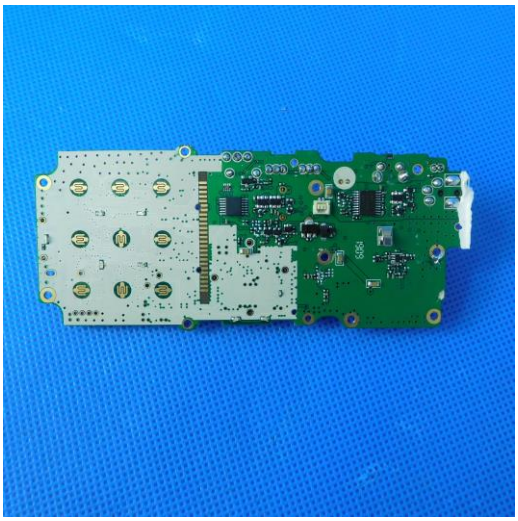












8 APPENDIX REPORT