

TEST REPORT

Reference No. : WTF19S06040904W001 V1
FCC ID : 2AN4R-MIC-PDA8BUWM
Applicant : AMAZING-PRO ELECTRONIC LIMITED
Address : Room 1506, East Tower, Li Hua Building, No.92, Donghuaxi Road, Yuexiu District, Guangzhou, China
Manufacturer : AMAZING-PRO ELECTRONIC LIMITED
Address : Room 1506, East Tower, Li Hua Building, No.92, Donghuaxi Road, Yuexiu District, Guangzhou, China
Product : WIRELESS MICROPHONE
Model(s) : MIC-PDA8BUWM
Brand Name : NA
Standards : FCC CFR47 Part 74
Date of Receipt sample : 2019-06-22
Date of Test : 2019-06-23 to 2019-07-07
Date of Issue : 2019-07-11
Test Result : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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2 Laboratories Introduction

Waltek Services (Shenzhen) Co., Ltd is a professional third-party testing and certification laboratory with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by ILAC (International Laboratory Accreditation Cooperation) member. A2LA (American Association for Laboratory Accreditation, the certification number is 4243.01) of USA, CNAS (China National Accreditation Service for Conformity Assessment, the registration number is L3110) of China. Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC (The Federal Communications Commission), CEC (California energy efficiency), ISED (Innovation, Science and Economic Development Canada). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as Intertek (ETL-SEMKO), TÜV Rheinland, TÜV SÜD, etc.



Waltek Services (Shenzhen) Co., Ltd is one of the largest and the most comprehensive third party testing laboratory in China. Our test capability covered four large fields: safety test. Electro Magnetic Compatibility (EMC), and energy performance, wireless radio. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

Test Facility:**A. Accreditations for Conformity Assessment (International)**

Country/Region	Scope Covered By	Scope	Note
USA	ISO/IEC 17025	FCC ID \ DOC \ VOC	1
Canada		IC ID \ VOC	2
Japan		MIC-T \ MIC-R	-
Europe		EMCD \ RED	-
Taiwan		NCC	-
Hong Kong		OFCA	-
Australia		RCM	-
India		WPC	-
Thailand		NTC	-
Singapore		IDA	-
Note:			
1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476.			
2. ISED CAB identifier: CN0013			

B. TCBs and Notify Bodies Recognized Testing Laboratory.

Recognized Testing Laboratory of ...	Notify body number
TUV Rheinland	Optional.
Intertek	
TUV SUD	
SGS	
Phoenix Testlab GmbH	0700
Element Materials Technology Warwick Ltd	0891
Timco Engineering, Inc.	1177
Eurofins Product Service GmbH	0681

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4 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTF19S06040 904W001	2019-06-22	2019-06-23 to 2019-07-07	2019-07-08	original	-	Replaced
WTF19S06040 904W001 V1	2019-06-22	2019-06-23 to 2019-07-07	2019-07-11	Updated	Version 1	Vaild

5 General Information

5.1 General Description of E.U.T

Product:	WIRELESS MICROPHONE
Model(s):	MIC-PDA8BUWM
Model Description:	N/A
Operation Frequency:	520MHz,522MHz
The Lowest Oscillator:	24MHz
Antenna installation:	Integrated Antenna
Gain:	3dBi

5.2 Details of E.U.T

Technical Data:	Input: DC 3V power by 1.5A*2 batteris
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6 Test Summary

Test Items	Test Requirement	Test Method	Result
EIRP	74.861(e)(1)(i)	ANSI/TIA-603-E:2016	PASS
Modulation Characteristics	2.1047(a)	ANSI/TIA-603-E:2016	PASS
Occupied Bandwidth	2.1049(c)(1)	ANSI/TIA-603-E:2016	PASS
Radiated Emissions	2.1053 & 74.861(e)(6)	ANSI/TIA-603-E:2016	PASS
Spurious emissions at antenna terminals	2.1051	ANSI/TIA-603-E:2016	PASS
Frequencies Stability	2.1055(a)(1)	ANSI/TIA-603-E:2016	PASS
Remark: PASS means that the test results complies with related requirements. N/A means that the test is not applicable for the EUT.			

7 Equipment Used during Test

7.1 Equipments List

3m Semi-anechoic Chamber for Radiation Emissions Test site						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Spectrum Analyzer	R&S	FSP	100091	2019-04-28	2020-04-27
2	EMI Test Receiver	R&S	ESCI	100947	2019-09-11	2020-09-10
3	Pre-amplifier	Agilent	8447F	3113A06717	2019-04-18	2020-04-17
4	Pre-amplifier	Compliance Direction	PAP-0118	24002	2018-09-14	2019-09-13
5	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	2019-04-08	2020-04-07
6	Horn Antenna	ETS	3117	00086197	2019-04-18	2020-04-17
7	Horn Antenna	ETS	3116B	00088203	2019-03-16	2020-03-15
8	Loop Antenna	SCHWARZECK	HFRA 5165	9365	2019-04-09	2020-04-08
RF Conducted Testing						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMC Analyzer	R&S	ESCI	101155	2018-09-16	2019-09-15
2.	Humidity Chamber	GF	GTH-225-40-1P	IAA061213	2019-05-14	2020-05-13
3.	DC Power Supply	EVERFINE	WY305	1004002	2019-04-09	2020-04-08
4.	Modulation Analyzer	HP	8920B	-	2019-04-09	2020-04-08

7.2 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-6}$
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (Bilog antenna 30M~1000MHz)
	± 4.74 dB (Horn antenna 1000M~25000MHz)

8 EIRP

Test requirement: FCC CFR47 Part 74 Section 74.861(e)(1)(ii)

Test method: Based on ANSI/TIA-603-E:2016

Limit: According to Part 74.861(e)(1)(ii), the conduct power shall not exceed 250mW (23.98 dBm).

8.1 Test Procedure

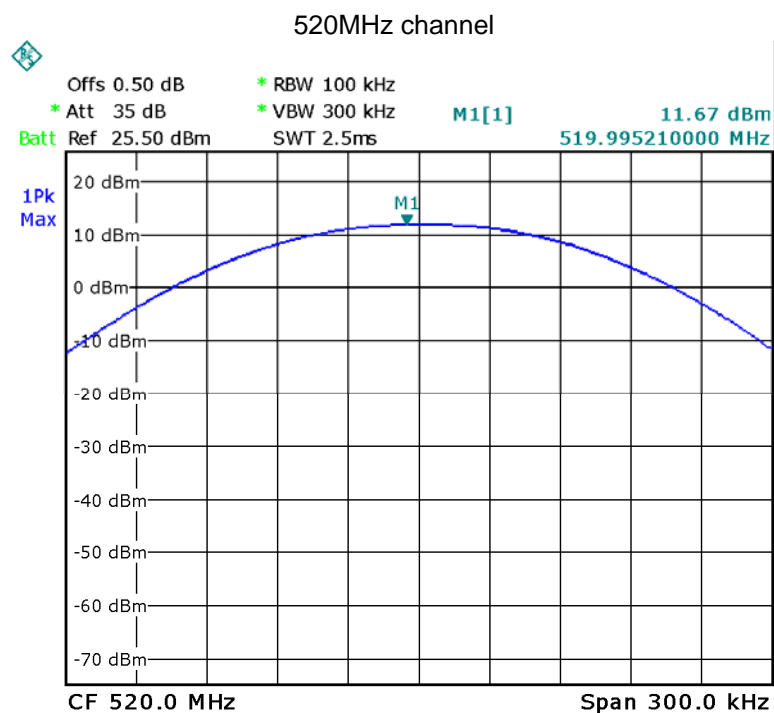
The maximum peak output power was measured with a spectrum analyzer connected to the antenna terminal (conducted measurement) while EUT was operating in normal situation.

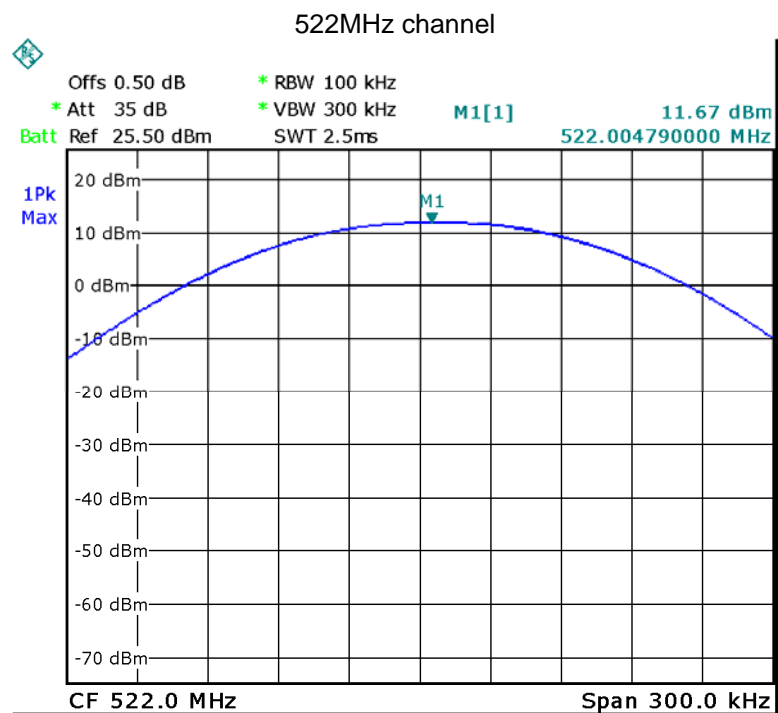
8.2 Test result

Frequency (MHz)	RF Output Power (dBm)	Limit (dBm)	Result
520MHz	11.67	23.98	PASS
522MHz	11.67	23.98	PASS

Remark: EIRP = RF Output Power + Ant Gain- L_C , $G=3.0\text{dBi}$, $L_C=0$

Please refer to following plot:



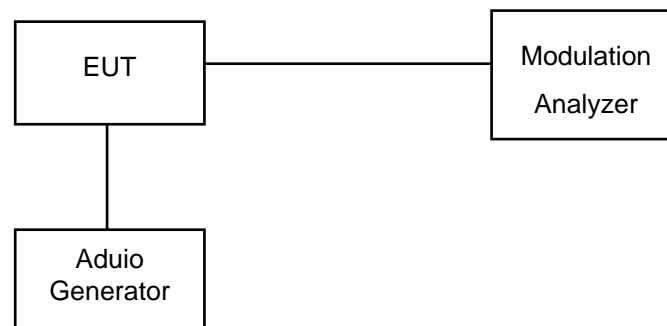


9 Modulation Characteristics

Test requirement:	FCC CFR47 Part 2 Section 2.1047(a)
Test method:	Based on ANSI/TIA-603-E:2016
Requirement:	According to Part 2.1047(a), for Voice Modulated Communication Equipment, the frequency response of the audio modulating circuit over a range of 100Hz to 5000Hz shall be measured.

9.1 Test Procedure

(a) Test Configuration



(b) Audio Frequency Response:

- 1) Apply a 1000 Hz tone and adjust the audio frequency generator to produce 20% of the rated system deviation.
- 2) Set the test receiver to measure rms deviation and record the deviation reading as DEV_{REF} .
- 3) Set the audio frequency generator to the desired test frequency between 100 Hz and 5000 Hz.
- 4) Record the test receiver deviation reading as DEV_{FREQ} .
- 5) Calculate the audio frequency response at the present frequency as:
$$\text{audio frequency response} = 20\lg(DEV_{FREQ} / DEV_{REF})$$
- 6) Repeat steps 4) through 5) for all the desired test frequencies.

(c) Modulation Limiting:

- 1) 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.
- 2) Measure both the instantaneous and steady-state deviation at and after the time of increasing the audio input level.
- 3) With the level from the audio frequency generator held constant at the level obtained in step e), slowly vary the audio frequency from 300 Hz to 3000 Hz and observe the steady-state deviation. Record the maximum deviation.
- 4) Set the test receiver to measure peak negative deviation and repeat steps 1) through 3).
- 5) The values recorded in steps 3) and 4) are the modulation limiting.

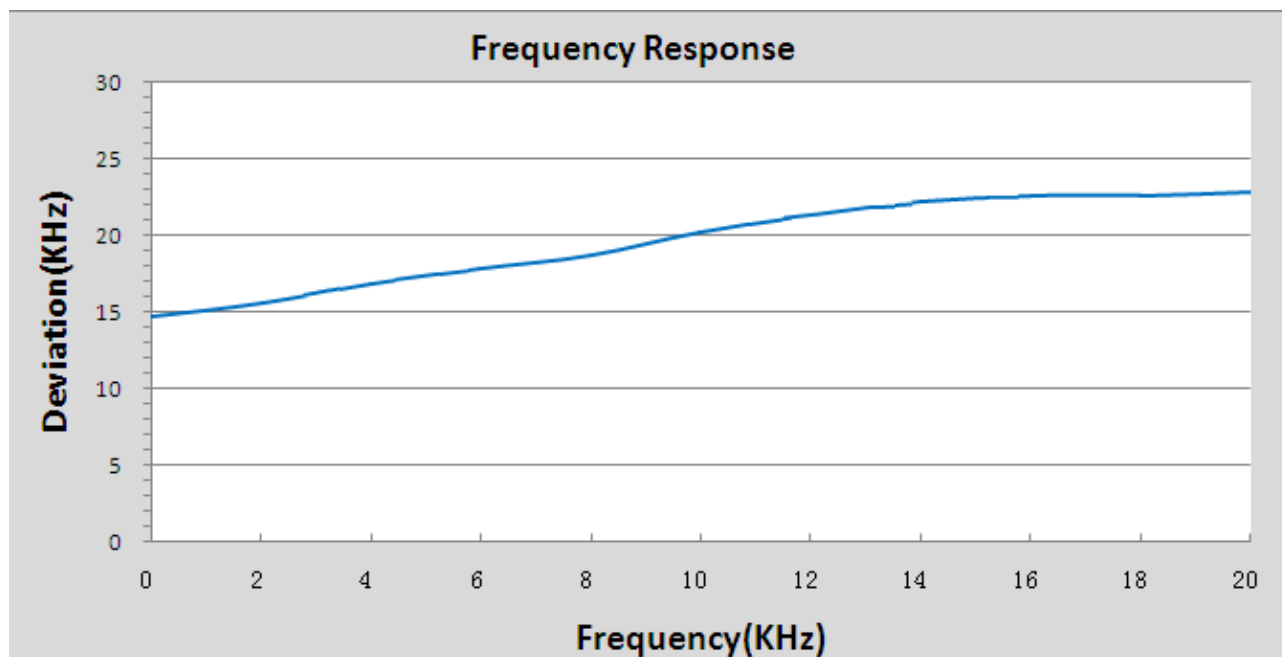
9.2 Test Result

The test data of modulation characteristic is showing as below:

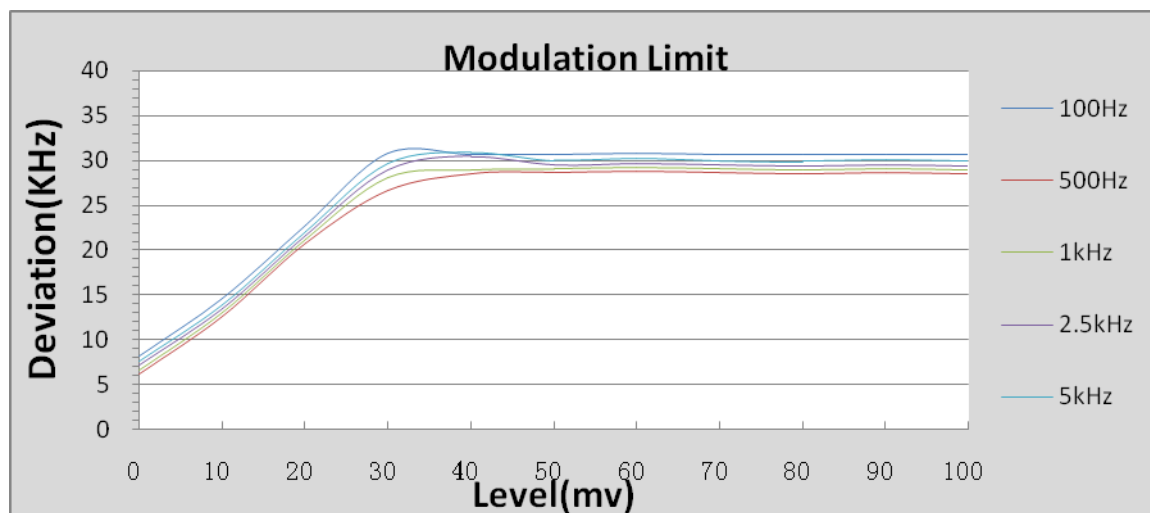
Audio Frequency Response

Note: All supported channels have been tested, only the data of the worst channel (520MHz) is recorded

520MHz Channel



Level(mv)	100Hz	500Hz	1kHz	2.5kHz	5kHz	Limit(kHz)
0	8.33	6.19	6.64	7.04	7.57	±75.00
10	14.62	12.57	13.02	13.55	13.95	±75.00
20	23.26	20.95	21.33	21.58	22.58	±75.00
30	31.24	27.04	28.44	29.15	29.27	±75.00
40	30.81	28.52	29.24	30.65	31.25	±75.00
50	30.84	28.84	29.53	29.73	30.23	±75.00
60	30.91	28.76	29.42	29.42	30.59	±75.00
70	31.10	28.94	29.34	29.95	30.22	±75.00
80	30.92	28.84	29.30	29.84	30.33	±75.00
90	31.02	28.83	29.44	29.92	30.42	±75.00
100	30.97	28.92	29.44	29.88	30.32	±75.00



10 Occupied Bandwidth of Emission

Test requirement:	FCC CFR47 Part 2 Section 2.1049©(1)
Test method:	Based on ANSI/TIA-603-E:2016
Limit:	According to FCC 74.861 (e)(5), the frequency emission bandwidth shall not exceed 200 kHz.

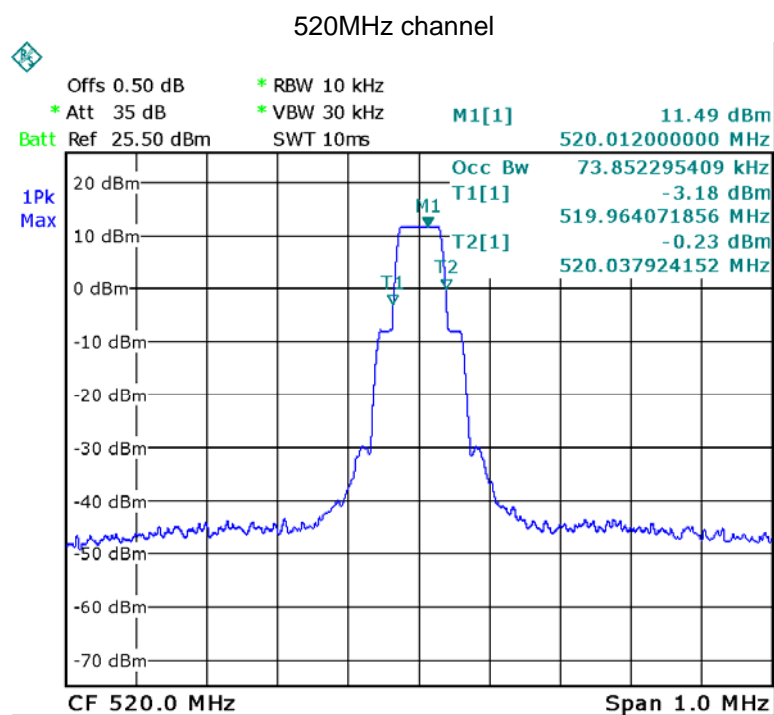
10.1 Test Procedure

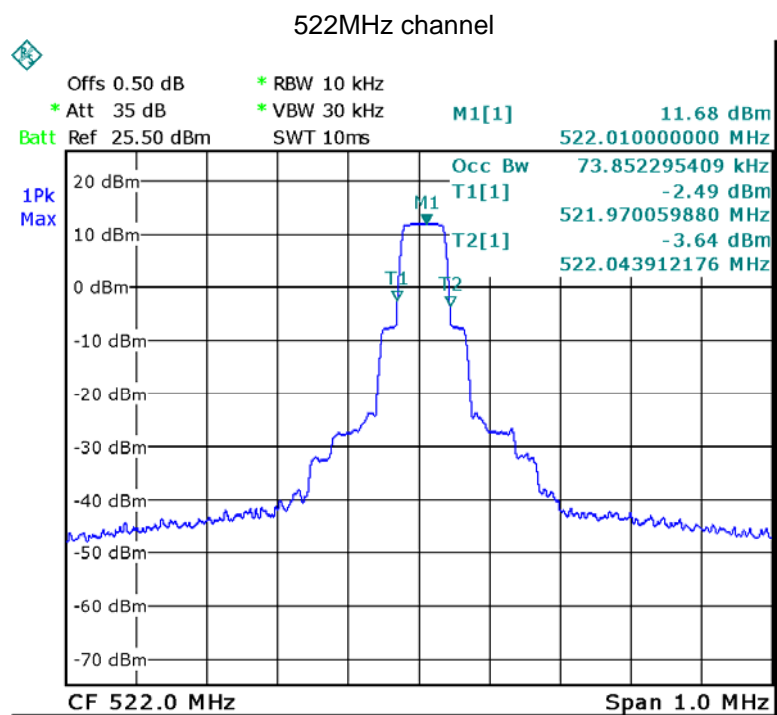
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and set it to any one convenient frequency within its operating range.

10.2 Test Result

Frequency (MHz)	99% Bandwidth (kHz)	Limit (kHz)	Result
520MHz	73.85	200	PASS
522MHz	73.85	200	PASS

Test Plot:





11 Spurious Emissions at Antenna Terminals

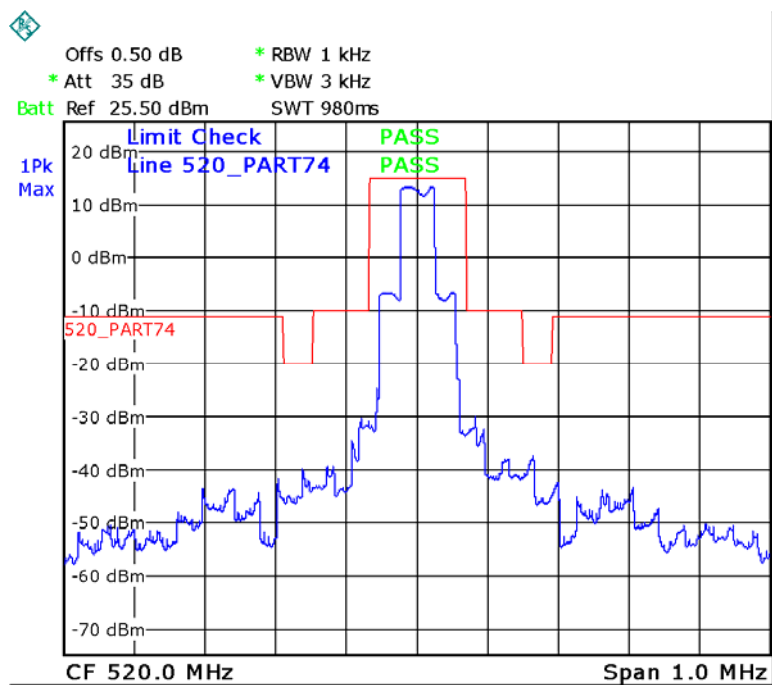
Test requirement:	FCC CFR47 Part 2 Section 2.1053
Test method:	Based on ANSI/TIA-603-E:2016
Limit:	<p>According to Part 74.861 (e)(6), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:</p> <p>(i) on any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB.</p> <p>(ii) on any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB.</p> <p>(iii) on any frequency removed from the operating frequency by more than 250 percent up to and the authorized bandwidth shall be attenuated below the un-modulated carrier by at least $43 + 10 \log$ (output power in watts)dB.</p>

11.1 Test Procedure

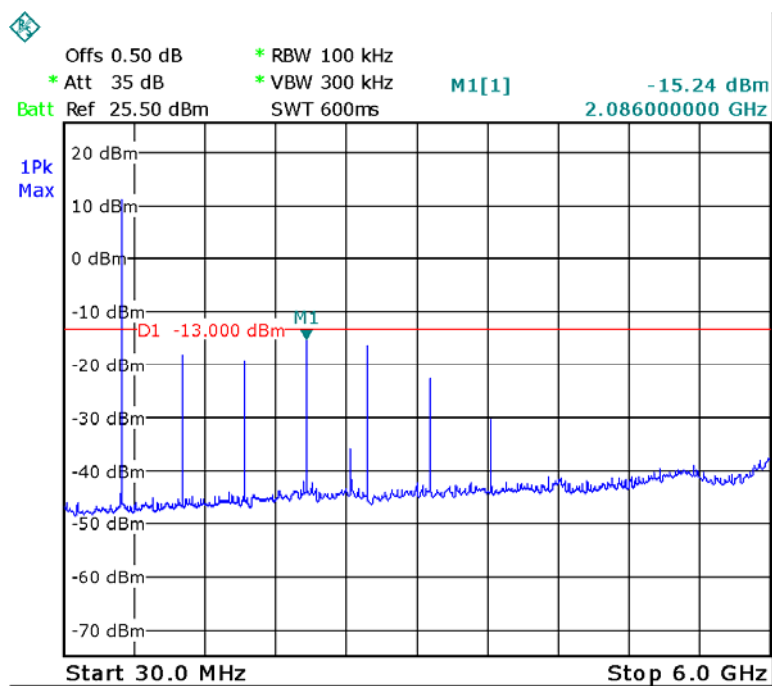
1. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
2. Set the SA on Max-Hold Mode, and then keep the EUT in transmitting mode. Record all the signals from each channel until each one has been recorded.
3. Set the SA on View mode and then plot the result on SA screen.
4. Repeat above procedures until all frequencies measured were complete.

11.2 Test Data

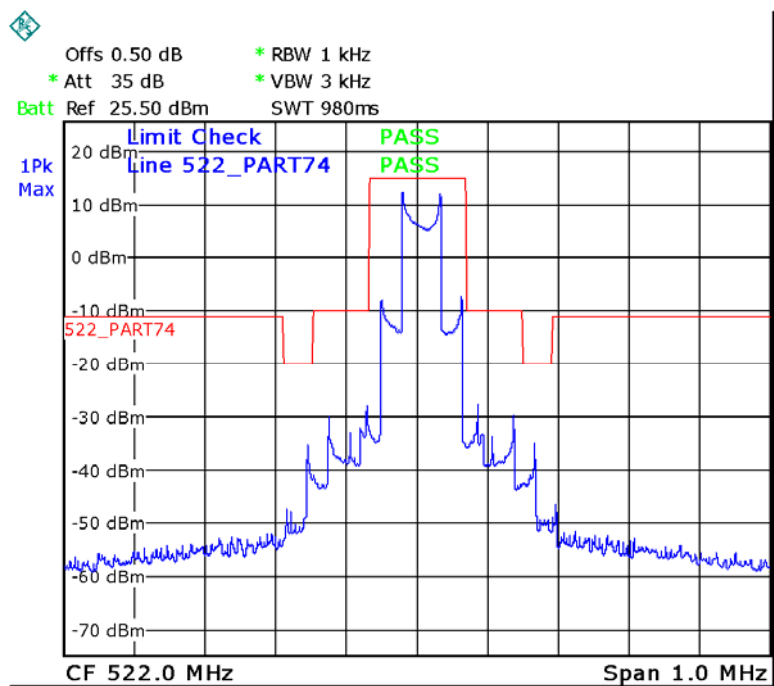
Emission Mask 520MHz Channel



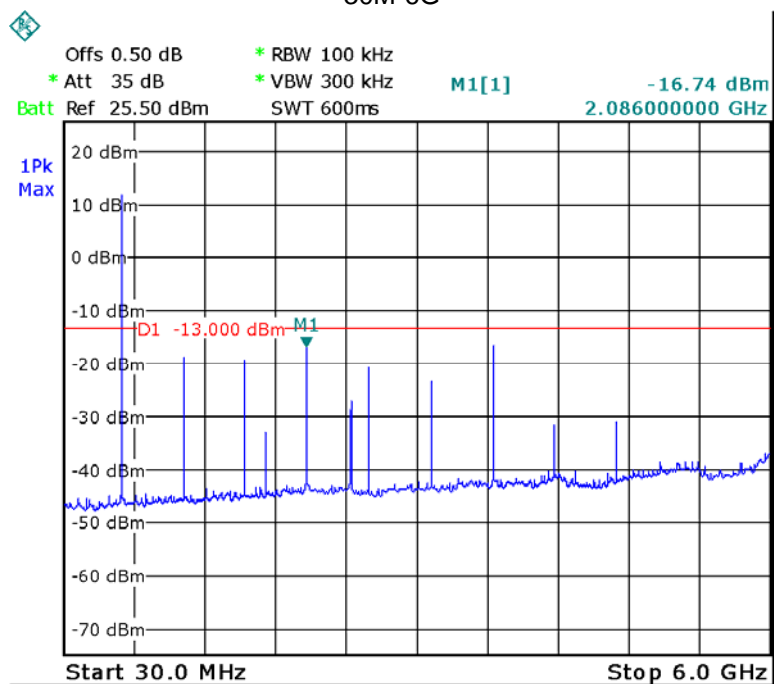
30M-6G



522MHz Channel



30M-6G



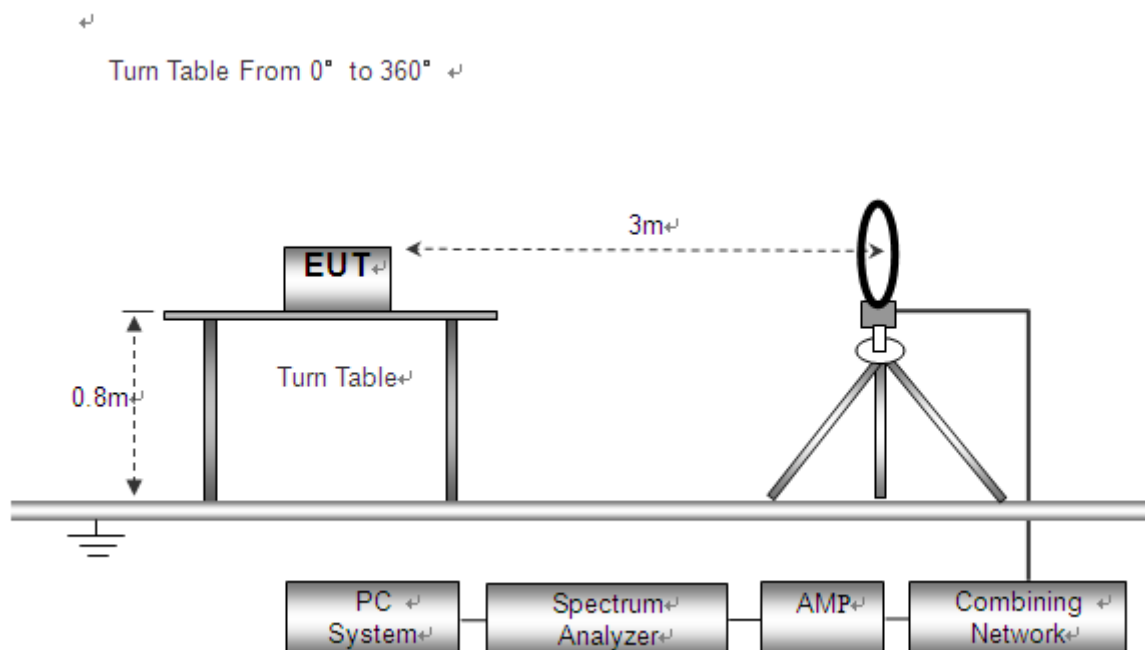
12 Radiated Emission Test

Test requirement:	FCC CFR47 Part 2 Section 2.1053
Test method:	Based on ANSI/TIA-603-E:2016
Limit:	<p>According to Part 74.861 (e)(6), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:</p> <p>(i) on any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB.</p> <p>(ii) on any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB.</p> <p>(iii) on any frequency removed from the operating frequency by more than 250 percent up to and the authorized bandwidth shall be attenuated below the un-modulated carrier by at least $43 + 10 \log$ (output power in watts)dB.</p>

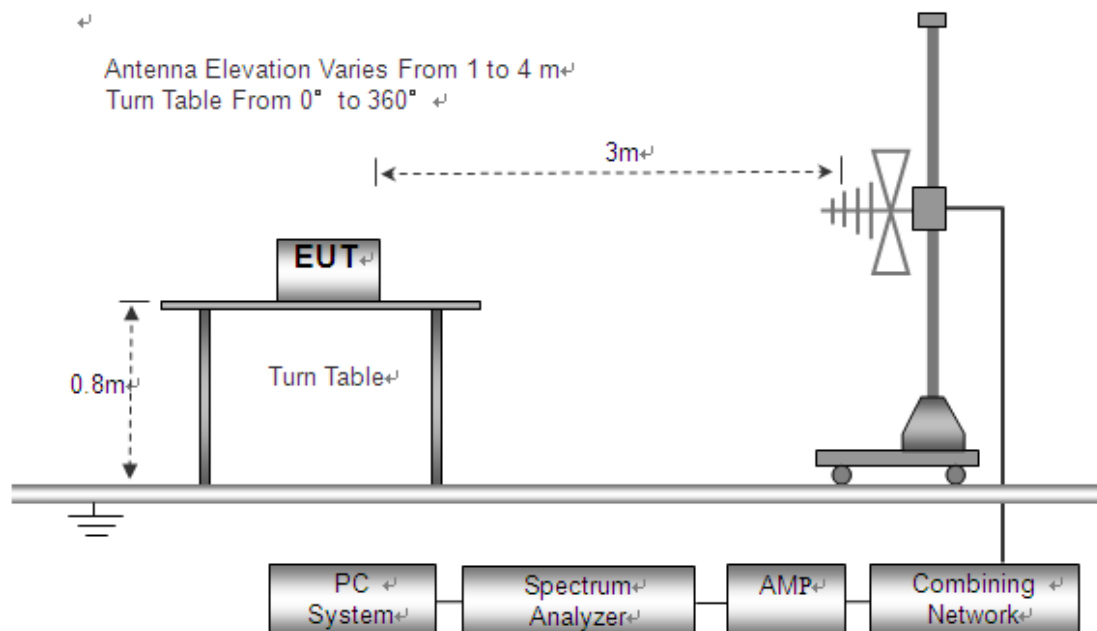
12.1 EUT Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4

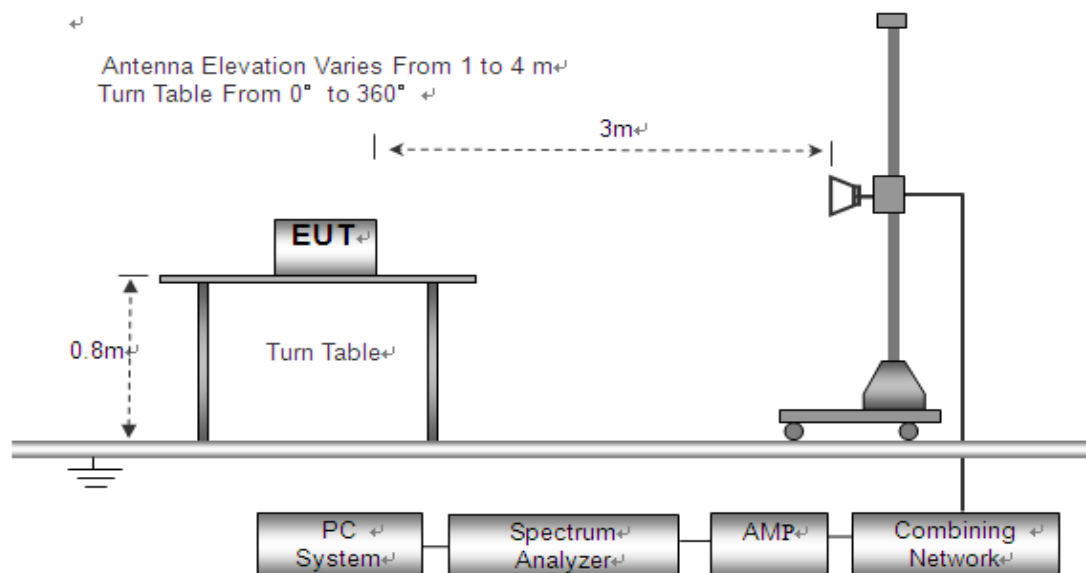
The test setup for emission measurement below 30MHz.



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz Emissions.



12.2 Spectrum Analyzer Setup

According to FCC Part 2 Section 2.1053 Rules, the system was tested 9KHz to 6000MHz.

Below 30MHz

Sweep SpeedAuto
 IF Bandwidth.....10kHz
 Video Bandwidth.....10kHz
 Resolution Bandwidth.....10kHz

30MHz ~ 1GHz

Start Frequency30 MHz
 Stop Frequency.....1000MHz
 Sweep Speed.....Auto
 IF Bandwidth120 KHz
 Video Bandwidth300KHz
 Quasi-Peak Adapter Bandwidth.....120 KHz
 Quasi-Peak Adapter ModeNormal
 Resolution Bandwidth100KHz

Above 1GHz

Start Frequency1000 MHz
 Stop Frequency.....7000MHz
 Sweep Speed.....Auto
 IF Bandwidth120 KHz
 Video Bandwidth3MHz
 Quasi-Peak Adapter Bandwidth.....120 KHz
 Quasi-Peak Adapter ModeNormal
 Resolution Bandwidth1MHz

12.3 Test Procedure

1. Place the transmitter to be tested on the turntable in the standard test site. The transmitter is Transmitting into a non-radiating load, which is placed on the turntable.
2. The output of the antenna was connected to the measuring receiver and a peak detector was used for the measurement as indicated on the report.
3. The transmitter was switched on; if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
4. The test antenna shall be raised and Lowed through the specified range of height until the measuring receiver detects a maximum signal level.
5. The transmitter shall than be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
6. The test antenna shall be raised and Lowed again through the specified range of height until the measuring receiver detects a maximum signal level.
7. The maximum signal level detected by the measuring receiver shall be noted.
8. The measurement shall be repeated with the test antenna set to horizontal polarization.

9. Replace the antenna with a proper antenna (substitution antenna).
10. The substitution antenna shall be oriented for vertical polarization and, if necessary, the length of the substitution antenna shall be adjusted to correspond to the frequency of transmitting.
11. The substitution antenna shall be connected to a calibrated signal generator.
12. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
13. The test antenna shall be raised and Lowered through the specified range of the height to ensure that the maximum signal is received.
14. The input signal to substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.
15. The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
16. The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.
17. The radiation emission was tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.
18. The EUT was under working mode during the final qualification test and the configuration was used to represent the worst case results.

12.4 Test Result

Note: All supported channels have been tested, only the data of the worst channel(520MHz) is recorded

Test Frequency : 9kHz ~ 30MHz

The measurements were more than 20 dB below the limit and not reported.

Test Frequency : 1GHz-6GHz

Frequency	Detector	Ant.	Antenna Height	Turntable Angle	Emission Level	Limit	Margin
(MHz)		Pol	(m)	(°)	(dBm)	(dBm)	(dB)
Low Channel							
1040.00	Peak	H	1.4	298	-32.37	-13	-19.37
1040.00	Peak	V	1.8	35	-37.25	-13	-24.25
1560.04	Peak	H	1.2	0	-50.49	-13	-37.49
1560.04	Peak	V	1.6	270	-52.55	-13	-39.55
2080.00	Peak	H	1.1	163	-50.07	-13	-37.07
2080.00	Peak	V	1.7	5	-52.24	-13	-39.24

The measurements below 1G were more than 20 dB below the limit and not reported.

13 Frequency Stability

Test requirement:	FCC CFR47 Part 2 Section 2.1055(a)(a)
Test method:	Based on ANSI/TIA-603-E:2016
Limit:	According to FCC 74.86(e)(4), the frequency tolerance of the transmitter shall be 0.005 percent.

13.1 Test Configuration

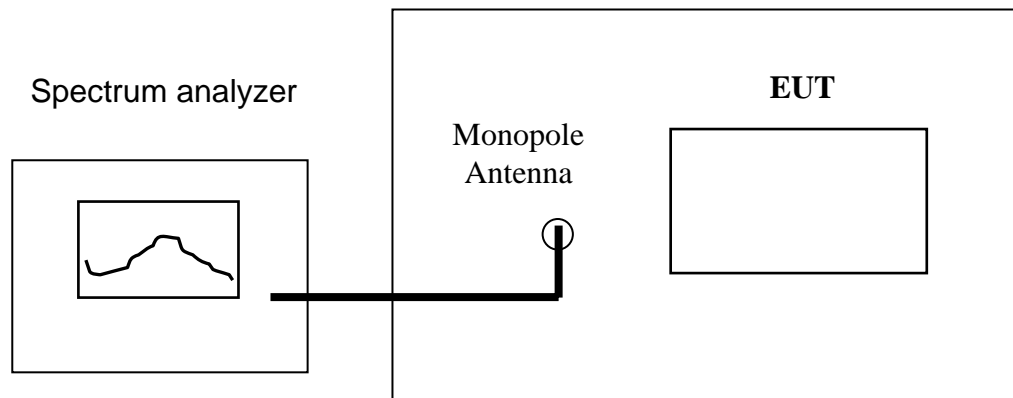


Figure 1

13.2 Test Procedure

A) Frequency stability versus input voltage

1. Setup the configuration per figure 1 for frequencies measured at an environmental chamber whose temperature is set to 20 °C. Install new batteries in the EUT.
2. Set SA center frequency to the EUT operation frequency. Then set SA RBW to 30 kHz, VBW to 100kHz and frequency span to 500 kHz. Record this frequency to be a reference.
3. Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

B) Frequency stability versus environmental temperature

1. Setup the configuration per figure 1 for frequencies measured at an environmental chamber, Install new batteries in the EUT.
2. Turn on EUT and set SA center frequency to the EUT operation frequency, then set SA RBW to 30kHz, VBW to 100kHz and frequency span to 500 kHz. Record this frequency to be a reference.
3. Set the temperature of chamber to 50°C. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the chamber, turn the EUT on and measure the EUT operating frequency.
4. Repeat step 2 with a 10°C decreased per stage until the lowest temperature -30°C is measured, record all measurement frequencies.

13.3 Test Result

a) Frequency stability versus input voltage

520MHz channel

Power Supply	Reference Frequency (MHz)	Environment Temperature (°C)	Frequency Measured	Frequency Tolerance (%)
3.3V, DC	520.00	20	520.00	0.00
2.7V, DC	520.00	20	520.002	0.000385
3.3V, DC	522.00	20	522.00	0.00
2.7V, DC	522.00	20	519.998	-0.000383

Remark: The 3V is the end point voltage which is specified by the manufacturer.

b) Frequency stability versus environmental temperature

520MHz Channel Limit: 0.005%			
Environment Temperature(°C)	Power Supply	Frequency Deviation measured with time Elapse(30 minutes)	
		MHz	%
50	3V, DC	520.001	0.000192
40	3V, DC	520.004	0.000769
30	3V, DC	520.004	0.000769
20	3V, DC	520.005	0.000962
10	3V, DC	520.007	0.001346
0	3V, DC	520.006	0.001154
-10	3V, DC	520.004	0.000769
-20	3V, DC	520.003	0.000577
-30	3V, DC	520.002	0.000385

522MHz Channel Limit: 0.005%			
Environment Temperature(°C)	Power Supply	Frequency Deviation measured with time Elapse(30 minutes)	
		MHz	%
50	3V, DC	522.001	0.000192
40	3V, DC	522.004	0.000766
30	3V, DC	522.00	0.000000
20	3V, DC	521.999	-0.000192
10	3V, DC	521.998	-0.000383
0	3V, DC	522.006	0.001149
-10	3V, DC	522.003	0.000575
-20	3V, DC	522.005	0.000958
-30	3V, DC	521.999	-0.000192

Test Result: The max frequency tolerance rating is 0.001346% < 0.005%. Passed.

14 Photographs of test setup and EUT.

Note: Please refer to appendix: Appendix-MIC-PDA8BUWM-Photos.

=====End of Report=====