Shenzhen CTL Testing Technology Co., Ltd.
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TEST REPORT

FCC PART 74H

Report Reference No.....: **CTL1707131052-WF**

Compiled by: (position+printed name+signature)	Allen Wang (File administrators)	Allen Wang
Tested by: (position+printed name+signature)	Nice Nong (Test Engineer)	Nice Nong
Approved by: (position+printed name+signature)	Ivan Xie (Manager)	Ivan Xie

Product Name.....:	UHF Wireless Microphone
Model/Type reference.....:	WM100-TX, WM100-RX, WM100-HTX, WM100
Trade Mark.....:	COMICA
FCC ID.....:	**2ANK3-WM100**
Applicant's name.....:	**Comica Electronic Technology Co., LTD**
Address of applicant.....:	4th Floor Building 3 NO 51 Gezhen East Road, Pinghu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong Province, China
Test Firm.....:	**Shenzhen CTL Testing Technology Co., Ltd.**
Address of Test Firm.....:	Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055
Test specification.....:	
Standard.....:	**FCC Part 74 Subpart H—Low Power Auxiliary Stations**
TRF Originator.....:	Shenzhen CTL Testing Technology Co., Ltd.
Master TRF.....:	Dated 2011-01
Date of Receipt.....:	July 18, 2017
Date of Test Date.....:	July 18, 2017–Aug. 23, 2017
Data of Issue.....:	Aug. 24, 2017
Result.....:	Pass

TEST REPORT

Test Report No. :	CTL1707131052-WF	Aug. 24, 2017
		Date of issue

Equipment under Test	:	UHF Wireless Microphone
Model /Type	:	WM100-TX, WM100-RX, WM100-HTX, WM100
Applicant	:	**Comica Electronic Technology Co., LTD**
Address	:	4th Floor Building 3 NO 51 Gezhen East Road, Pinghu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong Province, China
Manufacturer	:	**Comica Electronic Technology Co., LTD**
Address	:	4th Floor Building 3 NO 51 Gezhen East Road, Pinghu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong Province, China

Test result	**Pass ***

* In the configuration tested, the EUT complied with the standards specified page 5.

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

** Modified History **

Revisions	Description	Issued Data	Report No.	Remark
Version 1.0	Initial Test Report Release	2017-08-25	CTL1707131052-WF	Tracy Qi

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1 SUMMARY

1.1 Test Standards

The tests were performed according to following standards:

TIA/EIA 603

FCC Part 74 Subpart H—Low Power Auxiliary Stations

TIA-603-C (2004)-Land Mobile FM or PM Communications Equipment Measurement and Performance Standards

FCC Part 2: FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS

ANSI C63.10:2013: –American National Standard for Testing Unlicensed Wireless Devices

ANSI C63.4: 2014: –American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz Range of 9 kHz to 40GHz

1.2 Test Description

FCC Rules	Description of Test	Test Result
FCC section 74.861(e)(1), FCC part 2, section 2.1046	RF Output Power	Complies
FCC section 74.861(e)(3) , FCC part 2, section 2.1047	Modulation Characteristic	Complies
FCC section 74.861(e)(5) , FCC part 2, section 2.1049	Emission Bandwidth	Complies
FCC section 74.861(e)(6) , FCC part 2, section 2.1053	Field Strength of Spurious Emission	Complies
FCC section 74.861(e)(4) , FCC part 2, section 2.1055	Frequency Stability	Complies

1.3 Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.
Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.

1.3.2 Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

FCC-Registration No.: 970318

Shenzhen CTL Testing Technology 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 970318, December 19, 2013.

1.4 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 CTL Testing Technology 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 CTL laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	Above 1GHz	4.32dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

1 This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2 GENERAL INFORMATION

2.1 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2 General Description of EUT

Product Name:	UHF Wireless Microphone
Model/Type reference:	WM100-TX
Power supply:	DC 3.00V
Wireless microphone	
Alignment range:	520MHz-534.1MHz
Channel number:	48
Channel separation:	300KHz
Modulation Type:	F3E
Antenna Type:	Integral antenna
Antenna Gain:	3.0dBi

Note: For more details, please refer to the user's manual of the EUT.

2.3 Description of Test Modes and Test Frequency

This device worked in continuous transmitting (Duty Cycle more than 98%) when it turned on and all test coducted usder this mode .

Operation Frequency List:

Channel	Frequency (MHz)
00	**520.00**
01	520.30
⋮	⋮
23	526.60
24	**526.90**
22	527.20
⋮	⋮
46	533.80
47	**534.10**

Note: The line displays in grey were the channel selected for testing.

2.4 Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2017/06/02	2018/06/01
Bilog Antenna	Sunol Sciences Corp.	JB1	A061714	2017/06/02	2018/06/01
EMI Test Receiver	R&S	ESCI	103710	2017/06/02	2018/06/01
Spectrum Analyzer	Agilent	E4407B	MY41440676	2017/05/21	2018/05/20
Spectrum Analyzer	Agilent	N9020	US46220290	2017/01/17	2018/01/16
Controller	EM Electronics	Controller EM 1000	N/A	2017/05/21	2018/05/20
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2017/05/19	2018/05/18
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062014	2017/05/19	2018/05/18
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2017/05/19	2018/05/18
Amplifier	Agilent	8349B	3008A02306	2017/05/19	2018/05/18
Amplifier	Agilent	8447D	2944A10176	2017/05/19	2018/05/18
Temperature/Humidity Meter	Gangxing	CTH-608	02	2017/05/20	2018/05/19
Radio Communication Tester	HP	8920A	116250	2016/10/11	2017/10/10
				2017/10/11	2018/10/10
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	N/A	2017/05/20	2018/05/19
High-Pass Filter	K&L	41H10-1375/U12750-O/O	N/A	2017/05/20	2018/05/19
Climate Chamber	ESPEC	EL-10KA	A20120523	2017/05/20	2018/05/19
SIGNAL GENERATOR	Agilent	E4421B	US40051744	2017/05/20	2018/05/19
Directional Coupler	Agilent	87300B	3116A03638	2017/05/20	2018/05/19
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-10M	10m	2017/06/02	2018/06/01
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	2017/06/02	2018/06/01
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	2017/06/02	2018/06/01
RF Cable	Megalon	RF-A303	N/A	2017/06/02	2018/06/01

The calibration interval was one year

2.5 Related Submittal(s) / Grant(s)

This submittal(s) (test report) is intended to comply with FCC Part 74 Subpart H Rules.

2.6 Modifications

No modifications were implemented to meet testing criteria.

3 TEST CONDITIONS AND RESULTS

3.1 Output Power Measurement

Limit

According to §74.861(e)(1)(ii), the operating frequency at 470-608 and 614-698 shall not exceed 250 mW conducted power.

Test Procedure

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum.

Test Configuration

Test Results

Type	Channel	Output power (dBm)	Limit (dBm)	Result
F3E	00	5.389	24.00	Pass
	24	5.436		
	47	5.934		

520.00MHz

526.90MHz

534.10MHz

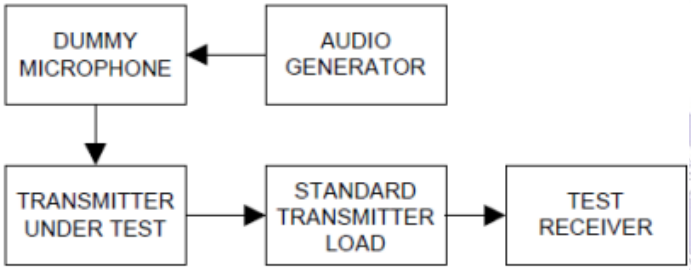
3.2 Modulation Characteristics

Limit

Test Standard: FCC Part 74.861(e)(3)
Any form of modulation may be used. A maximum deviation of ±75 kHz is permitted when frequency modulation is employed.

Test Standard: FCC Part 2.1047(a) & (b)
(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.
(b) Equipment which employs modulation limiting. A curve or family of curves showing the percentage of modulation versus the modulation input voltage shall be supplied. The information submitted shall be sufficient to show modulation limiting capability throughout the range of modulating frequencies and input modulating signal levels employed.

Test Configuration



Measurement Procedure

a) Audio Frequency Response

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. Adjust the transmitter per the manufacturer's procedure for full rated system deviation.
4. Apply a 1000 Hz tone and adjust the audio frequency generator to produce 20% of the rated system deviation.
5. Set the test receiver to measure rms deviation and record the deviation reading as DEV_{REF}.
6. Set the audio frequency generator to the desired test frequency between 100Hz and 2000Hz.
7. Record the test receiver deviation reading as DEV_{FREQ}
8. Calculate the audio frequency response at the present frequency as:

$$audio\ frequency\ response = 20\ \log_{10}\left(\frac{DEV_{FREQ}}{DEV_{REF}}\right)$$

9. Repeat steps 6 through 8 for all the desired test frequencies.

b) Modulation Limiting

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 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.
5. Increase the level from the audio frequency generator by 20dB in one step (rise time between the 10% and 90% points shall be 0.1 second maximum).

6. Measure both the instantaneous and steady-state deviation at and after the time of increasing the audio input level.
7. With the level from the audio frequency generator held constant at the level obtained in step 5, slowly vary the audio frequency from 100Hz to 3000Hz and observe the steady-state deviation. Record the maximum deviation.
8. Set the test receiver to measure peak negative deviation and repeat steps 4 through 7.
9. The values recorded in steps 7 and 8 are the modulation limiting.

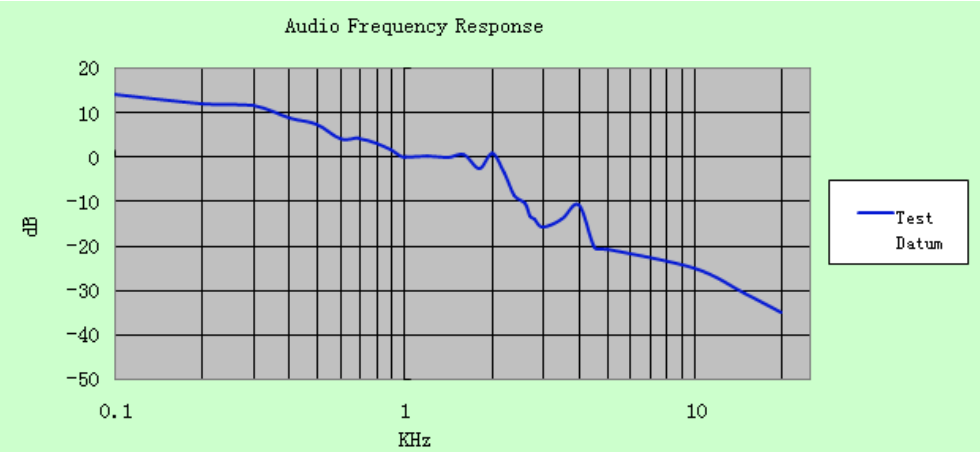
TEST RESULTS

Audio Frequency Response

520.00MHz

0dB=10mV at 1kHz (20% of the maximum rated system deviation.)

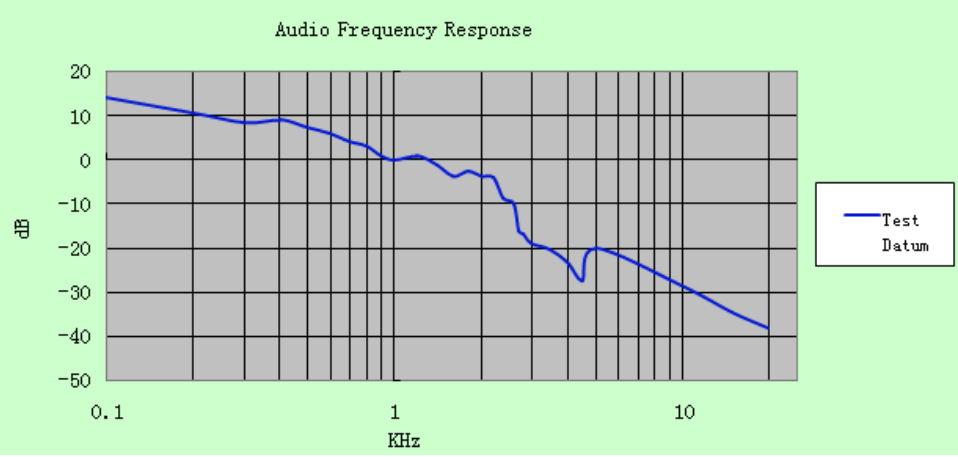
Frequency (KHz)	Frequency Deviation (KHz)	1KHz Refenerce Deviation (KHz)	Audio Frequency Response (dB)
0.1	6.24	1.79	14.03
0.2	5.90	1.79	12.05
0.3	4.28	1.79	11.46
0.4	3.47	1.79	8.86
0.5	3.85	1.79	7.42
0.6	2.71	1.79	4.09
0.7	2.48	1.79	4.15
0.8	2.05	1.79	2.98
0.9	1.84	1.79	1.43
1.0	1.79	1.79	0.00
1.2	1.42	1.79	0.15
1.4	1.36	1.79	-0.07
1.6	0.95	1.79	0.58
1.8	0.87	1.79	-2.75
2.0	1.42	1.79	0.85
2.2	1.00	1.79	-3.90
2.4	0.73	1.79	-8.73
2.6	0.70	1.79	-10.61
2.7	0.67	1.79	-13.18
2.8	0.42	1.79	-14.02
3.0	0.39	1.79	-15.74
3.5	0.30	1.79	-14.10
4.0	0.48	1.79	-10.70
4.5	0.18	1.79	-20.42
5.0	0.13	1.79	-20.81
10.0	0.10	1.79	-25.09
15.0	0.07	1.79	-30.75
20.0	0.03	1.79	-35.10



526.90MHZ

0dB=11mV at 1kHz (20% of the maximum rated system deviation.)

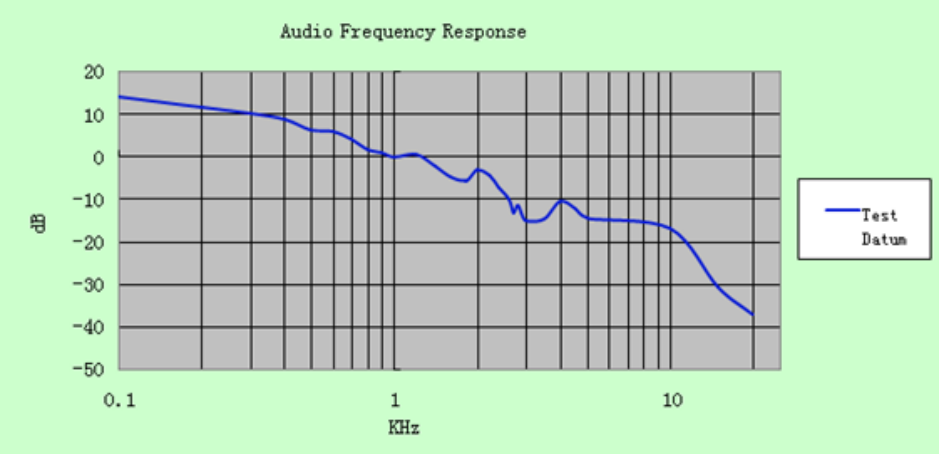
Frequency (KHz)	Frequency Deviation (KHz)	1KHz Refenerce Deviation (KHz)	Audio Frequency Response (dB)
0.1	5.95	1.95	13.94
0.2	4.03	1.95	10.58
0.3	3.71	1.95	8.42
0.4	3.10	1.95	9.01
0.5	2.88	1.95	7.24
0.6	2.75	1.95	5.86
0.7	2.60	1.95	4.05
0.8	2.16	1.95	3.17
0.9	2.02	1.95	1.03
1.0	1.95	1.95	0.00
1.2	2.48	1.95	0.75
1.4	2.10	1.95	-1.28
1.6	1.43	1.95	-3.70
1.8	1.08	1.95	-2.59
2.0	1.00	1.95	-3.74
2.2	0.94	1.95	-4.08
2.4	0.83	1.95	-8.84
2.6	0.76	1.95	-10.16
2.7	0.95	1.95	-16.28
2.8	0.78	1.95	-17.04
3.0	0.41	1.95	-19.07
3.5	0.47	1.95	-20.42
4.0	1.35	1.95	-23.41
4.5	0.10	1.95	-27.50
5.0	0.04	1.95	-20.17
10.0	0.28	1.95	-28.51
15.0	0.07	1.95	-34.54
20.0	0.03	1.95	-38.11



534.10MHZ

0dB=10mV at 1kHz (20% of the maximum rated system deviation.)

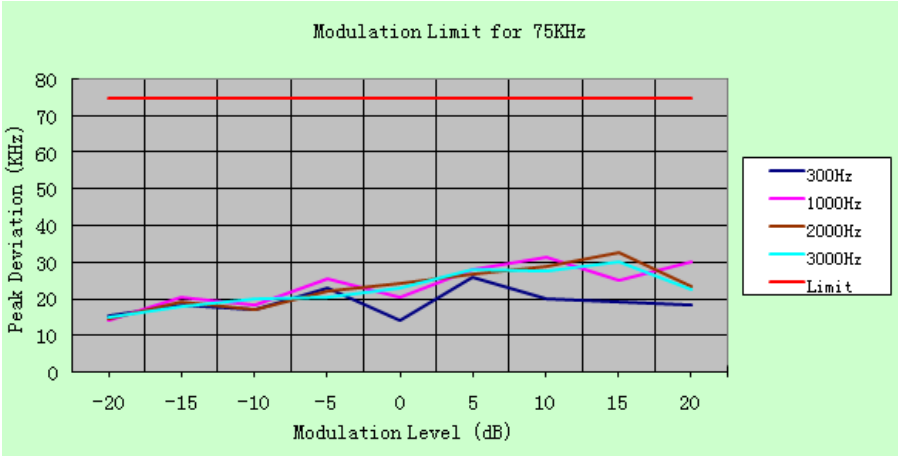
Frequency (KHz)	Frequency Deviation (KHz)	1KHz Refenerce Deviation (KHz)	Audio Frequency Response (dB)
0.1	6.85	1.68	14.07
0.2	5.43	1.68	11.59
0.3	4.60	1.68	10.10
0.4	3.72	1.68	8.75
0.5	2.91	1.68	6.24
0.6	2.17	1.68	5.80
0.7	2.05	1.68	3.92
0.8	1.14	1.68	1.78
0.9	1.70	1.68	0.99
1.0	1.68	1.68	0.00
1.2	1.18	1.68	0.48
1.4	1.45	1.68	-2.42
1.6	1.01	1.68	-4.94
1.8	0.98	1.68	-5.70
2.0	0.83	1.68	-3.17
2.2	0.78	1.68	-4.50
2.4	0.40	1.68	-7.13
2.6	0.36	1.68	-10.17
2.7	0.42	1.68	-13.20
2.8	0.30	1.68	-11.68
3.0	0.21	1.68	-15.08
3.5	0.27	1.68	-14.73
4.0	0.15	1.68	-10.58
4.5	0.08	1.68	-12.09
5.0	0.10	1.68	-14.47
10.0	0.07	1.68	-17.04
15.0	0.05	1.68	-30.68
20.0	0.01	1.68	-37.10



Modulation Limit:

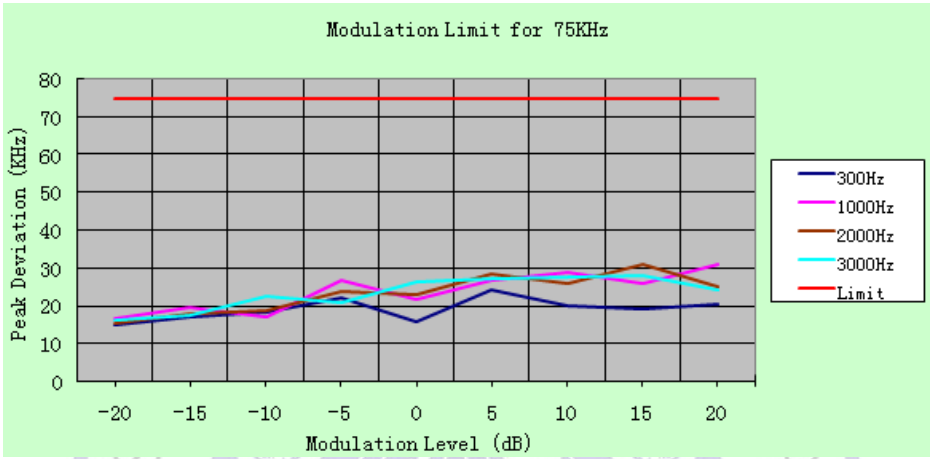
520.00MHz

Modulation Level (dB)	Peak Freq. Deviation At 300 Hz (KHz)	Peak Freq. Deviation At 1000Hz (KHz)	Peak Freq. Deviation At 2000Hz (KHz)	Peak Freq. Deviation At 3000 Hz (KHz)
-20	15.57	14.05	14.47	15.01
-15	18.22	20.42	19.05	18.12
-10	17.12	18.14	16.92	20.14
-5	23.07	25.33	22.05	20.57
0	14.25	20.42	24.12	23.18
+5	25.90	28.07	26.70	27.90
+10	20.13	31.42	28.85	27.67
+15	19.34	25.25	32.73	30.14
+20	18.60	30.12	23.49	22.70



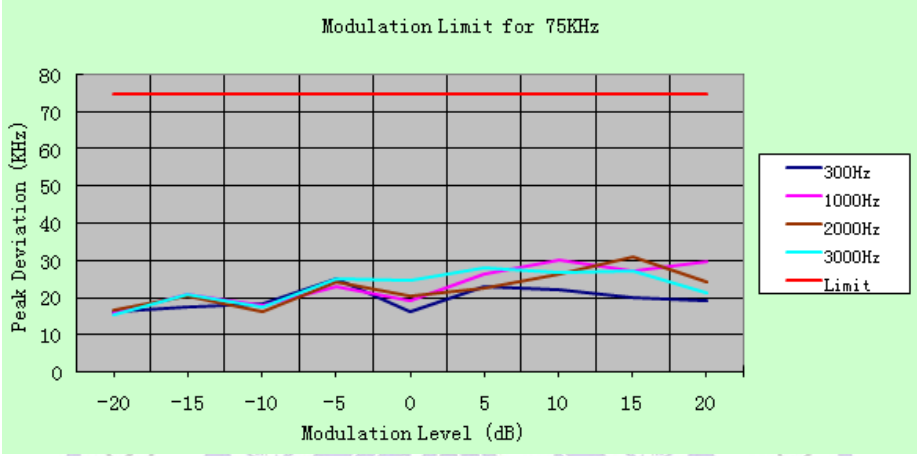
526.90MHz

Modulation Level (dB)	Peak Freq. Deviation At 300 Hz (KHz)	Peak Freq. Deviation At 1000Hz (KHz)	Peak Freq. Deviation At 2000Hz (KHz)	Peak Freq. Deviation At 3000 Hz (KHz)
-20	15.05	16.70	15.48	16.25
-15	17.15	19.45	18.10	17.41
-10	18.57	17.04	18.85	22.35
-5	22.13	26.70	24.13	21.07
0	15.95	21.98	23.30	26.24
+5	24.31	27.02	28.47	27.12
+10	20.29	28.80	26.08	27.49
+15	19.14	26.14	31.13	28.02
+20	20.70	31.07	25.24	24.11



534.10MHz

Modulation Level (dB)	Peak Freq. Deviation At 300 Hz (KHz)	Peak Freq. Deviation At 1000Hz (KHz)	Peak Freq. Deviation At 2000Hz (KHz)	Peak Freq. Deviation At 3000 Hz (KHz)
-20	16.01	15.82	16.33	15.24
-15	17.48	21.07	20.29	20.95
-10	18.05	17.84	16.11	17.24
-5	25.22	23.02	24.38	25.01
0	16.05	19.16	20.20	24.78
+5	23.10	26.21	22.47	28.12
+10	22.24	30.12	26.10	27.03
+15	20.05	27.03	30.98	27.24
+20	19.11	29.60	24.30	21.38



3.3 Operating Bandwidth and Emissions Mask

Limit

Test Standard: FCC Part 74.861(e)(5), (6)

(5) The operating bandwidth shall not exceed 200 kHz.

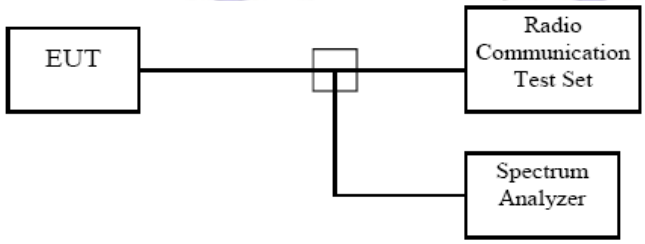
(6) The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

(i) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 per-cent of the authorized bandwidth: at least 25 dB;

(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;

(iii) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least 43+10log10 (mean output power in watts) dB.

Test Configuration



Measurement Procedure

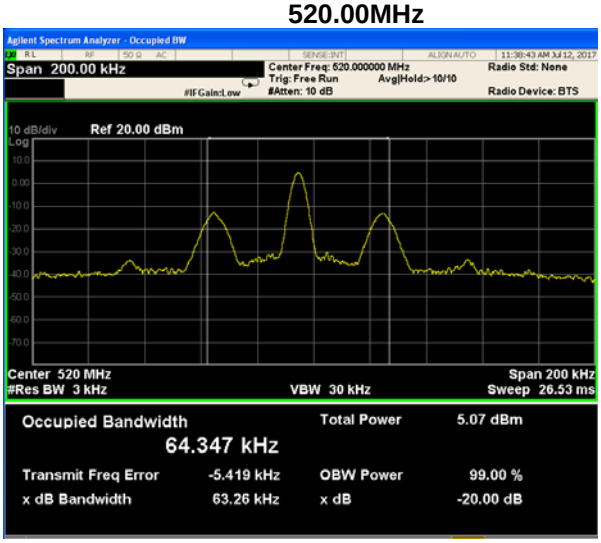
1. Connect the equipment as illustrated.
2. Adjust the spectrum analyzer for the following settings:
   RBW = 3kHz, VBW =30kHz
   Sweep Speed slow enough to maintain measurement calibration.
   Detector Mode = Positive Peak.
   Span that will allow proper viewing of the test bandwidth
3. Set the center frequency of the spectrum analyzer to the assigned transmitter frequency. Turn on the transmitter, and set the level of the unmodulated carrier to a full scale reference line. This is the 0 dB 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. Mark the 99% and 20dBm band bandwidth of peak frequency.
6. Repeat until all the rest channels are investigated.

Test Result

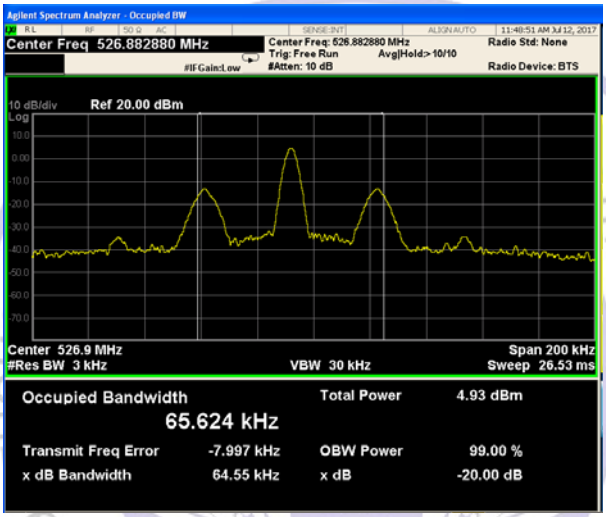
a) Operating Bandwidth:

Modulation	Frequency (MHz)	99% OBW (KHz)	20dB bandwidth (KHz)	Result
F3E	520.00	64.347	63.28	Pass
	526.90	65.624	64.55	
	534.10	65.403	64.44	

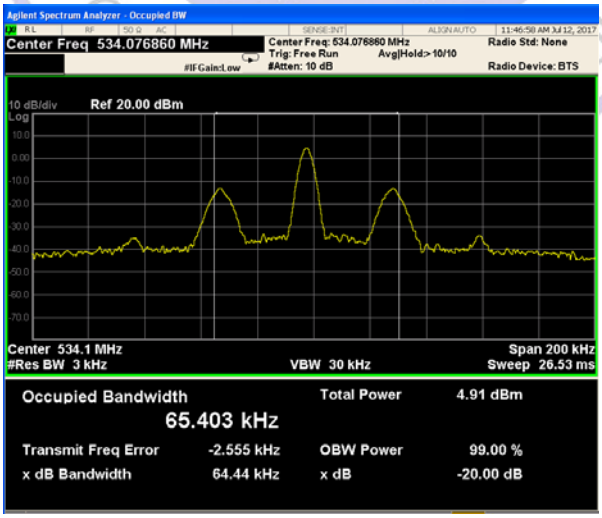
520.00MHz



526.90MHz

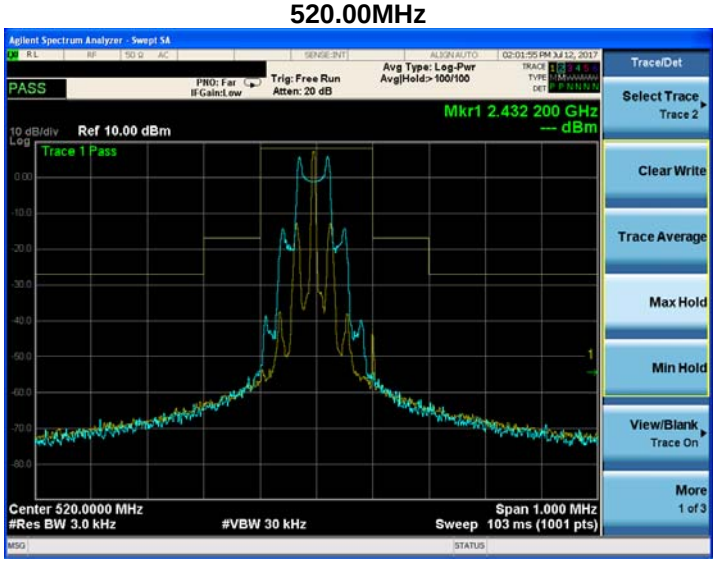


534.10MHz

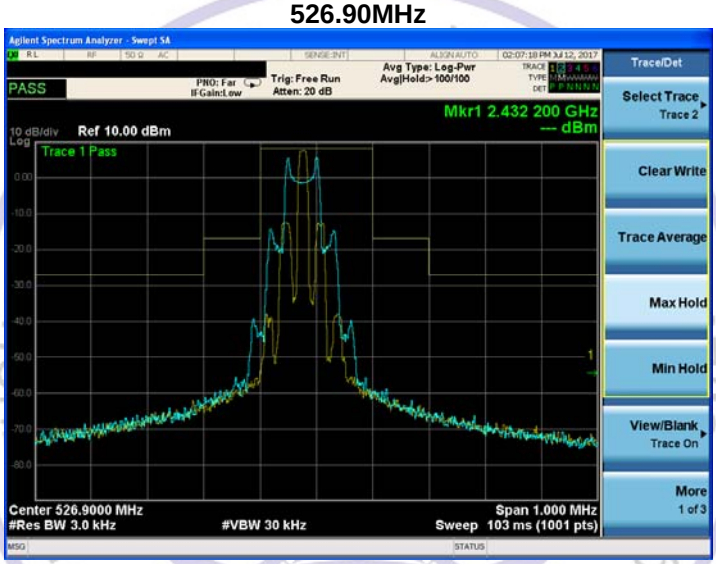


b) Emission Mask:

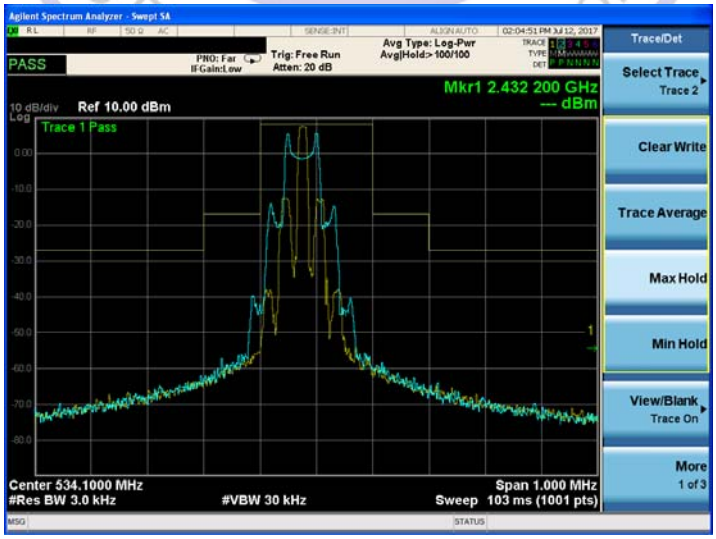
520.00MHz



526.90MHz



534.10MHz

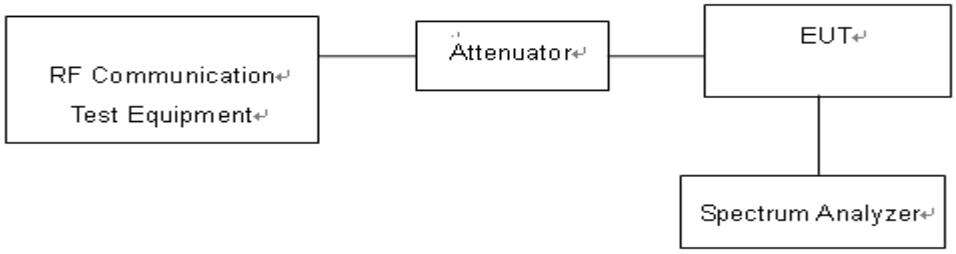


3.4 Emission Mask

LIMIT

Analog emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in Section 8.3.1.2 of the European Telecommunications Institute Standard ETSI EN 300 422-1 v1.4.2 (2011-08).

TEST CONFIGURATION



TEST PROCEDURE

1. With the Low Frequency (LF) audio signal generator set to 500 Hz, the audio input level to the EUT shall be Adjusted to 8 dB below the limiting threshold (-8dB limit) as declared by the manufacturer.
2. The corresponding audio output level from the demodulator shall be measured and recorded.
3. The input impedance of the noise meter shall be sufficiently high to avoid more than 0.1 dB changes in input level when the meter is switched between input and output.
4. The audio input level shall be increased by 20 dB, i.e. to 12 dB (lim), and the corresponding change in output level shall be measured.
5. It shall be checked that the audio output level has increased by ≤10 dB.
6. If the step 5 is not met, the initial audio input level shall be increased from -8 dB (lim) in 1 dB steps until the above condition is fulfilled, and the input level recorded in the test report. This level replaces the value derived from the manufacturer's declaration and is defined as -8dB (lim).
7. Measure the input level at the transmitter required to give +12 dB (lim) and record the EUT output level test plots by the spectrum analyzer.
8. The transmitter RF output spectrum shall be measured, using a spectrum analyser with the following settings:

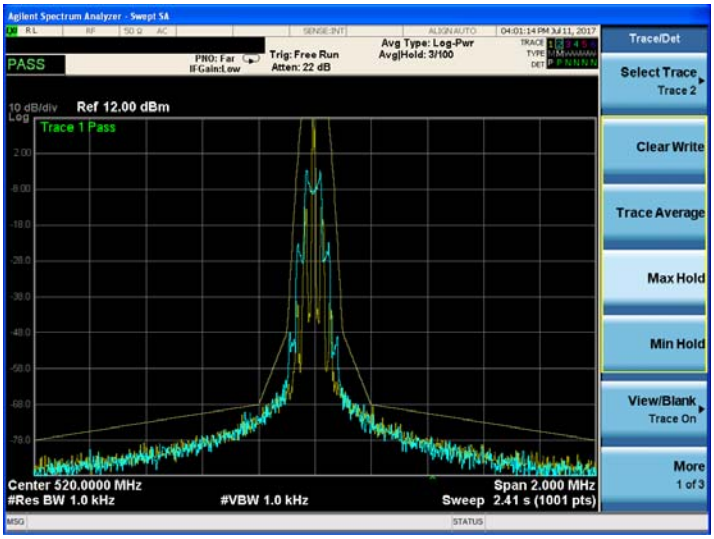
Centre frequency	Transmitter (Tx) nominal frequency
Span	fc - 1 MHz to fc + 1 MHz
Resolution BandWidth (RBW)	1 kHz
Video BandWidth(VBW)	1 kHz
Detector	Peak hold

TEST RESULTS

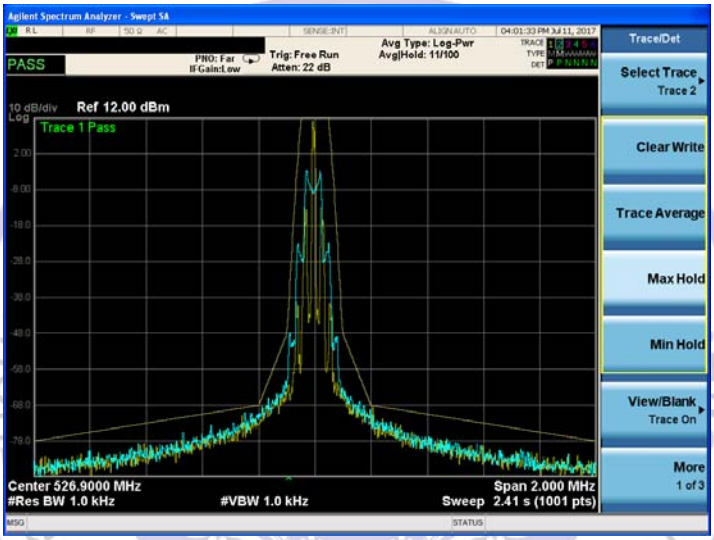
Note:

	Bandwidth(B)	B/2	0.35B
Manufacturer declare	200 KHz	150 KHz	0.70 KHz

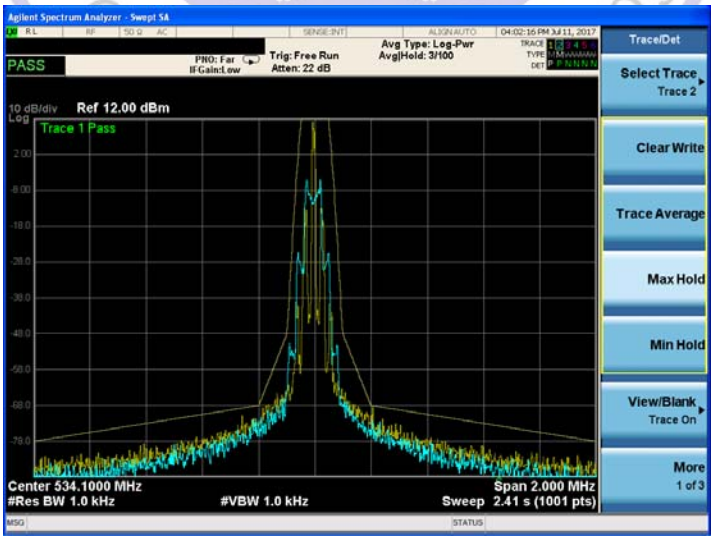
520.00MHz



526.90MHz



534.10MHz



3.5 Field Strength of Emission

Limit

According to §2.1053, measurements shall be made to detect spurious emission that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal condition of installation and operation. Information submitted shall include the relative radiated power of spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from a halfwave dipole antenna.

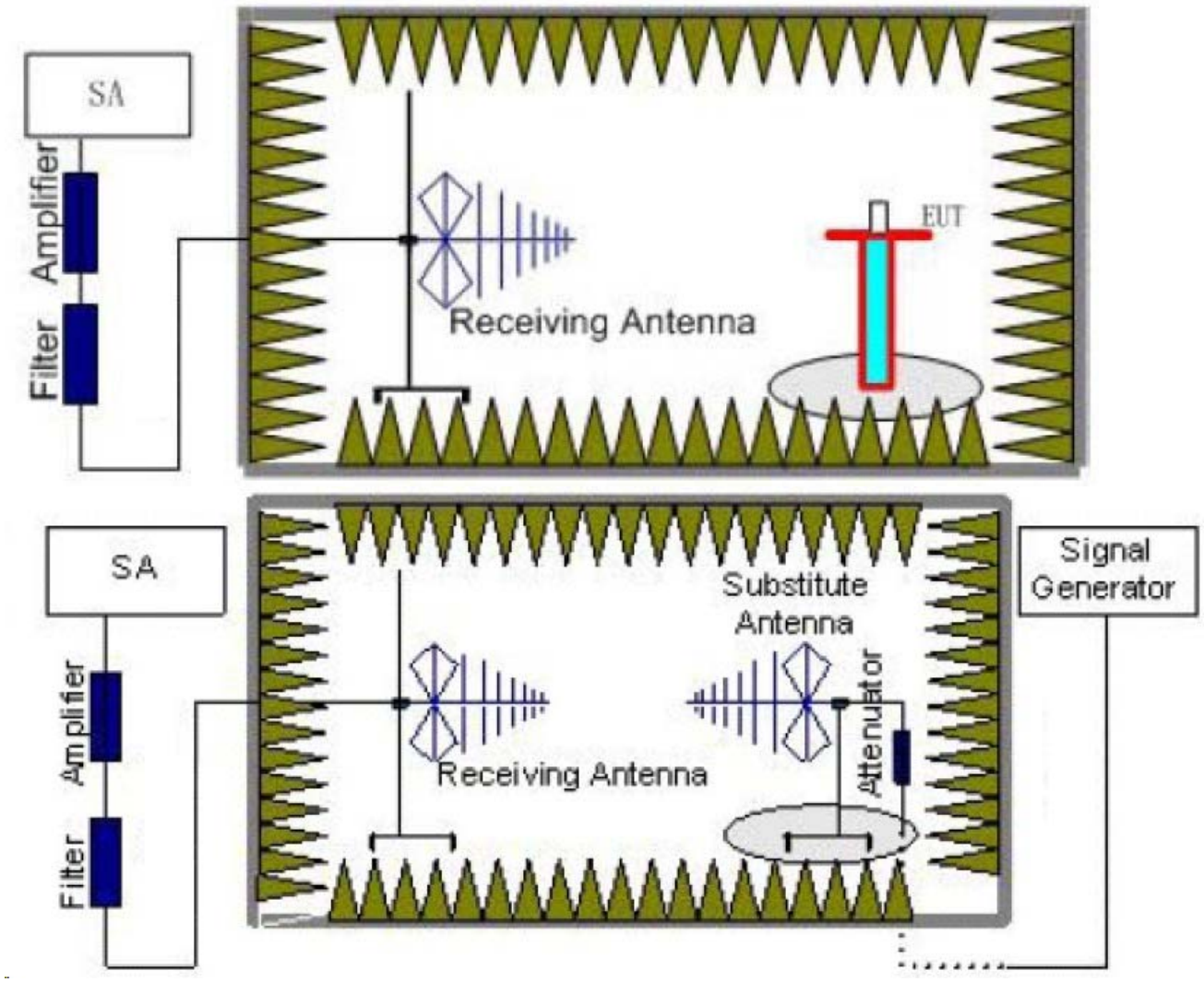
According to §74.861(e)(6), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the follwing sceedule:

(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.

(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.

(iii) on any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth shall be attenuated below the unmodulated carrier by at least 43 plus 10 Log(output power in watts) dB.

Test Configuration



Measurement Procedure

a. 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 1.0m. 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 test transmit frequencies were measured with peak detector.
b. 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.
c. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum 100 kHz below 1GHz and 1MHz above 1GHz, Sweep from 30MHz to the 10th harmonic of the fundamental frequency; and recorded the level of the concerned spurious emission point as (P_r).
d. The EUT then 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 (P_{Mea}) 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 (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
The measurement results are obtained as described below:

$$Power_{(EIRP)}=P_{Mea} - P_{cl} + G_a$$

Where;
P_{Mea} is the recorded signal generator level
P_{cl} is the cable loss connect between instruments
G_a Substitution Antenna Gain
e. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
f. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.
g. Test site anechoic chamber refer to ANSI C63.

Test Result

Remark: The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency; and worst spurious emissions recorded as below:

Test Frequency (MHz)	Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance (m)	G_a Antenna Gain(dBi)	Peak EIRP	Limit (dBm)	Margin (dB)	Polarization
520.00	1040.00	-28.14	2.05	3	10.59	-19.6	-13	6.60	H
	1560.00	-33.75	2.68	3	11.45	-24.98	-13	11.98	H
	2080.00	-36.01	3.12	3	13.14	-25.99	-13	12.99	H
	2600.00	-40.72	3.91	3	13.98	-30.65	-13	17.65	H
	1040.00	-27.75	2.05	3	10.59	-19.21	-13	6.21	V
	1560.00	-32.93	2.68	3	11.45	-24.16	-13	11.16	V
	2080.00	-34.58	3.12	3	13.14	-24.56	-13	11.56	V
	2600.00	-39.14	3.91	3	13.98	-29.07	-13	16.07	V

Test Frequency (MHz)	Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance (m)	G_a Antenna Gain(dBi)	Peak EIRP	Limit (dBm)	Margin (dB)	Polarization
526.90	1053.80	-30.14	2.04	3	10.62	-21.56	-13	8.56	H
	1580.70	-33.76	2.71	3	11.01	-25.46	-13	12.46	H
	2107.60	-35.04	3.09	3	13.77	-24.36	-13	11.36	H
	2634.50	-39.15	3.82	3	14.05	-28.92	-13	15.92	H
	1053.80	-28.84	2.01	3	10.82	-20.03	-13	7.03	V
	1580.70	-31.14	2.33	3	11.91	-21.56	-13	8.56	V
	2107.60	-35.68	3.28	3	13.05	-25.91	-13	12.91	V
	2634.50	-40.71	3.75	3	13.26	-31.2	-13	18.20	V

Test Frequency (MHz)	Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance (m)	G_a Antenna Gain(dBi)	Peak EIRP	Limit (dBm)	Margin (dB)	Polarization
534.10	1068.20	-29.57	2.17	3	11.04	-20.7	-13	7.70	H
	1602.30	-34.16	2.83	3	10.98	-26.01	-13	13.01	H
	2136.40	-36.21	3.01	3	13.42	-25.8	-13	12.80	H
	2670.50	-41.05	3.25	3	13.15	-31.15	-13	18.15	H
	1068.20	-27.35	2.47	3	10.07	-19.75	-13	6.75	V
	1602.30	-32.88	2.36	3	11.52	-23.72	-13	10.72	V
	2136.40	-36.01	3.02	3	12.95	-26.08	-13	13.08	V
	2670.50	-39.57	3.58	3	13.01	-30.14	-13	17.14	V

Remark:

1. *$EIRP=P_{Mea}(dBm)-P_{cl}(dB)+G_a(dBi)$*
2. *-- Means other points for values lower than limits and not recorded.*
3. *Margin = Limit – EIRP*

3.6 Frequency Stability Measurement

Limit

Test Standard: FCC Part 74.861(e)(4)
(4) The frequency tolerance of the transmitter shall be 0.005 percent.

Measurement Procedure

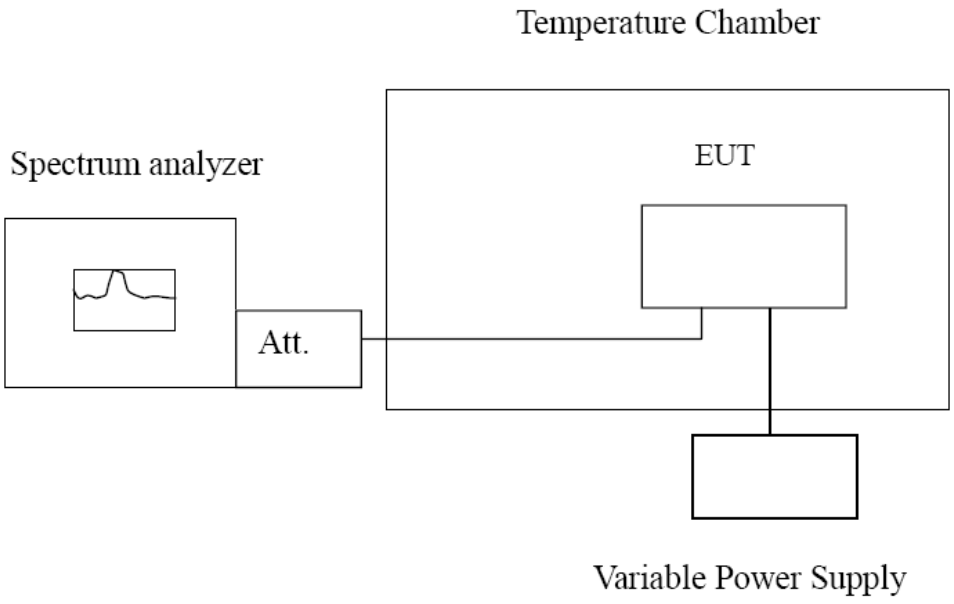
a) Frequency stability versus environmental temperature

1. Setup asTest Configuration for frequencies measured at ambient temperature if it is within 15℃to 25℃. Otherwise, an environmental chamber set for a temperature of 20℃shall be used.
2. Turn on EUT and set SA center frequency to the right frequency needs to be measured. Then set SA RBW to 30 kHz, VBW to 100kHz and frequency span to 500 kHz. Record this frequency to be a reference.
3. Set the temperature of chamber to 50℃. 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℃decreased per stage until the lowest temperature -30℃is measured, record all measurement frequencies.

b) Frequency stability versus input voltage

1. Setup asTest Configuration for frequencies measured at ambient temperature if it is within 15℃to 25℃. Otherwise, an environmental chamber set for a temperature of 20℃shall be used. Install new batteries in the EUT.
2. Set SA center frequency to the right frequency needs to be measured. Then set SA RBW to 30 kHz, VBW to 100kHz and frequency span to 500 kHz. Record this frequency to be a reference.
3. For non hand carried, battery operated device, supply the EUT primary voltage with 85 and 115 percent of the nominal value and record the frequency.

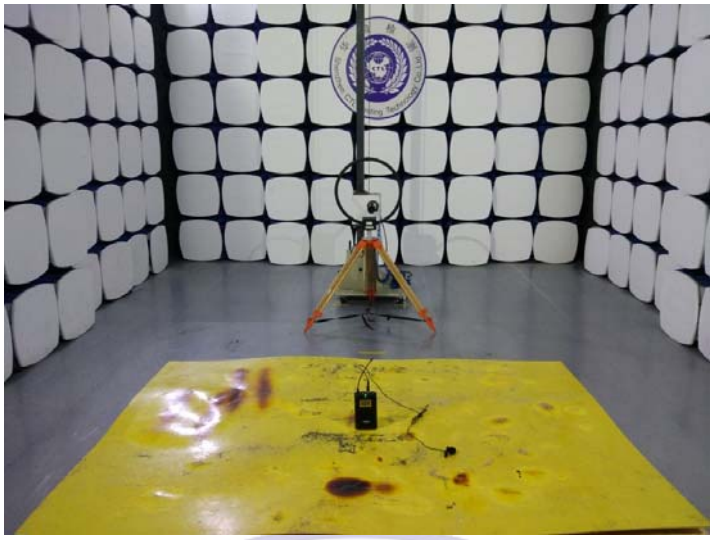
Test Configuration

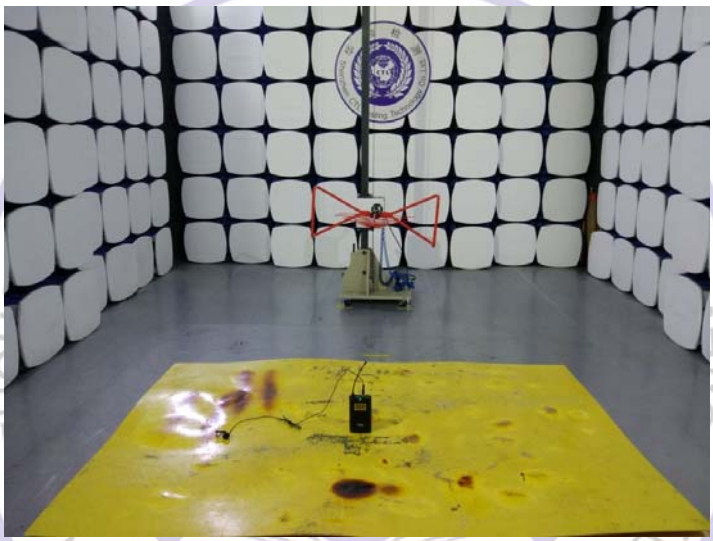


TEST RESULTS

Reference Frequency: 520.00MHz					
Voltage (V)	Temperature (℃)	Frequency error (MHz)	Frequency Tolerance (%)	Limit (%)	Result
3.00	-30	0.02056	0.00395	0.005	Pass
	-20	0.02405	0.00463		
	-10	0.02119	0.00408		
	0	0.02001	0.00385		
	10	0.01642	0.00316		
	20	0.00944	0.00182		
	30	0.01048	0.00202		
	40	0.02085	0.00401		
	50	0.02004	0.00385		
3.45	25	0.02415	0.00464		
2.55	25	0.02107	0.00405		

4 Test Setup Photos of the EUT

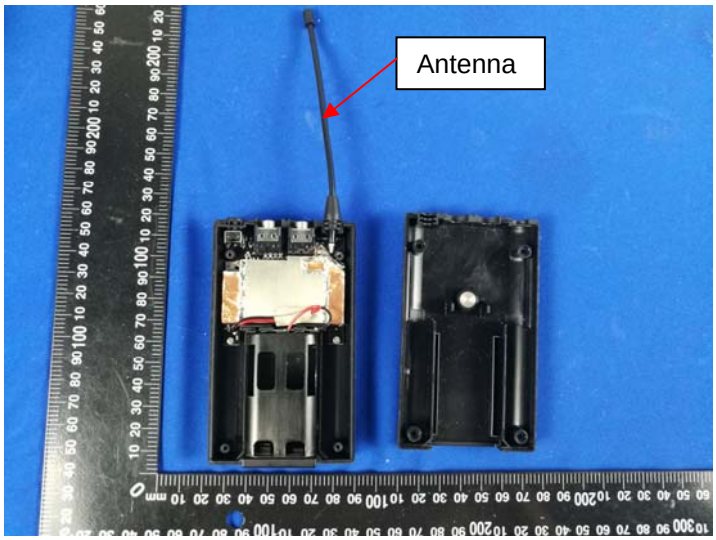


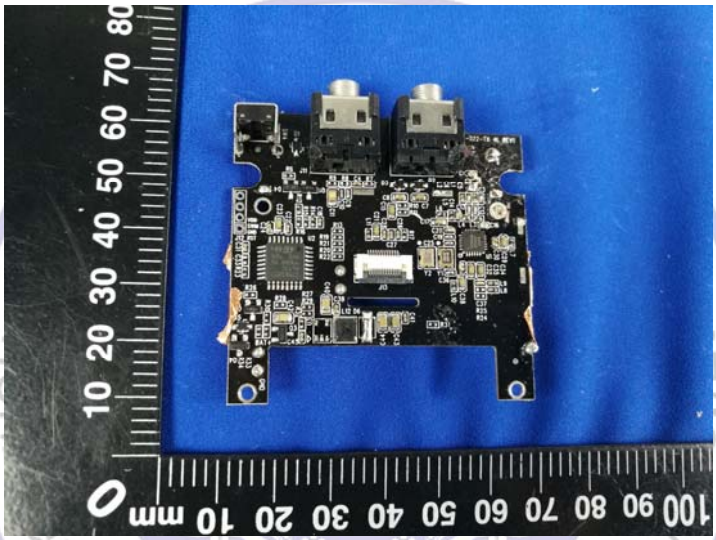


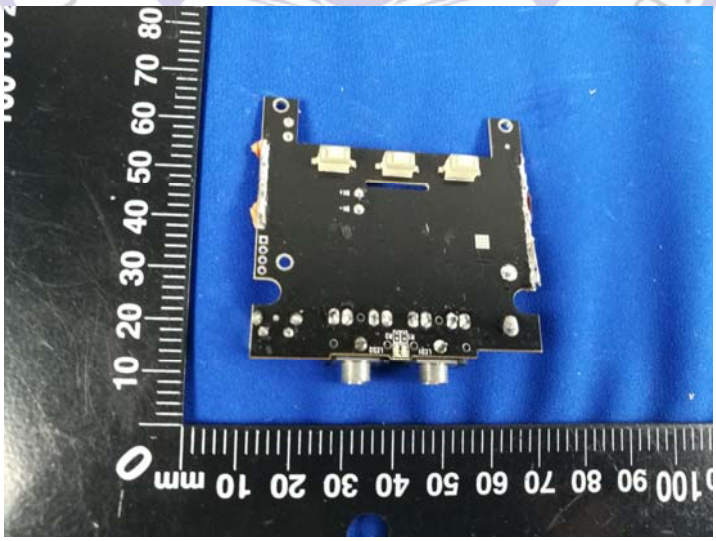
5 External and Internal Photos of the EUT

External Photos

Internal Photos







.....End of Report.....