FCC TEST REPORT

Test report
On Behalf of

JIUYI ELECTRONICS (HK) CO., LIMITED

For
wireless microphone

Model No.: K31, PDWMKHRD23, PDWMKHRD22WM.5, K30

FCC ID: 2AMZ9-PDWMKHRD23

Prepared for :	**JIUYI ELECTRONICS (HK) CO., LIMITED** **Unit D, 16/F, One Capital Place, 18Luard Road, Wanchai, HK.**
Prepared By :	**Shenzhen HUAK Testing Technology Co., Ltd.** **1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China**
Date of Test:	**Nov. 05, 2019 ~ Nov. 13, 2019**
Date of Report:	**Nov. 13, 2019**
Report Number:	**HK1911102831-E**

TEST RESULT CERTIFICATION

Applicant's name	:	JIUYI ELECTRONICS (HK) CO., LIMITED
Address	:	Unit D, 16/F, One Capital Place, 18Luard Road, Wanchai, HK.
Manufacture's Name	:	JIUYI ELECTRONICS (HK) CO., LIMITED
Address	:	Unit D, 16/F, One Capital Place, 18Luard Road, Wanchai, HK.
Product description		
Trade Mark	:	PYLEUSA / JYE
Product name	:	wireless microphone
Model and/or type reference	:	K31, PDWMKHRD23, PDWMKHRD22WM.5, K30
Standards	:	FCC Rules and Regulations Part 15 Subpart C Section 15.236 ANSI C63.4: 2014

Date of Test	:	
Date (s) of performance of tests	:	Nov. 05, 2019 ~ Nov. 13, 2019
Date of Issue	:	Nov. 13, 2019
Test Result	:	**Pass**

Testing Engineer : Gary Qian

(Gary Qian)

Technical Manager : Eden Hu

(Eden Hu)

Authorized Signatory : Jason Zhou

(Jason Zhou)

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1 TEST SUMMARY

1.1 TEST PROCEDURES AND RESULTS

Requirement	CFR 47 Section	Result
Conducted Emission	15.207	N/A
Conducted Peak Output Power	15.236(d)(1)	PASS
Occupied Bandwidth Emission	15.236(f)(2)	PASS
Radiated Spurious Emission	15.236(d)(2)	PASS
Spurious Emission at Antenna Port	15.236(d)(2)	PASS
Frequency Stability	15.236(f)(3)	PASS

Note:

1. PASS: Test item meets the requirement.

2. Fail: Test item does not meet the requirement.

3. N/A: Test case does not apply to the test object.

4. The test result judgment is decided by the limit of test standard.

1.2 TEST FACILITY

Test Firm : Shenzhen HUAK Testing Technology Co., Ltd.

Address 1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China

1.3 Measurement Uncertainty

The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	±2.56dB
2	RF power, conducted	±0.12dB
3	Spurious emissions, conducted	±0.11dB
4	All emissions, radiated(<1G)	±3.92dB
5	All emissions, radiated(>1G)	±4.28dB
6	Temperature	±0.1°C
7	Humidity	±1.0%

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	wireless microphone
Model Name	K31
Serial No.	PDWMKHRD23, PDWMKHRD22WM.5, K30
Model Difference	All model's the function, software and electric circuit are the same, only model named different. Test sample model: K31
Trade Mark	PYLEUSA/JYE
FCC ID	2AMZ9-PDWMKHRD23
Hardware Version:	190915V1.2SM <LED>
Software Version:	V1.1.3
Operation frequency	542.5MHz – 588.6MHz
Number of Channels	32
Antenna Type	PCB antenna
Antenna Gain	1.8dBi
Modulation Type	FM
Power Source	DC 3.0 from AA*2 battery

2.2 Carrier Frequency of Channels

Channel	Frequency	Channel	Frequency
0	542.5	16	562.2
1	544.1	17	563.3
2	545.6	18	564.5
3	547.3	19	564.9
4	548.9	20	566.5
5	550.5	21	566.8
6	552.1	22	568.3
7	553.7	23	570.6
8	555.3	24	574.1
9	556.1	25	576.4
10	556.9	26	578.7
11	558.4	27	580.2
12	558.6	28	582.5
13	560.1	29	584.8
14	560.7	30	586.3
15	561.7	31	588.6

2.3 Operation of EUT during testing

Operating Mode
The mode is used: **Transmitting mode**
Low Channel: CH00: 542.5MHz
Middle Channel: CH15:561.7MHz
High Channel: CH31:588.6MHz

2.4 DESCRIPTION OF TEST SETUP

Operation of EUT during conducted testing and Radiation testing:

Operation of EUT Above1GHz Radiation testing:

2.5 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Description	Model No.	Manufacturer	Remark	Certificate
RECEVIER	/	JIUYI ELECTRONICS (HK) CO., LIMITED	Provide by Applicant	SDOC
/	/	/	/	/

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

3. For conducted measurements (Output Power, 6dB Emission Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.

2.6 MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	R&S	ENV216	HKE-002	Dec. 27, 2018	1 Year
2.	Receiver	R&S	ESCI 7	HKE-010	Dec. 27, 2018	1 Year
3.	RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 27, 2018	1 Year
4.	Spectrum analyzer	R&S	FSP40	HKE-025	Dec. 27, 2018	1 Year
5.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 27, 2018	1 Year
6.	Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Dec. 27, 2018	1 Year
7.	EMI Test Receiver	Rohde & Schwarz	ESCI 7	HKE-010	Dec. 27, 2018	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	Dec. 27, 2018	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB 1519B	HKE-014	Dec. 27, 2018	1 Year
10.	Horn Antenna	Schewarzbeck	9120D	HKE-013	Dec. 27, 2018	1 Year
11.	Pre-amplifier	EMCI	EMC051845SE	HKE-015	Dec. 27, 2018	1 Year
12.	Pre-amplifier	Agilent	83051A	HKE-016	Dec. 27, 2018	1 Year
13.	EMI Test Software EZ-EMC	Tonscend	JS1120-B Version	HKE-083	Dec. 27, 2018	N/A
14.	Power Sensor	Agilent	E9300A	HKE-086	Dec. 27, 2018	1 Year
15.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 27, 2018	1 Year
16.	Signal generator	Agilent	N5182A	HKE-029	Dec. 27, 2018	1 Year
17.	Signal Generator	Agilent	83630A	HKE-028	Dec. 27, 2018	1 Year
18.	Shielded room	Shiel Hong	4*3*3	HKE-039	Dec. 27, 2017	3 Year
19.	Power Meter	R&S	NRVD	SEL0069	Dec. 27, 2018	1 Year
20	High Gain Antenna	Schewarzbeck	LB-180400KF	HKE-054	Dec. 27, 2018	1 Year

3 TEST RESULTS AND MEASUREMENT DATA

3.1 CONDUCTED EMISSIONS TEST

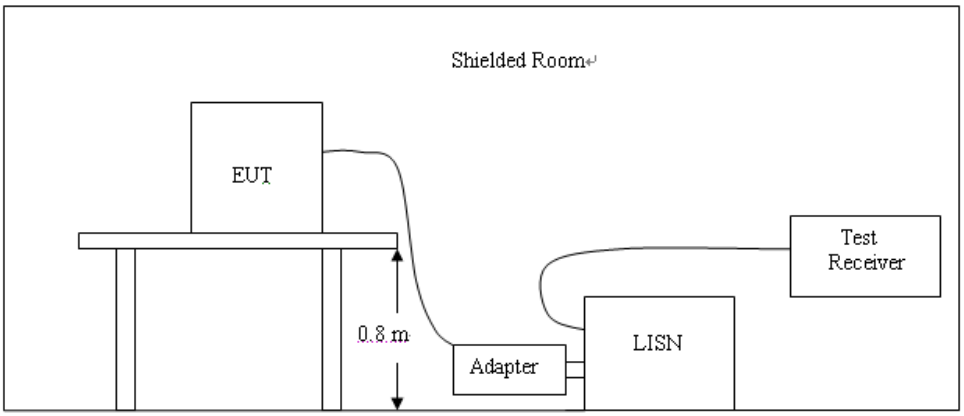
LIMIT

According to FCC CFR Title 47 Part 15 Subpart C Section 15.207 and RSS Gen 8.8, AC Power Line Conducted Emissions Limits for Licence-Exempt Radio Apparatus as below:

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

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 C63.10:2013.
2. Support equipment, if needed, was placed as per ANSI C63.10:2013
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013.
4. The adapter 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 RESULTS

Not application to this device

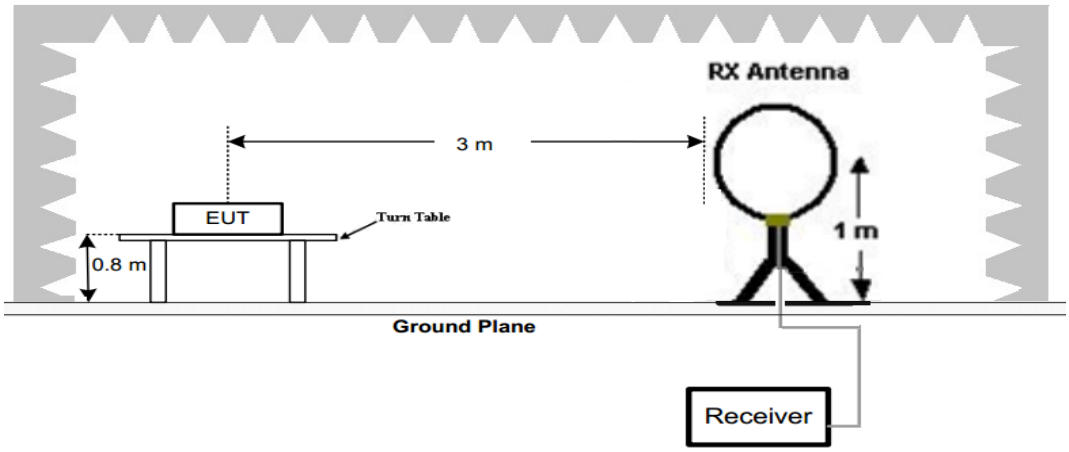
3.2 RADIATED EMISSION TEST

Limit

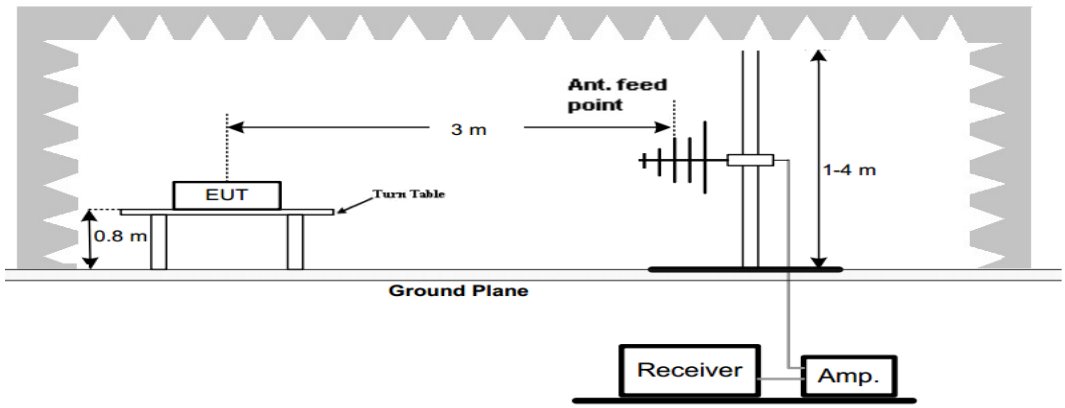
According to 15.236(d)(2), In the 600 MHz guard band and the 600 MHz duplex gap: 20 mW EIRP

TEST CONFIGURATION

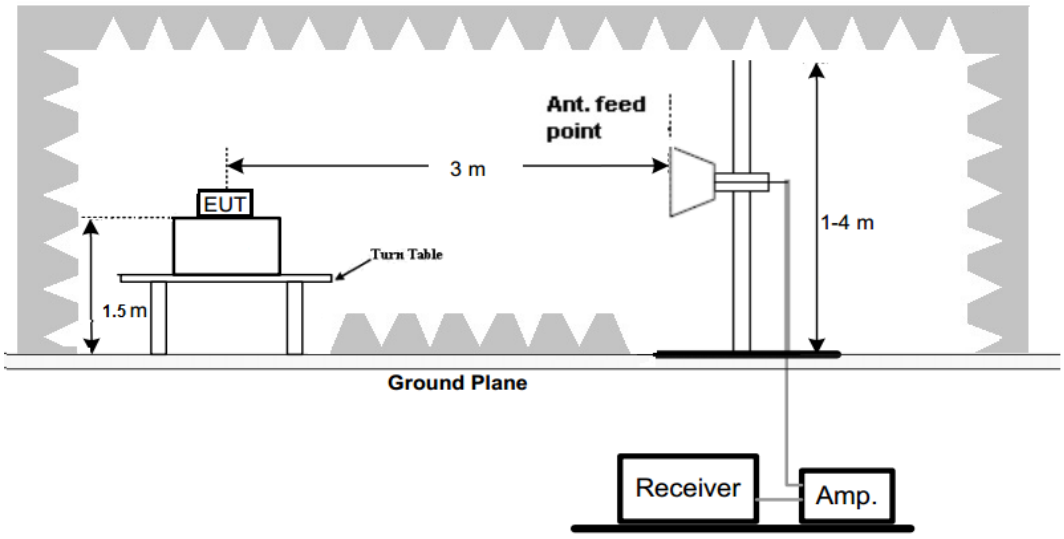
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



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



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



Frequency :9kHz-30MHz	Frequency :30MHz-1GHz	Frequency :Above 1GHz
RBW=10KHz,	RBW=120KHz,	RBW=1MHz,
VBW =30KHz	VBW=300KHz	VBW=3MHz(Peak), 10Hz(AV)
Sweep time= Auto	Sweep time= Auto	Sweep time= Auto
Trace = max hold	Trace = max hold	Trace = max hold
Detector function = peak	Detector function = peak	QP Detector function = peak, AV

Test Procedure

1.The setup of EUT is according with per TIA/EIA Standard 603 and ANSI C63.4-2014 measurement procedure.

2.The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

3.The frequency range up to tenth harmonic of the fundamental frequency was investigated.

4.Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution

antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

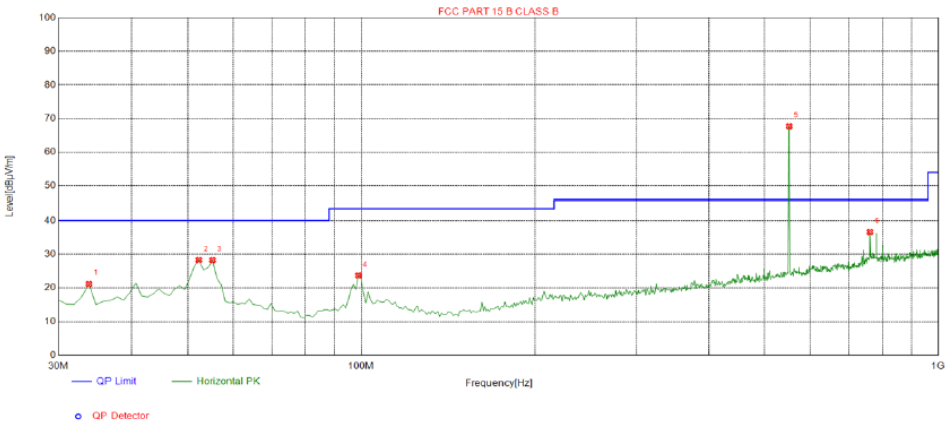
Spurious attenuation limit in dB = 43 + 10 Log_{10} (power in Watts)

TEST RESULTS

Below 1GHz Test Results: (Show only the worst test results)

Antenna polarity: H

Test Graph



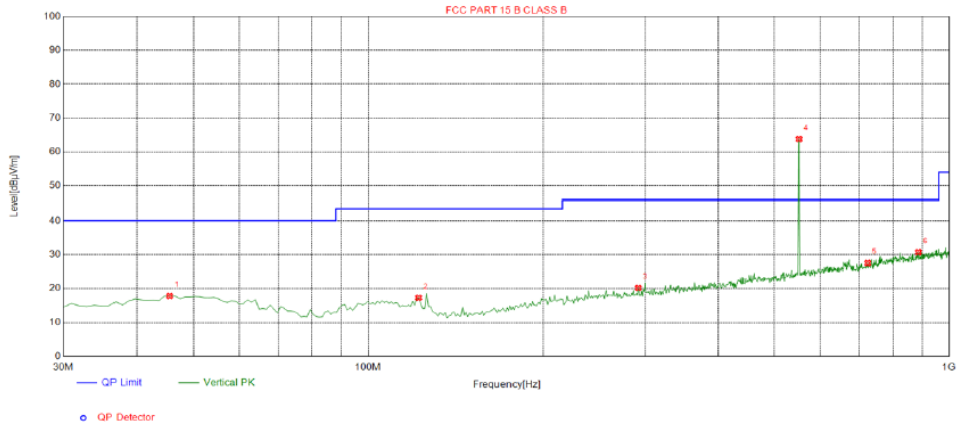
Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	33.8800	21.18	-16.19	40.00	18.82	100	25	Horizontal
2	52.3100	28.31	-14.00	40.00	11.69	100	245	Horizontal
3	55.2200	28.27	-14.44	40.00	11.73	100	267	Horizontal
4	98.8700	23.69	-15.59	43.50	19.81	100	12	Horizontal
5	551.860	67.75	-6.91	46.00	-21.75	100	264	Horizontal
6	762.350	36.65	-3.43	46.00	9.35	100	101	Horizontal

Remark:
The highest point is main frequency signal, which is not required to be specified by the basic limit.
Margin = Limit – Level
Level=Test receiver reading + factor
Factor= Antenna factor + cable loss- Amp factor

Antenna polarity: V

Test Graph



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	45.5200	17.80	-13.65	40.00	22.20	100	284	Vertical
2	122.150	17.29	-17.42	43.50	26.21	100	144	Vertical
3	291.900	20.16	-12.82	46.00	25.84	100	198	Vertical
4	551.860	63.78	-6.91	46.00	-17.78	100	38	Vertical
5	724.520	27.53	-4.63	46.00	18.47	100	348	Vertical
6	885.540	30.71	-1.96	46.00	15.29	100	204	Vertical

Remark:
The highest point is main frequency signal, which is not required to be specified by the basic limit.
Margin = Limit – Level
Level=Test receiver reading + factor
Factor= Antenna factor + cable loss- Amp factor

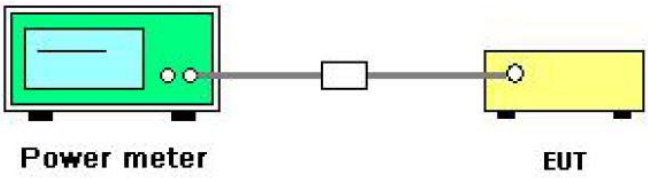
Remark：
(1) Measuring frequencies from 9 KHz to the 1 GHz, Radiated emission test from 9KHz to 30MHz was verified, and no any emission was found except system noise floor.
(2) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
(3) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.

3.4 Conducted Output Power

Limit

According to FCC 15.236(d)(1), for low power auxiliary station operating in the 470-608, and 614-698 MHz bands, In the bands allocated and assigned for broadcast television and in the 600 MHz service band: 50 mW EIRP

TEST CONFIGURATION



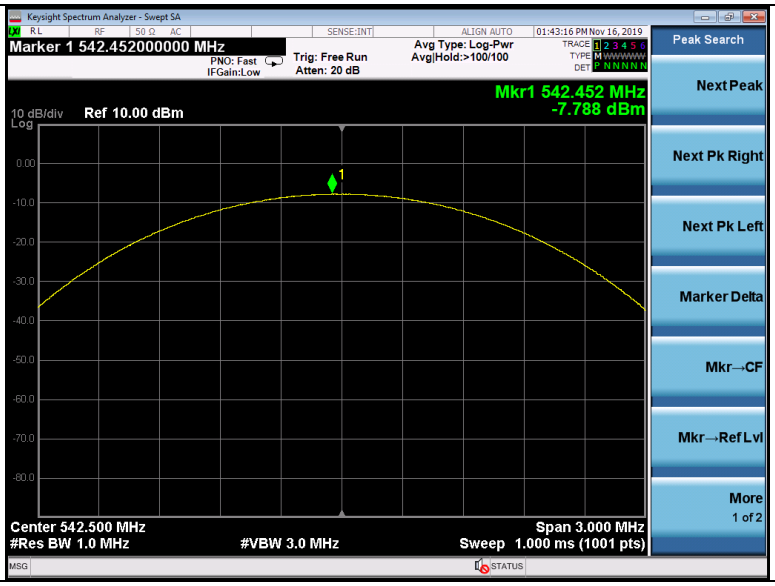
Test Procedure:

1. The maximum peak output power was measured with a Spectrum Analyzer connected to the antenna terminal while EUT was operating in unmodulated situation.
2. Power was supplied to the battery input connector a power supply. The power supply was set for +3.0VDC. The Spectrum Analyzer was connected at antenna terminal to measure RF power of the carrier.
3. A Multimeter was connected in series with final RF Stage to measure the current; A Multimeter was used to measure final RF Stage supply voltage. Then the voltage v.s. current of the final RF Stage can be showed.

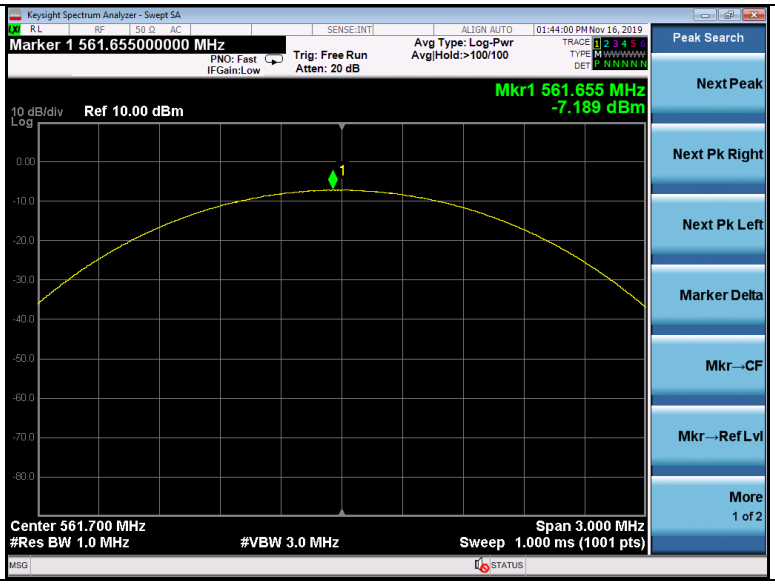
Test Results:

Test Channel	frequency (MHz)	Conducted Output Power (dBm)	ANT Gain (dBi)	EIRP (dBm)	Limit (dBm)	Result
CH00	542.5	-7.788	1.8	-5.988	17	PASS
CH15	561.7	-7.189	1.8	-5.389		PASS
CH31	588.6	-6.451	1.8	-4.651		PASS

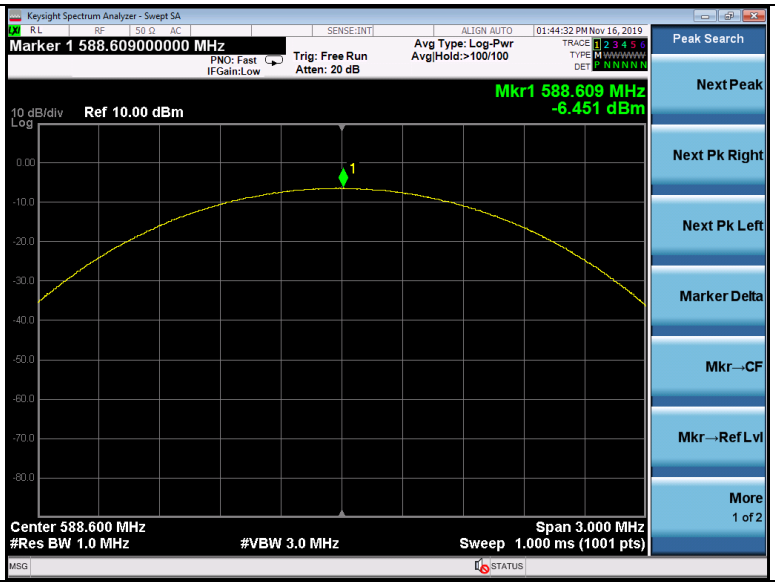
542.5MHz



561.7MHz



588.6MHz



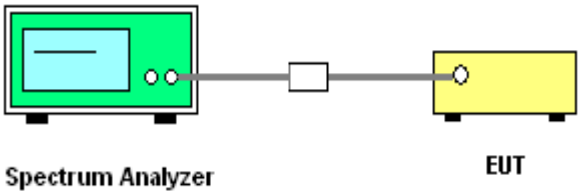
3.5 OCCUPIED BANDWIDTH MEASUREMENT

Limit

According to FCC 15.236(f)(2), The operating frequency within a permissible band of operation as defined in paragraph (c) must comply with the following requirements.
(1) The frequency selection shall be offset from the upper or lower band limits by 25 kHz or an integral multiple thereof.
(2) One or more adjacent 25 kHz segments within the assignable frequencies may be combined to form a channel whose maximum bandwidth shall not exceed 200 kHz. The operating bandwidth shall not exceed 200 kHz.
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 of ETSI EN 300 422-1 V1.4.2 (2011-08) (incorporated by reference, see §15.38). Emissions outside this band shall comply with the limit specified at the edges of the

ETSI mask

TEST CONFIGURATION



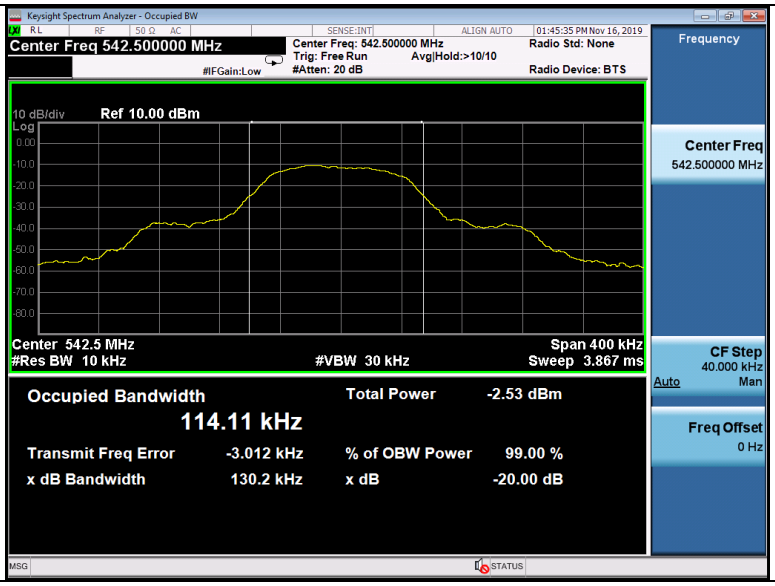
Test Procedure:

According to TIA-603 for additional Test Set-Up procedures, the occupied bandwidth of emission was measured with a Spectrum Analyzer connected to the antenna terminal while EUT was operating in 2.5kHz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation. Then mark the -26dB Bandwidth and record it.

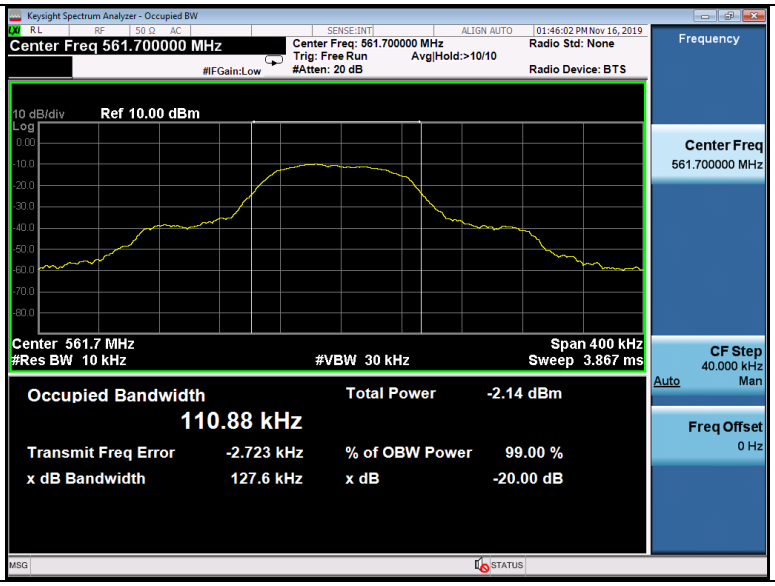
Test Results:

Test Channel	frequency (MHz)	-20Bandwidth (kHz)	99%Bandwidth (kHz)	Limit (kHz)	Result
CH00	542.5	130.2	114.11	200	PASS
CH15	561.7	127.6	110.88		PASS
CH31	588.6	125.8	108.58		PASS

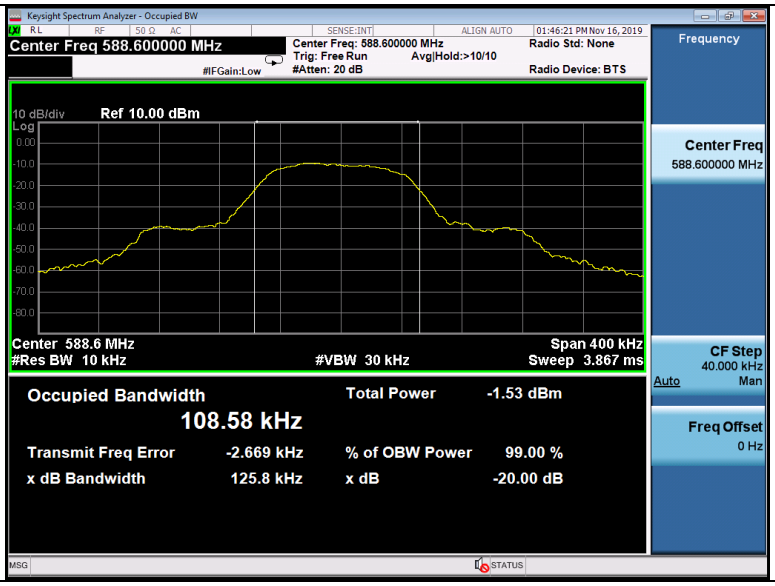
542.5MHz



561.7MHz

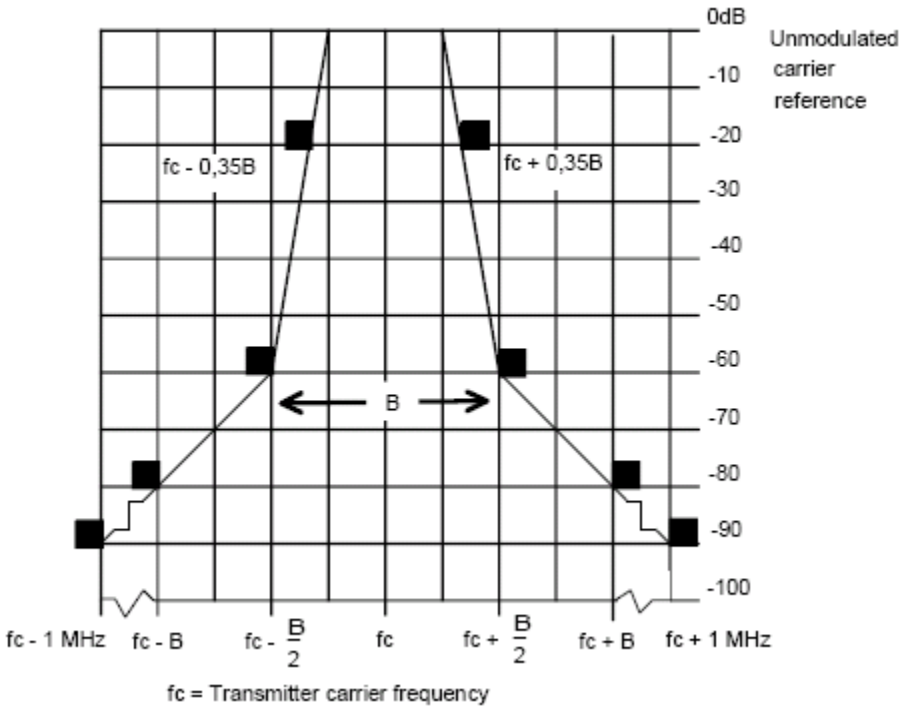


588.6MHz



3.5 Necessary bandwidth

Limit

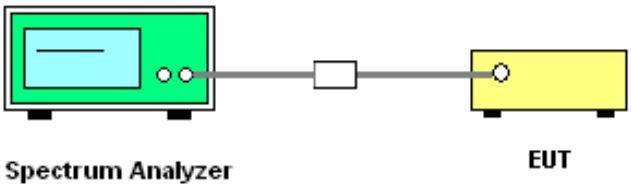


Standard Applicable

According to §15.236 (g) Emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in §8.3 of ETSI EN 300 422-1 V1.4.2 (2011-08), Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; Part 1: Technical characteristics and methods of measurement. Emissions outside of this band shall comply with the limits specified in section 8.4 of ETSI EN 300 422-1 V1.4.2 (2011-08).

According to ETSI EN 300 422-2 V2.1.1 section 8.3, the transmitter output spectrum shall be within the mask defined in the following figure.

TEST CONFIGURATION



Test Procedure:

The arrangement of test equipment as shown in figure B.1 shall be used. Note that the noise meter conforms to (quasi peak) without weighting filter (flat).

With the Low Frequency (LF) audio signal generator set to 500 Hz, the audio input level to the DUT shall be adjusted to 8 dB below the limiting threshold (-8 dB (lim)) as declared by the manufacturer.

The corresponding audio output level from the demodulator shall be measured and recorded.

The input impedance of the noise meter shall be sufficiently high to avoid more than 0,1 dB change in input level when the meter is switched between input and output.

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.

It shall be checked that the audio output level has increased by ≤ 10 dB.

If this condition 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 -8 dB (lim).

Measure the input level at the transmitter required to give +12 dB (lim).

The LF generator shall be replaced with the weighted noise source to Recommendation ITU-R BS.559-2 [i.3], band-limited to 15 kHz as described in IEC 60244-13 [2], and the level shall be adjusted such that the measured input to the transmitter corresponds to +12 dB (lim).

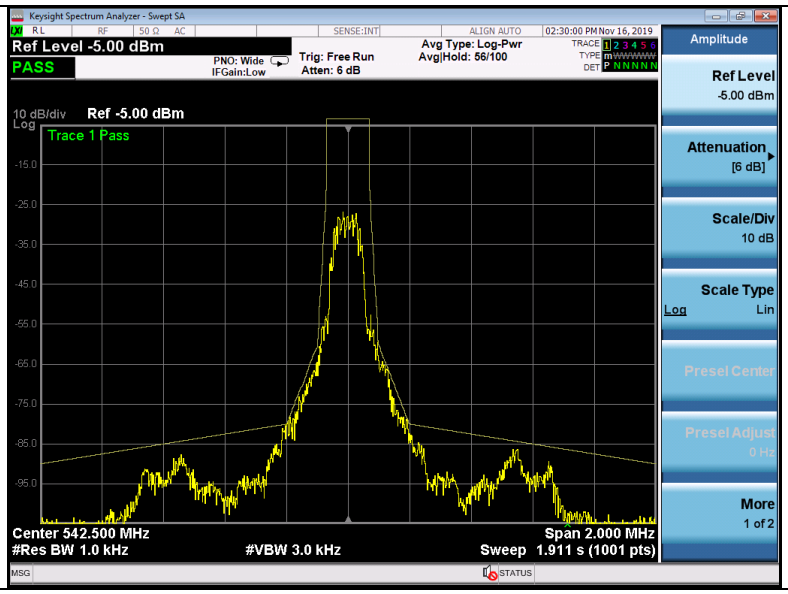
If the transmitter incorporates any ancillary coding or signalling channels (e.g. pilot-tones), these shall be enabled prior to any spectral measurements.

If the transmitter incorporates more than one audio input, e.g. stereo systems, the second and subsequent channels shall be simultaneously driven from the same noise source, attenuated to a level of -6 dB (lim).

- centre frequency: fc: Transmitter (Tx) nominal frequency;
- dispersion (Span): fc - 1 MHz to fc + 1 MHz;
- Resolution BandWidth (RBW): 1 kHz;
- Video BandWidth (VBW): 1 kHz;
- detector : Peak hold.

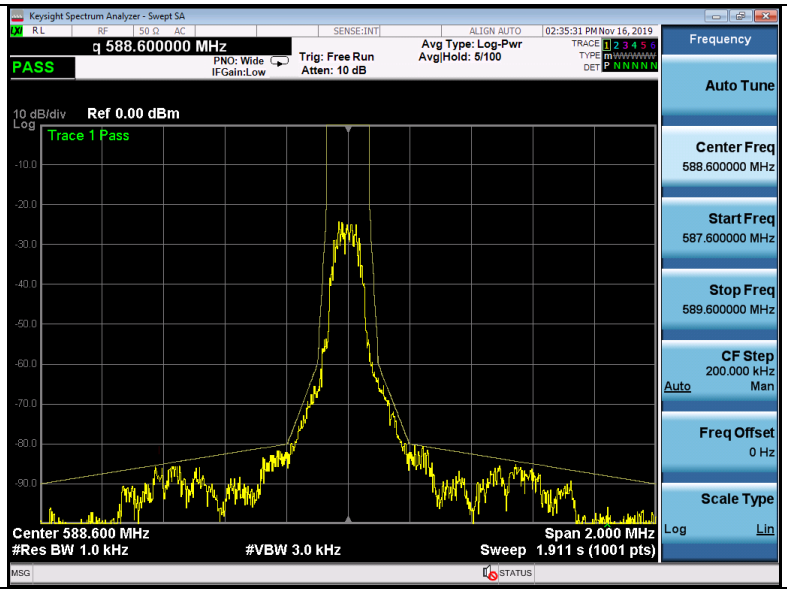
Test Result

542.5MHz



561.7MHz

588.6MHz



3.6 FREQUENCY STABILITY

Limit

±50ppm

Standard Applicable

According to FCC 15.236(f)(3), The frequency tolerance of the carrier signal shall be maintained within ±0.005% of the operating frequency over a temperature variation of −20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. Battery operated equipment shall be tested using a new battery.

TEST CONFIGURATION

Test Procedure:

1. Setup the configuration of the ambient temperature form -20ºC to 50ºC with sufficient time. And measure the different power of the EUT with an artificial power from highest to end point voltage.
2. Set frequency counter center frequency to the right frequency needs to be measured band.

Test Result

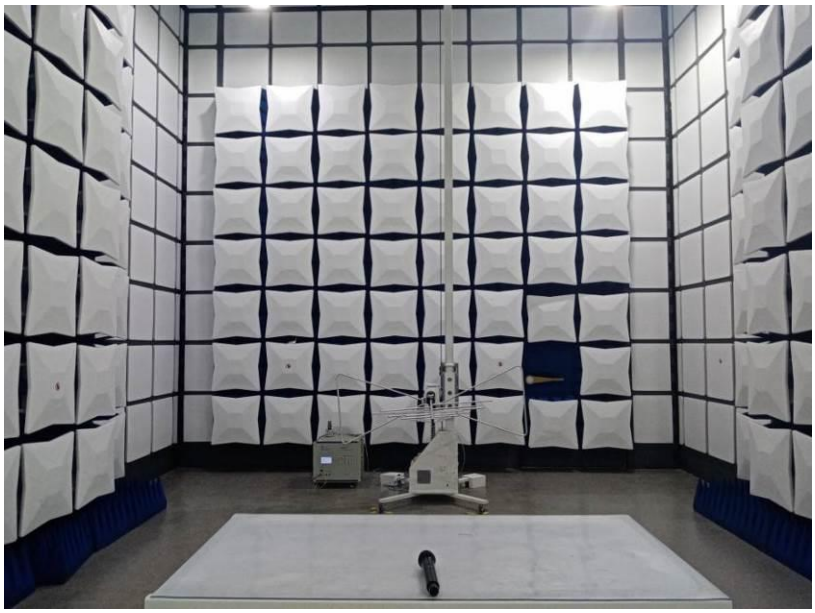
Test frequency	Test Conditions		Measure Frequency	Frequency Error		Limit	Result
(MHz)	Voltage (V)	Temperature (ºC)	(MHz)	(MHz)	ppm	ppm	
542.5MHz	N	N	542.4983	-0.0017	-3.05	±50ppm	PASS
		L	542.4803	-0.0197	-36.39		
		H	542.4894	-0.0106	-19.52		
	L	N	542.4890	-0.0110	-20.36		
		L	542.4875	-0.0125	-22.96		
		H	542.4793	-0.0207	-38.15		
	H	N	542.4886	-0.0114	-21.07		
		L	542.4917	-0.0083	-15.29		
		H	542.4926	-0.0074	-13.70		

Test frequency	Test Conditions		Measure Frequency	Frequency Error		Limit	Result
(MHz)	Voltage (V)	Temperature (ºC)	(MHz)	(MHz)	ppm	ppm	
561.7MHz	N	N	561.6968	-0.0032	-5.85	±50ppm	PASS
		L	561.6813	-0.0187	-34.55		
		H	561.6873	-0.0127	-23.35		
	L	N	561.6846	-0.0154	-28.35		
		L	561.6883	-0.0117	-21.54		
		H	561.6930	-0.0070	-12.89		
	H	N	561.6831	-0.0169	-31.19		
		L	561.6915	-0.0085	-15.70		
		H	561.6939	-0.0061	-11.19		

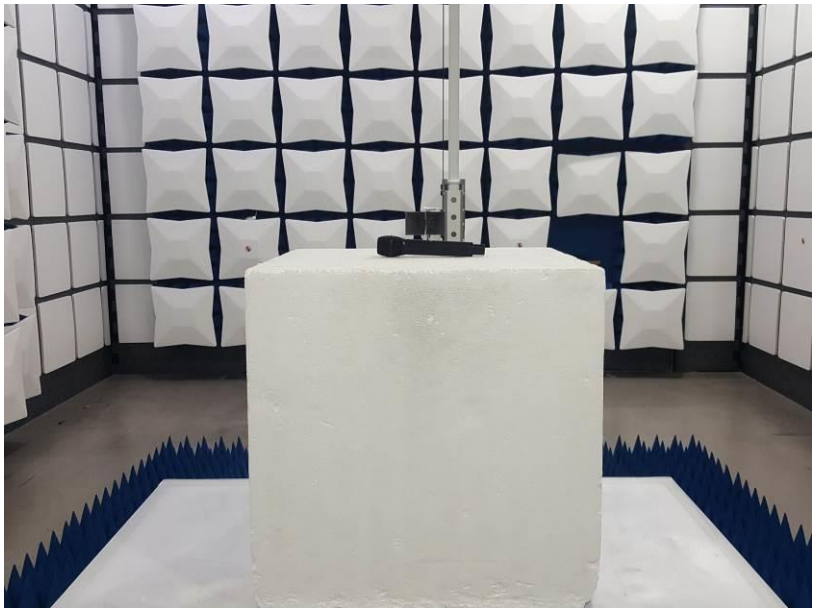
Test frequency	Test Conditions		Measure Frequency	Frequency Error		Limit	Result
(MHz)	Voltage (V)	Temperature (ºC)	(MHz)	(MHz)	ppm	ppm	
588.6MHz	N	N	588.5970	-0.0030	-5.51	±50ppm	PASS
		L	588.5842	-0.0158	-29.04		
		H	588.5832	-0.0168	-30.93		
	L	N	588.5921	-0.0079	-14.49		
		L	588.5920	-0.0080	-14.78		
		H	588.5844	-0.0156	-28.69		
	H	N	588.5831	-0.0169	-31.16		
		L	588.5970	-0.0030	-5.53		
		H	588.5938	-0.0062	-11.37		

4 PHOTOGRAPH OF TEST

30MHz-1000MHz



Above 1000MHz

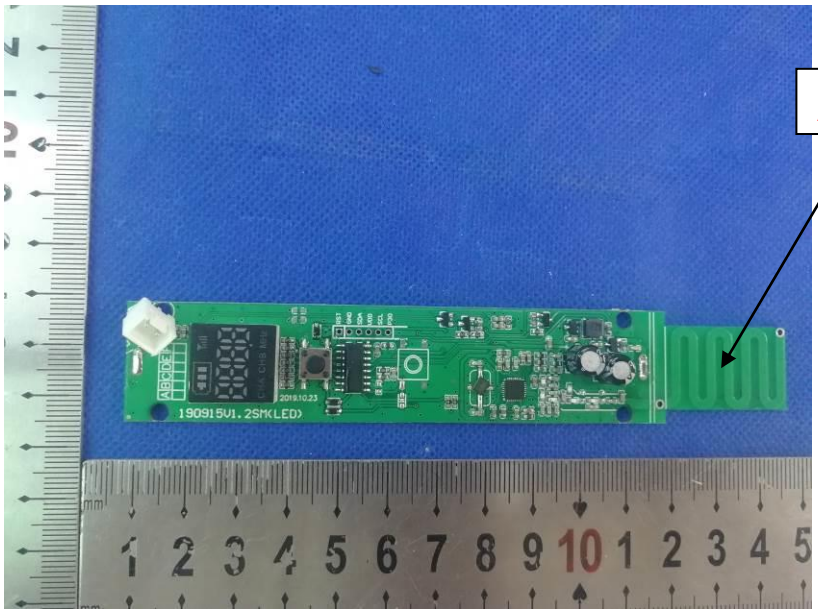


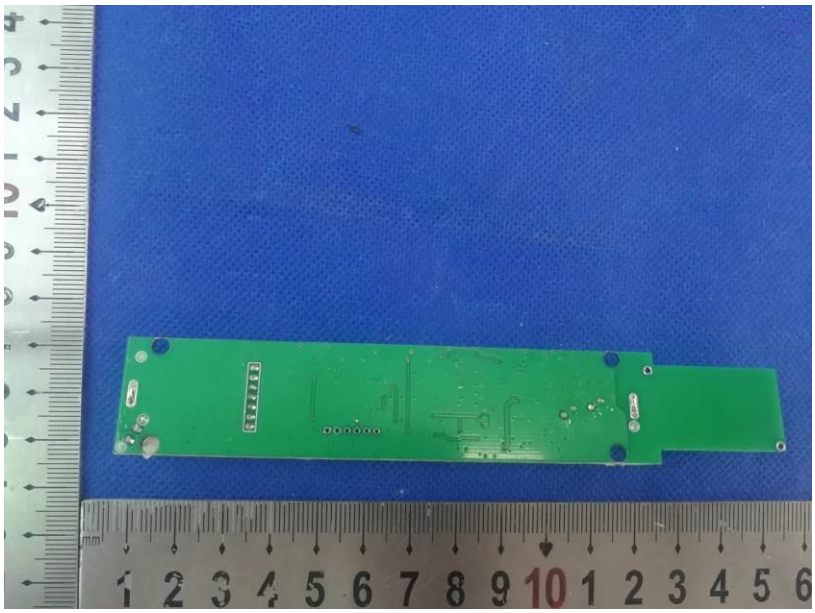
5 PHOTOGRAPH OF EUT

External photos


POWER

Internal photos


ANTENNA



END