

TEST REPORT

Client Information:

Applicant: Sound Town Inc.

Applicant add.: 376 Lemon Creek Dr, Suite C, Walnut, CA 91789, USA

Manufacturer: ZHEJIANG ASTONE ELECTRONICS CO.LTD

Manufacturer add.: No.1 Baoqun Road, Yaozhuang Town, Jiashan County, Zhejiang, China

Product Information:

Product Name: Wireless Microphone

Model No.: SWM16-MEGA-HM

Serial Model: SWM16-2MEGA, SWM16-4MEGA, NESO-F4HH, NESO-F4HL, NESO-F4LL, SWM26-U2HH, SWM26-HL, SWM26-LL, SWM20-U2HH, SWM20-LL, SWM10-U2HH, SWM01-U2HHV2, NESO-SU4HH, NESO-SU4HL, NESO-SU4LL, NESO-U4HH, NESO-U4HL, NESO-U4LL, SWM15-MAX

Brand Name: N/A

FCC ID: 2A8X3-SWM16MEGAHM

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.236

Prepared By:

Dongguan Yaxu (AiT) Technology Limited

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Date of Receipt: Oct. 17, 2023 Date of Test: Oct. 18, 2023~Nov. 07, 2023

Date of Issue: Nov. 08, 2023 Test Result: Pass

This device described above has been tested by Dongguan Yaxu (AiT) Technology Limited and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Reviewed by:


Simba Huang

Approved by:


Seal.chen

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Revision History

Revision	Issue Date	Revisions	Revised By
000	Nov. 08, 2023	Initial Issue	Seal Chen

2 Test Summary

The tests were performed according to following standards:

FCC Rules Part 15.236: Operation of wireless microphones in the bands 54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz and 614-698 MHz.

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

Test Item	Section in CFR 47	Result
RF Power Output	§15.236(d)	Pass
Occupied Bandwidth	§15.236(f)(2)	Pass
Necessary Bandwidth	§15.236(g)	Pass
Spurious emissions	§15.236(g)	Pass
Frequency Stability	§15.236(f)(3)	Pass
Conducted Emissions	§15.207	N/A

Note

1. Test according to ANSI C63.10:2013.
2. The measurement uncertainty is not included in the test result.

2.1 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 AiT 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.

2.2 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	0.009MHz-30MHz	3.10dB	(1)
Radiated Emission	30MHz-1GHz	3.75dB	(1)
Radiated Emission	1GHz-18GHz	3.88dB	(1)
Radiated Emission	18GHz-40GHz	3.88dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	1.20dB	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

3 Test Facility

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

.CNAS- Registration No: L6177

Dongguan Yaxu (AiT) technology Limited is accredited to ISO/IEC 17025:2017 general Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the competence of testing and calibration laboratories) on Aug.04, 2020

FCC-Registration No.: 703111 Designation Number: CN1313

Dongguan Yaxu (AiT) technology Limited 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.

IC —Registration No.: 6819A CAB identifier: CN0122

The 3m Semi-anechoic chamber of Dongguan Yaxu (AiT) technology Limited has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 6819A

A2LA-Lab Cert. No.: 6317.01

Dongguan Yaxu (AiT) technology Limited has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

3.1 Deviation from standard

None

3.2 Abnormalities from standard conditions

None

3.3 Test Location

Dongguan Yaxu (AiT) Technology Limited

Address: No.22, Jinqianling 3rd Street, Jitigang, Huangjiang, Dongguan, Guangdong, China

Tel.: +86-769-8202 0499

Fax.: +86-769-8202 0495

4 General Information

EUT Name:	Wireless Microphone
Model No:	SWM16-MEGA-HM
Serial Model:	SWM16-2MEGA,SWM16-4MEGA,NESO-F4HH,NESO-F4HL,NESO-F4LL, SWM26-U2HH,SWM26-HL,SWM26-LL,SWM20-U2HH,SWM20-LL, SWM10-U2HH,SWM01-U2HHV2,NESO-SU4HH,NESO-SU4HL,NESO-SU 4LL,NESO-U4HH,NESO-U4HL,NESO-U4LL,SWM15-MAX
Test sample(s) ID:	AIT23101301-1
Sample(s) Status:	Engineer sample
Serial No.:	N/A
Operation frequency:	586.29MHz~591.19MHz
Channel Number:	50
Modulation Technology:	FSK
Antenna Type:	Spring Antenna
Antenna gain:	1.0dBi
H/W No.:	N/A
S/W No.:	N/A
Power supply:	DC 3V by Battery
Model different:	The circuit design and PCB design of the product are the same as the internal structure, Only used to distinguish between different sales regions, and the model names and colour are different.
Note:	For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

4.1 Test frequencies

EUT channels and frequencies list:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	586.29	19	588.09	36	589.79
2	586.39	20	588.19	37	589.89
4	586.49	21	588.29	38	589.99
5	586.59	22	588.39	39	590.09
6	586.69	23	588.49	40	590.19
7	586.79	24	588.59	41	590.29
8	586.89	25	588.69	42	590.39
9	586.99	26	588.79	43	590.49
10	587.09	27	588.89	44	590.59
11	587.19	28	588.99	45	590.69
12	587.29	29	589.09	46	590.79
13	587.39	30	589.19	47	590.89
14	587.49	31	589.29	48	590.99
15	587.59	32	589.39	49	591.09
16	587.69	33	589.49	50	591.19
17	587.79	34	589.59	--	--
18	587.89	35	589.69	--	--

4.2 EUT Peripheral List

No.	Equipment	Manufacturer	EMC Compliance	Model No.	Serial No.	Power cord	Signal cord
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A

4.3 Test Peripheral List

No.	Equipment	Manufacturer	EMC Compliance	Model No.	Serial No.	Power cord	Signal cord
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A

4.4 TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

The radiated testing was performed at an antenna-to-EUT distance of 3 meters. All radiated and conducted emissions measurement was performed at Dongguan Yaxu (AiT) Technology Limit.

EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

EUT Exercise

The EUT was operated in the normal operating mode and a continuous transmits mode for other tests.

According to its specifications, the EUT must comply with the requirements of the Section 15.203, 15.205, 15.207, 15.209, 15.236 under the FCC Rules Part 15 Subpart C

General Test Procedures

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 6.3 of ANSI C63.10-2013.

4.5 Description of Test Modes

The EUT has been tested under operating condition.

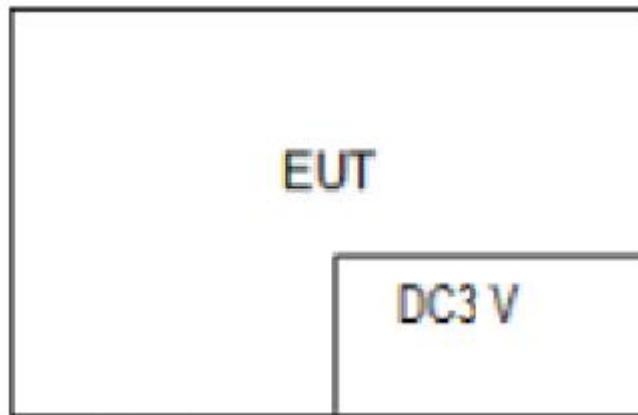
Worst-case mode and channel used for 9 KHz-1000 MHz radiated emissions was determined to be TX.

This test was performed with EUT in X, Y, Z position and the worst case was found when EUT in X position.

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Transmitting mode	Keep the EUT in continuously transmitting mode.		
Test software:	fixed in EUT by manufacturer		
Frequency	586.29MHz	588.69MHz	591.19MHz
Parameters(1Mbps)	Default	Default	Default

4.6 Block Diagram of Test Setup



5 Equipment Used during Test

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	Spectrum Analyzer	R&S	FSV40	101470	2023.09.08	2024.09.07
2	EMI Measuring Receiver	R&S	ESR	101160	2023.09.08	2024.09.07
3	Low Noise Pre Amplifier	HP	HP8447E	1937A01855	2023.09.08	2024.09.07
4	Low Noise Pre Amplifier	Tsj	MLA-0120-A02-34	2648A04738	2023.09.08	2024.09.07
5	Passive Loop	ETS	6512	00165355	2023.09.08	2024.09.07
6	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB9160	9160-3206	2023.09.08	2024.09.07
7	Broadband Horn Antenna	SCHWARZBECK	BBHA9120D	452	2023.09.08	2024.09.07
8	SHF-EHF Horn Antenna 15-40GHz	SCHWARZBECK	BBHA9170	BBHA917036 7d	2023.09.08	2024.09.07
9	EMI Test Receiver	R&S	ESCI	100124	2023.09.08	2024.09.07
10	LISN	Kyoritsu	KNW-242	8-837-4	2023.09.08	2024.09.07
11	LISN	R&S	ESH3-Z2	0357.8810.54-101161-S2	2023.09.08	2024.09.07
12	Pro.Temp&Humi.chamber	MENTEK	MHP-150-1C	MAA0811250 1	2023.09.08	2024.09.07
13	RF Automatic Test system	MW	MW100-RFCB	21033016	2023.09.08	2024.09.07
14	Signal Generator	Agilent	N5182A	MY50143009	2023.09.08	2024.09.07
15	Wideband Radio communication tester	R&S	CMW500	1201.0002K5 0	2023.09.08	2024.09.07
16	RF Automatic Test system	MW	MW100-RFCB	21033016	2023.09.08	2024.09.07
17	DC power supply	ZHAOXIN	RXN-305D-2	2807000255 9	N/A	N/A
18	RE Software	EZ	EZ-EMC_RE	Ver.AIT-03A	N/A	N/A
19	CE Software	EZ	EZ-EMC_CE	Ver.AIT-03A	N/A	N/A
20	RF Software	MW	MTS 8310	2.0.0.0	N/A	N/A
21	temporary antenna connector(Note)	NTS	R001	N/A	N/A	N/A

Note: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

6 Test results and Measurement Data

6.1 Maximum Output Power

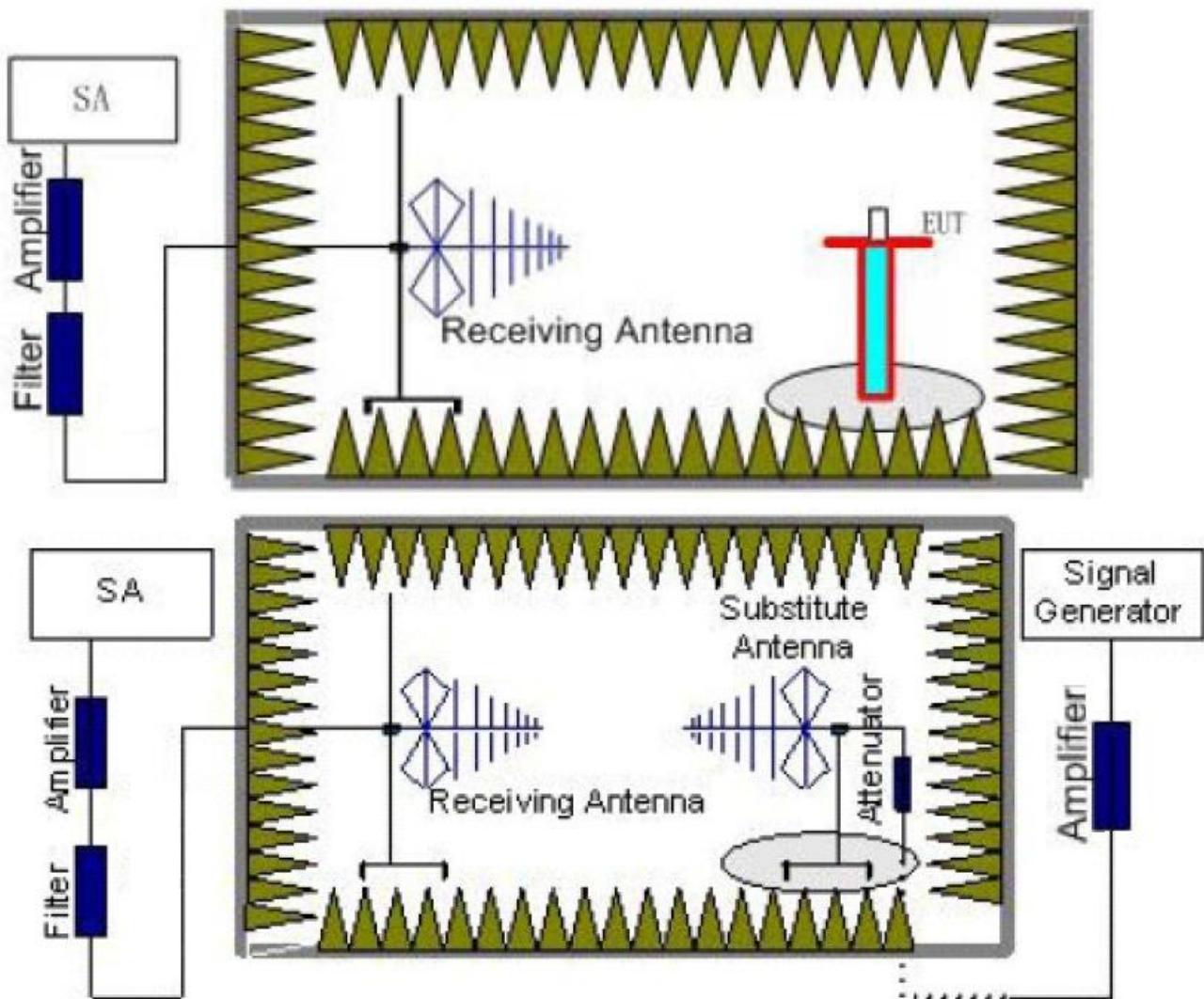
Limit

The maximum radiated power shall not exceed the following values:

- (1) In the bands allocated and assigned for broadcast television and in the 600 MHz service band: 50 mW EIRP
- (2) In the 600 MHz guard band and the 600 MHz duplex gap: 20 mW EIRP.

Test Procedure

1. EUT was placed on a 1.5 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 1.5m. 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.
2. 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.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz, And the maximum value of the receiver should be recorded as (P_r).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (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.
5. An amplifier may be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}), the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.
The measurement results are obtained as described below:
$$\text{Power(EIRP)} = P_{Mea} + P_{Ag} - P_{cl} + G_a$$
6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
7. ERP can be calculated from EIRP by subtracting the gain of the dipole, $ERP = EIRP - 2.15\text{dBi}$.

Test Configuration

Test Results

Temperature	24.8°C	Humidity	56%
Test Engineer	Simba Huang	Configurations	TX

Remark;

The field strength of radiation emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The data show in this report only with the worst case setup. After exploratory measurement the worst case of Z axis and receiver antenna at vertical polarization was reported.

Test Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dBi)	P _{Ag} (dB)	EIRP (dBm)	EIRP (mW)	FCC Limit (mW)	Polarization
586.29	-17.22	3.88	2.0	29.33	10.23	10.544	50	V
588.69	-16.96	3.06	2.0	28.82	10.80	12.023	50	V
591.19	-17.38	2.48	2.0	28.88	11.02	12.647	50	V

Remark: EIRP = P_{Mea}(dBm) + P_{Ag}(dB) - P_{cl}(dB) + G_a(dBi)

6.2 Spectrum Bandwidth Measurement

6.4.1 Standard requirement:

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.

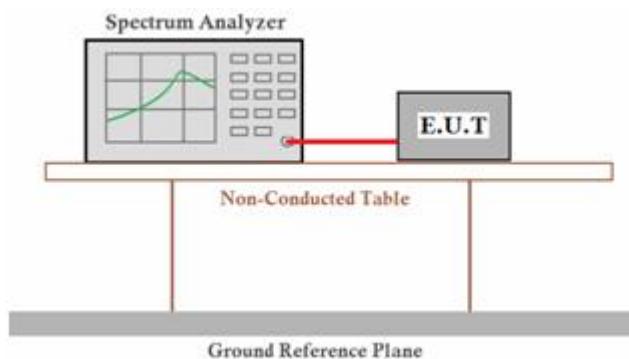
6.4.2 Measuring Instruments:

Please refer to equipment's list in this report.

6.4.3 Test Procedures

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 3 KHz RBW and 10 KHz VBW.

6.4.4 Test Setup Layout



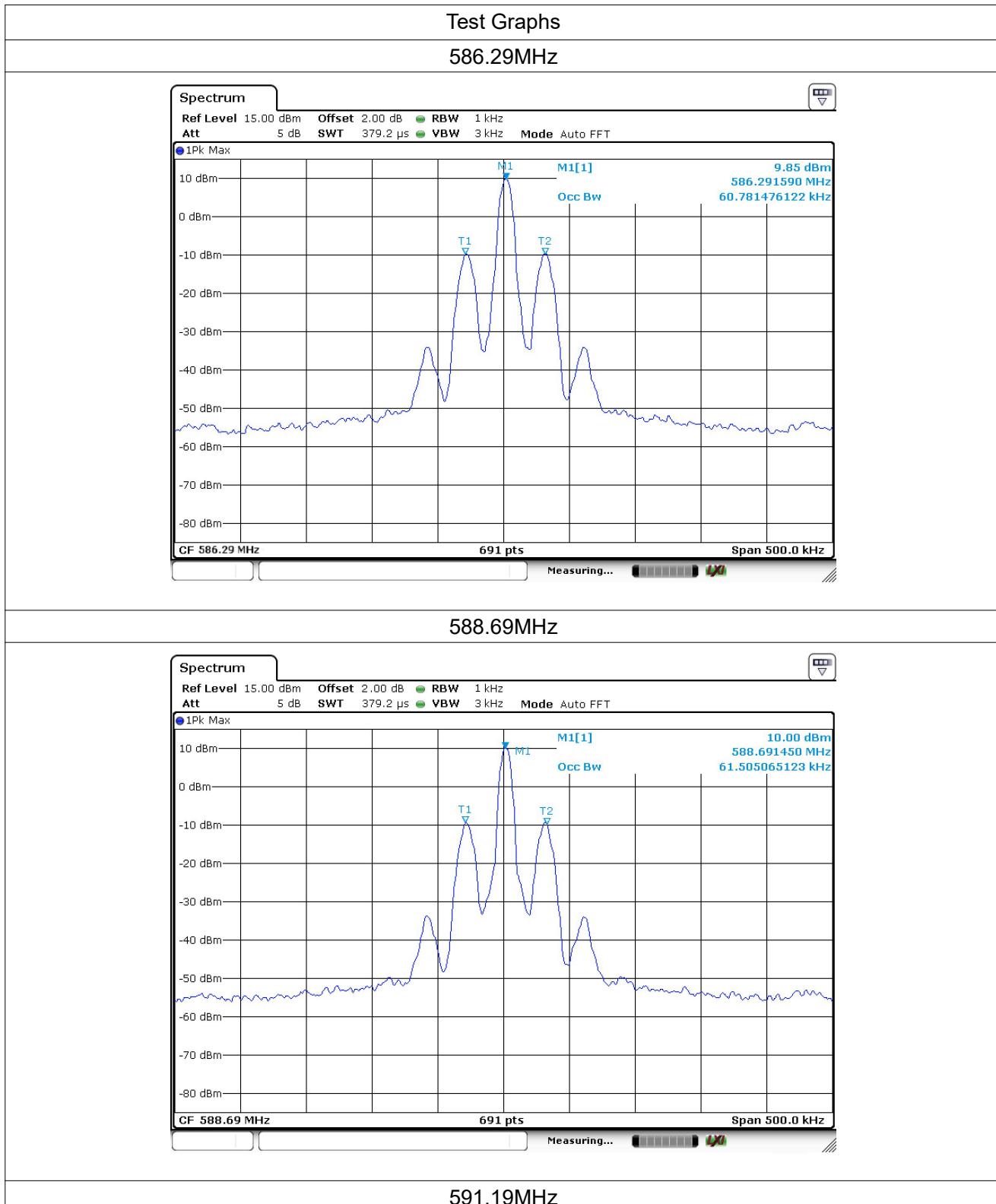
6.4.5 EUT Operation during Test

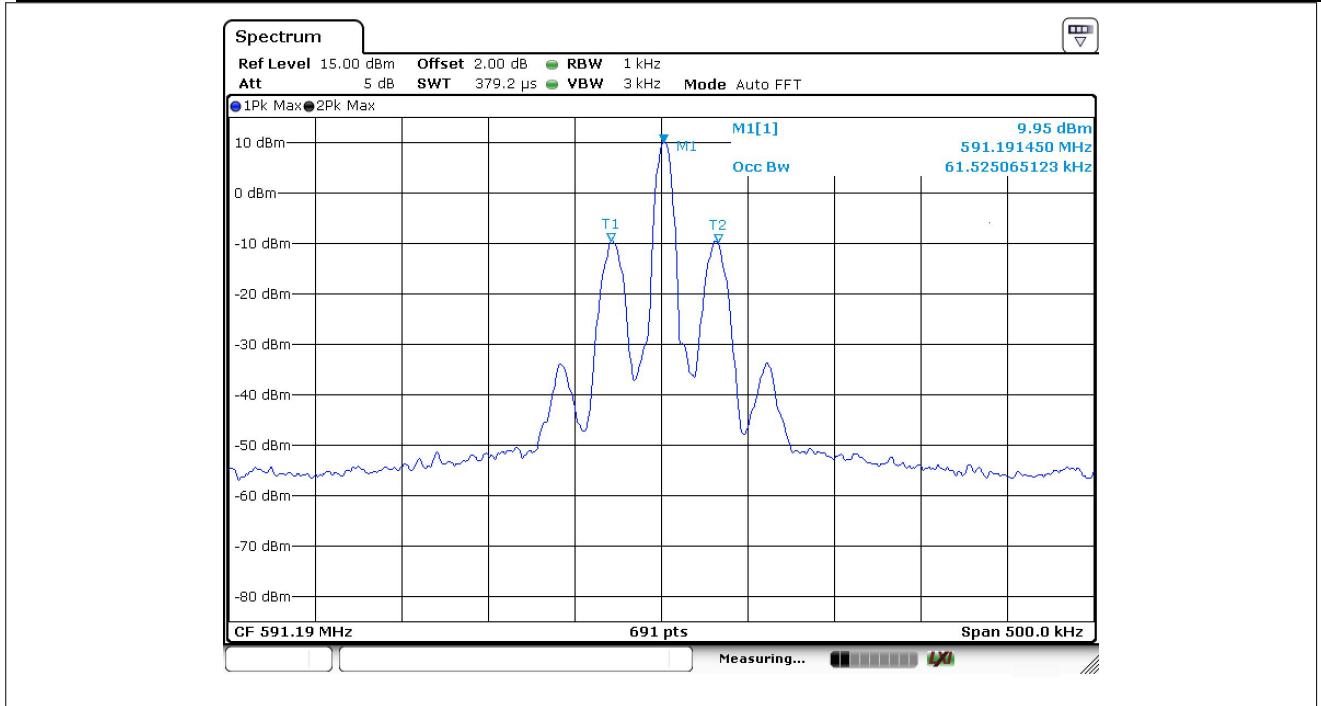
The EUT was programmed to be in continuously transmitting mode.

6.4.6 Test result

PASS

Antenna	Frequency (MHz)	99% Bandwidth (MHz)	Limit Bandwidth (kHz)	Verdict
Ant1	586.29	60.78	200	Pass
Ant1	588.69	61.50	200	Pass
Ant1	591.19	61.52	200	Pass





Remark:

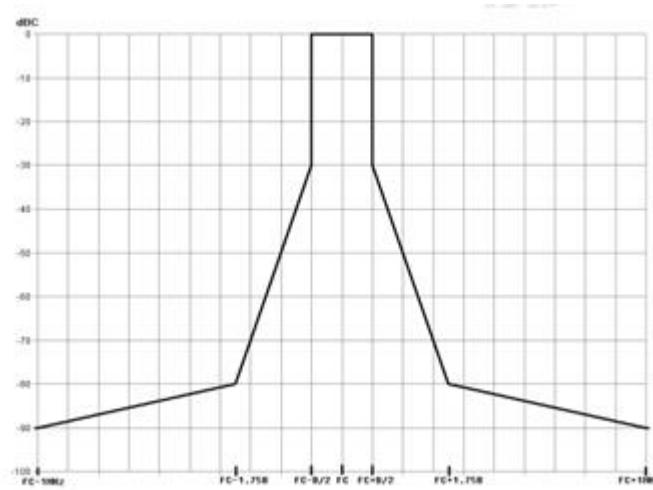
- 1). *Measured Bandwidth at difference data rate for each mode and recorded worst case for each mode.*
- 2). *Test results including cable loss;*

6.3 Necessary Bandwidth Measurement

6.4.7 Standard requirement:

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) as below:

The transmitter output spectrum shall be within the mask defined in figure below where B is the declared channel bandwidth



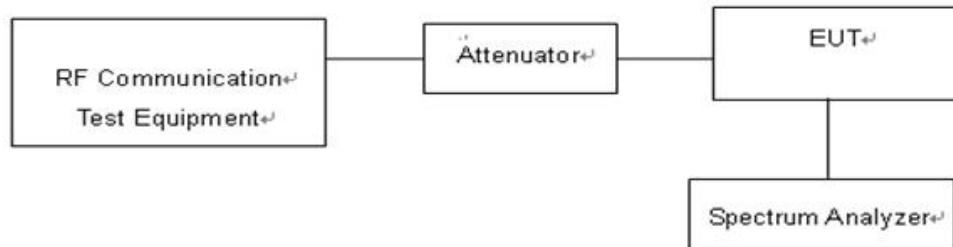
6.4.8 Measuring Instruments:

Please refer to equipment's list in this report.

6.4.9 Test Procedures

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: 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.

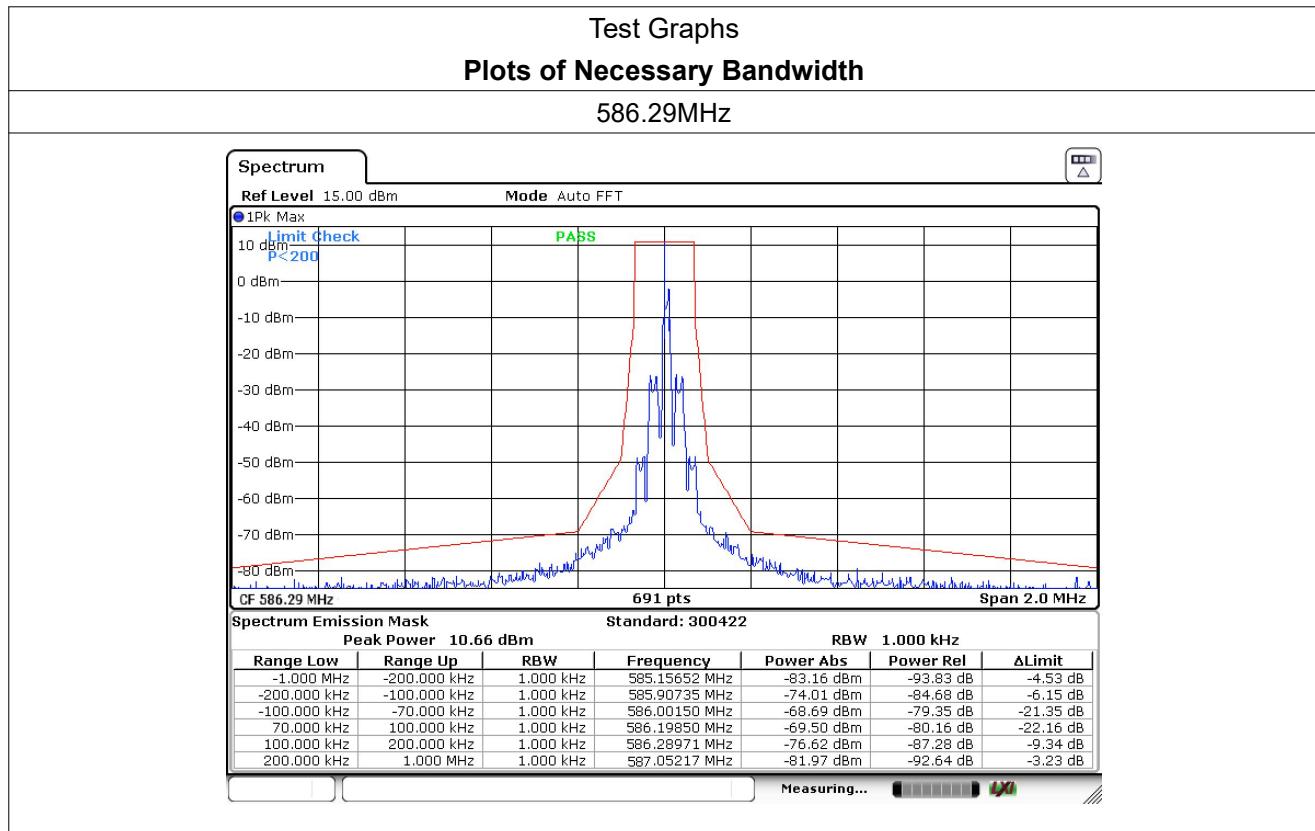
6.4.10 Test Setup Layout



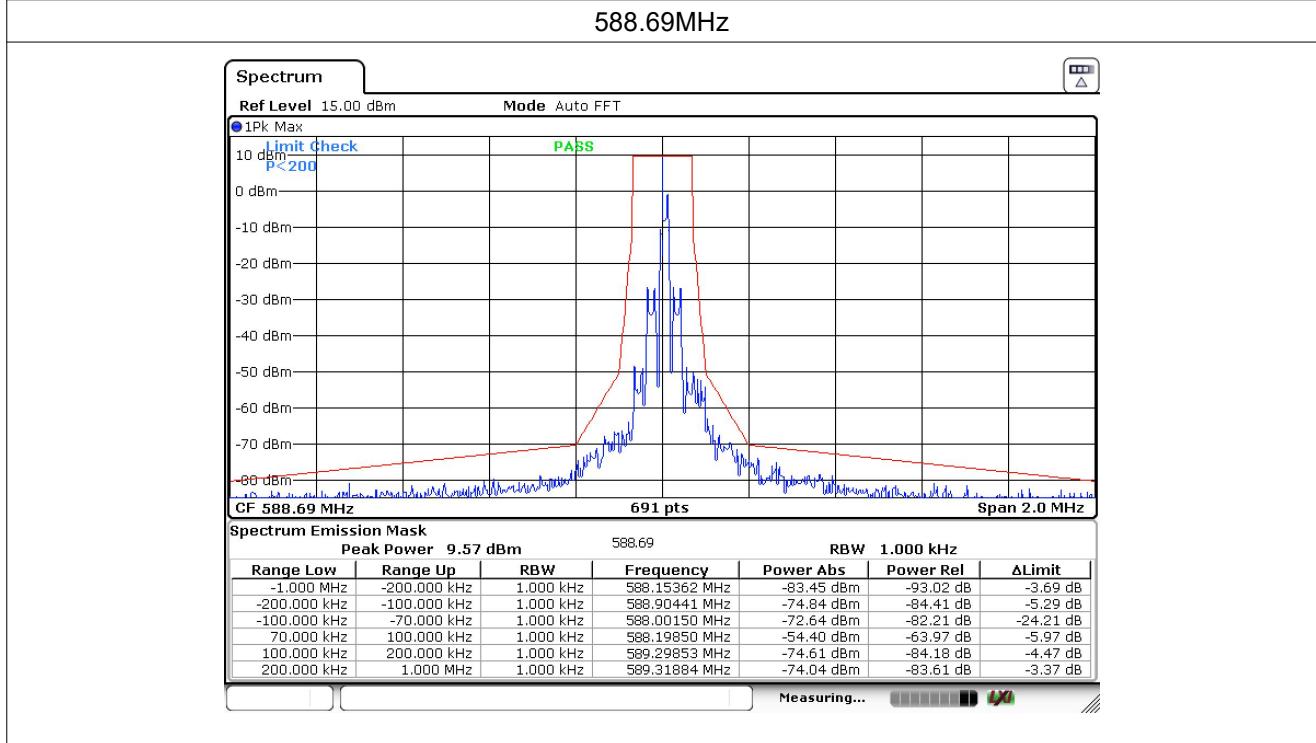
6.4.11 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

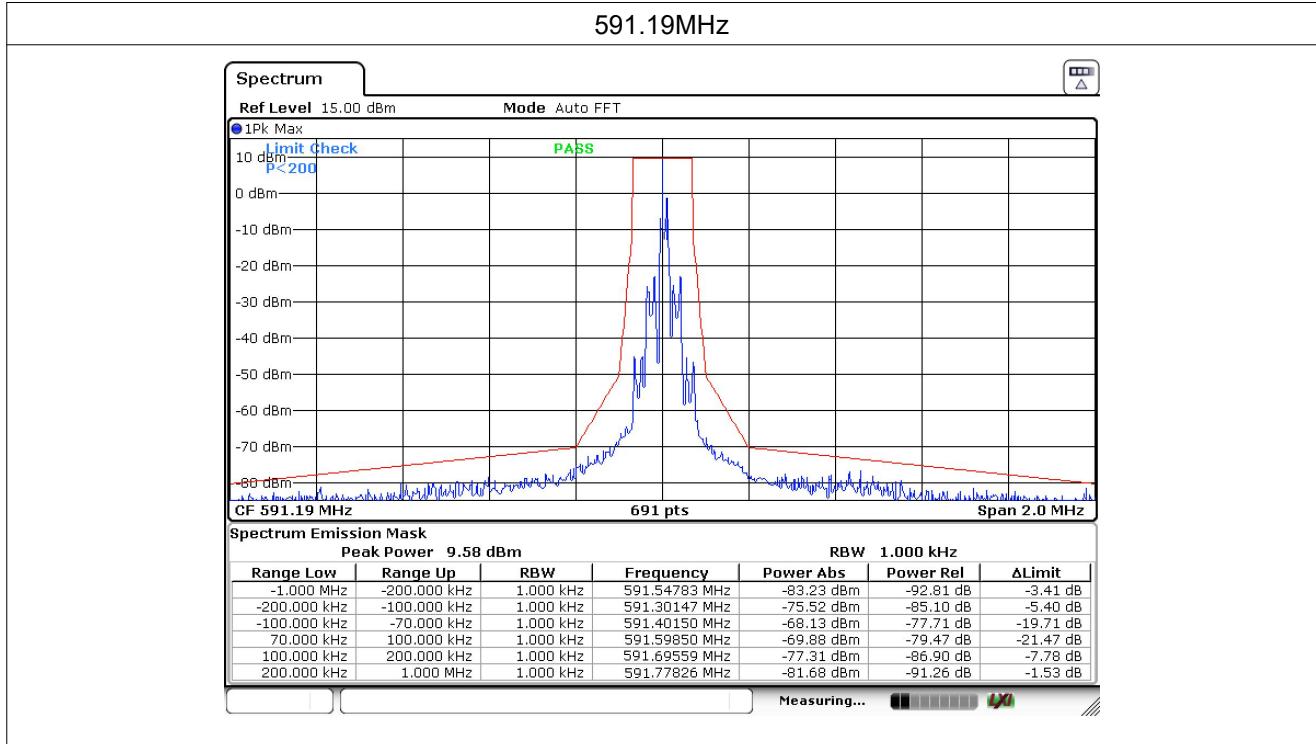
6.4.12 Test result



588.69MHz



591.19MHz

**Remark:**

- 1). Measured Bandwidth at difference data rate for each mode and recorded worst case for each mode.
- 2). Test results including cable loss;

6.4 Radiated Emissions Measurement

6.8.1 Standard requirement:

Table 3: Limits for spurious emissions

State	Frequency		
	47 MHz to 74 MHz 87,5 MHz to 137 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other Frequencies below 1 000 MHz	Frequencies above 1 000 MHz
Operation	4 nW	250 nW	1 μ W
Standby	2 nW	2 nW	20 nW

6.8.2 Measuring Instruments and Setting:

Please refer to equipment list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10 th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB/VB 200Hz/1KHz for QP/AVG
Start ~ Stop Frequency	150kHz~30MHz / RB/VB 9kHz/30KHz for QP/AVG
Start ~ Stop Frequency	30MHz~1000MHz / RB/VB 120kHz/1MHz for QP

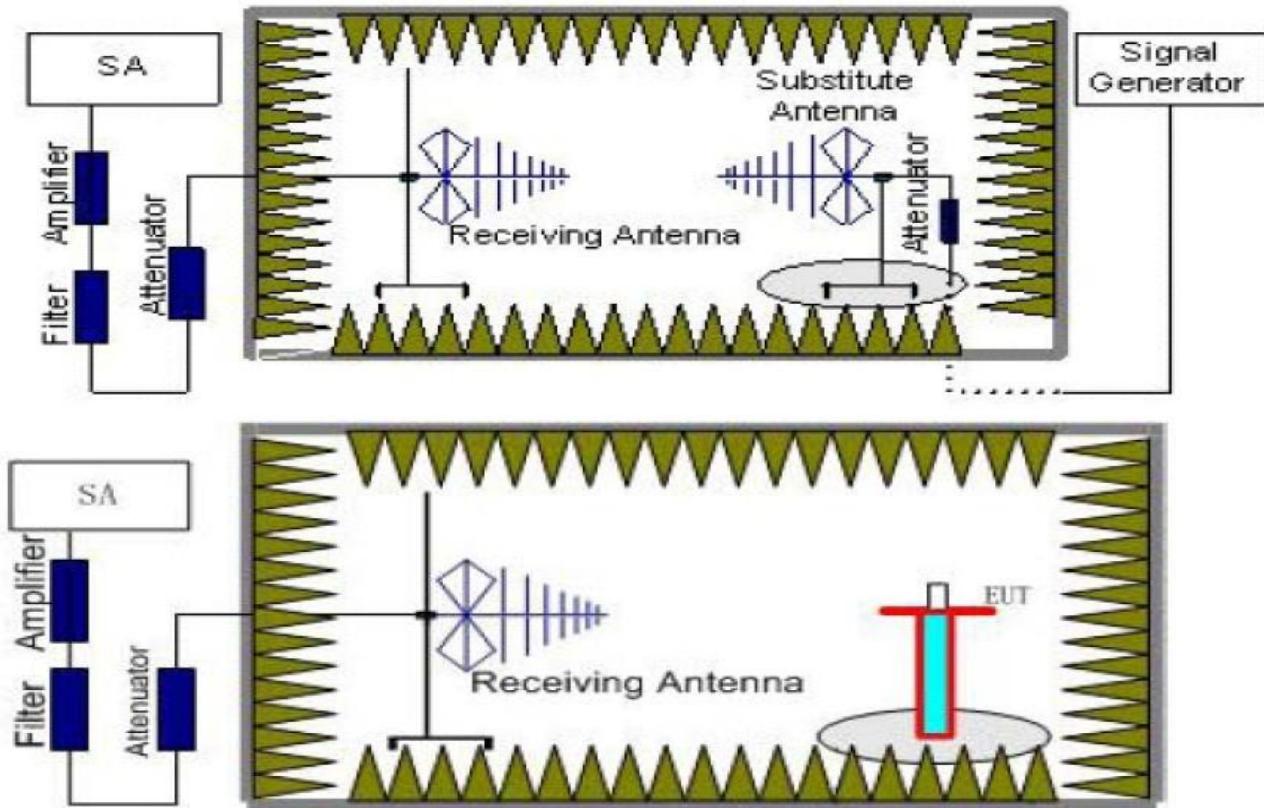
6.8.3 Test Procedures

1. Please refer to ETSI EN 300 422-1 V1.4.2 (2011-08) clause 6.1 for the test conditions.
2. Please refer to ETSI EN 300 422-1 V1.4.2 (2011-08) clause 8.4.2 for the measurement method.

6.8.4 Test Setup Layout

Test Configuration

Effective Radiated Power measurement (30 MHz to 12.75 GHz)



6.8.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

6.8.6 Test result

Temperature	25.2°C	Humidity	52.1%
Test Engineer	Simba Huang	Configurations	TX

Remarks:

1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

6.4.1 Spurious emissions

The test frequency range from 25MHz to 7GHz and recorded worst at below:

Test mode: Tx (586.29MHz)					
Frequency (MHz)	Pol./Ant	Measurement EIRP (dBm)	Limit (dBm)	Margin (dB)	Result
388.44	V	-54.82	-36	-18.82	PASS
582.82	V	-65.35	-54	-11.35	
778.10	V	-59.96	-54	-5.96	
972.21	V	-46.90	-36	-10.9	
1172.58	V	-43.97	-30	-13.97	
1758.87	V	-41.92	-30	-11.92	
2345.16	V	-39.73	-30	-9.73	
2931.45	V	-38.52	-30	-8.52	
3517.74	V	-35.66	-30	-5.66	
--	--	--	--	--	
388.41	H	-54.72	-36	-18.72	
582.75	H	-65.63	-54	-11.63	
777.72	H	-59.71	-54	-5.71	
971.85	H	-46.97	-36	-10.97	
1172.58	H	-44.87	-30	-14.87	
1758.87	H	-42.72	-30	-12.72	
2345.16	H	-43.26	-30	-13.26	
2931.45	H	-41.19	-30	-11.19	
3517.74	H	-39.62	-30	-9.62	
--	--	--	--	--	

Test mode: Tx (588.69MHz)					
Frequency (MHz)	Pol./Ant	Measurement EIRP (dBm)	Limit (dBm)	Margin (dB)	Result
389.03	V	-54.04	-36	-18.04	PASS
583.50	V	-64.95	-54	-10.95	
778.55	V	-59.16	-54	-5.16	
972.52	V	-46.13	-36	-10.13	
1177.38	V	-44.02	-30	-14.02	
1766.07	V	-45.35	-30	-15.35	
2354.76	V	-42.40	-30	-12.4	
2943.45	V	-41.80	-30	-11.8	
3532.14	V	-39.06	-30	-9.06	
--	--	--	--	--	
388.46	H	-54.15	-36	-18.15	
582.88	H	-65.46	-54	-11.46	
777.96	H	-59.93	-54	-5.93	
971.96	H	-47.00	-36	-11	
1177.38	H	-46.71	-30	-16.71	
1766.07	H	-45.49	-30	-15.49	
2354.76	H	-44.96	-30	-14.96	
2943.45	H	-40.11	-30	-10.11	
3532.14	H	-37.51	-30	-7.51	
--	H	--	--	--	

Test mode: Tx (591.19MHz)					
Frequency (MHz)	Pol./Ant	Measurement EIRP (dBm)	Limit (dBm)	Margin (dB)	Result
388.43	V	-54.56	-36	-18.56	PASS
583.22	V	-65.35	-54	-11.35	
777.69	V	-59.82	-54	-5.82	
972.26	V	-46.34	-36	-10.34	
1182.38	V	-45.63	-30	-15.63	
1773.57	V	-46.25	-30	-16.25	
2364.76	V	-43.42	-30	-13.42	
2955.95	V	-37.67	-30	-7.67	
3547.14	V	-36.45	-30	-6.45	
--	--	--	--	--	
388.78	H	-54.52	-36	-18.52	
582.98	H	-65.25	-54	-11.25	
778.40	H	-59.53	-54	-5.53	
971.55	H	-47.12	-36	-11.12	
1182.38	H	-45.75	-30	-15.75	
1773.57	H	-46.69	-30	-16.69	
2364.76	H	-39.75	-30	-9.75	
2955.95	H	-40.39	-30	-10.39	
3547.14	H	-38.92	-30	-8.92	
--	H	--	--	--	

Remark:

1. The test frequency range from 25MHz to 7GHz, RBW/VBW: 100 KHz/300KHz below 1GHz, RBW/VBW: 1000 KHz/3000KHz above 7GHz.
2. --"Other emission levels were very low against the limit and not reported."

6.5 Frequency Stability

6.4.13 Standard requirement:

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.005\%$ 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

6.4.14 Measuring Instruments:

Please refer to equipment's list in this report.

6.4.15 Test Procedures

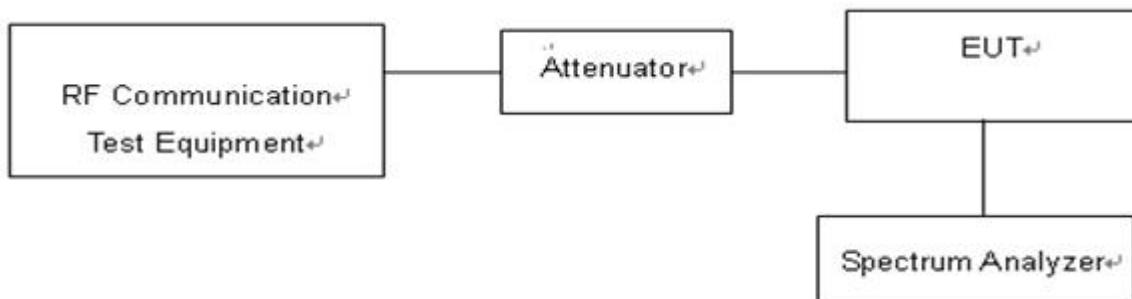
1. a) Frequency stability versus environmental temperature

1. Setup as Test Configuration for frequencies measured at ambient temperature if it is within 15°C to 25°C. Otherwise, an environmental chamber set for a temperature of 20°C 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 3 kHz, VBW to 10kHz 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 -20°C is measured, record all measurement frequencies.

b) Frequency stability versus input voltage

1. Setup as Test Configuration for frequencies measured at ambient temperature if it is within 15°C to 25°C. Otherwise, an environmental chamber set for a temperature of 20°C 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 3kHz, VBW to 10kHz and frequency span to 500 kHz. Record this frequency to be a reference.
3. For non hand carried, operated device, supply the EUT primary voltage with 85 and 115 percent of the nominal value and record the frequency.

6.4.16 Test Setup Layout



6.4.17 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

6.4.18 Test result

PASS

Reference Frequency: 586.29MHz					
Voltage (V)	Temperature (°C)	Frequency error (MHz)	Frequency Tolerance (%)	Limit (%)	Result
3.0V	-20	0.00072	0.00012%	±0.005	PASS
	-10	0.00101	0.00016%		
	0	0.00098	0.00016%		
	10	0.00222	0.00036%		
	20	0.00132	0.00021%		
	30	0.00117	0.00019%		
	40	0.00103	0.00017%		
	50	0.00092	0.00015%		
	2.7 V	0.00088	0.00014%		

Reference Frequency: 588.69MHz					
Voltage (V)	Temperature (°C)	Frequency error (MHz)	Frequency Tolerance (%)	Limit (%)	Result
3.3V	-20	0.00097	0.00015%	±0.005	PASS
	-10	0.00113	0.00017%		
	0	0.00072	0.00011%		
	10	0.00092	0.00014%		
	20	0.00078	0.00012%		
	30	0.00141	0.00021%		
	40	0.00123	0.00019%		
	50	0.00069	0.00011%		
	2.7 V	0.00066	0.00010%		

Reference Frequency: 591.19MHz					
Voltage (V)	Temperature (°C)	Frequency error (MHz)	Frequency Tolerance (%)	Limit (%)	Result
3.3V	-20	0.00094	0.00014%	±0.005	PASS
	-10	0.00113	0.00017%		
	0	0.00067	0.00010%		
	10	0.00083	0.00013%		
	20	0.00101	0.00015%		
	30	0.00069	0.00010%		
	40	0.00084	0.00013%		
	50	0.00091	0.00014%		
	2.7 V	0.00088	0.00013%		

6.6 Conducted Emissions

6.9.1 Standard requirement:

According to §15.207 (a): For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

* Decreasing linearly with the logarithm of the frequency

6.9.2 Measuring Instruments and Setting:

Please refer to equipment list in this report. The following table is the setting of the spectrum analyzer.

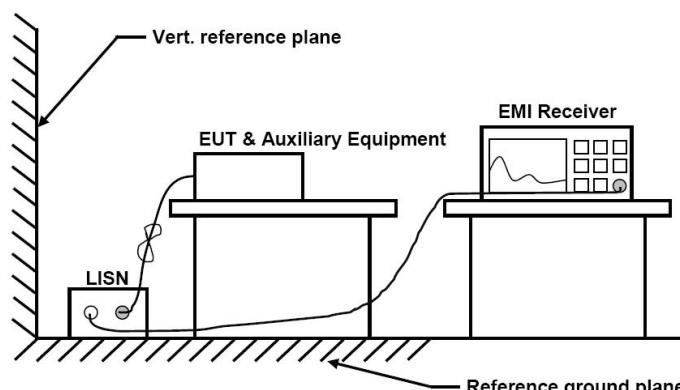
Spectrum Parameter	Setting
Detector	Peak
Attenuation	Auto
RB / VB (Emission in restricted band)	100KHz/300KHz
RB / VB (Emission in non-restricted band)	100KHz/300KHz

6.9.3 Test Procedures

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz

The spectrum from 9 kHz to 26.5GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

6.9.4 Test Setup Layout



6.9.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

6.9.6 Test result

N/A

The EUT is powered by Battery, So this test item is not applicable.

7 Test Setup Photo

Reference to the **appendix Setup photo** for details.

8 EUT Constructional Details

Reference to the appendix **External EUT photo & Internal EUT photo** for details.

-----End-----