

RF TEST REPORT

Report No. : 160824027SZN-001
Model No. : PH-13
Issued Date : 24 September 2016

Applicant: Acoustmax International Co., Ltd
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HongKong

**Test Method/
Standard:** FCC 47 CFR Part 74.861, Subpart H: 2015;
TIA/EIA-603-D-2010;

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Summary of Tests

Test Item	Requirement	Results
Effective Isotropic Radiated Power (EIRP)	FCC Part 74.861(e)(1)	Pass
Spurious radiation	FCC Part 74.861(e)(6)(iii)	Pass
Modulation characteristics	FCC Part 74.861(e)(3)	Pass
Operating bandwidth	FCC Part 74.861(e)(5)	Pass
Frequency tolerance	FCC Part 74.861(e)(4)	Pass
Emission mask	FCC Part 74.861(e)(6)	Pass

1. General information

1.1 Identification of the EUT

Product: Wireless Microphone

Model No.: PH-13

Type of Device: Handheld device

Nominal Channel Bandwidth: 200kHz

Operating Frequency: 192.6MHz

Channel Number: 1 Channel

Rated Power: 3.0Vdc (1.5V AA*2)

Test Date(s): 24 August 2016 to 23 September 2016

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Note 2: When determining the test conclusion, the Measurement Uncertainty of test has been considered.

1.2 Additional information about the EUT

The EUT is a Wireless Microphone operating at the frequency of 192.6MHz. The EUT is powered by DC 3V(1.5V AA*2). For more detail information please refer to the user manual.

Modulation type: FM
Antenna Type: Integral Antenna
Antenna Gain: 0.56 dBi

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

1.3 Peripherals equipment

Description	Manufacturer	Model No.
N/A	N/A	N/A

2. Test specifications

2.1 Test standard

The EUT was performed according to the requirements in FCC 47 CFR Part 74.861, Subpart H: 2015, and method of measurement per TIA/EIA-603-D-2010.

The test of radiated measurements according to TIA/EIA-603-D-2010 had been conducted and the mean power of emissions in the frequency band was all meet limit requirement, Measurements were made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, thus we evaluate the EUT pass the specified test.

Radiated emissions were invested cover the frequency range from 9KHz to 1000MHz using a receiver RBW of 10kHz, VBW of 300kHz and the frequency over 1 GHz using a spectrum analyzer RBW of 1 MHz, VBW of 3MHz, Detector Mode = Positive Peak for the test.

Substitution measurement shall be performed with a substitution antenna. For the test site with a fixed setup of the measurement antenna(s) and a reproducible positioning of the UUT, correction values from a verified site calibration shall be used for the test result.

The EUT setup configurations please refer to the photo of radiated setup photos.pdf.

2.2 Operation mode

The EUT was supplied by DC 3V (1.5V AA*2), and it was run in TX mode that was controlled by ON/OFF switch.

The EUT was transmitted continuously during the test. The worst case test result was showed in the report.

Table for Parameters of Test Software Setting

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

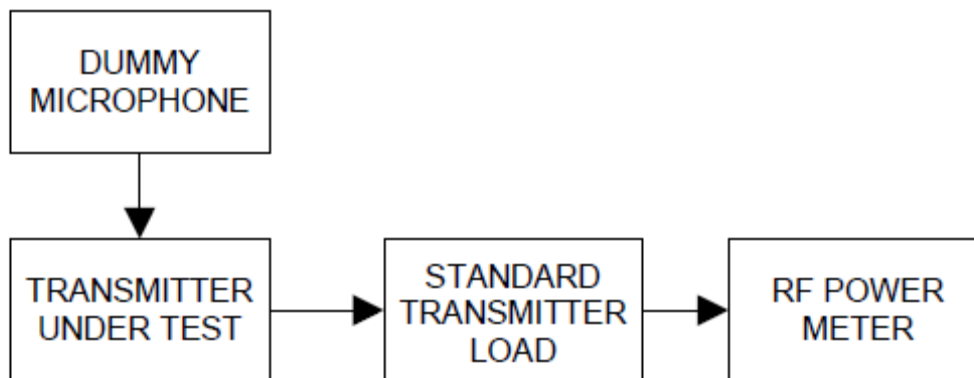
3. Effective Isotropic Radiated Power (EIRP) Measurement

3.1 Operating environment

Temperature: 25 °C
Relative Humidity: 50 %
Atmospheric Pressure: 1023 hPa

3.2 Test setup & procedure

The Diagram below shows the test setup, which is utilized to make these measurements.



The power output was measured on the EUT using a 50 ohm SMA cable connected to Power Meter and the measurement method refer to ANSI/TIA-603-D-2010, clause 2.2.1. Power was read directly and cable loss correction (0.5dB) was added to the reading to obtain power at the EUT antenna terminals.

3.3 Limit

Operating Frequency (MHz)	E.I.R.P(mW)
174-216	50

3.4 Measured data of Maximum Output Power test results

Frequency (MHz)	Conduct Output power (dBm)	Antenna Gain (dBi)	E.I.R.P (dBm)	E.I.R.P (mW)	Limit (mW)
192.6	7.79	0.56	8.35	6.84	50

Result: Pass

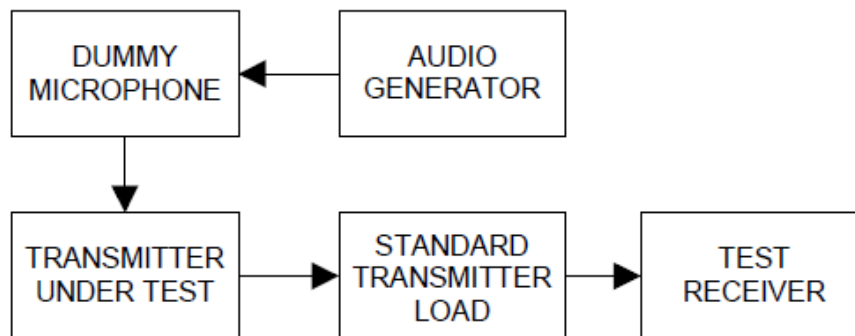
4. Modulation Characteristics Measurement

4.1 Operating environment

Temperature: 25 °C
Relative Humidity: 50 %
Atmospheric Pressure: 1023 hPa

4.2 Test setup & procedure

The Diagram below shows the test setup, which is utilized to make these measurements.



The test procedures refer to ANSI/TIA-603-D-2010, clause 2.2.3.

4.3 Limit

Limit:	± 75kHz
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4.4 Measured data of Modulation Characteristics test results

Rated system deviation: 9kHz, @1000Hz

Input Level (dB) \ Modulation	-20	-10	0	5	15	20
300Hz	4.9 kHz	8.2 kHz	8.9 kHz	9.0 kHz	11.8 kHz	13.3 kHz
1000Hz	5.3 kHz	8.6 kHz	9.1 kHz	9.0 kHz	12.7 kHz	16.0 kHz
2000Hz	5.1 kHz	8.5 kHz	9.3 kHz	9.3 kHz	12.0 kHz	15.7 kHz
3000Hz	5.5 kHz	9.3 kHz	10.2 kHz	10.8 kHz	14.0 kHz	16.9 kHz

Maximum Deviation: 16.9kHz

Result: Pass

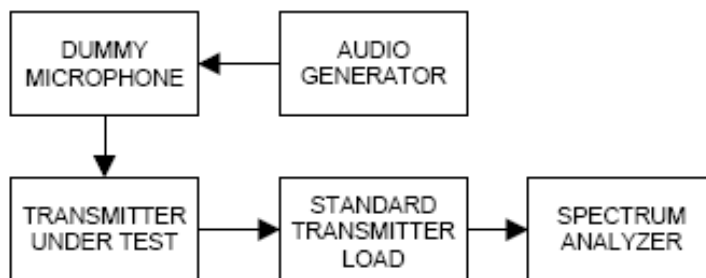
5. Operating bandwidth Measurement

5.1 Operating environment

Temperature: 25 °C
 Relative Humidity: 50 %
 Atmospheric Pressure: 1023 hPa

5.2 Test setup & procedure

The Diagram below shows the test setup, which is utilized to make these measurements.



The test procedures refer to ANSI/TIA-603-D-2010, clause 2.2.11.

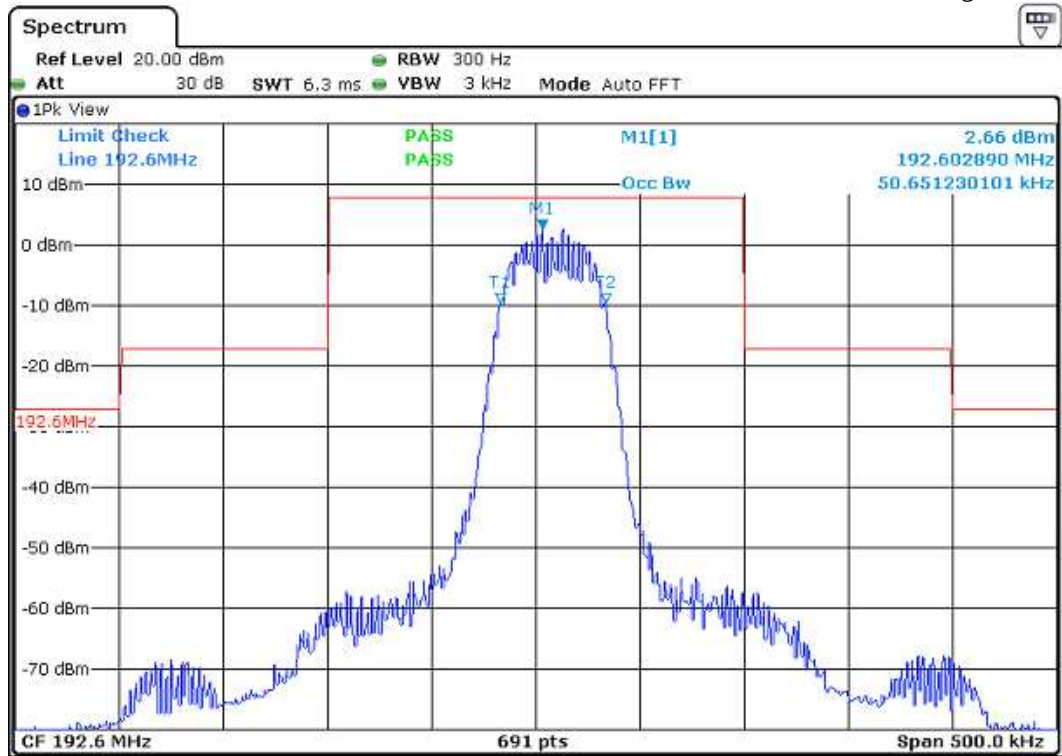
5.3 Limit

Limit:	200KHz
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5.4 Measured data of Operating bandwidth test results

Frequency (MHz)	Test Result(KHz)	Limit(KHz)
192.603	50.65	200

The test plot is attached as below.



Result: Pass

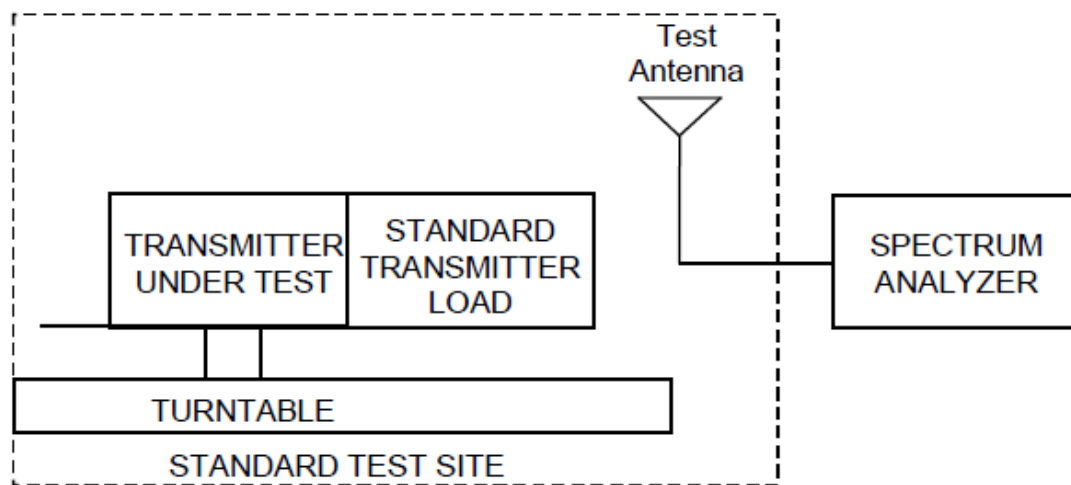
6. Spurious Radiation Measurement

6.1 Operating environment

Temperature:	23	°C
Relative Humidity:	58	%
Atmospheric Pressure	1023	hPa

6.2 Test setup & procedure

The Diagram below shows the test setup, which is utilized to make these measurements.



The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

Test procedures refer to ANSI/TIA-603-D-2010, clause 2.2.12.

- 1) Resolution Bandwidth = 10 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1GHz.
- 2) Video Bandwidth = 300 kHz for spurious emissions below 1 GHz, and 3 MHz for spurious emissions above 1 GHz.
- 3) Sweep Speed slow enough to maintain measurement calibration.
- 4) Detector Mode = Positive Peak.

6.3 Limit

*) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least $43 + 10 \log_{10}$ (mean output power in watts) dB.

To determine the Limit for Spurious Emissions the following method was used:

Maximum output power in Watt: 8.35dBm = 6.84mW

The emission must be reduced by:

$$43 + 10 * \log_{10}(0.00684) = 21.35 \text{ dB}$$

Therefore, the Emission Limit equals:

$$8.35\text{dBm} - 21.35\text{dB} = -13.0 \text{ dBm}$$

6.4 Radiated spurious emission test data

6.4.1 Measurement results: frequencies equal to or less than 1 GHz

Antenna Polarization	Frequency (MHz)	Measured Power (dBm)	Corr. (dB)	Limit (dBm)	Margin (dB)
Vertical	288.990	-31.7	-86.9	-13.0	-18.7
Vertical	385.020	-50.3	-85.7	-13.0	-37.3
Vertical	481.535	-48.2	-78.6	-13.0	-35.2

6.4.2 Measurement results: frequency above 1GHz

Antenna Polarization	Frequency (MHz)	Measured Power (dBm)	Corr. (dB)	Limit (dBm)	Margin (dB)
Vertical	1085.500	-42.3	-110.9	-13.0	-29.3
Vertical	1183.360	-45.8	-110.7	-13.0	-32.8
Vertical	1282.000	-49.2	-108.6	-13.0	-36.2

Notes:

The spectrum is measured from 9KHz to the 10th harmonic of the fundamental frequency of the transmitter using PK detector for test. The worst-case emission are reported however emission whose levels were not within 20dB of the respective limited were not reported. Correction values from a verified site calibration were used for the test result.

Test Result: Pass

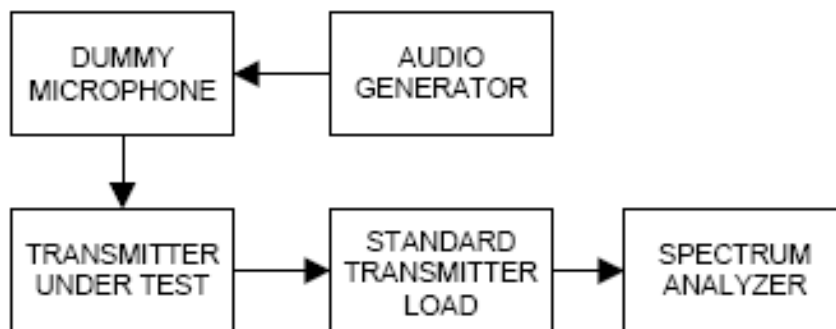
7. Emission Mask Measurement

7.1 Operating environment

Temperature:	23	°C
Relative Humidity:	58	%
Atmospheric Pressure	1023	hPa

7.2 Test setup & procedure

The Diagram below shows the test setup, which is utilized to make these measurements.

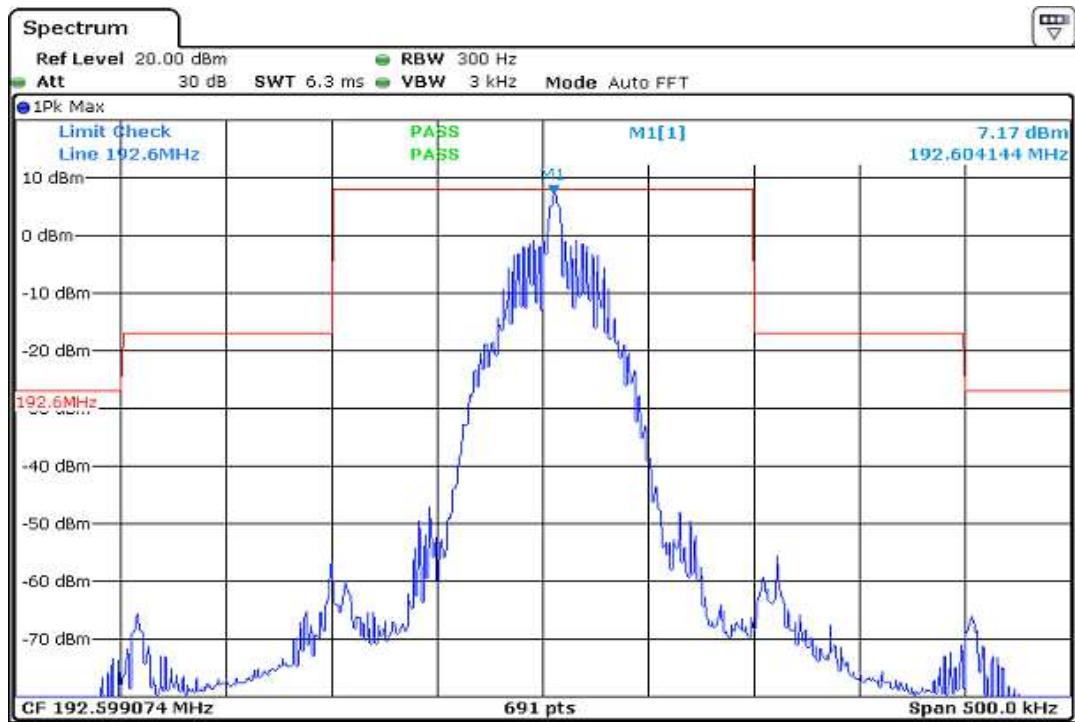


Test procedures refer to ANSI/TIA-603-D-2010, clause 2.2.11.

7.3 Limit

- (1) 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;
- (2) 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;

7.4 Emission Mask Test Plot



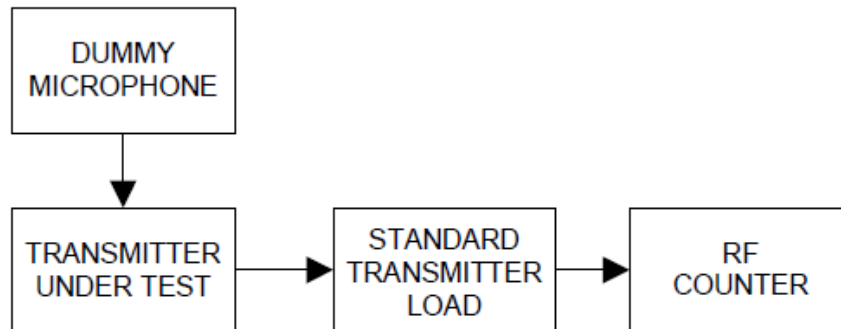
Test Result: Pass

8. Frequency Tolerance Measurement

8.1 Operating environment

Temperature: -30°C to 50°C
Relative Humidity: 58%
Atmospheric Pressure: 1023hPa

8.2 Test setup & procedure



Test procedures refer to ANSI/TIA-603-D-2010, clause 2.2.2.

8.3 Limit

Limit:	0.005%
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8.4 Frequency tolerance Test Data

Test Condition	Power Supply	Frequency (MHz)
-30°C	DC 3.0V	192.60523
-20°C	DC 3.0V	192.60536
-10°C	DC 3.0V	192.60531
0°C	DC 3.0V	192.60514
10°C	DC 3.0V	192.60524
20°C	DC 3.0V	192.60530
30°C	DC 3.0V	192.60522
40°C	DC 3.0V	192.60534
50°C	DC 3.0V	192.60532
Max. Frequency Error:		0.00536
Max. Frequency Tolerance:		0.0028%

Test Condition (°C)	Power Supply	Frequency (MHz)
20	DC 3.3V	192.60535
20	DC 3.0V	192.60528
20	DC 2.7V	192.60531
Max. Frequency Error:		0.00535
Max. Frequency Tolerance:		0.0028%

Test Result: Pass

Appendix A: Test equipment list

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ182-02	RF Power Meter	Anritsu	ML2496A	1302005	23-May-2016	23-May-2017
SZ182-02-01	Pulse Power Sensor	Anritsu	MA2411B	1207429	23-May-2016	23-May-2017
SZ061-12	BiConiLog Antenna	ETS	3142E	00166158	9-Sep-2016	9-Sep-2017
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	29-Apr-2016	29-Apr-2017
SZ061-09	Horn Antenna	ETS	3115	00092346	31-Oct-2015	31-Oct-2016
SZ061-07	Pyramidal Horn Antenna	ETS	3160-09	00083067	29-Mar-2016	29-Mar-2017
SZ185-01	EMI Receiver	R&S	ESCI	100547	23-Jan-2016	23-Jan-2017
SZ056-06	EXA Spectrum Analyzer	R&S	FSV40	101101	2-Jul-2016	2-Jul-2017
SZ181-04	Preamplifier	Agilent	8449B	3008A02474	23-Jan-2016	23-Jan-2017
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	16-Apr-2016	16-Apr-2018
SZ062-02	RF Cable	RADIAL	RG 213U	--	30-Jun-2016	30-Dec-2016
SZ062-05	RF Cable	RADIAL	0.04-26.5GHz	--	6-Apr-2016	6-Oct-2016
SZ062-12	RF Cable	RADIAL	0.04-26.5GHz	--	6-Apr-2016	6-Oct-2016
SZ067-21	Notch Filter	Micro-Tronics	High-pass filter	--	23-Jan-2016	23-Jan-2017
SZ067-04	Notch Filter	Micro-Tronics	BRM50702-02	--	6-Apr-2016	6-Oct-2016
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	23-May-2016	23-May-2017
SZ016-12	Programmable Temperature & Humidity Chamber	Taili	MHK-120NK	AB0105	23-Jan-2016	23-Jan-2017
SZ006-11	AC Power Source	Apcpowers	AFC-11005G	F311040110	23-Mar-2016	23-Sep-2016
SZ089-03	Audio Analyzer	Audio Precision	ATS-1A	45051	23 Jan 2016	23 Jan 2017

Expanded uncertainty of radiated emission measurement is ± 4.9 dB.

Expanded uncertainty of conducted emission measurement is ± 3.6 dB.