



TEST REPORT

Report No.: **HST201703-0946-FCC**

Sample Description.....: **Wireless Microphone**

Model.....: **TX4000**

Assessment Category...: **Entrusted**

Applicant.....: **CAD Audio, LLC**

Guangdong Huesent Testing & Inspection Technology Co., Ltd.



TEST REPORT

Sample Description	Wireless Microphone	Trademark	CAD
Model	TX4000	Specification	3VDC
Assessment Category	Entrusted	Sample Quantity	1
Applicant:	CAD Audio, LLC	Sample Status	Normal
Sample Received Date	Mar. 10, 2017	Test Date	Mar. 10 to Mar. 30, 2017
Issue Date	Mar. 31, 2017		
Manufacturer	CAD Audio, LLC		
Address	6573 Cochran Rd., Bldg I Solon Ohio United States 44139		
Factory	CAD Audio, LLC		
Address	6573 Cochran Rd., Bldg I Solon Ohio United States 44139		
Test address	F/1-2, South Block, A2 building, No.3 Ke Yan Lu Guangzhou Science City, Guangzhou, China		
Test Items	Listed on page 7 2.4		
Test standard	FCC Part 15.249: 2016		
Test Conclusion	The results conform to the requirements of standards with respect to the test items.		
Remarks	FCC ID: OQ5TX4000		
Tested by : Lemon Fu	Sign: <i>Lemon Fu</i>		
Reviewed by: Sandy Yu	Sign: <i>Sandy Yu</i>		
Approved by: Robin Peng	Sign: <i>Robin Peng</i>		

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1 Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (9kHz to 25GHz)	FCC PART 15.249	ANSI C63.10:2013	In FCC PART 15.249	PASS
Occupied Bandwidth	FCC PART 15.215	ANSI C63.10:2013	In FCC PART 15.215	PASS
Conducted Emissions at Mains Terminals	FCC PART 15.207	ANSI C63.10: 2013: Clause 6.2	In FCC PART 15.207	N/A
Frequency Stability	FCC PART 15.249	FCC CFR 47 Part 2.1055	In FCC PART 15.249.b)2)	N/A1

Note:

N/A1: Not applicable, since the frequency stability test was only for the “fixed, point-to-point operation is permitted in the 24.05-24.25 GHz band” equipments.

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Channel	Frequency/ MHz
Lowest	903.55
Middle	915.35
Highest	927.65

The tests were carried out on the 1 sample with the typical frequency of lowest/ middle/ highest channels listed above.

Channel list:

903.55 - 927.65 MHz Band T

CH	Group 1	Group 2	Group 3	Group 4
1	/	903.550	904.050	905.150
2	906.550	904.800	907.550	908.950
3	908.300	906.250	910.300	912.000
4	910.500	909.800	912.900	913.400
5	913.900	914.400	915.850	916.350
6	919.050	915.350	918.000	918.500
7	922.700	923.200	920.050	924.200
8	925.050	926.650	923.700	927.650

2 General Information

2.1 Details of E.U.T.

Power Supply: 3.0VDC 2*AA batteries
Main Function: Wireless microphone system with an associated receiver for transmitting voice.
Oscillating Frequency: Active crystal: 25MHz@U3, 26MHz@U4.
Port: N/A
Frequency Range: 903.55 MHz to 927.65 MHz for all the models listed in the cover.
Modulation: FM; Emission designator: 1M06F3E
Occupied bandwidth (99 % BW): 1056kHz
Antenna Number & Type: One & Fixed on PCB; Gained: 2.15 dBi; Impedance: 50-Ohm;
Antenna length: strip: 31.0mm, ring diameter: 11.9 mm.
Antenna min distance to the shell: 3.6 mm

2.2 Description of Support Units

/

2.3 Standards Applicable for Testing

The standard used was 47 CFR Part 15.249: 2016

The EUT belongs to low power communication device transmitter, and it's an unlicensed low power auxiliary device.

2.4 Test Location

I-Test Laboratory

F/1-2, South Block, A2 building, No.3 Ke Yan Lu Guangzhou Science City, Guangzhou, China

Tel: 00862032209330

Email: lbz@i-testlab.com

CNAS(Lab code:L4957) FCC (Registration No.:935596) IC (Registration NO.:8368A)

2.5 Deviation from Standards

None.

2.6 Abnormalities from Standard Conditions

None.

Annex 1:

Measurement Uncertainty

Parameter	Uncertainty
Conducted Emission (9KHz-150KHz)	$\pm 2.88\text{dB}$
Conducted Emission (150KHz-30MHz)	$\pm 2.67\text{dB}$
RF power,conducted	$\pm 0.70\text{dB}$
Spurious emissions,conducted	$\pm 1.19\text{dB}$
All emissions, radiated (<30M) (9KHz-30MHz)	$\pm 2.45\text{dB}$
All emissions, radiated(<1G) 30MHz-200MHz	$\pm 2.83\text{dB}$
All emissions, radiated(<1G) 200MHz-1000MHz	$\pm 2.94\text{dB}$
All emissions, radiated(>1G)	$\pm 3.03\text{dB}$
Temperature	$\pm 0.5^\circ\text{C}$
Humidity	$\pm 2\%$

3 Test Results

3.1 Radiation Interference

Test Requirement: FCC Part15.249, a) & FCC Part15.209
 Test Method: ANSI C63.10:2013
 Detector: Peak for pre-scan (The resolution bandwidth was 100 kHz and the video bandwidth was 300 kHz up to 1.0GHz and 1.0 MHz with a video BW of 3.0 MHz above 1.0GHz.)
 Average detector if maximised peak within 6dB of limit

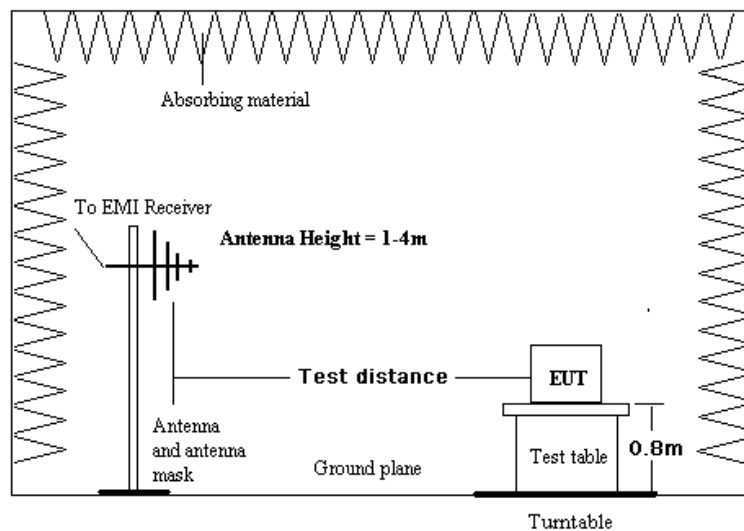
3.1.1 E.U.T. Operation

Operating Environment:
 Temperature: 20°C Humidity:50% RH Atmospheric Pressure: 103 kPa
 EUT Operation:

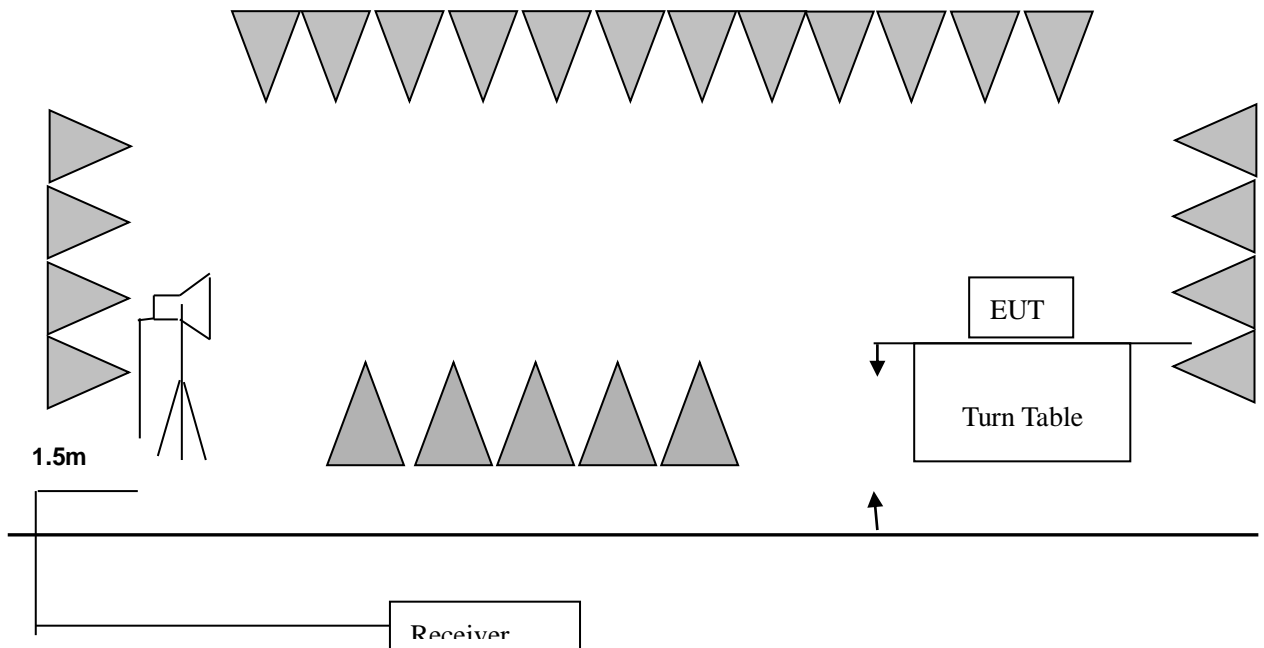
In the fundamental test, connecting the EUT to peripheral devices.
 Test the EUT work normally in on mode during the whole test.

3.1.2 Test Setup

30MHz-1GHz emissions:



1 GHz to 40 GHz emissions:



3.1.3 Test Procedure

ANSI STANDARD C63.10-2013 6.5 Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz

An initial pre-scan was performed in the 3m chamber using the spectrum analyser in peak detection mode. Average measurements were conducted based on the peak sweep graph. When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical polarities. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes and choose the worst case of X/ Y/ Z orthogonal planes for the final measurement.

3.1.4 Measurement Data

Copy from FCC Part 15.249.a)

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental	Field Strength	
Frequency	Fundamental	Harmonics
MHz	millivolts/meter(mV/m)	microvolts/meter(uV/m)
902 - 928	50	500
2400 - 2483.5	50	500
5725 - 5875	50	500
24000 - 24250	250	2500

Quasi-Peak measurement of carrier						
Frequency	Level		Transducer	Limit	Margin	
MHz	dBuV/m		dB	dBuV/m	dB	
	V	H			V	H
903.55 (L)	89.9	79.3	27.7	94	-4.1	-14.7
915.35 (M)	88.8	89.5	27.8	94	-5.2	-4.5
927.65 (H)	81.7	90.4	27.8	94	-12.3	-3.6

Note:

50mV/m (94dBuV/m) for QP limit in band (902MHz to 928MHz).
The transducer factor = antenna factor + cable loss - preamplifier. In band 902MHz to 928MHz, preamplifier factor = 0 dB.
The Level = Read level + transducer factor.

H: Antenna polarization horizontal direction. V: Antenna polarization vertical direction.

The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes and choose the worst case of X orthogonal plane for the final measurement.

Peak measurement of harmonics and spurious emission at lowest channel 903.55 MHz

Frequency		Level		Transducer	Limit	Min. Margin	
MHz		dBuV/m		dB	dBuV/m	dB	
		V	H			V	H
2 nd	1807.1	61.5	56.2	-2.6	74	-12.5	-17.8
3 rd	2710.7	<50	<50	-2.1		< -24	< -24
4 th	3614.2	<50	<50	0.3		< -24	< -24
5 th	4517.8	<50	<50	4.1		< -24	< -24
6 th	5421.3	<50	<50	1.0		< -24	< -24
7 th	6324.9	<50	<50	5.1		< -24	< -24
8 th	7228.4	<50	<50	5.0		< -24	< -24
9 th	8132.0	<50	<50	6.0		< -24	< -24
10 th	9035.5	<50	<50	7.3		< -24	< -24

Average measurement of harmonics and spurious emission at lowest channel 903.55 MHz

Frequency		Level		Transducer	Limit	Min. Margin	
MHz		dBuV/m		dB	dBuV/m	dB	
		V	H			V	H
2 nd	1807.1	51.0	47.0	-2.6	54	-3.0	-7.0
3 rd	2710.7	<40	<40	-2.1		< -14	< -14
4 th	3614.2	<40	<40	0.3		< -14	< -14
5 th	4517.8	<40	<40	4.1		< -14	< -14
6 th	5421.3	<40	<40	1.0		< -14	< -14
7 th	6324.9	<40	<40	5.1		< -14	< -14
8 th	7228.4	<40	<40	5.0		< -14	< -14
9 th	8132.0	<40	<40	6.0		< -14	< -14
10 th	9035.5	<40	<40	7.3		< -14	< -14

Peak measurement of harmonics and spurious emission at middle channel 915.35 MHz

Frequency		Level		Transducer	Limit	Min. Margin	
MHz		dBuV/m		dB	dBuV/m	dB	
		V	H			V	H
2 nd	1830.70	60.2	55.2	-2.6	74	-13.8	-18.8
3 rd	2746.05	<50	<50	-2.1		< -24	< -24
4 th	3661.40	<50	<50	0.3		< -24	< -24
5 th	4576.75	<50	<50	4.1		< -24	< -24
6 th	5492.10	<50	<50	1.0		< -24	< -24
7 th	6407.45	<50	<50	5.1		< -24	< -24
8 th	7322.80	<50	<50	5.0		< -24	< -24
9 th	8238.15	<50	<50	6.0		< -24	< -24
10 th	9153.50	<50	<50	7.3		< -24	< -24

Average measurement of harmonics and spurious emission at middle channel 915.35 MHz

Frequency		Level		Transducer	Limit	Min. Margin	
MHz		dBuV/m		dB	dBuV/m	dB	
		V	H			V	H
2 nd	1830.70	50.4	47.2	-2.6	54	-3.6	-6.8
3 rd	2746.05	<50	<50	-2.1		< -14	< -14
4 th	3661.40	<50	<50	0.3		< -14	< -14
5 th	4576.75	<40	<40	4.1		< -14	< -14
6 th	5492.10	<40	<40	1.0		< -14	< -14
7 th	6407.45	<40	<40	5.1		< -14	< -14
8 th	7322.80	<40	<40	5.0		< -14	< -14
9 th	8238.15	<40	<40	6.0		< -14	< -14
10 th	9153.50	<40	<40	7.3		< -14	< -14

Peak measurement of harmonics and spurious emission at highest channel 927.65MHz

Frequency		Level		Transducer	Limit	Min. Margin	
MHz		dBuV/m		dB	dBuV/m	dB	
		V	H			V	H
2 nd	1855.30	61.1	56.7	-2.6	74	-12.9	-17.3
3 rd	2782.95	<50	<50	-2.1		< -24	< -24
4 th	3710.60	<50	<50	0.3		< -24	< -24
5 th	4638.25	<50	<50	4.1		< -24	< -24
6 th	5565.90	<50	<50	1.0		< -24	< -24
7 th	6493.55	<50	<50	5.1		< -24	< -24
8 th	7421.20	<50	<50	5.0		< -24	< -24
9 th	8348.85	<50	<50	6.0		< -24	< -24
10 th	9276.50	<50	<50	7.3		< -24	< -24

Average measurement of harmonics and spurious emission at highest channel 927.65MHz

Frequency		Level		Transducer	Limit	Min. Margin	
MHz		dBuV/m		dB	dBuV/m	dB	
		V	H			V	H
2 nd	1855.30	50.2	46.5	-2.6	54	-3.8	-7.5
3 rd	2782.95	<40	<40	-2.1		< -14	< -14
4 th	3710.60	<40	<40	0.3		< -14	< -14
5 th	4638.25	<40	<40	4.1		< -14	< -14
6 th	5565.90	<40	<40	1.0		< -14	< -14
7 th	6493.55	<40	<40	5.1		< -14	< -14
8 th	7421.20	<40	<40	5.0		< -14	< -14
9 th	8348.85	<40	<40	6.0		< -14	< -14
10 th	9276.50	<40	<40	7.3		< -14	< -14

Note:

500 μ V/m (54dBuV/m) for AVG limit, and Peak limit= AVG limit + 20dB.

The transducer factor = antenna factor + cable loss - preamplifier. In band 1GHz to 18GHz, preamplifier factor = -30dB.

The Level = Read level + transducer factor.

H: Antenna polarization horizontal direction. V: Antenna polarization vertical direction.

The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes and choose the worst case of X orthogonal plane for the final measurement.

Note:

The EUT's transmitting frequency range belonged to 902MHz to 928 MHz, and it is complied with the requirements of FCC Part 15.249.a).

The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes and choose the worst case of X orthogonal plane for the final measurement.

3.1.5 Radiated outside of the specified frequency bands

Copy from FCC Part 15.249.d)

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Copy from FCC Part 15.209: Radiated emission limits, general requirements

(a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency MHz	Field Strength microvolts/meter(uV/m)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

(d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Note:

Since the fundamental emissions peak and average values are shown on section 6.1.4 of this report, the general radiated emission limits in Section 15.209 is the lesser attenuation.

Limits for the frequency bands of 902 M - 928 MHz

Frequency	FCC Part 15.209 Radiated limits	
MHz	dBuV/m@3m	
	QP	AVG
30 - 88	40	/
88 - 216	43.5	/
216 - 960	46	/
960 - 1000	54	/
Above 1000	74(PK)	54

Frequency	15.249.d) limits	
MHz	dBuV/m@3m	
	QP	AVG
30 - 88	44	/
88 - 216	44	/
216 - 902	46	/
928-960	46	/
960 - 1000	54	/
1000-9280	74(PK)	54

Remark:

1. RF line voltage (dBuV)= 20 log RF line voltage (uV)
2. In the above table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.1.6 Measurement Data for 15.249.d

Test the EUT work normally in transmitting mode in mains.

1) 9kHz~30MHz Test result

The Low frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not report.

2) 30 MHz~1 GHz Spurious Emissions. Quasi-Peak Measurement

Test curves (with the Quasi-peak measurement and QP limit), 30M-1GHz, Horizontal & Vertical:

lowest channel 903.55MHz

Quasi-peak measurement: Horizontal

Frequency	Level	Transducer	Limit	Margin
MHz	dBuV/m	dB	dBuV/m	dB
30.0	19.6	18.3	40	-20.4
475.2	23.7	20.6	46	-22.3
675.1	28.1	24.1	46	-17.9
700.3	29.4	24.0	46	-16.6
750.7	29.6	25.2	46	-16.4
860.1*	29.4	25.6	46	-16.6
902.0*	29.0	25.7	46	-17.0
936.2*	29.8	26.2	46	-16.2

Quasi-peak measurement: Vertical

Frequency	Level	Transducer	Limit	Margin
MHz	dBuV/m	dB	dBuV/m	dB
30.0	20.2	18.3	40	-19.8
42.6	15.9	12.2	40	-24.1
675.1	31.1	24.1	46	-14.9
700.3	32.0	24.0	46	-14.0
750.7	31.2	25.2	46	-14.8
900.4*	30.5	25.9	46	-15.5
902.0*	30.0	25.9	46	-16.0
935.2*	30.5	26.2	46	-15.5

Note:

The transducer factor includes antenna factor and cable loss.

* means the frequency with max Quasi peak value for band-edge (frequency range of 802 MHz to 902MHz and 928 MHz to 1000 MHz, except for harmonics).

middle channel 915.35MHz

Quasi-peak measurement: Horizontal

Frequency	Level	Transducer	Limit	Margin
MHz	dBuV/m	dB	dBuV/m	dB
31.0	21.5	18.1	40	-18.5
42.6	19.7	12.2	40	-20.3
524.7	24.7	22.0	46	-21.3
675.1	30.5	24.1	46	-15.5
700.3	32.1	24.0	46	-13.9
854.1*	29.1	25.6	46	-16.9
935.3*	29.7	26.2	46	-16.3

Quasi-peak measurement: Vertical

Frequency	Level	Transducer	Limit	Margin
MHz	dBuV/m	dB	dBuV/m	dB
30.0	21.4	18.3	40	-18.6
524.7	20.9	22.0	46	-25.1
649.8	25.5	24.2	46	-20.5
675.1	30.9	24.1	46	-15.1
700.3	31.5	24.0	46	-14.5
880.4*	30.3	25.9	46	-15.7
937.2*	34.5	26.2	46	-11.5

Note:

The transducer factor includes antenna factor and cable loss.

* means the frequency with max Quasi peak value for band-edge (frequency range of 802 MHz to 902MHz and 928 MHz to 1000 MHz, except for harmonics).

highest channel 927.65MHz

Quasi-peak measurement: Horizontal

Frequency	Level	Transducer	Limit	Margin
MHz	dBuV/m	dB	dBuV/m	dB
30.0	20.7	18.3	40	-19.3
274.4	18.1	14.6	46	-27.9
625.6	29.2	23.2	46	-16.8
649.8	30.5	24.2	46	-15.5
675.1	34.3	24.1	46	-11.7
873.1*	29.0	25.7	46	-17.0
928.0*	29.0	26.2	46	-17.0
936.3*	29.3	26.2	46	-16.7

Quasi-peak measurement: Vertical

Frequency	Level	Transducer	Limit	Margin
MHz	dBuV/m	dB	dBuV/m	dB
30.0	22.9	18.3	40	-17.1
42.6	16.4	12.2	40	-23.6
675.1	30.8	24.1	46	-15.2
700.3	31.8	24.0	46	-14.2
750.7	31.1	25.3	46	-14.9
900.2*	30.2	25.9	46	-15.8
928.0*	30.1	26.2	46	-15.9
947.2*	30.8	26.2	46	-15.2

Note:

The transducer factor includes antenna factor and cable loss.

* means the frequency with max Quasi peak value for band-edge (frequency range of 802 MHz to 902MHz and 928 MHz to 1000 MHz, except for harmonics).

3) 1 GHz~9.30 GHz Spurious Emissions .Average & PK Measurement

Horizontal & Vertical:

Average measurement at lowest channel: 903.55 MHz

Frequency	Level		Transducer	Limit	Margin	
GHz	dBuV/m		dB	dBuV/m	dB	
	Horizontal	Vertical			Horizontal	Vertical
2.419	40.6	<40	6.6	54	-13.4	< -14
2.441	<40	47.1	6.7		< -14	-6.9
2.606	<40	41.9	7.3		< -14	-12.1
3.673	36.7	<40	11.1		-17.3	< -14
4.377	<40	39.3	13.6		< -14	-14.7
6.016	42.2	40.6	19.5		-11.8	-13.4

Peak measurement at lowest channel: 903.55 MHz

Frequency	Level		Transducer	Limit	Margin	
GHz	dBuV/m		dB	dBuV/m	dB	
	Horizontal	Vertical			Horizontal	Vertical
2.419	48.6	<50	6.6	74	-25.4	< -24
2.441	<50	57.1	6.7		< -24	-16.9
2.606	<50	49.9	7.3		< -24	-32.1
3.673	44.7	<50	11.1		-29.3	< -24
4.377	<50	47.3	13.6		< -24	-26.7
6.016	50.2	50.6	19.5		-23.8	-23.4

Note:

The transducer factor = antenna factor + cable loss - preamplifier. In band 1GHz to 18GHz, preamplifier factor = -30dB.

The Level = Read level + transducer factor.

H: Antenna polarization horizontal direction. V: Antenna polarization vertical direction.

The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes and choose the worst case of X orthogonal plane for the final measurement.

Average measurement at middle channel: 915.35 MHz

Frequency	Level		Transducer	Limit	Margin	
GHz	dBuV/m		dB	dBuV/m	dB	
	Horizontal	Vertical			Horizontal	Vertical
2.430	42.3	<40	6.7	54	-11.7	< -14
2.441	<40	47.0	6.6		< -14	-7.0
2.595	38.0	<40	7.2		-16.0	< -14
2.606	<40	43.5	7.3		< -14	-10.5
5.158	39.4	<40	16.1		-14.6	< -14
6.357	<40	40.6	19.5		< -14	-13.4

Peak measurement at middle channel: 915.35 MHz

Frequency	Level		Transducer	Limit	Margin	
GHz	dBuV/m		dB	dBuV/m	dB	
	Horizontal	Vertical			Horizontal	Vertical
2.430	52.3	<50	6.7	74	-21.7	< -24
2.441	<50	56.8	6.6		< -24	-17.2
2.595	47.0	<50	7.2		-27.0	< -24
2.606	<50	53.7	7.3		< -24	-20.3
5.158	47.4	<50	16.1		-26.6	< -24
6.357	<50	50.7	19.5		< -24	-23.3

Note:

The transducer factor = antenna factor + cable loss - preamplifier. In band 1GHz to 18GHz, preamplifier factor = -30dB.

The Level = Read level + transducer factor.

H: Antenna polarization horizontal direction. V: Antenna polarization vertical direction.

The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes and choose the worst case of X orthogonal plane for the final measurement.

Average measurement at highest channel: 927.65 MHz

Frequency	Level		Transducer	Limit	Margin	
GHz	dBuV/m		dB	dBuV/m	dB	
	Horizontal	Vertical			Horizontal	Vertical
2.408	38.1	40.0	6.6	54	-15.9	-14.0
2.595	<40	43.2	7.2		< -14	-10.8
2.606	39.7	<40	7.2		-14.3	< -14
5.246	38.7	<40	16.3		-15.3	< -14
5.411	<40	43.0	16.4		< -14	-11.0

Peak measurement at highest channel: 927.65 MHz

Frequency	Level		Transducer	Limit	Margin	
GHz	dBuV/m		dB	dBuV/m	dB	
	Horizontal	Vertical			Horizontal	Vertical
2.408	49.1	46.0	6.6	74	-24.9	-28.0
2.595	<50	55.2	7.2		< -24	-18.8
2.606	48.7	<50	7.2		-25.3	< -24
5.246	47.7	<50	16.3		-26.3	< -24
5.411	<50	50.0	16.4		< -24	-24.0

Note:

The transducer factor = antenna factor + cable loss - preamplifier. In band 1GHz to 18GHz, preamplifier factor = -30dB.

The Level = Read level + transducer factor.

H: Antenna polarization horizontal direction. V: Antenna polarization vertical direction.

The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes and choose the worst case of X orthogonal plane for the final measurement.

Note:

The EUT's transmitting frequency range belonged to 902MHz to 928 MHz, and it is complied with the requirements of FCC Part 15.249.d).

3.2 Occupied Bandwidth

Test Requirement: FCC Part15.215
Test Method: ANSI C63.10: 2013
Detector: Peak for scan (The resolution bandwidth was 30kHz and the video bandwidth was 10kHz, span was 2MHz)
maximised peak hold

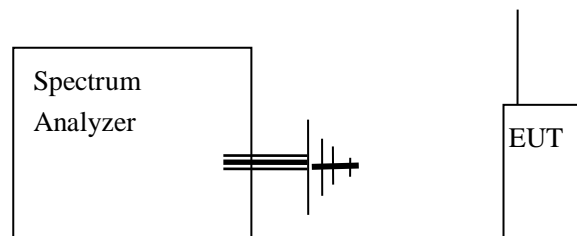
3.2.1 E.U.T. Operation

Operating Environment:
Temperature: 25°C Humidity:45% RH Atmospheric Pressure: 1020mBar

EUT Operation:

Pre-test the EUT with 1k to 20kHz sine wave signal input(level: 0.3 Vp-p). And the max 99%BW was measured as the EUT with 20 kHz sine wave signal input.

3.2.2 Test Setup



3.2.3 Test Procedure

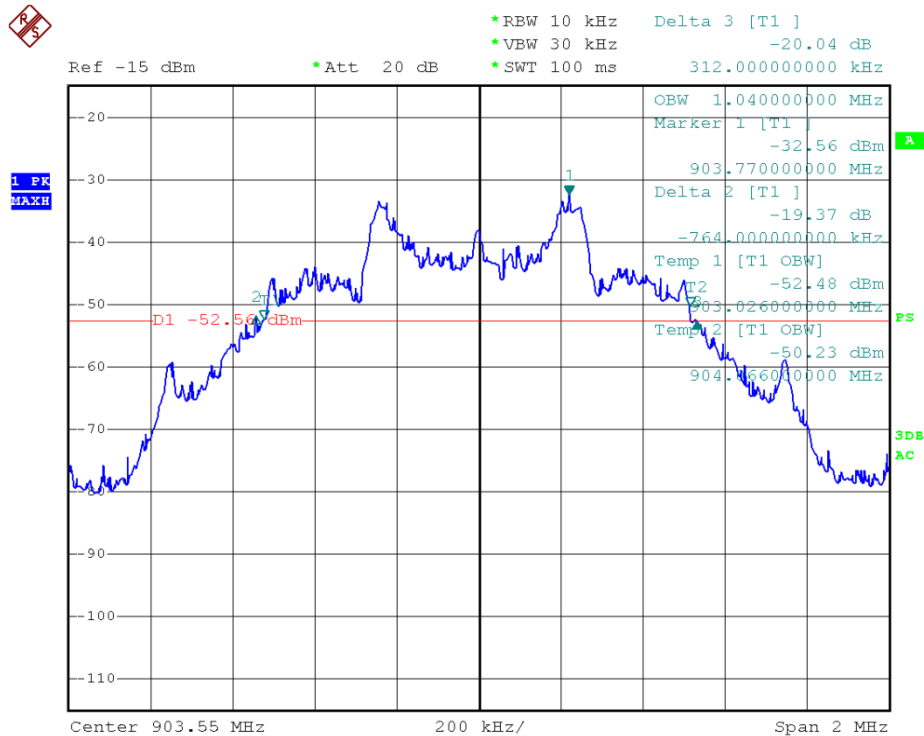
ANSI STANDARD C63.10-2013 6.9 Occupied bandwidth tests:

An initial pre-scan was performed in the 3m chamber using the spectrum analyzer in peak detection mode. Average measurements were conducted based on the peak sweep graph. When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical polarities.

3.2.4 Measurement Data

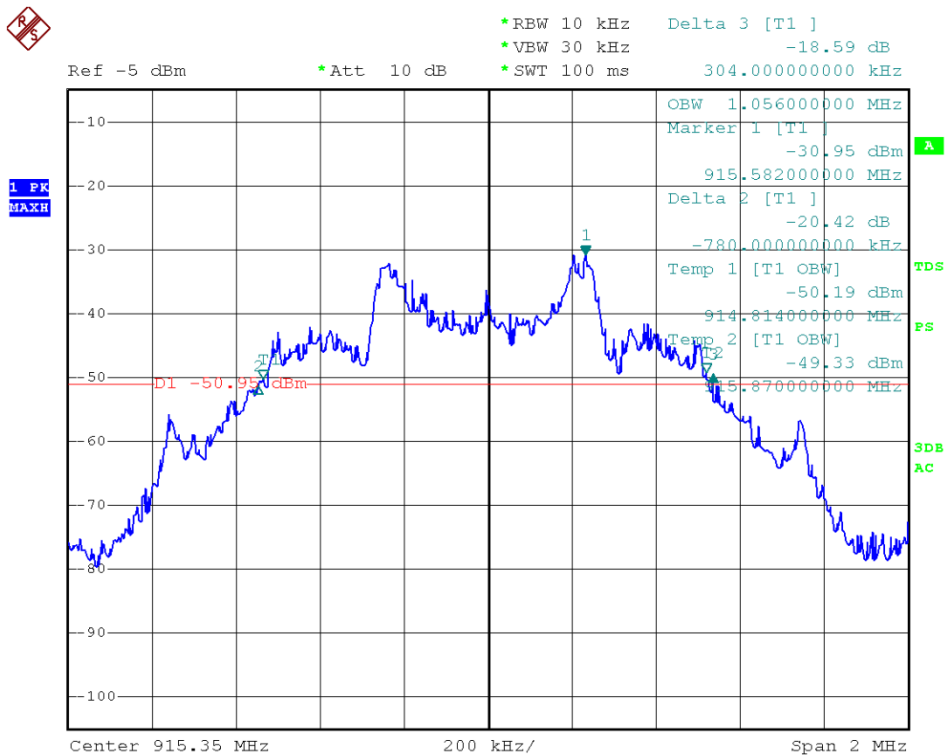
Test for the EUT with switch ON. Input with 20 kHz AF, 50% modulation + 16dB.

Maximum Peak hold measurement for 903.55 MHz



Frequency/ MHz	Δ FL- / kHz	Δ FL+ / kHz	-20dB Bandwidth/ kHz	Occupied Bandwidth (99% of total power)/ kHz
903.55	-764	312	1076	1040

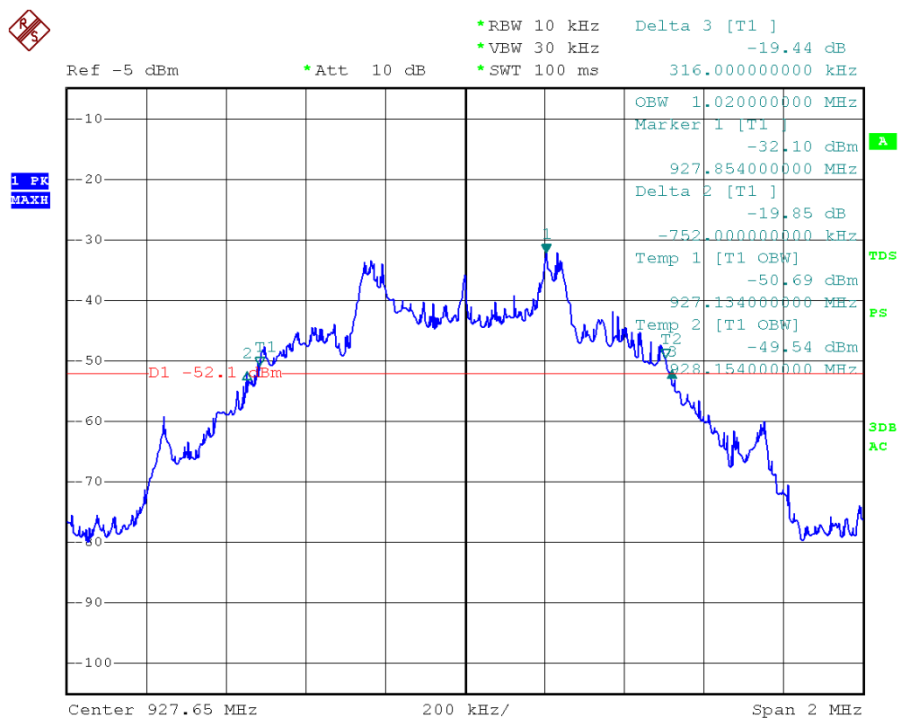
Maximum Peak hold measurement for 915.35 MHz



Date: 30.MAR.2017 05:34:55

Frequency/ MHz	Δ FL- / kHz	Δ FL+ / kHz	-20dB Bandwidth/ kHz	Occupied Bandwidth (99% of total power)/ kHz
915.35	-780	304	1084	1056

Maximum Peak hold measurement for 927.65 MHz



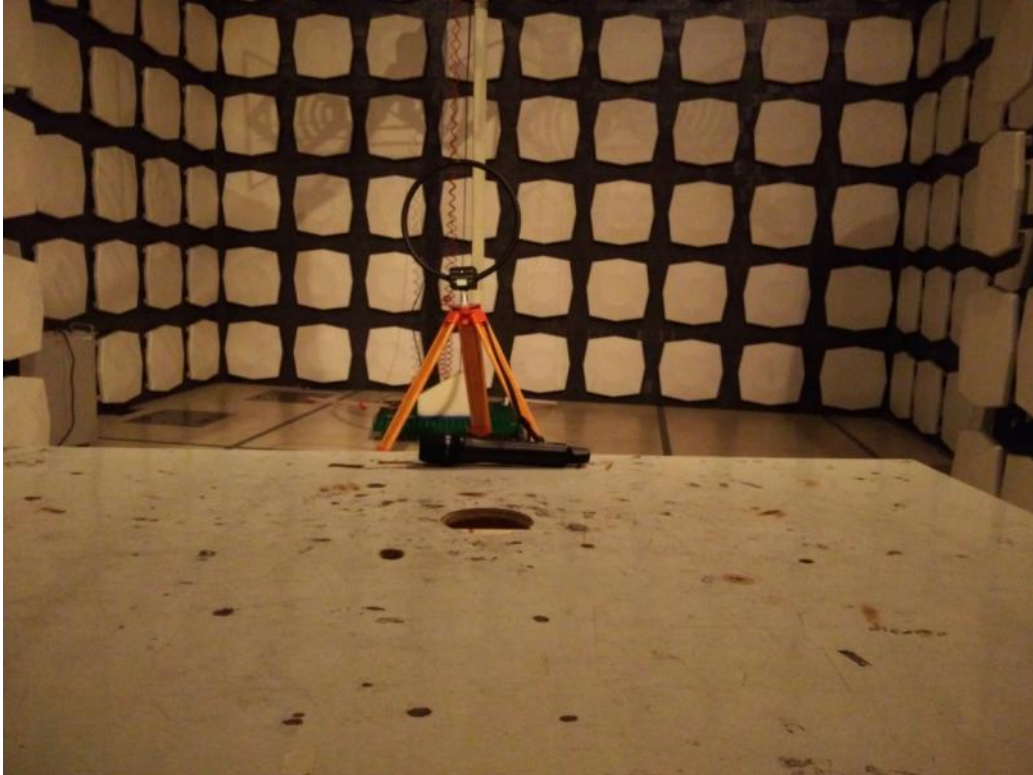
Date: 30.MAR.2017 05:41:41

Frequency/ MHz	Δ FL- / kHz	Δ FL+ / kHz	-20dB Bandwidth/ kHz	Occupied Bandwidth (99% of total power)/ kHz
927.65	-752	316	1068	1020

4 Photographs

4.1 Radiated Emission Test Setup

9kHz - 30MHz



30MHz – 1GHz



1GHz – 9.3GHz



4.2 EUT Constructional Details











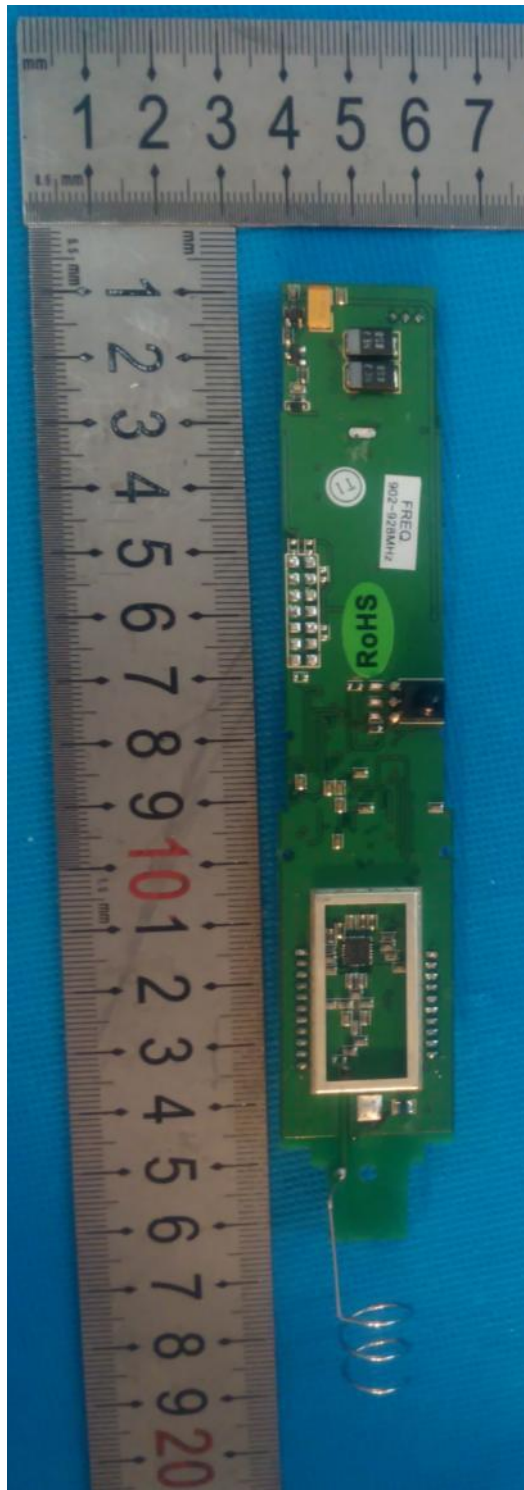
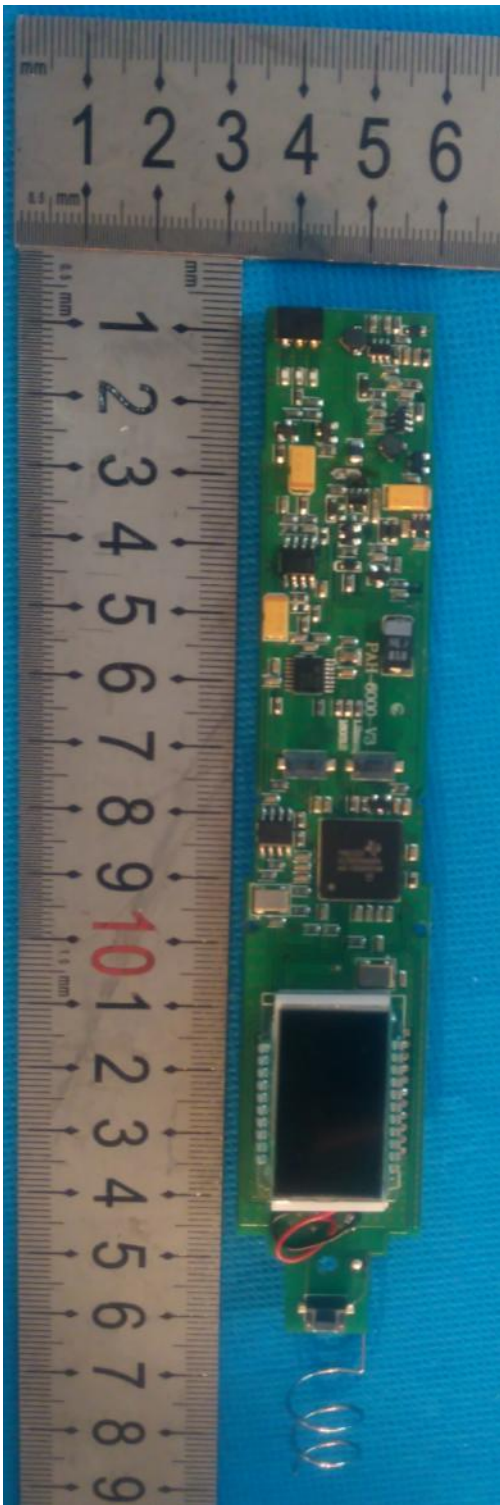


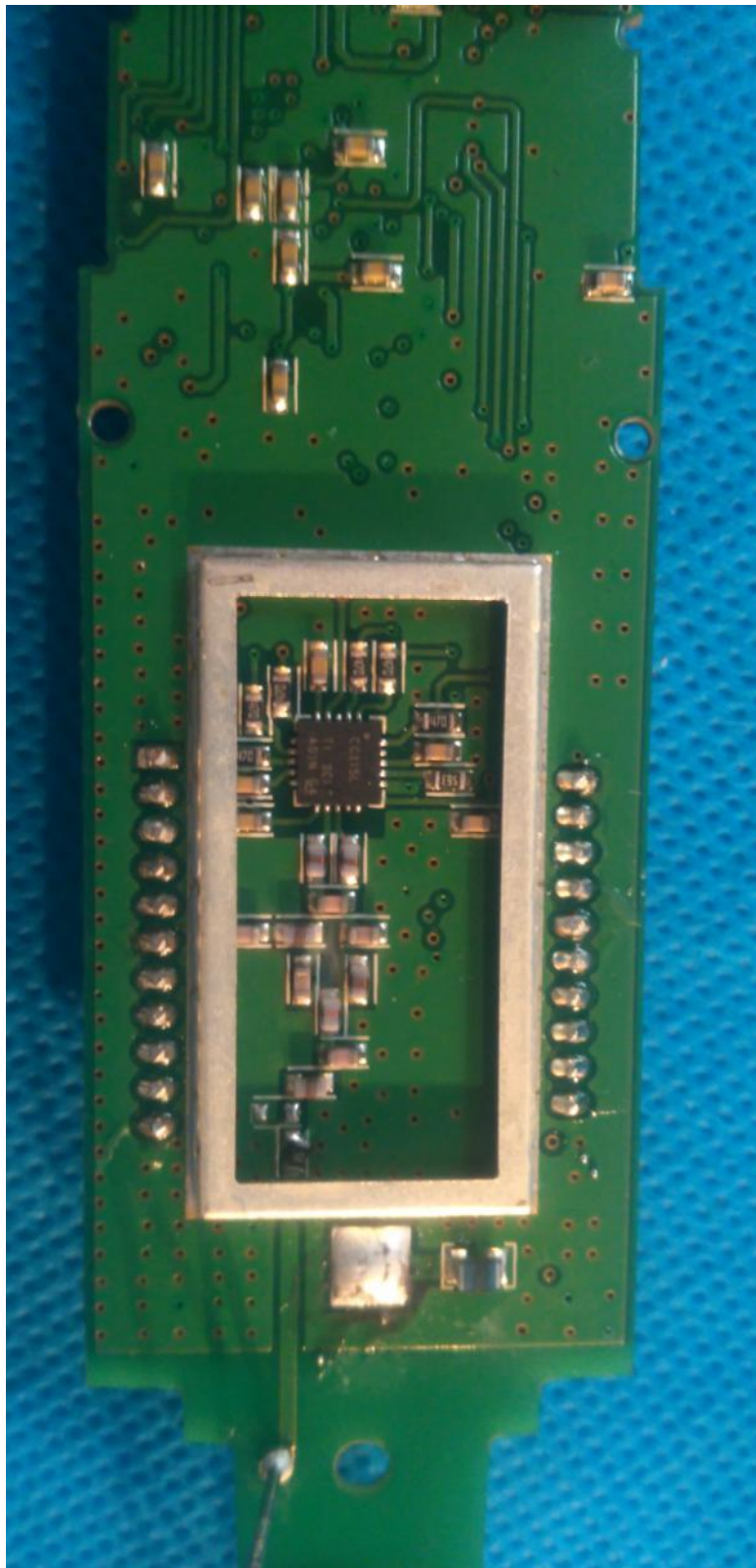


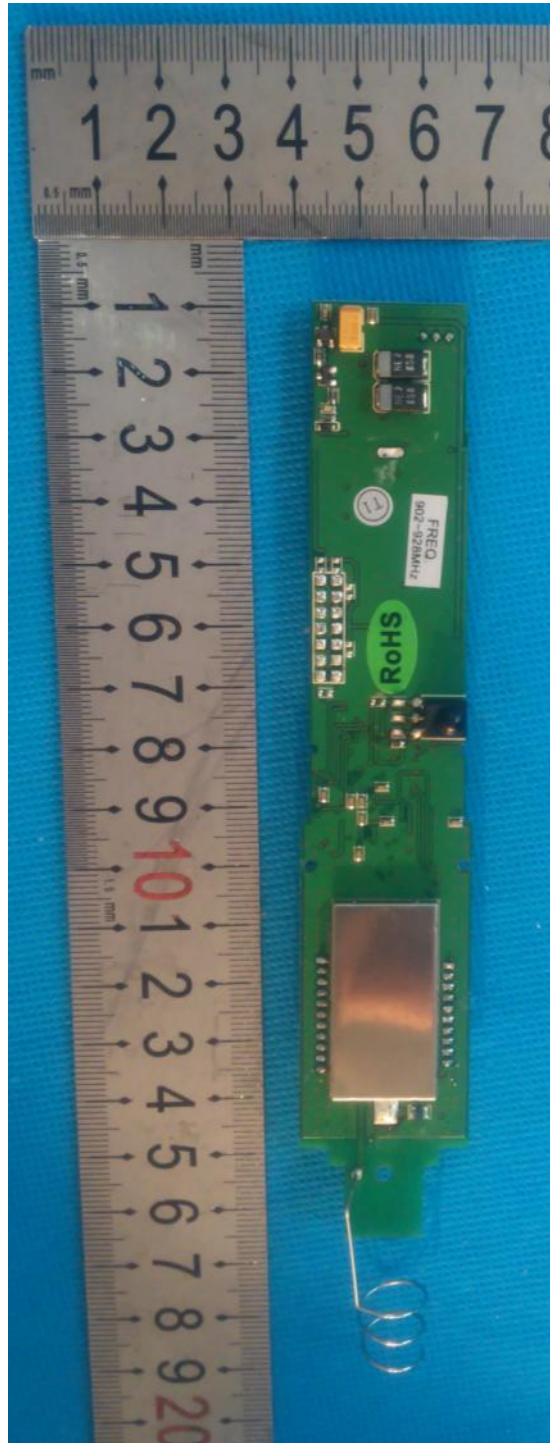


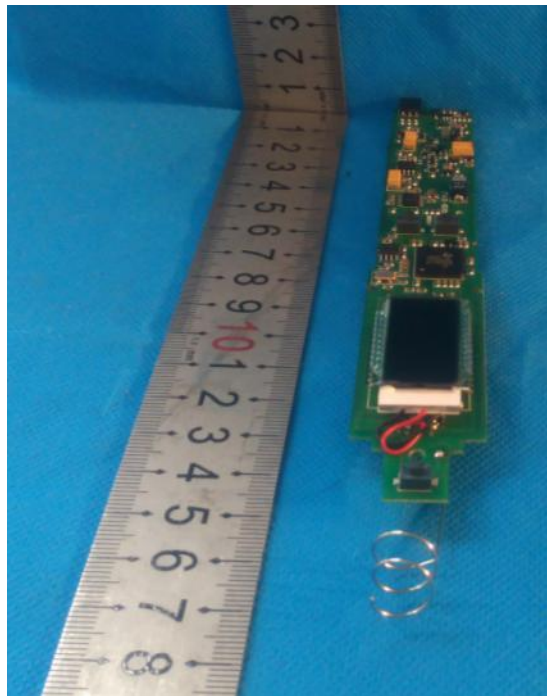
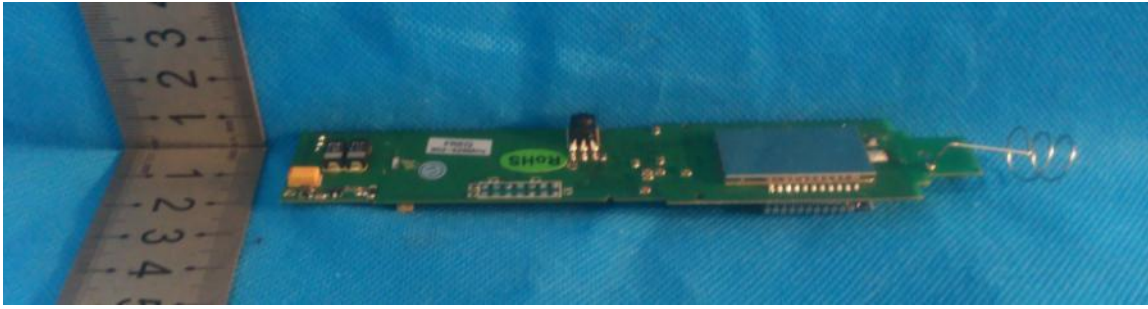


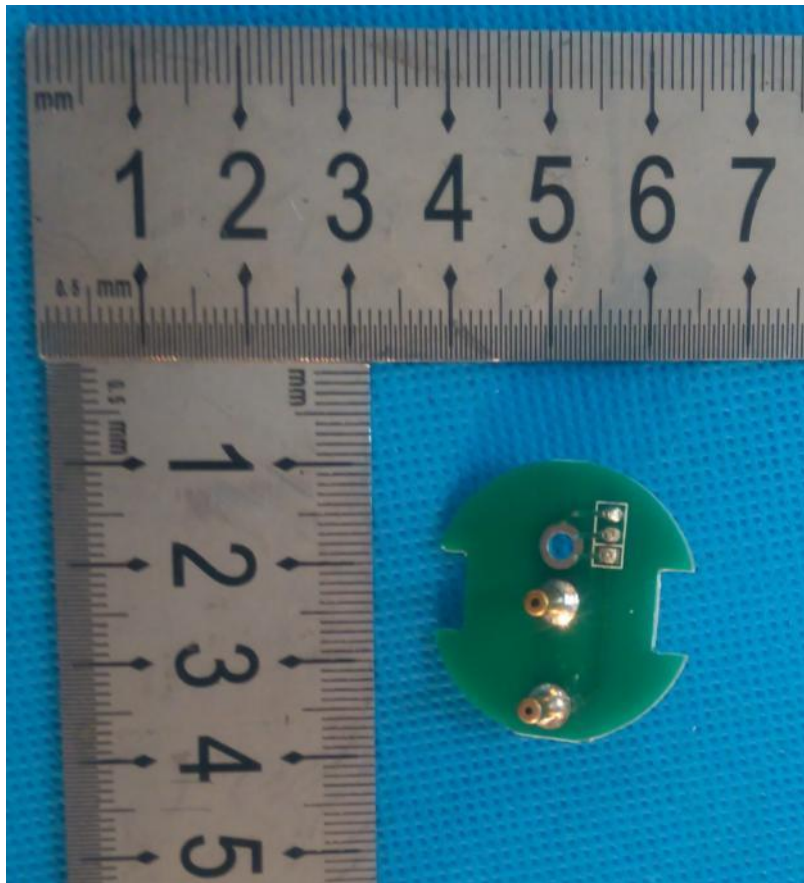
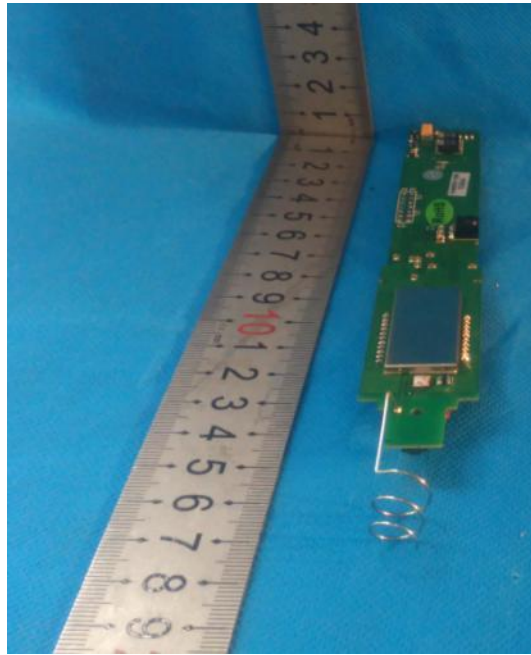


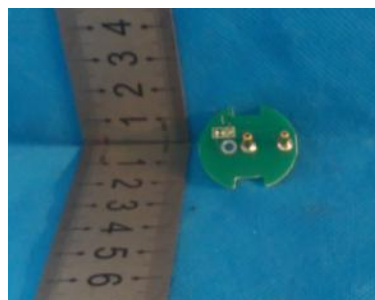
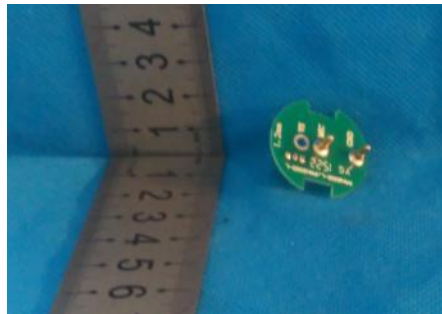


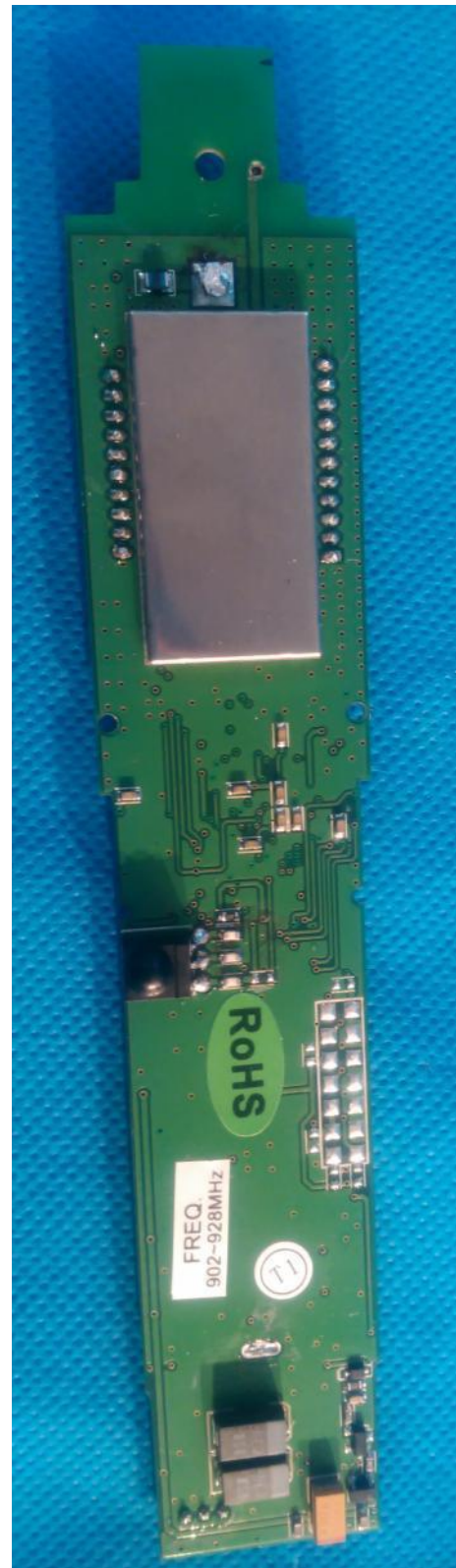
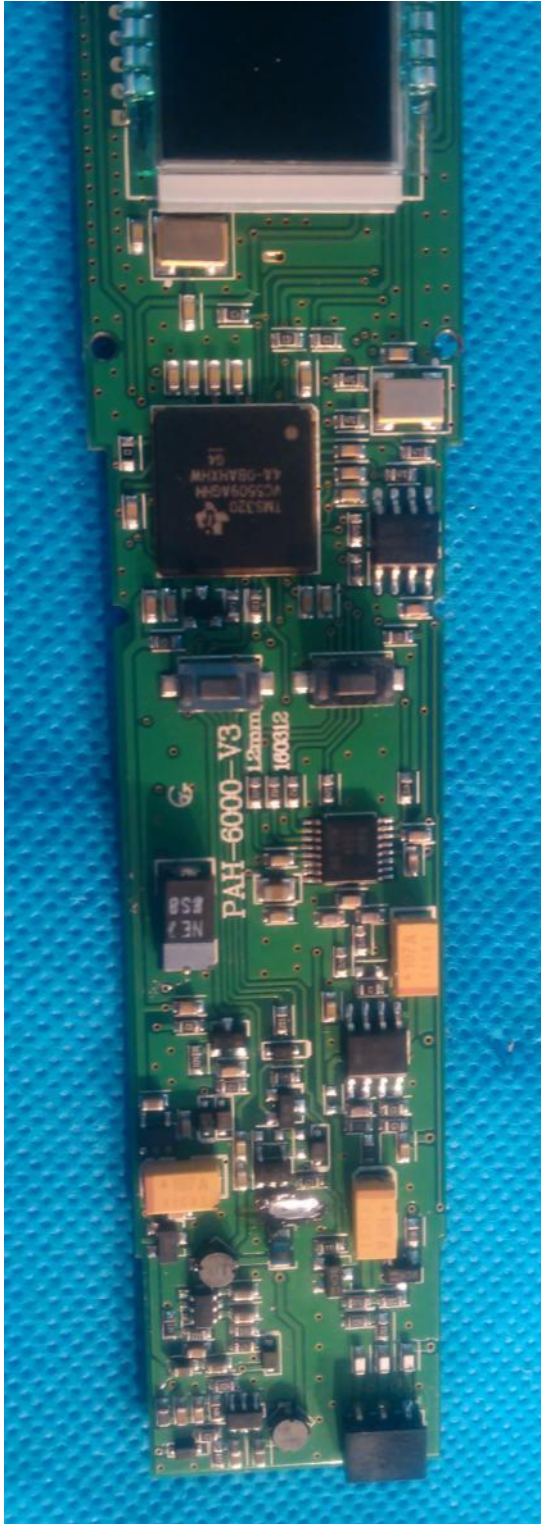




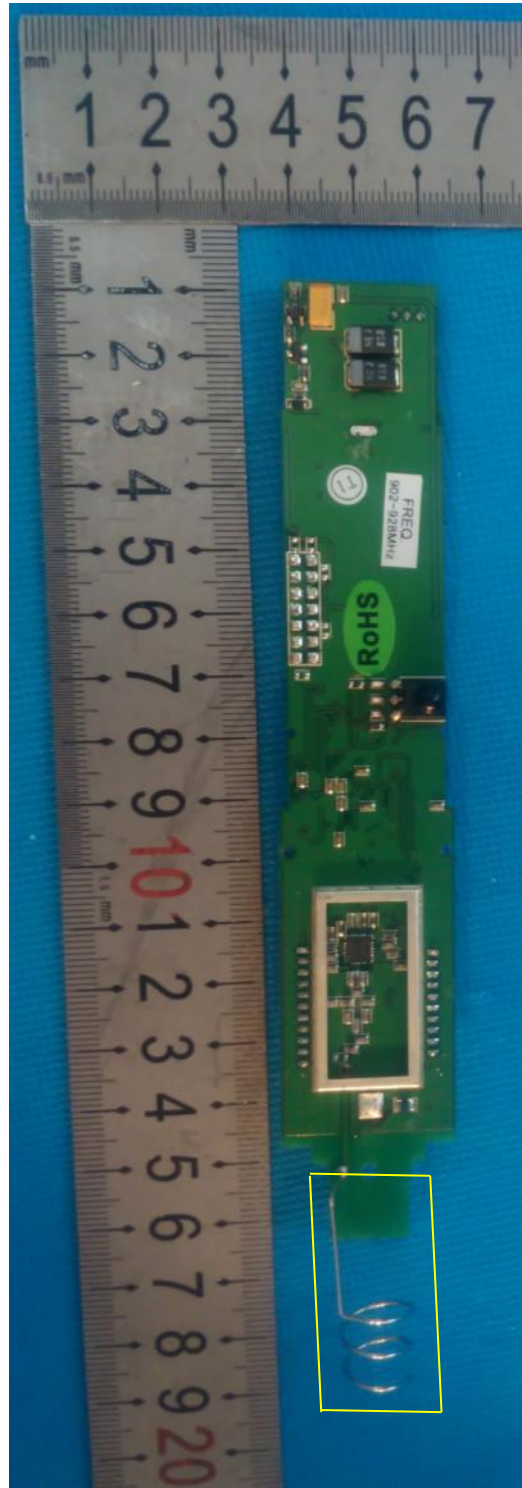






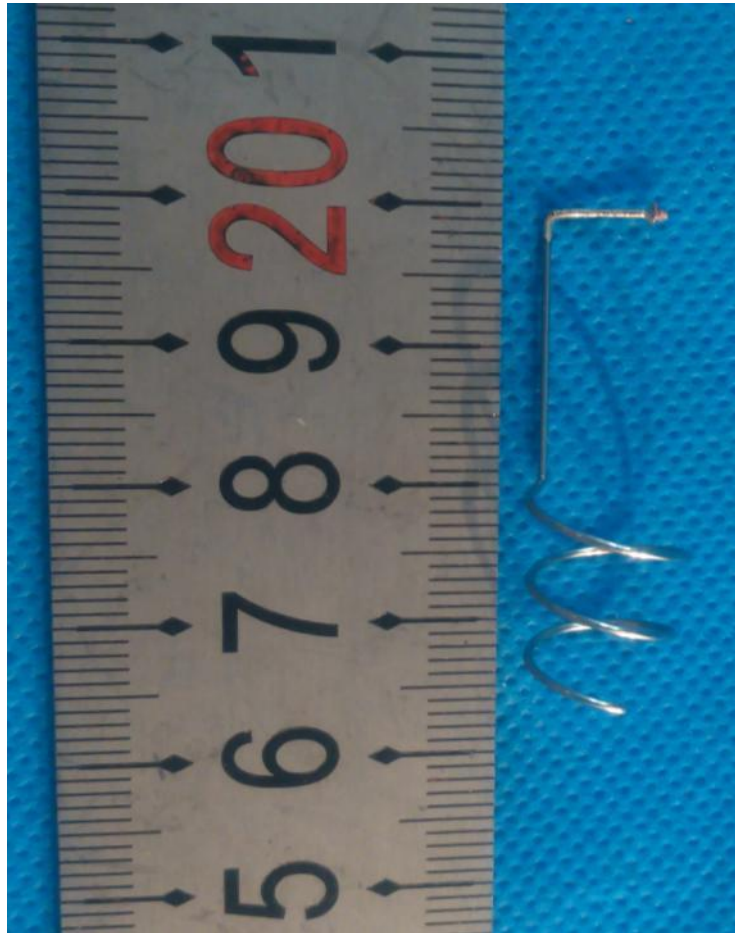


4.3 Antenna Photo



Antenna Number & Type: One & Fixed on PCB; Gained: 2.15 dBi; Impedance: 50-Ohm;
Antenna length: strip: 31.0mm, ring diameter: 11.9 mm.

Antenna min distance to the shell: 3.6 mm



Note:

The EUT was used permanently attached antenna, and it's complied with the requirements of section 15.203: antenna requirement.

5 Equipments Used during Test

Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date	Cal. Due date
1	RF Generator	Rohde & Schwarz	SMB100A-B106	1.031	2016-5-10	2017-5-10
2	Spectrum Analyzer	Rohde & Schwarz	FSP30	EMC0001	2016-3-24	2017-3-24
					2017-3-24	2018-3-24
3	EMI Test Receiver	Rohde & Schwarz	ESCI	EMC1002	2016-3-24	2017-3-24
					2017-3-24	2018-3-24
4	2-Channel Power Meter	Rohde & Schwarz	NRP2	1.033	2016-5-10	2017-5-10
5	Audio Analyzer	Hewlett Packard	8903B	EMC0011	2016-11-5	2017-11-5
6	Power Sensor	Rohde & Schwarz	NRP-Z91	1.034	2016-5-10	2017-5-10
7	Power Sensor	Rohde & Schwarz	NRP-Z91	1.035	2016-5-10	2017-5-10
8	Temperature Chamber	Gongwen	GDS-250	SFT0009	2016-11-5	2017-11-5
9	D.C. Power Supply	KIKUSUI	PAN35-10A	SFT0319	2016-11-5	2017-11-5
10	Temperature Chamber	Gongwen	GDS-250	SFT0009	2016-11-5	2017-11-5
11	D.C. Power Supply	KIKUSUI	PAN35-10A	SFT0319	2016-11-5	2017-11-5
12	Humidity/ Temperature Meter	Anymetre	TH101B	SFT0063	2016-11-5	2017-11-5
13	Barometer	ChangChun	DYM3	SEL0088	2016-6-8	2017-6-8
14	Multimeter	UNI-T	UT70A	EMC0017	2016-11-5	2017-11-5
15	Monopole Antenna	HST	N/A	EMC0089	2016-11-5	2017-11-5
16	Low loss coaxial cable	HST	2 m	EMC1008	2016-11-5	2017-11-5
17	Monopole Antenna	HST	N/A	N/A	2016-11-5	2017-11-5
18	Noise Generator	Ningbo Zhongce	DF1681	EMC0009	2016-11-5	2017-11-5
19	Semi-Anechoic chamber	ETS•Lindgren	FACT3 2.0	ITL-100	2016-6-17	2017-6-17
20	EMI Test receiver	R&S	ESVS10	ITL-111	2017-1-19	2018-1-19
21	EXA Spectrum Analyzer	Agilent Technologies	N9010A	ITL-114	2017-1-19	2018-1-19
22	Biconilog Antenna	ETS•Lindgren	3142D	ITL-105	2015-1-24	2018-1-24
23	Pre Amplifier	HP	8447F	ITL-116	2017-1-19	2018-1-19
24	Wideband	Mini-circuits	ZVA-183-S+	ITL-117	2017-1-19	2018-1-19

	Amplifier Super Ultra					
25	Horn Antenna	A-INFOMW	JTXLB-10180-N	ITL-110	2015-1-24	2018-1-24
26	Software	Audix	E3	ITL-109	/	/
27	Loop Antenna	BJ 2nd Factory	ZN30900A	EMC6001	2016-7-29	2019-7-29

End of report

Report Statement

- 1.This test report is invalid if altered, additions and deletions.
- 2.This test report is responsible for tested samples only .
- 3.Objections to the test report must be submitted to Guangdong Huesent Testing & Inspection Technology Co., Ltd. within 15 days.
- 4.The test report is invalid without the signatures of tester, reviewer ,approver ,and official stamp of test unit.
- 5.Without permission of Guangdong Huesent Testing & Inspection Technology Co., Ltd., This report is not permitted to be duplicated in extracts.
- 6.P”= Pass=Test item conform to the requirement
“F”= Fail=Test item not conform to the requirement
“N”= Not Applicable =Test item Not Applicable to the test object