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# **FCC Test Report**

CQASZ20180300012E-01 Report No.:

Netvox Technology Co., Ltd. Applicant:

**Address of Applicant:** No. 21-1, Sec. 1 Chung Hua West Road, Tainan, Taiwan, R.O.C.

Netvox Technology Co., Ltd. (Xiamen) Manufacturer:

Address of No.2, Xin Feng 2 Road, Xiamen Torch Hi-Tech Industrial Development Zone,

Manufacturer: Xiamen City, China

N/A Factory: Address of Factory: N/A **Equipment Under Test (EUT):** 

**Product:** Wireless Temperature And Humidity Sensor

Model No.: R711 **Brand Name:** Netvox

FCC ID: NRH-LR-R711

Standards: 47 CFR Part 15, Subpart C Date of Test: 2018-03-08 to 2018-03-22

Date of Issue: 2018-03-22

Test Result: PASS\*

Tested By:

Reviewed By:

Owen Zhou)

Approved By:



The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CQA, this report can't be reproduced except in full.

<sup>\*</sup> In the configuration tested, the EUT complied with the standards specified above.



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### 2 Version

## **Revision History Of Report**

Report No.	Version	Description	Issue Date
CQASZ20180300012E-01	Rev.01	Initial report	2018-03-14
CQASZ20180300012E-01	Rev.02	Re-test 20dB OBW and add restricted bands test	2018-03-22



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# 3 Test Summary

Test Item	Test Requirement	Test method	Result	
Antonno Boquiroment	47 CFR Part 15, Subpart C Section	ANSI C62 10 (2012)	PASS	
Antenna Requirement	15.203	ANSI C63.10 (2013)	PASS	
AC Power Line	47 CFR Part 15, Subpart C Section	ANSI C62 10 (2012)	NI/A	
Conducted Emission	15.207	ANSI C63.10 (2013)	N/A	
Field Strength of the	47 CFR Part 15, Subpart C Section	ANSI C62 10 (2012)	DASS	
Fundamental Signal 15.249 (a)		ANSI C63.10 (2013)	PASS	
Spurious Emissions	47 CFR Part 15, Subpart C Section	ANCI C62 40 (2042)	DACC	
Spurious Emissions	15.249 (a)/15.209	ANSI C63.10 (2013)	PASS	
Restricted bands	47 CFR Part 15, Subpart C Section			
around fundamental frequency (Radiated	•	ANSI C63.10 (2013)	PASS	
Emission)	15.249(a)/15.205			
20dB Occupied 47 CFR Part 15, Subpart C Section		ANSI C62 40 (2042)	DACC	
Bandwidth	15.215 (c)	ANSI C63.10 (2013)	PASS	

N/A: Not applicable, This EUT is battery power





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## **5** General Information

### **5.1 Client Information**

Applicant:	Netvox Technology Co., Ltd.
Address of Applicant:	No. 21-1, Sec. 1 Chung Hua West Road, Tainan, Taiwan, R.O.C.
Manufacturer:	Netvox Technology Co., Ltd. (Xiamen)
Address of Manufacturer:	No.2, Xin Feng 2 Road, Xiamen Torch Hi-Tech Industrial Development Zone, Xiamen City,China
Factory:	N/A
Address of Factory:	N/A

## **5.2 General Description of EUT**

Name:	Wireless Temperature And Humidity Sensor
Model No.:	R711
Trade Mark :	Netvox
Hardware Version:	V1.0
Software Version:	V1.0
Frequency Range:	902MHZ ~ 928MHz
Modulation Type:	FSK
Number of Channels:	80 (declared by the client)
Sample Type:	Portable production
Test Software of EUT:	Netvox LoRa FCC Test (manufacturer declare )
Antenna Type:	Integral antenna
Antenna Gain:	0dBi
Power Supply:	2 x AAA battery, DC3V



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Operation Frequency each of channel(MHz)								
902.3	902.5	902.7	902.9	903.1	903.3	903.5	903.7	
903.9	904.1	904.3	904.5	904.7	904.9	905.1	905.3	
905.5	905.7	905.9	906.1	906.3	906.5	906.7	906.9	
907.1	907.3	907.5	907.7	907.9	908.1	908.3	908.5	
908.7	908.9	909.1	909.3	909.5	909.7	909.9	910.1	
910.3	910.5	910.7	910.9	911.1	911.3	911.5	911.7	
911.9	912.1	912.3	912.5	912.7	912.9	913.1	913.3	
913.5	913.7	913.9	914.1	914.3	914.5	914.7	914.9	
903.0	904.6	906.2	907.8	909.4	911.0	912.6	914.2	
923.3	923.9	924.5	925.1	925.7	926.3	926.9	927.5	

#### Note:

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:

Channel	Frequency
The Lowest channel	902.3MHz
The Middle channel	914.9MHz
The Highest channel	927.5MHz



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#### 5.3 Test Environment and Mode

Operating Environment:	Operating Environment:				
Temperature:	24.0 °C				
Humidity:	52 % RH				
Atmospheric Pressure:	1008 mbar				
Test Mode:	Use test software (Netvox LoRa FCC Test) to set the lowest frequency, the middle frequency and the highest frequency keep transmitting of the EUT.				

### **5.4 Description of Support Units**

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.	Remark	FCC certification
/	/	/	/	/

### 5.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate.

The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities.

The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the **Shenzhen Huaxia Testing Technology Co., Ltd** quality system acc. to DIN EN ISO/IEC 17025.

Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CQA laboratory is reported:

Test	Range	Uncertainty	Notes
Radiated Emission	Below 1GHz	±5.12dB	(1)
Radiated Emission	Above 1GHz	±4.60dB	(1)
Conducted Disturbance	0.15~30MHz	±3.34dB	(1)

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



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#### 5.6 Test Location

All tests were performed at:

Shenzhen Huaxia Testing Technology Co., Ltd.,

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

### 5.7 Test Facility

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

#### • CNAS (No. CNAS L5785)

CNAS has accredited Shenzhen Huaxia Testing Technology Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

#### • ISED Registration No.: 22984-1

The 3m Semi-anechoic chamber of Shenzhen Huaxia Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

#### • A2LA (Certificate No. 4742.01)

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4742.01.

#### • FCC Registration No.: 522263

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.:522263

#### 5.8 Deviation from Standards

None.

#### 5.9 Abnormalities from Standard Conditions

None.

### 5.10 Other Information Requested by the Customer

None.



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## **5.11 Equipment List**

Item	Test Equipment	Manufacturer	Model No.	Instrument No.	Calibration Due Date
1	EMI Test Receiver	R&S	ESR7	CQA-005	2018/9/24
2	Spectrum analyzer	R&S	FSU26	CQA-038	2018/9/24
3	Preamplifier	MITEQ	AFS4- 00010300-18- 10P-4	CQA-035	2018/9/24
4	Preamplifier	MITEQ	AMF-6D- 02001800-29- 20P	CQA-036	2018/9/24
5	Loop antenna	Schwarzbeck	FMZB1516	CQA-087	2018/3/21
6	Bilog Antenna	R&S	HL562	CQA-011	2018/9/24
7	Horn Antenna	R&S	HF906	CQA-012	2018/9/24
8	Horn Antenna	R&S	BBHA 9170	CQA-088	2018/9/24
9	Coax cable (9KHz~40GHz)	CQA	RE-low-01	CQA-077	2018/9/24
10	Coax cable (9KHz~40GHz)	CQA	RE-high-02	CQA-078	2018/9/24
11	Antenna Connector	CQA	RFC-01	CQA-080	2018/9/24
12	RF cable(9KHz~40GHz)	CQA	RF-01	CQA-079	2018/9/24

#### 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

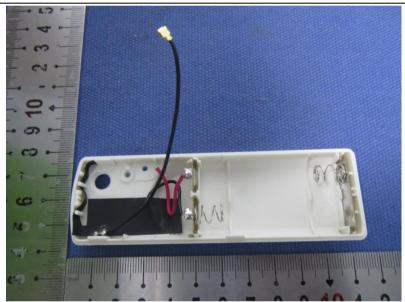
### 6.1 Antenna Requirement

**Standard requirement:** 47 CFR Part 15C Section 15.203

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

#### **EUT Antenna:**



The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.



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### **6.2 Radiated Emission**

Test Requirement:	47 CFR Part 15C Section	n 15.249 and 15.20	09 and 15.20	)5			
Test Method:	ANSI C63.10: 2013						
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)						
Receiver Setup:	Frequency	Detector	RBW	VBW	Re	mark	
	0.009MHz-0.090MHz	Peak	10kHz	30KHz	30KHz Peak		
	0.009MHz-0.090MHz	Average	10kHz	30KHz	30KHz Average		
	0.090MHz-0.110MHz	Quasi-peak	10kHz	30KHz	Quas	Quasi-peak	
	0.110MHz-0.490MHz	Peak	10kHz	30KHz	Р	eak	
	0.110MHz-0.490MHz	Average	10kHz	30KHz	Ave	erage	
	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quas	si-peak	
	30MHz-1GHz	Quasi-peak	100 kHz	300KHz	Quas	si-peak	
	Above 1GHz	Peak	1MHz	3MHz	Р	eak	
	Above 10112	Peak	1MHz	10Hz	Ave	erage	
	Note: For fundamental f	•		=5MHz, Peak	detect	tor is for	PK
Limit: (Spurious Emissions and band edge)	Frequency	Field strength (microvolt/meter )	Limit (dBuV/m	) Remark		Measurement distance (m)	
	0.009MHz-0.490MHz	2400/F(kHz)	-	-		300	
	0.490MHz-1.705MHz	24000/F(kHz)	-	-		30	
	1.705MHz-30MHz	30	-	-		30	
	30MHz-88MHz	100	40.	0 Quasi-pea	ık	3 3 3	
	88MHz-216MHz	150	43.	5 Quasi-pea	ık		
	216MHz-960MHz	200	46.	0 Quasi-pea	ık		
	960MHz-1GHz	500	54.	0 Quasi-pea	ık	3	
	Above 1GHz	500	54.	0 Average		3	
	Note: 1) 15.35(b), Unlead emissions is 200 applicable to the emission level rad	dB above the mequipment under t	aximum pe est. This pe	ermitted avera	ige er	nission I	limit
	2) Emissions rad	liated outside of the	e specified f	requency band	ls, exc	ept for	
	harmonics, shall	be attenuated by a	t least 50 dE	B below the leve	el of th	е	
	fundamental or to the general radiated emission limits in Section 15.209,						
	whichever is the I	esser attenuation.					
Limit:	Frequency	Limit (dBuV/	/m @3m)	Remark			
(Field strength of the	902MHz-928MHz	94.0	)	Average Val	lue		
fundamental signal)	JOZIVII IZ JZOIVII IZ	114.	0	Peak Value	е		



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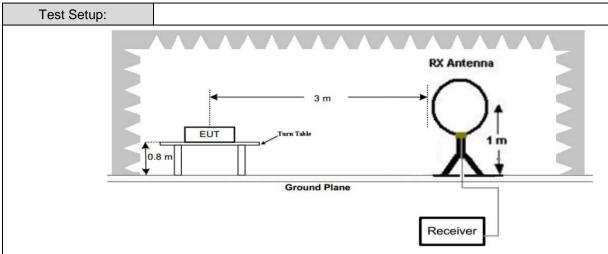
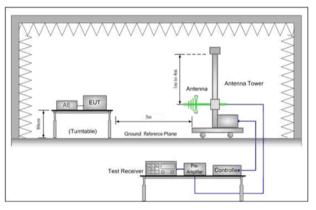


Figure 1. Below 30MHz



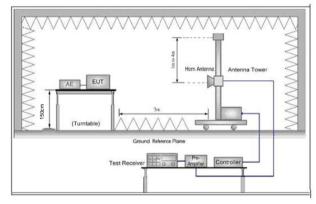


Figure 2. 30MHz to 1GHz

Figure 3. Above 1 GHz

#### Test Procedure:

- a. 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
  - 2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.

Note: For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table

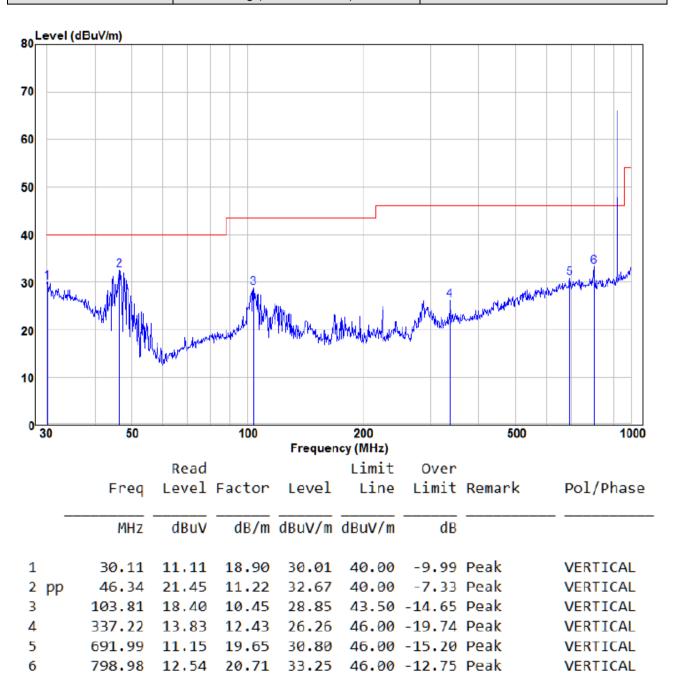


	<ul> <li>was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</li> <li>g. Test the EUT in the lowest channel,the middle channel,the Highest channel</li> <li>h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode,And found the X axis positioning which it is worse case.</li> <li>i. Repeat above procedures until all frequencies measured was complete.</li> </ul>
Instruments Used:	Refer to section 5.11 for details
Exploratory Test Mode:	Transmitting mode
Final Test Mode:	Pretest the EUT at Transmitting mode, For below 1GHz part, through pre-scan, the worst case is the lowest channel.  Only the worst case is recorded in the report.
Test Voltage:	DC3V
Test Results:	Pass

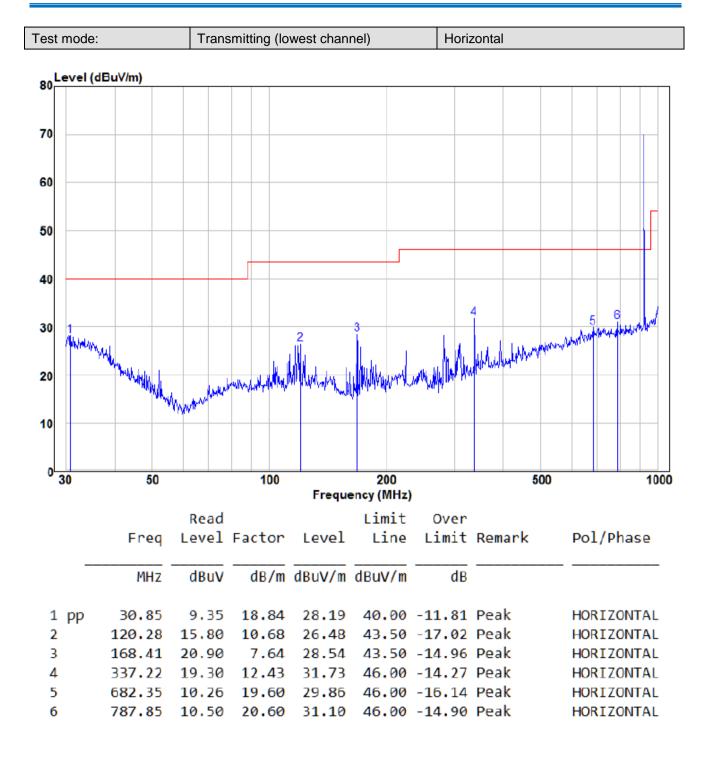


#### **Measurement Data**

30MHz~1GHz		
Test mode:	Transmitting (lowest channel)	Vertical









Above 1GHz							
Test mode:	mode: Transmitting Test cl		Test chann	Test channel: Lowest			
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector	Ant. Pol.
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Type	H/V
902.3	100.91	-9.33	91.58	114	-22.42	peak	Н
902.3	96.95	-9.33	87.62	94	-6.38	AVG	Н
1804.6	56.45	-4.28	52.17	74	-21.83	peak	Н
1804.6	40.76	-4.28	36.48	54	-17.52	AVG	Н
2706.9	51.14	1.13	52.27	74	-21.73	peak	Н
2706.9	37.00	1.13	38.13	54	-15.87	AVG	Н
902.3	102.61	-9.33	93.28	114	-20.72	peak	V
902.3	96.14	-9.33	86.80	94	-7.19	AVG	V
1804.6	56.18	-4.28	51.90	74	-22.10	peak	V
1804.6	42.98	-4.28	38.70	54	-15.30	AVG	V
2706.9	52.18	1.13	53.31	74	-20.69	peak	V
2706.9	38.43	1.13	39.56	54	-14.44	AVG	V

Test mode:		Transmitti	ng	Test chann	nel:	Middle	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector	Ant. Pol.
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Type	H/V
914.9	103.24	-9.37	93.87	114	-20.13	peak	Н
914.9	96.82	-9.37	87.45	94	-6.55	AVG	Н
1829.8	54.99	-4.14	50.85	74	-23.15	peak	Н
1829.8	43.59	-4.14	39.45	54	-14.55	AVG	Н
2744.7	51.26	0.56	51.82	74	-22.18	peak	Н
2744.7	37.08	0.56	37.64	54	-16.36	AVG	Н
914.9	100.97	-9.36	91.61	114	-22.39	peak	V
914.9	98.65	-9.36	89.29	94	-4.71	AVG	V
1829.8	55.68	-4.14	51.54	74	-22.46	peak	V
1829.8	43.26	-4.14	39.12	54	-14.88	AVG	V
2744.7	51.73	0.56	52.29	74	-21.71	peak	V
2744.7	38.33	0.56	38.89	54	-15.11	AVG	V



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Test mode:		Transmitti	ransmitting Test channel:		nel:	Highest	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector	Ant. Pol.
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Type	H/V
927.5	103.27	-9.23	94.04	114	-19.96	peak	Н
927.5	96.70	-9.23	87.47	94	-6.53	AVG	Н
1855	56.26	-4.03	52.23	74	-21.77	peak	Н
1855	41.70	-4.03	37.67	54	-16.33	AVG	Н
2782.5	51.66	1.68	53.34	74	-20.66	peak	Н
2782.5	37.27	1.68	38.95	54	-15.05	AVG	Н
927.5	101.24	-9.23	92.01	114	-21.99	peak	V
927.5	96.38	-9.23	87.15	94	-6.85	AVG	V
1855	54.69	-4.03	50.66	74	-23.34	peak	V
1855	43.22	-4.03	39.19	54	-14.81	AVG	V
2782.5	53.09	1.68	54.77	74	-19.23	peak	V
2782.5	37.56	1.68	39.24	54	-14.76	AVG	V

#### Remark:

- The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
   Final Test Level = Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor
- 2) Scan from 9kHz to 10GHz, The disturbance above 3GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.



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#### Restricted bands:

Test mode:		Transmittir	ng	Test chann	iel:	Lowest	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	<b>5</b>	Ant. Pol.
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type	H/V
902	45.78	-9.34	36.44	46	-9.56	peak	Н
902	46.42	-9.34	37.08	46	-8.92	peak	V

Test mode:		Transmittir	ng	Test chann	el:	Highest	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector	Ant. Pol.
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Type	H/V
928	47.23	-9.22	38.01	46	-7.99	peak	Н
928	48.34	-9.22	39.12	46	-6.88	peak	V

#### Remark:

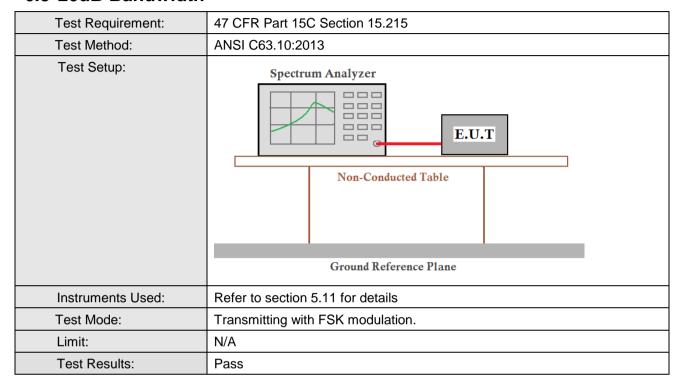
1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor



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### 6.3 20dB Bandwidth

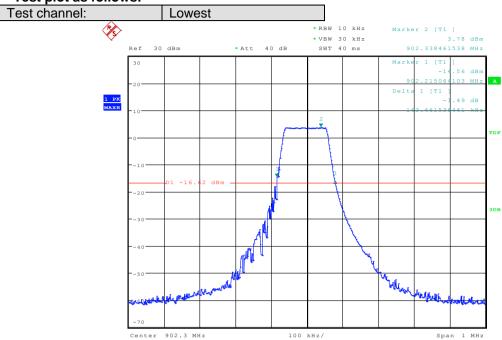


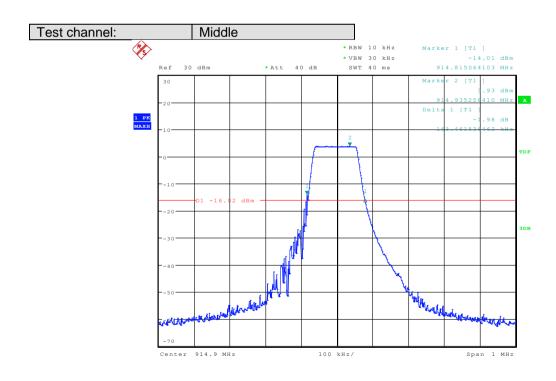
#### **Measurement Data**

Test channel	20dB bandwidth (MHz)	Results
Lowest	0.163	Pass
Middle	0.163	Pass
Highest	0.163	Pass

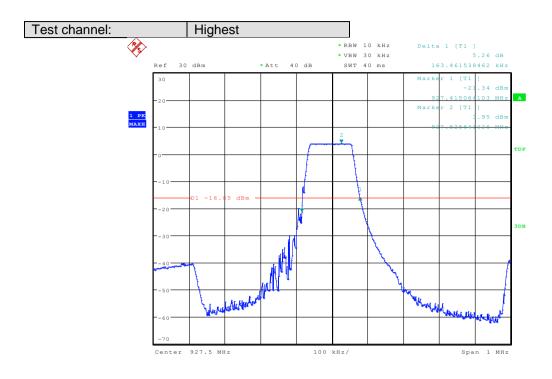






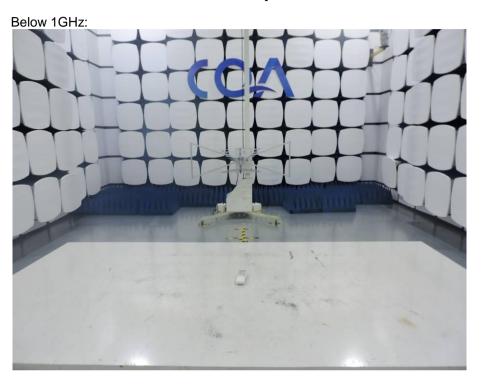


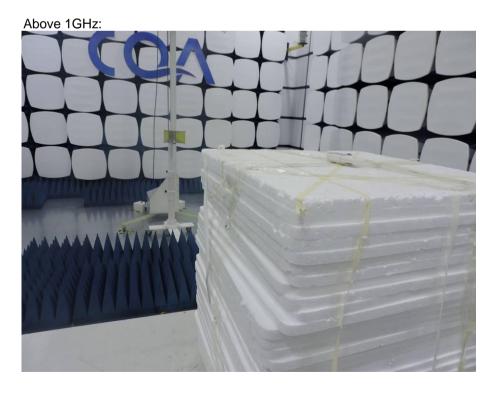




## 7 Photographs

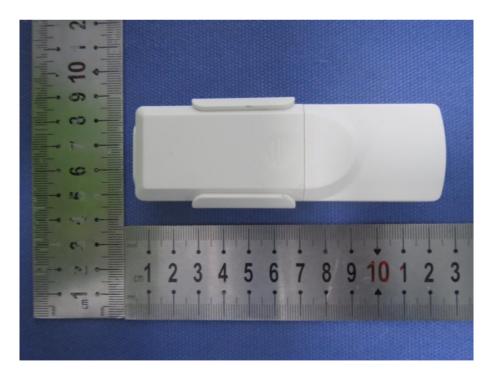
## 7.1 Radiated Emission Test Setup



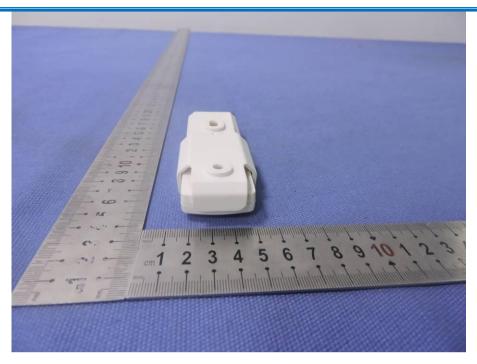


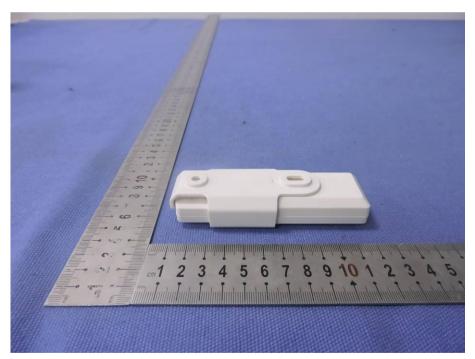
### 7.2 EUT Constructional Details



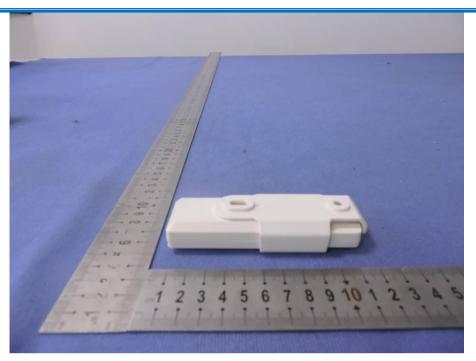


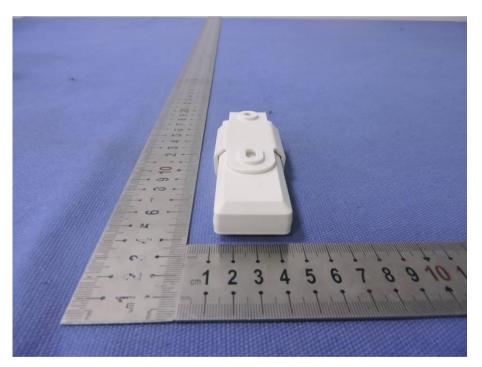










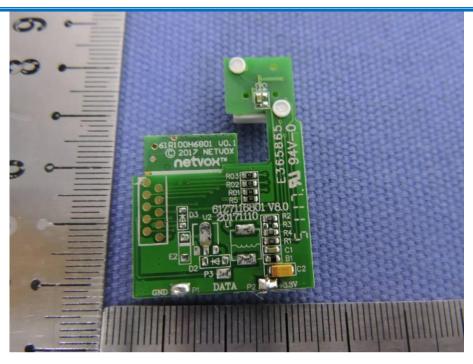


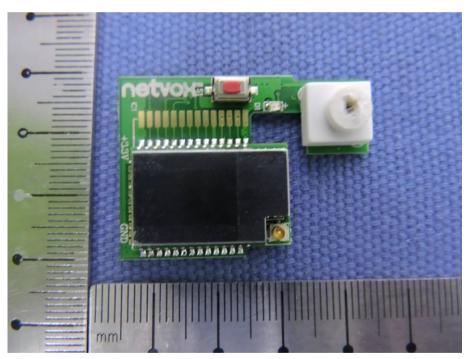








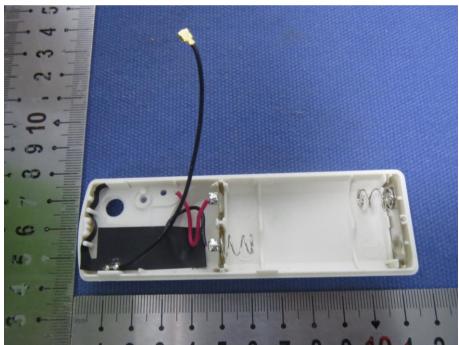












**END OF THE REPORT**