TEST REPORT

FCC ID: 2APNKWM900

Product Name	:	UHF Wireless Microphone
Model Name	:	WM900, WM300, WM920, WM930, WM940
Brand Name	:	N/A
Report No.	:	PTC18031913501E-FC01
Prepared for		
Dok(Hong Kong) Trading Ltd		
Room C, 22/F, Nathan Commercial Building, 430-436 Nathan Road, Kowloon, Hong Kong, China		
Prepared by		
Dongguan Precise Testing&Certification Corp., Ltd.		
Building D, Baoding Technology Park, Guangming Road 2, Guangming Community, Dongcheng District, Dongguan, Guangdong, China		

1TEST RESULT CERTIFICATION

Applicant's name	:	Dok(Hong Kong) Trading Ltd
Address	:	Room C, 22/F, Nathan Commercial Building, 430-436 Nathan Road, Kowloon, Hong Kong, China
Manufacture's name	:	Dok(Hong Kong) Trading Ltd
Address	:	Room C, 22/F, Nathan Commercial Building, 430-436 Nathan Road, Kowloon, Hong Kong, China
Product name	:	UHF Wireless Microphone
Model name	:	WM900, WM300, WM920, WM930, WM940
Brand Name	:	N/A
Standards	:	FCC CFR47 Part 15 Section 15.249
Test procedure	:	ANSI C63.10: 2013
Test Date	:	April 02, 2018 to April 20, 2018
Date of Issue	:	April 23, 2018
Test Result	:	Pass

This device described above has been tested by PTC, and the test results show that the equipment under test (EUT) is in compliance with the requirements. And it is applicable only to the tested sample identified in the report.
This report shall not be reproduced except in full, without the written approval of PTC, this document may be altered or revised by PTC, personal only, and shall be noted in the revision of the document.

Test Engineer:

Leo Yang

Leo Yang / Engineer

Technical Manager:

Chris Du / Manager

Contents

Page

1 TEST RESULT CERTIFICATION **2**

2 TEST SUMMARY **4**

3 TEST FACILITY **5**

4 GENERAL INFORMATION **6**

4.1 GENERAL DESCRIPTION OF E.U.T. 6

4.2 TEST MODE 7

5 EQUIPMENT DURING TEST **8**

5.1 EQUIPMENTS LIST 8

5.2 MEASUREMENT UNCERTAINTY 9

5.3 DESCRIPTION OF SUPPORT UNITS 10

6 FIELD STRENGTH OF FUNDAMENTAL EMISSION AND RADIATED SPURIOUS EMISSIONS **11**

6.1 EUT OPERATION 12

6.2 TEST SETUP 12

6.3 SPECTRUM ANALYZER SETUP 14

6.4 TEST PROCEDURE 14

6.5 SUMMARY OF TEST RESULTS 16

7 BAND EDGE EMISSION **21**

7.1 TEST PROCEDURE 21

7.2 TEST RESULTS 21

8 20 DB BANDWIDTH MEASUREMENT **23**

8.1 TEST PROCEDURE 23

8.2 TEST RESULT 23

9 ANTENNA REQUIREMENT **26**

9.1 ANTENNA REQUIREMENT 26

9.2 RESULT 26

10 TEST PHOTOS **27**

11 EUT PHOTOS **28**

2 Test Summary

Test Items	Test Requirement	Result
AC Power Conducted Emission	15.207	N/A
20dB Bandwidth	15.215(c)	PASS
Band edge	15.249 15.205 15.209	PASS
Field Strength of Fundamental Emissions	15.249(a) 15.249(c) 15.205(a) 15.209(a)	PASS
Radiated Spurious Emissions		PASS
Antenna Requirement	15.203	PASS

Note:

1. The EUT only powered by battery, no need to evaluate AC Power Conducted Emission.

2. The EUT is powered by new batteries during the test.

3 TEST FACILITY

Dongguan Precise Testing&Certification Corp., Ltd.

Building D,Baoding Technology Park,Guangming Road2, Dongcheng District, Dongguan, Guangdong, China, Dongguan, 523129

FCC Registration Number: 790290

A2LA Certificate No.: 4408.01

IC Registration Number: 12191A-1

4 General Information

4.1 General Description of E.U.T.

Product Name	:	UHF Wireless Microphone
Model Name	:	WM900, WM300, WM920, WM930, WM940 (Note: The samples are the same except appearance and model number. So WM900 was selected for full tested.)
Operating frequency	:	902.30MHz-926.80MHz
Numbers of Channel	:	20
Antenna Type	:	Internal Antenna
Antenna Gain	:	0dBi
Type of Modulation	:	FM
Power supply	:	DC 2*1.5V Battery

4.2 Test Mode

The EUT has been tested under its typical operating condition. Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting. Only the worst case data were reported.
For Radiated: The EUT's antenna was pre-tested under the following modes:

Test Mode	Description
Mode A	X-Y axis
Mode B	Y-Z axis
Mode C	X-Z axis

From the above modes, the worst case was found in Mode A, Therefore only the test data of the mode was recorded in this report.

Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	**902.30**	11	915.10
2	903.40	12	916.40
3	904.70	13	917.70
4	906.00	14	919.00
5	907.30	15	920.30
6	908.60	16	921.60
7	909.90	17	922.90
8	911.20	18	924.20
9	912.50	19	925.50
10	913.80	20	926.80

The 3 channels of lower, middle and higher were chosen for test.

Channel	**Frequency(MHz)**
1	902.30
11	915.10
20	926.80

5 Equipment During Test

5.1 Equipments List

RF Conducted Test

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
MXG Signal Analyzer	Agilent	N9020A	MY56070279	10Hz-30GHz	Apr 07, 2019
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	Oct 09, 2018

Remark: 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.

Radiated Emissions

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	9KHz-3GHz	Sep. 03, 2018
Loop Antenna	Schwarzbeck	FMZB 1519	012	9 KHz -30MHz	Aug 31, 2018
Bilog Antenna	SCHWARZBECK	VULB9160	9160-3355	25MHz-2GHz	Aug 31, 2018
Preamplifier (low frequency)	SCHWARZBECK	BBV 9475	9745-0013	1MHz-1GHz	Sep. 03, 2018
Cable	Schwarzbeck	PLF-100	549489	9KHz-3GHz	Sep. 03, 2018
Spectrum Analyzer	Agilent	E4407B	MY45109572	9KHz-40GHz	Oct. 13, 2018
Horn Antenna	SCHWARZBECK	9120D	9120D-1246	1GHz-18GHz	Aug. 31, 2018
Power Amplifier	LUNAR EM	LNA1G18-40	J10100000081	1GHz-26.5GHz	Aug. 31, 2018
Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	Sep. 03, 2018

5.2 Measurement Uncertainty

Parameter	Uncertainty
RF output power, conducted	±1.0dB
Power Spectral Density, conducted	±2.2dB
Radio Frequency	± 1 x 10^{-6}
Bandwidth	± 1.5 x 10^{-6}
Time	±2%
Duty Cycle	±2%
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Conducted Emissions (150kHz~30MHz)	±3.64dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB
Remark: The coverage Factor (k=2), and measurement Uncertainty for a level of Confidence of 95%	

5.3 Description of Support Units

Equipment	Model No.	Series No.
N/A	N/A	N/A

6 Field Strength of Fundamental Emission and Radiated Spurious Emissions

Test Requirement: : FCC Part C section 15.205 & 15.209 & 15.249

Test Method: : ANSI C63.10: 2013

Test Result: : PASS

Measurement Distance: : 3m

Limit: : See the follow table

15.209 limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

Note: 1. Emission level in dBuV/m=20 log (uV/m)

2. Measurement was performed at an antenna to the closed point of EUT distance of meters.

The field strength of emission from intentional radiators operated within these frequency bands shall comply with the following:

15.249(a) Limit:

Fundamental Frequency	Field strength of fundamental		Field strength of harmonics	
(MHz)	mV/m	dBuV/m	uV/m	dBuV/m
902-928	50	94	500	54
2400-2483.5	50	94	500	54
5725-5875	50	94	500	54
24000-24250	250	108	2500	68

6.1 EUT Operation

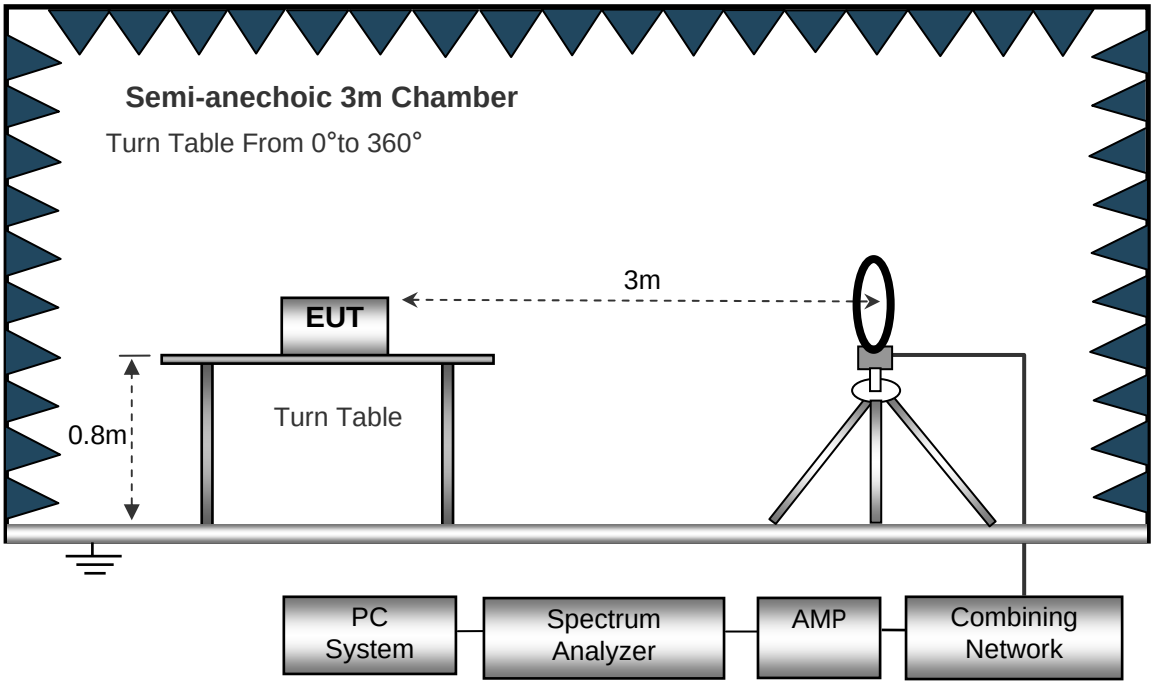
Operating Environment :

Temperature:	:	23.5 °C
Humidity:	:	51.1 % RH
Atmospheric Pressure:	:	101.2kPa
Test Voltage	:	DC 2*1.5V Battery

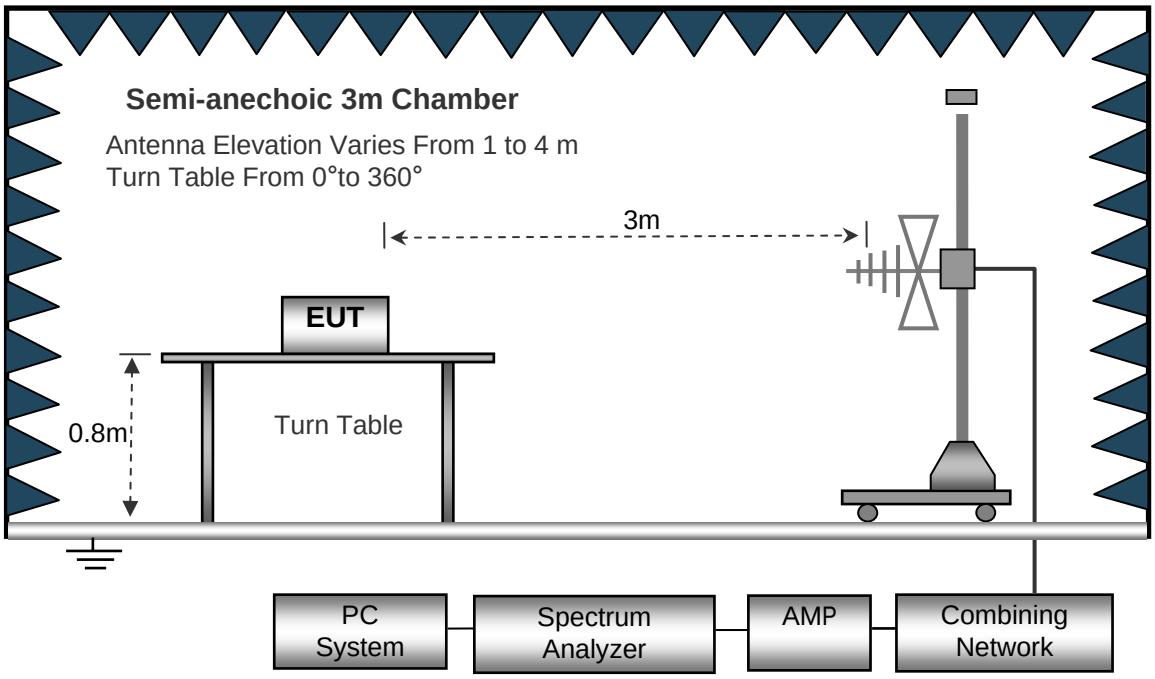
6.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site

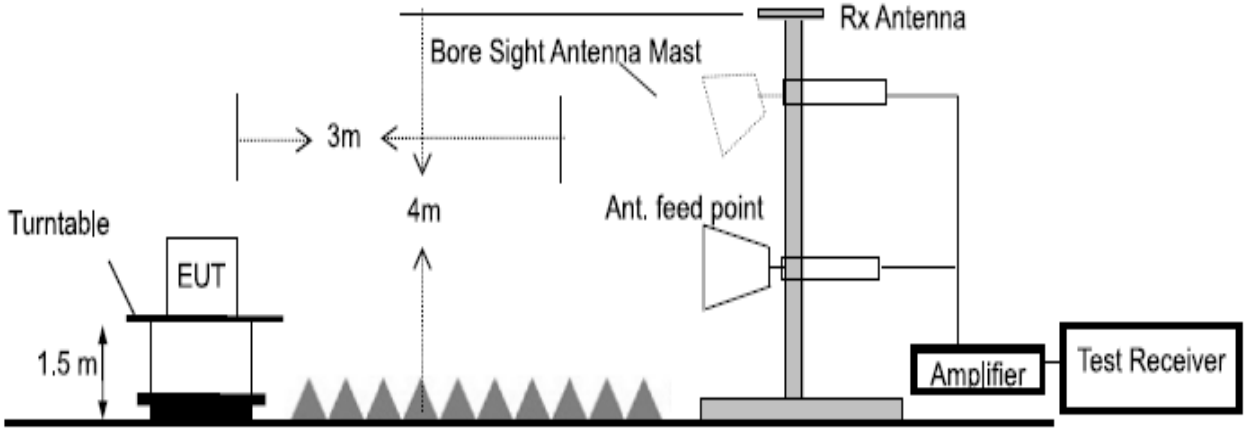
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



6.3 Spectrum Analyzer Setup

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / *10Hz* for Average

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

6.4 Test Procedure

1. The testing follows the guidelines in Spurious Radiated Emissions of ANSI C63.10-2013.

2. Below 1000MHz, The EUT was placed on a turn table which is 0.8m above ground plane. And above 1000MHz, The EUT was placed on a styrofoam table which is 1.5m above ground plane.

3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (From 1m to 4m) and turntable (from 0 degree to 360 degree) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.

5. Set to the maximum power setting and enable the EUT transmit continuously.

6. Final measurement (Above 1GHz): The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The EMI Receiver set to peak and average mode and a resolution bandwidth of 1MHz. The measurement will be performed in horizontal and vertical polarization of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 degree to 360 degree in order to have the antenna inside the cone of radiation.

7. Test Procedure of measurement (For Above 1GHz):

1) Monitor the frequency range at horizontal polarization and move the antenna over all sides of the EUT(if necessary move the EUT to another orthogonal axis).

2) Change the antenna polarization and repeat 1) with vertical polarization.

3) Make a hardcopy of the spectrum.

4) Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.

5) Change the analyser mode to Clear/ Write and found the cone of emission.

6) Rotate and move the EUT, so that the measuring distance can be enlarged to 3m and the antenna will be still inside the cone of emission.

7) Measure the level of the detected frequency with the correct resolution bandwidth, with the antenna polarization and azimuth and the peak and average detector, which causes the maximum emission.

8) Repeat steps 1) to 7) for the next antenna spot if the EUT is larger than the antenna beamwidth.

7. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.

6.5 Summary of Test Results

Test Frequency: 9KHz-30MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)
--	--	--	--	>20

Note:

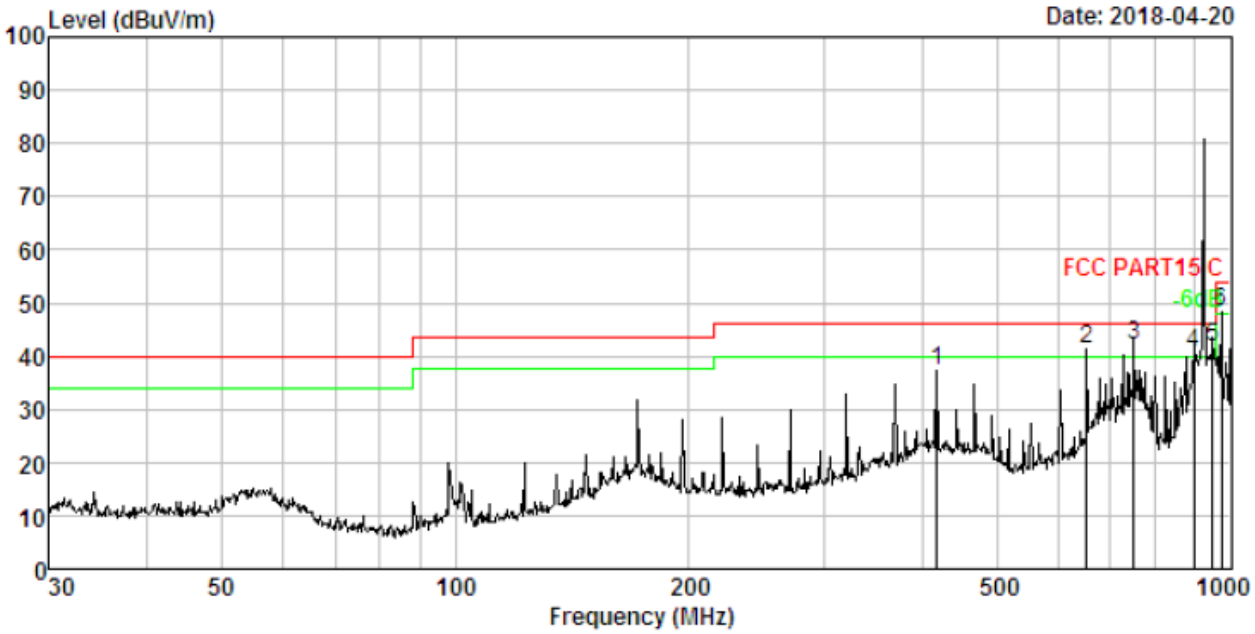
The amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.

Test Frequency: 30MHz ~ 1GHz

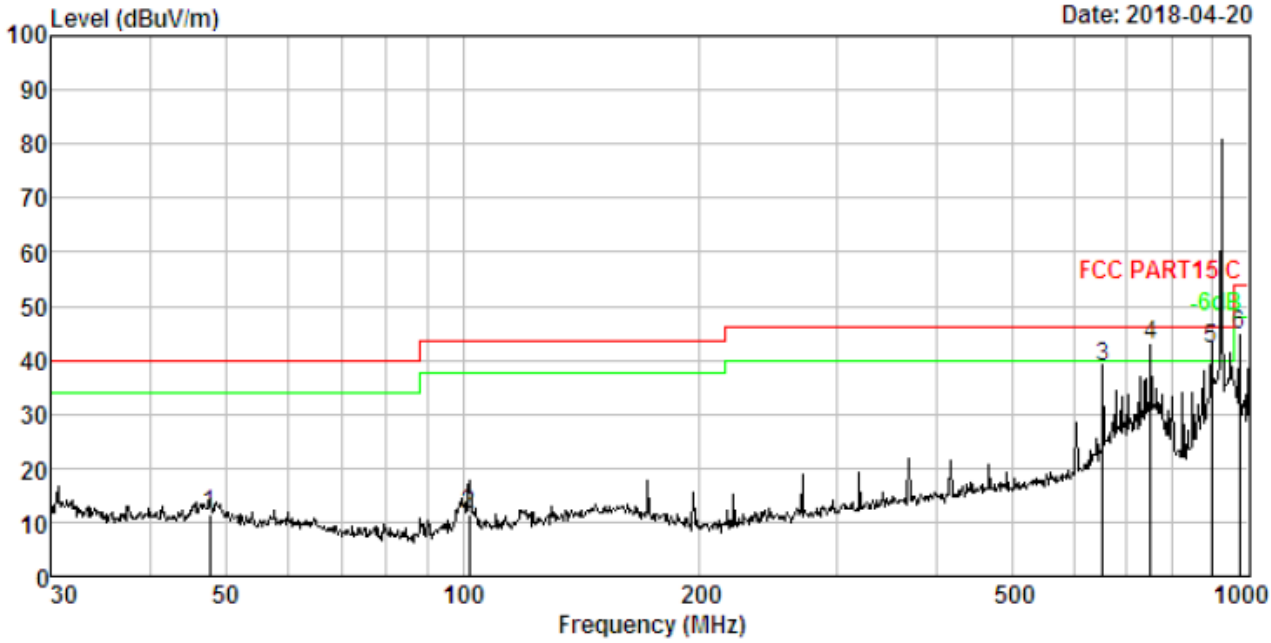
Remark: only the worst data were reported.

Test plot for Horizontal: 902.30MHz



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	417.641	3.44	15.66	49.00	30.89	37.21	46.00	-8.79	QP
2.	651.942	3.84	19.61	49.00	31.04	41.41	46.00	-4.59	QP
3.	750.108	3.97	21.35	47.90	31.09	42.13	46.00	-3.87	QP
4.	896.997	4.13	22.52	44.95	31.15	40.45	46.00	-5.55	QP
5.	948.761	4.18	23.41	45.15	31.17	41.57	46.00	-4.43	QP
6.	972.337	4.20	23.43	51.93	31.18	48.38	54.00	-5.62	QP

Test plot for Vertical: 902.30MHz



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	47.659	1.47	12.72	27.33	30.13	11.39	40.00	-28.61	QP
2.	102.001	2.16	10.41	29.37	30.40	11.54	43.50	-31.96	QP
3.	651.942	3.84	19.61	46.50	31.04	38.91	46.00	-7.09	QP
4.	750.108	3.97	21.35	48.60	31.09	42.83	46.00	-3.17	QP
5.	896.997	4.13	22.52	46.60	31.15	42.10	46.00	-3.90	QP
6.	972.337	4.20	23.43	48.20	31.18	44.65	54.00	-9.35	QP

Fundamental and Harmonics Average Result

Frequency	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
902.3	H	82.04	68.35	94	74	-11.96	-5.65
902.3	V	83.28	66.21	94	74	-10.72	-7.79
915.1	H	82.47	67.18	94	74	-11.53	-6.82
915.1	V	83.09	69.24	94	74	-10.91	-4.76
926.8	H	81.58	65.24	94	74	-12.42	-8.76
926.8	V	84.69	64.18	94	74	-9.31	-9.82

Test Frequency 1GHz-10GHz:

Frequency : 902.30MHz

Freq.	Ant. Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
1804.6	V	60.25	46.35	74	54	-13.75	-7.65
2706.9	V	58.04	44.18	74	54	-15.96	-9.82
3609.2	V	53.45	40.2	74	54	-20.55	-13.8
4511.5	V	50.92	38.24	74	54	-23.08	-15.76
5413.8	V	48.35	36.25	74	54	-25.65	-17.75
6316.1	V	44.12	33.82	74	54	-29.88	-20.18
1804.6	H	57.29	44.15	74	54	-16.71	-9.85
2706.9	H	53.62	42.08	74	54	-20.38	-11.92
3609.2	H	50.28	40.57	74	54	-23.72	-13.43
4511.5	H	48.15	38.12	74	54	-25.85	-15.88
5413.8	H	44.82	35.72	74	54	-29.18	-18.28
6316.1	H	40.69	32.48	74	54	-33.31	-21.52

Frequency: 915.10MHz

Freq.	Ant. Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
1830.2	V	56.32	45.26	74	54	-17.68	-8.74
2745.3	V	52.01	42.01	74	54	-21.99	-11.99
3660.4	V	48.65	38.29	74	54	-25.35	-15.71
4575.5	V	45.25	35.14	74	54	-28.75	-18.86
5490.6	V	41.78	32.26	74	54	-32.22	-21.74
6405.7	V	38.25	29.54	74	54	-35.75	-24.46
1830.2	H	54.26	44.21	74	54	-19.74	-9.79
2745.3	H	50.62	41.06	74	54	-23.38	-12.94
3660.4	H	47.35	38.25	74	54	-26.65	-15.75
4575.5	H	44.28	34.15	74	54	-29.72	-19.85
5490.6	H	41.09	30.25	74	54	-32.91	-23.75
6405.7	H	38.56	29.54	74	54	-35.44	-24.46

Frequency: 926.80MHz

Freq.	Ant. Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
1853.6	V	55.08	45.92	74	54	-18.92	-8.08
2780.4	V	52.84	41.52	74	54	-21.16	-12.48
3707.2	V	48.26	38.27	74	54	-25.74	-15.73
4634	V	44.18	36.29	74	54	-29.82	-17.71
5560.8	V	41.92	31.48	74	54	-32.08	-22.52
6487.6	V	38.27	27.56	74	54	-35.73	-26.44
1853.6	H	54.15	46.29	74	54	-19.85	-7.71
2780.4	H	51.92	42.18	74	54	-22.08	-11.82
3707.2	H	48.69	38.46	74	54	-25.31	-15.54
4634	H	45.08	35.82	74	54	-28.92	-18.18
5560.8	H	43.62	32.69	74	54	-30.38	-21.31
6487.6	H	40.28	29.57	74	54	-33.72	-24.43

7 BAND EDGE EMISSION

7.1 TEST PROCEDURE

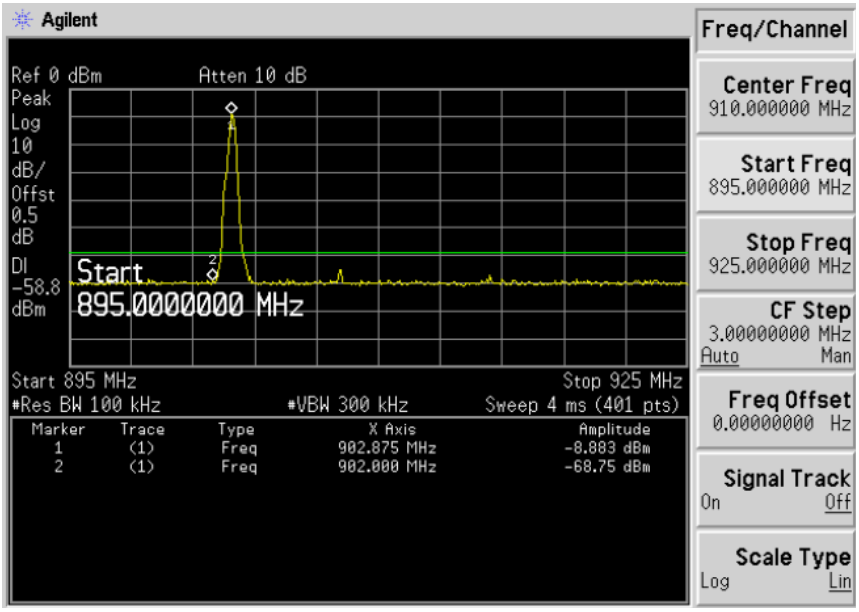
1. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.

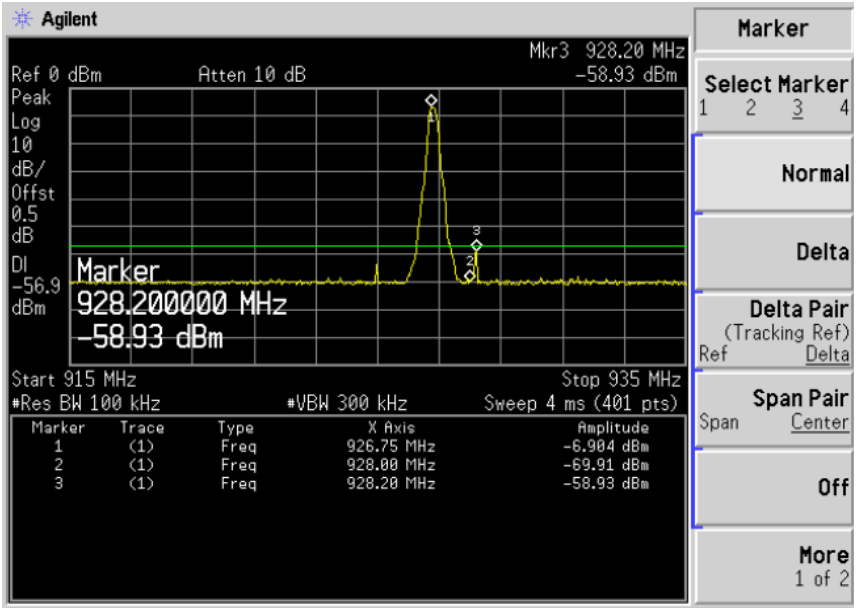
2. Set RBW to 100KHz and VBW of spectrum analyzer to 300KHz with a convenient frequency span including 100KHz bandwidth from band edge.

3. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.

4. Repeat above procedures until all measured frequencies were completed.

7.2 TEST RESULTS




Agilent
Mkr3 928.20 MHz
Ref 0 dBm
Atten 10 dB
-58.93 dBm
Peak
Log
10
dB/
Offst
0.5
dB
DI
-56.9
dBm
Marker
928.200000 MHz
-58.93 dBm
Start 915 MHz
Stop 935 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 4 ms (401 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 926.75 MHz -6.904 dBm
2 (1) Freq 928.00 MHz -69.91 dBm
3 (1) Freq 928.20 MHz -58.93 dBm
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

8 20 dB Bandwidth Measurement

Test Method : ANSI C63.10: 2013

8.1 Test Procedure

Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator.

Set span = 1MHz, centered on a transmitting channel

RBW≥1% 20dB Bandwidth, VBW≥RBW

Sweep= auto

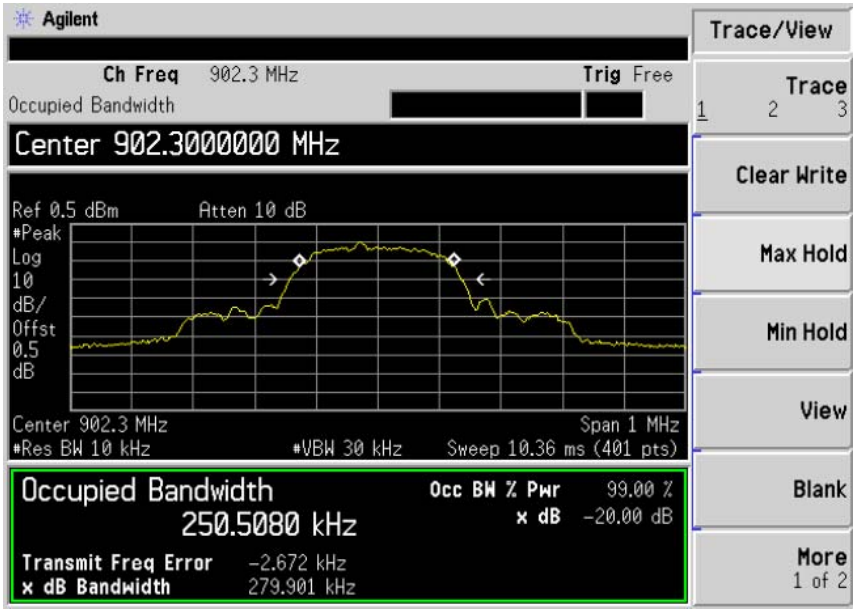
Detector function=peak

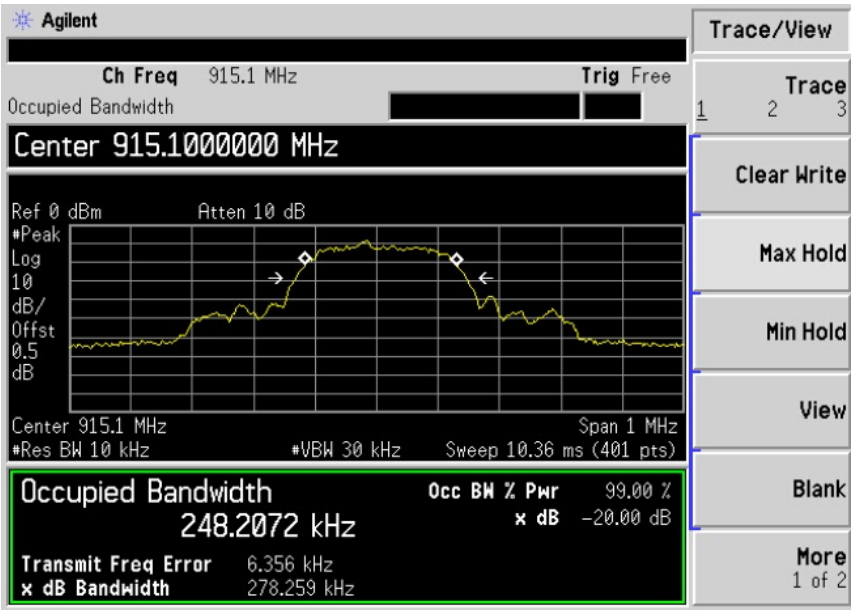
Trace=max hold

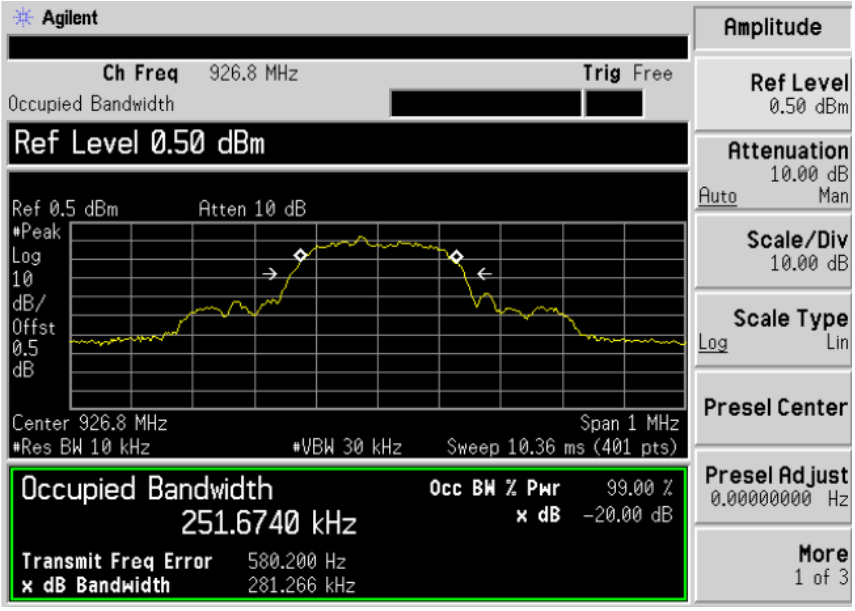
All the trace to stabilize, use the marker-to-peak function to set the marker to the peak of the emission, use the marker-delta function to measure and record the 20dB down and 99% bandwidth of the emission.

8.2 Test Result

Channel number	Channel frequency (MHz)	20dB Down BW(KHz)
01	902.30	278.901
11	915.10	278.259
20	926.80	281.266


Agilent
Trace/View
Ch Freq 902.3 MHz
Trig Free
Occupied Bandwidth
Trace
1 2 3
Center 902.3000000 MHz
Clear Write
Ref 0.5 dBm
Atten 10 dB
#Peak
Log
10
dB/
Offst
0.5
dB
Max Hold
Min Hold
View
Center 902.3 MHz
Span 1 MHz
#Res BW 10 kHz
#VBW 30 kHz
Sweep 10.36 ms (401 pts)
Occupied Bandwidth
250.5080 kHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Blank
Transmit Freq Error -2.672 kHz
x dB Bandwidth 279.901 kHz
More
1 of 2


Agilent
Trace/View
Ch Freq 915.1 MHz
Trig Free
Occupied Bandwidth
Trace
1 2 3
Center 915.1000000 MHz
Clear Write
Ref 0 dBm
Atten 10 dB
#Peak
Log
10
dB/
Offst
0.5
dB
Max Hold
Min Hold
View
Center 915.1 MHz
Span 1 MHz
#Res BW 10 kHz
#VBW 30 kHz
Sweep 10.36 ms (401 pts)
Occupied Bandwidth
248.2072 kHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Blank
Transmit Freq Error 6.356 kHz
x dB Bandwidth 278.259 kHz
More
1 of 2


Agilent
Ch Freq 926.8 MHz
Trig Free
Occupied Bandwidth
Ref Level 0.50 dBm
Ref 0.5 dBm
Atten 10 dB
#Peak
Log
10
dB/
Offst
0.5
dB
Center 926.8 MHz
Span 1 MHz
#Res BW 10 kHz
#VBW 30 kHz
Sweep 10.36 ms (401 pts)
Occupied Bandwidth
251.6740 kHz
Occ BW % Pwr 99.00 %
x dB -20.00 dB
Transmit Freq Error 580.200 Hz
x dB Bandwidth 281.266 kHz
Amplitude
Ref Level
0.50 dBm
Attenuation
10.00 dB
Auto Man
Scale/Div
10.00 dB
Scale Type
Log Lin
Presel Center
Presel Adjust
0.00000000 Hz
More
1 of 3

9 Antenna Requirement

9.1 Antenna Requirement

For intentional device, according to FCC 47 CFR Section 15.203, 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. And if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

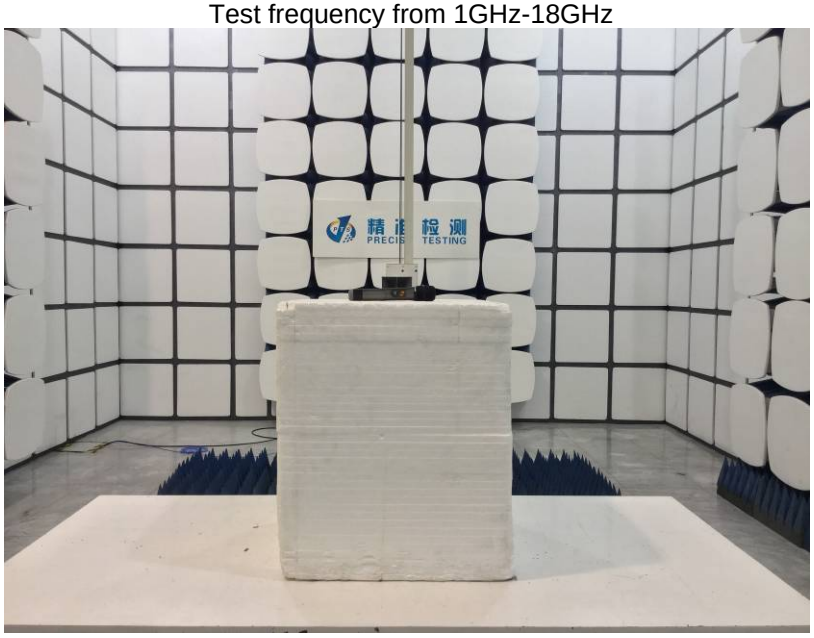
9.2 Result

The EUT'S antenna, permanent attached antenna, is internal antenna. The antenna's gain is 0dBi and meets the requirement.

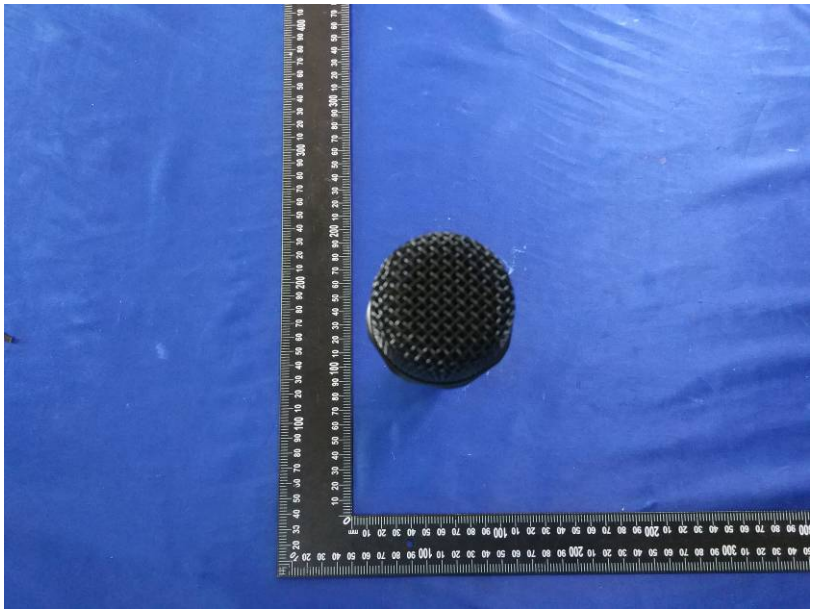
10 TEST PHOTOS

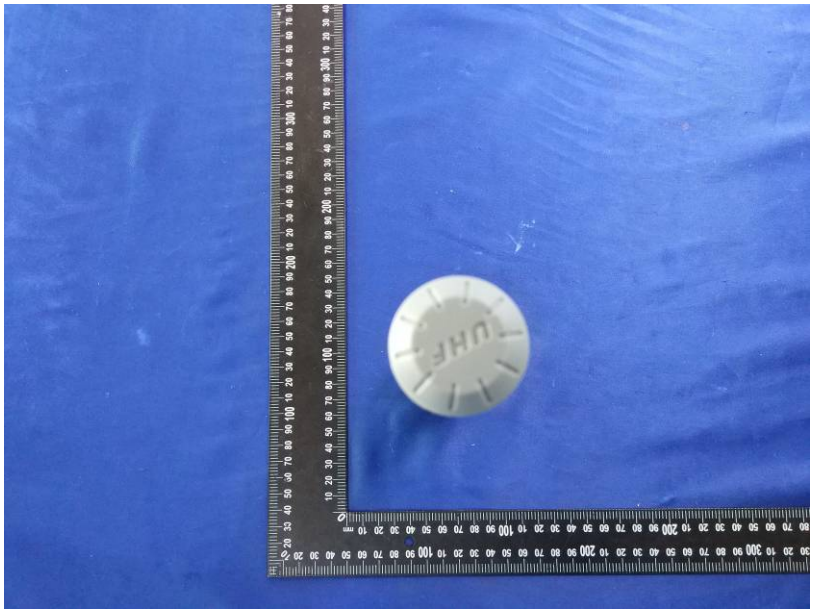
Radiated Spurious Emissions
From 30MHz-1000MHz

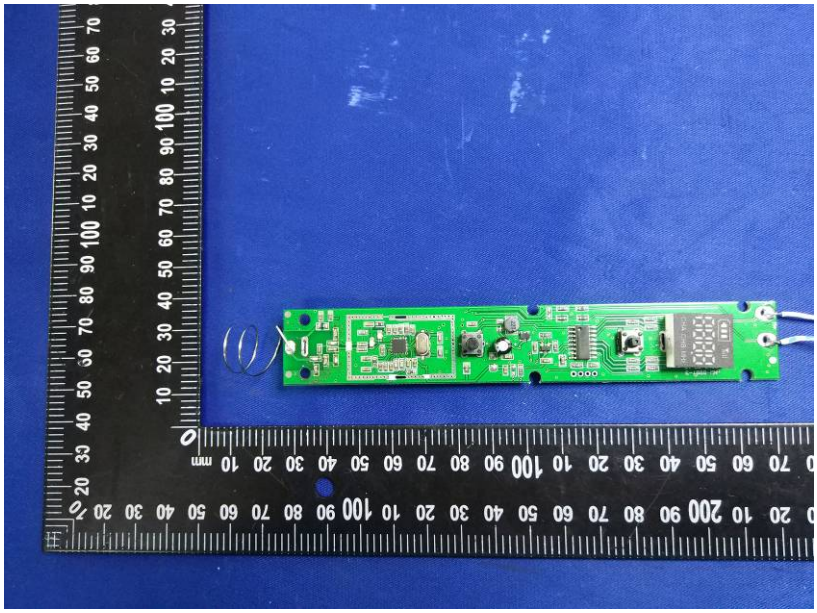
Test frequency from 1GHz-18GHz

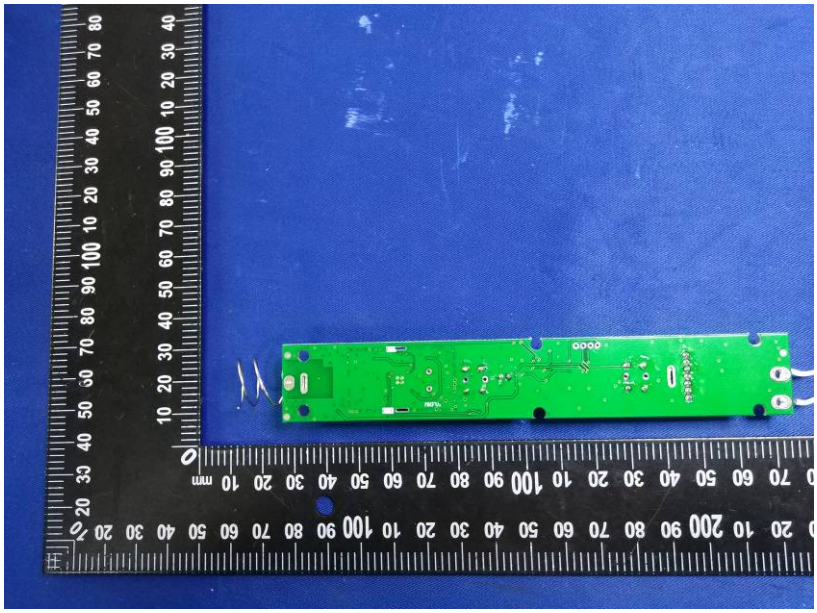


11 EUT PHOTOS




UHF





********THE END REPORT********