FCC TEST REPORT

FCC PART 15 SUBPART C 15.249

Test report

On Behalf of

SANWA LIMITED

For

2.4G Wireless Mouse Receiver

Model No.: GMAERGW17RC

FCC ID: 2AMSUERGW17RC

Prepared for :	**SANWA LIMITED** **Room 1005, 10/F., Tower 2, Silvercord, 30 Canton Road, Tsim Sha Tsui, Kowloon, Hong Kong**
Prepared By :	**Shenzhen HUAK Testing Technology Co., Ltd.** **1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China**
Date of Test:	**Oct. 24, 2018 ~ Oct. 30, 2018**
Date of Report:	**Oct. 30, 2018**
Report Number:	**HK1810301404E**

TEST RESULT CERTIFICATION

Applicant's name	SANWA LIMITED
Address	Room 1005, 10/F., Tower 2, Silvercord, 30 Canton Road, Tsim Sha Tsui, Kowloon, Hong Kong
Manufacture's Name	Dongguan Togran Electronics Co., Ltd.
Address	No.262, Shidan Road, The 3rd Industrial Zone, Juzhou, Shijie Town, Dongguan City, Guangdong Province, P.R.China.
Product description	
Trade Mark:	SANWA
Product name	2.4G Wireless Mouse Receiver
Model and/or type reference	GMAERGW17RC
Standards	FCC Rules and Regulations Part 15 Subpart C Section 15.249 ANSI C63.10: 2013

Date of Test	:	
Date (s) of performance of tests	:	Oct. 24, 2018 ~ Oct. 30, 2018
Date of Issue	:	Oct. 30, 2018
Test Result	:	**Pass**

Testing Engineer : 

(Gary Qian)

Technical Manager : 

(Eden Hu)

Authorized Signatory : 

(Jason Zhou)

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1. TEST SUMMARY

1.1 TEST PROCEDURES AND RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.249&15.209	Radiated Emission	Compliant
§15.249&15.209	Band Edges Emission	Compliant
§15.215	20dB bandwidth	Compliant
§15.207	Conducted Emission	Compliant

1.2 TEST FACILITY

Test Firm : Shenzhen HUAK Testing Technology Co., Ltd.

Address : 1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China

Designation Number: : CN1229

Test Firm Registration Number : 616276

1.3 MEASUREMENT UNCERTAINTY

Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty(Above 1GHz)	=	4.06dB, k=2

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Operation Frequency	2408-2474MHz
Field Strength(3m)	89.42dBuV/m(Average)@3m
Modulation	GFSK
Number of channels	40(Channel Spacing 2MHz)
Test Channels	2408MHz, 2440MHz, 2474MHz
Hardware Version	V1.0
Software Version	V1.0
Antenna Designation	Fixed antenna
Antenna Gain	-5.23dBi
Power Supply	DC 5V

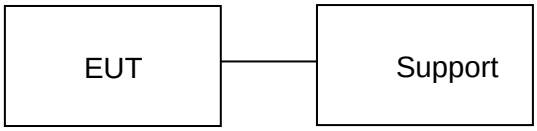
2.2 OPERATION OF EUT DURING TESTING

NO.	TEST MODE DESCRIPTION
1	Low channel TX
2	Middle channel TX
3	High channel TX

Note:
1. Only the data of the worst case recorded in the test report.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.

2.3 DESCRIPTION OF TEST SETUP

Operation of EUT during Radiation and Above1GHz Radiation testing:



Item	Equipment	Model No.	Specification	Remark
1	Dell PC	Ins 14-7460-D1525S	N/A	Provided by test lab
2	PC adapter	YH-195-462	DC19.5V/4.62A	Provided by test lab

2.4 MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	R&S	ENV216	HKE-002	Dec. 28, 2017	1 Year
2.	Receiver	R&S	ESCI 7	HKE-010	Dec. 28, 2017	1 Year
3.	RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 28, 2017	1 Year
4.	Spectrum analyzer	R&S	FSP40	HKE-025	Dec. 28, 2017	1 Year
5.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 28, 2017	1 Year
6.	Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Dec. 28, 2017	1 Year
7.	EMI Test Receiver	Rohde & Schwarz	ESCI 7	HKE-010	Dec. 28, 2017	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	Dec. 28, 2017	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Dec. 28, 2017	1 Year
10.	Horn Antenna	Schewarzbeck	9120D	HKE-013	Dec. 28, 2017	1 Year
11.	Pre-amplifier	EMCI	EMC051845 SE	HKE-015	Dec. 28, 2017	1 Year
12.	Pre-amplifier	Agilent	83051A	HKE-016	Dec. 28, 2017	1 Year
13.	EMI Test Software EZ-EMC	Tonscend	JS1120-B Version	HKE-083	Dec. 28, 2017	N/A
14.	Shielded room	Shiel Hong	4*3*3	HKE-039	Dec. 28, 2017	3 Year

3. RADIATED EMISSION

3.1. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer. 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.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RBW 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RBW 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RBW 120KHz for QP
Start ~Stop Frequency	1GHz~26.5GHz 3MHz/10MHz for Peak, 3MHz/10Hz for Average

Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RBW 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RBW 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RBW 120KHz for QP

Test limit for Standard FCC15.249

Fundamental Frequency	**Field Strength of Fundamental (millivolts/meter)**	**Field Strength of Harmonics (microvolts/meter)**
900-928MHz	50	500
2400-2483.5MHz	50	500
5725-5875MHz	50	500
24.0-24.25GHz	250	2500

Test limit for Standard FCC 15.209

Frequency (MHz)	**Distance Meters**	**Field Strengths Limit**	
		μV/m	**dB(μV)/m**
0.009 ~ 0.490	300	2400/F(kHz)	---
0.490 ~ 1.705	30	24000/F(kHz)	---
1.705 ~ 30	30	30	---
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	Other:74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

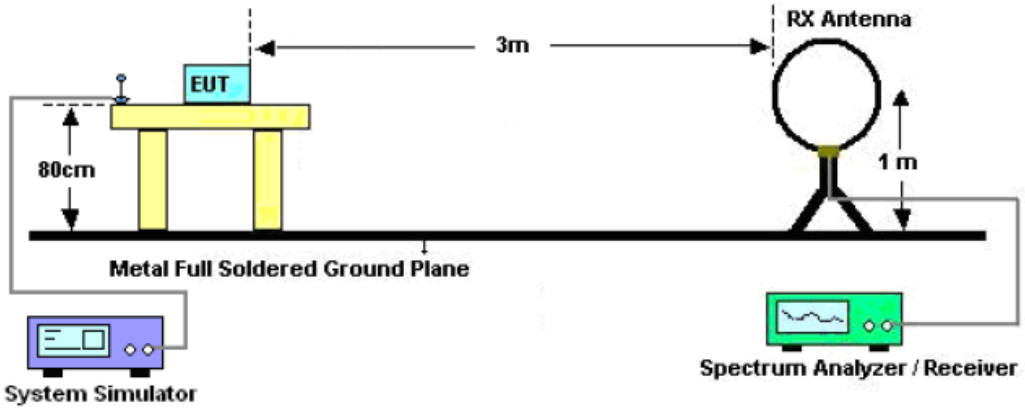
Remark: (1) Emission level dBμV = 20 log Emission level μV/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

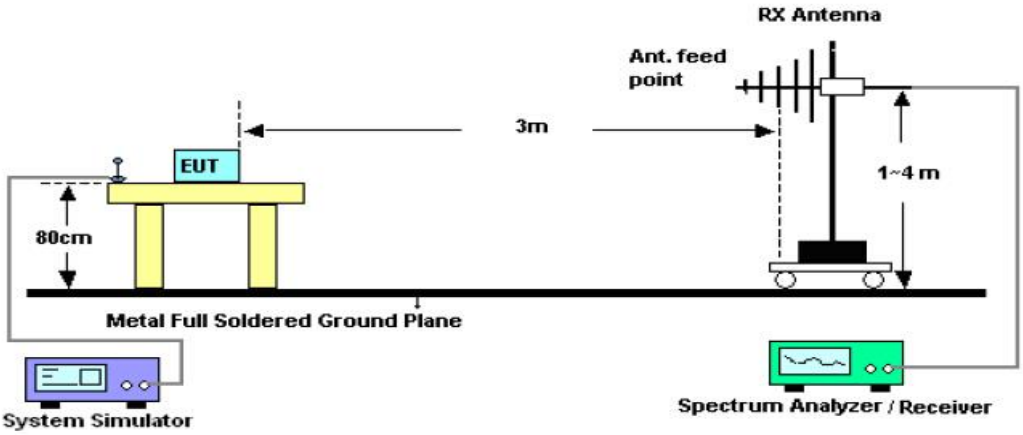
(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

3.2. TEST SETUP

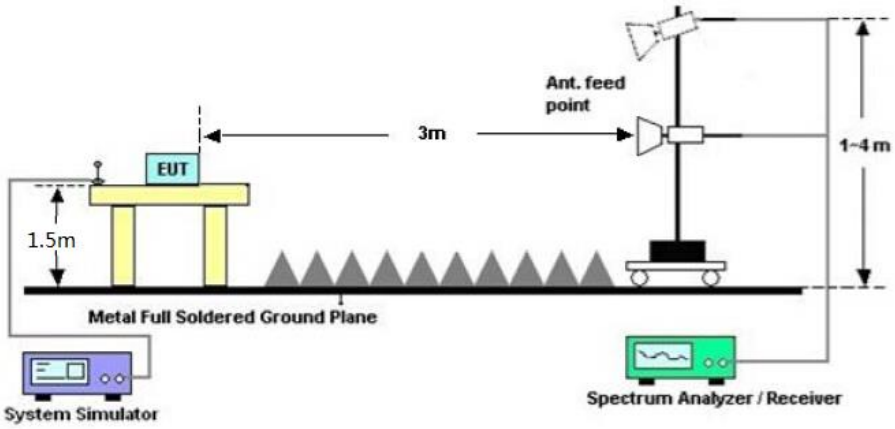
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz

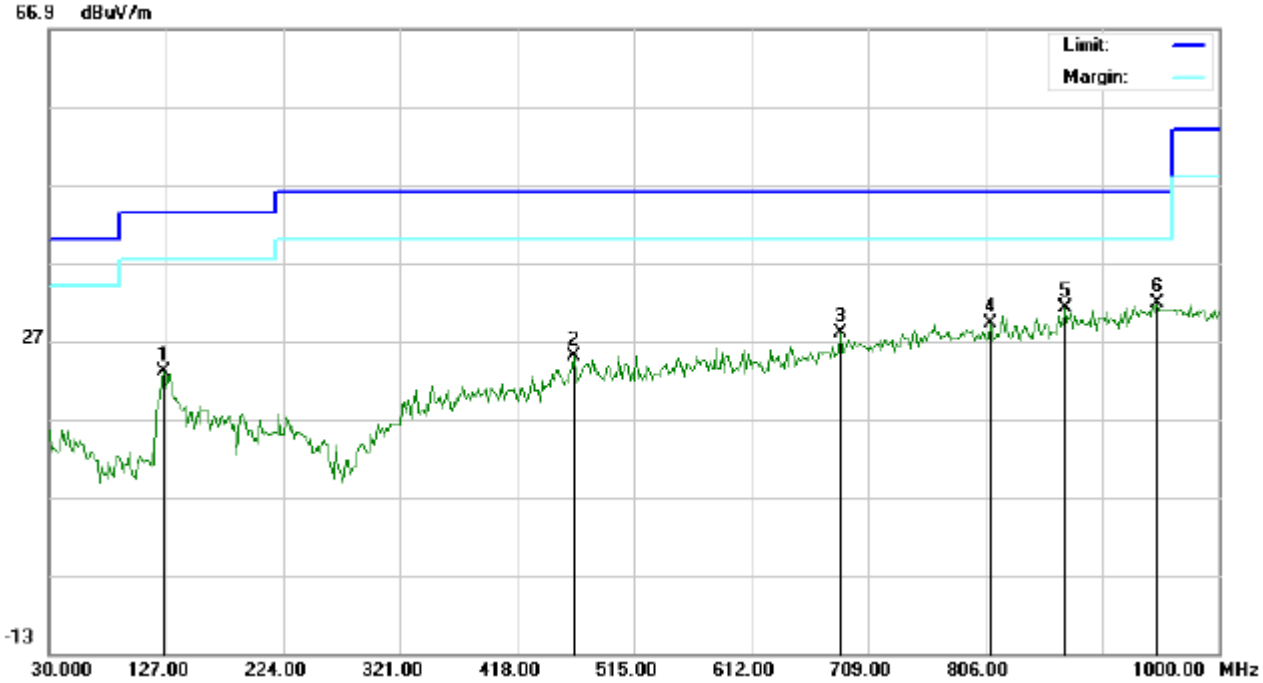


3.3. TEST RESULT

RADIATED EMISSION BELOW 30MHz

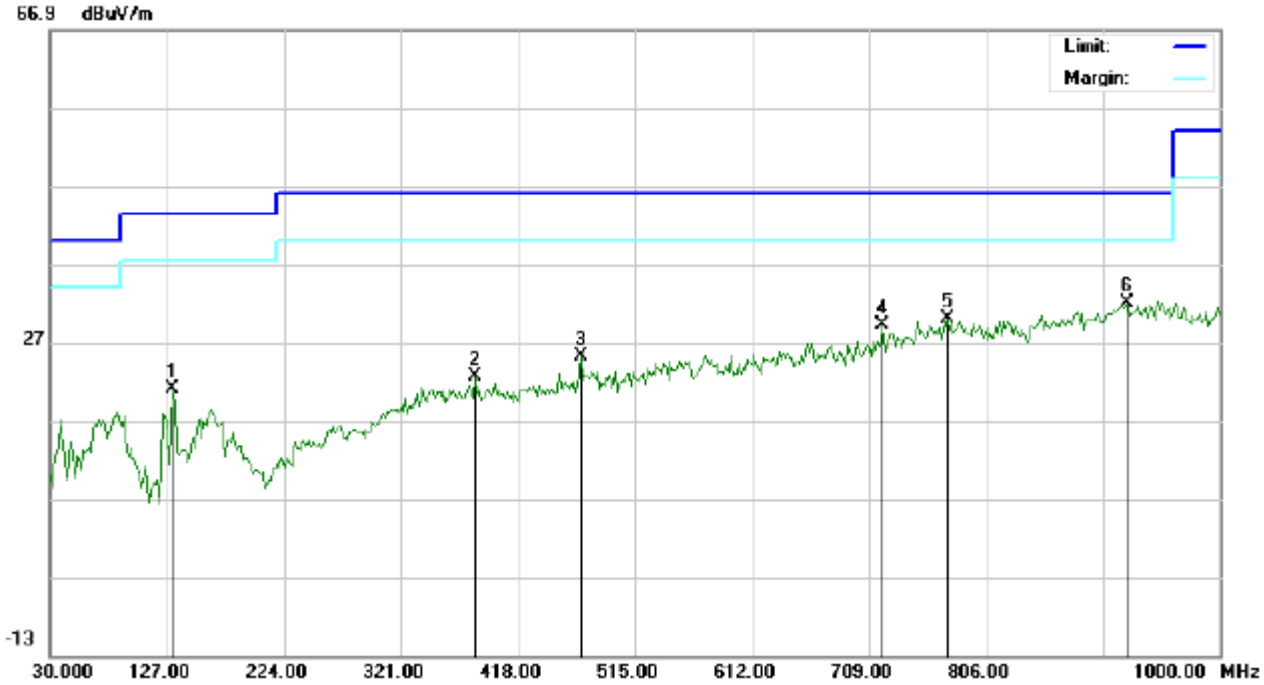
No emission found between lowest internal used/generated frequencies to 30MHz.

RADIATED EMISSION BELOW 1GHZ-Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		125.3833	14.67	8.37	23.04	43.50	-20.46	peak	
2		464.8833	4.22	20.75	24.97	46.00	-21.03	peak	
3		686.3667	3.22	24.85	28.07	46.00	-17.93	peak	
4		810.8500	1.97	27.32	29.29	46.00	-16.71	peak	
5		872.2833	3.36	27.89	31.25	46.00	-14.75	peak	
6	*	948.2667	1.83	29.95	31.78	46.00	-14.22	peak	

RADIATED EMISSION BELOW 1GHZ-Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		131.8497	9.22	11.80	21.02	43.50	-22.48	peak	
2		382.4331	3.56	18.95	22.51	46.00	-23.49	peak	
3		469.7332	4.33	20.80	25.13	46.00	-20.87	peak	
4		720.3165	3.35	25.77	29.12	46.00	-16.88	peak	
5		773.6666	3.14	26.96	30.10	46.00	-15.90	peak	
6	*	922.3999	2.77	29.23	32.00	46.00	-14.00	peak	

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin=Measurement-Limit.

2. The “Factor” value can be calculated automatically by software of measurement system.

3. The mode 1 is the worst case, and only the data of the worst case recorded in this test report.

RADIATED EMISSION ABOVE 1GHZ

Field strength of fundamental emission

EUT：	2.4G Wireless Mouse Receiver	Model Name. ：	GMAERGW17RC
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage：	DC 5V
Test Mode ：	Mode 1/2/3	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2408.021	101.26	-9.61	91.65	114.00	-22.35	peak
2408.021	99.03	-9.61	89.42	94.00	-4.58	AVG
2440.021	100.98	-9.61	91.37	114.00	-22.63	peak
2440.021	98.85	-9.61	89.24	94.00	-4.76	AVG
2474.021	100.94	-9.61	91.33	114.00	-22.67	peak
2474.021	98.80	-9.61	89.19	94.00	-4.81	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT：	2.4G Wireless Mouse Receiver	Model Name. ：	GMAERGW17RC
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	Mode 1/2/3	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2408.021	99.15	-9.61	89.54	114.00	-24.46	peak
2408.021	96.82	-9.61	87.21	94.00	-6.79	AVG
2440.021	99.02	-9.61	89.41	114.00	-24.59	peak
2440.021	96.74	-9.61	87.13	94.00	-6.87	AVG
2474.021	98.86	-9.61	89.25	114.00	-24.75	peak
2474.021	96.55	-9.61	86.94	94.00	-7.06	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Field strength of spurious emission

EUT：	2.4G Wireless Mouse Receiver	Model Name. ：	GMAERGW17RC
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage：	DC 5V
Test Mode ：	Mode 1	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4816.034	49.38	3.76	53.14	74.00	-20.86	peak
4816.034	47.85	3.76	51.61	54.00	-2.39	AVG
7224.045	40.35	8.17	48.52	74.00	-25.48	peak
7224.045	37.24	8.17	45.41	54.00	-8.59	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT：	2.4G Wireless Mouse Receiver	Model Name. ：	GMAERGW17RC
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	Mode 1	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4816.034	48.86	3.76	52.62	74.00	-21.38	peak
4816.034	46.72	3.76	50.48	54.00	-3.52	AVG
7224.045	39.97	8.17	48.14	74.00	-25.86	peak
7224.045	36.89	8.17	45.06	54.00	-8.94	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT：	2.4G Wireless Mouse Receiver	Model Name.：	GMAERGW17RC
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage：	DC 5V
Test Mode ：	Mode 2	Polarization：	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4880.034	49.07	3.78	52.85	74.00	-21.15	peak
4880.034	46.26	3.78	50.04	54.00	-3.96	AVG
7320.045	41.13	8.23	49.36	74.00	-24.64	peak
7320.045	38.28	8.23	46.51	54.00	-7.49	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT：	2.4G Wireless Mouse Receiver	Model Name. ：	GMAERGW17RC
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	Mode 2	Polarization：	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4880.034	48.36	3.78	52.14	74.00	-21.86	peak
4880.034	45.48	3.78	49.26	54.00	-4.74	AVG
7320.045	40.89	8.23	49.12	74.00	-24.88	peak
7320.045	37.46	8.23	45.69	54.00	-8.31	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT：	2.4G Wireless Mouse Receiver	Model Name.：	GMAERGW17RC
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage：	DC 5V
Test Mode ：	Mode 3	Polarization：	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4948.034	49.21	3.81	53.02	74.00	-20.98	peak
4948.034	45.90	3.81	49.71	54.00	-4.29	AVG
7422.045	40.35	8.27	48.62	74.00	-25.38	peak
7422.045	37.04	8.27	45.31	54.00	-8.69	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT：	2.4G Wireless Mouse Receiver	Model Name. ：	GMAERGW17RC
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	Mode 3	Polarization：	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4948.034	48.83	3.81	52.64	74.00	-21.36	peak
4948.034	45.11	3.81	48.92	54.00	-5.08	AVG
7422.045	39.27	8.27	47.54	74.00	-26.46	peak
7422.045	35.91	8.27	44.18	54.00	-9.82	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Note: Other emissions from 8G to 25 GHz are considered as ambient noise. No recording in the test report.
Factor=Antenna Factor + Cable loss - Amplifier gain, Margin=Measurement-Limit.
The “Factor” value can be calculated automatically by software of measurement system.

4. BAND EDGE EMISSION

4.1. MEASUREMENT PROCEDURE

1. The EUT operates at transmitting mode. The operate channel is tested to verify the largest transmission and spurious emissions power at the continuous transmission mode.

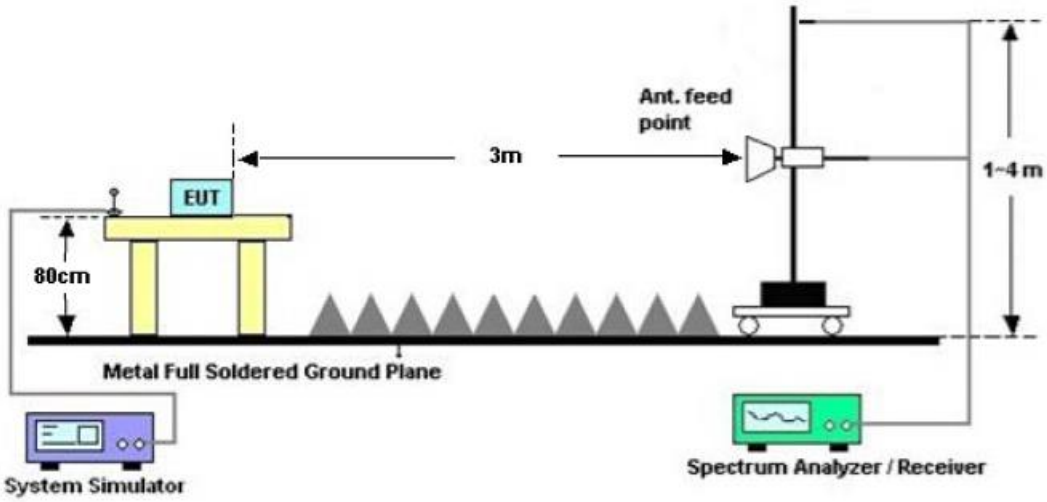
2. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission: (a) PEAK: RBW=1MHz, VBW=3MHz , Sweep=AUTO

(b) AVERAGE: RBW=1MHz ; VBW=1/on time(1kHz), Sweep=AUTO

3. Other procedures refer to clause 3.1.

4.2 TEST SETUP

RADIATED EMISSION TEST SETUP



4.3 RADIATED TEST RESULT

Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain. Field Strength=Factor + Reading level
2. The factor had been edited in the “Input Correction” of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB(μV) to represent the Amplitude. Use the F dB(μV/m) to represent the Field Strength. So A=F.

EUT：	2.4G Wireless Mouse Receiver	Model Name. ：	GMAERGW17RC
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	Mode 1	Polarization：	Horizontal

Peak Value

Average Value

EUT：	2.4G Wireless Mouse Receiver	Model Name. ：	GMAERGW17RC
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	Mode 1	Polarization：	Vertical

Peak Value

Average Value

EUT：	2.4G Wireless Mouse Receiver	Model Name. ：	GMAERGW17RC
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	Mode 3	Polarization：	Horizontal

Peak Value

Average Value

EUT：	2.4G Wireless Mouse Receiver	Model Name. ：	GMAERGW17RC
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	Mode 3	Polarization：	Vertical

Peak Value

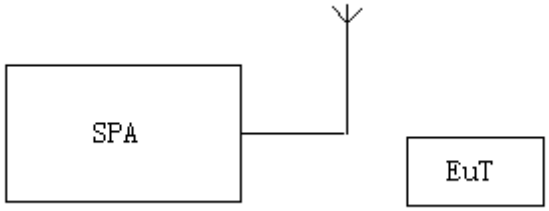
Average

5. BANDWIDTH

5.1. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2, Set the EUT Work on the operation frequency individually.
3. Set Span = approximately 2 to 5 times the OBW, centered on a hoping channel
   The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately 3* RBW; Sweep = auto; Detector function = peak
4. Set SPA Trace 1 Max hold, then View.

5.2. TEST SETUP

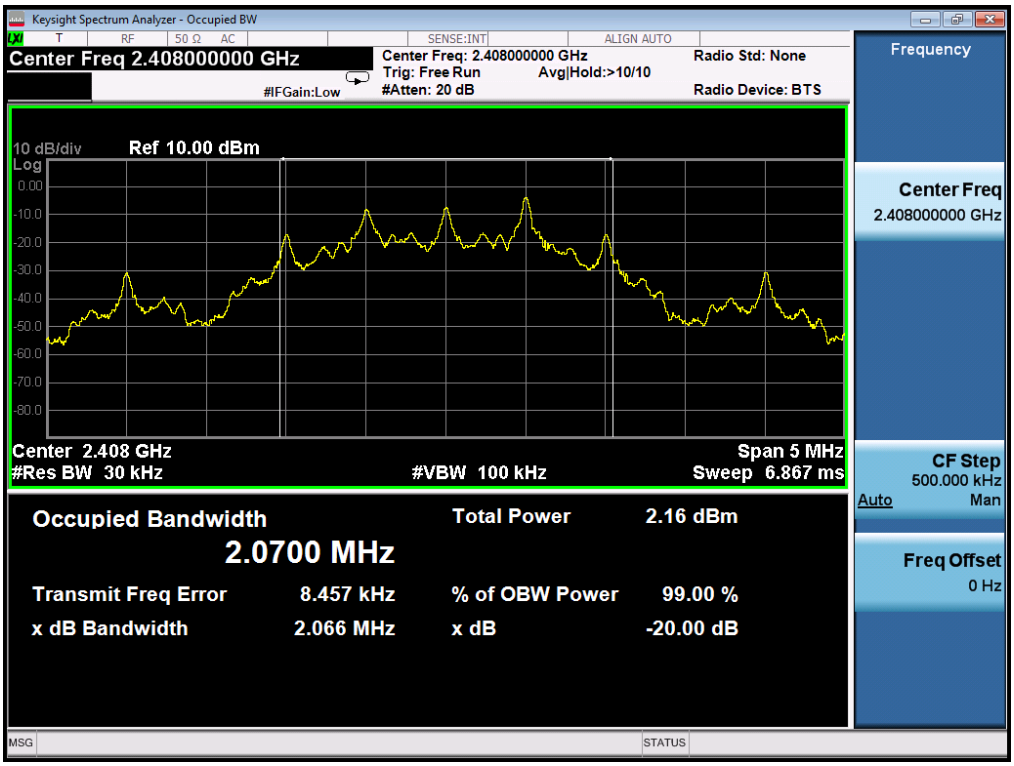


5.3. TEST RESULT

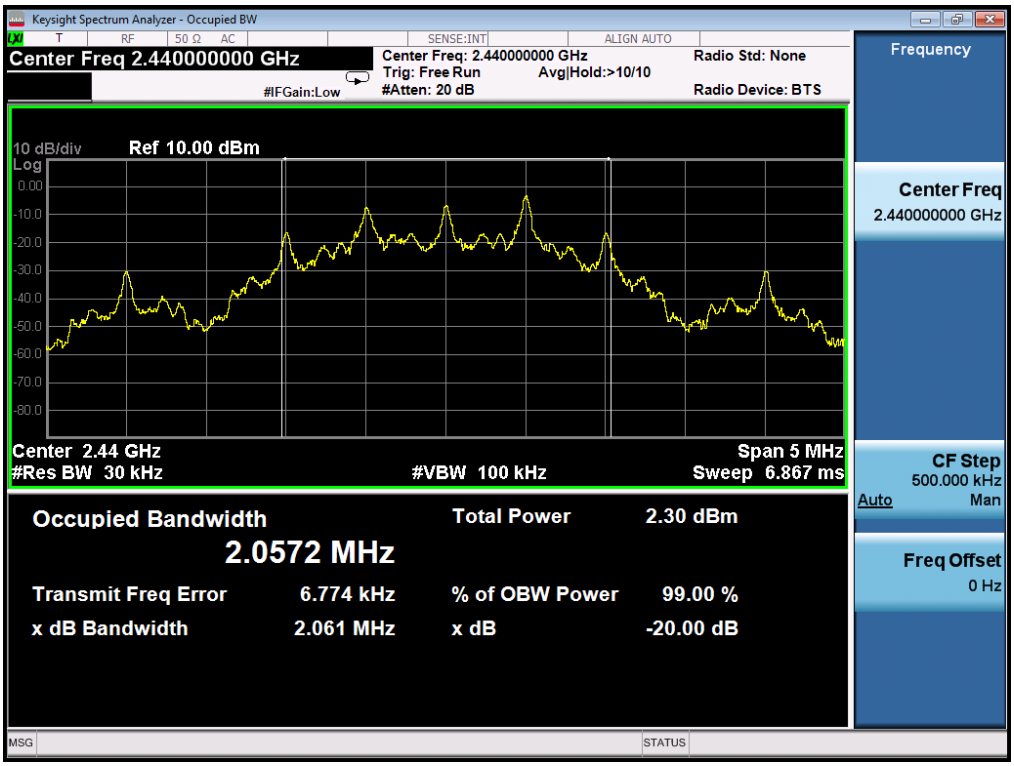
TEST ITEM	-20dB BANDWIDTH
TEST MODE	Mode1, Mode 2, Mode 3

Channel	MHz	Criteria
Low Channel	2.066	PASS
Middle Channel	2.061	PASS
High Channel	2.062	PASS

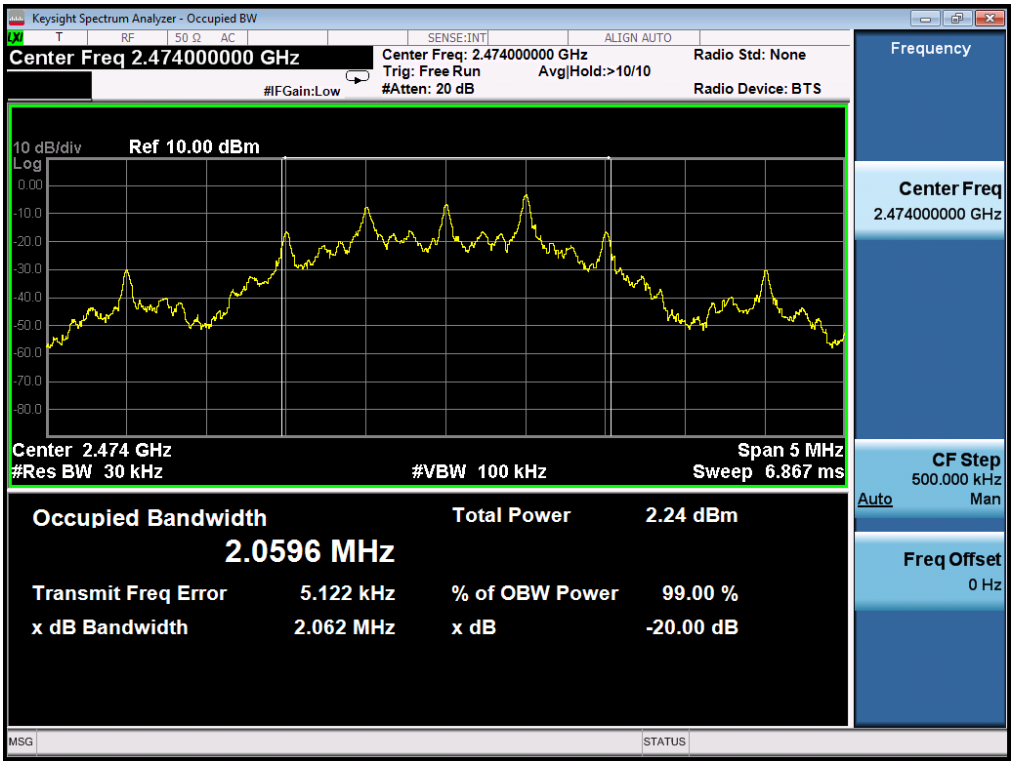
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



6. FCC LINE CONDUCTED EMISSION TEST

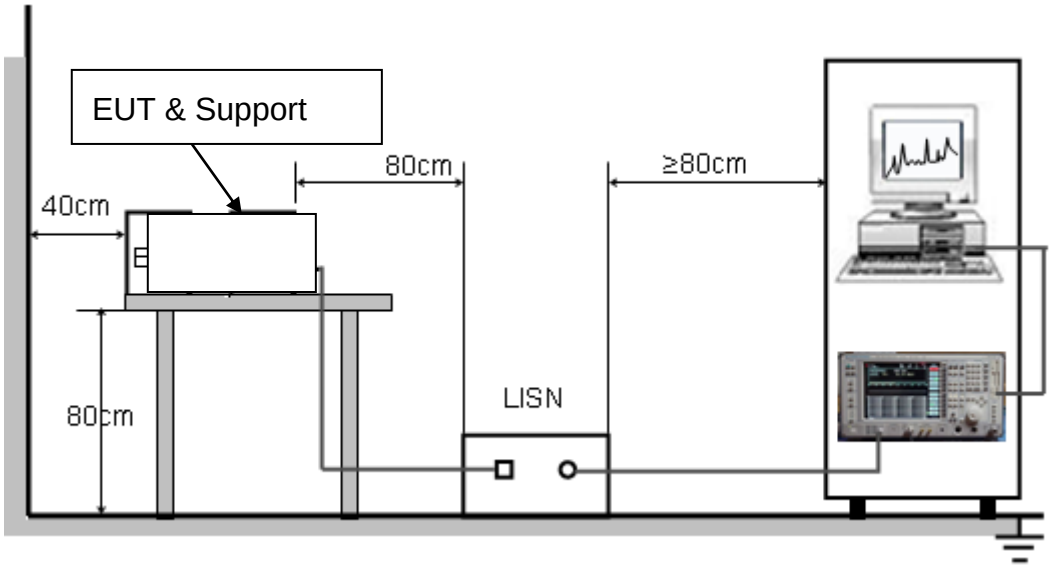
6.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

6.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



6.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC 5V power from adapter which received AC120V/60Hz power from a LISN.
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

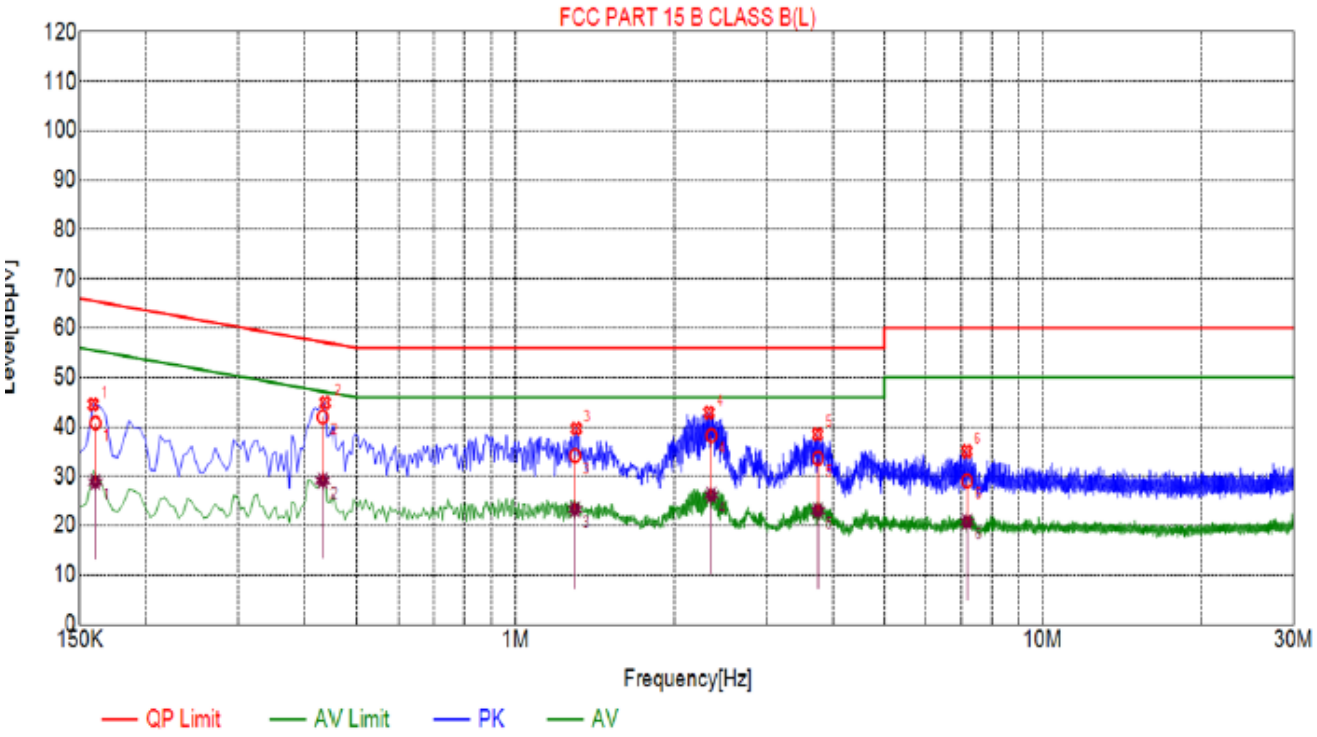
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

6.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

6.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

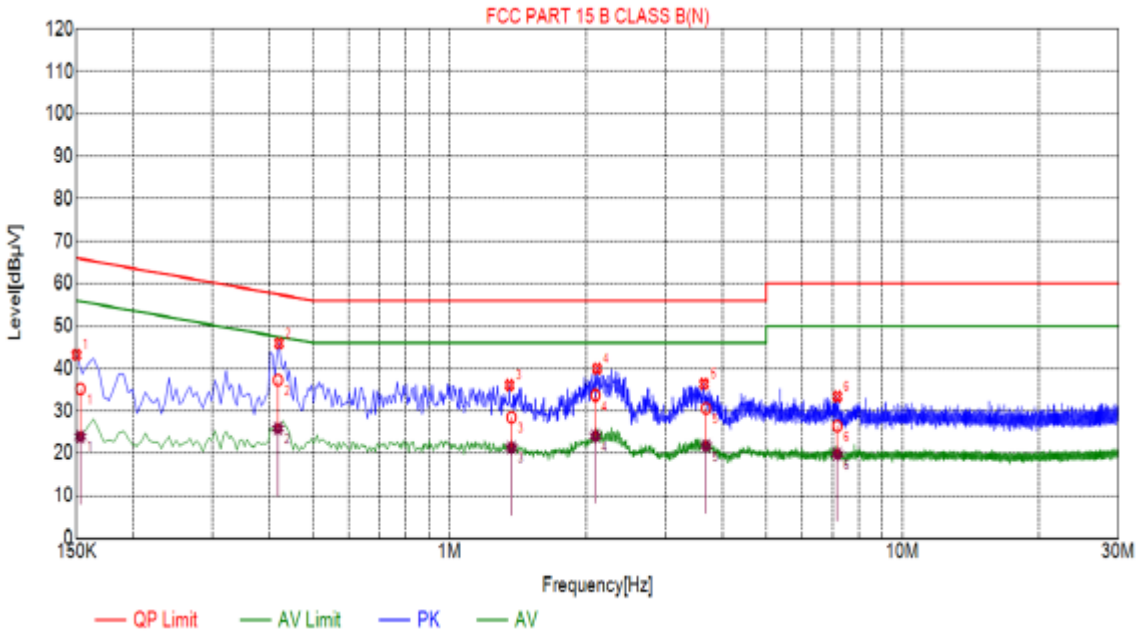
Line Conducted Emission Test Line 1-L



Suspected List						
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector
1	0.1590	44.58	10.01	65.52	20.94	PK
2	0.4380	44.93	10.05	57.10	12.17	PK
3	1.3020	39.69	10.10	56.00	16.31	PK
4	2.3280	42.93	10.18	56.00	13.07	PK
5	3.7410	38.52	10.25	56.00	17.48	PK
6	7.1835	35.09	10.19	60.00	24.91	PK

Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]
1	0.1605	10.00	40.79	65.44	24.65	28.86	55.44	26.58
2	0.4336	10.05	42.04	57.18	15.14	29.15	47.18	18.03
3	1.2954	10.09	34.20	56.00	21.80	23.27	46.00	22.73
4	2.3512	10.18	38.25	56.00	17.75	26.20	46.00	19.80
5	3.7461	10.25	33.63	56.00	22.37	23.04	46.00	22.96
6	7.1897	10.19	29.09	60.00	30.91	20.79	50.00	29.21

Line Conducted Emission Test Line 2-N



Suspected List						
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector
1	0.1500	43.17	10.03	66.00	22.83	PK
2	0.4200	45.92	10.04	57.45	11.53	PK
3	1.3560	36.08	10.10	56.00	19.92	PK
4	2.1165	40.00	10.16	56.00	16.00	PK
5	3.6465	36.36	10.25	56.00	19.64	PK
6	7.1835	33.41	10.19	60.00	26.59	PK

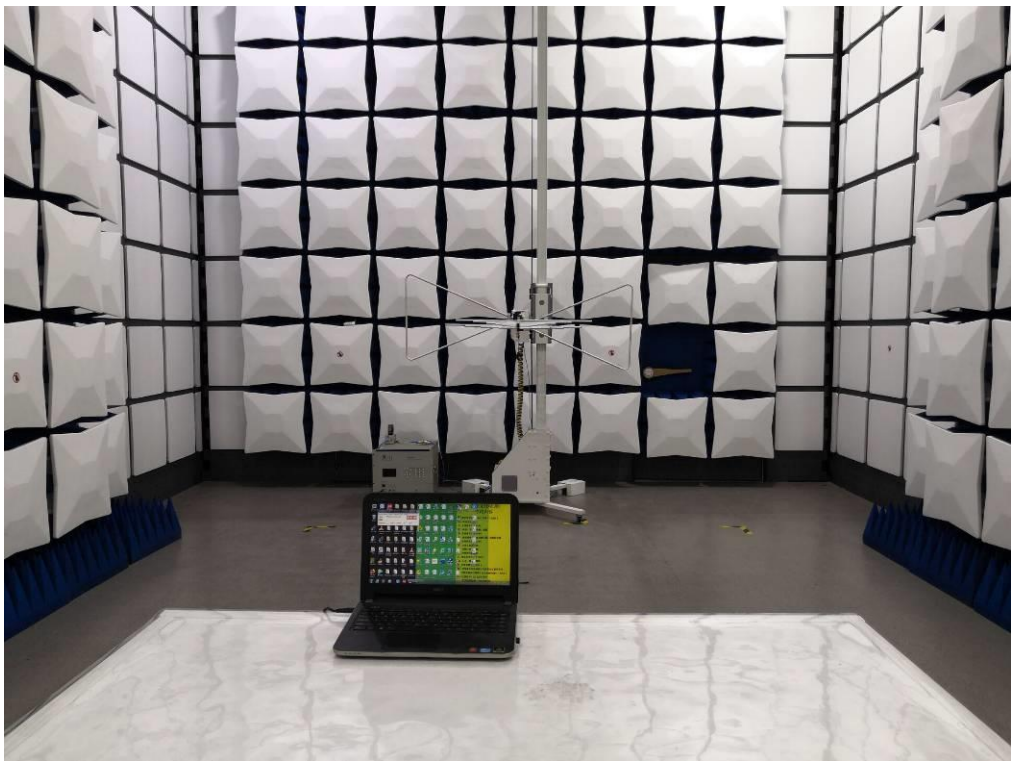
Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]
1	0.1530	10.03	35.21	65.84	30.63	23.93	55.84	31.91
2	0.4178	10.04	37.28	57.49	20.21	25.84	47.49	21.65
3	1.3695	10.11	28.51	56.00	27.49	21.34	46.00	24.66
4	2.0987	10.15	33.68	56.00	22.32	24.11	46.00	21.89
5	3.6829	10.25	30.62	56.00	25.38	21.80	46.00	24.20
6	7.1785	10.19	26.47	60.00	33.53	19.88	50.00	30.12

RESULT: PASS

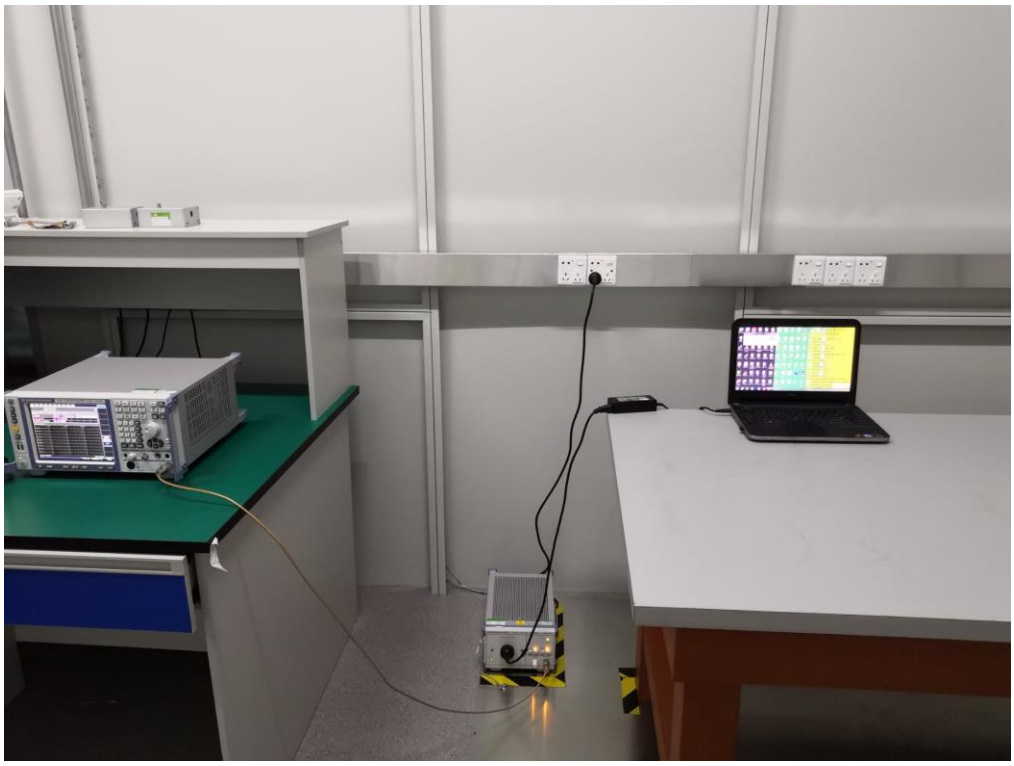
Note: All the test modes had been tested, the mode 1 was the worst case. Only the data of the worst case would be record in this test report.

7. PHOTOGRAPH OF TEST

Radiated Emission



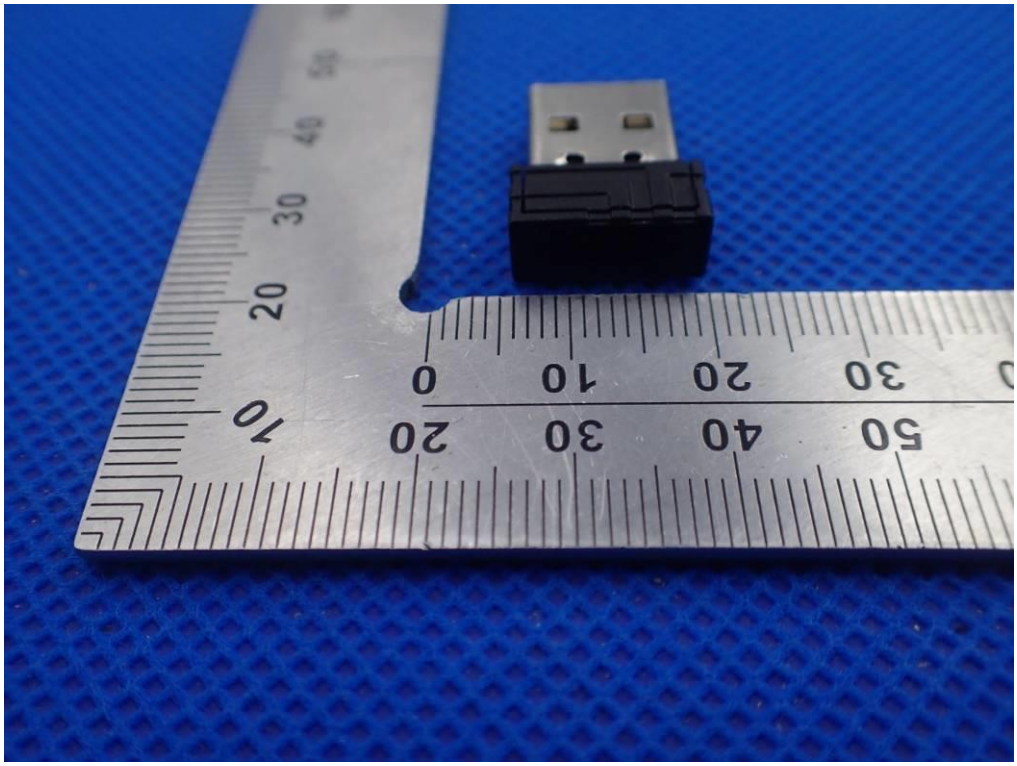
Conducted Emission



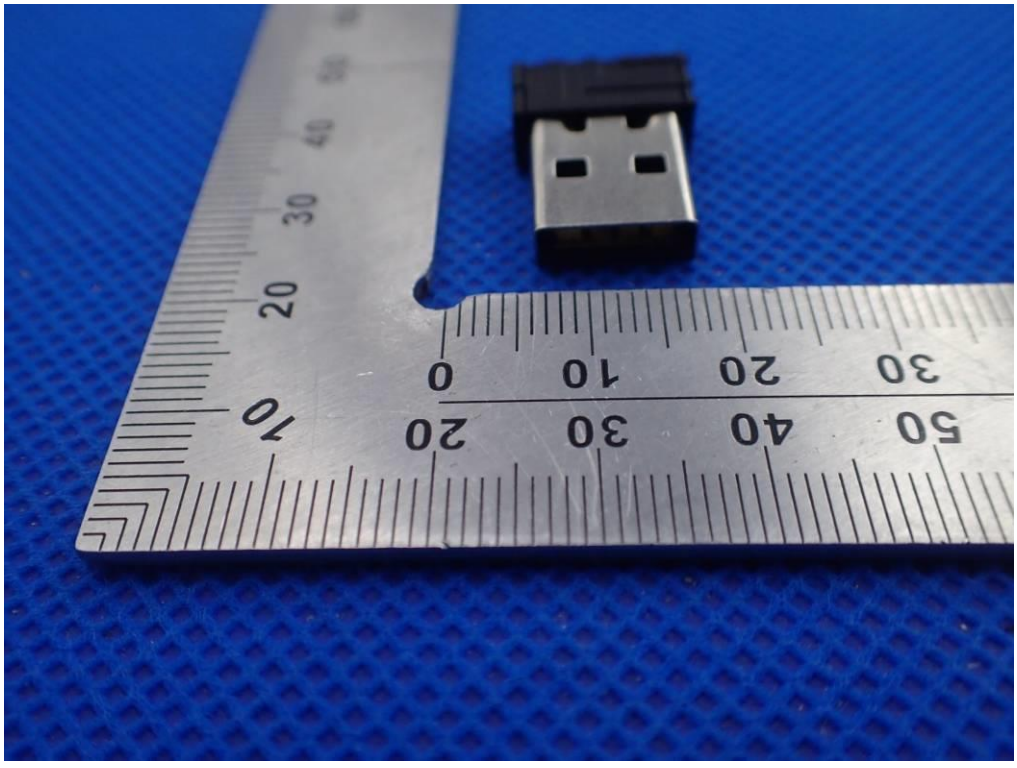
8. PHOTOGRAPH OF EUT

ALL VEIW OF EUT

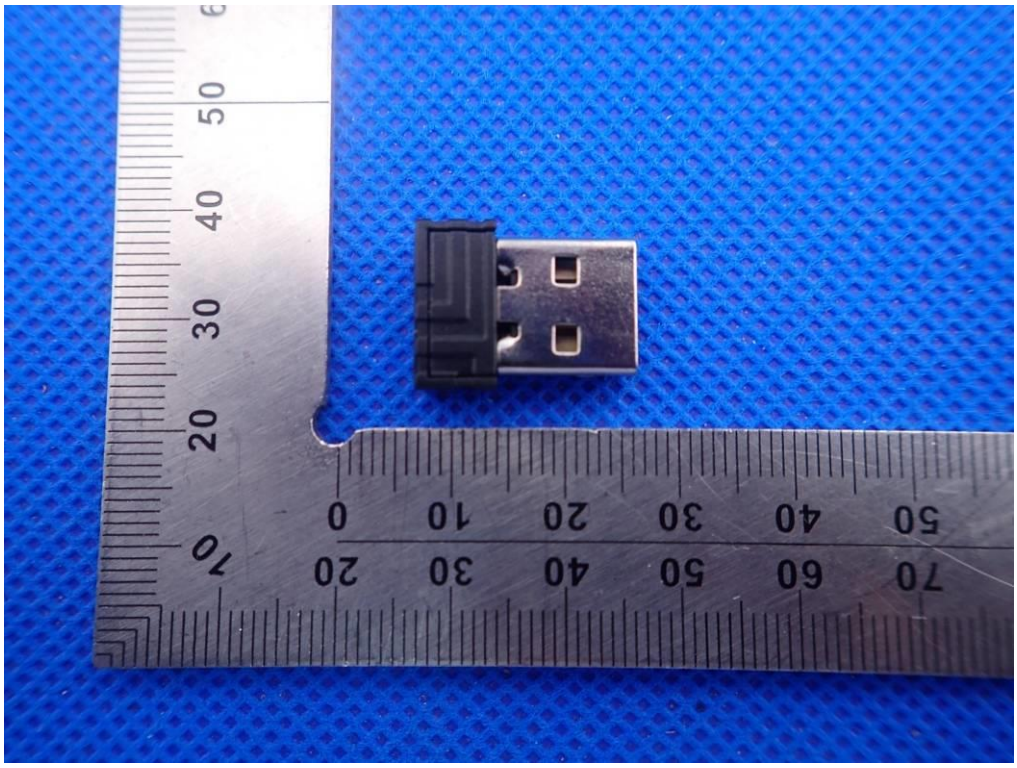
TOP VIEW OF EUT



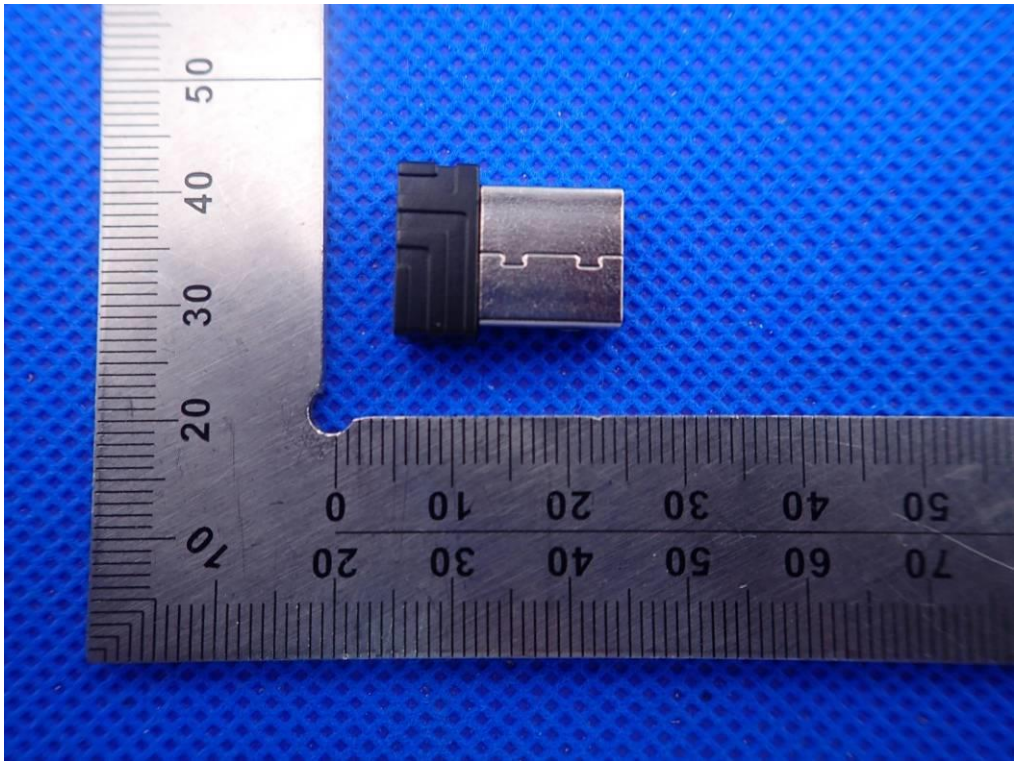
BOTTOM VIEW OF EUT



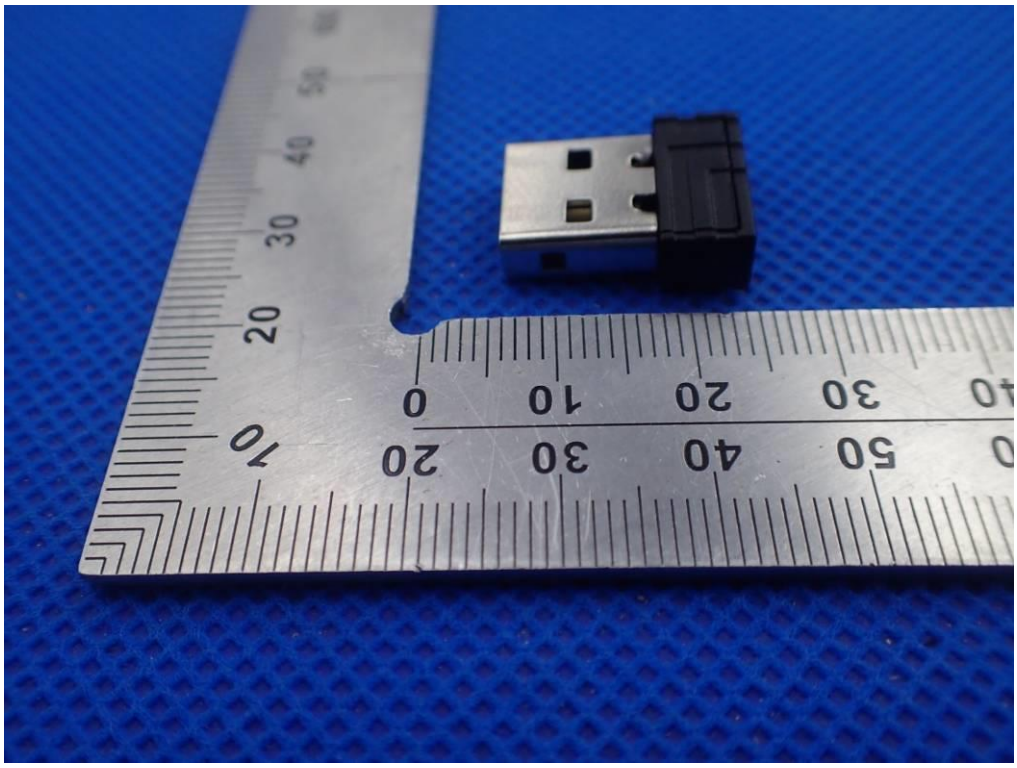
FRONT VIEW OF EUT



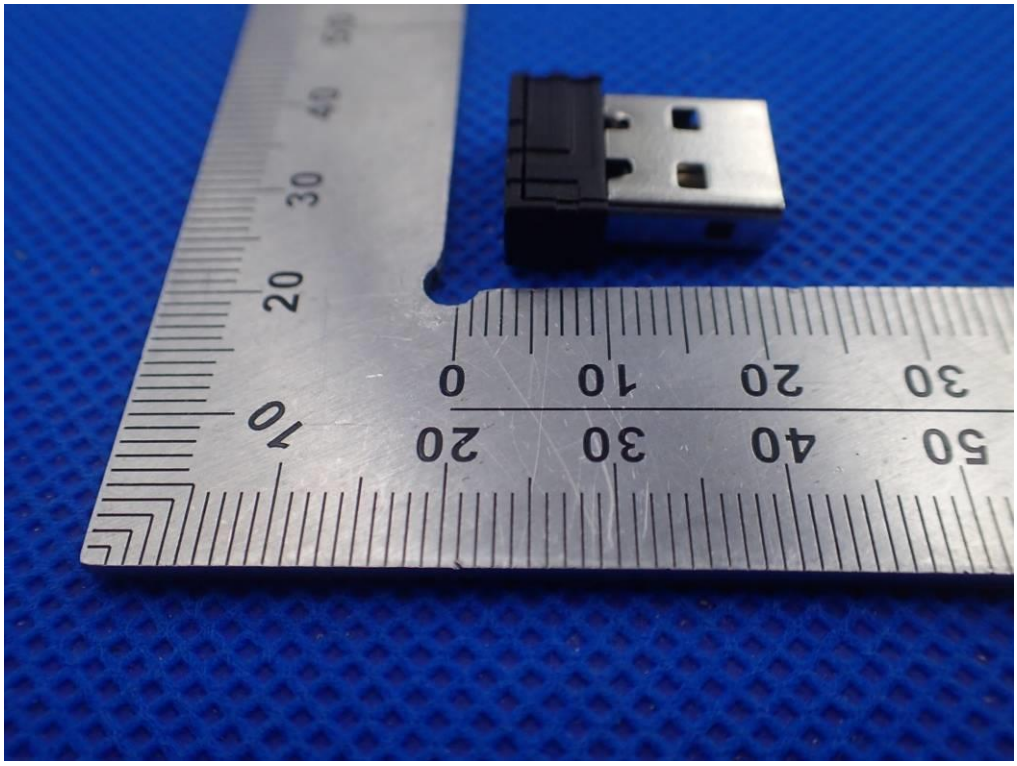
BACK VIEW OF EUT



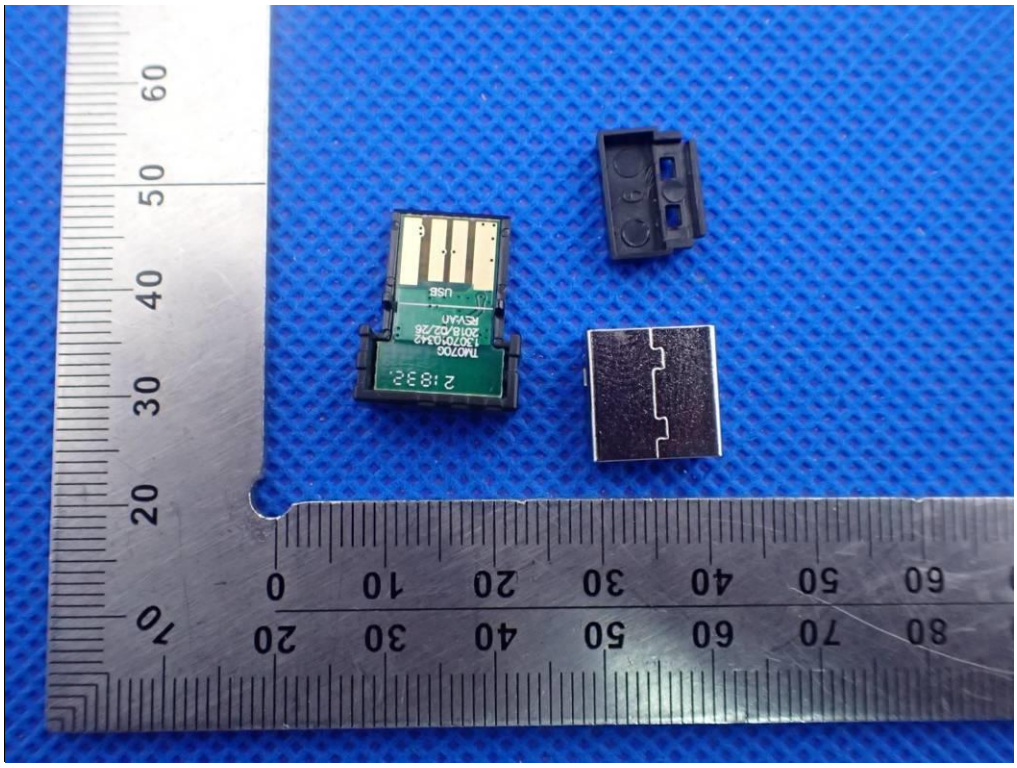
LEFT VIEW OF EUT



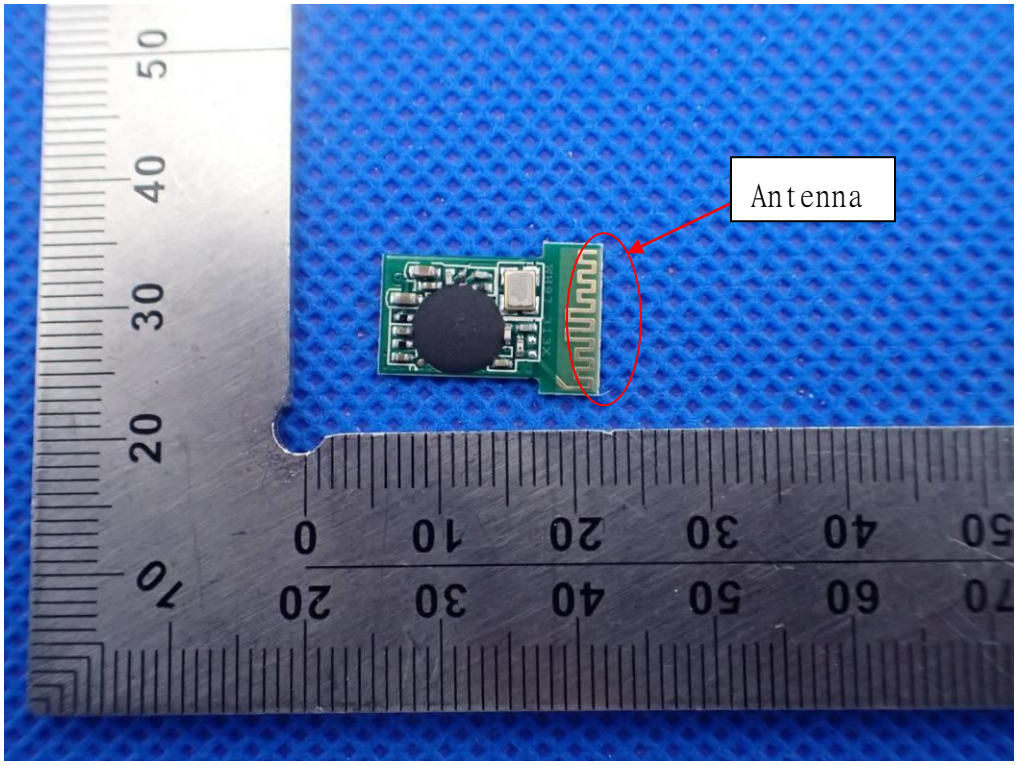
RIGHT VIEW OF EUT



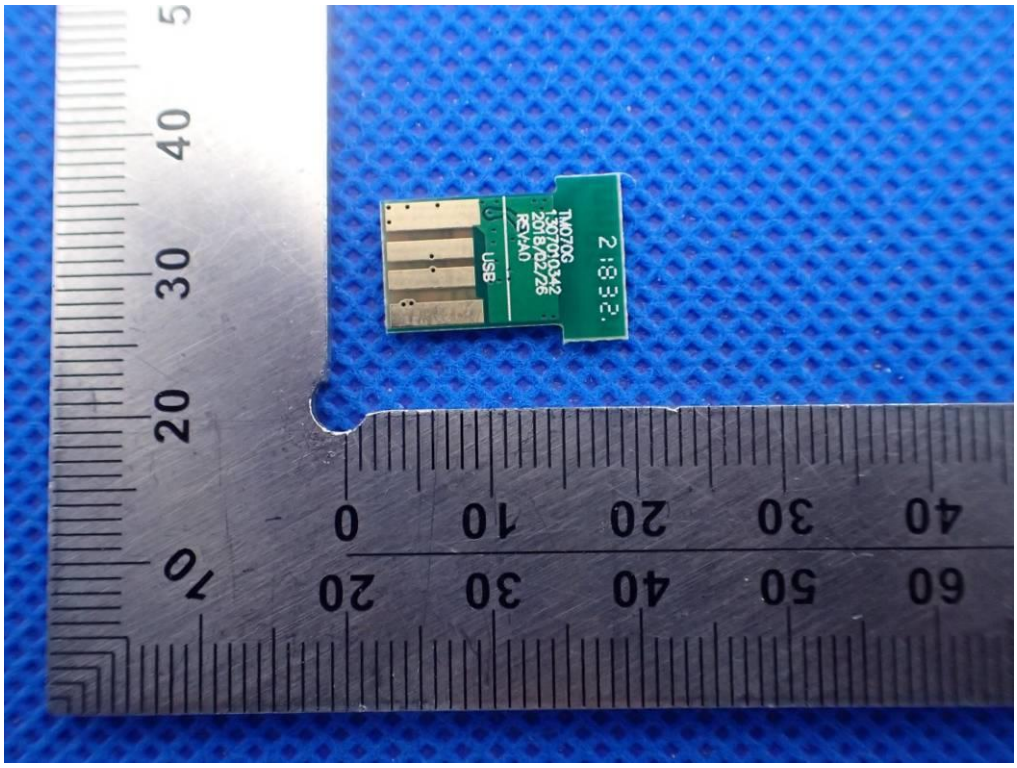
OPEN VIEW OF EUT 1



INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



----END OF REPORT----