

TEST REPORT

Product Name : Wireless Mouse
Brand Mark : TECKNET/TeckNet
Model No. : EWM01576
Report Number : BLA-EMC-202202-A1402
FCC ID : 2AK8Q-EWM01576
Date of Sample Receipt : 2022/2/22
Date of Test : 2022/3/2 to 2022/3/30
Date of Issue : 2022/3/30
Test Standard : 47 CFR Part 15, Subpart C 15.249
Test Result : Pass

Prepared for:

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201, 111-3, Huangjinshan District, Bantian Community, Bantian Street,
Longgang District, Shenzhen, China

Prepared by:

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Date:

2022/3/30



REPORT REVISE RECORD

Version No.	Date	Description
00	2022/3/30	Original

BlueAsia

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1 TEST SUMMARY

Test item	Test Requirement	Test Method	Class/Severity	Result
Radiated Emissions	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)	Pass
Restricted Band Around Fundamental Frequency	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209	Pass
Field Strength of the Fundamental Signal (15.249(a))	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.5&6.6	47 CFR Part 15, Subpart C 15.249(a)	Pass
20dB Bandwidth	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
Antenna Requirement	47 CFR Part 15, Subpart C 15.249	N/A	47 CFR Part 15, Subpart C 15.203	Pass

2 GENERAL INFORMATION

Applicant	Shenzhen Unichain Technology Co., Ltd
Address	201, 111-3, Huangjinshan District, Bantian Community, Bantian Street, Longgang District, Shenzhen, China
Manufacturer	Shenzhen Unichain Technology Co., Ltd
Address	201, 111-3, Huangjinshan District, Bantian Community, Bantian Street, Longgang District, Shenzhen, China
Factory	Shenzhen Unichain Technology Co., Ltd
Address	201, 111-3, Huangjinshan District, Bantian Community, Bantian Street, Longgang District, Shenzhen, China
Product Name	Wireless Mouse
Test Model No.	EWM01576

3 GENERAL DESCRIPTION OF E.U.T.

Hardware Version	N/A
Software Version	N/A
Channel Spacing:	2MHz
Frequency Range:	2408MHz~2474MHz
Modulation Type:	GFSK
Number of Channels:	34 (declared by the client)
Antenna Type:	PCB ANT
Antenna Gain:	0dBi(Provided by the applicant)
Power Supply:	DC3V

4 TEST ENVIRONMENT

Environment	Temperature	Voltage
normal	25°C	3VDC

5 TEST MODE

TEST MODE	TEST MODE DESCRIPTION
TX	Keep the EUT in transmitting mode
Remak: new battery is used during all test.	

6 MEASUREMENT UNCERTAINTY

Parameter	Expanded Uncertainty (Confidence of 95%)
Radiated Emission(9kHz-30MHz)	±4.34dB
Radiated Emission(30Mz-1000MHz)	±4.24dB
Radiated Emission(1GHz-18GHz)	±4.68dB
AC Power Line Conducted Emission(150kHz-30MHz)	±3.45dB

7 DESCRIPTION OF SUPPORT UNIT

Device Type	Manufacturer	Model Name	Serial No.	Remark
PC	HASEE	K610D	N/A	N/A

8 LABORATORY LOCATION

All tests were performed at:
BlueAsia of Technical Services(Shenzhen) Co., Ltd.
Building C, No. 107, Shihuan Road, Shiyuan Sub-District, Baoan District, Shenzhen, Guangdong Province,
China
Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673
No tests were sub-contracted.

9 TEST INSTRUMENTS LIST

Test Equipment Of Radiated Emissions					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Chamber	SKET	966	N/A	10/11/2020	9/11/2023
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Receiver	R&S	ESR7	101199	24/9/2021	23/9/2022
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	26/9/2020	25/9/2022
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	26/9/2020	25/9/2022
Amplifier	SKET	LNPA-0118-45	N/A	24/9/2021	23/9/2022
EMI software	EZ	EZ-EMC	N/A	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	26/9/2020	25/9/2022

Test Equipment Of Restricted Band Around Fundamental Frequency					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Chamber	SKET	966	N/A	10/11/2020	9/11/2023
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Receiver	R&S	ESR7	101199	24/9/2021	23/9/2022
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	26/9/2020	25/9/2022
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	26/9/2020	25/9/2022
Amplifier	SKET	LNPA-0118-45	N/A	24/9/2021	23/9/2022
EMI software	EZ	EZ-EMC	N/A	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	26/9/2020	25/9/2022

Test Equipment Of Field Strength of the Fundamental Signal (15.249(a))					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Chamber	SKET	966	N/A	10/11/2020	9/11/2023
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Receiver	R&S	ESR7	101199	24/9/2021	23/9/2022
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	26/9/2020	25/9/2022
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	26/9/2020	25/9/2022
Amplifier	SKET	LNPA-0118-45	N/A	24/9/2021	23/9/2022
EMI software	EZ	EZ-EMC	N/A	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	26/9/2020	25/9/2022

Test Equipment Of 20dB Bandwidth					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Shield room	SKET	833	N/A	25/11/2020	24/11/2023
Receiver	R&S	ESPI3	101082	24/9/2021	23/9/2022
LISN	R&S	ENV216	3560.6550.15	24/9/2021	23/9/2022
LISN	AT	AT166-2	AKK1806000003	26/9/2021	25/9/2022
EMI software	EZ	EZ-EMC	N/A	N/A	N/A

Test Equipment Of Conducted Emissions at AC Power Line (150kHz-30MHz)					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Shield room	SKET	833	N/A	25/11/2020	24/11/2023
Receiver	R&S	ESPI3	101082	24/9/2021	23/9/2022

LISN	R&S	ENV216	3560.6550.15	24/9/2021	23/9/2022
LISN	AT	AT166-2	AKK1806000003	26/9/2021	25/9/2022
EMI software	EZ	EZ-EMC	N/A	N/A	N/A

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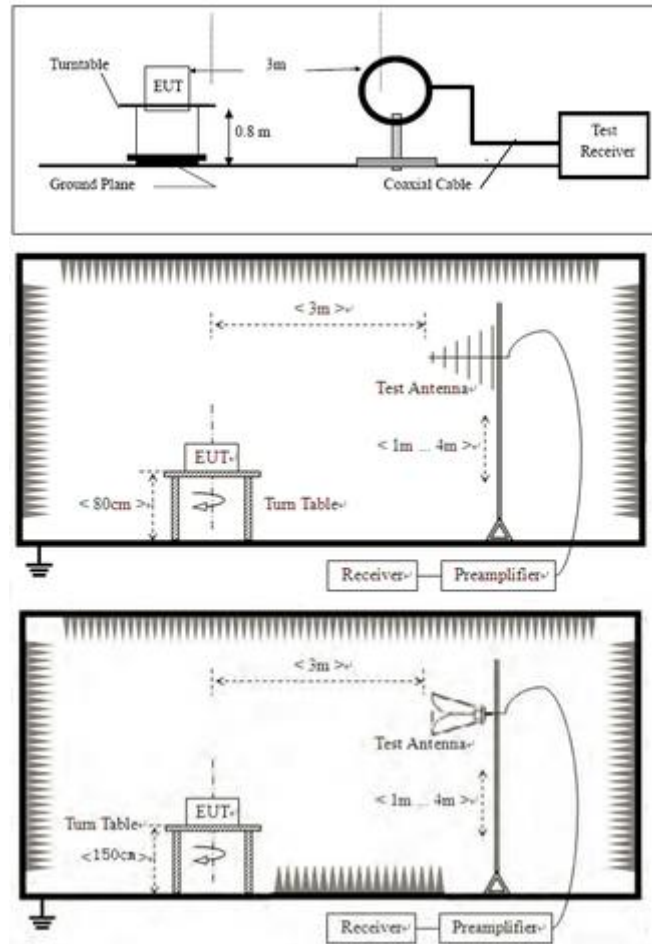
10 RADIATED EMISSIONS

Test Standard	47 CFR Part 15, Subpart C 15.249
Test Method	ANSI C63.10 (2013) Section 6.4&6.5&6.6
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25°C
Humidity	60%

10.1 LIMITS

Frequency(MHz)	Field strength (microvolts/meter)	Limit (dBuV/m)	Detector	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	-	300
0.490-1.705	24000/F(kHz)	-	-	30
1.705-30	30	-	-	30
30-88	100	40.0	QP	3
88-216	150	43.5	QP	3
216-960	200	46.0	QP	3
960-1000	500	54.0	QP	3
Above 1000	500	54.0	AV	3

10.2 BLOCK DIAGRAM OF TEST SETUP



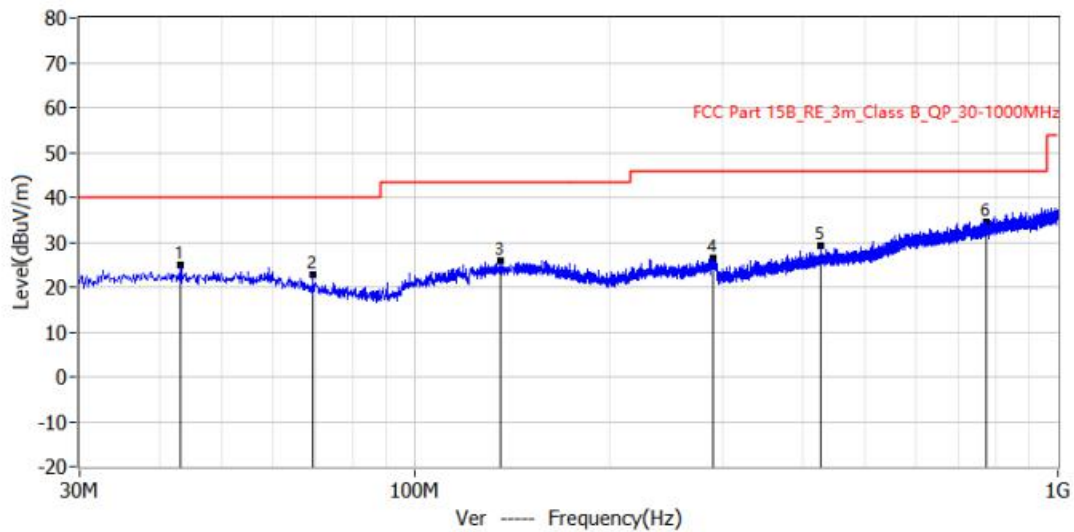
10.3 PROCEDURE

For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. Only the worst position of vertical was shown in the report.

10.4 TEST DATA

[TestMode: TX below 1G]; [Polarity: Vertical]

Test Lab: BlueAsia EMC Lab (RE #1)	Project: BLA-EMC-202202-A14
EUT: Wireless Mouse	Test Engineer: York
M/N: EWM01576	Temperature:
S/N:	Humidity:
Test Mode: TX mode	Test Voltage:
Note:	Test Data: 2022-03-26 12:03:54

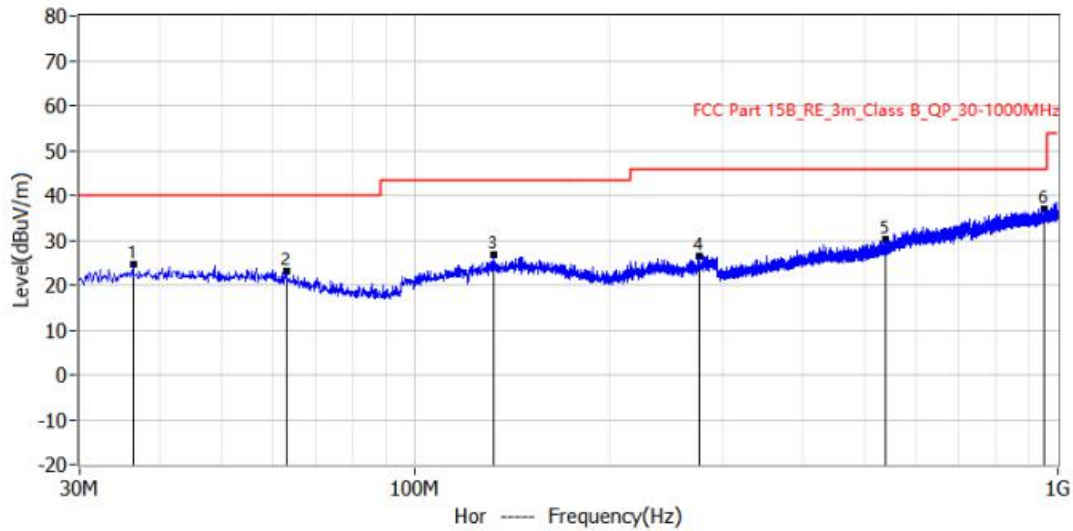


No.	Frequency	Limit dBuV/m	Level dBuV/m	Delta dB	Reading dBuV	Factor dB/m	Detector	Polar	Height cm	Angle deg
1*	43.095MHz	40.0	24.9	-15.1	0.9	24.0	QP	Ver	100.0	220.0
2*	69.285MHz	40.0	22.8	-17.2	1.2	21.6	QP	Ver	100.0	183.0
3*	135.366MHz	43.5	25.7	-17.8	2.2	23.5	QP	Ver	100.0	229.0
4*	290.809MHz	46.0	26.5	-19.5	2.7	23.8	QP	Ver	100.0	141.0
5*	427.094MHz	46.0	29.2	-16.8	1.6	27.6	QP	Ver	100.0	248.0
6*	774.111MHz	46.0	34.6	-11.4	1.0	33.6	QP	Ver	100.0	322.0

Test Result: Pass

[TestMode: TX below 1G]; [Polarity: Horizontal]

Test Lab: BlueAsia EMC Lab (RE #1)	Project: BLA-EMC-202202-A14
EUT: Wireless Mouse	Test Engineer: York
M/N: EWM01576	Temperature:
S/N:	Humidity:
Test Mode: TX mode	Test Voltage:
Note:	Test Data: 2022-03-26 12:05:49

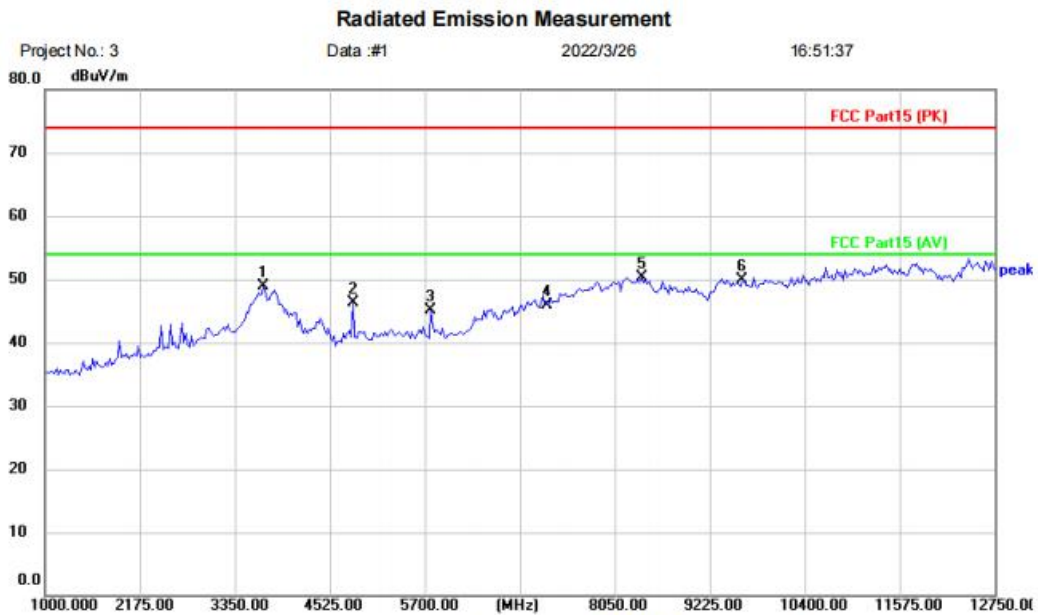


No.	Frequency	Limit dBuV/m	Level dBuV/m	Delta dB	Reading dBuV	Factor dB/m	Detector	Polar	Height cm	Angle deg
1*	36.305MHz	40.0	24.6	-15.4	0.9	23.7	QP	Hor	100.0	18.0
2*	62.859MHz	40.0	23.2	-16.8	0.3	22.9	QP	Hor	100.0	0.0
3*	132.093MHz	43.5	26.7	-16.8	3.4	23.3	QP	Hor	100.0	31.0
4*	275.774MHz	46.0	26.5	-19.5	3.1	23.4	QP	Hor	100.0	181.0
5*	540.220MHz	46.0	30.2	-15.8	0.6	29.6	QP	Hor	100.0	334.0
6*	951.985MHz	46.0	37.0	-9.0	1.4	35.6	QP	Hor	100.0	275.0

Test Result: Pass

Above 1GHz:

[TestMode: TX low channel]; [Polarity: Vertical]



Project No.: 3 Data :#1 2022/3/26 16:51:37

Site Polarization: **Vertical** Temperature: (C)

Limit: FCC Part15 (PK) Power: Humidity: %RH

EUT: Wireless Mouse

M/N: EWMO1576

Mode: TX-L

Note:

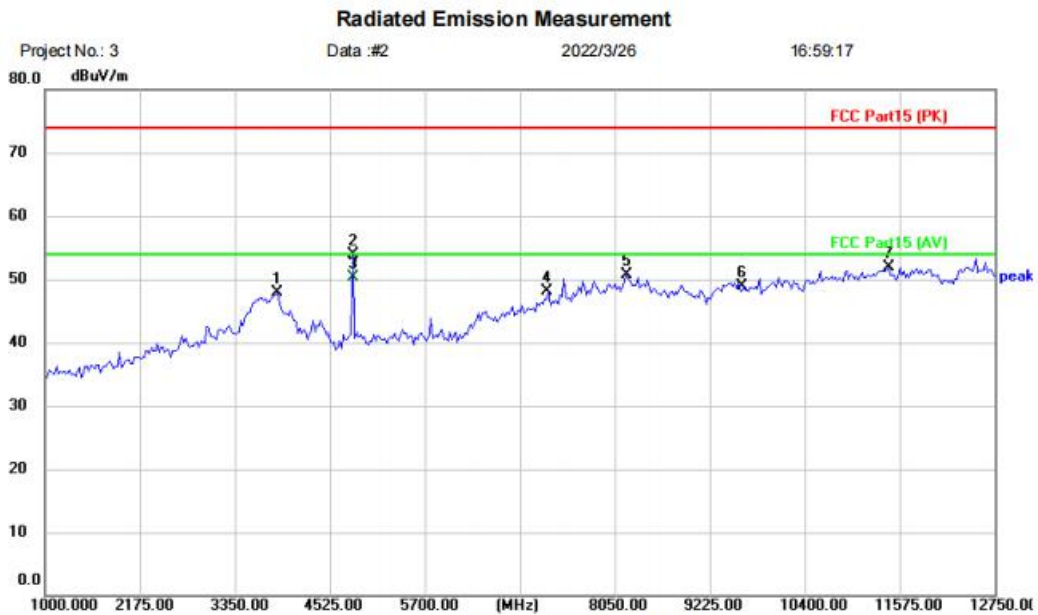
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		3702.500	42.89	6.06	48.95	74.00	-25.05	peak	
2		4807.000	44.87	1.43	46.30	74.00	-27.70	peak	
3		5770.500	43.25	1.80	45.05	74.00	-28.95	peak	
4		7224.000	39.01	6.91	45.92	74.00	-28.08	peak	
5	*	8379.000	40.65	9.74	50.39	74.00	-23.61	peak	
6		9632.000	39.36	10.61	49.97	74.00	-24.03	peak	

*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result: Pass

[TestMode: TX low channel]; [Polarity: Horizontal]



Site: Polarization: **Horizontal** Temperature: (C)
 Limit: FCC Part15 (PK) Power: Humidity: %RH
 EUT: Wireless Mouse
 M/N: EWMO1576
 Mode: TX-L
 Note:

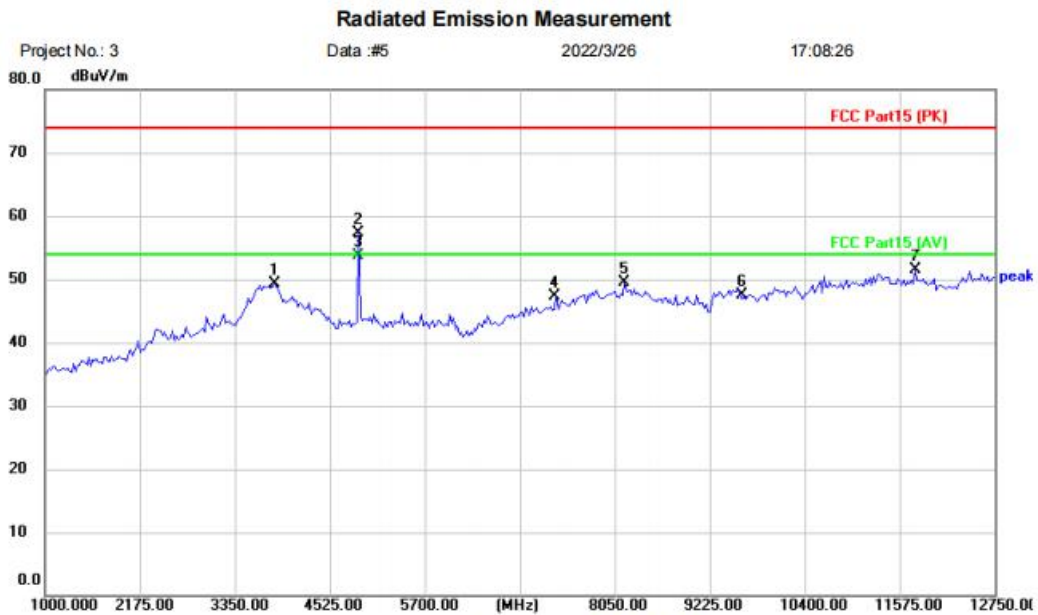
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		3867.000	42.79	5.05	47.84	74.00	-26.16	peak	
2		4807.000	52.40	1.43	53.83	74.00	-20.17	peak	
3	*	4807.000	48.89	1.43	50.32	54.00	-3.68	AVG	
4		7224.000	41.21	6.91	48.12	74.00	-25.88	peak	
5		8191.000	41.27	9.35	50.62	74.00	-23.38	peak	
6		9632.000	38.27	10.61	48.88	74.00	-25.12	peak	
7		11434.000	38.88	12.98	51.86	74.00	-22.14	peak	

*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result: Pass

[TestMode: TX mid channel]; [Polarity: Horizontal]



Site: Polarization: **Horizontal** Temperature: (C)
 Limit: FCC Part15 (PK) Power: Humidity: %RH
 EUT: Wireless Mouse
 M/N: EWMO1576
 Mode: TX-M
 Note:

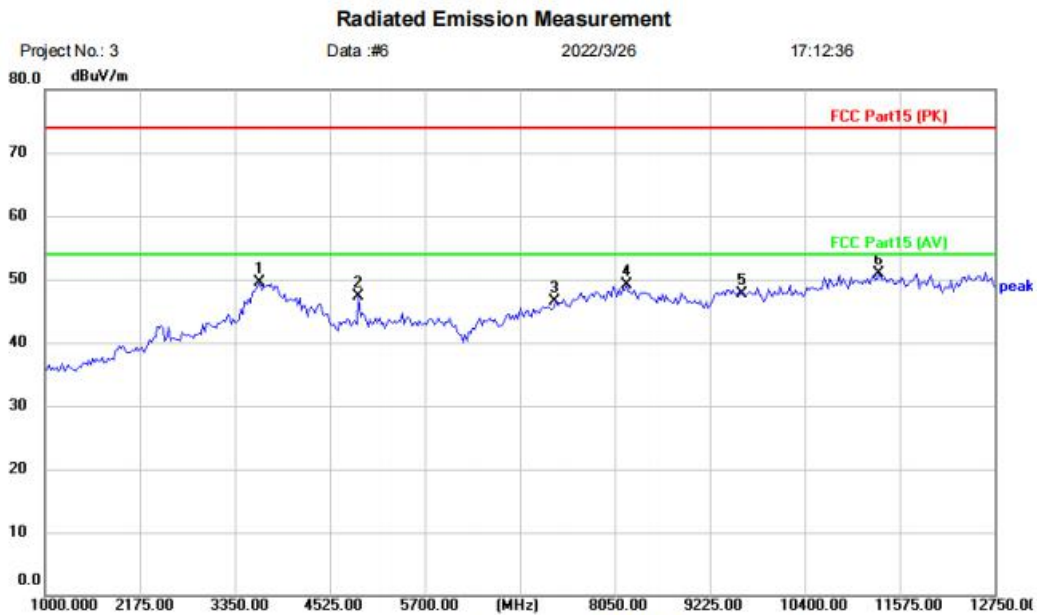
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		3843.500	42.19	7.12	49.31	74.00	-24.69	peak	
2		4877.500	53.97	3.37	57.34	74.00	-16.66	peak	
3	*	4877.500	50.32	3.37	53.69	54.00	-0.31	AVG	
4		7320.000	40.83	6.41	47.24	74.00	-26.76	peak	
5		8167.500	41.30	8.17	49.47	74.00	-24.53	peak	
6		9632.000	38.24	9.34	47.58	74.00	-26.42	peak	
7		11763.000	39.96	11.63	51.59	74.00	-22.41	peak	

*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result: Pass

[TestMode: TX mid channel]; [Polarity: Vertical]



Site: Polarization: **Vertical** Temperature: (C)
 Limit: FCC Part15 (PK) Power: Humidity: %RH
 EUT: Wireless Mouse
 M/N: EWMO1576
 Mode: TX-M
 Note:

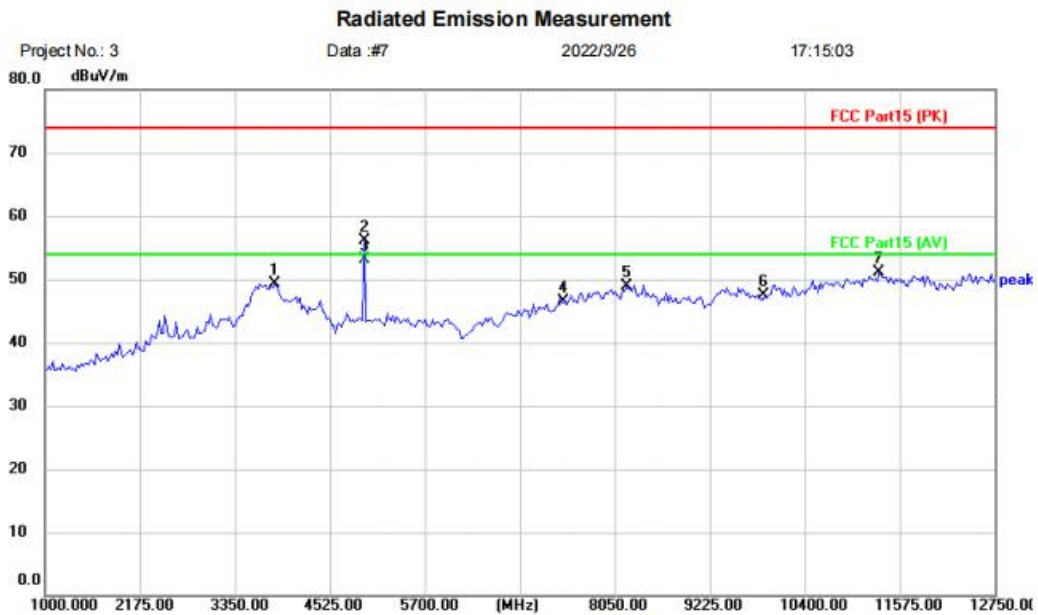
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		3655.500	41.74	7.76	49.50	74.00	-24.50	peak	
2		4877.500	43.91	3.37	47.28	74.00	-26.72	peak	
3		7320.000	40.02	6.41	46.43	74.00	-27.57	peak	
4		8191.000	40.97	8.20	49.17	74.00	-24.83	peak	
5		9632.000	38.38	9.34	47.72	74.00	-26.28	peak	
6	*	11316.500	38.97	11.88	50.85	74.00	-23.15	peak	

*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result: Pass

[TestMode: TX high channel]; [Polarity: Horizontal]



Site: Polarization: **Horizontal** Temperature: (C)
 Limit: FCC Part15 (PK) Power: Humidity: %RH
 EUT: Wireless Mouse
 M/N: EWMO1576
 Mode: TX-H
 Note:

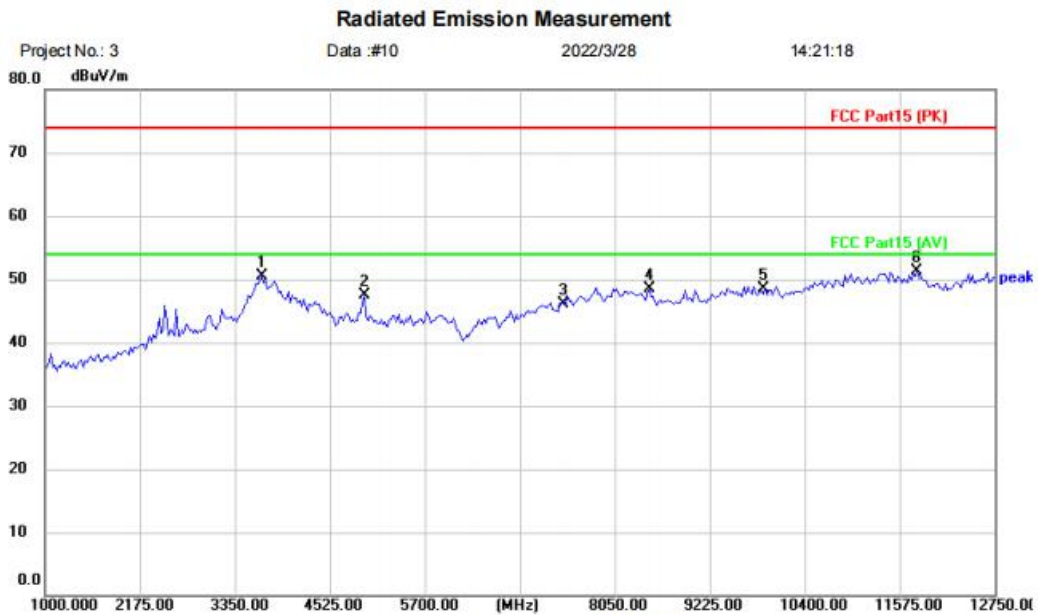
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		3843.500	42.26	7.12	49.38	74.00	-24.62	peak	
2		4948.000	52.44	3.65	56.09	74.00	-17.91	peak	
3	*	4948.000	49.51	3.65	53.16	54.00	-0.84	AVG	
4		7422.000	39.71	6.81	46.52	74.00	-27.48	peak	
5		8191.000	40.77	8.20	48.97	74.00	-25.03	peak	
6		9896.000	37.40	10.06	47.46	74.00	-26.54	peak	
7		11316.500	39.23	11.88	51.11	74.00	-22.89	peak	

*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result: Pass

[TestMode: TX high channel]; [Polarity: Vertical]



Site: Polarization: **Vertical** Temperature: (C)
 Limit: FCC Part15 (PK) Power: Humidity: %RH
 EUT: Wireless Mouse
 M/N: EWMO1576
 Mode: TX-H
 Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		3679.000	42.68	7.73	50.41	74.00	-23.59	peak	
2		4948.000	43.91	3.65	47.56	74.00	-26.44	peak	
3		7422.000	39.33	6.81	46.14	74.00	-27.86	peak	
4		8473.000	40.33	8.17	48.50	74.00	-25.50	peak	
5		9896.000	38.39	10.06	48.45	74.00	-25.55	peak	
6	*	11786.500	39.64	11.57	51.21	74.00	-22.79	peak	

*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result: Pass

11 RESTRICTED BAND AROUND FUNDAMENTAL FREQUENCY

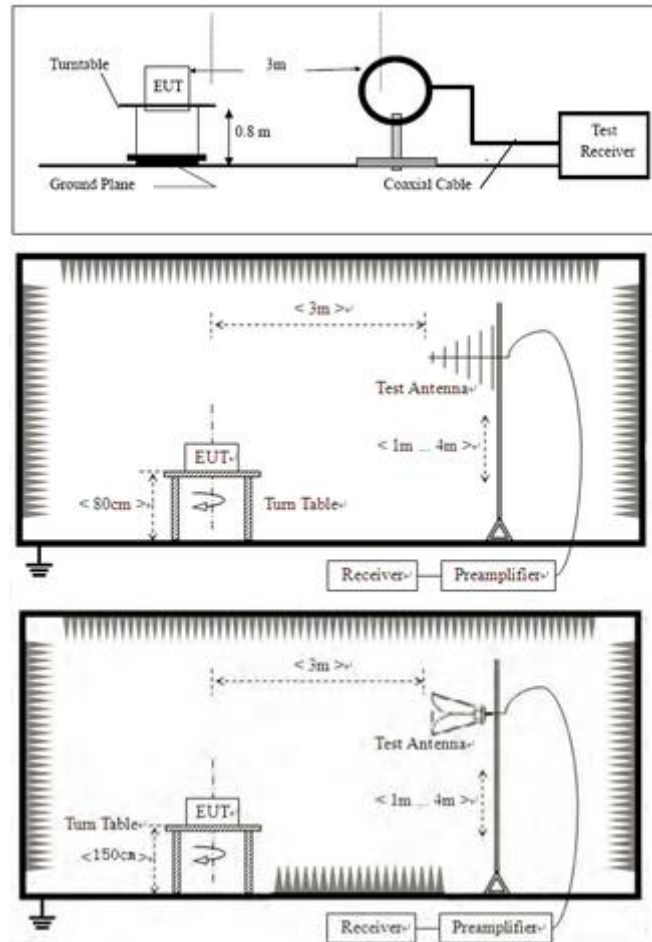
Test Standard	47 CFR Part 15, Subpart C 15.249
Test Method	ANSI C63.10 (2013) Section 6.4&6.5&6.6
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25°C
Humidity	60%

11.1 LIMITS

Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
Above 1GHz	74.0	Peak Value

Emission 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.

11.2 BLOCK DIAGRAM OF TEST SETUP



11.3 PROCEDURE

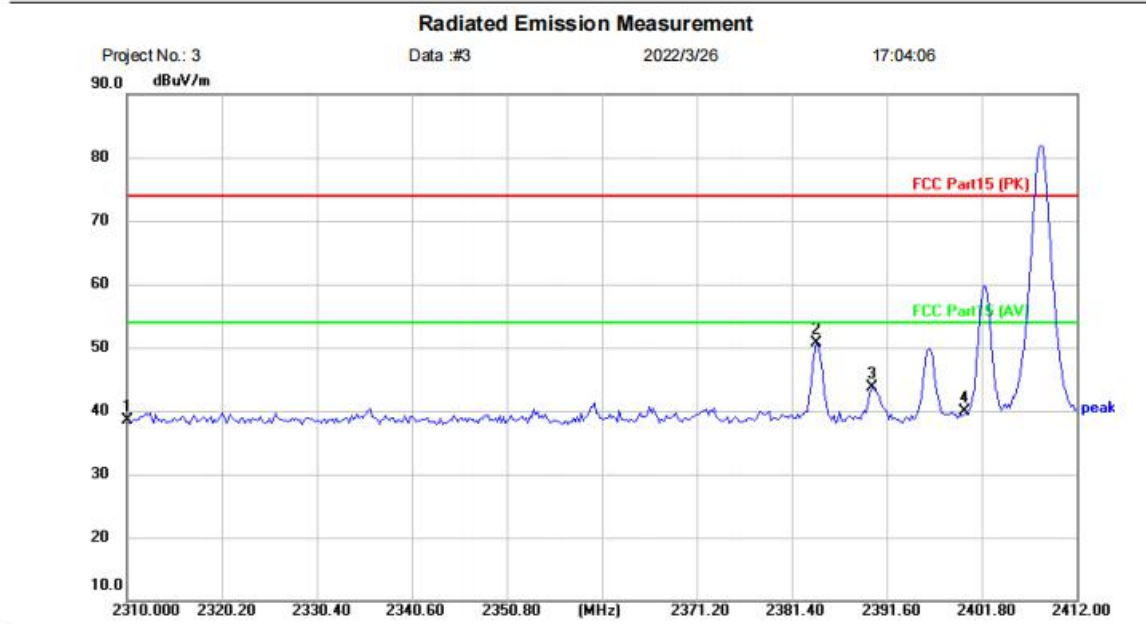
- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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 was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 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.

- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
 - i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
 - j. Repeat above procedures until all frequencies measured was complete.
- Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

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11.4 TEST DATA

[TestMode: TX low channel]; [Polarity: Vertical]



Site: _____ Polarization: **Vertical** Temperature: _____ (C)
 Limit: FCC Part15 (PK) Power: _____ Humidity: _____ %RH
 EUT: Wireless Mouse
 M/N: EWMO1576
 Mode: TX-L
 Note:

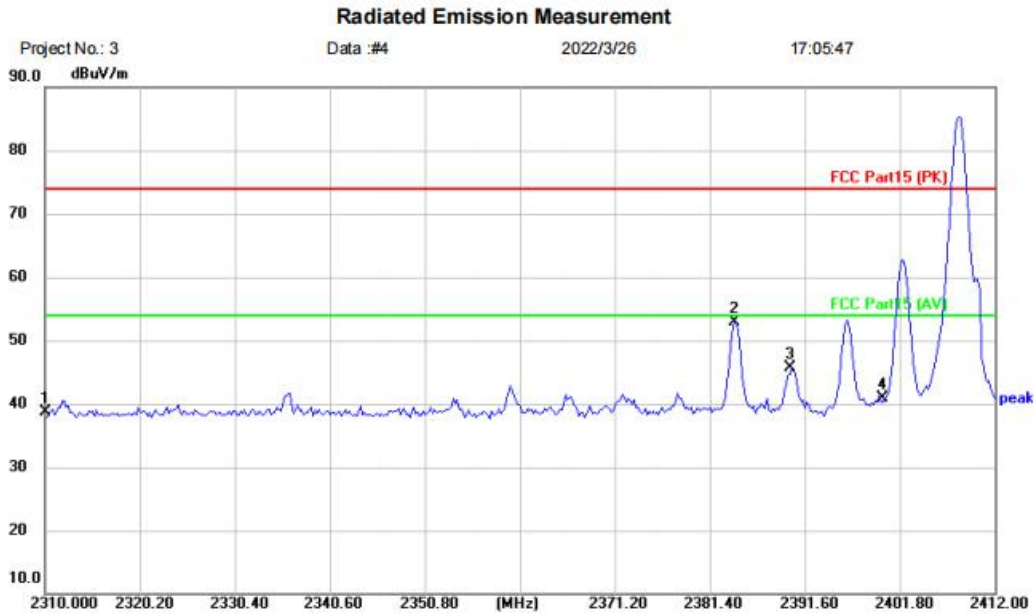
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2310.000	42.40	-3.93	38.47	74.00	-35.53	peak	
2	*	2384.052	54.22	-3.60	50.62	74.00	-23.38	peak	
3		2390.000	47.21	-3.58	43.63	74.00	-30.37	peak	
4		2400.000	43.52	-3.54	39.98	74.00	-34.02	peak	

*:Maximum data x:Over limit l:over margin

(Reference Only)

Test Result: Pass

[TestMode: TX low channel]; [Polarity: Horizontal]



Site: Polarization: **Horizontal** Temperature: (C)
 Limit: FCC Part15 (PK) Power: Humidity: %RH
 EUT: Wireless Mouse
 M/N: EWMO1576
 Mode: TXL
 Note:

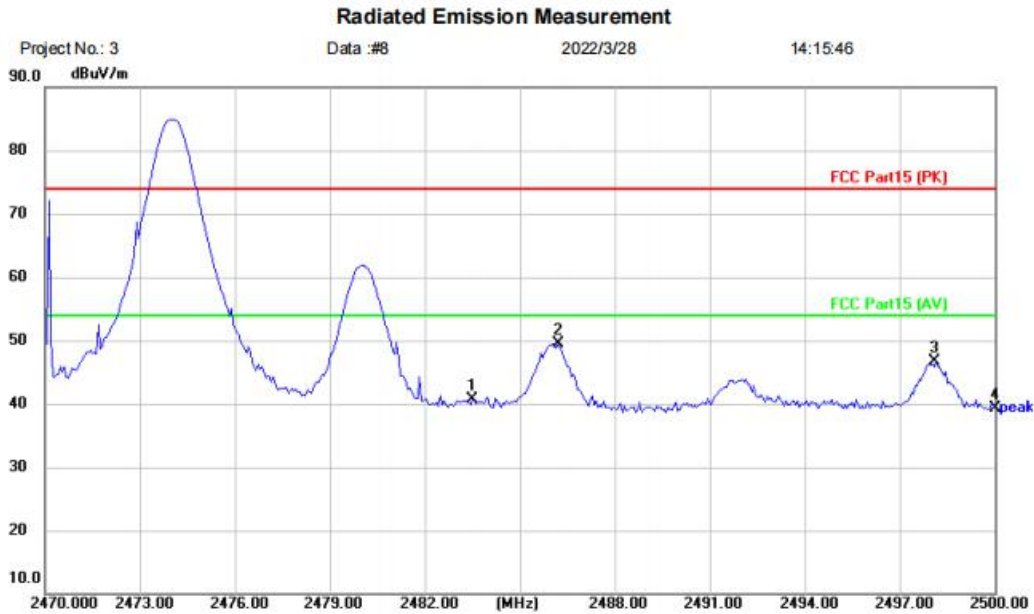
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2310.000	42.69	-3.93	38.76	74.00	-35.24	peak	
2	*	2384.052	56.46	-3.60	52.86	74.00	-21.14	peak	
3		2390.000	49.28	-3.58	45.70	74.00	-28.30	peak	
4		2400.000	44.47	-3.54	40.93	74.00	-33.07	peak	

*:Maximum data x:Over limit l:over margin

(Reference Only)

Test Result: Pass

[TestMode: TX high channel]; [Polarity: Vertical]



Site	Polarization: Vertical	Temperature: (C)
Limit: FCC Part15 (PK)	Power:	Humidity: %RH
EUT: Wireless Mouse		
M/N: EWMO1576		
Mode: TX-H		
Note:		

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2483.500	43.77	-3.14	40.63	74.00	-33.37	peak	
2	*	2486.200	52.72	-3.14	49.58	74.00	-24.42	peak	
3		2498.140	49.81	-3.08	46.73	74.00	-27.27	peak	
4		2500.000	42.38	-3.08	39.30	74.00	-34.70	peak	

*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result: Pass

12 FIELD STRENGTH OF THE FUNDAMENTAL SIGNAL (15.249(A))

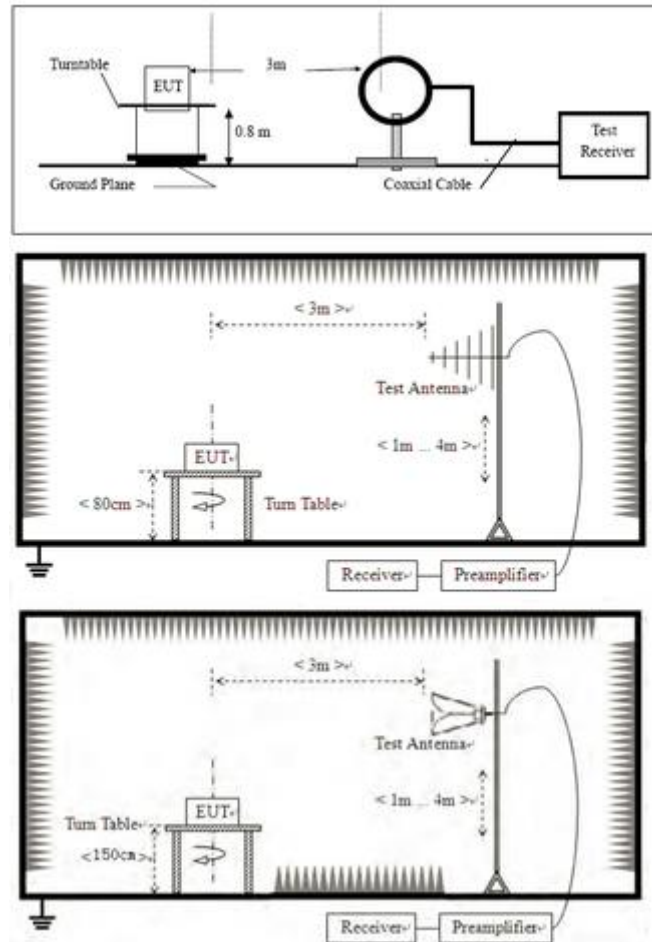
Test Standard	47 CFR Part 15, Subpart C 15.249
Test Method	ANSI C63.10 (2013) Section 6.5&6.6
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25°C
Humidity	60%

12.1 LIMITS

Fundamental frequency(MHz)	Field strength of fundamental(microvolts/meter)	Field strength of harmonics(microvolts/meter)
902-928	50	500
2400-2483.5	50	500
5725-5875	50	500
24000-24250	250	2500

Remark: The frequencies above 1000MHz are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

12.2 BLOCK DIAGRAM OF TEST SETUP



12.3 PROCEDURE

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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 was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 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.

- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
 - i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
 - j. Repeat above procedures until all frequencies measured was complete.
- Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

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12.4 TEST DATA

Peak value:

Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Level (dB μ V/m)	Limit (dB μ V/m)	Over Limit (dB)	Antenna Polaxis
2408	90.24	-3.51	86.73	114.00	-27.27	H
2408	86.22	-3.51	82.71	114.00	-31.29	V
2440	88.86	-3.34	85.52	114.00	-28.48	H
2440	86.28	-3.34	82.94	114.00	-31.06	V
2474	87.34	-3.20	84.14	114.00	-29.86	H
2474	88.22	-3.20	85.02	114.00	-28.98	V

Average value:

Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Level (dB μ V/m)	Limit (dB μ V/m)	Over Limit (dB)	Antenna Polaxis
2408	79.46	-3.51	75.95	94.00	-18.05	H
2408	76.55	-3.51	73.04	94.00	-20.96	V
2440	79.28	-3.34	75.94	94.00	-18.06	H
2440	77.05	-3.34	73.71	94.00	-20.29	V
2474	76.86	-3.20	73.66	94.00	-20.34	H
2474	78.21	-3.20	75.01	94.00	-18.99	V

NOTE: RBW 3MHz VBW 10MHz · PK detector is for PK value ,RMS detector is for AV value.

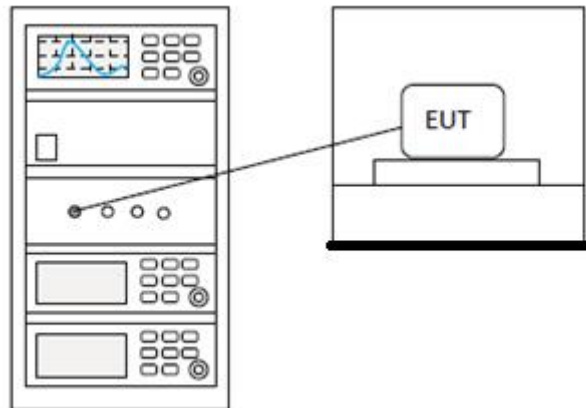
13 20DB BANDWIDTH

Test Standard	47 CFR Part 15, Subpart C 15.249
Test Method	ANSI C63.10 (2013) Section 6.9
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25°C
Humidity	60%

13.1 LIMITS

Limit:	N/A
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13.2 BLOCK DIAGRAM OF TEST SETUP



13.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

14 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)

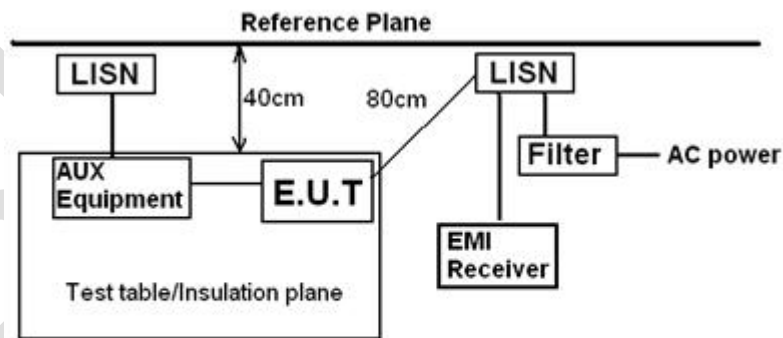
Test Standard	47 CFR Part 15, Subpart C 15.249
Test Method	ANSI C63.10 (2013) Section 6.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25°C
Humidity	60%

14.1 LIMITS

Frequency of emission(MHz)	Conducted limit(dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

14.2 BLOCK DIAGRAM OF TEST SETUP



Remark:
 E.U.T: Equipment Under Test
 LISN: Line Impedance Stabilization Network
 Test table height=0.8m

14.3 PROCEDURE

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50H + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor

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15 ANTENNA REQUIREMENT

Test Standard	47 CFR Part 15, Subpart C 15.249
Test Method	N/A

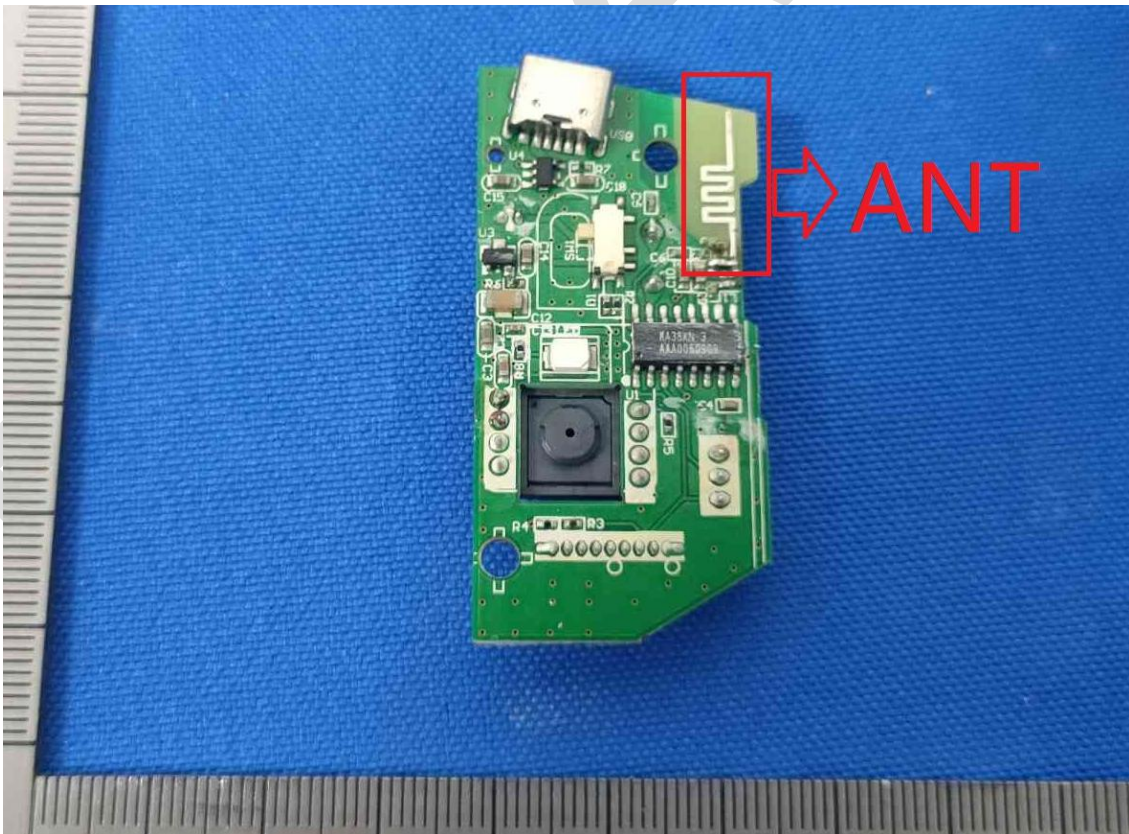
15.1 CONCLUSION

Standard 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 an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an 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.

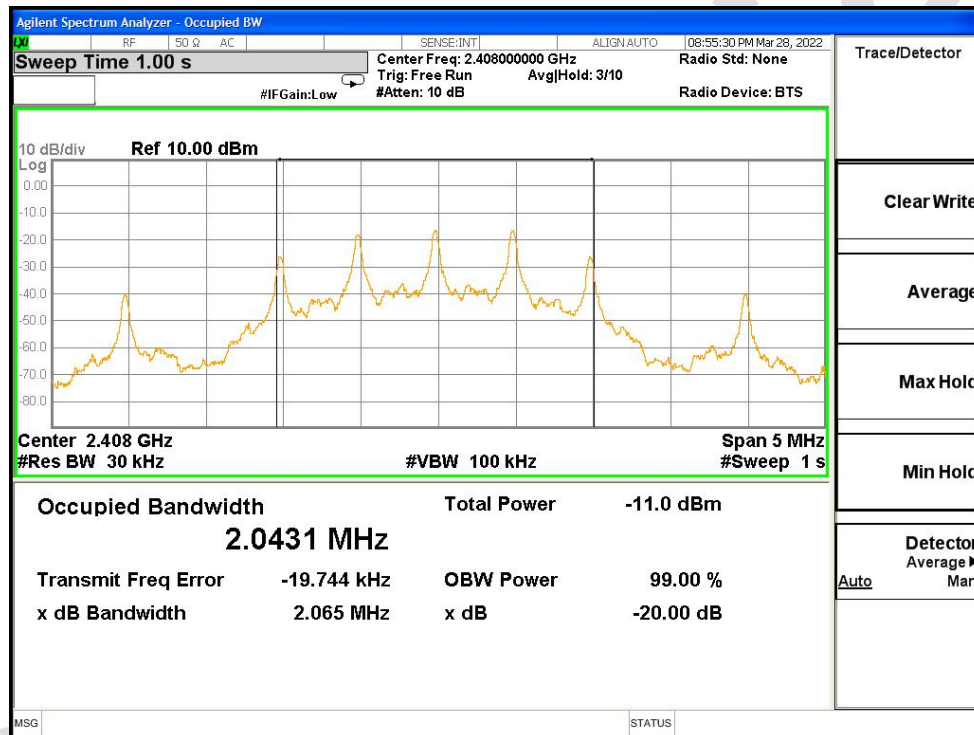


16 APPENDIX

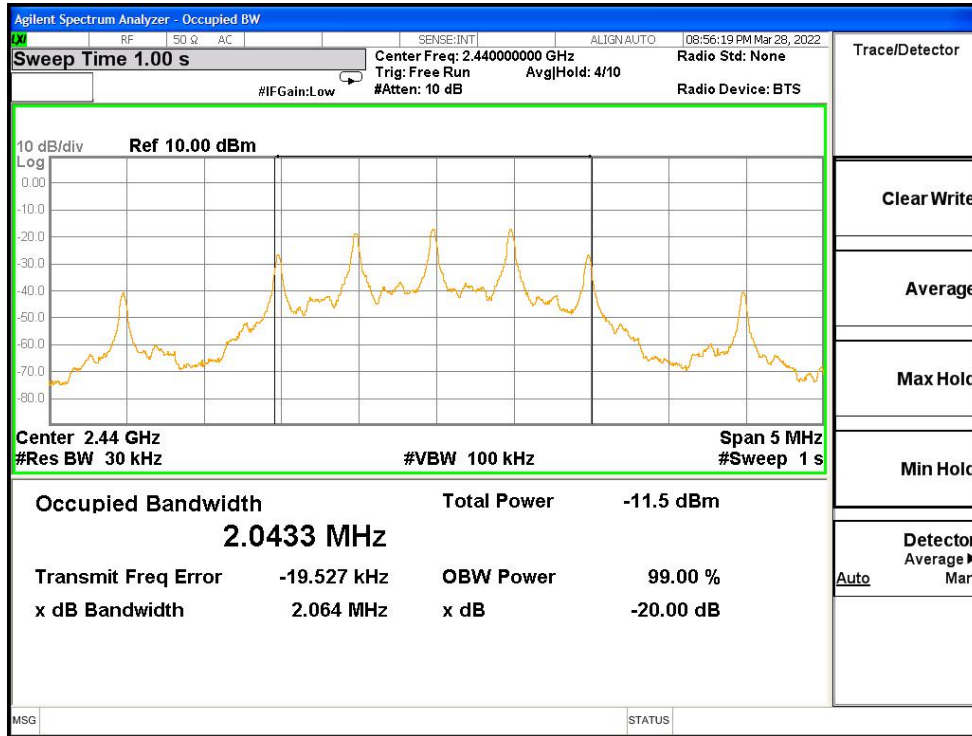
16.1 -20DB BANDWIDTH

Condition	Mode	Frequency (MHz)	Antenna	-20 dB Bandwidth (MHz)	Limit -20 dB Bandwidth (MHz)	Verdict
NVNT	GFSK	2408	Ant1	2.065	0.5	Pass
NVNT	GFSK	2440	Ant1	2.064	0.5	Pass
NVNT	GFSK	2474	Ant1	2.065	0.5	Pass

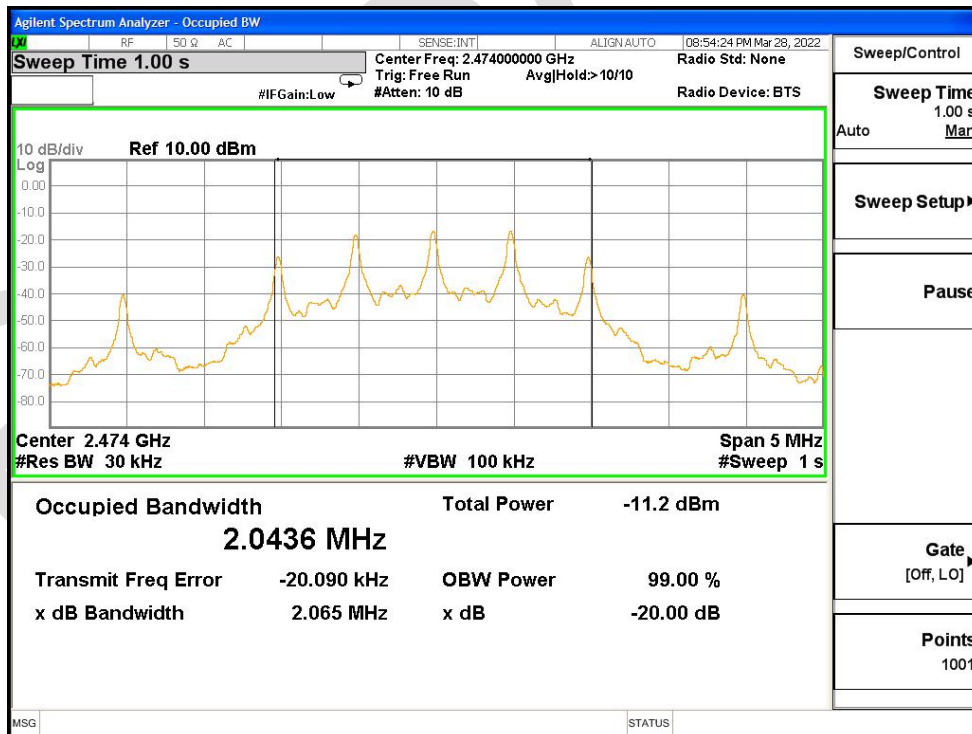
-20dB Bandwidth NVNT GFSK 2408MHz Ant1



-20dB Bandwidth NVNT GFSK 2440MHz Ant1



-20dB Bandwidth NVNT GFSK 2474MHz Ant1



APPENDIX A: PHOTOGRAPHS OF TEST SETUP

Radiated Emissions



Conducted Emissions at AC Power Line (150kHz-30MHz)



APPENDIX B: PHOTOGRAPHS OF EUT

Reference to the test report No. BLA-EMC-202202-A1401

----END OF REPORT----

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