

FCC TEST REPORT
for
Beijing Miiw Technology Co., Ltd.

MIIW USB Receiver
Model No. : MWM24ND

FCC ID: 2AR3N-MWWR01

Prepared for : Beijing Miiw Technology Co., Ltd.
Address : RM101, Building A-1, Shunshijiaye Innovation Park, Beijing,
China

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Report No. : ATE20190227
Date of Test : February 25, 2019
Date of Report : February 28, 2019

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Test Report Certification

Applicant : Beijing Miiw Technology Co., Ltd.
Address : RM101, Building A-1, Shunshijiaye Innovation Park, Beijing,
China
Product : MIIW USB Receiver
Model No. : MWM24ND

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart B Class B ANSI C63.4: 2014

The device described above is tested by Shenzhen Accurate Technology Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart B Class B limits both radiated and conducted emissions. The measurement results are contained in this test report and Shenzhen Accurate Technology Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Shenzhen Accurate Technology Co., Ltd.

Date of Test : February 25, 2019
Date of Report : February 28, 2019

Prepared by :


(Stanley Yang, Engineer)

Approved & Authorized Signer :


(Sean Liu, Manager)

1. TEST RESULTS SUMMARY

Test Items	Test Standard	Test Results
Power Line Conducted Emission	FCC Part 15 Subpart B	Pass
Radiated Emission	FCC Part 15 Subpart B	Pass

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

Product : MIIIW USB Receiver
Model No. : MWM24ND
Max Work Frequency : 2.4GHz
Rating : USB 5V

2.2. Test mode description

Test mode: on (Data Transfer)

2.3. Accessory and Auxiliary Equipment

Notebook PC: Manufacturer: Lenovo
M/N: ThinkPad X240
S/N:n.a

2.4. Description of Test Facility

EMC Lab	:	Recognition of accreditation by Federal Communications Commission (FCC) The Designation Number is CN1189 The Registration Number is 708358 Listed by Innovation, Science and Economic Development Canada (ISED) The Registration Number is 5077A-2 Accredited by China National Accreditation Service for Conformity Assessment (CNAS) The Registration Number is CNAS L3193 Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 4297.01
Name of Firm	:	Shenzhen Accurate Technology Co., Ltd.
Site Location	:	1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

2.5. Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Power Disturbance Expanded Uncertainty	=	2.92 dB, 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

3. MEASURING DEVICE AND TEST EQUIPMENT

3.1.The Equipment Used to Conducted Emission Measurement

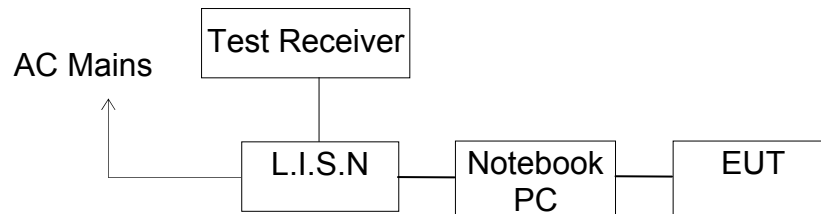
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCS30	100307	Jan.05, 2019	1 Year
2.	L.I.S.N.	Schwarzbeck	NLSK8126	8126431	Jan.05, 2019	1 Year
3.	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100305	Jan.05, 2019	1 Year
4.	50Ω Coaxial Switch	Anritsu Corp	MP59B	6200283936	Jan.05, 2019	1 Year
5.	RF Coaxial Cable	SUHNER	N-2m	No.2	Jan.05, 2019	1 Year
6.	Measurement Software: ES-K1 V1.71					

3.2.The Equipment Used to Radiated Emission Measurement

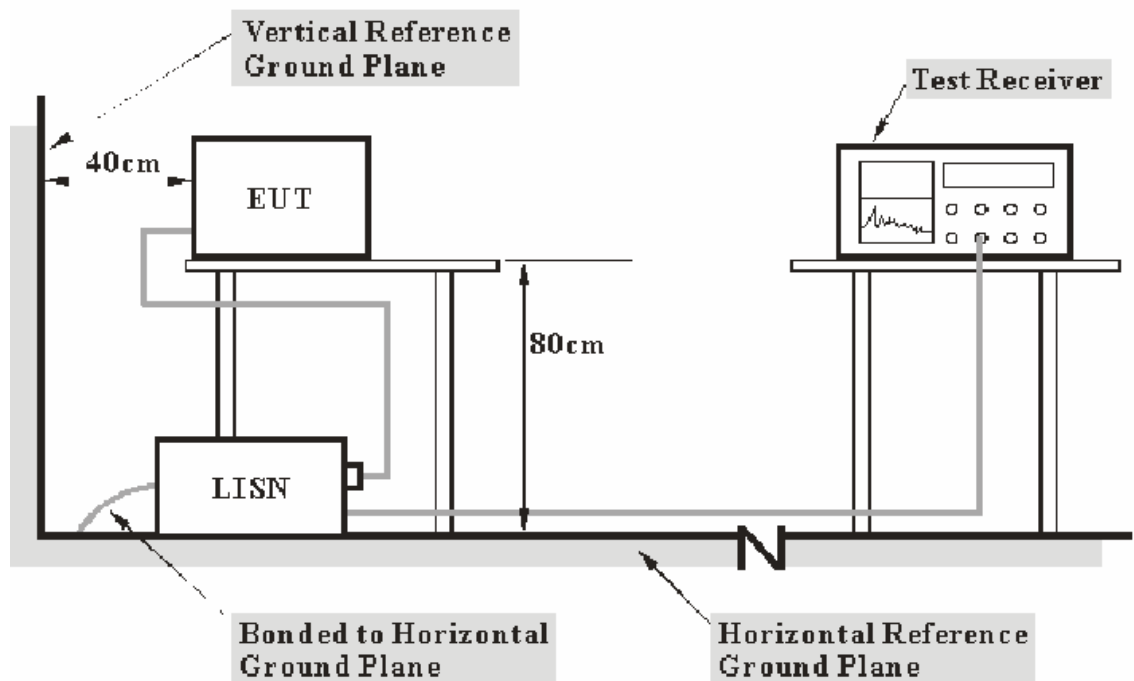
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Rohde&Schwarz	FSV40	101495	Jan.05, 2019	1 Year
2.	Test Receiver	Rohde& Schwarz	ESR	101817	Jan.05, 2019	1 Year
3.	Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan.05, 2019	1 Year
4.	Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan.05, 2019	1 Year
5.	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan.05, 2019	1 Year
6.	Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan.05, 2019	1 Year
7.	RF Switching Unit+PreAMP	Compliance Direction	RSU-M2	38322	Jan.05, 2019	1 Year
8.	Pre-Amplifier	Agilent	8447D	294A10619	Jan.05, 2019	1 Year
9.	Pre-Amplifier	Rohde&Schwarz	CBLU11835 40-01	3791	Jan.05, 2019	1 Year
10.	50 Coaxial Switch	Anritsu Corp	MP59B	6200506474	Jan.05, 2019	1 Year
11.	RF Coaxial Cable	RESENBERGER	N-12m	No.11	Jan.05, 2019	1 Year
12.	RF Coaxial Cable	RESENBERGER	N-0.5m	No.12	Jan.05, 2019	1 Year
13.	RF Coaxial Cable	SUHNER	N-2m	No.13	Jan.05, 2019	1 Year
14.	RF Coaxial Cable	SUHNER	N-0.5m	No.15	Jan.05, 2019	1 Year
15.	RF Coaxial Cable	SUHNER	N-2m	No.16	Jan.05, 2019	1 Year
16.	RF Coaxial Cable	RESENBERGER	N-6m	No.17	Jan.05, 2019	1 Year
17.	Measurement Software: EZ EMC V1.1.4.2					

4. POWER LINE CONDUCTED EMISSION MEASUREMENT

4.1. Block Diagram of Test Setup



4.2. Test System Setup



- Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

4.3.Power Line Conducted Emission Limits (Class B)

Frequency (MHz)	Limit dB(μ V)	
	Quasi-peak Level	Average Level
0.15 - 0.50	66.0 – 56.0 *	56.0 – 46.0 *
0.50 - 5.00	56.0	46.0
5.00 - 30.00	60.0	50.0
NOTE1: The lower limit shall apply at the transition frequencies.		
NOTE2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.		

4.4.Configuration of EUT on Measurement

The equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

4.5.Operating Condition of EUT

4.5.1.Setup the EUT and simulator as shown as Section 4.1.

4.5.2.Turn on the power of all equipment.

4.5.3.Let the EUT work in test mode and measure it.

4.6.Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at ATC is +2.23dB.

4.7.Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4: 2014 on Conducted Emission Measurement.

The bandwidth of test receiver (R & S ESCS30) is set at 9kHz.

4.8.Data Sample

Frequency (MHz)	Transducer value (dB)	QuasiPeak Level (dB μ V)	Average Level (dB μ V)	QuasiPeak Limit (dB μ V)	Average Limit (dB μ V)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
X.XX	10.6	25.3	17.0	59.0	49.0	33.7	32.0	Pass

Frequency(MHz) = Emission frequency in MHz

Transducer value(dB) = Insertion loss of LISN + Cable Loss

Level(dB μ V) = Quasi-peak Reading/Average Reading + Transducer value

Limit (dB μ V) = Limit stated in standard

Calculation Formula:

Margin = Limit (dB μ V) - Level (dB μ V)

4.9.Measurement Results

Pass.

The frequency range from 150kHz to 30MHz is checked.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

Emissions attenuated more than 20 dB below the permissible value are not reported.

All data was recorded in the Quasi-peak and average detection mode.

The spectral diagrams are attached as below.

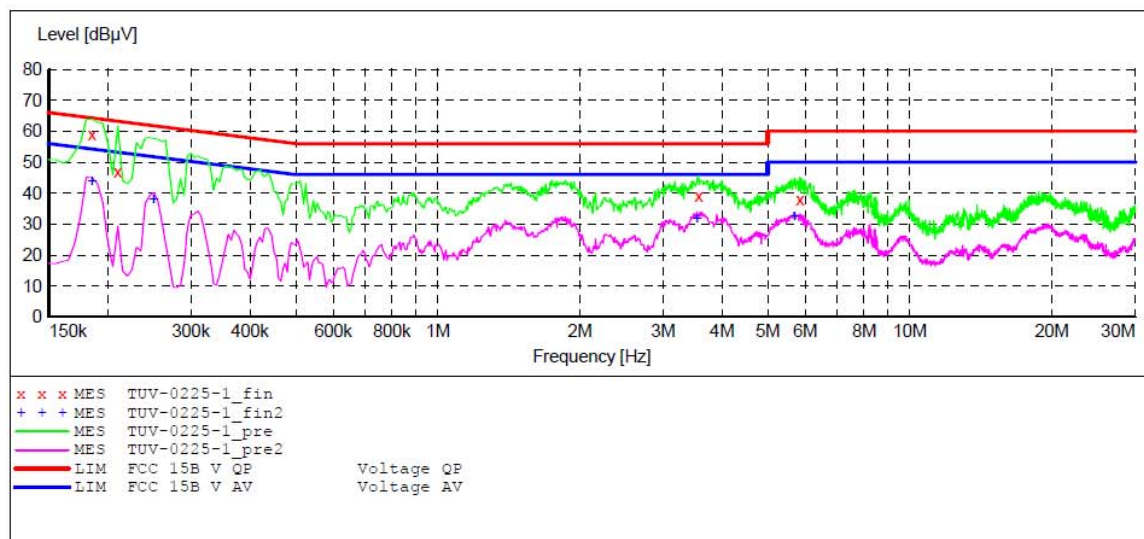
ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15 B

EUT: MIIIW USB Receiver M/N:MWM24ND
 Manufacturer: MIIIW
 Operating Condition: On(Data Transfer)
 Test Site: 1#Shielding Room
 Operator: WADE
 Test Specification: L 120V/60Hz
 Comment:
 Start of Test: 2/25/2019 /

SCAN TABLE: "V 9K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70
 Start Stop Step Detector Meas. IF Transducer
 Frequency Frequency Width Time Bandw.
 9.0 kHz 150.0 kHz 100.0 Hz QuasiPeak 1.0 s 200 Hz NSLK8126 2008
 Average
 150.0 kHz 30.0 MHz 5.0 kHz QuasiPeak 1.0 s 9 kHz NSLK8126 2008
 Average



MEASUREMENT RESULT: "TUV-0225-1_fin"

2/25/2019

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.185000	58.90	10.5	64	5.4	QP	L1	GND
0.210000	46.80	10.5	63	16.4	QP	L1	GND
3.570000	39.00	11.1	56	17.0	QP	L1	GND
5.850000	37.80	11.2	60	22.2	QP	L1	GND

MEASUREMENT RESULT: "TUV-0225-1_fin2"

2/25/2019

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.185000	43.80	10.5	54	10.5	AV	L1	GND
0.250000	37.80	10.6	52	14.0	AV	L1	GND
3.540000	31.70	11.1	46	14.3	AV	L1	GND
5.690000	32.40	11.2	50	17.6	AV	L1	GND

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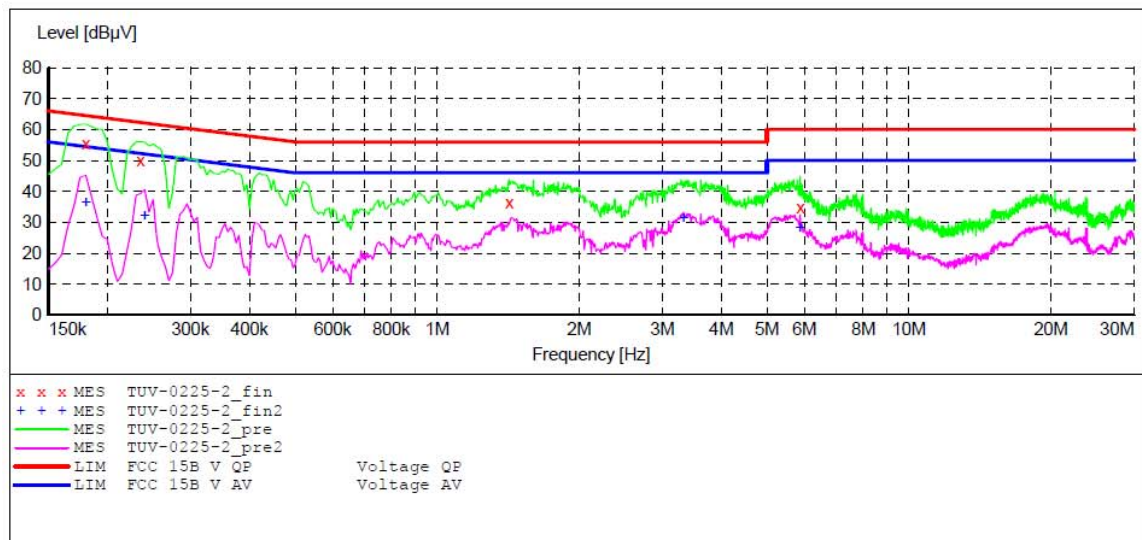
CONDUCTED EMISSION STANDARD FCC PART 15 B

EUT: MIIIW USB Receiver M/N:MWM24ND
 Manufacturer: MIIIW
 Operating Condition: On(Data Transfer)
 Test Site: 1#Shielding Room
 Operator: WADE
 Test Specification: N 120V/60Hz
 Comment:
 Start of Test: 2/25/2019 /

SCAN TABLE: "V 9K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70

Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	NSLK8126 2008
Average						
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	NSLK8126 2008
Average						



MEASUREMENT RESULT: "TUV-0225-2_fin"

2/25/2019

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.180000	55.40	10.5	65	9.1	QP	N	GND
0.235000	50.00	10.6	62	12.3	QP	N	GND
1.420000	36.50	10.9	56	19.5	QP	N	GND
5.880000	34.80	11.2	60	25.2	QP	N	GND

MEASUREMENT RESULT: "TUV-0225-2_fin2"

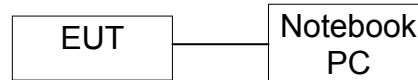
2/25/2019

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.180000	36.50	10.5	55	18.0	AV	N	GND
0.240000	31.90	10.6	52	20.2	AV	N	GND
3.330000	31.10	11.1	46	14.9	AV	N	GND
5.880000	28.20	11.2	50	21.8	AV	N	GND

5. RADIATED EMISSION MEASUREMENT

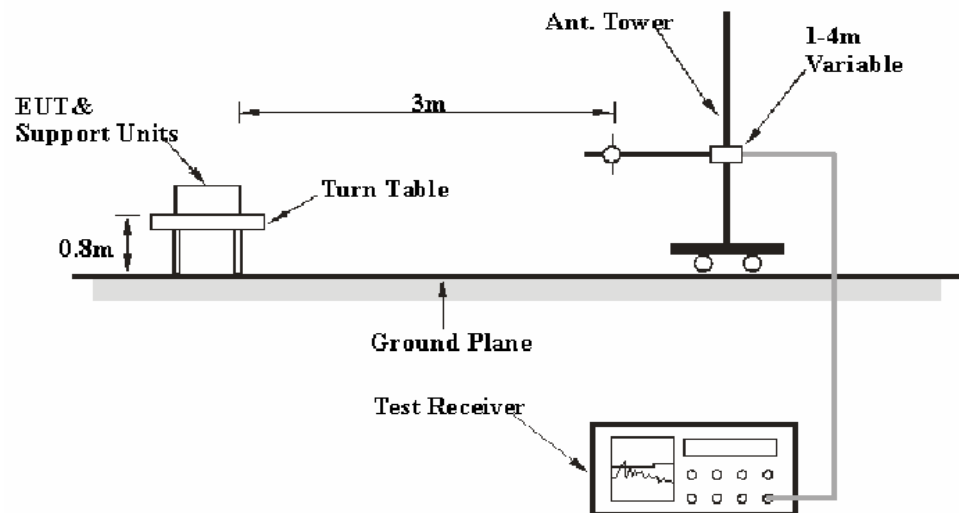
5.1. Block Diagram of Test

5.1.1. Block diagram of connection between the EUT and simulators

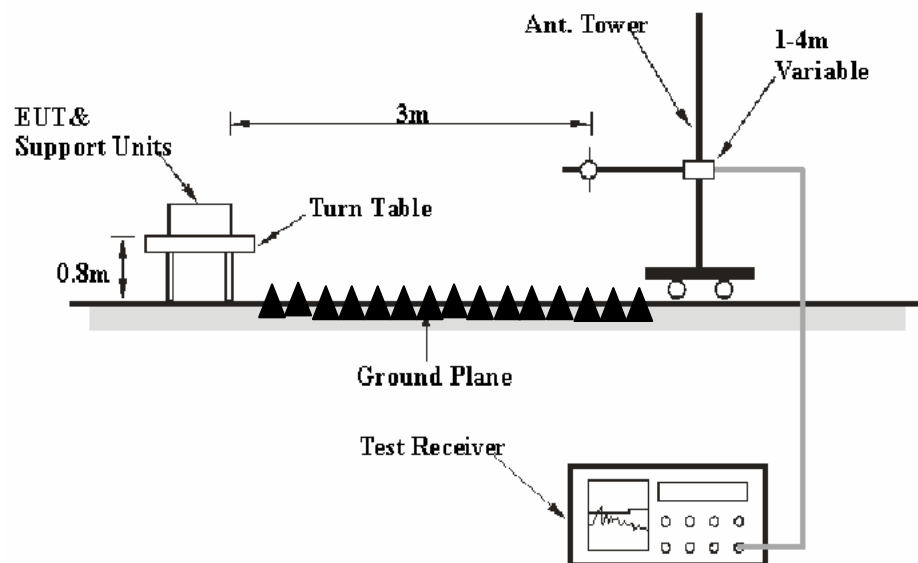


5.1.2. Block diagram of test setup (In chamber)

Radiated Emission Test Set-Up, Frequency 30MHz- 1GHz



Radiated Emission Test Set-Up, Frequency above 1GHz



5.2.Radiated Emission Limit (Class B)

All emanations from a class B device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

Frequency MHz	Distance Meters	Field Strengths Limit	
		$\mu\text{V/m}$	$\text{dB}(\mu\text{V/m})$
30-88	3	100	40.0
88-216	3	150	43.5
216-960	3	200	46.0
Above 960	3	500	54.0
Remark: (1) Emission level $\text{dB}(\mu\text{V}) = 20 \log$ Emission level $\mu\text{V/m}$. (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.			

5.3.Configuration of EUT on Measurement

The equipments are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

5.4.Operating Condition of EUT

5.4.1.Setup the EUT and simulator as shown as Section 5.1.

5.4.2.Turn on the power of all equipment.

5.4.3.Let the EUT work in test mode and measure it.

5.5. Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4: 2014 on radiated emission measurement.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz.

Note: The EUT highest operating frequency provided by Manufacturer is 2480MHz, the radiated emission measurement shall be made up to 25GHz.

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30.
1.705–108	1000.
108–500	2000.
500–1000	5000.
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

5.6.Data Sample

Frequency (MHz)	Reading (dB μ V)	Factor (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Remark
X.XX	49.83	-22.03	27.80	43.50	-15.70	QP

Frequency(MHz) = Emission frequency in MHz

Reading(dB μ V) = Uncorrected Analyzer/Receiver reading

Factor (dB/m)= Antenna factor + Cable Loss – Amplifier gain

Result(dB μ V/m) = Reading + Factor

Limit (dB μ V/m)= Limit stated in standard

Margin (dB) = Result(dB μ V/m) - Limit (dB μ V/m)

Calculation Formula:

Margin(dB) = Result (dB μ V/m)–Limit(dB μ V/m)

Result(dB μ V/m)= Reading(dB μ V)+ Factor(dB/m)

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the limit.

5.7.Measurement Results

Pass.

We tested Radiated Emission from 30MHz to 25GHz, The radiation emissions from 12.75G-25GHz are not reported, because the test values lower than the limits of 20dB.

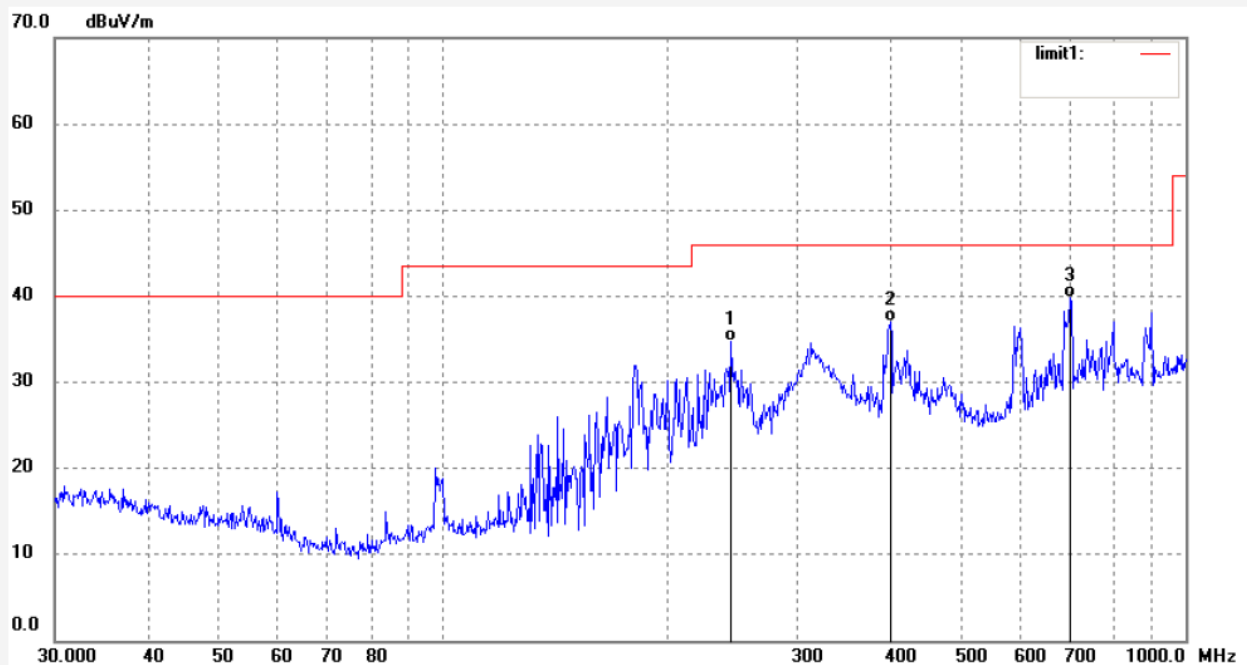
The fundamental radiated emissions were reduced by Band Reject Filter in the attached plots

The spectral diagrams are attached as below.

Job No.: LGW2019 #386
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: MIIIW USB Receiver
Mode: On(Data Transfer)
Model: MWM24ND
Manufacturer: MIIIW

Polarization: Horizontal
Power Source: DC 5V
Date: 19/02/25/
Time:
Engineer Signature: WADE
Distance: 3m

Note:

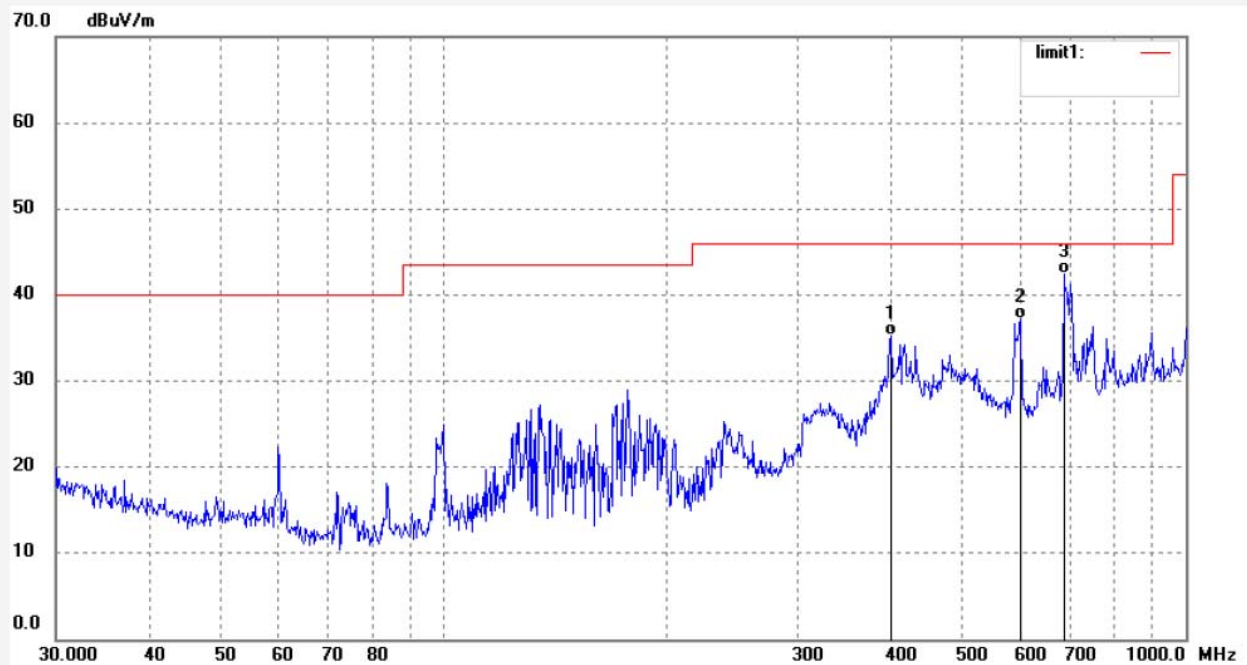


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	244.2321	45.41	-10.60	34.81	46.00	-11.19	QP			
2	400.4318	43.36	-6.43	36.93	46.00	-9.07	QP			
3	699.3046	40.81	-1.08	39.73	46.00	-6.27	QP			

Job No.: LGW2019 #387
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: MIIIW USB Receiver
Mode: On(Data Transfer)
Model: MWM24ND
Manufacturer: MIIIW

Polarization: Vertical
Power Source: DC 5V
Date: 19/02/25/
Time:
Engineer Signature: WADE
Distance: 3m

Note:

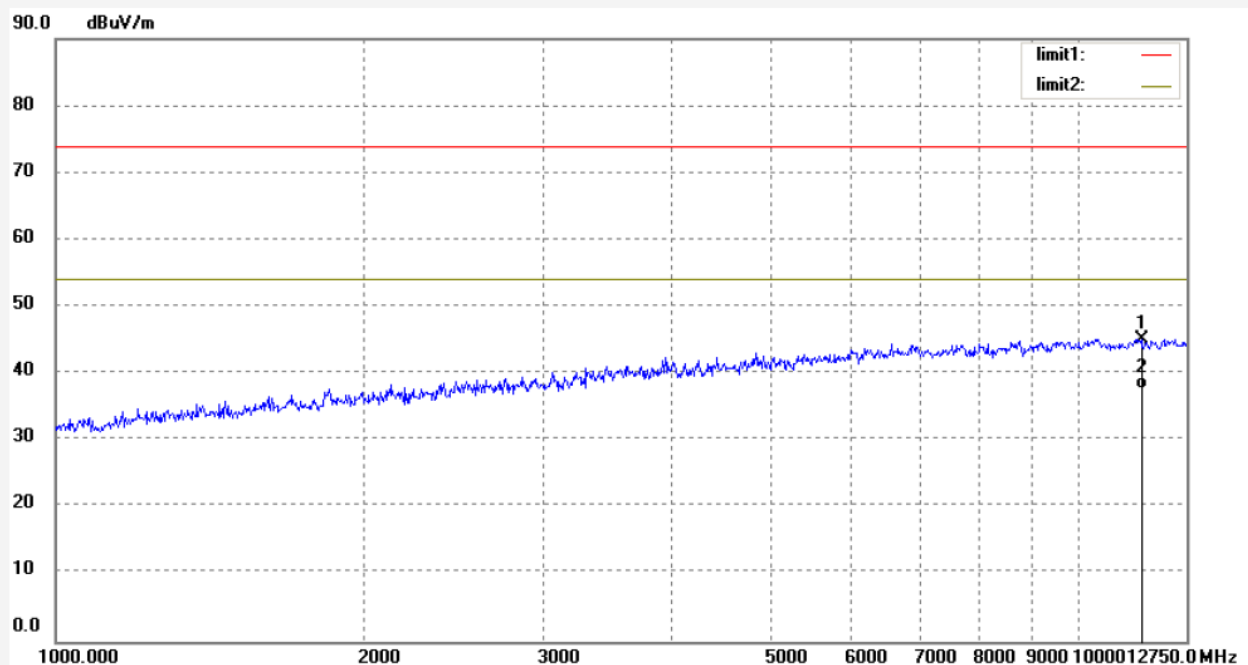


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	400.4318	41.63	-6.43	35.20	46.00	-10.80	QP			
2	599.3212	39.53	-2.38	37.15	46.00	-8.85	QP			
3	684.7454	43.71	-1.30	42.41	46.00	-3.59	QP			

Job No.: LGW2019 #393
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: MIIIW USB Receiver
Mode: On(Data Transfer)
Model: MWM24ND
Manufacturer: MIIIW

Polarization: Horizontal
Power Source: DC 5V
Date: 19/02/25/
Time:
Engineer Signature: WADE
Distance: 3m

Note:

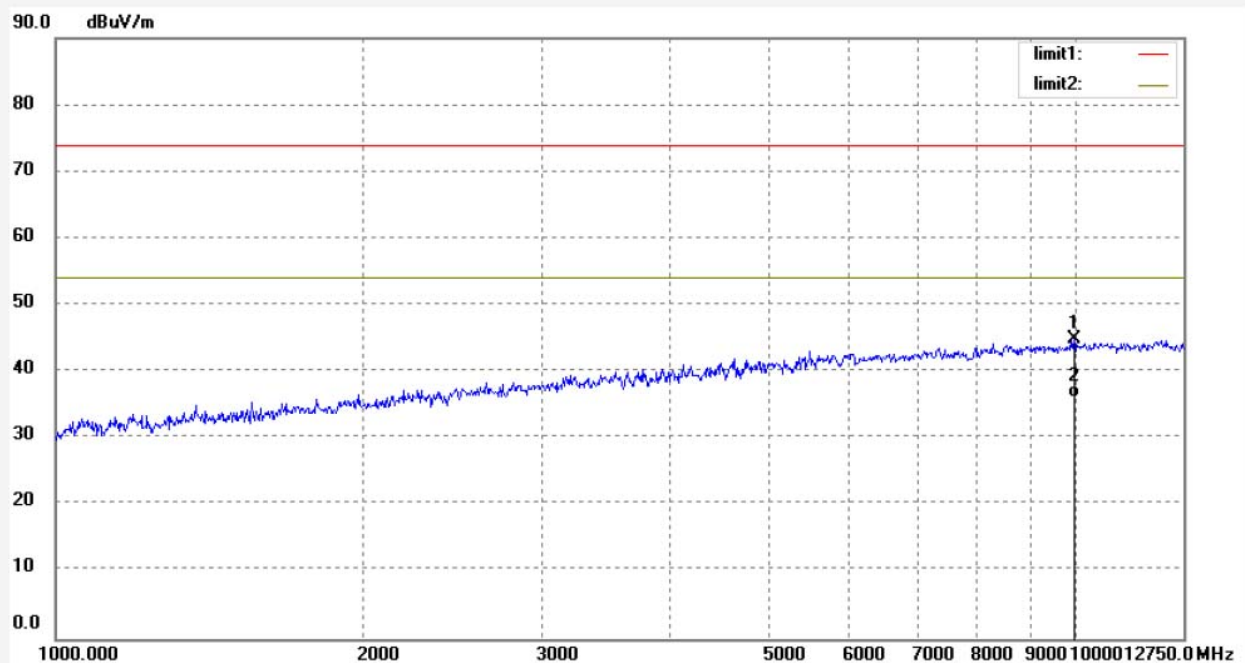


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	11515.685	25.04	20.08	45.12	74.00	-28.88	peak			
2	11515.685	17.60	20.08	37.68	54.00	-16.32	AVG			

Job No.: LGW2019 #392
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: MIIIW USB Receiver
Mode: On(Data Transfer)
Model: MWM24ND
Manufacturer: MIIIW

Polarization: Vertical
Power Source: DC 5V
Date: 19/02/25/
Time:
Engineer Signature: WADE
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	9960.375	26.69	18.17	44.86	74.00	-29.14	peak			
2	9960.375	17.95	18.17	36.12	54.00	-17.88	AVG			

***** End of Test Report *****