

Report No.: NTC2012059FV00

# **FCC RADIO TEST REPORT**

Applicant.....: Acrox Technologies Co., Ltd.

Address.....: 4F., No.89, Minshan St., Neihu Dist., Taipei City 114, Taiwan, R.O.C

Manufacturer.....: Acrox Technologies Co., Ltd

Address.....: Hsinmin Industrial, Changan Town, Dongguan City, Guangdong, China

Factory.....: RX TECH ELECTRONIC VINA COMPANY LIMITED

Address.....: Plan plot#355, map#14, Yen Phong Industrial Park, Long Chau Commune, Yen

Phong District, Bac Ninh Province, Vietnam

Product Nam.....: 2.4GHz Dongle

Brand Name....: onn., ACROX

Model No. .....: MQW

FCC ID.....: PRDRXOX

Measurement Standard......: 47 CFR FCC Part 15, Subpart C (Section 15.249)

Receipt Date of Samples....: December 04, 2020

Date of Tested.....: December 07, 2020 to December 12, 2020

Date of Report.....: December 14, 2020

This report shows that above equipment is technically compliant with the requirements of the standards above. All test results in this report apply only to the tested sample(s). Without prior written approval of Dongguan Nore

Testing Center Co., Ltd, this report shall not be reproduced except in full.

Prepared by

Alina Guo / Project Engineer

Iori Fan / Authorized Signatory



### **Table of Contents**

1. Summary of Test Result	4
2. General Description of EUT	5
3. Test Channels and Modes Detail	7
4. Configuration of EUT	7
5. Modification of EUT	7
6. Description of Support Device	8
7. Test Facility and Location	9
8. Applicable Standards and References	9
9. Deviations and Abnormalities from Standard Conditions	10
10. Test Conditions	10
11. Measurement Uncertainty	10
12. Sample Calculations	11
13. Test Items and Results	12
13.1 Conducted Emissions Measurement	12
13.2 Radiated Spurious Emissions and Restricted Bands Measurement	16
13.3 20dB Bandwidth Measurement	24
13.4 Antenna Requirement	26
14. Test Equipment List	27





# **Revision History**

Report Number	Description	Issued Date
NTC2012059FV00	Initial Issue	2020-12-14





# 1. Summary of Test Result

FCC Rules	Description of Test	Result	Remarks
§15.207 (a)	AC Power Conducted Emission	PASS	
§15.249(a)/ 15.209	Radiated Emissions	PASS	
§15.249(d)/ 15.205	Band Edge	PASS	
§15.215(c)	20dB Bandwidth	PASS	
§15.203	Antenna Requirement	PASS	





# 2. General Description of EUT

Product Information	
Product name:	2.4GHz Dongle
Main Model Name:	MQW
Additional Model Name:	N/A
Model Difference:	N/A
S/N:	2102A00001
Brand Name:	onn., ACROX
Hardware version:	V1.0
Software version:	V1.0
Rating:	DC 5V come from PC
Typical arrangement:	Table-top
I/O Port:	N/A
Accessories Information	
Adapter:	N/A
Cable:	N/A
Other:	N/A
Additional information	
Note:	N/A
Remark:	All the information above are provided by the manufacturer. More detailed feature of the EUT please refers to the user manual.





Technical Specification	(2.4G Function)
Frequency Range:	2402-2480MHz
Modulation Type:	GFSK
Number of Channel:	40 (refer to following channel list for details)
Channel Space:	2MHz
Antenna Type:	PCB antenna
Antenna Gain:	-2.58 dBi (Declared by manufacturer)

	Channel List							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)			
1	2402	15	2430	29	2458			
2	2404	16	2432	30	2460			
3	2406	17	2434	31	2462			
4	2408	18	2436	32	2464			
5	2410	19	2438	33	2466			
6	2412	20	2440	34	2468			
7	2414	21	2442	35	2470			
8	2416	22	2444	36	2472			
9	2418	23	2446	37	2474			
10	2420	24	2448	38	2476			
11	2422	25	2450	39	2478			
12	2424	26	2452	40	2480			
13	2426	27	2454	-	-			
14	2428	28	2456	-	-			

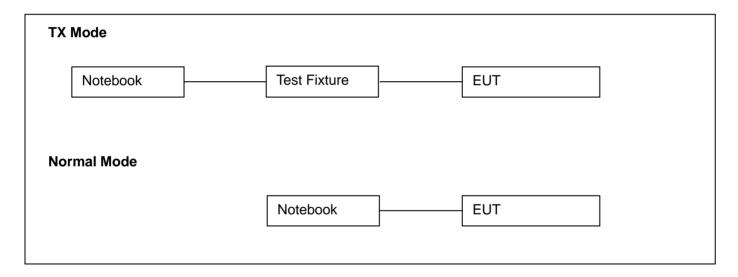


### 3. Test Channels and Modes Detail

Mode		Channel		Frequency (MHz)	Modulation	Data Rate (Mbps)
1	TX	Low	1	2402	GFSK	1
2	TX	Mid	20	2440	GFSK	1
3	TX	High	40	2480	GFSK	1
4.	Normal Mode					

Note: TX mode means that the EUT was programmed to be in continuously transmitting mode.

# 4. Configuration of EUT



### 5. Modification of EUT

No modifications are made to the EUT during all test items.



# 6. Description of Support Device

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Equipment	Brand	M/N	S/N	Cable Specification	Remarks
1.	Notebook	Lenovo	02213DC	0A33012	Power cord, 1.8m, unshielded	
2.	Power supply (Notebook)	Taida	92P1154	N/A		
3.	Test fixture					Provided by manufacturer

No.	Test Software	Modulation	Power Setting
1	Dongle_EMI_Test.exe (Provided by manufacturer)	GFSK	7



# 7. Test Facility and Location

Test Site	:	Dongguan Nore Testing Center Co., Ltd. (Dongguan NTC Co., Ltd.)			
Accreditations and	:	The Laboratory has been assessed and proved to be in compliance with			
Authorizations		CNAS/CL01			
		Listed by CNAS, August 13, 2018			
		The Certificate Registration Number is L5795.			
		The Certificate is valid until August 13, 2024			
		The Laboratory has been assessed and proved to be in compliance with ISO17025			
		Listed by A2LA, November 01, 2017			
		ne Certificate Registration Number is 4429.01			
		The Certificate is valid until December 31, 2021			
		Listed by FCC, November 06, 2017			
		Test Firm Registration Number: 907417			
		Listed by Industry Canada, June 08, 2017			
		The Certificate Registration Number. Is 46405-9743A			
Test Site Location	:	Building D, Gaosheng Science and Technology Park, Hongtu Road, Nancheng			
		District, Dongguan City, Guangdong Province, China			

# 8. Applicable Standards and References

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

### **Test Standards:**

47 CFR Part 15, Subpart C, 15.249 ANSI C63.10-2013

### **References Test Guidance:**

N/A



### 9. Deviations and Abnormalities from Standard Conditions

No additions, deviations and exclusions from the standard.

### 10. Test Conditions

No.	Test Item	Test Mode	Test Voltage	Tested by	Remarks
1.	AC Power Conducted Emission	4	AC 120V 60Hz	Ray	See note 1
2.	Radiated Emissions	1-4	AC 120V 60Hz	Ray	See note 1
3.	Band Edge	1-3	AC 120V 60Hz	Ray	See note 1
4.	20dB Bandwidth	1-3	AC 120V 60Hz	Ray	See note 1
5.	Antenna Requirement				See note 1

### Note:

- 1. The testing climatic conditions for temperature, humidity, and atmospheric pressure are within: 15~35 ℃, 30~70%, 86~106kPa
- 2. As the EUT can be operated multiple positions, all X,Y,Z axis were considered during the test and only the worst case X was recorded.

# 11. Measurement Uncertainty

No.	Test Item	Frequency	Uncertainty	Remarks
1.	Conducted Emission	150KHz ~ 30MHz	±2.52 dB	
		9kHz ~ 30MHz	±2.60 dB	
2.	adiated Emission Test	30MHz ~ 1GHz	±4.68 dB	
		1GHz ~ 18GHz	±5.14 dB	
		18GHz ~ 40GHz	±5.14 dB	

### Note:

- 1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
- 2. The measurement uncertainly levels above are estimated and calculated according to CISPR 16-4-2.
- 3. The conformity assessment statement in this report is based solely on the test results, measurement uncertainty is excluded.





### 12. Sample Calculations

Conducted Emission							
Freq. (MHz)	Reading Level (dBuV)	Measurement (dBuV)	Limit (dBuV)	Over (dB)	Detector		
0.1900	30.10	10.60	40.70	79.00	-38.30	QP	

Where,

Freq. =Emission frequency in MHz

Reading Level = Uncorrected Analyzer/Receiver reading

Corrector Factor = Insertion loss of LISN + Cable Loss + RF Switching Unit attenuation

Measurement = Reading + Corrector Factor
Limit = Limit stated in standard

Margin = Measurement - Limit

Detector = Reading for Quasi-Peak / Average / Peak

Radiated Spurious Emissions and Restricted Bands							
Freq. (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector	
60.0700	45.88	-18.38	27.50	49.00	-21.50	QP	

Where,

Freq. = Emission frequency in MHz

Reading Level = Uncorrected Analyzer/Receiver reading

Corrector Factor = Antenna Factor + Cable Loss - Pre-amplifier

Measurement = Reading + Corrector Factor

Limit = Limit stated in standard

Over = Margin, which calculated by Measurement - Limit

Detector = Reading for Quasi-Peak / Average / Peak

Note: For all conducted test items, the spectrum analyzer offset or transducer is derived from RF cable loss and attenuator factor. The offset or transducer is equal to the RF cable loss plus attenuator factor.



### 13. Test Items and Results

### 13.1 Conducted Emissions Measurement

### LIMIT

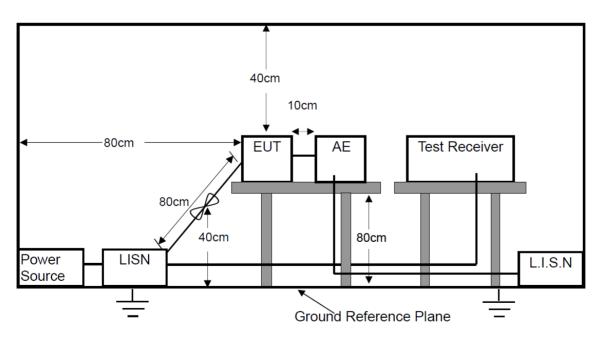
According to the requirements of FCC PART 15.207, the limits are as follows:

Frequency (MHz)	Quasi-peak	Average
0.15 to 0.5	66 to 56	56 to 46
0.5 to 5	56	46
5 to 30	60	50

Note: 1. If the limits for the average detector are met when using the quasi-peak detector, then the limits for the measurements with the average detector are considered to be met.

- 2. The lower limit shall apply at the transition frequencies.
- 3. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5MHz.

### **BLOCK DIAGRAM OF TEST SETUP**





### **TEST PROCEDURES**

- a. The EUT was placed on a wooden table 0.8m height from the metal ground plan and 0.4m from the conducting wall of the shielding room and it was kept at 0.8m from any other grounded conducting surface.
- b. All I/O cables and support devices were positioned as per ANSI C63.10.
- c. Connect mains power port of the EUT to a line impedance stabilization network (LISN).
- d. Connect all support devices to the other LISN and AAN, if needed.
- e. Scan the frequency range from 150KHz to 30MHz at both sides of AC line for maximum conducted interference checking and record the test data.

### **TEST RESULTS**

**PASS** 

Please refer to the following pages.

30.000



0.150

0.5

M/N: MQW	Testing Voltage: AC 120V/60Hz
Phase: L1	Detector: QP & AVG
Test Model: 1	

# Conducted Emission Measurement Date: 2020/12/10 Time: 17:29:51 80.0 dBuV 70 60 FCC PART 15C\_QP FCC PART 15C\_AVG 10 0.0

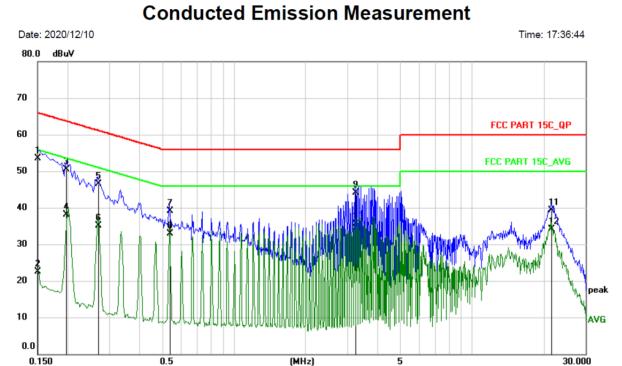
(MHz)

5

No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
	MHz	dBu∨	dB	dBu∨	dBuV	dB	Detector	Comment	
1	0.1500	44.40	10.60	55.00	66.00	-11.00	QP		
2	0.1500	11.60	10.60	22.20	56.00	-33.80	AVG		
3	0.2020	41.00	10.60	51.60	63.53	-11.93	QP		
4	0.2020	26.60	10.60	37.20	53.53	-16.33	AVG		
5	0.2700	36.80	10.60	47.40	61.12	-13.72	QP		
6	0.2700	21.00	10.60	31.60	51.12	-19.52	AVG		
7 *	3.7620	35.79	10.71	46.50	56.00	-9.50	QP		
8	3.7620	25.49	10.71	36.20	46.00	-9.80	AVG		
9	9.6779	27.57	10.73	38.30	60.00	-21.70	QP		
10	9.6779	20.97	10.73	31.70	50.00	-18.30	AVG		
11	21.4340	28.83	10.77	39.60	60.00	-20.40	QP		
12	21.4340	21.83	10.77	32.60	50.00	-17.40	AVG		



M/N: MQW	Testing Voltage: AC 120V/60Hz
Phase: L1	Detector: QP & AVG
Test Model: 1	



Freq.	Level	Correct Factor	Measure- ment	Limit	Over		
MHz	dBu∀	dB	dBuV	dBu∀	dB	Detector	Comment
0.1500	43.00	10.60	53.60	66.00	-12.40	QP	
0.1500	11.90	10.60	22.50	56.00	-33.50	AVG	
0.1980	40.00	10.60	50.60	63.69	-13.09	QP	
0.1980	27.50	10.60	38.10	53.69	-15.59	AVG	
0.2700	35.90	10.60	46.50	61.12	-14.62	QP	
0.2700	24.60	10.60	35.20	51.12	-15.92	AVG	
0.5380	28.47	10.63	39.10	56.00	-16.90	QP	
0.5380	22.27	10.63	32.90	46.00	-13.10	AVG	
3.2260	33.49	10.71	44.20	56.00	-11.80	QP	
3.2260	24.79	10.71	35.50	46.00	-10.50	AVG	
21.5780	28.53	10.77	39.30	60.00	-20.70	QP	
21.5780	23.43	10.77	34.20	50.00	-15.80	AVG	
	MHz 0.1500 0.1500 0.1980 0.1980 0.2700 0.2700 0.5380 0.5380 3.2260 3.2260 21.5780	MHz dBuV  0.1500 43.00  0.1500 11.90  0.1980 40.00  0.1980 27.50  0.2700 35.90  0.2700 24.60  0.5380 28.47  0.5380 22.27  3.2260 33.49  3.2260 24.79  21.5780 28.53	MHz dBuV dB  0.1500 43.00 10.60  0.1500 11.90 10.60  0.1980 40.00 10.60  0.2700 35.90 10.60  0.2700 24.60 10.60  0.5380 28.47 10.63  0.5380 22.27 10.63  3.2260 33.49 10.71  3.2260 24.79 10.71  21.5780 28.53 10.77	MHz         dBuV         dB         dBuV           0.1500         43.00         10.60         53.60           0.1500         11.90         10.60         22.50           0.1980         40.00         10.60         50.60           0.1980         27.50         10.60         38.10           0.2700         35.90         10.60         46.50           0.2700         24.60         10.60         35.20           0.5380         28.47         10.63         39.10           0.5380         22.27         10.63         32.90           3.2260         33.49         10.71         44.20           3.2260         24.79         10.71         35.50           21.5780         28.53         10.77         39.30	MHz         dBuV         dB         dBuV         dB	MHz         dBuV         dB         dBuV         dBuV         dB           0.1500         43.00         10.60         53.60         66.00         -12.40           0.1500         11.90         10.60         22.50         56.00         -33.50           0.1980         40.00         10.60         50.60         63.69         -13.09           0.1980         27.50         10.60         38.10         53.69         -15.59           0.2700         35.90         10.60         46.50         61.12         -14.62           0.2700         24.60         10.60         35.20         51.12         -15.92           0.5380         28.47         10.63         39.10         56.00         -13.10           0.5380         22.27         10.63         32.90         46.00         -13.10           3.2260         33.49         10.71         44.20         56.00         -11.80           3.2260         24.79         10.71         35.50         46.00         -10.50           21.5780         28.53         10.77         39.30         60.00         -20.70	MHz         dBuV         dB         dBuV         dBuV         dB         Detector           0.1500         43.00         10.60         53.60         66.00         -12.40         QP           0.1500         11.90         10.60         22.50         56.00         -33.50         AVG           0.1980         40.00         10.60         50.60         63.69         -13.09         QP           0.1980         27.50         10.60         38.10         53.69         -15.59         AVG           0.2700         35.90         10.60         46.50         61.12         -14.62         QP           0.2700         24.60         10.60         35.20         51.12         -15.92         AVG           0.5380         28.47         10.63         39.10         56.00         -16.90         QP           0.5380         22.27         10.63         32.90         46.00         -13.10         AVG           3.2260         33.49         10.71         44.20         56.00         -11.80         QP           3.2260         24.79         10.71         35.50         46.00         -10.50         AVG           21.5780         28.53         10.77





### 13.2 Radiated Spurious Emissions and Restricted Bands Measurement

### LIMIT

Frequency range	Distance Meters	Field Strengths Limit (15.209)			
MHz	Diotarios motors	μV/m			
0.009 ~ 0.490	300	2400/F	F(kHz)		
0.490 ~ 1.705	30	24000/	F(kHz)		
1.705 ~ 30	30	3	0		
30 ~ 88	3	100			
88 ~ 216	3	150			
216 ~ 960	3	200			
Above 960	3	500			
Frequency range	Distance Meters	Field Strengths	Limit (15.249)		
MHz		mV/m (Field strength of fundamental)	μV/m (Field strength of Harmonics)		
902 ~ 928	3	50	500		
2400 ~ 2483.5	3	50	500		
5725 ~ 5875	5725 ~ 5875 3		500		
24000 ~ 2425000	3	250 2500			

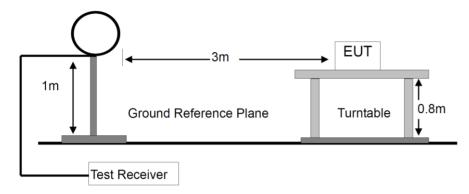
Remark:

- (1) Emission level (dB) $\mu$ V = 20 log Emission level  $\mu$ V/m
- (2) The smaller limit shall apply at the cross point between two frequency bands.
- (3) As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
- (4) The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.
- (5) §15.249(d) specifies that emissions which fall in the restricted bands, as defined in §15.205 comply with radiated emission limits specified in §15.209.

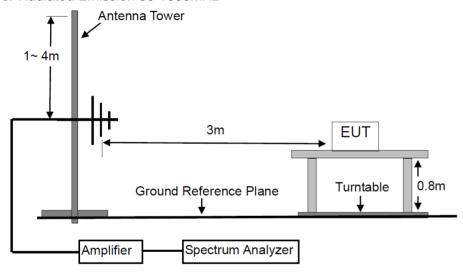


### **BLOCK DIAGRAM OF TEST SETUP**

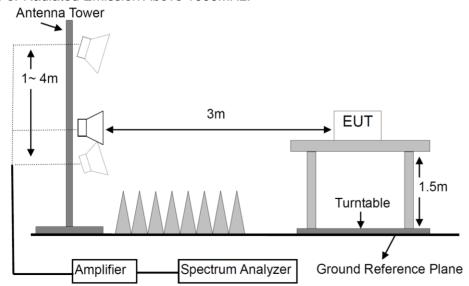
### For Radiated Emission below 30MHz



### For Radiated Emission 30-1000MHz



### For Radiated Emission Above 1000MHz.





### **TEST PROCEDURES**

- a. Below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi- anechoic chamber room.
- b. For the radiated emission test above 1GHz:
  - The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter full anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation. 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.
- c. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The height of antenna 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.
- e. 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 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.
- f. A Quasi-peak measurement was then made for that frequency point for below 1GHz test. PK and AV for above 1GHz emission test.

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

Frequency Band (MHz)	Detector	Resolution Bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	3 MHz
Above 1000	Average	1 MHz	10 Hz





# **TEST RESULTS**

PASS

Please refer to the following pages.





20

10

0.0

30.0000 127.000

224.000

321.000

418.000

M/N: MQW	Testing Voltage: AC 120V/60Hz		
Polarization: Horizontal	Detector: QP		
Test Model: 1	Distance: 3m		

**Radiated Emission Measurement** 

# Date: 2020/12/10 80.0 dBuV/m 70 60 FCC\_PART 15C\_3m Margin -6 dB

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment	
1		211.3900	39.77	-7.57	32.20	43.50	-11.30	QP		
 2	*	332.6400	41.97	-4.57	37.40	46.00	-8.60	QP		
3		531.4900	29.42	-1.22	28.20	46.00	-17.80	QP		
4		765.2600	26.48	3.32	29.80	46.00	-16.20	QP		
5		836.0700	31.73	4.57	36.30	46.00	-9.70	QP		
6		901.0600	26.79	6.21	33.00	46.00	-13.00	QP		

515.000

612.000

709.000

806.000

1000.000 MHz

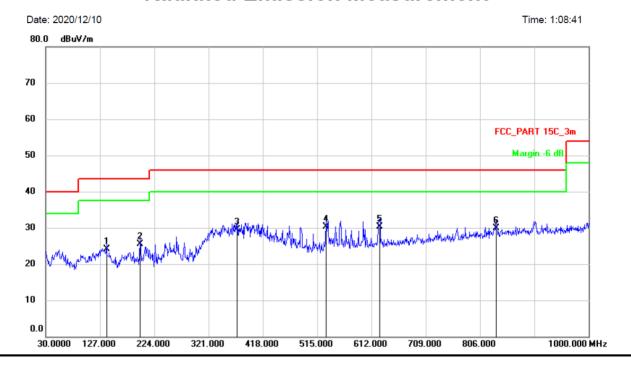
Note: Below 30MHz, the emissions are lower than 20dB below the allowable limit.





M/N: MQW	Testing Voltage: AC 120V/60Hz		
Polarization: Vertical	Detector: QP		
Test Model: 1	Distance: 3m		

# **Radiated Emission Measurement**



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment	
1		138.6400	35.65	-11.45	24.20	43.50	-19.30	QP		
2		198.7800	34.40	-8.80	25.60	43.50	-17.90	QP		
3		372.4100	34.44	-4.84	29.60	46.00	-16.40	QP		
4		530.5200	32.53	-2.23	30.30	46.00	-15.70	QP		
5	*	626.5500	30.18	0.22	30.40	46.00	-15.60	QP		
6		835.1000	25.44	4.56	30.00	46.00	-16.00	QP		

Note: Below 30MHz, the emissions are lower than 20dB below the allowable limit.





Modulation: GFSK			Test Re	sult: PASS	3		Test frequency range: 1-25GHz			
Freq.	Ant. Pol.	Read Level(d	_	Factor	l (aBuv/m)		Limit 3m (dBuV/m)		Margin (dB)	
(MHz)	(H/V)	PK	AV	(dB/m)	PK	AV	PK	AV	PK	AV
			Ope	ration Mo	de: TX Mo	de (Low)				
2402	V	73.01	40.60	0.13	73.14	40.73	114.00	94.00	-40.86	-53.27
4804	V	46.14	31.08	6.30	52.44	37.38	74.00	54.00	-21.56	-16.62
7206	V	45.25	30.28	10.44	55.69	40.72	74.00	54.00	-18.31	-13.28
2402	Н	8382	42.52	0.13	83.95	42.65	114.00	94.00	-30.05	-51.35
4804	Н	45.67	31.02	6.30	51.97	37.32	74.00	54.00	-22.03	-16.68
7206	Н	45.56	30.51	10.44	56.00	40.95	74.00	54.00	-18.00	-13.05
	Operation Mode: TX Mode (Mid)									
2440	V	74.63	40.35	0.23	74.86	40.58	114.00	94.00	-39.14	-53.42
4880	V	46.08	31.46	6.60	52.68	38.06	74.00	54.00	-21.32	-15.94
7320	V	46.10	30.58	10.55	56.65	41.13	74.00	54.00	-17.35	-12.87
2440	Н	83.50	41.91	0.23	83.73	42.14	114.00	94.00	-30.27	-51.86
4880	Н	45.52	31.45	6.60	52.12	38.05	74.00	54.00	-21.88	-15.95
7320	Н	46.48	30.46	10.55	57.03	41.01	74.00	54.00	-16.97	-12.99
			Oper	ation Mod	de: TX Mo	de (High)	)			
2480	V	75.34	40.90	0.34	75.68	41.24	114.00	94.00	-38.32	-52.76
4960	V	45.49	30.47	6.89	52.38	37.36	74.00	54.00	-21.62	-16.64
7440	V	46.87	30.92	10.60	57.47	41.52	74.00	54.00	-16.53	-12.48
2480	Н	82.18	42.32	0.34	82.52	42.66	114.00	94.00	-31.48	-51.34
4960	Н	45.37	30.52	6.889	52.26	37.41	74.00	54.00	-21.74	-16.59
7440	Н	46.82	30.88	10.60	57.42	41.48	74.00	54.00	-16.58	-12.52

Remark: Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 10dB below the permissible limits.

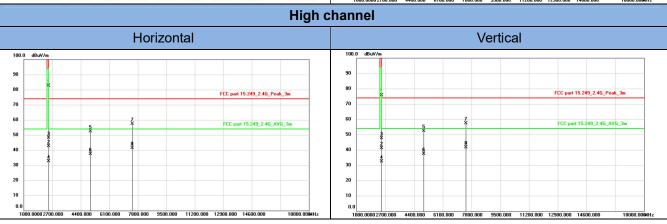


Report No.: NTC2012059FV00

Band edge in restricted band:										
2390.000	Н	46.93	31.80	0.09	47.02	31.89	74.00	54.00	-26.98	-22.11
2390.000	V	46.47	31.58	0.09	46.56	31.67	74.00	54.00	-27.44	-22.33
2483.500	Н	47.80	32.34	0.34	48.14	32.68	74.00	54.00	-25.86	-21.32
2483.500	V	47.24	32.05	0.34	47.58	32.39	74.00	54.00	-26.42	-21.61

Note: Other band edge, the emissions are lower than 20dB below the allowable limit.

### 





### 13.3 20dB Bandwidth Measurement

### LIMIT

There is no limit.

### **BLOCK DIAGRAM OF TEST SETUP**

EUT	Attenuator		- Spectrum Analyzer
-----	------------	--	---------------------

### **TEST PROCEDURES**

The 20dB bandwidth of the emission was contained within the frequency band designated which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered, FCC Rule 15.215(c):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW was chosen so that the display was a result of the hopping channel modulation. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. Use the spectrum 20dB down delta function to measure the bandwidth.

### **TEST RESULTS**

**PASS** 

Please refer to the following table.





Date: 10.DEC.2020 16:49:50

Channel Frequency (MHz)		Data Rate (Mbps)		20dB Bandwidth (MHz)	Result		
1	2402	1		1.11	PASS		
20	2440	1		1.13	PASS		
40	2480	1		1.12	PASS		
	2402MHz			2440MHz			
Ref -30 dBm Att -30 -40 -40 -50 -50 -50 -60 -70 -80 -110 -110 -110 -110 -110 -110 -110	Temp 1 (T1 nos)	G dis 3 MHz 3 MHz 6 G dis 6 dis 6 dis 7 GHz 6	Ref -30 d -30 -40 -40 -70 -80 -70 -110 -120 -130 Center 2	.44 CHE 300 KHE/	2.40062692 DEZ  AGMS 251 2.80 MB  BM 1.12300 000 MB2  -64.27 MB 2  -64.27 MB 2  -64.34 MB 2		
	2480MHz						
Ref -30 dBm Att -30 -46 -46 -46 -46 -46 -46 -46 -46 -46 -46	7 mm 1 (71 mb) -6 -7 -6 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7	3 GHE 0 DB B MHS WHS WHS WHS WHS WHS WHS WHS WHS WHS W					



### 13.4 Antenna Requirement

### STANDARD APPLICABLE

According to of FCC part 15C section 15.203 and 15.240:

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

Systems operating in the 2400-2483.5MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

### **ANTENNA CONNECTED CONSTRUCTION**

The antenna is PCB antenna that no antenna other than furnished by the responsible party shall be used with the device, and the best case gain of the antenna is -2.58dBi, Therefore, the antenna is consider meet the requirement.



# 14. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI7	100837	Mar. 13, 2020	1 Year
2.	Antenna	Schwarzbeck	VULB9162	9162-010	Mar. 23, 2020	1 Year
3.	Spectrum Analyzer	Rohde & Schwarz	FSU26	200409/026	Mar. 13, 2020	1 Year
4.	Spectrum Analyzer	Keysight	N9020A	MY54200831	Mar. 13, 2020	1 Year
5.	Spectrum Analyzer	Rohde & Schwarz	FSV40	101094	Mar. 13, 2020	1 Year
6.	Horn Antenna	Schwarzbeck	BBHA9170	9170-172	Mar. 22, 2019	2 Year
7.	Power Sensor	DARE	RPR3006W	15l00041SNO 64	Mar. 13, 2020	1 Year
8.	Communication Tester	Rohde & Schwarz	CMW500	149004	Mar. 13, 2020	1 Year
9.	Horn Antenna	COM-Power	AH-118	071078	Mar. 23, 2020	1 Year
10.	Pre-Amplifier	HP	HP 8449B	3008A00964	Mar. 13, 2020	1 Year
11.	Pre-Amplifier	HP	HP 8447D	1145A00203	Mar. 13, 2020	1 Year
12.	Loop Antenna	Schwarzbeck	FMZB 1513	1513-272	Mar. 23, 2020	1 Year
13.	Test Receiver	Rohde & Schwarz	ESCI	101152	Mar. 14, 2020	1 Year
14.	L.I.S.N	Rohde & Schwarz	ENV 216	101317	Mar. 13, 2020	1 Year
15.	L.I.S.N	Rohde & Schwarz	ESH2-Z5	893606/014	Mar. 13, 2020	1 Year
16.	RF Switching Unit	Compliance Direction Systems Inc.	RSU-M2	38311	Mar.13, 2020	1 Year
17.	Temperature & Humidity Chamber	REMAFEE	SYHR225L	N/A	Mar. 13, 2020	1 Year
18.	DC Source	Maynuo	MY8811	N/A	Mar. 13, 2020	1 Year
19.	Temporary antenna connector	TESCOM	SS402	N/A	N/A	N/A
20.	Chamber	SAEMC	9*7*7m	N/A	Jun. 20, 2019	2 Year
21.	Test Software	EZ	EZ_EMC	N/A	N/A	N/A

Note: For photographs of EUT and measurement, please refer to appendix in separate documents.