

Shenzhen Toby Technology Co., Ltd.

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FCC Radio Test Report FCC ID: XMF-MID7018

Change II

Report No. : TB-FCC182524

Applicant: Lightcomm Technology Co., Ltd.

Equipment Under Test (EUT)

EUT Name : 7" Tablet

Model No. : 100026191

Series Model No. : MID7018, MID6903

Brand Name : onn

Sample ID : 20210623-07-01#& 20210623-07-02#

Receipt Date : 2021-06-30

Test Date : 2021-07-02 to 2021-07-09

Issue Date : 2021-07-10

Standards : FCC Part 15, Subpart C 15.247

Test Method : ANSI C63.10: 2013

Conclusions : PASS

In the configuration tested, the EUT complied with the standards specified above,

The EUT technically complies with the FCC and IC requirements

Test/Witness Engineer:

Engineer Supervisor :

Engineer Manager

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Ray La

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

TB-RF-074-1.0



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Revision History

Report No.	Version	Description	Issued Date
TB-FCC182524	Rev.01	Initial issue of report	2021-07-10
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1. General Information about EUT

1.1 Client Information

Applicant : Lightcomm Technology Co., Ltd.				
Address : UNIT 1306 13/F ARION COMMERCIAL CENTRE,2-12 ROAD WEST, SHEUNG WAN HK				
Manufacturer	Huizhou Hengdu Electronics Co., Ltd			
		No.8 Huitai Road, Huinan High-tech Industrial Park, Huiao Avenue, Huizhou, Guangdong, China.		

1.2 General Description of EUT (Equipment Under Test)

EUT Name		7" Tablet		
Models No.	:	100026191, MID7018, MID6903		
Model Difference)	All these models are identical in the same PCB, layout and electrical circuit, The only difference is model name and Screen.		
Product Description		Operation 802.11b/g/n(HT20): 2412MHz~2462MHz Frequency: 802.11n(HT40): 2422MHz~2452MHz Number of 802.11b/g/n(HT20):11 channels see note(3)		
Power Supply		Antenna Gain: 0.67dBi FPC Antenna Adapter(TEKA-UCA10US) Input: 100-240V~, 50/60Hz, 0.2A MAX Output: DC 5V 1A DC 3.8V by 3700mAh Rechargeable Li-ion battery		
Software Version	:	RP1A.200720.011 release-keys		
Hardware Version		MID7018-MR_MT8168_LPDDR4_EMMC_V1_1		
Remark		The antenna gain and adapter provided by the applicant, the verified for the RF conduction test and adapter provided by TOBY test lab.		

Note:

- (1) This Test Report is FCC Part 15.247 for 802.11b/g/n, the test procedure follows the FCC KDB 558074 D01 15.247 Meas Guidance v05r02.
- (2) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



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(3) Channel List:

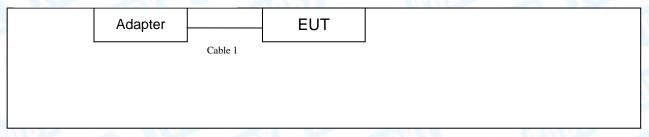
TOBY

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	05	2432	09	2452
02	2417	06	2437	10	2457
03	2422	07	2442	11	2462
04	2427	80	2447		

Note: CH 01~CH 11 for 802.11b/g/n(HT20) CH 03~CH 9 for 802.11n(HT40)

- (4) The Antenna information about the equipment is provided by the applicant.
- 1.3 Block Diagram Showing the Configuration of System Tested

Charging Mode+TX mode



TX Mode



1.4 Description of Support Units

Equipment Information							
Name Model FCC ID/VOC Manufacturer							
33	WALL TO			√			
	Cable Information						
Number Shielded Type Ferrite Core Length Note							
Cable 1	Yes	NO	1.0M	Accessory			



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1.5 Description of Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned follow was evaluated respectively.

For Conducted Test				
Final Test Mode Description				
Mode 1	Charging + TX B Mode			

For Radiated Test				
Final Test Mode Description				
Mode 2	TX Mode B Mode Channel 01/06/11			
Mode 3	TX Mode G Mode Channel 01/06/11			
Mode 4 TX Mode N(HT20) Mode Channel 01/06/				
Mode 5 TX Mode N(HT40) Mode Channel 03/06/09				

Note:

(1) For all test, we have verified the construction and function in typical operation. And all the test modes were carried out with the EUT in transmitting operation in maximum power with all kinds of data rate.

According to ANSI C63.10 standards, the measurements are performed at the highest, Middle, lowest available channels, and the worst case data rate as follows:

802.11b Mode: CCK (1 Mbps) 802.11g Mode: OFDM (6 Mbps)

802.11n (HT20) Mode: MCS 0 (6.5 Mbps) 802.11n (HT40) Mode: MCS 0 (13 Mbps)

- (2) During the testing procedure, the continuously transmitting with the maximum power mode was programmed by the customer.
- (3) The EUT is portable unit; in normal use it was positioned on X-plane. The worst case was found positioned on X-plane. Therefore only the test data of this X-plane was used for radiated emission measurement test.





1.6 Description of Test Software Setting

During testing channel&Power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of WLAN.

Test Software Version	M	Γ8168-LaunchEngMode	.apk
Channel	CH 01	CH 06	CH 11
IEEE 802.11b DSSS	13	13	15
IEEE 802.11g OFDM	11	11	11
IEEE 802.11n (HT20)	11	11	11
Test Software Version		n/a	
Channel	CH 03	CH 06	CH 09
IEEE 802.11n (HT40)	10	10	10

1.7 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

Test Item	Parameters	Expanded Uncertainty (U _{Lab})
Conducted Emission	Level Accuracy: 9kHz~150kHz 150kHz to 30MHz	±3.50 dB ±3.10 dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	±4.60 dB
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	±4.50 dB
Radiated Emission	Level Accuracy: Above 1000MHz	±4.20 dB



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1.8 Test Facility

The testing report were performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at 1/F.,Building 6, Rundongsheng Industrial Zone, Longzhu, Xixiang, Bao'an District, Shenzhen, Guangdong, China. At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

A2LA Certificate No.: 4750.01

The laboratory has been accredited by American Association for Laboratory Accreditation(A2LA) to ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories for the technical competence in the field of Electrical Testing. And the A2LA Certificate No.: 4750.01.FCC Accredited Test Site Number: 854351. Designation Number: CN1223.

IC Registration No.: (11950A)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A. CAB identifier: CN0056.



2. Test Summary

	FCC Pa	rt 15 Subpart C(15.24	7)/RSS 247 Issue 2		
Standard So	ection	Took Itom	Toot Sample(a)		D
FCC	IC	Test Item	Test Sample(s)	Judgment	Remark
15.203		Antenna Requirement	1.003	N/A	N/A Note(2)
15.207(a)	RSS-GEN 7.2.4	Conducted Emission	0811	N/A	N/A Note(2)
15.205&15.247(d)	RSS-GEN 7.2.2	Band-Edge & Unwanted Emissions into Restricted Frequency		N/A	N/A Note(2)
15.247(a)(2)	RSS 247 5.2 (1)	6dB Bandwidth		N/A	N/A Note(2)
15.247(b)(3)	RSS 247 5.4 (4)	Conducted Max Output Power	20210623-07-01# 20210623-07-02#	PASS	N/A
15.247(e)	RSS 247 5.2 (2)	Power Spectral Density	1408	N/A	N/A Note(2)
15.205, 15.209&15.247(d)	RSS 247 5.5	Transmitter Radiated Spurious &Unwanted Emissions into Restricted Frequency	20210623-07-01# 20210623-07-02#	PASS	N/A

Note:

- (1) N/A is an abbreviation for Not Applicable.
- (2) This report is Class II change report for the original equipment have changed, the transmitter module itself has not changed. More information about the test data please refer to the original test report.
- (3) As there is no change regard RF transmitter portion and Antenna assembly, the change will not have effect on Radiated emission above 1GHz by judging for experience, thus testing is performed up to 1GHz only.

3. Test Software

Test Item	Test Software	Manufacturer	Version No.
Conducted Emission	EZ-EMC	EZ	CDI-03A2
Radiation Emission	EZ-EMC	EZ	FA-03A2RE
RF Conducted	MTS-8310	MWRFtest	V2.0.0.0
Measurement	10113-0310	MAKETEST	V2.0.0.0



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4. Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 02, 2021	Jul. 01, 2022
EMI Test Receiver	Rohde & Schwarz	ESPI	100010/007	Jul. 02, 2021	Jul. 01, 2022
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102197	Jul. 02, 2021	Jul. 01, 2022
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar.01, 2020	Feb. 28, 2022
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar.01, 2020	Feb. 28, 2022
Horn Antenna	ETS-LINDGREN	BBHA 9170	BBHA9170582	Mar.01, 2020	Feb. 28, 2022
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-059	Jul. 06, 2021	Jul. 05, 2022
Pre-amplifier	Sonoma	310N	185903	Feb. 25, 2021	Feb. 24, 2022
Pre-amplifier	HP	8449B	3008A00849	Feb. 25, 2021	Feb. 24, 2022
Pre-amplifier	SKET	LNPA_1840G-50	SK201904032	Feb. 25, 2021	Feb. 24, 2022
Cable	HUBER+SUHNER	100	SUCOFLEX	Feb. 25, 2021	Feb. 24, 2022
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Antenna Conducted E	Emission				
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 02, 2021	Jul. 01, 2022
Spectrum Analyzer	Rohde & Schwarz	ESPI	100010/007	Jul. 02, 2021	Jul. 01, 2022
MXA Signal Analyzer	Agilent	N9020A	MY49100060	Sep. 11, 2020	Sep. 10, 2021
Vector Signal Generator	Agilent	N5182A	MY50141294	Sep. 11, 2020	Sep. 10, 2021
Analog Signal Generator	Agilent	N5181A	MY50141953	Sep. 11, 2020	Sep. 10, 2021
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO26	Sep. 11, 2020	Sep. 10, 2021
DE Davis Cara	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO29	Sep. 11, 2020	Sep. 10, 2021
RF Power Sensor	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO31	Sep. 11, 2020	Sep. 10, 2021
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO33	Sep. 11, 2020	Sep. 10, 2021



5. Radiated Emission Test

6.1 Test Standard and Limit

6.1.1 Test Standard FCC Part 15.209

6.1.2 Test Limit

Radiated Emission Limits (9 kHz~1000 MHz)

Frequency (MHz	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Radiated Emission Limit (Above 1000MHz)

Frequency	Distance of 3m (dBuV/m)			
(MHz)	Peak	Average		
Above 1000	74	54		

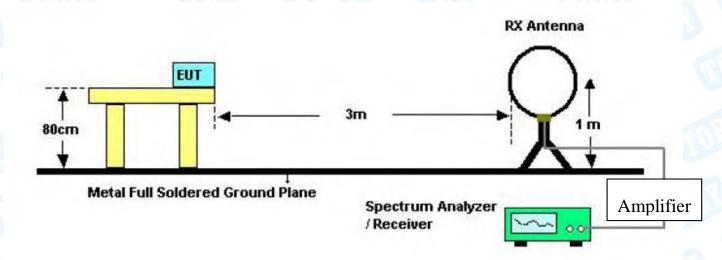
Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission Level(dBuV/m)=20log Emission Level(uV/m)

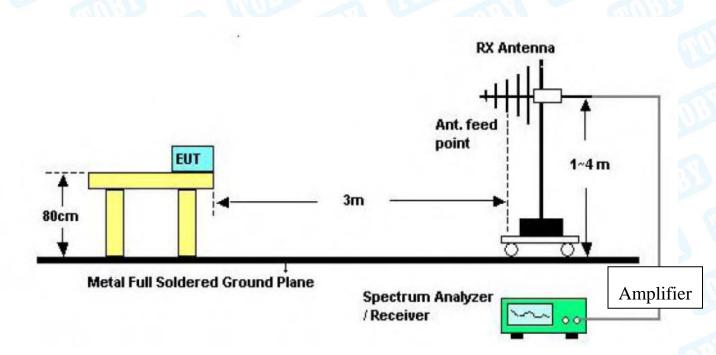




6.2 Test Setup



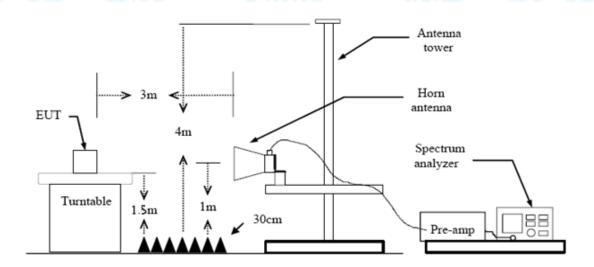
Below 30MHz Test Setup



Below 1000MHz Test Setup

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Above 1GHz Test Setup

6.3 Test Procedure

- (1) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- (2) Measurements at frequency Below 1GHz. The EUT was placed on a rotating 0.8m high above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- (3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (4) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- (5) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (7) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (8) For the actual test configuration, please see the test setup photo.



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6.4 Deviation From Test Standard

No deviation

6.5 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

6.6 Test Data

Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.

Please refer to the Attachment A.



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6. Peak Output Power Test

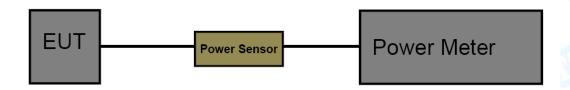
6.1 Test Standard and Limit

6.1.1 Test Standard FCC Part 15.247 (b)

6.1.2 Test Limit

FCC Part 15 Subpart C(15.247)/RSS-210						
Test Item Limit Frequency Range(MHz						
Peak Output Power	2400~2483.5					

6.2 Test Setup



6.3 Test Procedure

The measurement is according to section 9.1.2 of KDB 558074 D01 DTS Meas Guidance v05r02.

The EUT was connected to RF power meter via a broadband power sensor as show the block above. The power sensor video bandwidth is greater than or equal to the DTS bandwidth of the equipment.

6.4 Deviation From Test Standard

No deviation

6.5 EUT Operating Condition

The EUT was set to continuously transmitting in the max power during the test.

6.6 Test Data

Please refer to the Attachment E.



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7. Antenna Requirement

7.1 Standard Requirement

7.1.1 Standard FCC Part 15.203

7.1.2 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 a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. 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.

7.2 Deviation From Test Standard

No deviation

7.3 Antenna Connected Construction

The gains of the antenna used for transmitting is 0.67dBi, and the antenna de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

Result

The EUT antenna is a FPC Antenna. It complies with the standard requirement.

	Antenna Type	
TO THE	Permanent attached antenna	
	⊠Unique connector antenna	J Mor
The same	Professional installation antenna	



Attachment A-- Radiated Emission Test Data

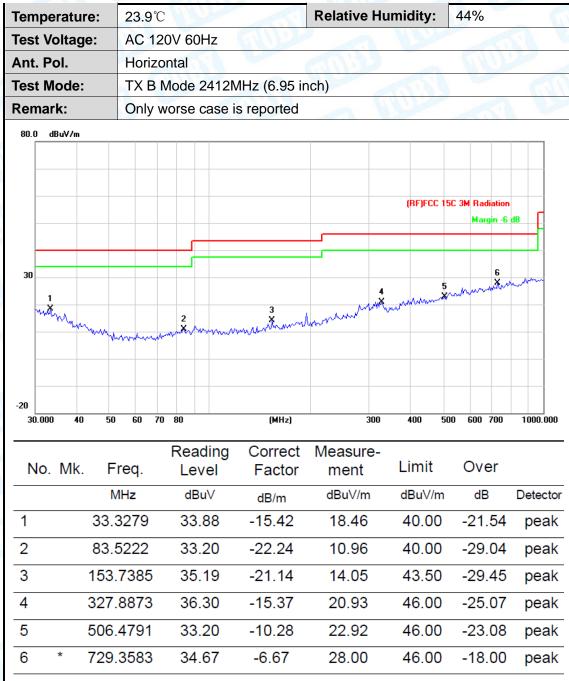
9KHz~30MHz

From 9KHz to 30MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB

below the permissible value has no need to be reported.

30MHz~1GHz



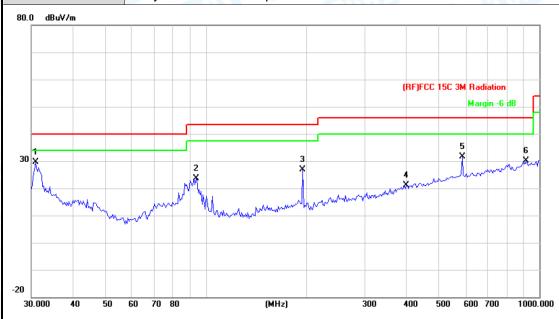
Remark:

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
- 2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Lèvel (dBμV)
- 3. Margin (dB) = QuasiPeak (dB μ V/m)-Limit QPK(dB μ V/m)





Relative Humidity: 44% Temperature: 23.9℃ AC 120V 60Hz **Test Voltage:** Ant. Pol. Vertical **Test Mode:** TX B Mode 2412MHz (6.95 inch) Remark: Only worse case is reported



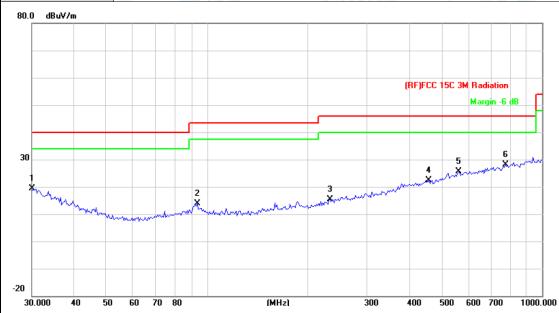
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	30.8535	43.10	-13.58	29.52	40.00	-10.48	peak
2		93.4402	45.52	-21.89	23.63	43.50	-19.87	peak
3		195.1365	46.70	-19.87	26.83	43.50	-16.67	peak
4		399.0302	33.41	-12.33	21.08	46.00	-24.92	peak
5		586.8437	40.21	-8.47	31.74	46.00	-14.26	peak
6		912.8620	34.40	-4.26	30.14	46.00	-15.86	peak

- Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
 QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = QuasiPeak (dB μ V/m)-Limit QPK(dB μ V/m)





Relative Humidity: 23.9℃ 44% Temperature: **Test Voltage:** AC 120V 60Hz Ant. Pol. Horizontal **Test Mode:** TX B Mode 2412MHz (7 inch) Remark: Only worse case is reported



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		30.2111	32.57	-13.11	19.46	40.00	-20.54	peak
2		93.4402	35.81	-21.89	13.92	43.50	-29.58	peak
3		232.5318	33.47	-18.17	15.30	46.00	-30.70	peak
4		459.1144	34.03	-11.66	22.37	46.00	-23.63	peak
5		562.6624	34.30	-8.77	25.53	46.00	-20.47	peak
6	*	776.8778	34.30	-6.10	28.20	46.00	-17.80	peak

Remark:

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB) 2. QuasiPeak (dB μ V/m)= Corr. (dB/m)+ Read Level (dB μ V)
- 3. Margin (dB) = QuasiPeak (dB μ V/m)-Limit QPK(dB μ V/m)





Relative Humidity: 44% Temperature: 23.9℃ AC 120V 60Hz **Test Voltage:** Ant. Pol. Vertical **Test Mode:** TX B Mode 2412MHz (7 inch) Remark: Only worse case is reported



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		31.7313	39.79	-14.25	25.54	40.00	-14.46	peak
2		92.7871	49.64	-21.89	27.75	43.50	-15.75	peak
3		195.1365	47.67	-19.87	27.80	43.50	-15.70	peak
4		410.3825	34.47	-12.21	22.26	46.00	-23.74	peak
5	*	586.8437	43.88	-8.47	35.41	46.00	-10.59	peak
6		979.1804	37.21	-4.05	33.16	54.00	-20.84	peak

- Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
 QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = QuasiPeak (dB μ V/m)-Limit QPK(dB μ V/m)





Attachment B-- Peak Output Power Test Data

Test Conditions	s: Continuous Transm	nitting Mode		
Temperature:	25 ℃	Relative Humidity:	55%	
Test Voltage:	DC 3.8V		The same	
Mode	Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)	
	2412	12.98		
802.11b	2437	11.34		
	2462	11.10		
	2412	10.11		
802.11g	2437	10.12		
	2462	9.92	30	
802.11n	2412	10.22	30	
(HT20)	2437	10.02		
(11120)	2462	10.22		
802.11n	2422	2 10.24		
(HT40)	2437	10.19		
(11140)	2452	9.51		
	Resi	ult: PASS		





Duty Cycle Mode **Test Result** Channel frequency (MHz) 2412 802.11b 2437 2462 2412 802.11g 2437 2462 >98% 2412 802.11n 2437 (HT20) 2462 2422 802.11n 2437 (HT40) 2452 Please see below plots

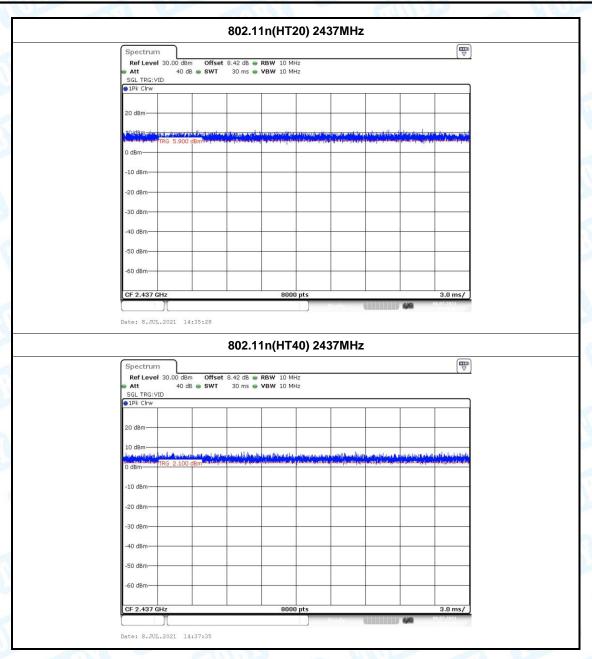




802.11b 2437MHz -20 dBm -60 dBm-Date: 8.JUL.2021 14:28:03 802.11g 2437MHz -50 dBm

Date: 8.JUL.2021 14:31:32





----END OF REPORT----