FCC Radio Test Report

FCC ID: XMF-MID1035

Change II

Report No.	:	TB-FCC179116
Applicant	:	Lightcomm Technology Co., Ltd.
Equipment Under Test (EUT)		
EUT Name	:	10.1"Tablet
Model No.	:	100026203
Series Model No.	:	MID1035A, 100003562, MID1035
Brand Name	:	onn
Sample ID	:	20210310-36-1#
Receipt Date	:	2021-03-12
Test Date	:	2021-03-13 to 2021-03-16
Issue Date	:	2021-03-17
Standards	:	FCC Part 15, Subpart E 15.407
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	:	Rebeca
Test/Witness Engineer	:	Ivan Su
Approved& Authorized	:	Ray Lai

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.

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Revision History

Report No.	Version	Description	Issued Date
TB-FCC178282	Rev.01	Initial issue of report	2021-01-19
TB-FCC179115	Rev.02	Delete the audio noise reduction IC module	2021-03-17

1. General Information about EUT

1.1 Client Information

Applicant	:	Lightcomm Technology Co., Ltd.
Address	:	UNIT 1306 13/F ARION COMMERCIAL CENTRE, 2-12 QUEEN'S ROAD WEST, SHEUNG WAN HK
Manufacturer	:	Huizhou Hengdu Electronics Co., Ltd.
Address	:	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	:	10.1"Tablet	
Models No.	:	100026203, MID1035A, 100003562, MID1035	
Model Difference	:	All these models are identical in the same PCB, layout and electrical circuit, The only difference is model name and memory capacity.	
Product Description	:	Operation Frequency: U-NII-1: 5180MHz~5240MHz, U-NII-2A: 5260MHz~5320MHz U-NII-2C: 5500MHz~5720MHz, U-NII-3: 5745MHz~5825MHz	
		Antenna Gain:	2.92dBi FPC Antenna
		Modulation Type:	802.11a: OFDM (QPSK, BPSK, 16QAM) 802.11n: OFDM (QPSK, BPSK, 16QAM, 64QAM) 802.11ac: OFDM (QPSK, BPSK, 16QAM, 64QAM, 256QAM)
		Bit Rate of Transmitter:	802.11a: 6/9/12/18/24/36/48/54 Mbps 802.11n: up to 150Mbps 802.11ac: at most 433.3 Mbps
Power Rating	:	Adapter(TEKA-UCA20US) Input: 100-240V~, 50/60Hz, 0.35A MAX Output: DC 5V 2A DC 3.8V by 6600mAh Li-ion Polymer battery	
Software Version	:	RP1A.200720.011 release-keys	
Hardware Version	:	MID1035MQ_MT8768_LPDDR4_DSP_MB-VER1_1	
Remark	:	The adapter and antenna gain provided by the applicant, the verified for the RF conduction test provided by TOBY test lab.	

Note:

(1) This Test Report is FCC Part 15, Subpart E(15.407) for 802.11a/n/ac, the test procedure follows the KDB 789033 D02 General U-NII Test Procedures New Rules v02r01. More detailed features description, please refer to the manufacturer's specifications or the User's Manual.

(2) Channel List:

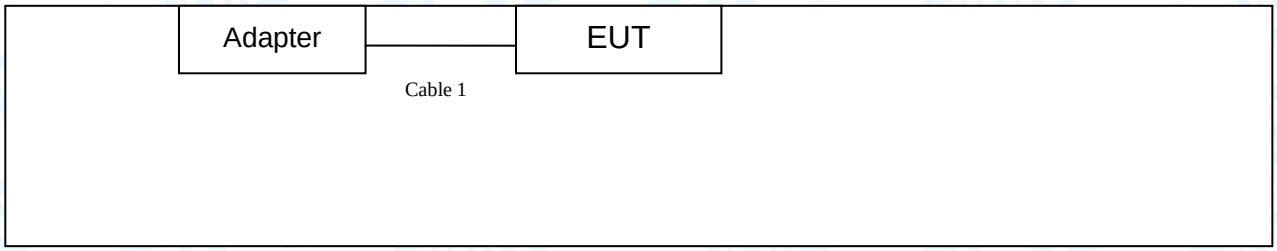
Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5180~5240MHz **(U-NII-1)**	36	5180 MHz	44	5220 MHz
	38	5190 MHz	46	5230 MHz
	40	5200 MHz	48	5240 MHz
	42	5210 MHz		
For 20 MHz Bandwidth, use channel 36, 40, 44, 48. For 40 MHz Bandwidth, use channel 38, 46. For 80 MHz Bandwidth, use channel 42.				

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5260~5320 MHz **(U-NII-2A)**	52	5260 MHz	60	5300 MHz
	54	5270 MHz	62	5310MHz
	56	5280MHz	64	5320 MHz
	58	5290MHz		
For 20 MHz Bandwidth, use channel 52, 56, 60, 64. For 40 MHz Bandwidth, use channel 54, 62. For 80 MHz Bandwidth, use channel 58.				

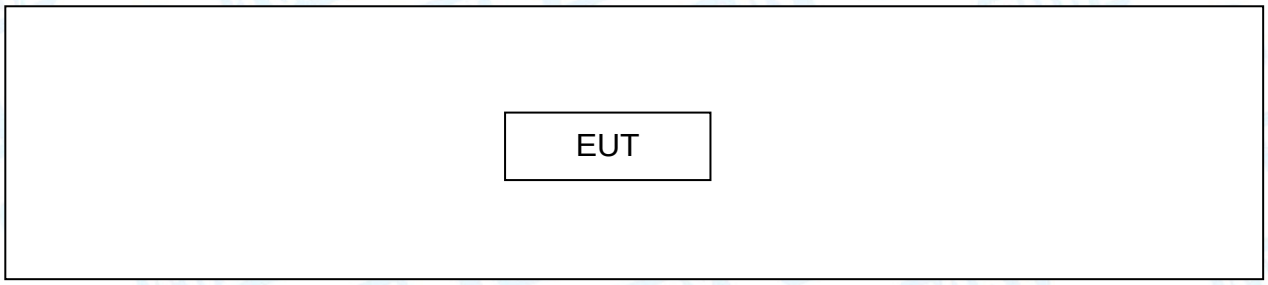
Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5500~5720 MHz **(U-NII-2C)**	100	5500 MHz	124	5620 MHz
	102	5510 MHz	126	5630 MHz
	104	5520 MHz	128	5640 MHz
	106	5530 MHz	132	5660 MHz
	108	5540 MHz	134	5670 MHz
	110	5550 MHz	136	5680 MHz
	112	5560 MHz	138	5690 MHz
	116	5580 MHz	140	5700 MHz
	118	5590 MHz	142	5710 MHz
	120	5600 MHz	144	5720 MHz
	122	5610 MHz		
For 20 MHz Bandwidth, use channel 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140, 144 For 40 MHz Bandwidth, use channel 102, 110, 118, 126, 134, 142 For 80 MHz Bandwidth, use channel 106, 122, 138.				

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5745~5825MHz **(U-NII-3)**	149	5745 MHz	157	5785 MHz
	151	5755 MHz	159	5795 MHz
	153	5765 MHz	161	5805 MHz
	155	5775 MHz	165	5825 MHz
For 20 MHz Bandwidth, use channel 149, 153, 157, 161, 165. For 40 MHz Bandwidth, use channel 151, 159. For 80 MHz Bandwidth, use channel 155.				

1.3 Block Diagram Showing the Configuration of System Tested



TX Mode



1.4 Description of Support Units

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

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 a Mode(5180MHz)
For Radiated Test Below 1GHz		
Final Test Mode		**Description**
Mode 2		Charging + TX a Mode(5180MHz)
For Radiated Test Above 1GHz		
Test Band	**Final Test Mode**	**Description**
U-NII-1	Mode 3	TX Mode 802.11a Mode Channel 36/40/48
	Mode 4	TX Mode 802.11n(HT20) Mode Channel 36/40/48
	Mode 5	TX Mode 802.11ac(VHT20) Mode Channel 36/40/48
	Mode 6	TX Mode 802.11n(HT40) Mode Channel 38/46
	Mode 7	TX Mode 802.11ac(VHT40) Mode Channel 38/46
	Mode 8	TX Mode 802.11ac(VHT80) Mode Channel 42
U-NII-2A	Mode 9	TX Mode 802.11a Mode Channel 52/56/64
	Mode 10	TX Mode 802.11n(HT20) Mode Channel 52/56/64
	Mode 11	TX Mode 802.11ac(VHT20) Mode Channel 52/56/64
	Mode 12	TX Mode 802.11n(HT40) Mode Channel 54/62
	Mode 13	TX Mode 802.11ac(VHT40) Mode Channel 54/62
	Mode 14	TX Mode 802.11ac(VHT80) Mode Channel 58
U-NII-2C	Mode 15	TX Mode 802.11a Mode Channel 100/120/144
	Mode 16	TX Mode 802.11n(HT20) Mode Channel 100/120/144
	Mode 17	TX Mode 802.11ac(VHT20) Mode Channel 100/120/144
	Mode 18	TX Mode 802.11n(HT40) Mode Channel 102/118/142
	Mode 19	TX Mode 802.11ac(VHT40) Mode Channel 102/118/142
	Mode 20	TX Mode 802.11ac(VHT80) Mode Channel 106/122/138
U-NII-3	Mode 21	TX Mode 802.11a Mode Channel 149/157/165
	Mode 22	TX Mode 802.11n(HT20) Mode Channel 149/157/165
	Mode 23	TX Mode 802.11ac(vHT20) Mode Channel 149/157/165
	Mode 24	TX Mode 802.11n(HT40) Mode Channel 151/159
	Mode 25	TX Mode 802.11ac(VHT40) Mode Channel 151/159
	Mode 26	TX Mode 802.11ac(VHT80) Mode Channel 155

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:

802.11a Mode: OFDM (6 Mbps)
802.11n (HT20) Mode: MCS 0
802.11n (HT40) Mode: MCS 0
802.11a(VHT20) Mode: MCS 0
802.11a(VHT40) Mode: MCS 0
802.11a(VHT80) Mode: MCS 0

(2) During the testing procedure, the continuously transmitting with the maximum power mode was programmed by the customer.

(3) The EUT 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: LaunchEngmode		
Test Mode: Continuously transmitting		
U-NII-1		
Mode	**Frequency (MHz)**	**Parameters**
802.11a	5180	16
	5200	16
	5240	16
802.11n(HT20)	5180	16
	5200	16
	5240	16
802.11ac(VHT20)	5180	16
	5200	16
	5240	16
802.11n(HT40)	5190	16
	5230	16
802.11ac(VHT40)	5190	16
	5230	16
802.11ac(VHT80)	5210	16
U-NII-2A		
Mode	**Frequency (MHz)**	**Parameters**
802.11a	5260	16
	5280	16
	5320	16
802.11n(HT20)	5260	16
	5280	16
	5320	16
802.11ac(HT20)	5260	16
	5280	16
	5320	16
802.11n(HT40)	5270	16
	5310	16
802.11ac(VHT40)	5270	16
	5310	16
802.11ac(VHT80)	5290	16

U-NII-2C		
Mode	Frequency (MHz)	Parameters
802.11a	5500	16
	5600	16
	5720	16
802.11n(HT20)	5500	16
	5600	16
	5720	16
802.11ac(HT20)	5500	16
	5600	16
	5720	16
802.11n(HT40)	5510	16
	5590	16
	5710	16
802.11ac(VHT40)	5510	16
	5590	16
	5710	16
802.11ac(VHT80)	5530	16
	5610	16
	5690	16
U-NII-3		
Mode	Frequency (MHz)	Parameters
802.11a	5745	16
	5785	16
	5825	16
802.11n(HT20)	5745	16
	5785	16
	5825	16
802.11ac(HT20)	5745	16
	5785	16
	5825	16
802.11n(HT40)	5755	16
	5795	16
802.11ac(VHT40)	5755	16
	5795	16
802.11ac(VHT80)	5775	16

1.7 Measurement Uncertainty

The reported uncertainty of measurement y ± 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

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.

2. Test Summary

FCC Part 15 Subpart E(15.407)				
Standard Section FCC	**Test Item**	**Test Sample(s)**	**Judgment**	**Remark**
15.203	Antenna Requirement	N/A	N/A	N/A Note(2)
15.207	Conducted Emission	N/A	N/A	N/A
15.407(b)	Band Edge Emissions	N/A	N/A	N/A Note(2)
15.407(a)	26dB Bandwidth&99% Bandwidth	N/A	N/A	N/A Note(2)
15.407(e)	6dB Bandwidth(**only for UNII-3**)	N/A	N/A	N/A Note(2)
15.407(a)	AVG Output Power	N/A	N/A	N/A
15.407(a)	Power Spectral Density	N/A	N/A	N/A Note(2)
15.407(b)	Transmitter Radiated Spurious Emission	20210310-36-1#	PASS	N/A
15.407(a)	Peak Excursion	N/A	N/A	N/A Note(2)
15.407(g)	Frequency Stability	N/A	N/A	N/A Note(2)

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 Measurement	MTS-8310	MWRFtest	V2.0.0.0

4. Test Equipment

Radiation Emission Test					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal. Due Date**
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 06, 2020	Jul. 05, 2021
EMI Test Receiver	Rohde & Schwarz	ESPI	100010/007	Jul. 06, 2020	Jul. 05, 2021
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102197	Jul. 06, 2020	Jul. 05, 2021
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, 2020	Jul. 05, 2021
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	Jul. 07, 2020	Jul. 06, 2021
Cable	HUBER+SUHNER	100	SUCOFLEX	Feb. 25, 2021	Feb. 24, 2022
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A

5. Radiated Emission Test

5.1 Test Standard and Limit

5.1.1 Test Standard

FCC Part 15.209

5.1.2 Test Limit

Radiated Emission Limits (9kHz~1000MHz)

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 (MHz)	Distance of 3m (dBuV/m)	
	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)

Limits of unwanted emission out of the restricted bands

Frequency (MHz)	EIRP Limits (dBm)	Equivalent Field Strength at 3m (dBuV/m)
5150~5250	-27	68.3
5250~5350	-27	68.3
5470~5725	-27	68.3
5725~5825	-27(Note 2)	68.3
	10(Note 2)	105.3
	15.6(Note 2)	110.9
	27(Note 2)	122.3

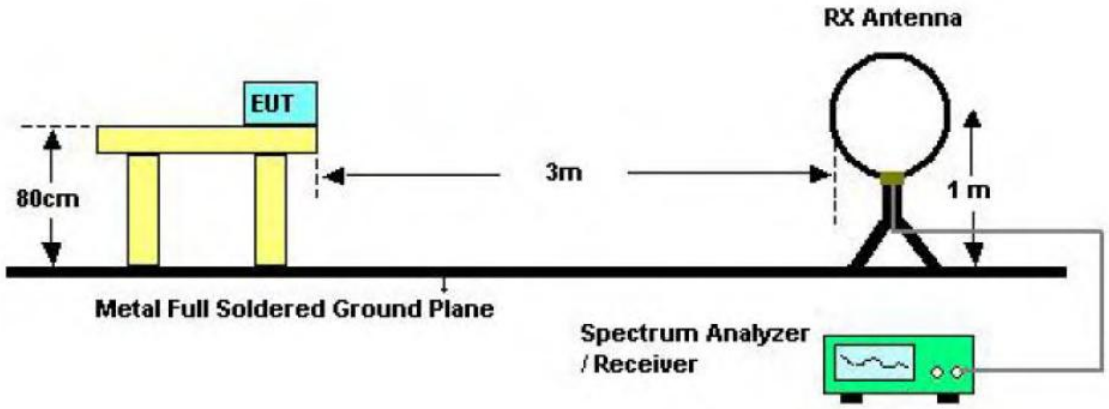
NOTE:

1, The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

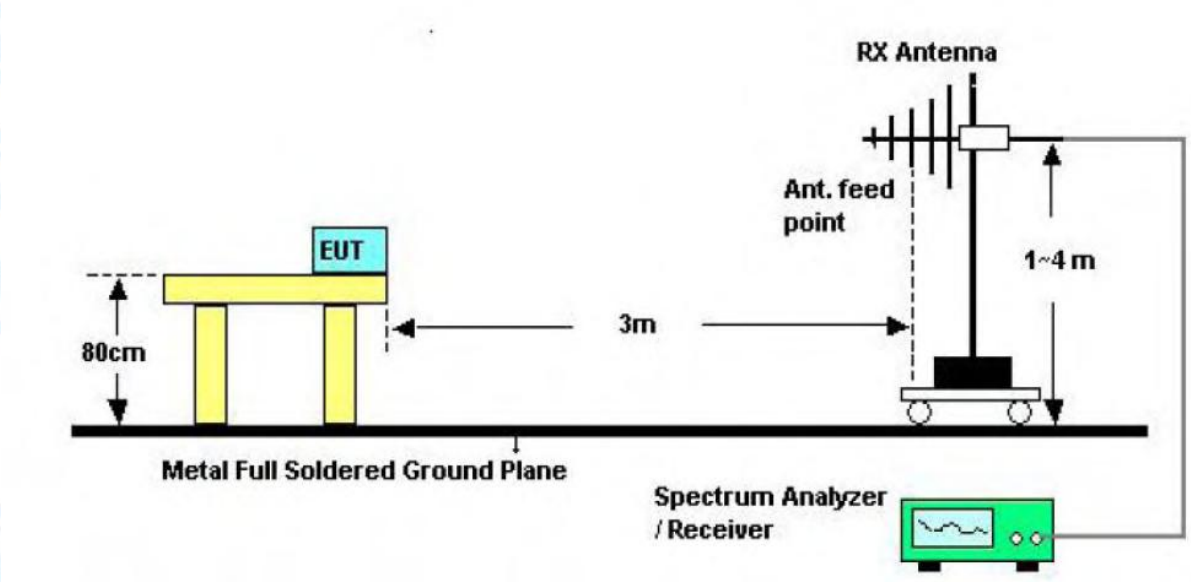
E= $\frac{1000000\sqrt{30P}}{3}$ uV/m, where P is the eirp (Watts)

2, According to FCC 16-24,All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below theband edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above orbelow the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27dBm/MHz at the band edge.

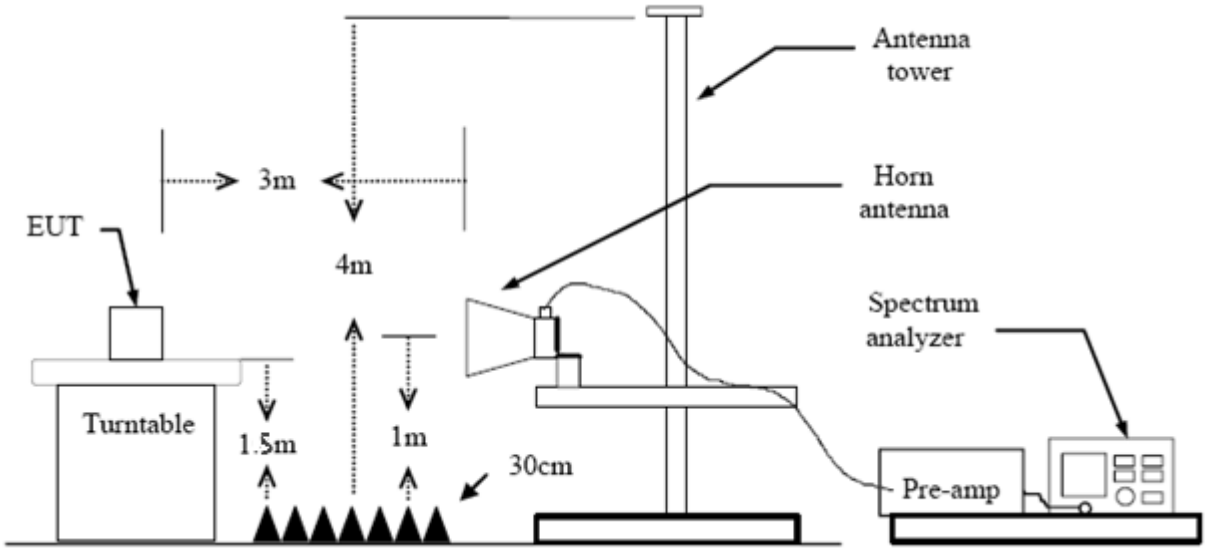
5.2 Test Setup



Below 30MHz Test Setup



Below 1000MHz Test Setup



Above 1GHz Test Setup

5.3 Test Procedure

(1) The measuring distance of 3m shall be used for measurements at frequency up to 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.

(2) 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.

(3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical Antenna 0re 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.

5.4 Deviation From Test Standard

No deviation

5.5 EUT Operating Condition

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

5.6 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.

Attachment A-- Radiated Emission Test Data

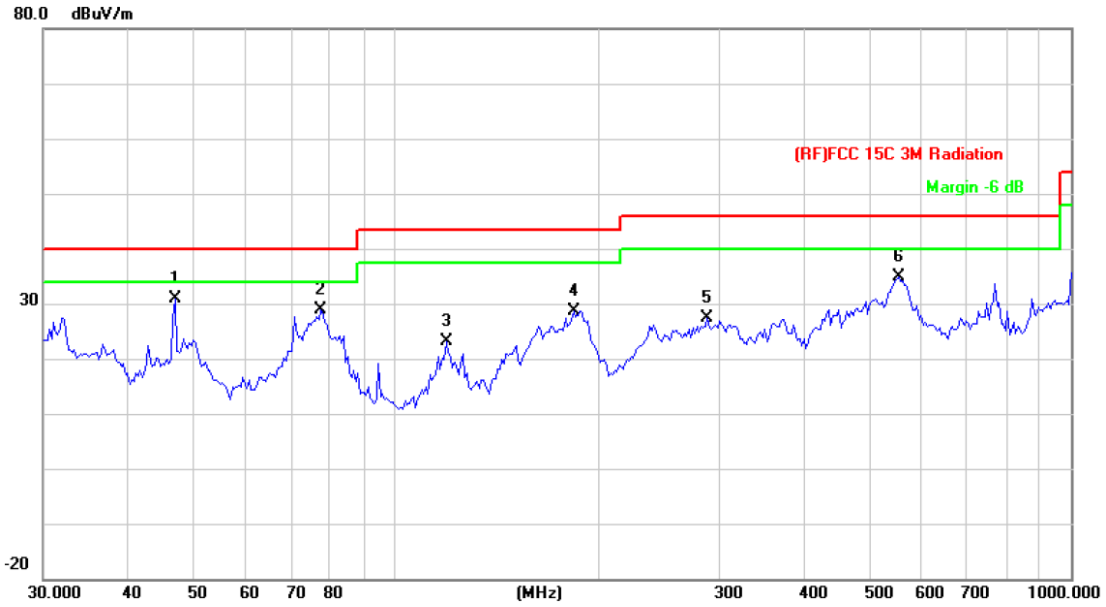
9 KHz~30 MHz

From 9 KHz to 30 MHz: 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

Temperature:	23.5℃	**Relative Humidity:**	42%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX 802.11a Mode 5180MHz (U-NII-1)		
Remark:	Only worse case is reported		

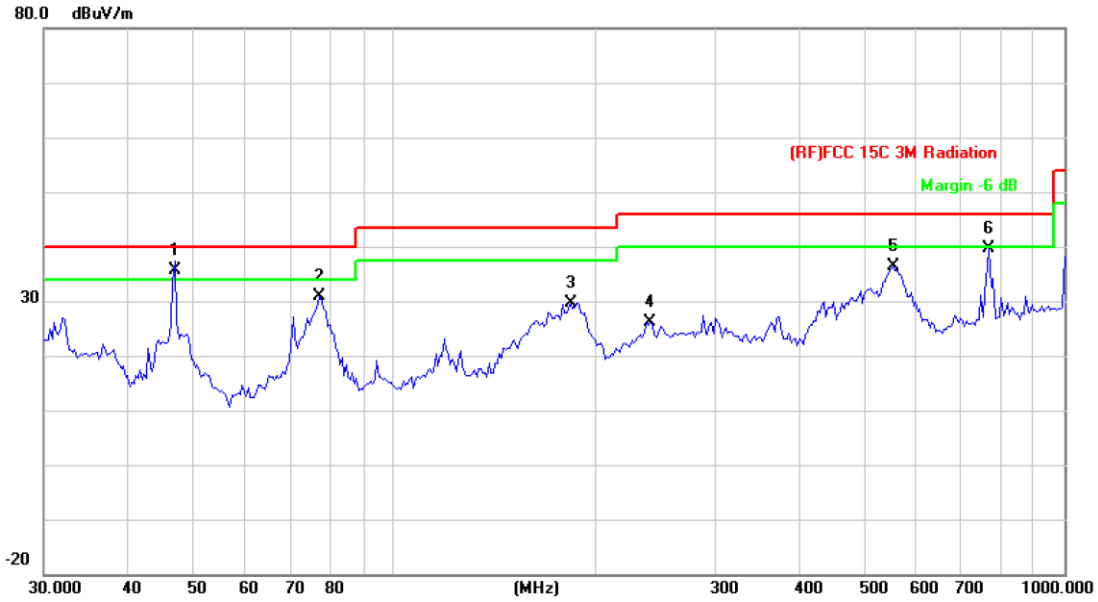


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	46.9947	53.03	-22.07	30.96	40.00	-9.04	peak
2		77.3212	51.51	-22.71	28.80	40.00	-11.20	peak
3		118.6012	45.28	-22.18	23.10	43.50	-20.40	peak
4		183.2005	48.62	-20.01	28.61	43.50	-14.89	peak
5		289.0020	43.86	-16.50	27.36	46.00	-18.64	peak
6		554.8251	43.67	-8.87	34.80	46.00	-11.20	peak

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

Emission Level= Read Level+ Correct Factor

Temperature:	23.5℃	**Relative Humidity:**	42%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	TX 802.11a Mode 5180MHz (U-NII-1)		
Remark:	Only worse case is reported.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	46.9947	57.75	-22.07	35.68	40.00	-4.32	QP
2		77.3212	53.51	-22.71	30.80	40.00	-9.20	peak
3		183.2005	49.62	-20.01	29.61	43.50	-13.89	peak
4		240.8302	43.73	-17.72	26.01	46.00	-19.99	peak
5		554.8252	45.17	-8.87	36.30	46.00	-9.70	peak
6		771.4486	45.82	-6.20	39.62	46.00	-6.38	peak

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

Emission Level= Read Level+ Correct Factor

-----END OF REPORT-----