

FCC Radio Test Report

FCC ID: XMF-MID7018

Change II

Report No. : TB-FCC182522
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,

Test/Witness Engineer :

Rebecca

Engineer Supervisor :

IVAN SU

Engineer Manager :

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-FCC182522	Rev.01	Initial issue of report	2021-07-10

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, Huiiao Avenue, Huizhou, Guangdong, China.

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	7" Tablet
Model(s) No.	:	100026191, MID7018, MID6903
Model Different	:	All these models are identical in the same PCB, layout and electrical circuit, The only difference is model name and Screen.
Product Description	Operation Frequency:	Bluetooth 5.0(BLE): 2402MHz~2480MHz
	Number of Channel:	Bluetooth 5.0(BLE): 40 channels see note(3)
	RF Output Power:	-2.21dBm (Max)
	Antenna Gain:	0.67 dBi FPC Antenna
	Modulation Type:	GFSK
	Bit Rate of Transmitter:	1Mbps&2Mbps
Power Rating	:	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 provided by TOBY test lab.

Note:

This Test Report is FCC Part 15.247 for Bluetooth, the test procedure follows the FCC KDB 558074 D01 15.247 Meas Guidance v05r02.

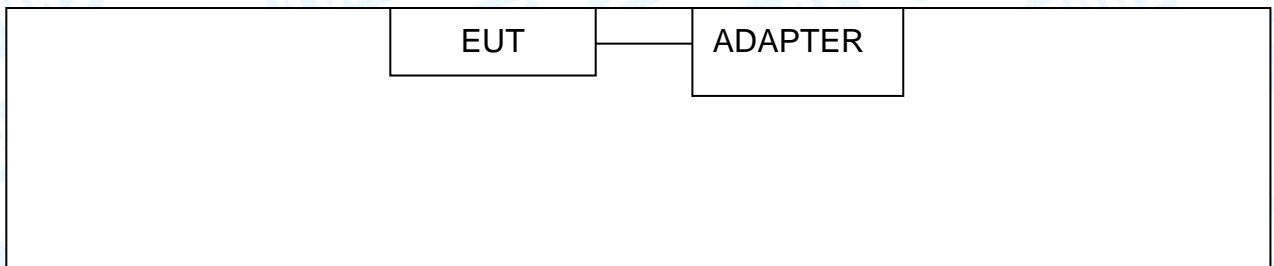
- (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- (2) Antenna information provided by the applicant.

(3) Channel List:

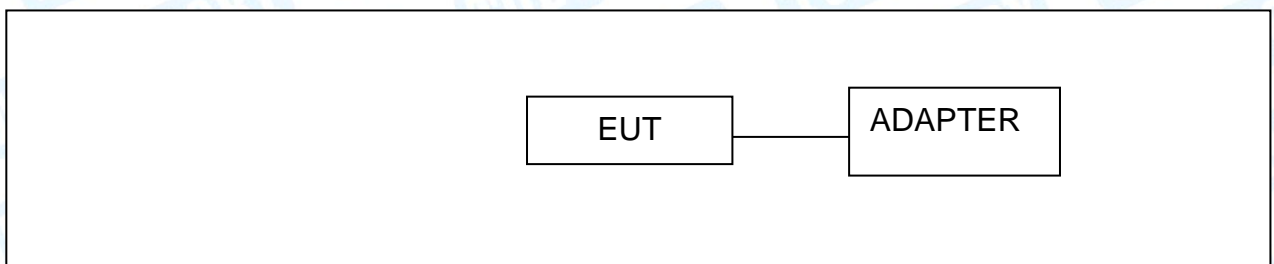
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	14	2430	28	2458
01	2404	15	2432	29	2460
02	2406	16	2434	30	2462
03	2408	17	2436	31	2464
04	2410	18	2438	32	2466
05	2412	19	2440	33	2468
06	2414	20	2442	34	2470
07	2416	21	2444	35	2472
08	2418	22	2446	36	2474
09	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	39	2480
12	2426	26	2454		
13	2428	27	2456		

1.3 Block Diagram Showing the Configuration of System Tested

Conducted Test



Radiated Test



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	USB Charging+TX Mode
For Radiated Test	
Final Test Mode	Description
Mode 2	TX Mode
Mode 3	TX 1Mbps Mode (Channel 00/20/39)
Mode 4	TX 2Mbps Mode (Channel 00/20/39)

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:
BLE Mode: GFSK Modulation Transmitting mode.
- (2) During the testing procedure, the continuously transmitting with the maximum power mode was programmed by the customer.
- (3) The EUT is considered a 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 RF setting.

Test Software Version	MT8168-LaunchEngMode.apk		
Frequency	2402 MHz	2442MHz	2480 MHz
BLE GFSK	DEF	DEF	DEF

1.7 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded 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. CAB identifier: CN0056.

2. Test Summary

FCC Part 15 Subpart C(15.247)/RSS 247 Issue 2					
Standard Section		Test Item	Test Sample(s)	Judgment	Remark
FCC	IC				
15.203		Antenna Requirement	/	N/A	N/A Note(2)
15.207(a)	RSS-GEN 7.2.4	Conducted Emission	/	N/A	N/A
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	/	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 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. 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 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
RF Power Sensor	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO26	Sep. 11, 2020	Sep. 10, 2021
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO29	Sep. 11, 2020	Sep. 10, 2021
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO31	Sep. 11, 2020	Sep. 10, 2021
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO33	Sep. 11, 2020	Sep. 10, 2021

5. Radiated Emission Test

5.1 Test Standard and Limit

5.1.1 Test Standard

FCC Part 15.247(d)

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

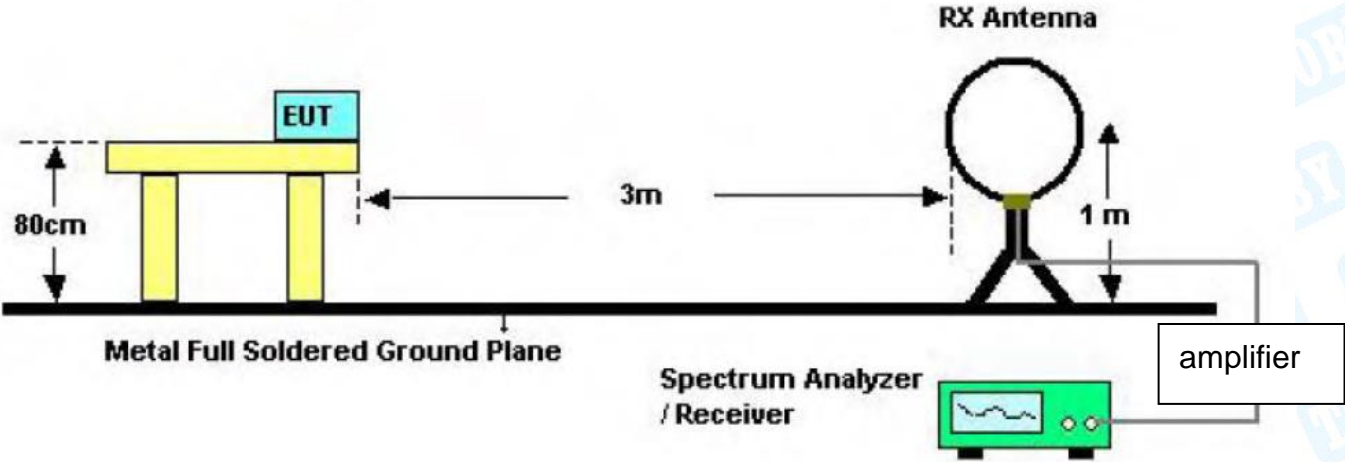
Radiated Emission Limit (Above 1000MHz)

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

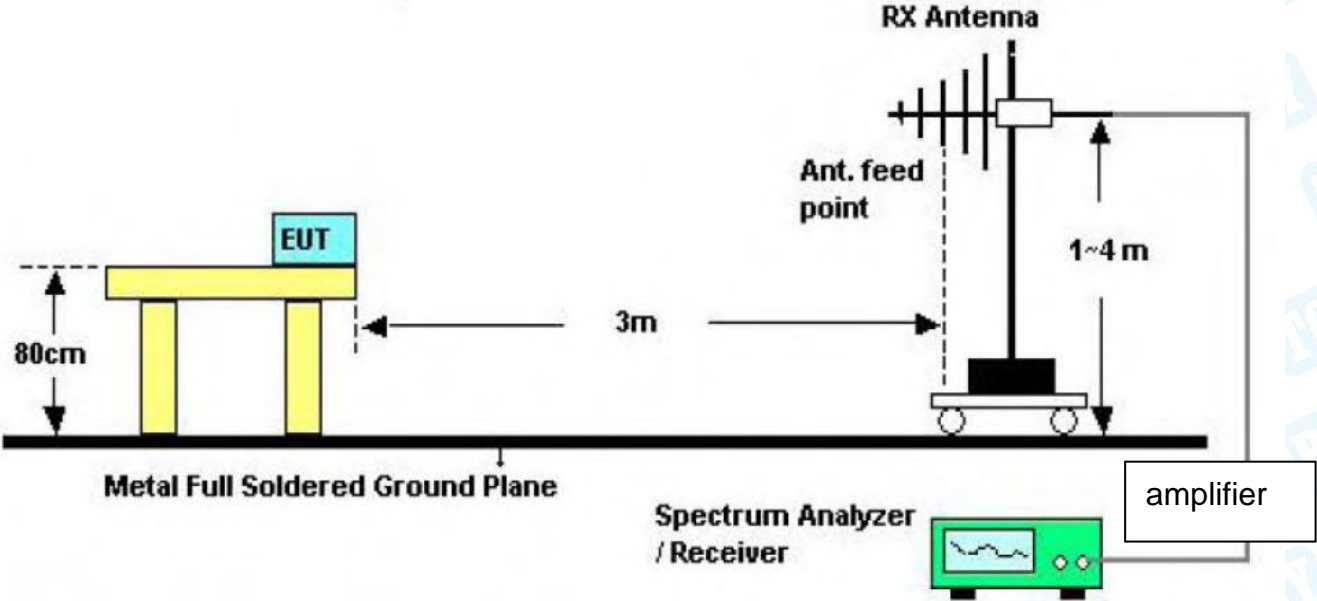
Note:

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

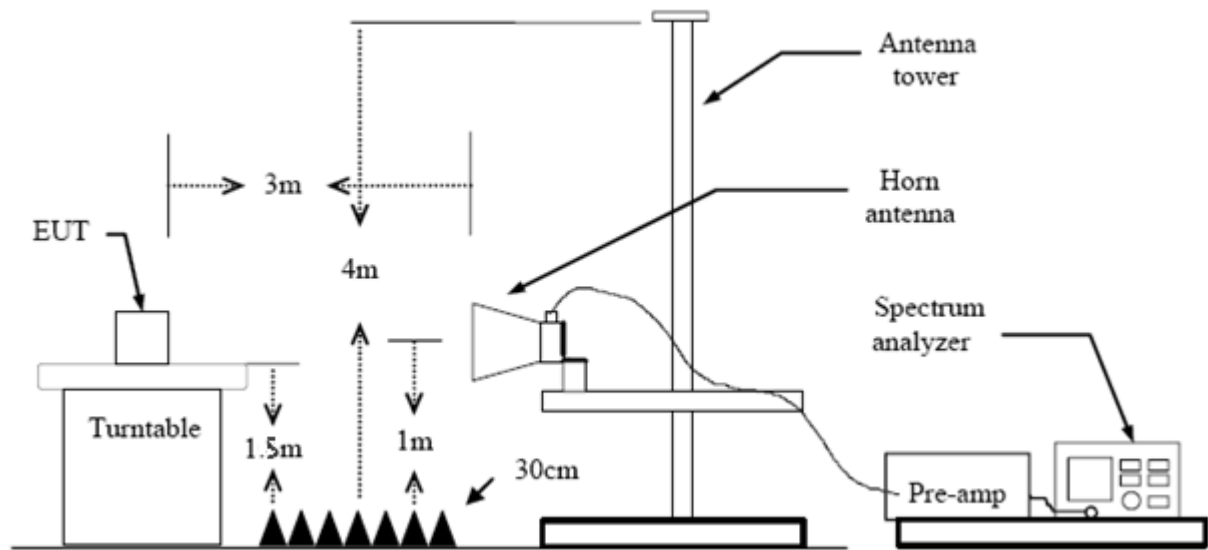
5.2 Test Setup



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 and above 1 GHz. The EUT was placed on a rotating 0.8m high above 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 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.

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.

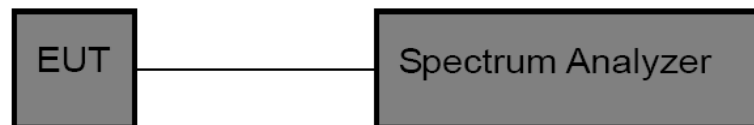
6. Peak Output Power Test

6.1 Test Standard and Limit

- 6.1.1 Test Standard
FCC Part 15.247 (b)(3)
- 6.1.2 Test Limit

FCC Part 15 Subpart C(15.247)/RSS-247		
Test Item	Limit	Frequency Range(MHz)
Peak Output Power	1 Watt or 30 dBm	2400~2483.5

6.2 Test Setup



6.3 Test Procedure

The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement is according to section 9.1.1 of KDB 558074 D01 Meas Guidance v05r02.

- (1) Set the RBW \geq DTS Bandwidth
- (2) Set VBW \geq 3*RBW
- (3) Set Span \geq 3*RBW
- (4) Sweep time=auto
- (5) Detector= peak
- (6) Trace mode= maxhold.
- (7) Allow trace to fully stabilize, and then use peak marker function to determine the peak amplitude level.

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 B.

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 0.68dBi, and the antenna de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

7.4 Result

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

Antenna Type
<input type="checkbox"/> Permanent attached antenna
<input checked="" type="checkbox"/> Unique connector antenna
<input type="checkbox"/> Professional installation antenna

Attachment A-- Radiated Emission Test Data

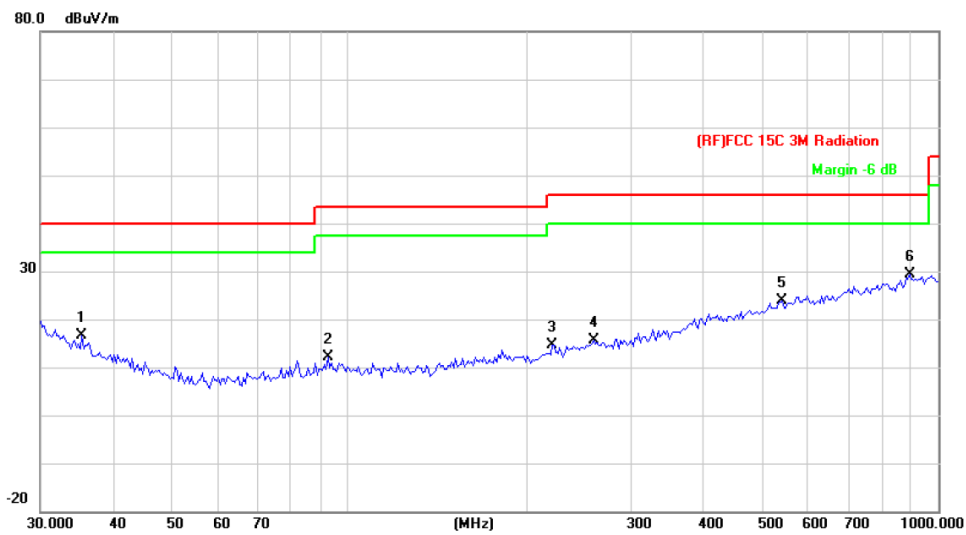
9 KHz~30 MHz

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:	23.9°C	Relative Humidity:	44%
Test Voltage:	AC 120V 60Hz		
Ant. Pol.	Horizontal		
Test Mode:	Mode 2 (6.95 inch)		
Remark:	Only worse case is reported.		



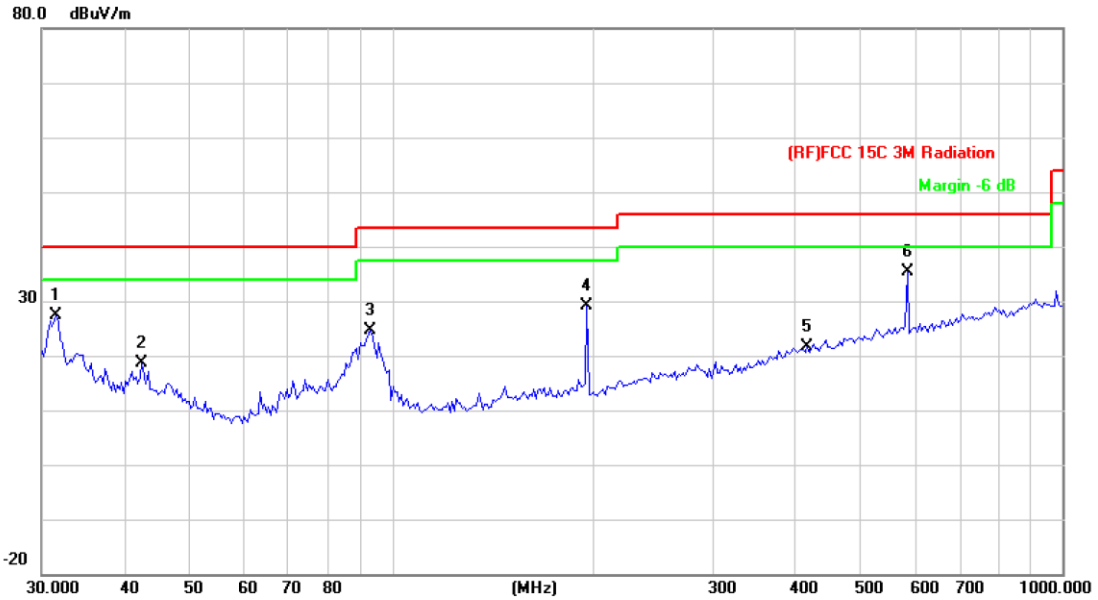
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1		35.2512	33.37	-16.79	16.58	40.00	-23.42	peak
2		92.1388	33.98	-21.88	12.10	43.50	-31.40	peak
3		221.3921	33.52	-18.78	14.74	46.00	-31.26	peak
4		260.1444	32.65	-17.03	15.62	46.00	-30.38	peak
5		543.2742	32.98	-9.14	23.84	46.00	-22.16	peak
6	*	893.8567	33.84	-4.45	29.39	46.00	-16.61	peak

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

Remark:

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

Temperature:	23.9°C	Relative Humidity:	44%
Test Voltage:	AC 120V 60Hz		
Ant. Pol.	Vertical		
Test Mode:	Mode 2 (6.95 inch)		
Remark:	Only worse case is reported.		



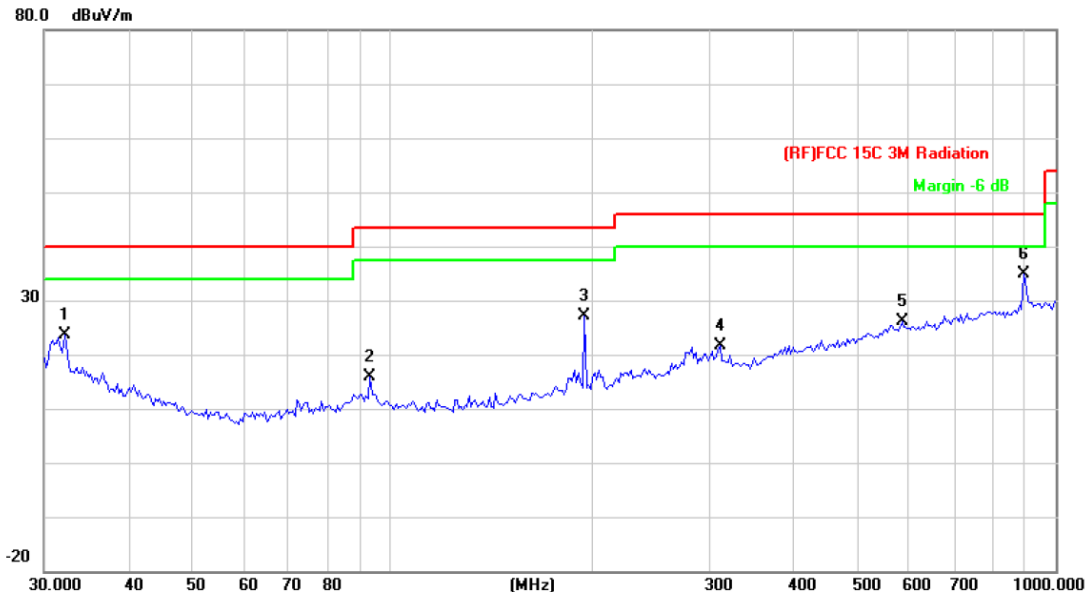
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		31.5095	41.53	-14.08	27.45	40.00	-12.55	peak
2		42.3022	38.82	-20.11	18.71	40.00	-21.29	peak
3		92.7871	46.50	-21.89	24.61	43.50	-18.89	peak
4		195.1365	49.05	-19.87	29.18	43.50	-14.32	peak
5		416.1791	33.69	-12.18	21.51	46.00	-24.49	peak
6	*	586.8437	43.94	-8.47	35.47	46.00	-10.53	peak

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

Remark:

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

Temperature:	23.9°C	Relative Humidity:	44%
Test Voltage:	AC 120V 60Hz		
Ant. Pol.	Horizontal		
Test Mode:	Mode 2 (7 inch)		
Remark:	Only worse case is reported.		



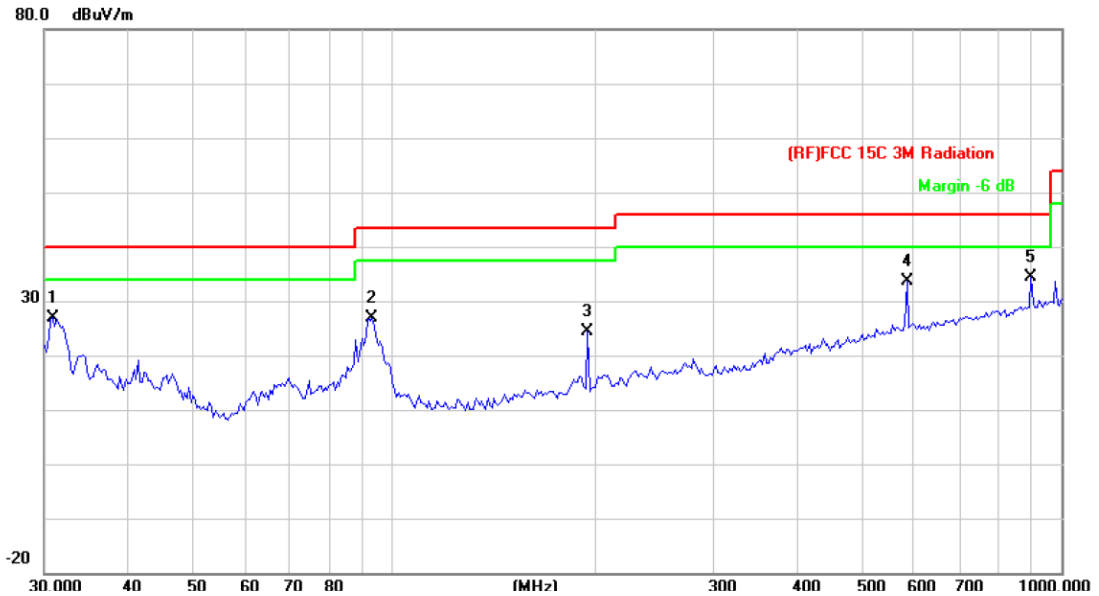
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		32.1795	38.20	-14.57	23.63	40.00	-16.37	peak
2		92.7871	37.79	-21.89	15.90	43.50	-27.60	peak
3		195.1365	47.06	-19.87	27.19	43.50	-16.31	peak
4		312.1794	37.40	-15.88	21.52	46.00	-24.48	peak
5		586.8437	34.60	-8.47	26.13	46.00	-19.87	peak
6	*	893.8567	39.41	-4.45	34.96	46.00	-11.04	peak

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

Remark:

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

Temperature:	23.9°C	Relative Humidity:	44%
Test Voltage:	AC 120V 60Hz		
Ant. Pol.	Vertical		
Test Mode:	Mode 2 (7 inch)		
Remark:	Only worse case is reported.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		30.8535	40.56	-13.58	26.98	40.00	-13.02	peak
2		92.7871	48.65	-21.89	26.76	43.50	-16.74	peak
3		195.1365	44.36	-19.87	24.49	43.50	-19.01	peak
4		586.8437	42.17	-8.47	33.70	46.00	-12.30	peak
5	*	900.1474	38.60	-4.24	34.36	46.00	-11.64	peak

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

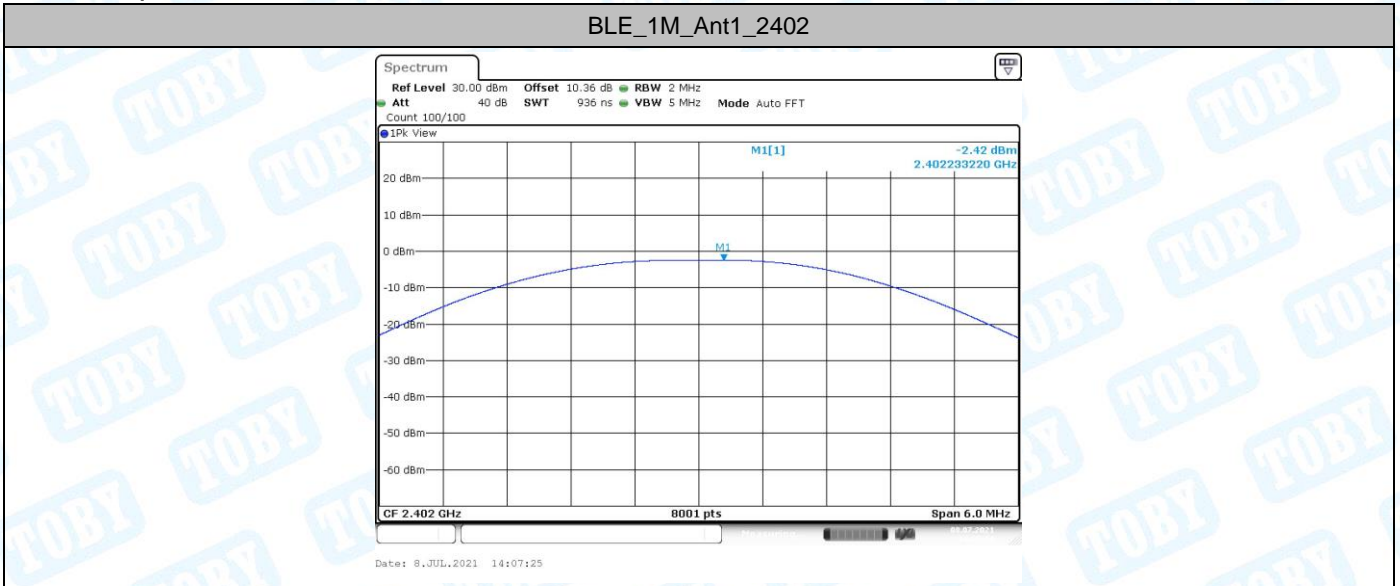
Remark:

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

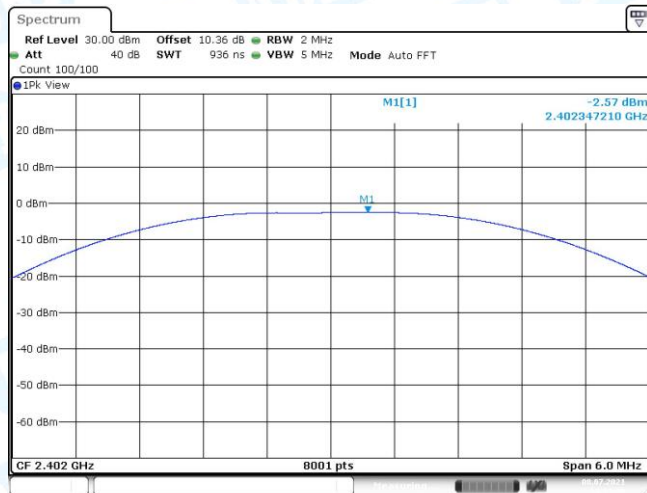
Attachment B-- Peak Output Power Test Data

Test Mode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	-2.42	<=30	PASS
		2442	-2.21	<=30	PASS
		2480	-2.66	<=30	PASS
BLE_2M	Ant1	2402	-2.57	<=30	PASS
		2442	-2.32	<=30	PASS
		2480	-2.74	<=30	PASS

Test Graphs

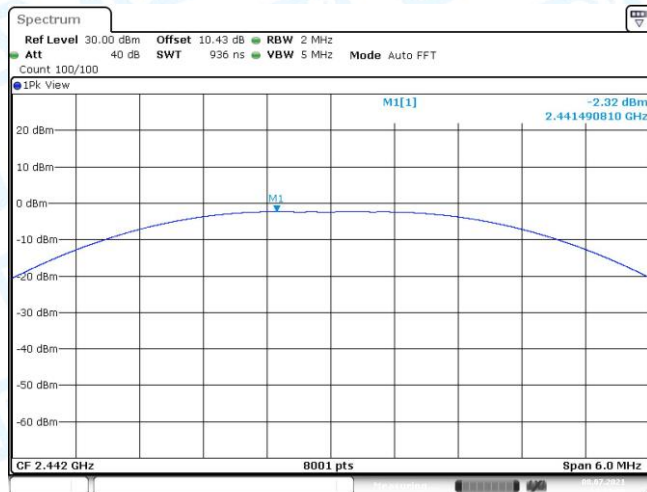


BLE_2M_Ant1_2402



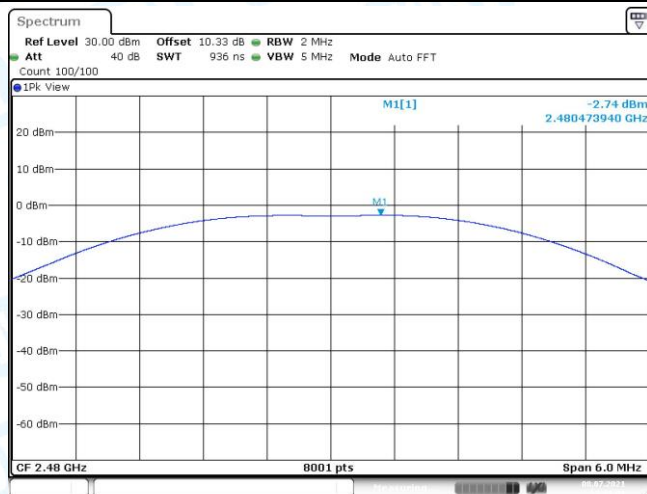
Date: 8.JUL.2021 14:13:36

BLE_2M_Ant1_2442



Date: 8.JUL.2021 14:13:50

BLE_2M_Ant1_2480



Date: 8.JUL.2021 14:14:01

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