FCC RF Test Report

APPLICANT	:	Lenovo(Shanghai) Electronics Technology Co., Ltd.
EQUIPMENT	:	Portable Tablet Computer
BRAND NAME	:	Lenovo
MODEL NAME	:	Lenovo TB-8304F1
FCC ID	:	O57TB8304F1
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure

This is a data re-used report which is only valid together with the original test report. The product was received on Jan. 09, 2018 and testing was completed on Mar. 28, 2018. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.

James Huang

TESTING
NVLAP LAB CODE 600155-0

Approved by: James Huang / Manager

Sporton International (Kunshan) Inc.
No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335 China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR810905D	Rev. 01	Initial issue of report	Mar. 28, 2018

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.407(a)	Maximum Conducted Output Power	FCC ≤ 24 dBm (depend on band)	Pass	-
3.2	15.407(b)	Unwanted Emissions	15.407(b) 15.209(a)	Pass	Under limit 6.74 dB at 5150.000 MHz

1 General Description

1.1 Applicant

Lenovo(Shanghai) Electronics Technology Co., Ltd.
NO.68 BUILDING, 199 FENJU RD, China (Shanghai) Pilot Free Trade Zone, 200131, CHINA

1.2 Manufacturer

Lenovo PC HK Limited
23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Portable Tablet Computer
Brand Name	Lenovo
Model Name	Lenovo TB-8304F1
FCC ID	O57TB8304F1
EUT supports Radios application	WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20/HT40 Bluetooth v3.0+EDR/ Bluetooth v4.0 LE/ Bluetooth v4.1 LE/Bluetooth v4.2 LE
HW Version	Lenovo Tablet TB-8304F1
SW Version	TB-8304F1_RF01_180208
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	5180 MHz ~ 5240 MHz 5260 MHz ~ 5320 MHz 5500 MHz ~ 5720 MHz
Maximum Output Power to Antenna	**<5180 MHz ~ 5240 MHz>** 802.11a : 14.97 dBm / 0.0314 W 802.11n HT20 : 14.92 dBm / 0.0310 W 802.11n HT40 : 13.84 dBm / 0.0242 W **<5260 MHz ~ 5320 MHz>** 802.11a : 14.44 dBm / 0.0278 W 802.11n HT20 : 14.72 dBm / 0.0296 W 802.11n HT40 : 13.81 dBm / 0.0240 W **<5500 MHz ~ 5720 MHz >** 802.11a : 13.79 dBm / 0.0239 W 802.11n HT20 : 13.91 dBm / 0.0246 W 802.11n HT40 : 14.07 dBm / 0.0255 W
Antenna Gain / Gain	**<5180 MHz ~ 5240 MHz>** IFA Antenna with gain 0.75 dBi **<5260 MHz ~ 5320 MHz>** IFA Antenna with gain 1.24 dBi **<5500 MHz ~ 5720 MHz>** IFA Antenna with gain 2.37 dBi
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.5 Modification of EUT

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

1.6 Component List

There are four samples under test, the differences of four samples are shown in the table below.

Based on the similarity of four samples, only choose sample 1 to perform full test.

Object	Sample 1	Sample 2
LPDDR3 EMCP	Samsung: KMQE60013M-B318 (2+16G)	Hynix: H9TQ17ABJTBCUR-KUM (2+16G)
PCB	CEE: A5e5b_MainboardPCB	Huashen: A5e5b_Mainboard PCB
Battery	Sunwoda: L16D1P34	SCUD: L16D1P34
speakerBox1	Xichundz: ZA2060AAA601USAA_Speaker Box_1511_FPC_Xichundz	Keysound: ZA2060AAA601USAA_Speaker Box_1511_FPC_Keysound
LCM	TXD: TXDT800CXPA-36	Starry: 2081080BH8021006-51F
Camera_Back	JSL: HS6283A1D-0P0J0	JSL: HS6283A1D-0P0J0
Camera_Front	C&T: V20672 V0	Brodsands: B02SF0319
Object	**Sample 3**	**Sample 4**
LPDDR3 EMCP	Samsung: KMFE60012M-B214 (1+16G)	Samsung: KMFE60012M-B214 (1+16G)
PCB	CEE: A5e5b_MainboardPCB	Huashen: A5e5b_Mainboard PCB
Battery	Sunwoda: L16D1P34	SCUD: L16D1P34
speakerBox1	Xichundz: ZA2060AAA601USAA_Speaker Box_1511_FPC_Xichundz	Keysound: ZA2060AAA601USAA_Speaker Box_1511_FPC_Keysound
LCM	TXD: TXDT800CXPA-36	Starry: 2081080BH8021006-51F
Camera_Back	JSL: HS6283A1D-0P0J0	JSL: HS6283A1D-0P0J0
Camera_Front	C&T: V20672 V0	Brodsands: B02SF0319

1.7 Re-use of Measured Data

1.7.1 Introduction Section

This application re-uses data collected on a similar device. The subject device of this application (Model: Lenovo TB-8304F1, FCC ID: O57TB8304F1) is electrically identical to the reference device (Model: Lenovo TB-8304F, FCC ID: O57TB8304F) for the portions of the circuitry corresponding to the data being re-used, as treated by KDB Publication 178919 D01.

1.7.2 Difference Section

For details concerning the similarity with respect to component placement, mechanical/electrical design etc., please refer to the Product Equality Declaration.

The re-used RF data includes the following bands provided in Appendix E (Sporton RF Report No. FR810906D for the reference device Model: Lenovo TB-8304F, FCC ID: O57TB8304F):

1.7.3 Spot Check Verification Data Section

In order to confirm hardware similarity of the subject device with the reference device, spot check measurements were performed on the subject device for conducted power and radiated spurious emission, the test result were consistent with FCC ID: O57TB8304F.

Assertions concerning the similarity of these devices are based on representations by the applicant. The applicant accepts full responsibility for the validity of the similarity claim, and for the determination that verification test data are sufficient to support it.

1.7.4 Reference detail Section:

Equipment Class	Reference FCC ID	Folder Test	Report Title/Section
NII (B1~3)	O57TB8304F	Part15E(FR810906D)	All sections (except conducted power and worse case of RSE) applicable
NII (B4)	O57TB8304F	Part15E(FR810906E)	All sections (conducted power and worse case of RSE) applicable
NII (DFS)	O57TB8304F	Part15E(FZ810906)	All sections applicable

1.8 Testing Location

Sporton International (Kunshan) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600155-0) and the FCC designation No. is CN5013.

Test Site	Sporton International (Kunshan) Inc.		
Test Site Location	No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335 China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	**Sporton Site No.**		**FCC Test Firm Registration No.**
	TH01-KS	03CH03-KS	630927

Note: The test site complies with ANSI C63.4 2014 requirement.

1.9 Applicable Standards

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

- FCC Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

2.1 Carrier Frequency Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5180-5240 MHz Band 1 (U-NII-1)	36	5180	44	5220
	38*	5190	46*	5230
	40	5200	48	5240
	-	-	-	-

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5260-5320 MHz Band 2 (U-NII-2A)	52	5260	60	5300
	54*	5270	62*	5310
	56	5280	64	5320
	-	-	-	-

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5500-5720 MHz Band 3 (U-NII-2C)	100	5500	120	5600
	102*	5510	124	5620
	104	5520	126*	5630
	108	5540	128	5640
	110*	5550	132	5660
	112	5560	134*	5670
	116	5580	136	5680
	118*	5590	140	5700
	-	-	144	5720

Note: The above Frequency and Channel in "*" were 802.11n HT40.

2.2 Test Mode

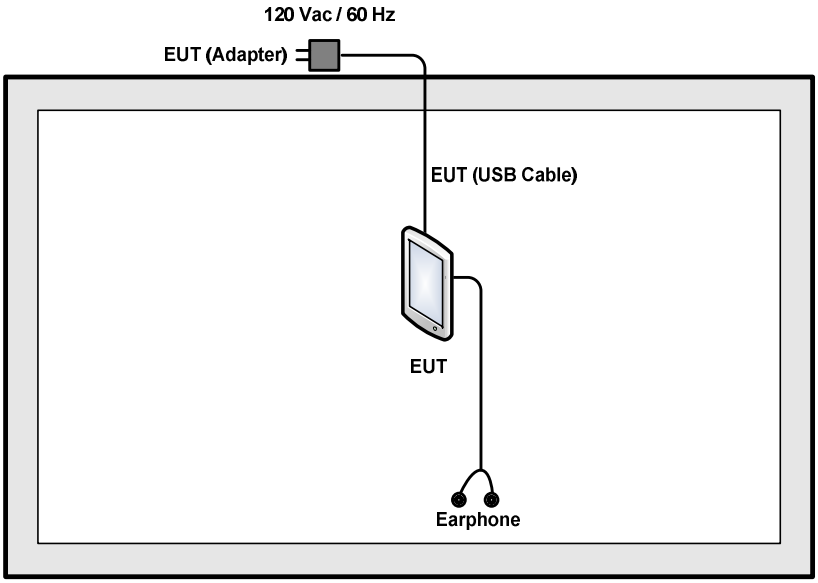
Final test mode of radiated spurious emissions are considering the modulation and worse data rates as below table.

Modulation	Data Rate
802.11n HT40	MCS0

Ch. #		Band I : 5180-5240 MHz
		802.11n HT40
L	Low	38

2.3 Connection Diagram of Test System

<WLAN 802.11n HT40 Tx Mode>



2.4 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuously transmit/receive.

2.5 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Earphone	Lenovo	P121	N/A	Unshielded,1.2m	N/A

3 Test Result

3.1 Maximum Conducted Output Power Measurement

3.1.1 Limit of Maximum Conducted Output Power

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW.

For the 5.25–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note that U-NII-2 band, devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

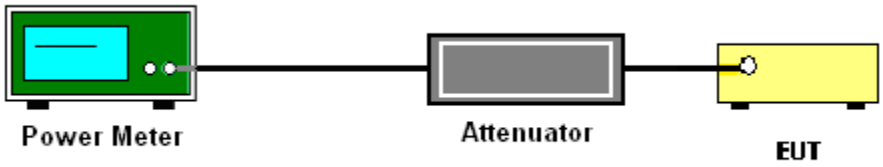
3.1.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

Method PM (Measurement using an RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor, 10 log(1/x), where x is the duty cycle.

3.1.4 Test Setup



3.1.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.2 Unwanted Radiated Emission Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

3.2.1 Limit of Unwanted Emissions

(1) For transmitters operating in the 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of –27dBm/MHz.

For transmitters operating in the 5250-5350 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band must meet all applicable technical requirements for operation in the 5150-5250 MHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5150-5250 MHz band.

For transmitters operating in the 5470-5725MHz band: all emissions outside of the 5470-5725MHz band shall not exceed an EIRP of -27 dBm/MHz.

(2) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table

Frequency (MHz)	Field Strength (microvolts/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

Note: The following formula is used to convert the EIRP to field strength.

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

EIRP (dBm)	Field Strength at 3m (dBµV/m)
- 27	68.3

(3) KDB789033 D01 v02r01 G)2)c)

(i) Section 15.407(b)(1) to (b)(3) specify the unwanted emission limits for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz.[3]

(ii) Section 15.407(b)(4) specifies the unwanted emission limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are in terms of a Peak detector. An alternative to the band emissions mask is specified in Section 15.407(b)(4)(ii). The alternative limits are based on the highest antenna gain specified in the filing. There are also marketing and importation restrictions for the devices using the alternative limit.[4]

Note 3: An out-of-band emission that complies with both the average and peak limits of Section 15.209 is not required to satisfy the -27 dBm/MHz peak emission limit.

Note 4: Only devices with antenna gains of 10 dBi or less may be approved using the emission limits specified in Section 15.247(d) till March 2, 2018; all other devices operating in this band must use the mask specified in Section 15.407(b)(4)(i).

3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section G) Unwanted emissions measurement.

   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz

   - RBW = 120 kHz
   - VBW = 300 kHz
   - Detector = Peak
   - Trace mode = max hold

   (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz

   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

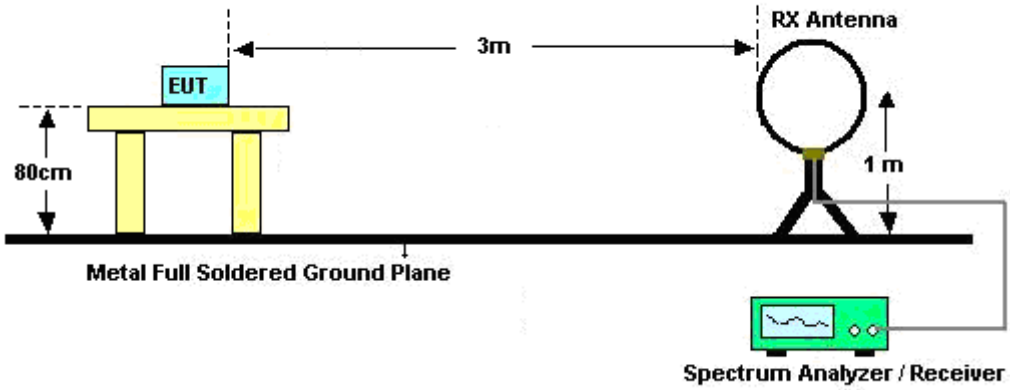
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

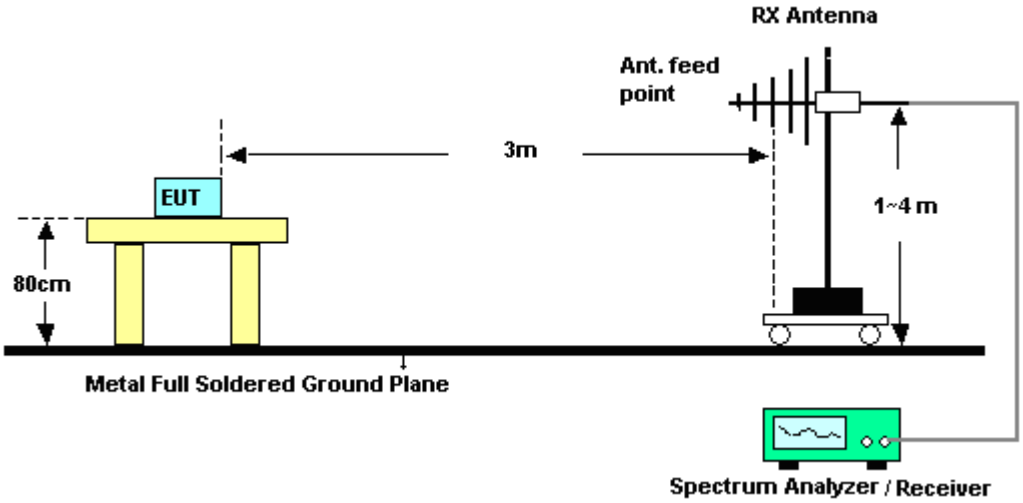
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.2.4 Test Setup

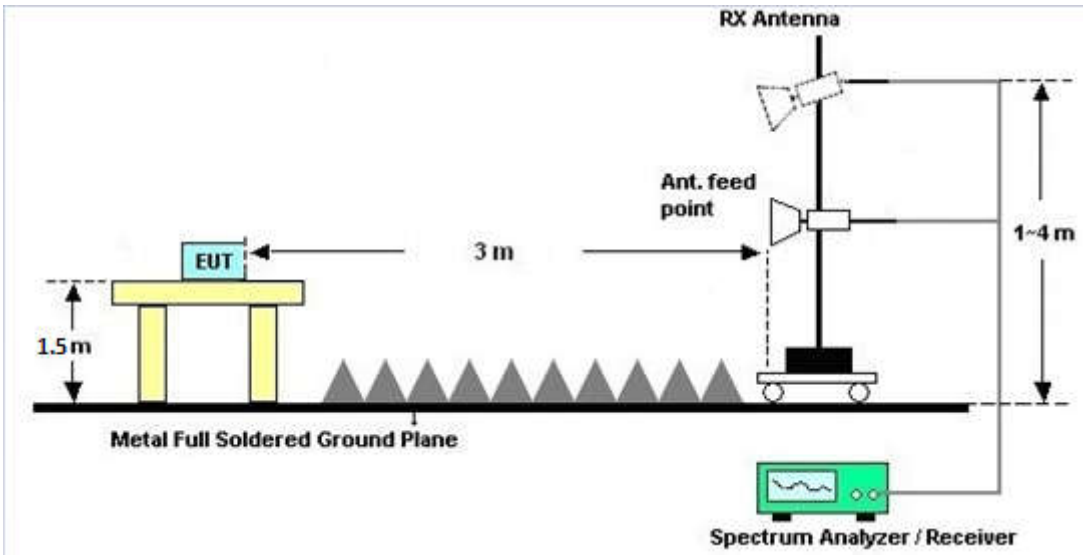
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.2.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

3.2.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B.

3.2.7 Duty Cycle

Please refer to Appendix C.

3.2.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)

Please refer to Appendix B.

4 List of Measuring Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 18, 2018	Mar. 28, 2018	Jan. 17, 2019	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 18, 2018	Mar. 28, 2018	Jan. 17, 2019	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz; Max 30dBm	Oct. 19, 2017	Mar. 11, 2018	Oct. 18, 2018	Radiation (03CH03-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz~44GHz	Apr. 18, 2017	Mar. 11, 2018	Apr. 17, 2018	Radiation (03CH03-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 22, 2017	Mar. 11, 2018	Oct. 21, 2018	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	35406	25MHz~2GHz	Apr. 22, 2017	Mar. 11, 2018	Apr. 21, 2018	Radiation (03CH03-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1356	1GHz~18GHz	Apr. 22, 2017	Mar. 11, 2018	Apr. 21, 2018	Radiation (03CH03-KS)
SHF-EHF Horn	Com-Power	AH-840	101070	18GHz~40GHz	Dec. 06. 2017	Mar. 11, 2018	Dec. 05. 2018	Radiation (03CH03-KS)
Amplifier	com-power	PA-103A	161069	1MHz~1000MHz / 32 dB	Apr. 18, 2017	Mar. 11, 2018	Apr. 17, 2018	Radiation (03CH03-KS)
Amplifier	MITEQ	TTA1840-35-HG	1887435	18GHz~40GHz	Oct. 12, 2017	Mar. 11, 2018	Oct. 11, 2018	Radiation (03CH03-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	1GHz~18GHz	Apr. 18. 2017	Mar. 11, 2018	Apr. 17, 2018	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Oct. 12, 2017	Mar. 11, 2018	Oct. 11, 2018	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Mar. 11, 2018	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Mar. 11, 2018	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Mar. 11, 2018	NCR	Radiation (03CH03-KS)

NCR: No Calibration Required

5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.6dB**

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.5dB**

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.5dB**

Appendix A. Conducted Test Results

Report Number : FR810905D

Test Engineer:	Orion Li	Temperature:	21~25	°C
Test Date:	2018/3/28	Relative Humidity:	51~55	%

Report Number : FR810905D

TEST RESULTS DATA
Average Power Table

FCC Band I										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
11a	6Mbps	1	36	5180	97.57	14.97	24.00	0.75		Pass
11a	6Mbps	1	44	5220	97.57	14.62	24.00	0.75		Pass
11a	6Mbps	1	48	5240	97.57	14.57	24.00	0.75		Pass
HT20	MCS0	1	36	5180	97.40	14.92	24.00	0.75		Pass
HT20	MCS0	1	44	5220	97.40	14.64	24.00	0.75		Pass
HT20	MCS0	1	48	5240	97.40	14.72	24.00	0.75		Pass
HT40	MCS0	1	38	5190	94.92	10.15	24.00	0.75		Pass
HT40	MCS0	1	46	5230	94.92	13.84	24.00	0.75		Pass

TEST RESULTS DATA
Average Power Table

FCC Band II										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)	EIRP Power Limit (dBm)	Pass/Fail
11a	6M bps	1	52	5260	97.57	14.44	23.98	1.24	26.99	Pass
11a	6M bps	1	60	5300	97.57	14.32	23.98	1.24	26.99	Pass
11a	6M bps	1	64	5320	97.57	14.37	23.98	1.24	26.99	Pass
HT20	MCS 0	1	52	5260	97.40	14.72	23.98	1.24	26.99	Pass
HT20	MCS 0	1	60	5300	97.40	14.46	23.98	1.24	26.99	Pass
HT20	MCS 0	1	64	5320	97.40	14.56	23.98	1.24	26.99	Pass
HT40	MCS 0	1	54	5270	94.92	13.81	23.98	1.24	26.99	Pass
HT40	MCS 0	1	62	5310	94.92	11.01	23.98	1.24	26.99	Pass

Report Number : FR810905D

TEST RESULTS DATA
Average Power Table

FCC Band III										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)	EIRP Power Limit (dBm)	Pass/Fail
11a	6M bps	1	100	5500	97.57	13.79	23.98	2.37	26.99	Pass
11a	6M bps	1	116	5580	97.57	13.62	23.98	2.37	26.99	Pass
11a	6M bps	1	140	5700	97.57	13.79	23.98	2.37	26.99	Pass
11a	6Mbps	1	144	5720	97.57	13.73	23.98	2.37	26.99	Pass
HT20	MCS 0	1	100	5500	97.40	13.76	23.98	2.37	26.99	Pass
HT20	MCS 0	1	116	5580	97.40	13.65	23.98	2.37	26.99	Pass
HT20	MCS 0	1	140	5700	97.40	13.91	23.98	2.37	26.99	Pass
HT20	MCS0	1	144	5720	97.57	13.88	23.98	2.37	26.99	Pass
HT40	MCS 0	1	102	5510	94.92	10.74	23.98	2.37	26.99	Pass
HT40	MCS 0	1	110	5550	94.92	13.78	23.98	2.37	26.99	Pass
HT40	MCS 0	1	134	5670	94.92	13.85	23.98	2.37	26.99	Pass
HT40	MCS0	1	142	5710	94.92	14.07	23.98	2.37	26.99	Pass

Appendix B. Radiated Spurious Emission

Band 1 5150~5250MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		5150	57.2	-16.8	74	47.07	35.39	7.99	33.25	300	164	P	H
		5150	47.26	-6.74	54	37.13	35.39	7.99	33.25	300	164	A	H
	*	5188	95.51	-	-	85.41	35.36	7.99	33.25	300	164	P	H
	*	5188	86.51	-	-	76.41	35.36	7.99	33.25	300	164	A	H
		5356.08	51.58	-22.42	74	41.35	35.23	8.22	33.22	300	164	P	H
		5396.22	42.32	-11.68	54	32.04	35.19	8.3	33.21	300	164	A	H
		5148.32	54.11	-19.89	74	43.98	35.39	7.99	33.25	302	235	P	V
		5149.28	44.77	-9.23	54	34.64	35.39	7.99	33.25	302	235	A	V
	*	5200	89.29	-	-	79.2	35.35	7.99	33.25	302	235	P	V
	*	5200	81.77	-	-	71.68	35.35	7.99	33.25	302	235	A	V
		5385.96	51.08	-22.92	74	40.81	35.2	8.28	33.21	302	235	P	V
		5371.92	42.43	-11.57	54	32.18	35.22	8.25	33.22	302	235	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 1 5150~5250MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		10380	45.33	-28.67	74	58.67	38.48	11.98	63.8	100	360	P	H
		10380	42.65	-31.35	74	55.99	38.48	11.98	63.8	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

WIFI 802.11n HT40 (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 LF		30.97	20.97	-19.03	40	25.73	25.74	0.58	31.08	100	0	P	H
		110.51	17.85	-25.65	43.5	29.75	17.69	1.15	30.74	-	-	P	H
		257.95	19.65	-26.35	46	30.98	18.17	1.75	31.25	-	-	P	H
		551.86	24.9	-21.1	46	28.97	24.83	2.6	31.5	-	-	P	H
		818.61	25.68	-20.32	46	25.32	28.06	3.19	30.89	-	-	P	H
		927.25	26.67	-19.33	46	24.73	29.7	3.45	31.21	-	-	P	H
		32.91	30.34	-9.66	40	36.15	24.62	0.61	31.04	-	-	P	V
		45.52	32.35	-7.65	40	45.71	17.33	0.73	31.42	100	0	P	V
		53.28	28.75	-11.25	40	45.12	14.34	0.79	31.5	-	-	P	V
		105.66	24.54	-18.96	43.5	36.4	17.74	1.12	30.72	-	-	P	V
		553.8	24.69	-21.31	46	28.74	24.85	2.6	31.5	-	-	P	V
		851.59	26.39	-19.61	46	25.81	28.52	3.26	31.2	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Note symbol

*	**Fundamental Frequency** which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is **not under limit 6dB**
P/A	**P**eak or **A**verage
H/V	**H**orizontal or **V**ertical

A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

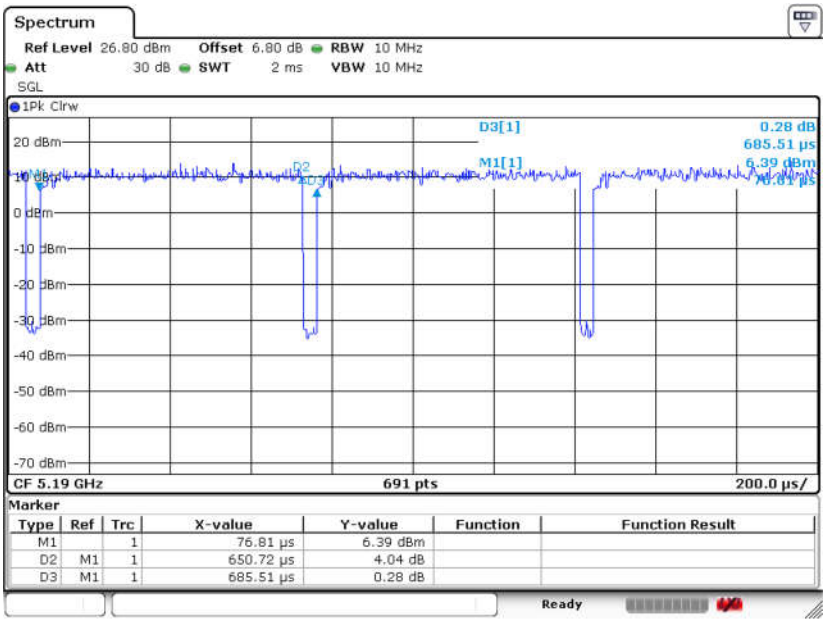
= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.

Appendix C. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11n HT40	94.92	0.651	1.536	3 kHz

802.11n HT40



Appendix E. Reference Report

Please refer to Sporton report number FR810906D which is issued separately.