FCC RADIO TEST REPORT

FCC ID	:	2AJN7-TP00122AUC
Equipment	:	Notebook Computer/Foldable PC
Brand Name	:	Lenovo
Model Name	:	TP00122A
Applicant	:	LC Future Center Limited Taiwan Branch 7F., No. 780, Bei'an Rd., Zhongshan Dist., Taipei City 104, Taiwan
Manufacturer	:	LCFC (HeFei) Electronics Technology Co., Ltd. No. 3188-1, Yungu Road (Hefei Export Processing Zone), Hefei Economics & Technology Development Area, Anhui, CHINA
Standard	:	FCC 47 CFR Part 2, 22(H), 24(E), 27

Equipment: Foxconn T99W175 tested inside of Lenovo Notebook Computer/Foldable PC.

The product was received on Jul. 21, 2020 and testing was started from Aug. 17, 2020 and completed on Aug. 28, 2020. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in compliance with the applicable technical standards.

The test results in this partial report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan

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History of this test report

Report No.	Version	Description	Issued Date
FG072019B	01	Initial issue of report	Sep. 18, 2020

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
-	§2.1046	Conducted Output Power	-	See Note
	§22.913 (a)(2)	Effective Radiated Power (Band 5) (Band 26)	-	
	§27.50 (b)(10) §27.50 (c)(10)	Effective Radiated Power (Band 12) (Band 13) (Band 17) (Band 71)		
	§24.232 (c) §27.50 (h)(2)	Equivalent Isotropic Radiated Power (Band 2) (Band 25) (Band 7) (Band 38) (Band 41)		
	§27.50 (d)(4)	Equivalent Isotropic Radiated Power (Band 4) (Band 66)		
-	§24.232 (d) §27.50 (d)(5)	Peak-to-Average Ratio	-	See Note
-	§2.1049	Occupied Bandwidth	-	See Note
-	§2.1051 §22.917 (a) §24.238 (a) §27.53 (c)(2)(4) §27.53 (g) §27.53 (h)	Conducted Band Edge Measurement (Band 2) (Band 4) (Band 5) (Band 12) (Band 13) (Band 17) (Band 25) (Band 26) (Band 66) (Band 71)	-	See Note
	§2.1051 §27.53 (m)(4)	Conducted Band Edge Measurement (Band 7) (Band 38) (Band 41)		
-	§2.1051 §22.917 (a) §24.238 (a) §27.53 (c)(2) §27.53 (g) §27.53 (h)	Conducted Spurious Emission (Band 2) (Band 4) (Band 5) (Band 12) (Band 13) (Band 17) (Band 25) (Band 26) (Band 66) (Band 71)	-	See Note
	§2.1051 §27.53 (m)(4)	Conducted Spurious Emission (Band 7) (Band 38) (Band 41)		
-	§2.1055 §22.355 §24.235 §27.54	Frequency Stability Temperature & Voltage	-	See Note

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1053 §22.917 (a) §24.238 (a) §27.53 (c)(2) §27.53 (f) §27.53 (g) §27.53 (h)	Radiated Spurious Emission (Band 2) (Band 4) (Band 5) (Band 12) (Band 13) (Band 17) (Band 25) (Band 26) (Band 66) (Band 71)	Pass	Under limit 17.74 dB at 10755.000 MHz
	§2.1051 §27.53 (m)(4)	Radiated Spurious Emission (Band 7) (Band 38) (Band 41)		
Note: The module (Model: T99W175) makes no difference after verifying output power, this report reuses test data from the module report.				

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Wii Chang

Report Producer: Ruby Zou

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	Notebook Computer/Foldable PC
Brand Name	Lenovo
Model Name	TP00122A
FCC ID	2AJN7-TP00122AUC
EUT supports Radios application	WCDMA/HSPA/LTE/GNSS/5G NR WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80/VHT160 WLAN 11ax HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE
EUT Stage	Production Unit

Remark:

1. The above EUT's information was declared by manufacturer.
2. Equipment: Foxconn T99W175 tested inside of Lenovo Notebook Computer/Foldable PC.

WWAN Antenna Information				
Main Antenna	**Manufacturer**	Amphenol	**Peak gain (dBi)**	1.94
	Part number	LXA494-16-000-C	**Type**	PIFA
MIMO 2 Antenna	**Manufacturer**	Amphenol	**Peak gain (dBi)**	1.44
	Part number	LXA493-16-000-C	**Type**	PIFA

1.2 Product Specification subjective to this standard

Standards-related Product Specification	
Tx Frequency	LTE Band 41 : 2498.5 MHz ~ 2687.5 MHz
Rx Frequency	LTE Band 41 : 2498.5 MHz ~ 2687.5 MHz
Bandwidth	LTE Band 41 : 5MHz / 10MHz / 15MHz / 20MHz
Type of Modulation	QPSK / 16QAM / 64QAM

1.3 Modification of EUT

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

1.4 Testing Location

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
Test Site Location	No.58 , Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City, Taiwan
Test Site No.	**Sporton Site No.**
	03CH12-HY
Test Engineer	Jack Cheng, Lance Chiang and Chuan Chu
Temperature	22.8~26.2℃
Relative Humidity	56.5~68.6%

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

FCC Designation No.: TW0007

1.5 Applicable Standards

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

- ANSI C63.26-2015
- ANSI / TIA-603-E
- FCC 47 CFR Part 2, 22(H), 24(E), 27
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. The TAF code is not including all the FCC KDB listed without accreditation.

2 Test Configuration of Equipment Under Test

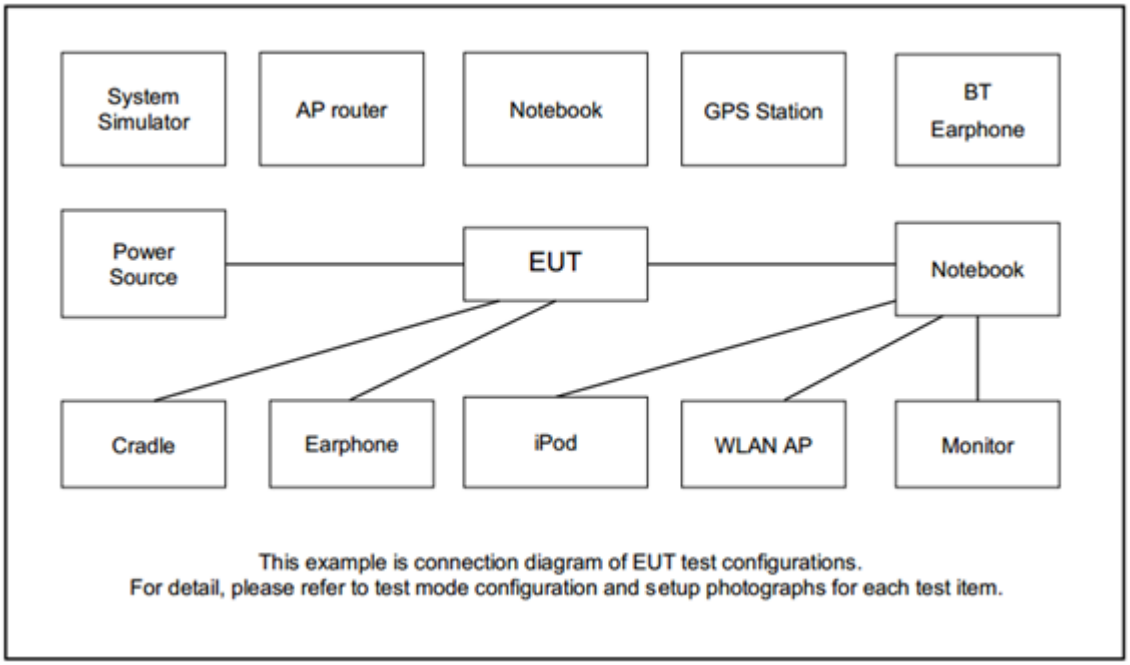
2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane without Adapter) were recorded in this report.

Test Items	Band	Bandwidth (MHz)						Modulation			RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Radiated Spurious Emission	41	-	-				v	v			v			v	v	v
Remark	1. The mark "**v** " means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. The device is investigated from 1GHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. 4. All the radiated test cases were performed with Adapter 1.															

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8821C	N/A	N/A	Unshielded, 1.8 m

2.4 Frequency List of Low/Middle/High Channels

LTE Band 41 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	39750	40620	41490
	Frequency	2506.0	2593.0	2680.0

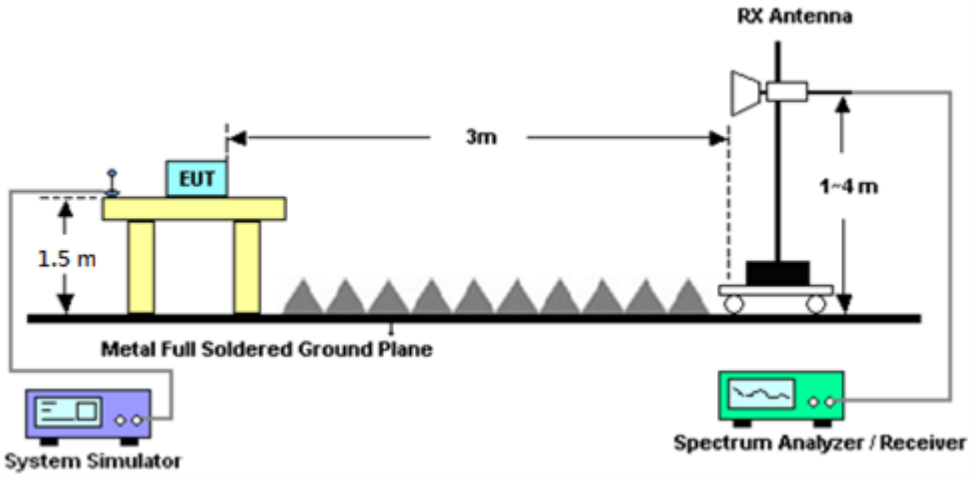
3 Radiated Test Items

3.1 Measuring Instruments

See list of measuring instruments of this test report.

3.1.1 Test Setup

For radiated test above 1GHz



3.1.2 Test Result of Radiated Test

Please refer to Appendix A.

3.2 Radiated Spurious Emission Measurement

3.2.1 Description of Radiated Spurious Emission Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

For LTE Band 41

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 55 + 10 log (P) dB.

The spectrum is scanned from 1GHz up to a frequency including its 10th harmonic.

3.2.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 7 and ANSI / TIA-603-E Section 2.2.12.

1. The EUT was placed on a turntable with 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

    The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)

    For LTE Band 41

    The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)

    EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain

    ERP (dBm) = EIRP - 2.15

4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1328	1GHz~18GHz	Nov. 14, 2019	Aug. 17, 2020~ Aug. 28, 2020	Nov. 13, 2020	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz~40GHz	Dec. 10, 2019	Aug. 17, 2020~ Aug. 28, 2020	Dec. 09, 2020	Radiation (03CH12-HY)
Preamplifier	Agilent	8449B	3008A02375	1GHz~26.5GHz	Mar. 26, 2020	Aug. 17, 2020~ Aug. 28, 2020	Mar. 25, 2021	Radiation (03CH12-HY)
Preamplifier	Jet-Power	JPA0118-55-303K	1710001800054002	1GHz~18GHz	Feb. 07, 2020	Aug. 17, 2020~ Aug. 28, 2020	Feb. 06, 2021	Radiation (03CH12-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz~40GHz	Dec. 13, 2019	Aug. 17, 2020~ Aug. 28, 2020	Dec. 12, 2020	Radiation (03CH12-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV3044	101048	10Hz~44GHz	Apr. 29, 2020	Aug. 17, 2020~ Aug. 28, 2020	Apr. 28, 2021	Radiation (03CH12-HY)
Signal Generator	Anritsu	MG3694C	163401	0.1Hz~40GHz	Feb. 15, 2020	Aug. 17, 2020~ Aug. 28, 2020	Feb. 14, 2021	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0058/126E	30MHz~18GHz	Dec. 12, 2019	Aug. 17, 2020~ Aug. 28, 2020	Dec. 11, 2020	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30MHz~40GHz	Feb. 25, 2020	Aug. 17, 2020~ Aug. 28, 2020	Feb. 24, 2021	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30MHz~40GHz	Feb. 25, 2020	Aug. 17, 2020~ Aug. 28, 2020	Feb. 24, 2021	Radiation (03CH12-HY)
Hygrometer	TECPEL	DTM-303B	TP140349	N/A	Oct. 25, 2019	Aug. 17, 2020~ Aug. 28, 2020	Oct. 24, 2020	Radiation (03CH12-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Aug. 17, 2020~ Aug. 28, 2020	N/A	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Aug. 17, 2020~ Aug. 28, 2020	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Aug. 17, 2020~ Aug. 28, 2020	N/A	Radiation (03CH12-HY)
Software	Audix	E3 6.2009-8-24	RK-000989	N/A	N/A	Aug. 17, 2020~ Aug. 28, 2020	N/A	Radiation (03CH12-HY)

5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.21**

Appendix A. Test Results of Radiated Test

LTE Band 41_HPUE

LTE Band 41 / 20MHz / QPSK									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	5028	-53.52	-25	-28.52	-75.37	-64.54	1.62	12.64	H
	7542	-45.53	-25	-20.53	-71.72	-54.64	2.00	11.11	H
	10062	-44.35	-25	-19.35	-74.08	-53.20	2.40	11.25	H
									H
									H
									H
	5028	-53.76	-25	-28.76	-75.2	-64.78	1.62	12.64	V
	7542	-45.36	-25	-20.36	-71.51	-54.47	2.00	11.11	V
	10062	-43.43	-25	-18.43	-73.82	-52.28	2.40	11.25	V
									V
									V
									V
Middle	5202	-53.27	-25	-28.27	-75.24	-64.49	1.66	12.88	H
	7806	-47.53	-25	-22.53	-73.47	-56.66	2.03	11.16	H
	10404	-43.84	-25	-18.84	-74.43	-52.42	2.39	10.98	H
									H
									H
									H
	5202	-53.49	-25	-28.49	-75.29	-64.71	1.66	12.88	V
	7806	-46.55	-25	-21.55	-72.19	-55.68	2.03	11.16	V
	10404	-43.95	-25	-18.95	-74.46	-52.53	2.39	10.98	V
									V
									V
									V

Highest	5376	-51.15	-25	-26.15	-73.76	-62.57	1.71	13.13	H
	8064	-46.76	-25	-21.76	-73.87	-56.03	2.06	11.33	H
	10755	-42.74	-25	-17.74	-73.6	-51.12	2.52	10.90	H
									H
									H
									H
	5376	-50.92	-25	-25.92	-73.14	-62.34	1.71	13.13	V
	8064	-46.72	-25	-21.72	-73.83	-55.99	2.06	11.33	V
	10755	-43.48	-25	-18.48	-74.11	-51.86	2.52	10.90	V
									V
									V
									V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.