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, and 90(S)**

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
FG072019F	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 §90.635	Conducted Output Power and Effective Radiated Power	-	See Note
-	-	Peak-to-Average Ratio	-	See Note
-	§2.1049 §90.209	Occupied Bandwidth and 26dB Bandwidth	-	See Note
-	§2.1051 §90.691	Emission masks – In-band emissions	-	See Note
-	§2.1051 §90.691	Emission masks – Out of band emissions	-	See Note
-	§2.1055 §90.213	Frequency Stability for Temperature & Voltage	-	See Note
3.1	§2.1053 §90.691	Field Strength of Spurious Radiation	Pass	Under limit 26.12 dB at 2440.000 MHz

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: Celery Wei

1 General Description

1.1 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.
3. All test items were performed with Main Antenna.

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 of Equipment Under Test

Product Specification subjective to this standard	
Tx Frequency	LTE Band 26 : 814.7 ~ 823.3 MHz
Rx Frequency	LTE Band 26 : 859.7 ~ 868.3 MHz
Bandwidth	1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz
Type of Modulation	QPSK / 16QAM / 64QAM / 256QAM

1.3 Modification of EUT

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

1.4 Testing Site

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 Applied Standards

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

- FCC 47 CFR Part 2, 90
- ANSI / TIA-603-E
- ANSI C63.26-2015
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- Interim Guidance for Equipment Authorization of Devices with Channel Bandwidths Combined Across Two Contiguous Service Rule Allocations OET/Lab/EACB, June 6, 2013

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

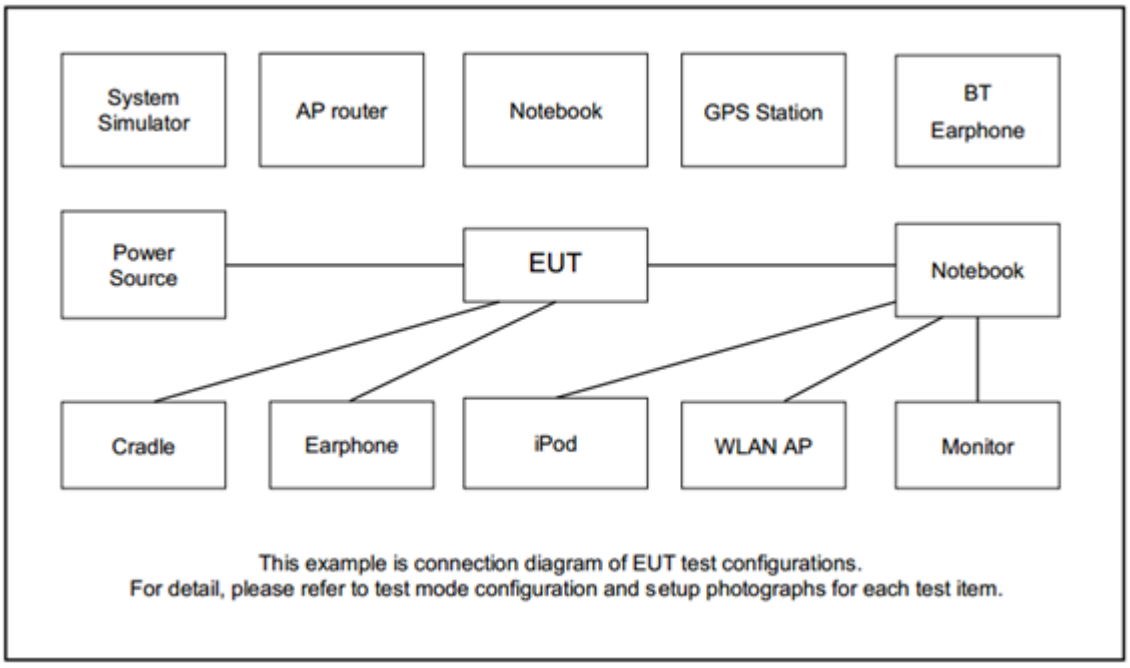
2.1 Test Mode

During all testing, EUT is in link mode with base station emulator at maximum power level.

For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.

Conducted Test Cases	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	26	v			v	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. LTE Band26 transmit frequency for part22 rule is 824MHz-849MHz, for part90 rule is 814MHz-824MHz. ERP over 15MHz bandwidth complies the ERP limit line of part22 rule, therefore ERP of the partial frequency spectrum which falls within part 22 also complies. 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 26 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
15	Channel	26765	-	-
	Frequency	821.5	-	-
10	Channel	-	26740	-
	Frequency	-	819	-
1.4	Channel	26697	26740	26783
	Frequency	814.7	819	823.3

3 Radiated Test Items

3.1 Field Strength of Spurious Radiation Measurement

3.1.1 Description of Field Strength of Spurious Radiated Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E. The power of any emission FCC Part 90.691 on any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth at least 43 + 10 log (P) dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

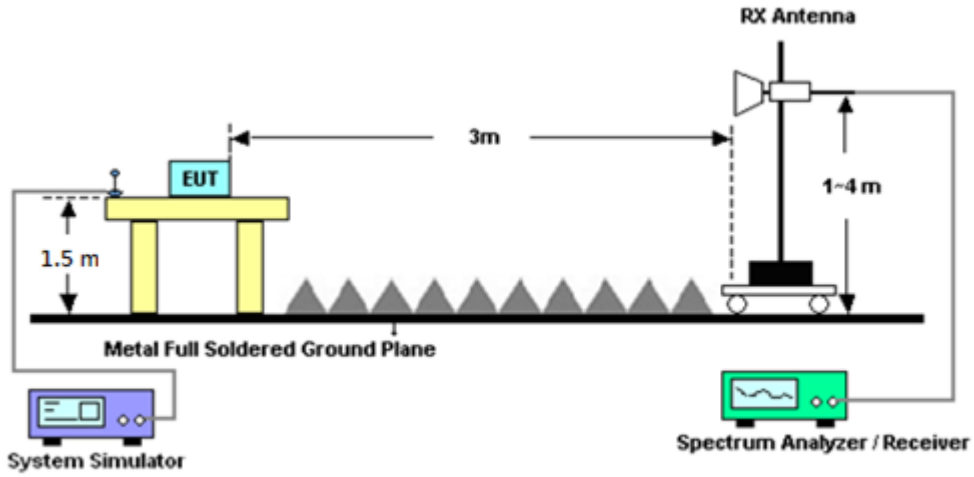
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43+10\log_{10}(P[Watts])$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

3.1.2 Test Procedures

1. 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.
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. For testing above 1GHz, make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, Sweep = 500ms, 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. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
11. ERP (dBm) = EIRP - 2.15
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
13. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

3.1.3 Test Setup

For radiated test above 1GHz



3.1.4 Test Result of Field Strength of Spurious Radiated

Please refer to Appendix A.

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)
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)
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 26

LTE Band 26 / 1.4MHz / QPSK									
Channel	Frequency (MHz)	ERP (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	1632	-62.98	-13	-49.98	-71.35	-68.52	0.91	8.60	H
	2448	-58.89	-13	-45.89	-72.33	-66.23	1.14	10.63	H
	3256	-57.35	-13	-44.35	-72.77	-65.80	1.32	11.91	H
	1632	-63.63	-13	-50.63	-71.53	-69.17	0.91	8.60	V
	2448	-58.81	-13	-45.81	-72.34	-66.15	1.14	10.63	V
	3256	-56.58	-13	-43.58	-72.49	-65.03	1.32	11.91	V
Middle	1640	-62.98	-13	-49.98	-71.38	-68.54	0.92	8.63	H
	2456	-57.63	-13	-44.63	-71.09	-64.98	1.14	10.64	H
	3280	-57.33	-13	-44.33	-72.7	-65.83	1.32	11.97	H
	1640	-63.50	-13	-50.50	-71.39	-69.06	0.92	8.63	V
	2456	-58.74	-13	-45.74	-72.3	-66.09	1.14	10.64	V
	3280	-56.61	-13	-43.61	-72.46	-65.11	1.32	11.97	V
Highest	1648	-63.22	-13	-50.22	-71.64	-68.81	0.92	8.66	H
	2472	-58.49	-13	-45.49	-71.96	-65.86	1.14	10.66	H
	3296	-57.37	-13	-44.37	-72.7	-65.91	1.32	12.01	H
	1648	-63.87	-13	-50.87	-71.76	-69.46	0.92	8.66	V
	2472	-58.62	-13	-45.62	-72.24	-65.99	1.14	10.66	V
	3296	-57.29	-13	-44.29	-73.09	-65.83	1.32	12.01	V

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

LTE Band 26 / 10MHz / QPSK									
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1632	-62.77	-13	-49.77	-71.14	-68.31	0.91	8.60	H
	2440	-39.12	-13	-26.12	-52.55	-46.45	1.14	10.62	H
	3256	-57.44	-13	-44.44	-72.86	-65.89	1.32	11.91	H
	1632	-63.27	-13	-50.27	-71.17	-68.81	0.91	8.60	V
	2440	-46.89	-13	-33.89	-60.32	-54.22	1.14	10.62	V
	3256	-56.86	-13	-43.86	-72.28	-65.31	1.32	11.91	V

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

LTE Band 26 / 15MHz / QPSK									
Channel	Frequency (MHz)	ERP (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	1656	-62.12	-13	-49.12	-70.57	-67.74	0.92	8.69	H
	2488	-47.22	-13	-34.22	-60.72	-54.61	1.15	10.68	H
	3312	-57.43	-13	-44.43	-72.73	-66.00	1.33	12.05	H
	1656	-62.99	-13	-49.99	-70.87	-68.61	0.92	8.69	V
	2488	-52.76	-13	-39.76	-66.45	-60.15	1.15	10.68	V
	3312	-57.19	-13	-44.19	-72.95	-65.76	1.33	12.05	V

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