



FCC RADIO TEST REPORT

FCC ID : PU5-TP00127A
Equipment : Notebook Computer
Brand Name : Lenovo
Model Name : TP00127A
Applicant : Wistron Corporation
21F, No. 88, Sec. 1, Hsin Tai Wu Rd., Hsichih
Dist, New Taipei City 221, Taiwan
Manufacturer : Wistron Corporation
21F, No. 88, Sec. 1, Hsin Tai Wu Rd., Hsichih
Dist, New Taipei City 221, Taiwan
Standard : FCC 47 CFR Part 2, 22(H), 24(E), 27

Equipment: Quectel EM120R-GL tested inside of Lenovo Notebook Computer

The product was received on Dec. 16, 2020 and testing was started from Dec. 27, 2020 and completed on Dec. 29, 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
FG0D1617B	01	Initial issue of report	Feb. 01, 2021



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)		
	§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 25) (Band 26) (Band 66)	- -	See Note 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 25) (Band 26) (Band 66)	- -	See Note 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 25) (Band 26) (Band 66)	Pass	Under limit 3.04 dB at 1560.000 MHz
	\$2.1051 \$27.53 (m)(4)	Radiated Spurious Emission (Band 7) (Band 38) (Band 41)		

Note: The module (Model: EM120R-GL) 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: Cindy Liu



1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	Notebook Computer
Brand Name	Lenovo
Model Name	TP00127A
FCC ID	PU5-TP00127A
EUT supports Radios application	WCDMA/HSPA/LTE/GNSS/NFC/UWB
EUT Stage	Production Unit

Remark:

1. The above EUT's information was declared by manufacturer.
2. Equipment: Quectel EM120R-GL tested inside of Lenovo Notebook Computer.

WWAN Antenna Information				
Main Antenna	Manufacturer	AWAN	Peak gain (dBi)	2.19
	Part number	025.901S1.0021	Type	PIFA

Remark: The above EUT's information was declared by manufacturer. Please refer to Comments and Explanations in report summary.



1.2 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx Frequency	LTE Band 2 : 1850.7 MHz ~ 1909.3 MHz LTE Band 4 : 1710.7 MHz ~ 1754.3 MHz LTE Band 5 : 824.7 MHz ~ 848.3 MHz LTE Band 7 : 2502.5 MHz ~ 2567.5 MHz LTE Band 12 : 699.7 MHz ~ 715.3 MHz LTE Band 13 : 779.5 MHz ~ 784.5 MHz LTE Band 25: 1850.7MHz ~ 1914.3 MHz LTE Band 26 : 824.7MHz ~ 848.3 MHz LTE Band 38 : 2572.5MHz ~ 2617.5MHz LTE Band 41 : 2498.5 MHz ~ 2687.5 MHz LTE Band 66 : 1710.7 MHz ~ 1779.3 MHz
Rx Frequency	LTE Band 2 : 1930.7 MHz ~ 1989.3 MHz LTE Band 4 : 2110.7 MHz ~ 2154.3 MHz LTE Band 5 : 869.7 MHz ~ 893.3 MHz LTE Band 7 : 2622.5MHz ~ 2687.5 MHz LTE Band 12 : 729.7 MHz ~ 745.3 MHz LTE Band 13 : 748.5 MHz ~ 753.5 MHz LTE Band 25: 1930.7MHz ~ 1994.3 MHz LTE Band 26 : 869.7MHz ~ 893.3MHz LTE Band 38 : 2572.5MHz ~ 2617.5MHz LTE Band 41 : 2498.5 MHz ~ 2687.5 MHz LTE Band 66 : 2110.7 MHz ~ 2199.3 MHz
Bandwidth	LTE Band 2 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 4 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 5 : 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 7 : 5MHz / 10MHz / 15MHz / 20MHz LTE Band 12 : 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 13 : 5MHz / 10MHz LTE Band 25: 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 26 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz LTE Band 38 : 5MHz / 10MHz / 15MHz / 20MHz LTE Band 41 : 5MHz / 10MHz / 15MHz / 20MHz LTE Band 66 : 1.4MHz / 3MHz / 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	22.3~26.4℃
Relative Humidity	58~66%

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
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01.

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

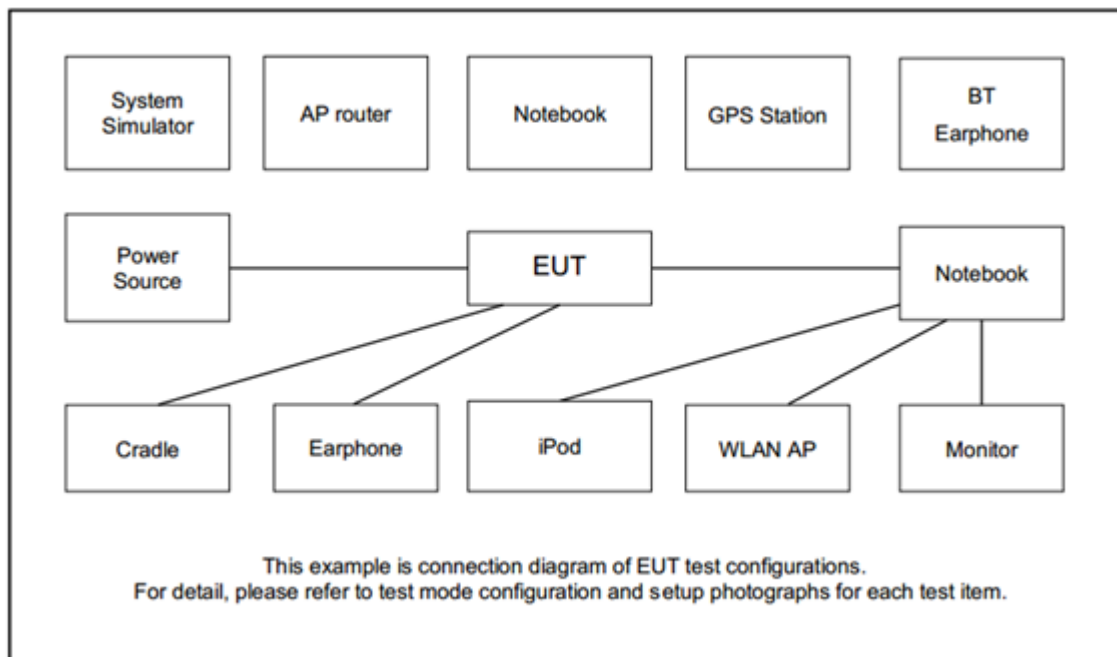
2.1 Test Mode

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 Tablet Type (three orthogonal panels, X, Y, Z) and Notebook Type. The worst cases (Y plane for LTE Band 12, 13, Z plane for LTE Band 26, Z plane with Accessory for LTE Band 2 and Notebook type with Accessory for LTE Band 7, 25, 41 (HPUE), 66) 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	2						v	v			v			v	v	v
	4	Covered by Band 66														
	5	Covered by Band 26														
	7	-	-				v	v			v			v	v	v
	12				v	-	-	v			v			v	v	v
	13	-	-	v	v	-	-	v			v			v	v	v
	25						v	v			v			v	v	v
	26					v	-	v			v			v	v	v
	38	Covered by Band 41														
	41	-	-				v	v			v			v	v	v
	66						v	v			v			v	v	v
Remark	- The mark "v" means that this configuration is chosen for testing - The mark "-" means that this bandwidth is not supported. - The device is investigated from 30MHz 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. - Wider operating range bandwidth covers narrower one when the power is higher or the same.															

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.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A

2.4 Frequency List of Low/Middle/High Channels

LTE Band 2 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	18700	18900	19100
	Frequency	1860	1880	1900
LTE Band 7 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	20850	21100	21350
	Frequency	2510	2535	2560
LTE Band 12 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	23060	23095	23130
	Frequency	704	707.5	711
LTE Band 13 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	-	23230	-
	Frequency	-	782	-
5	Channel	23205	23230	23255
	Frequency	779.5	782	784.5
LTE Band 25 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	26140	26340	26590
	Frequency	1860	1880	1905
LTE Band 26 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
15	Channel	26865	26915	26965
	Frequency	831.5	836.5	841.5



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
LTE Band 66 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	132072	132322	132572
	Frequency	1720	1745	1770

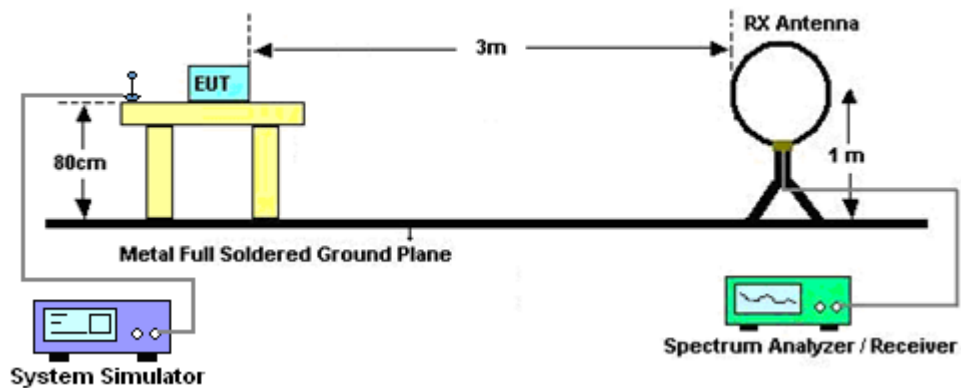
3 Radiated Test Items

3.1 Measuring Instruments

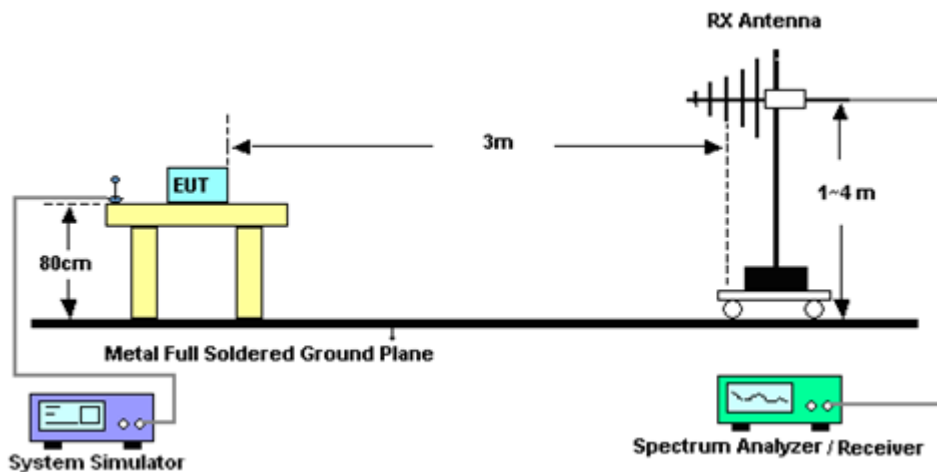
See list of measuring instruments of this test report.

3.1.1 Test Setup

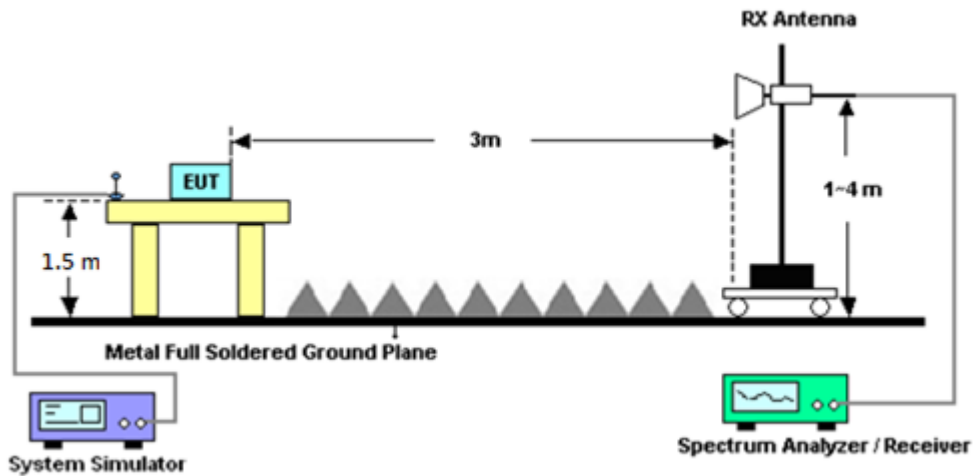
For radiated test below 30MHz



For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



3.1.2 Test Result of Radiated Test

Please refer to Appendix A.

Note:

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.

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.



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 7, 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.

For LTE Band 13

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

The spectrum is scanned from 30 MHz 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 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. 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 $43 + 10\log(P)$ dB below the transmitter power P(Watts)

For LTE Band 7, 41

The limit line is derived from $55 + 10\log(P)$ 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
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Jul. 14, 2020	Dec. 27, 2020~ Dec. 29, 2020	Jul. 13, 2021	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N -06	40103 & 07	30MHz~1GHz	Apr. 29, 2020	Dec. 27, 2020~ Dec. 29, 2020	Apr. 28, 2021	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-1328	1GHz~18GHz	Nov. 23, 2020	Dec. 27, 2020~ Dec. 29, 2020	Nov. 22, 2021	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120D	9120D-1212	1GHz ~ 18GHz	May 20, 2020	Dec. 27, 2020~ Dec. 29, 2020	May 19, 2021	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA917058 4	18GHz~40GHz	Dec. 11, 2020	Dec. 27, 2020~ Dec. 29, 2020	Dec. 10, 2021	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA917098 0	18GHz ~ 40GHz	Jan. 10, 2020	Dec. 27, 2020~ Dec. 29, 2020	Jan. 09, 2021	Radiation (03CH12-HY)
Preamplifier	COM-POWER	PA-103	161075	10MHz~1GHz	Mar. 25, 2020	Dec. 27, 2020~ Dec. 29, 2020	Mar. 24, 2021	Radiation (03CH12-HY)
Preamplifier	Keysight	83017A	MY57280120	1GHz~26.5GHz	Jul. 20, 2020	Dec. 27, 2020~ Dec. 29, 2020	Jul. 19, 2021	Radiation (03CH12-HY)
Preamplifier	Jet-Power	JPA0118-55-3 03K	1710001800 054002	1GHz~18GHz	Feb. 07, 2020	Dec. 27, 2020~ Dec. 29, 2020	Feb. 06, 2021	Radiation (03CH12-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz~40GHz	Dec. 11, 2020	Dec. 27, 2020~ Dec. 29, 2020	Dec. 10, 2021	Radiation (03CH12-HY)
Spectrum Analyzer	Agilent	N9010A	MY54200485	10Hz~44GHz	Feb. 10, 2020	Dec. 27, 2020~ Dec. 29, 2020	Feb. 09, 2021	Radiation (03CH12-HY)
Signal Generator	Anritsu	MG3694C	163401	0.1Hz~40GHz	Feb. 15, 2020	Dec. 27, 2020~ Dec. 29, 2020	Feb. 14, 2021	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9kHz~30MHz	Mar. 12, 2020	Dec. 27, 2020~ Dec. 29, 2020	Mar. 11, 2021	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0058/126E	30MHz~18GHz	Dec. 11, 2020	Dec. 27, 2020~ Dec. 29, 2020	Dec. 10, 2021	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30MHz~40GHz	Feb. 25, 2020	Dec. 27, 2020~ Dec. 29, 2020	Feb. 24, 2021	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30MHz~40GHz	Feb. 25, 2020	Dec. 27, 2020~ Dec. 29, 2020	Feb. 24, 2021	Radiation (03CH12-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Dec. 27, 2020~ Dec. 29, 2020	N/A	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Dec. 27, 2020~ Dec. 29, 2020	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Dec. 27, 2020~ Dec. 29, 2020	N/A	Radiation (03CH12-HY)
Software	Audix	E3 6.2009-8-24	RK-000989	N/A	N/A	Dec. 27, 2020~ Dec. 29, 2020	N/A	Radiation (03CH12-HY)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	3.07
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	3.21
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Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	3.80
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Appendix A. Test Results of Radiated Test

LTE Band 26

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	1649	-49.39	-13	-36.39	-57.84	-54.99	0.92	8.67	H
	2474	-53.57	-13	-40.57	-67.09	-60.94	1.14	10.66	H
	3299	-57.48	-13	-44.48	-72.81	-66.02	1.32	12.02	H
									H
									H
									H
	1649	-50.04	-13	-37.04	-57.96	-55.64	0.92	8.67	V
	2474	-54.70	-13	-41.70	-68.37	-62.07	1.14	10.66	V
	3299	-56.22	-13	-43.22	-72.02	-64.76	1.32	12.02	V
									V
									V
									V
Middle	1659	-50.63	-13	-37.63	-59.12	-56.26	0.92	8.70	H
	2489	-56.50	-13	-43.50	-70.05	-63.89	1.15	10.68	H
	3319	-57.09	-13	-44.09	-72.36	-65.68	1.33	12.07	H
									H
									H
									H
	1659	-49.84	-13	-36.84	-57.75	-55.47	0.92	8.70	V
	2489	-57.61	-13	-44.61	-71.35	-65.00	1.15	10.68	V
	3319	-56.77	-13	-43.77	-72.5	-65.36	1.33	12.07	V
									V
									V
									V



Highest	1669	-53.01	-13	-40.01	-61.53	-58.67	0.93	8.74	H
	2504	-56.83	-13	-43.83	-70.4	-64.23	1.15	10.70	H
	3339	-57.54	-13	-44.54	-72.75	-66.17	1.33	12.11	H
									H
									H
									H
	1669	-53.01	-13	-40.01	-60.92	-58.67	0.93	8.74	V
	2504	-57.64	-13	-44.64	-71.42	-65.04	1.15	10.70	V
	3339	-57.13	-13	-44.13	-72.8	-65.76	1.33	12.11	V
									V
									V
									V

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

**LTE Band 2**

LTE Band 2 / 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	3702	-55.45	-13	-42.45	-73.38	-66.66	1.41	12.62	H
	5553	-48.41	-13	-35.41	-71.57	-59.97	1.74	13.30	H
	7404	-47.40	-13	-34.40	-74.21	-56.72	1.94	11.25	H
									H
									H
									H
									H
	3702	-55.06	-13	-42.06	-73.14	-66.27	1.41	12.62	V
	5553	-50.89	-13	-37.89	-73.58	-62.45	1.74	13.30	V
	7404	-47.64	-13	-34.64	-74.3	-56.96	1.94	11.25	V
									V
									V
									V
									V
Middle	3742	-54.63	-13	-41.63	-72.74	-65.85	1.42	12.65	H
	5613	-44.53	-13	-31.53	-67.61	-56.09	1.74	13.30	H
	7484	-47.39	-13	-34.39	-73.83	-56.53	1.98	11.13	H
									H
									H
									H
									H
	3742	-53.85	-13	-40.85	-72.16	-65.07	1.42	12.65	V
	5613	-49.92	-13	-36.92	-72.66	-61.48	1.74	13.30	V
	7484	-47.17	-13	-34.17	-73.56	-56.31	1.98	11.13	V
									V
									V
									V
									V



Highest	3782	-55.15	-13	-42.15	-73.44	-65.36	2.02	12.23	H
	5673	-51.31	-13	-38.31	-74.7	-61.64	2.12	12.44	H
	7564	-48.43	-13	-35.43	-74.47	-56.55	2.11	10.23	H
									H
									H
									H
									H
	3782	-54.79	-13	-41.79	-73.33	-65.00	2.02	12.23	V
	5673	-52.04	-13	-39.04	-74.94	-62.37	2.12	12.44	V
	7564	-48.27	-13	-35.27	-74.26	-56.39	2.11	10.23	V
									V
									V
									V
									V

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

**LTE Band 25**

LTE Band 25 / 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	3702	-54.90	-13	-41.90	-72.83	-66.11	1.41	12.62	H
	5553	-50.68	-13	-37.68	-73.84	-62.24	1.74	13.30	H
	7404	-47.48	-13	-34.48	-74.29	-56.80	1.94	11.25	H
									H
									H
									H
									H
	3702	-54.05	-13	-41.05	-72.13	-65.26	1.41	12.62	V
	5553	-48.79	-13	-35.79	-71.48	-60.35	1.74	13.30	V
	7404	-47.45	-13	-34.45	-74.11	-56.77	1.94	11.25	V
									V
									V
									V
									V
Middle	3742	-53.59	-13	-40.59	-71.7	-64.81	1.42	12.65	H
	5611	-51.23	-13	-38.23	-74.3	-62.79	1.74	13.30	H
	7487	-47.05	-13	-34.05	-73.48	-56.19	1.98	11.12	H
									H
									H
									H
									H
	3742	-52.47	-13	-39.47	-70.78	-63.69	1.42	12.65	V
	5611	-51.48	-13	-38.48	-74.22	-63.04	1.74	13.30	V
	7487	-47.31	-13	-34.31	-73.69	-56.45	1.98	11.12	V
									V
									V
									V
									V



Highest	3792	-53.84	-13	-40.84	-72.17	-65.08	1.44	12.68	H
	5688	-51.22	-13	-38.22	-74.69	-62.79	1.73	13.30	H
	7584	-48.12	-13	-35.12	-74.04	-57.24	2.00	11.12	H
									H
									H
									H
									H
	3792	-54.19	-13	-41.19	-72.78	-65.43	1.44	12.68	V
	5688	-50.07	-13	-37.07	-73.01	-61.64	1.73	13.30	V
	7584	-47.87	-13	-34.87	-73.75	-56.99	2.00	11.12	V
									V
									V
									V
									V

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

**LTE Band 12**

LTE Band 12 / 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)
Lowest	1400	-59.18	-13	-46.18	-68.75	-63.83	0.84	7.64	H
	2096	-53.99	-13	-40.99	-66.59	-60.91	1.06	10.13	H
	2800	-57.85	-13	-44.85	-72.27	-65.54	1.22	11.06	H
									H
									H
									H
									H
	1400	-59.99	-13	-46.99	-68.33	-64.64	0.84	7.64	V
	2096	-52.70	-13	-39.70	-64.20	-59.62	1.06	10.13	V
	2800	-58.02	-13	-45.02	-72.38	-65.71	1.22	11.06	V
									V
									V
									V
									V
Middle	1408	-58.00	-13	-45.00	-67.54	-62.68	0.85	7.68	H
	2112	-53.96	-13	-40.96	-66.85	-60.90	1.06	10.16	H
	2816	-57.85	-13	-44.85	-72.33	-65.55	1.23	11.08	H
									H
									H
									H
									H
	1408	-60.62	-13	-47.62	-68.94	-65.30	0.85	7.68	V
	2112	-54.22	-13	-41.22	-65.99	-61.16	1.06	10.16	V
	2816	-57.85	-13	-44.85	-72.29	-65.55	1.23	11.08	V
									V
									V
									V
									V



Highest	1416	-55.60	-13	-42.60	-65.11	-60.32	0.85	7.71	H
	2120	-53.41	-13	-40.41	-66.44	-60.36	1.07	10.17	H
	2824	-57.22	-13	-44.22	-71.73	-64.93	1.23	11.09	H
									H
									H
									H
									H
	1416	-57.90	-13	-44.90	-66.20	-62.62	0.85	7.71	V
	2120	-52.39	-13	-39.39	-64.29	-59.34	1.07	10.17	V
	2824	-57.96	-13	-44.96	-72.44	-65.67	1.23	11.09	V
									V
									V
									V
									V

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

**LTE Band 13**

LTE Band 13 / 5MHz / 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	1552	-46.00	-13	-33.00	-54.71	-51.26	0.89	8.30	H
	2336	-44.73	-13	-31.73	-58.48	-51.94	1.11	10.47	H
	3112	-53.66	-13	-40.66	-69.09	-61.79	1.29	11.57	H
	3888	-51.40	-13	-38.40	-69.49	-60.52	1.46	12.73	H
									H
									H
									H
	1552	-47.90	-13	-34.90	-55.90	-53.16	0.89	8.30	V
	2336	-48.42	-13	-35.42	-61.74	-55.63	1.11	10.47	V
	3112	-53.11	-13	-40.11	-68.88	-61.24	1.29	11.57	V
	3888	-52.64	-13	-39.64	-77.84	-61.76	1.46	12.73	V
									V
									V
									V
Middle	1560	-45.19	-42.15	-3.04	-53.83	-50.48	0.89	8.33	H
	2336	-41.72	-13	-28.72	-55.47	-48.93	1.11	10.47	H
	3120	-53.74	-13	-40.74	-69.19	-61.89	1.29	11.59	H
	3896	-52.52	-13	-39.52	-70.63	-61.64	1.46	12.74	H
									H
									H
									H
	1560	-48.26	-42.15	-6.11	-56.26	-53.55	0.89	8.33	V
	2336	-45.42	-13	-32.42	-58.74	-52.63	1.11	10.47	V
	3120	-51.24	-13	-38.24	-67.05	-59.39	1.29	11.59	V
	3896	-53.97	-13	-40.97	-72.18	-63.09	1.46	12.74	V
									V
									V
									V



Highest	1568	-45.29	-42.15	-3.14	-53.87	-50.61	0.89	8.36	H
	2344	-43.77	-13	-30.77	-57.46	-50.99	1.12	10.48	H
	3128	-53.48	-13	-40.48	-68.94	-61.64	1.29	11.61	H
	3912	-53.43	-13	-40.43	-71.58	-62.56	1.47	12.75	H
									H
									H
									H
	1568	-48.69	-42.15	-6.54	-56.68	-54.01	0.89	8.36	V
	2344	-48.10	-13	-35.10	-61.42	-55.32	1.12	10.48	V
	3128	-51.95	-13	-38.95	-67.79	-60.11	1.29	11.61	V
	3912	-54.67	-13	-41.67	-72.88	-63.80	1.47	12.75	V
									V
									V
									V

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



LTE Band 13 / 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	1552	-44.70	-13	-31.70	-53.41	-49.96	0.89	8.30	H
	2336	-43.41	-13	-30.41	-57.16	-50.62	1.11	10.47	H
	3112	-52.53	-13	-39.53	-67.96	-60.66	1.29	11.57	H
	3888	-50.79	-13	-37.79	-68.88	-59.91	1.46	12.73	H
									H
									H
									H
	1552	-46.65	-13	-33.65	-54.65	-51.91	0.89	8.30	V
	2336	-47.46	-13	-34.46	-60.78	-54.67	1.11	10.47	V
	3112	-51.41	-13	-38.41	-67.18	-59.54	1.29	11.57	V
	3888	-52.25	-13	-39.25	-70.45	-61.37	1.46	12.73	V
									V
									V
									V
									V
									V

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

**LTE Band 7**

LTE Band 7 / 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	5002	-49.79	-25	-24.79	-71.81	-60.78	1.61	12.60	H
	7503	-42.51	-25	-17.51	-68.86	-51.62	1.99	11.10	H
	10004	-44.84	-25	-19.84	-74.4	-53.74	2.40	11.30	H
									H
									H
									H
									H
	5002	-47.50	-25	-22.50	-69.07	-58.49	1.61	12.60	V
	7503	-37.95	-25	-12.95	-64.27	-47.06	1.99	11.10	V
	10004	-44.17	-25	-19.17	-74.52	-53.07	2.40	11.30	V
									V
									V
									V
									V
Middle	5052	-48.09	-25	-23.09	-70.09	-59.14	1.62	12.67	H
	7578	-40.62	-25	-15.62	-66.58	-49.73	2.00	11.12	H
	10104	-44.19	-25	-19.19	-74	-53.01	2.40	11.22	H
									H
									H
									H
									H
	5052	-44.82	-25	-19.82	-66.45	-55.87	1.62	12.67	V
	7578	-38.03	-25	-13.03	-63.95	-47.14	2.00	11.12	V
	10104	-44.09	-25	-19.09	-74.48	-52.91	2.40	11.22	V
									V
									V
									V
									V



Highest	5102	-46.43	-25	-21.43	-68.4	-57.54	1.64	12.74	H
	7653	-44.83	-25	-19.83	-70.7	-53.95	2.01	11.13	H
	10204	-44.52	-25	-19.52	-74.59	-53.26	2.40	11.14	H
									H
									H
									H
									H
	5102	-44.09	-25	-19.09	-65.76	-55.20	1.64	12.74	V
	7653	-43.15	-25	-18.15	-68.9	-52.27	2.01	11.13	V
	10204	-43.68	-25	-18.68	-74.1	-52.42	2.40	11.14	V
									V
									V
									V
									V

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

**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	4994	-51.55	-25	-26.55	-73.55	-62.54	1.61	12.60	H
	7491	-44.32	-25	-19.32	-70.71	-53.45	1.99	11.11	H
	9988	-45.31	-25	-20.31	-74.89	-54.22	2.40	11.30	H
									H
									H
									H
									H
	4994	-47.72	-25	-22.72	-69.26	-58.71	1.61	12.60	V
	7491	-38.14	-25	-13.14	-64.49	-47.27	1.99	11.11	V
	9988	-44.34	-25	-19.34	-74.69	-53.25	2.40	11.30	V
									V
									V
									V
									V
Middle	5166	-47.84	-25	-22.84	-69.79	-59.02	1.65	12.83	H
	7752	-43.24	-25	-18.24	-69.15	-52.37	2.03	11.15	H
	10332	-44.50	-25	-19.50	-74.89	-53.14	2.39	11.03	H
									H
									H
									H
									H
	5166	-46.17	-25	-21.17	-67.91	-57.35	1.65	12.83	V
	7752	-38.75	-25	-13.75	-64.42	-47.88	2.03	11.15	V
	10332	-44.24	-25	-19.24	-74.71	-52.88	2.39	11.03	V
									V
									V
									V
									V



Highest	5340	-47.40	-25	-22.40	-69.82	-58.78	1.70	13.08	H
	8016	-37.50	-25	-12.50	-64.66	-46.67	2.06	11.23	H
	10683	-43.69	-25	-18.69	-74.55	-52.10	2.49	10.90	H
									H
									H
									H
									H
	5340	-42.95	-25	-17.95	-65.03	-54.33	1.70	13.08	V
	8016	-36.08	-25	-11.08	-63.13	-45.25	2.06	11.23	V
	10683	-43.85	-25	-18.85	-74.47	-52.26	2.49	10.90	V
									V
									V
									V
									V

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

**LTE Band 66**

LTE Band 66 / 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	3422	-54.54	-13	-41.54	-70.48	-65.51	1.35	12.31	H
	5133	-46.91	-13	-33.91	-68.86	-58.05	1.64	12.79	H
	6844	-49.05	-13	-36.05	-74.42	-59.43	1.74	12.12	H
									H
									H
									H
									H
	3422	-54.24	-13	-41.24	-70.6	-65.21	1.35	12.31	V
	5133	-42.85	-13	-29.85	-64.55	-53.99	1.64	12.79	V
	6844	-49.33	-13	-36.33	-74.31	-59.71	1.74	12.12	V
									V
									V
									V
									V
Middle	3472	-54.75	-13	-41.75	-71.17	-65.83	1.35	12.43	H
	5208	-45.92	-13	-32.92	-67.88	-57.15	1.66	12.89	H
	6944	-48.08	-13	-35.08	-73.96	-58.33	1.73	11.98	H
									H
									H
									H
									H
	3472	-52.56	-13	-39.56	-69.36	-63.64	1.35	12.43	V
	5208	-42.00	-13	-29.00	-63.79	-53.23	1.66	12.89	V
	6944	-48.37	-13	-35.37	-73.79	-58.62	1.73	11.98	V
									V
									V
									V
									V



Highest	3522	-53.46	-13	-40.46	-70.33	-64.61	1.37	12.51	H
	5283	-46.85	-13	-33.85	-69.08	-58.16	1.68	13.00	H
	7044	-47.76	-13	-34.76	-74.06	-57.85	1.74	11.83	H
									H
									H
									H
									H
	3522	-50.77	-13	-37.77	-67.92	-61.92	1.37	12.51	V
	5283	-47.26	-13	-34.26	-69.22	-58.57	1.68	13.00	V
	7044	-48.08	-13	-35.08	-73.93	-58.17	1.74	11.83	V
									V
									V
									V
									V

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