



FCC RADIO TEST REPORT

FCC ID : PU5-TP00139AM
Equipment : Notebook Computer
Brand Name : Lenovo
Model Name : TP00139A
Applicant : Wistron Corporation
21F, No. 88, Sec. 1, Hsin Tai Wu Rd., Hsichih Dist,
New Taipei City 221, Taiwan
Manufacturer : Lenovo PC HK Limited.
23/F, Lincoln House, Taikoo Place, 979 King's Road,
Quarry Bay, Hong Kong, China
Standard : FCC 47 CFR Part 2, 27

Equipment: Foxconn T99W175 tested inside of Lenovo Notebook Computer.

The product was received on Jan. 17, 2022 and testing was performed from Feb. 11, 2022 to Feb. 26, 2022. We, Sporton International Inc. Wensan 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. Wensan Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Sporton International Inc. Wensan Laboratory



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Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Reporting only	-
	§27.50 (j)(3)	Equivalent Isotropic Radiated Power (n77)	Pass	
-	§27.50 (j)(4)	Peak-to-Average Ratio	-	See Note
-	§2.1049	Occupied Bandwidth	-	See Note
-	§2.1051 §27.53 (l)(2)	Conducted Band Edge Measurement (n77)	-	See Note
-	§2.1051 §27.53 (l)(2)	Conducted Spurious Emission (n77)	-	See Note
-	§2.1055 §27.54	Frequency Stability Temperature & Voltage	-	See Note
4.2	§2.1051 §27.53 (l)(2)	Radiated Spurious Emission (n77)	Pass	Under limit 20.01 dB at 15846.000 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 (PASS/FAIL) with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
- The measurement uncertainty please refer to this report "Uncertainty of Evaluation".

Comments and Explanations:

The product specifications of the EUT presented in the report are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: William Chen

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	TP00139A
FCC ID	PU5-TP00139AM
Sample 1	EUT with AWAN Antenna
Sample 2	EUT with LUXSHARE-ICT Antenna
EUT supports Radios application	WCDMA/HSPA/LTE/5G NR/GNSS 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.

WWAN Antenna Information				
MIMO 2 Antenna	Manufacturer	AWAN	Peak gain (dBi)	5G NR n77 : 2.94
	Part number	SA30Y56105AA	Type	PIFA
	Manufacturer	LUXSHARE-ICT	Peak gain (dBi)	5G NR n77 : 0.30
	Part number	SA30Y56104AA	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 is subject to this standard	
Tx/Rx Frequency	5G NR n77: 3710 MHz ~ 3970 MHz
Bandwidth	20MHz/40MHz/50MHz/60MHz/80MHz/90MHz/100MHz
Maximum Output Power to Antenna	5G NR n77: 26.05 dBm 5G NR n77: 23.96 dBm for HPUE
Type of Modulation	CP-OFDM: QPSK/16QAM/64QAM/256QAM DFT-s-OFDM: PI/2 BPSK/QPSK/16QAM/64QAM/256QAM

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.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333
Test Site No.	Sporton Site No.
	TH03-HY (TAF Code: 1190)
Test Engineer	Luffy Lin
Temperature (°C)	23.3~23.9
Relative Humidity (%)	51~55
Remark	The Conducted test item subcontracted to Sporton International Inc. EMC & Wireless Communications Laboratory

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010
Test Site No.	Sporton Site No.
	03CH12-HY
Test Engineer	Jack Cheng, Lance Chiang and Chuan Chu
Temperature (°C)	21.6~26.2
Relative Humidity (%)	56~68

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

FCC Designation No.: TW1190 and TW3786



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, 27
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ FCC KDB 412172 D01 Determining ERP and EIRP v01r01
- ♦ 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.

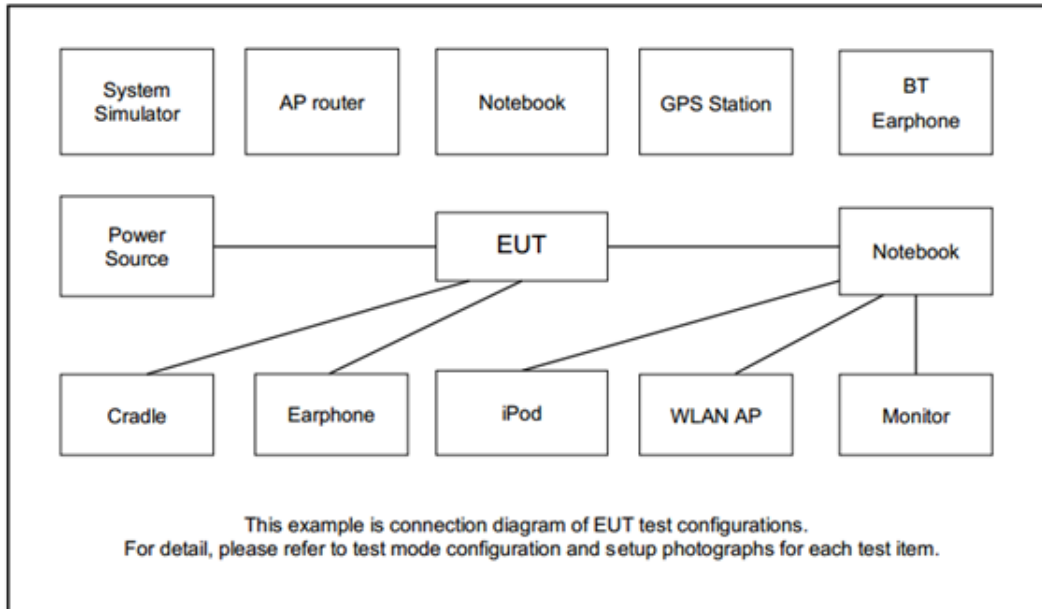
2 Test Configuration of Equipment Under Test

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.

Test Items	NR Band	Bandwidth (MHz)												Modulation					RB #			Test Channel		
		5	10	15	20	25	30	40	50	60	80	90	100	PI/2 BPSK	QPSK	16QAM	64QAM	256QAM	1	Half	Full	L	M	H
Max. Output Power	n77	-	-	-	v	-	-	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
E.I.R.P	n77	-	-	-	v	-	-	v	v	v	v	v	v	v	v	v	v	v	Max. Power					
Radiated Spurious Emission	n77	-	-	-	v	-	-							v					v			v	v	v
Remark	<ol style="list-style-type: none"> 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. Test combination is EN-DC 66A_n77A. For radiated measurement, pre-scanned in two modes, DFT-s OFDM and CP OFDM. The worst cases (DFT-s OFDM) were recorded in this report, and the worst modes of FR1 and LTE for simultaneous transmission were verified and compliant. All the radiated test cases were performed with Adapter 2. 																							

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	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	System Simulator	Anritsu	MT8821C	N/A	N/A	Unshielded, 1.8 m
3.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A

2.4 Frequency List of Low/Middle/High Channels

5G NR Band n77 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
100	Channel	650000	656000	662000
	Frequency	3750	3840	3930
90	Channel	649668	656000	662332
	Frequency	3745.02	3840	3934.98
80	Channel	649334	656000	662666
	Frequency	3740.01	3840	3939.99
60	Channel	648668	656000	663332
	Frequency	3730.02	3840	3949.98
50	Channel	648334	656000	663666
	Frequency	3725.01	3840	3954.99
40	Channel	648000	656000	664000
	Frequency	3720	3840	3960
20	Channel	647334	656000	664666
	Frequency	3710.01	3840	3969.99

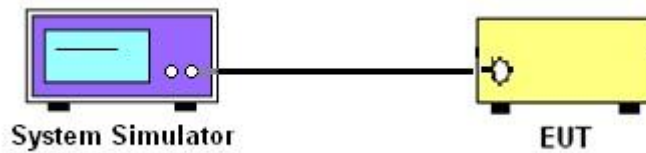
3 Conducted Test Items

3.1 Measuring Instruments

See list of measuring instruments of this test report.

3.1.1 Test Setup

3.1.2 Conducted Output Power



3.1.3 Test Result of Conducted Test

Please refer to Appendix A.



3.2 Conducted Output Power and EIRP

3.2.1 Description of the Conducted Output Power Measurement and EIRP Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The EIRP of mobile transmitters must not exceed 1 Watts for 5G NR n77 and n78

According to KDB 412172 D01 Power Approach,

$EIRP = P_T + G_T - L_C$, $ERP = EIRP - 2.15$, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.2.2 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through the system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

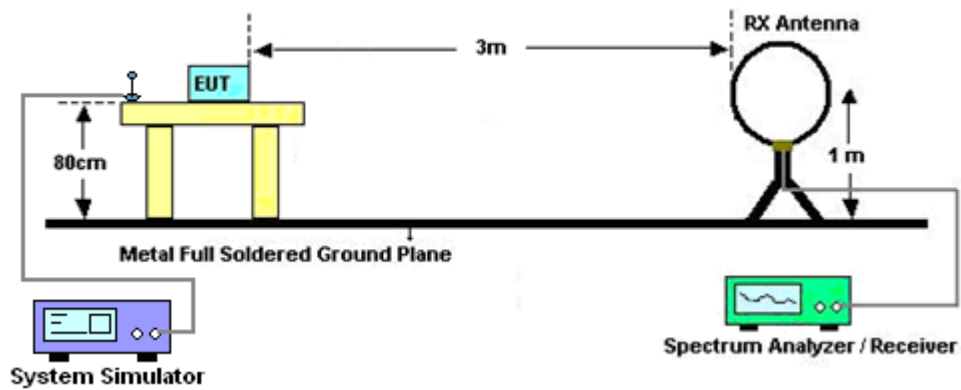
4 Radiated Test Items

4.1 Measuring Instruments

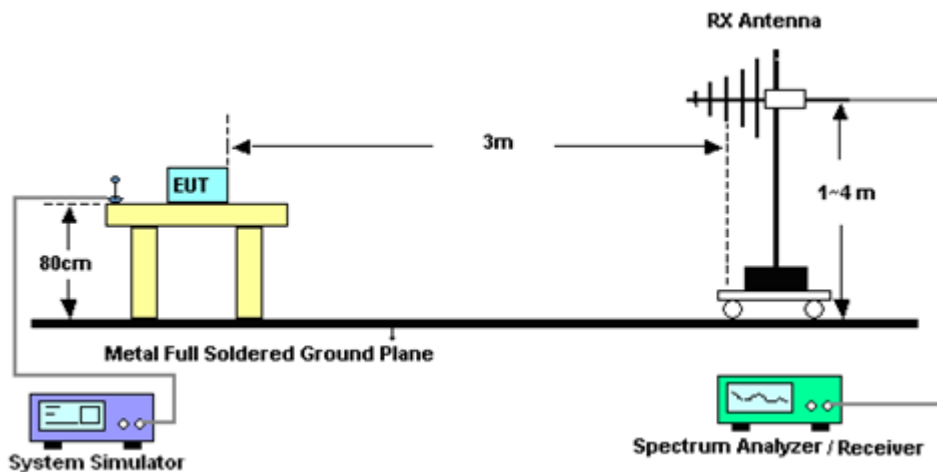
See list of measuring instruments of this test report.

4.1.1 Test Setup

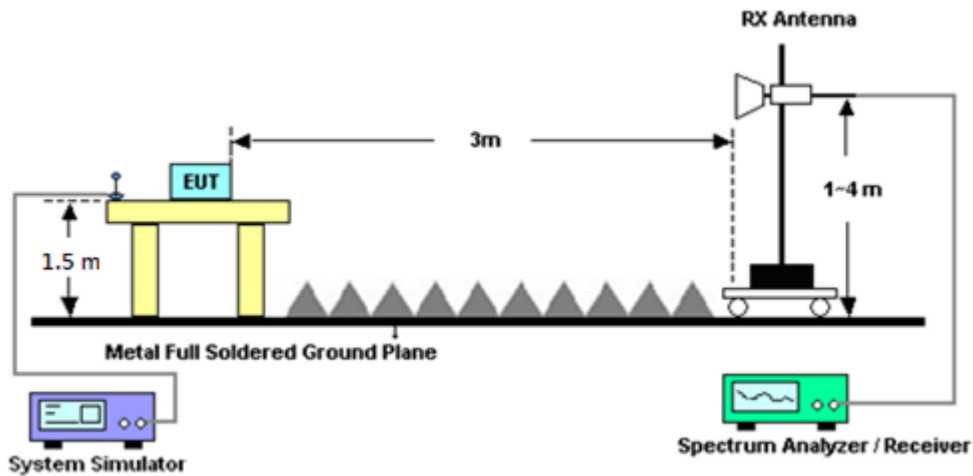
For radiated emissions below 30MHz



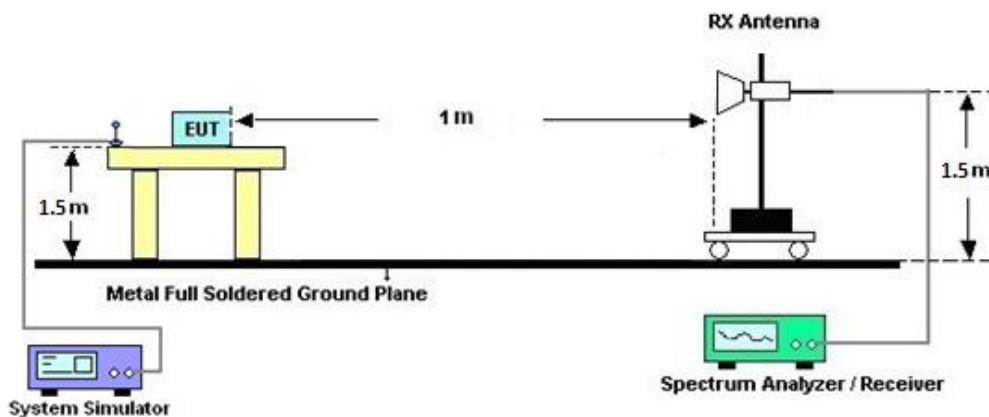
For radiated test from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



4.1.2 Test Result of Radiated Test

Please refer to Appendix B.

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 adequate comparison measurement 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.



4.2 Radiated Spurious Emission Measurement

4.2.1 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.

4.2.2 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.



5 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	Sep. 07, 2021	Feb. 11, 2022~ Feb. 26, 2022	Sep. 06, 2022	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N -06	37059 & 01	30MHz~1GHz	Oct. 09, 2021	Feb. 11, 2022~ Feb. 26, 2022	Oct. 08, 2022	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D & N-6-06	35414 & AT-N0602	30MHz~1GHz	Oct. 09, 2021	Feb. 11, 2022~ Feb. 26, 2022	Oct. 08, 2022	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-1326	1GHz~18GHz	Oct. 25, 2021	Feb. 11, 2022~ Feb. 26, 2022	Oct. 24, 2022	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-1212	1GHz~18GHz	May 18, 2021	Feb. 11, 2022~ Feb. 26, 2022	May 17, 2022	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA917025 1	18GHz~40GHz	Nov. 30, 2021	Feb. 11, 2022~ Feb. 26, 2022	Nov. 29, 2022	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA917057 6	18GHz~40GHz	May 21, 2021	Feb. 11, 2022~ Feb. 26, 2022	May 20, 2022	Radiation (03CH12-HY)
Preamplifier	COM-POWER	PA-103	161075	10MHz~1GHz	Mar. 24, 2021	Feb. 11, 2022~ Feb. 26, 2022	Mar. 23, 2022	Radiation (03CH12-HY)
Preamplifier	Aglient	8449B	3008A02375	1GHz~26.5GHz	May 25, 2021	Feb. 11, 2022~ Feb. 26, 2022	May 24, 2022	Radiation (03CH12-HY)
Preamplifier	E-INSTRUME NT TECH LTD.	ERA-100M-18 G-56-01-A70	EC1900270	1GHz-18GHz	Dec. 27, 2021	Feb. 11, 2022~ Feb. 26, 2022	Dec. 26, 2022	Radiation (03CH12-HY)
Preamplifier	EMEC	EM18G40G	060801	18GHz~40GHz	Jun. 22, 2021	Feb. 11, 2022~ Feb. 26, 2022	Jun. 21, 2022	Radiation (03CH12-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200486	10Hz~44GHz	Oct. 15, 2021	Feb. 11, 2022~ Feb. 26, 2022	Oct. 14, 2022	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30MHz~40GHz	Feb. 22, 2021	Feb. 11, 2022~ Feb. 20, 2022	Feb. 21, 2022	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30MHz~40GHz	Feb. 21, 2022	Feb. 21, 2022~ Feb. 26, 2022	Feb. 20, 2023	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30MHz~40GHz	Feb. 22, 2021	Feb. 11, 2022~ Feb. 20, 2022	Feb. 21, 2022	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30MHz~40GHz	Feb. 21, 2022	Feb. 21, 2022~ Feb. 26, 2022	Feb. 20, 2023	Radiation (03CH12-HY)
Filter	Wainwright	WLKS1200-12 SS	SN2	1.2GHz Low Pass Filter	Mar. 17, 2021	Feb. 11, 2022~ Feb. 26, 2022	Mar. 16, 2022	Radiation (03CH12-HY)
Filter	Wainwright	WHKX12-1080 -1200-15000-6 OSS	SN1	1.2GHz High Pass Filter	Mar. 17, 2021	Feb. 11, 2022~ Feb. 26, 2022	Mar. 16, 2022	Radiation (03CH12-HY)
Filter	Wainwright	WHKX12-2700 -3000-18000-6 OST	SN2	3GHz High Pass Filter	Jul. 12, 2021	Feb. 11, 2022~ Feb. 26, 2022	Jul. 11, 2022	Radiation (03CH12-HY)
Hygrometer	TECPEL	DTM-303B	TP140349	N/A	Sep. 30, 2021	Feb. 11, 2022~ Feb. 26, 2022	Sep. 29, 2022	Radiation (03CH12-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Feb. 11, 2022~ Feb. 26, 2022	N/A	Radiation (03CH12-HY)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Feb. 11, 2022~ Feb. 26, 2022	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Feb. 11, 2022~ Feb. 26, 2022	N/A	Radiation (03CH12-HY)
Software	Audix	E3 6.2009-8-24	RK-000989	N/A	N/A	Feb. 11, 2022~ Feb. 26, 2022	N/A	Radiation (03CH12-HY)
Hygrometer	Testo	608-H11	34893240	NA	Nov. 17, 2021	Feb. 17, 2022~ Feb. 21, 2022	Nov. 16, 2022	Conducted (TH03-HY)
Base Station (Measure)	Anritsu	MT8821C	6261849015	LTE	Ocr. 06, 2021	Feb. 17, 2022~ Feb. 21, 2022	Oct. 05, 2022	Conducted (TH03-HY)
Base Station (Measure)	Anritsu	MT8000A	6261940327	FR1	Oct. 29, 2021	Feb. 17, 2022~ Feb. 21, 2022	Oct. 28, 2022	Conducted (TH03-HY)



6 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.10 dB
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.39 dB
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Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.34 dB
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Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power) and EIRP

NR n77 Maximum Average Power [dBm] (GT - LC = 2.94 dB)										
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)		
20	1	1	PI/2 BPSK	25.81	25.90	25.65	28.84	0.7656		
20	1	49		25.70	25.69	25.76				
20	25	12		25.74	25.65	25.65				
20	1	0		22.42	22.33	22.32				
20	1	50		22.42	22.32	22.36				
20	50	0		25.39	25.29	25.32				
20	1	1	QPSK	25.78	25.69	25.58			27.85	0.6095
20	1	49		25.84	25.82	25.65				
20	25	12		25.76	25.68	25.66				
20	1	0		22.41	22.34	22.19				
20	1	50		22.39	22.28	22.36				
20	50	0		24.88	24.82	24.78				
20	1	1	16-QAM	24.91	24.81	24.77	27.85	0.6095		
20	1	1	64-QAM	23.36	23.24	23.21				
20	1	1	256-QAM	21.38	21.39	21.30				
Limit	EIRP < 1W			Result			Pass			

NR n77 Maximum Average Power [dBm] (GT - LC = 2.94 dB)										
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)		
40	1	1	PI/2 BPSK	25.91	25.97	25.79	28.99	0.7925		
40	1	104		26.05	25.93	25.90				
40	50	25		25.93	25.93	25.71				
40	1	0		22.47	22.53	22.44				
40	1	105		22.75	22.49	22.61				
40	100	0		25.50	25.57	25.44				
40	1	1	QPSK	25.85	25.98	25.84			27.98	0.6281
40	1	104		26.01	25.93	25.86				
40	50	25		25.95	25.83	25.71				
40	1	0		22.54	22.66	22.41				
40	1	105		22.76	22.55	22.52				
40	100	0		25.05	25.03	24.94				
40	1	1	16-QAM	25.04	24.96	24.95	27.98	0.6281		
40	1	1	64-QAM	23.47	23.65	23.57				
40	1	1	256-QAM	21.53	21.64	21.58				
Limit	EIRP < 1W			Result			Pass			



NR n77 Maximum Average Power [dBm] (GT - LC = 2.94 dB)										
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)		
50	1	1	PI/2 BPSK	25.46	25.48	25.64	28.61	0.7261		
50	1	131		25.63	25.57	25.64				
50	64	32		25.64	25.53	25.51				
50	1	0		22.12	21.99	22.23				
50	1	132		22.26	22.18	22.25				
50	128	0		25.18	25.11	25.13				
50	1	1	QPSK	25.41	25.52	25.49			28.61	0.7261
50	1	131		25.58	25.59	25.54				
50	64	32		25.67	25.61	25.47				
50	1	0		22.08	22.03	22.08				
50	1	132		22.12	22.03	22.14				
50	128	0		24.69	24.68	24.61				
50	1	1	16-QAM	24.54	24.55	24.65	27.59	0.5741		
50	1	1	64-QAM	23.12	23.06	23.12				
50	1	1	256-QAM	21.15	21.08	21.06				
Limit	EIRP < 1W			Result			Pass			

NR n77 Maximum Average Power [dBm] (GT - LC = 2.94 dB)										
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)		
60	1	1	PI/2 BPSK	25.48	25.48	25.51	28.63	0.7295		
60	1	160		25.65	25.57	25.49				
60	81	40		25.65	25.57	25.48				
60	1	0		22.12	22.11	22.06				
60	1	161		22.26	22.14	22.09				
60	162	0		25.23	25.16	25.12				
60	1	1	QPSK	25.56	25.57	25.47			28.63	0.7295
60	1	160		25.69	25.62	25.48				
60	81	40		25.65	25.55	25.44				
60	1	0		22.12	22.09	22.06				
60	1	161		22.26	22.24	22.02				
60	162	0		24.72	24.68	24.51				
60	1	1	16-QAM	24.62	24.68	24.65	27.62	0.5781		
60	1	1	64-QAM	23.13	23.21	23.16				
60	1	1	256-QAM	21.09	21.23	21.35				
Limit	EIRP < 1W			Result			Pass			



NR n77 Maximum Average Power [dBm] (GT - LC = 2.94 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
80	1	1	PI/2 BPSK	22.12	25.75	25.53	28.73	0.7464
80	1	215		25.66	25.79	25.65		
80	108	54		25.68	25.69	25.53		
80	1	0		22.21	22.55	22.13		
80	1	216		22.25	22.45	22.10		
80	216	0		25.35	25.42	25.15		
80	1	1	QPSK	25.54	25.61	25.46		
80	1	215		25.72	25.62	25.45		
80	108	54		25.73	25.63	25.55		
80	1	0		22.24	22.24	22.17		
80	1	216		22.25	22.27	22.15		
80	216	0		24.82	24.81	24.65		
80	1	1	16-QAM	24.76	24.83	24.62	27.77	0.5984
80	1	1	64-QAM	23.28	23.19	23.09		
80	1	1	256-QAM	21.32	21.28	21.03		
Limit	EIRP < 1W			Result			Pass	

NR n77 Maximum Average Power [dBm] (GT - LC = 2.94 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
90	1	1	PI/2 BPSK	25.57	25.54	25.47	28.65	0.7328
90	1	243		25.71	25.55	25.47		
90	120	60		25.54	25.59	25.57		
90	1	0		22.27	22.18	22.08		
90	1	244		22.28	22.16	22.09		
90	243	0		25.19	25.21	25.09		
90	1	1	QPSK	25.52	25.61	25.53		
90	1	243		22.74	25.59	25.42		
90	120	60		25.59	25.65	25.56		
90	1	0		22.16	22.17	22.13		
90	1	244		22.32	22.22	22.01		
90	243	0		24.71	24.68	24.63		
90	1	1	16-QAM	24.68	24.71	24.74	27.68	0.5861
90	1	1	64-QAM	23.25	23.18	23.22		
90	1	1	256-QAM	21.09	21.35	21.33		
Limit	EIRP < 1W			Result			Pass	



NR n77 Maximum Average Power [dBm] (GT - LC = 2.94 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
100	1	1	PI/2 BPSK	25.55	25.57	25.44	28.67	0.7362
100	1	271		25.73	25.59	25.56		
100	135	67		25.59	25.51	25.44		
100	1	0		22.15	22.13	22.08		
100	1	272		22.35	22.23	22.08		
100	270	0		25.25	25.16	25.01		
100	1	1	QPSK	25.54	25.57	25.45	27.72	0.5916
100	1	271		25.66	25.55	25.44		
100	135	67		25.55	25.48	25.51		
100	1	0		22.22	22.12	22.06		
100	1	272		22.25	22.24	22.07		
100	270	0		24.67	24.58	24.74		
100	1	1	16-QAM	24.78	24.72	24.63	27.72	0.5916
100	1	1	64-QAM	23.32	23.20	23.03		
100	1	1	256-QAM	21.22	21.17	21.08		
Limit	EIRP < 1W			Result			Pass	



NR n77 (HPUE) Maximum Average Power [dBm] (GT - LC = 2.94 dB)										
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)		
20	1	1	PI/2 BPSK	23.60	23.52	23.61	26.56	0.4529		
20	1	49		23.58	23.60	23.58				
20	25	12		23.56	23.59	23.49				
20	1	0		22.51	22.51	22.45				
20	1	50		23.51	22.53	22.51				
20	50	0		23.55	23.58	23.52				
20	1	1	QPSK	23.61	23.62	23.52			26.56	0.4529
20	1	49		23.58	23.60	23.40				
20	25	12		23.55	23.58	23.51				
20	1	0		22.52	22.52	22.39				
20	1	50		22.54	22.53	22.41				
20	50	0		23.59	23.60	23.52				
20	1	1	16-QAM	23.51	23.58	23.45	26.52	0.4487		
20	1	1	64-QAM	23.48	23.55	23.54				
20	1	1	256-QAM	21.48	21.56	21.44				
Limit	EIRP < 1W			Result			Pass			

NR n77 (HPUE) Maximum Average Power [dBm] (GT - LC = 2.94 dB)										
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)		
40	1	1	PI/2 BPSK	23.87	23.85	23.78	26.90	0.4898		
40	1	104		23.96	23.82	23.92				
40	50	25		23.72	23.74	23.63				
40	1	0		22.72	22.81	22.95				
40	1	105		22.97	22.72	22.71				
40	100	0		23.84	22.85	23.65				
40	1	1	QPSK	23.77	23.79	23.62			26.90	0.4898
40	1	104		23.95	23.81	23.86				
40	50	25		23.76	23.73	23.66				
40	1	0		22.71	22.81	22.52				
40	1	105		22.85	22.68	22.73				
40	100	0		23.75	23.76	23.68				
40	1	1	16-QAM	23.75	23.74	23.65	26.69	0.4667		
40	1	1	64-QAM	23.54	23.71	23.70				
40	1	1	256-QAM	21.69	21.75	21.49				
Limit	EIRP < 1W			Result			Pass			



NR n77 (HPUE) Maximum Average Power [dBm] (GT - LC = 2.94 dB)										
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)		
50	1	1	PI/2 BPSK	23.25	23.45	23.46	26.54	0.4508		
50	1	131		23.42	23.56	23.52				
50	64	32		23.42	23.32	23.39				
50	1	0		22.16	22.23	22.30				
50	1	132		22.36	22.47	22.38				
50	128	0		23.37	23.48	23.42				
50	1	1	QPSK	23.32	23.34	23.36			26.45	0.4416
50	1	131		23.46	23.44	23.60				
50	64	32		23.41	23.36	23.35				
50	1	0		22.20	22.23	22.24				
50	1	132		22.38	22.35	22.43				
50	128	0		23.40	23.42	23.38				
50	1	1	16-QAM	23.51	23.31	23.39	26.45	0.4416		
50	1	1	64-QAM	23.23	23.26	23.28				
50	1	1	256-QAM	21.27	21.16	21.25				
Limit	EIRP < 1W			Result			Pass			

NR n77 (HPUE) Maximum Average Power [dBm] (GT - LC = 2.94 dB)										
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)		
60	1	1	PI/2 BPSK	23.36	23.65	23.29	26.59	0.4560		
60	1	160		23.58	23.42	23.42				
60	81	40		23.54	23.48	23.27				
60	1	0		22.26	22.26	22.15				
60	1	161		22.38	23.32	22.25				
60	162	0		23.49	23.45	23.26				
60	1	1	QPSK	23.33	23.35	23.34			26.42	0.4385
60	1	160		23.61	23.46	23.33				
60	81	40		23.54	23.50	22.29				
60	1	0		22.34	22.32	22.21				
60	1	161		22.46	22.38	22.26				
60	162	0		23.55	23.45	23.32				
60	1	1	16-QAM	23.38	23.48	23.34	26.42	0.4385		
60	1	1	64-QAM	23.18	23.35	23.25				
60	1	1	256-QAM	21.26	21.32	21.32				
Limit	EIRP < 1W			Result			Pass			



NR n77 (HPUE) Maximum Average Power [dBm] (GT - LC = 2.94 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
80	1	1	PI/2 BPSK	23.33	23.44	23.31	26.51	0.4477
80	1	215		23.48	23.36	23.29		
80	108	54		23.52	23.40	23.35		
80	1	0		22.21	23.28	22.29		
80	1	216		22.30	22.26	22.34		
80	216	0		23.42	23.48	23.40		
80	1	1	QPSK	23.38	23.57	23.35		
80	1	215		23.42	23.33	23.28		
80	108	54		23.48	23.35	23.25		
80	1	0		22.35	22.26	22.18		
80	1	216		23.32	22.21	22.20		
80	216	0		23.41	23.35	23.25		
80	1	1	16-QAM	23.35	23.42	23.31	26.36	0.4325
80	1	1	64-QAM	23.33	23.32	23.19		
80	1	1	256-QAM	21.41	21.24	21.07		
Limit	EIRP < 1W			Result			Pass	

NR n77 (HPUE) Maximum Average Power [dBm] (GT - LC = 2.94 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
90	1	1	PI/2 BPSK	23.44	23.46	23.40	26.54	0.4508
90	1	243		23.60	23.36	23.27		
90	120	60		23.41	23.48	23.39		
90	1	0		22.30	22.28	22.19		
90	1	244		22.51	22.26	22.18		
90	243	0		23.42	23.39	23.37		
90	1	1	QPSK	23.43	23.44	23.45		
90	1	243		23.58	23.35	23.23		
90	120	60		23.41	23.31	23.31		
90	1	0		22.27	22.28	22.22		
90	1	244		22.47	22.28	22.25		
90	243	0		23.39	23.36	23.30		
90	1	1	16-QAM	23.42	23.44	23.41	26.38	0.4345
90	1	1	64-QAM	23.32	23.32	23.27		
90	1	1	256-QAM	21.29	21.29	21.37		
Limit	EIRP < 1W			Result			Pass	



NR n77 (HPUE) Maximum Average Power [dBm] (GT - LC = 2.94 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
100	1	1	PI/2 BPSK	23.45	23.33	23.32	26.56	0.4529
100	1	271		23.62	23.36	23.30		
100	135	67		23.46	23.33	23.24		
100	1	0		22.33	22.26	22.18		
100	1	272		22.40	22.28	22.21		
100	270	0		23.52	23.38	23.32		
100	1	1	QPSK	23.33	23.35	23.27		
100	1	271		23.54	23.35	23.42		
100	135	67		23.45	23.38	23.21		
100	1	0		22.22	22.30	22.18		
100	1	272		22.51	22.31	22.28		
100	270	0		23.41	23.35	23.32		
100	1	1	16-QAM	23.40	23.38	23.35	26.34	0.4305
100	1	1	64-QAM	23.21	23.25	23.24		
100	1	1	256-QAM	21.36	21.09	21.35		
Limit	EIRP < 1W			Result			Pass	



Appendix B. Test Results of Radiated Test

<Sample 2>

EN-DC 66A-n77A

EN-DC 66A-n77A / 20MHz / PI/2 BPSK									
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	7406	-44.51	-13	-31.51	-71.86	-51.67	1.94	11.25	H
	11107	-40.95	-13	-27.95	-72.64	-47.22	2.61	11.03	H
	14808	-33.84	-13	-20.84	-71.72	-40.74	2.94	11.99	H
	18510	-54.99	-13	-41.99	-73.58	-68.84	1.90	17.90	H
	22206	-53.56	-13	-40.56	-76.28	-68.18	2.05	18.82	H
	25914	-51.00	-13	-38.00	-77.38	-65.98	1.95	19.08	H
									H
	7406	-44.69	-13	-31.69	-71.89	-51.85	1.94	11.25	V
	11107	-41.31	-13	-28.31	-72.83	-47.58	2.61	11.03	V
	14808	-35.60	-13	-22.60	-71.53	-42.50	2.94	11.99	V
	18510	-56.06	-13	-43.06	-73.79	-69.91	1.90	17.90	V
	22206	-54.08	-13	-41.08	-76.81	-68.70	2.05	18.82	V
	25914	-50.56	-13	-37.56	-78.04	-65.54	1.95	19.08	V
	Middle	7663	-44.95	-13	-31.95	-71.37	-51.92	2.01	11.13
11496		-39.68	-13	-26.68	-71.87	-46.58	2.44	11.50	H
15324		-33.05	-13	-20.05	-70.9	-42.62	3.09	14.80	H
19154		-55.58	-13	-42.58	-74.87	-69.67	1.82	18.05	H
22983		-52.94	-13	-39.94	-77.28	-67.03	1.98	18.22	H
26813		-51.28	-13	-38.28	-78.2	-65.69	2.18	18.74	H
									H
7663		-45.38	-13	-32.38	-71.67	-52.35	2.01	11.13	V
11496		-39.87	-13	-26.87	-71.91	-46.77	2.44	11.50	V
15324		-34.82	-13	-21.82	-71.25	-44.39	3.09	14.80	V
19154		-56.88	-13	-43.88	-75.48	-70.97	1.82	18.05	V
22987		-53.06	-13	-40.06	-77.42	-67.14	1.98	18.21	V
26813		-50.07	-13	-37.07	-78.47	-64.48	2.18	18.74	V



Highest	7926	-44.56	-13	-31.56	-71.62	-51.55	2.05	11.19	H
	11884	-39.33	-13	-26.33	-72.14	-47.19	2.56	12.58	H
	15846	-33.15	-13	-20.15	-71.31	-45.11	3.06	17.18	H
	19809	-55.76	-13	-42.76	-75.88	-70.08	1.93	18.40	H
	23767	-52.00	-13	-39.00	-77.27	-65.87	1.98	18.00	H
	27728	-51.44	-13	-38.44	-77.82	-66.29	2.29	19.29	H
									H
	7926	-44.75	-13	-31.75	-71.61	-51.74	2.05	11.19	V
	11884	-38.94	-13	-25.94	-72.22	-46.80	2.56	12.58	V
	15846	-33.01	-13	-20.01	-71.39	-44.97	3.06	17.18	V
	19809	-55.85	-13	-42.85	-75.37	-70.17	1.93	18.40	V
	23767	-51.42	-13	-38.42	-77.08	-65.29	1.98	18.00	V
	27728	-50.23	-13	-37.23	-77.94	-65.08	2.29	19.29	V
									V

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