FCC RF Test Report

APPLICANT	: Lenovo (Shanghai) Electronics Technology Co., Ltd.
EQUIPMENT	: Portable Tablet Computer
BRAND NAME	: Lenovo
MODEL NAME	: TB360ZJ
FCC ID	: O57TB360ZJ
STANDARD	: 47 CFR Part 2, 27O
CLASSIFICATION	: Licensed Non-Broadcast Station Transmitter (TNB)
TEST DATE(S)	: Mar. 28, 2023 ~ Apr. 03, 2023

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown 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 Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia

ACCREDITED Cert #5145.02

Sporton International Inc. (Kunshan)

No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG312017B	Rev. 01	Initial issue of report	May 15, 2023

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	Reporting Only	PASS	-
	§27.50(j)(3)	Equivalent Isotropic Radiated Power (5G NR n77, n78)	EIRP < 1Watt		
4.4	§2.1053 §27.53(l)(2)	Radiated Spurious Emission (5G NR n77, n78)	< $43+10\log_{10}$(P[Watts])	PASS	Under limit 42.21 dB at 7590.000 MHz

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.

1 General Description

1.1 Applicant

Lenovo (Shanghai) Electronics Technology Co., Ltd.
Section 304-305, Building No. 4, # 222, Meiyue Road, China (Shanghai) Pilot Free Trade Zone

1.2 Manufacturer

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

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Portable Tablet Computer
Brand Name	Lenovo
Model Name	TB360ZJ
FCC ID	O57TB360ZJ
IMEI Code	Conducted: 861392060006920 Radiation: 861392060006946
HW Version	TB360ZJ
SW Version	TB360ZJ_RF01_0316
EUT Stage	Identical Prototype

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency	5G NR n77: 3700 MHz ~ 3980 MHz 5G NR n78: 3700 MHz ~ 3800 MHz
Bandwidth	n77: 20MHz/40MHz/100MHz n78: 60MHz/100MHz
SCS	30kHz
Antenna Type	PIFA Antenna
Antenna Gain	**<Ant. 3>:** n77: 0.32 dBi n78: 0.32 dBi **<Ant. 4>:** n77: 0.09 dBi n78: 0.09 dBi **<Ant. 7>:** n77: 0.13 dBi n78: 0.13 dBi **<Ant. 11>:** n77: -2.11 dBi n78: -2.11 dBi
Type of Modulation	CP-OFDM: QPSK / 16QAM / 64QAM / 256QAM

	DFT-s-OFDM: PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM

Remark:

1. The device supports n77/n78(1T4R) SRS resources on Ant.3/4/7/11, only the worst test data of Antenna 3 is showed in the report.
2. 5G NR support SA (n77) mode and NSA(n77/n78) mode, and supports power class 3 only.
3. The EN-DC mode combination could be referred to the product spec.

1.5 Modification of EUT

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

1.6 Re-use of Measured Data

1.6.1 Introduction Section

This application re-uses data collected on a similar device. The subject device of this application (Model: TB360ZJ, FCC ID: O57TB360ZJ) is electrically identical to the reference device (Model: TB360ZU, FCC ID: O57TB360ZU) for the portions of the circuitry corresponding to the data being re-used. Based on their similarity, the 47 CFR Part 2, 27O (equipment class: TNB) reuse the original model's result and do spot-check, following the FCC KDB 484596 D01 v01.

The applicant takes full responsibility that the test data as referenced in this report represent compliance for this FCC ID: O57TB360ZJ.

1.6.2 Model Difference Information

The **main** difference between FCC ID: O57TB360ZU and FCC ID: O57TB360ZJ is as below:

- Remove GSM850/1900, WCDMA Band II/IV, LTE B2/4/7/12/13/25/38/66, 5G NR n5/7/38/41/66/71, 5G NR n78 SA mode.
- Add n77 NSA mode; LTE B41 support HPUE mode;

Other differences and all the details of similarity and difference can be found in the confidential documents (TB360ZJ_Operational Description of Product Equality Declaration).

1.6.3 Reference detail Section:

Rule Part	Equipment Class	Frequency Band (MHz)	Reference FCC ID (Parent)	Reference Title	Report Title/Section
27O	TNB (NR)	n77/n78	O57TB360ZU	FG311926H	All sections applicable for n77 SA mode except Power

1.6.4 Spot Check Verification Data Section

Conducted power test and radiated spurious emission test against the variant model based on the worst-case condition from the original model was performed in this filing to demonstrate the test data from original model remains representative for the variant model

Summary for power and RSE spot check for each rule entry and technology is listed as below:

Test Item	Mode	O57TB360ZU Parent Worst Result	O57TB360ZJ Variant Check Result	Difference (dB)
Conducted Power (dBm)	27O n77	26.10	24.92	-1.18
Radiated Spurious Emission (dBm)	27O N77 BW=100M	-45.31	-44.95	0.36

Conclusion:
Conducted Power and Radiated spurious emission test against the variant model based on the worst-case condition from the original model was performed in this filing to demonstrate the test data from original model remains representative for the variant model.

Based on the spot check test result, the test data from the original model is representative for the variant model. The power level and RSE spot check are shown within expected level compliant to limit line.

We confirm that the test data reuse policy of FCC KDB 484596 D01 Referencing Test Data v01 has been followed and the test data as referenced from the parent model report represents compliance with new FCC ID.

1.7 Maximum EIRP and Emission Designator

5G NRn77		PI/2 BPSK / QPSK	16QAM / 64QAM / 256QAM
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Maximum EIRP(W)
100	3750.00 ~ 3930.00	0.3342	0.2742

ENDC B41A_n78		PI/2 BPSK / QPSK	16QAM / 64QAM / 256QAM
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Maximum EIRP(W)
100	3750.00	0.3048	0.2495

Note:

1. According to the maximum power between 5G NR n77 and 5G NR n78, 5G NR n77 covers 5G NR n78 mode for all test items.
2. All modulations have been tested, and only the worst test results of PSK & QAM are shown in the report.

1.8 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH04-KS TH01-KS	CN1257	314309

1.9 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH04-KS	AUDIX	E3	6.2009-8-24al

1.10 Applicable Standards

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

- 47 CFR Part 2, 27O
- ANSI C63.26-2015
- FCC KDB 971168 D01 Power Meas License Digital Systems v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

All test items were verified and recorded according to the standards and without any deviation during the test.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

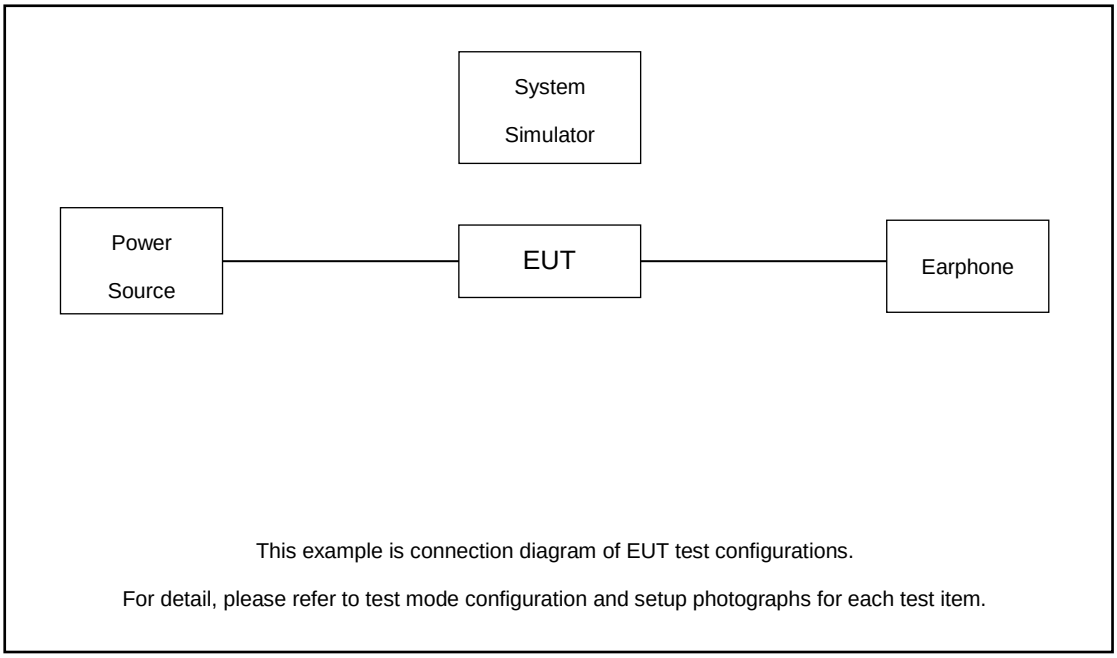
Antenna port conducted and radiated test items are performed according to KDB 971168 D01 Power Meas License Digital Systems v03r01 with maximum output power.

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

The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission

Test Items	5G NR	Bandwidth (MHz)									Modulation					RB #		Test Channel		
		20	30	40	50	60	70	80	90	100	PI/2 BPSK	QPSK	16QAM	64QAM	256 QAM	1	Full	L	M	H
Max. Output Power	n77	v	-	v		-	-	-	-	v	v	v	v	v	v	v	v	v	v	v
	n78	-	-	-	-	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	v
	n78	-	-	-	-	v	-	-	-	v	v	v	v	v	v	v	v	v	v	v
Radiated Spurious Emission	n77	Worst Case																	v	
Note	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 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. 4. Based on engineering evaluation, only the worst modulations test results are shown in the report. 5. Frequency Stability：Normal Voltage = 3.86V；Low Voltage =3.60V.；High Voltage =4.43V																			

2.2 Connection Diagram of Test System



The EUT has been configuration operated in a manner tended to maximize its emission

characteristics in a typical application.

2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	DC Power Supply	GW	GPS-3030D	N/A	N/A	Unshielded, 1.8 m
2.	LTE Base Station	Anritsu	MT8820/8821	N/A	N/A	Unshielded, 1.8 m
3.	NR Base Station	Anritsu	MT8000A	N/A	N/A	Unshielded, 1.8 m
4.	Earphone	N/A	N/A	N/A	N/A	N/A

2.4 Frequency List of Low/Middle/High Channels

5G n77 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
100	Channel	650000	656000	662000
	Frequency	3750	3840	3930
40	Channel	648000	656000	664000
	Frequency	3720	3840	3960
20	Channel	647334	656000	664666
	Frequency	3710.01	3840	3969.99

5G n78 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
100	Channel		650000	
	Frequency		3750	
60	Channel	648668	650000	651332
	Frequency	3730.02	3750	3769.98

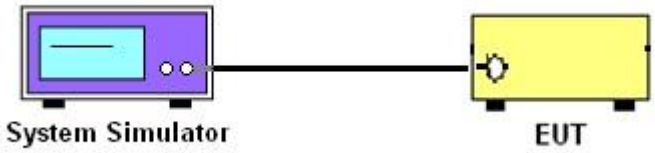
3 Conducted Test Items

3.1 Measuring Instruments

See list of measuring instruments of this test report.

3.2 Test Setup

3.2.1 Conducted Output Power



3.3 Test Result of Conducted Test

Please refer to Appendix A.

3.4 Conducted Output Power and EIRP

3.4.1 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, 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

3.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2
2. The transmitter output port was connected to the system simulator.
3. Set EUT at maximum power through the system simulator.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure and record the power level from the system simulator.

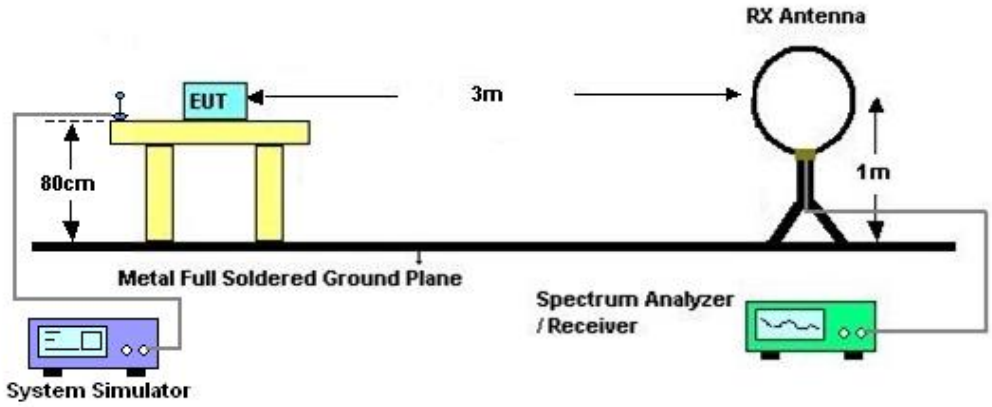
4 Radiated Test Items

4.1 Measuring Instruments

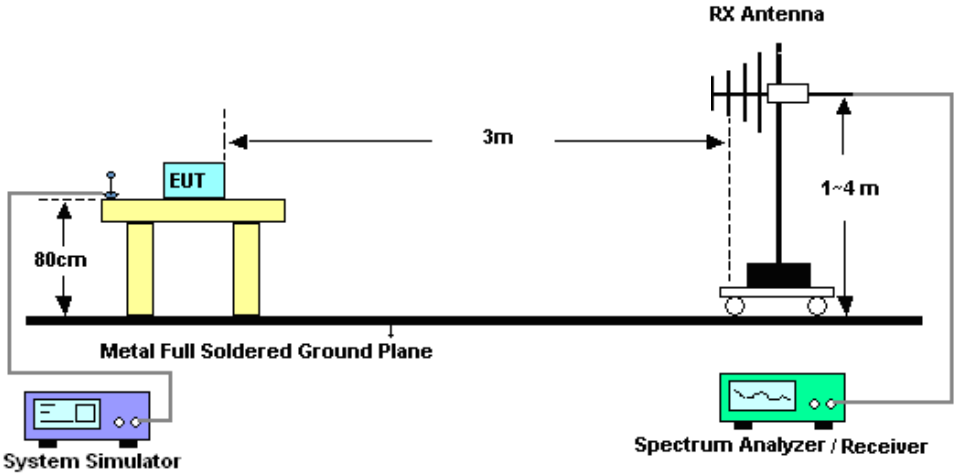
See list of measuring instruments of this test report.

4.2 Test Setup

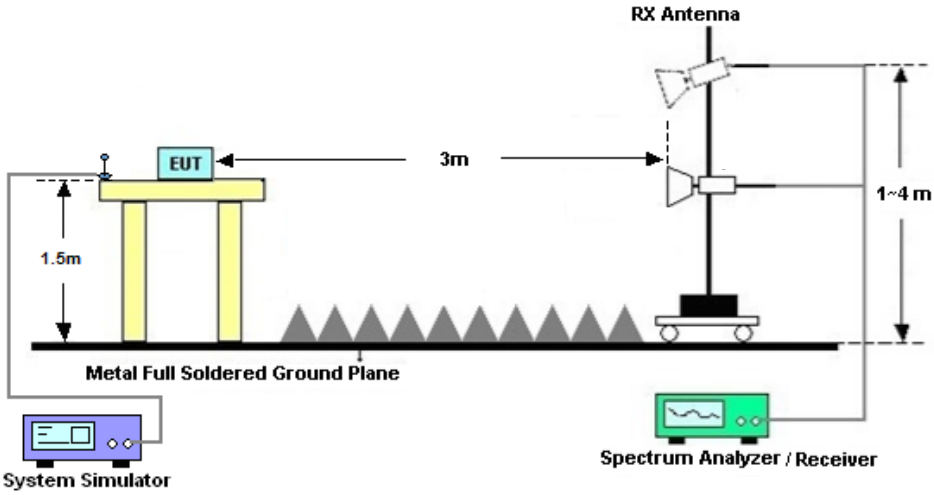
4.2.1 For radiated test below 30MHz



4.2.2 For radiated test from 30MHz to 1GHz



4.2.3 For radiated test above 1GHz



4.3 Test Result of Radiated Test

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.

Please refer to Appendix B.

4.4 Radiated Spurious Emission

4.4.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI C63.26. 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.

4.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.5
2. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
6. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
7. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
8. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
9. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
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.
    The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 12, 2022	Apr. 03, 2023	Oct. 11, 2023	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	NCR	Apr. 03, 2023	NCR	Conducted (TH01-KS)
Temperature &humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 15, 2022	Apr. 03, 2023	Jul. 14, 2023	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010B	MY57471079	10Hz-44G,MAX 30dB	Oct. 12, 2022	Mar. 28, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 16, 2022	Mar. 28, 2023	Oct. 15, 2023	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	May 24, 2022	Mar. 28, 2023	May 23, 2023	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1284	1GHz~18GHz	Jan. 04, 2023	Mar. 28, 2023	Jan. 03, 2024	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 04, 2023	Mar. 28, 2023	Jan. 03, 2024	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Jan. 04, 2023	Mar. 28, 2023	Jan. 03, 2024	Radiation (03CH04-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 04, 2023	Mar. 28, 2023	Jan. 03, 2024	Radiation (03CH04-KS)
high gain Amplifier	EM	EM01G18GA	060840	1Ghz-18Ghz	Oct. 12, 2022	Mar. 28, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
Amplifier	Agilent	8449B	3008A02370	1Ghz-18Ghz	Oct. 12, 2022	Mar. 28, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Mar. 28, 2023	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Mar. 28, 2023	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Mar. 28, 2023	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required

6 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Measurement

Test Item	Uncertainty
Conducted Power	±0.46 dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.3dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.8dB

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.8dB

---------- THE END ----------

Appendix A. Test Results of Conducted Test

Test Engineer :	Simle Wang	**Temperature :**	22~23℃
		Relative Humidity :	40~42%

FR1 n77(Ant3)

Transmitter Conducted Output Power And EIRP, (G_T-L_C)=0.32dB

NR Band	SCS	BandWidth	Arfcn	Freq(MHz)	Modulation	RB	Conducted Power(dBm)	EIRP(dBm)	EIRP(W)
77	30	20	647334	3710.01	DFT-s-OFDM PI/2 BPSK	1@1	24.6	24.92	0.3105
77	30	20	647334	3710.01	DFT-s-OFDM QPSK	1@1	24.67	24.99	0.3155
77	30	20	647334	3710.01	DFT-s-OFDM 16 QAM	1@1	23.72	24.04	0.2535
77	30	20	656000	3840	DFT-s-OFDM PI/2 BPSK	1@1	24.82	25.14	0.3266
77	30	20	656000	3840	DFT-s-OFDM QPSK	1@1	24.76	25.08	0.3221
77	30	20	656000	3840	DFT-s-OFDM 16 QAM	1@1	24.37	24.69	0.2944
77	30	20	664666	3969.99	DFT-s-OFDM PI/2 BPSK	1@1	24.45	24.77	0.2999
77	30	20	664666	3969.99	DFT-s-OFDM QPSK	1@1	24.54	24.86	0.3062
77	30	20	664666	3969.99	DFT-s-OFDM 16 QAM	1@1	23.66	23.98	0.2500
77	30	40	648000	3720	DFT-s-OFDM PI/2 BPSK	1@1	24.77	25.09	0.3228
77	30	40	648000	3720	DFT-s-OFDM QPSK	1@1	24.76	25.08	0.3221
77	30	40	648000	3720	DFT-s-OFDM 16 QAM	1@1	23.88	24.2	0.2630
77	30	40	656000	3840	DFT-s-OFDM PI/2 BPSK	1@1	24.86	25.18	0.3296
77	30	40	656000	3840	DFT-s-OFDM QPSK	1@1	24.88	25.2	0.3311
77	30	40	656000	3840	DFT-s-OFDM 16 QAM	1@1	24.33	24.65	0.2917
77	30	40	664000	3960	DFT-s-OFDM PI/2 BPSK	1@1	24.77	25.09	0.3228
77	30	40	664000	3960	DFT-s-OFDM QPSK	1@1	24.84	25.16	0.3281
77	30	40	664000	3960	DFT-s-OFDM 16 QAM	1@1	23.94	24.26	0.2667
77	30	100	650000	3750	DFT-s-OFDM PI/2 BPSK	135@67	24.43	24.75	0.2985
77	30	100	650000	3750	DFT-s-OFDM PI/2 BPSK	1@1	24.89	25.21	0.3319
77	30	100	650000	3750	DFT-s-OFDM PI/2 BPSK	1@271	24.13	24.45	0.2786
77	30	100	650000	3750	DFT-s-OFDM QPSK	135@67	24.36	24.68	0.2938
77	30	100	650000	3750	DFT-s-OFDM QPSK	1@1	24.25	24.57	0.2864
77	30	100	650000	3750	DFT-s-OFDM QPSK	1@271	24.15	24.47	0.2799
77	30	100	650000	3750	DFT-s-OFDM 16 QAM	135@67	23.31	23.63	0.2307
77	30	100	650000	3750	DFT-s-OFDM 16 QAM	1@1	23.43	23.75	0.2371
77	30	100	650000	3750	DFT-s-OFDM 16 QAM	1@271	23.25	23.57	0.2275
77	30	100	650000	3750	DFT-s-OFDM 64 QAM	135@67	21.86	22.18	0.1652
77	30	100	650000	3750	DFT-s-OFDM 64 QAM	1@1	21.66	21.98	0.1578
77	30	100	650000	3750	DFT-s-OFDM 64 QAM	1@271	21.62	21.94	0.1563
77	30	100	650000	3750	DFT-s-OFDM 256 QAM	135@67	19.83	20.15	0.1035
77	30	100	650000	3750	DFT-s-OFDM 256 QAM	1@1	19.62	19.94	0.0986
77	30	100	650000	3750	DFT-s-OFDM 256 QAM	1@271	19.54	19.86	0.0968
77	30	100	650000	3750	CP-OFDM QPSK	137@68	22.82	23.14	0.2061
77	30	100	650000	3750	CP-OFDM QPSK	1@1	22.65	22.97	0.1982
77	30	100	650000	3750	CP-OFDM QPSK	1@271	22.69	23.01	0.2000
77	30	100	650000	3750	CP-OFDM 16 QAM	137@68	22.31	22.63	0.1832
77	30	100	650000	3750	CP-OFDM 16 QAM	1@1	22.37	22.69	0.1858

77	30	100	656000	3840	DFT-s-OFDM PI/2 BPSK	135@67	24.87	25.19	0.3304
77	30	100	656000	3840	DFT-s-OFDM PI/2 BPSK	1@1	24.92	25.24	0.3342
77	30	100	656000	3840	DFT-s-OFDM PI/2 BPSK	1@271	24.44	24.76	0.2992
77	30	100	656000	3840	DFT-s-OFDM QPSK	135@67	24.79	25.11	0.3243
77	30	100	656000	3840	DFT-s-OFDM QPSK	1@1	24.89	25.21	0.3319
77	30	100	656000	3840	DFT-s-OFDM QPSK	1@271	24.49	24.81	0.3027
77	30	100	656000	3840	DFT-s-OFDM 16 QAM	135@67	24.06	24.38	0.2742
77	30	100	656000	3840	DFT-s-OFDM 16 QAM	1@1	23.52	23.84	0.2421
77	30	100	656000	3840	DFT-s-OFDM 16 QAM	1@271	23.58	23.9	0.2455
77	30	100	656000	3840	DFT-s-OFDM 64 QAM	135@67	22.54	22.86	0.1932
77	30	100	656000	3840	DFT-s-OFDM 64 QAM	1@1	21.75	22.07	0.1611
77	30	100	656000	3840	DFT-s-OFDM 64 QAM	1@271	21.89	22.21	0.1663
77	30	100	656000	3840	DFT-s-OFDM 256 QAM	135@67	20.52	20.84	0.1213
77	30	100	656000	3840	DFT-s-OFDM 256 QAM	1@1	19.66	19.98	0.0995
77	30	100	656000	3840	DFT-s-OFDM 256 QAM	1@271	19.85	20.17	0.1040
77	30	100	656000	3840	CP-OFDM QPSK	137@68	23.48	23.8	0.2399
77	30	100	656000	3840	CP-OFDM QPSK	1@1	22.86	23.18	0.2080
77	30	100	656000	3840	CP-OFDM QPSK	1@271	22.91	23.23	0.2104
77	30	100	656000	3840	CP-OFDM 16 QAM	137@68	22.93	23.25	0.2113
77	30	100	656000	3840	CP-OFDM 16 QAM	1@1	22.53	22.85	0.1928
77	30	100	662000	3930	DFT-s-OFDM PI/2 BPSK	135@67	24.71	25.03	0.3184
77	30	100	662000	3930	DFT-s-OFDM PI/2 BPSK	1@1	24.69	25.01	0.3170
77	30	100	662000	3930	DFT-s-OFDM PI/2 BPSK	1@271	24.45	24.77	0.2999
77	30	100	662000	3930	DFT-s-OFDM QPSK	135@67	24.69	25.01	0.3170
77	30	100	662000	3930	DFT-s-OFDM QPSK	1@1	24.48	24.8	0.3020
77	30	100	662000	3930	DFT-s-OFDM QPSK	1@271	24.52	24.84	0.3048
77	30	100	662000	3930	DFT-s-OFDM 16 QAM	135@67	23.69	24.01	0.2518
77	30	100	662000	3930	DFT-s-OFDM 16 QAM	1@1	23.63	23.95	0.2483
77	30	100	662000	3930	DFT-s-OFDM 16 QAM	1@271	23.53	23.85	0.2427
77	30	100	662000	3930	DFT-s-OFDM 64 QAM	135@67	22.18	22.5	0.1778
77	30	100	662000	3930	DFT-s-OFDM 64 QAM	1@1	21.86	22.18	0.1652
77	30	100	662000	3930	DFT-s-OFDM 64 QAM	1@271	21.86	22.18	0.1652
77	30	100	662000	3930	DFT-s-OFDM 256 QAM	135@67	20.19	20.51	0.1125
77	30	100	662000	3930	DFT-s-OFDM 256 QAM	1@1	19.85	20.17	0.1040
77	30	100	662000	3930	DFT-s-OFDM 256 QAM	1@271	19.8	20.12	0.1028
77	30	100	662000	3930	CP-OFDM QPSK	137@68	23.17	23.49	0.2234
77	30	100	662000	3930	CP-OFDM QPSK	1@1	22.97	23.29	0.2133
77	30	100	662000	3930	CP-OFDM QPSK	1@271	22.92	23.24	0.2109
77	30	100	662000	3930	CP-OFDM 16 QAM	137@68	22.69	23.01	0.2000
77	30	100	662000	3930	CP-OFDM 16 QAM	1@1	22.6	22.92	0.1959

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Transmitter Conducted Output Power And EIRP, (G_T-L_C)=0.32dB

NR Band	SCS	BandWidth	Arfcn	Freq(MHz)	Modulation	RB	Conducted Power(dBm)	EIRP(dBm)	EIRP(W)
77	30	20	647334	3710.01	DFT-s-OFDM PI/2 BPSK	1@1	24.59	24.91	0.3097
77	30	20	656000	3840	DFT-s-OFDM PI/2 BPSK	1@1	24.3	24.62	0.2897
77	30	20	664666	3969.99	DFT-s-OFDM PI/2 BPSK	1@1	24.5	24.82	0.3034
77	30	40	648000	3720	DFT-s-OFDM PI/2 BPSK	1@1	24.81	25.13	0.3258
77	30	40	656000	3840	DFT-s-OFDM PI/2 BPSK	1@1	24.76	25.08	0.3221
77	30	40	664000	3960	DFT-s-OFDM PI/2 BPSK	1@1	24.85	25.17	0.3289
77	30	100	650000	3750	DFT-s-OFDM PI/2 BPSK	135@67	24.36	24.68	0.2938
77	30	100	650000	3750	DFT-s-OFDM PI/2 BPSK	1@1	24.87	25.19	0.3304
77	30	100	650000	3750	DFT-s-OFDM PI/2 BPSK	1@271	24.23	24.55	0.2851
77	30	100	650000	3750	DFT-s-OFDM QPSK	135@67	24.36	24.68	0.2938
77	30	100	650000	3750	DFT-s-OFDM QPSK	1@1	24.27	24.59	0.2877
77	30	100	650000	3750	DFT-s-OFDM QPSK	1@271	24.21	24.53	0.2838
77	30	100	650000	3750	DFT-s-OFDM 16 QAM	135@67	23.38	23.7	0.2344
77	30	100	650000	3750	DFT-s-OFDM 16 QAM	1@1	23.47	23.79	0.2393
77	30	100	650000	3750	DFT-s-OFDM 16 QAM	1@271	23.41	23.73	0.2360
77	30	100	650000	3750	DFT-s-OFDM 64 QAM	135@67	21.84	22.16	0.1644
77	30	100	650000	3750	DFT-s-OFDM 64 QAM	1@1	21.92	22.24	0.1675
77	30	100	650000	3750	DFT-s-OFDM 64 QAM	1@271	21.87	22.19	0.1656
77	30	100	650000	3750	DFT-s-OFDM 256 QAM	135@67	19.85	20.17	0.1040
77	30	100	650000	3750	DFT-s-OFDM 256 QAM	1@1	19.62	19.94	0.0986
77	30	100	650000	3750	DFT-s-OFDM 256 QAM	1@271	19.41	19.73	0.0940
77	30	100	650000	3750	CP-OFDM QPSK	1@1	22.72	23.04	0.2014
77	30	100	656000	3840	DFT-s-OFDM PI/2 BPSK	135@67	24.82	25.14	0.3266
77	30	100	656000	3840	DFT-s-OFDM PI/2 BPSK	1@1	24.4	24.72	0.2965
77	30	100	656000	3840	DFT-s-OFDM PI/2 BPSK	1@271	24.53	24.85	0.3055
77	30	100	656000	3840	DFT-s-OFDM QPSK	135@67	24.87	25.19	0.3304
77	30	100	656000	3840	DFT-s-OFDM QPSK	1@1	24.34	24.66	0.2924
77	30	100	656000	3840	DFT-s-OFDM QPSK	1@271	24.47	24.79	0.3013
77	30	100	656000	3840	DFT-s-OFDM 16 QAM	135@67	23.97	24.29	0.2685
77	30	100	656000	3840	DFT-s-OFDM 16 QAM	1@1	23.66	23.98	0.2500
77	30	100	656000	3840	DFT-s-OFDM 16 QAM	1@271	23.76	24.08	0.2559
77	30	100	656000	3840	DFT-s-OFDM 64 QAM	135@67	22.44	22.76	0.1888
77	30	100	656000	3840	DFT-s-OFDM 64 QAM	1@1	22.15	22.47	0.1766
77	30	100	656000	3840	DFT-s-OFDM 64 QAM	1@271	22.16	22.48	0.1770
77	30	100	656000	3840	DFT-s-OFDM 256 QAM	135@67	20.48	20.8	0.1202
77	30	100	656000	3840	DFT-s-OFDM 256 QAM	1@1	19.88	20.2	0.1047
77	30	100	656000	3840	DFT-s-OFDM 256 QAM	1@271	19.7	20.02	0.1005
77	30	100	656000	3840	CP-OFDM QPSK	1@1	22.8	23.12	0.2051

77	30	100	662000	3930	DFT-s-OFDM PI/2 BPSK	135@67	24.71	25.03	0.3184
77	30	100	662000	3930	DFT-s-OFDM PI/2 BPSK	1@1	24.52	24.84	0.3048
77	30	100	662000	3930	DFT-s-OFDM PI/2 BPSK	1@271	24.53	24.85	0.3055
77	30	100	662000	3930	DFT-s-OFDM QPSK	135@67	24.72	25.04	0.3192
77	30	100	662000	3930	DFT-s-OFDM QPSK	1@1	24.41	24.73	0.2972
77	30	100	662000	3930	DFT-s-OFDM QPSK	1@271	24.46	24.78	0.3006
77	30	100	662000	3930	DFT-s-OFDM 16 QAM	135@67	23.64	23.96	0.2489
77	30	100	662000	3930	DFT-s-OFDM 16 QAM	1@1	23.61	23.93	0.2472
77	30	100	662000	3930	DFT-s-OFDM 16 QAM	1@271	23.79	24.11	0.2576
77	30	100	662000	3930	DFT-s-OFDM 64 QAM	135@67	22.15	22.47	0.1766
77	30	100	662000	3930	DFT-s-OFDM 64 QAM	1@1	22.13	22.45	0.1758
77	30	100	662000	3930	DFT-s-OFDM 64 QAM	1@271	22.16	22.48	0.1770
77	30	100	662000	3930	DFT-s-OFDM 256 QAM	135@67	20.17	20.49	0.1119
77	30	100	662000	3930	DFT-s-OFDM 256 QAM	1@1	19.78	20.1	0.1023
77	30	100	662000	3930	DFT-s-OFDM 256 QAM	1@271	19.7	20.02	0.1005
77	30	100	662000	3930	CP-OFDM QPSK	1@1	22.89	23.21	0.2094

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Transmitter Conducted Output Power And EIRP, (G_T-L_C)=0.32dB

NR Band	SCS	BandWidth	Arfcn	Freq(MHz)	Modulation	RB	Conducted Power(dBm)	EIRP(dBm)	EIRP(W)
78	30	60	648668	3730.02	DFT-s-OFDM PI/2 BPSK	1@1	24.43	24.75	0.2985
78	30	60	650000	3750	DFT-s-OFDM PI/2 BPSK	1@1	24.32	24.64	0.2911
78	30	60	651332	3769.98	DFT-s-OFDM PI/2 BPSK	1@1	24.46	24.78	0.3006
78	30	100	650000	3750	DFT-s-OFDM PI/2 BPSK	135@67	24.52	24.84	0.3048
78	30	100	650000	3750	DFT-s-OFDM PI/2 BPSK	1@1	24.28	24.6	0.2884
78	30	100	650000	3750	DFT-s-OFDM PI/2 BPSK	1@271	24.42	24.74	0.2979
78	30	100	650000	3750	DFT-s-OFDM QPSK	135@67	24.48	24.8	0.3020
78	30	100	650000	3750	DFT-s-OFDM QPSK	1@1	24.23	24.55	0.2851
78	30	100	650000	3750	DFT-s-OFDM QPSK	1@271	24.4	24.72	0.2965
78	30	100	650000	3750	DFT-s-OFDM 16 QAM	135@67	23.49	23.81	0.2404
78	30	100	650000	3750	DFT-s-OFDM 16 QAM	1@1	23.41	23.73	0.2360
78	30	100	650000	3750	DFT-s-OFDM 16 QAM	1@271	23.65	23.97	0.2495
78	30	100	650000	3750	DFT-s-OFDM 64 QAM	135@67	22	22.32	0.1706
78	30	100	650000	3750	DFT-s-OFDM 64 QAM	1@1	21.86	22.18	0.1652
78	30	100	650000	3750	DFT-s-OFDM 64 QAM	1@271	22.12	22.44	0.1754
78	30	100	650000	3750	DFT-s-OFDM 256 QAM	135@67	19.98	20.3	0.1072
78	30	100	650000	3750	DFT-s-OFDM 256 QAM	1@1	19.49	19.81	0.0957
78	30	100	650000	3750	DFT-s-OFDM 256 QAM	1@271	19.7	20.02	0.1005
78	30	100	650000	3750	CP-OFDM QPSK	1@1	22.67	22.99	0.1991

Appendix B. Test Results of Radiated Test

Radiated Spurious Emission

Test Engineer :	Carry Xu	Temperature :	23~25℃
		Relative Humidity :	41~42%

Pre-scanned harmonic for the different antenna combinations, we choose the worst antenna mode to perform final test and record in the report.

EN-DC_41A_n77A / LTE 10MHz + NR 100MHz / QPSK / ANT2 (LTE) & ANT3(NR)								
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	7590	-57.90	-13	-44.90	-68.11	3.03	13.24	H
	11388	-59.76	-13	-46.76	-69.21	3.56	13.01	H
	15180	-58.17	-13	-45.17	-67.69	3.92	13.44	H
	7590	-55.21	-13	-42.21	-65.42	3.03	13.24	V
	11388	-59.31	-13	-46.31	-68.76	3.56	13.01	V
	15180	-57.73	-13	-44.73	-67.25	3.92	13.44	V

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

Appendix D. Reference Report

Please refer to Sporton report number FG311926H which is issued separately.