FCC RADIO TEST REPORT

FCC ID	:	**2AJN7-TP00128B**
Equipment	:	**Notebook Computer**
Brand Name	:	**Lenovo**
Model Name		**TP00128B**
Applicant	:	**LC Future Center Limited Taiwan Branch** **7F., No.780, Beian Rd., Zhongshan Dist., Taipei 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, 27**

Equipment: Fibocom FM350-GL tested inside of Lenovo Notebook Computer.

The product was received on Sep. 06, 2021 and testing was performed from Oct. 07, 2021 to Jan. 08, 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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History of this test report

Report No.	Version	Description	Issued Date
FG190605I	01	Initial issue of report	Jan. 25, 2022

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) (n78)	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) (n78)	-	See Note
-	§2.1051 §27.53 (l)(2)	Conducted Spurious Emission (n77) (n78)	-	See Note
-	§2.1055 §27.54	Frequency Stability Temperature & Voltage	-	See Note
4.2	§2.1051 §27.53 (l)(2)	Radiated Spurious Emission (n77) (n78)	Pass	Under limit 19.38 dB at 15164.000 MHz

Note:

1. The certified module (model: FM350-GL) which supports normal mode and TX switching mode being integrated into a notebook computer. Spot check on both modes were performed and no degradation occur. Thus the module test results were leveraged in this report and additionally reporting the spot check results in this report.
2. In normal mode, Conducted power was verified to be consistent with the original modular approval, so the output power level in the original modular grant is referenced in this report for determining EIRP of this host product, and verified the TX switching mode of Radiated Spurious Emission and Conducted power.

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: Sheng Kuo

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	TP00128B
FCC ID	2AJN7-TP00128B
Sample 1	EUT with Amphenol Antenna
Sample 2	EUT with JYT/NVC Antenna
EUT supports Radios application	WCDMA/HSPA/LTE/5G NR/GNSS
EUT Stage	Production Unit

Remark:

1. The above EUT's information was declared by manufacturer.
2. Equipment: Fibocom FM350-GL tested inside of Lenovo Notebook Computer.

	Normal mode	**TX switching mode**
	TX/RX	TX/RX
Ant_0 (Main)	WCDMA : 2/4/5 LTE : 2/4/5/7/12/13/14/17/25/26/30/38/66/71 NR : 2/5/7/25/30/38/66/71	WCDMA : 5 LTE : 5/12/13/14/17/26/41/48/71 NR : 5/41/71/77/78
Ant_2 (MIMO2)	LTE : 41/48 NR : 41/77/78	WCDMA : 2/4 LTE : 2/4/7/25/30/38/66 NR : 2/7/25/30/38/66

WWAN Antenna Information				
Main Antenna	**Manufacturer**	Amphenol	**Peak gain (dBi)**	5G NR n77 : 1.60 5G NR n78 : 1.60
	Part number	TKC114-16-000-C	**Type**	PIFA
	Manufacturer	JYT/NVC	**Peak gain (dBi)**	5G NR n77 : -3.67 5G NR n78 : -3.52
	Part number	JYAAE0154HR	**Type**	PIFA
MIMO 2 Antenna	**Manufacturer**	Amphenol	**Peak gain (dBi)**	5G NR n77 : 0.26 5G NR n78 : 0.61
	Part number	TKC113-16-000-C	**Type**	PIFA
	Manufacturer	JYT/NVC	**Peak gain (dBi)**	5G NR n77 : -4.40 5G NR n78 : -5.61
	Part number	JYAAE0155HR	**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/Rx Frequency	5G NR n77: 3705 MHz ~ 3975 MHz 5G NR n78: 3705 MHz ~ 3795 MHz
Bandwidth	SCS 15kHz: 10MHz/15MHz/20MHz SCS 30kHz: 10MHz/15MHz/20MHz/40MHz/50MHz/60MHz/80MHz/100MHz
Maximum Output Power to Antenna	5G NR n77: 26.03 dBm 5G NR n78: 26.69 dBm
Type of Modulation	CP-OFDM: QPSK/16QAM/64QAM/256QAM DFT-s-OFDM: PI/2 BPSK/QPSK/16QAM/64QAM/256QAM

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

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	Sherry Wu
Temperature	23.5~26.4℃
Relative Humidity	49.8~55.5%
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	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.

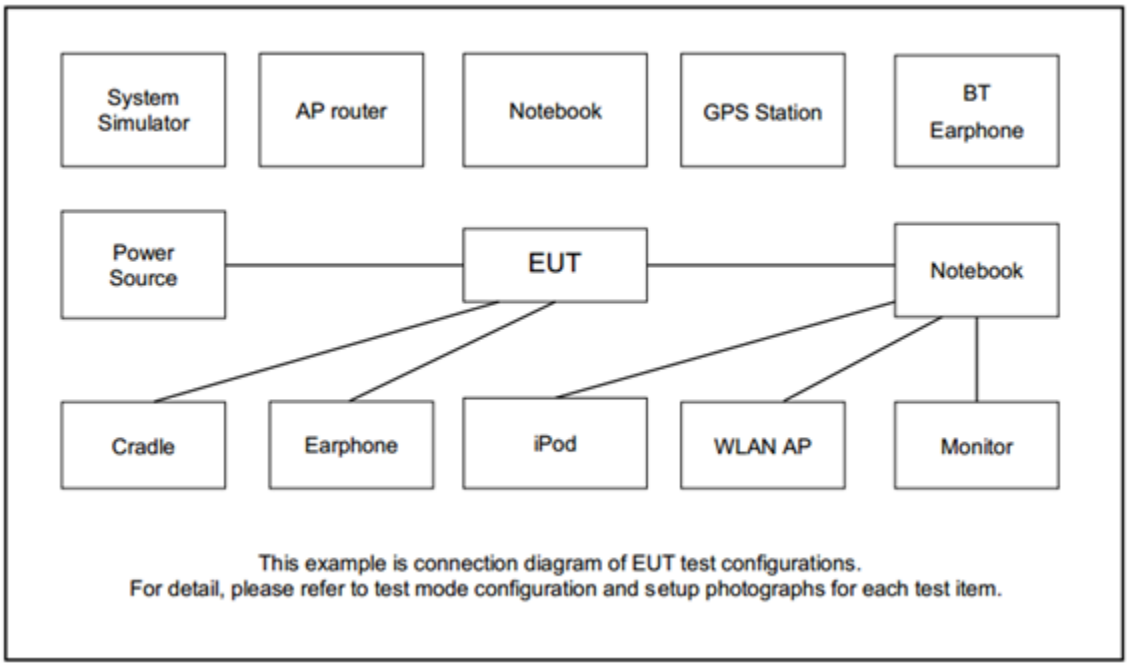
For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in Tablet Type (three orthogonal axis (X: flat, Y: portrait, Z: landscape)) and Notebook Type, adjusting the measurement antenna orientation, following C63.26 exploratory test procedures and find (**<Main Antenna>:** X plane with accessory for 5G NR n78 MIMO (HPUE), Y plane with accessory for 5G NR n77 MIMO (HPUE); **<MIMO 1 Antenna>:** Y plane with accessory for 5G NR n78 MIMO (HPUE), EUT with accessory for 5G NR n77 MIMO (HPUE); **<MIMO 2 Antenna>:** EUT with accessory for 5G NR n77 MIMO (HPUE), n78 MIMO (HPUE); **<Main Antenna + MIMO 2 Antenna>:** X plane with accessory for ENDC 2A-n78A, Y plane with accessory for 5G NR n78 MIMO (HPUE), Z plane with accessory for ENDC 2A-n77A, EUT with accessory for 5G NR n77 MIMO (HPUE); **<Aux. Antenna>:** X plane with accessory for 5G NR n77 MIMO (HPUE), n78 MIMO (HPUE)) as worst plane.

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	v
	n78	-	v	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	v	Max. Power					
	n78	-	v	v	v	-	-	v	v	v	v	-	v	v	v	v	v	v						
Radiated Spurious Emission	n77	-				-	-					-	v	v					v			v	v	v
	n78	-				-	-					-	v	v					v				v	

Remark

1. The mark "**v** " means that this configuration is chosen for testing
2. The mark "-" means that this bandwidth is not supported.
3. The device is investigated from 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. Test combination are EN-DC 2A_n77A and EN-DC 2A_n78A.
5. All the radiated test cases were performed with Sample 1.
6. 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.

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.	System Simulator	Anritsu	MT8000A	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 for SCS 15kHz				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	647334	656000	664666
	Frequency	3710.01	3840	3969.99
15	Channel	647168	656000	664832
	Frequency	3707.52	3840	3972.48
10	Channel	647000	656000	665000
	Frequency	3705	3840	3975

5G NR Band n77 Channel and Frequency List for SCS 30kHz				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
100	Channel	650000	656000	662000
	Frequency	3750	3840	3930
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
15	Channel	647168	656000	664832
	Frequency	3707.52	3840	3972.48
10	Channel	647000	656000	665000
	Frequency	3705	3840	3975

5G NR n78 Channel and Frequency List for SCS 15kHz				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	647334	650000	652666
	Frequency	3710.01	3750	3789.99
15	Channel	647168	650000	664832
	Frequency	3707.52	3750	3972.48
10	Channel	647000	650000	653000
	Frequency	3705	3750	3795

5G NR n78 Channel and Frequency List for SCS 30kHz				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
100	Channel	-	650000	-
	Frequency	-	3750	-
80	Channel	649334	650000	650666
	Frequency	3740.01	3750	3759.99
60	Channel	648668	650000	651332
	Frequency	3730.02	3750	3769.98
50	Channel	648334	650000	651666
	Frequency	3725.01	3750	3774.99
40	Channel	648000	650000	652000
	Frequency	3720	3750	3780
20	Channel	647334	650000	652666
	Frequency	3710.01	3750	3789.99
15	Channel	647168	650000	664832
	Frequency	3707.52	3750	3972.48
10	Channel	647000	650000	653000
	Frequency	3705	3750	3795

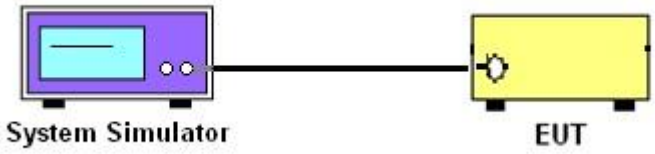
3 Conducted Test Items

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.

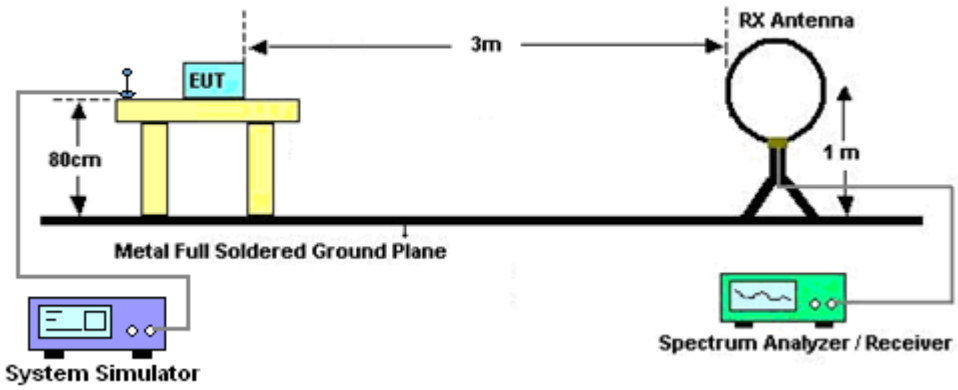
4 Radiated Test Items

4.1 Measuring Instruments

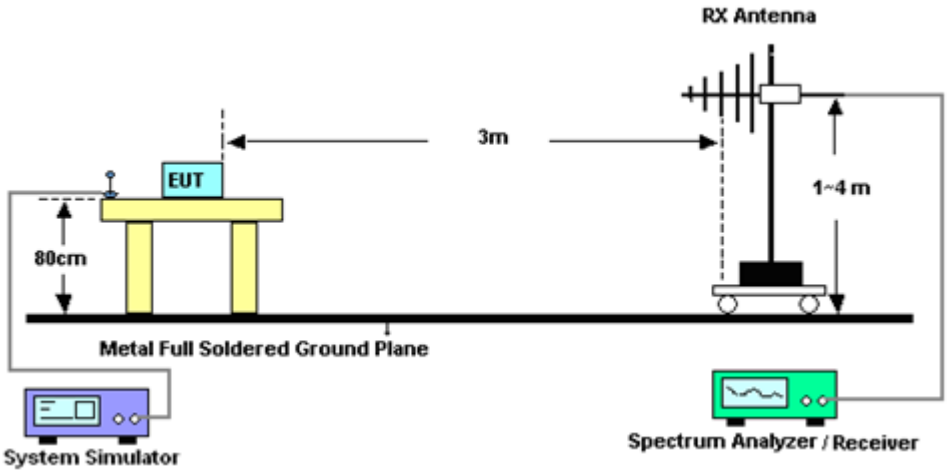
See list of measuring instruments of this test report.

4.1.1 Test Setup

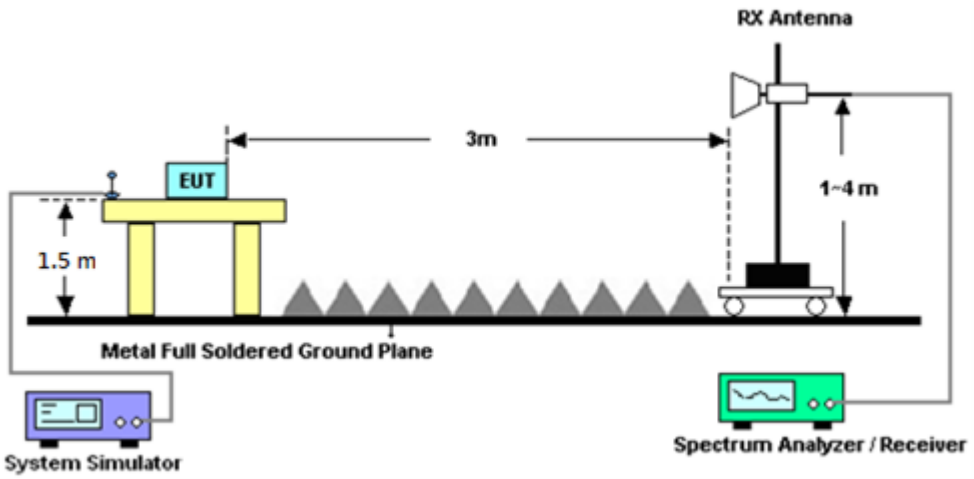
For radiated emissions below 30MHz



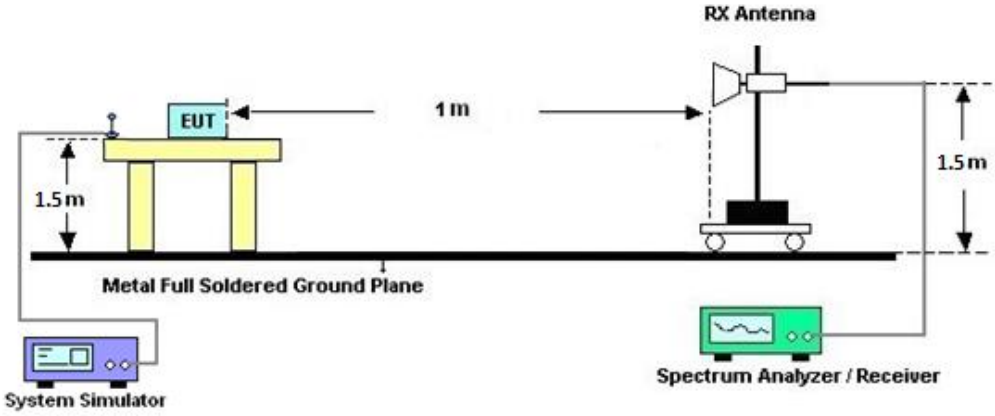
For radiated test from 30MHz to 1GHz



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
Base Station (Measure)	Anritsu	MT8821C	6261849015	LTE	Oct. 06, 2021	Oct. 07, 2021~ Jan. 05, 2022	Oct. 05, 2022	Conducted (TH03-HY)
Base Station (Measure)	Anritsu	MT8000A	6262012917	FR1	Jan. 07, 2021	Oct. 07, 2021~ Jan. 05, 2022	Jan. 06, 2022	Conducted (TH03-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Jan. 04, 2021	Oct. 14, 2021~ Nov. 13, 2021	Jan. 03, 2022	Radiation (03CH12-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Sep. 07, 2021	Dec. 28, 2021~ Jan. 08, 2022	Sep. 06, 2022	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CCBL 6111D & 00800N1D01N -06	41912 & 05	30MHz~1GHz	Feb. 08, 2021	Oct. 14, 2021~ Jan. 08, 2022	Feb. 07, 2022	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CCBL 6111D & 00800N1D01N -06	40103 & 07	30MHz~1GHz	Apr. 28, 2021	Oct. 14, 2021~ Jan. 08, 2022	Apr. 27, 2022	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1328	1GHz~18GHz	Nov. 23, 2020	Oct. 14, 2021~ Nov. 13, 2021	Nov. 22, 2021	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1328	1GHz~18GHz	Dec. 03, 2021	Dec. 28, 2021~ Jan. 08, 2022	Dec. 02, 2022	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1212	1GHz~18GHz	May 18, 2021	Oct. 14, 2021~ Jan. 08, 2022	May 17, 2022	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	00993	18GHz~40GHz	Nov. 19, 2020	Oct. 14, 2021~ Nov. 13, 2021	Nov. 18, 2021	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	00993	18GHz~40GHz	Nov. 30, 2021	Dec. 28, 2021~ Jan. 08, 2022	Nov. 29, 2022	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170576	18GHz~40GHz	May 21, 2021	Oct. 14, 2021~ Jan. 08, 2022	May 20, 2022	Radiation (03CH12-HY)
Preamplifier	COM-POWER	PA-103	161075	10MHz~1GHz	Mar. 24, 2021	Oct. 14, 2021~ Jan. 08, 2022	Mar. 23, 2022	Radiation (03CH12-HY)
Preamplifier	Agilent	8449B	3008A02375	1GHz~26.5GHz	May 25, 2021	Oct. 14, 2021~ Jan. 08, 2022	May 24, 2022	Radiation (03CH12-HY)
Preamplifier	JPA0118-55-303K	JPA0118-55-303K	1710001800054002	1GHz-18GHz	Jun. 16, 2021	Oct. 14, 2021~ Nov. 13, 2021	Jun. 15, 2022	Radiation (03CH12-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz~40GHz	Dec. 11, 2020	Oct. 14, 2021~ Nov. 13, 2021	Dec. 10, 2021	Radiation (03CH12-HY)
Preamplifier	E-INSTRUMENT TECH LTD.	ERA-100M-18G-56-01-A70	EC1900249	1GHz-18GHz	Dec. 22, 2021	Dec. 28, 2021~ Jan. 08, 2022	Dec. 21, 2022	Radiation (03CH12-HY)
Preamplifier	EMEC	EM18G40G	060801	18GHz~40GHz	Jun. 22, 2021	Dec. 28, 2021~ Jan. 08, 2022	Jun. 21, 2022	Radiation (03CH12-HY)
Spectrum Analyzer	Agilent	N9010A	MY53470118	10Hz~44GHz	Jan. 15, 2021	Oct. 14, 2021~ Jan. 08, 2022	Jan. 14, 2022	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9kHz~30MHz	Mar. 11, 2021	Oct. 14, 2021~ Jan. 08, 2022	Mar. 10, 2022	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0058/126E	30MHz~18GHz	Dec. 11, 2020	Oct. 14, 2021~ Nov. 13, 2021	Dec. 10, 2021	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0058/126E	30MHz~18GHz	Dec. 10, 2021	Dec. 28, 2021~ Jan. 08, 2022	Dec. 09, 2022	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30MHz~40GHz	Feb. 22, 2021	Oct. 14, 2021~ Jan. 08, 2022	Feb. 21, 2022	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30MHz~40GHz	Feb. 22, 2021	Oct. 14, 2021~ Jan. 08, 2022	Feb. 21, 2022	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	Oct. 14, 2021~ Jan. 08, 2022	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Oct. 14, 2021~ Jan. 08, 2022	N/A	Radiation (03CH12-HY)
Software	Audix	E3 6.2009-8-24	RK-000989	N/A	N/A	Oct. 14, 2021~ Jan. 08, 2022	N/A	Radiation (03CH12-HY)
Filter	Wainwright	WLKS1200-12 SS	SN2	1.2GHz Low Pass Filter	Mar. 17, 2021	Oct. 14, 2021~ Jan. 08, 2022	Mar. 16, 2022	Radiation (03CH12-HY)
Filter	Wainwright	WHKX12-2700 -3000-18000-6 0ST	SN2	3GHz High Pass Filter	Jul. 12, 2021	Oct. 14, 2021~ Jan. 08, 2022	Jul. 11, 2022	Radiation (03CH12-HY)
Filter	Wainwright	WHKX8-5872. 5-6750-18000- 40ST	SN2	6.75GHz High Pass Filter	Mar. 17, 2021	Oct. 14, 2021~ Jan. 08, 2022	Mar. 16, 2022	Radiation (03CH12-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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.39 dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.34 dB

Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power) and EIRP

<MIMO2 Antenna>

<SCS 15K>

NR n77 (HPUE) Maximum Average Power [dBm] (GT - LC = 0.26 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
10	1	1	PI/2 BPSK	25.42	25.41	25.45	25.97	0.3954
10	1	50		25.53	25.62	25.54		
10	25	12		25.51	25.53	25.62		
10	1	1	QPSK	25.21	25.54	25.71		
10	1	50		25.35	25.64	25.64		
10	25	12		25.38	25.58	25.59		
10	1	1	16-QAM	24.45	24.71	24.85	25.11	0.3243
10	1	1	64-QAM	23.08	23.08	23.13		
10	1	1	256-QAM	20.81	21.41	21.18		
Limit	EIRP < 1W			Result			Pass	

NR n77 (HPUE) Maximum Average Power [dBm] (GT - LC = 0.26 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
15	1	1	PI/2 BPSK	25.01	25.55	25.66	26.22	0.4188
15	1	77		25.22	25.71	25.75		
15	36	18		25.18	25.74	25.81		
15	1	1	QPSK	25.12	25.46	25.92		
15	1	77		25.32	25.61	25.96		
15	36	18		25.19	25.79	25.83		
15	1	1	16-QAM	24.36	24.69	25.28	25.54	0.3581
15	1	1	64-QAM	22.65	23.16	23.38		
15	1	1	256-QAM	20.45	21.23	21.66		
Limit	EIRP < 1W			Result			Pass	

NR n77 (HPUE) Maximum Average Power [dBm] (GT - LC = 0.26 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
20	1	1	PI/2 BPSK	25.03	25.45	25.58	26.20	0.4169
20	1	104		25.26	25.48	25.64		
20	50	25		25.20	25.62	25.84		
20	1	1	QPSK	25.14	24.55	25.68		
20	1	104		25.42	25.68	25.84		
20	50	25		25.23	25.71	25.94		
20	1	1	16-QAM	23.97	24.55	24.76	25.02	0.3177
20	1	1	64-QAM	22.46	23.23	23.19		
20	1	1	256-QAM	20.49	21.22	21.11		
Limit	EIRP < 1W			Result			Pass	

NR n78 (HPUE) Maximum Average Power [dBm] (GT - LC = 0.61 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
10	1	1	PI/2 BPSK	26.17	26.15	26.19	26.92	0.492
10	1	50		26.26	26.21	26.27		
10	25	12		26.24	26.08	26.31		
10	1	1	QPSK	26.24	26.17	26.16		
10	1	50		26.23	26.23	26.24		
10	25	12		26.21	26.16	26.27		
10	1	1	16-QAM	25.22	25.20	25.66	26.27	0.4236
10	1	1	64-QAM	24.01	23.91	24.54		
10	1	1	256-QAM	21.47	21.27	21.53		
Limit	EIRP < 1W			Result			Pass	

NR n78 (HPUE) Maximum Average Power [dBm] (GT - LC = 0.61 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
15	1	1	PI/2 BPSK	26.05	26.24	26.36	27.13	0.5164
15	1	77		26.23	26.29	26.47		
15	36	18		26.21	26.33	26.49		
15	1	1	QPSK	26.02	26.21	26.31		
15	1	77		26.19	26.26	26.45		
15	36	18		26.17	26.29	26.52		
15	1	1	16-QAM	24.61	25.52	25.41	26.13	0.4102
15	1	1	64-QAM	24.29	24.01	24.35		
15	1	1	256-QAM	21.66	21.44	21.71		
Limit	EIRP < 1W			Result			Pass	

NR n78 (HPUE) Maximum Average Power [dBm] (GT - LC = 0.61 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
20	1	1	PI/2 BPSK	25.96	26.21	26.24	27.10	0.5129
20	1	104		26.10	26.25	26.36		
20	50	25		26.21	26.28	26.49		
20	1	1	QPSK	25.99	26.18	26.27		
20	1	104		26.07	26.21	26.31		
20	50	25		26.18	26.26	26.46		
20	1	1	16-QAM	25.41	25.45	25.52	26.13	0.4102
20	1	1	64-QAM	23.87	23.98	24.61		
20	1	1	256-QAM	21.62	21.31	21.59		
Limit	EIRP < 1W			Result			Pass	

<SCS 30K>

NR n77 (HPUE) Maximum Average Power [dBm] (GT - LC = 0.26 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
10	1	1	PI/2 BPSK	25.04	25.68	25.71	26.22	0.4188
10	1	22		25.11	25.72	25.67		
10	12	6		25.19	25.79	25.96		
10	1	1	QPSK	25.09	25.72	25.76		
10	1	22		25.12	25.68	25.78		
10	12	6		25.21	25.77	25.91		
10	1	1	16-QAM	24.14	24.78	24.67	25.04	0.3192
10	1	1	64-QAM	22.74	23.33	23.41		
10	1	1	256-QAM	20.56	21.17	21.18		
Limit	EIRP < 1W			Result			Pass	

NR n77 (HPUE) Maximum Average Power [dBm] (GT - LC = 0.26 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
15	1	1	PI/2 BPSK	25.05	25.64	25.77	26.19	0.4159
15	1	36		25.17	25.68	25.71		
15	18	9		25.29	25.81	25.93		
15	1	1	QPSK	25.09	25.72	25.79		
15	1	36		25.18	25.69	25.78		
15	18	9		25.27	25.81	25.84		
15	1	1	16-QAM	24.21	24.78	24.68	25.04	0.3192
15	1	1	64-QAM	22.65	23.41	23.44		
15	1	1	256-QAM	20.57	21.22	21.19		
Limit	EIRP < 1W			Result			Pass	

NR n77 (HPUE) Maximum Average Power [dBm] (GT - LC = 0.26 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
20	1	1	PI/2 BPSK	25.06	25.52	25.71	26.28	0.4246
20	1	49		25.14	25.55	25.71		
20	25	12		25.28	25.75	26.02		
20	1	1	QPSK	25.06	25.63	25.79		
20	1	49		25.14	25.61	25.74		
20	25	12		25.31	25.84	25.88		
20	1	1	16-QAM	24.05	24.81	24.61	25.07	0.3214
20	1	1	64-QAM	22.69	23.31	23.44		
20	1	1	256-QAM	20.61	21.29	21.11		
Limit	EIRP < 1W			Result			Pass	

NR n77 (HPUE) Maximum Average Power [dBm] (GT - LC = 0.26 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
40	1	1	PI/2 BPSK	24.72	25.23	25.31	26.14	0.4111
40	1	104		25.03	25.33	25.47		
40	50	25		25.31	25.76	25.88		
40	1	1	QPSK	24.73	25.26	25.45		
40	1	104		25.11	25.41	25.51		
40	50	25		25.27	25.83	25.84		
40	1	1	16-QAM	24.05	24.77	24.62	25.03	0.3184
40	1	1	64-QAM	22.71	23.30	23.42		
40	1	1	256-QAM	20.54	21.22	21.27		
Limit	EIRP < 1W			Result			Pass	

NR n77 (HPUE) Maximum Average Power [dBm] (GT - LC = 0.26 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
50	1	1	PI/2 BPSK	24.88	25.52	25.51	26.27	0.4236
50	1	131		25.31	25.65	25.58		
50	64	32		25.28	25.81	26.01		
50	1	1	QPSK	24.89	25.59	25.71		
50	1	131		25.41	25.66	25.83		
50	64	32		25.42	25.82	25.92		
50	1	1	16-QAM	24.13	24.80	24.61	25.06	0.3206
50	1	1	64-QAM	22.69	23.30	23.33		
50	1	1	256-QAM	20.51	21.13	21.23		
Limit	EIRP < 1W			Result			Pass	

NR n77 (HPUE) Maximum Average Power [dBm] (GT - LC = 0.26 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
60	1	1	PI/2 BPSK	24.45	25.47	25.64	26.29	0.4256
60	1	160		24.95	25.75	25.82		
60	81	40		25.26	25.82	25.93		
60	1	1	QPSK	24.56	25.58	25.56		
60	1	160		25.03	25.78	25.87		
60	81	40		25.16	25.79	26.03		
60	1	1	16-QAM	24.22	24.73	24.61	24.99	0.3155
60	1	1	64-QAM	22.71	23.30	23.47		
60	1	1	256-QAM	20.52	21.12	21.16		
Limit	EIRP < 1W			Result			Pass	

NR n77 (HPUE) Maximum Average Power [dBm] (GT - LC = 0.26 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
80	1	1	PI/2 BPSK	24.39	24.89	25.05	25.97	0.3954
80	1	215		24.97	25.19	25.21		
80	108	54		25.27	25.62	25.65		
80	1	1	QPSK	24.17	24.94	25.08		
80	1	215		25.09	25.24	25.27		
80	108	54		25.33	25.63	25.71		
80	1	1	16-QAM	24.16	24.79	24.68	25.05	0.3199
80	1	1	64-QAM	22.64	23.38	23.44		
80	1	1	256-QAM	20.79	21.15	21.26		
Limit	EIRP < 1W			Result			Pass	

NR n77 (HPUE) Maximum Average Power [dBm] (GT - LC = 0.26 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
100	1	1	PI/2 BPSK	24.06	24.53	24.68	25.83	0.3828
100	1	271		24.85	24.93	24.98		
100	135	67		25.17	25.45	25.55		
100	1	1	QPSK	24.09	24.67	24.96		
100	1	271		24.98	25.15	25.32		
100	135	67		25.19	25.51	25.57		
100	1	1	16-QAM	24.23	24.77	24.70	25.03	0.3184
100	1	1	64-QAM	22.65	23.31	23.49		
100	1	1	256-QAM	20.75	21.24	21.19		
Limit	EIRP < 1W			Result			Pass	

NR n78 (HPUE) Maximum Average Power [dBm] (GT - LC = 0.61 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
10	1	1	PI/2 BPSK	26.07	26.31	26.29	27.12	0.5152
10	1	22		26.15	26.36	26.35		
10	12	6		26.21	26.47	26.51		
10	1	1	QPSK	26.09	26.27	26.32		
10	1	22		26.19	26.34	26.34		
10	12	6		26.25	26.43	26.49		
10	1	1	16-QAM	25.27	25.28	25.53	26.14	0.4111
10	1	1	64-QAM	23.73	23.92	24.39		
10	1	1	256-QAM	21.53	22.01	22.24		
Limit	EIRP < 1W			Result			Pass	

NR n78 (HPUE) Maximum Average Power [dBm] (GT - LC = 0.61 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
15	1	1	PI/2 BPSK	26.02	26.28	26.42	27.16	0.5200
15	1	36		26.14	26.31	26.47		
15	18	9		26.24	26.41	26.55		
15	1	1	QPSK	26.07	26.29	26.41		
15	1	36		26.17	26.27	26.44		
15	18	9		26.21	26.39	26.49		
15	1	1	16-QAM	25.25	25.56	25.82	26.43	0.4395
15	1	1	64-QAM	23.88	23.97	24.27		
15	1	1	256-QAM	21.42	21.55	21.96		
Limit	EIRP < 1W			Result			Pass	

NR n78 (HPUE) Maximum Average Power [dBm] (GT - LC = 0.61 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
20	1	1	PI/2 BPSK	26.05	26.23	26.24	27.13	0.5164
20	1	49		26.15	26.24	26.40		
20	25	12		26.28	26.44	26.49		
20	1	1	QPSK	26.01	26.19	26.27		
20	1	49		26.17	26.23	26.39		
20	25	12		26.38	26.39	26.52		
20	1	1	16-QAM	25.37	25.48	25.73	26.34	0.4305
20	1	1	64-QAM	23.78	23.81	24.12		
20	1	1	256-QAM	21.36	21.47	21.78		
Limit	EIRP < 1W			Result			Pass	

NR n78 (HPUE) Maximum Average Power [dBm] (GT - LC = 0.61 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
40	1	1	PI/2 BPSK	26.69	25.83	25.90	27.30	0.5370
40	1	104		25.98	26.04	26.10		
40	50	25		26.26	26.34	26.37		
40	1	1	QPSK	25.71	25.87	25.87		
40	1	104		26.01	26.07	26.08		
40	50	25		26.31	26.30	26.34		
40	1	1	16-QAM	24.85	24.73	24.88	25.49	0.3540
40	1	1	64-QAM	23.29	23.29	23.46		
40	1	1	256-QAM	21.16	21.49	21.55		
Limit	EIRP < 1W			Result			Pass	

NR n78 (HPUE) Maximum Average Power [dBm] (GT - LC = 0.61 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
50	1	1	PI/2 BPSK	25.87	26.07	26.11	27.10	0.5129
50	1	131		26.23	26.28	26.34		
50	64	32		26.25	26.36	26.46		
50	1	1	QPSK	25.91	26.11	26.13		
50	1	131		26.21	26.26	26.31		
50	64	32		26.19	26.31	26.49		
50	1	1	16-QAM	24.81	25.31	25.22	25.92	0.3908
50	1	1	64-QAM	23.49	23.59	23.68		
50	1	1	256-QAM	21.66	21.32	21.85		
Limit	EIRP < 1W			Result			Pass	

NR n78 (HPUE) Maximum Average Power [dBm] (GT - LC = 0.61 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
60	1	1	PI/2 BPSK	25.91	25.98	26.08	27.02	0.5035
60	1	160		26.32	26.34	26.41		
60	81	40		26.29	26.31	26.39		
60	1	1	QPSK	25.84	26.05	26.04		
60	1	160		26.09	26.32	26.37		
60	81	40		26.31	26.32	26.36		
60	1	1	16-QAM	25.02	25.12	25.06	25.73	0.3741
60	1	1	64-QAM	23.57	23.72	23.79		
60	1	1	256-QAM	21.33	21.37	21.52		
Limit	EIRP < 1W			Result			Pass	

NR n78 (HPUE) Maximum Average Power [dBm] (GT - LC = 0.61 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
80	1	1	PI/2 BPSK	25.34	25.38	25.52	26.85	0.4842
80	1	215		25.84	25.87	25.93		
80	108	54		26.19	26.16	26.16		
80	1	1	QPSK	25.38	25.44	25.41		
80	1	215		25.76	25.79	25.82		
80	108	54		26.17	26.21	26.24		
80	1	1	16-QAM	24.53	24.52	24.58	25.19	0.3304
80	1	1	64-QAM	23.11	23.05	23.16		
80	1	1	256-QAM	21.16	21.14	21.13		
Limit	EIRP < 1W			Result			Pass	

NR n78 (HPUE) Maximum Average Power [dBm] (GT - LC = 0.61 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
100	1	1	PI/2 BPSK	-	24.85	-	26.57	0.4539
100	1	271			25.45			
100	135	67			25.92			
100	1	1	QPSK		24.95			
100	1	271			25.69			
100	135	67			25.96			
100	1	1	16-QAM		24.19		24.80	0.3020
100	1	1	64-QAM		22.78			
100	1	1	256-QAM		20.36			
Limit	EIRP < 1W			Result			Pass	

<Main Antenna>

NR n77 (HPUE) Maximum Average Power [dBm] (GT - LC = 1.6 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
20	1	1	PI/2 BPSK	24.83	25.14	25.25	26.92	0.4920
20	1	1	QPSK	24.84	25.19	25.32		
Limit	EIRP < 1W			Result			Pass	

NR n78 (HPUE) Maximum Average Power [dBm] (GT - LC = 1.6 dB)								
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP(W)
20	1	1	PI/2 BPSK	26.58	26.65	26.66	28.28	0.6730
20	1	1	QPSK	26.54	26.67	26.68		
Limit	EIRP < 1W			Result			Pass	

Appendix B. Test Results of Radiated Test

5G NR n77 (HPUE) (Ant. MIMO 2)

5G NR n77 / 100MHz / 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	7405	-44.65	-13	-31.65	-72.01	-51.81	1.94	11.25	H
	11103	-40.53	-13	-27.53	-72.21	-46.80	2.61	11.02	H
	14804	-34.06	-13	-21.06	-71.92	-40.95	2.94	11.97	H
	18510	-55.41	-13	-42.41	-73.8	-69.26	1.90	17.90	H
	22207	-53.38	-13	-40.38	-75.84	-68.00	2.05	18.82	H
	25914	-50.81	-13	-37.81	-76.92	-65.79	1.95	19.08	H
									H
	7405	-43.83	-13	-30.83	-71.04	-50.99	1.94	11.25	V
	11103	-36.45	-13	-23.45	-67.96	-42.72	2.61	11.02	V
	14804	-35.95	-13	-22.95	-71.87	-42.84	2.94	11.97	V
	18510	-56.35	-13	-43.35	-73.88	-70.20	1.90	17.90	V
	22207	-53.35	-13	-40.35	-75.83	-67.97	2.05	18.82	V
	25914	-50.23	-13	-37.23	-77.44	-65.21	1.95	19.08	V
									V
Middle	7582	-45.63	-13	-32.63	-72.12	-52.59	2.00	11.12	H
	11373	-36.51	-13	-23.51	-68.55	-43.21	2.49	11.35	H
	15164	-32.75	-13	-19.75	-70.97	-41.28	3.04	13.72	H
	18954	-55.36	-13	-42.36	-74.47	-69.36	1.75	17.90	H
	22747	-52.67	-13	-39.67	-76.7	-67.00	1.97	18.45	H
	26535	-50.50	-13	-37.50	-77.71	-64.78	2.37	18.79	H
									H
	7582	-45.37	-13	-32.37	-71.82	-52.33	2.00	11.12	V
	11373	-36.62	-13	-23.62	-68.51	-43.32	2.49	11.35	V
	15164	-34.89	-13	-21.89	-71.11	-43.42	3.04	13.72	V
	18954	-56.14	-13	-43.14	-74.54	-70.14	1.75	17.90	V
	22747	-52.87	-13	-39.87	-76.93	-67.20	1.97	18.45	V
	26535	-48.96	-13	-35.96	-77.67	-63.24	2.37	18.79	V

Highest	7762	-45.74	-13	-32.74	-72.2	-52.72	2.03	11.15	H
	11643	-38.96	-13	-25.96	-71.39	-46.22	2.49	11.90	H
	15524	-34.05	-13	-21.05	-71.55	-44.85	3.13	16.08	H
	19409	-55.69	-13	-42.69	-74.88	-69.89	1.96	18.31	H
	23287	-52.49	-13	-39.49	-77.18	-66.45	1.97	18.09	H
	27168	-51.26	-13	-38.26	-77.88	-65.88	2.10	18.87	H
									H
	7762	-45.62	-13	-32.62	-71.82	-52.60	2.03	11.15	V
	11643	-34.09	-13	-21.09	-66.6	-41.35	2.49	11.90	V
	15524	-34.40	-13	-21.40	-71.19	-45.20	3.13	16.08	V
	19409	-56.56	-13	-43.56	-75.08	-70.76	1.96	18.31	V
	23287	-52.27	-13	-39.27	-77.08	-66.23	1.97	18.09	V
	27168	-49.67	-13	-36.67	-77.7	-64.29	2.10	18.87	V
									V

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

5G NR n77 MIMO (HPUE) (Ant. MIMO 2 + Ant. Main)

5G NR n77 MIMO (HPUE)/ 100MHz / 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)
Middle	7582	-45.51	-13	-32.51	-72	-52.47	2.00	11.12	H
	11373	-39.80	-13	-26.80	-71.84	-46.50	2.49	11.35	H
	15164	-32.79	-13	-19.79	-71.01	-41.32	3.04	13.72	H
	18954	-56.05	-13	-43.05	-74.62	-70.05	1.75	17.90	H
	22747	-52.33	-13	-39.33	-76.36	-66.66	1.97	18.45	H
	26535	-50.46	-13	-37.46	-77.67	-64.74	2.37	18.79	H
									H
	7582	-44.97	-13	-31.97	-71.42	-51.93	2.00	11.12	V
	11373	-39.75	-13	-26.75	-71.64	-46.45	2.49	11.35	V
	15164	-35.17	-13	-22.17	-71.39	-43.70	3.04	13.72	V
	18954	-56.58	-13	-43.58	-74.44	-70.58	1.75	17.90	V
	22747	-52.70	-13	-39.70	-76.76	-67.03	1.97	18.45	V
	26535	-48.77	-13	-35.77	-77.48	-63.05	2.37	18.79	V
									V

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

EN-DC 2A-n77A (Ant. Main + Ant. MIMO 2)

5G NR n77 / 20MHz + 100MHz / 1RB0 QPSK + 1RB1 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	7402	-44.29	-13	-31.29	-71.67	-51.46	1.94	11.26	H
	11103	-40.07	-13	-27.07	-71.75	-46.34	2.61	11.02	H
	14804	-33.52	-13	-20.52	-71.38	-40.41	2.94	11.97	H
	18510	-55.52	-13	-42.52	-73.91	-69.37	1.90	17.90	H
	22207	-54.18	-13	-41.18	-76.64	-68.80	2.05	18.82	H
	25903	-51.51	-13	-38.51	-77.61	-66.48	1.96	19.08	H
									H
	7402	-45.15	-13	-32.15	-72.37	-52.32	1.94	11.26	V
	11103	-37.81	-13	-24.81	-69.32	-44.08	2.61	11.02	V
	14804	-35.90	-13	-22.90	-71.82	-42.79	2.94	11.97	V
	18510	-56.42	-13	-43.42	-73.95	-70.27	1.90	17.90	V
	22207	-53.57	-13	-40.57	-76.05	-68.19	2.05	18.82	V
	25903	-50.51	-13	-37.51	-77.71	-65.48	1.96	19.08	V
									V
Middle	7582	-45.97	-13	-32.97	-72.46	-52.93	2.00	11.12	H
	11373	-39.02	-13	-26.02	-71.06	-45.72	2.49	11.35	H
	15164	-32.98	-13	-19.98	-71.2	-41.51	3.04	13.72	H
	18954	-55.31	-13	-42.31	-74.42	-69.31	1.75	17.90	H
	22750	-52.66	-13	-39.66	-76.69	-66.99	1.98	18.45	H
	26538	-50.45	-13	-37.45	-77.66	-64.73	2.36	18.79	H
									H
	7582	-45.95	-13	-32.95	-72.4	-52.91	2.00	11.12	V
	11373	-37.07	-13	-24.07	-68.96	-43.77	2.49	11.35	V
	15164	-35.08	-13	-22.08	-71.3	-43.61	3.04	13.72	V
	18954	-56.23	-13	-43.23	-74.63	-70.23	1.75	17.90	V
	22750	-52.51	-13	-39.51	-76.58	-66.84	1.98	18.45	V
	26538	-48.39	-13	-35.39	-77.1	-62.67	2.36	18.79	V
									V

Highest	7762	-45.69	-13	-32.69	-72.15	-52.67	2.03	11.15	H
	11643	-39.16	-13	-26.16	-71.59	-46.42	2.49	11.90	H
	15524	-33.86	-13	-20.86	-71.36	-44.66	3.13	16.08	H
	19409	-55.92	-13	-42.92	-75.11	-70.12	1.96	18.31	H
	23283	-51.98	-13	-38.98	-76.66	-65.94	1.97	18.09	H
	27168	-51.05	-13	-38.05	-77.67	-65.67	2.10	18.87	H
									H
	7762	-44.59	-13	-31.59	-70.79	-51.57	2.03	11.15	V
	11643	-37.55	-13	-24.55	-70.06	-44.81	2.49	11.90	V
	15524	-34.68	-13	-21.68	-71.47	-45.48	3.13	16.08	V
	19409	-56.43	-13	-43.43	-74.95	-70.63	1.96	18.31	V
	23283	-52.44	-13	-39.44	-77.25	-66.40	1.97	18.09	V
	27168	-49.95	-13	-36.95	-77.98	-64.57	2.10	18.87	V
									V

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

5G NR n78 (HPUE) (Ant. MIMO 2)

5G NR n78(HPUE) / 100MHz / 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)
Middle	7405	-44.26	-13	-31.26	-71.62	-51.42	1.94	11.25	H
	11105	-36.77	-13	-23.77	-68.45	-43.04	2.61	11.03	H
	14802	-33.87	-13	-20.87	-71.72	-40.75	2.93	11.97	H
	18510	-55.68	-13	-42.68	-74.07	-69.53	1.90	17.90	H
	22206	-53.81	-13	-40.81	-76.27	-68.43	2.05	18.82	H
	25914	-51.49	-13	-38.49	-77.6	-66.47	1.95	19.08	H
									H
	7405	-44.88	-13	-31.88	-72.09	-52.04	1.94	11.25	V
	11105	-40.65	-13	-27.65	-72.17	-46.92	2.61	11.03	V
	14802	-35.86	-13	-22.86	-71.79	-42.74	2.93	11.97	V
	18510	-56.24	-13	-43.24	-73.77	-70.09	1.90	17.90	V
	22206	-53.33	-13	-40.33	-75.81	-67.95	2.05	18.82	V
	25914	-50.59	-13	-37.59	-77.8	-65.57	1.95	19.08	V
									V

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

5G NR n78 MIMO (HPUE) (Ant. MIMO 2 + Ant. Main)

5G NR n78 MIMO (HPUE) / 100MHz / 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)
Middle	7405	-45.13	-13	-32.13	-72.48	-52.29	1.94	11.25	H
	11105	-41.03	-13	-28.03	-72.71	-47.30	2.61	11.03	H
	14802	-34.09	-13	-21.09	-71.94	-40.97	2.93	11.97	H
	18510	-55.88	-13	-42.88	-74.27	-69.73	1.90	17.90	H
	22207	-53.58	-13	-40.58	-76.04	-68.20	2.05	18.82	H
	25914	-51.04	-13	-38.04	-77.15	-66.02	1.95	19.08	H
									H
	7405	-44.43	-13	-31.43	-71.63	-51.59	1.94	11.25	V
	11105	-34.61	-13	-21.61	-66.12	-40.88	2.61	11.03	V
	14802	-36.20	-13	-23.20	-72.13	-43.08	2.93	11.97	V
	18510	-56.31	-13	-43.31	-73.84	-70.16	1.90	17.90	V
	22207	-53.36	-13	-40.36	-75.84	-67.98	2.05	18.82	V
	25914	-50.53	-13	-37.53	-77.74	-65.51	1.95	19.08	V
									V

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

EN-DC 2A-n78A (Ant. Main + Ant. MIMO 2)

EN-DC 2A-n78A / 20MHz + 50MHz / 1RB0 QPSK + 1RB1PI/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)
Middle	7455	-44.51	-13	-31.51	-71.64	-51.57	1.97	11.17	H
	11183	-39.85	-13	-26.85	-71.65	-46.25	2.57	11.12	H
	14910	-33.10	-13	-20.10	-71.36	-40.30	2.96	12.31	H
	18643	-56.12	-13	-43.12	-74.73	-70.02	1.85	17.90	H
	22362	-52.77	-13	-39.77	-75.94	-67.37	2.01	18.76	H
	26091	-51.75	-13	-38.75	-78.19	-66.65	2.00	19.05	H
									H
	7455	-43.99	-13	-30.99	-71.03	-51.05	1.97	11.17	V
	11183	-38.52	-13	-25.52	-70.15	-44.92	2.57	11.12	V
	14910	-35.55	-13	-22.55	-71.51	-42.75	2.96	12.31	V
	18643	-56.81	-13	-43.81	-74.6	-70.71	1.85	17.90	V
	22362	-52.25	-13	-39.25	-75.46	-66.85	2.01	18.76	V
	26091	-50.28	-13	-37.28	-77.85	-65.18	2.00	19.05	V
									V

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

5G NR n77 (HPUE) (Ant. Main)

5G NR n77 / 100MHz / 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	7405	-44.58	-13	-31.58	-71.94	-51.74	1.94	11.25	H
	11103	-40.66	-13	-27.66	-72.34	-46.93	2.61	11.02	H
	14804	-33.83	-13	-20.83	-71.69	-40.72	2.94	11.97	H
	18510	-56.87	-13	-43.87	-74.17	-70.72	1.90	17.90	H
	22207	-54.04	-13	-41.04	-75.5	-68.66	2.05	18.82	H
	25914	-51.17	-13	-38.17	-77.58	-66.15	1.95	19.08	H
									H
	7405	-44.74	-13	-31.74	-71.95	-51.90	1.94	11.25	V
	11103	-40.68	-13	-27.68	-72.19	-46.95	2.61	11.02	V
	14804	-35.63	-13	-22.63	-71.55	-42.52	2.94	11.97	V
	18510	-57.35	-13	-44.35	-73.79	-71.20	1.90	17.90	V
	22207	-54.00	-13	-41.00	-75.48	-68.62	2.05	18.82	V
	25914	-49.38	-13	-36.38	-76.89	-64.36	1.95	19.08	V
									V
Middle	7582	-45.65	-13	-32.65	-72.14	-52.61	2.00	11.12	H
	11373	-39.88	-13	-26.88	-71.92	-46.58	2.49	11.35	H
	15164	-33.00	-13	-20.00	-71.22	-41.53	3.04	13.72	H
	18954	-55.99	-13	-42.99	-74.27	-69.99	1.75	17.90	H
	22747	-52.48	-13	-39.48	-75.6	-66.81	1.97	18.45	H
	26535	-49.62	-13	-36.62	-76.61	-63.90	2.37	18.79	H
									H
	7582	-45.39	-13	-32.39	-71.84	-52.35	2.00	11.12	V
	11373	-40.03	-13	-27.03	-71.92	-46.73	2.49	11.35	V
	15164	-34.78	-13	-21.78	-71	-43.31	3.04	13.72	V
	18954	-56.91	-13	-43.91	-74.48	-70.91	1.75	17.90	V
	22747	-52.65	-13	-39.65	-75.81	-66.98	1.97	18.45	V
	26535	-47.93	-13	-34.93	-76.42	-62.21	2.37	18.79	V
									V

	7762	-45.26	-13	-32.26	-71.72	-52.24	2.03	11.15	H
	11643	-39.17	-13	-26.17	-71.6	-46.43	2.49	11.90	H
	15524	-33.78	-13	-20.78	-71.28	-44.58	3.13	16.08	H
	19409	-56.04	-13	-43.04	-74.26	-70.24	1.96	18.31	H
	23287	-52.25	-13	-39.25	-76.31	-66.21	1.97	18.09	H
	27168	-50.74	-13	-37.74	-76.86	-65.36	2.10	18.87	H
									H
Highest	7762	-45.83	-13	-32.83	-72.03	-52.81	2.03	11.15	V
	11643	-39.11	-13	-26.11	-71.62	-46.37	2.49	11.90	V
	15524	-34.29	-13	-21.29	-71.08	-45.09	3.13	16.08	V
	19409	-57.11	-13	-44.11	-74.66	-71.31	1.96	18.31	V
	23287	-52.06	-13	-39.06	-76.25	-66.02	1.97	18.09	V
	27168	-49.26	-13	-36.26	-76.79	-63.88	2.10	18.87	V
									V

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

5G NR n78 (HPUE) (Ant. Main)

5G NR n78(HPUE) / 100MHz / 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)
Middle	7405	-44.74	-13	-31.74	-72.1	-51.90	1.94	11.25	H
	11105	-40.50	-13	-27.50	-72.18	-46.77	2.61	11.03	H
	14802	-33.15	-13	-20.15	-71	-40.03	2.93	11.97	H
	18510	-56.14	-13	-43.14	-73.43	-69.99	1.90	17.90	H
	22206	-54.07	-13	-41.07	-75.52	-68.69	2.05	18.82	H
	25914	-51.31	-13	-38.31	-77.72	-66.29	1.95	19.08	H
									H
	7405	-44.42	-13	-31.42	-71.63	-51.58	1.94	11.25	V
	11105	-40.67	-13	-27.67	-72.19	-46.94	2.61	11.03	V
	14802	-35.68	-13	-22.68	-71.61	-42.56	2.93	11.97	V
	18510	-56.87	-13	-43.87	-73.31	-70.72	1.90	17.90	V
	22206	-53.16	-13	-40.16	-74.63	-67.78	2.05	18.82	V
	25914	-50.24	-13	-37.24	-77.75	-65.22	1.95	19.08	V
									V

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

5G NR n77 (HPUE) (Ant. MIMO 1_SRS)

5G NR n77 / 100MHz / 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	7405	-44.62	-13	-31.62	-72	-51.78	1.94	11.25	H
	11103	-40.87	-13	-27.87	-72.55	-47.14	2.61	11.02	H
	14804	-33.66	-13	-20.66	-71.52	-40.55	2.94	11.97	H
	18510	-55.74	-13	-42.74	-73.02	-69.59	1.90	17.90	H
	22207	-53.61	-13	-40.61	-75.06	-68.23	2.05	18.82	H
	25914	-51.07	-13	-38.07	-77.47	-66.05	1.95	19.08	H
									H
	7405	-44.97	-13	-31.97	-72.19	-52.13	1.94	11.25	V
	11103	-41.66	-13	-28.66	-73.18	-47.93	2.61	11.02	V
	14804	-35.83	-13	-22.83	-71.75	-42.72	2.94	11.97	V
	18510	-57.19	-13	-44.19	-73.61	-71.04	1.90	17.90	V
	22207	-52.99	-13	-39.99	-74.46	-67.61	2.05	18.82	V
	25914	-50.16	-13	-37.16	-77.67	-65.14	1.95	19.08	V
									V
Middle	7582	-45.49	-13	-32.49	-71.98	-52.45	2.00	11.12	H
	11373	-40.62	-13	-27.62	-72.67	-47.32	2.49	11.35	H
	15164	-32.97	-13	-19.97	-71.19	-41.50	3.04	13.72	H
	18954	-55.59	-13	-42.59	-73.88	-69.59	1.75	17.90	H
	22747	-52.39	-13	-39.39	-75.51	-66.72	1.97	18.45	H
	26535	-49.26	-13	-36.26	-76.25	-63.54	2.37	18.79	H
									H
	7582	-45.81	-13	-32.81	-72.25	-52.77	2.00	11.12	V
	11373	-40.68	-13	-27.68	-72.57	-47.38	2.49	11.35	V
	15164	-35.36	-13	-22.36	-71.58	-43.89	3.04	13.72	V
	18954	-56.33	-13	-43.33	-73.9	-70.33	1.75	17.90	V
	22747	-52.35	-13	-39.35	-75.51	-66.68	1.97	18.45	V
	26535	-48.59	-13	-35.59	-77.07	-62.87	2.37	18.79	V
									V

Highest	7762	-45.28	-13	-32.28	-71.74	-52.26	2.03	11.15	H
	11643	-39.81	-13	-26.81	-72.24	-47.07	2.49	11.90	H
	15524	-33.51	-13	-20.51	-71.01	-44.31	3.13	16.08	H
	19409	-55.79	-13	-42.79	-74.02	-69.99	1.96	18.31	H
	23287	-51.73	-13	-38.73	-75.78	-65.69	1.97	18.09	H
	27168	-50.33	-13	-37.33	-76.45	-64.95	2.10	18.87	H
									H
	7762	-46.06	-13	-33.06	-72.26	-53.04	2.03	11.15	V
	11643	-39.44	-13	-26.44	-71.95	-46.70	2.49	11.90	V
	15524	-34.08	-13	-21.08	-70.87	-44.88	3.13	16.08	V
	19409	-56.51	-13	-43.51	-74.06	-70.71	1.96	18.31	V
	23287	-51.49	-13	-38.49	-75.67	-65.45	1.97	18.09	V
	27168	-49.45	-13	-36.45	-76.98	-64.07	2.10	18.87	V
									V

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

5G NR n78 (HPUE) (Ant. MIMO 1_SRS)

5G NR n78(HPUE) / 100MHz / 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)
Middle	7403	-44.86	-13	-31.86	-72.24	-52.03	1.94	11.26	H
	11104	-41.18	-13	-28.18	-72.86	-47.45	2.61	11.02	H
	14805	-33.75	-13	-20.75	-71.61	-40.64	2.94	11.98	H
	18510	-56.09	-13	-43.09	-73.37	-69.94	1.90	17.90	H
	22206	-53.70	-13	-40.70	-75.15	-68.32	2.05	18.82	H
	25914	-50.96	-13	-37.96	-77.36	-65.94	1.95	19.08	H
									H
	7403	-44.72	-13	-31.72	-71.94	-51.89	1.94	11.26	V
	11104	-41.52	-13	-28.52	-73.04	-47.79	2.61	11.02	V
	14805	-35.72	-13	-22.72	-71.64	-42.61	2.94	11.98	V
	18510	-57.35	-13	-44.35	-73.77	-71.20	1.90	17.90	V
	22206	-53.79	-13	-40.79	-75.26	-68.41	2.05	18.82	V
	25914	-50.07	-13	-37.07	-77.58	-65.05	1.95	19.08	V
									V

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

5G NR n77 (HPUE) (Ant. Aux._SRS)

5G NR n77 / 100MHz / 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	7405	-44.23	-13	-31.23	-71.59	-51.39	1.94	11.25	H
	11103	-40.21	-13	-27.21	-71.89	-46.48	2.61	11.02	H
	14804	-33.35	-13	-20.35	-71.21	-40.24	2.94	11.97	H
	18510	-56.12	-13	-43.12	-73.42	-69.97	1.90	17.90	H
	22207	-53.39	-13	-40.39	-74.85	-68.01	2.05	18.82	H
	25914	-50.93	-13	-37.93	-77.34	-65.91	1.95	19.08	H
									H
	7405	-44.47	-13	-31.47	-71.68	-51.63	1.94	11.25	V
	11103	-40.14	-13	-27.14	-71.65	-46.41	2.61	11.02	V
	14804	-35.45	-13	-22.45	-71.37	-42.34	2.94	11.97	V
	18510	-57.15	-13	-44.15	-73.59	-71.00	1.90	17.90	V
	22207	-53.76	-13	-40.76	-75.24	-68.38	2.05	18.82	V
	25914	-49.36	-13	-36.36	-76.87	-64.34	1.95	19.08	V
									V
Middle	7582	-45.00	-13	-32.00	-71.49	-51.96	2.00	11.12	H
	11373	-39.63	-13	-26.63	-71.67	-46.33	2.49	11.35	H
	15164	-32.38	-13	-19.38	-70.6	-40.91	3.04	13.72	H
	18954	-55.34	-13	-42.34	-73.62	-69.34	1.75	17.90	H
	22747	-52.14	-13	-39.14	-75.26	-66.47	1.97	18.45	H
	26535	-49.58	-13	-36.58	-76.57	-63.86	2.37	18.79	H
									H
	7582	-45.12	-13	-32.12	-71.57	-52.08	2.00	11.12	V
	11373	-39.81	-13	-26.81	-71.7	-46.51	2.49	11.35	V
	15164	-34.43	-13	-21.43	-70.64	-42.96	3.04	13.72	V
	18954	-56.07	-13	-43.07	-73.64	-70.07	1.75	17.90	V
	22747	-52.03	-13	-39.03	-75.19	-66.36	1.97	18.45	V
	26535	-48.14	-13	-35.14	-76.63	-62.42	2.37	18.79	V
									V

Highest	7762	-45.15	-13	-32.15	-71.61	-52.13	2.03	11.15	H
	11643	-39.20	-13	-26.20	-71.63	-46.46	2.49	11.90	H
	15524	-33.26	-13	-20.26	-70.76	-44.06	3.13	16.08	H
	19409	-55.04	-13	-42.04	-73.26	-69.24	1.96	18.31	H
	23287	-51.05	-13	-38.05	-75.11	-65.01	1.97	18.09	H
	27168	-50.82	-13	-37.82	-76.94	-65.44	2.10	18.87	H
									H
	7762	-45.41	-13	-32.41	-71.61	-52.39	2.03	11.15	V
	11643	-39.16	-13	-26.16	-71.67	-46.42	2.49	11.90	V
	15524	-33.93	-13	-20.93	-70.72	-44.73	3.13	16.08	V
	19409	-56.10	-13	-43.10	-73.65	-70.30	1.96	18.31	V
	23287	-51.59	-13	-38.59	-75.78	-65.55	1.97	18.09	V
	27168	-48.84	-13	-35.84	-76.37	-63.46	2.10	18.87	V
									V

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

5G NR n78 (HPUE) (Ant. Aux._SRS)

5G NR n78(HPUE) / 100MHz / 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)
Middle	7405	-44.20	-13	-31.20	-71.55	-51.36	1.94	11.25	H
	11105	-40.35	-13	-27.35	-72.03	-46.62	2.61	11.03	H
	14802	-33.55	-13	-20.55	-71.4	-40.43	2.93	11.97	H
	18510	-56.68	-13	-43.68	-73.98	-70.53	1.90	17.90	H
	22206	-53.93	-13	-40.93	-75.38	-68.55	2.05	18.82	H
	25914	-51.38	-13	-38.38	-77.79	-66.36	1.95	19.08	H
									H
	7405	-44.39	-13	-31.39	-71.6	-51.55	1.94	11.25	V
	11105	-40.43	-13	-27.43	-71.95	-46.70	2.61	11.03	V
	14802	-35.40	-13	-22.40	-71.33	-42.28	2.93	11.97	V
	18510	-57.28	-13	-44.28	-73.72	-71.13	1.90	17.90	V
	22206	-54.19	-13	-41.19	-75.66	-68.81	2.05	18.82	V
	25914	-50.27	-13	-37.27	-77.78	-65.25	1.95	19.08	V
									V

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