



# FCC RF Test Report

**APPLICANT** : Nokia Shanghai Bell Co., Ltd.  
**EQUIPMENT** : Nokia FastMile 5G Receiver High Gain  
**BRAND NAME** : Nokia  
**MODEL NAME** : 5G16-A  
**FCC ID** : 2ADZR5G16A  
**STANDARD** : 47 CFR Part 2, 22(H), 24(E), 27(L), 27(M), 27(N), 27(O),  
27(Q), 96  
**CLASSIFICATION** : PCS Licensed Transmitter (PCB)  
**TEST DATE(S)** : May 30, 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



**Sporton International Inc. (Kunshan)**

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



TABLE OF CONTENTS

REVISION HISTORY...3
SUMMARY OF TEST RESULT...4
1 GENERAL DESCRIPTION...6
1.1 Applicant...6
1.2 Manufacturer...6
1.3 Product Feature of Equipment Under Test...6
1.4 Product Specification of Equipment Under Test...6
1.5 Modification of EUT...7
1.6 Testing Location...7
1.7 Test Software...8
1.8 Applicable Standards...8
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST...9
2.1 Test Mode...9
2.2 Connection Diagram of Test System...10
2.3 Support Unit used in test configuration and system...10
2.4 Frequency List of Low/Middle/High Channels...11
3 RADIATED TEST ITEMS...17
3.1 Measuring Instruments...17
3.2 Test Setup...17
3.3 Test Result of Radiated Test...18
3.4 Radiated Spurious Emission...19
4 LIST OF MEASURING EQUIPMENT...20
5 MEASUREMENT UNCERTAINTY...21
APPENIX A. TEST RESULTS OF RADIATED TEST...1
APPENIX B. SETUP PHOTOGRAPHS...1





### SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
-	§2.1046	Conducted Output Power	Reporting Only	PASS	-
	§22.913(a)(5)	Effective Radiated Power (5G NR n5)	ERP < 7 Watt		
	§27.50(c)(10)	Effective Radiated Power (5G NR n71)	ERP < 3 Watt		
	§24.232(c) §27.50(h)(2)	Equivalent Isotropic Radiated Power (5G NR n2, n25) (5G NR n7, n41)	EIRP < 2Watt		
	§27.50(d)(4)	Equivalent Isotropic Radiated Power (5G NR n66)	EIRP < 1Watt		
	§27.50(j)(3)	Equivalent Isotropic Radiated Power (5G NR n77, n78)	EIRP < 1Watt		
	§96.41	Maximum E.I.R.P (Band 48) Maximum Power Spectral Density	EIRP < 47 dBm/10MHz PSD < 37 dBm/MHz		
-	§24.232(d) §27.50(j)(4) §96.41	Peak-to-Average Ratio	<13 dB	PASS	-
-	§2.1049 §96.41	Occupied Bandwidth	Reporting Only	PASS	-
-	§2.1051 §22.917(a) §24.238(a) §27.53(h) §27.53(g) §27.53(l)(2) §27.53(m)(2)(v)	Conducted Band Edge Measurement (5G NR n5) (5G NR n2, n25) (5G NR n66) (5G NR n71) (5G NR n77, n78) (5G NR n7, n41)	< 43+10log10(P[Watts])	PASS	-
	§96.41	Conducted Band Edge Measurement (5G NR n48)	< -40dBm/MHz		
-	§2.1051 §22.917(a) §24.238(a) §27.53(h) §27.53(g) §27.53(l)(2) §27.53(m)(2)(v)	Conducted Spurious Emission (5G NR n5) (5G NR n2, n25) (5G NR n66) (5G NR n71) (5G NR n77, n78) (5G NR n7, n41)	< 43+10log10(P[Watts])	PASS	-
	§96.41	Conducted Band Edge Measurement (5G NR n48)	< -40dBm/MHz		
-	§2.1055 §22.355	Frequency Stability Temperature & Voltage	< 2.5 ppm for Part 22	PASS	-
	§24.235 §27.54		Within Authorized Band		



3.4	§2.1053 §22.917(a) §24.238(a) §27.53(h) §27.53(g) §27.53(l)(2) §27.53(m)(2)(v)	Radiated Spurious Emission (5G NR n5) (5G NR n2, n25) (5G NR n66) (5G NR n71) (5G NR n77, n78) (5G NR n7, n41)	< 43+10log <sub>10</sub> (P[Watts])	PASS	Under limit 16.76 dB at 10800 MHz
	§96.41	Conducted Band Edge Measurement (5G NR n48)	< -40dBm/MHz		

Remark 1 : The test items of inter band CA were cover by 5G NR single carrier due to the CA power is reduced according to 3GPP MPR.

<b>Conformity Assessment Condition:</b>
<ol style="list-style-type: none"> <li>The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.</li> <li>The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty"</li> </ol>
<b>Disclaimer:</b>
The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.



# 1 General Description

## 1.1 Applicant

Nokia Shanghai Bell Co., Ltd.

388#, Ningqiao Road, China (Shanghai) Pilot Free Trade Zone, Shanghai 201206, China

## 1.2 Manufacturer

Nokia Solutions and Networks Oy

Karakaari 7, 02610 Espoo, Finland

## 1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Nokia FastMile 5G Receiver High Gain
Brand Name	Nokia
Model Name	5G16-A
FCC ID	2ADZR5G16A
IMEI Code	Radiation: 35523128005010/35523128005200
HW Version	3TG02369Axxx, x:A~Z
SW Version	5GReceiver-HG-2_D230200B31T0001E0147
EUT Stage	Identical Prototype

## 1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	5G NR n2 : 1850 MHz ~ 1910 MHz 5G NR n5 : 824 MHz ~ 849 MHz 5G NR n7 : 2500 MHz ~ 2570 MHz 5G NR n25 : 1850 MHz ~ 1915 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n38 : 2570 MHz ~ 2620 MHz 5G NR n48: 3550 MHz ~ 3700 MHz 5G NR n66 : 1710 MHz ~ 1755 MHz 5G NR n71: 663 MHz ~ 698 MHz 5G NR n77: 3450 MHz ~ 3550 MHz, 3700 MHz ~ 3980 MHz 5G NR n78: 3450 MHz ~ 3550 MHz, 3700 MHz ~ 3800 MHz
Rx Frequency	5G NR n2 : 1930 MHz ~ 1990 MHz 5G NR n5 : 869 MHz ~ 894 MHz 5G NR n7 : 2620 MHz ~ 2690 MHz 5G NR n25 : 1930 MHz ~ 1995 MHz 5G NR n38 : 2570 MHz ~ 2620 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n48: 3550 MHz ~ 3700 MHz 5G NR n66 : 2110 MHz~ 2155 MHz 5G NR n71: 617 MHz ~ 652 MHz 5G NR n77: 3450 MHz ~ 3550 MHz, 3700 MHz ~ 3980 MHz 5G NR n78: 3450 MHz ~ 3550 MHz, 3700 MHz ~ 3800 MHz
Bandwidth	n2: 5MHz / 10MHz / 15MHz / 20MHz/ 25MHz / 30MHz / 35MHz / 40MHz



	n5: 5MHz / 10MHz / 15MHz / 20MHz/ 25MHz n7: 5MHz / 10MHz / 15MHz / 20MHz/ 25MHz / 30MHz / 40MHz / 50MHz n25: 5MHz / 10MHz / 15MHz / 20MHz/ 25MHz / 30MHz / 35MHz / 40MHz / 45MHz n38: 5MHz / 10MHz / 15MHz / 20MHz/ 25MHz / 30MHz / 40MHz n41: 10MHz / 15MHz / 20MHz/ 30MHz / 35MHz / 40MHz / 50MHz n66: 5MHz /10MHz / 15MHz / 20MHz/ 25MHz /30MHz / 35MHz / 40MHz / 45MHz n71: 5MHz /10MHz / 15MHz / 20MHz n77/ n78: 10MHz / 15MHz / 20MHz / 25MHz / 30MHz / 40MHz / 50MHz / 60MHz / 70MHz / 80MHz / 90MHz / 100MHz n48: 10MHz /15MHz / 20MHz / 30MHz / 40MHz					
<b>SCS</b>	15kHz ,30kHz					
<b>Uplink CA Bands Under Test</b>	n2A-n77A	n25A-n78A	n41A-n71A	n48A-n77A	n77A-n66A	n78A-n38A
	n2A-n66A	n25A-n66A	n66A-n71A	n48A-n41A	n77A-n71A	n78A-n41A
	n2A-n71A	n25A-n71A	n66A-n78A	N71A-n78A	n77A-n2A	n78A-n66A
	n2A-n78A	n38A-n78A	n66A-n2A	N71A-n2A	n77A-n5A	n78A-n71A
	n5A-n77A	n41A-n66A	n66A-n5A	N71A-n25A	n77A-n41A	
	n5A-n66A	n41A-n77A	n66A-n7A	N71A-n41A	n78A-n2A	
	n7A-n66A	n41A-n78A	n66A-n25A	N71A-n66A	n78A-n7A	
n7A-n78A	n41A-n48A	n66A-n41A	n77A-n48A	n78A-n25A		
<b>Type of Modulation</b>	CP-OFDM: QPSK / 16QAM / 64QAM / 256QAM DFT-s-OFDM: PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM					

**Note:** For all uplink inter-band CA combination, only the worst combinations is tested and reflected in the report.

### 1.5 Modification of EUT

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

### 1.6 Testing Location

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

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



### 1.7 Test Software

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

### 1.8 Applicable Standards

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

- ♦ 47 CFR Part 2, 22(H), 24(E), 27(L), 27(M), 27(N), 27(O), 27(Q), 96
- ♦ ANSI C63.26-2015
- ♦ FCC KDB 971168 D01 Power Meas License Digital Systems v03r01
- ♦ FCC KDB 412172 D01 Determining ERP and EIRP v01r01

**Remark:**

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.





## 2 Test Configuration of Equipment Under Test

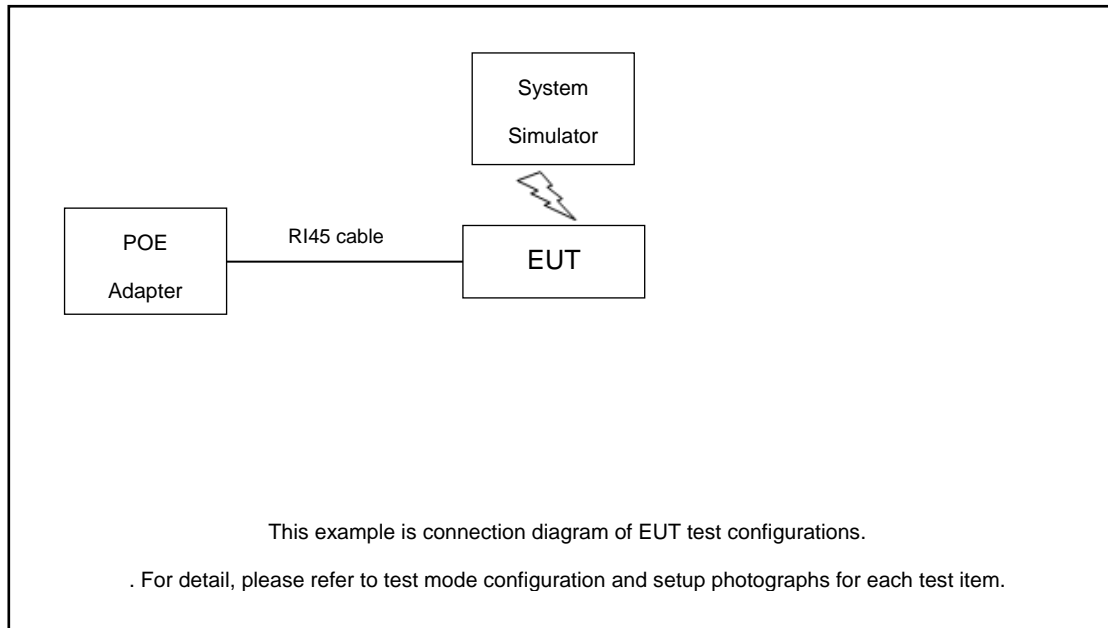
### 2.1 Test Mode

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.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission. (Y-Plane)

Test Items	5G NR	Bandwidth (MHz)												Modulation					RB #		Test Channel		
		5	10	15	20	25	30	40	50	60	70	80	90	100	PI/2 BPSK	QPSK	16QAM	64QAM	256QAM	1	Full	L	M
Radiated Spurious Emission	n2A-n77A	Worst Case																	1	Full		v	
	n5A-n77A	Worst Case																	1	Full		v	
	n7A-n66A	Worst Case																	1	Full			
	n7A-n78A	Worst Case																	1	Full		v	
	n25A-n78A	Worst Case																	1	Full		v	
	n41A-n66A	Worst Case																	1	Full		v	
	n41A-n77A	Worst Case																	1	Full		v	
	n66A-n71A	Worst Case																	1	Full		v	
	n77A-n48A	Worst Case																	1	Full		v	
	n77A-n66A	Worst Case																	1	Full		v	
	n77A-n71A	Worst Case																	1	Full		v	
Note	<ol style="list-style-type: none"> <li>The mark "v" means that this configuration is chosen for testing</li> <li>The mark "-" means that this bandwidth is not supported.</li> <li>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.</li> <li>For all uplink inter-band CA combination, only the worst combination is tested and reflected in the report.</li> <li>Frequency Stability : Normal Voltage = 54V ; Low Voltage =48V. ; High Voltage =57V</li> </ol>																						

## 2.2 Connection Diagram of Test System



## 2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	NR Base Station	Anritsu	MT8000A	N/A	N/A	Unshielded, 1.8 m



### 2.4 Frequency List of Low/Middle/High Channels

5G NR n2 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
40	Channel	374000	376000	378000
	Frequency	1870	1880	1890
35	Channel	373500	376000	378500
	Frequency	1867.5	1880	1892.5
30	Channel	373000	376000	379000
	Frequency	1865.0	1880	1895.0
25	Channel	372500	376000	379500
	Frequency	1862.5	1880	1897.5
20	Channel	372000	376000	380000
	Frequency	1860	1880	1900
15	Channel	371500	376000	380500
	Frequency	1857.5	1880	1902.5
10	Channel	371000	376000	381000
	Frequency	1855	1880	1905
5	Channel	370500	376000	381500
	Frequency	1852.5	1880	1907.5

5G NR n5 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
25	Channel	-	167300	-
	Frequency	-	836.5	-
20	Channel	166800	167300	167800
	Frequency	834	836.5	839
15	Channel	166300	167300	168300
	Frequency	831.5	836.5	841.5
10	Channel	165800	167300	168800
	Frequency	829	836.5	844
5	Channel	165300	167300	169300
	Frequency	826.5	836.5	846.5



5G NR n7 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
50	Channel	505000	507000	509000
	Frequency	2525	2535	2545
40	Channel	504000	507000	510000
	Frequency	2520	2535	2550
30	Channel	503000	507000	511000
	Frequency	2515	2535	2555
25	Channel	502500	507000	511500
	Frequency	2512.5	2535	2557.5
20	Channel	502000	507000	512000
	Frequency	2510	2535	2560
15	Channel	501500	507000	512500
	Frequency	2507.5	2535	2562.5
10	Channel	501000	507000	513000
	Frequency	2505	2535	2565
5	Channel	500500	507000	513500
	Frequency	2502.5	2535	2567.5

5G NR n25 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
45	Channel	374500	376500	378500
	Frequency	1872.5	1882.5	1892.5
40	Channel	374000	376500	379000
	Frequency	1870	1882.5	1895
35	Channel	373500	376500	379500
	Frequency	1867.5	1882.5	1897.5
30	Channel	373000	376500	380000
	Frequency	1865	1882.5	1900
25	Channel	372500	376500	380500
	Frequency	1862.5	1882.5	1902.5
20	Channel	372000	376500	381000
	Frequency	1860	1882.5	1905
15	Channel	371500	376500	381500
	Frequency	1857.5	1882.5	1907.5
10	Channel	371000	376500	382000



	Frequency	1855	1882.5	1910
5	Channel	370500	376500	382500
	Frequency	1852.5	1882.5	1912.5

5G NR n38 Channel and Frequency List for SCS 15k/30k				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
40	Channel	518000	519000	520000
	Frequency	2590	2595	2600
30	Channel	517000	519000	521000
	Frequency	2585	2595	2605
25	Channel	516500	519000	521500
	Frequency	2582.5	2595	2607.5
20	Channel	516000	519000	522000
	Frequency	2580	2595	2610
15	Channel	515500	519000	522500
	Frequency	2577.5	2595	2612.5
10	Channel	515000	519000	523000
	Frequency	2575	2595	2615
5	Channel	514500	519000	523500
	Frequency	2572.5	2595	2617.5

5G NR n41 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
50	Channel	504201	518601	532998
	Frequency	2521.005	2593.005	2664.99
40	Channel	503202	518601	534000
	Frequency	2516.01	2593.005	2670
35	Channel	502701	518598	534498
	Frequency	2513.505	2592.99	2672.49
30	Channel	502200	518601	534999
	Frequency	2511	2593.005	2674.995
20	Channel	501201	518601	535998
	Frequency	2506.005	2593.005	2679.99
15	Channel	500700	518601	536499
	Frequency	2503.5	2593.005	2682.495
10	Channel	500202	518601	537000
	Frequency	2501.01	2593.005	2685



5G NR n66 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
45	Channel	-	346500	-
	Frequency	-	1732.5	-
40	Channel	346000	346500	347000
	Frequency	1730	1732.5	1735
35	Channel	345500	346500	347500
	Frequency	1727.5	1732.5	1737.5
30	Channel	345000	346500	348000
	Frequency	1725	1732.5	1742.5
25	Channel	344500	346500	348500
	Frequency	1722.5	1732.5	1742.5
20	Channel	344000	346500	349500
	Frequency	1720	1732.5	1747.5
15	Channel	343500	346500	349500
	Frequency	1717.5	1732.5	1747.5
10	Channel	343000	346500	350000
	Frequency	1715	1732.5	1750
5	Channel	342500	346500	350500
	Frequency	1712.5	1732.5	1752.5

5G NR n71 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	134600	136100	137600
	Frequency	673	680.5	688
15	Channel	134100	136100	138100
	Frequency	670.5	680.5	690.5
10	Channel	133600	136100	138600
	Frequency	668	680.5	693
5	Channel	133100	136100	139100
	Frequency	665.5	680.5	695.5

5G 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
70	Channel	649000	656000	663000
	Frequency	3735	3840	3945
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
30	Channel	647668	656000	664332
	Frequency	3715.02	3840	3964.98
25	Channel	647500	656000	664500
	Frequency	3712.5	3840	3967.5
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 n78 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
100	Channel	650000		
	Frequency	3750		
90	Channel	649668	650000	650332
	Frequency	3745.02	3750	3754.98
80	Channel	649334	650000	650666
	Frequency	3740.01	3750	3759.99
70	Channel	649000	650000	651000
	Frequency	3735	3750	3765
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
30	Channel	647668	650000	652332
	Frequency	3715.02	3750	3784.98



25	Channel	647500	650000	652500
	Frequency	3712.5	3750	3787.5
20	Channel	647334	650000	652666
	Frequency	3710.01	3750	3789.99
15	Channel	647168	650000	652832
	Frequency	3707.52	3750	3792.48
10	Channel	647000	650000	653000
	Frequency	3705	3750	3795

5G NR n48 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
40	Channel	638000	641666	645332
	Frequency	3570.00	3624.99	3679.98
30	Channel	637668	641666	645666
	Frequency	3565.02	3624.99	3684.99
20	Channel	637334	641666	646000
	Frequency	3560.01	3624.99	3690
15	Channel	637168	641666	646166
	Frequency	3557.52	3624.99	3692.49
10	Channel	637000	641666	646332
	Frequency	3555.0	3624.99	3694.98



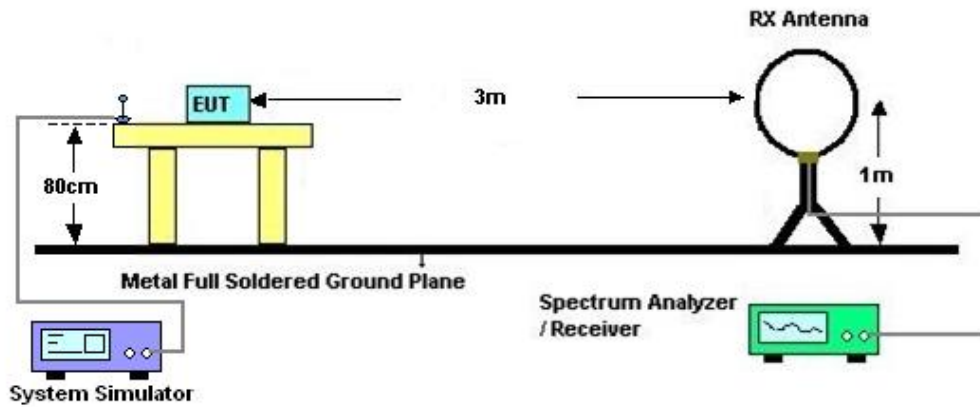
### 3 Radiated Test Items

#### 3.1 Measuring Instruments

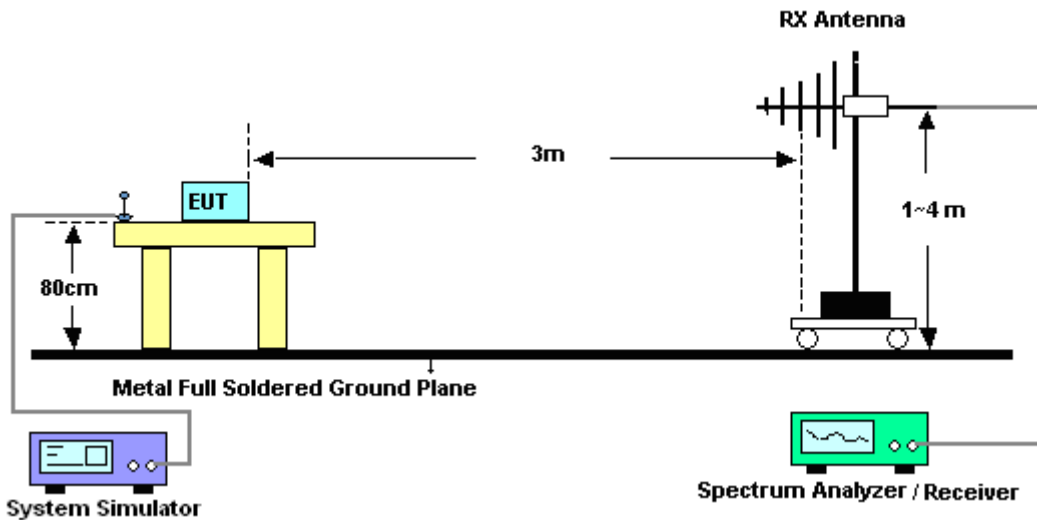
See list of measuring instruments of this test report.

#### 3.2 Test Setup

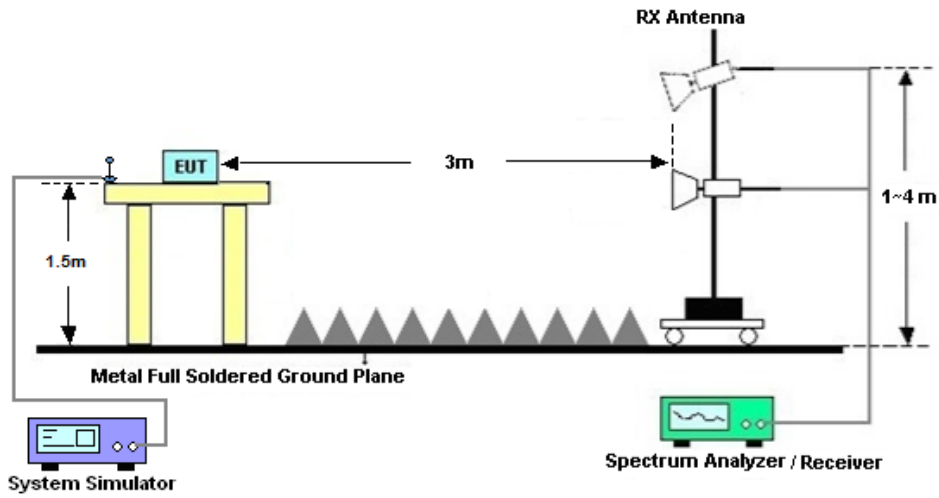
##### 3.2.1 For radiated test below 30MHz



##### 3.2.2 For radiated test from 30MHz to 1GHz



### 3.2.3 For radiated test above 1GHz



### 3.3 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 A.



### 3.4 Radiated Spurious Emission

#### 3.4.1 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.

For 5G NR n48

The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

#### 3.4.2 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  $43 + 10\log(P)$ dB below the transmitter power P(Watts)  
=  $P(W) - [43 + 10\log(P)] (dB)$   
=  $[30 + 10\log(P)] (dBm) - [43 + 10\log(P)] (dB)$   
= -13dBm.



### 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EXA Spectrum Analyzer	Keysight	N9010B	MY57471079	10Hz-44G,MAX 30dB	Oct. 12, 2022	May 30, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 16, 2022	May 30, 2023	Oct. 15, 2023	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	Apr. 09, 2023	May 30, 2023	Apr. 08, 2024	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1284	1GHz~18GHz	Oct. 16, 2022	May 30, 2023	Oct. 15, 2023	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	380827	9KHz-1GHz	Jul. 11, 2022	May 30, 2023	Jul. 10, 2023	Radiation (03CH04-KS)
high gain Amplifier	EM	EM01G18G A	060840	1Ghz-18Ghz	Oct. 12, 2022	May 30, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
Amplifier	Agilent	8449B	3008A02370	1Ghz-18Ghz	Oct. 12, 2022	May 30, 2023	Oct. 11, 2023	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	May 30, 2023	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	May 30, 2023	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	May 30, 2023	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required



## 5 Measurement Uncertainty

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 Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.82dB
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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))	3.56dB
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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))	3.54dB
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## Appendix A. Test Results of Radiated Test

### Radiated Spurious Emission

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

ULCA_n2A-n77A (ANT0+1)								
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)
NR n2 BW 40MHz Middle 1RB0,QPSK	3720	-47.03	-13	-34.03	-59.29	2.64	14.90	H
	5583	-45.83	-13	-32.83	-57.69	2.94	14.80	H
	7446	-45.07	-13	-32.07	-54.84	3.39	13.16	H
	3720	-48.29	-13	-35.29	-60.55	2.64	14.90	V
	5583	-50.89	-13	-37.89	-62.75	2.94	14.80	V
	7446	-47.99	-13	-34.99	-57.76	3.39	13.16	V
NR n77 BW 100MHz Middle 1RB0,QPSK	7590	-52.57	-13	-39.57	-62.78	3.03	13.24	H
	11388	-48.33	-13	-35.33	-57.78	3.56	13.01	H
	15180	-58.74	-13	-45.74	-68.26	3.92	13.44	H
	7590	-52.54	-13	-39.54	-62.75	3.03	13.24	V
	11388	-48.59	-13	-35.59	-58.04	3.56	13.01	V
	15180	-58.78	-13	-45.78	-68.30	3.92	13.44	V

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

ULCA_n5A-n77A (ANT4+1)								
Channel	Frequency ( MHz )	ERP/EIRP ( dBm )	Limit ( dBm )	Over Limit ( dB )	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain (dBi)	Polarization (H/V)
NR n5 BW 25MHz Middle 1RB0,QPSK	1650	-42.57	-13	-29.57	-49.54	1.58	10.70	H
	2480	-31.44	-13	-18.44	-39.69	2.102	12.50	H
	3300	-32.31	-13	-19.31	-41.20	2.856	13.90	H
	1650	-50.42	-13	-37.42	-57.39	1.58	10.70	V
	2480	-52.29	-13	-39.29	-60.54	2.10	12.50	V
	3300	-39.20	-13	-26.20	-48.09	2.86	13.90	V
NR n77 BW 100MHz Middle 1RB0,QPSK	7584	-62.32	-13	-49.32	-72.53	3.03	13.24	H
	11388	-59.94	-13	-46.94	-69.39	3.56	13.01	H
	15180	-58.37	-13	-45.37	-67.89	3.92	13.44	H
	7584	-62.21	-13	-49.21	-72.42	3.03	13.24	V
	11388	-60.03	-13	-47.03	-69.48	3.56	13.01	V
	15180	-57.99	-13	-44.99	-67.51	3.92	13.44	V

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



ULCA_n7A-n66A (ANT0+1)								
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)
NR n7 BW 50MHz Middle 1RB0,QPSK	3450	-57.60	-13	-44.60	-67.81	3.03	13.24	H
	5175	-54.96	-13	-41.96	-64.41	3.56	13.01	H
	6900	-65.75	-13	-52.75	-75.27	3.92	13.44	H
	3450	-58.04	-13	-45.04	-68.25	3.03	13.24	V
	5175	-54.83	-13	-41.83	-64.28	3.56	13.01	V
	6900	-65.81	-13	-52.81	-75.33	3.92	13.44	V
NR n66 BW 45MHz Middle 1RB0,QPSK	5124	-55.40	-13	-42.40	-66.14	2.60	13.34	H
	7536	-53.51	-13	-40.51	-64.02	3.01	13.52	H
	10044	-49.39	-13	-36.39	-59.59	3.27	13.47	H
	5124	-55.58	-13	-42.58	-66.32	2.60	13.34	V
	7536	-56.04	-13	-43.04	-66.55	3.01	13.52	V
	10044	-60.28	-13	-47.28	-70.48	3.27	13.47	V

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

ULCA_n7A-n78A (ANT0+1)								
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)
NR n7 BW 50MHz Middle 1RB0,QPSK	5022	-31.50	-13	-18.50	-41.71	3.03	13.24	H
	7536	-31.05	-13	-18.05	-40.50	3.56	13.01	H
	10044	-36.60	-13	-23.60	-46.12	3.92	13.44	H
	5022	-35.20	-13	-22.20	-45.41	3.03	13.24	V
	7536	-39.11	-13	-26.11	-48.56	3.56	13.01	V
	10044	-41.70	-13	-28.70	-51.22	3.92	13.44	V
NR n78 BW 100MHz Middle 1RB0,QPSK	7416	-62.17	-13	-49.17	-72.38	3.03	13.24	H
	11112	-60.32	-13	-47.32	-69.77	3.56	13.01	H
	14820	-58.94	-13	-45.94	-68.46	3.92	13.44	H
	7416	-62.57	-13	-49.57	-72.78	3.03	13.24	V
	11112	-60.00	-13	-47.00	-69.45	3.56	13.01	V
	14820	-59.38	-13	-46.38	-68.90	3.92	13.44	V

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

ULCA_n25A-n78A (ANT0+1)								
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)
NR n25 BW 45MHz Middle 1RB0,QPSK	3720	-47.74	-13	-34.74	-60.00	2.64	14.90	H
	5583	-43.85	-13	-30.85	-55.71	2.94	14.80	H
	7446	-45.74	-13	-32.74	-55.51	3.39	13.16	H
	3720	-49.38	-13	-36.38	-61.64	2.64	14.90	V
	5583	-50.83	-13	-37.83	-62.69	2.94	14.80	V
	7446	-47.61	-13	-34.61	-57.38	3.39	13.16	V
NR n78 BW 100MHz Middle 1RB0,QPSK	7410	-53.12	-13	-40.12	-63.33	3.03	13.24	H
	11118	-48.80	-13	-35.80	-58.25	3.56	13.01	H
	14820	-58.99	-13	-45.99	-68.51	3.92	13.44	H
	7410	-52.77	-13	-39.77	-62.98	3.03	13.24	V
	11118	-48.48	-13	-35.48	-57.93	3.56	13.01	V
	14820	-59.27	-13	-46.27	-68.79	3.92	13.44	V



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

ULCA_n41A-n66A (ANT1+0)								
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)
NR n41 BW 50MHz Middle 1RB0,QPSK	5090	-39.57	-13	-26.57	-49.78	3.03	13.24	H
	7635	-37.48	-13	-24.48	-46.93	3.56	13.01	H
	10180	-57.90	-13	-44.90	-67.42	3.92	13.44	H
	12720	-59.56	-13	-46.56	-69.48	4.44	14.36	H
	5090	-43.84	-13	-30.84	-54.05	3.03	13.24	V
	7635	-35.94	-13	-22.94	-45.39	3.56	13.01	V
	10180	-58.03	-13	-45.03	-67.55	3.92	13.44	V
	12720	-52.58	-13	-39.58	-69.48	4.44	14.36	V
NR n66 BW 45MHz Middle 1RB0,QPSK	3450	-57.55	-13	-44.55	-68.29	2.60	13.34	H
	5175	-55.55	-13	-42.55	-66.06	3.01	13.52	H
	6900	-54.38	-13	-41.38	-64.58	3.27	13.47	H
	3450	-58.40	-13	-45.40	-69.14	2.60	13.34	V
	5175	-55.38	-13	-42.38	-65.89	3.01	13.52	V
	6900	-54.68	-13	-41.68	-64.88	3.27	13.47	V

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

ULCA_n41A-n77A (ANT0+1)								
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)
NR n41 BW 50MHz Middle 1RB0,QPSK	5090	-39.36	-13	-26.36	-49.57	3.03	13.24	H
	7632	-45.77	-13	-32.77	-55.22	3.56	13.01	H
	10176	-41.36	-13	-28.36	-50.88	3.92	13.44	H
	5090	-43.44	-13	-30.44	-53.65	3.03	13.24	V
	7632	-50.69	-13	-37.69	-60.14	3.56	13.01	V
	10176	-53.97	-13	-40.97	-63.49	3.92	13.44	V
NR n77 BW 100MHz Middle 1RB0,QPSK	7584	-56.12	-13	-43.12	-66.33	3.03	13.24	H
	11385	-57.64	-13	-44.64	-67.09	3.56	13.01	H
	15180	-58.06	-13	-45.06	-67.58	3.92	13.44	H
	7584	-58.57	-13	-45.57	-68.78	3.03	13.24	V
	11376	-59.74	-13	-46.74	-69.19	3.56	13.01	V
	15180	-58.25	-13	-45.25	-67.77	3.92	13.44	V

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





ULCA_n66A-n71A (ANT0+5)								
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)
NR n66 BW 45MHz Middle 1RB0,QPSK	3450	-54.34	-13	-41.34	-65.08	2.604	13.34	H
	5175	-52.64	-13	-39.64	-63.15	3.011	13.52	H
	6900	-52.50	-13	-39.50	-62.70	3.271	13.47	H
	3450	-56.92	-13	-43.92	-67.66	2.604	13.34	V
	5175	-55.23	-13	-42.23	-65.74	3.011	13.52	V
	6900	-54.75	-13	-41.75	-64.95	3.271	13.47	V
NR n71 BW 20MHz Middle 1RB0,QPSK	1344	-65.66	-13	-52.66	-75.87	3.03	13.24	H
	2014	-60.25	-13	-47.25	-69.70	3.56	13.01	H
	2686	-58.72	-13	-45.72	-68.24	3.92	13.44	H
	1344	-65.23	-13	-52.23	-75.44	3.03	13.24	V
	2014	-59.91	-13	-46.91	-69.36	3.56	13.01	V
	2686	-57.76	-13	-44.76	-67.28	3.92	13.44	V

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

ULCA_n77A-n48A (ANT0+1)								
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)
NR n77 BW 100MHz Middle 1RB0,QPSK	7584	-52.05	-13	-39.05	-62.26	3.03	13.24	H
	11376	-56.72	-13	-43.72	-66.17	3.56	13.01	H
	15180	-58.45	-13	-45.45	-67.97	3.92	13.44	H
	7584	-54.52	-13	-41.52	-64.73	3.03	13.24	V
	11376	-57.94	-13	-44.94	-67.39	3.56	13.01	V
	15180	-58.02	-13	-45.02	-67.54	3.92	13.44	V
NR n48 BW 40MHz Middle 1RB0,QPSK	7200	-59.41	-40	-19.41	-70.87	2.84	14.30	H
	10800	-56.76	-40	-16.76	-66.70	3.49	13.43	H
	14412	-59.03	-40	-19.03	-69.27	3.85	14.09	H
	7200	-60.97	-40	-20.97	-72.43	2.84	14.30	V
	10800	-59.47	-40	-19.47	-69.41	3.49	13.43	V
	14412	-59.23	-40	-19.23	-69.47	3.85	14.09	V

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

ULCA_n77A-n66A (ANT0+1)								
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)
NR n77 BW 100MHz Middle 1RB0,QPSK	7584	-52.05	-13	-39.05	-62.26	3.03	13.24	H
	11376	-56.72	-13	-43.72	-66.17	3.56	13.01	H
	15180	-58.45	-13	-45.45	-67.97	3.92	13.44	H
	7584	-53.74	-13	-40.74	-63.95	3.03	13.24	V
	11376	-56.51	-13	-43.51	-65.96	3.56	13.01	V
	15180	-58.34	-13	-45.34	-67.86	3.92	13.44	V
NR n66 BW 45MHz Middle 1RB0,QPSK	3450	-54.06	-13	-39.81	-63.55	2.60	13.34	H
	5175	-55.61	-13	-41.07	-64.58	3.01	13.52	H
	6900	-62.75	-13	-35.53	-58.73	3.27	13.47	H
	7584	-56.91	-13	-42.45	-66.19	2.60	13.34	V
	11376	-58.86	-13	-42.17	-65.68	3.01	13.52	V
	15180	-57.98	-13	-40.15	-63.35	3.27	13.47	V

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



ULCA_n77A-n71A (ANT1+4)								
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)
NR n77 BW 100MHz Middle 1RB0,QPSK	7305	-65.29	-13	-52.29	-75.50	3.03	13.24	H
	10957	-64.05	-13	-51.05	-73.50	3.56	13.01	H
	14610	-62.23	-13	-49.23	-71.75	3.92	13.44	H
	7590	-58.19	-13	-45.19	-68.40	3.03	13.24	V
	11385	-60.35	-13	-47.35	-69.80	3.56	13.01	V
	15180	-58.36	-13	-45.36	-67.88	3.92	13.44	V
NR n71 BW 20MHz Middle 1RB0,QPSK	1344	-65.48	-13	-52.48	-67.23	1.02	4.92	H
	2014	-60.45	-13	-47.45	-62.42	1.27	5.39	H
	2686	-58.37	-13	-45.37	-61.30	1.49	6.57	H
	1344	-65.05	-13	-52.05	-66.80	1.02	4.92	V
	2014	-59.80	-13	-46.80	-61.77	1.27	5.39	V
	2686	-57.84	-13	-44.84	-60.77	1.49	6.57	V

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