FCC RF Test Report

APPLICANT	:	Sonim Technologies, Inc.
EQUIPMENT	:	Smart phone
BRAND NAME	:	Sonim
MODEL NAME	:	XP9900 (P14001)
FCC ID	:	WYPP14010
STANDARD	:	47 CFR Part 2, Part 27 Subpart Q
CLASSIFICATION	:	PCS Licensed Transmitter Held to Ear (PCE)
TEST DATE(S)	:	Aug. 22, 2023 ~ Aug. 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

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
FG371405G	Rev. 01	Initial issue of report	Nov. 02, 2023

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	—	Report Only	-
3.5	§27.50 (k)(4)	Peak-to-Average Ratio	<13dB	PASS	
3.6	§27.50 (k)(3)	EIRP	EIRP < 1W (30dBm)	PASS	-
3.7	§2.1049	Occupied Bandwidth	—	Report Only	-
3.8	§2.1051 §27.53 (n)(2)	Conducted Band Edge Measurement	-13dBm/MHz	PASS	-
3.9	§2.1051 §27.53 (n)(2)	Conducted Spurious Emission	-13dBm/MHz	PASS	-
3.10	§2.1055 §27.54	Frequency Stability Temperature & Voltage	Within the band	PASS	-
4.4	§2.1053 §27.53 (n)(2)	Radiated Spurious Emission	-13dBm/MHz	PASS	Under limit 33.02 dB at 13824.00 MHz

Note: This is a variant report, the change note could be referred to the XP9900_ Class II Permissive Change letter which is exhibit separately. According to the change, only the related cases were tested, all the other test results are referred to the original report I22Z60589-WMD03.

Conformity Assessment Condition:
1. 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. 2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty”
Disclaimer:
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

Sonim Technologies, Inc.
4445 Eastgate Mall, Suite 200, San Diego, CA 92121, USA

1.2 Manufacturer

Sonim Technologies, Inc.
4445 Eastgate Mall, Suite 200, San Diego, CA 92121, USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Smart phone
Brand Name	Sonim
Model Name	XP9900 (P14001)
FCC ID	WYPP14010
IMEI Code	Conducted : 016188000785233 Radiation : 016188000788997
HW Version	V1.0
SW Version	10.0.0-01-12.0.0-10.60.10
EUT Stage	Identical Prototype

1.4 Product Specification of Equipment Under Test

Product Feature	
Tx/Rx Frequency	5G NR n77: 3450 MHz ~ 3550 MHz 5G NR n78: 3450 MHz ~ 3550 MHz
SCS	30kHz
Bandwidth	n77/n78: 20 / 30 / 40 / 50 / 60 / 70 / 80 / 90 / 100MHz
Antenna Gain	**<Ant. 5>** 5G NR n77/n78: -3.80 dBi
Type of Modulation	CP-OFDM: QPSK / 16QAM / 64QAM / 256QAM DFT-s-OFDM: PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM

Remark:

1. 5G NR n77/n78 support SA and NSA mode. The whole testing has assessed SA mode for n77 by referring to the higher conducted power for conducted test items.
2. The device supports HPUE mode for 5G NR n77.
3. The EN-DC combinations declared by the manufacturer are as follows: DC_5A_n77A, DC_12A_n77A, DC_13A_n77A, DC_14A_n77A, DC_2A_n78A, DC_5A_n78A, DC_7A_n78A , DC_12A_n78A and DC_13A_n78A.

1.5 Modification of EUT

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

1.6 Maximum EIRP Power and Emission Designator

5G NR n77		PI/2 BPSK		QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
20	3460.02 ~ 3540.00	0.1706	-	0.1714	-	0.1384	-
30	3465.00 ~ 3534.99	0.1722	-	0.1738	-	0.1738	-
40	3470.01 ~ 3529.98	0.1730	-	0.1730	-	0.1413	-
50	3475.02 ~ 3525.00	0.1679	-	0.1667	-	0.1618	-
60	3480.00 ~ 3519.99	0.1652	-	0.1656	-	0.1549	-
70	3485.01 ~ 3514.98	0.1614	-	0.1603	-	0.1303	-
80	3490.02 ~ 3510.00	0.1589	-	0.1592	-	0.1567	-
90	3495.00 ~ 3504.99	0.1589	-	0.1585	-	0.1297	-
100	3500.01	0.1746	-	0.1734	97M4G7D	0.1291	97M6W7D

5G NR n78		PI/2 BPSK		QPSK		16QAM/64QAM/256QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
20	3460.02 ~ 3540.00	0.0817	-	0.0815	-	0.0659	-
30	3465.00 ~ 3534.99	0.0824	-	0.0811	-	0.0658	-
40	3470.01 ~ 3529.98	0.0824	-	0.0828	-	0.0667	-
50	3475.02 ~ 3525.00	0.0787	-	0.0802	-	0.0650	-
60	3480.00 ~ 3519.99	0.0800	-	0.0804	-	0.0661	-
70	3485.01 ~ 3514.98	0.0794	-	0.0791	-	0.0650	-
80	3490.02 ~ 3510.00	0.0787	-	0.0802	-	0.0643	-
90	3495.00 ~ 3504.99	0.0787	-	0.0793	-	0.0649	-
100	3500.01	0.0828		0.0766	97M4G7D	0.0622	97M6W7D

Note:

1. 5G NR Band n77 overlaps the entire frequency range of Band n78, and n77 power > n78 power, therefore the conducted test results of n77 provided in this report cover n78.
2. All modulations have been tested, and only the worst test results of PSK & QAM are shown in the report.

1.7 Testing Site

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.**
	03CH03-KS TH01-KS	CN1257	314309

1.8 Test Software

Item	Site	Manufacture	Name	Version
1.	TH01-KS	Tonscend	JS1120-3 test system China_210602	3.3.10
2.	03CH03-KS	AUDIX	E3	210616

1.9 Applied Standards

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

- 47 CFR Part 2, Part 27 Subpart Q
- ANSI C63.26-2015
- FCC KDB 971168 Power Meas License Digital Systems D01 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

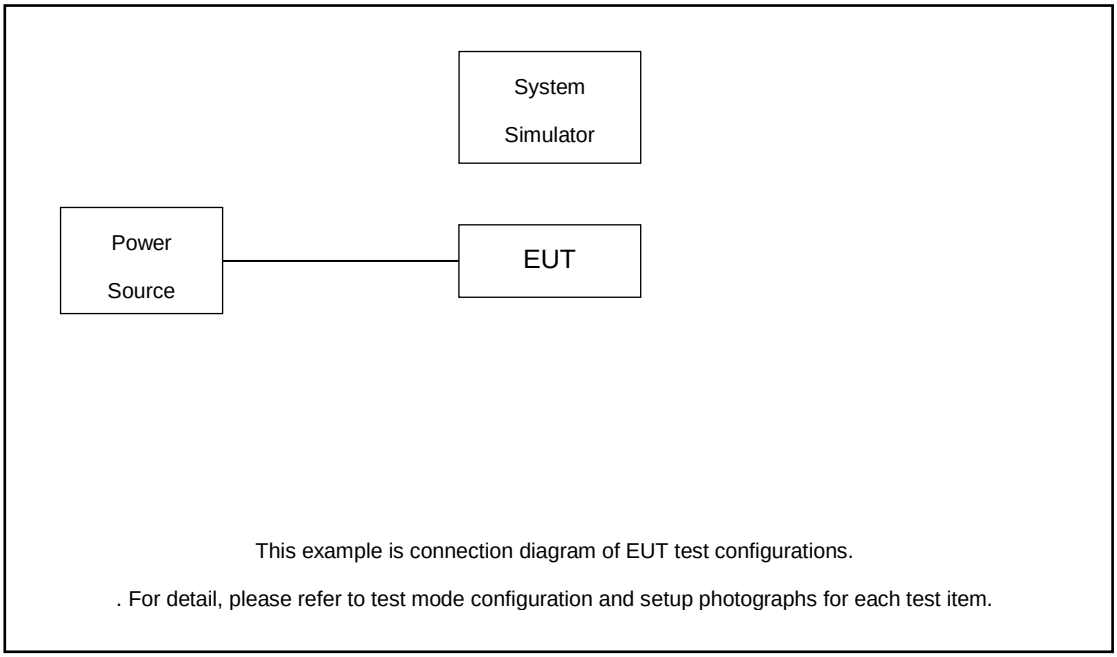
Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

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

Test Cases	Band	Bandwidth (MHz)	Modulation	RB #	Test Channel
		eg. 5M, 10M, 15M, 20M	eg. PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	1RB, Partial RB, Full RB	L/M/H
Max. Output Power	5G n77	20M, 30M, 40M, 50M, 60M, 70M, 80M, 90M, 100M	All Modulations	1RB, Full RB	L, M, H
	5G n78	20M, 30M, 40M, 50M, 60M, 70M, 80M, 90M, 100M	All Modulations	1RB, Full RB	L, M, H
Peak-to-Average Ratio	5G n77	100M	PI/2 BPSK, QPSK	1RB, Full RB	M
E.I.R.P	5G n77	20M, 30M, 40M, 50M, 60M, 70M, 80M, 90M, 100M	All Modulations	1RB, Full RB	L, M, H
	5G n78	20M, 30M, 40M, 50M, 60M, 70M, 80M, 90M, 100M	All Modulations	1RB, Full RB	L, M, H
26dB and 99% Bandwidth	5G n77	100M	QPSK, 16QAM, 64QAM, 256QAM	Full RB	M
Conducted Band Edge	5G n77	100M	PI/2 BPSK, QPSK	1RB, Full RB	L, H
Conducted Spurious Emission	5G n77	100M	PI/2 BPSK, QPSK	1RB	L, M, H
Frequency Stability	5G n77	20M	QPSK	Full RB	M
Radiated Spurious Emission	5G n77	Worst case from maximum power			M
	5G n78	Worst case from maximum power			M

Note:
1. 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.
2. Frequency Stability: Normal Voltage = 3.9V; Low Voltage =3.6V; High Voltage =4.45V.

2.2 Connection Diagram of Test System



This example is connection diagram of EUT test configurations.

. For detail, please refer to test mode configuration and setup photographs for each test item.

2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	Power Supply	GWINSTEK	PSS-2002	N/A	N/A	Unshielded, 1.8 m
2.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
3.	NR Base Station	Anritsu	MT8000A	N/A	N/A	Unshielded, 1.8 m

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 6.5 dB and 20dB attenuator.

Example :

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 6.5 + 20 = 26.5 (dB)

2.5 Frequency List of Low/Middle/High Channels

5G n77/n78 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
100	Channel	-	633334	-
	Frequency	-	3500.01	-
90	Channel	633000	633334	633666
	Frequency	3495	3500.01	3504.99
80	Channel	632668	633334	634000
	Frequency	3490.02	3500.01	3510
70	Channel	632334	633334	634332
	Frequency	3485.01	3500.01	3514.98
60	Channel	632000	633334	634666
	Frequency	3480	3500.01	3519.99
50	Channel	631668	633334	635000
	Frequency	3475.02	3500.01	3525
40	Channel	631334	633334	635332
	Frequency	3470.01	3500.01	3529.98
30	Channel	631000	633334	635666
	Frequency	3465	3500.01	3534.99
20	Channel	630668	633334	636000
	Frequency	3460.02	3500.01	3540

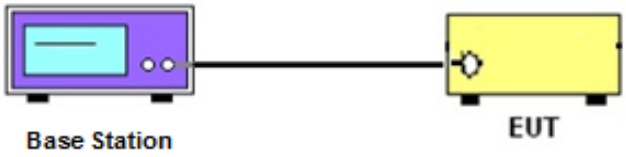
3 Conducted Test Items

3.1 Measuring Instruments

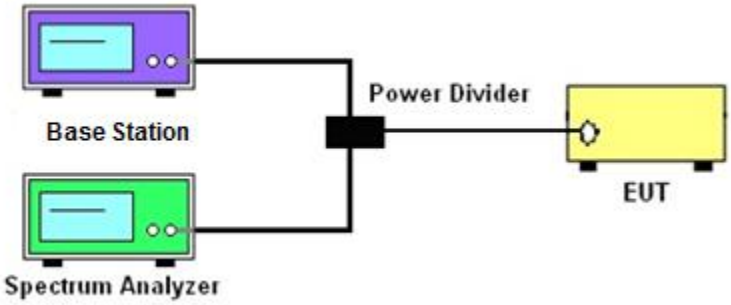
See list of measuring instruments of this test report.

3.2 Test Setup

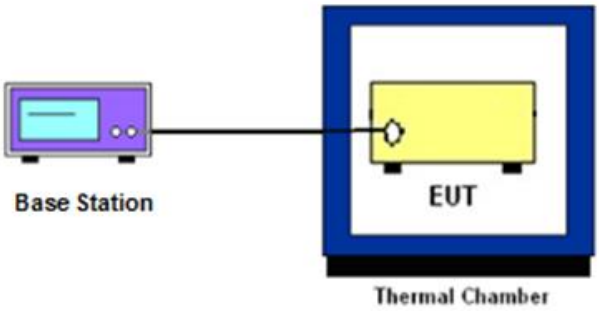
3.2.1 Conducted Output Power



3.2.2 Peak-to-Average Ratio, Occupied / 26dB Bandwidth, Band-Edge and Conducted Spurious Emission



3.2.3 Frequency Stability



3.3 Test Result of Conducted Test

Please refer to Appendix A.

3.4 Conducted Output Power Measurement

3.4.1 Description of the Conducted Output Power Measurement

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

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.

3.5 Peak-to-Average Ratio

3.5.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.5.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2.3.4 (CCDF).
2. The EUT was connected to spectrum and system simulator via a power divider.
3. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
4. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
5. Record the deviation as Peak to Average Ratio.

3.6 EIRP

3.6.1 Description of EIRP Limit

§ 27.50 (k)(3)

Mobile devices are limited to 1Watt (30 dBm) EIRP. Mobile devices operating in these bands must employ a means for limiting power to the minimum necessary for successful communications

3.6.2 Test Procedures

1. According to KDB 412172 D01 Power Approach,
2. 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

3.7 Occupied Bandwidth

3.7.1 Description of Occupied Bandwidth Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

3.7.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.4
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
4. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
5. Set the detection mode to peak, and the trace mode to max hold.
6. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace. (this is the reference value)
7. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
8. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “–X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
9. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.8 Conducted Band Edge Measurement

3.8.1 Description of Conducted Band Edge Measurement

§ 27.53 (n)(2)

For mobile operations in the 3450-3550 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz.

Compliance with this paragraph is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed, but limited to a maximum of 200 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz.

3.8.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured.
4. Set RBW ≥ 1% EBW but limited to a maximum of 200 kHz in the 1MHz band immediately outside and adjacent to the band edge.
5. Beyond the 1 MHz and 5 MHz removed from the band edge, set RBW ≥ 500KHz.
6. Beyond the 5 MHz removed from the band edge, set RBW = 1MHz.
7. Set spectrum analyzer with RMS detector.
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
9. Checked that all the results comply with the emission limit line.

3.9 Conducted Spurious Emission Measurement

3.9.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges shall not exceed −13 dBm/MHz.

It is measured by means of a calibrated spectrum analyzer and scanned from 9 kHz up to a frequency including its 10^{th} harmonic.

3.9.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
7. Set spectrum analyzer with RMS detector.
8. Taking the record of maximum spurious emission.
9. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
10. Checked that all the results comply with the emission limit line.

3.10 Frequency Stability Measurement

3.10.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block.

3.10.2 Test Procedures for Temperature Variation

1. The testing follows ANSI C63.26 section 5.6.4
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.10.3 Test Procedures for Voltage Variation

1. The testing follows ANSI C63.26 section 5.6.5.
2. The EUT was placed in a temperature chamber at 20±5°C and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value for other than hand carried battery equipment.
4. For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.
5. The variation in frequency was measured for the worst case.

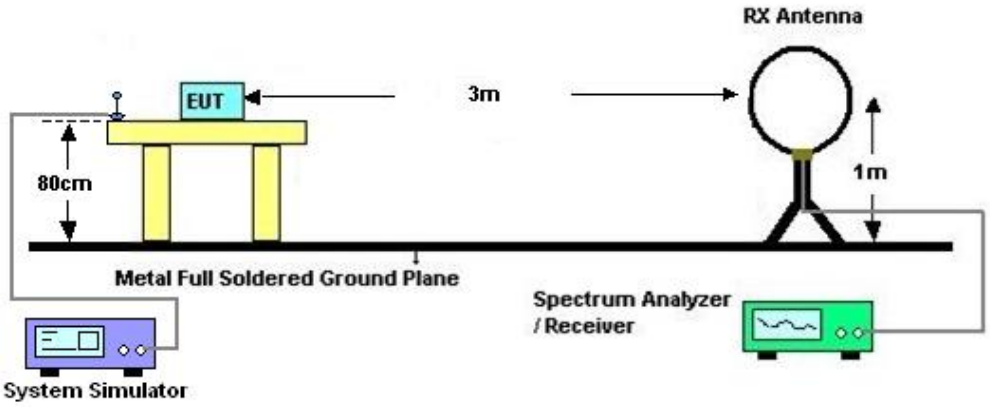
4 Radiated Test Items

4.1 Measuring Instruments

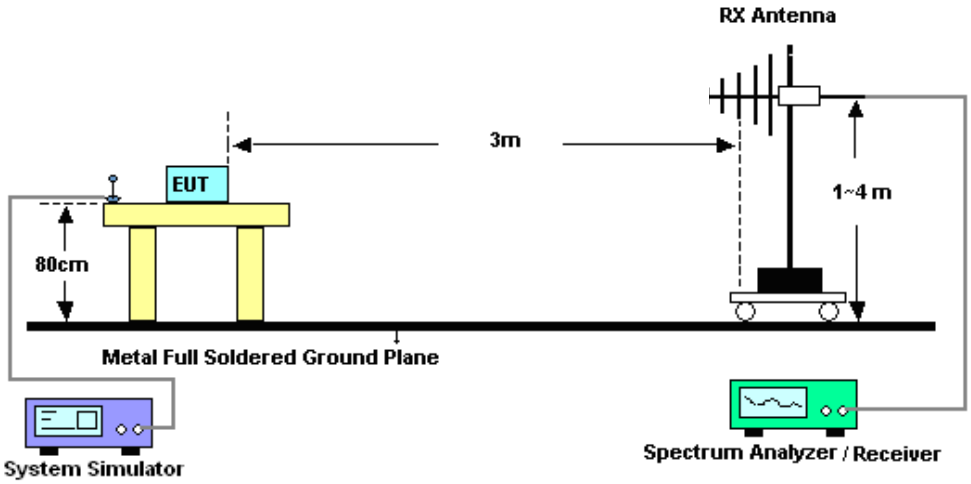
See list of measuring instruments of this test report.

4.2 Test Setup

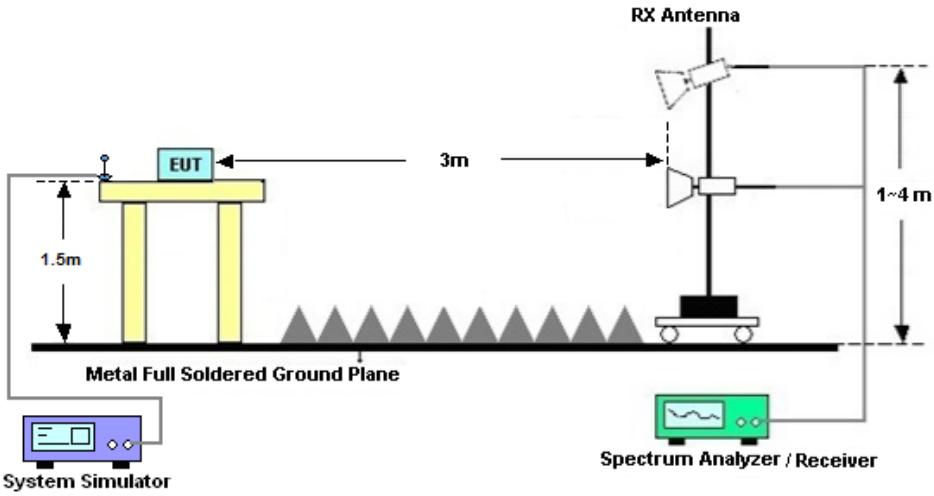
4.2.1 For radiated test below 30MHz



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 Measurement

4.4.1 Description of Radiated Spurious Emission

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 shall not exceed −13 dBm/MHz.

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

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.
   EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
   ERP (dBm) = EIRP - 2.15
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

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	Aug. 22, 2023	Oct. 11, 2023	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	NCR	Aug. 22, 2023	NCR	Conducted (TH01-KS)
Temperature & humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 06, 2023	Aug. 22, 2023	Jul. 05, 2024	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz;Max 30dBm	Oct. 13, 2022	Aug. 30, 2023	Oct. 12, 2023	Radiation (03CH03-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44GHz	May 15, 2023	Aug. 30, 2023	May 14, 2024	Radiation (03CH03-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 16, 2022	Aug. 30, 2023	Oct. 15, 2023	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	23182	30MHz-1GHz	Dec. 23, 2022	Aug. 30, 2023	Dec. 22, 2023	Radiation (03CH03-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 15, 2022	Aug. 30, 2023	Nov. 14, 2023	Radiation (03CH03-KS)
SHF-EHF Horn	com-power	AH-840	101116	18GHz~40GHz	Oct. 17, 2022	Aug. 30, 2023	Oct. 16, 2023	Radiation (03CH03-KS)
Amplifier	SONOMA	310N	413740	30MHz ~1000MHz	Jan. 05, 2023	Aug. 30, 2023	Jan. 04, 2024	Radiation (03CH03-KS)
Amplifier	EM	EM18G40GA	060851	18~40GHz	Jan. 05, 2023	Aug. 30, 2023	Jan. 04, 2024	Radiation (03CH03-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2082394	1Ghz-18Ghz	Jan. 05, 2023	Aug. 30, 2023	Jan. 04, 2024	Radiation (03CH03-KS)
Amplifier	Keysight	83017A	MY53270319	1GHz~26.5GHz	Oct. 12, 2022	Aug. 30, 2023	Oct. 11, 2023	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Aug. 30, 2023	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Aug. 30, 2023	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Aug. 30, 2023	NCR	Radiation (03CH03-KS)

NCR: No Calibration Required

6 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 Conducted Measurement

Test Item	Uncertainty
Conducted Power	±0.46 dB
Conducted Emissions	±2.26 dB
Occupied Channel Bandwidth	±0.1 %

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.76dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.65dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.57dB

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

Appendix A. Test Results of Conducted Test

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

Software Version: 23.06.1602

FR1 N77

Transmitter Conducted Output Power And EIRP, (G_T - L_C)=-3.8dB

NR Band	SCS	Band Width	Arfcn	Freq (MHz)	Modulation	RB	Conducted Power (dBm)	EIRP (dBm)	EIRP (W)
77	30	20	630668	3460.02	DFT-s-OFDM PI/2 BPSK	1@1	26.12	22.32	0.1706
77	30	20	630668	3460.02	DFT-s-OFDM QPSK	1@1	26.14	22.34	0.1714
77	30	20	630668	3460.02	DFT-s-OFDM 16 QAM	1@1	25.21	21.41	0.1384
77	30	20	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	26	22.2	0.1660
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	1@1	25.94	22.14	0.1637
77	30	20	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	25.07	21.27	0.1340
77	30	20	636000	3540	DFT-s-OFDM PI/2 BPSK	1@1	26.01	22.21	0.1663
77	30	20	636000	3540	DFT-s-OFDM QPSK	1@1	26.05	22.25	0.1679
77	30	20	636000	3540	DFT-s-OFDM 16 QAM	1@1	25.18	21.38	0.1374
77	30	30	631000	3465	DFT-s-OFDM PI/2 BPSK	1@1	26.16	22.36	0.1722
77	30	30	631000	3465	DFT-s-OFDM QPSK	1@1	26.2	22.4	0.1738
77	30	30	631000	3465	DFT-s-OFDM 16 QAM	1@1	26.2	22.4	0.1738
77	30	30	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	26.05	22.25	0.1679
77	30	30	633334	3500.01	DFT-s-OFDM QPSK	1@1	26.04	22.24	0.1675
77	30	30	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	25.14	21.34	0.1361
77	30	30	635666	3534.99	DFT-s-OFDM PI/2 BPSK	1@1	26.03	22.23	0.1671
77	30	30	635666	3534.99	DFT-s-OFDM QPSK	1@1	26.11	22.31	0.1702
77	30	30	635666	3534.99	DFT-s-OFDM 16 QAM	1@1	25.2	21.4	0.1380
77	30	40	631334	3470.01	DFT-s-OFDM PI/2 BPSK	1@1	26.18	22.38	0.1730
77	30	40	631334	3470.01	DFT-s-OFDM QPSK	1@1	26.18	22.38	0.1730
77	30	40	631334	3470.01	DFT-s-OFDM 16 QAM	1@1	25.3	21.5	0.1413
77	30	40	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	26.1	22.3	0.1698
77	30	40	633334	3500.01	DFT-s-OFDM QPSK	1@1	26.1	22.3	0.1698
77	30	40	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	25.19	21.39	0.1377
77	30	40	635332	3529.98	DFT-s-OFDM PI/2 BPSK	1@1	26.1	22.3	0.1698
77	30	40	635332	3529.98	DFT-s-OFDM QPSK	1@1	26.1	22.3	0.1698
77	30	40	635332	3529.98	DFT-s-OFDM 16 QAM	1@1	25.17	21.37	0.1371
77	30	50	631668	3475.02	DFT-s-OFDM PI/2 BPSK	1@1	26.05	22.25	0.1679
77	30	50	631668	3475.02	DFT-s-OFDM QPSK	1@1	26.02	22.22	0.1667
77	30	50	631668	3475.02	DFT-s-OFDM 16 QAM	1@1	25.12	21.32	0.1355
77	30	50	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	25.86	22.06	0.1607
77	30	50	633334	3500.01	DFT-s-OFDM QPSK	1@1	25.91	22.11	0.1626
77	30	50	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	25.01	21.21	0.1321
77	30	50	635000	3525	DFT-s-OFDM PI/2 BPSK	1@1	25.86	22.06	0.1607
77	30	50	635000	3525	DFT-s-OFDM QPSK	1@1	25.95	22.15	0.1641
77	30	50	635000	3525	DFT-s-OFDM 16 QAM	1@1	25.89	22.09	0.1618
77	30	60	632000	3480	DFT-s-OFDM PI/2 BPSK	1@1	25.98	22.18	0.1652
77	30	60	632000	3480	DFT-s-OFDM QPSK	1@1	25.99	22.19	0.1656
77	30	60	632000	3480	DFT-s-OFDM 16 QAM	1@1	24.96	21.16	0.1306
77	30	60	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	25.93	22.13	0.1633
77	30	60	633334	3500.01	DFT-s-OFDM QPSK	1@1	25.9	22.1	0.1622
77	30	60	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	25.04	21.24	0.1330

77	30	60	634666	3519.99	DFT-s-OFDM PI/2 BPSK	1@1	25.91	22.11	0.1626
77	30	60	634666	3519.99	DFT-s-OFDM QPSK	1@1	25.9	22.1	0.1622
77	30	60	634666	3519.99	DFT-s-OFDM 16 QAM	1@1	25.7	21.9	0.1549
77	30	70	632334	3485.01	DFT-s-OFDM PI/2 BPSK	1@1	25.88	22.08	0.1614
77	30	70	632334	3485.01	DFT-s-OFDM QPSK	1@1	25.85	22.05	0.1603
77	30	70	632334	3485.01	DFT-s-OFDM 16 QAM	1@1	24.95	21.15	0.1303
77	30	70	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	25.77	21.97	0.1574
77	30	70	633334	3500.01	DFT-s-OFDM QPSK	1@1	25.76	21.96	0.1570
77	30	70	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	24.88	21.08	0.1282
77	30	70	634332	3514.98	DFT-s-OFDM PI/2 BPSK	1@1	25.77	21.97	0.1574
77	30	70	634332	3514.98	DFT-s-OFDM QPSK	1@1	25.75	21.95	0.1567
77	30	70	634332	3514.98	DFT-s-OFDM 16 QAM	1@1	24.86	21.06	0.1276
77	30	80	632668	3490.02	DFT-s-OFDM PI/2 BPSK	1@1	25.81	22.01	0.1589
77	30	80	632668	3490.02	DFT-s-OFDM QPSK	1@1	25.82	22.02	0.1592
77	30	80	632668	3490.02	DFT-s-OFDM 16 QAM	1@1	25.69	21.89	0.1545
77	30	80	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	25.75	21.95	0.1567
77	30	80	633334	3500.01	DFT-s-OFDM QPSK	1@1	25.77	21.97	0.1574
77	30	80	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	24.88	21.08	0.1282
77	30	80	634000	3510	DFT-s-OFDM PI/2 BPSK	1@1	25.72	21.92	0.1556
77	30	80	634000	3510	DFT-s-OFDM QPSK	1@1	25.71	21.91	0.1552
77	30	80	634000	3510	DFT-s-OFDM 16 QAM	1@1	25.75	21.95	0.1567
77	30	90	633000	3495	DFT-s-OFDM PI/2 BPSK	1@1	25.81	22.01	0.1589
77	30	90	633000	3495	DFT-s-OFDM QPSK	1@1	25.8	22	0.1585
77	30	90	633000	3495	DFT-s-OFDM 16 QAM	1@1	24.88	21.08	0.1282
77	30	90	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	25.79	21.99	0.1581
77	30	90	633334	3500.01	DFT-s-OFDM QPSK	1@1	25.78	21.98	0.1578
77	30	90	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	24.9	21.1	0.1288
77	30	90	633666	3504.99	DFT-s-OFDM PI/2 BPSK	1@1	25.81	22.01	0.1589
77	30	90	633666	3504.99	DFT-s-OFDM QPSK	1@1	25.8	22	0.1585
77	30	90	633666	3504.99	DFT-s-OFDM 16 QAM	1@1	24.93	21.13	0.1297
77	30	100	633334	3500.01	DFT-s-OFDM PI/2 BPSK	135@67	25.64	21.84	0.1528
77	30	100	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	26.22	22.42	0.1746
77	30	100	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@271	25.53	21.73	0.1489
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	135@67	25.66	21.86	0.1535
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@1	26.19	22.39	0.1734
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@271	25.56	21.76	0.1500
77	30	100	633334	3500.01	DFT-s-OFDM 16 QAM	135@67	24.65	20.85	0.1216
77	30	100	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	24.91	21.11	0.1291
77	30	100	633334	3500.01	DFT-s-OFDM 16 QAM	1@271	24.71	20.91	0.1233
77	30	100	633334	3500.01	DFT-s-OFDM 64 QAM	135@67	23.14	19.34	0.0859
77	30	100	633334	3500.01	DFT-s-OFDM 64 QAM	1@1	23.24	19.44	0.0879
77	30	100	633334	3500.01	DFT-s-OFDM 64 QAM	1@271	22.99	19.19	0.0830
77	30	100	633334	3500.01	DFT-s-OFDM 256 QAM	135@67	21.16	17.36	0.0545
77	30	100	633334	3500.01	DFT-s-OFDM 256 QAM	1@1	21.2	17.4	0.0550
77	30	100	633334	3500.01	DFT-s-OFDM 256 QAM	1@271	20.92	17.12	0.0515
77	30	100	633334	3500.01	CP-OFDM QPSK	137@68	24.15	20.35	0.1084
77	30	100	633334	3500.01	CP-OFDM QPSK	1@1	24.33	20.53	0.1130
77	30	100	633334	3500.01	CP-OFDM QPSK	1@271	23.99	20.19	0.1045

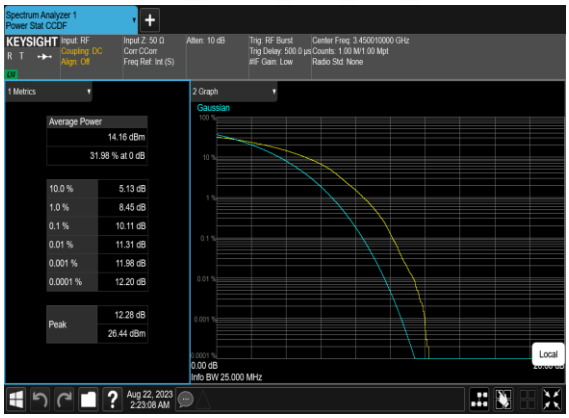
Frequency Stability

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Deviation (ppm)	Verdict	Environment
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	-0.0013	**PASS**	NV
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0025	**PASS**	LV
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0026	**PASS**	HV
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	-0.0012	**PASS**	-30℃
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0018	**PASS**	-20℃
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0014	**PASS**	-10℃
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0019	**PASS**	0℃
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0016	**PASS**	10℃
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0021	**PASS**	20℃
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0026	**PASS**	30℃
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	-0.0015	**PASS**	40℃
77	30	20	633334	3500.01	DFT-s-OFDM QPSK	50@0	0.0029	**PASS**	50℃

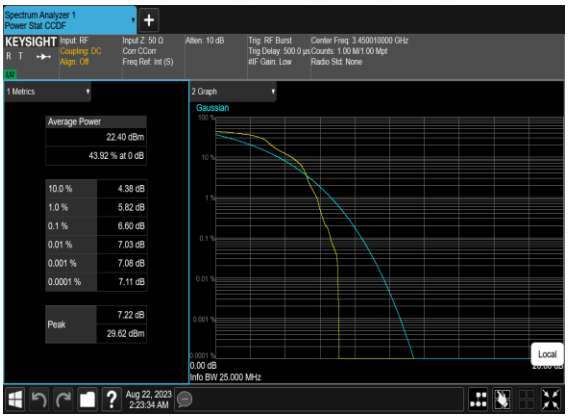
Peak to Average Ratio

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result (dB)	Limit (dB)	Verdict
77	30	100	633334	3500.01	DFT-s-OFDM PI/2 BPSK	270@0	10.11	13	**PASS**
77	30	100	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@0	6.6	13	**PASS**
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	270@0	10.38	13	**PASS**
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@0	7.57	13	**PASS**

N77(100M)_DFT-s-OFDM_PI_2-BPSK_Outer_Full_Mid_CH

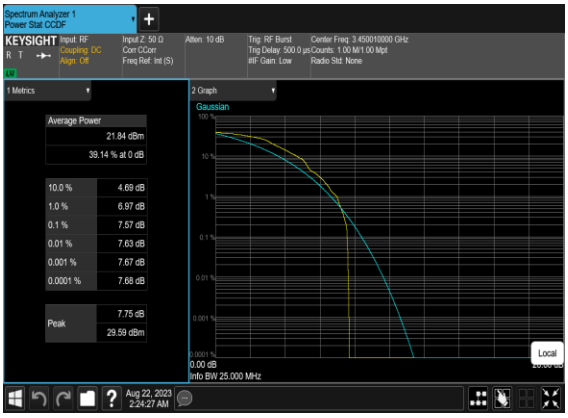


N77(100M)_DFT-s-OFDM_PI_2-BPSK_Edge_1RB_Left_Mid_CH



N77(100M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH

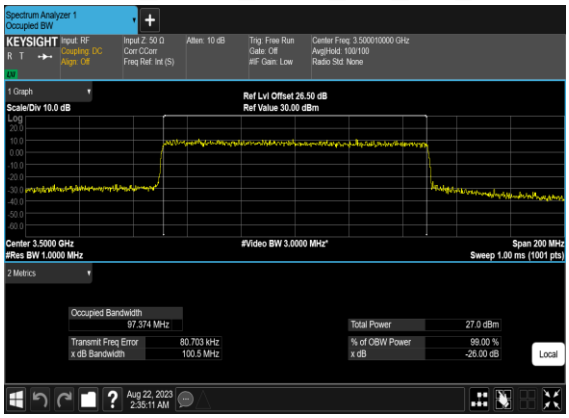
N77(100M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



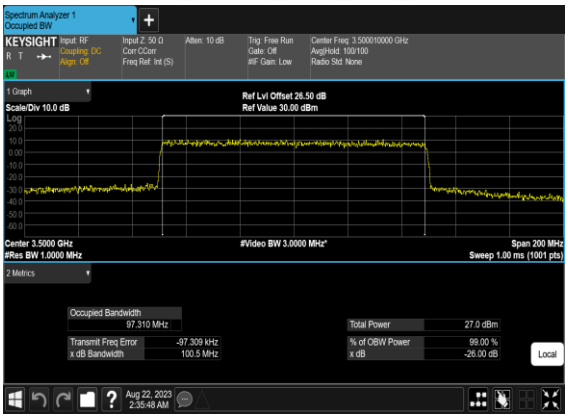
Occupied Bandwidth

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	OBW (MHz)	26dB BW (MHz)
77	30	100	633334	3500.01	CP-OFDM QPSK	273@0	97.374	100.5
77	30	100	633334	3500.01	CP-OFDM 16 QAM	273@0	97.31	100.5
77	30	100	633334	3500.01	CP-OFDM 64 QAM	273@0	97.284	100.5
77	30	100	633334	3500.01	CP-OFDM 256 QAM	273@0	97.56	100.6

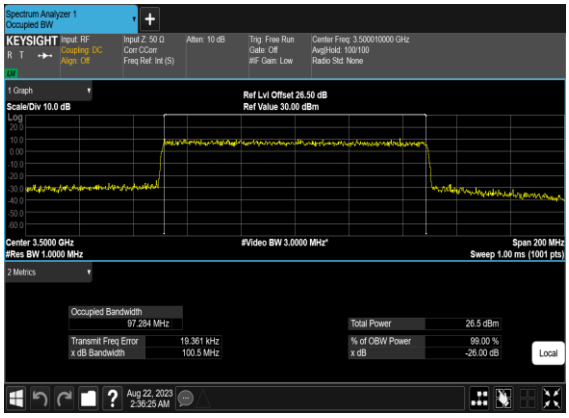
N77(100M)_CP-OFDM_QPSK_Outer_Full_Mid_CH



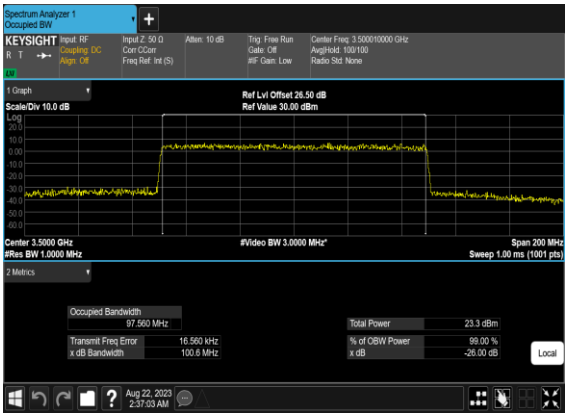
N77(100M)_CP-OFDM_16 QAM_Outer_Full_Mid_CH



N77(100M)_CP-OFDM_64 QAM_Outer_Full_Mid_CH



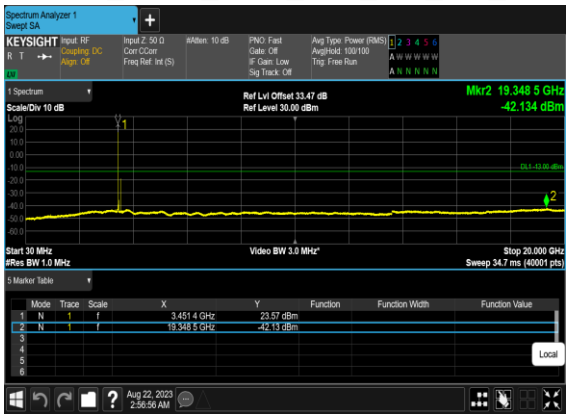
N77(100M)_CP-OFDM_256 QAM_Outer_Full_Mid_CH



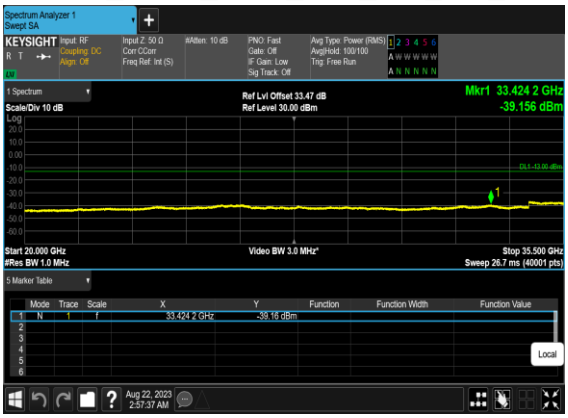
Conducted Spurious Emissions

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result	Verdict
77	30	100	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**---**
77	30	100	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	30	100	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**---**
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**

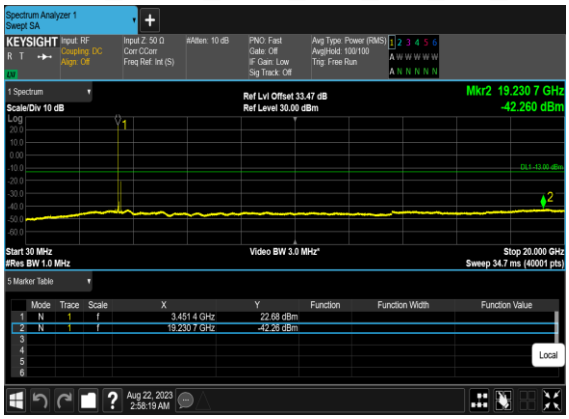
N77(100M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



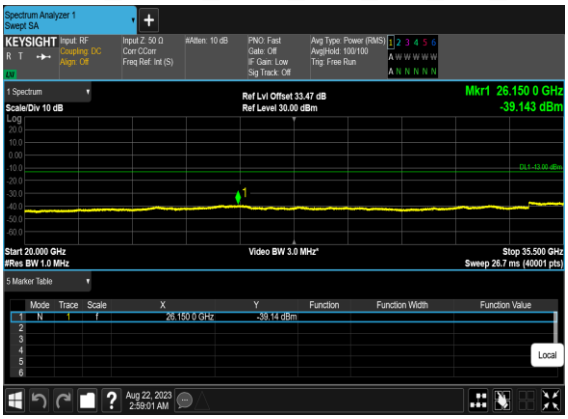
N77(100M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



N77(100M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



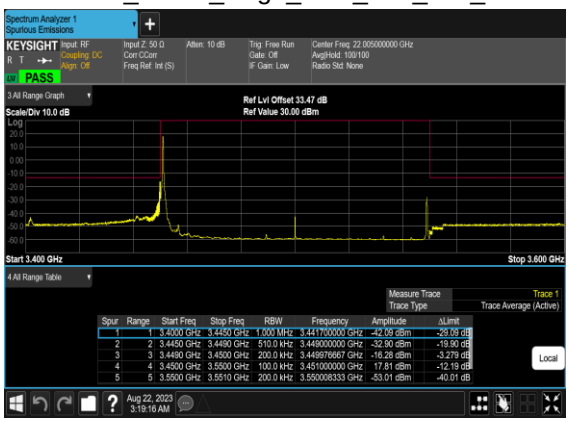
N77(100M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



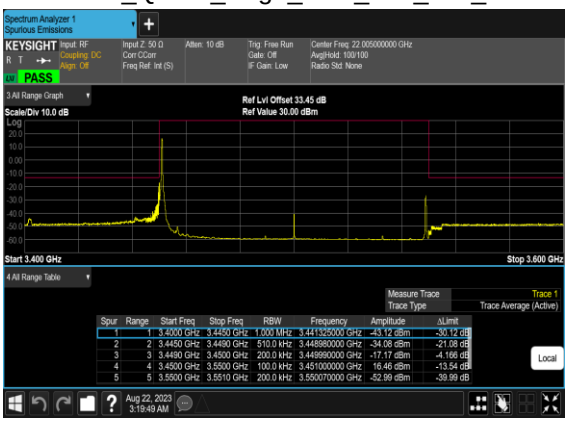
Conducted Band Edge

NR Band	SCS (kHz)	Bandwidth (MHz)	Arfcn	Freq (MHz)	Modulation	RB	Result	Verdict
77	30	100	633334	3500.01	DFT-s-OFDM BPSK	1@0	see graph	**PASS**
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@0	see graph	**PASS**
77	30	100	633334	3500.01	DFT-s-OFDM BPSK	1@272	see graph	**PASS**
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@272	see graph	**PASS**
77	30	100	633334	3500.01	DFT-s-OFDM BPSK	270@0	see graph	**PASS**
77	30	100	633334	3500.01	DFT-s-OFDM QPSK	270@0	see graph	**PASS**

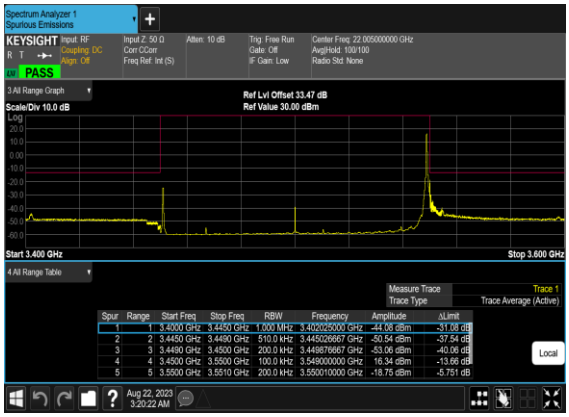
N77(100M)_DFT-s-OFDM_BPSK_Edge_1RB_Left_Mid_CH



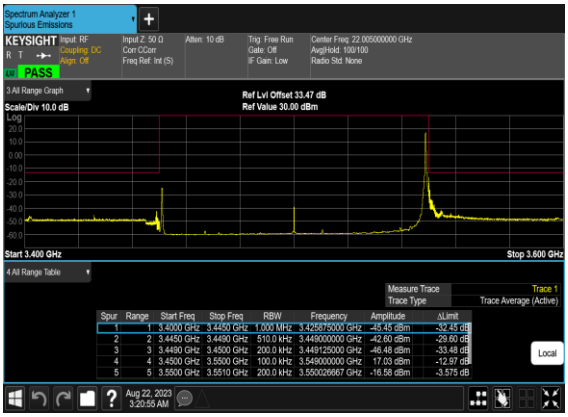
N77(100M)_DFT-s-OFDM_QPSK_Edge_1RB_Left_Mid_CH



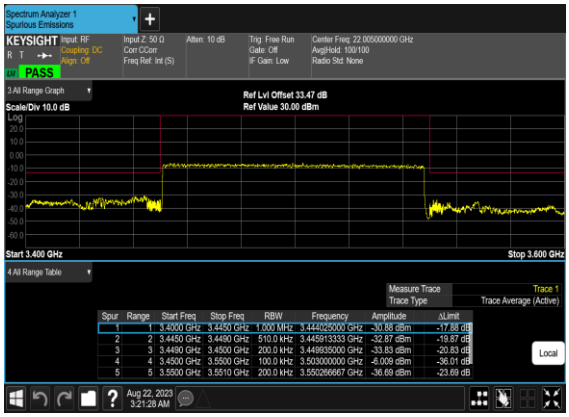
N77(100M)_DFT-s-OFDM_BPSK_Edge_1RB_Right_Mid_CH



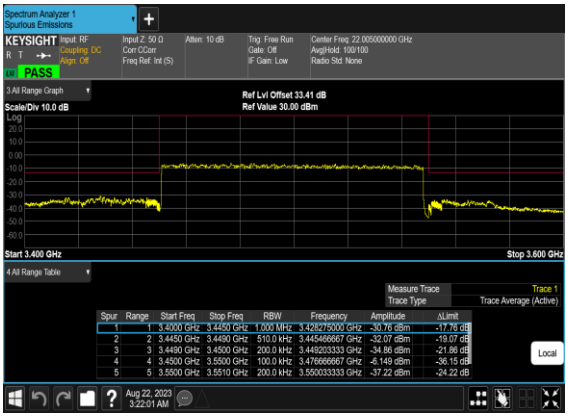
N77(100M)_DFT-s-OFDM_QPSK_Edge_1RB_Right_Mid_CH



N77(100M)_DFT-s-OFDM_BPSK_Outer_Full_Mid_CH



N77(100M)_DFT-s-OFDM_QPSK_Outer_Full_Mid_CH



FR1 N78

Transmitter Conducted Output Power And EIRP, (G_T - L_C)=-3.8dB

NR Band	SCS	Band Width	Arfcn	Freq (MHz)	Modulation	RB	Conducted Power (dBm)	EIRP (dBm)	EIRP (W)
78	30	100	633334	3500.01	DFT-s-OFDM PI/2 BPSK	135@67	22.34	18.54	0.0714
78	30	100	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	22.98	19.18	0.0828
78	30	100	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@271	22.07	18.27	0.0671
78	30	100	633334	3500.01	DFT-s-OFDM QPSK	135@67	22.38	18.58	0.0721
78	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@1	22.64	18.84	0.0766
78	30	100	633334	3500.01	DFT-s-OFDM QPSK	1@271	22.05	18.25	0.0668
78	30	100	633334	3500.01	DFT-s-OFDM 16 QAM	135@67	21.39	17.59	0.0574
78	30	100	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	21.74	17.94	0.0622
78	30	100	633334	3500.01	DFT-s-OFDM 16 QAM	1@271	21.22	17.42	0.0552
78	30	100	633334	3500.01	DFT-s-OFDM 64 QAM	135@67	19.83	16.03	0.0401
78	30	100	633334	3500.01	DFT-s-OFDM 64 QAM	1@1	19.99	16.19	0.0416
78	30	100	633334	3500.01	DFT-s-OFDM 64 QAM	1@271	19.51	15.71	0.0372
78	30	100	633334	3500.01	DFT-s-OFDM 256 QAM	135@67	17.83	14.03	0.0253
78	30	100	633334	3500.01	DFT-s-OFDM 256 QAM	1@1	17.97	14.17	0.0261
78	30	100	633334	3500.01	DFT-s-OFDM 256 QAM	1@271	17.43	13.63	0.0231
78	30	100	633334	3500.01	CP-OFDM QPSK	137@68	20.81	17.01	0.0502
78	30	100	633334	3500.01	CP-OFDM QPSK	1@1	21.11	17.31	0.0538
78	30	100	633334	3500.01	CP-OFDM QPSK	1@271	20.58	16.78	0.0476
78	30	20	630668	3460.02	DFT-s-OFDM PI/2 BPSK	1@1	22.92	19.12	0.0817
78	30	20	630668	3460.02	DFT-s-OFDM QPSK	1@1	22.91	19.11	0.0815
78	30	20	630668	3460.02	DFT-s-OFDM 16 QAM	1@1	21.89	18.09	0.0644
78	30	20	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	22.67	18.87	0.0771
78	30	20	633334	3500.01	DFT-s-OFDM QPSK	1@1	22.75	18.95	0.0785
78	30	20	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	21.79	17.99	0.0630
78	30	20	636000	3540	DFT-s-OFDM PI/2 BPSK	1@1	22.88	19.08	0.0809
78	30	20	636000	3540	DFT-s-OFDM QPSK	1@1	22.89	19.09	0.0811
78	30	20	636000	3540	DFT-s-OFDM 16 QAM	1@1	21.99	18.19	0.0659
78	30	30	631000	3465	DFT-s-OFDM PI/2 BPSK	1@1	22.96	19.16	0.0824
78	30	30	631000	3465	DFT-s-OFDM QPSK	1@1	22.89	19.09	0.0811
78	30	30	631000	3465	DFT-s-OFDM 16 QAM	1@1	21.98	18.18	0.0658
78	30	30	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	22.71	18.91	0.0778
78	30	30	633334	3500.01	DFT-s-OFDM QPSK	1@1	22.74	18.94	0.0783
78	30	30	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	21.85	18.05	0.0638
78	30	30	635666	3534.99	DFT-s-OFDM PI/2 BPSK	1@1	22.8	19	0.0794
78	30	30	635666	3534.99	DFT-s-OFDM QPSK	1@1	22.84	19.04	0.0802
78	30	30	635666	3534.99	DFT-s-OFDM 16 QAM	1@1	21.97	18.17	0.0656
78	30	40	631334	3470.01	DFT-s-OFDM PI/2 BPSK	1@1	22.96	19.16	0.0824
78	30	40	631334	3470.01	DFT-s-OFDM QPSK	1@1	22.98	19.18	0.0828
78	30	40	631334	3470.01	DFT-s-OFDM 16 QAM	1@1	22.04	18.24	0.0667
78	30	40	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	22.83	19.03	0.0800
78	30	40	633334	3500.01	DFT-s-OFDM QPSK	1@1	22.88	19.08	0.0809
78	30	40	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	21.98	18.18	0.0658
78	30	40	635332	3529.98	DFT-s-OFDM PI/2 BPSK	1@1	22.81	19.01	0.0796

78	30	40	635332	3529.98	DFT-s-OFDM QPSK	1@1	22.85	19.05	0.0804
78	30	40	635332	3529.98	DFT-s-OFDM 16 QAM	1@1	21.88	18.08	0.0643
78	30	50	631668	3475.02	DFT-s-OFDM PI/2 BPSK	1@1	22.76	18.96	0.0787
78	30	50	631668	3475.02	DFT-s-OFDM QPSK	1@1	22.84	19.04	0.0802
78	30	50	631668	3475.02	DFT-s-OFDM 16 QAM	1@1	21.93	18.13	0.0650
78	30	50	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	22.68	18.88	0.0773
78	30	50	633334	3500.01	DFT-s-OFDM QPSK	1@1	22.66	18.86	0.0769
78	30	50	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	21.81	18.01	0.0632
78	30	50	635000	3525	DFT-s-OFDM PI/2 BPSK	1@1	22.57	18.77	0.0753
78	30	50	635000	3525	DFT-s-OFDM QPSK	1@1	22.6	18.8	0.0759
78	30	50	635000	3525	DFT-s-OFDM 16 QAM	1@1	21.74	17.94	0.0622
78	30	60	632000	3480	DFT-s-OFDM PI/2 BPSK	1@1	22.83	19.03	0.0800
78	30	60	632000	3480	DFT-s-OFDM QPSK	1@1	22.85	19.05	0.0804
78	30	60	632000	3480	DFT-s-OFDM 16 QAM	1@1	22	18.2	0.0661
78	30	60	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	22.81	19.01	0.0796
78	30	60	633334	3500.01	DFT-s-OFDM QPSK	1@1	22.8	19	0.0794
78	30	60	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	21.93	18.13	0.0650
78	30	60	634666	3519.99	DFT-s-OFDM PI/2 BPSK	1@1	22.72	18.92	0.0780
78	30	60	634666	3519.99	DFT-s-OFDM QPSK	1@1	22.71	18.91	0.0778
78	30	60	634666	3519.99	DFT-s-OFDM 16 QAM	1@1	21.82	18.02	0.0634
78	30	70	632334	3485.01	DFT-s-OFDM PI/2 BPSK	1@1	22.8	19	0.0794
78	30	70	632334	3485.01	DFT-s-OFDM QPSK	1@1	22.78	18.98	0.0791
78	30	70	632334	3485.01	DFT-s-OFDM 16 QAM	1@1	21.93	18.13	0.0650
78	30	70	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	22.76	18.96	0.0787
78	30	70	633334	3500.01	DFT-s-OFDM QPSK	1@1	22.75	18.95	0.0785
78	30	70	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	21.84	18.04	0.0637
78	30	70	634332	3514.98	DFT-s-OFDM PI/2 BPSK	1@1	22.64	18.84	0.0766
78	30	70	634332	3514.98	DFT-s-OFDM QPSK	1@1	22.66	18.86	0.0769
78	30	70	634332	3514.98	DFT-s-OFDM 16 QAM	1@1	21.87	18.07	0.0641
78	30	80	632668	3490.02	DFT-s-OFDM PI/2 BPSK	1@1	22.76	18.96	0.0787
78	30	80	632668	3490.02	DFT-s-OFDM QPSK	1@1	22.84	19.04	0.0802
78	30	80	632668	3490.02	DFT-s-OFDM 16 QAM	1@1	21.86	18.06	0.0640
78	30	80	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	22.65	18.85	0.0767
78	30	80	633334	3500.01	DFT-s-OFDM QPSK	1@1	22.75	18.95	0.0785
78	30	80	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	21.87	18.07	0.0641
78	30	80	634000	3510	DFT-s-OFDM PI/2 BPSK	1@1	22.67	18.87	0.0771
78	30	80	634000	3510	DFT-s-OFDM QPSK	1@1	22.73	18.93	0.0782
78	30	80	634000	3510	DFT-s-OFDM 16 QAM	1@1	21.88	18.08	0.0643
78	30	90	633000	3495	DFT-s-OFDM PI/2 BPSK	1@1	22.74	18.94	0.0783
78	30	90	633000	3495	DFT-s-OFDM QPSK	1@1	22.78	18.98	0.0791
78	30	90	633000	3495	DFT-s-OFDM 16 QAM	1@1	21.74	17.94	0.0622
78	30	90	633334	3500.01	DFT-s-OFDM PI/2 BPSK	1@1	22.74	18.94	0.0783
78	30	90	633334	3500.01	DFT-s-OFDM QPSK	1@1	22.72	18.92	0.0780
78	30	90	633334	3500.01	DFT-s-OFDM 16 QAM	1@1	21.75	17.95	0.0624
78	30	90	633666	3504.99	DFT-s-OFDM PI/2 BPSK	1@1	22.76	18.96	0.0787
78	30	90	633666	3504.99	DFT-s-OFDM QPSK	1@1	22.79	18.99	0.0793
78	30	90	633666	3504.99	DFT-s-OFDM 16 QAM	1@1	21.92	18.12	0.0649

Appendix B. Test Results of Radiated Test

Radiated Spurious Emission

Test Engineer :	Chris Chen	Temperature :	23~25℃
		Relative Humidity :	41~42%

RSE pre-scanned harmonic for different antennas, choose the worst antenna perform final test and record in the report.

SA n77 / NR 100MHz / QPSK / ANT5								
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	6912	-58.79	-13	-45.79	-69.00	3.03	13.24	H
	10368	-52.05	-13	-39.05	-61.50	3.56	13.01	H
	13824	-46.12	-13	-33.12	-55.64	3.92	13.44	H
	6900	-52.93	-13	-39.93	-63.14	3.03	13.24	V
	10368	-51.48	-13	-38.48	-60.93	3.56	13.01	V
	13824	-46.02	-13	-33.02	-55.54	3.92	13.44	V

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

EN-DC_5A_n78A / LTE 10MHz + NR 100MHz / QPSK / ANT1 (LTE) & ANT5(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	6912	-58.79	-13	-45.79	-69.00	3.03	13.24	H
	10368	-51.60	-13	-38.60	-61.05	3.56	13.01	H
	13824	-46.75	-13	-33.75	-56.27	3.92	13.44	H
	6912	-58.81	-13	-45.81	-69.02	3.03	13.24	V
	10368	-51.76	-13	-38.76	-61.21	3.56	13.01	V
	13824	-46.66	-13	-33.66	-56.18	3.92	13.44	V

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

EN-DC_5A_n78A / LTE 10MHz + NR 100MHz / QPSK / ANT1 (LTE) & ANT5(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	6900	-54.35	-13	-41.35	-64.56	3.03	13.24	H
	10368	-51.37	-13	-38.37	-60.82	3.56	13.01	H
	13824	-46.84	-13	-33.84	-56.36	3.92	13.44	H
	6900	-52.18	-13	-39.18	-62.39	3.03	13.24	V
	10368	-52.10	-13	-39.10	-61.55	3.56	13.01	V
	13824	-46.73	-13	-33.73	-56.25	3.92	13.44	V

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