TEST REPORT

FCC Test for RT8808-77C
Class II Permissive Change

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2404-FC007

DATE OF ISSUE
April 22, 2024

Tested by
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Applicant	**SAMSUNG Electronics Co., Ltd.** 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Product Name Model Name	RRU(RT8808) RT8808-77C
FCC ID	A3LRT8808-77A
Date of Test	March 14, 2024 ~ April 17, 2024
Location of Test	■ Permanent Testing Lab ☐ On Site Testing (Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea)
Test Standard Used	CFR 47 Part 2, Part 27
Test Results	PASS

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	April 22, 2024	Initial Release

Notice

Content
Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance. The results shown in this test report only apply to the sample(s), as received, provided by the applicant, unless otherwise stated. The test results have only been applied with the test methods required by the standard(s). The laboratory is not accredited for the test results marked *. Information provided by the applicant is marked **. Test results provided by external providers are marked ***. When confirmation of authenticity of this test report is required, please contact www.hct.co.kr The test results in this test report are not associated with the ((KS Q) ISO/IEC 17025) accreditation by KOLAS (Korea Laboratory Accreditation Scheme) / A2LA (American Association for Laboratory Accreditation) that are under the ILAC (International Laboratory Accreditation Cooperation) Mutual Recognition Agreement (MRA).

CONTENTS

1. GENERAL INFORMATION

1.1. APPLICANT INFORMATION

Company Name	Samsung Electronics Co., Ltd.
Company Address	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

1.2. PRODUCT INFORMATION

EUT Type	RRU(RT8808)					
EUT Serial Number	S617718742					
Power Supply	-48 VDC					
Output Power	Band	Carrier	Bandwidth	Power		
	(8 Port) 5G NR n77	1	40 MHz	40 W/path, Total: 320 W		
	(8 Port) 5G NR n77	1	60 MHz	40 W/path, Total: 320 W		
	(8 Port) 5G NR n77	1	80 MHz	40 W/path, Total: 320 W		
Frequency Range	(8 Port) 5G NR n77: 3 900 MHz ~ 3 980 MHz					
Emission Designator	Mode	Bandwidth	Emission Designator			
			QPSK (G7D)	Conducted (W)	16/64/256 QAM (W7D)	Conducted (W)
	(8 Port) 5G NR n77	40 MHz	38M1G7D	294.36	38M1W7D	291.91
	(8 Port) 5G NR n77	60 MHz	58M1G7D	296.33	58M1W7D	283.93
	(8 Port) 5G NR n77	80 MHz	77M7G7D	279.80	77M8W7D	280.61
Modulation Type	QPSK, 16QAM, 64QAM, 256QAM					

1.3. TEST INFORMATION

FCC Rule Parts	CFR 47 Part 2, Part 27
Measurement standards	ANSI C63.26-2015, KDB 662911 D01 v02r01, KDB 971168 D01 v03r01
Place of Test	74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

2. FACILITIES AND ACCREDITATIONS

2.1. FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA.
The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.
Detailed description of test facility was submitted to the Commission and accepted dated March 11, 2024 (CAB identifier: KR0032).

2.2. EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.
Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.
All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

3. TEST SPECIFICATIONS

3.1. STANDARDS

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 2, Part 27

Description	Reference	Results
RF Output Power	§ 2.1046, § 27.50(j)(2)	Compliant
PAPR	§ 27.50(j)(4)	Compliant
Occupied Bandwidth	§ 2.1049	Compliant
Out-of-band Unwanted Emissions	§ 2.1051, § 27.53(l)(1)	Compliant
Spurious Unwanted Emissions		Compliant
Radiated Emissions	§ 2.1053, § 27.53(l)(1)	Compliant
Frequency Stability	§ 2.1055, § 27.54	Compliant

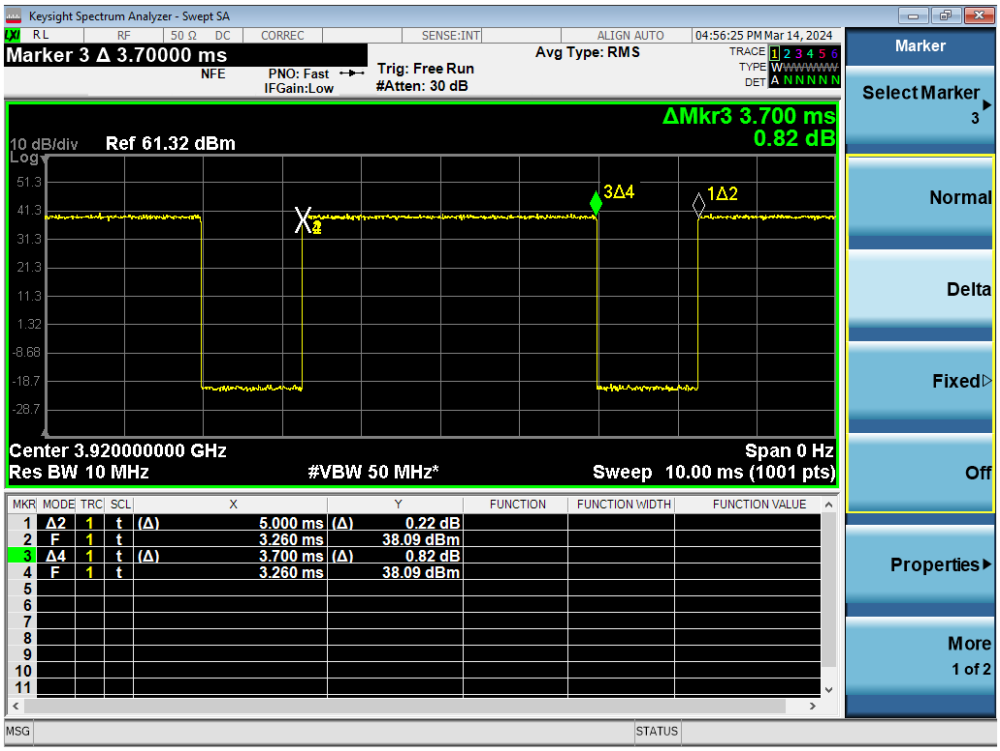
Note:

1. The equipment changes of C2PC models does not degrade the data reported to the Commission in original application report listed below.
   FCC ID: A3LRT8808-77A previous report.
   - Original equipment report no. HCT-RF-2108-FC003
2. The data from that application has been verified through appropriate spot checks to demonstrate compliance for this device as shown in the test result.
3. Output power was verified to be within the expected tune up tolerances prior to performing the spot checks for radiated spurious emissions.

3.2. ADDITIONAL DESCRIPTIONS ABOUT TEST

- The EUT was operated in a manner representative of the typical usage of the equipment.
- During all testing, system components were manipulated within the confines of typical usage to maximize each emission.
- All 5G NR modulation types (QPSK, 16QAM, 64QAM, 256QAM) supported by the EUT have been tested.
- The measurement has been performed for NR carrier in the mode of full resource Block size as the worst case to transmit maximum output power.
- The dummy loads were connected to the RF output ports for radiated spurious emission testing.
- Because of the EUT using TDD technology, it cannot be configured to transmit continuously and measurement instrument cannot be configured to measure only during active transmissions. So, we performed the measurement using duty cycle method.

Measurement Result of RT8808-77C Transmit On/Off Timing



The EUT duty cycle is calculated according to ANSI C63.26 - 5.2.4.3.4.

Duty Cycle = On-time / Transmitter period = 3.70 ms / 5.00 ms = 0.74

Duty Correction = 10 log (1/duty cycle) = 10 log (1/0.74) = 1.308 dB (1.3076828... dB)#

The value 1.308 is an approximate value, and actual values(1.3076828...) have been used in all calculations.

- The tests results in plots are already including the actual value of loss for the attenuator and cable combination. Please check correction factors below table.

ANT0

Correction factor table			
Frequency (MHz)	Factor (dB)	Frequency (MHz)	Factor (dB)
400	30.394	11 000	37.278
600	30.696	12 000	38.070
800	30.967	13 000	37.236
1 000	31.217	14 000	38.871
1 200	31.507	15 000	37.926
1 400	31.662	16 000	35.750
1 600	31.848	17 000	29.107
1 800	32.001	18 000	28.683
2 000	32.322	19 000	34.252
2 200	32.378	20 000	34.627
2 400	32.545	21 000	35.681
2 600	32.683	22 000	34.751
2 800	32.980	23 000	34.122
3 000	33.112	24 000	32.089
3 100	33.166	25 000	28.128
3 200	33.255	26 000	27.520
3 300	33.283	27 000	33.216
3 400	33.430	28 000	32.247
3 500	33.454	29 000	36.571
3 600	34.050	30 000	35.001
3 700	34.067	31 000	34.425
3 800	33.991	32 000	31.705
3 900	34.075	33 000	37.123
4 000	34.145	34 000	37.720
5 000	34.876	35 000	36.363
6 000	35.397	36 000	27.928
7 000	36.431	37 000	34.687
8 000	37.341	38 000	35.277
9 000	38.353	39 000	35.354
10 000	32.398	40 000	40.636

ANT1

Correction factor table			
Frequency (MHz)	Factor (dB)	Frequency (MHz)	Factor (dB)
400	30.682	11 000	36.940
600	30.982	12 000	37.758
800	30.912	13 000	37.606
1 000	31.674	14 000	39.096
1 200	31.475	15 000	37.942
1 400	31.516	16 000	35.657
1 600	31.665	17 000	29.253
1 800	32.132	18 000	28.898
2 000	31.836	19 000	33.923
2 200	32.832	20 000	34.699
2 400	33.007	21 000	35.284
2 600	32.515	22 000	34.648
2 800	33.356	23 000	33.977
3 000	32.983	24 000	32.185
3 100	32.989	25 000	27.861
3 200	32.869	26 000	27.453
3 300	33.054	27 000	33.645
3 400	33.203	28 000	32.587
3 500	33.050	29 000	36.284
3 600	34.169	30 000	34.538
3 700	33.648	31 000	34.624
3 800	33.991	32 000	31.971
3 900	34.486	33 000	37.211
4 000	34.498	34 000	37.985
5 000	34.575	35 000	36.549
6 000	35.850	36 000	27.613
7 000	36.591	37 000	35.183
8 000	37.157	38 000	34.881
9 000	38.809	39 000	35.319
10 000	31.902	40 000	41.023

ANT2

Correction factor table			
Frequency (MHz)	Factor (dB)	Frequency (MHz)	Factor (dB)
400	30.415	11 000	37.729
600	30.743	12 000	38.620
800	31.028	13 000	37.614
1 000	31.330	14 000	38.815
1 200	31.626	15 000	38.625
1 400	31.769	16 000	35.571
1 600	31.983	17 000	28.969
1 800	32.182	18 000	29.007
2 000	32.471	19 000	34.460
2 200	32.574	20 000	34.577
2 400	32.738	21 000	36.026
2 600	32.838	22 000	34.582
2 800	33.177	23 000	33.843
3 000	33.306	24 000	32.677
3 100	33.351	25 000	28.132
3 200	33.480	26 000	27.537
3 300	33.549	27 000	33.137
3 400	33.642	28 000	32.166
3 500	33.703	29 000	36.528
3 600	34.233	30 000	35.548
3 700	34.189	31 000	34.136
3 800	34.226	32 000	31.691
3 900	34.244	33 000	37.264
4 000	34.330	34 000	38.272
5 000	35.013	35 000	36.421
6 000	35.735	36 000	28.477
7 000	36.687	37 000	35.189
8 000	37.411	38 000	35.650
9 000	38.215	39 000	35.721
10 000	32.326	40 000	40.840

ANT3

Correction factor table			
Frequency (MHz)	Factor (dB)	Frequency (MHz)	Factor (dB)
400	30.587	11 000	37.028
600	30.936	12 000	37.809
800	31.213	13 000	36.976
1 000	31.562	14 000	39.134
1 200	31.857	15 000	38.562
1 400	32.005	16 000	35.466
1 600	33.850	17 000	29.486
1 800	33.761	18 000	28.909
2 000	34.032	19 000	34.904
2 200	33.945	20 000	34.634
2 400	33.745	21 000	36.200
2 600	33.876	22 000	35.088
2 800	34.113	23 000	33.961
3 000	33.936	24 000	32.651
3 100	34.065	25 000	27.974
3 200	34.064	26 000	27.261
3 300	34.091	27 000	33.828
3 400	34.312	28 000	32.924
3 500	34.388	29 000	36.342
3 600	35.033	30 000	35.657
3 700	34.700	31 000	35.039
3 800	34.826	32 000	32.176
3 900	34.616	33 000	37.543
4 000	34.672	34 000	37.562
5 000	35.393	35 000	36.528
6 000	35.958	36 000	28.207
7 000	37.206	37 000	35.018
8 000	38.047	38 000	35.379
9 000	39.049	39 000	35.674
10 000	32.508	40 000	40.760

ANT4

Correction factor table			
Frequency (MHz)	Factor (dB)	Frequency (MHz)	Factor (dB)
400	32.596	11 000	37.675
600	32.898	12 000	38.245
800	33.140	13 000	37.336
1 000	33.338	14 000	38.898
1 200	33.563	15 000	38.173
1 400	33.740	16 000	36.056
1 600	33.958	17 000	29.533
1 800	34.076	18 000	28.850
2 000	34.419	19 000	34.200
2 200	34.503	20 000	34.767
2 400	34.539	21 000	35.595
2 600	34.631	22 000	34.850
2 800	34.943	23 000	33.828
3 000	35.084	24 000	32.091
3 100	35.047	25 000	28.812
3 200	35.092	26 000	27.335
3 300	35.068	27 000	33.512
3 400	35.177	28 000	32.214
3 500	35.218	29 000	36.416
3 600	35.675	30 000	34.786
3 700	35.593	31 000	34.560
3 800	35.614	32 000	32.384
3 900	35.581	33 000	37.817
4 000	35.624	34 000	38.052
5 000	36.009	35 000	36.415
6 000	36.183	36 000	27.909
7 000	37.041	37 000	35.042
8 000	37.397	38 000	35.398
9 000	37.770	39 000	35.617
10 000	32.763	40 000	40.537

ANT5

Correction factor table			
Frequency (MHz)	Factor (dB)	Frequency (MHz)	Factor (dB)
400	30.575	11 000	37.440
600	30.927	12 000	38.683
800	31.203	13 000	37.546
1 000	31.584	14 000	38.652
1 200	31.899	15 000	38.117
1 400	32.010	16 000	36.073
1 600	32.250	17 000	29.439
1 800	32.422	18 000	29.257
2 000	32.796	19 000	34.809
2 200	32.891	20 000	34.542
2 400	33.028	21 000	35.490
2 600	33.188	22 000	35.228
2 800	33.534	23 000	34.432
3 000	33.667	24 000	32.763
3 100	33.724	25 000	28.651
3 200	33.811	26 000	27.538
3 300	33.901	27 000	33.356
3 400	34.056	28 000	32.169
3 500	34.088	29 000	36.603
3 600	34.354	30 000	35.257
3 700	34.303	31 000	34.493
3 800	34.198	32 000	31.724
3 900	34.228	33 000	37.317
4 000	34.344	34 000	37.566
5 000	35.242	35 000	36.146
6 000	35.847	36 000	28.471
7 000	37.318	37 000	34.945
8 000	38.240	38 000	35.286
9 000	39.255	39 000	35.587
10 000	32.474	40 000	41.153

ANT6

Correction factor table			
Frequency (MHz)	Factor (dB)	Frequency (MHz)	Factor (dB)
400	33.928	11 000	37.000
600	33.253	12 000	37.810
800	32.884	13 000	37.479
1 000	33.162	14 000	38.800
1 200	33.197	15 000	37.718
1 400	33.461	16 000	36.291
1 600	33.686	17 000	29.292
1 800	33.817	18 000	29.319
2 000	34.081	19 000	34.445
2 200	34.450	20 000	34.836
2 400	35.049	21 000	35.532
2 600	34.792	22 000	34.837
2 800	34.965	23 000	34.045
3 000	34.994	24 000	32.631
3 100	34.982	25 000	28.725
3 200	35.128	26 000	27.568
3 300	35.081	27 000	33.889
3 400	35.387	28 000	32.730
3 500	35.204	29 000	36.601
3 600	35.771	30 000	35.432
3 700	35.627	31 000	34.561
3 800	35.501	32 000	32.173
3 900	35.476	33 000	37.207
4 000	35.613	34 000	38.334
5 000	35.887	35 000	36.929
6 000	36.049	36 000	28.204
7 000	36.615	37 000	35.075
8 000	36.823	38 000	35.740
9 000	37.579	39 000	35.465
10 000	33.039	40 000	40.395

ANT7

Correction factor table			
Frequency (MHz)	Factor (dB)	Frequency (MHz)	Factor (dB)
400	30.619	11 000	36.972
600	31.001	12 000	37.910
800	31.331	13 000	37.556
1 000	31.635	14 000	38.658
1 200	31.940	15 000	37.861
1 400	32.168	16 000	35.503
1 600	32.402	17 000	29.421
1 800	32.603	18 000	28.370
2 000	32.986	19 000	34.324
2 200	33.085	20 000	35.184
2 400	33.273	21 000	36.085
2 600	33.439	22 000	35.207
2 800	33.728	23 000	34.406
3 000	33.929	24 000	31.750
3 100	33.988	25 000	27.963
3 200	34.110	26 000	27.865
3 300	34.245	27 000	33.412
3 400	34.339	28 000	32.076
3 500	34.418	29 000	36.537
3 600	34.817	30 000	35.557
3 700	34.830	31 000	34.300
3 800	34.688	32 000	32.167
3 900	34.708	33 000	36.747
4 000	34.813	34 000	38.133
5 000	35.759	35 000	36.394
6 000	36.530	36 000	28.157
7 000	37.664	37 000	35.142
8 000	38.420	38 000	35.266
9 000	39.333	39 000	35.095
10 000	32.111	40 000	40.604

3.3. MAXIMUM MEASUREMENTUNCERTAINTY

Description	Condition	Uncertainty
Radiated Disturbance	9 kHz ~ 30 MHz	4.36 dB
	30 MHz ~ 1 GHz	5.70 dB
	1 GHz ~ 18 GHz	5.52 dB
	18 GHz ~ 40 GHz	5.66 dB

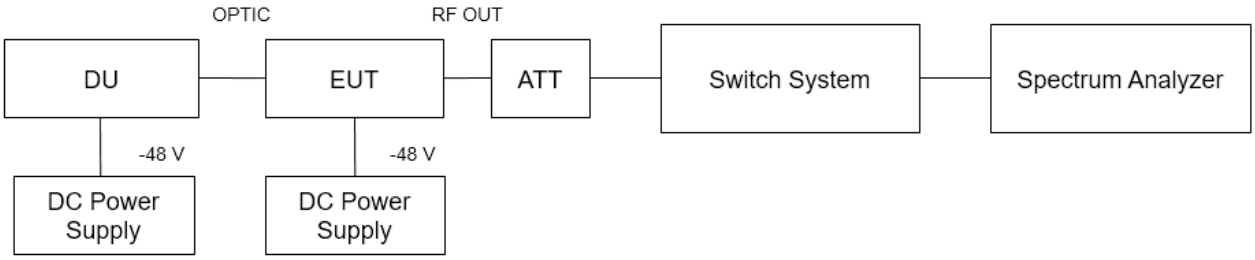
Coverage factor k = 2, Confidence levels of 95 %

3.4. STANDARDS ENVIRONMENTAL TEST CONDITIONS

Temperature:	+15 °C to +35 °C
Relative humidity:	30 % to 60 %
Air pressure:	860 mbar to 1 060 mbar

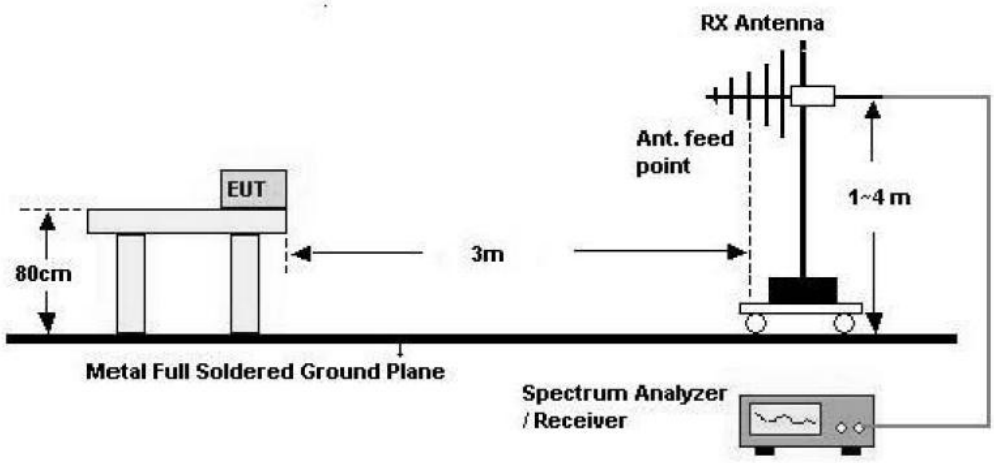
3.5. TEST DIAGRAMS

Conducted Test

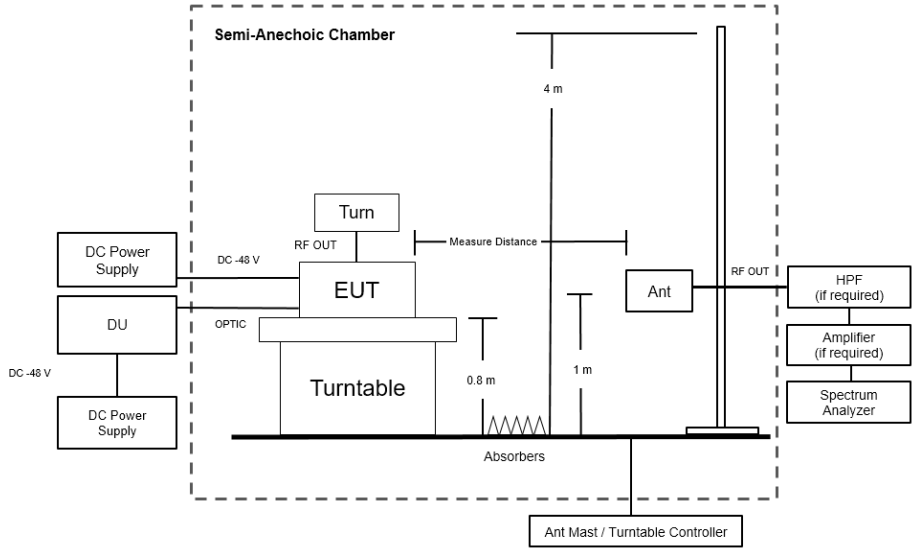


Radiated Test

30 MHz ~ 1 GHz

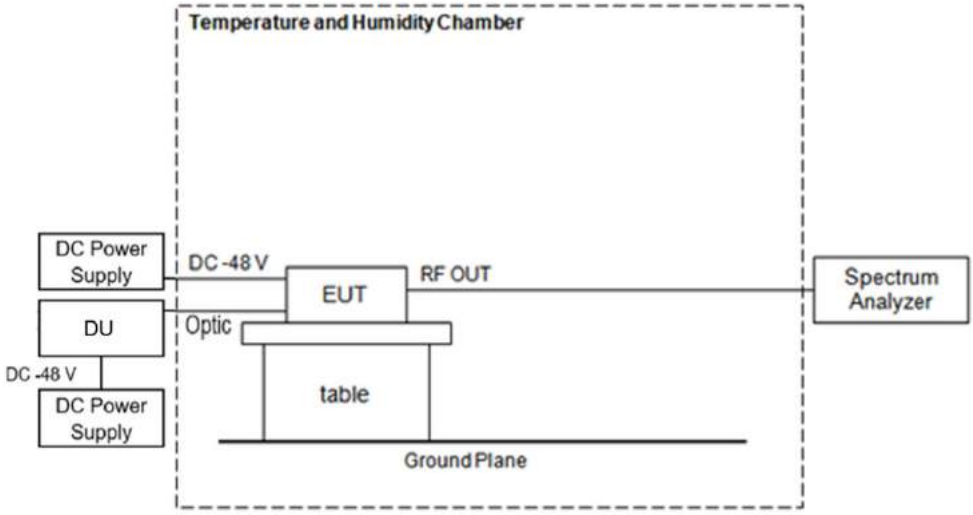


Above 1 GHz



※ EUT position is adopted by placement of floor-standing refer to section 5.5.2.3.2 of ANSI C63.26-2015

Frequency Stability



Note: All modulations(QPSK, 16QAM, 64QAM, 256QAM) were investigated and the worst case configuration channel results are reported.

4. TEST EQUIPMENTS

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
PXA Signal Analyzer	N9030A	Keysight	MY55410714	2025-02-13	Annual
PXA Signal Analyzer	N9030A	Keysight	MY49431434	2024-12-27	Annual
RF Switch System	TMX0132C	TNM System	TM21100002	N/A	N/A
#30 dB Attenuator	TWAN-300-18G	Teleworld	N/A	2024-08-18	Annual
#50Ω Termination	908A	H.P.	N/A	N/A	N/A
#30 dB Attenuator	WA93-30-33	Weinschel, Inc.	0499	2024-11-24	Annual
Coaxial Attenuator	FAS-23-20	MCLI	103756	2025-01-02	Annual
DC Power Supply	EX 60-40	ODA	ODA-02-0923-01606	2025-02-23	Annual
DC Power Supply	6674A	Agilent	MY41003340	2024-07-06	Annual
Temperature and Humidity Chamber	NY-THR18750	NANGYEAL	NY-200912201A	2025-01-04	Annual
Amp & Filter Bank Switch Controller	FBSM-01B	TNM system	TM20090002	N/A	N/A
Controller(Antenna mast & Turn Table)	CO3000	Innco systems	CO3000/1251/48920320/P	N/A	N/A
Antenna Position Tower	MA4640/800-XP-ET	Innco systems	N/A	N/A	N/A
Turn Table	DS2000-S	Innco systems	N/A	N/A	N/A
Turn Table	Turn Table	Ets	N/A	N/A	N/A
Loop Antenna	FMZB 1513	Schwarzbeck	1513-333	2026-03-07	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	01039	2024-09-16	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	937	2025-02-13	Biennial
Horn Antenna (15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170342	2024-09-29	Biennial
RF Switching System	FBSR-04C (7G HPF+LNA)	T&M SYSTEM	S4L5	2025-04-11	Annual
Power Amplifier	CBL18265035	CERNEX	22966	2024-11-17	Annual
Power Amplifier	CBL26405040	CERNEX	25956	2025-02-26	Annual

#This equipment has been used to each port, but we only listed one equipment for simplicity.

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date, or will be tested after the calibration is completed.

5. TEST RESULT

5.1. RF OUTPUT POWER and PSD

Test Requirements:

§ 2.1046 Measurements required: RF power output.

(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in § 2.1033(c)(8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

(b) For single sideband, independent sideband, and single channel, controlled carrier radiotelephone transmitters the procedure specified in paragraph (a) of this section shall be employed and, in addition, the transmitter shall be modulated during the test as specified and applicable in § 2.1046 (b) (1-5). In all tests, the input level of the modulating signal shall be such as to develop rated peak envelope power or carrier power, as appropriate, for the transmitter.

(c) For measurements conducted pursuant to paragraphs (a) and (b) of this section, all calculations and methods used by the applicant for determining carrier power or peak envelope power, as appropriate, on the basis of measured power in the radio frequency load attached to the transmitter output terminals shall be shown. Under the test conditions specified, no components of the emission spectrum shall exceed the limits specified in the applicable rule parts as necessary for meeting occupied bandwidth or emission limitations.

§ 27.50 Power limits and duty cycle.

(j) The following power requirements apply to stations transmitting in the 3700-3980 MHz band:

(2) The power of each fixed or base station transmitting in the 3700-3980 MHz band and situated in any geographic location other than that described in paragraph (j)(1) of this section is limited to an EIRP of 1640 Watts/MHz. This limit applies to the aggregate power of all antenna elements in any given sector of a base station.

Test Procedures:

The measurement is performed in accordance with Section 5.2.4.4.2 of ANSI C63.26.

When the fundamental condition for average power measurements cannot be realized (i.e., the EUT cannot be configured to transmit at full-power on a continuous basis (i.e., duty cycle < 98%) and the instrumentation cannot be configured to measure only during active full-power transmissions), then the following procedure can be used if the EUT duty cycle is constant (i.e., duty cycle variations are less than or equal to ±2%). See 5.2.4.3.4 for guidance on measurement of duty cycle.

a) Set span to 2 × to 3 × the OBW.

b) Set RBW = 1 % to 5 % of the OBW.

c) Set VBW ≥ 3 × RBW.

d) Set number of measurement points in sweep ≥ 2 × span / RBW.

e) Sweep time:

   1) Set = auto-couple, or

   2) Set ≥ [10 × (number of points in sweep) × (transmission symbol period)] for single sweep (automation-compatible) measurement.

f) Detector = power averaging (rms).

g) Set sweep trigger to “free run.”

h) Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over the on and off time of the transmitter, it can be necessary to increase the number of traces to be averaged above 100, or if using a manually configured sweep time, increase the sweep time.

i) Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band or channel power measurement function with band/channel limits set equal to the OBW band edges. If the instrument does not have a band or channel power function, sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

j) Add 10 log (1/duty cycle) to the measured power level to compute the average power during continuous transmission. For example, add [10 log (1/0.25)] = 6 dB if the duty cycle is a constant 25%.

The PSD measurement is performed in accordance with Section 5.2.4.5 of ANSI C63.26.
Some regulatory requirements specify the RF output power limits in terms of maximum or average PSD, (i.e., the output power or unwanted emissions power limits are defined within a specified reference bandwidth).
When average PSD limits are specified, the same fundamental measurement condition applies as previously discussed (i.e., averaging is to be performed only over durations of active transmissions at maximum output power level). Thus, when performing this measurement, the EUT must either be configured to transmit continuously at full power while the compliance measurement is performed, or else the measurement instrumentation must be configured to acquire data only over durations when the EUT is actively transmitting at full power. In circumstances where neither of these conditions can be realized, then alternative procedures are provided for both constant duty cycle and non-constant duty cycle transmissions.
The PSD is measured following the same procedures described in 5.2.4.4 for measuring the total average power, but with the RBW set to the reference bandwidth specified by the applicable regulatory requirement, and by using the marker function to identify the maximum PSD instead of summing the power across the OBW. If the fundamental measurement condition cannot be realized, then one of the alternative procedures in 5.2.4.4.2 or 5.2.4.4.3 should be selected, based on whether the transmitter duty cycle is constant (variations $\leq \pm 2\%$) or non-constant (variations $> \pm 2\%$), respectively.

Note:

1. The measured value is calculated by adding duty correction.
   Sample Calculation:
   Measured Value = 44.76 dBm (actual measured value) + 1.308 dB[#] (duty correction) = 46.07 dBm
   [#] The value 1.308 is an approximate value, and actual values(1.3076828...) have been used in all calculations.
2. The results of the Conducted output power and PSD test shown above the frequency measured values are very small and similar trend for each port, so we are attached only the worst case plot.

Test Results:

Tabular Data of RF output power

(8 Port) 5G NR n77 40 MHz 1 Carrier

Ant.	Mod.	Ch.	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
0	QPSK	Low	3 920.00	45.32	34.03
		Middle	3 940.00	45.64	36.65
		High	3 960.00	45.35	34.32
	16QAM	Low	3 920.00	45.43	34.87
		Middle	3 940.00	45.63	36.56
		High	3 960.00	45.66	36.85
	64QAM	Low	3 920.00	45.49	35.38
		Middle	3 940.00	45.65	36.76
		High	3 960.00	45.63	36.52
	256QAM	Low	3 920.00	45.55	35.93
		Middle	3 940.00	45.72	37.35
		High	3 960.00	45.54	35.78
1	QPSK	Low	3 920.00	45.64	36.63
		Middle	3 940.00	45.91	39.04
		High	3 960.00	45.68	37.01
	16QAM	Low	3 920.00	45.74	37.50
		Middle	3 940.00	45.93	39.18
		High	3 960.00	45.81	38.13
	64QAM	Low	3 920.00	45.80	38.00
		Middle	3 940.00	45.88	38.69
		High	3 960.00	45.63	36.57
	256QAM	Low	3 920.00	45.87	38.67
		Middle	3 940.00	45.90	38.93
		High	3 960.00	45.80	38.00
2	QPSK	Low	3 920.00	45.41	34.75
		Middle	3 940.00	45.67	36.91
		High	3 960.00	45.18	32.97
	16QAM	Low	3 920.00	45.54	35.82
		Middle	3 940.00	45.53	35.69
		High	3 960.00	45.53	35.74
	64QAM	Low	3 920.00	45.60	36.30
		Middle	3 940.00	45.60	36.35
		High	3 960.00	45.31	34.00
	256QAM	Low	3 920.00	45.64	36.66
		Middle	3 940.00	45.65	36.71
		High	3 960.00	45.65	36.75

Ant.	Mod.	Ch.	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
3	QPSK	Low	3 920.00	45.78	37.81
		Middle	3 940.00	45.85	38.49
		High	3 960.00	45.46	35.16
	16QAM	Low	3 920.00	45.87	38.65
		Middle	3 940.00	45.80	38.01
		High	3 960.00	45.84	38.35
	64QAM	Low	3 920.00	45.94	39.23
		Middle	3 940.00	45.87	38.66
		High	3 960.00	45.65	36.69
	256QAM	Low	3 920.00	45.97	39.57
		Middle	3 940.00	45.86	38.54
		High	3 960.00	45.65	36.76
4	QPSK	Low	3 920.00	45.35	34.31
		Middle	3 940.00	45.40	34.69
		High	3 960.00	45.09	32.31
	16QAM	Low	3 920.00	45.45	35.09
		Middle	3 940.00	45.32	34.05
		High	3 960.00	45.34	34.17
	64QAM	Low	3 920.00	45.54	35.83
		Middle	3 940.00	45.37	34.40
		High	3 960.00	45.24	33.38
	256QAM	Low	3 920.00	45.53	35.77
		Middle	3 940.00	45.39	34.56
		High	3 960.00	45.10	32.40
5	QPSK	Low	3 920.00	45.09	32.31
		Middle	3 940.00	45.12	32.50
		High	3 960.00	44.86	30.64
	16QAM	Low	3 920.00	45.14	32.69
		Middle	3 940.00	45.04	31.95
		High	3 960.00	45.08	32.19
	64QAM	Low	3 920.00	45.20	33.08
		Middle	3 940.00	45.08	32.22
		High	3 960.00	45.05	31.98
	256QAM	Low	3 920.00	45.20	33.11
		Middle	3 940.00	45.13	32.61
		High	3 960.00	44.77	29.96

Ant.	Mod.	Ch.	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
6	QPSK	Low	3 920.00	45.46	35.16
		Middle	3 940.00	46.07	40.44
		High	3 960.00	45.36	34.37
	16QAM	Low	3 920.00	45.55	35.91
		Middle	3 940.00	45.83	38.26
		High	3 960.00	45.57	36.10
	64QAM	Low	3 920.00	45.59	36.18
		Middle	3 940.00	44.57	28.63
		High	3 960.00	45.59	36.20
	256QAM	Low	3 920.00	45.61	36.37
		Middle	3 940.00	44.53	28.37
		High	3 960.00	45.42	34.86
7	QPSK	Low	3 920.00	45.42	34.81
		Middle	3 940.00	45.52	35.64
		High	3 960.00	45.34	34.21
	16QAM	Low	3 920.00	45.48	35.35
		Middle	3 940.00	45.53	35.69
		High	3 960.00	45.54	35.84
	64QAM	Low	3 920.00	45.49	35.38
		Middle	3 940.00	45.52	35.68
		High	3 960.00	45.44	35.00
	256QAM	Low	3 920.00	45.54	35.83
		Middle	3 940.00	45.52	35.61
		High	3 960.00	45.19	33.05

Sum Data of Port 0 ~ Port 7

Frequency (MHz)	Output Power (Conducted)			
	QPSK	16QAM	64QAM	256QAM
	W			
3 920.00	279.80	285.87	289.40	291.91
3 940.00	294.36	289.40	281.39	282.68
3 960.00	270.98	287.38	280.34	277.56

(8 Port) 5G NR n77 60 MHz 1 Carrier

Ant.	Mod.	Ch.	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
0	QPSK	Low	3 930.00	45.67	36.91
		Middle	3 940.00	45.68	36.97
		High	3 950.00	45.55	35.87
	16QAM	Low	3 930.00	45.47	35.25
		Middle	3 940.00	45.67	36.87
		High	3 950.00	45.71	37.20
	64QAM	Low	3 930.00	45.50	35.49
		Middle	3 940.00	45.44	34.99
		High	3 950.00	45.76	37.67
	256QAM	Low	3 930.00	45.43	34.95
		Middle	3 940.00	45.62	36.48
		High	3 950.00	45.58	36.12
1	QPSK	Low	3 930.00	46.02	40.00
		Middle	3 940.00	45.92	39.05
		High	3 950.00	45.93	39.15
	16QAM	Low	3 930.00	45.83	38.29
		Middle	3 940.00	45.79	37.94
		High	3 950.00	45.93	39.21
	64QAM	Low	3 930.00	45.85	38.48
		Middle	3 940.00	45.65	36.69
		High	3 950.00	45.89	38.82
	256QAM	Low	3 930.00	45.82	38.19
		Middle	3 940.00	45.89	38.79
		High	3 950.00	45.84	38.35
2	QPSK	Low	3 930.00	45.82	38.24
		Middle	3 940.00	45.56	35.93
		High	3 950.00	45.68	36.96
	16QAM	Low	3 930.00	45.63	36.53
		Middle	3 940.00	45.45	35.05
		High	3 950.00	45.62	36.48
	64QAM	Low	3 930.00	45.66	36.79
		Middle	3 940.00	45.40	34.66
		High	3 950.00	45.54	35.85
	256QAM	Low	3 930.00	45.57	36.09
		Middle	3 940.00	45.63	36.59
		High	3 950.00	45.62	36.44

Ant.	Mod.	Ch.	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
3	QPSK	Low	3 930.00	45.54	35.82
		Middle	3 940.00	45.18	32.94
		High	3 950.00	45.29	33.79
	16QAM	Low	3 930.00	45.29	33.82
		Middle	3 940.00	45.04	31.88
		High	3 950.00	45.15	32.76
	64QAM	Low	3 930.00	45.34	34.21
		Middle	3 940.00	45.18	32.95
		High	3 950.00	45.12	32.50
	256QAM	Low	3 930.00	45.27	33.66
		Middle	3 940.00	45.23	33.36
		High	3 950.00	45.18	32.98
4	QPSK	Low	3 930.00	45.80	37.98
		Middle	3 940.00	45.44	35.03
		High	3 950.00	45.59	36.21
	16QAM	Low	3 930.00	45.48	35.34
		Middle	3 940.00	45.29	33.83
		High	3 950.00	45.41	34.75
	64QAM	Low	3 930.00	45.55	35.87
		Middle	3 940.00	45.24	33.45
		High	3 950.00	45.40	34.64
	256QAM	Low	3 930.00	45.49	35.38
		Middle	3 940.00	45.52	35.64
		High	3 950.00	45.50	35.51
5	QPSK	Low	3 930.00	45.51	35.57
		Middle	3 940.00	45.22	33.24
		High	3 950.00	45.29	33.80
	16QAM	Low	3 930.00	45.27	33.64
		Middle	3 940.00	45.04	31.95
		High	3 950.00	45.14	32.70
	64QAM	Low	3 930.00	45.35	34.32
		Middle	3 940.00	45.03	31.86
		High	3 950.00	45.13	32.60
	256QAM	Low	3 930.00	45.27	33.65
		Middle	3 940.00	45.26	33.58
		High	3 950.00	45.19	33.01

Ant.	Mod.	Ch.	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
6	QPSK	Low	3 930.00	45.24	33.40
		Middle	3 940.00	44.88	30.79
		High	3 950.00	45.11	32.45
	16QAM	Low	3 930.00	45.01	31.69
		Middle	3 940.00	44.82	30.35
		High	3 950.00	44.95	31.28
	64QAM	Low	3 930.00	45.09	32.25
		Middle	3 940.00	45.29	33.82
		High	3 950.00	44.92	31.07
	256QAM	Low	3 930.00	44.96	31.35
		Middle	3 940.00	45.04	31.92
		High	3 950.00	45.02	31.75
7	QPSK	Low	3 930.00	45.84	38.41
		Middle	3 940.00	45.52	35.66
		High	3 950.00	45.63	36.53
	16QAM	Low	3 930.00	45.65	36.73
		Middle	3 940.00	45.39	34.62
		High	3 950.00	45.57	36.07
	64QAM	Low	3 930.00	45.63	36.53
		Middle	3 940.00	45.36	34.36
		High	3 950.00	45.52	35.68
	256QAM	Low	3 930.00	45.59	36.21
		Middle	3 940.00	45.56	35.97
		High	3 950.00	45.55	35.88

Sum Data of Port 0 ~ Port 7

Frequency (MHz)	Output Power (Conducted)			
	QPSK	16QAM	64QAM	256QAM
	W			
3 930.00	296.33	281.30	283.93	279.48
3 940.00	279.60	272.49	272.78	282.33
3 950.00	284.74	280.45	278.83	280.04

(8 Port) 5G NR n77 80 MHz 1 Carrier

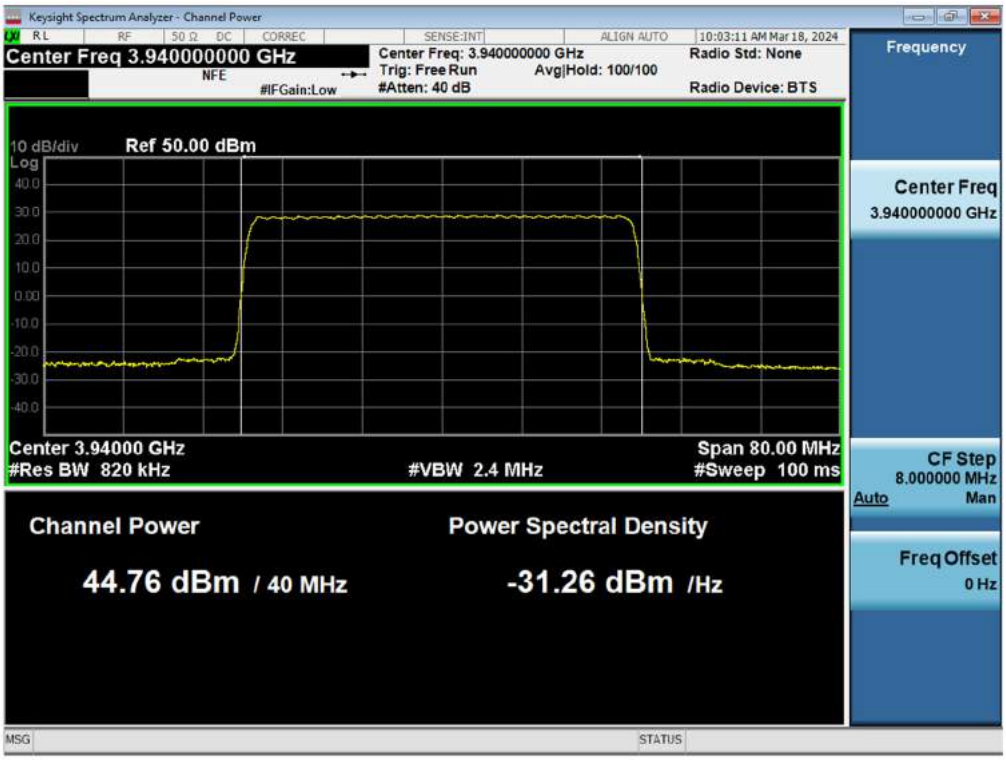
Ant.	Mod.	Ch.	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
0	QPSK	Middle	3 940.00	45.73	37.39
	16QAM	Middle	3 940.00	45.38	34.52
	64QAM	Middle	3 940.00	45.47	35.25
	256QAM	Middle	3 940.00	45.43	34.93
1	QPSK	Middle	3 940.00	45.93	39.22
	16QAM	Middle	3 940.00	45.72	37.29
	64QAM	Middle	3 940.00	45.79	37.92
	256QAM	Middle	3 940.00	45.80	37.99
2	QPSK	Middle	3 940.00	45.55	35.86
	16QAM	Middle	3 940.00	45.51	35.58
	64QAM	Middle	3 940.00	45.52	35.64
	256QAM	Middle	3 940.00	45.52	35.65
3	QPSK	Middle	3 940.00	45.19	33.04
	16QAM	Middle	3 940.00	45.33	34.11
	64QAM	Middle	3 940.00	45.12	32.52
	256QAM	Middle	3 940.00	45.18	32.98
4	QPSK	Middle	3 940.00	45.45	35.08
	16QAM	Middle	3 940.00	45.60	36.27
	64QAM	Middle	3 940.00	45.38	34.48
	256QAM	Middle	3 940.00	45.45	35.08
5	QPSK	Middle	3 940.00	45.17	32.86
	16QAM	Middle	3 940.00	45.30	33.88
	64QAM	Middle	3 940.00	45.07	32.15
	256QAM	Middle	3 940.00	45.16	32.79
6	QPSK	Middle	3 940.00	44.88	30.75
	16QAM	Middle	3 940.00	45.05	32.01
	64QAM	Middle	3 940.00	44.82	30.30
	256QAM	Middle	3 940.00	44.92	31.04
7	QPSK	Middle	3 940.00	45.51	35.60
	16QAM	Middle	3 940.00	45.68	36.96
	64QAM	Middle	3 940.00	45.38	34.51
	256QAM	Middle	3 940.00	45.50	35.51

Sum Data of Port 0 ~ Port 7

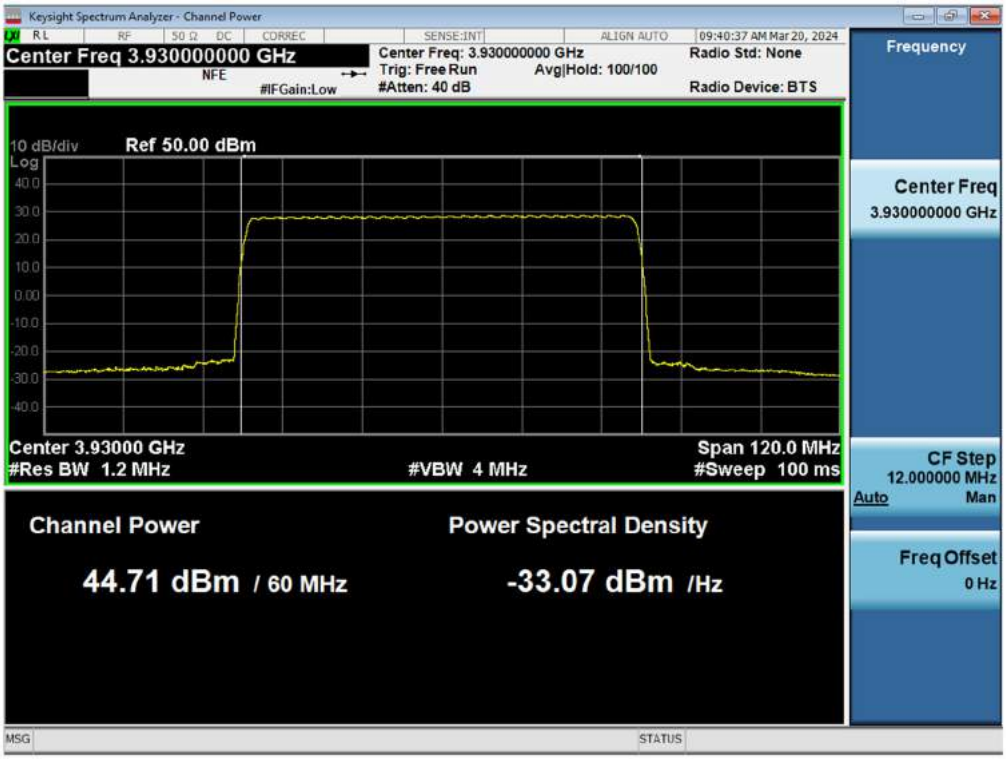
Frequency (MHz)	Output Power (Conducted)			
	QPSK	16QAM	64QAM	256QAM
	W			
3 940.00	279.80	280.61	272.77	275.97

Plot Data of RF Output Power

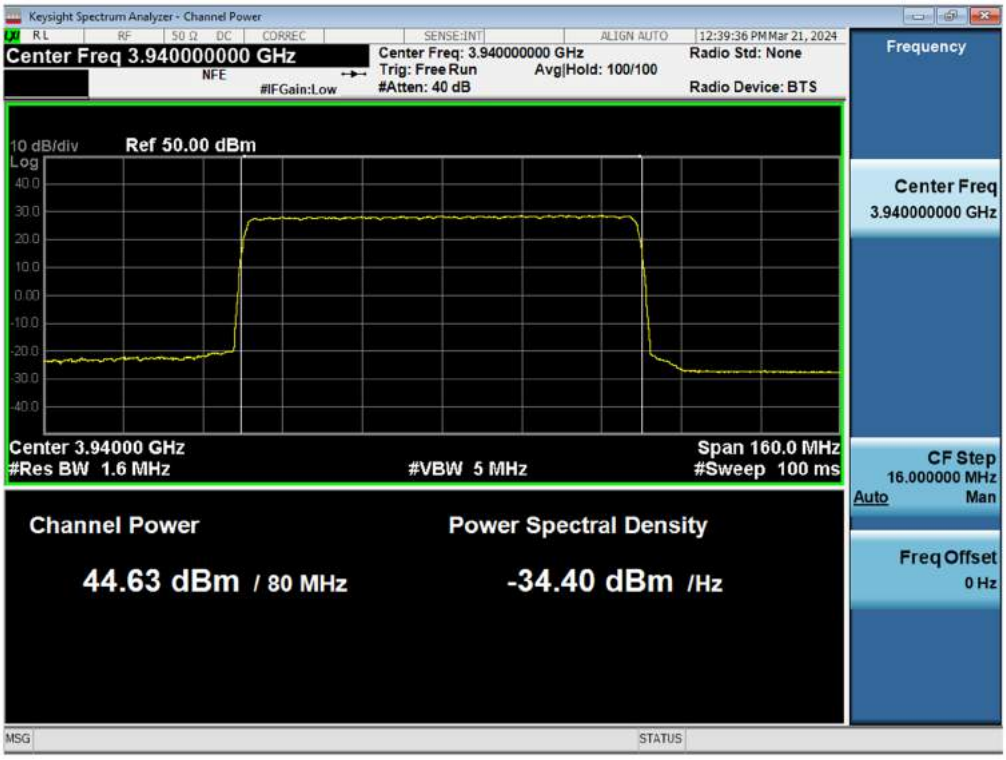
Antenna 6 / (8 Port) 5G NR n77 40 MHz 1 Carrier / QPSK / Middle



Antenna 1 / (8 Port) 5G NR n77 60 MHz 1 Carrier / QPSK / Low



Antenna 1 / (8 Port) 5G NR n77 80 MHz 1 Carrier / QPSK / Middle



Tabular Data of PSD

(8 Port) 5G NR n77 40 MHz 1 Carrier

Ant.	Mod.	Ch.	Frequency (MHz)	Measured Value (dBm/MHz)	Calculated (W/MHz)
0	QPSK	Low	3 920.00	30.64	1.16
		Middle	3 940.00	30.61	1.15
		High	3 960.00	30.35	1.08
	16QAM	Low	3 920.00	30.36	1.09
		Middle	3 940.00	30.61	1.15
		High	3 960.00	30.61	1.15
	64QAM	Low	3 920.00	30.59	1.15
		Middle	3 940.00	30.53	1.13
		High	3 960.00	30.49	1.12
	256QAM	Low	3 920.00	30.74	1.19
		Middle	3 940.00	30.67	1.17
		High	3 960.00	30.59	1.15
1	QPSK	Low	3 920.00	30.57	1.14
		Middle	3 940.00	30.67	1.17
		High	3 960.00	30.98	1.25
	16QAM	Low	3 920.00	30.81	1.21
		Middle	3 940.00	30.83	1.21
		High	3 960.00	30.67	1.17
	64QAM	Low	3 920.00	30.91	1.23
		Middle	3 940.00	30.62	1.15
		High	3 960.00	30.57	1.14
	256QAM	Low	3 920.00	30.87	1.22
		Middle	3 940.00	30.86	1.22
		High	3 960.00	30.96	1.25
2	QPSK	Low	3 920.00	30.28	1.07
		Middle	3 940.00	30.53	1.13
		High	3 960.00	30.32	1.08
	16QAM	Low	3 920.00	30.50	1.12
		Middle	3 940.00	30.63	1.16
		High	3 960.00	30.41	1.10
	64QAM	Low	3 920.00	30.50	1.12
		Middle	3 940.00	30.73	1.18
		High	3 960.00	30.62	1.15
	256QAM	Low	3 920.00	30.51	1.13
		Middle	3 940.00	30.56	1.14
		High	3 960.00	30.47	1.12

Ant.	Mod.	Ch.	Frequency (MHz)	Measured Value (dBm/MHz)	Calculated (W/MHz)
3	QPSK	Low	3 920.00	30.67	1.17
		Middle	3 940.00	31.00	1.26
		High	3 960.00	30.39	1.09
	16QAM	Low	3 920.00	30.88	1.23
		Middle	3 940.00	30.86	1.22
		High	3 960.00	30.70	1.17
	64QAM	Low	3 920.00	30.95	1.25
		Middle	3 940.00	30.75	1.19
		High	3 960.00	30.56	1.14
	256QAM	Low	3 920.00	30.89	1.23
		Middle	3 940.00	30.78	1.20
		High	3 960.00	30.78	1.20
4	QPSK	Low	3 920.00	30.41	1.10
		Middle	3 940.00	30.31	1.07
		High	3 960.00	29.93	0.98
	16QAM	Low	3 920.00	30.50	1.12
		Middle	3 940.00	30.32	1.08
		High	3 960.00	30.35	1.08
	64QAM	Low	3 920.00	30.47	1.12
		Middle	3 940.00	30.41	1.10
		High	3 960.00	30.32	1.08
	256QAM	Low	3 920.00	30.52	1.13
		Middle	3 940.00	30.31	1.07
		High	3 960.00	30.29	1.07
5	QPSK	Low	3 920.00	30.62	1.15
		Middle	3 940.00	29.98	1.00
		High	3 960.00	29.79	0.95
	16QAM	Low	3 920.00	30.18	1.04
		Middle	3 940.00	29.76	0.95
		High	3 960.00	30.02	1.01
	64QAM	Low	3 920.00	30.20	1.05
		Middle	3 940.00	30.08	1.02
		High	3 960.00	30.02	1.00
	256QAM	Low	3 920.00	30.41	1.10
		Middle	3 940.00	30.06	1.01
		High	3 960.00	29.65	0.92

Ant.	Mod.	Ch.	Frequency (MHz)	Measured Value (dBm/MHz)	Calculated (W/MHz)
6	QPSK	Low	3 920.00	30.42	1.10
		Middle	3 940.00	29.11	0.81
		High	3 960.00	30.45	1.11
	16QAM	Low	3 920.00	30.75	1.19
		Middle	3 940.00	29.08	0.81
		High	3 960.00	30.40	1.10
	64QAM	Low	3 920.00	30.84	1.21
		Middle	3 940.00	29.03	0.80
		High	3 960.00	30.48	1.12
	256QAM	Low	3 920.00	30.66	1.16
		Middle	3 940.00	29.25	0.84
		High	3 960.00	30.31	1.07
7	QPSK	Low	3 920.00	30.37	1.09
		Middle	3 940.00	30.61	1.15
		High	3 960.00	30.26	1.06
	16QAM	Low	3 920.00	30.56	1.14
		Middle	3 940.00	30.34	1.08
		High	3 960.00	30.43	1.10
	64QAM	Low	3 920.00	30.53	1.13
		Middle	3 940.00	30.52	1.13
		High	3 960.00	30.36	1.09
	256QAM	Low	3 920.00	30.50	1.12
		Middle	3 940.00	30.33	1.08
		High	3 960.00	30.08	1.02

Sum Data of Port 0 ~ Port 7

Frequency (MHz)	PSD (Conducted)			
	QPSK	16QAM	64QAM	256QAM
	W			
3 920.00	8.97	9.13	9.25	9.27
3 940.00	8.74	8.65	8.70	8.73
3 960.00	8.61	8.88	8.84	8.79

(8 Port) 5G NR n77 60 MHz 1 Carrier

Ant.	Mod.	Ch.	Frequency (MHz)	Measured Value (dBm/MHz)	Calculated (W/MHz)
0	QPSK	Low	3 930.00	28.91	0.78
		Middle	3 940.00	28.90	0.78
		High	3 950.00	28.85	0.77
	16QAM	Low	3 930.00	28.77	0.75
		Middle	3 940.00	29.03	0.80
		High	3 950.00	29.07	0.81
	64QAM	Low	3 930.00	29.01	0.80
		Middle	3 940.00	29.02	0.80
		High	3 950.00	28.96	0.79
	256QAM	Low	3 930.00	29.00	0.79
		Middle	3 940.00	28.87	0.77
		High	3 950.00	28.88	0.77
1	QPSK	Low	3 930.00	29.10	0.81
		Middle	3 940.00	29.08	0.81
		High	3 950.00	29.17	0.83
	16QAM	Low	3 930.00	29.14	0.82
		Middle	3 940.00	29.26	0.84
		High	3 950.00	29.08	0.81
	64QAM	Low	3 930.00	29.28	0.85
		Middle	3 940.00	28.85	0.77
		High	3 950.00	29.15	0.82
	256QAM	Low	3 930.00	28.90	0.78
		Middle	3 940.00	29.11	0.81
		High	3 950.00	29.27	0.85
2	QPSK	Low	3 930.00	29.11	0.81
		Middle	3 940.00	29.06	0.81
		High	3 950.00	28.99	0.79
	16QAM	Low	3 930.00	28.92	0.78
		Middle	3 940.00	28.66	0.73
		High	3 950.00	28.75	0.75
	64QAM	Low	3 930.00	29.05	0.80
		Middle	3 940.00	28.65	0.73
		High	3 950.00	28.87	0.77
	256QAM	Low	3 930.00	29.13	0.82
		Middle	3 940.00	28.81	0.76
		High	3 950.00	28.76	0.75

Ant.	Mod.	Ch.	Frequency (MHz)	Measured Value (dBm/MHz)	Calculated (W/MHz)
3	QPSK	Low	3 930.00	28.50	0.71
		Middle	3 940.00	28.42	0.69
		High	3 950.00	28.69	0.74
	16QAM	Low	3 930.00	28.39	0.69
		Middle	3 940.00	28.17	0.66
		High	3 950.00	28.47	0.70
	64QAM	Low	3 930.00	28.41	0.69
		Middle	3 940.00	28.49	0.71
		High	3 950.00	28.45	0.70
	256QAM	Low	3 930.00	28.46	0.70
		Middle	3 940.00	28.39	0.69
		High	3 950.00	28.45	0.70
4	QPSK	Low	3 930.00	29.26	0.84
		Middle	3 940.00	28.82	0.76
		High	3 950.00	28.71	0.74
	16QAM	Low	3 930.00	28.73	0.75
		Middle	3 940.00	28.45	0.70
		High	3 950.00	28.57	0.72
	64QAM	Low	3 930.00	28.74	0.75
		Middle	3 940.00	28.52	0.71
		High	3 950.00	28.67	0.74
	256QAM	Low	3 930.00	28.86	0.77
		Middle	3 940.00	28.66	0.73
		High	3 950.00	28.59	0.72
5	QPSK	Low	3 930.00	28.55	0.72
		Middle	3 940.00	28.37	0.69
		High	3 950.00	28.46	0.70
	16QAM	Low	3 930.00	28.30	0.68
		Middle	3 940.00	28.16	0.65
		High	3 950.00	28.22	0.66
	64QAM	Low	3 930.00	28.54	0.72
		Middle	3 940.00	28.22	0.66
		High	3 950.00	28.30	0.68
	256QAM	Low	3 930.00	28.47	0.70
		Middle	3 940.00	28.44	0.70
		High	3 950.00	28.29	0.67

Ant.	Mod.	Ch.	Frequency (MHz)	Measured Value (dBm/MHz)	Calculated (W/MHz)
6	QPSK	Low	3 930.00	28.55	0.72
		Middle	3 940.00	27.99	0.63
		High	3 950.00	28.17	0.66
	16QAM	Low	3 930.00	28.18	0.66
		Middle	3 940.00	27.85	0.61
		High	3 950.00	28.14	0.65
	64QAM	Low	3 930.00	28.36	0.69
		Middle	3 940.00	28.57	0.72
		High	3 950.00	28.06	0.64
	256QAM	Low	3 930.00	28.25	0.67
		Middle	3 940.00	28.16	0.66
		High	3 950.00	28.36	0.69
7	QPSK	Low	3 930.00	29.52	0.90
		Middle	3 940.00	28.71	0.74
		High	3 950.00	28.92	0.78
	16QAM	Low	3 930.00	28.98	0.79
		Middle	3 940.00	28.57	0.72
		High	3 950.00	28.80	0.76
	64QAM	Low	3 930.00	28.86	0.77
		Middle	3 940.00	28.71	0.74
		High	3 950.00	28.63	0.73
	256QAM	Low	3 930.00	28.83	0.76
		Middle	3 940.00	28.87	0.77
		High	3 950.00	28.70	0.74

Sum Data of Port 0 ~ Port 7

Frequency (MHz)	PSD (Conducted)			
	QPSK	16QAM	64QAM	256QAM
	W			
3 930.00	6.29	5.91	6.06	5.99
3 940.00	5.91	5.72	5.84	5.89
3 950.00	6.00	5.86	5.86	5.89

(8 Port) 5G NR n77 80 MHz 1 Carrier

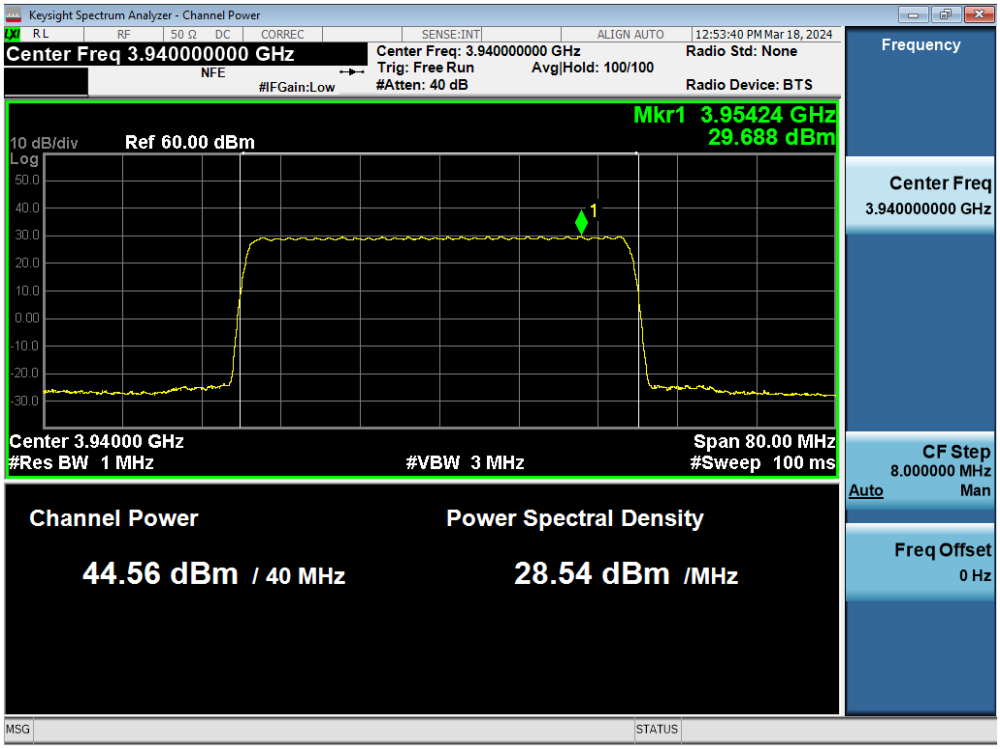
Ant.	Mod.	Ch.	Frequency (MHz)	Measured Value (dBm/MHz)	Calculated (W/MHz)
0	QPSK	Middle	3 940.00	27.96	0.63
	16QAM	Middle	3 940.00	27.56	0.57
	64QAM	Middle	3 940.00	27.58	0.57
	256QAM	Middle	3 940.00	27.81	0.60
1	QPSK	Middle	3 940.00	27.94	0.62
	16QAM	Middle	3 940.00	27.69	0.59
	64QAM	Middle	3 940.00	27.81	0.60
	256QAM	Middle	3 940.00	27.71	0.59
2	QPSK	Middle	3 940.00	27.47	0.56
	16QAM	Middle	3 940.00	27.64	0.58
	64QAM	Middle	3 940.00	27.40	0.55
	256QAM	Middle	3 940.00	27.62	0.58
3	QPSK	Middle	3 940.00	27.26	0.53
	16QAM	Middle	3 940.00	27.51	0.56
	64QAM	Middle	3 940.00	27.29	0.54
	256QAM	Middle	3 940.00	27.27	0.53
4	QPSK	Middle	3 940.00	27.49	0.56
	16QAM	Middle	3 940.00	27.77	0.60
	64QAM	Middle	3 940.00	27.65	0.58
	256QAM	Middle	3 940.00	27.47	0.56
5	QPSK	Middle	3 940.00	27.19	0.52
	16QAM	Middle	3 940.00	27.19	0.52
	64QAM	Middle	3 940.00	27.01	0.50
	256QAM	Middle	3 940.00	27.12	0.51
6	QPSK	Middle	3 940.00	26.89	0.49
	16QAM	Middle	3 940.00	27.09	0.51
	64QAM	Middle	3 940.00	26.85	0.48
	256QAM	Middle	3 940.00	26.99	0.50
7	QPSK	Middle	3 940.00	27.44	0.55
	16QAM	Middle	3 940.00	27.67	0.58
	64QAM	Middle	3 940.00	27.31	0.54
	256QAM	Middle	3 940.00	27.57	0.57

Sum Data of Port 0 ~ Port 7

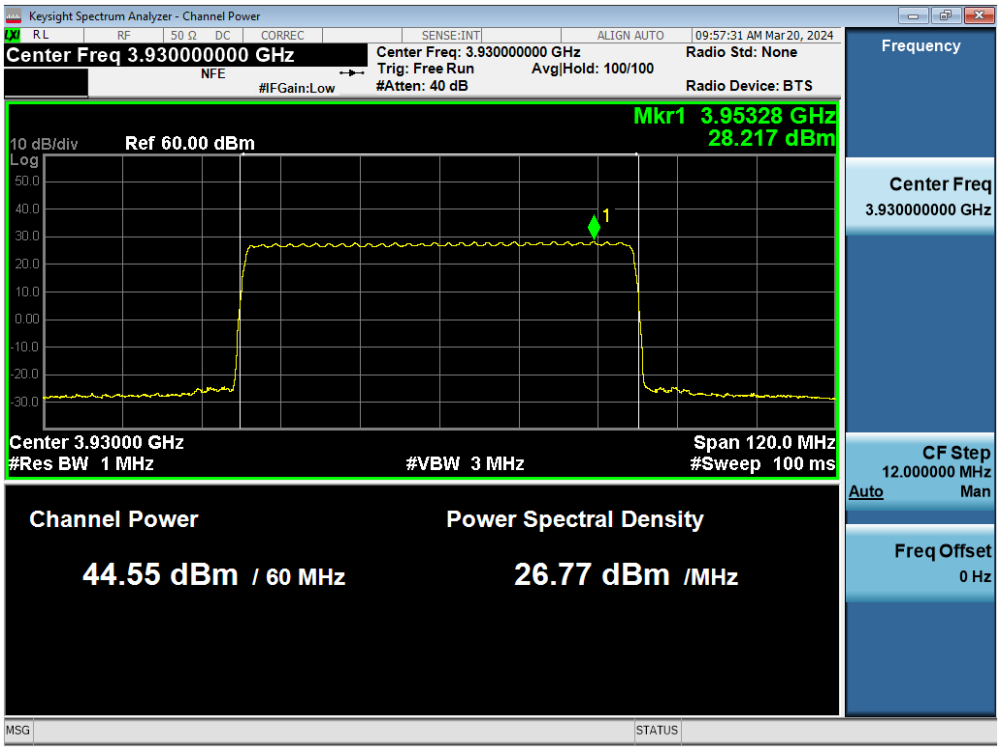
Frequency (MHz)	PSD (Conducted)			
	QPSK	16QAM	64QAM	256QAM
	W/MHz			
3 940.00	4.47	4.52	4.37	4.45

Plot Data of PSD

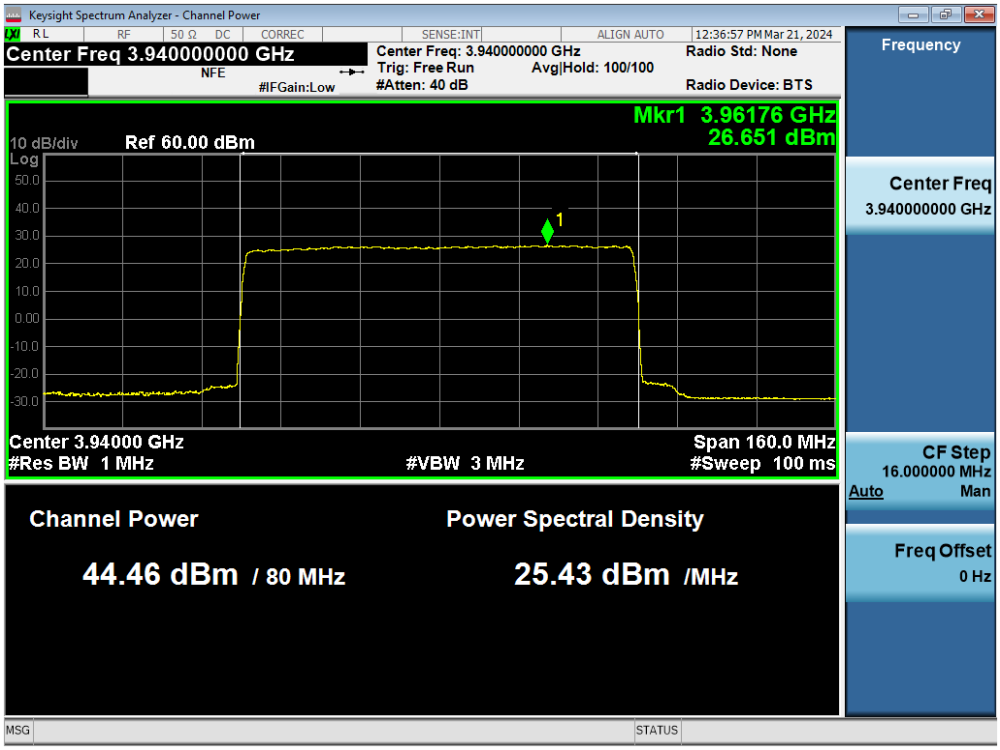
Antenna 3 / (8 Port) 5G NR n77 40 MHz 1 Carrier / QPSK / Middle



Antenna 7 / (8 Port) 5G NR n77 60 MHz 1 Carrier / QPSK / Low



Antenna 0 / (8 Port) 5G NR n77 80 MHz 1 Carrier / QPSK / Middle



5.2. PAPR

Test Requirements:

§ 27.50 Power limits and duty cycle.

(j) The following power requirements apply to stations transmitting in the 3700-3980 MHz band:

(4) Equipment employed must be authorized in accordance with the provisions of § 27.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (j)(5) of this section. 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.

Test Procedures:

The measurement is performed in accordance with Section 5.2.3.4 of ANSI C63.26.

The following guidelines are offered for performing a CCDF measurement.

a) Set resolution/measurement bandwidth ≥ OBW or specified reference bandwidth.

b) Set the number of counts to a value that stabilizes the measured CCDF curve.

c) Set the measurement interval as follows:

1) For continuous transmissions, set to the greater of [10 × (number of points in sweep) × (transmission symbol period)] or 1 ms.

2) For burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize. Set the measurement interval to a time that is less than or equal to the burst duration.

3) If there are several carriers in a single antenna port, the peak power shall be determined for each individual carrier (by disabling the other carriers while measuring the required carrier) and the total peak power calculated from the sum of the individual carrier peak powers.

d) Record the maximum PAPR level associated with a probability of 0.1%.

e) The peak power level is calculated form the sum of the PAPR value from step d) to the measured average power.

Note: The results of the PAPR test shown above the frequency measured values are very small and similar trend for each port, so we are attached only the worst case plot.

Test Results:
Tabular data of PAR

(8 Port) 5G NR n77 40 MHz 1 Carrier

Ant.	Mod.	Ch.	Frequency (MHz)	0.1 % PAPR (dB)
0	QPSK	Low	3 920.00	8.79
		Middle	3 940.00	8.69
		High	3 960.00	8.95
	16QAM	Low	3 920.00	9.13
		Middle	3 940.00	8.69
		High	3 960.00	8.92
	64QAM	Low	3 920.00	9.28
		Middle	3 940.00	9.11
		High	3 960.00	9.04
	256QAM	Low	3 920.00	8.96
		Middle	3 940.00	8.93
		High	3 960.00	9.12
1	QPSK	Low	3 920.00	9.37
		Middle	3 940.00	8.98
		High	3 960.00	8.97
	16QAM	Low	3 920.00	8.72
		Middle	3 940.00	9.13
		High	3 960.00	8.89
	64QAM	Low	3 920.00	9.04
		Middle	3 940.00	9.10
		High	3 960.00	8.93
	256QAM	Low	3 920.00	8.88
		Middle	3 940.00	8.79
		High	3 960.00	8.78
2	QPSK	Low	3 920.00	8.74
		Middle	3 940.00	8.85
		High	3 960.00	8.85
	16QAM	Low	3 920.00	8.88
		Middle	3 940.00	8.97
		High	3 960.00	8.84
	64QAM	Low	3 920.00	9.00
		Middle	3 940.00	8.88
		High	3 960.00	8.90
	256QAM	Low	3 920.00	8.92
		Middle	3 940.00	8.75
		High	3 960.00	8.92

Ant.	Mod.	Ch.	Frequency (MHz)	0.1 % PAPR (dB)
3	QPSK	Low	3 920.00	9.30
		Middle	3 940.00	8.92
		High	3 960.00	8.94
	16QAM	Low	3 920.00	8.72
		Middle	3 940.00	8.99
		High	3 960.00	8.88
	64QAM	Low	3 920.00	8.76
		Middle	3 940.00	8.75
		High	3 960.00	8.94
	256QAM	Low	3 920.00	8.74
		Middle	3 940.00	8.92
		High	3 960.00	8.87
4	QPSK	Low	3 920.00	8.93
		Middle	3 940.00	8.83
		High	3 960.00	8.73
	16QAM	Low	3 920.00	9.19
		Middle	3 940.00	9.07
		High	3 960.00	8.97
	64QAM	Low	3 920.00	8.82
		Middle	3 940.00	8.68
		High	3 960.00	8.96
	256QAM	Low	3 920.00	9.19
		Middle	3 940.00	8.92
		High	3 960.00	8.91
5	QPSK	Low	3 920.00	8.67
		Middle	3 940.00	9.15
		High	3 960.00	8.90
	16QAM	Low	3 920.00	8.79
		Middle	3 940.00	8.90
		High	3 960.00	9.01
	64QAM	Low	3 920.00	8.75
		Middle	3 940.00	8.91
		High	3 960.00	8.82
	256QAM	Low	3 920.00	8.93
		Middle	3 940.00	8.86
		High	3 960.00	9.13

Ant.	Mod.	Ch.	Frequency (MHz)	0.1 % PAPR (dB)
6	QPSK	Low	3 920.00	8.77
		Middle	3 940.00	8.94
		High	3 960.00	8.83
	16QAM	Low	3 920.00	8.79
		Middle	3 940.00	8.81
		High	3 960.00	8.86
	64QAM	Low	3 920.00	8.56
		Middle	3 940.00	8.78
		High	3 960.00	8.69
	256QAM	Low	3 920.00	9.14
		Middle	3 940.00	9.00
		High	3 960.00	8.87
7	QPSK	Low	3 920.00	9.00
		Middle	3 940.00	8.78
		High	3 960.00	8.75
	16QAM	Low	3 920.00	8.77
		Middle	3 940.00	8.95
		High	3 960.00	8.94
	64QAM	Low	3 920.00	8.96
		Middle	3 940.00	8.89
		High	3 960.00	8.96
	256QAM	Low	3 920.00	8.79
		Middle	3 940.00	8.87
		High	3 960.00	8.85

(8 Port) 5G NR n77 60 MHz 1 Carrier

Ant.	Mod.	Ch.	Frequency (MHz)	0.1 % PAPR (dB)
0	QPSK	Low	3 930.00	9.22
		Middle	3 940.00	8.83
		High	3 950.00	9.09
	16QAM	Low	3 930.00	8.57
		Middle	3 940.00	8.81
		High	3 950.00	8.97
	64QAM	Low	3 930.00	8.67
		Middle	3 940.00	8.89
		High	3 950.00	9.00
	256QAM	Low	3 930.00	8.96
		Middle	3 940.00	9.01
		High	3 950.00	8.90
1	QPSK	Low	3 930.00	8.63
		Middle	3 940.00	8.96
		High	3 950.00	8.81
	16QAM	Low	3 930.00	8.79
		Middle	3 940.00	8.97
		High	3 950.00	9.44
	64QAM	Low	3 930.00	8.66
		Middle	3 940.00	9.17
		High	3 950.00	8.93
	256QAM	Low	3 930.00	8.89
		Middle	3 940.00	8.86
		High	3 950.00	9.58
2	QPSK	Low	3 930.00	9.12
		Middle	3 940.00	8.82
		High	3 950.00	9.04
	16QAM	Low	3 930.00	8.95
		Middle	3 940.00	9.14
		High	3 950.00	8.90
	64QAM	Low	3 930.00	9.21
		Middle	3 940.00	8.78
		High	3 950.00	8.92
	256QAM	Low	3 930.00	8.77
		Middle	3 940.00	8.99
		High	3 950.00	8.76

Ant.	Mod.	Ch.	Frequency (MHz)	0.1 % PAPR (dB)
3	QPSK	Low	3 930.00	8.95
		Middle	3 940.00	9.08
		High	3 950.00	8.69
	16QAM	Low	3 930.00	8.73
		Middle	3 940.00	8.81
		High	3 950.00	8.96
	64QAM	Low	3 930.00	8.98
		Middle	3 940.00	8.59
		High	3 950.00	8.89
	256QAM	Low	3 930.00	8.86
		Middle	3 940.00	9.18
		High	3 950.00	8.77
4	QPSK	Low	3 930.00	8.64
		Middle	3 940.00	8.84
		High	3 950.00	8.94
	16QAM	Low	3 930.00	8.96
		Middle	3 940.00	9.09
		High	3 950.00	9.22
	64QAM	Low	3 930.00	8.90
		Middle	3 940.00	8.92
		High	3 950.00	8.85
	256QAM	Low	3 930.00	8.93
		Middle	3 940.00	8.49
		High	3 950.00	8.78
5	QPSK	Low	3 930.00	8.87
		Middle	3 940.00	9.00
		High	3 950.00	8.68
	16QAM	Low	3 930.00	8.80
		Middle	3 940.00	8.85
		High	3 950.00	8.86
	64QAM	Low	3 930.00	8.97
		Middle	3 940.00	8.82
		High	3 950.00	8.68
	256QAM	Low	3 930.00	8.65
		Middle	3 940.00	9.16
		High	3 950.00	8.77

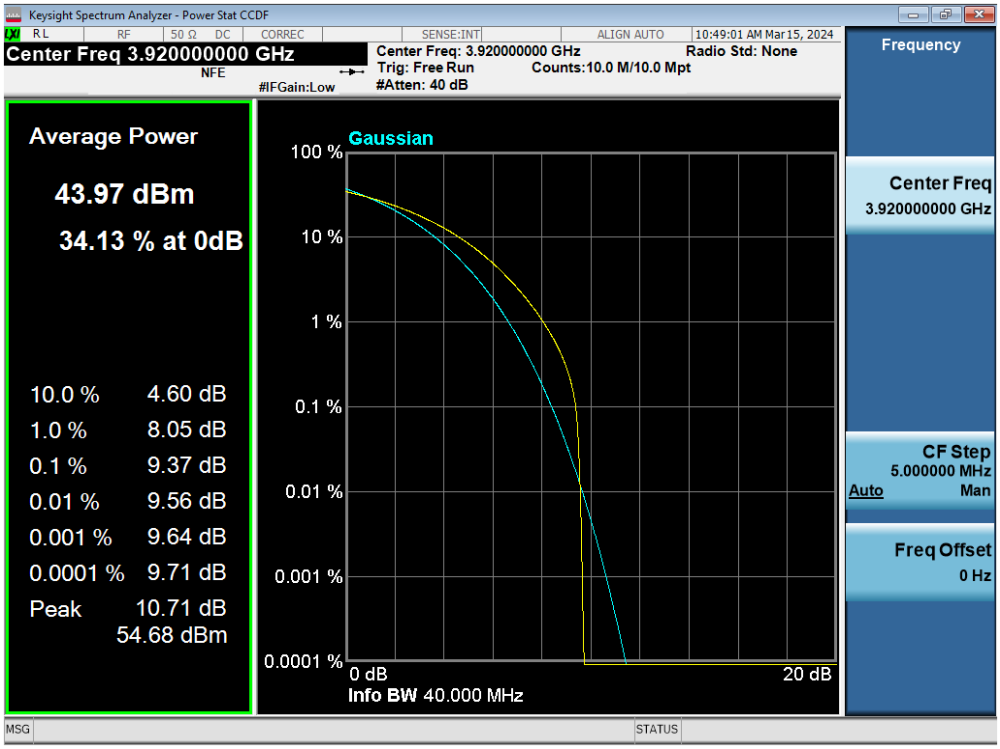
Ant.	Mod.	Ch.	Frequency (MHz)	0.1 % PAPR (dB)
6	QPSK	Low	3 930.00	9.08
		Middle	3 940.00	8.75
		High	3 950.00	8.83
	16QAM	Low	3 930.00	9.12
		Middle	3 940.00	8.97
		High	3 950.00	8.80
	64QAM	Low	3 930.00	8.95
		Middle	3 940.00	8.81
		High	3 950.00	8.88
	256QAM	Low	3 930.00	9.07
		Middle	3 940.00	9.02
		High	3 950.00	8.79
7	QPSK	Low	3 930.00	8.76
		Middle	3 940.00	8.93
		High	3 950.00	8.81
	16QAM	Low	3 930.00	8.84
		Middle	3 940.00	8.82
		High	3 950.00	8.84
	64QAM	Low	3 930.00	8.86
		Middle	3 940.00	8.77
		High	3 950.00	8.79
	256QAM	Low	3 930.00	8.90
		Middle	3 940.00	8.98
		High	3 950.00	8.85

(8 Port) 5G NR n77 80 MHz 1 Carrier

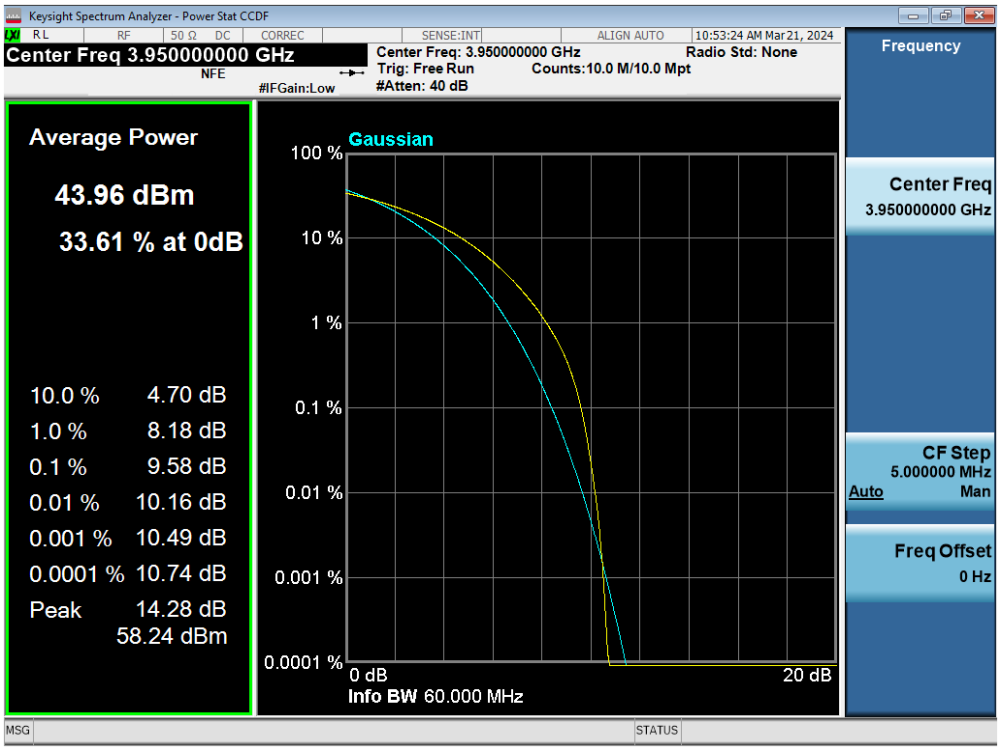
Ant.	Mod.	Ch.	Frequency (MHz)	0.1 % PAPR (dB)
0	QPSK	Middle	3 940.00	8.66
	16QAM	Middle	3 940.00	9.37
	64QAM	Middle	3 940.00	8.94
	256QAM	Middle	3 940.00	8.78
1	QPSK	Middle	3 940.00	9.09
	16QAM	Middle	3 940.00	8.99
	64QAM	Middle	3 940.00	9.29
	256QAM	Middle	3 940.00	8.91
2	QPSK	Middle	3 940.00	8.79
	16QAM	Middle	3 940.00	8.91
	64QAM	Middle	3 940.00	8.77
	256QAM	Middle	3 940.00	8.97
3	QPSK	Middle	3 940.00	8.94
	16QAM	Middle	3 940.00	9.14
	64QAM	Middle	3 940.00	9.10
	256QAM	Middle	3 940.00	8.81
4	QPSK	Middle	3 940.00	8.99
	16QAM	Middle	3 940.00	9.01
	64QAM	Middle	3 940.00	8.84
	256QAM	Middle	3 940.00	8.83
5	QPSK	Middle	3 940.00	9.27
	16QAM	Middle	3 940.00	8.94
	64QAM	Middle	3 940.00	8.99
	256QAM	Middle	3 940.00	8.86
6	QPSK	Middle	3 940.00	9.20
	16QAM	Middle	3 940.00	8.86
	64QAM	Middle	3 940.00	9.02
	256QAM	Middle	3 940.00	8.80
7	QPSK	Middle	3 940.00	9.03
	16QAM	Middle	3 940.00	9.33
	64QAM	Middle	3 940.00	9.01
	256QAM	Middle	3 940.00	8.98

Plot Data of PAPR

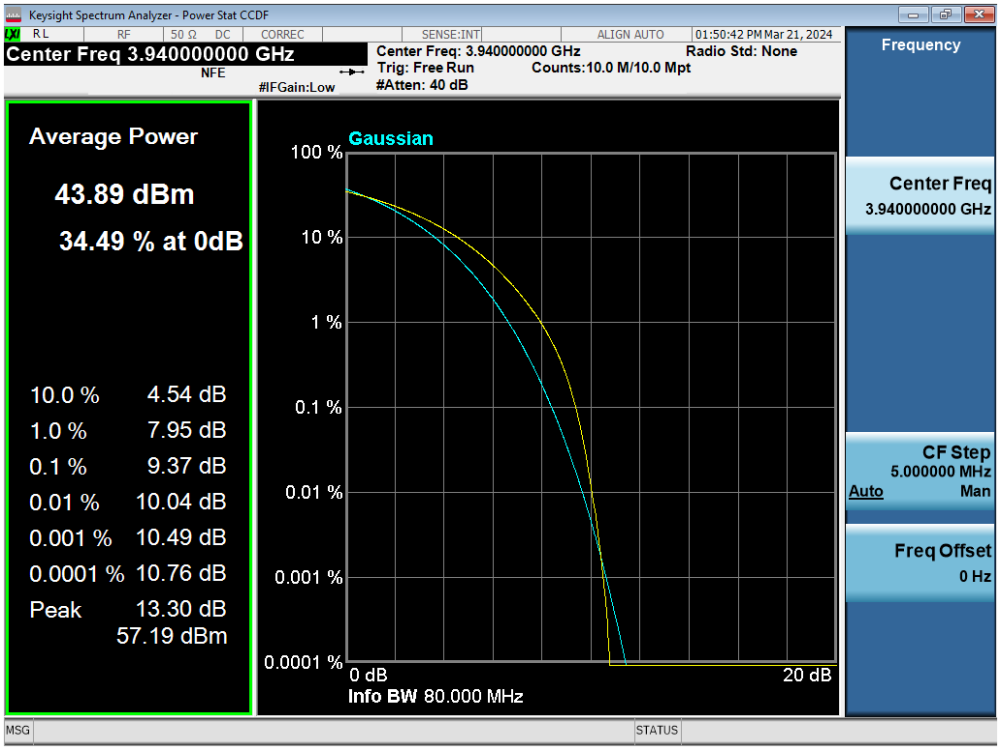
Antenna 1/ (8 Port) 5G NR n77 40 MHz 1 Carrier / QPSK / Low



Antenna 1/ (8 Port) 5G NR n77 60 MHz 1 Carrier / 256QAM / High



Antenna 0/ (8 Port) 5G NR n77 80 MHz 1 Carrier / 16QAM / Middle



5.3. OCCUPIED BANDWIDTH

Test Requirements:

§ 2.1049 Measurements required: Occupied bandwidth.

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the specified conditions of § 2.1049 (a) through (i) as applicable.

Test Procedures:

The measurement is performed in accordance with Section 5.4.3 and 5.4.4 of ANSI C63.26.

5.4.3 Occupied bandwidth—Relative measurement procedure

The OBW is measured as the width of the spectral envelope of the modulated signal, at an amplitude level reduced from a reference value by a specified ratio (or in decibels, a specified number of dB down from the reference value). The typical ratio for transmitters is −26 dB, corresponding to the 26 dB BW; however, other ratios can be specified. In this subclause, the ratio is designated by "−X dB."

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.

b) The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW.

c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
NOTE—Step a), step b), and step c) may require iteration to adjust within the specified tolerances.

d) The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target "−X dB" requirement, i.e., if the requirement calls for measuring the −26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.

e) Set spectrum analyzer detection mode to peak, and the trace mode to max hold.

f) Determine the reference value by either of the following:
   1) 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).
   2) Set the EUT to transmit an unmodulated carrier. Set the spectrum analyzer marker to the level of the carrier.

g) Determine the "−X dB amplitude" as equal to (Reference Value − X). Alternatively, this calculation can be performed on the spectrum analyzer using the delta-marker measurement function.

h) If the reference value was determined using an unmodulated carrier, turn the EUT modulation on, then either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise the trace from step f) shall be used for step i).

i) 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 amplitude" determined in step f). If a marker is below this "−X dB amplitude" value it should be as close as possible to this value. The OBW is the positive frequency difference between the two markers. The spectral envelope can cross the "−X dB amplitude" at

multiple points. The lowest or Highest frequency shall be selected as the frequencies that are the farthest away from the center frequency at which the spectral envelope crosses the "−X dB amplitude."

j) The OBW shall be reported by providing plot(s) of the measuring instrument display, to include markers depicting the relevant frequency and amplitude information (e.g., marker table). The frequency and amplitude axis and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

5.4.4 Occupied bandwidth—Power bandwidth (99%) measurement procedure

The OBW is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

The following procedure shall be used for measuring (99%) power bandwidth:

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (typically a span of 1.5 × OBW is sufficient).

b) The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW.

c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
NOTE—Step a), step b), and step c) may require iteration to adjust within the specified tolerances.

d) Set the detection mode to peak, and the trace mode to max-hold.

e) If the instrument does not have a 99% OBW function, recover the trace data points and sum directly in linear power terms. Place the recovered amplitude data points, beginning at the lowest frequency, in a running sum until 0.5% of the total is reached. Record that frequency as the lower OBW frequency. Repeat the process until 99.5% of the total is reached and record that frequency as the upper OBW frequency. The 99% power OBW can be determined by computing the difference these two frequencies.

f) The OBW shall be reported and plot(s) of the measuring instrument display shall be provided with the test report. The frequency and amplitude axis and scale shall be clearly labeled. Tabular data can be reported in addition to the plot(s).

Note: The results of the Occupied Bandwidth test shown above the frequency measured values are very small and similar trend for each port, so we are attached only the worst case plot.

Test Results:
Tabular Data of Occupied Bandwidth

(8 Port) 5G NR n77 40 MHz 1 Carrier

Ant.	Mod.	Ch.	Frequency (MHz)	Occupied Bandwidth (MHz)
0	QPSK	Low	3 920.00	37.971
		Middle	3 940.00	38.038
		High	3 960.00	37.934
	16QAM	Low	3 920.00	37.937
		Middle	3 940.00	37.934
		High	3 960.00	37.923
	64QAM	Low	3 920.00	38.034
		Middle	3 940.00	37.977
		High	3 960.00	37.936
	256QAM	Low	3 920.00	37.954
		Middle	3 940.00	37.936
		High	3 960.00	37.974
1	QPSK	Low	3 920.00	38.054
		Middle	3 940.00	38.037
		High	3 960.00	37.945
	16QAM	Low	3 920.00	37.928
		Middle	3 940.00	38.016
		High	3 960.00	37.933
	64QAM	Low	3 920.00	38.042
		Middle	3 940.00	37.932
		High	3 960.00	37.937
	256QAM	Low	3 920.00	37.952
		Middle	3 940.00	37.960
		High	3 960.00	37.938
2	QPSK	Low	3 920.00	37.974
		Middle	3 940.00	37.974
		High	3 960.00	38.013
	16QAM	Low	3 920.00	38.021
		Middle	3 940.00	37.955
		High	3 960.00	37.896
	64QAM	Low	3 920.00	38.000
		Middle	3 940.00	37.968
		High	3 960.00	37.904
	256QAM	Low	3 920.00	37.974
		Middle	3 940.00	37.907
		High	3 960.00	37.877

Ant.	Mod.	Ch.	Frequency (MHz)	Occupied Bandwidth (MHz)
3	QPSK	Low	3 920.00	37.970
		Middle	3 940.00	37.921
		High	3 960.00	37.893
	16QAM	Low	3 920.00	37.964
		Middle	3 940.00	38.007
		High	3 960.00	37.922
	64QAM	Low	3 920.00	37.972
		Middle	3 940.00	38.064
		High	3 960.00	37.958
	256QAM	Low	3 920.00	37.905
		Middle	3 940.00	38.029
		High	3 960.00	37.915
4	QPSK	Low	3 920.00	37.955
		Middle	3 940.00	37.942
		High	3 960.00	37.990
	16QAM	Low	3 920.00	37.993
		Middle	3 940.00	37.959
		High	3 960.00	37.956
	64QAM	Low	3 920.00	38.091
		Middle	3 940.00	37.972
		High	3 960.00	37.975
	256QAM	Low	3 920.00	37.945
		Middle	3 940.00	38.035
		High	3 960.00	37.915
5	QPSK	Low	3 920.00	37.986
		Middle	3 940.00	38.006
		High	3 960.00	37.981
	16QAM	Low	3 920.00	37.967
		Middle	3 940.00	37.985
		High	3 960.00	37.901
	64QAM	Low	3 920.00	37.910
		Middle	3 940.00	38.044
		High	3 960.00	37.966
	256QAM	Low	3 920.00	37.991
		Middle	3 940.00	37.987
		High	3 960.00	37.935

Ant.	Mod.	Ch.	Frequency (MHz)	Occupied Bandwidth (MHz)
6	QPSK	Low	3 920.00	37.944
		Middle	3 940.00	37.878
		High	3 960.00	37.956
	16QAM	Low	3 920.00	37.934
		Middle	3 940.00	37.974
		High	3 960.00	37.929
	64QAM	Low	3 920.00	38.009
		Middle	3 940.00	37.980
		High	3 960.00	37.901
	256QAM	Low	3 920.00	37.900
		Middle	3 940.00	37.923
		High	3 960.00	37.947
7	QPSK	Low	3 920.00	37.946
		Middle	3 940.00	37.923
		High	3 960.00	37.979
	16QAM	Low	3 920.00	37.932
		Middle	3 940.00	37.915
		High	3 960.00	37.925
	64QAM	Low	3 920.00	37.959
		Middle	3 940.00	37.978
		High	3 960.00	37.898
	256QAM	Low	3 920.00	37.973
		Middle	3 940.00	37.856
		High	3 960.00	37.949

(8 Port) 5G NR n77 60 MHz 1 Carrier

Ant.	Mod.	Ch.	Frequency (MHz)	Occupied Bandwidth (MHz)
0	QPSK	Low	3 930.00	57.783
		Middle	3 940.00	57.838
		High	3 950.00	57.914
	16QAM	Low	3 930.00	57.807
		Middle	3 940.00	57.841
		High	3 950.00	57.915
	64QAM	Low	3 930.00	57.896
		Middle	3 940.00	57.909
		High	3 950.00	57.843
	256QAM	Low	3 930.00	57.892
		Middle	3 940.00	57.919
		High	3 950.00	58.085
1	QPSK	Low	3 930.00	57.933
		Middle	3 940.00	58.027
		High	3 950.00	57.892
	16QAM	Low	3 930.00	58.041
		Middle	3 940.00	57.944
		High	3 950.00	57.949
	64QAM	Low	3 930.00	57.893
		Middle	3 940.00	57.971
		High	3 950.00	57.873
	256QAM	Low	3 930.00	57.967
		Middle	3 940.00	57.950
		High	3 950.00	57.933
2	QPSK	Low	3 930.00	58.042
		Middle	3 940.00	57.967
		High	3 950.00	58.007
	16QAM	Low	3 930.00	58.071
		Middle	3 940.00	57.997
		High	3 950.00	57.904
	64QAM	Low	3 930.00	57.896
		Middle	3 940.00	57.914
		High	3 950.00	57.900
	256QAM	Low	3 930.00	57.885
		Middle	3 940.00	58.024
		High	3 950.00	57.922

Ant.	Mod.	Ch.	Frequency (MHz)	Occupied Bandwidth (MHz)
3	QPSK	Low	3 930.00	58.020
		Middle	3 940.00	57.963
		High	3 950.00	57.989
	16QAM	Low	3 930.00	57.901
		Middle	3 940.00	58.054
		High	3 950.00	57.929
	64QAM	Low	3 930.00	58.029
		Middle	3 940.00	58.029
		High	3 950.00	57.931
	256QAM	Low	3 930.00	57.971
		Middle	3 940.00	57.985
		High	3 950.00	57.876
4	QPSK	Low	3 930.00	57.894
		Middle	3 940.00	57.962
		High	3 950.00	57.888
	16QAM	Low	3 930.00	57.942
		Middle	3 940.00	57.880
		High	3 950.00	57.939
	64QAM	Low	3 930.00	57.811
		Middle	3 940.00	57.924
		High	3 950.00	57.836
	256QAM	Low	3 930.00	57.999
		Middle	3 940.00	57.953
		High	3 950.00	57.951
5	QPSK	Low	3 930.00	57.946
		Middle	3 940.00	57.898
		High	3 950.00	57.865
	16QAM	Low	3 930.00	57.963
		Middle	3 940.00	58.033
		High	3 950.00	57.960
	64QAM	Low	3 930.00	57.936
		Middle	3 940.00	58.010
		High	3 950.00	57.917
	256QAM	Low	3 930.00	57.967
		Middle	3 940.00	57.886
		High	3 950.00	57.916

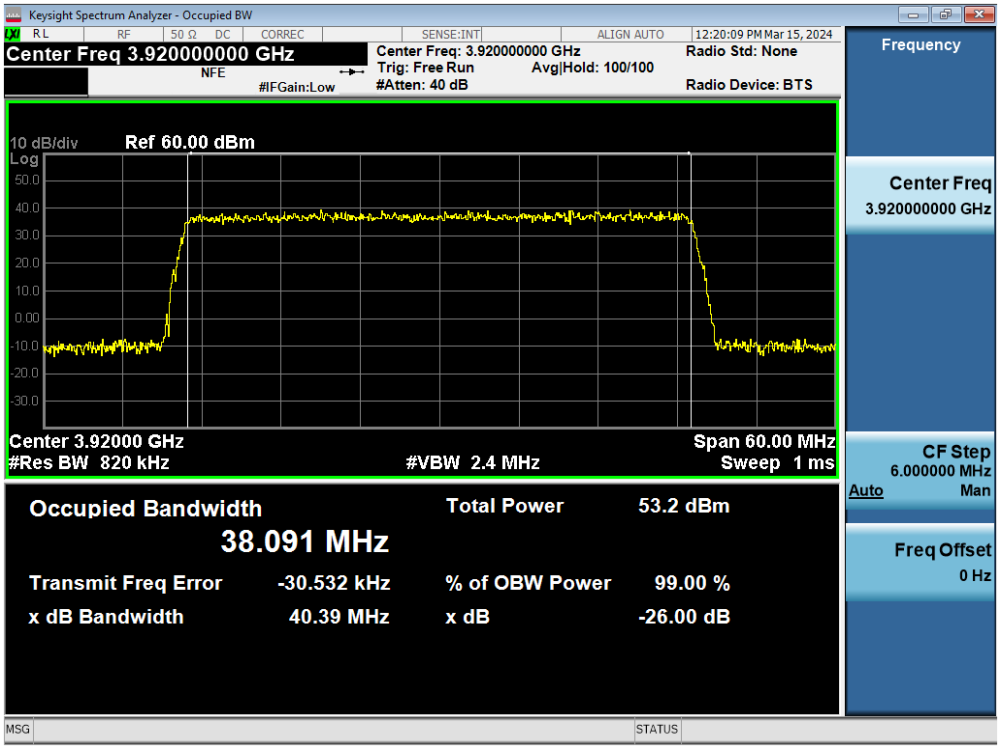
Ant.	Mod.	Ch.	Frequency (MHz)	Occupied Bandwidth (MHz)
6	QPSK	Low	3 930.00	57.938
		Middle	3 940.00	57.928
		High	3 950.00	57.929
	16QAM	Low	3 930.00	57.837
		Middle	3 940.00	57.926
		High	3 950.00	57.986
	64QAM	Low	3 930.00	57.809
		Middle	3 940.00	57.954
		High	3 950.00	57.870
	256QAM	Low	3 930.00	57.908
		Middle	3 940.00	57.799
		High	3 950.00	58.066
7	QPSK	Low	3 930.00	58.058
		Middle	3 940.00	57.899
		High	3 950.00	57.915
	16QAM	Low	3 930.00	57.962
		Middle	3 940.00	57.963
		High	3 950.00	57.972
	64QAM	Low	3 930.00	57.967
		Middle	3 940.00	57.883
		High	3 950.00	57.953
	256QAM	Low	3 930.00	57.865
		Middle	3 940.00	57.960
		High	3 950.00	57.878

(8 Port) 5G NR n77 80 MHz 1 Carrier

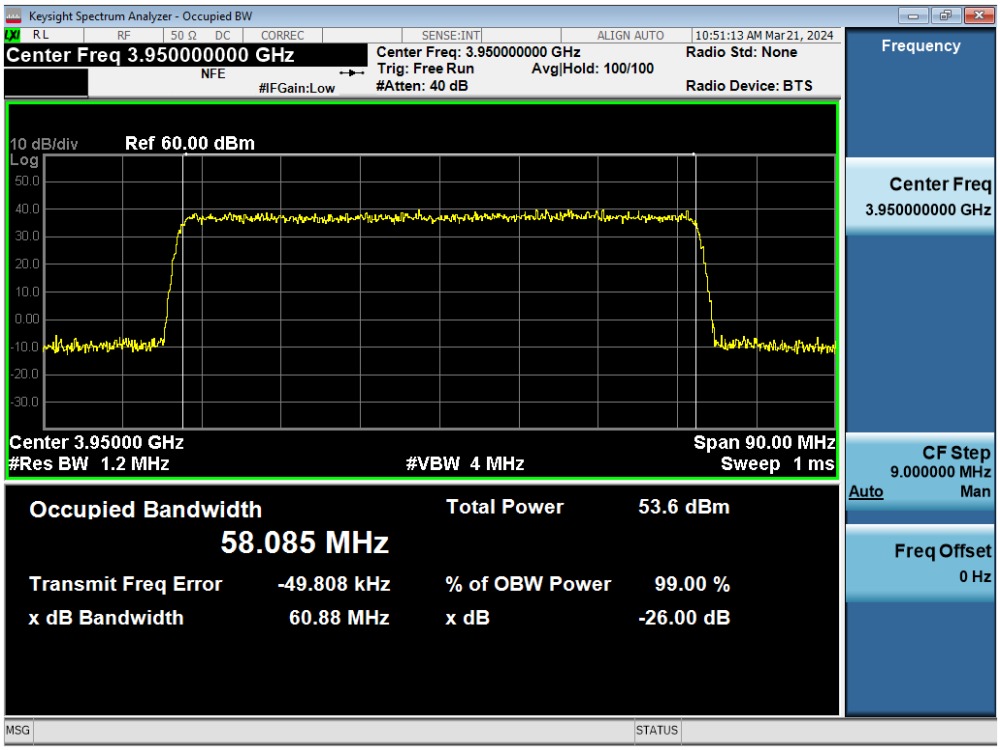
Ant.	Mod.	Ch.	Frequency (MHz)	Occupied Bandwidth (MHz)
0	QPSK	Middle	3 940.00	77.495
	16QAM	Middle	3 940.00	77.500
	64QAM	Middle	3 940.00	77.521
	256QAM	Middle	3 940.00	77.397
1	QPSK	Middle	3 940.00	77.680
	16QAM	Middle	3 940.00	77.512
	64QAM	Middle	3 940.00	77.496
	256QAM	Middle	3 940.00	77.681
2	QPSK	Middle	3 940.00	77.532
	16QAM	Middle	3 940.00	77.586
	64QAM	Middle	3 940.00	77.496
	256QAM	Middle	3 940.00	77.535
3	QPSK	Middle	3 940.00	77.616
	16QAM	Middle	3 940.00	77.709
	64QAM	Middle	3 940.00	77.748
	256QAM	Middle	3 940.00	77.665
4	QPSK	Middle	3 940.00	77.589
	16QAM	Middle	3 940.00	77.506
	64QAM	Middle	3 940.00	77.586
	256QAM	Middle	3 940.00	77.620
5	QPSK	Middle	3 940.00	77.412
	16QAM	Middle	3 940.00	77.645
	64QAM	Middle	3 940.00	77.610
	256QAM	Middle	3 940.00	77.574
6	QPSK	Middle	3 940.00	77.496
	16QAM	Middle	3 940.00	77.427
	64QAM	Middle	3 940.00	77.491
	256QAM	Middle	3 940.00	77.455
7	QPSK	Middle	3 940.00	77.444
	16QAM	Middle	3 940.00	77.586
	64QAM	Middle	3 940.00	77.508
	256QAM	Middle	3 940.00	77.516

Plot Data of Occupied bandwidth

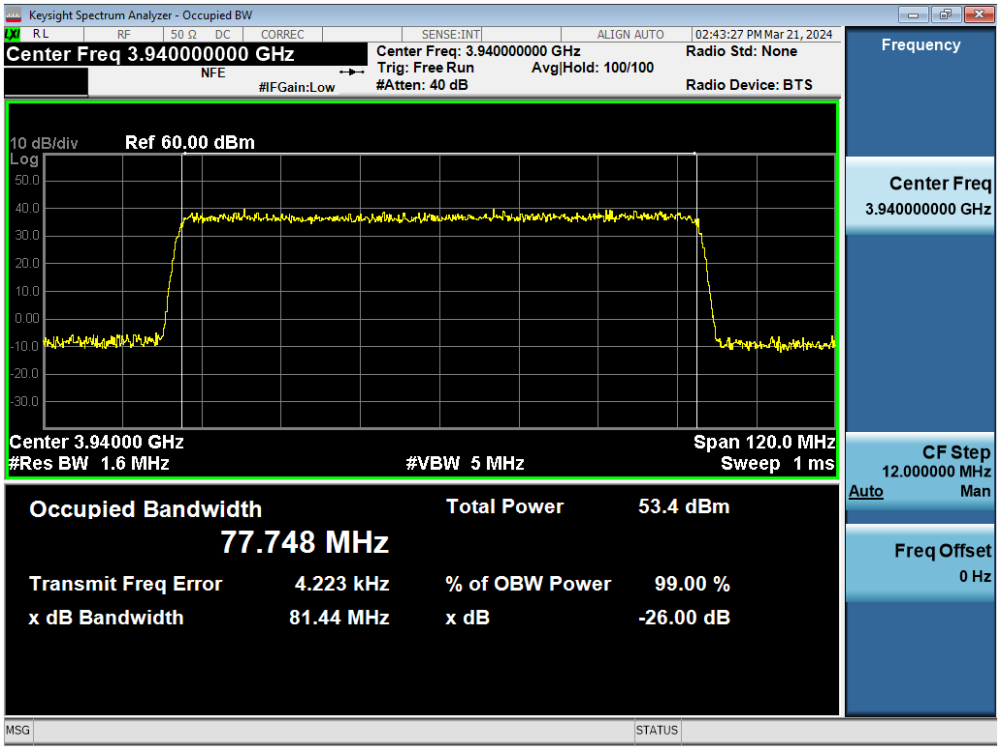
Antenna 4 / (8 Port) 5G NR n77 40 MHz 1 Carrier / 64QAM / Low



Antenna 0 / (8 Port) 5G NR n77 60 MHz 1 Carrier / 256QAM / High



Antenna 3 / (8 Port) 5G NR n77 80 MHz 1 Carrier / 64QAM / Middle



5.4. OUT-OF-BAND UNWANTED EMISSIONS

Test Requirements:

§ 2.1051 Measurements required: Spurious emissions at antenna terminals.

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in § 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

§ 27.53 Emission limits.

(l) 3.7 GHz Service. The following emission limits apply to station transmitting in the 3700-3980 MHz band:

(1) For base station operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz. Compliance with this paragraph (l)(1) 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. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

Test Procedures:

The measurement is performed in accordance with Section 5.7.2, 5.7.3 of ANSI C63.26.

5.7.2 Basic guidelines for unwanted emissions conducted measurements

a) For improvement of the accuracy in the measurement of the average power of a noise-like emission, a RBW narrower than the specified reference bandwidth can be used (generally limited to no less than 1% of the OBW), provided that a subsequent integration is performed over the full required measurement bandwidth. This integration should be performed using the spectrum analyzer's channel power, adjacent channel power, or band power functions. When using the integration method at the channel/block/band edge, the starting frequency of the integration shall be centered at one-half of the RBW away from the band/channel/block edge.

5.7.3 Out-of-band unwanted emissions measurements

a) Set the spectrum analyzer center frequency to the block, band, or channel edge frequency.

b) Set the span wide enough to capture the fundamental emission closest to the authorized block or band edge, and to include all modulation products that spill into the immediately adjacent frequency band. In some cases, it may be possible to set the center frequency and span so as to encompass the fundamental emission and the unwanted out-of-band (band-edge) emissions on either side of the authorized block, band, or channel. This can be accomplished with a single (slow) sweep, if adequate overload protection and sufficient dynamic range can be maintained.

c) Set the number of points in sweep ≥ 2 × span / RBW.

d) Sweep time should be auto for peak detection. For rms detection the sweep time should be set as follows:

1) If the device can be configured to transmit continuously (duty cycle ≥ 98%), set the (sweep time) > (number of points in sweep) × (symbol period) (e.g., by a factor of 10 × symbol period × number of points). Increasing the sweep time (i.e., slowing the sweep speed) will allow for averaging over multiple symbols

2) If the device cannot be configured to transmit continuously (duty cycle < 98%) and a freerunning sweep must be used, set the sweep time so that the averaging is performed over multiple on/off cycles by setting the sweep time > (number of points in sweep) × (transmitter period) (i.e., the transmit on-time + the off-time). The spectrum analyzer readings shall subsequently be corrected by [10 log (1/duty cycle)]. This assumes that the transmission period and duty cycle is relatively constant (duty cycle variation ≤ ±2%).

3) If the device cannot be configured to transmit continuously (duty cycle < 98%) and a freerunning sweep must be used, set the sweep time so that the averaging is performed over multiple on/off cycles by setting the sweep time > (number of points in sweep) × (transmitter period) (i.e., the transmit on-time + the off-time). The spectrum analyzer readings shall subsequently be corrected by [10 log (1/duty cycle)]. This assumes that the transmission period and duty cycle is relatively constant (duty cycle variation ≤ ±2%).

4) If the device cannot be configured to transmit continuously and a free-running sweep must be used, and if the transmissions exhibit a non-constant duty cycle (duty cycle variations > ±2%), set the sweep time so that the averaging is performed over the on-period by setting the sweep time > (symbol period) × (number of points), while also maintaining the sweep time < (transmitter on-time). The trace mode shall be set to max hold, since not every display point will be averaged only over just the on-time. Thus, multiple sweeps (e.g., 100) in maximum hold are necessary to ensure that the maximum power is measured.

e) The test report shall include the plots of the measuring instrument display and the measured data.

f) See Annex I for example emission mask plots.

Note:

1. Due to MIMO operations, a correction has been added to the limit according to KDB 662911 D01 v02r01.
   - 8Tx MIMO correction: 10 log(N_{ANT}) = 10 log(8) = 9.03 dB // -13 dBm – 9.03 dB = -22.03 dBm
2. The measured value is calculated by adding duty correction.
   Sample Calculations:
   Measured Value = -25.65 dBm (actual measured value) + 1.308 dB[#] (duty correction) = -24.34 dBm
   [#] The value 1.308 is an approximate value, and actual values(1.3076828...) have been used in all calculations.
3. The results of the Out-of-band Unwanted Emissions test shown above the frequency measured values are very small and similar trend for each port, so we are attached only the worst case plot.

Test Results:
Tabular Data of Out-of-band Unwanted Emissions

(8 Port) 5G NR n77 40 MHz 1 Carrier

Ant.	Mod.	Ch.	Frequency (MHz)	Measured Value (dBm)
0	QPSK	Low	3 899.80	-25.31
		High	3 980.20	-23.38
	16QAM	Low	3 899.80	-25.20
		High	3 980.20	-23.97
	64QAM	Low	3 899.80	-25.08
		High	3 980.20	-23.53
	256QAM	Low	3 899.80	-24.34
		High	3 980.20	-23.76
1	QPSK	Low	3 899.80	-24.73
		High	3 980.20	-23.83
	16QAM	Low	3 899.80	-24.91
		High	3 980.20	-24.17
	64QAM	Low	3 899.80	-24.89
		High	3 980.20	-24.37
	256QAM	Low	3 899.80	-24.84
		High	3 980.20	-23.85
2	QPSK	Low	3 899.80	-25.30
		High	3 980.20	-25.18
	16QAM	Low	3 899.80	-25.47
		High	3 980.20	-25.17
	64QAM	Low	3 899.80	-25.46
		High	3 980.20	-25.35
	256QAM	Low	3 899.80	-25.32
		High	3 980.20	-24.78
3	QPSK	Low	3 899.80	-25.27
		High	3 980.20	-24.59
	16QAM	Low	3 899.80	-25.29
		High	3 980.20	-24.74
	64QAM	Low	3 899.80	-25.35
		High	3 980.20	-24.62
	256QAM	Low	3 899.80	-25.35
		High	3 980.20	-24.41

Ant.	Mod.	Ch.	Frequency (MHz)	Measured Value (dBm)
4	QPSK	Low	3 899.80	-25.51
		High	3 980.20	-24.86
	16QAM	Low	3 899.80	-25.43
		High	3 980.20	-24.91
	64QAM	Low	3 899.80	-25.37
		High	3 980.20	-24.95
	256QAM	Low	3 899.80	-25.41
		High	3 980.20	-24.87
5	QPSK	Low	3 899.80	-25.99
		High	3 980.20	-25.49
	16QAM	Low	3 899.80	-26.06
		High	3 980.20	-25.75
	64QAM	Low	3 899.80	-26.03
		High	3 980.20	-25.84
	256QAM	Low	3 899.80	-26.11
		High	3 980.20	-26.03
6	QPSK	Low	3 899.80	-25.25
		High	3 980.20	-24.57
	16QAM	Low	3 899.80	-25.12
		High	3 980.20	-24.62
	64QAM	Low	3 899.80	-25.13
		High	3 980.20	-24.56
	256QAM	Low	3 899.80	-25.02
		High	3 980.20	-24.57
7	QPSK	Low	3 899.80	-25.68
		High	3 980.20	-25.13
	16QAM	Low	3 899.80	-25.90
		High	3 980.20	-25.24
	64QAM	Low	3 899.80	-25.96
		High	3 980.20	-25.29
	256QAM	Low	3 899.80	-25.89
		High	3 980.20	-25.69

(8 Port) 5G NR n77 60 MHz 1 Carrier

Ant.	Mod.	Ch.	Frequency (MHz)	Measured Value (dBm)
0	QPSK	Low	3 899.70	-25.65
		High	3 980.30	-25.15
	16QAM	Low	3 899.70	-25.85
		High	3 980.30	-25.25
	64QAM	Low	3 899.70	-25.86
		High	3 980.30	-25.02
	256QAM	Low	3 899.70	-25.67
		High	3 980.30	-25.99
1	QPSK	Low	3 899.70	-24.44
		High	3 980.30	-25.44
	16QAM	Low	3 899.70	-24.78
		High	3 980.30	-25.19
	64QAM	Low	3 899.70	-24.75
		High	3 980.30	-24.84
	256QAM	Low	3 899.70	-24.96
		High	3 980.30	-25.65
2	QPSK	Low	3 899.70	-24.98
		High	3 980.30	-26.29
	16QAM	Low	3 899.70	-25.50
		High	3 980.30	-26.54
	64QAM	Low	3 899.70	-25.54
		High	3 980.30	-26.94
	256QAM	Low	3 899.70	-25.56
		High	3 980.30	-26.30
3	QPSK	Low	3 899.70	-24.91
		High	3 980.30	-26.77
	16QAM	Low	3 899.70	-25.31
		High	3 980.30	-26.44
	64QAM	Low	3 899.70	-25.31
		High	3 980.30	-26.98
	256QAM	Low	3 899.70	-25.35
		High	3 980.30	-26.80

Ant.	Mod.	Ch.	Frequency (MHz)	Measured Value (dBm)
4	QPSK	Low	3 899.70	-24.23
		High	3 980.30	-25.44
	16QAM	Low	3 899.70	-24.83
		High	3 980.30	-24.92
	64QAM	Low	3 899.70	-24.59
		High	3 980.30	-25.56
	256QAM	Low	3 899.70	-24.86
		High	3 980.30	-25.39
5	QPSK	Low	3 899.70	-26.08
		High	3 980.30	-27.44
	16QAM	Low	3 899.70	-26.42
		High	3 980.30	-27.65
	64QAM	Low	3 899.70	-26.47
		High	3 980.30	-27.76
	256QAM	Low	3 899.70	-26.41
		High	3 980.30	-27.45
6	QPSK	Low	3 899.70	-25.49
		High	3 980.30	-27.05
	16QAM	Low	3 899.70	-25.51
		High	3 980.30	-26.97
	64QAM	Low	3 899.70	-25.75
		High	3 980.30	-26.84
	256QAM	Low	3 899.70	-25.93
		High	3 980.30	-26.99
7	QPSK	Low	3 899.70	-25.25
		High	3 980.30	-26.73
	16QAM	Low	3 899.70	-26.12
		High	3 980.30	-25.50
	64QAM	Low	3 899.70	-26.03
		High	3 980.30	-26.88
	256QAM	Low	3 899.70	-26.29
		High	3 980.30	-27.04

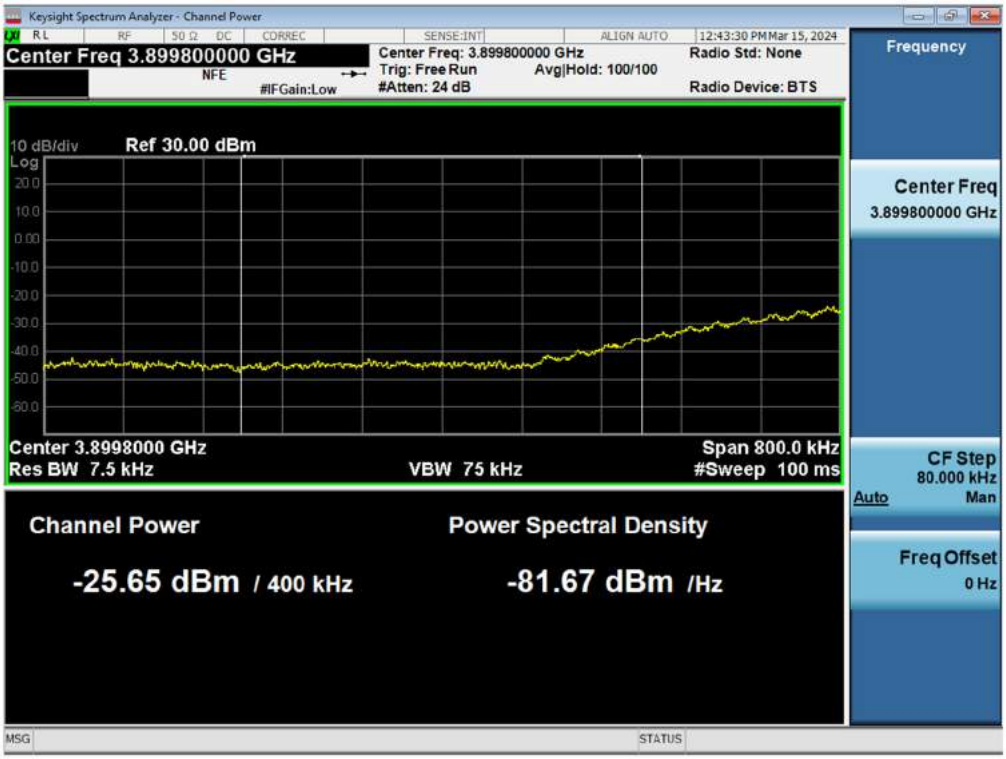
(8 Port) 5G NR n77 80 MHz 1 Carrier

Ant.	Mod.	Ch.	Frequency (MHz)	Measured Value (dBm)
0	QPSK	Low	3 899.60	-24.73
		High	3 980.40	-23.76
	16QAM	Low	3 899.60	-25.59
		High	3 980.40	-24.22
	64QAM	Low	3 899.60	-25.39
		High	3 980.40	-24.98
	256QAM	Low	3 899.60	-25.47
		High	3 980.40	-24.86
1	QPSK	Low	3 899.60	-23.60
		High	3 980.40	-23.71
	16QAM	Low	3 899.60	-24.10
		High	3 980.40	-24.93
	64QAM	Low	3 899.60	-24.02
		High	3 980.40	-25.13
	256QAM	Low	3 899.60	-24.18
		High	3 980.40	-24.93
2	QPSK	Low	3 899.60	-25.18
		High	3 980.40	-26.52
	16QAM	Low	3 899.60	-25.16
		High	3 980.40	-25.92
	64QAM	Low	3 899.60	-25.34
		High	3 980.40	-26.56
	256QAM	Low	3 899.60	-25.52
		High	3 980.40	-25.80
3	QPSK	Low	3 899.60	-24.80
		High	3 980.40	-26.14
	16QAM	Low	3 899.60	-24.47
		High	3 980.40	-25.70
	64QAM	Low	3 899.60	-24.90
		High	3 980.40	-26.26
	256QAM	Low	3 899.60	-24.89
		High	3 980.40	-26.26

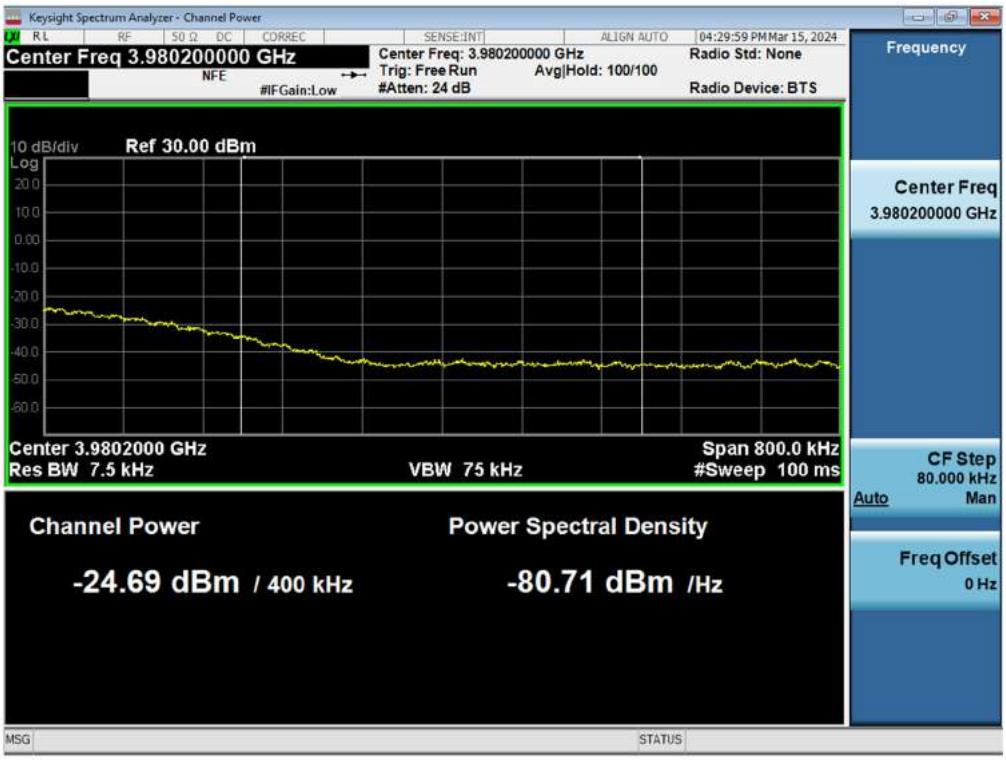
Ant.	Mod.	Ch.	Frequency (MHz)	Measured Value (dBm)
4	QPSK	Low	3 899.60	-24.10
		High	3 980.40	-24.48
	16QAM	Low	3 899.60	-23.84
		High	3 980.40	-24.25
	64QAM	Low	3 899.60	-24.07
		High	3 980.40	-24.65
	256QAM	Low	3 899.60	-24.17
		High	3 980.40	-24.63
5	QPSK	Low	3 899.60	-26.01
		High	3 980.40	-26.73
	16QAM	Low	3 899.60	-25.87
		High	3 980.40	-26.60
	64QAM	Low	3 899.60	-26.27
		High	3 980.40	-27.30
	256QAM	Low	3 899.60	-26.31
		High	3 980.40	-27.15
6	QPSK	Low	3 899.60	-25.02
		High	3 980.40	-26.45
	16QAM	Low	3 899.60	-24.88
		High	3 980.40	-26.18
	64QAM	Low	3 899.60	-25.11
		High	3 980.40	-26.47
	256QAM	Low	3 899.60	-25.04
		High	3 980.40	-26.69
7	QPSK	Low	3 899.60	-25.71
		High	3 980.40	-25.95
	16QAM	Low	3 899.60	-25.62
		High	3 980.40	-26.05
	64QAM	Low	3 899.60	-26.05
		High	3 980.40	-26.79
	256QAM	Low	3 899.60	-25.95
		High	3 980.40	-26.17

Plot Data of Out-of-band Unwanted Emissions

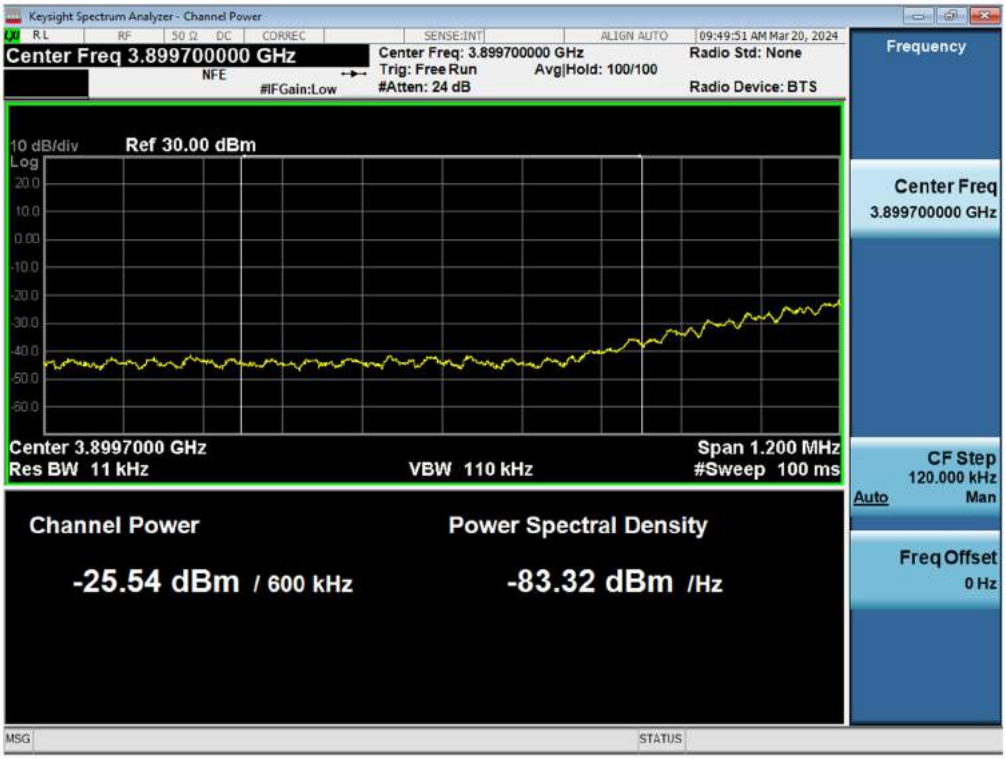
Antenna 0 / (8 Port) 5G NR n77 40 MHz 1 Carrier / 256QAM / Low



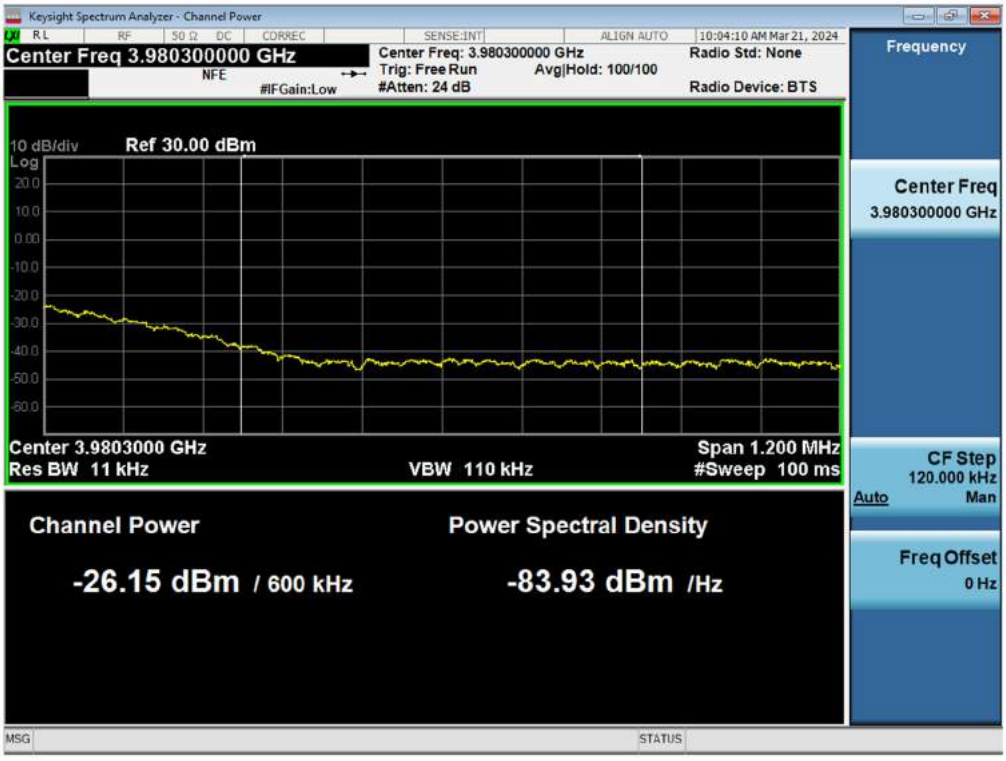
Antenna 0 / (8 Port) 5G NR n77 40 MHz 1 Carrier / QPSK / High



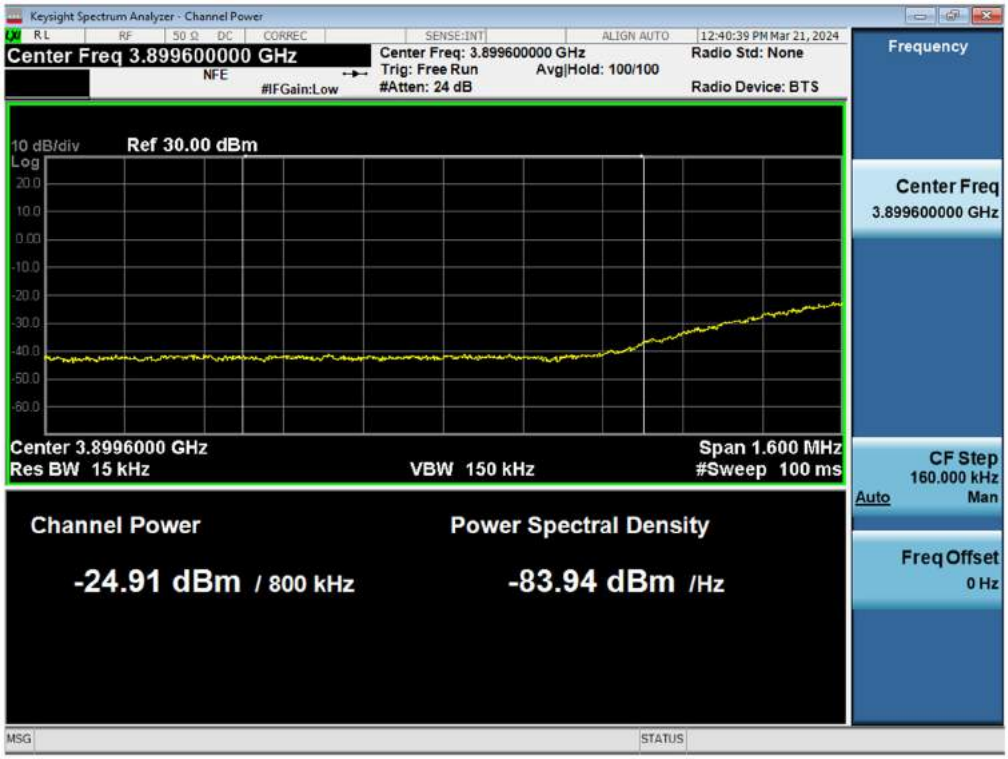
Antenna 4 / (8 Port) 5G NR n77 60 MHz 1 Carrier / QPSK / Low



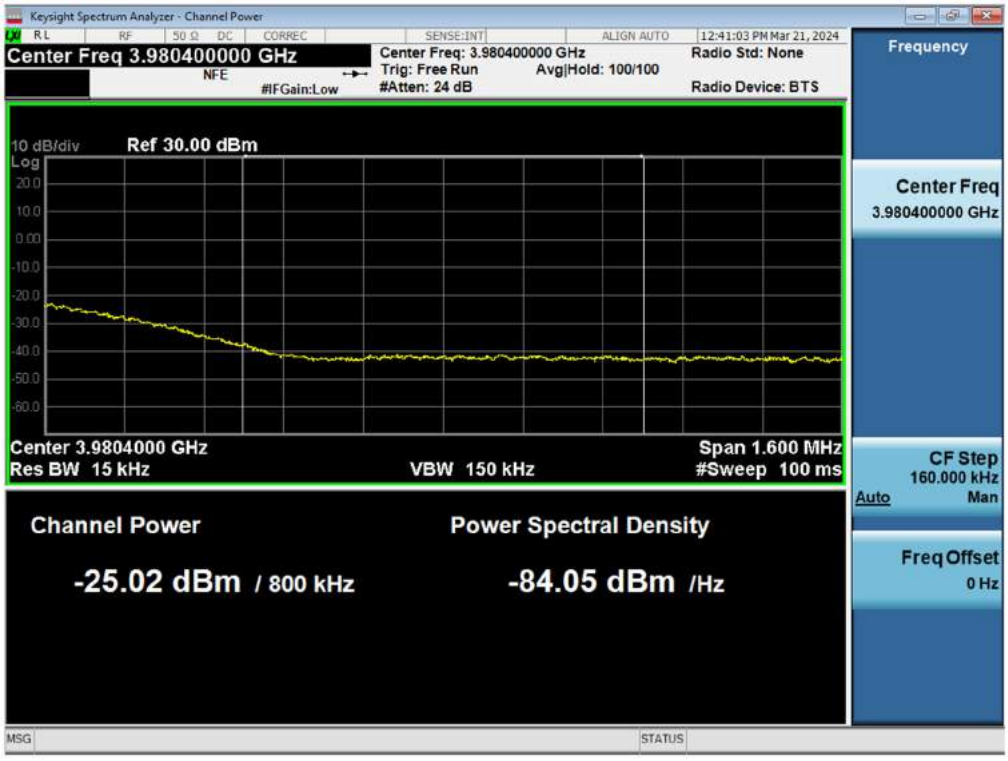
Antenna 1 / (8 Port) 5G NR n77 60 MHz 1 Carrier / 64QAM / High



Antenna 1 / (8 Port) 5G NR n77 80 MHz 1 Carrier / QPSK / Low



Antenna 1 / (8 Port) 5G NR n77 80 MHz 1 Carrier / QPSK / High



5.5. SPURIOUS UNWANTED EMISSIONS

Test Requirements:

§ 2.1051 Measurements required: Spurious emissions at antenna terminals.

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in § 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

§ 27.53 Emission limits.

(l) 3.7 GHz Service. The following emission limits apply to station transmitting in the 3700-3980 MHz band:

(1) For base station operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz. Compliance with this paragraph (l)(1) 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. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

Test Procedures:

The measurement is performed in accordance with Section 5.7.4 of ANSI C63.26.

5.7.4 Spurious unwanted emission measurements

a) Set the spectrum analyzer start frequency to the lowest frequency generated by the EUT, without going below 9 kHz, and the stop frequency to the lower frequency covered by the measurements previously performed in 5.7.3. As an alternative, the stop frequency can be set to the value specified in 5.1.1, depending on the EUT operating range, if the resulting plot can clearly demonstrate compliance for all frequencies not addressed by the out-of-band emissions measurements performed as per 5.7.3.

b) When using an average power (rms) detector, ensure that the number of points in the sweep $\geq 2 \times$ (span / RBW). This may require that the measurement range defined by the start and stop frequencies be subdivided, depending on the spectrum analyzer capabilities. This requirement does not apply to peak-detected power measurements. When average power is specified by the applicable regulation, a peak-detector can be utilized for preliminary measurements to accommodate wider frequency spans. Any emissions found in the preliminary measurement to exceed the applicable limit(s) shall be further examined using a power averaging (rms) detector with the minimum number of measurement points as defined above.

c) The sweep time should be set to auto-couple for performing peak-detector measurements. For measurements that use a power averaging (rms) detector, the sweep time shall be set as described for out-of-band emissions measurements in item d) of 5.7.3.

d) Identify and measure the Highest spurious emission levels in each frequency range. It is not necessary to re-measure the out-of-band emissions as a part of this test. Record the frequencies and amplitudes corresponding to the measured emissions and capture the data plots.

e) Repeat step b) through step d) for the upper spurious emission frequency range if not already captured by a wide span measurement performed as per the alternative provided in step a). The upper frequency for this measurement is defined in 5.1.1 as a function of the EUT operating range.

f) Compare the results with the corresponding limit in the applicable regulation.

g) The test report shall include the data plots of the measuring instrument display and the measured data.

Note:

1. In 9 kHz to 30 MHz band, RBW narrower than reference bandwidth is used. So following correction factor is applied.
   - 10 log [(reference bandwidth)/(resolution bandwidth)]

   : 9 kHz to 150 kHz applied 1 kHz RBW, 10 log (1 kHz / 1 MHz) = - 30 dB

   : 150 kHz to 30 MHz applied 10 kHz RBW, 10 log (10 kHz / 1 MHz) = - 20 dB

   : From Band Edge to Edge±100 MHz, 10 log (100 kHz / 1 MHz) = - 10 dB
2. Due to MIMO operations, a correction has been added to the limit according to KDB 662911 D01 v02r01.
   - 8Tx MIMO correction: 10 log(N_{ANT}) = 10 log(8) = 9.03 dB // -13 dBm – 9.03 dB = -22.03 dBm
3. The measured value is calculated by adding duty correction.

   Sample Calculations:

   Measured Value = -54.352 dBm (actual measured value) + 1.308 dB# (duty correction) + 30 dB (RBW correction)

   = -23.044 dBm

   # The value 1.308 is an approximate value, and actual values(1.3076828...) have been used in all calculations.
4. The results of the Spurious Unwanted Emissions shown above the frequency measured values are very small and similar trend for each port, so we are attached only the worst case plot.

Test Results:
Tabular Data of Spurious Unwanted Emissions

(8 Port) 5G NR n77 40 MHz 1 Carrier
Test Result for Output Port 0

Mod.	Ch.	Measured Level (dBm)							
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge - 100 MHz	Low Edge - 100 MHz ~ Low Edge	High Edge ~ High Edge + 100 MHz	High Edge + 100 MHz ~ 10 GHz	10 GHz ~ 26.5 GHz	26.5 GHz ~ 40 GHz
QPSK	Low	-29.373	-38.367	-23.205	-25.467	-27.992	-23.556	-28.612	-24.418
	Middle	-27.502	-39.800	-23.267	-23.290	-23.473	-23.663	-29.125	-24.378
	High	-28.378	-41.682	-22.839	-23.369	-28.278	-23.420	-29.301	-24.286
16QAM	Low	-27.102	-40.706	-23.855	-25.212	-22.747	-24.571	-28.112	-23.518
	Middle	-24.541	-39.147	-23.046	-24.403	-25.114	-24.554	-28.533	-24.666
	High	-27.428	-42.454	-23.533	-23.929	-23.812	-23.870	-28.895	-25.064
64QAM	Low	-27.404	-40.006	-23.303	-23.117	-28.439	-23.255	-29.286	-24.803
	Middle	-24.411	-39.547	-23.266	-24.564	-24.880	-23.242	-28.591	-24.698
	High	-27.037	-41.546	-23.230	-24.461	-28.169	-23.283	-28.621	-24.118
256QAM	Low	-28.922	-41.137	-23.227	-23.275	-27.799	-22.307	-27.748	-24.000
	Middle	-25.292	-38.576	-22.849	-23.637	-24.941	-23.662	-29.254	-25.003
	High	-27.296	-39.805	-23.101	-23.545	-24.248	-23.167	-29.201	-24.494

Test Result for Output Port 1

Mod.	Ch.	Measured Level (dBm)							
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge - 100 MHz	Low Edge - 100 MHz ~ Low Edge	High Edge ~ High Edge + 100 MHz	High Edge + 100 MHz ~ 10 GHz	10 GHz ~ 26.5 GHz	26.5 GHz ~ 40 GHz
QPSK	Low	-23.552	-39.540	-22.727	-23.633	-26.280	-23.713	-25.208	-24.615
	Middle	-23.735	-39.696	-23.266	-24.153	-27.849	-24.492	-29.261	-24.898
	High	-23.712	-42.871	-25.761	-22.597	-28.783	-24.785	-28.867	-25.024
16QAM	Low	-23.497	-42.113	-22.782	-22.825	-26.381	-24.540	-28.579	-24.687
	Middle	-24.795	-38.357	-22.779	-24.548	-25.872	-24.352	-28.853	-25.705
	High	-24.846	-42.980	-23.246	-23.079	-28.950	-24.554	-28.555	-24.739
64QAM	Low	-26.223	-42.919	-23.038	-23.813	-29.156	-24.240	-29.369	-24.072
	Middle	-23.217	-40.216	-23.057	-24.845	-26.374	-24.481	-29.319	-25.385
	High	-24.646	-42.178	-25.116	-23.055	-27.243	-23.585	-29.718	-24.350
256QAM	Low	-24.093	-43.713	-23.296	-23.331	-29.201	-24.506	-25.329	-25.220
	Middle	-24.768	-40.363	-23.083	-24.154	-25.221	-23.689	-29.474	-25.274
	High	-23.248	-42.571	-22.857	-24.651	-24.229	-23.487	-29.103	-25.521

Test Result for Output Port 2

Mod.	Ch.	Measured Level (dBm)							
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge - 100 MHz	Low Edge - 100 MHz ~ Low Edge	High Edge ~ High Edge + 100 MHz	High Edge + 100 MHz ~ 10 GHz	10 GHz ~ 26.5 GHz	26.5 GHz ~ 40 GHz
QPSK	Low	-24.592	-40.066	-23.469	-23.918	-27.833	-24.500	-26.400	-24.747
	Middle	-24.571	-40.848	-23.349	-25.284	-27.853	-25.199	-29.523	-25.792
	High	-24.690	-42.056	-24.507	-23.671	-23.942	-24.699	-29.591	-24.214
16QAM	Low	-25.033	-41.871	-23.341	-23.629	-28.889	-24.652	-28.542	-24.975
	Middle	-26.765	-40.092	-23.260	-25.272	-27.925	-25.721	-27.297	-24.713
	High	-23.481	-42.844	-23.524	-23.638	-23.716	-24.629	-28.229	-24.222
64QAM	Low	-25.372	-42.294	-24.334	-23.759	-29.064	-24.658	-28.552	-24.008
	Middle	-23.440	-40.570	-23.568	-25.559	-26.064	-24.430	-28.960	-25.097
	High	-23.183	-43.245	-24.245	-23.307	-24.765	-24.974	-29.280	-25.436
256QAM	Low	-24.004	-42.267	-23.086	-23.410	-30.367	-25.005	-26.980	-23.488
	Middle	-24.630	-40.322	-23.006	-25.801	-26.302	-24.055	-29.609	-24.811
	High	-24.484	-40.604	-23.664	-23.622	-24.425	-23.797	-27.879	-24.218

Test Result for Output Port 3

Mod.	Ch.	Measured Level (dBm)							
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge - 100 MHz	Low Edge - 100 MHz ~ Low Edge	High Edge ~ High Edge + 100 MHz	High Edge + 100 MHz ~ 10 GHz	10 GHz ~ 26.5 GHz	26.5 GHz ~ 40 GHz
QPSK	Low	-29.056	-40.007	-22.490	-23.811	-26.365	-23.230	-26.398	-24.821
	Middle	-24.258	-41.485	-22.926	-24.138	-24.923	-24.246	-29.013	-24.688
	High	-27.512	-41.695	-23.080	-23.218	-25.012	-23.367	-25.745	-24.462
16QAM	Low	-24.145	-42.071	-23.232	-22.699	-28.611	-24.277	-29.599	-24.126
	Middle	-23.286	-41.057	-23.055	-24.477	-25.481	-24.580	-29.968	-24.506
	High	-27.074	-42.947	-24.012	-23.847	-24.583	-23.792	-28.830	-23.336
64QAM	Low	-27.471	-43.320	-23.208	-23.680	-27.975	-23.822	-29.091	-24.664
	Middle	-24.499	-41.457	-23.139	-24.677	-26.310	-23.288	-29.194	-25.193
	High	-27.428	-41.839	-23.412	-22.771	-24.174	-23.964	-29.069	-23.763
256QAM	Low	-27.877	-42.759	-23.506	-23.489	-27.798	-23.542	-26.810	-25.283
	Middle	-23.133	-40.754	-22.841	-24.372	-25.564	-23.802	-28.763	-25.359
	High	-25.899	-42.961	-23.414	-22.828	-23.882	-23.591	-28.741	-24.882

Test Result for Output Port 4

Mod.	Ch.	Measured Level (dBm)							
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge - 100 MHz	Low Edge - 100 MHz ~ Low Edge	High Edge ~ High Edge + 100 MHz	High Edge + 100 MHz ~ 10 GHz	10 GHz ~ 26.5 GHz	26.5 GHz ~ 40 GHz
QPSK	Low	-24.430	-41.055	-23.499	-24.820	-28.094	-24.374	-25.231	-24.839
	Middle	-25.394	-41.885	-23.336	-24.341	-25.588	-24.927	-29.389	-24.807
	High	-24.968	-40.346	-22.614	-24.549	-23.667	-25.408	-29.354	-24.928
16QAM	Low	-25.276	-42.371	-23.936	-24.791	-27.007	-25.112	-28.492	-24.960
	Middle	-24.128	-40.588	-23.182	-24.016	-25.421	-24.711	-29.384	-25.279
	High	-27.137	-40.555	-23.465	-24.618	-22.706	-24.734	-28.838	-24.451
64QAM	Low	-26.571	-40.942	-22.765	-23.701	-29.037	-24.388	-29.358	-24.493
	Middle	-26.866	-42.183	-23.740	-23.991	-26.217	-24.997	-29.596	-24.742
	High	-24.890	-40.448	-23.015	-23.394	-23.140	-24.267	-25.416	-24.844
256QAM	Low	-26.938	-40.262	-23.523	-23.766	-28.743	-24.972	-25.598	-23.894
	Middle	-27.857	-40.755	-23.349	-23.630	-25.397	-25.322	-28.936	-24.679
	High	-25.840	-39.578	-22.973	-24.321	-23.510	-24.786	-29.082	-25.294

Test Result for Output Port 5

Mod.	Ch.	Measured Level (dBm)							
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge - 100 MHz	Low Edge - 100 MHz ~ Low Edge	High Edge ~ High Edge + 100 MHz	High Edge + 100 MHz ~ 10 GHz	10 GHz ~ 26.5 GHz	26.5 GHz ~ 40 GHz
QPSK	Low	-27.754	-41.553	-24.164	-23.065	-29.621	-23.488	-27.031	-24.515
	Middle	-27.228	-41.086	-24.368	-26.608	-27.615	-23.661	-29.110	-24.497
	High	-24.896	-43.267	-23.666	-24.125	-24.944	-24.161	-29.614	-24.184
16QAM	Low	-30.223	-41.293	-24.185	-23.278	-29.933	-23.683	-29.668	-23.201
	Middle	-24.198	-40.915	-23.037	-25.937	-25.671	-23.746	-28.465	-24.257
	High	-27.011	-42.696	-23.132	-24.140	-25.071	-23.971	-29.082	-25.372
64QAM	Low	-28.391	-43.025	-24.280	-23.918	-30.923	-23.793	-29.191	-23.536
	Middle	-23.168	-39.895	-22.597	-26.383	-26.624	-23.261	-29.729	-24.862
	High	-27.756	-43.352	-23.143	-23.666	-24.970	-23.350	-29.633	-24.885
256QAM	Low	-30.829	-42.560	-23.284	-24.671	-30.316	-23.257	-26.888	-25.145
	Middle	-23.044	-41.316	-23.476	-26.107	-26.464	-23.742	-29.261	-24.441
	High	-27.596	-42.623	-22.792	-24.337	-22.931	-22.670	-28.903	-25.030

Test Result for Output Port 6

Mod.	Ch.	Measured Level (dBm)							
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge - 100 MHz	Low Edge - 100 MHz ~ Low Edge	High Edge ~ High Edge + 100 MHz	High Edge + 100 MHz ~ 10 GHz	10 GHz ~ 26.5 GHz	26.5 GHz ~ 40 GHz
QPSK	Low	-25.978	-41.184	-24.195	-27.271	-28.541	-25.368	-28.745	-25.270
	Middle	-25.011	-42.157	-24.065	-25.625	-27.299	-25.584	-27.155	-24.409
	High	-26.295	-40.112	-23.435	-24.309	-24.399	-25.547	-28.460	-24.611
16QAM	Low	-25.682	-41.083	-23.188	-25.746	-28.276	-26.472	-29.635	-24.279
	Middle	-24.844	-43.280	-23.446	-25.395	-27.658	-25.141	-28.113	-25.232
	High	-25.452	-39.842	-23.422	-24.953	-23.972	-25.471	-29.487	-24.209
64QAM	Low	-25.405	-40.666	-23.101	-23.674	-29.945	-26.216	-28.515	-25.199
	Middle	-26.751	-42.965	-23.990	-25.608	-28.349	-25.772	-27.019	-24.978
	High	-26.897	-39.788	-22.968	-26.073	-24.038	-25.578	-28.271	-25.438
256QAM	Low	-25.990	-37.808	-23.590	-23.404	-30.548	-25.750	-28.220	-24.727
	Middle	-24.144	-42.824	-23.671	-25.183	-27.754	-26.111	-28.905	-24.968
	High	-26.717	-38.376	-23.515	-25.994	-23.303	-25.697	-28.593	-25.576

Test Result for Output Port 7

Mod.	Ch.	Measured Level (dBm)							
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge - 100 MHz	Low Edge - 100 MHz ~ Low Edge	High Edge ~ High Edge + 100 MHz	High Edge + 100 MHz ~ 10 GHz	10 GHz ~ 26.5 GHz	26.5 GHz ~ 40 GHz
QPSK	Low	-30.082	-41.935	-23.799	-24.367	-28.736	-23.450	-27.434	-24.259
	Middle	-25.061	-41.549	-23.179	-27.030	-26.949	-23.574	-28.898	-25.088
	High	-29.077	-42.839	-23.557	-24.011	-23.433	-23.481	-27.537	-23.912
16QAM	Low	-29.210	-41.841	-23.686	-23.658	-28.529	-24.438	-26.780	-24.956
	Middle	-23.835	-42.383	-23.944	-25.887	-26.905	-23.503	-26.780	-23.354
	High	-28.759	-42.919	-23.230	-23.604	-23.330	-23.103	-29.598	-25.597
64QAM	Low	-28.775	-43.200	-23.177	-23.585	-28.213	-23.700	-27.163	-24.929
	Middle	-23.381	-41.675	-23.785	-23.661	-27.916	-23.680	-29.059	-25.965
	High	-29.423	-42.719	-22.678	-23.377	-23.049	-23.129	-29.609	-24.753
256QAM	Low	-28.595	-43.413	-23.176	-24.934	-28.786	-23.151	-26.759	-24.035
	Middle	-23.227	-40.368	-25.266	-26.597	-26.697	-23.581	-26.882	-25.221
	High	-28.503	-42.559	-22.620	-23.043	-23.462	-23.707	-29.177	-24.953

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Test Result for Output Port 0

Mod.	Ch.	Measured Level (dBm)							
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge - 100 MHz	Low Edge - 100 MHz ~ Low Edge	High Edge ~ High Edge + 100 MHz	High Edge + 100 MHz ~ 10 GHz	10 GHz ~ 26.5 GHz	26.5 GHz ~ 40 GHz
QPSK	Low	-27.038	-40.707	-23.198	-24.022	-24.937	-23.387	-28.890	-24.506
	Middle	-27.924	-41.392	-23.294	-24.828	-23.605	-23.483	-29.255	-23.873
	High	-28.715	-39.684	-24.371	-25.909	-23.856	-23.167	-28.877	-25.102
16QAM	Low	-27.814	-39.888	-23.326	-23.844	-25.050	-23.959	-29.255	-24.064
	Middle	-28.099	-41.086	-23.269	-25.218	-24.772	-23.131	-28.595	-24.673
	High	-28.651	-41.221	-24.037	-24.402	-23.909	-23.906	-29.049	-24.676
64QAM	Low	-27.516	-41.687	-23.105	-24.181	-25.011	-23.809	-29.401	-24.767
	Middle	-28.862	-42.021	-23.657	-25.262	-23.491	-23.784	-28.931	-24.565
	High	-29.066	-40.854	-23.128	-23.771	-23.388	-23.777	-27.735	-25.226
256QAM	Low	-27.124	-41.891	-23.665	-23.622	-24.249	-23.340	-29.211	-24.540
	Middle	-28.912	-40.815	-23.110	-25.118	-23.956	-23.908	-29.633	-24.170
	High	-28.897	-41.835	-23.902	-25.716	-24.062	-23.860	-30.048	-25.579

Test Result for Output Port 1

Mod.	Ch.	Measured Level (dBm)							
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge - 100 MHz	Low Edge - 100 MHz ~ Low Edge	High Edge ~ High Edge + 100 MHz	High Edge + 100 MHz ~ 10 GHz	10 GHz ~ 26.5 GHz	26.5 GHz ~ 40 GHz
QPSK	Low	-24.021	-40.181	-23.598	-23.134	-24.968	-24.492	-29.299	-25.813
	Middle	-24.359	-39.585	-23.772	-23.328	-24.982	-23.036	-29.094	-24.274
	High	-23.156	-40.658	-23.314	-23.515	-22.986	-24.780	-25.208	-24.599
16QAM	Low	-23.048	-40.260	-24.927	-23.122	-24.549	-24.723	-26.328	-25.037
	Middle	-23.748	-39.604	-23.463	-23.397	-25.636	-23.722	-25.415	-24.749
	High	-23.243	-40.294	-23.286	-23.118	-23.857	-24.400	-24.715	-24.736
64QAM	Low	-25.057	-39.935	-23.655	-23.209	-25.595	-23.929	-27.823	-25.034
	Middle	-23.821	-40.023	-23.336	-23.950	-23.072	-24.199	-28.566	-25.277
	High	-24.889	-40.541	-23.171	-23.228	-23.869	-24.285	-24.343	-23.146
256QAM	Low	-23.860	-41.106	-23.670	-23.038	-24.800	-23.603	-29.433	-25.072
	Middle	-23.839	-40.485	-23.727	-23.470	-24.925	-24.116	-25.294	-23.857
	High	-24.231	-40.465	-24.521	-23.580	-24.073	-24.340	-25.606	-23.981

Test Result for Output Port 2

Mod.	Ch.	Measured Level (dBm)							
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge - 100 MHz	Low Edge - 100 MHz ~ Low Edge	High Edge ~ High Edge + 100 MHz	High Edge + 100 MHz ~ 10 GHz	10 GHz ~ 26.5 GHz	26.5 GHz ~ 40 GHz
QPSK	Low	-23.447	-42.384	-23.750	-23.550	-26.647	-24.437	-29.255	-24.398
	Middle	-25.301	-42.388	-24.495	-24.216	-25.482	-23.647	-25.603	-25.429
	High	-24.431	-41.019	-23.620	-25.184	-23.611	-25.059	-26.552	-24.352
16QAM	Low	-26.364	-41.595	-23.587	-23.817	-26.340	-24.253	-29.283	-24.627
	Middle	-24.902	-42.122	-24.214	-24.944	-26.132	-23.939	-26.683	-24.856
	High	-25.481	-41.977	-23.073	-24.588	-25.079	-24.442	-26.340	-24.827
64QAM	Low	-25.157	-42.495	-23.439	-24.226	-25.999	-23.644	-29.428	-24.717
	Middle	-23.800	-41.028	-23.170	-25.122	-26.376	-24.928	-26.566	-24.871
	High	-23.530	-41.490	-24.504	-24.551	-24.852	-24.874	-26.268	-24.034
256QAM	Low	-25.702	-42.202	-23.067	-23.700	-25.147	-24.279	-28.981	-24.701
	Middle	-24.000	-41.697	-23.240	-25.223	-26.003	-24.510	-25.944	-24.452
	High	-25.618	-42.317	-23.049	-25.502	-25.483	-23.790	-26.411	-23.807

Test Result for Output Port 3

Mod.	Ch.	Measured Level (dBm)							
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge - 100 MHz	Low Edge - 100 MHz ~ Low Edge	High Edge ~ High Edge + 100 MHz	High Edge + 100 MHz ~ 10 GHz	10 GHz ~ 26.5 GHz	26.5 GHz ~ 40 GHz
QPSK	Low	-26.991	-43.817	-23.524	-23.192	-26.558	-23.651	-28.521	-24.706
	Middle	-27.947	-44.251	-23.763	-23.543	-24.559	-23.296	-29.281	-24.780
	High	-27.400	-44.019	-23.336	-24.372	-24.229	-23.228	-26.956	-25.320
16QAM	Low	-24.329	-43.482	-23.248	-24.223	-27.316	-24.379	-27.269	-24.428
	Middle	-28.157	-44.611	-23.096	-24.020	-26.471	-24.207	-29.638	-24.929
	High	-27.772	-44.113	-23.431	-23.397	-24.926	-23.038	-27.281	-24.726
64QAM	Low	-24.771	-43.279	-23.630	-23.334	-27.369	-23.246	-29.001	-23.245
	Middle	-28.934	-44.557	-23.752	-24.403	-25.390	-23.408	-28.761	-25.233
	High	-28.398	-43.270	-23.422	-23.513	-25.057	-23.672	-27.756	-24.615
256QAM	Low	-28.668	-43.709	-23.032	-23.540	-25.797	-23.745	-27.922	-23.893
	Middle	-27.602	-43.549	-23.100	-24.420	-25.175	-24.265	-29.089	-24.464
	High	-28.617	-43.126	-23.112	-24.172	-24.749	-23.440	-27.426	-25.514

Test Result for Output Port 4

Mod.	Ch.	Measured Level (dBm)							
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge - 100 MHz	Low Edge - 100 MHz ~ Low Edge	High Edge ~ High Edge + 100 MHz	High Edge + 100 MHz ~ 10 GHz	10 GHz ~ 26.5 GHz	26.5 GHz ~ 40 GHz
QPSK	Low	-26.354	-43.522	-23.133	-23.205	-25.165	-24.961	-26.990	-25.141
	Middle	-25.777	-44.267	-23.232	-23.311	-24.873	-25.543	-26.424	-24.114
	High	-27.765	-43.784	-23.261	-23.184	-23.480	-24.533	-26.722	-24.528
16QAM	Low	-26.849	-43.953	-23.539	-23.261	-24.365	-25.125	-27.028	-24.754
	Middle	-25.413	-44.425	-23.980	-23.298	-24.620	-25.472	-29.093	-24.891
	High	-26.776	-43.655	-23.592	-23.079	-23.662	-25.096	-26.291	-24.183
64QAM	Low	-23.658	-44.223	-23.048	-23.361	-25.568	-24.842	-27.837	-24.661
	Middle	-26.280	-44.489	-23.082	-24.129	-24.019	-25.691	-26.576	-24.659
	High	-27.218	-44.010	-23.174	-23.138	-23.447	-24.615	-25.846	-23.424
256QAM	Low	-25.456	-44.528	-23.304	-23.071	-25.913	-24.892	-26.135	-25.153
	Middle	-25.438	-44.331	-23.397	-23.045	-24.648	-24.969	-29.246	-24.379
	High	-26.204	-44.312	-23.776	-23.445	-23.664	-24.986	-28.831	-25.096

Test Result for Output Port 5

Mod.	Ch.	Measured Level (dBm)							
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge - 100 MHz	Low Edge - 100 MHz ~ Low Edge	High Edge ~ High Edge + 100 MHz	High Edge + 100 MHz ~ 10 GHz	10 GHz ~ 26.5 GHz	26.5 GHz ~ 40 GHz
QPSK	Low	-25.622	-43.982	-24.554	-24.486	-26.930	-23.619	-28.593	-25.042
	Middle	-27.668	-44.388	-24.445	-25.528	-26.116	-23.285	-28.586	-24.486
	High	-28.419	-45.064	-23.910	-25.363	-25.142	-23.417	-28.063	-24.497
16QAM	Low	-29.204	-44.077	-24.345	-24.770	-28.838	-24.115	-28.425	-24.839
	Middle	-28.282	-45.538	-23.115	-25.499	-26.092	-23.236	-29.257	-25.053
	High	-28.753	-45.032	-23.757	-24.376	-25.953	-23.063	-27.271	-25.192
64QAM	Low	-28.134	-44.705	-23.163	-24.523	-27.266	-23.936	-28.365	-24.795
	Middle	-26.740	-45.274	-24.387	-26.148	-26.634	-23.763	-28.434	-24.289
	High	-24.631	-44.784	-23.305	-25.056	-26.517	-23.549	-27.806	-24.418
256QAM	Low	-28.461	-44.629	-23.345	-24.268	-26.210	-23.338	-29.379	-24.710
	Middle	-25.520	-45.048	-24.341	-25.706	-27.998	-23.853	-28.091	-24.321
	High	-29.274	-44.220	-23.124	-25.714	-25.269	-23.259	-27.843	-23.874

Test Result for Output Port 6

Mod.	Ch.	Measured Level (dBm)							
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge - 100 MHz	Low Edge - 100 MHz ~ Low Edge	High Edge ~ High Edge + 100 MHz	High Edge + 100 MHz ~ 10 GHz	10 GHz ~ 26.5 GHz	26.5 GHz ~ 40 GHz
QPSK	Low	-24.572	-44.922	-23.343	-23.211	-26.162	-25.417	-28.444	-23.353
	Middle	-26.168	-46.510	-23.390	-24.093	-25.693	-25.275	-27.732	-23.432
	High	-26.286	-45.185	-23.216	-23.357	-25.007	-24.348	-27.889	-24.465
16QAM	Low	-25.775	-44.364	-23.379	-23.744	-26.757	-25.094	-28.735	-23.836
	Middle	-25.879	-46.062	-23.519	-23.927	-25.885	-26.536	-28.903	-24.792
	High	-25.978	-46.559	-23.271	-23.826	-24.570	-25.829	-28.445	-24.135
64QAM	Low	-25.525	-46.229	-23.548	-24.336	-27.344	-25.319	-28.632	-25.497
	Middle	-24.413	-45.525	-23.177	-24.404	-26.090	-25.984	-27.858	-24.488
	High	-25.552	-44.621	-23.202	-23.532	-23.694	-24.717	-27.772	-24.728
256QAM	Low	-25.026	-46.047	-23.128	-23.899	-25.442	-24.016	-29.231	-24.975
	Middle	-26.391	-46.079	-23.195	-23.853	-27.116	-25.652	-28.824	-24.633
	High	-25.589	-46.053	-23.576	-23.951	-25.239	-25.464	-28.294	-24.698

Test Result for Output Port 7

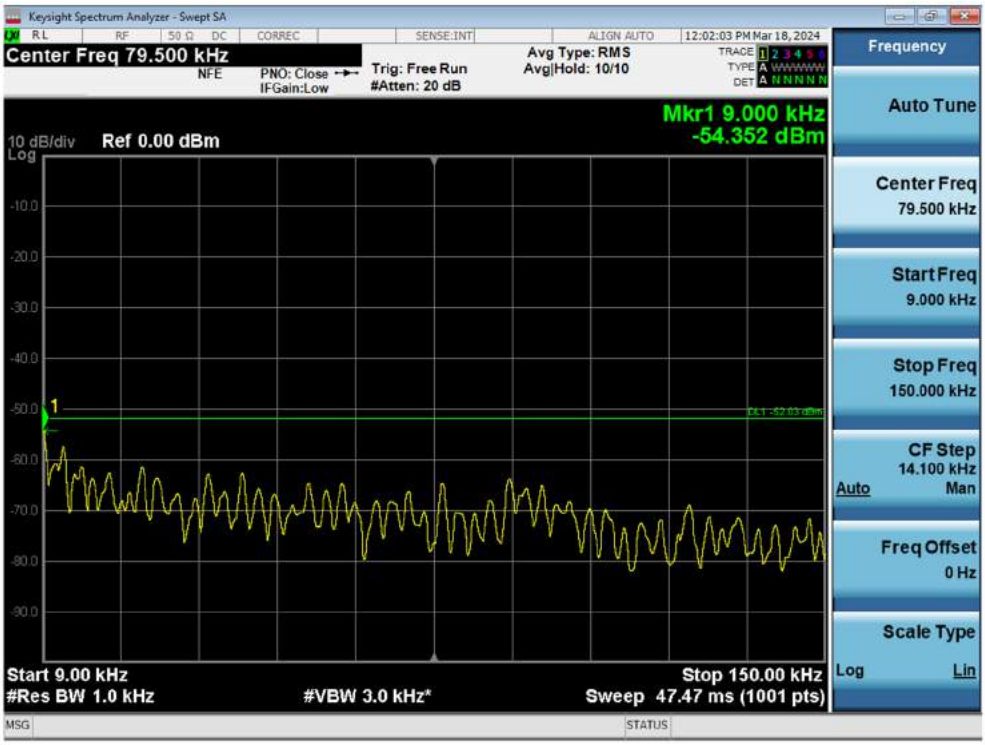
Mod.	Ch.	Measured Level (dBm)							
		9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge - 100 MHz	Low Edge - 100 MHz ~ Low Edge	High Edge ~ High Edge + 100 MHz	High Edge + 100 MHz ~ 10 GHz	10 GHz ~ 26.5 GHz	26.5 GHz ~ 40 GHz
QPSK	Low	-26.335	-44.223	-24.718	-24.581	-26.008	-23.106	-28.947	-24.886
	Middle	-27.947	-45.404	-23.858	-24.874	-25.959	-23.300	-28.767	-24.578
	High	-28.377	-44.901	-23.635	-25.015	-25.280	-23.149	-27.358	-25.355
16QAM	Low	-28.246	-44.021	-23.464	-24.397	-27.131	-23.063	-29.053	-25.137
	Middle	-28.845	-45.300	-23.569	-24.667	-26.019	-23.887	-28.257	-24.328
	High	-28.577	-45.303	-23.305	-23.506	-25.356	-23.506	-28.303	-24.260
64QAM	Low	-28.278	-44.694	-23.514	-24.035	-26.693	-23.354	-27.942	-24.625
	Middle	-29.333	-45.692	-23.629	-24.582	-26.099	-24.102	-28.704	-23.849
	High	-26.131	-45.403	-24.566	-25.073	-23.514	-23.268	-27.541	-24.981
256QAM	Low	-28.589	-44.885	-23.829	-24.639	-26.172	-23.660	-29.015	-23.811
	Middle	-27.940	-44.694	-23.405	-25.344	-25.385	-23.476	-28.594	-24.374
	High	-28.655	-45.294	-23.626	-25.240	-24.232	-23.638	-27.135	-24.309

(8 Port) 5G NR n77 80 MHz 1 Carrier

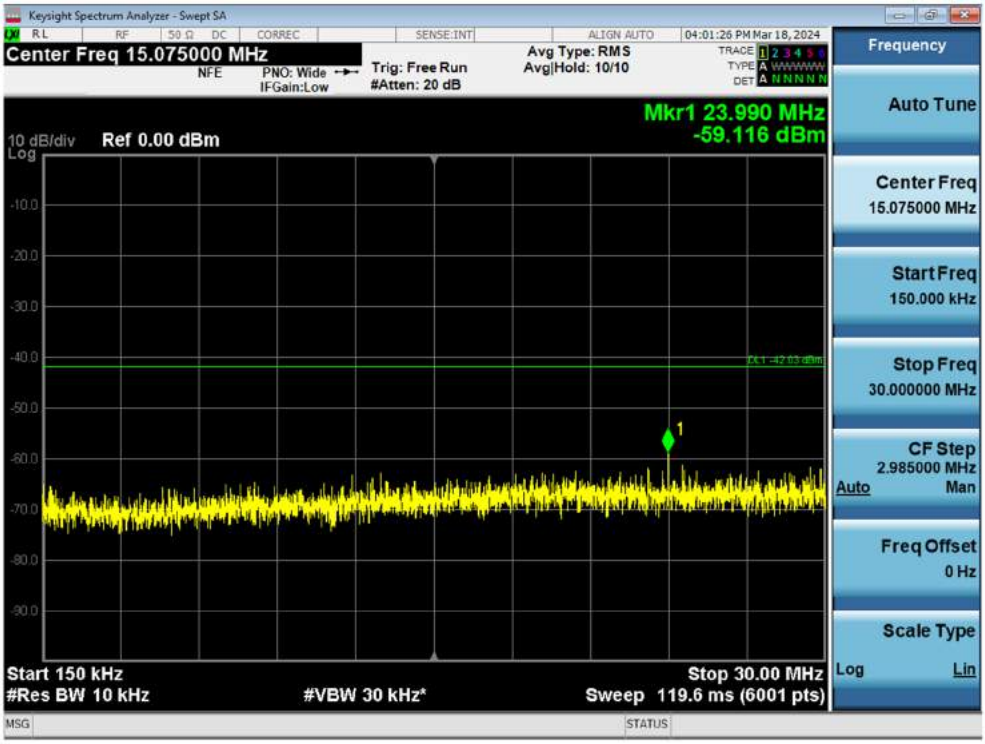
Port	Mod.	Ch.	Measured Level (dBm)							
			9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge - 100 MHz	Low Edge - 100 MHz ~ Low Edge	High Edge ~ High Edge + 100 MHz	High Edge + 100 MHz ~ 10 GHz	10 GHz ~ 26.5 GHz	26.5 GHz ~ 40 GHz
0	QPSK	Middle	-28.149	-41.014	-23.264	-23.963	-23.184	-24.058	-29.013	-24.736
	16QAM	Middle	-27.365	-42.764	-23.941	-23.686	-23.053	-24.684	-29.108	-25.007
	64QAM	Middle	-29.344	-41.433	-23.369	-23.751	-23.886	-23.395	-29.139	-24.012
	256QAM	Middle	-27.995	-41.058	-23.153	-24.000	-23.049	-23.887	-29.387	-24.627
1	QPSK	Middle	-23.594	-39.849	-23.484	-22.732	-23.567	-24.420	-28.642	-23.874
	16QAM	Middle	-24.001	-38.457	-24.249	-22.552	-23.361	-23.798	-26.733	-24.282
	64QAM	Middle	-23.260	-36.892	-23.438	-23.063	-23.567	-23.998	-26.855	-24.172
	256QAM	Middle	-23.266	-37.282	-23.356	-23.145	-23.251	-24.189	-26.476	-24.649
2	QPSK	Middle	-24.540	-43.104	-23.069	-24.207	-25.569	-24.363	-27.589	-24.776
	16QAM	Middle	-24.282	-43.670	-23.409	-23.934	-23.781	-24.409	-27.238	-24.458
	64QAM	Middle	-24.739	-42.942	-23.241	-24.163	-24.891	-24.729	-28.163	-23.740
	256QAM	Middle	-25.134	-42.865	-23.425	-23.787	-24.562	-25.308	-27.558	-24.099
3	QPSK	Middle	-27.599	-43.887	-23.263	-23.508	-24.463	-23.644	-27.526	-24.026
	16QAM	Middle	-28.128	-44.086	-23.280	-23.404	-24.433	-23.507	-27.786	-24.667
	64QAM	Middle	-26.919	-45.025	-24.329	-23.557	-24.988	-23.865	-27.933	-24.771
	256QAM	Middle	-28.809	-44.882	-23.149	-23.561	-24.420	-23.554	-28.521	-24.453
4	QPSK	Middle	-26.167	-45.159	-23.488	-22.873	-23.096	-25.357	-27.256	-25.021
	16QAM	Middle	-25.738	-45.339	-23.277	-22.483	-23.323	-24.922	-26.722	-24.643
	64QAM	Middle	-26.514	-44.741	-23.579	-22.683	-23.189	-25.006	-27.269	-25.659
	256QAM	Middle	-26.397	-44.498	-23.396	-22.783	-23.083	-24.741	-27.576	-24.558
5	QPSK	Middle	-28.819	-46.078	-24.494	-24.588	-25.566	-23.605	-27.899	-25.562
	16QAM	Middle	-27.778	-45.170	-23.816	-24.167	-26.088	-23.098	-28.684	-24.908
	64QAM	Middle	-28.901	-45.580	-23.714	-25.069	-25.331	-23.907	-27.955	-25.320
	256QAM	Middle	-28.206	-45.561	-23.584	-24.553	-24.854	-23.589	-27.761	-24.869
6	QPSK	Middle	-25.347	-45.687	-23.875	-23.312	-23.785	-25.716	-28.927	-24.552
	16QAM	Middle	-24.460	-45.127	-23.208	-23.477	-24.201	-24.914	-28.688	-25.034
	64QAM	Middle	-25.686	-44.872	-23.957	-23.899	-25.125	-26.001	-29.249	-25.228
	256QAM	Middle	-25.979	-44.956	-23.146	-23.174	-25.138	-25.772	-28.946	-24.268
7	QPSK	Middle	-28.678	-45.865	-23.801	-24.181	-23.690	-23.873	-27.994	-24.858
	16QAM	Middle	-28.603	-46.069	-23.538	-24.138	-24.737	-23.115	-29.045	-24.390
	64QAM	Middle	-26.991	-45.485	-24.049	-24.835	-25.561	-23.773	-28.091	-24.114
	256QAM	Middle	-28.606	-45.704	-23.984	-23.404	-25.855	-23.562	-28.757	-25.294

Plot Data of Spurious Unwanted Emissions

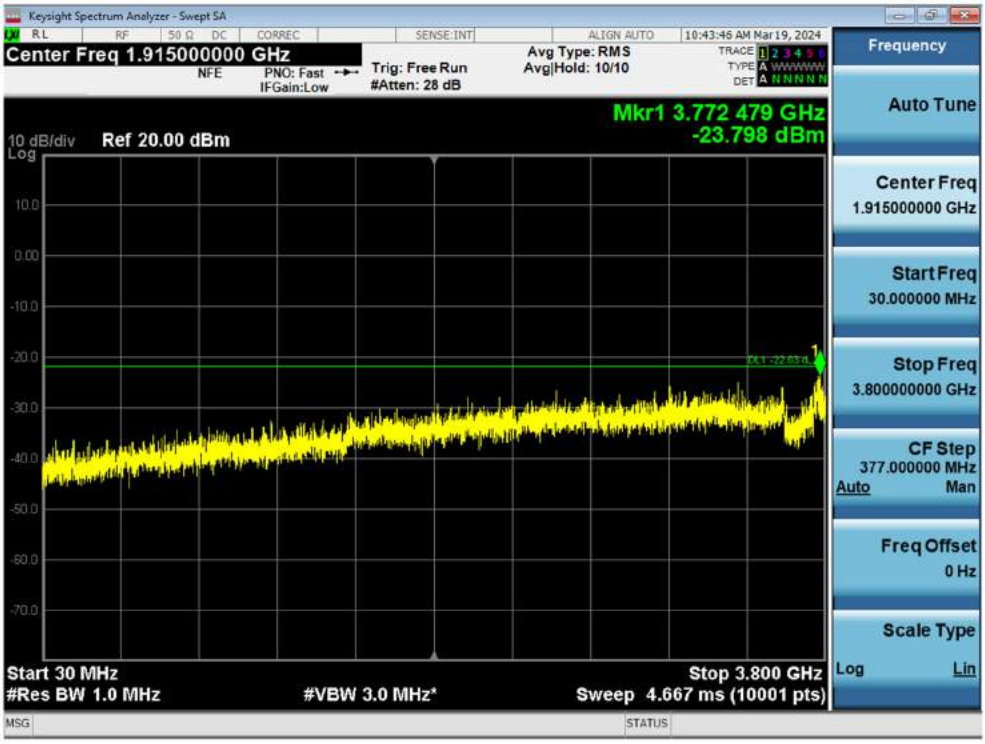
Antenna 5 / (8 Port) 5G NR n77 40 MHz 1 Carrier / 9 kHz ~ 150 kHz / 256QAM / Middle



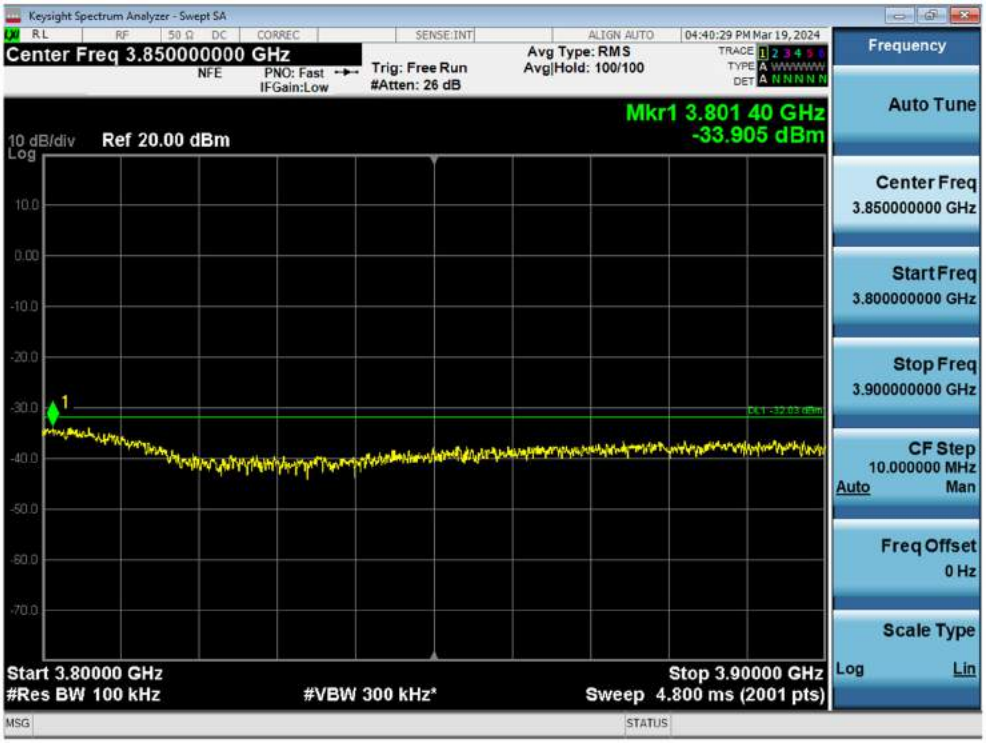
Antenna 6 / (8 Port) 5G NR n77 40 MHz 1 Carrier / 150 kHz ~ 30 MHz / 256QAM / Low



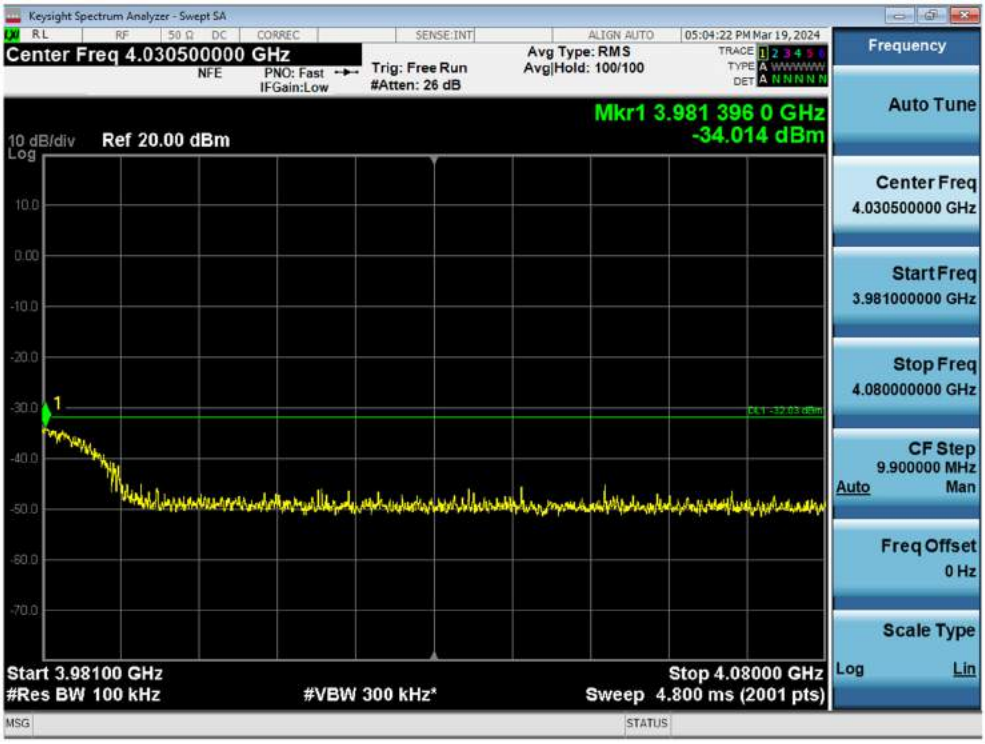
Antenna 3 / (8 Port) 5G NR n77 40 MHz 1 Carrier / 30 MHz ~ Low Edge - 100 MHz / QPSK / Low



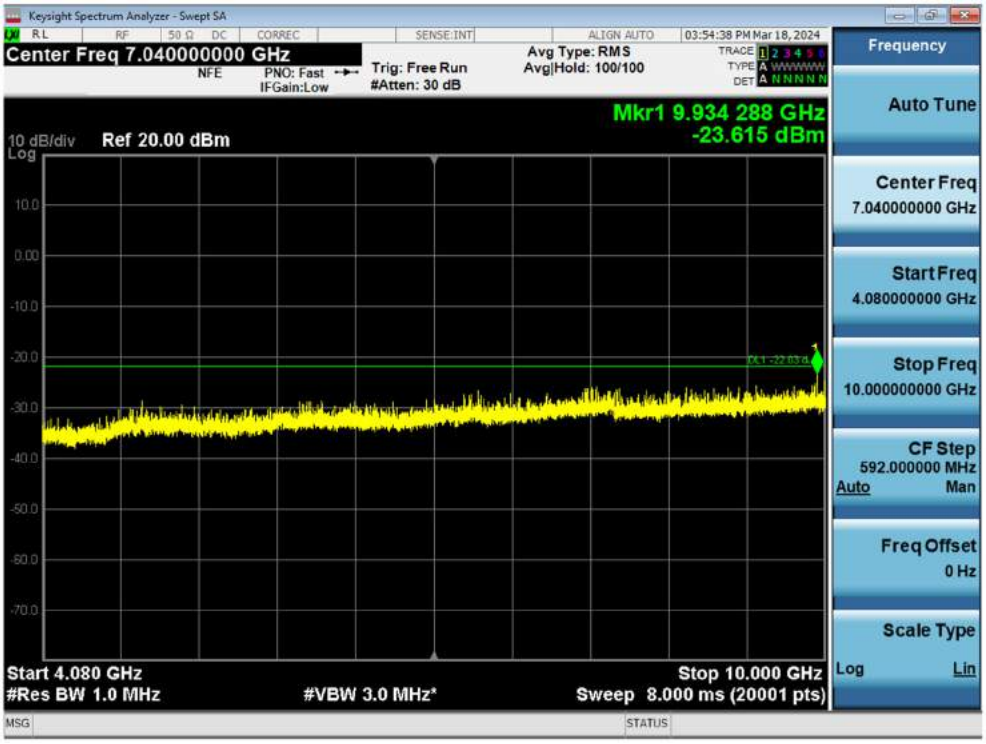
Antenna 1 / (8 Port) 5G NR n77 40 MHz 1 Carrier / Low Edge - 100 MHz ~ Low Edge / QPSK / High



Antenna 4 / (8 Port) 5G NR n77 40 MHz 1 Carrier / High Edge ~ High Edge + 100 MHz / 16QAM / High

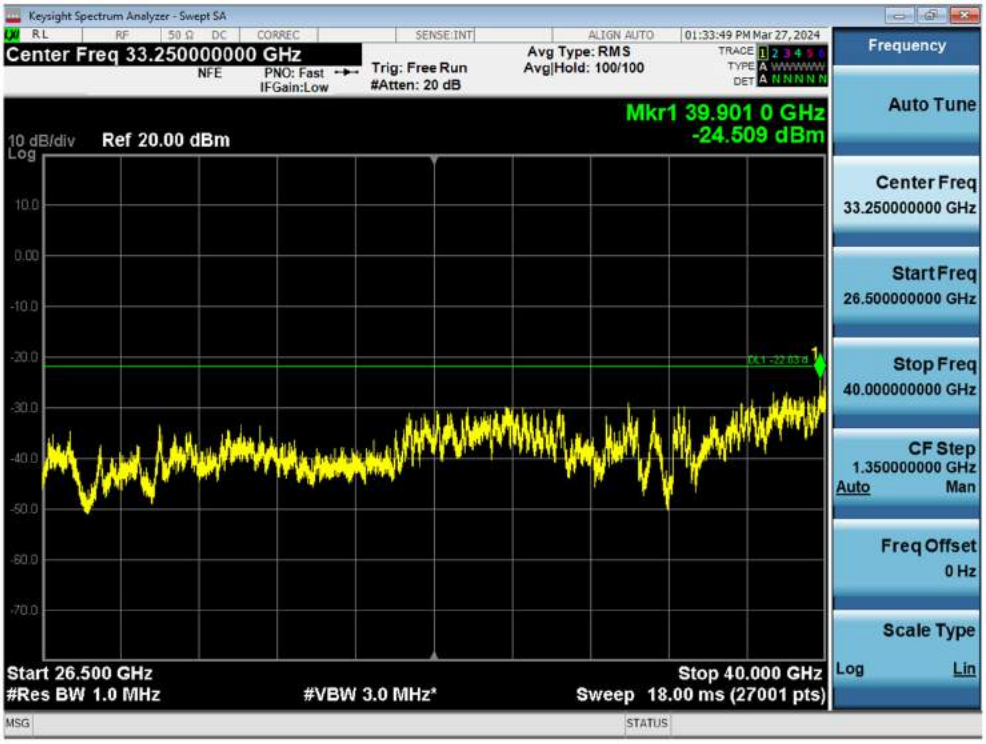


Antenna 0 / (8 Port) 5G NR n77 40 MHz 1 Carrier / High Edge + 100 MHz ~ 10 GHz / 256QAM / Low

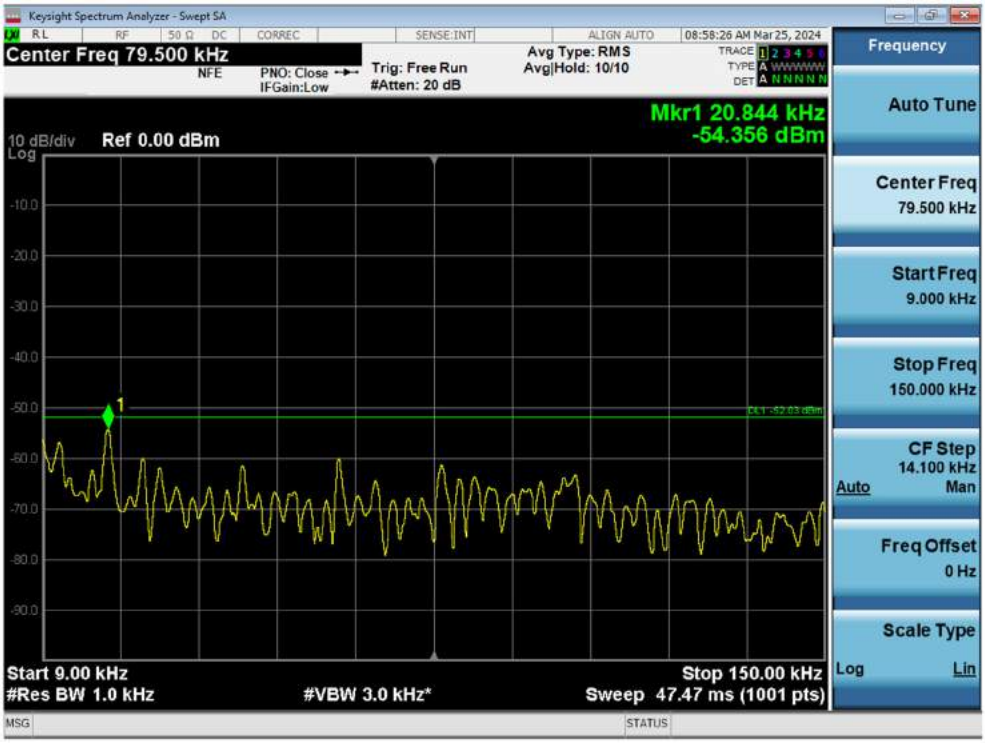


Antenna 1 / (8 Port) 5G NR n77 40 MHz 1 Carrier / 10 GHz ~ 26.5 GHz / QPSK / Low

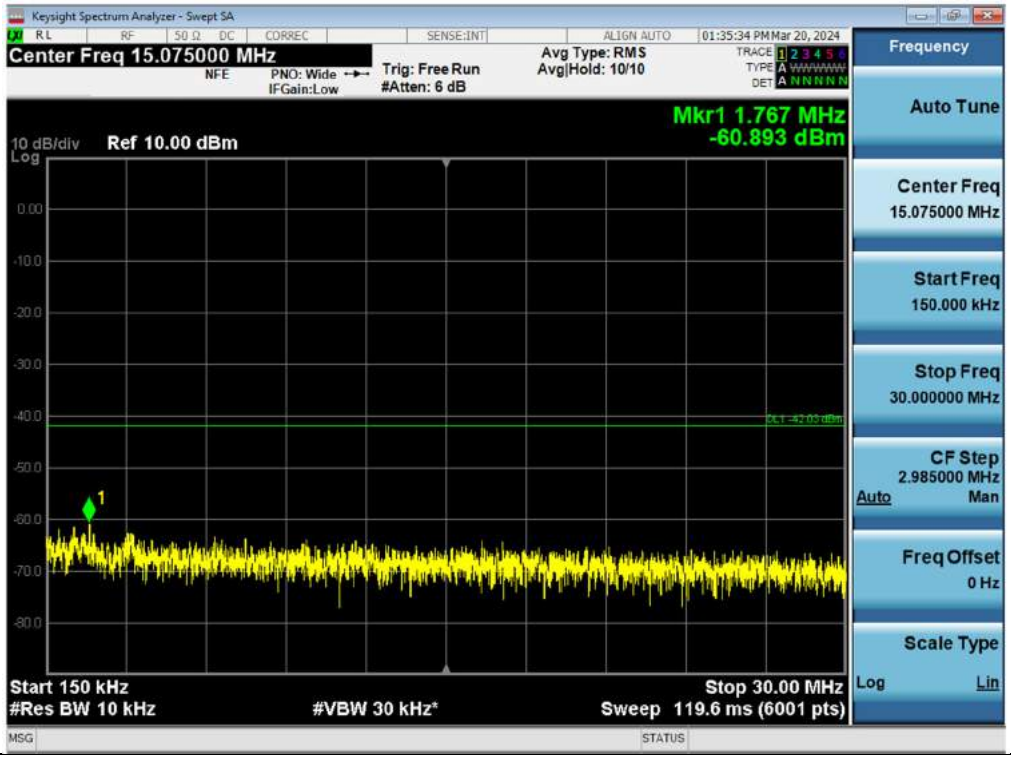
Antenna 5 / (8 Port) 5G NR n77 40 MHz 1 Carrier / 26.5 GHz ~ 40 GHz / 16QAM / Low



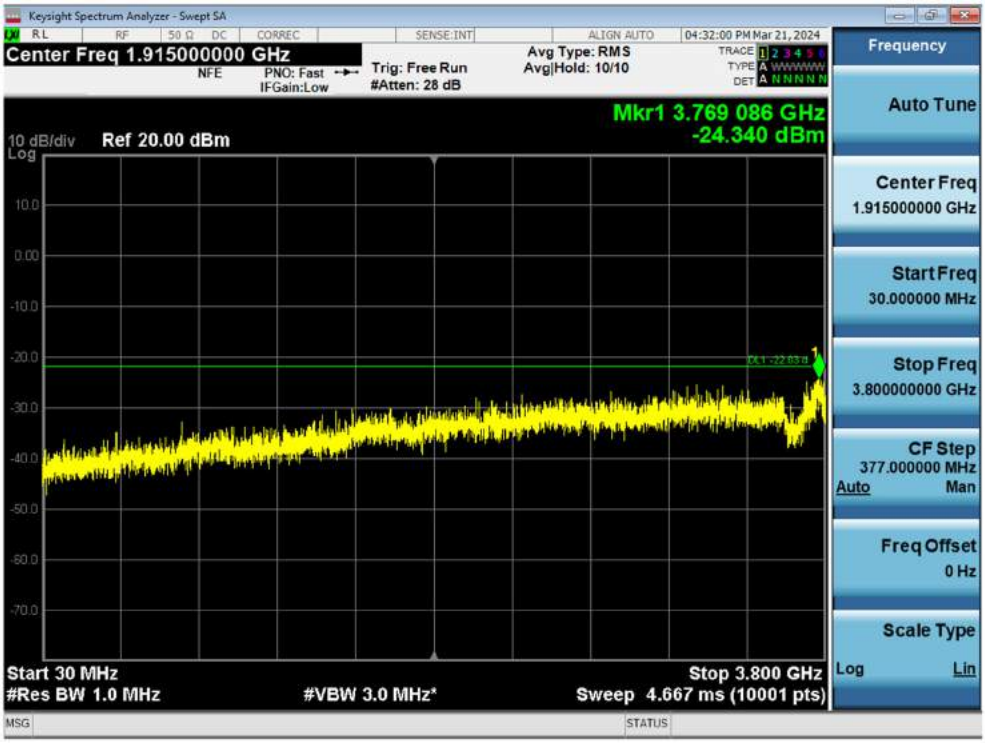
Antenna 1 / (8 Port) 5G NR n77 60 MHz 1 Carrier / 9 kHz ~ 150 kHz / 16QAM / Low



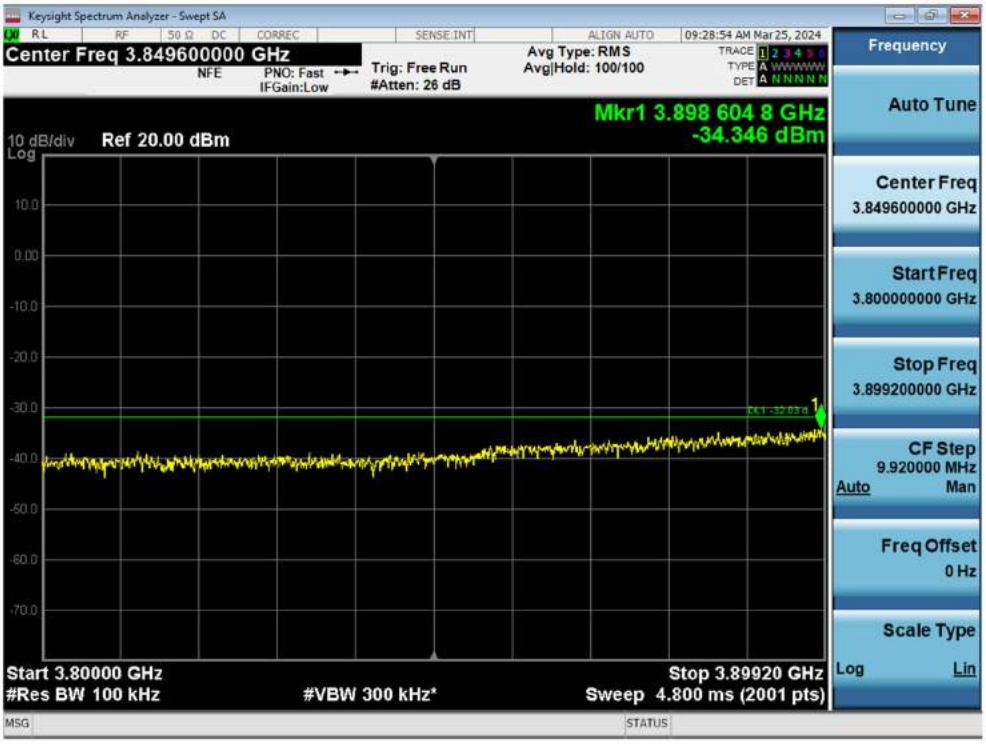
Antenna 1 / (8 Port) 5G NR n77 60 MHz 1 Carrier / 150 kHz ~ 30 MHz / QPSK / Middle



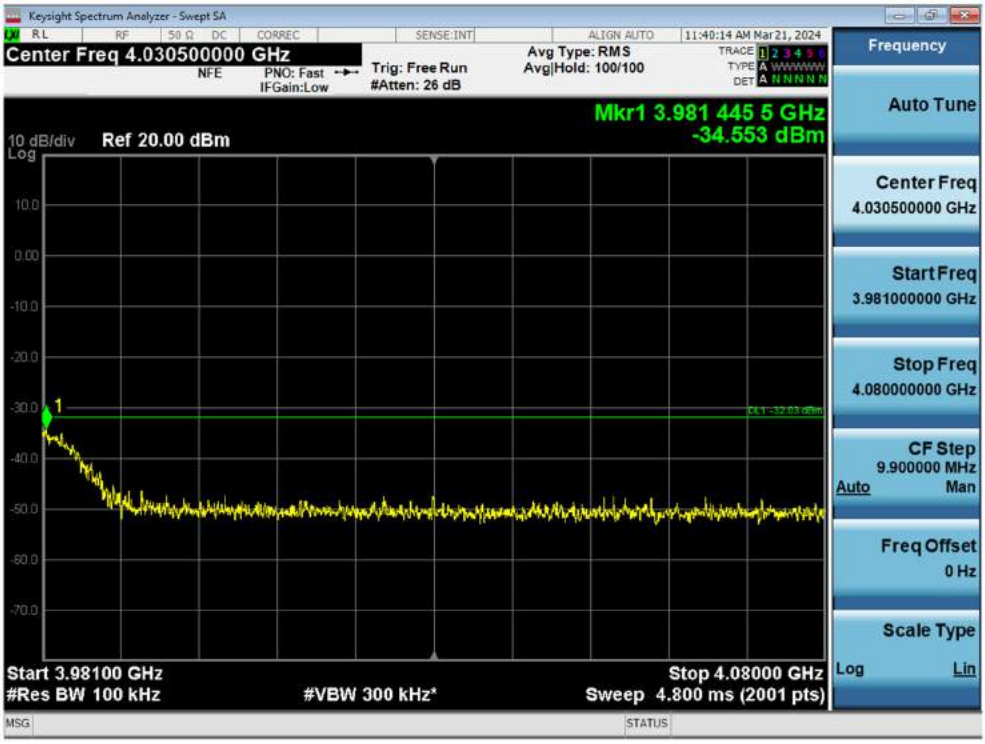
Antenna 3 / (8 Port) 5G NR n77 60 MHz 1 Carrier / 30 MHz ~ Low Edge - 100 MHz / 256QAM / Low



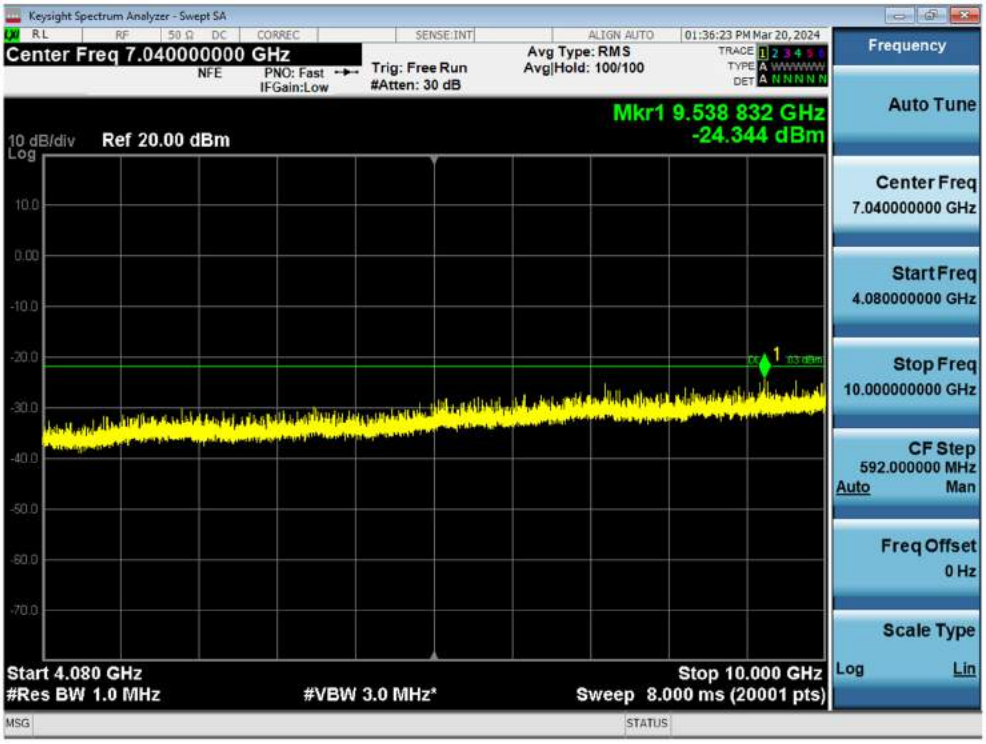
Antenna 1 / (8 Port) 5G NR n77 60 MHz 1 Carrier / Low Edge - 100 MHz ~ Low Edge / 256QAM / Low



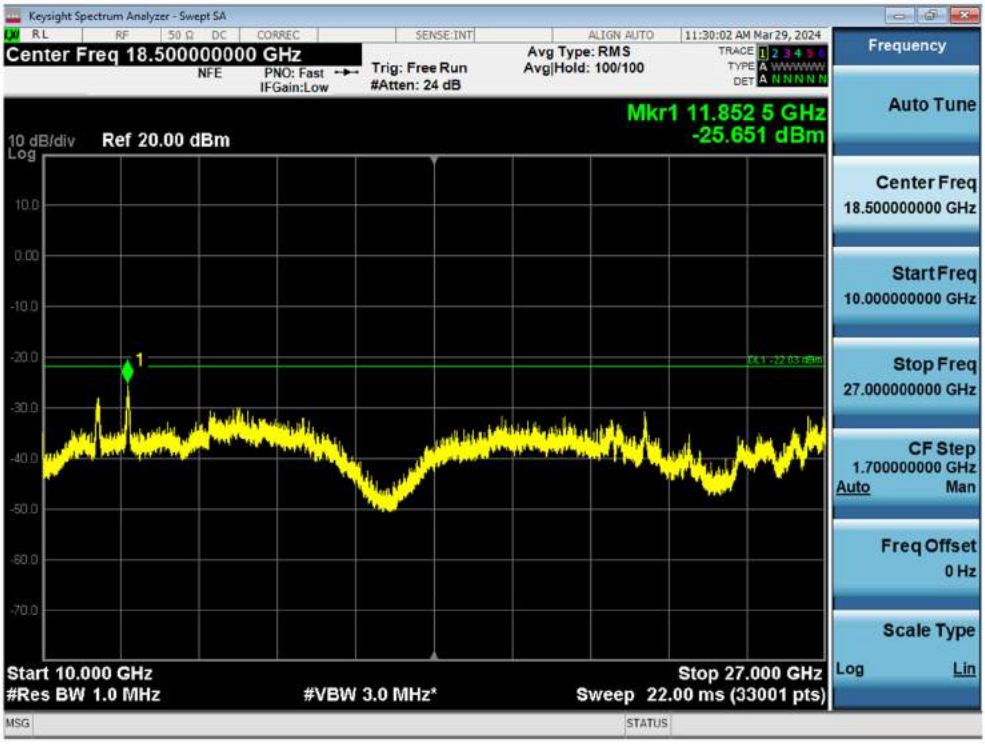
Antenna 1 / (8 Port) 5G NR n77 60 MHz 1 Carrier / High Edge ~ High Edge + 100 MHz / QPSK / High



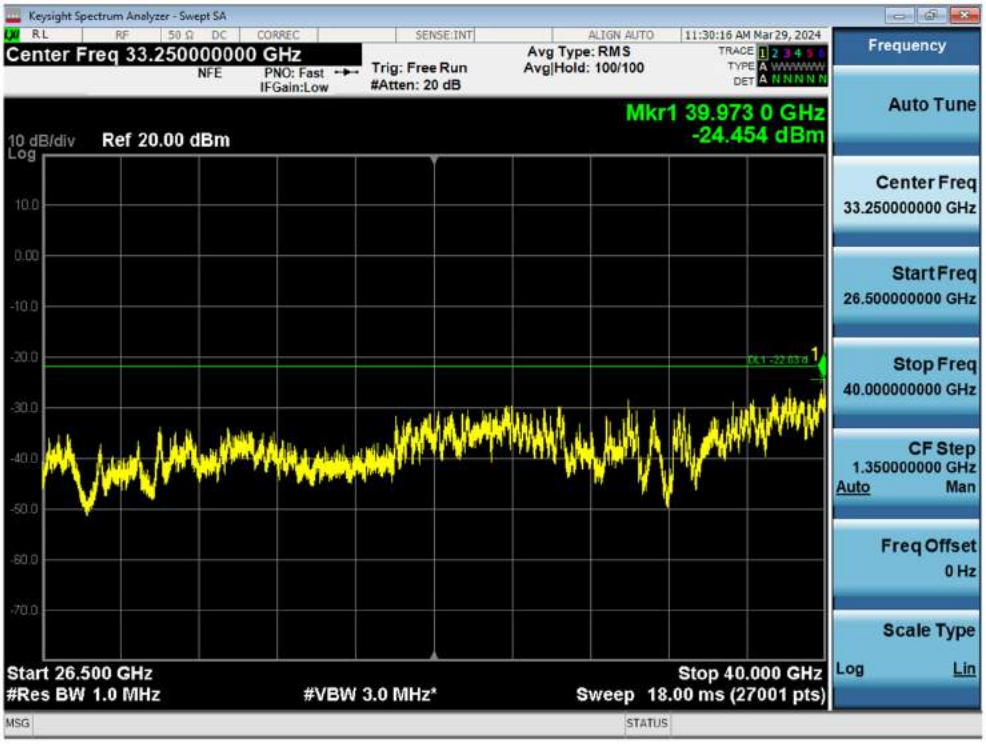
Antenna 1 / (8 Port) 5G NR n77 60 MHz 1 Carrier / High Edge + 100 MHz ~ 10 GHz / QPSK / Middle



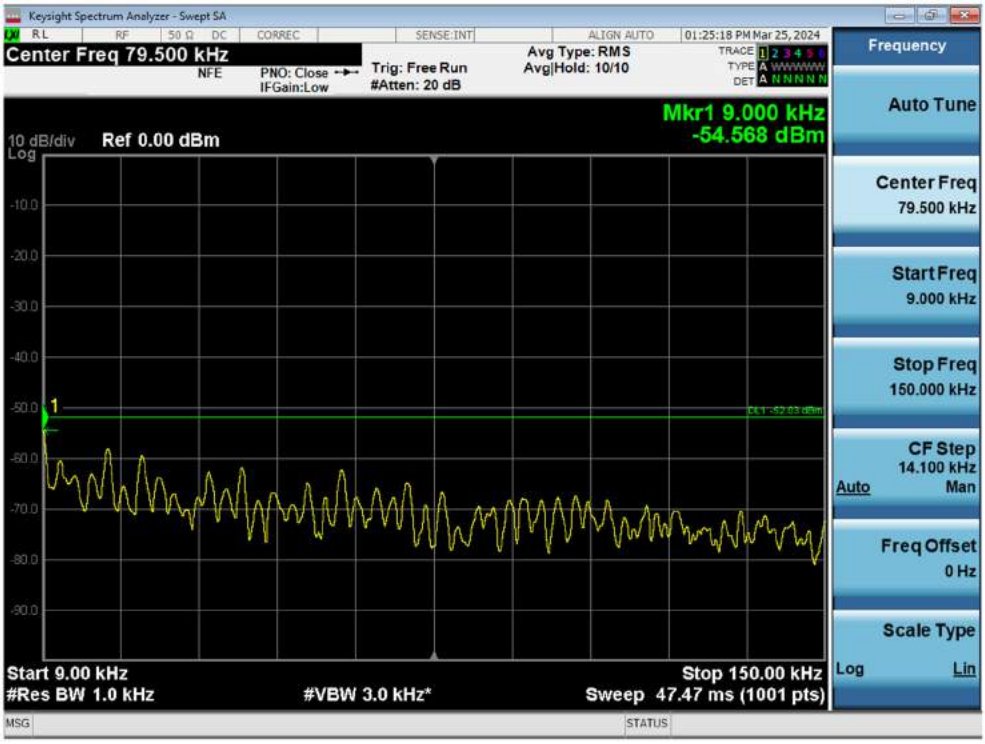
Antenna 1 / (8 Port) 5G NR n77 60 MHz 1 Carrier / 10 GHz ~ 26.5 GHz / 64QAM / High



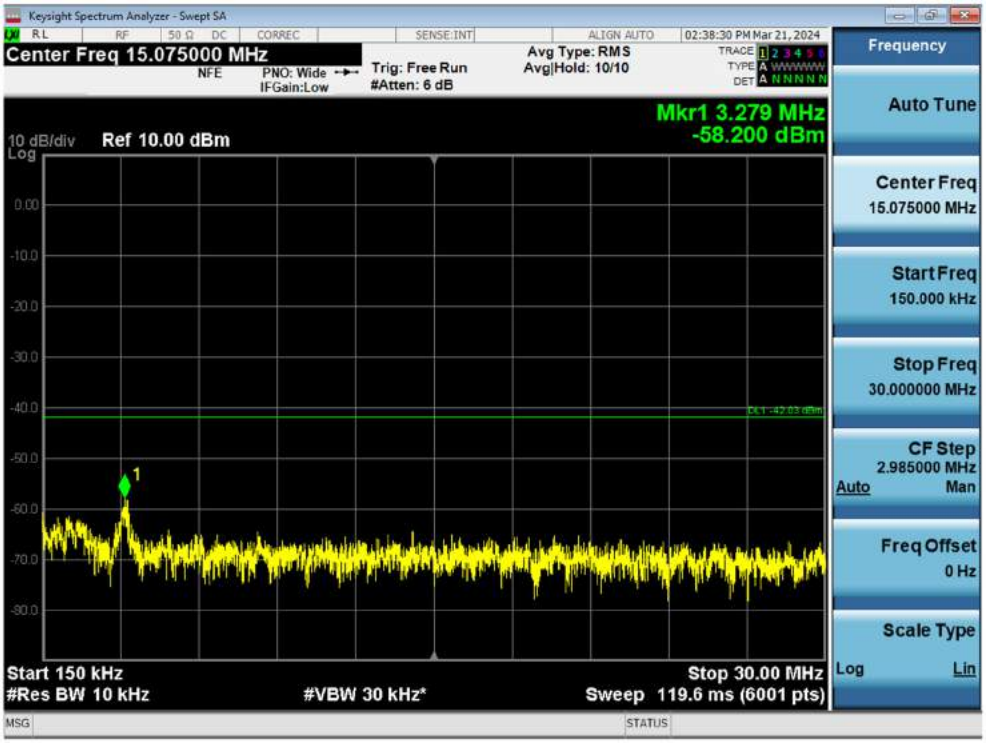
Antenna 1 / (8 Port) 5G NR n77 60 MHz 1 Carrier / 26.5 GHz ~ 40 GHz / 64QAM / High



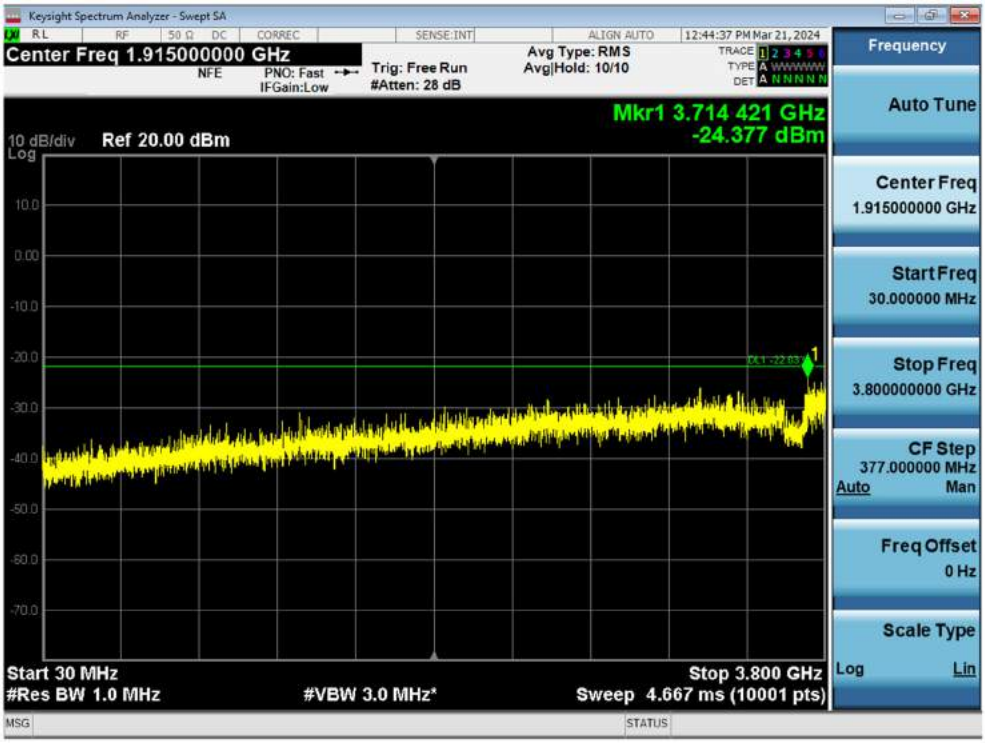
Antenna 1 / (8 Port) 5G NR n77 80 MHz 1 Carrier / 9 kHz ~ 150 kHz / 64QAM / Middle



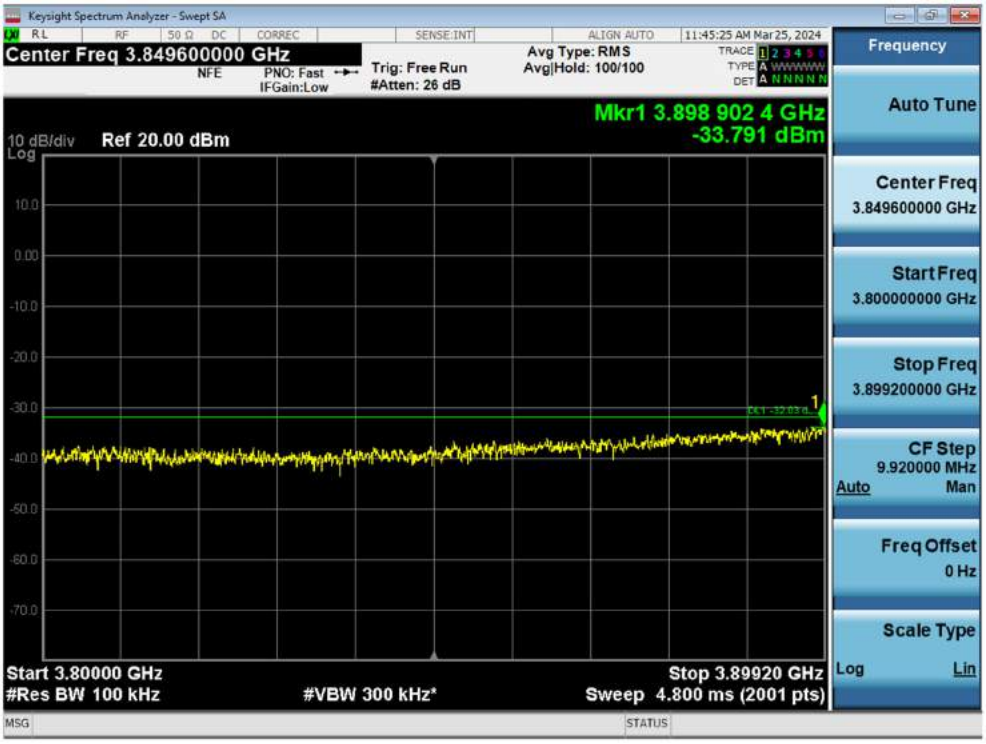
Antenna 1 / (8 Port) 5G NR n77 80 MHz 1 Carrier / 150 kHz ~ 30 MHz / 64QAM / Middle



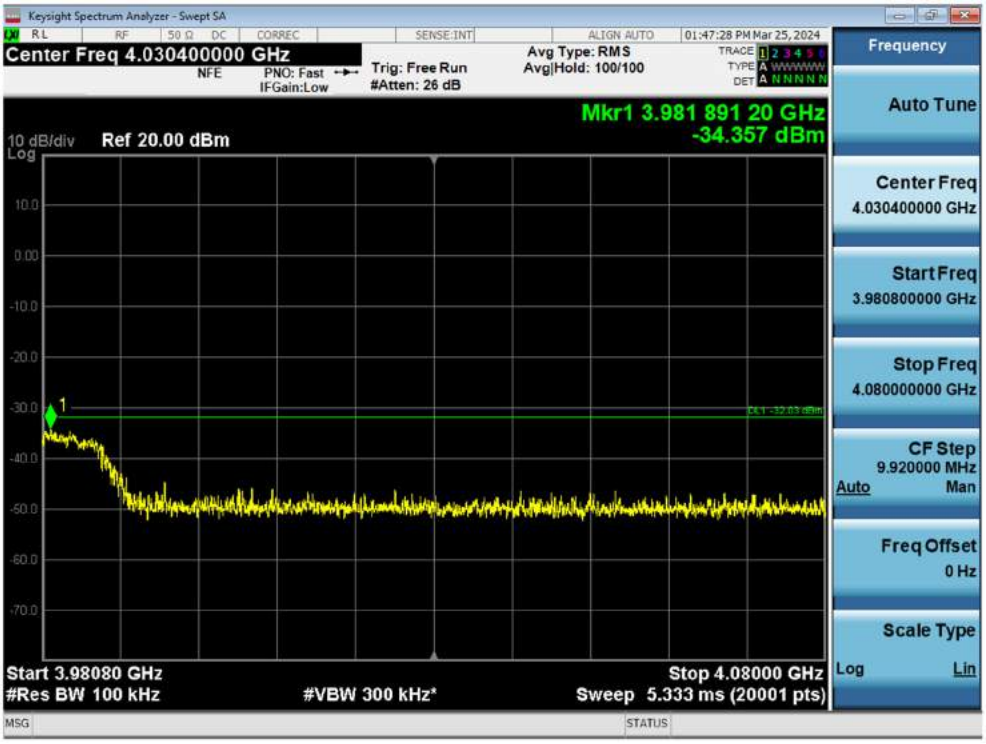
Antenna 2 / (8 Port) 5G NR n77 80 MHz 1 Carrier / 30 MHz ~ Low Edge - 100 MHz / QPSK / Middle



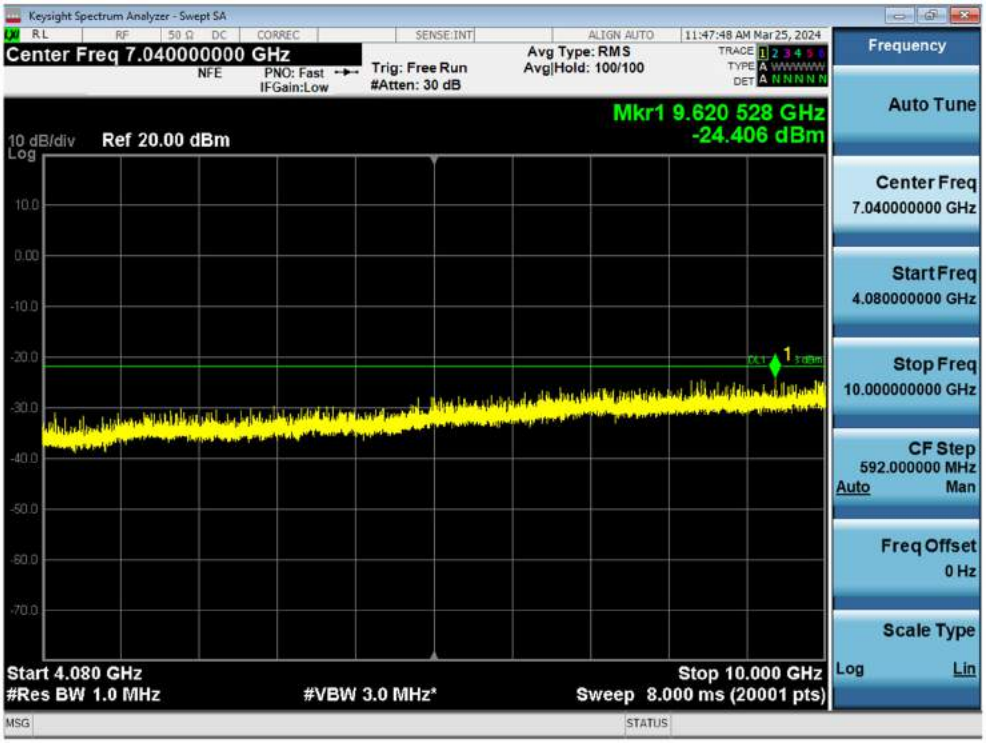
Antenna 4 / (8 Port) 5G NR n77 80 MHz 1 Carrier / Low Edge - 100 MHz ~ Low Edge / 16QAM / Middle



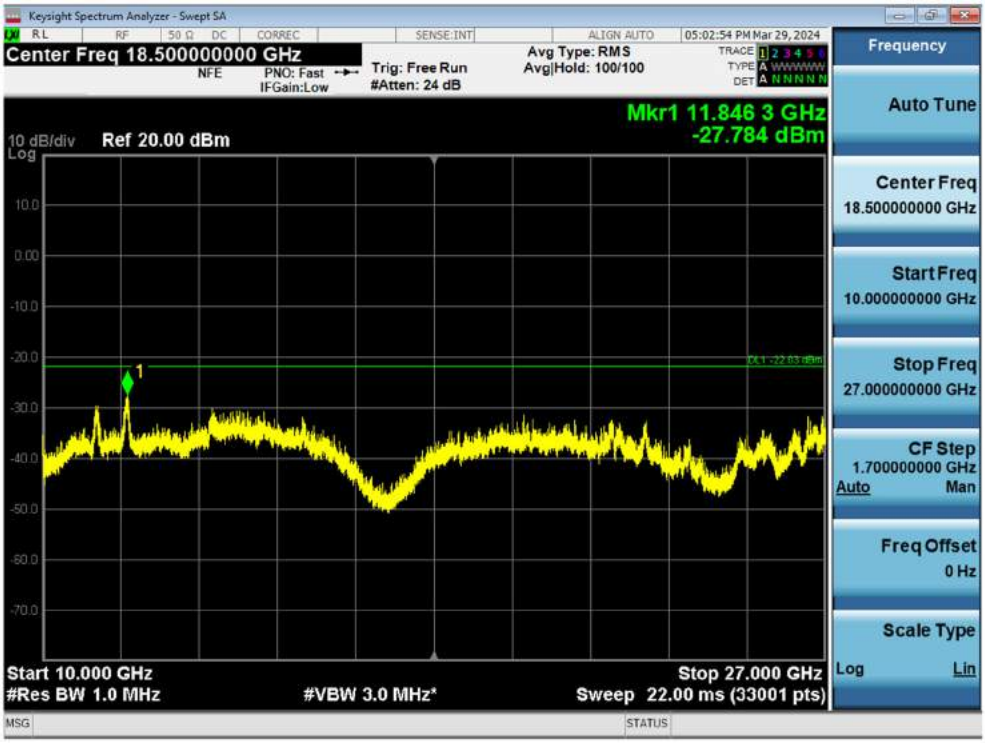
Antenna 0 / (8 Port) 5G NR n77 80 MHz 1 Carrier / High Edge ~ High Edge + 100 MHz / 256QAM / Middle



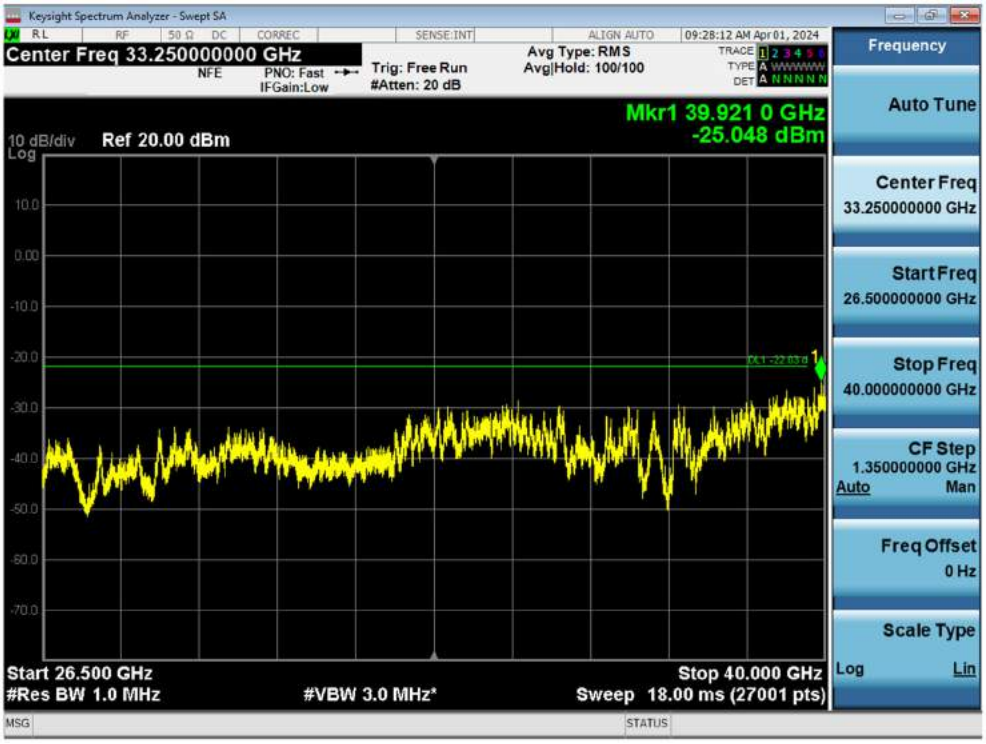
Antenna 5 / (8 Port) 5G NR n77 80 MHz 1 Carrier / High Edge + 100 MHz ~ 10 GHz / 16QAM / Middle



Antenna 1 / (8 Port) 5G NR n77 80 MHz 1 Carrier / 10 GHz ~ 26.5 GHz / 256QAM / Middle



Antenna 2 / (8 Port) 5G NR n77 80 MHz 1 Carrier / 26.5 GHz ~ 40 GHz / 64QAM / Middle



5.6. RADIATED EMISSIONS

Test Requirements:

§ 2.1053 Measurements required: Field strength of spurious radiation.

(a) Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of § 2.1049, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from halfwave dipole antennas.

(b) The measurements specified in paragraph (a) of this section shall be made for the following equipment:

(1) Those in which the spurious emissions are required to be 60 dB or more below the mean power of the transmitter.

(2) All equipment operating on frequencies higher than 25 MHz.

(3) All equipment where the antenna is an integral part of, and attached directly to the transmitter.

(4) Other types of equipment as required, when deemed necessary by the Commission.

§ 27.53 Emission limits.

(l) 3.7 GHz Service. The following emission limits apply to station transmitting in the 3700-3980 MHz band:

(1) For base station operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz. Compliance with this paragraph (l)(1) 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. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

Test Procedures:

The measurement is performed in accordance with Section 5.5.3.2 of ANSI C63.26.

a) Place the EUT in the center of the turntable. The EUT shall be configured to transmit into the standard non-radiating load (for measuring radiated spurious emissions), connected with cables of minimal length unless specified otherwise. If the EUT uses an adjustable antenna, the antenna shall be positioned to the length that produces the worst case emission at the fundamental operating frequency.

b) Each emission under consideration shall be evaluated:
   1) Raise and lower the measurement antenna in accordance 5.5.2, as necessary to enable detection of the maximum emission amplitude relative to measurement antenna height.
   2) Rotate the EUT through 360° to determine the maximum emission level relative to the axial position.
   3) Return the turntable to the azimuth where the highest emission amplitude level was observed.
   4) Vary the measurement antenna height again through 1 m to 4 m again to find the height associated with the maximum emission amplitude.
   5) Record the measured emission amplitude level and frequency using the appropriate RBW.

c) Repeat step b) for each emission frequency with the measurement antenna oriented in both the horizontal and vertical polarizations to determine the orientation that gives the maximum emissions amplitude.

d) ~ j) Omitted

k) Provide the complete measurement results as a part of the test report.

Note:

1. The results of the Radiated Emissions test shown above are measured at maximum power, and data values are attached only in the worst case.
2. We have done horizontal and vertical polarization in detecting antenna.
3. The amplitude of the spurious domain emission attenuated by more than 20 dB over the permissible value was not recorded according to ANSI C63.26, clause 5.1.1., c).
4. Measure distance = 3 m

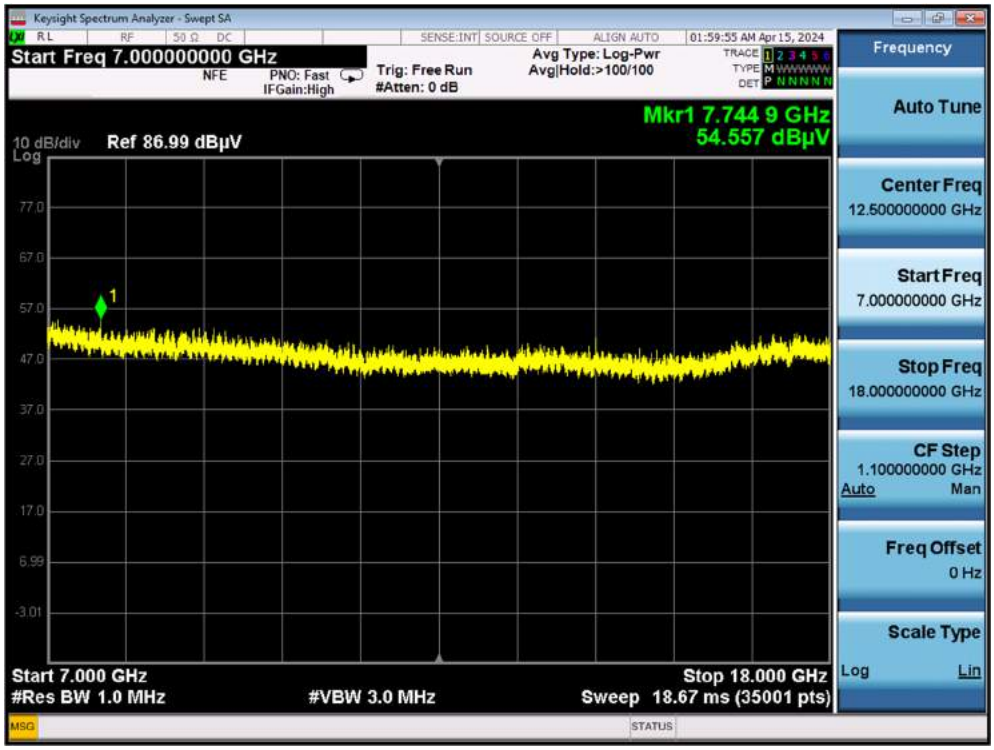
Test Results:

Freq.(MHz)	Measured Level	Ant. Factor	A.G.+C.L.+H.P.F.	Pol.	Measured Power	Result
	[dBµV]	[dB/m]	[dB]		[dBm]	[dBm/m]
No Critical Peaks Found.						

C.L.: Cable Loss / A.G.: Amp Gain / H.P.F.: High Pass Filter

Plot data of Radiated Emissions

(8 Port) 5G NR n77 80 MHz 1 Carrier



Note: Only the worst case plots for Radiated Spurious Emissions.

5.7. FREQUENCY STABILITY

Test Requirements:

§ 2.1055 Measurements required: Frequency stability.

(a) The frequency stability shall be measured with variation of ambient temperature as follows:

(1) From －30° to + 50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.

§ 27.54 Frequency stability.

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Test Procedures:

The measurement is performed in accordance with Section 5.6.3, 5.6.4 and 5.6.5 of ANSI C63.26.

5.6.3 Procedure for frequency stability testing

Frequency stability is a measure of the frequency drift due to temperature and supply voltage variations, with reference to the frequency measured at +20 °C and rated supply voltage.

The operating carrier frequency shall be set up in accordance with the manufacturer's published operation and instruction manual prior to the commencement of these tests. No adjustment of any frequency determining circuit element shall be made subsequent to this initial set-up. Frequency stability is tested:

a) At 10 °C intervals of temperatures between －30 °C and +50 °C at the manufacturer's rated supply voltage, and

b) At +20 °C temperature and ±15% supply voltage variations. If a product is specified to operate over a range of input voltage then the －15% variation is applied to the lowermost voltage and the +15% is applied to the uppermost voltage.

During the test all necessary settings, adjustments and control of the EUT have to be performed without disturbing the test environment, i.e., without opening the environmental chamber. The frequency stabilities can be maintained to a lesser temperature range provided that the transmitter is automatically inhibited from operating outside the lesser temperature range. For handheld equipment that is only capable of operating from internal batteries and the supply voltage cannot be varied, the frequency stability tests shall be performed at the nominal battery voltage and the battery end point voltage specified by the manufacturer. An external supply voltage can be used and set at the internal battery nominal voltage, and again at the battery operating end point voltage which shall be specified by the equipment manufacturer.

If an unmodulated carrier is not available, the mean frequency of a modulated carrier can be obtained by using a frequency counter with gating time set to an appropriately large multiple of bit periods (gating time depending on the required accuracy). Full details on the choice of values shall be included in the test report.

5.6.4 Frequency stability over variations in temperature

a) Supply the EUT with a nominal 60 Hz ac voltage, dc voltage, or install a new or fully charged battery in the EUT.

b) If possible a dummy load should be connected to the EUT because an antenna near the metallic walls of an environmental test chamber could affect the output frequency of the EUT. If the EUT is equipped with a permanently attached, adjustable-length antenna, the EUT should be placed in the center of the chamber with the antenna adjusted to the shortest length possible.

c) Turn on the EUT, and tune it to the center frequency of the operating band.

d) Couple the transmitter output to the measuring instrument through a suitable attenuator and coaxial cable. If connection to the EUT output is not possible, make the measurement by connecting an antenna to the measuring instrument with a suitable length of coaxial cable and placing the measuring antenna near the EUT (e.g., 15 cm away).

NOTE—An instrument that has an adequate level of accuracy as specified by the procuring or regulatory authority is the recommended measuring instrument.

e) Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument, but is strong enough to allow measurement of the operating or fundamental frequency of the EUT). Adjust the detector bandwidth and span settings to achieve a resolution capable of accurate frequency measurements over the applicable frequency stability limits.

f) Turn the EUT off, and place it inside the environmental temperature chamber. For devices that have oscillator heaters, energize only the heater circuit.

g) Set the temperature control on the chamber to the Highest temperature specified in the regulatory requirements for the type of device, and allow the oscillator heater and the chamber temperature to stabilize. Unless otherwise instructed by the regulatory authority, this temperature should be 50 °C.

h) While maintaining a constant temperature inside the environmental chamber, turn on the EUT and allow sufficient time for the EUT temperature to stabilize.

i) Measure the frequency.

j) Switch off the EUT, but do not switch off the oscillator heater.

k) Lower the chamber temperature to the next level that is required by the standard and allow the temperature inside the chamber to stabilize. Unless otherwise instructed by the regulators, this temperature step should be 10 °C.

l) Repeat step h) through step k) down to the lowest specified temperature. Unless otherwise instructed by the regulators, this temperature should be −30 °C. When the frequency stability limit is stated as being sufficient such that the fundamental emissions stay within the authorized bands of operation, a reference point shall be established at the applicable unwanted emissions limit using a RBW equal to the RBW required by the unwanted emissions specification of the applicable regulatory standard. These reference points measured using the lowest and Highest channel of operation shall be identified as f_L and f_H respectively. The worst-case frequency offset determined in the above methods shall be added or subtracted from the values of f_L and f_H and the resulting frequencies must remain within the band.

m) Omitted

5.6.5 Frequency stability when varying supply voltage

a) Couple the transmitter output to the measuring instrument through a suitable attenuator and coaxial cable. If connection to the EUT output is not possible make the measurement by connecting an antenna to the measuring instrument with a suitable length of coaxial cable and placing the measuring antenna near the EUT (e.g., 15 cm away)

b) Supply the EUT with nominal ac or dc voltage. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

c) Turn on the EUT, and couple its output to a frequency counter or other frequency-measuring instrument.

d) Tune the EUT to the center frequency of the operating band. Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument, but is strong enough to allow measurement of the operating or fundamental frequency of the EUT). Adjust the detector bandwidth and span settings to achieve a resolution capable of accurate frequency measurements over the applicable frequency stability limits.

   NOTE—An instrument that has an adequate level of accuracy as specified by the procuring or regulatory authority is the recommended measuring instrument.

e) Measure the frequency.

f) Unless otherwise specified, vary primary supply voltage from 85% to 115% of the nominal value for other than hand carried battery equipment.

g) 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.

h) Repeat the frequency measurement.

   NOTE—For band-edge compliance, it can be required to make these measurements at the low and High channel of the operating band.

Note: The results of the frequency stability test shown above the frequency deviation measured values are very small and similar trend for each port, so we are attached only the worst case data.

Test Results:

Reference: - 48 Vdc at 20°C **Freq.** = 3,940,000,000 Hz

Voltage	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(°C)	(Hz)	Error (Hz)	(Hz)	
100 %	+20(Ref)	3 940 000 003.932	3.932	0.000	0.00000
	-30	3 940 000 003.958	0.026	-3.905	-0.00099
	-20	3 940 000 008.653	4.721	0.789	0.00020
	-10	3 940 000 013.021	9.090	5.158	0.00131
	0	3 940 000 010.373	6.441	2.509	0.00064
	+10	3 940 000 012.772	8.840	4.909	0.00125
	+30	3 940 000 006.989	3.057	-0.874	-0.00022
	+40	3 940 000 010.758	6.827	2.895	0.00073
	+50	3 940 000 009.203	5.271	1.339	0.00034
115 %	+20	3 940 000 009.602	5.671	1.739	0.00044
85 %	+20	3 940 000 013.804	9.873	5.941	0.00151

Note: The results of the frequency stability test shown above the frequency deviation measured values are very small and similer trend for each port, so attached datas were only the port 0.

6. Annex B_EUT AND TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-2404-FC007-P