Testing and Certification

TEST REPORT

FCC Test for MT6433-77A
Class II Permissive Change

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2605-FC005-R2

DATE OF ISSUE
May 15, 2026

Tested by
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HCT CO., LTD.
BongJai Huh / CEO

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May 15, 2026

Applicant	**SAMSUNG Electronics Co., Ltd.** 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Product Name Model Name	MMU(MT6433) MT6433-77A
FCC ID	A3LMT6433-77A
Date of Test	April 24, 2026 ~ May 11, 2026
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

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REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	May 11, 2026	Initial Release
1	May 13, 2026	- Revised the 'Date of Test' on page 2. - Revised the plot on page 10.
2	May 15, 2026	- Revised the 'Emission Designator' on page 5.

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).

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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	MMU(MT6433)
EUT Serial Number	S61H300208
Power Supply	-48 VDC
Frequency Range	3 700 MHz ~ 3 980 MHz
Modulation Type	QPSK, 16QAM, 64QAM, 256QAM

	Band	Carrier	Bandwidth	Power
Output Power	(64 Port) n77 5G NR + n77 5G NR	2	100 MHz + 40 MHz	7.5 W/path, 480 W
	(64 Port) n77 5G NR + n77 5G NR_Asym	2	100 MHz + 40 MHz	7.5 W/path, 480 W
	(64 Port) n77 5G NR + n77 5G NR	2	100 MHz + 100 MHz	7.5 W/path, 480 W
	(64 Port) n77 5G NR + n77 5G NR_Asym	2	100 MHz + 100 MHz	7.5 W/path, 480 W

	Mode	Bandwidth	Emission Designator			
			QPSK (G7D)	Conducted (W)	16 QAM (W7D)	Conducted (W)
Emission Designator	(64 Port) n77 5G NR + n77 5G NR	100 MHz + 40 MHz	137MG7D	468.47	137MW7D	520.33
	(64 Port) n77 5G NR + n77 5G NR_Asym	100 MHz + 40 MHz	137MG7D	483.70	137MW7D	530.13
	(64 Port) n77 5G NR + n77 5G NR	100 MHz + 100 MHz	197MG7D	501.05	197MW7D	532.94
	(64 Port) n77 5G NR + n77 5G NR_Asym	100 MHz + 100 MHz	196MG7D	470.09	196MW7D	475.31

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<table>
<tr><td>Antenna Specification</td><td>
Same PSD
<table>
<tr><th rowspan="3">Category</th><th rowspan="3">Peak Gain</th><th rowspan="3">EIRP Limit</th><th colspan="4">Attenuation (dB)</th></tr>
<tr><th colspan="4">Bandwidth (MHz)</th></tr>
<tr><th>100+40</th><th>100+60</th><th>100+80</th><th>100+100</th></tr>
<tr><td rowspan="2">Common Beam</td><td rowspan="2">19.8 dBi</td><td>1640 W/MHz</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>3280 W/MHz</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td rowspan="2">User-specific Beam</td><td rowspan="2">27.1 dBi</td><td>1640 W/MHz</td><td>0.901</td><td>0.321</td><td>0</td><td>0</td></tr>
<tr><td>3280 W/MHz</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
</table>
Asymmetric PSD
<table>
<tr><th rowspan="3">Category</th><th rowspan="3">Peak Gain</th><th rowspan="3">EIRP Limit</th><th colspan="4">Attenuation (dB)</th></tr>
<tr><th colspan="4">Bandwidth (MHz)</th></tr>
<tr><th>100+40</th><th>100+60</th><th>100+80</th><th>100+100</th></tr>
<tr><td rowspan="2">Common Beam</td><td rowspan="2">19.8 dBi</td><td>1640 W/MHz</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>3280 W/MHz</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td rowspan="2">User-specific Beam</td><td rowspan="2">27.1 dBi</td><td>1640 W/MHz</td><td>1.393</td><td>1.393</td><td>1.393</td><td>1.393</td></tr>
<tr><td>3280 W/MHz</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
</table>
- The gain of the user-specific beam is higher than that of the common beam; therefore, the user-specific beam is controlled through beamforming functionality.
- Attenuation values are applied per Bandwidth based on each gain condition.
- The information for the 100 + 60 and 100 + 80 carrier aggregation modes was not formally reported in the test report, but was included for reference purposes only.
</td></tr>
</table>

1.3. TEST INFORMATION

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

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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, Republic 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 February 26, 2026 (Registration Number: 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.”

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3. TEST SPECIFICATIONS

3.1. STANDARDS

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

Description	Reference	Results
Conducted Output Power and PSD	§ 2.1046, § 27.50(j)(1), (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	Compliant

Note: The decision rule applies 'simple acceptance'.

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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.
- The user-specific beam, which has the highest antenna gain among the supported beam configurations, was applied for testing as the worst-case condition.
- All modulation types (QPSK, 16QAM, 64QAM, 256QAM) supported by the EUT have been tested, and the test results presented in the following sections represent the worst-case conditions for each respective measurement.
  Test results are reported based on emission designators: QPSK (G7D) and QAM (W7D), where the QAM category includes 16QAM, 64QAM, and 256QAM, and the worst-case condition (16QAM) is applied.
  Based on the measured RF Output Power and PSD, 16QAM was identified as the worst-case modulation.
  For PAPR, OBW, OOBE, Unwanted Emissions, and RSE, the results are reported based on the worst-case modulation condition.
- For the multi-carrier aggregation mode, all test items were represented and reported in a single mode. Accordingly, Conducted Output Power and PSD were reported based on the worst-case conditions per modulation scheme (QPSK and QAM), while PAPR, OBW, OOBE, Unwanted Emissions, and RSE were reported only for the worst-case modulation scheme.
- All mode of operation, supporting bandwidth and frequencies were investigated. The test plots shown in the following sections represent the worst-case emissions.
- The measurement has been performed for each carrier in the mode of full resource block size as worst-case to transmit maximum output power condition.
- The dummy loads were connected to the RF output ports for radiated spurious emission testing.
- The operating frequencies used by the operator are defined as the center frequencies per channel bandwidth as shown in the table below.

Carrier Config (MHz)	Channel Bandwidth (MHz)	Center Frequency (MHz)	Frequency Range (MHz)
100 + 40	100	3 750	3 700 ~ 3 800
	40	3 820	3 800 ~ 3 840
100 + 60	100	3 750	3 700 ~ 3 800
	60	3 830	3 800 ~ 3 860
100 + 80	100	3 750	3 700 ~ 3 800
	80	3 840	3 800 ~ 3 880
100 + 100	100	3 750	3 700 ~ 3 800
	100	3 850	3 800 ~ 3 900

(The information for the 100 + 60 and 100 + 80 carrier aggregation modes was not formally reported in the test report, but was included for reference purposes only.)

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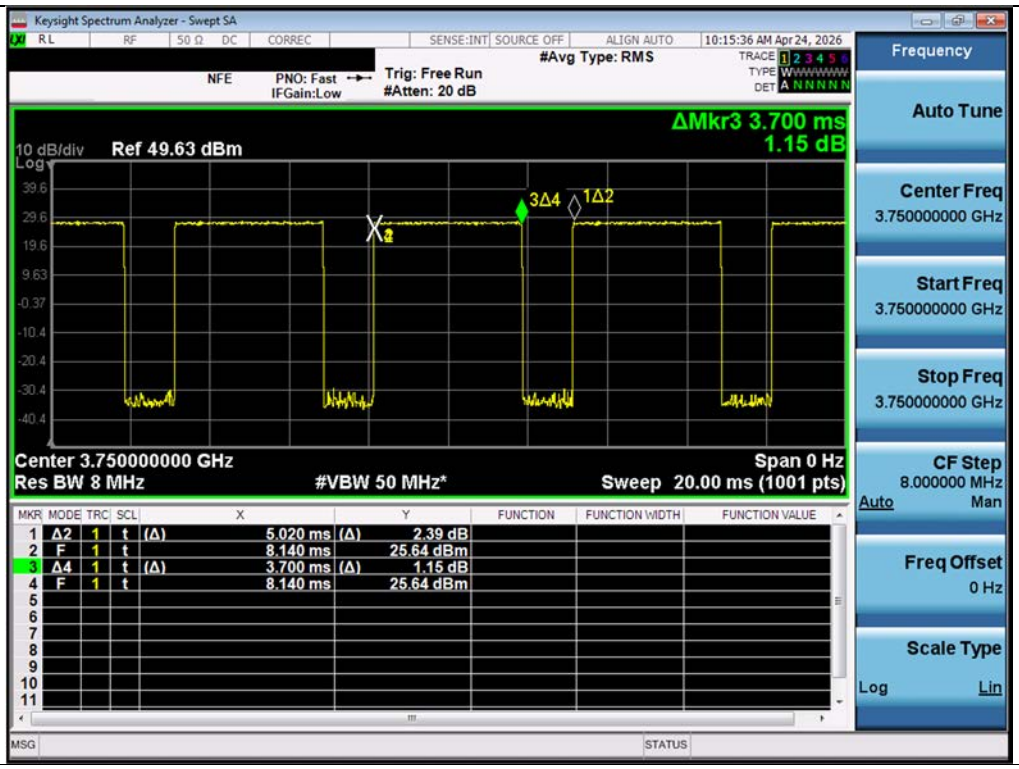
- Because of the EUT using TDD technology, it cannot be configured to transmit continuously and measurement instrument cannot be configured to measure only during active transmissions. So, we performed the measurement using duty cycle method.

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 / 5.02 ms = 0.74

Duty Correction = 10 log (1/duty cycle) = 10 log (1/0.74) = 1.31 dB#

The exact value is 1.3076828..., which has been rounded to 1.31 dB and applied in the calculations.

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- 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.

Port 0

Correction factor table			
Frequency (MHz)	Factor (dB)	Frequency (MHz)	Factor (dB)
0.009	29.757	11 000	25.506
100	30.394	12 000	25.727
200	30.698	13 000	25.966
300	30.964	14 000	26.378
400	31.217	15 000	27.167
500	31.299	16 000	27.139
600	31.477	17 000	27.287
700	31.656	18 000	27.580
800	31.751	19 000	27.368
900	31.942	20 000	27.855
1 000	32.885	21 000	27.812
1 500	33.439	22 000	28.432
2 000	33.896	23 000	28.165
2 500	33.620	24 000	28.237
3 000	34.097	25 000	28.441
3 100	34.223	26 000	28.599
3 200	34.279	27 000	29.106
3 300	34.289	28 000	29.315
3 400	34.473	29 000	29.756
3 500	34.488	30 000	29.649
3 600	34.545	31 000	29.615
3 700	34.556	32 000	30.634
3 800	34.610	33 000	36.794
3 900	34.698	34 000	31.049
4 000	34.582	35 000	30.285
5 000	36.031	36 000	29.807
6 000	36.047	37 000	29.826
7 000	36.658	38 000	29.809
8 000	37.118	39 000	30.045
9 000	37.559	40 000	30.082
10 000	25.108	-	-

Note: The correction factor was applied to each port, but only one factor is listed for simplicity.

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3.3. MAXIMUM MEASUREMENTUNCERTAINTY

Description	Condition	Uncertainty
Radiated Disturbance	9 kHz ~ 30 MHz	4.54 dB
	30 MHz ~ 1 GHz	5.74 dB
	1 GHz ~ 18 GHz	5.80 dB
	18 GHz ~ 40 GHz	5.86 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

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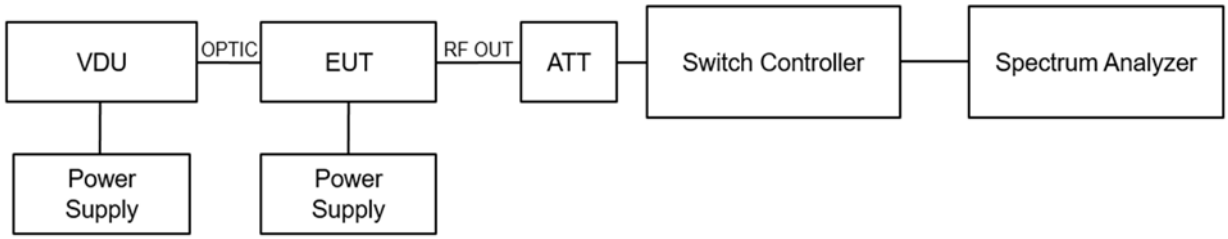
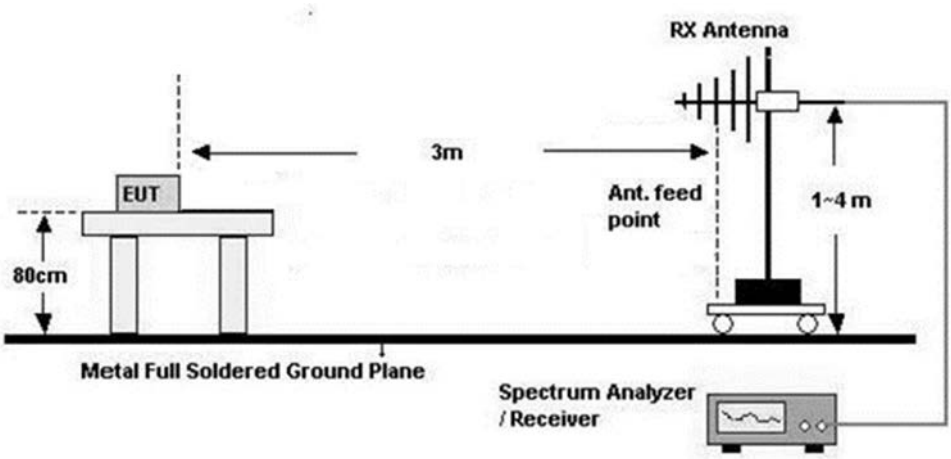
3.5. TEST DIAGRAMS

Conducted Test

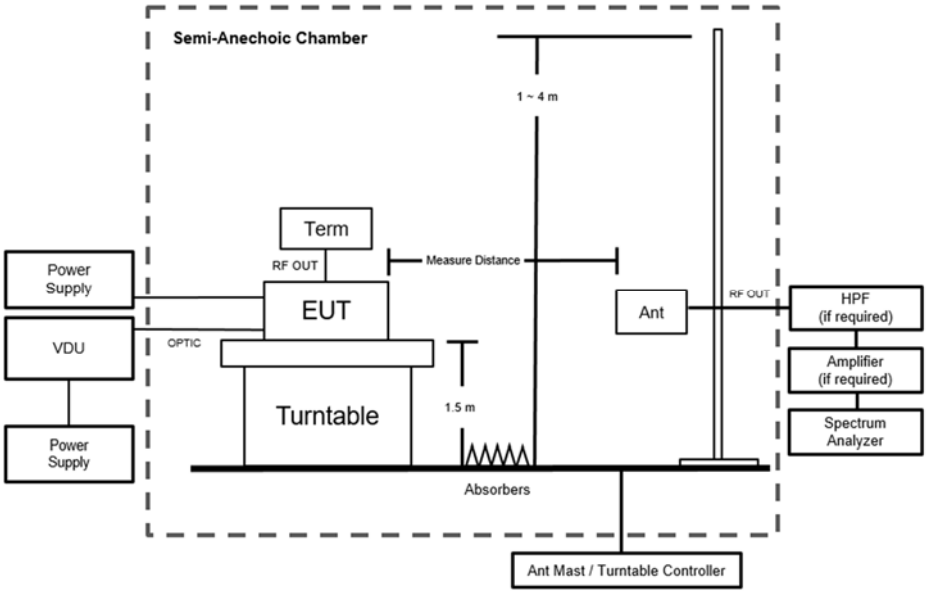


Radiated Test

30 MHz ~ 1 GHz



Above 1 GHz



※ Measure distance is 3 m.

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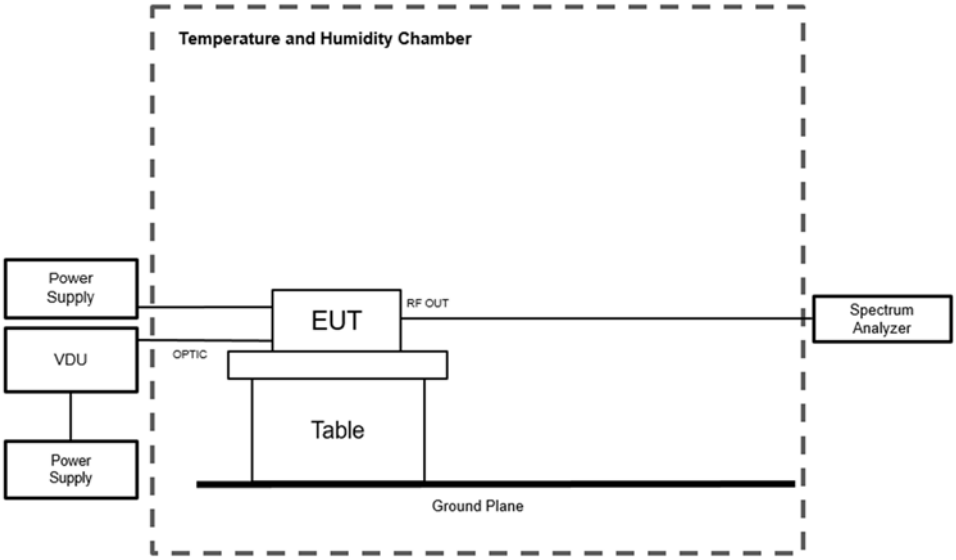
Frequency Stability



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

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4. TEST EQUIPMENTS

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
PXA Signal Analyzer	N9030A	Keysight	MY49431434	07/10/2026	Annual
PXA Signal Analyzer	N9030A	Keysight	MY55410714	12/09/2026	Annual
PXA Signal Analyzer	N9030B	Keysight	MY55480110	01/13/2027	Annual
RF Switch System	TMX0132C	TNM System	TM20010001	N/A	N/A
RF Switch System	TMX0132C	TNM System	TM20010002	N/A	N/A
20 dB Attenuator	FAS-23-20	MCLI	103756	12/16/2026	Annual
#30 dB Attenuator	5930_SMA-50-010	HUBER SUHNER	33	09/16/2026	Annual
#50Ω Termination	908A	H.P.	N/A	N/A	N/A
DC Power Supply	6674A	Agillent	MY41003340	06/20/2026	Annual
DC Power Supply	EX 60-40	ODA	ODA-02-0923-01606	02/05/2027	Annual
Temperature and Humidity Chamber	NY-THR18750	NANGYEAL	NY-200912201A	12/16/2026	Annual
Amp & Filter Bank Switch Controller	FBSM-01B	TNM system	TM20090002	N/A	N/A
Controller (Antenna Mast & Turn Table)	CO3000	Innco system	CO3000/1251/48920320/P	N/A	N/A
Antenna Mast	MA4640	Innco system	S4AM	08/01/2026	Annual
Turn Table	N/A	Ets	N/A	N/A	N/A
Loop Antenna	FMZB 1513	Schwarzbeck	1513-333	06/23/2027	Biennial
Trilog Broadband Antenna	VULB 9168	Schwarzbeck	9168-0895	08/28/2026	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-937	02/07/2027	Biennial
Horn Antenna	BBHA9170	Schwarzbeck	BBHA9170342	09/20/2026	Biennial
RF Switching System	FBSR-04C (10 dB ATT + LNA)	TNM system	S4L2	03/04/2027	Annual
RF Switching System	FBSR-04C (3 dB ATT + LNA)	TNM system	S4L3	03/04/2027	Annual
RF Switching System	FBSR-04C (LNA)	TNM system	S4L4	03/04/2027	Annual
RF Switching System	FBSR-04C (7 GHz HPF + LNA)	TNM system	S4L5	03/04/2027	Annual
RF Switching System	FBSR-04C (Thru)	TNM system	S4L6	03/04/2027	Annual
LOW NOISE AMPLIFIER	TK-PA1840H	TESTEK	170011-L	09/29/2026	Annual

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

Note: All test equipment was within its valid calibration period at the time of testing.

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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:

(1) The power of each fixed or base station transmitting in the 3700-3980 MHz band and located in any county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, is limited to an equivalent isotropically radiated power (EIRP) of 3280 Watts/MHz. This limit applies to the aggregate power of all antenna elements in any given sector of a base station.

(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.

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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%.

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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 ≤ ±2%) or non-constant (variations > ±2%), respectively.

Note:

1. The results of the Conducted Output Power and PSD tests show a similar trend across all ports, and all measured values fall within the allowable tolerance; therefore, only the worst-case plot is attached.
2. The conducted output power and PSD levels were measured under the worst-case conditions, and the final summed values were determined through mathematical summation.
3. The duty cycle correction factor was applied as an ext. gain value in the plot and was taken into account in the measurement.

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Test Results:

Tabular Data of RF Contiguous Output Power

(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]

Antenna	Modulation	Channel	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
13	QPSK	Op. Freq.	3 770.00	38.59	7.23
	16QAM	Op. Freq.	3 770.00	39.10	8.13
27	QPSK	Op. Freq.	3 770.00	38.64	7.32
	16QAM	Op. Freq.	3 770.00	38.74	7.49

Sum Data

Frequency (MHz)	Output Power (Conducted)	
	QPSK	16QAM
	W	
3 770.00	468.47	520.33

(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]_Asym

Antenna	Modulation	Channel	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
13	QPSK	Op. Freq.	3 770.00	38.78	7.54
	16QAM	Op. Freq.	3 770.00	38.90	7.76
27	QPSK	Op. Freq.	3 770.00	38.78	7.56
	16QAM	Op. Freq.	3 770.00	39.18	8.28

Sum Data

Frequency (MHz)	Output Power (Conducted)	
	QPSK	16QAM
	W	
3 770.00	483.70	530.13

The report shall not be (partly) reproduced except in full without approval of the laboratory.

(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]

Antenna	Modulation	Channel	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
27	QPSK	Op. Freq.	3 800.00	38.94	7.83
	16QAM	Op. Freq.	3 800.00	39.21	8.33

Sum Data

Frequency (MHz)	Output Power (Conducted)	
	QPSK	16QAM
	W	
3 800.00	501.05	532.94

(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]_Asym

Antenna	Modulation	Channel	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
27	QPSK	Op. Freq.	3 800.00	38.66	7.35
	16QAM	Op. Freq.	3 800.00	38.71	7.43

Sum Data

Frequency (MHz)	Output Power (Conducted)	
	QPSK	16QAM
	W	
3 800.00	470.09	475.31

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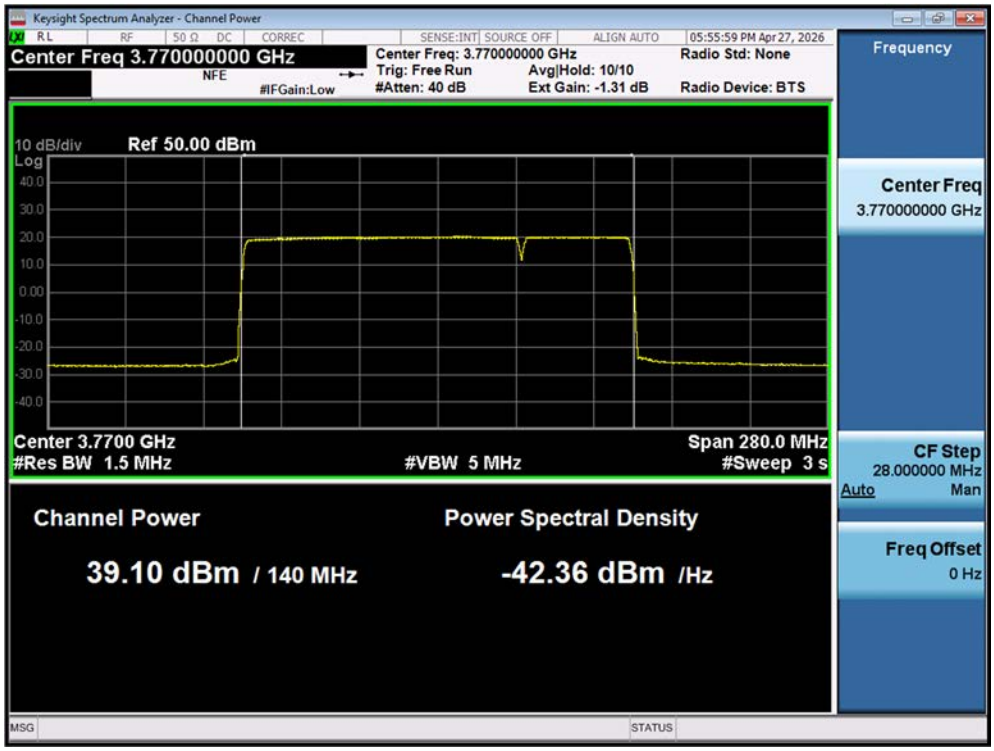
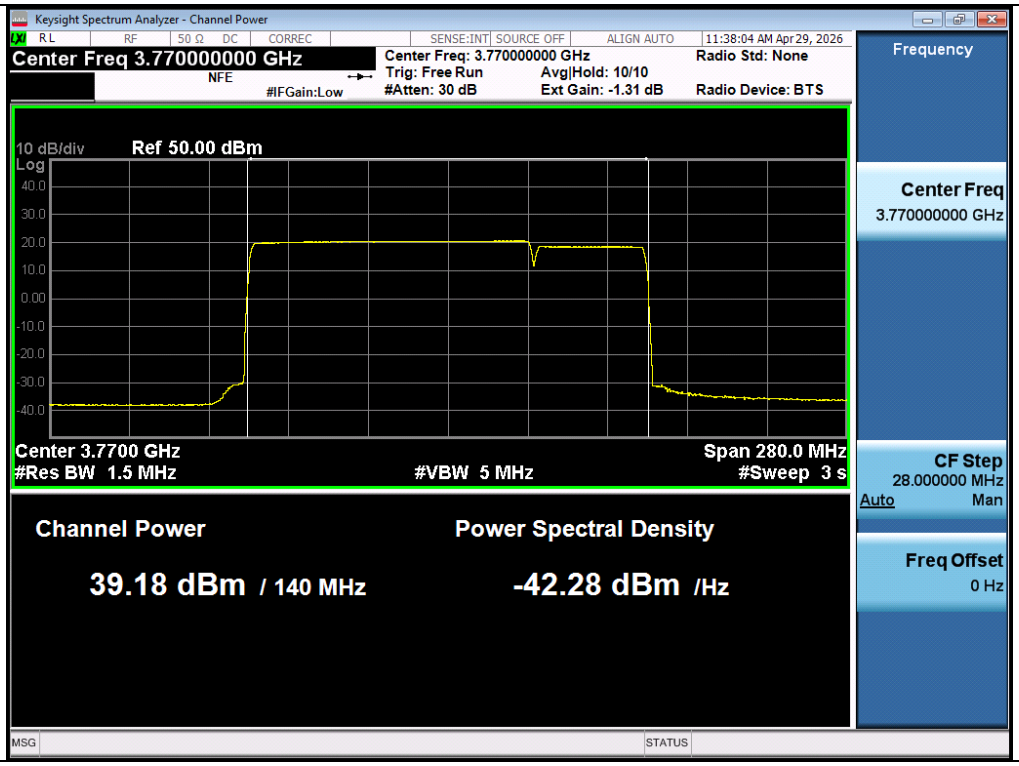
Plot Data of RF Output Power

Antenna 13 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier] / 16QAM / Op. Freq. / Contiguous



Antenna 27 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]_Asym / 16QAM / Op. Freq. / Contiguous



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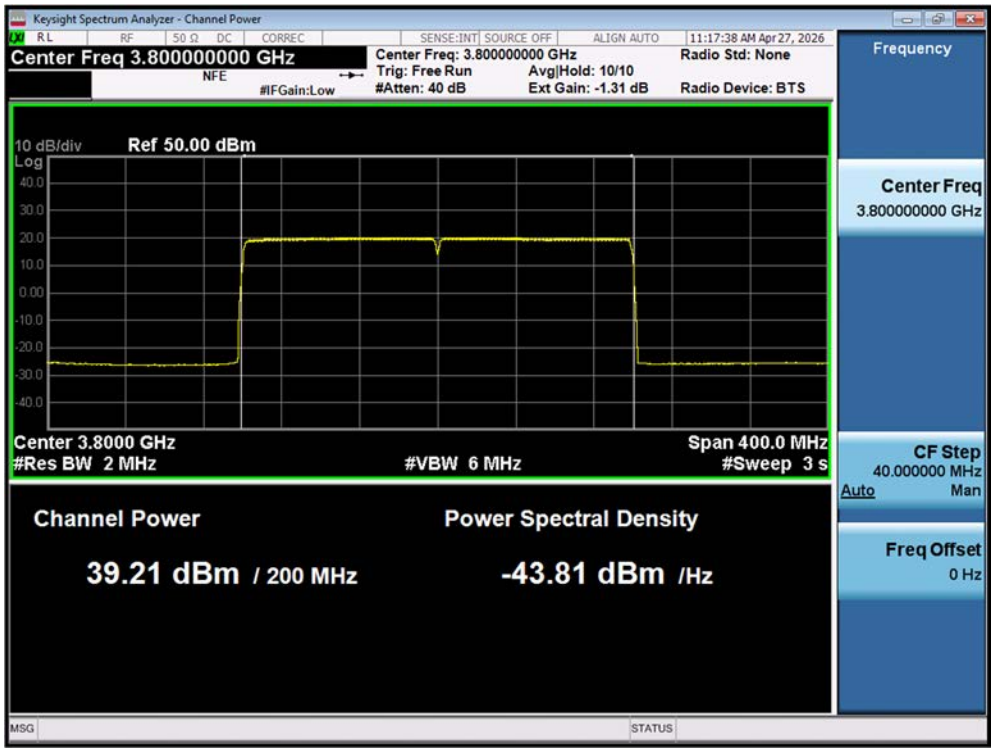
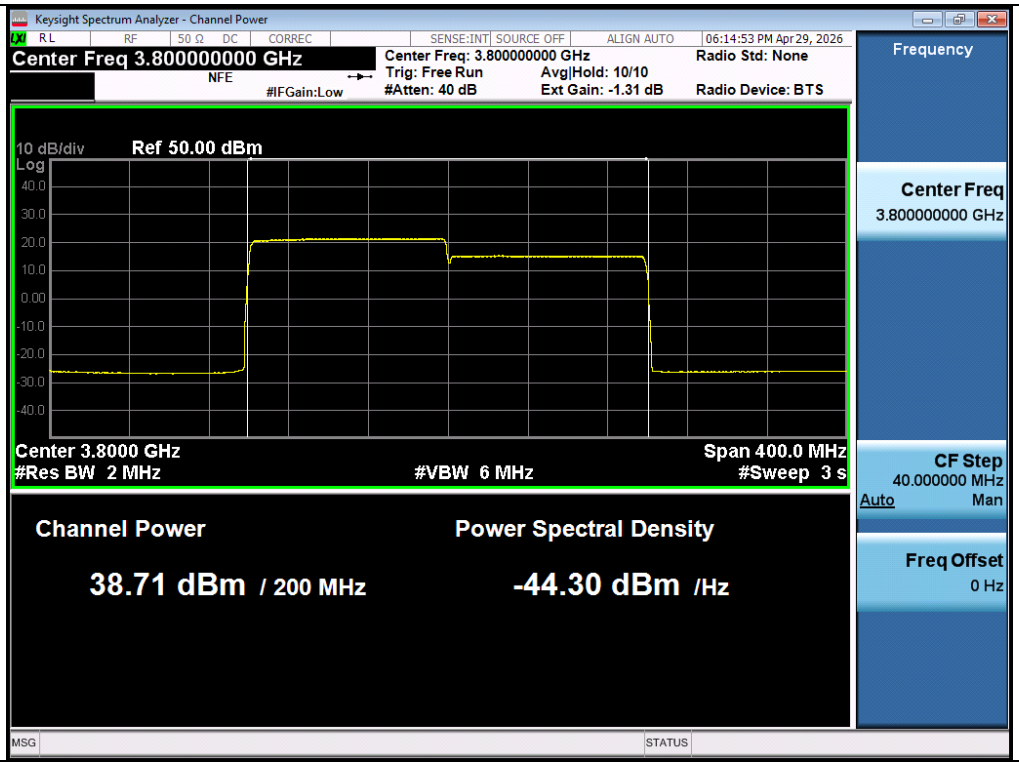
Antenna 27 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier] / 16QAM / Op. Freq. / Contiguous



Antenna 27 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]_Asym / 16QAM / Op. Freq. / Contiguous



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Test Results:
Tabular Data of RF Contiguous PSD
(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]

Port	Modulation	Channel	Frequency (MHz)	Measured Value (dBm/MHz)	Ant. Gain (dBi)	Att. (dB)	E.I.R.P. (dBm/MHz)	Calculated (W/MHz)
13	QPSK	Op. Freq.	3 770.00	17.36	27.1	0.910	43.56	22.69
	16QAM	Op. Freq.	3 770.00	17.41	27.1	0.910	43.61	22.96
43	QPSK	Op. Freq.	3 770.00	17.73	27.1	0.910	43.93	24.71
	16QAM	Op. Freq.	3 770.00	17.73	27.1	0.910	43.93	24.71

Sum Data

Frequency (MHz)	E.I.R.P.		Limit
	QPSK	16QAM	
	W/MHz		
3 820.00	1 581.54	1 581.54	1 640

Sum Data

Frequency (MHz)	E.I.R.P.		Limit
	QPSK	16QAM	
	W/MHz		
3 820.00	1 946.17	1 946.17	3 280

Note: The sum data for the EIRP limit of 3280 W/MHz was calculated by applying 0 dB attenuation in accordance with the antenna specification described in Section 1.2.

(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]_Asym

Port	Modulation	Channel	Frequency (MHz)	Measured Value (dBm/MHz)	Ant. Gain (dBi)	Att. (dB)	E.I.R.P. (dBm/MHz)	Calculated (W/MHz)
13	QPSK	Op. Freq.	3 770.00	18.25	27.1	1.393	43.96	24.87
	16QAM	Op. Freq.	3 770.00	18.35	27.1	1.393	44.05	25.42
43	QPSK	Op. Freq.	3 770.00	17.51	27.1	1.393	43.22	20.97
	16QAM	Op. Freq.	3 770.00	17.85	27.1	1.393	43.56	22.68

Sum Data

Frequency (MHz)	E.I.R.P.		Limit
	QPSK	16QAM	
	W/MHz		
3 830.00	1 591.77	1 626.97	1 640

Sum Data

Frequency (MHz)	E.I.R.P.		Limit
	QPSK	16QAM	
	W/MHz		
3 830.00	2 242.23	2 242.23	3 280

Note: The sum data for the EIRP limit of 3280 W/MHz was calculated by applying 0 dB attenuation in accordance with the antenna specification described in Section 1.2.

The report shall not be (partly) reproduced except in full without approval of the laboratory.

(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]

Port	Modulation	Channel	Frequency (MHz)	Measured Value (dBm/MHz)	Ant. Gain (dBi)	Att. (dB)	E.I.R.P. (dBm/MHz)	Calculated (W/MHz)
13	QPSK	Op. Freq.	3 800.00	16.71	27.1	0	43.81	24.04
	16QAM	Op. Freq.	3 800.00	16.87	27.1	0	43.97	24.92

Sum Data

Frequency (MHz)	E.I.R.P.		Limit
	QPSK	16QAM	
	W/MHz		
3 840.00	1 538.79	1 594.70	1 640

Sum Data

Frequency (MHz)	E.I.R.P.		Limit
	QPSK	16QAM	
	W/MHz		
3 840.00	1 538.79	1 594.70	3 280

Note: The sum data for the EIRP were calculated by applying 0 dB attenuation in accordance with the antenna specification described in Section 1.2.

(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]_Asym

Port	Modulation	Channel	Frequency (MHz)	Measured Value (dBm/MHz)	Ant. Gain (dBi)	Att. (dB)	E.I.R.P. (dBm/MHz)	Calculated (W/MHz)
13	QPSK	Op. Freq.	3 800.00	18.32	27.1	1.393	44.03	25.28
	16QAM	Op. Freq.	3 800.00	18.37	27.1	1.393	44.08	25.58

Sum Data

Frequency (MHz)	E.I.R.P.		Limit
	QPSK	16QAM	
	W/MHz		
3 750.00	1 617.63	1 637.12	1 640

Sum Data

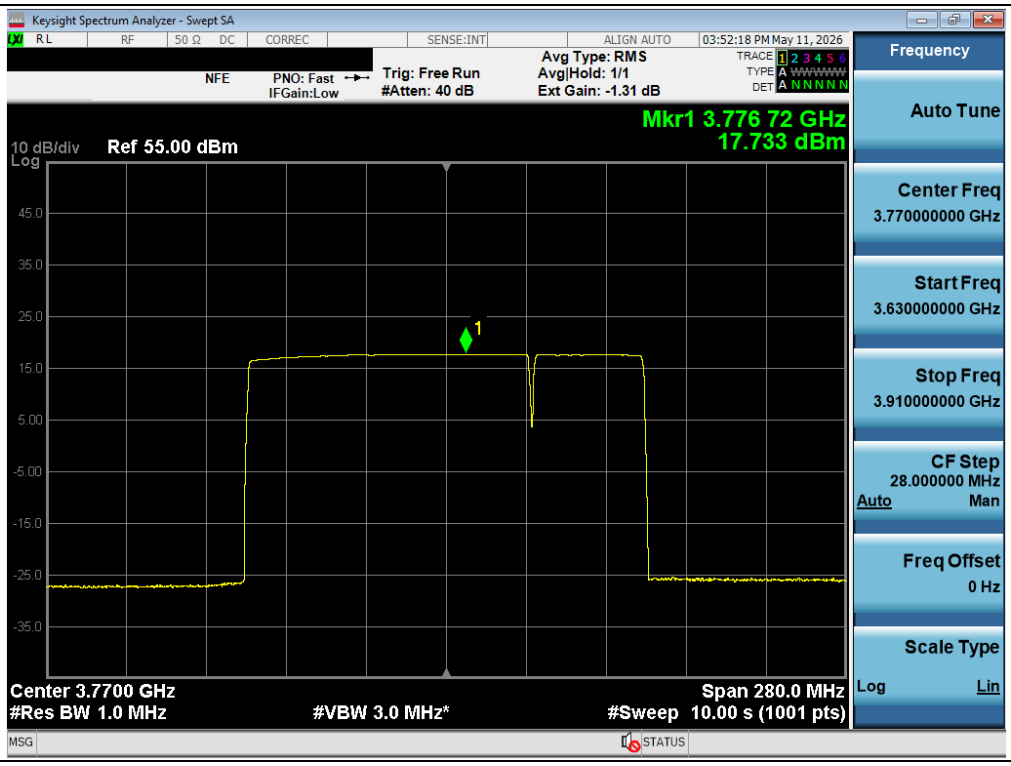
Frequency (MHz)	E.I.R.P.		Limit
	QPSK	16QAM	
	W/MHz		
3 750.00	2 229.36	2 256.21	3 280

Note: The sum data for the EIRP limit of 3280 W/MHz was calculated by applying 0 dB attenuation in accordance with the antenna specification described in Section 1.2.

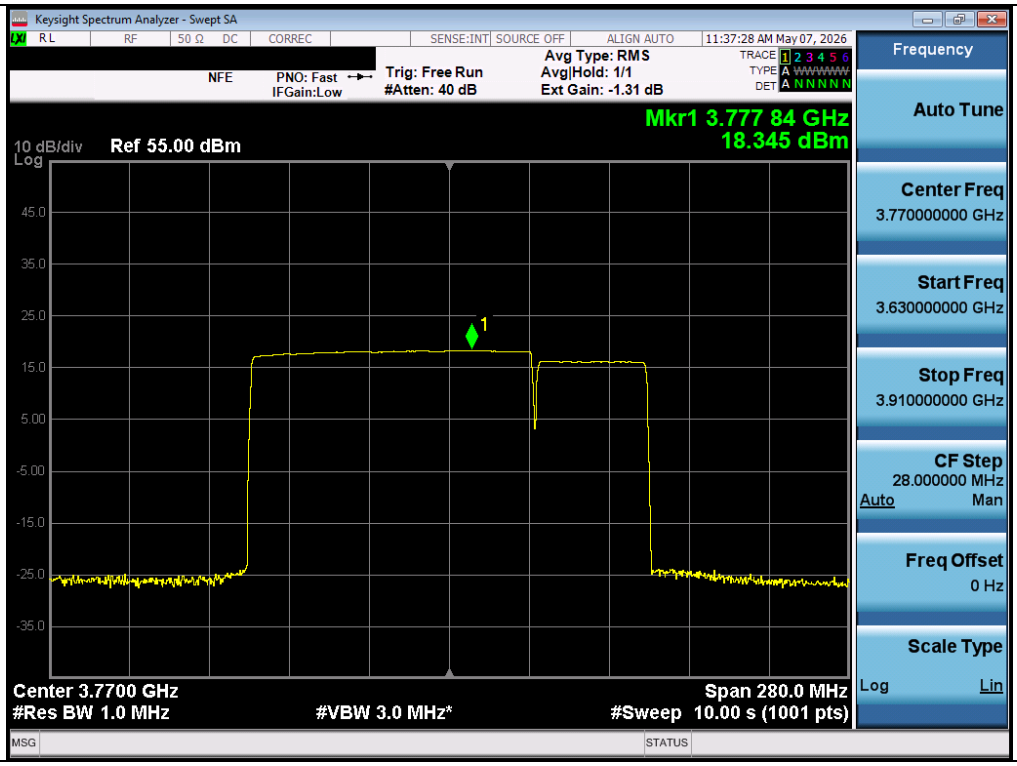
The report shall not be (partly) reproduced except in full without approval of the laboratory.

Plot Data of PSD

Antenna 13 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier] / 16QAM / Op. Freq. / Contiguous



Antenna 13 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]_Asym / 16QAM / Op. Freq. / Contiguous



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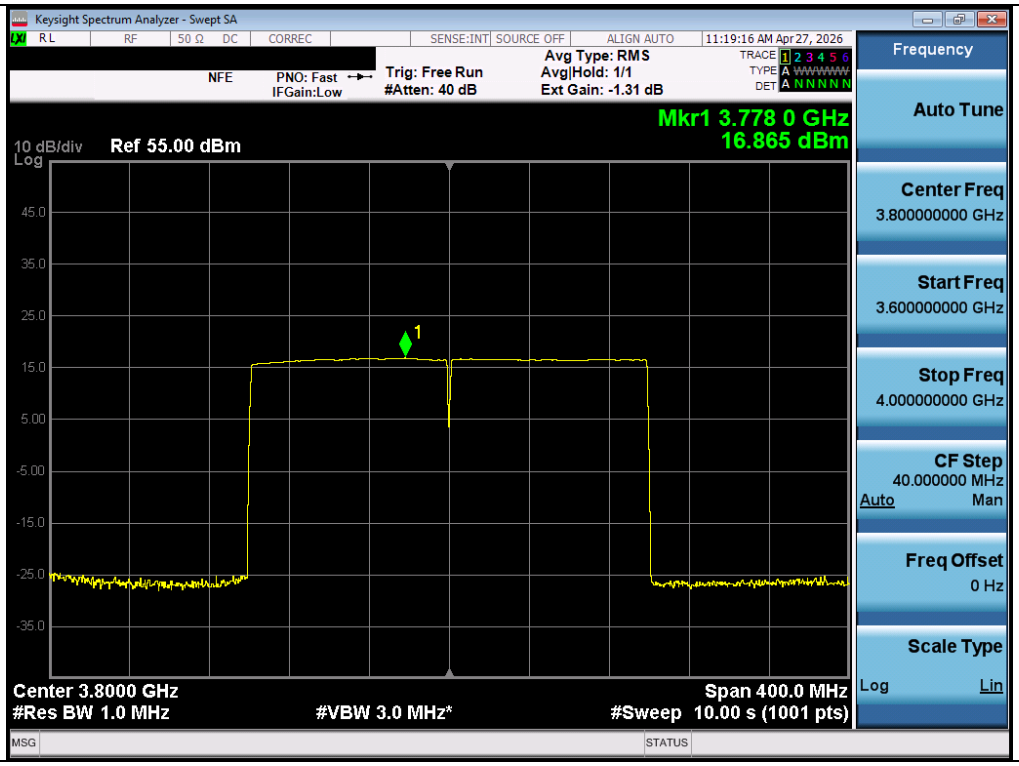
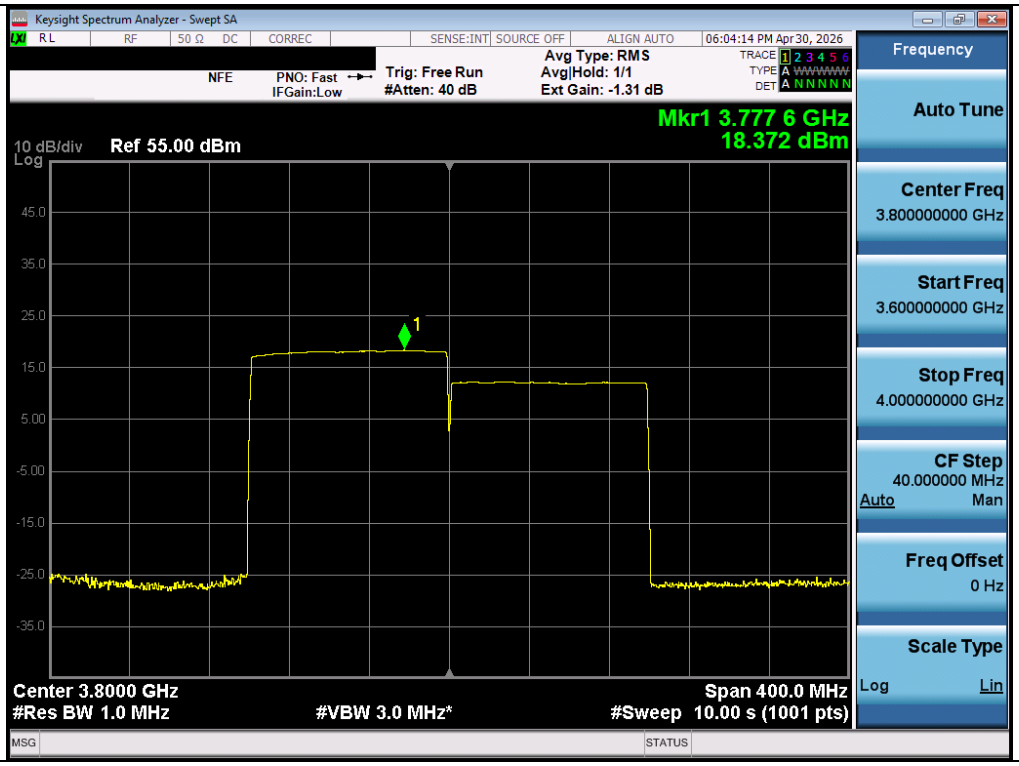
Antenna 13 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier] / 16QAM / Op. Freq. / Contiguous



Antenna 13 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]_Asym / 16QAM / Op. Freq. / Contiguous



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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 tests show a similar trend across all ports; therefore, only the worst-case plots are attached.

The report shall not be (partly) reproduced except in full without approval of the laboratory.

Test Results:
Tabular Data of RF Contiguous PAPR
(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]

Port	Modulation	Channel	Frequency (MHz)	0.1 % PAPR (dB)
0	16QAM	Operator Freq.	3 770.00	8.83
54	16QAM	Operator Freq.	3 770.00	9.27

(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]_Asym

Port	Modulation	Channel	Frequency (MHz)	0.1 % PAPR (dB)
0	16QAM	Operator Freq.	3 770.00	9.20
54	16QAM	Operator Freq.	3 770.00	9.32

(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]

Port	Modulation	Channel	Frequency (MHz)	0.1 % PAPR (dB)	Frequency (MHz)	0.1 % PAPR (dB)
54	16QAM	Operator Freq.	3 750.00	9.14	3 850.00	9.15

(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]_Asym

Port	Modulation	Channel	Frequency (MHz)	0.1 % PAPR (dB)	Frequency (MHz)	0.1 % PAPR (dB)
54	16QAM	Operator Freq.	3 750.00	9.19	3 850.00	9.56

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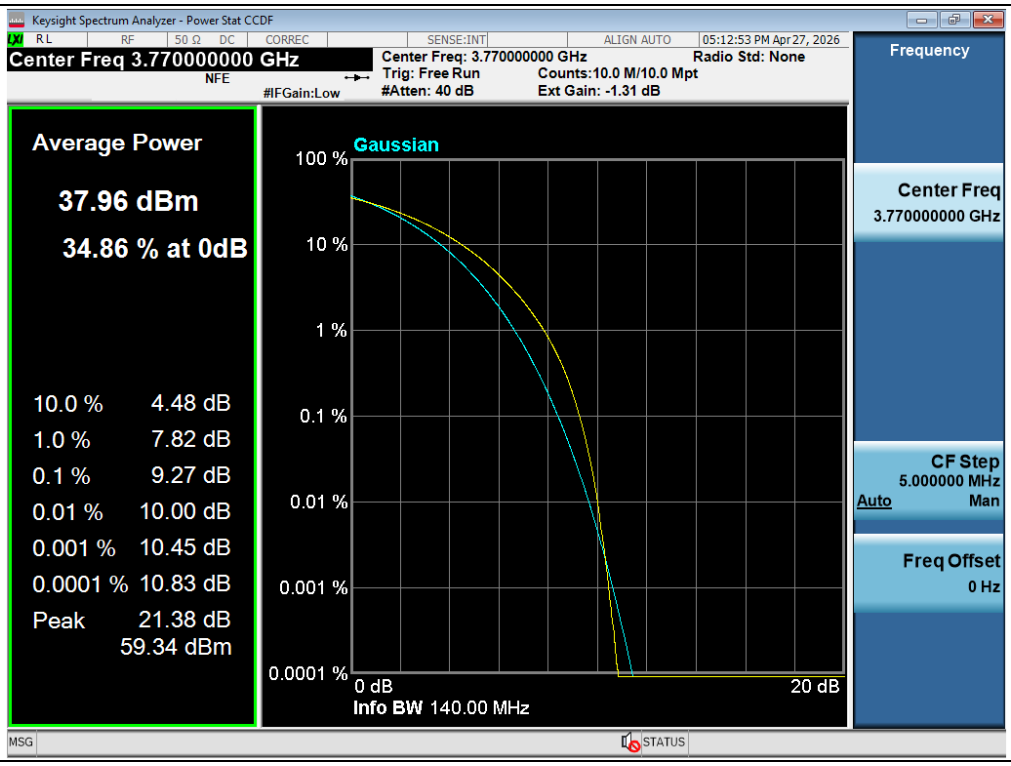
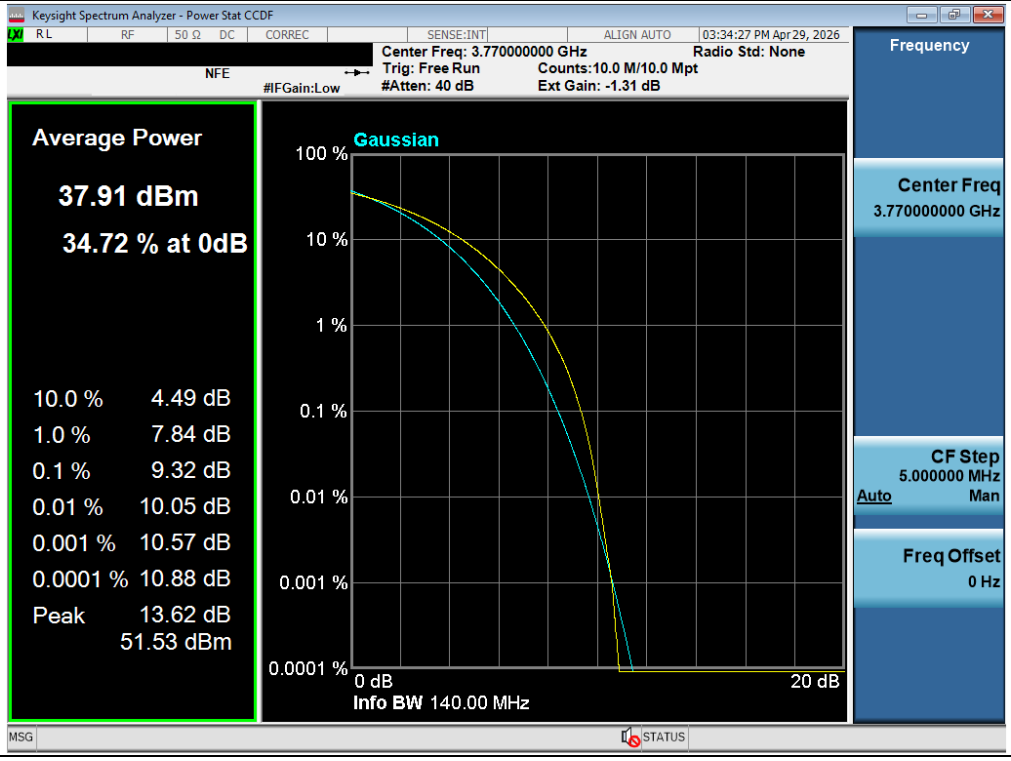
Plot Data of PAPR

Antenna 54 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier] / 16QAM / Op. Freq. / Contiguous

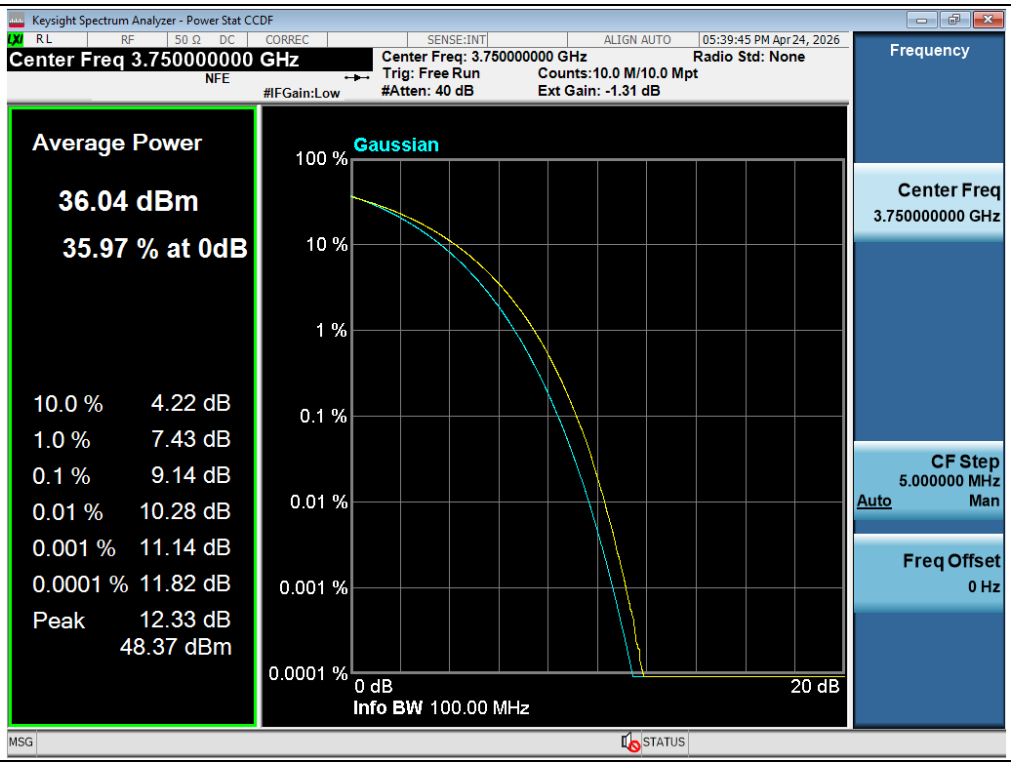


Antenna 54 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]_Asym / 16QAM / Op. Freq. / Contiguous

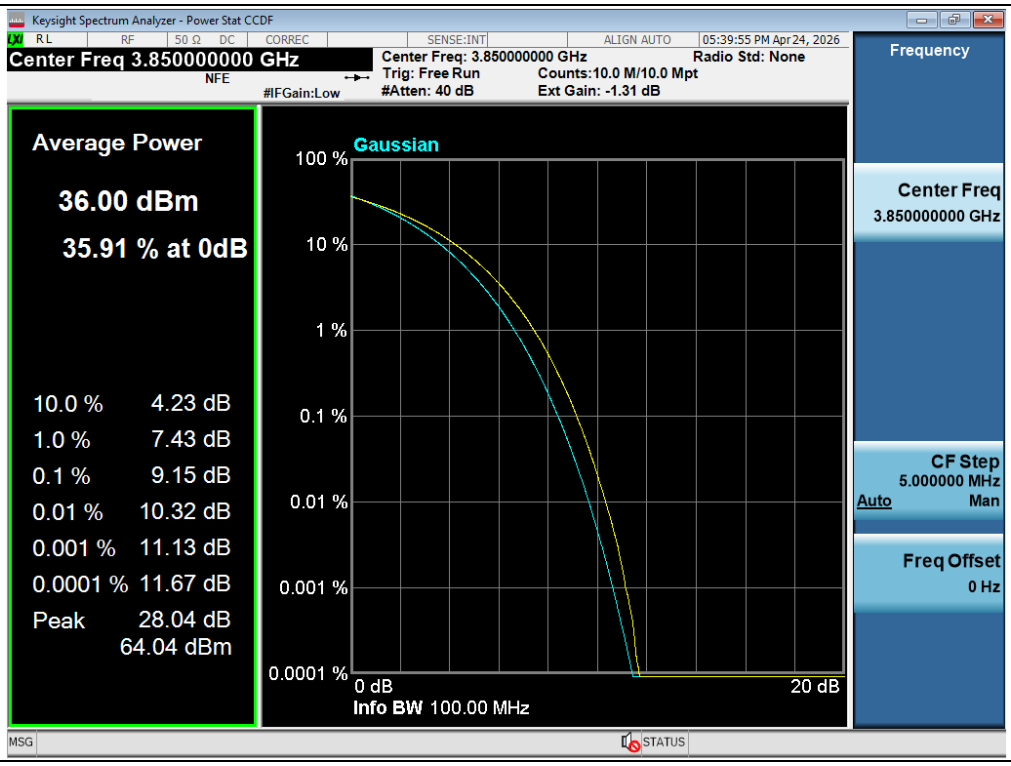


The report shall not be (partly) reproduced except in full without approval of the laboratory.

Antenna 54 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier] / 16QAM / Op. Freq. / Contiguous / 3 750 MHz

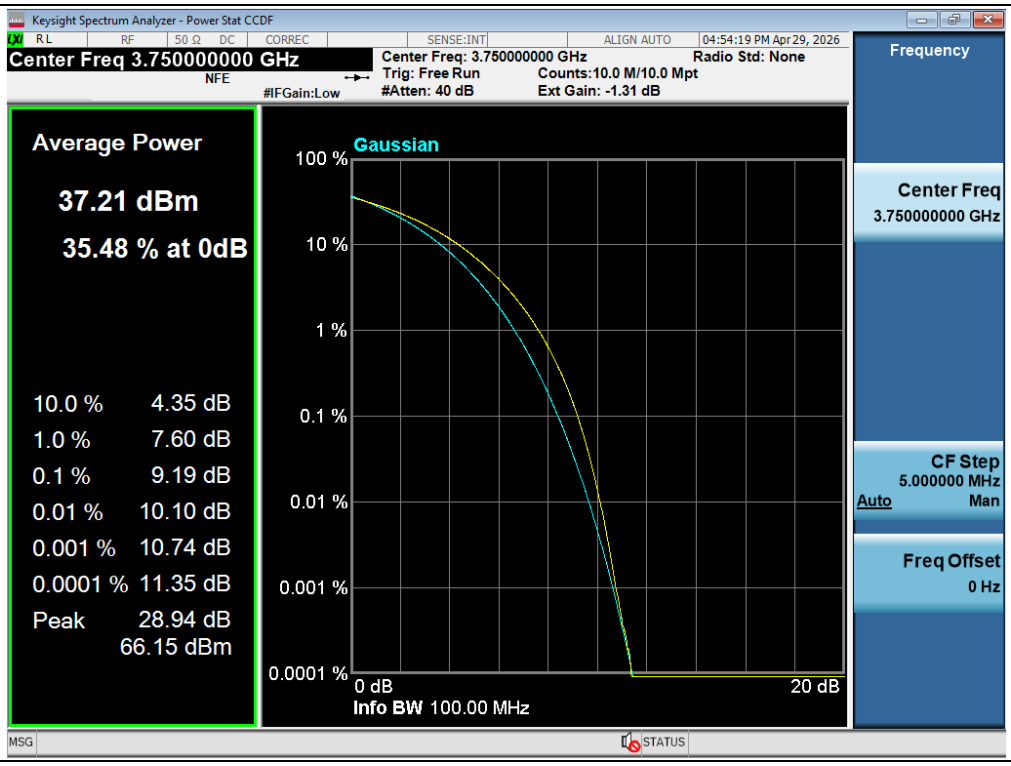


Antenna 54 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier] / 16QAM / Op. Freq. / Contiguous / 3 840 MHz

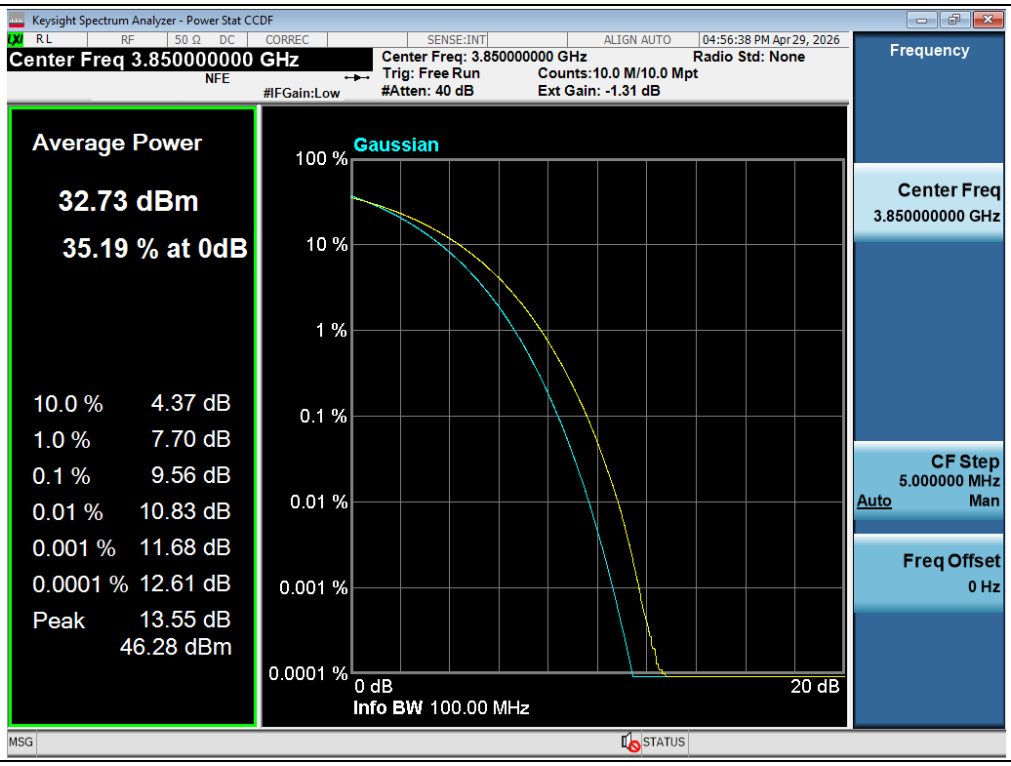


The report shall not be (partly) reproduced except in full without approval of the laboratory.

Antenna 54 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]_Asym / 16QAM / Op. Freq. / Contiguous / 3 750 MHz



Antenna 54 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]_Asym / 16QAM / Op. Freq. / Contiguous / 3 840 MHz



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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 5.4.4 of ANSI C63.26.

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:

(c) 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).

(d) 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.

(e) 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.

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

(g) 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.

(h) 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 tests show a similar trend across all ports; therefore, only the worst-case plots are attached.

The report shall not be (partly) reproduced except in full without approval of the laboratory.

Test Results:
Tabular Data of RF Contiguous Occupied bandwidth
(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]

Port	Modulation	Channel	Frequency (MHz)	Occupied bandwidth (MHz)
23	16QAM	Operator Freq.	3 770.00	136.89
36	16QAM	Operator Freq.	3 770.00	137.04

(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]_Asym

Port	Modulation	Channel	Frequency (MHz)	Occupied bandwidth (MHz)
23	16QAM	Operator Freq.	3 770.00	136.65
36	16QAM	Operator Freq.	3 770.00	136.68

(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]

Port	Modulation	Channel	Frequency (MHz)	Occupied bandwidth (MHz)
23	16QAM	Operator Freq.	3 800.00	196.81

(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]_Asym

Port	Modulation	Channel	Frequency (MHz)	Occupied bandwidth (MHz)
23	16QAM	Operator Freq.	3 800.00	195.85

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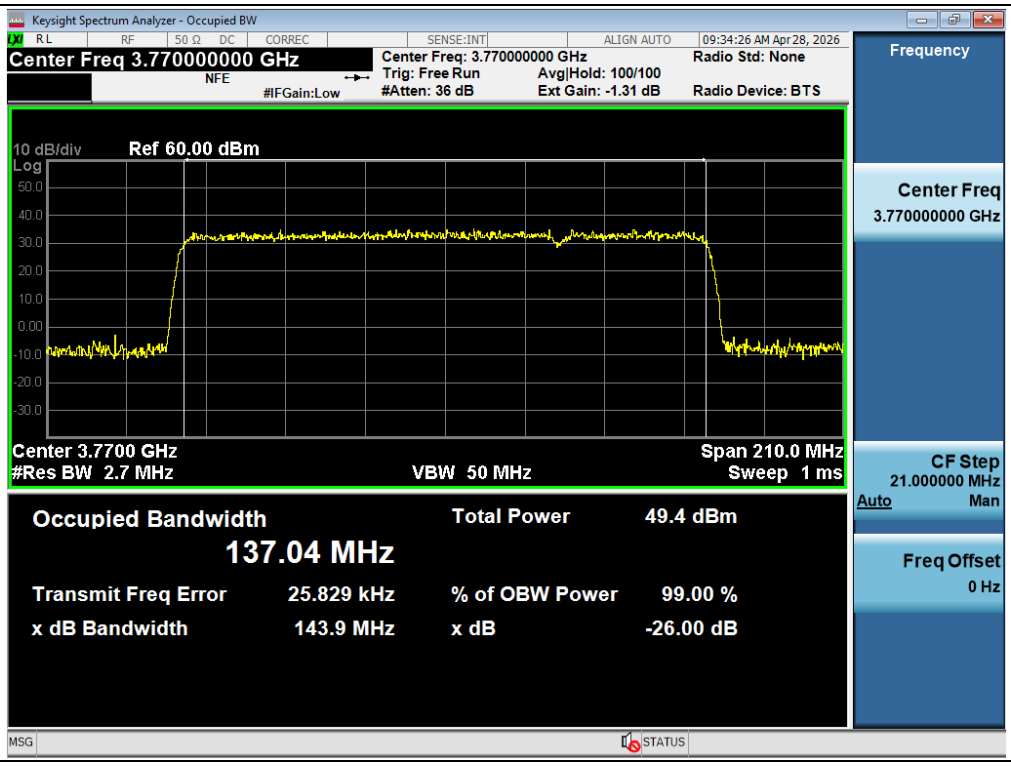
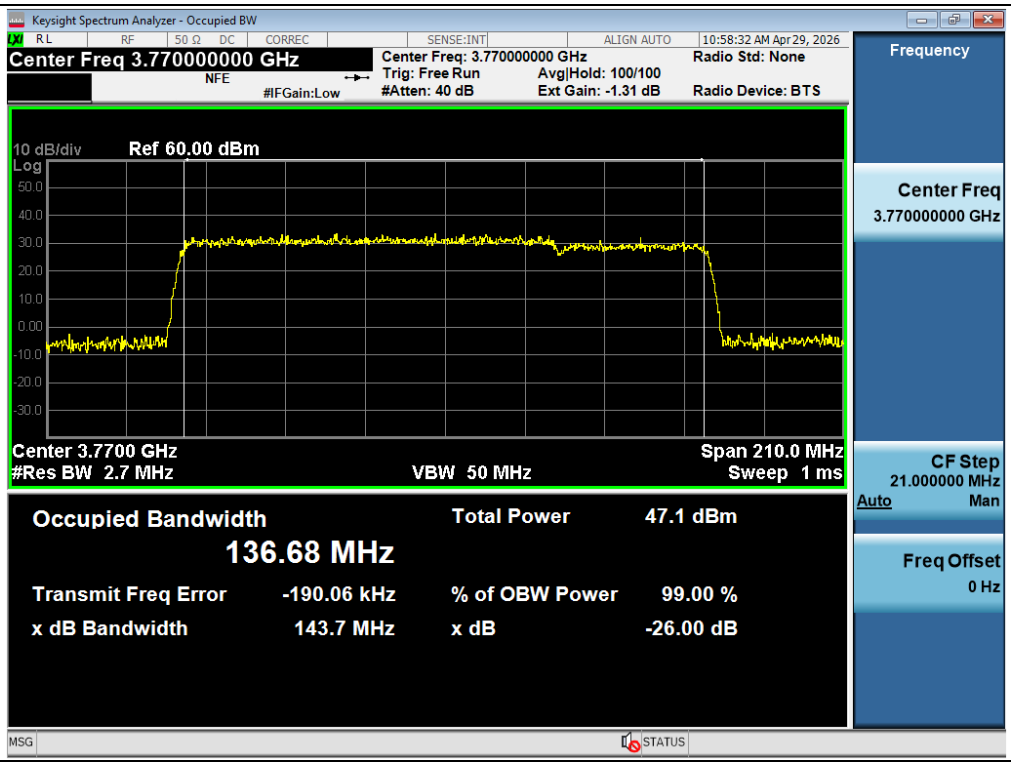
Plot Data of Occupied bandwidth

Antenna 36 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier] / 16QAM / Op. Freq. / Contiguous



Antenna 36 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]_Asym / 16QAM / Op. Freq. / Contiguous



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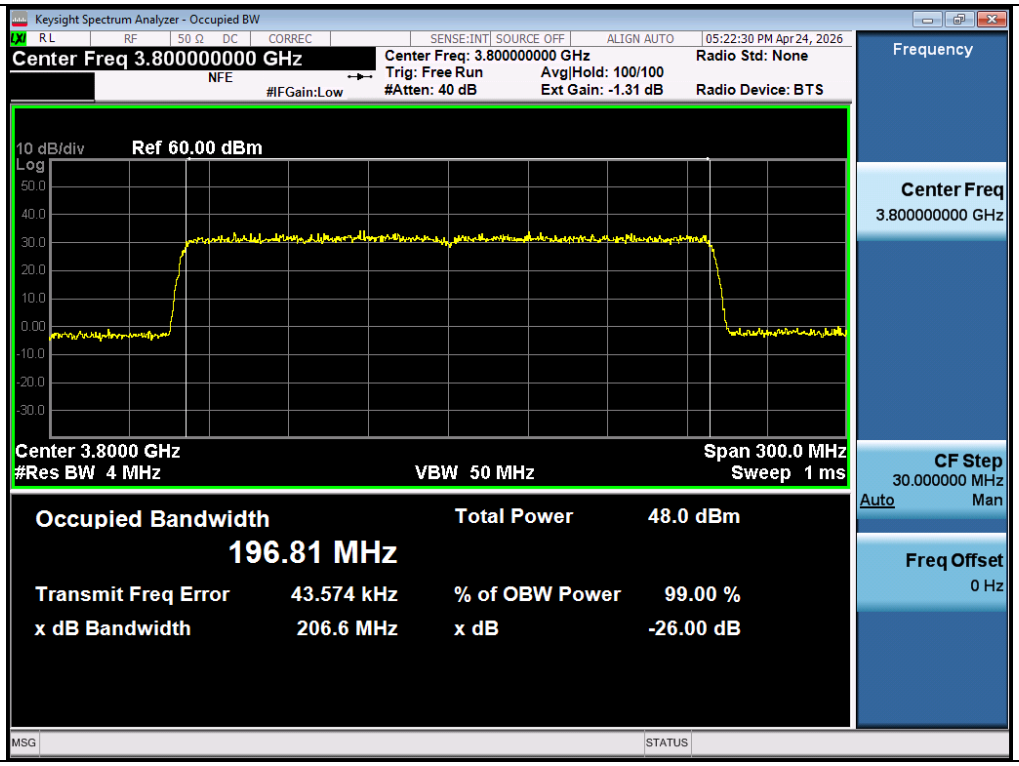
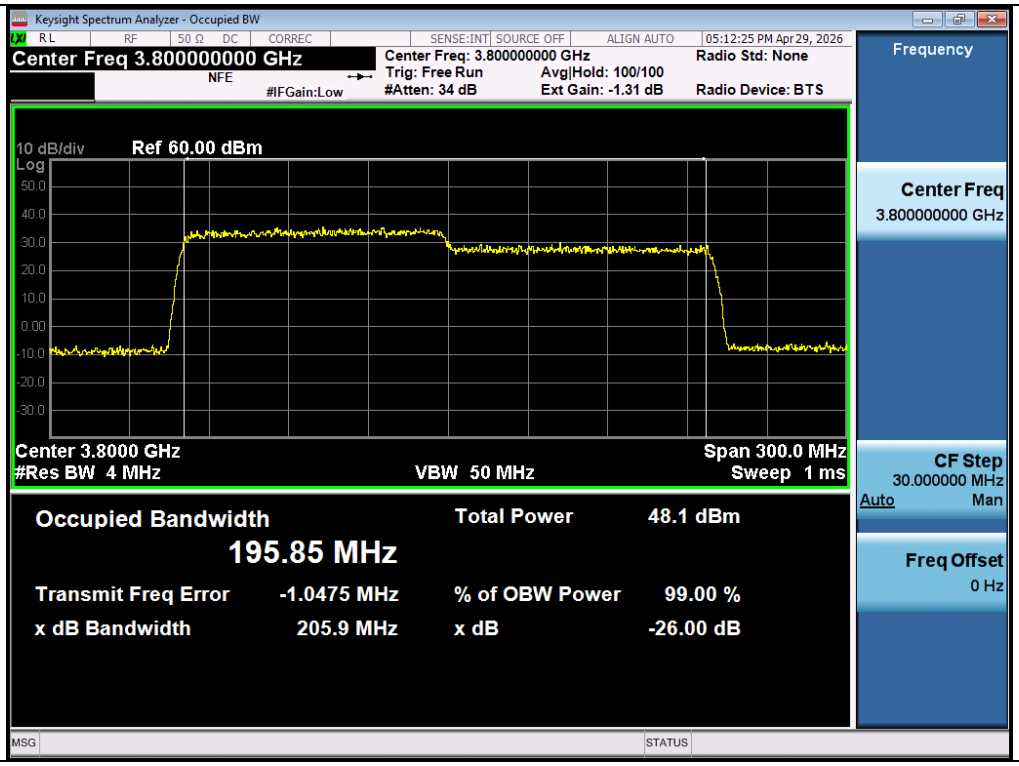
Antenna 23 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier] / 16QAM / Op. Freq. / Contiguous



Antenna 23 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]_Asym / 16QAM / Op. Freq. / Contiguous



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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 and 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

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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 transmit continuously (duty cycle < 98%), a gated sweep shall be used when possible (i.e., gate triggered such that the analyzer only sweeps when the device is transmitting at full power), set the sweep time > (number of points in sweep) × (symbol period) but the sweep time shall always be maintained at a value that is less than or equal to the minimum transmission time.

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.

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Note:

1. Due to MIMO operations, a correction has been added to the limit according to KDB 662911 D01 v02r01.
   - 4Tx MIMO correction: 10 log(N_{ANT}) = 10 log(64) = 18.06 dB
   - Corrected Measured Level = Measured Level + 10 log(64)

   If the corrected measured level for each port does not exceed the limit, the MIMO combined value will also not exceed the limit.
2. In frequency regions adjacent to the fundamental signal, the measured results may include contributions from the transmitter's fundamental emission. Accordingly, emissions close to the channel edge were assessed with consideration of this contribution. The duty cycle correction factor was applied as an external gain in the plot for signal-based measurements and was taken into account in the relevant measurements.
3. All blocks of operation were investigated, and the results for the worst case configuration are reported.
4. The results of the Out-of-band Unwanted Emissions tests show a similar trend across all ports; therefore, only the worst-case plots are attached.
5. For the 1 MHz bands immediately outside and adjacent to the frequency block, ANSI C63.26 Sections 5.7.2 and 5.7.3 were applied depending on the margin to the limit.

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Test Results:
Tabular Data of Contiguous Out-of-band Unwanted Emissions
(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]

Port	Modulation	Ch.	Edge Position	Freq. (MHz)	Measured Level (dBm)	Corrected Measured Level (dBm)	Freq. (MHz)	Measured Level (dBm)	Corrected Measured Level (dBm)	Limit (dBm)
5	16QAM	Op. Freq.	Left	3 699.50	-31.60	-13.54	-	-	-	-13
			Right	3 840.20	-34.67	-16.61	3 840.47	-34.26	-16.20	
34	16QAM	Op. Freq.	Left	3 699.50	-32.00	-13.93	-	-	-	
			Right	3 840.20	-34.98	-16.92	3 840.40	-34.91	-16.85	
54	16QAM	Op. Freq.	Left	3 699.50	-33.15	-15.09	-	-	-	
			Right	3 840.20	-35.75	-17.69	3 840.85	-35.22	-17.16	

(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]_Asym

Port	Modulation	Ch.	Edge Position	Freq. (MHz)	Measured Level (dBm)	Corrected Measured Level (dBm)	Freq. (MHz)	Measured Level (dBm)	Corrected Measured Level (dBm)	Limit (dBm)
5	16QAM	Op. Freq.	Left	3 699.50	-31.77	-13.71	-	-	-	-13
			Right	3 840.20	-35.02	-16.96	3 840.74	-34.93	-16.87	
34	16QAM	Op. Freq.	Left	3 699.50	-31.25	-13.19	-	-	-	
			Right	3 840.20	-31.61	-13.55	3 840.41	-34.32	-16.26	
54	16QAM	Op. Freq.	Left	3 699.50	-32.55	-14.49	-	-	-	
			Right	3 840.20	-33.09	-15.03	3 840.40	-36.01	-17.95	

(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]

Port	Modulation	Ch.	Edge Position	Freq. (MHz)	Measured Level (dBm)	Corrected Measured Level (dBm)	Limit (dBm)
5	16QAM	Op. Freq.	Left	3 699.50	-32.28	-14.22	-13
			Right	3 900.50	-31.13	-13.07	
34	16QAM	Op. Freq.	Left	3 699.50	-32.92	-14.86	
			Right	3 900.50	-32.52	-14.46	

(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]_Asym

Port	Modulation	Ch.	Edge Position	Freq. (MHz)	Measured Level (dBm)	Corrected Measured Level (dBm)	Limit (dBm)
5	16QAM	Op. Freq.	Left	3 699.50	-31.67	-13.61	-13
			Right	3 900.50	-33.67	-15.61	
34	16QAM	Op. Freq.	Left	3 699.50	-31.98	-13.92	
			Right	3 900.50	-33.92	-15.85	

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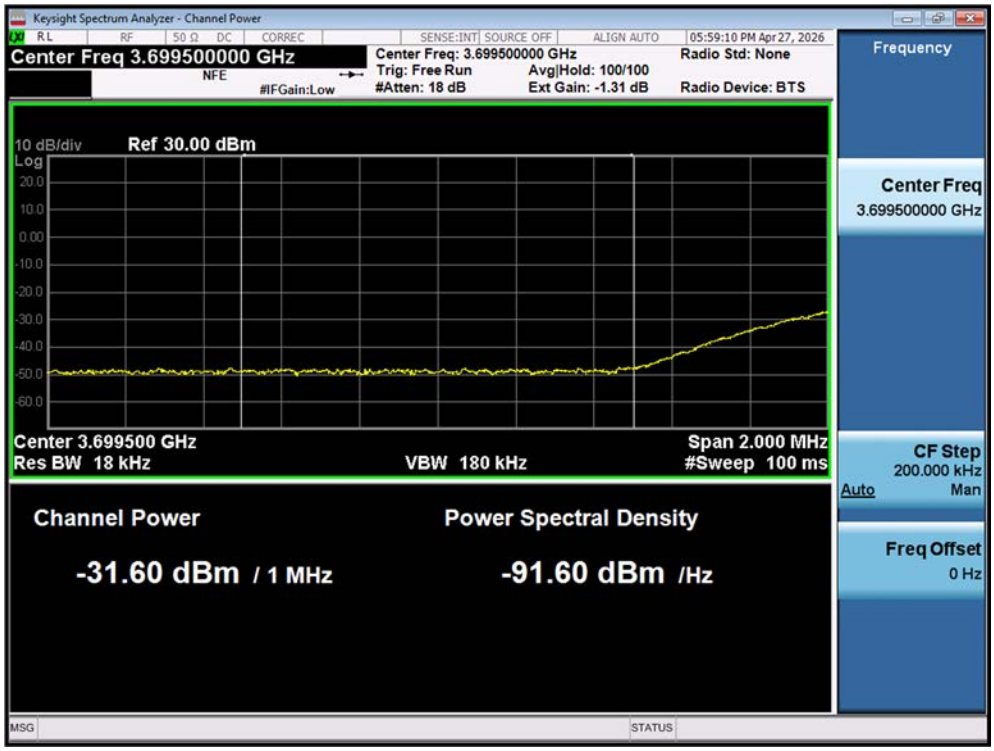
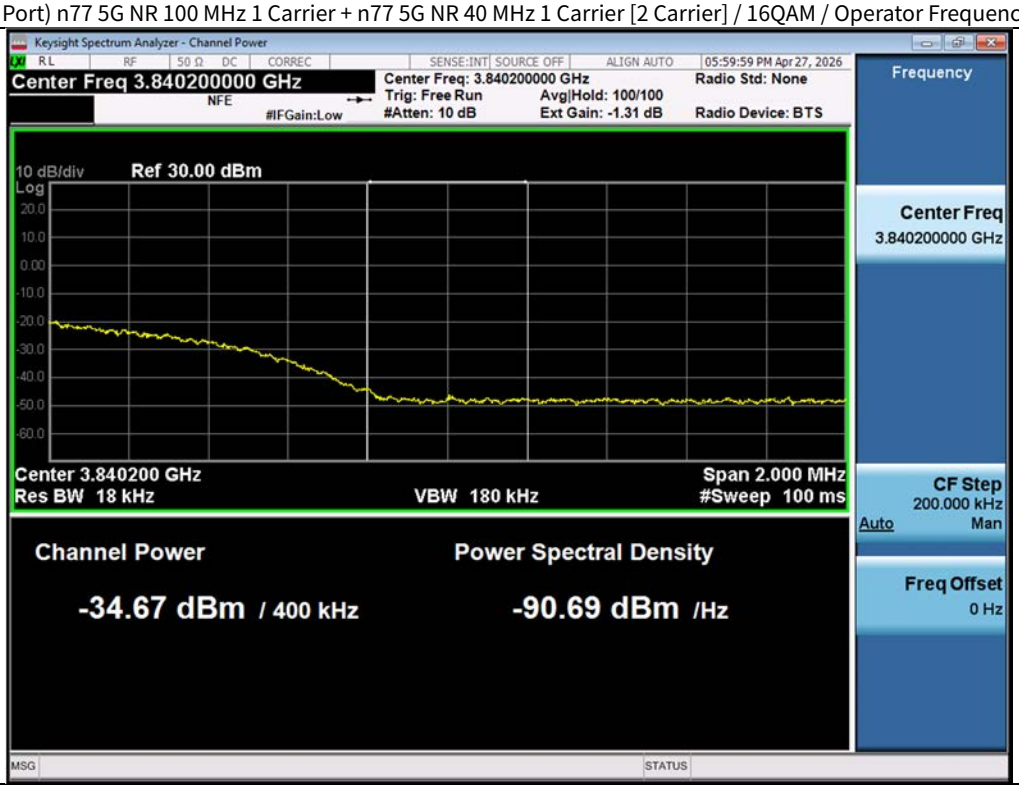
Plot Data of Out-of-band Unwanted Emissions

Port 5 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier] / 16QAM / Operator Frequency / Left



Port 5 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier] / 16QAM / Operator Frequency / Right(1)



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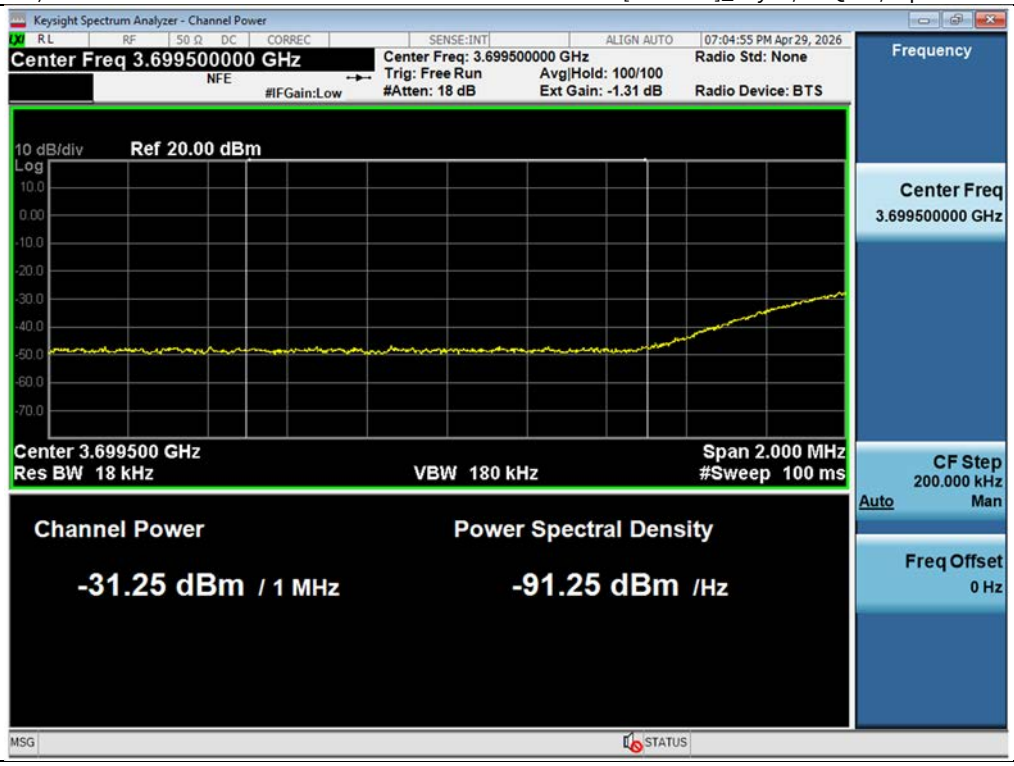
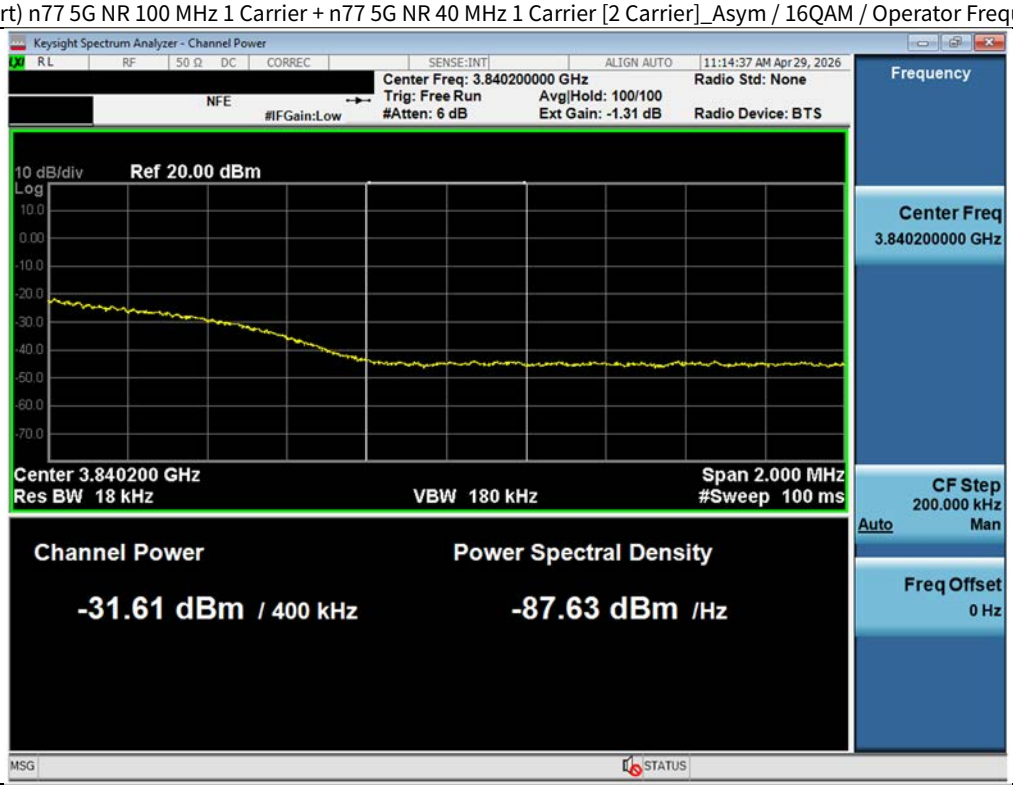
Port 5 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier] / 16QAM / Operator Frequency / Right(2)

Port 34 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]_Asym / 16QAM / Operator Frequency / Left



The report shall not be (partly) reproduced except in full without approval of the laboratory.

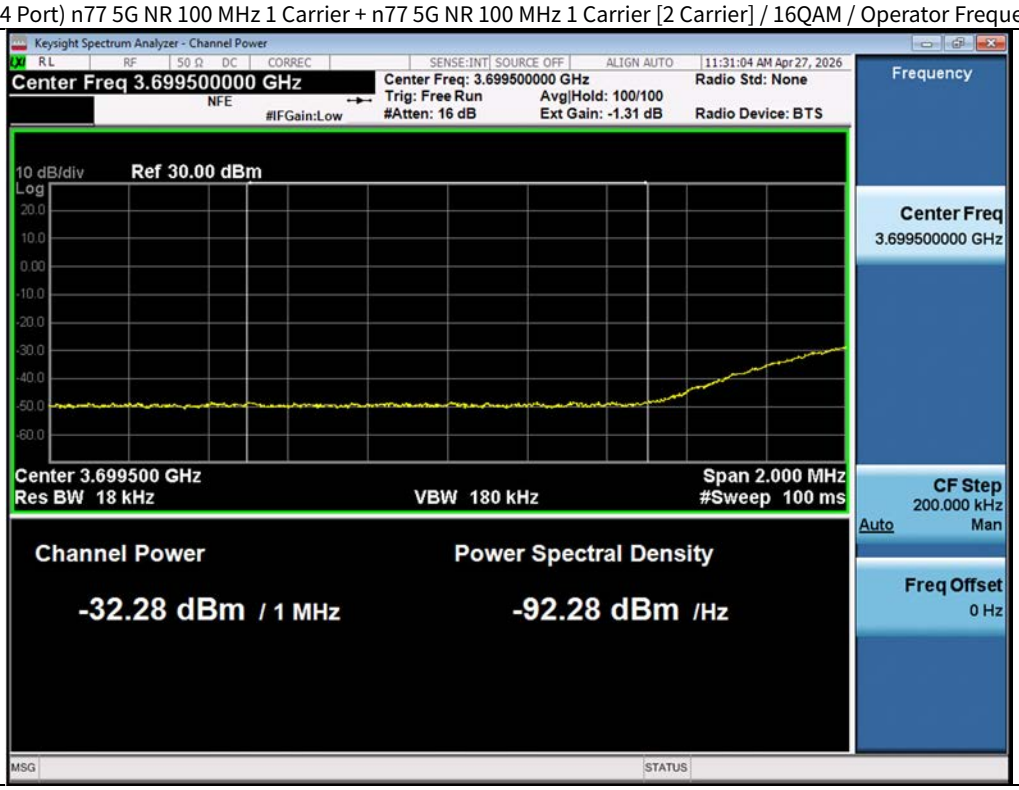
Port 34 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]_Asym / 16QAM / Operator Frequency / Right(1)



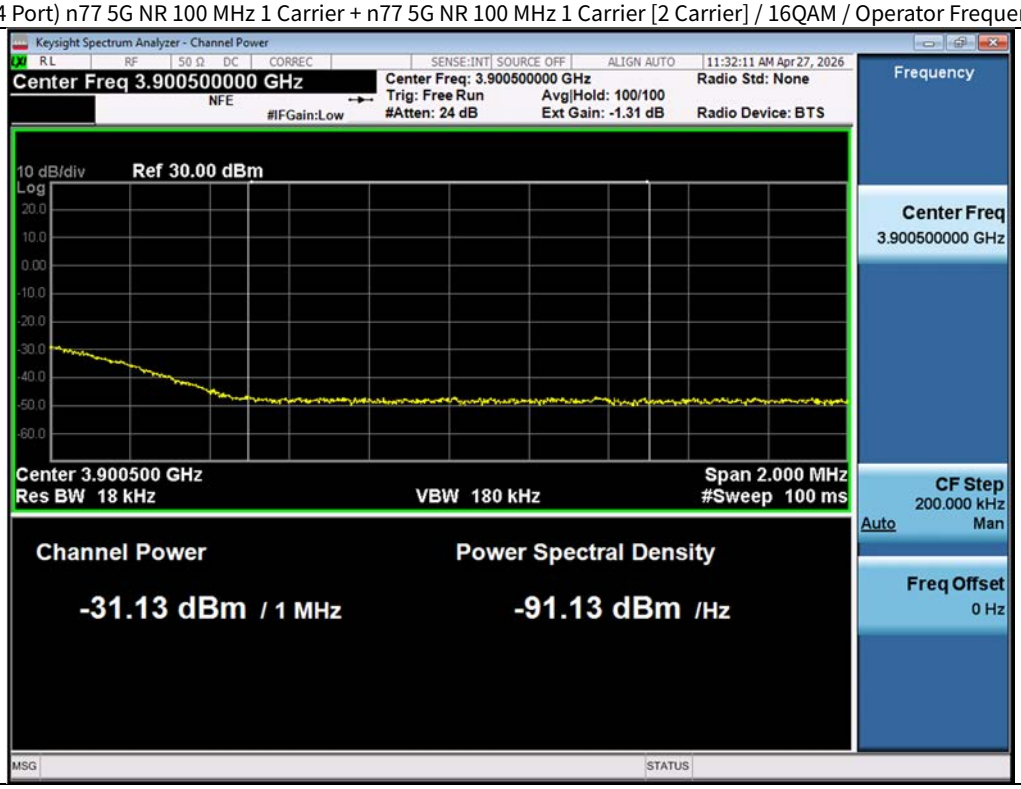
Port 34 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]_Asym / 16QAM / Operator Frequency / Right(2)

The report shall not be (partly) reproduced except in full without approval of the laboratory.

Port 5 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier] / 16QAM / Operator Frequency / Left



Port 5 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier] / 16QAM / Operator Frequency / Right



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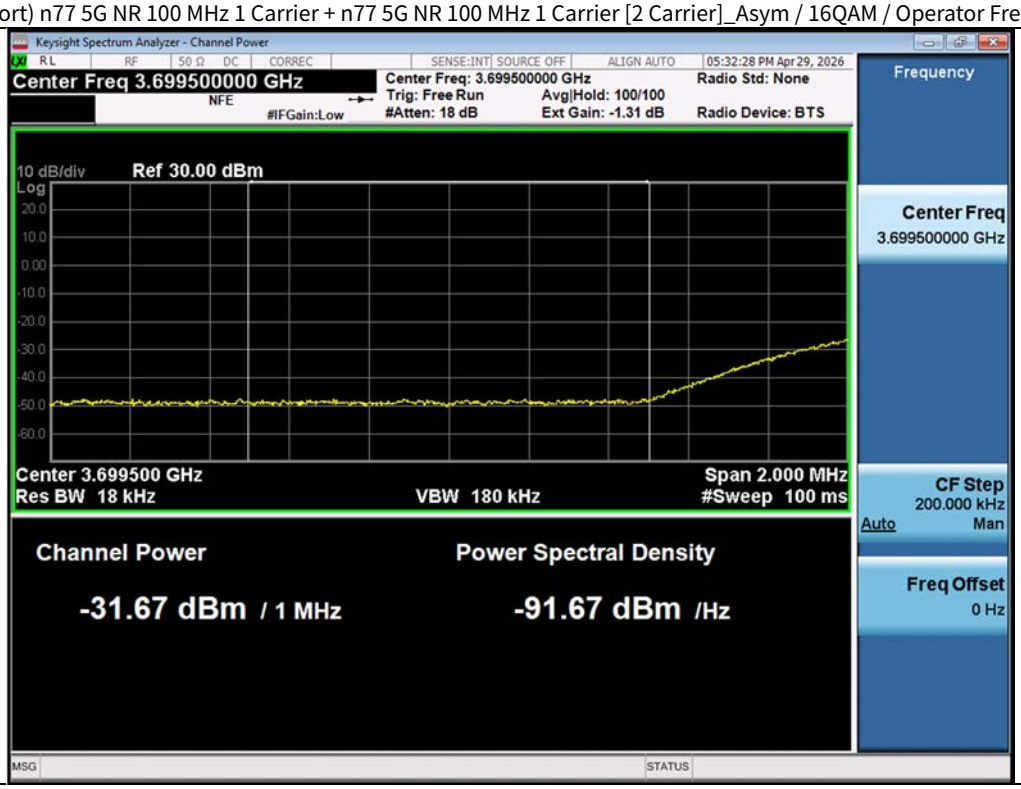
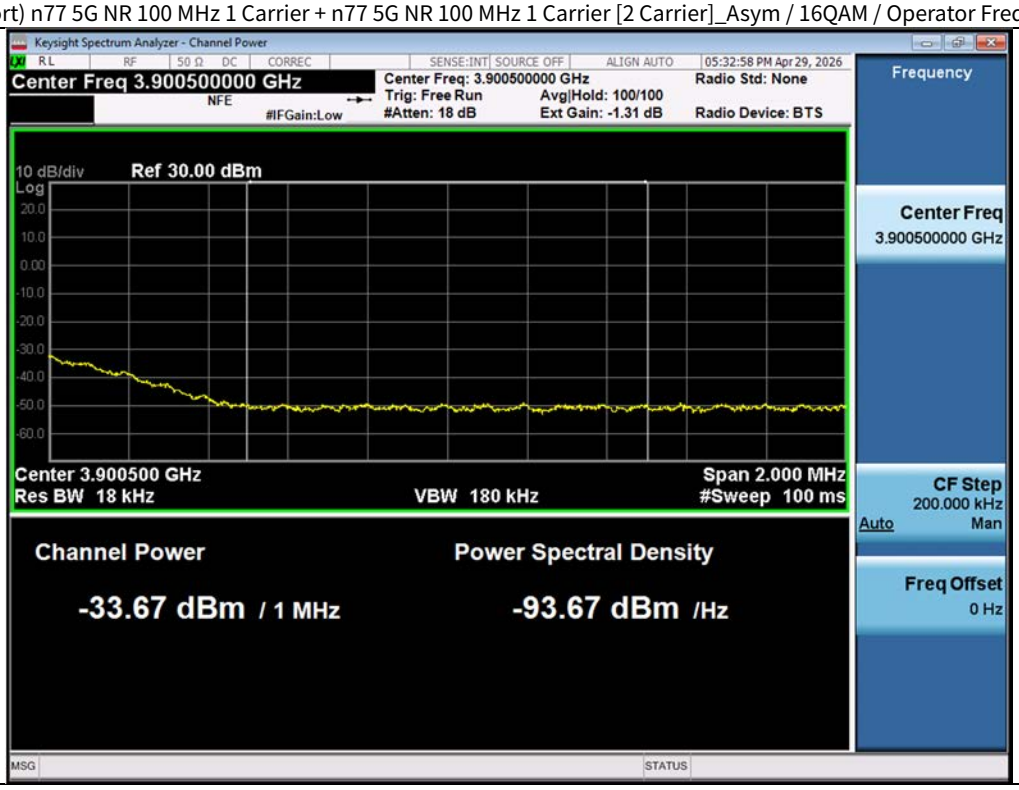
Port 5 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]_Asym / 16QAM / Operator Frequency / Left



Port 5 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]_Asym / 16QAM / Operator Frequency / Right



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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.

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Test Procedures:

The measurement is performed in accordance with Section 5.7.2, 5.7.4 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.

5.7.4 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 ≥ 2 × (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.

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Note:

1. In some frequency ranges, the RBW was reduced to 0.1%, 1%, and 10% of the reference bandwidth for measuring unwanted emissions levels. Therefore, the limit lines of the test plots were downward corrected from the limits (−values) in accordance with section 5.7.2 of ANSI C63.26-2015, while the measured values from the plots were adjusted with the correction factors and recorded in the tabular data (+values) to demonstrate compliance with the limits. Test plots show results with relative correction applied, while tabular tables present the results with full correction applied to compare to the actual limit.

Reduced RBW	0.1 %	1 %	10 %
Plot: Limit line compensation	-30 dB	-20 dB	-10 dB
Tabular data: Applied correction	+30 dB	+20 dB	+10 dB

2. Due to MIMO operations, a correction has been added to the limit according to KDB 662911 D01 v02r01.
   - 4Tx MIMO correction: 10 log(N_{ANT}) = 10 log(64) = 18.06 dB
   - Corrected Measured Level = Measured Level + 10 log(64)

   If the corrected measured level for each port does not exceed the limit, the MIMO combined value will also not exceed the limit.

3. In frequency regions adjacent to the fundamental signal, the measured results may include contributions from the transmitter's fundamental emission. Accordingly, emissions close to the channel edge were assessed with consideration of this contribution. The duty cycle correction factor was applied as an external gain in the plot for signal-based measurements and was taken into account in the relevant measurements.

4. The results of the Spurious Unwanted Emissions tests show a similar trend across all ports; therefore, only the worst-case plots are attached.

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Test Results:

Tabular Data of RF Contiguous Spurious Unwanted Emissions

(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]

Port	Modulation	Channel	Corrected Measured Level (dBm/MHz)						
			9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ 3 698 MHz	3 698 MHz ~ 3 699 MHz	3 841 MHz ~ 3 842 MHz	3 842 MHz ~ 10 GHz	10 GHz ~ 40 GHz
38	16QAM	Op. Freq.	-39.037	-44.140	-33.260	-34.104	-32.651	-32.108	-34.311
54	16QAM		-39.241	-44.369	-33.217	-34.267	-32.653	-32.159	-34.314
Limit			-13						

(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]_Asym

Port	Modulation	Channel	Corrected Measured Level (dBm/MHz)						
			9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ 3 698 MHz	3 698 MHz ~ 3 699 MHz	3 841 MHz ~ 3 842 MHz	3 842 MHz ~ 10 GHz	10 GHz ~ 40 GHz
38	16QAM	Op. Freq.	-38.789	-42.932	-32.818	-33.938	-33.447	-32.512	-35.110
54	16QAM		-38.780	-43.555	-34.281	-34.543	-33.040	-32.732	-35.072
Limit			-13						

(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]

Port	Modulation	Channel	Corrected Measured Level (dBm/MHz)				
			9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ 3 699 MHz	3 901 MHz ~ 10 GHz	10 GHz ~ 40 GHz
38	16QAM	Op. Freq.	-41.659	-44.404	-32.283	-32.621	-35.036
Limit			-13				

(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]_Asym

Port	Modulation	Channel	Corrected Measured Level (dBm/MHz)						
			9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ 3 699 MHz	3 698 MHz ~ 3 699 MHz	3 901 MHz ~ 3 902 MHz	3 902 MHz ~ 10 GHz	10 GHz ~ 40 GHz
38	16QAM	Op. Freq.	-39.340	-43.055	-33.407	-35.263	-32.986	-34.152	-35.750
Limit			-13						

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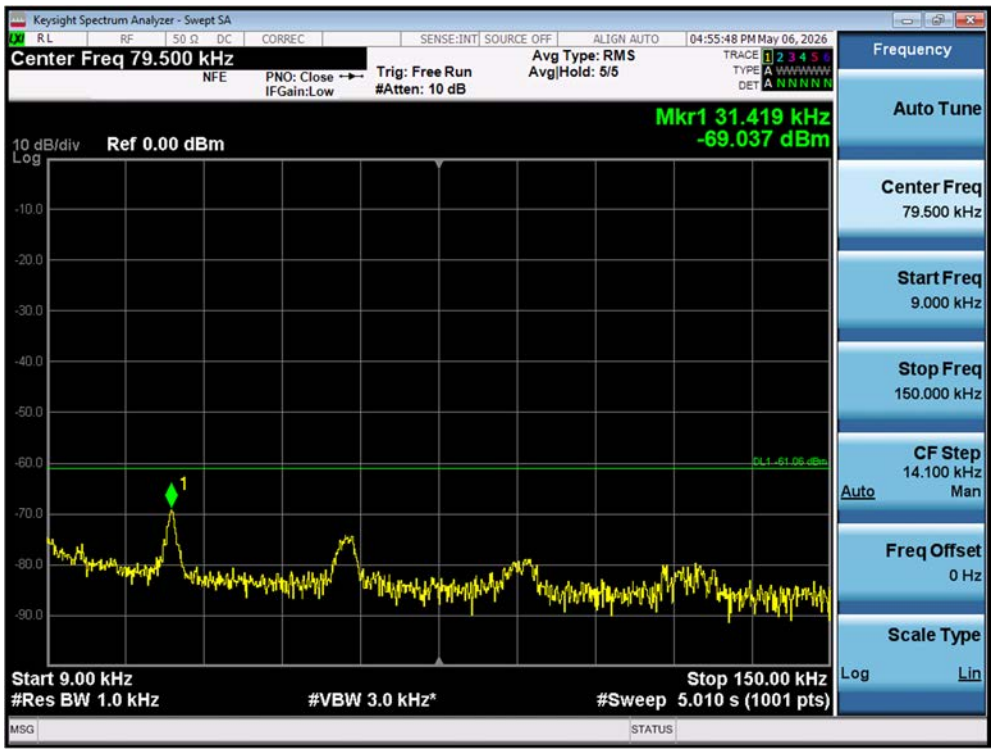
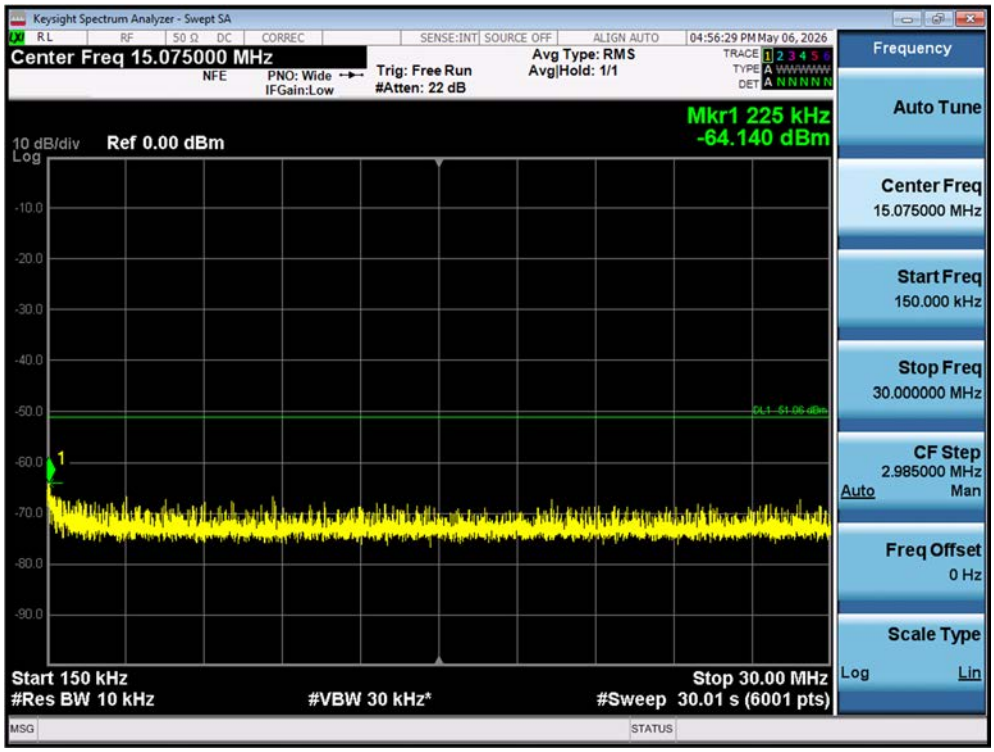
Plot Data of Spurious Unwanted Emissions

Port 38 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier] /
9 kHz ~ 150 kHz / 16QAM / Operator Frequency



Port 38 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier] /
150 kHz ~ 30 MHz / 16QAM / Operator Frequency



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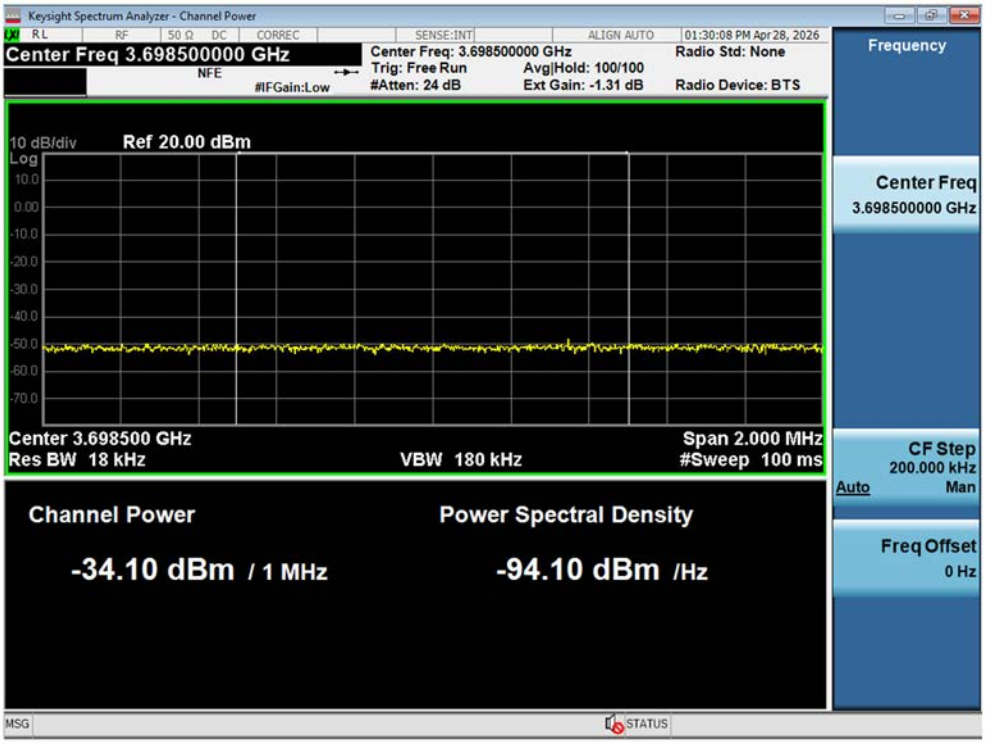
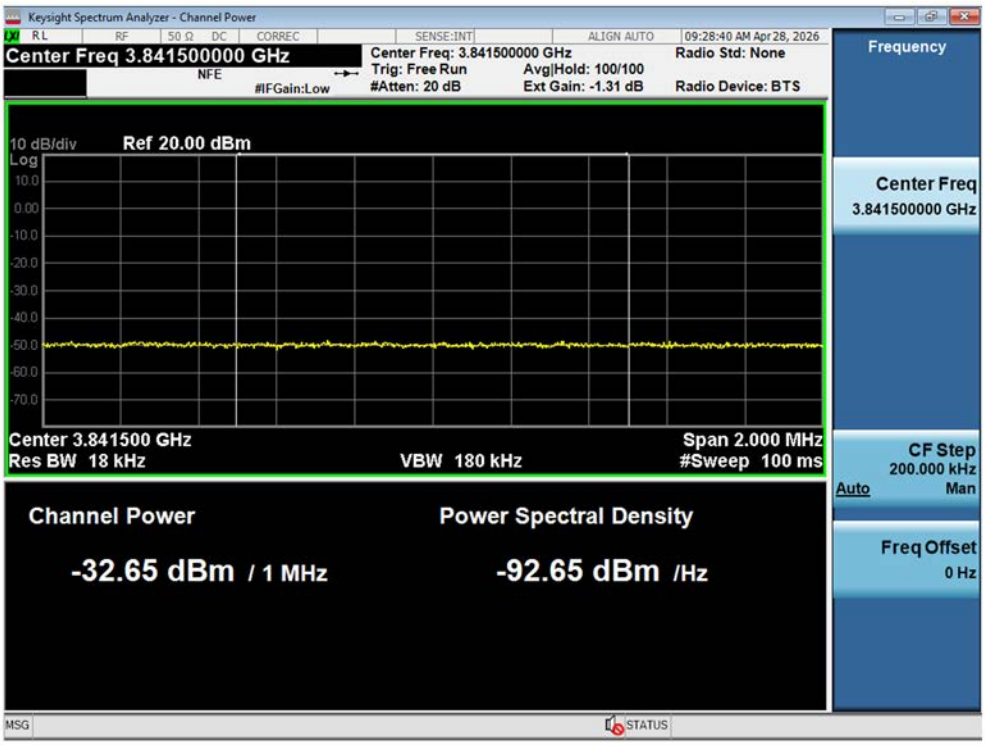
Port 54 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier] /
30 MHz ~ 3 698 MHz / 16QAM / Operator Frequency

Port 38 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier] /
3 698 MHz ~ 3 699 MHz / 16QAM / Operator Frequency

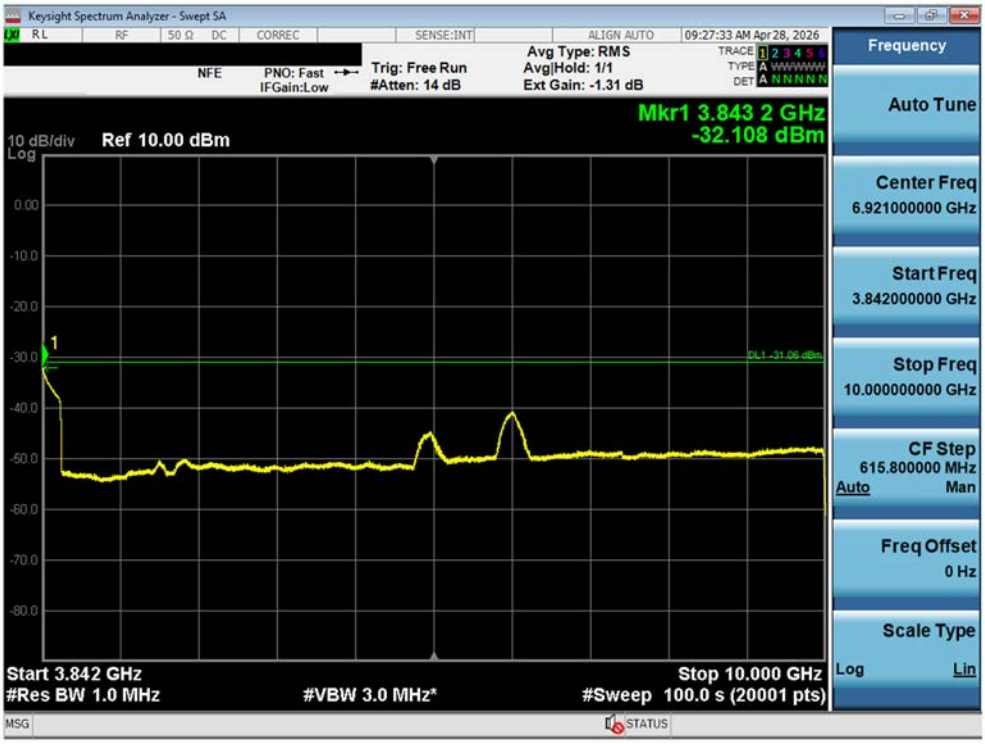


The report shall not be (partly) reproduced except in full without approval of the laboratory.

Port 38 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier] /
3 841 MHz ~ 3 842 MHz / 16QAM / Operator Frequency



Port 38 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier] /
3 842 MHz ~ 10 GHz / 16QAM / Operator Frequency



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Port 38 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier] /
10 GHz ~ 40 GHz / 16QAM / Operator Frequency

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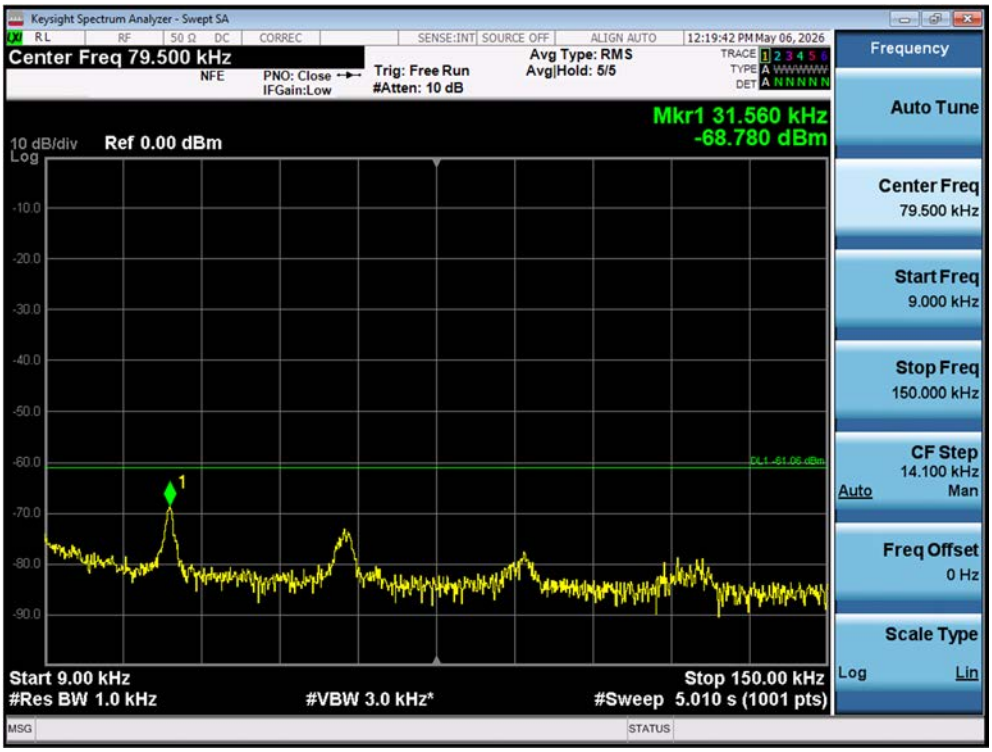
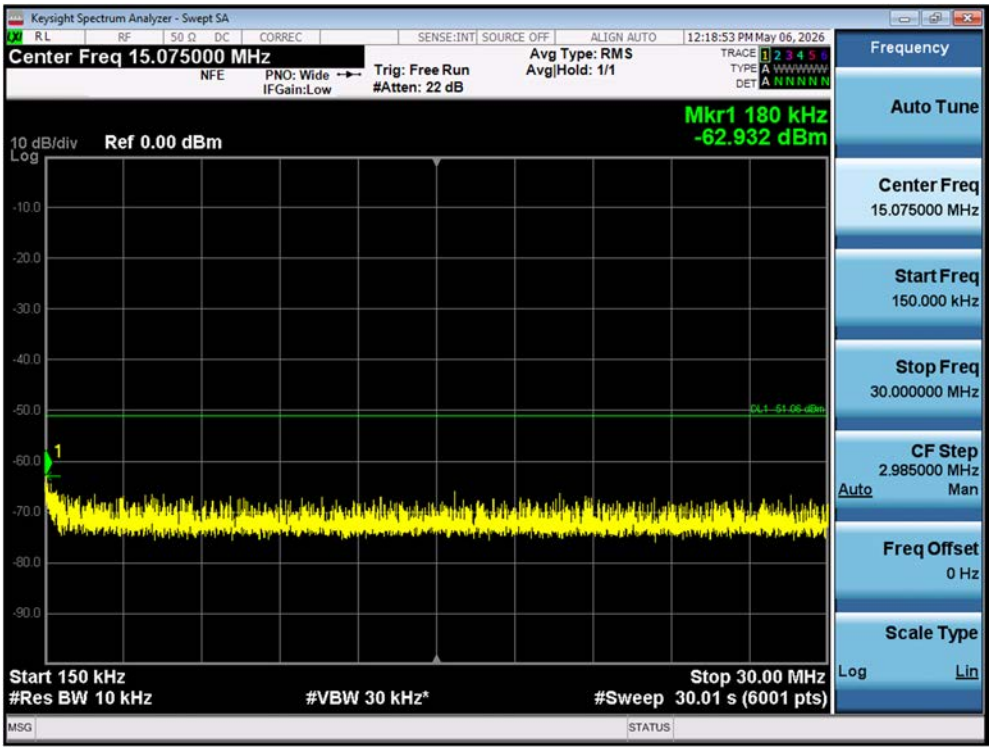
Port 54 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]_Asym /
9 kHz ~ 150 kHz / 16QAM / Operator Frequency



Port 38 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]_Asym /
150 kHz ~ 30 MHz / 16QAM / Operator Frequency



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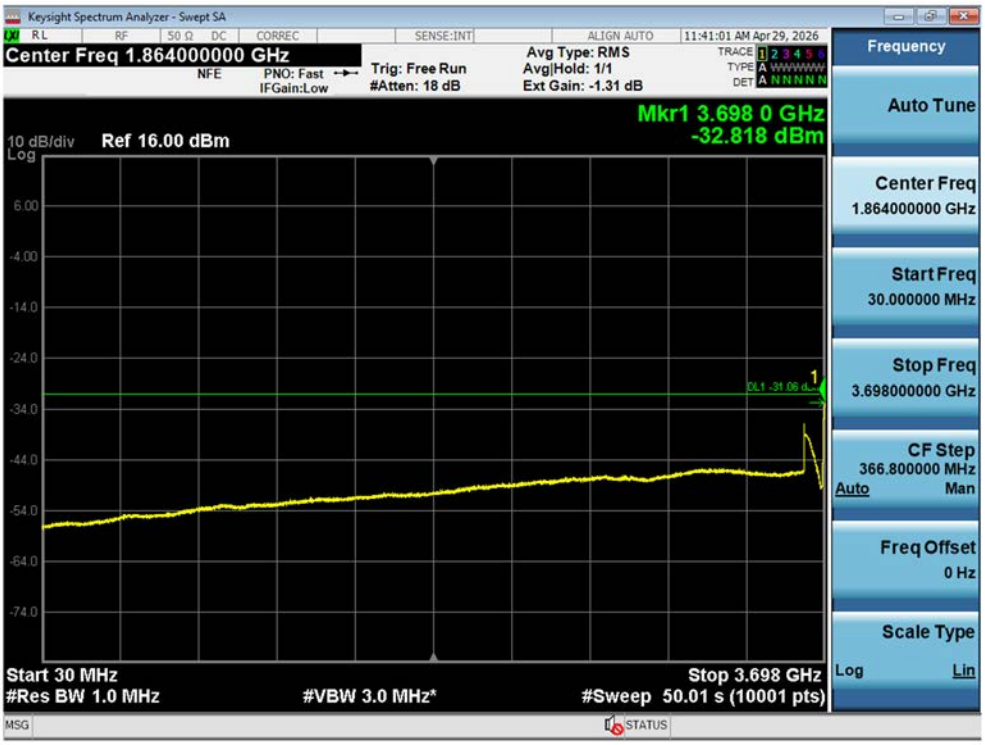
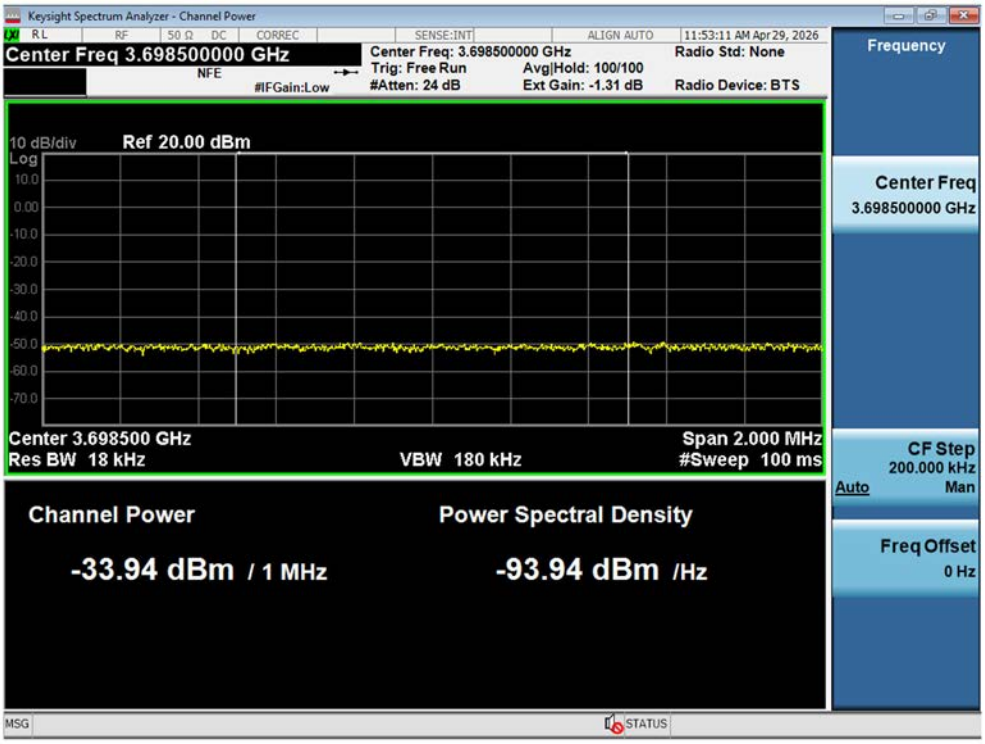
Port 38 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]_Asym /
30 MHz ~ 3 698 MHz / 16QAM / Operator Frequency



Port 38 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]_Asym /
3 698 MHz ~ 3 699 MHz / 16QAM / Operator Frequency



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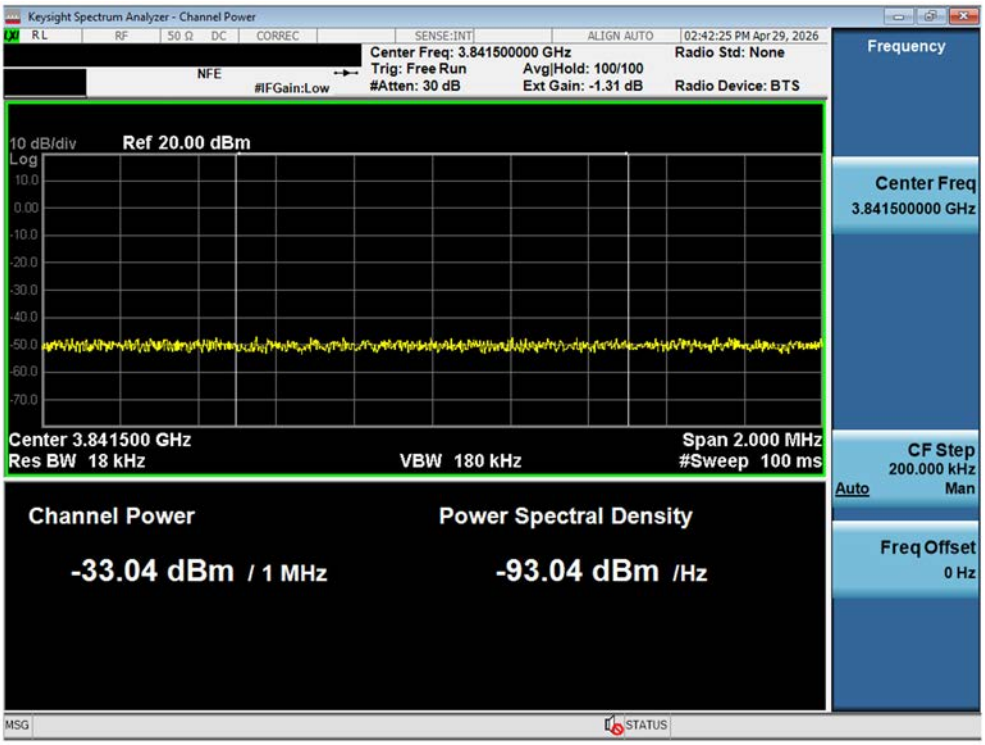
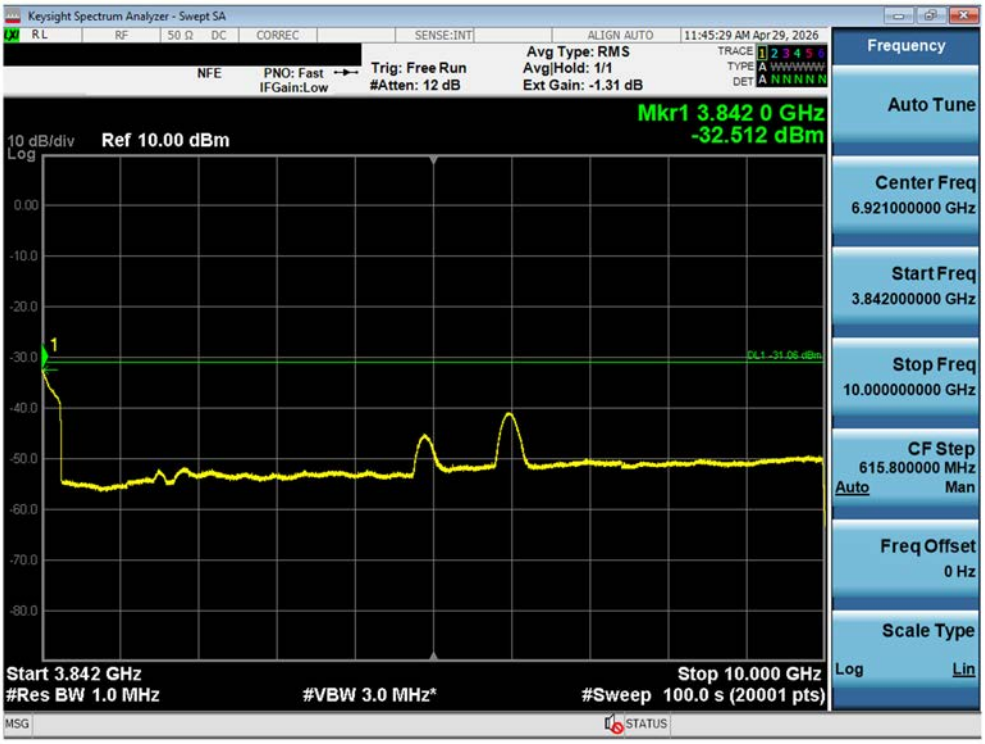
Port 54 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]_Asym /
3 841 MHz ~ 3 842 MHz / 16QAM / Operator Frequency



Port 38 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]_Asym /
3 842 MHz ~ 10 GHz / 16QAM / Operator Frequency



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Port 54 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]_Asym / 10 GHz ~ 40 GHz / 16QAM / Operator Frequency

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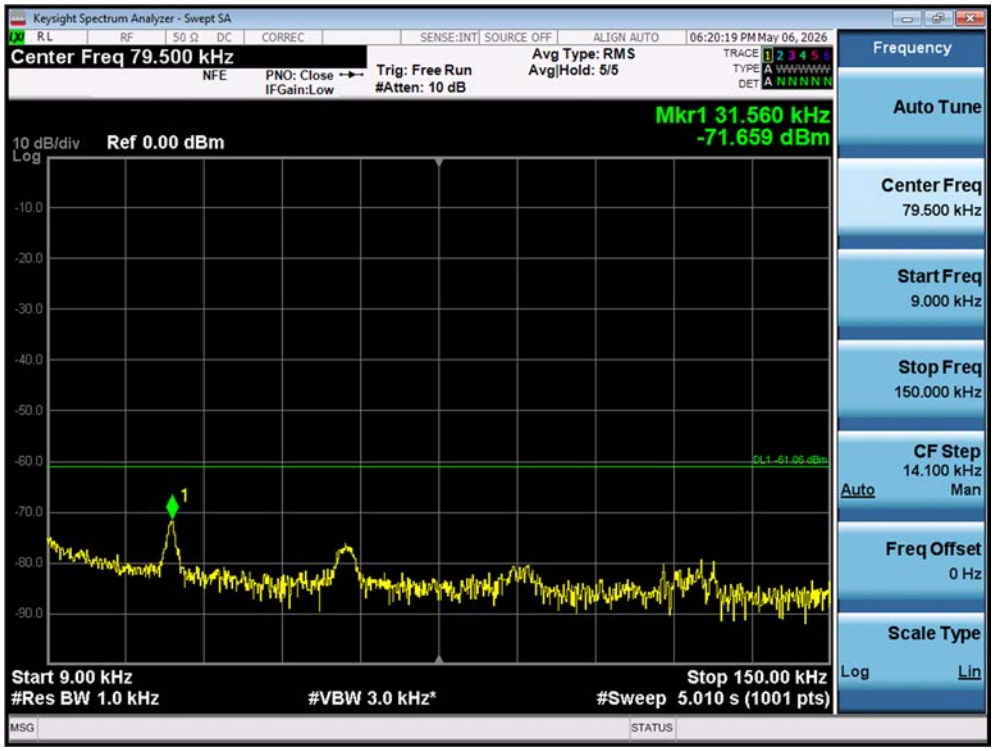
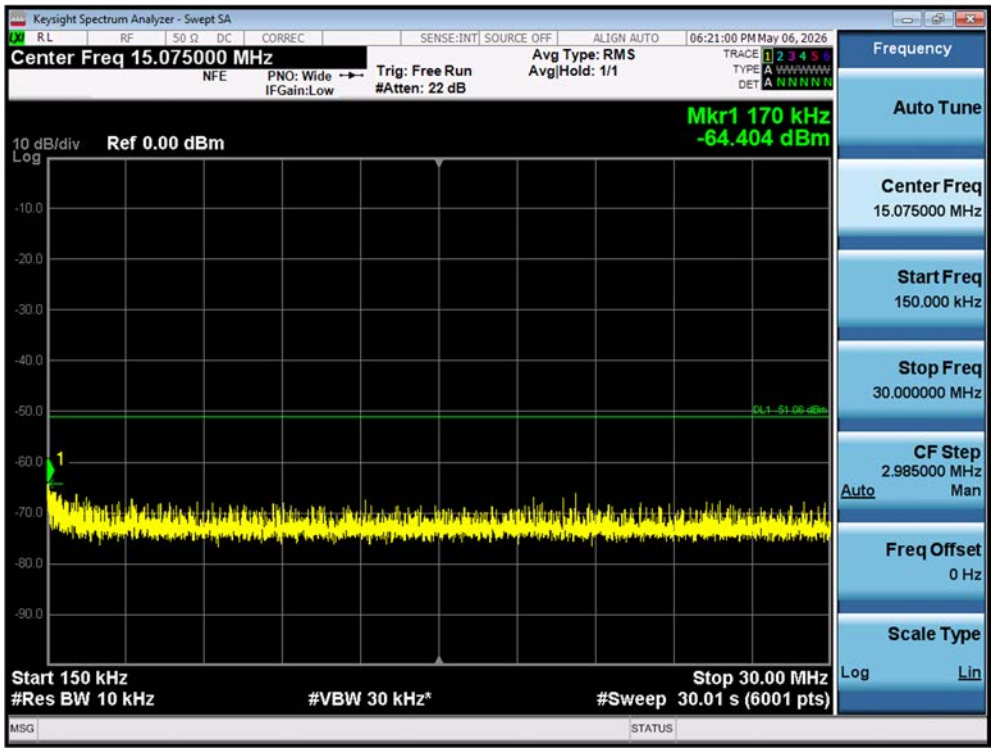
Port 38 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier] /
9 kHz ~ 150 kHz / 16QAM / Operator Frequency



Port 38 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier] /
150 kHz ~ 30 MHz / 16QAM / Operator Frequency



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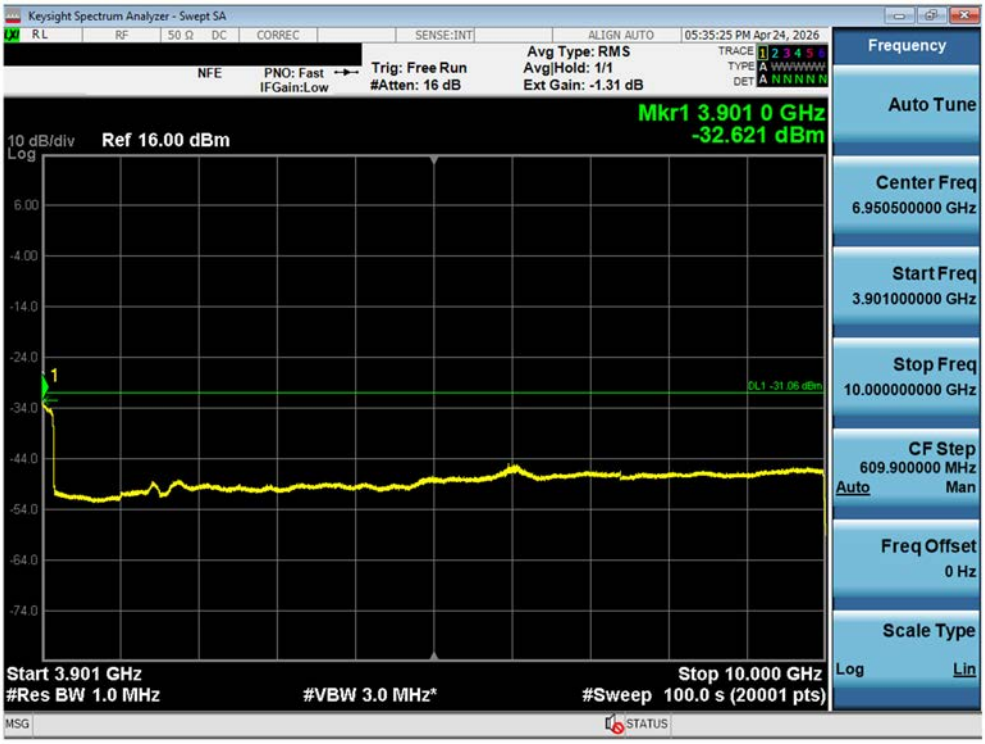
Port 38 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier] /
30 MHz ~ 3 699 MHz / 16QAM / Operator Frequency

Port 38 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier] /
3 901 MHz ~ 10 GHz / 16QAM / Operator Frequency



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Port 38 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier] /
10 GHz ~ 40 GHz / 16QAM / Operator Frequency

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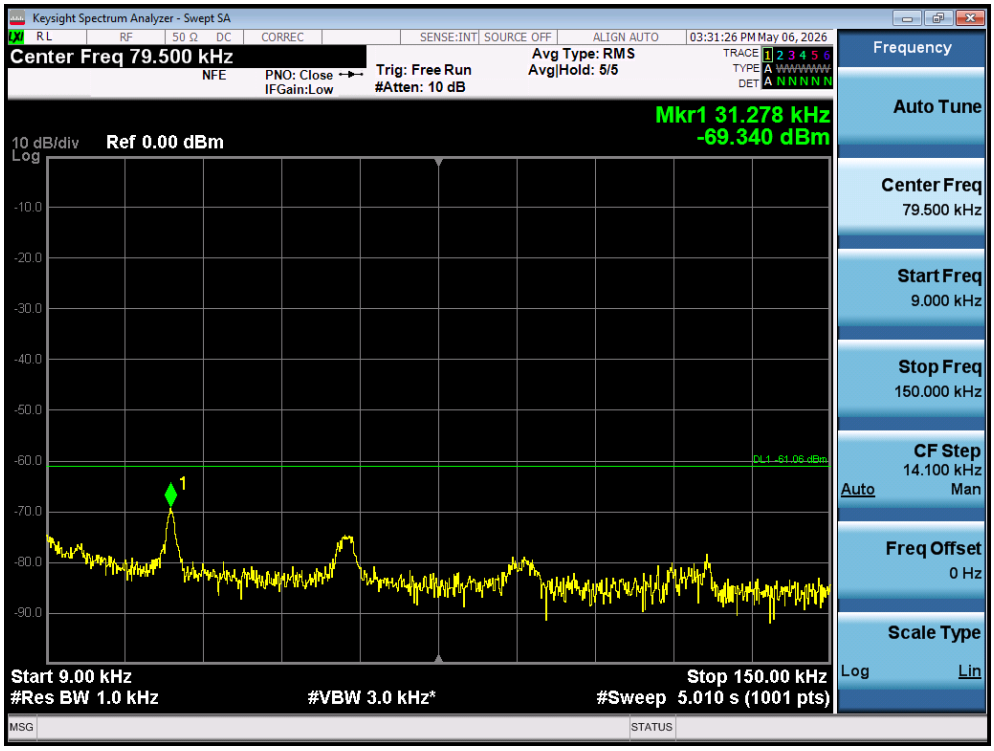
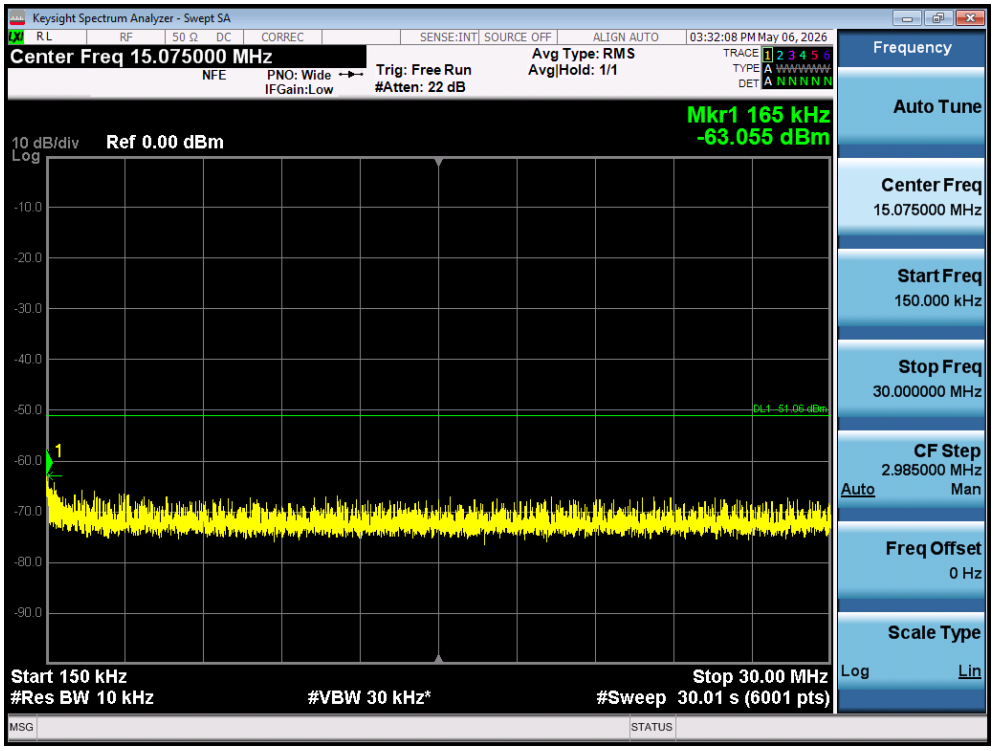
Port 38 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]_Asym /
9 kHz ~ 150 kHz / 16QAM / Operator Frequency



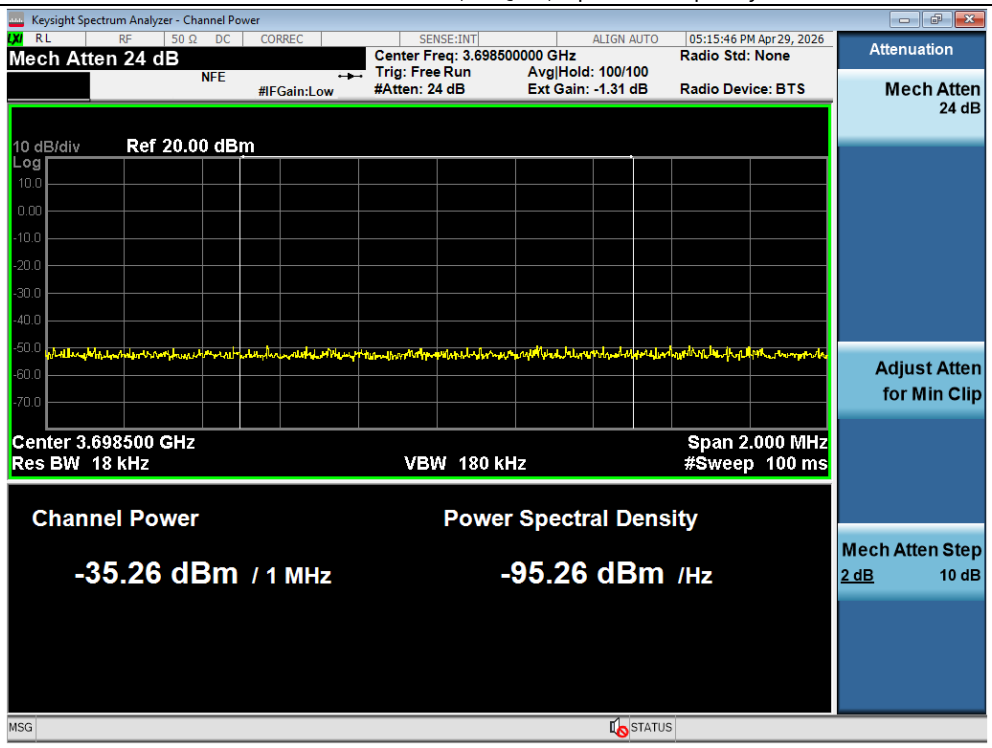
Port 38 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]_Asym /
150 kHz ~ 30 MHz / 16QAM / Operator Frequency



The report shall not be (partly) reproduced except in full without approval of the laboratory.

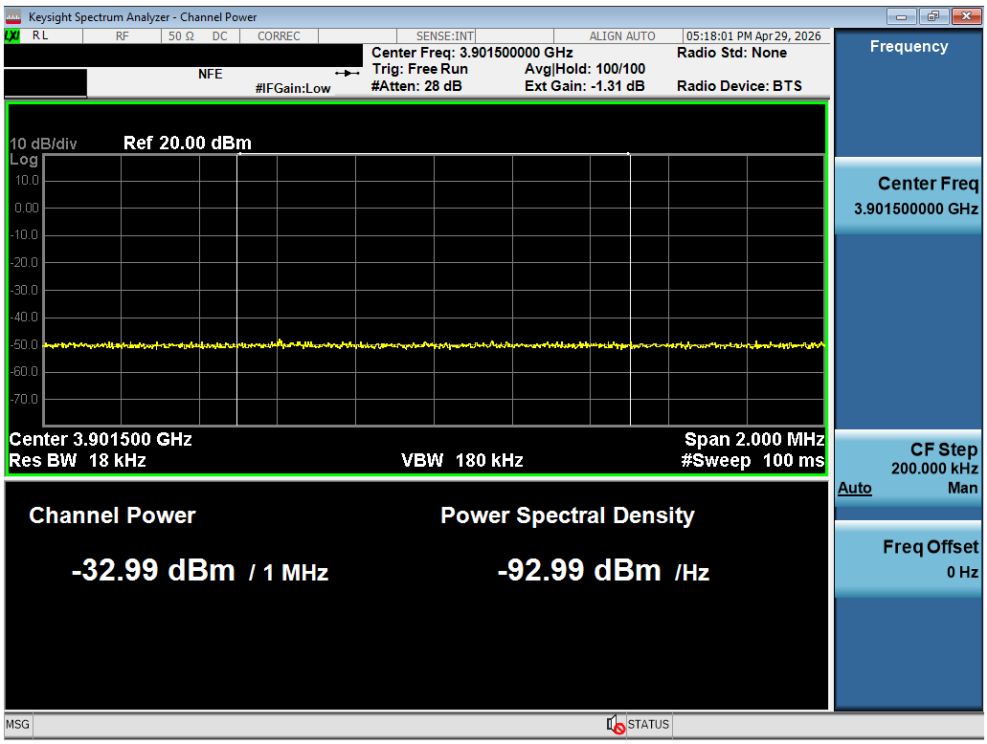
Port 38 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]_Asym / 30 MHz ~ 3 698 MHz / 16QAM / Operator Frequency

Port 38 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]_Asym / 3 698 MHz ~ 3 699 MHz / 16QAM / Operator Frequency

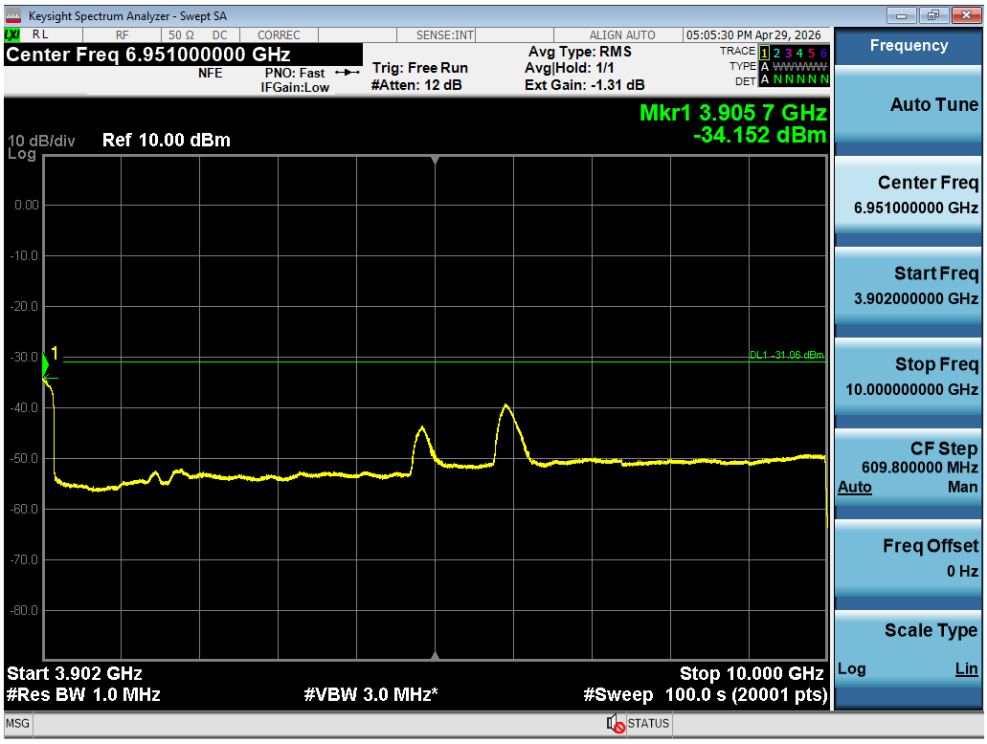


The report shall not be (partly) reproduced except in full without approval of the laboratory.

Port 38 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]_Asym /
3 901 MHz ~ 3 902 MHz / 16QAM / Operator Frequency



Port 38 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]_Asym /
3 902 MHz ~ 10 GHz / 16QAM / Operator Frequency



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Port 38 / (64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 100 MHz 1 Carrier [2 Carrier]_Asym / 10 GHz ~ 40 GHz / 16QAM / Operator Frequency

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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.

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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. Radiated emissions were measured at maximum output power, and only the worst-case data are provided.
2. Measurements were performed using both horizontal and vertical polarizations of the receiving antenna.
3. Spurious emissions attenuated by more than 20 dB below the permissible limit were not recorded in accordance with ANSI C63.26 Clause 5.1.1., c).
4. Measure distance = 3 m

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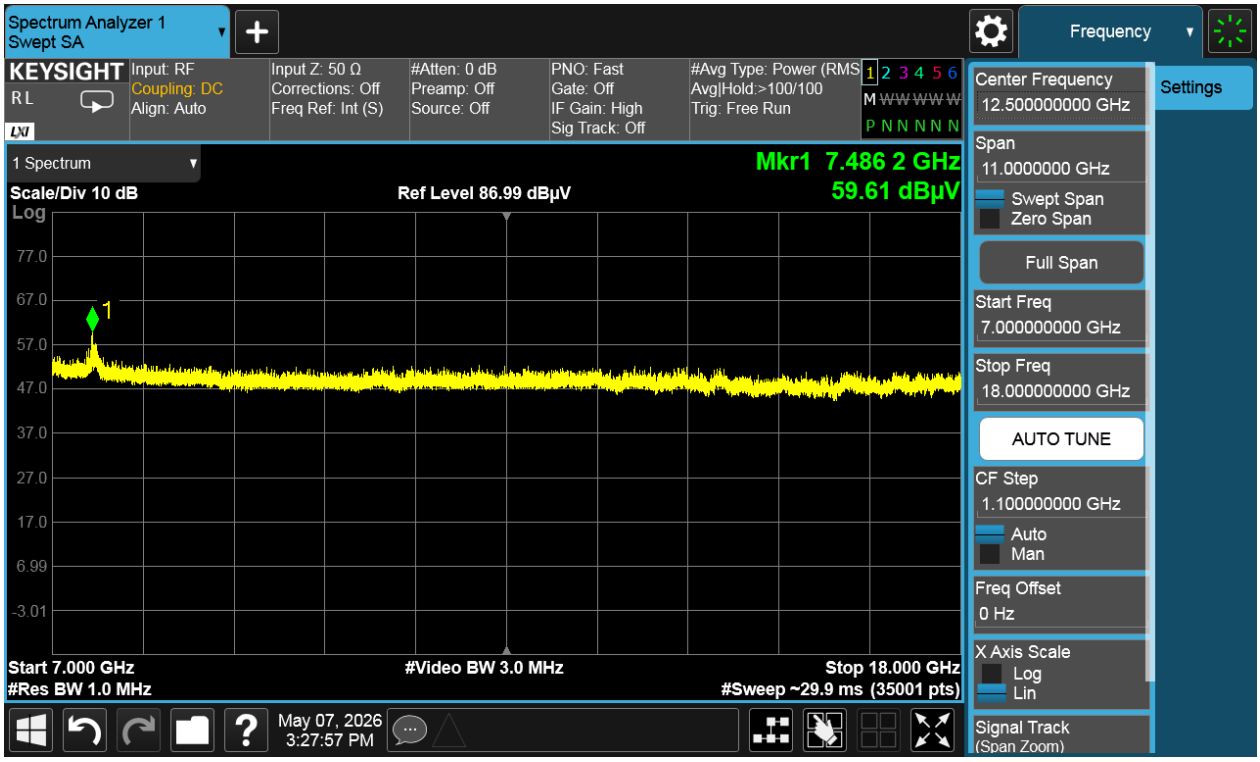
Test Results:

Frequency [MHz]	Measured Level [dBμV]	Antenna Factor [dB/m]	A.G.+C.L.+H.P.F. [dB]	Polarization [H/V]	Measured Power [dBm]	Result [dBm]	Limit [dBm/m]
No emissions within 20 dB of the limit.							

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

Plot data of Radiated Emissions

(64 Port) n77 5G NR 100 MHz 1 Carrier + n77 5G NR 40 MHz 1 Carrier [2 Carrier]_Asym / 16QAM



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

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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.

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.

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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

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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 tests show a similar trend across all ports; therefore, only the worst-case data are attached.

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Test Results:

Reference: - 48 Vdc at 20°C **Freq.** = 3,770,000,000 Hz

Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100 %	+20(Ref)	3770 000 008	7.700	0.000	0.00000
	-30	3770 000 010	2.662	-5.038	-0.00134
	-20	3770 000 017	9.459	1.759	0.00047
	-10	3770 000 008	0.549	-7.151	-0.00190
	0	3770 000 015	7.572	-0.128	-0.00003
	+10	3770 000 014	6.435	-1.265	-0.00034
	+30	3770 000 008	0.413	-7.288	-0.00193
	+40	3770 000 012	4.076	-3.624	-0.00096
	+50	3770 000 009	0.873	-6.827	-0.00181
115 %	+20	3770 000 012	3.963	-3.737	-0.00099
85 %	+20	3770 000 012	4.013	-3.688	-0.00098

Reference: - 48 Vdc at 20°C **Freq.** = 3,800,000,000 Hz

Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (Hz)	ppm
100 %	+20(Ref)	3800 000 005	5.147	0.000	0.00000
	-30	3800 000 008	2.464	-2.683	-0.00071
	-20	3800 000 015	9.619	4.472	0.00118
	-10	3800 000 005	0.159	-4.988	-0.00131
	0	3800 000 011	5.814	0.667	0.00018
	+10	3800 000 006	1.212	-3.935	-0.00104
	+30	3800 000 014	8.702	3.555	0.00094
	+40	3800 000 015	9.950	4.803	0.00126
	+50	3800 000 009	4.016	-1.131	-0.00030
115 %	+20	3800 000 006	1.273	-3.874	-0.00102
85 %	+20	3800 000 013	7.843	2.696	0.00071

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6. Annex A_EUT AND TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2605-FC005-P

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