

TEST REPORT

FCC Test for RF2217d-D1A
Class II Permissive Change

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2112-FC023

DATE OF ISSUE
December 15, 2021

Tested by
Kyung Soo Kang



Technical Manager
Jong Seok Lee



HCT CO., LTD.
Bongjai Huh
BongJai Huh / CEO



HCT Co., Ltd.

74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
Tel. +82 31 634 6300 Fax. +82 31 645 6401

**TEST
REPORT**
FCC Test for
RF2217d-D1A

REPORT NO.
HCT-RF-2112-FC023

DATE OF ISSUE
December 15, 2021

Additional Model
-

Applicant **SAMSUNG Electronics Co., Ltd.**
129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

**Eut Type
Model Name** RRU(RF2217d)
RF2217d-D1A

FCC ID A3LRF2217D-D1A

Date of Test November 24, 2021 ~ December 10, 2021

FCC Rule Parts: CFR 47 Part 2, Part 22, Part 24

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.
This test results were applied only to the test methods required by the standard.

REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	December 15, 2021	Initial Release

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.

If this report is required to confirmation of authenticity, please contact to www.hct.co.kr

CONTENTS

1. GENERAL INFORMATION	5
1.1. APPLICANT INFORMATION	5
1.2. PRODUCT INFORMATION	5
1.3. TEST INFORMATION	6
2. FACILITIES AND ACCREDITATIONS	7
2.1. FACILITIES	7
2.2. EQUIPMENT	7
3. TEST SPECIFICATIONS	8
3.1. STANDARDS	8
3.2. ADDITIONAL DESCRIPTIONS ABOUT TEST	9
3.3. MAXIMUM MEASUREMENT UNCERTAINTY	12
3.4. STANDARDS ENVIRONMENTAL TEST CONDITIONS	12
3.5. TEST DIAGRAMS	13
4. TEST EQUIPMENTS	15
5. TEST RESULT	16
5.1. RF OUTPUT POWER and PSD	16
5.2. PAPR	67
5.3. OCCUPIED BANDWIDTH	89
5.4. OUT-OF-BAND UNWANTED EMISSIONS	112
5.5. SPURIOUS UNWANTED EMISSIONS	143
5.6. RADIATED EMISSIONS	214
5.7. FREQUENCY STABILITY	218
6. Annex B_EUT AND TEST SETUP PHOTO	222

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(RF2217d)					
EUT Serial Number	ORU-RU-042					
Power Supply	-48 VDC					
Channel Bandwidth & Output Power	Band	Carrier	Bandwidth	Power		
	B2 LTE	1	5 MHz	0.125 W/path, Total: 0.25 W		
	B2 LTE	1	10 MHz	0.125 W/path, Total: 0.25 W		
	B2 LTE	1	15 MHz	0.125 W/path, Total: 0.25 W		
	B2 LTE	1	20 MHz	0.125 W/path, Total: 0.25 W		
	B5 LTE	1	5 MHz	0.125 W/path, Total: 0.25 W		
	B5 LTE	1	10 MHz	0.125 W/path, Total: 0.25 W		
	B2 LTE + B2 LTE	2	5 MHz + 5 MHz	0.125 W/path, Total: 0.25 W		
	B2 LTE + B2 LTE	2	15 MHz + 5 MHz	0.125 W/path, Total: 0.25 W		
	5G NR n2 + B2 LTE	2	5 MHz + 5 MHz	0.125 W/path, Total: 0.25 W		
5G NR n2 + B2 LTE	2	15 MHz + 5 MHz	0.125 W/path, Total: 0.25 W			
Frequency Range	Band 2 : 1930 ~ 1990 MHz Band 5 : 869 ~ 894 MHz					
Emission Designator	Mode	Bandwidth	Emission Designator			
			QPSK (G7D)	Conducted (W)	16/64/256 QAM (W7D)	Conducted (W)
	B2 LTE	5 MHz	4M51G7D	0.25	4M52W7D	0.25
	B2 LTE	10 MHz	9M00G7D	0.26	9M03W7D	0.26
	B2 LTE	15 MHz	13M5G7D	0.25	13M6W7D	0.25
	B2 LTE	20 MHz	18M0G7D	0.26	18M0W7D	0.25
	B5 LTE	5 MHz	4M51G7D	0.26	4M53W7D	0.27
	B5 LTE	10 MHz	9M03G7D	0.27	9M04W7D	0.27
	B2 LTE + B2 LTE (Contiguous)	5 MHz + 5 MHz	9M49G7D	0.25	9M51W7D	0.26
	B2 LTE + B2 LTE (Contiguous)	15 MHz + 5 MHz	19M0G7D	0.26	19M0W7D	0.26
	5G NR n2 + B2 LTE (Contiguous)	5 MHz + 5 MHz	9M50G7D	0.25	9M49W7D	0.26
	5G NR n2 + B2 LTE (Contiguous)	15 MHz + 5 MHz	19M3G7D	0.25	19M4W7D	0.25
	B2 LTE + B2 LTE (Non-Contiguous)	5 MHz + 5 MHz	9M01G7D	0.25	9M03W7D	0.25
	B2 LTE + B2 LTE (Non-Contiguous)	15 MHz + 5 MHz	18M0G7D	0.25	18M0W7D	0.25
	5G NR n2 + B2 LTE (Non-Contiguous)	5 MHz + 5 MHz	9M00G7D	0.25	9M01W7D	0.24
5G NR n2 + B2 LTE (Non-Contiguous)	15 MHz + 5 MHz	18M7G7D	0.24	18M7W7D	0.25	

Modulation Type	QPSK, 16QAM, 64QAM, 256QAM	
Antenna Specification	Antenna type: Integrated	
	Gain: Band 5 : 3.5 ± 1 dBi, Band 2 : 4.0 ± 1 dBi	
	Directional gain calculations for in-band measurements according to KDB 662911 D01 v02r01. Transmit signals in two ports are correlated and equal antenna gain in each bands respectively.	
	Directional gain	$G_{ANT} + 10 \log(N_{ANT})$ dBi
	Band 5	$4.5 \text{ dBi} + 10 \log(2) = 7.5 \text{ dBi}$
	Band 2	$5.0 \text{ dBi} + 10 \log(2) = 8.0 \text{ dBi}$

1.3. TEST INFORMATION

FCC Rule Parts	CFR 47 Part 2, Part 22, Part 24
Measurement standards	ANSI C63.26-2015, KDB 662911 D01 v02r01, KDB 971168 D01 v03r01
Place of Test	HCT CO., LTD. 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 April 02, 2018 (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."

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 22, Part 24

Description	Reference	Results
RF Output Power and PSD	§ 2.1046, § 22.913, § 24.232	Compliant
PAPR	§ 22.913(d), § 24.232(d)	Compliant
Occupied Bandwidth	§ 2.1049	Compliant
Out-of-band Unwanted Emissions	§ 2.1051, § 22.917, § 24.238	Compliant
Spurious Unwanted Emissions		Compliant
Radiated Emissions	§ 2.1053, § 22.917, § 24.238	Compliant
Frequency Stability	§ 2.1055, § 22.355, § 24.235	Compliant

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 LTE and 5G NR modulation types (QPSK, 16QAM, 64QAM, 256QAM) supported by the EUT have been tested.
- 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 performed for each LTE and NR 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 device was operating at 100% duty cycle.

- 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)
500	30.409	4 000	33.598
600	30.539	5 000	34.155
700	30.744	6 000	34.747
800	30.815	7 000	35.672
900	30.855	8 000	36.021
1 000	30.869	9 000	37.087
1 100	30.940	10 000	39.721
1 200	31.276	11 000	38.959
1 300	31.323	12 000	39.868
1 400	31.489	13 000	41.343
1 500	31.499	14 000	41.279
1 600	31.648	15 000	41.353
1 700	31.523	16 000	42.032
1 800	31.623	17 000	42.408
1 900	31.725	18 000	42.739
2 000	31.836	19 000	42.530
2 100	31.989	20 000	44.425
2 200	32.046	21 000	44.517
2 300	32.142	22 000	44.144
2 400	32.273	23 000	44.497
2 500	32.361	24 000	46.247
2 600	32.489	25 000	49.764
2 700	32.353	26 000	46.257
2 800	32.406	-	-
2 900	32.674	-	-
3 000	32.969	-	-

ANT1**Correction factor table**

Frequency (MHz)	Factor (dB)	Frequency (MHz)	Factor (dB)
500	30.494	4 000	33.593
600	30.622	5 000	34.127
700	30.836	6 000	34.691
800	30.897	7 000	35.599
900	30.933	8 000	35.850
1 000	30.953	9 000	36.931
1 100	31.070	10 000	39.694
1 200	31.401	11 000	39.201
1 300	31.446	12 000	39.884
1 400	31.628	13 000	41.817
1 500	31.633	14 000	40.749
1 600	31.769	15 000	40.529
1 700	31.660	16 000	41.728
1 800	31.760	17 000	41.104
1 900	31.859	18 000	42.201
2 000	31.971	19 000	41.170
2 100	32.084	20 000	43.137
2 200	32.161	21 000	43.402
2 300	32.257	22 000	45.137
2 400	32.292	23 000	43.489
2 500	32.385	24 000	46.028
2 600	32.490	25 000	47.221
2 700	32.384	26 000	44.850
2 800	32.415	-	-
2 900	32.661	-	-
3 000	32.983	-	-

3.3. MAXIMUM MEASUREMENT UNCERTAINTY

Description	Condition	Uncertainty
Radiated Disturbance	9 kHz ~ 30 MHz	± 3.40 dB
	30 MHz ~ 1 GHz	± 4.80 dB
	1 GHz ~ 18 GHz	± 5.70 dB
	18 GHz ~ 40 GHz	± 5.05 dB

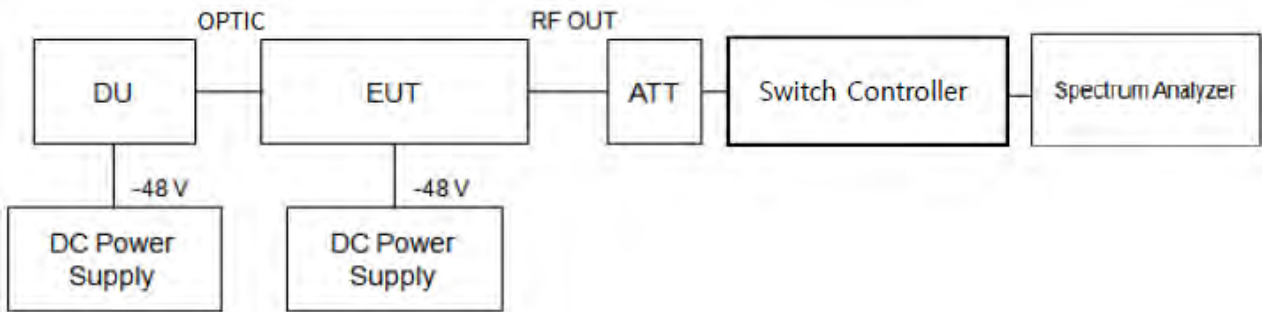
Coverage factor $k=2$, Confidence levels of 95 %

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

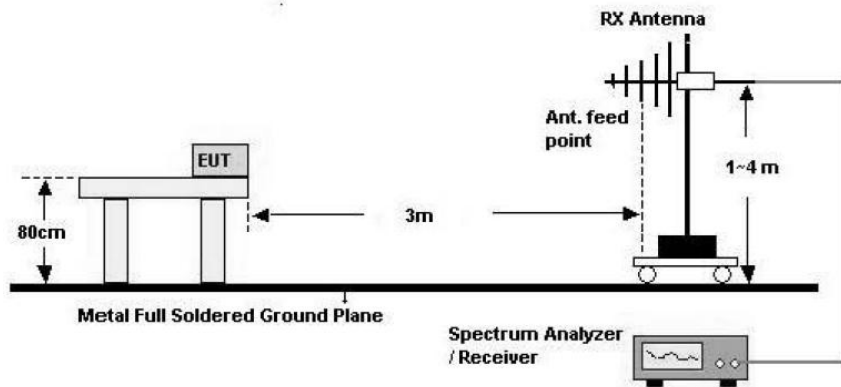
3.5. TEST DIAGRAMS

Conducted Test

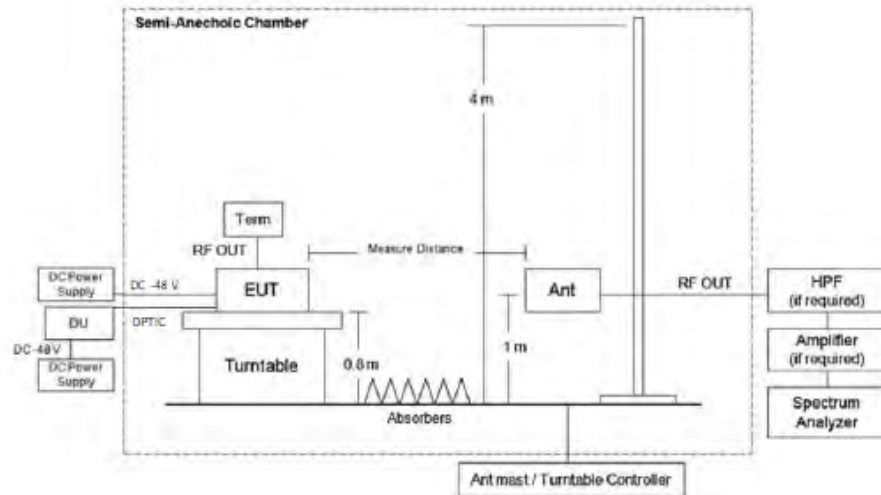


Radiated Test

30 MHz ~ 1 GHz

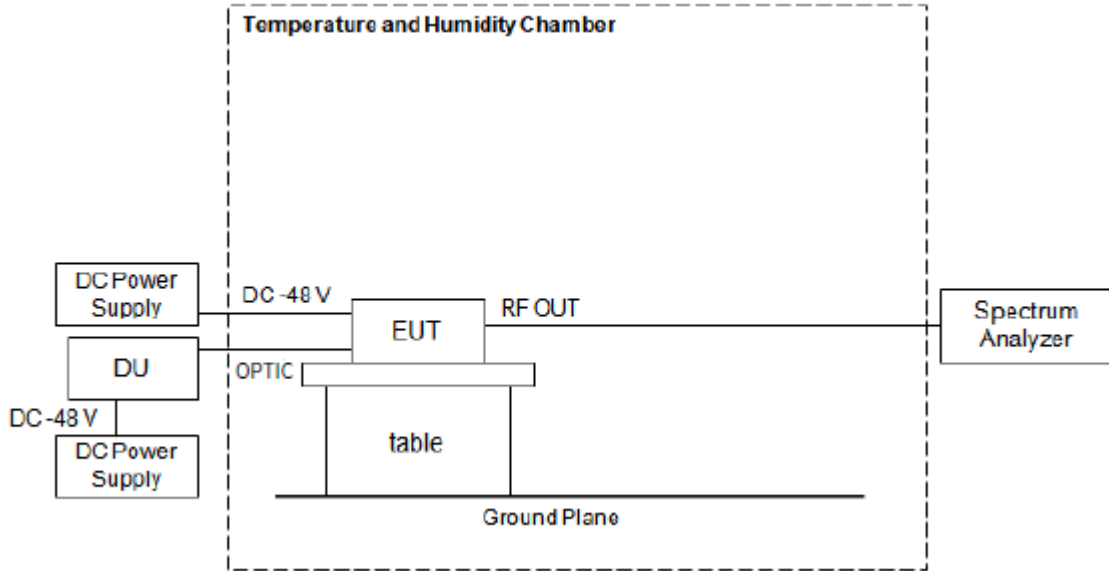


Above 1 GHz



※ 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
MXA Signal Analyzer	N9020A	Agilent	MY46471250	2022-08-11	Annual
PXA Signal Analyzer	N9030B	Keysight	MY55480110	2022-03-23	Annual
RF Switch System	TMX0132C	TNM system	TM20010001	N/A	N/A
30 dB Attenuator	WA93-30-33	Weinschel Associates	0137	2022-03-30	Annual
30 dB Attenuator	WA93-30-33	Weinschel Associates	0190	2022-03-30	Annual
30 dB Attenuator	67-30-33	Weinschel Associates	CL4337	2022-05-12	Annual
30 dB Attenuator	67-30-33	Weinschel Associates	CL4340	2022-05-12	Annual
DC Power Supply	PWR800L	KIKUSUI	RK000880	2022-07-20	Annual
DC Power Supply	PWR800L	KIKUSUI	LG003309	2022-05-28	Annual
Temperature and Humidity Chamber	NY-THR18750	NANGYEUL CO., LTD.	NY-200912201A	2022-01-14	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	2022-03-19	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	01039	2022-08-02	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	02296	2022-06-28	Biennial
Horn Antenna (15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170342	2022-10-13	Biennial
Spectrum Analyzer	FSP40	Rohde & Schwarz	100843	2022-11-08	Annual
HPF(3 ~ 18 GHz) + LNA(0.1 ~ 18 GHz)	FBSR-04C	TNM system	N/A	2022-09-16	Annual
Low Noise Amplifier	LLAU1183540Q	LTC Microwave	100	2022-09-16	Annual
High Pass Filter	WHKX10-900-1000-15000-40SS	Wainwright Instruments	16	2022-08-05	Annual
High Pass Filter	WHKX12-2805-3000-18000-40SS	Wainwright Instruments	45	2022-09-16	Annual
Power Amplifier	CBL18265035	CERNEX	22966	2022-12-02	Annual
Power Amplifier	CBL26405040	CERNEX	25956	2022-03-23	Annual

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.

§ 22.913 Effective radiated power limits.

Licensees in the Cellular Radiotelephone Service are subject to the effective radiated power (ERP) limits and other requirements in this Section. *See also* § 22.169.

- (a) *Maximum ERP.* The ERP of transmitters in the Cellular Radiotelephone Service must not exceed the limits in this section.
 - (1) Except as described in paragraphs (a)(2), (3), and (4) of this section, the ERP of base stations and repeaters must not exceed—
 - (i) 500 watts per emission; or
 - (ii) 400 watts/MHz (PSD) per sector.
 - (2) Except as described in paragraphs (a)(3) and (4) of this section, for systems operating in areas more than 72 kilometers (45 miles) from international borders that:
 - (i) Are located in counties with population densities of 100 persons or fewer per square mile, based upon the most recently available population statistics from the Bureau of the Census; or
 - (ii) Extend coverage into Unserved Area on a secondary basis (*see* § 22.949), the ERP of base transmitters and repeaters must not exceed—
 - (A) 1000 watts per emission; or
 - (B) 800 watts/MHz (PSD) per sector.
 - (3) Provided that they also comply with paragraphs (b) and (c) of this section, licensees are permitted to operate their base transmitters and repeaters with an ERP greater than 400 watts/MHz (PSD) per sector, up to a maximum ERP of 1000 watts/MHz (PSD) per sector unless they meet the conditions in paragraph (a)(4) of this section.

- (4) Provided that they also comply with paragraphs (b) and (c) of this section, licensees of systems operating in areas more than 72 kilometers (45 miles) from international borders that:
 - (i) Are located in counties with population densities of 100 persons or fewer per square mile, based upon the most recently available population statistics from the Bureau of the Census; or
 - (ii) Extend coverage into Unserved Area on a secondary basis (*see* § 22.949), are permitted to operate base transmitters and repeaters with an ERP greater than 800 watts/MHz (PSD) per sector, up to a maximum of 2000 watts/MHz (PSD) per sector.
- (5) The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.
- (d) *Power measurement.* Measurement of the ERP of Cellular base transmitters and repeaters must be made using an average power measurement technique. The peak-to-average ratio (PAR) of the transmission must not exceed 13 dB.

§ 24.232 Power and antenna height limits.

- (a) (1) Base stations with an emission bandwidth of 1 MHz or less are limited to 1640 watts equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph (b) below.
- (2) Base stations with an emission bandwidth greater than 1 MHz are limited to 1640 watts/MHz equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph (b) below.
- (3) Base station antenna heights may exceed 300 meters HAAT with a corresponding reduction in power; see Tables 1 and 2 of this section.
- (4) The service area boundary limit and microwave protection criteria specified in § 24.236 and 24.237 apply.

Table 1—Reduced Power for Base Station Antenna Heights Over 300 Meters, With Emission Bandwidth of 1 MHz or Less

HAAT in meters	Maximum EIRP watts
≤300	1640
≤500	1070
≤1000	490
≤1500	270
≤2000	160

Table 2—Reduced Power for Base Station Antenna Heights Over 300 Meters, With Emission Bandwidth Greater Than 1 MHz

HAAT in meters	Maximum EIRP watts/MHz
≤300	1640
≤500	1070
≤1000	490
≤1500	270
≤2000	160

- (b) (1) Base stations that are located in counties with population densities of 100 persons or fewer per square mile, based upon the most recently available population statistics from the Bureau of the Census, with an emission bandwidth of 1 MHz or less are limited to 3280 watts equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT.
- (2) Base stations that are located in counties with population densities of 100 persons or fewer per square mile, based upon the most recently available population statistics from the Bureau of the Census, with an emission bandwidth greater than 1 MHz are limited to 3280 watts/MHz equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT.
- (3) Base station antenna heights may exceed 300 meters HAAT with a corresponding reduction in power; see Tables 3 and 4 of this section.
- (4) The service area boundary limit and microwave protection criteria specified in § § 24.236 and 24.237 apply.
- (5) Operation under this paragraph (b) at power limits greater than permitted under paragraph (a) of this section must be coordinated in advance with all broadband PCS licensees authorized to operate on adjacent frequency blocks within 120 kilometers (75 miles) of the base station and is limited to base stations located more than 120 kilometers (75 miles) from the Canadian border and more than 75 kilometers (45 miles) from the Mexican border.

Table 3—Reduced Power for Base Station Antenna Heights Over 300 Meters, With Emission Bandwidth of 1 MHz or Less

HAAT in meters	Maximum EIRP watts
≤300	3280
≤500	2140
≤1000	980
≤1500	540
≤2000	320

Table 4—Reduced Power for Base Station Antenna Heights Over 300 Meters, With Emission Bandwidth Greater Than 1 MHz

HAAT in meters	Maximum EIRP watts/MHz
≤300	3280
≤500	2140
≤1000	980
≤1500	540
≤2000	320

- (c) Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.
- (d) 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 (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of § 24.51. 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.
- (e) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

Test Procedures:

The measurement is performed in accordance with Section 5.2.4.4.1 of ANSI C63.26.

The EUT is considered to transmit continuously if it can be configured to transmit at a burst duty cycle of greater than or equal to 98% throughout the duration of the measurement. If this condition can be achieved, then the following procedure can be used to measure the average output power of the EUT.

- 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 period)] for single sweep (automation-compatible) measurement. Transmission period is the on and off time of the transmitter.
- f) Detector = power averaging (rms).
- g) If the EUT can be configured to transmit continuously, then set the trigger to free run.
- h) If the EUT cannot be configured to transmit continuously, then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Verify that the sweep time is less than or equal to the transmission burst duration. Time gating can also be used under similar

constraints (i.e., configured such that measurement data is collected only during active full-power transmissions).

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

Note:

1. The conducted emission level is measured at each antenna port and then summed mathematically to determine the total emission level from the device.
2. Sum data is in a tolerance of specification provided from manufacturer.
3. Directional gain calculations for in-band measurements according to KDB 662911 D01 v02r01.
 - Transmit signals in two ports are correlated and equal antenna gain in each bands respectively.
Directional gain = $G_{ANT} + 10 \log(N_{ANT})$ dBi
Band 5: 4.5 dBi + 10 log(2) = 7.5 dBi
Band 2: 5.0 dBi + 10 log(2) = 8.0 dBi
4. MIMO E.I.R.P. PSD Sample Calculation
= Ant 0_Measured value + Ant 1_Measured value + directional gain = MIMO E.I.R.P. PSD
5. The results of the RF 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
B2 LTE 5 MHz 1 Carrier

Ant.	Mod	Ch	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
0	QPSK	Low	1932.50	20.73	0.12
		Middle	1960.00	20.88	0.12
		High	1987.50	20.77	0.12
	16QAM	Low	1932.50	20.67	0.12
		Middle	1960.00	20.84	0.12
		High	1987.50	20.83	0.12
	64QAM	Low	1932.50	20.73	0.12
		Middle	1960.00	20.79	0.12
		High	1987.50	20.89	0.12
	256QAM	Low	1932.50	20.60	0.11
		Middle	1960.00	20.76	0.12
		High	1987.50	20.85	0.12
1	QPSK	Low	1932.50	20.86	0.12
		Middle	1960.00	20.97	0.12
		High	1987.50	20.96	0.12
	16QAM	Low	1932.50	20.75	0.12
		Middle	1960.00	20.93	0.12
		High	1987.50	20.92	0.12
	64QAM	Low	1932.50	20.92	0.12
		Middle	1960.00	20.94	0.12
		High	1987.50	20.89	0.12
	256QAM	Low	1932.50	20.74	0.12
		Middle	1960.00	20.98	0.13
		High	1987.50	20.95	0.12

Sum Data of Port 0 and Port 1

Frequency (MHz)	Output Power(Conducted)			
	QPSK	16QAM	64QAM	256QAM
	W			
1932.50	0.24	0.24	0.24	0.23
1960.00	0.25	0.25	0.24	0.24
1987.50	0.24	0.24	0.25	0.25

B2 LTE 10 MHz 1 Carrier

Ant.	Mod	Ch	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
0	QPSK	Low	1935.00	20.76	0.12
		Middle	1960.00	21.12	0.13
		High	1985.00	20.97	0.13
	16QAM	Low	1935.00	20.83	0.12
		Middle	1960.00	21.03	0.13
		High	1985.00	20.92	0.12
	64QAM	Low	1935.00	20.70	0.12
		Middle	1960.00	20.94	0.12
		High	1985.00	20.91	0.12
	256QAM	Low	1935.00	20.77	0.12
		Middle	1960.00	21.04	0.13
		High	1985.00	20.95	0.12
1	QPSK	Low	1935.00	20.89	0.12
		Middle	1960.00	21.16	0.13
		High	1985.00	20.94	0.12
	16QAM	Low	1935.00	21.00	0.13
		Middle	1960.00	21.14	0.13
		High	1985.00	20.94	0.12
	64QAM	Low	1935.00	20.90	0.12
		Middle	1960.00	21.18	0.13
		High	1985.00	20.94	0.12
	256QAM	Low	1935.00	20.98	0.13
		Middle	1960.00	21.15	0.13
		High	1985.00	21.08	0.13

Sum Data of Port 0 and Port 1

Frequency (MHz)	Output Power(Conducted)			
	QPSK	16QAM	64QAM	256QAM
	W			
1935.00	0.24	0.25	0.24	0.24
1960.00	0.26	0.26	0.26	0.26
1985.00	0.25	0.25	0.25	0.25

B2 LTE 15 MHz 1 Carrier

Ant.	Mod	Ch	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
0	QPSK	Low	1937.50	20.88	0.12
		Middle	1960.00	20.95	0.12
		High	1982.50	20.93	0.12
	16QAM	Low	1937.50	20.93	0.12
		Middle	1960.00	20.96	0.12
		High	1982.50	20.98	0.13
	64QAM	Low	1937.50	20.87	0.12
		Middle	1960.00	20.97	0.12
		High	1982.50	20.95	0.12
	256QAM	Low	1937.50	20.86	0.12
		Middle	1960.00	20.97	0.13
		High	1982.50	20.95	0.12
1	QPSK	Low	1937.50	20.91	0.12
		Middle	1960.00	21.11	0.13
		High	1982.50	20.93	0.12
	16QAM	Low	1937.50	20.98	0.13
		Middle	1960.00	21.15	0.13
		High	1982.50	20.99	0.13
	64QAM	Low	1937.50	20.96	0.12
		Middle	1960.00	21.11	0.13
		High	1982.50	21.00	0.13
	256QAM	Low	1937.50	20.89	0.12
		Middle	1960.00	21.11	0.13
		High	1982.50	20.97	0.13

Sum Data of Port 0 and Port 1

Frequency (MHz)	Output Power(Conducted)			
	QPSK	16QAM	64QAM	256QAM
	W			
1937.50	0.25	0.25	0.25	0.24
1960.00	0.25	0.25	0.25	0.25
1982.50	0.25	0.25	0.25	0.25

B2 LTE 20 MHz 1 Carrier

Ant.	Mod	Ch	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
0	QPSK	Low	1940.00	20.87	0.12
		Middle	1960.00	21.01	0.13
		High	1980.00	20.87	0.12
	16QAM	Low	1940.00	20.82	0.12
		Middle	1960.00	20.97	0.13
		High	1980.00	20.97	0.12
	64QAM	Low	1940.00	20.83	0.12
		Middle	1960.00	20.96	0.12
		High	1980.00	20.83	0.12
	256QAM	Low	1940.00	20.85	0.12
		Middle	1960.00	21.00	0.13
		High	1980.00	20.92	0.12
1	QPSK	Low	1940.00	20.89	0.12
		Middle	1960.00	21.15	0.13
		High	1980.00	20.96	0.12
	16QAM	Low	1940.00	20.93	0.12
		Middle	1960.00	21.05	0.13
		High	1980.00	20.99	0.13
	64QAM	Low	1940.00	20.93	0.12
		Middle	1960.00	21.09	0.13
		High	1980.00	20.97	0.13
	256QAM	Low	1940.00	20.94	0.12
		Middle	1960.00	21.05	0.13
		High	1980.00	21.05	0.13

Sum Data of Port 0 and Port 1

Frequency (MHz)	Output Power(Conducted)			
	QPSK	16QAM	64QAM	256QAM
	W			
1940.00	0.25	0.24	0.25	0.25
1960.00	0.26	0.25	0.25	0.25
1980.00	0.25	0.25	0.25	0.25

B5 LTE 5 MHz 1 Carrier

Ant.	Mod	Ch	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
0	QPSK	Low	871.50	21.14	0.13
		Middle	881.50	21.08	0.13
		High	891.50	21.11	0.13
	16QAM	Low	871.50	21.19	0.13
		Middle	881.50	21.19	0.13
		High	891.50	21.15	0.13
	64QAM	Low	871.50	21.20	0.13
		Middle	881.50	21.06	0.13
		High	891.50	21.07	0.13
	256QAM	Low	871.50	21.14	0.13
		Middle	881.50	21.06	0.13
		High	891.50	21.09	0.13
1	QPSK	Low	871.50	21.26	0.13
		Middle	881.50	21.20	0.13
		High	891.50	21.23	0.13
	16QAM	Low	871.50	21.31	0.14
		Middle	881.50	21.24	0.13
		High	891.50	21.28	0.13
	64QAM	Low	871.50	21.24	0.13
		Middle	881.50	21.35	0.14
		High	891.50	21.21	0.13
	256QAM	Low	871.50	21.19	0.13
		Middle	881.50	21.24	0.13
		High	891.50	21.30	0.13

Sum Data of Port 0 and Port 1

Frequency (MHz)	Output Power(Conducted)			
	QPSK	16QAM	64QAM	256QAM
	W			
871.50	0.26	0.27	0.26	0.26
881.50	0.26	0.26	0.26	0.26
891.50	0.26	0.26	0.26	0.26

B5 LTE 10 MHz 1 Carrier

Ant.	Mod	Ch	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
0	QPSK	Low	874.00	21.24	0.13
		Middle	881.50	21.06	0.13
		High	889.00	21.18	0.13
	16QAM	Low	874.00	21.24	0.13
		Middle	881.50	21.12	0.13
		High	889.00	21.09	0.13
	64QAM	Low	874.00	21.26	0.13
		Middle	881.50	21.06	0.13
		High	889.00	21.10	0.13
	256QAM	Low	874.00	21.24	0.13
		Middle	881.50	21.10	0.13
		High	889.00	21.12	0.13
1	QPSK	Low	874.00	21.29	0.13
		Middle	881.50	21.33	0.14
		High	889.00	21.33	0.14
	16QAM	Low	874.00	21.19	0.13
		Middle	881.50	21.24	0.13
		High	889.00	21.24	0.13
	64QAM	Low	874.00	21.33	0.14
		Middle	881.50	21.32	0.14
		High	889.00	21.28	0.13
	256QAM	Low	874.00	21.22	0.13
		Middle	881.50	21.31	0.14
		High	889.00	21.31	0.14

Sum Data of Port 0 and Port 1

Frequency (MHz)	Output Power(Conducted)			
	QPSK	16QAM	64QAM	256QAM
	W			
874.00	0.27	0.26	0.27	0.27
881.50	0.26	0.26	0.26	0.26
889.00	0.27	0.26	0.26	0.26

Tabular Data of RF Contiguous output power

B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Mod	Ch	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
0	QPSK	Low	1935.00	20.82	0.12
		Middle	1960.00	20.98	0.13
		High	1985.00	20.95	0.12
	16QAM	Low	1935.00	20.78	0.12
		Middle	1960.00	21.06	0.13
		High	1985.00	20.97	0.13
	64QAM	Low	1935.00	20.78	0.12
		Middle	1960.00	20.96	0.12
		High	1985.00	20.95	0.12
	256QAM	Low	1935.00	20.74	0.12
		Middle	1960.00	20.97	0.13
		High	1985.00	20.91	0.12
1	QPSK	Low	1935.00	20.89	0.12
		Middle	1960.00	21.07	0.13
		High	1985.00	20.98	0.13
	16QAM	Low	1935.00	20.86	0.12
		Middle	1960.00	21.13	0.13
		High	1985.00	20.94	0.12
	64QAM	Low	1935.00	20.87	0.12
		Middle	1960.00	21.09	0.13
		High	1985.00	20.98	0.13
	256QAM	Low	1935.00	20.83	0.12
		Middle	1960.00	21.06	0.13
		High	1985.00	20.95	0.12

Sum Data of Port 0 and Port 1

Frequency (MHz)	Output Power(Conducted)			
	QPSK	16QAM	64QAM	256QAM
	W			
1935.00	0.24	0.24	0.24	0.24
1960.00	0.25	0.26	0.25	0.25
1985.00	0.25	0.25	0.25	0.25

B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Mod	Ch	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
0	QPSK	Low	1940.00	20.85	0.12
		Middle	1960.00	21.03	0.13
		High	1980.00	21.04	0.13
	16QAM	Low	1940.00	20.83	0.12
		Middle	1960.00	20.98	0.13
		High	1980.00	20.94	0.12
	64QAM	Low	1940.00	20.86	0.12
		Middle	1960.00	21.05	0.13
		High	1980.00	21.01	0.13
	256QAM	Low	1940.00	20.85	0.12
		Middle	1960.00	21.01	0.13
		High	1980.00	21.00	0.13
1	QPSK	Low	1940.00	20.90	0.12
		Middle	1960.00	21.14	0.13
		High	1980.00	20.98	0.13
	16QAM	Low	1940.00	20.95	0.12
		Middle	1960.00	21.11	0.13
		High	1980.00	21.03	0.13
	64QAM	Low	1940.00	20.91	0.12
		Middle	1960.00	21.11	0.13
		High	1980.00	21.03	0.13
	256QAM	Low	1940.00	20.96	0.12
		Middle	1960.00	21.10	0.13
		High	1980.00	21.03	0.13

Sum Data of Port 0 and Port 1

Frequency (MHz)	Output Power(Conducted)			
	QPSK	16QAM	64QAM	256QAM
	W			
1940.00	0.24	0.25	0.25	0.25
1960.00	0.26	0.25	0.26	0.26
1980.00	0.25	0.25	0.25	0.25

5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Mod	Ch	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
0	QPSK	Low	1935.00	20.75	0.12
		Middle	1960.00	20.96	0.12
		High	1985.00	20.91	0.12
	16QAM	Low	1935.00	20.75	0.12
		Middle	1960.00	20.97	0.13
		High	1985.00	20.91	0.12
	64QAM	Low	1935.00	20.74	0.12
		Middle	1960.00	20.96	0.12
		High	1985.00	20.89	0.12
	256QAM	Low	1935.00	20.80	0.12
		Middle	1960.00	20.99	0.13
		High	1985.00	20.85	0.12
1	QPSK	Low	1935.00	20.85	0.12
		Middle	1960.00	21.06	0.13
		High	1985.00	20.97	0.12
	16QAM	Low	1935.00	20.91	0.12
		Middle	1960.00	21.15	0.13
		High	1985.00	20.98	0.13
	64QAM	Low	1935.00	20.84	0.12
		Middle	1960.00	21.02	0.13
		High	1985.00	20.97	0.13
	256QAM	Low	1935.00	20.88	0.12
		Middle	1960.00	20.98	0.13
		High	1985.00	20.97	0.12

Sum Data of Port 0 and Port 1

Frequency (MHz)	Output Power(Conducted)			
	QPSK	16QAM	64QAM	256QAM
	W			
1935.00	0.24	0.24	0.24	0.24
1960.00	0.25	0.26	0.25	0.25
1985.00	0.25	0.25	0.25	0.25

5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Mod	Ch	Frequency (MHz)	Measured Value (dBm)	Calculated (W)
0	QPSK	Low	1940.00	20.74	0.12
		Middle	1960.00	20.89	0.12
		High	1980.00	20.86	0.12
	16QAM	Low	1940.00	20.72	0.12
		Middle	1960.00	20.90	0.12
		High	1980.00	20.89	0.12
	64QAM	Low	1940.00	20.75	0.12
		Middle	1960.00	20.86	0.12
		High	1980.00	20.91	0.12
	256QAM	Low	1940.00	20.70	0.12
		Middle	1960.00	20.89	0.12
		High	1980.00	20.94	0.12
1	QPSK	Low	1940.00	20.91	0.12
		Middle	1960.00	21.06	0.13
		High	1980.00	20.98	0.13
	16QAM	Low	1940.00	20.89	0.12
		Middle	1960.00	21.07	0.13
		High	1980.00	21.08	0.13
	64QAM	Low	1940.00	20.88	0.12
		Middle	1960.00	21.09	0.13
		High	1980.00	21.00	0.13
	256QAM	Low	1940.00	20.90	0.12
		Middle	1960.00	21.05	0.13
		High	1980.00	21.07	0.13

Sum Data of Port 0 and Port 1

Frequency (MHz)	Output Power(Conducted)			
	QPSK	16QAM	64QAM	256QAM
	W			
1940.00	0.24	0.24	0.24	0.24
1960.00	0.25	0.25	0.25	0.25
1980.00	0.25	0.25	0.25	0.25

Tabular Data of RF Non-Contiguous output power
B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Mod	B2 LTE 5 MHz		B2 LTE 5 MHz		Summation Value (dBm)	Calculated (W)
		Frequency (MHz)	Measured Value (dBm)	Frequency (MHz)	Measured Value (dBm)		
0	QPSK	1932.50	17.74	1987.50	17.87	20.82	0.12
	16QAM	1932.50	17.81	1987.50	17.94	20.89	0.12
	64QAM	1932.50	17.77	1987.50	17.99	20.89	0.12
	256QAM	1932.50	17.68	1987.50	17.91	20.80	0.12
1	QPSK	1932.50	17.81	1987.50	17.93	20.88	0.12
	16QAM	1932.50	18.09	1987.50	18.06	21.08	0.13
	64QAM	1932.50	17.94	1987.50	18.02	20.99	0.13
	256QAM	1932.50	17.93	1987.50	18.01	20.98	0.13

Sum Data of Port 0 and Port 1

Frequency (MHz)	Output Power(Conducted)			
	QPSK	16QAM	64QAM	256QAM
	W			
1932.50 + 1987.50	0.25	0.25	0.25	0.25

B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Mod	B2 LTE 15 MHz		B2 LTE 5 MHz		Summation Value (dBm)	Calculated (W)
		Frequency (MHz)	Measured Value (dBm)	Frequency (MHz)	Measured Value (dBm)		
0	QPSK	1937.50	19.63	1987.50	14.94	20.90	0.12
	16QAM	1937.50	19.42	1987.50	15.24	20.82	0.12
	64QAM	1937.50	19.68	1987.50	15.04	20.96	0.12
	256QAM	1937.50	19.57	1987.50	14.94	20.86	0.12
1	QPSK	1937.50	19.68	1987.50	14.92	20.93	0.12
	16QAM	1937.50	19.47	1987.50	15.13	20.83	0.12
	64QAM	1937.50	19.69	1987.50	14.85	20.92	0.12
	256QAM	1937.50	19.63	1987.50	14.82	20.87	0.12

Sum Data of Port 0 and Port 1

Frequency (MHz)	Output Power(Conducted)			
	QPSK	16QAM	64QAM	256QAM
	W			
1937.50 + 1987.50	0.25	0.24	0.25	0.25

5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Mod	5G NR n2 5 MHz		B2 LTE 5 MHz		Summation Value (dBm)	Calculated (W)
		Frequency (MHz)	Measured Value (dBm)	Frequency (MHz)	Measured Value (dBm)		
0	QPSK	1932.50	17.74	1987.50	17.94	20.85	0.12
	16QAM	1932.50	17.74	1987.50	17.75	20.75	0.12
	64QAM	1932.50	17.65	1987.50	17.91	20.79	0.12
	256QAM	1932.50	17.61	1987.50	17.86	20.75	0.12
1	QPSK	1932.50	17.89	1987.50	17.88	20.90	0.12
	16QAM	1932.50	17.90	1987.50	17.95	20.93	0.12
	64QAM	1932.50	17.83	1987.50	17.94	20.90	0.12
	256QAM	1932.50	17.87	1987.50	17.95	20.92	0.12

Sum Data of Port 0 and Port 1

Frequency (MHz)	Output Power(Conducted)			
	QPSK	16QAM	64QAM	256QAM
	W			
1932.50 + 1987.50	0.25	0.24	0.24	0.24

5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Mod	5G NR n2 15 MHz		B2 LTE 5 MHz		Summation Value (dBm)	Calculated (W)
		Frequency (MHz)	Measured Value (dBm)	Frequency (MHz)	Measured Value (dBm)		
0	QPSK	1937.50	19.48	1987.50	14.83	20.76	0.12
	16QAM	1937.50	19.51	1987.50	14.71	20.75	0.12
	64QAM	1937.50	19.50	1987.50	14.91	20.80	0.12
	256QAM	1937.50	19.52	1987.50	14.86	20.80	0.12
1	QPSK	1937.50	19.67	1987.50	14.90	20.92	0.12
	16QAM	1937.50	19.73	1987.50	14.96	20.98	0.13
	64QAM	1937.50	19.69	1987.50	14.91	20.94	0.12
	256QAM	1937.50	19.67	1987.50	14.89	20.92	0.12

Sum Data of Port 0 and Port 1

Frequency (MHz)	Output Power(Conducted)			
	QPSK	16QAM	64QAM	256QAM
	W			
1937.50 + 1987.50	0.24	0.25	0.25	0.25

Plot Data of RF Output Power

Antenna 1 / B2 LTE 5 MHz 1 Carrier / 256QAM / Middle



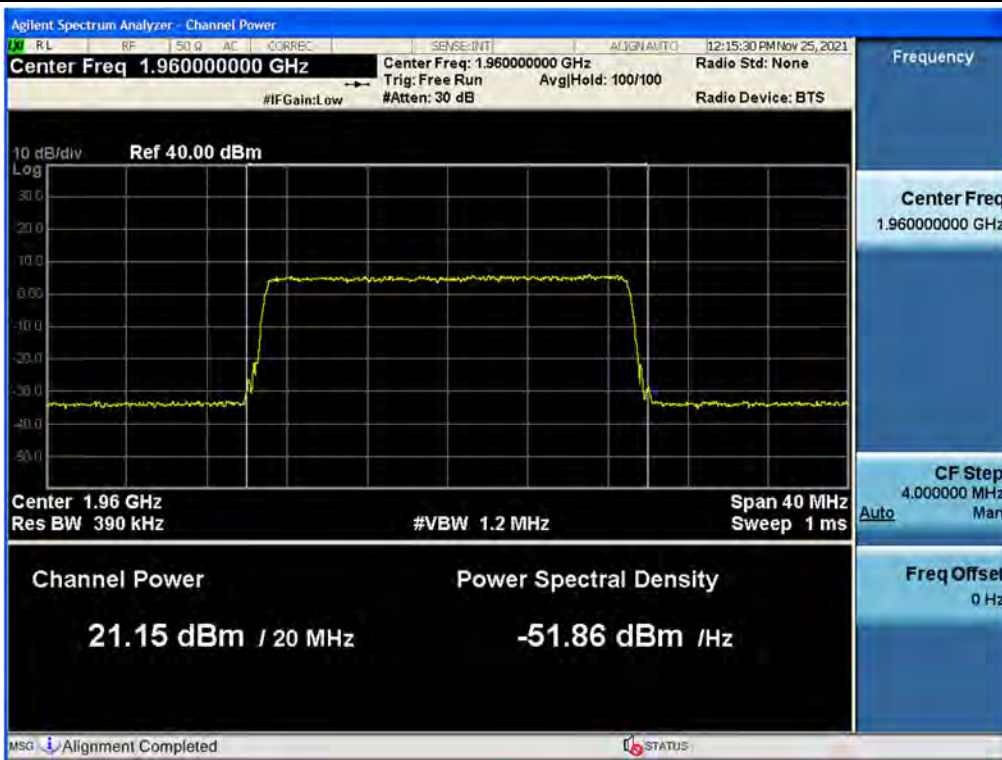
Antenna 1 / B2 LTE 10 MHz 1 Carrier / 64QAM / Middle



Antenna 1 / B2 LTE 15 MHz 1 Carrier / 16QAM / Middle



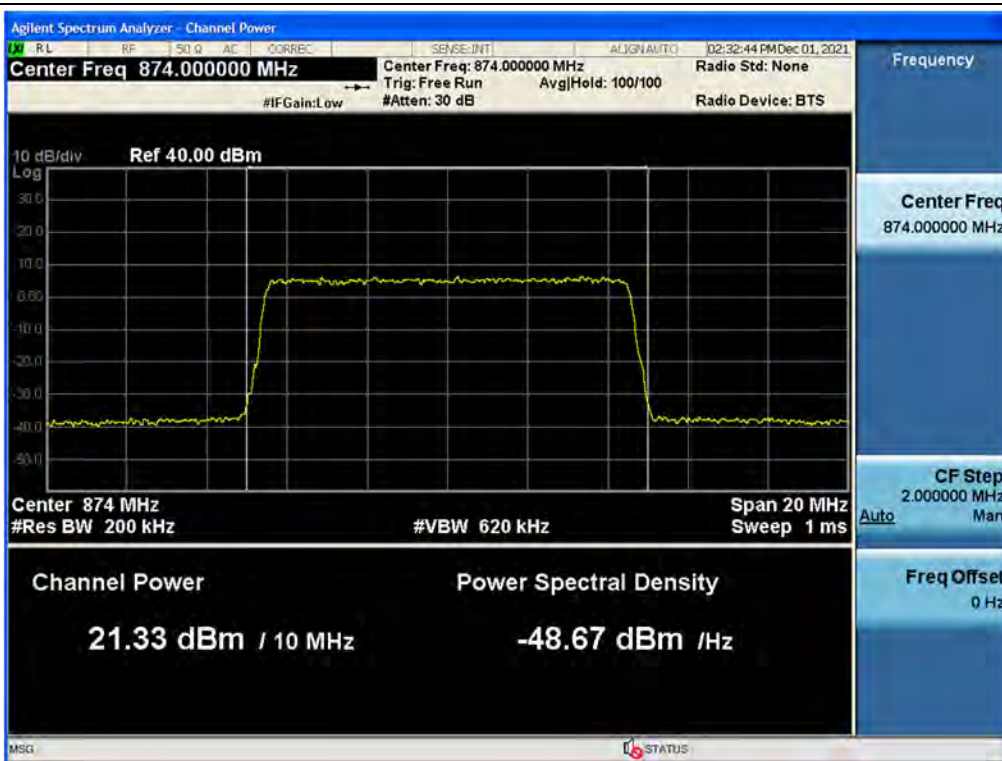
Antenna 1 / B2 LTE 20 MHz 1 Carrier / QPSK / Middle



Antenna 1 / B5 LTE 5 MHz 1 Carrier / 64QAM / Middle



Antenna 1 / B5 LTE 10 MHz 1 Carrier / 64QAM / Low



Antenna 1 / B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / 16QAM / Middle

Antenna 1 / B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / QPSK / Middle


Antenna 1 / 5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / 16QAM / Middle



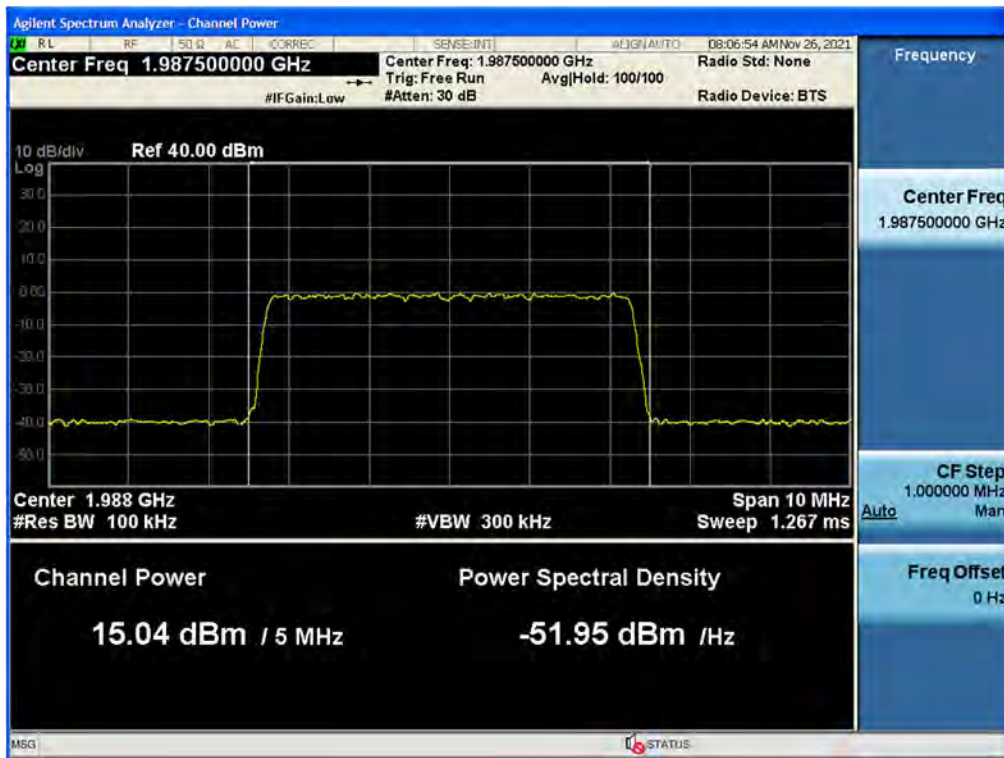
Antenna 1 / 5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / 64QAM / Middle



Antenna 1 / B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / B2 LTE 5 MHz / 16QAM / Low

Antenna 1 / B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / B2 LTE 5 MHz / 16QAM / High


Antenna 0 / B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / B2 LTE 15 MHz / 64QAM / Low

Antenna 0 / B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / B2 LTE 5 MHz / 64QAM / High


Antenna 1 / 5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 5G NR n2 5 MHz / QPSK / Low

Antenna 1 / 5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 5G NR n2 5 MHz / QPSK / High


Antenna 1 / 5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 5G NR n2 15 MHz / 16QAM / Low



Antenna 1 / 5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 5G NR n2 5 MHz / 16QAM / High



Tabular Data of PSD

B2 LTE 5 MHz 1 Carrier

Ant.	Mod	Ch	Frequency (MHz)	Measured Value (dBm/MHz)	Ant. Gain (dBi)	E.I.R.P. (dBm/MHz)	Calculated (W/MHz)	Limit (W/MHz)
0	QPSK	Low	1932.50	15.23	8.00	23.23	0.21	1640
		Middle	1960.00	15.39	8.00	23.39	0.22	
		High	1987.50	15.27	8.00	23.27	0.21	
	16QAM	Low	1932.50	15.40	8.00	23.40	0.22	
		Middle	1960.00	15.48	8.00	23.48	0.22	
		High	1987.50	15.73	8.00	23.73	0.24	
	64QAM	Low	1932.50	15.22	8.00	23.22	0.21	
		Middle	1960.00	15.23	8.00	23.23	0.21	
		High	1987.50	15.28	8.00	23.28	0.21	
	256QAM	Low	1932.50	15.26	8.00	23.26	0.21	
		Middle	1960.00	15.16	8.00	23.16	0.21	
		High	1987.50	15.34	8.00	23.34	0.22	
1	QPSK	Low	1932.50	15.51	8.00	23.51	0.22	
		Middle	1960.00	15.55	8.00	23.55	0.23	
		High	1987.50	15.43	8.00	23.43	0.22	
	16QAM	Low	1932.50	15.58	8.00	23.58	0.23	
		Middle	1960.00	15.74	8.00	23.74	0.24	
		High	1987.50	15.69	8.00	23.69	0.23	
	64QAM	Low	1932.50	15.49	8.00	23.49	0.22	
		Middle	1960.00	15.46	8.00	23.46	0.22	
		High	1987.50	15.60	8.00	23.60	0.23	
	256QAM	Low	1932.50	15.29	8.00	23.29	0.21	
		Middle	1960.00	15.45	8.00	23.45	0.22	
		High	1987.50	15.48	8.00	23.48	0.22	

Sum Data of Port 0 and Port 1

Frequency (MHz)	PSD				Limit
	QPSK	16QAM	64QAM	256QAM	
	W/MHz				
1932.50	0.43	0.45	0.43	0.43	1640
1960.00	0.44	0.46	0.43	0.43	
1987.50	0.43	0.47	0.44	0.44	

B2 LTE 10 MHz 1 Carrier

Ant.	Mod	Ch	Frequency (MHz)	Measured Value (dBm/MHz)	Ant. Gain (dBi)	E.I.R.P. (dBm/MHz)	Calculated (W/MHz)	Limit (W/MHz)
0	QPSK	Low	1935.00	12.39	8.00	20.39	0.11	1640
		Middle	1960.00	12.62	8.00	20.62	0.12	
		High	1985.00	12.40	8.00	20.40	0.11	
	16QAM	Low	1935.00	12.63	8.00	20.63	0.12	
		Middle	1960.00	12.98	8.00	20.98	0.13	
		High	1985.00	12.69	8.00	20.69	0.12	
	64QAM	Low	1935.00	12.34	8.00	20.34	0.11	
		Middle	1960.00	12.72	8.00	20.72	0.12	
		High	1985.00	12.56	8.00	20.56	0.11	
	256QAM	Low	1935.00	12.57	8.00	20.57	0.11	
		Middle	1960.00	12.60	8.00	20.60	0.11	
		High	1985.00	12.63	8.00	20.63	0.12	
1	QPSK	Low	1935.00	12.43	8.00	20.43	0.11	
		Middle	1960.00	12.74	8.00	20.74	0.12	
		High	1985.00	12.66	8.00	20.66	0.12	
	16QAM	Low	1935.00	12.89	8.00	20.89	0.12	
		Middle	1960.00	12.95	8.00	20.95	0.12	
		High	1985.00	12.61	8.00	20.61	0.12	
	64QAM	Low	1935.00	12.54	8.00	20.54	0.11	
		Middle	1960.00	13.04	8.00	21.04	0.13	
		High	1985.00	12.48	8.00	20.48	0.11	
256QAM	Low	1935.00	12.67	8.00	20.67	0.12		
	Middle	1960.00	12.89	8.00	20.89	0.12		
	High	1985.00	12.53	8.00	20.53	0.11		

Sum Data of Port 0 and Port 1

Frequency (MHz)	PSD				Limit
	QPSK	16QAM	64QAM	256QAM	
	W/MHz				
1935.00	0.22	0.24	0.22	0.23	1640
1960.00	0.23	0.25	0.25	0.24	
1985.00	0.23	0.23	0.23	0.23	

B2 LTE 15 MHz 1 Carrier

Ant.	Mod	Ch	Frequency (MHz)	Measured Value (dBm/MHz)	Ant. Gain (dBi)	E.I.R.P. (dBm/MHz)	Calculated (W/MHz)	Limit (W/MHz)
0	QPSK	Low	1937.50	10.59	8.00	18.59	0.07	1640
		Middle	1960.00	10.83	8.00	18.83	0.08	
		High	1982.50	10.74	8.00	18.74	0.07	
	16QAM	Low	1937.50	11.45	8.00	19.45	0.09	
		Middle	1960.00	11.41	8.00	19.41	0.09	
		High	1982.50	11.15	8.00	19.15	0.08	
	64QAM	Low	1937.50	10.74	8.00	18.74	0.07	
		Middle	1960.00	10.88	8.00	18.88	0.08	
		High	1982.50	11.16	8.00	19.16	0.08	
	256QAM	Low	1937.50	10.59	8.00	18.59	0.07	
		Middle	1960.00	10.86	8.00	18.86	0.08	
		High	1982.50	10.69	8.00	18.69	0.07	
1	QPSK	Low	1937.50	10.62	8.00	18.62	0.07	
		Middle	1960.00	11.06	8.00	19.06	0.08	
		High	1982.50	10.73	8.00	18.73	0.07	
	16QAM	Low	1937.50	11.20	8.00	19.20	0.08	
		Middle	1960.00	11.39	8.00	19.39	0.09	
		High	1982.50	11.70	8.00	19.70	0.09	
	64QAM	Low	1937.50	10.51	8.00	18.51	0.07	
		Middle	1960.00	10.86	8.00	18.86	0.08	
		High	1982.50	11.02	8.00	19.02	0.08	
256QAM	Low	1937.50	10.84	8.00	18.84	0.08		
	Middle	1960.00	11.07	8.00	19.07	0.08		
	High	1982.50	11.19	8.00	19.19	0.08		

Sum Data of Port 0 and Port 1

Frequency (MHz)	PSD				Limit
	QPSK	16QAM	64QAM	256QAM	
	W/MHz				
1937.50	0.14	0.17	0.15	0.15	1640
1960.00	0.16	0.17	0.15	0.16	
1982.50	0.15	0.18	0.16	0.16	

B2 LTE 20 MHz 1 Carrier

Ant.	Mod	Ch	Frequency (MHz)	Measured Value (dBm/MHz)	Ant. Gain (dBi)	E.I.R.P. (dBm/MHz)	Calculated (W/MHz)	Limit (W/MHz)
0	QPSK	Low	1940.00	9.67	8.00	17.67	0.06	1640
		Middle	1960.00	9.47	8.00	17.47	0.06	
		High	1980.00	9.46	8.00	17.46	0.06	
	16QAM	Low	1940.00	9.40	8.00	17.40	0.05	
		Middle	1960.00	9.71	8.00	17.71	0.06	
		High	1980.00	9.74	8.00	17.74	0.06	
	64QAM	Low	1940.00	9.35	8.00	17.35	0.05	
		Middle	1960.00	9.34	8.00	17.34	0.05	
		High	1980.00	9.45	8.00	17.45	0.06	
	256QAM	Low	1940.00	9.73	8.00	17.73	0.06	
		Middle	1960.00	9.55	8.00	17.55	0.06	
		High	1980.00	9.56	8.00	17.56	0.06	
1	QPSK	Low	1940.00	9.64	8.00	17.64	0.06	
		Middle	1960.00	9.80	8.00	17.80	0.06	
		High	1980.00	9.61	8.00	17.61	0.06	
	16QAM	Low	1940.00	9.91	8.00	17.91	0.06	
		Middle	1960.00	9.98	8.00	17.98	0.06	
		High	1980.00	9.76	8.00	17.76	0.06	
	64QAM	Low	1940.00	9.68	8.00	17.68	0.06	
		Middle	1960.00	9.71	8.00	17.71	0.06	
		High	1980.00	9.55	8.00	17.55	0.06	
256QAM	Low	1940.00	9.74	8.00	17.74	0.06		
	Middle	1960.00	9.79	8.00	17.79	0.06		
	High	1980.00	9.93	8.00	17.93	0.06		

Sum Data of Port 0 and Port 1

Frequency (MHz)	PSD				Limit
	QPSK	16QAM	64QAM	256QAM	
	W/MHz				
1940.00	0.12	0.12	0.11	0.12	1640
1960.00	0.12	0.12	0.11	0.12	
1980.00	0.11	0.12	0.11	0.12	

B5 LTE 5 MHz 1 Carrier

Ant.	Mod	Ch	Frequency (MHz)	Measured Value (dBm/MHz)	Ant. Gain (dBi)	E.R.P. (dBm/MHz)	Calculated (W/MHz)	Limit (W/MHz)
0	QPSK	Low	871.50	15.61	7.50	20.96	0.12	1640
		Middle	881.50	15.99	7.50	21.34	0.14	
		High	891.50	15.83	7.50	21.18	0.13	
	16QAM	Low	871.50	16.16	7.50	21.51	0.14	
		Middle	881.50	15.93	7.50	21.28	0.13	
		High	891.50	15.92	7.50	21.27	0.13	
	64QAM	Low	871.50	15.77	7.50	21.12	0.13	
		Middle	881.50	15.56	7.50	20.91	0.12	
		High	891.50	15.65	7.50	21.00	0.13	
	256QAM	Low	871.50	15.77	7.50	21.12	0.13	
		Middle	881.50	15.62	7.50	20.97	0.13	
		High	891.50	15.62	7.50	20.97	0.13	
1	QPSK	Low	871.50	15.71	7.50	21.06	0.13	
		Middle	881.50	15.82	7.50	21.17	0.13	
		High	891.50	15.77	7.50	21.12	0.13	
	16QAM	Low	871.50	15.97	7.50	21.32	0.14	
		Middle	881.50	16.03	7.50	21.38	0.14	
		High	891.50	16.04	7.50	21.39	0.14	
	64QAM	Low	871.50	15.63	7.50	20.98	0.13	
		Middle	881.50	15.73	7.50	21.08	0.13	
		High	891.50	15.61	7.50	20.96	0.12	
256QAM	Low	871.50	15.66	7.50	21.01	0.13		
	Middle	881.50	15.65	7.50	21.00	0.13		
	High	891.50	15.71	7.50	21.06	0.13		

Sum Data of Port 0 and Port 1

Frequency (MHz)	PSD				Limit
	QPSK	16QAM	64QAM	256QAM	
	W/MHz				
871.50	0.25	0.28	0.25	0.26	1640
881.50	0.27	0.27	0.25	0.25	
891.50	0.26	0.27	0.25	0.25	

B5 LTE 10 MHz 1 Carrier

Ant.	Mod	Ch	Frequency (MHz)	Measured Value (dBm/MHz)	Ant. Gain (dBi)	E.R.P. (dBm/MHz)	Calculated (W/MHz)	Limit (W/MHz)
0	QPSK	Low	874.00	12.78	7.50	18.13	0.06	1640
		Middle	881.50	12.58	7.50	17.93	0.06	
		High	889.00	12.87	7.50	18.22	0.07	
	16QAM	Low	874.00	13.22	7.50	18.57	0.07	
		Middle	881.50	13.02	7.50	18.37	0.07	
		High	889.00	13.09	7.50	18.44	0.07	
	64QAM	Low	874.00	12.74	7.50	18.09	0.06	
		Middle	881.50	12.66	7.50	18.01	0.06	
		High	889.00	12.81	7.50	18.16	0.07	
	256QAM	Low	874.00	12.81	7.50	18.16	0.07	
		Middle	881.50	12.47	7.50	17.82	0.06	
		High	889.00	12.61	7.50	17.96	0.06	
1	QPSK	Low	874.00	12.89	7.50	18.24	0.07	
		Middle	881.50	12.75	7.50	18.10	0.06	
		High	889.00	12.84	7.50	18.19	0.07	
	16QAM	Low	874.00	13.15	7.50	18.50	0.07	
		Middle	881.50	13.08	7.50	18.43	0.07	
		High	889.00	13.01	7.50	18.36	0.07	
	64QAM	Low	874.00	12.92	7.50	18.27	0.07	
		Middle	881.50	12.68	7.50	18.03	0.06	
		High	889.00	12.75	7.50	18.10	0.06	
256QAM	Low	874.00	12.89	7.50	18.24	0.07		
	Middle	881.50	12.88	7.50	18.23	0.07		
	High	889.00	12.83	7.50	18.18	0.07		

Sum Data of Port 0 and Port 1

Frequency (MHz)	PSD				Limit
	QPSK	16QAM	64QAM	256QAM	
	W/MHz				
874.00	0.13	0.14	0.13	0.13	1640
881.50	0.13	0.14	0.13	0.13	
889.00	0.13	0.14	0.13	0.13	

Tabular Data of Contiguous PSD
B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Mod	Ch	Frequency (MHz)	Measured Value (dBm/MHz)	Ant. Gain (dBi)	E.I.R.P. (dBm/MHz)	Calculated (W/MHz)	Limit (W/MHz)
0	QPSK	Low	1935.00	12.26	8.00	20.26	0.11	1640
		Middle	1960.00	12.45	8.00	20.45	0.11	
		High	1985.00	12.41	8.00	20.41	0.11	
	16QAM	Low	1935.00	12.51	8.00	20.51	0.11	
		Middle	1960.00	12.70	8.00	20.70	0.12	
		High	1985.00	12.67	8.00	20.67	0.12	
	64QAM	Low	1935.00	12.35	8.00	20.35	0.11	
		Middle	1960.00	12.47	8.00	20.47	0.11	
		High	1985.00	12.40	8.00	20.40	0.11	
	256QAM	Low	1935.00	12.20	8.00	20.20	0.10	
		Middle	1960.00	12.27	8.00	20.27	0.11	
		High	1985.00	12.47	8.00	20.47	0.11	
1	QPSK	Low	1935.00	12.40	8.00	20.40	0.11	
		Middle	1960.00	12.69	8.00	20.69	0.12	
		High	1985.00	12.40	8.00	20.40	0.11	
	16QAM	Low	1935.00	12.46	8.00	20.46	0.11	
		Middle	1960.00	12.84	8.00	20.84	0.12	
		High	1985.00	12.81	8.00	20.81	0.12	
	64QAM	Low	1935.00	12.36	8.00	20.36	0.11	
		Middle	1960.00	12.60	8.00	20.60	0.11	
		High	1985.00	12.51	8.00	20.51	0.11	
	256QAM	Low	1935.00	12.44	8.00	20.44	0.11	
		Middle	1960.00	12.54	8.00	20.54	0.11	
		High	1985.00	12.60	8.00	20.60	0.11	

Sum Data of Port 0 and Port 1

Frequency (MHz)	PSD				Limit
	QPSK	16QAM	64QAM	256QAM	
	W/MHz				
1935.00	0.22	0.22	0.22	0.22	1640
1960.00	0.23	0.24	0.23	0.22	
1985.00	0.22	0.24	0.22	0.23	

B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Mod	Ch	Frequency (MHz)	Measured Value (dBm/MHz)	Ant. Gain (dBi)	E.I.R.P. (dBm/MHz)	Calculated (W/MHz)	Limit (W/MHz)
0	QPSK	Low	1940.00	9.36	8.00	17.36	0.05	1640
		Middle	1960.00	9.55	8.00	17.55	0.06	
		High	1980.00	9.58	8.00	17.58	0.06	
	16QAM	Low	1940.00	10.01	8.00	18.01	0.06	
		Middle	1960.00	9.99	8.00	17.99	0.06	
		High	1980.00	10.27	8.00	18.27	0.07	
	64QAM	Low	1940.00	9.59	8.00	17.59	0.06	
		Middle	1960.00	9.60	8.00	17.60	0.06	
		High	1980.00	9.61	8.00	17.61	0.06	
	256QAM	Low	1940.00	9.46	8.00	17.46	0.06	
		Middle	1960.00	9.49	8.00	17.49	0.06	
		High	1980.00	9.57	8.00	17.57	0.06	
1	QPSK	Low	1940.00	9.45	8.00	17.45	0.06	
		Middle	1960.00	9.65	8.00	17.65	0.06	
		High	1980.00	9.52	8.00	17.52	0.06	
	16QAM	Low	1940.00	10.38	8.00	18.38	0.07	
		Middle	1960.00	10.03	8.00	18.03	0.06	
		High	1980.00	10.07	8.00	18.07	0.06	
	64QAM	Low	1940.00	9.53	8.00	17.53	0.06	
		Middle	1960.00	9.68	8.00	17.68	0.06	
		High	1980.00	9.74	8.00	17.74	0.06	
	256QAM	Low	1940.00	9.62	8.00	17.62	0.06	
		Middle	1960.00	9.93	8.00	17.93	0.06	
		High	1980.00	9.76	8.00	17.76	0.06	

Sum Data of Port 0 and Port 1

Frequency (MHz)	PSD				Limit
	QPSK	16QAM	64QAM	256QAM	
	W/MHz				
1940.00	0.11	0.13	0.11	0.11	1640
1960.00	0.12	0.13	0.12	0.12	
1980.00	0.11	0.13	0.12	0.12	

5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Mod	Ch	Frequency (MHz)	Measured Value (dBm/MHz)	Ant. Gain (dBi)	E.I.R.P. (dBm/MHz)	Calculated (W/MHz)	Limit (W/MHz)
0	QPSK	Low	1935.00	12.18	8.00	20.18	0.10	1640
		Middle	1960.00	12.41	8.00	20.41	0.11	
		High	1985.00	12.71	8.00	20.71	0.12	
	16QAM	Low	1935.00	12.46	8.00	20.46	0.11	
		Middle	1960.00	12.87	8.00	20.87	0.12	
		High	1985.00	12.46	8.00	20.46	0.11	
	64QAM	Low	1935.00	12.51	8.00	20.51	0.11	
		Middle	1960.00	12.47	8.00	20.47	0.11	
		High	1985.00	12.40	8.00	20.40	0.11	
	256QAM	Low	1935.00	12.36	8.00	20.36	0.11	
		Middle	1960.00	12.52	8.00	20.52	0.11	
		High	1985.00	12.41	8.00	20.41	0.11	
1	QPSK	Low	1935.00	12.47	8.00	20.47	0.11	
		Middle	1960.00	12.75	8.00	20.75	0.12	
		High	1985.00	12.71	8.00	20.71	0.12	
	16QAM	Low	1935.00	12.82	8.00	20.82	0.12	
		Middle	1960.00	12.83	8.00	20.83	0.12	
		High	1985.00	12.85	8.00	20.85	0.12	
	64QAM	Low	1935.00	12.51	8.00	20.51	0.11	
		Middle	1960.00	12.60	8.00	20.60	0.11	
		High	1985.00	12.53	8.00	20.53	0.11	
256QAM	Low	1935.00	12.35	8.00	20.35	0.11		
	Middle	1960.00	12.89	8.00	20.89	0.12		
	High	1985.00	12.51	8.00	20.51	0.11		

Sum Data of Port 0 and Port 1

Frequency (MHz)	PSD				Limit
	QPSK	16QAM	64QAM	256QAM	
	W/MHz				
1935.00	0.22	0.23	0.22	0.22	1640
1960.00	0.23	0.24	0.23	0.24	
1985.00	0.24	0.23	0.22	0.22	

5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Mod	Ch	Frequency (MHz)	Measured Value (dBm/MHz)	Ant. Gain (dBi)	E.I.R.P. (dBm/MHz)	Calculated (W/MHz)	Limit (W/MHz)
0	QPSK	Low	1940.00	9.05	8.00	17.05	0.05	1640
		Middle	1960.00	9.41	8.00	17.41	0.06	
		High	1980.00	9.24	8.00	17.24	0.05	
	16QAM	Low	1940.00	10.58	8.00	18.58	0.07	
		Middle	1960.00	10.79	8.00	18.79	0.08	
		High	1980.00	10.81	8.00	18.81	0.08	
	64QAM	Low	1940.00	9.07	8.00	17.07	0.05	
		Middle	1960.00	9.22	8.00	17.22	0.05	
		High	1980.00	9.22	8.00	17.22	0.05	
	256QAM	Low	1940.00	9.29	8.00	17.29	0.05	
		Middle	1960.00	9.26	8.00	17.26	0.05	
		High	1980.00	9.16	8.00	17.16	0.05	
1	QPSK	Low	1940.00	9.44	8.00	17.44	0.06	
		Middle	1960.00	9.55	8.00	17.55	0.06	
		High	1980.00	9.25	8.00	17.25	0.05	
	16QAM	Low	1940.00	10.82	8.00	18.82	0.08	
		Middle	1960.00	10.77	8.00	18.77	0.08	
		High	1980.00	10.68	8.00	18.68	0.07	
	64QAM	Low	1940.00	9.36	8.00	17.36	0.05	
		Middle	1960.00	9.58	8.00	17.58	0.06	
		High	1980.00	9.49	8.00	17.49	0.06	
	256QAM	Low	1940.00	9.40	8.00	17.40	0.05	
		Middle	1960.00	9.55	8.00	17.55	0.06	
		High	1980.00	9.41	8.00	17.41	0.06	

Sum Data of Port 0 and Port 1

Frequency (MHz)	PSD				Limit
	QPSK	16QAM	64QAM	256QAM	
	W/MHz				
1940.00	0.11	0.15	0.11	0.11	1640
1960.00	0.11	0.15	0.11	0.11	
1980.00	0.11	0.15	0.11	0.11	

Tabular Data of Non-Contiguous PSD
B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Mod	Frequency (MHz)	Measured Value (dBm/MHz)	Ant. Gain (dBi)	E.I.R.P. (dBm/MHz)	Calculated (W/MHz)	Limit (W/MHz)
0	QPSK	1932.50 + 1987.50	12.67	8.00	20.67	0.12	1640
	16QAM	1932.50 + 1987.50	12.78	8.00	20.78	0.12	
	64QAM	1932.50 + 1987.50	12.47	8.00	20.47	0.11	
	256QAM	1932.50 + 1987.50	12.59	8.00	20.59	0.11	
1	QPSK	1932.50 + 1987.50	12.57	8.00	20.57	0.11	
	16QAM	1932.50 + 1987.50	12.71	8.00	20.71	0.12	
	64QAM	1932.50 + 1987.50	12.55	8.00	20.55	0.11	
	256QAM	1932.50 + 1987.50	12.53	8.00	20.53	0.11	

Sum Data of Port 0 and Port 1

Frequency (MHz)	PSD				Limit
	QPSK	16QAM	64QAM	256QAM	
	W/MHz				
1932.50 + 1987.50	0.23	0.24	0.22	0.23	1640

B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Mod	Frequency (MHz)	Measured Value (dBm/MHz)	Ant. Gain (dBi)	E.I.R.P. (dBm/MHz)	Calculated (W/MHz)	Limit (W/MHz)
0	QPSK	1937.50 + 1987.50	9.53	8.00	17.53	0.06	1640
	16QAM	1937.50 + 1987.50	10.15	8.00	18.15	0.07	
	64QAM	1937.50 + 1987.50	9.44	8.00	17.44	0.06	
	256QAM	1937.50 + 1987.50	9.48	8.00	17.48	0.06	
1	QPSK	1937.50 + 1987.50	9.44	8.00	17.44	0.06	
	16QAM	1937.50 + 1987.50	10.32	8.00	18.32	0.07	
	64QAM	1937.50 + 1987.50	9.56	8.00	17.56	0.06	
	256QAM	1937.50 + 1987.50	9.54	8.00	17.54	0.06	

Sum Data of Port 0 and Port 1

Frequency (MHz)	PSD				Limit
	QPSK	16QAM	64QAM	256QAM	
	W/MHz				
1937.50 + 1987.50	0.11	0.13	0.11	0.11	1640

5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Mod	Frequency (MHz)	Measured Value (dBm/MHz)	Ant. Gain (dBi)	E.I.R.P. (dBm/MHz)	Calculated (W/MHz)	Limit (W/MHz)
0	QPSK	1932.50 + 1987.50	12.34	8.00	20.34	0.11	1640
	16QAM	1932.50 + 1987.50	12.83	8.00	20.83	0.12	
	64QAM	1932.50 + 1987.50	12.52	8.00	20.52	0.11	
	256QAM	1932.50 + 1987.50	12.46	8.00	20.46	0.11	
1	QPSK	1932.50 + 1987.50	12.63	8.00	20.63	0.12	
	16QAM	1932.50 + 1987.50	12.84	8.00	20.84	0.12	
	64QAM	1932.50 + 1987.50	12.59	8.00	20.59	0.11	
	256QAM	1932.50 + 1987.50	12.50	8.00	20.50	0.11	

Sum Data of Port 0 and Port 1

Frequency (MHz)	PSD				Limit
	QPSK	16QAM	64QAM	256QAM	
	W/MHz				
1932.50 + 1987.50	0.22	0.24	0.23	0.22	1640

5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Mod	Frequency (MHz)	Measured Value (dBm/MHz)	Ant. Gain (dBi)	E.I.R.P. (dBm/MHz)	Calculated (W/MHz)	Limit (W/MHz)
0	QPSK	1937.50 + 1987.50	9.30	8.00	17.30	0.05	1640
	16QAM	1937.50 + 1987.50	10.80	8.00	18.80	0.08	
	64QAM	1937.50 + 1987.50	9.31	8.00	17.31	0.05	
	256QAM	1937.50 + 1987.50	9.22	8.00	17.22	0.05	
1	QPSK	1937.50 + 1987.50	9.48	8.00	17.48	0.06	
	16QAM	1937.50 + 1987.50	10.95	8.00	18.95	0.08	
	64QAM	1937.50 + 1987.50	9.70	8.00	17.70	0.06	
	256QAM	1937.50 + 1987.50	9.45	8.00	17.45	0.06	

Sum Data of Port 0 and Port 1

Frequency (MHz)	PSD				Limit
	QPSK	16QAM	64QAM	256QAM	
	W/MHz				
1937.50 + 1987.50	0.11	0.15	0.11	0.11	1640

Plot Data of PSD

Antenna 1 / B2 LTE 5 MHz 1 Carrier / 256QAM / Middle



Antenna 1 / B2 LTE 10 MHz 1 Carrier / 64QAM / Middle



Antenna 1 / B2 LTE 15 MHz 1 Carrier / 16QAM / Middle



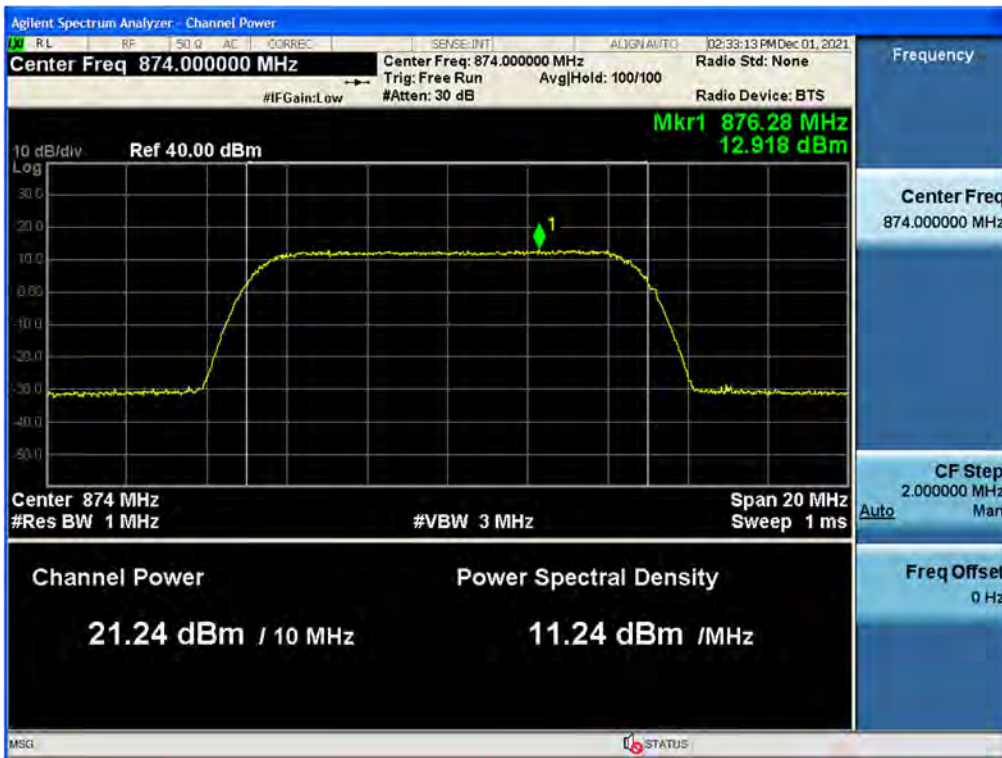
Antenna 1 / B2 LTE 20 MHz 1 Carrier / QPSK / Middle



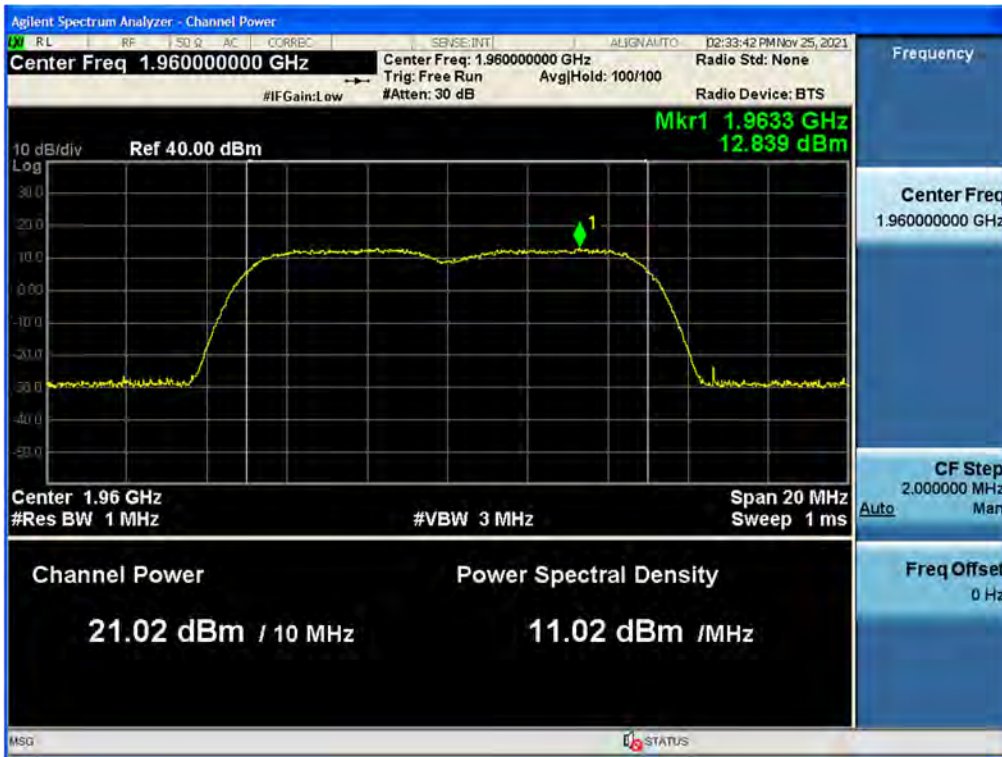
Antenna 1 / B5 LTE 5 MHz 1 Carrier / 64QAM / Middle



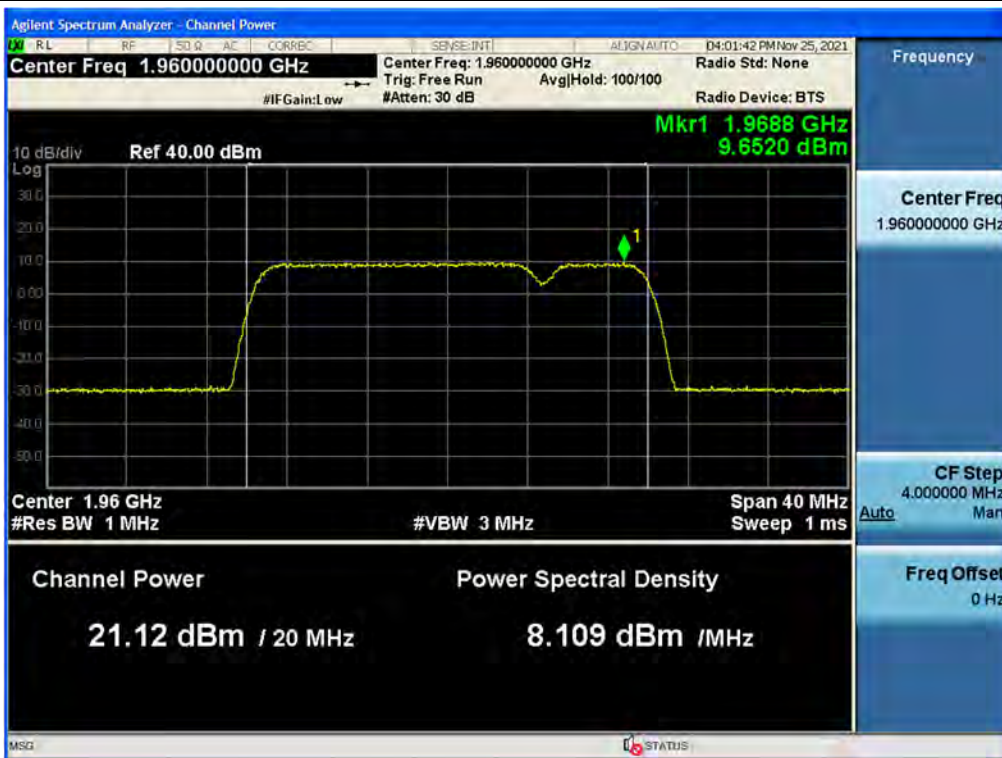
Antenna 1 / B5 LTE 10 MHz 1 Carrier / 64QAM / Low



Antenna 1 / B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / 16QAM / Middle



Antenna 1 / B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / QPSK / Middle



Antenna 1 / 5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / 16QAM / Middle



Antenna 1 / 5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / 64QAM / Middle



Antenna 1 / B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / B2 LTE 5 MHz / 16QAM / Low

Antenna 1 / B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / B2 LTE 5 MHz / 16QAM / High


Antenna 0 / B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / B2 LTE 15 MHz / 64QAM / Low



Antenna 0 / B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / B2 LTE 5 MHz / 64QAM / High



Antenna 1 / 5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 5G NR n2 5 MHz / QPSK / Low



Antenna 1 / 5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 5G NR n2 5 MHz / QPSK / High



Antenna 1 / 5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 5G NR n2 15 MHz / 16QAM / Low



Antenna 1 / 5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 5G NR n2 5 MHz / 16QAM / High



5.2. PAPR

Test Requirements:

§ 22.913 Effective radiated power limits.

- (d) Measurement of the ERP of Cellular base transmitters and repeaters must be made using an average power measurement technique. The peak-to-average ratio (PAR) of the transmission must not exceed 13 dB.

§ 24.232 Power and antenna height limits.

- (d) 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 (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of § 24.51. 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 \geq 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 $[10 \times (\text{number of points in sweep}) \times (\text{transmission symbol period})]$ 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 from the sum of the PAPR value from step d) to the measured average power.

Note: The results of 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.

Tabular data of PAPR

B2 LTE 5 MHz 1 Carrier

Ant.	Modulation	Channel	Frequency (MHz)	0.1 % PAPR (dB)
0	QPSK	Low	1932.50	8.35
		Middle	1960.00	8.47
		High	1987.50	8.43
	16QAM	Low	1932.50	8.34
		Middle	1960.00	8.44
		High	1987.50	8.41
	64QAM	Low	1932.50	8.27
		Middle	1960.00	8.35
		High	1987.50	8.32
	256QAM	Low	1932.50	8.40
		Middle	1960.00	8.51
		High	1987.50	8.43
1	QPSK	Low	1932.50	8.31
		Middle	1960.00	8.41
		High	1987.50	8.38
	16QAM	Low	1932.50	8.30
		Middle	1960.00	8.36
		High	1987.50	8.39
	64QAM	Low	1932.50	8.22
		Middle	1960.00	8.32
		High	1987.50	8.25
	256QAM	Low	1932.50	8.33
		Middle	1960.00	8.46
		High	1987.50	8.39

B2 LTE 10 MHz 1 Carrier

Ant.	Modulation	Channel	Frequency (MHz)	0.1 % PAPR (dB)
0	QPSK	Low	1935.00	8.43
		Middle	1960.00	8.46
		High	1985.00	8.44
	16QAM	Low	1935.00	8.40
		Middle	1960.00	8.38
		High	1985.00	8.33
	64QAM	Low	1935.00	8.40
		Middle	1960.00	8.48
		High	1985.00	8.42
	256QAM	Low	1935.00	8.46
		Middle	1960.00	8.53
		High	1985.00	8.47
1	QPSK	Low	1935.00	8.36
		Middle	1960.00	8.44
		High	1985.00	8.45
	16QAM	Low	1935.00	8.31
		Middle	1960.00	8.34
		High	1985.00	8.35
	64QAM	Low	1935.00	8.37
		Middle	1960.00	8.42
		High	1985.00	8.39
	256QAM	Low	1935.00	8.43
		Middle	1960.00	8.47
		High	1985.00	8.46

B2 LTE 15 MHz 1 Carrier

Ant.	Modulation	Channel	Frequency (MHz)	0.1 % PAPR (dB)
0	QPSK	Low	1937.50	8.41
		Middle	1960.00	8.42
		High	1982.50	8.46
	16QAM	Low	1937.50	8.41
		Middle	1960.00	8.44
		High	1982.50	8.40
	64QAM	Low	1937.50	8.35
		Middle	1960.00	8.39
		High	1982.50	8.37
	256QAM	Low	1937.50	8.42
		Middle	1960.00	8.44
		High	1982.50	8.43
1	QPSK	Low	1937.50	8.34
		Middle	1960.00	8.43
		High	1982.50	8.42
	16QAM	Low	1937.50	8.38
		Middle	1960.00	8.43
		High	1982.50	8.42
	64QAM	Low	1937.50	8.56
		Middle	1960.00	8.33
		High	1982.50	8.31
	256QAM	Low	1937.50	8.39
		Middle	1960.00	8.42
		High	1982.50	8.43

B2 LTE 20 MHz 1 Carrier

Ant.	Modulation	Channel	Frequency (MHz)	0.1 % PAPR (dB)
0	QPSK	Low	1940.00	8.45
		Middle	1960.00	8.43
		High	1980.00	8.46
	16QAM	Low	1940.00	8.48
		Middle	1960.00	8.45
		High	1980.00	8.44
	64QAM	Low	1940.00	8.38
		Middle	1960.00	8.39
		High	1980.00	8.36
	256QAM	Low	1940.00	8.48
		Middle	1960.00	8.48
		High	1980.00	8.53
1	QPSK	Low	1940.00	8.38
		Middle	1960.00	8.46
		High	1980.00	8.42
	16QAM	Low	1940.00	8.43
		Middle	1960.00	8.42
		High	1980.00	8.46
	64QAM	Low	1940.00	8.36
		Middle	1960.00	8.41
		High	1980.00	8.39
	256QAM	Low	1940.00	8.43
		Middle	1960.00	8.46
		High	1980.00	8.41

B5 LTE 5 MHz 1 Carrier

Ant.	Modulation	Channel	Frequency (MHz)	0.1 % PAPR (dB)
0	QPSK	Low	871.50	8.24
		Middle	881.50	8.30
		High	891.50	8.24
	16QAM	Low	871.50	8.15
		Middle	881.50	8.24
		High	891.50	8.25
	64QAM	Low	871.50	8.18
		Middle	881.50	8.14
		High	891.50	8.20
	256QAM	Low	871.50	8.29
		Middle	881.50	8.28
		High	891.50	8.30
1	QPSK	Low	871.50	8.13
		Middle	881.50	8.24
		High	891.50	8.21
	16QAM	Low	871.50	8.17
		Middle	881.50	8.21
		High	891.50	8.19
	64QAM	Low	871.50	8.10
		Middle	881.50	8.16
		High	891.50	8.12
	256QAM	Low	871.50	8.15
		Middle	881.50	8.26
		High	891.50	8.25

B5 LTE 10 MHz 1 Carrier

Ant.	Modulation	Channel	Frequency (MHz)	0.1 % PAPR (dB)
0	QPSK	Low	874.00	8.31
		Middle	881.50	8.32
		High	889.00	8.37
	16QAM	Low	874.00	8.22
		Middle	881.50	8.26
		High	889.00	8.29
	64QAM	Low	874.00	8.31
		Middle	881.50	8.29
		High	889.00	8.30
	256QAM	Low	874.00	8.38
		Middle	881.50	8.35
		High	889.00	8.33
1	QPSK	Low	874.00	8.26
		Middle	881.50	8.29
		High	889.00	8.26
	16QAM	Low	874.00	8.18
		Middle	881.50	8.19
		High	889.00	8.20
	64QAM	Low	874.00	8.21
		Middle	881.50	8.27
		High	889.00	8.25
	256QAM	Low	874.00	8.29
		Middle	881.50	8.32
		High	889.00	8.27

Tabular Data of RF Contiguous PAPR

B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Modulation	Channel	Frequency (MHz)	0.1 % PAPR (dB)
0	QPSK	Low	1935.00	9.96
		Middle	1960.00	10.20
		High	1985.00	10.25
	16QAM	Low	1935.00	10.01
		Middle	1960.00	10.23
		High	1985.00	10.28
	64QAM	Low	1935.00	9.89
		Middle	1960.00	10.15
		High	1985.00	10.20
	256QAM	Low	1935.00	9.88
		Middle	1960.00	10.33
		High	1985.00	10.26
1	QPSK	Low	1935.00	9.88
		Middle	1960.00	10.25
		High	1985.00	10.10
	16QAM	Low	1935.00	9.84
		Middle	1960.00	10.26
		High	1985.00	10.19
	64QAM	Low	1935.00	9.90
		Middle	1960.00	10.28
		High	1985.00	10.11
	256QAM	Low	1935.00	9.99
		Middle	1960.00	10.18
		High	1985.00	10.16

B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Modulation	Channel	Frequency (MHz)	0.1 % PAPR (dB)
0	QPSK	Low	1940.00	8.49
		Middle	1960.00	8.49
		High	1980.00	8.47
	16QAM	Low	1940.00	8.49
		Middle	1960.00	8.51
		High	1980.00	8.46
	64QAM	Low	1940.00	8.48
		Middle	1960.00	8.53
		High	1980.00	8.53
	256QAM	Low	1940.00	8.45
		Middle	1960.00	8.50
		High	1980.00	8.44
1	QPSK	Low	1940.00	8.40
		Middle	1960.00	8.44
		High	1980.00	8.46
	16QAM	Low	1940.00	8.44
		Middle	1960.00	8.52
		High	1980.00	8.48
	64QAM	Low	1940.00	8.37
		Middle	1960.00	8.50
		High	1980.00	8.46
	256QAM	Low	1940.00	8.40
		Middle	1960.00	8.42
		High	1980.00	8.44

5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Modulation	Channel	Frequency (MHz)	0.1 % PAPR (dB)
0	QPSK	Low	1935.00	8.39
		Middle	1960.00	8.45
		High	1985.00	8.52
	16QAM	Low	1935.00	8.43
		Middle	1960.00	8.46
		High	1985.00	8.43
	64QAM	Low	1935.00	8.40
		Middle	1960.00	8.49
		High	1985.00	8.35
	256QAM	Low	1935.00	8.36
		Middle	1960.00	8.50
		High	1985.00	8.39
1	QPSK	Low	1935.00	8.36
		Middle	1960.00	8.42
		High	1985.00	8.44
	16QAM	Low	1935.00	8.38
		Middle	1960.00	8.48
		High	1985.00	8.42
	64QAM	Low	1935.00	8.34
		Middle	1960.00	8.35
		High	1985.00	8.39
	256QAM	Low	1935.00	8.35
		Middle	1960.00	8.39
		High	1985.00	8.38

5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Modulation	Channel	Frequency (MHz)	0.1 % PAPR (dB)
0	QPSK	Low	1940.00	8.43
		Middle	1960.00	8.45
		High	1980.00	8.42
	16QAM	Low	1940.00	8.45
		Middle	1960.00	8.39
		High	1980.00	8.39
	64QAM	Low	1940.00	8.49
		Middle	1960.00	8.48
		High	1980.00	8.49
	256QAM	Low	1940.00	8.33
		Middle	1960.00	8.41
		High	1980.00	8.39
1	QPSK	Low	1940.00	8.43
		Middle	1960.00	8.39
		High	1980.00	8.39
	16QAM	Low	1940.00	8.37
		Middle	1960.00	8.40
		High	1980.00	8.38
	64QAM	Low	1940.00	8.40
		Middle	1960.00	8.45
		High	1980.00	8.39
	256QAM	Low	1940.00	8.34
		Middle	1960.00	8.36
		High	1980.00	8.38

Tabular data of Non-Contiguous PAPR
B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Modulation	B2 LTE 5 MHz		B2 LTE 5 MHz	
		Frequency (MHz)	Measured Value (dB)	Frequency (MHz)	Measured Value (dB)
0	QPSK	1932.50	8.02	1987.50	7.88
	16QAM	1932.50	8.01	1987.50	7.83
	64QAM	1932.50	7.94	1987.50	7.82
	256QAM	1932.50	8.04	1987.50	7.90
1	QPSK	1932.50	7.95	1987.50	7.87
	16QAM	1932.50	7.94	1987.50	7.85
	64QAM	1932.50	7.88	1987.50	7.80
	256QAM	1932.50	7.99	1987.50	7.85

B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Modulation	B2 LTE 15 MHz		B2 LTE 5 MHz	
		Frequency (MHz)	Measured Value (dB)	Frequency (MHz)	Measured Value (dB)
0	QPSK	1937.50	8.44	1987.50	8.37
	16QAM	1937.50	8.42	1987.50	8.39
	64QAM	1937.50	8.37	1987.50	8.31
	256QAM	1937.50	8.44	1987.50	8.48
1	QPSK	1937.50	8.40	1987.50	8.38
	16QAM	1937.50	8.45	1987.50	8.38
	64QAM	1937.50	8.31	1987.50	8.32
	256QAM	1937.50	8.41	1987.50	8.43

5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Modulation	5G NR n2 5 MHz		B2 LTE 5 MHz	
		Frequency (MHz)	Measured Value (dB)	Frequency (MHz)	Measured Value (dB)
0	QPSK	1932.50	8.39	1987.50	8.42
	16QAM	1932.50	8.53	1987.50	8.52
	64QAM	1932.50	8.35	1987.50	8.49
	256QAM	1932.50	8.41	1987.50	8.34
1	QPSK	1932.50	8.41	1987.50	8.41
	16QAM	1932.50	8.48	1987.50	8.40
	64QAM	1932.50	8.32	1987.50	8.51
	256QAM	1932.50	8.43	1987.50	8.39

5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

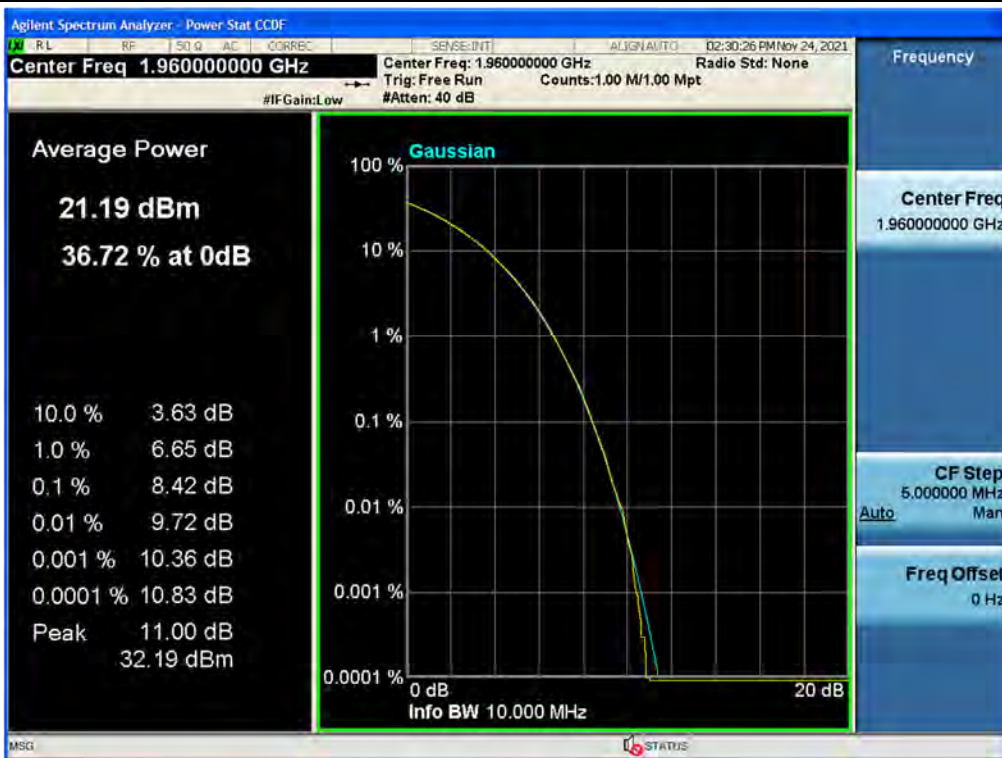
Ant.	Modulation	5G NR n2 15 MHz		B2 LTE 5 MHz	
		Frequency (MHz)	Measured Value (dB)	Frequency (MHz)	Measured Value (dB)
0	QPSK	1937.50	8.47	1987.50	8.45
	16QAM	1937.50	8.44	1987.50	8.47
	64QAM	1937.50	8.50	1987.50	8.51
	256QAM	1937.50	8.38	1987.50	8.44
1	QPSK	1937.50	8.43	1987.50	8.43
	16QAM	1937.50	8.42	1987.50	8.48
	64QAM	1937.50	8.46	1987.50	8.47
	256QAM	1937.50	8.41	1987.50	8.38

Plot Data of PAPR

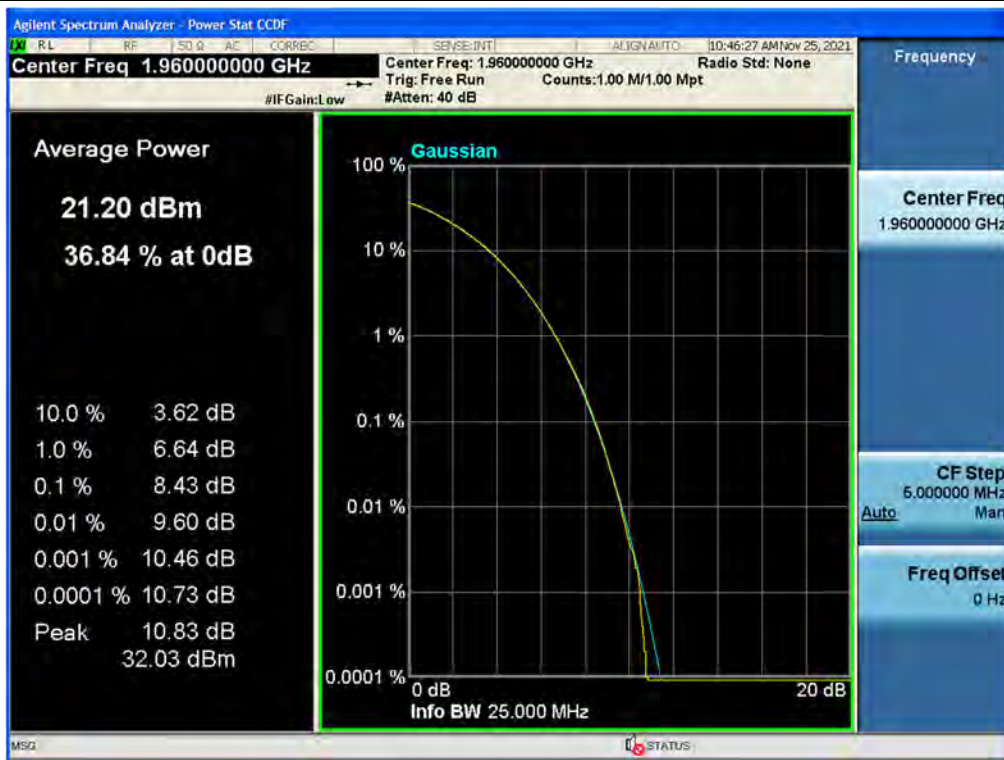
Antenna 1 / B2 LTE 5 MHz 1 Carrier / 256QAM / Middle



Antenna 1 / B2 LTE 10 MHz 1 Carrier / 64QAM / Middle



Antenna 1 / B2 LTE 15 MHz 1 Carrier / 16QAM / Middle



Antenna 1 / B2 LTE 20 MHz 1 Carrier / QPSK / Middle



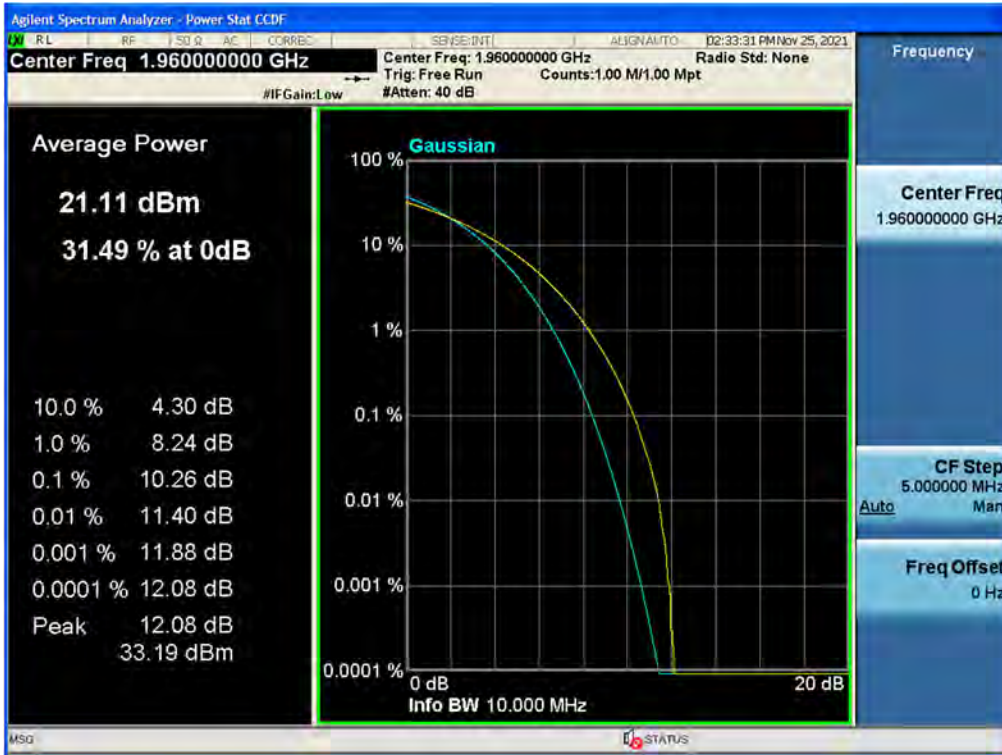
Antenna 1 / B5 LTE 5 MHz 1 Carrier / 64QAM / Middle



Antenna 1 / B5 LTE 10 MHz 1 Carrier / 64QAM / Low

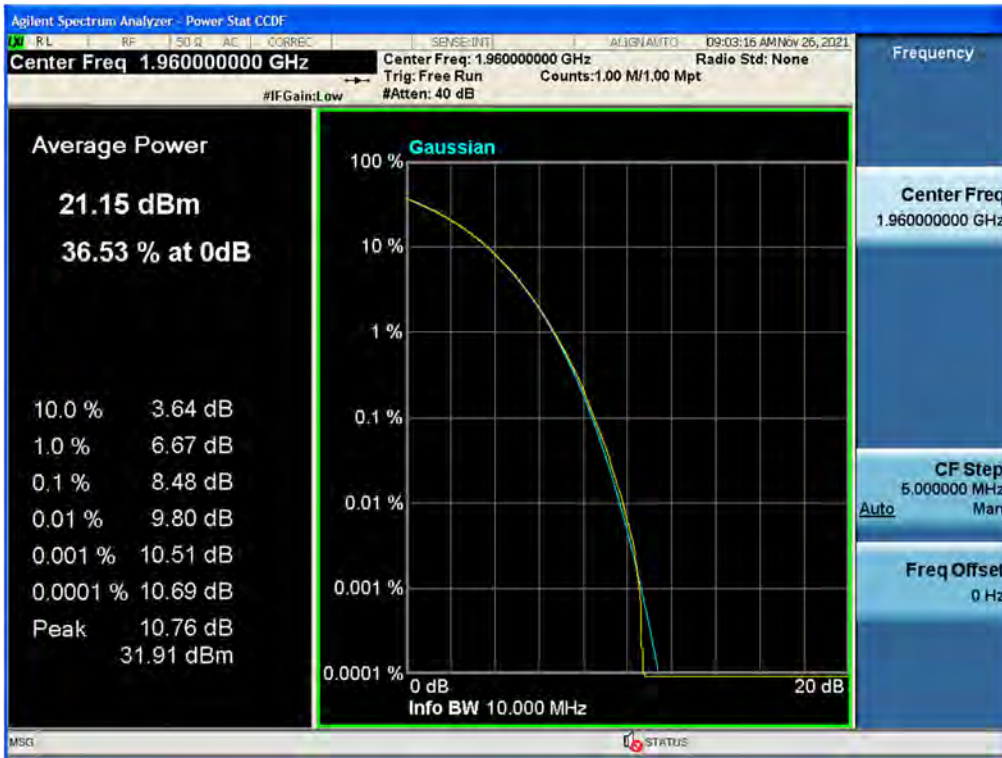


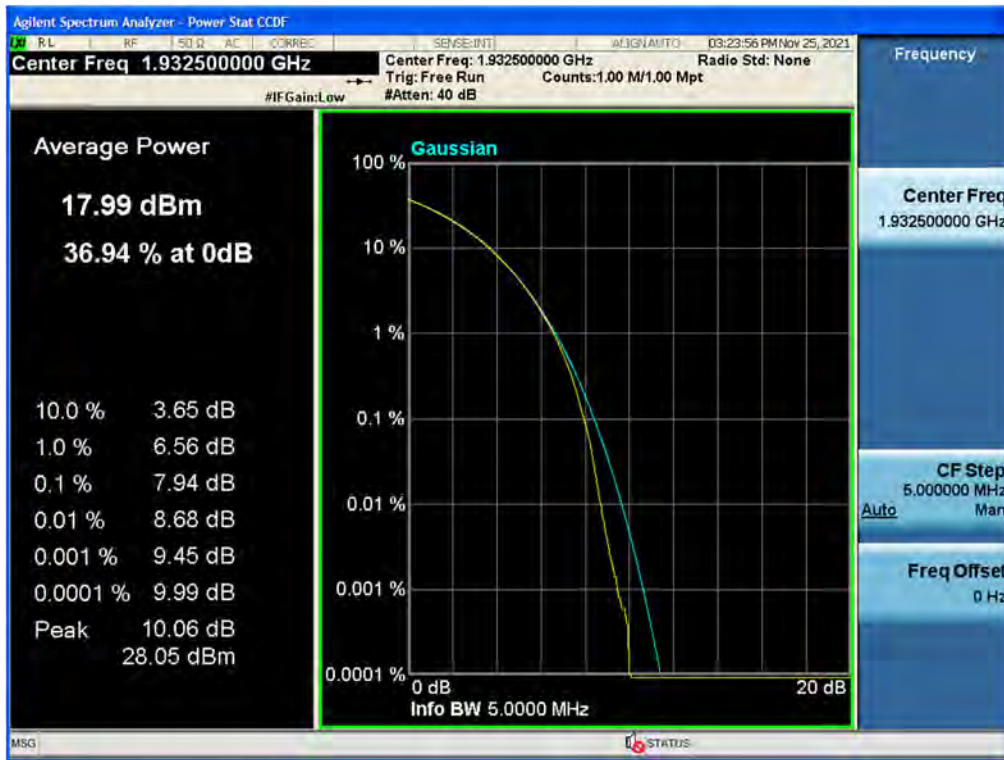
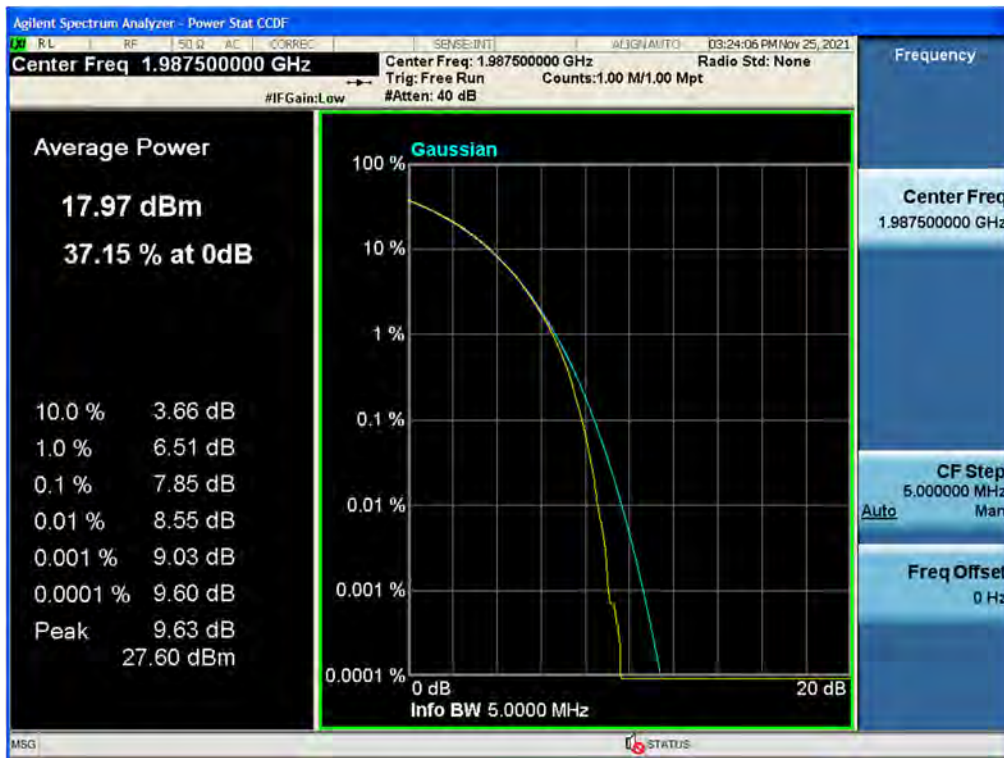
Antenna 1 / B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / 16QAM / Middle



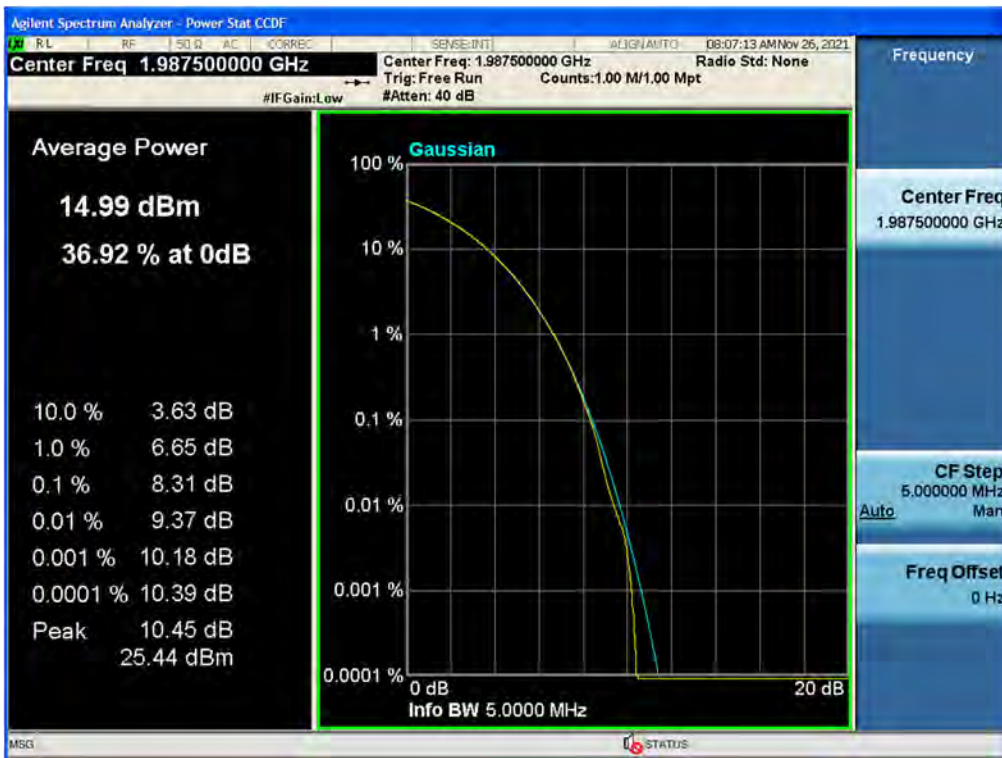
Antenna 1 / B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / QPSK / Middle

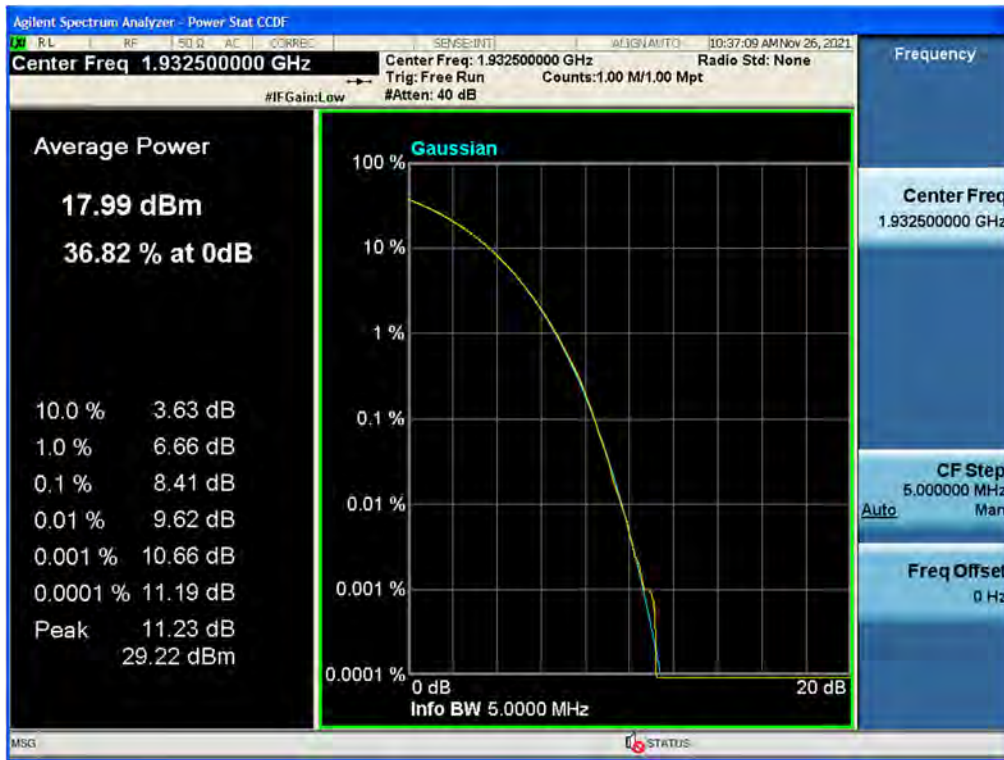


Antenna 1 / 5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / 16QAM / Middle

Antenna 1 / 5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / 64QAM / Middle


Antenna 1 / B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / B2 LTE 5 MHz / 16QAM / Low

Antenna 1 / B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / B2 LTE 5 MHz / 16QAM / High


Antenna 0 / B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / B2 LTE 15 MHz / 64QAM / Low

Antenna 0 / B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / B2 LTE 5 MHz / 64QAM / High


Antenna 1 / 5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 5G NR n2 5 MHz / QPSK / Low

Antenna 1 / 5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 5G NR n2 5 MHz / QPSK / High


Antenna 1 / 5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 5G NR n2 15 MHz / 16QAM / Low



Antenna 1 / 5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 5G NR n2 5 MHz / 16QAM / High



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 $\geq 3 \times$ 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 $1.5 \times \text{OBW}$ 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 $\geq 3 \times \text{RBW}$.
- 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

B2 LTE 5 MHz 1 Carrier

Ant	Mod	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
0	QPSK	Low	1932.50	4.4869
		Middle	1960.00	4.5095
		High	1987.50	4.4962
	16QAM	Low	1932.50	4.4845
		Middle	1960.00	4.4862
		High	1987.50	4.4861
	64QAM	Low	1932.50	4.5083
		Middle	1960.00	4.5131
		High	1987.50	4.5053
	256QAM	Low	1932.50	4.5037
		Middle	1960.00	4.4948
		High	1987.50	4.5027
1	QPSK	Low	1932.50	4.4976
		Middle	1960.00	4.4992
		High	1987.50	4.5049
	16QAM	Low	1932.50	4.4976
		Middle	1960.00	4.4719
		High	1987.50	4.4732
	64QAM	Low	1932.50	4.5012
		Middle	1960.00	4.5065
		High	1987.50	4.5223
	256QAM	Low	1932.50	4.5072
		Middle	1960.00	4.5106
		High	1987.50	4.5038

B2 LTE 10 MHz 1 Carrier

Ant	Mod	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
0	QPSK	Low	1935.00	9.0006
		Middle	1960.00	8.9861
		High	1985.00	8.9915
	16QAM	Low	1935.00	9.0133
		Middle	1960.00	8.9968
		High	1985.00	9.0216
	64QAM	Low	1935.00	8.9902
		Middle	1960.00	8.9681
		High	1985.00	8.9858
	256QAM	Low	1935.00	9.0144
		Middle	1960.00	8.9963
		High	1985.00	8.9894
1	QPSK	Low	1935.00	8.9690
		Middle	1960.00	8.9900
		High	1985.00	8.9976
	16QAM	Low	1935.00	8.9611
		Middle	1960.00	9.0175
		High	1985.00	8.9963
	64QAM	Low	1935.00	8.9976
		Middle	1960.00	9.0149
		High	1985.00	9.0324
	256QAM	Low	1935.00	8.9755
		Middle	1960.00	9.0054
		High	1985.00	8.9666

B2 LTE 15 MHz 1 Carrier

Ant	Mod	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
0	QPSK	Low	1937.50	13.514
		Middle	1960.00	13.522
		High	1982.50	13.489
	16QAM	Low	1937.50	13.495
		Middle	1960.00	13.483
		High	1982.50	13.484
	64QAM	Low	1937.50	13.478
		Middle	1960.00	13.530
		High	1982.50	13.530
	256QAM	Low	1937.50	13.444
		Middle	1960.00	13.522
		High	1982.50	13.500
1	QPSK	Low	1937.50	13.517
		Middle	1960.00	13.458
		High	1982.50	13.515
	16QAM	Low	1937.50	13.520
		Middle	1960.00	13.573
		High	1982.50	13.529
	64QAM	Low	1937.50	13.514
		Middle	1960.00	13.511
		High	1982.50	13.511
	256QAM	Low	1937.50	13.492
		Middle	1960.00	13.489
		High	1982.50	13.472

B2 LTE 20 MHz 1 Carrier

Ant	Mod	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
0	QPSK	Low	1940.00	17.918
		Middle	1960.00	17.978
		High	1980.00	17.942
	16QAM	Low	1940.00	17.968
		Middle	1960.00	18.020
		High	1980.00	17.991
	64QAM	Low	1940.00	18.006
		Middle	1960.00	17.994
		High	1980.00	17.962
	256QAM	Low	1940.00	17.970
		Middle	1960.00	18.008
		High	1980.00	17.964
1	QPSK	Low	1940.00	17.988
		Middle	1960.00	17.980
		High	1980.00	17.925
	16QAM	Low	1940.00	18.001
		Middle	1960.00	17.970
		High	1980.00	18.001
	64QAM	Low	1940.00	17.954
		Middle	1960.00	18.018
		High	1980.00	17.983
	256QAM	Low	1940.00	17.945
		Middle	1960.00	18.003
		High	1980.00	17.992

B5 LTE 5 MHz 1 Carrier

Ant	Mod	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
0	QPSK	Low	871.50	4.5011
		Middle	881.50	4.5053
		High	891.50	4.5046
	16QAM	Low	871.50	4.5053
		Middle	881.50	4.4762
		High	891.50	4.4870
	64QAM	Low	871.50	4.5010
		Middle	881.50	4.5196
		High	891.50	4.5019
	256QAM	Low	871.50	4.4985
		Middle	881.50	4.5164
		High	891.50	4.5272
1	QPSK	Low	871.50	4.4969
		Middle	881.50	4.5004
		High	891.50	4.4998
	16QAM	Low	871.50	4.4868
		Middle	881.50	4.4768
		High	891.50	4.4906
	64QAM	Low	871.50	4.5112
		Middle	881.50	4.5079
		High	891.50	4.5150
	256QAM	Low	871.50	4.5106
		Middle	881.50	4.5151
		High	891.50	4.4880

B5 LTE 10 MHz 1 Carrier

Ant	Mod	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
0	QPSK	Low	874.00	8.9802
		Middle	881.50	9.0312
		High	889.00	8.9892
	16QAM	Low	874.00	9.0231
		Middle	881.50	9.0376
		High	889.00	9.0189
	64QAM	Low	874.00	8.9670
		Middle	881.50	9.0367
		High	889.00	8.9781
	256QAM	Low	874.00	8.9818
		Middle	881.50	9.0003
		High	889.00	8.9796
1	QPSK	Low	874.00	9.0112
		Middle	881.50	9.0178
		High	889.00	8.9754
	16QAM	Low	874.00	9.0055
		Middle	881.50	8.9725
		High	889.00	8.9856
	64QAM	Low	874.00	8.9814
		Middle	881.50	9.0145
		High	889.00	9.0019
	256QAM	Low	874.00	9.0076
		Middle	881.50	8.9994
		High	889.00	8.9913

Tabular Data of RF Contiguous Occupied Bandwidth
B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant	Mod	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
0	QPSK	Low	1935.00	9.4946
		Middle	1960.00	9.4847
		High	1985.00	9.4735
	16QAM	Low	1935.00	9.4442
		Middle	1960.00	9.4423
		High	1985.00	9.4897
	64QAM	Low	1935.00	9.5137
		Middle	1960.00	9.5036
		High	1985.00	9.4747
	256QAM	Low	1935.00	9.4752
		Middle	1960.00	9.5144
		High	1985.00	9.4597
1	QPSK	Low	1935.00	9.4821
		Middle	1960.00	9.4871
		High	1985.00	9.4618
	16QAM	Low	1935.00	9.4407
		Middle	1960.00	9.4427
		High	1985.00	9.4565
	64QAM	Low	1935.00	9.4709
		Middle	1960.00	9.4769
		High	1985.00	9.4821
	256QAM	Low	1935.00	9.4889
		Middle	1960.00	9.4621
		High	1985.00	9.4815

B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant	Mod	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
0	QPSK	Low	1940.00	18.942
		Middle	1960.00	18.957
		High	1980.00	18.932
	16QAM	Low	1940.00	18.930
		Middle	1960.00	18.931
		High	1980.00	18.927
	64QAM	Low	1940.00	18.959
		Middle	1960.00	18.937
		High	1980.00	18.937
	256QAM	Low	1940.00	18.932
		Middle	1960.00	18.949
		High	1980.00	18.936
1	QPSK	Low	1940.00	18.938
		Middle	1960.00	18.918
		High	1980.00	18.934
	16QAM	Low	1940.00	18.960
		Middle	1960.00	18.989
		High	1980.00	18.940
	64QAM	Low	1940.00	18.955
		Middle	1960.00	18.940
		High	1980.00	18.979
	256QAM	Low	1940.00	18.953
		Middle	1960.00	18.943
		High	1980.00	18.957

5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant	Mod	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
0	QPSK	Low	1935.00	9.4633
		Middle	1960.00	9.4698
		High	1985.00	9.4959
	16QAM	Low	1935.00	9.4635
		Middle	1960.00	9.4730
		High	1985.00	9.4878
	64QAM	Low	1935.00	9.4731
		Middle	1960.00	9.4821
		High	1985.00	9.4803
	256QAM	Low	1935.00	9.4654
		Middle	1960.00	9.4708
		High	1985.00	9.4912
1	QPSK	Low	1935.00	9.4941
		Middle	1960.00	9.4819
		High	1985.00	9.4950
	16QAM	Low	1935.00	9.4591
		Middle	1960.00	9.4595
		High	1985.00	9.4739
	64QAM	Low	1935.00	9.4575
		Middle	1960.00	9.4527
		High	1985.00	9.4795
	256QAM	Low	1935.00	9.4724
		Middle	1960.00	9.4691
		High	1985.00	9.4818

5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant	Mod	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
0	QPSK	Low	1940.00	19.279
		Middle	1960.00	19.282
		High	1980.00	19.242
	16QAM	Low	1940.00	19.266
		Middle	1960.00	19.219
		High	1980.00	19.364
	64QAM	Low	1940.00	19.261
		Middle	1960.00	19.298
		High	1980.00	19.275
256QAM	Low	1940.00	19.232	
	Middle	1960.00	19.314	
	High	1980.00	19.250	
1	QPSK	Low	1940.00	19.316
		Middle	1960.00	19.242
		High	1980.00	19.290
	16QAM	Low	1940.00	19.336
		Middle	1960.00	19.210
		High	1980.00	19.252
	64QAM	Low	1940.00	19.317
		Middle	1960.00	19.266
		High	1980.00	19.234
256QAM	Low	1940.00	19.268	
	Middle	1960.00	19.262	
	High	1980.00	19.285	

Tabular Data of Non-Contiguous Occupied Bandwidth
B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant	Mod	B2 LTE 5 MHz		B2 LTE 5 MHz		Total OBW (MHz)
		Frequency (MHz)	Measured Value (MHz)	Frequency (MHz)	Measured Value (MHz)	
0	QPSK	1932.50	4.5018	1987.50	4.5114	9.0132
	16QAM	1932.50	4.4733	1987.50	4.4924	8.9657
	64QAM	1932.50	4.5201	1987.50	4.5082	9.0283
	256QAM	1932.50	4.4988	1987.50	4.5172	9.0160
1	QPSK	1932.50	4.4946	1987.50	4.5119	9.0065
	16QAM	1932.50	4.4812	1987.50	4.5002	8.9814
	64QAM	1932.50	4.4952	1987.50	4.5077	9.0029
	256QAM	1932.50	4.5026	1987.50	4.5113	9.0140

B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant	Mod	B2 LTE 15 MHz		B2 LTE 5 MHz		Total OBW (MHz)
		Frequency (MHz)	Measured Value (MHz)	Frequency (MHz)	Measured Value (MHz)	
0	QPSK	1937.50	13.514	1987.50	4.5089	18.023
	16QAM	1937.50	13.473	1987.50	4.4844	17.957
	64QAM	1937.50	13.454	1987.50	4.5064	17.960
	256QAM	1937.50	13.493	1987.50	4.5197	18.013
1	QPSK	1937.50	13.515	1987.50	4.5126	18.028
	16QAM	1937.50	13.531	1987.50	4.4721	18.003
	64QAM	1937.50	13.507	1987.50	4.4954	18.003
	256QAM	1937.50	13.496	1987.50	4.5265	18.022

5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

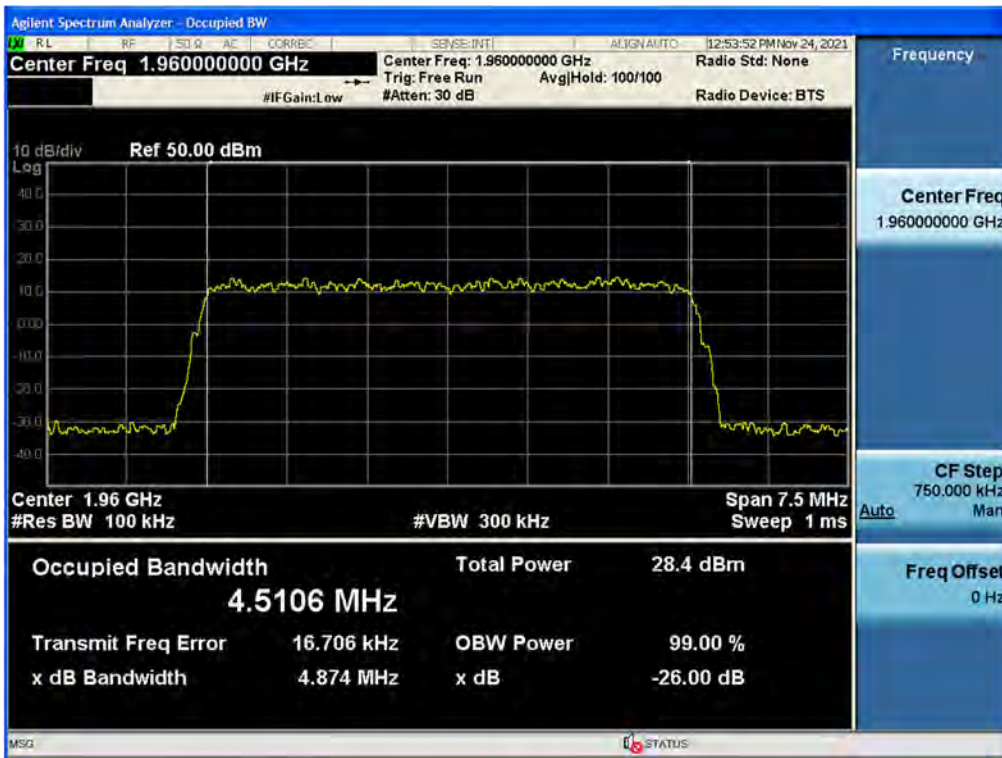
Ant	Mod	5G NR n2 5 MHz		B2 LTE 5 MHz		Total OBW (MHz)
		Frequency (MHz)	Measured Value (MHz)	Frequency (MHz)	Measured Value (MHz)	
0	QPSK	1932.50	4.4897	1987.50	4.5008	8.9905
	16QAM	1932.50	4.5002	1987.50	4.4682	8.9684
	64QAM	1932.50	4.4849	1987.50	4.5092	8.9941
	256QAM	1932.50	4.5061	1987.50	4.5071	9.0132
1	QPSK	1932.50	4.4923	1987.50	4.5094	9.0018
	16QAM	1932.50	4.4949	1987.50	4.4794	8.9742
	64QAM	1932.50	4.4945	1987.50	4.5062	9.0006
	256QAM	1932.50	4.4939	1987.50	4.5057	8.9996

5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

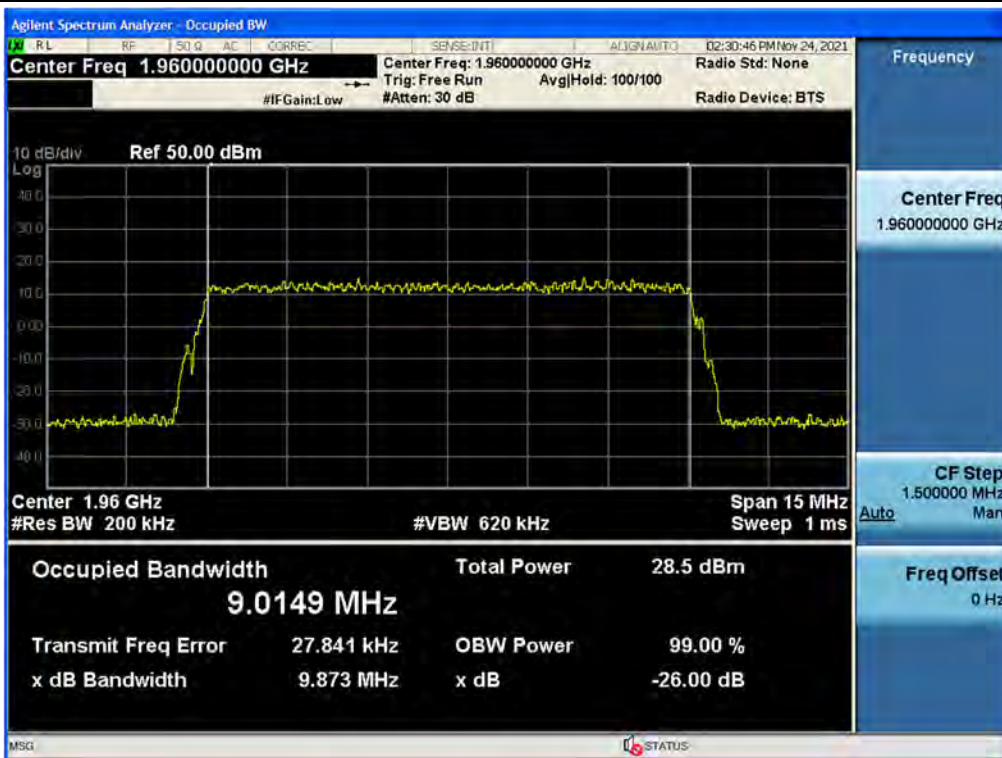
Ant	Mod	5G NR n2 15 MHz		B2 LTE 5 MHz		Total OBW (MHz)
		Frequency (MHz)	Measured Value (MHz)	Frequency (MHz)	Measured Value (MHz)	
0	QPSK	1937.50	14.176	1987.50	4.4956	18.671
	16QAM	1937.50	14.202	1987.50	4.4785	18.680
	64QAM	1937.50	14.150	1987.50	4.4986	18.649
	256QAM	1937.50	14.125	1987.50	4.5123	18.637
1	QPSK	1937.50	14.127	1987.50	4.4981	18.625
	16QAM	1937.50	14.224	1987.50	4.4944	18.718
	64QAM	1937.50	14.160	1987.50	4.5320	18.692
	256QAM	1937.50	14.154	1987.50	4.5014	18.656

Plot Data of Occupied bandwidth

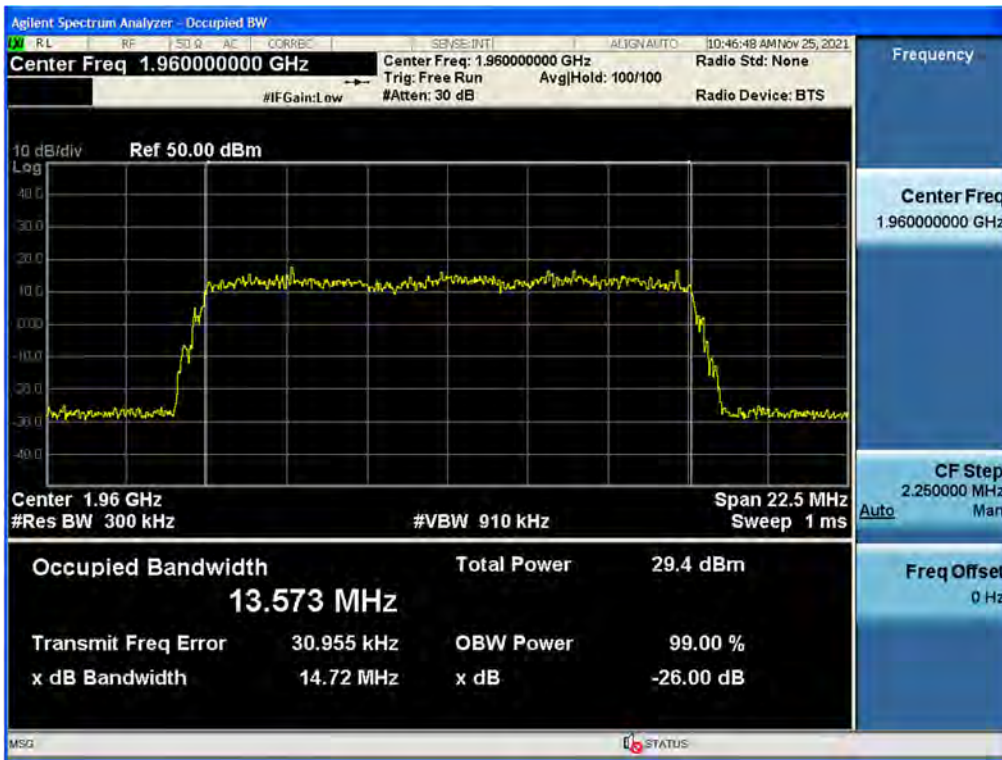
Antenna 1 / B2 LTE 5 MHz 1 Carrier / 256QAM / Middle



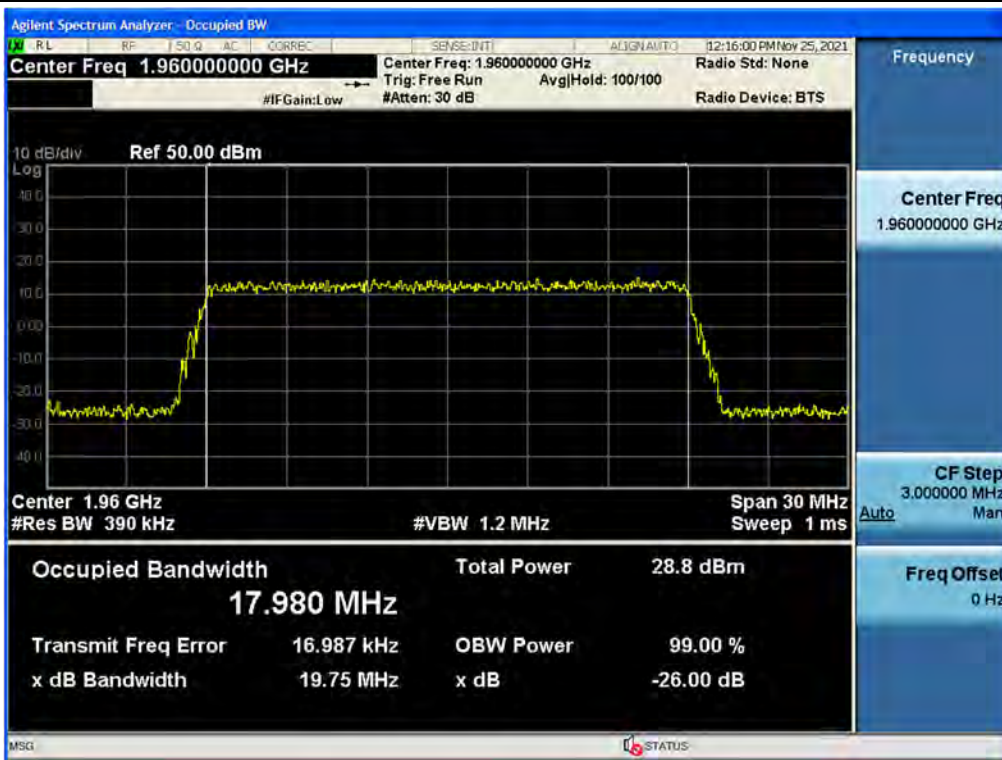
Antenna 1 / B2 LTE 10 MHz 1 Carrier / 64QAM / Middle



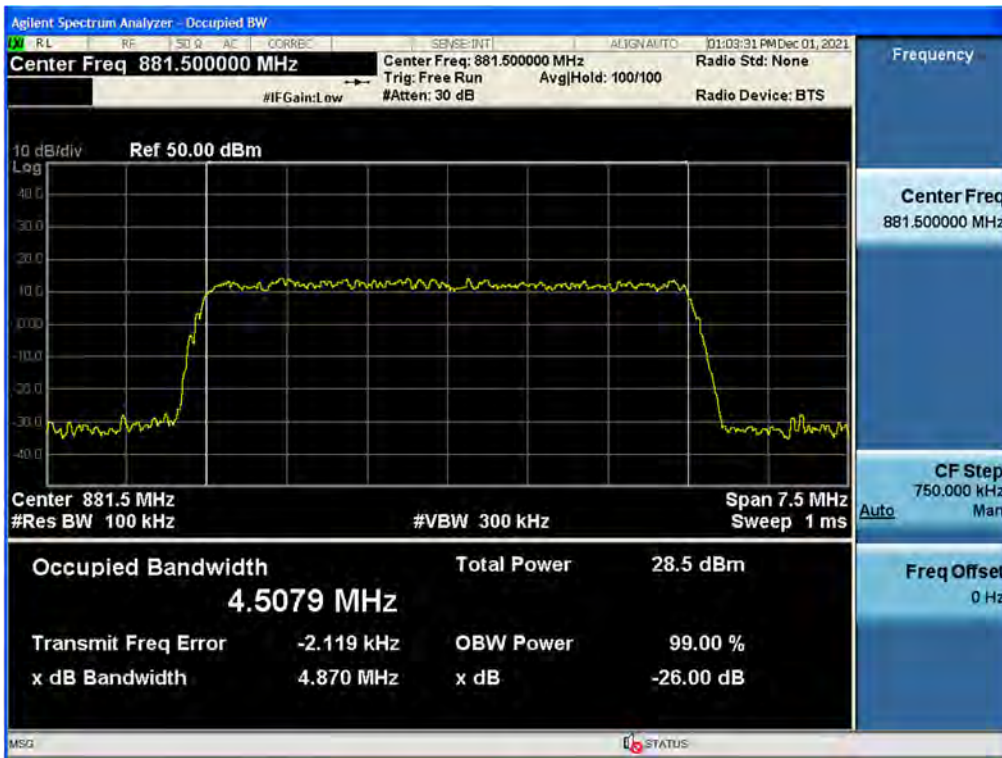
Antenna 1 / B2 LTE 15 MHz 1 Carrier / 16QAM / Middle



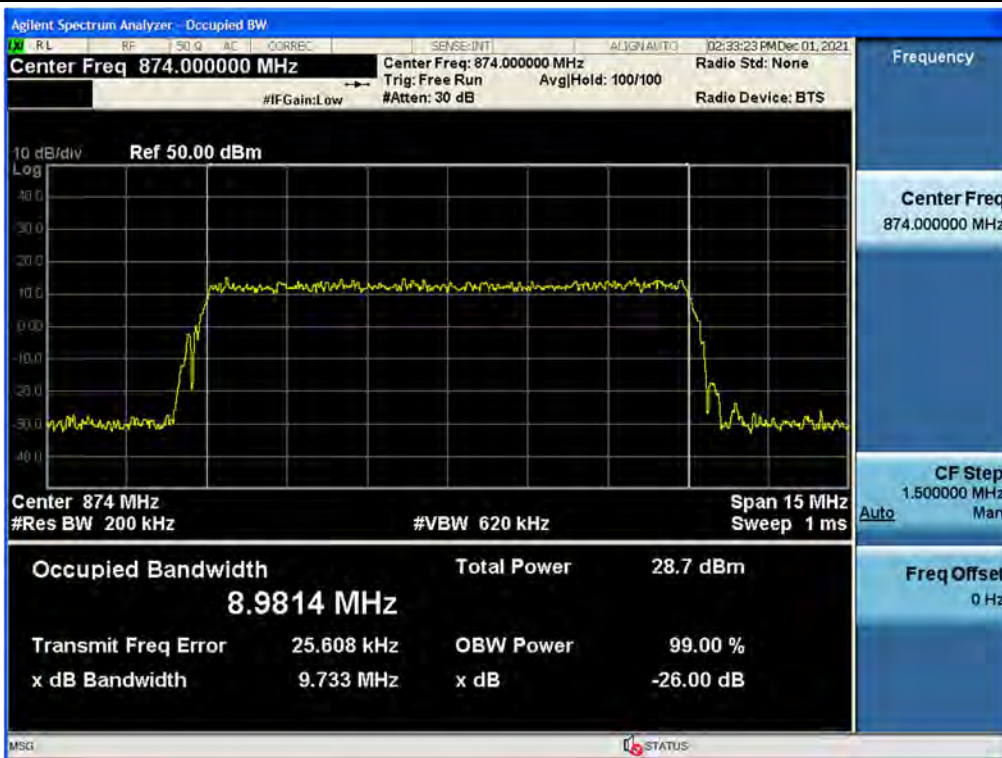
Antenna 1 / B2 LTE 20 MHz 1 Carrier / QPSK / Middle

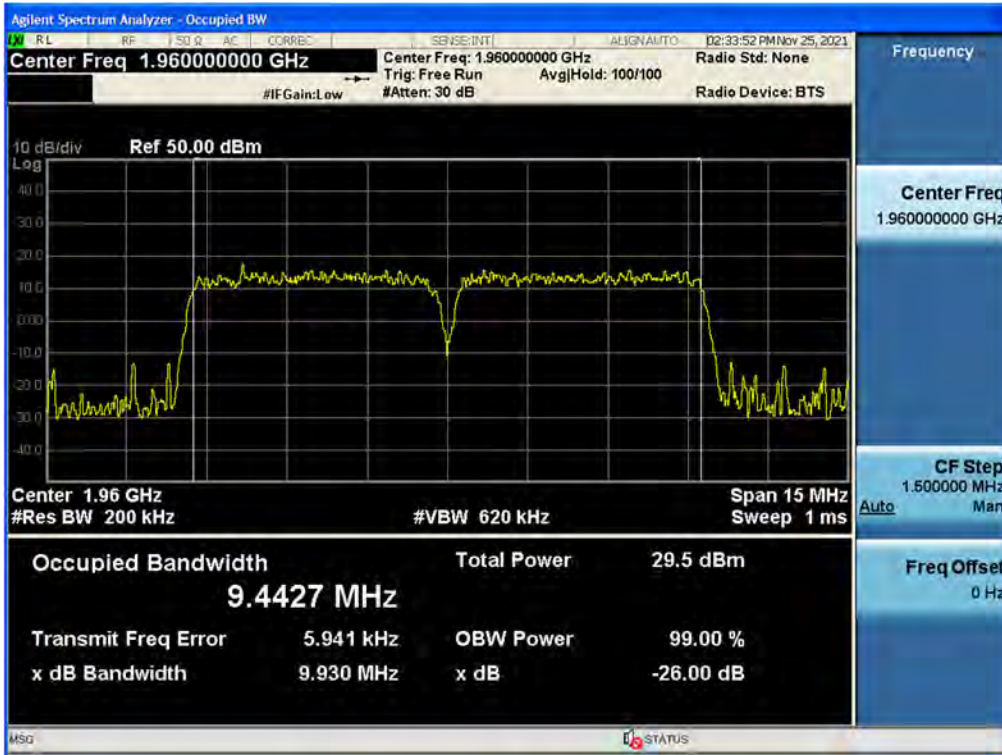
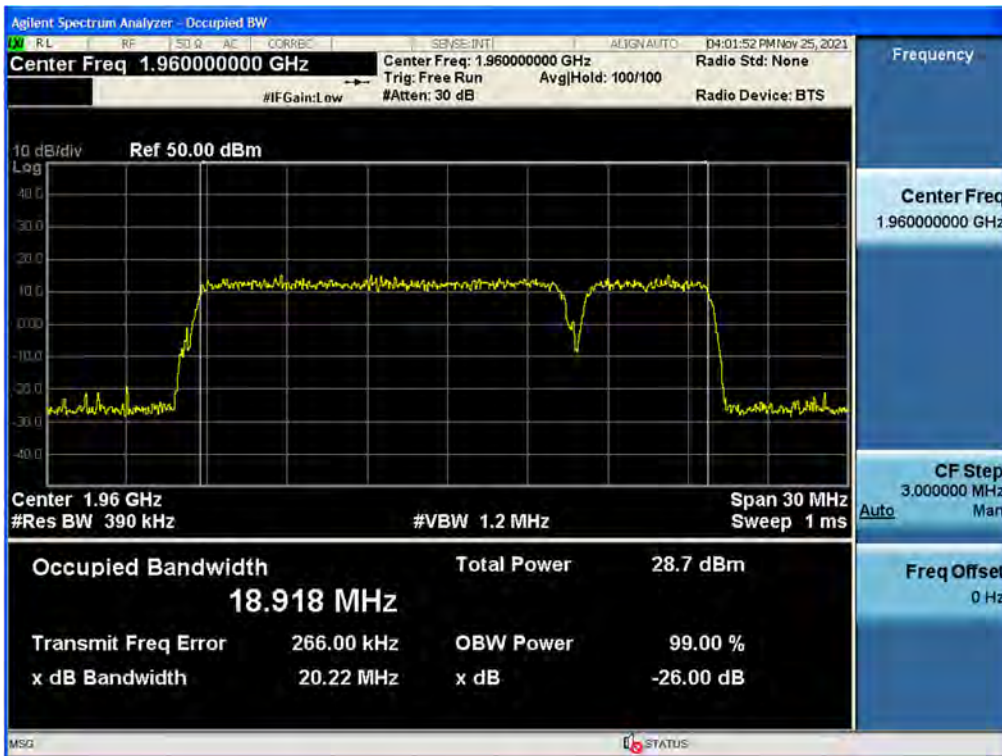


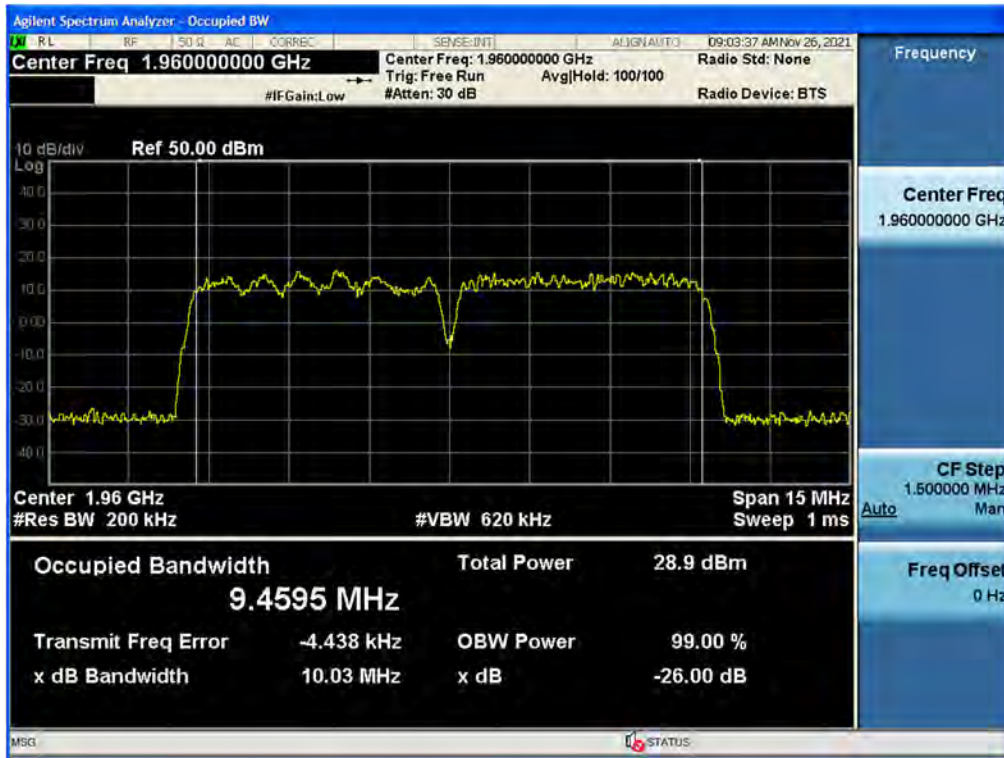
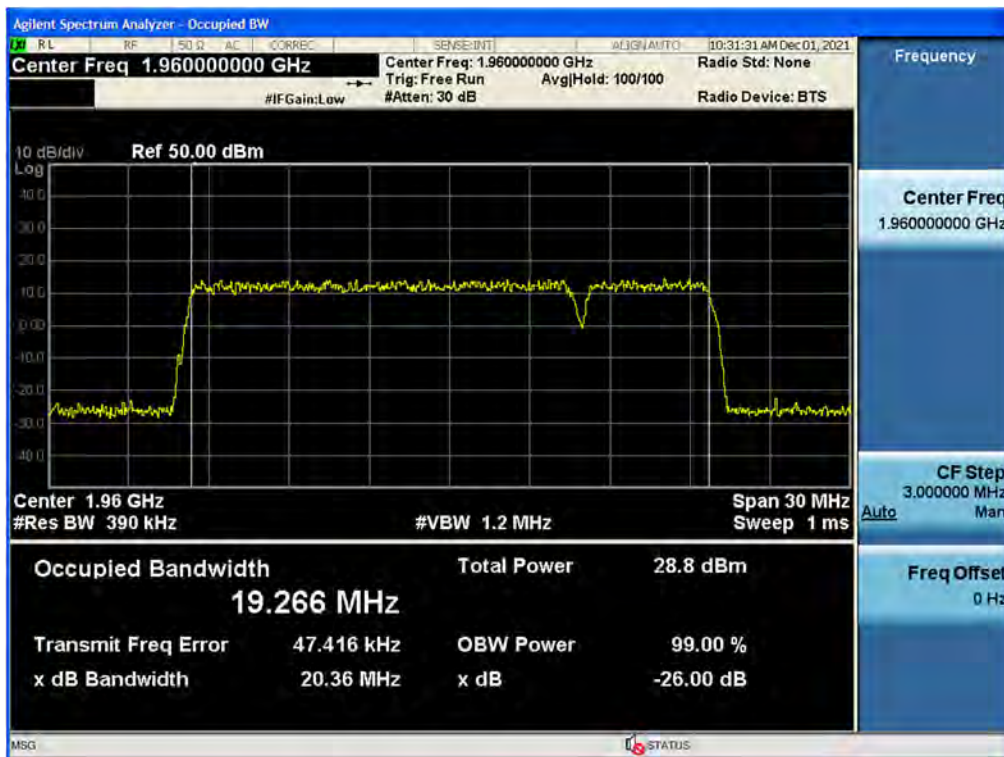
Antenna 1 / B5 LTE 5 MHz 1 Carrier / 64QAM / Middle

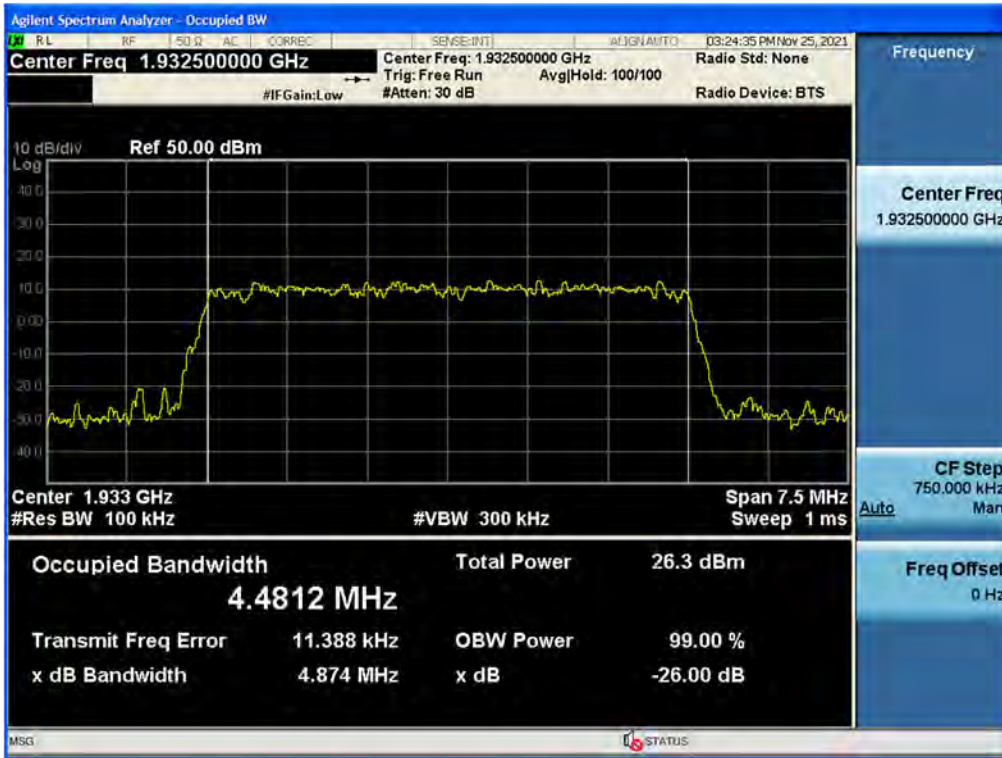
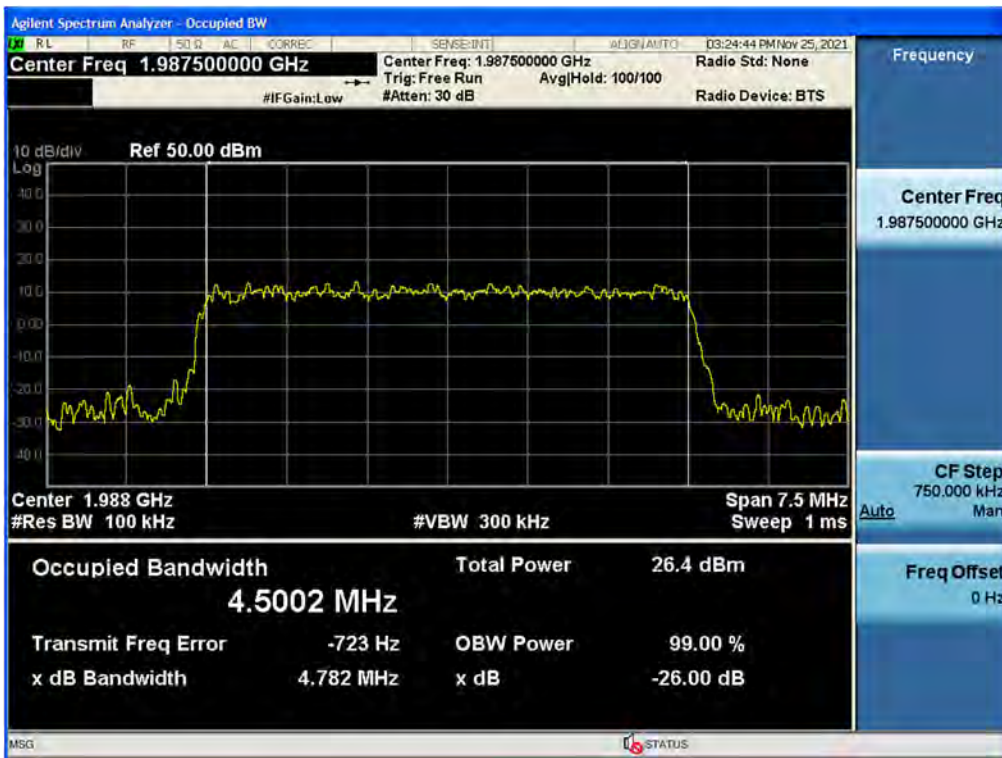


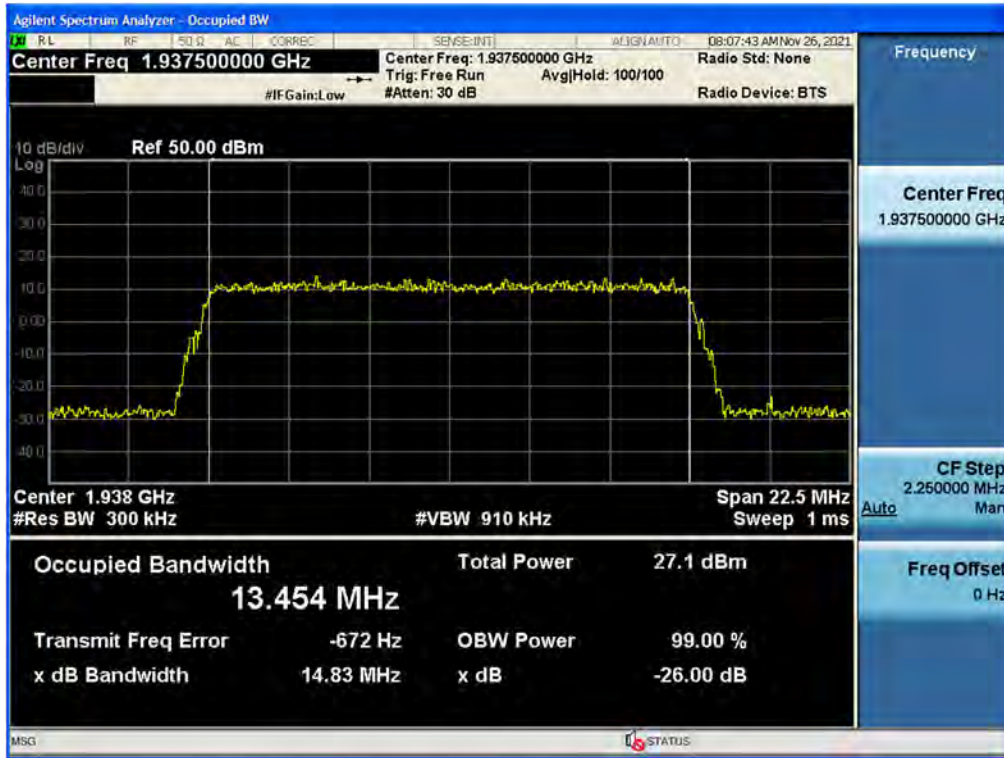
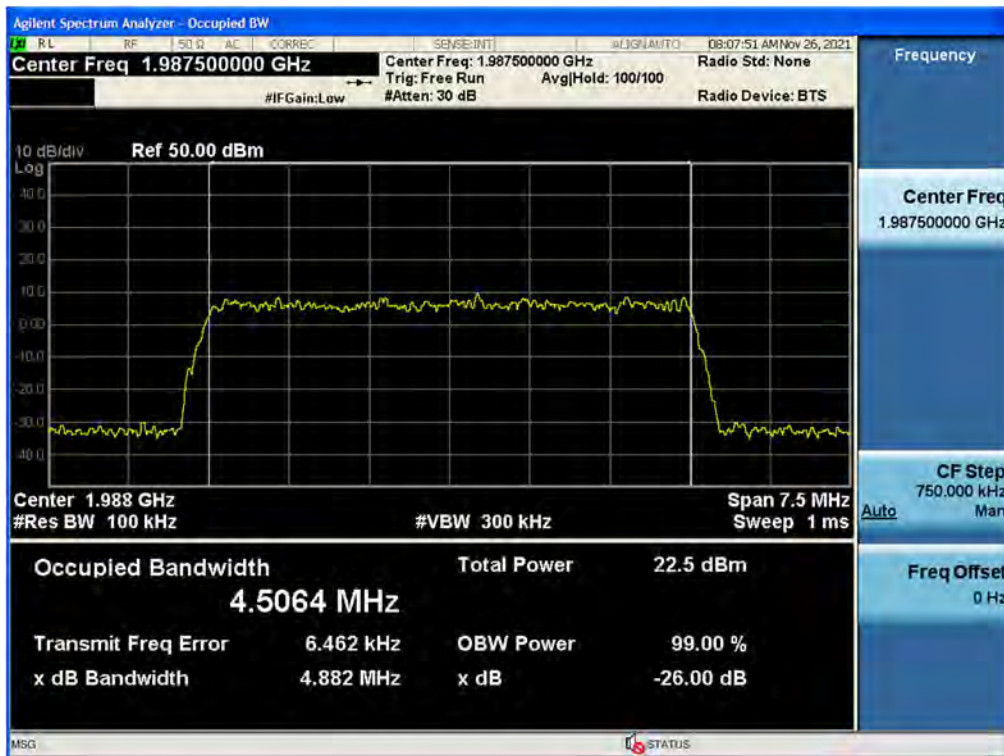
Antenna 1 / B5 LTE 10 MHz 1 Carrier / 64QAM / Low

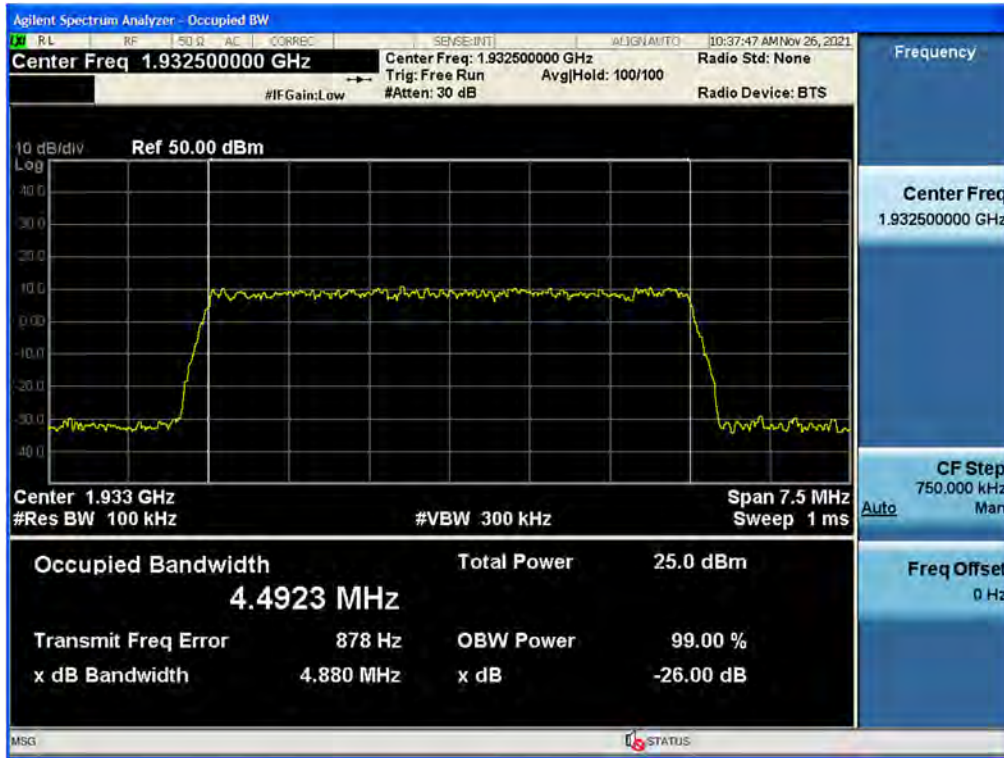
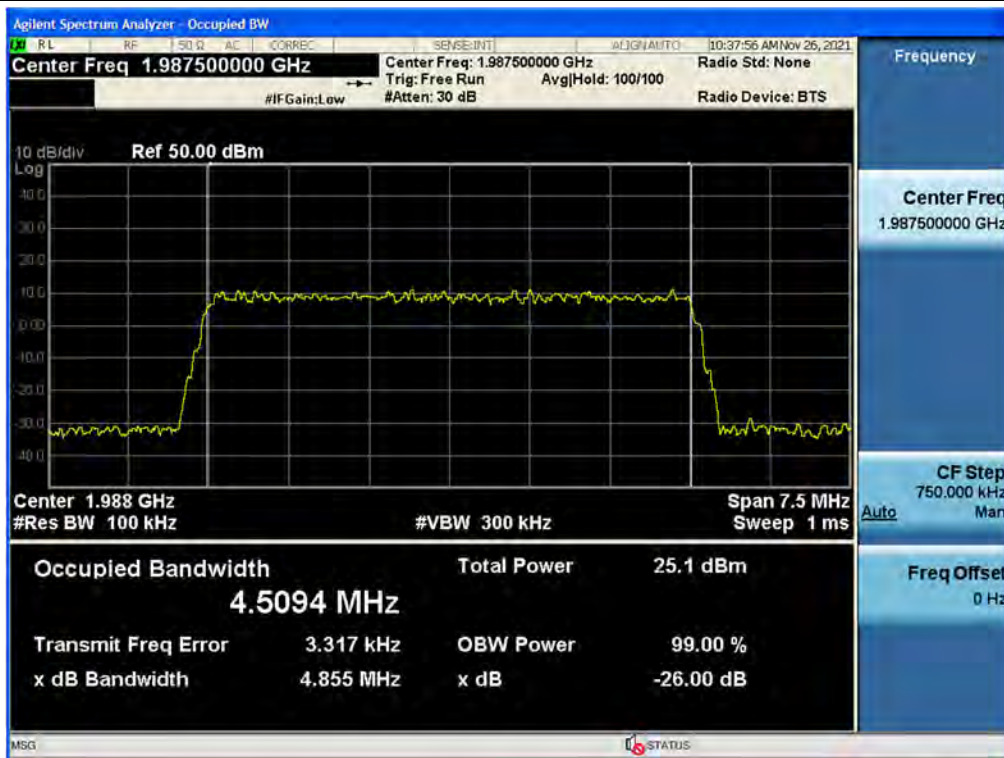


Antenna 1 / B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / 16QAM / Middle

Antenna 1 / B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / QPSK / Middle


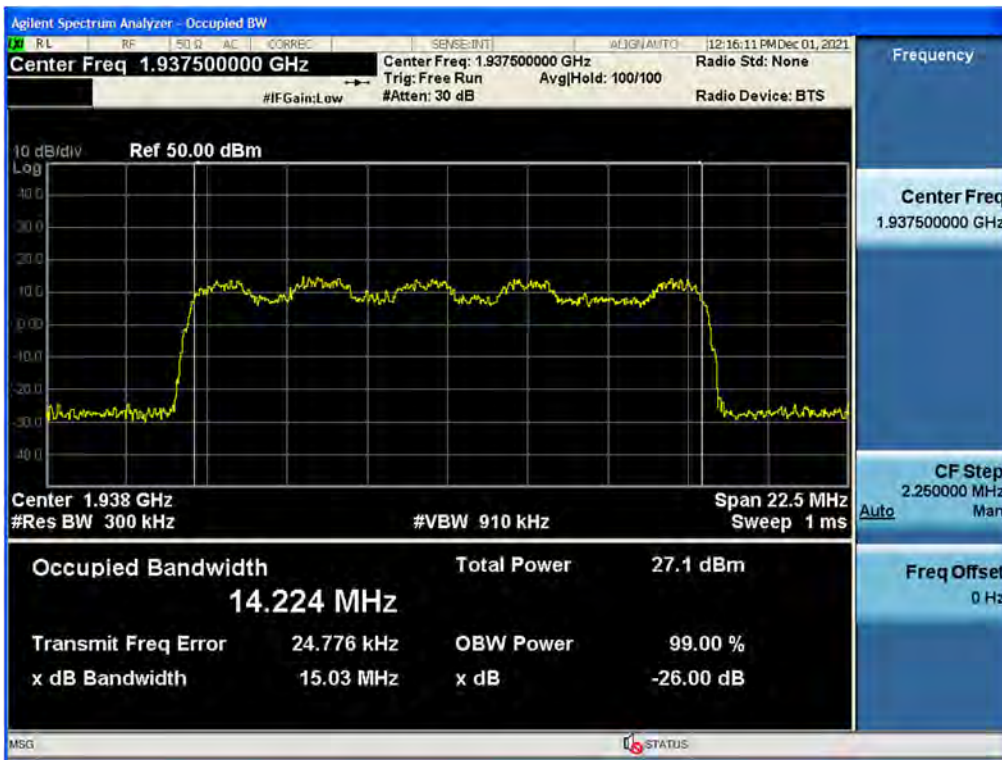
Antenna 1 / 5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / 16QAM / Middle

Antenna 1 / 5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / 64QAM / Middle


Antenna 1 / B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / B2 LTE 5 MHz / 16QAM / Low

Antenna 1 / B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / B2 LTE 5 MHz / 16QAM / High


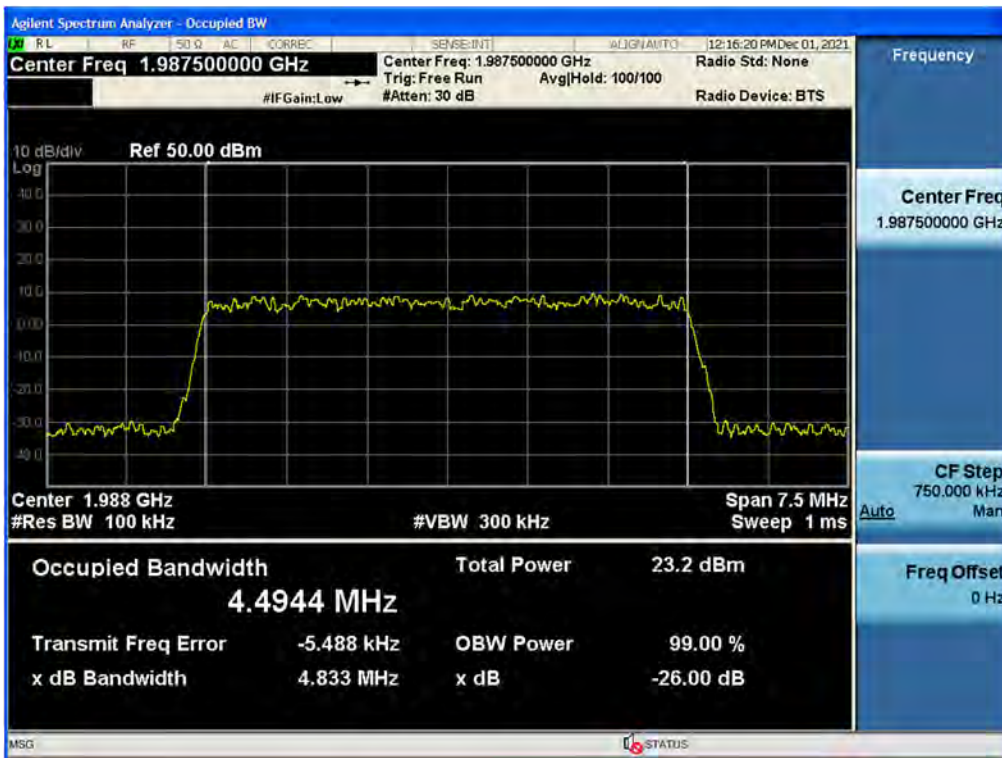
Antenna 0 / B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / B2 LTE 15 MHz / 64QAM / Low

Antenna 0 / B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / B2 LTE 5 MHz / 64QAM / High


Antenna 1 / 5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 5G NR n2 5 MHz / QPSK / Low

Antenna 1 / 5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 5G NR n2 5 MHz / QPSK / High


Antenna 1 / 5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 5G NR n2 15 MHz / 16QAM / Low



Antenna 1 / 5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 5G NR n2 5 MHz / 16QAM / High



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.

§ 22.917 Emission limitations for cellular equipment.

The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

- (a) *Out of band emissions.* The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.
- (b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a reference bandwidth as follows:
 - (1) In the spectrum below 1 GHz, instrumentation should employ a reference bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy, provided that the measured power is integrated over the full required reference bandwidth (i.e., 100 kHz or 1 percent of emission bandwidth, as specified). 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.
 - (2) In the spectrum above 1 GHz, instrumentation should employ a reference bandwidth of 1 MHz.
- (c) *Alternative out of band emission limit.* Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas, in lieu of that set forth in this section, pursuant to a private contractual arrangement of all affected licensees and applicants. In this event, each party to such contract shall maintain a copy of the contract in their station files and disclose it to prospective assignees or transferees and, upon request, to the FCC.
- (d) *Interference caused by out of band emissions.* If any emission from a transmitter operating in this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than specified in this section.

§ 24.238 Emission limitations for Broadband PCS equipment.

The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.

- (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

- (b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). 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.
- (c) Alternative out of band emission limit. Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas, in lieu of that set forth in this section, pursuant to a private contractual arrangement of all affected licensees and applicants. In this event, each party to such contract shall maintain a copy of the contract in their station files and disclose it to prospective assignees or transferees and, upon request, to the FCC.
- (d) Interference caused by out of band emissions. If any emission from a transmitter operating in this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than

Test Procedures:

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

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 $\geq 2 \times \text{span} / \text{RBW}$.
- 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 $\geq 98\%$), set the (sweep time) $>$ (number of points in sweep) \times (symbol period) (e.g., by a factor of $10 \times$ symbol period \times 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) \times (transmitter period) (i.e., the transmit on-time + the off-time). The spectrum analyzer readings shall subsequently be corrected by $[10 \log (1/\text{duty cycle})]$. This assumes that the transmission period and duty cycle is relatively constant (duty cycle variation $\leq \pm 2\%$).
 - 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) \times (transmitter period) (i.e., the transmit on-time + the off-time). The spectrum analyzer readings

shall subsequently be corrected by $[10 \log (1/\text{duty cycle})]$. This assumes that the transmission period and duty cycle is relatively constant (duty cycle variation $\leq \pm 2\%$).

- 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 $> \pm 2\%$), set the sweep time so that the averaging is performed over the on-period by setting the sweep time $> (\text{symbol period}) \times (\text{number of points})$, while also maintaining the sweep time $< (\text{transmitter on-time})$. 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:

2. Due to MIMO operations, a correction has been added to the limit according to KDB 662911 D01 v02r01.
 - 2Tx MIMO correction: $10 \log(N_{\text{ANT}}) = 10 \log(2) = 3.01 \text{ dB} // -13 \text{ dBm} - 10 \log(2) = -16.01 \text{ dBm}$
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

B2 LTE 5 MHz 1 Carrier

Ant.	Mod.	Channel	Frequency (MHz)	Measured Value (dBm)
0	QPSK	Low	1929.98	-32.49
		High	1990.03	-32.80
	16QAM	Low	1929.98	-32.71
		High	1990.03	-32.83
	64QAM	Low	1929.98	-31.86
		High	1990.03	-32.80
	256QAM	Low	1929.98	-32.62
		High	1990.03	-33.35
1	QPSK	Low	1929.98	-32.84
		High	1990.03	-32.34
	16QAM	Low	1929.98	-32.12
		High	1990.03	-32.36
	64QAM	Low	1929.98	-31.68
		High	1990.03	-32.45
	256QAM	Low	1929.98	-31.93
		High	1990.03	-31.86

B2 LTE 10 MHz 1 Carrier

Ant.	Mod.	Channel	Frequency (MHz)	Measured Value (dBm)
0	QPSK	Low	1929.95	-29.44
		High	1990.05	-29.92
	16QAM	Low	1929.95	-29.24
		High	1990.05	-29.47
	64QAM	Low	1929.95	-29.54
		High	1990.05	-30.63
	256QAM	Low	1929.95	-29.98
		High	1990.05	-28.47
1	QPSK	Low	1929.95	-29.47
		High	1990.05	-29.82
	16QAM	Low	1929.95	-29.36
		High	1990.05	-29.19
	64QAM	Low	1929.95	-29.61
		High	1990.05	-29.40
	256QAM	Low	1929.95	-28.99
		High	1990.05	-29.66

B2 LTE 15 MHz 1 Carrier

Ant.	Mod.	Channel	Frequency (MHz)	Measured Value (dBm)
0	QPSK	Low	1929.93	-28.06
		High	1990.08	-27.71
	16QAM	Low	1929.93	-27.60
		High	1990.08	-27.76
	64QAM	Low	1929.93	-27.09
		High	1990.08	-27.18
	256QAM	Low	1929.93	-27.69
		High	1990.08	-28.00
1	QPSK	Low	1929.93	-27.43
		High	1990.08	-27.52
	16QAM	Low	1929.93	-27.90
		High	1990.08	-27.63
	64QAM	Low	1929.93	-27.03
		High	1990.08	-27.82
	256QAM	Low	1929.93	-27.54
		High	1990.08	-27.84

B2 LTE 20 MHz 1 Carrier

Ant.	Mod.	Channel	Frequency (MHz)	Measured Value (dBm)
0	QPSK	Low	1929.90	-26.78
		High	1990.10	-26.98
	16QAM	Low	1929.90	-26.33
		High	1990.10	-25.98
	64QAM	Low	1929.90	-26.38
		High	1990.10	-26.68
	256QAM	Low	1929.90	-27.10
		High	1990.10	-26.33
1	QPSK	Low	1929.90	-26.16
		High	1990.10	-26.47
	16QAM	Low	1929.90	-26.27
		High	1990.10	-26.14
	64QAM	Low	1929.90	-26.36
		High	1990.10	-26.46
	256QAM	Low	1929.90	-26.73
		High	1990.10	-26.63

B5 LTE 5 MHz 1 Carrier

Ant.	Mod.	Channel	Frequency (MHz)	Measured Value (dBm)
0	QPSK	Low	868.98	-33.43
		High	894.03	-34.66
	16QAM	Low	868.98	-33.58
		High	894.03	-34.20
	64QAM	Low	868.98	-33.21
		High	894.03	-33.47
	256QAM	Low	868.98	-33.24
		High	894.03	-33.43
1	QPSK	Low	868.98	-33.47
		High	894.03	-34.09
	16QAM	Low	868.98	-32.99
		High	894.03	-33.60
	64QAM	Low	868.98	-33.67
		High	894.03	-34.45
	256QAM	Low	868.98	-34.01
		High	894.03	-33.46

B5 LTE 10 MHz 1 Carrier

Ant.	Mod.	Channel	Frequency (MHz)	Measured Value (dBm)
0	QPSK	Low	868.95	-31.33
		High	894.05	-30.90
	16QAM	Low	868.95	-31.19
		High	894.05	-32.02
	64QAM	Low	868.95	-31.90
		High	894.05	-31.45
	256QAM	Low	868.95	-31.08
		High	894.05	-31.31
1	QPSK	Low	868.95	-31.18
		High	894.05	-30.61
	16QAM	Low	868.95	-30.92
		High	894.05	-30.49
	64QAM	Low	868.95	-31.89
		High	894.05	-31.22
	256QAM	Low	868.95	-30.58
		High	894.05	-30.70

Tabular Data of Contiguous Out-of-band Unwanted Emissions

B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Mod.	Channel	Frequency (MHz)	Measured Value (dBm)
0	QPSK	Low	1929.98	-33.11
		High	1990.03	-33.26
	16QAM	Low	1929.98	-33.07
		High	1990.03	-32.10
	64QAM	Low	1929.98	-32.84
		High	1990.03	-33.00
	256QAM	Low	1929.98	-32.03
		High	1990.03	-32.66
1	QPSK	Low	1929.98	-32.53
		High	1990.03	-32.26
	16QAM	Low	1929.98	-32.21
		High	1990.03	-32.09
	64QAM	Low	1929.98	-31.49
		High	1990.03	-32.27
	256QAM	Low	1929.98	-31.79
		High	1990.03	-31.84

B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Mod.	Channel	Frequency (MHz)	Measured Value (dBm)
0	QPSK	Low	1929.93	-27.78
		High	1990.03	-32.79
	16QAM	Low	1929.93	-27.77
		High	1990.03	-32.73
	64QAM	Low	1929.93	-27.20
		High	1990.03	-33.05
	256QAM	Low	1929.93	-28.00
		High	1990.03	-33.25
1	QPSK	Low	1929.93	-27.42
		High	1990.03	-32.84
	16QAM	Low	1929.93	-28.30
		High	1990.03	-32.91
	64QAM	Low	1929.93	-27.52
		High	1990.03	-33.12
	256QAM	Low	1929.93	-28.04
		High	1990.03	-32.24

5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Mod.	Channel	Frequency (MHz)	Measured Value (dBm)
0	QPSK	Low	1929.98	-32.06
		High	1990.03	-32.37
	16QAM	Low	1929.98	-33.32
		High	1990.03	-32.76
	64QAM	Low	1929.98	-32.89
		High	1990.03	-32.59
	256QAM	Low	1929.98	-32.31
		High	1990.03	-32.98
1	QPSK	Low	1929.98	-31.61
		High	1990.03	-33.68
	16QAM	Low	1929.98	-32.98
		High	1990.03	-32.19
	64QAM	Low	1929.98	-32.47
		High	1990.03	-32.10
	256QAM	Low	1929.98	-31.76
		High	1990.03	-32.71

5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Mod.	Channel	Frequency (MHz)	Measured Value (dBm)
0	QPSK	Low	1929.93	-27.65
		High	1990.03	-32.21
	16QAM	Low	1929.93	-27.53
		High	1990.03	-31.88
	64QAM	Low	1929.93	-27.75
		High	1990.03	-32.65
	256QAM	Low	1929.93	-27.70
		High	1990.03	-33.15
1	QPSK	Low	1929.93	-27.72
		High	1990.03	-32.07
	16QAM	Low	1929.93	-27.44
		High	1990.03	-32.38
	64QAM	Low	1929.93	-27.57
		High	1990.03	-32.69
	256QAM	Low	1929.93	-27.68
		High	1990.03	-32.03

Tabular Data of Non-Contiguous Out-of-band Unwanted Emissions

B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Mod.	Channel	Frequency (MHz)	Measured Value (dBm)
0	QPSK	Low	1929.98	-31.85
		High	1990.03	-31.65
	16QAM	Low	1929.98	-32.77
		High	1990.03	-32.30
	64QAM	Low	1929.98	-32.01
		High	1990.03	-31.67
	256QAM	Low	1929.98	-32.22
		High	1990.03	-31.42
1	QPSK	Low	1929.98	-32.32
		High	1990.03	-31.98
	16QAM	Low	1929.98	-32.22
		High	1990.03	-32.11
	64QAM	Low	1929.98	-31.92
		High	1990.03	-32.46
	256QAM	Low	1929.98	-32.28
		High	1990.03	-31.87

B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

Ant.	Mod.	Channel	Frequency (MHz)	Measured Value (dBm)
0	QPSK	Low	1929.93	-28.22
		High	1990.03	-32.82
	16QAM	Low	1929.93	-28.71
		High	1990.03	-32.61
	64QAM	Low	1929.93	-28.03
		High	1990.03	-32.32
	256QAM	Low	1929.93	-28.24
		High	1990.03	-32.74
1	QPSK	Low	1929.93	-27.95
		High	1990.03	-32.76
	16QAM	Low	1929.93	-27.71
		High	1990.03	-32.96
	64QAM	Low	1929.93	-27.40
		High	1990.03	-33.04
	256QAM	Low	1929.93	-26.78
		High	1990.03	-32.36

5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

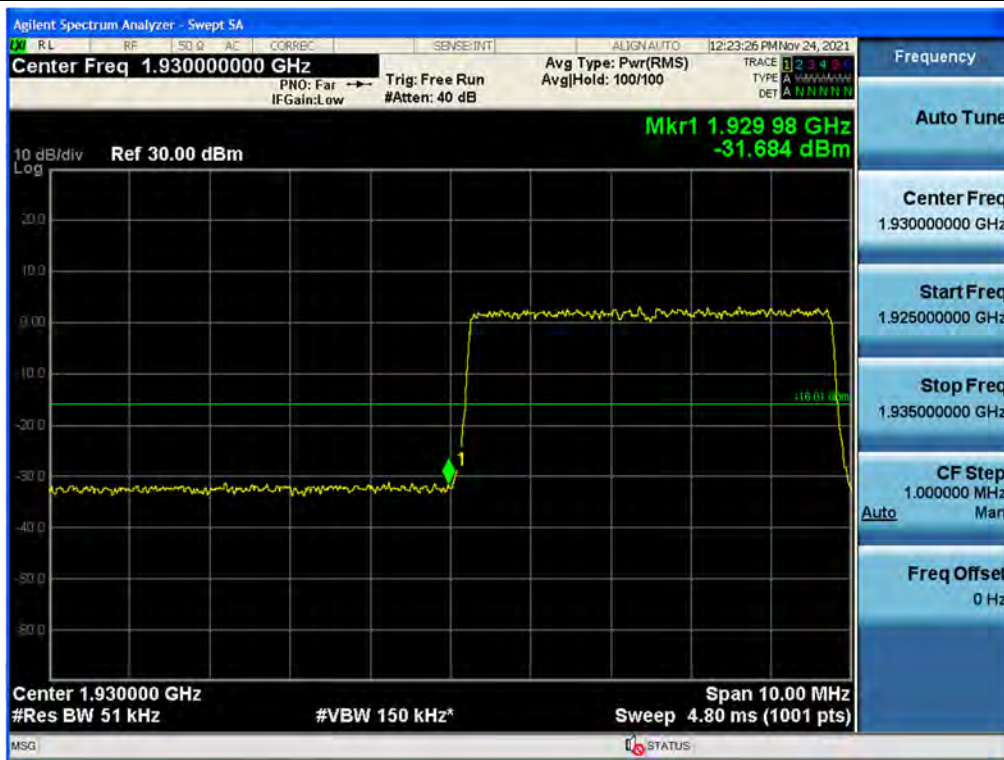
Ant.	Mod.	Channel	Frequency (MHz)	Measured Value (dBm)
0	QPSK	Low	1929.98	-32.71
		High	1990.03	-32.74
	16QAM	Low	1929.98	-33.26
		High	1990.03	-31.68
	64QAM	Low	1929.98	-33.15
		High	1990.03	-32.49
	256QAM	Low	1929.98	-32.30
		High	1990.03	-32.71
1	QPSK	Low	1929.98	-32.79
		High	1990.03	-32.62
	16QAM	Low	1929.98	-32.75
		High	1990.03	-32.38
	64QAM	Low	1929.98	-32.89
		High	1990.03	-33.08
	256QAM	Low	1929.98	-32.81
		High	1990.03	-32.86

5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]

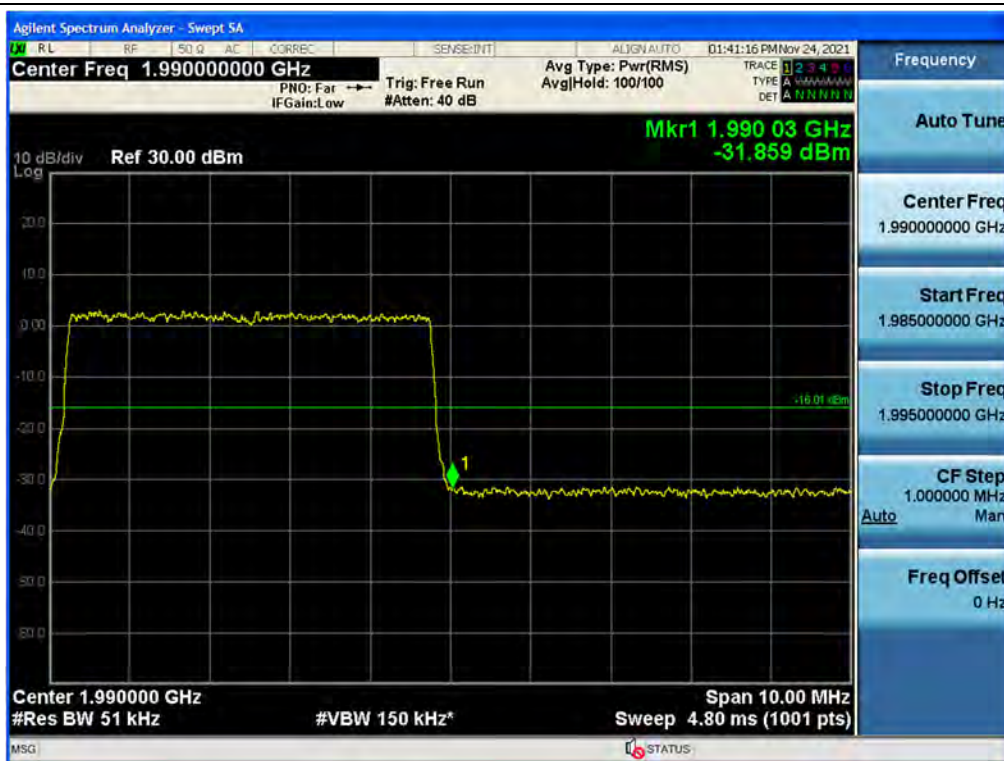
Ant.	Mod.	Channel	Frequency (MHz)	Measured Value (dBm)
0	QPSK	Low	1929.93	-27.95
		High	1990.03	-32.42
	16QAM	Low	1929.93	-27.63
		High	1990.03	-33.08
	64QAM	Low	1929.93	-27.90
		High	1990.03	-32.99
	256QAM	Low	1929.93	-28.01
		High	1990.03	-32.54
1	QPSK	Low	1929.93	-28.37
		High	1990.03	-31.97
	16QAM	Low	1929.93	-27.65
		High	1990.03	-32.69
	64QAM	Low	1929.93	-27.45
		High	1990.03	-32.64
	256QAM	Low	1929.93	-28.03
		High	1990.03	-32.27

Plot Data of Out-of-band Unwanted Emissions

Antenna 1 / B2 LTE 5 MHz 1 Carrier / 64QAM / Low



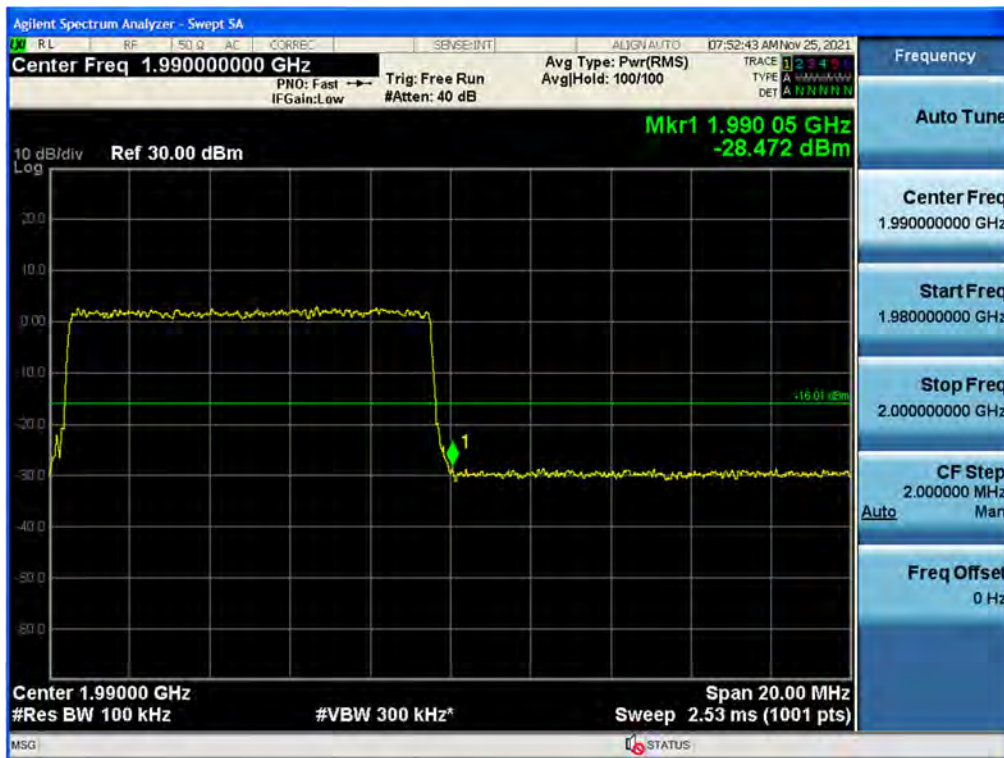
Antenna 1 / B2 LTE 5 MHz 1 Carrier / 256QAM / High



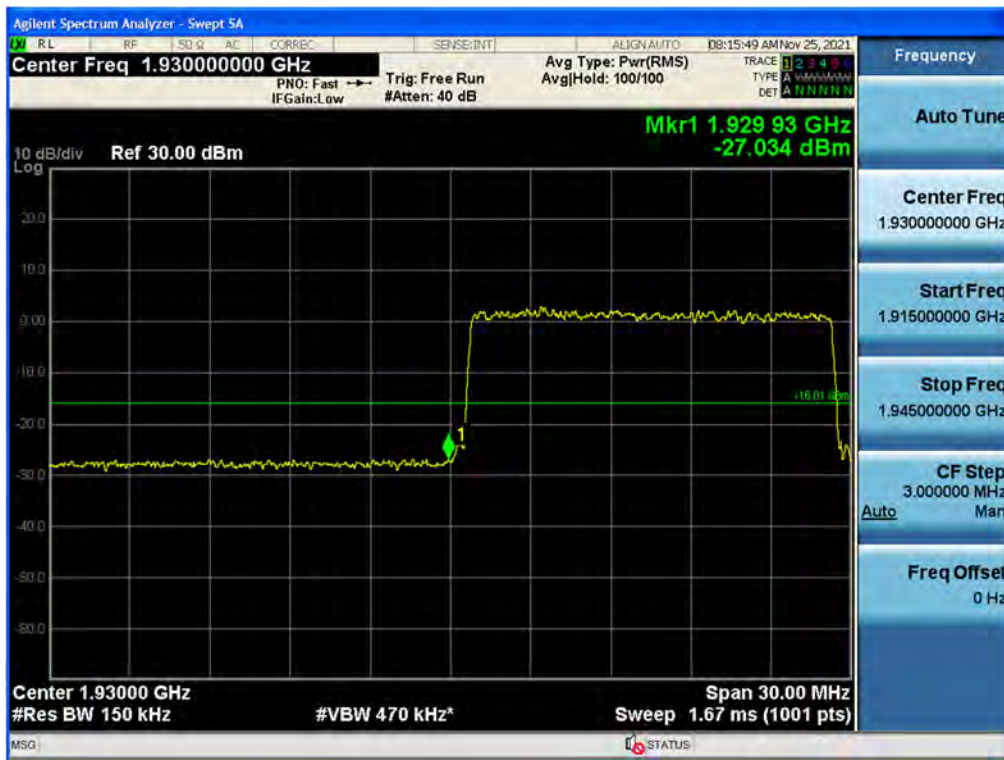
Antenna 1 / B2 LTE 10 MHz 1 Carrier / 256QAM / Low



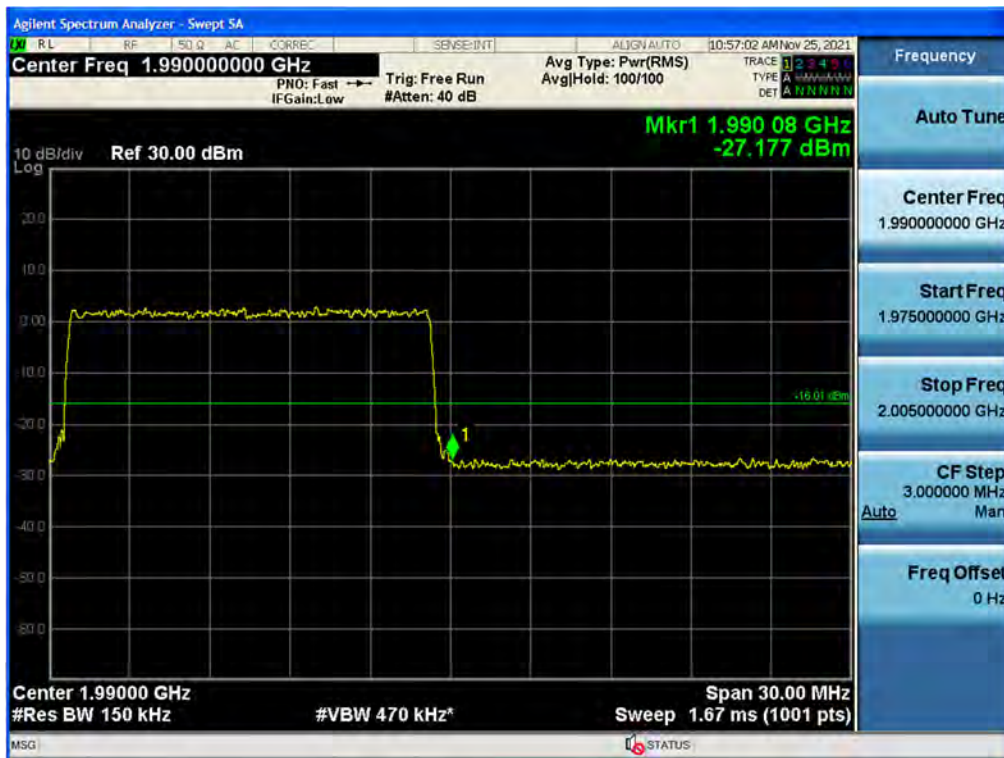
Antenna 0 / B2 LTE 10 MHz 1 Carrier / 256QAM / High



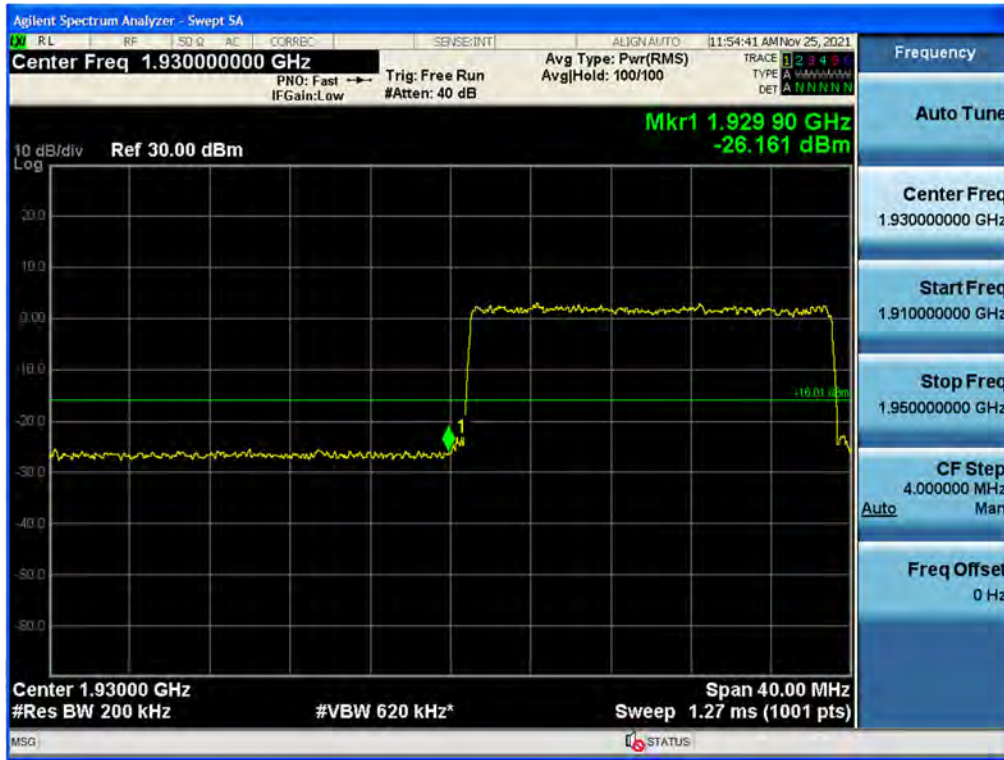
Antenna 1 / B2 LTE 15 MHz 1 Carrier / 64QAM / Low



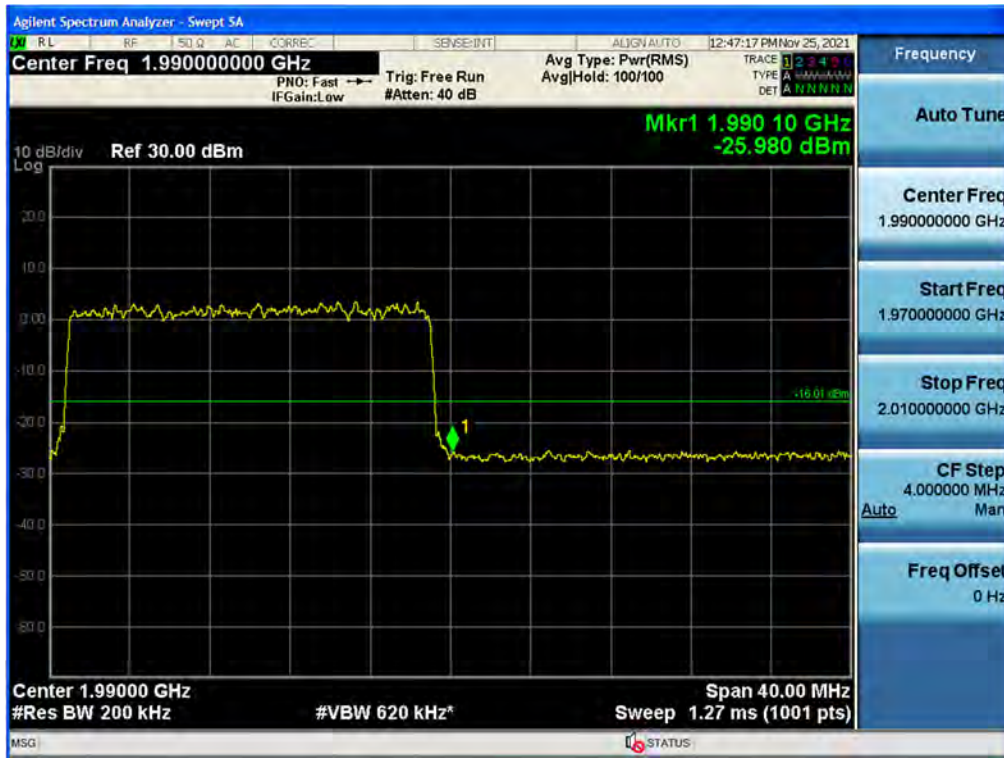
Antenna 0 / B2 LTE 15 MHz 1 Carrier / 64QAM / High



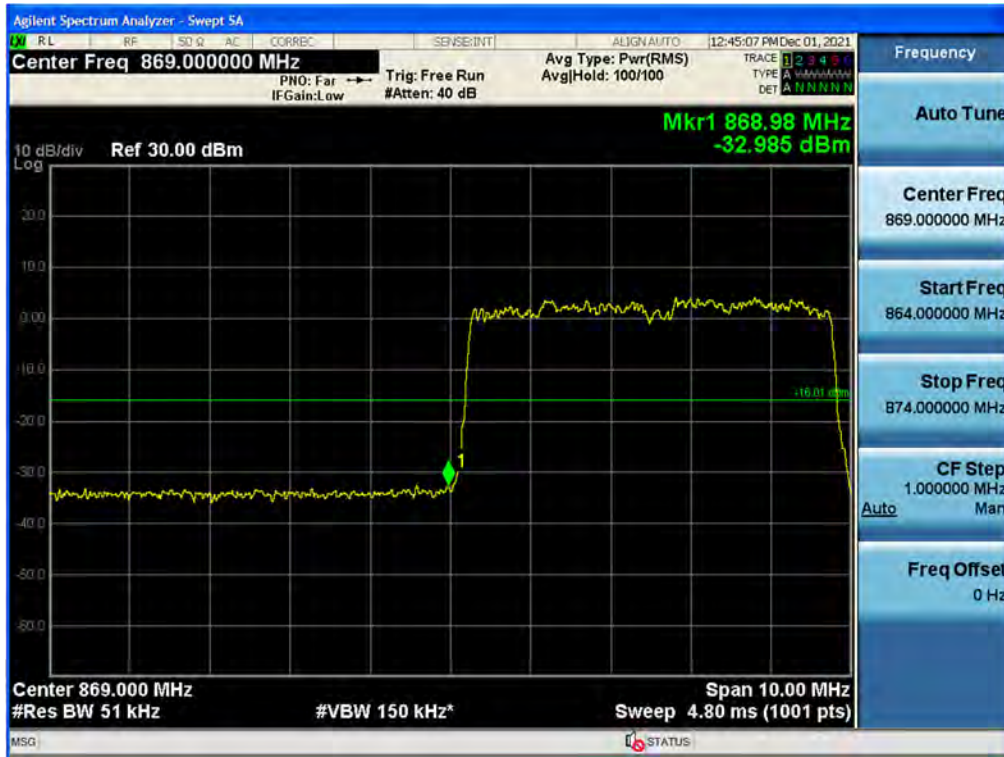
Antenna 1 / B2 LTE 20 MHz 1 Carrier / QPSK / Low



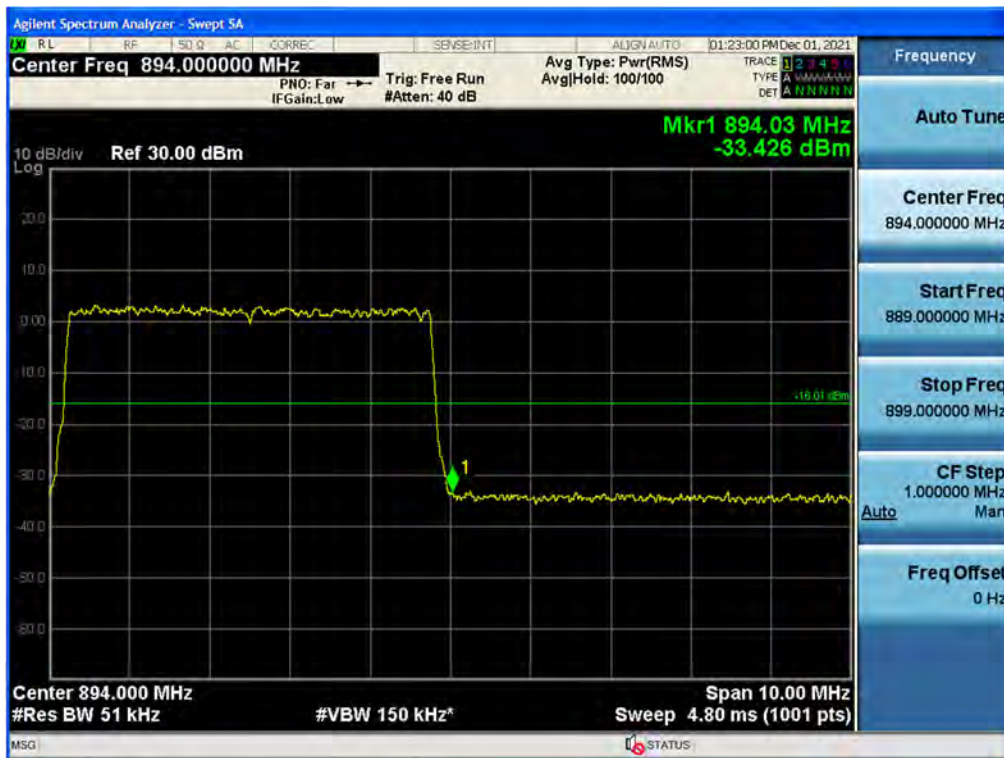
Antenna 0 / B2 LTE 20 MHz 1 Carrier / 16QAM / High



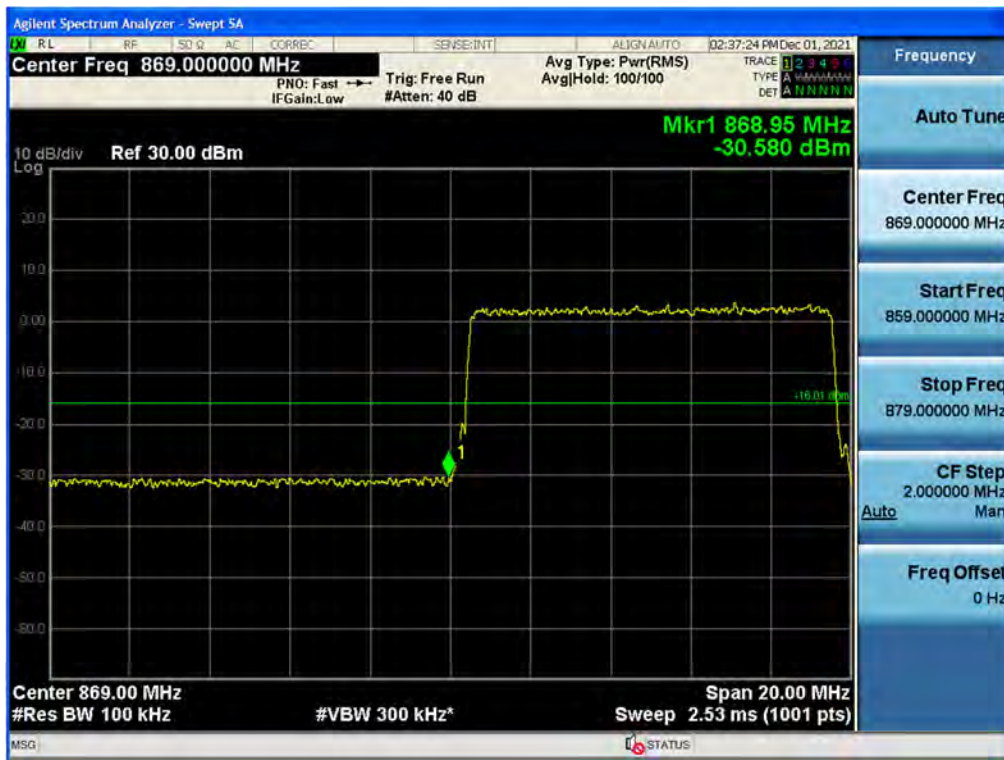
Antenna 1 / B5 LTE 5 MHz 1 Carrier / 16QAM / Low



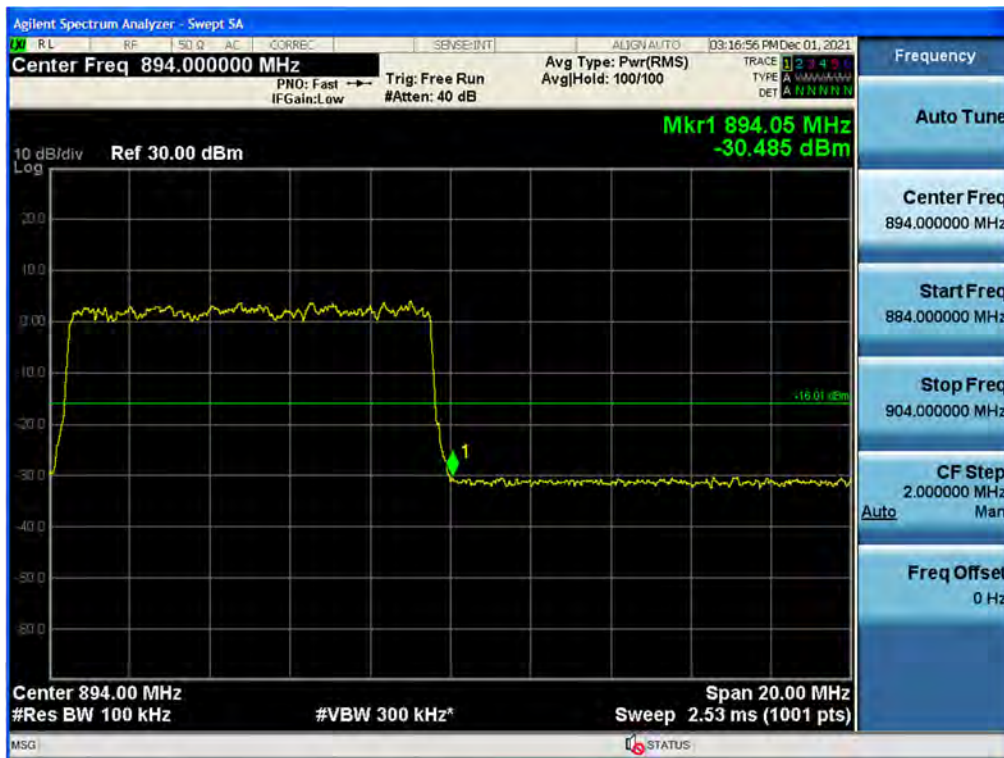
Antenna 0 / B5 LTE 5 MHz 1 Carrier / 256QAM / High



Antenna 1 / B5 LTE 10 MHz 1 Carrier / 256QAM / Low



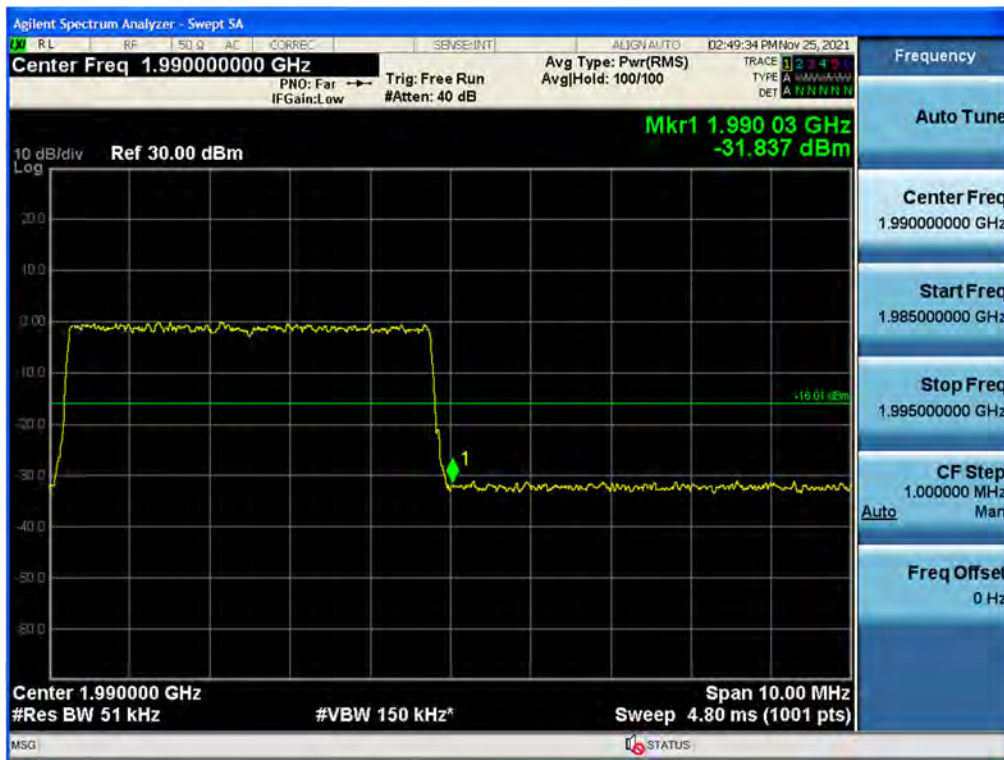
Antenna 1 / B5 LTE 10 MHz 1 Carrier / 16QAM / High



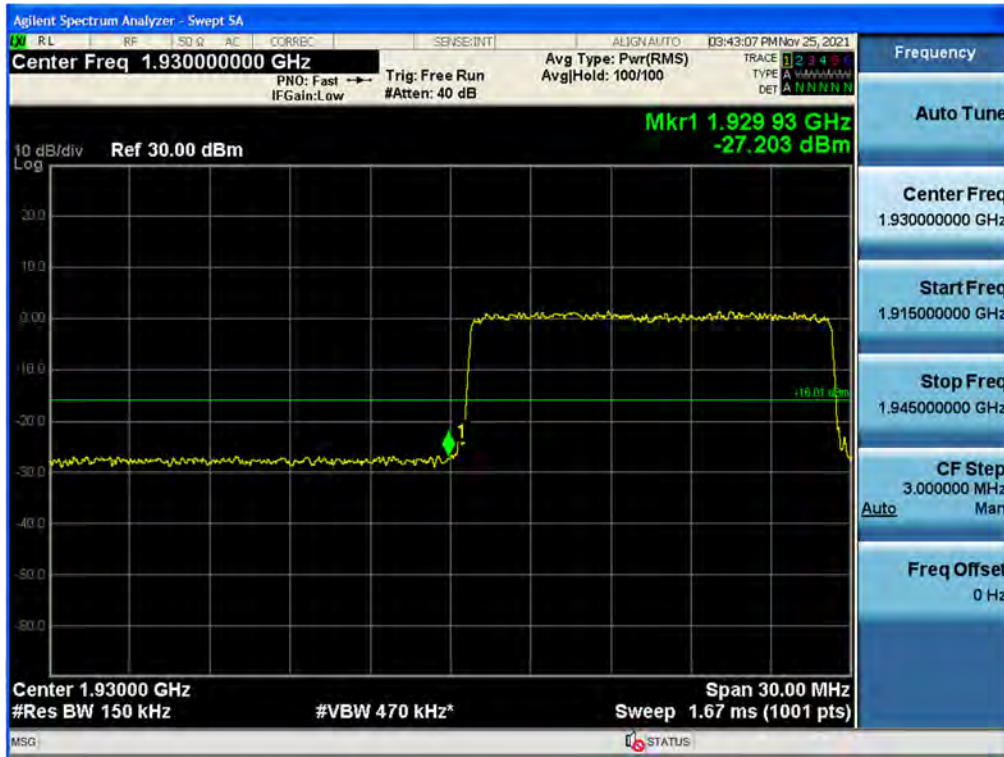
Antenna 1 / B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / 64QAM / Low



Antenna 1 / B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / 256QAM / High



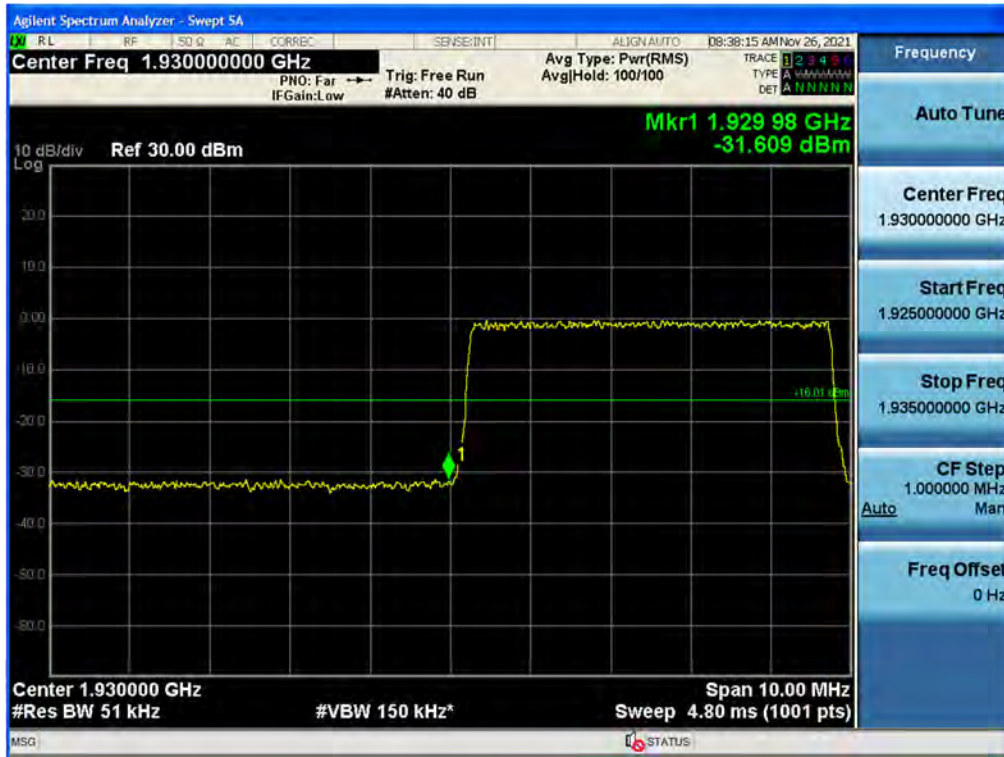
Antenna 0 / B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / 64QAM / Low



Antenna 1 / B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / 256QAM / High



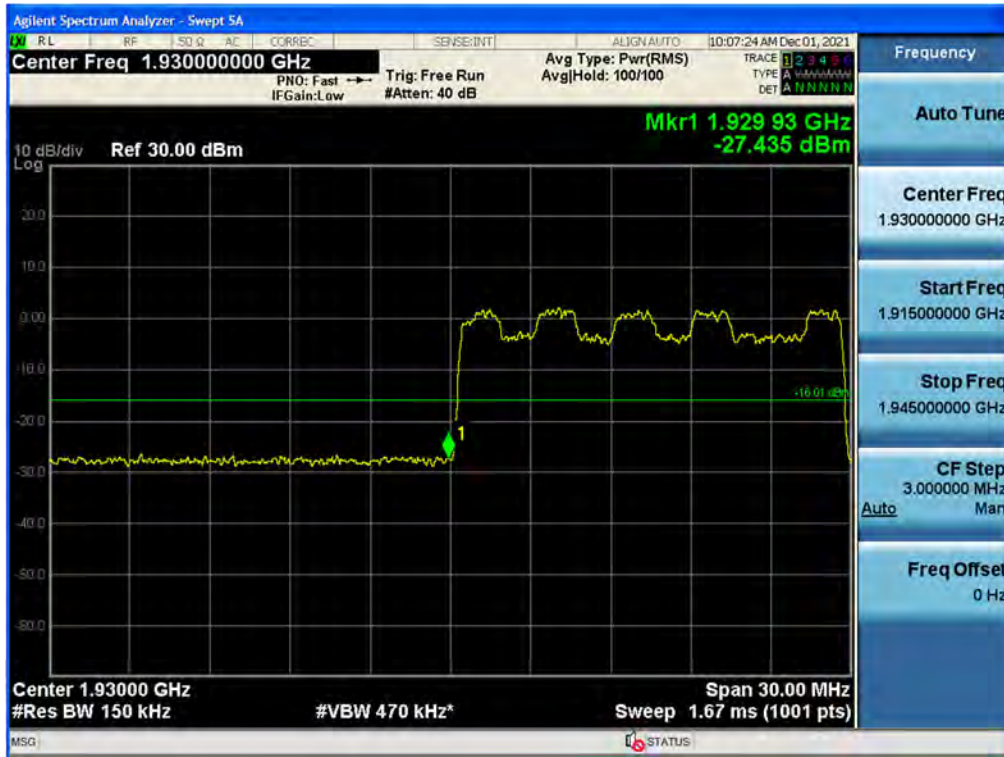
Antenna 1 / 5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / QPSK / Low



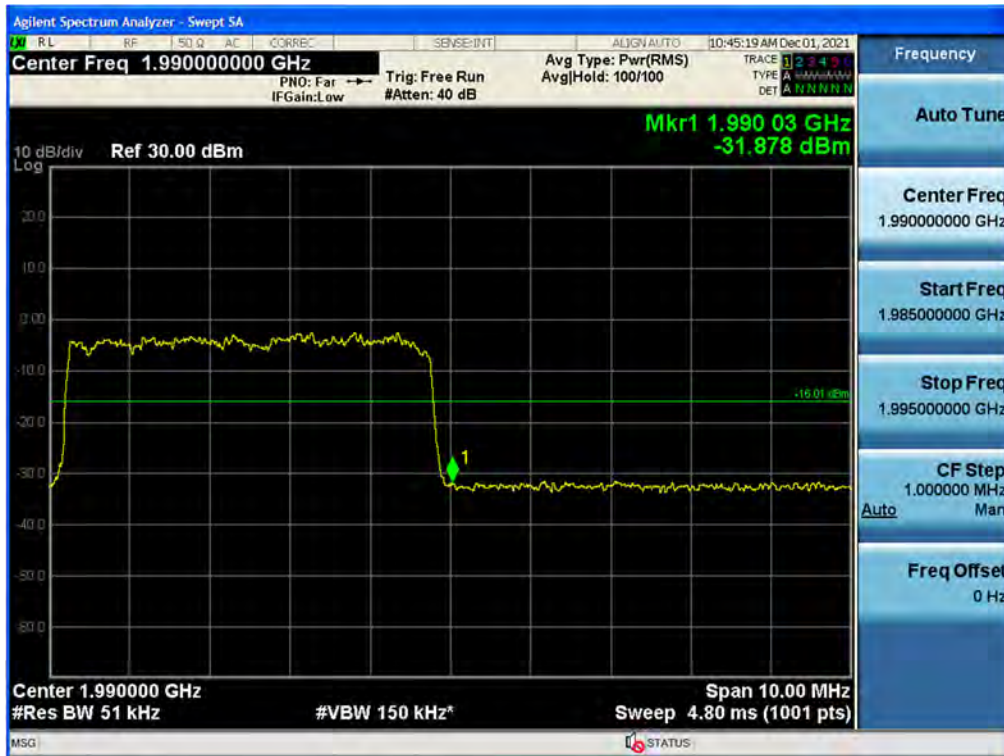
Antenna 1 / 5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / 64QAM / High



Antenna 1 / 5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / 16QAM / Low



Antenna 0 / 5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / 16QAM / High



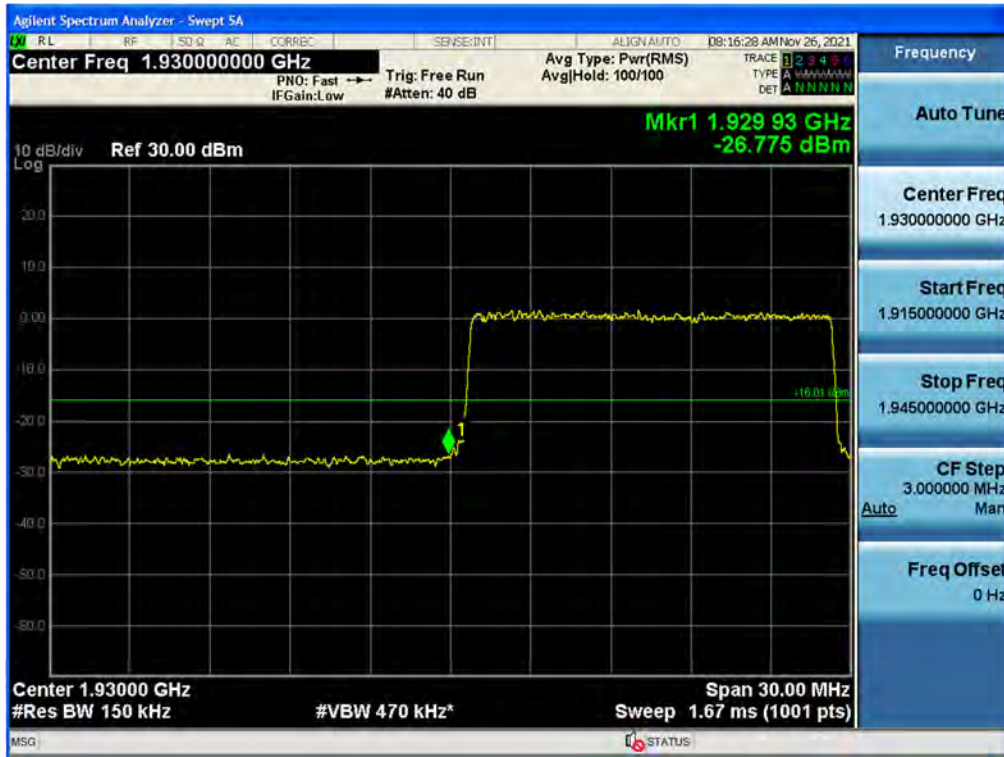
Antenna 0 / B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / QPSK / Low



Antenna 0 / B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 256QAM / High



Antenna 1 / B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 256QAM / Low



Antenna 0 / B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 64QAM / High



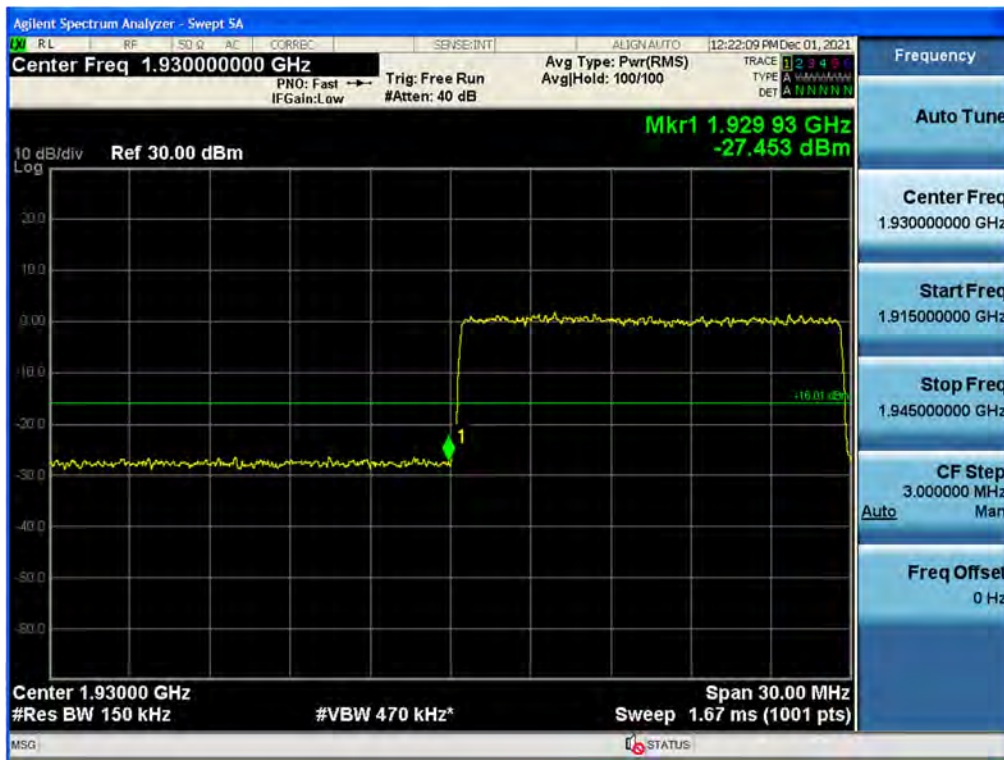
Antenna 0 / 5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 256QAM / Low



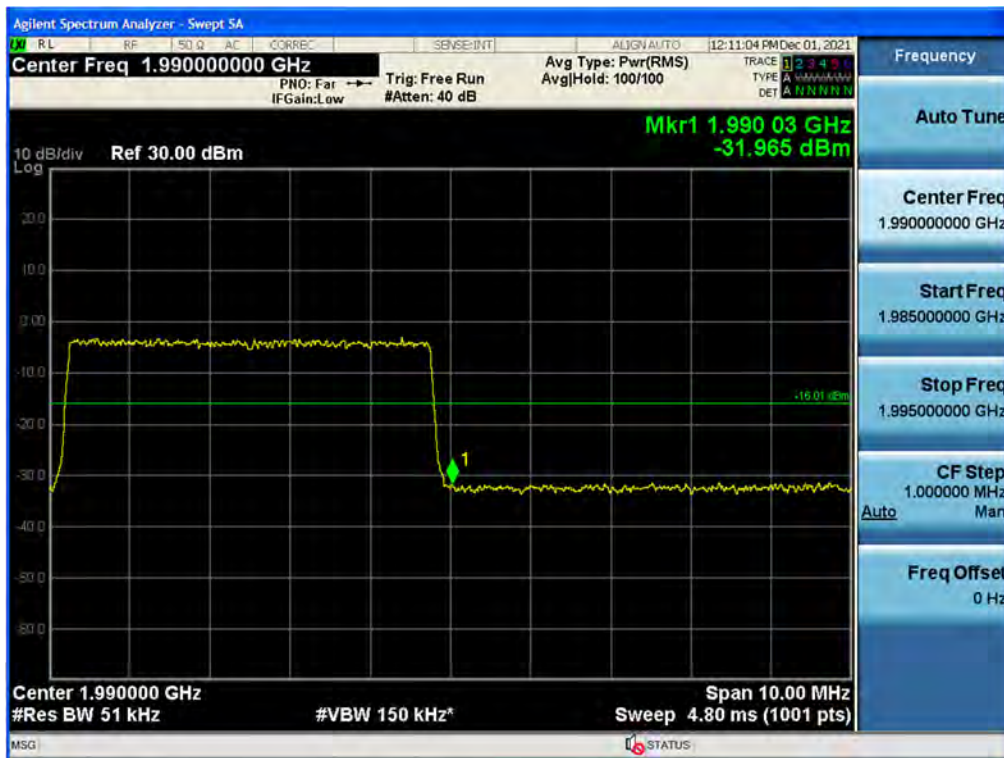
Antenna 0 / 5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 16QAM / High



Antenna 1 / 5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 64QAM / Low



Antenna 1 / 5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Non-Contiguous / 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.

§ 22.917 Emission limitations for cellular equipment.

The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

- (a) *Out of band emissions.* The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.
- (b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a reference bandwidth as follows:
 - (1) In the spectrum below 1 GHz, instrumentation should employ a reference bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy, provided that the measured power is integrated over the full required reference bandwidth (i.e., 100 kHz or 1 percent of emission bandwidth, as specified). 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.
 - (2) In the spectrum above 1 GHz, instrumentation should employ a reference bandwidth of 1 MHz.
- (c) *Alternative out of band emission limit.* Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas, in lieu of that set forth in this section, pursuant to a private contractual arrangement of all affected licensees and applicants. In this event, each party to such contract shall maintain a copy of the contract in their station files and disclose it to prospective assignees or transferees and, upon request, to the FCC.
- (d) *Interference caused by out of band emissions.* If any emission from a transmitter operating in this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than specified in this section.

§ 24.238 Emission limitations for Broadband PCS equipment.

The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.

- (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

- (b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). 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.
- (c) Alternative out of band emission limit. Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas, in lieu of that set forth in this section, pursuant to a private contractual arrangement of all affected licensees and applicants. In this event, each party to such contract shall maintain a copy of the contract in their station files and disclose it to prospective assignees or transferees and, upon request, to the FCC.
- (d) Interference caused by out of band emissions. If any emission from a transmitter operating in this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than

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 $\geq 2 \times (\text{span} / \text{RBW})$. 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.
 $- 10 \log [(reference\ bandwidth)/(resolution\ bandwidth)]$

RBW narrower correction factor	B2	B5
9 kHz to 150 kHz applied 1 kHz RBW	$10 \log (1\text{ MHz} / 1\text{ kHz}) = 30\text{ dB}$	$10 \log (100\text{ kHz} / 1\text{ kHz}) = 20\text{ dB}$
150 kHz to 30 MHz applied 10 kHz RBW	$10 \log (1\text{ MHz} / 10\text{ kHz}) = 20\text{ dB}$	$10 \log (100\text{ kHz} / 10\text{ kHz}) = 10\text{ dB}$
Edge freq. to edge $\pm 100\text{ MHz}$ applied 100 kHz RBW	$10 \log (1\text{ MHz} / 100\text{ kHz}) = 10\text{ dB}$	-

2. Due to MIMO operations, a correction has been added to the limit according to KDB 662911 D01 v02r01.
 - 2Tx MIMO correction: $10 \log(N_{ANT}) = 10 \log(2) = 3.01\text{ dB} // -13\text{ dBm} - 10 * \log(2) = -16.01\text{ dBm}$
3. 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 Radiated Spurious Emissions
B2 LTE 5 MHz 1 Carrier
Test Result for Output Port 0

Mod.	Channel	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
QPSK	Low	-25.664	-38.858	-35.048	-28.831	-28.266	-23.687	-22.425
	Middle	-28.619	-39.757	-35.384	-28.737	-27.942	-23.790	-22.722
	High	-26.561	-37.783	-35.314	-28.799	-28.085	-22.928	-22.273
16QAM	Low	-26.744	-38.421	-35.865	-28.869	-28.205	-23.411	-22.802
	Middle	-27.100	-40.654	-34.948	-28.473	-28.381	-23.579	-21.883
	High	-27.752	-37.902	-35.253	-28.781	-28.190	-23.743	-22.507
64QAM	Low	-27.253	-39.828	-34.149	-28.918	-28.334	-22.952	-22.644
	Middle	-26.110	-39.195	-35.437	-28.748	-28.251	-23.521	-21.406
	High	-26.944	-41.395	-34.925	-28.725	-28.183	-23.832	-22.787
256QAM	Low	-26.480	-38.203	-35.514	-28.557	-28.032	-23.350	-22.624
	Middle	-27.977	-39.009	-35.619	-28.873	-28.132	-23.481	-22.499
	High	-27.245	-40.841	-34.927	-28.659	-28.164	-23.735	-22.219

Test Result for Output Port 1

Mod.	Channel	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
QPSK	Low	-26.267	-39.107	-35.076	-28.560	-28.124	-22.363	-20.480
	Middle	-27.485	-39.940	-34.940	-28.525	-28.095	-23.908	-20.197
	High	-26.065	-39.608	-35.021	-28.616	-27.992	-23.979	-20.270
16QAM	Low	-26.463	-39.901	-34.935	-28.609	-27.907	-23.848	-20.269
	Middle	-26.709	-40.348	-35.302	-28.703	-28.021	-23.771	-20.213
	High	-26.549	-39.444	-35.183	-28.654	-28.157	-23.035	-20.240
64QAM	Low	-26.713	-39.070	-35.223	-28.641	-28.216	-23.677	-20.148
	Middle	-27.766	-39.050	-34.887	-28.462	-27.991	-23.255	-20.037
	High	-27.724	-39.586	-34.442	-28.525	-27.935	-23.517	-19.795
256QAM	Low	-25.606	-39.432	-34.735	-28.641	-28.016	-23.951	-20.193
	Middle	-27.166	-39.766	-34.800	-28.616	-28.193	-23.843	-21.036
	High	-25.819	-40.311	-34.993	-28.510	-28.006	-23.821	-20.014

**B2 LTE 10 MHz 1 Carrier
Test Result for Output Port 0**

Mod.	Channel	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
QPSK	Low	-25.576	-39.003	-34.392	-28.856	-28.142	-23.758	-22.451
	Middle	-27.821	-39.561	-34.814	-28.502	-28.085	-23.551	-22.391
	High	-27.676	-39.419	-35.551	-28.859	-28.213	-23.864	-22.936
16QAM	Low	-26.970	-40.314	-35.109	-28.727	-28.057	-24.089	-22.215
	Middle	-28.011	-39.659	-35.295	-28.544	-27.859	-23.596	-22.636
	High	-27.379	-39.797	-35.599	-28.652	-28.428	-23.481	-23.062
64QAM	Low	-27.641	-40.518	-35.128	-28.464	-28.212	-23.209	-21.925
	Middle	-26.980	-39.790	-34.570	-28.541	-28.115	-23.314	-22.106
	High	-26.786	-40.076	-35.266	-28.911	-28.309	-23.939	-22.816
256QAM	Low	-26.770	-40.156	-35.032	-28.839	-28.191	-23.050	-22.418
	Middle	-26.872	-39.986	-35.211	-28.668	-28.151	-23.989	-22.813
	High	-27.071	-38.648	-35.776	-28.496	-27.958	-23.749	-22.361

Test Result for Output Port 1

Mod.	Channel	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
QPSK	Low	-27.145	-38.247	-35.096	-28.678	-28.127	-23.981	-20.681
	Middle	-26.964	-39.918	-35.070	-28.412	-27.960	-23.590	-20.063
	High	-27.149	-40.231	-35.423	-28.819	-28.060	-24.314	-20.250
16QAM	Low	-27.182	-39.930	-35.322	-28.644	-28.062	-23.789	-19.422
	Middle	-25.615	-40.357	-35.038	-28.537	-28.205	-24.189	-19.501
	High	-27.972	-39.319	-35.537	-28.848	-27.939	-24.055	-20.901
64QAM	Low	-27.464	-40.568	-34.614	-28.633	-28.175	-23.926	-19.794
	Middle	-28.048	-40.274	-35.257	-28.413	-27.999	-23.587	-20.282
	High	-26.919	-38.946	-35.289	-28.834	-28.350	-23.491	-20.522
256QAM	Low	-25.978	-39.302	-34.506	-28.576	-28.113	-23.603	-20.002
	Middle	-27.335	-39.185	-35.441	-28.678	-28.003	-23.921	-19.957
	High	-26.618	-38.509	-35.243	-28.720	-28.270	-23.720	-20.062

**B2 LTE 15 MHz 1 Carrier
Test Result for Output Port 0**

Mod.	Channel	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
QPSK	Low	-26.925	-39.848	-35.579	-29.000	-28.461	-23.641	-22.485
	Middle	-26.108	-38.978	-34.890	-28.801	-28.351	-23.178	-22.663
	High	-28.359	-38.066	-34.735	-28.635	-28.168	-23.084	-22.526
16QAM	Low	-26.899	-39.081	-35.046	-28.892	-28.195	-23.192	-22.664
	Middle	-26.691	-39.776	-35.015	-28.851	-28.197	-23.478	-22.612
	High	-26.998	-40.817	-35.010	-28.697	-28.071	-22.526	-22.519
64QAM	Low	-26.953	-39.677	-35.666	-28.834	-28.347	-23.393	-22.341
	Middle	-26.324	-40.282	-35.440	-28.781	-28.041	-23.758	-22.400
	High	-27.410	-39.697	-35.310	-28.736	-28.043	-23.372	-22.478
256QAM	Low	-28.002	-39.798	-35.035	-29.005	-28.469	-23.339	-22.336
	Middle	-28.271	-38.633	-35.086	-28.614	-28.122	-24.105	-21.605
	High	-26.843	-40.204	-35.153	-28.856	-28.075	-23.939	-22.522

Test Result for Output Port 1

Mod.	Channel	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
QPSK	Low	-26.927	-38.729	-34.624	-28.580	-28.067	-23.548	-20.313
	Middle	-26.975	-38.677	-35.251	-28.612	-27.868	-23.953	-20.525
	High	-25.672	-40.194	-34.862	-28.495	-28.012	-23.410	-19.982
16QAM	Low	-27.427	-39.469	-35.198	-28.700	-27.934	-23.959	-20.893
	Middle	-26.391	-40.007	-34.997	-28.476	-28.024	-23.640	-20.148
	High	-26.642	-39.632	-34.703	-28.578	-27.969	-24.040	-20.046
64QAM	Low	-26.959	-40.421	-35.291	-28.582	-28.141	-24.112	-20.478
	Middle	-27.573	-40.229	-34.167	-28.571	-28.042	-23.763	-20.532
	High	-27.495	-39.600	-35.145	-28.639	-27.939	-23.731	-20.055
256QAM	Low	-27.121	-37.929	-35.063	-28.821	-28.149	-24.177	-19.166
	Middle	-26.663	-39.014	-34.913	-28.407	-27.822	-23.890	-19.820
	High	-28.236	-39.027	-35.140	-28.689	-27.894	-23.725	-19.820

**B2 LTE 20 MHz 1 Carrier
Test Result for Output Port 0**

Mod.	Channel	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
QPSK	Low	-26.533	-41.490	-34.938	-28.837	-28.095	-23.771	-22.055
	Middle	-27.150	-38.995	-34.750	-28.765	-28.002	-23.182	-22.045
	High	-26.048	-39.305	-35.476	-28.626	-27.790	-23.353	-21.959
16QAM	Low	-26.804	-39.036	-35.162	-28.803	-28.238	-23.823	-22.355
	Middle	-25.568	-40.830	-34.863	-28.686	-28.088	-23.523	-22.035
	High	-26.591	-39.277	-34.768	-28.814	-27.967	-22.946	-22.062
64QAM	Low	-27.992	-39.252	-34.295	-28.345	-28.221	-23.701	-22.124
	Middle	-27.652	-39.872	-35.527	-28.788	-28.240	-23.699	-22.184
	High	-25.697	-39.932	-35.382	-28.619	-28.098	-23.662	-22.490
256QAM	Low	-27.695	-37.961	-35.240	-28.679	-28.246	-23.723	-22.097
	Middle	-27.669	-38.298	-35.046	-28.535	-28.301	-23.081	-22.055
	High	-26.901	-38.624	-35.052	-28.689	-27.968	-23.322	-21.791

Test Result for Output Port 1

Mod.	Channel	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
QPSK	Low	-27.743	-38.845	-34.693	-28.441	-27.812	-23.138	-20.381
	Middle	-27.545	-39.147	-34.629	-28.524	-28.027	-23.961	-19.940
	High	-25.542	-38.523	-34.819	-28.470	-27.982	-23.646	-20.281
16QAM	Low	-26.358	-40.755	-34.591	-28.629	-28.014	-23.231	-19.304
	Middle	-26.080	-39.713	-34.432	-28.540	-27.970	-23.770	-20.083
	High	-27.500	-39.795	-34.845	-28.550	-27.933	-23.503	-20.656
64QAM	Low	-24.526	-39.732	-34.873	-28.572	-28.064	-24.010	-19.666
	Middle	-27.475	-38.968	-35.076	-28.360	-28.026	-23.452	-19.323
	High	-25.698	-40.173	-34.800	-28.544	-28.074	-23.243	-19.362
256QAM	Low	-28.734	-39.455	-35.204	-28.555	-27.818	-23.699	-20.112
	Middle	-26.366	-38.717	-35.103	-28.624	-28.084	-23.772	-20.044
	High	-28.042	-39.148	-35.345	-28.619	-28.023	-23.457	-20.260

**B5 LTE 5 MHz 1 Carrier
Test Result for Output Port 0**

Mod.	Channel	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 ~ 1 GHz	1 GHz ~ 10 GHz
QPSK	Low	-37.759	-49.473	-47.276	-40.438	-40.303	-23.480
	Middle	-36.086	-50.825	-47.731	-40.476	-40.126	-23.919
	High	-38.164	-48.635	-46.807	-40.290	-40.112	-24.097
16QAM	Low	-38.003	-48.198	-47.592	-40.402	-40.295	-23.780
	Middle	-37.402	-47.885	-46.747	-40.557	-40.289	-23.531
	High	-37.837	-47.713	-47.154	-40.626	-40.073	-23.796
64QAM	Low	-36.162	-49.245	-47.228	-40.579	-40.003	-24.009
	Middle	-38.042	-49.042	-47.168	-40.462	-40.158	-23.272
	High	-37.281	-48.710	-47.002	-40.579	-39.994	-24.107
256QAM	Low	-37.156	-48.990	-47.227	-40.401	-40.142	-24.005
	Middle	-36.617	-48.946	-47.047	-40.556	-40.071	-24.466
	High	-37.461	-49.262	-47.217	-40.556	-40.253	-23.583

Test Result for Output Port 1

Mod.	Channel	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 ~ 1 GHz	1 GHz ~ 10 GHz
QPSK	Low	-37.186	-49.535	-46.686	-40.406	-40.186	-24.300
	Middle	-36.679	-49.848	-46.848	-40.376	-40.321	-23.825
	High	-36.819	-50.630	-47.054	-40.319	-39.829	-23.609
16QAM	Low	-37.259	-49.023	-46.952	-40.491	-40.139	-24.267
	Middle	-37.300	-49.017	-46.828	-40.499	-39.899	-23.376
	High	-35.734	-50.285	-46.950	-40.370	-40.351	-23.946
64QAM	Low	-36.871	-49.281	-46.838	-40.130	-40.248	-23.690
	Middle	-35.893	-49.042	-46.913	-40.265	-40.156	-23.696
	High	-38.092	-49.996	-47.137	-40.298	-40.210	-24.443
256QAM	Low	-36.812	-47.485	-46.737	-40.409	-40.229	-23.975
	Middle	-36.416	-50.666	-47.026	-40.223	-40.191	-23.735
	High	-36.936	-49.938	-47.134	-40.496	-40.300	-23.532

**B5 LTE 10 MHz 1 Carrier
Test Result for Output Port 0**

Mod.	Channel	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 ~ 1 GHz	1 GHz ~ 10 GHz
QPSK	Low	-37.839	-49.797	-47.007	-40.428	-40.135	-23.563
	Middle	-38.553	-49.769	-47.112	-40.500	-40.294	-23.456
	High	-36.753	-48.695	-47.329	-40.600	-40.318	-23.505
16QAM	Low	-37.900	-47.776	-47.091	-40.290	-40.289	-24.021
	Middle	-35.894	-49.303	-47.405	-40.548	-40.258	-23.704
	High	-37.942	-49.649	-47.095	-40.645	-40.235	-23.277
64QAM	Low	-37.780	-48.154	-47.042	-40.532	-40.243	-23.504
	Middle	-38.142	-49.854	-47.128	-40.425	-40.227	-23.733
	High	-36.350	-49.562	-47.335	-40.325	-39.904	-24.396
256QAM	Low	-36.820	-49.778	-47.013	-40.465	-40.170	-24.096
	Middle	-36.864	-48.709	-46.912	-40.544	-40.237	-23.008
	High	-38.501	-49.028	-47.041	-40.663	-40.168	-23.292

Test Result for Output Port 1

Mod.	Channel	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 ~ 1 GHz	1 GHz ~ 10 GHz
QPSK	Low	-36.797	-49.707	-47.390	-40.497	-40.204	-23.462
	Middle	-36.486	-49.285	-46.807	-40.088	-40.043	-24.617
	High	-36.911	-49.475	-47.171	-40.034	-39.993	-23.813
16QAM	Low	-36.185	-49.416	-46.856	-40.497	-40.235	-24.124
	Middle	-36.832	-49.520	-46.561	-40.211	-39.951	-23.753
	High	-37.663	-50.174	-46.863	-40.267	-40.233	-23.600
64QAM	Low	-37.061	-48.996	-46.907	-40.534	-40.291	-23.813
	Middle	-36.273	-48.969	-46.662	-40.349	-40.300	-22.993
	High	-37.693	-50.786	-47.265	-40.398	-40.191	-24.265
256QAM	Low	-36.293	-49.047	-47.264	-40.279	-39.967	-24.122
	Middle	-36.560	-49.156	-46.970	-40.183	-40.189	-23.725
	High	-36.451	-49.073	-46.876	-40.385	-40.204	-24.103

Tabular Data of Contiguous Unwanted Emissions
B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]
Test Result for Output Port 0

Mod.	Channel	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
QPSK	Low	-26.185	-38.768	-34.880	-28.120	-28.190	-23.579	-21.930
	Middle	-26.829	-39.852	-35.647	-28.528	-28.162	-23.407	-22.096
	High	-27.694	-38.629	-34.617	-28.694	-28.132	-22.979	-21.883
16QAM	Low	-26.944	-40.636	-35.080	-28.367	-28.203	-23.591	-22.338
	Middle	-27.324	-37.932	-35.080	-28.693	-27.940	-23.677	-21.359
	High	-26.847	-39.849	-35.541	-28.871	-28.094	-23.281	-22.384
64QAM	Low	-26.852	-40.685	-34.611	-28.584	-28.253	-23.553	-22.380
	Middle	-28.358	-39.285	-35.106	-28.755	-28.115	-23.659	-22.336
	High	-27.653	-39.888	-34.969	-28.652	-27.954	-23.990	-22.346
256QAM	Low	-25.653	-39.522	-34.864	-27.916	-28.239	-23.723	-21.751
	Middle	-26.992	-39.573	-35.725	-28.482	-27.960	-23.758	-22.011
	High	-26.755	-39.983	-35.271	-28.392	-27.993	-23.760	-22.091

Test Result for Output Port 1

Mod.	Channel	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
QPSK	Low	-26.546	-40.091	-34.989	-28.421	-27.981	-23.662	-19.662
	Middle	-27.496	-39.199	-34.406	-28.077	-28.156	-23.232	-19.684
	High	-26.184	-37.665	-34.651	-28.564	-27.962	-24.096	-20.305
16QAM	Low	-27.080	-39.027	-34.506	-27.710	-28.031	-23.566	-19.226
	Middle	-26.831	-40.135	-34.458	-28.525	-28.108	-23.450	-20.215
	High	-27.368	-38.709	-35.021	-28.411	-27.867	-23.311	-19.581
64QAM	Low	-26.907	-39.139	-35.079	-28.229	-28.186	-23.470	-20.330
	Middle	-28.170	-40.145	-35.094	-28.605	-28.006	-23.362	-19.907
	High	-27.757	-39.701	-34.709	-28.617	-28.007	-24.092	-20.238
256QAM	Low	-27.317	-39.773	-35.303	-27.767	-28.095	-23.671	-19.865
	Middle	-27.387	-39.660	-34.683	-28.549	-28.006	-22.336	-20.083
	High	-27.395	-38.877	-34.852	-28.731	-27.893	-24.077	-19.396

B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]
Test Result for Output Port 0

Mod.	Channel	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
QPSK	Low	-27.317	-38.500	-35.340	-28.829	-28.162	-24.041	-22.398
	Middle	-25.959	-40.807	-34.726	-28.738	-28.065	-22.818	-22.082
	High	-27.090	-38.790	-34.701	-28.790	-28.407	-23.788	-22.184
16QAM	Low	-26.949	-40.018	-34.764	-28.565	-28.069	-23.724	-21.834
	Middle	-26.166	-38.690	-35.159	-28.618	-28.201	-23.828	-22.296
	High	-26.974	-39.524	-35.135	-28.877	-28.411	-24.124	-22.396
64QAM	Low	-26.558	-37.847	-34.595	-28.603	-28.274	-23.735	-22.444
	Middle	-26.169	-39.670	-34.963	-28.650	-28.111	-24.005	-21.940
	High	-28.552	-39.324	-35.050	-28.717	-28.365	-24.180	-22.232
256QAM	Low	-26.441	-39.211	-35.386	-28.626	-28.142	-23.726	-21.608
	Middle	-26.695	-39.450	-34.988	-28.472	-28.108	-23.653	-22.306
	High	-27.132	-40.029	-35.146	-28.797	-28.378	-23.586	-22.751

Test Result for Output Port 1

Mod.	Channel	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
QPSK	Low	-27.531	-38.003	-35.182	-28.325	-28.166	-24.217	-19.712
	Middle	-27.290	-39.517	-35.047	-28.441	-28.044	-23.729	-20.132
	High	-26.128	-39.376	-35.523	-28.594	-28.291	-23.400	-20.457
16QAM	Low	-27.932	-39.611	-34.669	-28.516	-27.927	-23.629	-19.926
	Middle	-26.126	-40.360	-34.906	-28.484	-27.984	-23.741	-19.496
	High	-25.128	-37.812	-35.463	-28.922	-28.355	-23.647	-21.068
64QAM	Low	-26.304	-38.016	-35.142	-28.418	-27.861	-23.152	-20.285
	Middle	-27.233	-39.568	-34.990	-28.548	-27.948	-23.396	-20.197
	High	-26.082	-39.092	-34.855	-28.759	-28.226	-23.616	-20.451
256QAM	Low	-26.944	-38.836	-35.174	-28.473	-28.057	-23.486	-19.247
	Middle	-26.787	-37.949	-35.098	-28.485	-27.937	-23.970	-19.747
	High	-26.336	-37.775	-35.032	-28.669	-28.195	-24.037	-20.450

**5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]
 Test Result for Output Port 0**

Mod.	Channel	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
QPSK	Low	-26.626	-38.870	-35.121	-28.809	-28.253	-23.367	-22.386
	Middle	-27.266	-38.540	-35.238	-28.941	-28.315	-23.465	-22.743
	High	-25.851	-39.203	-35.192	-28.904	-28.406	-23.823	-22.941
16QAM	Low	-26.096	-37.758	-35.424	-28.902	-28.308	-23.814	-21.999
	Middle	-27.348	-39.814	-34.834	-28.841	-28.360	-23.523	-21.944
	High	-27.715	-38.568	-35.742	-28.906	-28.331	-24.179	-22.634
64QAM	Low	-25.552	-40.093	-35.019	-28.769	-28.347	-23.957	-22.214
	Middle	-27.263	-39.539	-34.964	-28.816	-28.151	-23.377	-22.610
	High	-27.190	-39.106	-35.015	-28.875	-28.294	-23.782	-22.928
256QAM	Low	-27.166	-39.717	-35.189	-28.865	-28.219	-23.689	-21.578
	Middle	-27.359	-39.870	-35.249	-28.806	-28.284	-23.744	-22.742
	High	-26.668	-39.080	-35.333	-28.964	-28.433	-23.629	-22.878

Test Result for Output Port 1

Mod.	Channel	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
QPSK	Low	-26.356	-39.276	-35.364	-28.564	-28.160	-23.715	-19.778
	Middle	-27.396	-39.400	-34.838	-28.669	-28.240	-24.053	-20.387
	High	-26.342	-39.014	-35.380	-28.705	-27.934	-23.838	-20.685
16QAM	Low	-27.177	-38.158	-35.277	-28.705	-28.149	-23.309	-19.792
	Middle	-27.695	-39.192	-35.212	-28.661	-28.143	-23.529	-20.652
	High	-28.328	-38.974	-34.957	-28.703	-28.254	-23.390	-19.610
64QAM	Low	-26.746	-38.722	-35.045	-28.694	-28.098	-22.994	-20.403
	Middle	-27.397	-38.401	-34.952	-28.681	-28.135	-23.176	-20.172
	High	-25.547	-39.078	-35.272	-28.654	-28.082	-23.529	-20.348
256QAM	Low	-25.927	-38.517	-34.730	-28.640	-28.179	-24.068	-20.849
	Middle	-26.751	-37.547	-34.562	-28.633	-28.188	-23.825	-20.293
	High	-26.899	-39.867	-35.114	-28.792	-28.326	-24.011	-20.191

**5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]
 Test Result for Output Port 0**

Mod.	Channel	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
QPSK	Low	-26.037	-38.834	-35.110	-28.809	-28.376	-23.929	-22.183
	Middle	-27.189	-39.765	-34.592	-28.776	-28.242	-23.894	-22.473
	High	-26.284	-39.278	-34.885	-28.402	-28.163	-23.875	-22.010
16QAM	Low	-26.720	-39.712	-35.107	-28.668	-28.184	-24.207	-22.385
	Middle	-27.844	-39.087	-34.703	-28.466	-28.139	-23.409	-22.183
	High	-27.028	-39.252	-35.250	-28.707	-28.153	-23.484	-21.644
64QAM	Low	-26.955	-39.606	-34.726	-28.627	-28.192	-23.376	-22.532
	Middle	-26.815	-39.174	-34.802	-28.802	-28.222	-23.132	-22.512
	High	-26.434	-39.690	-34.958	-28.753	-28.132	-23.390	-22.710
256QAM	Low	-25.975	-39.101	-35.025	-28.818	-28.183	-22.875	-21.845
	Middle	-26.691	-40.600	-35.383	-28.727	-28.111	-23.412	-22.436
	High	-26.944	-38.738	-34.928	-28.658	-28.157	-23.480	-22.543

Test Result for Output Port 1

Mod.	Channel	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
QPSK	Low	-26.273	-39.110	-34.983	-28.516	-27.818	-24.075	-20.418
	Middle	-26.789	-39.041	-34.624	-28.710	-27.997	-23.595	-19.750
	High	-27.396	-40.447	-35.109	-28.660	-28.194	-23.396	-20.469
16QAM	Low	-26.232	-39.925	-35.311	-28.546	-27.996	-23.497	-20.698
	Middle	-25.805	-38.965	-35.372	-28.401	-27.874	-24.084	-19.769
	High	-27.678	-39.755	-35.001	-28.512	-28.096	-23.870	-20.288
64QAM	Low	-27.332	-39.109	-35.106	-28.664	-28.070	-23.990	-19.981
	Middle	-25.904	-39.617	-35.310	-28.679	-28.118	-22.862	-20.608
	High	-27.642	-38.661	-34.913	-28.492	-28.195	-23.945	-20.707
256QAM	Low	-25.667	-37.510	-34.669	-28.570	-28.019	-23.245	-20.793
	Middle	-27.429	-39.342	-34.628	-28.471	-27.900	-23.635	-20.375
	High	-26.022	-38.490	-34.761	-28.679	-28.124	-24.136	-19.950

Tabular Data of Non-Contiguous Unwanted Emissions
B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]
Test Result for Output Port 0

Mod.	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
QPSK	-26.627	-39.181	-34.884	-28.482	-28.135	-23.441	-22.057
16QAM	-27.383	-38.976	-35.091	-28.663	-27.908	-23.170	-22.010
64QAM	-25.971	-39.356	-35.307	-28.560	-28.173	-23.638	-22.546
256QAM	-28.229	-39.872	-35.450	-28.487	-27.752	-23.487	-22.027

Test Result for Output Port 1

Mod.	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
QPSK	-26.738	-40.887	-34.671	-28.444	-27.876	-23.918	-19.675
16QAM	-26.199	-38.485	-35.600	-28.504	-27.906	-23.651	-20.054
64QAM	-26.165	-38.607	-34.968	-28.615	-27.914	-23.466	-20.422
256QAM	-27.489	-39.177	-35.401	-28.549	-28.059	-23.626	-20.201

B2 LTE 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]
Test Result for Output Port 0

Mod.	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
QPSK	-26.015	-39.865	-35.125	-28.893	-27.972	-23.504	-22.552
16QAM	-27.919	-40.332	-35.090	-28.759	-28.177	-23.906	-22.098
64QAM	-26.566	-38.573	-35.361	-28.961	-28.294	-23.394	-22.438
256QAM	-27.236	-38.530	-35.222	-28.919	-28.112	-24.148	-22.690

Test Result for Output Port 1

Mod.	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
QPSK	-25.945	-38.119	-34.809	-28.731	-28.093	-24.351	-20.934
16QAM	-27.296	-39.311	-35.218	-28.675	-28.184	-23.678	-20.419
64QAM	-26.177	-37.856	-35.062	-28.594	-27.811	-23.520	-20.293
256QAM	-27.456	-39.947	-34.927	-28.789	-28.021	-23.910	-20.199

5G NR n2 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]
Test Result for Output Port 0

Mod.	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
QPSK	-27.675	-39.682	-35.170	-28.730	-28.344	-23.895	-22.664
16QAM	-26.266	-39.854	-35.671	-28.888	-28.330	-23.636	-22.590
64QAM	-27.755	-38.726	-34.602	-28.953	-28.347	-23.318	-22.697
256QAM	-26.839	-37.485	-34.417	-28.941	-28.213	-24.080	-23.014

Test Result for Output Port 1

Mod.	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
QPSK	-26.405	-39.144	-34.991	-28.817	-28.034	-22.974	-20.392
16QAM	-26.786	-39.809	-35.230	-28.825	-28.181	-23.933	-20.422
64QAM	-27.281	-39.542	-35.393	-28.877	-28.153	-22.974	-20.455
256QAM	-27.082	-40.207	-35.264	-28.486	-28.361	-23.968	-20.618

5G NR n2 15 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier]
Test Result for Output Port 0

Mod.	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
QPSK	-26.642	-39.064	-34.202	-28.721	-27.963	-23.788	-22.461
16QAM	-25.921	-38.156	-34.287	-28.797	-28.121	-23.349	-22.241
64QAM	-27.776	-38.404	-34.846	-28.941	-28.180	-23.673	-22.421
256QAM	-26.669	-38.656	-35.073	-28.671	-28.279	-23.101	-22.433

Test Result for Output Port 1

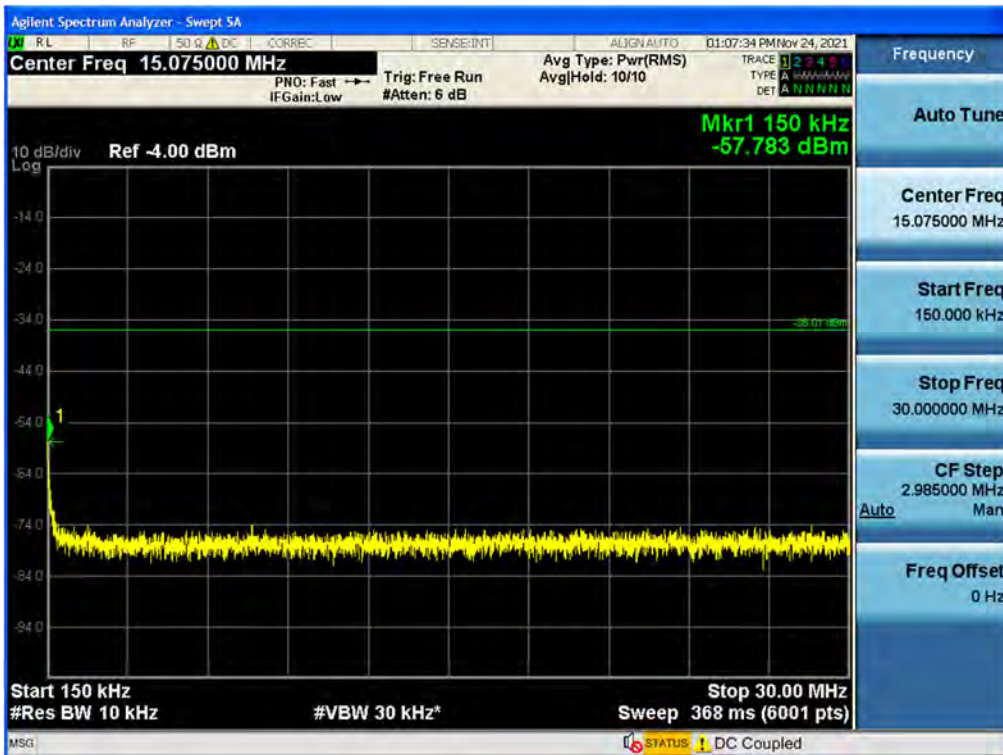
Mod.	Measured Level (dBm)						
	9 kHz ~ 150 kHz	150 kHz ~ 30 MHz	30 MHz ~ Low Edge-100 MHz	Low Edge-100 MHz ~ Low Edge	High Edge ~ High Edge +100 MHz	High Edge +100 MHz ~ 10 GHz	10 GHz ~ 26.5 GHz
QPSK	-26.904	-39.106	-35.221	-28.402	-28.258	-22.929	-19.149
16QAM	-27.063	-38.994	-35.120	-28.704	-28.046	-23.412	-19.099
64QAM	-27.063	-40.953	-35.002	-28.707	-27.742	-23.097	-19.994
256QAM	-26.147	-38.745	-34.823	-28.725	-28.056	-22.986	-20.038

Plot Data of Conducted Spurious Emissions

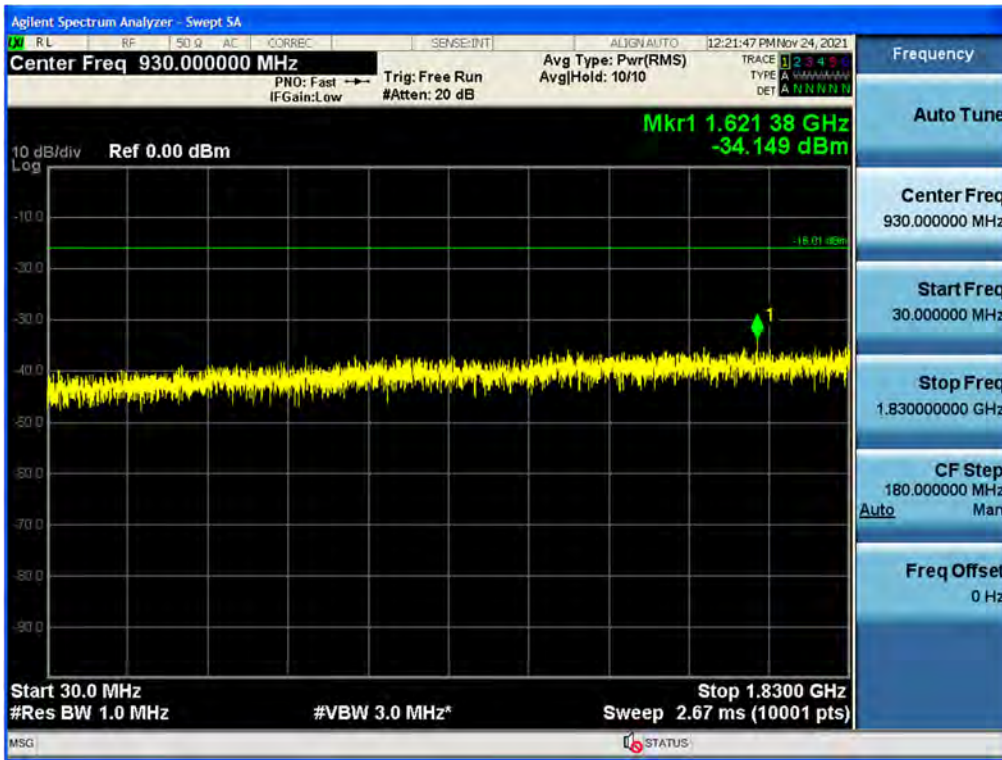
Antenna 1 / 9 kHz ~ 150 kHz / B2 LTE 5 MHz 1 Carrier / 256QAM / Low



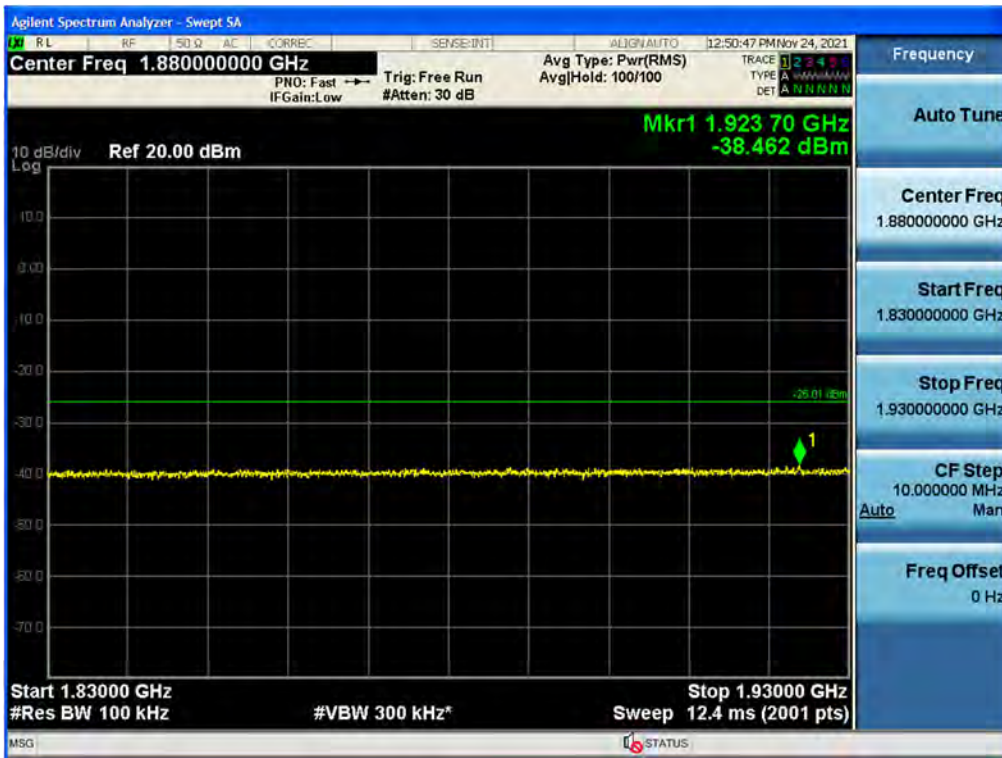
Antenna 0 / 150 kHz ~ 30 MHz / B2 LTE 5 MHz 1 Carrier / QPSK / High



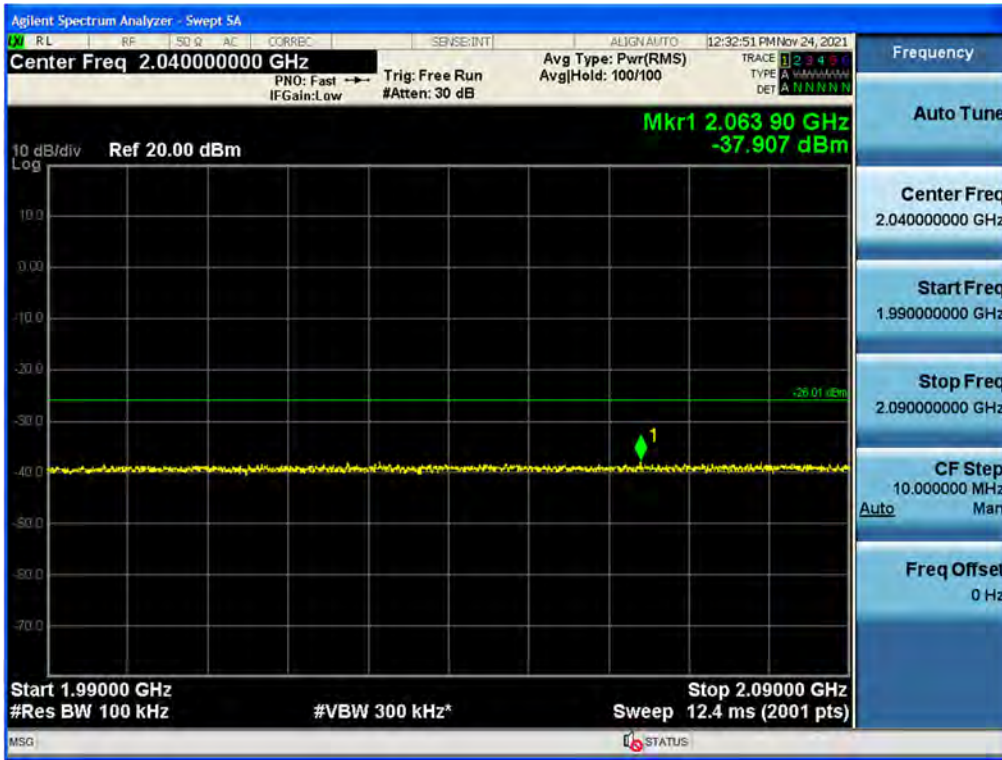
Antenna 0 / 30 MHz ~ Low Edge-100 MHz / B2 LTE 5 MHz 1 Carrier / 64QAM / Low



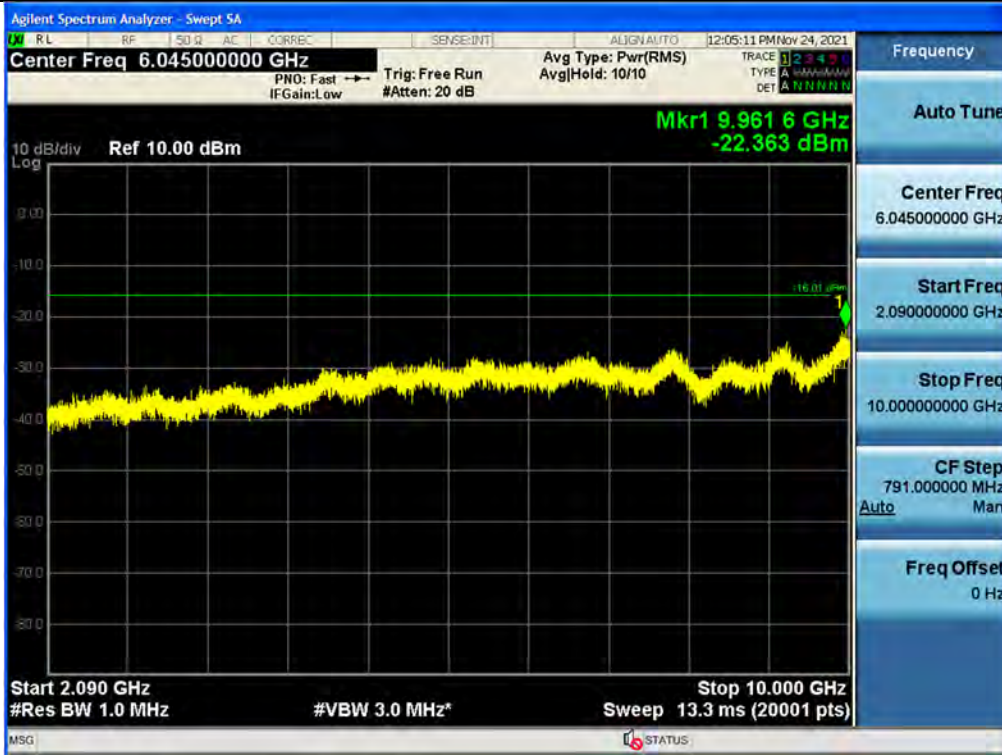
Antenna 1 / Low Edge-100 MHz ~ Low Edge / B2 LTE 5 MHz 1 Carrier / 64QAM / Middle



Antenna 1 / High Edge ~ High Edge+100 MHz / B2 LTE 5 MHz 1 Carrier / 16QAM / Low



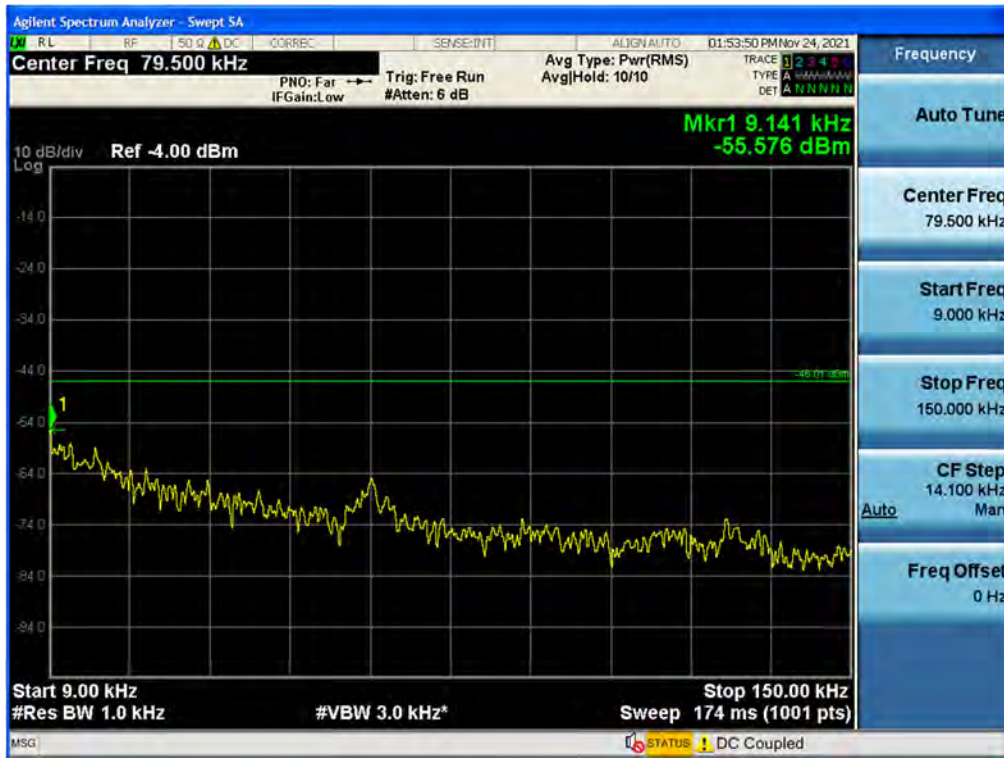
Antenna 1 / High Edge+100 MHz ~ 10 GHz / B2 LTE 5 MHz 1 Carrier / QPSK / Low



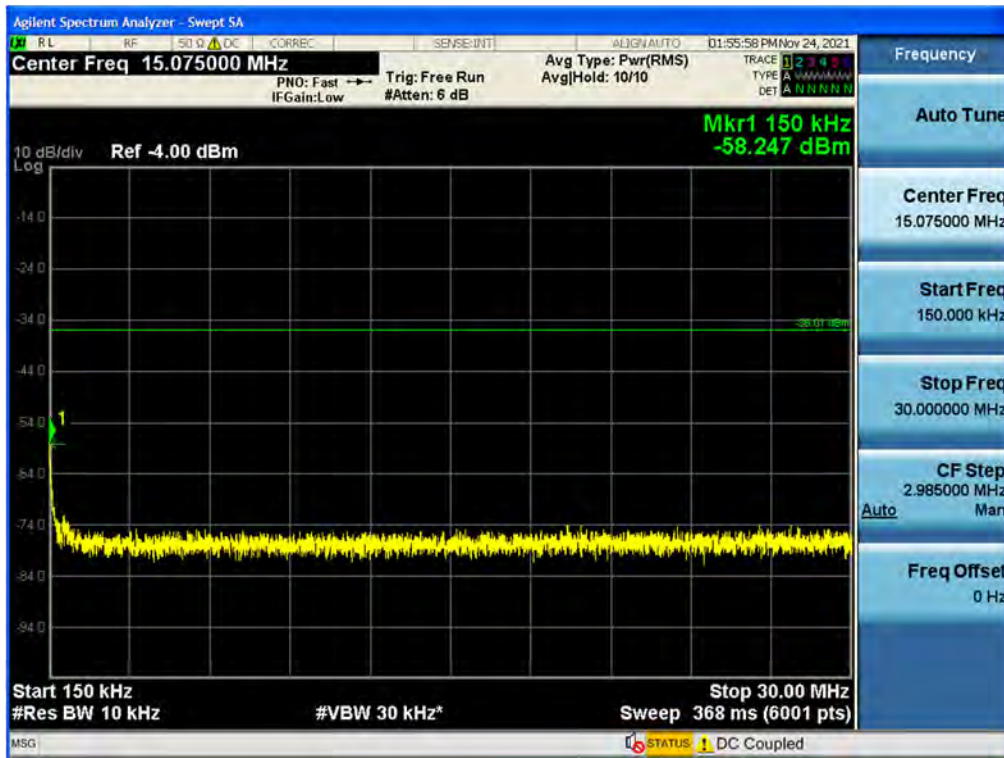
Antenna 1 / 10 GHz ~ 26.5 GHz / B2 LTE 5 MHz 1 Carrier / 64QAM / High



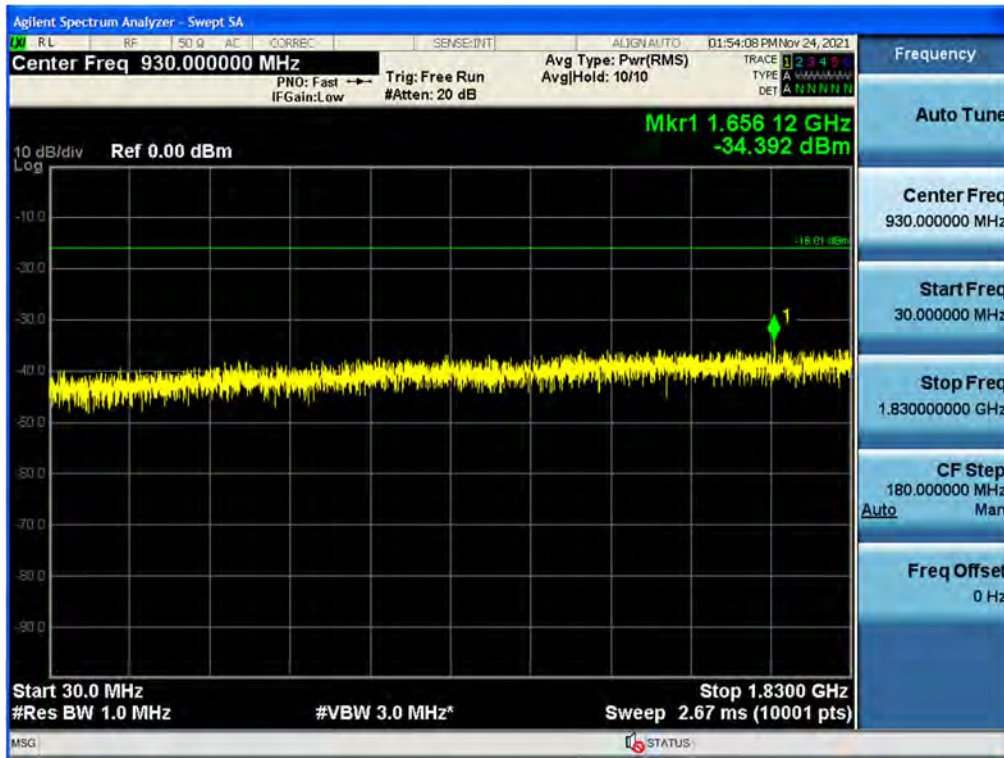
Antenna 0 / 9 kHz ~ 150 kHz / B2 LTE 10 MHz 1 Carrier / QPSK / Low



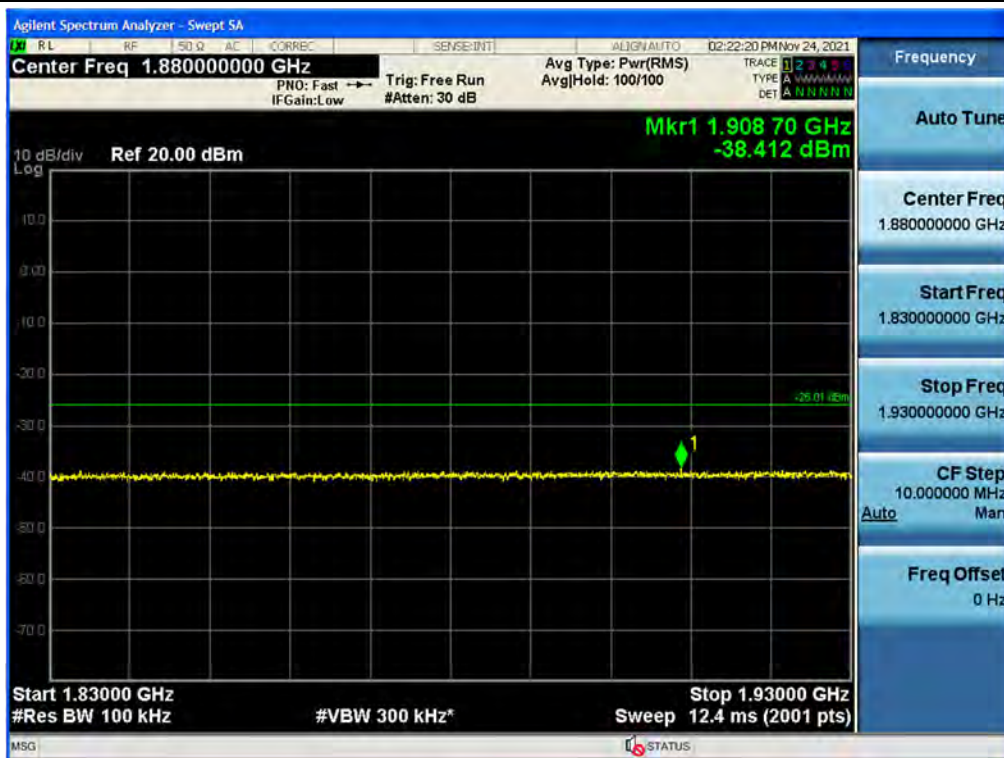
Antenna 1 / 150 kHz ~ 30 MHz / B2 LTE 10 MHz 1 Carrier / QPSK / Low



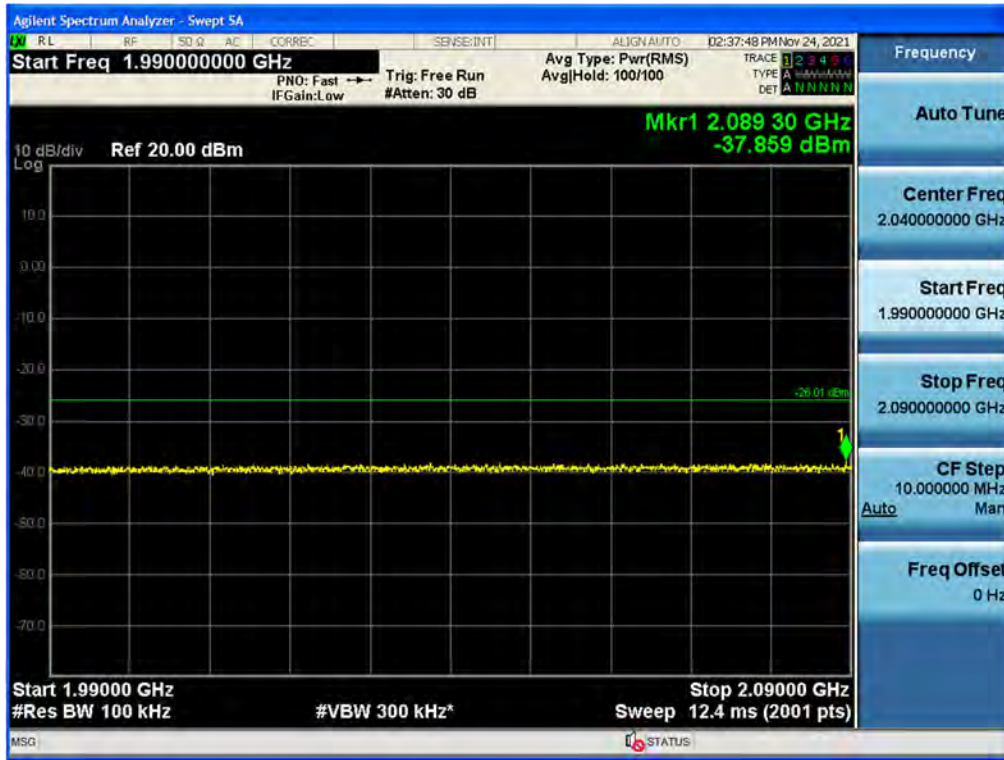
Antenna 0 / 30 MHz ~ Low Edge-100 MHz / B2 LTE 10 MHz 1 Carrier / QPSK / Low



Antenna 1 / Low Edge-100 MHz ~ Low Edge / B2 LTE 10 MHz 1 Carrier / QPSK / Middle



Antenna 0 / High Edge ~ High Edge+100 MHz / B2 LTE 10 MHz 1 Carrier / 16QAM / Middle



Antenna 0 / High Edge+100 MHz ~ 10 GHz / B2 LTE 10 MHz 1 Carrier / 256QAM / Low



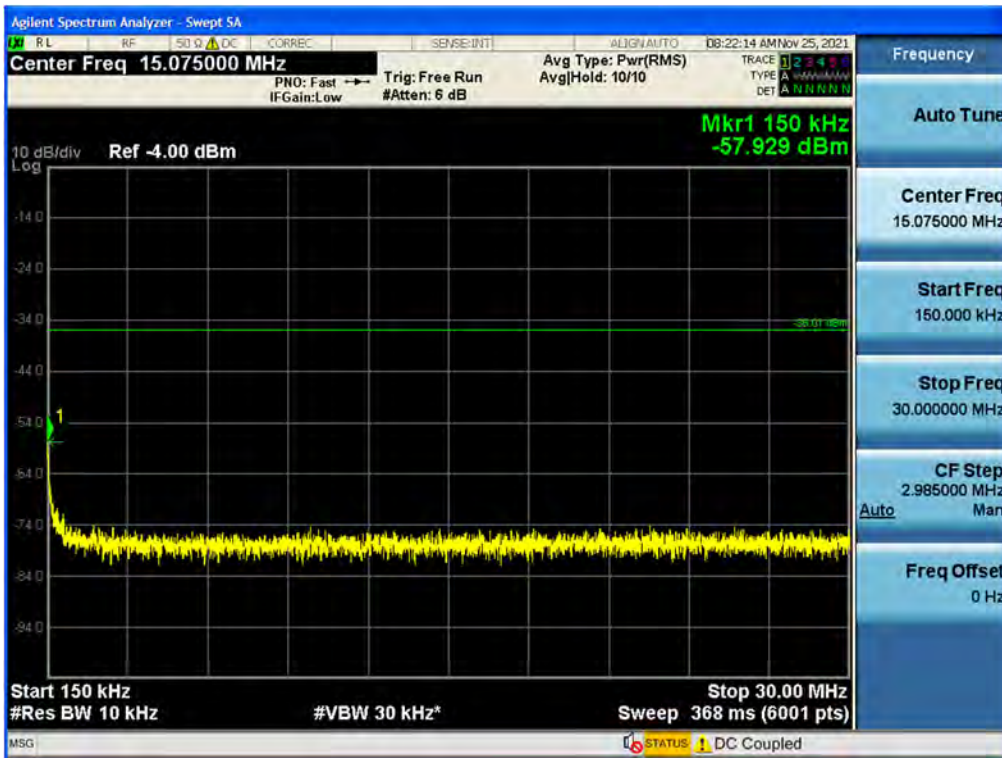
Antenna 1 / 10 GHz ~ 26.5 GHz / B2 LTE 10 MHz 1 Carrier / 16QAM / Low



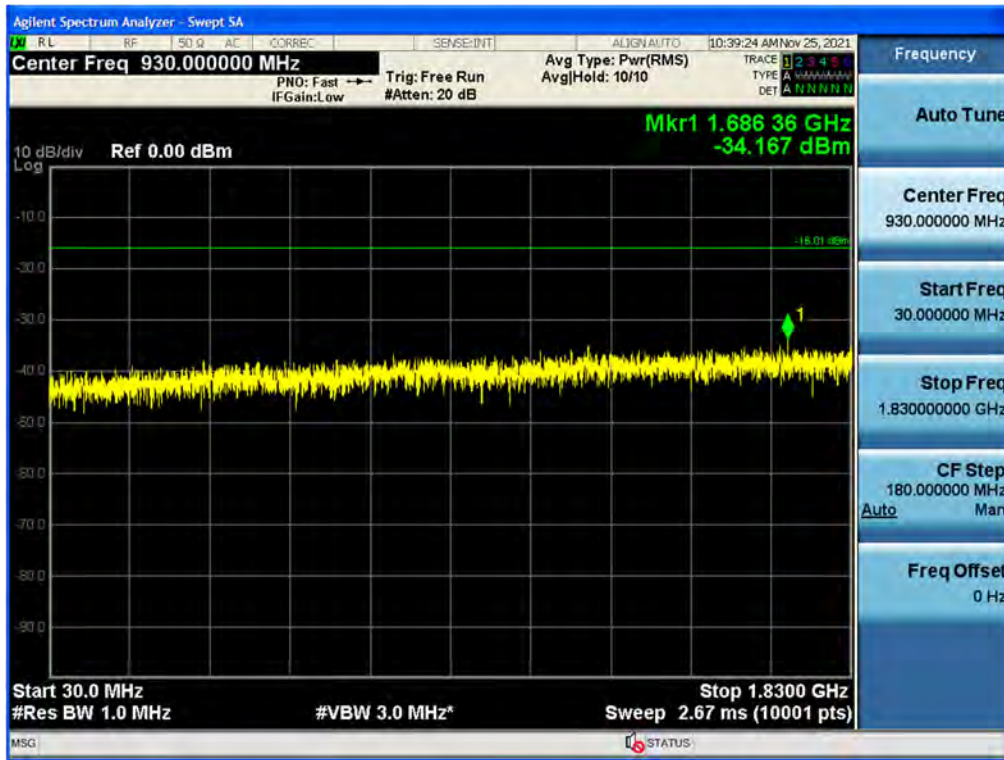
Antenna 1 / 9 kHz ~ 150 kHz / B2 LTE 15 MHz 1 Carrier / QPSK / High



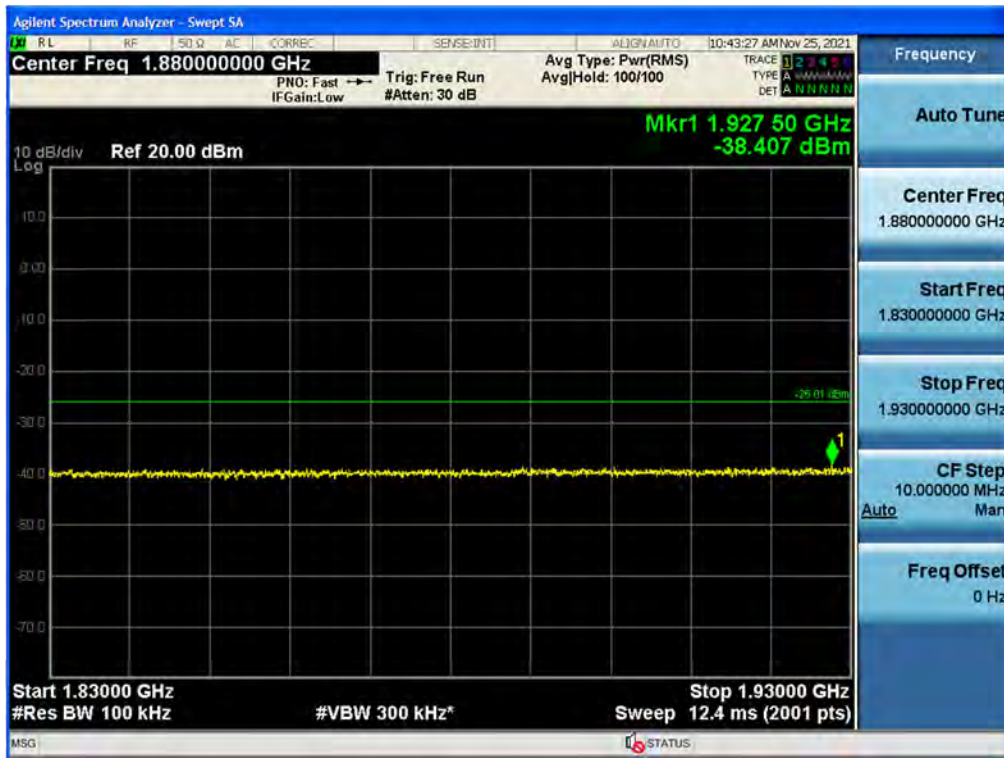
Antenna 1 / 150 kHz ~ 30 MHz / B2 LTE 15 MHz 1 Carrier / 256QAM / Low



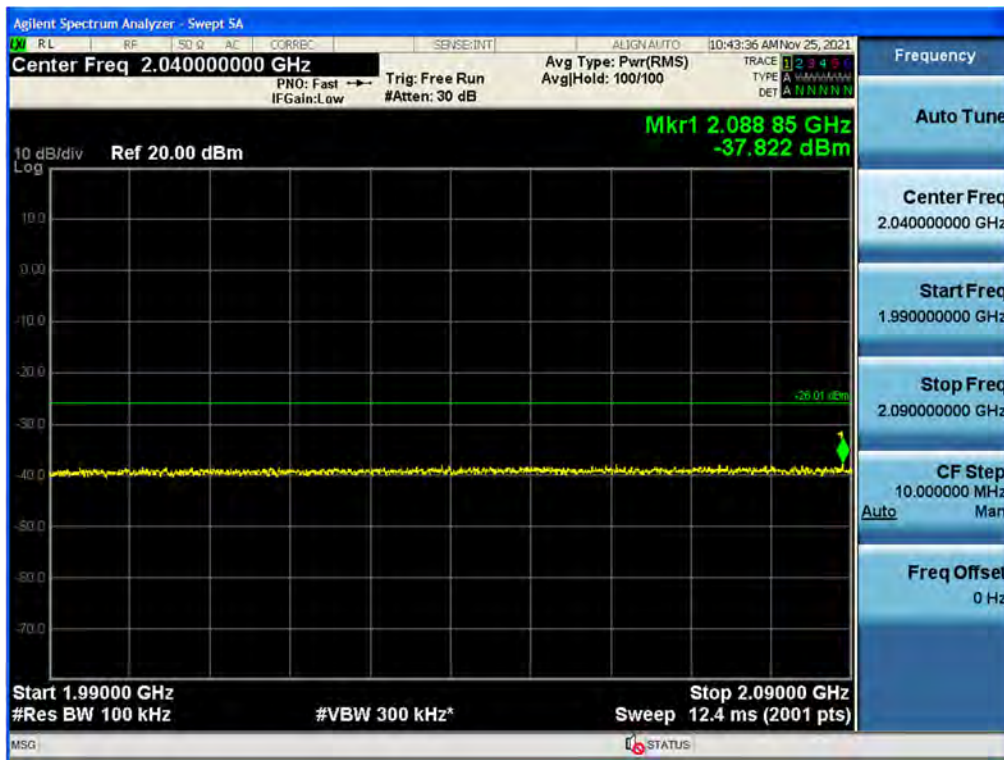
Antenna 1 / 30 MHz ~ Low Edge-100 MHz / B2 LTE 15 MHz 1 Carrier / 64QAM / Middle



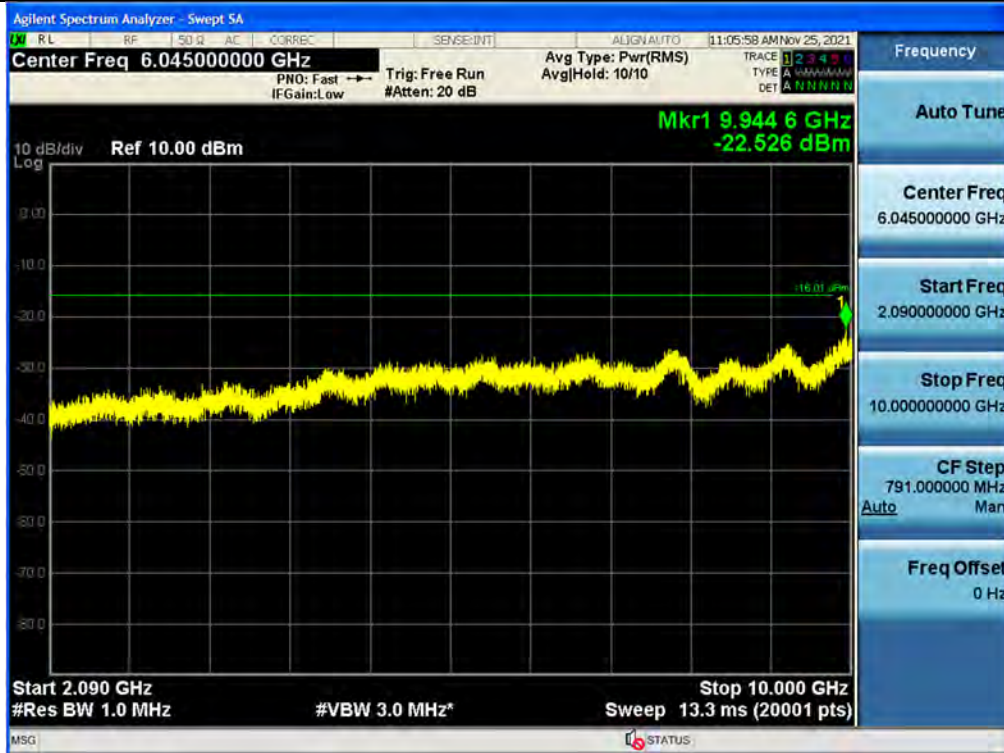
Antenna 1 / Low Edge-100 MHz ~ Low Edge / B2 LTE 15 MHz 1 Carrier / 256QAM / Middle



Antenna 1 / High Edge ~ High Edge+100 MHz / B2 LTE 15 MHz 1 Carrier / 256QAM / Middle



Antenna 0 / High Edge+100 MHz ~ 10 GHz / B2 LTE 15 MHz 1 Carrier / 16QAM / High



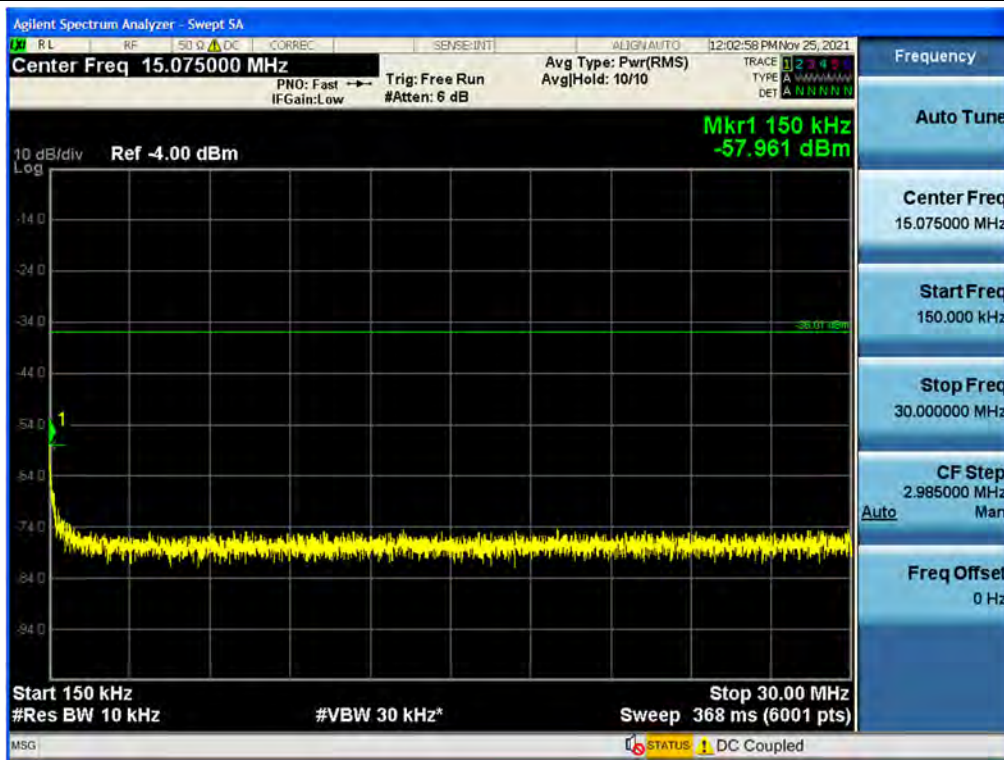
Antenna 1 / 10 GHz ~ 26.5 GHz / B2 LTE 15 MHz 1 Carrier / 256QAM / Low



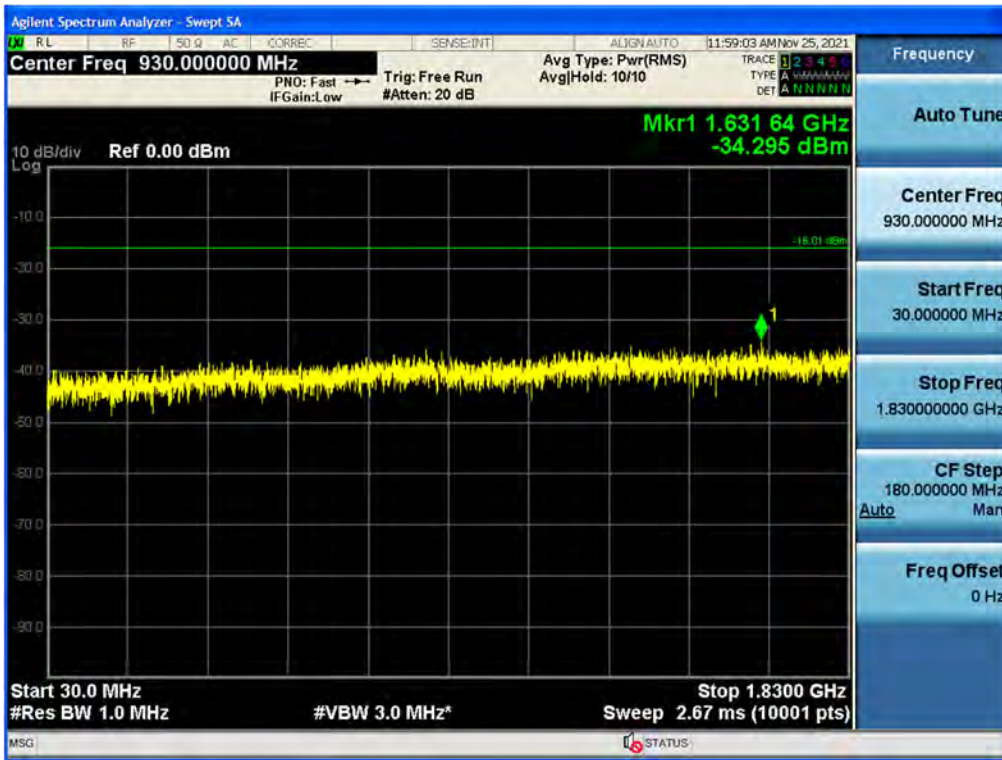
Antenna 1 / 9 kHz ~ 150 kHz / B2 LTE 20 MHz 1 Carrier / 64QAM / Low



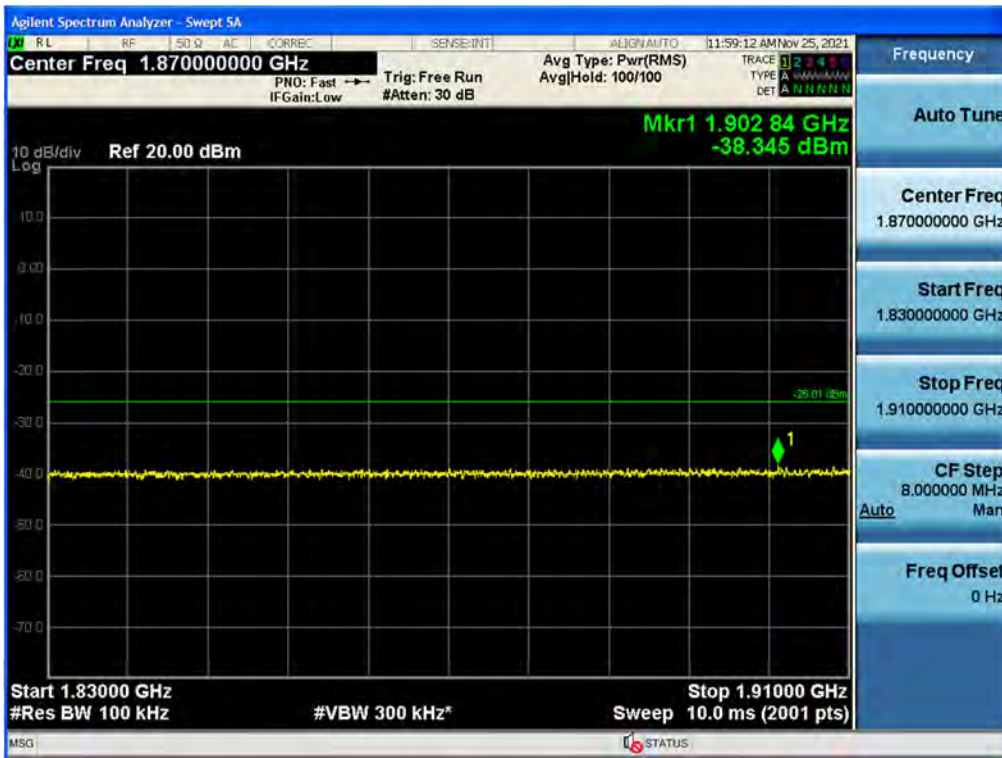
Antenna 0 / 150 kHz ~ 30 MHz / B2 LTE 20 MHz 1 Carrier / 256QAM / Low



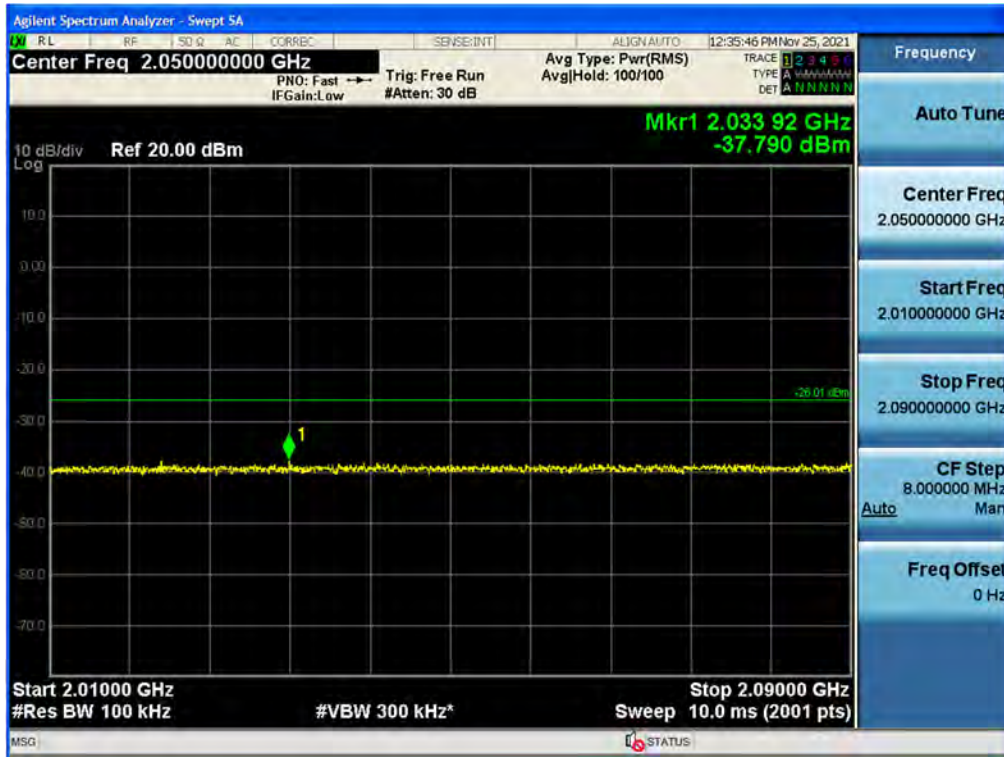
Antenna 0 / 30 MHz ~ Low Edge-100 MHz / B2 LTE 20 MHz 1 Carrier / 64QAM / Low



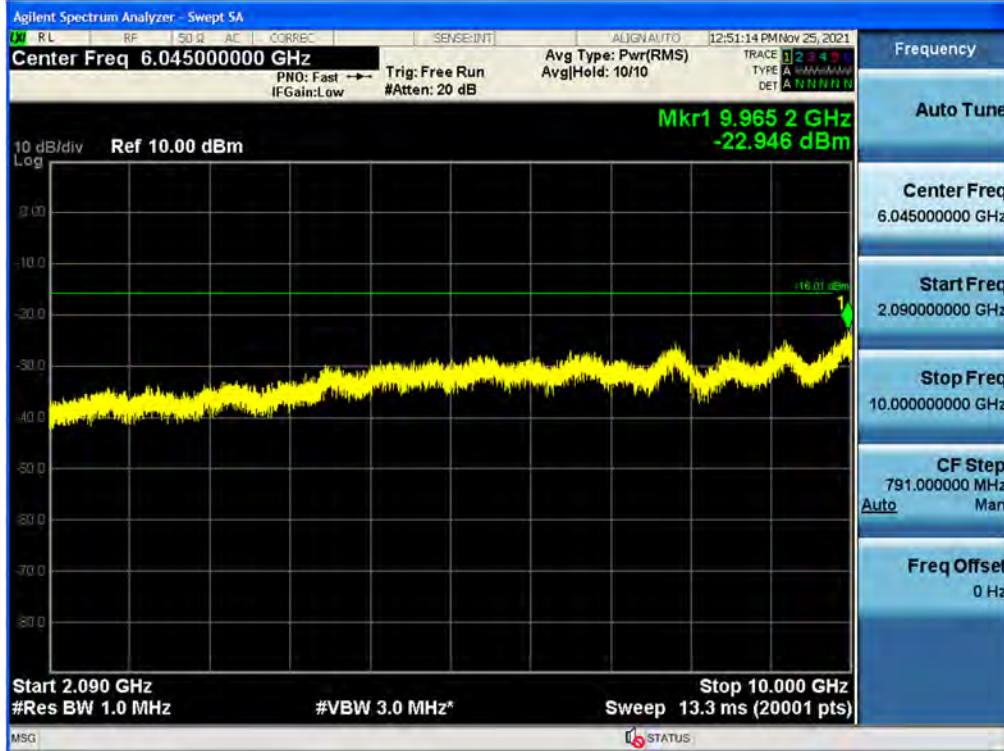
Antenna 0 / Low Edge-100 MHz ~ Low Edge / B2 LTE 20 MHz 1 Carrier / 64QAM / Low



Antenna 0 / High Edge ~ High Edge+100 MHz / B2 LTE 20 MHz 1 Carrier / QPSK / High



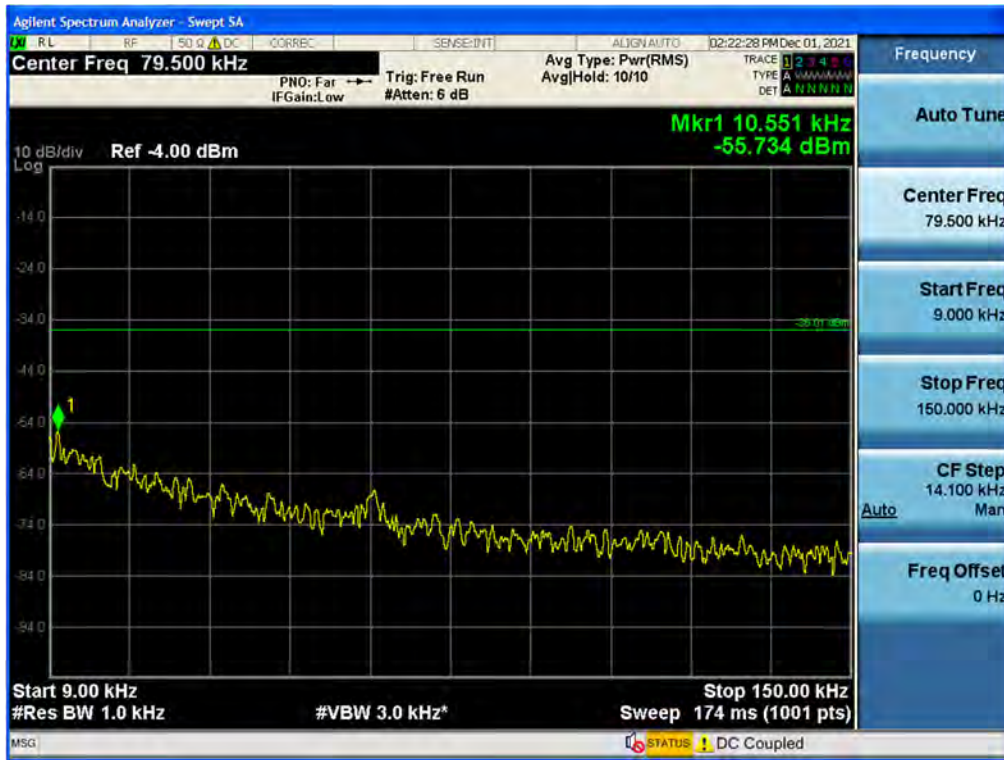
Antenna 0 / High Edge+100 MHz ~ 10 GHz / B2 LTE 20 MHz 1 Carrier / 16QAM / High



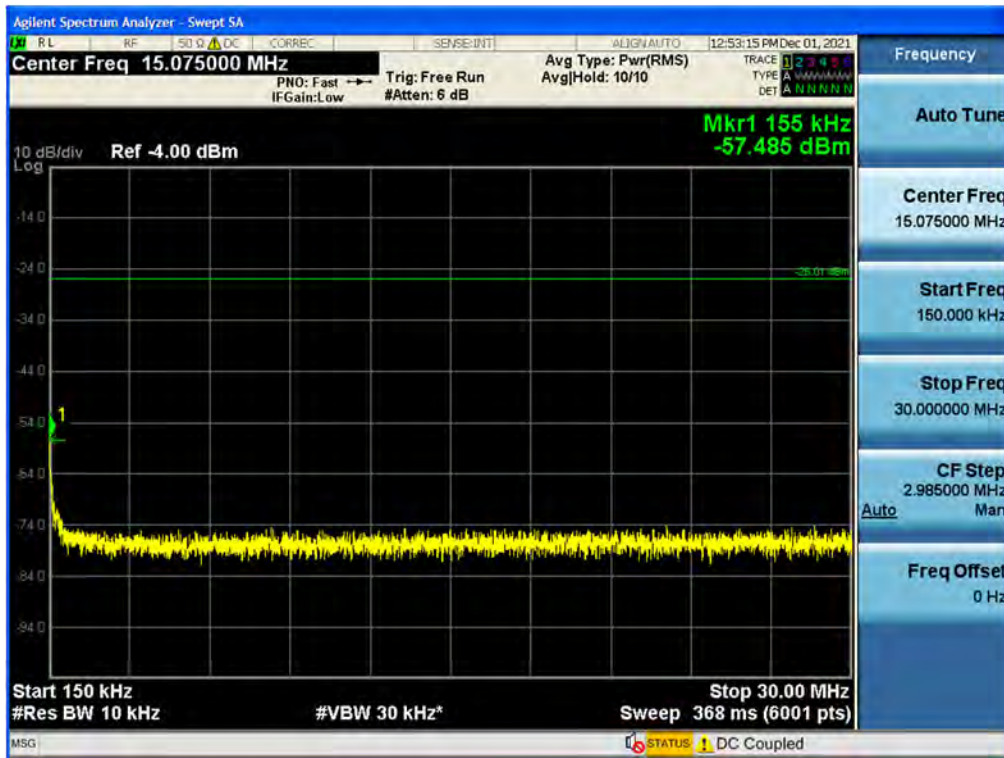
Antenna 1 / 10 GHz ~ 26.5 GHz / B2 LTE 20 MHz 1 Carrier / 16QAM / Low



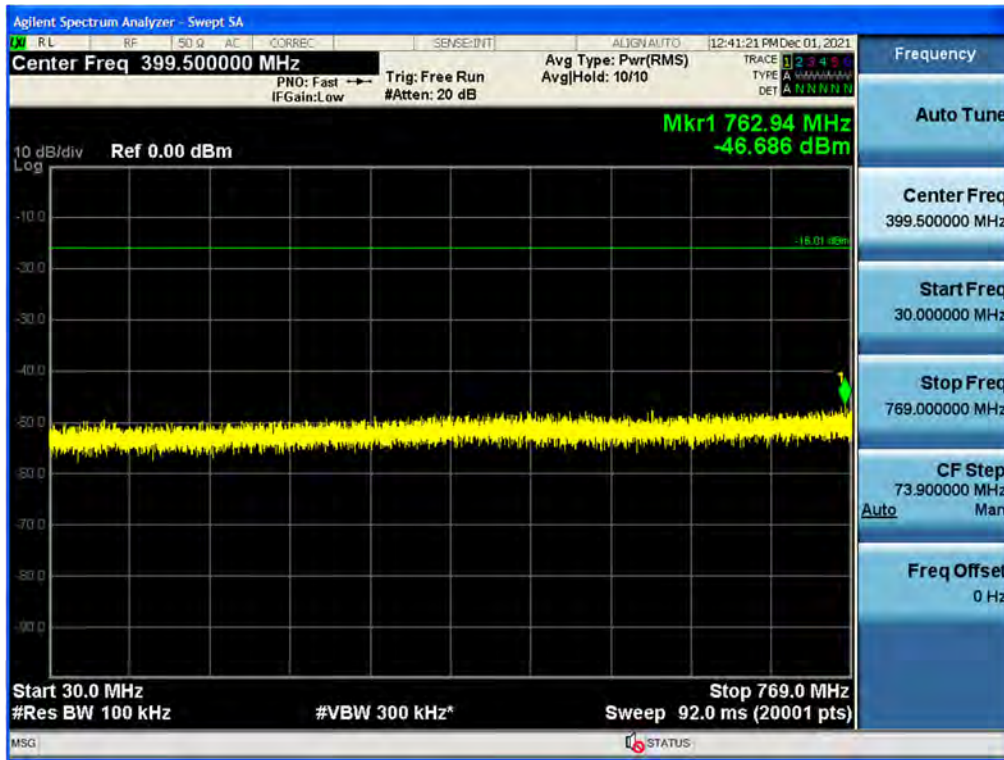
Antenna 1 / 9 kHz ~ 150 kHz / B5 LTE 5 MHz 1 Carrier / 16QAM / High



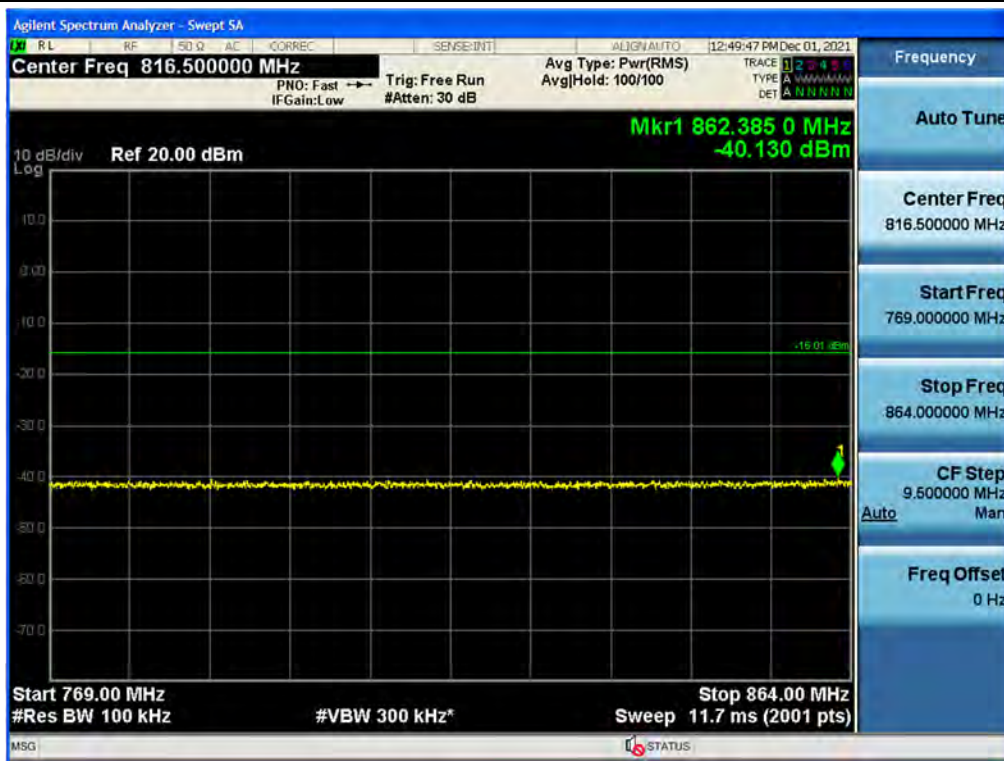
Antenna 1 / 150 kHz ~ 30 MHz / B5 LTE 5 MHz 1 Carrier / 256QAM / Low



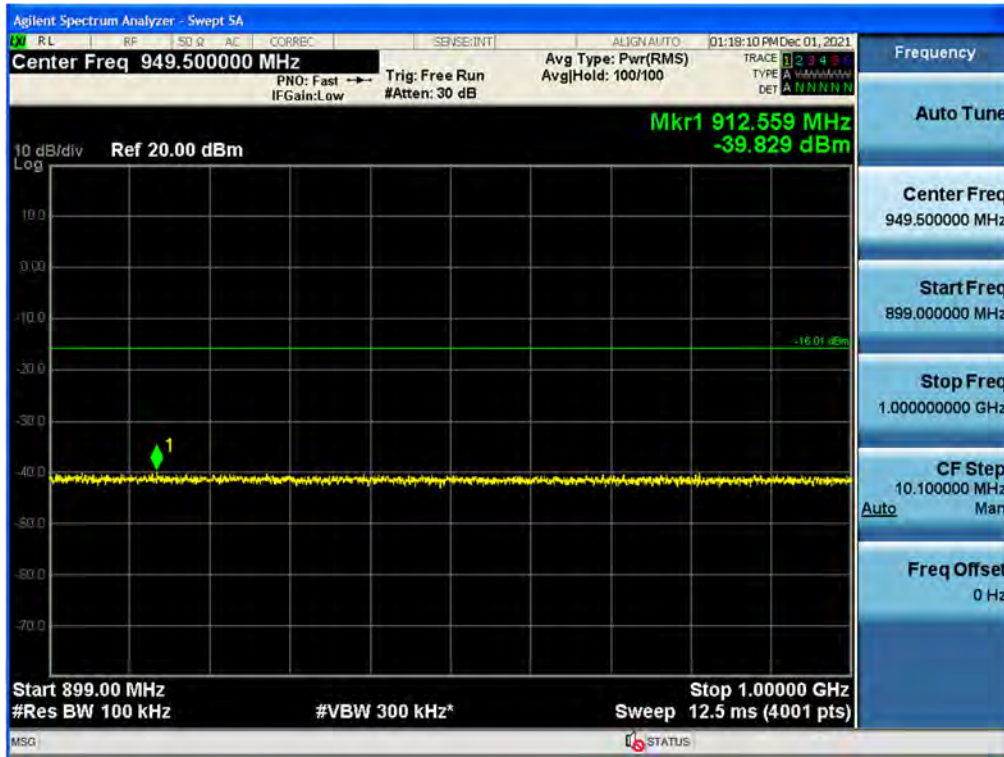
Antenna 1 / 30 MHz ~ Low Edge-100 MHz / B5 LTE 5 MHz 1 Carrier / QPSK / Low



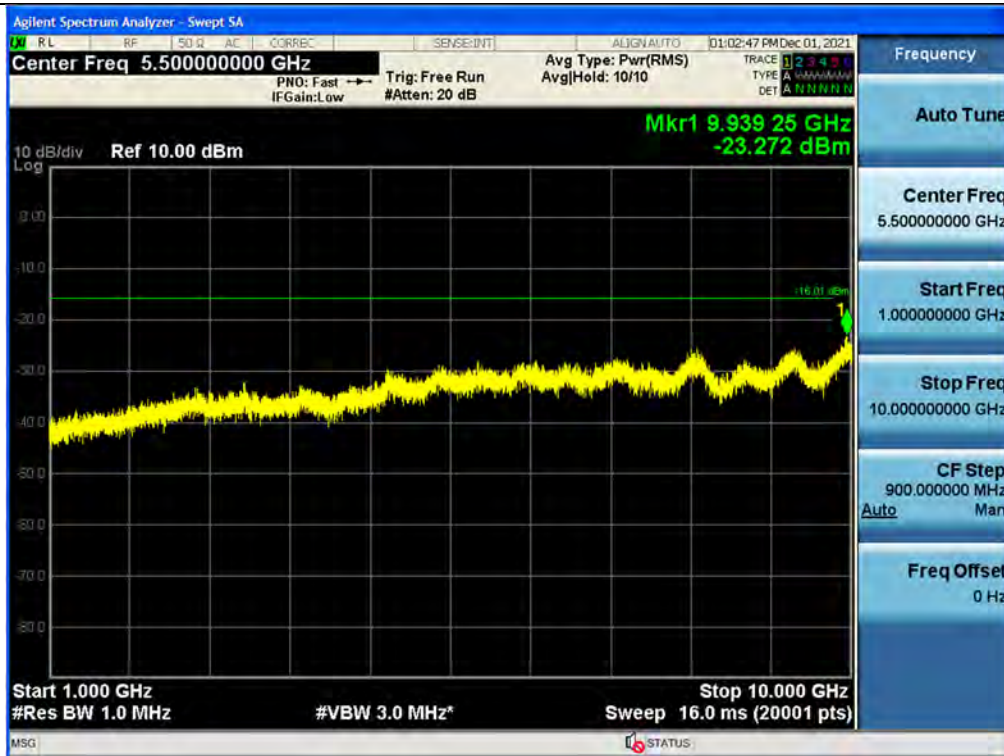
Antenna 1 / Low Edge-100 MHz ~ Low Edge / B5 LTE 5 MHz 1 Carrier / 64QAM / Low



Antenna 1 / High Edge ~ 1 GHz / B5 LTE 5 MHz 1 Carrier / QPSK / High



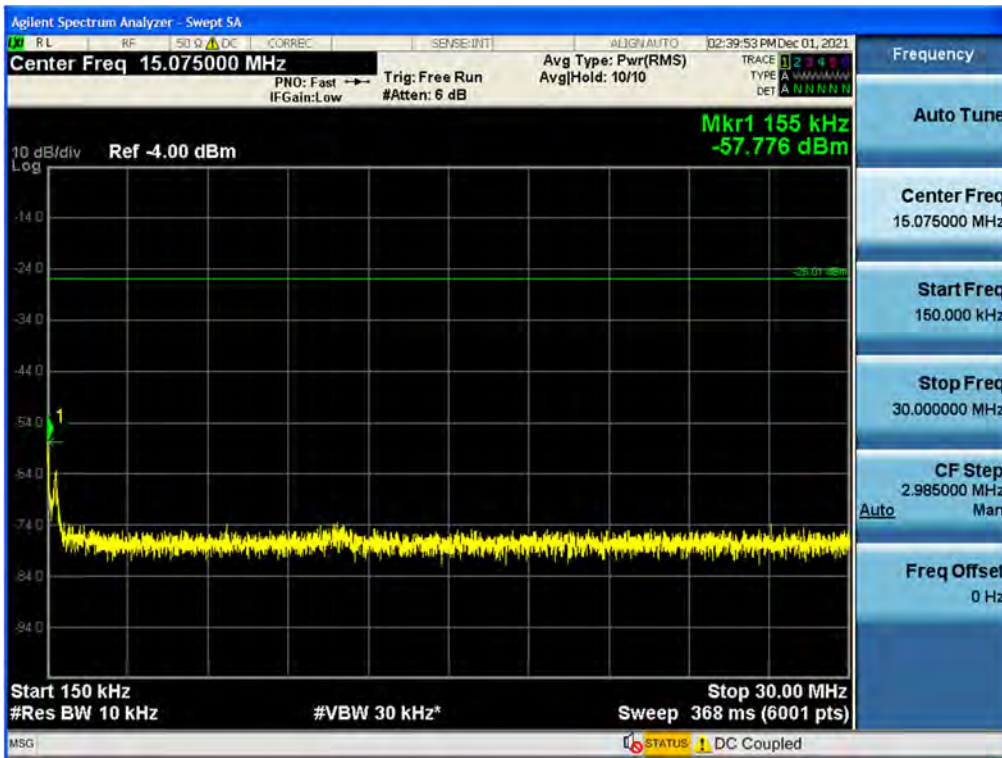
Antenna 0 / 1 GHz ~ 10 GHz / B5 LTE 5 MHz 1 Carrier / 64QAM / Middle



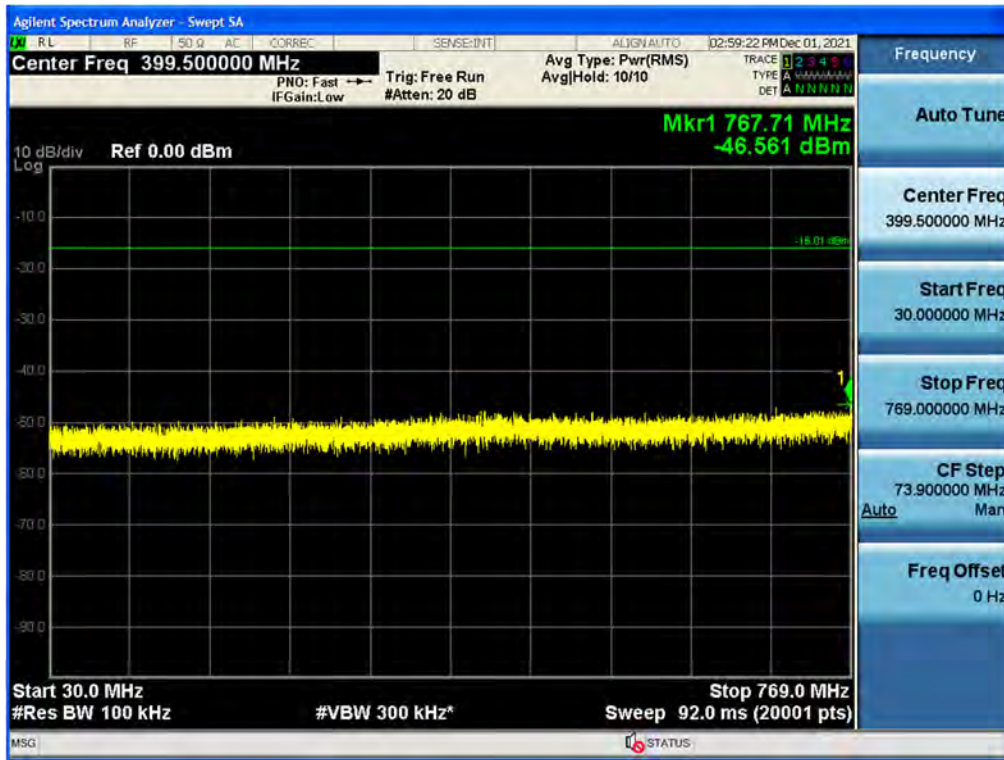
Antenna 0 / 9 kHz ~ 150 kHz / B5 LTE 10 MHz 1 Carrier / 16QAM / Middle



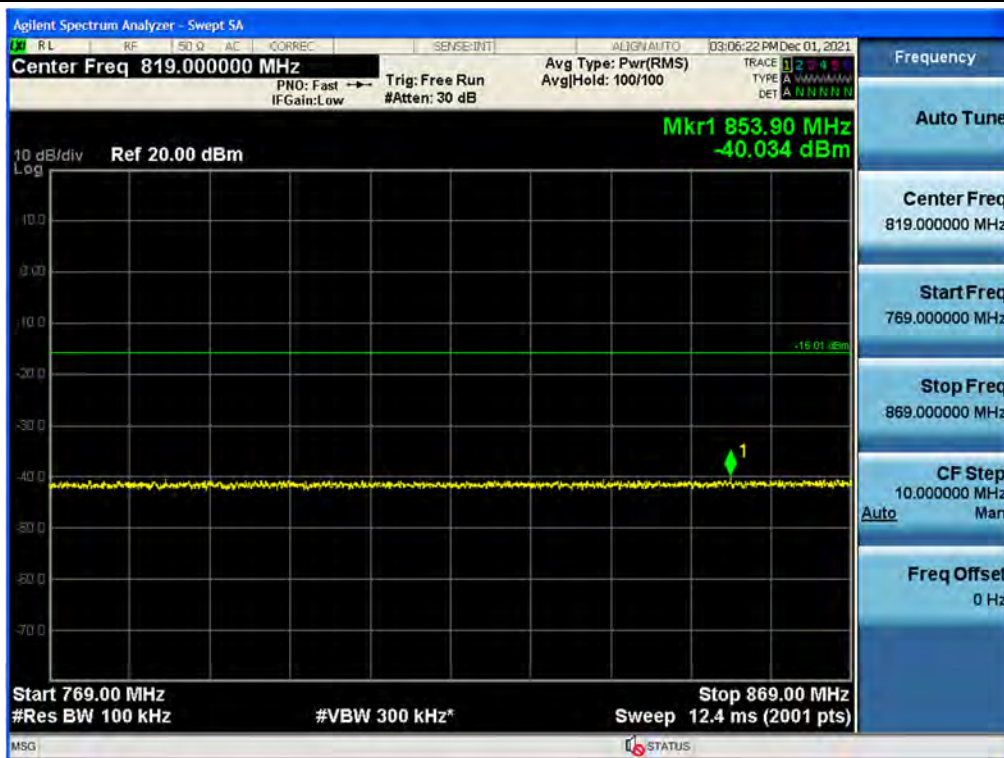
Antenna 0 / 150 kHz ~ 30 MHz / B5 LTE 10 MHz 1 Carrier / 16QAM / Low



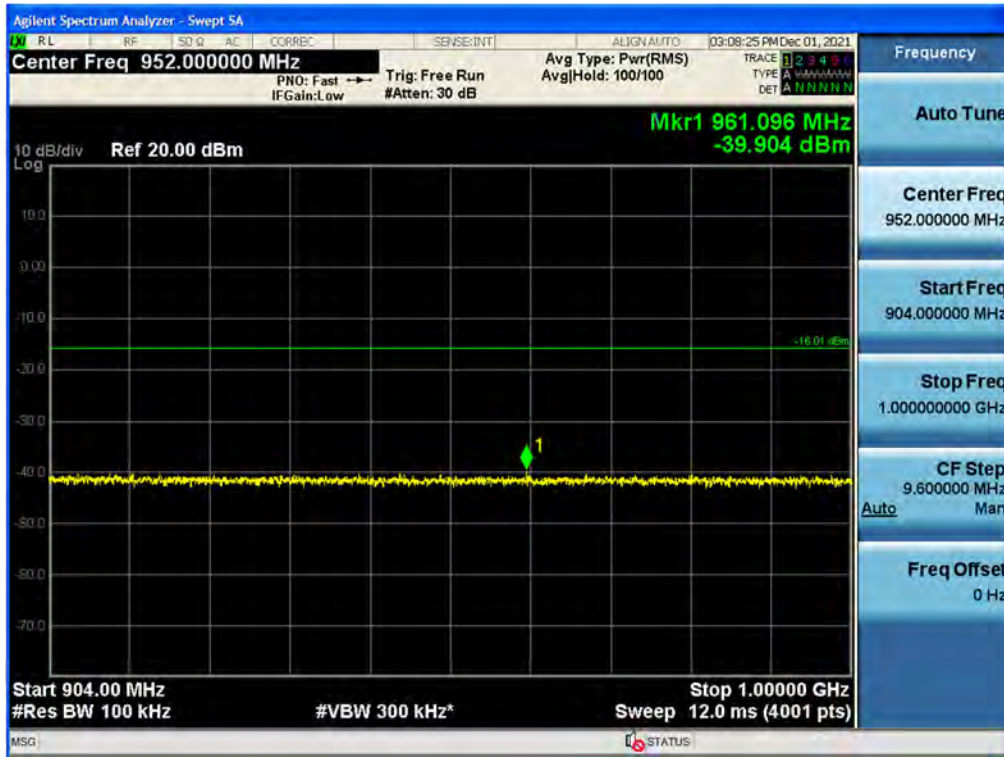
Antenna 1 / 30 MHz ~ Low Edge-100 MHz / B5 LTE 10 MHz 1 Carrier / 16QAM / Middle



Antenna 1 / Low Edge-100 MHz ~ Low Edge / B5 LTE 10 MHz 1 Carrier / QPSK / High



Antenna 0 / High Edge ~ 1 GHz / B5 LTE 10 MHz 1 Carrier / 64QAM / High



Antenna 1 / 1 GHz ~ 10 GHz / B5 LTE 10 MHz 1 Carrier / 64QAM / Middle



Antenna 0 / 9 kHz ~ 150 kHz / B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / 256QAM / Low

Antenna 1 / 150 kHz ~ 30 MHz / B2 LTE 5 MHz 1 Carrier + B2 LTE 5 MHz 1 Carrier [2 Carrier] / Contiguous / QPSK / High
