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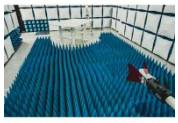

TEST REPORT
PART 22 & 27 MEASUREMENT REPORT

Applicant Name:
Samsung Electronics Co., Ltd.
129, Samsung-ro,
Yeongtong-gu, Suwon-si
Gyeonggi-do, 16677, Korea

Date of Testing:
04/12/2023 - 05/26/2023
Test Site/Location:
Element Lab., Suwon,
Yongin-si, Gyeonggi-do, Korea
Test Report Serial No.:
8K23040701-00-R2.A3L

FCC ID:	**A3LRF4461D-13A**
APPLICANT:	**Samsung Electronics Co., Ltd.**

Application Type:	Certification
Model:	RF4461d-13A
EUT Type:	RRU(RF4461d)
FCC Classification:	Licensed Non-Broadcast Station Transmitter
FCC Rule Part(s):	22 & 27
Test Procedure(s):	ANSI C63.26-2015, KDB 971168 D01 v03r01, KDB 662911 D01 v02r01

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

ACCREDITED
Testing Laboratory
Certificate Number 2041.04

Prepared by DuJin Kim
Test Engineer

Reviewed by Charles.Shin
Technical Manager

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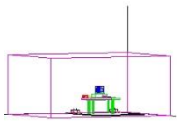
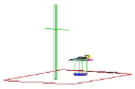


MEASUREMENT REPORT
FCC Part 22 & 27



Mode	FCC Rule Part	Tx Frequency (MHz)	Total Power		Emission Designator	Modulation
			Max. Power (dBm)	Max. Power (W)		
LTE B5_1C_5M	22	869 – 894	47.92	61.89	4M49G7D	QPSK
			47.98	62.75	4M49W7D	QAM
LTE B5_1C_10M			51.01	126.20	8M97G7D	QPSK
			51.02	126.34	8M98W7D	QAM
LTE B5_2C_5M+5M			50.99	125.62	9M45G7D	QPSK
			50.90	122.90	9M43W7D	QAM
LTE B5_3C_5M+10M+10M			51.01	126.23	24M0G7D	QPSK
			51.09	128.41	24M0W7D	QAM
DSS B(n)5_1C_10M			51.12	129.46	9M28G7D	QPSK
			51.10	128.72	9M28W7D	QAM
DSS B(n)5_2C_10M+10M			51.07	127.82	19M1G7D	QPSK
			51.10	128.85	19M0W7D	QAM
NR n5_1C_5M			47.99	62.96	4M47G7D	QPSK
			47.98	62.82	4M49W7D	QAM
NR n5_1C_10M			50.99	125.48	9M32G7D	QPSK
			50.98	125.33	9M32W7D	QAM
NR n5_1C_15M			51.02	126.51	14M1G7D	QPSK
			51.00	125.93	14M2W7D	QAM
NR n5_2C_5M+5M			51.02	126.37	9M43G7D	QPSK
			51.01	126.25	9M46W7D	QAM
NR n5_2C_10M+15M			51.00	125.79	24M0G7D	QPSK
			50.97	124.95	24M1W7D	QAM
MSR 2C_DSS B(n)5_1C_10M+ LTE B5_1C_5M			50.97	125.04	14M3G7D	QPSK
			51.05	127.21	14M2W7D	QAM
MSR 3C_DSS B(n)5_2C_10M+10M+ LTE B5_1C_5M			50.85	121.51	24M1G7D	QPSK
			50.87	122.06	24M1W7D	QAM
MSR 2C_NR n5_1C_5M+ LTE B5_1C_5M			50.98	125.33	9M45G7D	QPSK
			50.97	124.90	9M42W7D	QAM
MSR 3C_NR n5_2C_10M+10M+ LTE B5_1C_5M			50.79	119.98	24M2G7D	QPSK
			50.71	117.66	24M2W7D	QAM
MSR 2C_DSS B(n)5_1C_10M+ NR n5_1C_5M			51.25	133.21	14M3G7D	QPSK
			51.25	133.21	14M3W7D	QAM
MSR 2C_DSS B(n)5_1C_10M+ NR n5_1C_15M			50.96	124.66	24M0G7D	QPSK
			50.92	123.49	24M0W7D	QAM
MSR 3C_DSS B(n)5_1C_10M+ NR n5_1C_5M+LTE B5_1C_5M			51.11	129.14	19M3G7D	QPSK
			51.15	130.34	19M2W7D	QAM
MSR 3C_DSS B(n)5_1C_10M+ NR n5_1C_10M+LTE B5_1C_5M			51.03	126.78	24M1G7D	QPSK
			50.97	125.06	24M1W7D	QAM
LTE B13_1C_5M	27	746 – 756	47.77	59.85	4M50G7D	QPSK
			47.75	59.52	4M51W7D	QAM
LTE B13_1C_10M			50.70	117.42	8M98G7D	QPSK
			50.63	115.62	8M99W7D	QAM
LTE B13_2C_5M+5M			50.69	117.19	9M45G7D	QPSK
			50.61	115.06	9M44W7D	QAM

2TX Configuration EUT Overview

Mode	FCC Rule Part	Tx Frequency (MHz)	Total Power		Emission Designator	Modulation
			Max. Power (dBm)	Max. Power (W)		
LTE B5_1C_5M	22	869 – 894	49.20	83.16	4M49G7D	QPSK
			49.20	83.25	4M50W7D	QAM
LTE B5_1C_10M			52.44	175.37	8M98G7D	QPSK
			52.52	178.70	8M98W7D	QAM
LTE B5_2C_5M+5M			52.32	170.45	9M48G7D	QPSK
			52.33	170.94	9M45W7D	QAM
LTE B5_3C_5M+10M+10M			52.39	173.36	24M1G7D	QPSK
			52.39	173.44	24M1W7D	QAM
DSS B(n)5_1C_10M			52.53	179.16	9M27G7D	QPSK
			52.58	181.16	9M27W7D	QAM
DSS B(n)5_2C_10M+10M			52.65	184.03	19M1G7D	QPSK
			52.65	184.22	19M0W7D	QAM
NR n5_1C_5M			49.32	85.57	4M47G7D	QPSK
			49.35	86.07	4M49W7D	QAM
NR n5_1C_10M			52.49	177.59	9M30G7D	QPSK
			52.52	178.83	9M30W7D	QAM
NR n5_1C_15M			52.47	176.69	14M1G7D	QPSK
			52.45	175.90	14M2W7D	QAM
NR n5_2C_5M+5M			52.39	173.30	9M43G7D	QPSK
			52.40	173.78	9M46W7D	QAM
NR n5_2C_10M+15M			52.44	175.25	24M1G7D	QPSK
			52.40	173.86	24M1W7D	QAM
MSR 2C_DSS B(n)5_1C_10M+ LTE B5_1C_5M			52.56	180.15	14M3G7D	QPSK
			52.58	180.94	14M3W7D	QAM
MSR 3C_DSS B(n)5_2C_10M+10M+ LTE B5_1C_5M			52.04	159.80	24M2G7D	QPSK
			52.13	163.23	24M1W7D	QAM
MSR 2C_NR n5_1C_5M+ LTE B5_1C_5M			52.53	179.09	9M45G7D	QPSK
			52.51	178.17	9M43W7D	QAM
MSR 3C_NR n5_2C_10M+10M+ LTE B5_1C_5M			52.14	163.85	24M2G7D	QPSK
			52.26	168.35	24M2W7D	QAM
MSR 2C_DSS B(n)5_1C_10M+ NR n5_1C_5M			52.33	170.94	14M3G7D	QPSK
			52.29	169.45	14M3W7D	QAM
MSR 2C_DSS B(n)5_1C_10M+ NR n5_1C_15M			52.23	166.95	24M0G7D	QPSK
			52.32	170.69	24M0W7D	QAM
MSR 3C_DSS B(n)5_1C_10M+ NR n5_1C_5M+LTE B5_1C_5M			52.29	169.31	19M2G7D	QPSK
			52.31	170.15	19M3W7D	QAM
MSR 3C_DSS B(n)5_1C_10M+ NR n5_1C_10M+LTE B5_1C_5M			52.19	165.45	24M2G7D	QPSK
			52.10	162.28	24M2W7D	QAM
LTE B13_1C_5M	27	746 – 756	49.21	83.39	4M49G7D	QPSK
			49.27	84.53	4M50W7D	QAM
LTE B13_1C_10M			52.25	168.01	8M98G7D	QPSK
			52.20	165.88	8M98W7D	QAM
LTE B13_2C_5M+5M			52.17	164.90	9M45G7D	QPSK
			52.20	165.78	9M44W7D	QAM

4TX Configuration EUT Overview

Notes: Total Power shown in the table above are the full conducted average output power that will appear on the Grant of Authorization.

1.0 REVISION RECORD

Issue Number	Issued Date	Revision History
8K23040701-00.A3L	05/26/2023	Initial Issue
8K23040701-00-R1.A3L	05/31/2023	Revision due to updated data table names.
8K23040701-00-R2.A3L	06/06/2023	Revision due to updated device capabilities

2.0 INTRODUCTION

2.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada.

2.2 Element Test Location

These measurement tests were conducted at the Element Materials Technology Suwon. Ltd. facility located at (#1407) 13, Heungdeok 1-ro, Giheung-gu, Yongin-si, Gyeonggi-do 16954, Korea.

2.3 Test Facility / Accreditation

Measurements were performed at Element Materials Technology Suwon Lab located in Yongin-si, Gyeonggi, Korea.

- Element Materials Technology Suwon is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation(A2LA) with Certificate number 2041.04 for Specific Absorption Rate (SAR), where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.

- Element Materials Technology Suwon facility is accredited, designated, and recognized in accordance with the provision of Radio Wave Act and International Standard ISO/IEC 17025:2017 under the National Radio Research Agency.

  - Designation Number / CABID: KR0169
  - Test Firm Registration Number of FCC: 417945
  - Test Firm Registration Number of IC: 26168

3.0 PRODUCT INFORMATION

3.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung RRU(RF4461d) FCC ID: A3LRF4461D-13A**. The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 22 & 27.

3.2 Device Capabilities

This device supports the following conditional features and filter information declared by the manufacture.

EUT Type	RRU (RF4461d)		
Model Name	RF4461d-13A		
Test Device Serial No	DKN2303015, DKN230301F		
Device Capabilities:	LTE, NR, DSS, NB-IoT Guard Band/In-Band		
Operating Band/Frequency Range:	Band	Tx (Downlink)	Rx (Uplink)
	B13:	746 MHz to 756 MHz	777 MHz to 787 MHz
	B5/n5:	869 MHz to 894 MHz	824 MHz to 849 MHz
Supported Modulation	LTE, NR, DSS: QPSK, 16QAM, 64QAM, 256QAM NB-IoT: QPSK(N-TM)		
Supported Number of Carriers and Channel Bandwidth	B13: 5/10 MHz for LTE B13 with up to 2CC aggregation of Max. Bandwidth 10 MHz and 200 kHz for NB-IoT Guard Band/In-Band		
	B5/n5: 5/10/15 MHz for LTE B5/5G NR n5 with up to 3CC aggregation of Max. Bandwidth 25 MHz and 10 MHz bandwidth modes for DSS n5(B5)		
	B13&B5/n5 Multi-Band: 5/10 MHz for LTE B13 with NB-IoT Guard Band/In Band and 5/ 10/15 MHz for LTE B5 / 5G NR n5 with up to 5CC aggregation of Max 35 MHz.		
IBW/OBW	B13 :10 MHz / 10 MHz B5/n5 :25 MHz / 25 MHz		
Maximum Output Power	B13	2TRx: Max. 60W/Path, 120W/Unit 4TRx: Max. 40W/Path, 160W/Unit	
	B5/n5	2TRx: Max. 60W/Path, 120W/Unit 4TRx: Max. 40W/Path, 160W/Unit	
	B13& B5(n5) Multi-Band	2TRx: Max. 120W/Path, 240W/Unit 4TRx: Max. 80W/Path, 320W/Unit	
Number of Antenna ports	2TRx, 4TRx Configuration		
Supported Configurations	Single carrier, Multi-carrier, Multi-Band operation		
Input Voltage:	-48 VDC		
Maximum antenna gain	Antenna is not provided by manufacture		

3.3 Test Configuration

The setup is as follows:

a) The EUT ("RRU(RF4461d)") and a Data Unit (DU) are each powered by -48V DC power supply.
b) The DU is connected to a test laptop via an ethernet cable acting as backhaul.
c) DU connects to the EUT through a fiber optic cable.
d) An RF cable connects the signal analyzer and the EUT Ports for respective measurement.

The EUT was tested per the guidance of ANSI C63.26-2015 and KDB 971168 D01 v03r01. See Section 8.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

Distribution unit (DU) which were used in test, that authorized under the SDoC procedure.

The following information is about configurations of carrier frequency and output power per port declared by the manufacturer.

* Abbreviations:

- 1C: Single carrier operation
- 2C: Contiguous 2 carriers in multi-carrier operation
- 2NC: Non-Contiguous 2 carriers in multi-carrier operation
- 3C: Contiguous 3 carriers in multi-carrier operation
- 3NC: Non-Contiguous 3 carriers in multi-carrier operation

Configuration	No. of Carriers	Carrier Bandwidth (MHz)	Carrier Frequency Configuration (MHz)			Rated Power (per a path)	
			Lowest	Middle	Highest	2TX	4TX
LTE B13_1C_5M	1	5	748.5	751.0	753.5	30	20
LTE_B13_1C_10M	1	10	751.0			60	40
LTE B13_1C_5M+5M	2	5+5	748.5 + 753.5			60	40
LTE_B13_1C_10M+ NB-IoT(2GB)	3	0.2+5+0.2	746.4(GB) + 751.0(L) + 755.6(GB)			60	40
LTE B13_1C_5M+ NB-IoT(1IB)	1	5	746.7(IB) + 748.5(L)	750.1(IB) + 751.0(L)	753.5(L) + 755.3(IB)	30	20
LTE_B13_1C_10M+ NB-IoT(2IB)	1	5	747.3(IB)+751.0(L)+754.7(IB)			60	40
LTE B13_1C_10M+ NB-IoT(1GB+1IB)	2	0.2+5	746.4(GB)+751.0(L)+754.7(IB)			60	40

Configuration	No. of Carriers	Carrier Bandwidth (MHz)	Carrier Frequency Configuration (MHz)			Rated Power (per a path)	
			Lowest	Middle	Highest	2TX	4TX
LTE B5_1C_5M	1	5	871.5	881.5	891.5	30	20
LTE B5_1C_10M	1	10	874.0	881.5	889.0	60	40
LTE B5_2C_5M+5M	2	5+5	871.5+876.5	879.0+884.0	886.5+891.5	60	40
LTE B5_2NC_5M+5M			871.5+891.5			60	40
LTE B5_3C_5M+10M+10M	3	10+10+5	871.5+897.0+889.0			60	40
DSS B(n)5_1C_10M	1	10	874.0	881.5	889.0	60	40
DSS B(n)5_2C_10M+10M	2	10+10	874.0 + 884.0	876.5 + 886.5	879.0 + 889.0	60	40
DSS B(n)5_2NC_10M+10M			874.0 + 889.0			60	40
NR n5_1C_5M	1	5	871.5	881.5	891.5	30	20
NR n5_1C_10M	1	10	874.0	881.5	889.0	60	40
NR n5_1C_15M	1	15	876.5	881.5	886.5	60	40
NR n5_2C_5M+5M	2	5+5	871.5 + 876.5	879.0 + 884.0	886.5 + 891.5	60	40
NR n5_2NC_5M+5M			871.5 + 891.5			60	40
NR n5_2C_10M+15M	2	10+15	874.0 + 886.5			60	40
MSR 2C_ DSS B(n)5_1C_10M+ LTE B5_1C_5M	2	10+5	874.0+881.5	879.0+886.5	884.0+891.5	60	40
MSR_2NC_ DSS B(n)5_1C_10M+ LTE B5_1C_5M			874.0+891.5			60	40
MSR_3C_ DSS B(n)5_2C_10M+10M +LTE B5_1C_5M	3	10+10+5	871.5+897.0+889.0			60	40
MSR_2C_ NR n5_1C_5M+ LTE B5_1C_5M	2	5+5	871.5+876.5	879.0+884.0	886.5+891.5	60	40
MSR_2NC_ NR n5_1C_5M+ LTE B5_1C_5M			871.5+891.5			60	40
MSR_3C_ NR n5_2C_10M+10M LTE B5_1C_5M	3	10+10+5	874.0+884.0+891.5			60	40
MSR_2C_ DSS B(n)5_1C_10M+ NR n5_1C_5M	2	10+5	874.0+881.5	879.0+886.5	884.0+891.5	60	40
MSR_2NC_ DSS B(n)5_1C_10M+ NR n5_1C_5M			874.0+891.5			60	40
MSR_2C_ DSS B(n)5_1C_10M+ NR n5_1C_15M	2	10+15	874.0+886.5			60	40
MSR_3C_ DSS B(n)5_1C_10M+ NR n5_1C_5M+ LTE B5_1C_5M	3	10+5+5	874.0+881.5+ 886.5	876.5+884.0+ 889.0	879.0+886.5+ 891.5	60	40
MSR_3NC_ DSS B(n)5_1C_10M+ NR n5_1C_5M+ LTE B5_1C_5M	3		874.0+886.5+891.5			60	40
MSR_3C_ DSS B(n)5_1C_10M+ NR n5_1C_10M+ LTE B5_1C_5M	3	10+10+5	874.0+884.0+891.5			60	40

3.4 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and no modifications were made during testing.

4.0 DESCRIPTION OF TESTS

4.1 Measurement Procedure

The measurement procedures described in the document titled “American National Standard for Compliance Testing of Transmitter Used in Licensed Radio Service” (ANSI C63.26-2015) and the guidance provided in KDB 842590 D01 v01r01 were used in the measurement of the EUT.

Occupied Bandwidth:
KDB 971168 D01 v03r01 – Section 4.3
ANSI C63.26-2015 – Section 5.4.4

Conducted Power Measurement and EIRP and PSD
KDB 971168 D01 v03r01 – Section 5.3
KDB 971168 D01 v03r01 – Section 5.4
KDB 662911 D01 v02r01 – Section E)1) In-Band Power Measurements
ANSI C63.26-2015 – Section 5.2.5
ANSI C63.26-2015 – Section 5.2.4

Peak-to-Average Power Ratio:
KDB 971168 D01 v03r01 – Section 5.7
ANSI C63.26-2015 – Section 5.2.3.4

Channel Edge Emissions at Antenna Terminal
KDB 971168 D01 v03r01 – Section 6
KDB 662911 D01 v02r01 – Section E)3) Out-of-Band and Spurious Emission Measurements
a) Absolute Emission Limits
iii) Measure and add 10 log(N_{ANT}) dB
ANSI C63.26-2015 – Section 5.7

Spurious and Harmonic Emissions at Antenna Terminal
KDB 971168 D01 v03r01 – Section 6
KDB 662911 D01 v02r01 – Section E)3) Out-of-Band and Spurious Emission Measurements
a) Absolute Emission Limits
iii) Measure and add 10 log(N_{ANT}) dB
ANSI C63.26-2015 – Section 5.7

Radiated unwanted emission
KDB 971168 D01 v03r01 – Section 7
ANSI C63.26-2015 – Section 5.8

Frequency Stability / Temperature Variation
KDB 971168 D01 v03r01 – Section 9
ANSI C63.26-2015 – Section 5.6

4.2 Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi- anechoic chamber which is shielded from any ambient interference.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. For frequencies above 1GHz, linearly polarized Vivaldi antennas were used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, mode of operation, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and Vivaldi antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the polarity of the receive antenna to produce the worst-case emissions

4.3 Measurement Software

Test item	Name	Version
Conducted Measurement	Node B automation	1.0

4.4 Enviromental Conditions

The temperature is controlled within the range of 15°C to 35°C. The relative humidity is controlled within the range of 10% to 75%. The atmospheric pressure is monitored within the range 86-106kPa (860-1060mbar).

5.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95% level of confidence. The measurement uncertainty shown below meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Contribution	Expanded Uncertainty (±dB)
Conducted Bench Top Measurements	1.37
Radiated Disturbance (<1GHz)	3.94
Radiated Disturbance (>1GHz)	4.75
Radiated Disturbance (>18GHz)	4.84

6.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurement antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacture	Model	Description	Cal Date	Cal interval	Cal Due	Serial Number
Rohde & Schwarz	FSW43	Signal Analyzer	07/05/2022	Annual	07/04/2023	101250
AC POWER KOREA	ACPD-60150	DC Power Supply	01/12/2023	Annual	01/11/2024	DC-1
SUKSAN TECHNOLOGY	SE-CT-10	Temperature Chamber	07/05/2022	Annual	07/04/2023	191021
Rohde & Schwarz	TS-SFUNIT-Rx	Shielded Filter Unit	01/13/2023	Annual	01/12/2024	102131
Schwarzbeck	VULB9162	Broadband TRILOG Antenna	07/13/2021	Biennial	07/12/2023	9162-217
Sunol sciences	DRH-118	Horn Antenna	07/14/2021	Biennial	07/13/2023	A102416-1
K&L MICROWAVE	50140	High Pass Filter	07/05/2022	Annual	07/05/2023	3
Reachline	250W18NN-40	Attenuator	01/13/2023	Annual	01/12/2024	PK0288
Reachline	250W18NN-40	Attenuator	01/13/2023	Annual	01/12/2024	PK0293
Reachline	250W18NN-40	Attenuator	01/13/2023	Annual	01/12/2024	PK0294
Reachline	250W18NN-40	Attenuator	01/13/2023	Annual	01/12/2024	PK0295

Table 6-1. Test Equipment

Notes:

1. For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.

2. All testing was performed before the calibration due date.

7.0 SAMPLE CALCULATIONS

Emission Designator

QPSK Modulation

Emission Designator = 4M49G7D

Occupied Bandwidth = 4.49 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data transmission, telemetry, telecommand

QAM Modulation

Emission Designator = 4M49W7D

Occupied Bandwidth = 4.49 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data transmission, telemetry, telecommand

8.0 TEST RESULTS

8.1 Summary

Company Name: SAMSUNG Electronics Co., Ltd.

FCC ID: A3LRF4461D-13A

FCC Classification: Licensed Non-Broadcast Station Transmitter

Mode(s): LTE, NR, DSS, NB-IoT Guard Band/In-Band

FCC Part Section(s)	Test Description	Limit	Test Condition	Test Result	Reference
§ 2.1046	Conducted Average Output Power	N/A	CONDUCTED	PASS	Annex 1
§ 2.1049	Occupied Bandwidth	N/A		PASS	Section 8.2
§ 2.1046, §22.913(a) § 27.50(b)	Equivalent Radiated Power	≤ 1000W ERP		PASS	Section 8.3 (Note 4)
§22.913 § 2.1046,	Peak-to-average ratio	≤ 13 dB		PASS	Section 8.4
§2.1051 §22.917 §27.53(c), (f)	Band Edge Emissions at Antenna Terminal	< 43 + log10(P[Watts]) at Band Edge and all out-of-band emissions		PASS	Section 8.5
	Spurious and Harmonic Emissions at Antenna Terminal			PASS	Section 8.6
§ 2.1055 § 27.54	Frequency Stability	Fundamental emissions stay within authorized frequency block		PASS	Section 8.7
§2.1053 §22.917 §27.53(c)	Radiated unwanted emission	< 43 + log10(P[Watts]) at Band Edge and all out-of-band emissions	RADIATED	PASS	Section 8.8

Table 8-1. Summary of Test Results

Notes:

1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.

2) The analyzer plots were all taken with a correction table loaded into the analyzer.

3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.

4) The maximum antenna gain is determined at the time of licensing depending on the geographical location of the base station.

8.2 Occupied Bandwidth

Test Overview

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. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Procedures Used

KDB 971168 D01 v03r01 – Section 4.3

ANSI C63.26-2015 – Section 5.4.4

Test Setting

The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The spectrum analyzer settings were as follows:

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW ≥ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

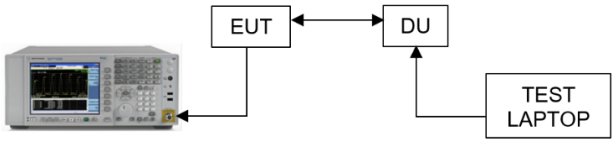


Figure 8-1. Test Instrument & Measurement Setup

Test Notes

None

Channel	Port	OBW (MHz)			
		QPSK	16QAM	64QAM	256QAM
Low	0	**4.49**	4.48	**4.49**	4.49
	1	4.49	4.47	4.49	4.49
Middle	0	4.49	4.48	4.49	4.49
	1	4.49	4.48	4.49	4.49
High	0	4.48	4.47	4.48	4.48
	1	4.48	4.47	4.48	4.48

Table 8-2. Occupied Bandwidth Summary Data (LTE B5_1C_5M _2T)

Channel	Port	OBW (MHz)			
		QPSK	16QAM	64QAM	256QAM
Low	0	8.96	**8.98**	8.98	8.97
	1	**8.97**	8.96	8.97	8.96
Middle	0	8.96	8.96	8.98	8.97
	1	8.97	8.96	8.97	8.97
High	0	8.94	8.96	8.97	8.94
	1	8.95	8.96	8.96	8.95

Table 8-3. Occupied Bandwidth Summary Data (LTE B5_1C_10M _2T)

Channel	Port	OBW (MHz)	
		QPSK	16QAM
Low	0	9.44	9.41
	1	9.44	9.42
Middle	0	**9.45**	**9.43**
	1	9.44	9.43
High	0	9.44	9.43
	1	9.42	9.40

Table 8-4. Occupied Bandwidth Summary Data (LTE B5_2C_5M+5M _2T)

Channel	Port	OBW (MHz)	
		QPSK	16QAM
Middle	0	**24.03**	23.99
	1	24.03	**24.02**

Table 8-5. Occupied Bandwidth Summary Data (LTE B5_3C_5M+10M+10M _2T)

DSS Ratio	Channel	Port	OBW (MHz)			
			QPSK	16QAM	64QAM	256QAM
LTE 9 : NR 1	Low	0	9.19	9.10	9.21	9.22
		1	9.20	9.08	9.22	9.22
	Middle	0	9.24	9.12	9.23	9.23
		1	9.22	9.09	9.22	9.23
	High	0	9.20	9.08	9.21	9.19
		1	9.22	9.11	9.21	9.18
LTE 8 : NR 2	Low	0	9.25	9.14	9.22	9.26
		1	9.24	9.15	9.23	9.24
	Middle	0	9.28	9.15	9.24	9.26
		1	9.28	9.14	9.24	9.26
	High	0	9.26	9.11	9.20	9.22
		1	9.23	9.12	9.23	9.25
LTE 7 : NR 3	Low	0	9.27	9.19	9.27	9.28
		1	9.26	9.17	9.25	9.27
	Middle	0	**9.28**	9.19	9.26	9.27
		1	9.28	9.15	9.25	9.27
	High	0	9.23	9.17	9.24	9.24
		1	9.25	9.19	9.24	9.24
LTE 6 : NR 4	Low	0	9.25	9.19	9.25	9.27
		1	9.24	9.16	9.25	9.26
	Middle	0	9.27	9.16	9.25	9.26
		1	9.27	9.16	9.26	9.28
	High	0	9.25	9.14	9.24	9.24
		1	9.27	9.14	9.24	9.23
LTE 5 : NR 5	Low	0	9.26	9.21	9.23	9.26
		1	9.25	9.17	9.25	9.27
	Middle	0	9.25	9.19	9.25	9.27
		1	9.27	9.19	9.25	9.27
	High	0	9.26	9.15	9.25	9.24
		1	9.27	9.19	9.23	9.26
LTE 4 : NR 6	Low	0	9.26	9.19	9.26	9.27
		1	9.28	9.18	9.27	9.24
	Middle	0	9.25	9.16	9.25	9.27
		1	9.26	9.21	9.27	9.27
	High	0	9.24	9.15	9.26	9.26
		1	9.23	9.14	9.25	9.25
LTE 3 : NR 7	Low	0	9.25	9.20	9.25	9.27
		1	9.25	9.18	9.25	9.26
	Middle	0	9.25	9.20	9.25	9.25
		1	9.25	9.19	9.26	9.26
	High	0	9.23	9.17	9.24	9.27
		1	9.25	9.16	9.26	9.26
LTE 2 : NR 8	Low	0	9.25	9.19	9.25	9.25
		1	9.26	9.19	9.26	**9.28**
	Middle	0	9.26	9.21	9.26	9.25
		1	9.27	9.19	9.26	9.27
	High	0	9.25	9.17	9.25	9.23
		1	9.24	9.20	9.24	9.25

Table 8-6. Occupied Bandwidth Summary Data (DSS B(n)5_1C_10M_2T)

DSS Ratio	Channel	Port	OBW (MHz)	
			QPSK	16QAM
LTE 9 : NR 1	Low	0	19.04	18.95
		1	**19.10**	18.96
	Middle	0	19.04	18.95
		1	19.08	**18.99**
	High	0	19.02	18.96
		1	19.03	18.97

Table 8-7. Occupied Bandwidth Summary Data (DSS B(n)5_2C_10M+10M_2T)

Channel	Port	OBW (MHz)			
		QPSK	16QAM	64QAM	256QAM
Low	0	**4.47**	**4.49**	4.47	4.47
	1	4.47	4.49	4.47	4.47
Middle	0	4.47	4.49	4.47	4.47
	1	4.46	4.49	4.47	4.47
High	0	4.47	4.49	4.46	4.46
	1	4.47	4.49	4.47	4.47

Table 8-8. Occupied Bandwidth Summary Data (NR n5_1C_5M_2T)

Channel	Port	OBW (MHz)			
		QPSK	16QAM	64QAM	256QAM
Low	0	9.31	9.25	9.28	**9.32**
	1	9.29	9.26	9.29	9.28
Middle	0	9.30	9.23	9.31	9.28
	1	**9.32**	9.23	9.29	9.29
High	0	9.29	9.22	9.28	9.27
	1	9.29	9.21	9.28	9.25

Table 8-9. Occupied Bandwidth Summary Data (NR n5_1C_10M_2T)

Channel	Port	OBW (MHz)			
		QPSK	16QAM	64QAM	256QAM
Low	0	**14.10**	14.14	14.10	14.12
	1	14.08	14.13	14.12	14.09
Middle	0	14.10	14.12	14.14	14.10
	1	14.08	14.14	14.15	14.11
High	0	14.08	14.14	14.10	14.09
	1	14.10	**14.15**	14.12	14.08

Table 8-10. Occupied Bandwidth Summary Data (NR n5_1C_15M_2T)

Channel	Port	OBW (MHz)	
		QPSK	16QAM
Low	0	9.41	**9.46**
	1	9.42	9.44
Middle	0	**9.43**	9.47
	1	9.43	9.44
High	0	9.42	9.41
	1	9.42	9.42

Table 8-11. Occupied Bandwidth Summary Data (NR n5_2C_5M+5M_2T)

Channel	Port	OBW (MHz)	
		QPSK	16QAM
Middle	0	24.01	24.07
	1	**24.03**	**24.12**

Table 8-12. Occupied Bandwidth Summary Data (NR n5_2C_10M+15M_2T)

DSS Ratio	Channel	Port	OBW (MHz)	
			QPSK	16QAM
LTE 9 : NR 1	Low	0	14.26	14.22
		1	**14.27**	14.22
	Middle	0	14.25	14.22
		1	14.23	**14.23**
	High	0	14.25	14.23
		1	14.26	14.20

Table 8-13. Occupied Bandwidth Summary Data (MSR 2C_DSS B(n)5_1C_10M+LTE B5_1C_5M_2T)

DSS Ratio	Channel	Port	OBW (MHz)	
			QPSK	16QAM
LTE 9 : NR 1	Middle	0	24.12	**24.09**
		1	**24.14**	24.07

Table 8-14. Occupied Bandwidth Summary Data (MSR 3C_DSS B(n)5_2C_10M+10M+LTE B5_1C_5M_2T)

Channel	Port	OBW (MHz)	
		QPSK	16QAM
Low	0	9.44	9.41
	1	**9.45**	9.40
Middle	0	9.44	9.41
	1	9.44	9.41
High	0	9.43	9.39
	1	9.43	**9.42**

Table 8-15. Occupied Bandwidth Summary Data (MSR 2C_NR n5_1C_5M+LTE B5_1C_5M_2T)

Channel	Port	OBW (MHz)	
		QPSK	16QAM
Middle	0	24.21	**24.15**
	1	**24.22**	24.15

Table 8-16. Occupied Bandwidth Summary Data (MSR 3C_NR n5_2C_10M+10M+LTE B5_1C_5M_2T)

DSS Ratio	Channel	Port	OBW (MHz)	
			QPSK	16QAM
LTE 9 : NR 1	Low	0	14.26	**14.28**
		1	14.25	14.25
	Middle	0	**14.27**	14.25
		1	14.26	14.23
	High	0	14.26	14.25
		1	14.24	14.24

Table 8-17. Occupied Bandwidth Summary Data (MSR 2C_DSS B(n)5_1C_10M+NR n5_1C_5M_2T)

DSS Ratio	Channel	Port	OBW (MHz)	
			QPSK	16QAM
LTE 9 : NR 1	Middle	0	**23.96**	23.99
		1	23.95	**24.00**

Table 8-18. Occupied Bandwidth Summary Data (MSR 2C_DSS B(n)5_1C_10M+NR n5_1C_15M_2T)

DSS Ratio	Channel	Port	OBW (MHz)	
			QPSK	16QAM
LTE 9 : NR 1	Low	0	19.18	19.18
		1	19.19	19.17
	Middle	0	19.21	19.15
		1	**19.26**	**19.22**
	High	0	19.17	19.17
		1	19.21	19.13

Table 8-19. Occupied Bandwidth Summary Data (MSR 3C_DSS B(n)5_1C_10M+NR n5_1C_5M+LTE B5_1C_5M_2T)

DSS Ratio	Channel	Port	OBW (MHz)	
			QPSK	16QAM
LTE 9 : NR 1	Middle	0	24.08	**24.10**
		1	**24.14**	24.07

Table 8-20. Occupied Bandwidth Summary Data (MSR 3C_DSS B(n)5_1C_10M+NR n5_1C_10M+LTE B5_1C_5M_2T)

Channel	Port	OBW (MHz)			
		QPSK	16QAM	64QAM	256QAM
Low	0	4.49	4.47	4.49	4.49
	1	**4.50**	4.47	4.49	4.50
Middle	0	4.49	4.47	4.49	4.50
	1	4.49	4.47	4.49	**4.51**
High	0	4.50	4.47	4.49	4.51
	1	4.49	4.47	4.49	4.50

Table 8-21. Occupied Bandwidth Summary Data (LTE B13_1C_5M_2T)

Channel	Port	OBW (MHz)			
		QPSK	16QAM	64QAM	256QAM
Middle	0	8.96	8.96	8.97	**8.99**
	1	**8.98**	8.96	8.96	8.98

Table 8-22. Occupied Bandwidth Summary Data (LTE B13_1C_10M_2T)

Channel	Port	OBW (MHz)	
		QPSK	16QAM
Middle	0	**9.45**	9.43
	1	9.44	**9.44**

Table 8-23. Occupied Bandwidth Summary Data (LTE B13_2C_5M+5M_2T)

Channel	Port	OBW (MHz)
		QPSK
Low	0	4.47
	1	4.47
Middle	0	**4.48**
	1	4.47
High	0	4.48
	1	4.48

Table 8-24. Occupied Bandwidth Summary Data (LTE B13_1C_5M+NB-IoT(1IB)_2T)

Channel	Port	OBW (MHz)			
		QPSK			
		LTE B13_1C_10M+NB-IoT(2GB)	LTE B13_1C_10M+NB-IoT(1GB+1IB)	LTE B13_1C_10M+NB-IoT(1IB+1GB)	LTE B13_1C_10M+NB-IoT(2IB)
Middle	0	**9.49**	9.21	9.22	8.96
	1	9.48	9.20	9.21	8.96

Table 8-25. Occupied Bandwidth Summary Data (LTE B13_1C_10M+NB-IoT_2T)

Channel	Port	OBW (MHz)			
		QPSK	16QAM	64QAM	256QAM
Low	0	**4.49**	4.48	**4.50**	4.48
	1	4.48	4.48	4.49	4.48
	2	4.48	4.48	4.49	4.49
	3	4.48	4.48	4.49	4.48
Middle	0	4.48	4.48	4.49	4.48
	1	4.48	4.48	4.49	4.48
	2	4.48	4.48	4.49	4.49
	3	4.48	4.48	4.49	4.49
High	0	4.47	4.47	4.48	4.48
	1	4.48	4.48	4.49	4.49
	2	4.47	4.47	4.48	4.48
	3	4.48	4.48	4.49	4.49

Table 8-26. Occupied Bandwidth Summary Data (LTE B5_1C_5M_4T)

Channel	Port	OBW (MHz)			
		QPSK	16QAM	64QAM	256QAM
Low	0	8.96	8.95	8.97	8.94
	1	8.97	8.96	8.97	8.95
	2	**8.98**	8.96	8.97	8.97
	3	8.96	8.97	8.97	8.96
Middle	0	8.95	8.96	8.97	8.97
	1	8.97	8.97	**8.98**	8.97
	2	8.96	8.95	8.98	8.96
	3	8.96	8.97	8.98	8.96
High	0	8.94	8.94	8.95	8.94
	1	8.95	8.95	8.97	8.95
	2	8.95	8.95	8.96	8.95
	3	8.96	8.95	8.97	8.94

Table 8-27. Occupied Bandwidth Summary Data (LTE B5_1C_10M_4T)

Channel	Port	OBW (MHz)	
		QPSK	16QAM
Low	0	9.45	9.44
	1	9.44	9.42
	2	9.46	9.41
	3	9.44	9.44
Middle	0	**9.48**	9.41
	1	9.48	9.43
	2	9.45	9.42
	3	9.46	**9.45**
High	0	9.45	9.42
	1	9.44	9.42
	2	9.45	9.42
	3	9.45	9.41

Table 8-28. Occupied Bandwidth Summary Data (LTE B5_2C_5M+5M_4T)

Channel	Port	OBW (MHz)	
		QPSK	16QAM
Middle	0	24.04	24.06
	1	**24.06**	**24.10**
	2	24.02	24.09
	3	24.04	24.08

Table 8-29. Occupied Bandwidth Summary Data (LTE B5_3C_5M+10M+10M _4T)

DSS Ratio	Channel	Port	OBW (MHz)			
			QPSK	16QAM	64QAM	256QAM
LTE 9 : NR 1	Low	0	9.19	9.08	9.21	9.21
		1	9.22	9.11	9.21	9.22
		2	9.24	9.13	9.22	9.25
		3	9.24	9.13	9.20	9.23
	Middle	0	9.23	9.10	9.20	9.21
		1	9.26	9.10	9.20	9.23
		2	9.24	9.13	9.24	9.23
		3	9.21	9.11	9.24	9.23
	High	0	9.17	9.10	9.19	9.21
		1	9.21	9.12	9.22	9.20
		2	9.23	9.11	9.21	9.20
		3	9.17	9.11	9.22	9.22
LTE 8 : NR 2	Low	0	9.24	9.11	9.23	9.25
		1	9.23	9.12	9.24	9.27
		2	9.23	9.12	9.24	9.26
		3	9.25	9.12	9.25	9.24
	Middle	0	9.23	9.15	9.26	9.25
		1	9.23	9.11	9.25	9.26
		2	9.24	9.14	9.26	9.26
		3	9.24	9.12	9.24	9.26
	High	0	9.23	9.10	9.23	9.24
		1	9.22	9.11	9.23	9.24
		2	9.24	9.11	9.24	9.23
		3	9.23	9.12	9.25	9.25
LTE 4 : NR 6	Low	0	9.24	9.17	**9.27**	9.25
		1	9.26	9.16	9.25	9.24
		2	9.25	9.17	9.27	9.26
		3	9.26	9.18	9.26	9.25
	Middle	0	9.26	9.19	9.24	9.26
		1	9.26	9.17	9.25	9.27
		2	**9.27**	9.16	9.25	9.25
		3	9.26	9.16	9.26	9.25
	High	0	9.26	9.12	9.24	9.24
		1	9.23	9.14	9.25	9.25
		2	9.24	9.12	9.25	9.25
		3	9.25	9.13	9.25	9.24

Table 8-30. Occupied Bandwidth Summary Data (DSS B(n)5_1C_10M_4T)

DSS Ratio	Channel	Port	OBW (MHz)	
			QPSK	16QAM
LTE 9 : NR 1	Low	0	19.00	18.94
		1	19.04	18.89
		2	**19.11**	18.85
		3	19.01	18.88
	Middle	0	19.10	18.94
		1	19.04	18.97
		2	19.09	18.95
		3	19.09	18.94
	High	0	19.04	18.92
		1	19.06	**18.98**
		2	19.02	18.97
		3	19.01	18.96

Table 8-31. Occupied Bandwidth Summary Data (DSS B(n)5_2C_10M+10M_2T)

Channel	Port	OBW (MHz)			
		QPSK	16QAM	64QAM	256QAM
Low	0	**4.47**	4.49	4.48	4.47
	1	4.47	4.48	4.47	4.46
	2	4.47	**4.49**	4.47	4.47
	3	4.47	4.49	4.47	4.47
Middle	0	4.47	4.49	4.47	4.47
	1	4.47	4.48	4.49	4.47
	2	4.47	4.49	4.49	4.48
	3	4.47	4.48	4.49	4.48
High	0	4.46	4.48	4.47	4.46
	1	4.47	4.48	4.47	4.46
	2	4.47	4.48	4.47	4.46
	3	4.46	4.48	4.46	4.46

Table 8-32. Occupied Bandwidth Summary Data (NR n5_1C_5M_4T)

Channel	Port	OBW (MHz)			
		QPSK	16QAM	64QAM	256QAM
Low	0	**9.30**	9.25	9.29	9.29
	1	9.30	9.25	**9.30**	9.29
	2	9.30	9.26	9.28	9.29
	3	9.30	9.23	9.29	9.29
Middle	0	9.29	9.27	9.30	9.29
	1	9.30	9.23	9.30	9.30
	2	9.29	9.24	9.30	9.29
	3	9.30	9.26	9.29	9.29
High	0	9.28	9.20	9.29	9.28
	1	9.28	9.21	9.28	9.28
	2	9.30	9.22	9.28	9.28
	3	9.27	9.21	9.29	9.28

Table 8-33. Occupied Bandwidth Summary Data (NR n5_1C_10M_4T)

Channel	Port	OBW (MHz)			
		QPSK	16QAM	64QAM	256QAM
Low	0	14.09	**14.15**	14.09	14.12
	1	14.07	14.13	14.09	14.09
	2	**14.10**	14.14	14.10	14.11
	3	14.09	14.12	14.09	14.10
Middle	0	14.10	14.16	14.09	14.09
	1	14.09	14.14	14.11	14.11
	2	14.09	14.14	14.10	14.11
	3	14.10	14.14	14.11	14.13
High	0	14.08	14.13	14.10	14.10
	1	14.08	14.12	14.07	14.10
	2	14.08	14.13	14.10	14.09
	3	14.07	14.13	14.08	14.09

Table 8-34. Occupied Bandwidth Summary Data (NR n5_1C_15M_4T)

Channel	Port	OBW (MHz)	
		QPSK	16QAM
Low	0	9.42	9.45
	1	**9.43**	**9.46**
	2	9.43	9.45
	3	9.43	9.45
Middle	0	9.43	9.45
	1	9.42	9.45
	2	9.43	9.46
	3	9.43	9.45
High	0	9.41	9.43
	1	9.42	9.44
	2	9.41	9.44
	3	9.42	9.44

Table 8-35. Occupied Bandwidth Summary Data (NR n5_2C_5M+5M_4T)

Channel	Port	OBW (MHz)	
		QPSK	16QAM
Middle	0	24.05	24.11
	1	24.04	24.10
	2	**24.05**	24.11
	3	24.05	**24.11**

Table 8-36. Occupied Bandwidth Summary Data (NR n5_2C_10M+15M_4T)

DSS Ratio	Channel	Port	OBW (MHz)	
			QPSK	16QAM
LTE 9 : NR 1	Low	0	14.29	14.21
		1	14.26	14.25
		2	14.27	14.23
		3	14.27	14.23
	Middle	0	14.29	14.18
		1	14.26	14.22
		2	**14.29**	14.25
		3	14.25	14.24
	High	0	14.24	14.18
		1	14.28	**14.26**
		2	14.26	14.23
		3	14.27	14.21

Table 8-37. Occupied Bandwidth Summary Data (MSR 2C_DSS B(n)5_1C_10M+LTE B5_1C_5M_4T)

DSS Ratio	Channel	Port	OBW (MHz)	
			QPSK	16QAM
LTE 9 : NR 1	Middle	0	24.16	24.07
		1	**24.18**	24.01
		2	24.11	**24.07**
		3	24.14	24.02

Table 8-38. Occupied Bandwidth Summary Data (MSR 3C_DSS B(n)5_2C_10M+10M+LTE B5_1C_5M_4T)

Channel	Port	OBW (MHz)	
		QPSK	16QAM
Low	0	9.44	**9.43**
	1	9.43	9.42
	2	9.43	9.41
	3	9.43	9.43
Middle	0	9.44	9.42
	1	9.44	9.43
	2	9.44	9.42
	3	**9.45**	9.42
High	0	9.43	9.41
	1	9.43	9.41
	2	9.42	9.43
	3	9.42	9.40

Table 8-39. Occupied Bandwidth Summary Data (MSR 2C_NR n5_1C_5M+LTE B5_1C_5M_4T)

Channel	Port	OBW (MHz)	
		QPSK	16QAM
Middle	0	**24.21**	24.18
	1	24.20	**24.19**
	2	24.20	24.18
	3	24.19	24.17

Table 8-40. Occupied Bandwidth Summary Data (MSR 3C_NR n5_2C_10M+10M+LTE B5_1C_5M_4T)

DSS Ratio	Channel	Port	OBW (MHz)	
			QPSK	16QAM
LTE 9 : NR 1	Low	0	14.26	14.26
		1	14.26	14.25
		2	14.24	14.24
		3	14.27	14.23
	Middle	0	14.27	14.24
		1	14.19	**14.26**
		2	14.27	14.25
		3	**14.29**	14.22
	High	0	14.23	14.22
		1	14.25	14.22
		2	14.27	14.22
		3	14.24	14.26

Table 8-41. Occupied Bandwidth Summary Data (MSR 2C_DSS B(n)5_1C_10M+NR n5_1C_5M_4T)

DSS Ratio	Channel	Port	OBW (MHz)	
			QPSK	16QAM
LTE 9 : NR 1	Middle	0	23.93	24.02
		1	**23.98**	**24.03**
		2	23.93	24.02
		3	23.94	23.99

Table 8-42. Occupied Bandwidth Summary Data (MSR 2C_DSS B(n)5_1C_10M+NR n5_1C_15M_4T)

DSS Ratio	Channel	Port	OBW (MHz)	
			QPSK	16QAM
LTE 9 : NR 1	Low	0	19.22	**19.26**
		1	**19.24**	19.16
		2	19.21	19.22
		3	19.23	19.18
	Middle	0	19.21	19.20
		1	19.23	19.18
		2	19.21	19.14
		3	19.23	19.19
	High	0	19.21	19.12
		1	19.19	19.16
		2	19.18	19.20
		3	19.18	19.18

Table 8-43. Occupied Bandwidth Summary Data (MSR 3C_DSS B(n)5_1C_10M+NR n5_1C_5M+LTE B5_1C_5M_4T)

DSS Ratio	Channel	Port	OBW (MHz)	
			QPSK	16QAM
LTE 9 : NR 1	Middle	0	24.10	24.05
		1	**24.16**	24.06
		2	24.13	**24.17**
		3	24.16	24.02

Table 8-44. Occupied Bandwidth Summary Data (MSR 3C_DSS B(n)5_1C_10M+NR n5_1C_10M+LTE B5_1C_5M_4T)

Channel	Port	OBW (MHz)			
		QPSK	16QAM	64QAM	256QAM
Low	0	4.48	4.47	4.48	4.48
	1	4.48	4.48	4.49	4.49
	2	4.48	4.48	4.49	4.48
	3	**4.49**	4.47	4.49	4.48
Middle	0	4.48	4.47	4.49	4.48
	1	4.48	4.47	4.49	4.48
	2	4.49	4.48	4.48	4.48
	3	4.48	4.48	4.48	4.48
High	0	4.48	4.48	4.49	4.49
	1	4.48	4.48	4.49	4.48
	2	4.48	4.48	4.49	4.48
	3	4.48	4.48	**4.50**	4.49

Table 8-45. Occupied Bandwidth Summary Data (LTE B13_1C_5M_4T)

Channel	Port	OBW (MHz)			
		QPSK	16QAM	64QAM	256QAM
Middle	0	8.97	8.96	**8.98**	8.96
	1	8.96	8.97	8.97	8.96
	2	**8.98**	8.96	8.97	8.96
	3	8.96	8.96	8.96	8.97

Table 8-46. Occupied Bandwidth Summary Data (LTE B13_1C_10M_4T)

Channel	Port	OBW (MHz)	
		QPSK	16QAM
Middle	0	9.44	9.42
	1	**9.45**	9.42
	2	9.44	9.41
	3	9.44	**9.44**

Table 8-47. Occupied Bandwidth Summary Data (LTE B13_2C_5M+5M_4T)

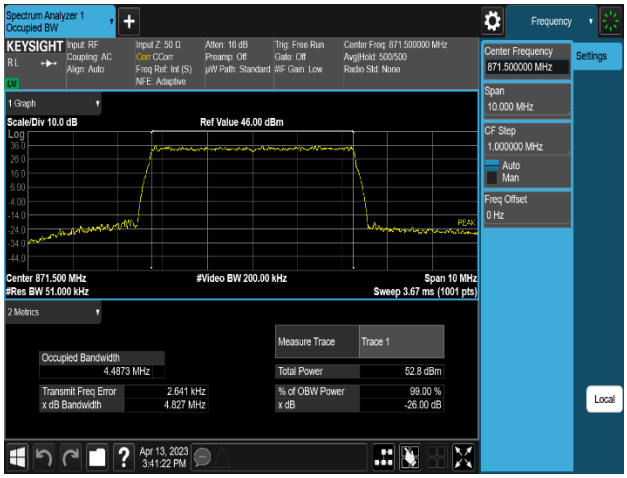
Channel	Port	OBW (MHz)
		QPSK
Low	0	4.47
	1	**4.48**
	2	4.48
	3	4.47
Middle	0	4.47
	1	4.47
	2	4.47
	3	4.47
High	0	4.48
	1	4.48
	2	4.47
	3	4.47

Table 8-48. Occupied Bandwidth Summary Data (LTE B13_1C_5M+NB-IoT(1IB)_4T)

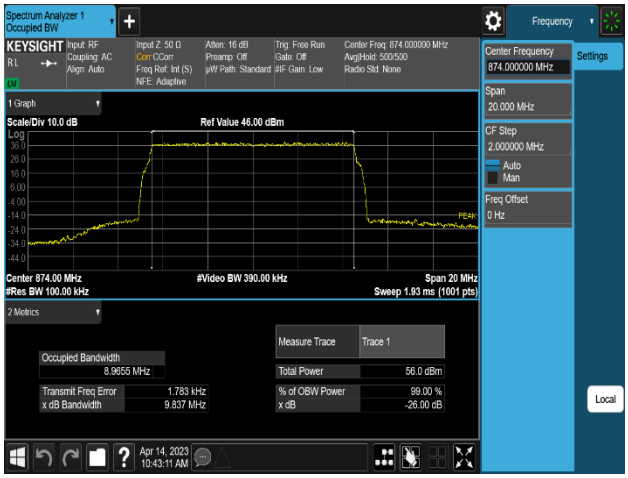
Channel	Port	OBW (MHz)			
		QPSK			
		LTE B13_1C_10M+NB-IoT(2GB)	LTE B13_1C_10M+NB-IoT(1GB+1IB)	LTE B13_1C_10M+NB-IoT(1IB+1GB)	LTE B13_1C_10M+NB-IoT(2IB)
Middle	0	9.49	9.21	9.22	8.95
	1	9.49	9.21	9.22	8.94
	2	**9.49**	9.22	9.21	8.95
	3	9.49	9.20	9.22	8.95

Table 7 2. Occupied Bandwidth Summary Data (LTE B13_1C_10M+NB-IoT_4T)

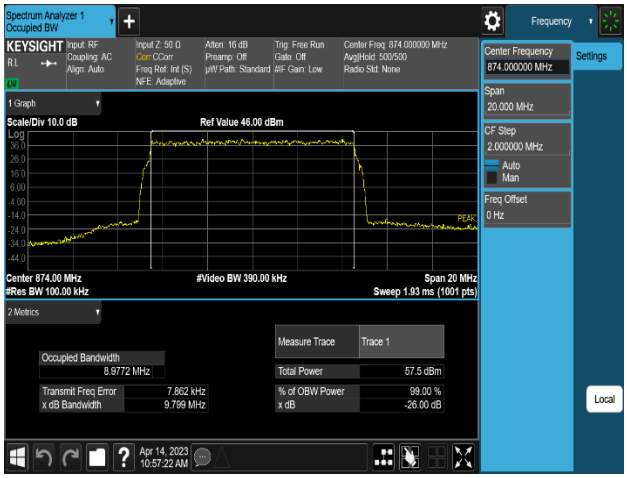
Plot 8-1. Occupied Bandwidth Plot
(LTE B5_1C_5M_QPSK - Low Channel_2T, Port 0)



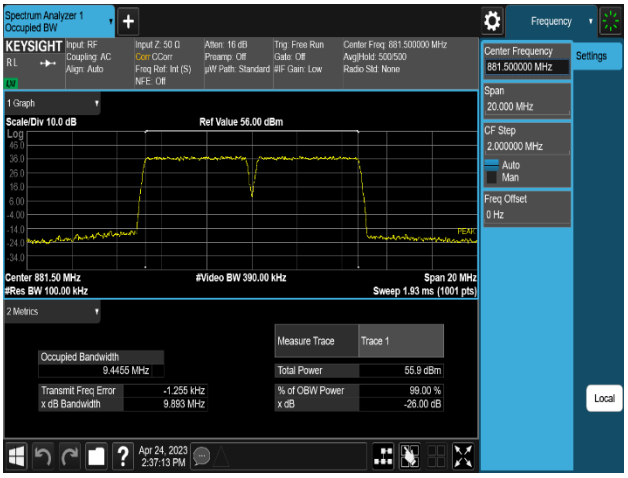
Plot 8-2. Occupied Bandwidth Plot
(LTE B5_1C_5M_64QAM - Low Channel_2T, Port 0)



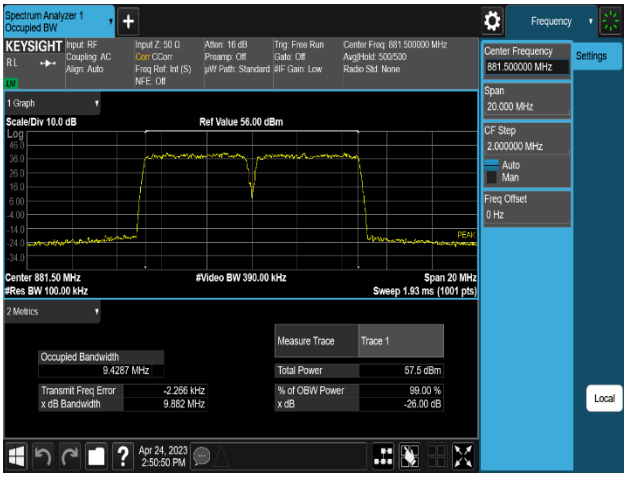
Plot 8-3. Occupied Bandwidth Plot
(LTE B5_1C_10M_QPSK - Low Channel_2T, Port 1)



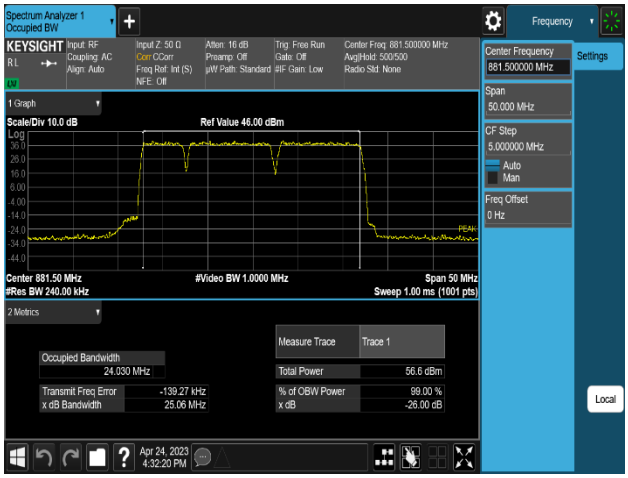
Plot 8-4. Occupied Bandwidth Plot
(LTE B5_1C_10M_16QAM - Low Channel_2T, Port 0)



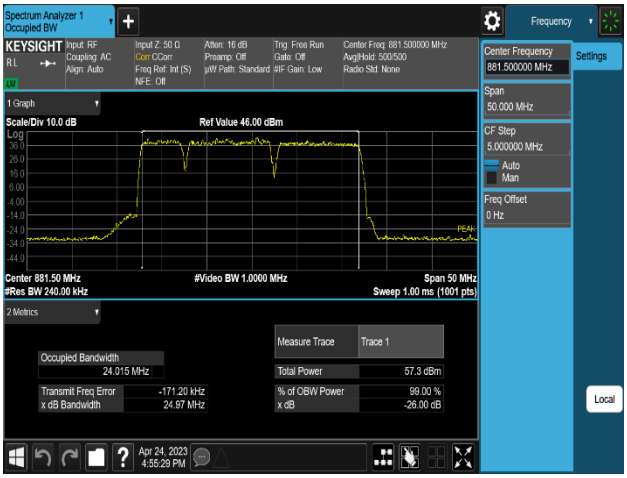
Plot 8-5. Occupied Bandwidth Plot
(LTE B5_2C_5M+5M_QPSK - Mid Channel_2T, Port 0)



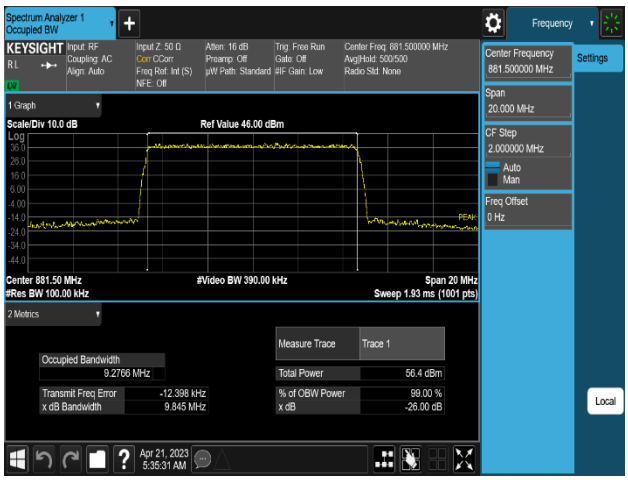
Plot 8-6. Occupied Bandwidth Plot
(LTE B5_2C_5M+5M_16QAM - Mid Channel_2T, Port 0)



Plot 8-7. Occupied Bandwidth Plot
(LTE B5_3C_5M+10M+10M_3C_QPSK – Mid Channel_2T, Port 0)

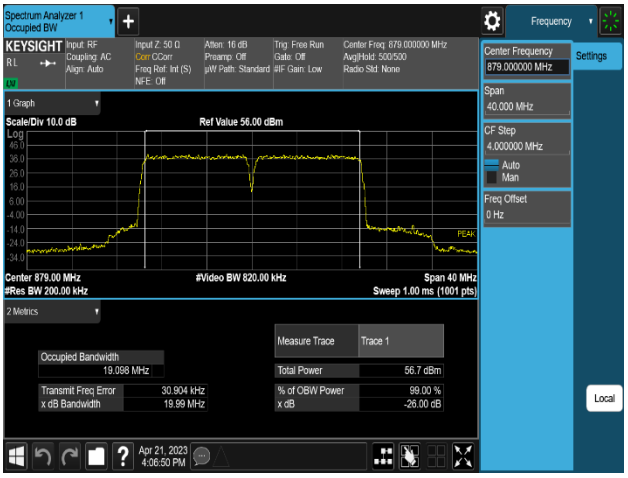


Plot 8-8. Occupied Bandwidth Plot
(LTE B5_3C_5M+10M+10M_3C_16QAM – Mid Channel_2T, Port 1)

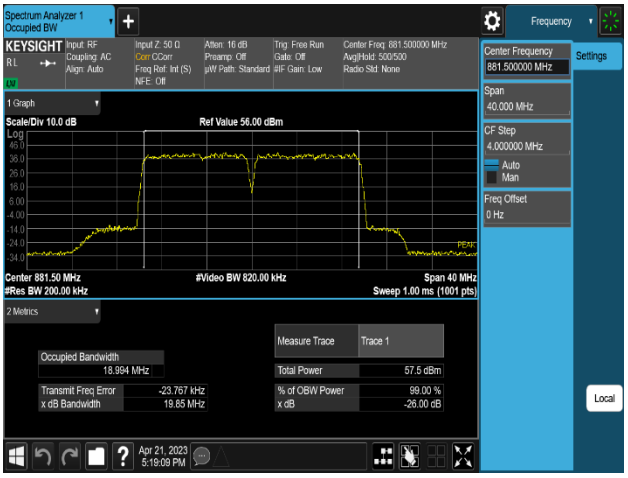


Plot 8-9. Occupied Bandwidth Plot
(DSS B(n)5_1C_10M_QPSK - Mid Channel_2T, Port 0)

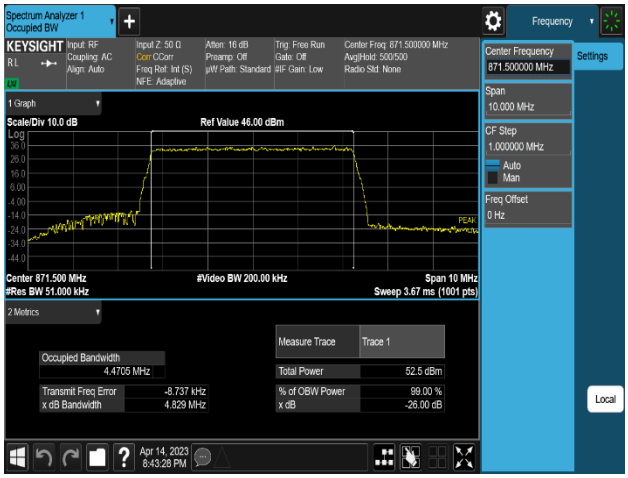
Plot 8-10. Occupied Bandwidth Plot
(DSS B(n)5_1C_10M_256QAM - Low Channel_2T, Port 1)



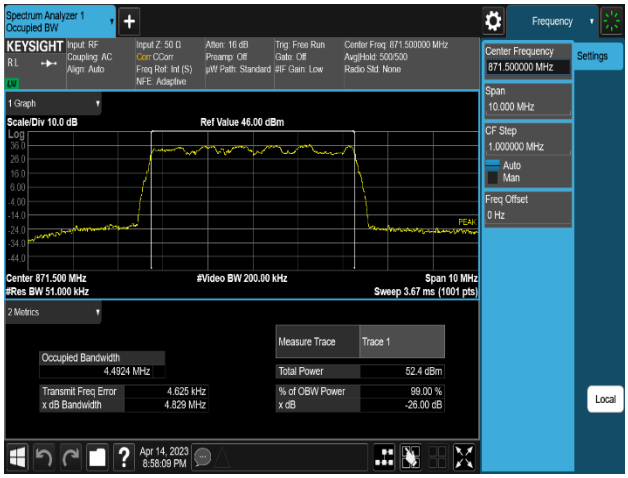
Plot 8-11. Occupied Bandwidth Plot
(DSS B(n)5_2C_10M+10M_QPSK - Low Channel_2T, Port 1)



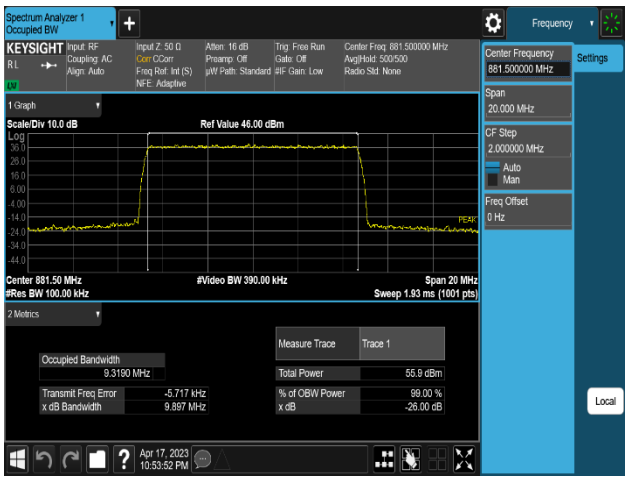
Plot 8-12. Occupied Bandwidth Plot
(DSS B(n)5_2C_10M+10M_16QAM - Mid Channel_2T, Port 1)



Plot 8-13. Occupied Bandwidth Plot
(NR n5_1C_5M_QPSK - Low Channel_2T, Port 0)

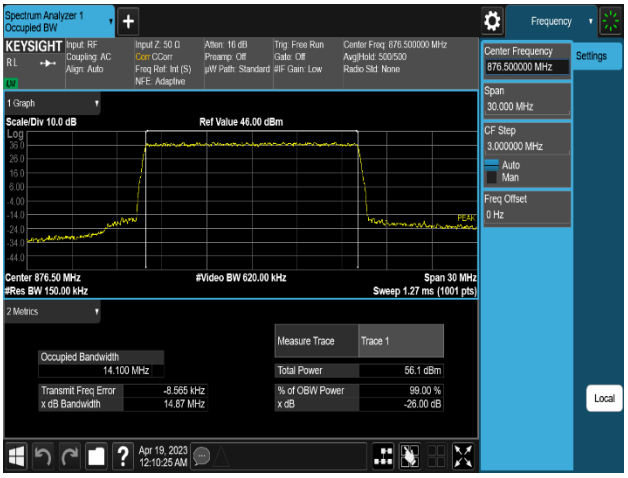


Plot 8-14. Occupied Bandwidth Plot
(NR n5_1C_5M_16QAM - Low Channel_2T, Port 0)

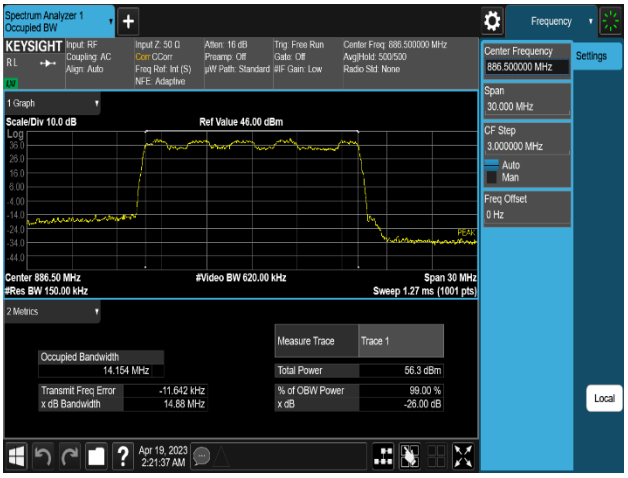


Plot 8-15. Occupied Bandwidth Plot
(NR n5_1C_10M_QPSK - Mid Channel_2T, Port 1)

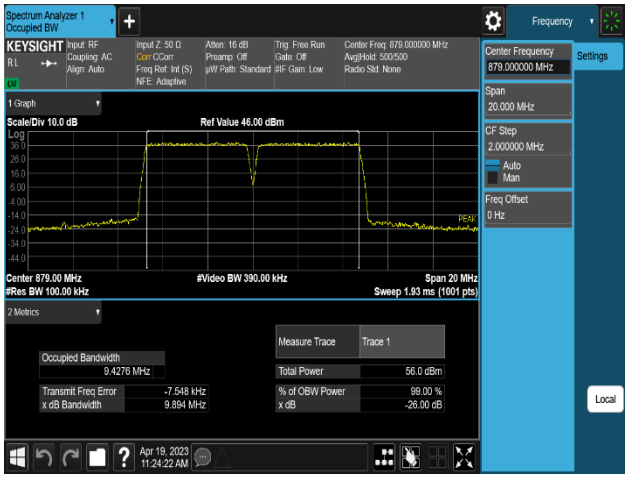
Plot 8-16. Occupied Bandwidth Plot
(NR n5_1C_10M_256QAM - Low Channel_2T, Port 0)



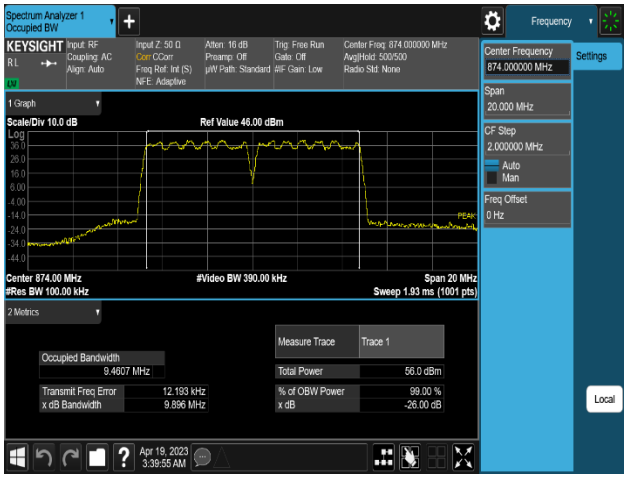
Plot 8-17. Occupied Bandwidth Plot
(NR n5_1C_15M_QPSK - Low Channel_2T, Port 0)



Plot 8-18. Occupied Bandwidth Plot
(NR n5_1C_15M_16QAM - High Channel_2T, Port 1)

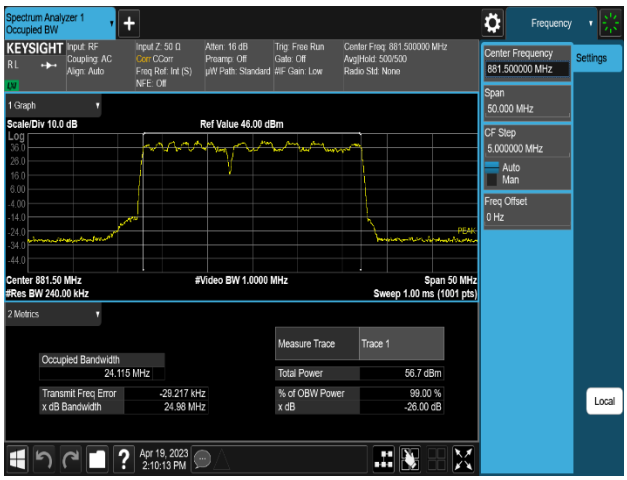


Plot 8-19. Occupied Bandwidth Plot
(NR n5_2C_5M+5M_2C_QPSK - Mid Channel_2T, Port 0)

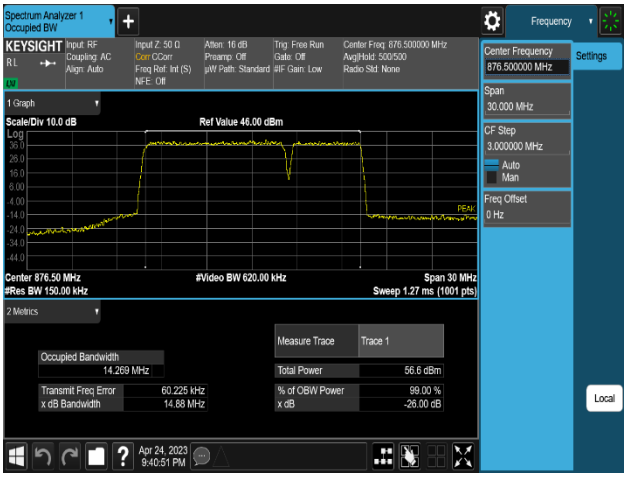


Plot 8-20. Occupied Bandwidth Plot
(NR n5_2C_5M+5M_16QAM - Low Channel_2T, Port 0)

Plot 8-21. Occupied Bandwidth Plot
(NR n5_2C_10M+15M_QPSK - Mid Channel_2T, Port 1)

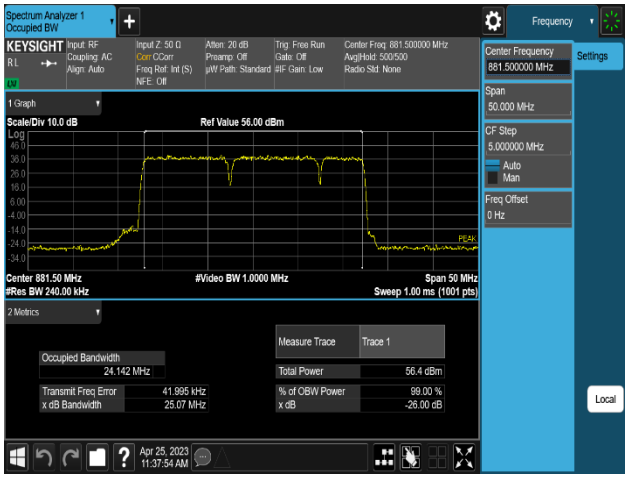


Plot 8-22. Occupied Bandwidth Plot
(NR n5_2C_10M+15M_16QAM - Mid Channel_2T, Port 1)

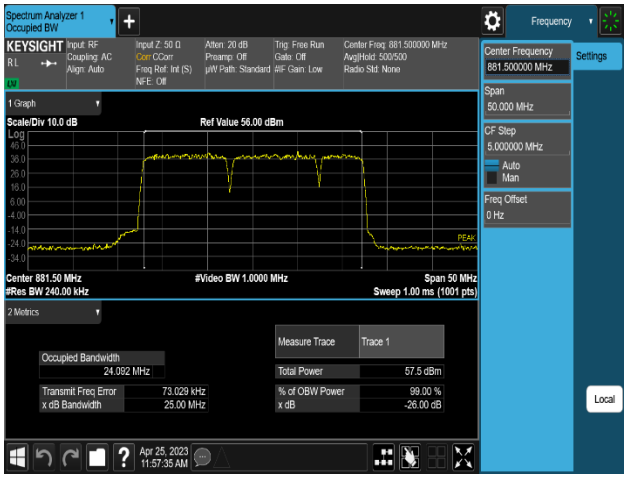


Plot 8-23. Occupied Bandwidth Plot
(MSR 2C_DSS B(n)5_1C_10M+LTE B5_1C_5M_QPSK - Low Channel_2T, Port 1)

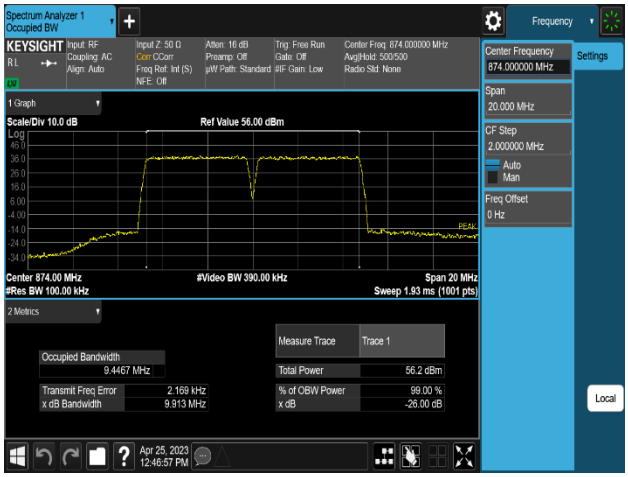
Plot 8-24. Occupied Bandwidth Plot
(MSR 2C_DSS B(n)5_1C_10M+LTE B5_1C_5M_16QAM - Mid Channel_2T, Port 1)



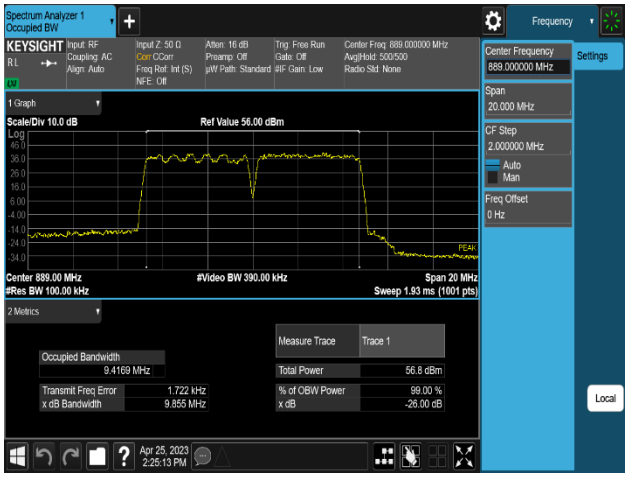
Plot 8-25. Occupied Bandwidth Plot
(MSR 3C_DSS B(n)5_2C_10M+10M+LTE B5_1C_5M_QPSK - Mid Channel_2T, Port 1)



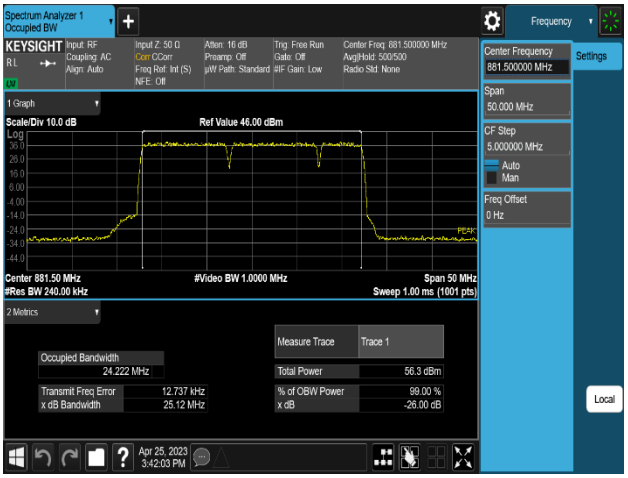
Plot 8-26. Occupied Bandwidth Plot
(MSR 3C_DSS B(n)5_2C_10M+10M+LTE B5_1C_5M_16QAM - Mid Channel_2T, Port 0)



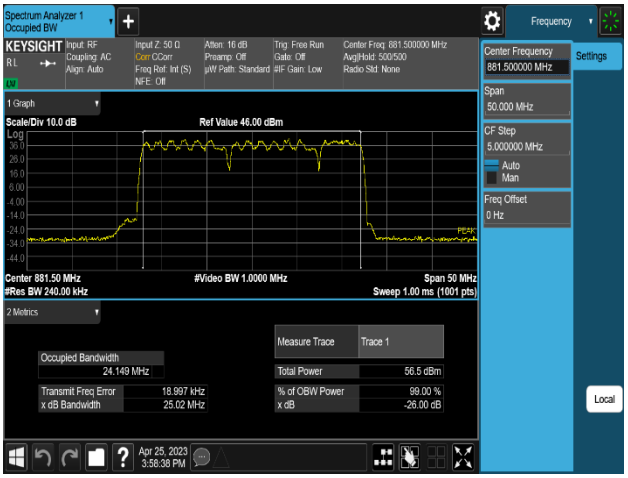
Plot 8-27. Occupied Bandwidth Plot
(MSR 2C_NR n5_1C_5M+LTE B5_1C_5M_QPSK - Low Channel_2T, Port 1)



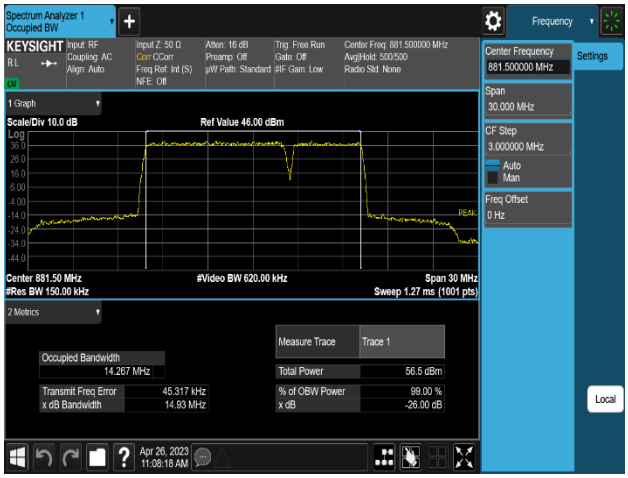
Plot 8-28. Occupied Bandwidth Plot
(MSR 2C_NR n5_1C_5M+LTE B5_1C_5M_16QAM - High Channel_2T, Port 1)



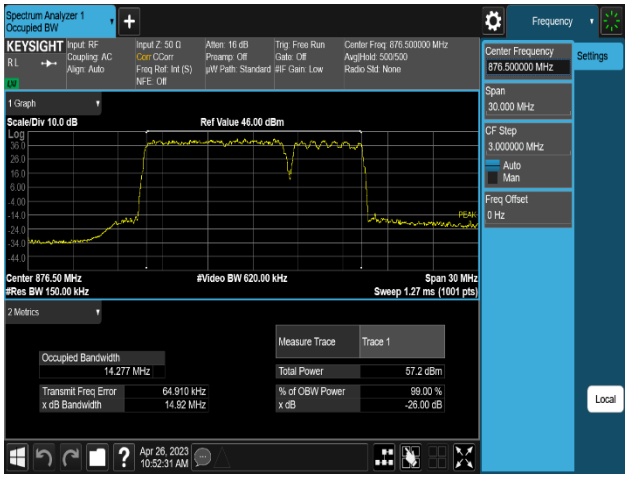
Plot 8-29. Occupied Bandwidth Plot
(MSR 3C_NR n5_2C_10M+10M+LTE B5_1C_5M_QPSK - Mid Channel_2T, Port 1)



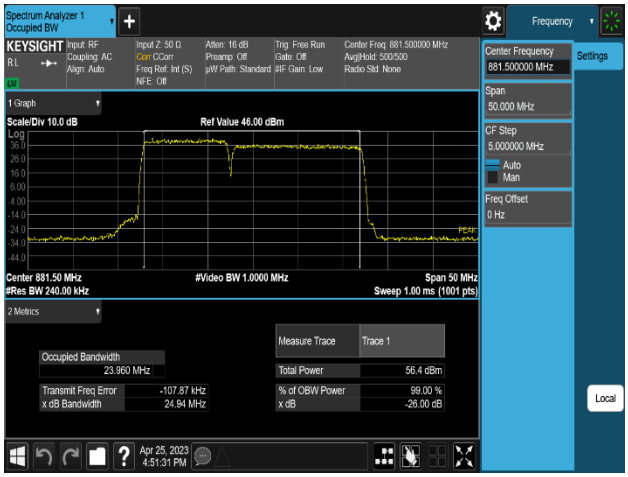
Plot 8-30. Occupied Bandwidth Plot
(MSR 3C_NR n5_2C_10M+10M+LTE B5_1C_5M_16QAM - Mid Channel_2T, Port 0)



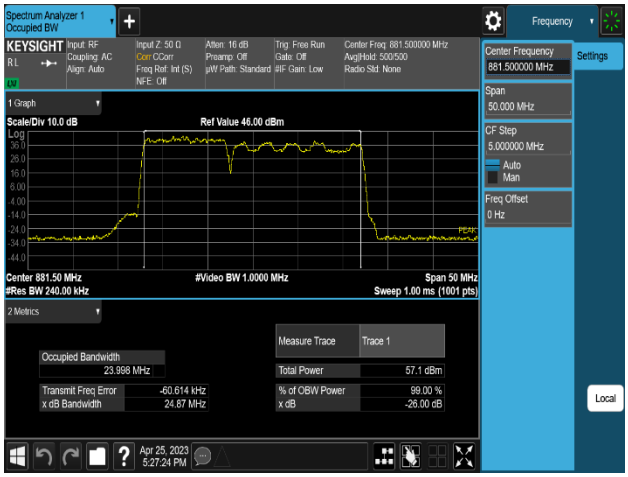
Plot 8-31. Occupied Bandwidth Plot
(MSR 2C_DSS B(n)5_1C_10M+NR n5_1C_5M_QPSK - Mid Channel_2T, Port 0)



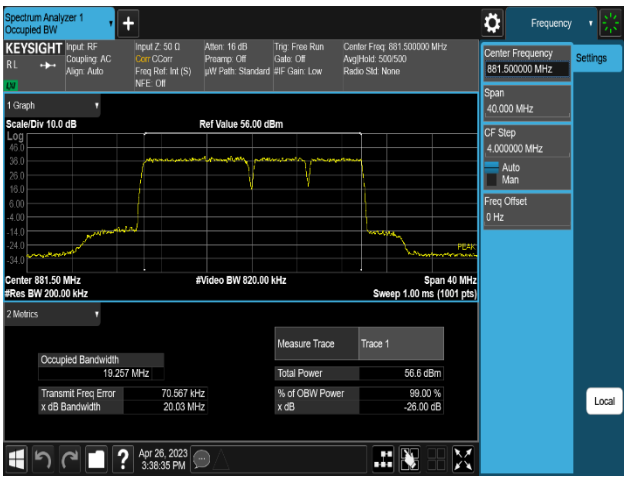
Plot 8-32. Occupied Bandwidth Plot
(MSR 2C_DSS B(n)5_1C_10M+NR n5_1C_5M_16QAM - Low Channel_2T, Port 0)



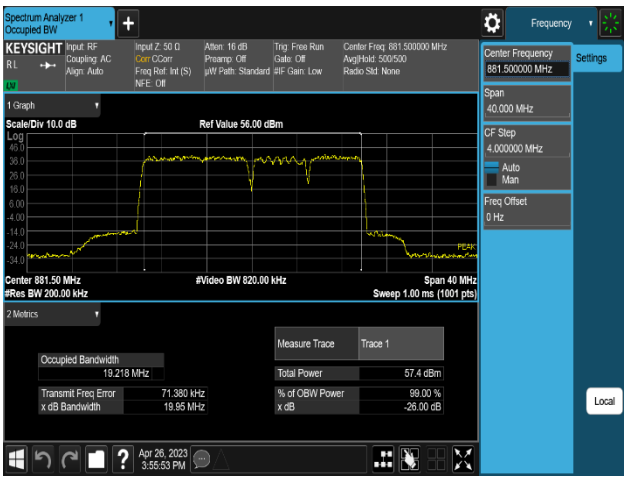
Plot 8-33. Occupied Bandwidth Plot
(MSR 2C_DSS B(n)5_1C_10M+NR n5_1C_15M_QPSK - Mid Channel_2T, Port 0)



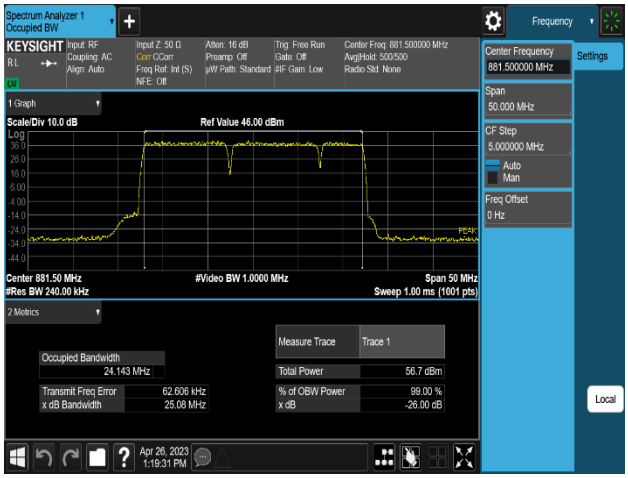
Plot 8-34. Occupied Bandwidth Plot
(DSS B(n)5_1C_10M+NR n5_1C_15M_16QAM - Mid Channel_2T, Port 1)



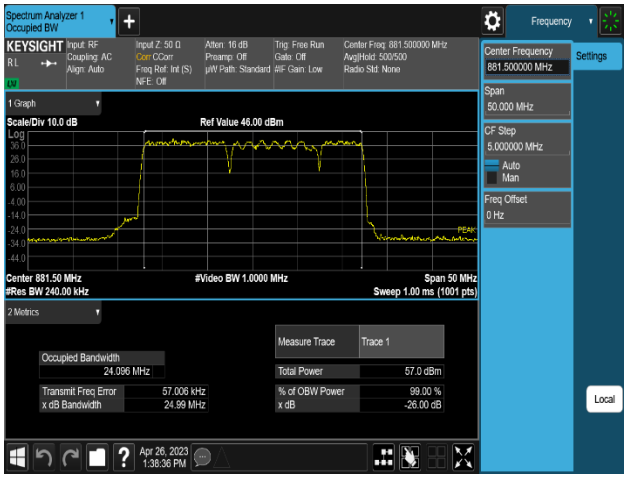
Plot 8-35. Occupied Bandwidth Plot
(MSR 3C_DSS B(n)5_1C_10M+NR n5_1C_5M+LTE B5_1C_5M_QPSK - Mid Channel_2T, Port 1)



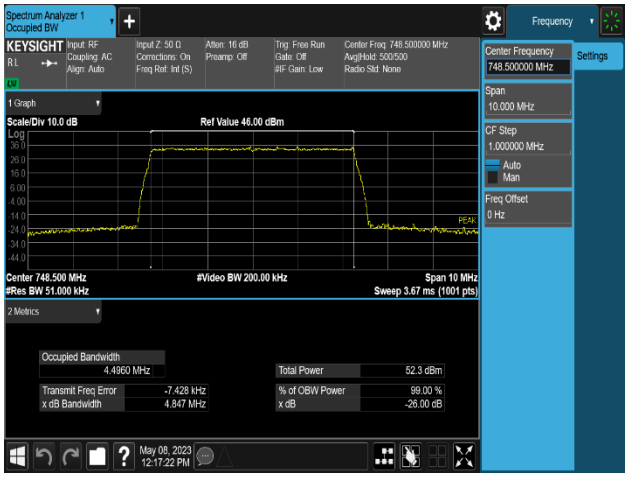
Plot 8-36. Occupied Bandwidth Plot
(MSR 3C_DSS B(n)5_1C_10M+NR n5_1C_5M+LTE B5_1C_5M_16QAM - Mid Channel _2T, Port 1)



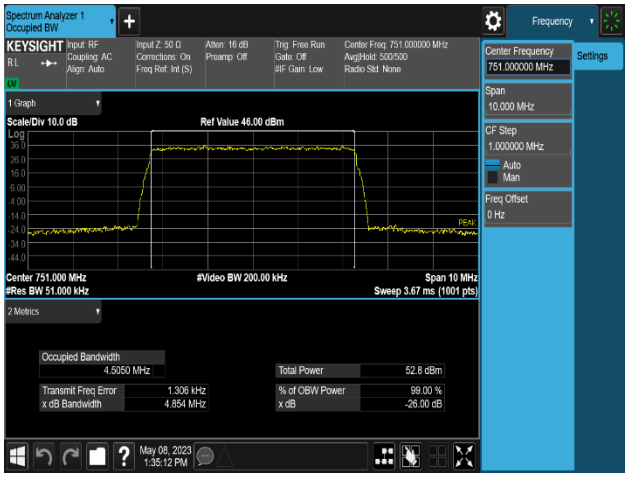
Plot 8-37. Occupied Bandwidth Plot
(MSR 3C_DSS B(n)5_1C_10M+NR n5_1C_10M+LTE B5_1C_5M_QPSK - Mid Channel _2T, Port 1)



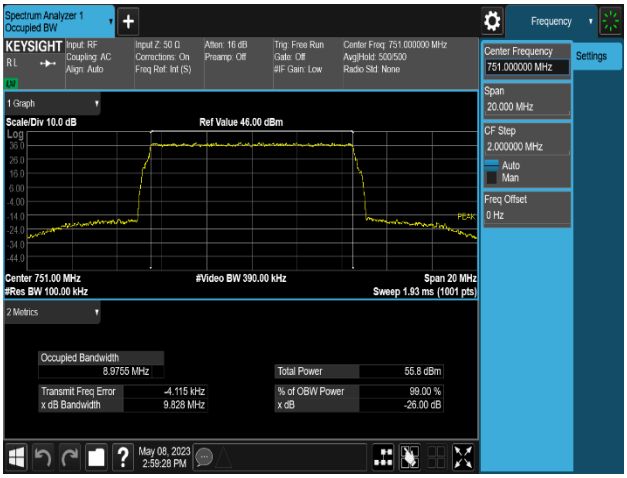
Plot 8-38. Occupied Bandwidth Plot
(MSR 3C_DSS B(n)5_1C_10M+NR n5_1C_10M+LTE B5_1C_5M_16QAM - Mid Channel _2T, Port 0)



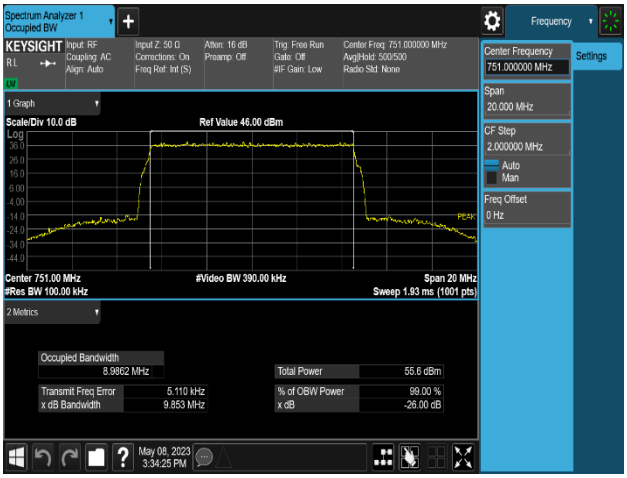
Plot 8-39. Occupied Bandwidth Plot
(LTE B13_1C_5M_QPSK - Low Channel_2T, Port 1)



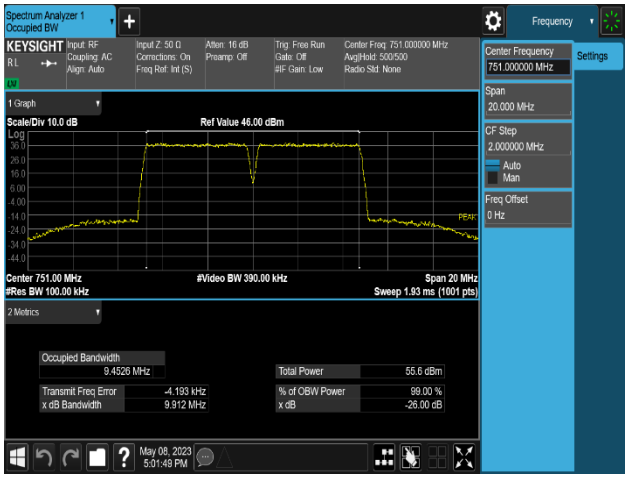
Plot 8-40. Occupied Bandwidth Plot
(LTE B13_1C_5M_256QAM - Mid Channel_2T, Port 1)



Plot 8-41. Occupied Bandwidth Plot
(LTE B13_1C_10M_QPSK - Mid Channel_2T, Port 1)

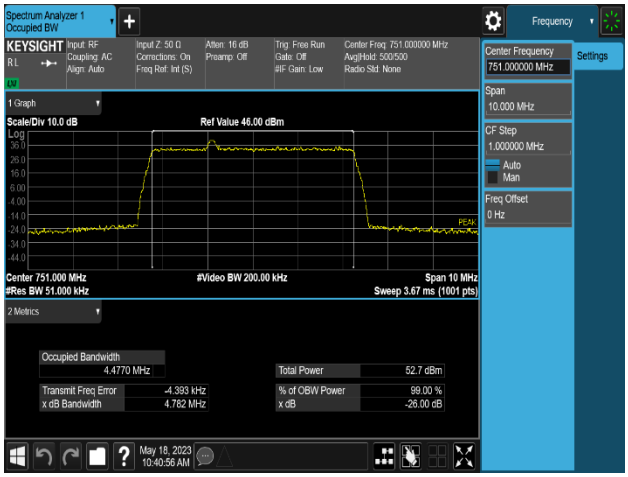


Plot 8-42. Occupied Bandwidth Plot
(LTE B13_1C_10M_256QAM - Mid Channel_2T, Port 0)

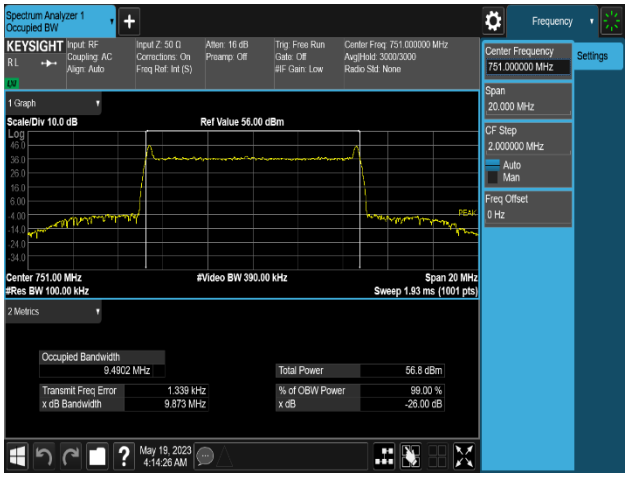


Plot 8-43. Occupied Bandwidth Plot
(LTE B13_2C_5M+5M_QPSK - Mid Channel_2T, Port 0)

Plot 8-44. Occupied Bandwidth Plot
(LTE B13_2C_5M+5M_16QAM - Mid Channel_2T, Port 1)

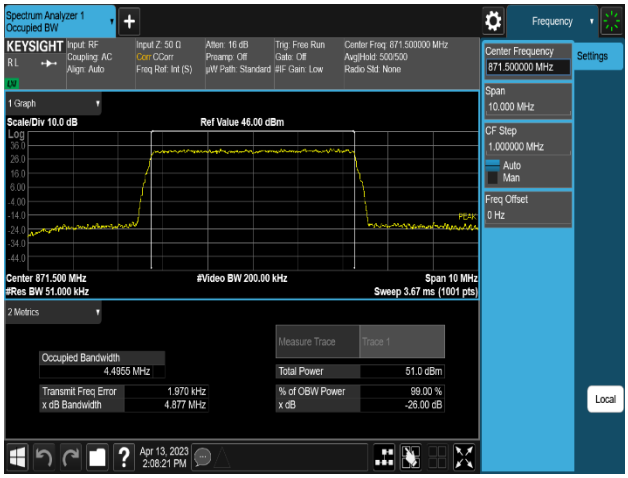


Plot 8-45. Occupied Bandwidth Plot
(LTE B13_1C_5M+NB-IoT(1IB)_QPSK - Mid Channel_2T, Port 0)

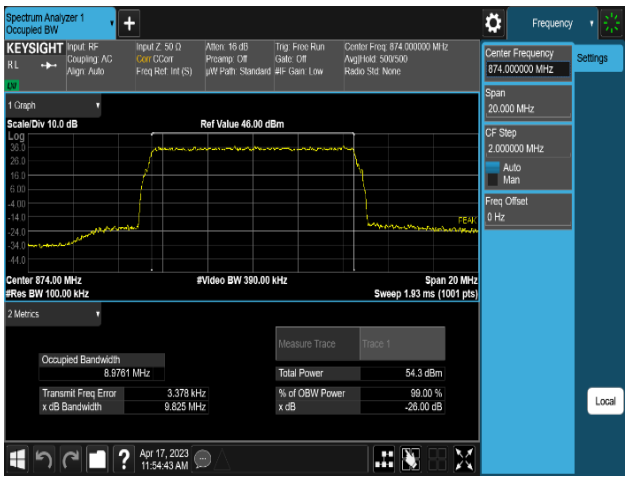


Plot 8-46. Occupied Bandwidth Plot
(LTE B13_1C_10M+NB-IoT(2GB)_QPSK - Mid Channel_2T, Port 0)

Plot 8-47. Occupied Bandwidth Plot
(LTE B5_1C_5M_QPSK - Low Channel_4T, Port 0)

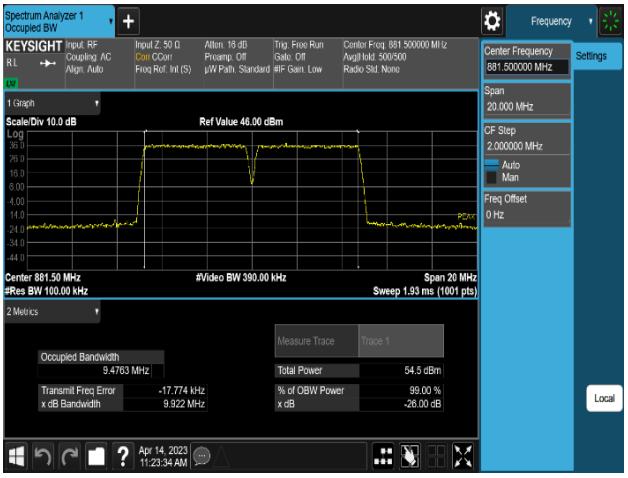


Plot 8-48. Occupied Bandwidth Plot
(LTE B5_1C_5M_64QAM - Low Channel_4T, Port 0)

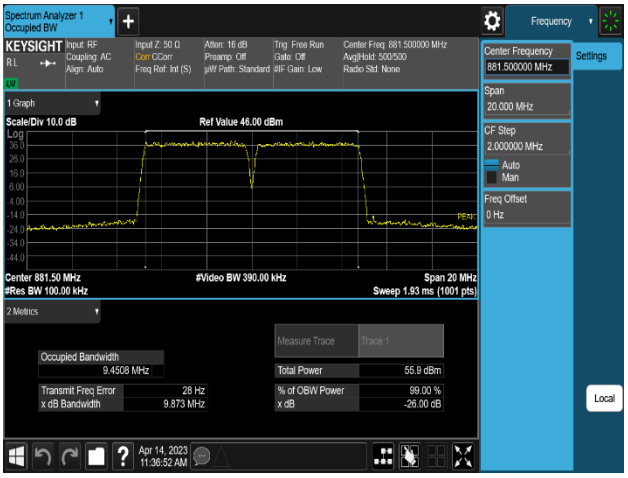


Plot 8-49. Occupied Bandwidth Plot
(LTE B5_1C_10M_QPSK - Low Channel_4T, Port 2)

Plot 8-50. Occupied Bandwidth Plot
(LTE B5_1C_10M_64QAM - Mid Channel_4T, Port 1)



Plot 8-51. Occupied Bandwidth Plot
(LTE B5_2C_5M+5M_2C_QPSK - Mid Channel_4T, Port 0)



Plot 8-52. Occupied Bandwidth Plot
(LTE B5_2C_5M+5M_2C_16QAM - Mid Channel_4T, Port 3)