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PART 22 MEASUREMENT REPORT

Applicant Name:
Samsung Electronics Co., Ltd.
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Gyeonggi-do, 16677, Korea

Date of Testing:
9/11/2023 – 2/5/2024
Test Report Issue Date:
2/5/2024
Test Site/Location:
Element lab., Gyeonggi-do, South Korea
Test Report Serial No.:
1M2312110124 -15.A3L

FCC ID:	**A3LSMS928JPN**
Applicant Name:	**Samsung Electronics Co., Ltd.**

Application Type:	Certification
Model:	SC-52E
Additional Model(s):	SCG26
EUT Type:	Portable Handset
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part:	22
Test Procedure(s):	ANSI C63.26-2015, KDB 648474 D03 v01r04, KDB 484596 D01 v02r02

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.

Prepared by

Reviewed by

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Antenna-A								
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	ERP		EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]	
GSM/GPRS	N/A	GMSK	824.2 - 848.8	0.541	27.33	0.887	29.48	245KGXW
EDGE	N/A	8-PSK	824.2 - 848.8	0.088	19.46	0.145	21.61	250KG7W
WCDMA	N/A	Spread Spectrum	826.4 - 846.6	0.089	19.51	0.147	21.66	4M17F9W
LTE Band 5	10 MHz	QPSK	829.0 - 844.0	0.108	20.32	0.177	22.47	9M00G7D
		16QAM	829.0 - 844.0	0.092	19.66	0.152	21.81	9M01W7D
	5 MHz	QPSK	826.5 - 846.5	0.108	20.34	0.177	22.49	4M53G7D
		16QAM	826.5 - 846.5	0.090	19.53	0.147	21.68	4M52W7D
	3 MHz	QPSK	825.5 - 847.5	0.109	20.38	0.179	22.53	2M71G7D
		16QAM	825.5 - 847.5	0.090	19.54	0.147	21.69	2M72W7D
	1.4 MHz	QPSK	824.7 - 848.3	0.106	20.27	0.175	22.42	1M10G7D
		16QAM	824.7 - 848.3	0.093	19.66	0.152	21.81	1M11W7D
NR Band n5	20 MHz	π/2 BPSK	834.0 - 839.0	0.078	18.92	0.128	21.07	18M0G7D
		QPSK	834.0 - 839.0	0.074	18.70	0.122	20.85	19M1G7D
		16QAM	834.0 - 839.0	0.057	17.59	0.094	19.74	19M0W7D
	15 MHz	π/2 BPSK	831.5 - 841.5	0.078	18.94	0.129	21.09	13M5G7D
		QPSK	831.5 - 841.5	0.074	18.70	0.122	20.85	14M2G7D
		16QAM	831.5 - 841.5	0.055	17.41	0.090	19.56	14M2W7D
	10 MHz	π/2 BPSK	829.0 - 844.0	0.078	18.93	0.128	21.08	9M03G7D
		QPSK	829.0 - 844.0	0.075	18.73	0.122	20.88	9M36G7D
		16QAM	829.0 - 844.0	0.060	17.80	0.099	19.95	9M36W7D
	5 MHz	π/2 BPSK	826.5 - 846.5	0.080	19.04	0.131	21.19	4M53G7D
		QPSK	826.5 - 846.5	0.078	18.93	0.128	21.08	4M50G7D
		16QAM	826.5 - 846.5	0.059	17.72	0.097	19.87	4M52W7D

Antenna-E								
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	ERP		EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]	
GSM/GPRS	N/A	GMSK	824.2 - 848.8	0.261	24.17	0.429	26.32	247KGXW
EDGE	N/A	8-PSK	824.2 - 848.8	0.147	21.67	0.241	23.82	243KG7W
WCDMA	N/A	Spread Spectrum	826.4 - 846.6	0.043	16.35	0.071	18.50	4M15F9W
LTE Band 5	10 MHz	QPSK	829.0 - 844.0	0.100	20.02	0.165	22.17	9M01G7D
		16QAM	829.0 - 844.0	0.082	19.12	0.134	21.27	9M01W7D
	5 MHz	QPSK	826.5 - 846.5	0.102	20.10	0.168	22.25	4M54G7D
		16QAM	826.5 - 846.5	0.081	19.08	0.133	21.23	4M55W7D
	3 MHz	QPSK	825.5 - 847.5	0.103	20.13	0.169	22.28	2M71G7D
		16QAM	825.5 - 847.5	0.078	18.92	0.128	21.07	2M70W7D
	1.4 MHz	QPSK	824.7 - 848.3	0.097	19.88	0.159	22.03	1M10G7D
		16QAM	824.7 - 848.3	0.079	18.96	0.129	21.11	1M11W7D
NR Band n5	20 MHz	π/2 BPSK	834.0 - 839.0	0.101	20.06	0.166	22.21	18M0G7D
		QPSK	834.0 - 839.0	0.096	19.81	0.157	21.96	19M1G7D
		16QAM	834.0 - 839.0	0.080	19.05	0.132	21.20	19M0W7D
	15 MHz	π/2 BPSK	831.5 - 841.5	0.102	20.08	0.167	22.23	13M5G7D
		QPSK	831.5 - 841.5	0.095	19.80	0.157	21.95	14M3G7D
		16QAM	831.5 - 841.5	0.084	19.26	0.138	21.41	14M2W7D
	10 MHz	π/2 BPSK	829.0 - 844.0	0.106	20.24	0.173	22.39	8M99G7D
		QPSK	829.0 - 844.0	0.099	19.94	0.162	22.09	9M34G7D
		16QAM	829.0 - 844.0	0.084	19.24	0.138	21.39	9M35W7D
	5 MHz	π/2 BPSK	826.5 - 846.5	0.106	20.25	0.174	22.40	4M53G7D
		QPSK	826.5 - 846.5	0.099	19.96	0.163	22.11	4M52G7D
		16QAM	826.5 - 846.5	0.081	19.11	0.132	21.20	4M53W7D

EUT Overview

1.0 INTRODUCTION

1.1 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.

1.2 Element Test Location

These measurement tests were conducted at the Element Suwon Laboratory located at 13, Heungdeok 1-ro, Giheung-gu, Yongin-si, Gyeonggi-do, 16954, South Korea. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

1.3 Test Facility / Accreditations

Measurements were performed at Element Materials Technology Suwon, Ltd. located in Yongin-si, Gyeonggi-do, 16954, South Korea.

- Element Materials Technology Suwon, Ltd. 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), and Electromagnetic Compatibility (EMC) & Telecommunications testing for FCC and Innovation, Science, and Economic Development Canada rules.

- Element Materials Technology Suwon, Ltd. 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 ISED: 26168

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMS928JPN**. 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 and RSS-132.

Test Device Serial No.: 0091M, 0117M, 0248M, 0417M, 1253M

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, Multi-band 5G NR (FR1), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5GHz and 6GHz), Bluetooth (1x, EDR, LE), NFC, Wireless Power Transfer

This device uses a tuner circuit that dynamically updates the antenna impedance parameters to optimize antenna performance for certain bands and modes of operation. The tuner for this device was set to simulate a "free space" condition where the transmit antenna is matched to the medium into which it is transmitting and, thus, the power is at its maximum level.

2.3 Test Configuration

The EUT was tested per the guidance of ANSI C63.26-2015. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

This device supports wireless charging capability and, thus, is subject to the test requirements of KDB 648474 D03 v01r04. Additional radiated spurious emission measurements were performed with the EUT lying flat on an authorized wireless charging pad (WCP) Model: 0 while operating under normal conditions in a simulated call or data transmission configuration. The worst case radiated emissions data is shown in this report.

2.4 Software and Firmware

Testing was performed on device(s) using software/firmware version S928USQU0AWIA installed on the EUT.

2.5 EMI Suppression Device(s)/Modifications

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

3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedures described in the "American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services" (ANSI C63.26-2015) were used in the measurement of the EUT.

Deviation from Measurement Procedure……..……..None

3.2 Radiated Power and Radiated Spurious 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. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. For measurements below 1GHz, the absorbers are removed. A raised turntable is used for radiated measurement. The turn table is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm tall test table made of Styrodur is placed on top of the turn table. A Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer.

For radiated power measurements, substitution method is used per the guidance of ANSI C63.26-2015. For emissions below 1GHz, a half-wave dipole is substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

$$P_{d\ [dBm]} = P_{g\ [dBm]} - \text{cable loss}_{\ [dB]} + \text{antenna gain}_{\ [dBd/dBi]};$$

where P_d is the dipole equivalent power, P_g is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to $P_{g\ [dBm]}$ – cable loss $_{[dB]}$.

For radiated spurious emissions measurements, the field strength conversion method is used per the formulas in Section 5.2.7 of ANSI C63.26-2015. Field Strength (EIRP) is calculated using the following formulas:

$$E_{[dB\mu V/m]} = \text{Measured amplitude level}_{[dBm]} + 107 + \text{Cable Loss}_{[dB]} + \text{Antenna Factor}_{[dB/m]}$$

And

$$EIRP_{[dBm]} = E_{[dB\mu V/m]} + 20\log D - 104.8;$$ where D is the measurement distance in meters.

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 414788 D01 v01r01.

Radiated power and radiated spurious emission levels are investigated with the receive antenna horizontally and vertically polarized per ANSI C63.26-2015.

4.0 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	1.95
Radiated Disturbance (<1GHz)	4.10
Radiated Disturbance (>1GHz)	4.82
Radiated Disturbance (>18GHz)	4.96

5.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	N9030A	PXA Signal Analyzer	2023-07-04	Annual	2024-07-03	MY49432391
Anritsu	S820E	Cable and Antenna Analyzer	2023-07-05	Annual	2024-07-04	1839097
Anritsu	MA24106A	USB Power Sensor	2023-07-05	Annual	2024-07-04	1244512
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	2022-10-21	Biennial	2024-10-20	10160045
Com-Power	PAM-118A	Preamplifier	2023-07-05	Annual	2024-07-04	551042
Espec	SH-242	Environmental Chamber	2023-07-05	Annual	2024-07-04	93011064
Fairview Microwave	FM2CP1122-10	2.92mm Directional Coupler	2023-07-04	Annual	2024-07-03	1946
Keysight Technologies	N9030B	MXA Signal Analyzer	2023-07-04	Annual	2024-07-03	MY57143276
Mini-Circuits	BW-N10W5+	Attenuator	2023-07-04	Annual	2024-07-03	1607
Mini-Circuits	BW-N10W5+	Attenuator	2023-07-04	Annual	2024-07-03	1607
Rohde & Schwarz	TS-PR18	Preamplifier	2023-07-05	Annual	2024-07-04	102141
Rohde & Schwarz	SMB100A03	Signal Generator	2023-01-17	Annual	2024-01-16	182487
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	2023-02-17	Annual	2024-02-16	131453
Rohde & Schwarz	FSW43	Signal and Spectrum Analyzer	2023-01-13	Annual	2024-01-12	101955
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2023-02-17	Annual	2024-02-16	102131
Rohde & Schwarz	TC-TA18	VIVALDI-ANT	2021-10-22	Biennial	2023-10-21	101097
Rohde & Schwarz	TC-TA18	VIVALDI-ANT	2021-10-22	Biennial	2023-10-21	101098
Schwarzbeck	VULB9162	Broadband TRILOG Antenna	2023-06-01	Biennial	2025-05-31	9162-217
Schwarzbeck	UHA9105	Dipole Antenna	2022-07-19	Biennial	2024-07-18	91052522
Sunol	DRH-118	Horn Antenna	2023-01-26	Biennial	2025-01-25	A060215

Table 5-1. Test Equipment

Notes:

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.

6.0 SAMPLE CALCULATIONS

GSM Emission Designator

Emission Designator = 250KGXW
GSM BW = 250 kHz
G = Phase Modulation
X = Cases not otherwise covered
W = Combination (Audio/Data)

EDGE Emission Designator

Emission Designator = 250KG7W
EDGE BW = 250 kHz
G = Phase Modulation
7 = Quantized/Digital Info
W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M16F9W
WCDMA BW = 4.16 MHz
F = Frequency Modulation
9 = Composite Digital Info
W = Combination (Audio/Data)

QPSK Modulation

Emission Designator = 8M62G7D
LTE BW = 8.62 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data transmission, telemetry, telecommand

QAM Modulation

Emission Designator = 8M45W7D
LTE BW = 8.45 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data transmission, telemetry, telecommand

Spurious Radiated Emission

Example: Spurious emission at 3700.40 MHz

The receive spectrum analyzer reading at 3 meters with the EUT on the turntable was –81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of –81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 3700.40 MHz. So 6.1 dB is added to the signal generator reading of –30.9 dBm yielding –24.80 dBm. The fundamental EIRP was 25.50 dBm so this harmonic was 25.50 dBm – (-24.80) = 50.3 dBc.

7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.

FCC ID: A3LSMS928JPN

FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)

Mode(s): NR/GSM/GPRS/WCDMA/LTE

Test Condition	Test Description	FCC Part Section(s)	RSS Section(s)	Test Limit	Test Result	Reference
CONDUCTED	Occupied Bandwidth	2.1049(h)	RSS-Gen(6.7)	N/A	PASS	Section 7.2
	Conducted Band Edge / Spurious Emissions	2.1051, 22.917(a)	RSS-Gen(6.13), RSS-132(5.5)	≥ 43 + 10 log (P[Watts]) dB of attenuation below transmitter power	PASS	Sections 7.3, 7.4
	Frequency Stability	2.1055, 22.355	RSS-Gen(6.11), RSS-132(5.3)	The carrier frequency of the transmitter must be maintained within the 2.5ppm	PASS	Section 7.7
RADIATED	Effective Radiated Power / Equivalent Isotropic Radiated Power	22.913(a)(5)	RSS-Gen(6.12), RSS-132(5.4)	< 7 Watts max. ERP	PASS	Section 7.5
	Radiated Spurious Emissions	2.1053, 22.917(a)	RSS-Gen(7.3), RSS-132(5.6)	> 43 + 10 log10 (P[Watts]) for all out-of-band emissions	PASS	Section 7.6

Table 7-1. 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. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
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, attenuators, and couplers.
4) All conducted emissions measurements are performed with automated test software to capture the corresponding plots necessary to show compliance. The measurement software utilized is EMC Software Tool v1.2.2.
5) Data was leveraged from test report 1M2308210092-02, FCC ID: A3LSMS928U. See Table 7-2 and Table 7-3 for results.

FCC Rules	Test Item	Test Case	Units	Limit	Reference FCC ID: A3LSMS928U	Variant FCC ID: A3LSMS928JPN	Deviation	Max Deviation	Pass/Fail
22	Conducted Output Power	LTE B5	-	-	-	-	-	-	-
	Occupied Bandwidth	n5, 20MHz, CP-OFDM QPSK	MHz	N/A	19.08	19.02	0.06	N/A	PASS
	Conducted Spurious Emissions	GPRS / Low Channel	dBm	-13	-29.72	-28.66	1.06	3	PASS
	Conducted Out-of-Band Emissions (Band Edge)	LTE B5, 1.4MHz, Low Edge	dBm	-13	-16.21	-16.35	0.14	3	PASS
	Frequency Stability	WCDMA	Hz	N/A	-2100	-1770	330	N/A	PASS
	ERP/EIRP	GPRS	dBm	40.61	27.33	26.05	1.28	3	PASS
	Radiated Spurious Emissions	GPRS	dBm	-13	-48.01	-46.52	1.49	3	PASS

Table 7-2. Summary of Spot-checks

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Reference Conducted Power [dBm]	Variant Conducted Power [dBm]
10 MHz	QPSK	26840	829.0	1 / 25	23.81	23.78
		26915	836.5	1 / 25	23.93	23.86
		26990	844.0	1 / 49	24.03	23.90
	16QAM	26990	844.0	1 / 49	23.22	23.17
5 MHz	QPSK	26815	826.5	1 / 0	23.85	23.81
		26915	836.5	1 / 24	23.92	23.88
		27015	846.5	1 / 12	24.10	23.89
	16QAM	26815	826.5	1 / 0	22.93	22.99
3 MHz	QPSK	26805	825.5	1 / 0	23.89	23.75
		26915	836.5	1 / 7	23.85	23.74
		27025	847.5	1 / 14	24.06	23.98
	16QAM	26805	825.5	1 / 0	22.93	22.84
1.4 MHz	QPSK	26797	824.7	1 / 3	23.78	23.66
		26915	836.5	1 / 3	23.84	23.99
		27033	848.3	1 / 0	24.06	24.01
	16QAM	27033	848.3	1 / 0	23.22	23.15

Table 7-3. Conducted Power Spot-checks

Mode	3GPP 34.121 Subtest	Cellular Band [dBm]		
		4132	4183	4233
WCDMA	12.2 kbps RMC	23.07	**23.17**	23.09
	12.2 kbps AMR	23.06	23.16	23.08
HSDPA	Subtest 1	22.16	22.15	22.18
	Subtest 2	22.18	22.21	22.15
	Subtest 3	21.69	21.68	21.66
	Subtest 4	21.64	21.67	21.63
HSUPA	Subtest 1	22.16	22.27	22.25
	Subtest 2	20.08	20.14	20.10
	Subtest 3	21.13	21.21	21.19
	Subtest 4	20.14	20.17	20.16
	Subtest 5	22.20	22.23	22.19
DC-HSDPA	Subtest 1	22.47	22.60	22.50
	Subtest 2	22.54	22.55	22.60
	Subtest 3	22.19	22.40	22.27
	Subtest 4	22.25	22.32	22.31

Table 7-4. Conducted Power Spot-checks - WCDMA - ANT A

7.2 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 Procedure Used

ANSI C63.26-2015 – Section 5.4.4

Test Settings

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.

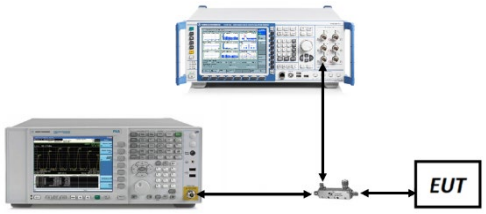


Figure 7-1. Test Instrument & Measurement Setup

Test Notes

None.

Mode	Bandwidth	Modulation	OBW [MHz]
GSM-Cell	N/A	GSMK	0.25
GSM-Cell Edge		8-PSK	0.25
WCDMA-Cell		Spead Spectrum	4.17
LTE-B5	10 MHz	QPSK	9.00
		16QAM	9.01
	5 MHz	QPSK	4.53
		16QAM	4.52
	3 MHz	QPSK	2.71
		16QAM	2.72
	1.4 MHz	QPSK	1.10
		16QAM	1.11
NR-n5	20 MHz	π/2 BPSK	18.00
		QPSK	19.08
		16QAM	19.03
	15 MHz	π/2 BPSK	13.47
		QPSK	14.18
		16QAM	14.24
	10 MHz	π/2 BPSK	9.03
		QPSK	9.36
		16QAM	9.36
	5 MHz	π/2 BPSK	4.53
		QPSK	4.50
		16QAM	4.52

Table 7-5. Occupied Bandwidth Test Results – Ant A

GPRS Cell – Ant A

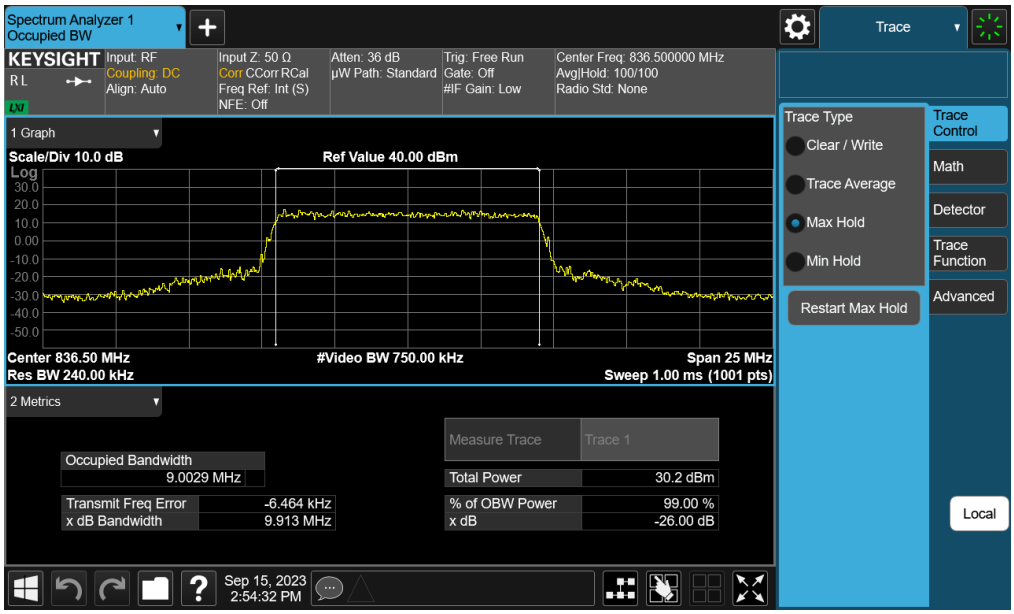
Plot 7-1. Occupied Bandwidth Plot (GPRS, Ch. 190 – Ant A)

Plot 7-2. Occupied Bandwidth Plot (EDGE, Ch. 190 – Ant A)

WCDMA Cell – Ant A

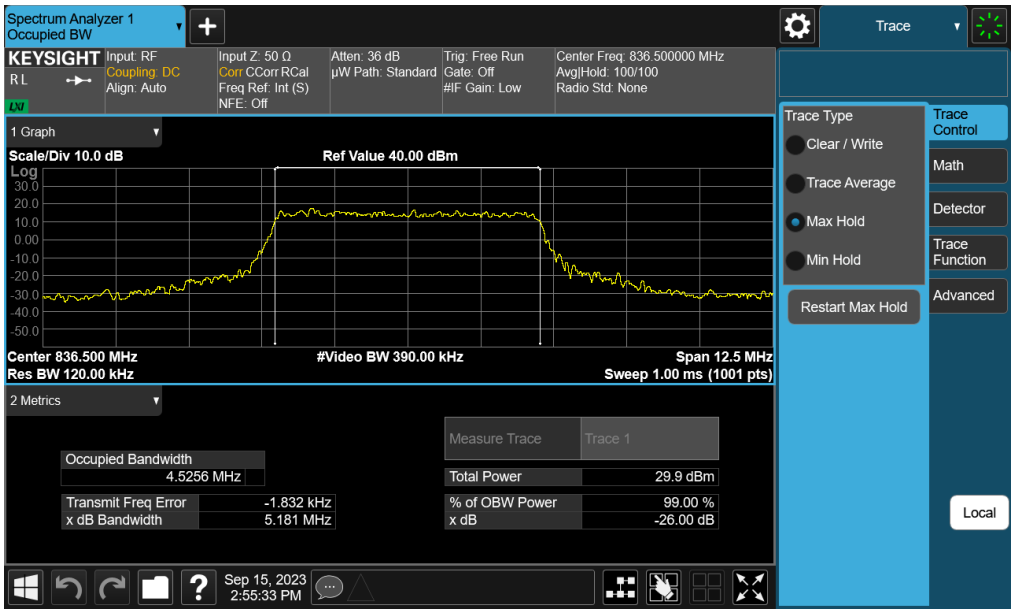
Plot 7-3. Occupied Bandwidth Plot (WCDMA, Ch. 4183 – Ant A)

LTE Band 5 – Ant A

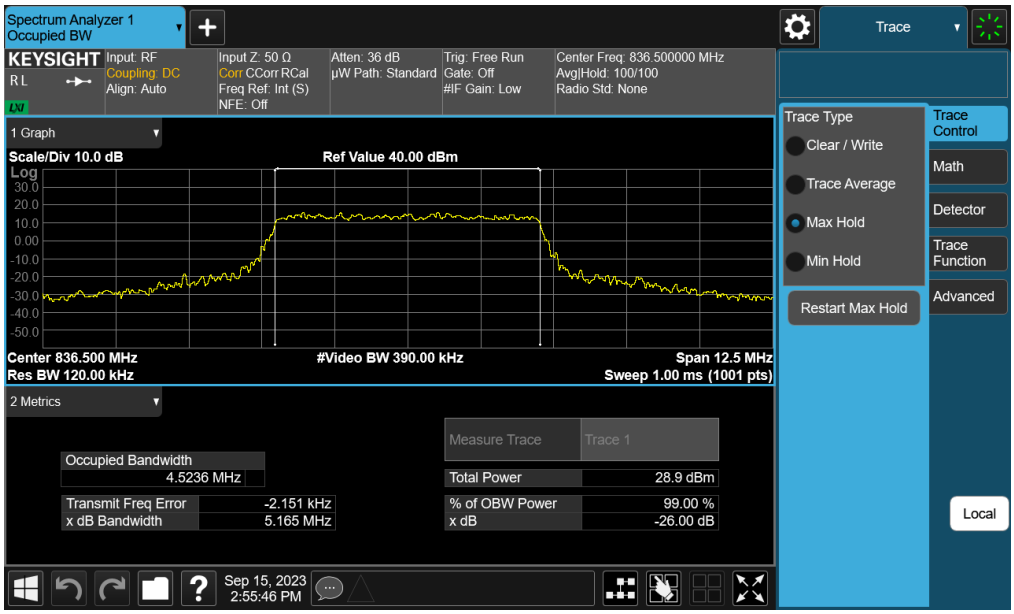


Plot 7-4. Occupied Bandwidth Plot (LTE Band 5 - 10MHz QPSK - Full RB Configuration – Ant A)

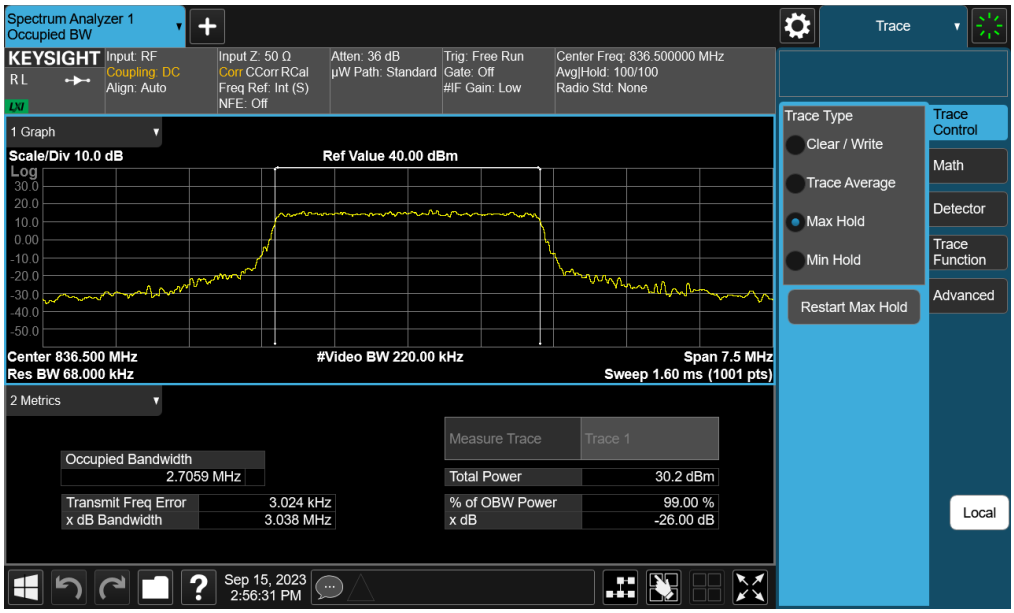
Plot 7-5. Occupied Bandwidth Plot (LTE Band 5 - 10MHz 16-QAM - Full RB Configuration – Ant A)



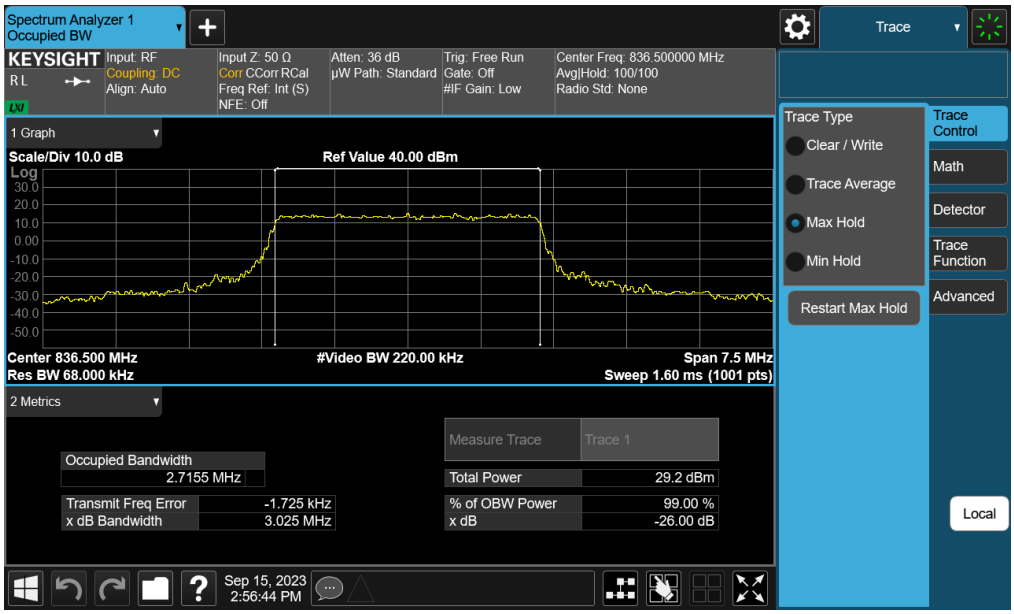
Plot 7-6. Occupied Bandwidth Plot (LTE Band 5 - 5MHz QPSK - Full RB Configuration – Ant A)



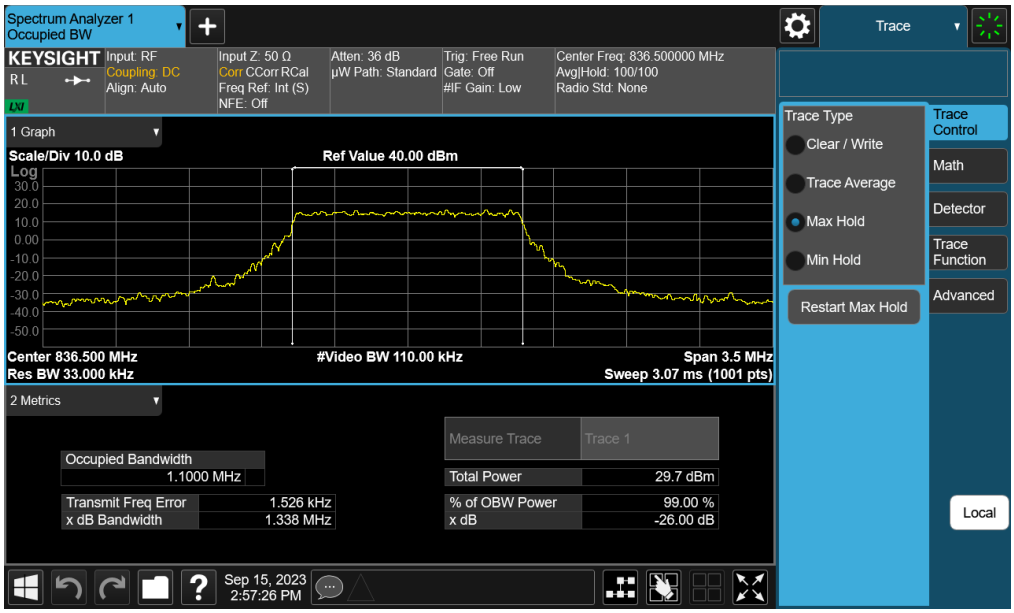
Plot 7-7. Occupied Bandwidth Plot (LTE Band 5 - 5MHz 16-QAM - Full RB Configuration – Ant A)



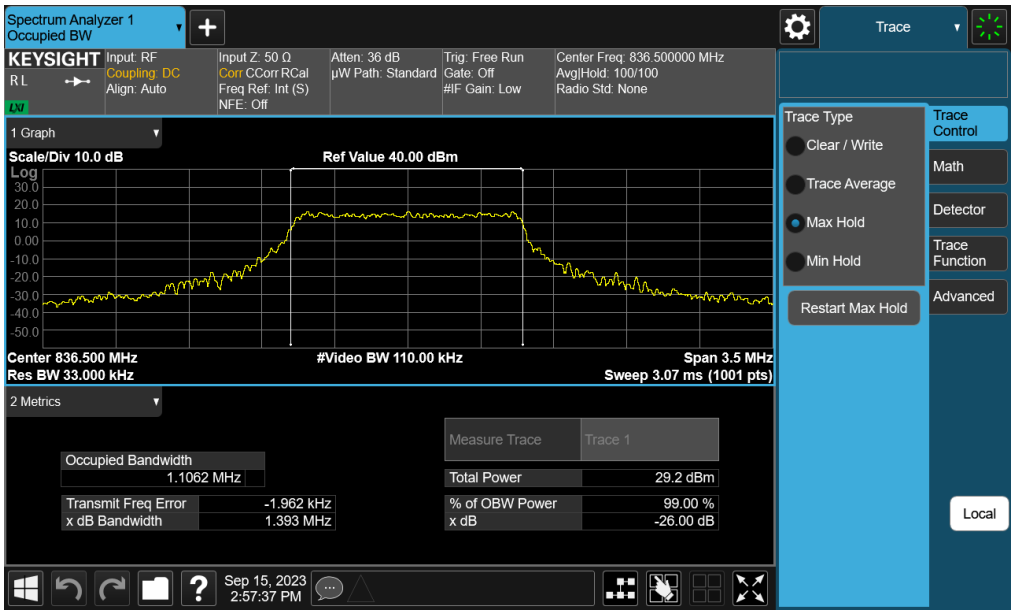
Plot 7-8. Occupied Bandwidth Plot (LTE Band 5 - 3MHz QPSK - Full RB Configuration – Ant A)



Plot 7-9. Occupied Bandwidth Plot (LTE Band 5 - 3MHz 16-QAM - Full RB Configuration – Ant A)



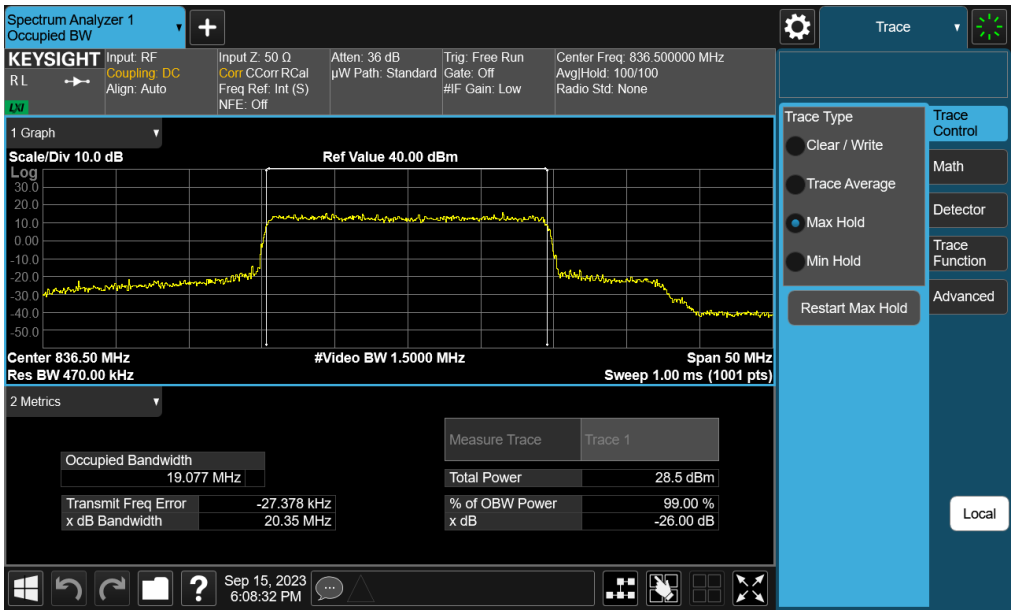
Plot 7-10. Occupied Bandwidth Plot (LTE Band 5 - 1.4MHz QPSK - Full RB Configuration – Ant A)



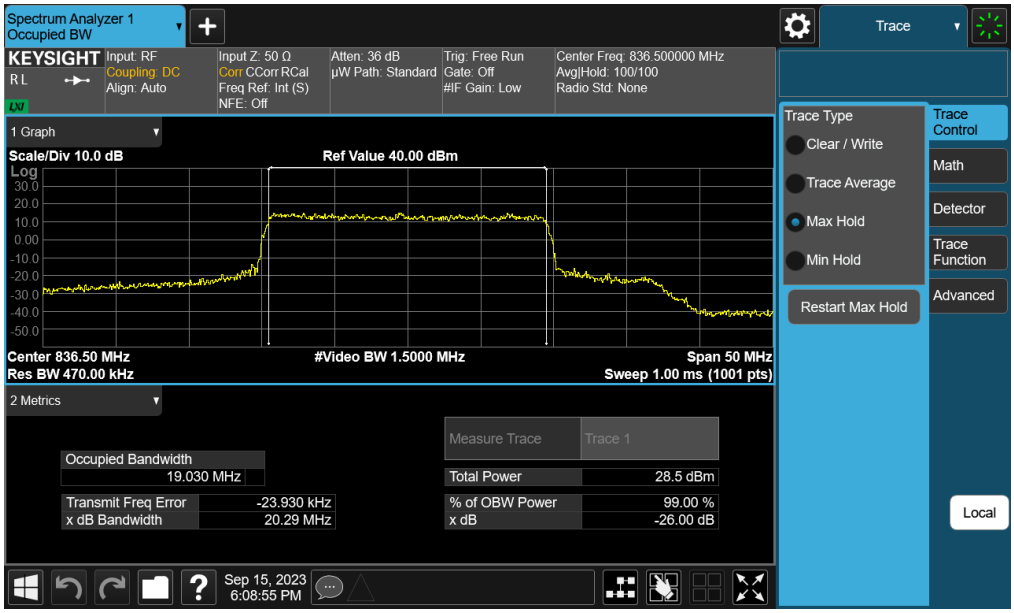
Plot 7-11. Occupied Bandwidth Plot (LTE Band 5 - 1.4MHz 16-QAM - Full RB Configuration – Ant A)

NR Band n5

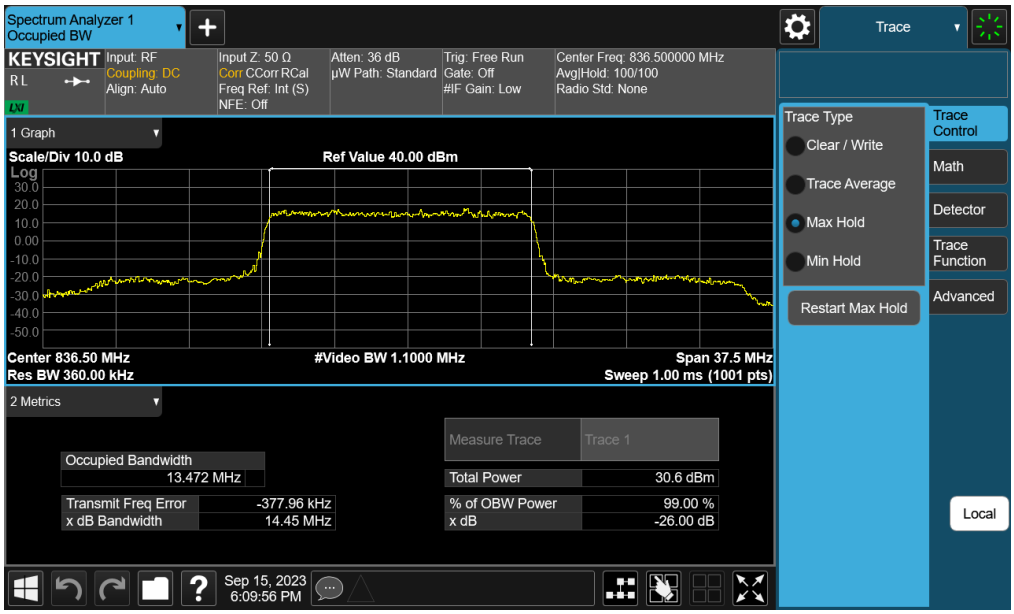
Plot 7-12. Occupied Bandwidth Plot (NR Band n5 - 20MHz π/2 BPSK - Full RB Configuration – Ant A)



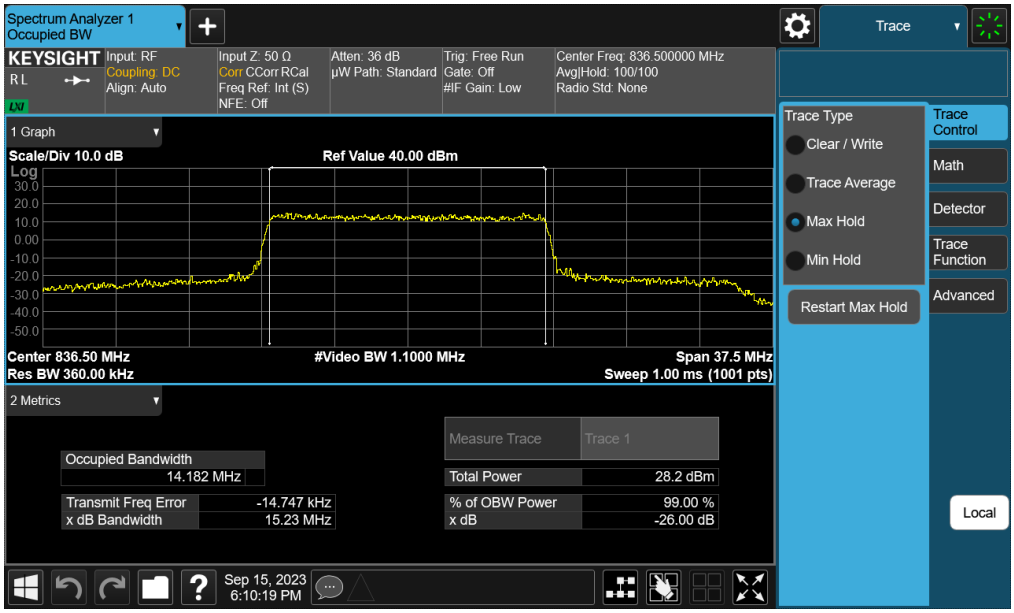
Plot 7-13. Occupied Bandwidth Plot (NR Band n5 - 20MHz QPSK - Full RB Configuration – Ant A)



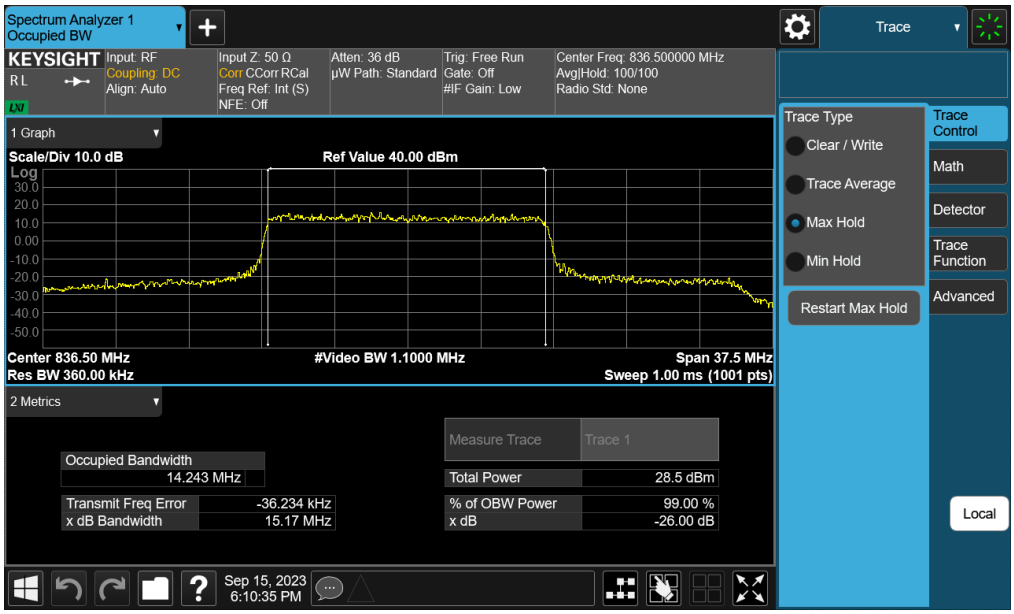
Plot 7-14. Occupied Bandwidth Plot (NR Band n5 - 20MHz 16-QAM - Full RB Configuration – Ant A)



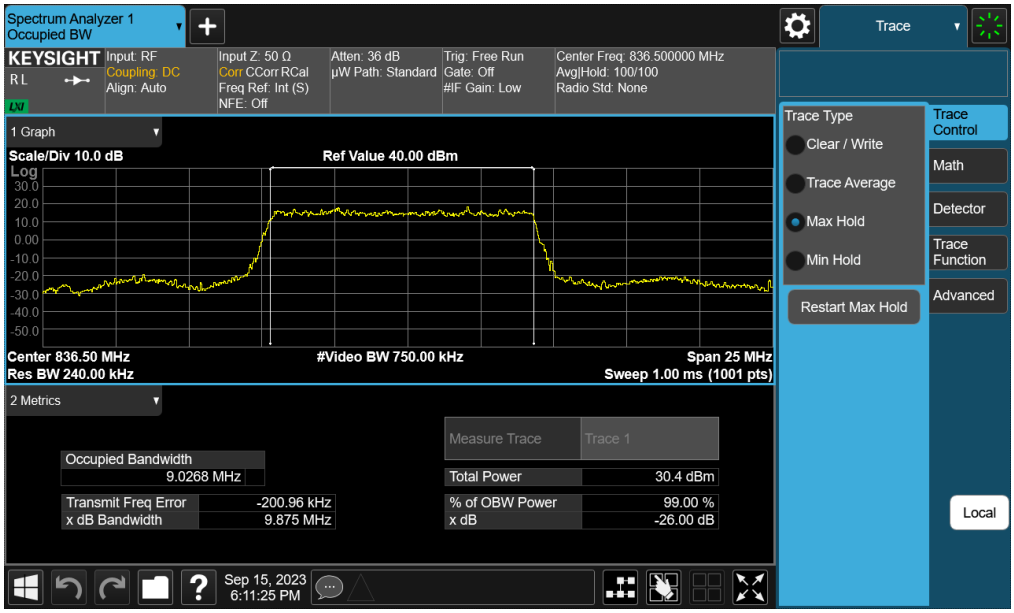
Plot 7-15. Occupied Bandwidth Plot (NR Band n5 - 15MHz π/2 BPSK - Full RB Configuration – Ant A)



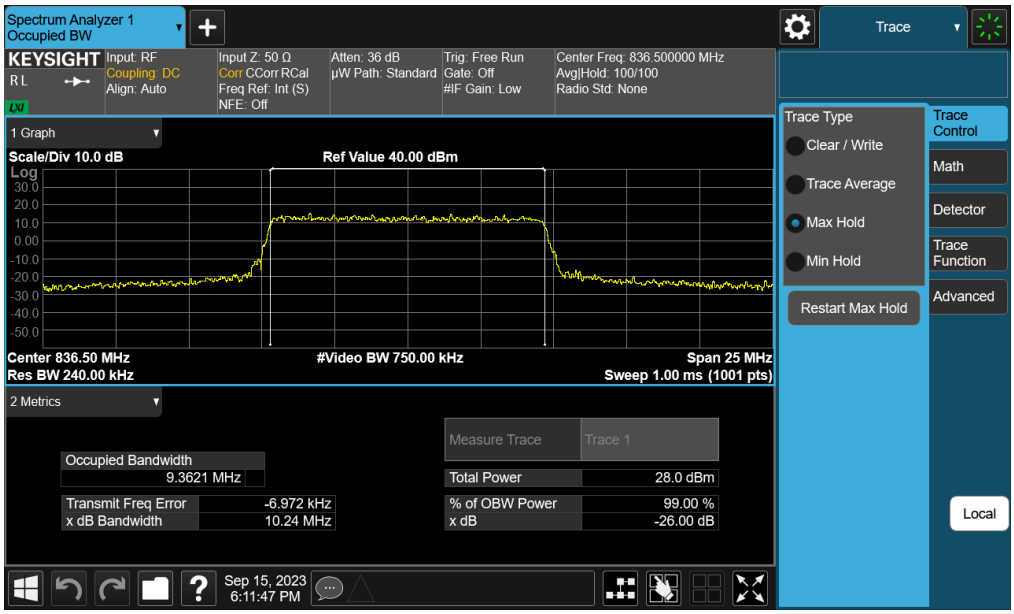
Plot 7-16. Occupied Bandwidth Plot (NR Band n5 - 15MHz QPSK - Full RB Configuration – Ant A)



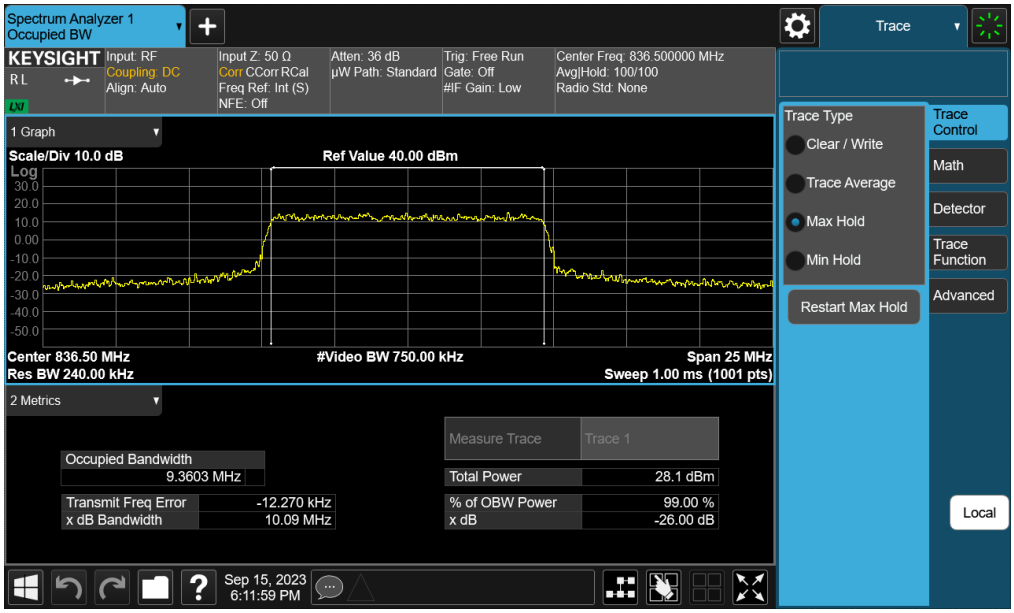
Plot 7-17. Occupied Bandwidth Plot (NR Band n5 - 15MHz 16-QAM - Full RB Configuration – Ant A)



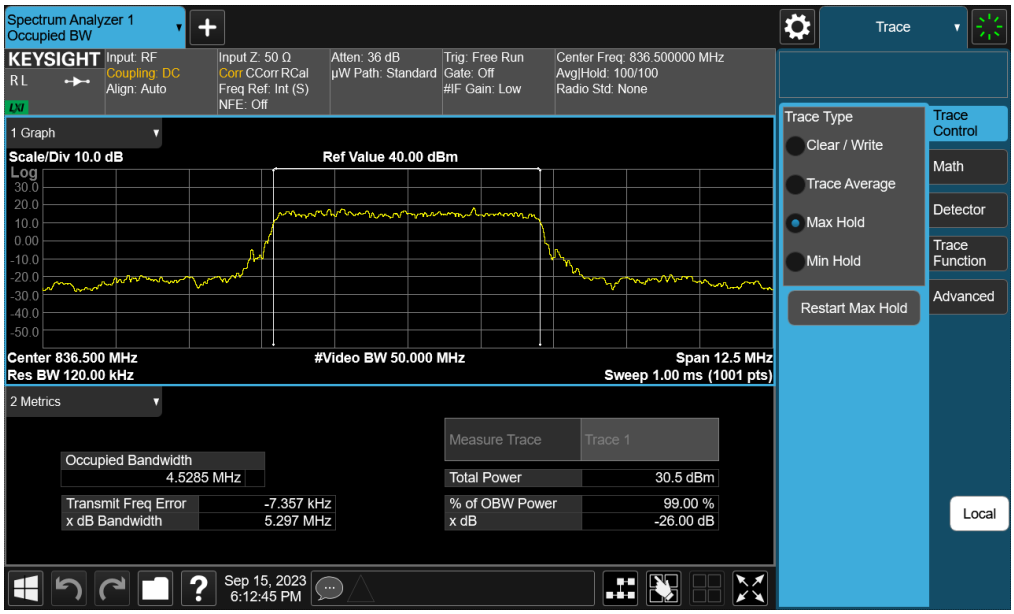
Plot 7-18. Occupied Bandwidth Plot (NR Band n5 - 10MHz π/2 BPSK - Full RB Configuration – Ant A)



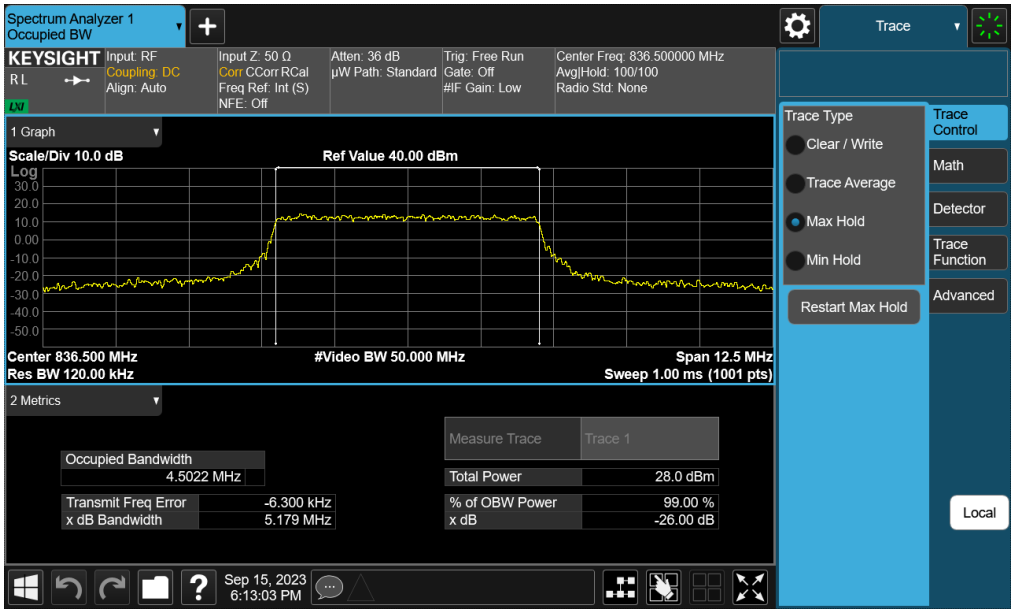
Plot 7-19. Occupied Bandwidth Plot (NR Band n5 - 10MHz QPSK - Full RB Configuration – Ant A)



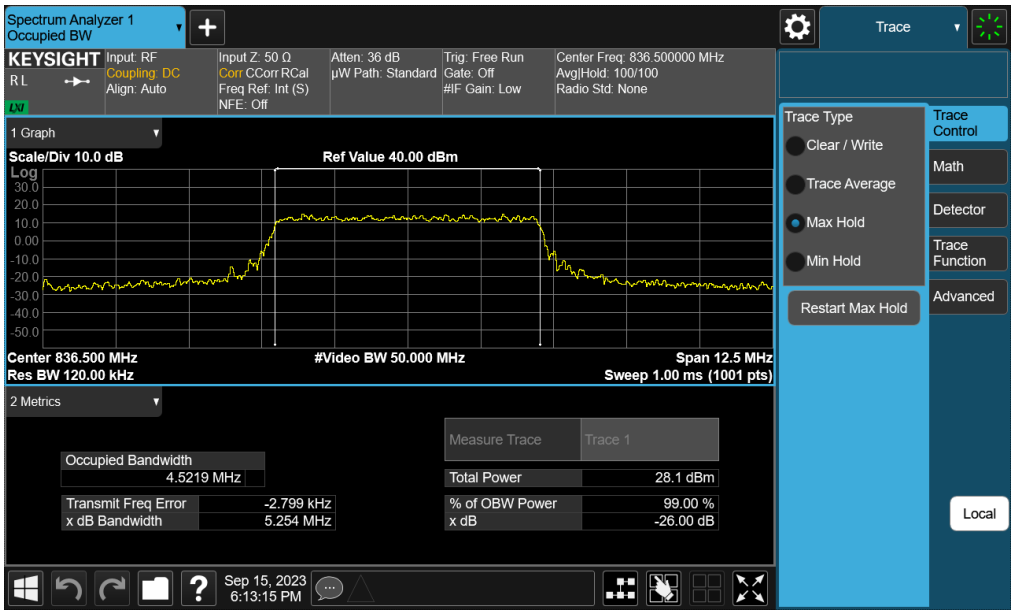
Plot 7-20. Occupied Bandwidth Plot (NR Band n5 - 10MHz 16-QAM - Full RB Configuration – Ant A)



Plot 7-21. Occupied Bandwidth Plot (NR Band n5 - 5MHz π/2 BPSK - Full RB Configuration – Ant A)



Plot 7-22. Occupied Bandwidth Plot (NR Band n5 - 5MHz QPSK - Full RB Configuration – Ant A)



Plot 7-23. Occupied Bandwidth Plot (NR Band n5 - 5MHz 16-QAM - Full RB Configuration – Ant A)

Mode	Bandwidth	Modulation	OBW [MHz]
GSM-Cell	N/A	GSMK	0.25
GSM-Cell Edge		8-PSK	0.24
WCDMA-Cell		Spead Spectrum	4.15
LTE-B5	10 MHz	QPSK	9.01
		16QAM	9.01
	5 MHz	QPSK	4.54
		16QAM	4.55
	3 MHz	QPSK	2.71
		16QAM	2.70
	1.4 MHz	QPSK	1.10
		16QAM	1.11
NR-n5	20 MHz	π/2 BPSK	18.00
		QPSK	19.07
		16QAM	19.00
	15 MHz	π/2 BPSK	13.55
		QPSK	14.26
		16QAM	14.21
	10 MHz	π/2 BPSK	8.99
		QPSK	9.34
		16QAM	9.35
	5 MHz	π/2 BPSK	4.53
		QPSK	4.52
		16QAM	4.53

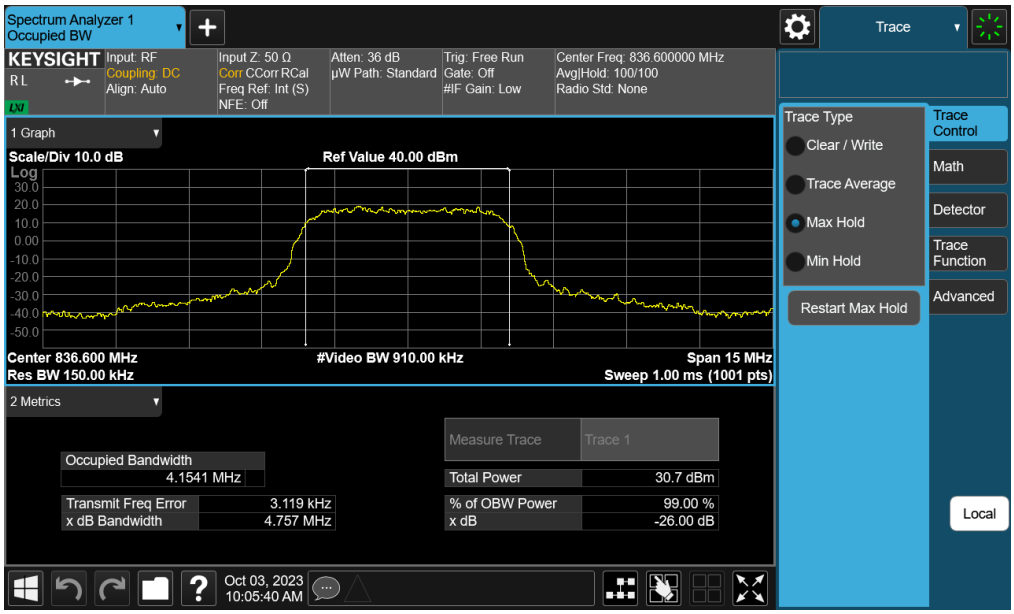
Table 7-6. Occupied Bandwidth Test Results – Ant E

GPRS Cell – Ant E

Plot 7-24. Occupied Bandwidth Plot (GPRS, Ch. 190 – Ant E)

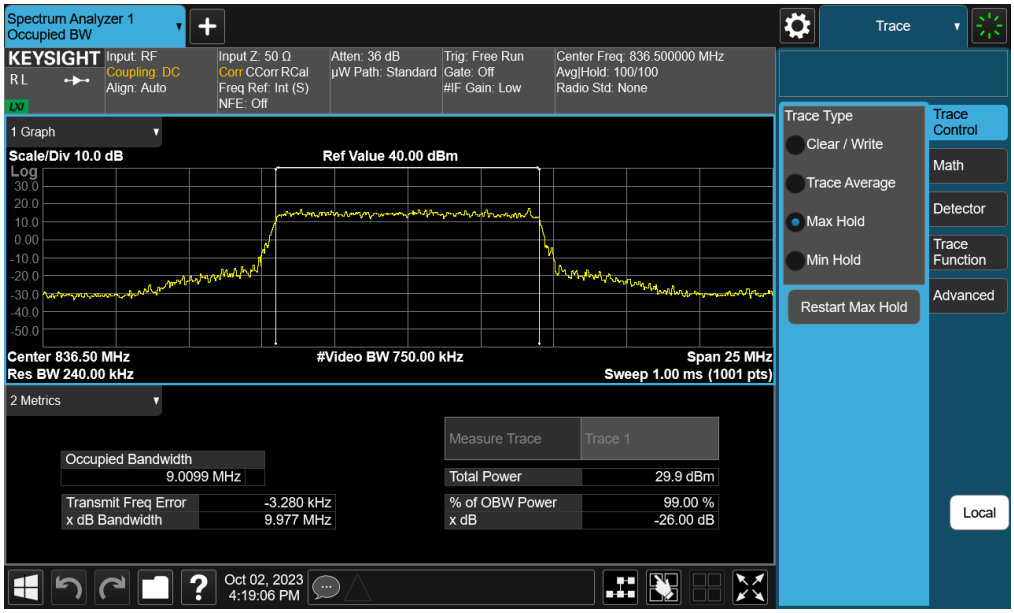
Plot 7-25. Occupied Bandwidth Plot (EDGE, Ch. 190 – Ant E)

WCDMA Cell – Ant E

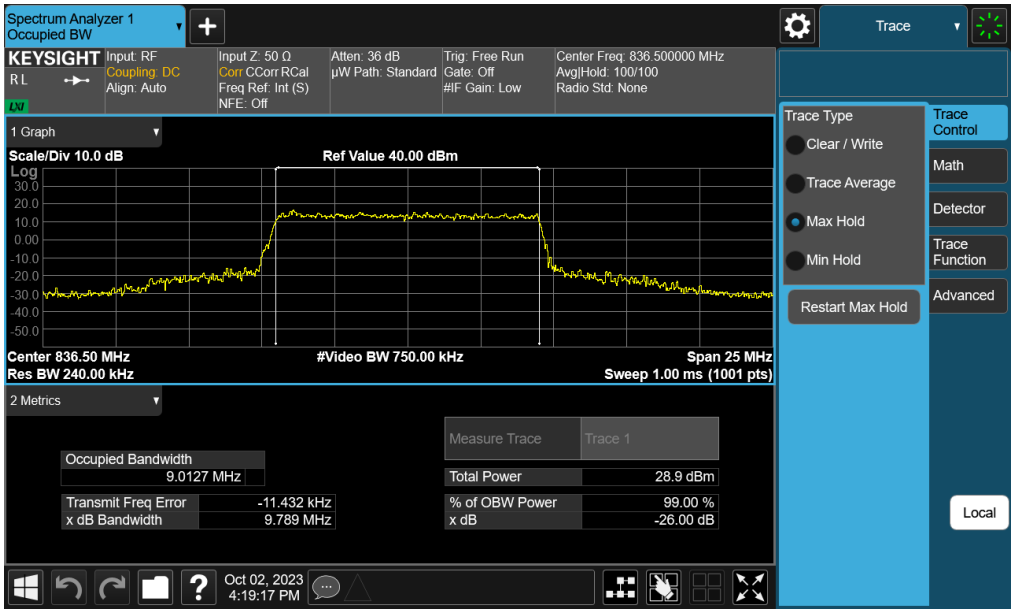


Plot 7-26. Occupied Bandwidth Plot (WCDMA, Ch. 4183 – Ant E)

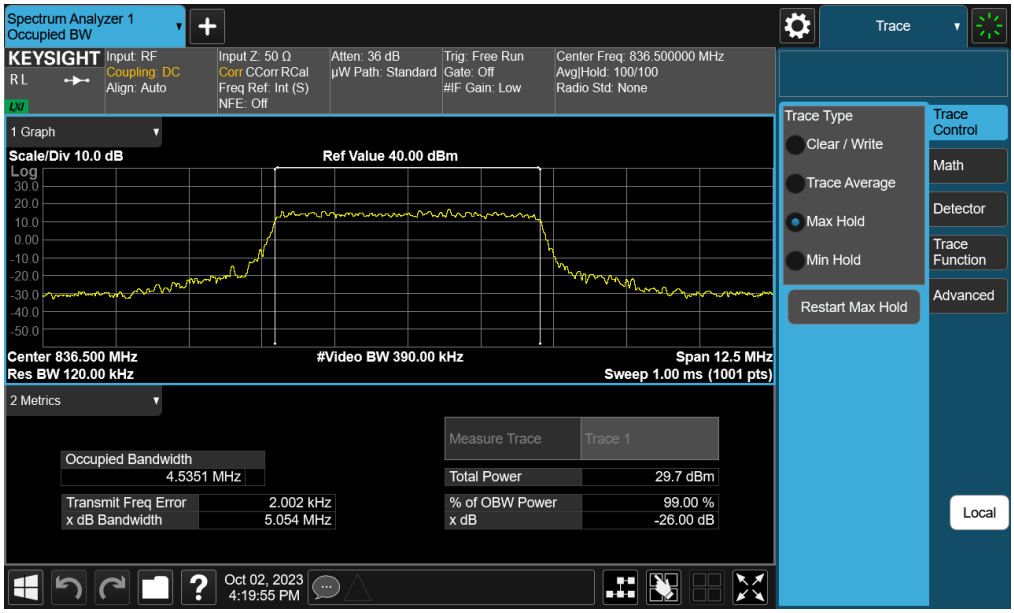
LTE Band 5 – Ant E



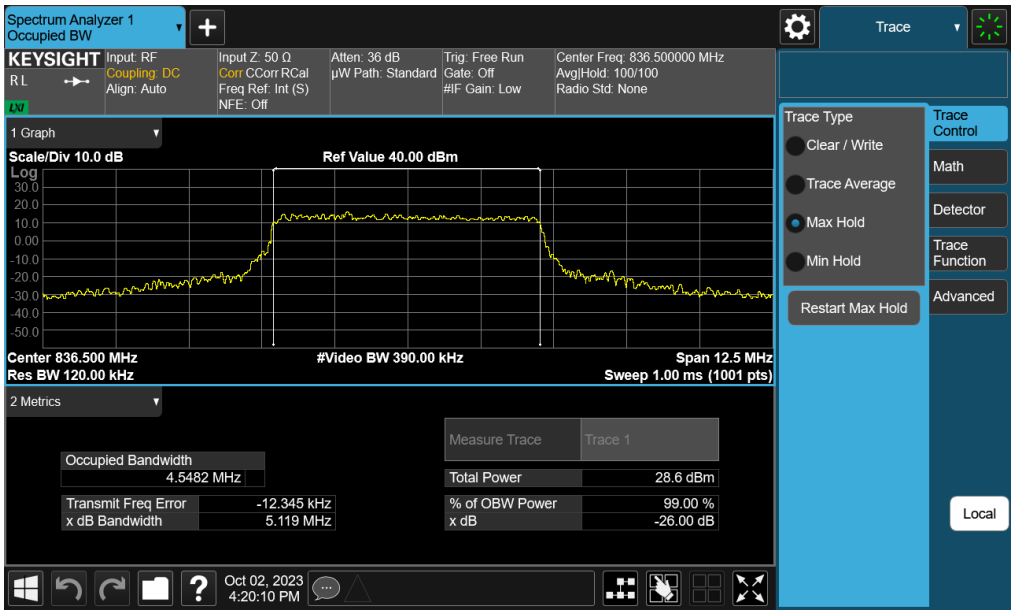
Plot 7-27. Occupied Bandwidth Plot (LTE Band 5 - 10MHz QPSK - Full RB Configuration – Ant E)



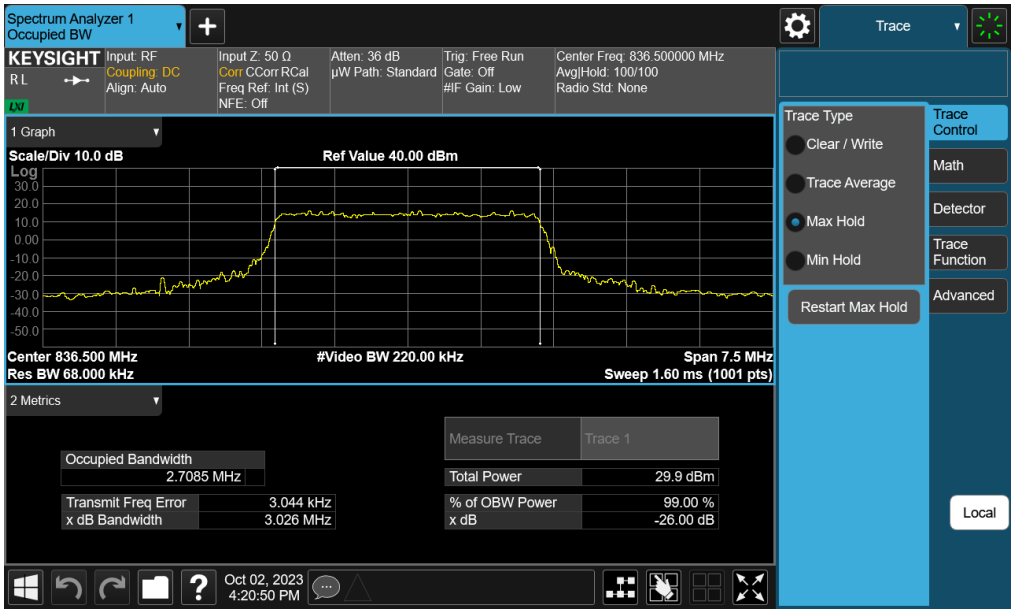
Plot 7-28. Occupied Bandwidth Plot (LTE Band 5 - 10MHz 16-QAM - Full RB Configuration – Ant E)



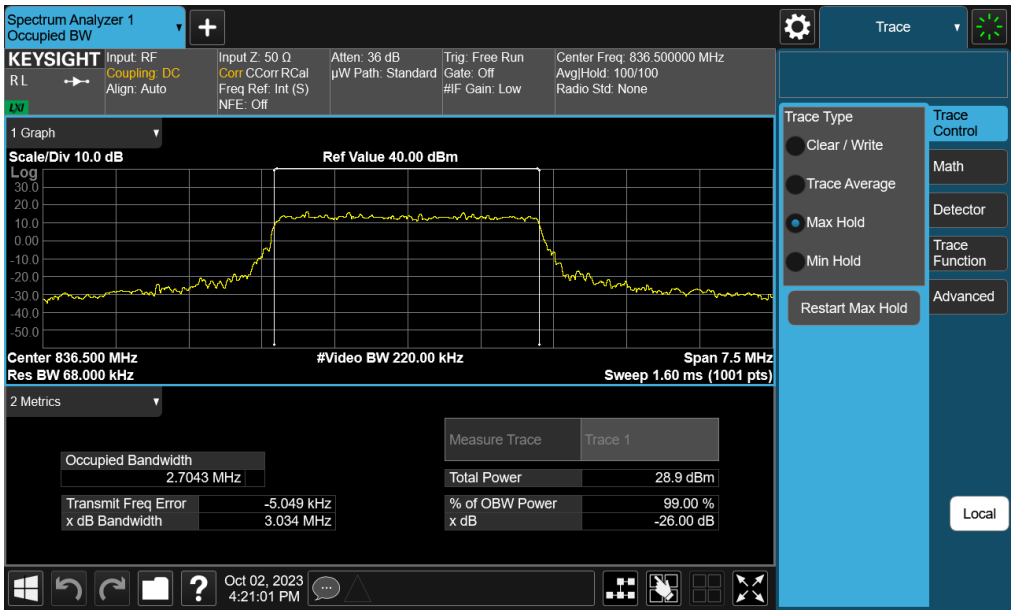
Plot 7-29. Occupied Bandwidth Plot (LTE Band 5 - 5MHz QPSK - Full RB Configuration – Ant E)



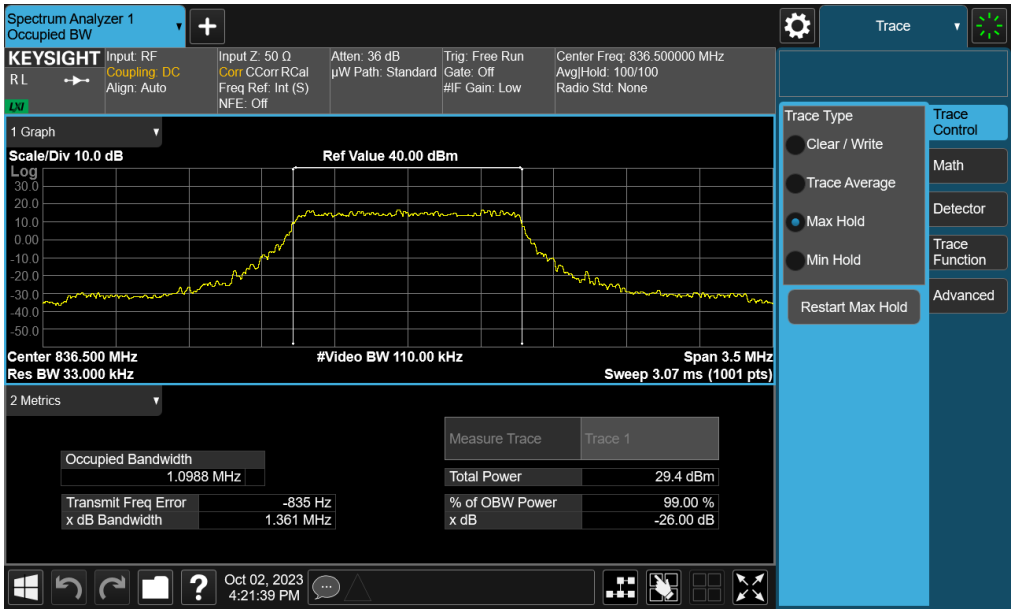
Plot 7-30. Occupied Bandwidth Plot (LTE Band 5 - 5MHz 16-QAM - Full RB Configuration – Ant E)



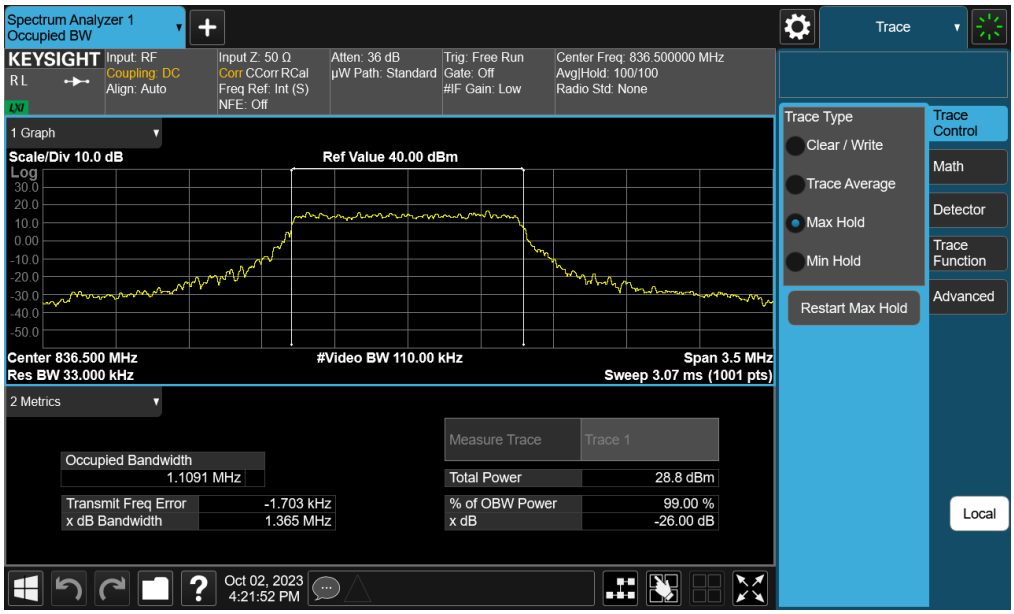
Plot 7-31. Occupied Bandwidth Plot (LTE Band 5 - 3MHz QPSK - Full RB Configuration – Ant E)



Plot 7-32. Occupied Bandwidth Plot (LTE Band 5 - 3MHz 16-QAM - Full RB Configuration – Ant E)



Plot 7-33. Occupied Bandwidth Plot (LTE Band 5 - 1.4MHz QPSK - Full RB Configuration – Ant E)

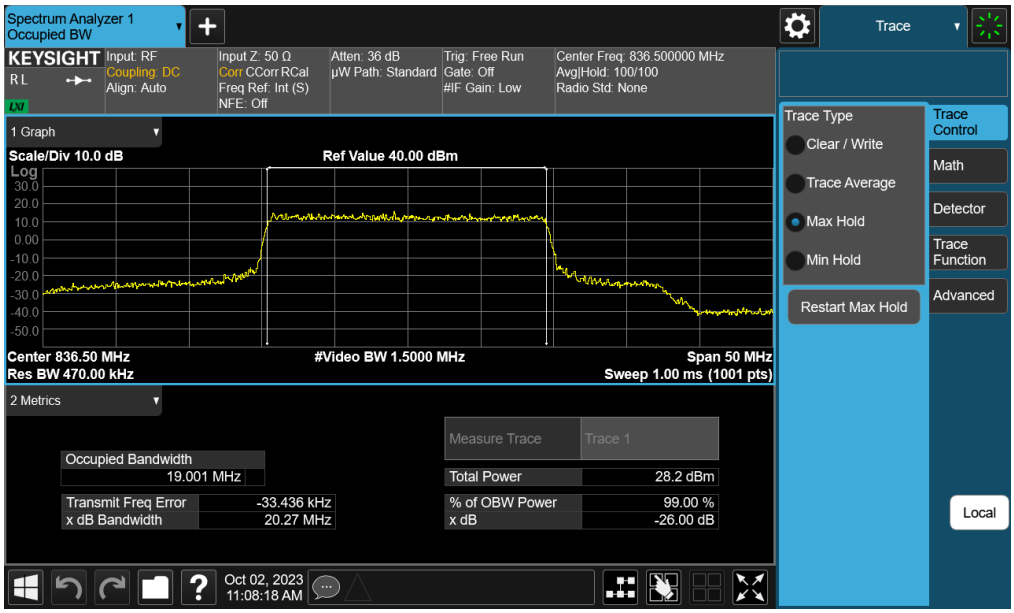


Plot 7-34. Occupied Bandwidth Plot (LTE Band 5 - 1.4MHz 16-QAM - Full RB Configuration – Ant E)

NR Band n5

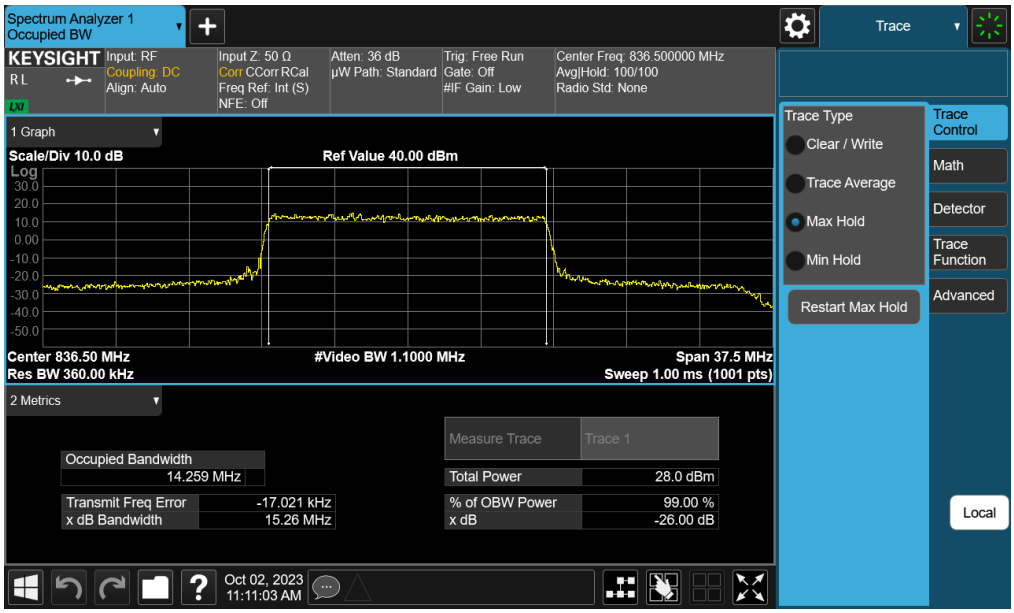
Plot 7-35. Occupied Bandwidth Plot (NR Band n5 - 20MHz π/2 BPSK - Full RB Configuration – Ant E)

Plot 7-36. Occupied Bandwidth Plot (NR Band n5 - 20MHz QPSK - Full RB Configuration – Ant E)

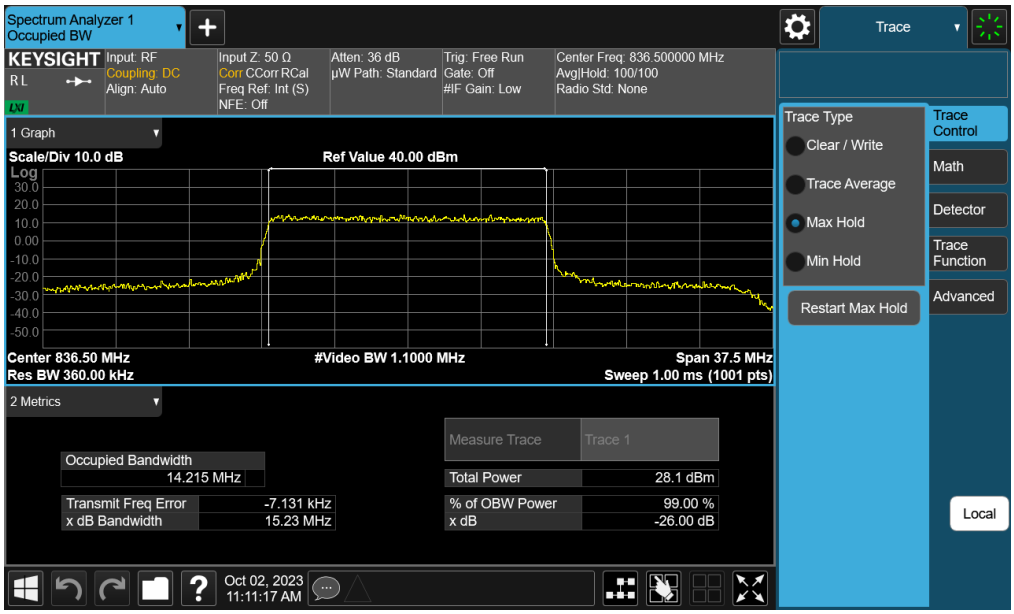


Plot 7-37. Occupied Bandwidth Plot (NR Band n5 - 20MHz 16-QAM - Full RB Configuration – Ant E)

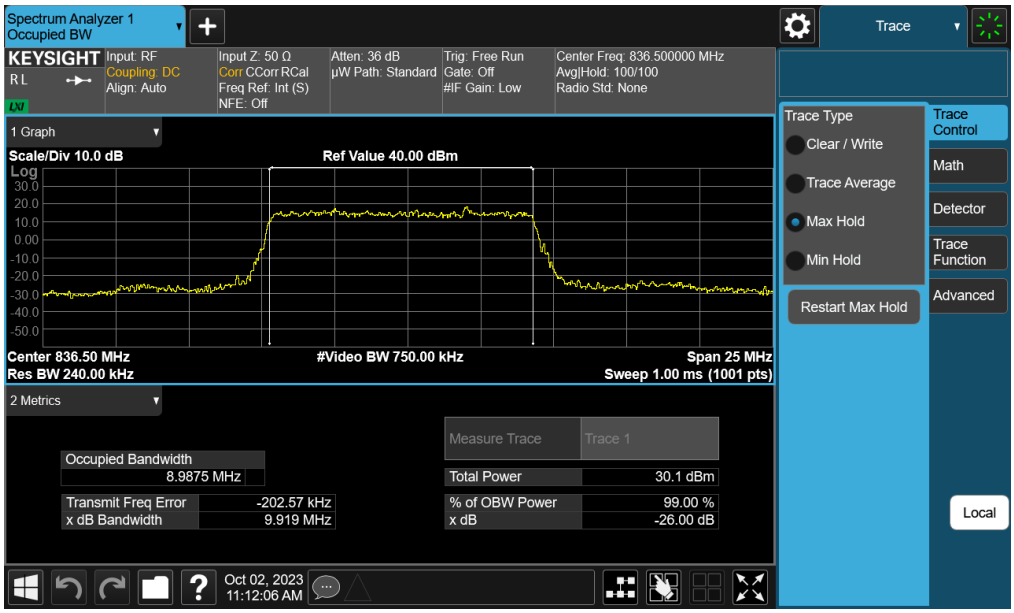
Plot 7-38. Occupied Bandwidth Plot (NR Band n5 - 15MHz π/2 BPSK - Full RB Configuration – Ant E)



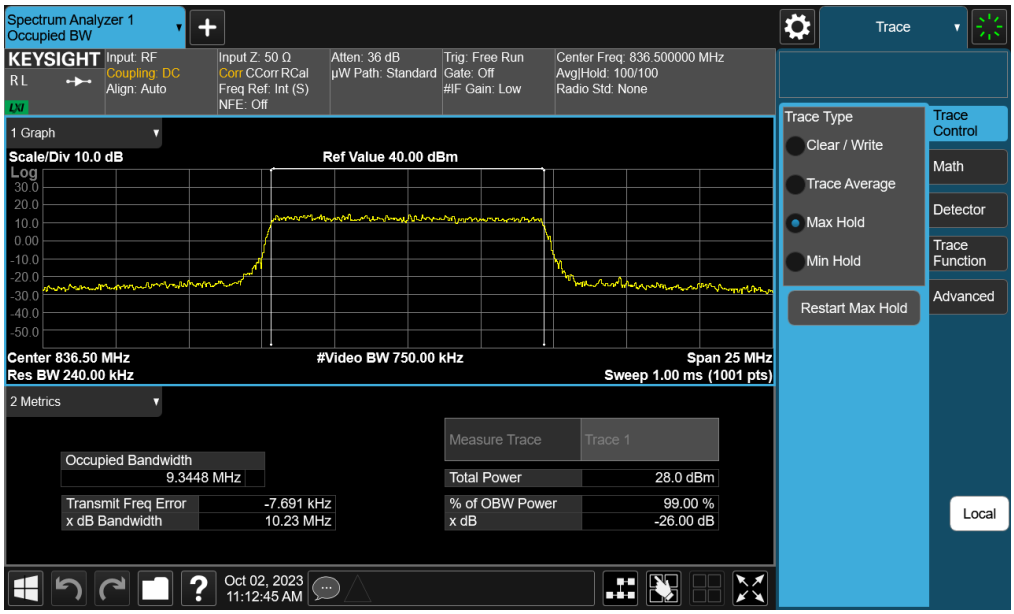
Plot 7-39. Occupied Bandwidth Plot (NR Band n5 - 15MHz QPSK - Full RB Configuration – Ant E)



Plot 7-40. Occupied Bandwidth Plot (NR Band n5 - 15MHz 16-QAM - Full RB Configuration – Ant E)



Plot 7-41. Occupied Bandwidth Plot (NR Band n5 - 10MHz π/2 BPSK - Full RB Configuration – Ant E)



Plot 7-42. Occupied Bandwidth Plot (NR Band n5 - 10MHz QPSK - Full RB Configuration – Ant E)