

FCC Sub6 REPORT

Certification

Applicant Name:

SAMSUNG Electronics Co., Ltd.

Date of Issue:

October 16, 2023

Location:

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 Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Report No.: HCT-RF-2310-FC048

FCC ID:	A3LSMS926U
APPLICANT:	SAMSUNG Electronics Co., Ltd.

Model(s): SM-S926U
 Additional Model(s): SM-S926U1
 EUT Type: Mobile phone
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 FCC Rule Part(s): §27

Ant A

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	EIRP	
				Max. Power (W)	Max. Power (dBm)
Sub6 n70 (5)	1697.5 – 1707.5	4M47G7D	PI/2 BPSK	0.175	22.43
		4M51G7D	QPSK	0.172	22.36
		4M53W7D	16QAM	0.138	21.39
		4M52W7D	64QAM	0.098	19.91
		4M51W7D	256QAM	0.054	17.33
Sub6 n70 (10)	1700.0 – 1705.0	8M99G7D	PI/2 BPSK	0.177	22.49
		9M00G7D	QPSK	0.171	22.32
		8M97W7D	16QAM	0.131	21.17
		8M93W7D	64QAM	0.097	19.85
		8M99W7D	256QAM	0.053	17.21
Sub6 n70 (15)	1702.5	13M5G7D	PI/2 BPSK	0.171	22.32
		13M5G7D	QPSK	0.163	22.12
		13M4W7D	16QAM	0.130	21.13
		13M4W7D	64QAM	0.097	19.85
		13M4W7D	256QAM	0.052	17.19

Ant F

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	EIRP	
				Max. Power (W)	Max. Power (dBm)
Sub6 n70 (5)	1697.5 – 1707.5	4M59G7D	PI/2 BPSK	0.158	22.00
		4M57G7D	QPSK	0.154	21.88
		4M55W7D	16QAM	0.121	20.81
		4M60W7D	64QAM	0.086	19.33
		4M46W7D	256QAM	0.048	16.77
Sub6 n70 (10)	1700.0 – 1705.0	8M97G7D	PI/2 BPSK	0.160	22.04
		8M98G7D	QPSK	0.156	21.93
		8M97W7D	16QAM	0.121	20.81
		8M97W7D	64QAM	0.088	19.44
		8M95W7D	256QAM	0.048	16.84
Sub6 n70 (15)	1702.5	13M5G7D	PI/2 BPSK	0.155	21.89
		13M4G7D	QPSK	0.149	21.73
		13M5W7D	16QAM	0.118	20.71
		13M5W7D	64QAM	0.087	19.39
		13M5W7D	256QAM	0.046	16.66

The measurements shown in this report were made in accordance with the procedures specified in CFR47 section §2.947. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.
HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)

Report No.: HCT-RF-2310-FC048

REVIEWED BY



Report prepared by : Jae Ryang Do
Engineer of Telecommunication Testing Center

Report approved by : Jong Seok Lee
Manager of Telecommunication Testing Center

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.

This laboratory is not accredited for the test results marked *.
The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2310-FC048	October 16, 2023	- First Approval Report

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MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name:	SAMSUNG Electronics Co., Ltd.
Address:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
FCC ID:	A3LSMS926U
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§27
EUT Type:	Mobile phone
Model(s):	SM-S926U
Additional Model(s):	SM-S926U1
SCS(kHz):	15
Bandwidth(MHz):	5, 10, 15
Waveform:	CP-OFDM, DFT-S-OFDM
Modulation:	DFT-S-OFDM: PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM CP-OFDM: QPSK, 16QAM, 64QAM, 256QAM
Tx Frequency:	1697.5 MHz – 1707.5 MHz (Sub6 n70(5 MHz)) 1700.0 MHz – 1705.0 MHz (Sub6 n70(10 MHz)) 1705.5 MHz (Sub6 n70(15 MHz))
Date(s) of Tests:	August 31, 2023 ~ October 11, 2023
Serial number:	Radiated: R3CW80MAMQT (Ant A), R3CW90B4EDB (Ant F) Conducted: R3CW80MAK7Y (Ant A), 741c314dee0f7ece (Ant F)

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a Mobile Phone with GSM/GPRS/EGPRS/UMTS and LTE, Sub6, mmWave.

It also supports IEEE 802.11 a/b/g/n/ac/ax (20/40/80/160 MHz), WIFI 6E, Bluetooth, BT LE, NFC, UWB, WPT.

2.2. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

2.3. TEST FACILITY

The Fully-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.**

3. DESCRIPTION OF TESTS

3.1 TEST PROCEDURE

Test Description	Test Procedure Used
Occupied Bandwidth	- KDB 971168 D01 v03r01 – Section 4.3 - ANSI C63.26-2015 – Section 5.4.4
Band Edge	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Spurious and Harmonic Emissions at Antenna Terminal	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Conducted Output Power	- N/A (See SAR Report)
Peak- to- Average Ratio	- KDB 971168 D01 v03r01 – Section 5.7 - ANSI C63.26-2015 – Section 5.2.3.4 - ANSI C63.26-2015 – Section 5.2.6(only GSM)
Frequency stability	- ANSI C63.26-2015 – Section 5.6
Effective Radiated Power/ Effective Isotropic Radiated Power	- KDB 971168 D01 v03r01 – Section 5.2 & 5.8 - ANSI/TIA-603-E-2016 – Section 2.2.17
Radiated Spurious and Harmonic Emissions	- KDB 971168 D01 v03r01 – Section 6.2 - ANSI/TIA-603-E-2016 – Section 2.2.12

3.2 RADIATED POWER

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

The equipment under test is placed on a non-conductive table 3-meters away from the receive antenna in accordance with ANSI/TIA-603-E-2016 Clause 2.2.17.

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5 % of the expected OBW, not to exceed 1 MHz
3. VBW ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points > 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

Test Note

1. The turntable is rotated through 360 degrees, and the receiving antenna scans in order to determine the level of the maximized emission.
2. A half wave dipole is then substituted in place of the EUT. For emissions above 1 GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator and the previously recorded signal was duplicated.

The power is calculated by the following formula;

$$P_d \text{ (dBm)} = P_g \text{ (dBm)} - \text{cable loss (dB)} + \text{antenna gain (dB)}$$

Where: P_d is the dipole equivalent power and P_g is the generator output power into the substitution antenna.

3. The maximum value is calculated by adding the forward power to the calibrated source plus its appropriate gain value.

These steps are repeated with the receiving antenna in both vertical and horizontal polarization. the difference

between the gain of the horn and an isotropic antenna are taken into consideration

4. The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
5. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

3.3 RADIATED SPURIOUS EMISSIONS

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA-603-E-2016.

Test Settings

1. RBW = 100kHz for emissions below 1 GHz and 1 MHz for emissions above 1 GHz
2. VBW \geq 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points $>$ 2 x span / RBW
5. Detector = Peak
6. Trace mode = Max Hold
7. The trace was allowed to stabilize
8. Test channel : Low/ Middle/ High
9. Frequency range : We are performed all frequency to 10th harmonics from 9 kHz.

Test Note

1. Measurements value show only up to 3 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin $>$ 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
2. The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the test data
3. For spurious emissions above 1 GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator and the previously recorded signal was duplicated. The spurious emissions is calculated by the following formula;

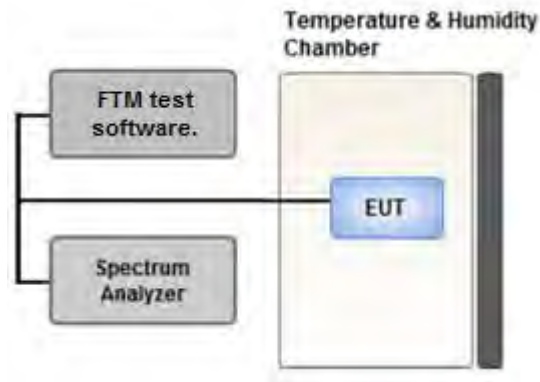
$$\text{Result}_{(dBm)} = P_g_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dBi)}$$

Where: P_g is the generator output power into the substitution antenna.

If the fundamental frequency is below 1 GHz, RF output power has been converted to EIRP.

$$\text{EIRP}_{(dBm)} = \text{ERP}_{(dBm)} + 2.15 \text{ dB}$$

3.4 PEAK- TO- AVERAGE RATIO



Test setup

① CCDF Procedure for PAPR

Test Settings

1. Set resolution/measurement bandwidth \geq signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Set the measurement interval as follows:
 - for continuous transmissions, set to 1 ms,
 - or 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 and set the measurement interval to a time that is less than or equal to the burst duration.
4. Record the maximum PAPR level associated with a probability of 0.1 %.

② Alternate Procedure for PAPR

Use one of the procedures presented in 5.2(ANSI C63.26-2015) to measure the total peak power and record as P_{Pk} .

Use one of the applicable procedures presented 5.2(ANSI C63.26-2015) to measure the total average power and record as P_{Avg} . Determine the P.A.R. from:

$$P.A.R. (dB) = P_{Pk} (dBm) - P_{Avg} (dBm) \quad (P_{Avg} = \text{Average Power} + \text{Duty cycle Factor})$$

Test Settings(Peak Power)

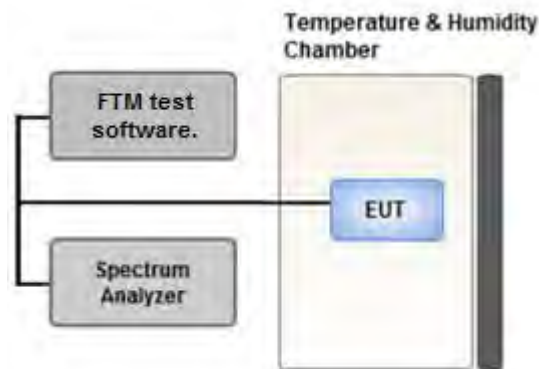
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW $\geq 3 \times$ RBW.

1. Set the RBW \geq OBW.
2. Set VBW $\geq 3 \times$ RBW.
3. Set span $\geq 2 \times$ OBW.
4. Sweep time $\geq 10 \times$ (number of points in sweep) \times (transmission symbol period).
5. Detector = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the peak amplitude level.

Test Settings(Average Power)

1. Set span to $2 \times$ to $3 \times$ the OBW.
2. Set RBW \geq OBW.
3. Set VBW $\geq 3 \times$ RBW.
4. Set number of measurement points in sweep $\geq 2 \times$ span / RBW.
5. Sweep time:
Set $\geq [10 \times (\text{number of points in sweep}) \times (\text{transmission period})]$ for single sweep (automation-compatible) measurement. The transmission period is the (on + off) time.
6. Detector = power averaging (rms).
7. Set sweep trigger to "free run."
8. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. (To accurately determine the average power over the on and off period of the transmitter, it can be necessary to increase the number of traces to be averaged above 100 or, if using a manually configured sweep time, increase the sweep time.)
9. Use the peak marker function to determine the maximum amplitude level.
10. Add $[10 \log (1/\text{duty cycle})]$ to the measured maximum power level to compute the average power during continuous transmission. For example, add $[10 \log (1/0.25)] = 6$ dB if the duty cycle is a constant 25 %.

3.5 OCCUPIED BANDWIDTH.



Test setup

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

The EUT makes a call to the communication simulator.

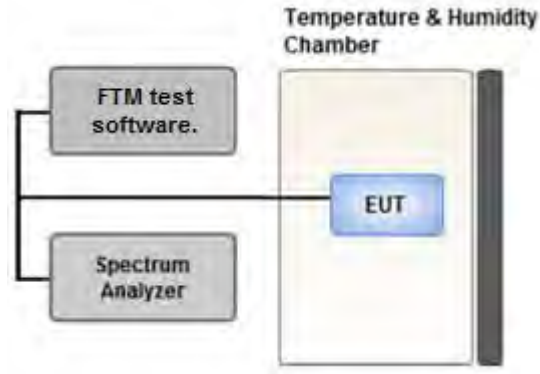
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth

Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99 % occupied bandwidth and the 26 dB 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 $\geq 3 \times$ 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

3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



Test setup

Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic.

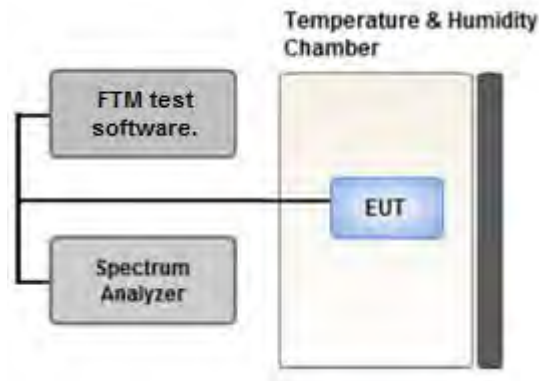
All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

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

Test Settings

1. RBW = 1 MHz
2. VBW \geq 3 MHz
3. Detector = RMS
4. Trace Mode = trace average
5. Sweep time = auto
6. Number of points in sweep \geq 2 x Span / RBW

3.7 BAND EDGE



Test setup

Test Overview

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Settings

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW > 1 % of the emission bandwidth
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points $\geq 2 \times \text{Span}/\text{RBW}$
7. Trace mode = trace average
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Test Notes

According to FCC 22.917, 24.238, 27.53 specified that 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.

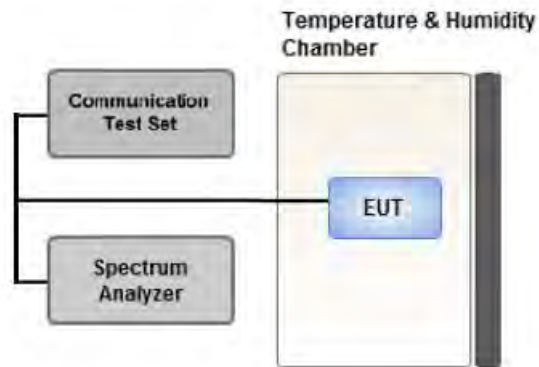
In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

All measurements were done at 2 channels (low and high operational frequency range).

The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

Where Margin < 1 dB the emission level is either corrected by $10 \log(1 \text{ MHz}/\text{RB})$ or the emission is integrated over a 1 MHz bandwidth to determine the final result. When using the integration method the integration window is either centered on the emission or, for emissions at the band edge, centered by an offset of 500 kHz from the block edge so that the integration window is the 1 MHz adjacent to the block edge.

3.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE



Test setup

Test Overview

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015.

The frequency stability of the transmitter is measured by:

1. Temperature:

The temperature is varied from -30 °C to +50 °C in 10 °C increments using an environmental chamber.

2. Primary Supply Voltage:

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

.- For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.

Test Settings

1. The carrier frequency of the transmitter is measured at room temperature

(20 °C to provide a reference).

2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter.

Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.

3. Frequency measurements are made at 10 °C intervals ranging from -30 °C to +50 °C. A period of at

least one half-hour is provided to allow stabilization of the equipment at each temperature level.

3.9 WORST CASE(RADIATED TEST)

- Waveform : All Waveform of operation were investigated and the worst case configuration results are reported.

(Worst case: DFT-S-OFDM)

- The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.

- All modes of operation were investigated and the worst case configuration results are reported.

Mode : Stand alone, Stand alone + External accessories (Earphone, AC adapter, etc)

Worst case : Stand alone

Mode : SA only

- We were performed the RSE test in condition of co-location.

Mode : Stand alone, Simultaneous transmission scenarios

Worst case : Stand alone

- All RB sizes, offsets of operation were investigated and the worst case configuration results are reported.

Please refer to the table below.

-In the case of radiated spurious emissions, all bandwidth of operation was investigated and the worst case bandwidth results are reported. (Worst case : 10 MHz(Ant A), 10 MHz(Ant F))

- SM-S926U & additional models were tested and the worst case results are reported.

(Worst case : SM-S926U)

[Ant A Worst case]

Test Description	Modulation	RB size	RB offset	Axis
Effective Isotropic Radiated Power	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	See Section 8.1		Z
Radiated Spurious and Harmonic Emissions	PI/2 BPSK	See Section 8.2		Z

[Ant F Worst case]

Test Description	Modulation	RB size	RB offset	Axis
Effective Isotropic Radiated Power	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	See Section 8.1		Z
Radiated Spurious and Harmonic Emissions	PI/2 BPSK	See Section 8.2		Z

3.10 WORST CASE(CONDUCTED TEST)

- Waveform : All Waveform of operation were investigated and the worst case configuration results are reported.

(Worst case: DFT-S-OFDM)

- Modulation : All Modulations of operation were investigated and the worst case configuration results are reported.

(Worst case: PI/2 BPSK)

- All modes of operation were investigated and the worst case configuration results are reported.

Mode : SA only

- All RB sizes, offsets of operation were investigated and the worst case configuration results are reported.

Please refer to the table below.

- SM-S926U & additional models were tested and the worst case results are reported.

(Worst case : SM-S926U)

[Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset
Occupied Bandwidth, Peak-To-Average Ratio	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	5, 10, 15	Mid	Full RB	0
Band Edge	PI/2 BPSK	5	Low	1	0
			High	1	24
		10	Low	1	0
			High	1	51
		15	Low	1	0
			High	1	78
		5, 10, 15	Low, High	Full RB	0
Spurious and Harmonic Emissions at Antenna Terminal	PI/2 BPSK	5, 10, 15	Low, Mid, High	1	1

4. LIST OF TEST EQUIPMENT

Equipment	Model	Manufacture	Serial No.	Due to Calibration	Calibration Interval
Precision Dipole Antenna	UHAP	Schwarzbeck	01273	03/27/2024	Biennial
Precision Dipole Antenna	UHAP	Schwarzbeck	01274	03/27/2024	Biennial
Horn Antenna(1~18 GHz)	BBHA 9120D	Schwarzbeck	02289	03/21/2024	Biennial
Horn Antenna(1~18 GHz)	BBHA 9120D	Schwarzbeck	9120D-1299	04/27/2025	Biennial
Horn Antenna(15~40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/29/2024	Biennial
Horn Antenna(15~40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170124	03/28/2025	Biennial
Loop Antenna(9 kHz~30 MHz)	FMZB1513	Rohde & Schwarz	1513-175	01/16/2025	Biennial
Bilog Antenna	VULB9160	Schwarzbeck	3150	03/09/2025	Biennial
Hybrid Antenna	VULB9160	Schwarzbeck	760	02/24/2025	Biennial
RF Switching System	FBSR-06B (1G HPF + LNA)	T&M SYSTEM	F3L1	05/22/2024	Annual
RF Switching System	FBSR-06B (3G HPF + LNA)	T&M SYSTEM	F3L2	05/22/2024	Annual
RF Switching System	FBSR-06B (6G HPF + LNA)	T&M SYSTEM	F3L3	05/22/2024	Annual
RF Switching System	FBSR-06B (LNA)	T&M SYSTEM	F3L4	05/22/2024	Annual
Power Amplifier	CBL18265035	CERNEK	22966	12/01/2023	Annual
Power Amplifier	CBL26405040	CERNEK	25956	03/02/2024	Annual
DC Power Supply	E3632A	Hewlett Packard	MY40004427	08/25/2024	Annual
Power Splitter(DC~26.5 GHz)	11667B	Hewlett Packard	11275	03/02/2024	Annual
Chamber	SU-642	ESPEC	93008124	02/22/2024	Annual
Signal Analyzer(10 Hz~26.5 GHz)	N9020A	Agilent	MY51110063	04/11/2024	Annual
ATTENUATOR(20 dB)	8493C	Hewlett Packard	17280	04/19/2024	Annual
Spectrum Analyzer(10 Hz~40 GHz)	FSV40	REOHDE & SCHWARZ	101436	02/22/2024	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/10/2024	Annual
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262287701	05/22/2024	Annual
Wideband Radio Communication Tester	MT8000A	Anritsu Corp.	6262302511	05/23/2024	Annual
SIGNAL GENERATOR (100 kHz~40 GHz)	SMB100A	REOHDE & SCHWARZ	177633	06/22/2024	Annual
Signal Analyzer(5 Hz~40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/24/2024	Annual
4-Way Divider	ZC4PD-K1844+	Mini-Circuits	942907	09/19/2024	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	HCT CO., LTD.,	-	-	-

Note:

1. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
2. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

5. 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 data shown herein 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.

Parameter	Expanded Uncertainty (\pm dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.90 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.14 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.16 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.57 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.76 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (Above 40 GHz)	5.52 (Confidence level about 95 %, $k=2$)

6. SUMMARY OF TEST RESULTS

6.1 Test Condition: Conducted Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Occupied Bandwidth	§2.1049	N/A	PASS
Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	§2.1051, §27.53(h)	< 43 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions	PASS
Conducted Output Power	§2.1046	N/A	<u>See Note1</u>
Peak- to- Average Ratio	§27.50(d)(5)	< 13 dB	PASS
Frequency stability / variation of ambient temperature	§2.1055, §27.54	Emission must remain in band	PASS

Note:

1. See SAR Report
2. All conducted tests were tested using 5G Wireless Tester.

6.2 Test Condition: Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Equivalent Isotropic Radiated Power	§27.50(d)(4)	< 1 Watts max. EIRP	PASS
Radiated Spurious and Harmonic Emissions	§2.1053, §27.53(h)	< 43 + 10log10 (P[Watts]) for all out-of band emissions	PASS

Note:

1. Radiated tests were tested using 5G Wireless Tester.

7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

Ch./ Freq.		Measured Level(dBm)	Substitute Level(dBm)	Ant. Gain (dBd)	C.L	Pol.	ERP	
channel	Freq.(MHz)						W	dBm
128	824.20	-21.37	38.40	-10.61	0.95	H	0.483	26.84

ERP = Substitute LEVEL(dBm) + Ant. Gain – CL(Cable Loss)

- 1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.
- 2) During the test, the turn table is rotated until the maximum signal is found.
- 3) Record the field strength meter's level.
- 4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
- 5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
- 6) The signal generator output level with Ant. Gain and cable loss are the rating of effective radiated power.

7.2 EIRP Sample Calculation

Ch./ Freq.		Measured Level(dBm)	Substitute Level(dBm)	Ant. Gain (dBi)	C.L	Pol.	EIRP	
channel	Freq.(MHz)						W	dBm
340500	1,732.50	-15.75	18.45	9.90	1.76	H	0.456	26.59

EIRP = Substitute LEVEL(dBm) + Ant. Gain – CL(Cable Loss)

- 1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.
- 2) During the test, the turn table is rotated until the maximum signal is found.
- 3) Record the field strength meter's level.
- 4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
- 5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
- 6) The signal generator output level with Ant. Gain and cable loss are the rating of equivalent isotropic radiated power.

7.3. Emission Designator

GSM Emission Designator

Emission Designator = 249KGXW

GSM BW = 249 kHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

EDGE Emission Designator

Emission Designator = 249KG7W

GSM BW = 249 kHz

G = Phase Modulation

7 = Quantized/Digital Info

W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M17F9W

WCDMA BW = 4.17 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

PSK Modulation

Emission Designator = 4M48G7D

LTE BW = 4.48 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

QAM Modulation

Emission Designator = 4M48W7D

LTE BW = 4.48 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

8. TEST DATA(Ant A)

8.1 EQUIVALENT ISOTROPIC RADIATED POWER

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP		RB	
									W	W	dBm	Size
1697.5		PI/2 BPSK	-18.81	14.82	9.60	1.99	V	< 1.00	0.175	22.43	1	12
		QPSK	-18.88	14.75	9.60	1.99	V		0.172	22.36		
		16-QAM	-19.95	13.68	9.60	1.99	V		0.135	21.29		
		64-QAM	-21.40	12.23	9.60	1.99	V		0.097	19.84		
		256-QAM	-23.95	9.68	9.60	1.99	V		0.054	17.29		
1702.5	Sub6 n70/ 5 MHz [15 kHz]	PI/2 BPSK	-18.84	14.79	9.60	1.99	V	< 1.00	0.174	22.40	1	23
		QPSK	-18.95	14.68	9.60	1.99	V		0.170	22.29		
		16-QAM	-19.85	13.78	9.60	1.99	V		0.138	21.39		
		64-QAM	-21.33	12.30	9.60	1.99	V		0.098	19.91		
		256-QAM	-23.91	9.72	9.60	1.99	V		0.054	17.33		
1707.5		PI/2 BPSK	-18.77	14.43	9.60	1.99	V	< 1.00	0.160	22.04	1	1
		QPSK	-18.96	14.24	9.60	1.99	V		0.153	21.85		
		16-QAM	-19.90	13.30	9.60	1.99	V		0.123	20.91		
		64-QAM	-21.36	11.84	9.60	1.99	V		0.088	19.45		
		256-QAM	-24.06	9.14	9.60	1.99	V		0.047	16.75		

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP		RB	
									W	W	dBm	Size
1700.0	Sub6 n70/ 10 MHz [15 kHz]	PI/2 BPSK	-18.79	14.84	9.60	1.99	V	< 1.00	0.176	22.45	1	50
		QPSK	-18.92	14.71	9.60	1.99	V		0.171	22.32		
		16-QAM	-20.07	13.56	9.60	1.99	V		0.131	21.17		
		64-QAM	-21.39	12.24	9.60	1.99	V		0.097	19.85		
		256-QAM	-24.03	9.60	9.60	1.99	V		0.053	17.21		
1702.5		PI/2 BPSK	-18.75	14.88	9.60	1.99	V		0.177	22.49	1	50
		QPSK	-18.93	14.70	9.60	1.99	V		0.170	22.31		
		16-QAM	-20.11	13.52	9.60	1.99	V		0.130	21.13		
		64-QAM	-21.41	12.22	9.60	1.99	V		0.096	19.83		
		256-QAM	-24.14	9.49	9.60	1.99	V		0.051	17.10		
1705.0	PI/2 BPSK	-18.76	14.66	9.60	1.99	V	0.169	22.27	1	26		
	QPSK	-18.88	14.54	9.60	1.99	V	0.164	22.15				
	16-QAM	-19.99	13.43	9.60	1.99	V	0.127	21.04				
	64-QAM	-21.34	12.08	9.60	1.99	V	0.093	19.69				
	256-QAM	-24.05	9.37	9.60	1.99	V	0.050	16.98				

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP		RB	
									W	W dBm	Size	Offset
1702.5	Sub6 n70/ 15 MHz [15 kHz]	PI/2 BPSK	-18.92	14.71	9.60	1.99	V	< 1.00	0.171	22.32	1	77
		QPSK	-19.12	14.51	9.60	1.99	V		0.163	22.12		
		16-QAM	-20.11	13.52	9.60	1.99	V		0.130	21.13		
		64-QAM	-21.39	12.24	9.60	1.99	V		0.097	19.85		
		256-QAM	-24.05	9.58	9.60	1.99	V		0.052	17.19		

8.2 RADIATED SPURIOUS EMISSIONS

- NR Band: N70
- Bandwidth: 10 MHz
- Modulation: PI/2 BPSK
- Distance: 3 meters
- SCS: 15 kHz

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)	RB	
									Size	Offset
340000 (1700.0)	3 400.00	-59.66	11.10	-61.91	2.91	H	-53.72	-13.00	1	50
	5 100.00	-52.29	10.80	-47.28	3.66	V	-40.14	-13.00		
	6 800.00	-61.43	10.70	-50.31	4.25	H	-43.86	-13.00		
	8 500.00	-59.99	10.60	-46.26	4.79	H	-40.45	-13.00		
	10 200.00	-62.72	11.00	-45.73	5.33	H	-40.06	-13.00		
340500 (1702.5)	3 405.00	-59.46	11.10	-61.57	2.91	H	-53.38	-13.00	1	50
	5 107.50	-52.40	10.80	-46.91	3.67	V	-39.78	-13.00		
	6 810.00	-63.12	10.70	-52.13	4.24	H	-45.67	-13.00		
	8 512.50	-61.92	10.60	-48.27	4.80	H	-42.47	-13.00		
	10 215.00	-63.61	11.00	-46.56	5.32	H	-40.88	-13.00		
341000 (1705.0)	3 410.00	-60.58	11.10	-62.55	2.91	V	-54.36	-13.00	1	26
	5 115.00	-52.58	10.80	-47.03	3.66	V	-39.88	-13.00		
	6 820.00	-63.31	10.70	-52.28	4.25	V	-45.83	-13.00		
	8 525.00	-62.29	10.60	-49.18	4.82	V	-43.40	-13.00		
	10 230.00	-64.50	11.00	-47.84	5.33	V	-42.17	-13.00		

8.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
Sub6 n70	5 MHz	1702.5	BPSK	25	0	3.91
			QPSK			4.55
			16-QAM			5.46
			64-QAM			5.92
			256-QAM			6.70
	10 MHz		BPSK	50		3.84
			QPSK			4.48
			16-QAM			5.36
			64-QAM			5.87
			256-QAM			6.50
	15 MHz		BPSK	75		3.76
			QPSK			4.35
			16-QAM			5.24
			64-QAM			5.79
			256-QAM			6.45

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 60 ~ 74.

8.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
Sub6 n70	5 MHz	1702.5	BPSK	25	0	4.4665
			QPSK			4.5142
			16-QAM			4.5296
			64-QAM			4.5157
			256-QAM			4.5055
	10 MHz		BPSK	50		8.9915
			QPSK			8.9972
			16-QAM			8.9705
			64-QAM			8.9276
			256-QAM			8.9904
	15 MHz		BPSK	75		13.489
			QPSK			13.468
			16-QAM			13.413
			64-QAM			13.438
			256-QAM			13.424

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 45 ~ 59.

8.5 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
Sub6 n70	5	1697.5	4.9676	30.200	-80.667	-50.467	-13.00
		1702.5	8.2483	30.815	-79.624	-48.809	
		1707.5	3.8007	30.200	-79.758	-49.558	
	10	1700.0	8.8639	30.815	-81.085	-50.270	
		1702.5	9.9671	30.815	-81.110	-50.295	
		1705.0	8.2747	30.815	-80.787	-49.972	
	15	1702.5	9.1615	30.815	-80.746	-49.931	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 93 ~ 106.
2. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
3. Factor(dB) = Cable Loss + Ext. Attenuator + Power Splitter

Frequency Range (GHz)	Factor [dB]
0.03 – 1	27.494
1 – 5	30.200
5 – 10	30.815
10 – 15	31.340
15 – 20	31.713
Above 20	32.355

8.6 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 75 ~ 92.

8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

- ▣ BandWidth: 5 MHz
- ▣ Voltage(100 %): 3.880 VDC
- ▣ Batt. Endpoint: 3.300 VDC
- ▣ LIMIT: Emission must remain in band

Test. Frequency (MHz)	Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
1697.5	100 %	+20(Ref)	1697 500 000	0.0	0.000 000	0.000
	100 %	-30	1697 499 999	-1.2	0.000 000	-0.001
	100 %	-20	1697 500 000	0.3	0.000 000	0.000
	100 %	-10	1697 499 997	-2.7	0.000 000	-0.002
	100 %	0	1697 499 999	-0.5	0.000 000	0.000
	100 %	+10	1697 499 996	-3.4	0.000 000	-0.002
	100 %	+30	1697 499 997	-3.1	0.000 000	-0.002
	100 %	+40	1697 499 999	-0.4	0.000 000	0.000
	100 %	+50	1697 499 997	-2.6	0.000 000	-0.002
	Batt. Endpoint	+20	1697 499 995	-4.5	0.000 000	-0.003
1707.5	100 %	+20(Ref)	1707 499 998	0.0	0.000 000	0.000
	100 %	-30	1707 499 994	-4.1	0.000 000	-0.002
	100 %	-20	1707 499 995	-3.0	0.000 000	-0.002
	100 %	-10	1707 499 994	-4.5	0.000 000	-0.003
	100 %	0	1707 499 995	-3.5	0.000 000	-0.002
	100 %	+10	1707 499 992	-5.6	0.000 000	-0.003
	100 %	+30	1707 499 994	-3.7	0.000 000	-0.002
	100 %	+40	1707 499 995	-2.8	0.000 000	-0.002
	100 %	+50	1707 499 996	-1.6	0.000 000	-0.001
	Batt. Endpoint	+20	1707 499 995	-3.2	0.000 000	-0.002

- ▣ BandWidth: 10 MHz
- ▣ Voltage(100 %): 3.880 VDC
- ▣ Batt. Endpoint: 3.300 VDC
- ▣ LIMIT: Emission must remain in band

Test. Frequency (MHz)	Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
1700.0	100 %	+20(Ref)	1699 999 999	0.0	0.000 000	0.000
	100 %	-30	1700 000 002	3.0	0.000 000	0.002
	100 %	-20	1699 999 998	-1.2	0.000 000	-0.001
	100 %	-10	1700 000 000	0.7	0.000 000	0.000
	100 %	0	1700 000 000	0.8	0.000 000	0.000
	100 %	+10	1699 999 998	-0.6	0.000 000	0.000
	100 %	+30	1699 999 996	-2.7	0.000 000	-0.002
	100 %	+40	1700 000 000	1.1	0.000 000	0.001
	100 %	+50	1699 999 997	-1.5	0.000 000	-0.001
	Batt. Endpoint	+20	1699 999 999	-0.4	0.000 000	0.000
1705.0	100 %	+20(Ref)	1705 000 003	0.0	0.000 000	0.000
	100 %	-30	1705 000 006	3.6	0.000 000	0.002
	100 %	-20	1705 000 007	4.8	0.000 000	0.003
	100 %	-10	1705 000 007	4.3	0.000 000	0.003
	100 %	0	1705 000 008	5.5	0.000 000	0.003
	100 %	+10	1705 000 006	3.5	0.000 000	0.002
	100 %	+30	1705 000 008	4.9	0.000 000	0.003
	100 %	+40	1705 000 006	3.7	0.000 000	0.002
	100 %	+50	1705 000 005	2.0	0.000 000	0.001
	Batt. Endpoint	+20	1705 000 007	4.1	0.000 000	0.002

- ▣ BandWidth: 15 MHz
- ▣ Voltage(100 %): 3.880 VDC
- ▣ Batt. Endpoint: 3.300 VDC
- ▣ LIMIT: Emission must remain in band

Test. Frequency (MHz)	Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
1702.5	100 %	+20(Ref)	1702 499 996	0.0	0.000 000	0.000
	100 %	-30	1702 499 991	-4.9	0.000 000	-0.003
	100 %	-20	1702 499 993	-3.3	0.000 000	-0.002
	100 %	-10	1702 499 994	-1.9	0.000 000	-0.001
	100 %	0	1702 499 993	-3.4	0.000 000	-0.002
	100 %	+10	1702 499 991	-4.8	0.000 000	-0.003
	100 %	+30	1702 499 993	-3.3	0.000 000	-0.002
	100 %	+40	1702 499 992	-4.4	0.000 000	-0.003
	100 %	+50	1702 499 994	-2.4	0.000 000	-0.001
	Batt. Endpoint	+20	1702 499 996	-0.3	0.000 000	0.000

9. TEST DATA(Ant F)

9.1 EQUIVALENT ISOTROPIC RADIATED POWER

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP		RB	
									W	W dBm	Size	Offset
1697.5	Sub6 n70/ 5 MHz [15 kHz]	PI/2 BPSK	-19.24	14.39	9.60	1.99	V	< 1.00	0.158	22.00	1	12
		QPSK	-19.36	14.27	9.60	1.99	V		0.154	21.88		
		16-QAM	-20.43	13.20	9.60	1.99	V		0.121	20.81		
		64-QAM	-21.91	11.72	9.60	1.99	V		0.086	19.33		
		256-QAM	-24.47	9.16	9.60	1.99	V		0.048	16.77		
1702.5		PI/2 BPSK	-19.41	14.22	9.60	1.99	V		0.153	21.83	1	12
		QPSK	-19.59	14.04	9.60	1.99	V		0.146	21.65		
		16-QAM	-20.44	13.19	9.60	1.99	V		0.120	20.80		
		64-QAM	-21.99	11.64	9.60	1.99	V		0.084	19.25		
		256-QAM	-24.64	8.99	9.60	1.99	V		0.046	16.60		
1707.5	PI/2 BPSK	-19.57	13.63	9.60	1.99	V	0.133	21.24	1	1		
	QPSK	-19.59	13.61	9.60	1.99	V	0.133	21.22				
	16-QAM	-20.62	12.58	9.60	1.99	V	0.105	20.19				
	64-QAM	-22.19	11.01	9.60	1.99	V	0.073	18.62				
	256-QAM	-24.73	8.47	9.60	1.99	V	0.041	16.08				

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP		RB	
									W	W dBm	Size	Offset
1700.0	Sub6 n70/ 10 MHz [15 kHz]	PI/2 BPSK	-19.20	14.43	9.60	1.99	V	< 1.00	0.160	22.04	1	50
		QPSK	-19.41	14.22	9.60	1.99	V		0.153	21.83		
		16-QAM	-20.56	13.07	9.60	1.99	V		0.117	20.68		
		64-QAM	-22.02	11.61	9.60	1.99	V		0.084	19.22		
		256-QAM	-24.60	9.03	9.60	1.99	V		0.046	16.64		
1702.5		PI/2 BPSK	-19.21	14.42	9.60	1.99	V		0.160	22.03	1	1
		QPSK	-19.31	14.32	9.60	1.99	V		0.156	21.93		
		16-QAM	-20.43	13.20	9.60	1.99	V		0.121	20.81		
		64-QAM	-21.80	11.83	9.60	1.99	V		0.088	19.44		
		256-QAM	-24.40	9.23	9.60	1.99	V		0.048	16.84		
1705.0	PI/2 BPSK	-19.32	14.10	9.60	1.99	V	0.148	21.71	1	26		
	QPSK	-19.65	13.77	9.60	1.99	V	0.137	21.38				
	16-QAM	-20.48	12.94	9.60	1.99	V	0.114	20.55				
	64-QAM	-21.95	11.47	9.60	1.99	V	0.081	19.08				
	256-QAM	-24.61	8.81	9.60	1.99	V	0.044	16.42				

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP		RB	
									W	W dBm	Size	Offset
1702.5	Sub6 n70/ 15 MHz [15 kHz]	PI/2 BPSK	-19.35	14.28	9.60	1.99	V	< 1.00	0.155	21.89	1	39
		QPSK	-19.51	14.12	9.60	1.99	V		0.149	21.73		
		16-QAM	-20.53	13.10	9.60	1.99	V		0.118	20.71		
		64-QAM	-21.85	11.78	9.60	1.99	V		0.087	19.39		
		256-QAM	-24.58	9.05	9.60	1.99	V		0.046	16.66		

9.2 RADIATED SPURIOUS EMISSIONS

- NR Band: N70
- Bandwidth: 10 MHz
- Modulation: PI/2 BPSK
- Distance: 3 meters
- SCS: 15 kHz

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)	RB	
									Size	Offset
340000 (1700.0)	3 400.00	-60.05	11.10	-62.30	2.91	V	-54.11	-13.00	1	50
	5 100.00	-61.40	10.80	-56.39	3.66	V	-49.25	-13.00		
	6 800.00	-63.02	10.70	-51.90	4.25	V	-45.45	-13.00		
	8 500.00	-62.58	10.60	-48.85	4.79	V	-43.04	-13.00		
	10 200.00	-62.97	11.00	-45.98	5.33	V	-40.31	-13.00		
340500 (1702.5)	3 405.00	-60.96	11.10	-63.07	2.91	V	-54.88	-13.00	1	1
	5 107.50	-63.15	10.80	-57.66	3.67	V	-50.53	-13.00		
	6 810.00	-63.02	10.70	-52.03	4.24	V	-45.57	-13.00		
	8 512.50	-62.86	10.60	-49.21	4.80	V	-43.41	-13.00		
	10 215.00	-64.11	11.00	-47.06	5.32	V	-41.38	-13.00		
341000 (1705.0)	3 410.00	-60.96	11.10	-62.93	2.91	V	-54.74	-13.00	1	26
	5 115.00	-61.16	10.80	-55.61	3.66	V	-48.46	-13.00		
	6 820.00	-63.71	10.70	-52.68	4.25	V	-46.23	-13.00		
	8 525.00	-61.83	10.60	-48.72	4.82	V	-42.94	-13.00		
	10 230.00	-63.67	11.00	-47.01	5.33	V	-41.34	-13.00		

9.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
Sub6 n70	5 MHz	1702.5	BPSK	25	0	3.95
			QPSK			4.47
			16-QAM			5.31
			64-QAM			5.86
			256-QAM			6.28
	10 MHz		BPSK	50		3.90
			QPSK			4.48
			16-QAM			5.27
			64-QAM			5.82
			256-QAM			6.62
	15 MHz		BPSK	75		3.81
			QPSK			4.47
			16-QAM			5.34
			64-QAM			5.87
			256-QAM			6.53

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 123 ~ 137.

9.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
Sub6 n70	5 MHz	1702.5	BPSK	25	0	4.5902
			QPSK			4.5726
			16-QAM			4.5523
			64-QAM			4.6002
			256-QAM			4.4608
	10 MHz		BPSK	50		8.9697
			QPSK			8.9771
			16-QAM			8.9731
			64-QAM			8.9680
			256-QAM			8.9493
	15 MHz		BPSK	75		13.469
			QPSK			13.443
			16-QAM			13.447
			64-QAM			13.481
			256-QAM			13.496

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 108 ~ 122.

9.5 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
Sub6 n70	5	1697.5	8.0374	30.815	-80.827	-50.012	-13.00
		1702.5	8.0135	30.815	-81.005	-50.190	
		1707.5	3.4108	30.200	-80.426	-50.226	
	10	1700.0	3.3914	30.200	-80.425	-50.225	
		1702.5	7.1765	30.815	-80.532	-49.717	
		1705.0	3.4009	30.200	-80.107	-49.907	
	15	1702.5	3.3914	30.200	-80.384	-50.184	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 156 ~ 169.
2. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
3. Factor(dB) = Cable Loss + Ext. Attenuator + Power Splitter

Frequency Range (GHz)	Factor [dB]
0.03 – 1	27.494
1 – 5	30.200
5 – 10	30.815
10 – 15	31.340
15 – 20	31.713
Above 20	32.355

9.6 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 138 ~ 155.

9.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

- ▣ BandWidth: 5 MHz
- ▣ Voltage(100 %): 3.880 VDC
- ▣ Batt. Endpoint: 3.300 VDC
- ▣ LIMIT: Emission must remain in band

Test. Frequency (MHz)	Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
1697.5	100 %	+20(Ref)	1697 499 996	0.0	0.000 000	0.000
	100 %	-30	1697 499 994	-2.4	0.000 000	-0.001
	100 %	-20	1697 499 994	-2.7	0.000 000	-0.002
	100 %	-10	1697 499 995	-1.0	0.000 000	-0.001
	100 %	0	1697 499 992	-4.1	0.000 000	-0.002
	100 %	+10	1697 499 994	-2.3	0.000 000	-0.001
	100 %	+30	1697 499 994	-2.4	0.000 000	-0.001
	100 %	+40	1697 499 993	-3.3	0.000 000	-0.002
	100 %	+50	1697 499 994	-2.2	0.000 000	-0.001
	Batt. Endpoint	+20	1697 499 994	-2.3	0.000 000	-0.001
1707.5	100 %	+20(Ref)	1707 499 996	0.0	0.000 000	0.000
	100 %	-30	1707 499 994	-2.1	0.000 000	-0.001
	100 %	-20	1707 499 992	-4.1	0.000 000	-0.002
	100 %	-10	1707 499 993	-3.4	0.000 000	-0.002
	100 %	0	1707 499 991	-4.8	0.000 000	-0.003
	100 %	+10	1707 499 993	-3.1	0.000 000	-0.002
	100 %	+30	1707 499 991	-5.0	0.000 000	-0.003
	100 %	+40	1707 499 993	-3.0	0.000 000	-0.002
	100 %	+50	1707 499 994	-2.3	0.000 000	-0.001
	Batt. Endpoint	+20	1707 499 995	-0.9	0.000 000	-0.001

- ▣ BandWidth: 10 MHz
- ▣ Voltage(100 %): 3.880 VDC
- ▣ Batt. Endpoint: 3.300 VDC
- ▣ LIMIT: Emission must remain in band

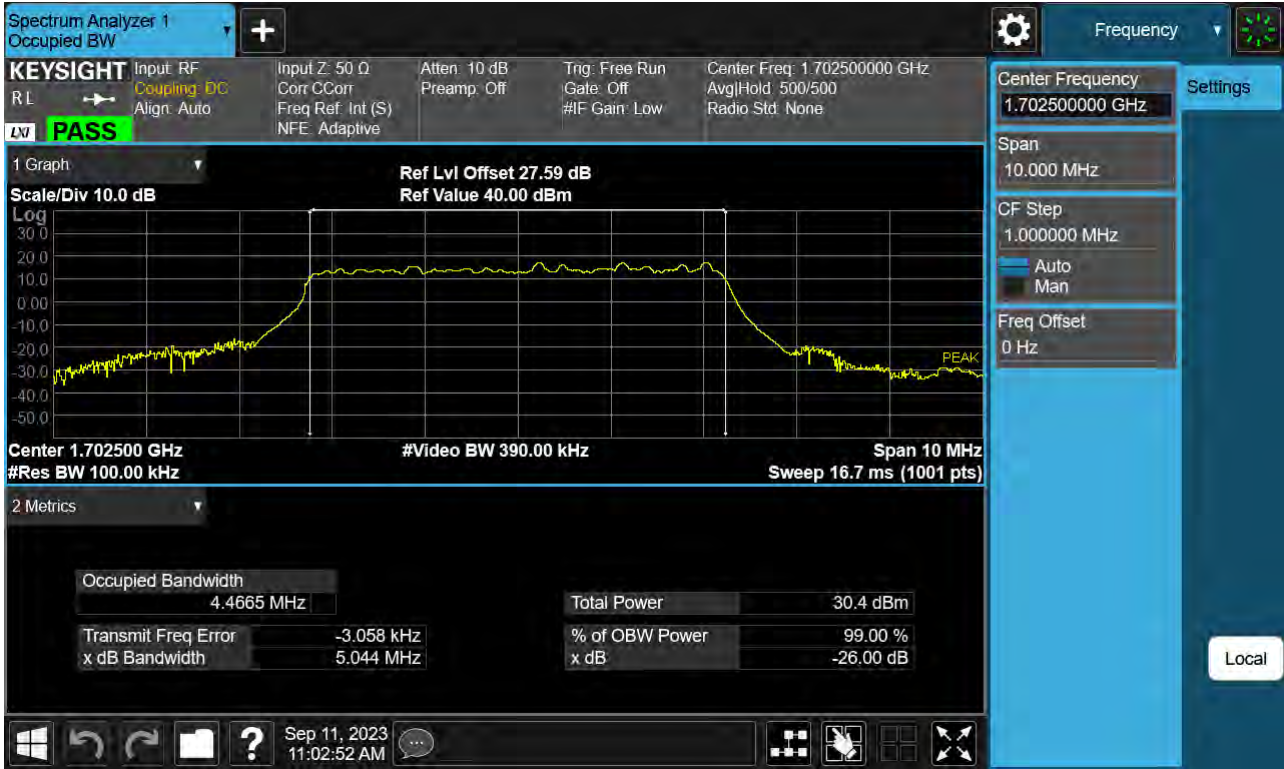
Test. Frequency (MHz)	Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
1700.0	100 %	+20(Ref)	1700 000 002	0.0	0.000 000	0.000
	100 %	-30	1700 000 006	4.5	0.000 000	0.003
	100 %	-20	1700 000 006	3.7	0.000 000	0.002
	100 %	-10	1700 000 008	5.8	0.000 000	0.003
	100 %	0	1700 000 008	5.7	0.000 000	0.003
	100 %	+10	1700 000 004	1.7	0.000 000	0.001
	100 %	+30	1700 000 007	5.0	0.000 000	0.003
	100 %	+40	1700 000 004	1.6	0.000 000	0.001
	100 %	+50	1700 000 004	1.6	0.000 000	0.001
	Batt. Endpoint	+20	1700 000 006	3.8	0.000 000	0.002
1705.0	100 %	+20(Ref)	1705 000 005	0.0	0.000 000	0.000
	100 %	-30	1705 000 011	5.5	0.000 000	0.003
	100 %	-20	1705 000 010	5.0	0.000 000	0.003
	100 %	-10	1705 000 009	3.3	0.000 000	0.002
	100 %	0	1705 000 013	8.0	0.000 000	0.005
	100 %	+10	1705 000 009	4.0	0.000 000	0.002
	100 %	+30	1705 000 010	4.7	0.000 000	0.003
	100 %	+40	1705 000 012	6.1	0.000 000	0.004
	100 %	+50	1705 000 008	2.7	0.000 000	0.002
	Batt. Endpoint	+20	1705 000 010	4.4	0.000 000	0.003

- ▣ BandWidth: 15 MHz
- ▣ Voltage(100 %): 3.880 VDC
- ▣ Batt. Endpoint: 3.300 VDC
- ▣ LIMIT: Emission must remain in band

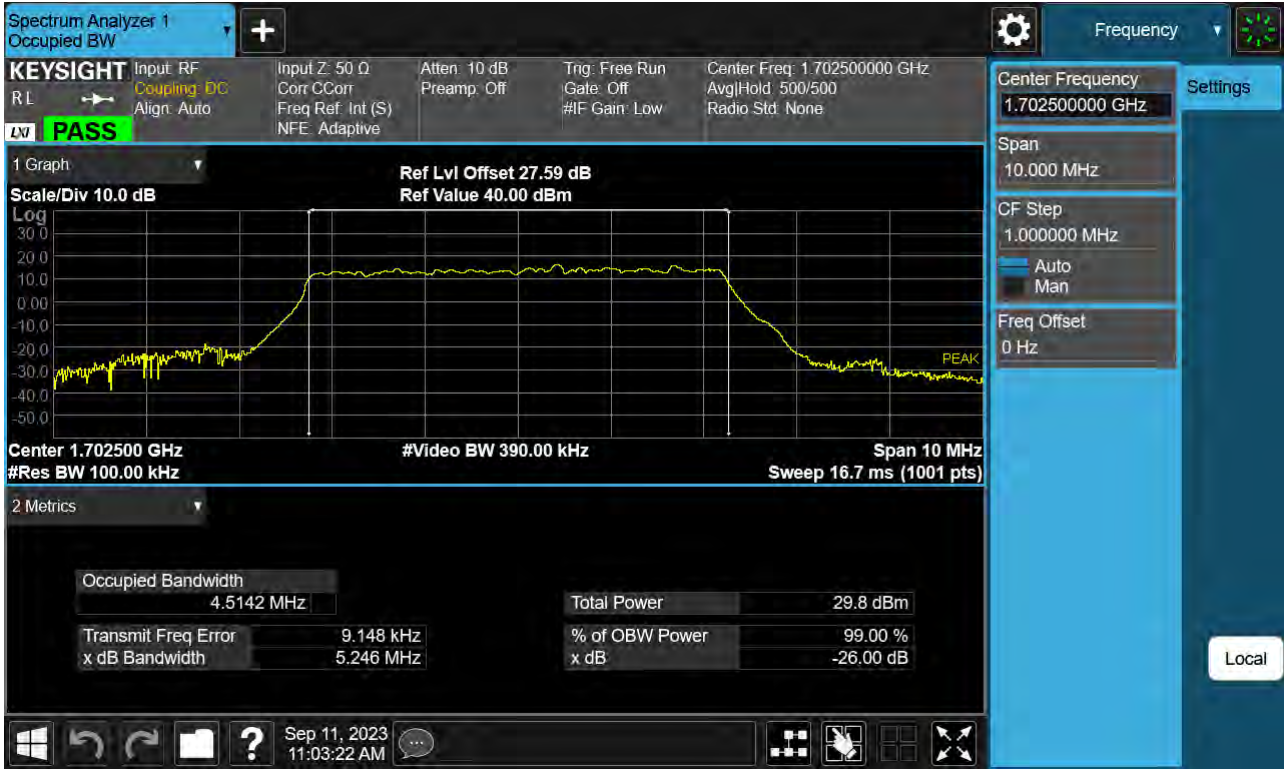
Test. Frequency (MHz)	Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
1702.5	100 %	+20(Ref)	1702 499 997	0.0	0.000 000	0.000
	100 %	-30	1702 499 995	-1.9	0.000 000	-0.001
	100 %	-20	1702 499 995	-2.2	0.000 000	-0.001
	100 %	-10	1702 499 996	-1.4	0.000 000	-0.001
	100 %	0	1702 499 997	-0.1	0.000 000	0.000
	100 %	+10	1702 499 995	-2.1	0.000 000	-0.001
	100 %	+30	1702 499 994	-2.6	0.000 000	-0.002
	100 %	+40	1702 499 995	-1.6	0.000 000	-0.001
	100 %	+50	1702 499 996	-0.7	0.000 000	0.000
	Batt. Endpoint	+20	1702 499 997	0.1	0.000 000	0.000

10. TEST PLOTS(Ant A)

Sub6 n70. Occupied Bandwidth Plot (5 M BW Ch.340500 BPSK Full RB)



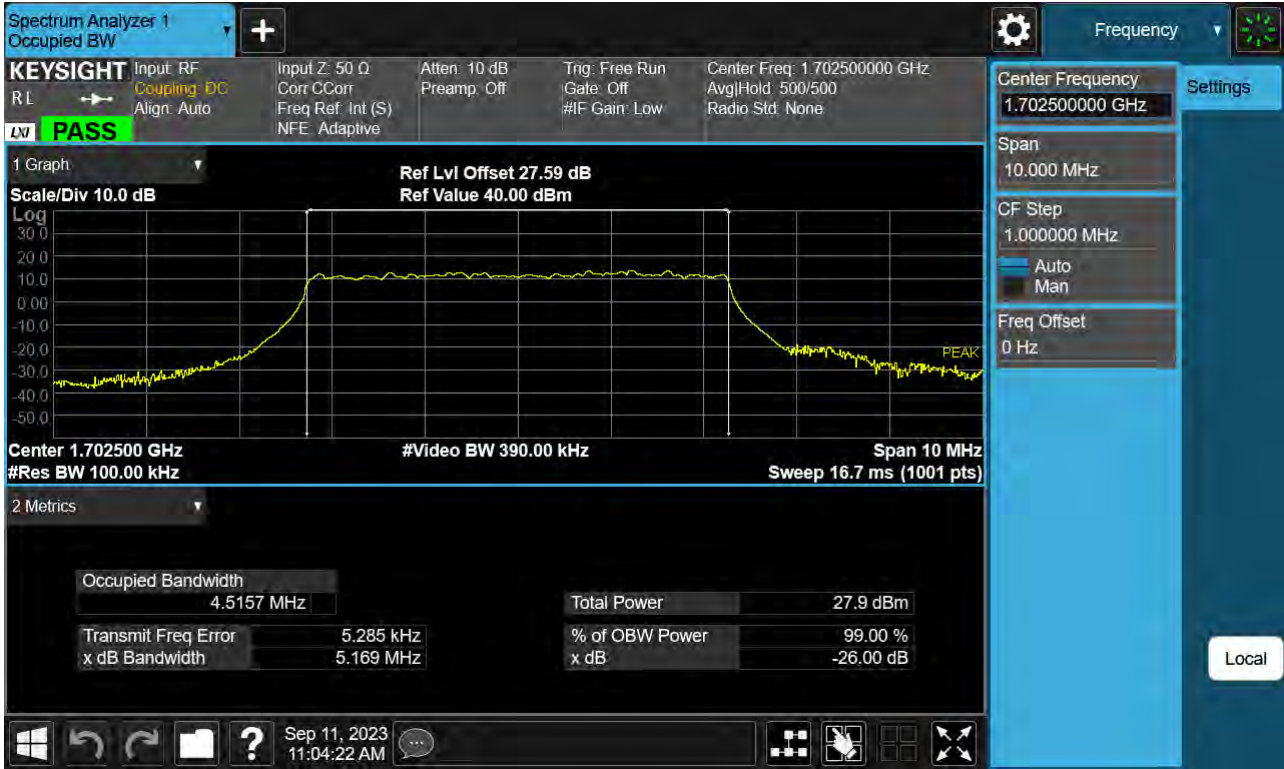
Sub6 n70. Occupied Bandwidth Plot (5 M BW Ch.340500 QPSK Full RB)



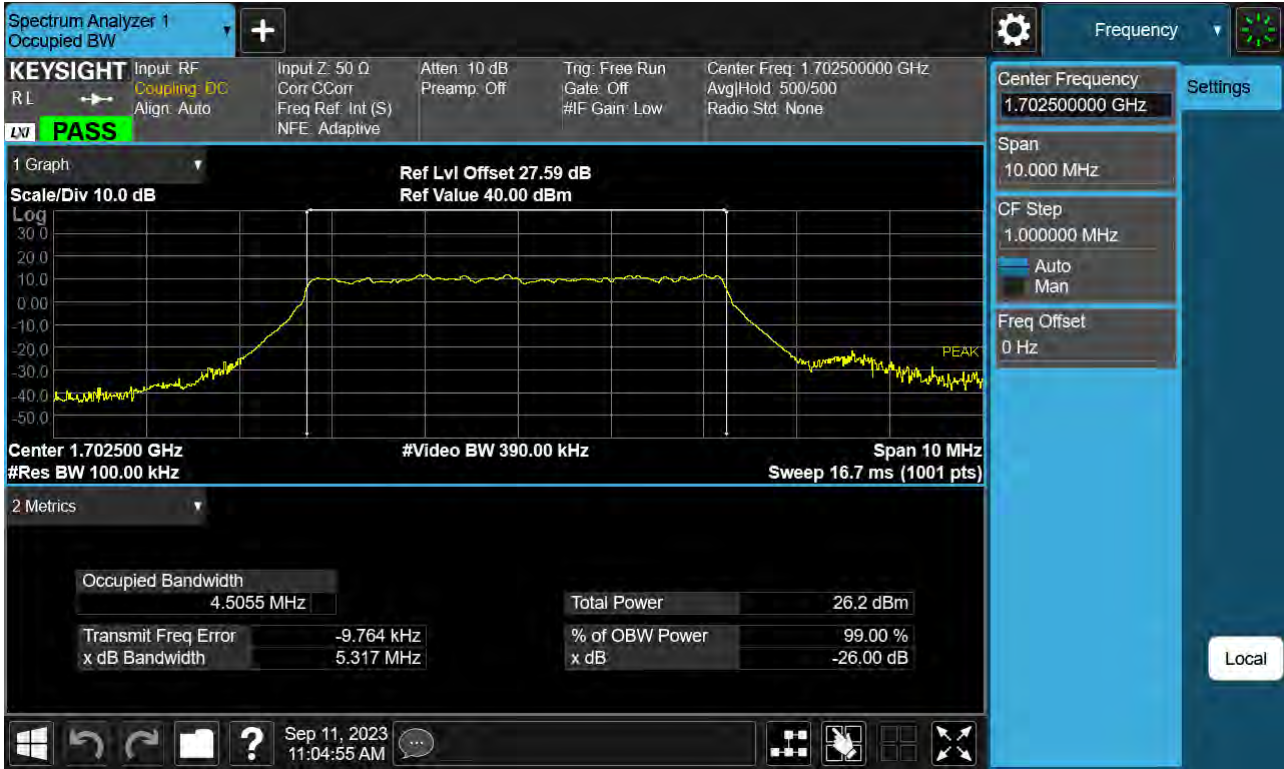
Sub6 n70. Occupied Bandwidth Plot (5 M BW Ch.340500 16QAM Full RB)



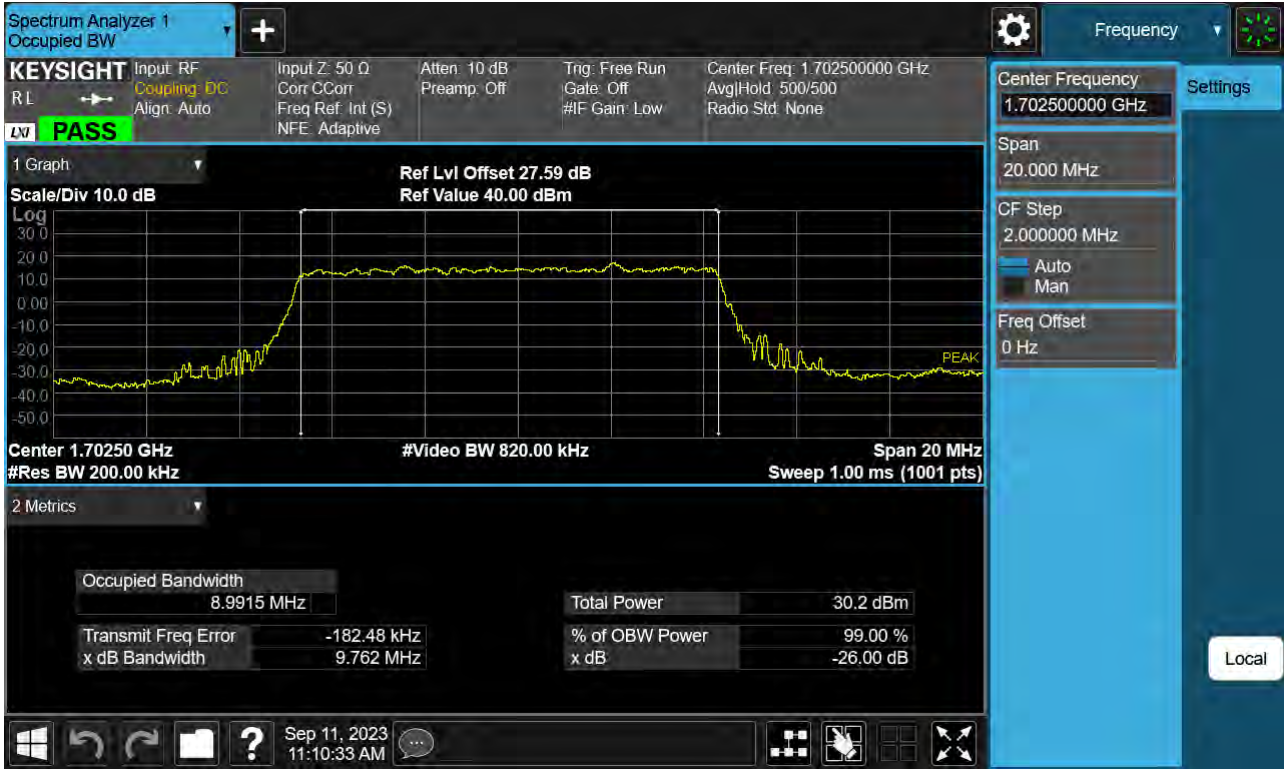
Sub6 n70. Occupied Bandwidth Plot (5 M BW Ch.340500 64QAM Full RB)



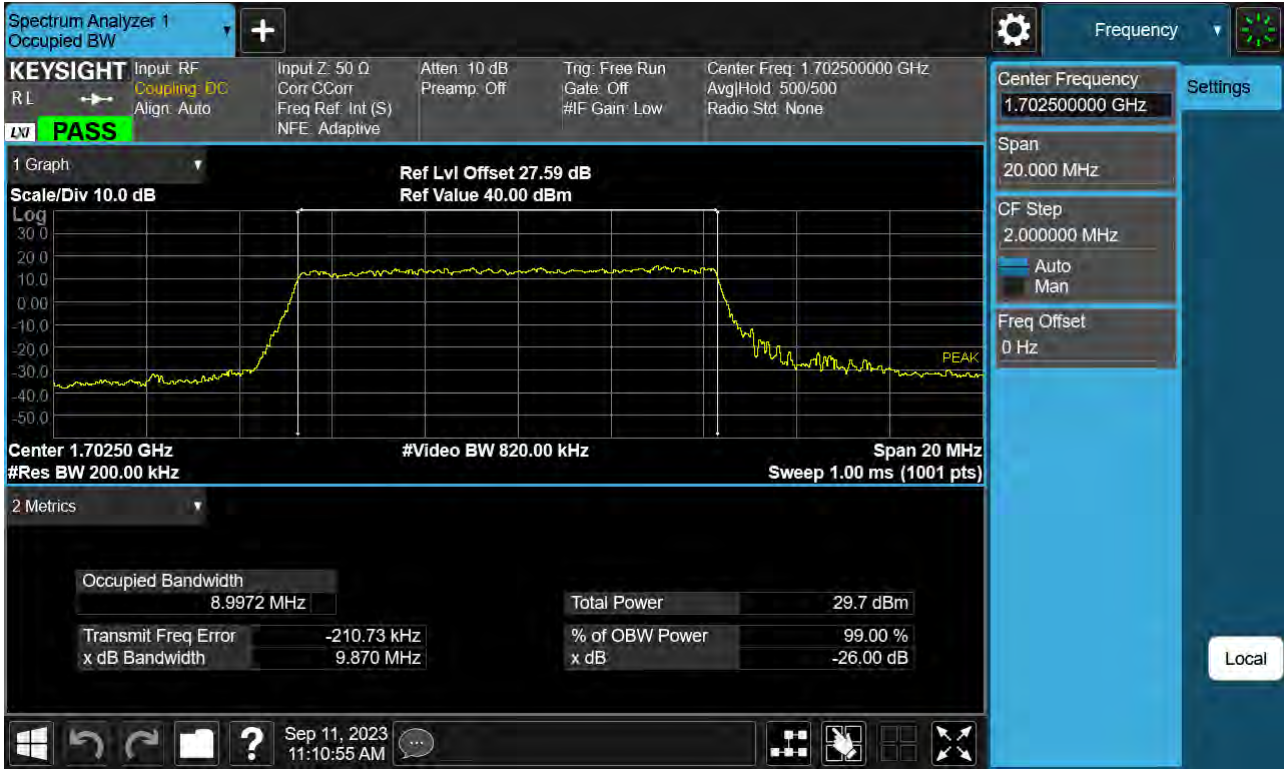
Sub6 n70. Occupied Bandwidth Plot (5 M BW Ch.340500 256QAM Full RB)



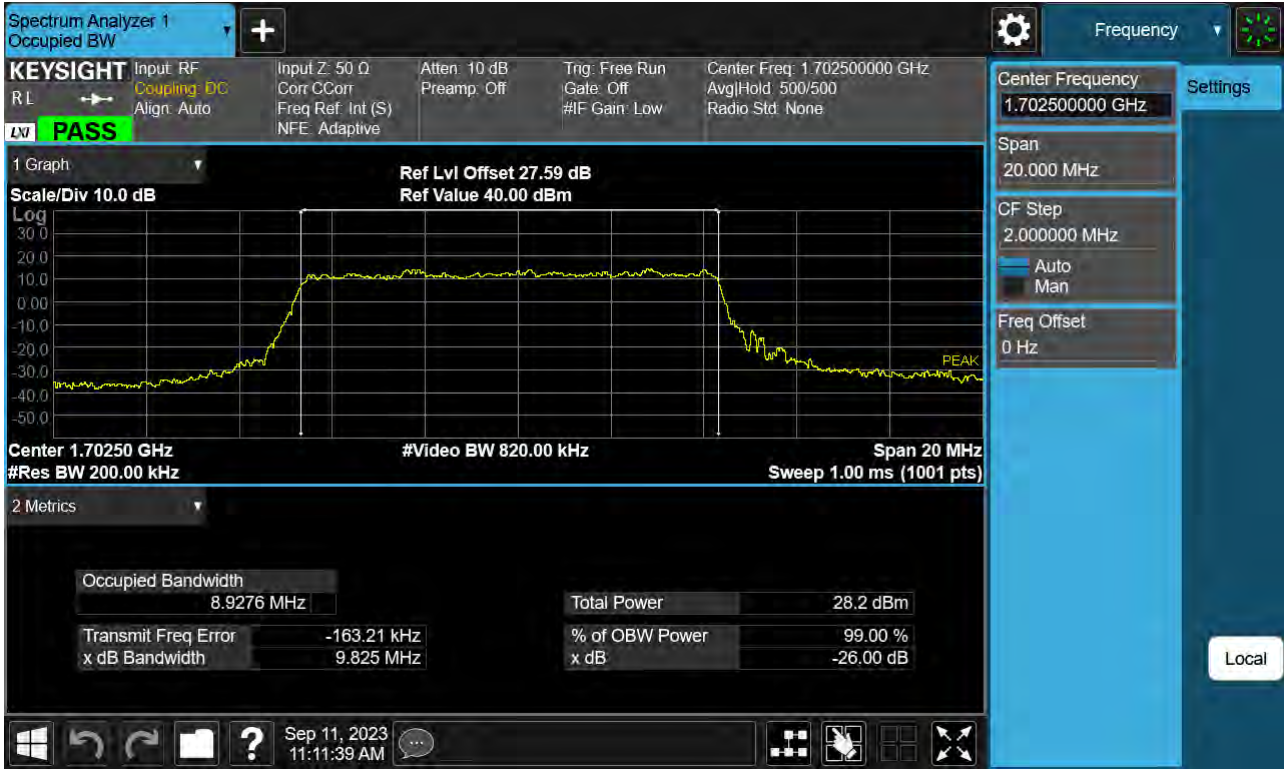
Sub6 n70. Occupied Bandwidth Plot (10 M BW Ch.340500 BPSK Full RB)



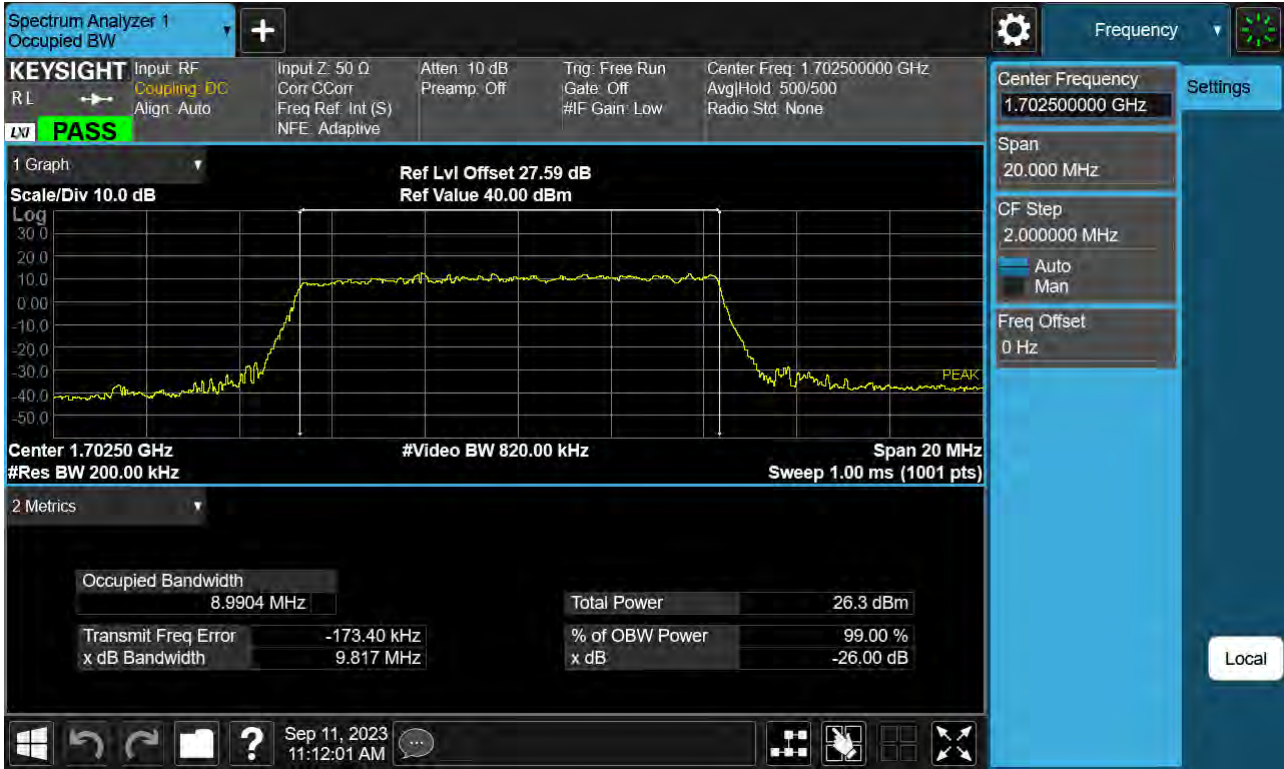
Sub6 n70. Occupied Bandwidth Plot (10 M BW Ch.340500 QPSK Full RB)



Sub6 n70. Occupied Bandwidth Plot (10 M BW Ch.340500 64QAM Full RB)



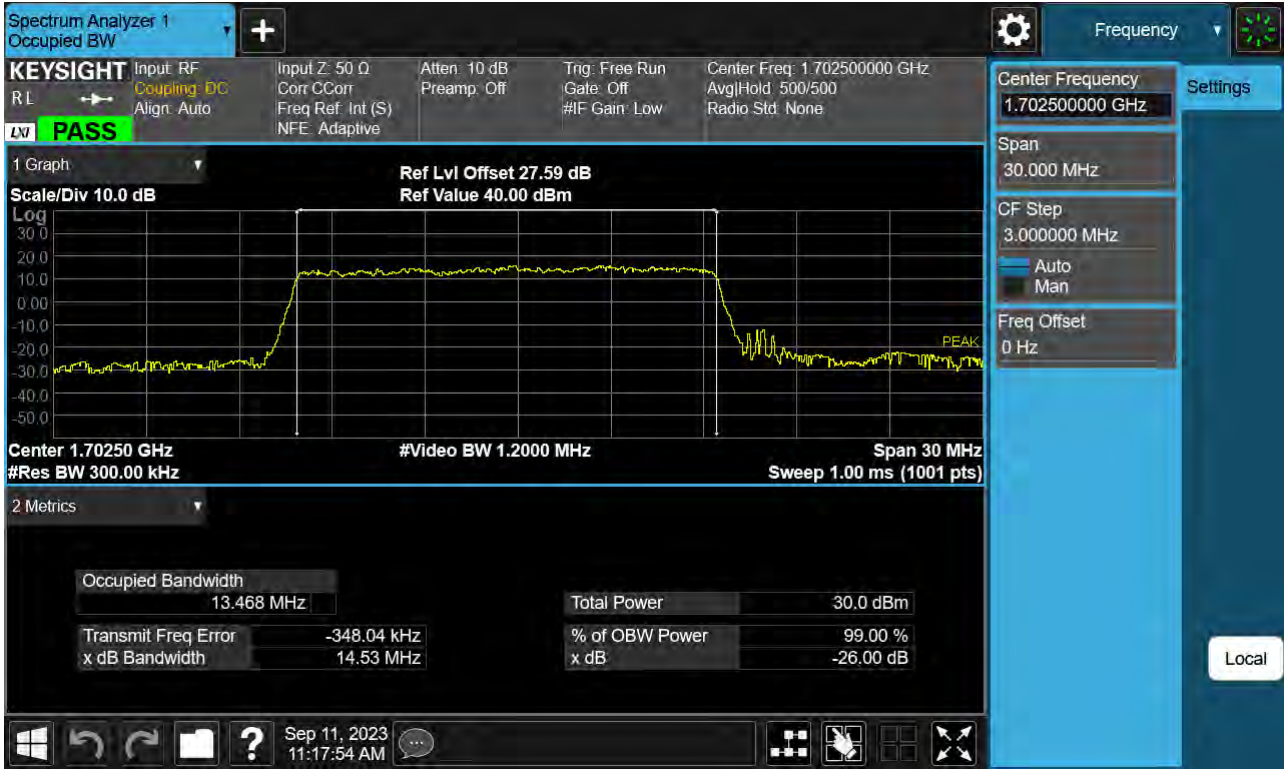
Sub6 n70. Occupied Bandwidth Plot (10 M BW Ch.340500 256QAM Full RB)



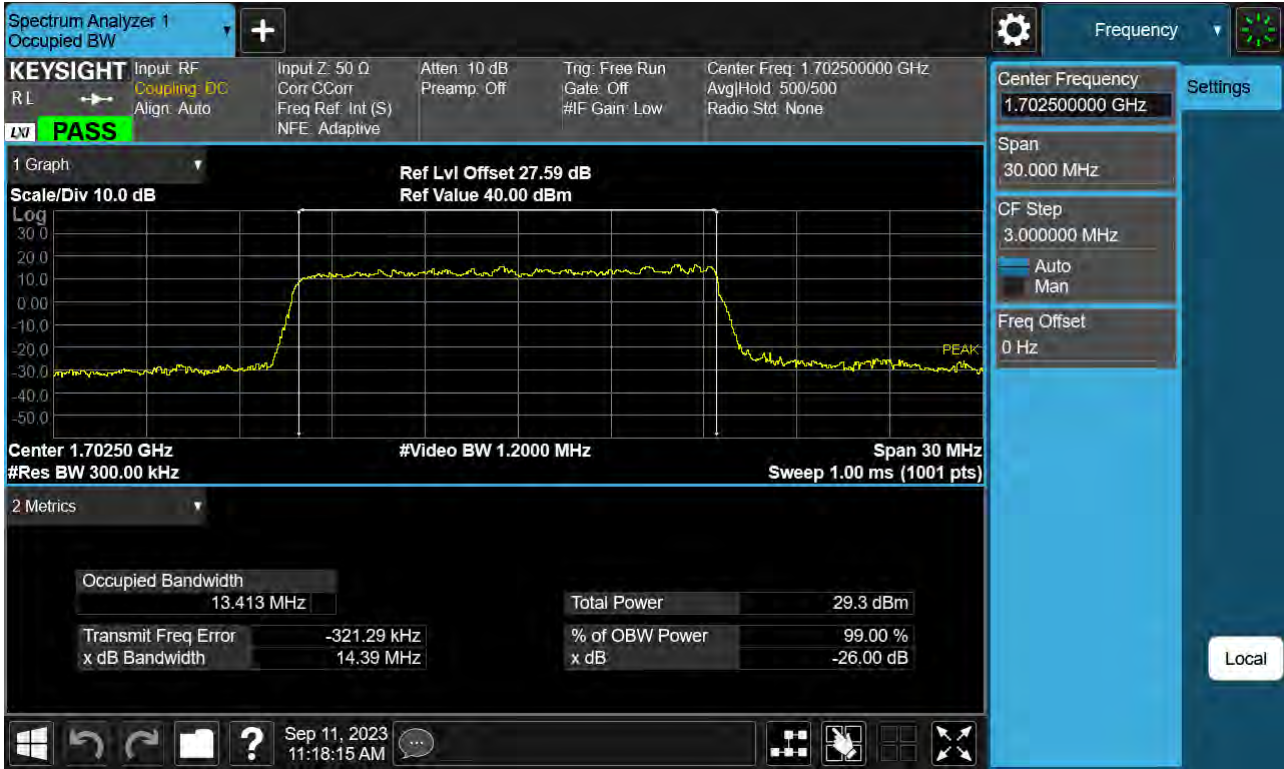
Sub6 n70. Occupied Bandwidth Plot (15 M BW Ch.340500 BPSK Full RB)



Sub6 n70. Occupied Bandwidth Plot (15 M BW Ch.340500 QPSK Full RB)



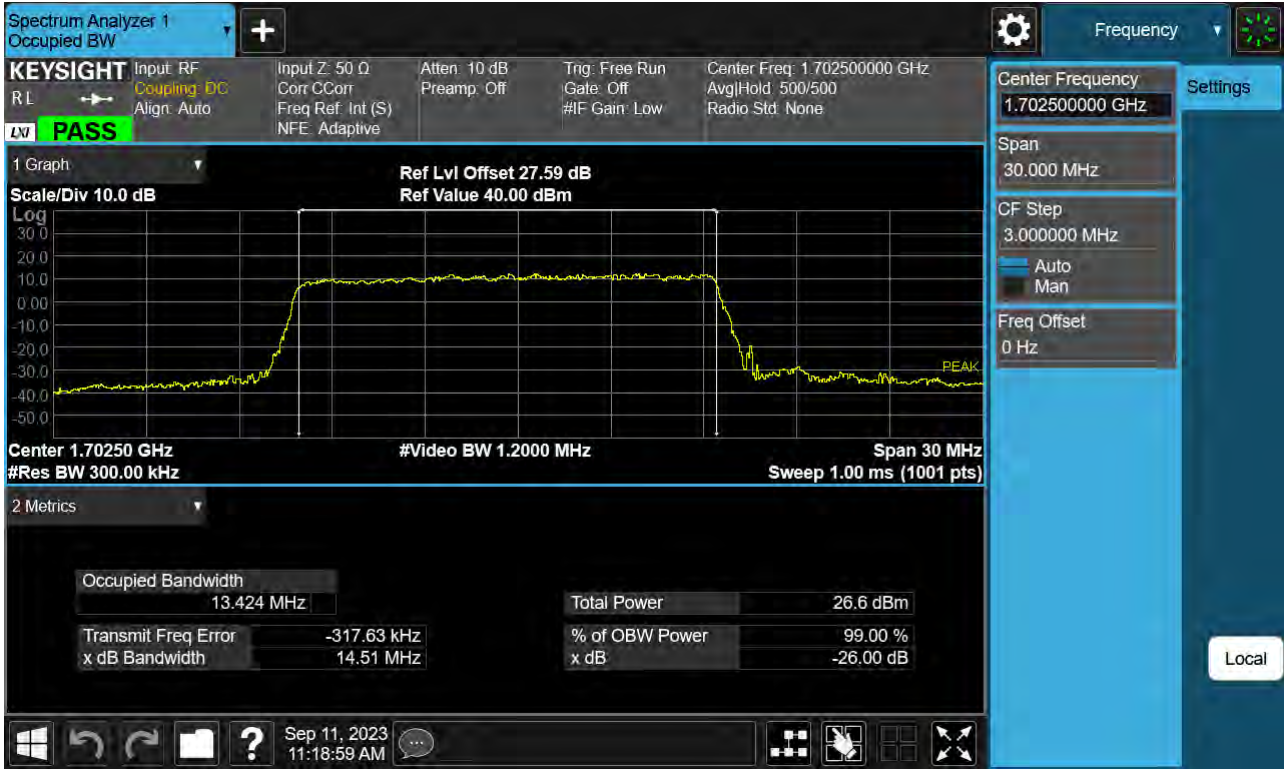
Sub6 n70. Occupied Bandwidth Plot (15 M BW Ch.340500 16QAM Full RB)



Sub6 n70. Occupied Bandwidth Plot (15 M BW Ch.340500 64QAM Full RB)



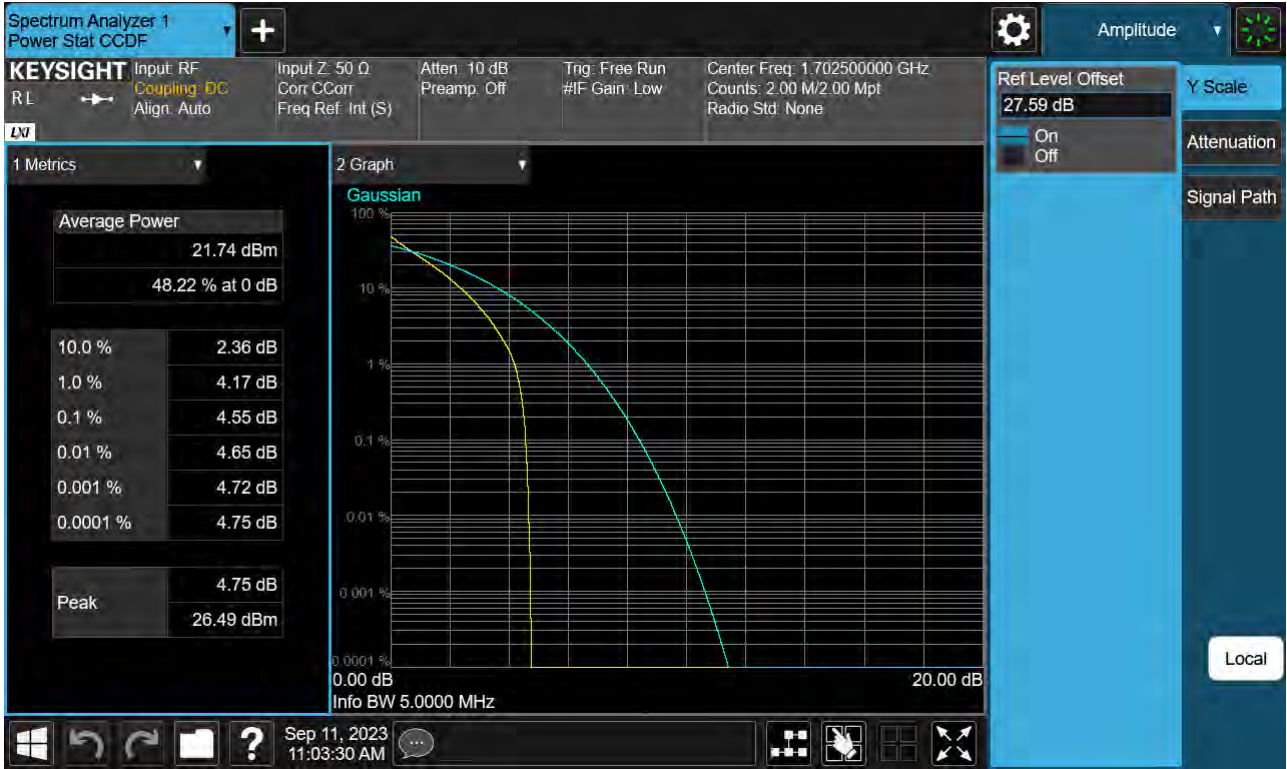
Sub6 n70. Occupied Bandwidth Plot (15 M BW Ch.340500 256QAM Full RB)



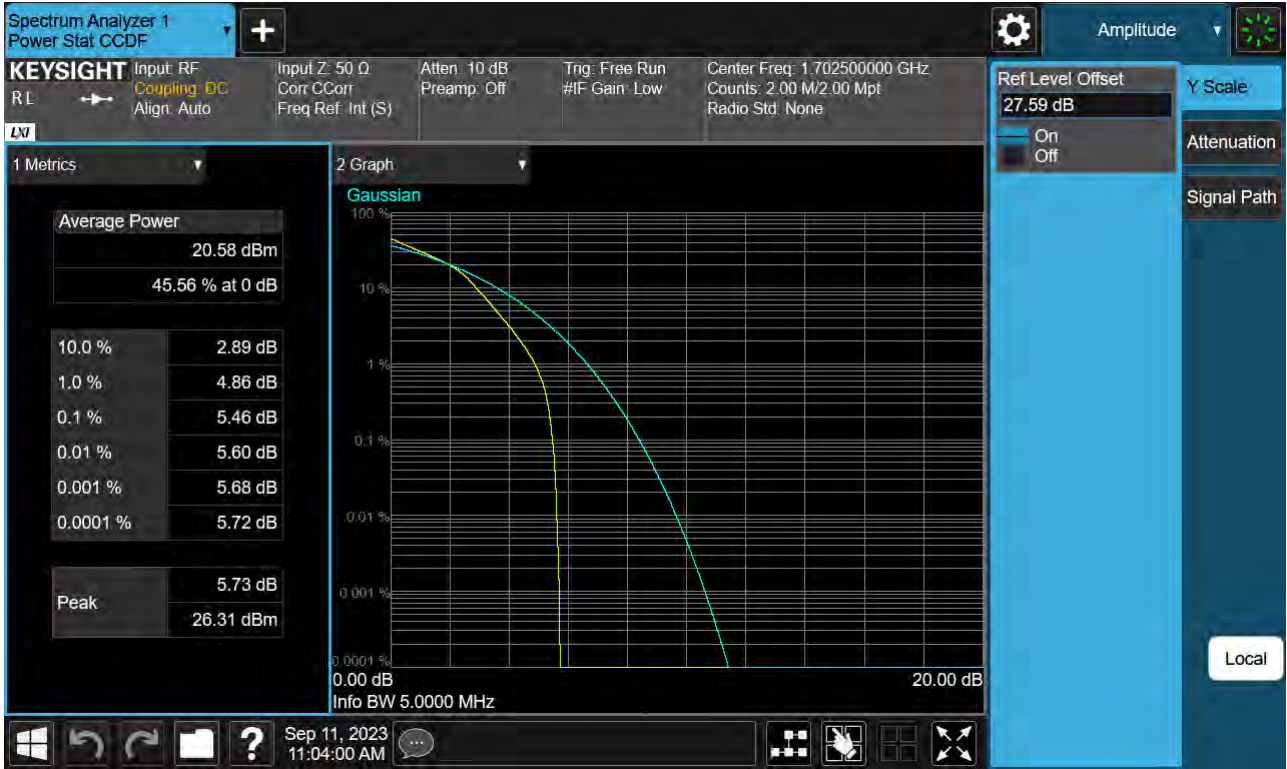
Sub6 n70. PAR Plot (5 M BW_Ch.340500_ BPSK_ Full RB)



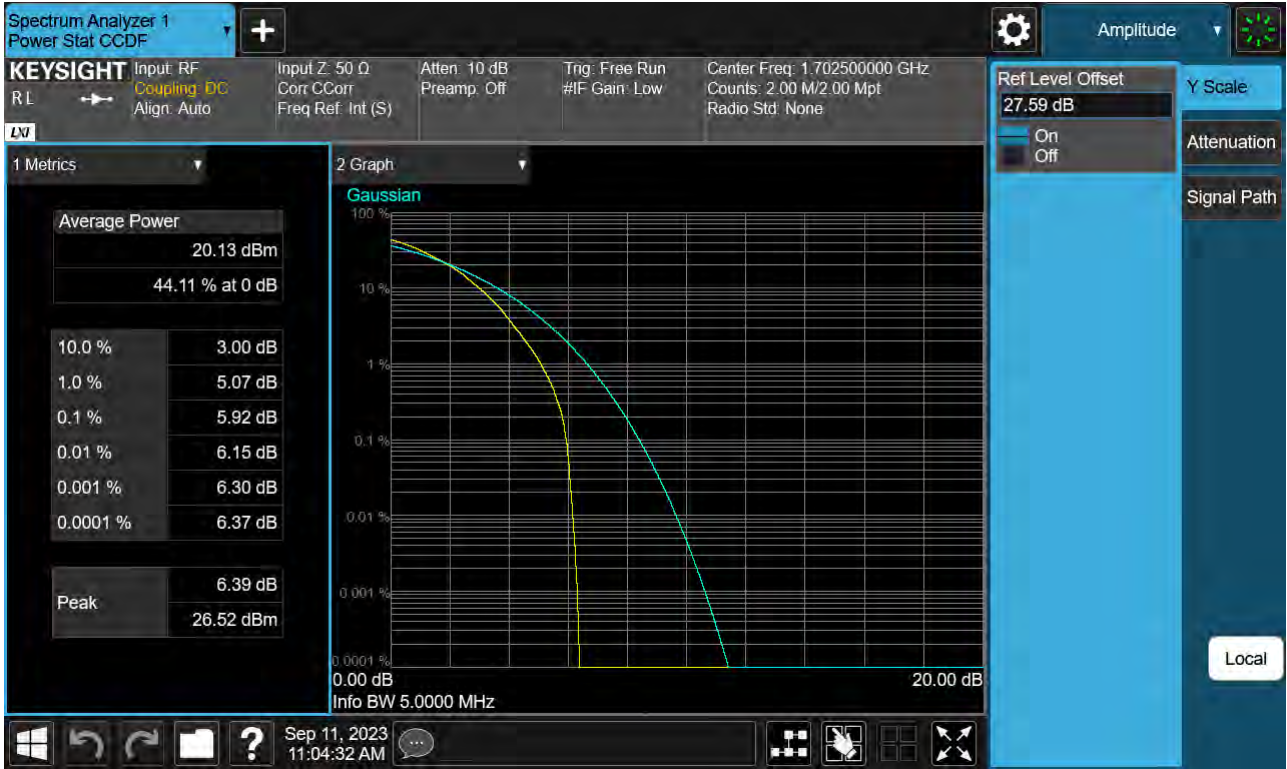
Sub6 n70. PAR Plot (5 M BW_Ch.340500_QPSK_Full RB)



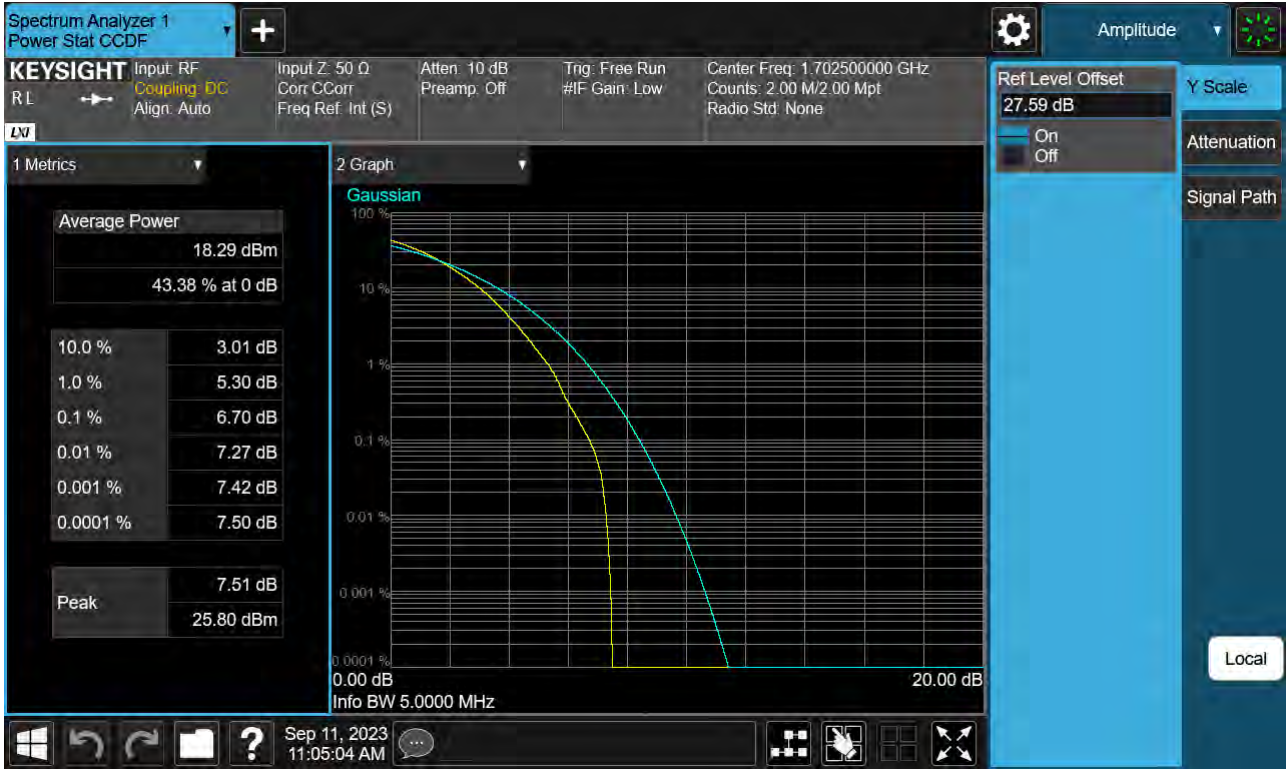
Sub6 n70. PAR Plot (5 M BW_Ch.340500_16QAM_Full RB)



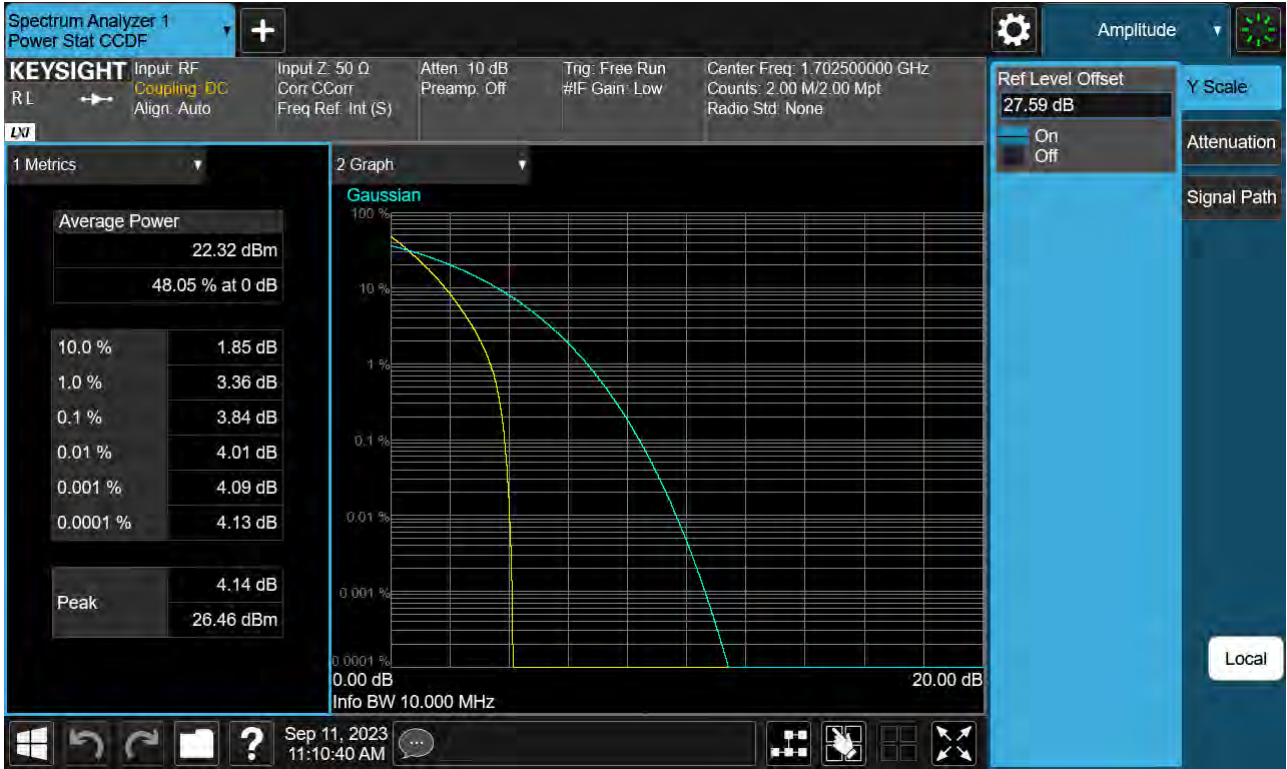
Sub6 n70. PAR Plot (5 M BW_Ch.340500_64QAM_Full RB)



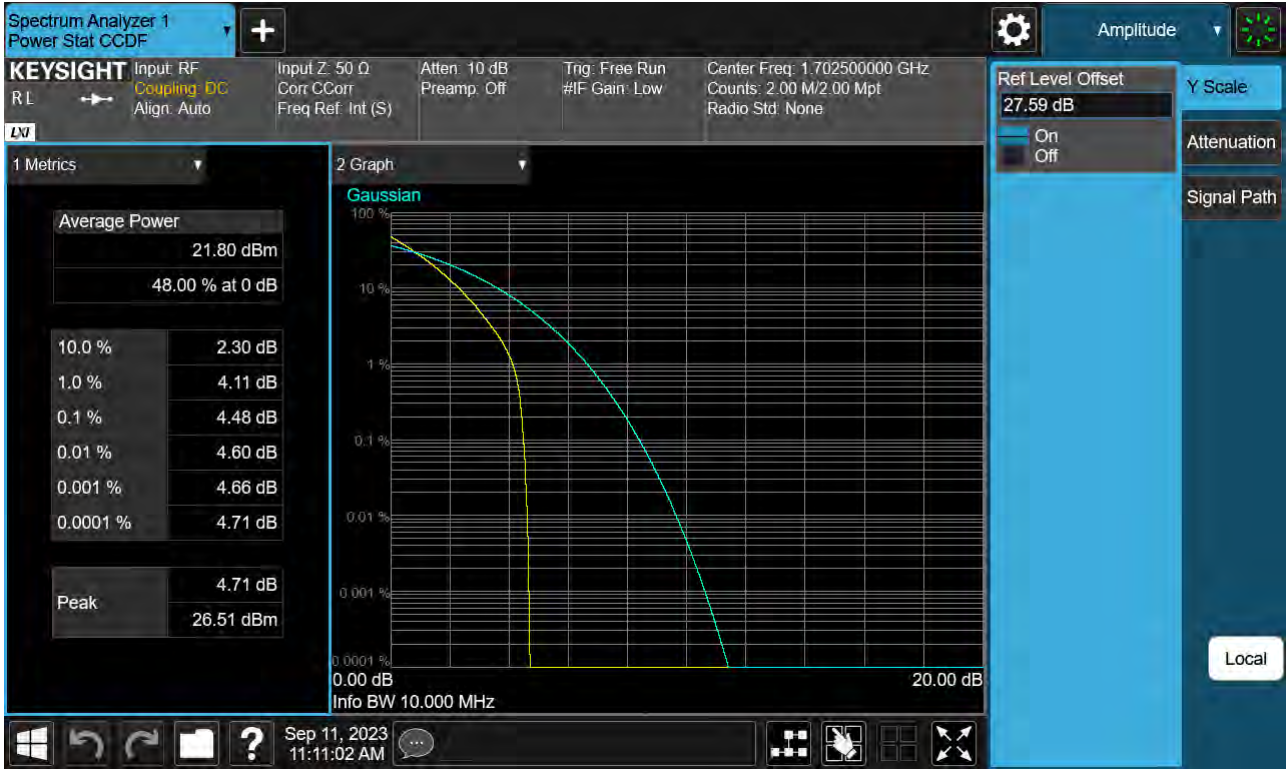
Sub6 n70. PAR Plot (5 M BW_Ch.340500_256QAM_Full RB)



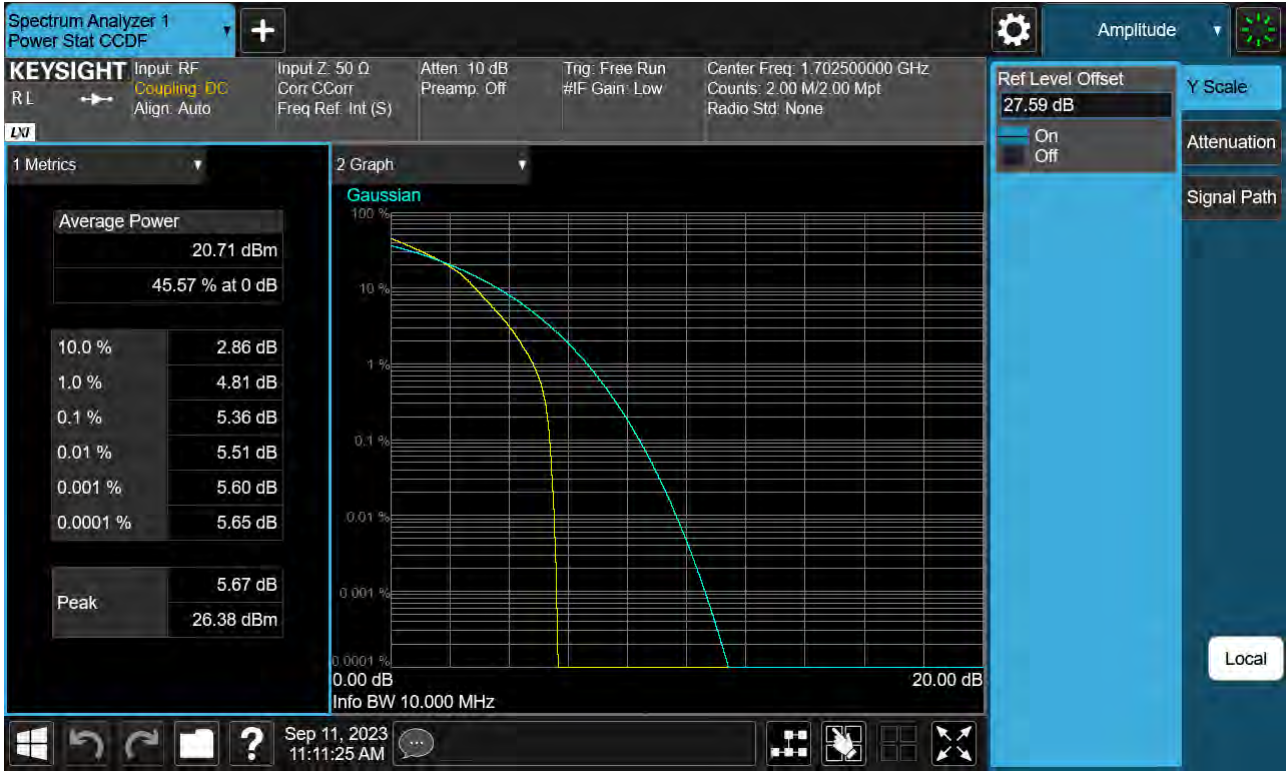
Sub6 n70. PAR Plot (10 M BW_Ch.340500_ BPSK_ Full RB)



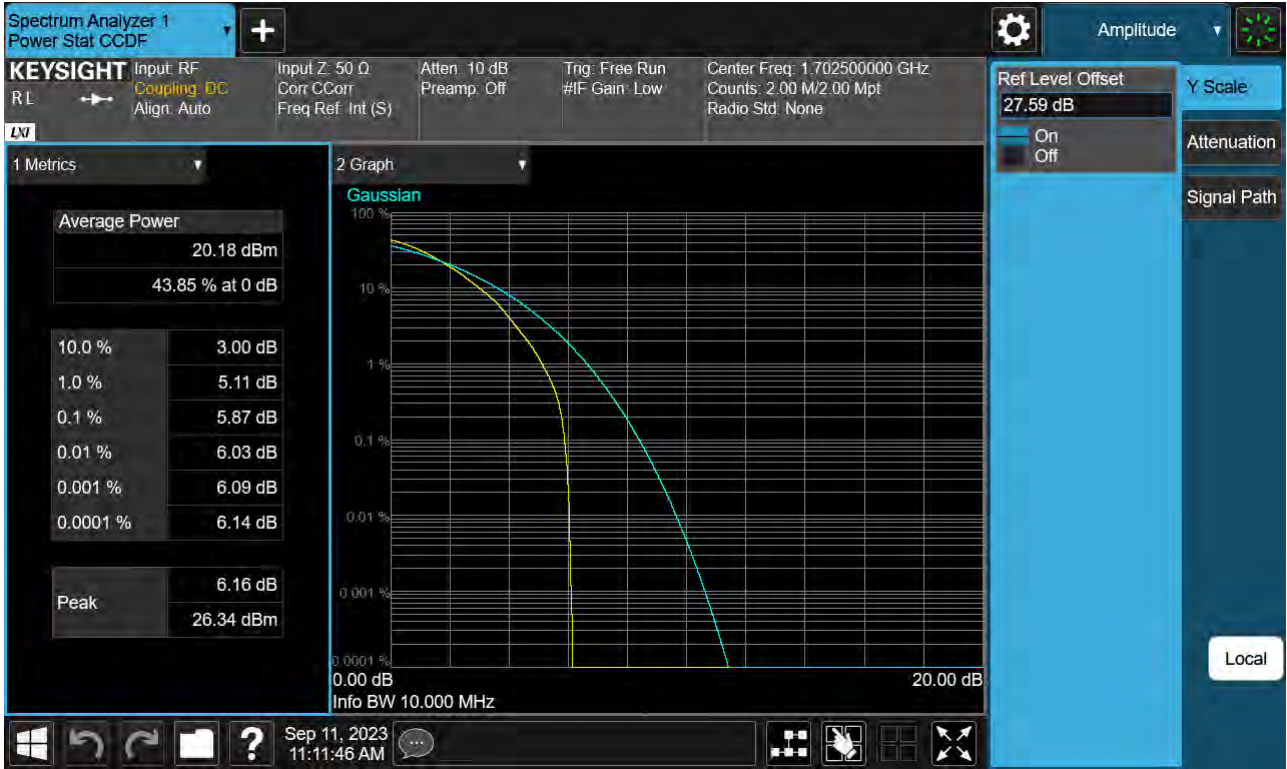
Sub6 n70. PAR Plot (10 M BW_Ch.340500_QPSK_Full RB)



Sub6 n70. PAR Plot (10 M BW_Ch.340500_16QAM_Full RB)



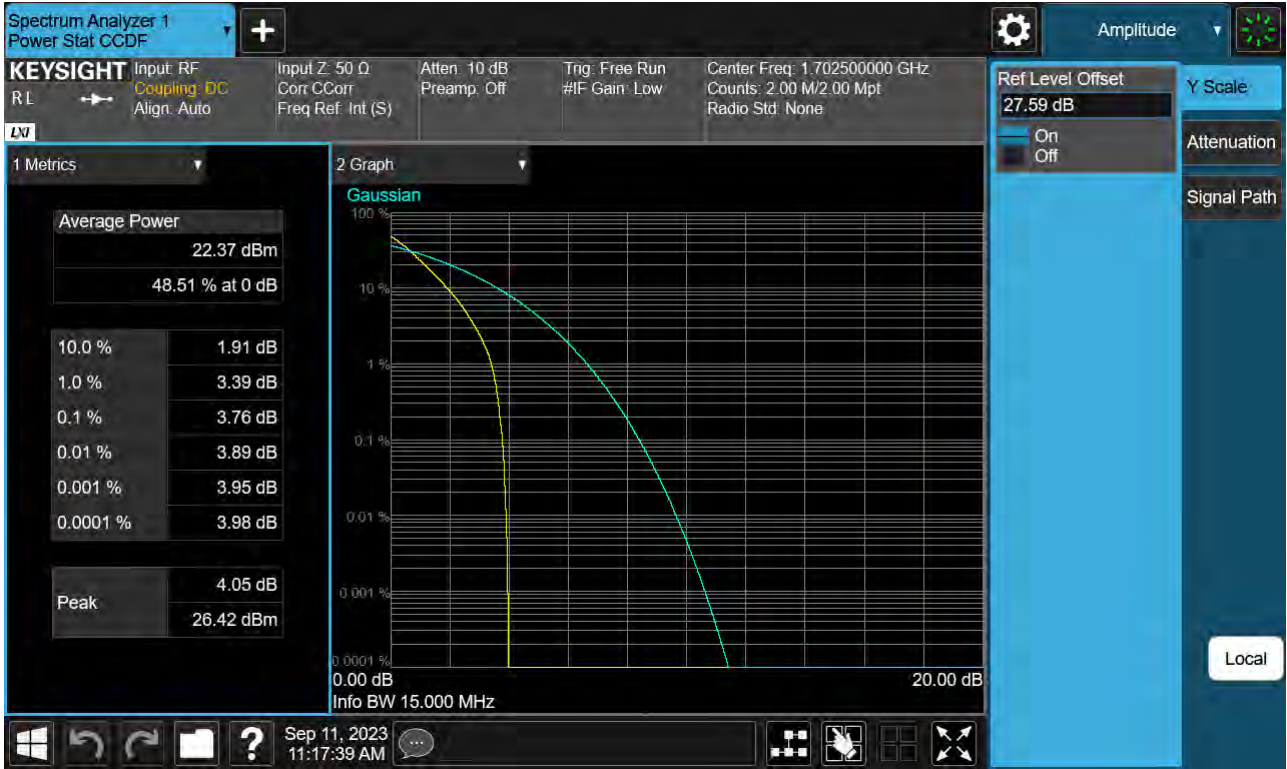
Sub6 n70. PAR Plot (10 M BW_Ch.340500_64QAM_Full RB)



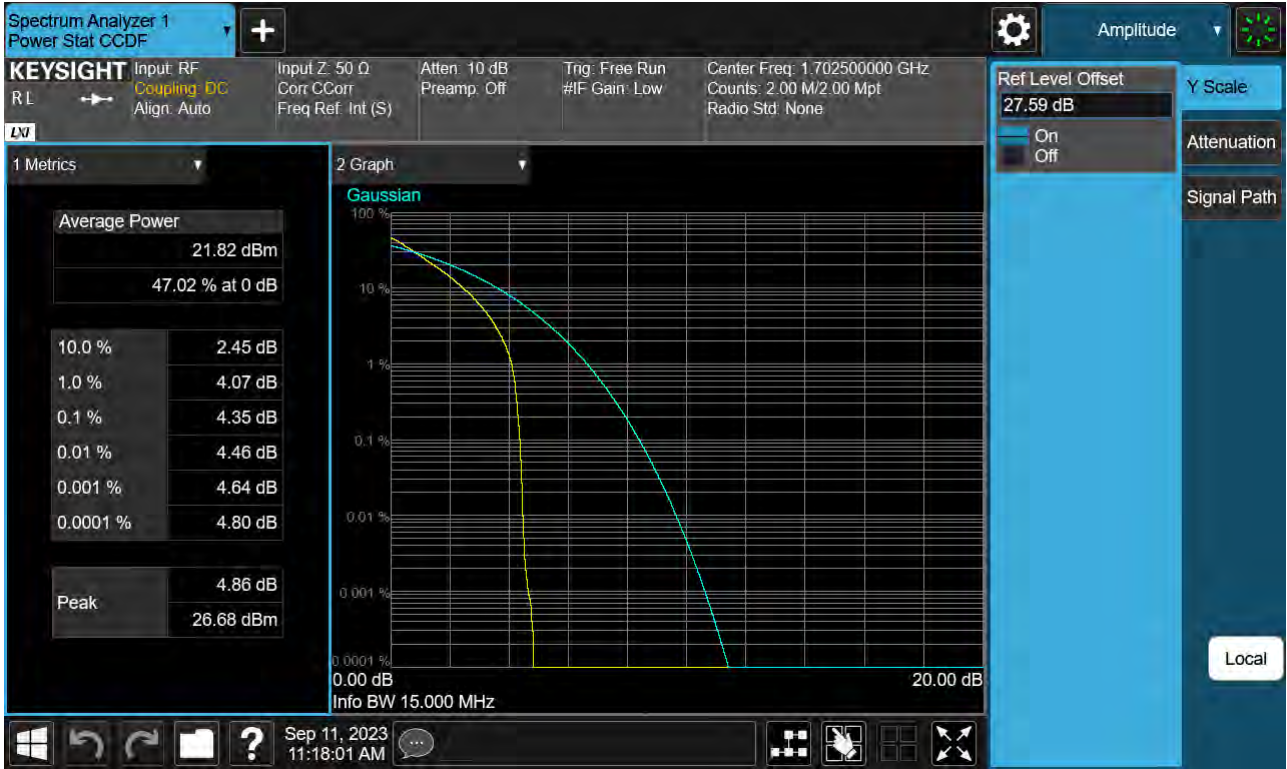
Sub6 n70. PAR Plot (10 M BW_Ch.340500_256QAM_Full RB)



Sub6 n70. PAR Plot (15 M BW_Ch.340500_ BPSK_ Full RB)



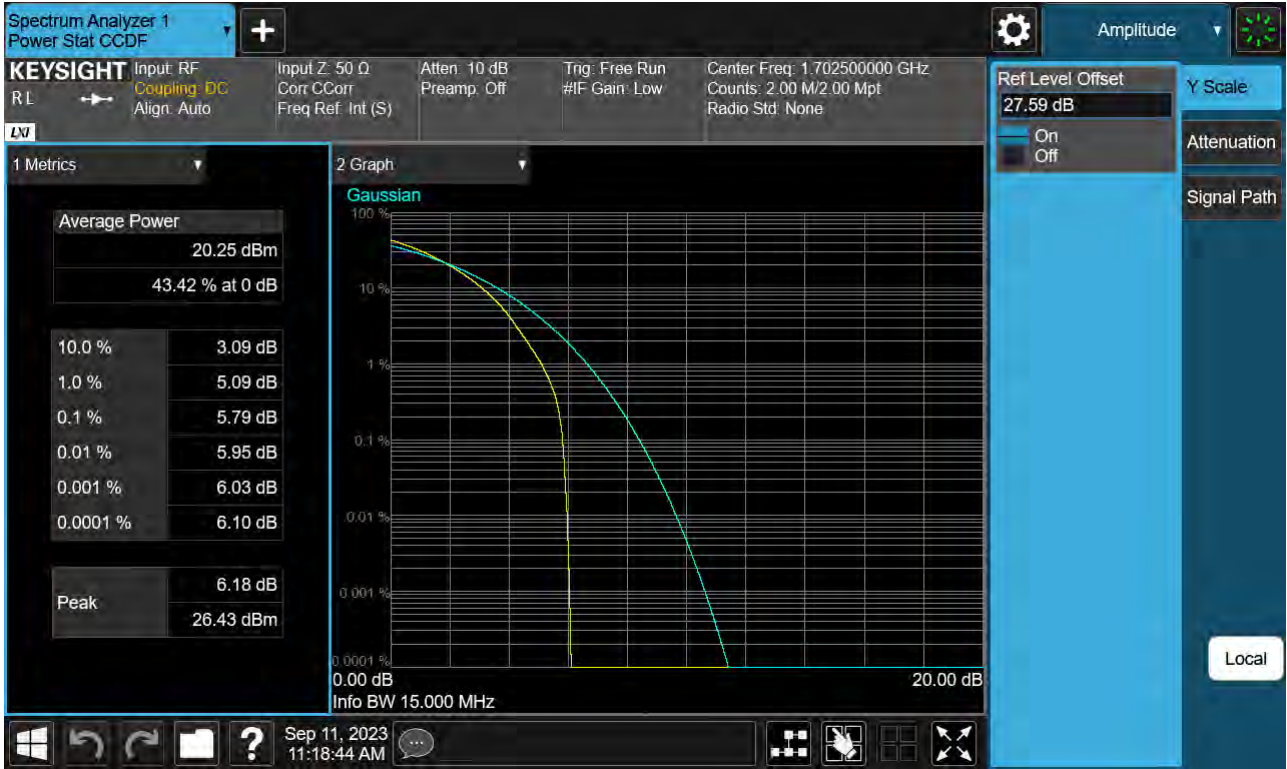
Sub6 n70. PAR Plot (15 M BW_Ch.340500_QPSK_Full RB)



Sub6 n70. PAR Plot (15 M BW_Ch.340500_16QAM_Full RB)



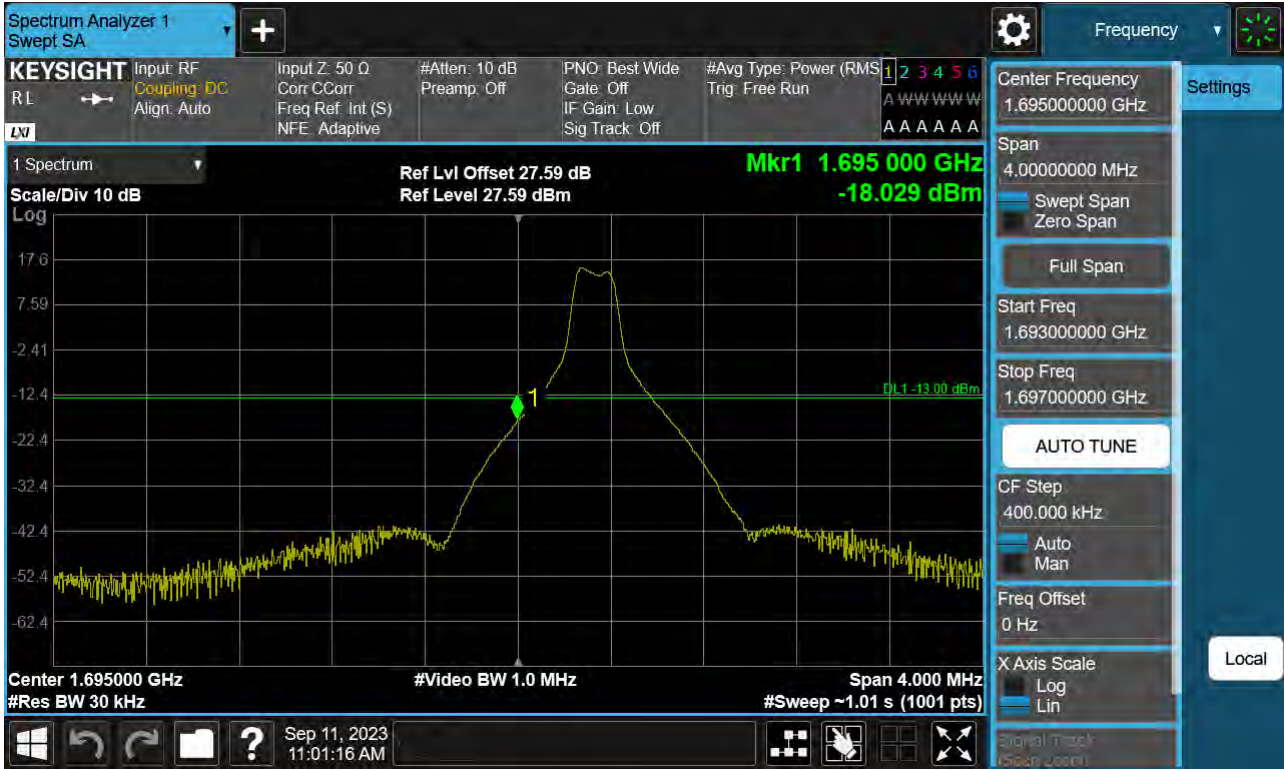
Sub6 n70. PAR Plot (15 M BW_Ch.340500_64QAM_Full RB)



Sub6 n70. PAR Plot (15 M BW_Ch.340500_256QAM_Full RB)



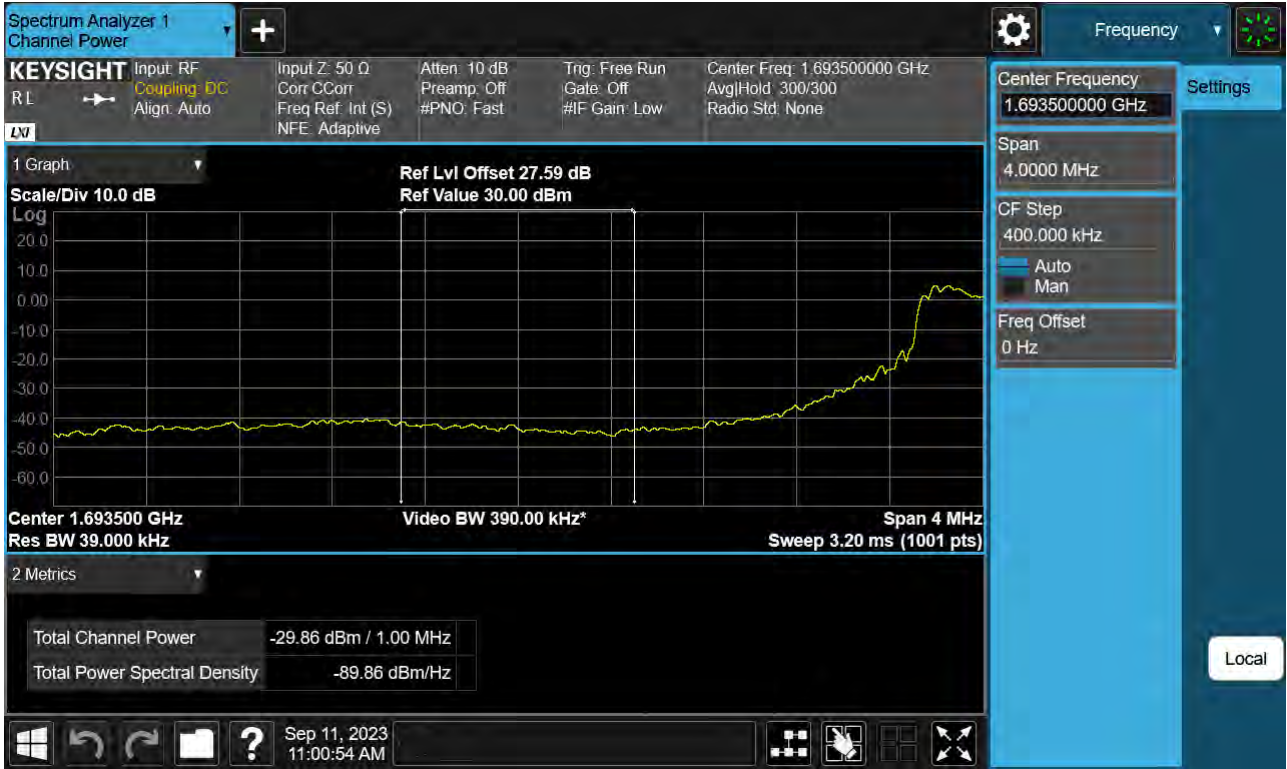
Sub6 n70. Lower Band Edge Plot (5 M BW Ch.339500 BPSK RB 1, Offset 0) -1



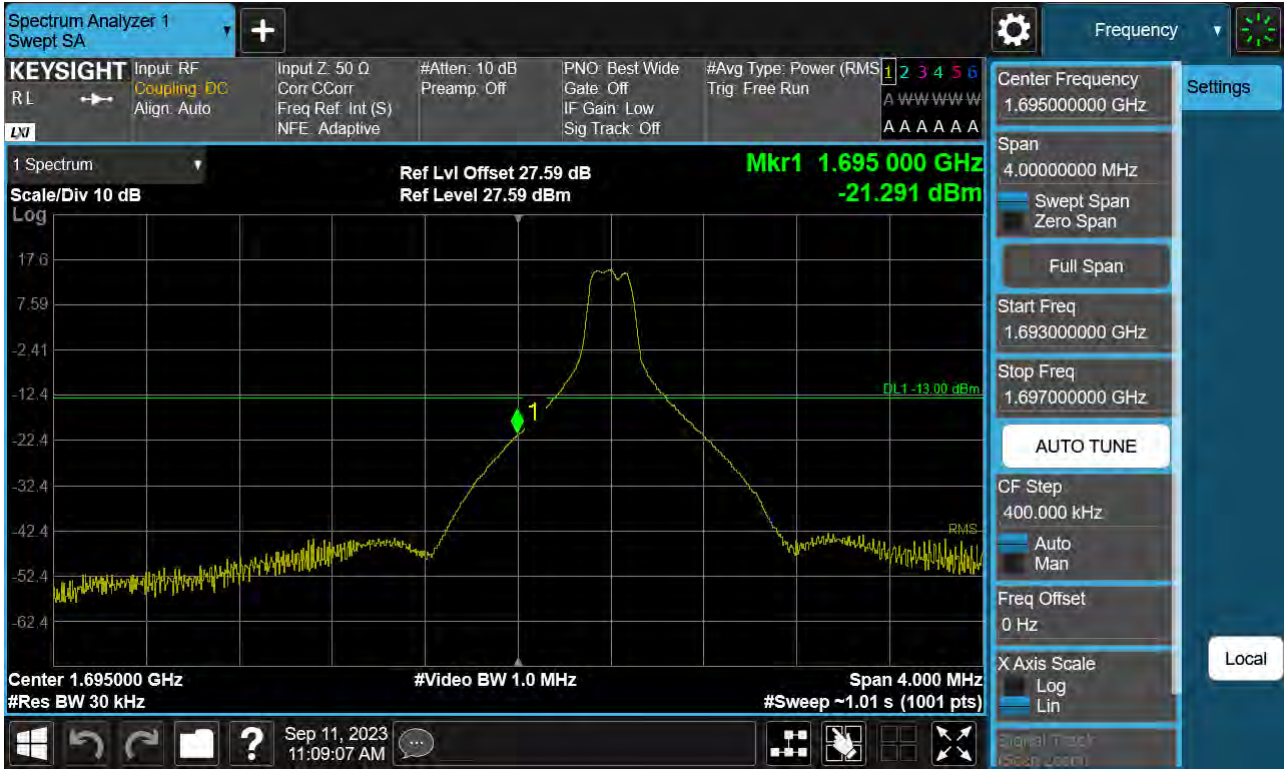
Sub6 n70. Lower Band Edge Plot (5 M BW Ch.339500 BPSK Full RB) -2



Sub6 n70. Lower Extended Band Edge Plot (5 M BW Ch.339500 BPSK_ Full RB) -3



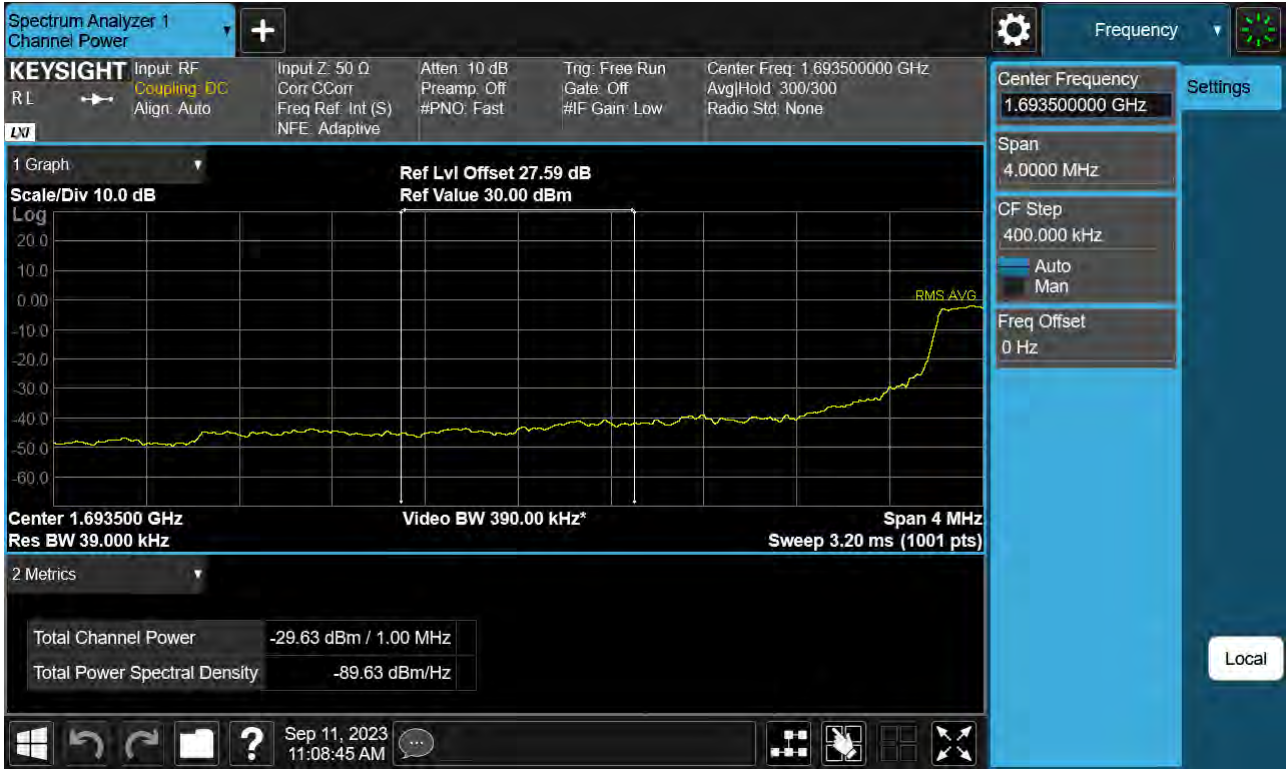
Sub6 n70. Lower Band Edge Plot (10 M BW Ch.340000 BPSK RB 1, Offset 0) -1



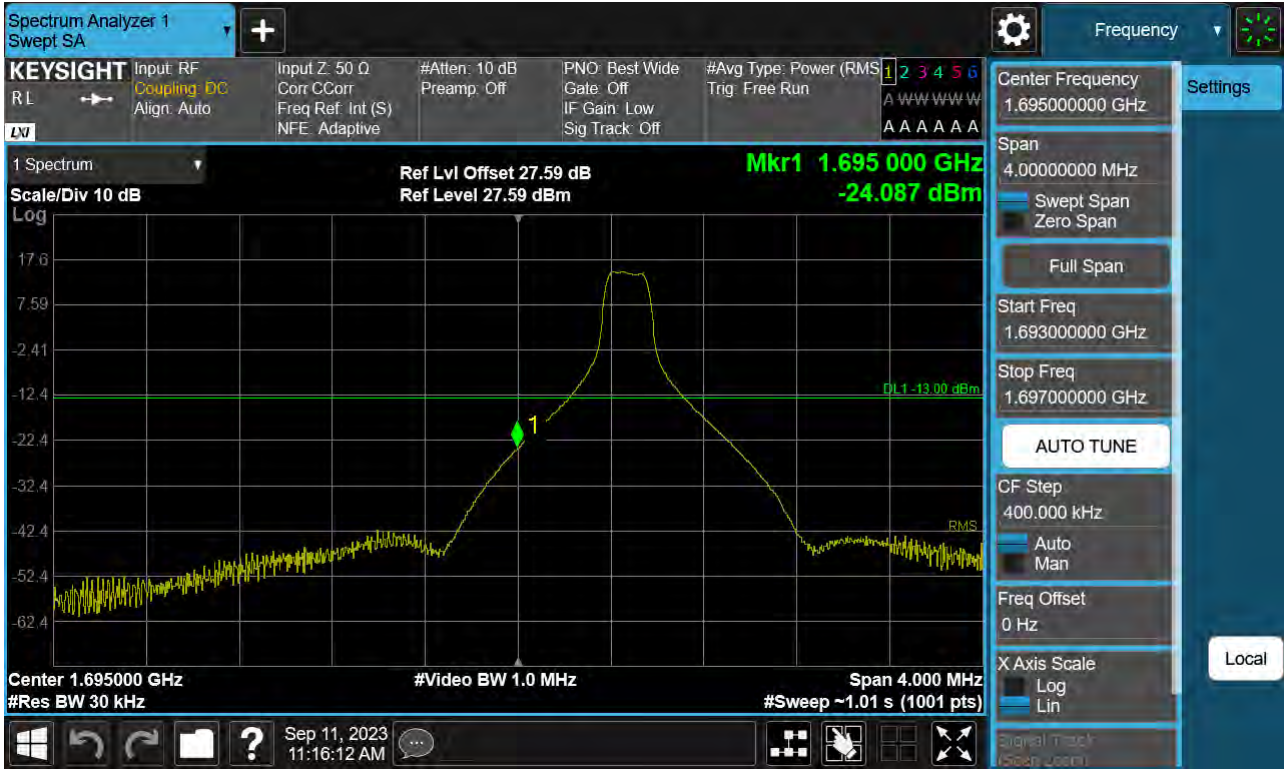
Sub6 n70. Lower Band Edge Plot (10 M BW Ch.340000 BPSK Full RB) -2



Sub6 n70. Lower Extended Band Edge Plot (10 M BW Ch.340000 BPSK_ Full RB) -3



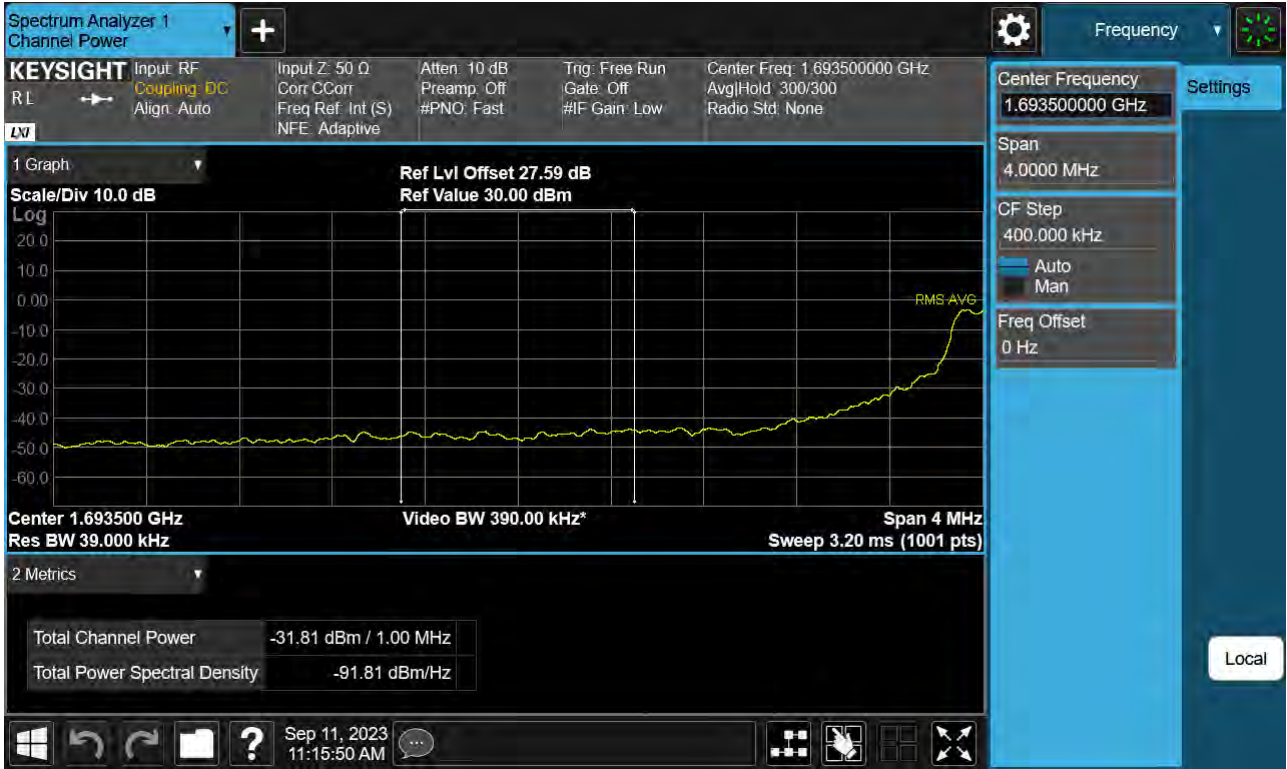
Sub6 n70. Lower Band Edge Plot (15 M BW Ch.340500 BPSK RB 1, Offset 0) -1



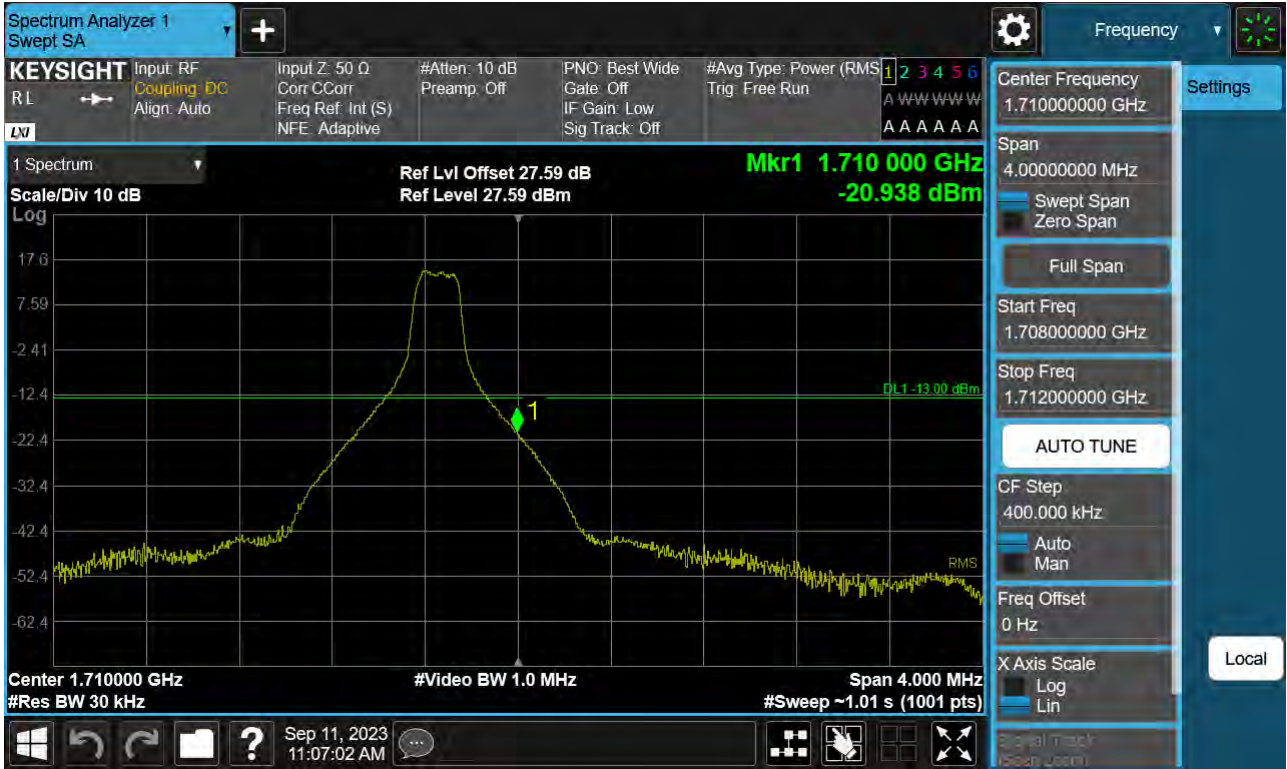
Sub6 n70. Lower Band Edge Plot (15 M BW Ch.340500 BPSK Full RB) -2



Sub6 n70. Lower Extended Band Edge Plot (15 M BW Ch.340500 BPSK_ Full RB) -3



Sub6 n70. Upper Band Edge Plot (5 M BW Ch.341500 BPSK_RB1_Offset 24) -1



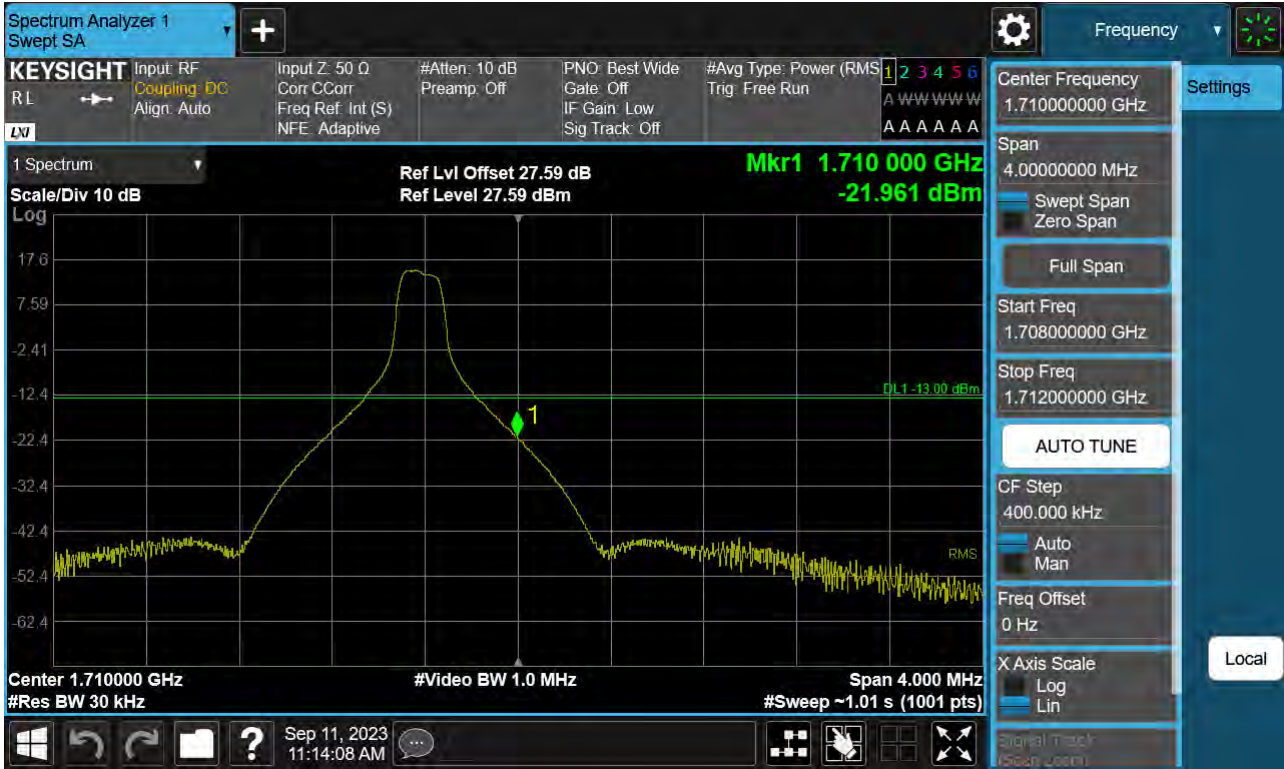
Sub6 n70. Upper Band Edge Plot (5 M BW Ch.341500 BPSK_ Full RB) -2



Sub6 n70. Upper Extended Band Edge Plot (5 M BW Ch.341500 BPSK_ Full RB) -3



Sub6 n70. Upper Band Edge Plot (10 M BW Ch.341000 BPSK_RB1_Offset 51) -1



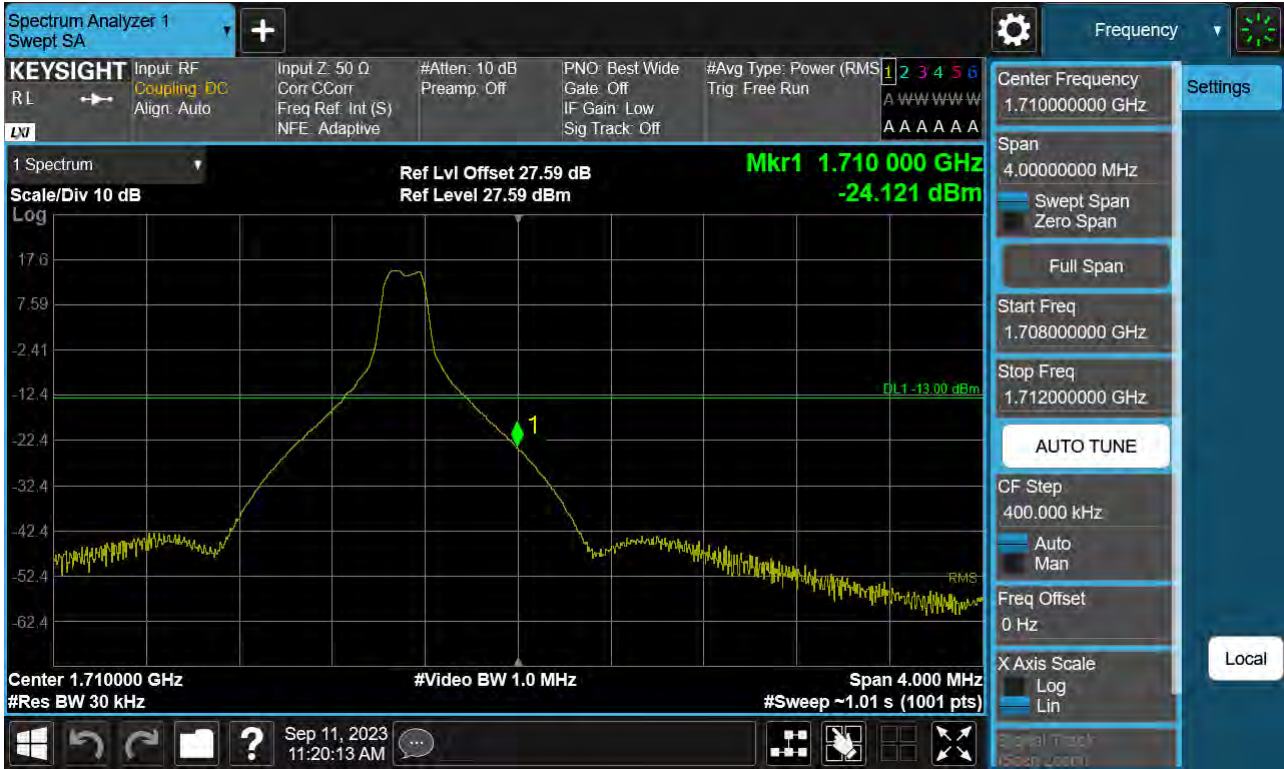
Sub6 n70. Upper Band Edge Plot (10 M BW Ch.341000 BPSK_ Full RB) -2



Sub6 n70. Upper Extended Band Edge Plot (10 M BW Ch.341000 BPSK_ Full RB) -3



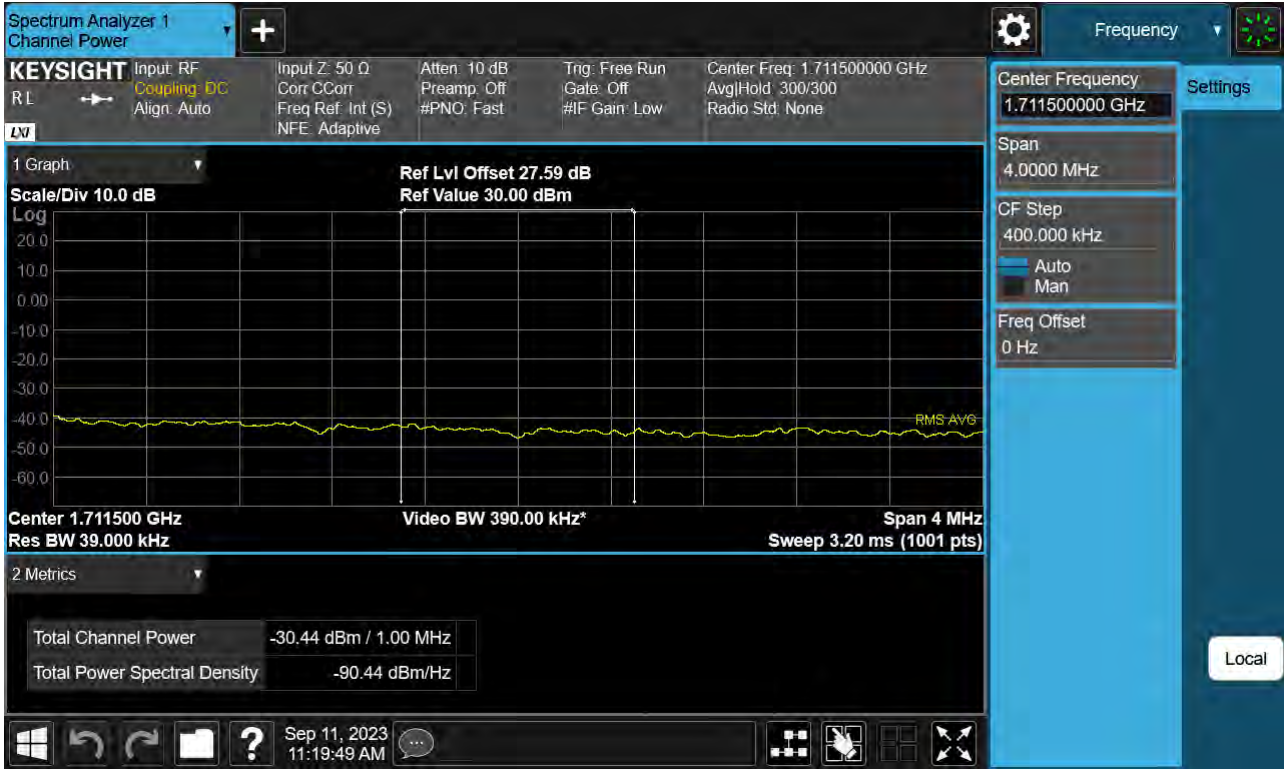
Sub6 n70. Upper Band Edge Plot (15 M BW Ch.340500 BPSK_RB1_Offset 78) -1



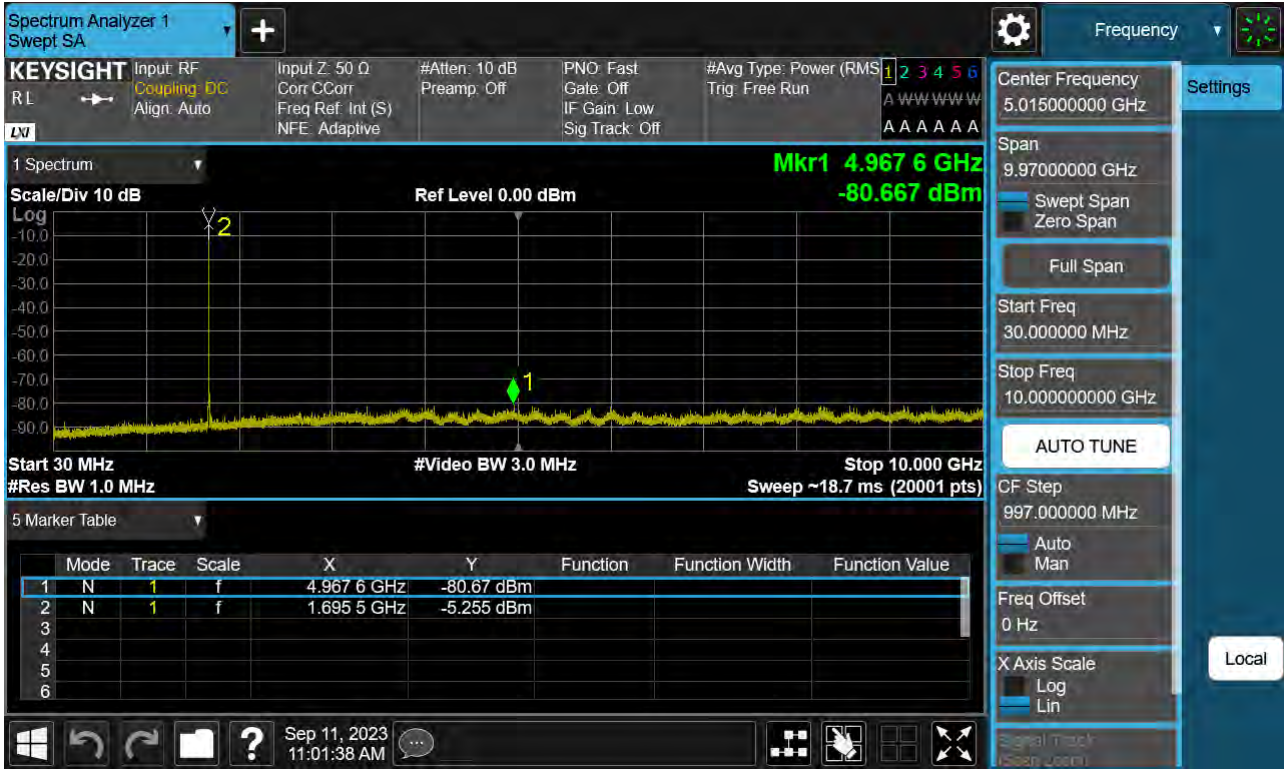
Sub6 n70. Upper Band Edge Plot (15 M BW Ch.340500 BPSK_ Full RB) -2



Sub6 n70. Upper Extended Band Edge Plot (15 M BW Ch.340500 BPSK_ Full RB) -3



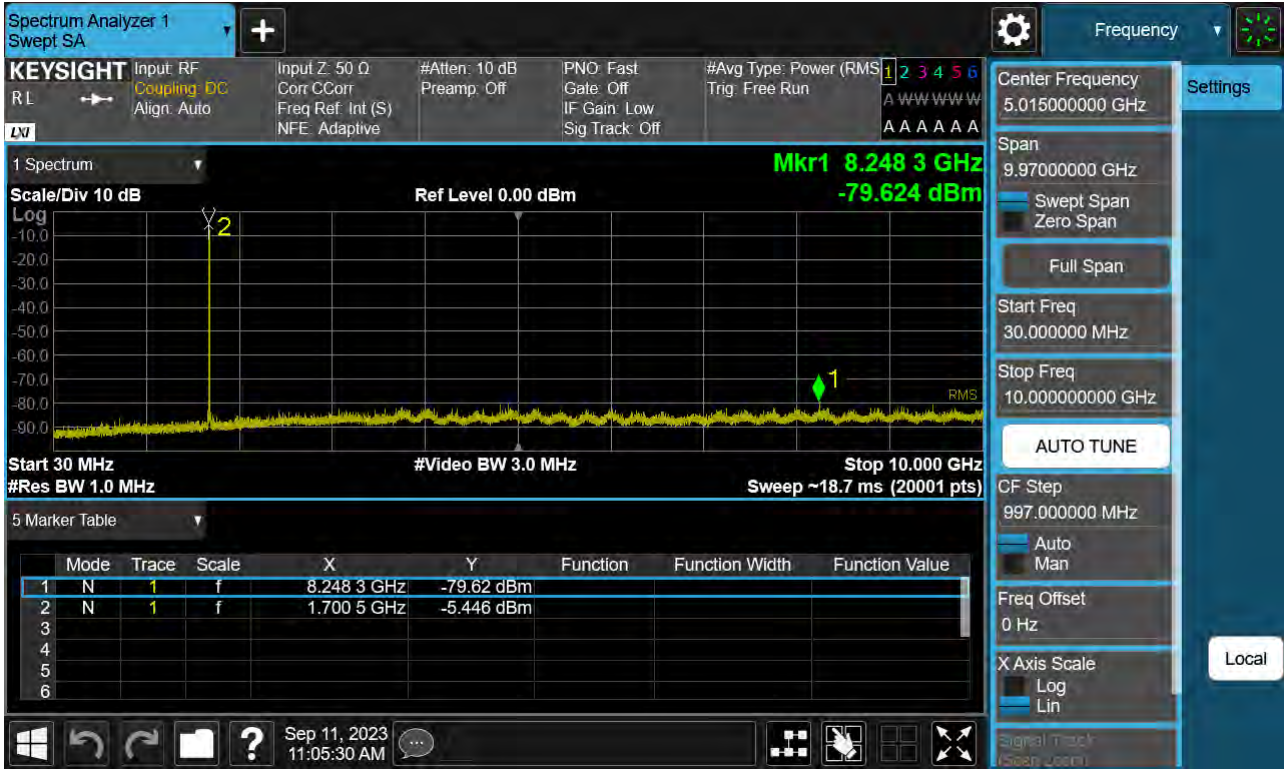
Sub6 n70. Conducted Spurious Plot_1 (339500ch_5 MHz_BPSK_RB 1_1)



Sub6 n70. Conducted Spurious Plot_2 (339500ch_5 MHz_BPSK_RB 1_1)



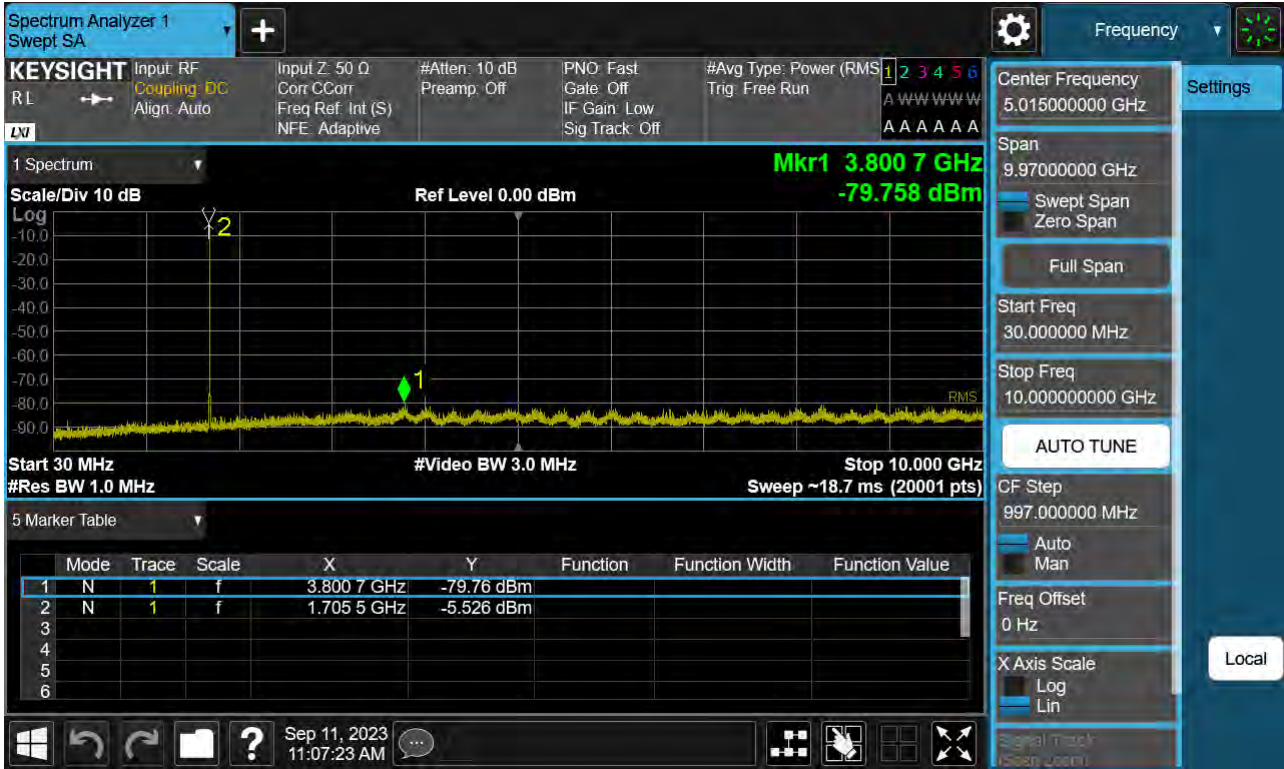
Sub6 n70. Conducted Spurious Plot_1 (340500ch_5 MHz_BPSK_RB 1_1)



Sub6 n70. Conducted Spurious Plot_2 (340500ch_5 MHz_BPSK_RB 1_1)



Sub6 n70. Conducted Spurious Plot_1 (341500ch_5 MHz_BPSK_RB 1_1)



Sub6 n70. Conducted Spurious Plot_2 (341500ch_5 MHz_BPSK_RB 1_1)



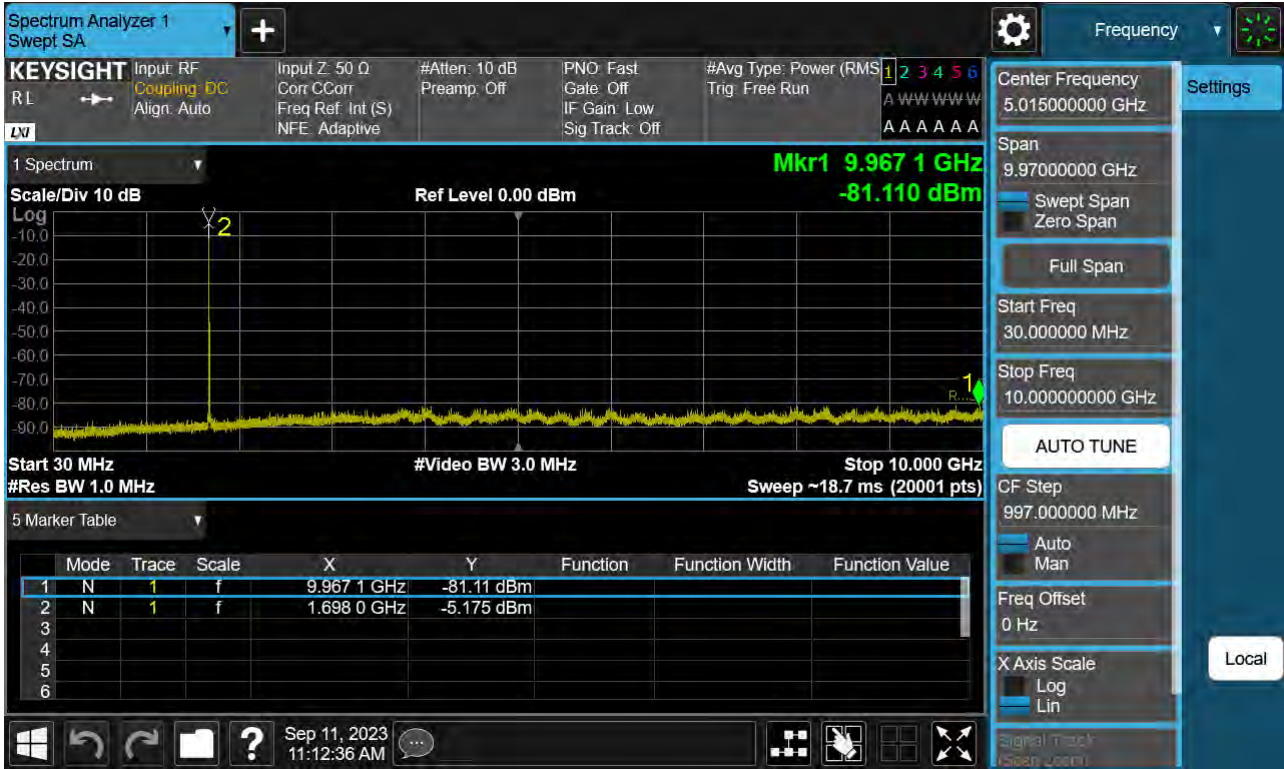
Sub6 n70. Conducted Spurious Plot_1 (340000ch_10 MHz_BPSK_RB 1_1)



Sub6 n70. Conducted Spurious Plot_2 (340000ch_10 MHz_BPSK_RB 1_1)



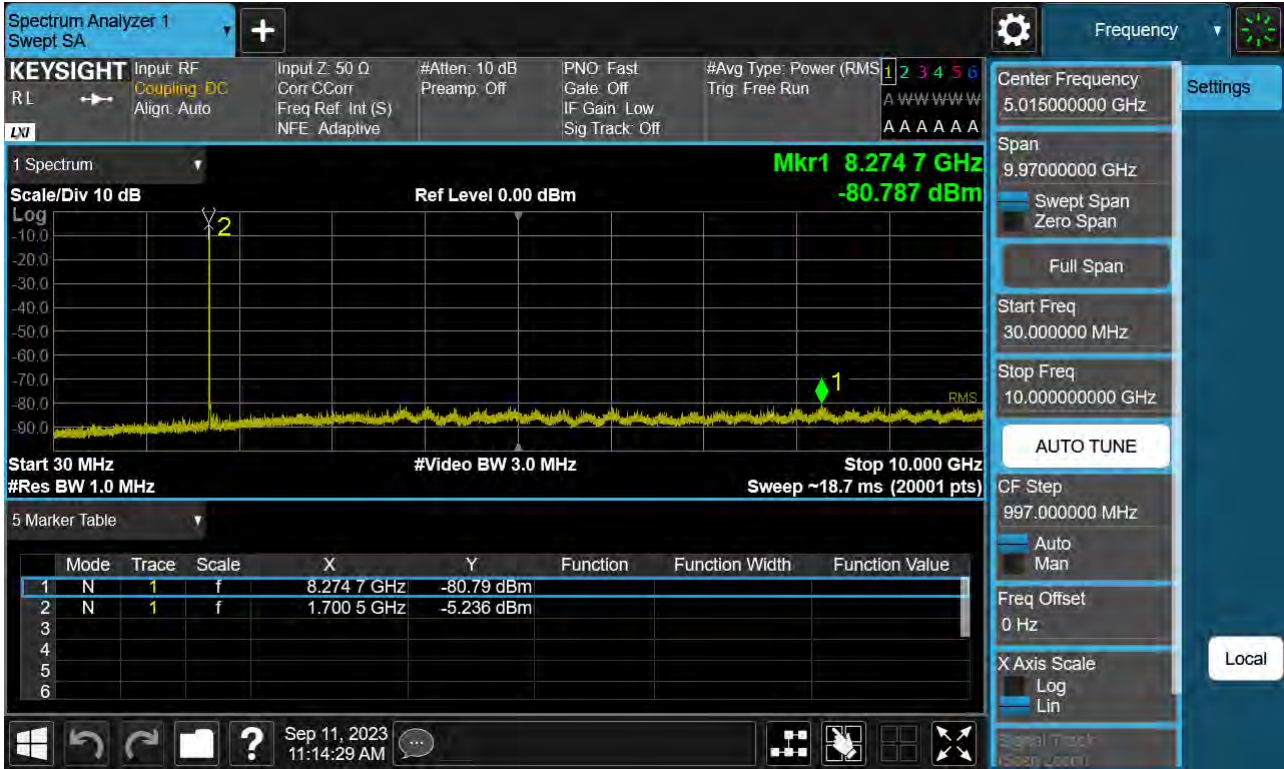
Sub6 n70. Conducted Spurious Plot_1 (340500ch_10 MHz_BPSK_RB 1_1)



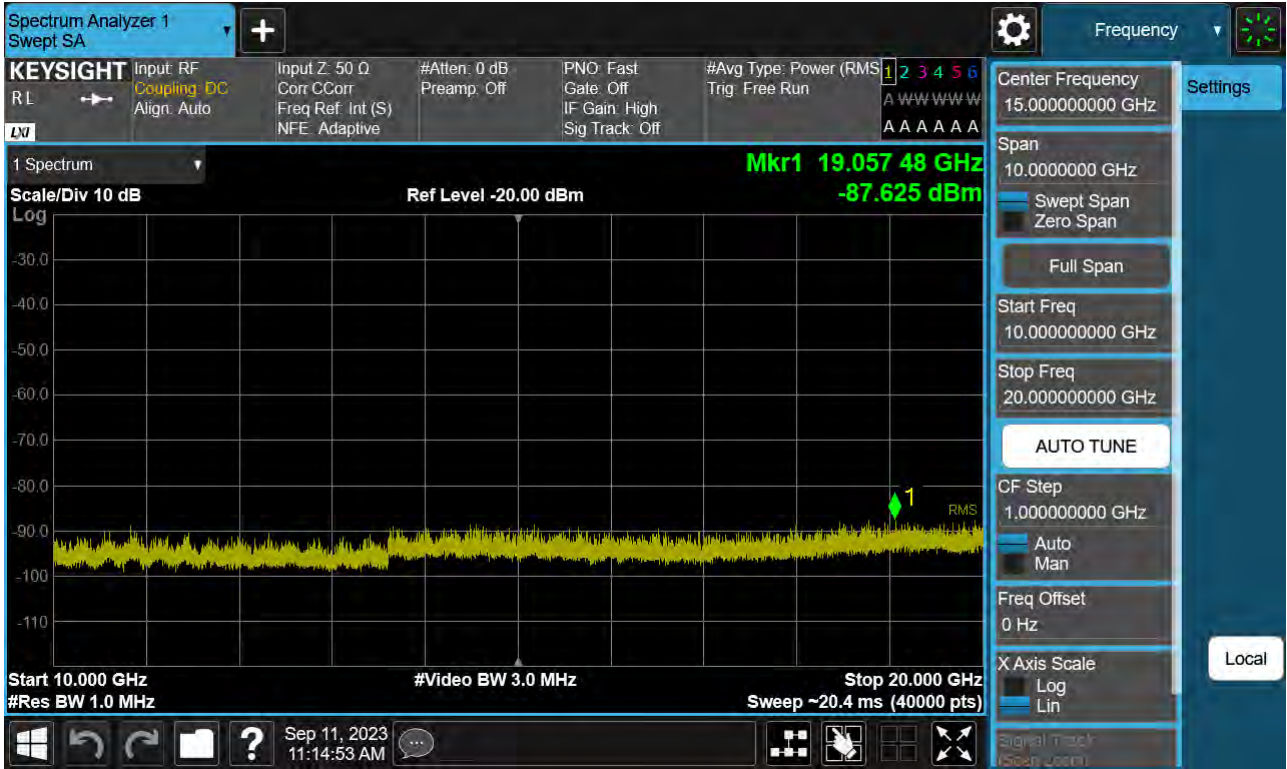
Sub6 n70. Conducted Spurious Plot_2 (340500ch_10 MHz_BPSK_RB 1_1)



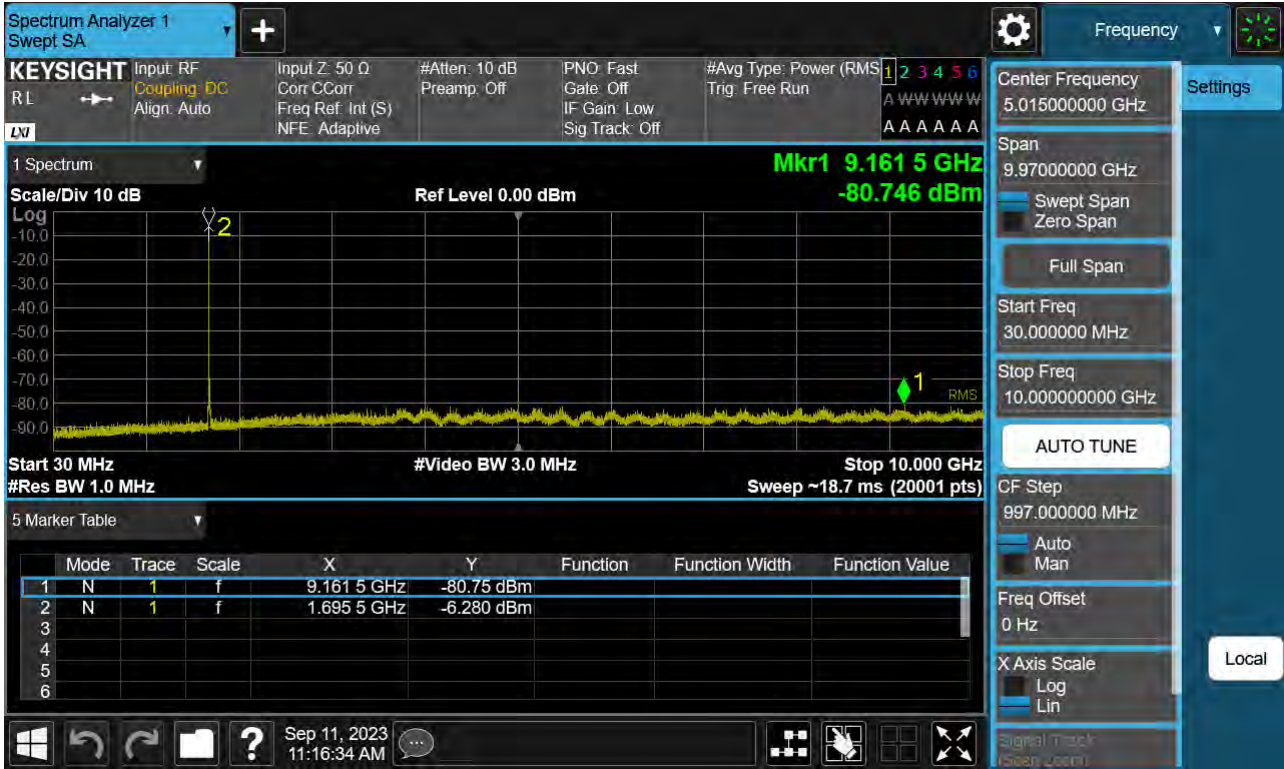
Sub6 n70. Conducted Spurious Plot_1 (341000ch_10 MHz_BPSK_RB 1_1)



Sub6 n70. Conducted Spurious Plot_2 (341000ch_10 MHz_BPSK_RB 1_1)



Sub6 n70. Conducted Spurious Plot_1 (340500ch_15 MHz_BPSK_RB 1_1)



Sub6 n70. Conducted Spurious Plot_2 (340500ch_15 MHz_BPSK_RB 1_1)

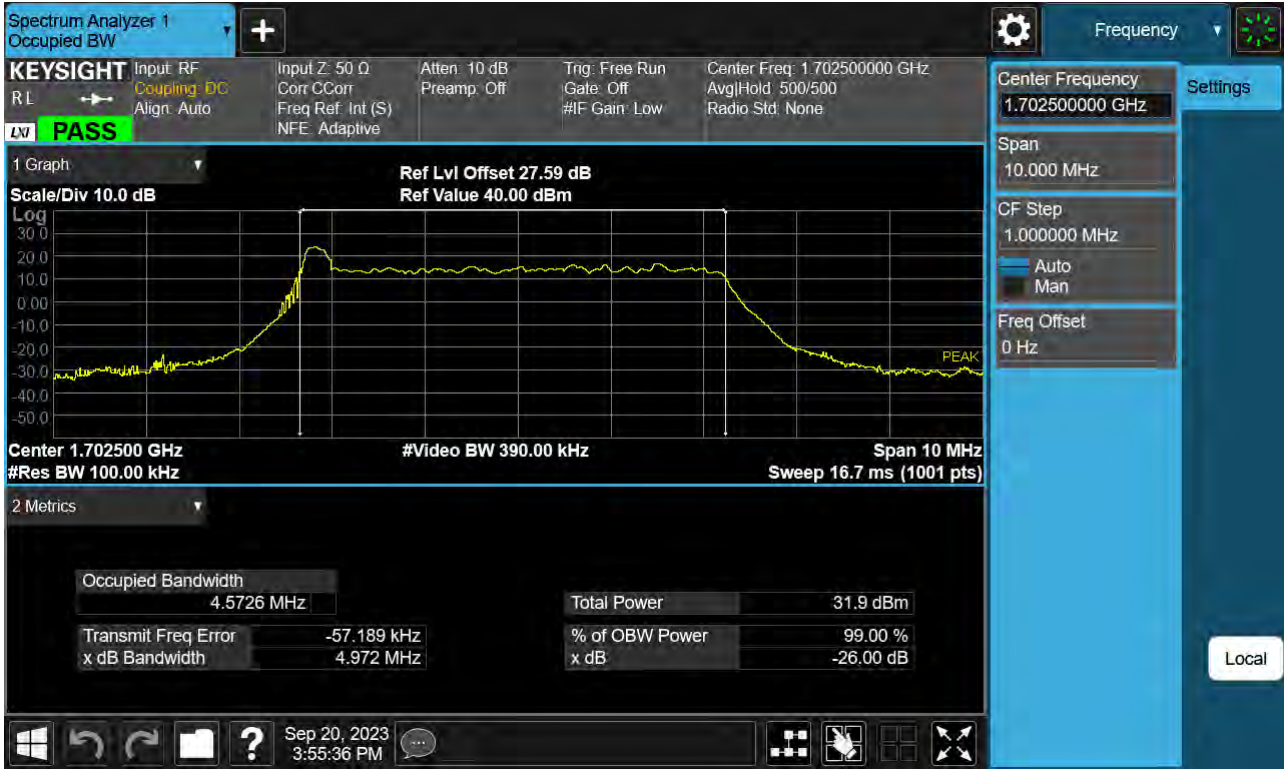


11. TEST PLOTS(Ant F)

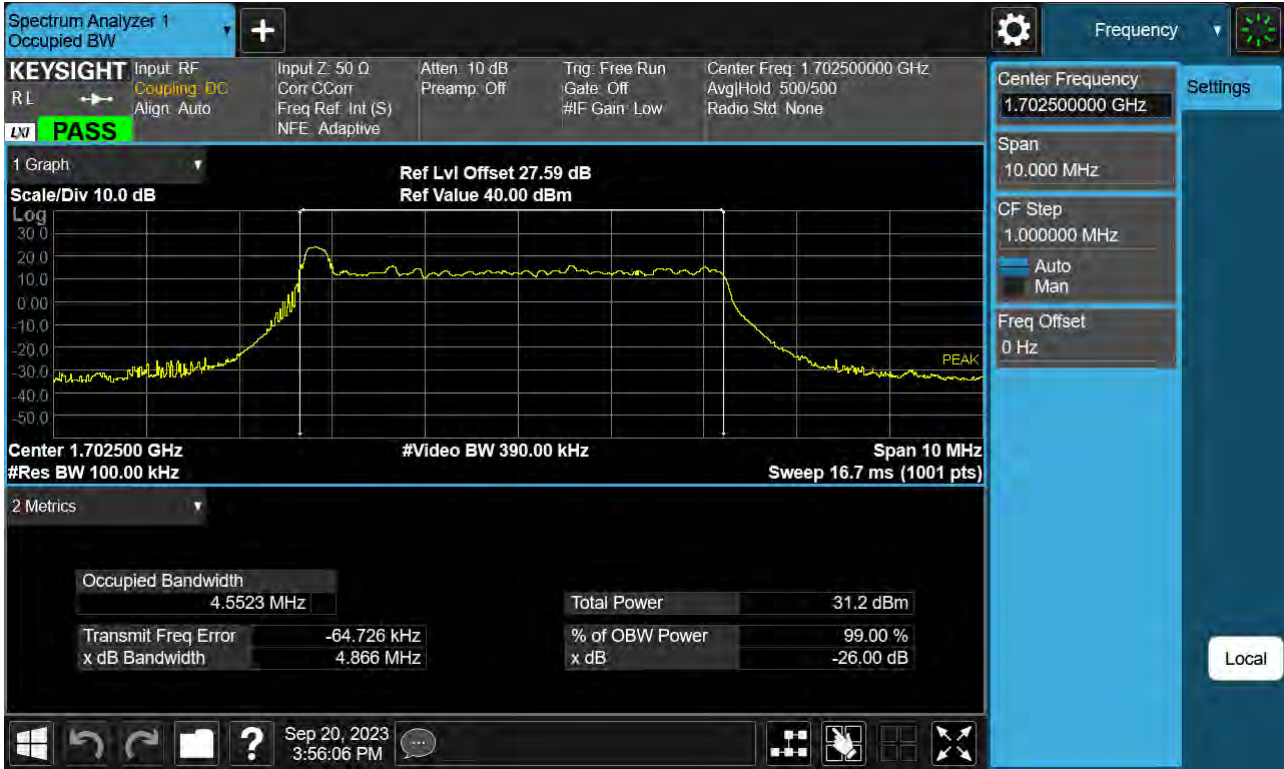
Sub6 n70. Occupied Bandwidth Plot (5 M BW Ch.340500 BPSK Full RB)



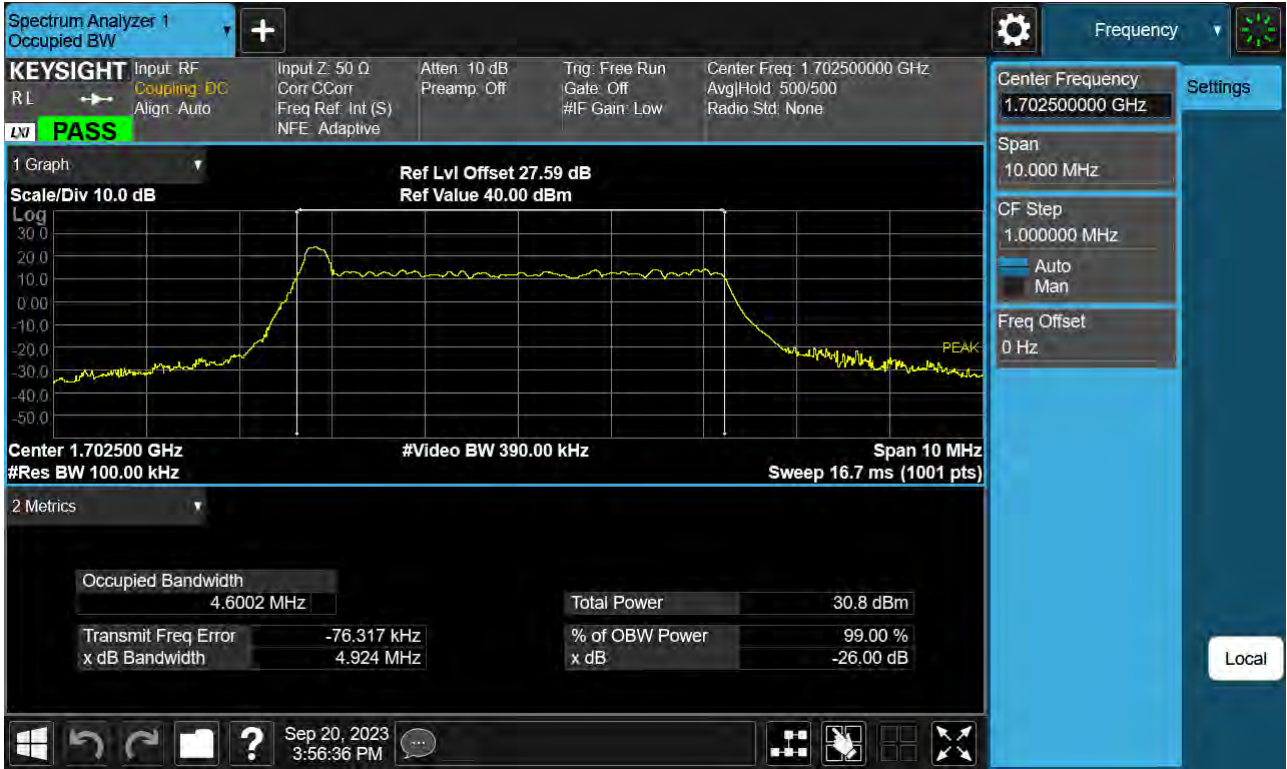
Sub6 n70. Occupied Bandwidth Plot (5 M BW Ch.340500 QPSK Full RB)



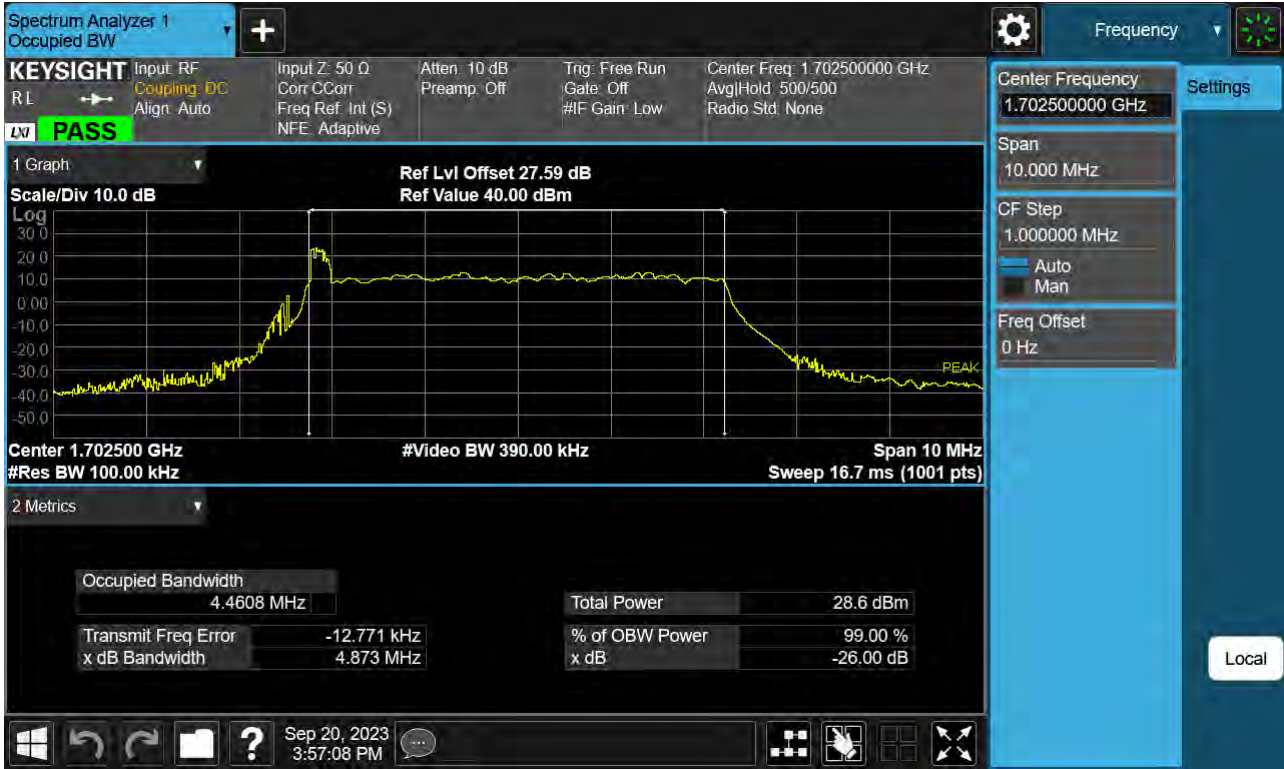
Sub6 n70. Occupied Bandwidth Plot (5 M BW Ch.340500 16QAM Full RB)



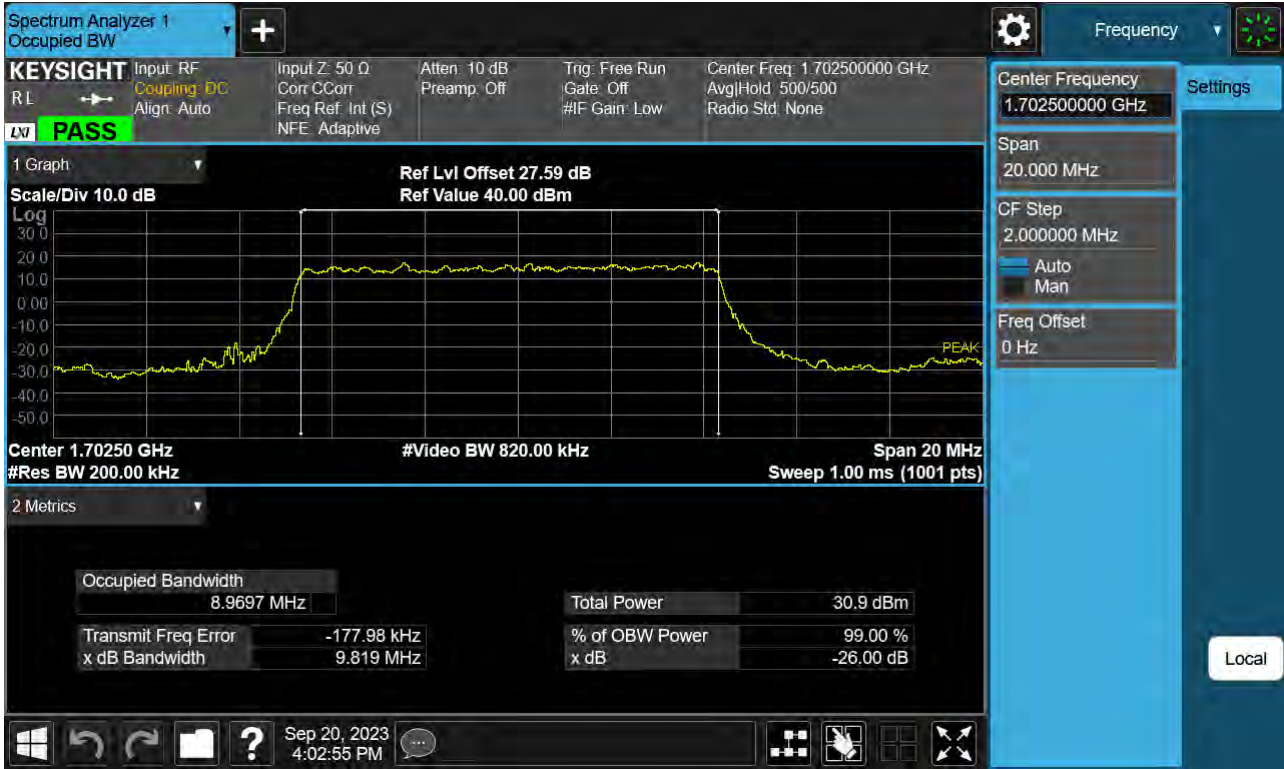
Sub6 n70. Occupied Bandwidth Plot (5 M BW Ch.340500 64QAM Full RB)



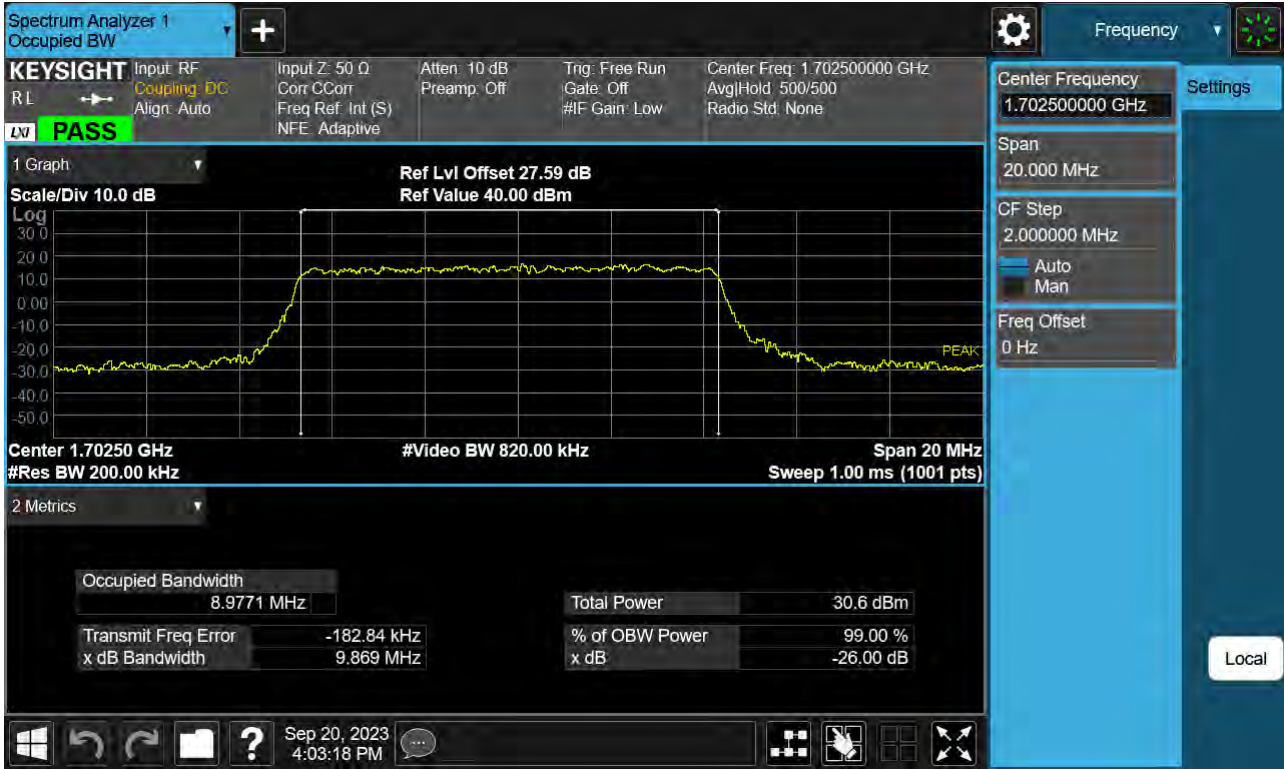
Sub6 n70. Occupied Bandwidth Plot (5 M BW Ch.340500 256QAM Full RB)



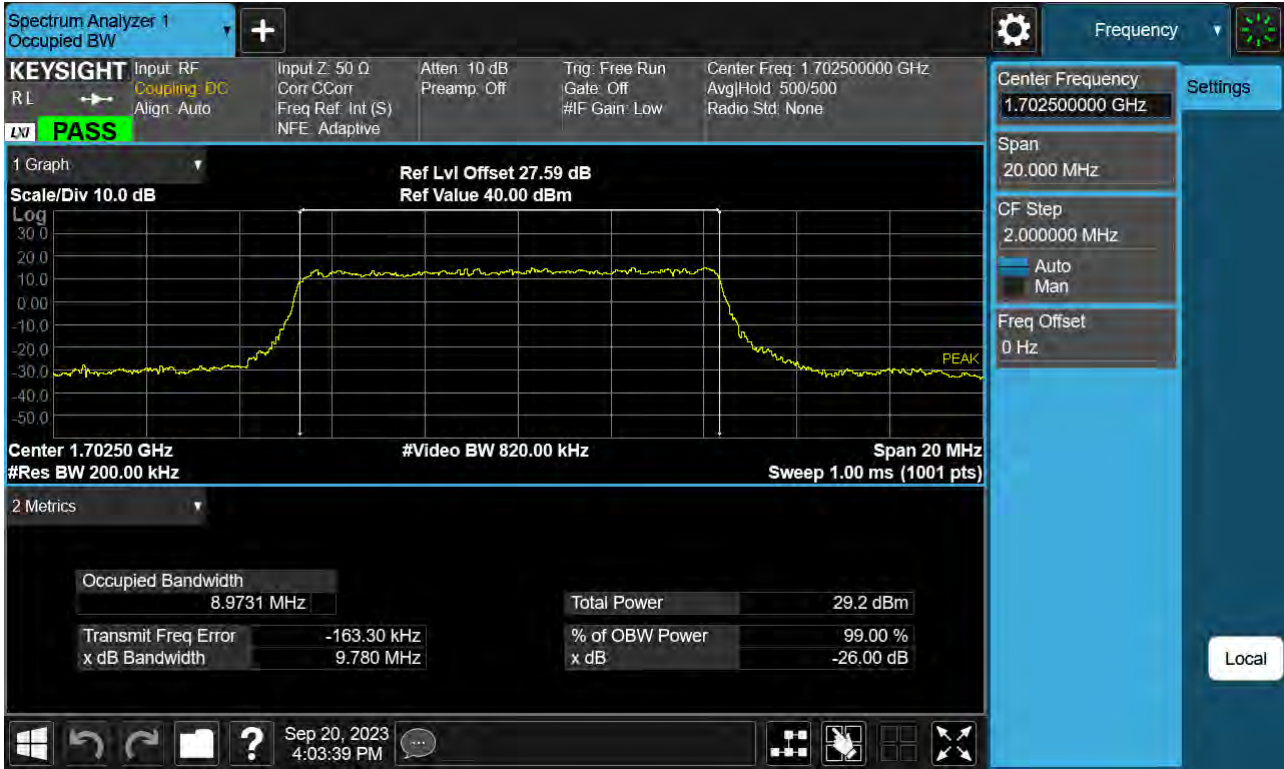
Sub6 n70. Occupied Bandwidth Plot (10 M BW Ch.340500 BPSK Full RB)



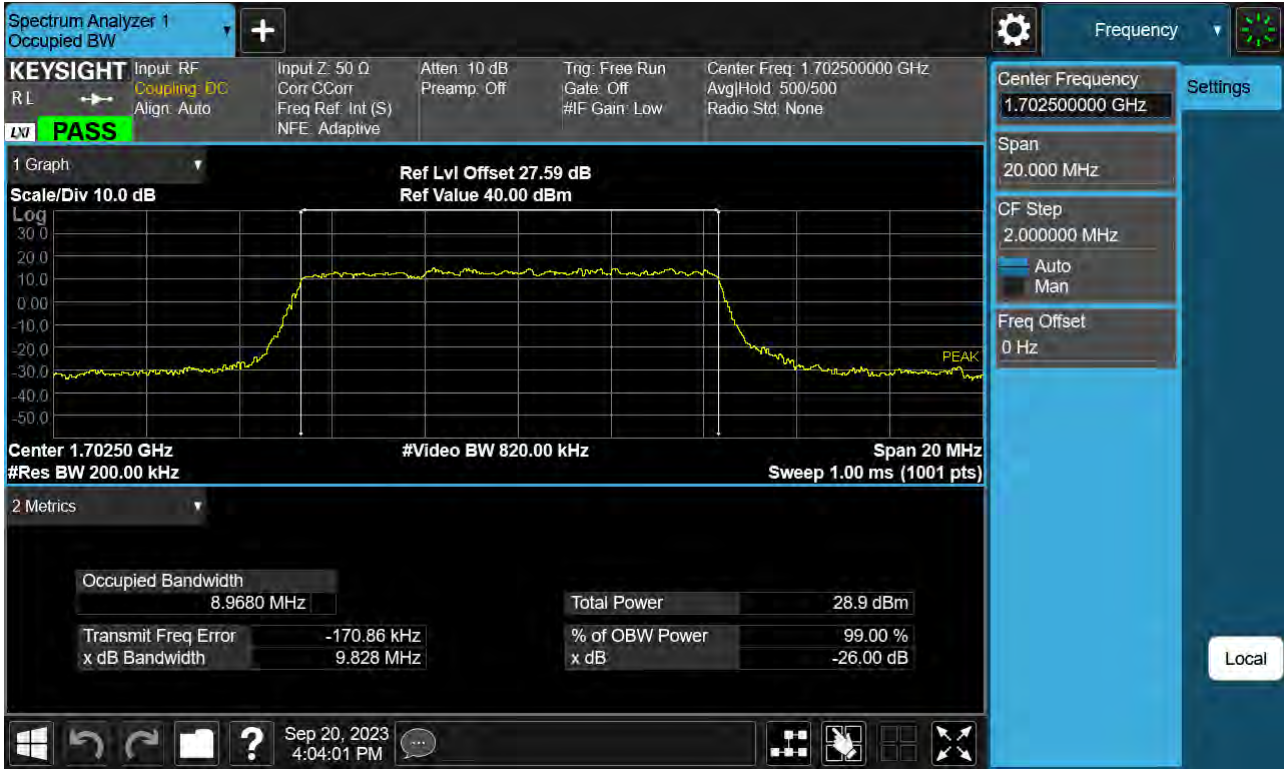
Sub6 n70. Occupied Bandwidth Plot (10 M BW Ch.340500 QPSK Full RB)



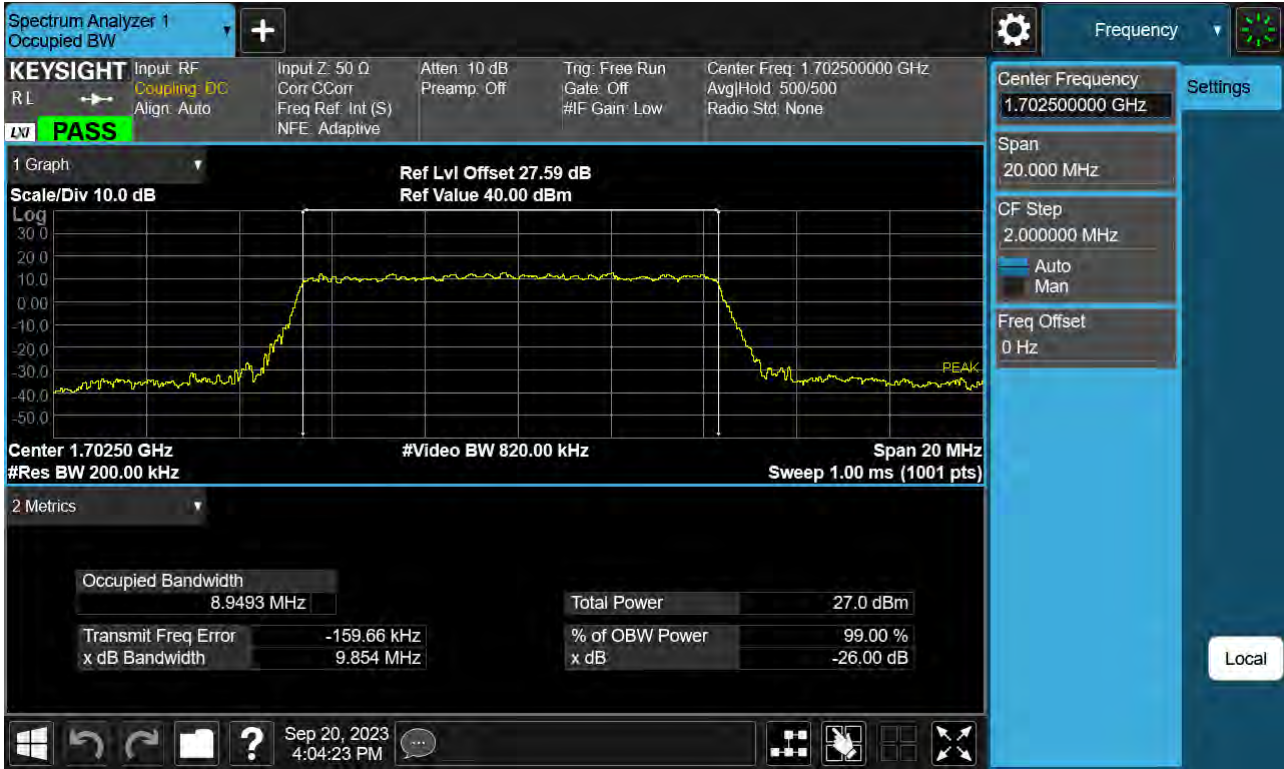
Sub6 n70. Occupied Bandwidth Plot (10 M BW Ch.340500 16QAM Full RB)



Sub6 n70. Occupied Bandwidth Plot (10 M BW Ch.340500 64QAM Full RB)



Sub6 n70. Occupied Bandwidth Plot (10 M BW Ch.340500 256QAM Full RB)



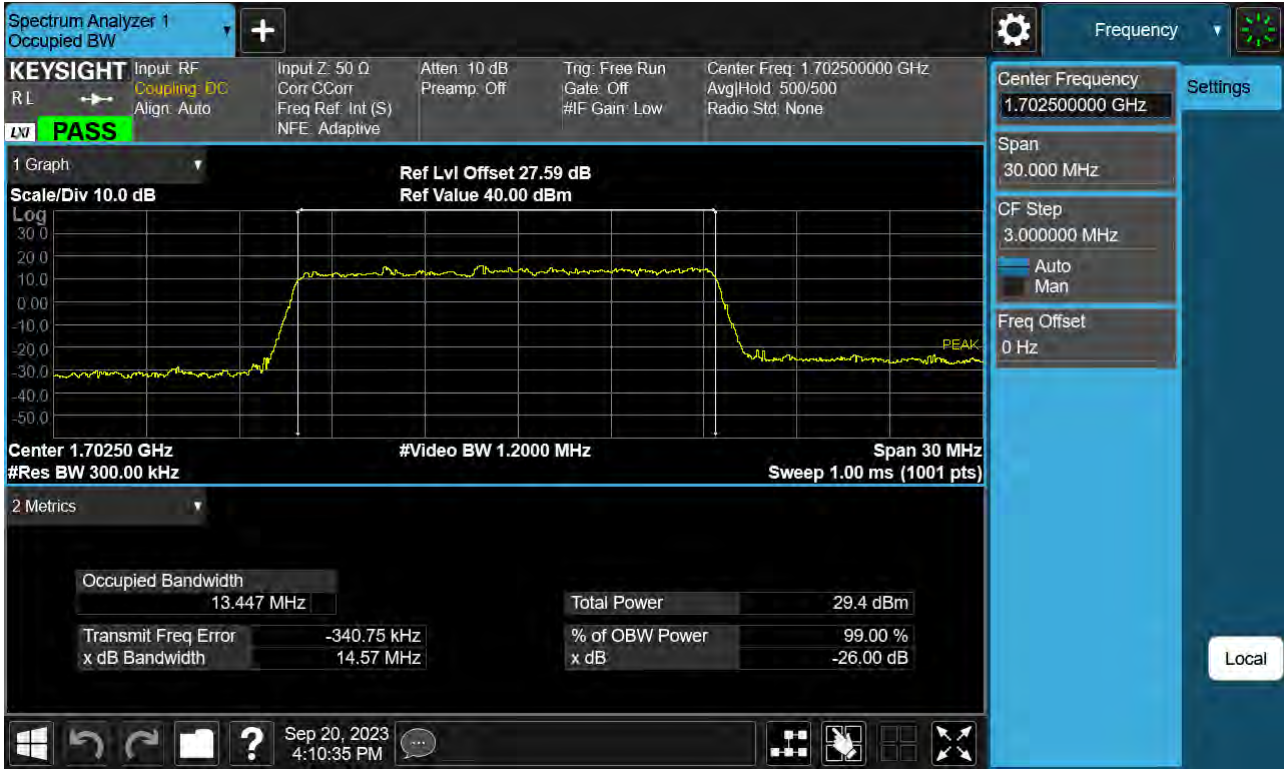
Sub6 n70. Occupied Bandwidth Plot (15 M BW Ch.340500 BPSK Full RB)



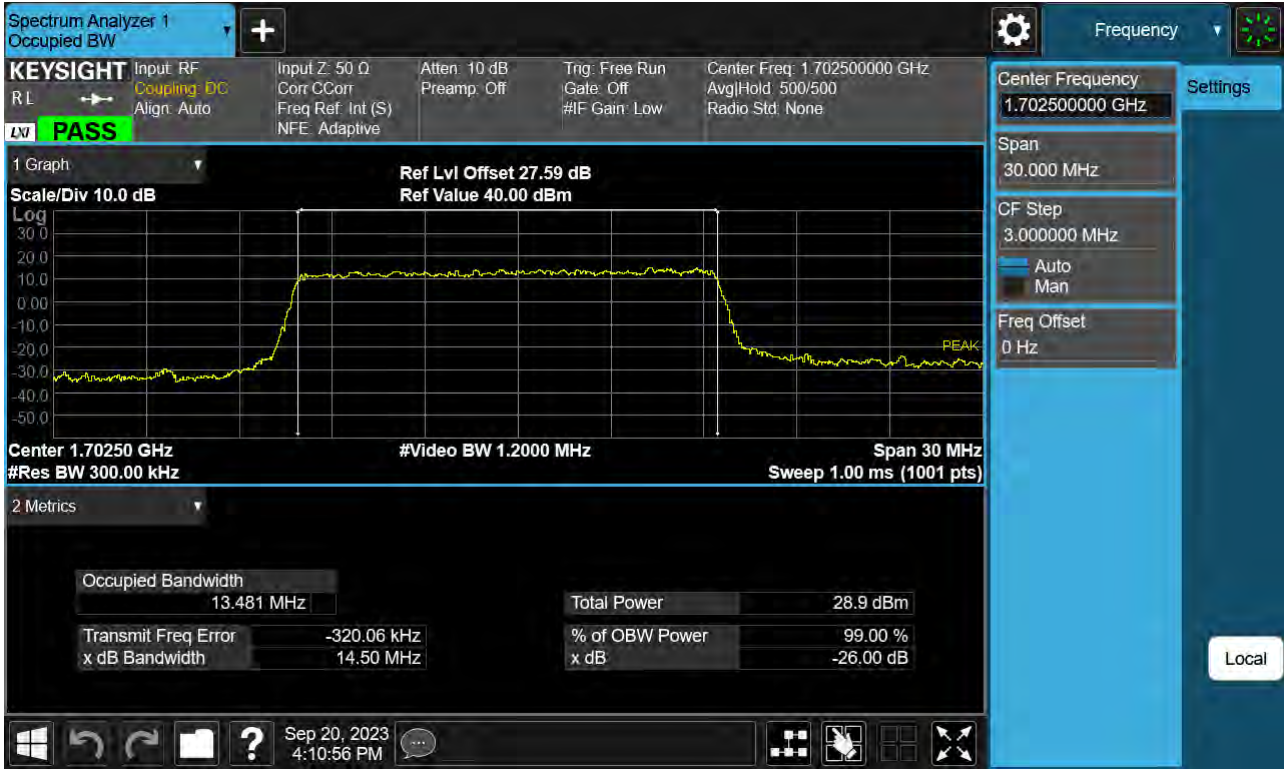
Sub6 n70. Occupied Bandwidth Plot (15 M BW Ch.340500 QPSK Full RB)



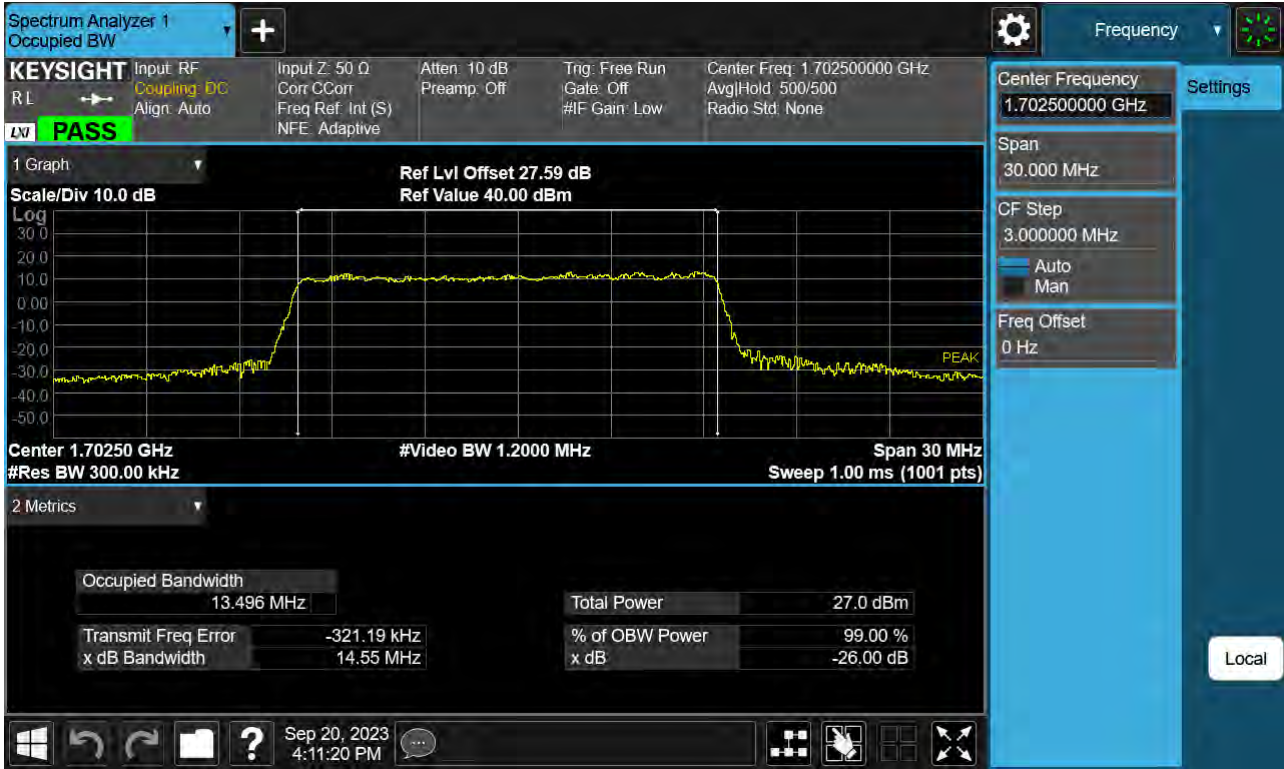
Sub6 n70. Occupied Bandwidth Plot (15 M BW Ch.340500 16QAM Full RB)



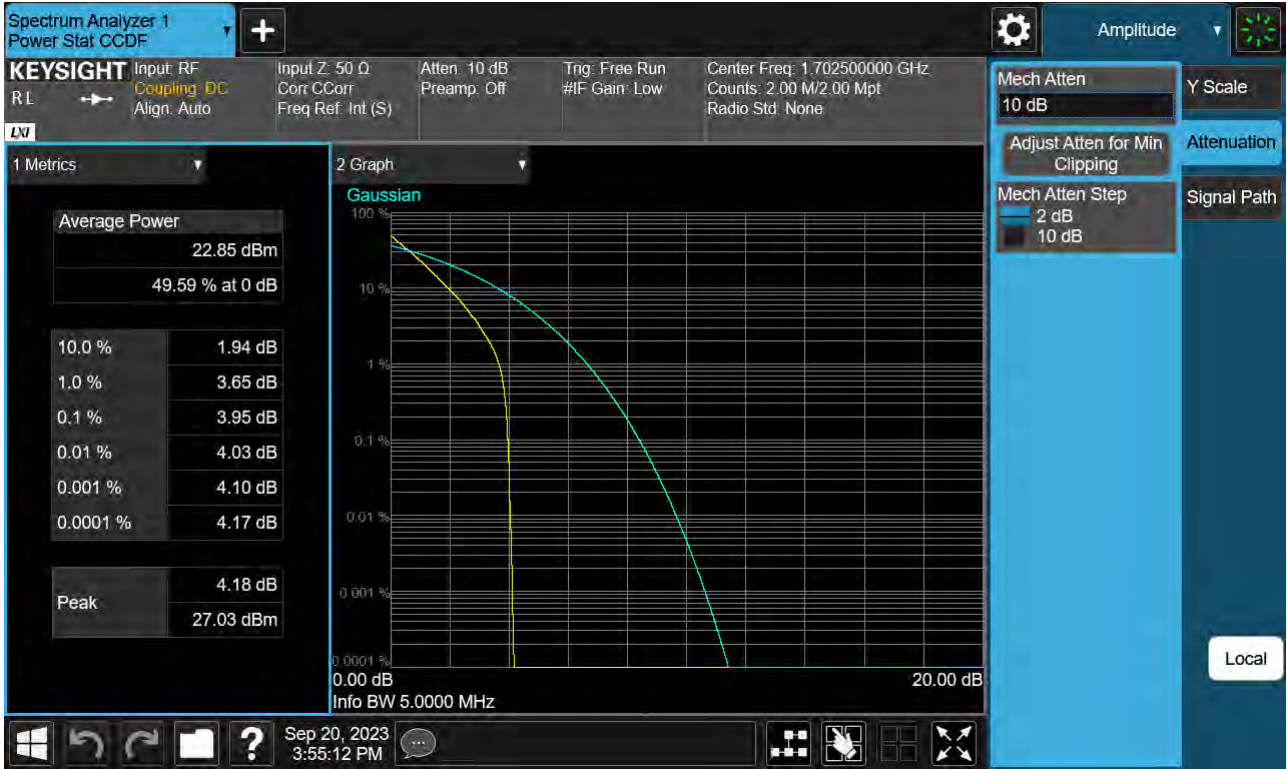
Sub6 n70. Occupied Bandwidth Plot (15 M BW Ch.340500 64QAM Full RB)



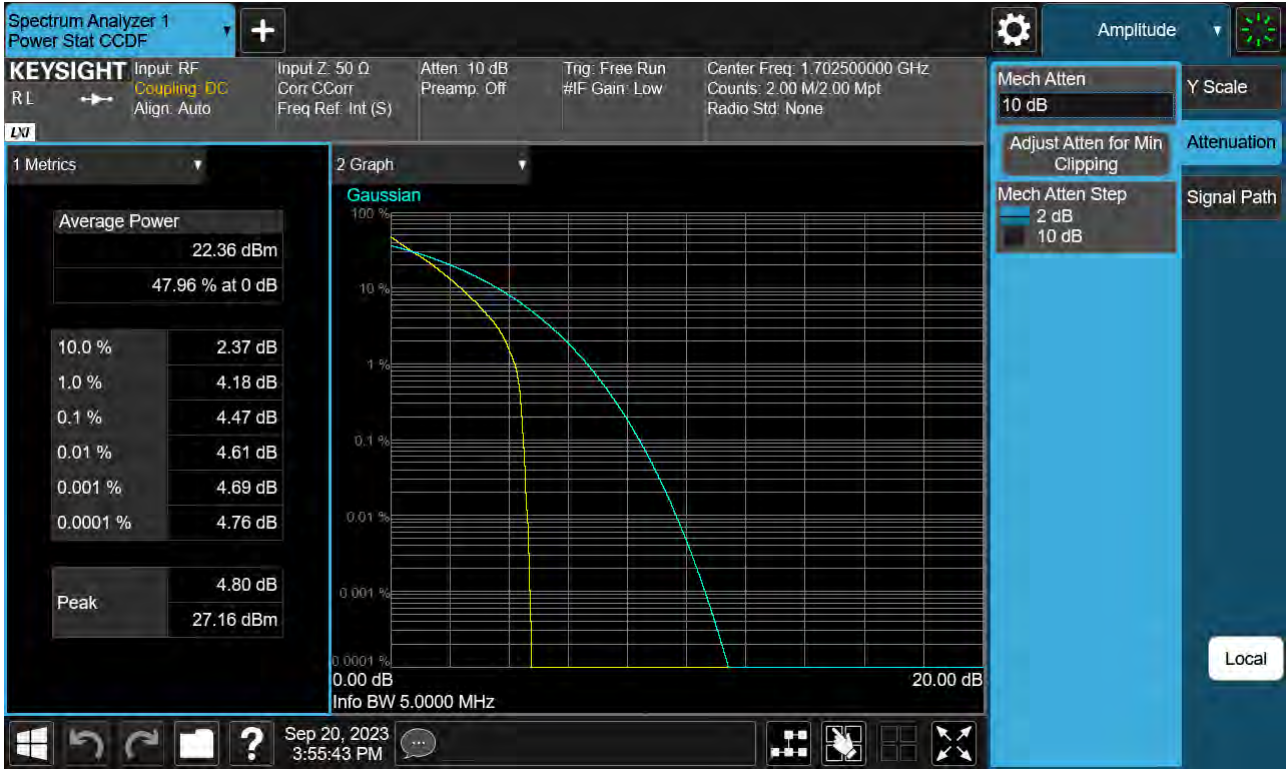
Sub6 n70. Occupied Bandwidth Plot (15 M BW Ch.340500 256QAM Full RB)



Sub6 n70. PAR Plot (5 M BW_Ch.340500_ BPSK_ Full RB)



Sub6 n70. PAR Plot (5 M BW_Ch.340500_QPSK_Full RB)



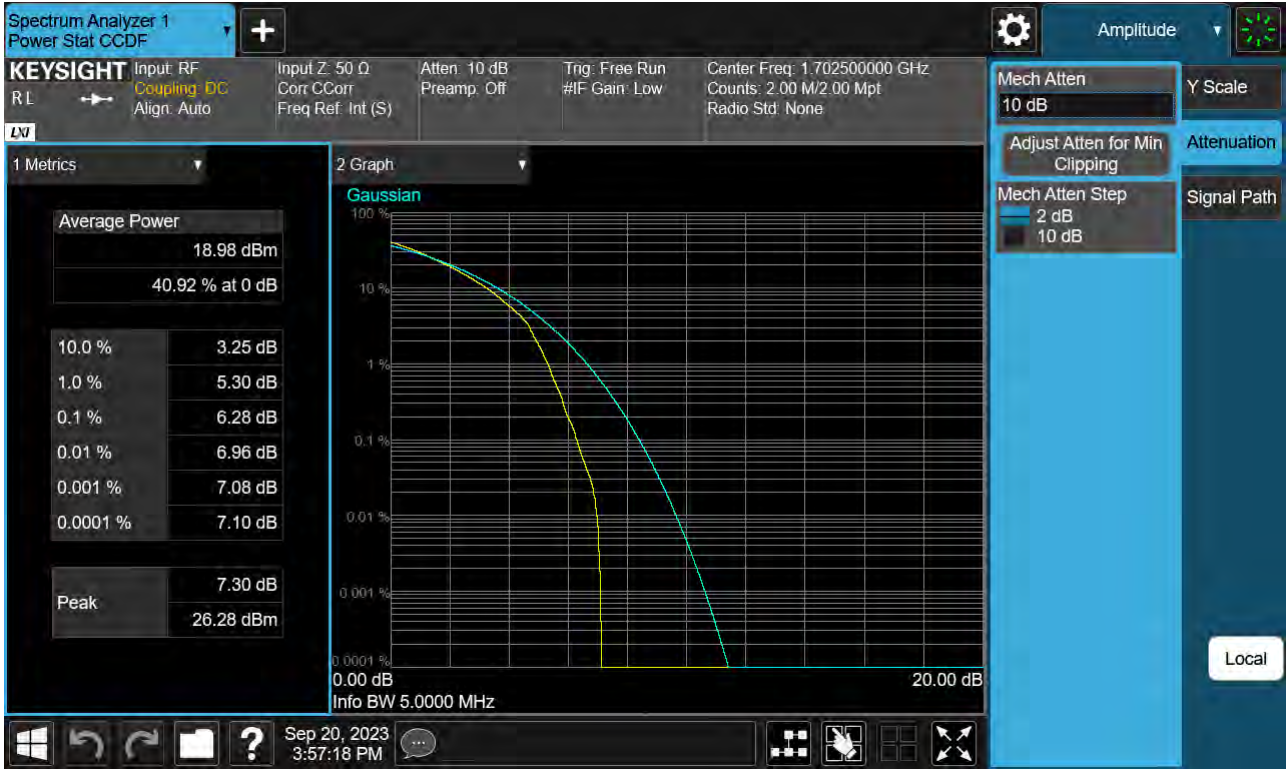
Sub6 n70. PAR Plot (5 M BW_Ch.340500_16QAM_Full RB)



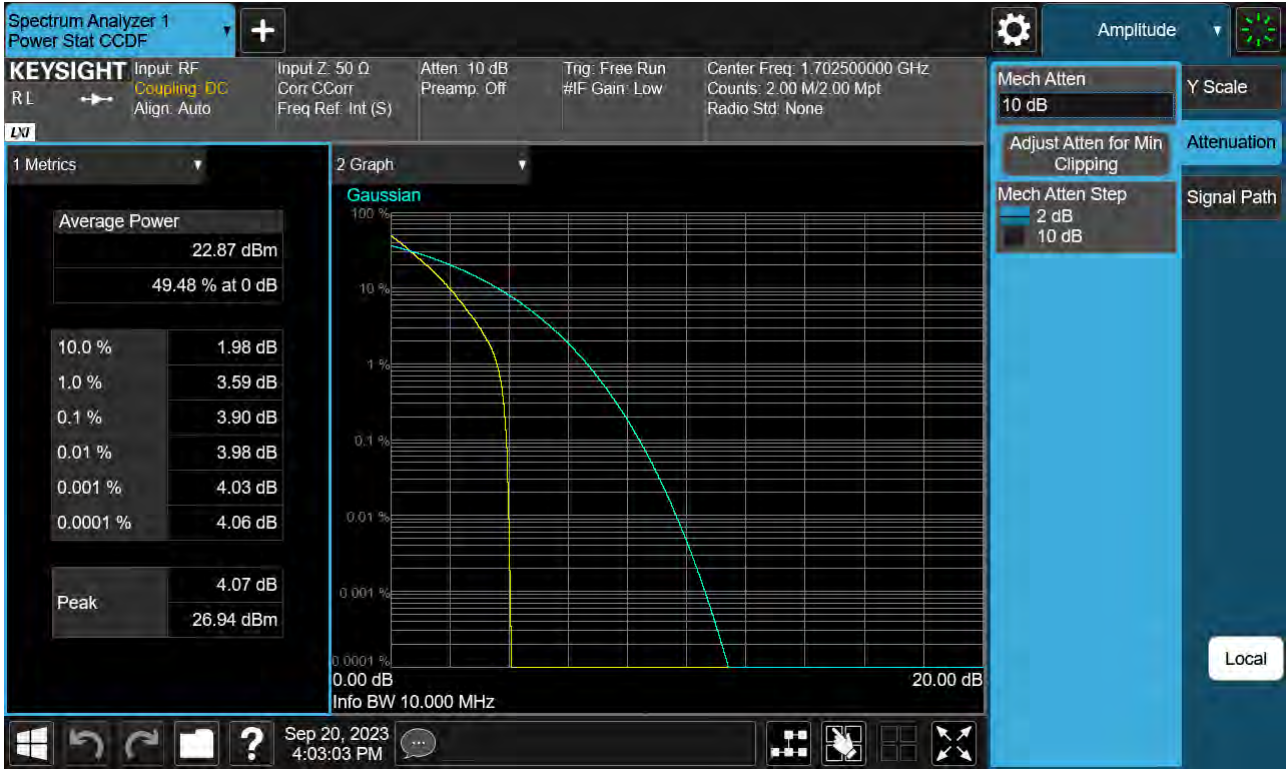
Sub6 n70. PAR Plot (5 M BW_Ch.340500_64QAM_Full RB)



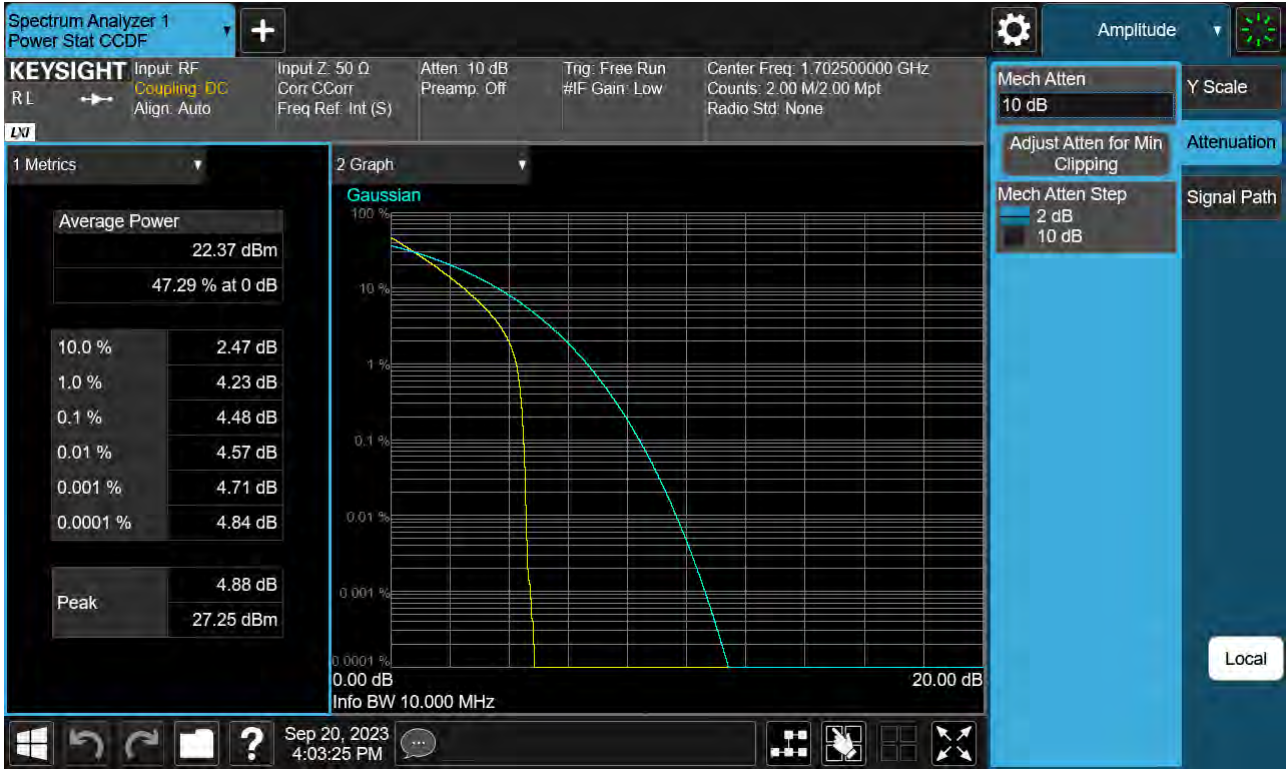
Sub6 n70. PAR Plot (5 M BW_Ch.340500_256QAM_Full RB)



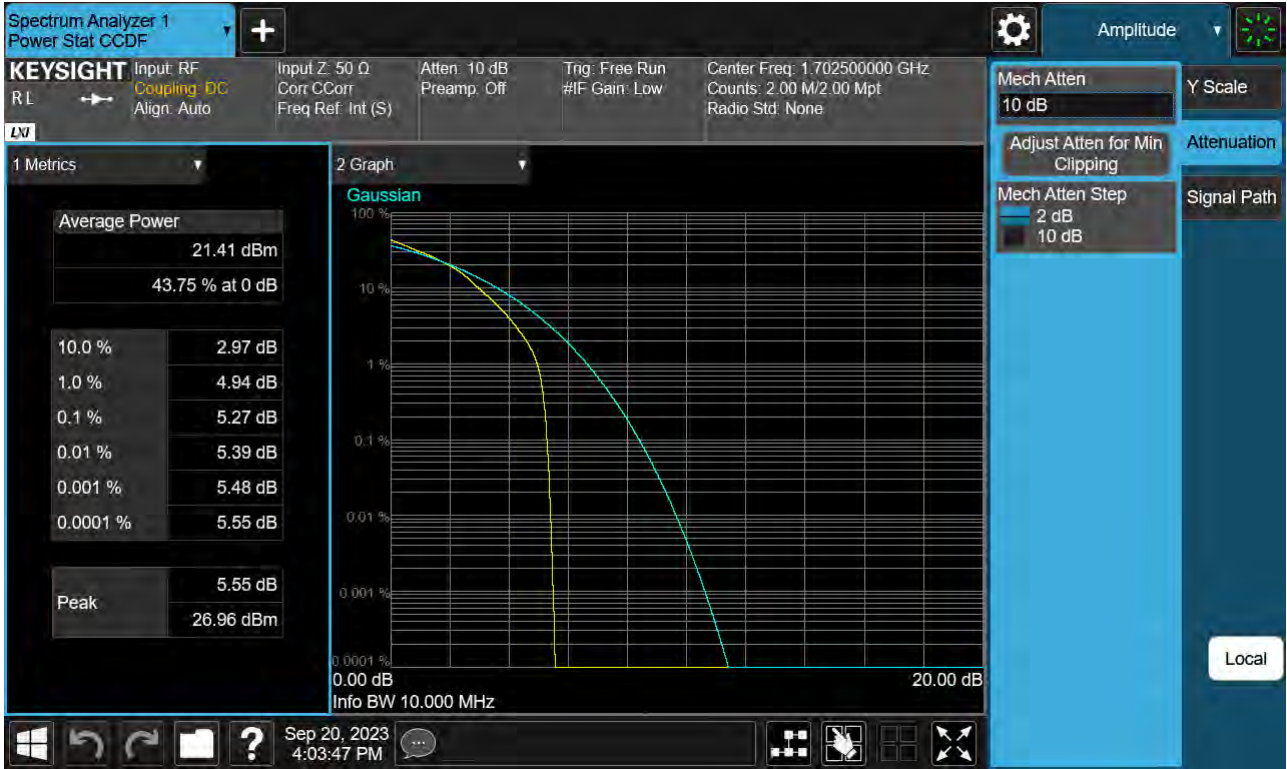
Sub6 n70. PAR Plot (10 M BW_Ch.340500_ BPSK_ Full RB)



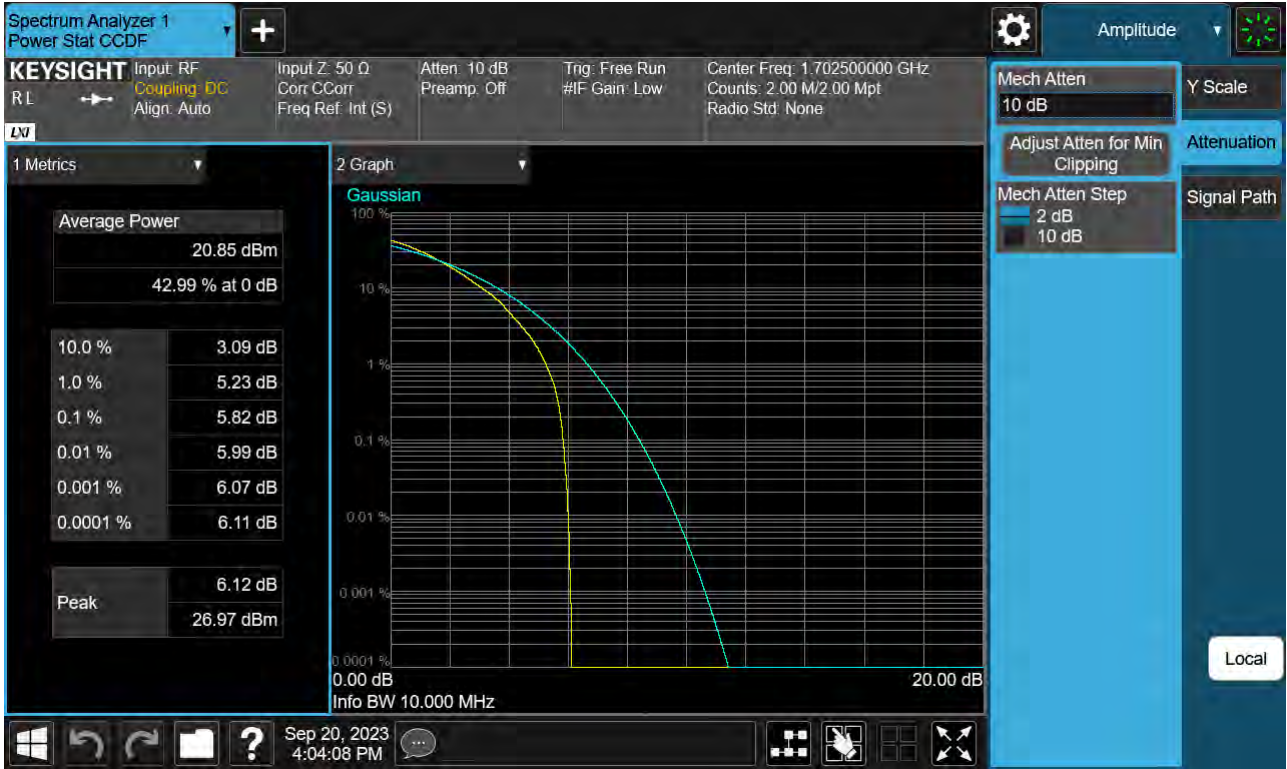
Sub6 n70. PAR Plot (10 M BW_Ch.340500_QPSK_Full RB)



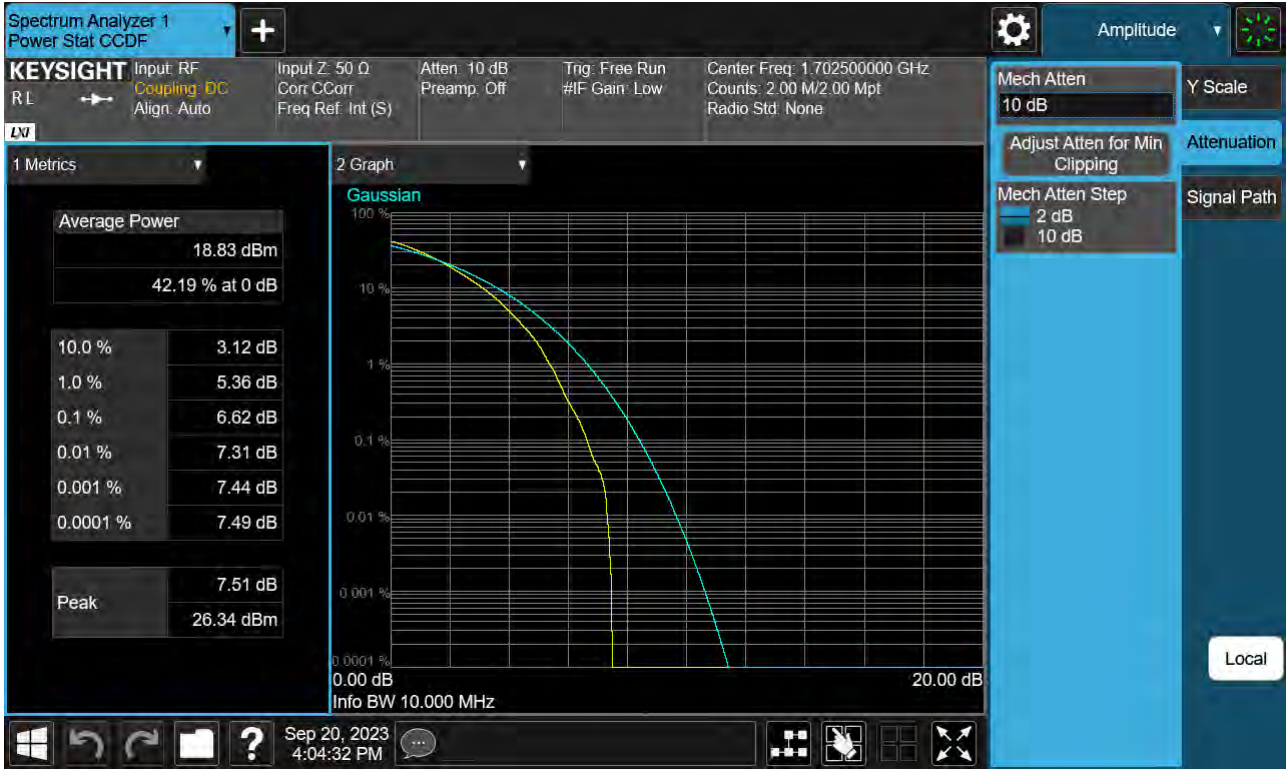
Sub6 n70. PAR Plot (10 M BW_Ch.340500_16QAM_Full RB)



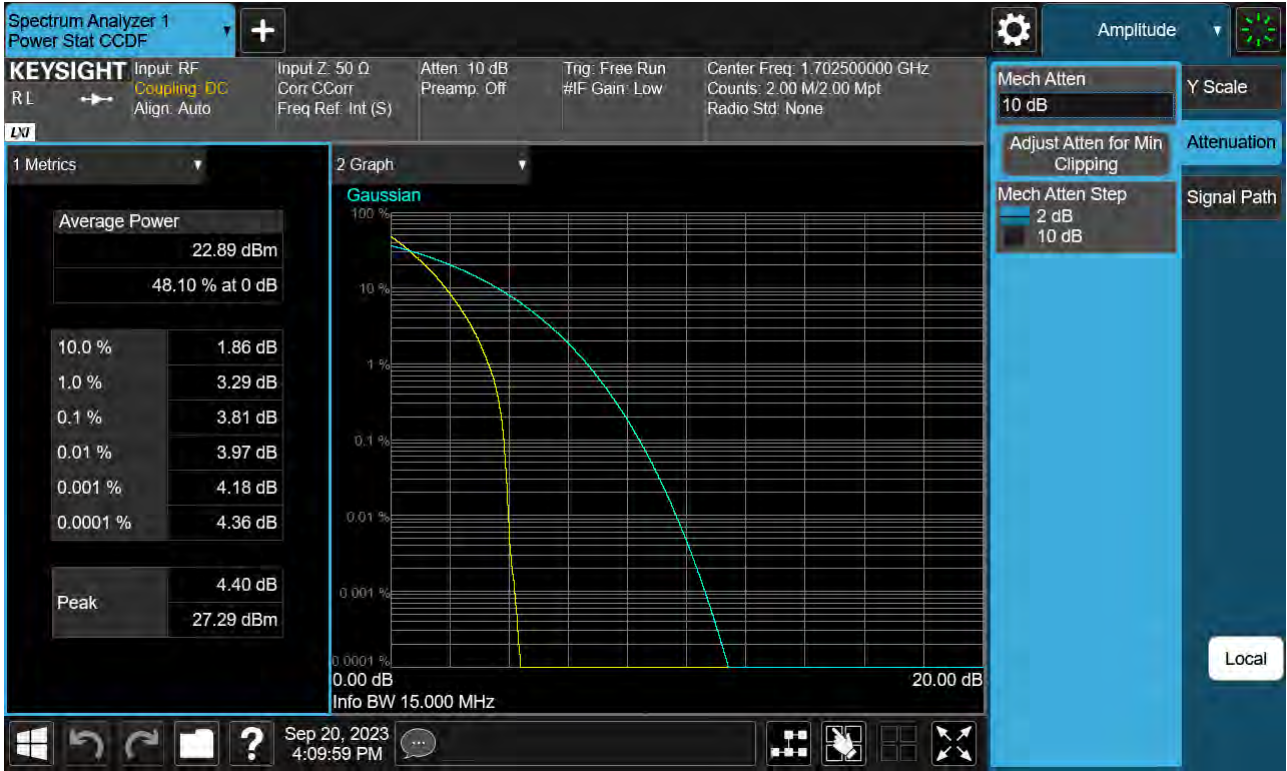
Sub6 n70. PAR Plot (10 M BW_Ch.340500_64QAM_Full RB)



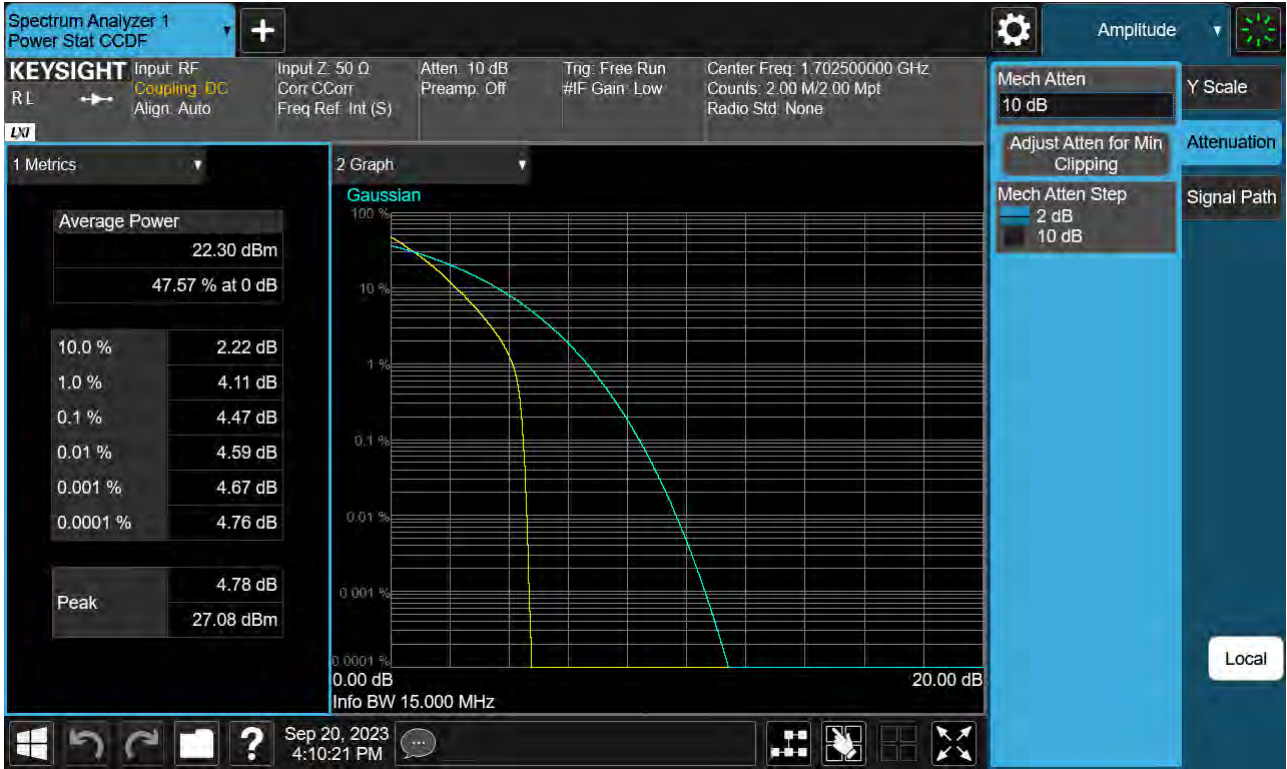
Sub6 n70. PAR Plot (10 M BW_Ch.340500_256QAM_Full RB)



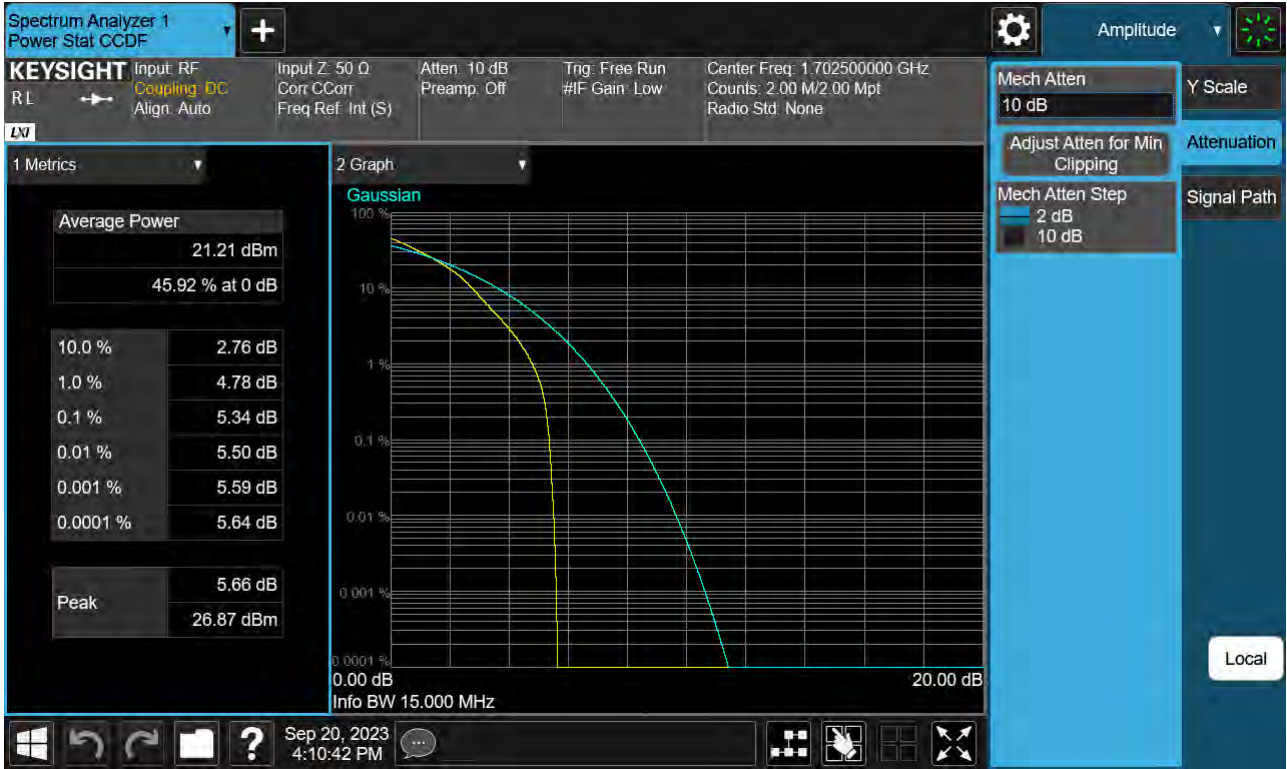
Sub6 n70. PAR Plot (15 M BW_Ch.340500_ BPSK_ Full RB)



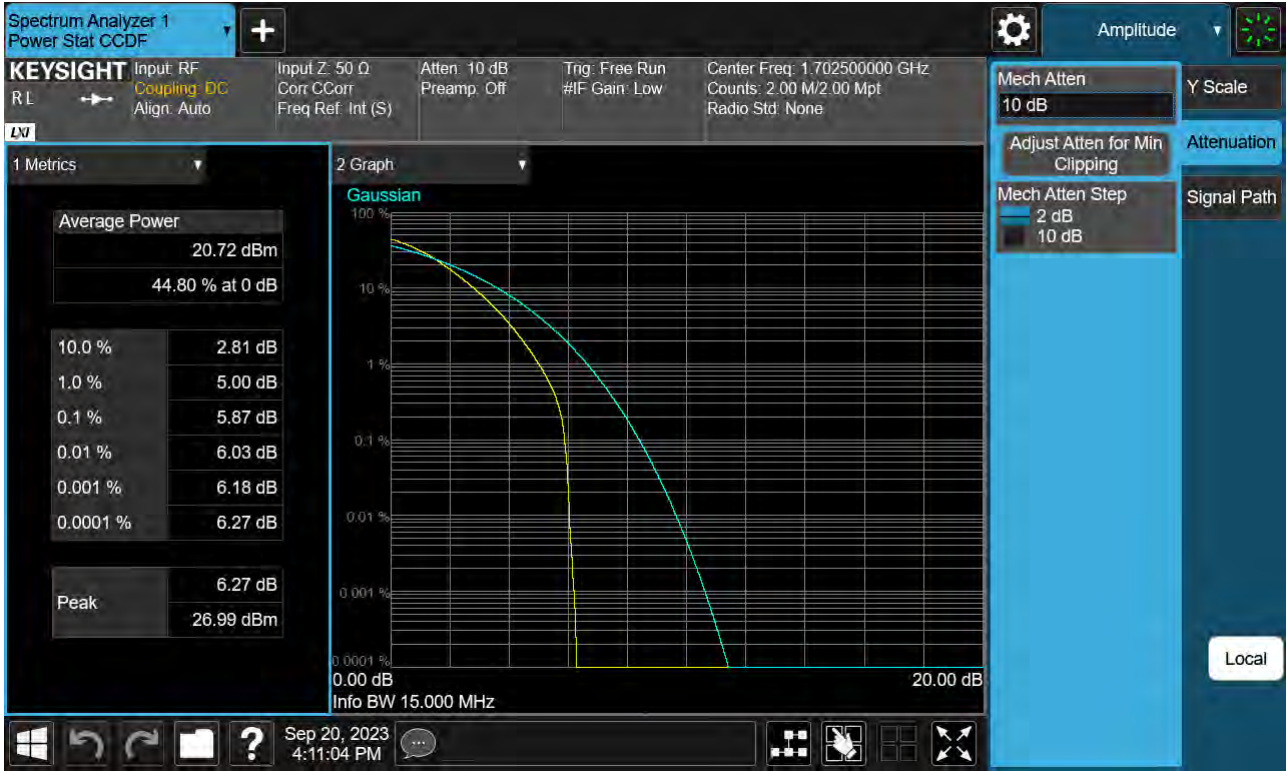
Sub6 n70. PAR Plot (15 M BW_Ch.340500_QPSK_Full RB)



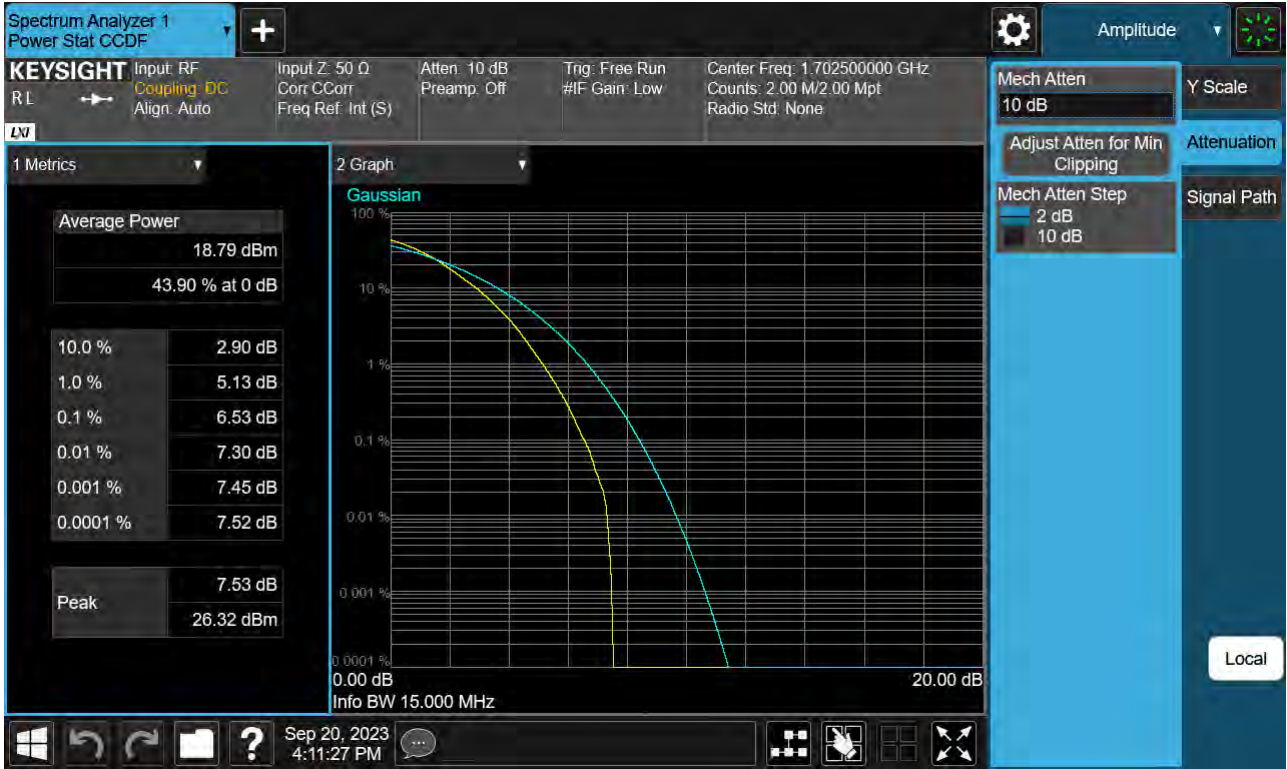
Sub6 n70. PAR Plot (15 M BW_Ch.340500_16QAM_Full RB)



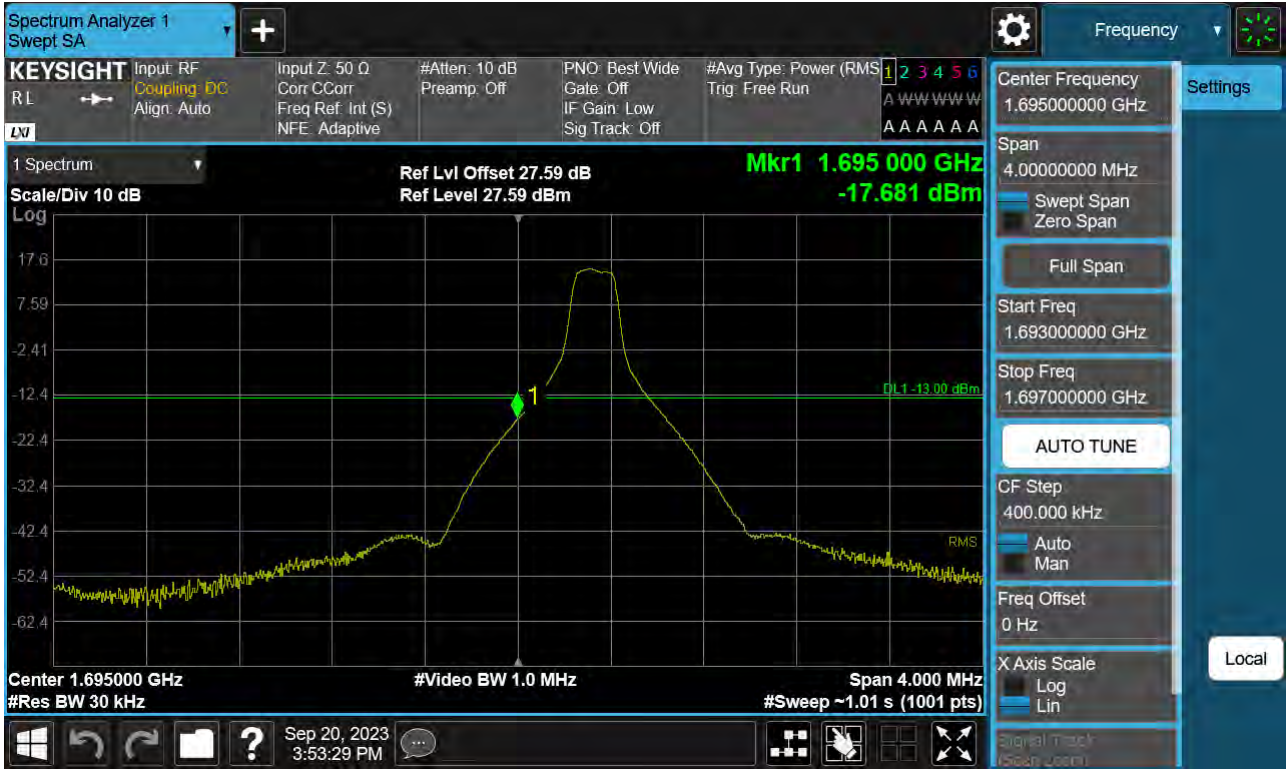
Sub6 n70. PAR Plot (15 M BW_Ch.340500_64QAM_Full RB)



Sub6 n70. PAR Plot (15 M BW_Ch.340500_256QAM_Full RB)



Sub6 n70. Lower Band Edge Plot (5 M BW Ch.339500 BPSK RB 1, Offset 0) -1



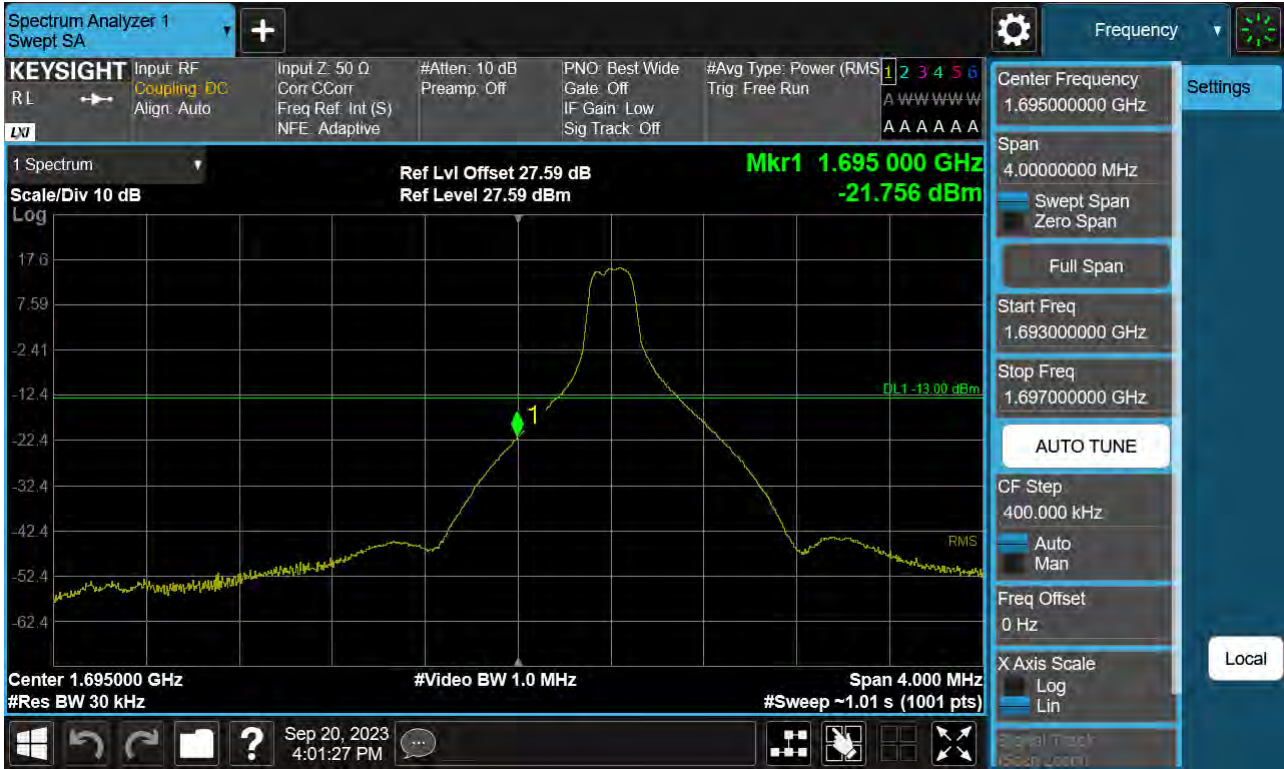
Sub6 n70. Lower Band Edge Plot (5 M BW Ch.339500 BPSK Full RB) -2



Sub6 n70. Lower Extended Band Edge Plot (5 M BW Ch.339500 BPSK_ Full RB) -3



Sub6 n70. Lower Band Edge Plot (10 M BW Ch.340000 BPSK RB 1, Offset 0) -1



Sub6 n70. Lower Band Edge Plot (10 M BW Ch.340000 BPSK Full RB) -2



Sub6 n70. Lower Extended Band Edge Plot (10 M BW Ch.340000 BPSK_ Full RB) -3

