

# FCC Sub6 REPORT

## Certification

**Applicant Name:**  
SAMSUNG Electronics Co., Ltd.

**Date of Issue:**  
July 13, 2023

**Address:**  
129, Samsung-ro, Yeongtong-gu,  
Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

**Location:**  
HCT CO., LTD.,  
74, Seoicheon-ro 578beon-gil, Majang-myeon,  
Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

**Report No.:** HCT-RF-2307-FC011

**FCC ID:** A3LSMX616B

**APPLICANT:** SAMSUNG Electronics Co., Ltd.

Model(s): SM-X616B  
 EUT Type: Tablet  
 FCC Classification: PCS Licensed Transmitter (PCB)  
 FCC Rule Part(s): §27, §2

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	EIRP	
				Max. Power (W)	Max. Power (dBm)
Sub6 n66 (5)	1712.5 – 1777.5	4M68G7D	PI/2 BPSK	0.262	24.18
		4M67G7D	QPSK	0.259	24.13
		4M70W7D	16QAM	0.224	23.50
		4M68W7D	64QAM	0.161	22.06
		4M72W7D	256QAM	0.105	20.20
Sub6 n66 (10)	1715.0 – 1775.0	9M02G7D	PI/2 BPSK	0.258	24.11
		9M00G7D	QPSK	0.254	24.04
		9M01W7D	16QAM	0.207	23.15
		8M99W7D	64QAM	0.161	22.06
		8M99W7D	256QAM	0.103	20.13
Sub6 n66 (15)	1717.5 – 1772.5	13M4G7D	PI/2 BPSK	0.229	23.60
		13M5G7D	QPSK	0.226	23.55
		13M5W7D	16QAM	0.204	23.09
		13M5W7D	64QAM	0.153	21.85
		13M4W7D	256QAM	0.094	19.72
Sub6 n66 (20)	1720.0 – 1770.0	18M0G7D	PI/2 BPSK	0.244	23.87
		17M9G7D	QPSK	0.242	23.84
		17M9W7D	16QAM	0.220	23.42
		18M0W7D	64QAM	0.163	22.11
		17M9W7D	256QAM	0.102	20.10

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-2307-FC011

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REVIEWED BY



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Report prepared by : Jung Ki Lim  
Engineer of Telecommunication Testing Center

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

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-2307-FC011	July 13, 2023	- First Approval Report

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.

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# MEASUREMENT REPORT

## 1. GENERAL INFORMATION

<b>Applicant Name:</b>	SAMSUNG Electronics Co., Ltd.
<b>Address:</b>	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
<b>FCC ID:</b>	A3LSMX616B
<b>Application Type:</b>	Certification
<b>FCC Classification:</b>	PCS Licensed Transmitter (PCB)
<b>FCC Rule Part(s):</b>	§27, §2
<b>EUT Type:</b>	Tablet
<b>Model(s):</b>	SM-X616B
<b>SCS(kHz):</b>	15
<b>Bandwidth(MHz):</b>	5, 10, 15, 20
<b>Waveform:</b>	CP-OFDM, DFT-S-OFDM
<b>Modulation:</b>	DFT-S-OFDM: PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM CP-OFDM: QPSK, 16QAM, 64QAM, 256QAM
<b>Tx Frequency:</b>	1712.5 MHz – 1777.5 MHz (Sub6 n66(5 MHz)) 1715.0 MHz – 1775.0 MHz (Sub6 n66(10 MHz)) 1717.5 MHz – 1772.5 MHz (Sub6 n66(15 MHz)) 1720.0 MHz – 1770.0 MHz (Sub6 n66(20 MHz))
<b>Date(s) of Tests:</b>	May 08, 2023 ~ June 30, 2023
<b>Serial number:</b>	Radiated: R32W3008L1X Conducted: R32W3007XJL

## **2. INTRODUCTION**

### **2.1. DESCRIPTION OF EUT**

The EUT was a Tablet with GSM/GPRS/EGPRS/UMTS and LTE, Sub6.

It also supports IEEE 802.11 a/b/g/n/ac (20/40/80 MHz), Bluetooth, BT LE.

### **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  $\geq$  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  $\geq 3 \times$  RBW
3. Span = 1.5 times the OBW
4. No. of sweep points  $> 2 \times$  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 10<sup>th</sup> 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;

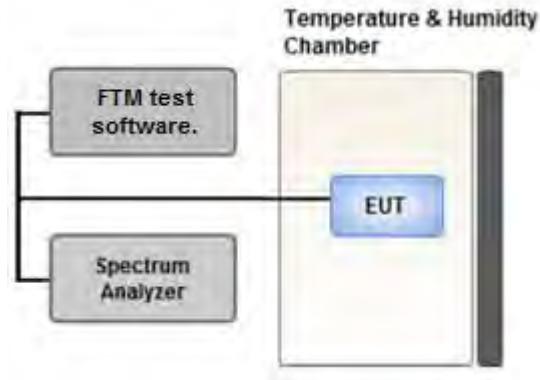
$$\text{Result}_{(dBm)} = P_g_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dBi)}$$

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.

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

### 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)**

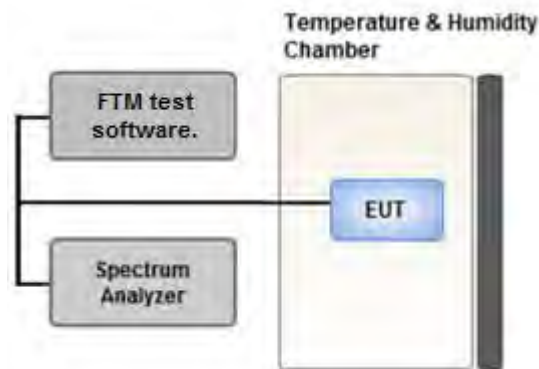
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW  $\geq 3 \times$  RBW.

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.

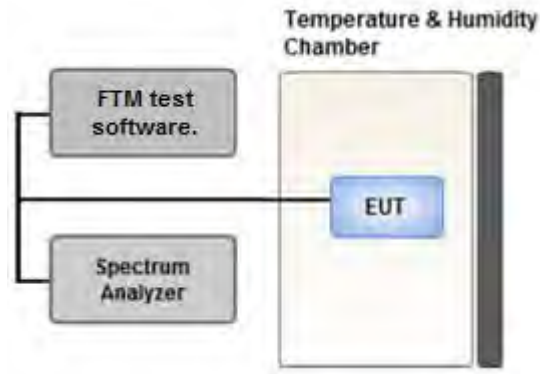
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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.

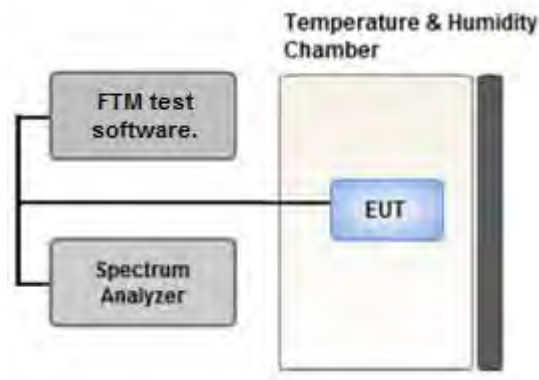
All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

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.

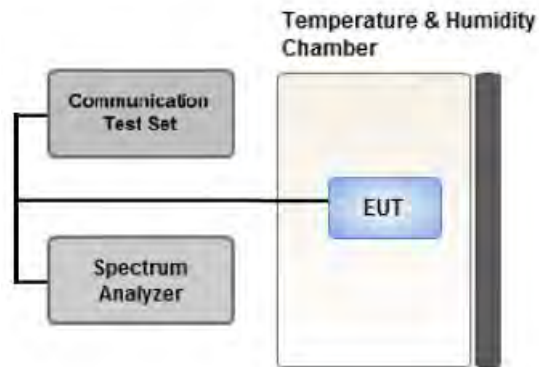
In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

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 : NSA, SA

Worst case: SA

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

Mode : Stand alone, Simultaneous transmission scenarios

Worst case : Stand alone

- Radiated Spurious emissions are measured while operating in EN-DC mode with Sub 6 NR carrier as well as an LTE carrier (anchor).

All EN-DC mode of operation were investigated and the worst case configuration results are reported.

(Worst case: 12A-n66A(10 MHz))

- 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 were investigated and the worst case bandwidth results are reported.

(Worst case : 5 MHz)

[ Worst case ]

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



**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 Modulation 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 : NSA, SA

Worst case: SA

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

Please refer to the table below.

[ 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, 20	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
		20	Low	1	0
			High	1	105
		5, 10, 15, 20	Low, High	Full RB	0
Spurious and Harmonic Emissions at Antenna Terminal	PI/2 BPSK	5, 10, 15, 20	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	09/05/2023	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	08/18/2023	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	09/27/2023	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  $U_{\text{CISPR}}$  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	<b><u>See Note1</u></b>
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
349000	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

### 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
1712.5		PI/2 BPSK	-17.54	15.82	9.60	2.00	H	< 1.00	0.220	23.42	1	12
		QPSK	-17.62	15.74	9.60	2.00	H		0.216	23.34		
		16-QAM	-18.10	15.26	9.60	2.00	H		0.193	22.86		
		64-QAM	-19.48	13.88	9.60	2.00	H		0.141	21.48		
		256-QAM	-21.72	11.64	9.60	2.00	H		0.084	19.24		
1745.0	Sub6 n66/ 5 MHz [15 kHz]	PI/2 BPSK	-17.13	16.47	9.75	2.04	H	< 1.00	0.262	24.18	1	1
		QPSK	-17.18	16.42	9.75	2.04	H		0.259	24.13		
		16-QAM	-17.81	15.79	9.75	2.04	H		0.224	23.50		
		64-QAM	-19.43	14.17	9.75	2.04	H		0.154	21.88		
		256-QAM	-21.55	12.05	9.75	2.04	H		0.095	19.76		
1777.5		PI/2 BPSK	-17.71	15.83	9.90	2.08	H	< 1.00	0.232	23.65	1	23
		QPSK	-17.75	15.79	9.90	2.08	H		0.230	23.61		
		16-QAM	-18.15	15.39	9.90	2.08	H		0.209	23.21		
		64-QAM	-19.30	14.24	9.90	2.08	H		0.161	22.06		
		256-QAM	-21.16	12.38	9.90	2.08	H		0.105	20.20		

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
1715.0	Sub6 n66/ 10 MHz [15 kHz]	PI/2 BPSK	-18.19	15.17	9.60	2.00	H	< 1.00	0.189	22.77	1	26
		QPSK	-18.21	15.15	9.60	2.00	H		0.188	22.75		
		16-QAM	-18.61	14.75	9.60	2.00	H		0.172	22.35		
		64-QAM	-19.83	13.53	9.60	2.00	H		0.130	21.13		
		256-QAM	-21.88	11.48	9.60	2.00	H		0.081	19.08		
1745.0		PI/2 BPSK	-17.20	16.40	9.75	2.04	H		0.258	24.11	1	1
		QPSK	-17.27	16.33	9.75	2.04	H		0.254	24.04		
		16-QAM	-18.24	15.36	9.75	2.04	H		0.203	23.07		
		64-QAM	-19.81	13.79	9.75	2.04	H		0.141	21.50		
		256-QAM	-22.11	11.49	9.75	2.04	H		0.083	19.20		
1775.0	PI/2 BPSK	-17.84	15.70	9.90	2.08	H	0.225	23.52	1	1		
	QPSK	-17.87	15.67	9.90	2.08	H	0.223	23.49				
	16-QAM	-18.21	15.33	9.90	2.08	H	0.207	23.15				
	64-QAM	-19.30	14.24	9.90	2.08	H	0.161	22.06				
	256-QAM	-21.23	12.31	9.90	2.08	H	0.103	20.13				



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
1717.5	Sub6 n66/ 15 MHz [15 kHz]	PI/2 BPSK	-18.41	14.95	9.60	2.00	H	< 1.00	0.180	22.55	1	39
		QPSK	-18.46	14.90	9.60	2.00	H		0.178	22.50		
		16-QAM	-18.73	14.63	9.60	2.00	H		0.167	22.23		
		64-QAM	-19.74	13.62	9.60	2.00	H		0.132	21.22		
		256-QAM	-21.82	11.54	9.60	2.00	H		0.082	19.14		
1745.0		PI/2 BPSK	-17.71	15.89	9.75	2.04	H		0.229	23.60	1	1
		QPSK	-17.76	15.84	9.75	2.04	H		0.226	23.55		
		16-QAM	-18.22	15.38	9.75	2.04	H		0.204	23.09		
		64-QAM	-19.69	13.91	9.75	2.04	H		0.145	21.62		
		256-QAM	-21.62	11.98	9.75	2.04	H		0.093	19.69		
1772.5	PI/2 BPSK	-17.82	15.72	9.90	2.08	H	0.226	23.54	1	1		
	QPSK	-17.86	15.68	9.90	2.08	H	0.224	23.50				
	16-QAM	-18.30	15.24	9.90	2.08	H	0.202	23.06				
	64-QAM	-19.51	14.03	9.90	2.08	H	0.153	21.85				
	256-QAM	-21.64	11.90	9.90	2.08	H	0.094	19.72				

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
1720.0	Sub6 n66/ 20 MHz [15 kHz]	PI/2 BPSK	-18.09	15.41	9.60	2.00	H	< 1.00	0.200	23.01	1	104
		QPSK	-18.15	15.35	9.60	2.00	H		0.197	22.95		
		16-QAM	-18.55	14.95	9.60	2.00	H		0.180	22.55		
		64-QAM	-20.14	13.36	9.60	2.00	H		0.125	20.96		
		256-QAM	-22.27	11.23	9.60	2.00	H		0.076	18.83		
1745.0		PI/2 BPSK	-17.61	15.99	9.75	2.04	H		0.234	23.70	1	53
		QPSK	-17.65	15.95	9.75	2.04	H		0.232	23.66		
		16-QAM	-18.04	15.56	9.75	2.04	H		0.212	23.27		
		64-QAM	-19.40	14.20	9.75	2.04	H		0.155	21.91		
		256-QAM	-21.70	11.90	9.75	2.04	H		0.091	19.61		
1770.0	PI/2 BPSK	-17.58	16.06	9.90	2.09	H	0.244	23.87	1	53		
	QPSK	-17.61	16.03	9.90	2.09	H	0.242	23.84				
	16-QAM	-18.03	15.61	9.90	2.09	H	0.220	23.42				
	64-QAM	-19.34	14.30	9.90	2.09	H	0.163	22.11				
	256-QAM	-21.35	12.29	9.90	2.09	H	0.102	20.10				

**8.2 RADIATED SPURIOUS EMISSIONS**

- NR Band: N66
- Bandwidth: 5 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
342500 (1712.5)	3 425.00	-59.45	11.10	-60.40	2.96	V	-52.26	-13.00	1	12
	5 137.50	-60.14	10.80	-54.87	3.62	V	-47.69	-13.00		
	6 850.00	-62.20	10.80	-51.25	4.32	V	-44.77	-13.00		
349000 (1745.0)	3 490.00	-61.08	11.20	-62.52	3.00	H	-54.32	-13.00	1	1
	5 235.00	-56.52	11.10	-51.59	3.70	H	-44.19	-13.00		
	6 980.00	-59.26	10.90	-46.55	4.30	H	-39.95	-13.00		
355500 (1777.5)	3 555.00	-60.48	11.40	-62.45	3.02	V	-54.07	-13.00	1	23
	5 332.50	-62.18	11.40	-57.13	3.73	V	-49.46	-13.00		
	7 110.00	-63.63	10.50	-49.69	4.36	V	-43.55	-13.00		

■ ENDC-Mode : 12A(10 MHz)-n66A(5 MHz)

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
23095 (707.5)	1415.00	-59.88	7.61	-66.51	1.87	V	-60.76	-13.00
	2122.50	-60.26	8.98	-66.08	2.31	V	-59.41	-13.00
	2830.00	-61.30	10.52	-65.31	2.73	V	-57.52	-13.00

**8.3 PEAK-TO-AVERAGE RATIO**

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB )
Sub6 n66	5 MHz	1745.0	BPSK	25	0	4.48
			QPSK			4.88
			16-QAM			5.63
			64-QAM			5.96
			256-QAM			6.37
	10 MHz		BPSK	50		4.55
			QPSK			4.96
			16-QAM			5.44
			64-QAM			5.71
			256-QAM			6.10
	15 MHz		BPSK	75		4.71
			QPSK			4.90
			16-QAM			5.38
			64-QAM			5.69
			256-QAM			5.97
	20 MHz		BPSK	100		4.29
			QPSK			4.94
			16-QAM			5.40
			64-QAM			5.65
			256-QAM			6.03

**Note:**

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 56 ~ 75.

**8.4 OCCUPIED BANDWIDTH**

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
Sub6 n66	5 MHz	1745.0	BPSK	25	0	4.6818
			QPSK			4.6689
			16-QAM			4.7031
			64-QAM			4.6720
			256-QAM			4.7177
	10 MHz		BPSK	50		9.0170
			QPSK			9.0038
			16-QAM			9.0078
			64-QAM			8.9925
			256-QAM			8.9916
	15 MHz		BPSK	75		13.443
			QPSK			13.492
			16-QAM			13.455
			64-QAM			13.519
			256-QAM			13.417
	20 MHz		BPSK	100		17.957
			QPSK			17.939
			16-QAM			17.900
			64-QAM			17.967
			256-QAM			17.865

**Note:**

1. Plots of the EUT's Occupied Bandwidth are shown Page 36 ~ 55.

**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 n66	5	1712.5	9.9327	30.815	-70.801	-39.986	-13.00
		1745.0	9.5040	30.815	-70.628	-39.813	
		1777.5	4.8988	30.200	-70.425	-40.225	
	10	1715.0	8.2483	30.815	-70.414	-39.599	
		1745.0	8.2358	30.815	-70.668	-39.853	
		1775.0	5.1705	30.815	-70.715	-39.900	
	15	1717.5	8.9033	30.815	-69.755	-38.940	
		1745.0	8.8310	30.815	-70.677	-39.862	
		1772.5	8.8564	30.815	-70.606	-39.791	
	20	1720.0	9.6999	30.815	-70.719	-39.904	
		1745.0	4.0429	30.200	-70.651	-40.451	
		1770.0	8.3669	30.815	-70.309	-39.494	

**Note:**

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 100 ~ 123.
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 76 ~ 99.

**8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE**

- ▣ BandWidth: 5 MHz
- ▣ Voltage(100 %): 3.850 VDC
- ▣ Batt. Endpoint: 3.400 VDC
- ▣ LIMIT: Emission must remain in band

Test. Frequency (MHz)	Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
1712.5	100 %	+20(Ref)	1712 500 000	0.0	0.000 000	0.000
	100 %	-30	1712 500 001	0.3	0.000 000	0.000
	100 %	-20	1712 500 000	0.0	0.000 000	0.000
	100 %	-10	1712 500 001	0.6	0.000 000	0.000
	100 %	0	1712 500 001	0.5	0.000 000	0.000
	100 %	+10	1712 500 000	-0.6	0.000 000	0.000
	100 %	+30	1712 500 000	-0.1	0.000 000	0.000
	100 %	+40	1712 500 000	-0.3	0.000 000	0.000
	100 %	+50	1712 500 000	-0.3	0.000 000	0.000
	Batt. Endpoint	+20	1712 500 000	0.0	0.000 000	0.000
1777.5	100 %	+20(Ref)	1777 499 999	0.0	0.000 000	0.000
	100 %	-30	1777 499 999	-0.8	0.000 000	0.000
	100 %	-20	1777 500 000	0.4	0.000 000	0.000
	100 %	-10	1777 499 999	0.0	0.000 000	0.000
	100 %	0	1777 499 999	-0.3	0.000 000	0.000
	100 %	+10	1777 500 000	0.3	0.000 000	0.000
	100 %	+30	1777 499 999	0.1	0.000 000	0.000
	100 %	+40	1777 499 999	-0.6	0.000 000	0.000
	100 %	+50	1777 499 999	-0.1	0.000 000	0.000
	Batt. Endpoint	+20	1777 499 999	-0.4	0.000 000	0.000

- ▣ BandWidth: 10 MHz
- ▣ Voltage(100 %): 3.850 VDC
- ▣ Batt. Endpoint: 3.400 VDC
- ▣ LIMIT: Emission must remain in band

Test. Frequency (MHz)	Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
1715.0	100 %	+20(Ref)	1715 000 000	0.0	0.000 000	0.000
	100 %	-30	1714 999 999	-0.5	0.000 000	0.000
	100 %	-20	1714 999 999	-0.5	0.000 000	0.000
	100 %	-10	1715 000 000	0.3	0.000 000	0.000
	100 %	0	1715 000 000	0.5	0.000 000	0.000
	100 %	+10	1714 999 999	-0.4	0.000 000	0.000
	100 %	+30	1714 999 999	-0.2	0.000 000	0.000
	100 %	+40	1714 999 999	-0.2	0.000 000	0.000
	100 %	+50	1714 999 999	-0.7	0.000 000	0.000
	Batt. Endpoint	+20	1714 999 999	-0.2	0.000 000	0.000
1775.0	100 %	+20(Ref)	1774 999 999	0.0	0.000 000	0.000
	100 %	-30	1774 999 999	-0.1	0.000 000	0.000
	100 %	-20	1774 999 998	-0.9	0.000 000	-0.001
	100 %	-10	1774 999 998	-0.7	0.000 000	0.000
	100 %	0	1774 999 999	0.1	0.000 000	0.000
	100 %	+10	1774 999 999	-0.1	0.000 000	0.000
	100 %	+30	1774 999 999	-0.1	0.000 000	0.000
	100 %	+40	1774 999 999	0.4	0.000 000	0.000
	100 %	+50	1774 999 999	0.0	0.000 000	0.000
	Batt. Endpoint	+20	1774 999 998	-0.9	0.000 000	0.000



- ▣ BandWidth: 15 MHz
- ▣ Voltage(100 %): 3.850 VDC
- ▣ Batt. Endpoint: 3.400 VDC
- ▣ LIMIT: Emission must remain in band

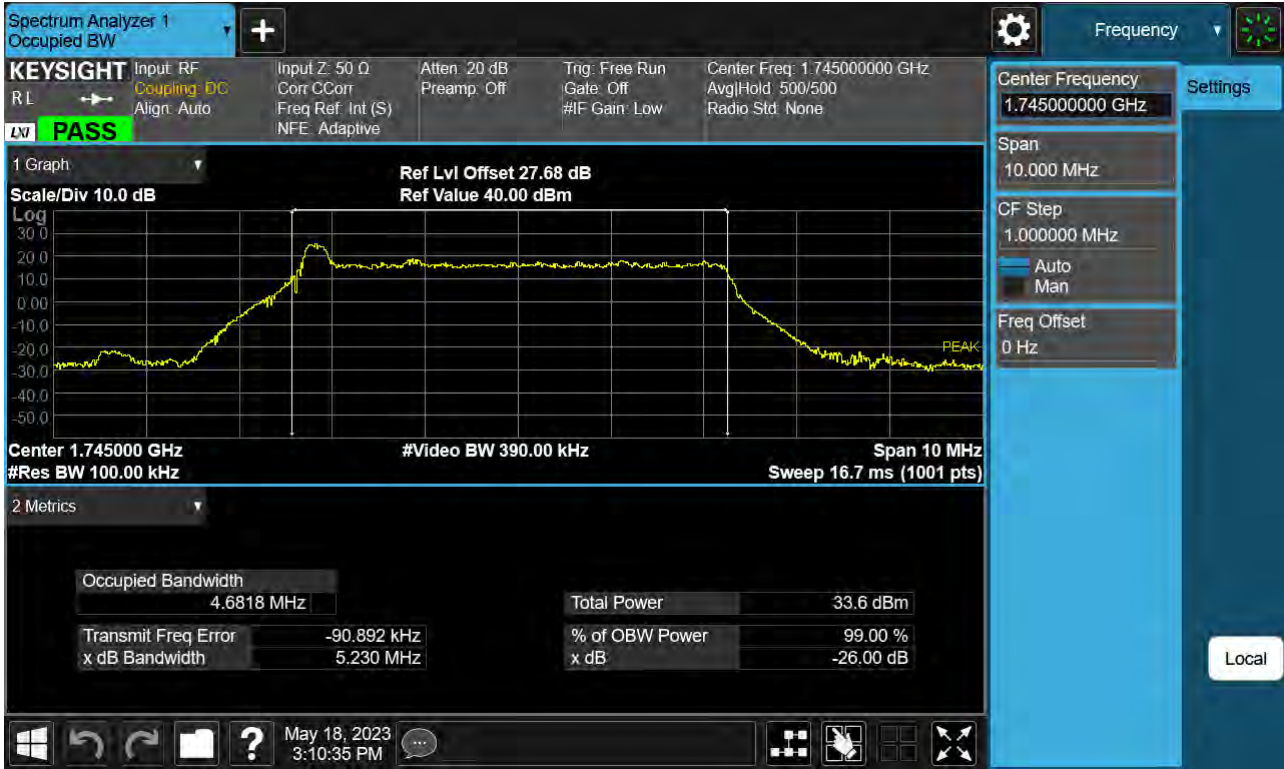
Test. Frequency (MHz)	Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
1717.5	100 %	+20(Ref)	1717 499 999	0.0	0.000 000	0.000
	100 %	-30	1717 499 999	-0.4	0.000 000	0.000
	100 %	-20	1717 500 000	0.7	0.000 000	0.000
	100 %	-10	1717 499 999	0.0	0.000 000	0.000
	100 %	0	1717 499 998	-0.8	0.000 000	0.000
	100 %	+10	1717 499 999	-0.5	0.000 000	0.000
	100 %	+30	1717 499 999	-0.4	0.000 000	0.000
	100 %	+40	1717 499 999	-0.7	0.000 000	0.000
	100 %	+50	1717 499 999	0.1	0.000 000	0.000
	Batt. Endpoint	+20	1717 500 000	0.2	0.000 000	0.000
1772.5	100 %	+20(Ref)	1772 500 000	0.0	0.000 000	0.000
	100 %	-30	1772 500 001	0.6	0.000 000	0.000
	100 %	-20	1772 500 000	-0.5	0.000 000	0.000
	100 %	-10	1772 500 000	-0.4	0.000 000	0.000
	100 %	0	1772 500 001	0.4	0.000 000	0.000
	100 %	+10	1772 500 001	1.0	0.000 000	0.001
	100 %	+30	1772 500 001	0.6	0.000 000	0.000
	100 %	+40	1772 500 001	0.7	0.000 000	0.000
	100 %	+50	1772 500 000	0.1	0.000 000	0.000
	Batt. Endpoint	+20	1772 500 000	0.1	0.000 000	0.000

- ▣ BandWidth: 20 MHz
- ▣ Voltage(100 %): 3.850 VDC
- ▣ Batt. Endpoint: 3.400 VDC
- ▣ LIMIT: Emission must remain in band

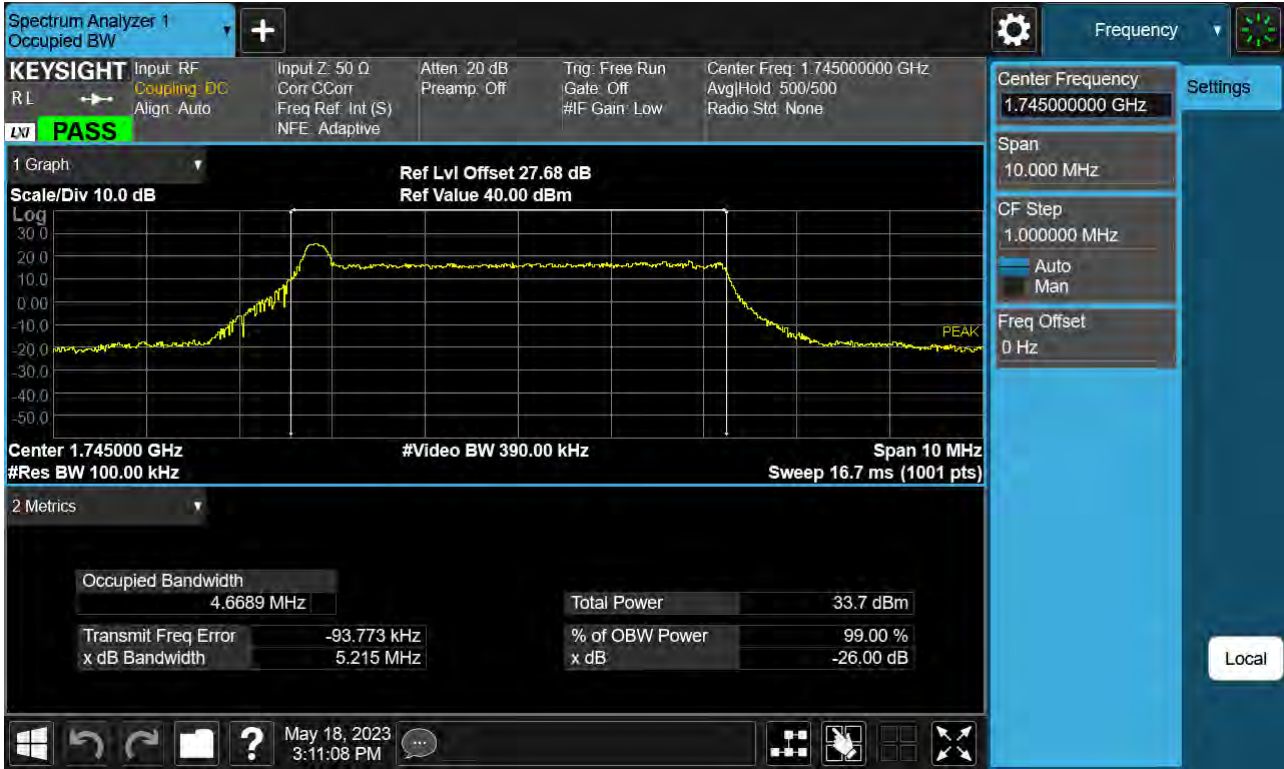
Test. Frequency (MHz)	Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
1720.0	100 %	+20(Ref)	1720 000 000	0.0	0.000 000	0.000
	100 %	-30	1720 000 000	-0.2	0.000 000	0.000
	100 %	-20	1720 000 000	-0.1	0.000 000	0.000
	100 %	-10	1720 000 000	0.1	0.000 000	0.000
	100 %	0	1720 000 000	0.2	0.000 000	0.000
	100 %	+10	1720 000 000	0.2	0.000 000	0.000
	100 %	+30	1720 000 001	1.0	0.000 000	0.001
	100 %	+40	1720 000 000	-0.1	0.000 000	0.000
	100 %	+50	1720 000 000	-0.6	0.000 000	0.000
	Batt. Endpoint	+20	1720 000 000	0.0	0.000 000	0.000
1770.0	100 %	+20(Ref)	1769 999 999	0.0	0.000 000	0.000
	100 %	-30	1769 999 998	-0.9	0.000 000	0.000
	100 %	-20	1769 999 999	-0.5	0.000 000	0.000
	100 %	-10	1769 999 999	-0.3	0.000 000	0.000
	100 %	0	1769 999 999	-0.3	0.000 000	0.000
	100 %	+10	1770 000 000	1.1	0.000 000	0.001
	100 %	+30	1770 000 000	0.4	0.000 000	0.000
	100 %	+40	1770 000 000	1.0	0.000 000	0.001
	100 %	+50	1769 999 999	0.1	0.000 000	0.000
	Batt. Endpoint	+20	1769 999 999	-0.3	0.000 000	0.000

## 9. TEST PLOTS

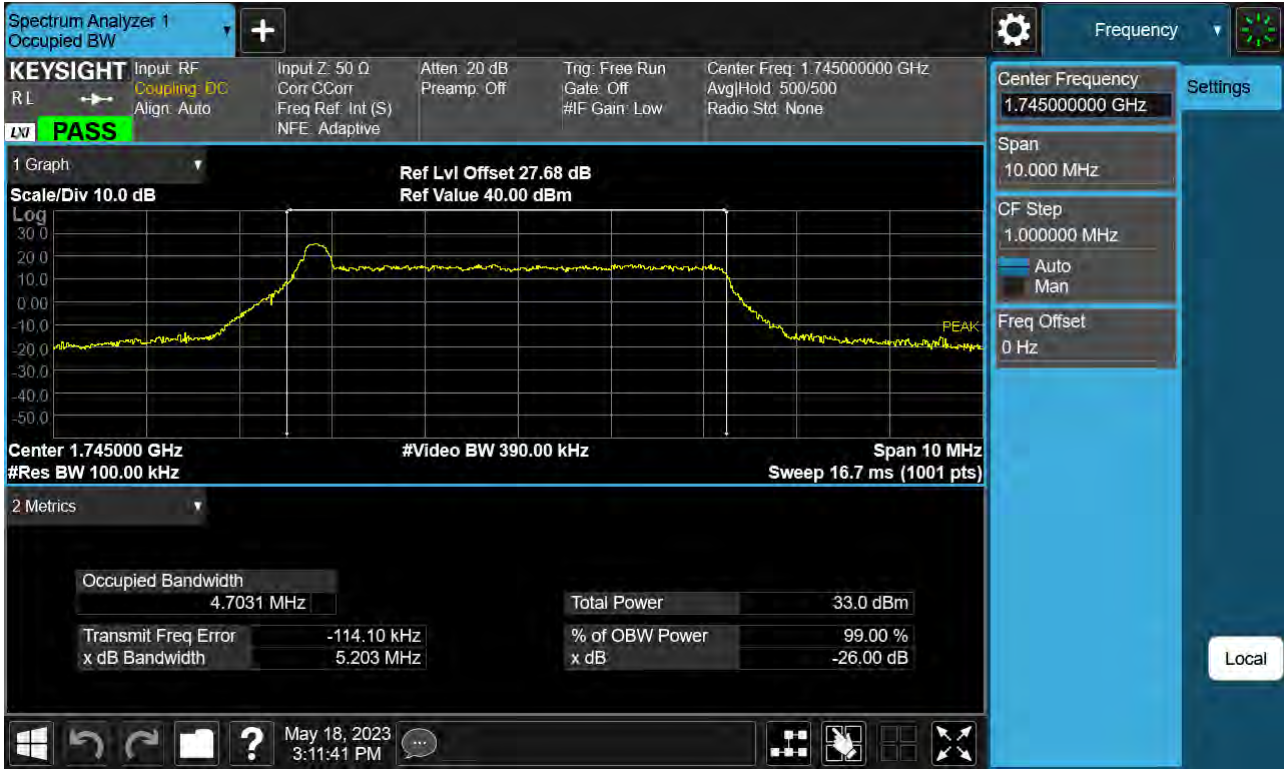
Sub6 n66. Occupied Bandwidth Plot (5 M BW Ch.349000 BPSK Full RB)



Sub6 n66. Occupied Bandwidth Plot (5 M BW Ch.349000 QPSK Full RB)



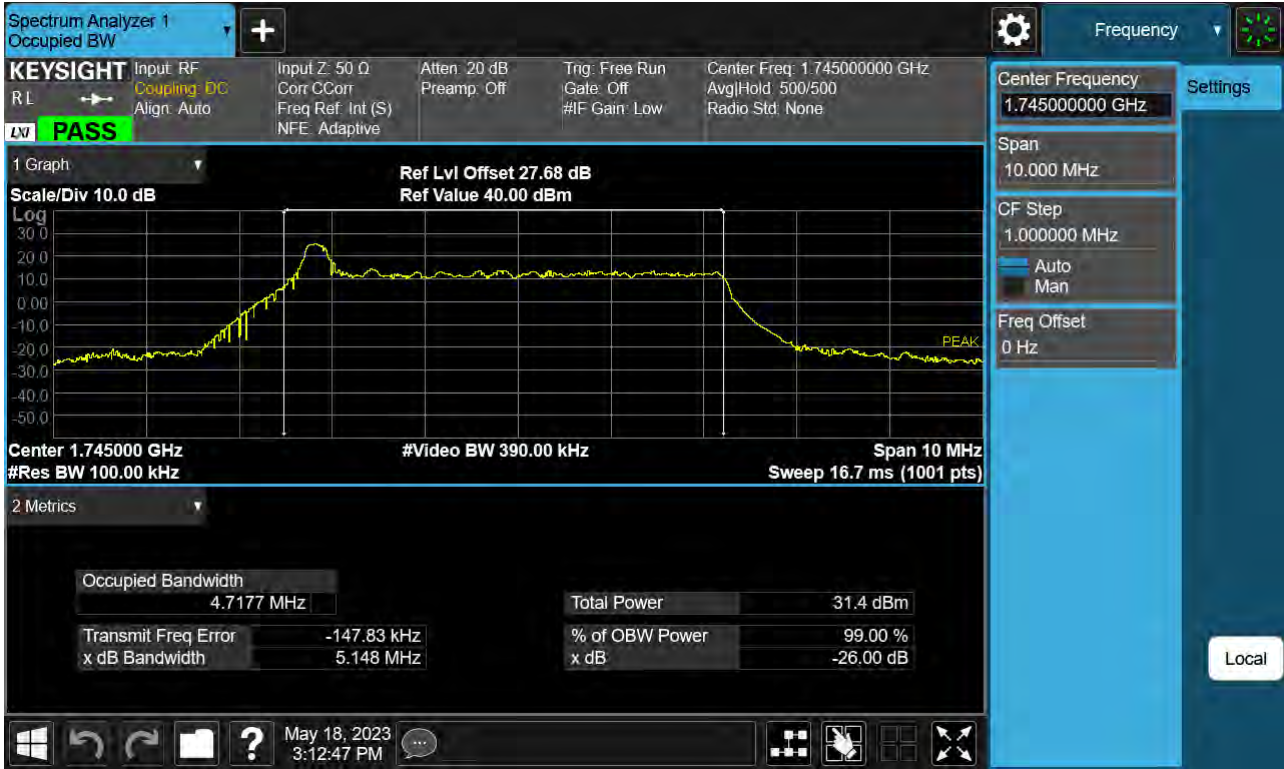
Sub6 n66. Occupied Bandwidth Plot (5 M BW Ch.349000 16QAM Full RB)



Sub6 n66. Occupied Bandwidth Plot (5 M BW Ch.349000 64QAM Full RB)



Sub6 n66. Occupied Bandwidth Plot (5 M BW Ch.349000 256QAM Full RB)





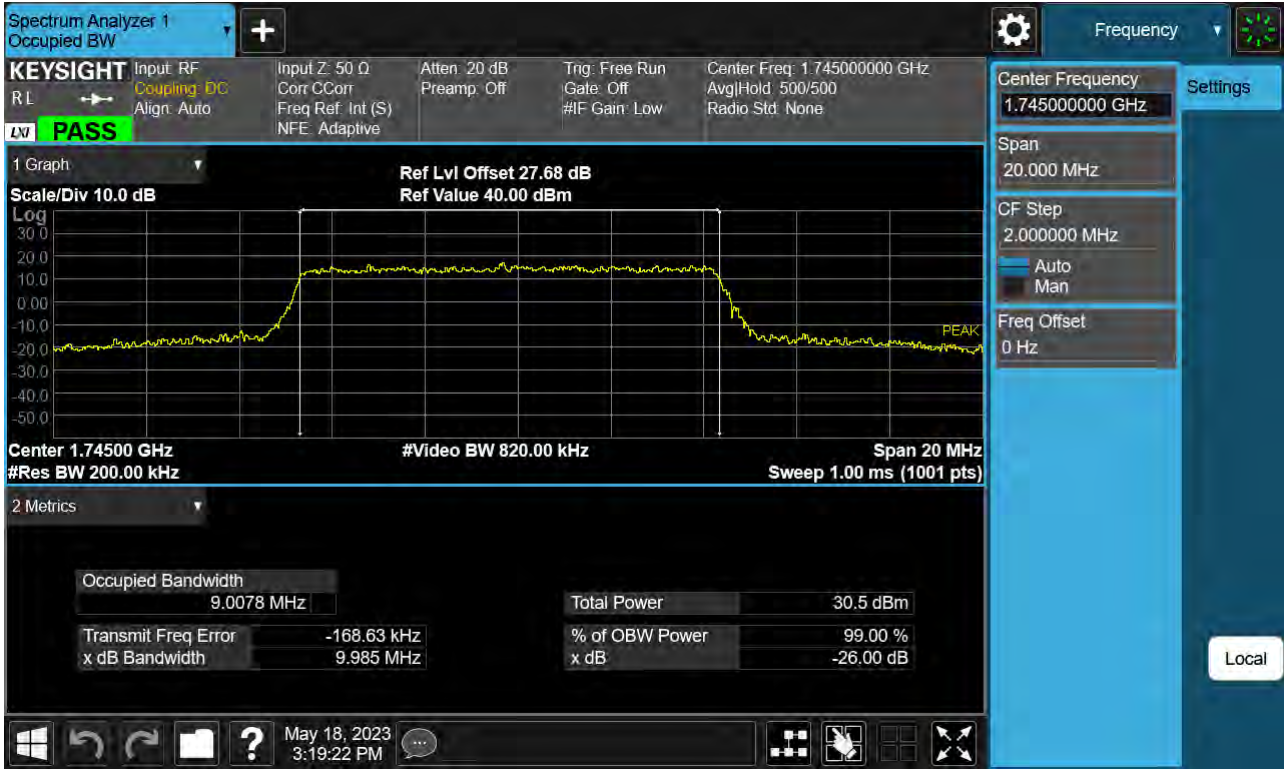
Sub6 n66. Occupied Bandwidth Plot (10 M BW Ch.349000 BPSK Full RB)



Sub6 n66. Occupied Bandwidth Plot (10 M BW Ch.349000 QPSK Full RB)



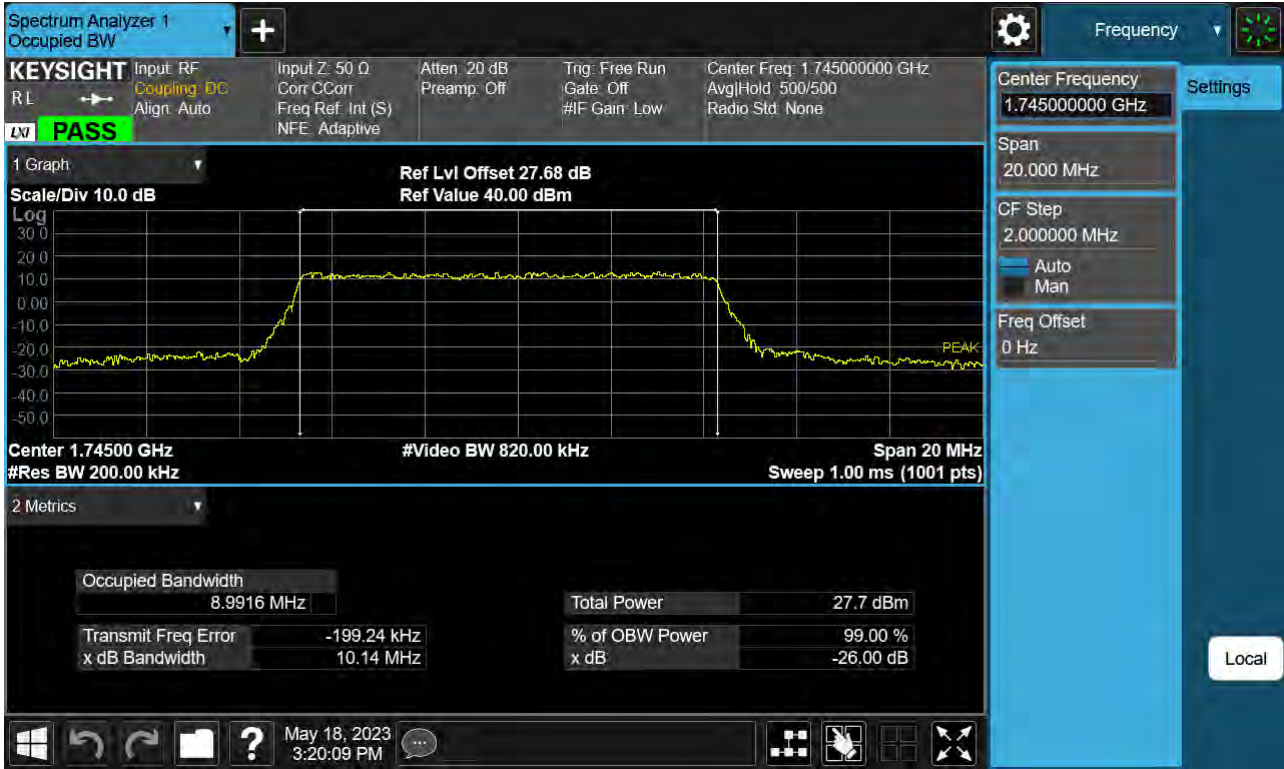
Sub6 n66. Occupied Bandwidth Plot (10 M BW Ch.349000 16QAM Full RB)



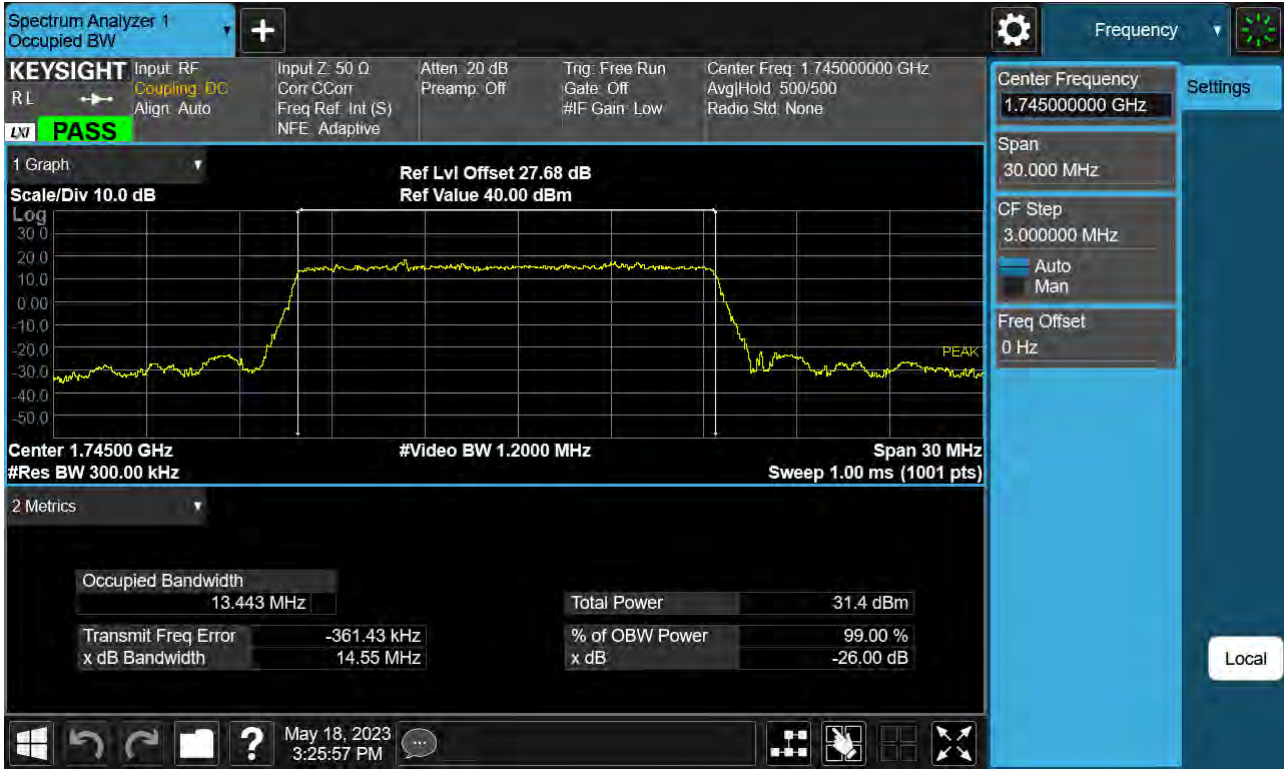
Sub6 n66. Occupied Bandwidth Plot (10 M BW Ch.349000 64QAM Full RB)



Sub6 n66. Occupied Bandwidth Plot (10 M BW Ch.349000 256QAM Full RB)



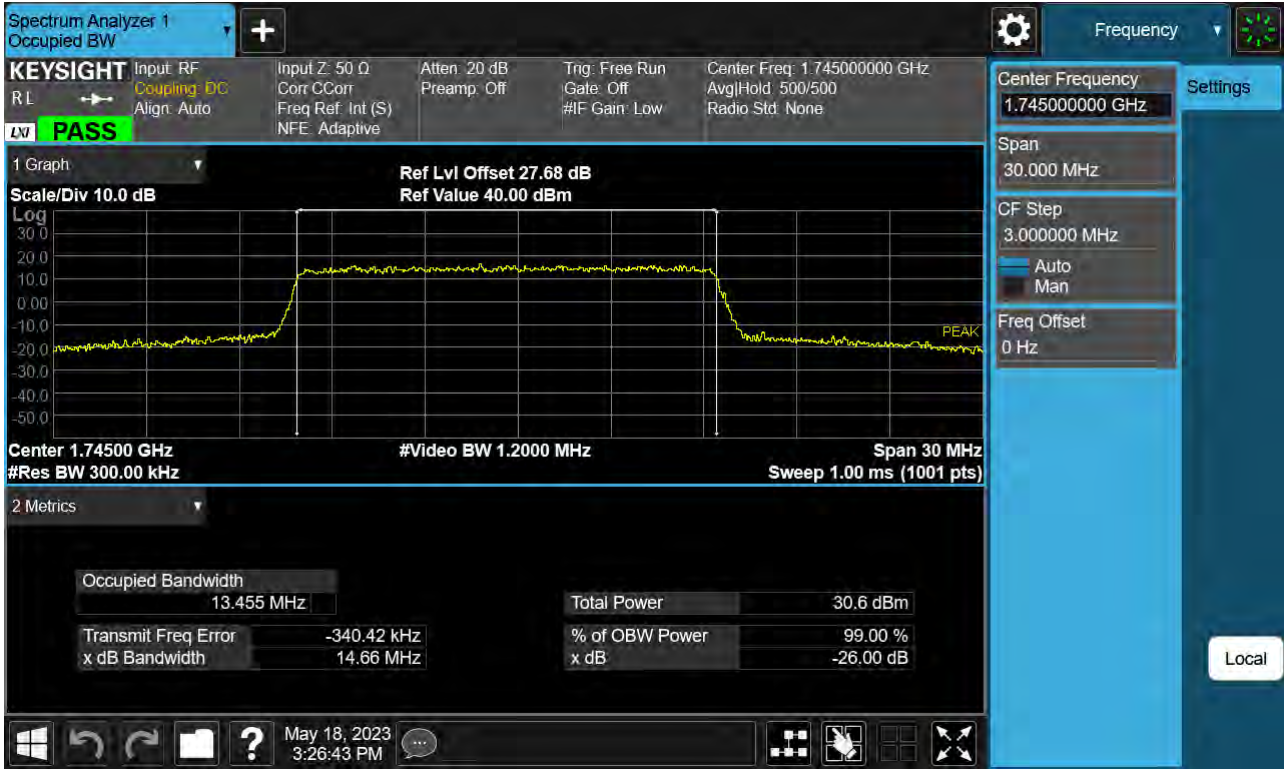
Sub6 n66. Occupied Bandwidth Plot (15 M BW Ch.349000 BPSK Full RB)



Sub6 n66. Occupied Bandwidth Plot (15 M BW Ch.349000 QPSK Full RB)

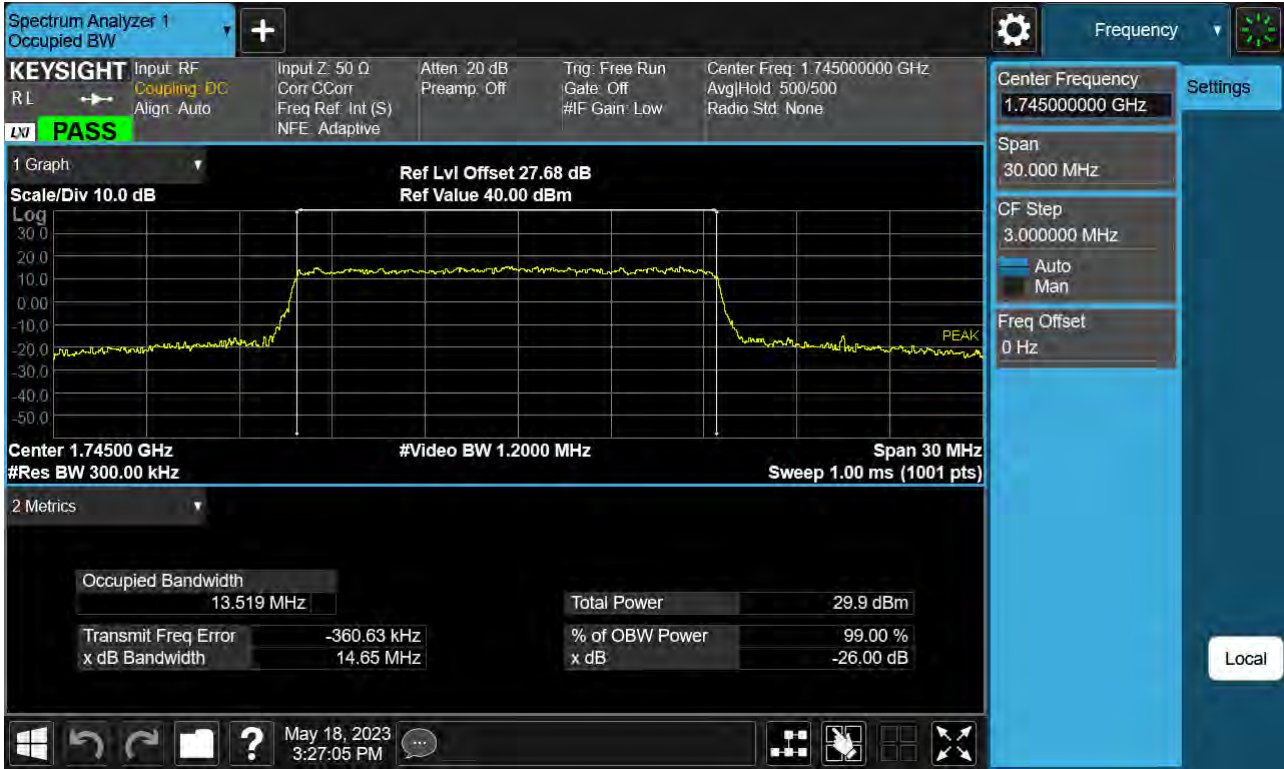


Sub6 n66. Occupied Bandwidth Plot (15 M BW Ch.349000 16QAM Full RB)

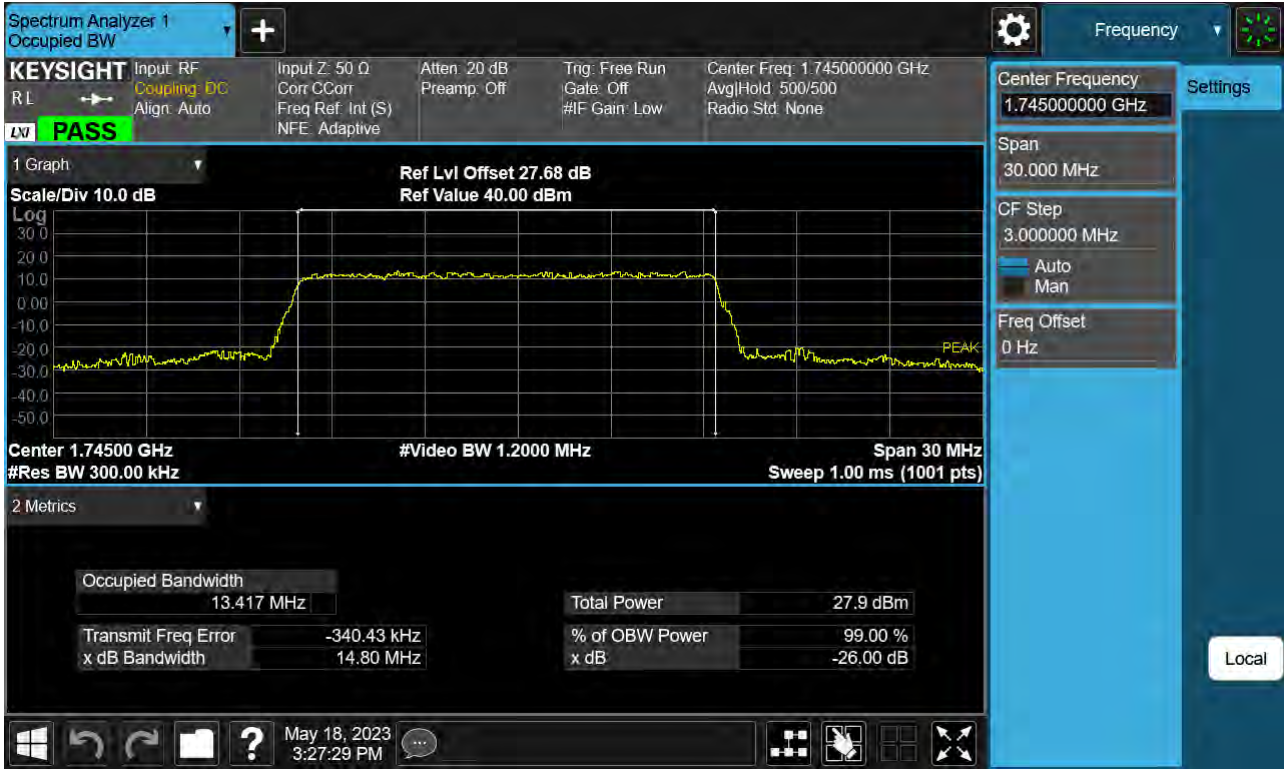




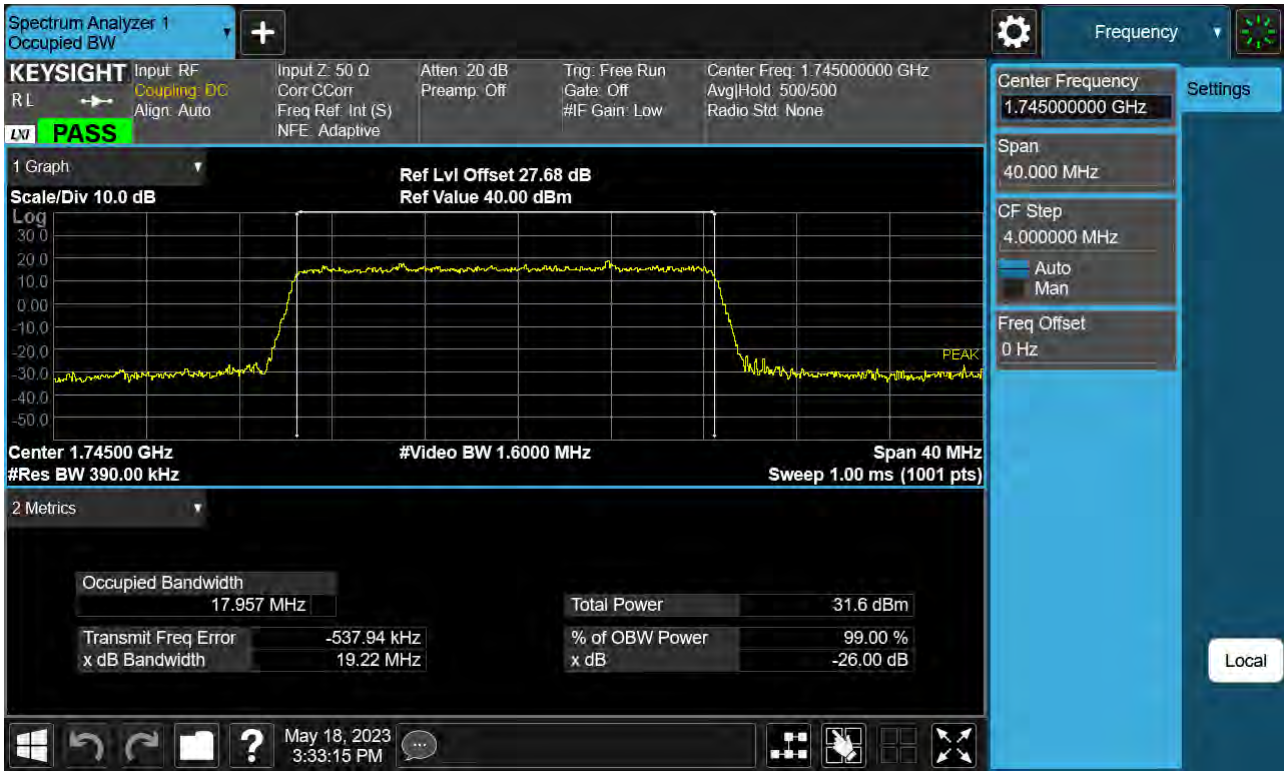
Sub6 n66. Occupied Bandwidth Plot (15 M BW Ch.349000 64QAM Full RB)



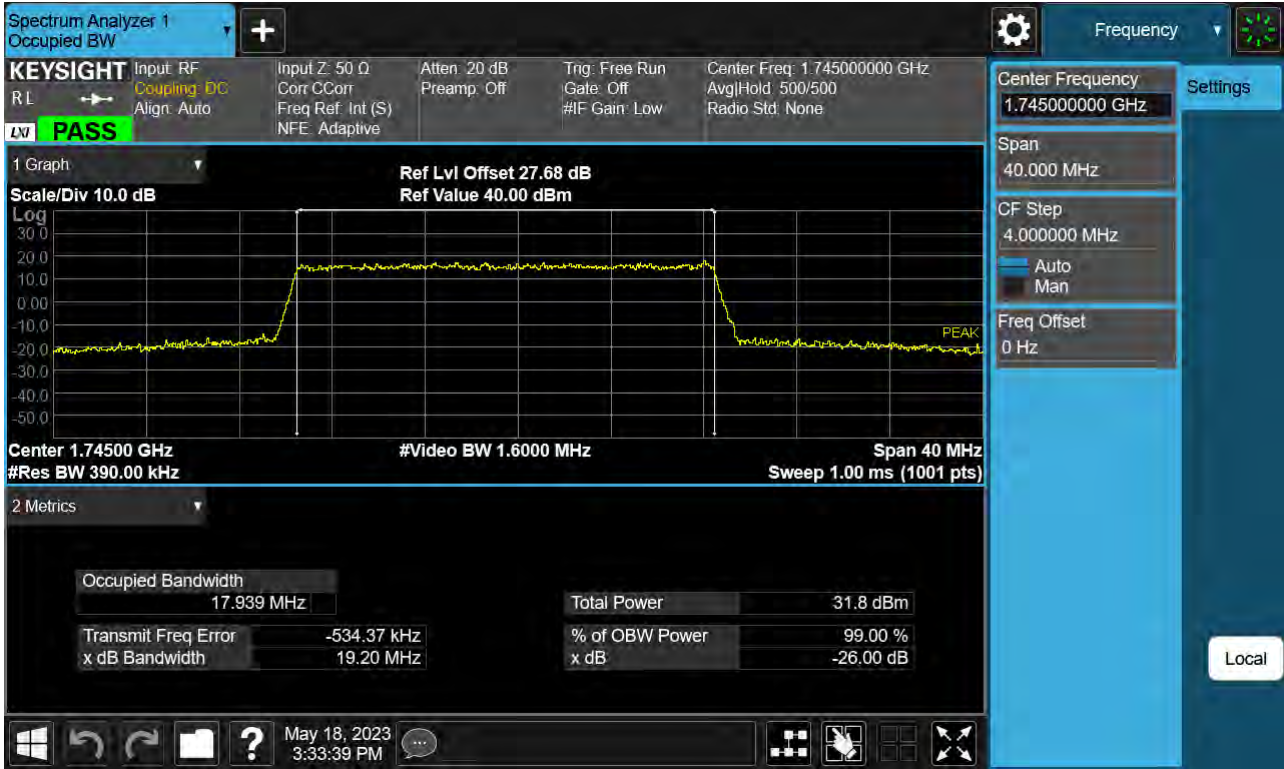
Sub6 n66. Occupied Bandwidth Plot (15 M BW Ch.349000 256QAM Full RB)



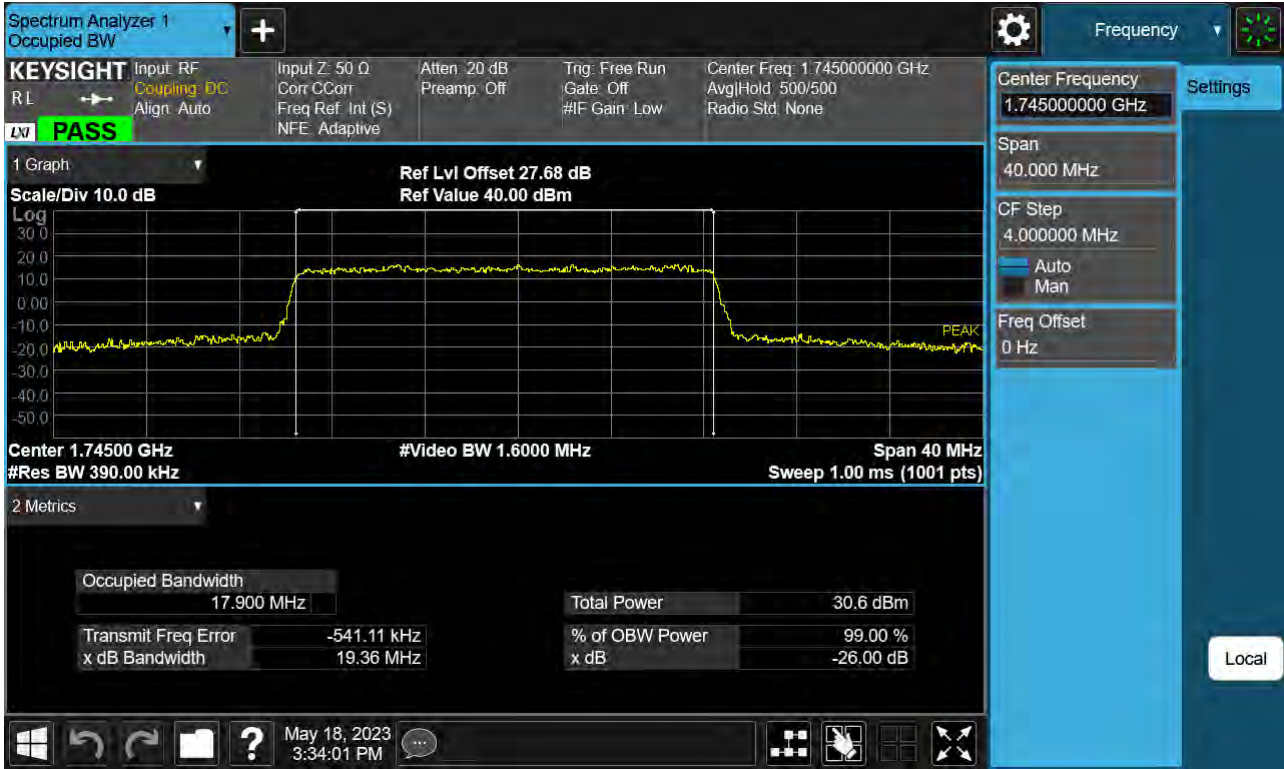
Sub6 n66. Occupied Bandwidth Plot (20 M BW Ch.349000 BPSK Full RB)



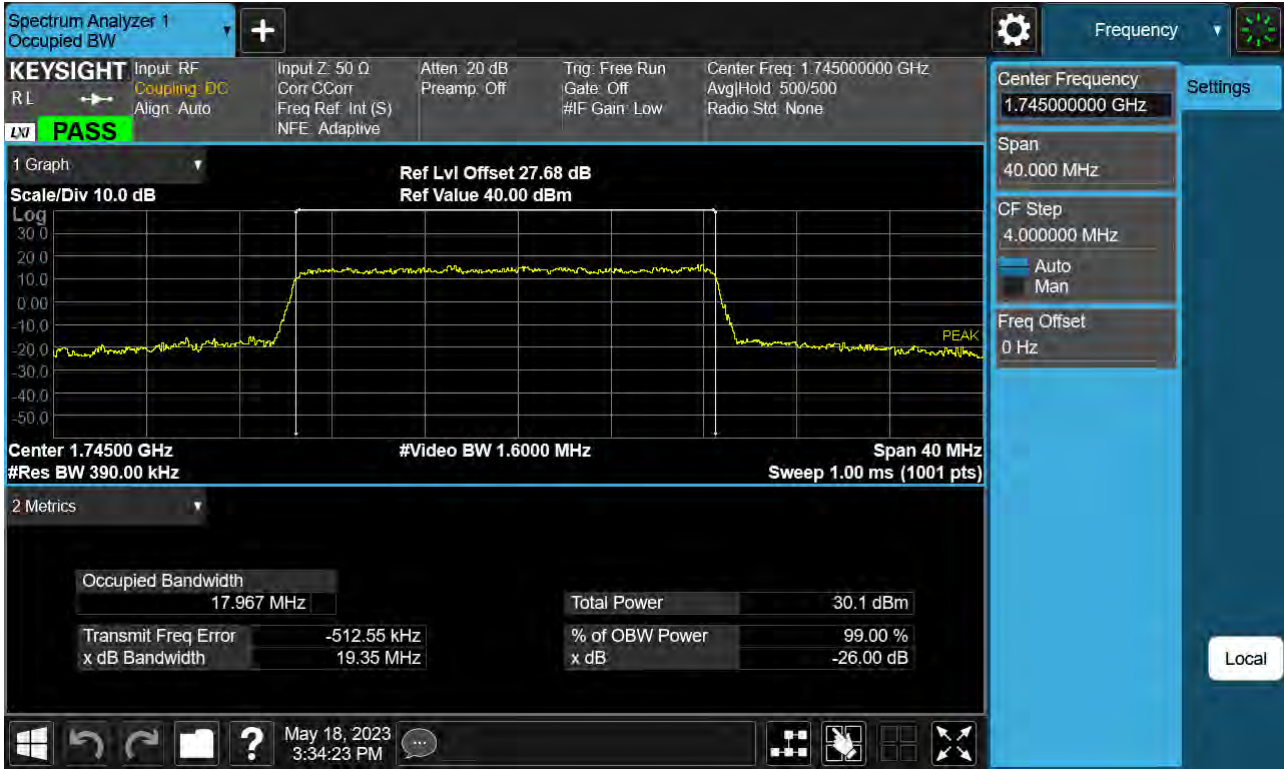
Sub6 n66. Occupied Bandwidth Plot (20 M BW Ch.349000 QPSK Full RB)



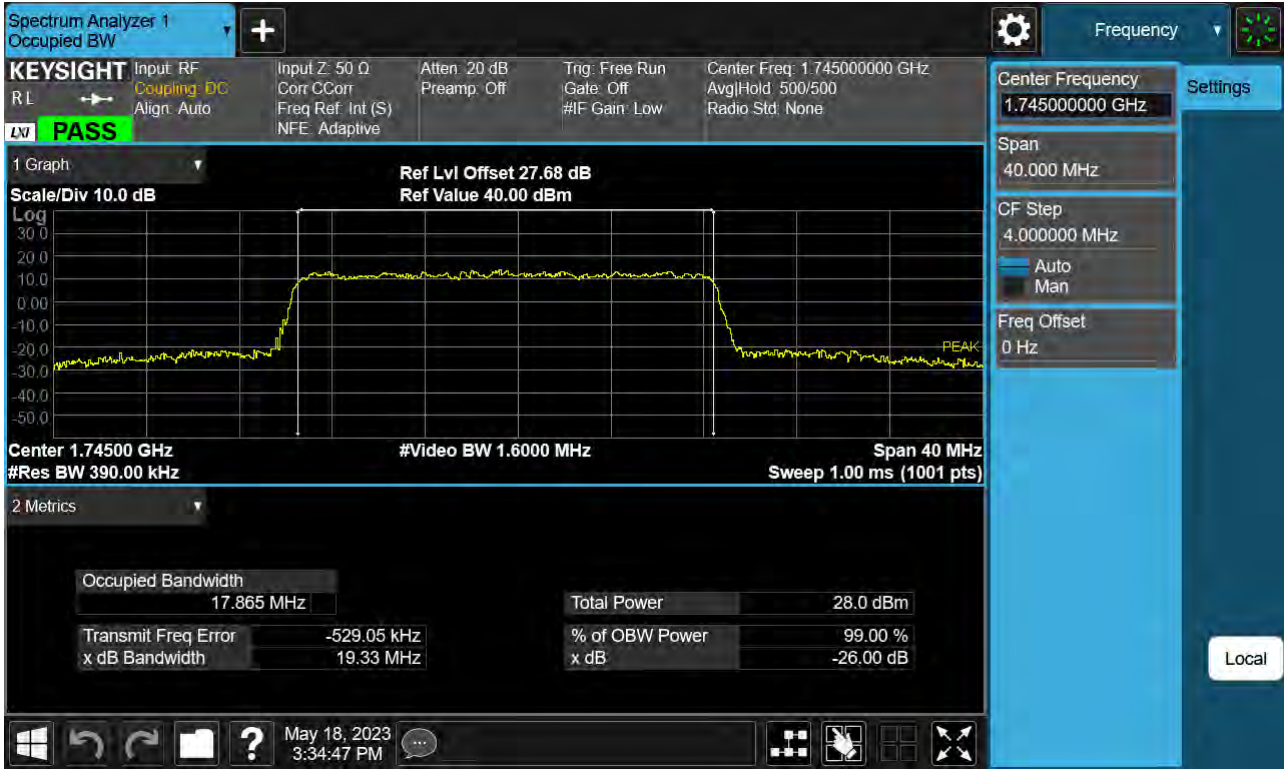
Sub6 n66. Occupied Bandwidth Plot (20 M BW Ch.349000 16QAM Full RB)



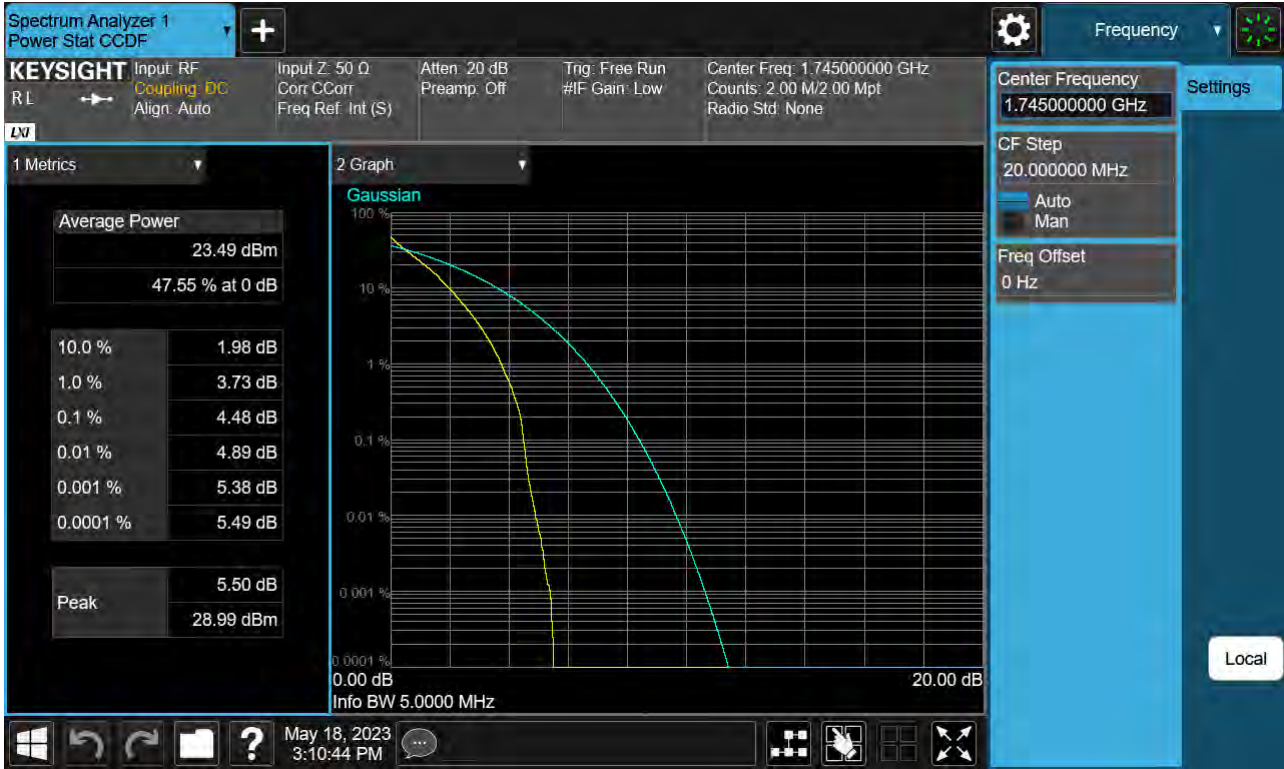
Sub6 n66. Occupied Bandwidth Plot (20 M BW Ch.349000 64QAM Full RB)



Sub6 n66. Occupied Bandwidth Plot (20 M BW Ch.349000 256QAM Full RB)



Sub6 n66. PAR Plot (5 M BW\_Ch.349000\_ BPSK\_ Full RB)





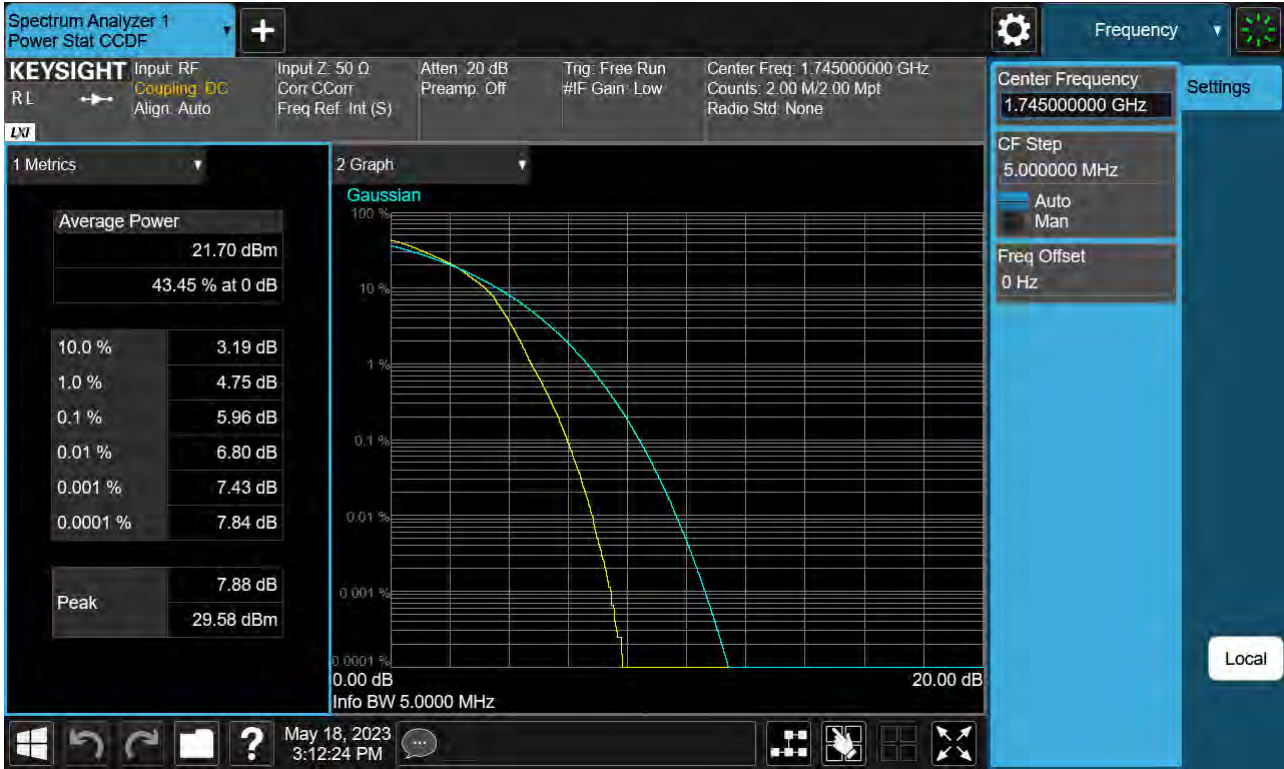
Sub6 n66. PAR Plot (5 M BW\_Ch.349000\_QPSK\_Full RB)



Sub6 n66. PAR Plot (5 M BW\_Ch.349000\_16QAM\_Full RB)



Sub6 n66. PAR Plot (5 M BW\_Ch.349000\_64QAM\_Full RB)



Sub6 n66. PAR Plot (5 M BW\_Ch.349000\_256QAM\_Full RB)



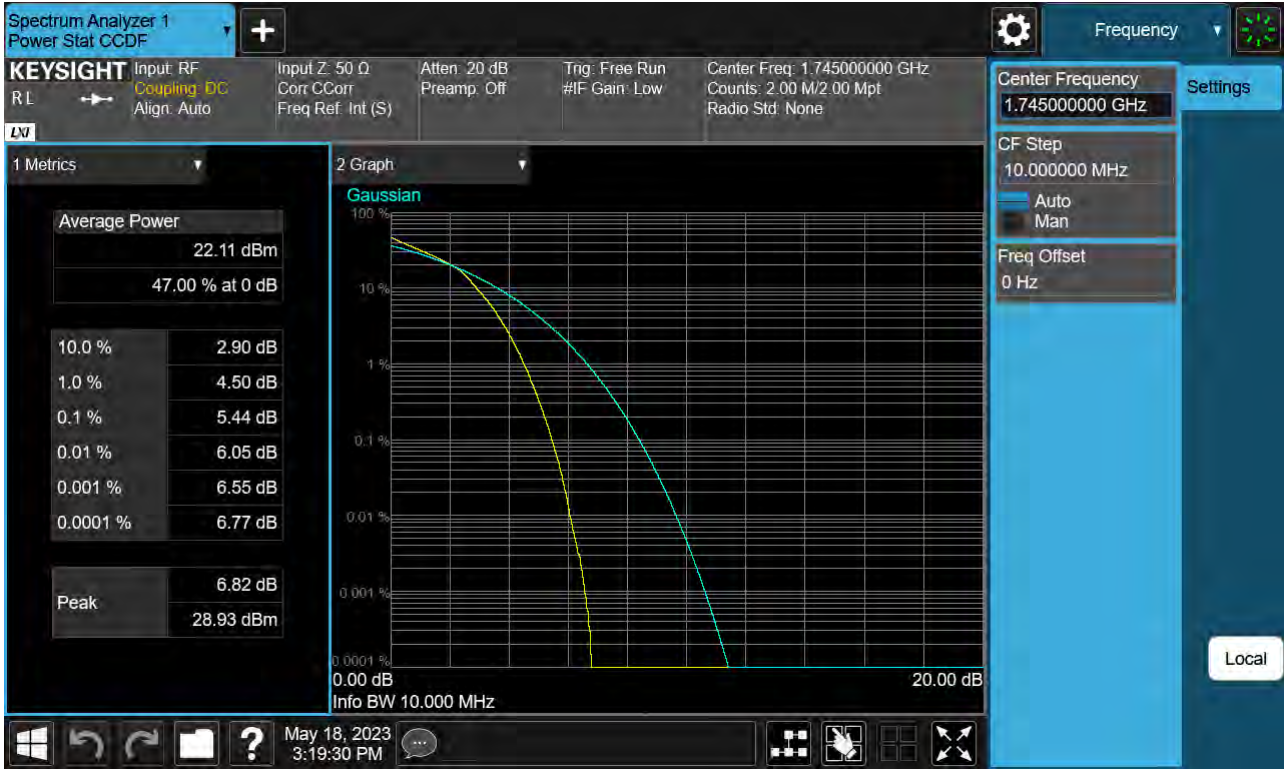
Sub6 n66. PAR Plot (10 M BW\_Ch.349000\_ BPSK\_ Full RB)



Sub6 n66. PAR Plot (10 M BW\_Ch.349000\_QPSK\_Full RB)



Sub6 n66. PAR Plot (10 M BW\_Ch.349000\_16QAM\_Full RB)



Sub6 n66. PAR Plot (10 M BW\_Ch.349000\_64QAM\_Full RB)





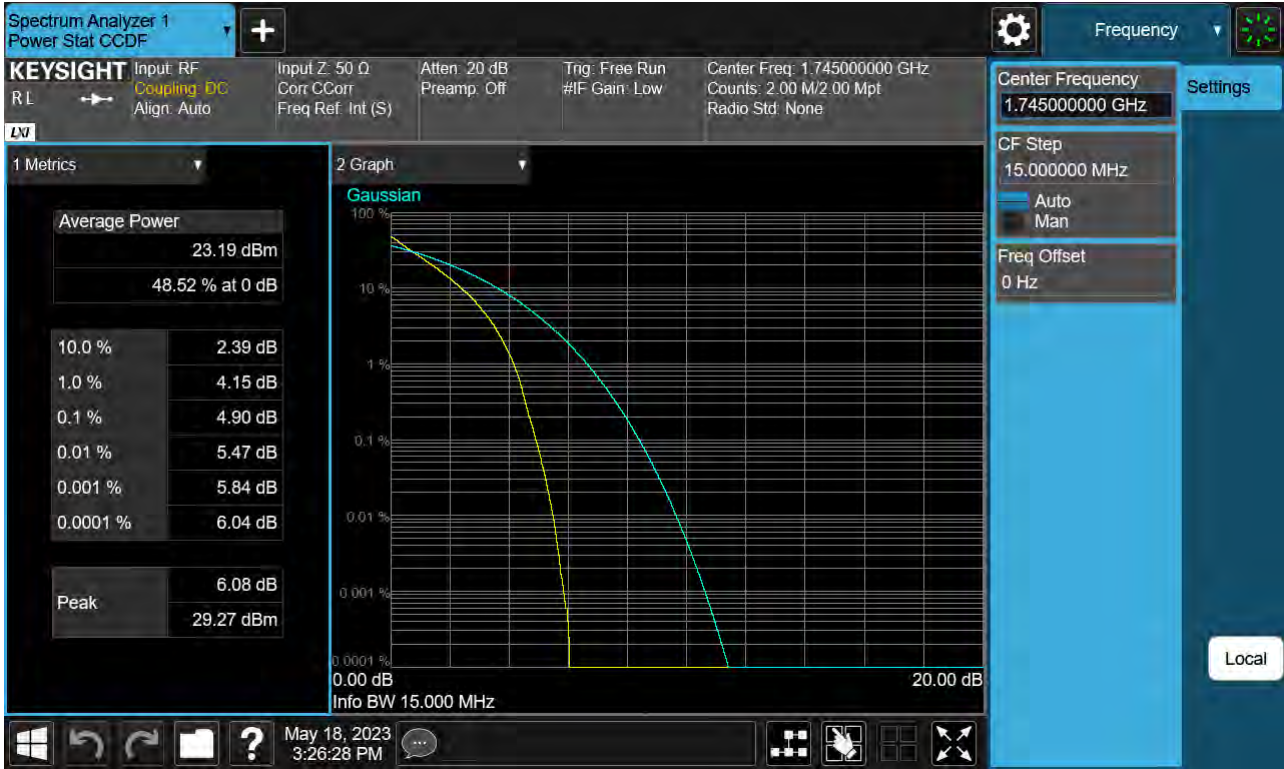
Sub6 n66. PAR Plot (10 M BW\_Ch.349000\_256QAM\_Full RB)



Sub6 n66. PAR Plot (15 M BW\_Ch.349000\_ BPSK\_ Full RB)



Sub6 n66. PAR Plot (15 M BW\_Ch.349000\_QPSK\_Full RB)



Sub6 n66. PAR Plot (15 M BW\_Ch.349000\_16QAM\_Full RB)



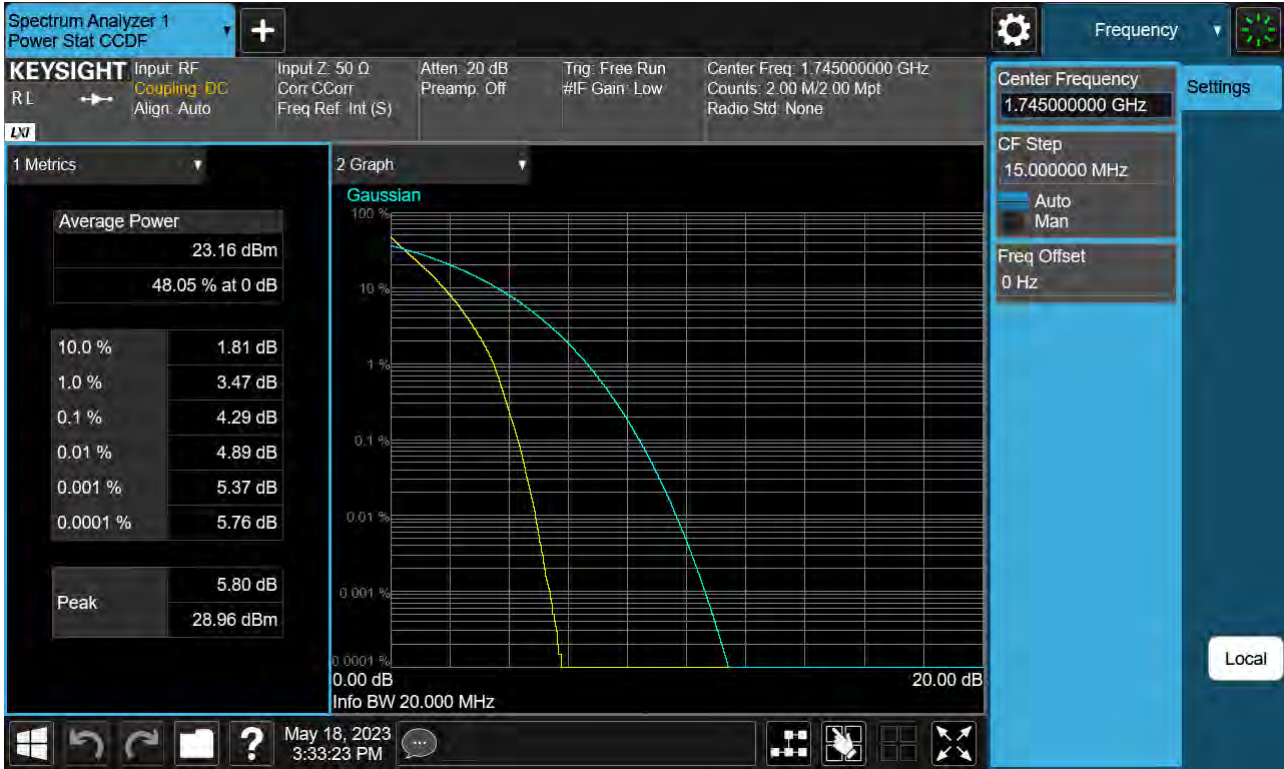
Sub6 n66. PAR Plot (15 M BW\_Ch.349000\_64QAM\_Full RB)



Sub6 n66. PAR Plot (15 M BW\_Ch.349000\_256QAM\_Full RB)



Sub6 n66. PAR Plot (20 M BW\_Ch.349000\_ BPSK\_ Full RB)



Sub6 n66. PAR Plot (20 M BW\_Ch.349000\_QPSK\_Full RB)

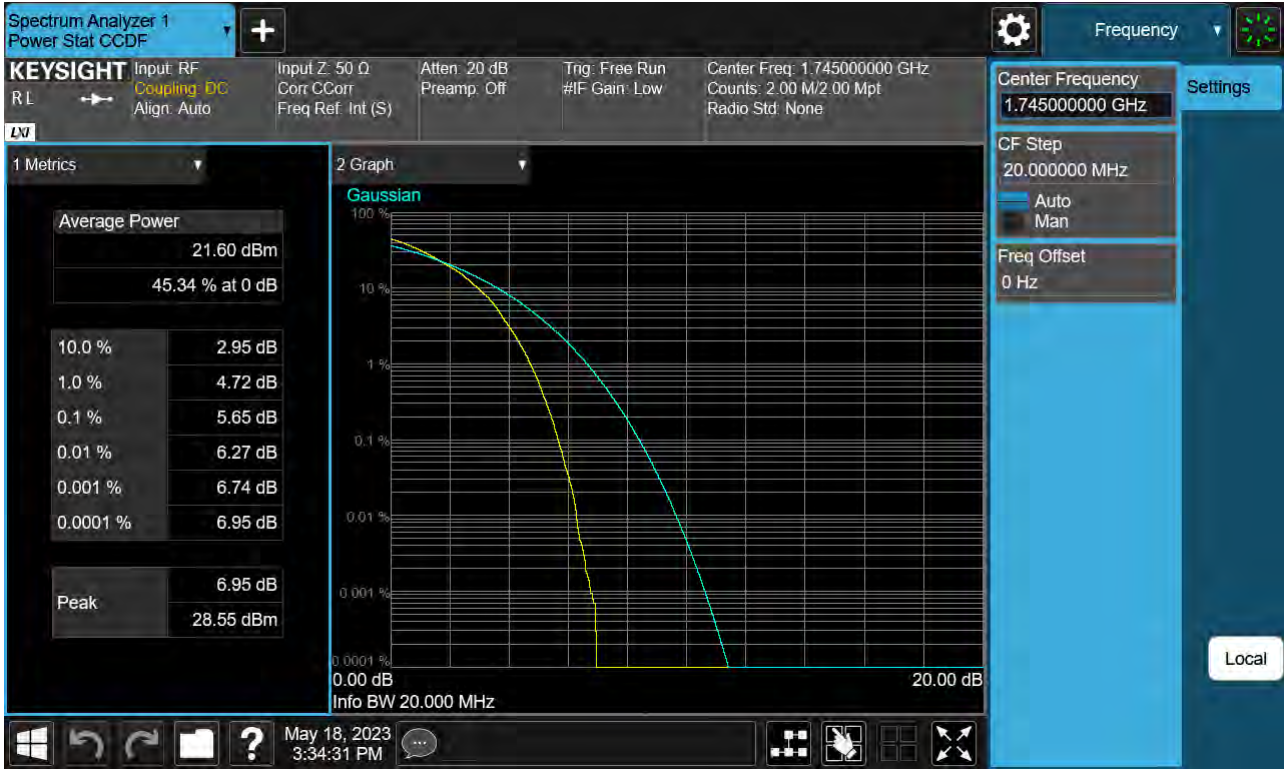




Sub6 n66. PAR Plot (20 M BW\_Ch.349000\_16QAM\_Full RB)



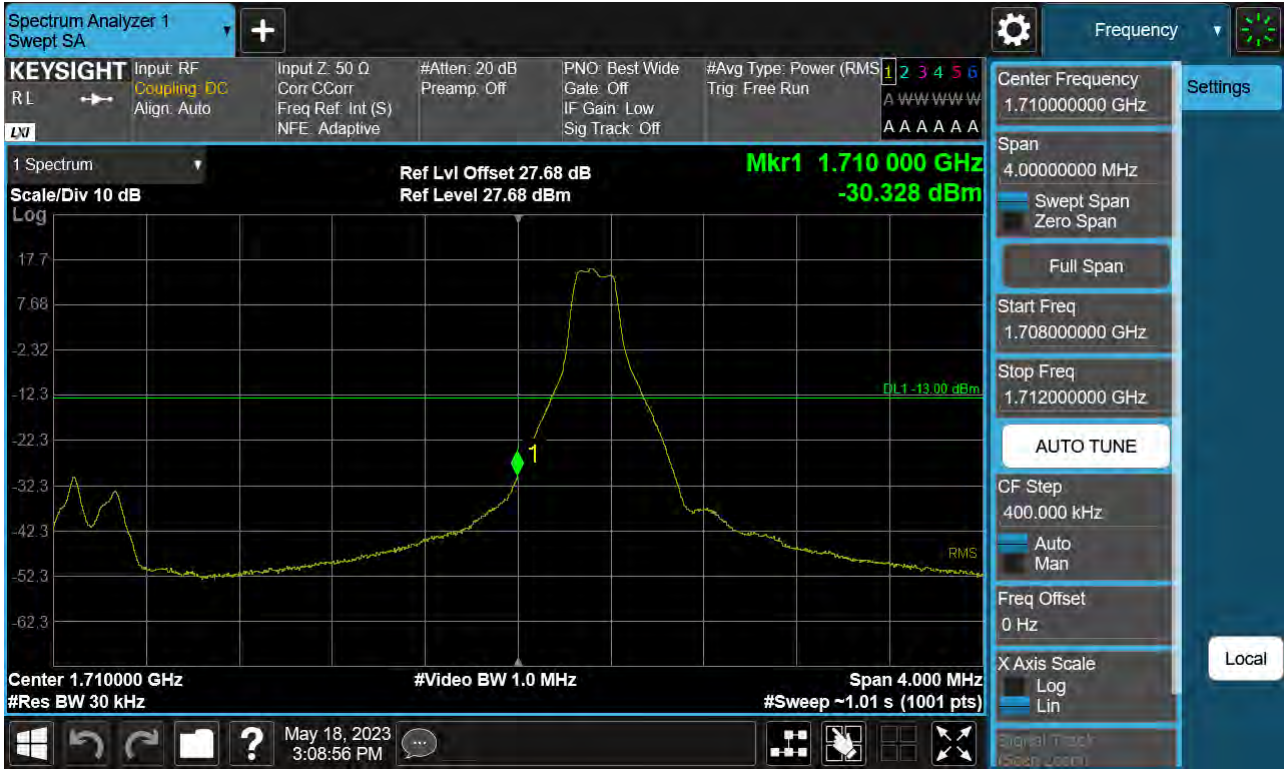
Sub6 n66. PAR Plot (20 M BW\_Ch.349000\_64QAM\_Full RB)



Sub6 n66. PAR Plot (20 M BW\_Ch.349000\_256QAM\_Full RB)



Sub6 n66. Lower Band Edge Plot (5 M BW Ch.342500 BPSK RB 1, Offset 0) -1



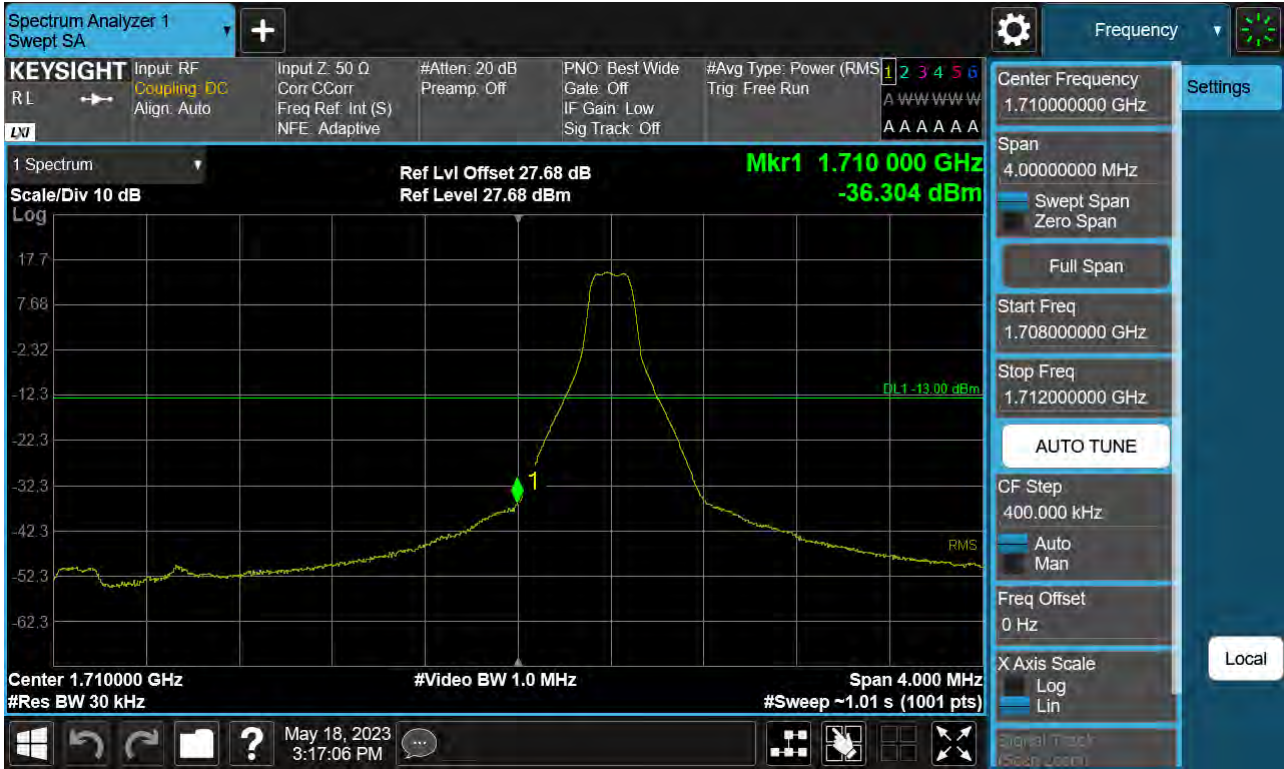
Sub6 n66. Lower Band Edge Plot (5 M BW Ch.342500 BPSK Full RB) -2



Sub6 n66. Lower Extended Band Edge Plot (5 M BW Ch.342500 BPSK\_ Full RB) -3



Sub6 n66. Lower Band Edge Plot (10 M BW Ch.343000 BPSK RB 1, Offset 0) -1



Sub6 n66. Lower Band Edge Plot (10 M BW Ch.343000 BPSK Full RB) -2

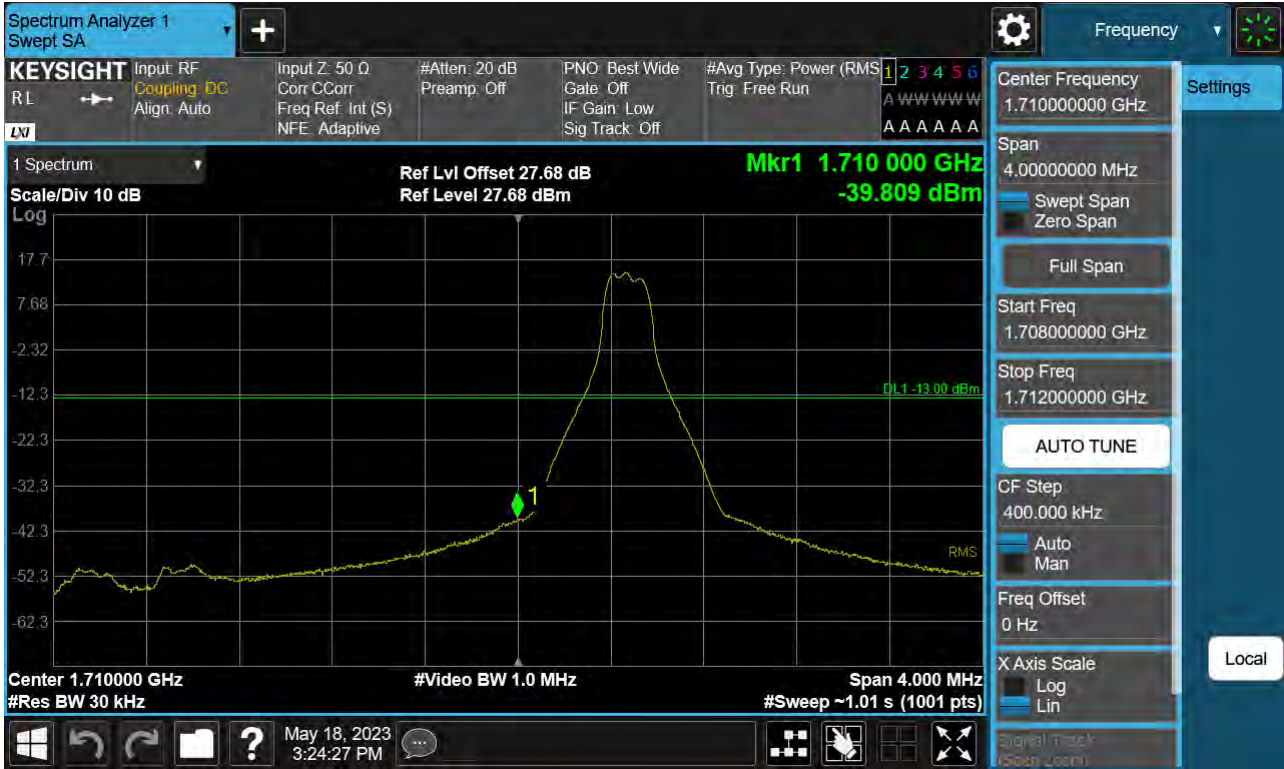




Sub6 n66. Lower Extended Band Edge Plot (10 M BW Ch.343000 BPSK\_ Full RB) -3



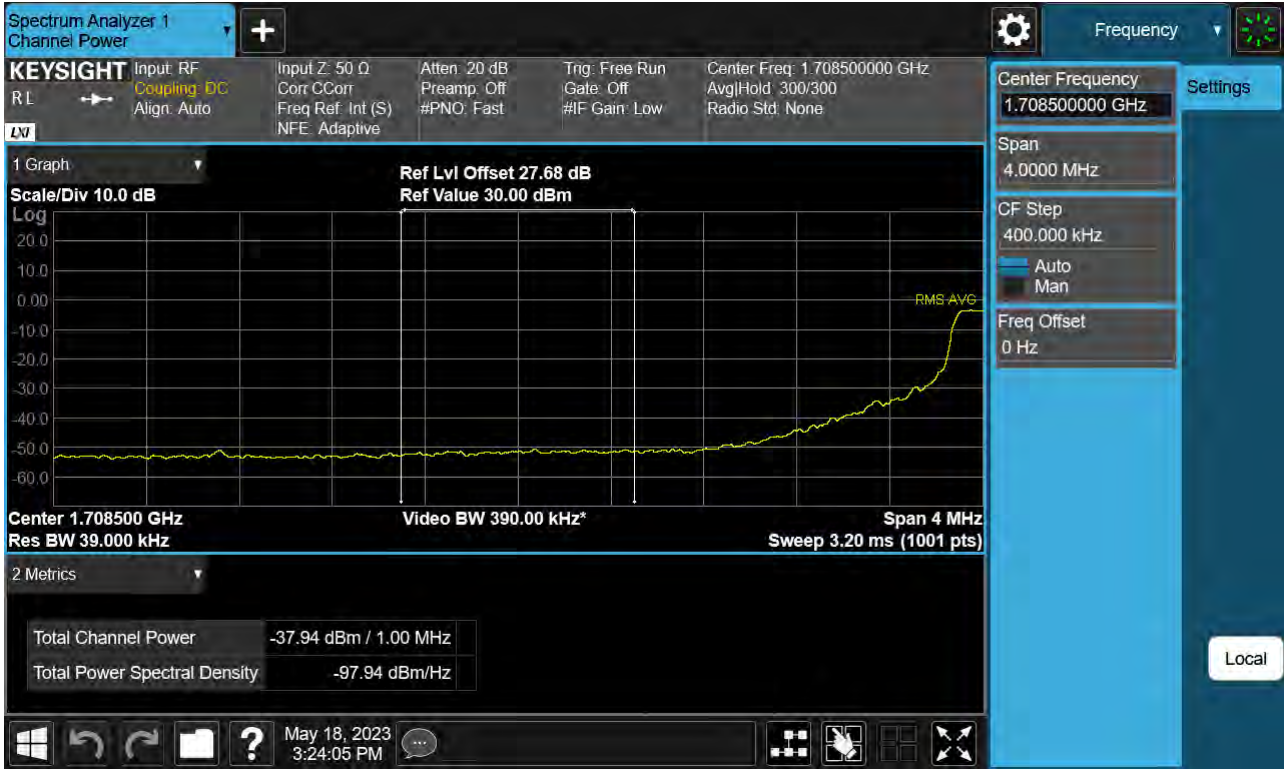
Sub6 n66. Lower Band Edge Plot (15 M BW Ch.343500 BPSK RB 1, Offset 0) -1



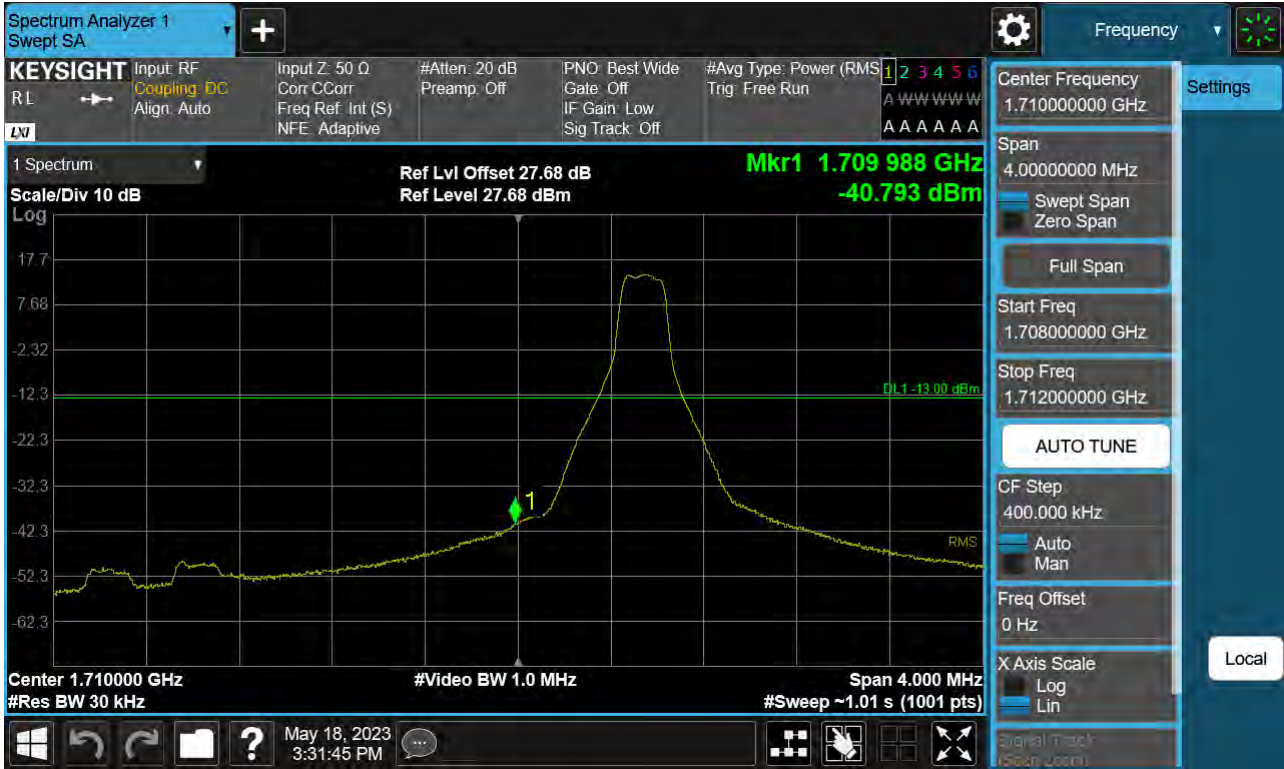
Sub6 n66. Lower Band Edge Plot (15 M BW Ch.343500 BPSK Full RB) -2



Sub6 n66. Lower Extended Band Edge Plot (15 M BW Ch.343500 BPSK\_ Full RB) -3



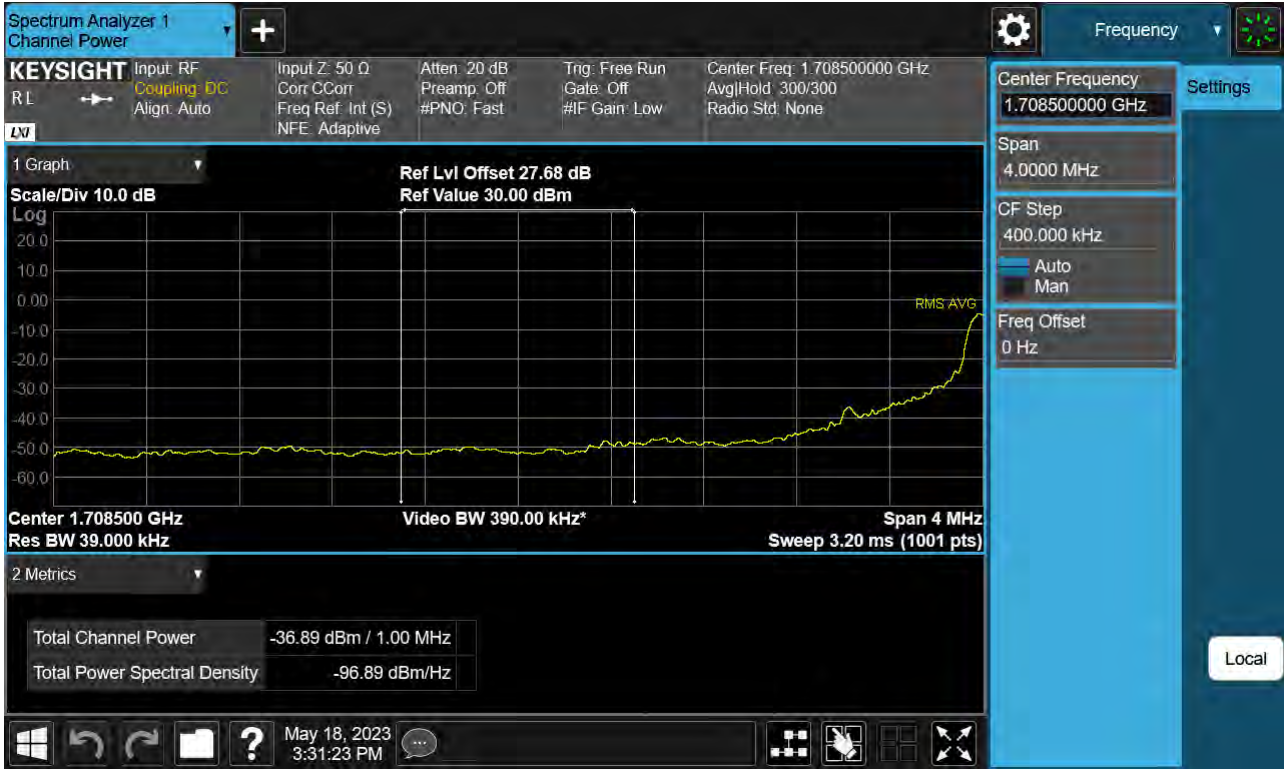
Sub6 n66. Lower Band Edge Plot (20 M BW Ch.344000 BPSK RB 1, Offset 0) -1



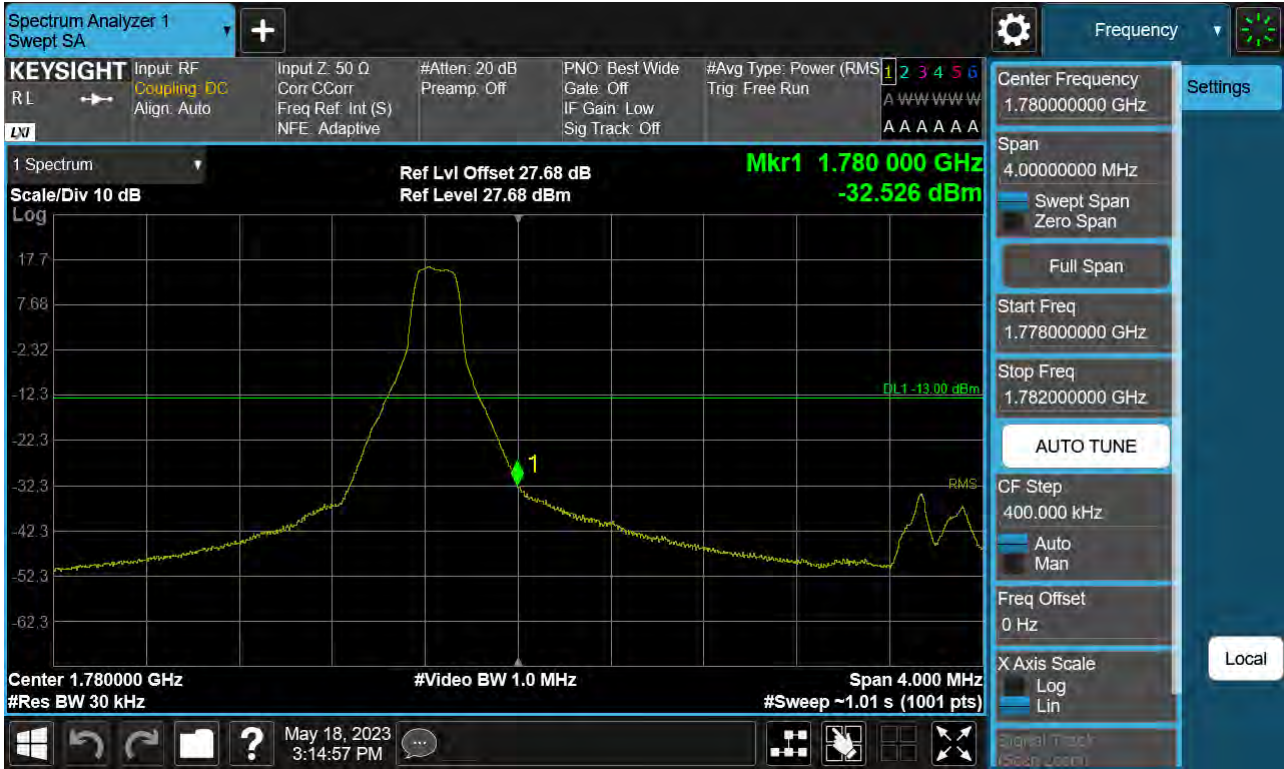
Sub6 n66. Lower Band Edge Plot (20 M BW Ch.344000 BPSK Full RB) -2



Sub6 n66. Lower Extended Band Edge Plot (20 M BW Ch.344000 BPSK\_ Full RB) -3



Sub6 n66. Upper Band Edge Plot (5 M BW Ch.355500 BPSK\_RB1\_Offset 24) -1

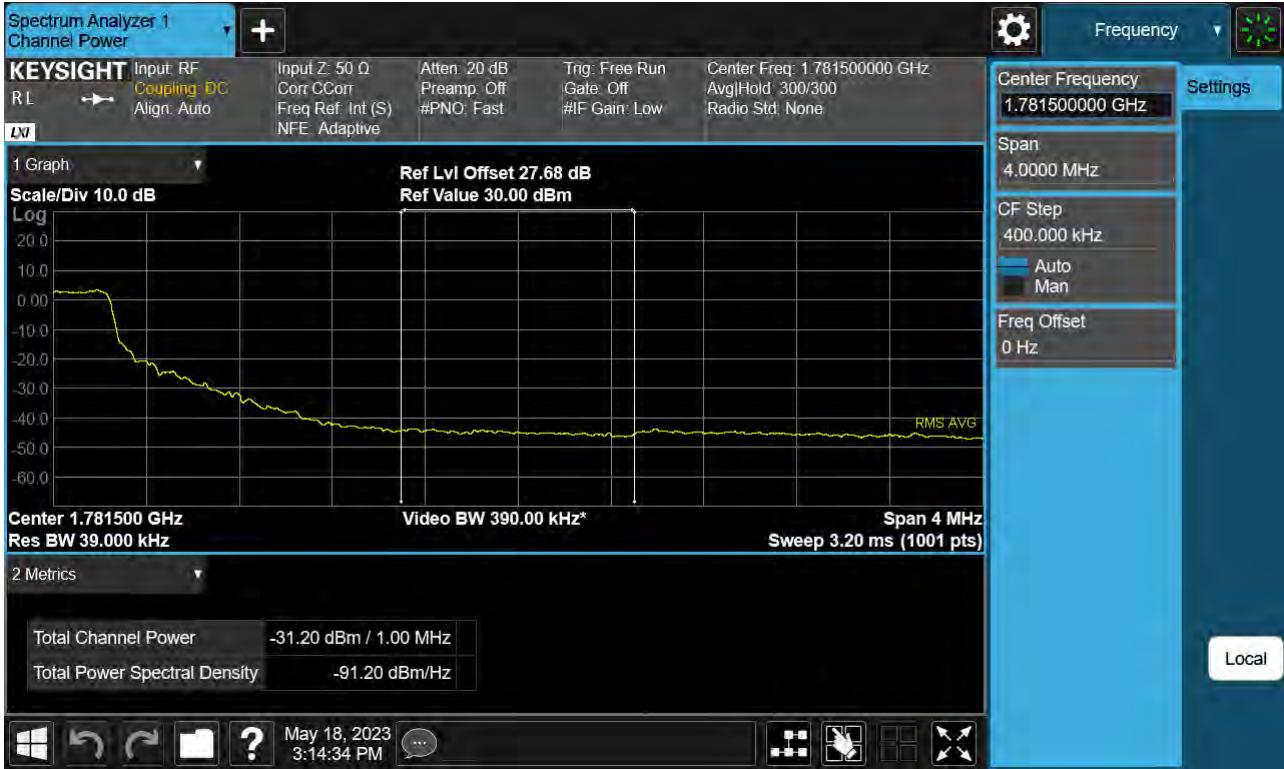




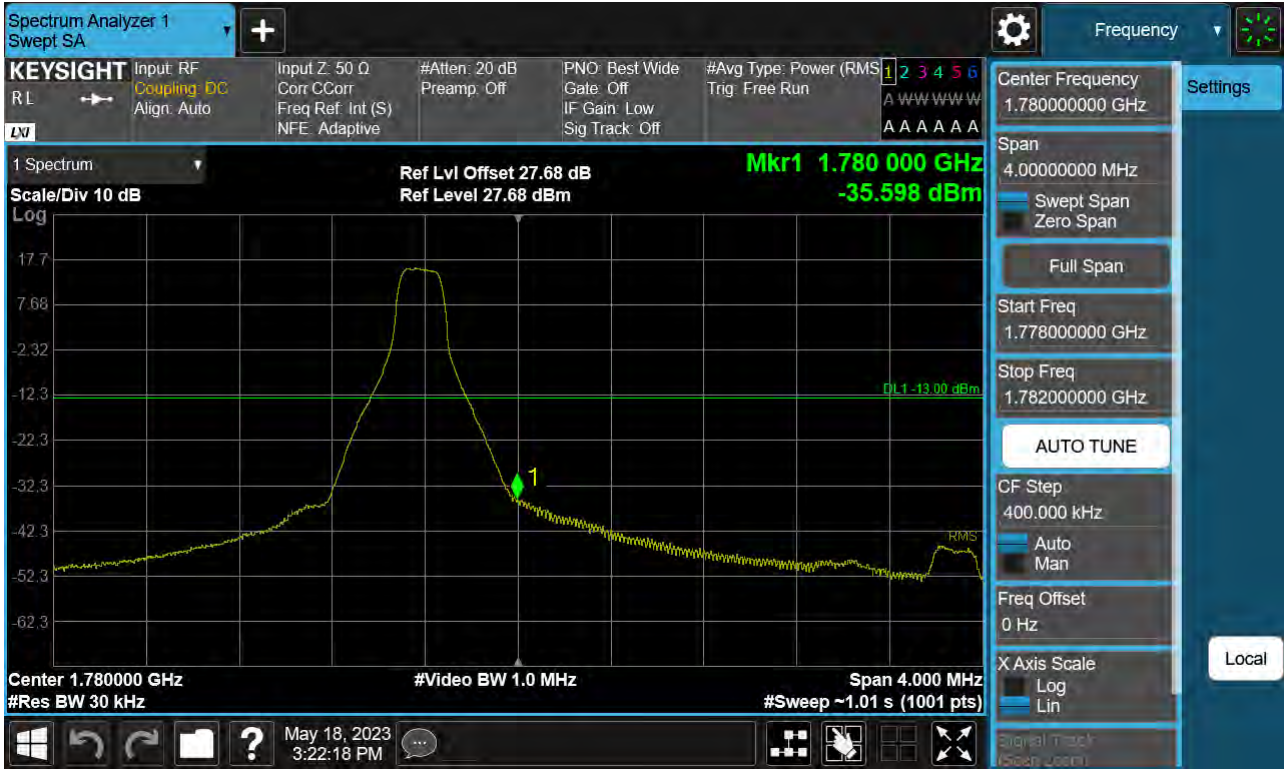
Sub6 n66. Upper Band Edge Plot (5 M BW Ch.355500 BPSK\_ Full RB) -2



Sub6 n66. Upper Extended Band Edge Plot (5 M BW Ch.355500 BPSK\_ Full RB) -3



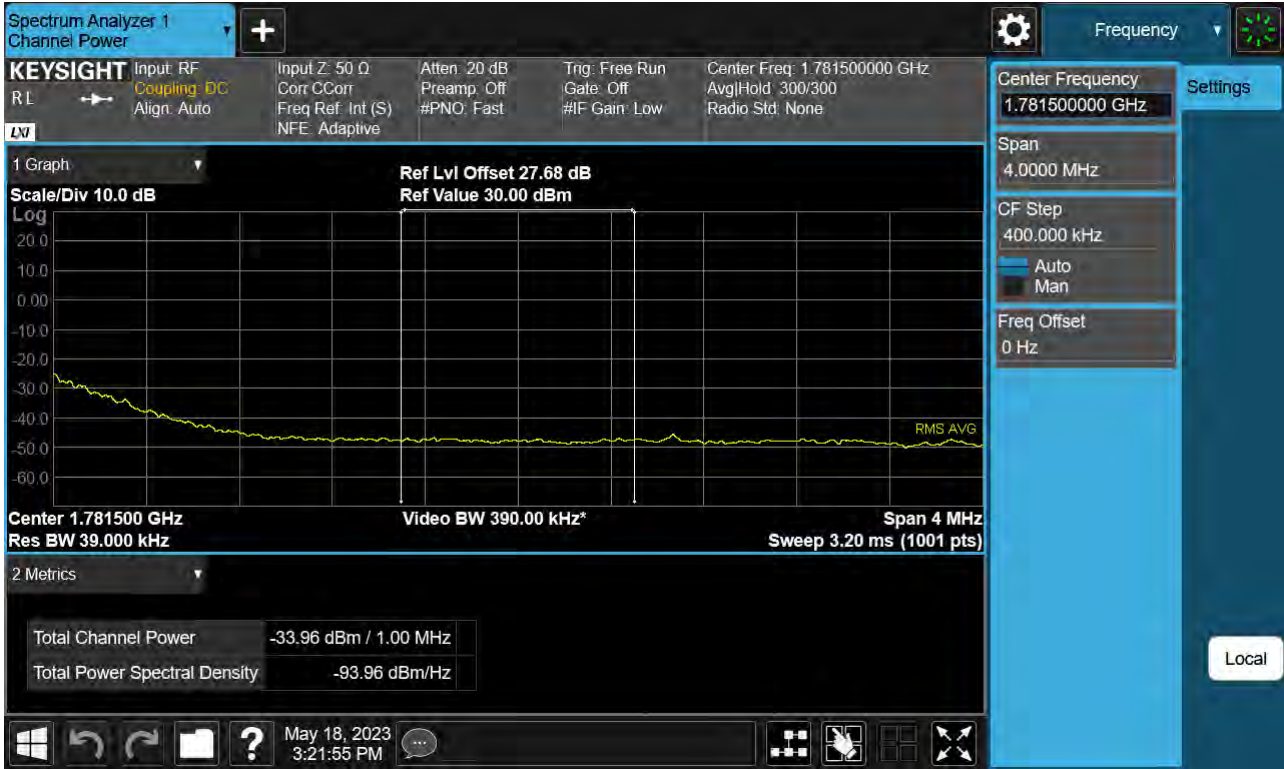
Sub6 n66. Upper Band Edge Plot (10 M BW Ch.355000 BPSK\_RB1\_Offset 51) -1



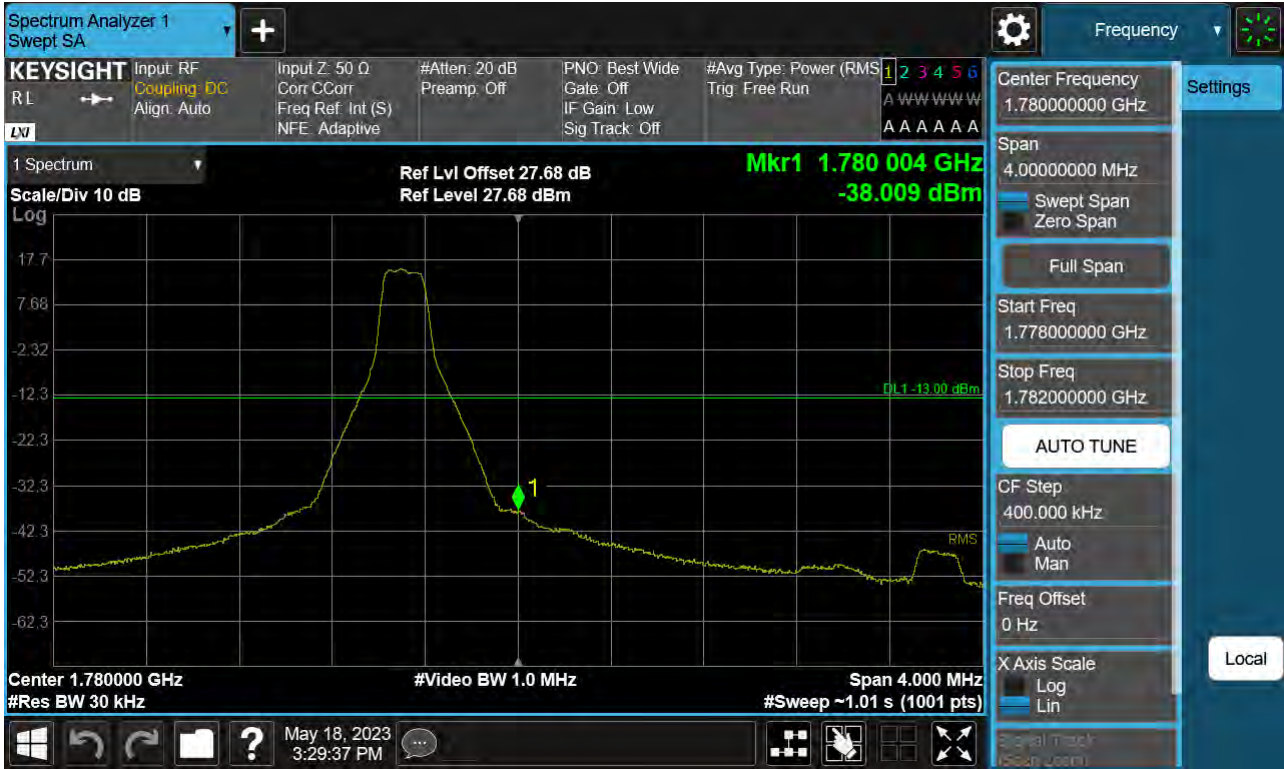
Sub6 n66. Upper Band Edge Plot (10 M BW Ch.355000 BPSK\_ Full RB) -2



Sub6 n66. Upper Extended Band Edge Plot (10 M BW Ch.355000 BPSK\_ Full RB) -3



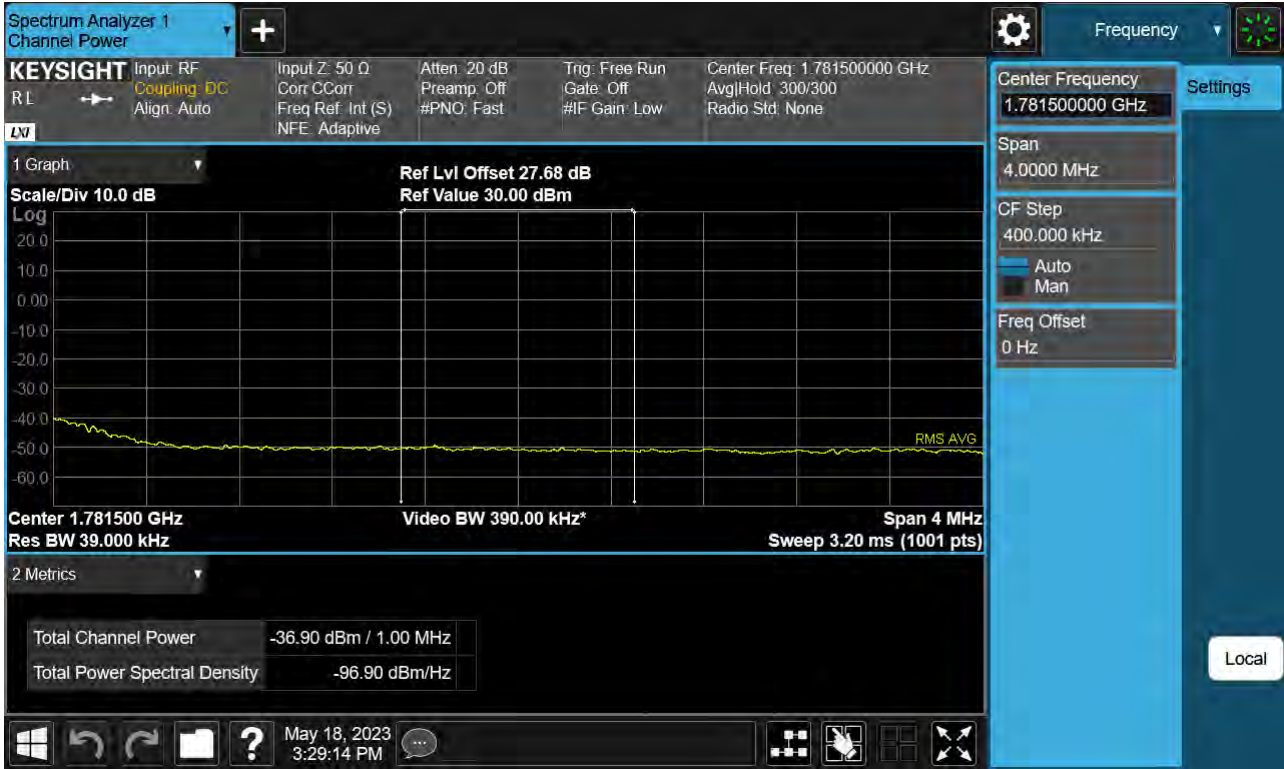
Sub6 n66. Upper Band Edge Plot (15 M BW Ch.354500 BPSK\_RB1\_Offset 78) -1



Sub6 n66. Upper Band Edge Plot (15 M BW Ch.354500 BPSK\_ Full RB) -2



Sub6 n66. Upper Extended Band Edge Plot (15 M BW Ch.354500 BPSK\_ Full RB) -3





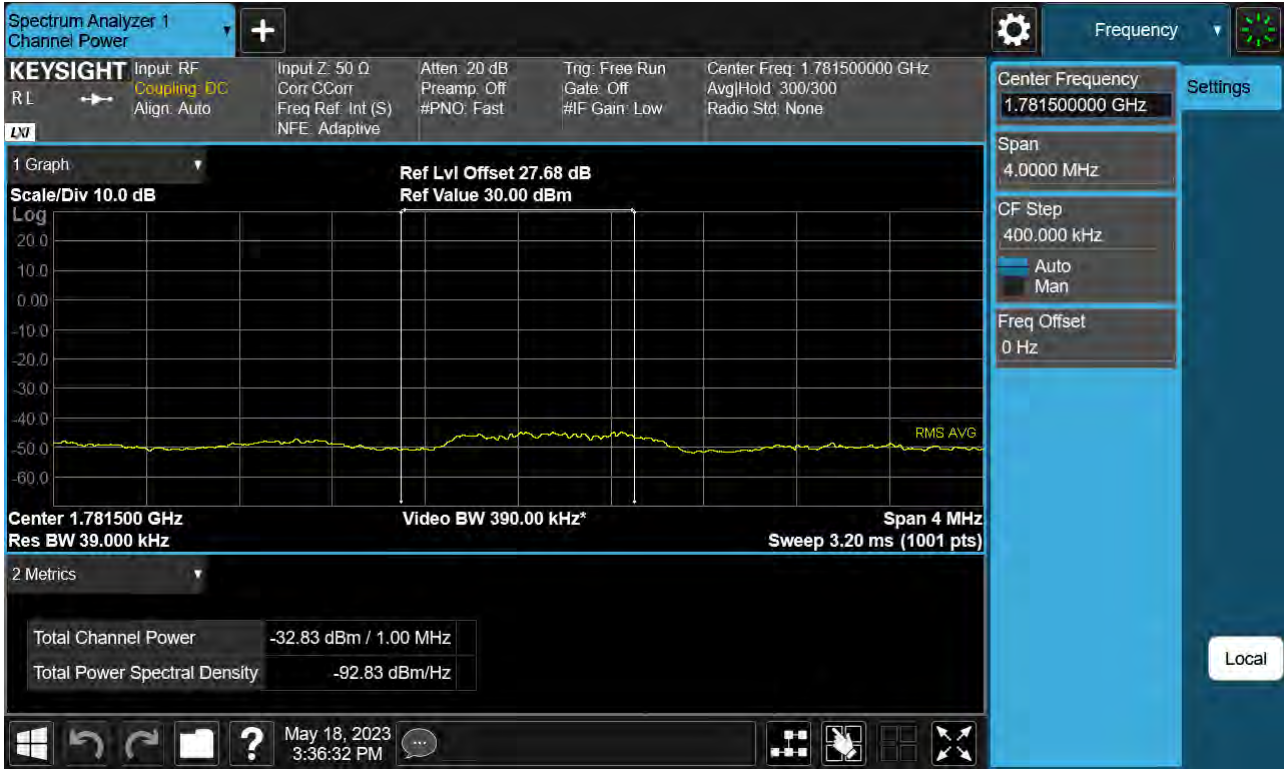
Sub6 n66. Upper Band Edge Plot (20 M BW Ch.354000 BPSK\_RB1\_Offset 105) -1



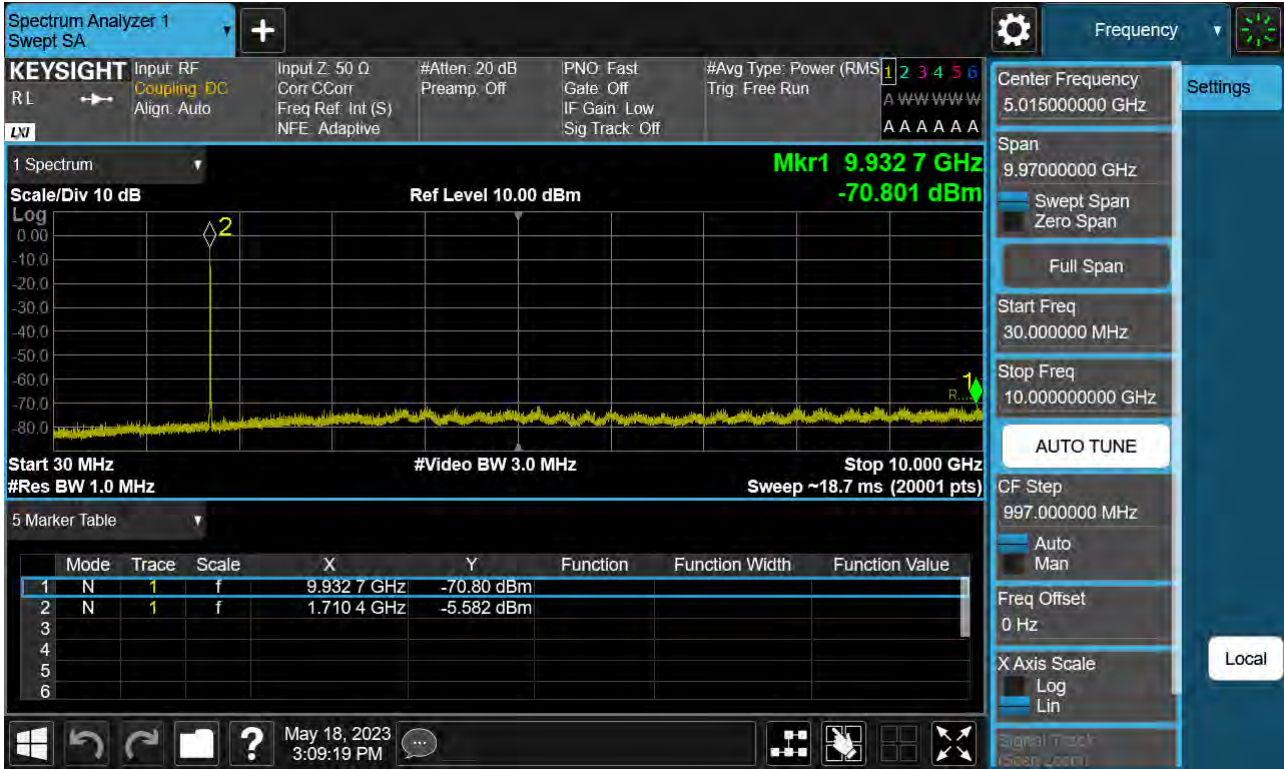
Sub6 n66. Upper Band Edge Plot (20 M BW Ch.354000 BPSK\_ Full RB) -2



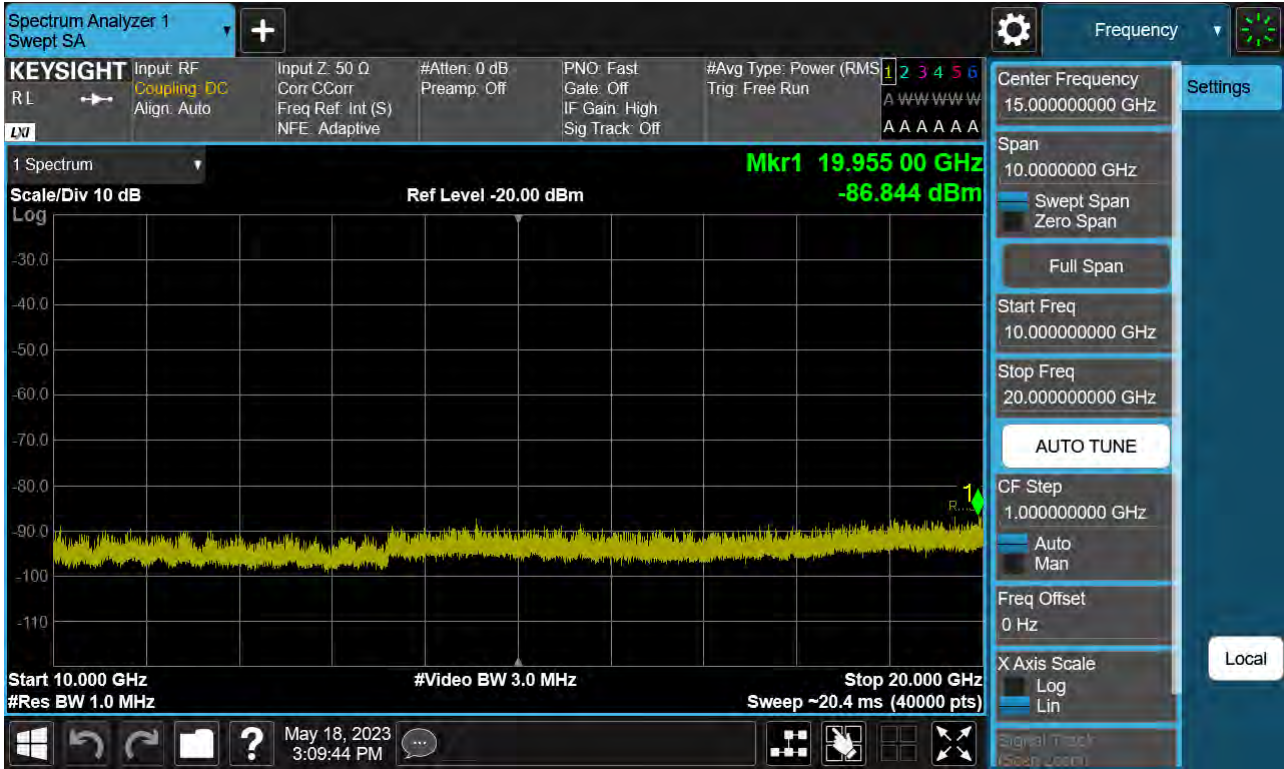
Sub6 n66. Upper Extended Band Edge Plot (20 M BW Ch.354000 BPSK\_ Full RB) -3



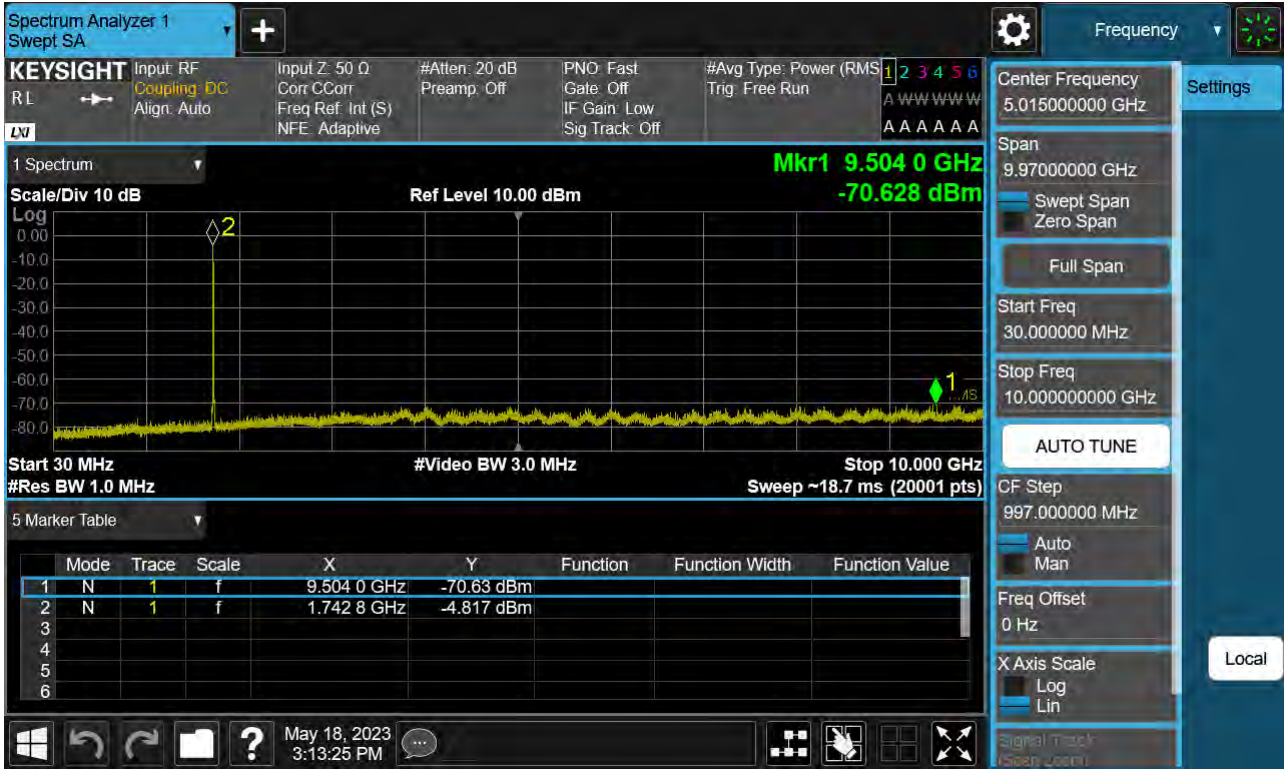
Sub6 n66. Conducted Spurious Plot\_1 (342500ch\_5 MHz\_BPSK\_RB 1\_1)



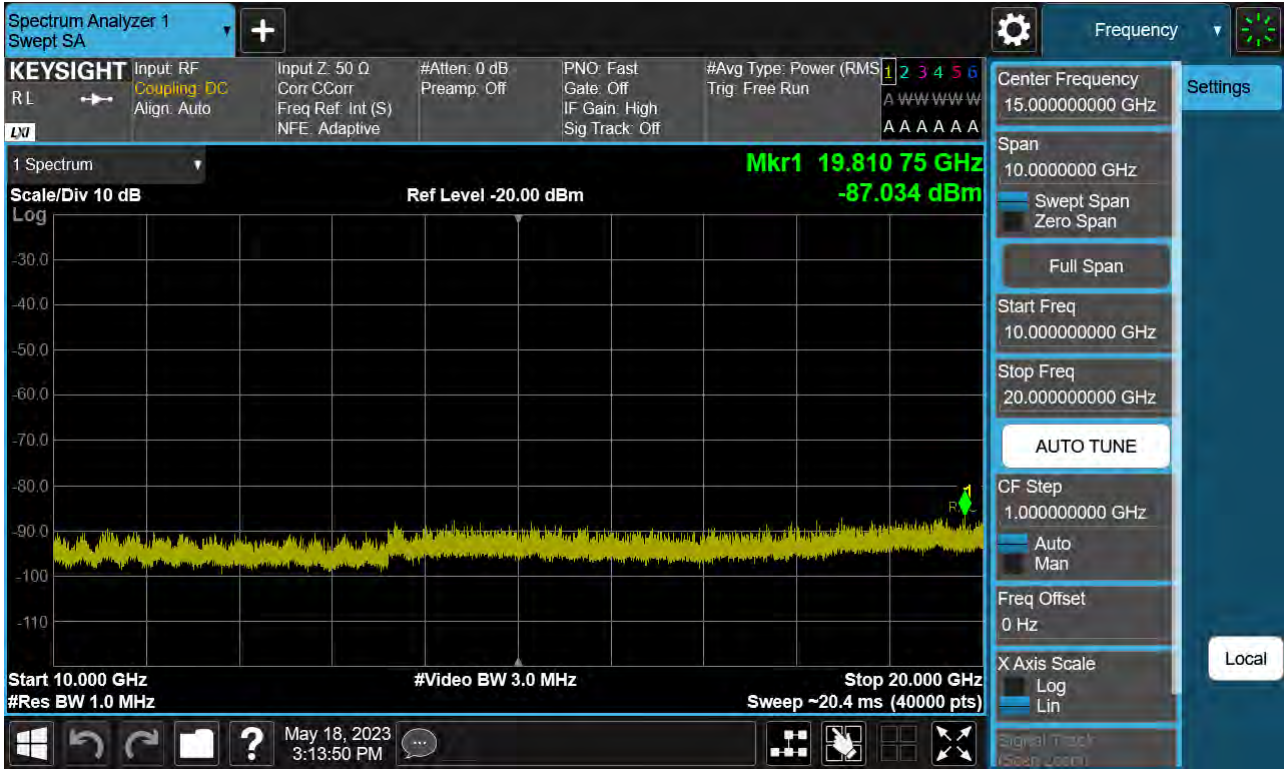
Sub6 n66. Conducted Spurious Plot\_2 (342500ch\_5 MHz\_BPSK\_RB 1\_1)



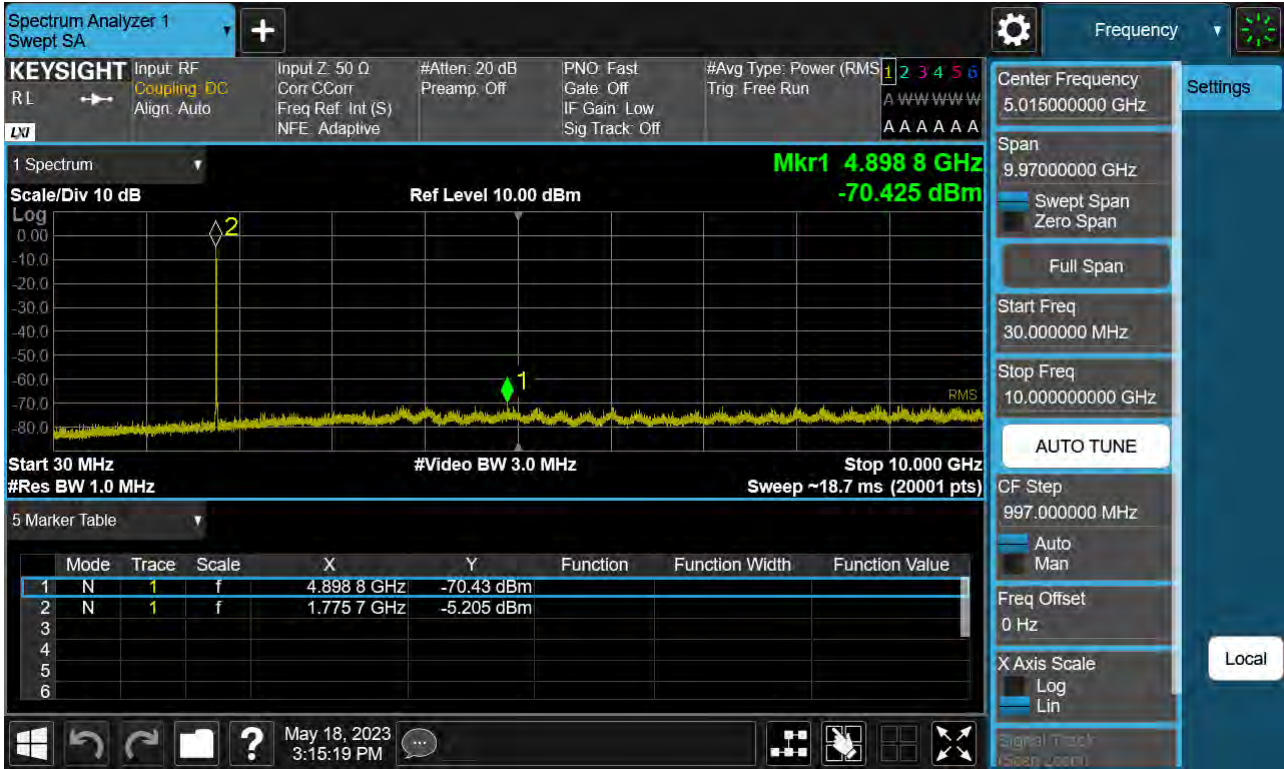
Sub6 n66. Conducted Spurious Plot\_1 (349000ch\_5 MHz\_BPSK\_RB 1\_1)



Sub6 n66. Conducted Spurious Plot\_2 (349000ch\_5 MHz\_BPSK\_RB 1\_1)

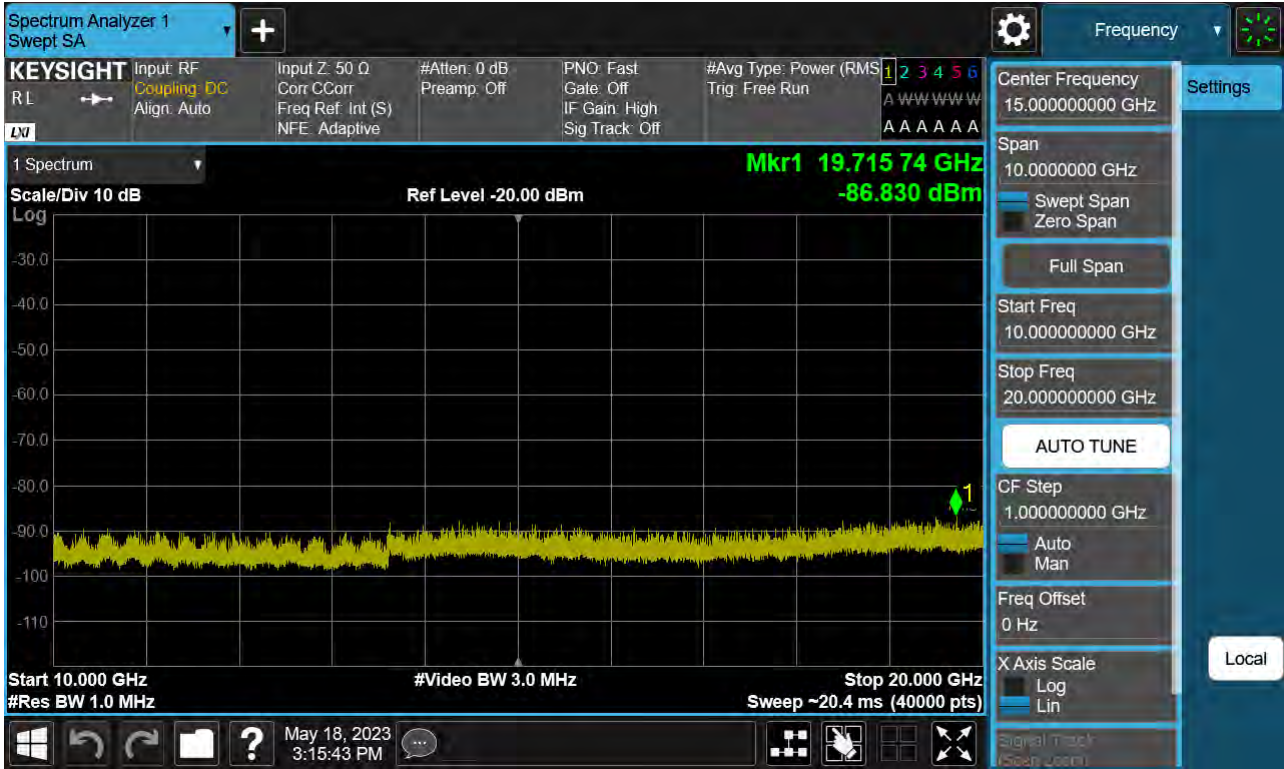


Sub6 n66. Conducted Spurious Plot\_1 (355500ch\_5 MHz\_BPSK\_RB 1\_1)

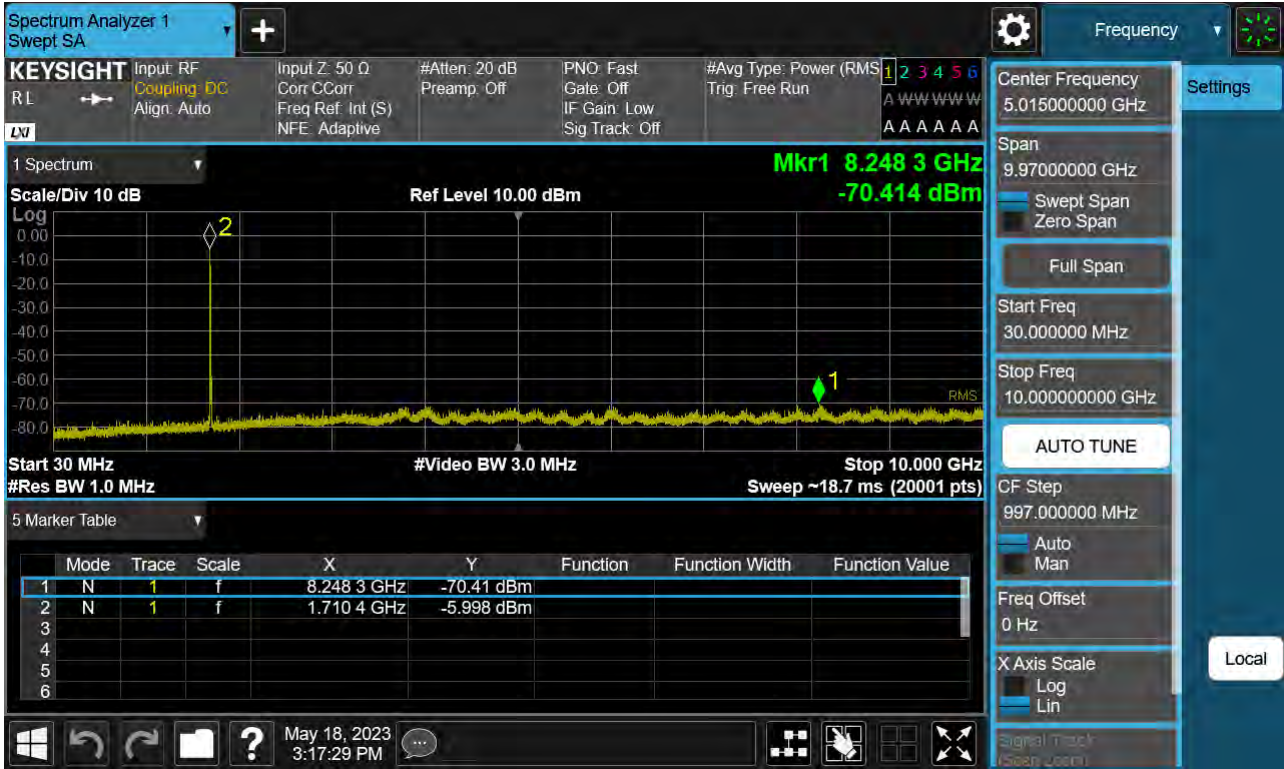




Sub6 n66. Conducted Spurious Plot\_2 (355500ch\_5 MHz\_BPSK\_ RB 1\_1)



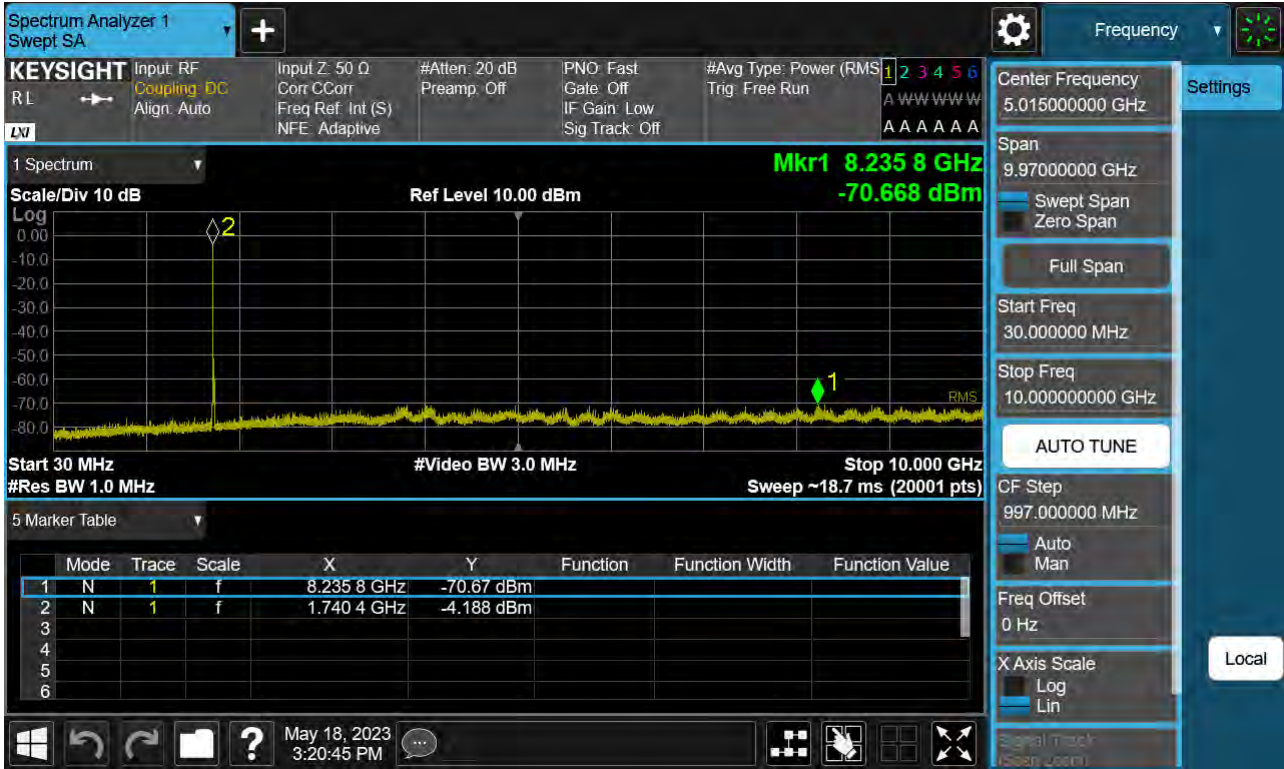
Sub6 n66. Conducted Spurious Plot\_1 (343000ch\_10 MHz\_BPSK\_RB 1\_1)



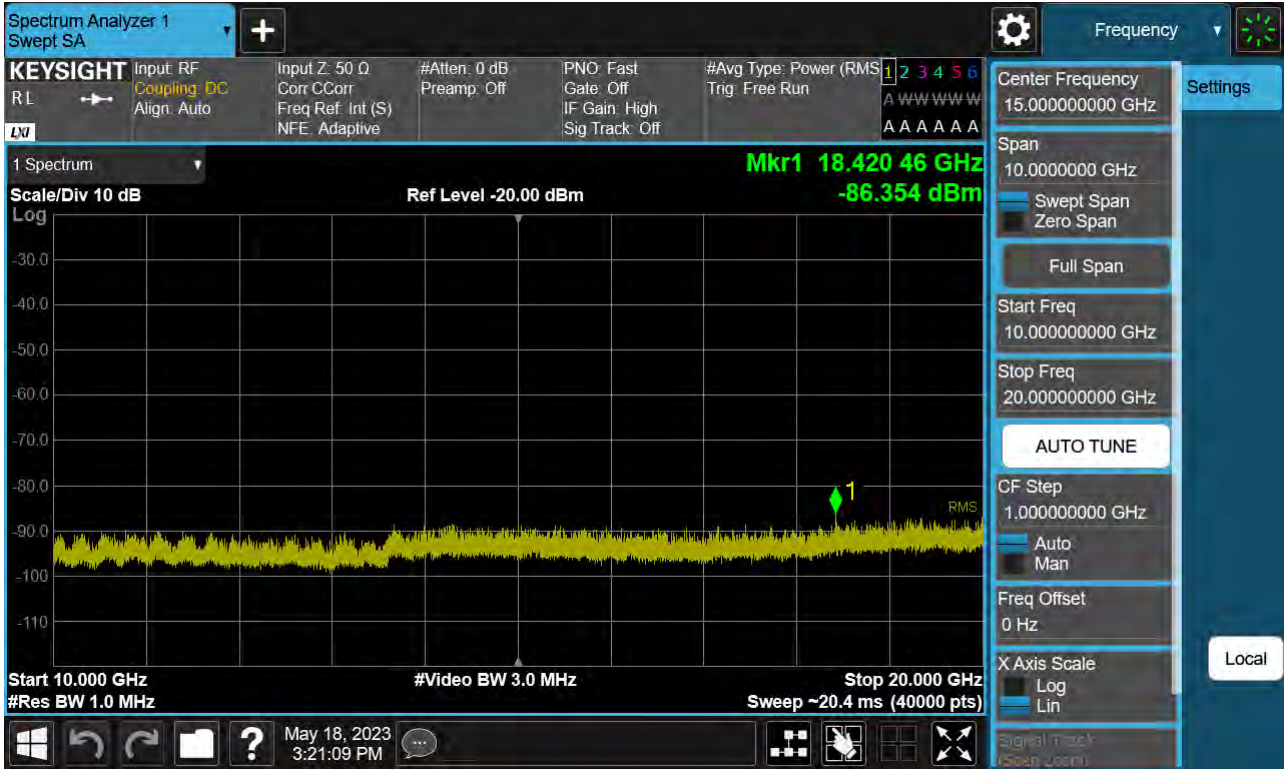
Sub6 n66. Conducted Spurious Plot\_2 (343000ch\_10 MHz\_BPSK\_RB 1\_1)



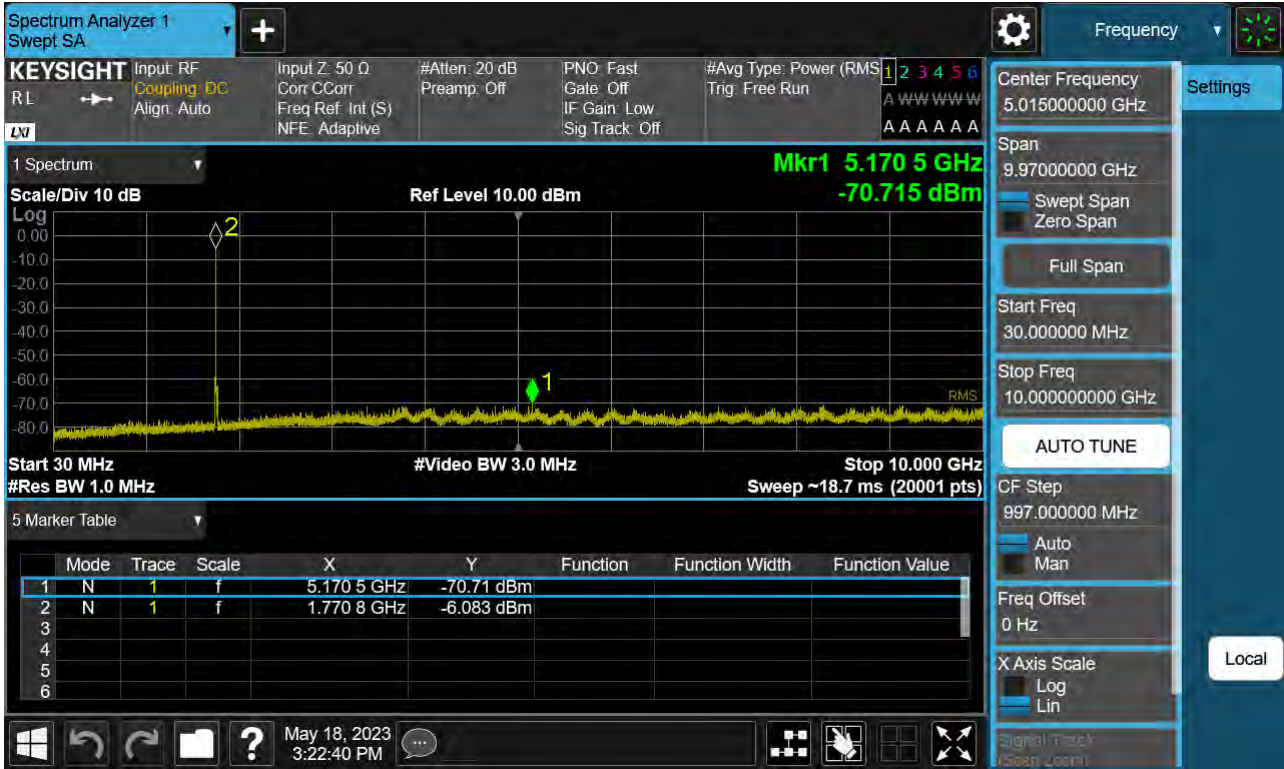
Sub6 n66. Conducted Spurious Plot\_1 (349000ch\_10 MHz\_BPSK\_RB 1\_1)



Sub6 n66. Conducted Spurious Plot\_2 (349000ch\_10 MHz\_BPSK\_RB 1\_1)



Sub6 n66. Conducted Spurious Plot\_1 (355000ch\_10 MHz\_BPSK\_RB 1\_1)



Sub6 n66. Conducted Spurious Plot\_2 (355000ch\_10 MHz\_BPSK\_RB 1\_1)

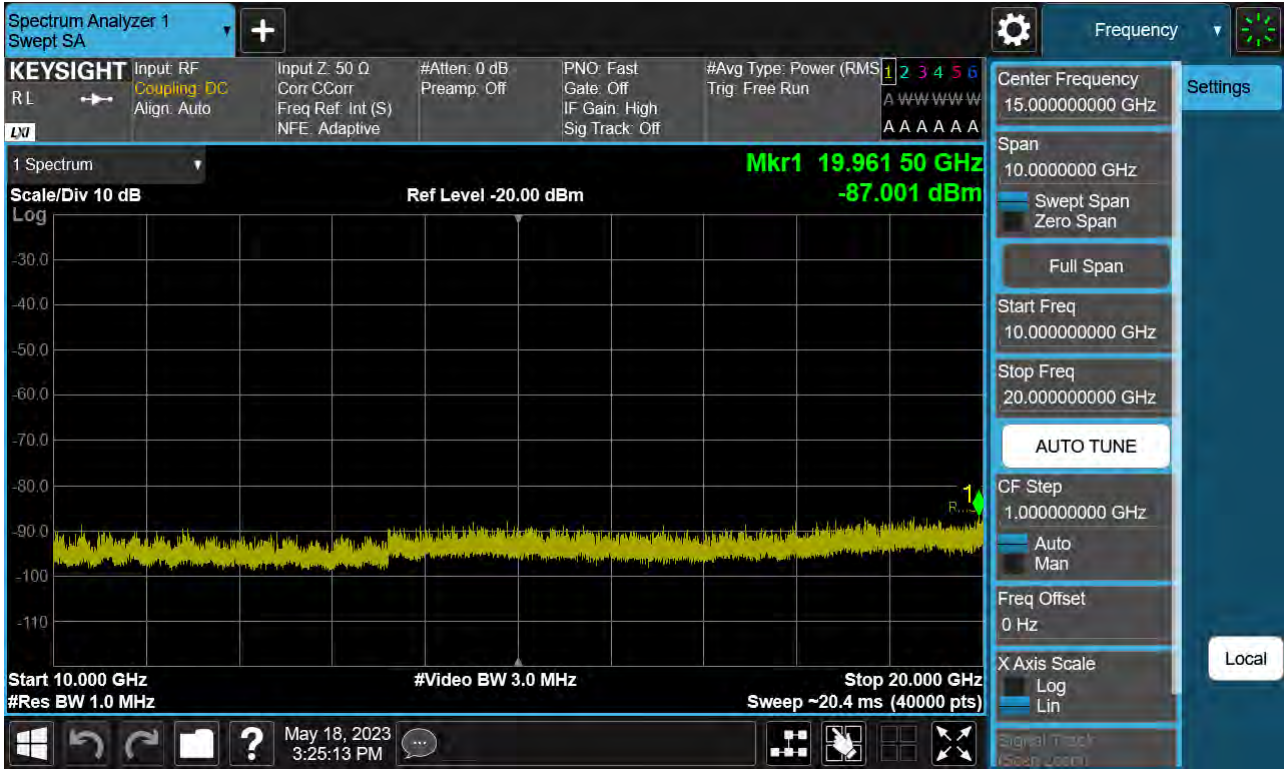


Sub6 n66. Conducted Spurious Plot\_1 (343500ch\_15 MHz\_BPSK\_RB 1\_1)

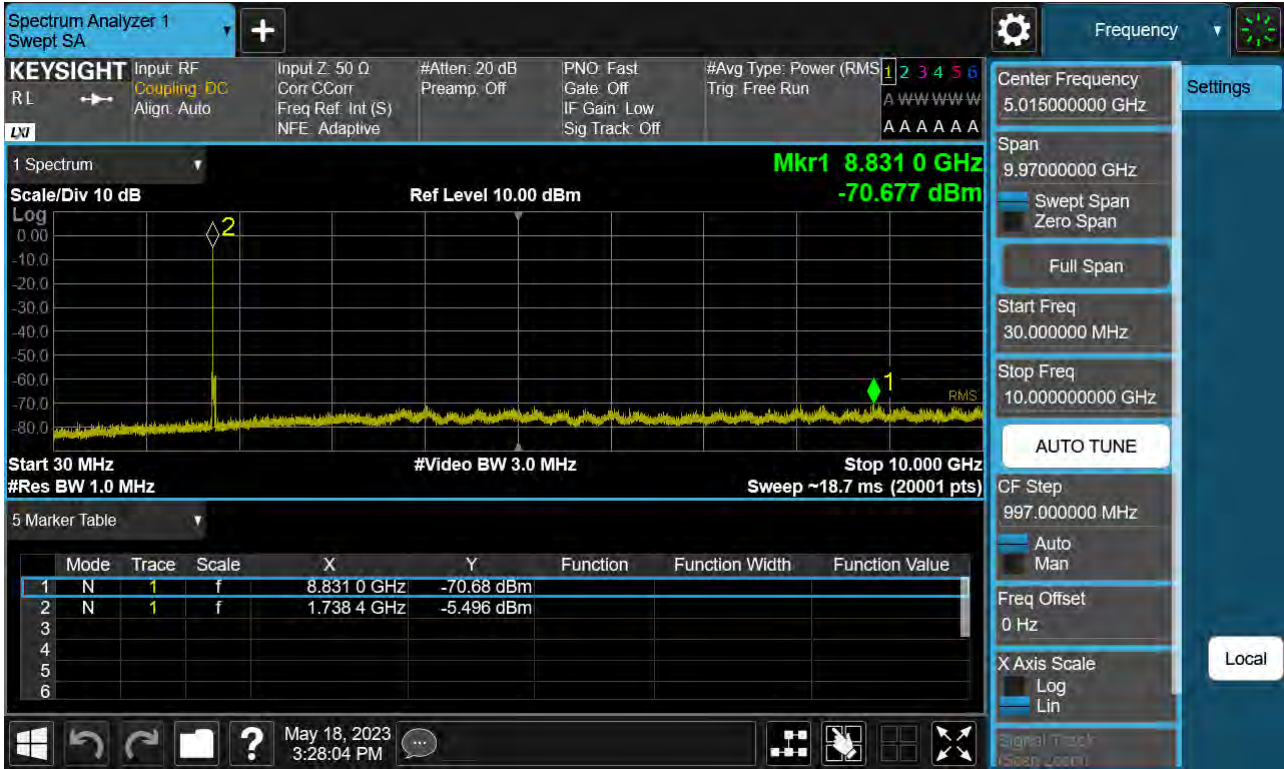




Sub6 n66. Conducted Spurious Plot\_2 (343500ch\_15 MHz\_BPSK\_RB 1\_1)



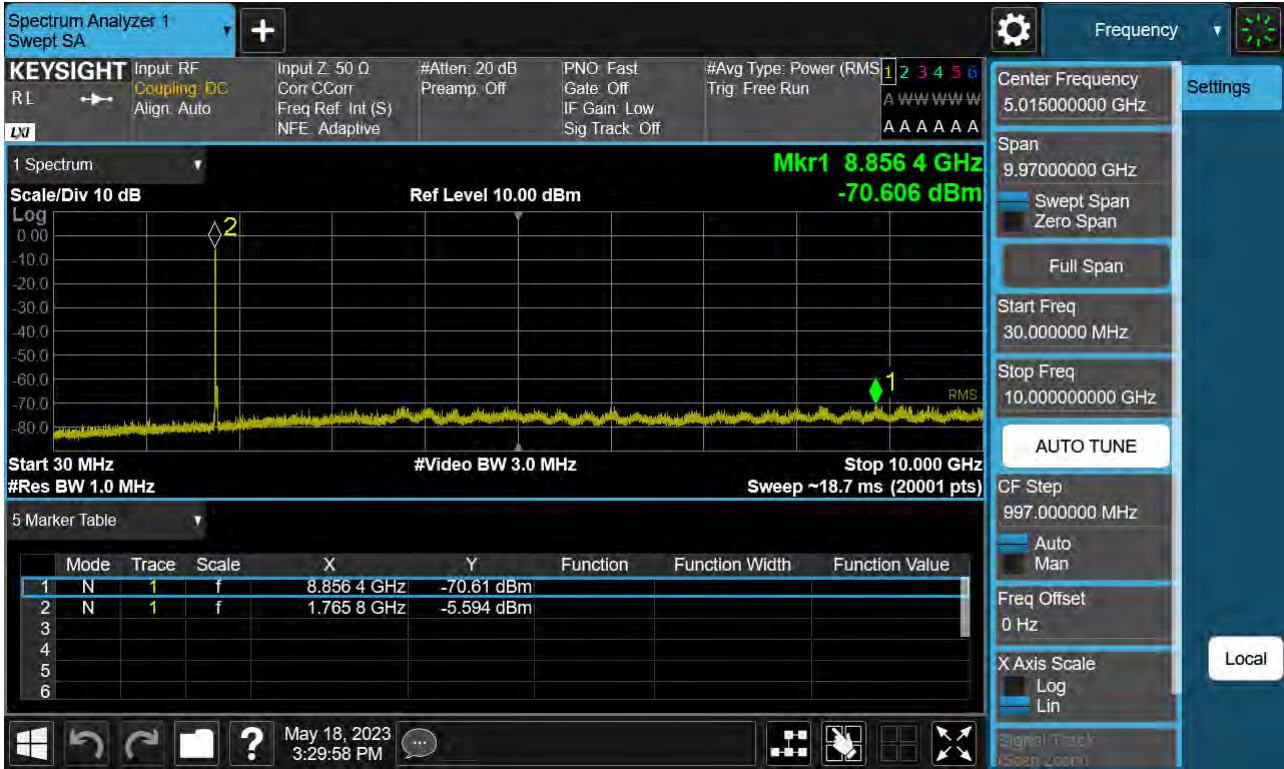
Sub6 n66. Conducted Spurious Plot\_1 (349000ch\_15 MHz\_BPSK\_RB 1\_1)



Sub6 n66. Conducted Spurious Plot\_2 (349000ch\_15 MHz\_BPSK\_RB 1\_1)



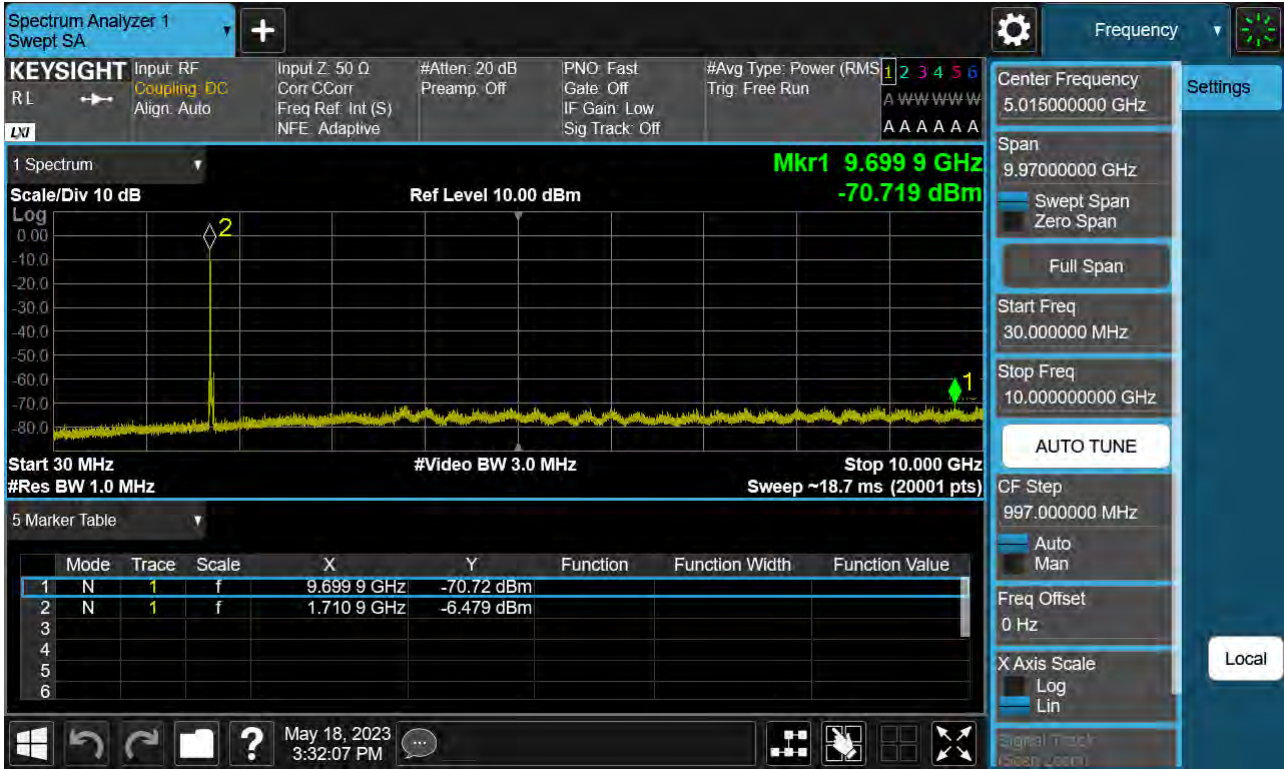
Sub6 n66. Conducted Spurious Plot\_1 (354500ch\_15 MHz\_BPSK\_RB 1\_1)



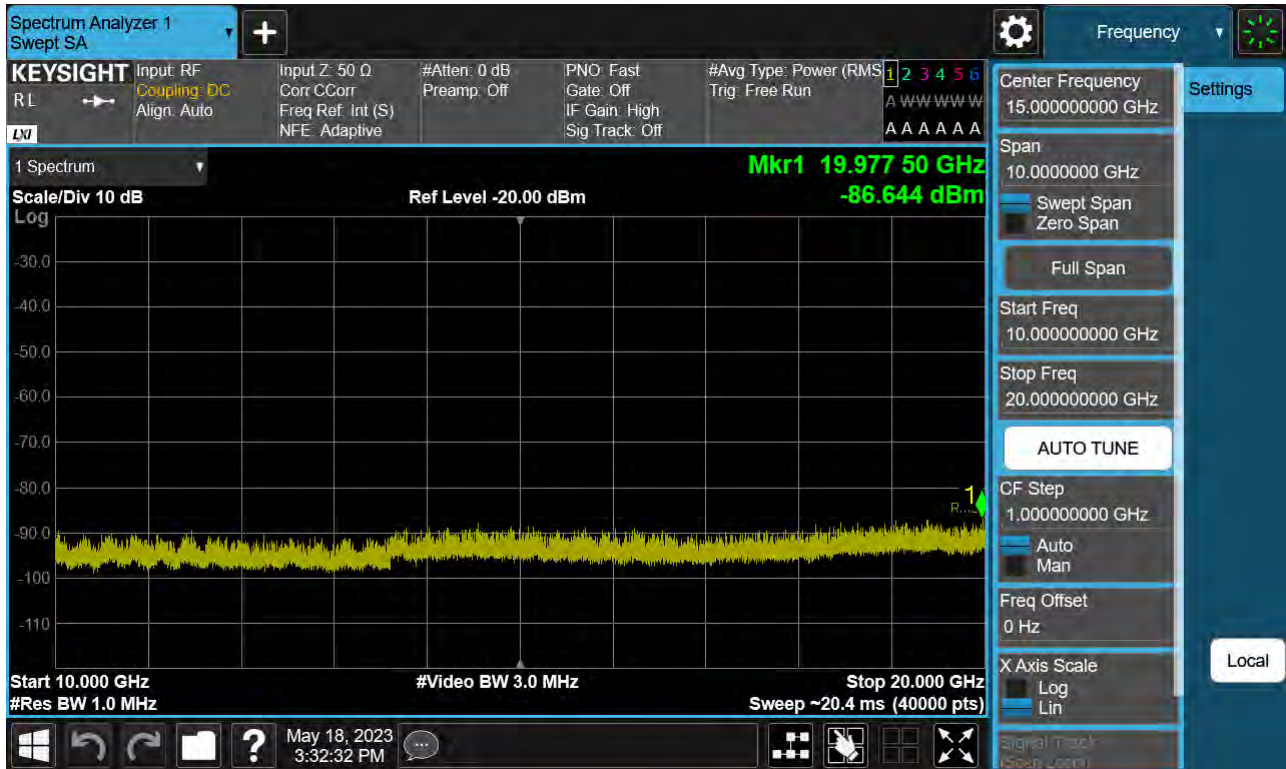
Sub6 n66. Conducted Spurious Plot\_2 (354500ch\_15 MHz\_BPSK\_RB 1\_1)



Sub6 n66. Conducted Spurious Plot\_1 (344000ch\_20 MHz\_BPSK\_RB 1\_1)



Sub6 n66. Conducted Spurious Plot\_2 (344000ch\_20 MHz\_BPSK\_RB 1\_1)



Sub6 n66. Conducted Spurious Plot\_1 (349000ch\_20 MHz\_BPSK\_RB 1\_1)





Sub6 n66. Conducted Spurious Plot\_2 (349000ch\_20 MHz\_BPSK\_RB 1\_1)



Sub6 n66. Conducted Spurious Plot\_1 (354000ch\_20 MHz\_BPSK\_RB 1\_1)



Sub6 n66. Conducted Spurious Plot\_2 (354000ch\_20 MHz\_BPSK\_RB 1\_1)



## 10. ANNEX A\_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2307-FC011-P