

FCC Sub6 REPORT

Certification

Applicant Name: SAMSUNG Electronics Co., Ltd.	Date of Issue: October 20, 2021
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-2109-FC045

FCC ID:	A3LSMA136U
APPLICANT:	SAMSUNG Electronics Co., Ltd.

Model(s): SM-A136U
 Additional Model(s): SM-A136U1, SM-S136DL
 EUT Type: Mobile Phone
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 FCC Rule Part(s): §27, §2

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	ERP	
				Max. Power (W)	Max. Power (dBm)
Sub6 n71 (5)	665.5 - 695.5	4M48G7D	PI/2 BPSK	0.072	18.57
		4M49G7D	QPSK	0.069	18.39
		4M50W7D	16QAM	0.055	17.43
		4M49W7D	64QAM	0.038	15.84
		4M50W7D	256QAM	0.025	14.03
Sub6 n71 (10)	668.0 - 693.0	9M00G7D	PI/2 BPSK	0.063	18.00
		8M96G7D	QPSK	0.060	17.78
		8M95W7D	16QAM	0.048	16.82
		9M00W7D	64QAM	0.033	15.18
		8M98W7D	256QAM	0.022	13.50
Sub6 n71 (15)	670.5 - 690.5	13M5G7D	PI/2 BPSK	0.057	17.53
		13M5G7D	QPSK	0.056	17.48
		13M5W7D	16QAM	0.044	16.44
		13M4W7D	64QAM	0.031	14.89
		13M5W7D	256QAM	0.021	13.19
Sub6 n71 (20)	673.0 - 688.0	17M9G7D	PI/2 BPSK	0.049	16.92
		18M0G7D	QPSK	0.049	16.91
		17M9W7D	16QAM	0.039	15.89
		17M9W7D	64QAM	0.027	14.34
		18M0W7D	256QAM	0.018	12.64

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-2109-FC045

REVIEWED BY



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

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-2109-FC045	October 20, 2021	- 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

Applicant Name:	SAMSUNG Electronics Co., Ltd.
Address:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
FCC ID:	A3LSMA136U
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§27, §2
EUT Type:	Mobile Phone
Model(s):	SM-A136U
Additional Model(s):	SM-A136U1, SM-S136DL
SCS(kHz):	15
Bandwidth(MHz):	5, 10, 15, 20
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:	665.5 MHz – 695.5 MHz (Sub6 n71(5 MHz)) 668.0 MHz – 693.0 MHz (Sub6 n71(10 MHz)) 670.5 MHz – 690.5 MHz (Sub6 n71(15 MHz)) 673.0 MHz – 688.0 MHz (Sub6 n71(20 MHz))
Date(s) of Tests:	September 13, 2021 ~ October 19, 2021
Serial number:	Radiated: 420015e6dcbb8865 Conducted: R3CR807JGZN

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

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

It also supports IEEE 802.11 a/b/g/n/ac (HT20/40/80), Bluetooth, BT LE, NFC.

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
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 = 100 kHz 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 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;

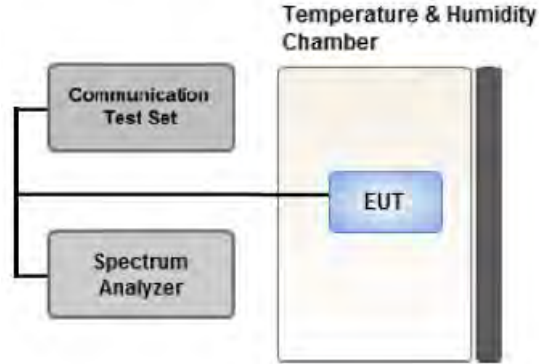
$$\text{Result}_{(dBm)} = P_g_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dBi)}$$

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.

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

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.

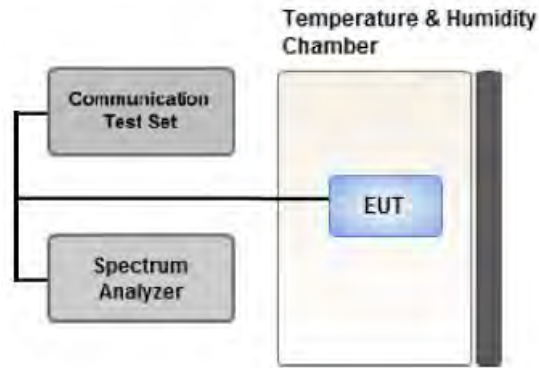
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5 % of the 99 % occupied bandwidth observed in Step 7

3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



Test setup

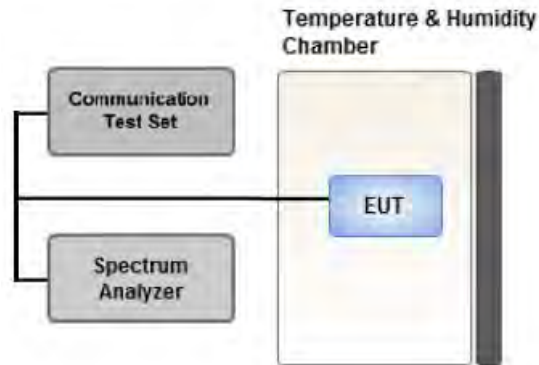
Test Overview

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 $\geq 2 \times \text{Span/RBW}$
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.

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: SA, NSA
Worst case: NSA
- 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: 2A-n71A(5 MHz))
- All RB sizes, offsets of operation were investigated and the worst case configuration results are reported.
Please refer to the table below.
- SM-A136U & additional models were tested and the worst case results are reported.
(Worst case : SM-A136U)

[Worst case]

Test Description	Modulation	RB size	RB offset	Axis
Effective Radiated Power	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	1	1	X
Radiated Spurious and Harmonic Emissions	PI/2 BPSK	1	1	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: SA, NSA
Worst case: NSA
- All RB sizes, offsets of operation were investigated and the worst case configuration results are reported.
Please refer to the table below.
- SM-A136U & additional models were tested and the worst case results are reported.
(Worst case : SM-A136U)

[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	05/30/2022	Biennial
Precision Dipole Antenna	UHAP	Schwarzbeck	01274	05/30/2022	Biennial
Horn Antenna(1~18GHz)	BBHA 9120D	Schwarzbeck	02289	05/08/2022	Biennial
Horn Antenna(1~18GHz)	BBHA 9120D	Schwarzbeck	9120D-1299	05/04/2022	Biennial
Horn Antenna(15~40GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	10/13/2022	Biennial
Horn Antenna(15~40GHz)	BBHA 9170	Schwarzbeck	BBHA9170124	02/11/2022	Biennial
Loop Antenna(9kHz~30 MHz)	FMZB1513	Rohde & Schwarz	1513-175	05/18/2022	Biennial
Bilog Antenna	VULB9160	Schwarzbeck	3150	03/03/2023	Biennial
Hybrid Antenna	VULB9160	Schwarzbeck	760	02/22/2023	Biennial
High Pass Filter	WHKX10-900-1000-15000-40SS	Wainwright Instruments	15	06/15/2022	Annual
High Pass Filter	WHKX10-2700-3000-18000-40SS	Wainwright Instruments	145	06/15/2022	Annual
High Pass Filter	WHNX6-4740-6000-26500-40CC	Wainwright Instruments	11	06/15/2022	Annual
LOW NOISE AMP (100 MHz ~ 18GHz)	CBLU1183540B-01	CERNEC	26822	06/15/2022	Annual
Power Amplifier	CBL18265035	CERNEC	22966	12/04/2021	Annual
Power Amplifier	CBL26405040	CERNEC	25956	03/23/2022	Annual
DC Power Supply	E3632A	Hewlett Packard	MY40004427	09/15/2022	Annual
Power Splitter(DC~26.5 GHz)	11667B	Hewlett Packard	11275	04/07/2022	Annual
Chamber	SU-642	ESPEC	93008124	03/15/2022	Annual
Signal Analyzer(10Hz~26.5GHz)	N9020A	Agilent	MY51110063	04/22/2022	Annual
ATTENUATOR(20dB)	8493C	Hewlett Packard	17280	06/01/2022	Annual
Spectrum Analyzer(10Hz~40GHz)	FSV40	REOHDE & SCHWARZ	101436	03/02/2022	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/18/2022	Annual
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262116770	07/12/2022	Annual
Wideband Radio Communication Tester	MT8820C	Anritsu Corp.	6201026545	01/07/2022	Annual
SIGNAL GENERATOR (100kHz~40GHz)	SMB100A	REOHDE & SCHWARZ	177633	07/05/2022	Annual
Signal Analyzer(5Hz~40.0GHz)	N9030B	KEYSIGHT	MY55480167	06/02/2022	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)	1.82 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.05 (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(g)	< 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>
Frequency stability / variation of ambient temperature	§2.1055, §27.54	Emission must remain in band	PASS

Note:

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

6.2 Test Condition : Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Effective Radiated Power	§27.50(c)(10)	< 3 Watts max. ERP	PASS
Radiated Spurious and Harmonic Emissions	§2.1053, §27.53(g)	< 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
20175	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)

QPSK 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 EFFECTIVE RADIATED POWER

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	Limit	ERP	
								W	W	dBm
665.5	Sub6 n71/ 5 MHz [15 kHz]	PI/2 BPSK	-30.82	27.52	-9.81	1.23	H	< 3.00	0.044	16.48
		QPSK	-31.13	27.21	-9.81	1.23	H		0.041	16.17
		16-QAM	-32.24	26.10	-9.81	1.23	H		0.032	15.06
		64-QAM	-33.79	24.55	-9.81	1.23	H		0.022	13.51
		256-QAM	-35.48	22.86	-9.81	1.23	H		0.015	11.82
680.5		PI/2 BPSK	-31.05	27.79	-9.78	1.28	H		0.047	16.73
		QPSK	-31.06	27.78	-9.78	1.28	H		0.047	16.72
		16-QAM	-32.07	26.77	-9.78	1.28	H		0.037	15.71
		64-QAM	-33.60	25.24	-9.78	1.28	H		0.026	14.18
		256-QAM	-35.37	23.47	-9.78	1.28	H		0.017	12.41
695.5		PI/2 BPSK	-30.09	29.60	-9.75	1.28	H		0.072	18.57
		QPSK	-30.27	29.42	-9.75	1.28	H		0.069	18.39
		16-QAM	-31.23	28.46	-9.75	1.28	H		0.055	17.43
		64-QAM	-32.82	26.87	-9.75	1.28	H		0.038	15.84
		256-QAM	-34.63	25.06	-9.75	1.28	H		0.025	14.03

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	Limit		ERP	
								W	W	dBm	
668.0	Sub6 n71/ 10 MHz [15 kHz]	PI/2 BPSK	-31.37	27.13	-9.80	1.23	H	< 3.00	0.041	16.10	
		QPSK	-31.38	27.12	-9.80	1.23	H		0.041	16.09	
		16-QAM	-32.45	26.05	-9.80	1.23	H		0.032	15.02	
		64-QAM	-34.00	24.50	-9.80	1.23	H		0.022	13.47	
		256-QAM	-35.68	22.82	-9.80	1.23	H		0.015	11.79	
680.5		PI/2 BPSK	-30.85	27.99	-9.78	1.28	H		0.049	16.93	
		QPSK	-30.87	27.97	-9.78	1.28	H		0.049	16.91	
		16-QAM	-31.95	26.89	-9.78	1.28	H		0.038	15.83	
		64-QAM	-33.49	25.35	-9.78	1.28	H		0.027	14.29	
		256-QAM	-35.55	23.29	-9.78	1.28	H		0.017	12.23	
693.0	PI/2 BPSK	-30.46	29.03	-9.75	1.28	H	0.063	18.00			
	QPSK	-30.68	28.81	-9.75	1.28	H	0.060	17.78			
	16-QAM	-31.64	27.85	-9.75	1.28	H	0.048	16.82			
	64-QAM	-33.28	26.21	-9.75	1.28	H	0.033	15.18			
	256-QAM	-34.96	24.53	-9.75	1.28	H	0.022	13.50			

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	Limit	ERP	
									W	W
670.5	Sub6 n71/ 15 MHz [15 kHz]	PI/2 BPSK	-31.25	27.34	-9.80	1.26	H	< 3.00	0.042	16.28
		QPSK	-31.27	27.32	-9.80	1.26	H		0.042	16.26
		16-QAM	-32.30	26.29	-9.80	1.26	H		0.033	15.23
		64-QAM	-33.86	24.73	-9.80	1.26	H		0.023	13.67
		256-QAM	-35.53	23.06	-9.80	1.26	H		0.016	12.00
680.5		PI/2 BPSK	-31.06	27.78	-9.78	1.28	H		0.047	16.72
		QPSK	-31.15	27.69	-9.78	1.28	H		0.046	16.63
		16-QAM	-32.16	26.68	-9.78	1.28	H		0.036	15.62
		64-QAM	-33.68	25.16	-9.78	1.28	H		0.026	14.10
		256-QAM	-35.43	23.41	-9.78	1.28	H		0.017	12.35
690.5	PI/2 BPSK	-30.82	28.57	-9.76	1.28	H	0.057	17.53		
	QPSK	-30.87	28.52	-9.76	1.28	H	0.056	17.48		
	16-QAM	-31.91	27.48	-9.76	1.28	H	0.044	16.44		
	64-QAM	-33.46	25.93	-9.76	1.28	H	0.031	14.89		
	256-QAM	-35.16	24.23	-9.76	1.28	H	0.021	13.19		

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	Limit		ERP	
								W	W	dBm	dBm
673.0	Sub6 n71/ 20 MHz [15 kHz]	PI/2 BPSK	-31.30	27.41	-9.79	1.26	H	< 3.00	0.043	16.36	
		QPSK	-31.33	27.38	-9.79	1.26	H		0.043	16.33	
		16-QAM	-32.35	26.36	-9.79	1.26	H		0.034	15.31	
		64-QAM	-33.90	24.81	-9.79	1.26	H		0.024	13.76	
		256-QAM	-35.60	23.11	-9.79	1.26	H		0.016	12.06	
680.5		PI/2 BPSK	-31.30	27.54	-9.78	1.28	H		0.044	16.48	
		QPSK	-31.31	27.53	-9.78	1.28	H		0.044	16.47	
		16-QAM	-32.29	26.55	-9.78	1.28	H		0.035	15.49	
		64-QAM	-33.88	24.96	-9.78	1.28	H		0.025	13.90	
		256-QAM	-35.60	23.24	-9.78	1.28	H		0.017	12.18	
688.0	PI/2 BPSK	-31.25	27.96	-9.76	1.28	H	0.049	16.92			
	QPSK	-31.26	27.95	-9.76	1.28	H	0.049	16.91			
	16-QAM	-32.28	26.93	-9.76	1.28	H	0.039	15.89			
	64-QAM	-33.83	25.38	-9.76	1.28	H	0.027	14.34			
	256-QAM	-35.53	23.68	-9.76	1.28	H	0.018	12.64			

8.2 RADIATED SPURIOUS EMISSIONS

- NR Band: N71
- LTE Band(Anchor): B2
- 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
133100 (665.5)	1 331.00	-48.51	6.86	-55.03	1.79	H	-49.96	-13.00
	1 996.50	-48.46	9.71	-55.37	2.23	V	-47.89	-13.00
	2 662.00	-57.36	10.18	-62.27	2.60	H	-54.69	-13.00
	3 327.50	-60.79	11.22	-62.68	2.98	H	-54.44	-13.00
	3 993.00	-61.26	11.26	-59.68	3.27	H	-51.69	-13.00
136100 (680.5)	1 361.00	-52.92	7.20	-59.04	1.80	H	-53.64	-13.00
	2 041.50	-48.13	9.38	-54.99	2.21	H	-47.82	-13.00
	2 722.00	-56.91	10.62	-61.63	2.56	H	-53.57	-13.00
	3 402.50	-61.16	11.30	-64.19	2.97	H	-55.86	-13.00
	4 083.00	-62.24	11.56	-61.98	3.31	H	-53.73	-13.00
139100 (695.5)	1 391.00	-55.75	7.50	-62.63	1.87	H	-57.00	-13.00
	2 086.50	-53.31	8.88	-59.16	2.29	V	-52.57	-13.00
	2 782.00	-58.65	10.74	-63.30	2.67	V	-55.23	-13.00
	3 477.50	-57.99	11.42	-61.17	3.01	V	-52.76	-13.00
	4 173.00	-61.78	11.70	-61.07	3.31	V	-52.68	-13.00

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
18900 (1880.0)	3,760.00	-56.49	11.64	-56.72	3.16	H	-48.24	-13.00
	5,640.00	-59.88	12.00	-53.70	3.93	H	-45.63	-13.00
	7,520.00	-58.94	11.54	-44.49	4.51	V	-37.46	-13.00

8.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
Sub6 n5	5 MHz	680.5	BPSK	25	0	4.11
			QPSK			5.12
			16-QAM			5.93
			64-QAM			5.96
			256-QAM			6.29
	10 MHz		BPSK	50		4.19
			QPSK			5.33
			16-QAM			5.94
			64-QAM			6.17
			256-QAM			6.41
	15 MHz		BPSK	75		4.11
			QPSK			5.13
			16-QAM			5.79
			64-QAM			6.09
			256-QAM			6.42
	20 MHz		BPSK	100		4.05
			QPSK			5.12
			16-QAM			5.84
			64-QAM			6.18
			256-QAM			6.43

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 56 ~ 75.
2. Peak- to- Average Ratio is not required. These values are reported for information only.

8.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
Sub6 n71	5 MHz	680.5	BPSK	25	0	4.4792
			QPSK			4.4896
			16-QAM			4.5011
			64-QAM			4.4908
			256-QAM			4.5043
	10 MHz		BPSK	50		9.0036
			QPSK			8.9644
			16-QAM			8.9527
			64-QAM			8.9950
			256-QAM			8.9752
	15 MHz		BPSK	75		13.458
			QPSK			13.489
			16-QAM			13.447
			64-QAM			13.431
			256-QAM			13.462
	20 MHz		BPSK	100		17.923
			QPSK			17.981
			16-QAM			17.900
			64-QAM			17.883
			256-QAM			17.952

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 n71	5	665.5	1.3271	30.200	-73.027	-42.827	-13.00
		680.5	1.3570	30.200	-75.672	-45.472	
		695.5	8.2428	30.815	-80.469	-49.654	
	10	668.0	1.3271	30.200	-72.631	-42.431	
		680.5	1.3520	30.200	-76.113	-45.913	
		693.0	1.3769	30.200	-75.344	-45.144	
	15	670.5	1.3271	30.200	-72.416	-42.216	
		680.5	4.0594	30.200	-79.886	-49.686	
		690.5	1.3670	30.200	-73.836	-43.636	
	20	673.0	1.3276	30.200	-73.189	-42.989	
		680.5	1.3426	30.200	-78.724	-48.524	
		688.0	1.3575	30.200	-75.639	-45.439	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 108 ~ 119.
2. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
3. Factor(dB) = Cable Loss + Attenuator + 4-Way Divider

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(26.5)	32.355

8.6 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 76 ~ 107.

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
665.5	100 %	+20(Ref)	665 500 015	0.0	0.000 000	0.000
	100 %	-30	665 500 026	11.8	0.000 002	0.018
	100 %	-20	665 500 018	3.4	0.000 001	0.005
	100 %	-10	665 500 029	14.8	0.000 002	0.022
	100 %	0	665 500 024	9.7	0.000 001	0.015
	100 %	+10	665 500 024	9.4	0.000 001	0.014
	100 %	+30	665 500 030	15.9	0.000 002	0.024
	100 %	+40	665 500 026	11.2	0.000 002	0.017
	100 %	+50	665 500 021	6.8	0.000 001	0.010
	Batt. Endpoint	+20	665 500 019	4.3	0.000 001	0.006
695.5	100 %	+20(Ref)	695 500 012	0.0	0.000 000	0.000
	100 %	-30	695 500 024	12.2	0.000 002	0.018
	100 %	-20	695 500 020	8.0	0.000 001	0.011
	100 %	-10	695 500 019	7.2	0.000 001	0.010
	100 %	0	695 500 024	12.2	0.000 002	0.018
	100 %	+10	695 500 023	11.6	0.000 002	0.017
	100 %	+30	695 500 019	7.5	0.000 001	0.011
	100 %	+40	695 500 027	15.7	0.000 002	0.023
	100 %	+50	695 500 017	5.2	0.000 001	0.007
	Batt. Endpoint	+20	695 500 024	12.4	0.000 002	0.018

- ▣ 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
668.0	100 %	+20(Ref)	668 000 004	0.0	0.000 000	0.000
	100 %	-30	668 000 008	3.6	0.000 001	0.005
	100 %	-20	668 000 014	9.9	0.000 001	0.015
	100 %	-10	668 000 019	14.5	0.000 002	0.022
	100 %	0	668 000 019	14.5	0.000 002	0.022
	100 %	+10	668 000 013	8.4	0.000 001	0.013
	100 %	+30	668 000 008	3.4	0.000 001	0.005
	100 %	+40	668 000 014	9.4	0.000 001	0.014
	100 %	+50	668 000 014	9.2	0.000 001	0.014
	Batt. Endpoint	+20	668 000 009	4.4	0.000 001	0.007
693.0	100 %	+20(Ref)	693 000 010	0.0	0.000 000	0.000
	100 %	-30	693 000 027	16.5	0.000 002	0.024
	100 %	-20	693 000 018	8.1	0.000 001	0.012
	100 %	-10	693 000 027	16.6	0.000 002	0.024
	100 %	0	693 000 016	5.8	0.000 001	0.008
	100 %	+10	693 000 019	8.3	0.000 001	0.012
	100 %	+30	693 000 023	12.5	0.000 002	0.018
	100 %	+40	693 000 020	9.5	0.000 001	0.014
	100 %	+50	693 000 026	16.0	0.000 002	0.023
	Batt. Endpoint	+20	693 000 025	14.9	0.000 002	0.021

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

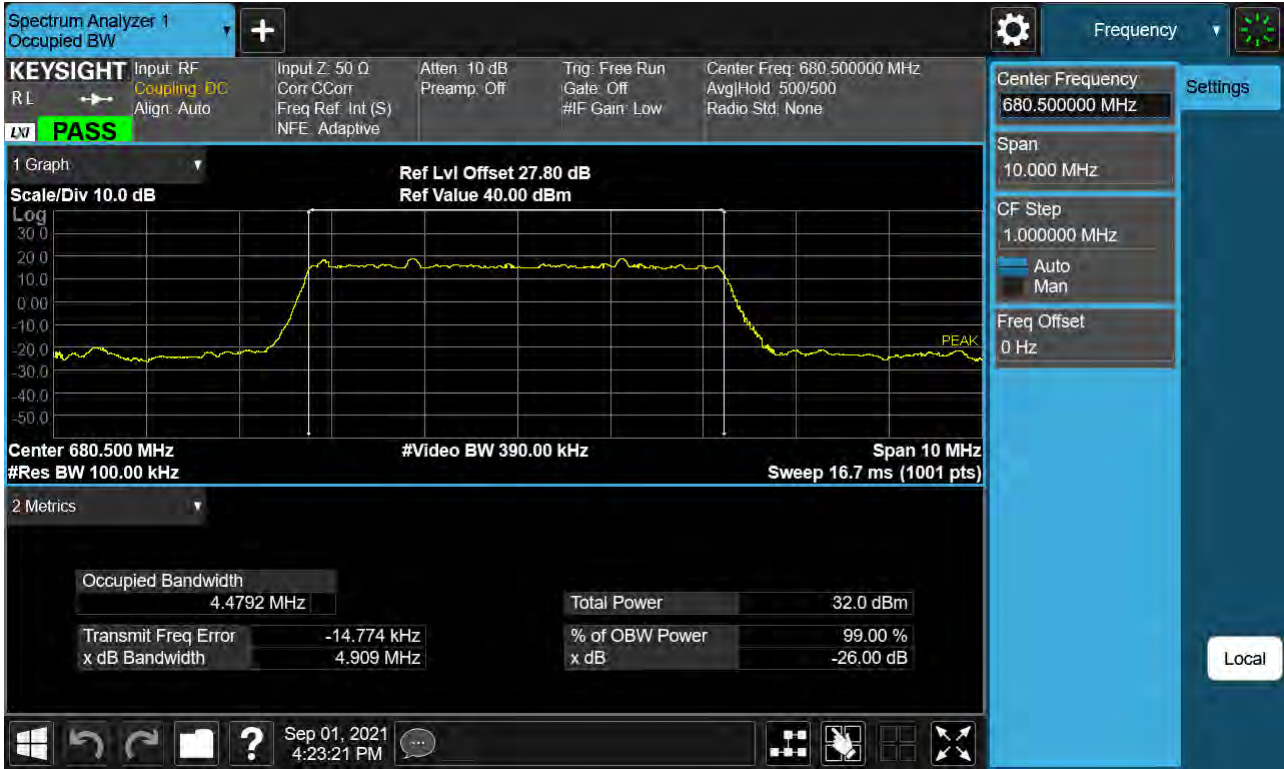
Test. Frequency (MHz)	Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
670.5	100 %	+20(Ref)	670 500 006	0.0	0.000 000	0.000
	100 %	-30	670 500 018	11.9	0.000 002	0.018
	100 %	-20	670 500 019	12.8	0.000 002	0.019
	100 %	-10	670 500 019	13.2	0.000 002	0.020
	100 %	0	670 500 012	6.0	0.000 001	0.009
	100 %	+10	670 500 019	13.2	0.000 002	0.020
	100 %	+30	670 500 017	11.2	0.000 002	0.017
	100 %	+40	670 500 014	8.0	0.000 001	0.012
	100 %	+50	670 500 022	16.0	0.000 002	0.024
	Batt. Endpoint	+20	670 500 014	7.4	0.000 001	0.011
690.5	100 %	+20(Ref)	690 500 008	0.0	0.000 000	0.000
	100 %	-30	690 500 013	4.8	0.000 001	0.007
	100 %	-20	690 500 017	8.8	0.000 001	0.013
	100 %	-10	690 500 022	14.1	0.000 002	0.020
	100 %	0	690 500 024	16.2	0.000 002	0.023
	100 %	+10	690 500 012	4.3	0.000 001	0.006
	100 %	+30	690 500 024	16.6	0.000 002	0.024
	100 %	+40	690 500 018	10.2	0.000 001	0.015
	100 %	+50	690 500 015	7.6	0.000 001	0.011
	Batt. Endpoint	+20	690 500 013	5.0	0.000 001	0.007

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

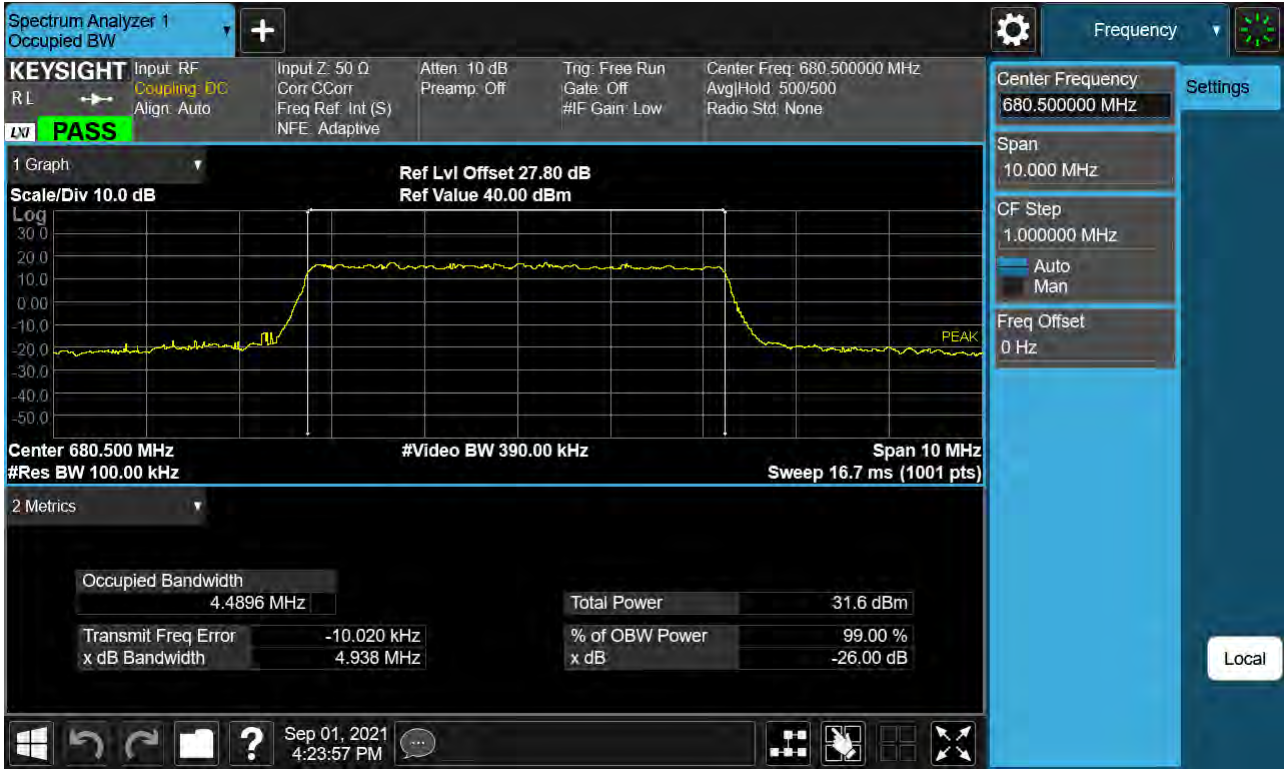
Test. Frequency (MHz)	Voltage (%)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
673.0	100 %	+20(Ref)	673 000 014	0.0	0.000 000	0.000
	100 %	-30	673 000 021	6.3	0.000 001	0.009
	100 %	-20	673 000 028	13.5	0.000 002	0.020
	100 %	-10	673 000 019	4.2	0.000 001	0.006
	100 %	0	673 000 021	6.6	0.000 001	0.010
	100 %	+10	673 000 021	7.1	0.000 001	0.010
	100 %	+30	673 000 029	14.8	0.000 002	0.022
	100 %	+40	673 000 029	14.2	0.000 002	0.021
	100 %	+50	673 000 031	16.3	0.000 002	0.024
	Batt. Endpoint	+20	673 000 023	8.6	0.000 001	0.013
688.0	100 %	+20(Ref)	688 000 017	0.0	0.000 000	0.000
	100 %	-30	688 000 032	14.7	0.000 002	0.021
	100 %	-20	688 000 026	9.0	0.000 001	0.013
	100 %	-10	688 000 031	13.8	0.000 002	0.020
	100 %	0	688 000 028	10.5	0.000 002	0.015
	100 %	+10	688 000 033	15.7	0.000 002	0.023
	100 %	+30	688 000 022	4.9	0.000 001	0.007
	100 %	+40	688 000 021	3.6	0.000 001	0.005
	100 %	+50	688 000 024	6.8	0.000 001	0.010
	Batt. Endpoint	+20	688 000 020	3.1	0.000 000	0.005

9. TEST PLOTS

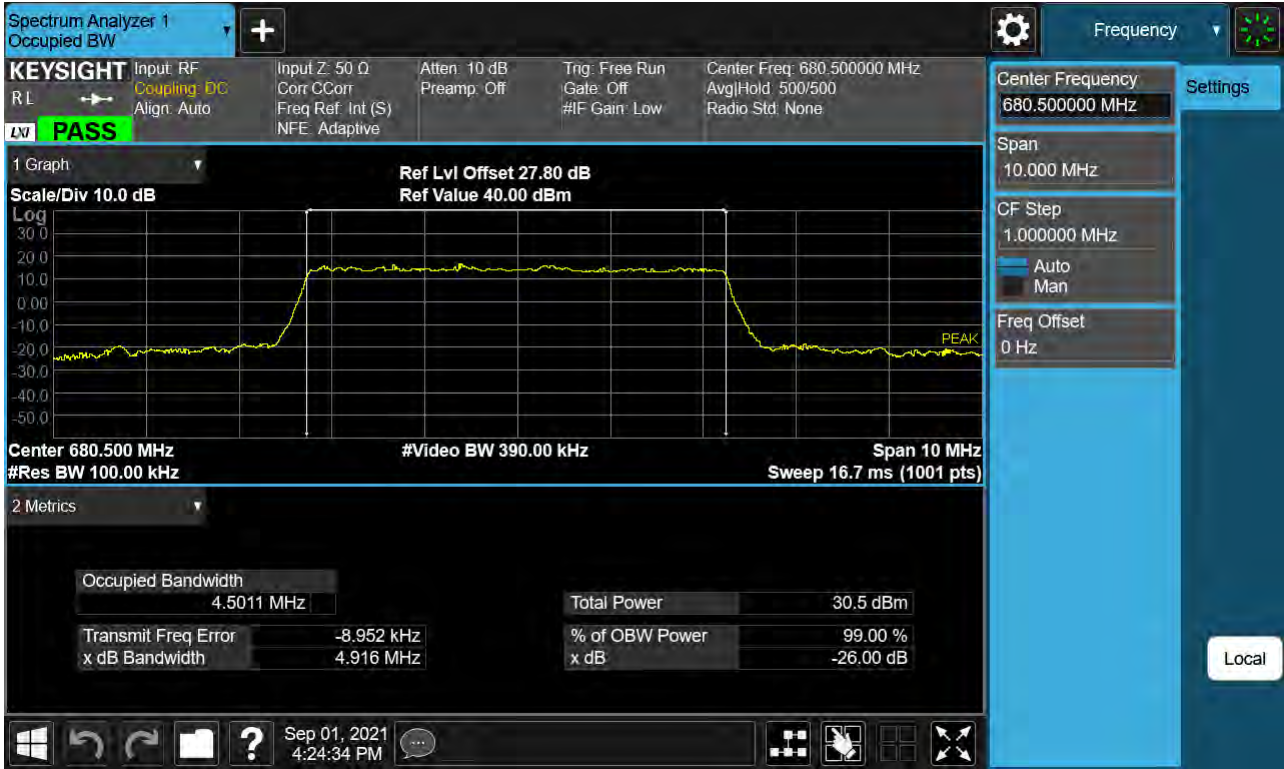
Sub6 n71. Occupied Bandwidth Plot (5 M BW Ch.136100 BPSK_Full RB)



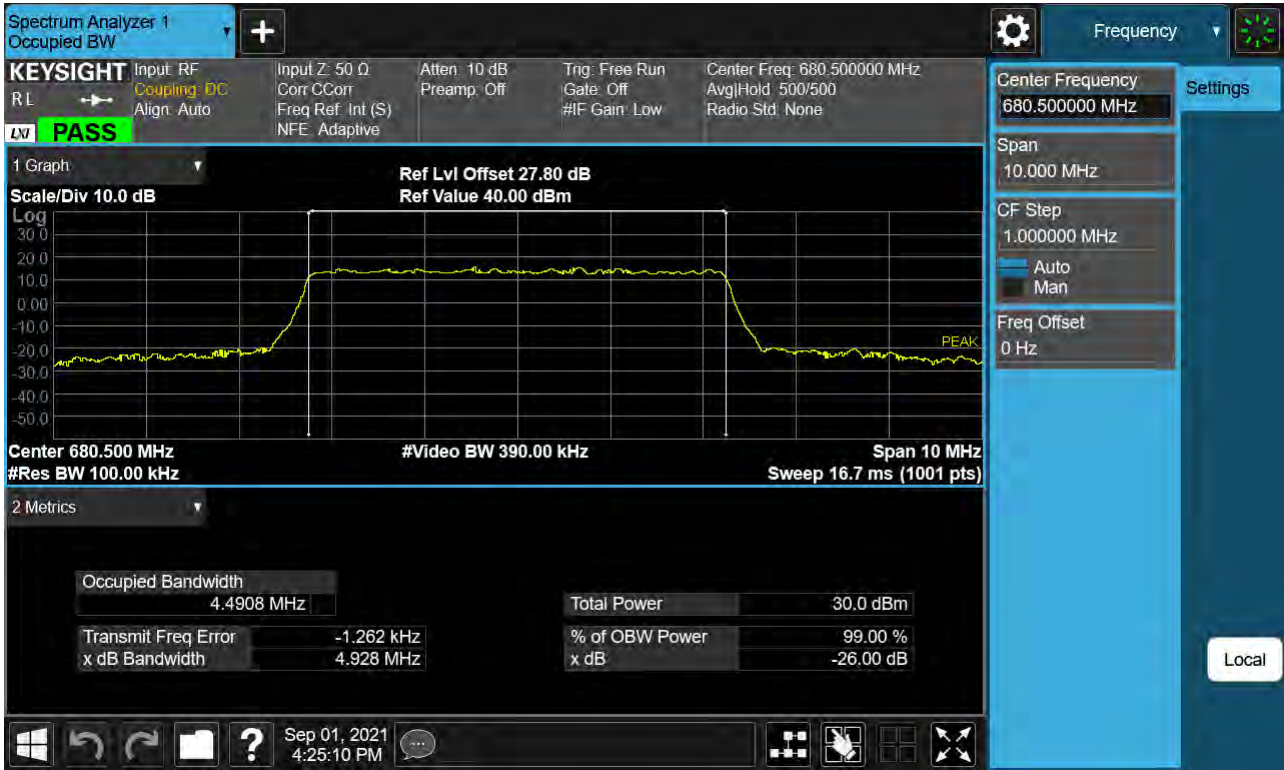
Sub6 n71. Occupied Bandwidth Plot (5 M BW Ch.136100 QPSK_ Full RB)



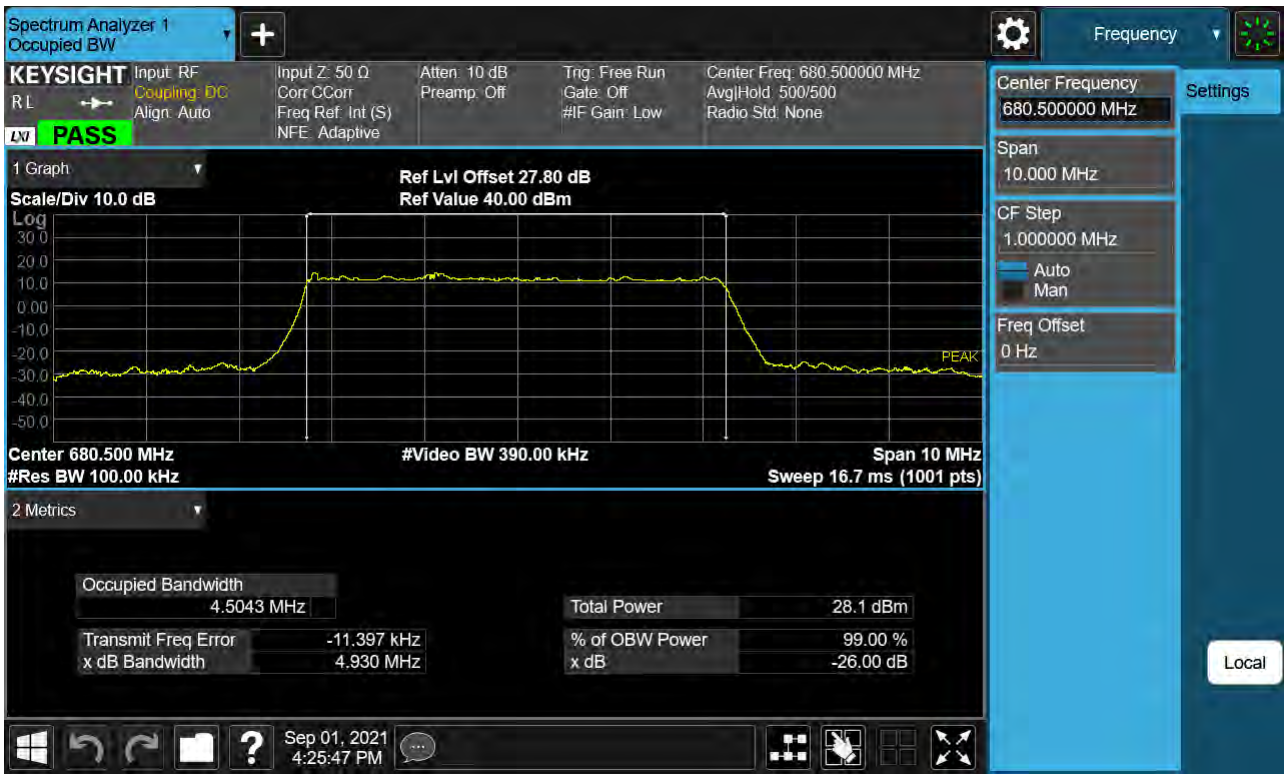
Sub6 n71. Occupied Bandwidth Plot (5 M BW Ch.136100 16QAM_ Full RB)



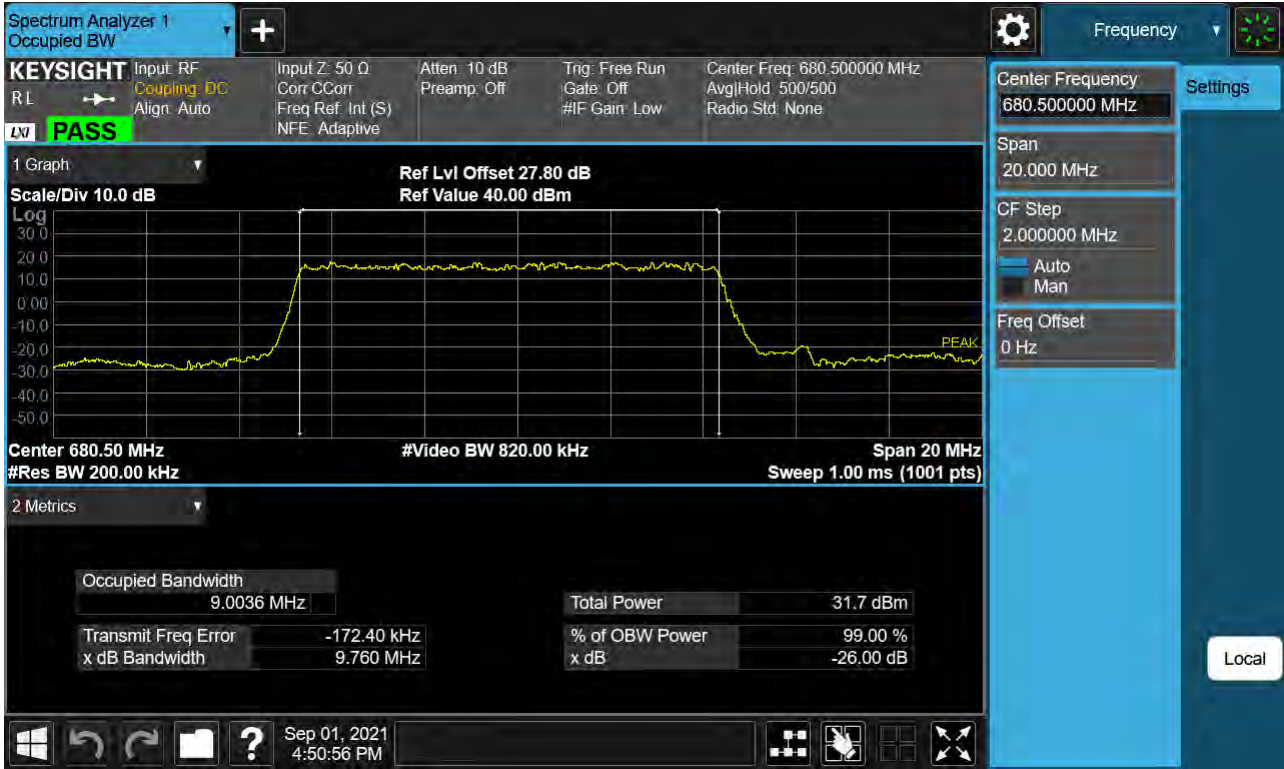
Sub6 n71. Occupied Bandwidth Plot (5 M BW Ch.136100 64QAM_ Full RB)



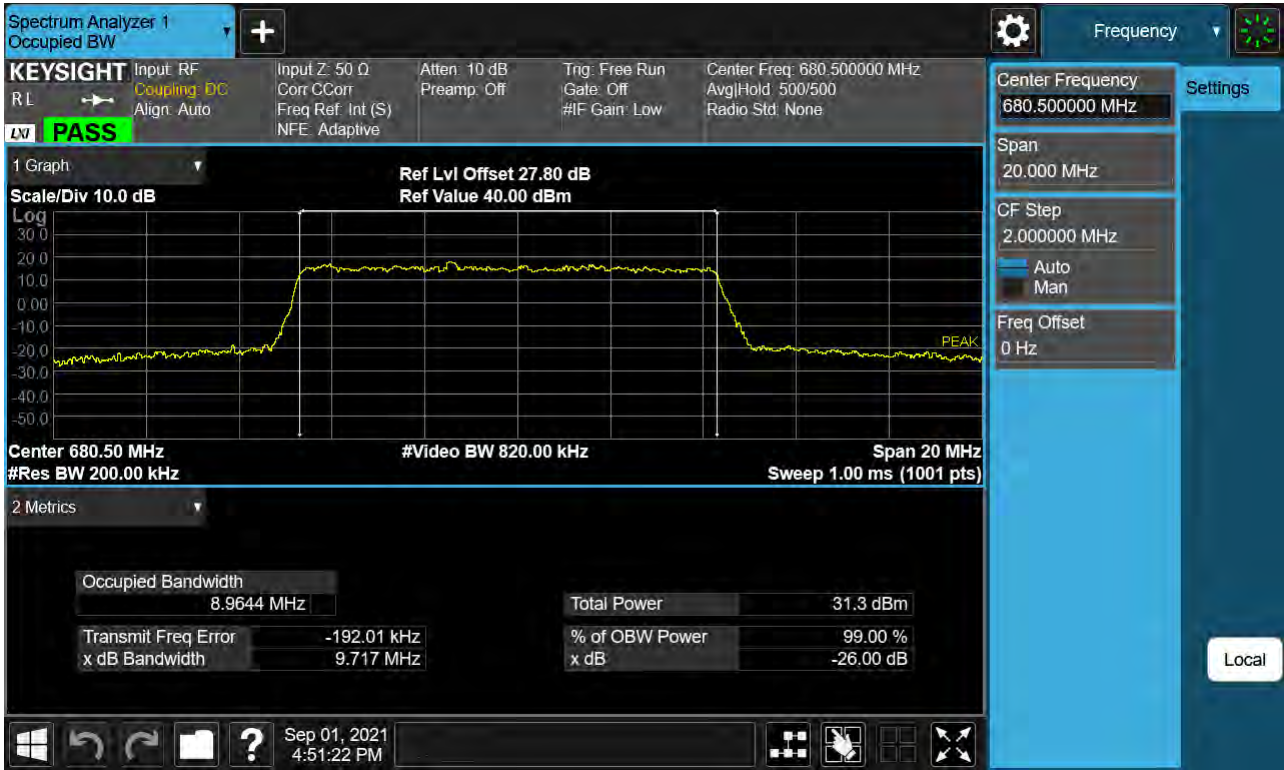
Sub6 n71. Occupied Bandwidth Plot (5 M BW Ch.136100 256QAM_ Full RB)



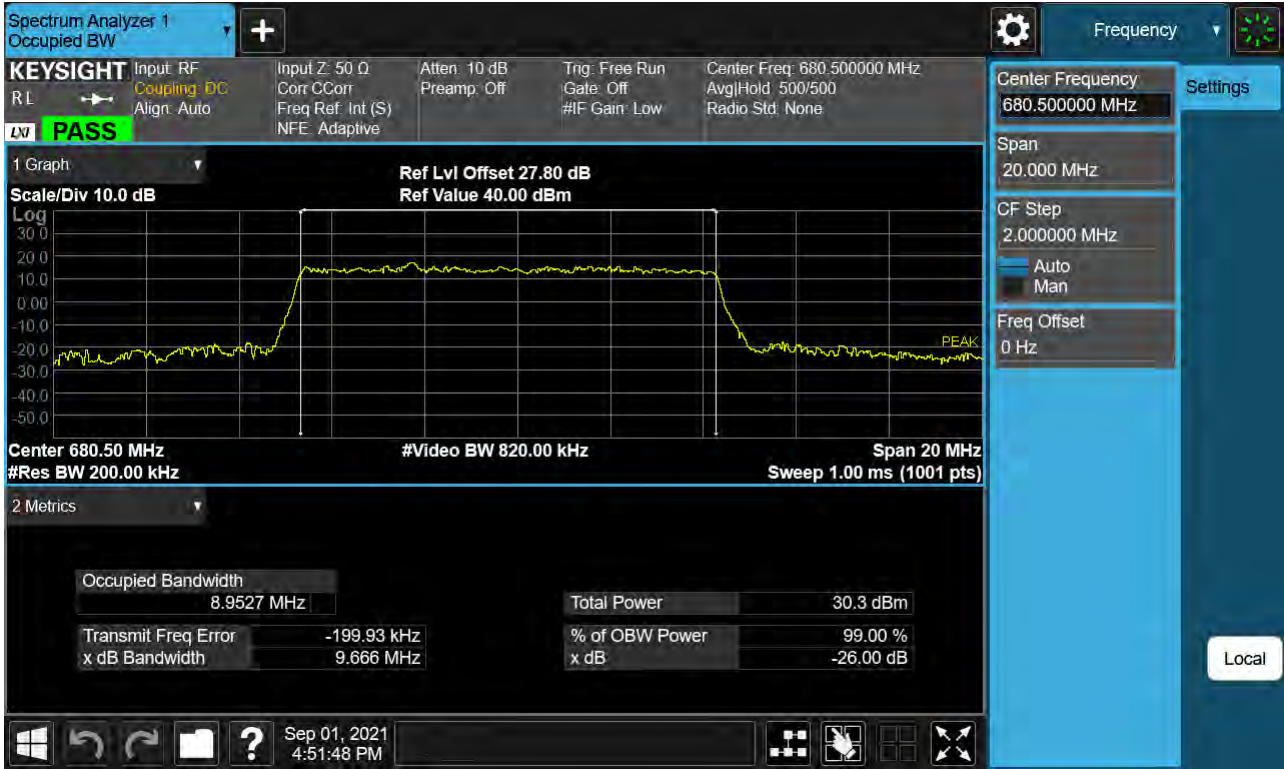
Sub6 n71. Occupied Bandwidth Plot (10 M BW Ch.136100 BPSK_ Full RB)



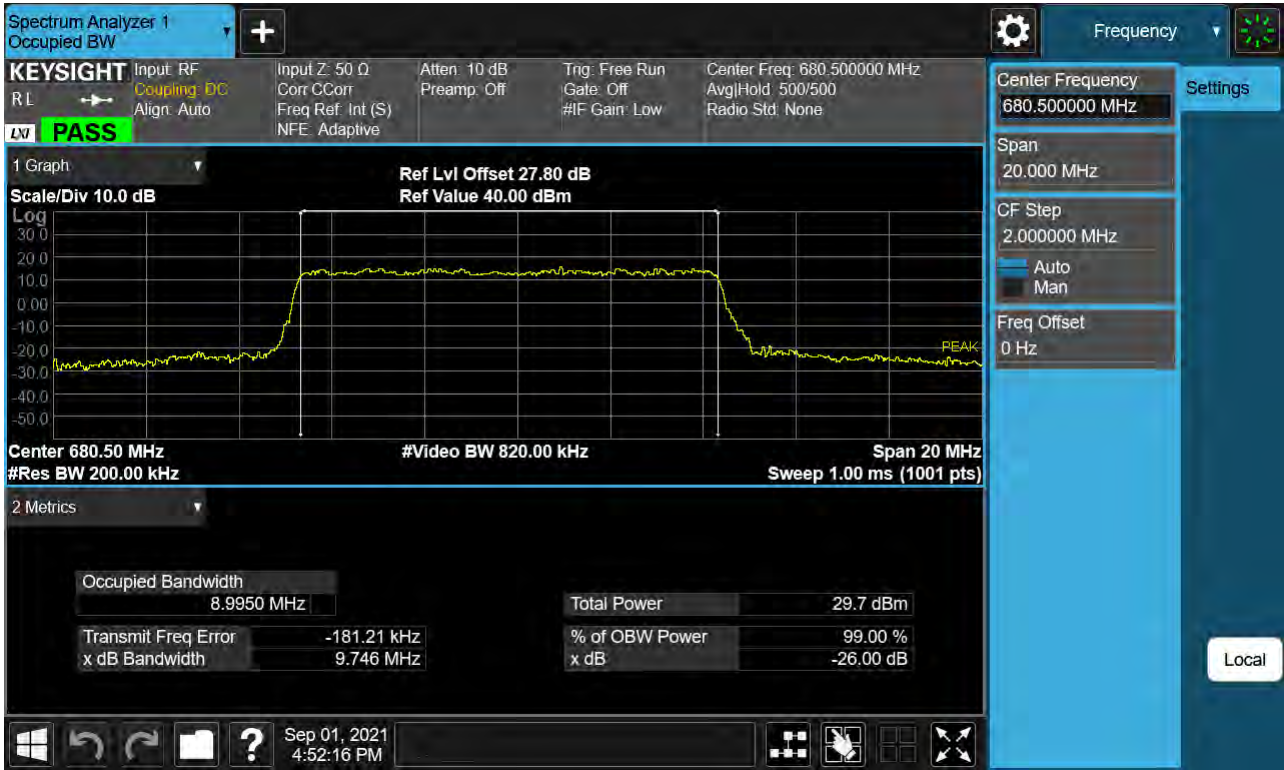
Sub6 n71. Occupied Bandwidth Plot (10 M BW Ch.136100 QPSK_ Full RB)



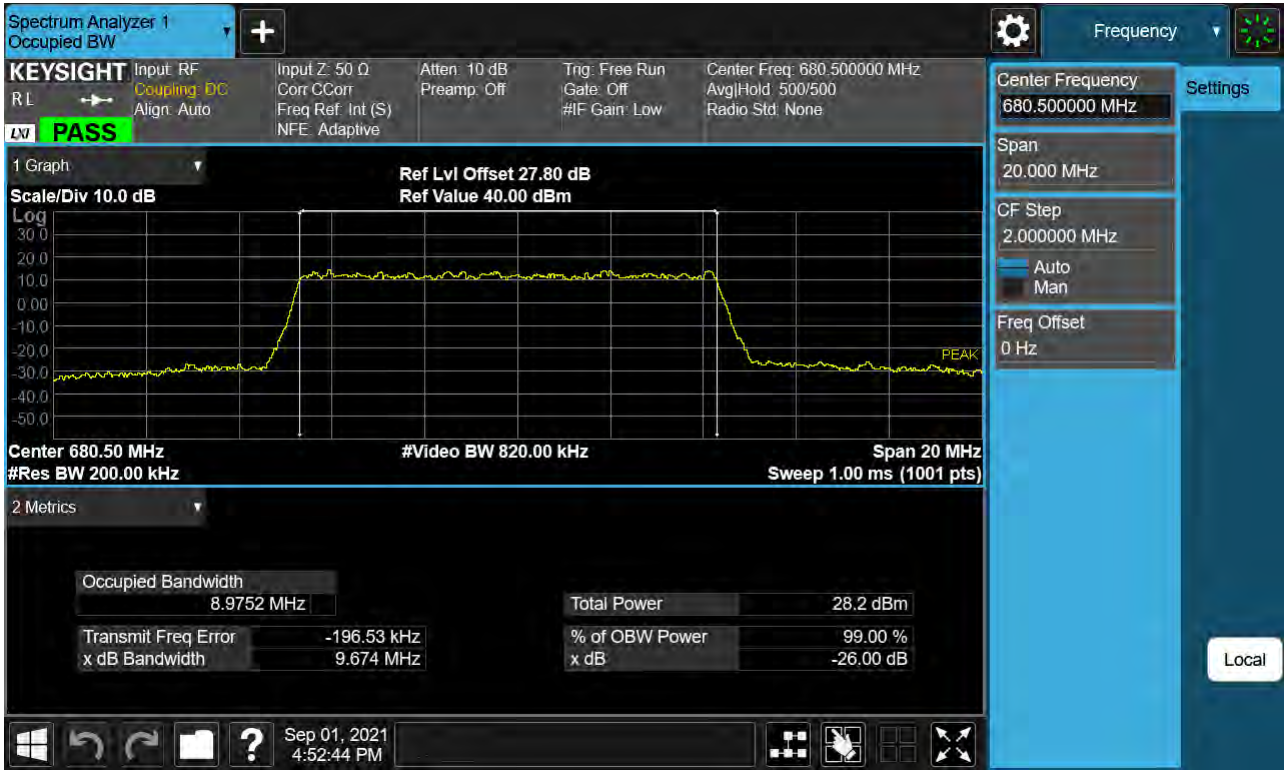
Sub6 n71. Occupied Bandwidth Plot (10 M BW Ch.136100 16QAM_ Full RB)



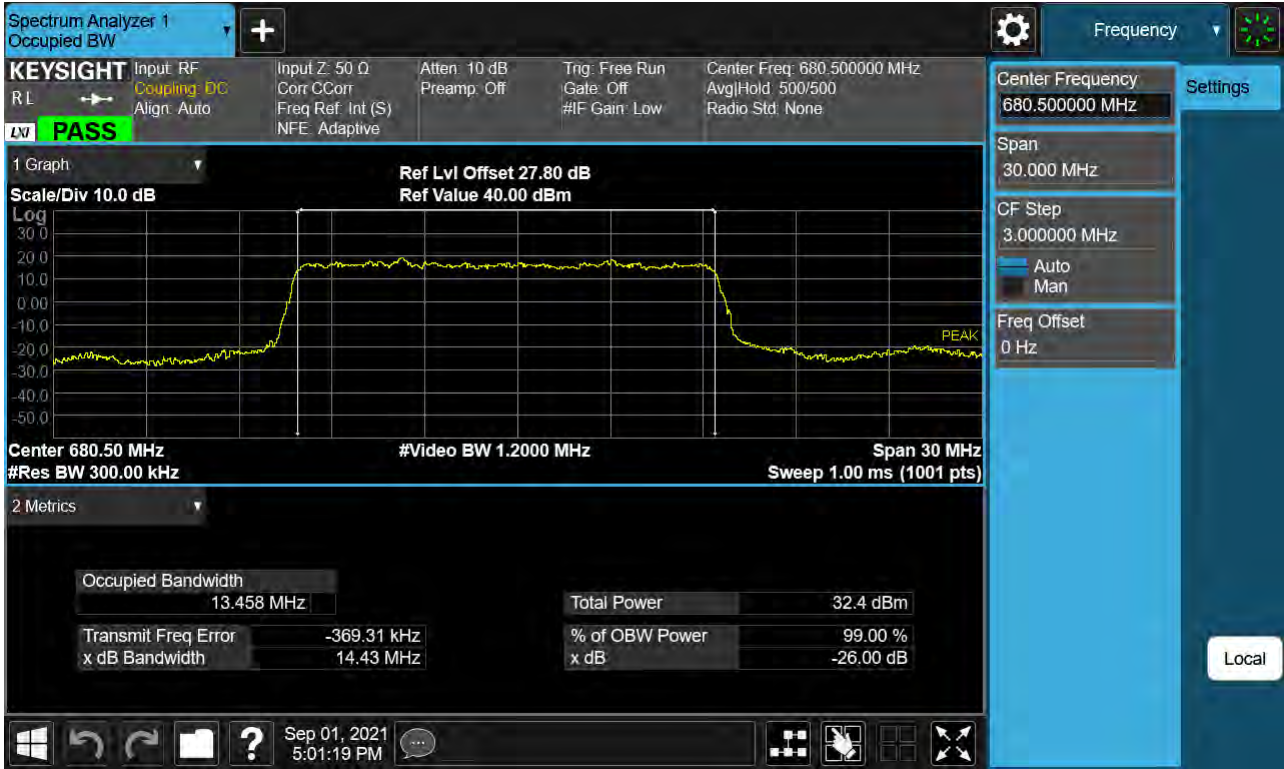
Sub6 n71. Occupied Bandwidth Plot (10 M BW Ch.136100 64QAM_ Full RB)



Sub6 n71. Occupied Bandwidth Plot (10 M BW Ch.136100 256QAM_ Full RB)



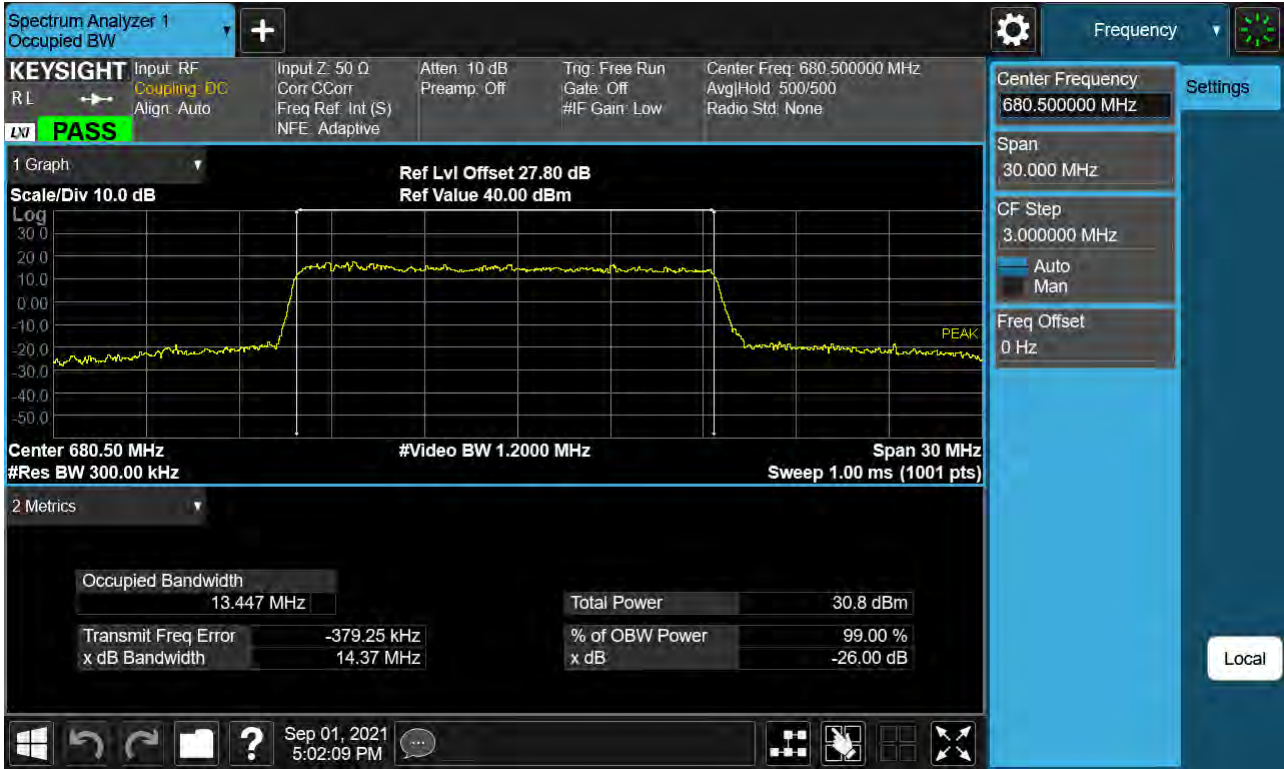
Sub6 n71. Occupied Bandwidth Plot (15 M BW Ch.136100 BPSK_ Full RB)



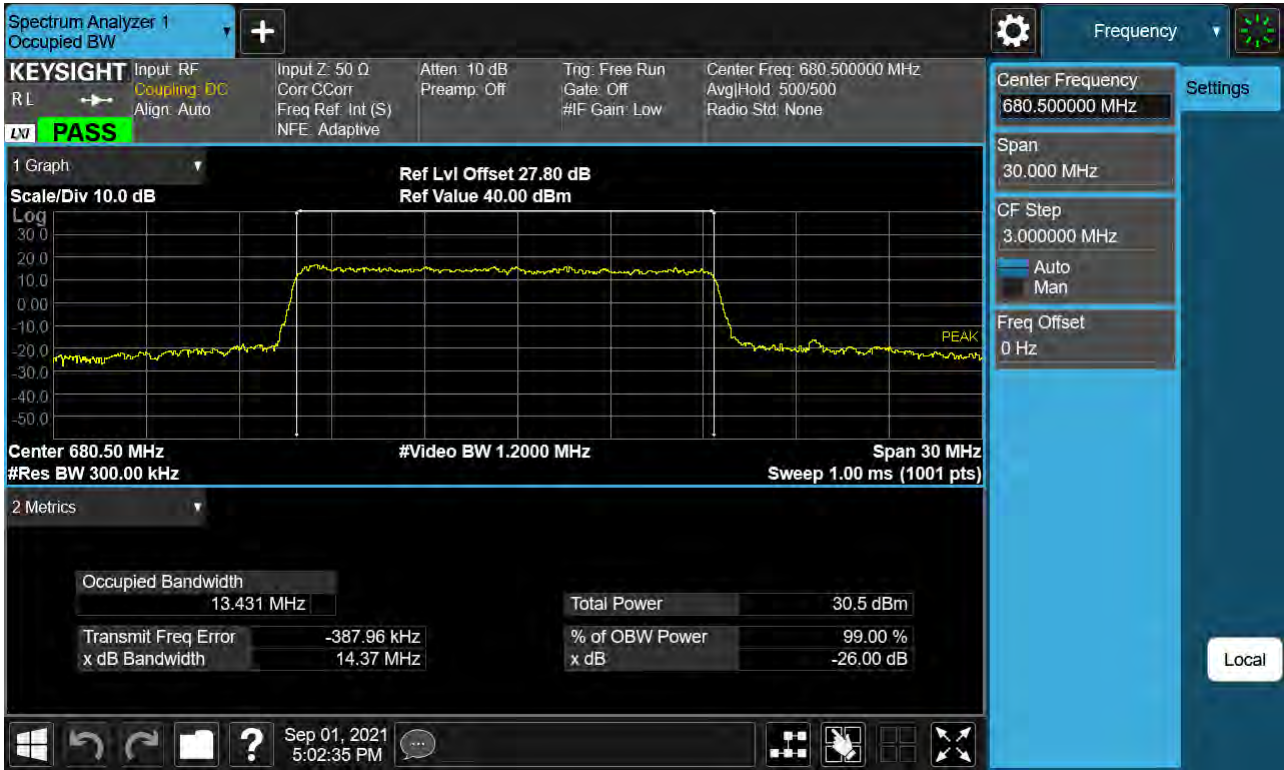
Sub6 n71. Occupied Bandwidth Plot (15 M BW Ch.136100 QPSK_ Full RB)



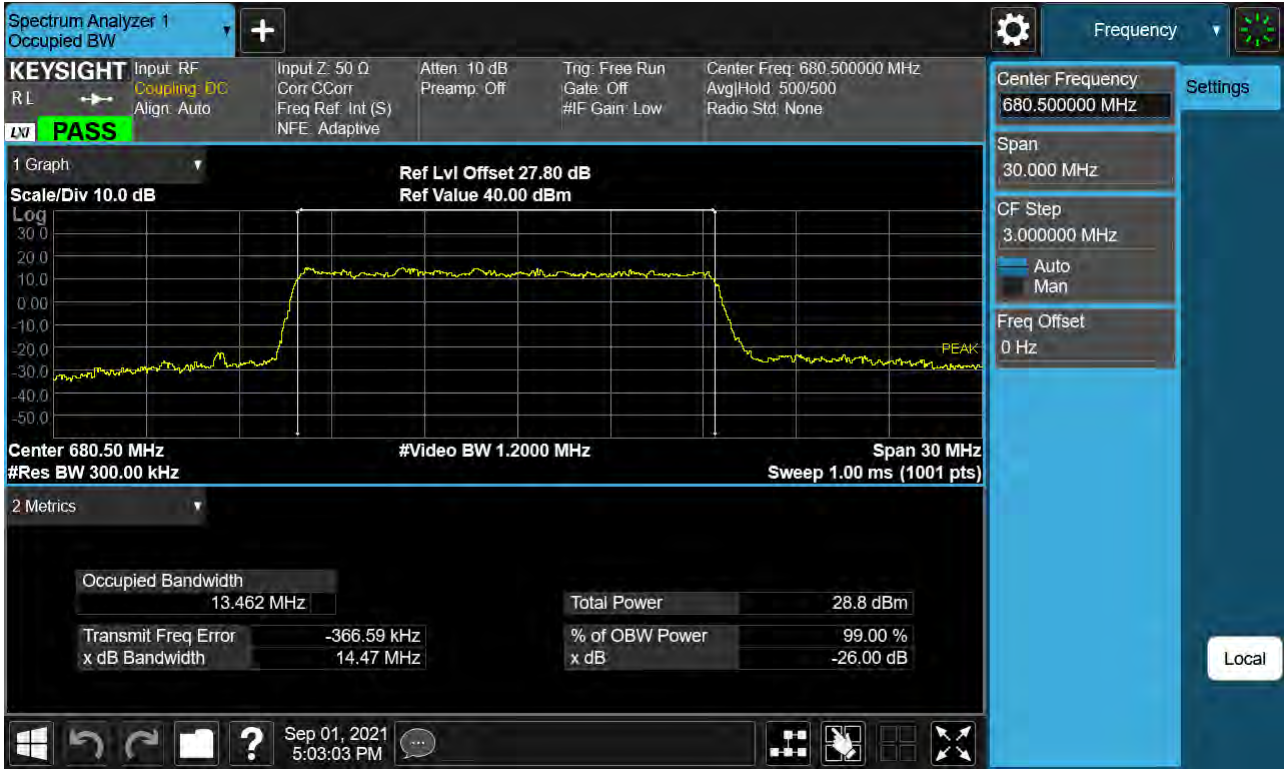
Sub6 n71. Occupied Bandwidth Plot (15 M BW Ch.136100 16QAM_ Full RB)



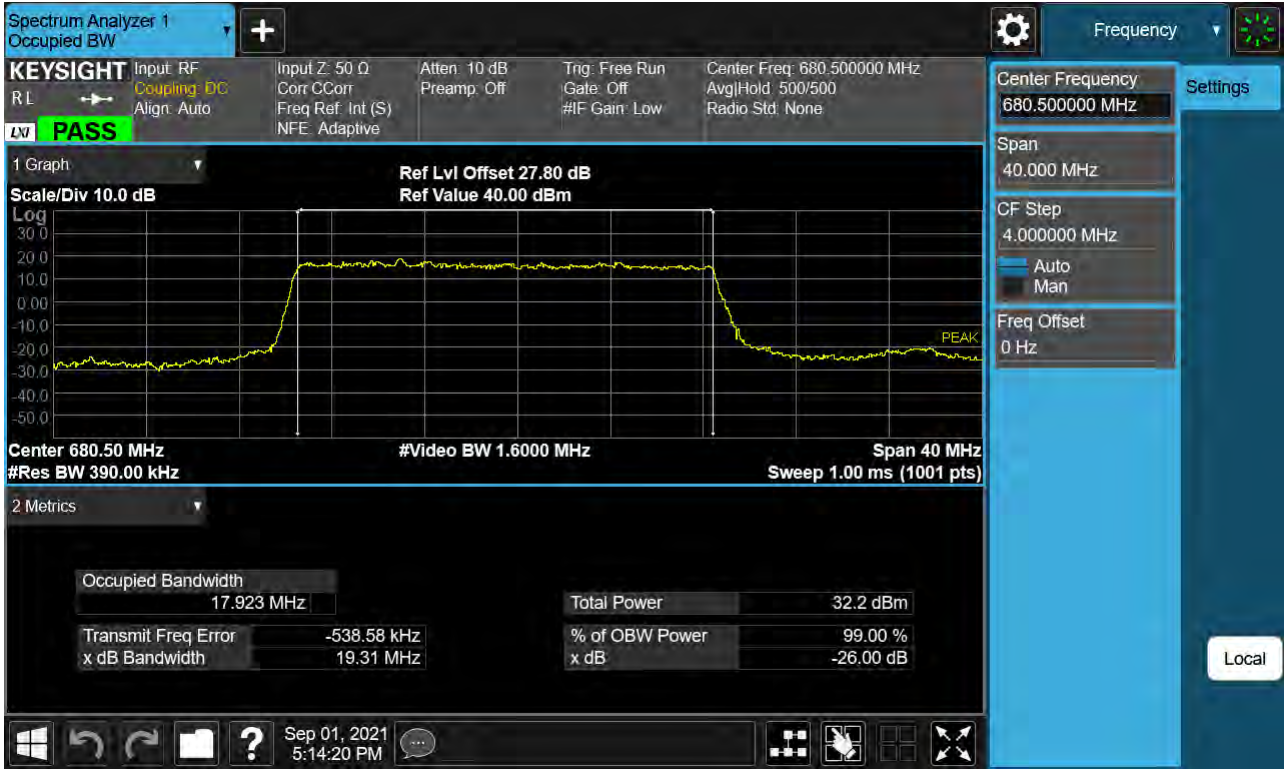
Sub6 n71. Occupied Bandwidth Plot (15 M BW Ch.136100 64QAM_ Full RB)



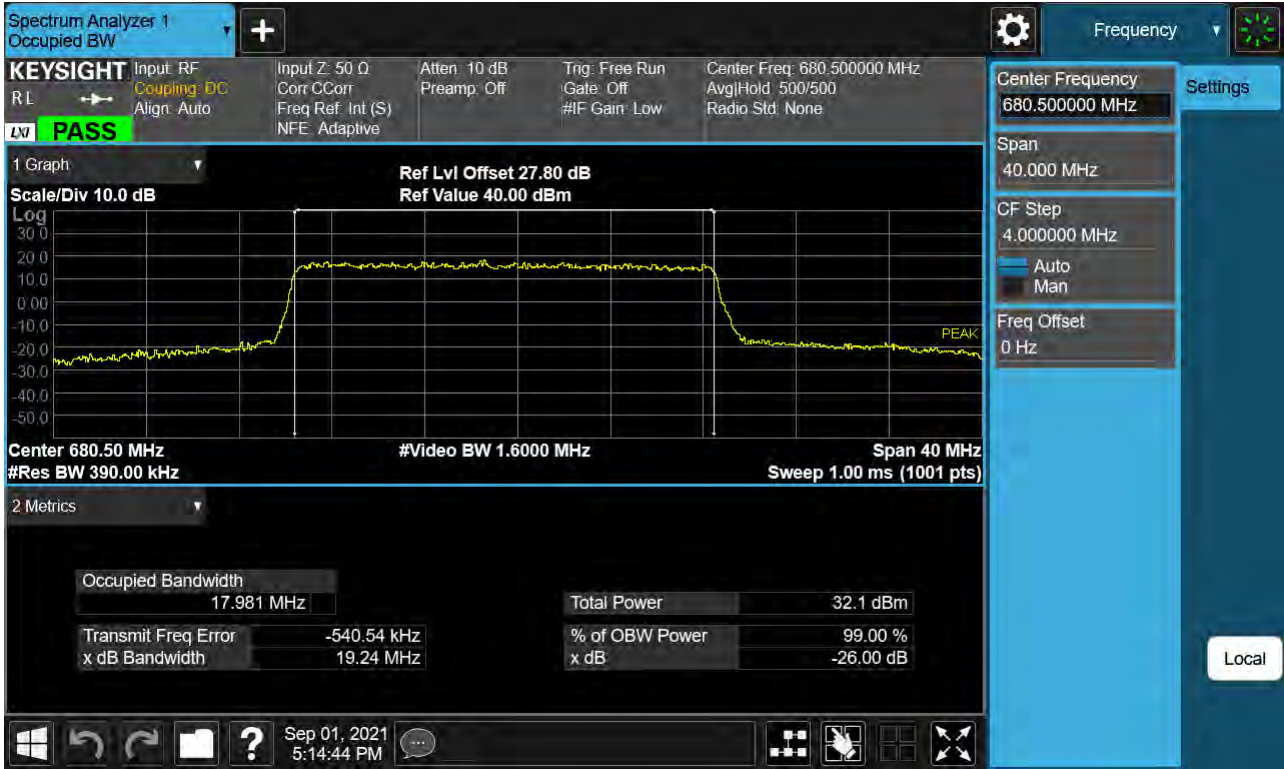
Sub6 n71. Occupied Bandwidth Plot (15 M BW Ch.136100 256QAM_ Full RB)



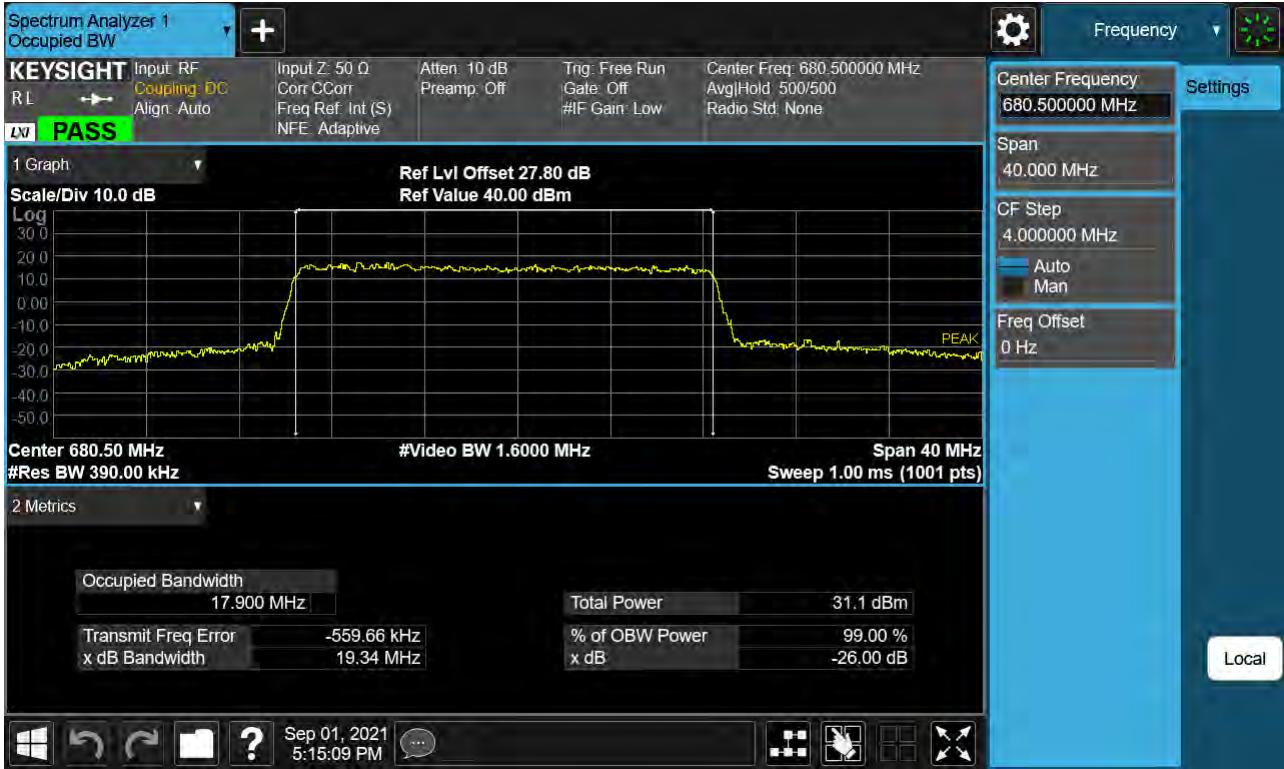
Sub6 n71. Occupied Bandwidth Plot (20 M BW Ch.136100 BPSK_ Full RB)



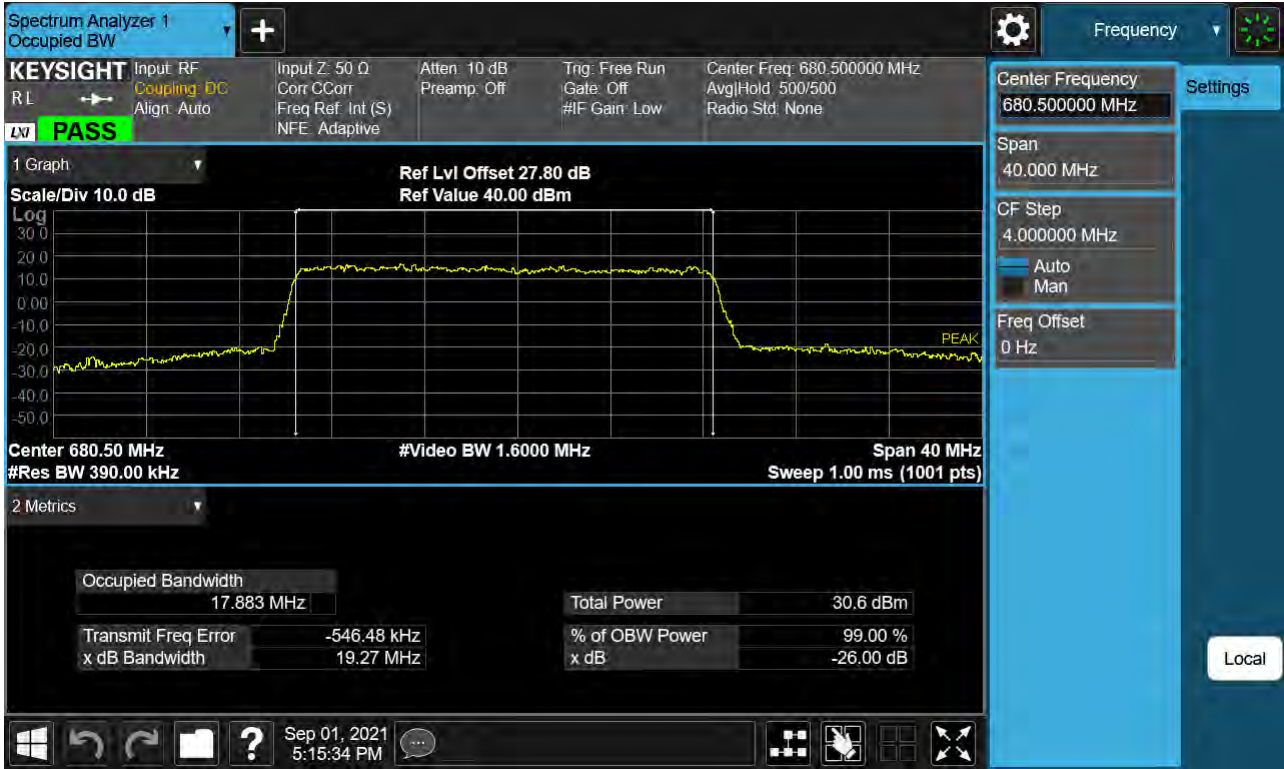
Sub6 n71. Occupied Bandwidth Plot (20 M BW Ch.136100 QPSK_ Full RB)



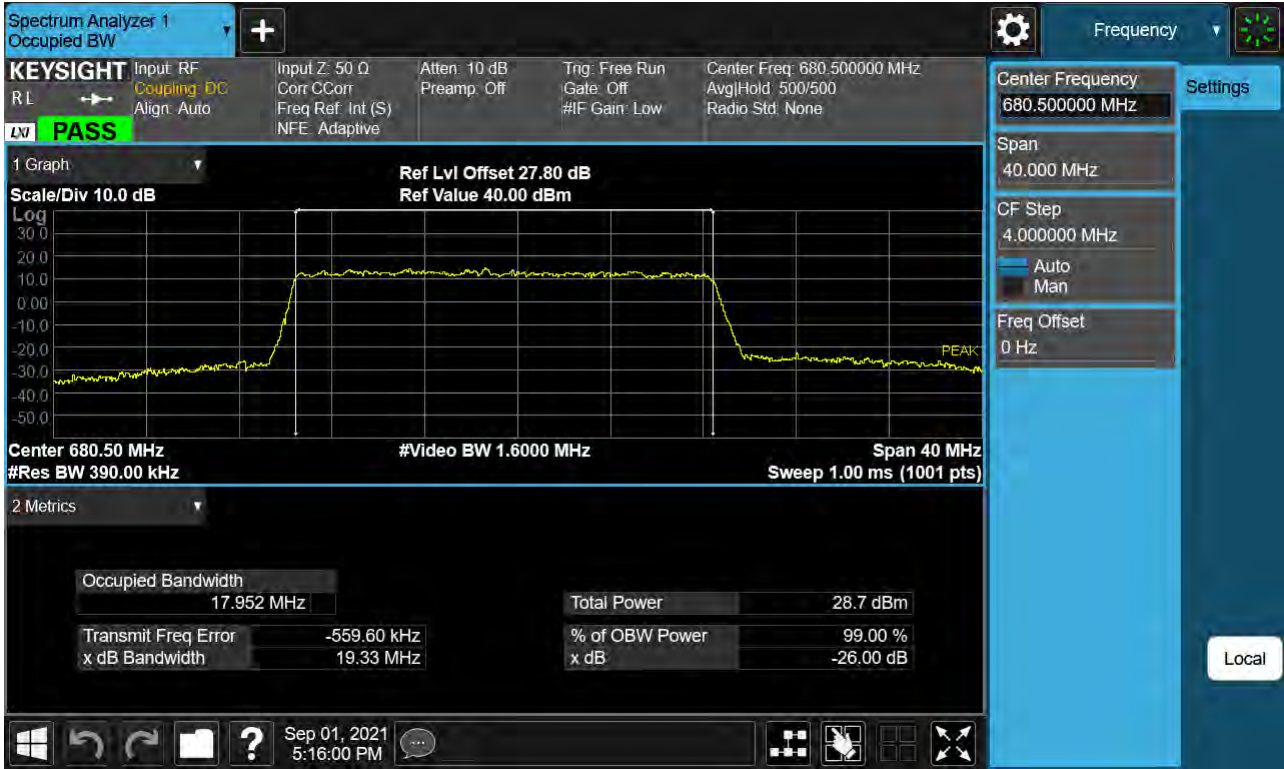
Sub6 n71. Occupied Bandwidth Plot (20 M BW Ch.136100 16QAM_ Full RB)



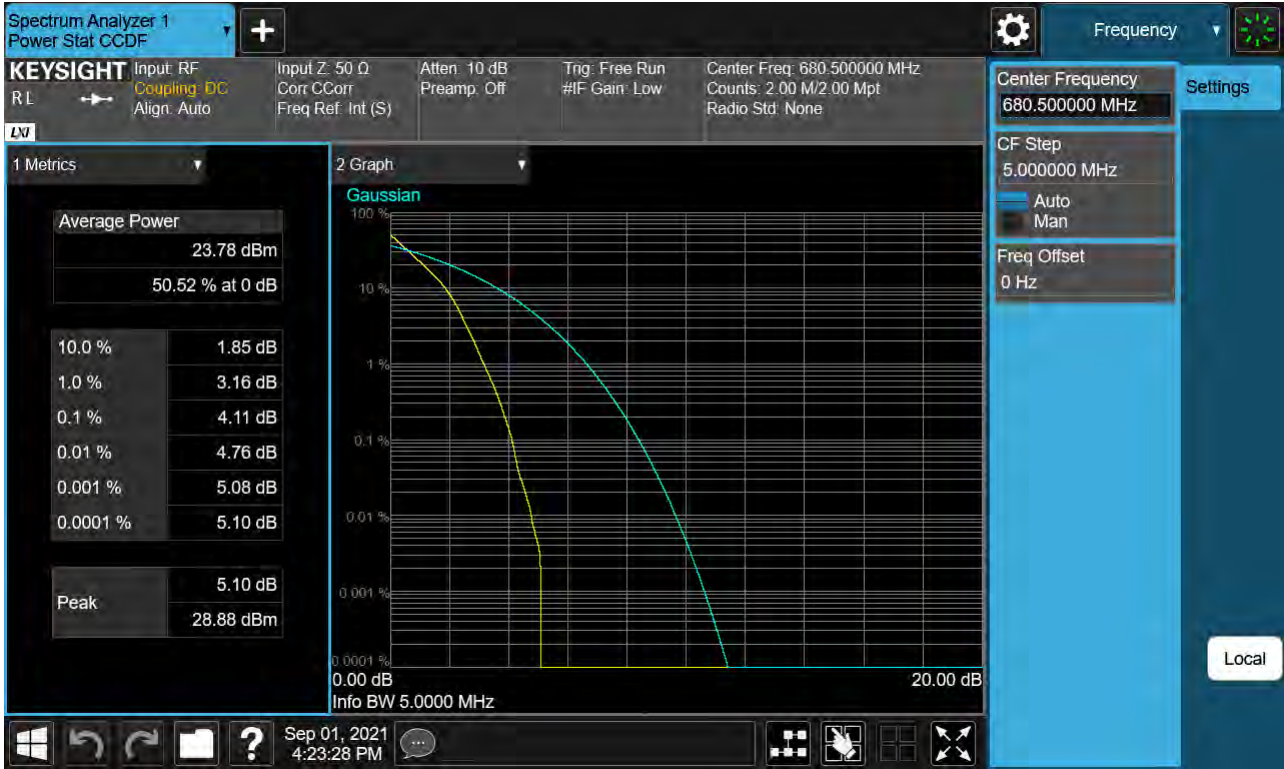
Sub6 n71. Occupied Bandwidth Plot (20 M BW Ch.136100 64QAM_ Full RB)



Sub6 n71. Occupied Bandwidth Plot (20 M BW Ch.136100 256QAM_ Full RB)



Sub6 n71. PAR Plot (5 M BW_Ch.349000_ BPSK_ Full RB)



Sub6 n71. PAR Plot (5 M BW_Ch.349000_QPSK_Full RB)



Sub6 n71. PAR Plot (5 M BW_Ch.349000_16QAM_Full RB)



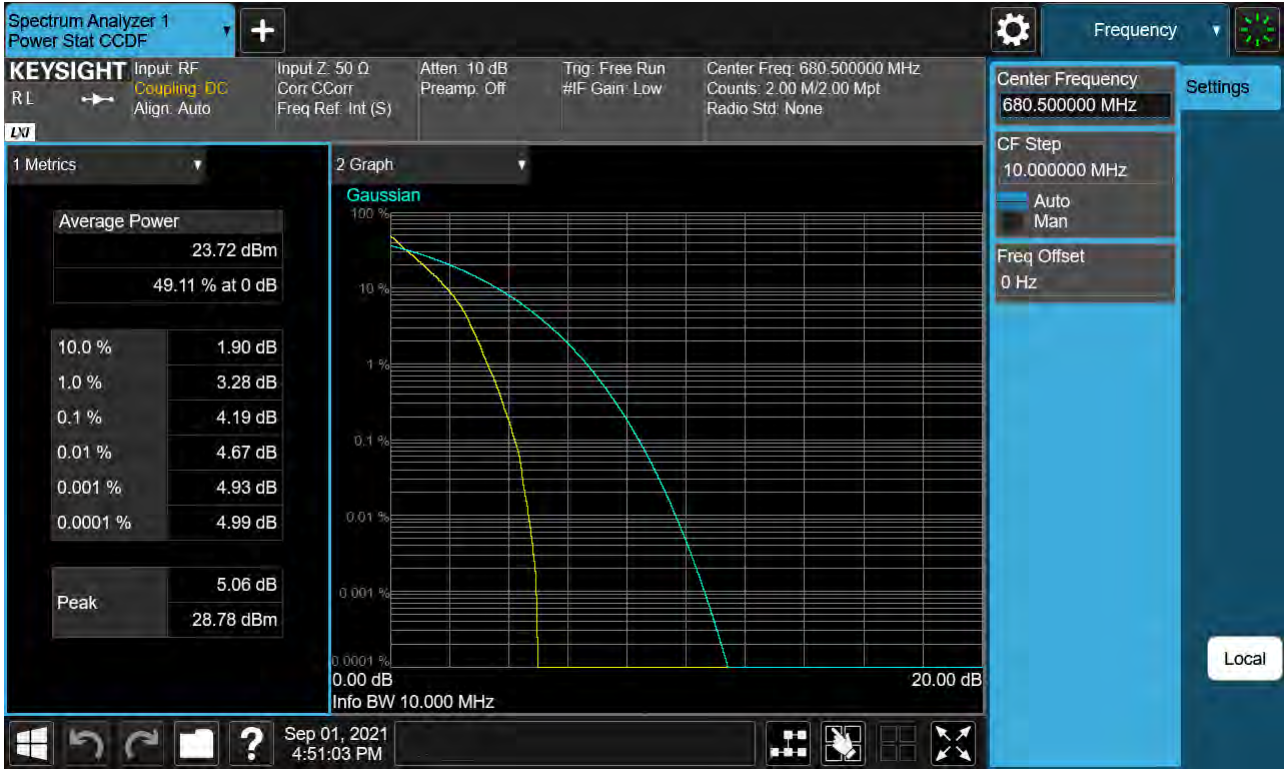
Sub6 n71. PAR Plot (5 M BW_Ch.349000_64QAM_Full RB)



Sub6 n71. PAR Plot (5 M BW_Ch.349000_256QAM_Full RB)



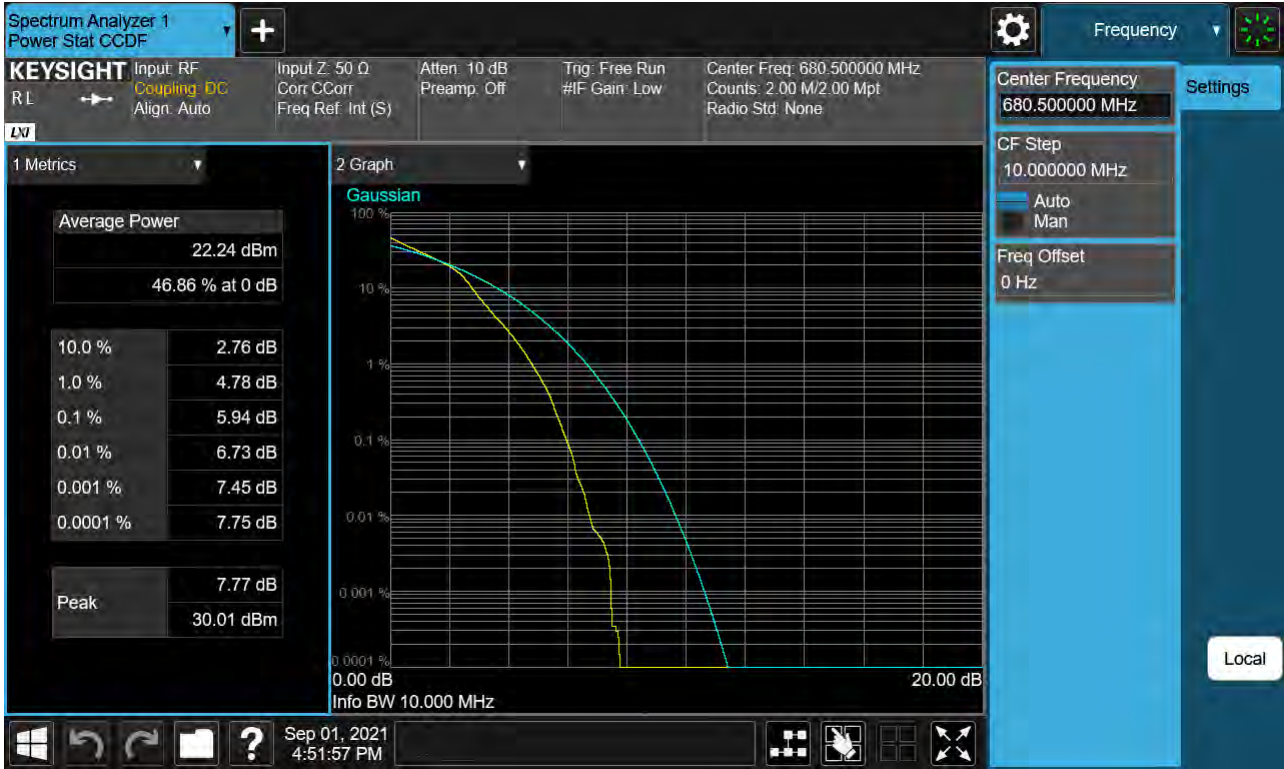
Sub6 n71. PAR Plot (10 M BW_Ch.349000_ BPSK_ Full RB)



Sub6 n71. PAR Plot (10 M BW_Ch.349000_QPSK_Full RB)



Sub6 n71. PAR Plot (10 M BW_Ch.349000_16QAM_Full RB)



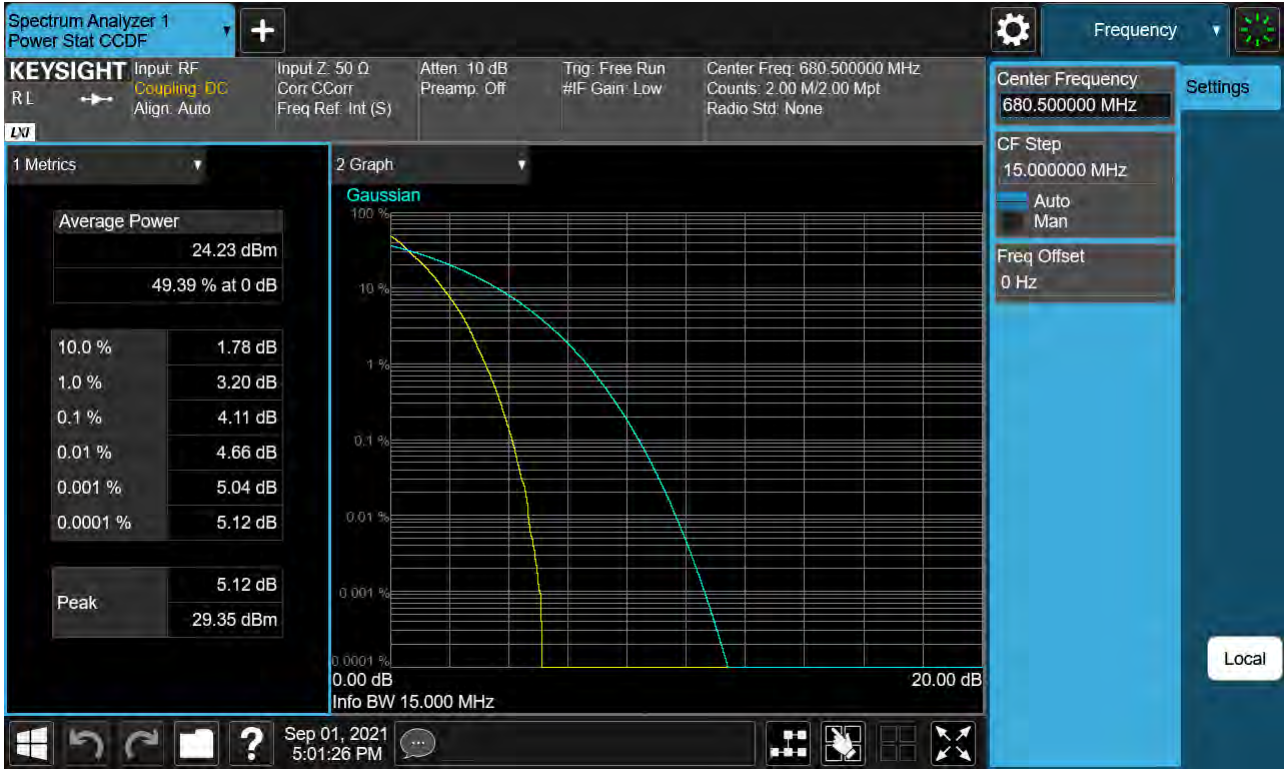
Sub6 n71. PAR Plot (10 M BW_Ch.349000_64QAM_Full RB)



Sub6 n71. PAR Plot (10 M BW_Ch.349000_256QAM_Full RB)



Sub6 n71. PAR Plot (15 M BW_Ch.349000_ BPSK_ Full RB)



Sub6 n71. PAR Plot (15 M BW_Ch.349000_QPSK_Full RB)



Sub6 n71. PAR Plot (15 M BW_Ch.349000_16QAM_Full RB)



Sub6 n71. PAR Plot (15 M BW_Ch.349000_64QAM_Full RB)



Sub6 n71. PAR Plot (15 M BW_Ch.349000_256QAM_Full RB)



Sub6 n71. PAR Plot (20 M BW_Ch.349000_ BPSK_ Full RB)



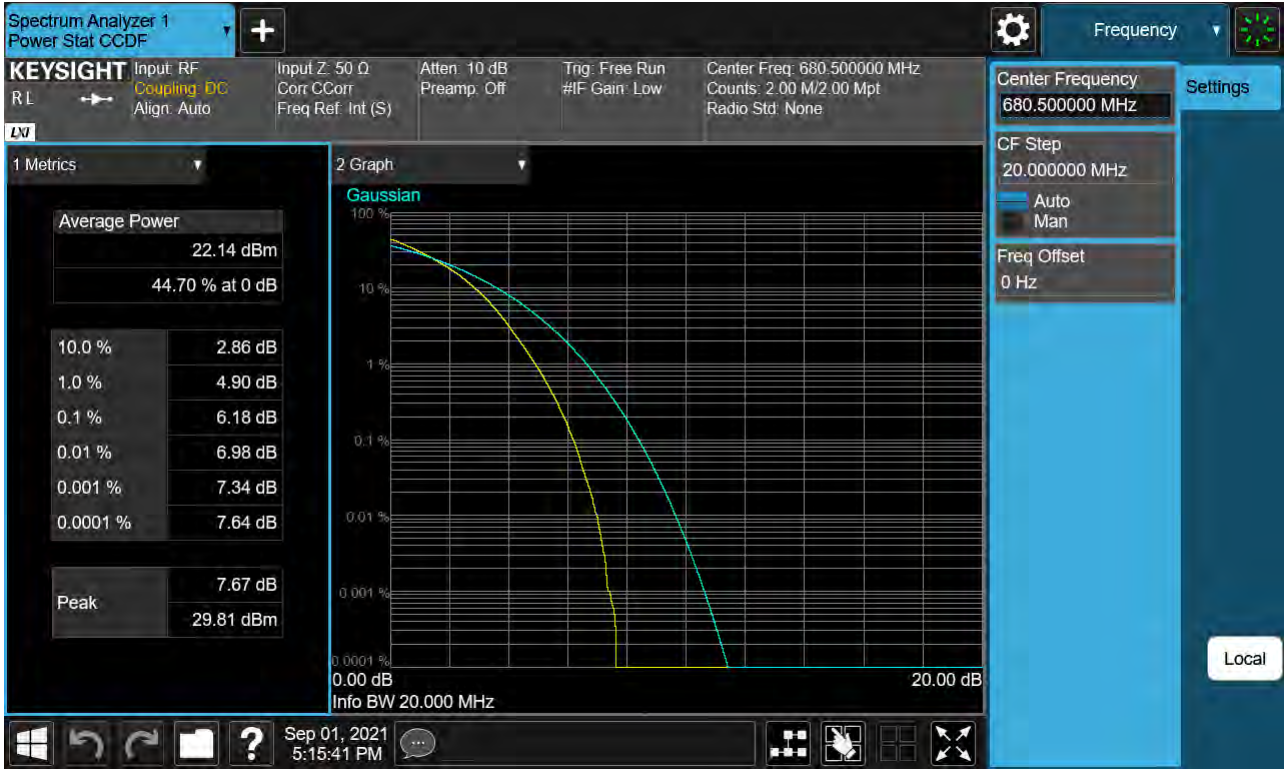
Sub6 n71. PAR Plot (20 M BW_Ch.349000_QPSK_Full RB)



Sub6 n71. PAR Plot (20 M BW_Ch.349000_16QAM_Full RB)



Sub6 n71. PAR Plot (20 M BW_Ch.349000_64QAM_Full RB)



Sub6 n71. PAR Plot (20 M BW_Ch.349000_256QAM_Full RB)



Sub6 n71. Lower Band Edge Plot (5 M BW Ch.133100 BPSK_RB1_Offset 0)_1



Sub6 n71. Lower Band Edge Plot (5 M BW Ch.133100 BPSK_RB1_Offset 0)_2



Sub6 n71. Lower Band Edge Plot (5 M BW Ch.133100 BPSK_ Full RB)



Sub6 n71. Lower Extended Band Edge Plot (5 M BW Ch.133100 BPSK_ Full RB)



Sub6 n71. Lower Band Edge Plot (10 M BW Ch.133600 BPSK_RB1_Offset 0)_1



Sub6 n71. Lower Band Edge Plot (10 M BW Ch.133600 BPSK_RB1_Offset 0)_2



Sub6 n71. Lower Band Edge Plot (10 M BW Ch.133600 BPSK_ Full RB)



Sub6 n71. Lower Extended Band Edge Plot (10 M BW Ch.133600 BPSK_ Full RB)



Sub6 n71. Lower Band Edge Plot (15 M BW Ch.134100 BPSK_RB1_Offset 0)_1



Sub6 n71. Lower Band Edge Plot (15 M BW Ch.134100 BPSK_RB1_Offset 0)_2



Sub6 n71. Lower Band Edge Plot (15 M BW Ch.134100 BPSK_ Full RB)



Sub6 n71. Lower Extended Band Edge Plot (15 M BW Ch.134100 BPSK_ Full RB)



Sub6 n71. Lower Band Edge Plot (20 M BW Ch.134600 BPSK_RB1_Offset 0)_1



Sub6 n71. Lower Band Edge Plot (20 M BW Ch.134600 BPSK_RB1_Offset 0)_2



Sub6 n71. Lower Band Edge Plot (20 M BW Ch.134600 BPSK_ Full RB)



Sub6 n71. Lower Extended Band Edge Plot (20 M BW Ch.134600 BPSK_ Full RB)



Sub6 n71. Upper Band Edge Plot (5 M BW Ch.139100 BPSK_RB1_Offset 24)_1



Sub6 n71. Upper Band Edge Plot (5 M BW Ch.139100 BPSK_RB1_Offset 24)_2



Sub6 n71. Upper Band Edge Plot (5 M BW Ch.139100 BPSK_ Full RB)



Sub6 n71. Upper Extended Band Edge Plot (5 M BW Ch.139100 BPSK_ Full RB)



Sub6 n71. Upper Band Edge Plot (10 M BW Ch.138600 BPSK_RB1_Offset 51)-1



Sub6 n71. Upper Band Edge Plot (10 M BW Ch.138600 BPSK_RB1_Offset 51)-2



Sub6 n71. Upper Band Edge Plot (10 M BW Ch.138600 BPSK_ Full RB)



Sub6 n71. Upper Extended Band Edge Plot (10 M BW Ch.138600 BPSK_ Full RB)



Sub6 n71. Upper Band Edge Plot (15 M BW Ch.138100 BPSK_RB1_Offset 78)_1



Sub6 n71. Upper Band Edge Plot (15 M BW Ch.138100 BPSK_RB1_Offset 78)_2



Sub6 n71. Upper Band Edge Plot (15 M BW Ch.138100 BPSK_ Full RB)



Sub6 n71. Upper Extended Band Edge Plot (15 M BW Ch.138100 BPSK_ Full RB)



Sub6 n71. Upper Band Edge Plot (20 M BW Ch.137600 BPSK_RB1_Offset 105)_1



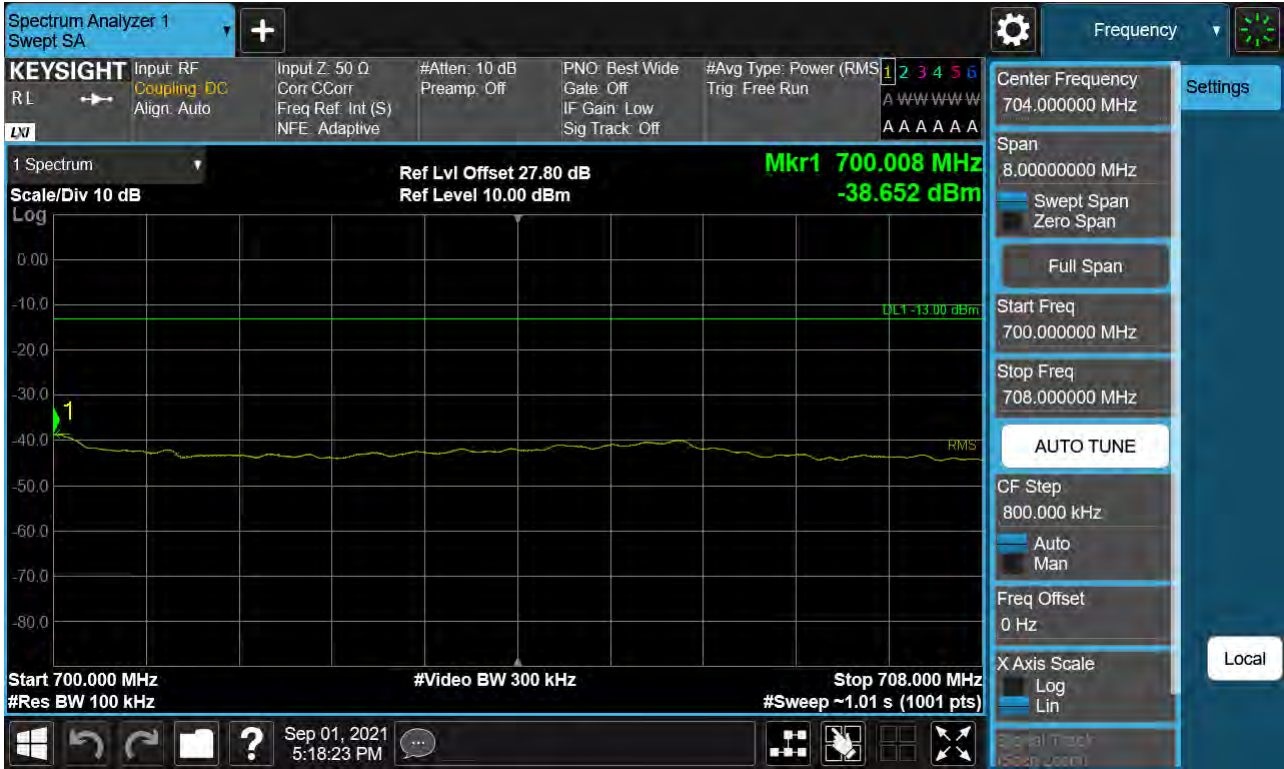
Sub6 n71. Upper Band Edge Plot (20 M BW Ch.137600 BPSK_RB1_Offset 105)_2



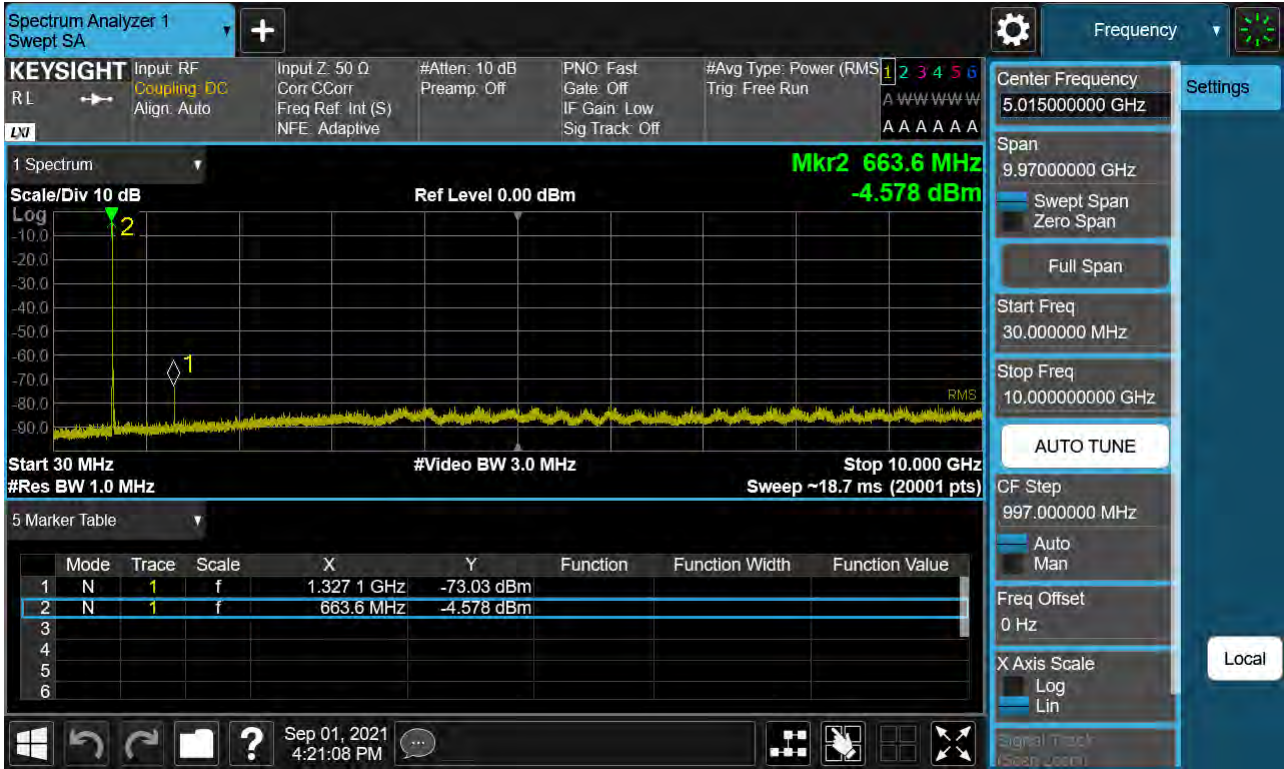
Sub6 n71. Upper Band Edge Plot (20 M BW Ch.137600 BPSK_ Full RB)



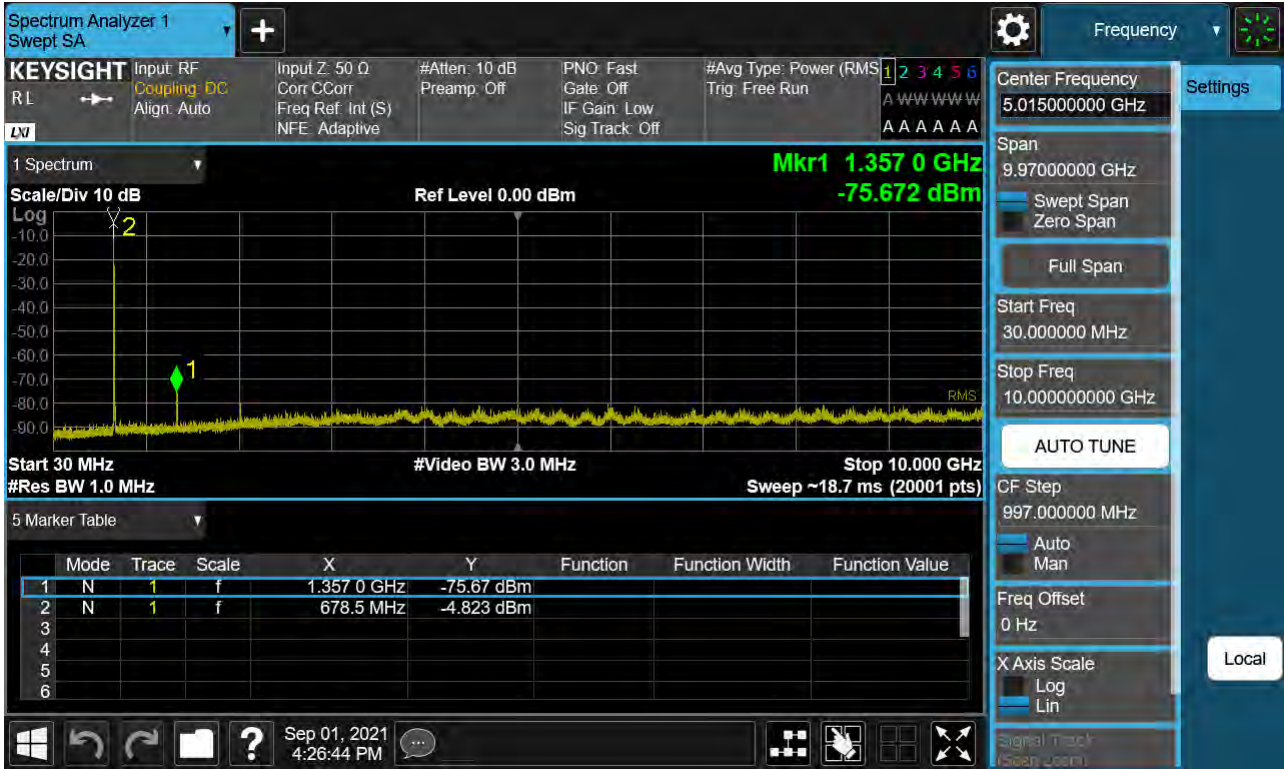
Sub6 n71. Upper Extended Band Edge Plot (20 M BW Ch.137600 BPSK_ Full RB)



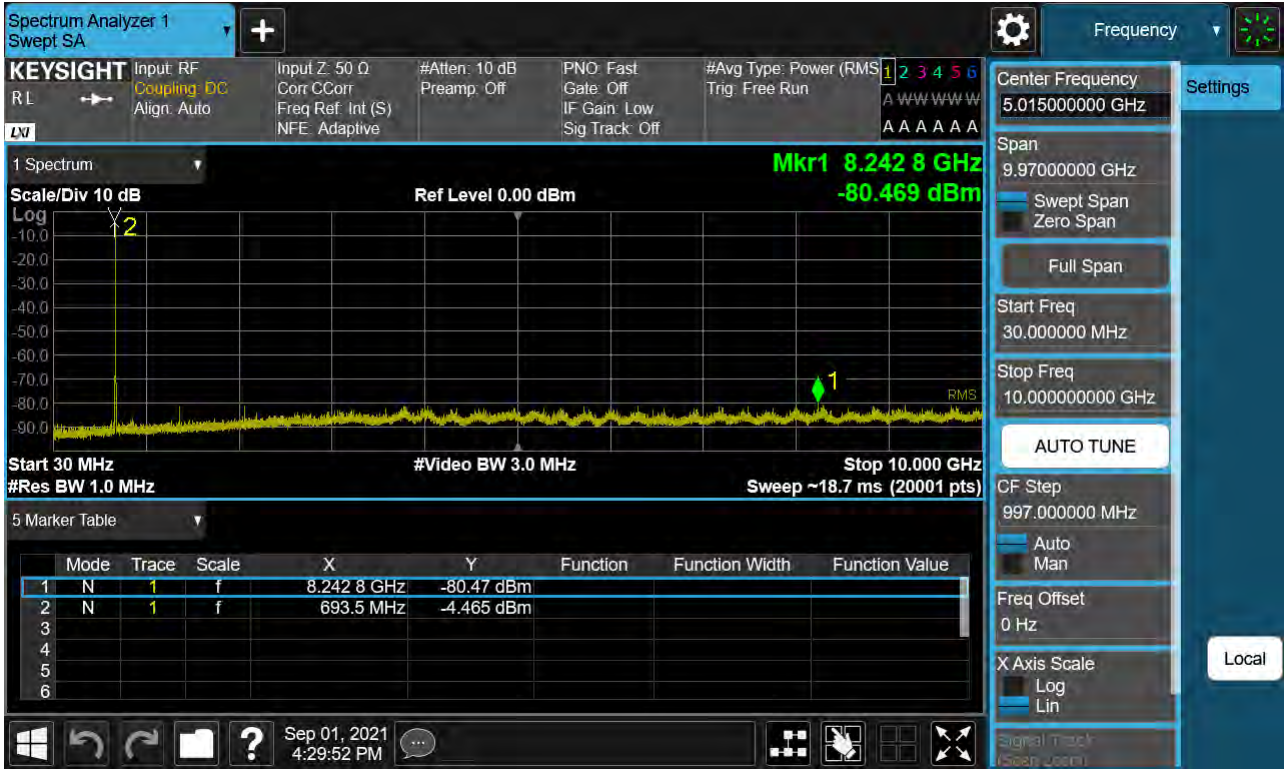
Sub6 n71. Conducted Spurious Plot _ (133100ch_5 MHz_BPSK_RB 1_1)



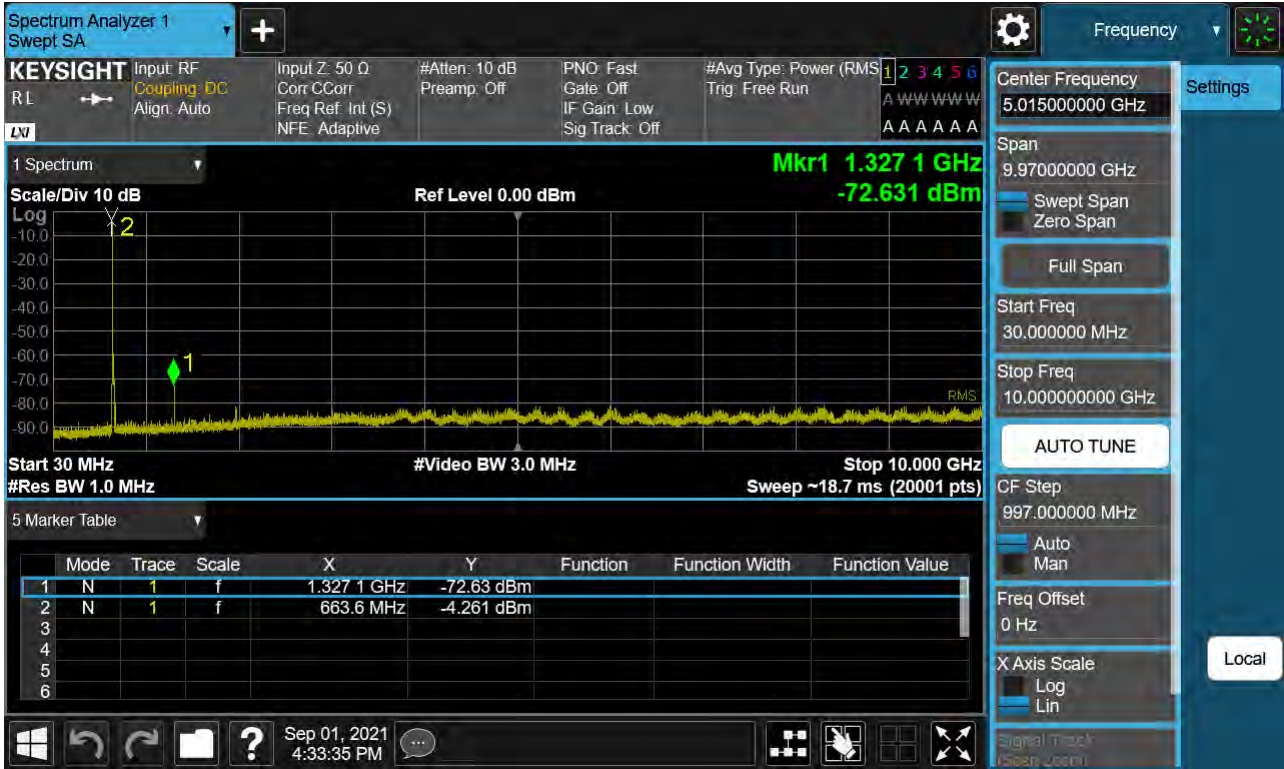
Sub6 n71. Conducted Spurious Plot _ (136100ch_5 MHz_BPSK_RB 1_1)



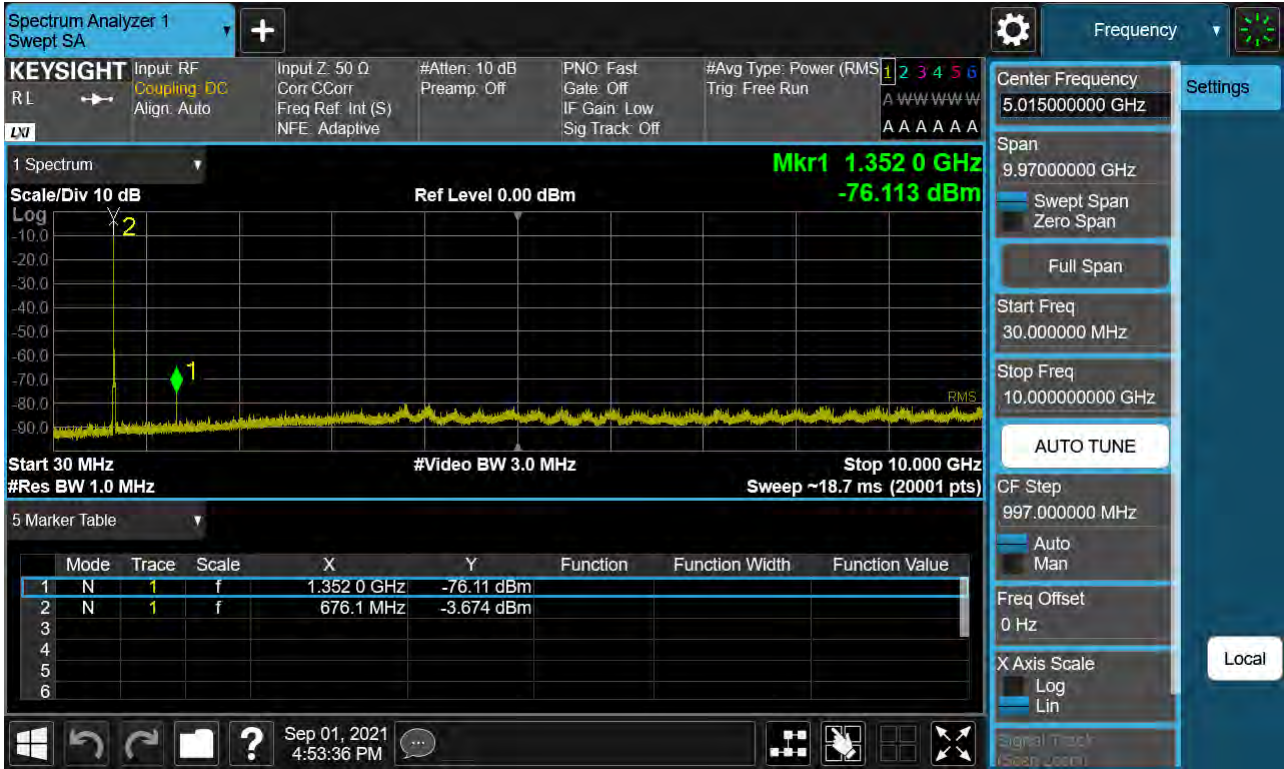
Sub6 n71. Conducted Spurious Plot _ (139100ch_5 MHz_BPSK_RB 1_1)



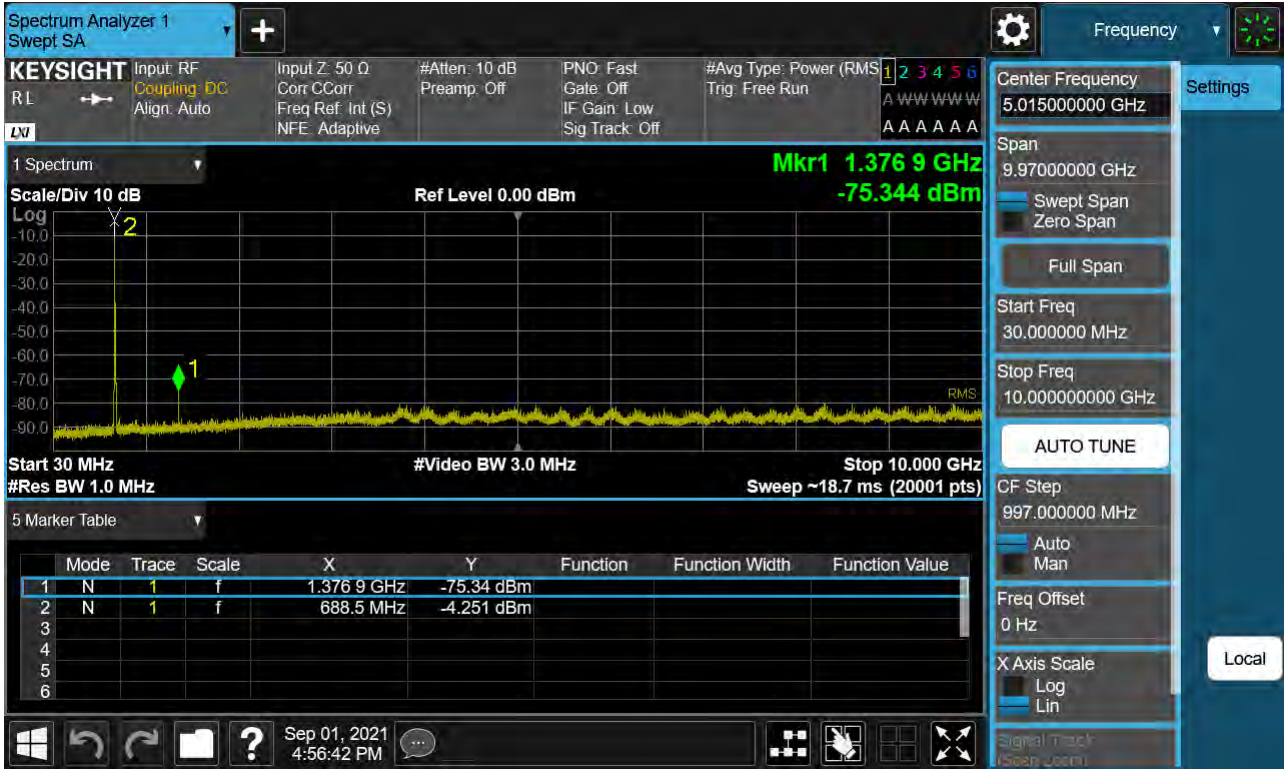
Sub6 n71. Conducted Spurious Plot _ (133600ch_10 MHz_BPSK_RB 1_1)



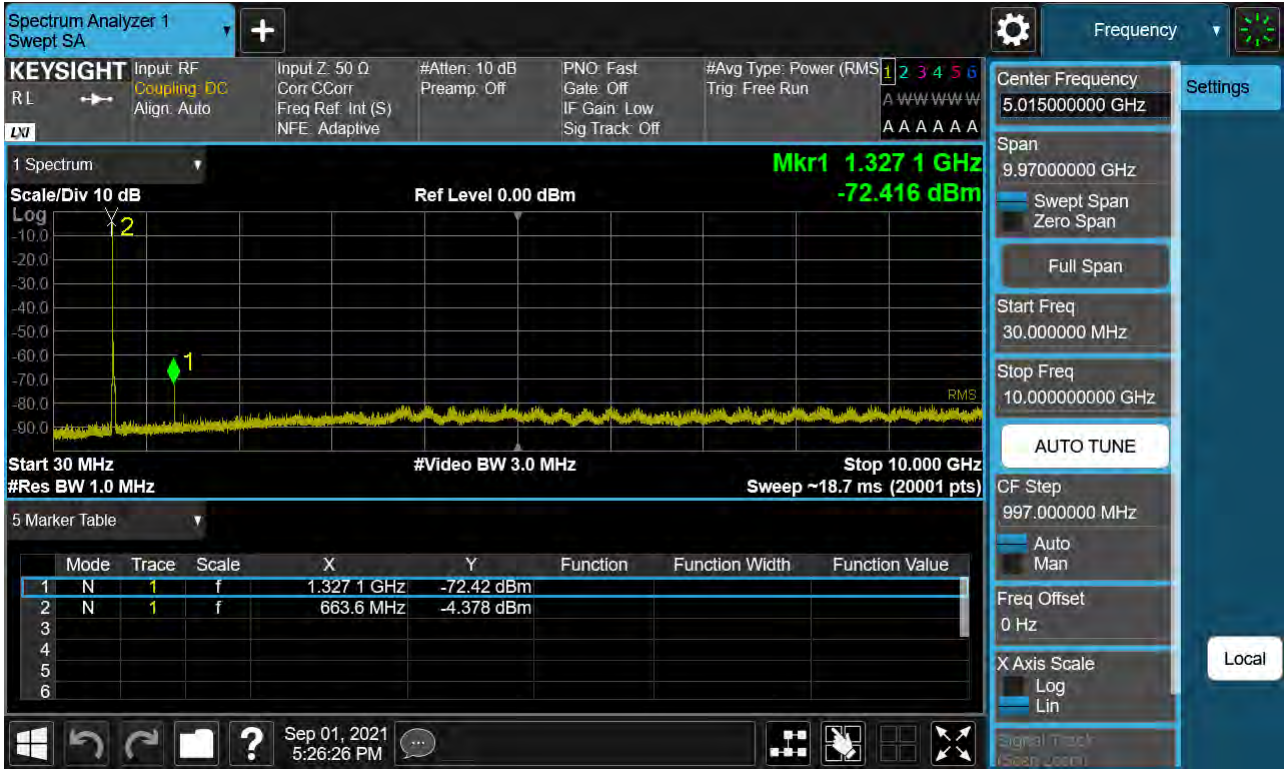
Sub6 n71. Conducted Spurious Plot _ (136100ch_10 MHz_BPSK_RB_1_1)



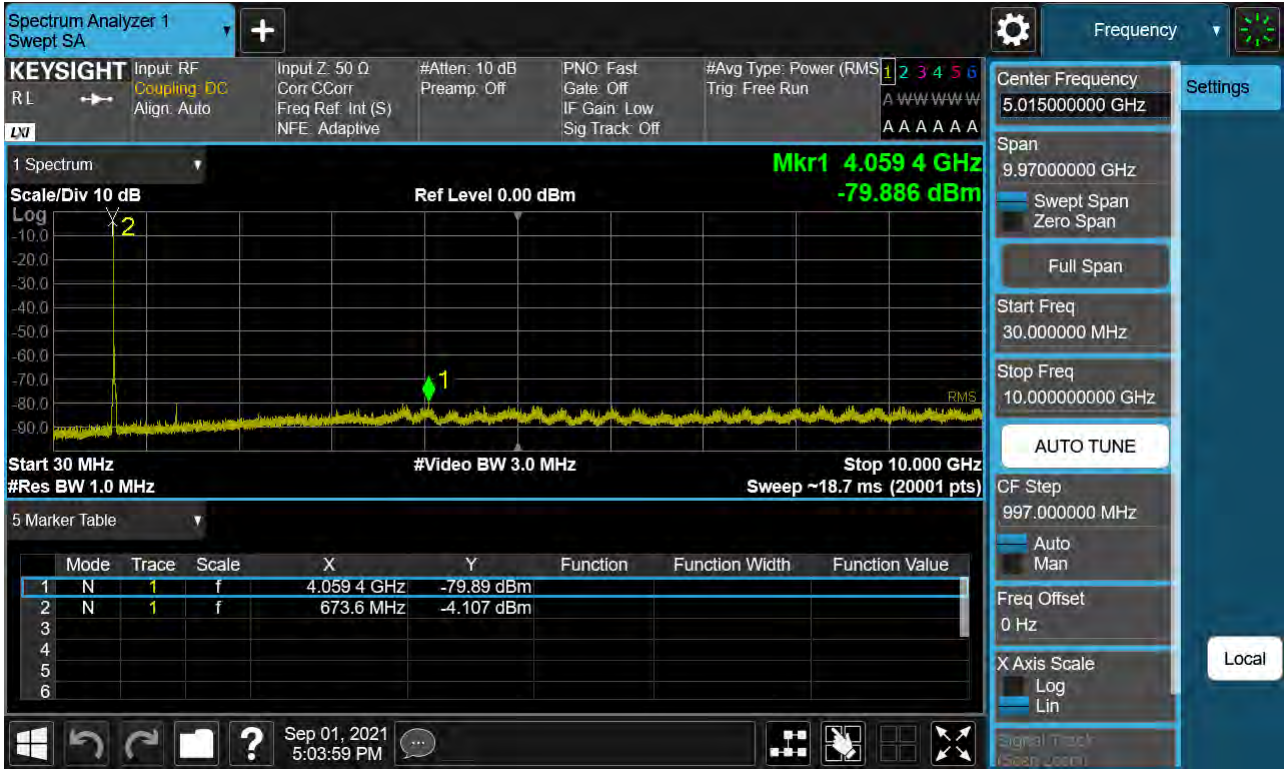
Sub6 n71. Conducted Spurious Plot _ (138600ch_10 MHz_BPSK_RB 1_1)



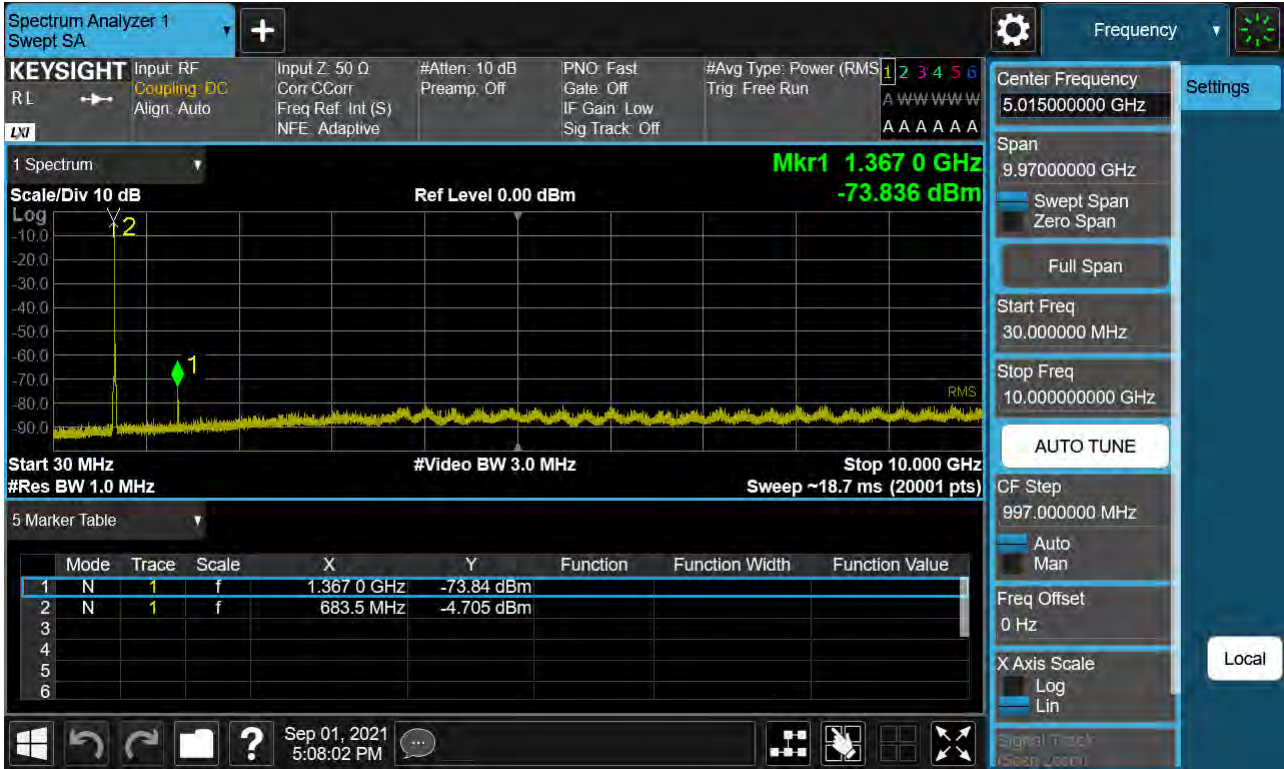
Sub6 n71. Conducted Spurious Plot _ (134100ch_15 MHz_BPSK_RB 1_1)



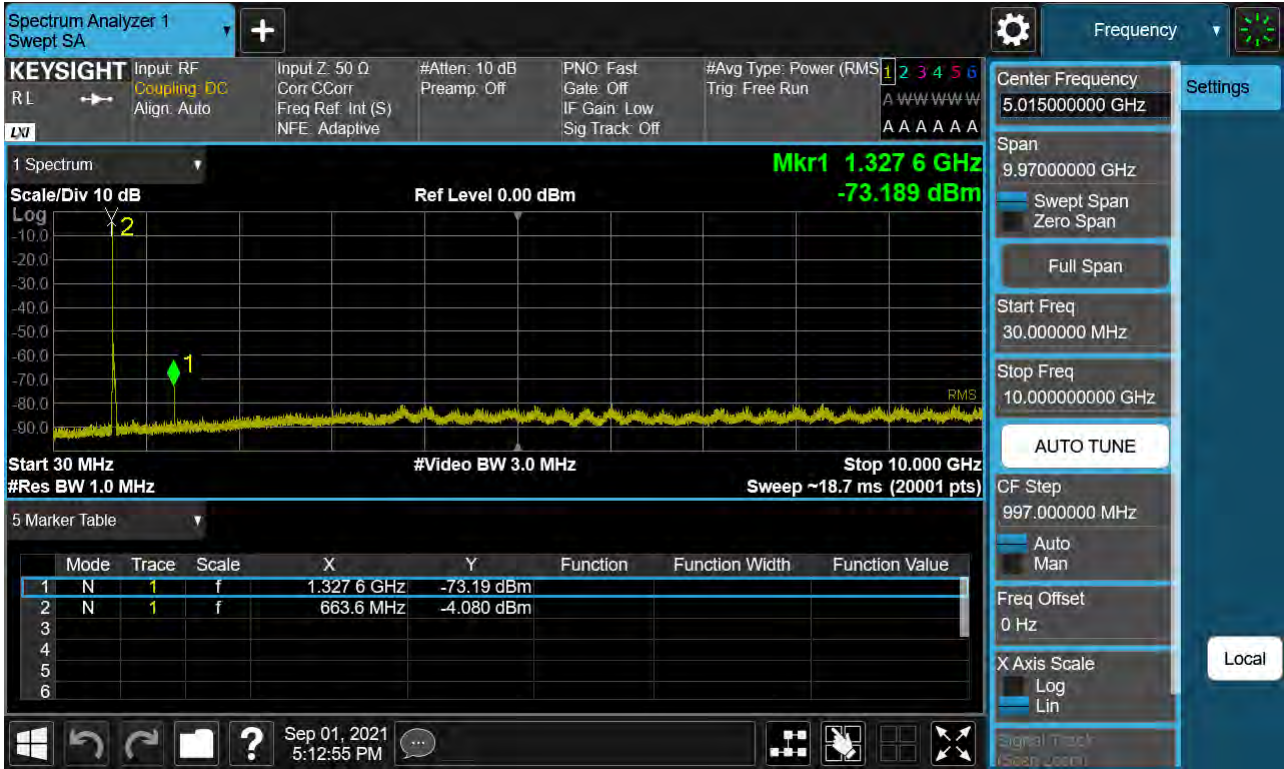
Sub6 n71. Conducted Spurious Plot _ (136100ch_15 MHz_BPSK_RB 1_1)



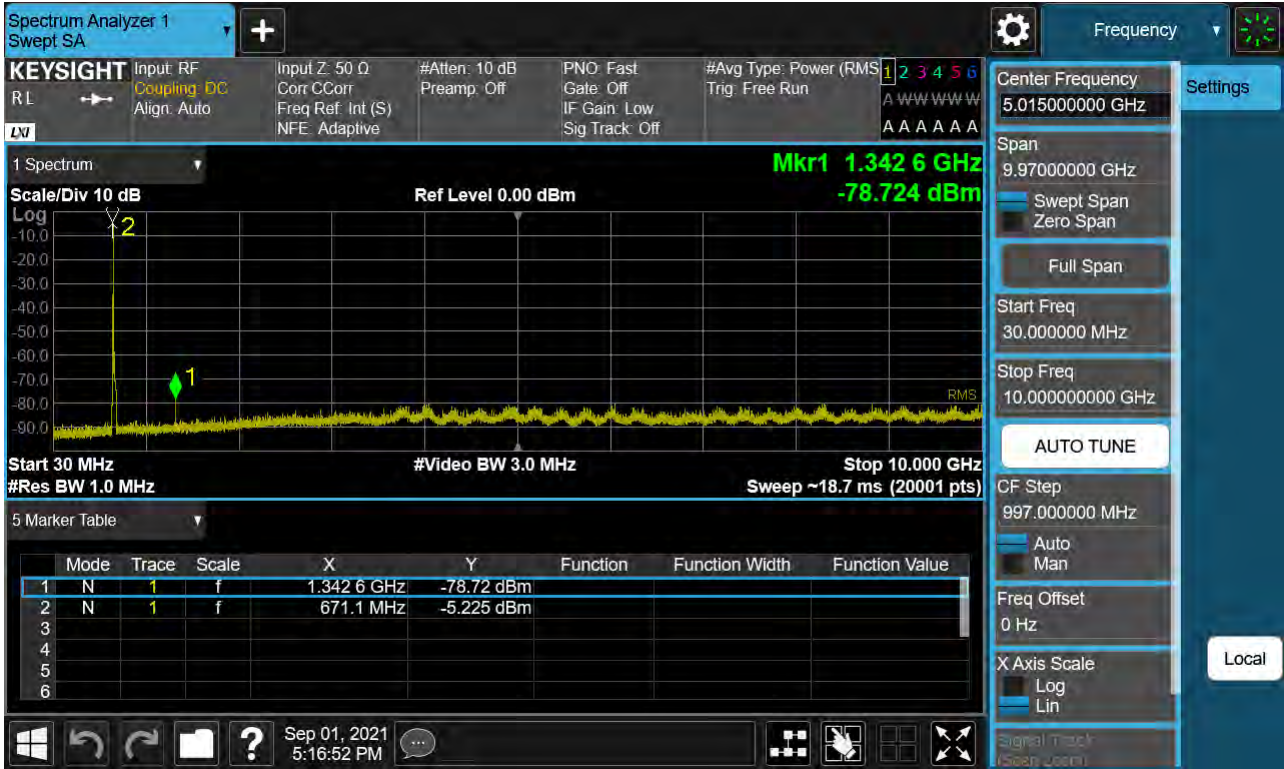
Sub6 n71. Conducted Spurious Plot _ (138100ch_15 MHz_BPSK_RB 1_1)



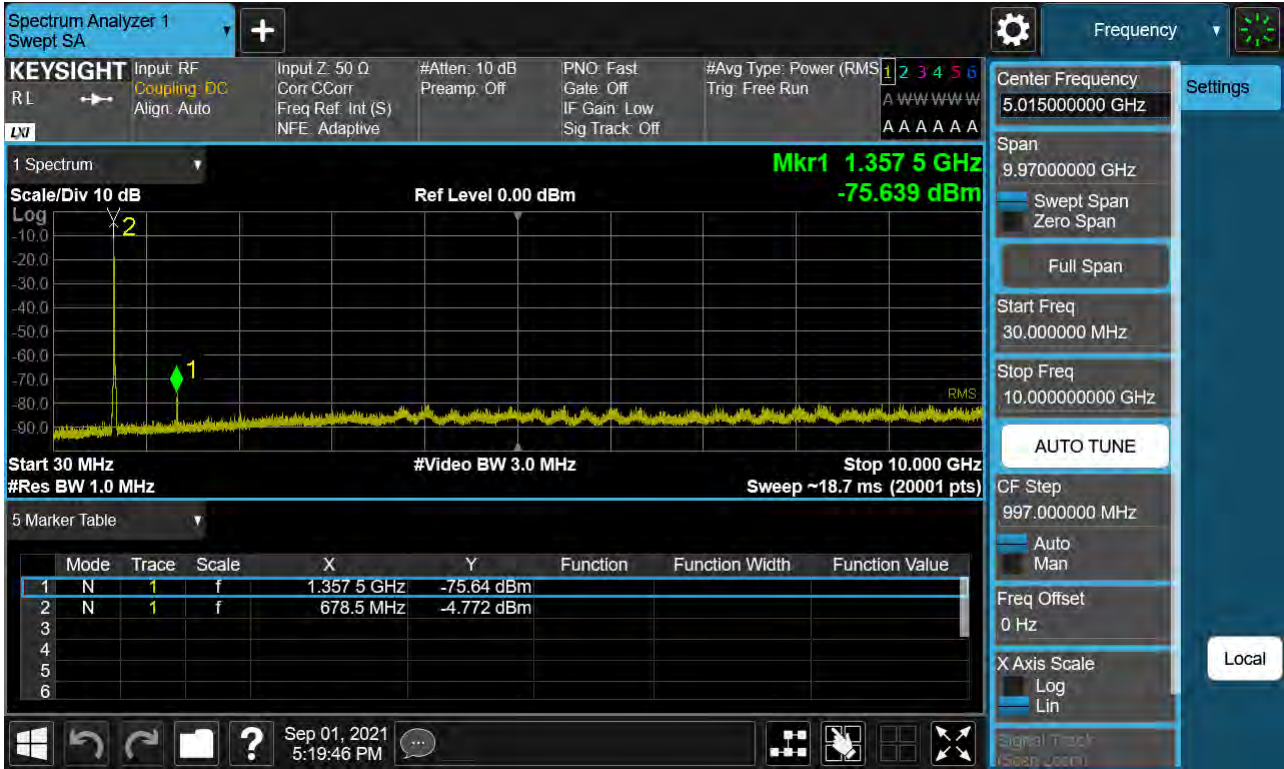
Sub6 n71. Conducted Spurious Plot _ (134600ch_20 MHz_BPSK_RB 1_1)



Sub6 n71. Conducted Spurious Plot _ (136100ch_20 MHz_BPSK_RB 1_1)



Sub6 n71. Conducted Spurious Plot _ (137600ch_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-2109-FC045-P