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FCC Sub6 REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

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

Date of Issue:
February 19, 2021

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

Report No.: HCT-RF-2102-FC031-R1

FCC ID: **A3LSMA326U**

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

Model(s):	SM-A326U
Additional Model(s):	SM-A326U1/DS, SM-S326DL
EUT Type:	Mobile Phone
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§24, §2

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	EIRP	
				Max. Power (W)	Max. Power (dBm)
Sub6 n2 (5)	1852.5 - 1907.5	4M48G7D	PI/2 BPSK	0.191	22.81
		4M50G7D	QPSK	0.188	22.74
		4M52W7D	16QAM	0.144	21.58
		4M49W7D	64QAM	0.102	20.09
		4M50W7D	256QAM	0.073	18.62
Sub6 n2 (10)	1855.0 - 1905.0	8M97G7D	PI/2 BPSK	0.184	22.64
		9M00G7D	QPSK	0.179	22.54
		8M99W7D	16QAM	0.143	21.55
		8M95W7D	64QAM	0.103	20.14
		8M98W7D	256QAM	0.073	18.66
Sub6 n2 (15)	1857.5 - 1902.5	13M4G7D	PI/2 BPSK	0.195	22.91
		13M5G7D	QPSK	0.189	22.77
		13M5W7D	16QAM	0.150	21.77
		13M5W7D	64QAM	0.107	20.30
		13M5W7D	256QAM	0.079	18.99
Sub6 n2 (20)	1860.0 - 1900.0	18M0G7D	PI/2 BPSK	0.207	23.15
		17M9G7D	QPSK	0.206	23.13
		17M9W7D	16QAM	0.153	21.85
		17M9W7D	64QAM	0.113	20.53
		18M0W7D	256QAM	0.079	18.99

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)

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)

* The report shall not be reproduced except in full(only partly) without approval of the laboratory.

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2102-FC031	February 10, 2021	- First Approval Report
HCT-RF-2102-FC031-R1	February 19, 2021	- Revised the E.I.R.P

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

Table of Contents

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:	A3LSMA326U
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§24, §2
EUT Type:	Mobile Phone
Model(s):	SM-A326U
Additional Model(s):	SM-A326U1/DS, SM-S326DL
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:	1852.5 MHz – 1907.5 MHz (Sub6 n2(5 MHz)) 1855.0 MHz – 1905.0 MHz (Sub6 n2(10 MHz)) 1857.5 MHz – 1902.5 MHz (Sub6 n2(15 MHz)) 1860.0 MHz – 1900.0 MHz (Sub6 n2(20 MHz))
Date(s) of Tests:	January 04, 2021 ~ February 05, 2021
Serial number:	Radiated: R3CNC01KD7D Conducted: 4C1B22D9E41C7ECE

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a Mobile Phone with GSM/GPRS/EGPRS/UMTS, CDMA(BC0, 1, 10) 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 - 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 1MHz
3. VBW ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points > 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

Test Note

1. The turntable is rotated through 360 degrees, and the receiving antenna scans in order to determine the level of the maximized emission.
2. A half wave dipole is then substituted in place of the EUT. For emissions above 1GHz, 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;

   $$P_{d(dBm)} = Pg_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dB)}$$

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

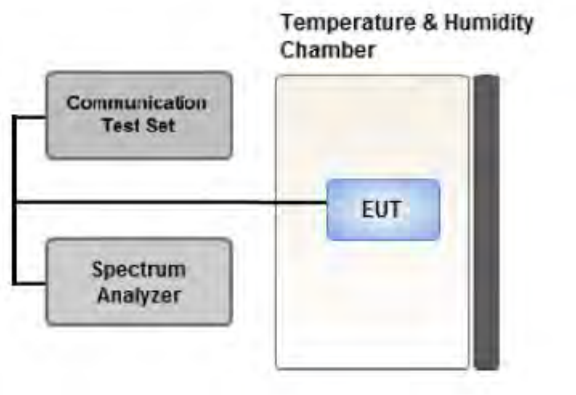
$$Result_{(dBm)} = Pg_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dBi)}$$

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

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

$$EIRP_{(dBm)} = ERP_{(dBm)} + 2.15$$

3.4 PEAK- TO- AVERAGE RATIO



Test setup

① **CCDF Procedure for PAPR**

Test Settings

1. Set resolution/measurement bandwidth ≥ 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:

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

Test Settings(Peak Power)

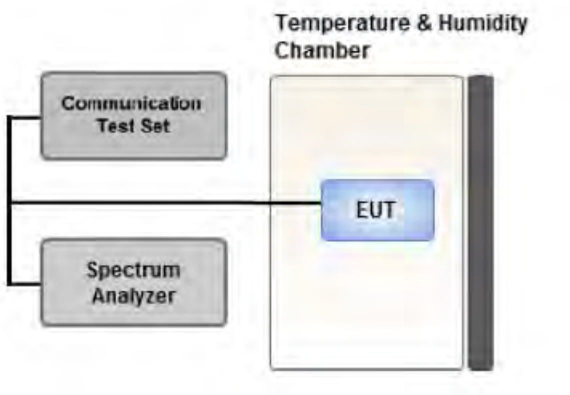
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW ≥ 3 × RBW.

1. Set the RBW ≥ OBW.
2. Set VBW ≥ 3 × RBW.
3. Set span ≥ 2 × OBW.
4. Sweep time ≥ 10 × (number of points in sweep) × (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 × to 3 × the OBW.
2. Set RBW ≥ OBW.
3. Set VBW ≥ 3 × RBW.
4. Set number of measurement points in sweep ≥ 2 × span / RBW.
5. Sweep time:
   Set ≥ [10 × (number of points in sweep) × (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/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.

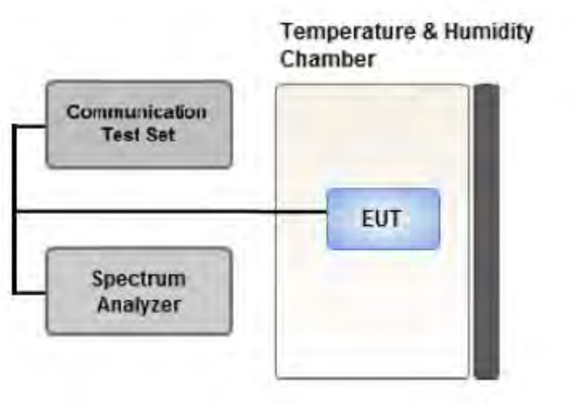
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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

3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



Test setup

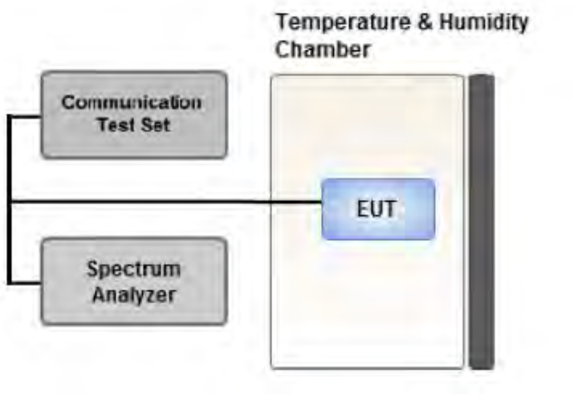
Test Overview

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 ≥ 3 MHz
3. Detector = RMS
4. Trace Mode = Average
5. Sweep time = auto
6. Number of points in sweep ≥ 2 * 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 ≥ 2 x Span/RBW
7. Trace mode = trace average
8. Sweep time = auto couple
9. The trace was allowed to stabilize

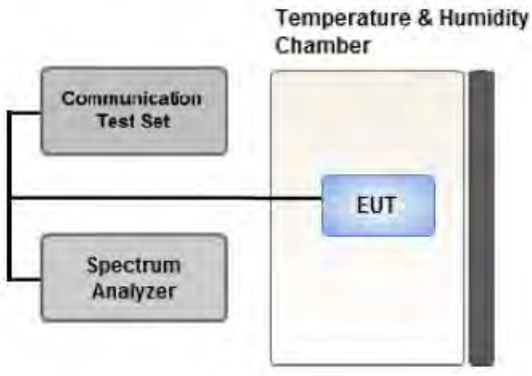
Test Notes

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.

(In the case of radiated spurious emissions, only the B.W result that confirmed the maximum radiated power was reported.)

- 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: 5A-n2A(BW 20MHz))
- All RB sizes, offsets of operation were investigated and the worst case configuration results are reported.
  Please refer to the table below.
- SM-A326U & additional models were tested and the worst case results are reported.
  (Worst case : SM-A326U)

[Worst case]

Test Description	Modulation	RB size	RB offset	Axis
Effective Isotropic Radiated Power	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	1	1	X
Radiated Spurious Emissions	PI/2 BPSK	1	1	X

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.
- SM-A326U & additional models were tested and the worst case results are reported.
(Worst case : SM-A326U)

[Worst case]

<table>
<tr><th>Test Description</th><th>Modulation</th><th>Bandwidth (MHz)</th><th>Frequency</th><th>RB size</th><th>RB offset</th></tr>
<tr><td>Occupied Bandwidth</td><td>PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM</td><td>5, 10, 15, 20</td><td>Mid</td><td>Full RB</td><td>0</td></tr>
<tr><td>Peak-To-Average Ratio</td><td>PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM</td><td>5, 10, 15, 20</td><td>Mid</td><td>Full RB</td><td>0</td></tr>
<tr><td rowspan="9">Band Edge</td><td rowspan="9">PI/2 BPSK</td><td rowspan="2">5</td><td>Low</td><td>1</td><td>0</td></tr>
<tr><td>High</td><td>1</td><td>24</td></tr>
<tr><td rowspan="2">10</td><td>Low</td><td>1</td><td>0</td></tr>
<tr><td>High</td><td>1</td><td>51</td></tr>
<tr><td rowspan="2">15</td><td>Low</td><td>1</td><td>0</td></tr>
<tr><td>High</td><td>1</td><td>78</td></tr>
<tr><td rowspan="2">20</td><td>Low</td><td>1</td><td>0</td></tr>
<tr><td>High</td><td>1</td><td>105</td></tr>
<tr><td>5, 10, 15, 20</td><td>Low, High</td><td>Full RB</td><td>0</td></tr>
<tr><td>Spurious and Harmonic Emissions at Antenna Terminal</td><td>PI/2 BPSK</td><td>5, 10, 15, 20</td><td>Low, Mid, High</td><td>1</td><td>1</td></tr>
</table>

4. LIST OF TEST EQUIPMENT

Manufacture	Model/ Equipment	Serial Number	Calibration Date	Calibration Interval	Calibration Due
Wainwright Instruments	WHKX10-900-1000-15000-40SS/ High Pass Filter	5	07/13/2020	Annual	07/13/2021
Wainwright Instruments	WHKX10-2700-3000-18000-40SS/ High Pass Filter	145	09/03/2020	Annual	09/03/2021
Wainwright Instruments	WHNX6-4740-6000-26500-40CC/ High Pass Filter	11	09/03/2020	Annual	09/03/2021
Hewlett Packard	11667B / Power Splitter(DC~26.5 GHz)	11275	04/27/2020	Annual	04/27/2021
CERNEX	LOW NOISE AMP (100MHz ~ 18GHz)	26822	06/04/2020	Annual	06/04/2021
CERNEX	CBL18265035 / Power Amplifier	22966	12/04/2020	Annual	12/04/2021
CERNEX	CBL26405040 / Power Amplifier	25956	03/23/2020	Annual	03/23/2021
Hewlett Packard	E3632A/DC Power Supply	MY40004427	09/16/2020	Annual	09/16/2021
Schwarzbeck	UHAP / Precision Dipole Antenna	01273	05/30/2020	Biennial	05/30/2022
Schwarzbeck	UHAP / Precision Dipole Antenna	01274	05/30/2020	Biennial	05/30/2022
ESPEC	SU-642 / Chamber	93008124	03/18/2020	Annual	03/18/2021
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	02289	05/08/2020	Biennial	05/08/2022
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	9120D-1299	05/10/2019	Biennial	05/10/2021
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170342	04/29/2019	Biennial	04/29/2021
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170124	02/11/2020	Biennial	02/11/2022
Agilent	N9020A/Signal Analyzer(10Hz~26.5GHz)	MY51110063	04/27/2020	Annual	04/27/2021
Hewlett Packard	8493C/ATTENUATOR(20dB)	17280	06/04/2020	Annual	06/04/2021
REOHDE & SCHWARZ	FSV40/Spectrum Analyzer(10Hz~40GHz)	101436	03/16/2020	Annual	03/16/2021
Rohde & Schwarz	FMZB1513/ Loop Antenna(9kHz~30MHz)	1513-175	05/18/2020	Biennial	05/18/2022
Schwarzbeck	VULB9160/ Bilog Antenna	3150	03/12/2019	Biennial	03/12/2021
Schwarzbeck	VULB9160/ Hybrid Antenna	760	03/22/2019	Biennial	03/22/2021
Anritsu Corp.	MT8821C/Wideband Radio Communication Tester	6262116770	07/22/2020	Annual	07/22/2021
REOHDE & SCHWARZ	SMB100A/ SIGNAL GENERATOR (100kHz~40GHz)	177633	07/13/2020	Annual	07/13/2021
KEYSIGHT	N9030B / Signal Analyzer(5Hz~40.0GHz)	MY55480167	06/04/2020	Annual	06/04/2021
KEYSIGHT	E7515B / 5G Wireless Tester	MY60101126	05/28/2020	Annual	05/28/2021
Mini-Circuits	ZC4PD-K1844+ / 4-Way Divider	942907	09/14/2020	Annual	09/14/2021
HCT CO., LTD.,	FCC LTE Mobile Conducted RF Automation Test Software	-	-	-	-

Note:

1. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
2. Espectially, 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 (±dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70
Radiated Disturbance (18 GHz ~ 40 GHz)	5.05

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, §24.238(a)	< 43 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions	PASS
Conducted Output Power	§2.1046	N/A	**See Note1**
Peak- to- Average Ratio	§24.232(d)	< 13 dB	PASS
Frequency stability / variation of ambient temperature	§24.235	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	§24.232(c)	< 2 Watts max. EIRP	PASS
Radiated Spurious and Harmonic Emissions	§2.1053, §24.238(a)	< 43 + 10log10 (P[Watts]) for all out-of band emissions	PASS

Note:

1. Radiateded tests were tested using FTM test software.

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)

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	
								W	W	dBm
1852.5	Sub6 n2/ 5 MHz [15 kHz]	PI/2 BPSK	-17.75	14.12	10.10	1.93	H	< 2.00	0.170	22.29
		QPSK	-17.77	14.10	10.10	1.93	H		0.169	22.27
		16-QAM	-18.61	13.26	10.10	1.93	H		0.139	21.43
		64-QAM	-20.00	11.87	10.10	1.93	H		0.101	20.04
		256-QAM	-21.43	10.44	10.10	1.93	H		0.073	18.61
1880.0		PI/2 BPSK	-17.28	14.80	9.98	1.97	H		0.191	22.81
		QPSK	-17.35	14.73	9.98	1.97	H		0.188	22.74
		16-QAM	-18.51	13.57	9.98	1.97	H		0.144	21.58
		64-QAM	-20.00	12.08	9.98	1.97	H		0.102	20.09
		256-QAM	-21.47	10.61	9.98	1.97	H		0.073	18.62
1907.5		PI/2 BPSK	-18.74	13.83	9.88	1.98	H		0.149	21.73
		QPSK	-18.77	13.80	9.88	1.98	H		0.148	21.70
		16-QAM	-19.85	12.72	9.88	1.98	H		0.115	20.62
		64-QAM	-21.40	11.17	9.88	1.98	H		0.081	19.07
		256-QAM	-22.42	10.15	9.88	1.98	H		0.064	18.05

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1855.0	Sub6 n2/ 10 MHz [15 kHz]	PI/2 BPSK	-17.73	14.26	10.08	1.94	H	< 2.00	0.174	22.40
		QPSK	-17.85	14.14	10.08	1.94	H		0.169	22.28
		16-QAM	-19.06	12.93	10.08	1.94	H		0.128	21.07
		64-QAM	-20.28	11.71	10.08	1.94	H		0.097	19.85
		256-QAM	-21.47	10.52	10.08	1.94	H		0.073	18.66
1880.0		PI/2 BPSK	-17.45	14.63	9.98	1.97	H		0.184	22.64
		QPSK	-17.55	14.53	9.98	1.97	H		0.179	22.54
		16-QAM	-18.54	13.54	9.98	1.97	H		0.143	21.55
		64-QAM	-19.95	12.13	9.98	1.97	H		0.103	20.14
		256-QAM	-21.44	10.64	9.98	1.97	H		0.073	18.65
1905.0		PI/2 BPSK	-18.36	14.22	9.89	1.98	H		0.164	22.14
		QPSK	-18.38	14.20	9.89	1.98	H		0.163	22.12
		16-QAM	-19.35	13.23	9.89	1.98	H		0.130	21.15
		64-QAM	-20.78	11.80	9.89	1.98	H		0.094	19.72
		256-QAM	-22.21	10.37	9.89	1.98	H		0.067	18.29

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1857.5	Sub6 n2/ 15 MHz [15 kHz]	PI/2 BPSK	-17.57	14.53	10.06	1.94	H	< 2.00	0.184	22.65
		QPSK	-17.60	14.50	10.06	1.94	H		0.183	22.62
		16-QAM	-18.45	13.65	10.06	1.94	H		0.150	21.77
		64-QAM	-19.92	12.18	10.06	1.94	H		0.107	20.30
		256-QAM	-21.23	10.87	10.06	1.94	H		0.079	18.99
1880.0		PI/2 BPSK	-17.18	14.90	9.98	1.97	H		0.195	22.91
		QPSK	-17.32	14.76	9.98	1.97	H		0.189	22.77
		16-QAM	-18.41	13.67	9.98	1.97	H		0.147	21.68
		64-QAM	-19.96	12.12	9.98	1.97	H		0.103	20.13
		256-QAM	-21.37	10.71	9.98	1.97	H		0.074	18.72
1902.5		PI/2 BPSK	-17.77	14.83	9.90	1.97	H		0.189	22.76
		QPSK	-17.80	14.80	9.90	1.97	H		0.188	22.73
		16-QAM	-18.91	13.69	9.90	1.97	H		0.145	21.62
		64-QAM	-20.50	12.10	9.90	1.97	H		0.101	20.03
		256-QAM	-21.92	10.68	9.90	1.97	H		0.073	18.61

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1860.0	Sub6 n2/ 20 MHz [15 kHz]	PI/2 BPSK	-17.50	14.60	10.06	1.94	H	< 2.00	0.187	22.72
		QPSK	-17.52	14.58	10.06	1.94	H		0.186	22.70
		16-QAM	-18.62	13.48	10.06	1.94	H		0.145	21.60
		64-QAM	-19.78	12.32	10.06	1.94	H		0.111	20.44
		256-QAM	-21.23	10.87	10.06	1.94	H		0.079	18.99
1880.0		PI/2 BPSK	-17.27	14.81	9.98	1.97	H		0.191	22.82
		QPSK	-17.30	14.78	9.98	1.97	H		0.190	22.79
		16-QAM	-18.40	13.68	9.98	1.97	H		0.148	21.69
		64-QAM	-19.70	12.38	9.98	1.97	H		0.109	20.39
		256-QAM	-21.33	10.75	9.98	1.97	H		0.075	18.76
1900.0		PI/2 BPSK	-17.38	15.22	9.90	1.97	H		0.207	23.15
		QPSK	-17.40	15.20	9.90	1.97	H		0.206	23.13
		16-QAM	-18.68	13.92	9.90	1.97	H		0.153	21.85
		64-QAM	-20.00	12.60	9.90	1.97	H		0.113	20.53
		256-QAM	-21.55	11.05	9.90	1.97	H		0.079	18.98

8.2 RADIATED SPURIOUS EMISSIONS

- NR Band: N2
- LTE Band(Anchor): B5
- Bandwidth: 20 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)
372000 (1860.0)	3 720.00	-56.59	11.70	-62.52	2.82	H	-53.64	-13.00
	5 580.00	-61.99	12.04	-62.37	3.51	V	-53.84	-13.00
	7 440.00	-58.59	11.36	-50.40	4.13	H	-43.17	-13.00
	9 300.00	-50.90	11.40	-42.83	4.61	V	-36.04	-13.00
	11 160.00	-64.74	12.30	-53.06	5.16	H	-45.92	-13.00
376000 (1880.0)	3 760.00	-57.27	11.64	-63.11	2.85	H	-54.32	-13.00
	5 640.00	-61.35	12.00	-61.67	3.54	V	-53.21	-13.00
	7 520.00	-58.15	11.54	-49.92	4.12	H	-42.50	-13.00
	9 400.00	-52.19	11.20	-43.43	4.67	V	-36.90	-13.00
	11 280.00	-56.45	12.14	-45.03	5.23	V	-38.12	-13.00
380000 (1900.0)	3 800.00	-57.83	11.40	-63.01	2.85	H	-54.46	-13.00
	5 700.00	-61.63	11.80	-61.48	3.56	V	-53.24	-13.00
	7 600.00	-63.75	11.60	-56.40	4.15	V	-48.95	-13.00
	9 500.00	-51.09	11.20	-42.79	4.65	V	-36.24	-13.00
	11 400.00	-57.13	12.20	-44.76	5.14	V	-37.70	-13.00

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
20525 (836.5)	1,673.00	-52.07	9.65	-61.84	2.01	V	-54.20	-13.00
	2,509.50	-50.01	10.75	-53.73	2.50	H	-45.48	-13.00
	3,346.00	-58.07	12.48	-59.06	2.92	H	-49.50	-13.00

8.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
Sub6 n2	5 MHz	1880.0	BPSK	25	0	3.70
			QPSK	25	0	4.72
			16-QAM	25	0	5.49
			64-QAM	25	0	5.79
			256-QAM	25	0	6.44
	10 MHz		BPSK	52	0	3.90
			QPSK	52	0	4.85
			16-QAM	52	0	5.74
			64-QAM	52	0	6.02
			256-QAM	52	0	6.32
	15 MHz		BPSK	79	0	3.86
			QPSK	79	0	4.88
			16-QAM	79	0	5.56
			64-QAM	79	0	5.94
			256-QAM	79	0	6.42
	20 MHz		BPSK	106	0	3.83
			QPSK	106	0	4.82
			16-QAM	106	0	5.59
			64-QAM	106	0	5.84
			256-QAM	106	0	6.31

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 n2	5 MHz	1880.0	BPSK	25	0	4.4783
			QPSK	25	0	4.5020
			16-QAM	25	0	4.5215
			64-QAM	25	0	4.4851
			256-QAM	25	0	4.4948
	10 MHz		BPSK	52	0	8.9679
			QPSK	52	0	8.9987
			16-QAM	52	0	8.9937
			64-QAM	52	0	8.9544
			256-QAM	52	0	8.9828
	15 MHz		BPSK	79	0	13.442
			QPSK	79	0	13.472
			16-QAM	79	0	13.464
			64-QAM	79	0	13.517
			256-QAM	79	0	13.453
	20 MHz		BPSK	106	0	17.959
			QPSK	106	0	17.899
			16-QAM	106	0	17.894
			64-QAM	106	0	17.871
			256-QAM	106	0	17.976

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 n2	5	1852.5	7.9562	31.591	-81.971	-50.380	-13.00
		1880.0	8.0728	31.591	-82.302	-50.711	
		1907.5	1.9866	30.981	-79.278	-48.297	
	10	1855.0	7.9920	31.591	-82.258	-50.667	
		1880.0	8.0434	31.591	-82.171	-50.580	
		1905.0	7.9756	31.591	-82.197	-50.606	
	15	1857.5	9.1635	31.591	-82.251	-50.660	
		1880.0	7.9925	31.591	-81.624	-50.033	
		1902.5	7.9841	31.591	-82.220	-50.629	
	20	1860.0	8.5588	31.591	-82.422	-50.831	
		1880.0	3.7363	31.591	-82.561	-50.970	
		1900.0	8.0090	31.591	-82.491	-50.900	

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 + Attenuator + 4-Way Divider

Frequency Range (GHz)	Factor [dB]
0.03 – 1	28.493
1 – 5	30.981
5 – 10	31.591
10 – 15	32.116
15 – 20	32.489
Above 20	33.131

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%): 3.860 VDC
- ▣ Batt. Endpoint: 3.400 VDC
- ▣ LIMIT: Emission must remain in band

Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
1852.5	100%	+20(Ref)	1852 500 012	0.0	0.000 000	0.000
	100%	-30	1852 500 017	5.5	0.000 000	0.003
	100%	-20	1852 500 027	15.5	0.000 001	0.008
	100%	-10	1852 500 027	15.6	0.000 001	0.008
	100%	0	1852 500 017	5.3	0.000 000	0.003
	100%	+10	1852 500 028	15.9	0.000 001	0.009
	100%	+30	1852 500 018	5.8	0.000 000	0.003
	100%	+40	1852 500 023	11.2	0.000 001	0.006
	100%	+50	1852 500 024	11.9	0.000 001	0.006
	Batt. Endpoint	+20	1852 500 025	13.1	0.000 001	0.007
1907.5	100%	+20(Ref)	1907 500 013	0.0	0.000 000	0.000
	100%	-30	1907 500 026	13.1	0.000 001	0.007
	100%	-20	1907 500 023	10.4	0.000 001	0.005
	100%	-10	1907 500 026	13.8	0.000 001	0.007
	100%	0	1907 500 022	9.0	0.000 000	0.005
	100%	+10	1907 500 026	13.7	0.000 001	0.007
	100%	+30	1907 500 029	16.8	0.000 001	0.009
	100%	+40	1907 500 025	12.6	0.000 001	0.007
	100%	+50	1907 500 028	15.1	0.000 001	0.008
	Batt. Endpoint	+20	1907 500 028	15.6	0.000 001	0.008

▣ BandWidth: 10 MHz

▣ Voltage(100%): 3.860 VDC

▣ Batt. Endpoint: 3.400 VDC

▣ LIMIT: Emission must remain in band

Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
1855.0	100%	+20(Ref)	1855 000 007	0.0	0.000 000	0.000
	100%	-30	1855 000 016	9.2	0.000 000	0.005
	100%	-20	1855 000 024	16.6	0.000 001	0.009
	100%	-10	1855 000 010	3.0	0.000 000	0.002
	100%	0	1855 000 024	16.9	0.000 001	0.009
	100%	+10	1855 000 017	10.2	0.000 001	0.006
	100%	+30	1855 000 020	12.9	0.000 001	0.007
	100%	+40	1855 000 018	11.2	0.000 001	0.006
	100%	+50	1855 000 022	14.8	0.000 001	0.008
	Batt. Endpoint	+20	1855 000 013	5.6	0.000 000	0.003
1905.0	100%	+20(Ref)	1905 000 016	0.0	0.000 000	0.000
	100%	-30	1905 000 026	9.8	0.000 001	0.005
	100%	-20	1905 000 028	12.3	0.000 001	0.006
	100%	-10	1905 000 027	10.6	0.000 001	0.006
	100%	0	1905 000 023	7.0	0.000 000	0.004
	100%	+10	1905 000 026	10.2	0.000 001	0.005
	100%	+30	1905 000 022	6.2	0.000 000	0.003
	100%	+40	1905 000 020	4.4	0.000 000	0.002
	100%	+50	1905 000 022	6.2	0.000 000	0.003
	Batt. Endpoint	+20	1905 000 030	14.3	0.000 001	0.007

▣ BandWidth: 15 MHz

▣ Voltage(100%): 3.860 VDC

▣ Batt. Endpoint: 3.400 VDC

▣ LIMIT: Emission must remain in band

Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
1857.5	100%	+20(Ref)	1857 500 005	0.0	0.000 000	0.000
	100%	-30	1857 500 015	10.2	0.000 001	0.005
	100%	-20	1857 500 019	13.4	0.000 001	0.007
	100%	-10	1857 500 008	3.2	0.000 000	0.002
	100%	0	1857 500 009	4.3	0.000 000	0.002
	100%	+10	1857 500 013	8.3	0.000 000	0.004
	100%	+30	1857 500 020	15.1	0.000 001	0.008
	100%	+40	1857 500 011	5.5	0.000 000	0.003
	100%	+50	1857 500 010	4.5	0.000 000	0.002
	Batt. Endpoint	+20	1857 500 016	10.5	0.000 001	0.006
1902.5	100%	+20(Ref)	1902 500 011	0.0	0.000 000	0.000
	100%	-30	1902 500 019	8.6	0.000 000	0.005
	100%	-20	1902 500 020	9.7	0.000 001	0.005
	100%	-10	1902 500 027	16.0	0.000 001	0.008
	100%	0	1902 500 015	3.9	0.000 000	0.002
	100%	+10	1902 500 014	3.6	0.000 000	0.002
	100%	+30	1902 500 027	16.0	0.000 001	0.008
	100%	+40	1902 500 019	8.4	0.000 000	0.004
	100%	+50	1902 500 020	9.9	0.000 001	0.005
	Batt. Endpoint	+20	1902 500 024	13.8	0.000 001	0.007

▣ BandWidth: 20 MHz

▣ Voltage(100%): 3.860 VDC

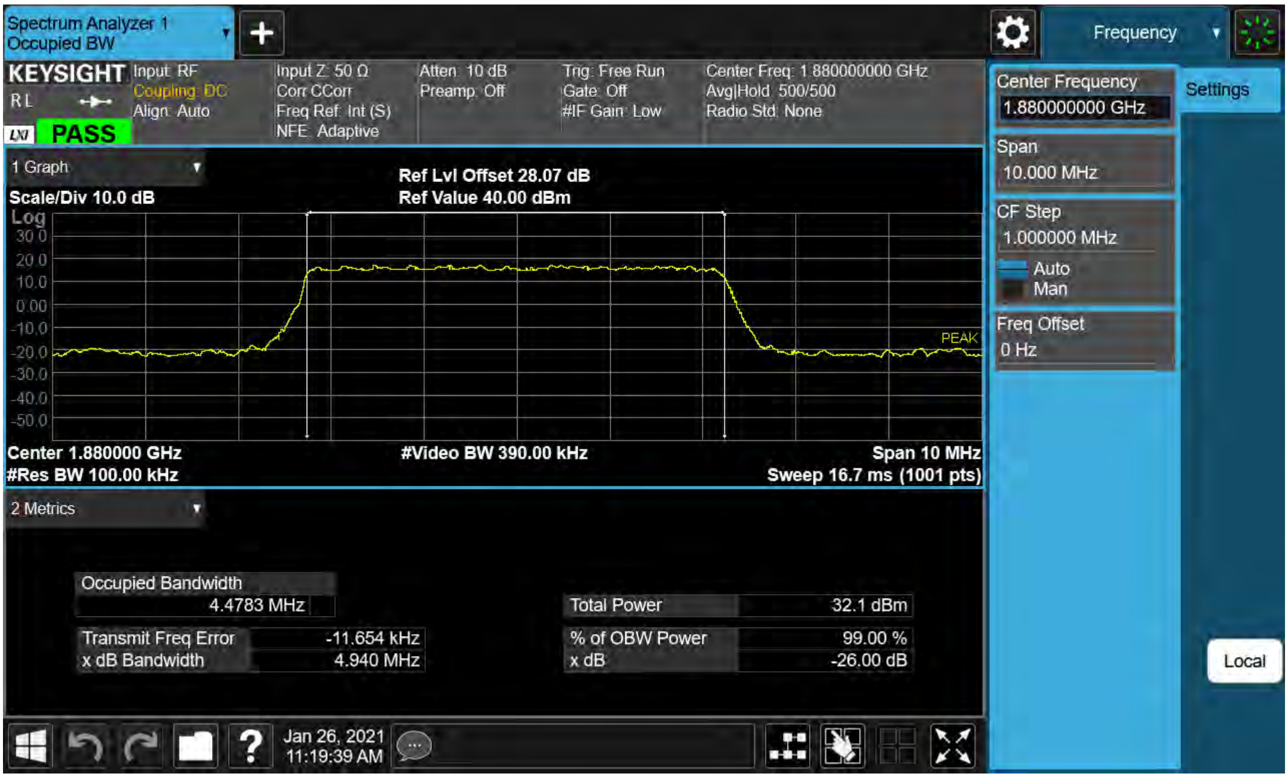
▣ Batt. Endpoint: 3.400 VDC

▣ LIMIT: Emission must remain in band

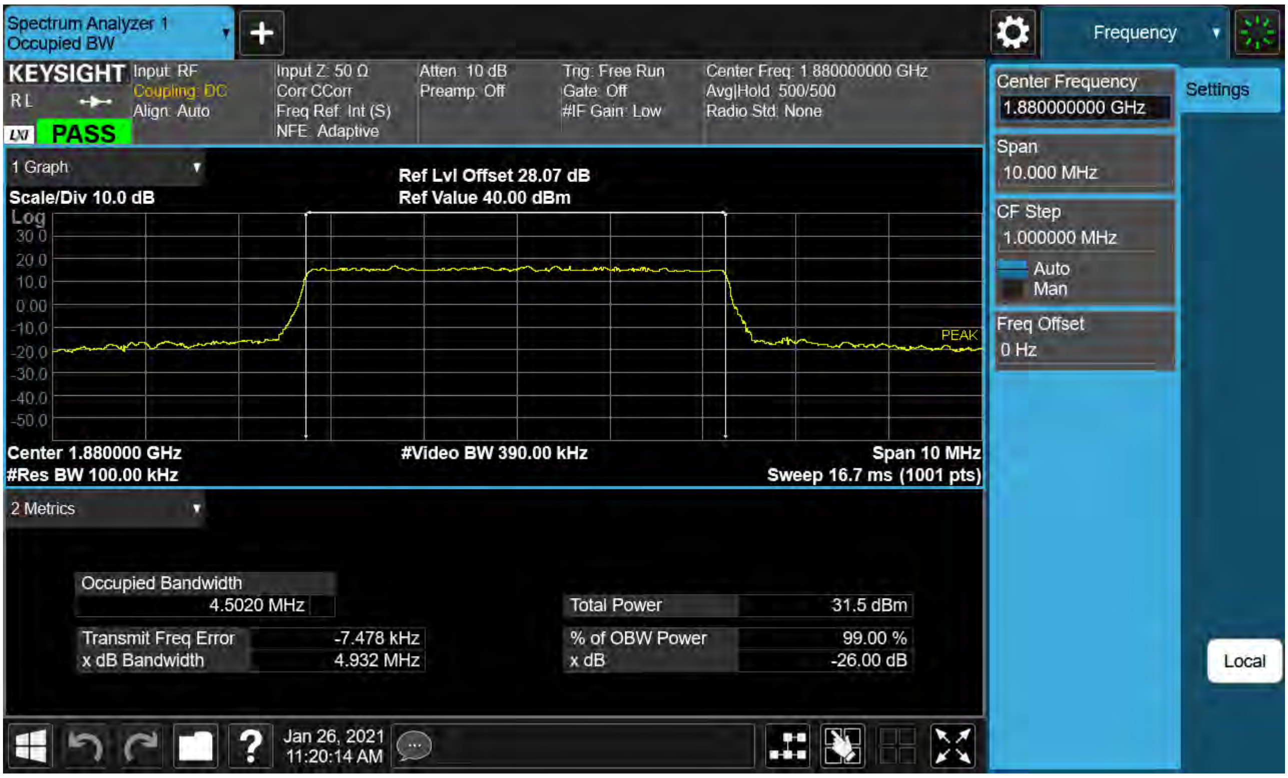
Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
1860.0	100%	+20(Ref)	1860 000 009	0.0	0.000 000	0.000
	100%	-30	1860 000 013	4.0	0.000 000	0.002
	100%	-20	1860 000 025	15.9	0.000 001	0.009
	100%	-10	1860 000 017	8.4	0.000 000	0.005
	100%	0	1860 000 019	9.8	0.000 001	0.005
	100%	+10	1860 000 020	10.5	0.000 001	0.006
	100%	+30	1860 000 016	6.5	0.000 000	0.003
	100%	+40	1860 000 017	7.7	0.000 000	0.004
	100%	+50	1860 000 018	8.8	0.000 000	0.005
	Batt. Endpoint	+20	1860 000 020	11.3	0.000 001	0.006
1900.0	100%	+20(Ref)	1900 000 017	0.0	0.000 000	0.000
	100%	-30	1900 000 034	17.0	0.000 001	0.009
	100%	-20	1900 000 020	3.3	0.000 000	0.002
	100%	-10	1900 000 025	8.7	0.000 000	0.005
	100%	0	1900 000 026	9.6	0.000 001	0.005
	100%	+10	1900 000 025	8.1	0.000 000	0.004
	100%	+30	1900 000 031	13.7	0.000 001	0.007
	100%	+40	1900 000 031	14.2	0.000 001	0.007
	100%	+50	1900 000 021	4.1	0.000 000	0.002
	Batt. Endpoint	+20	1900 000 022	5.3	0.000 000	0.003

9. TEST PLOTS

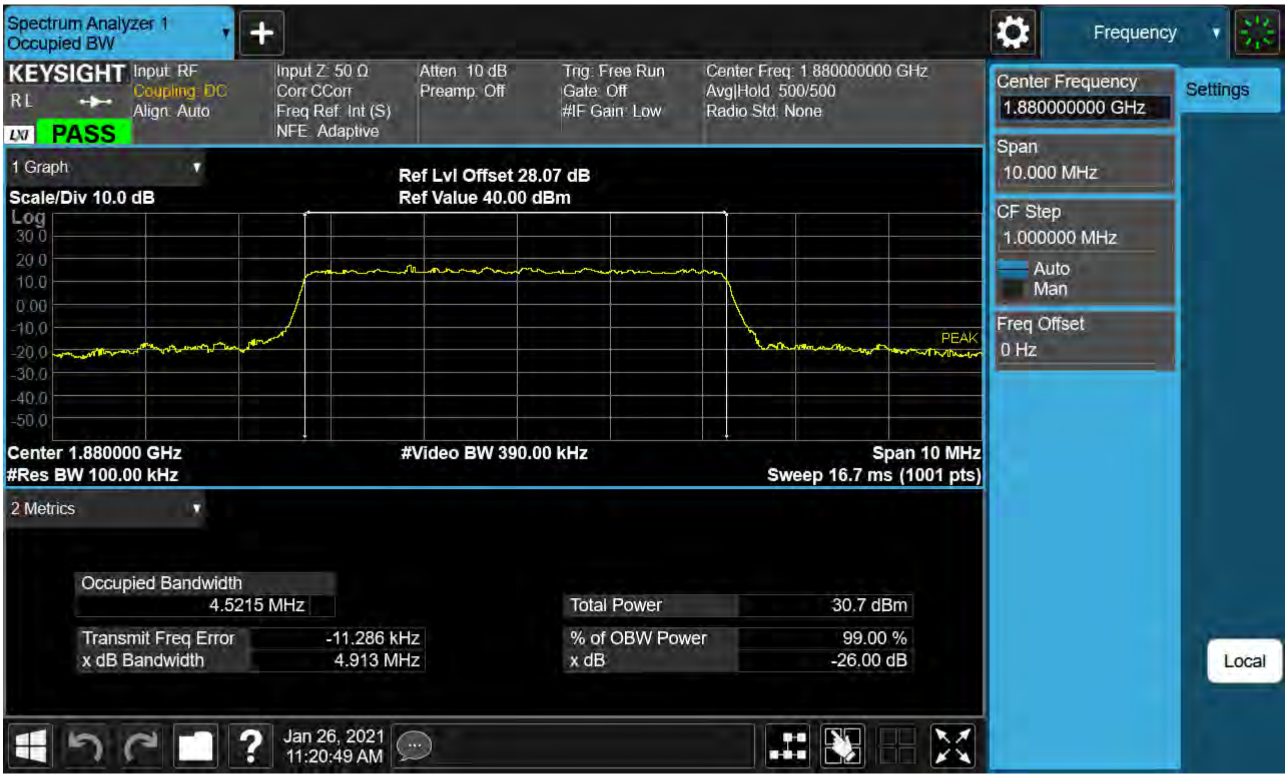
Sub6 n2. Occupied Bandwidth Plot (5M BW Ch.376000 BPSK RB 25_0)



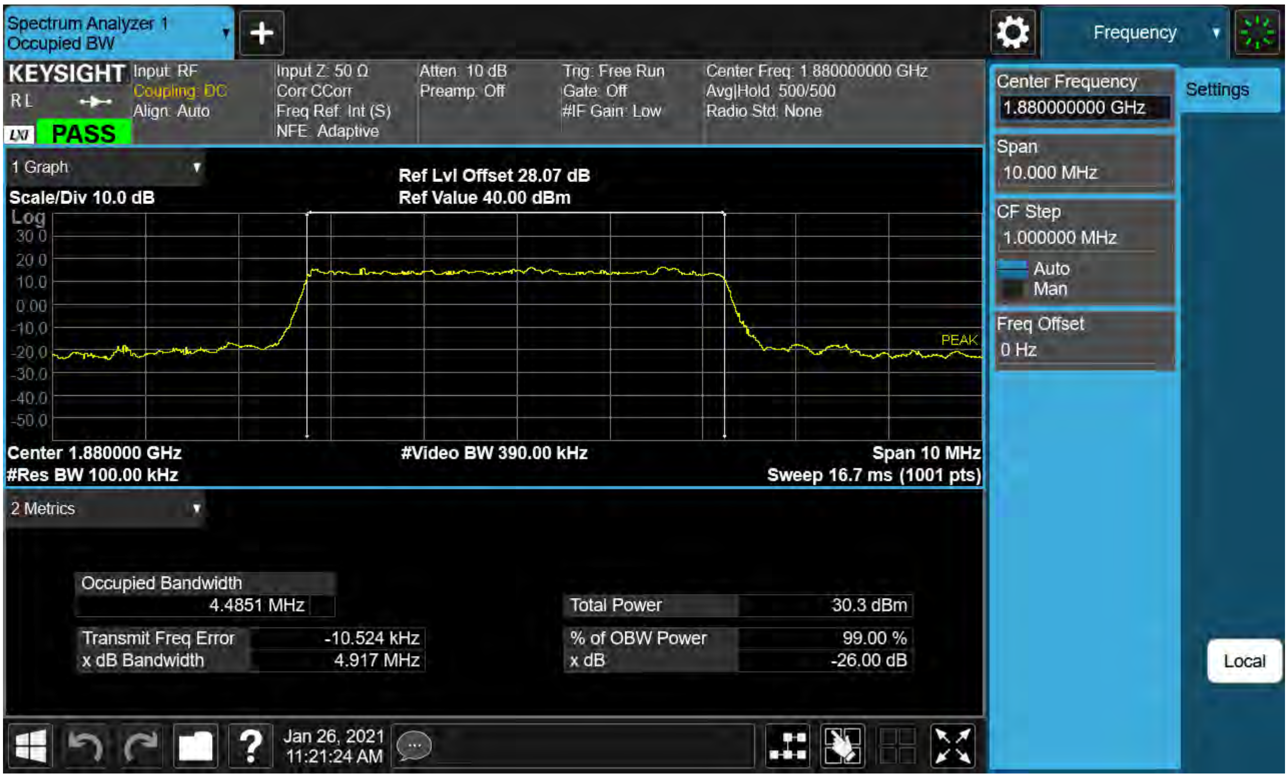
Sub6 n2. Occupied Bandwidth Plot (5M BW Ch.376000 QPSK RB 25_0)



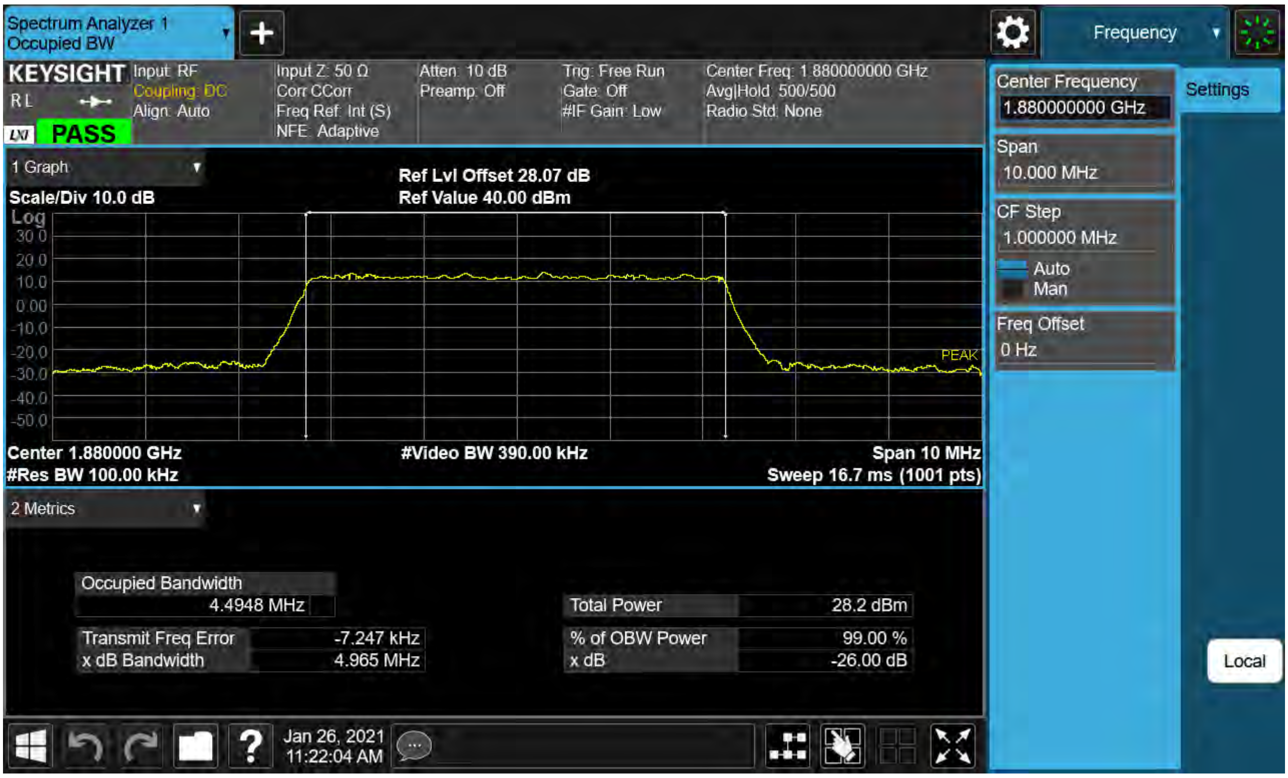
Sub6 n2. Occupied Bandwidth Plot (5M BW Ch.376000 16QAM RB 25_0)



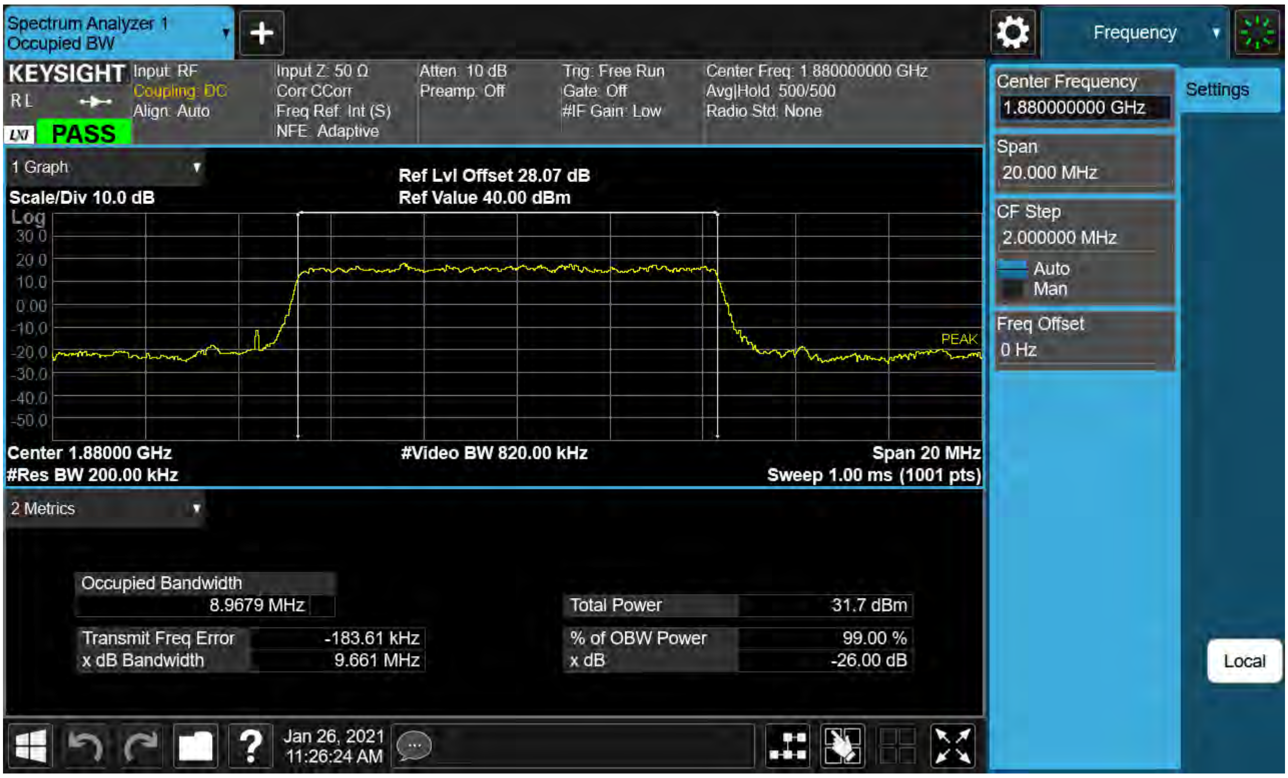
Sub6 n2. Occupied Bandwidth Plot (5M BW Ch.376000 64QAM RB 25_0)



Sub6 n2. Occupied Bandwidth Plot (5M BW Ch.376000 256QAM RB 25_0)



Sub6 n2. Occupied Bandwidth Plot (10M BW Ch.376000 BPSK RB 52_0)

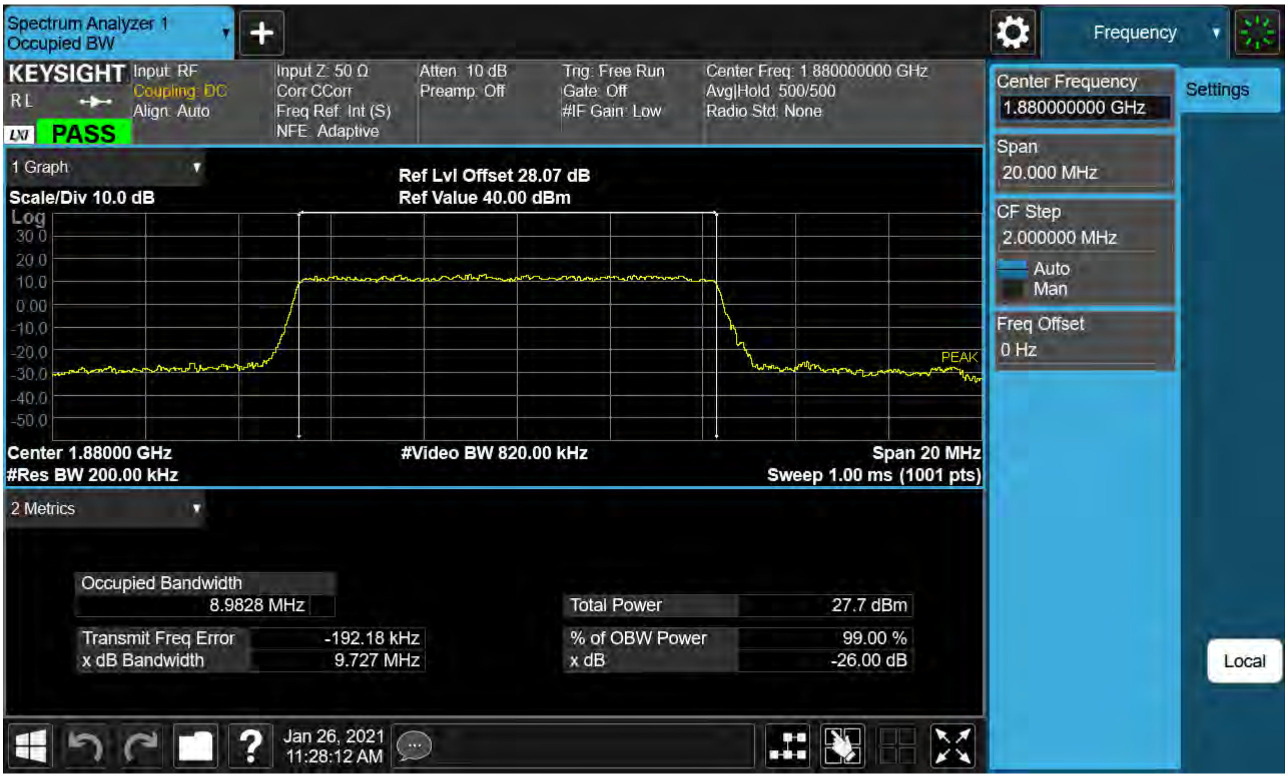


Sub6 n2. Occupied Bandwidth Plot (10M BW Ch.376000 QPSK RB 52_0)

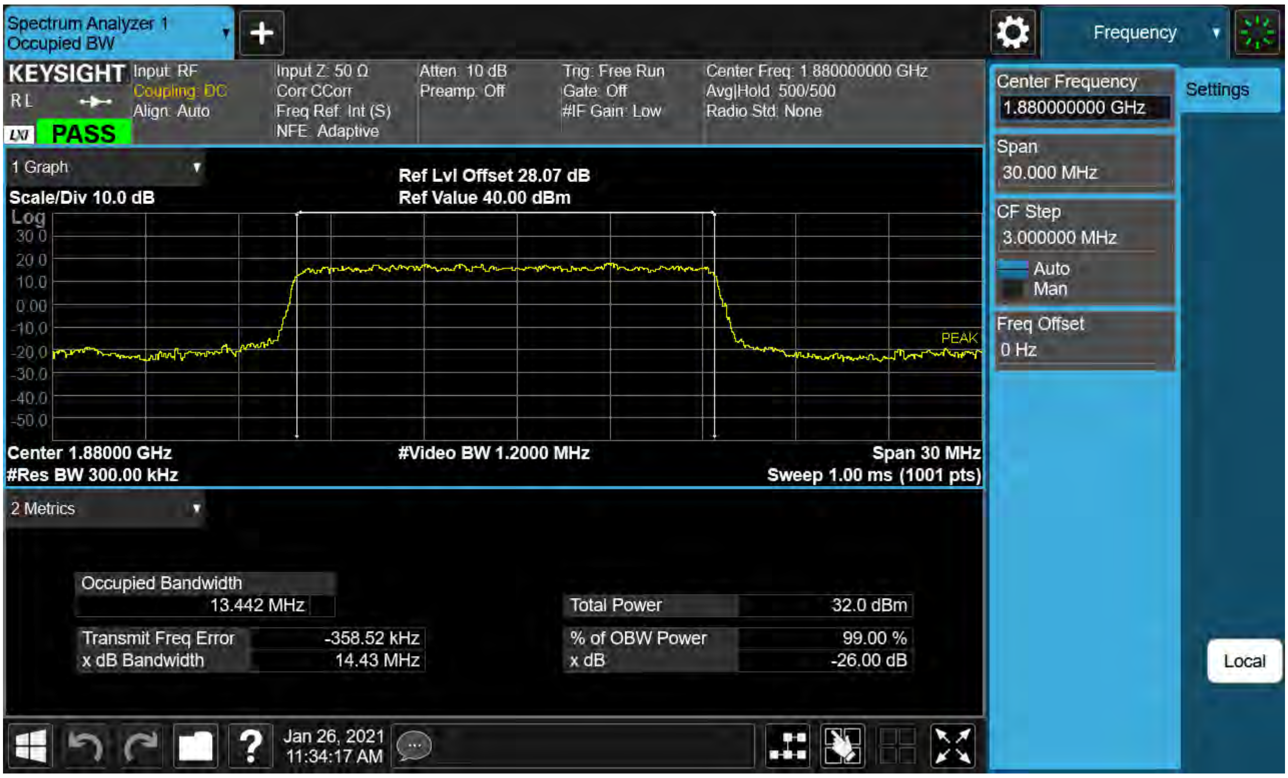
Sub6 n2. Occupied Bandwidth Plot (10M BW Ch.376000 16QAM RB 52_0)

Sub6 n2. Occupied Bandwidth Plot (10M BW Ch.376000 64QAM RB 52_0)

Sub6 n2. Occupied Bandwidth Plot (10M BW Ch.376000 256QAM RB 52_0)



Sub6 n2. Occupied Bandwidth Plot (15M BW Ch.376000 BPSK RB 79_0)

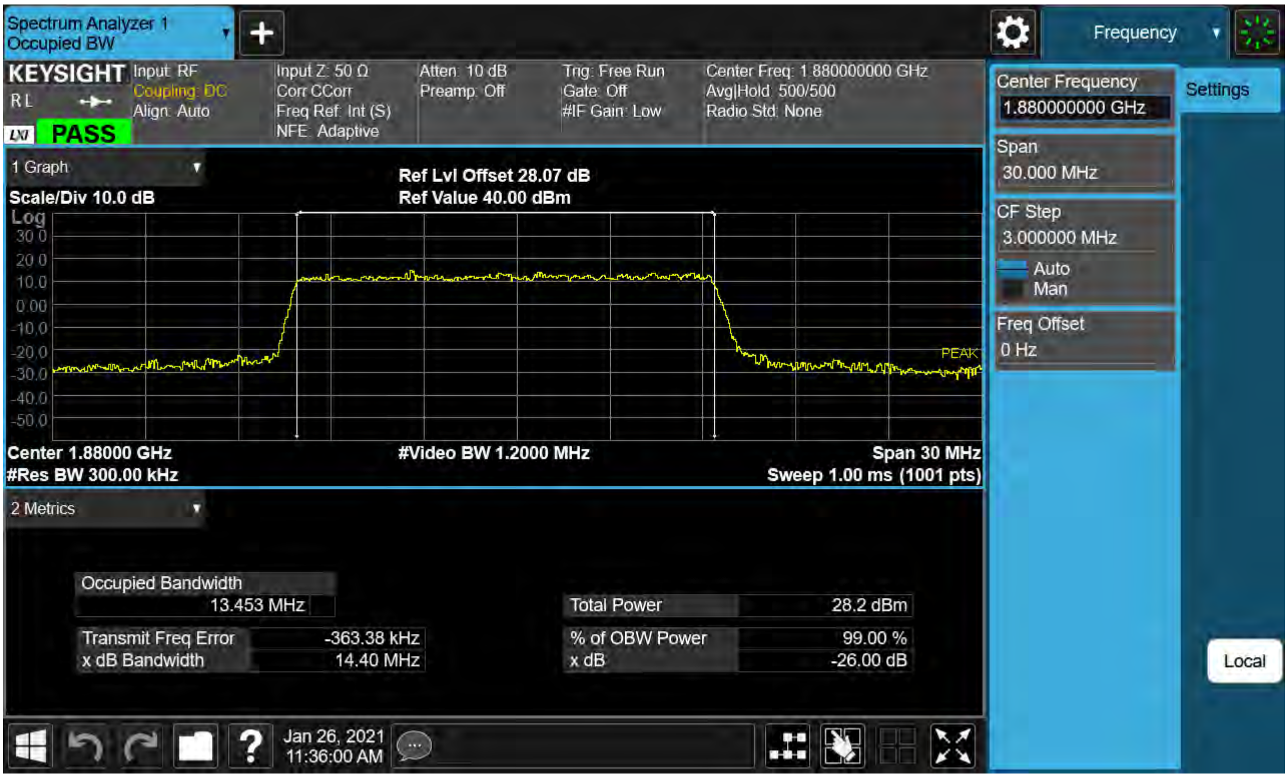


Sub6 n2. Occupied Bandwidth Plot (15M BW Ch.376000 QPSK RB 79_0)

Sub6 n2. Occupied Bandwidth Plot (15M BW Ch.376000 16QAM RB 79_0)

Sub6 n2. Occupied Bandwidth Plot (15M BW Ch.376000 64QAM RB 79_0)

Sub6 n2. Occupied Bandwidth Plot (15M BW Ch.376000 256QAM RB 79_0)



Sub6 n2. Occupied Bandwidth Plot (20M BW Ch.376000 BPSK RB 106_0)

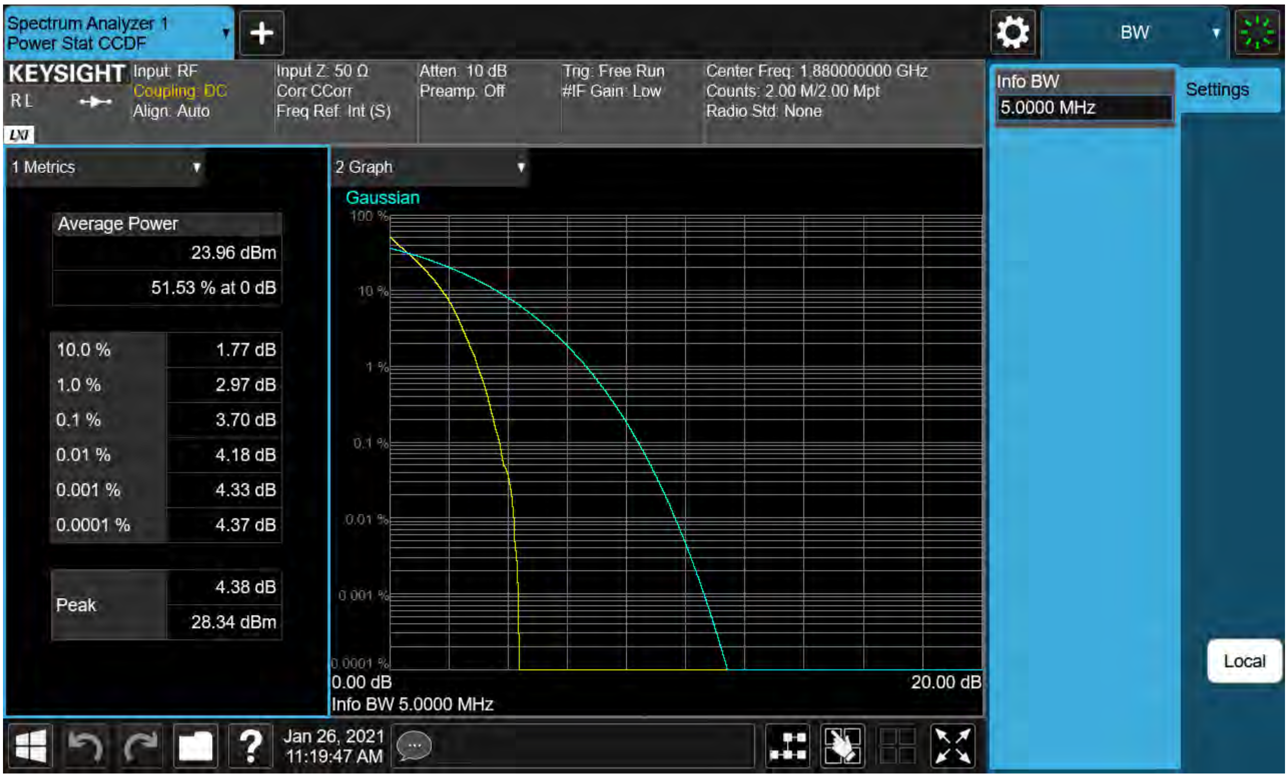
Sub6 n2. Occupied Bandwidth Plot (20M BW Ch.376000 QPSK RB 106_0)

Sub6 n2. Occupied Bandwidth Plot (20M BW Ch.376000 16QAM RB 106_0)

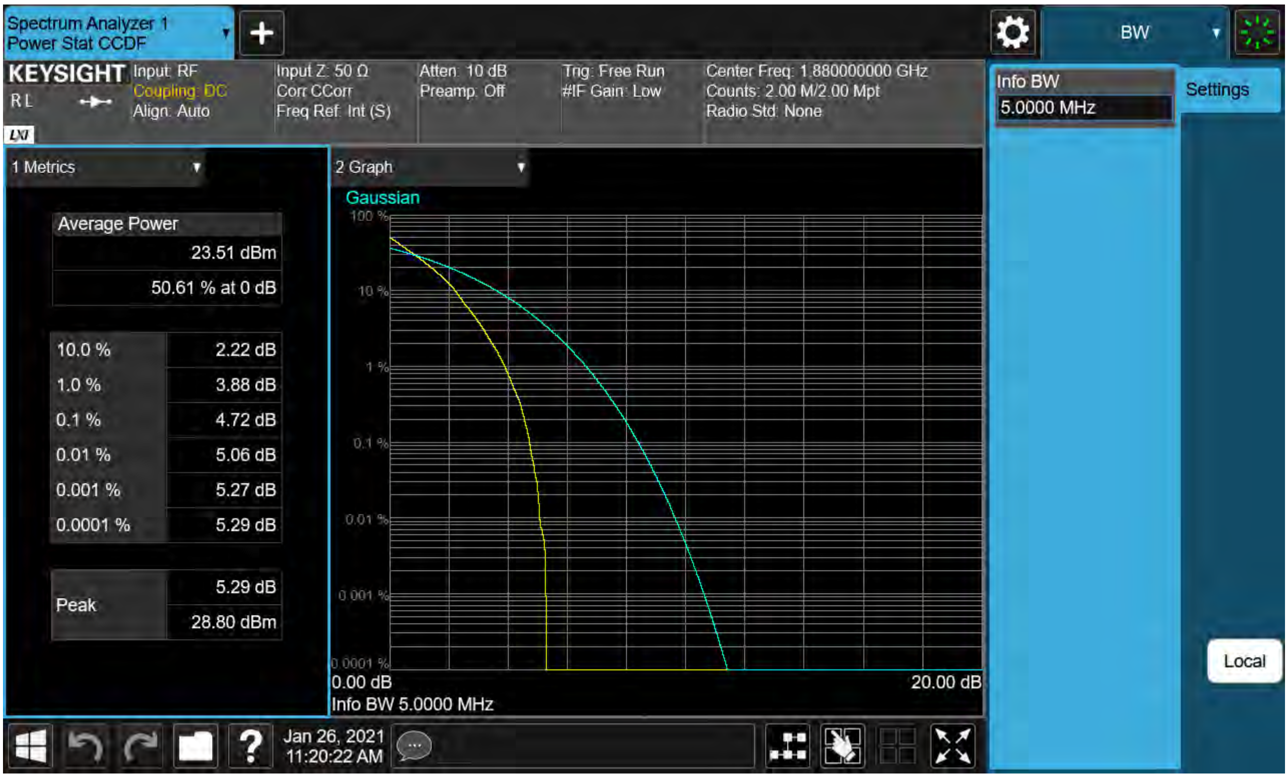
Sub6 n2. Occupied Bandwidth Plot (20M BW Ch.376000 64QAM RB 106_0)

Sub6 n2. Occupied Bandwidth Plot (20M BW Ch.376000 256QAM RB 106_0)

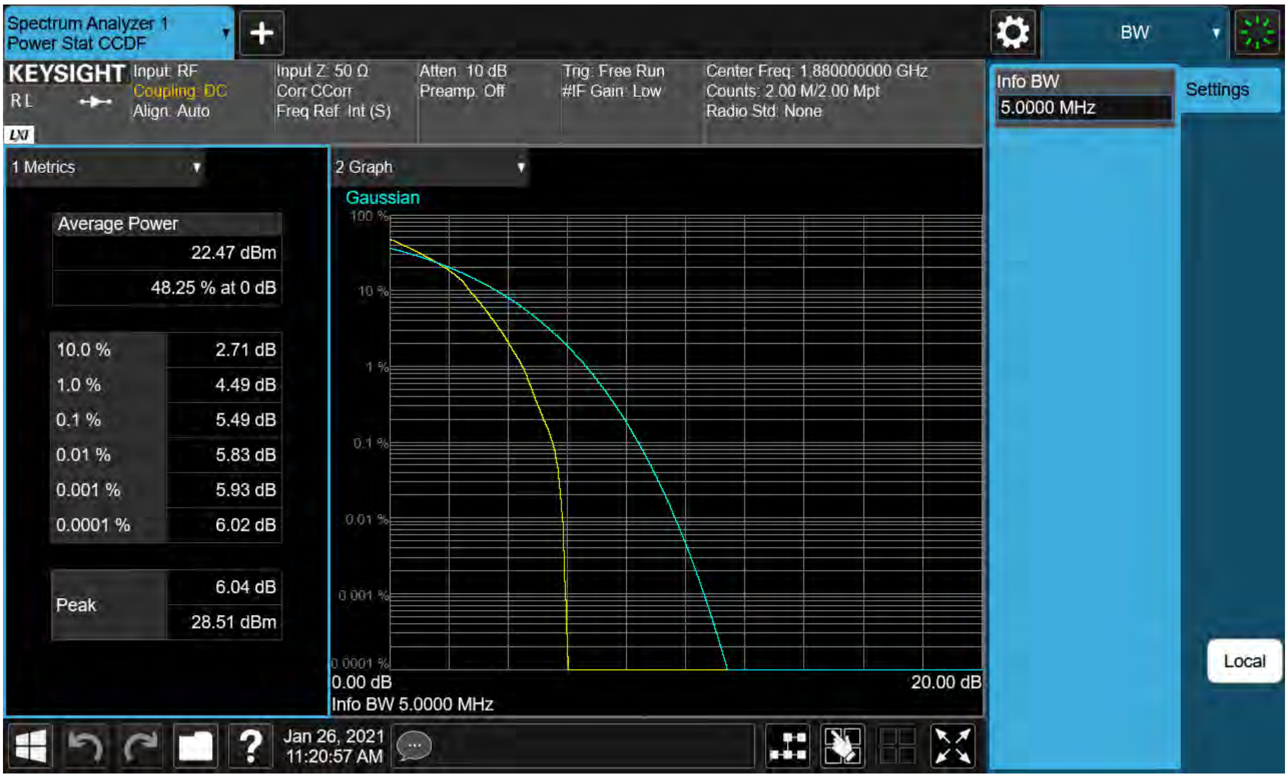
Sub6 n2. PAR Plot (5M BW Ch.376000 BPSK RB 25_0)



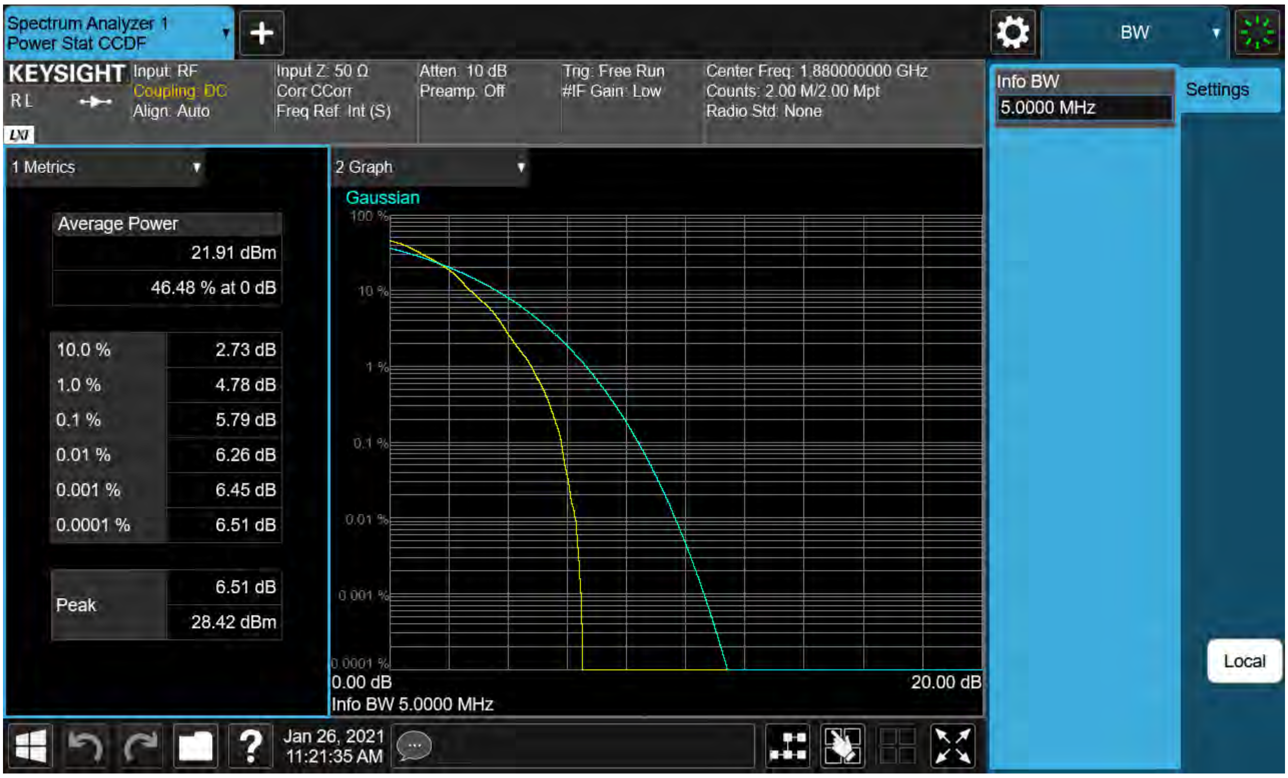
Sub6 n2. PAR Plot (5M BW Ch.376000 QPSK RB 25_0)



Sub6 n2. PAR Plot (5M BW Ch.376000 16QAM RB 25_0)

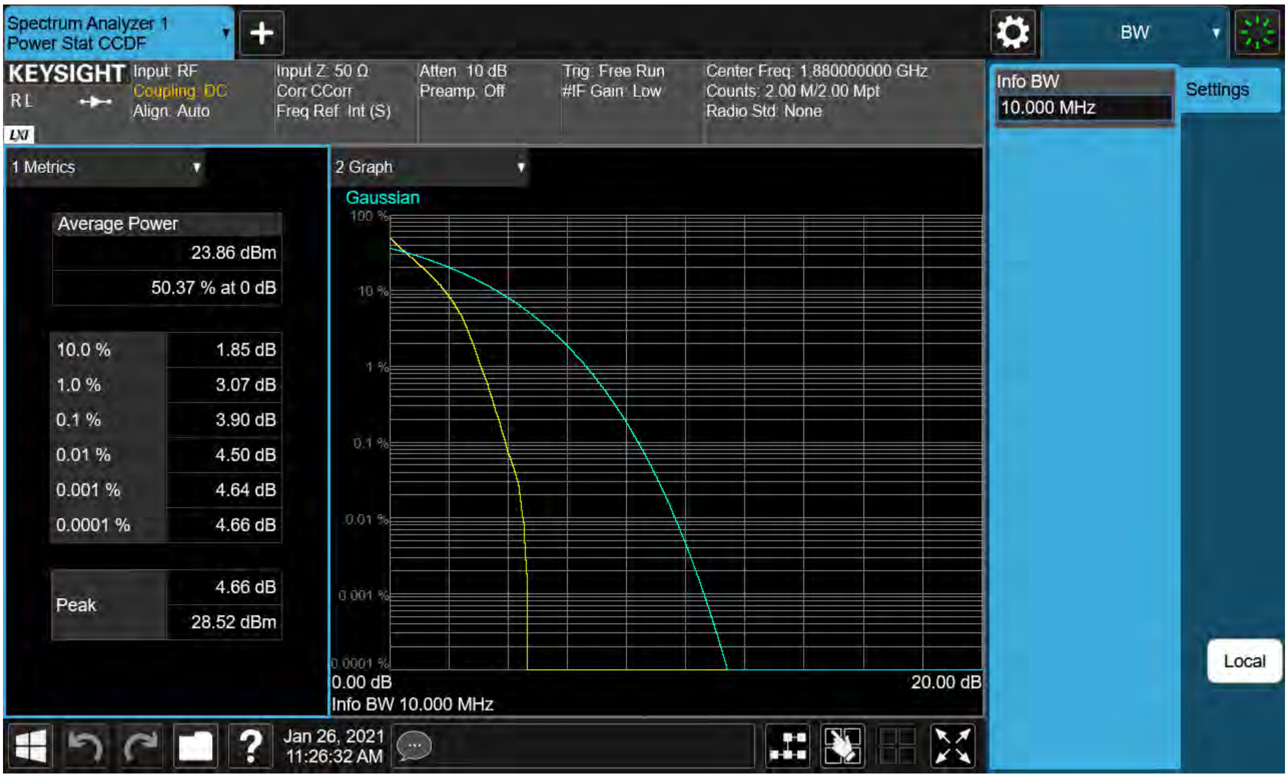


Sub6 n2. PAR Plot (5M BW Ch.376000 64QAM RB 25_0)

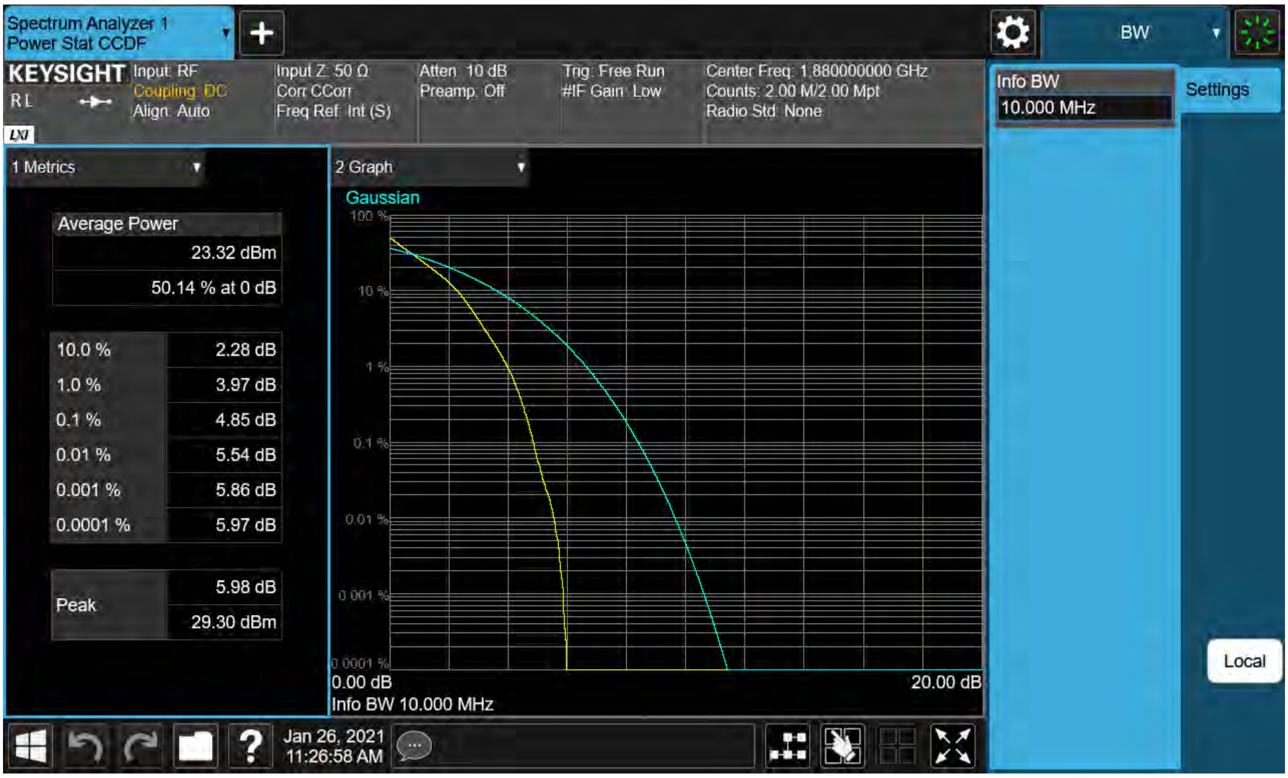


Sub6 n2. PAR Plot (5M BW Ch.376000 256QAM RB 25_0)

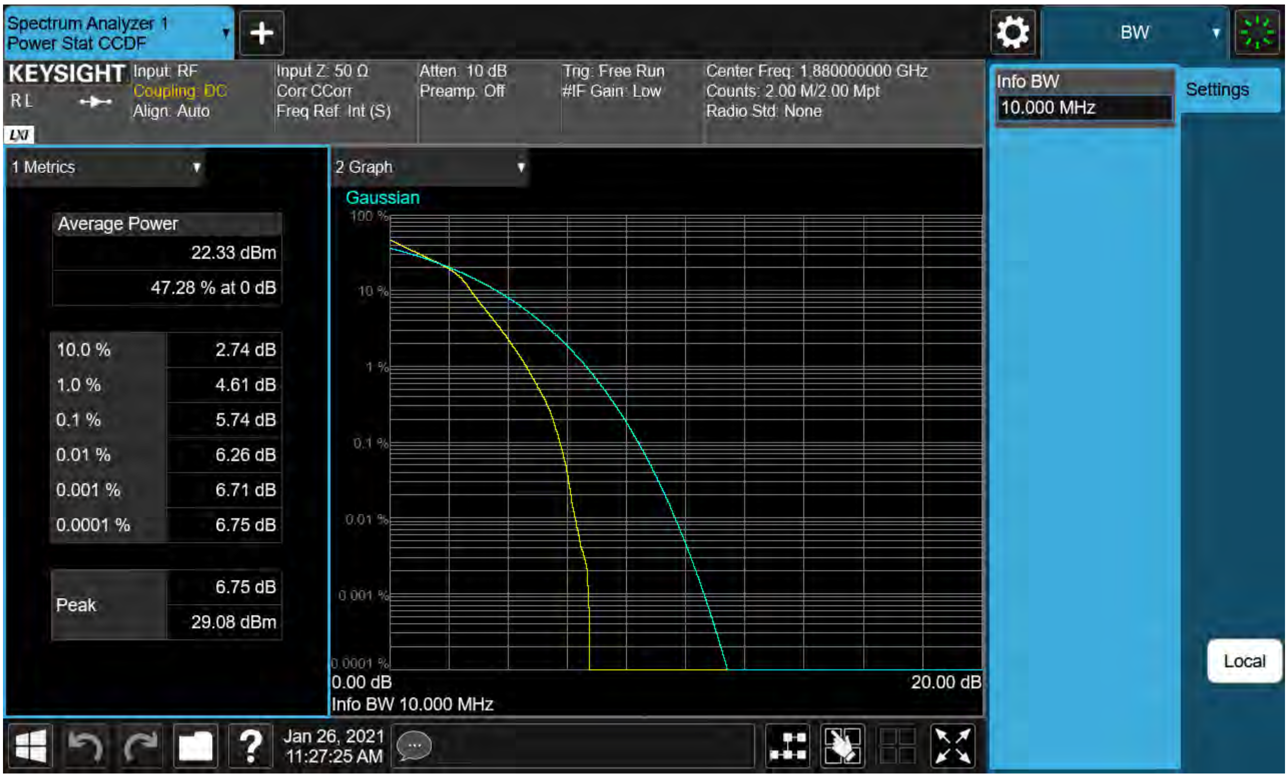
Sub6 n2. PAR Plot (10M BW Ch.376000 BPSK RB 52_0)



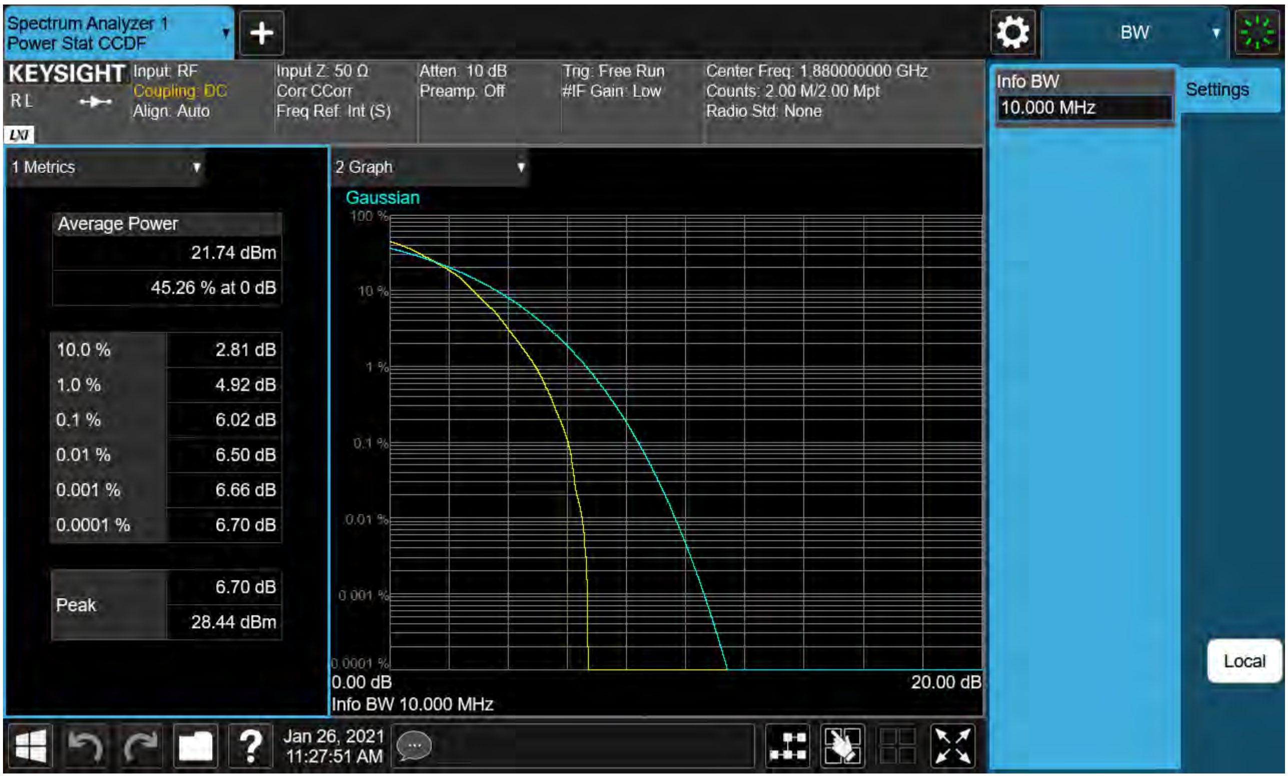
Sub6 n2. PAR Plot (10M BW Ch.376000 QPSK RB 52_0)



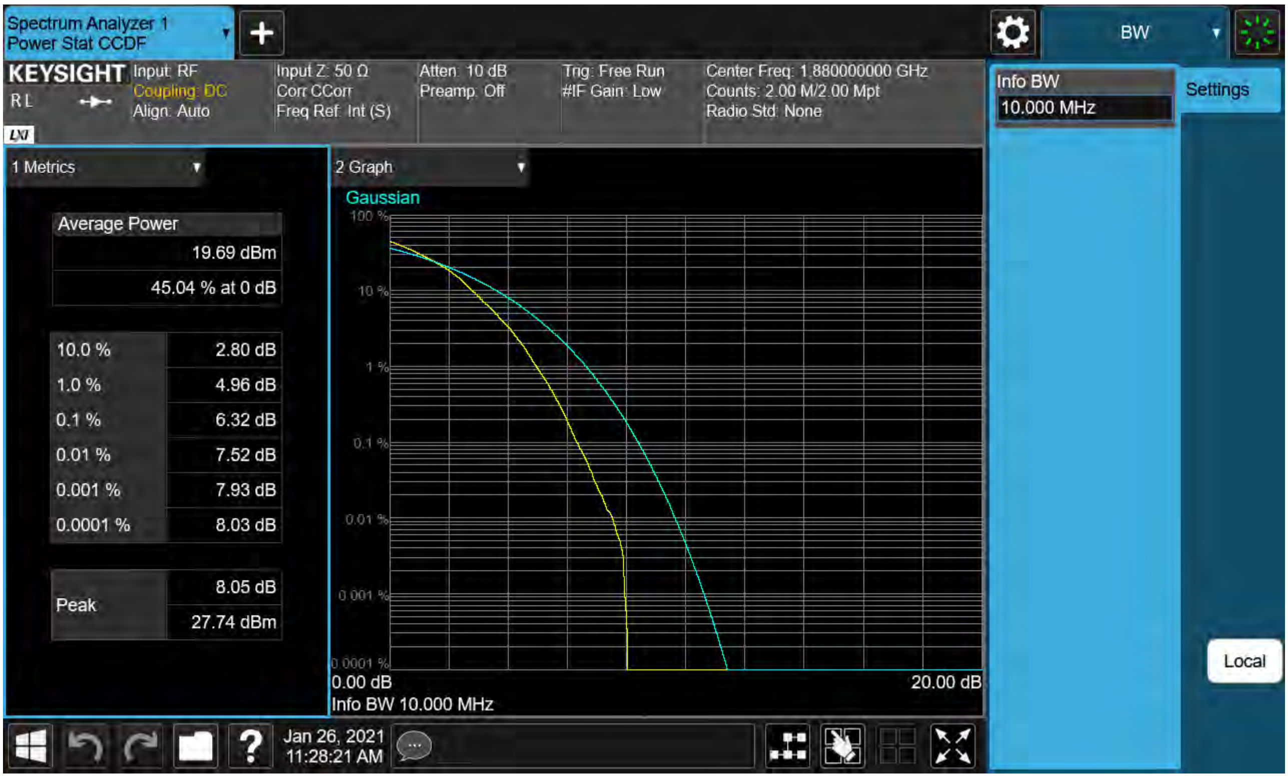
Sub6 n2. PAR Plot (10M BW Ch.376000 16QAM RB 52_0)



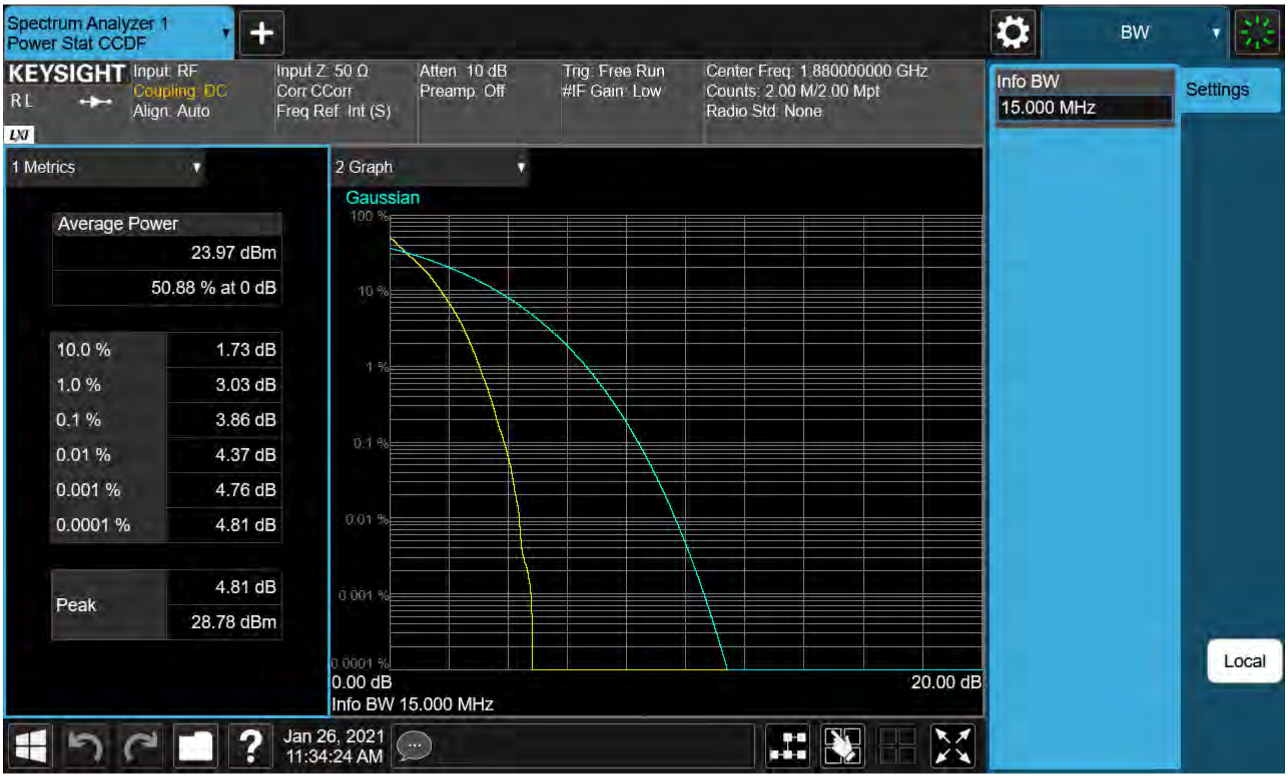
Sub6 n2. PAR Plot (10M BW Ch.376000 64QAM RB 52_0)



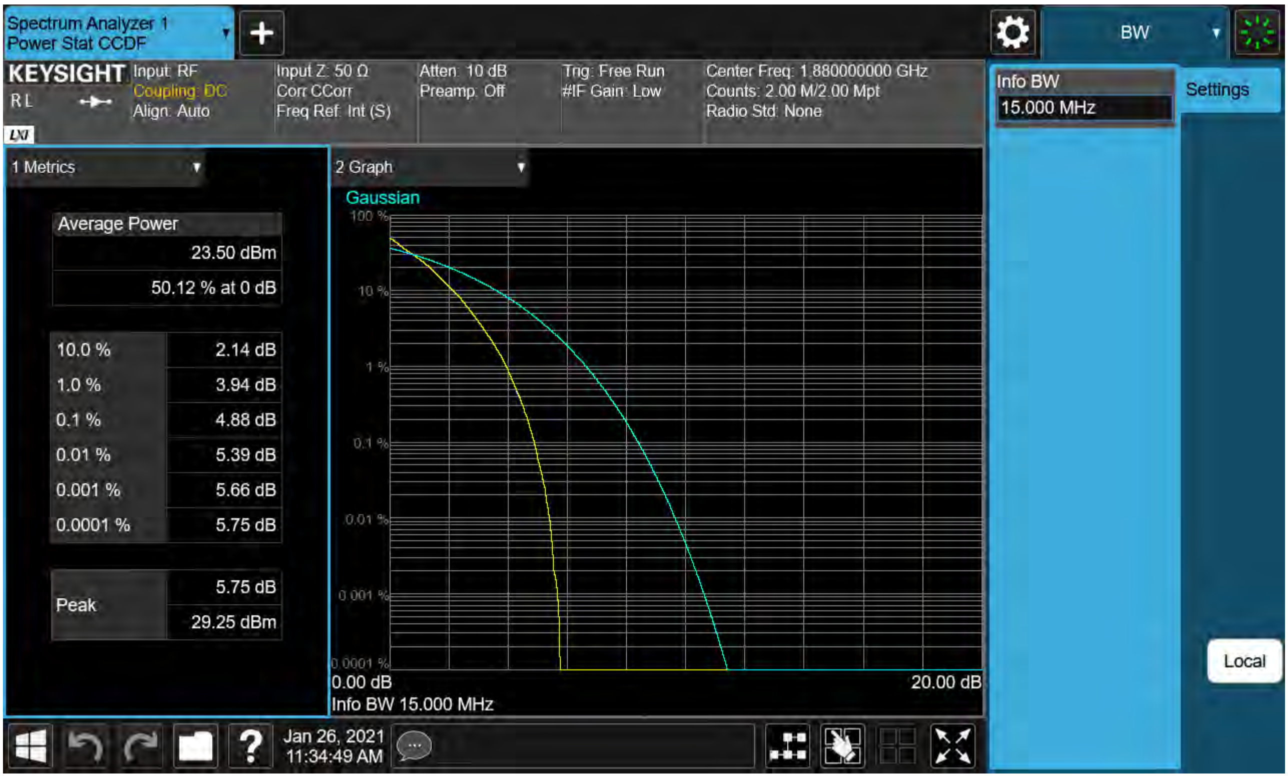
Sub6 n2. PAR Plot (10M BW Ch.376000 256QAM RB 52_0)



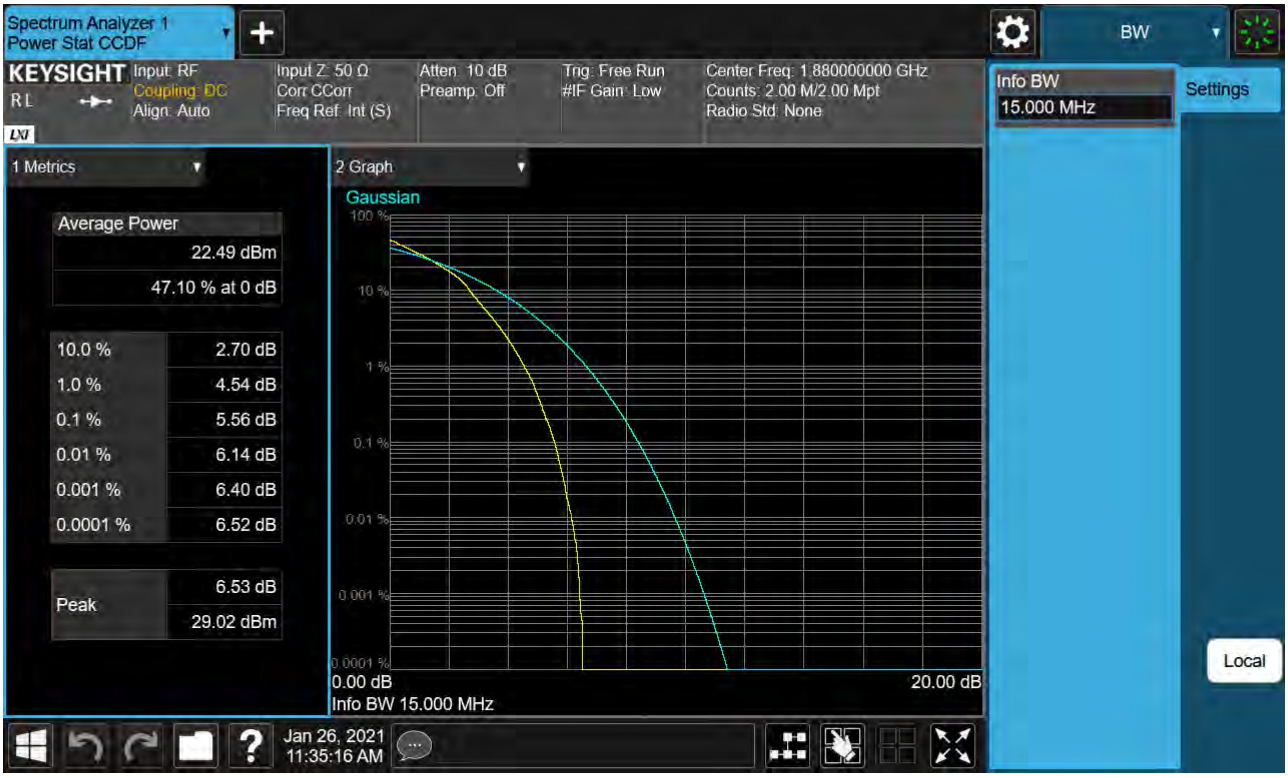
Sub6 n2. PAR Plot (15M BW Ch.376000 BPSK RB 79_0)



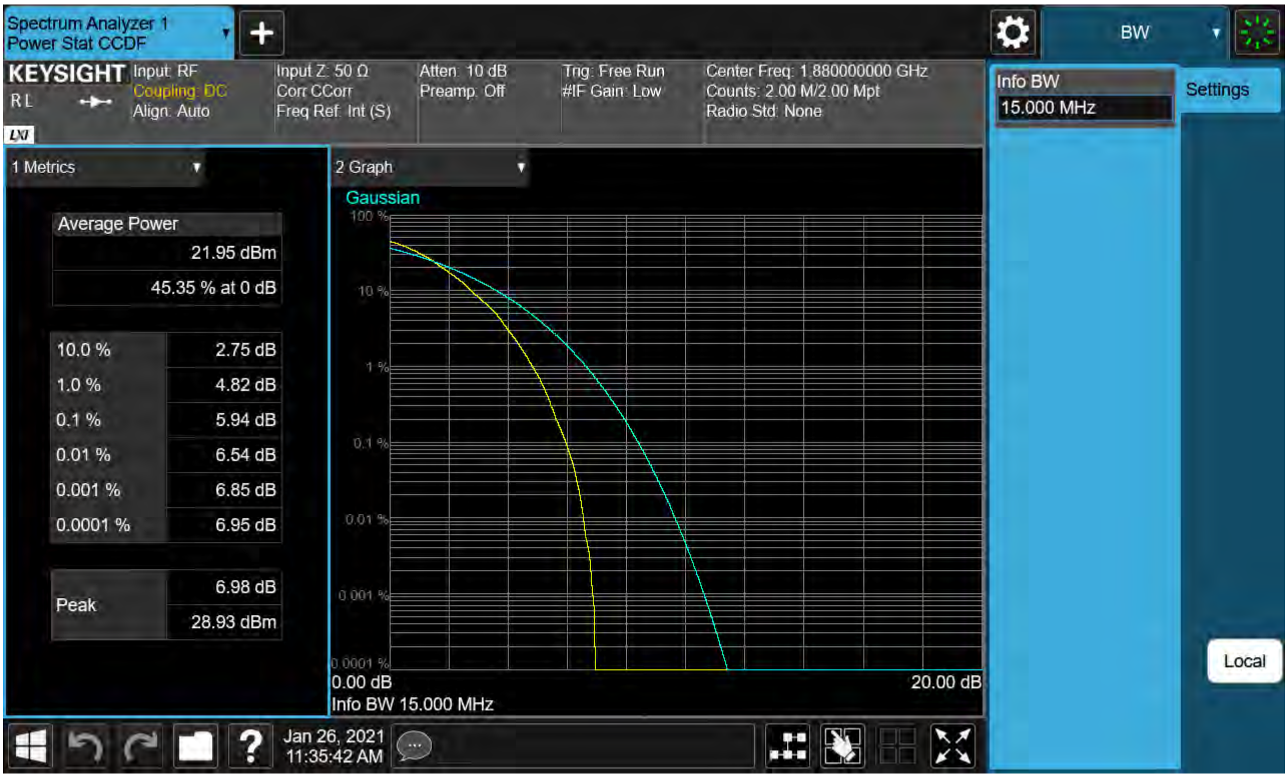
Sub6 n2. PAR Plot (15M BW Ch.376000 QPSK RB 79_0)



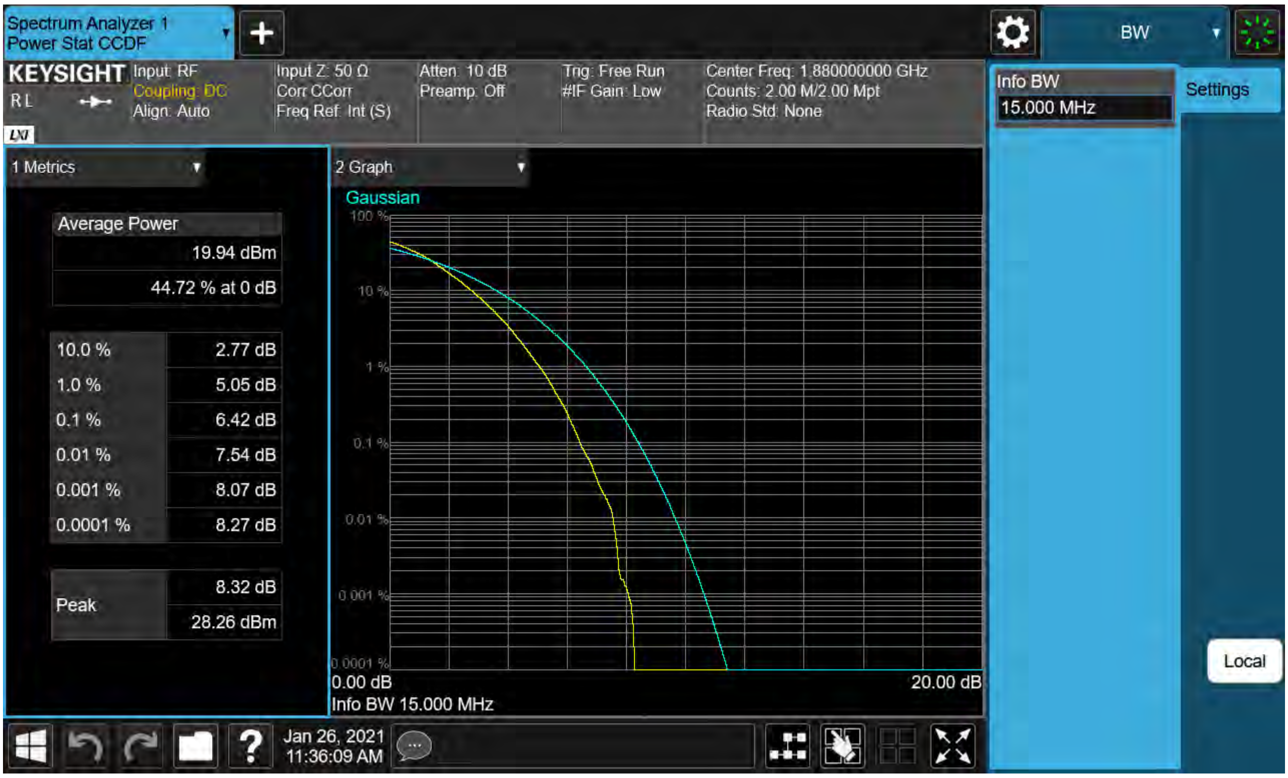
Sub6 n2. PAR Plot (15M BW Ch.376000 16QAM RB 79_0)



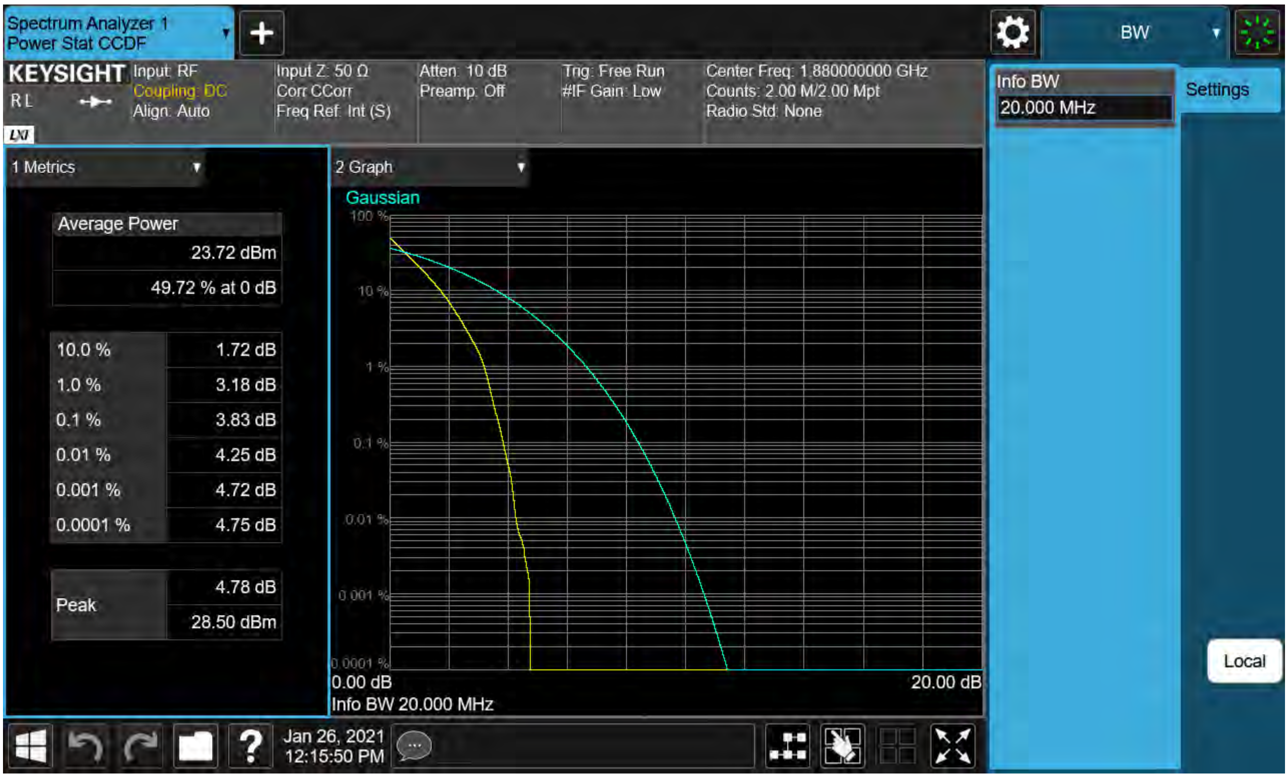
Sub6 n2. PAR Plot (15M BW Ch.376000 64QAM RB 79_0)



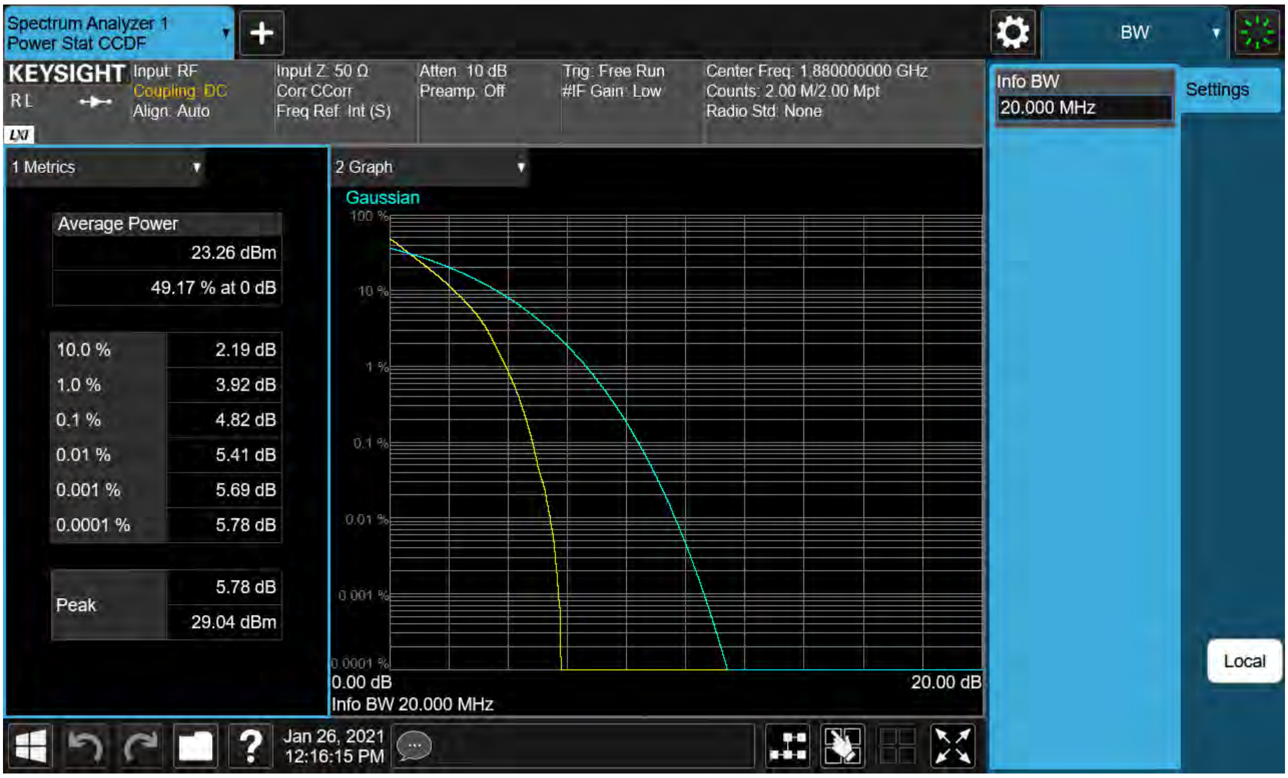
Sub6 n2. PAR Plot (15M BW Ch.376000 256QAM RB 79_0)



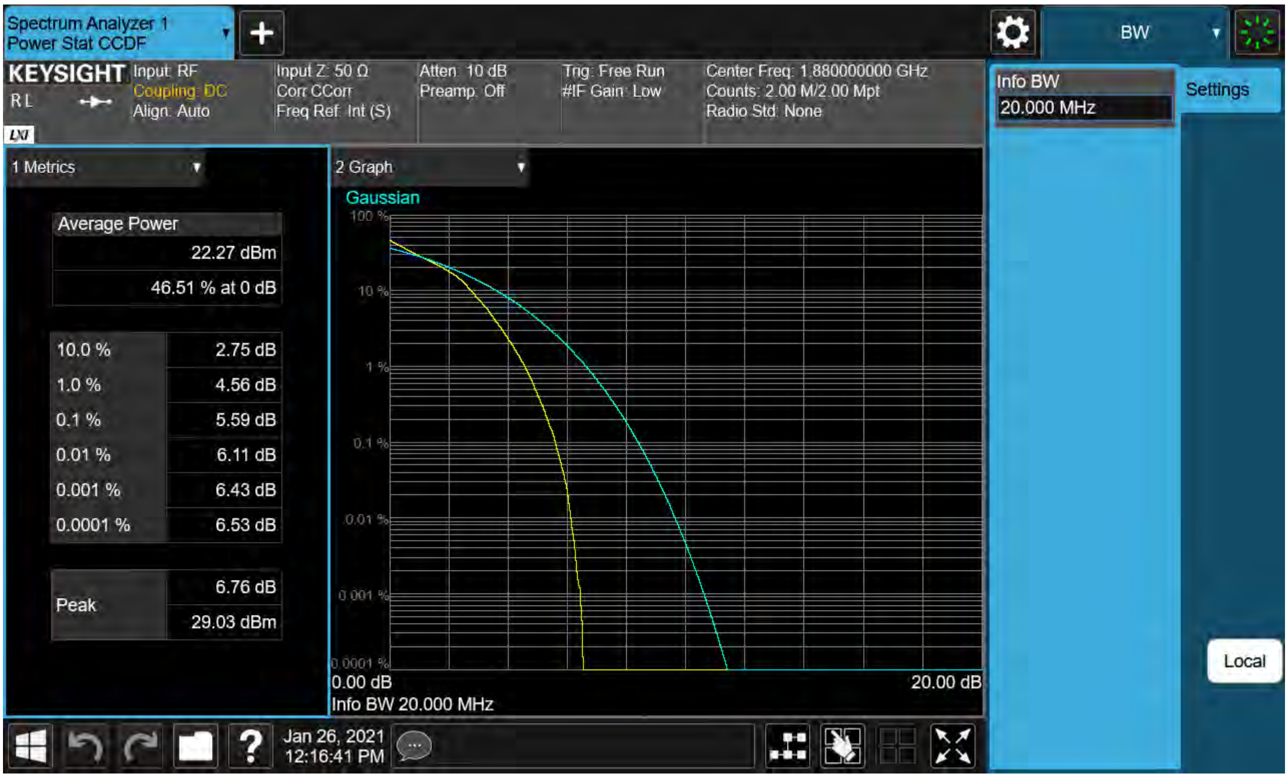
Sub6 n2. PAR Plot (20M BW Ch.376000 BPSK RB 106_0)



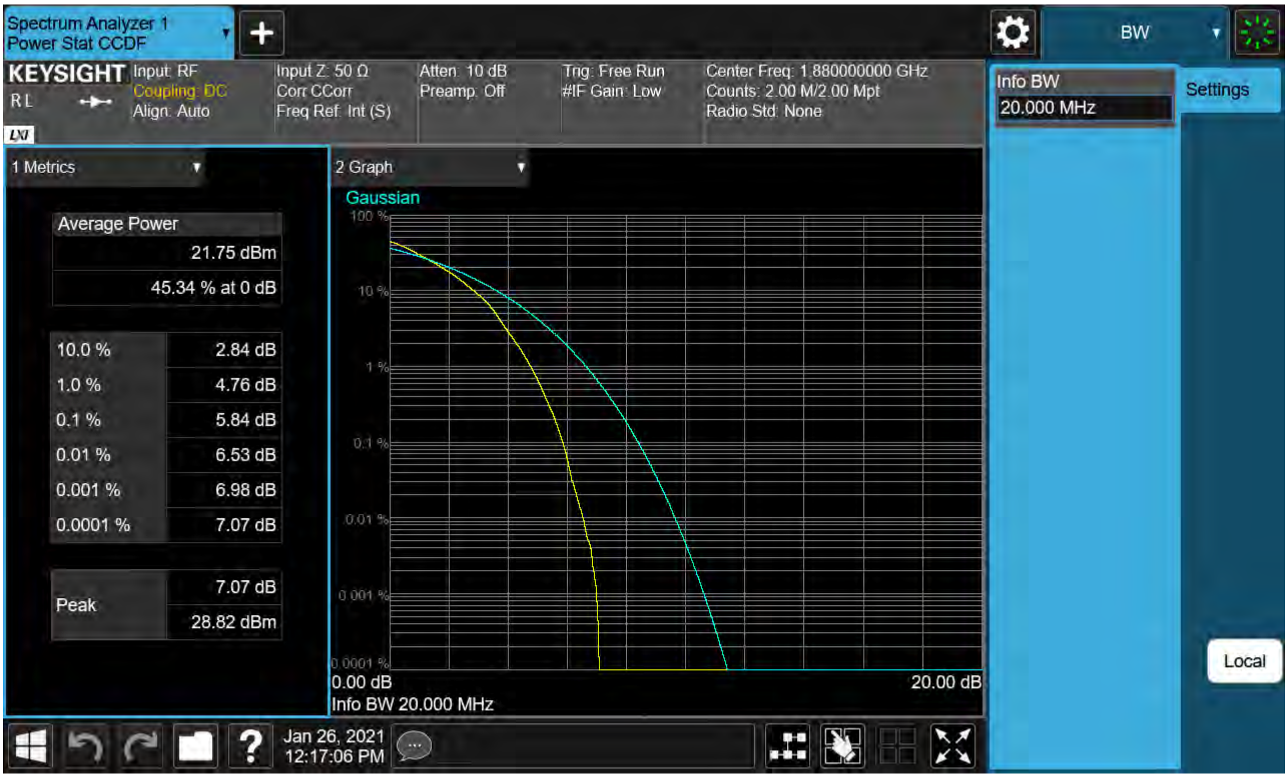
Sub6 n2. PAR Plot (20M BW Ch.376000 QPSK RB 106_0)



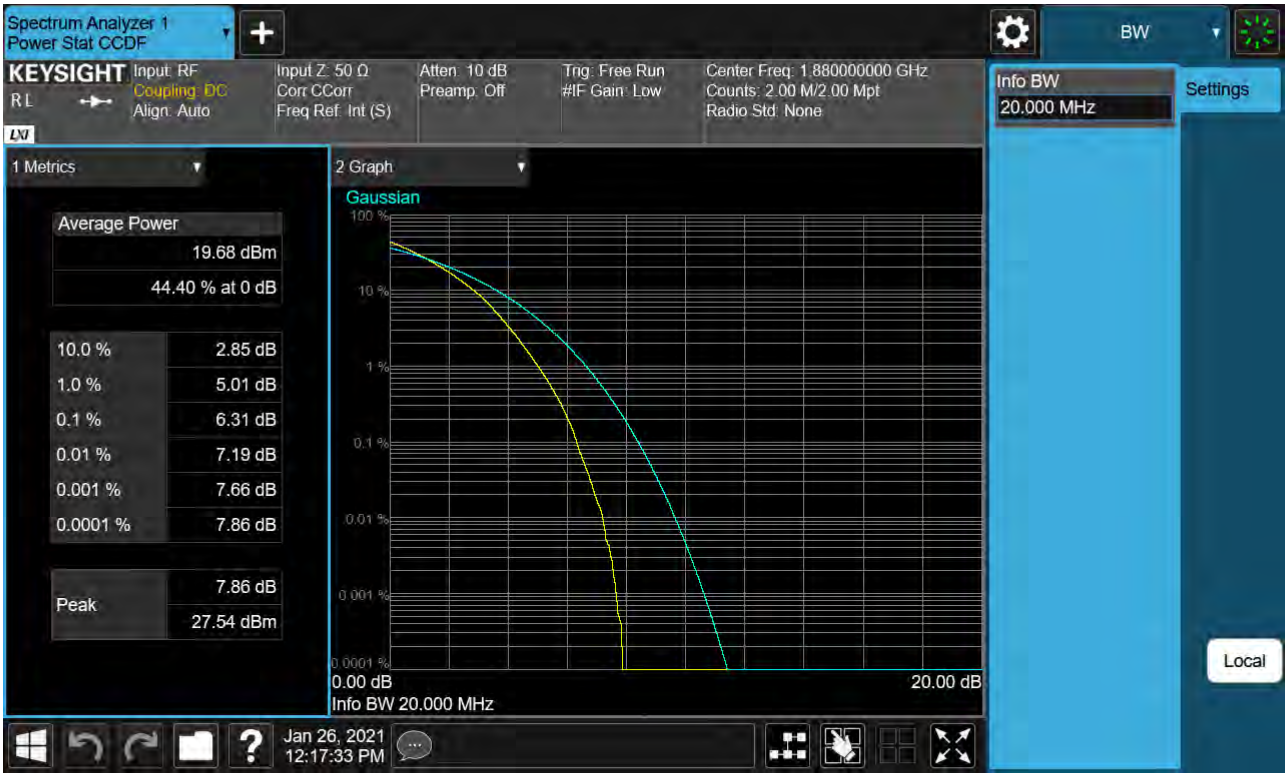
Sub6 n2. PAR Plot (20M BW Ch.376000 16QAM RB 106_0)



Sub6 n2. PAR Plot (20M BW Ch.376000 64QAM RB 106_0)



Sub6 n2. PAR Plot (20M BW Ch.376000 256QAM RB 106_0)



Sub6 n2. Lower Band Edge Plot (5M BW Ch.370500 BPSK_RB1_Offset 0) -1

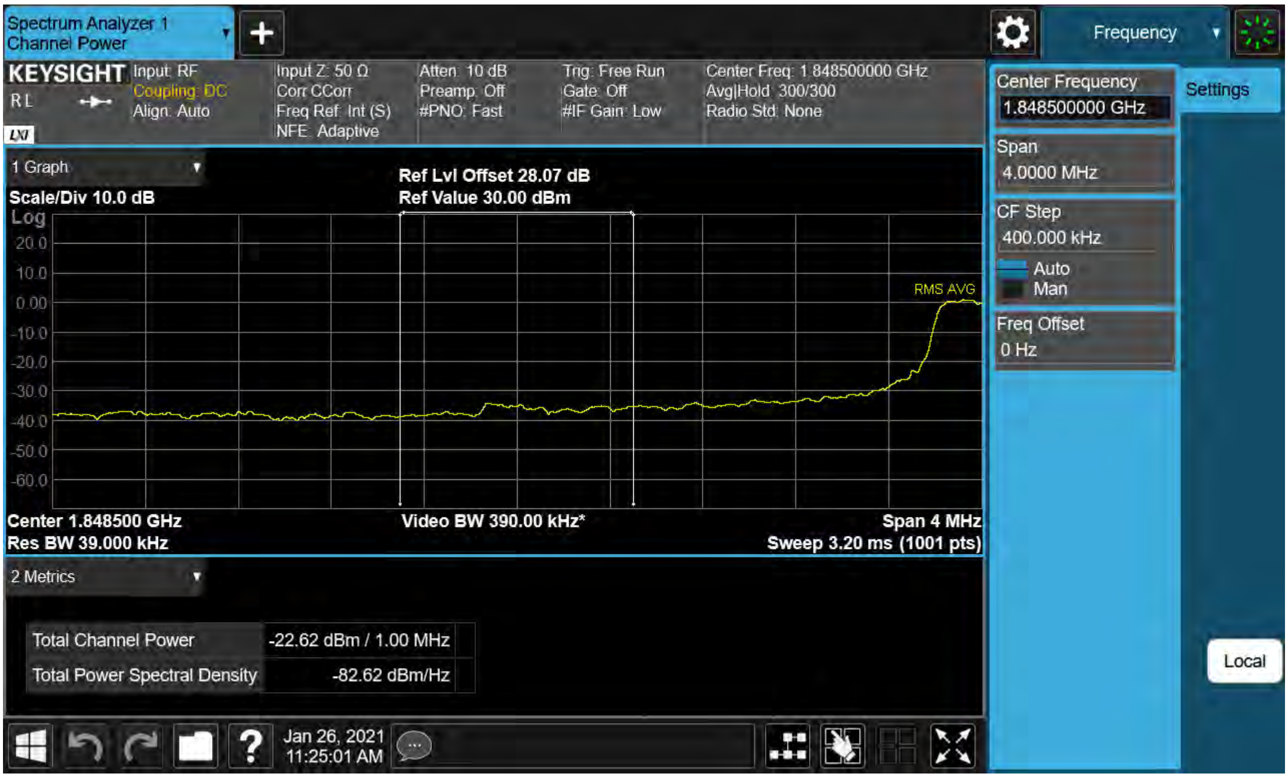
Sub6 n2. Lower Band Edge Plot (5M BW Ch.370500 BPSK_RB25_Offset 0) -2

Sub6 n2. Lower Extended Band Edge Plot (5M BW Ch.370500 BPSK_RB25_0) -3

Sub6 n2. Lower Band Edge Plot (10M BW Ch.371000 BPSK_RB1_Offset 0) -1

Sub6 n2. Lower Band Edge Plot (10M BW Ch.371000 BPSK_RB52_Offset 0) -2

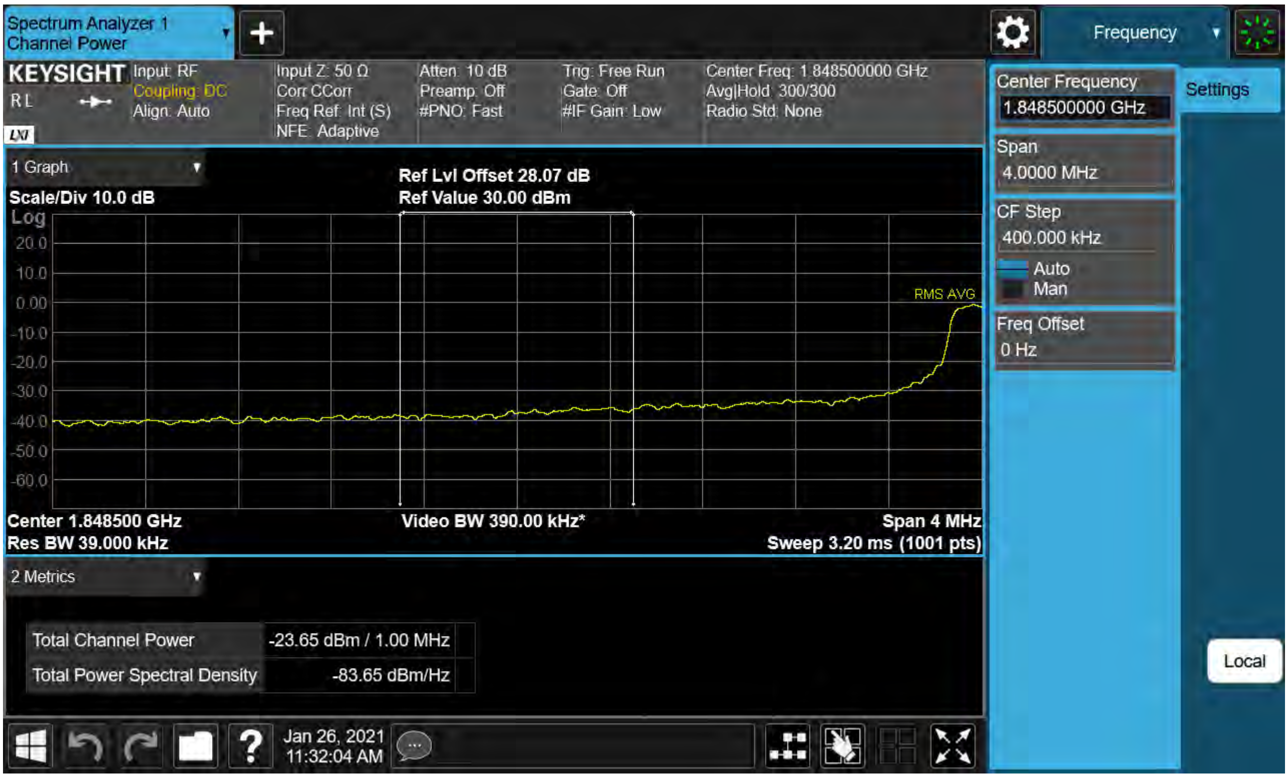
Sub6 n2. Lower Extended Band Edge Plot (10M BW Ch.371000 BPSK_RB52_0) -3



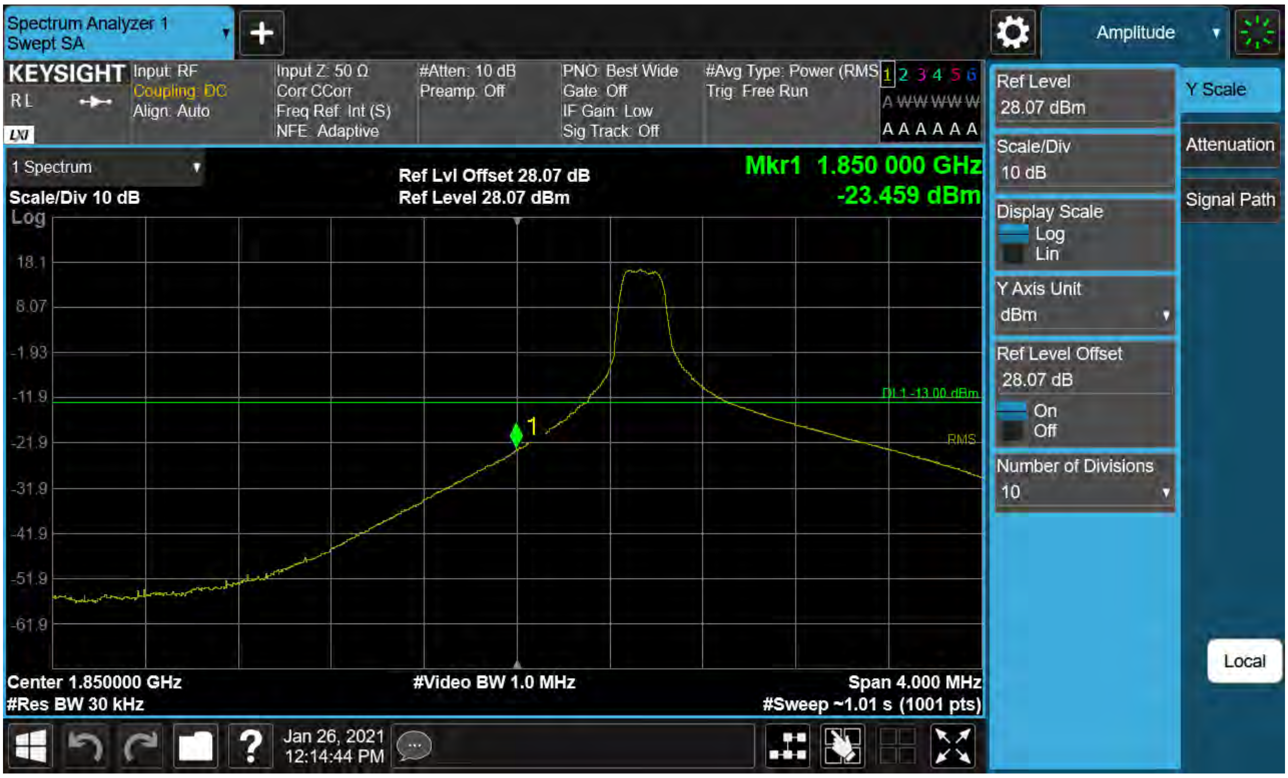
Sub6 n2. Lower Band Edge Plot (15M BW Ch.371500 BPSK_RB1_Offset 0) -1

Sub6 n2. Lower Band Edge Plot (15M BW Ch.371500 BPSK_RB79_Offset 0) -2

Sub6 n2. Lower Extended Band Edge Plot (15M BW Ch.371500 BPSK_RB79_0) -3

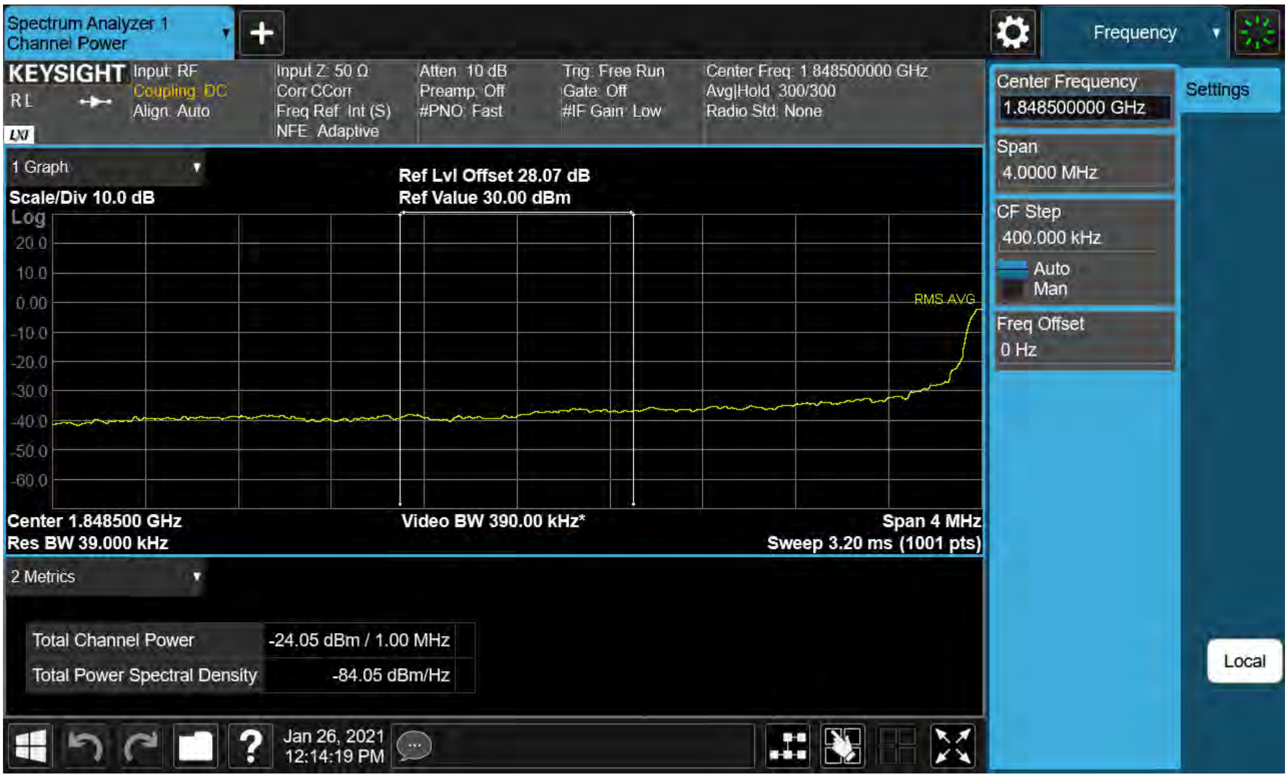


Sub6 n2. Lower Band Edge Plot (20M BW Ch.372000 BPSK_RB1_Offset 0) -1

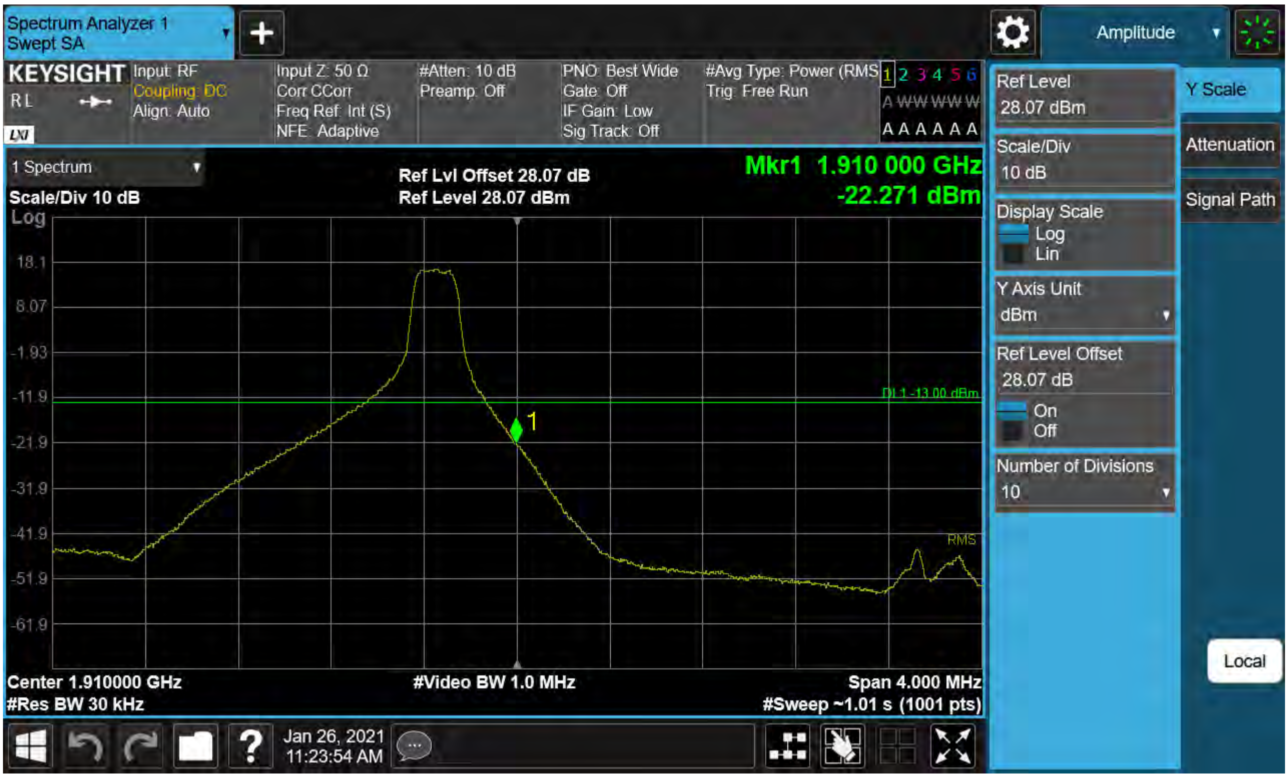


Sub6 n2. Lower Band Edge Plot (20M BW Ch.372000 BPSK_RB106_Offset 0) -2

Sub6 n2. Lower Extended Band Edge Plot (20M BW Ch.372000 BPSK_RB106_0) -3

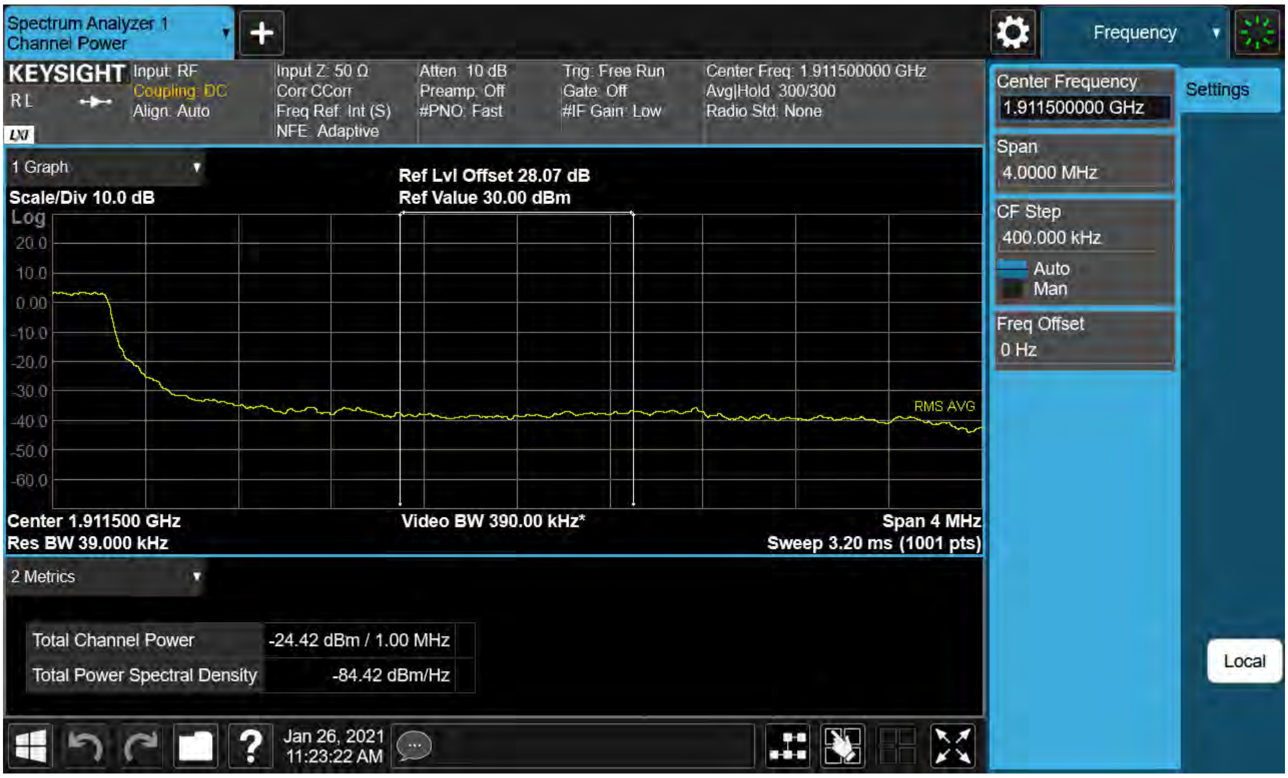


Sub6 n2. Upper Band Edge Plot (5M BW Ch.381500 BPSK_RB1_Offset 24) -1



Sub6 n2. Upper Band Edge Plot (5M BW Ch.381500 BPSK_RB25_Offset 0) -2

Sub6 n2. Upper Extended Band Edge Plot (5M BW Ch.381500 BPSK_RB25_0) -3



Sub6 n2. Upper Band Edge Plot (10M BW Ch.381000 BPSK_RB1_Offset 51) -1

Sub6 n2. Upper Band Edge Plot (10M BW Ch.381000 BPSK_RB52_Offset 0) -2

Sub6 n2. Upper Extended Band Edge Plot (10M BW Ch.381000 BPSK_RB52_0) -3

Sub6 n2. Upper Band Edge Plot (15M BW Ch.380500 BPSK_RB1_Offset 78) -1

Sub6 n2. Upper Band Edge Plot (15M BW Ch.380500 BPSK_RB79_Offset 0) -2

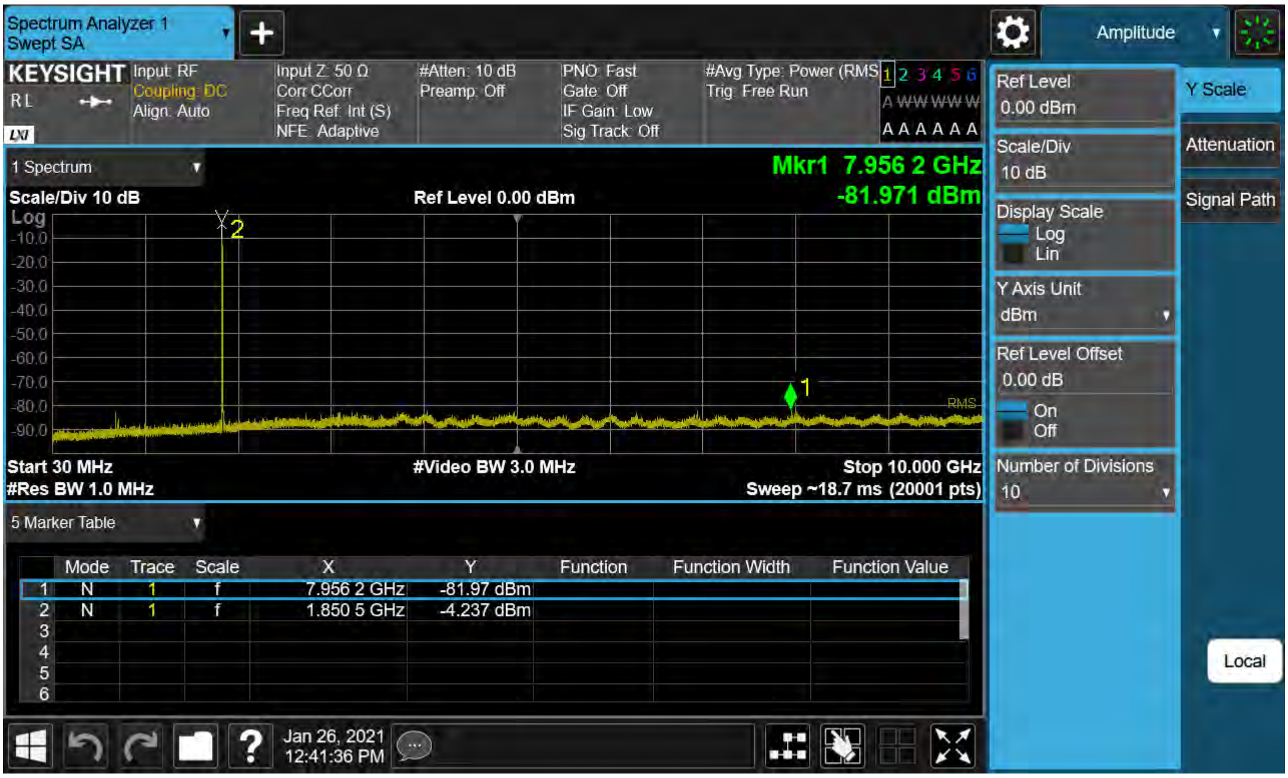
Sub6 n2. Upper Extended Band Edge Plot (15M BW Ch.380500 BPSK_RB79_0) -3

Sub6 n2. Upper Band Edge Plot (20M BW Ch.380000 BPSK_RB1_Offset 105) -1

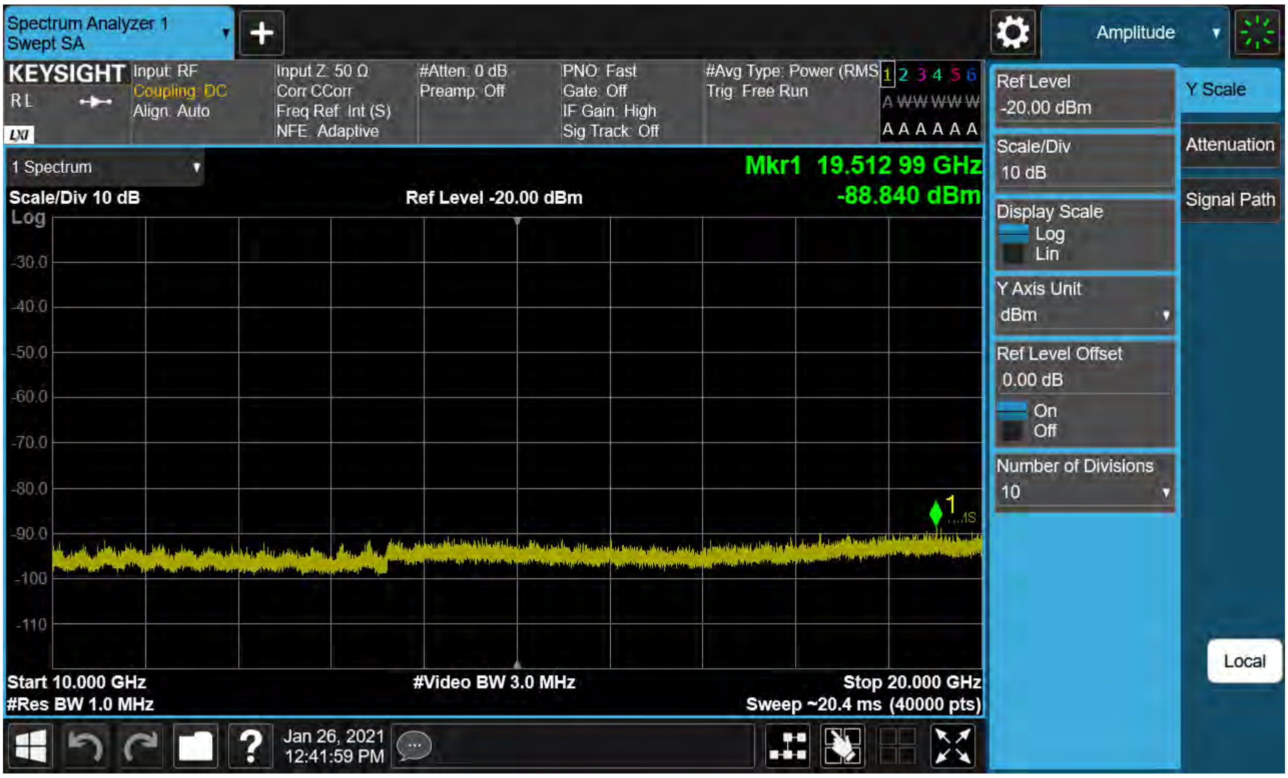
Sub6 n2. Upper Band Edge Plot (20M BW Ch.380000 BPSK_RB106_Offset 0) -2

Sub6 n2. Upper Extended Band Edge Plot (20M BW Ch.380000 BPSK _RB106_0) -3

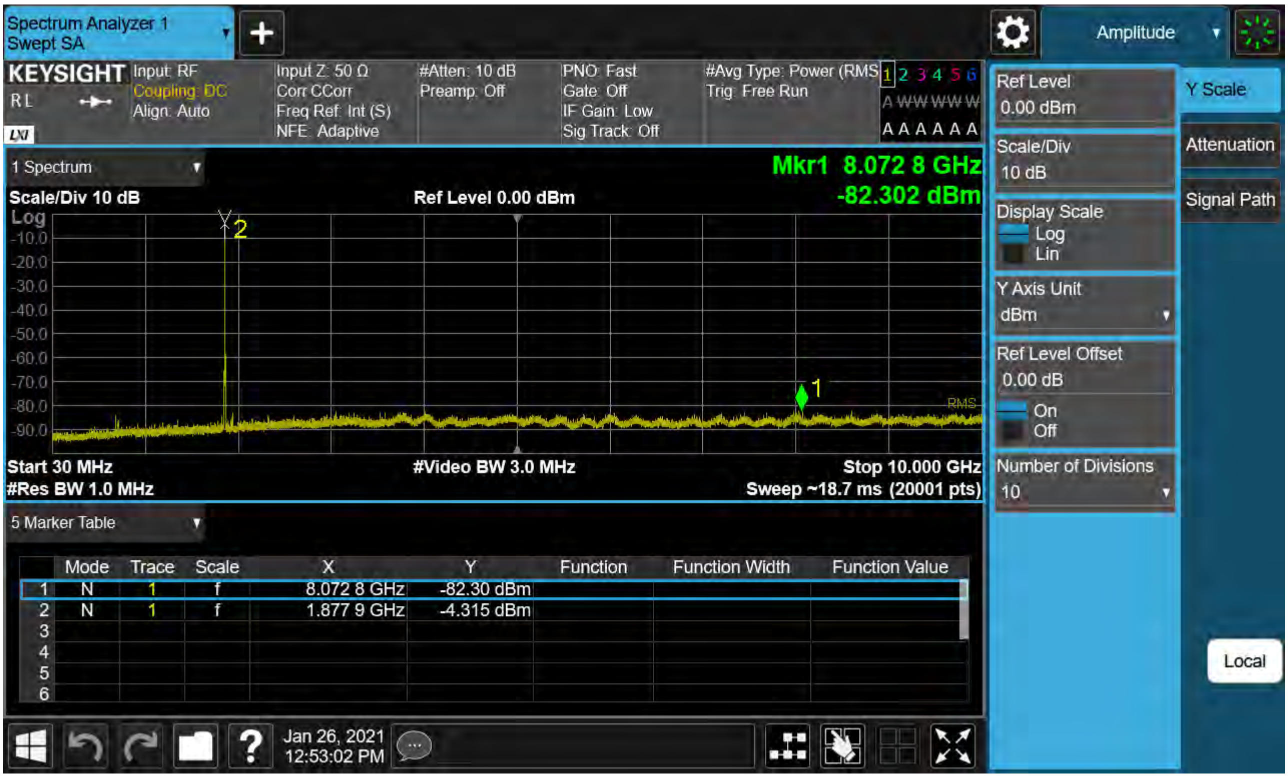
Sub6 n2. Conducted Spurious_1 (370500ch_5MHz_BPSK_RB 1_1)



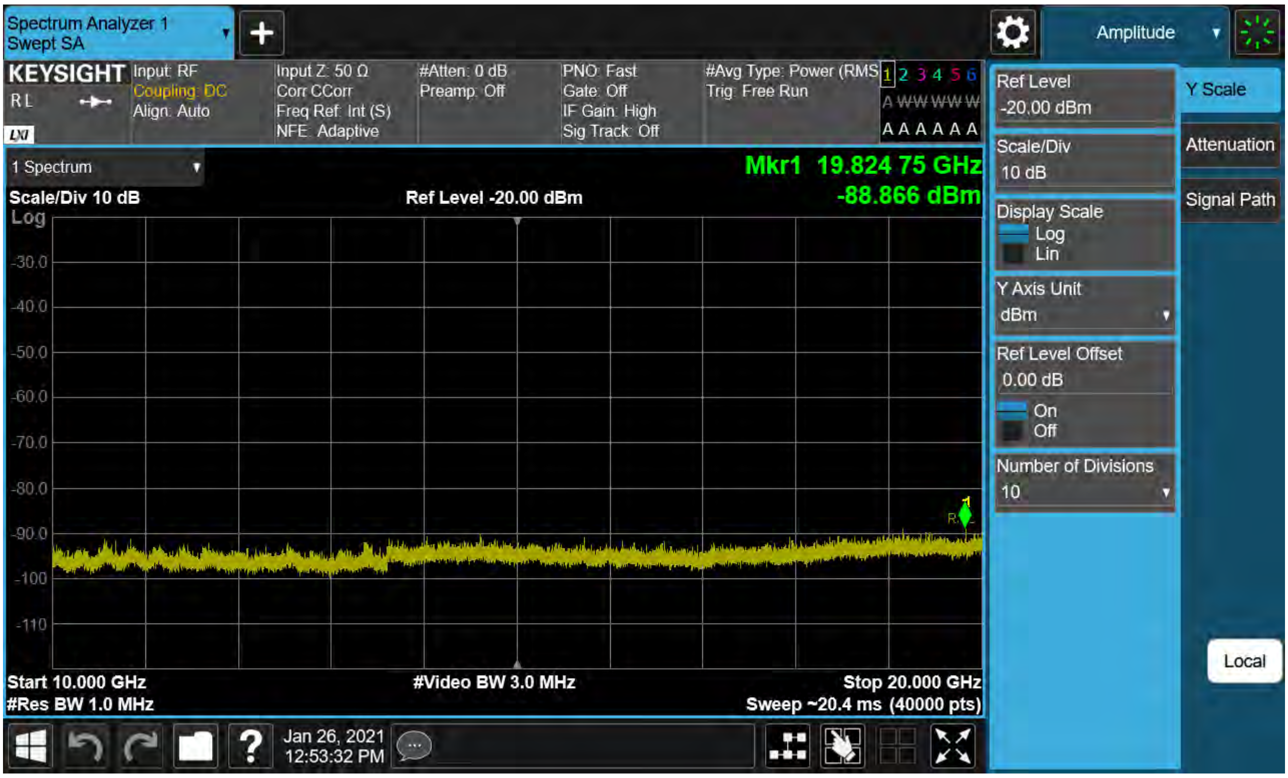
Sub6 n2. Conducted Spurious_2 (370500ch_5MHz_BPSK_RB 1_1)



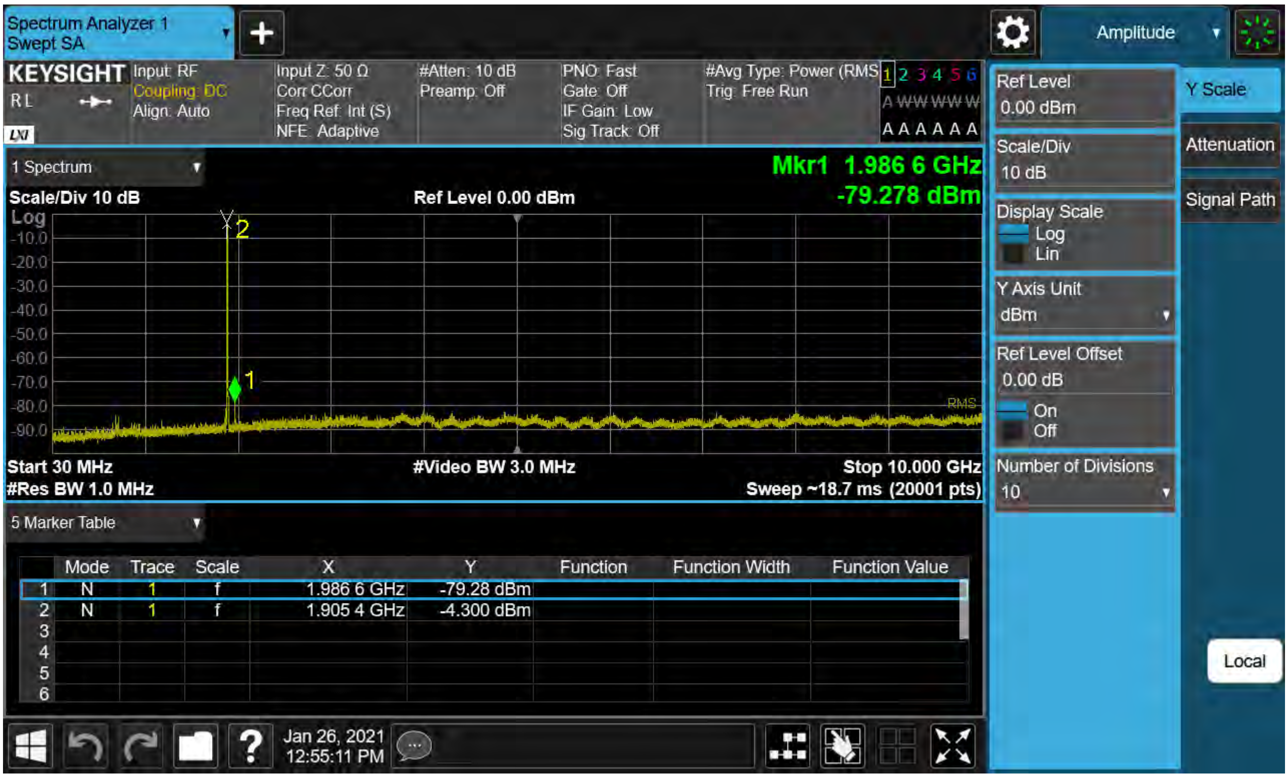
Sub6 n2. Conducted Spurious_1 (376000ch_5MHz_BPSK_RB 1_1)



Sub6 n2. Conducted Spurious_2 (376000ch_5MHz_ BPSK_RB 1_1)

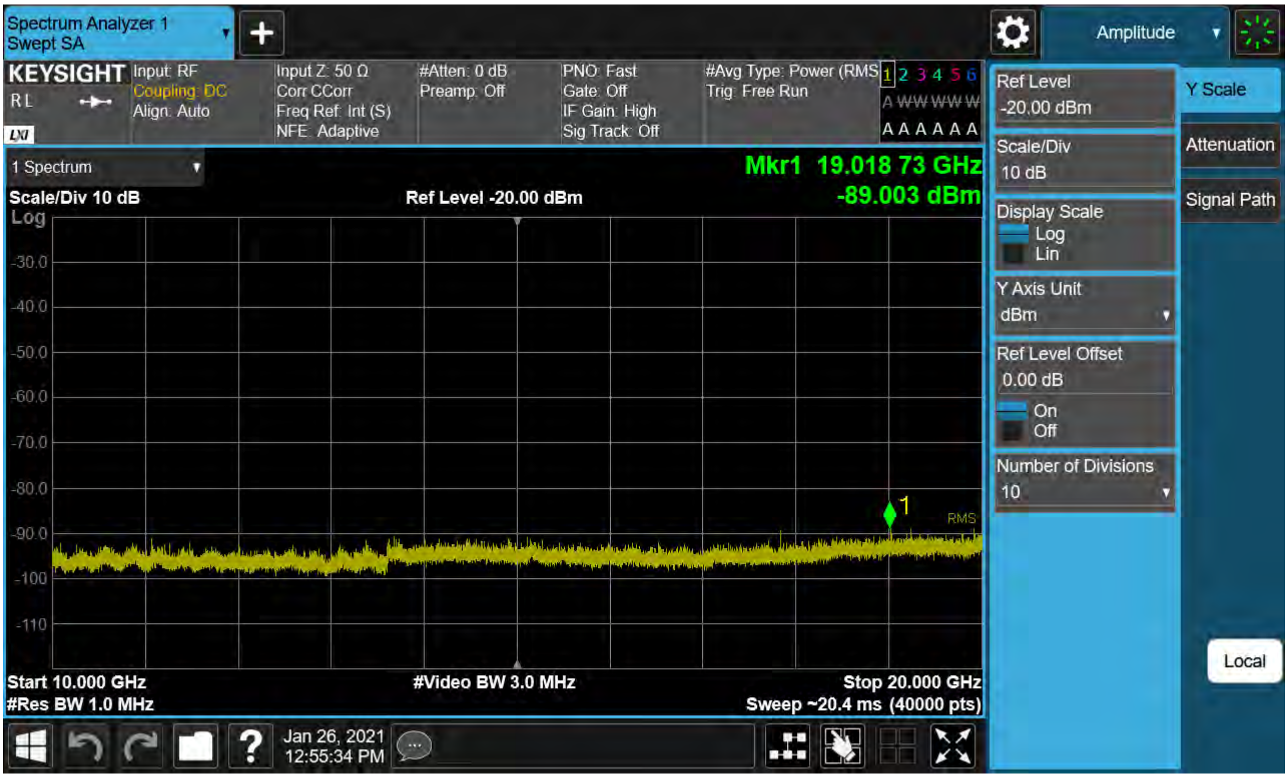


Sub6 n2. Conducted Spurious_1 (381500ch_5MHz_ BPSK_RB 1_1)

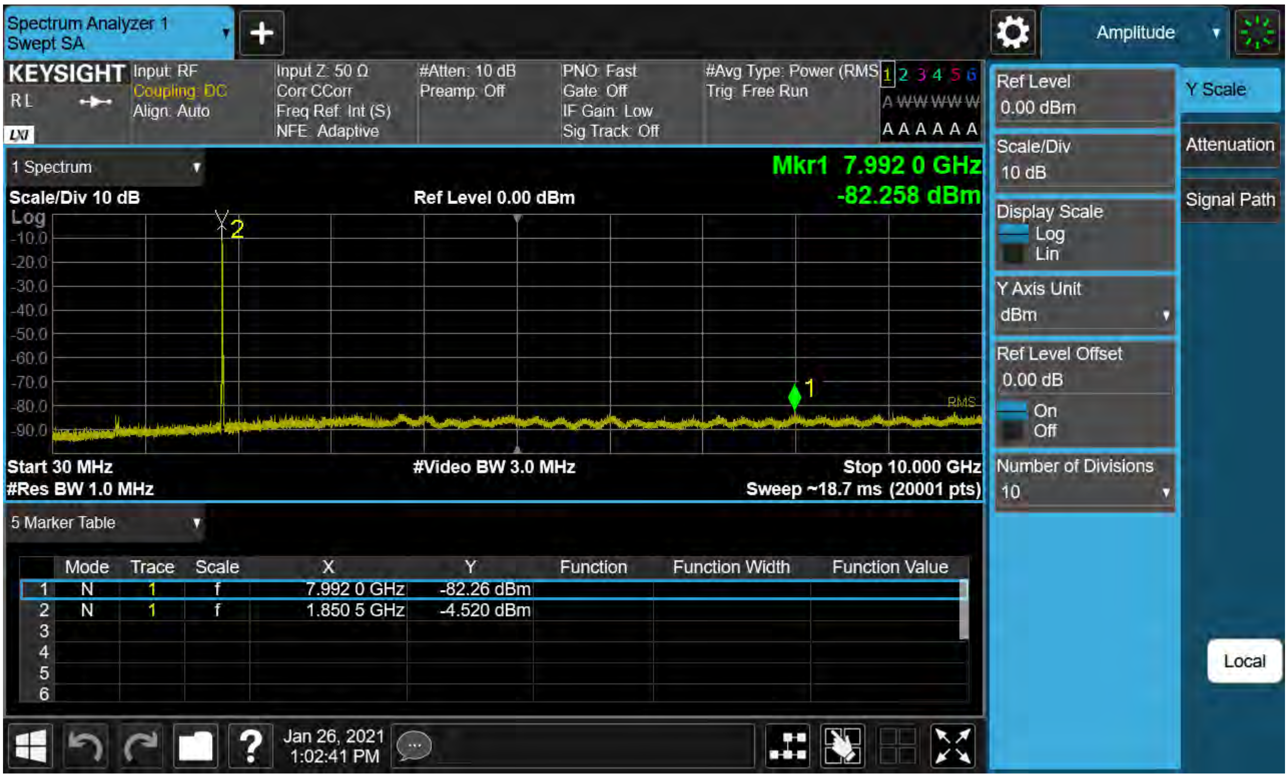


	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	1.986 6 GHz	-79.28 dBm			
2	N	1	f	1.905 4 GHz	-4.300 dBm			
3								
4								
5								
6								

Sub6 n2. Conducted Spurious_2 (381500ch_5MHz_ BPSK_RB 1_1)

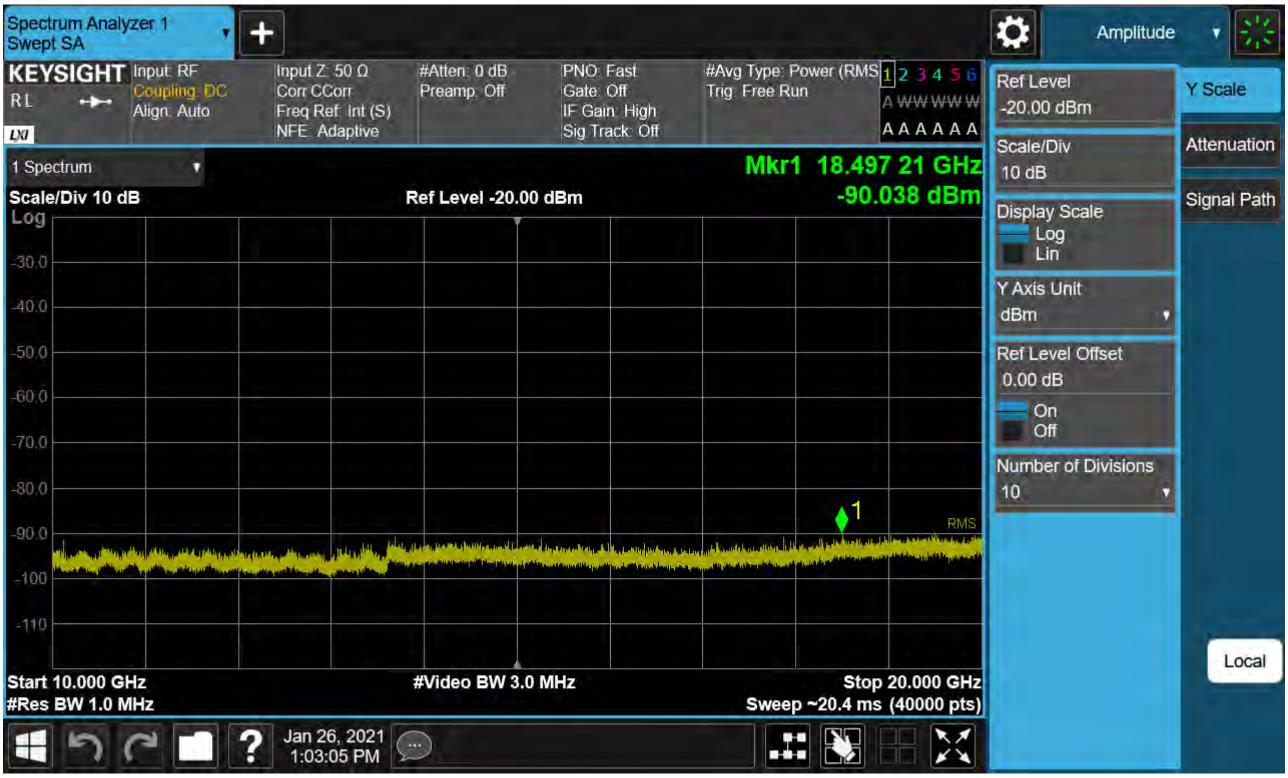


Sub6 n2. Conducted Spurious_1 (371000ch_10MHz_ BPSK _RB 1_1)

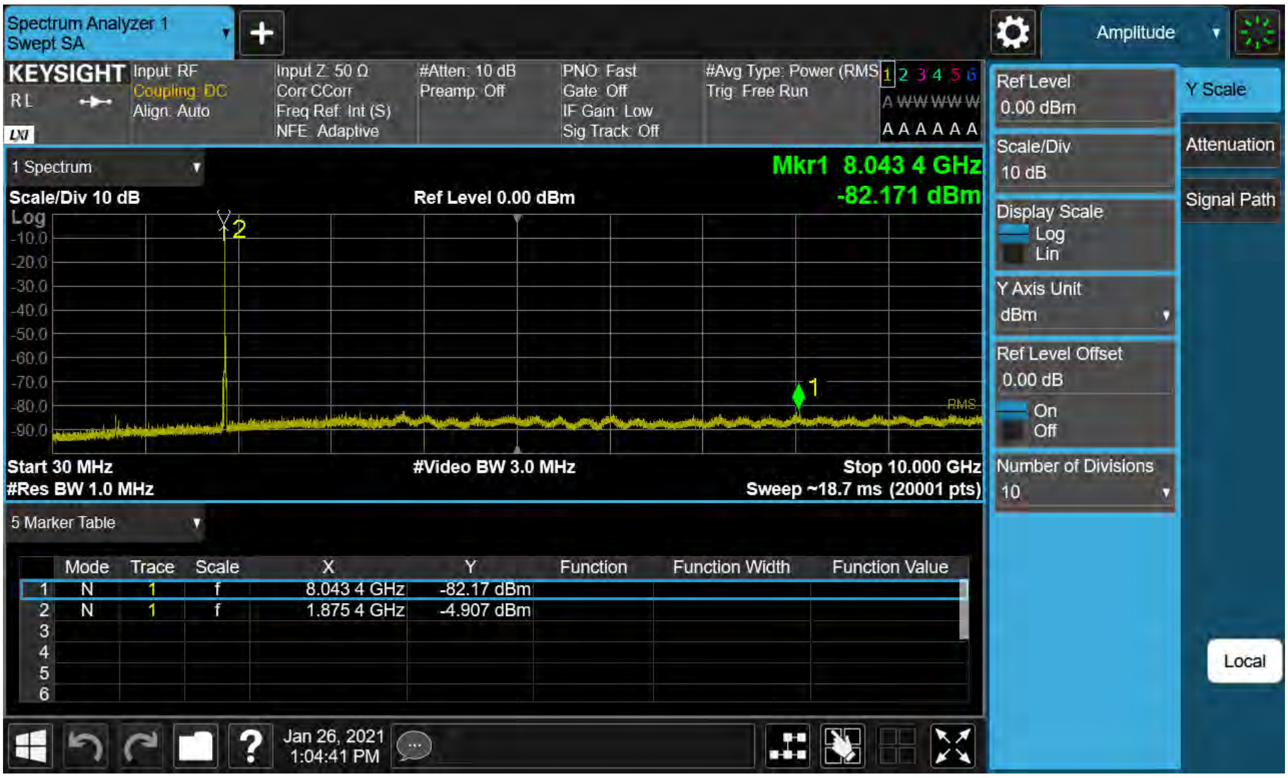


	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	7.992 0 GHz	-82.26 dBm			
2	N	1	f	1.850 5 GHz	-4.520 dBm			
3								
4								
5								
6								

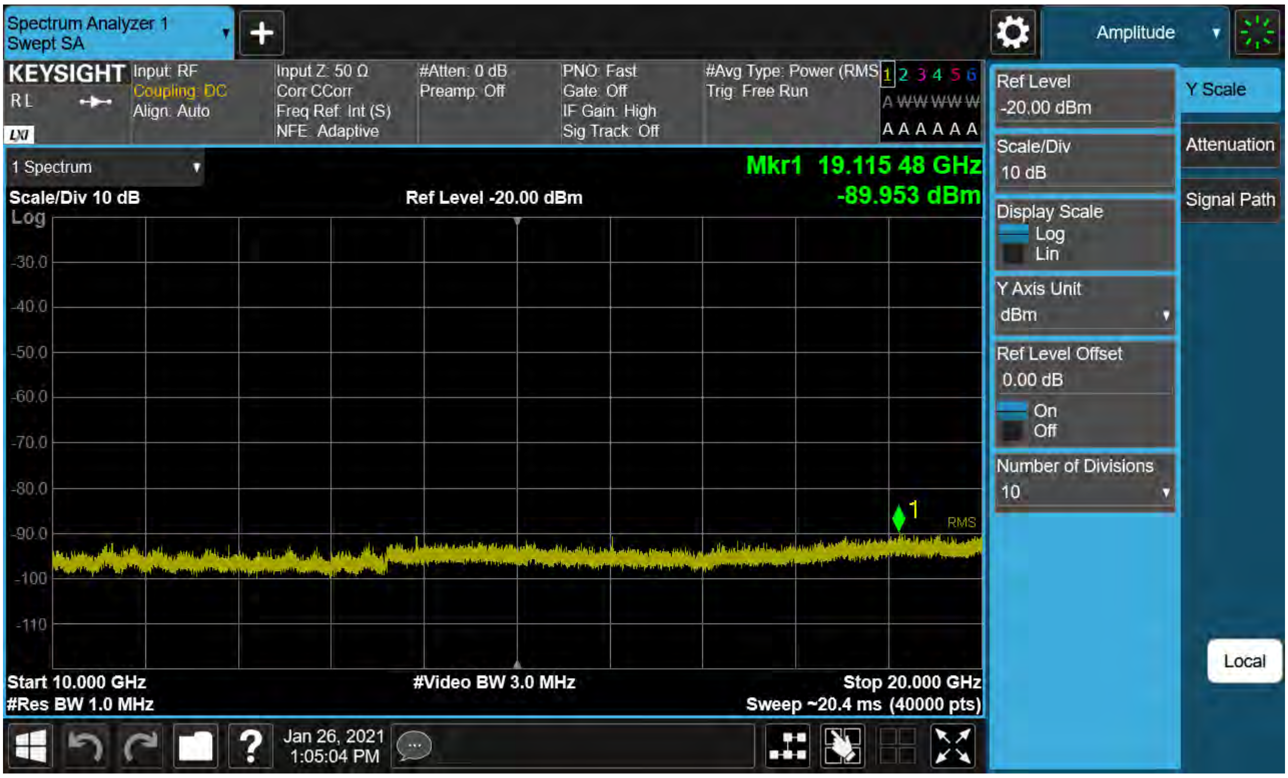
Sub6 n2. Conducted Spurious_2 (371000ch_10MHz_ BPSK_RB 1_1)



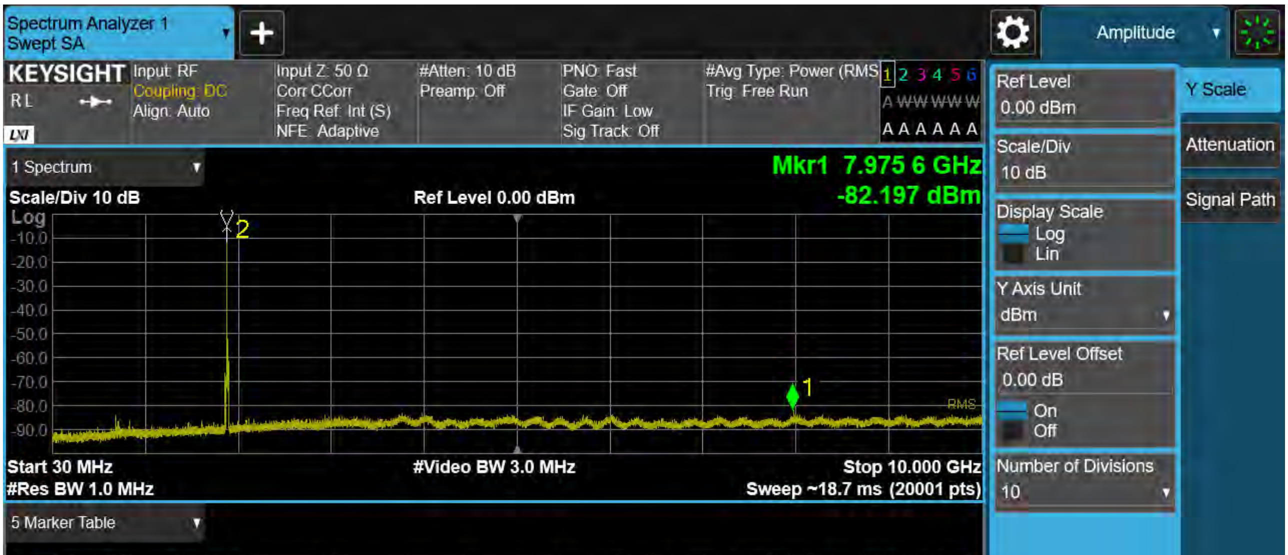
Sub6 n2. Conducted Spurious_1 (376000ch_10MHz_ BPSK_RB 1_1)



Sub6 n2. Conducted Spurious_2 (376000ch_10MHz_ BPSK_RB 1_1)

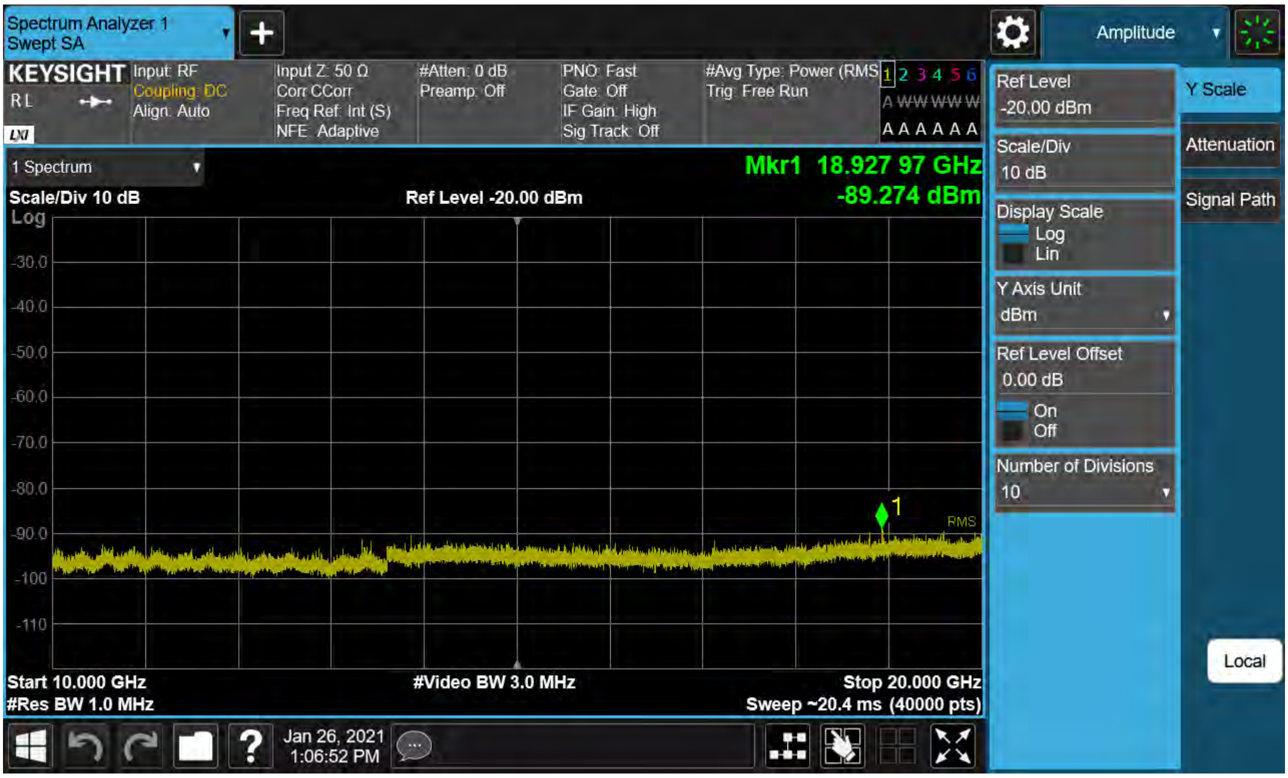


Sub6 n2. Conducted Spurious_1 (381000ch_10MHz_ BPSK_RB 1_1)

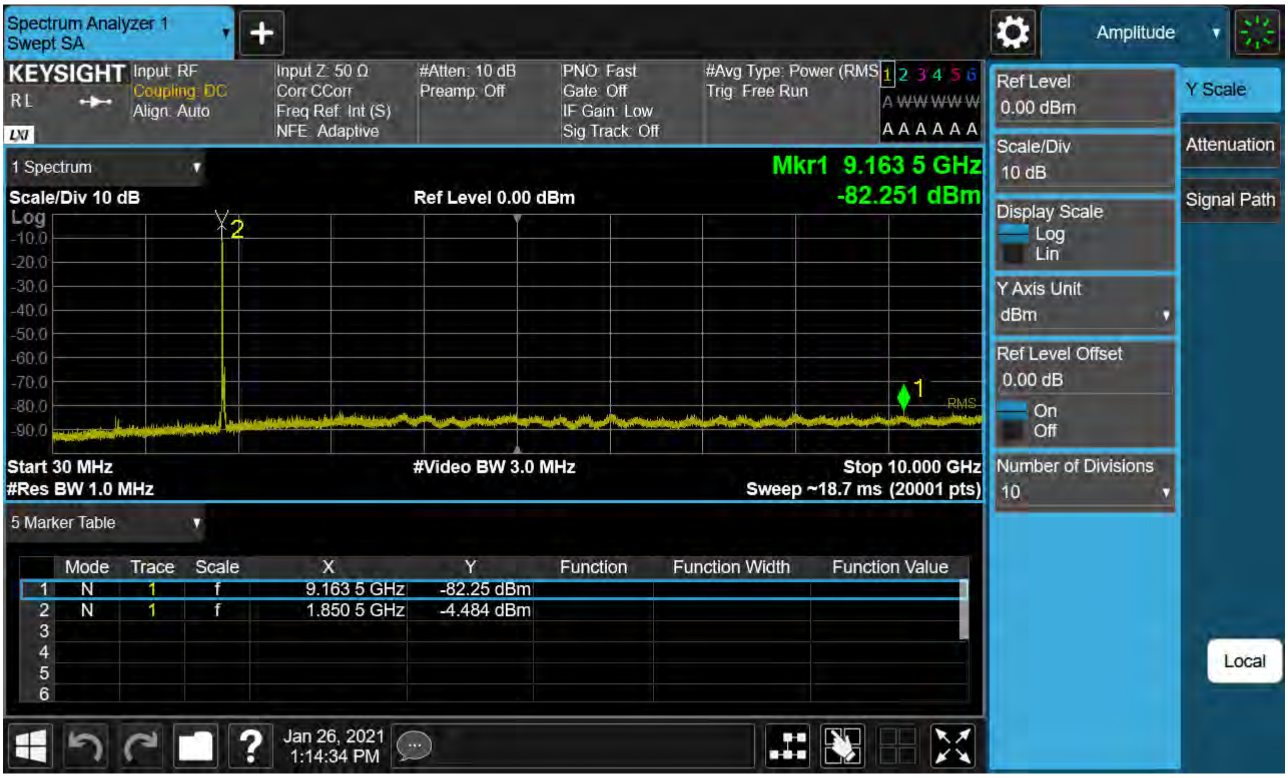


	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	7.975 6 GHz	-82.20 dBm			
2	N	1	f	1.900 4 GHz	-5.277 dBm			
3								
4								
5								
6								

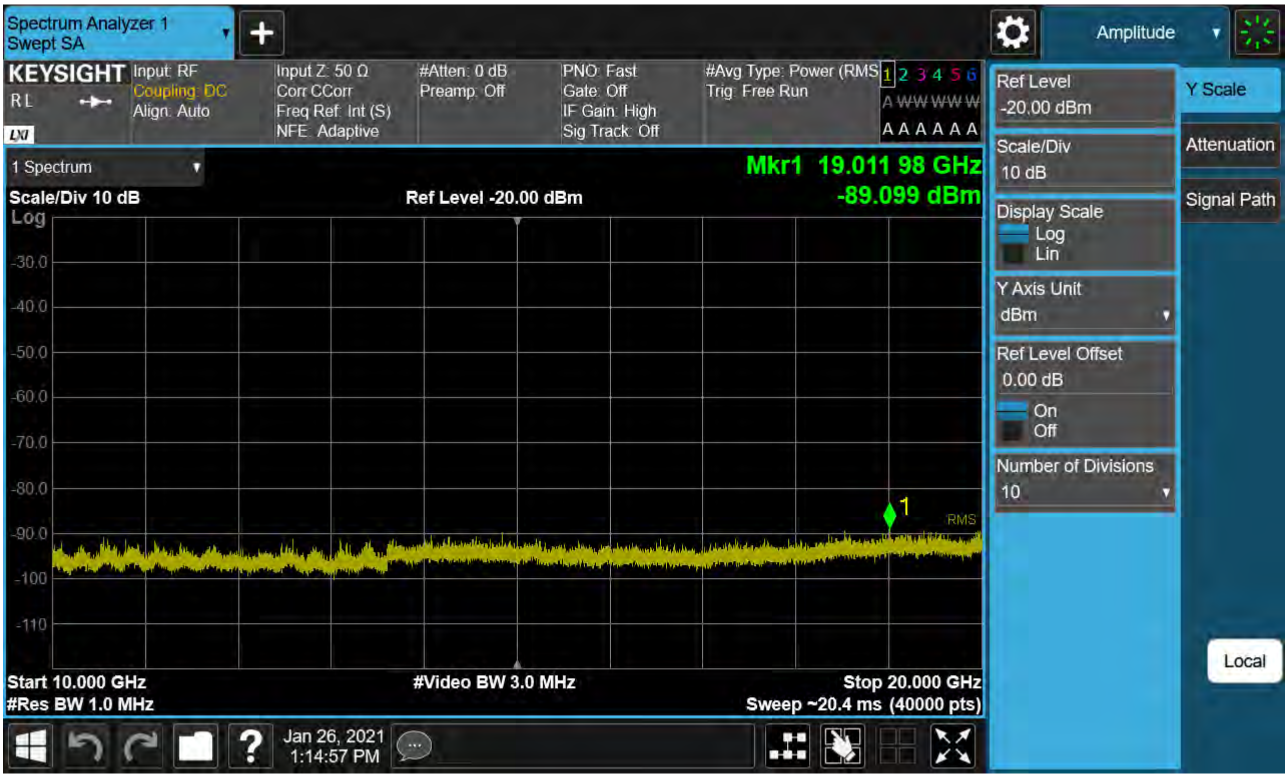
Sub6 n2. Conducted Spurious_2 (381000ch_10MHz_ BPSK_RB 1_1)



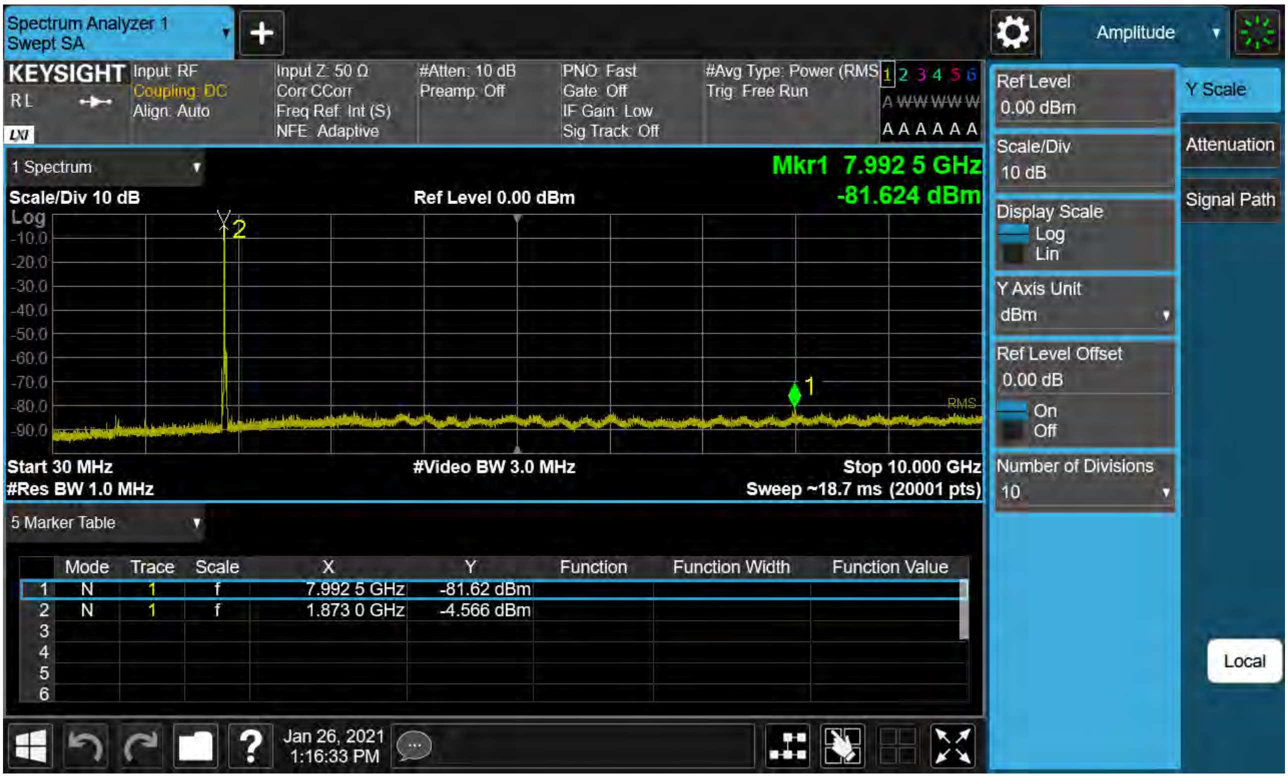
Sub6 n2. Conducted Spurious_1 (371500ch_15MHz_ BPSK_RB 1_1)



Sub6 n2. Conducted Spurious_2 (371500ch_15MHz_ BPSK_RB 1_1)

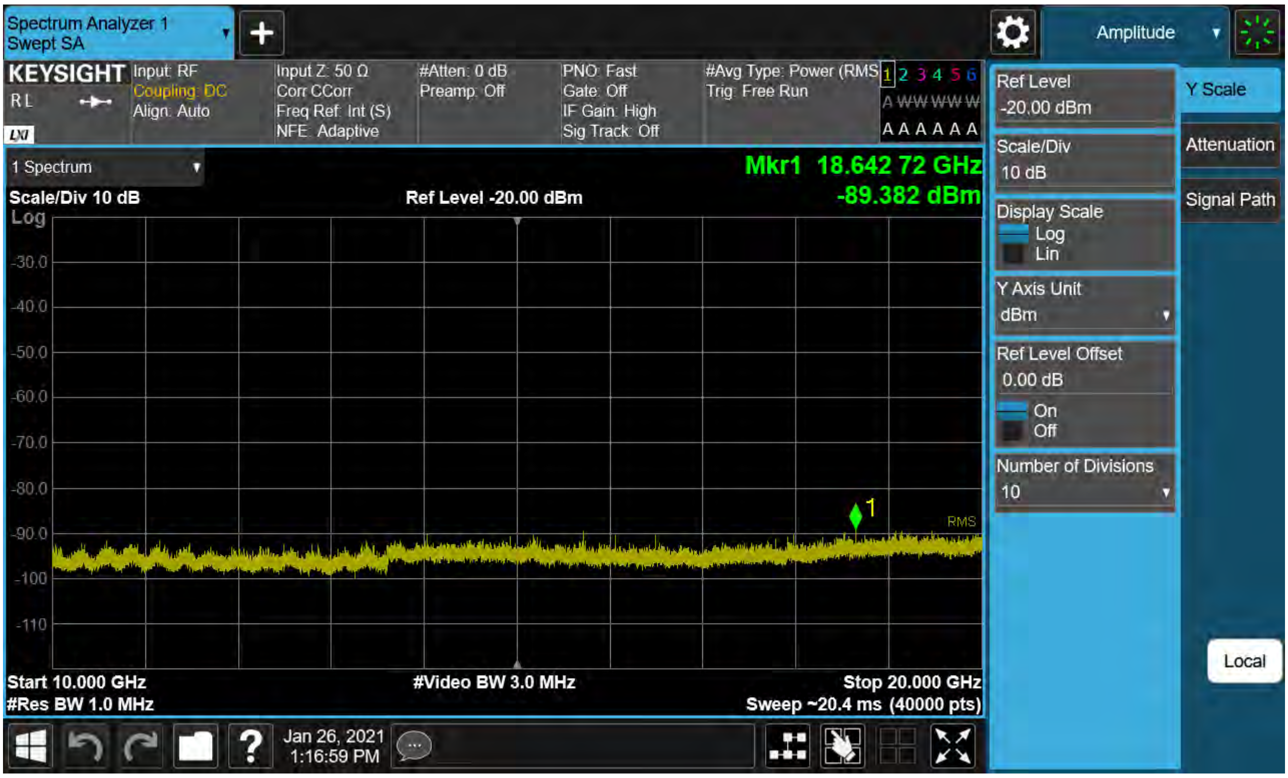


Sub6 n2. Conducted Spurious_1 (376000ch_15MHz_ BPSK_RB 1_1)

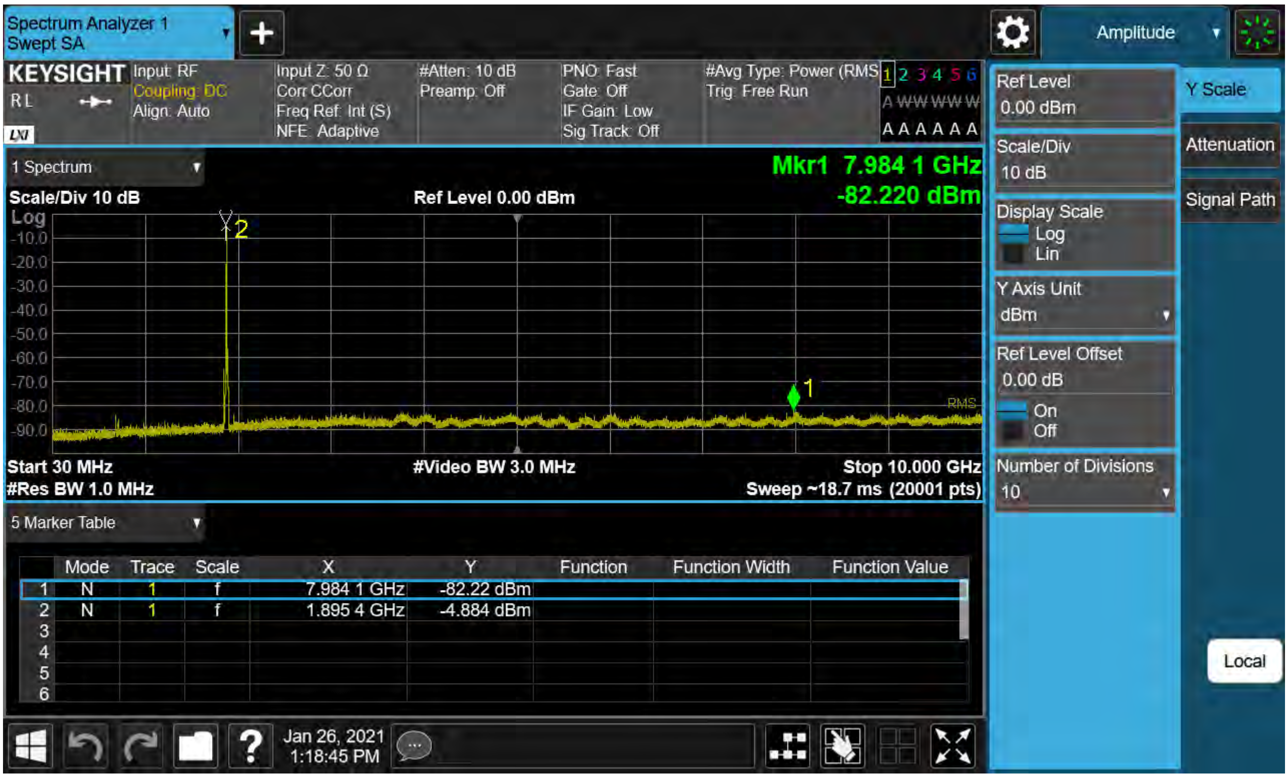


	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	7.992 5 GHz	-81.62 dBm			
2	N	1	f	1.873 0 GHz	-4.566 dBm			
3								
4								
5								
6								

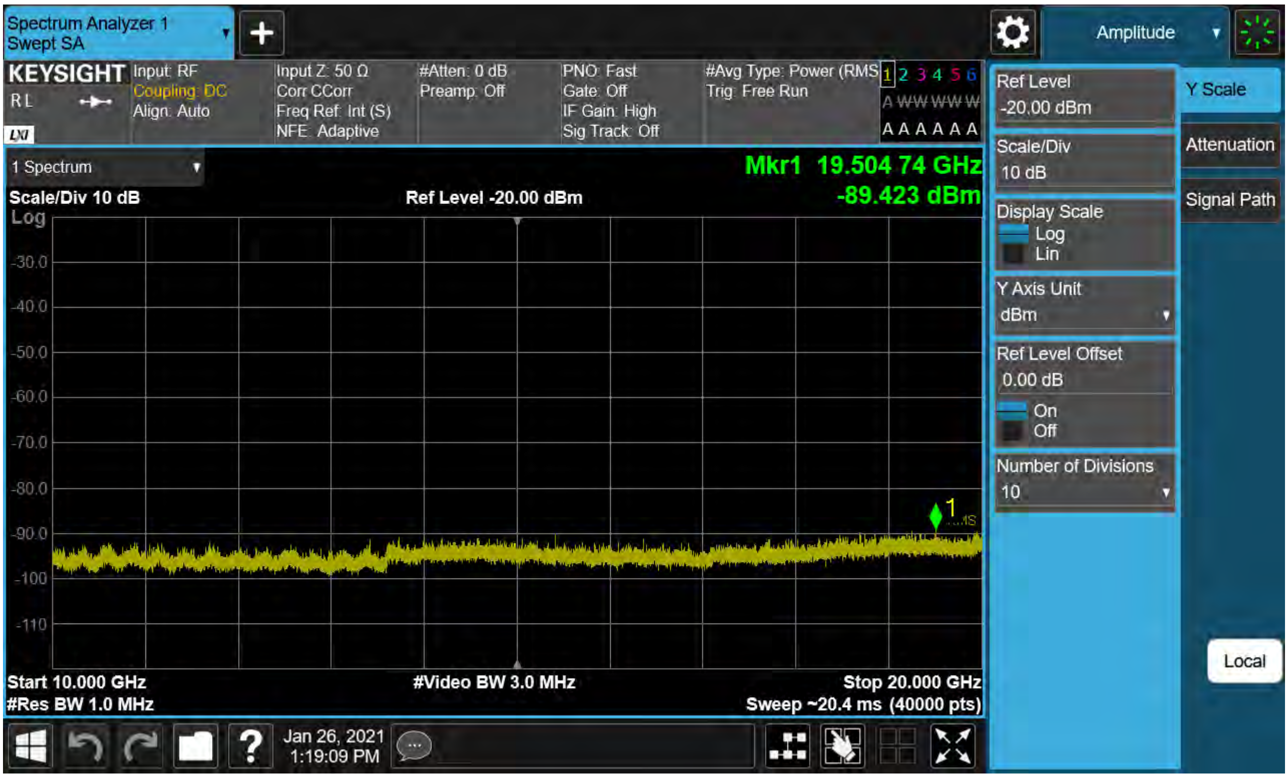
Sub6 n2. Conducted Spurious_2 (376000ch_15MHz_ BPSK_RB 1_1)



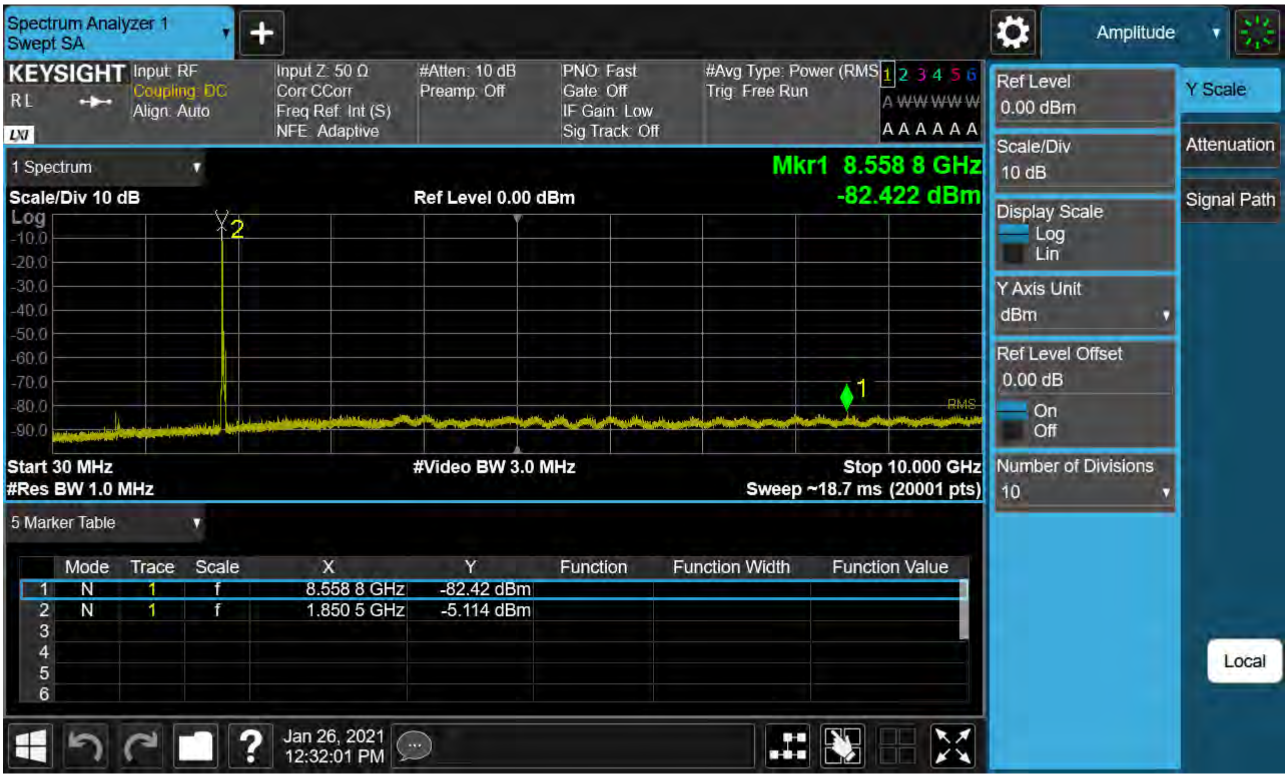
Sub6 n2. Conducted Spurious_1 (380500ch_15MHz_ BPSK_RB 1_1)



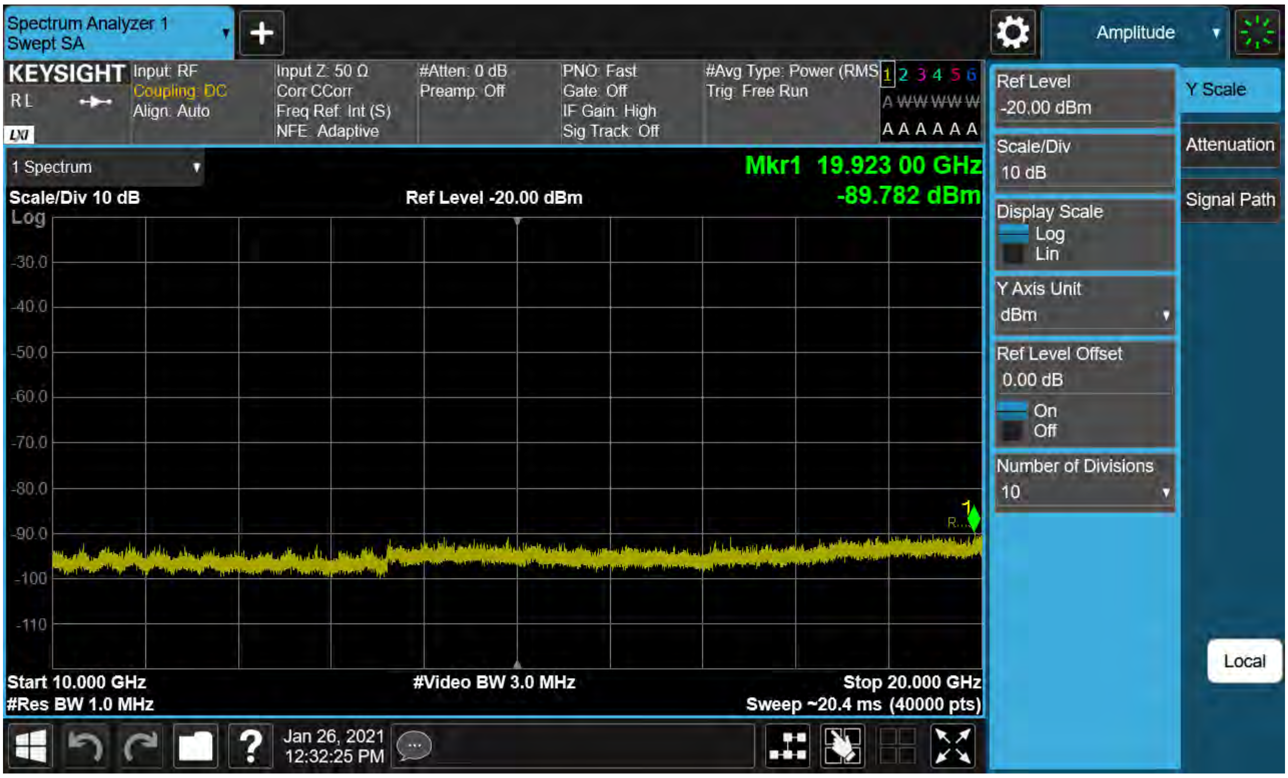
Sub6 n2. Conducted Spurious_2 (380500ch_15MHz_ BPSK_RB 1_1)



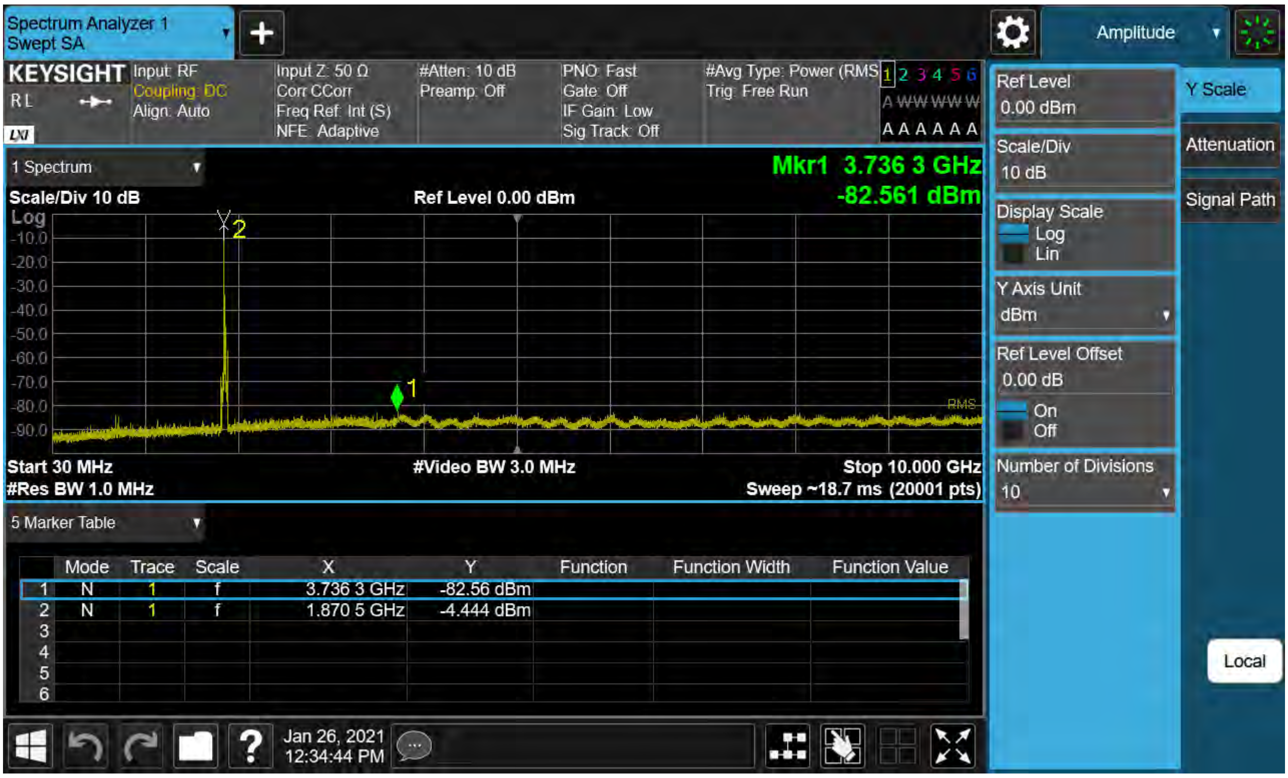
Sub6 n2. Conducted Spurious_1 (372000ch_20MHz_ BPSK_RB 1_1)



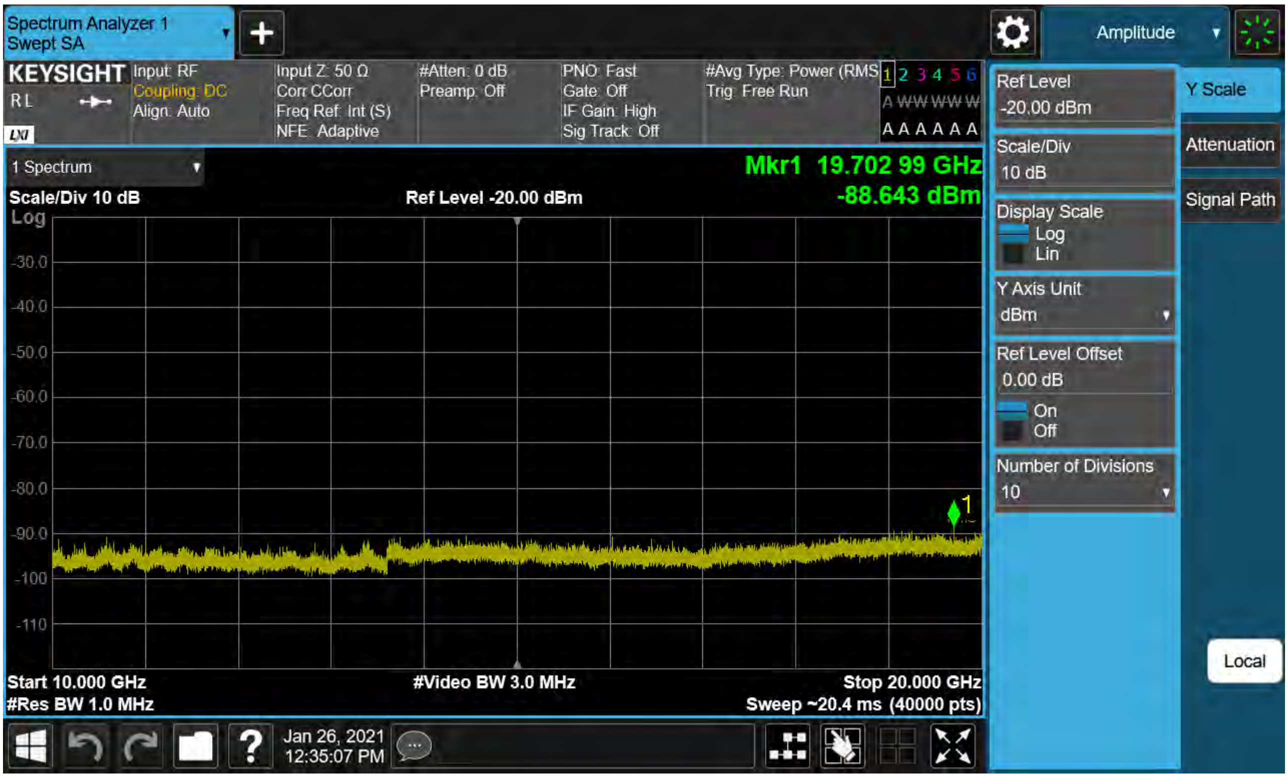
Sub6 n2. Conducted Spurious_2 (372000ch_20MHz_ BPSK_RB 1_1)



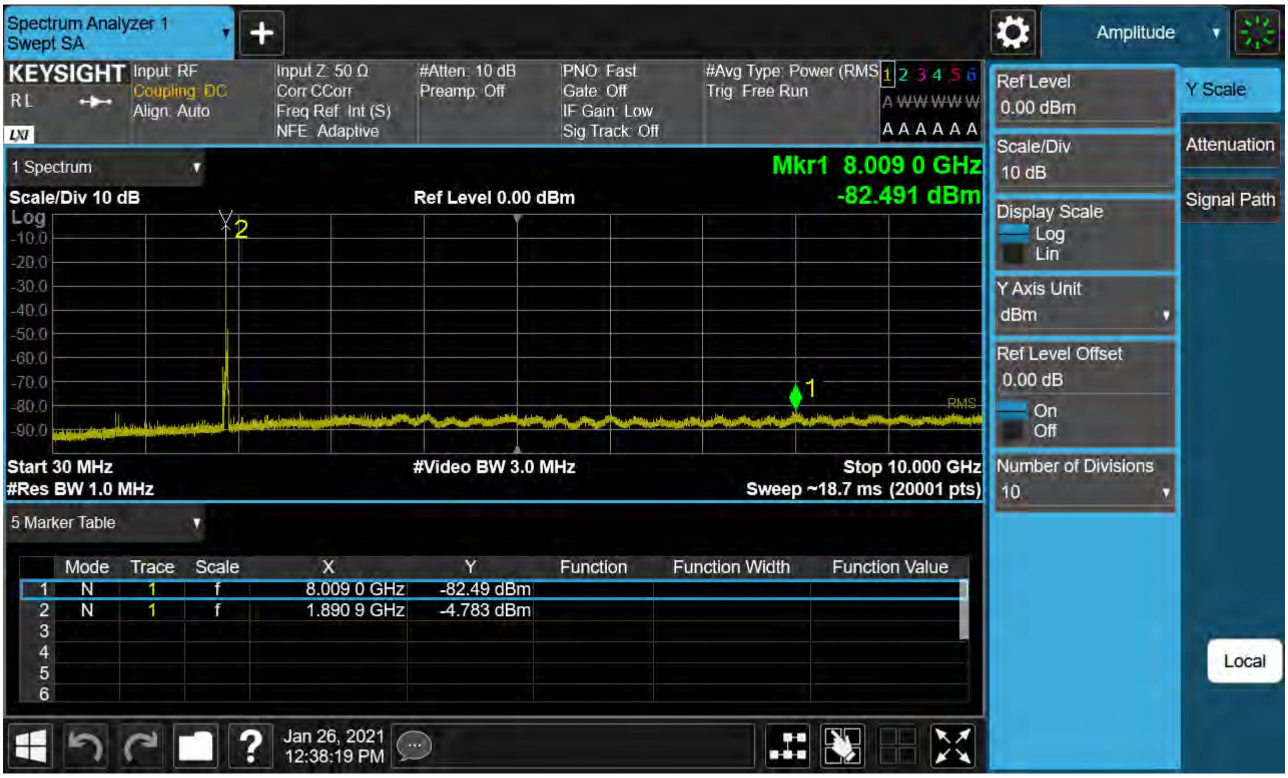
Sub6 n2. Conducted Spurious_1 (376000ch_20MHz_ BPSK_RB 1_1)



Sub6 n2. Conducted Spurious_2 (376000ch_20MHz_ BPSK_RB 1_1)

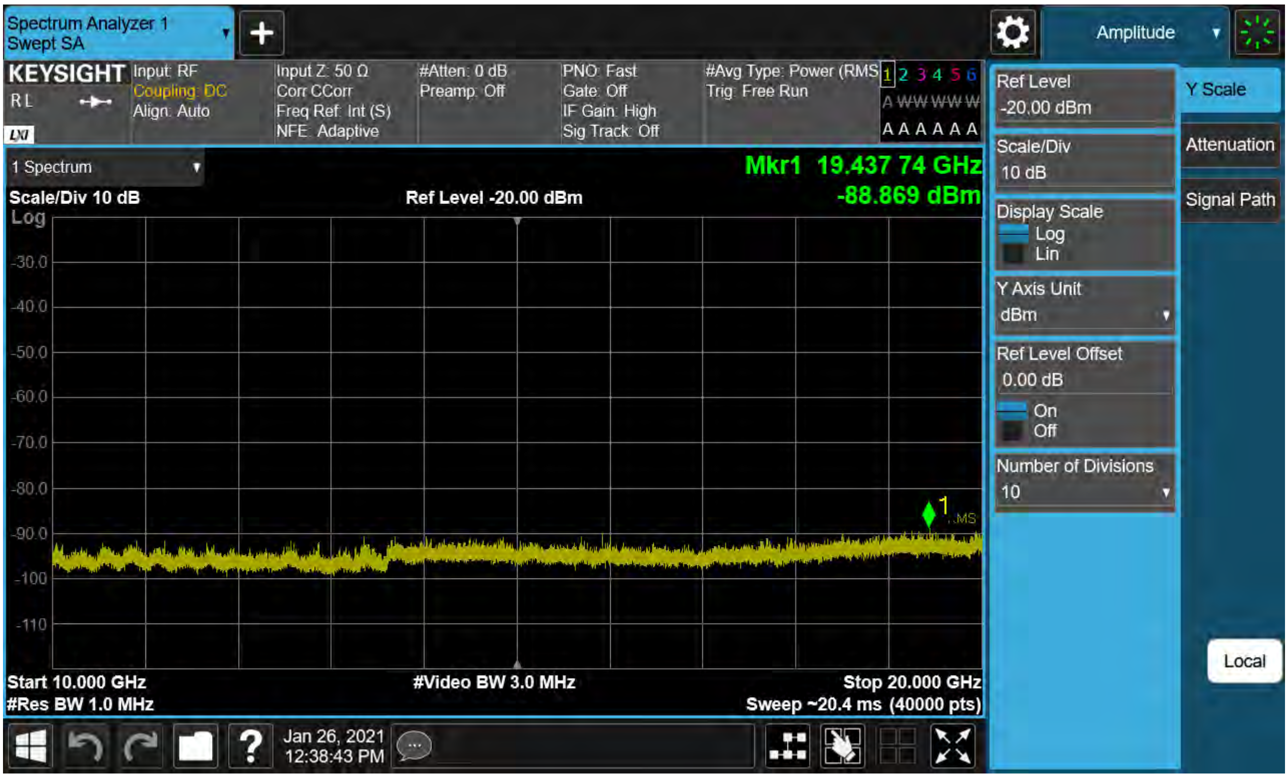


Sub6 n2. Conducted Spurious_1 (380000ch_20MHz_ BPSK_RB 1_1)



	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	8.009 0 GHz	-82.49 dBm			
2	N	1	f	1.890 9 GHz	-4.783 dBm			
3								
4								
5								
6								

Sub6 n2. Conducted Spurious_2 (380000ch_20MHz_BPSK_RB 1_1)



10. APPENDIX A_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2102-FC031-P