HCT CO.,LTD.
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA
TEL: +82-31-645-6300 FAX: +82-31-645-6401

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:
June 26, 2020

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

Report No.: HCT-RF-2006-FC062

FCC ID: **A3LSMA516U**

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

Model(s):	SM-A516U
Additional Model(s):	SM-A516U1
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)	EIRP Max. Power (dBm)
Sub6 n2 (5)	1852.5 - 1907.5	4M51G7D	PI/2 BPSK	0.225	23.52
		4M52G7D	QPSK	0.217	23.37
		4M51W7D	16QAM	0.178	22.51
		4M54W7D	64QAM	0.125	20.98
		4M51W7D	256QAM	0.079	18.96
Sub6 n2 (10)	1855.0 - 1905.0	9M02G7D	PI/2 BPSK	0.224	23.50
		8M98G7D	QPSK	0.216	23.34
		8M99W7D	16QAM	0.177	22.48
		9M00W7D	64QAM	0.126	21.00
		8M98W7D	256QAM	0.081	19.10
Sub6 n2 (15)	1857.5 - 1902.5	13M5G7D	PI/2 BPSK	0.218	23.38
		13M4G7D	QPSK	0.207	23.16
		13M5W7D	16QAM	0.174	22.41
		13M5W7D	64QAM	0.124	20.92
		13M5W7D	256QAM	0.081	19.07
Sub6 n2 (20)	1860.0 - 1900.0	18M0G7D	PI/2 BPSK	0.223	23.49
		17M9G7D	QPSK	0.212	23.26
		18M0W7D	16QAM	0.176	22.46
		18M0W7D	64QAM	0.123	20.91
		17M9W7D	256QAM	0.080	19.03

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 : Kwon Jeong
Engineer of Telecommunication Testing Center

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

This report only responds to the tested sample and may not be reproduced, except in full, without written approval of the HCT Co., Ltd.

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 KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2006-FC062	June 26, 2020	- First Approval Report

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:	A3LSMA516U
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-A516U
Additional Model(s):	SM-A516U1
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:	May 06, 2020 ~ June 25, 2020

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(n2/5/41/66/71).

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

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;

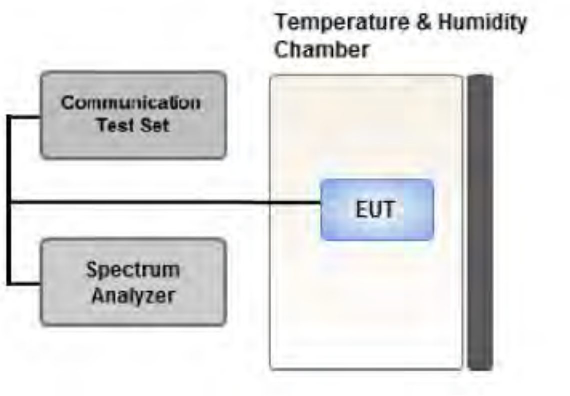
$$Result_{(dBm)} = Pg_{(dBm)} – \text{cable loss}_{(dB)} + \text{antenna gain}_{(dBi)}$$

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

   If the fundalmatal 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)

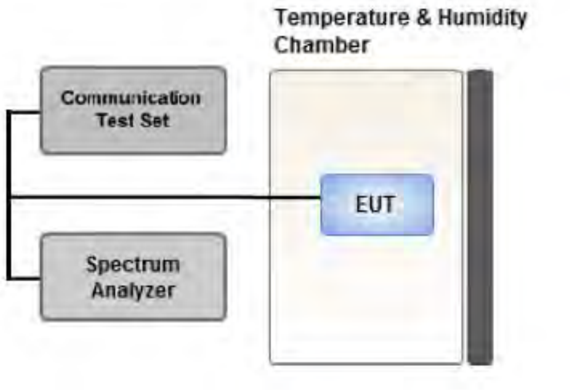
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW ≥ 3 × RBW.

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.

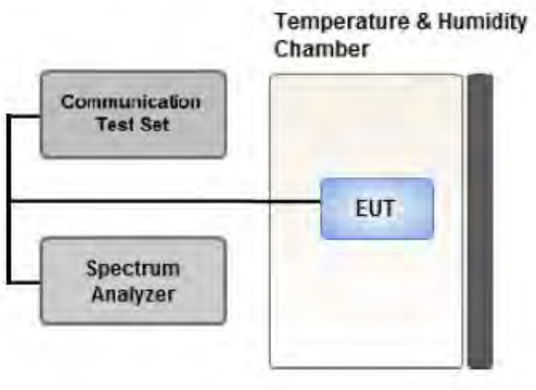
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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

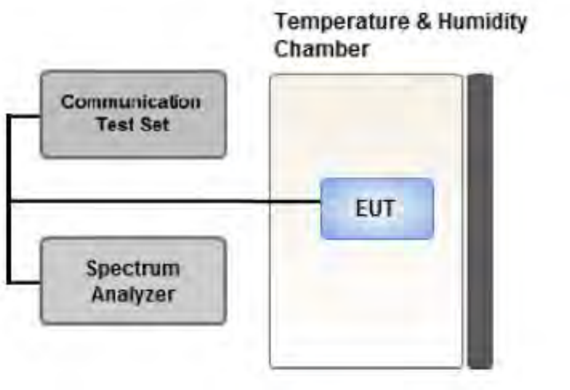
Test Overview

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

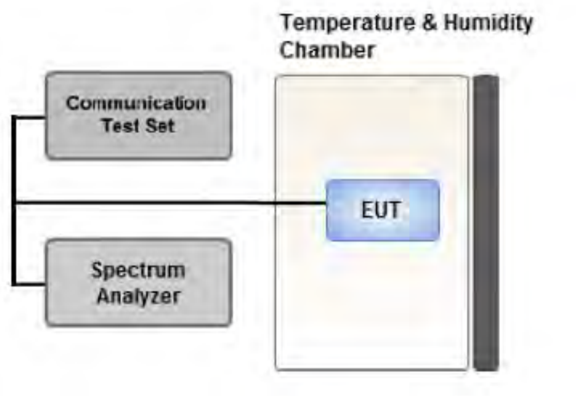
Test Notes

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.
- 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)
- The worst case is reported with the EUT positioning, modulations, and paging service configurations shown in the test data.
- Please refer to the table below.

-SM-A516U & additional models were tested and the worst case results are reported.
(Worst case : SM-A516U)

[Worst case]

Test Description	Modulation	RB size	RB offset	Axis
Effective Isotropic Radiated Power	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	1	1	Z
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)
- Worst case : Of all modulation, We have tested modulation of the high Conducted Output Power.
Conducted Output Power value can be confirmed on the SAR report.
- All modes of operation were investigated and the worst case configuration results are reported.

-SM-A516U & additional models were tested and the worst case results are reported.

(Worst case : SM-A516U)

[Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset
Occupied Bandwidth	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	5, 10, 15, 20	Mid	Full RB	0
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	49
		15	Low	1	0
			High	1	74
		20	Low	1	0
			High	1	99
		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

Manufacture	Model/ Equipment	Serial Number	Calibration Date	Calibration Interval	Calibration Due
T&M SYSTEM	FBSR-02B(WHK1.2/15G-10EF)/H.P.F	-	03/09/2020	Annual	03/09/2021
T&M SYSTEM	FBSR-02B(WHK3.3/18G-10EF)/H.P.F	-	03/09/2020	Annual	03/09/2021
WAINWRIGHT INSTRUMENT	WHNX6.0/26.5G-6SS/H.P.F	1	03/19/2020	Annual	03/19/2021
Hewlett Packard	11667B / Power Splitter(DC~26.5 GHz)	11275	04/27/2020	Annual	04/27/2021
Agilent	E3632A/DC Power Supply	MY40004326	07/01/2019	Annual	07/01/2020
Schwarzbeck	UHAP/ Dipole Antenna	557	03/29/2019	Biennial	03/29/2021
Schwarzbeck	UHAP/ Dipole Antenna	558	03/29/2019	Biennial	03/29/2021
ESPEC	SU-642 / Chamber	93000717	08/14/2019	Annual	08/14/2020
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	147	08/29/2019	Biennial	08/29/2021
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	9120D-1298	09/25/2019	Biennial	09/25/2021
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)	100931	10/14/2019	Annual	10/14/2020
Agilent	8960 (E5515C)/ Base Station	MY48360800	08/27/2019	Annual	08/27/2020
Schwarzbeck	FMZB1513/ Loop Antenna(9kHz~30MHz)	1513-175	04/26/2019	Biennial	04/26/2021
Schwarzbeck	VULB9160/ Bilog Antenna	9160-3368	08/09/2018	Biennial	08/09/2020
Schwarzbeck	VULB9160/ Hybrid Antenna	760	03/22/2019	Biennial	03/22/2021
Anritsu Corp.	MT8821C/Wideband Radio Communication Tester	6201502997	08/09/2019	Annual	08/09/2020
Anritsu Corp.	MT8820C/Wideband Radio Communication Tester	6201026545	01/22/2020	Annual	01/22/2021
REOHDE & SCHWARZ	SMB100A/ SIGNAL GENERATOR (100kHz~40GHz)	177633	07/15/2019	Annual	07/15/2020
KEYSIGHT	E7515B / 5G Wireless Tester	MY58300756	01/07/2020	Annual	01/07/2021
KEYSIGHT	N9030B / Signal Analyzer(5Hz~40.0GHz)	MY55480167	06/04/2020	Annual	06/04/2021
Mini-Circuits	ZC4PD-K1844+ / 4-Way Divider	942907	09/05/2019	Annual	09/05/2020
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).
3. Model : 8493C(S/N: 17280)
   - Use date of Equipment : May 07, 2020 ~ June 03, 2020/ June 07, 2020 ~ June 25, 2020
4. Model : N9030B(S/N: MY55480167)
   - Use date of Equipment : June 07, 2020 ~ June 25, 2020

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. The same samples were used for SAR and EMC

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

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	-18.45	15.19	10.10	1.94	V	< 2.00	0.216	23.35
		QPSK	-18.64	15.00	10.10	1.94	V		0.207	23.16
		16-QAM	-19.56	14.08	10.10	1.94	V		0.167	22.24
		64-QAM	-20.95	12.69	10.10	1.94	V		0.122	20.85
		256-QAM	-22.84	10.80	10.10	1.94	V		0.079	18.96
1880.0		PI/2 BPSK	-18.96	14.93	10.15	1.98	V		0.204	23.10
		QPSK	-19.15	14.74	10.15	1.98	V		0.195	22.91
		16-QAM	-19.96	13.93	10.15	1.98	V		0.162	22.10
		64-QAM	-21.46	12.43	10.15	1.98	V		0.115	20.60
		256-QAM	-23.39	10.50	10.15	1.98	V		0.074	18.67
1907.5		PI/2 BPSK	-19.05	15.29	10.23	2.00	V		0.225	23.52
		QPSK	-19.20	15.14	10.23	2.00	V		0.217	23.37
		16-QAM	-20.06	14.28	10.23	2.00	V		0.178	22.51
		64-QAM	-21.59	12.75	10.23	2.00	V		0.125	20.98
		256-QAM	-23.82	10.52	10.23	2.00	V		0.075	18.75

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	-18.50	15.31	10.12	1.94	V	< 2.00	0.224	23.49
		QPSK	-18.70	15.11	10.12	1.94	V		0.213	23.29
		16-QAM	-19.55	14.26	10.12	1.94	V		0.176	22.44
		64-QAM	-21.01	12.80	10.12	1.94	V		0.125	20.98
		256-QAM	-22.89	10.92	10.12	1.94	V		0.081	19.10
1880.0		PI/2 BPSK	-18.56	15.33	10.15	1.98	V		0.224	23.50
		QPSK	-18.72	15.17	10.15	1.98	V		0.216	23.34
		16-QAM	-19.58	14.31	10.15	1.98	V		0.177	22.48
		64-QAM	-21.06	12.83	10.15	1.98	V		0.126	21.00
		256-QAM	-23.04	10.85	10.15	1.98	V		0.080	19.02
1905.0		PI/2 BPSK	-18.91	15.18	10.22	2.00	V		0.218	23.39
		QPSK	-19.18	14.91	10.22	2.00	V		0.205	23.12
		16-QAM	-20.04	14.04	10.22	2.00	V		0.168	22.26
		64-QAM	-21.54	12.55	10.22	2.00	V		0.119	20.76
		256-QAM	-23.57	10.51	10.22	2.00	V		0.075	18.73

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	-18.67	15.14	10.13	1.95	V	< 2.00	0.215	23.32
		QPSK	-18.96	14.85	10.13	1.95	V		0.201	23.03
		16-QAM	-19.82	13.99	10.13	1.95	V		0.165	22.17
		64-QAM	-21.07	12.74	10.13	1.95	V		0.124	20.92
		256-QAM	-22.92	10.89	10.13	1.95	V		0.081	19.07
1880.0		PI/2 BPSK	-18.74	15.15	10.15	1.98	V		0.215	23.32
		QPSK	-18.90	14.99	10.15	1.98	V		0.207	23.16
		16-QAM	-19.65	14.24	10.15	1.98	V		0.174	22.41
		64-QAM	-21.16	12.73	10.15	1.98	V		0.123	20.90
		256-QAM	-23.25	10.64	10.15	1.98	V		0.076	18.81
1902.5		PI/2 BPSK	-18.77	15.18	10.20	2.00	V		0.218	23.38
		QPSK	-19.00	14.95	10.20	2.00	V		0.207	23.15
		16-QAM	-19.82	14.13	10.20	2.00	V		0.171	22.33
		64-QAM	-21.27	12.68	10.20	2.00	V		0.122	20.88
		256-QAM	-23.20	10.75	10.20	2.00	V		0.079	18.95

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	-18.50	15.31	10.13	1.95	V	< 2.00	0.223	23.49
		QPSK	-18.73	15.08	10.13	1.95	V		0.212	23.26
		16-QAM	-19.53	14.28	10.13	1.95	V		0.176	22.46
		64-QAM	-21.08	12.73	10.13	1.95	V		0.123	20.91
		256-QAM	-22.96	10.85	10.13	1.95	V		0.080	19.03
1880.0		PI/2 BPSK	-18.58	15.31	10.15	1.98	V		0.223	23.48
		QPSK	-18.80	15.09	10.15	1.98	V		0.212	23.26
		16-QAM	-19.64	14.25	10.15	1.98	V		0.175	22.42
		64-QAM	-21.20	12.69	10.15	1.98	V		0.122	20.86
		256-QAM	-23.09	10.80	10.15	1.98	V		0.079	18.97
1900.0		PI/2 BPSK	-18.90	15.05	10.20	2.00	V		0.211	23.25
		QPSK	-19.11	14.84	10.20	2.00	V		0.201	23.04
		16-QAM	-19.95	14.00	10.20	2.00	V		0.166	22.20
		64-QAM	-21.41	12.54	10.20	2.00	V		0.119	20.74
		256-QAM	-23.39	10.56	10.20	2.00	V		0.075	18.76

8.2 RADIATED SPURIOUS EMISSIONS

- NR Band: N2
- LTE Band(Anchor): B5
- Bandwidth: 5 MHz
- Modulation: PI/2 BPSK
- Distance: 3 meters
- SCS: 15 kHz

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
370500 (1852.5)	3,705.00	-53.83	12.42	-58.81	2.86	V	-49.26	-13.00
	5,557.50	-56.84	13.15	-55.30	3.58	V	-45.73	-13.00
	7,410.00	-56.89	11.13	-46.98	4.25	V	-40.10	-13.00
376000 (1880.0)	3,760.00	-55.19	12.48	-60.16	2.88	V	-50.57	-13.00
	5,640.00	-55.63	13.30	-54.25	3.62	V	-44.57	-13.00
	7,520.00	-56.33	11.30	-46.16	4.30	V	-39.16	-13.00
381500 (1907.5)	3,815.00	-54.84	12.40	-59.81	2.90	H	-50.31	-13.00
	5,722.50	-55.99	13.35	-53.85	3.63	H	-44.13	-13.00
	7,630.00	-58.02	11.60	-47.97	4.34	V	-40.71	-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	-52.37	9.65	-63.13	1.86	H	-55.34	-13.00
	2,509.50	-55.57	10.75	-60.68	2.32	V	-52.25	-13.00
	3,346.00	-57.14	12.48	-58.79	2.70	H	-49.02	-13.00

- NR Band: N2
- LTE Band(Anchor): B5
- Bandwidth: 10 MHz
- Modulation: PI/2 BPSK
- Distance: 3 meters
- SCS: 15 kHz

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
371000 (1855.0)	3,710.00	-55.62	12.43	-60.61	2.86	V	-51.04	-13.00
	5,565.00	-55.86	13.18	-54.19	3.59	V	-44.60	-13.00
	7,420.00	-56.71	11.15	-46.95	4.24	V	-40.04	-13.00
376000 (1880.0)	3,760.00	-54.78	12.48	-59.75	2.88	H	-50.16	-13.00
	5,640.00	-56.92	13.30	-55.54	3.62	V	-45.86	-13.00
	7,520.00	-56.13	11.30	-45.96	4.30	H	-38.96	-13.00
381000 (1905.0)	3,810.00	-53.78	12.40	-58.82	2.90	H	-49.32	-13.00
	5,715.00	-55.87	13.37	-53.74	3.63	H	-44.00	-13.00
	7,620.00	-56.82	11.60	-46.86	4.34	H	-39.60	-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	-52.30	9.65	-63.06	1.86	V	-55.27	-13.00
	2,509.50	-55.18	10.75	-60.29	2.32	V	-51.86	-13.00
	3,346.00	-57.03	12.48	-58.68	2.70	V	-48.91	-13.00

- NR Band: N2
- LTE Band(Anchor): B5
- Bandwidth: 15 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)
371500 (1857.5)	3,715.00	-54.81	12.44	-59.87	2.87	H	-50.29	-13.00
	5,572.50	-56.38	13.20	-54.59	3.59	H	-44.98	-13.00
	7,430.00	-55.91	11.15	-45.97	4.25	H	-39.07	-13.00
376000 (1880.0)	3,760.00	-53.70	12.48	-58.67	2.88	V	-49.08	-13.00
	5,640.00	-56.85	13.30	-55.47	3.62	V	-45.79	-13.00
	7,520.00	-56.65	11.30	-46.48	4.30	V	-39.48	-13.00
380500 (1902.5)	3,805.00	-54.27	12.40	-59.23	2.90	H	-49.73	-13.00
	5,707.50	-56.63	13.39	-54.46	3.63	V	-44.70	-13.00
	7,610.00	-57.28	11.55	-47.32	4.32	V	-40.09	-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	-52.66	9.65	-63.42	1.86	H	-55.63	-13.00
	2,509.50	-54.88	10.75	-59.99	2.32	V	-51.56	-13.00
	3,346.00	-57.31	12.48	-58.96	2.70	H	-49.19	-13.00

- ▣ 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	-53.59	12.45	-58.71	2.87	H	-49.13	-13.00
	5,580.00	-54.48	13.20	-51.87	3.58	V	-42.25	-13.00
	7,440.00	-55.95	11.18	-45.75	4.25	H	-38.82	-13.00
376000 (1880.0)	3,760.00	-52.91	12.48	-57.88	2.88	H	-48.29	-13.00
	5,640.00	-54.39	13.30	-53.01	3.62	V	-43.33	-13.00
	7,520.00	-55.58	11.30	-45.41	4.30	V	-38.41	-13.00
380000 (1900.0)	3,800.00	-53.49	12.40	-58.37	2.90	V	-48.87	-13.00
	5,700.00	-55.86	13.40	-53.67	3.63	H	-43.90	-13.00
	7,600.00	-57.14	11.50	-47.28	4.32	H	-40.10	-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	-52.08	9.65	-62.84	1.86	H	-55.05	-13.00
	2,509.50	-55.41	10.75	-60.52	2.32	V	-52.09	-13.00
	3,346.00	-57.56	12.48	-59.21	2.70	H	-49.44	-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	4.40
			QPSK	25	0	5.36
			16-QAM	25	0	6.02
			64-QAM	25	0	6.12
			256-QAM	25	0	6.65
	10 MHz		BPSK	50	0	4.43
			QPSK	50	0	5.40
			16-QAM	50	0	6.16
			64-QAM	50	0	6.25
			256-QAM	50	0	6.37
	15 MHz		BPSK	75	0	4.07
			QPSK	75	0	5.31
			16-QAM	75	0	6.07
			64-QAM	75	0	6.27
			256-QAM	75	0	6.34
	20 MHz		BPSK	100	0	4.10
			QPSK	100	0	5.26
			16-QAM	100	0	6.01
			64-QAM	100	0	6.21
			256-QAM	100	0	6.33

Note:

1. Plots of the EUT’s Peak- to- Average Ratio are shown Page 60 ~ 79.

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	4.5139
			QPSK	25	0	4.5188
			16-QAM	25	0	4.5055
			64-QAM	25	0	4.5378
			256-QAM	25	0	4.5097
	10 MHz		BPSK	50	0	9.0211
			QPSK	50	0	8.9791
			16-QAM	50	0	8.9883
			64-QAM	50	0	8.9996
			256-QAM	50	0	8.9790
	15 MHz		BPSK	75	0	13.484
			QPSK	75	0	13.424
			16-QAM	75	0	13.480
			64-QAM	75	0	13.458
			256-QAM	75	0	13.446
	20 MHz		BPSK	100	0	17.992
			QPSK	100	0	17.913
			16-QAM	100	0	17.956
			64-QAM	100	0	17.963
			256-QAM	100	0	17.917

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 40 ~ 59.

8.5 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
Sub6 n2	5	1852.5	3.7024	29.976	-67.254	-37.278	-13.00
		1880.0	3.7069	29.976	-67.044	-37.068	
		1907.5	3.6965	29.976	-67.025	-37.049	
	10	1855.0	3.7109	29.976	-67.359	-37.383	
		1880.0	3.6885	29.976	-66.986	-37.010	
		1905.0	3.7129	29.976	-67.302	-37.326	
	15	1857.5	3.7099	29.976	-66.843	-36.867	
		1880.0	3.6890	29.976	-67.524	-37.548	
		1902.5	3.6835	29.976	-67.050	-37.074	
	20	1860.0	3.7024	29.976	-67.480	-37.504	
		1880.0	3.6960	29.976	-67.023	-37.047	
		1900.0	3.7154	29.976	-67.219	-37.243	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 104 ~ 127.

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	25.870
1 – 5	28.576
5 – 10	29.191
10 – 15	29.716
15 – 20	30.089
Above 20	30.731

8.6 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 80 ~ 103.

8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

- ▣ BandWidth: 5 MHz
- ▣ Voltage(100%): 3.880 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 500 013	0.0	0.000 000	0.000
	100%	-30	1852 500 020	6.6	0.000 000	0.004
	100%	-20	1852 500 020	6.8	0.000 000	0.004
	100%	-10	1852 500 025	12.2	0.000 001	0.007
	100%	0	1852 500 020	7.1	0.000 000	0.004
	100%	+10	1852 500 016	2.6	0.000 000	0.001
	100%	+30	1852 500 025	11.7	0.000 001	0.006
	100%	+40	1852 500 018	4.7	0.000 000	0.003
	100%	+50	1852 500 021	8.2	0.000 000	0.004
	Batt. Endpoint	+20	1852 500 025	12.1	0.000 001	0.007
1907.5	100%	+20(Ref)	1907 500 011	0.0	0.000 000	0.000
	100%	-30	1907 500 018	7.1	0.000 000	0.004
	100%	-20	1907 500 016	4.6	0.000 000	0.002
	100%	-10	1907 500 016	5.1	0.000 000	0.003
	100%	0	1907 500 020	9.2	0.000 000	0.005
	100%	+10	1907 500 024	13.4	0.000 001	0.007
	100%	+30	1907 500 014	2.6	0.000 000	0.001
	100%	+40	1907 500 017	6.2	0.000 000	0.003
	100%	+50	1907 500 021	10.3	0.000 001	0.005
	Batt. Endpoint	+20	1907 500 024	12.9	0.000 001	0.007

▣ BandWidth: 10 MHz

▣ Voltage(100%): 3.880 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 000 006	0.0	0.000 000	0.000
	100%	-30	1855 000 013	7.4	0.000 000	0.004
	100%	-20	1855 000 009	3.3	0.000 000	0.002
	100%	-10	1855 000 018	12.6	0.000 001	0.007
	100%	0	1855 000 017	11.2	0.000 001	0.006
	100%	+10	1855 000 015	9.1	0.000 000	0.005
	100%	+30	1855 000 016	10.3	0.000 001	0.006
	100%	+40	1855 000 012	6.9	0.000 000	0.004
	100%	+50	1855 000 019	13.1	0.000 001	0.007
	Batt. Endpoint	+20	1855 000 016	10.2	0.000 001	0.005
1905.0	100%	+20(Ref)	1905 000 008	0.0	0.000 000	0.000
	100%	-30	1905 000 013	5.2	0.000 000	0.003
	100%	-20	1905 000 010	2.2	0.000 000	0.001
	100%	-10	1905 000 014	6.6	0.000 000	0.003
	100%	0	1905 000 021	13.4	0.000 001	0.007
	100%	+10	1905 000 019	11.6	0.000 001	0.006
	100%	+30	1905 000 019	10.8	0.000 001	0.006
	100%	+40	1905 000 016	8.1	0.000 000	0.004
	100%	+50	1905 000 012	4.5	0.000 000	0.002
	Batt. Endpoint	+20	1905 000 010	2.1	0.000 000	0.001

▣ BandWidth: 15 MHz

▣ Voltage(100%): 3.880 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 500 012	0.0	0.000 000	0.000
	100%	-30	1857 500 015	3.9	0.000 000	0.002
	100%	-20	1857 500 014	2.1	0.000 000	0.001
	100%	-10	1857 500 019	7.0	0.000 000	0.004
	100%	0	1857 500 013	1.9	0.000 000	0.001
	100%	+10	1857 500 018	6.6	0.000 000	0.004
	100%	+30	1857 500 015	3.5	0.000 000	0.002
	100%	+40	1857 500 020	8.2	0.000 000	0.004
	100%	+50	1857 500 017	5.7	0.000 000	0.003
	Batt. Endpoint	+20	1857 500 025	13.6	0.000 001	0.007
1902.5	100%	+20(Ref)	1902 500 010	0.0	0.000 000	0.000
	100%	-30	1902 500 021	11.4	0.000 001	0.006
	100%	-20	1902 500 022	12.4	0.000 001	0.006
	100%	-10	1902 500 011	1.9	0.000 000	0.001
	100%	0	1902 500 015	5.3	0.000 000	0.003
	100%	+10	1902 500 020	10.1	0.000 001	0.005
	100%	+30	1902 500 018	8.1	0.000 000	0.004
	100%	+40	1902 500 015	5.6	0.000 000	0.003
	100%	+50	1902 500 015	5.4	0.000 000	0.003
	Batt. Endpoint	+20	1902 500 019	9.4	0.000 000	0.005

▣ BandWidth: 20 MHz

▣ Voltage(100%): 3.880 VDC

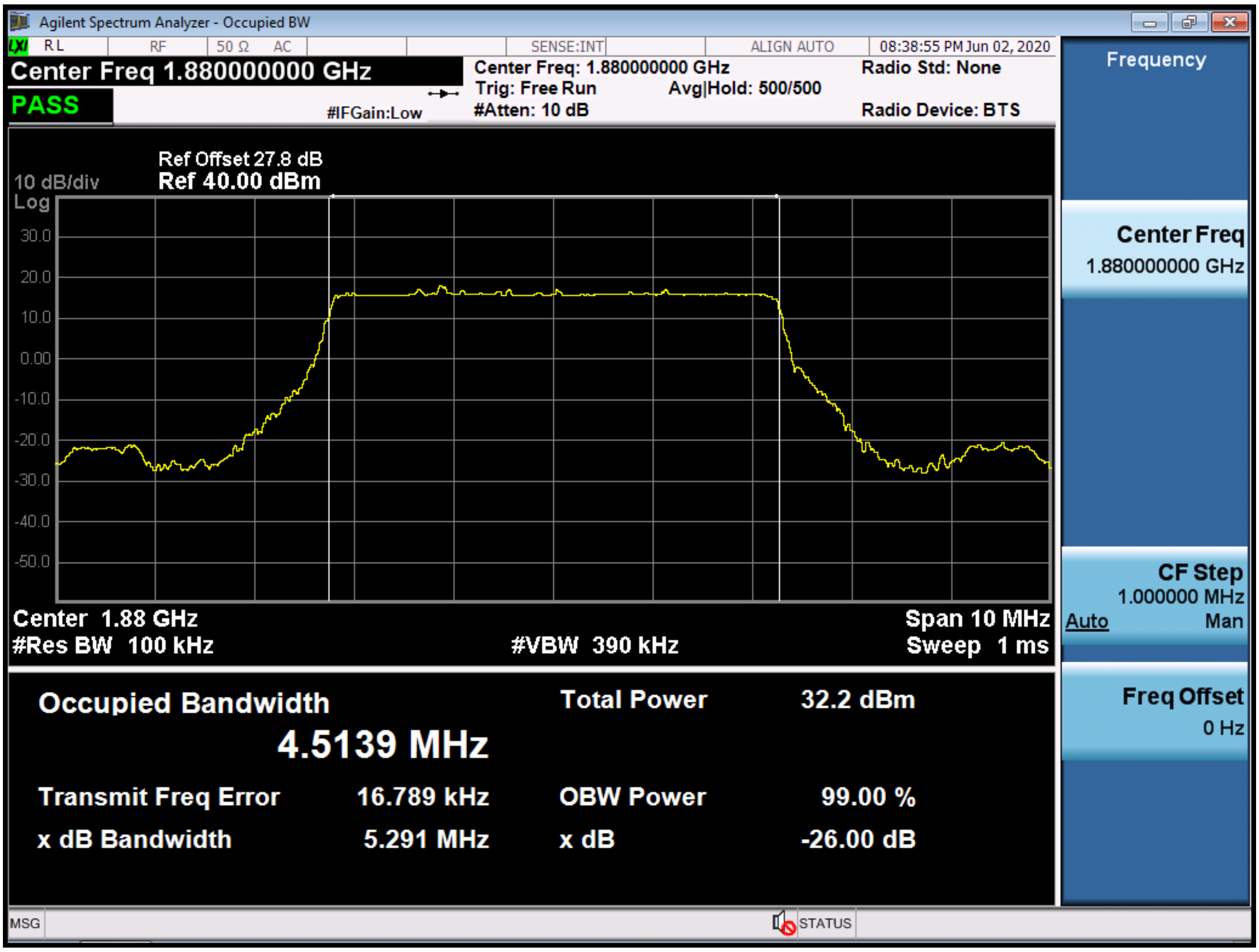
▣ Batt. Endpoint: 3.400 VDC

▣ LIMIT: Emission must remain in band

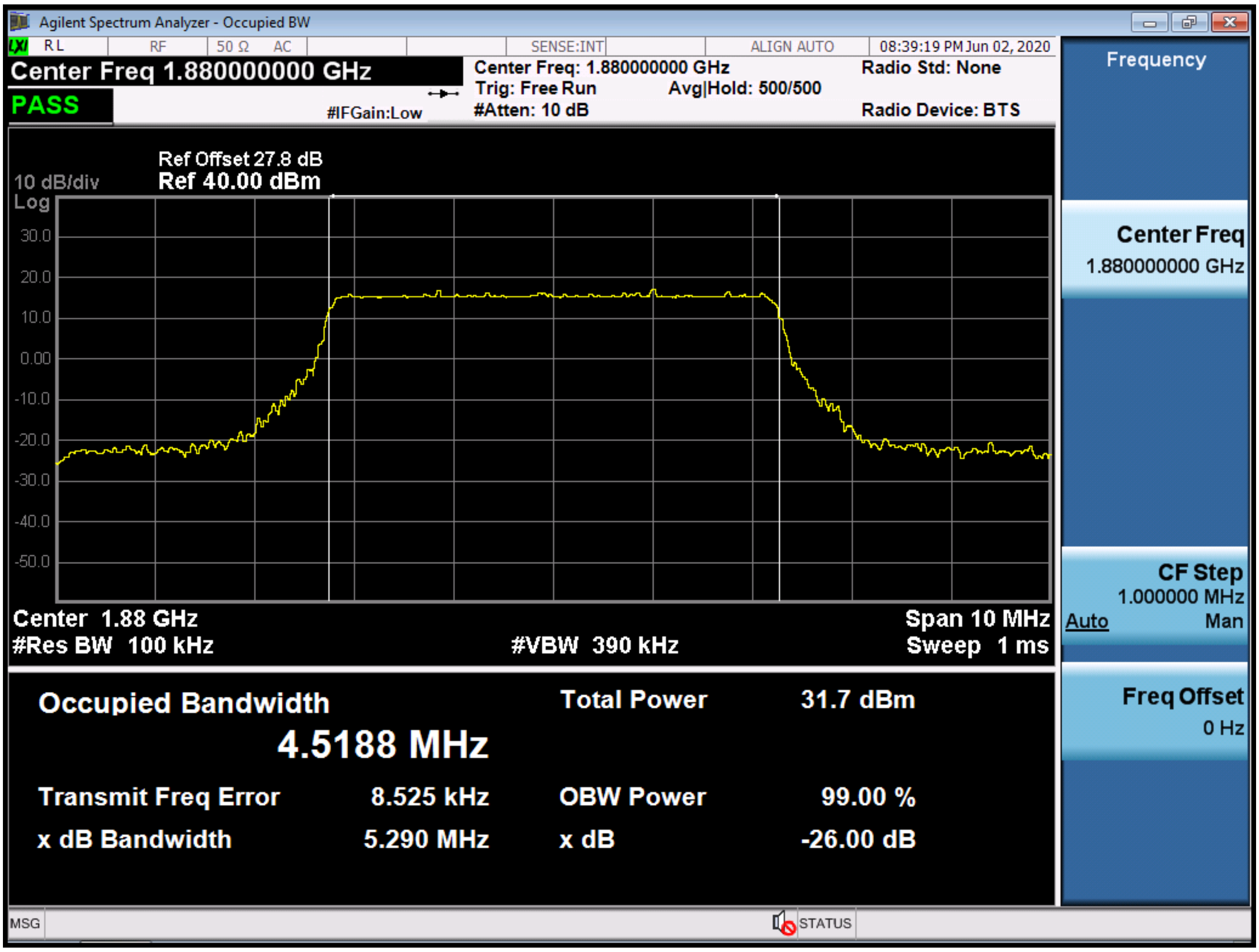
Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
1860.0	100%	+20(Ref)	1860 000 005	0.0	0.000 000	0.000
	100%	-30	1860 000 010	4.8	0.000 000	0.003
	100%	-20	1860 000 016	11.3	0.000 001	0.006
	100%	-10	1860 000 007	2.3	0.000 000	0.001
	100%	0	1860 000 018	13.6	0.000 001	0.007
	100%	+10	1860 000 014	9.3	0.000 000	0.005
	100%	+30	1860 000 014	9.5	0.000 001	0.005
	100%	+40	1860 000 015	10.1	0.000 001	0.005
	100%	+50	1860 000 011	6.3	0.000 000	0.003
	Batt. Endpoint	+20	1860 000 014	9.7	0.000 001	0.005
1900.0	100%	+20(Ref)	1900 000 006	0.0	0.000 000	0.000
	100%	-30	1900 000 011	5.0	0.000 000	0.003
	100%	-20	1900 000 009	3.2	0.000 000	0.002
	100%	-10	1900 000 015	9.2	0.000 000	0.005
	100%	0	1900 000 008	1.9	0.000 000	0.001
	100%	+10	1900 000 011	4.6	0.000 000	0.002
	100%	+30	1900 000 010	4.3	0.000 000	0.002
	100%	+40	1900 000 011	4.6	0.000 000	0.002
	100%	+50	1900 000 012	5.9	0.000 000	0.003
	Batt. Endpoint	+20	1900 000 019	13.4	0.000 001	0.007

9. TEST PLOTS

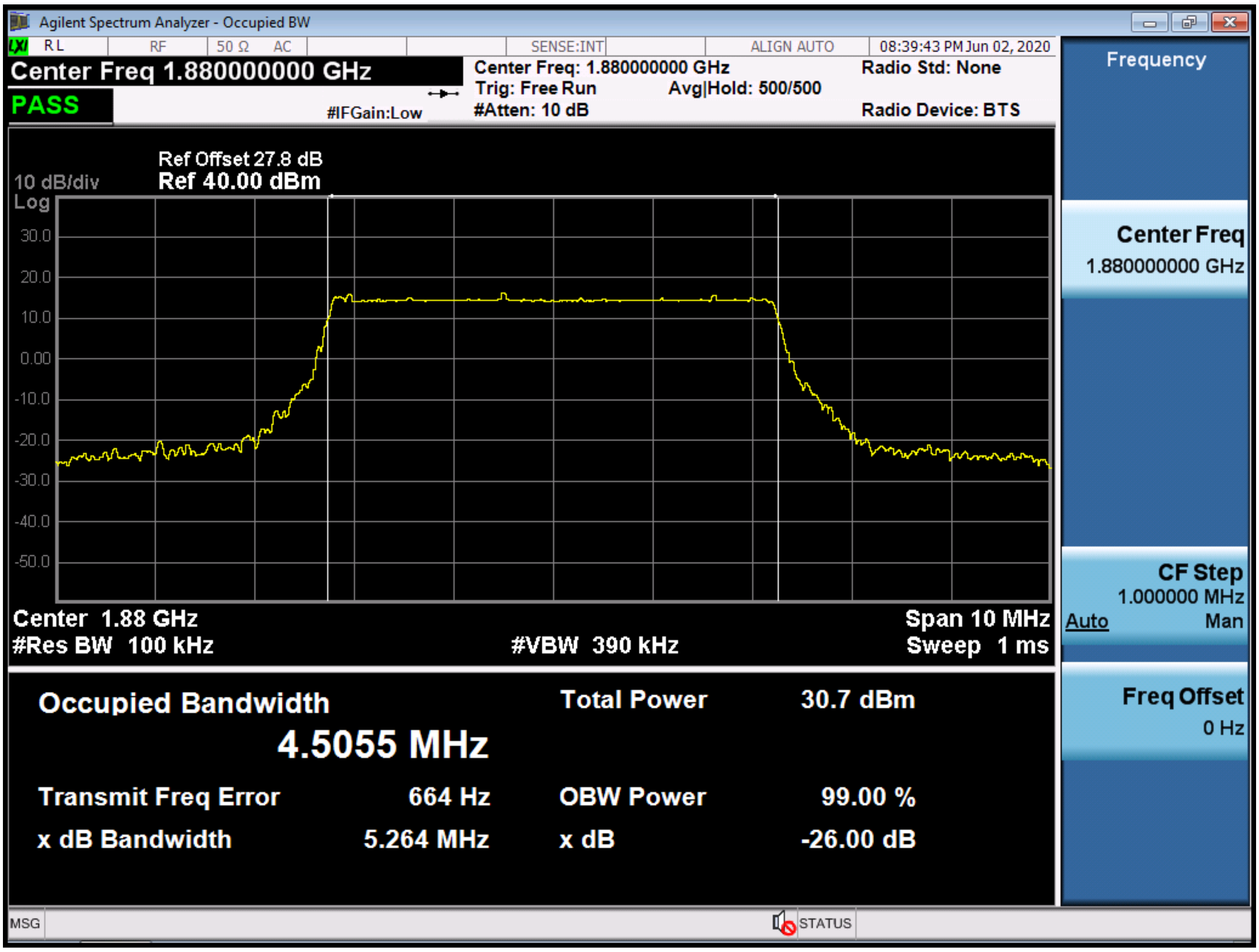
Sub6 n2. Occupied Bandwidth Plot (5M BW Ch.376000 BPSK RB 25_0)



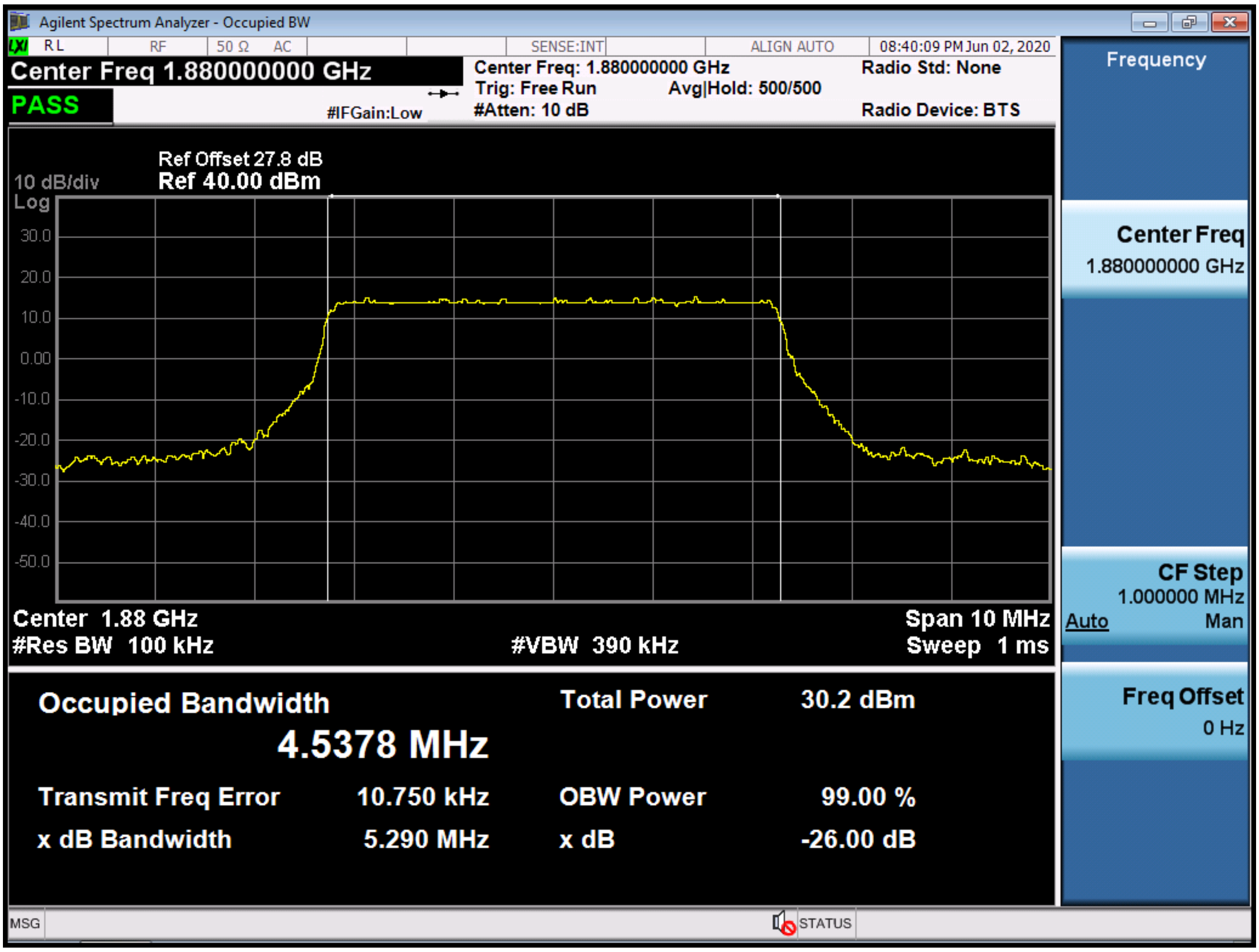
Sub6 n2. Occupied Bandwidth Plot (5M BW Ch.376000 QPSK RB 25_0)



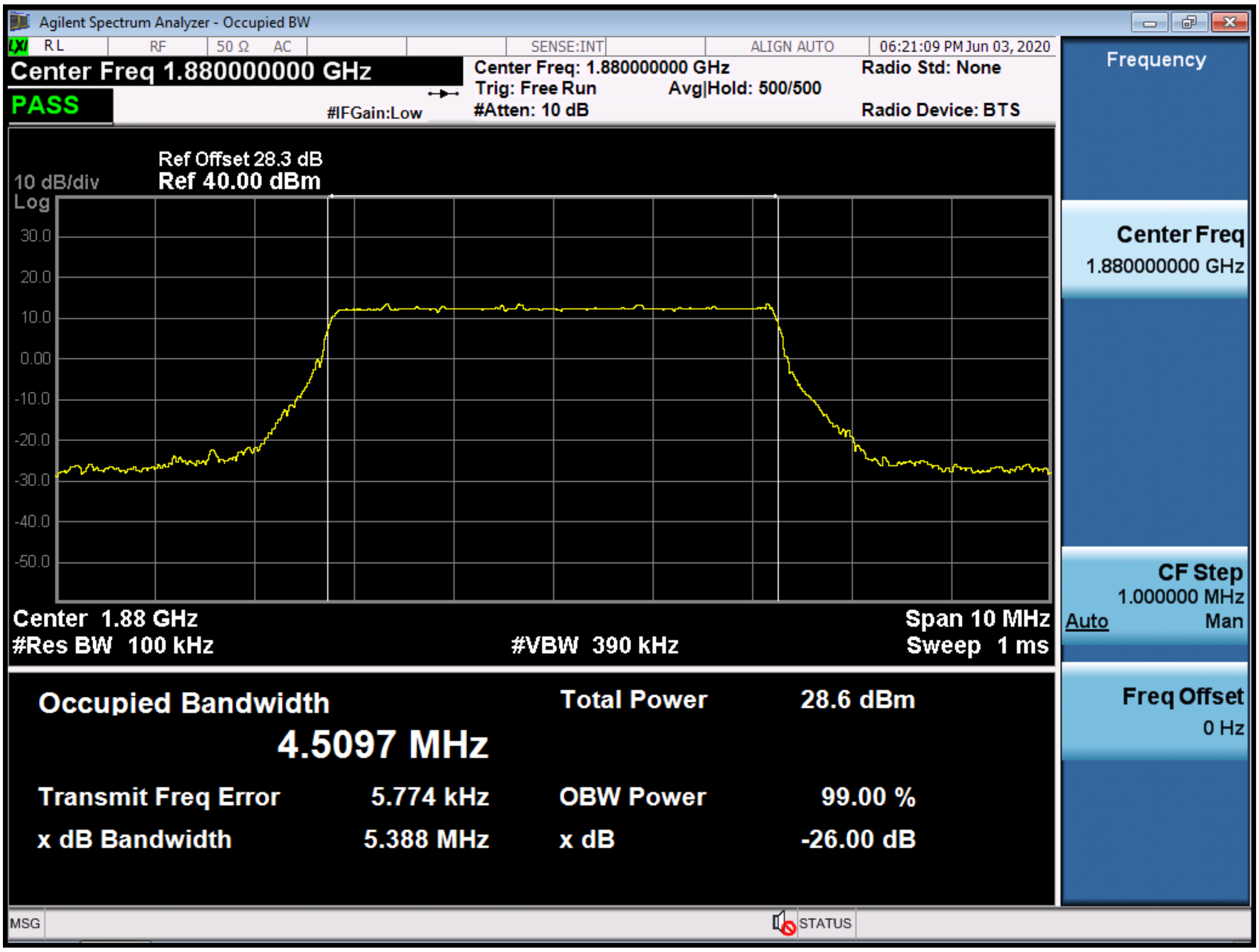
Sub6 n2. Occupied Bandwidth Plot (5M BW Ch.376000 16QAM RB 25_0)



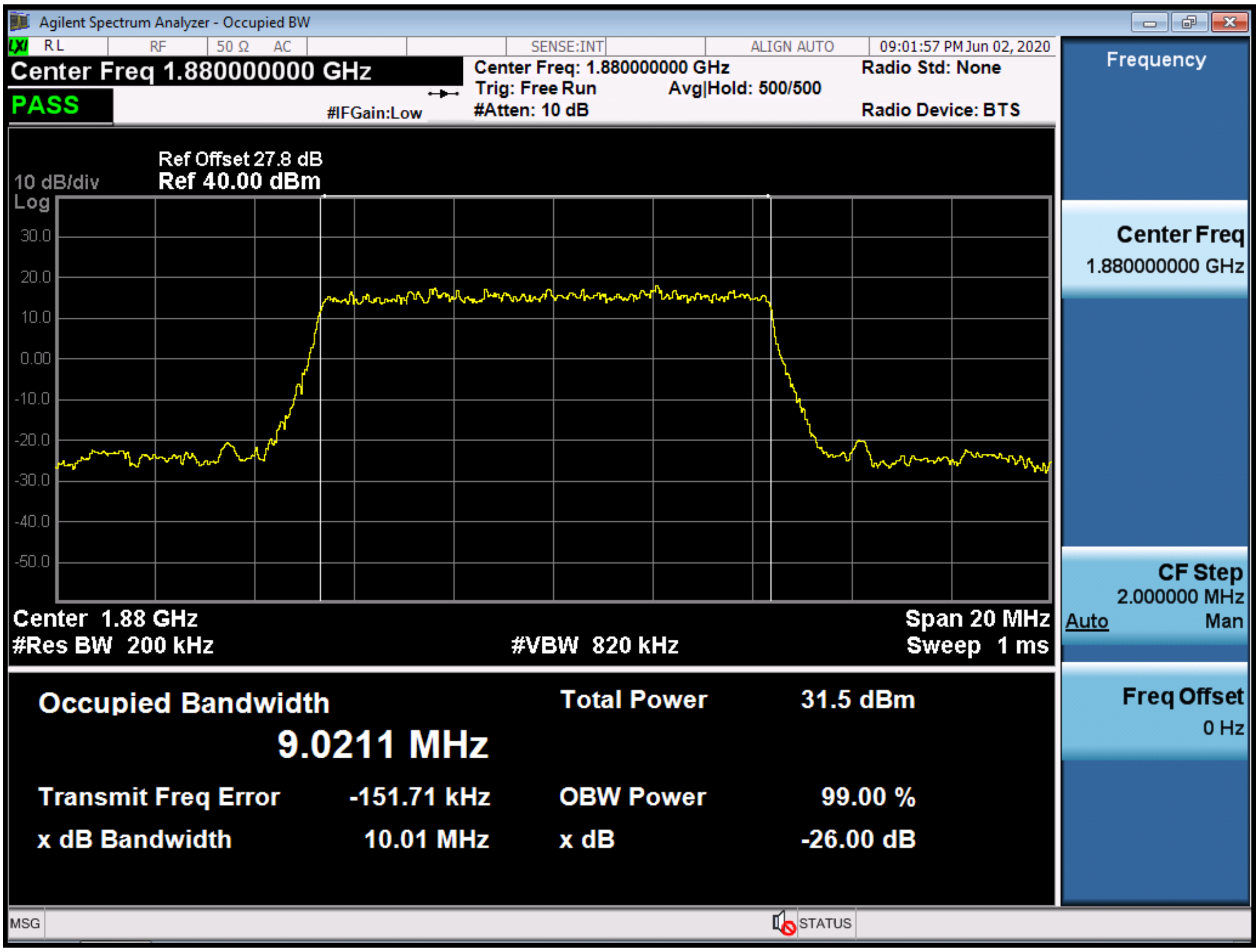
Sub6 n2. Occupied Bandwidth Plot (5M BW Ch.376000 64QAM RB 25_0)



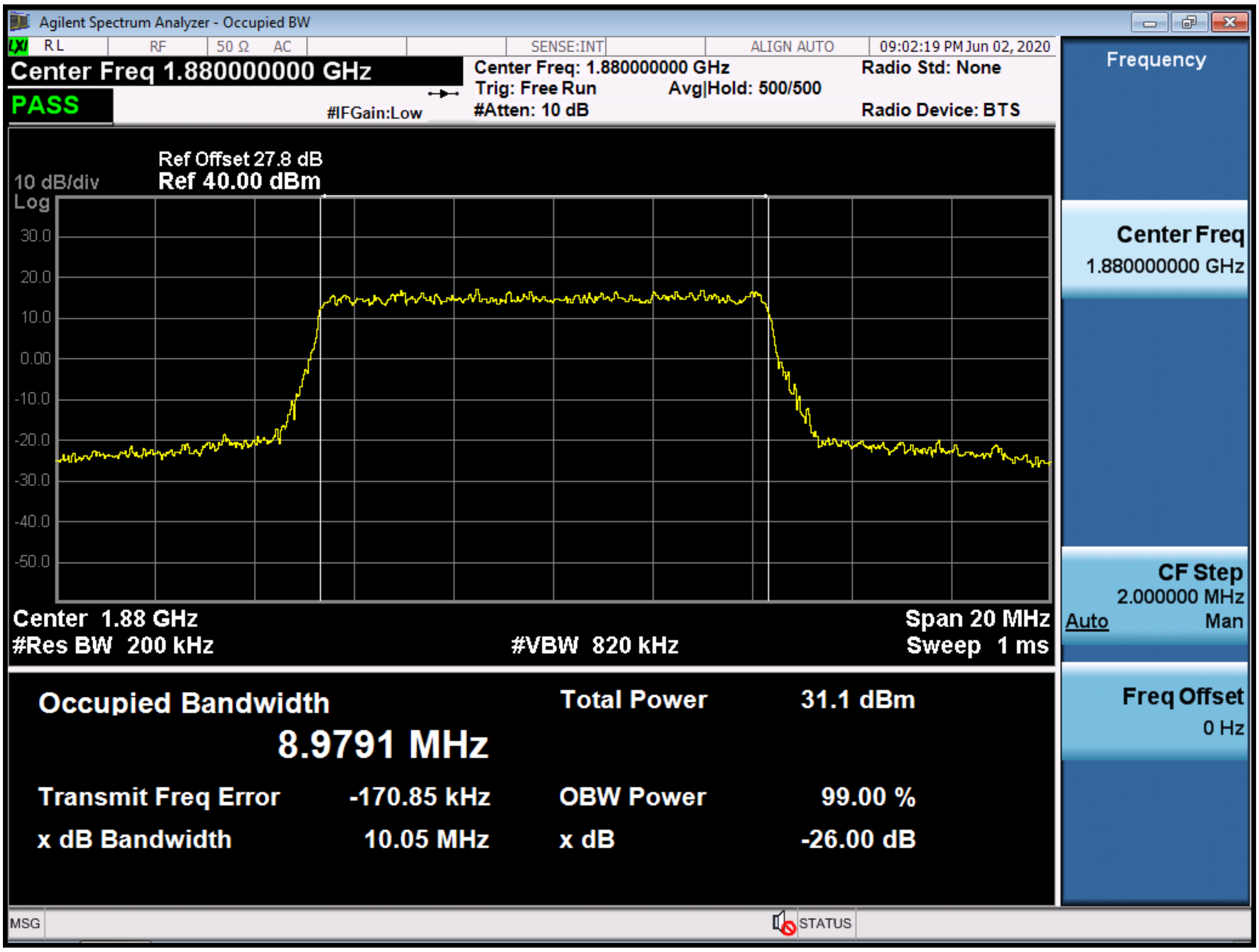
Sub6 n2. Occupied Bandwidth Plot (5M BW Ch.376000 256QAM RB 25_0)



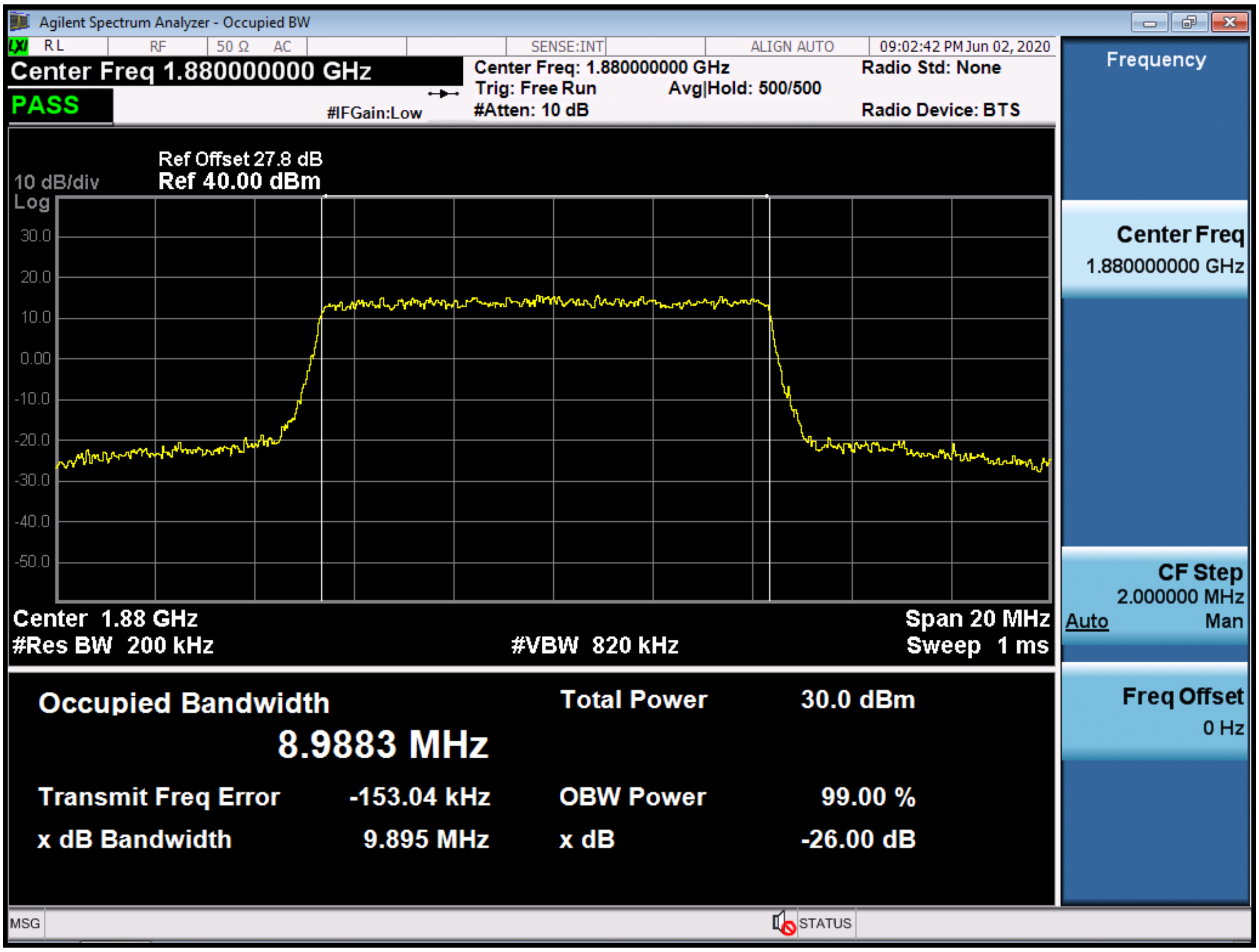
Sub6 n2. Occupied Bandwidth Plot (10M BW Ch.376000 BPSK RB 50_0)



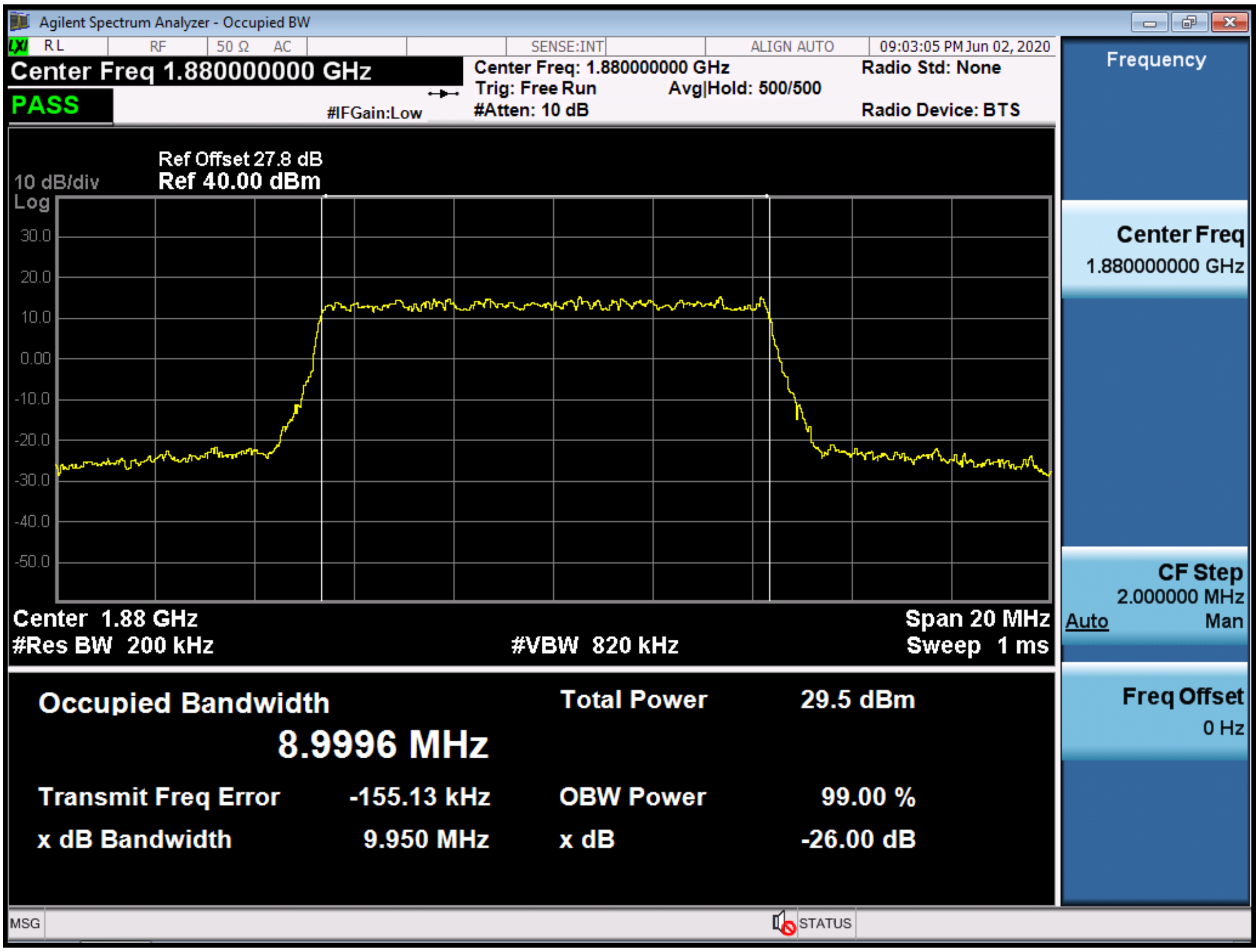
Sub6 n2. Occupied Bandwidth Plot (10M BW Ch.376000 QPSK RB 50_0)



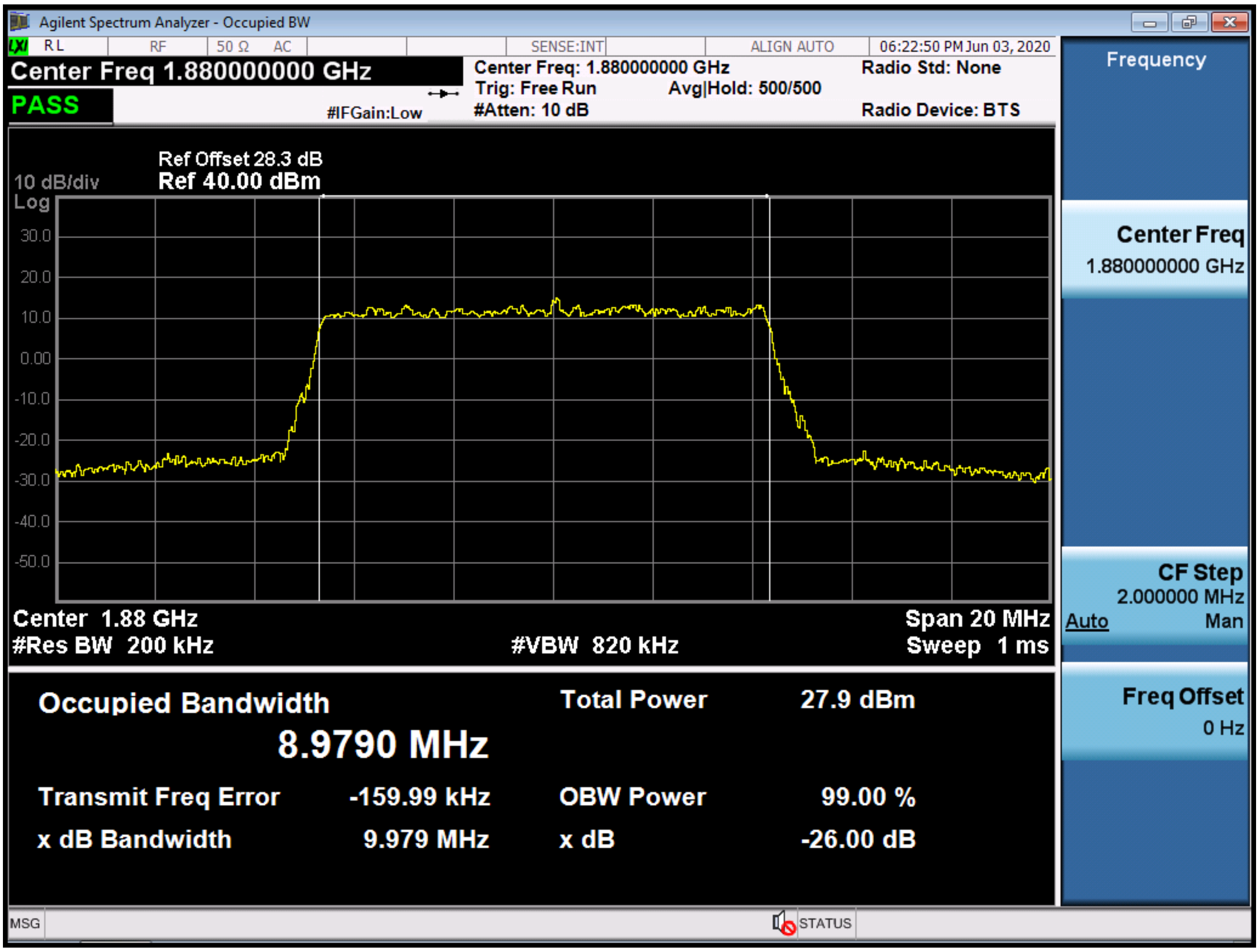
Sub6 n2. Occupied Bandwidth Plot (10M BW Ch.376000 16QAM RB 50_0)



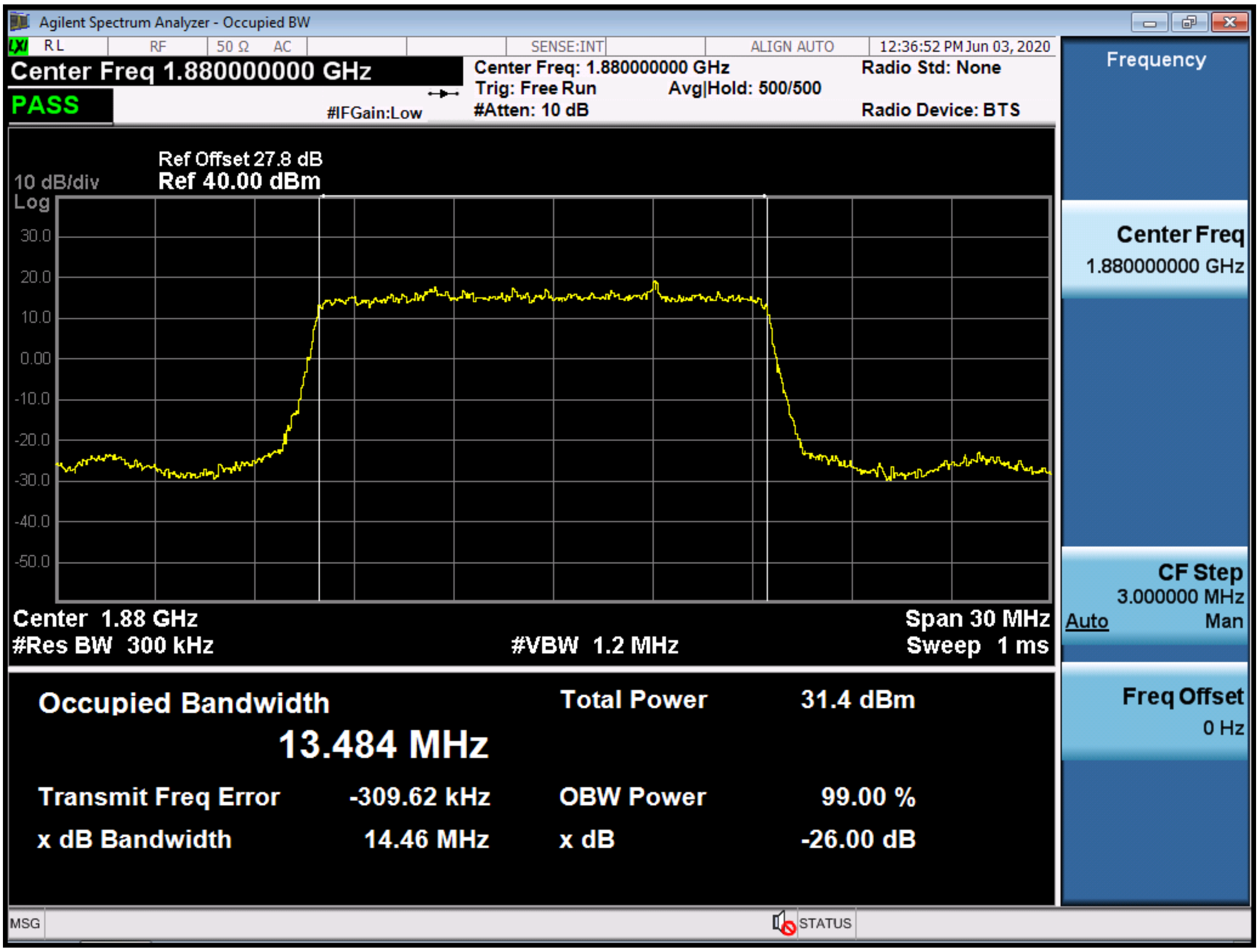
Sub6 n2. Occupied Bandwidth Plot (10M BW Ch.376000 64QAM RB 50_0)



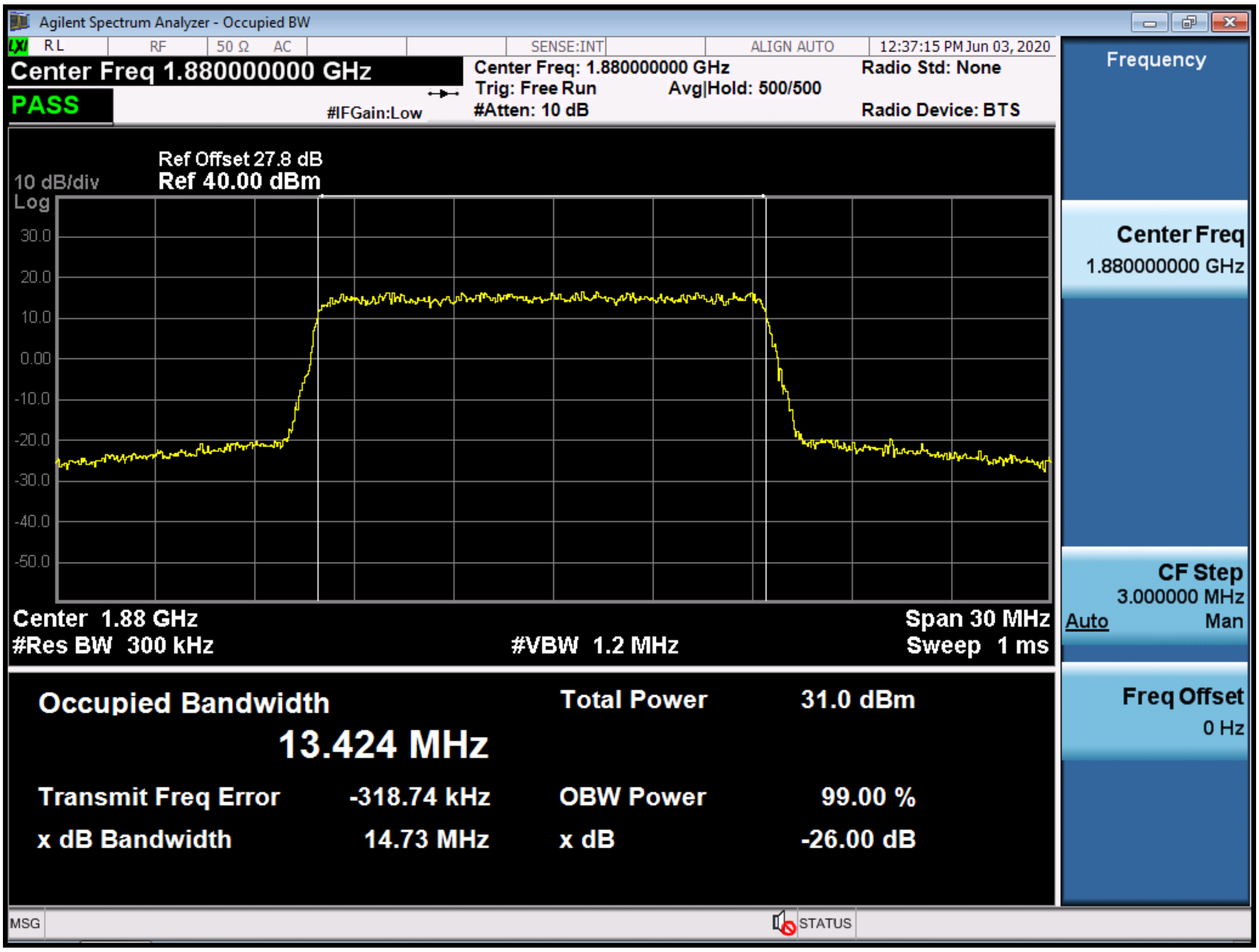
Sub6 n2. Occupied Bandwidth Plot (10M BW Ch.376000 256QAM RB 50_0)



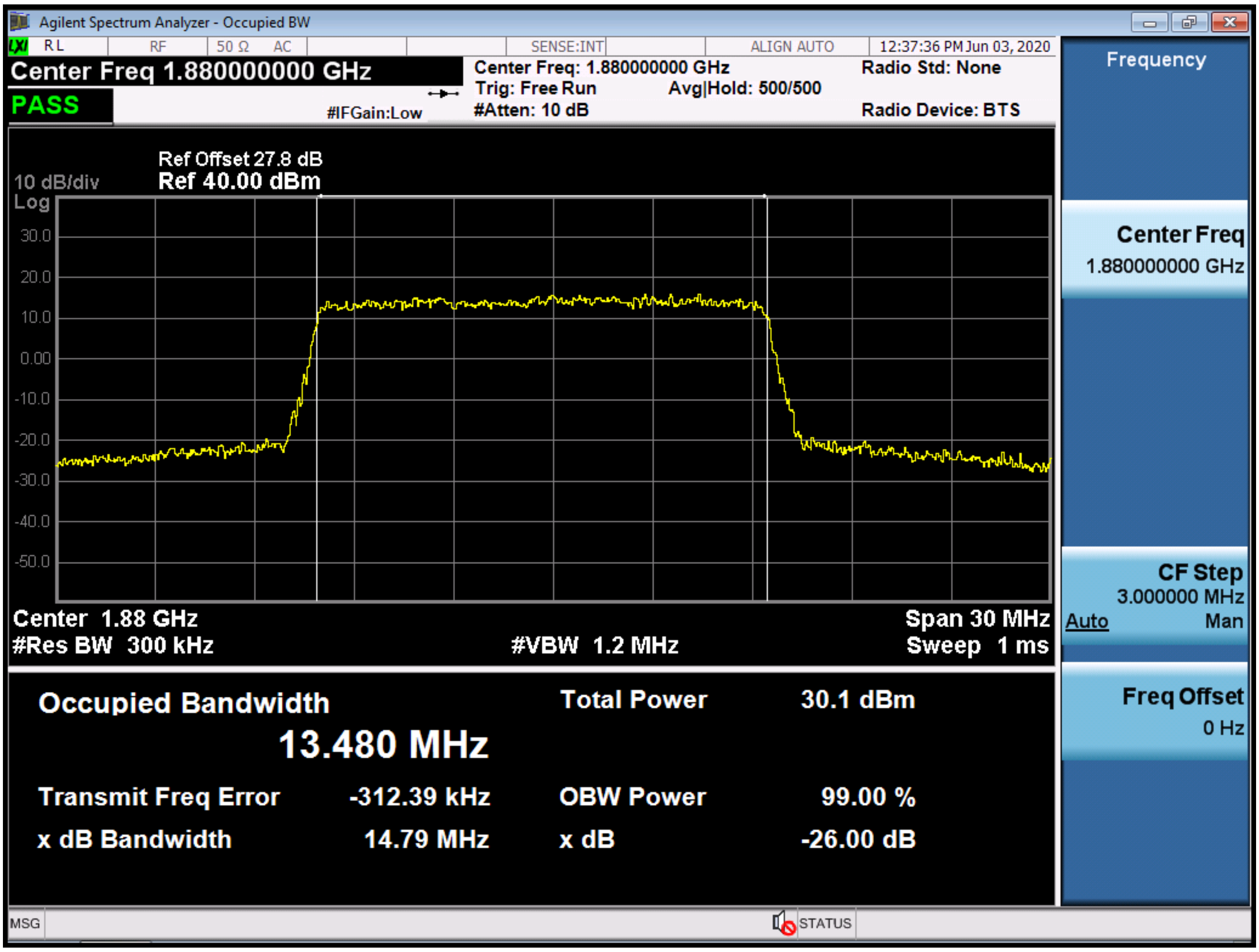
Sub6 n2. Occupied Bandwidth Plot (15M BW Ch.376000 BPSK RB 75_0)



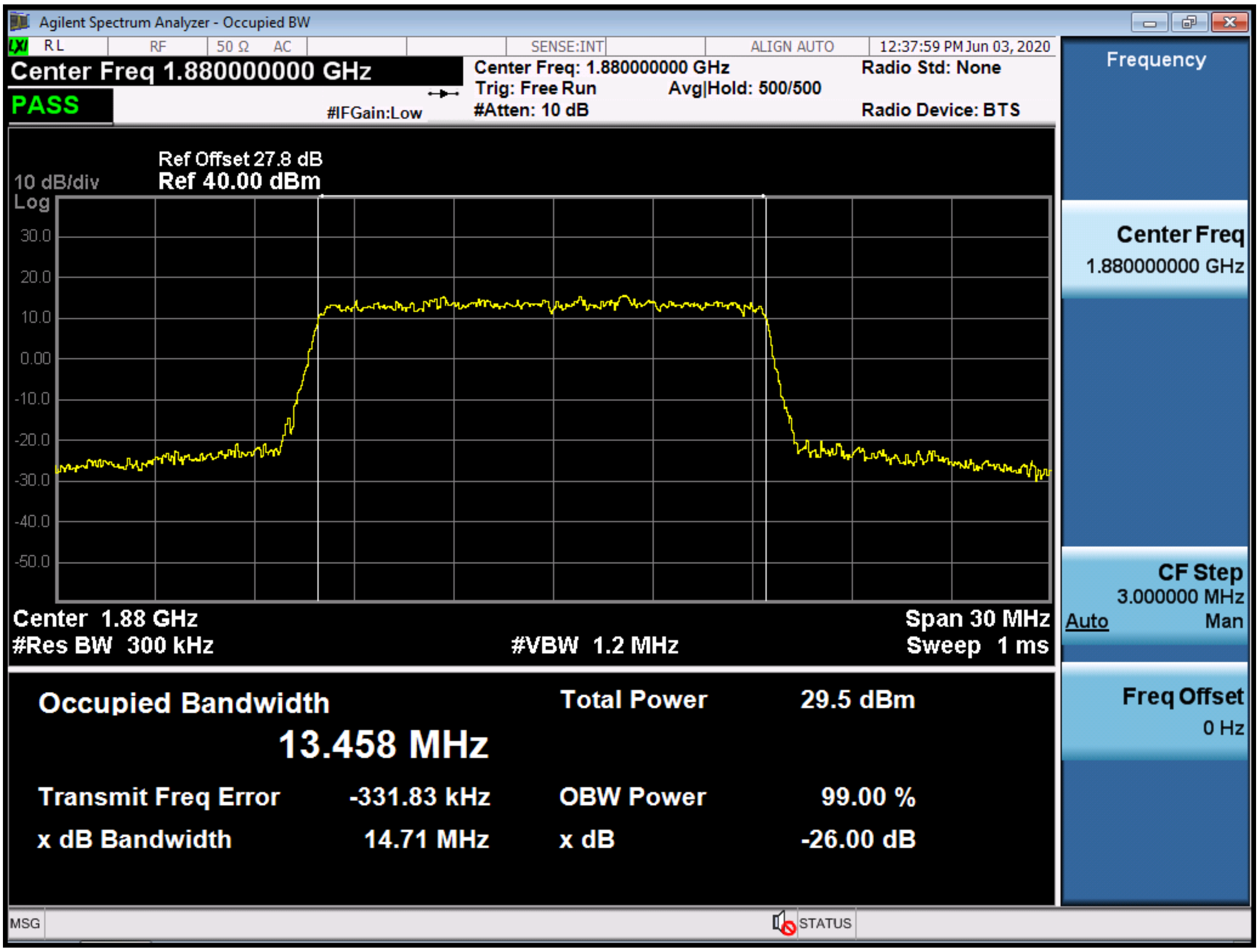
Sub6 n2. Occupied Bandwidth Plot (15M BW Ch.376000 QPSK RB 75_0)



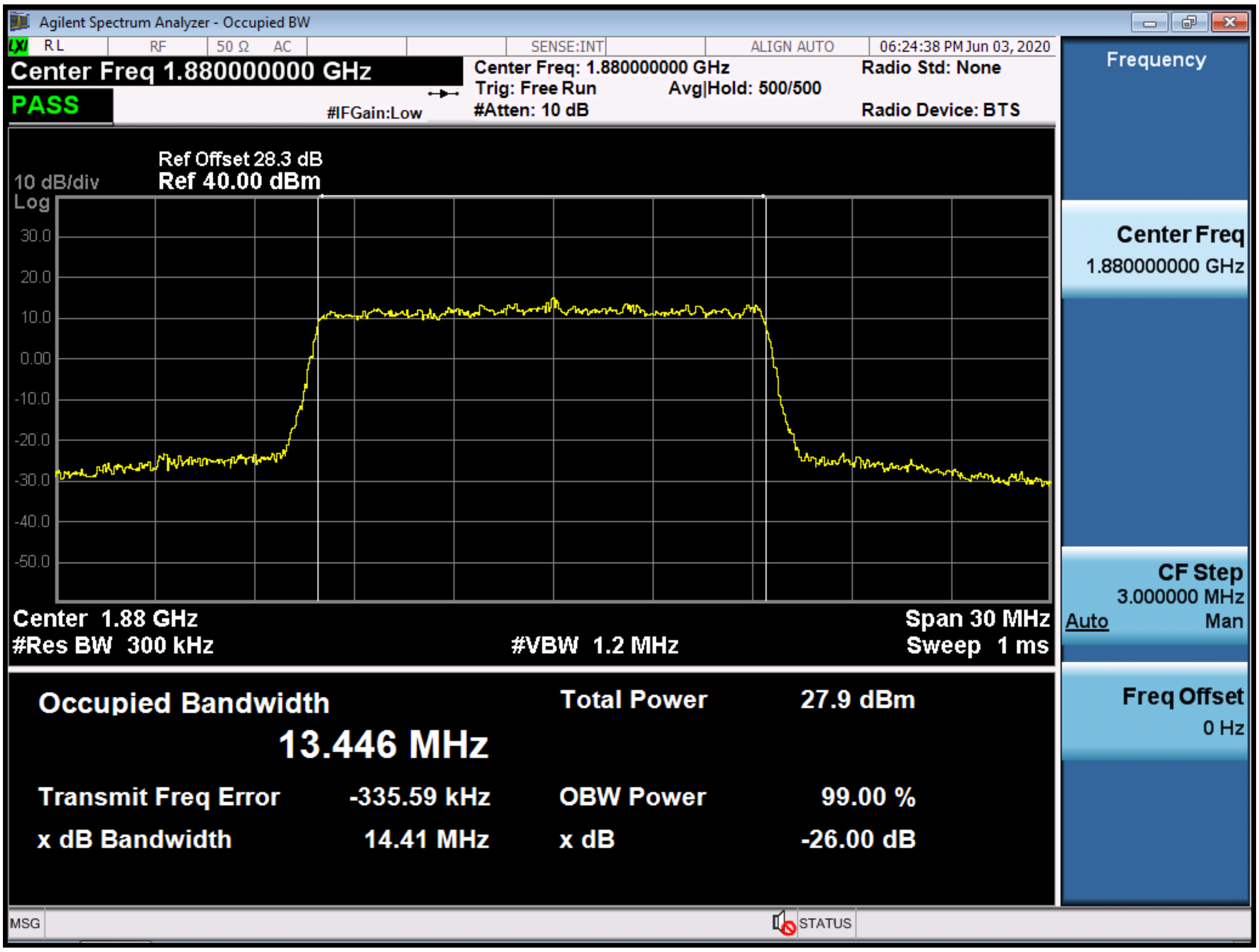
Sub6 n2. Occupied Bandwidth Plot (15M BW Ch.376000 16QAM RB 75_0)



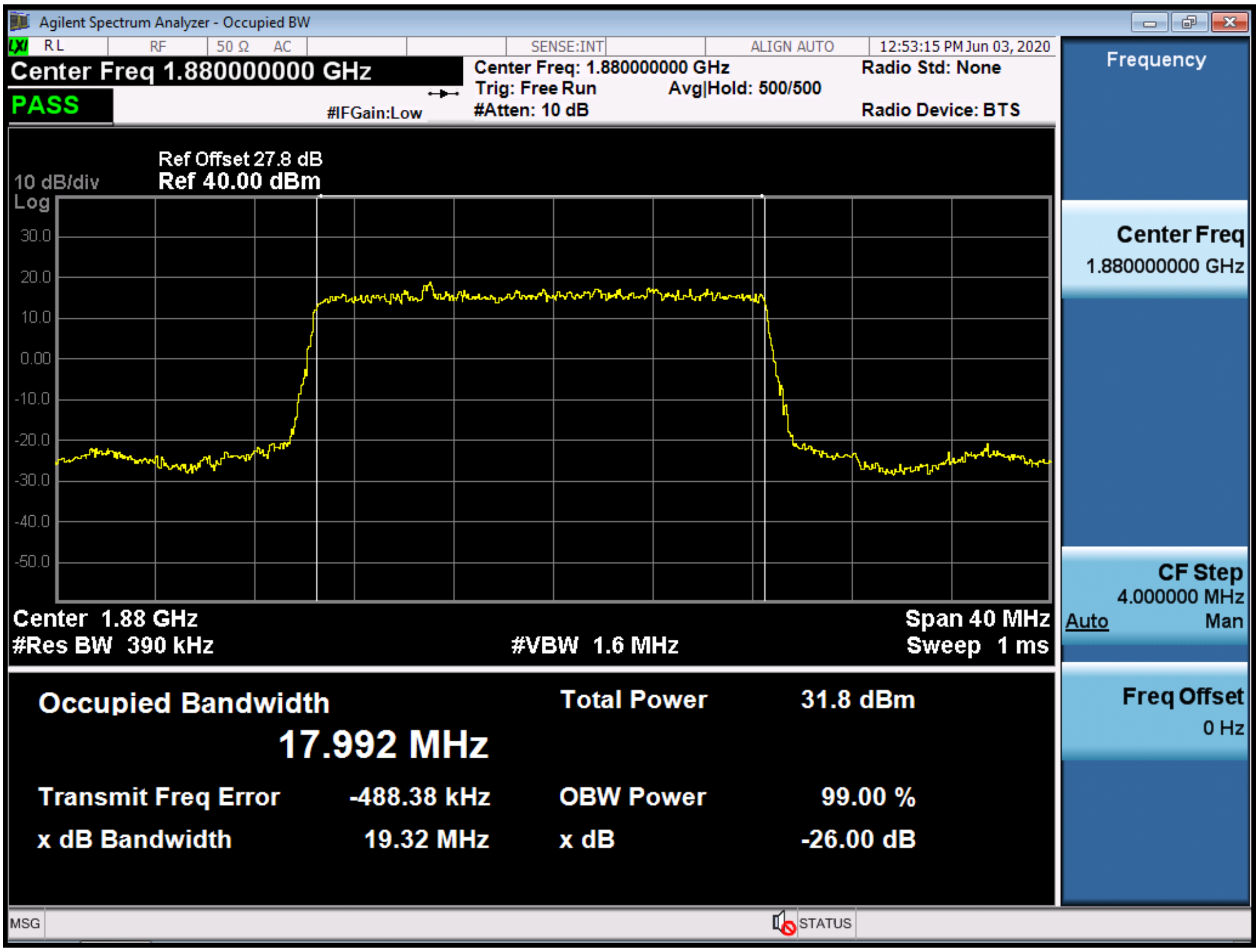
Sub6 n2. Occupied Bandwidth Plot (15M BW Ch.376000 64QAM RB 75_0)



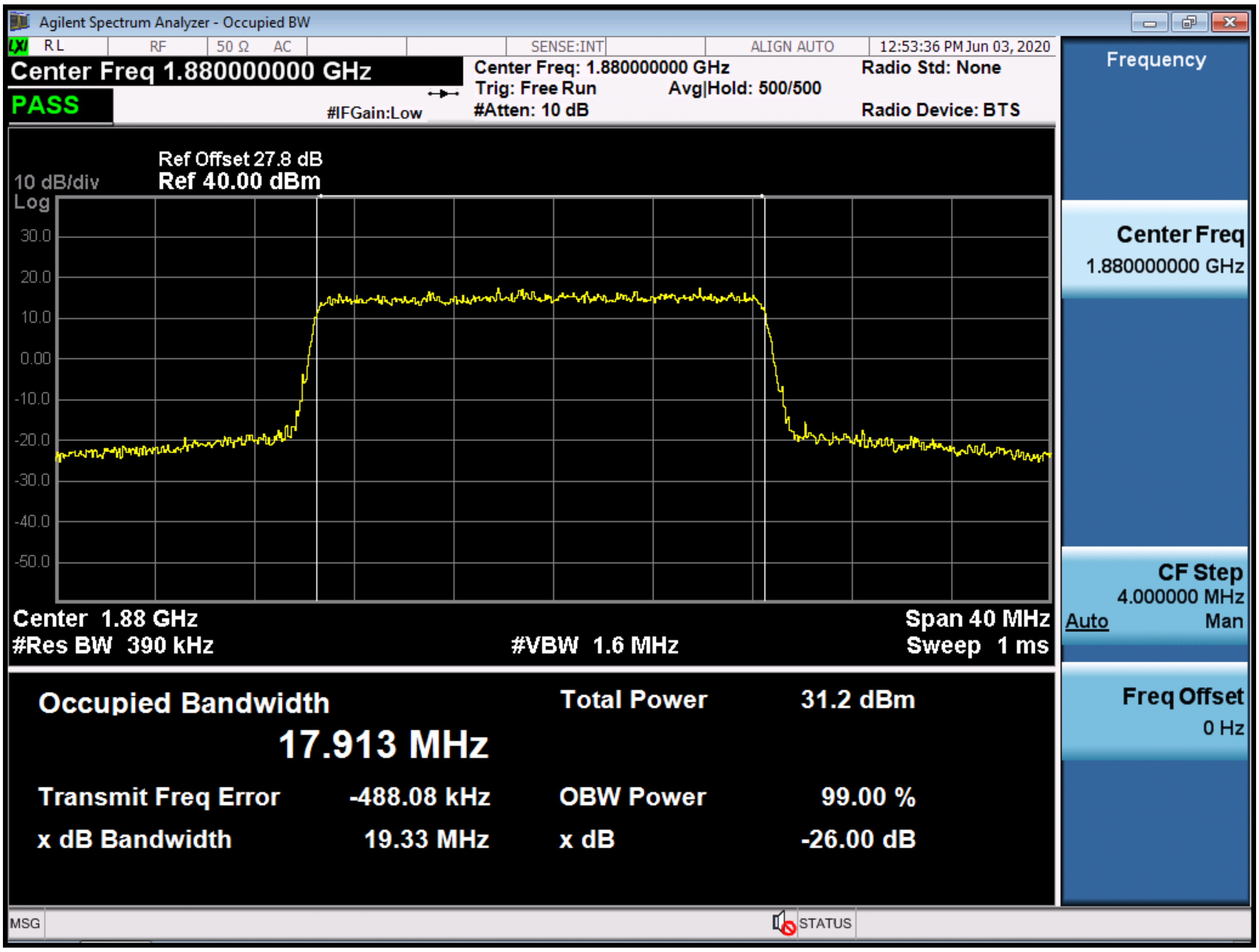
Sub6 n2. Occupied Bandwidth Plot (15M BW Ch.376000 256QAM RB 75_0)



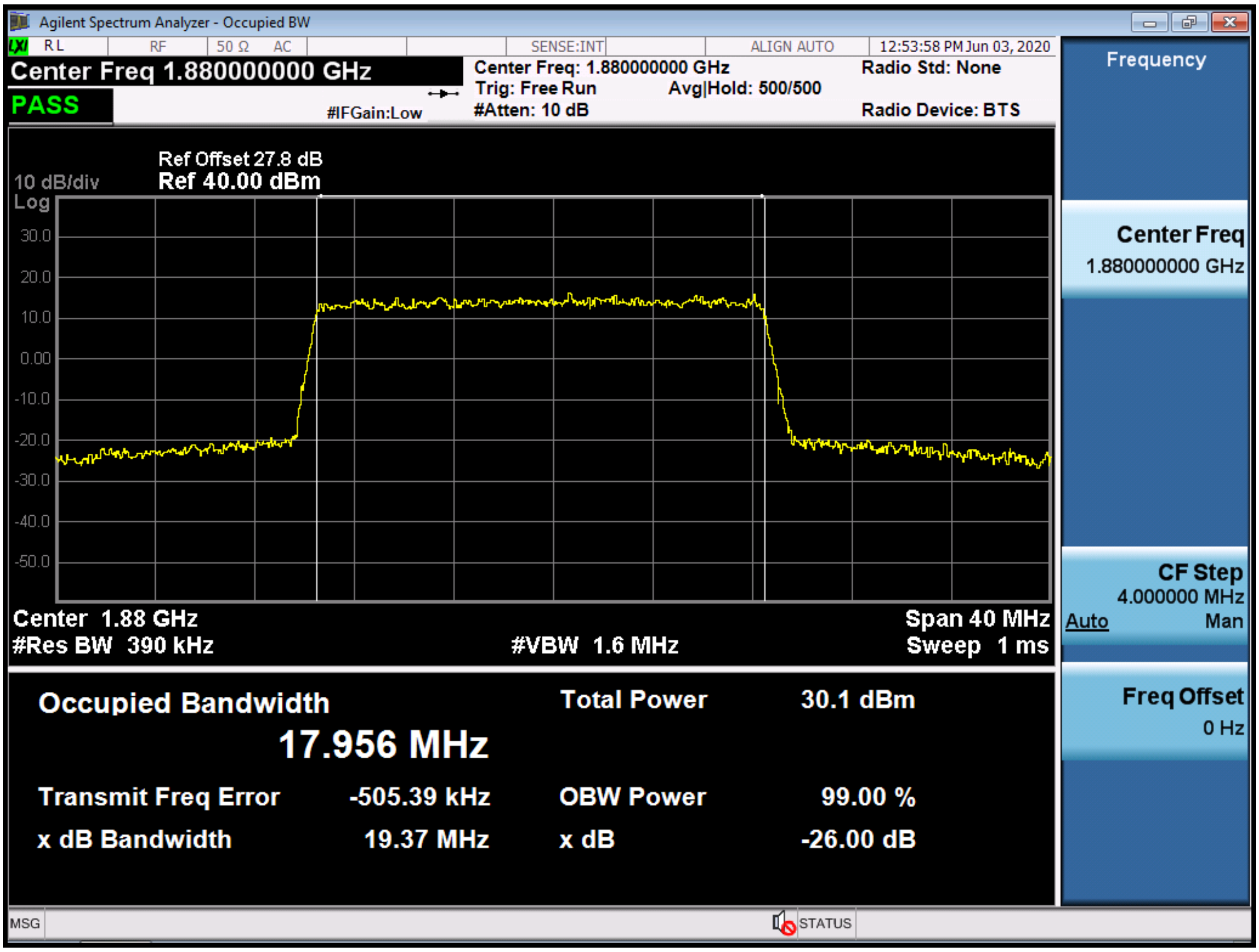
Sub6 n2. Occupied Bandwidth Plot (20M BW Ch.376000 BPSK RB 100_0)



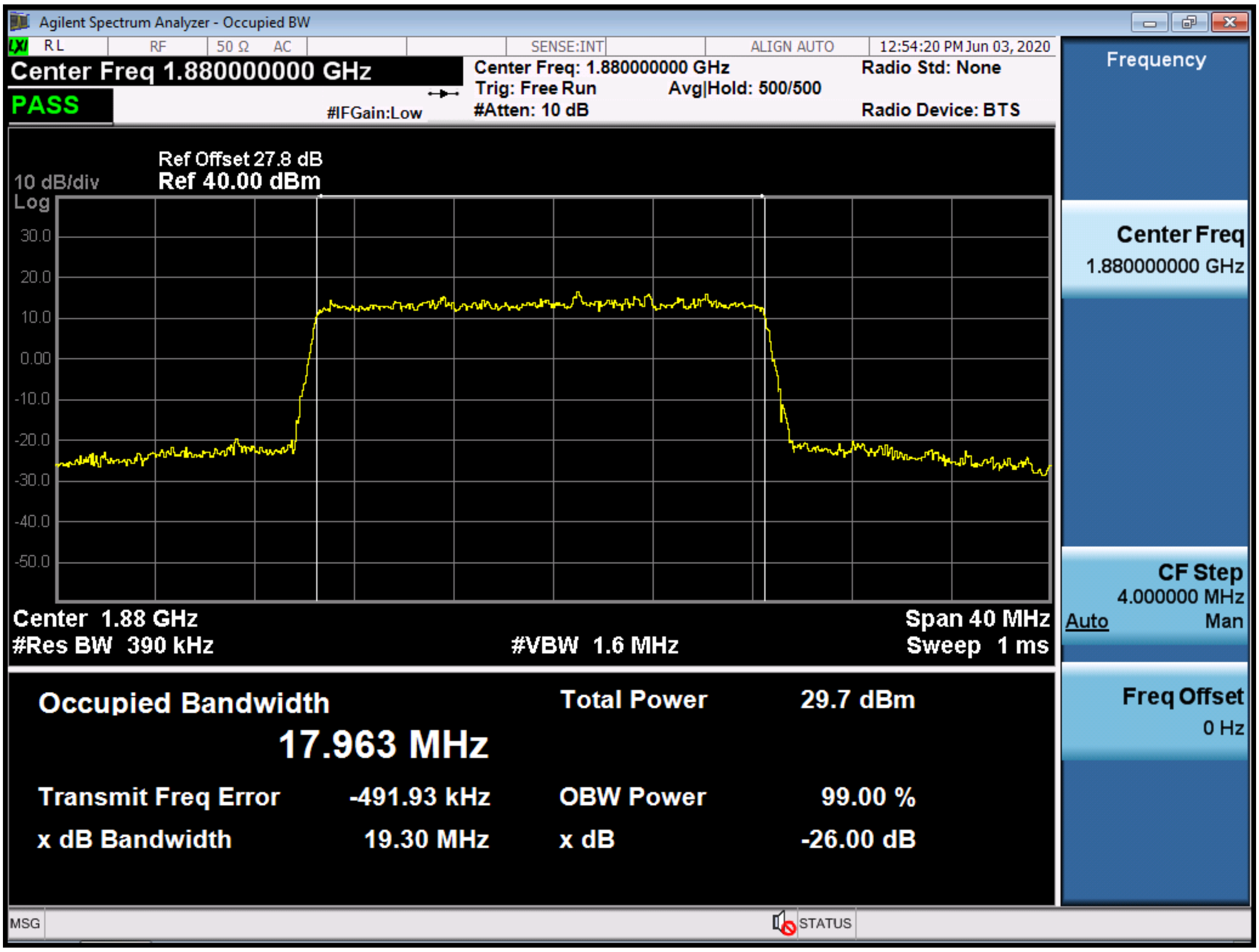
Sub6 n2. Occupied Bandwidth Plot (20M BW Ch.376000 QPSK RB 100_0)



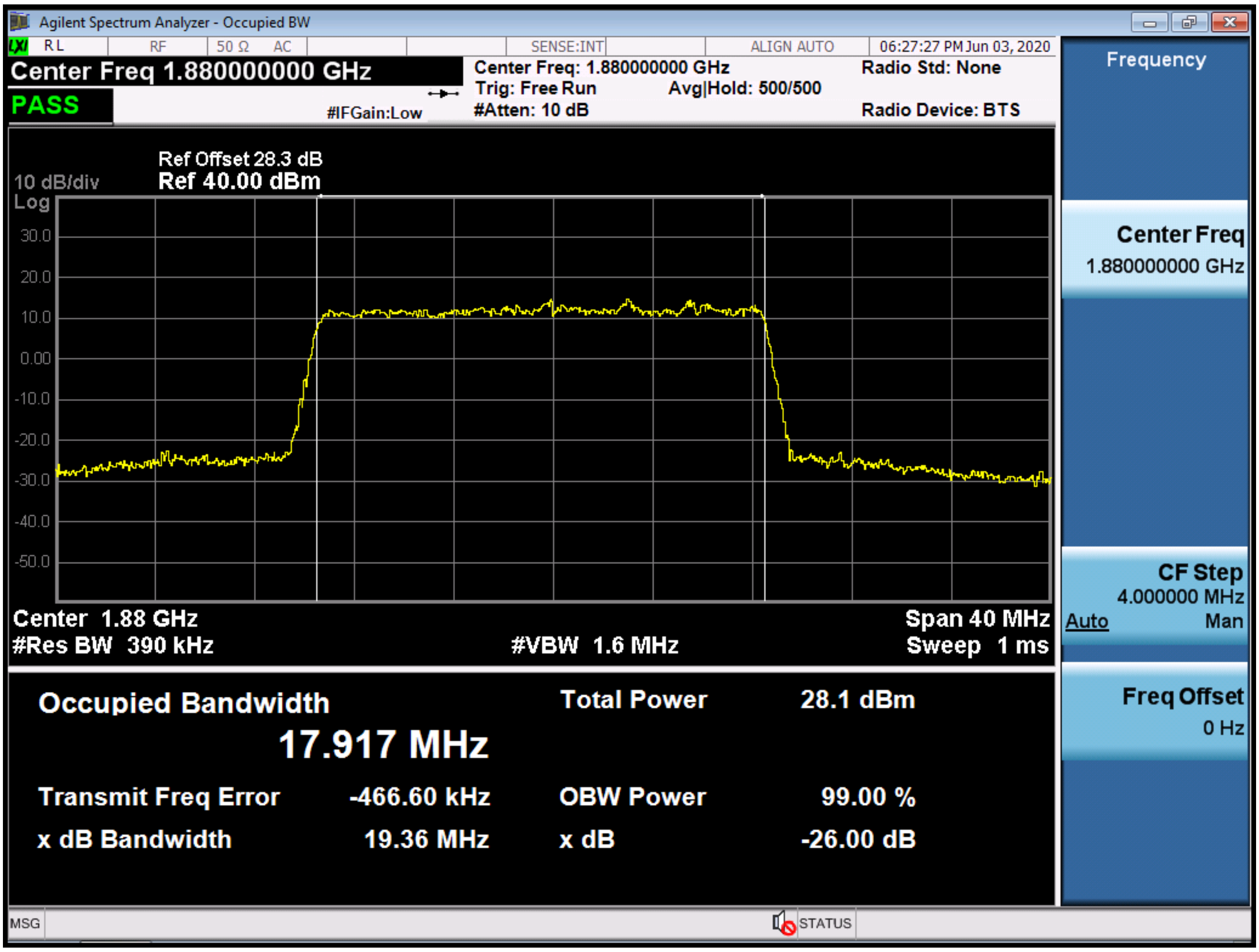
Sub6 n2. Occupied Bandwidth Plot (20M BW Ch.376000 16QAM RB 100_0)



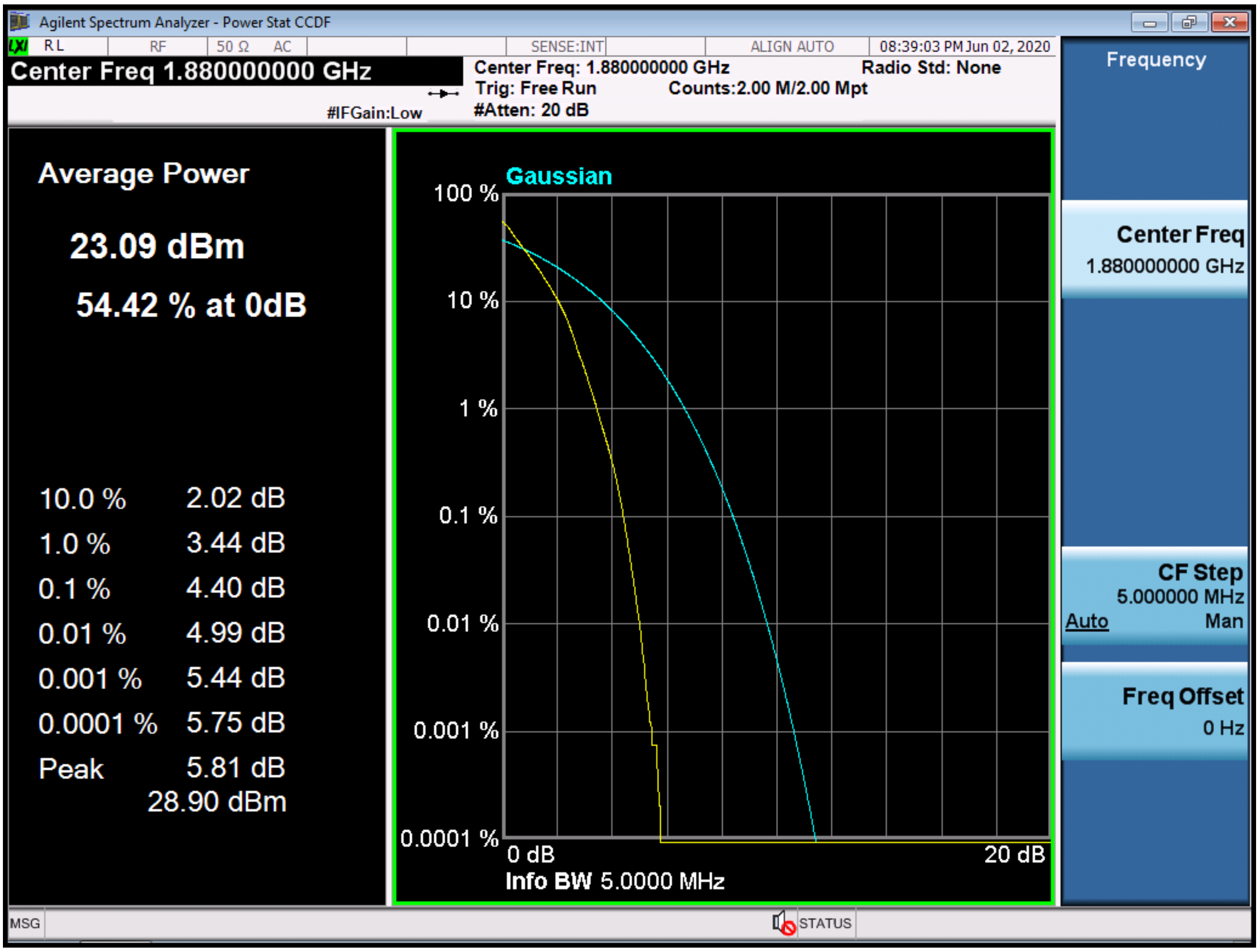
Sub6 n2. Occupied Bandwidth Plot (20M BW Ch.376000 64QAM RB 100_0)



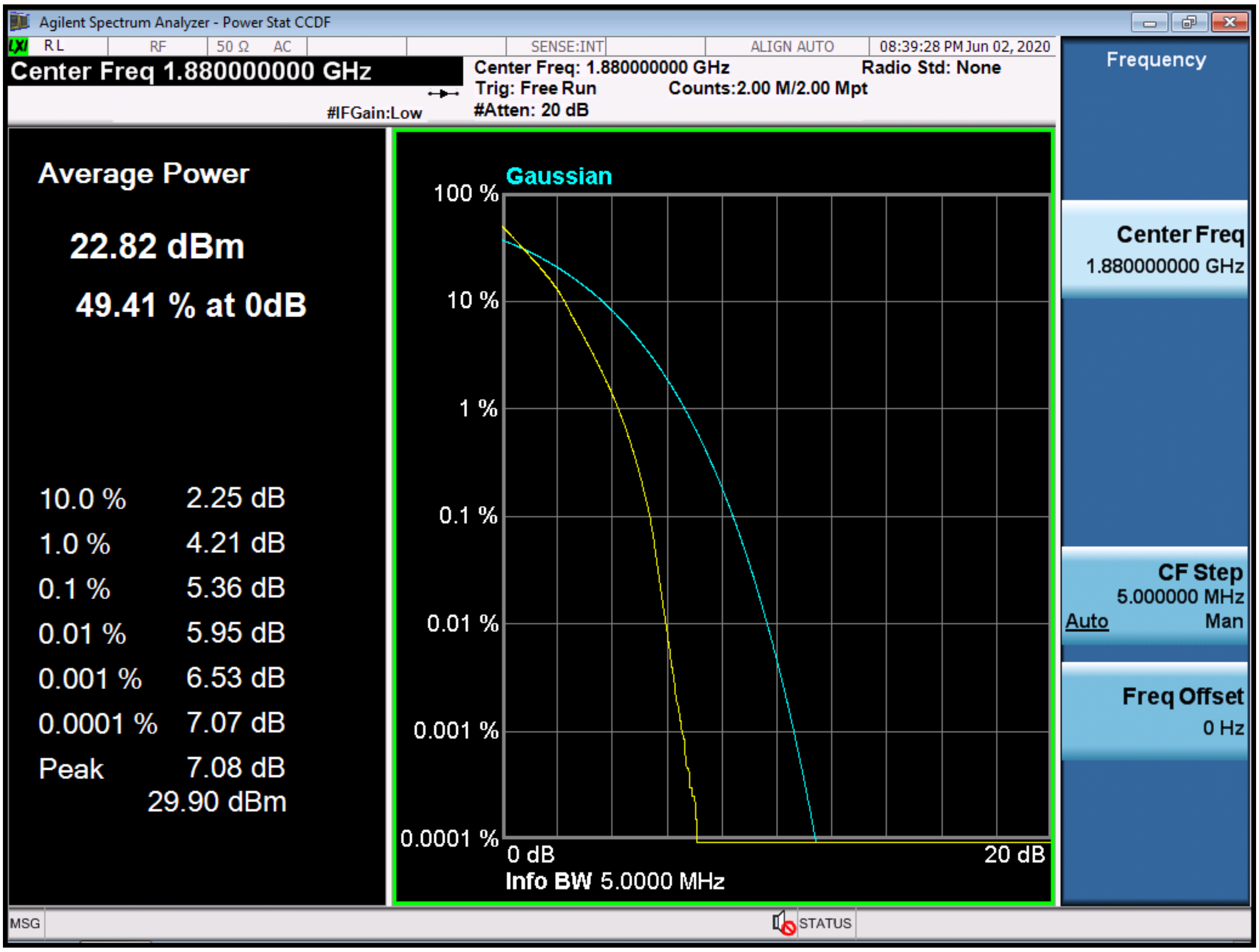
Sub6 n2. Occupied Bandwidth Plot (20M BW Ch.376000 256QAM RB 100_0)



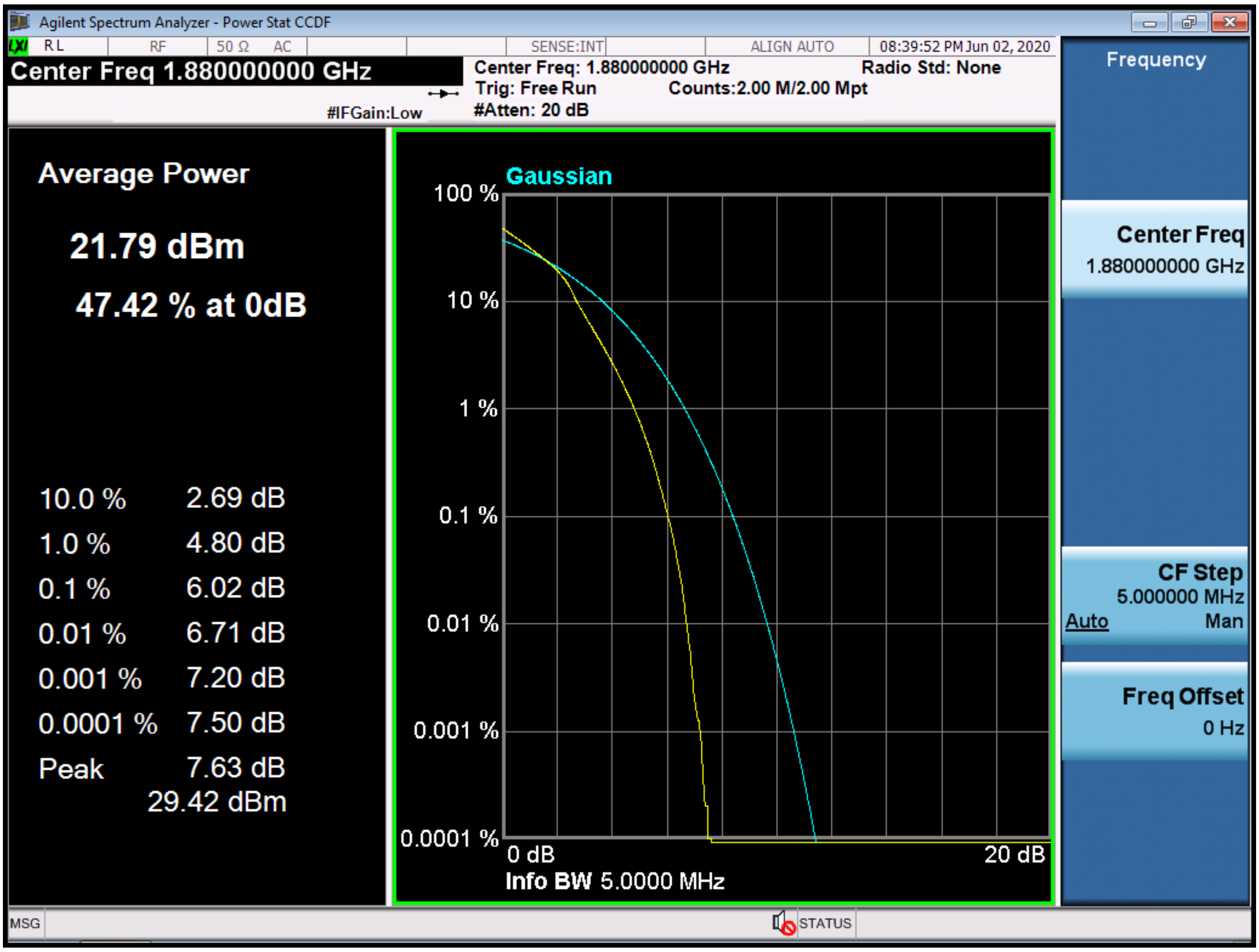
Sub6 n2. PAR Plot (5M BW Ch.376000 BPSK RB 25_0)



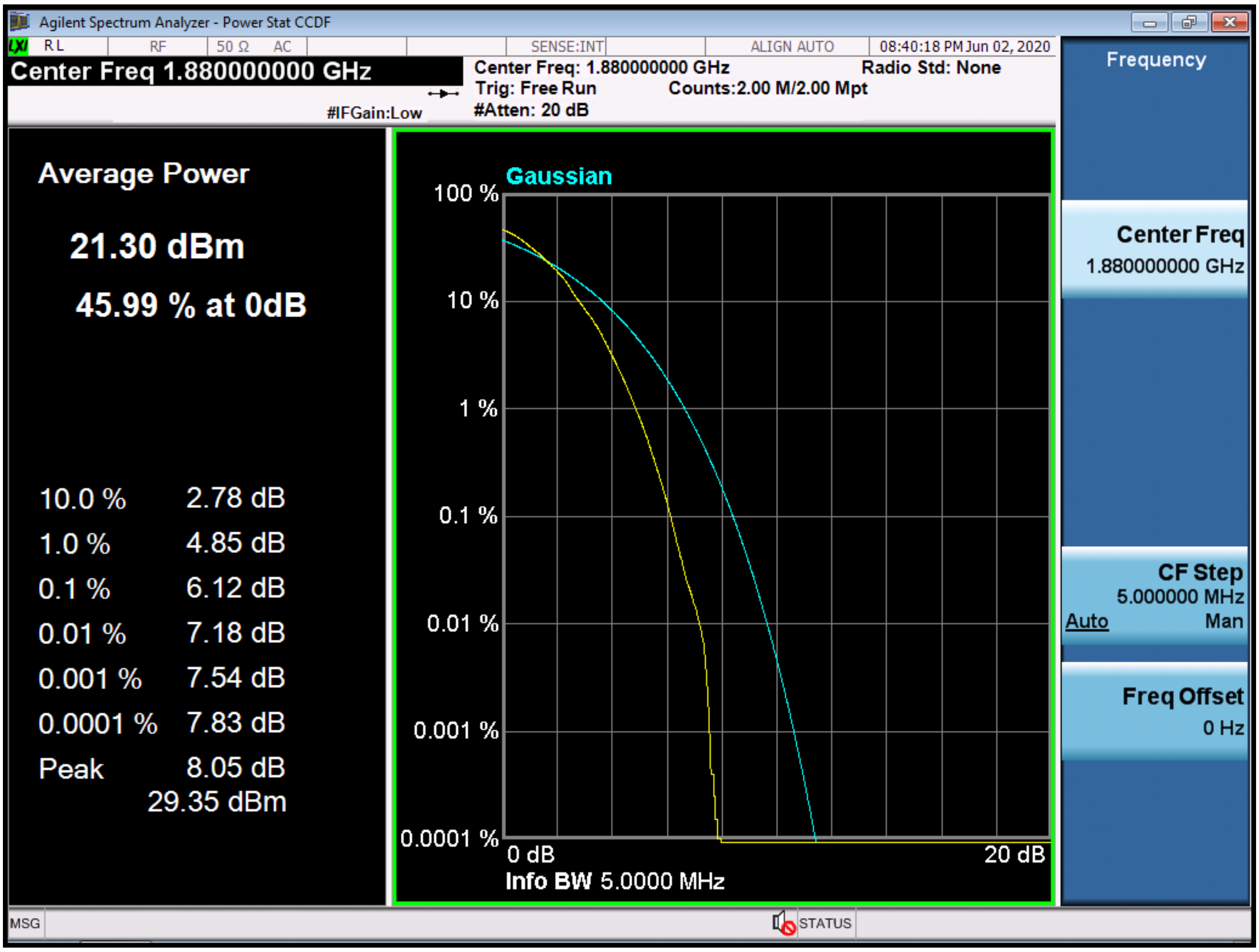
Sub6 n2. PAR Plot (5M BW Ch.376000 QPSK RB 25_0)



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

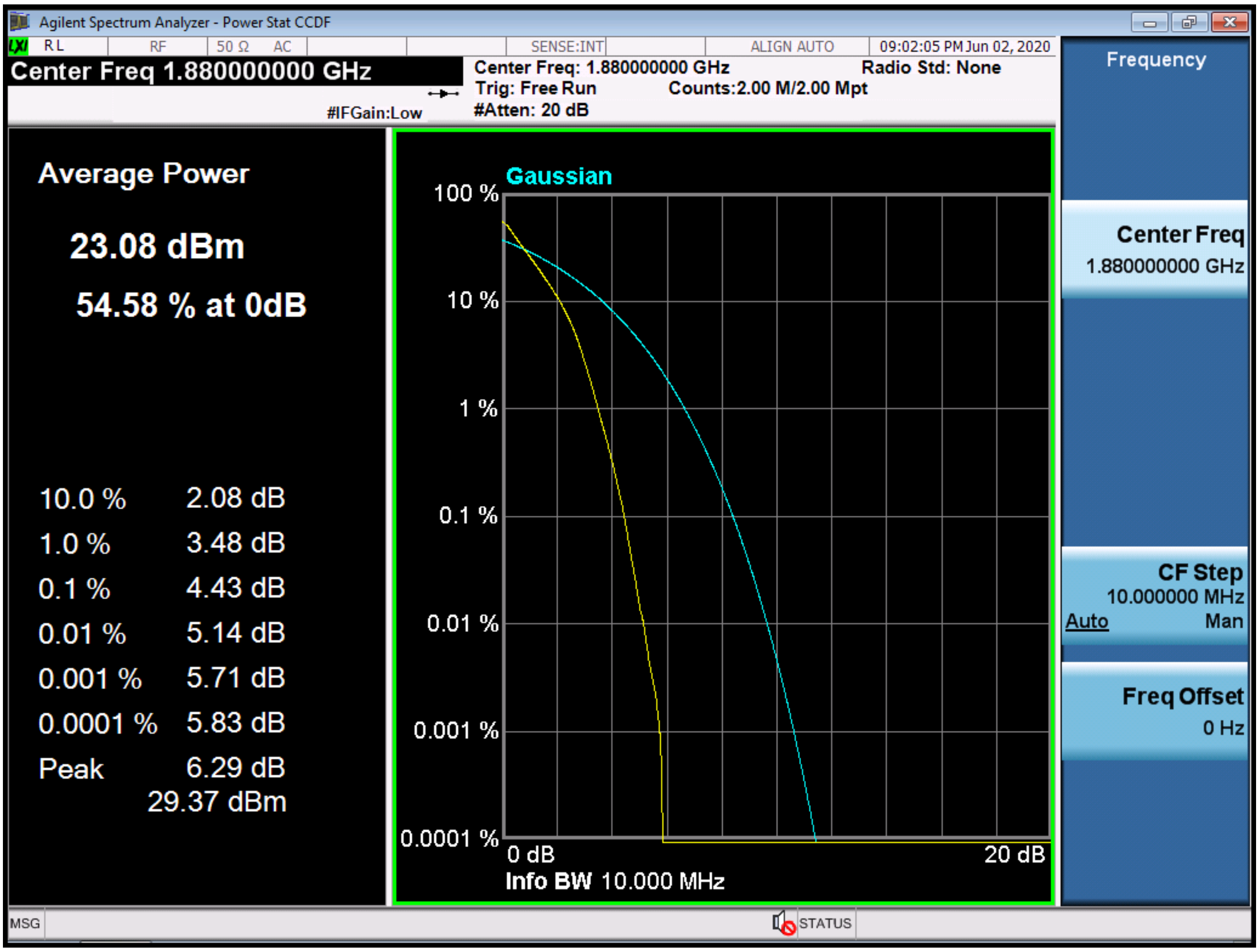


Sub6 n2. PAR Plot (5M BW Ch.376000 64QAM RB 25_0)

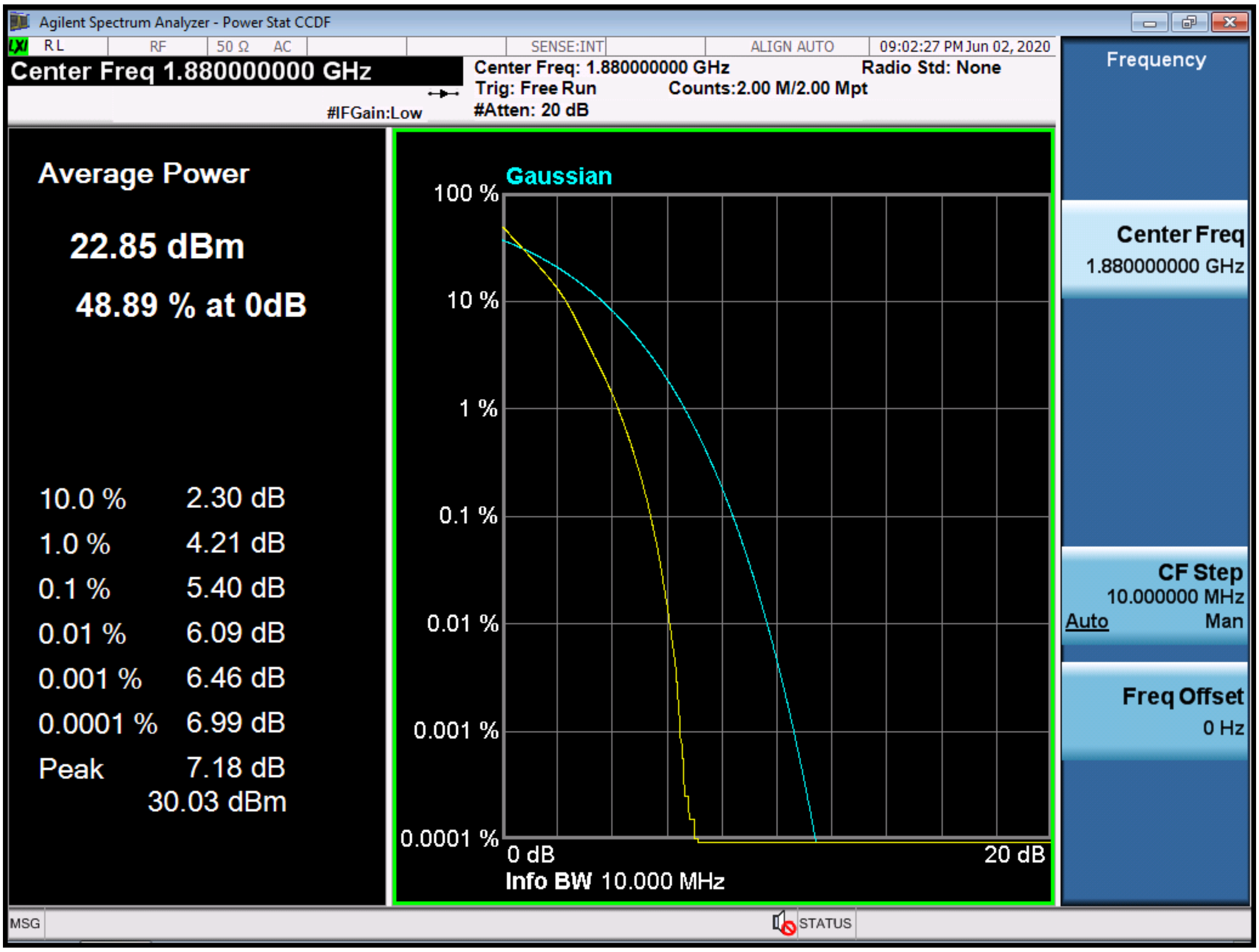


Sub6 n2. PAR Plot (5M BW Ch.376000 256QAM RB 25_0)

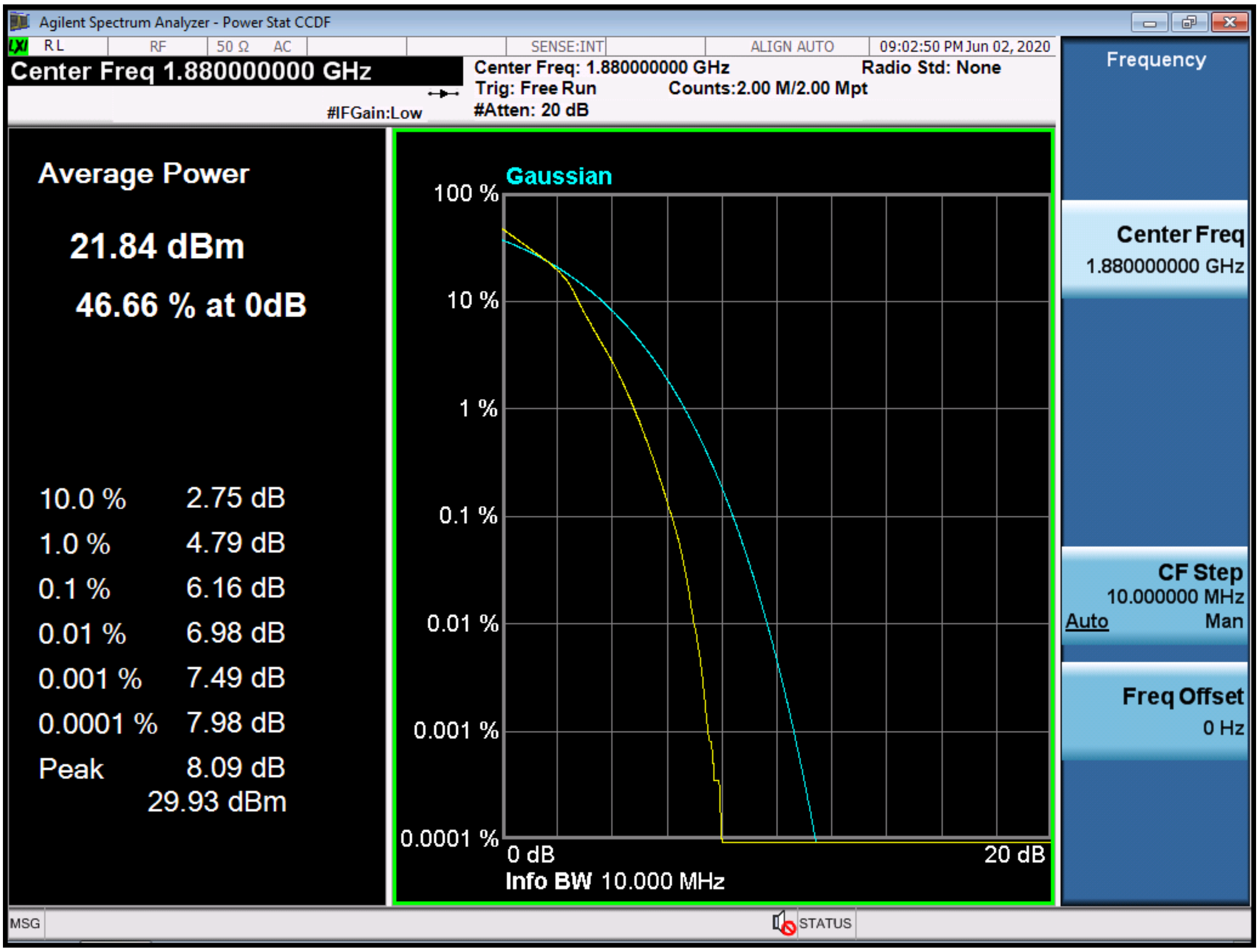
Sub6 n2. PAR Plot (10M BW Ch.376000 BPSK RB 50_0)



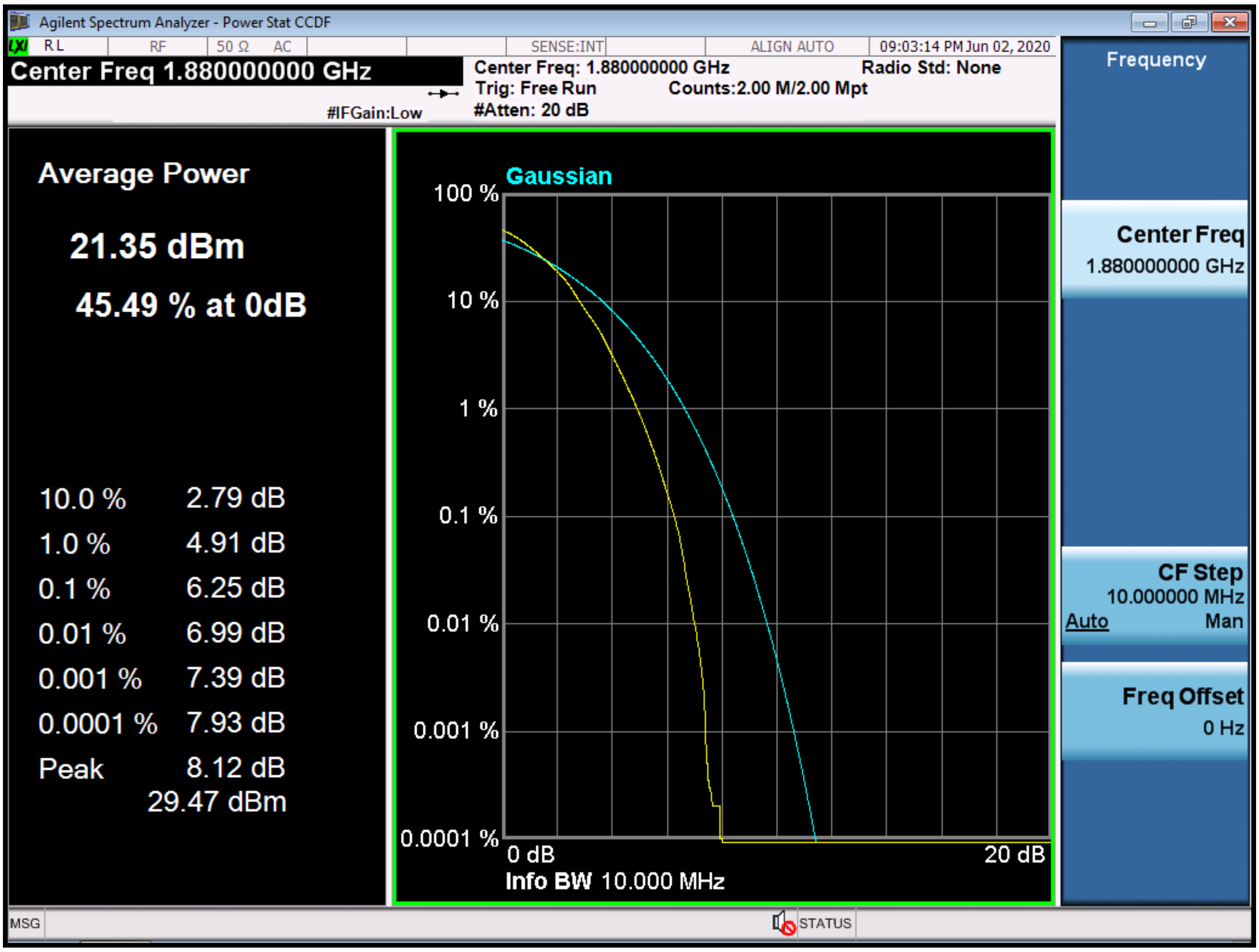
Sub6 n2. PAR Plot (10M BW Ch.376000 QPSK RB 50_0)



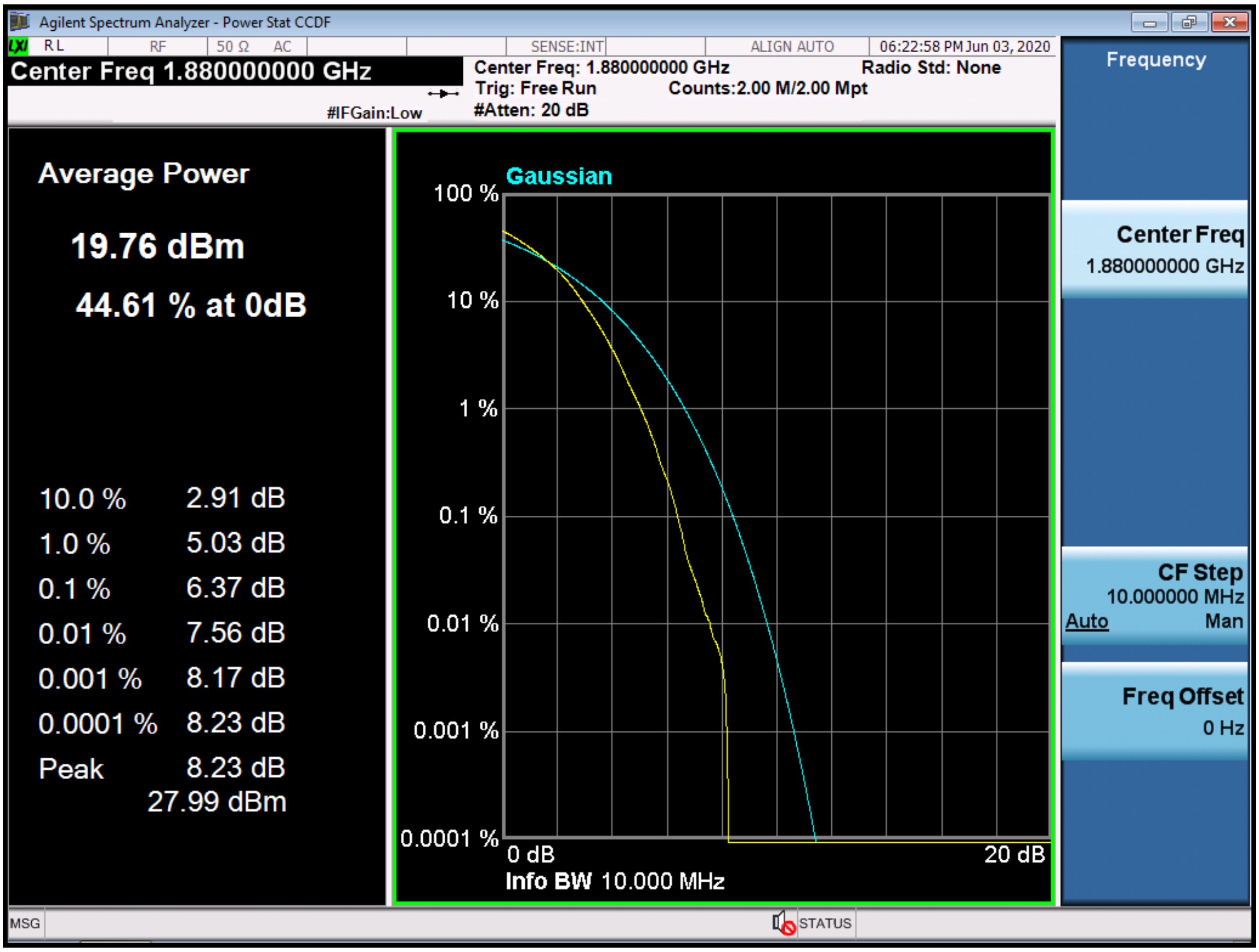
Sub6 n2. PAR Plot (10M BW Ch.376000 16QAM RB 50_0)



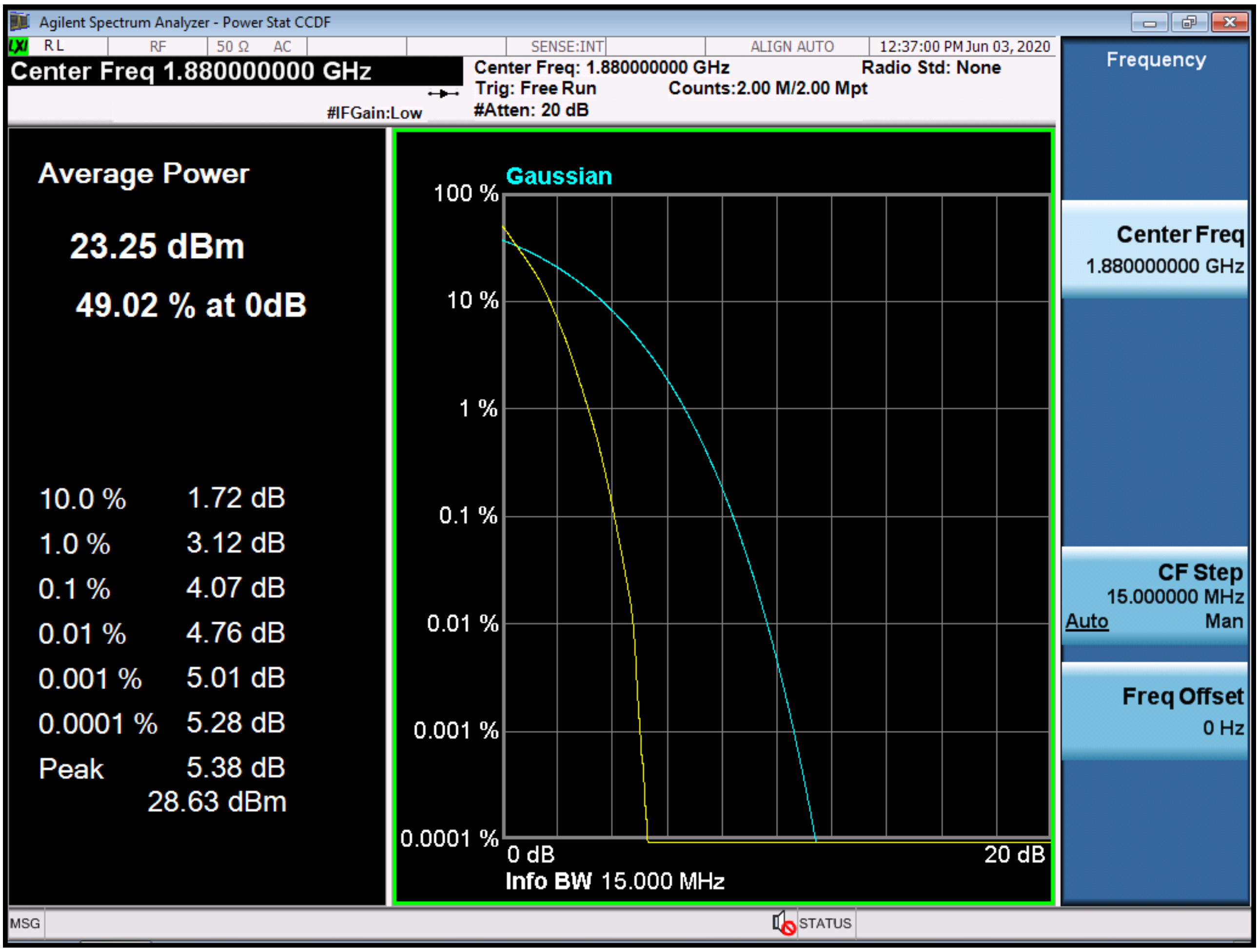
Sub6 n2. PAR Plot (10M BW Ch.376000 64QAM RB 50_0)



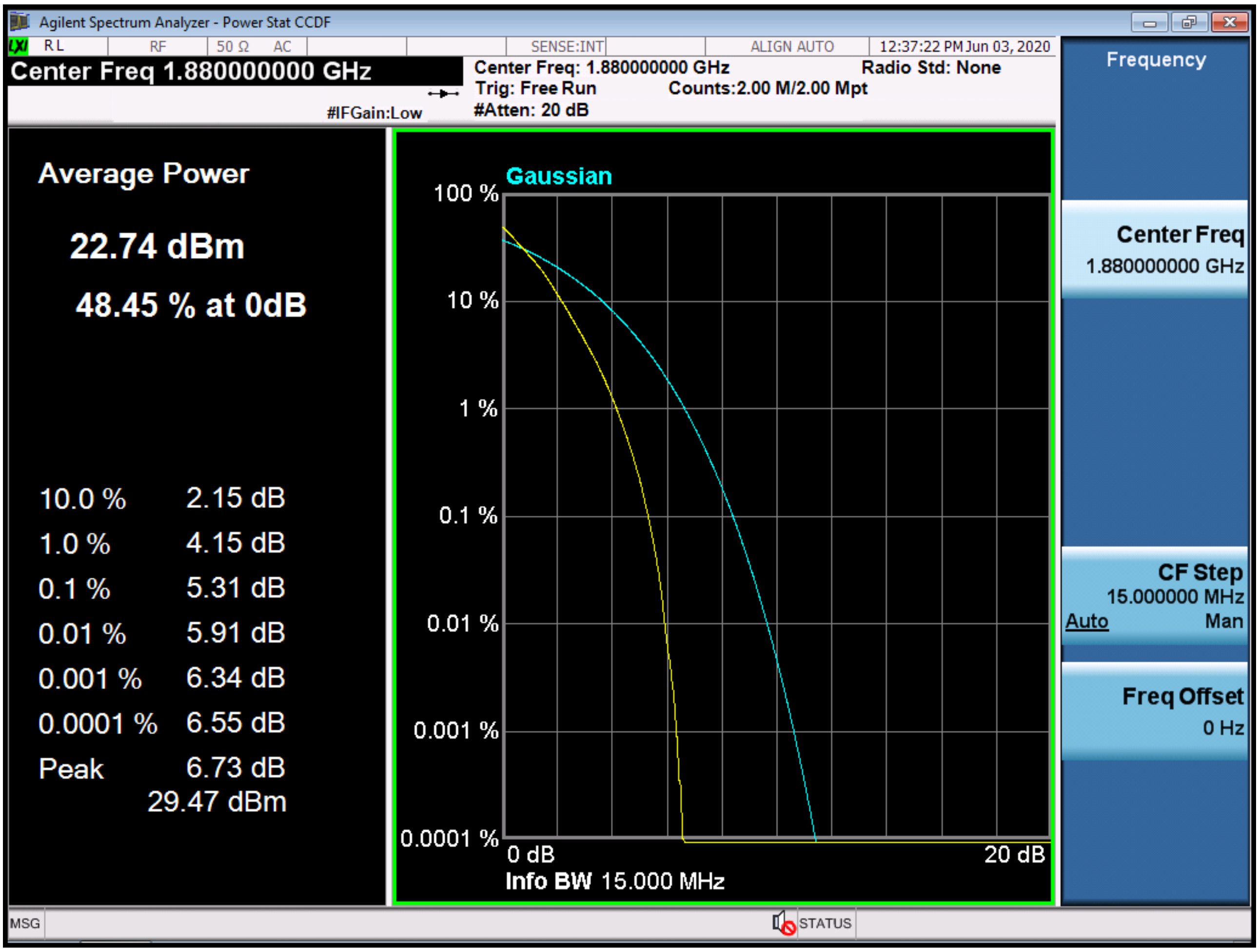
Sub6 n2. PAR Plot (10M BW Ch.376000 256QAM RB 50_0)



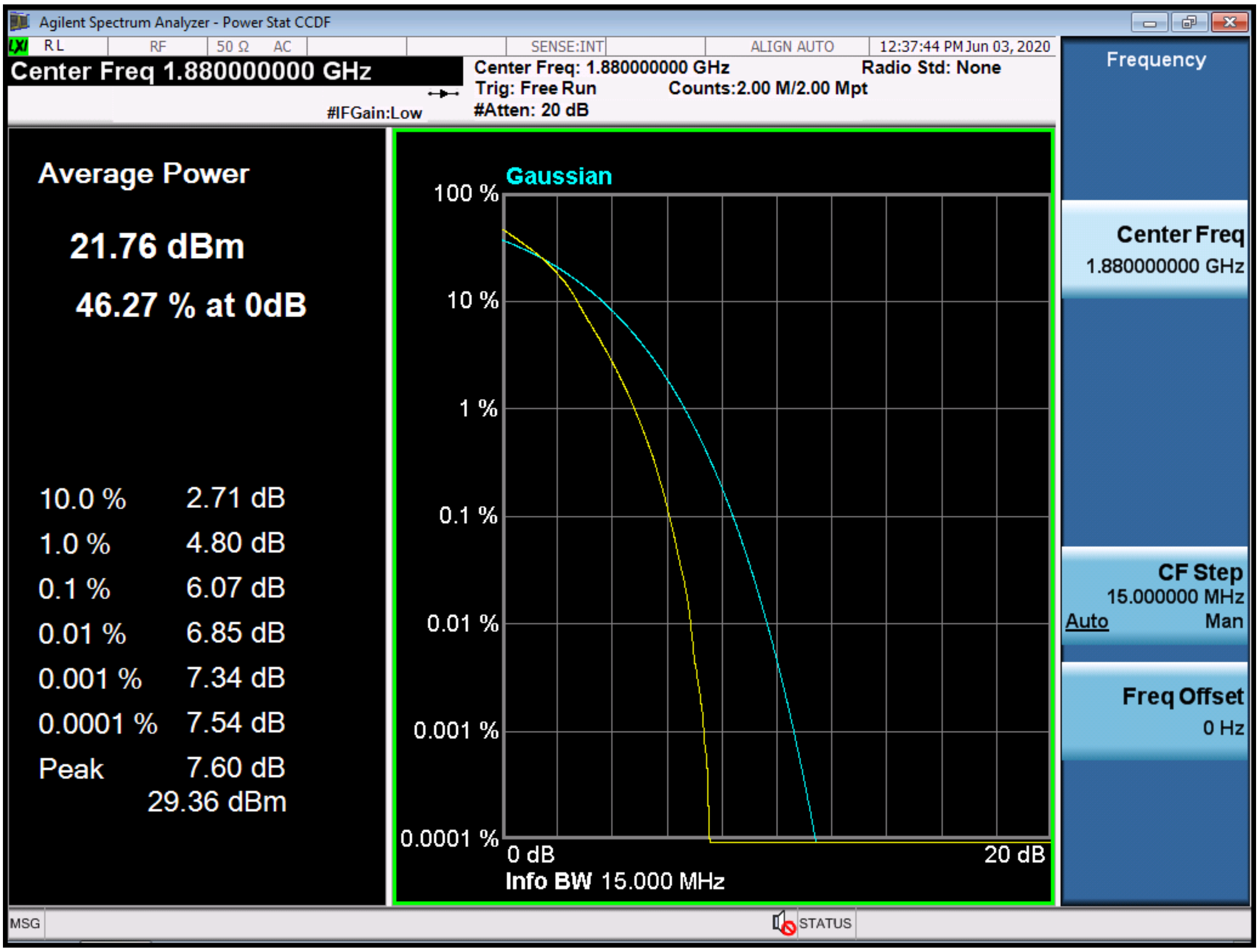
Sub6 n2. PAR Plot (15M BW Ch.376000 BPSK RB 75_0)



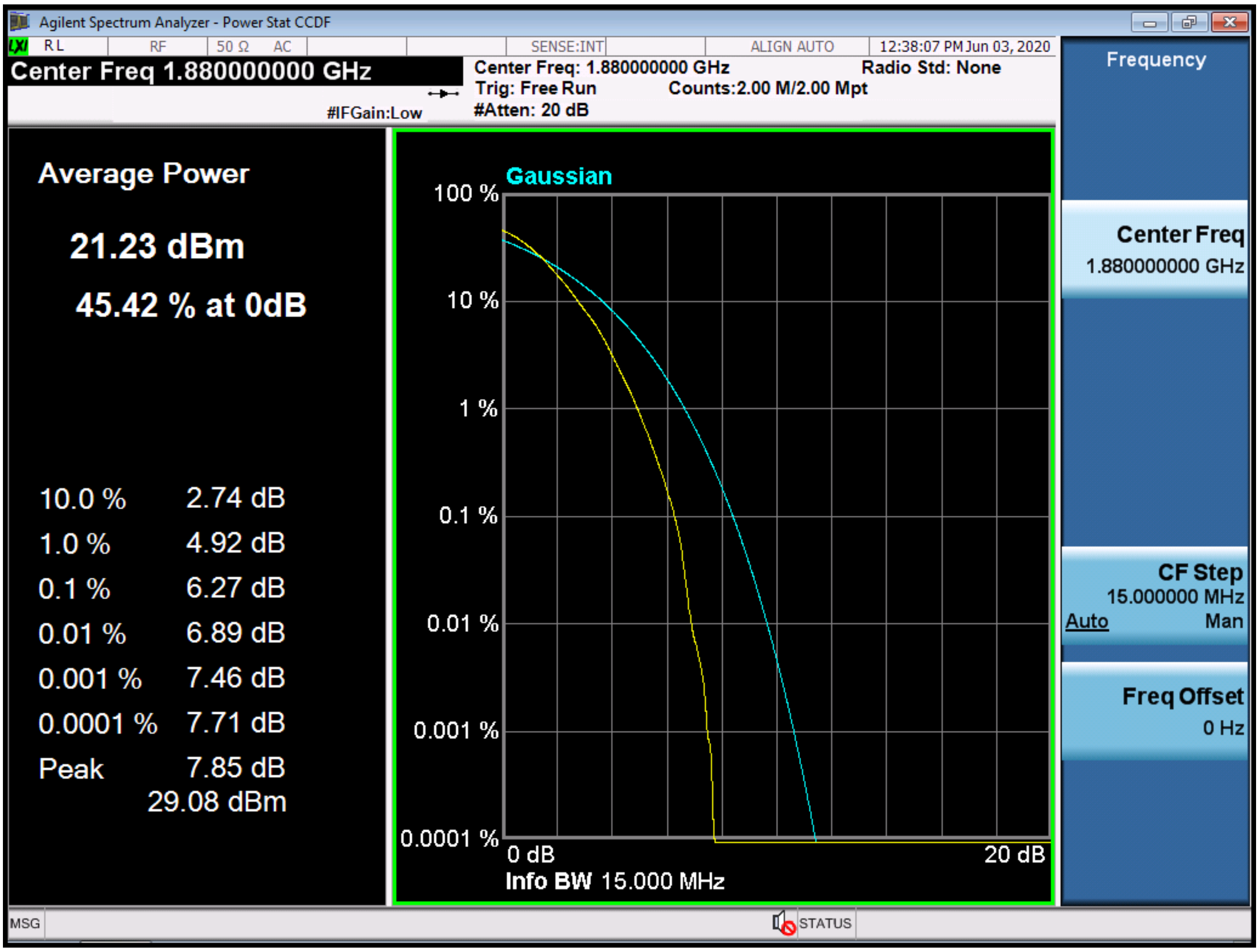
Sub6 n2. PAR Plot (15M BW Ch.376000 QPSK RB 75_0)



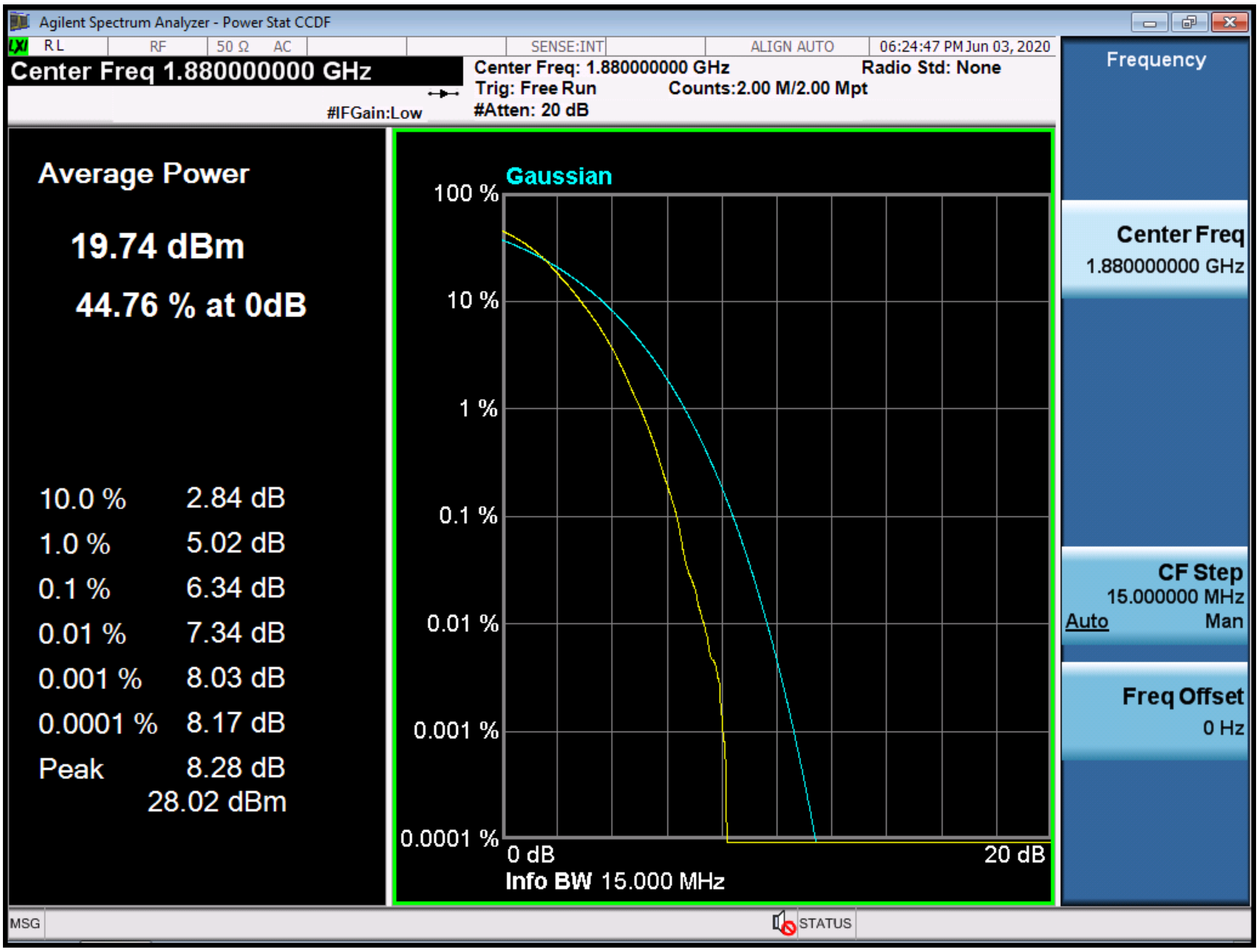
Sub6 n2. PAR Plot (15M BW Ch.376000 16QAM RB 75_0)



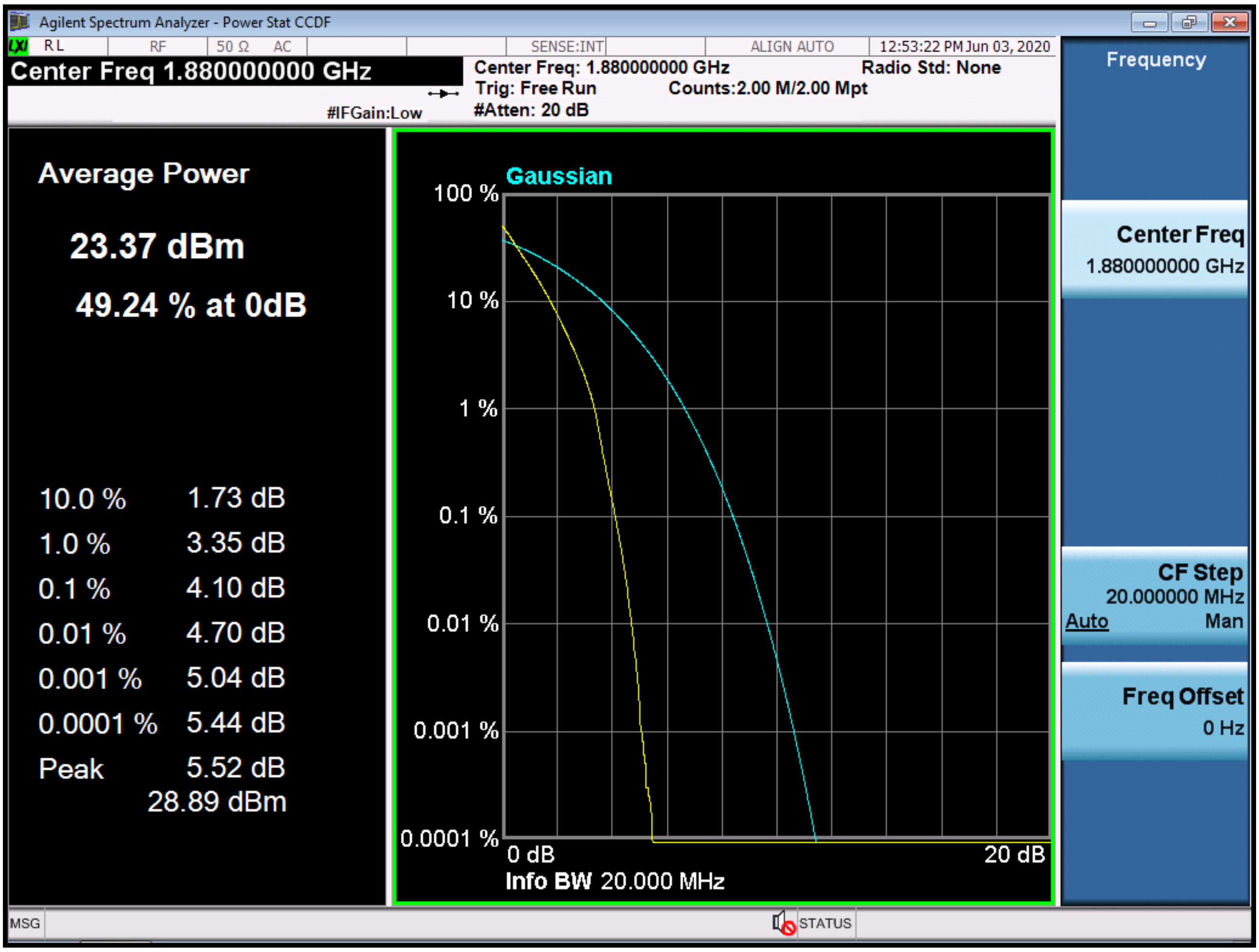
Sub6 n2. PAR Plot (15M BW Ch.376000 64QAM RB 75_0)



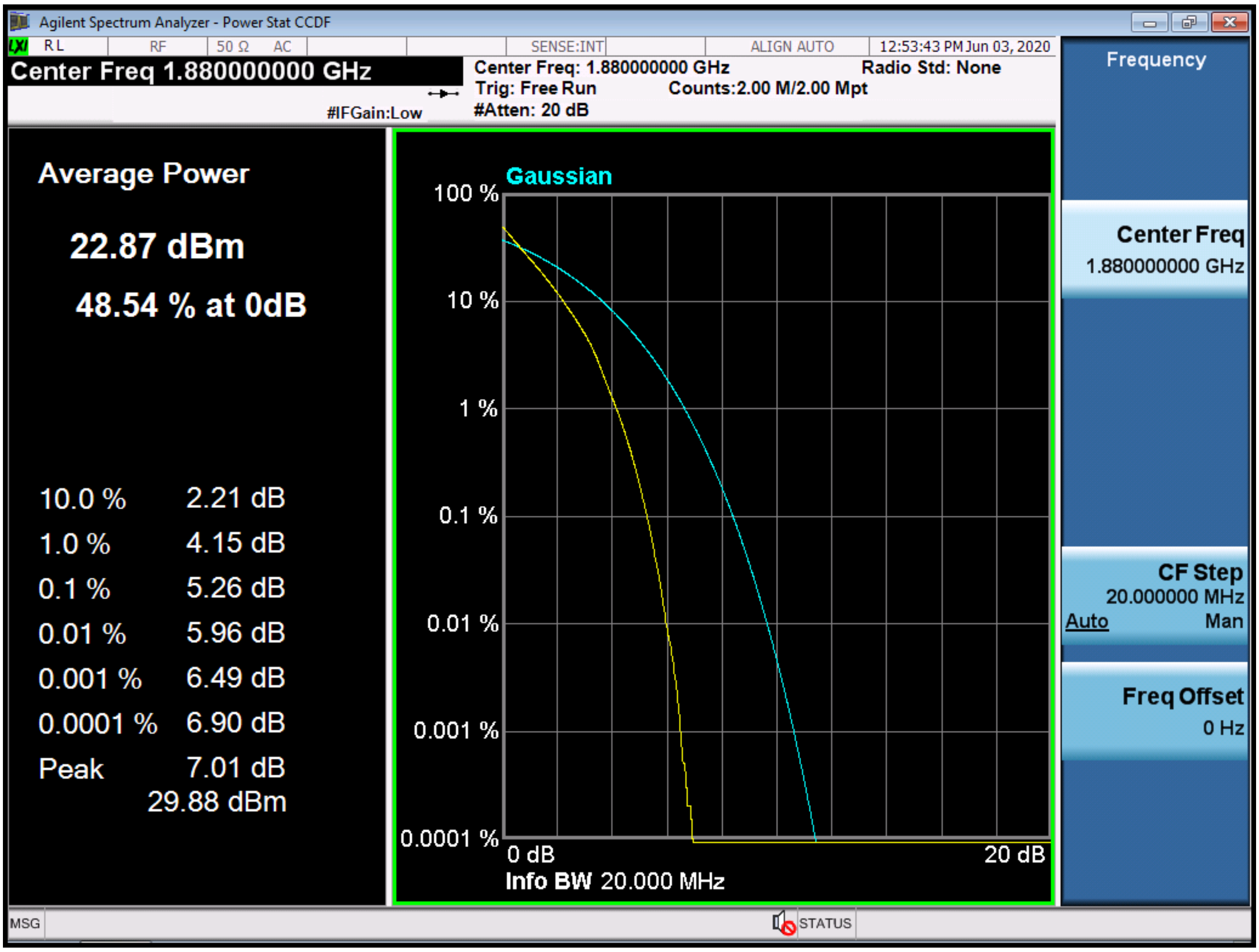
Sub6 n2. PAR Plot (15M BW Ch.376000 256QAM RB 75_0)



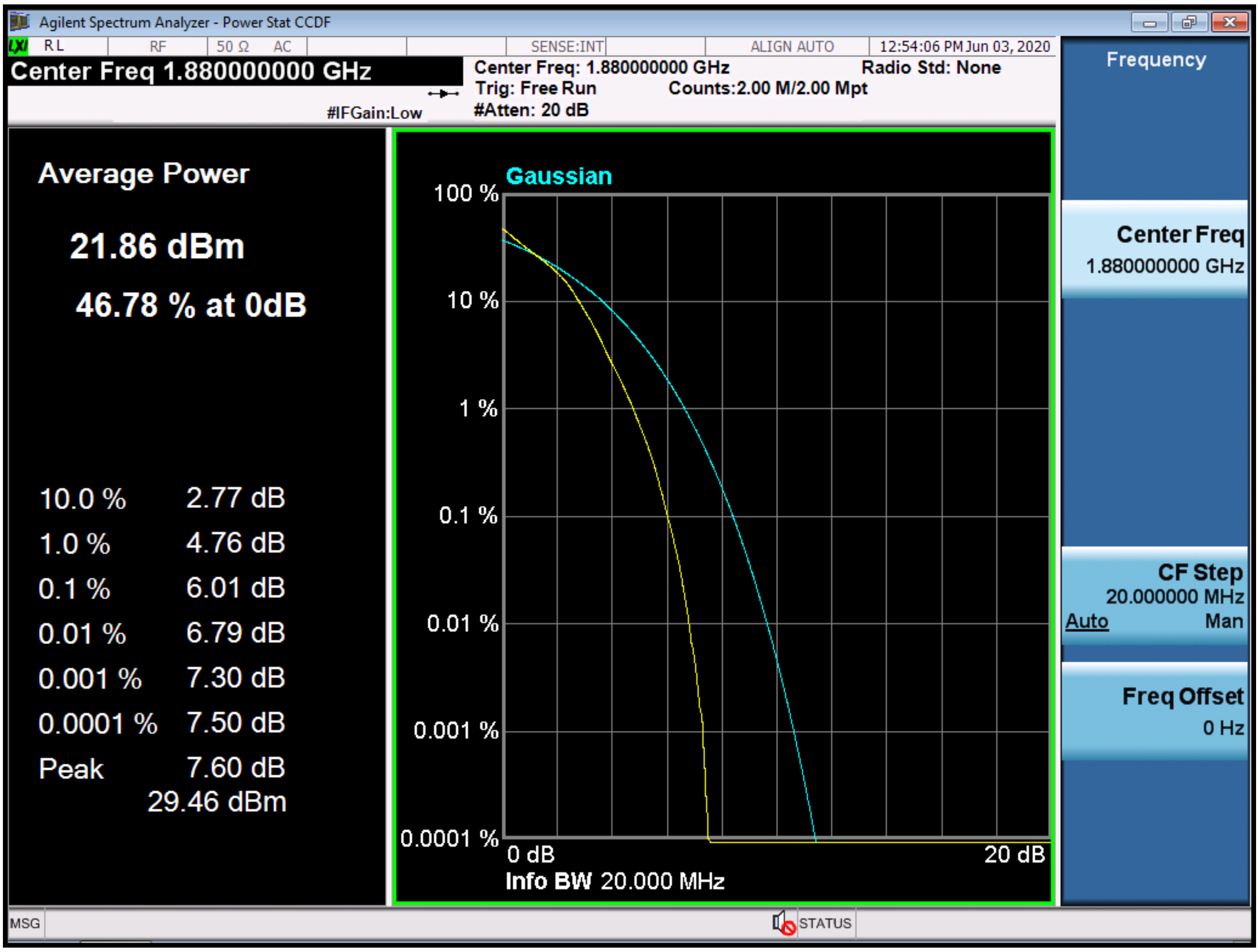
Sub6 n2. PAR Plot (20M BW Ch.376000 BPSK RB 100_0)



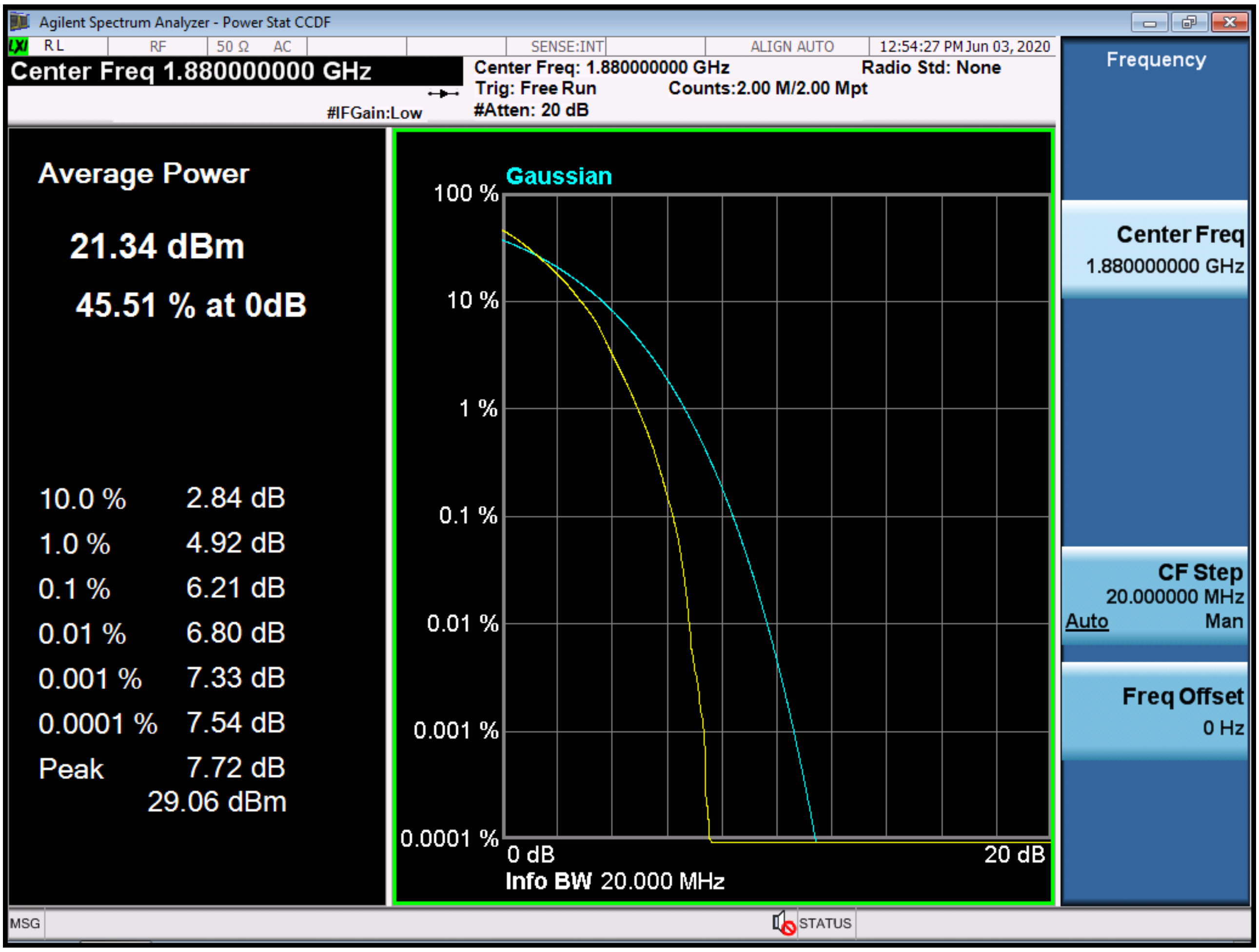
Sub6 n2. PAR Plot (20M BW Ch.376000 QPSK RB 100_0)



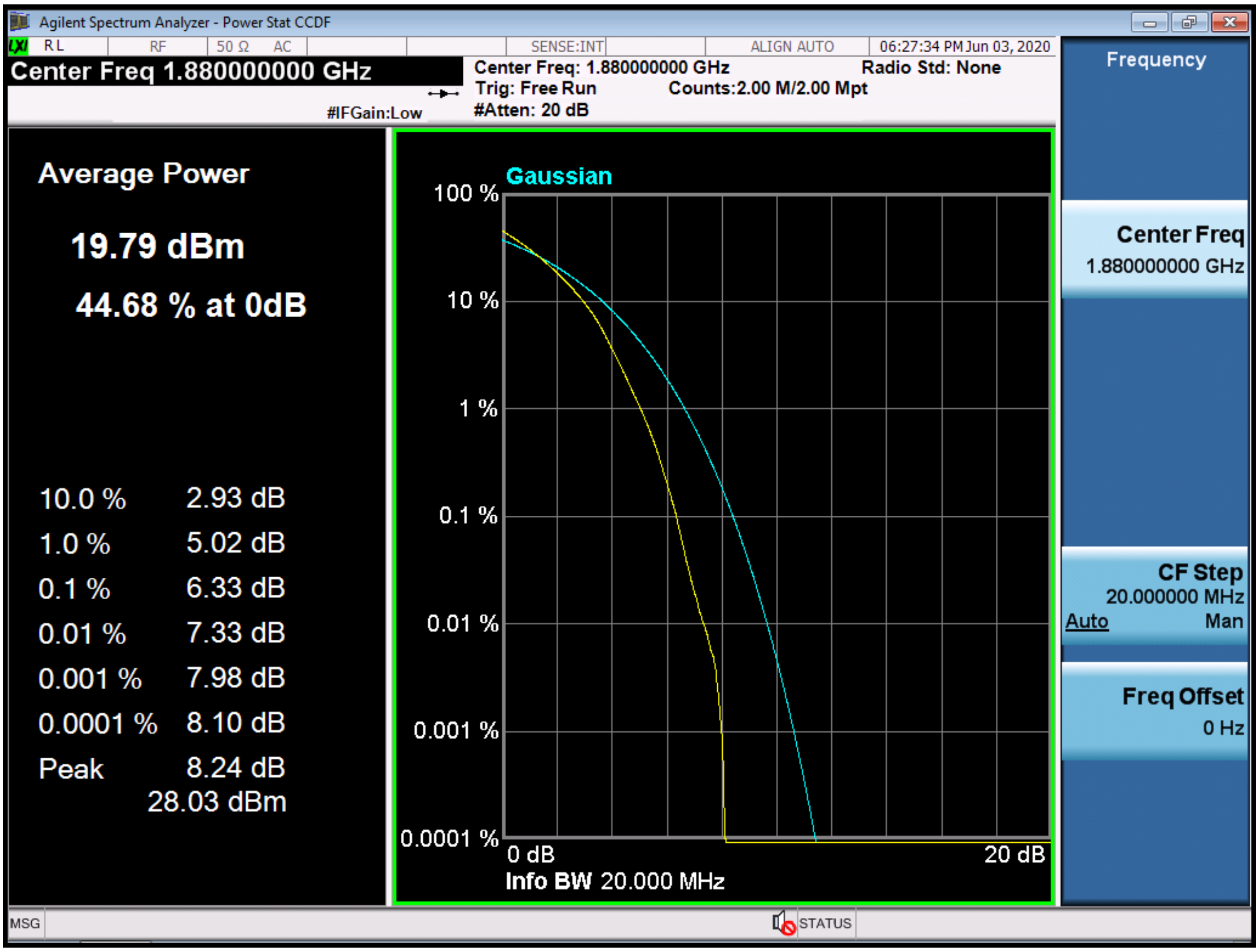
Sub6 n2. PAR Plot (20M BW Ch.376000 16QAM RB 100_0)



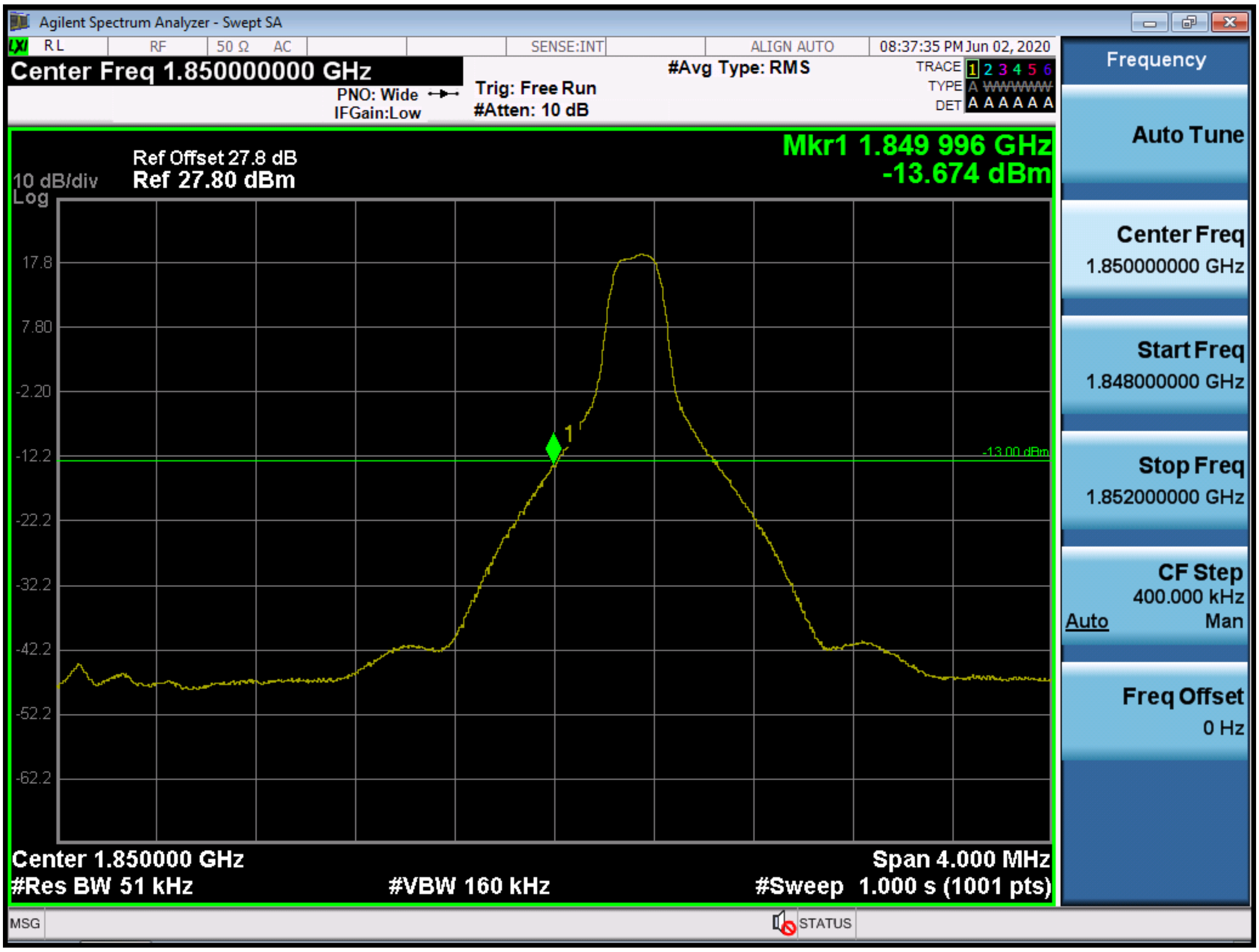
Sub6 n2. PAR Plot (20M BW Ch.376000 64QAM RB 100_0)



Sub6 n2. PAR Plot (20M BW Ch.376000 256QAM RB 100_0)



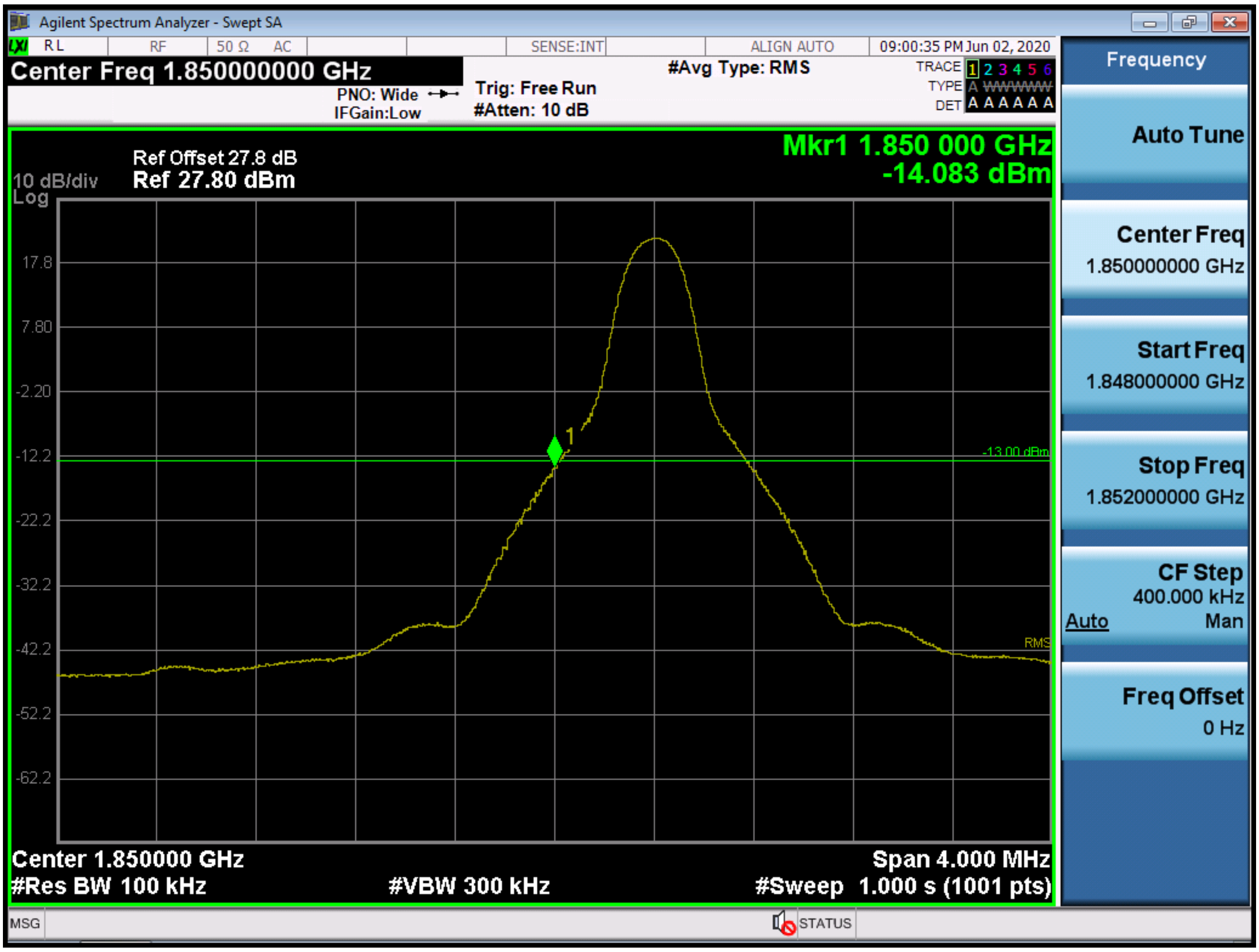
Sub6 n2. Lower Band Edge Plot (5M BW Ch.370500 BPSK_RB1_Offset 0) -1



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

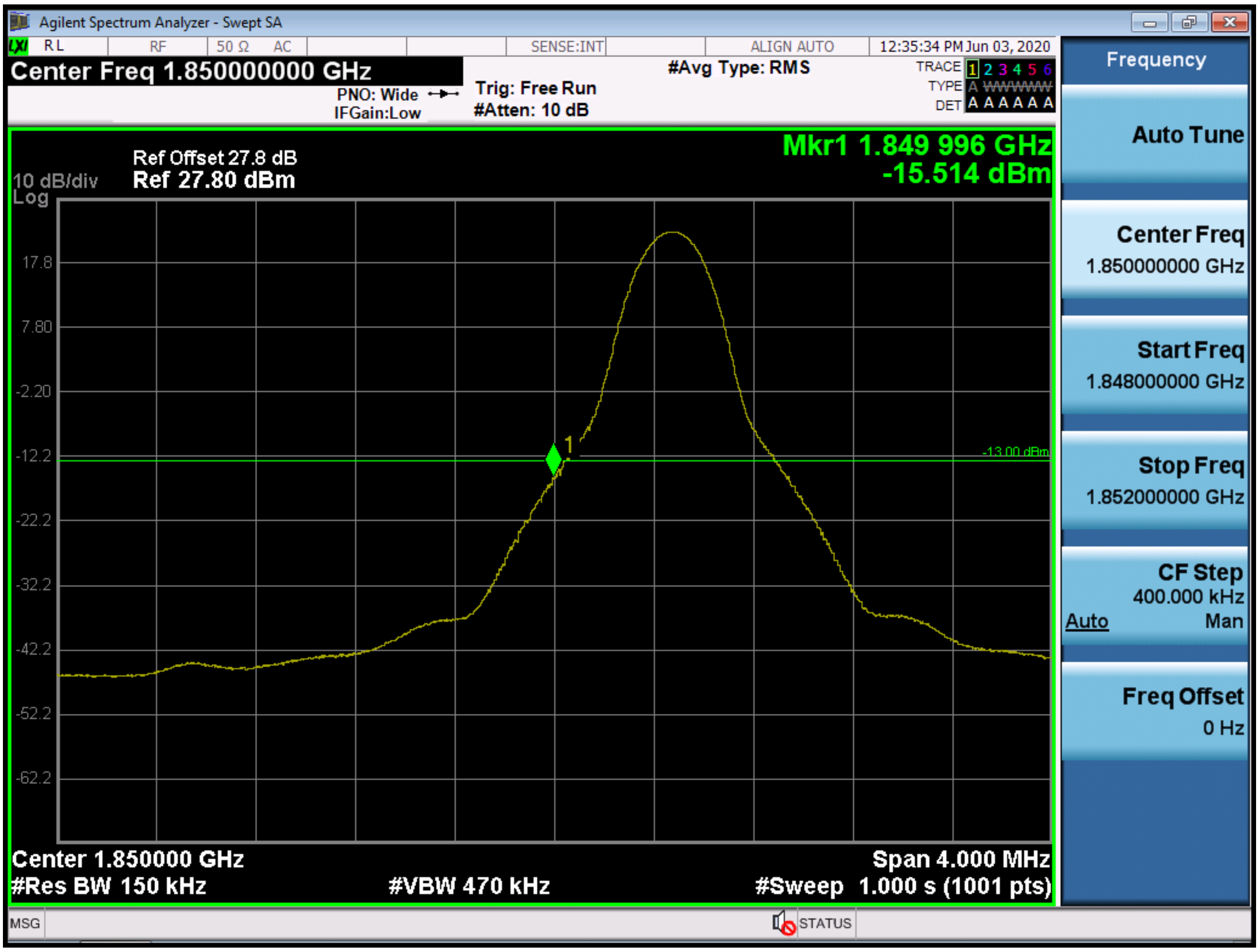
Sub6 n2. Lower Band Edge Plot (10M BW Ch.371000 BPSK_RB1_Offset 0) -1



Sub6 n2. Lower Band Edge Plot (10M BW Ch.371000 BPSK_RB50_Offset 0) -2

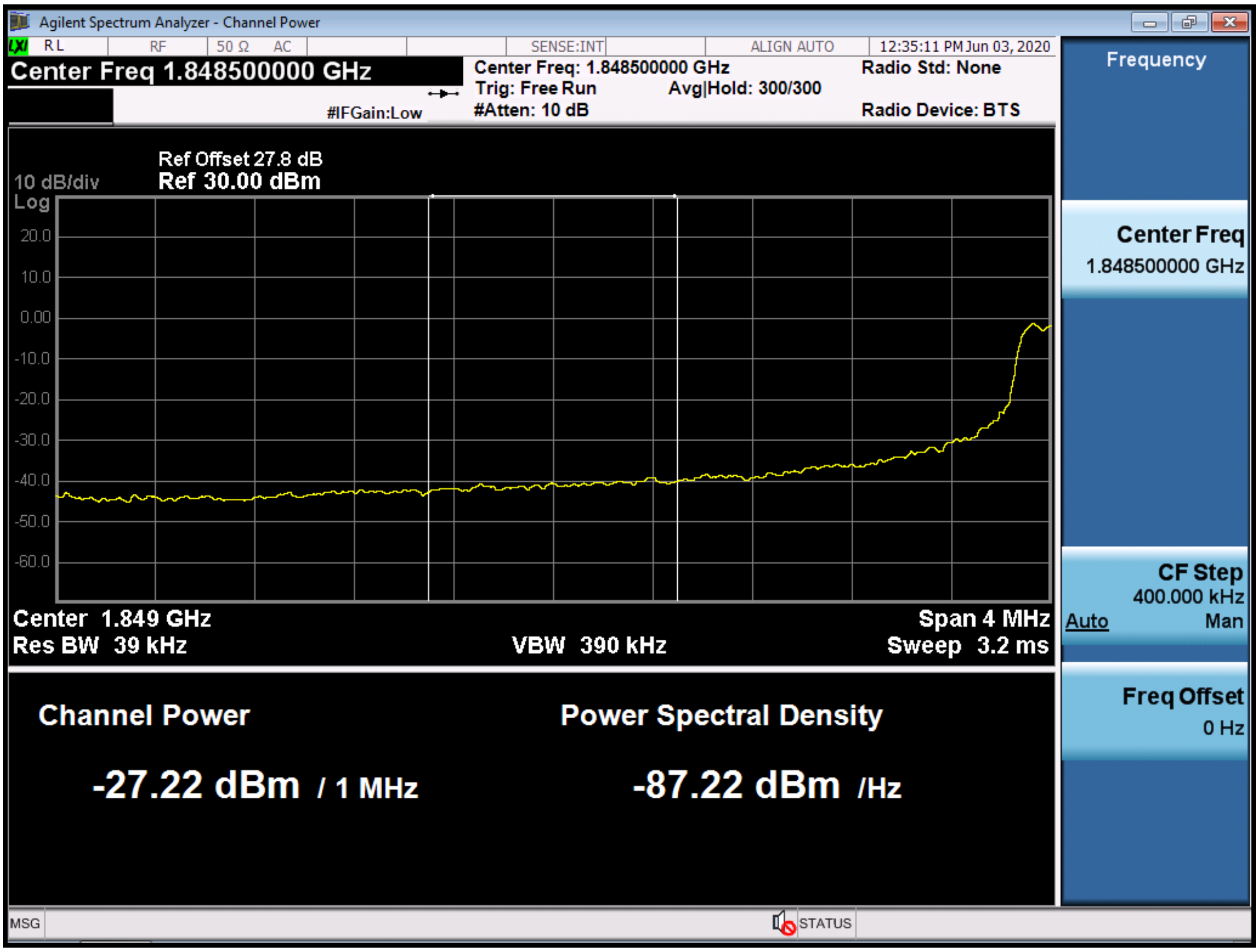
Sub6 n2. Lower Extended Band Edge Plot (10M BW Ch.371000 BPSK_RB50_0) -3

Sub6 n2. Lower Band Edge Plot (15M BW Ch.371500 BPSK_RB75_Offset 0) -1

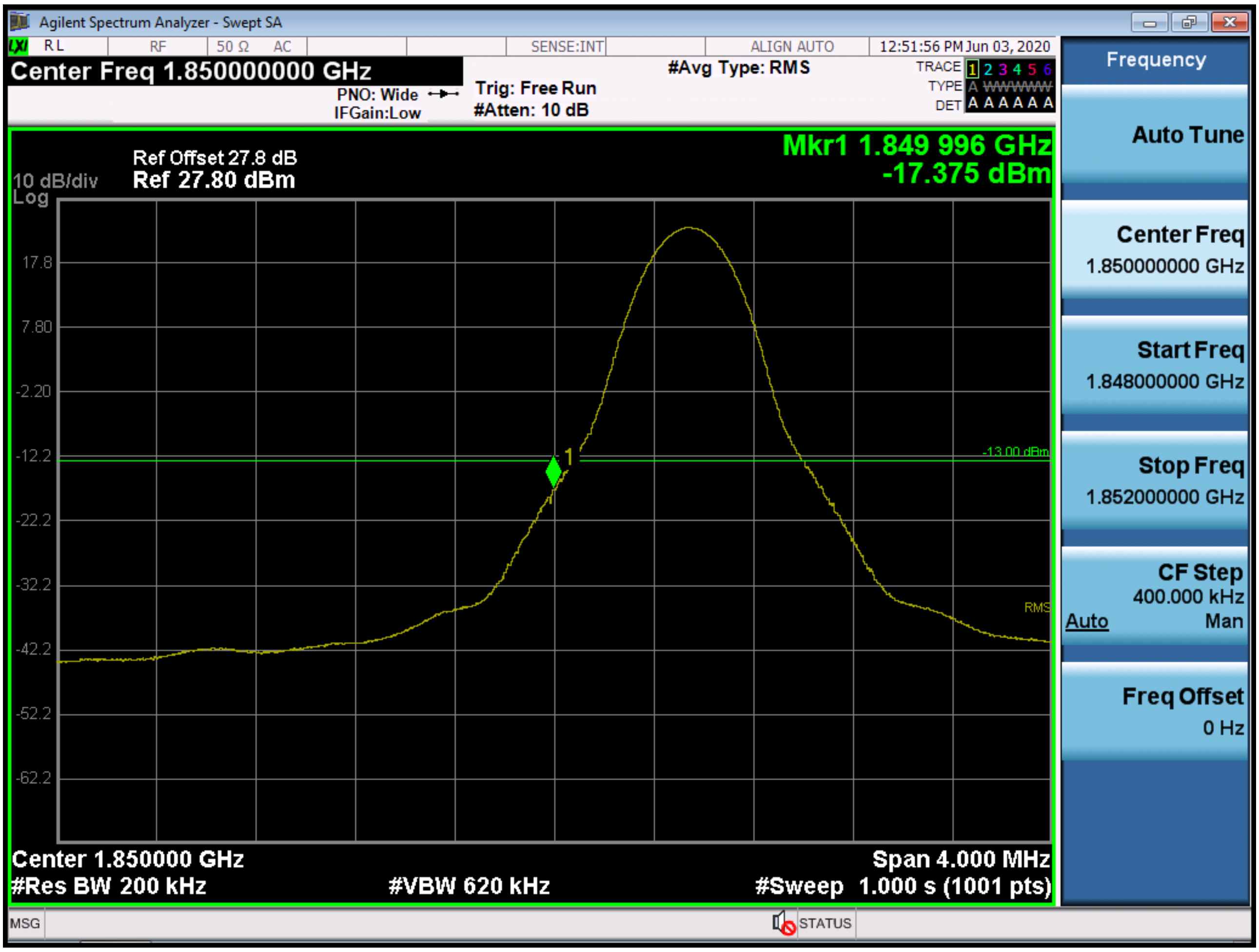


Sub6 n2. Lower Band Edge Plot (15M BW Ch.371500 BPSK_RB75_Offset 0) -2

Sub6 n2. Lower Extended Band Edge Plot (15M BW Ch.371500 BPSK_RB75_0) -3

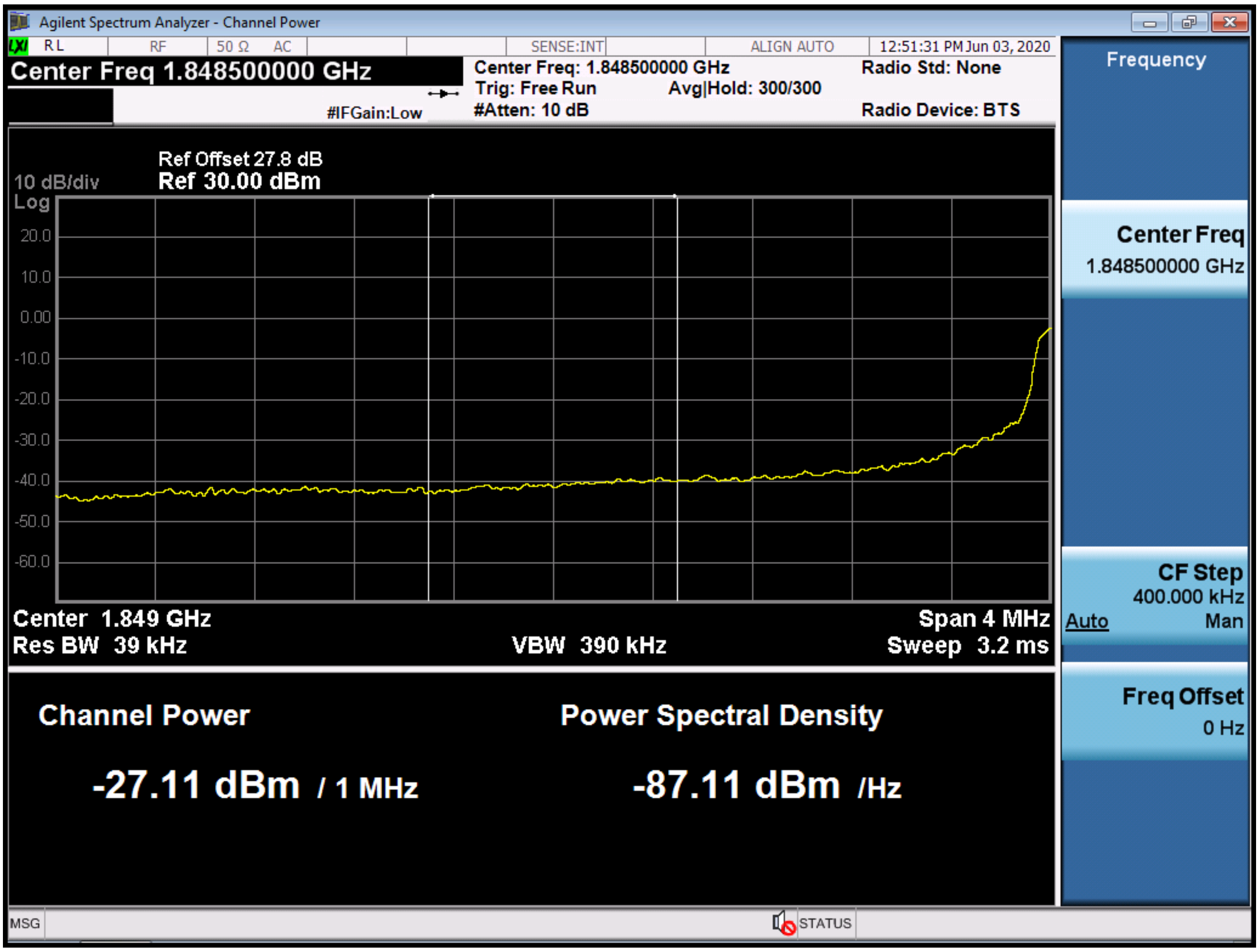


Sub6 n2. Lower Band Edge Plot (20M BW Ch.372000 BPSK_RB1_Offset 0) -1



Sub6 n2. Lower Band Edge Plot (20M BW Ch.372000 BPSK_RB100_Offset 0) -2

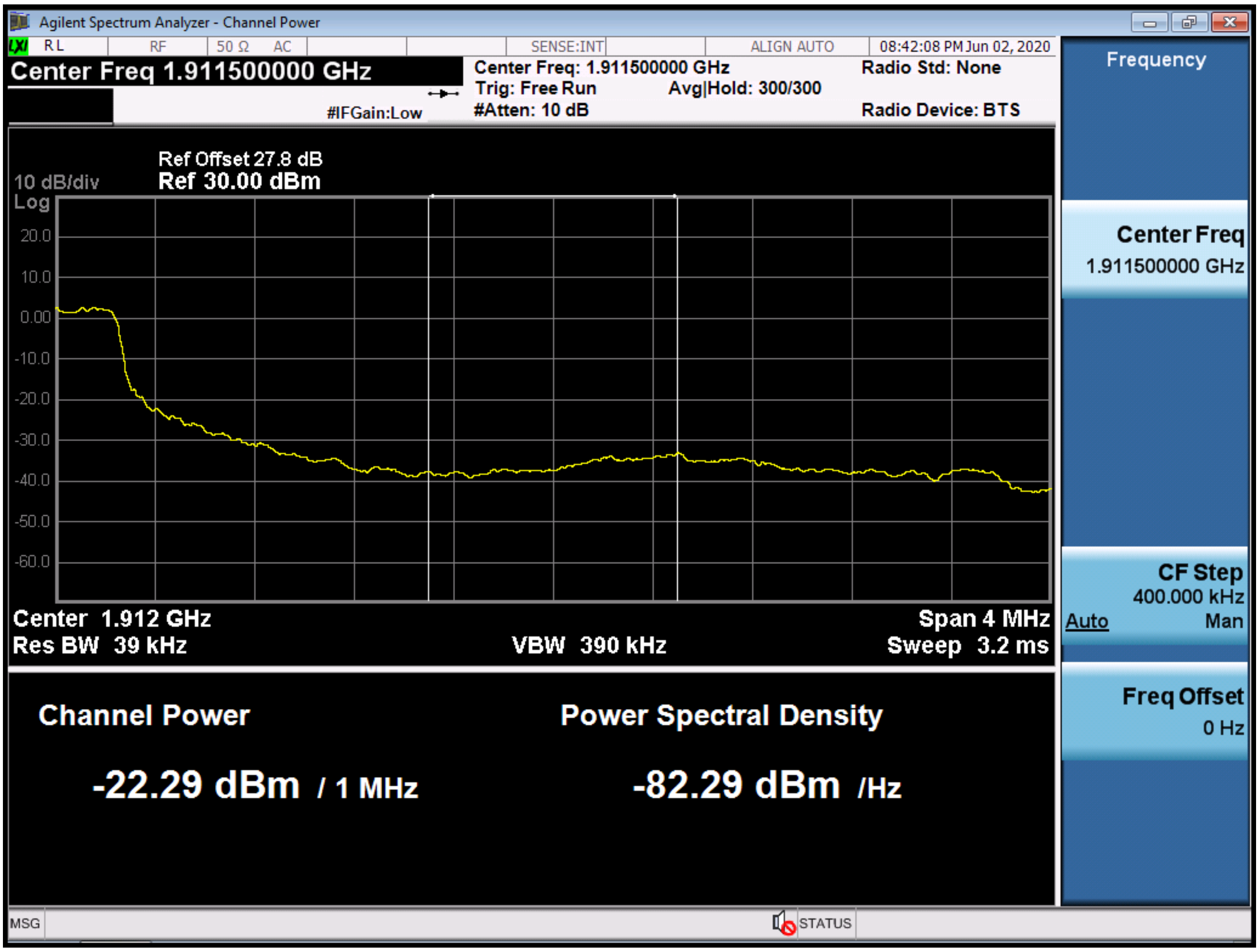
Sub6 n2. Lower Extended Band Edge Plot (20M BW Ch.372000 BPSK_RB100_0) -3



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

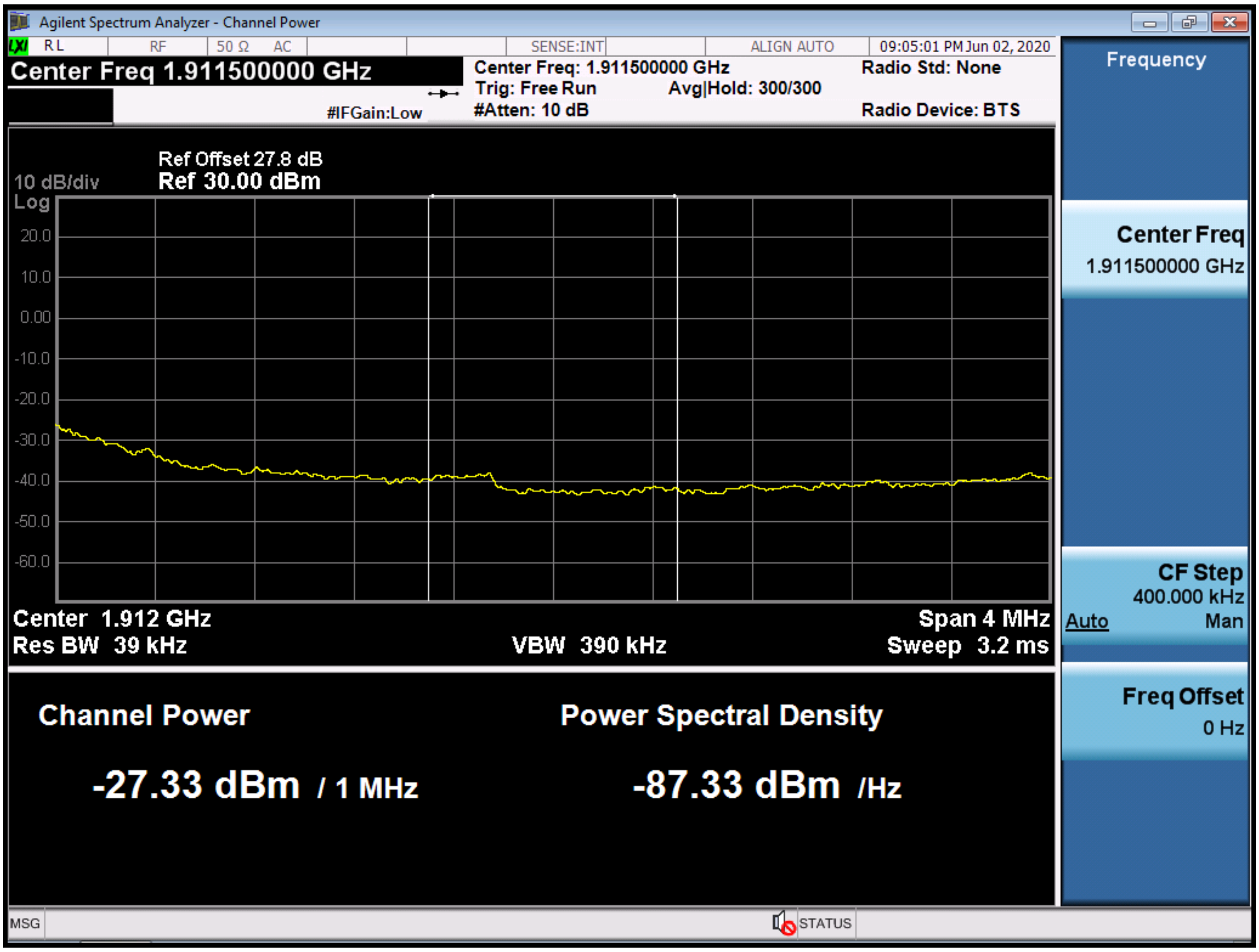
Sub6 n2. Upper Extended Band Edge Plot (5M BW Ch.381500 BPSK_RB25_0) -3



Sub6 n2. Upper Band Edge Plot (10M BW Ch.381000 BPSK_RB1_Offset 49) -1

Sub6 n2. Upper Band Edge Plot (10M BW Ch.381000 BPSK_RB50_Offset 0) -2

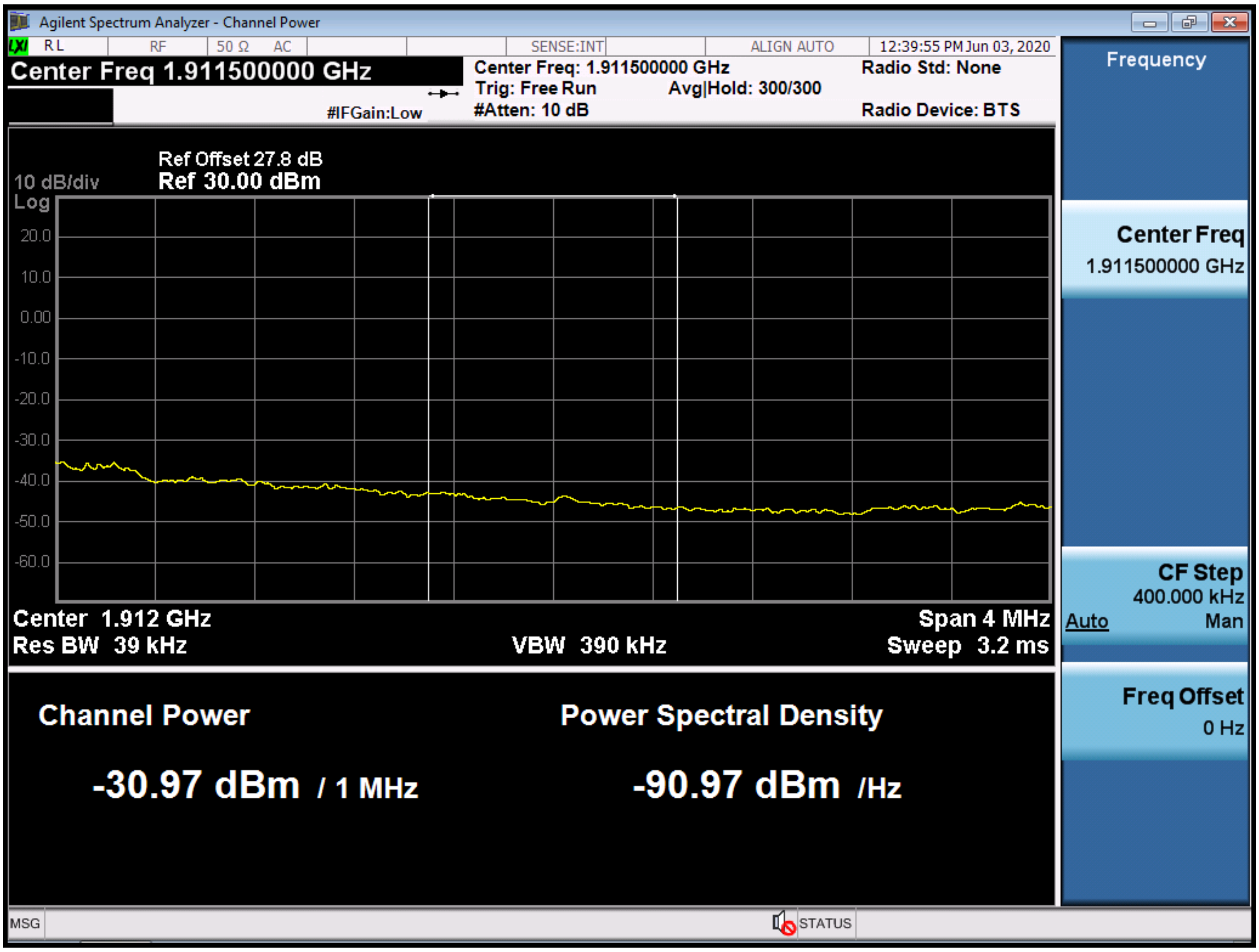
Sub6 n2. Upper Extended Band Edge Plot (10M BW Ch.381000 BPSK_RB50_0) -3



Sub6 n2. Upper Band Edge Plot (15M BW Ch.380500 BPSK_RB1_Offset 74) -1

Sub6 n2. Upper Band Edge Plot (15M BW Ch.380500 BPSK_RB75_Offset 0) -2

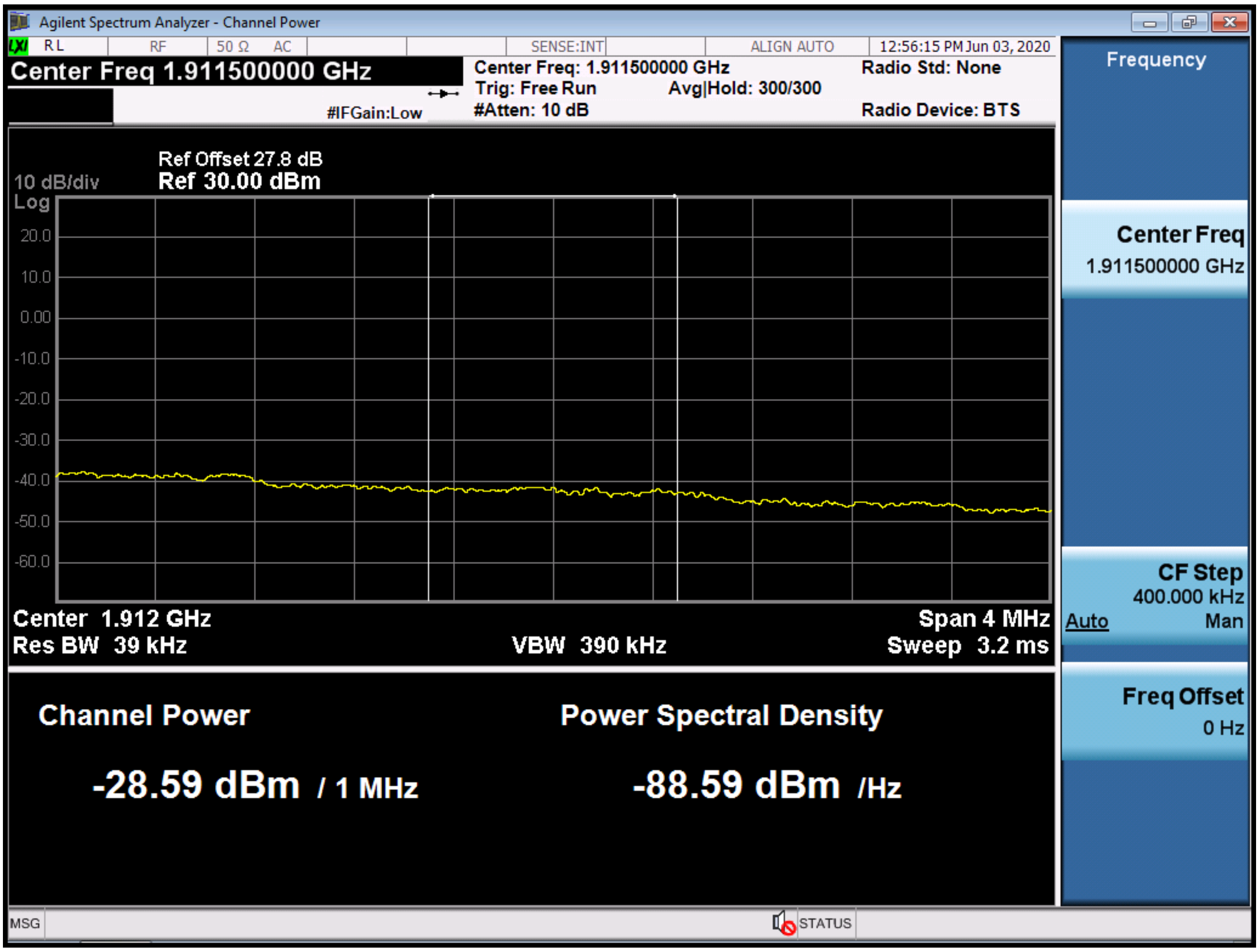
Sub6 n2. Upper Extended Band Edge Plot (15M BW Ch.380500 BPSK_RB75_0) -3



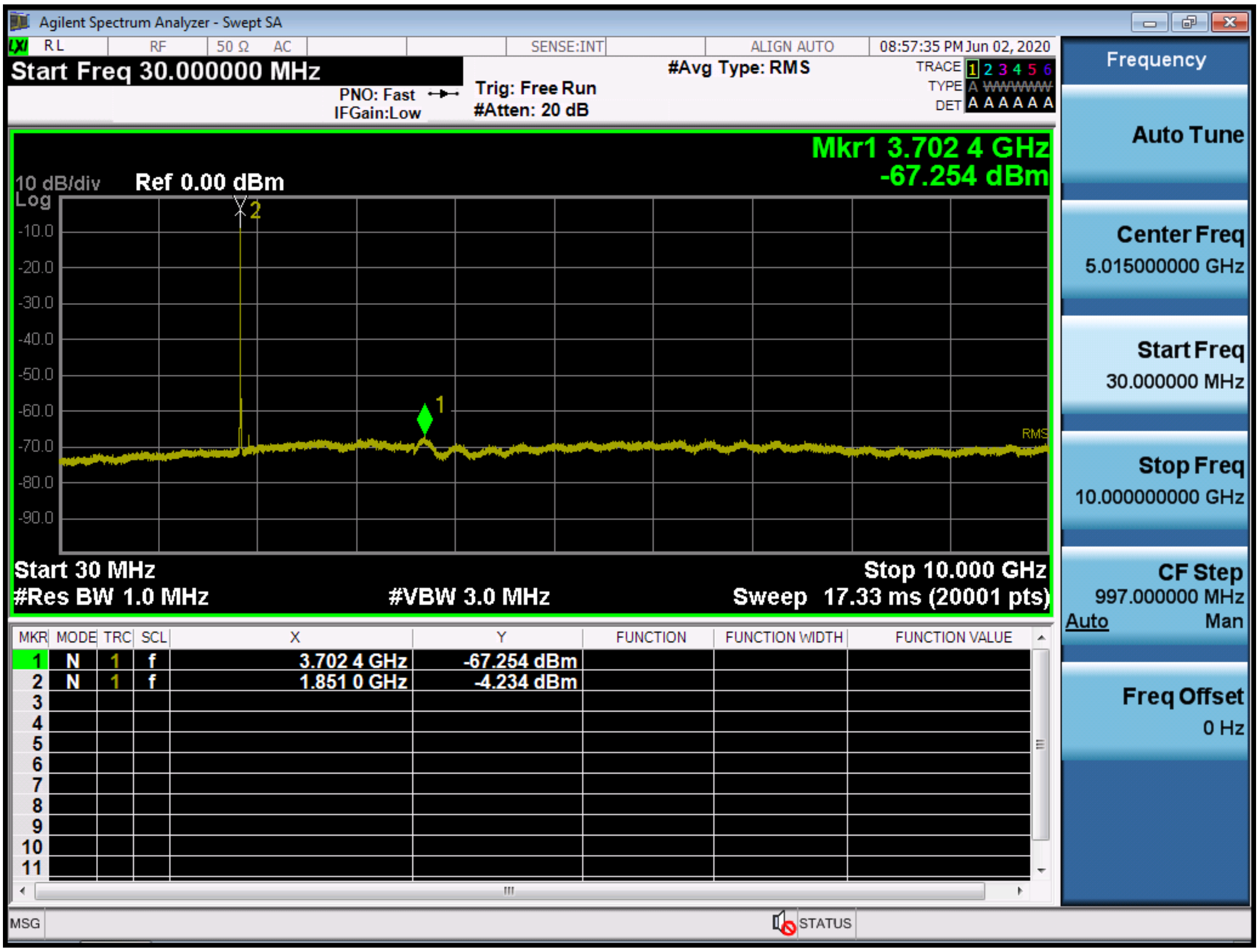
Sub6 n2. Upper Band Edge Plot (20M BW Ch.380000 BPSK_RB1_Offset 99) -1

Sub6 n2. Upper Band Edge Plot (20M BW Ch.380000 BPSK_RB100_Offset 0) -2

Sub6 n2. Upper Extended Band Edge Plot (20M BW Ch.380000 BPSK _RB100_0) -3

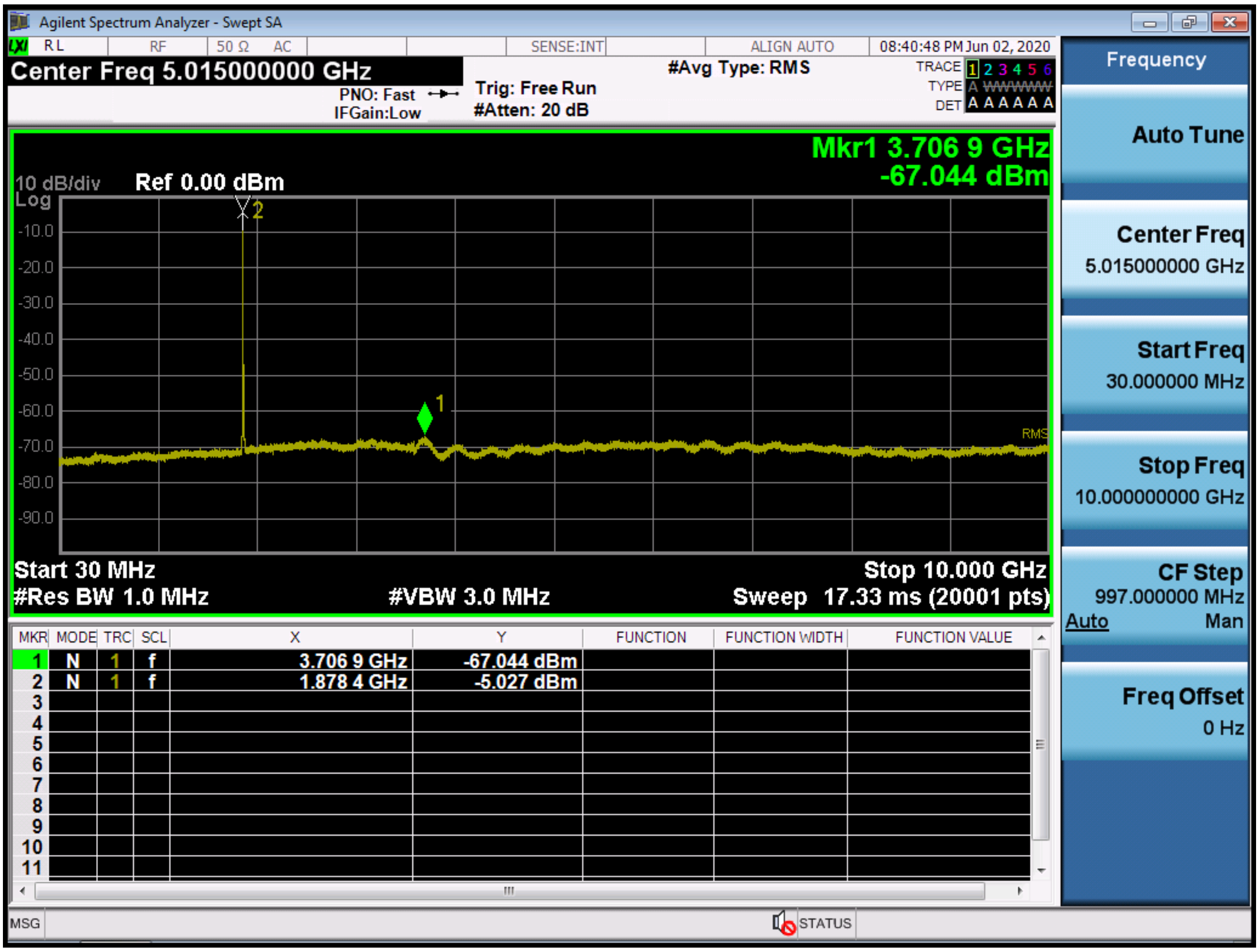


Sub6 n2. Conducted Spurious_1 (370500ch_5MHz_BPSK_RB 1_0)



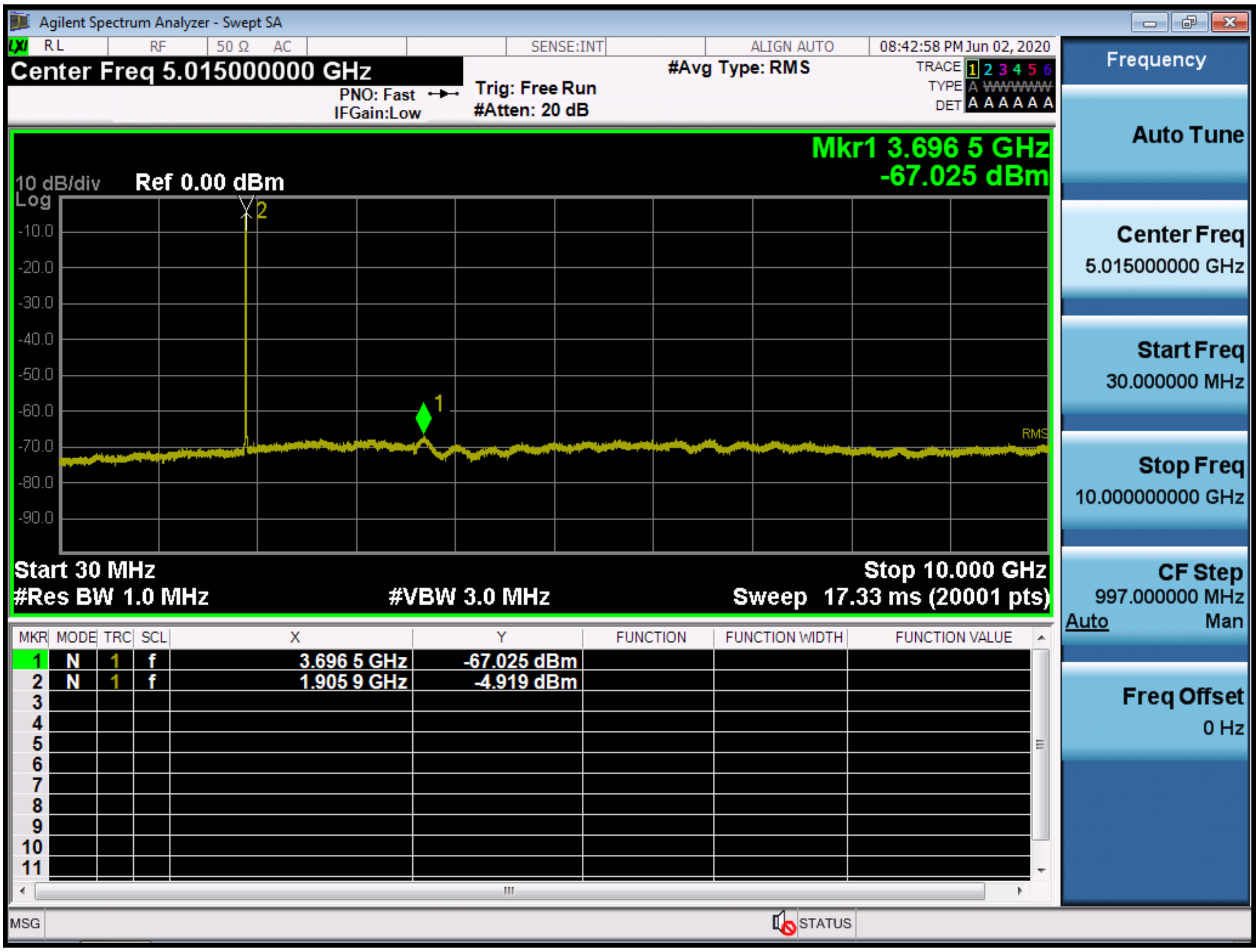
Sub6 n2. Conducted Spurious_2 (370500ch_5MHz_BPSK_RB 1_0)

Sub6 n2. Conducted Spurious_1 (376000ch_5MHz_BPSK_RB 1_0)



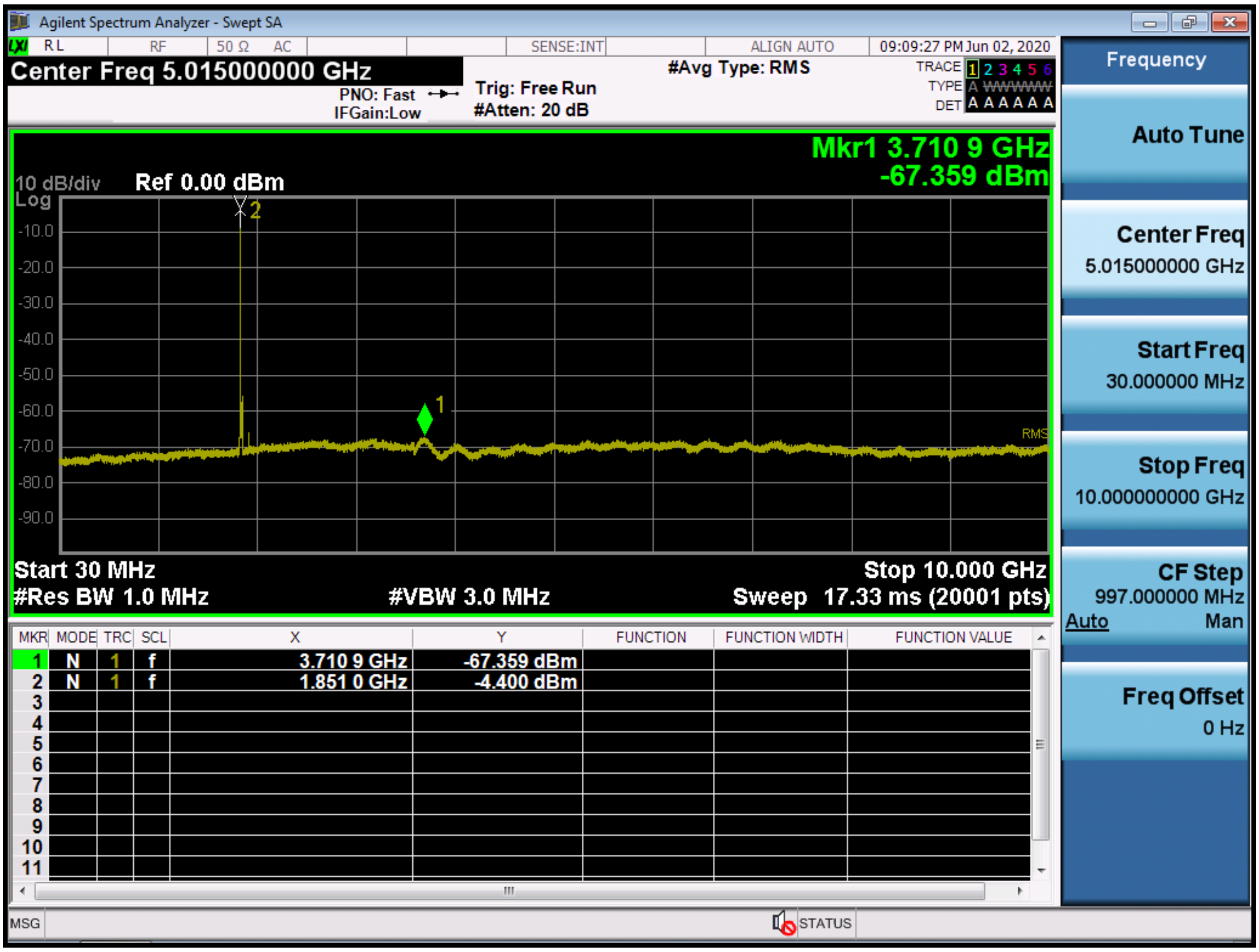
Sub6 n2. Conducted Spurious_2 (376000ch_5MHz_ BPSK_RB 1_0)

Sub6 n2. Conducted Spurious_1 (381500ch_5MHz_ BPSK_RB 1_0)



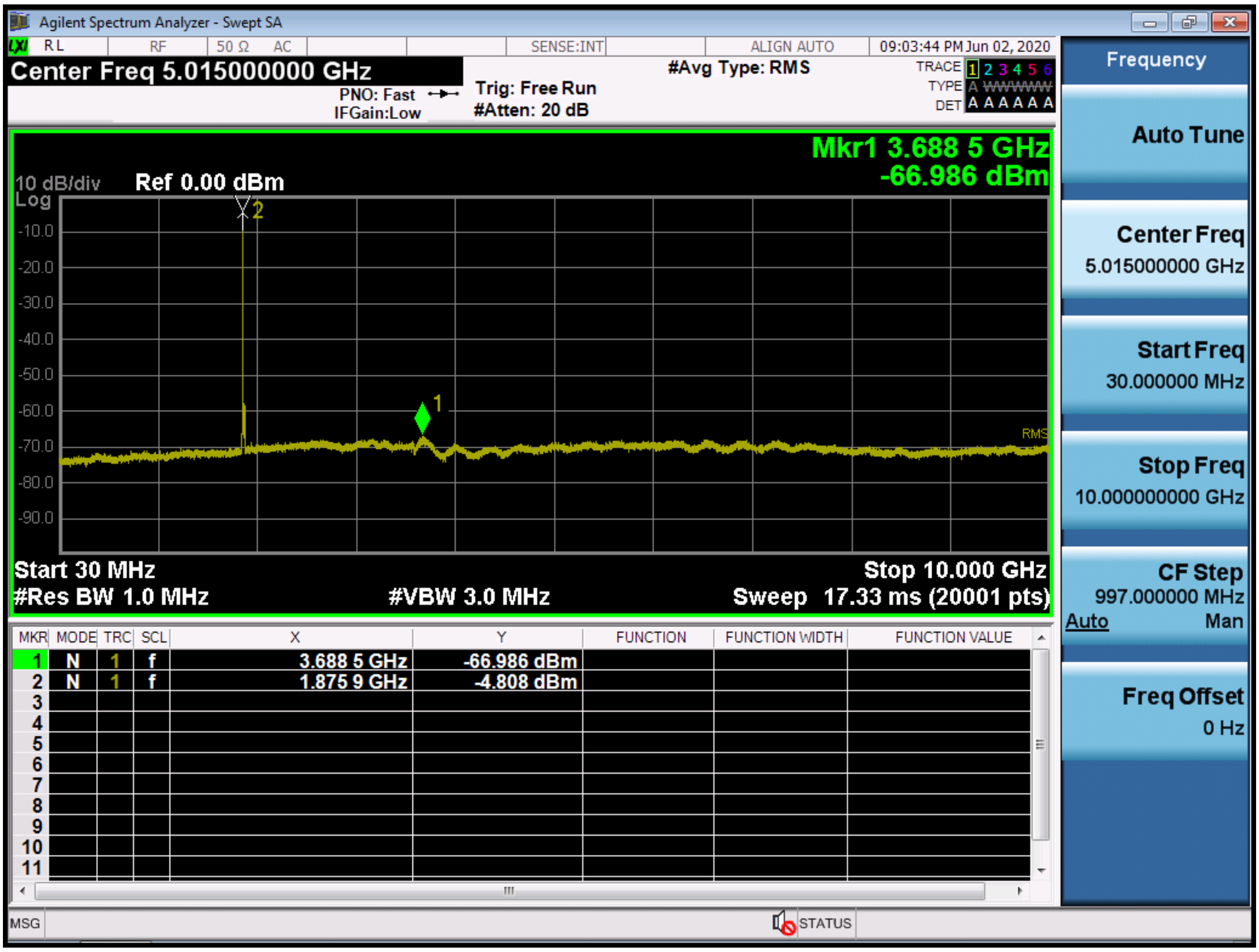
Sub6 n2. Conducted Spurious_2 (381500ch_5MHz_ BPSK_RB 1_0)

Sub6 n2. Conducted Spurious_1 (371000ch_10MHz_ BPSK _RB 1_0)

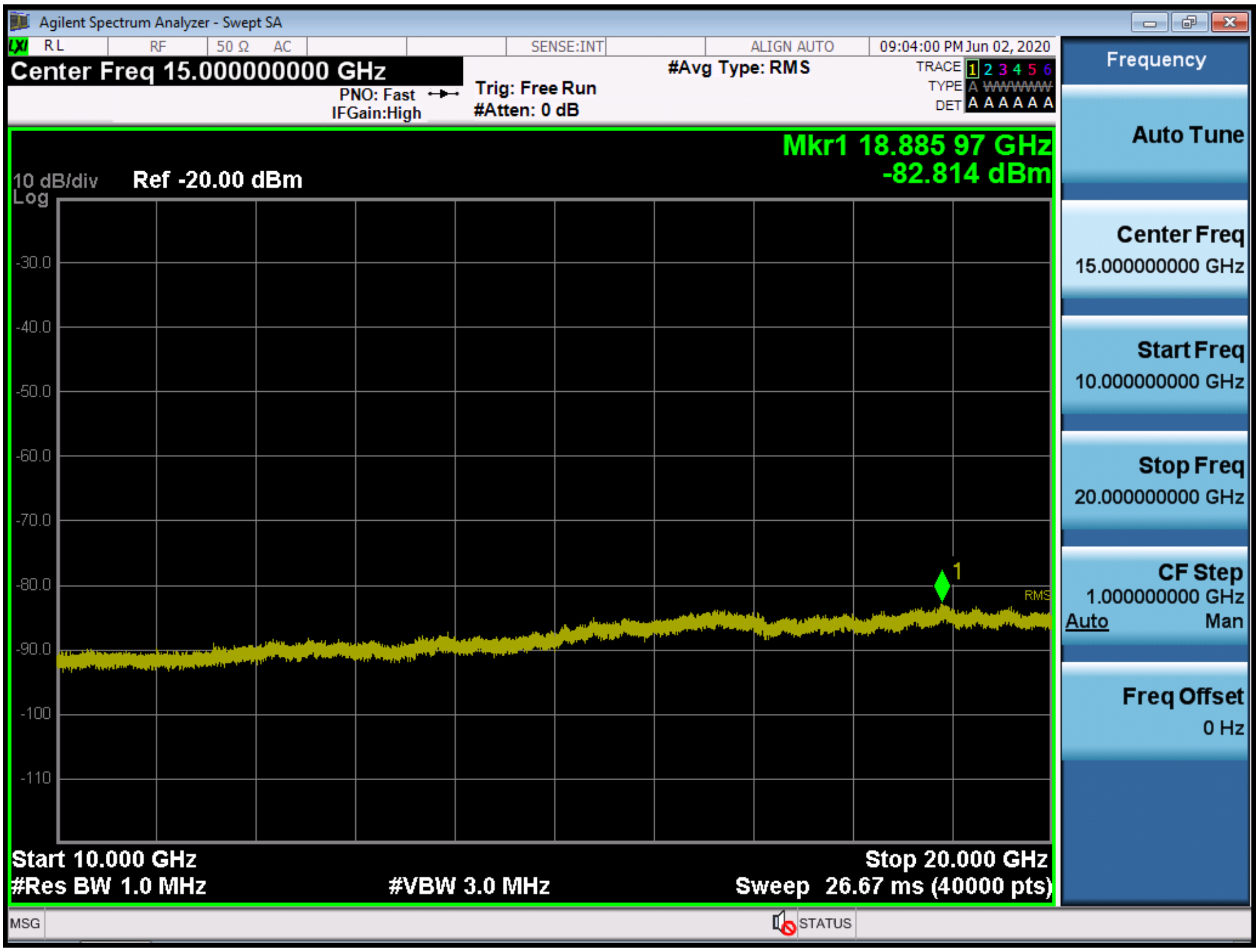


Sub6 n2. Conducted Spurious_2 (371000ch_10MHz_ BPSK_RB 1_0)

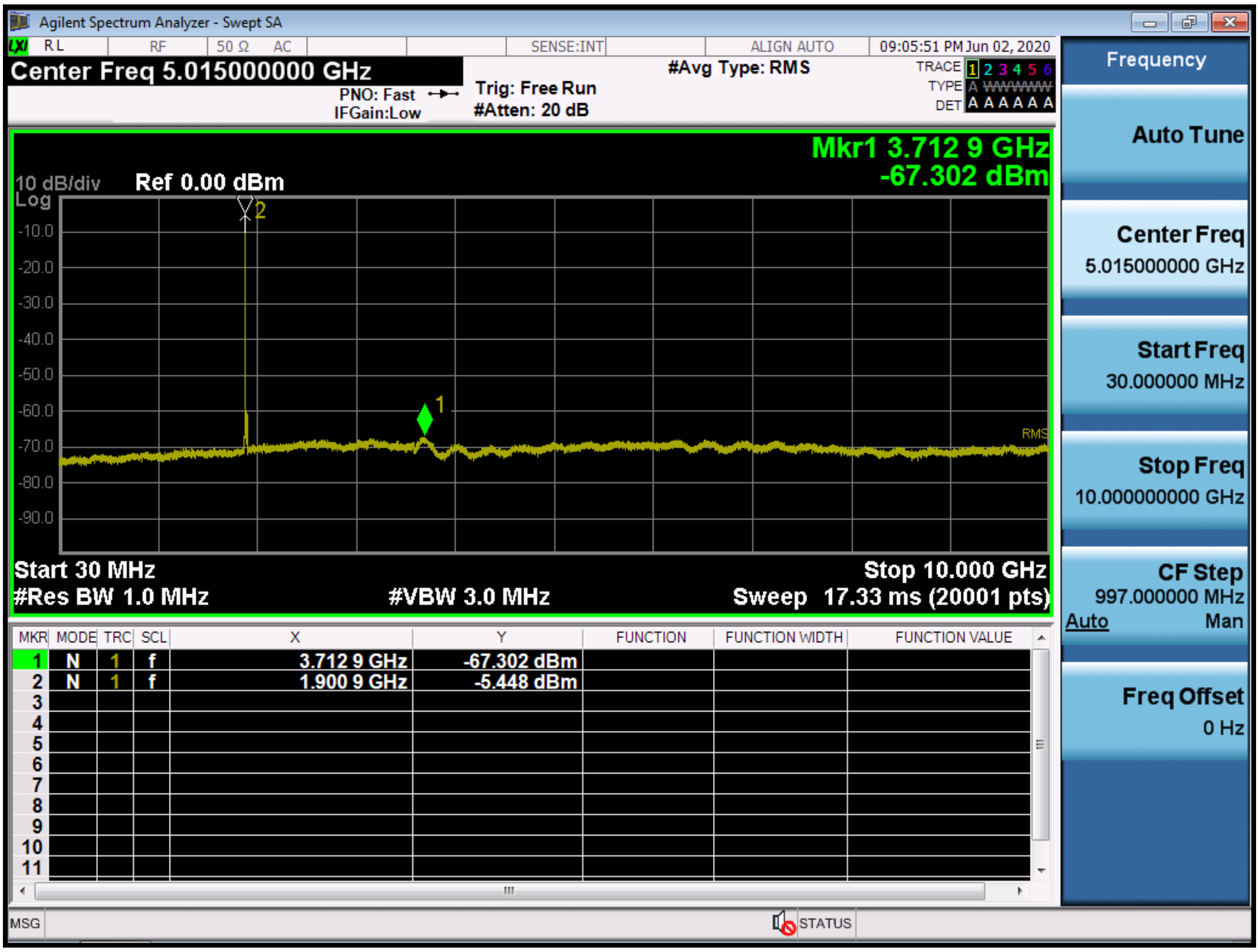
Sub6 n2. Conducted Spurious_1 (376000ch_10MHz_ BPSK_RB 1_0)



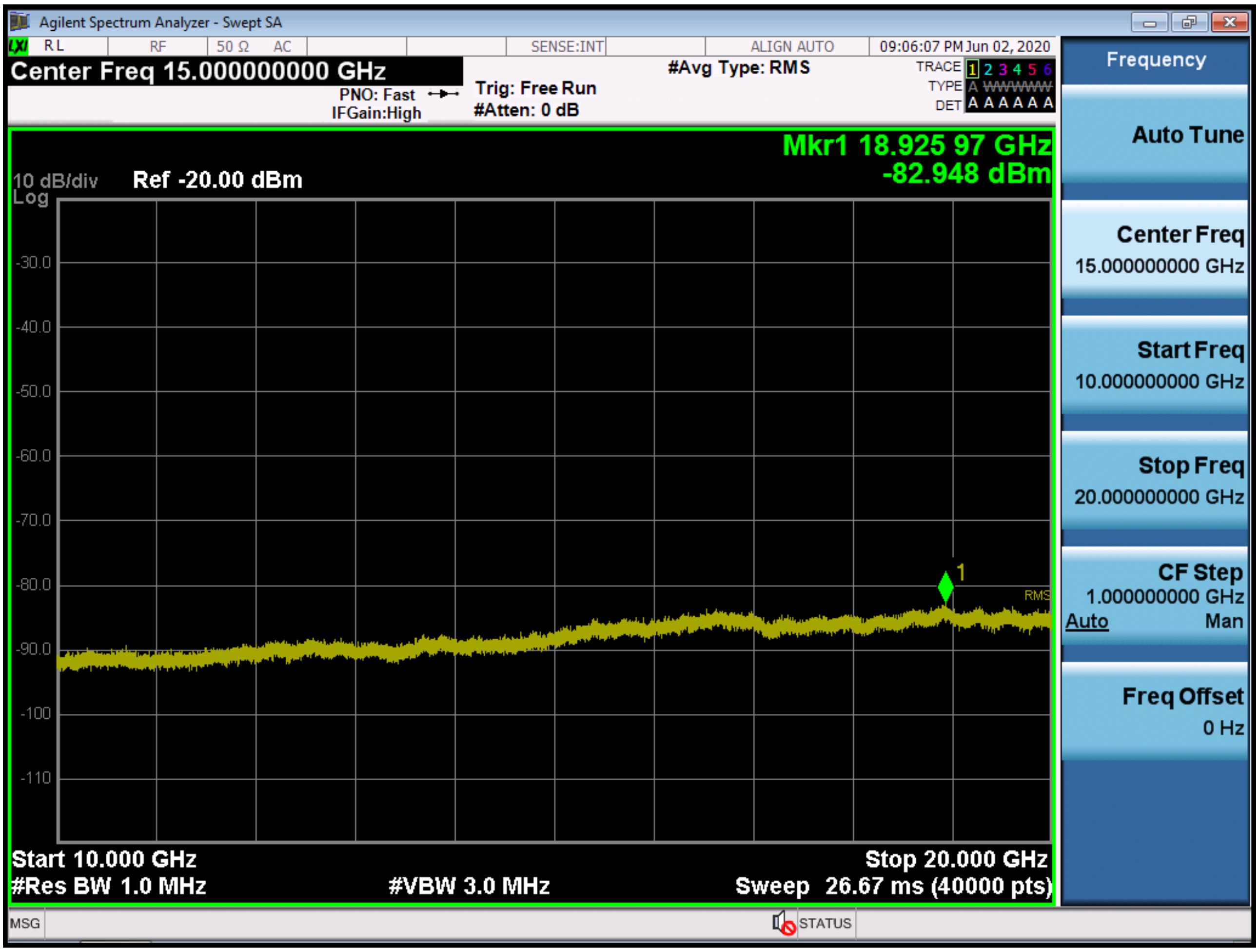
Sub6 n2. Conducted Spurious_2 (376000ch_10MHz_ BPSK_RB 1_0)



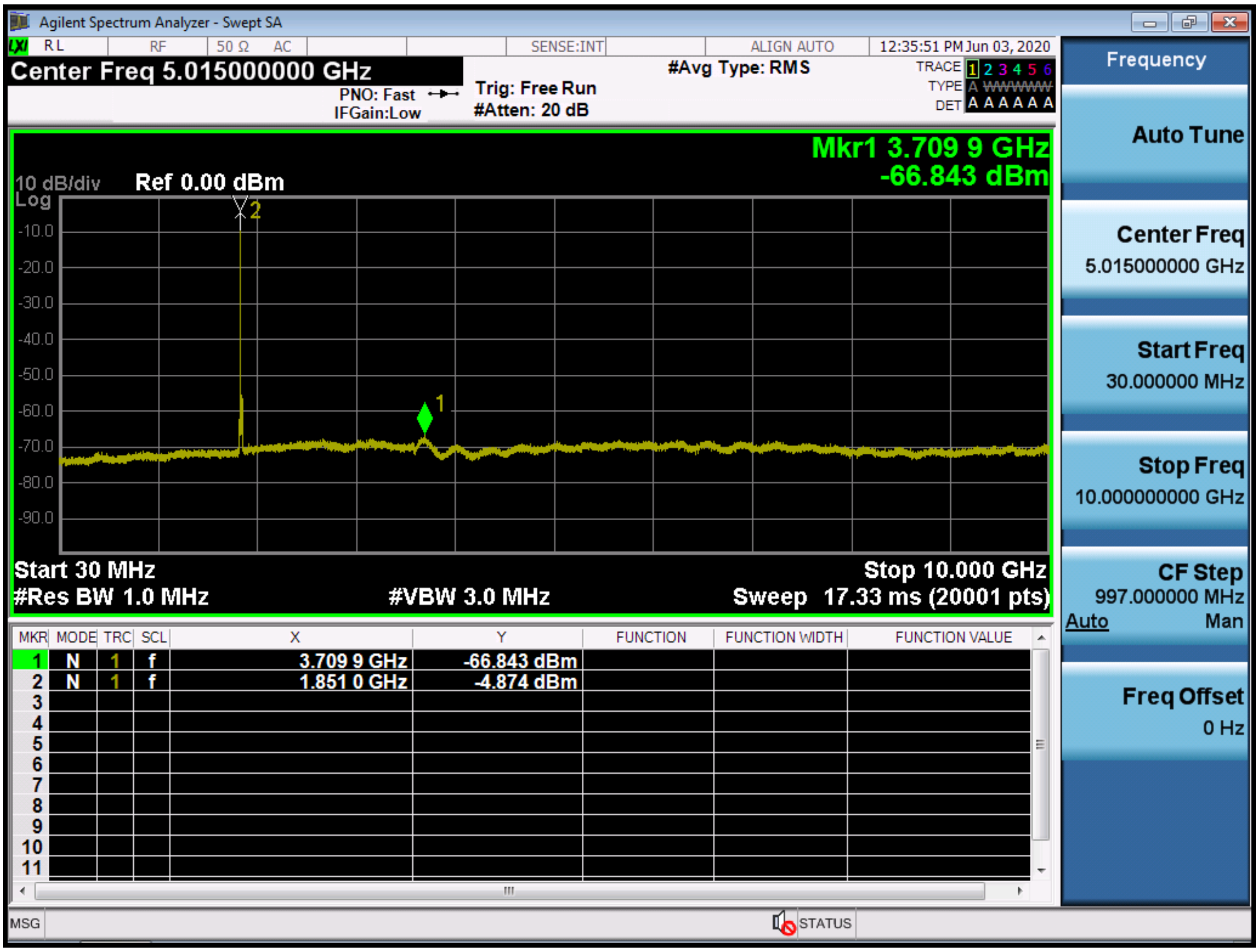
Sub6 n2. Conducted Spurious_1 (381000ch_10MHz_ BPSK_RB 1_0)



Sub6 n2. Conducted Spurious_2 (381000ch_10MHz_ BPSK_RB 1_0)

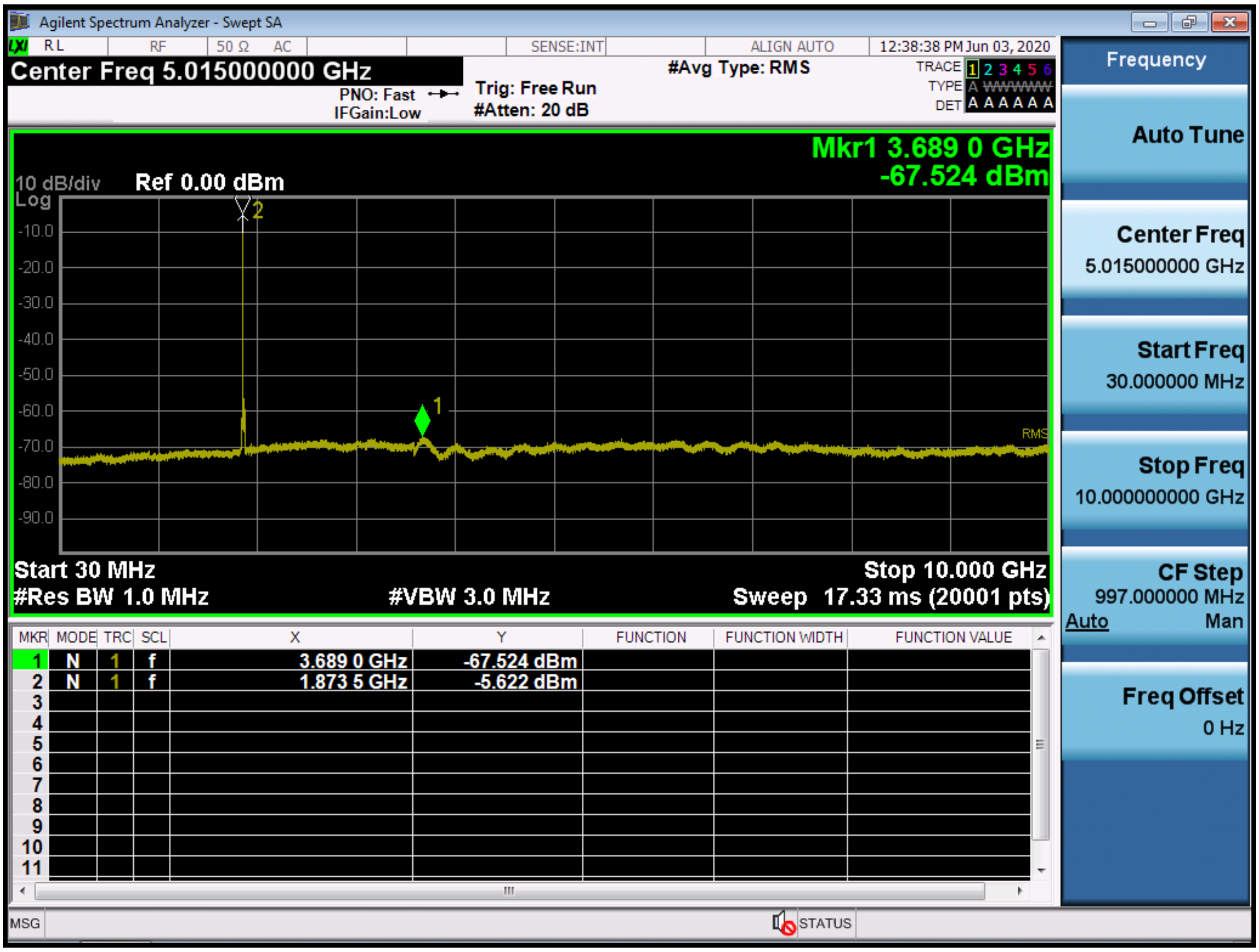


Sub6 n2. Conducted Spurious_1 (371500ch_15MHz_ BPSK_RB 1_0)



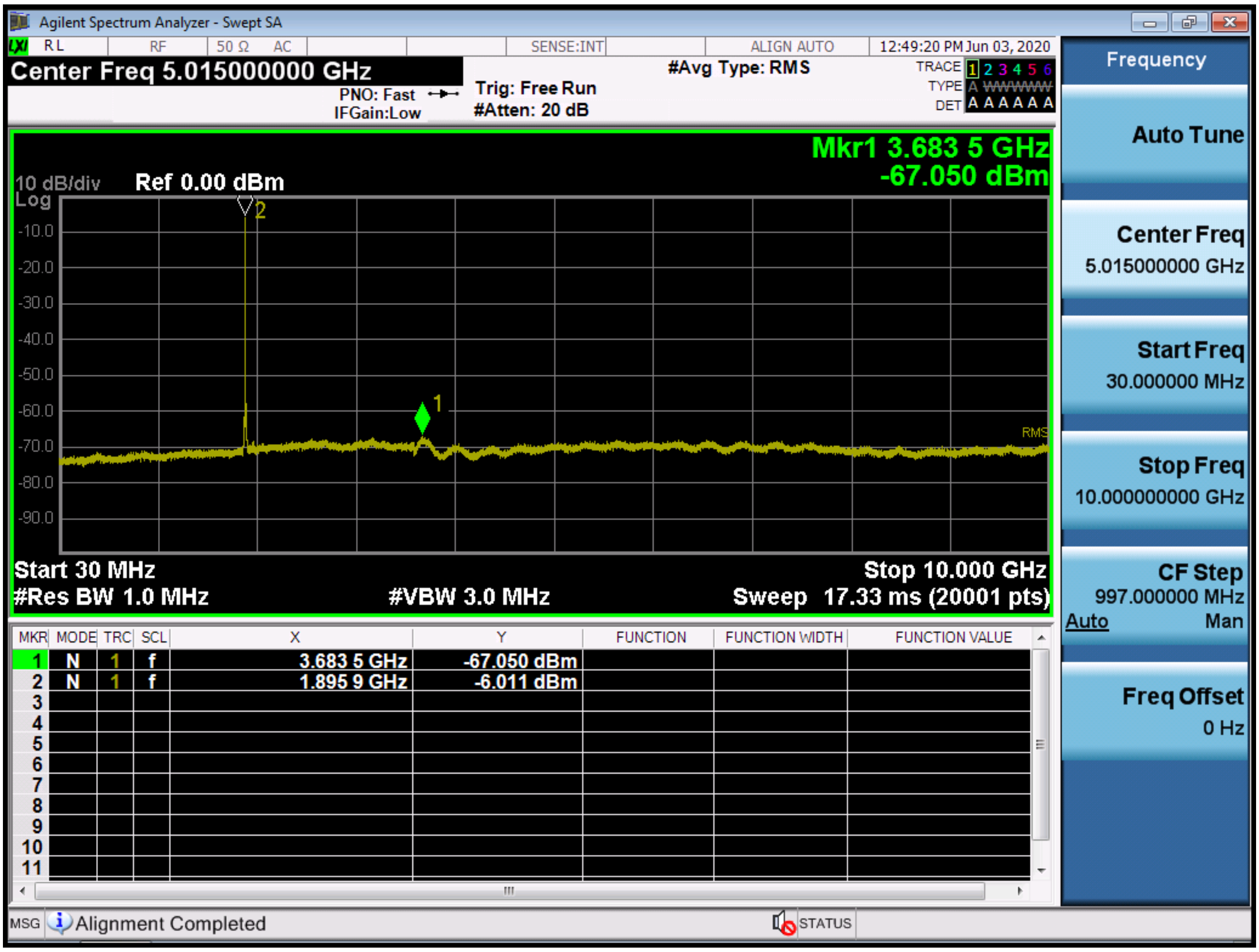
Sub6 n2. Conducted Spurious_2 (371500ch_15MHz_ BPSK_RB 1_0)

Sub6 n2. Conducted Spurious_1 (376000ch_15MHz_ BPSK_RB 1_0)



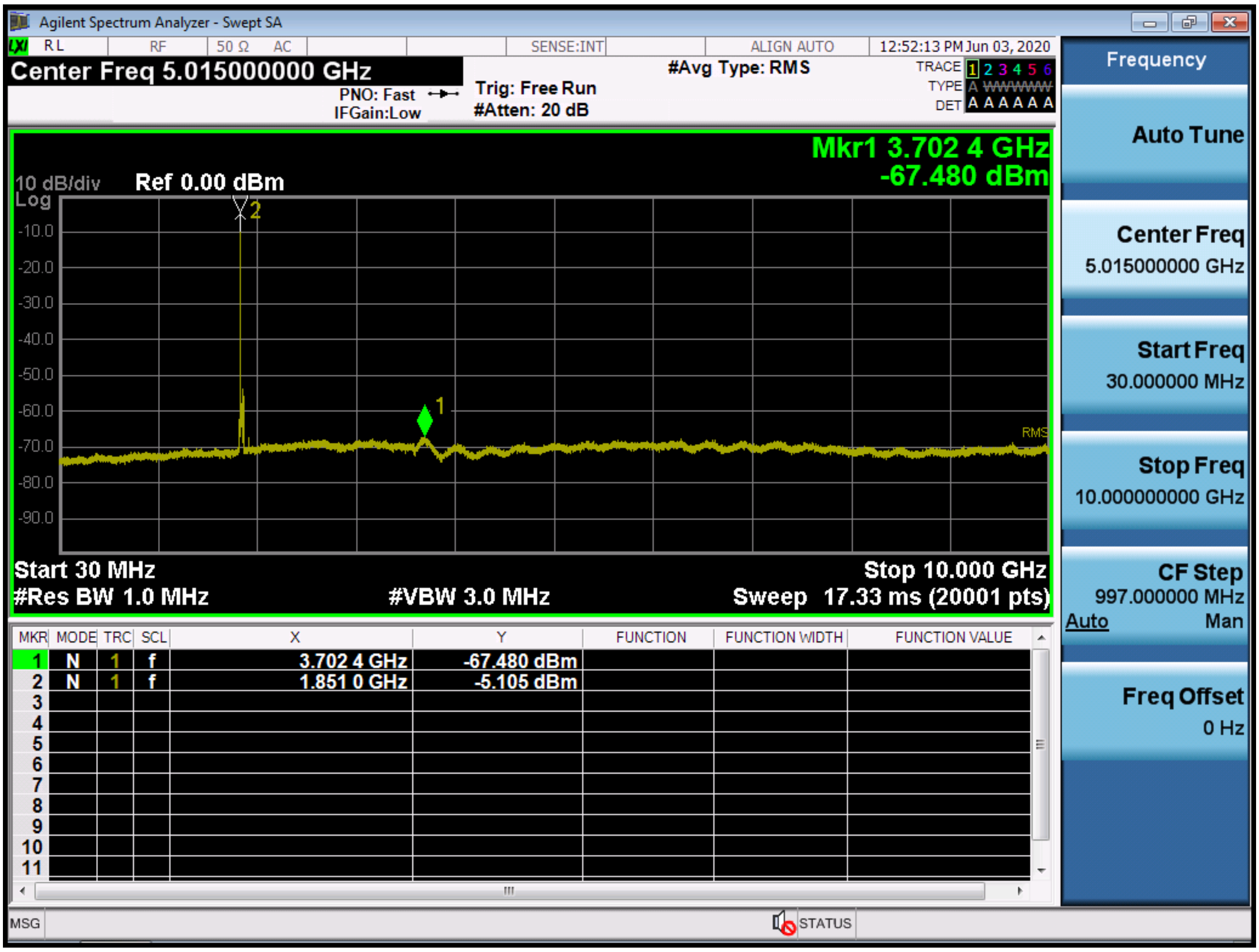
Sub6 n2. Conducted Spurious_2 (376000ch_15MHz_ BPSK_RB 1_0)

Sub6 n2. Conducted Spurious_1 (380500ch_15MHz_ BPSK_RB 1_0)

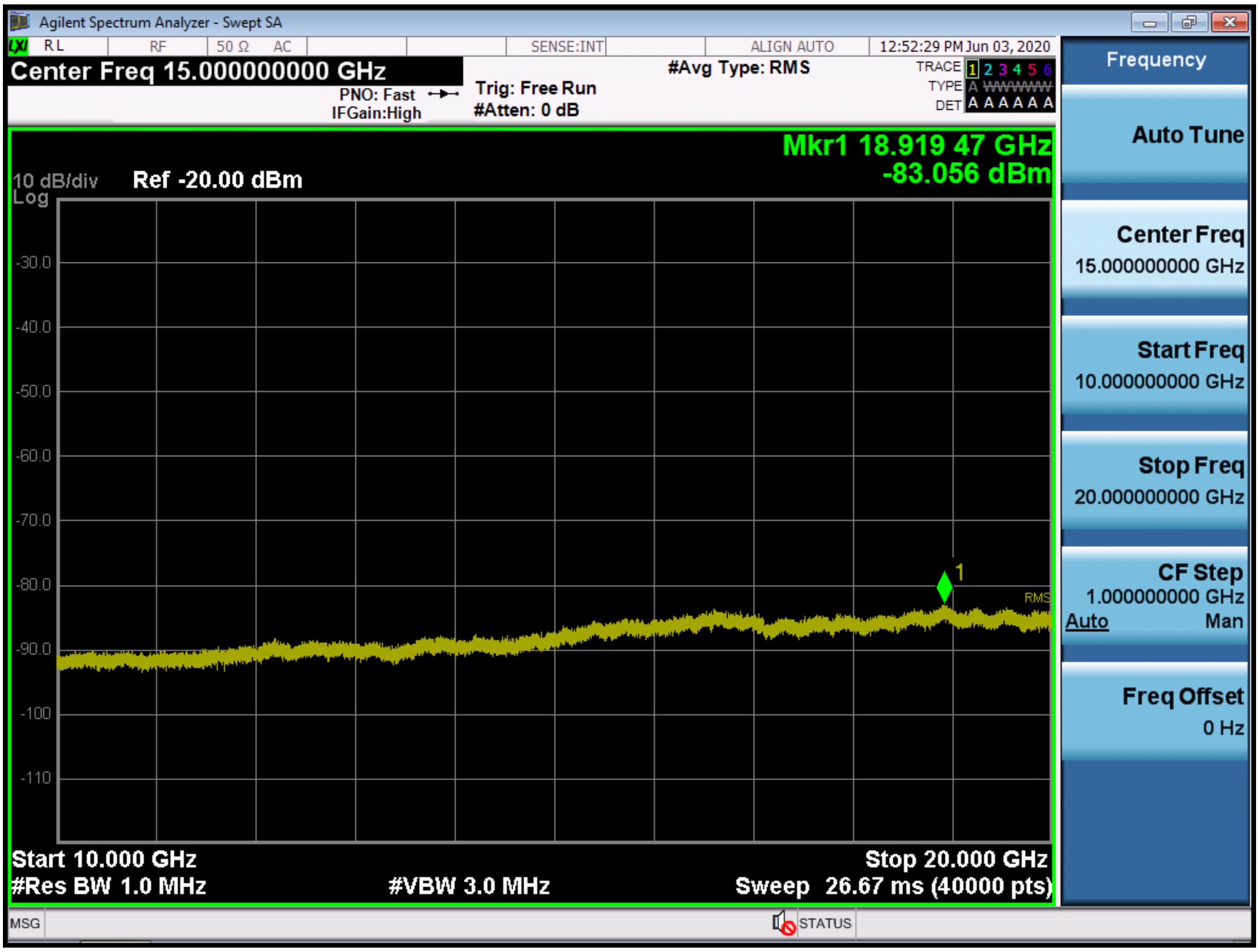


Sub6 n2. Conducted Spurious_2 (380500ch_15MHz_ BPSK_RB 1_0)

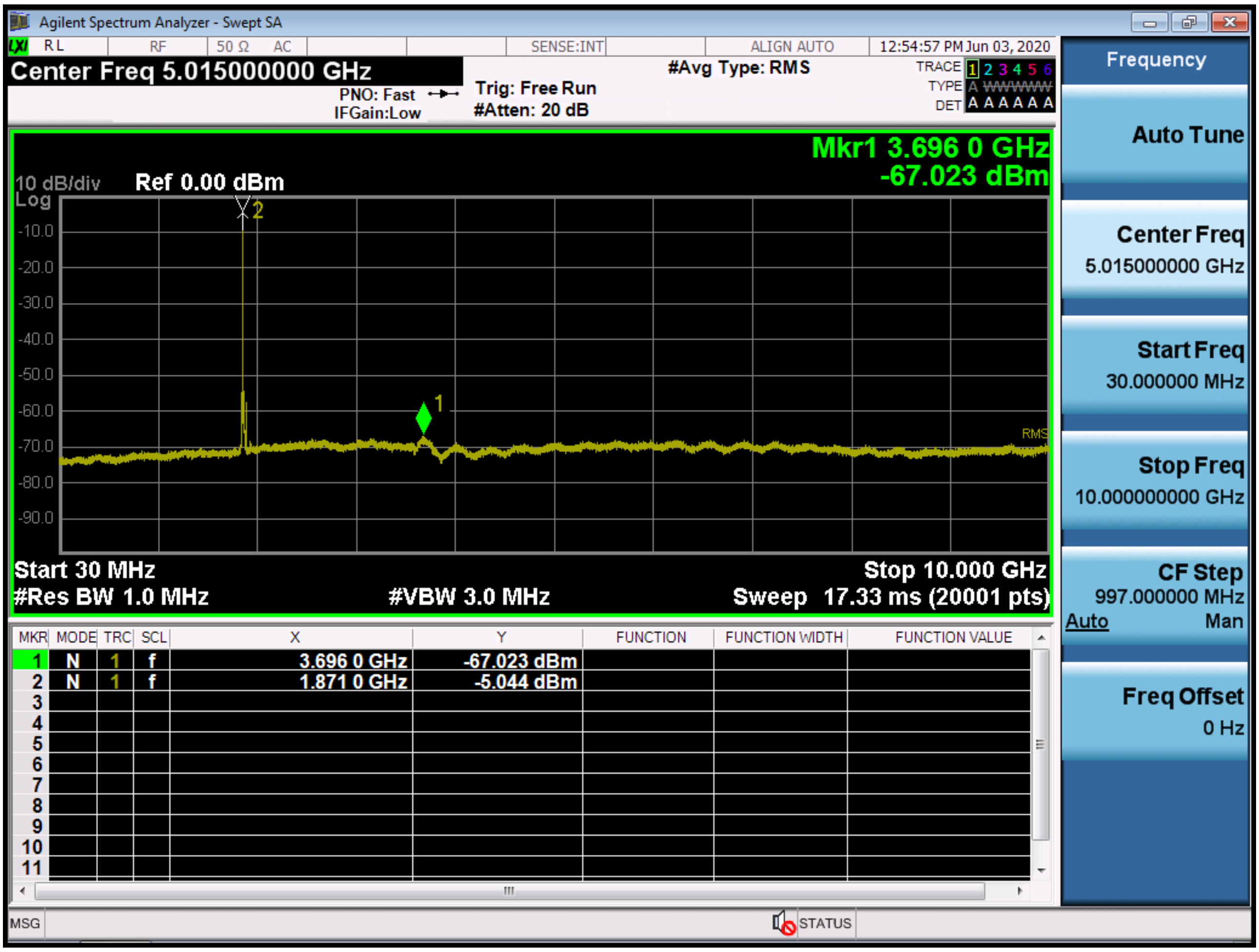
Sub6 n2. Conducted Spurious_1 (372000ch_20MHz_ BPSK_RB 1_0)



Sub6 n2. Conducted Spurious_2 (372000ch_20MHz_ BPSK_RB 1_0)

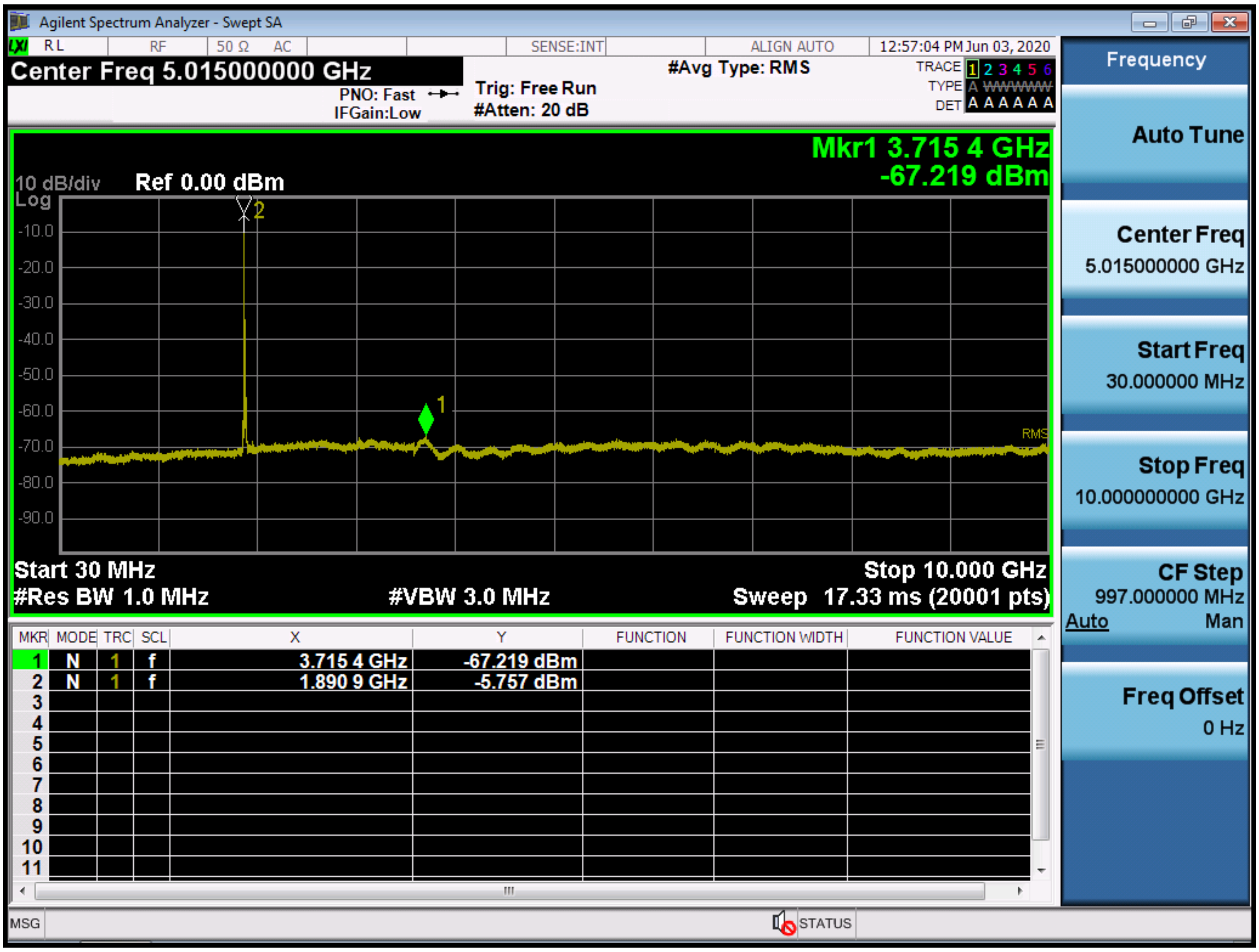


Sub6 n2. Conducted Spurious_1 (376000ch_20MHz_ BPSK_RB 1_0)

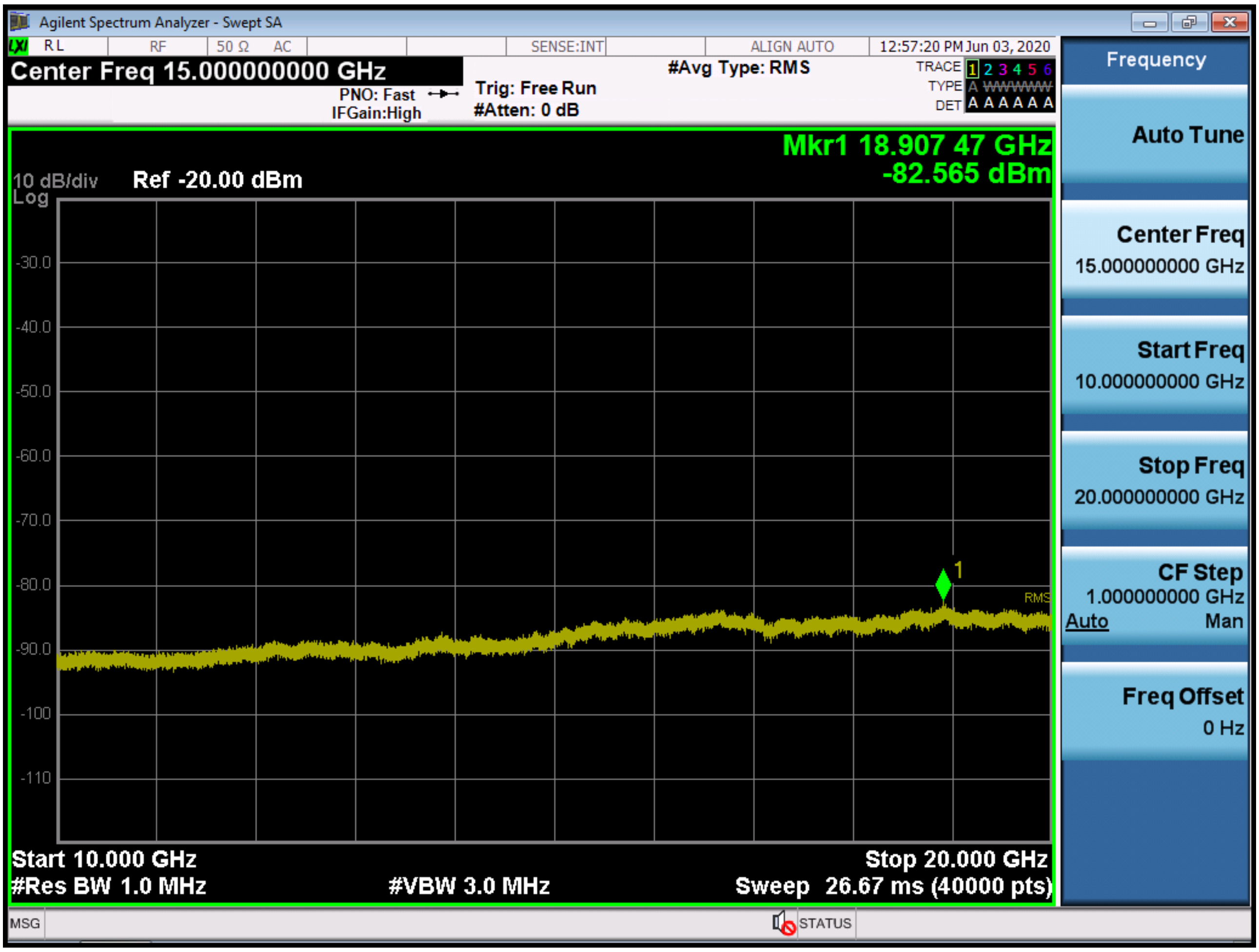


Sub6 n2. Conducted Spurious_2 (376000ch_20MHz_ BPSK_RB 1_0)

Sub6 n2. Conducted Spurious_1 (380000ch_20MHz_ BPSK_RB 1_0)



Sub6 n2. Conducted Spurious_2 (380000ch_20MHz_BPSK_RB 1_0)



10. APPENDIX A_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2006-FC062-P