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:
August 27, 2020

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

Report No.: HCT-RF-2008-FC071

FCC ID: **A3LSMG781U**

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

According to the Evaluation report, all of the data contained herein is reused from the reference FCC ID : A3LSMG781V report.

Model(s):	SM-G781U
Additional Model(s):	SM-G781U1/DS, SM-G781W
EUT Type:	Mobile Phone
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§27, §2

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	EIRP	
				Max. Power (W)	Max. Power (dBm)
Sub6 n66 (5)	1712.5 – 1777.5	4M49G7D	PI/2 BPSK	0.179	22.52
		4M49G7D	QPSK	0.169	22.29
		4M51W7D	16QAM	0.138	21.39
		4M49W7D	64QAM	0.103	20.13
		4M49W7D	256QAM	0.065	18.11
Sub6 n66 (10)	1715.0 – 1775.0	8M97G7D	PI/2 BPSK	0.182	22.61
		8M98G7D	QPSK	0.176	22.45
		8M98W7D	16QAM	0.145	21.62
		8M97W7D	64QAM	0.107	20.29
		8M97W7D	256QAM	0.066	18.22
Sub6 n66 (15)	1717.5 – 1772.5	13M5G7D	PI/2 BPSK	0.181	22.58
		13M5G7D	QPSK	0.173	22.38
		13M5W7D	16QAM	0.139	21.43
		13M5W7D	64QAM	0.104	20.18
		13M5W7D	256QAM	0.064	18.08
Sub6 n66 (20)	1720.0 – 1770.0	17M9G7D	PI/2 BPSK	0.185	22.68
		17M9G7D	QPSK	0.175	22.43
		17M9W7D	16QAM	0.139	21.43
		17M9W7D	64QAM	0.106	20.27
		17M9W7D	256QAM	0.066	18.21

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-2008-FC071	August 27, 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:	A3LSMG781U
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§27, §2
EUT Type:	Mobile Phone
Model(s):	SM-G781U
Additional Model(s):	SM-G781U1/DS, SM-G781W
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:	1712.5 MHz – 1777.5 MHz (Sub6 n66(5 MHz)) 1715.0 MHz – 1775.0 MHz (Sub6 n66(10 MHz)) 1717.5 MHz – 1772.5 MHz (Sub6 n66(15 MHz)) 1720.0 MHz – 1770.0 MHz (Sub6 n66(20 MHz))
Date(s) of Tests:	July 06, 2020 ~ August 12, 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.

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

2.2. MEASURING INSTRUMENT CALIBRATION

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

2.3. TEST FACILITY

The Fully-anechoic chamber and conducted measurement facility used to collect the radiated data are located at the **74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA.**

3. DESCRIPTION OF TESTS

3.1 TEST PROCEDURE

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

3.2 RADIATED POWER

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

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

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5% of the expected OBW, not to exceed 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;

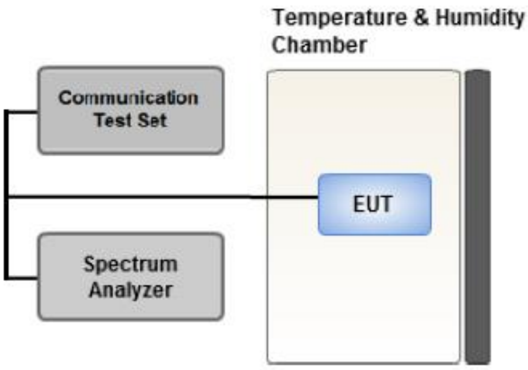
$$Result_{(dBm)} = Pg_{(dBm)} – cable\ loss_{(dB)} + antenna\ gain_{(dBi)}$$

   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:

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

<u>Test Settings(Peak Power)</u>

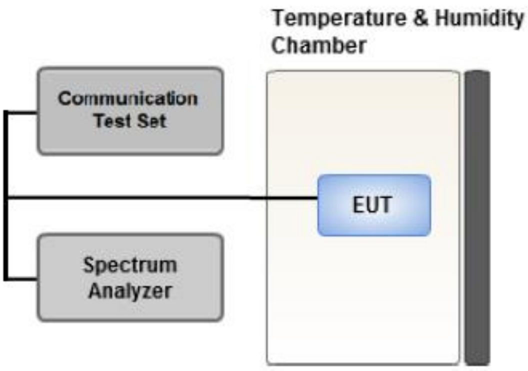
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW ≥ 3 × RBW.

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.

<u>Test Settings(Average Power)</u>

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.

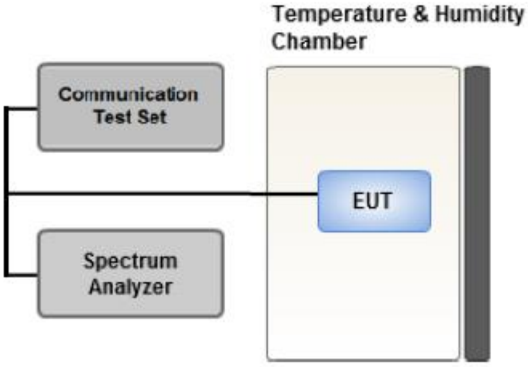
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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.

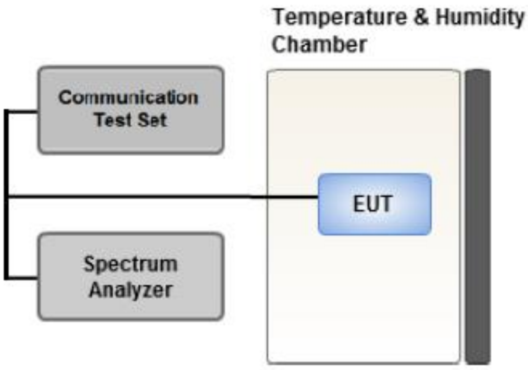
All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

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 = trace average
5. Sweep time = auto
6. Number of points in sweep ≥ 2 x Span / RBW

3.7 BAND EDGE



Test setup

Test Overview

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

Test Settings

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

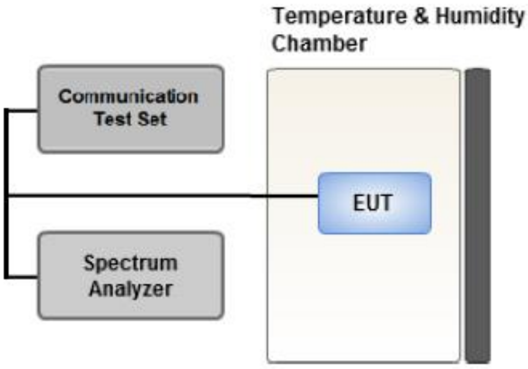
Test Notes

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-n66A)
- All RB sizes, offsets of operation were investigated and the worst case configuration results are reported.
  Please refer to the table below.

-SM-G781U & additional models were tested and the worst case results are reported.
  (Worst case : SM-G781U)

[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 and Harmonic Emissions	PI/2 BPSK	1	1	Z

3.10 WORST CASE(CONDUCTED TEST)

- Waveform : All Waveform of operation were investigated and the worst case configuration results are reported.
  (Worst case: DFT-S-OFDM)
- Modulation : All Modulation of operation were investigated and the worst case configuration results are reported.
  (Worst case: PI/2 BPSK)
- All RB sizes, offsets of operation were investigated and the worst case configuration results are reported.
  Please refer to the table below.

-SM-G781U & additional models were tested and the worst case results are reported.

(Worst case : SM-G781U)

[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	51
		15	Low	1	0
			High	1	78
		20	Low	1	0
			High	1	105
		5, 10, 15, 20	Low, High	Full RB	0
Spurious and Harmonic Emissions at Antenna Terminal	PI/2 BPSK	5, 10, 15, 20	Low, Mid, High	1	1

4. LIST OF TEST EQUIPMENT

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
Hewlett Packard	E3632A/DC Power Supply	MY4004427	09/27/2019	Annual	09/27/2020
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	93008124	03/18/2020	Annual	03/18/2021
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	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
Anritsu Corp.	MT8820C/Wideband Radio Communication Tester	6201026545	01/22/2020	Annual	01/22/2021
REOHDE & SCHWARZ	SMB100A/ SIGNAL GENERATOR (100kHz~40GHz)	177633	07/13/2020	Annual	07/13/2021
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).

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, §27.53(h)	< 43 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions	PASS
Conducted Output Power	§2.1046	N/A	**See Note1**
Peak- to- Average Ratio	27.50(d)(5)	< 13 dB	PASS
Frequency stability / variation of ambient temperature	§2.1055, § 27.54	Emission must remain in band	PASS

Note:

1. See SAR Report

2. 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	27.50(d)(4)	< 1 Watts max. EIRP	PASS
Radiated Spurious and Harmonic Emissions	§2.1053, §27.53(h)	< 43 + 10log10 (P[Watts]) for all out-of band emissions	PASS

7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

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

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

1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.

2) During the test , the turn table is rotated until the maximum signal is found.

3) Record the field strength meter's level.

4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.

5) Increase the signal generator output till the field strength meter's level is equal to the item (3).

6) The signal generator output level with Ant. Gain and cable loss are the rating of effective radiated power.

7.2 EIRP Sample Calculation

Ch./ Freq.		Measured Level(dBm)	Substitute Level(dBm)	Ant. Gain (dBi)	C.L	Pol.	EIRP	
channel	Freq.(MHz)						W	dBm
349000	1,732.50	-15.75	18.45	9.90	1.76	H	0.456	26.59

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

1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.

2) During the test , the turn table is rotated until the maximum signal is found.

3) Record the field strength meter's level.

4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.

5) Increase the signal generator output till the field strength meter's level is equal to the item (3).

6) The signal generator output level with Ant. Gain and cable loss are the rating of equivalent isotropic radiated power.

7.3. Emission Designator

GSM Emission Designator

Emission Designator = 249KGXW

GSM BW = 249 kHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

EDGE Emission Designator

Emission Designator = 249KG7W

GSM BW = 249 kHz

G = Phase Modulation

7 = Quantized/Digital Info

W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M17F9W

WCDMA BW = 4.17 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

PSK Modulation

Emission Designator = 4M48G7D

LTE BW = 4.48 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

QAM Modulation

Emission Designator = 4M48W7D

LTE BW = 4.48 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

8. TEST DATA

8.1 EQUIVALENT ISOTROPIC RADIATED POWER

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1712.5	Sub6 n66/ 5 MHz [15 kHz]	PI/2 BPSK	-21.34	12.30	9.85	2.05	V	< 1.00	0.102	20.10
		QPSK	-21.40	12.24	9.85	2.05	V		0.101	20.04
		16-QAM	-22.17	11.47	9.85	2.05	V		0.085	19.27
		64-QAM	-23.29	10.35	9.85	2.05	V		0.065	18.15
		256-QAM	-25.25	8.39	9.85	2.05	V		0.042	16.19
1745.0		PI/2 BPSK	-20.23	13.55	9.98	2.06	V		0.140	21.46
		QPSK	-20.24	13.54	9.98	2.06	V		0.140	21.45
		16-QAM	-21.12	12.66	9.98	2.06	V		0.114	20.57
		64-QAM	-22.61	11.17	9.98	2.06	V		0.081	19.08
		256-QAM	-24.61	9.17	9.98	2.06	V		0.051	17.08
1777.5		PI/2 BPSK	-19.11	14.54	10.05	2.07	V		0.179	22.52
		QPSK	-19.34	14.31	10.05	2.07	V		0.169	22.29
		16-QAM	-20.24	13.41	10.05	2.07	V		0.138	21.39
		64-QAM	-21.50	12.15	10.05	2.07	V		0.103	20.13
		256-QAM	-23.52	10.13	10.05	2.07	V		0.065	18.11

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1715.0	Sub6 n66/ 10 MHz [15 kHz]	PI/2 BPSK	-20.95	12.70	9.88	2.05	V	< 1.00	0.113	20.52
		QPSK	-21.19	12.46	9.88	2.05	V		0.107	20.28
		16-QAM	-22.06	11.59	9.88	2.05	V		0.087	19.41
		64-QAM	-22.45	11.20	9.88	2.05	V		0.080	19.02
		256-QAM	-24.51	9.14	9.88	2.05	V		0.050	16.96
1745.0		PI/2 BPSK	-19.63	14.15	9.98	2.06	V		0.161	22.06
		QPSK	-19.81	13.97	9.98	2.06	V		0.154	21.88
		16-QAM	-20.65	13.13	9.98	2.06	V		0.127	21.04
		64-QAM	-21.97	11.81	9.98	2.06	V		0.094	19.72
		256-QAM	-24.00	9.78	9.98	2.06	V		0.059	17.69
1775.0		PI/2 BPSK	-19.05	14.63	10.05	2.07	V		0.182	22.61
		QPSK	-19.21	14.47	10.05	2.07	V		0.176	22.45
		16-QAM	-20.04	13.64	10.05	2.07	V		0.145	21.62
		64-QAM	-21.37	12.31	10.05	2.07	V		0.107	20.29
		256-QAM	-23.44	10.24	10.05	2.07	V		0.066	18.22

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1717.5	Sub6 n66/ 15 MHz [15 kHz]	PI/2 BPSK	-19.89	13.77	9.90	2.05	V	< 1.00	0.145	21.62
		QPSK	-20.15	13.51	9.90	2.05	V		0.137	21.36
		16-QAM	-20.89	12.77	9.90	2.05	V		0.115	20.62
		64-QAM	-21.78	11.88	9.90	2.05	V		0.094	19.73
		256-QAM	-23.81	9.85	9.90	2.05	V		0.059	17.70
1745.0		PI/2 BPSK	-19.67	14.11	9.98	2.06	V		0.159	22.02
		QPSK	-19.84	13.94	9.98	2.06	V		0.153	21.85
		16-QAM	-20.67	13.11	9.98	2.06	V		0.126	21.02
		64-QAM	-21.99	11.79	9.98	2.06	V		0.093	19.70
		256-QAM	-23.94	9.84	9.98	2.06	V		0.060	17.75
1772.5		PI/2 BPSK	-19.11	14.60	10.05	2.07	V		0.181	22.58
		QPSK	-19.31	14.40	10.05	2.07	V		0.173	22.38
		16-QAM	-20.26	13.45	10.05	2.07	V		0.139	21.43
		64-QAM	-21.51	12.20	10.05	2.07	V		0.104	20.18
		256-QAM	-23.61	10.10	10.05	2.07	V		0.064	18.08

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1720.0	Sub6 n66/ 20 MHz [15 kHz]	PI/2 BPSK	-20.17	13.49	9.90	2.05	V	< 1.00	0.136	21.34
		QPSK	-20.21	13.45	9.90	2.05	V		0.135	21.30
		16-QAM	-20.98	12.68	9.90	2.05	V		0.113	20.53
		64-QAM	-21.77	11.89	9.90	2.05	V		0.094	19.74
		256-QAM	-23.81	9.85	9.90	2.05	V		0.059	17.70
1745.0		PI/2 BPSK	-19.99	13.79	9.98	2.06	V		0.148	21.70
		QPSK	-20.03	13.75	9.98	2.06	V		0.147	21.66
		16-QAM	-21.06	12.72	9.98	2.06	V		0.116	20.63
		64-QAM	-22.21	11.57	9.98	2.06	V		0.089	19.48
		256-QAM	-24.25	9.53	9.98	2.06	V		0.055	17.44
1770.0		PI/2 BPSK	-19.01	14.70	10.05	2.07	V		0.185	22.68
		QPSK	-19.26	14.45	10.05	2.07	V		0.175	22.43
		16-QAM	-20.26	13.45	10.05	2.07	V		0.139	21.43
		64-QAM	-21.42	12.29	10.05	2.07	V		0.106	20.27
		256-QAM	-23.48	10.23	10.05	2.07	V		0.066	18.21

8.2 RADIATED SPURIOUS EMISSIONS

- NR Band: N66
- 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)
342500 (1712.5)	3,425.00	-48.34	12.60	-54.24	2.96	H	-44.59	-13.00
	5,137.50	-53.03	12.45	-50.18	3.66	H	-41.39	-13.00
	6,850.00	-56.75	12.20	-50.13	4.25	V	-42.18	-13.00
349000 (1745.0)	3,490.00	-48.33	12.35	-53.93	2.97	H	-44.55	-13.00
	5,235.00	-52.66	13.09	-51.70	3.70	H	-42.30	-13.00
	6,980.00	-56.69	11.85	-48.52	4.28	V	-40.95	-13.00
355500 (1777.5)	3,555.00	-48.44	12.10	-53.71	3.02	H	-44.62	-13.00
	5,332.50	-53.08	13.35	-52.07	3.73	H	-42.45	-13.00
	7,110.00	-56.84	11.28	-47.84	4.34	V	-40.90	-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	-52.82	9.65	-62.59	2.01	H	-54.95	-13.00
	2,509.50	-46.67	10.75	-50.39	2.50	V	-42.14	-13.00
	3,346.00	-56.32	12.48	-57.31	2.92	H	-47.75	-13.00

▣ NR Band: N66

▣ 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)
343000 (1715.0)	3,430.00	-48.35	12.60	-54.14	2.96	H	-44.50	-13.00
	5,145.00	-52.75	12.43	-49.99	3.66	H	-41.22	-13.00
	6,860.00	-56.54	12.18	-49.76	4.27	V	-41.85	-13.00
349000 (1745.0)	3,490.00	-48.02	12.35	-53.62	2.97	H	-44.24	-13.00
	5,235.00	-52.98	13.09	-52.02	3.70	H	-42.62	-13.00
	6,980.00	-56.92	11.85	-48.75	4.28	V	-41.18	-13.00
355000 (1775.0)	3,550.00	-48.18	12.10	-53.39	3.02	H	-44.31	-13.00
	5,325.00	-53.03	13.35	-51.93	3.73	H	-42.31	-13.00
	7,100.00	-56.81	11.30	-48.11	4.36	V	-41.17	-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	-52.81	9.65	-62.58	2.01	V	-54.94	-13.00
	2,509.50	-46.85	10.75	-50.57	2.50	V	-42.32	-13.00
	3,346.00	-57.00	12.48	-57.99	2.92	H	-48.43	-13.00

- NR Band: N66
- 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)
343500 (1717.5)	3,435.00	-48.31	12.58	-54.12	2.97	H	-44.51	-13.00
	5,152.50	-53.06	12.50	-50.49	3.65	H	-41.64	-13.00
	6,870.00	-56.83	12.15	-50.21	4.27	V	-42.33	-13.00
349000 (1745.0)	3,490.00	-48.17	12.35	-53.77	2.97	H	-44.39	-13.00
	5,235.00	-52.67	13.09	-51.71	3.70	H	-42.31	-13.00
	6,980.00	-56.83	11.85	-48.66	4.28	V	-41.09	-13.00
354500 (1772.5)	3,545.00	-48.24	12.13	-53.43	3.02	H	-44.32	-13.00
	5,317.50	-52.80	13.35	-51.60	3.73	H	-41.98	-13.00
	7,090.00	-56.95	11.35	-48.11	4.35	H	-41.11	-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	-52.65	9.65	-62.42	2.01	V	-54.78	-13.00
	2,509.50	-47.06	10.75	-50.78	2.50	V	-42.53	-13.00
	3,346.00	-56.44	12.48	-57.43	2.92	H	-47.87	-13.00

- NR Band: N66
- 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)
344000 (1720.0)	3,440.00	-48.00	12.55	-53.83	2.97	H	-44.25	-13.00
	5,160.00	-52.85	12.60	-50.44	3.65	H	-41.49	-13.00
	6,880.00	-56.55	12.15	-50.05	4.27	V	-42.17	-13.00
349000 (1745.0)	3,490.00	-48.00	12.35	-53.60	2.97	H	-44.22	-13.00
	5,235.00	-53.13	13.09	-52.17	3.70	H	-42.77	-13.00
	6,980.00	-56.71	11.85	-48.54	4.28	V	-40.97	-13.00
354000 (1770.0)	3,540.00	-47.96	12.15	-53.14	3.01	H	-44.00	-13.00
	5,310.00	-52.64	13.38	-51.76	3.74	H	-42.12	-13.00
	7,080.00	-56.53	11.40	-47.51	4.32	V	-40.43	-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	-52.38	9.65	-62.15	2.01	H	-54.51	-13.00
	2,509.50	-46.63	10.75	-50.35	2.50	V	-42.10	-13.00
	3,346.00	-56.24	12.48	-57.23	2.92	H	-47.67	-13.00

8.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
Sub6 n66	5 MHz	1745.0	BPSK	25	0	3.81
			QPSK			4.58
			16-QAM			5.57
			64-QAM			5.96
			256-QAM			6.38
	10 MHz		BPSK	50		3.90
			QPSK			4.62
			16-QAM			5.58
			64-QAM			5.94
			256-QAM			6.54
	15 MHz		BPSK	75		4.09
			QPSK			4.84
			16-QAM			5.71
			64-QAM			6.11
			256-QAM			6.58
	20 MHz		BPSK	100		3.96
			QPSK			4.63
			16-QAM			5.57
			64-QAM			5.97
			256-QAM			6.64

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 61 ~ 80.

8.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
Sub6 n66	5 MHz	1745.0	BPSK	25	0	4.4910
			QPSK			4.4892
			16-QAM			4.5070
			64-QAM			4.4934
			256-QAM			4.4849
	10 MHz		BPSK	50		8.9699
			QPSK			8.9802
			16-QAM			8.9825
			64-QAM			8.9719
			256-QAM			8.9733
	15 MHz		BPSK	75		13.476
			QPSK			13.493
			16-QAM			13.526
			64-QAM			13.473
			256-QAM			13.500
	20 MHz		BPSK	100		17.860
			QPSK			17.911
			16-QAM			17.927
			64-QAM			17.881
			256-QAM			17.917

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 41~ 60.

8.5 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
Sub6 n66	5	1712.5	3.7089	30.278	-67.158	-36.880	-13.00
		1745.0	3.6910	30.278	-67.148	-36.870	
		1777.5	3.6935	30.278	-66.941	-36.663	
	10	1715.0	3.6930	30.278	-67.147	-36.869	
		1745.0	3.7229	30.278	-67.335	-37.057	
		1775.0	3.7254	30.278	-67.300	-37.022	
	15	1717.5	3.1661	30.278	-67.524	-37.246	
		1745.0	3.7174	30.278	-67.374	-37.096	
		1772.5	3.7015	30.278	-67.329	-37.051	
	20	1720.0	3.7179	30.278	-67.403	-37.125	
		1745.0	3.7010	30.278	-67.189	-36.911	
		1770.0	3.1805	30.278	-67.185	-36.907	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 105 ~ 128.

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	28.691
1 – 5	30.278
5 – 10	31.391
10 – 15	31.716
15 – 20	32.553
Above 20(26.5)	33.984

8.6 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 81 ~ 104.

8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

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

Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
1712.5	100%	+20(Ref)	1712 500 013	0.0	0.000 000	0.000
	100%	-30	1712 500 017	4.3	0.000 000	0.003
	100%	-20	1712 500 024	11.1	0.000 001	0.006
	100%	-10	1712 500 023	10.4	0.000 001	0.006
	100%	0	1712 500 018	5.6	0.000 000	0.003
	100%	+10	1712 500 024	11.1	0.000 001	0.006
	100%	+30	1712 500 022	9.6	0.000 001	0.006
	100%	+40	1712 500 026	13.4	0.000 001	0.008
	100%	+50	1712 500 026	13.5	0.000 001	0.008
	Batt. Endpoint	+20	1712 500 023	9.8	0.000 001	0.006
1777.5	100%	+20(Ref)	1777 500 014	0.0	0.000 000	0.000
	100%	-30	1777 500 022	7.9	0.000 000	0.004
	100%	-20	1777 500 025	11.3	0.000 001	0.006
	100%	-10	1777 500 028	13.8	0.000 001	0.008
	100%	0	1777 500 017	3.1	0.000 000	0.002
	100%	+10	1777 500 019	5.0	0.000 000	0.003
	100%	+30	1777 500 027	13.4	0.000 001	0.008
	100%	+40	1777 500 025	11.0	0.000 001	0.006
	100%	+50	1777 500 023	8.8	0.000 000	0.005
	Batt. Endpoint	+20	1777 500 026	12.6	0.000 001	0.007

▣ BandWidth: 10 MHz

▣ Voltage(100%): 3.850 VDC

▣ Batt. Endpoint: 3.400 VDC

▣ LIMIT: Emission must remain in band

Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
1715.0	100%	+20(Ref)	1715 000 009	0.0	0.000 000	0.000
	100%	-30	1715 000 015	5.7	0.000 000	0.003
	100%	-20	1715 000 022	12.9	0.000 001	0.008
	100%	-10	1715 000 019	10.0	0.000 001	0.006
	100%	0	1715 000 020	10.9	0.000 001	0.006
	100%	+10	1715 000 016	7.4	0.000 000	0.004
	100%	+30	1715 000 015	6.3	0.000 000	0.004
	100%	+40	1715 000 016	7.3	0.000 000	0.004
	100%	+50	1715 000 018	8.7	0.000 001	0.005
	Batt. Endpoint	+20	1715 000 012	3.3	0.000 000	0.002
1775.0	100%	+20(Ref)	1775 000 011	0.0	0.000 000	0.000
	100%	-30	1775 000 017	5.6	0.000 000	0.003
	100%	-20	1775 000 021	9.6	0.000 001	0.005
	100%	-10	1775 000 023	11.5	0.000 001	0.006
	100%	0	1775 000 019	7.5	0.000 000	0.004
	100%	+10	1775 000 018	7.0	0.000 000	0.004
	100%	+30	1775 000 025	13.5	0.000 001	0.008
	100%	+40	1775 000 021	9.8	0.000 001	0.005
	100%	+50	1775 000 025	13.9	0.000 001	0.008
	Batt. Endpoint	+20	1775 000 020	9.0	0.000 001	0.005

▣ BandWidth: 15 MHz

▣ Voltage(100%): 3.850 VDC

▣ Batt. Endpoint: 3.400 VDC

▣ LIMIT: Emission must remain in band

Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
1717.5	100%	+20(Ref)	1717 500 013	0.0	0.000 000	0.000
	100%	-30	1717 500 027	14.4	0.000 001	0.008
	100%	-20	1717 500 021	7.6	0.000 000	0.004
	100%	-10	1717 500 023	9.9	0.000 001	0.006
	100%	0	1717 500 023	10.1	0.000 001	0.006
	100%	+10	1717 500 022	8.8	0.000 001	0.005
	100%	+30	1717 500 028	14.8	0.000 001	0.009
	100%	+40	1717 500 021	7.9	0.000 000	0.005
	100%	+50	1717 500 024	11.2	0.000 001	0.007
	Batt. Endpoint	+20	1717 500 027	14.4	0.000 001	0.008
1772.5	100%	+20(Ref)	1772 500 009	0.0	0.000 000	0.000
	100%	-30	1772 500 021	12.2	0.000 001	0.007
	100%	-20	1772 500 018	8.5	0.000 000	0.005
	100%	-10	1772 500 016	7.1	0.000 000	0.004
	100%	0	1772 500 018	9.5	0.000 001	0.005
	100%	+10	1772 500 018	9.1	0.000 001	0.005
	100%	+30	1772 500 015	5.8	0.000 000	0.003
	100%	+40	1772 500 023	13.6	0.000 001	0.008
	100%	+50	1772 500 013	4.1	0.000 000	0.002
	Batt. Endpoint	+20	1772 500 020	11.4	0.000 001	0.006

▣ BandWidth: 20 MHz

▣ Voltage(100%): 3.850 VDC

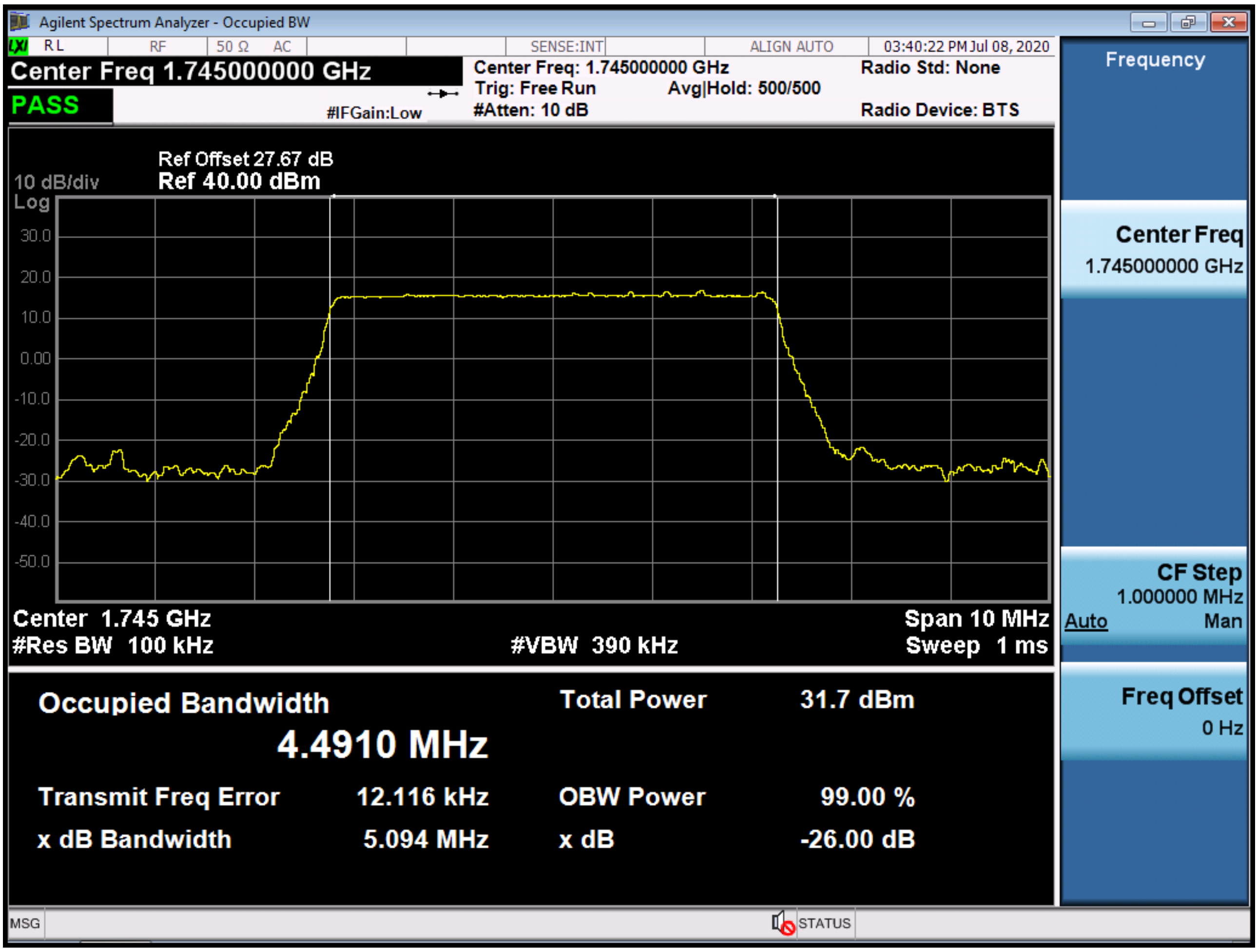
▣ Batt. Endpoint: 3.400 VDC

▣ LIMIT: Emission must remain in band

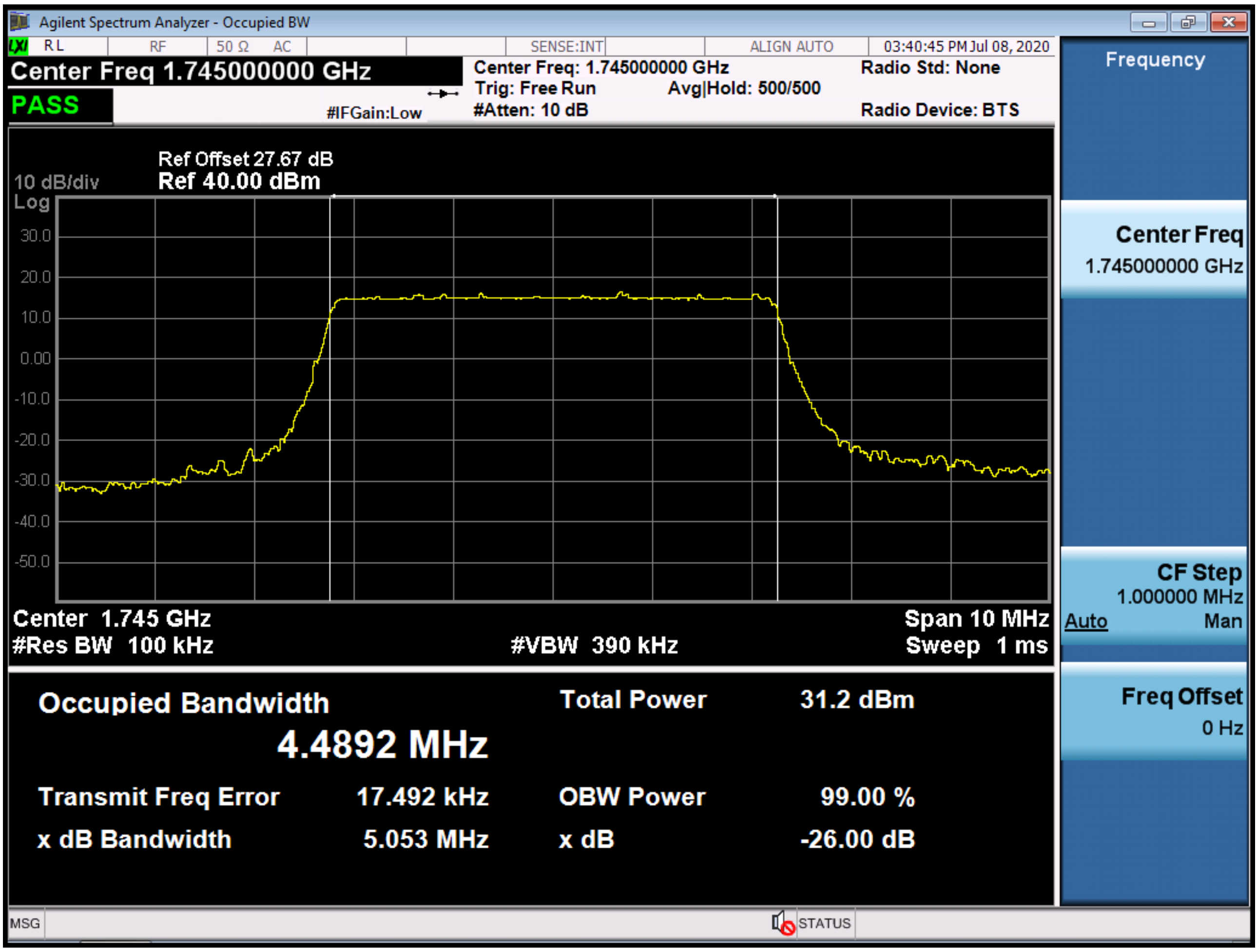
Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
1720.0	100%	+20(Ref)	1720 000 007	0.0	0.000 000	0.000
	100%	-30	1720 000 015	7.8	0.000 000	0.005
	100%	-20	1720 000 015	8.0	0.000 000	0.005
	100%	-10	1720 000 016	8.9	0.000 001	0.005
	100%	0	1720 000 018	10.9	0.000 001	0.006
	100%	+10	1720 000 019	11.5	0.000 001	0.007
	100%	+30	1720 000 015	8.0	0.000 000	0.005
	100%	+40	1720 000 013	5.8	0.000 000	0.003
	100%	+50	1720 000 014	6.5	0.000 000	0.004
	Batt. Endpoint	+20	1720 000 021	14.2	0.000 001	0.008
1770.0	100%	+20(Ref)	1770 000 014	0.0	0.000 000	0.000
	100%	-30	1770 000 026	12.0	0.000 001	0.007
	100%	-20	1770 000 027	12.4	0.000 001	0.007
	100%	-10	1770 000 027	12.8	0.000 001	0.007
	100%	0	1770 000 029	14.1	0.000 001	0.008
	100%	+10	1770 000 022	7.9	0.000 000	0.004
	100%	+30	1770 000 029	15.0	0.000 001	0.008
	100%	+40	1770 000 019	5.0	0.000 000	0.003
	100%	+50	1770 000 024	9.5	0.000 001	0.005
	Batt. Endpoint	+20	1770 000 027	12.2	0.000 001	0.007

9. TEST PLOTS

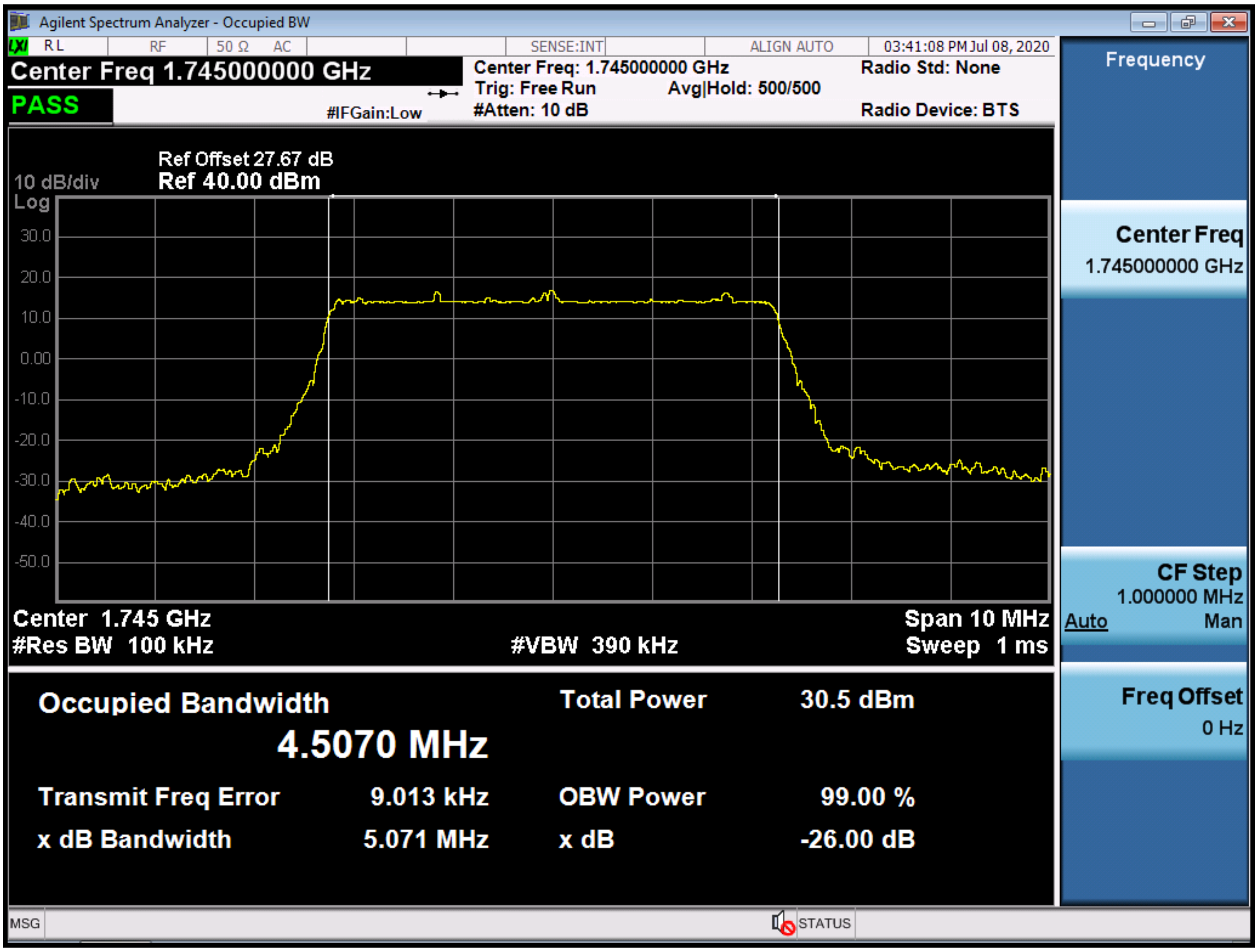
Sub6 n66. Occupied Bandwidth Plot (5M BW Ch.349000 BPSK RB 25)



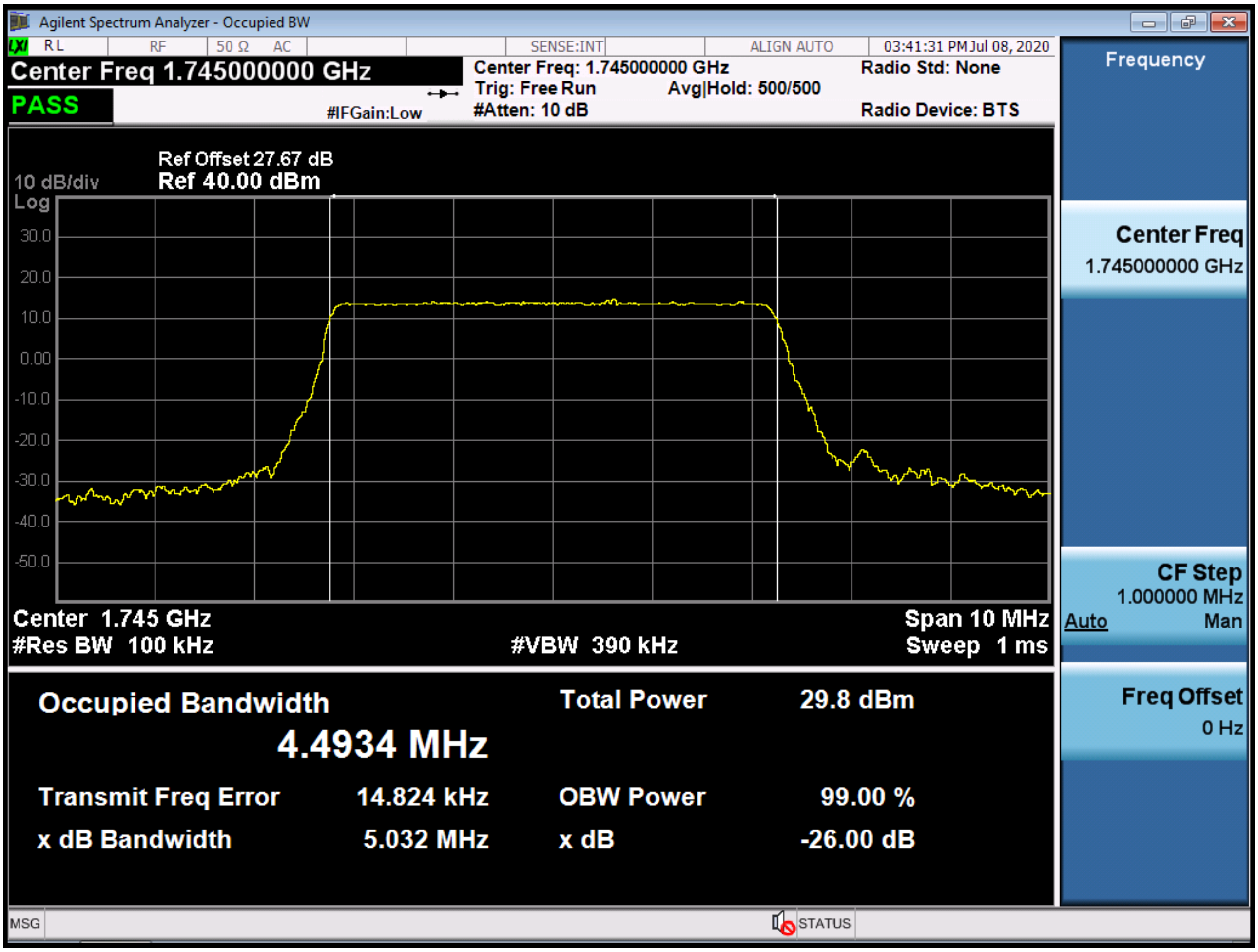
Sub6 n66. Occupied Bandwidth Plot (5M BW Ch.349000 QPSK RB 25)



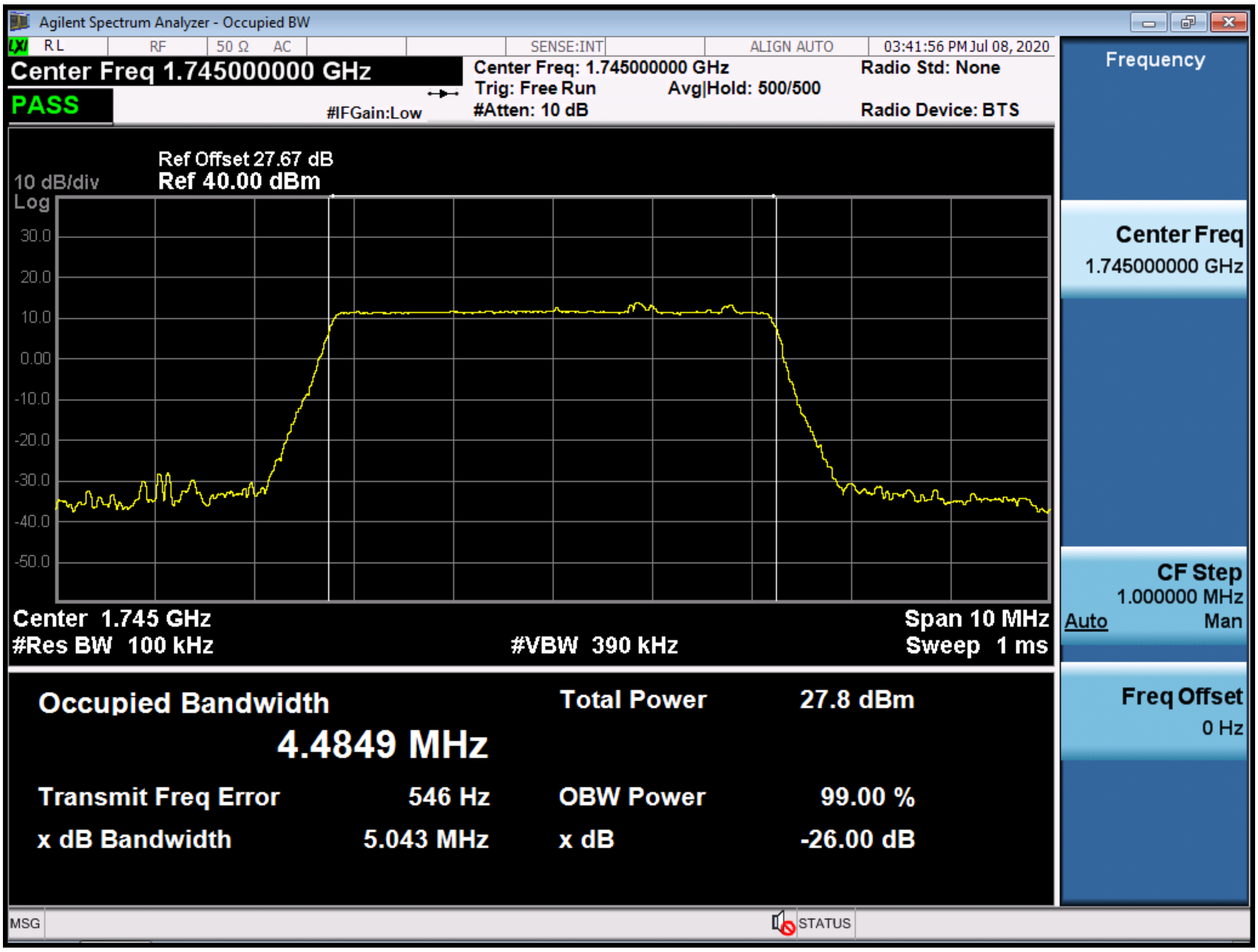
Sub6 n66. Occupied Bandwidth Plot (5M BW Ch.349000 16QAM RB 25)



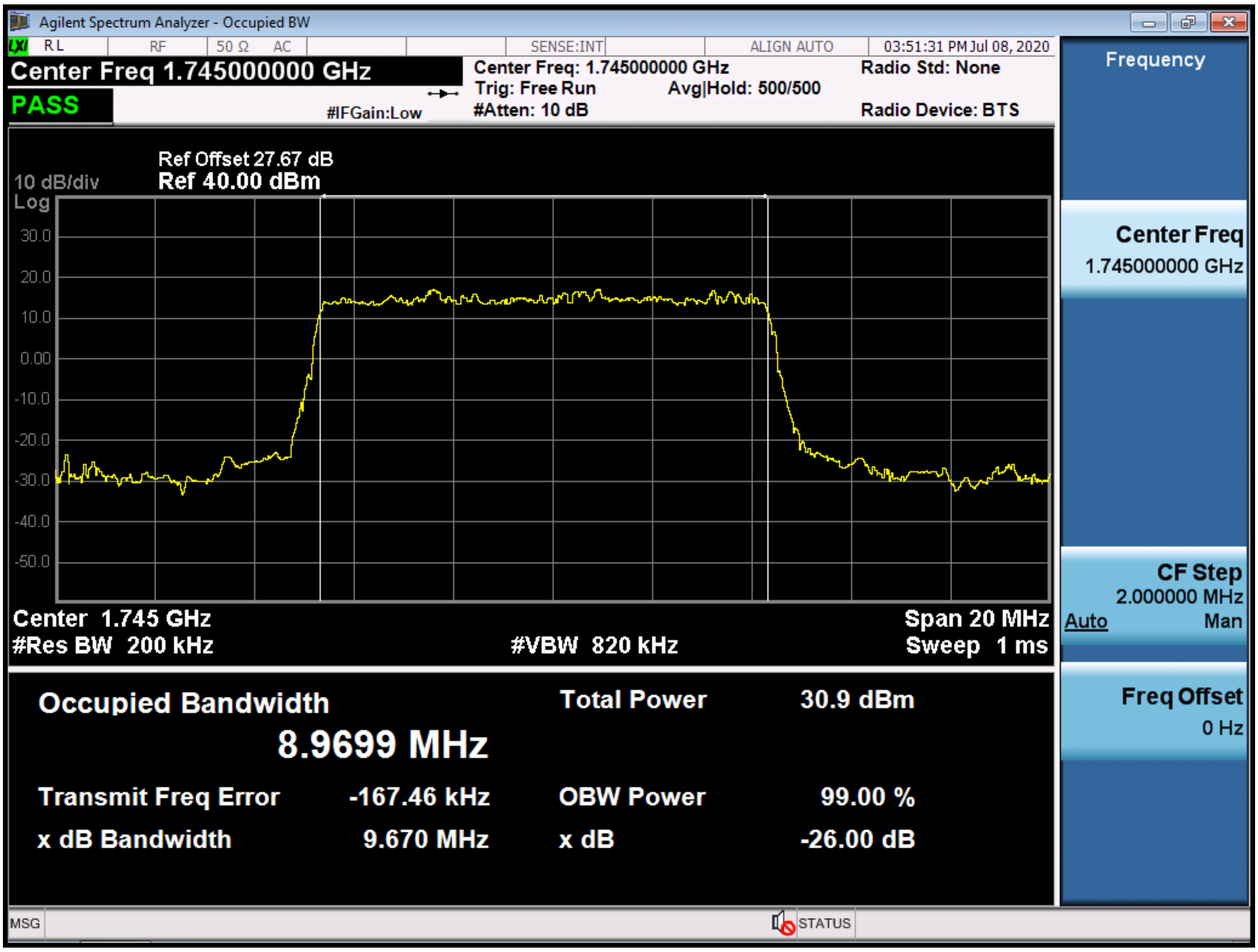
Sub6 n66. Occupied Bandwidth Plot (5M BW Ch.349000 64QAM RB 25)



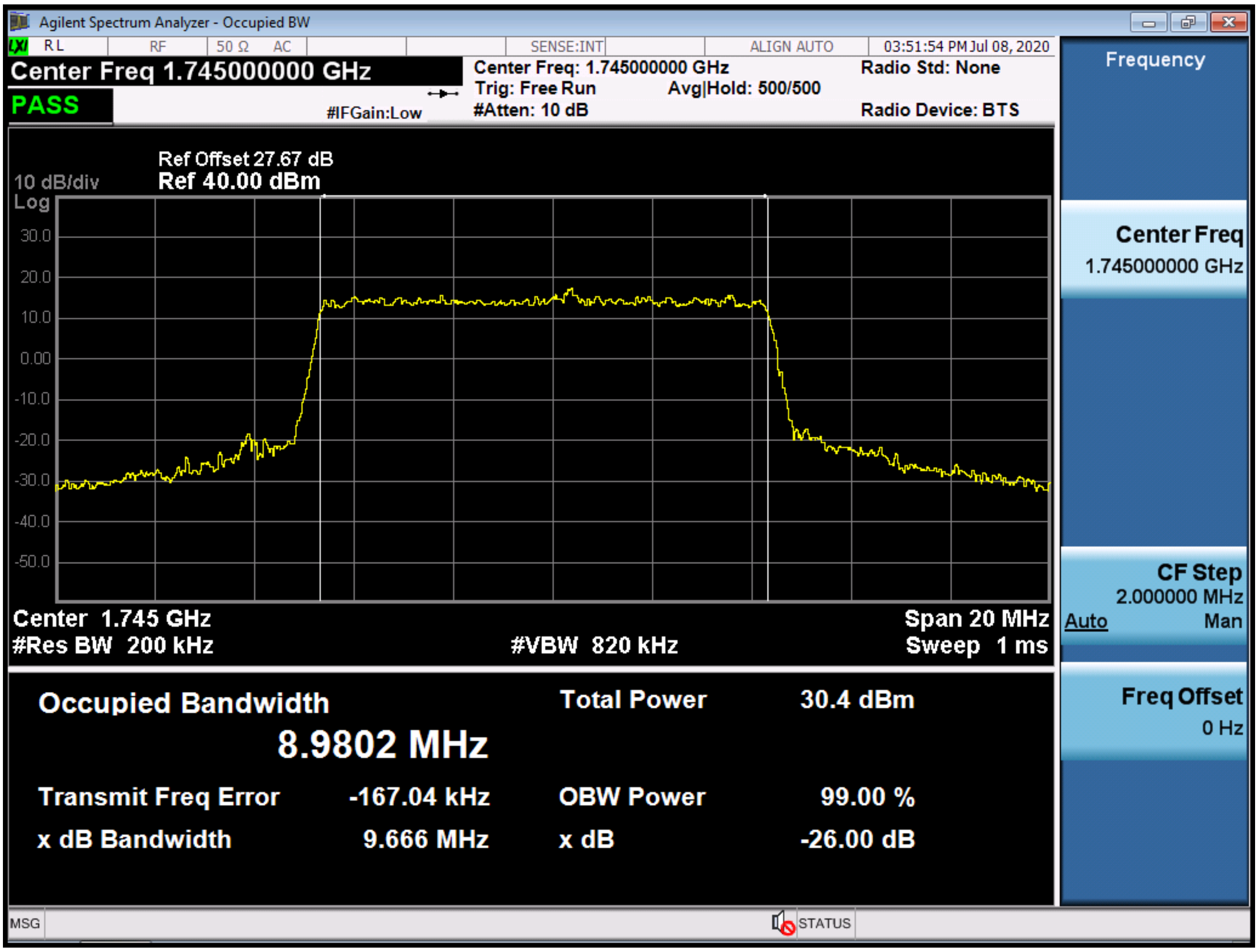
Sub6 n66. Occupied Bandwidth Plot (5M BW Ch.349000 25664QAM RB 25)



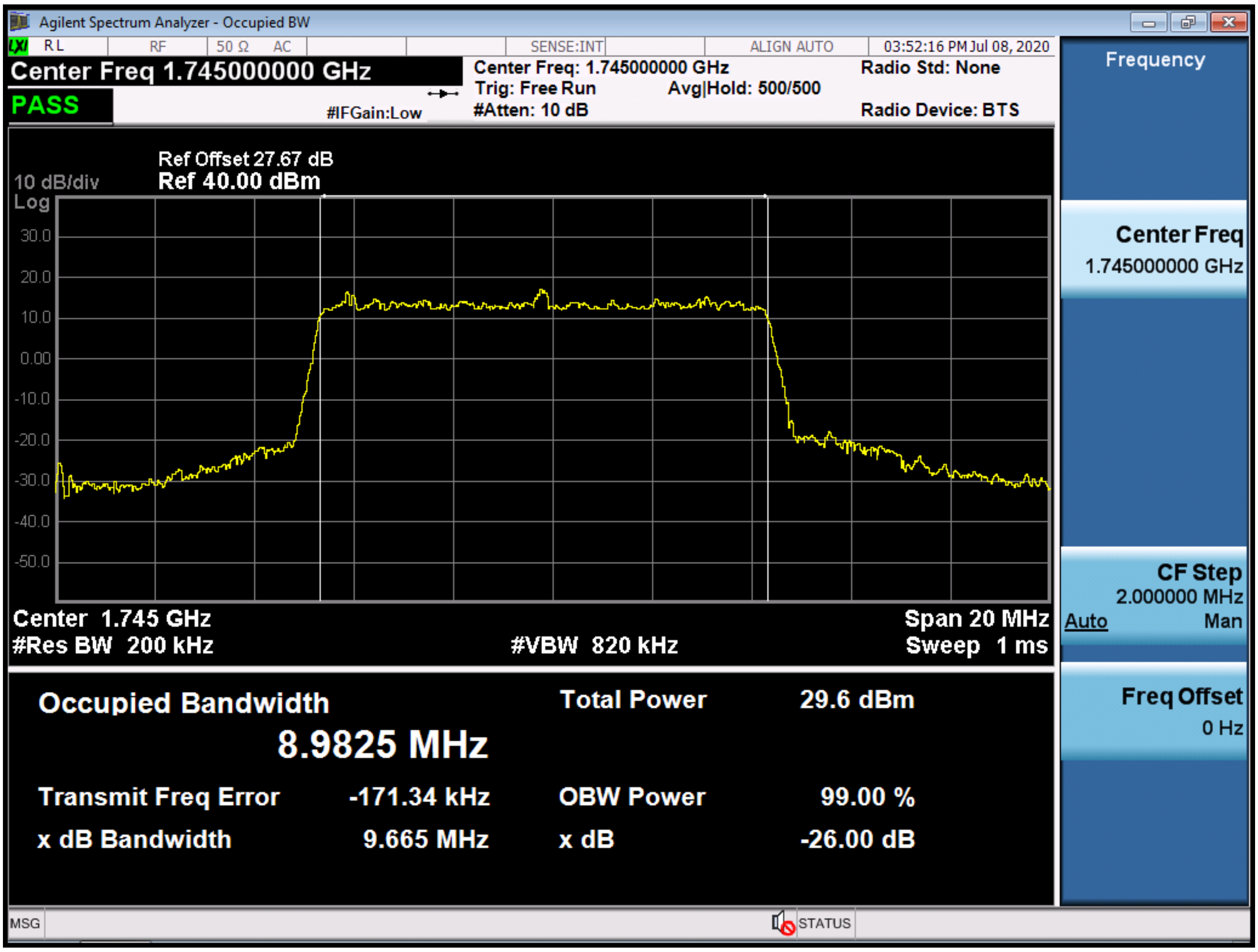
Sub6 n66. Occupied Bandwidth Plot (10M BW Ch.349000 BPSK RB 50)



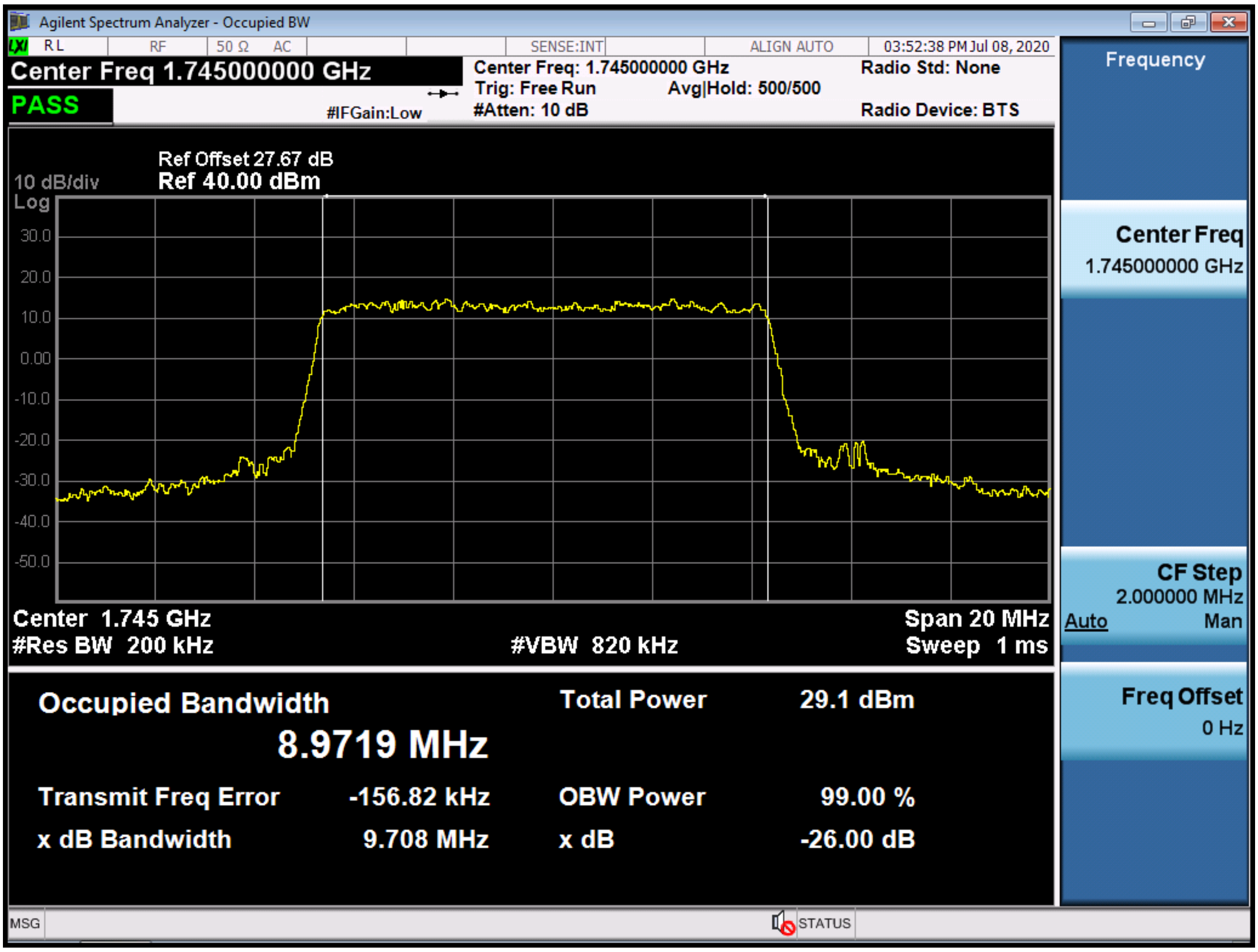
Sub6 n66. Occupied Bandwidth Plot (10M BW Ch.349000 QPSK RB 50)



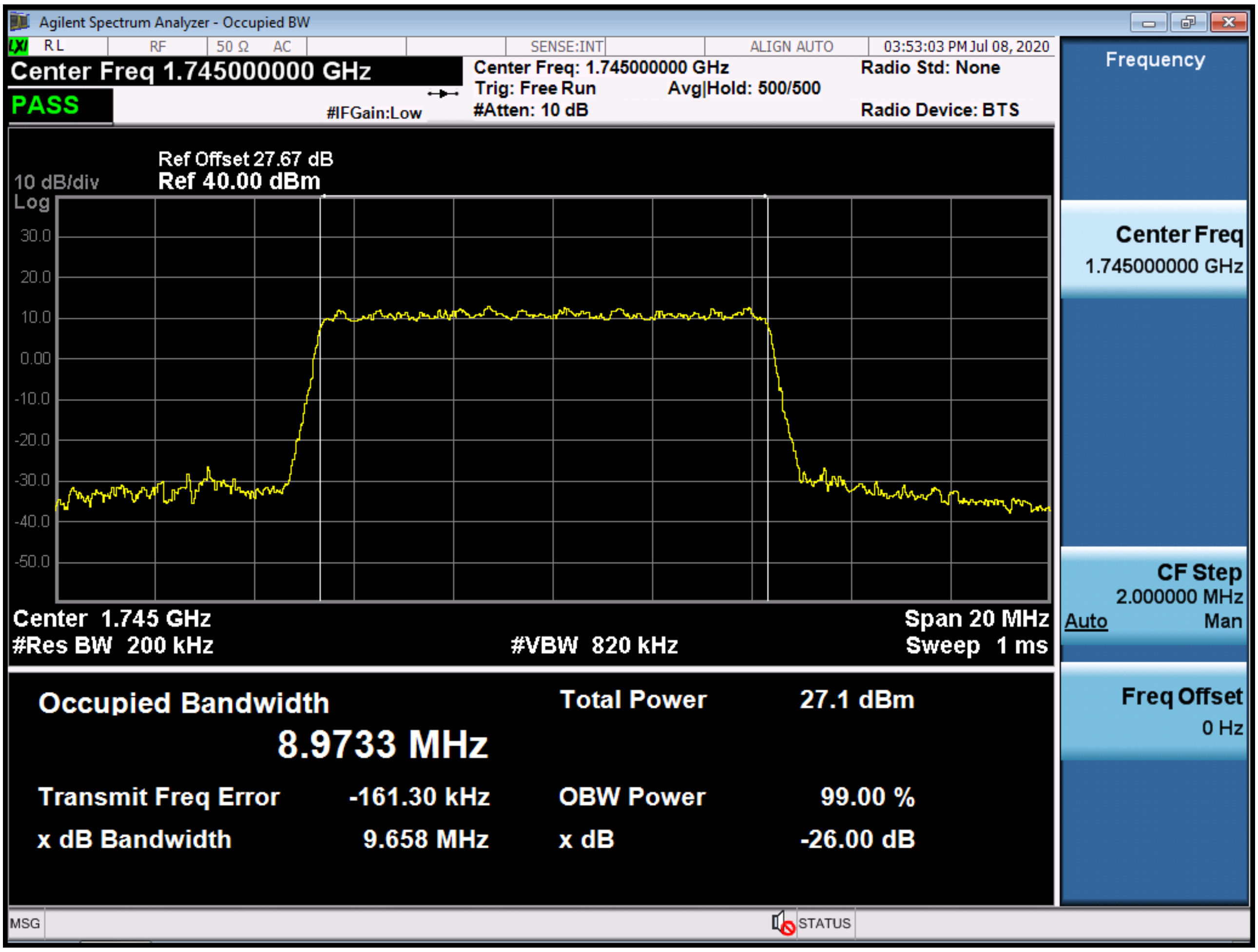
Sub6 n66. Occupied Bandwidth Plot (10M BW Ch.349000 16QAM RB 50)



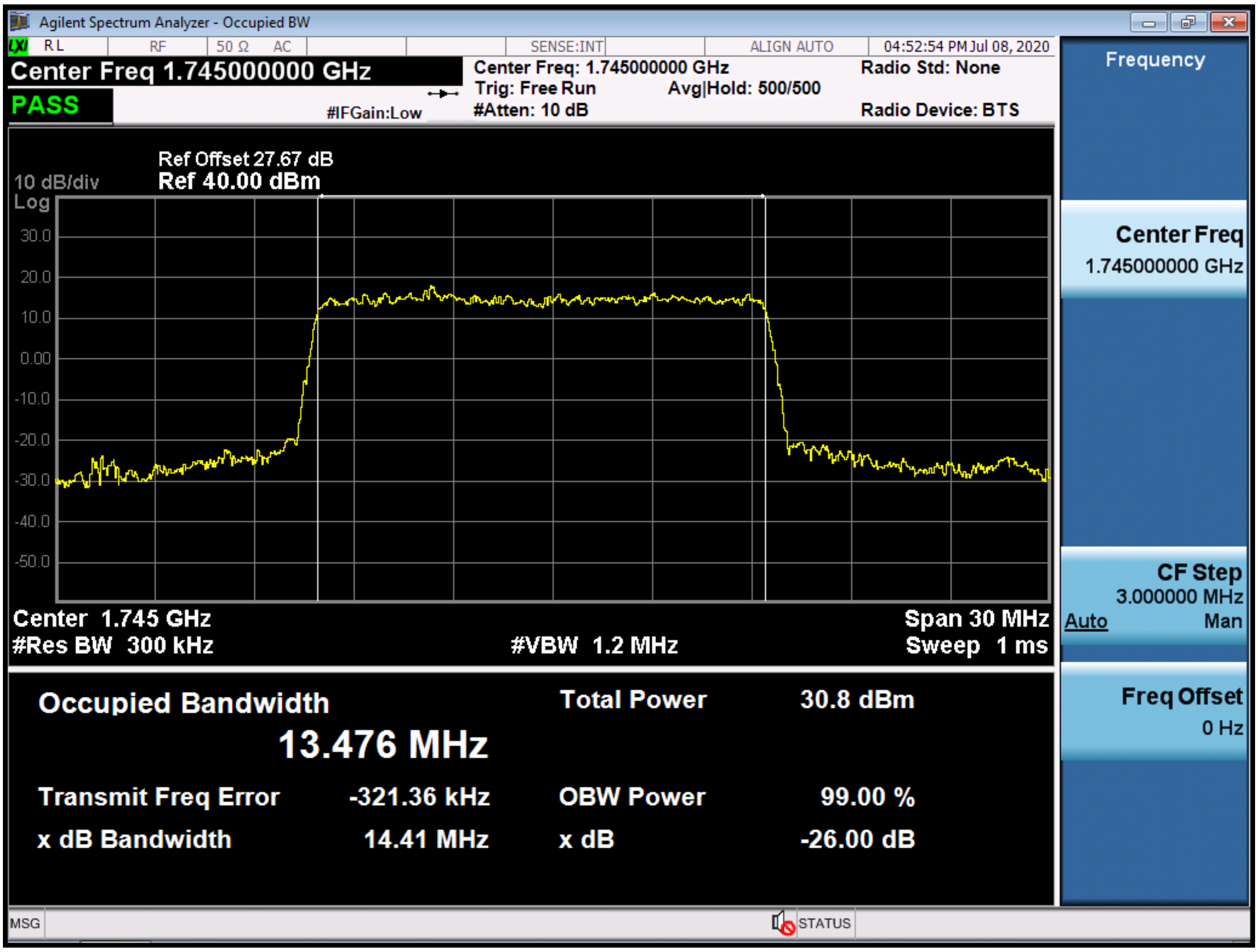
Sub6 n66. Occupied Bandwidth Plot (10M BW Ch.349000 64QAM RB 50)



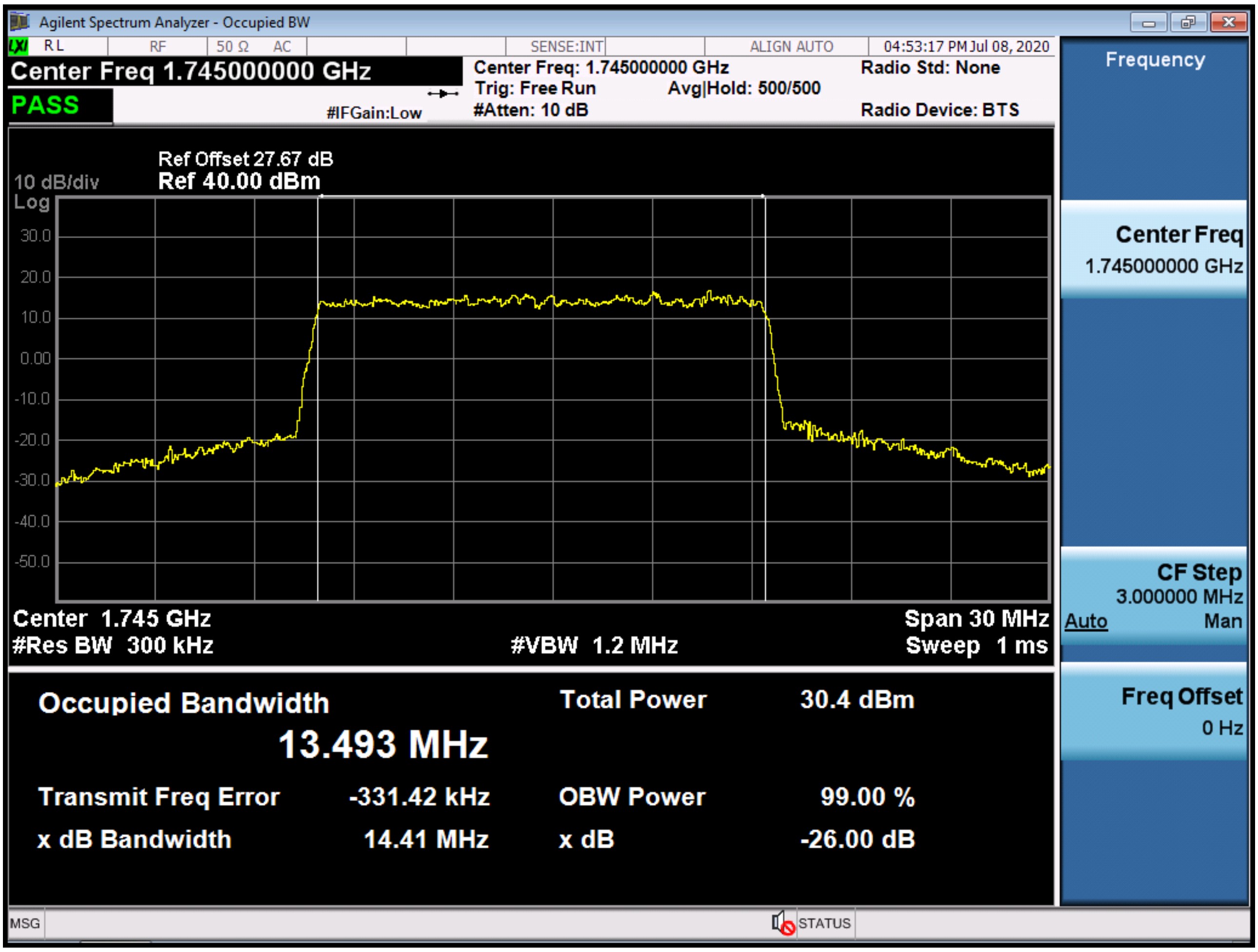
Sub6 n66. Occupied Bandwidth Plot (10M BW Ch.349000 256QAM RB 50)



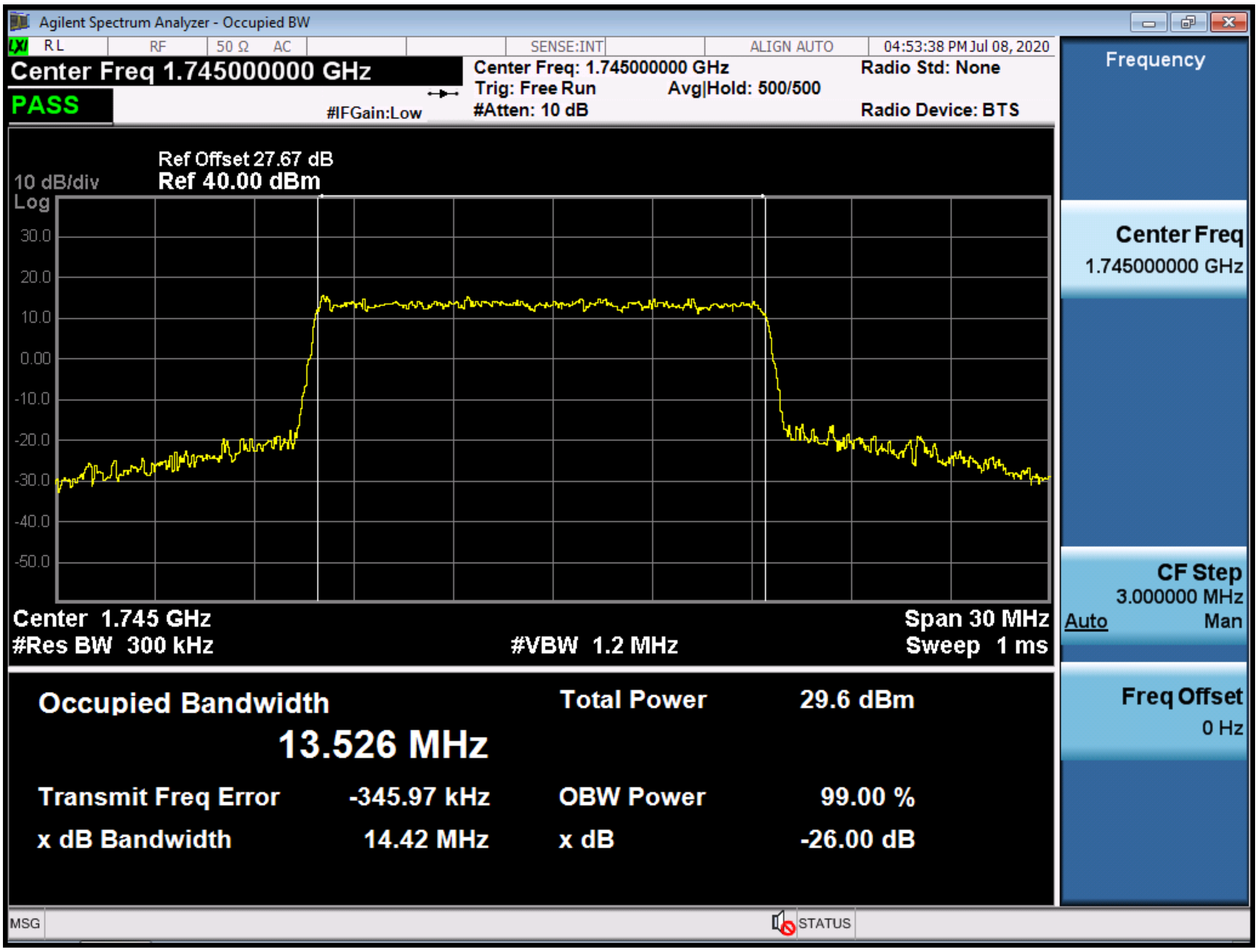
Sub6 n66. Occupied Bandwidth Plot (15M BW Ch.349000 BPSK RB 75)



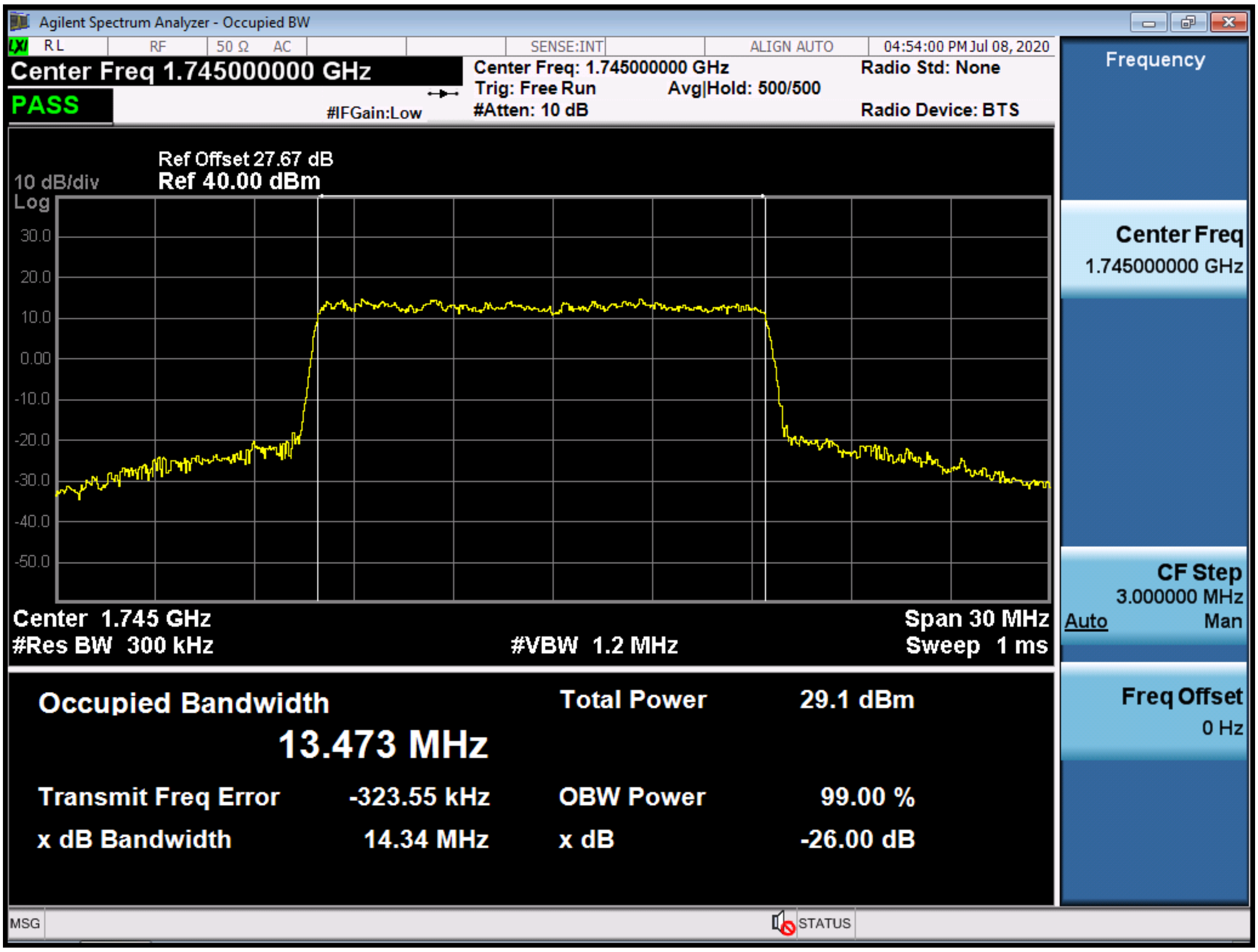
Sub6 n66. Occupied Bandwidth Plot (15M BW Ch.349000 QPSK RB 75)



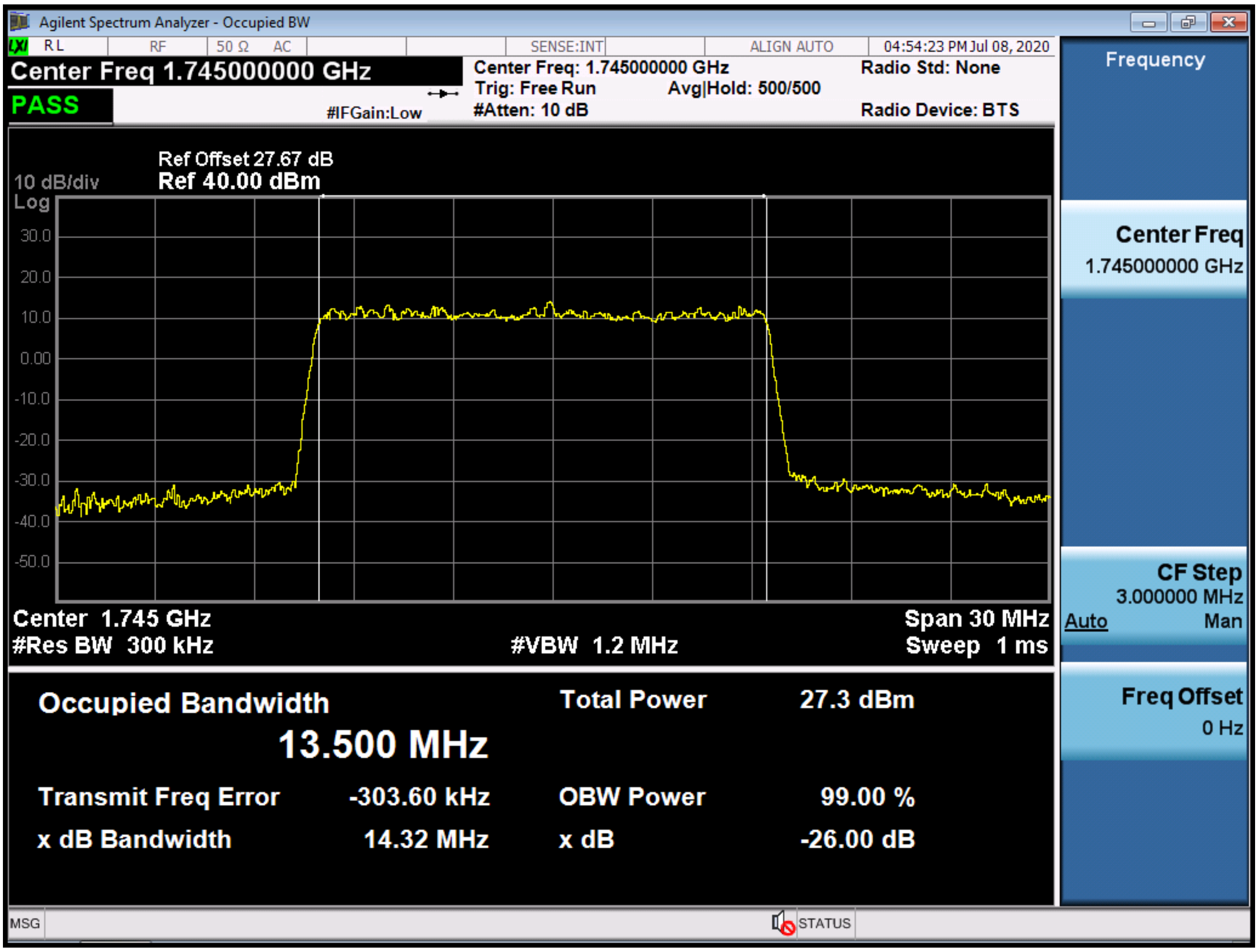
Sub6 n66. Occupied Bandwidth Plot (15M BW Ch.349000 16QAM RB 75)



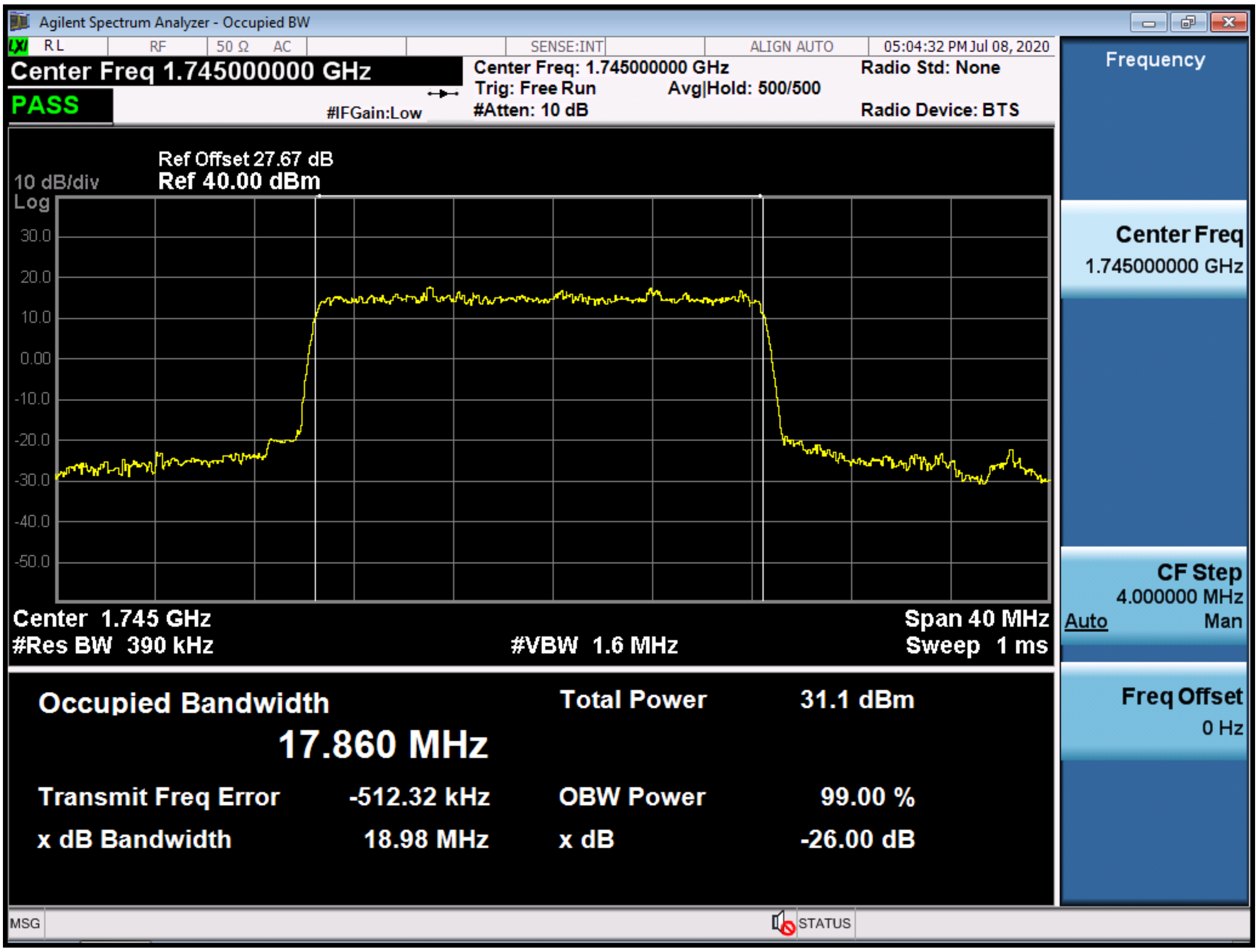
Sub6 n66. Occupied Bandwidth Plot (15M BW Ch.349000 64QAM RB 75)



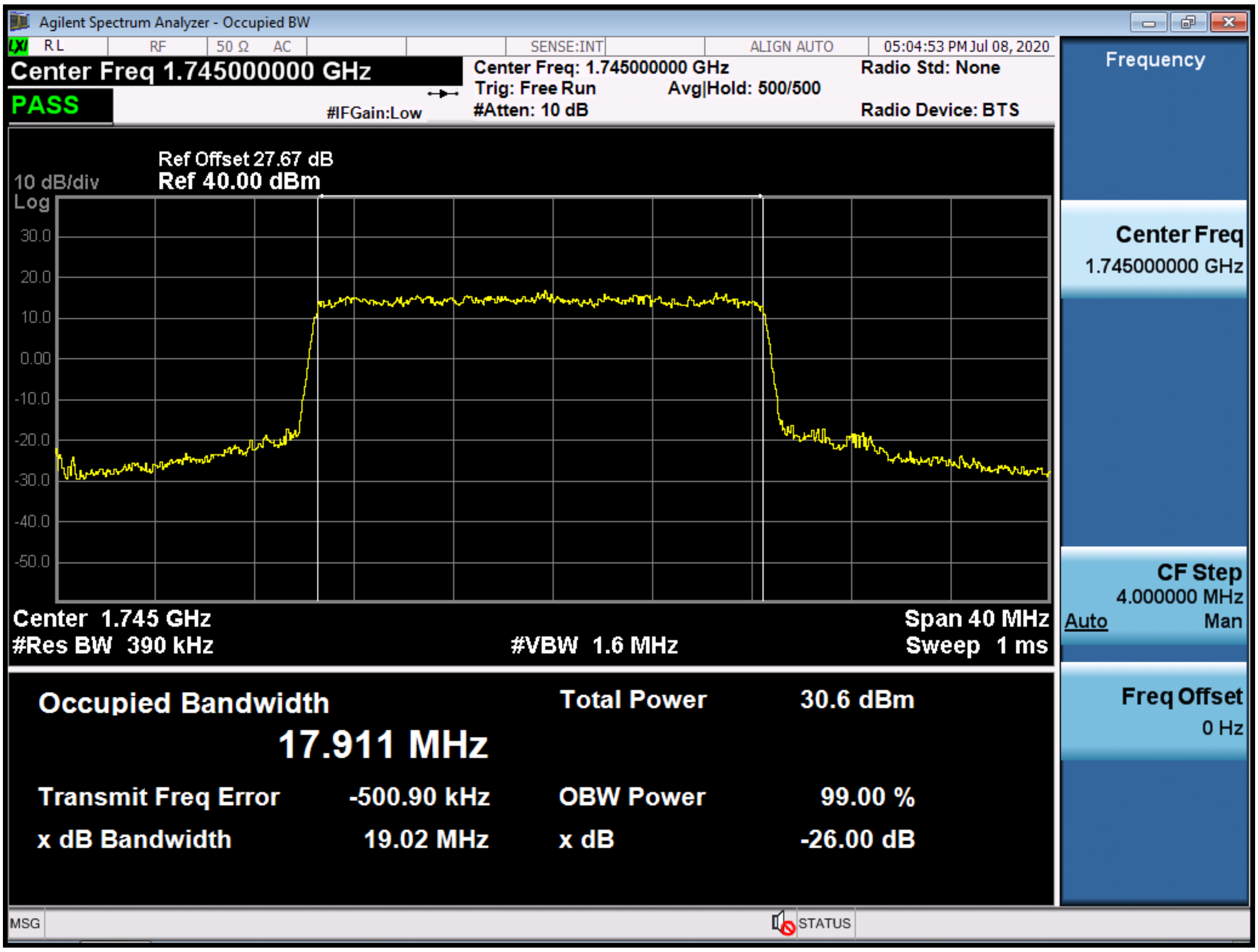
Sub6 n66. Occupied Bandwidth Plot (15M BW Ch.349000 256QAM RB 75)



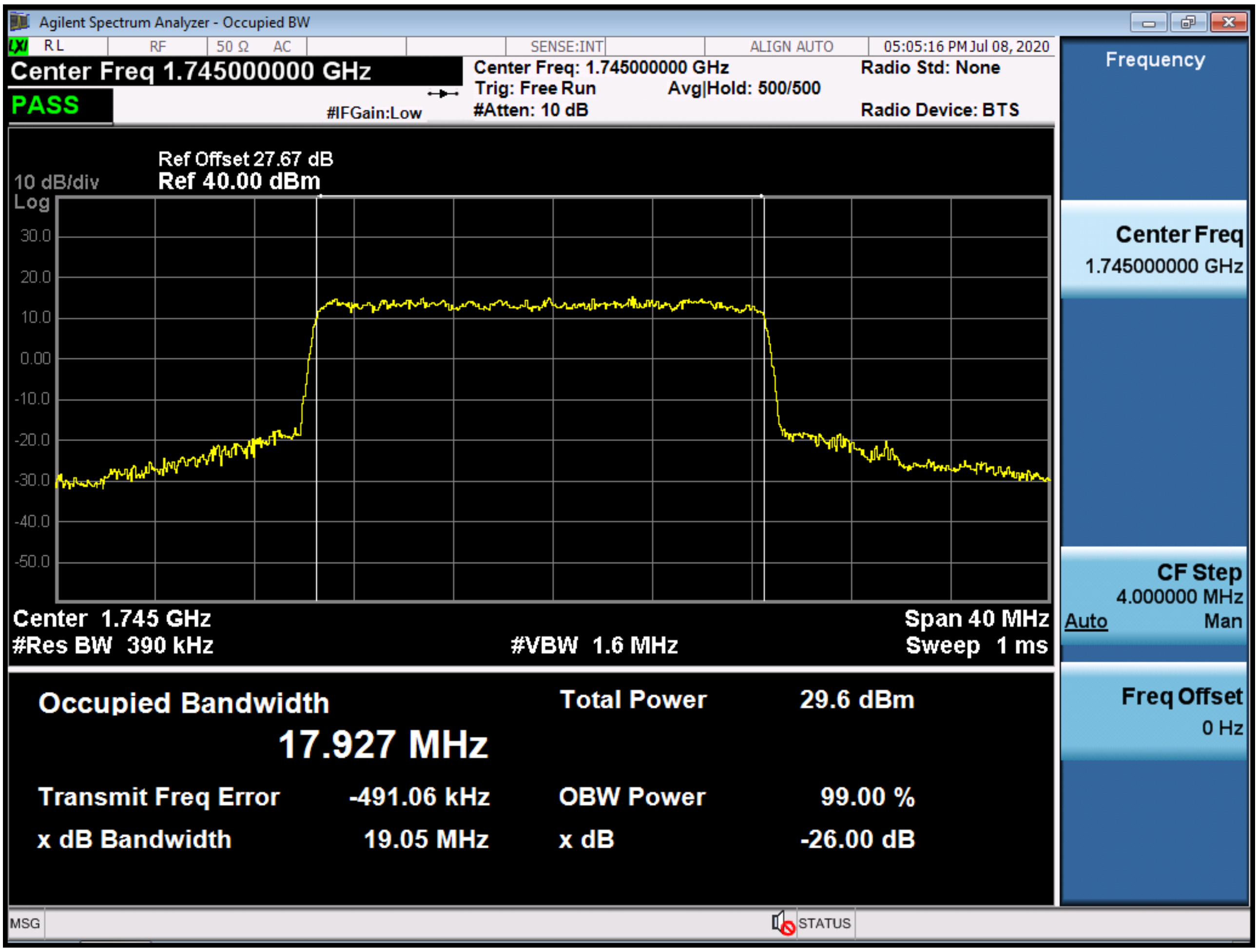
Sub6 n66. Occupied Bandwidth Plot (20M BW Ch.349000 BPSK RB 100)



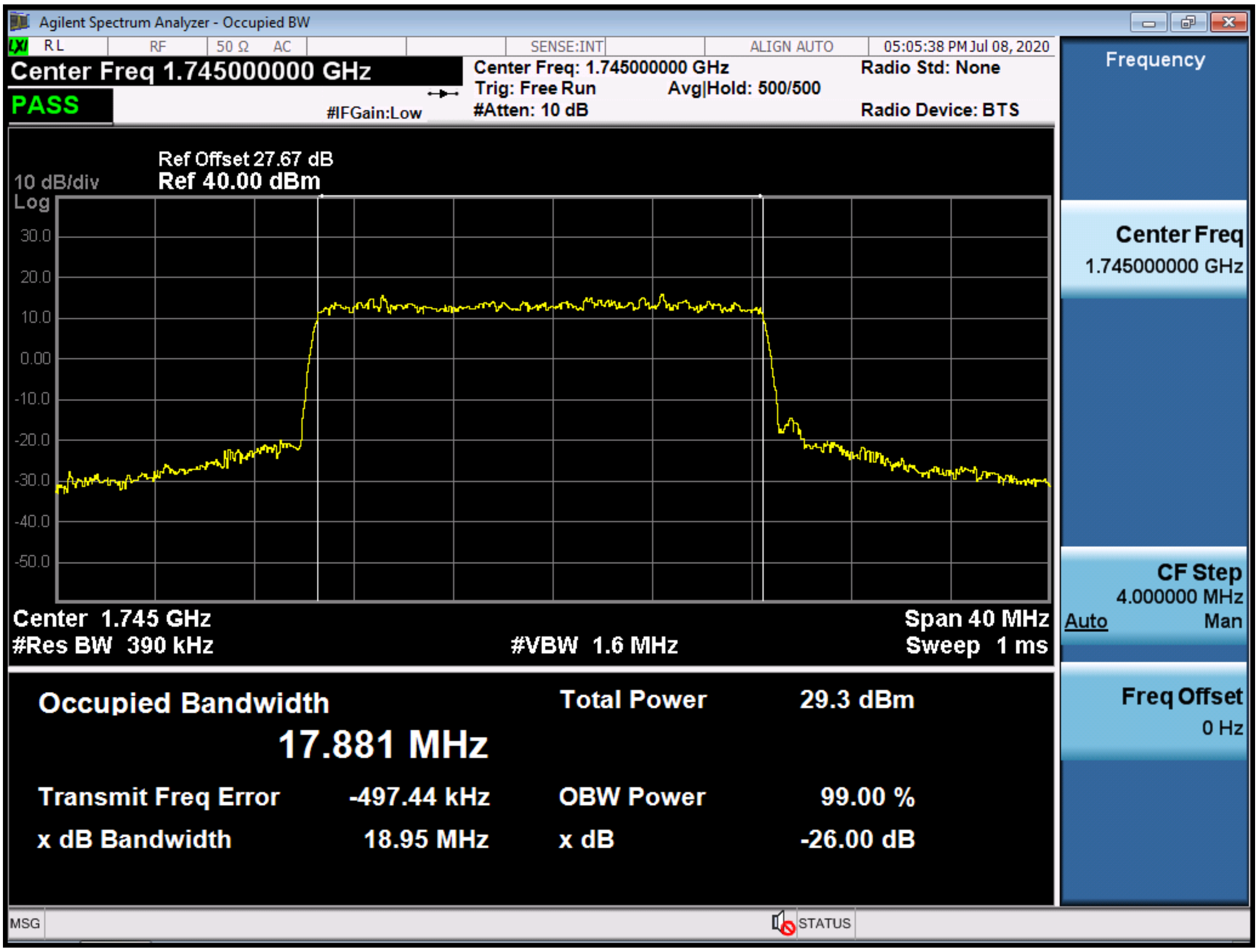
Sub6 n66. Occupied Bandwidth Plot (20M BW Ch.349000 QPSK RB 100)



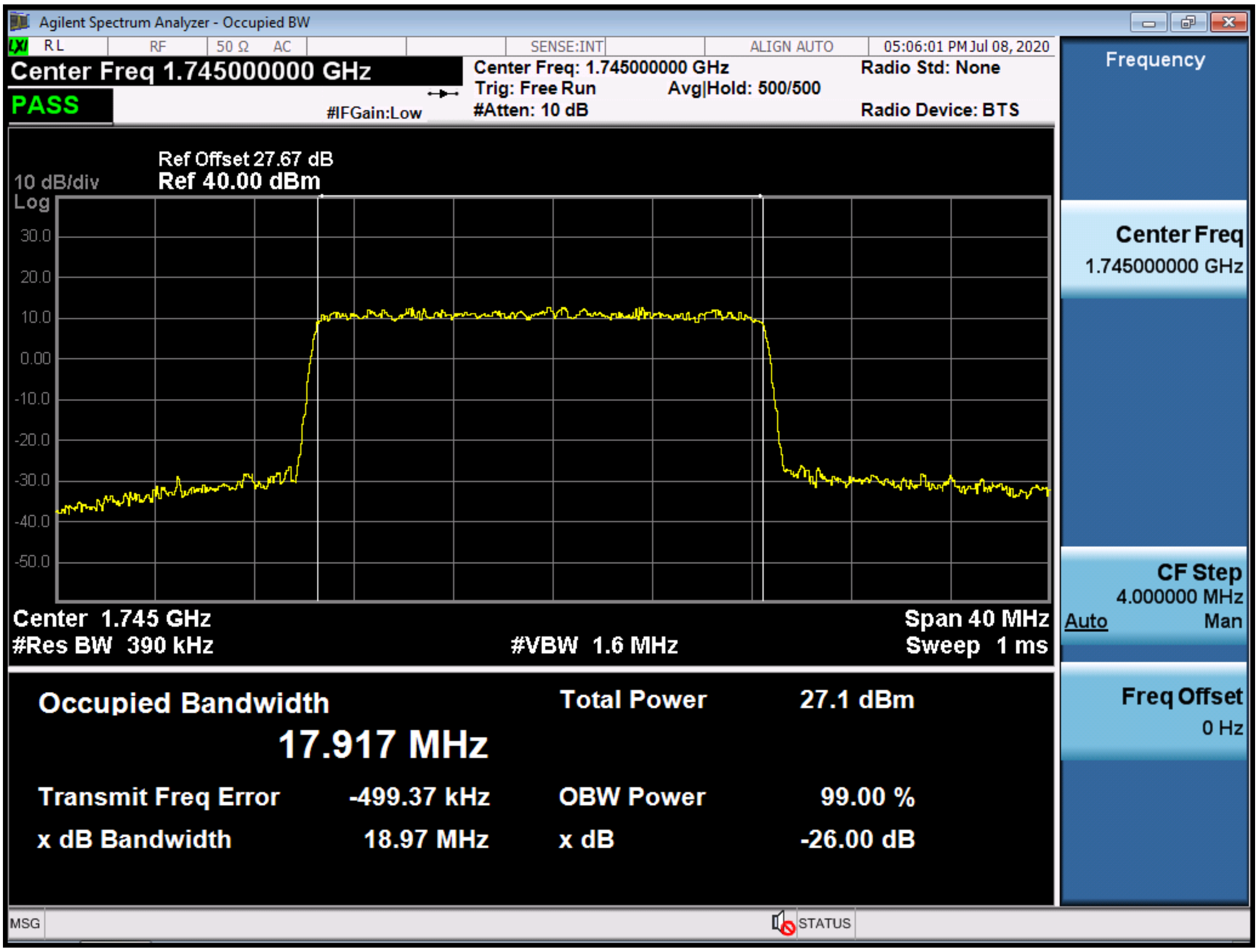
Sub6 n66. Occupied Bandwidth Plot (20M BW Ch.349000 16QAM RB 100)



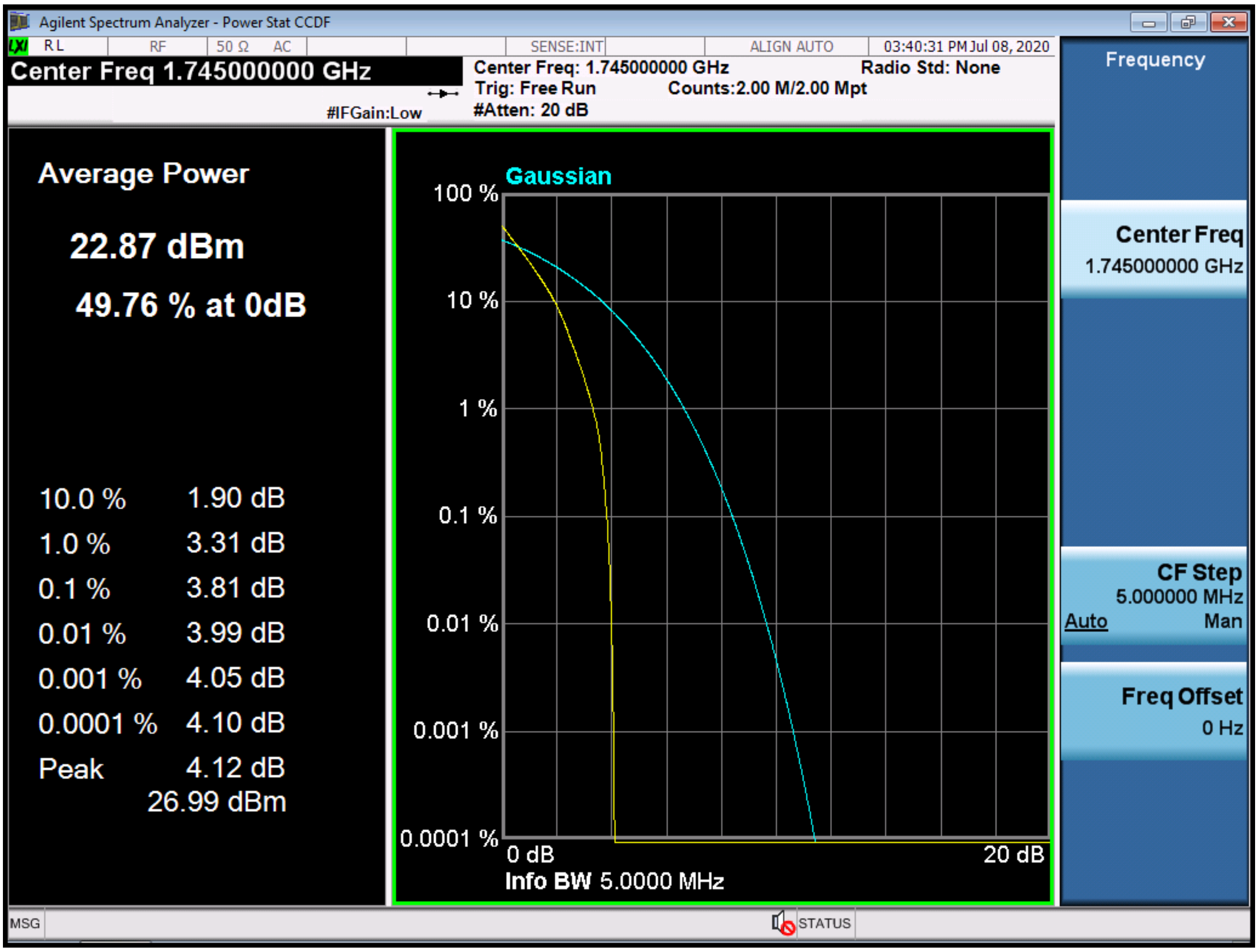
Sub6 n66. Occupied Bandwidth Plot (20M BW Ch.349000 64QAM RB 100)



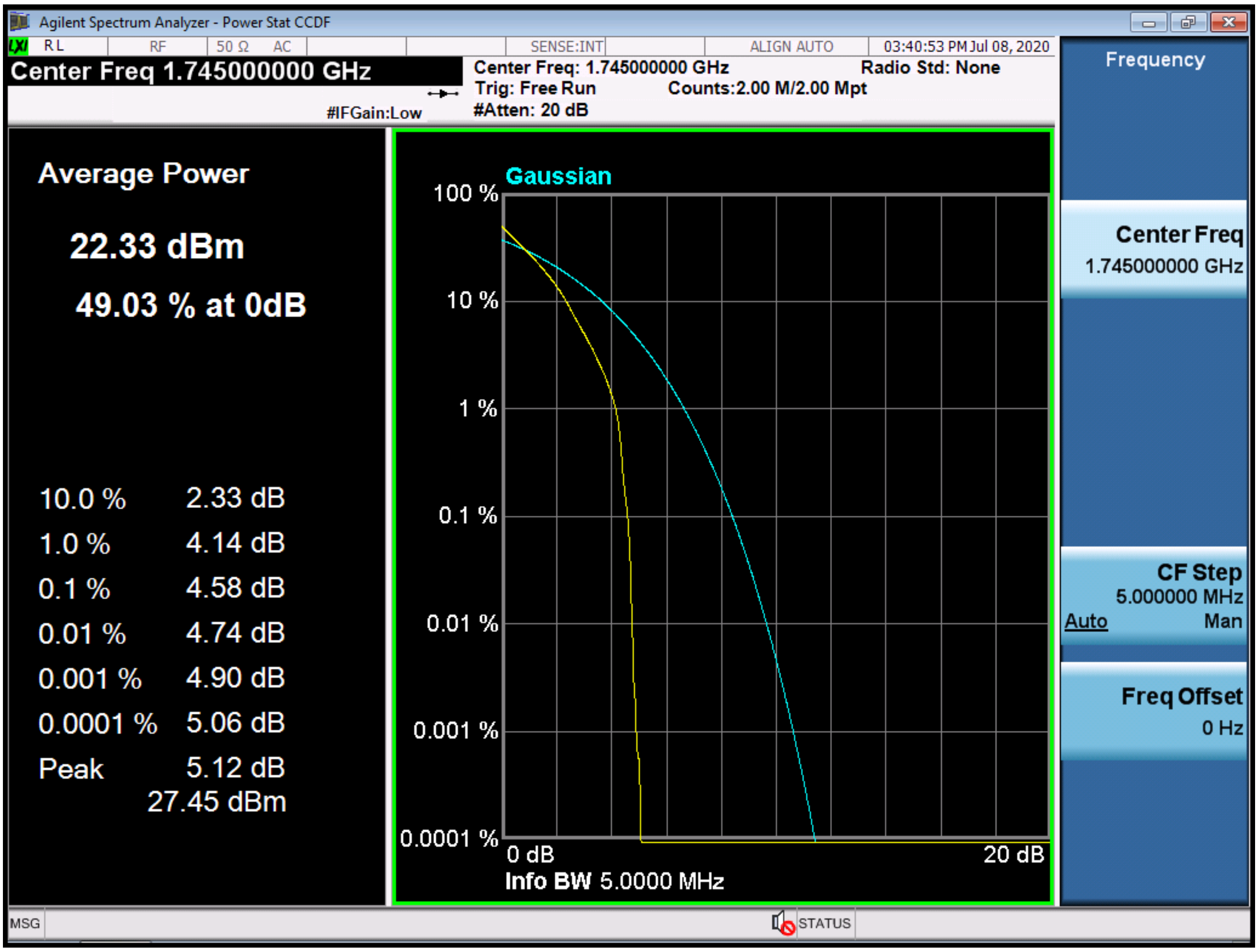
Sub6 n66. Occupied Bandwidth Plot (20M BW Ch.349000 256QAM RB 100)



Sub6 n66. PAR Plot (5M BW_Ch.349000_ BPSK_RB25_0)

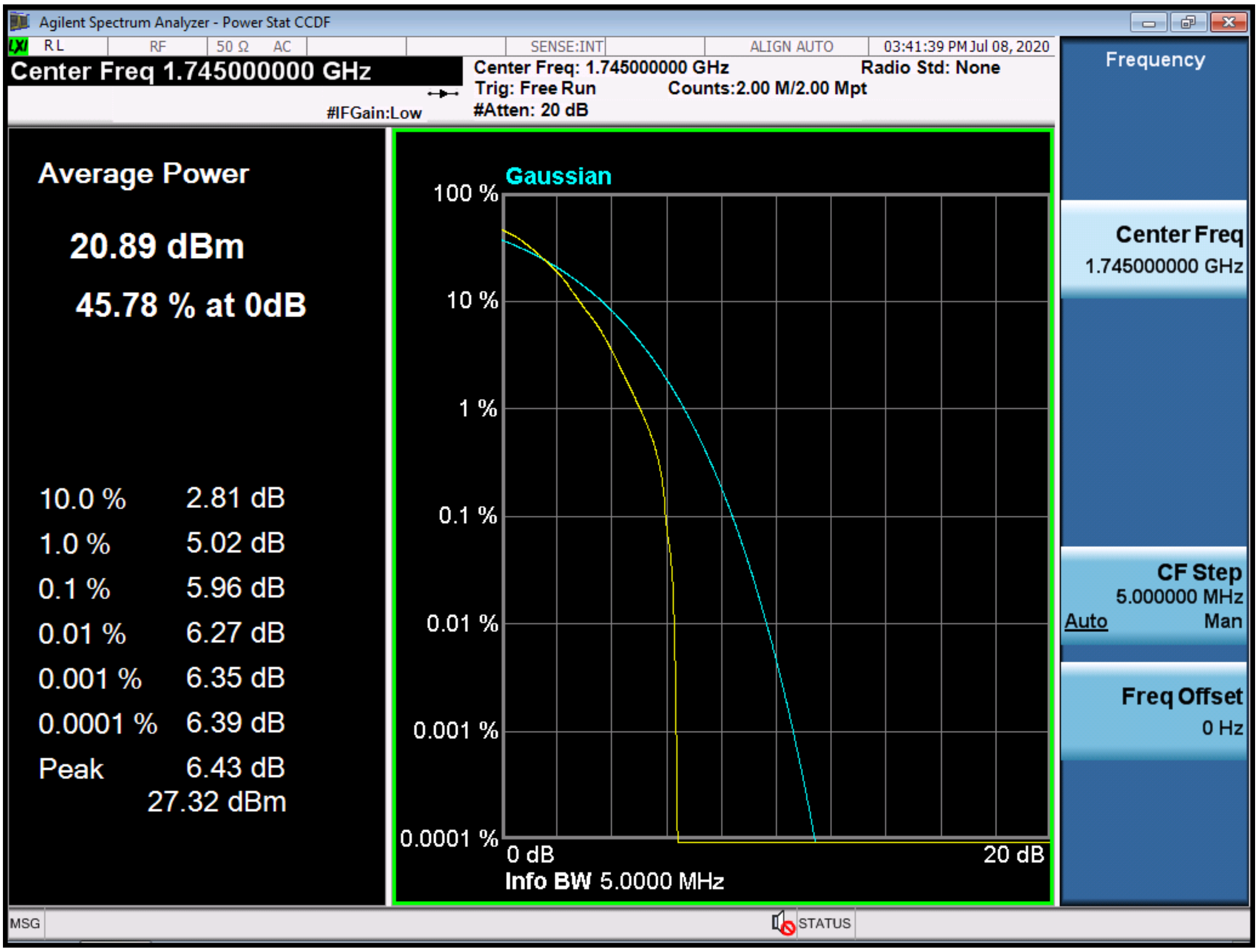


Sub6 n66. PAR Plot (5M BW_Ch.349000_QPSK_RB25_0)

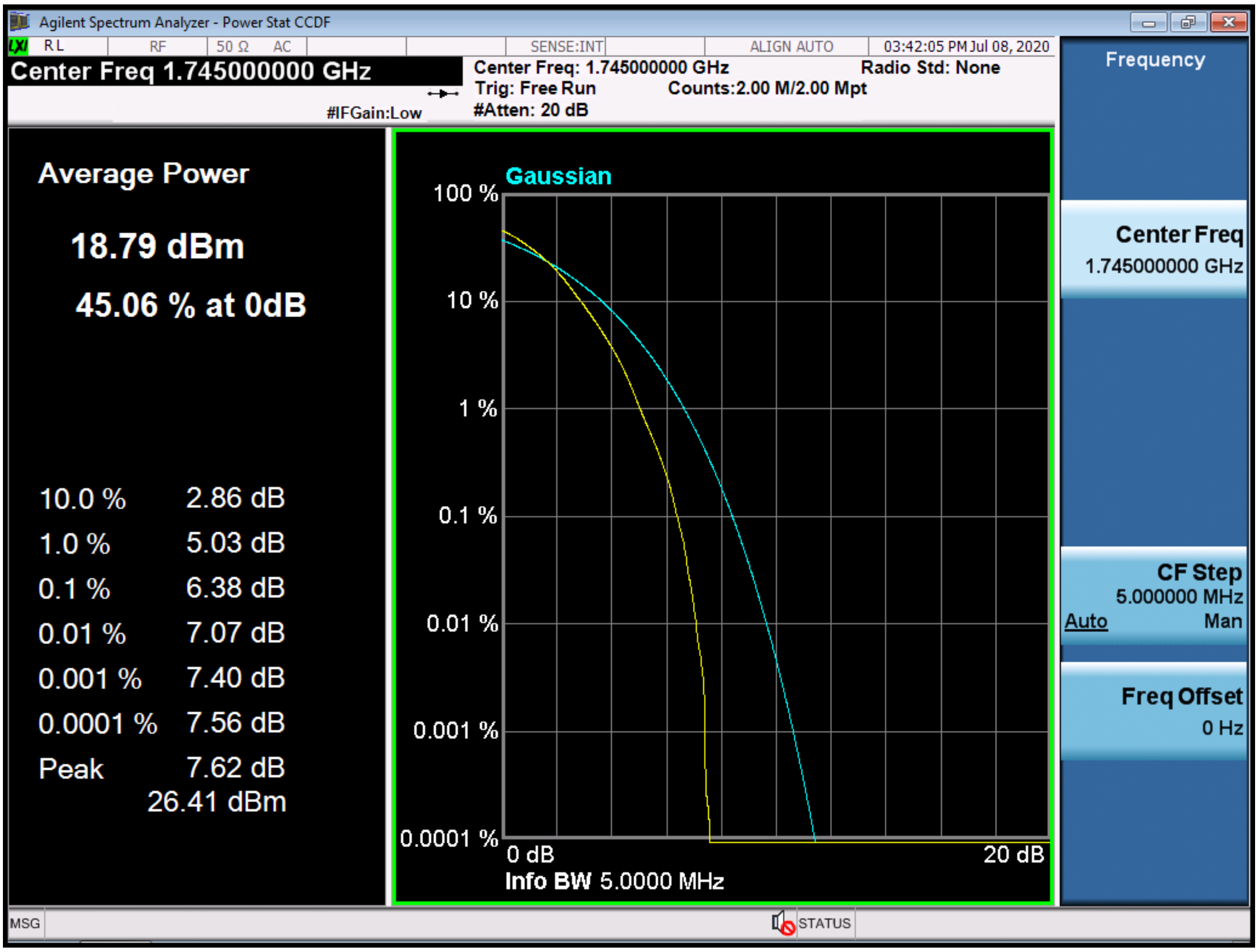


Sub6 n66. PAR Plot (5M BW_Ch.349000_16QAM_RB25_0)

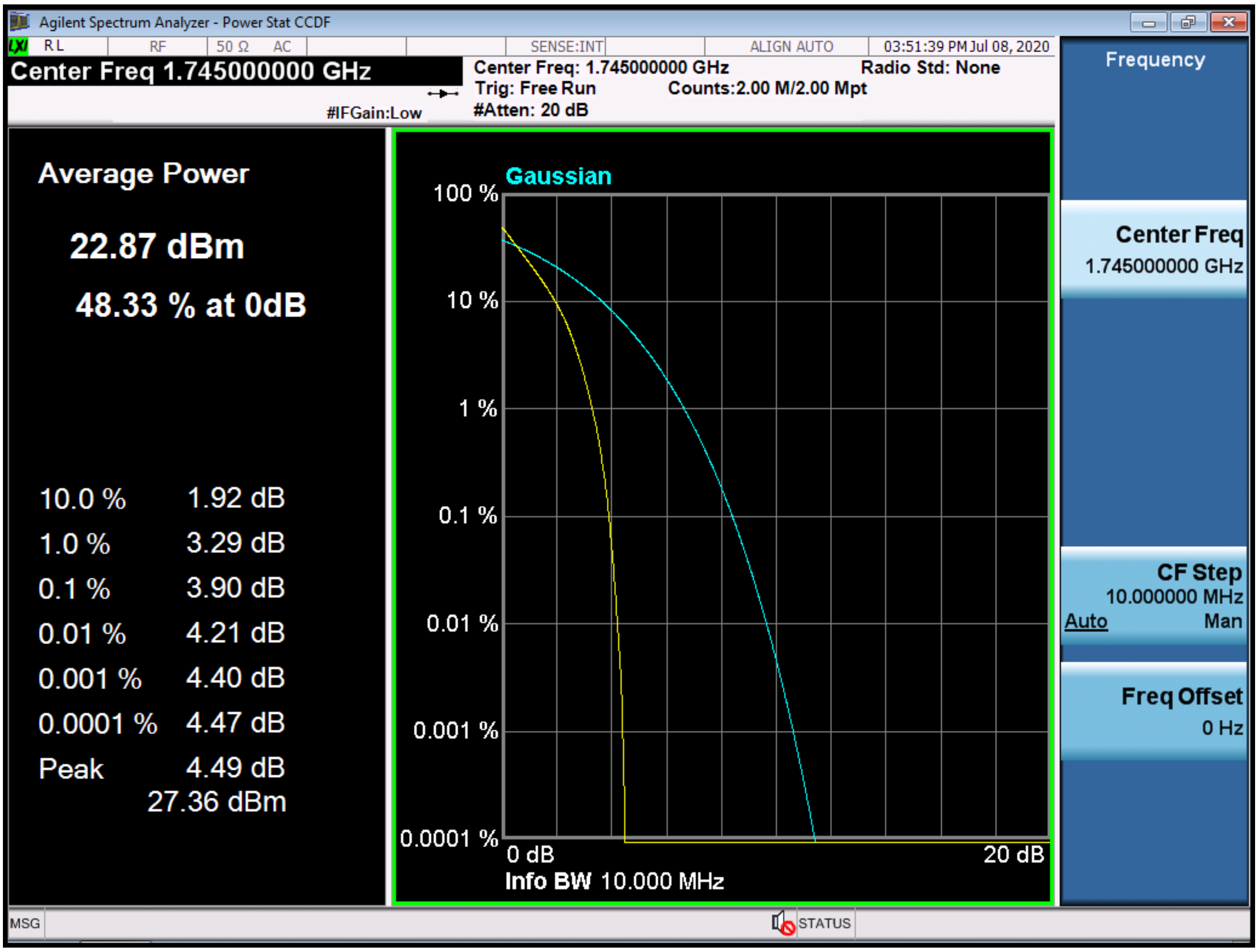
Sub6 n66. PAR Plot (5M BW_Ch.349000_64QAM_RB25_0)



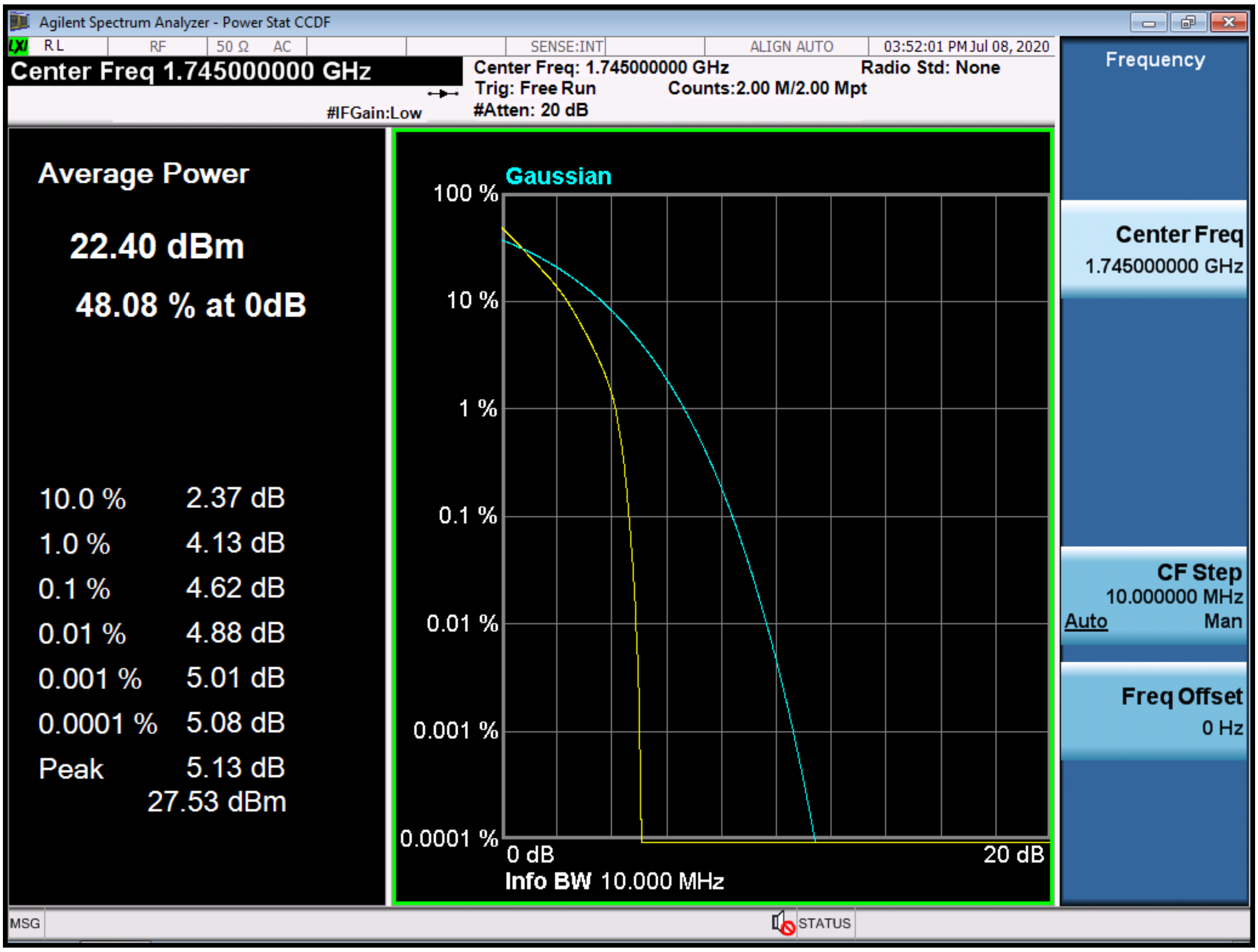
Sub6 n66. PAR Plot (5M BW_Ch.349000_256QAM_RB25_0)



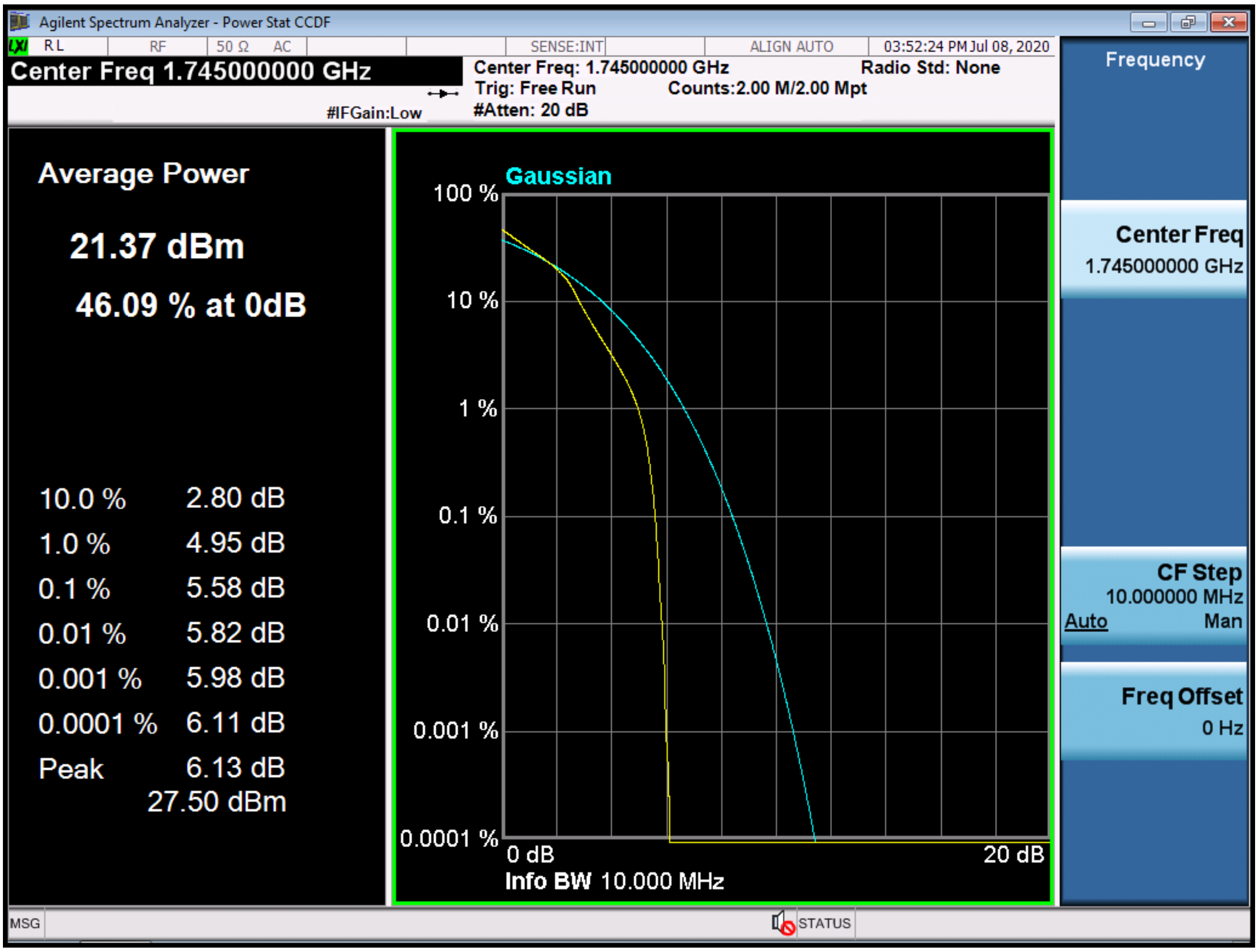
Sub6 n66. PAR Plot (10M BW_Ch.349000_ BPSK_RB50_0)



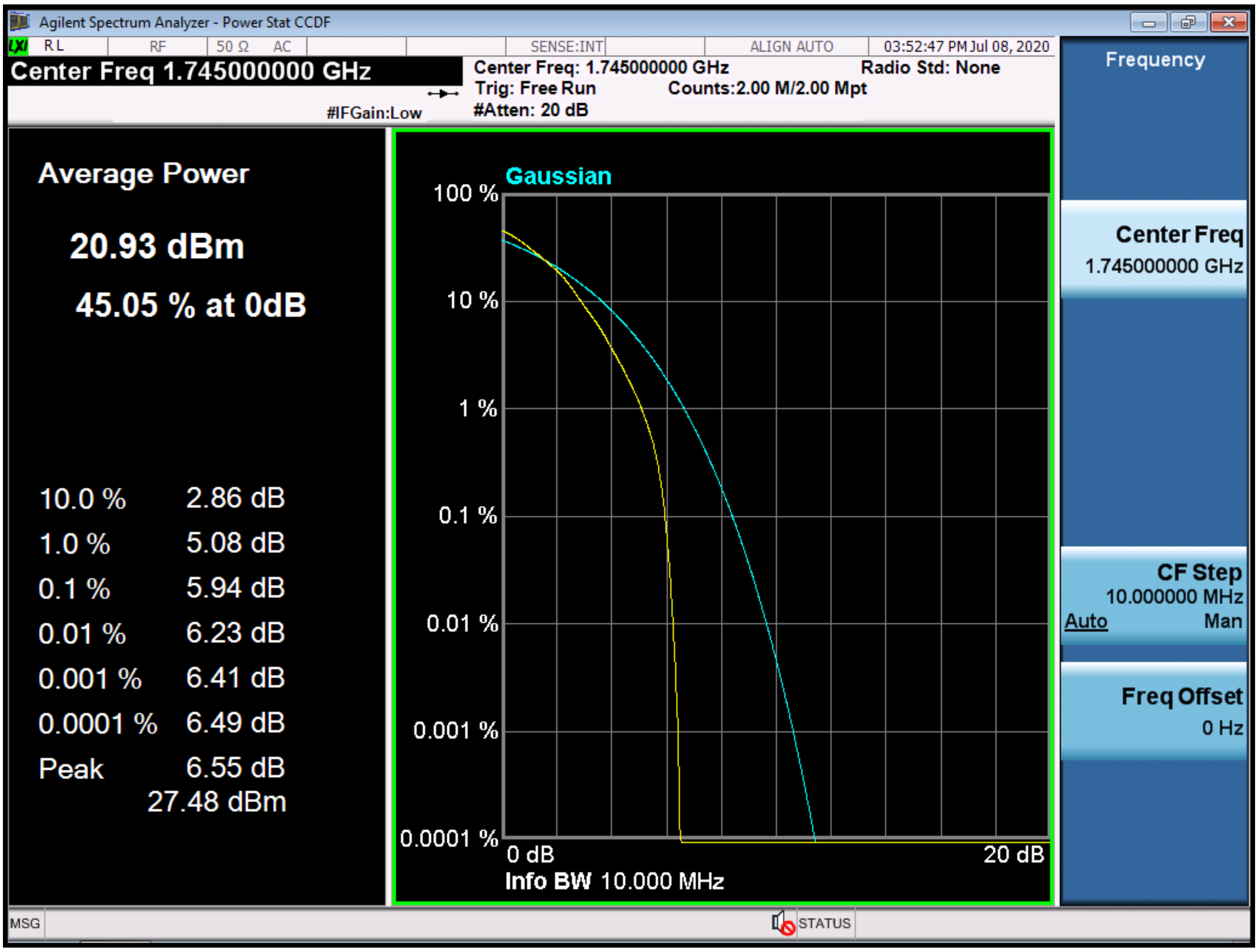
Sub6 n66. PAR Plot (10M BW_Ch.349000_QPSK_RB50_0)



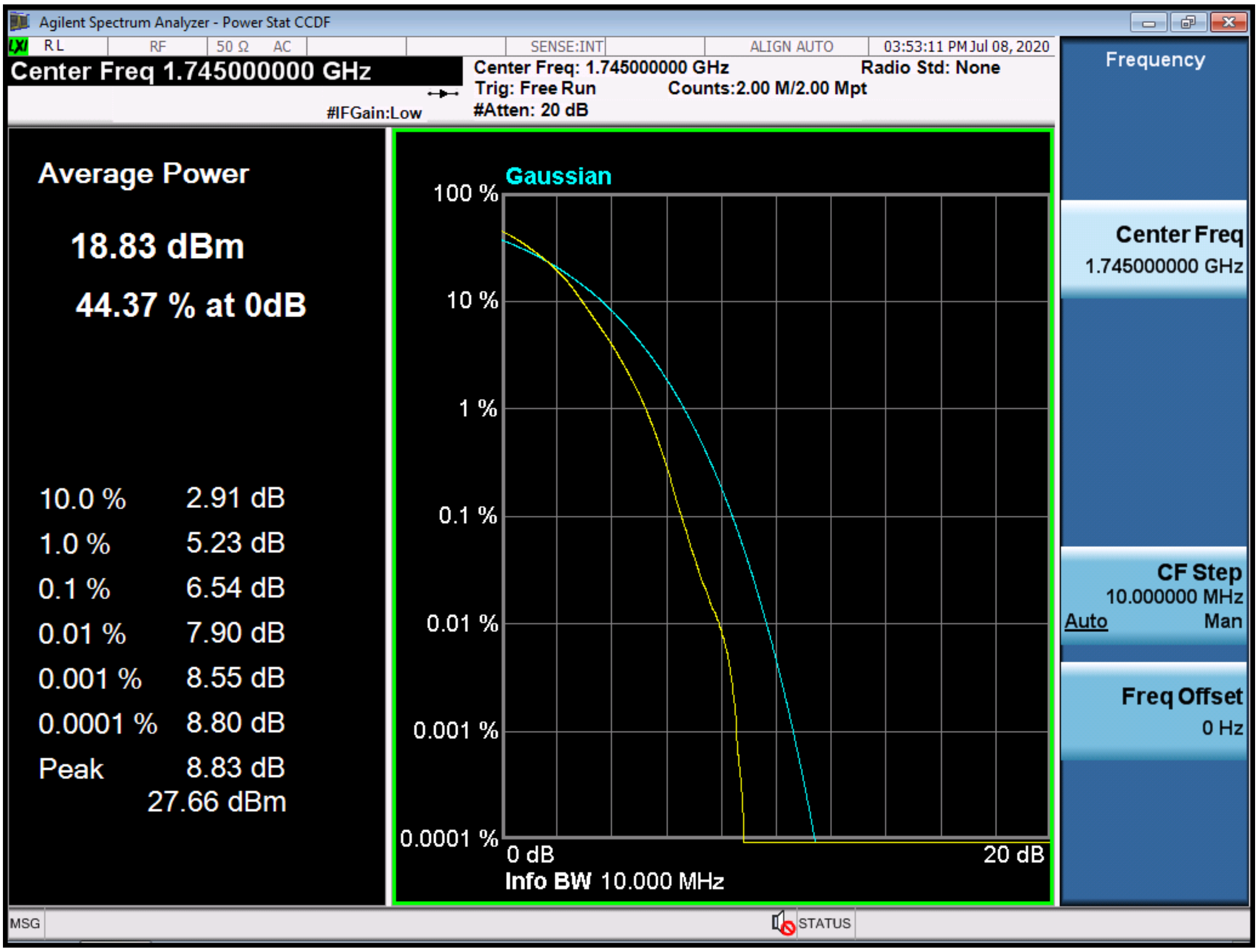
Sub6 n66. PAR Plot (10M BW_Ch.349000_16QAM_RB50_0)



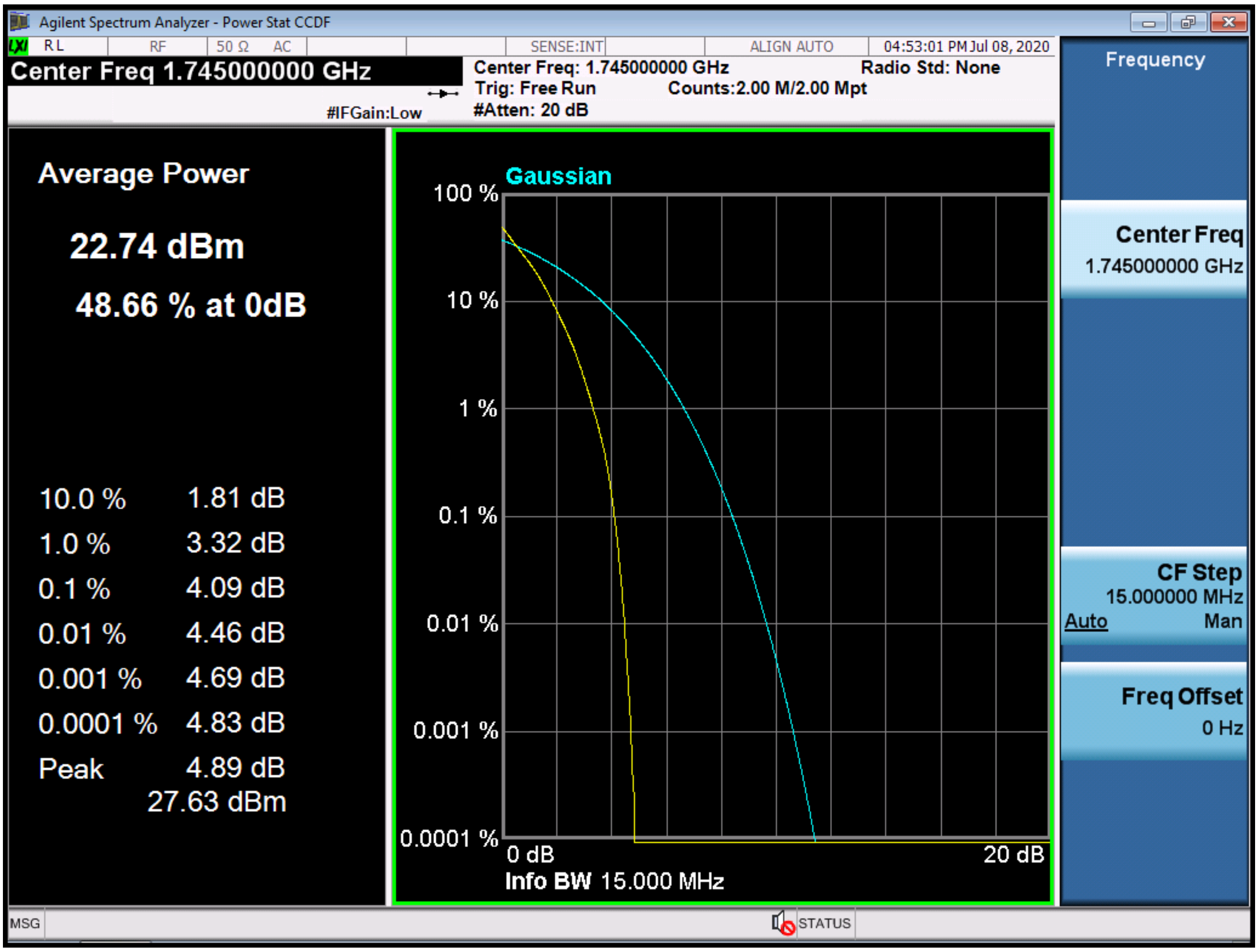
Sub6 n66. PAR Plot (10M BW_Ch.349000_64QAM_RB50_0)



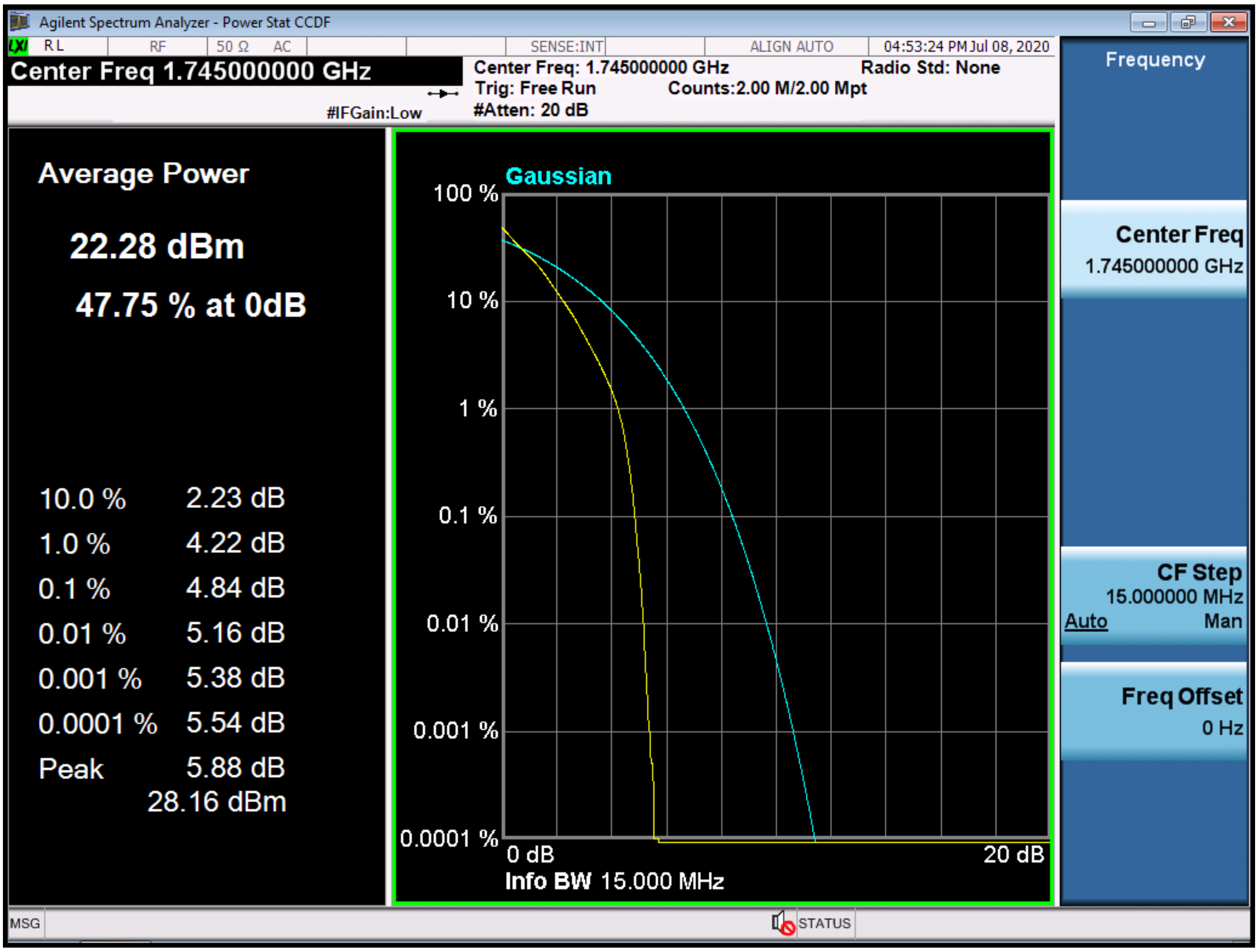
Sub6 n66. PAR Plot (10M BW_Ch.349000_256QAM_RB50_0)



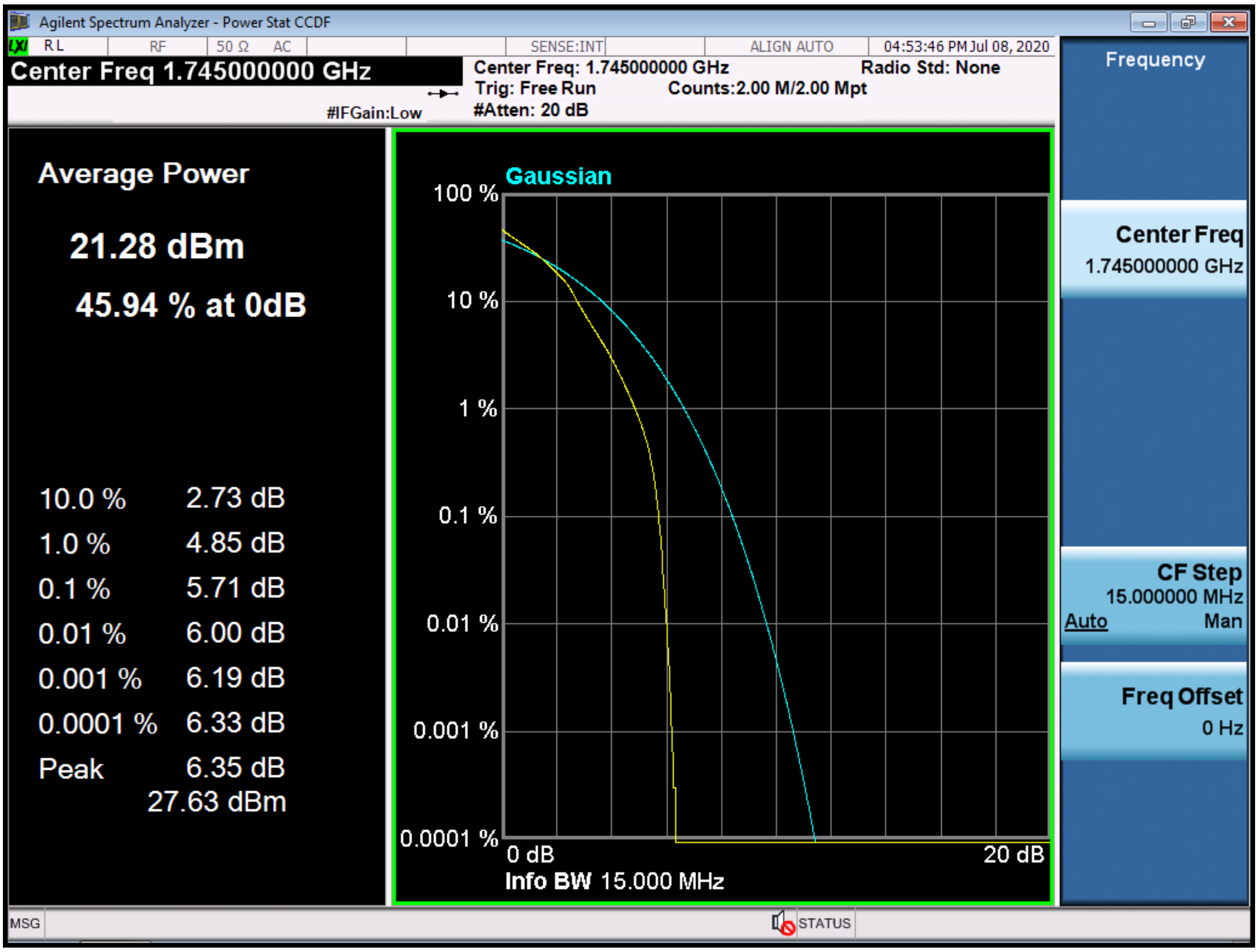
Sub6 n66. PAR Plot (15M BW_Ch.349000_ BPSK_RB75_0)



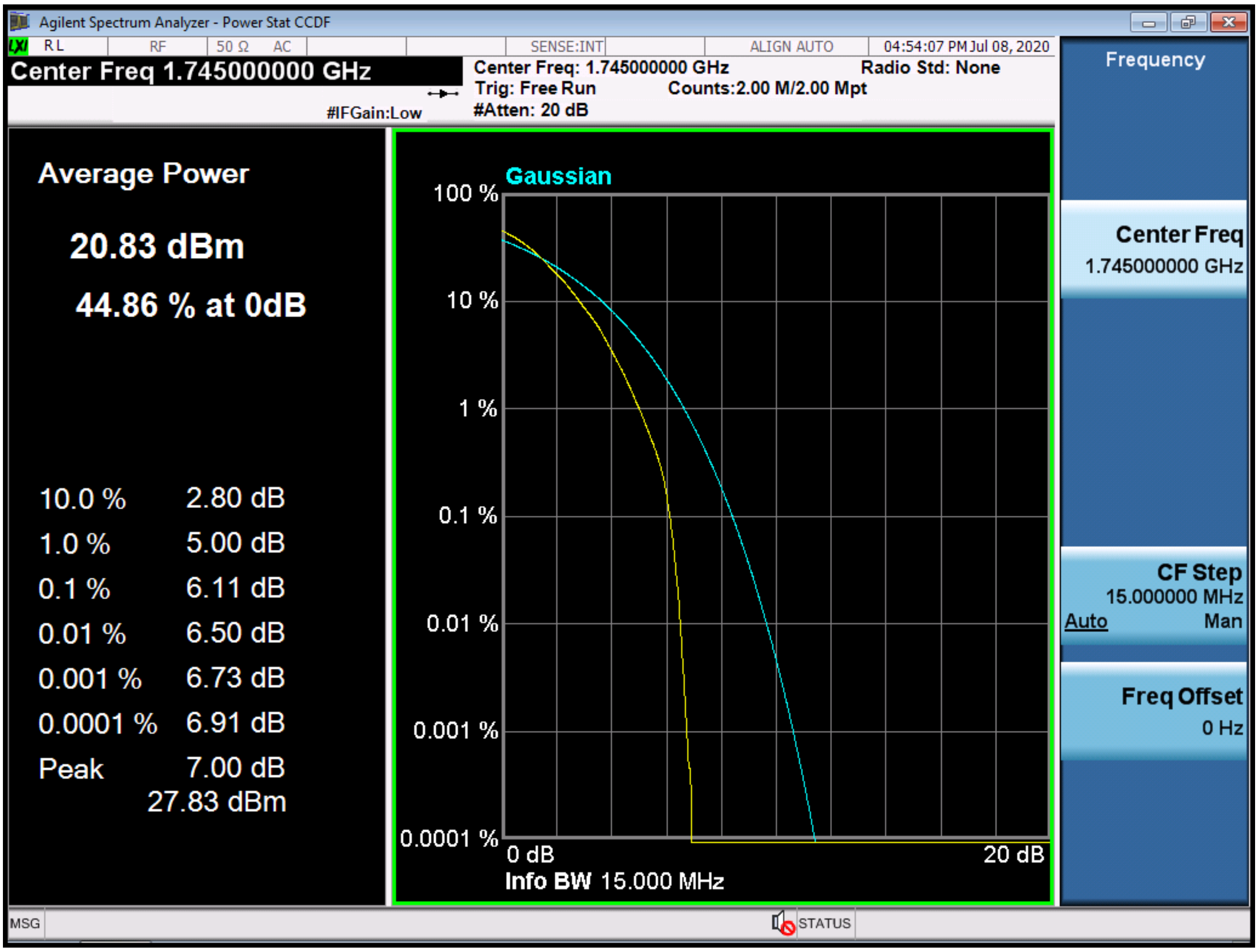
Sub6 n66. PAR Plot (15M BW_Ch.349000_QPSK_RB75_0)



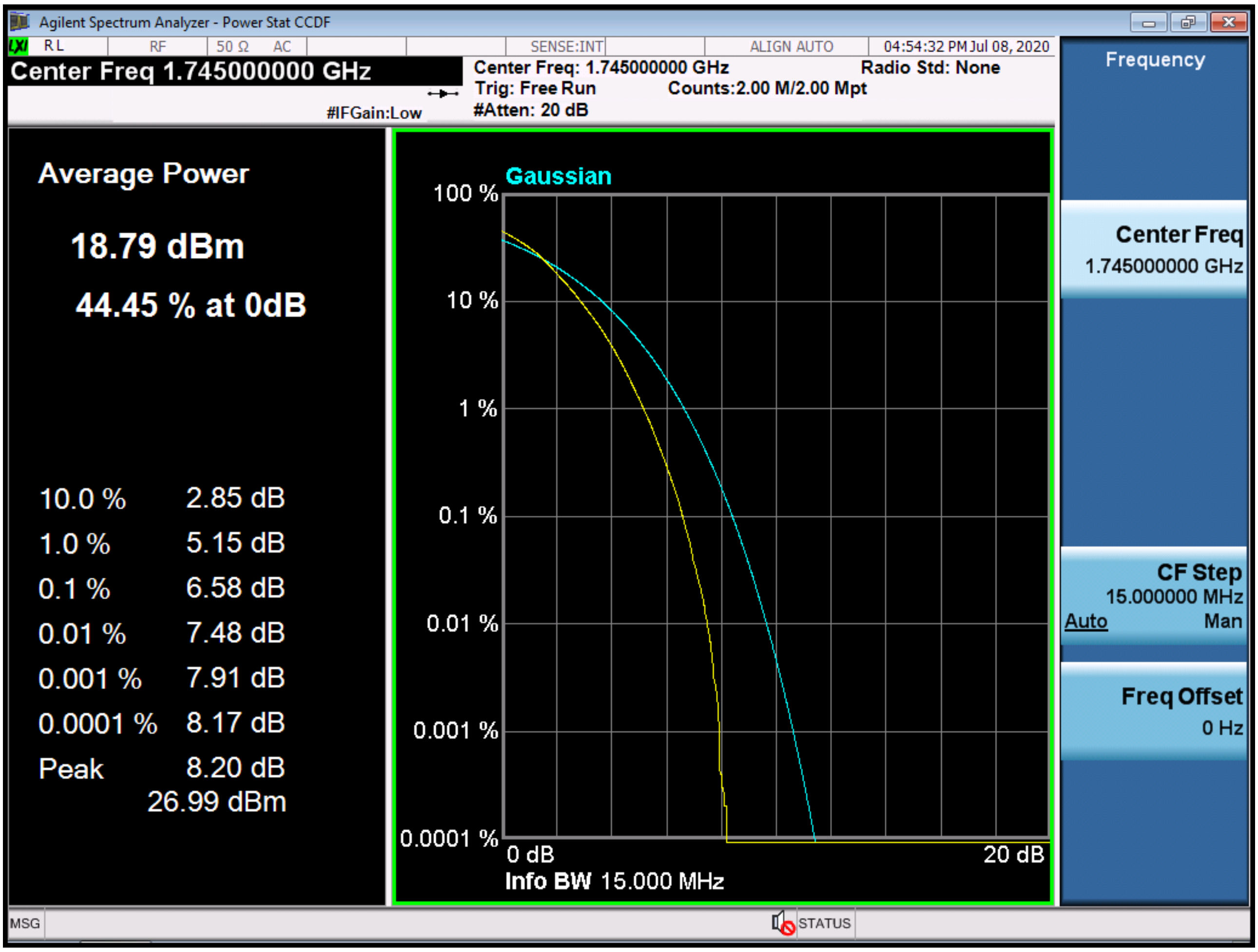
Sub6 n66. PAR Plot (15M BW_Ch.349000_16QAM_RB75_0)



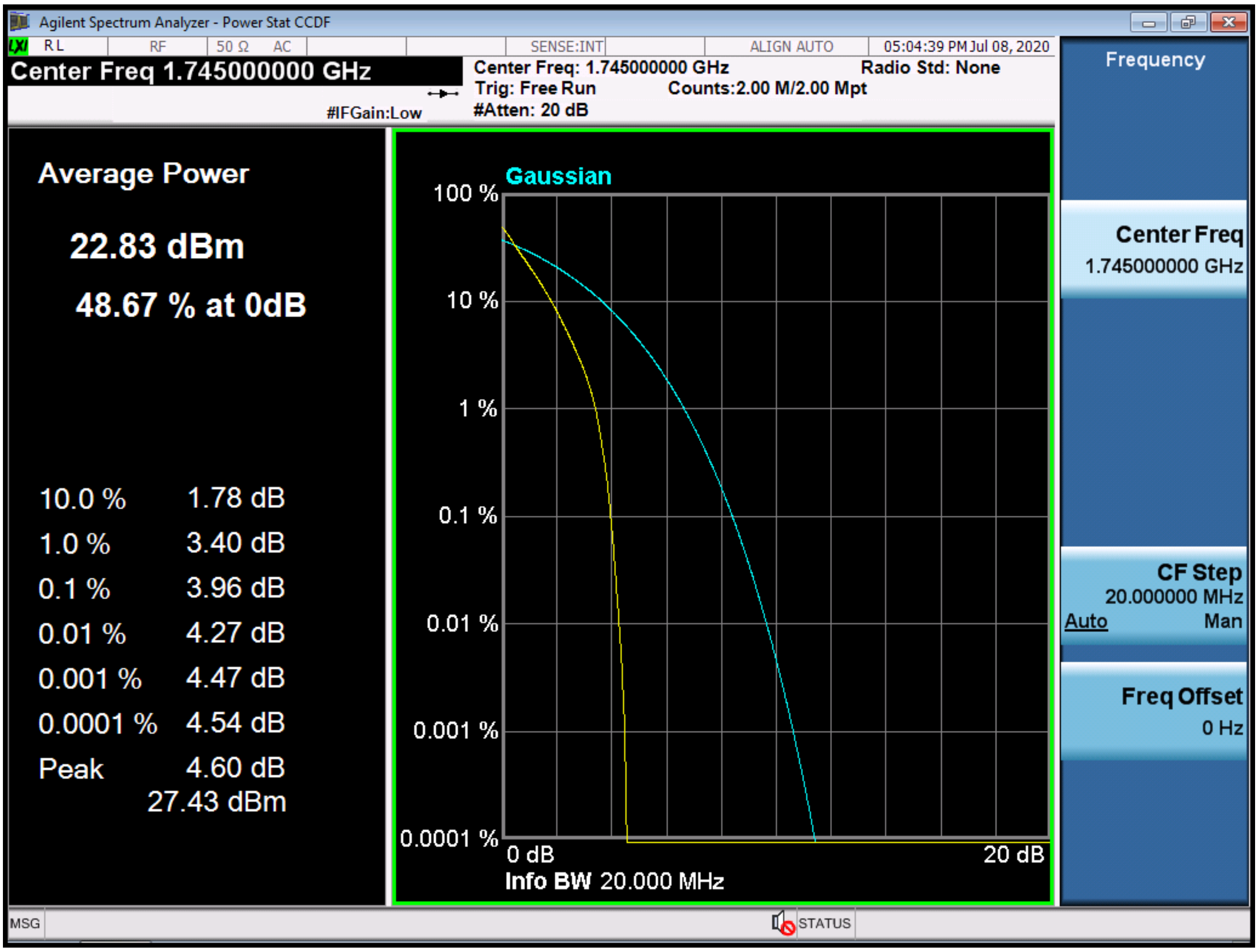
Sub6 n66. PAR Plot (15M BW_Ch.349000_64QAM_RB75_0)



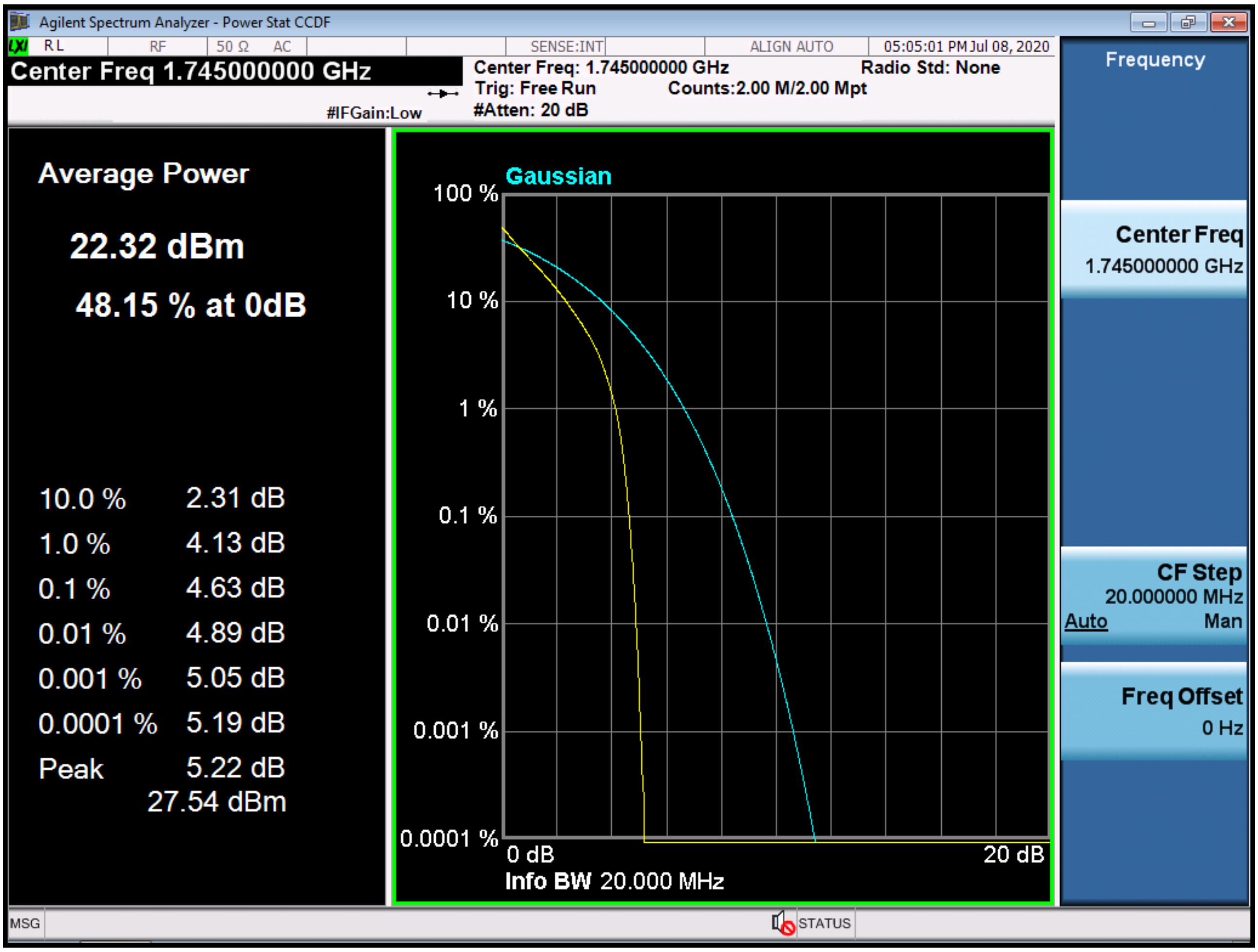
Sub6 n66. PAR Plot (15M BW_Ch.349000_256QAM_RB75_0)



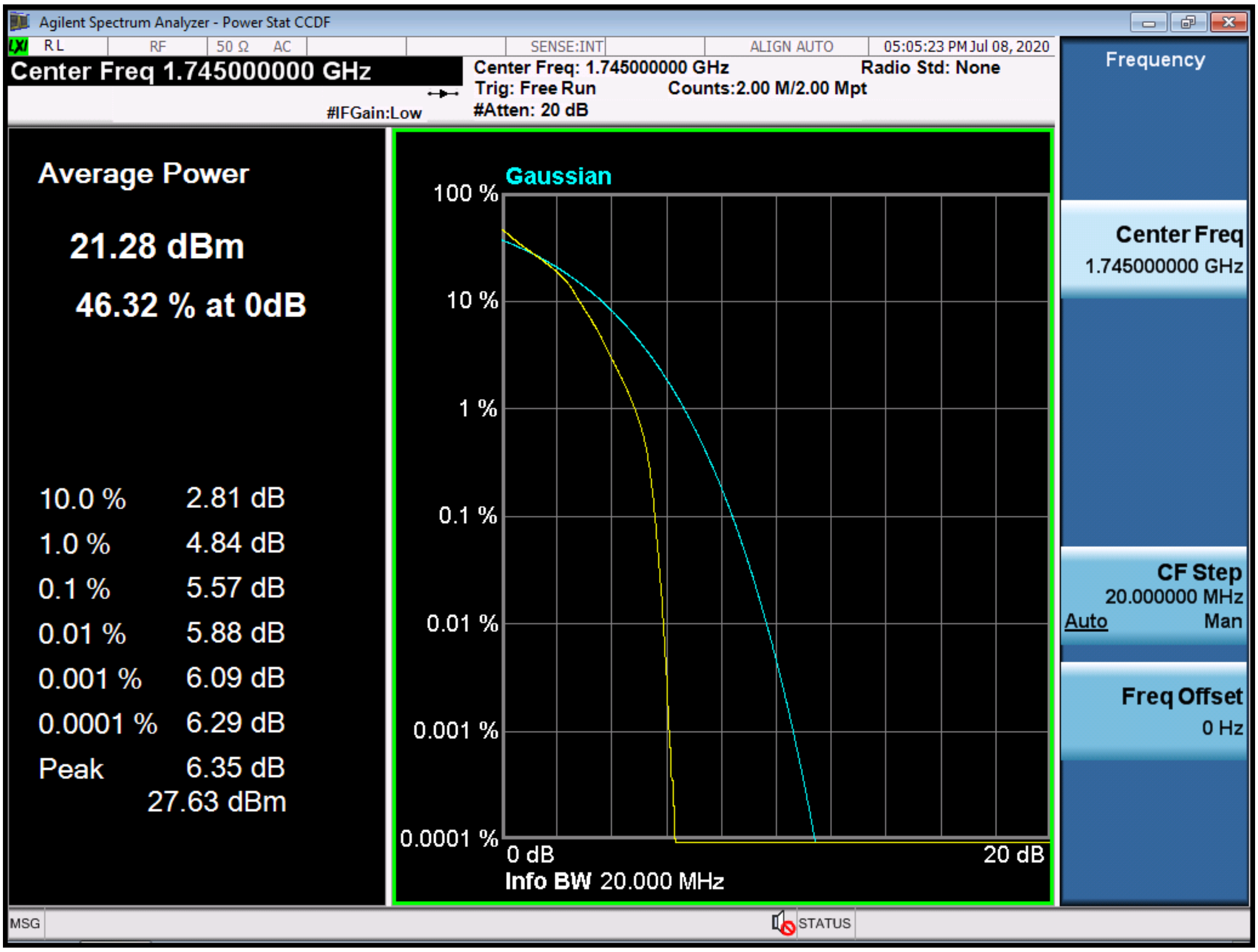
Sub6 n66. PAR Plot (20M BW_Ch.349000_ BPSK_RB100_0)



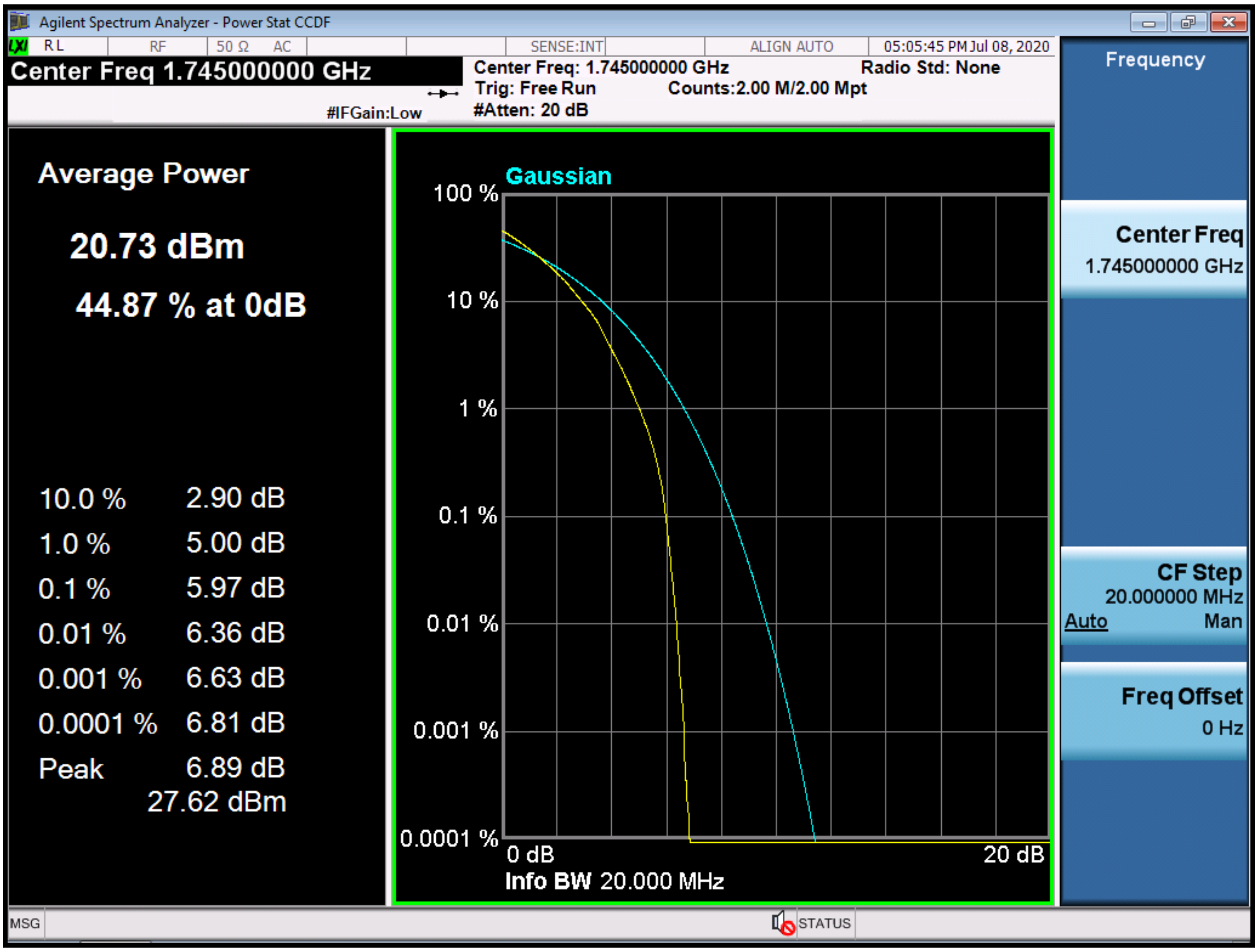
Sub6 n66. PAR Plot (20M BW_Ch.349000_QPSK_RB100_0)



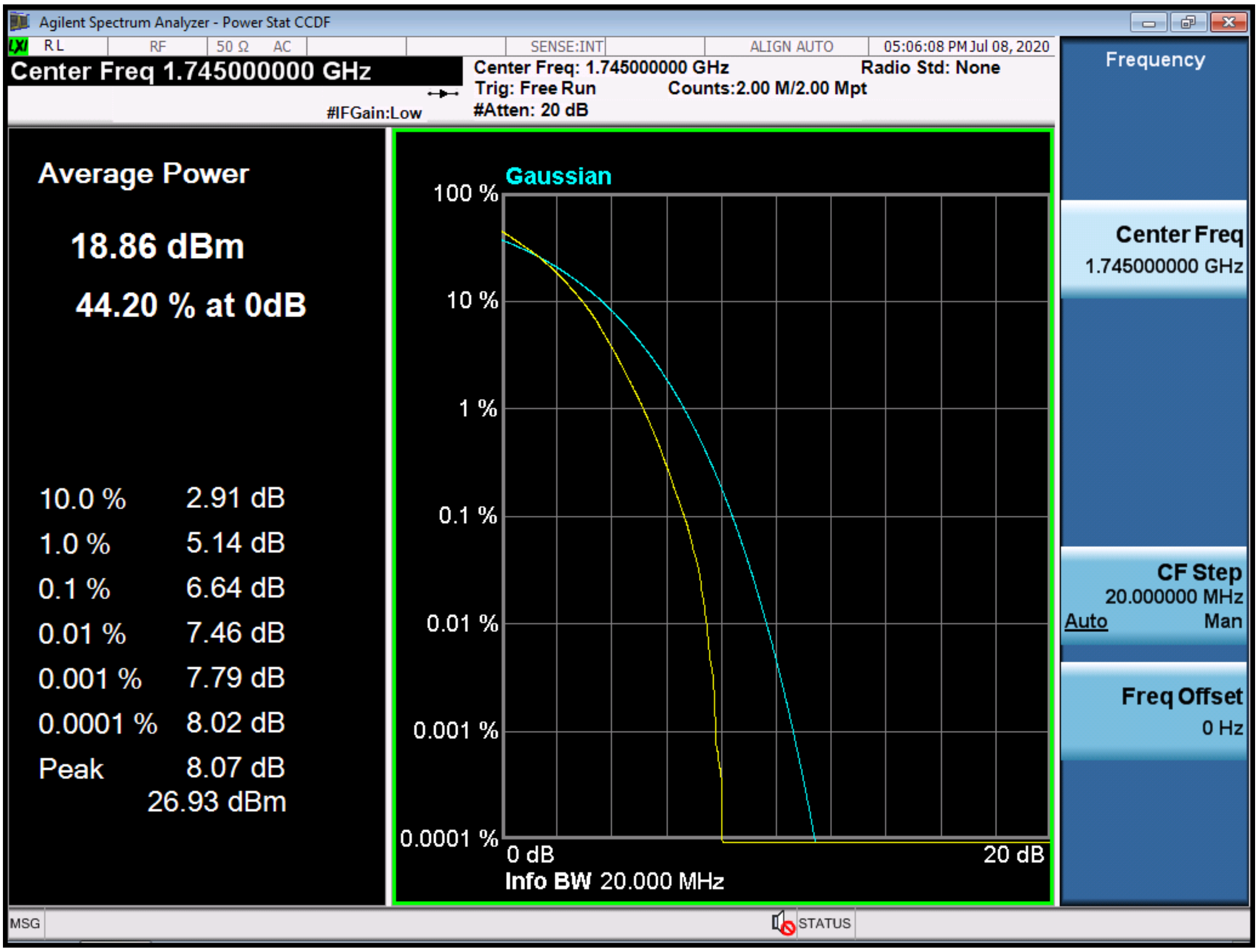
Sub6 n66. PAR Plot (20M BW_Ch.349000_16QAM_RB100_0)



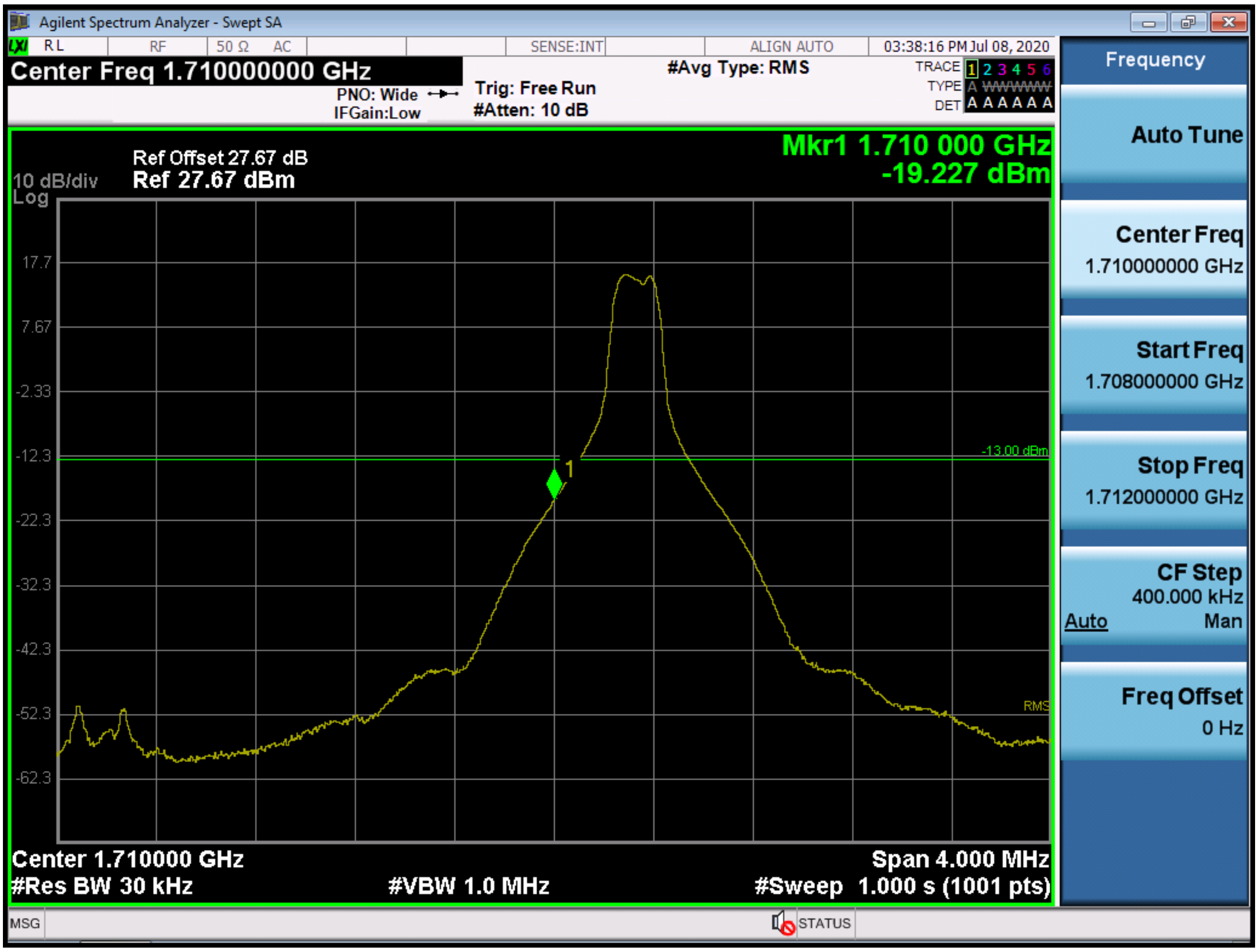
Sub6 n66. PAR Plot (20M BW_Ch.349000_64QAM_RB100_0)



ub6 n66. PAR Plot (20M BW_Ch.349000_256QAM_RB100_0)

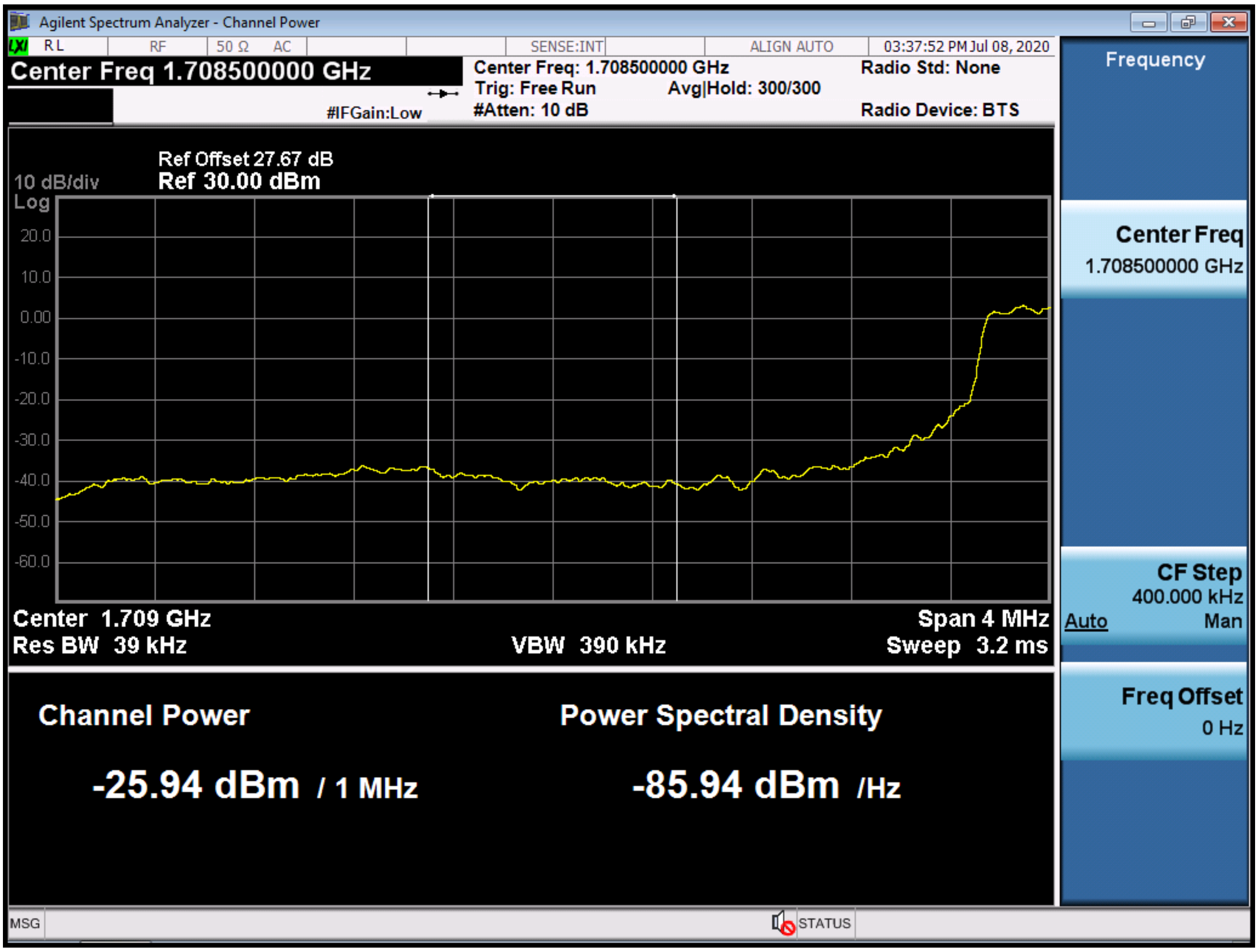


Sub6 n66. Lower Band Edge Plot (5M BW Ch.342500 BPSK RB 1, Offset 0) -1

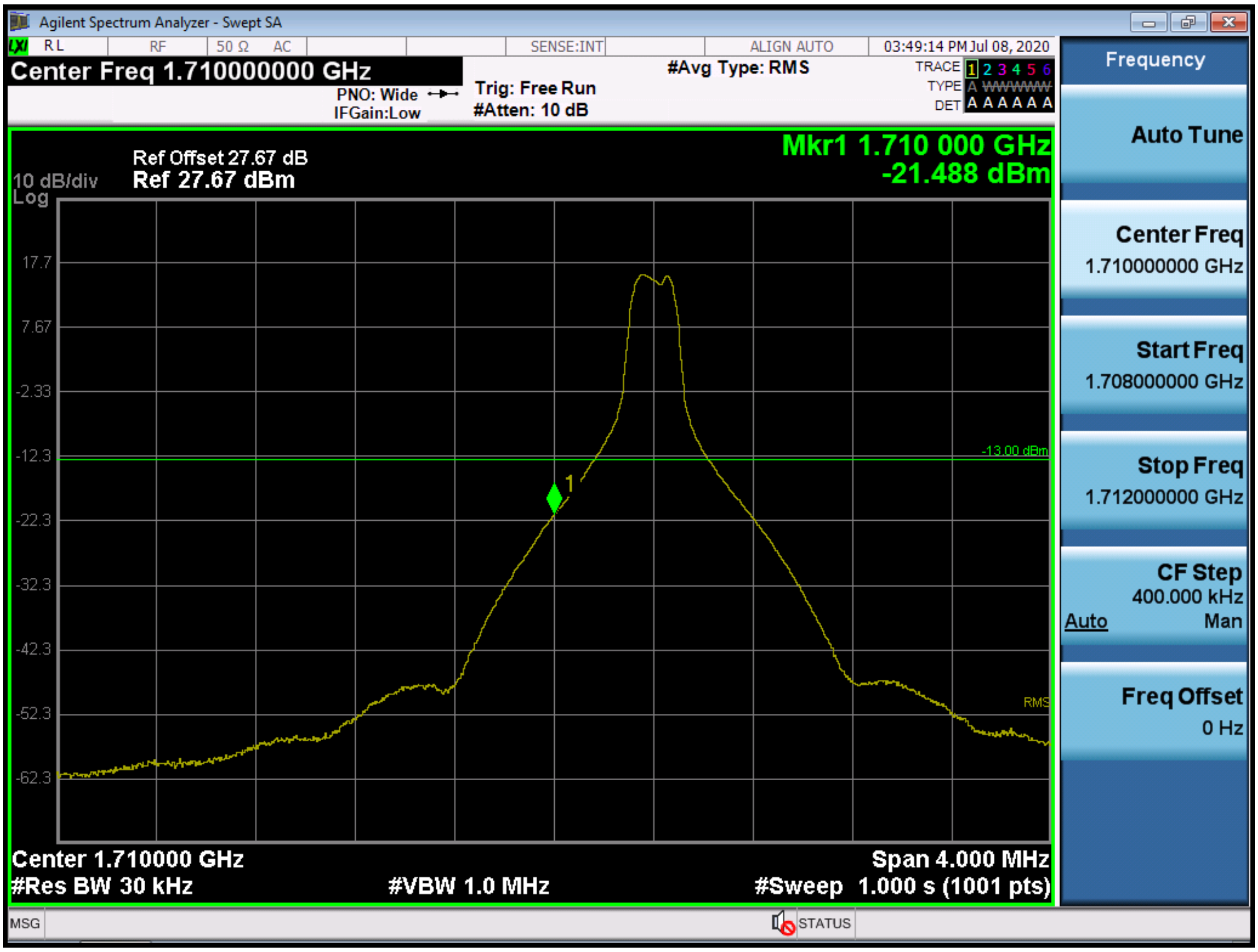


Sub6 n66. Lower Band Edge Plot (5M BW Ch.342500 BPSK RB 25_0) -2

Sub6 n66. Lower Extended Band Edge Plot (5M BW Ch.342500 BPSK_RB25_0) -3

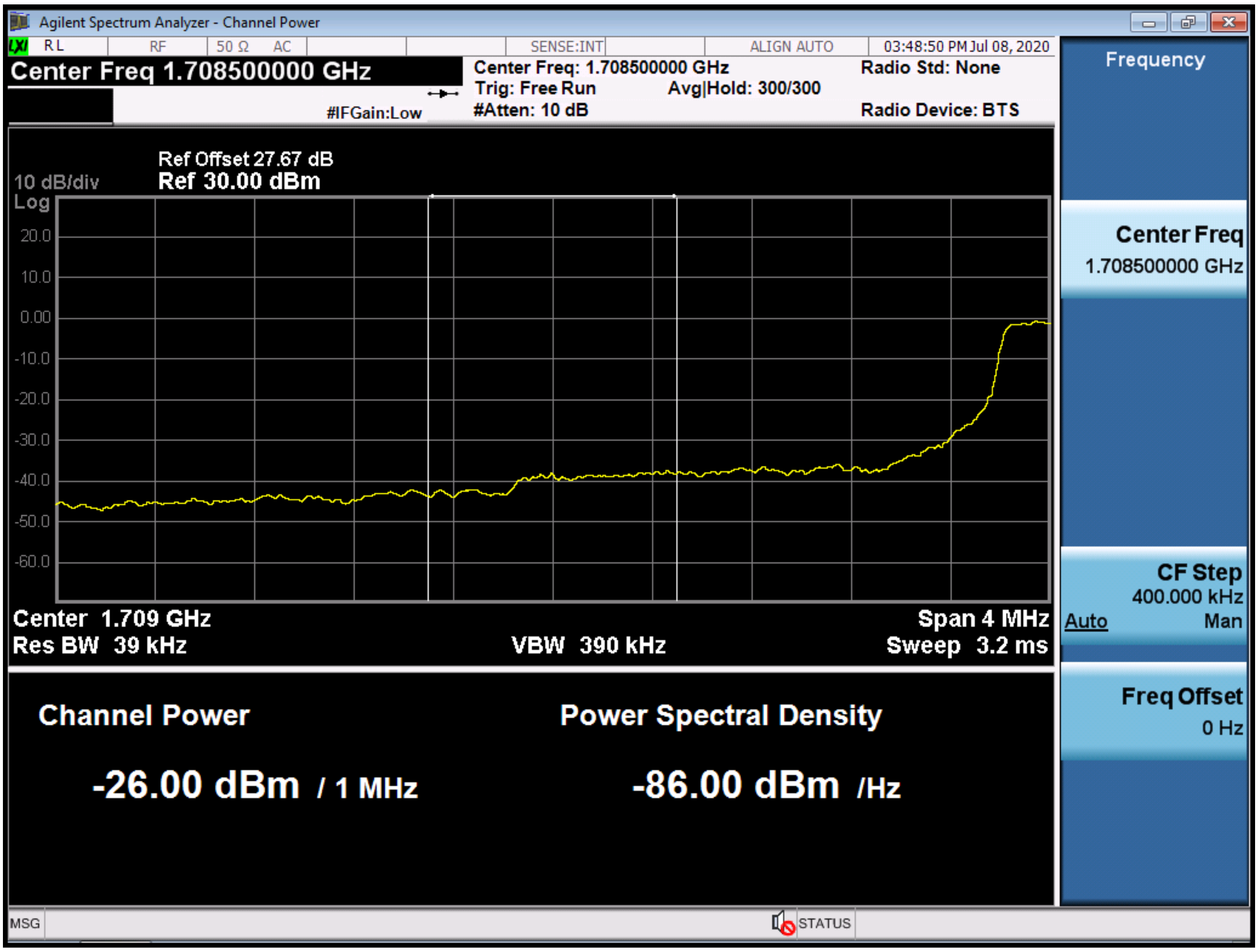


Sub6 n66. Lower Band Edge Plot (10M BW Ch.343000 BPSK RB 1, Offset 0) -1

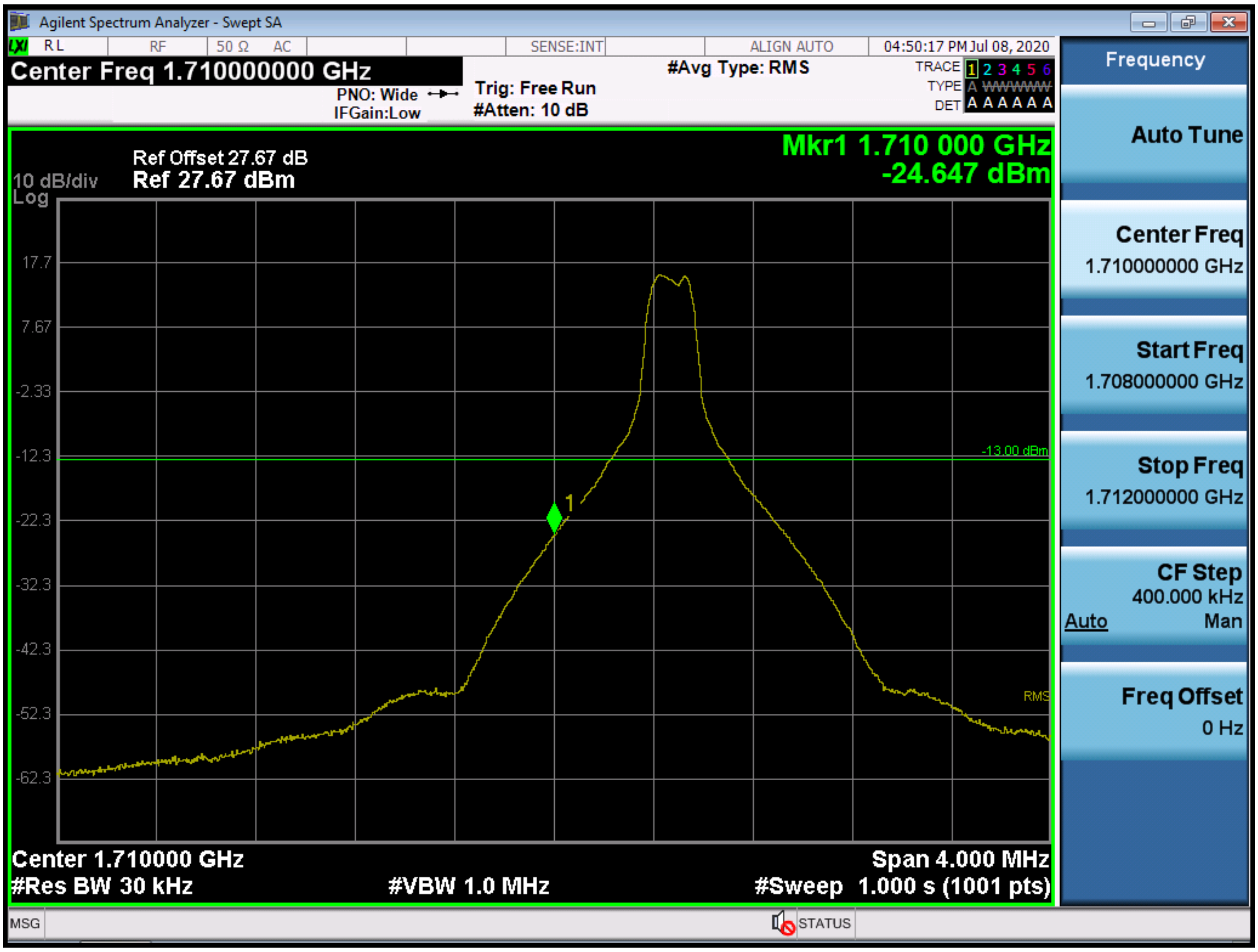


Sub6 n66. Lower Band Edge Plot (10M BW Ch.343000 BPSK RB 50_0) -2

Sub6 n66. Lower Extended Band Edge Plot (10M BW Ch.343000 BPSK_RB50_0) -3

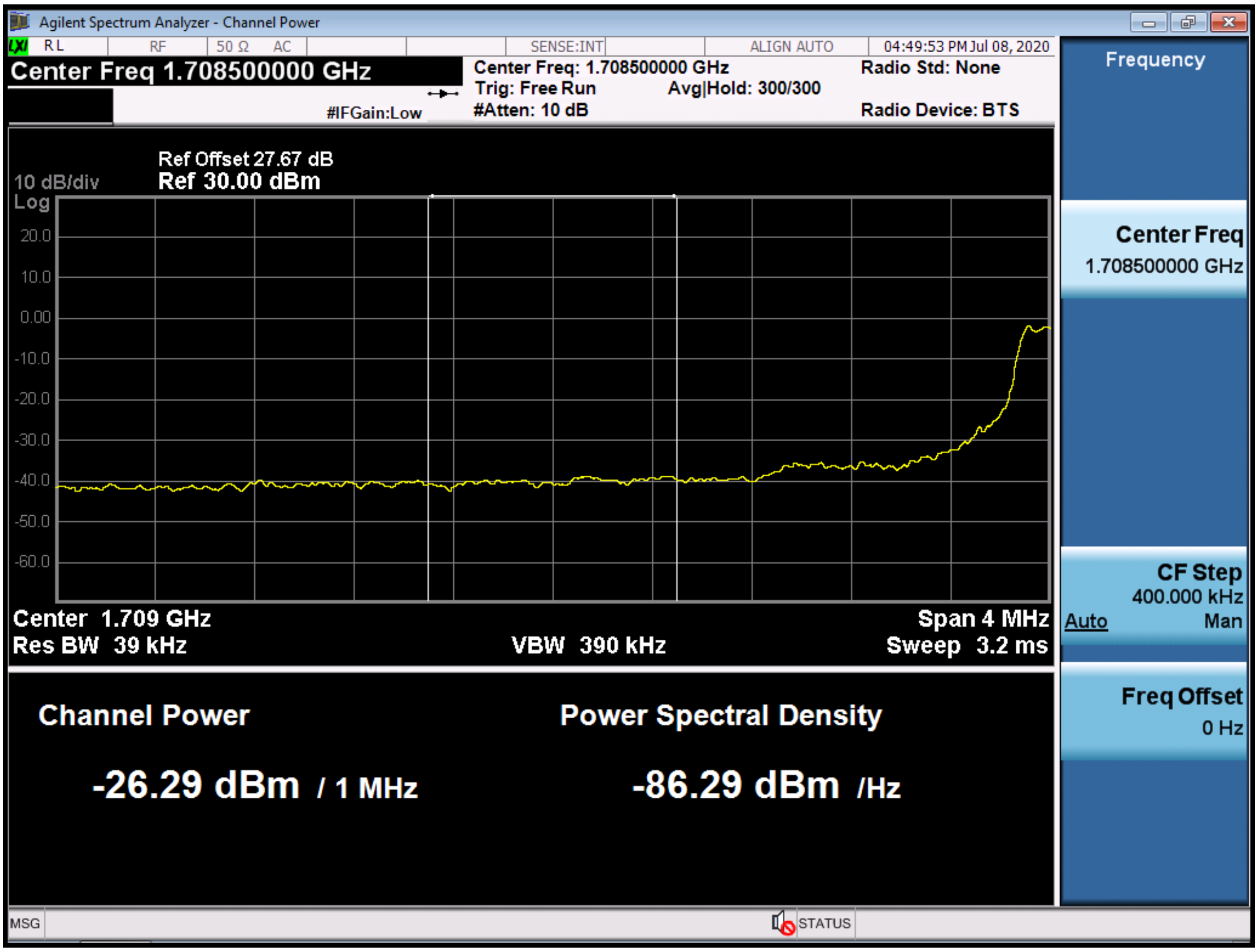


Sub6 n66. Lower Band Edge Plot (15M BW Ch.343500 BPSK RB 1, Offset 0) -1

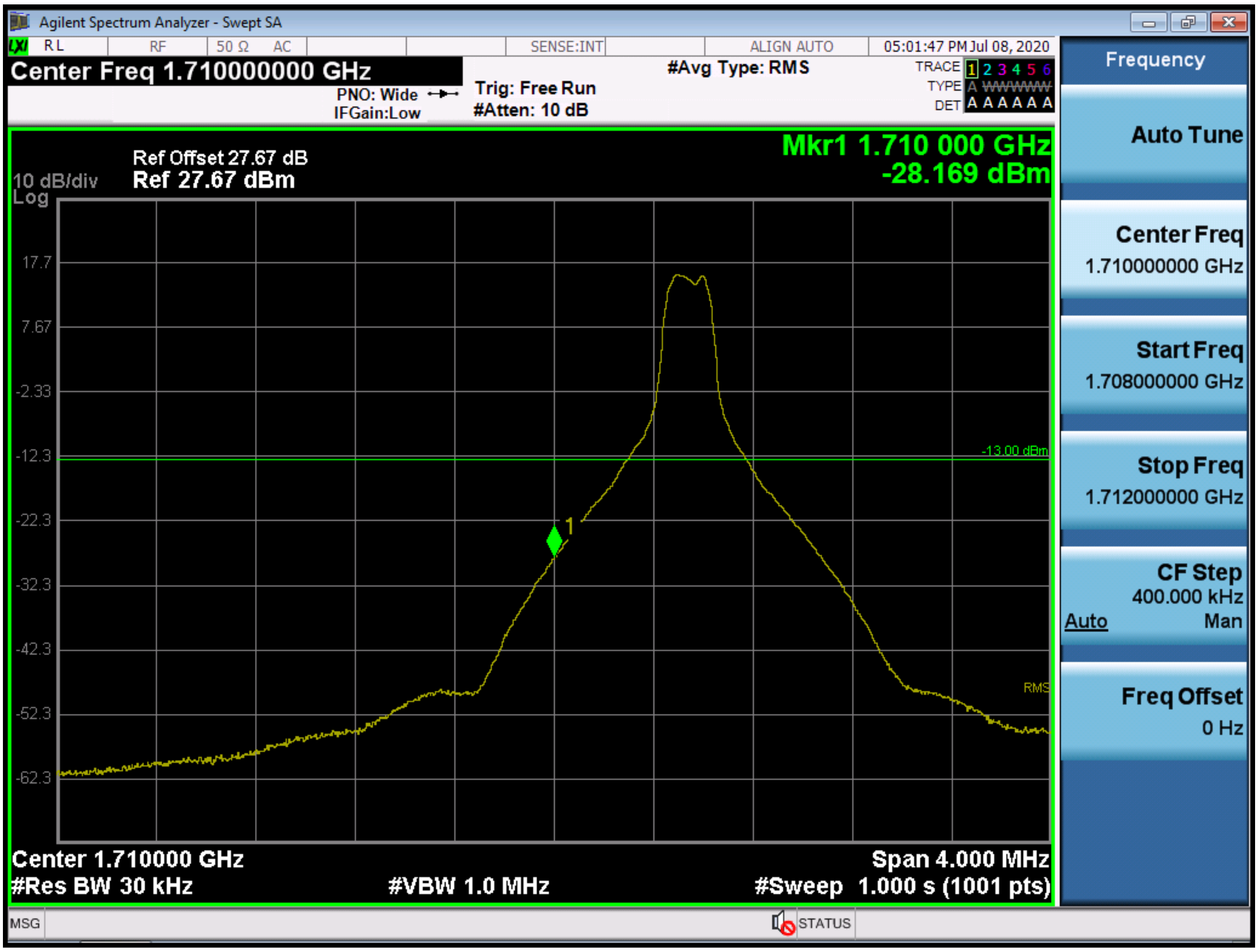


Sub6 n66. Lower Band Edge Plot (15M BW Ch.343500 BPSK RB 75_0) -2

Sub6 n66. Lower Extended Band Edge Plot (15M BW Ch.343500 BPSK_RB75_0) -3

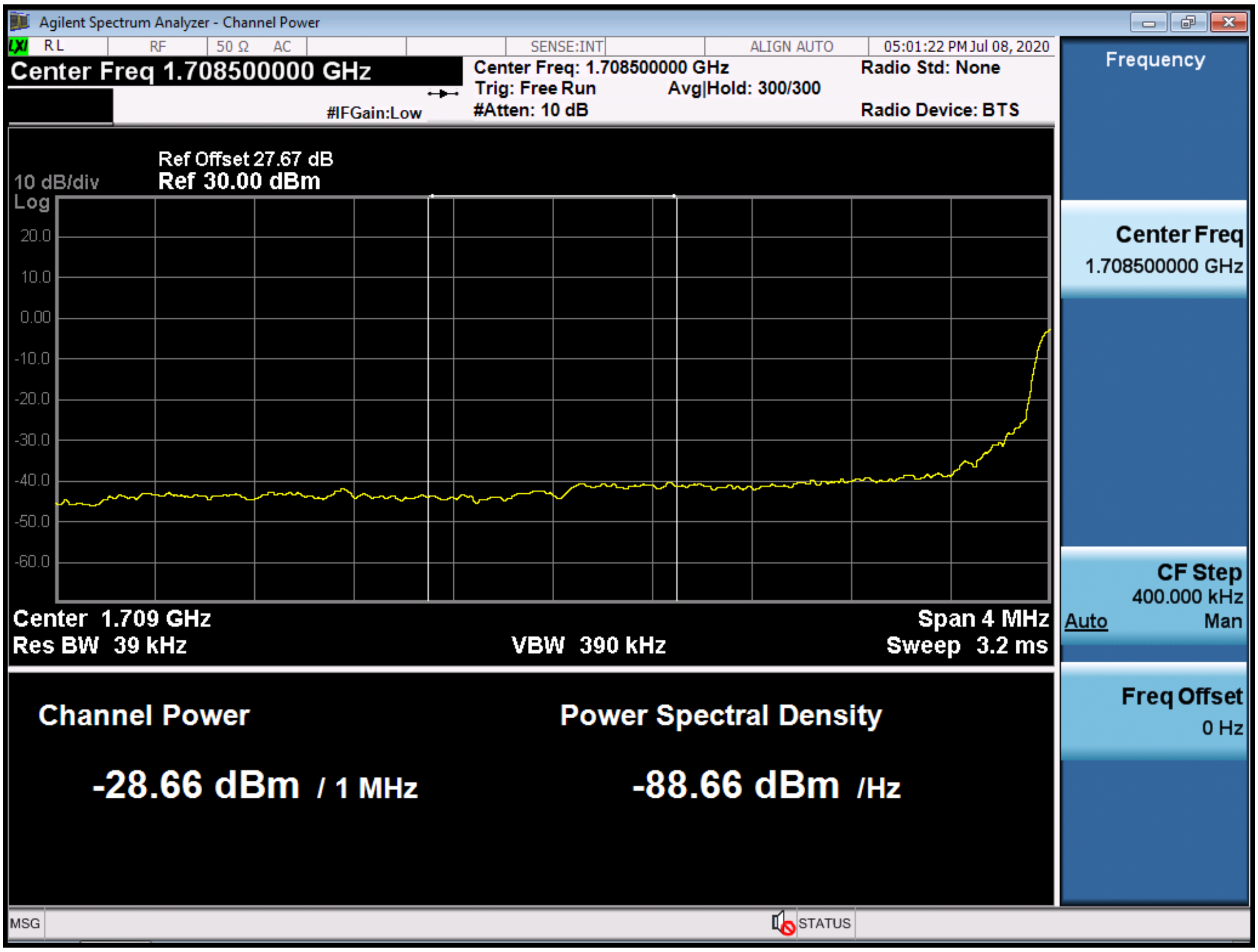


Sub6 n66. Lower Band Edge Plot (20M BW Ch.344000 BPSK RB 1, Offset 0) -1

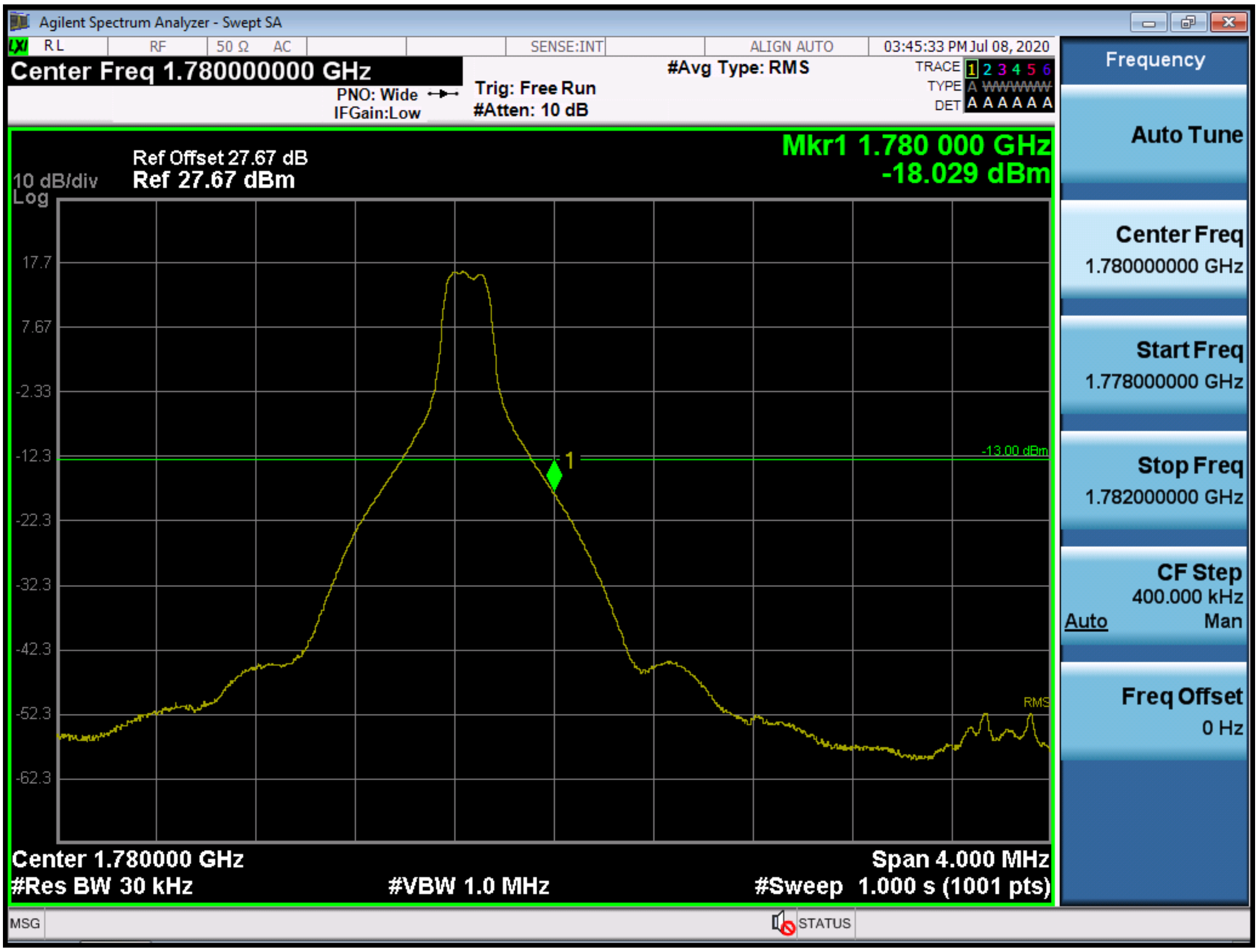


Sub6 n66. Lower Band Edge Plot (20M BW Ch.344000 BPSK RB 100_0) -2

Sub6 n66. Lower Extended Band Edge Plot (20M BW Ch.344000 BPSK_RB100_0) -3

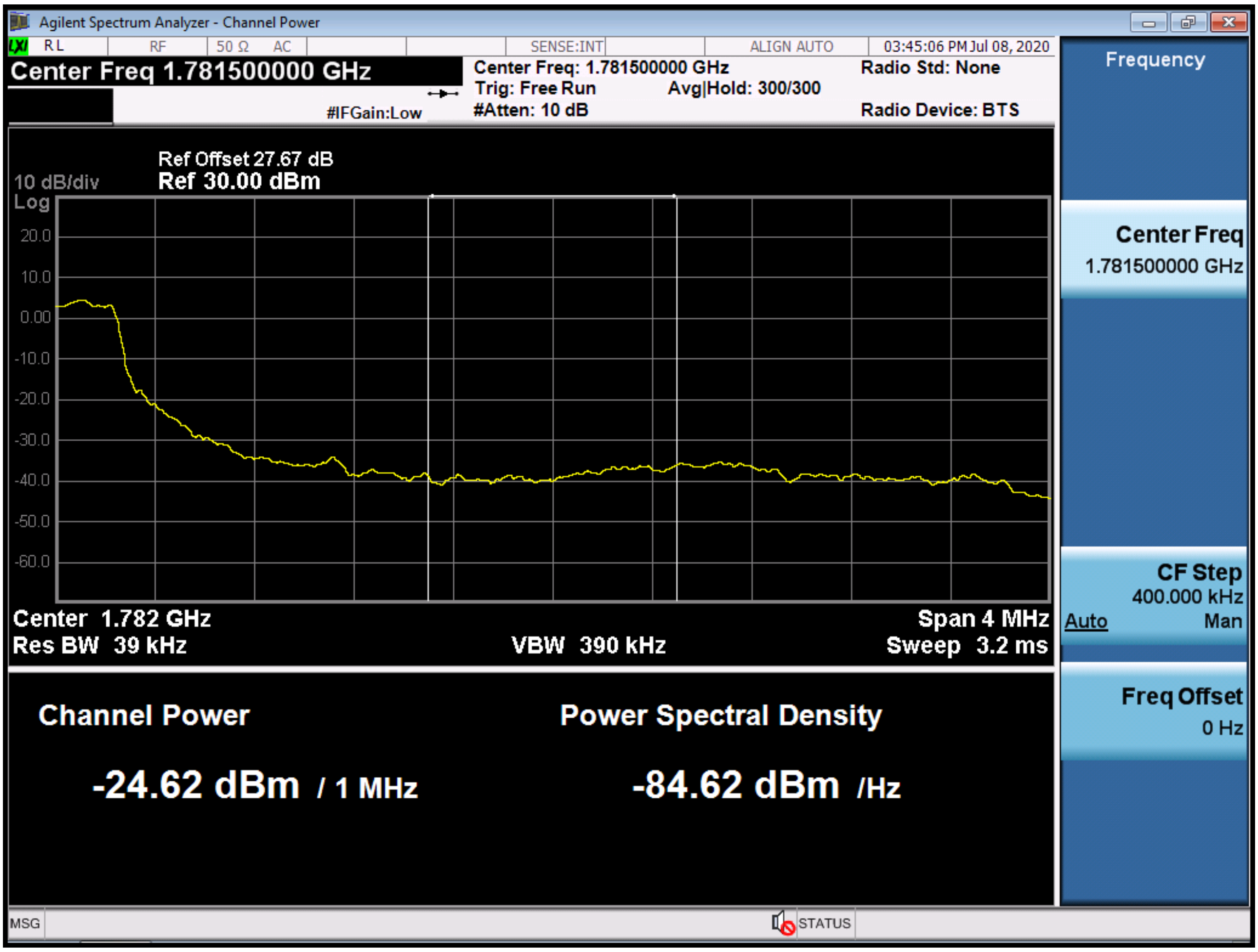


Sub6 n66. Upper Band Edge Plot (5M BW Ch.355500 BPSK_RB1_Offset 24) -1



Sub6 n66. Upper Band Edge Plot (5M BW Ch.355500 BPSK_RB25_0) -2

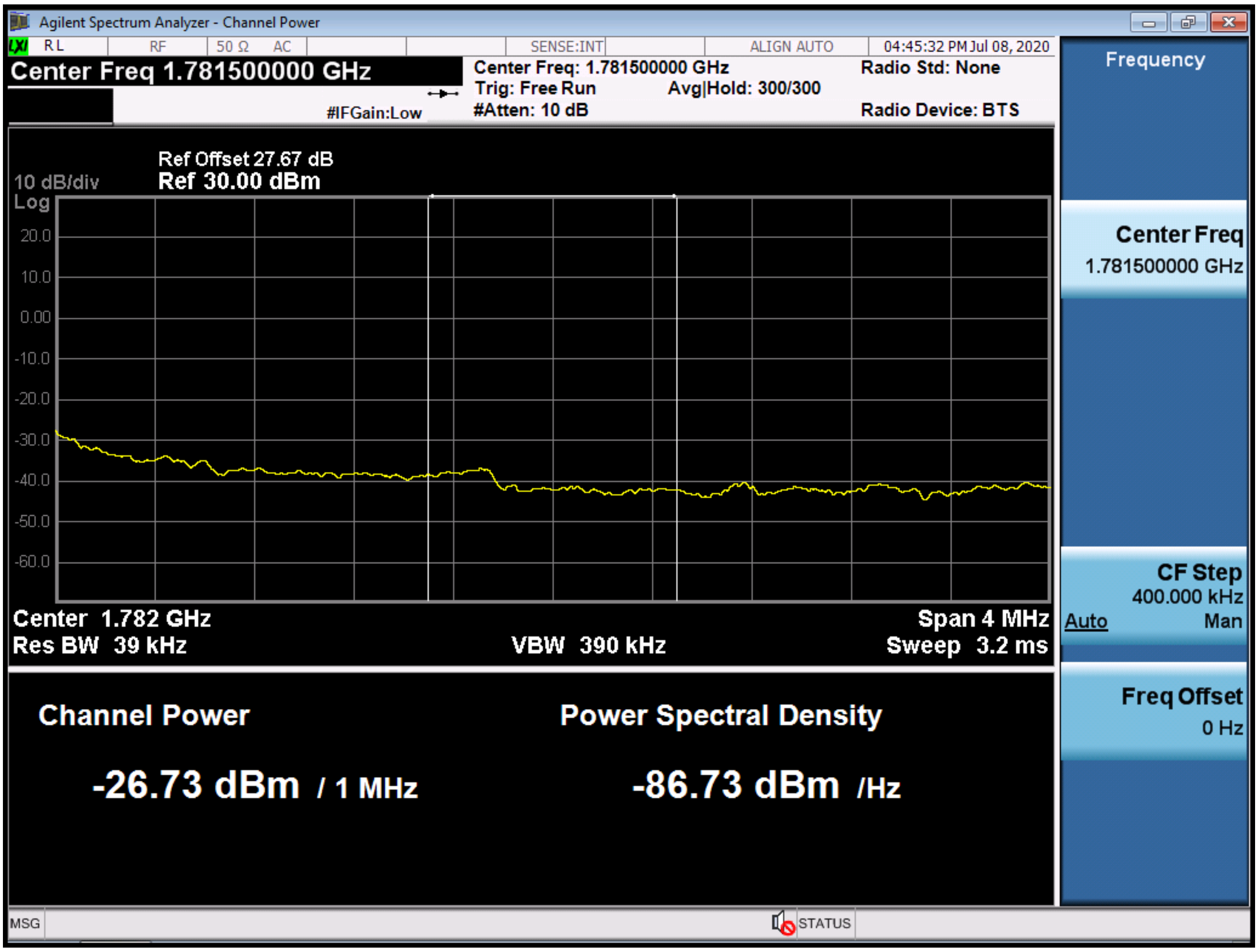
Sub6 n66. Upper Extended Band Edge Plot (5M BW Ch.355500 BPSK_RB25_0) -3



Sub6 n66. Upper Band Edge Plot (10M BW Ch.355000 BPSK_RB1_Offset 49) -1

Sub6 n66. Upper Band Edge Plot (10M BW Ch.355000 BPSK_RB50_0) -2

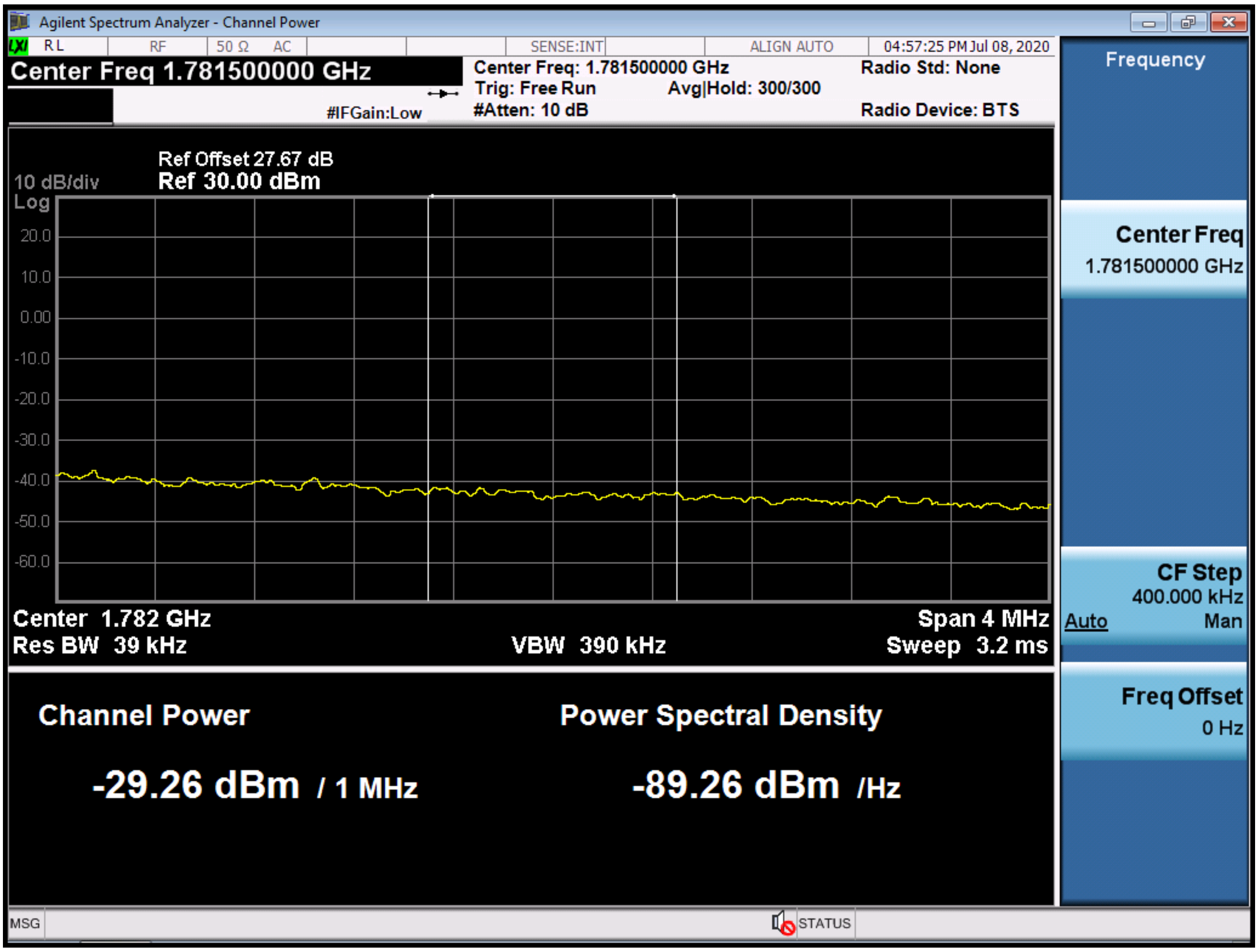
Sub6 n66. Upper Extended Band Edge Plot (10M BW Ch.355000 BPSK_RB50_0) -3



Sub6 n66. Upper Band Edge Plot (15M BW Ch.354500 BPSK_RB1_Offset 74) -1

Sub6 n66. Upper Band Edge Plot (15M BW Ch.354500 BPSK_RB75_0) -2

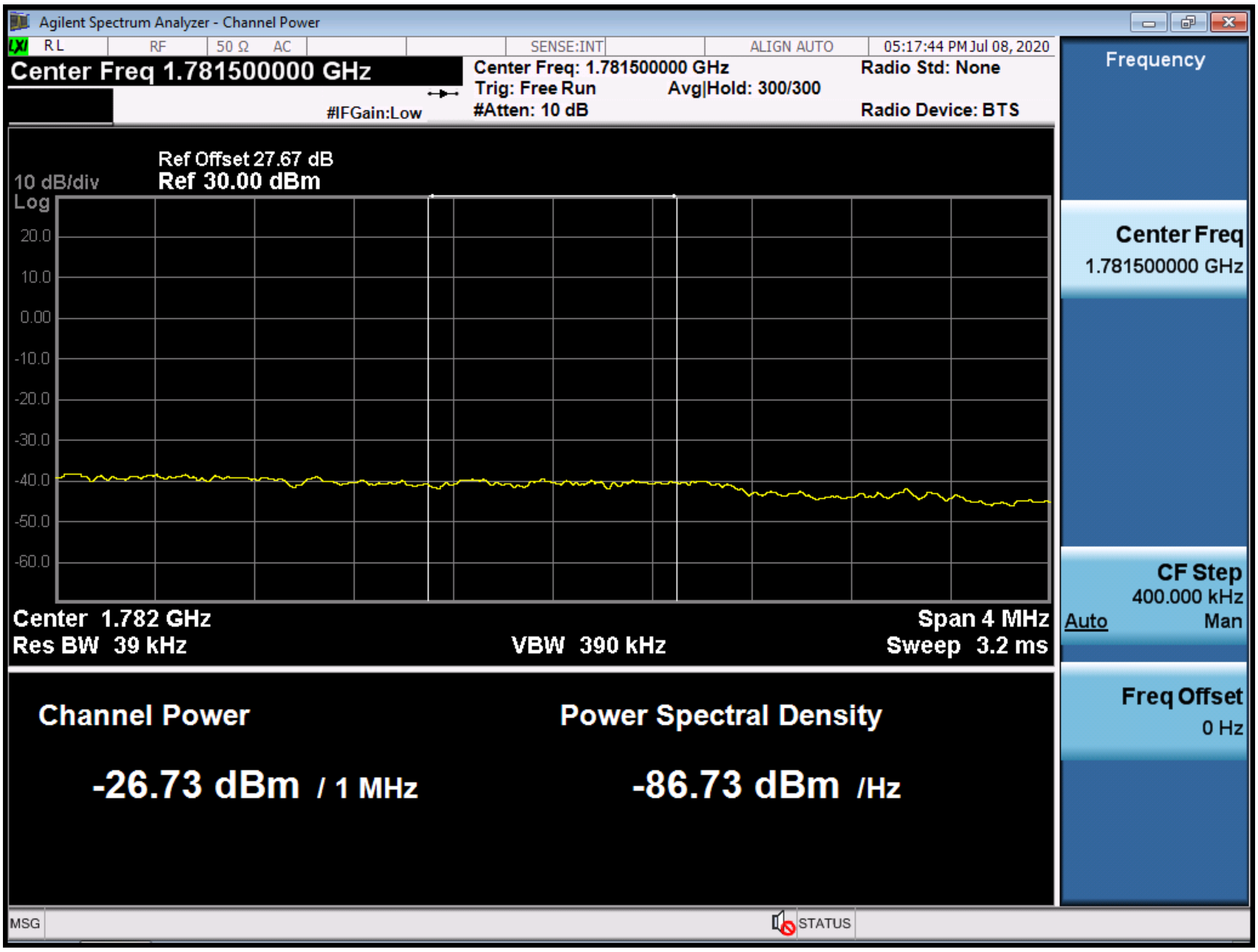
Sub6 n66. Upper Extended Band Edge Plot (15M BW Ch.354500 BPSK_RB75_0) -3



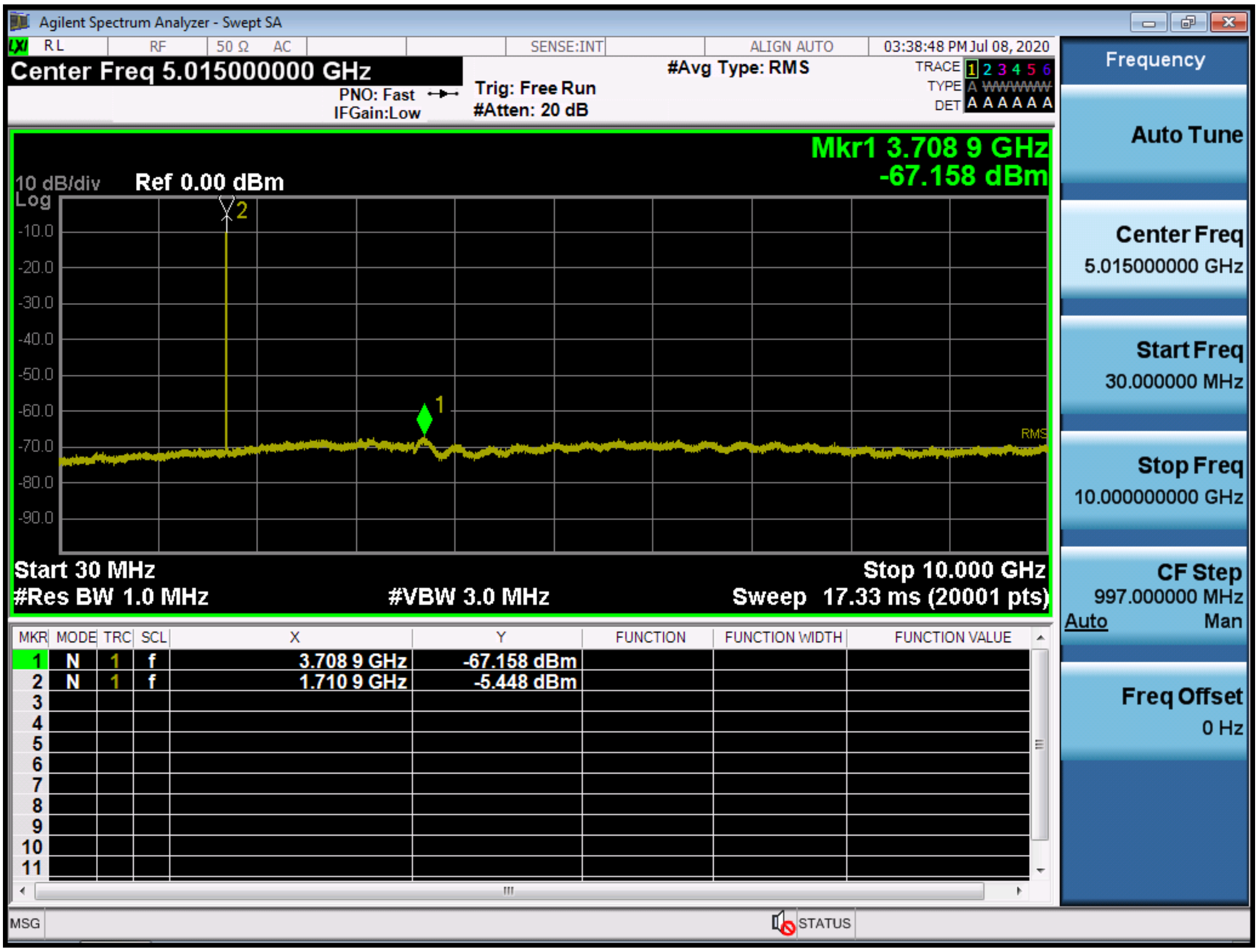
Sub6 n66. Upper Band Edge Plot (20M BW Ch.354000 BPSK_RB1_Offset 99) -1

Sub6 n66. Upper Band Edge Plot (20M BW Ch.354000 BPSK_RB100_0) -2

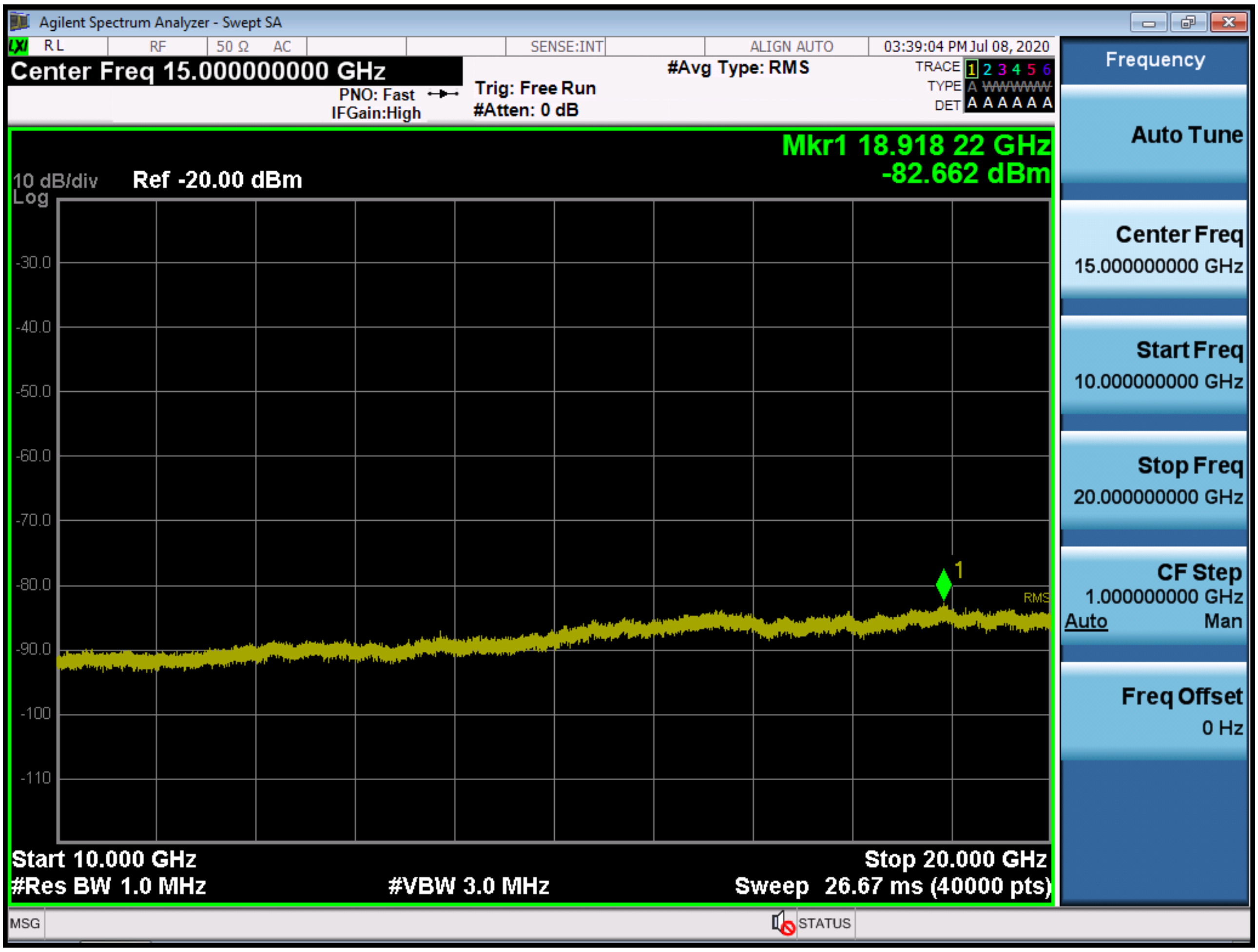
Sub6 n66. Upper Extended Band Edge Plot (20M BW Ch.354000 BPSK_RB100_0) -3



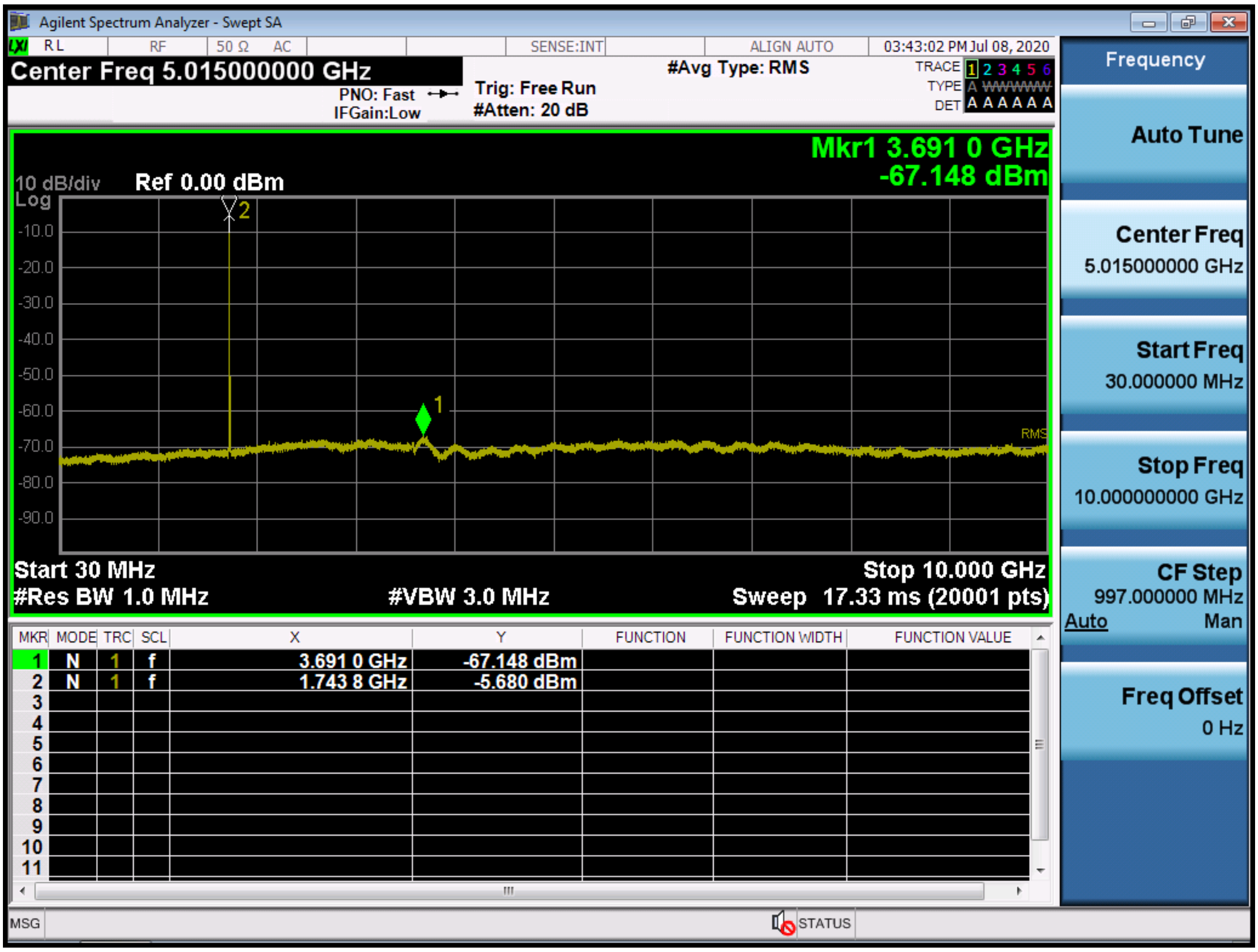
Sub6 n66. Conducted Spurious Plot_1 (342500ch_5MHz_BPSK_ RB 1_0)



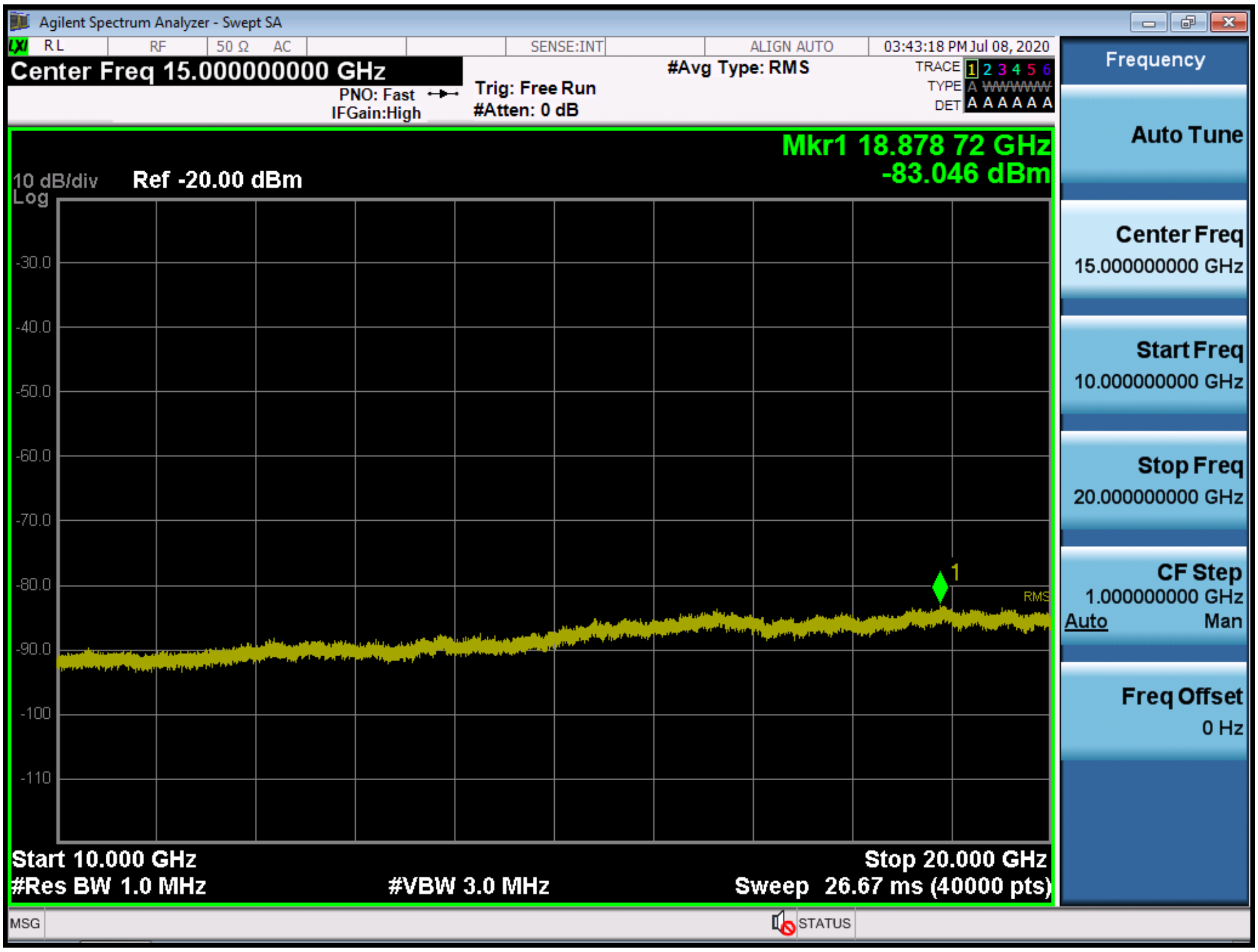
Sub6 n66. Conducted Spurious Plot_2 (342500ch_5MHz_BPSK_ RB 1_0)



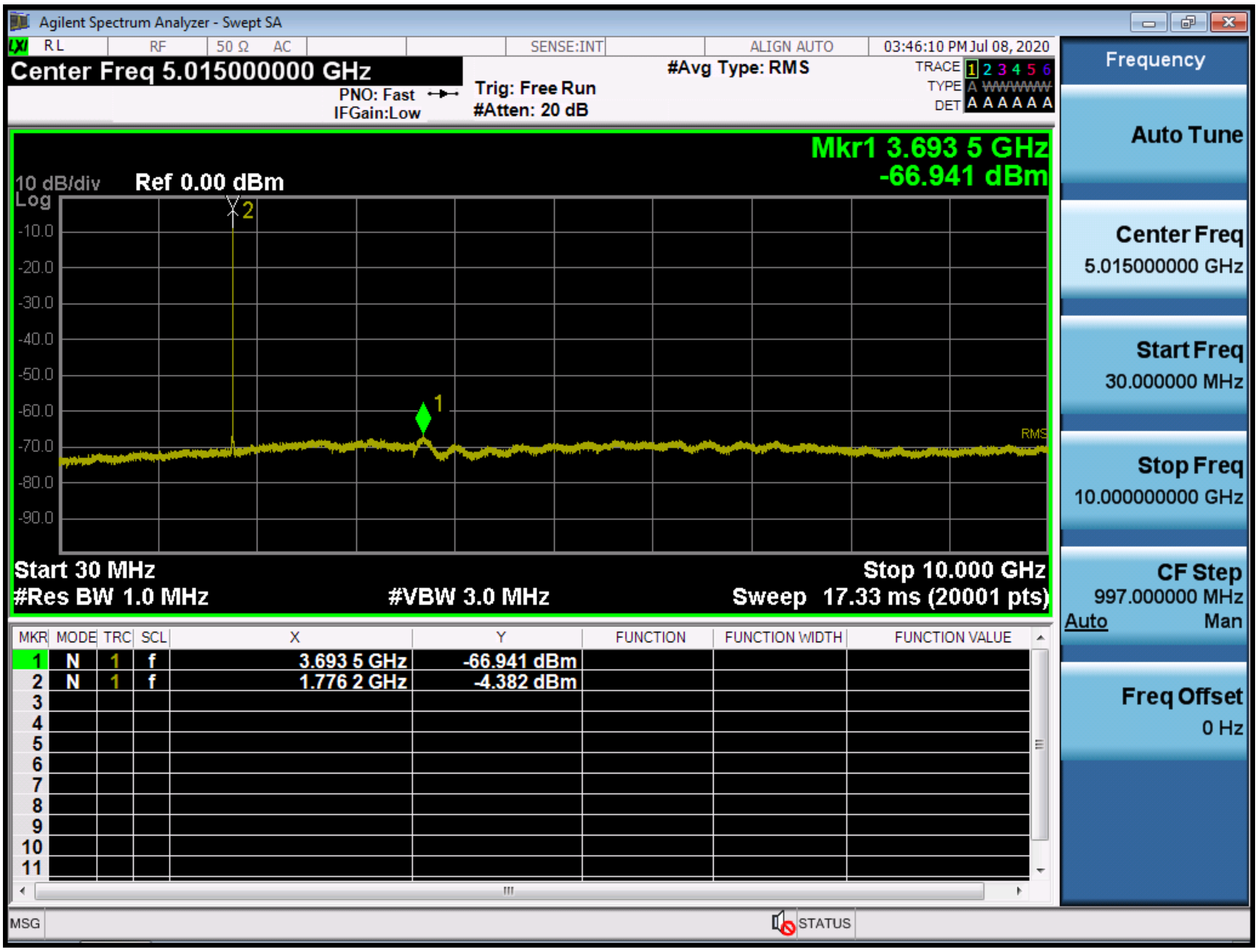
Sub6 n66. Conducted Spurious Plot_1 (349000ch_5MHz_BPSK_ RB 1_0)



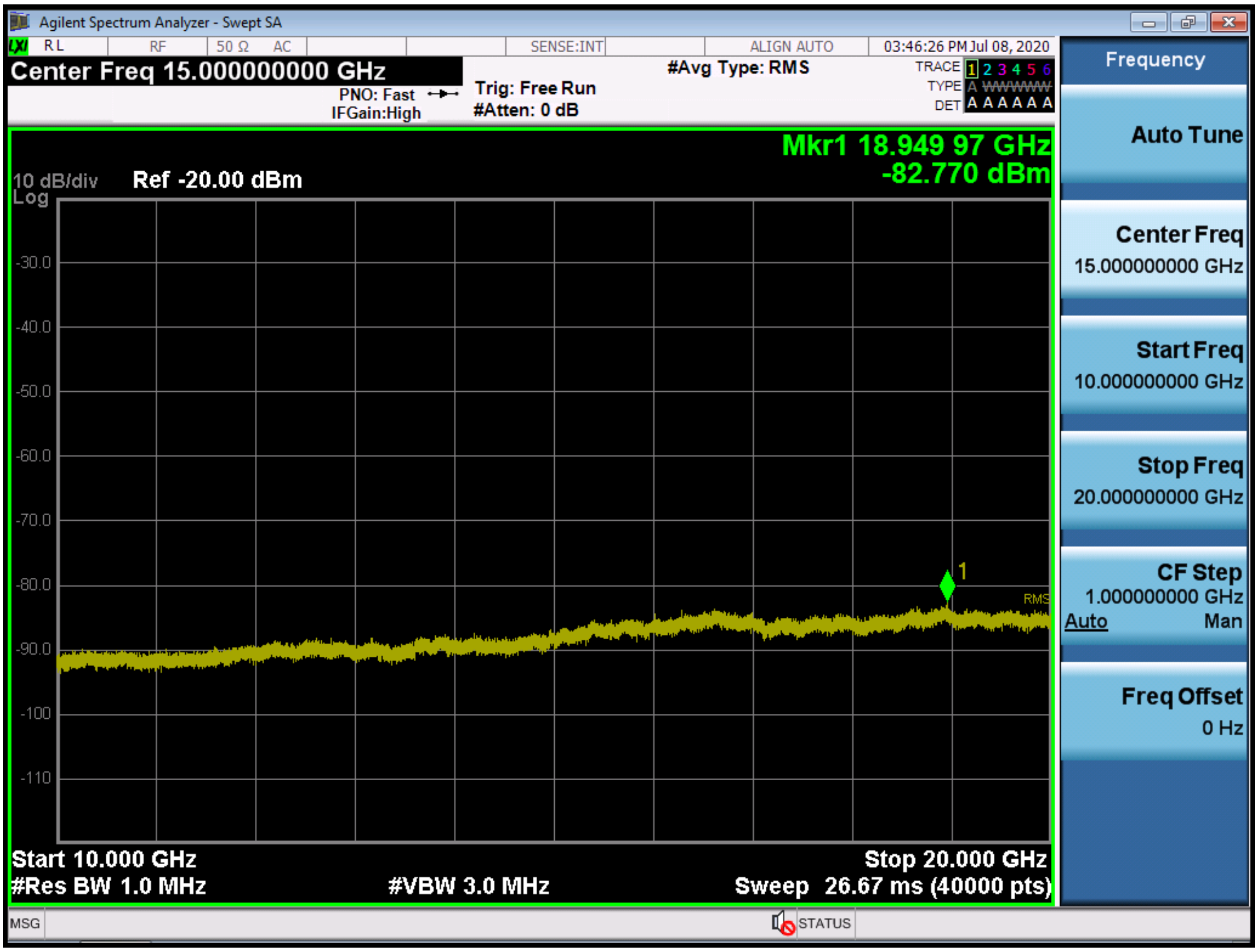
Sub6 n66. Conducted Spurious Plot_2 (349000ch_5MHz_BPSK_ RB 1_0)



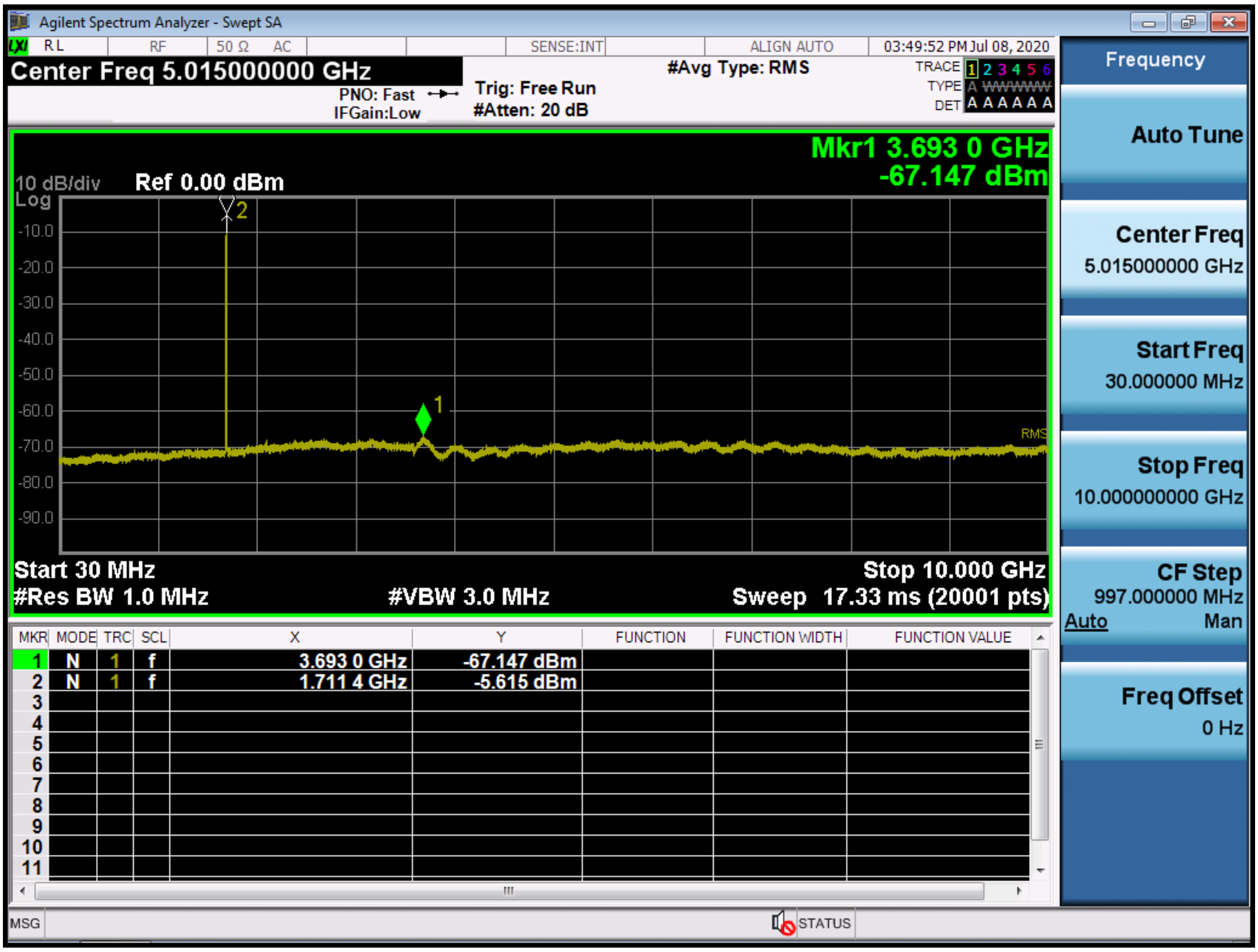
Sub6 n66. Conducted Spurious Plot_1 (355500ch_5MHz_BPSK_ RB 1_0)



Sub6 n66. Conducted Spurious Plot_2 (355500ch_5MHz_BPSK_ RB 1_0)

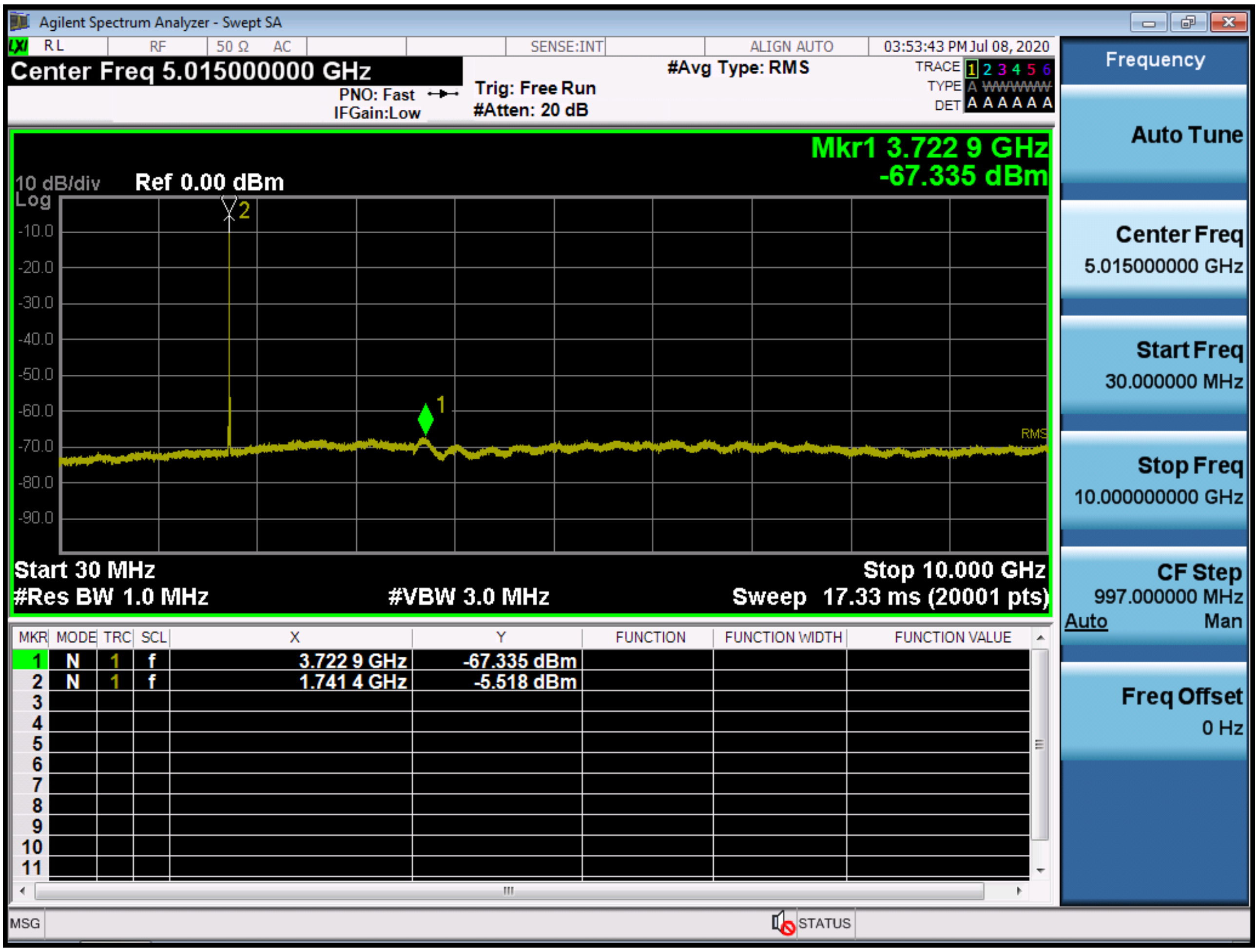


Sub6 n66. Conducted Spurious Plot_1 (343000ch_10MHz_BPSK_ RB 1_0)



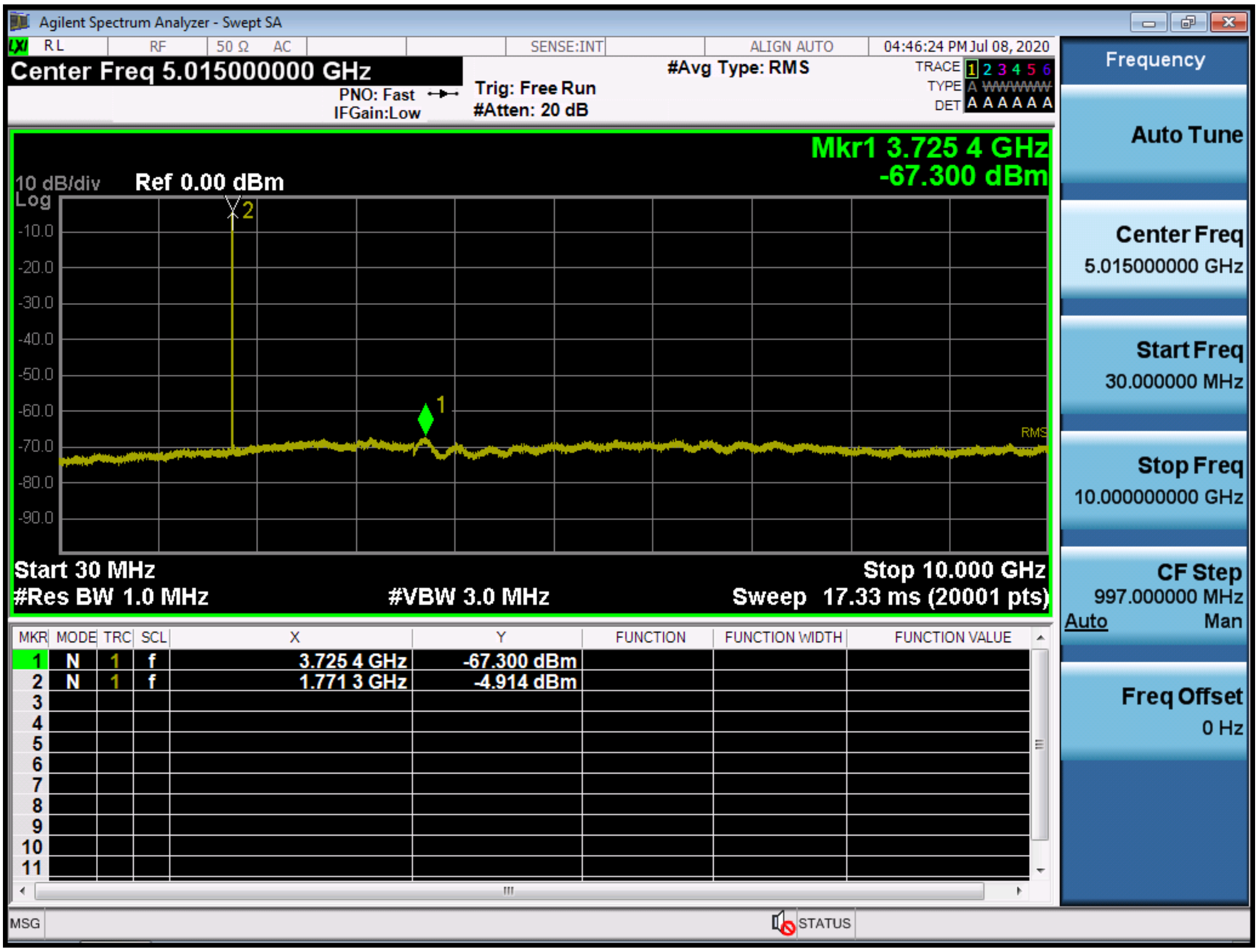
Sub6 n66. Conducted Spurious Plot_2 (343000ch_10MHz_BPSK_ RB 1_0)

Sub6 n66. Conducted Spurious Plot_1 (349000ch_10MHz_BPSK_ RB 1_0)



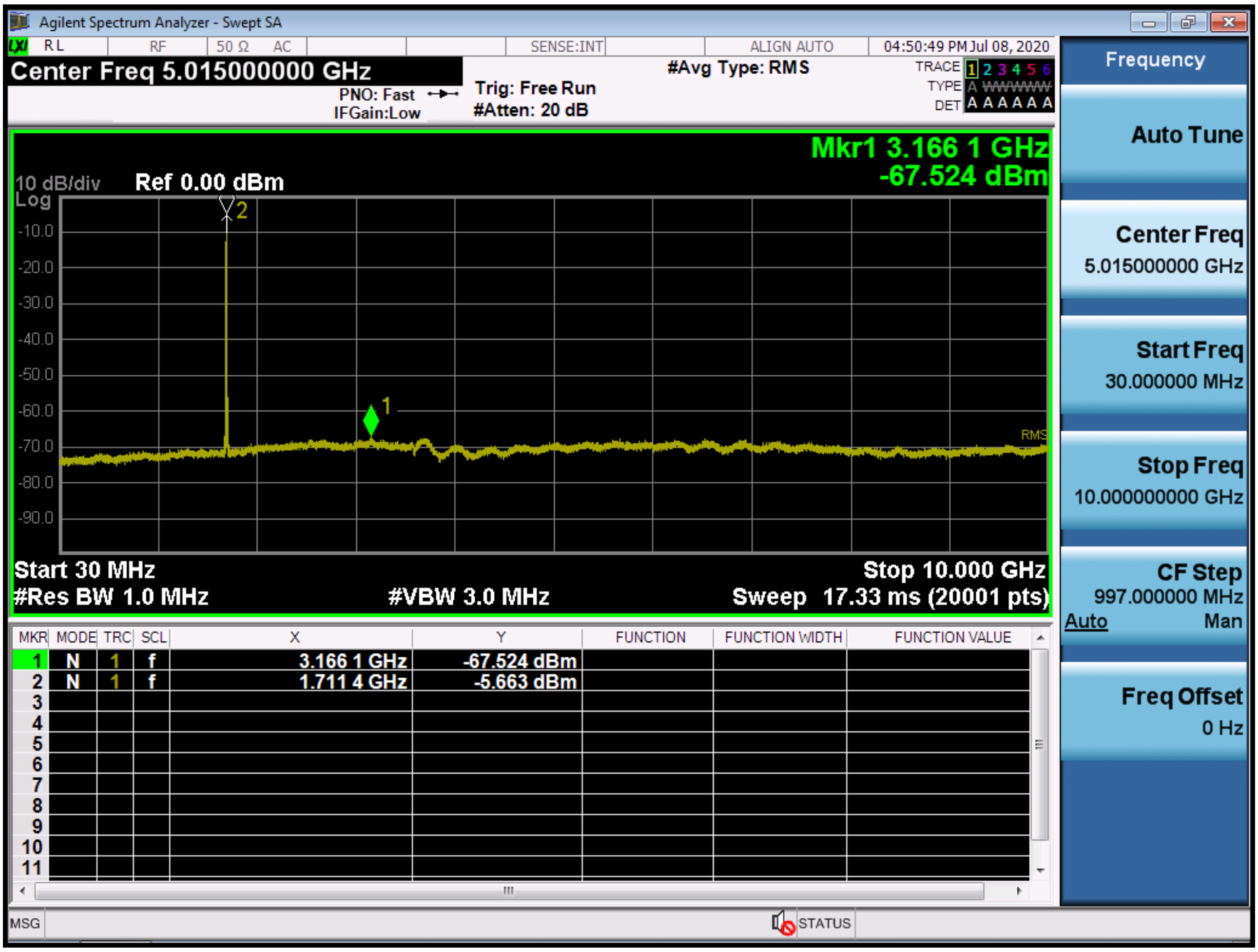
Sub6 n66. Conducted Spurious Plot_2 (349000ch_10MHz_BPSK_ RB 1_0)

Sub6 n66. Conducted Spurious Plot_1 (355000ch_10MHz_BPSK_ RB 1_0)



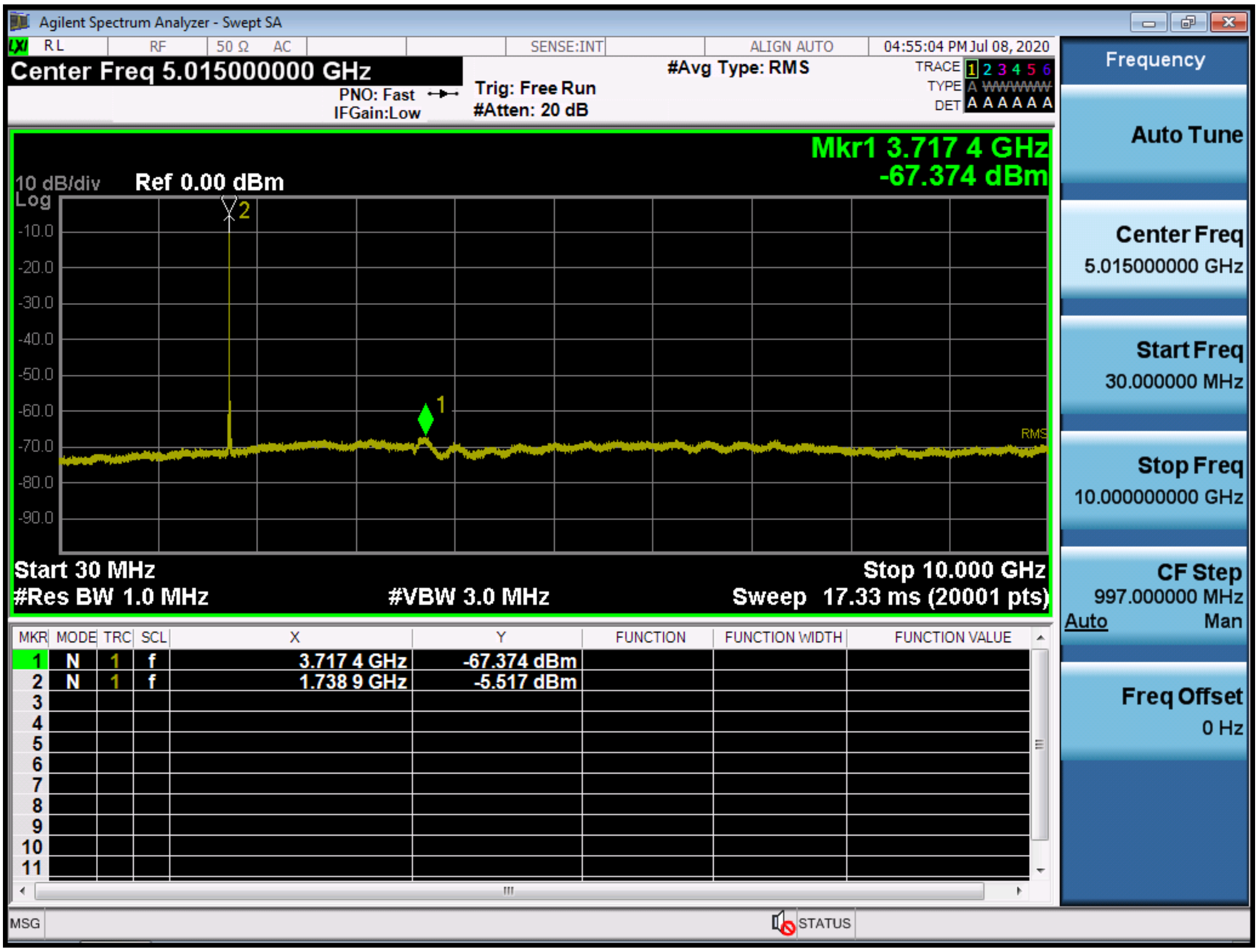
Sub6 n66. Conducted Spurious Plot_2 (355000ch_10MHz_BPSK_ RB 1_0)

Sub6 n66. Conducted Spurious Plot_1 (343500ch_15MHz_BPSK_ RB 1_0)



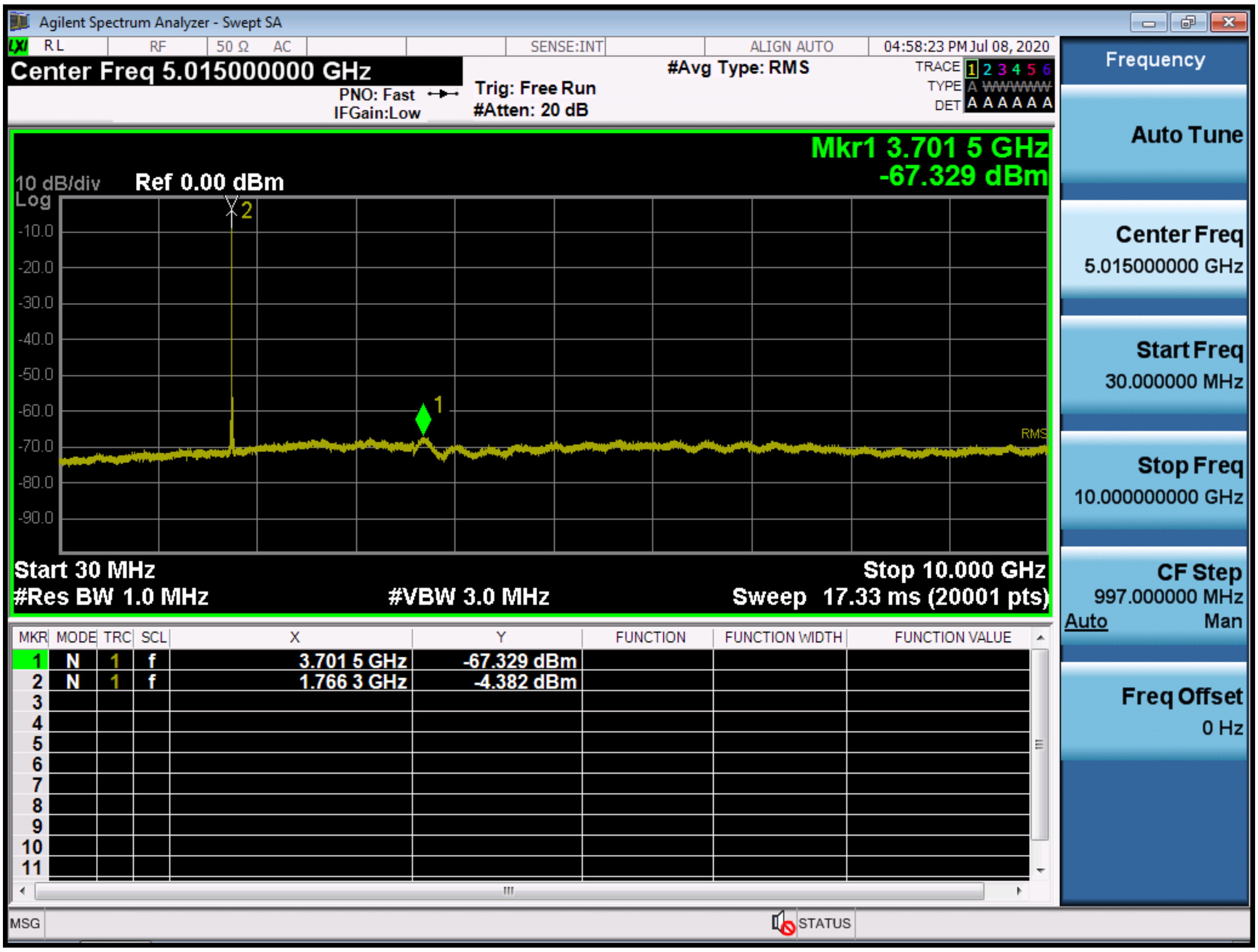
Sub6 n66. Conducted Spurious Plot_2 (343500ch_15MHz_BPSK_ RB 1_0)

Sub6 n66. Conducted Spurious Plot_1 (349000ch_15MHz_BPSK_ RB 1_0)

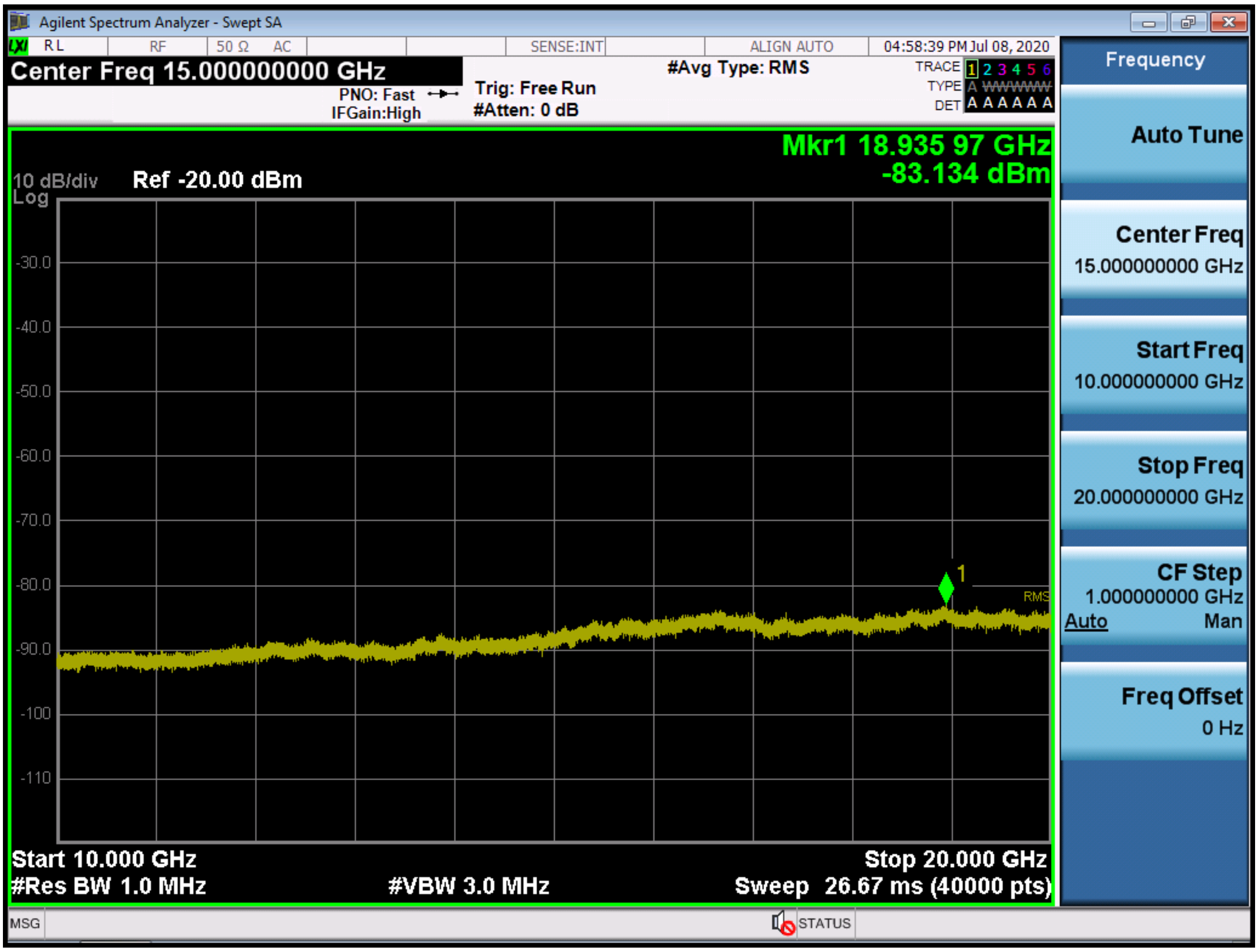


Sub6 n66. Conducted Spurious Plot_2 (349000ch_15MHz_BPSK_ RB 1_0)

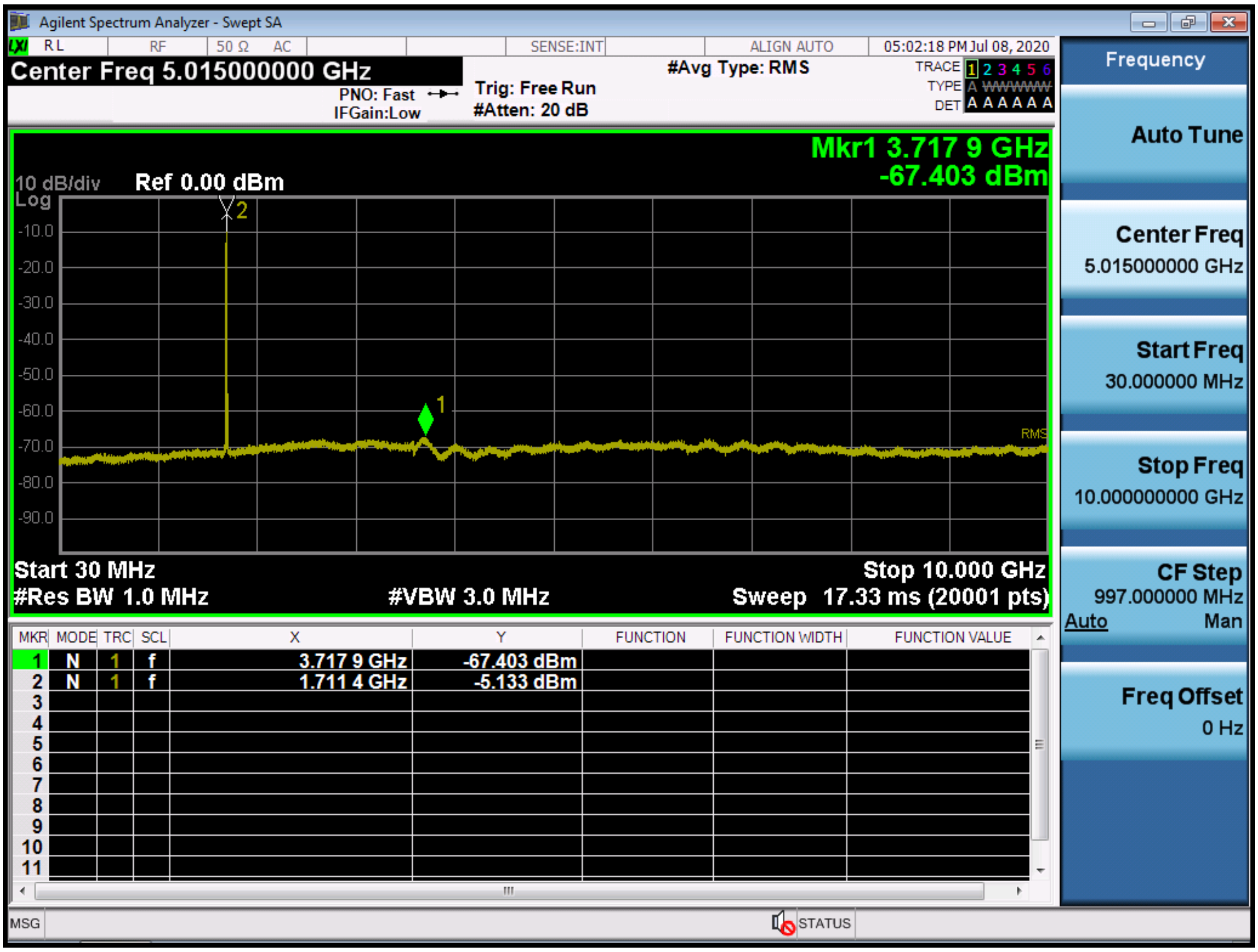
Sub6 n66. Conducted Spurious Plot_1 (354500ch_15MHz_BPSK_ RB 1_0)



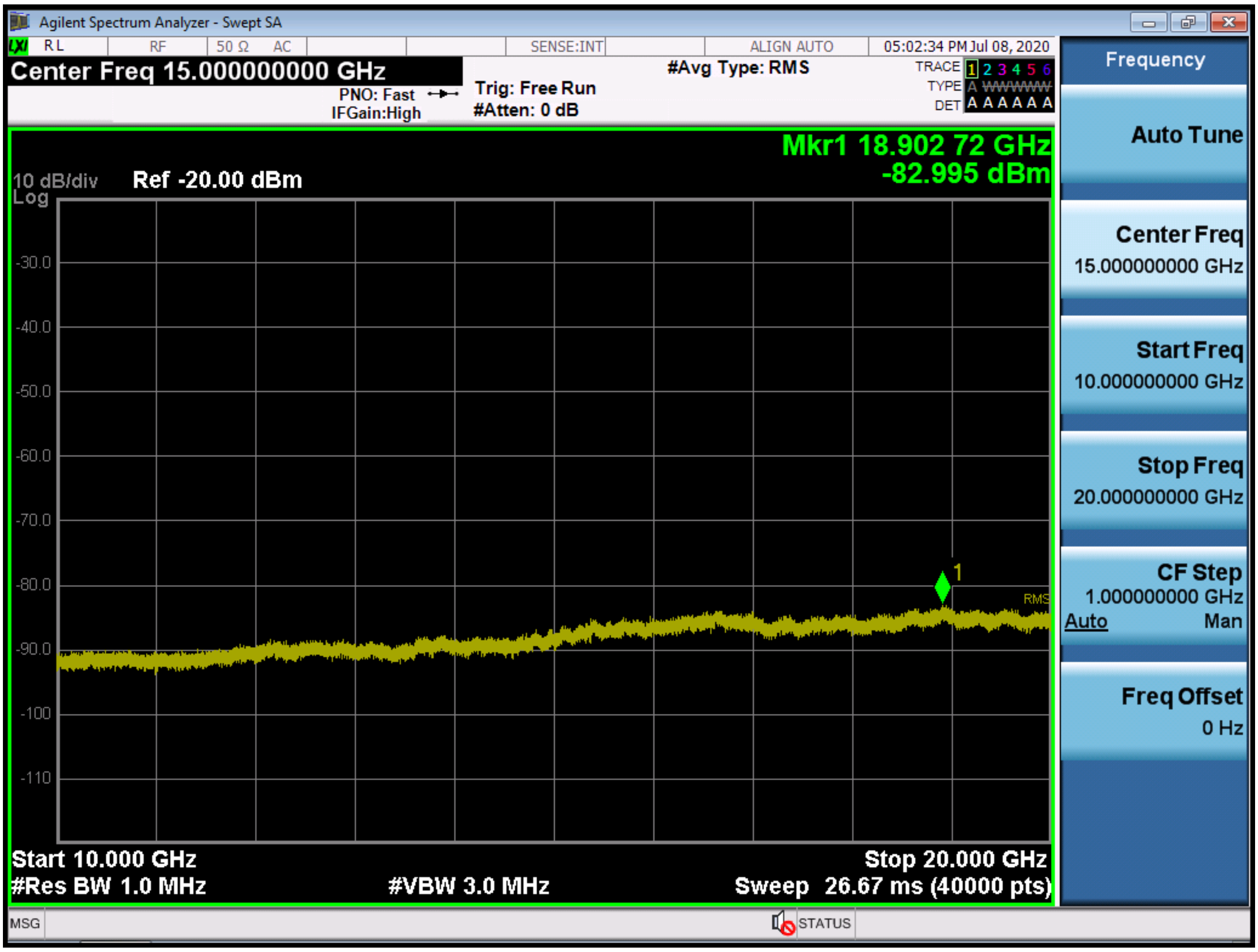
Sub6 n66. Conducted Spurious Plot_2 (354500ch_15MHz_BPSK_ RB 1_0)



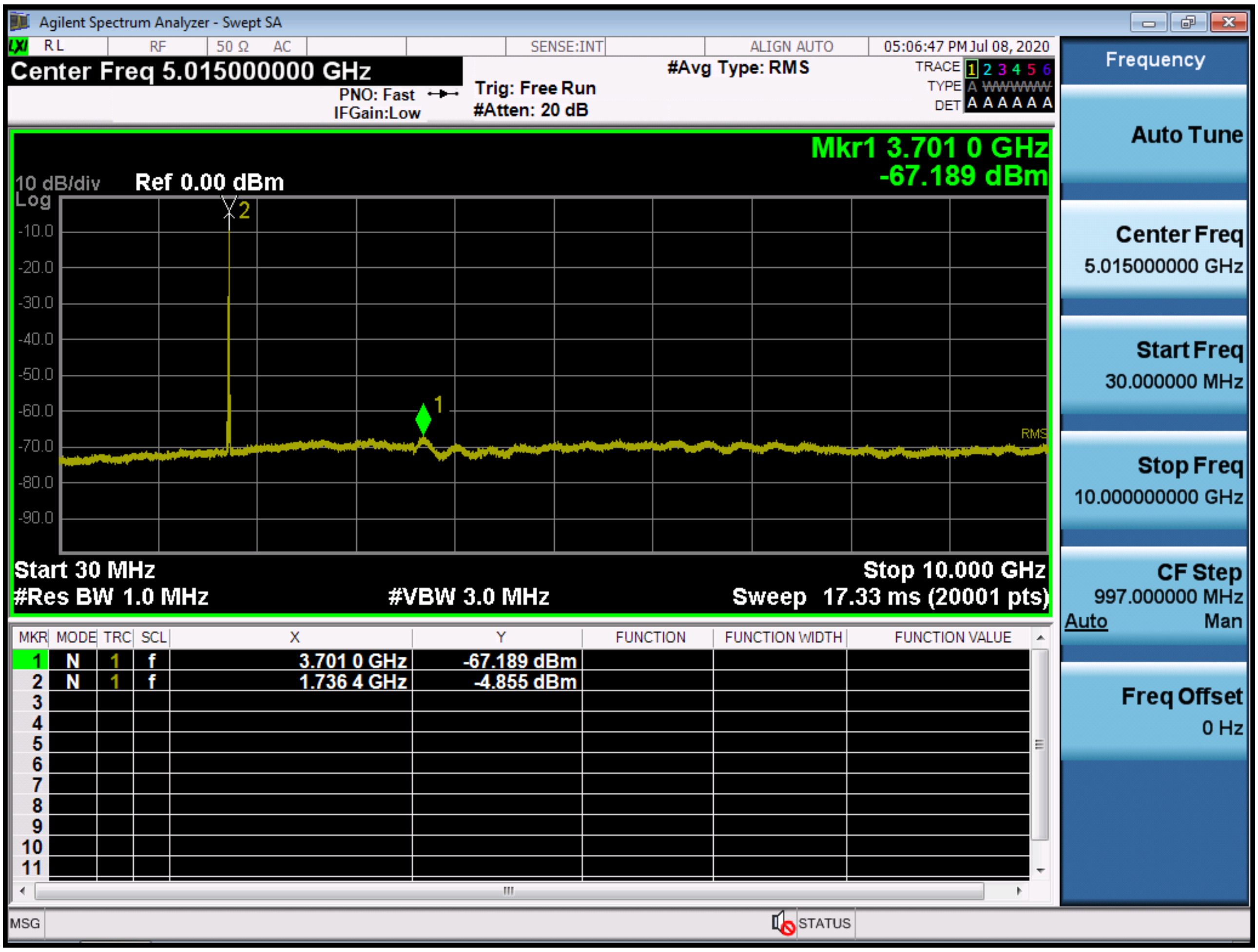
Sub6 n66. Conducted Spurious Plot_1 (344000ch_20MHz_BPSK_ RB 1_0)



Sub6 n66. Conducted Spurious Plot_2 (344000ch_20MHz_BPSK_ RB 1_0)

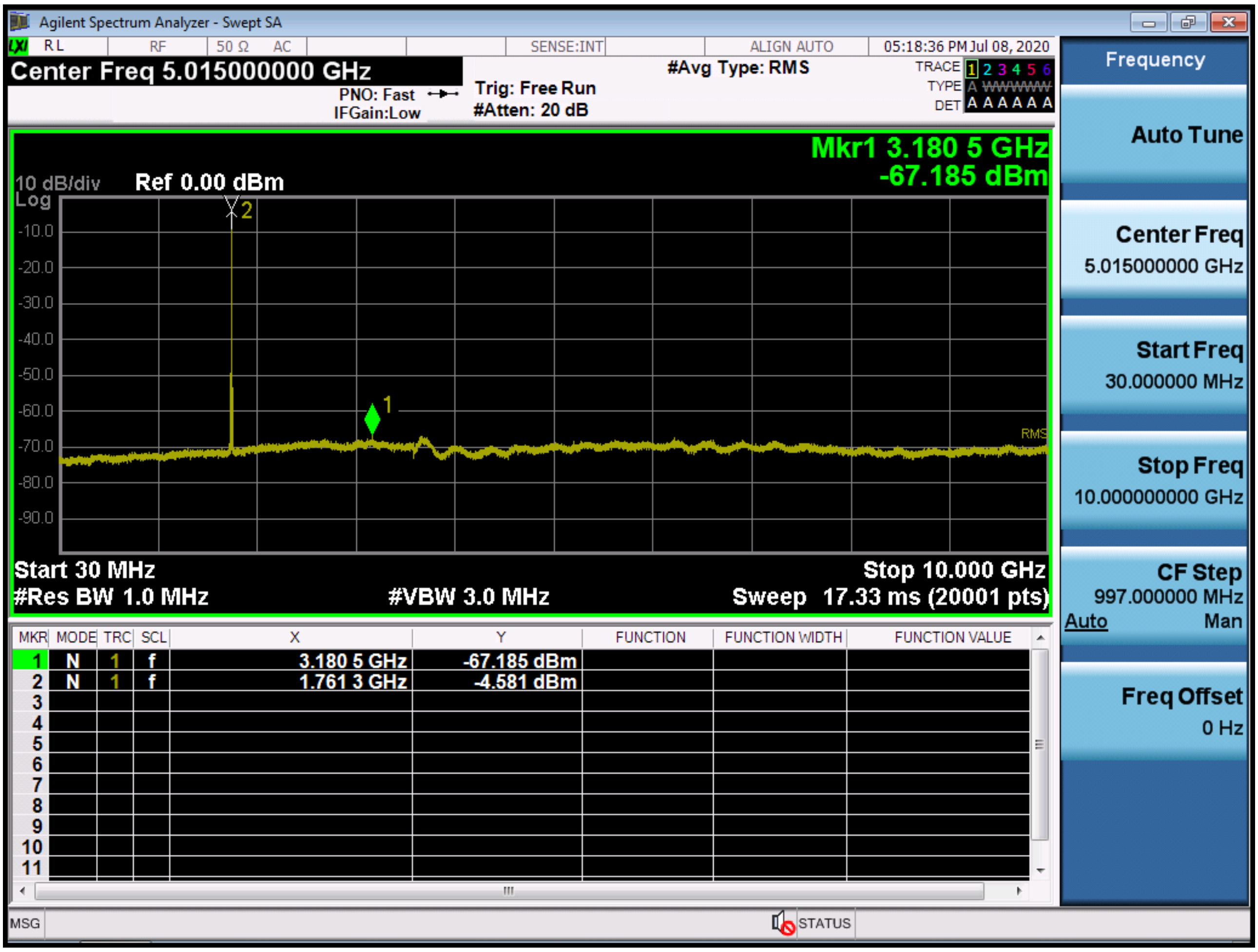


Sub6 n66. Conducted Spurious Plot_1 (349000ch_20MHz_BPSK_ RB 1_0)



Sub6 n66. Conducted Spurious Plot_2 (349000ch_20MHz_BPSK_ RB 1_0)

Sub6 n66. Conducted Spurious Plot_1 (354000ch_20MHz_BPSK_ RB 1_0)



Sub6 n66. Conducted Spurious Plot_2 (354000ch_20MHz_BPSK_ RB 1_0)

10. ANNEX A_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2008-FC071-P