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FCC LTE 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:
November 04, 2021

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

Report No.: HCT-RF-2110-FC034-R2

FCC ID:	**A3LSMN981B1**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**

Model(s): SM-N981B/DS
Additional Model(s): SM-N981B
EUT Type: Mobile phone
FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s): §90, §22, §2

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	Conducted Output Power	
				Max. Power (W)	Max. Power (dBm)
LTE – Band26 (1.4)	814.7 – 824.0	1M10G7D	QPSK	0.249	23.96
		1M10W7D	16QAM	0.165	22.17
		1M09W7D	64QAM	0.130	21.15
		1M10W7D	256QAM	0.104	20.19
LTE – Band26 (3)	815.5 – 824.0	2M71G7D	QPSK	0.251	23.99
		2M71W7D	16QAM	0.169	22.27
		2M72W7D	64QAM	0.133	21.24
		2M71W7D	256QAM	0.105	20.21
LTE – Band26 (5)	816.5 – 824.0	4M53G7D	QPSK	0.252	24.01
		4M50W7D	16QAM	0.170	22.31
		4M53W7D	64QAM	0.135	21.30
		4M52W7D	256QAM	0.104	20.18
LTE – Band26 (10)	819.0 – 824.0	9M01G7D	QPSK	0.254	24.05
		8M99W7D	16QAM	0.170	22.31
		8M99W7D	64QAM	0.135	21.30
		8M98W7D	256QAM	0.105	20.22
LTE – Band26 (15)	821.5	13M5G7D	QPSK	0.256	24.09
		13M4W7D	16QAM	0.174	22.41
		13M5W7D	64QAM	0.136	21.35
		13M4W7D	256QAM	0.108	20.35

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)

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2110-FC034	October 29, 2021	- First Approval Report
HCT-RF-2110-FC034-R1	November 03, 2021	- Revised the 1 page. - Revised the 15 page.
HCT-RF-2110-FC034-R2	November 04, 2021	- Revised the 15 page.

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:	A3LSMN981B1
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§90, §22, §2
EUT Type:	Mobile phone
Model(s):	SM-N981B/DS
Additional Model(s):	SM-N981B
Tx Frequency:	814.7 MHz – 823.3 MHz (LTE – Band 26 (1.4 MHz)) 815.5 MHz – 822.5 MHz (LTE – Band 26 (3 MHz)) 816.5 MHz – 821.5 MHz (LTE – Band 26 (5 MHz)) 819.0 MHz (LTE – Band 26 (10 MHz)) 821.5 MHz (LTE – Band 26 (15 MHz))
Date(s) of Tests:	October 04, 2021 ~ October 28, 2021
Serial number:	Radiated: R3CR90LSAZJ Conducted: R3CR90LSB3M

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

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

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
Channel 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	- KDB 971168 D01 v03r01 - Section 5.2.4 - ANSI C63.26-2015 - Section 5.2.1 & 5.2.4.2
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 CONDUCTED OUTPUT POWER

Test Overview

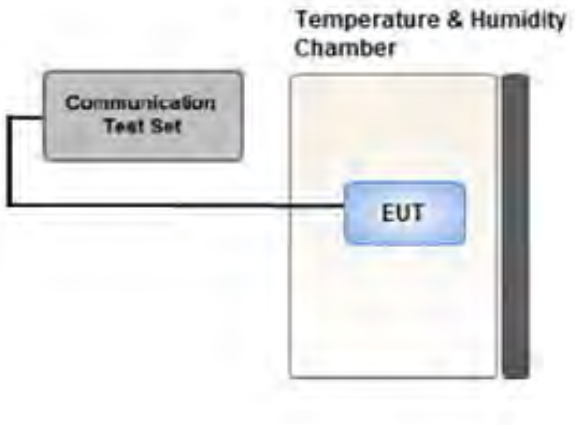
According to ANSI C63.26-2015 Section 5.2.1 when measuring the maximum RF output power from such devices, control over the EUT must be provided either through special test software (provided by manufacturer specifically for compliance testing, but not accessible by an end user) or through use of a base station emulator, communications test set, call box, or similar instrumentation that is capable of establishing a communications link with the EUT to enable control over variable parameters (e.g., output power, OBW, etc.).

In some cases, these instruments also include basic digital spectrum analyzer and/or power meter capabilities that can be utilized to measure the RF output power if the specified detectors and requirements can be realized and the measurement functions have been calibrated.

Test Procedure

1. The RF port of the EUT was connected to the Communication Tester via an RF cable.
2. Conducted average power was measured using a calibrated Radio Communication Tester.

Test setup



3.3 RADIATED POWER

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

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

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5 % of the expected OBW, not to exceed 1 MHz
3. VBW ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points > 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

Test Note

1. The turntable is rotated through 360 degrees, and the receiving antenna scans in order to determine the level of the maximized emission.
2. A half wave dipole is then substituted in place of the EUT. For emissions above 1 GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator and the previously recorded signal was duplicated.

   The power is calculated by the following formula;

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

   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.

3.4 RADIATED SPURIOUS EMISSIONS

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA-603-E-2016.

Test Settings

1. RBW = 100 kHz for emissions below 1 GHz and 1 MHz for emissions above 1 GHz
2. VBW ≥ 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 1 GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator and the previously recorded signal was duplicated.
   The spurious emissions is calculated by the following formula;

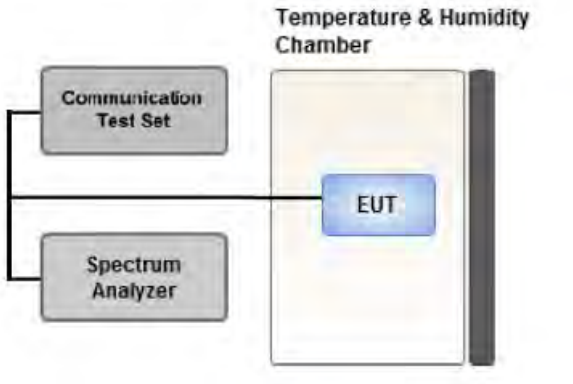
$$\text{Result}_{(dBm)} = \text{Pg}_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dBi)}$$

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

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

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

3.5 OCCUPIED BANDWIDTH.



Test setup

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

The EUT makes a call to the communication simulator.

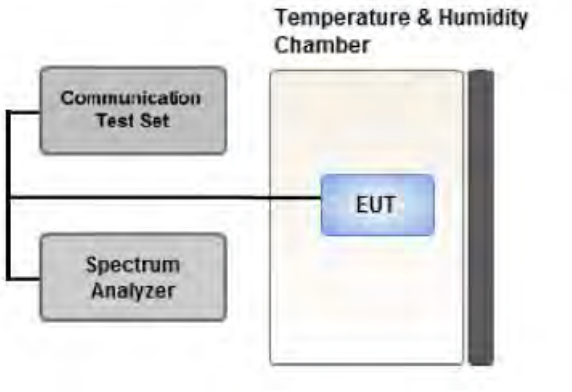
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth

Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99 % occupied bandwidth and the 26 dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5 % of the expected OBW
3. VBW ≥ 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.

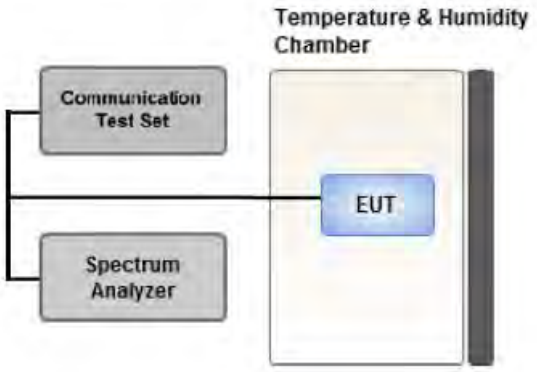
All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

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 CHANNEL 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.

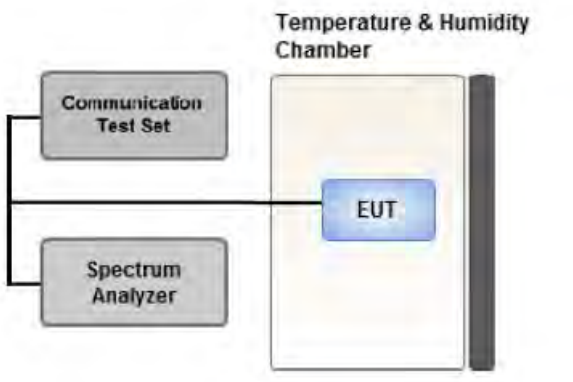
Test Settings

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 :
   .- EA licensee's frequency block by up to and including 37.5 kHz : 300 Hz
   .- EA licensee's frequency block greater than 37.5 kHz : 100 kHz
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

For 90.691(a), RBW=300 Hz for offset less than 37.5 kHz from channel edge and RBW=100 kHz for offsets greater than 37.5 kHz is allowed.

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)

- The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
- All modes of operation were investigated and the worst case configuration results are reported.
- In the case of radiated spurious emissions, all bandwidth of operation were investigated and the worst case bandwidth results are reported. (Worst case : 10 MHz)
- The worst case is reported with the EUT positioning, modulations, and paging service configurations shown in the test data.
- All modes of operation were tested and the worst case results are reported.
- Please refer to the table below.
- All modes of operation were investigated and the worst case configuration results are reported.

Mode : Stand alone, Stand alone + External accessories (Earphone, AC adapter, etc)

Worst case : Stand alone

- SM-N981B/DS & additional models were tested and the worst case results are reported.

(Worst case : SM-N981B/DS)

[Worst case]

Test Description	Modulation	Bandwidth (MHz)	RB size	RB offset	Axis
Effective Radiated Power	QPSK, 16QAM, 64QAM, 256QAM	1.4	1	5	X
		3		14	
		5		24	
		10		49	
		15		74	
Radiated Spurious and Harmonic Emissions	QPSK	10	1	49	Z

3.10 WORST CASE(CONDUCTED TEST)

-Worst case : Of all modulation, We have tested modulation of the high Conducted Output Power.

- SM-N981B/DS & additional models were tested and the worst case results are reported.

(Worst case : SM-N981B/DS)

[Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset
Occupied Bandwidth	QPSK, 16QAM, 64QAM, 256QAM	1.4, 3, 5	High	Full RB	0
	QPSK, 16QAM, 64QAM, 256QAM	10, 15	Mid	Full RB	0
Channel Edge	QPSK	1.4	Low	1	0
			High	1	5
		3	Low	1	0
			High	1	14
		5	Low	1	0
			High	1	24
		10	Mid	1	0
				1	49
		15	Mid	1	0
				1	74
		1.4, 3, 5	Low, High	Full RB	0
		10, 15	Mid	Full RB	0
Band Edge (Staddle Channel)	QPSK	1.4	Mid	1	5
		3	Mid	1	14
		5	Mid	1	24
		10	Mid	1	49
		1.4, 3, 5 10	Mid	Full RB	0
Spurious and Harmonic Emissions at Antenna Terminal	QPSK	1.4, 3, 5	Low, High	1	0
		10, 15	Mid	1	0

4. LIST OF TEST EQUIPMENT

Equipment	Model	Manufacture	Serial No.	Due to Calibration	Calibration Interval
Precision Dipole Antenna	UHAP	Schwarzbeck	01273	05/30/2022	Biennial
Precision Dipole Antenna	UHAP	Schwarzbeck	01274	05/30/2022	Biennial
Horn Antenna(1~18GHz)	BBHA 9120D	Schwarzbeck	02289	05/08/2022	Biennial
Horn Antenna(1~18GHz)	BBHA 9120D	Schwarzbeck	9120D-1299	05/04/2022	Biennial
Horn Antenna(15~40GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	10/13/2022	Biennial
Horn Antenna(15~40GHz)	BBHA 9170	Schwarzbeck	BBHA9170124	02/11/2022	Biennial
Loop Antenna(9kHz~30 MHz)	FMZB1513	Rohde & Schwarz	1513-175	05/18/2022	Biennial
Bilog Antenna	VULB9160	Schwarzbeck	3150	03/03/2023	Biennial
Hybrid Antenna	VULB9160	Schwarzbeck	760	02/22/2023	Biennial
High Pass Filter	WHKX10-900-1000-15000-40SS	Wainwright Instruments	15	06/15/2022	Annual
High Pass Filter	WHKX10-2700-3000-18000-40SS	Wainwright Instruments	145	06/15/2022	Annual
High Pass Filter	WHNX6-4740-6000-26500-40CC	Wainwright Instruments	11	06/15/2022	Annual
LOW NOISE AMP (100 MHz ~ 18GHz)	CBLU1183540B-01	CERNEX	26822	06/15/2022	Annual
Power Amplifier	CBL18265035	CERNEX	22966	12/04/2021	Annual
Power Amplifier	CBL26405040	CERNEX	25956	03/23/2022	Annual
DC Power Supply	E3632A	Hewlett Packard	MY40004427	09/15/2022	Annual
Power Splitter(DC~26.5 GHz)	11667B	Hewlett Packard	11275	04/07/2022	Annual
Chamber	SU-642	ESPEC	93008124	03/15/2022	Annual
Signal Analyzer(10Hz~26.5GHz)	N9020A	Agilent	MY51110063	04/22/2022	Annual
ATTENUATOR(20dB)	8493C	Hewlett Packard	17280	06/01/2022	Annual
Spectrum Analyzer(10Hz~40GHz)	FSV40	REOHDE & SCHWARZ	101436	03/02/2022	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/18/2022	Annual
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262116770	07/12/2022	Annual
Wideband Radio Communication Tester	MT8820C	Anritsu Corp.	6201026545	01/07/2022	Annual
SIGNAL GENERATOR (100kHz~40GHz)	SMB100A	REOHDE & SCHWARZ	177633	07/05/2022	Annual
Signal Analyzer(5Hz~40.0GHz)	N9030B	KEYSIGHT	MY55480167	06/02/2022	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	HCT CO., LTD.,	-	-	-

Note:

1. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
2. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

5. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4:2014. All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95 % level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (±dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82 (Confidence level about 95 %, k=2)
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40 (Confidence level about 95 %, k=2)
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80 (Confidence level about 95 %, k=2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70 (Confidence level about 95 %, k=2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.05 (Confidence level about 95 %, k=2)

6. SUMMARY OF TEST RESULTS

6.1 Test Condition : Conducted Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Occupied Bandwidth	§2.1049	N/A	PASS
Channel Edge / Spurious and Harmonic Emissions at Antenna Terminal.	§2.1051, §90.691	< 50 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions within 37.5 kHz of Block Edge	PASS
Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	§2.1051, §22.917(a)	< 43 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions	PASS
Conducted Output Power	§2.1046 §90.635	< 100 Watts	PASS
Frequency stability / variation of ambient temperature	§2.1055, §90.213 §22.355	< 2.5 ppm	PASS

6.2 Test Condition : Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Effective Radiated Power	§22.913(a)(5)	< 7 Watts max. ERP	PASS
Radiated Spurious and Harmonic Emissions	§2.1053, §90.691 §22.917(a)	< 43 + 10log10 (P[Watts]) for all out-of band emissions	PASS

7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

Ch./ Freq.		Measured	Substitute	Ant. Gain	C.L	Pol.	ERP	
channel	Freq.(MHz)	Level (dBm)	Level (dBm)	(dBd)			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	Substitute	Ant. Gain	C.L	Pol.	EIRP	
channel	Freq.(MHz)	Level (dBm)	Level (dBm)	(dBi)			W	dBm
20175	1,732.50	-15.75	18.45	9.90	1.76	H	0.456	26.59

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

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

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

3) Record the field strength meter's level.

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

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

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

7.3. Emission Designator

GSM Emission Designator

Emission Designator = 249KGXW
GSM BW = 249 kHz
G = Phase Modulation
X = Cases not otherwise covered
W = Combination (Audio/Data)

EDGE Emission Designator

Emission Designator = 249KG7W
GSM BW = 249 kHz
G = Phase Modulation
7 = Quantized/Digital Info
W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M17F9W
WCDMA BW = 4.17 MHz
F = Frequency Modulation
9 = Composite Digital Info
W = Combination (Audio/Data)

QPSK Modulation

Emission Designator = 4M48G7D
LTE BW = 4.48 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data transmission; telemetry; telecommand

QAM Modulation

Emission Designator = 4M48W7D
LTE BW = 4.48 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data transmission; telemetry; telecommand

8. TEST DATA

8.1 CONDUCTED OUTPUT POWER

Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm)				Limit (W)
				814.7 MHz		823.3 MHz		
				dBm	W	dBm	W	
1.4	QPSK	1	0	23.88	0.244	23.85	0.243	100
		1	3	23.88	0.244	23.84	0.242	100
		1	5	23.90	0.245	23.87	0.244	100
		3	0	23.85	0.243	23.86	0.243	100
		3	1	23.96	0.249	23.95	0.248	100
		3	3	23.91	0.246	23.93	0.247	100
		6	0	22.40	0.174	22.45	0.176	100
	16QAM	1	0	22.15	0.164	22.00	0.158	100
		1	3	21.99	0.158	21.98	0.158	100
		1	5	22.16	0.164	22.17	0.165	100
		3	0	21.98	0.158	21.99	0.158	100
		3	1	22.01	0.159	22.03	0.160	100
		3	3	22.05	0.160	22.02	0.159	100
		6	0	21.02	0.126	21.05	0.127	100
	64QAM	1	0	21.08	0.128	21.07	0.128	100
		1	3	20.94	0.124	20.99	0.126	100
		1	5	21.06	0.128	21.04	0.127	100
		3	0	20.86	0.122	20.91	0.123	100
		3	1	21.09	0.129	21.14	0.130	100
		3	3	21.00	0.126	21.10	0.129	100
		6	0	19.99	0.100	20.00	0.100	100
	256QAM	1	0	20.06	0.101	20.05	0.101	100
		1	3	19.99	0.100	19.99	0.100	100
		1	5	20.09	0.102	20.12	0.103	100
		3	0	19.88	0.097	19.93	0.098	100
		3	1	20.05	0.101	20.10	0.102	100
		3	3	20.03	0.101	20.07	0.102	100
		6	0	18.95	0.079	19.00	0.079	100

Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm)				Limit (W)
				815.5 MHz		822.5 MHz		
				dBm	W	dBm	W	
3	QPSK	1	0	23.85	0.243	23.81	0.240	100
		1	7	23.82	0.241	23.85	0.243	100
		1	14	23.96	0.249	23.94	0.248	100
		8	0	22.47	0.177	22.50	0.178	100
		8	3	22.49	0.177	22.51	0.178	100
		8	7	22.49	0.177	22.51	0.178	100
		15	0	22.53	0.179	22.54	0.179	100
	16QAM	1	0	22.25	0.168	22.24	0.167	100
		1	7	22.03	0.160	22.06	0.161	100
		1	14	22.07	0.161	22.08	0.161	100
		8	0	21.03	0.127	21.05	0.127	100
		8	3	21.04	0.127	21.07	0.128	100
		8	7	20.98	0.125	20.99	0.126	100
		15	0	21.07	0.128	21.09	0.129	100
	64QAM	1	0	21.10	0.129	21.14	0.130	100
		1	7	21.04	0.127	21.10	0.129	100
		1	14	21.21	0.132	21.23	0.133	100
		8	0	19.97	0.099	20.00	0.100	100
		8	3	20.00	0.100	20.04	0.101	100
		8	7	20.02	0.100	20.01	0.100	100
		15	0	20.04	0.101	20.06	0.101	100
	256QAM	1	0	20.15	0.104	20.16	0.104	100
		1	7	19.99	0.100	20.05	0.101	100
		1	14	20.18	0.104	20.21	0.105	100
		8	0	18.97	0.079	18.99	0.079	100
		8	3	18.97	0.079	19.00	0.079	100
		8	7	18.98	0.079	19.01	0.080	100
		15	0	18.96	0.079	18.97	0.079	100

Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm)				Limit (W)
				816.5 MHz		821.5 MHz		
				dBm	W	dBm	W	
5	QPSK	1	0	24.00	0.251	24.01	0.252	100
		1	12	23.83	0.242	23.90	0.245	100
		1	24	23.94	0.248	23.93	0.247	100
		12	0	22.54	0.179	22.56	0.180	100
		12	6	22.56	0.180	22.54	0.179	100
		12	11	22.56	0.180	22.57	0.181	100
		25	0	22.52	0.179	22.54	0.179	100
	16QAM	1	0	22.25	0.168	22.23	0.167	100
		1	12	22.24	0.167	22.27	0.169	100
		1	24	22.29	0.169	22.30	0.170	100
		12	0	21.05	0.127	21.08	0.128	100
		12	6	21.01	0.126	21.07	0.128	100
		12	11	21.07	0.128	21.10	0.129	100
		25	0	21.05	0.127	21.09	0.129	100
	64QAM	1	0	21.12	0.129	21.14	0.130	100
		1	12	21.16	0.131	21.19	0.132	100
		1	24	21.27	0.134	21.30	0.135	100
		12	0	20.05	0.101	20.10	0.102	100
		12	6	20.01	0.100	20.05	0.101	100
		12	11	20.04	0.101	20.06	0.101	100
		25	0	20.07	0.102	20.09	0.102	100
	256QAM	1	0	20.09	0.102	20.10	0.102	100
		1	12	20.15	0.104	20.18	0.104	100
		1	24	20.15	0.104	20.18	0.104	100
		12	0	19.00	0.079	19.01	0.080	100
		12	6	19.01	0.080	19.04	0.080	100
		12	11	19.01	0.080	19.02	0.080	100
		25	0	19.06	0.081	19.05	0.080	100

Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm)		Limit (W)
				819 MHz		
				dBm	W	
10	QPSK	1	0	24.00	0.251	100
		1	24	24.00	0.251	100
		1	49	24.05	0.254	100
		25	0	22.61	0.182	100
		25	12	22.57	0.181	100
		25	24	22.56	0.180	100
		50	0	22.56	0.180	100
	16QAM	1	0	22.25	0.168	100
		1	24	21.99	0.158	100
		1	49	22.27	0.169	100
		25	0	21.13	0.130	100
		25	12	21.15	0.130	100
		25	24	21.10	0.129	100
		50	0	21.12	0.129	100
	64QAM	1	0	21.30	0.135	100
		1	24	21.25	0.133	100
		1	49	21.30	0.135	100
		25	0	20.10	0.102	100
		25	12	20.11	0.103	100
		25	24	20.13	0.103	100
		50	0	20.07	0.102	100
	256QAM	1	0	20.22	0.105	100
		1	24	20.16	0.104	100
		1	49	20.18	0.104	100
		25	0	19.10	0.081	100
		25	12	19.11	0.081	100
		25	24	19.09	0.081	100
		50	0	19.11	0.081	100

Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm)		Limit (W)
				821.5 MHz		
				dBm	W	
15	QPSK	1	0	24.09	0.256	100
		1	36	23.95	0.248	100
		1	74	24.03	0.253	100
		36	0	22.61	0.182	100
		36	18	22.60	0.182	100
		36	39	22.51	0.178	100
		75	0	22.54	0.179	100
	16QAM	1	0	22.41	0.174	100
		1	36	22.30	0.170	100
		1	74	22.15	0.164	100
		36	0	21.16	0.131	100
		36	18	21.16	0.131	100
		36	39	21.04	0.127	100
		75	0	21.10	0.129	100
	64QAM	1	0	21.35	0.136	100
		1	36	21.27	0.134	100
		1	74	21.13	0.130	100
		36	0	20.14	0.103	100
		36	18	20.11	0.103	100
		36	39	20.03	0.101	100
		75	0	20.11	0.103	100
	256QAM	1	0	20.35	0.108	100
		1	36	20.24	0.106	100
		1	74	20.10	0.102	100
		36	0	19.15	0.082	100
		36	18	19.14	0.082	100
		36	39	19.07	0.081	100
		75	0	19.11	0.081	100

8.2 EFFECTIVE RADIATED POWER

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP	
								W	W	dBm
814.7	LTE B26/ 1.4 MHz	QPSK	-31.44	30.16	-10.11	1.40	H	< 100	0.073	18.65
		16QAM	-33.51	28.09	-10.11	1.40	H		0.045	16.58
		64QAM	-34.28	27.32	-10.11	1.40	H		0.038	15.81
		256QAM	-35.30	26.30	-10.11	1.40	H		0.030	14.79
823.3		QPSK	-30.85	30.22	-10.09	1.40	H		0.074	18.72
		16QAM	-32.74	28.33	-10.09	1.40	H		0.048	16.83
		64QAM	-33.75	27.32	-10.09	1.40	H		0.038	15.82
		256QAM	-34.85	26.22	-10.09	1.40	H		0.030	14.72

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP	
								W	W	dBm
815.5	LTE B26/ 3 MHz	QPSK	-31.45	30.07	-10.11	1.40	H	< 100	0.072	18.56
		16QAM	-33.18	28.34	-10.11	1.40	H		0.048	16.83
		64QAM	-34.52	27.00	-10.11	1.40	H		0.035	15.49
		256QAM	-35.31	26.21	-10.11	1.40	H		0.029	14.70
822.5		QPSK	-30.91	30.23	-10.10	1.40	H		0.075	18.73
		16QAM	-32.67	28.47	-10.10	1.40	H		0.050	16.97
		64QAM	-34.79	26.35	-10.10	1.40	H		0.031	14.85
		256QAM	-34.85	26.29	-10.10	1.40	H		0.030	14.79

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP	
								W	W	dBm
816.5	LTE B26/ 5 MHz	QPSK	-31.38	30.03	-10.11	1.40	H	< 100	0.071	18.53
		16QAM	-33.20	28.21	-10.11	1.40	H		0.047	16.71
		64QAM	-34.52	26.89	-10.11	1.40	H		0.035	15.39
		256QAM	-35.53	25.88	-10.11	1.40	H		0.027	14.38
821.5		QPSK	-30.93	30.34	-10.10	1.40	H		0.077	18.84
		16QAM	-32.78	28.49	-10.10	1.40	H		0.050	16.99
		64QAM	-33.83	27.44	-10.10	1.40	H		0.039	15.94
		256QAM	-34.91	26.36	-10.10	1.40	H		0.031	14.86

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP	
								W	W	dBm
819.0	LTE B26/ 10 MHz	QPSK	-31.08	30.39	-10.10	1.40	H	< 100	0.077	18.88
		16QAM	-32.89	28.58	-10.10	1.40	H		0.051	17.07
		64QAM	-33.94	27.53	-10.10	1.40	H		0.040	16.02
		256QAM	-34.99	26.48	-10.10	1.40	H		0.031	14.97

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP	
								W	W	dBm
821.5	LTE B26/ 15 MHz	QPSK	-31.04	30.23	-10.10	1.40	H	< 7.00	0.075	18.73
		16QAM	-32.88	28.39	-10.10	1.40	H		0.049	16.89
		64QAM	-33.97	27.30	-10.10	1.40	H		0.038	15.80
		256QAM	-34.92	26.35	-10.10	1.40	H		0.031	14.85

Note

1. Limit: None (for reporting purposes only)

8.3 RADIATED SPURIOUS EMISSIONS

▣ MODE: LTE B26

▣ MODULATION SIGNAL: 10 MHz QPSK

▣ DISTANCE: 3 meters

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit
26740 (819.0)	1 638.00	-57.29	9.32	-66.23	2.00	H	-58.91	-13.00
	2 457.00	-54.93	10.04	-60.43	2.56	H	-52.95	-13.00
	3 276.00	-59.27	10.85	-61.13	2.95	H	-53.22	-13.00

8.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
Band 26	1.4 MHz	823.3	QPSK	6	0	1.0965
			16QAM			1.1012
			64QAM			1.0928
			256QAM			1.1001
	3 MHz	822.5	QPSK	15		2.7060
			16QAM			2.7120
			64QAM			2.7172
			256QAM			2.7125
	5 MHz	821.5	QPSK	25		4.5294
			16QAM			4.4997
			64QAM			4.5308
			256QAM			4.5179
	10 MHz	819.0	QPSK	50		9.0127
			16QAM			8.9924
			64QAM			8.9931
			256QAM			8.9816
	15 MHz	821.5	QPSK	75		13.467
			16QAM			13.432
			64QAM			13.455
			256QAM			13.430

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 45 ~ 64.

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)
26	1.4	814.7	3.6910	27.976	-67.059	-39.083	-13.00
		823.3	3.7129	27.976	-66.778	-38.802	
	3	815.5	3.6965	27.976	-67.285	-39.309	
		822.5	3.7064	27.976	-66.865	-38.889	
	5	816.5	3.6815	27.976	-67.349	-39.373	
		821.5	3.6900	27.976	-66.900	-38.924	
	10	819.0	3.6730	27.976	-66.728	-38.752	
	15	821.5	3.7234	27.976	-67.442	-39.466	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 85 ~ 92.
2. Conducted Spurious Emissions was Tested QPSK Modulation, Resource Block Size 1 and Resource Block Offset 0
3. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
4. Factor (dB) = Cable Loss + Ext. Attenuator + Power Splitter

Frequency Range (GHz)	Factor [dB]
0.03 – 1	25.270
1 – 5	27.976
5 – 10	28.591
10 – 15	29.116
15 – 20	29.489
Above 20(26.5)	30.131

8.6 CHANNEL EDGE

- Plots of the EUT's Band Edge are shown Page 65 ~ 84.

8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

▣ MODE: LTE 26

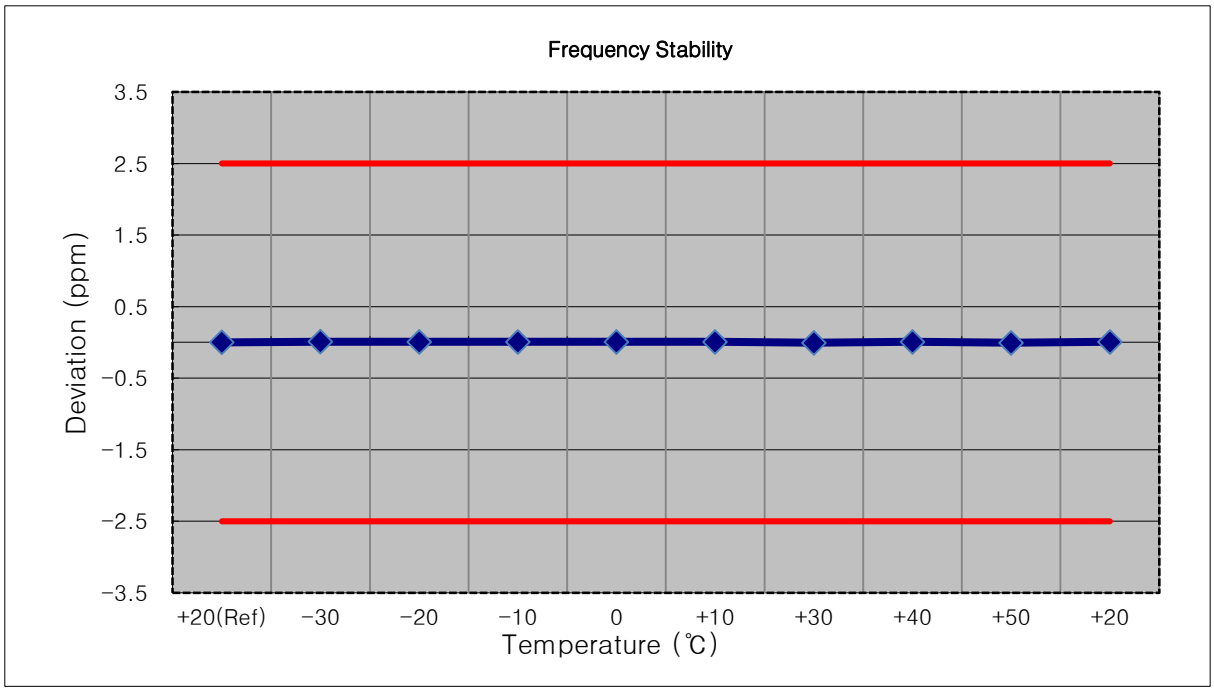
▣ OPERATING FREQUENCY: 814,700,000 Hz

▣ CHANNEL: 26697(1.4 MHz)

▣ REFERENCE VOLTAGE: 3.880 VDC

▣ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.880	+20(Ref)	814 700 005	0.0	0.000 000	0.000
100%		-30	814 700 014	8.3	0.000 001	0.010
100%		-20	814 700 011	6.0	0.000 001	0.007
100%		-10	814 700 012	6.6	0.000 001	0.008
100%		0	814 700 011	6.0	0.000 001	0.007
100%		+10	814 700 011	5.8	0.000 001	0.007
100%		+30	814 700 000	-5.2	-0.000 001	-0.006
100%		+40	814 700 012	6.2	0.000 001	0.008
100%		+50	814 700 000	-5.1	-0.000 001	-0.006
Batt. Endpoint	3.400	+20	814 700 012	6.8	0.000 001	0.008



▣ MODE: LTE 26

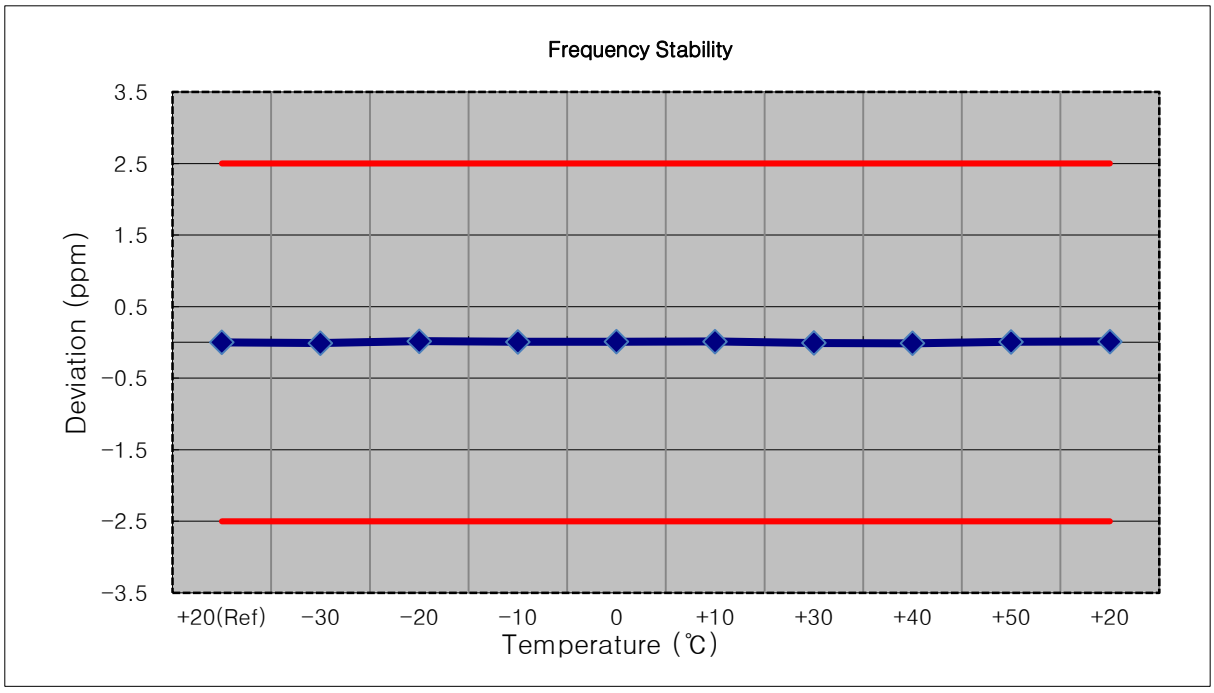
▣ OPERATING FREQUENCY: 815,500,000 Hz

▣ CHANNEL: 26705(3 MHz)

▣ REFERENCE VOLTAGE: 3.880 VDC

▣ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.880	+20(Ref)	815 500 013	0.0	0.000 000	0.000
100%		-30	815 500 004	-8.3	-0.000 001	-0.010
100%		-20	815 500 026	13.4	0.000 002	0.016
100%		-10	815 500 019	6.5	0.000 001	0.008
100%		0	815 500 020	7.5	0.000 001	0.009
100%		+10	815 500 022	9.5	0.000 001	0.012
100%		+30	815 500 006	-6.8	-0.000 001	-0.008
100%		+40	815 500 003	-9.7	-0.000 001	-0.012
100%		+50	815 500 018	5.6	0.000 001	0.007
Batt. Endpoint	3.400	+20	815 500 023	10.0	0.000 001	0.012



▣ MODE: LTE 26

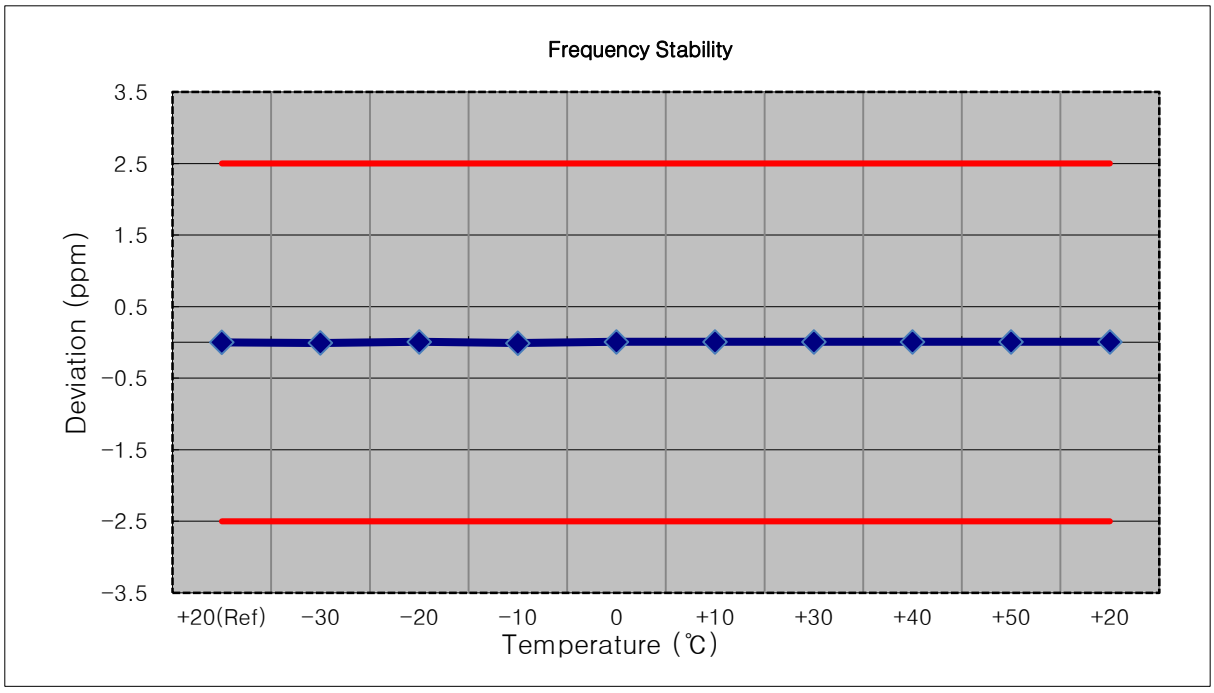
▣ OPERATING FREQUENCY: 816,500,000 Hz

▣ CHANNEL: 26715(5 MHz)

▣ REFERENCE VOLTAGE: 3.880 VDC

▣ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.880	+20(Ref)	816 499 994	0.0	0.000 000	0.000
100%		-30	816 499 989	-5.8	-0.000 001	-0.007
100%		-20	816 500 000	5.6	0.000 001	0.007
100%		-10	816 499 987	-7.5	-0.000 001	-0.009
100%		0	816 500 001	6.5	0.000 001	0.008
100%		+10	816 500 000	5.9	0.000 001	0.007
100%		+30	816 500 001	6.2	0.000 001	0.008
100%		+40	816 500 001	6.6	0.000 001	0.008
100%		+50	816 500 002	7.3	0.000 001	0.009
Batt. Endpoint	3.400	+20	816 500 001	6.6	0.000 001	0.008



▣ MODE: LTE 26

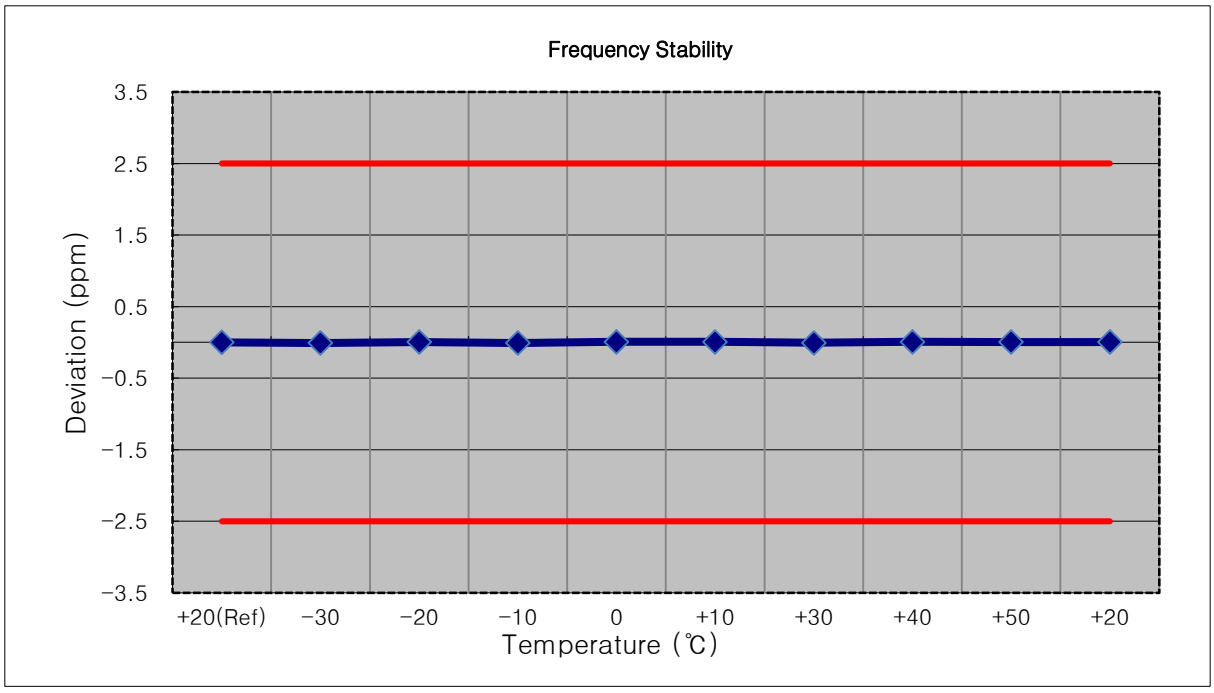
▣ OPERATING FREQUENCY: 819,000,000 Hz

▣ CHANNEL: 26740(10 MHz)

▣ REFERENCE VOLTAGE: 3.880 VDC

▣ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.880	+20(Ref)	819 000 006	0.0	0.000 000	0.000
100%		-30	819 000 001	-5.8	-0.000 001	-0.007
100%		-20	819 000 012	5.2	0.000 001	0.006
100%		-10	818 999 999	-7.1	-0.000 001	-0.009
100%		0	819 000 012	5.5	0.000 001	0.007
100%		+10	819 000 013	6.1	0.000 001	0.007
100%		+30	819 000 002	-4.4	-0.000 001	-0.005
100%		+40	819 000 013	6.3	0.000 001	0.008
100%		+50	819 000 011	4.7	0.000 001	0.006
Batt. Endpoint	3.400	+20	819 000 012	5.2	0.000 001	0.006



▣ MODE: LTE 26

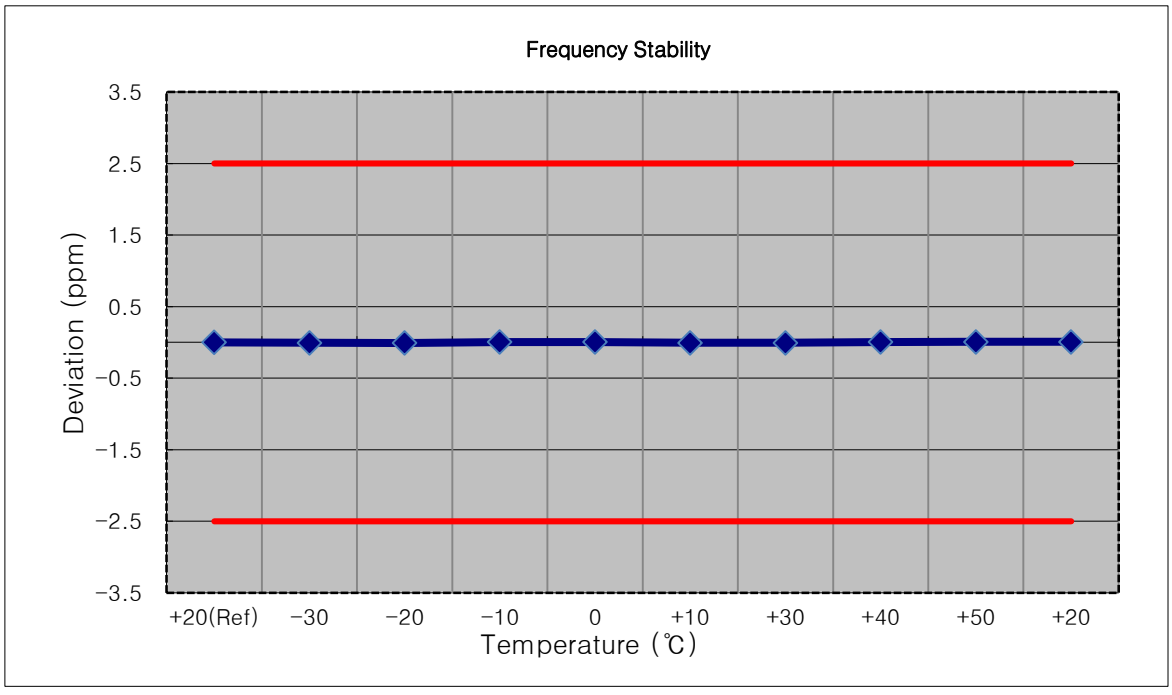
▣ OPERATING FREQUENCY: 821,500,000 Hz

▣ CHANNEL: 26765(15 MHz)

▣ REFERENCE VOLTAGE: 3.880 VDC

▣ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.880	+20(Ref)	821 500 007	0.0	0.000 000	0.000
100%		-30	821 500 002	-4.8	-0.000 001	-0.006
100%		-20	821 500 001	-5.9	-0.000 001	-0.007
100%		-10	821 500 012	5.0	0.000 001	0.006
100%		0	821 500 011	4.4	0.000 001	0.005
100%		+10	821 500 002	-5.4	-0.000 001	-0.007
100%		+30	821 500 003	-4.2	-0.000 001	-0.005
100%		+40	821 500 012	5.2	0.000 001	0.006
100%		+50	821 500 013	6.5	0.000 001	0.008
Batt. Endpoint	3.400	+20	821 500 014	6.9	0.000 001	0.008



8.8 STADDLE CHANNEL

8.8.1 CONDUCTED OUTPUT POWER

Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm)		Limit (W)
				824 MHz		
				dBm	W	
1.4	QPSK	1	0	23.87	0.244	100
		1	3	23.94	0.248	100
		1	5	23.91	0.246	100
		3	0	23.88	0.244	100
		3	1	23.94	0.248	100
		3	3	23.93	0.247	100
		6	0	22.44	0.175	100
	16QAM	1	0	22.17	0.165	100
		1	3	22.00	0.158	100
		1	5	22.14	0.164	100
		3	0	21.99	0.158	100
		3	1	22.17	0.165	100
		3	3	22.11	0.163	100
		6	0	21.05	0.127	100
	64QAM	1	0	21.10	0.129	100
		1	3	20.99	0.126	100
		1	5	21.15	0.130	100
		3	0	21.04	0.127	100
		3	1	21.12	0.129	100
		3	3	21.05	0.127	100
		6	0	20.08	0.102	100
	256QAM	1	0	20.19	0.104	100
		1	3	20.10	0.102	100
		1	5	20.12	0.103	100
		3	0	20.05	0.101	100
		3	1	20.11	0.103	100
		3	3	20.14	0.103	100
		6	0	19.41	0.087	100

Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm)		Limit (W)
				824 MHz		
				dBm	W	
3	QPSK	1	0	23.88	0.244	100
		1	7	23.87	0.244	100
		1	14	23.99	0.251	100
		8	0	22.54	0.179	100
		8	3	22.51	0.178	100
		8	7	22.55	0.180	100
		15	0	22.54	0.179	100
	16QAM	1	0	22.27	0.169	100
		1	7	22.07	0.161	100
		1	14	22.10	0.162	100
		8	0	21.08	0.128	100
		8	3	21.06	0.128	100
		8	7	21.00	0.126	100
		15	0	21.13	0.130	100
	64QAM	1	0	21.15	0.130	100
		1	7	21.10	0.129	100
		1	14	21.24	0.133	100
		8	0	20.00	0.100	100
		8	3	20.04	0.101	100
		8	7	20.09	0.102	100
		15	0	20.08	0.102	100
	256QAM	1	0	20.17	0.104	100
		1	7	20.10	0.102	100
		1	14	20.05	0.101	100
		8	0	19.01	0.080	100
		8	3	19.04	0.080	100
		8	7	19.06	0.081	100
		15	0	19.00	0.079	100

Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm)		Limit (W)
				824 MHz		
				dBm	W	
5	QPSK	1	0	24.01	0.252	100
		1	12	24.00	0.251	100
		1	24	23.99	0.251	100
		12	0	22.53	0.179	100
		12	6	22.58	0.181	100
		12	11	22.57	0.181	100
		25	0	22.53	0.179	100
	16QAM	1	0	22.26	0.168	100
		1	12	22.25	0.168	100
		1	24	22.31	0.170	100
		12	0	21.08	0.128	100
		12	6	21.04	0.127	100
		12	11	21.10	0.129	100
		25	0	21.09	0.129	100
	64QAM	1	0	21.14	0.130	100
		1	12	21.15	0.130	100
		1	24	21.24	0.133	100
		12	0	20.08	0.102	100
		12	6	20.04	0.101	100
		12	11	20.05	0.101	100
		25	0	20.03	0.101	100
	256QAM	1	0	20.04	0.101	100
		1	12	20.11	0.103	100
		1	24	20.12	0.103	100
		12	0	19.04	0.080	100
		12	6	19.02	0.080	100
		12	11	19.02	0.080	100
		25	0	19.05	0.080	100

Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm)		Limit (W)
				824 MHz		
				dBm	W	
10	QPSK	1	0	24.03	0.253	100
		1	24	24.01	0.252	100
		1	49	23.99	0.251	100
		25	0	22.55	0.180	100
		25	12	22.61	0.182	100
		25	24	22.58	0.181	100
		50	0	22.54	0.179	100
	16QAM	1	0	22.31	0.170	100
		1	24	22.29	0.169	100
		1	49	22.30	0.170	100
		25	0	21.05	0.127	100
		25	12	21.06	0.128	100
		25	24	21.15	0.130	100
		50	0	21.04	0.127	100
	64QAM	1	0	21.11	0.129	100
		1	24	21.13	0.130	100
		1	49	21.20	0.132	100
		25	0	20.06	0.101	100
		25	12	20.07	0.102	100
		25	24	20.05	0.101	100
		50	0	20.07	0.102	100
	256QAM	1	0	20.01	0.100	100
		1	24	20.11	0.103	100
		1	49	20.15	0.104	100
		25	0	19.14	0.082	100
		25	12	19.09	0.081	100
		25	24	19.11	0.081	100
		50	0	19.14	0.082	100

8.8.2 EFFECTIVE RADIATED POWER

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP	
								W	W	dBm
824.0	LTE B26/ 1.4 MHz	QPSK	-30.85	30.19	-10.09	1.40	H	< 7.00	0.074	18.70
		16QAM	-32.71	28.33	-10.09	1.40	H		0.048	16.84
		64QAM	-33.77	27.27	-10.09	1.40	H		0.038	15.78
		256QAM	-34.85	26.19	-10.09	1.40	H		0.030	14.70

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP	
								W	W	dBm
824.0	LTE B26/ 3 MHz	QPSK	-30.90	30.14	-10.09	1.40	H	< 7.00	0.073	18.65
		16QAM	-32.75	28.29	-10.09	1.40	H		0.048	16.80
		64QAM	-33.77	27.27	-10.09	1.40	H		0.038	15.78
		256QAM	-34.87	26.17	-10.09	1.40	H		0.029	14.68

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP	
								W	W	dBm
824.0	LTE B26/ 5 MHz	QPSK	-30.85	30.19	-10.09	1.40	H	< 7.00	0.074	18.70
		16QAM	-32.73	28.31	-10.09	1.40	H		0.048	16.82
		64QAM	-33.82	27.22	-10.09	1.40	H		0.037	15.73
		256QAM	-34.83	26.21	-10.09	1.40	H		0.030	14.72

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP	
								W	W	dBm
824.0	LTE B26/ 10 MHz	QPSK	-30.61	30.43	-10.09	1.40	H	< 7.00	0.078	18.94
		16QAM	-32.42	28.62	-10.09	1.40	H		0.052	17.13
		64QAM	-33.50	27.54	-10.09	1.40	H		0.040	16.05
		256QAM	-34.50	26.54	-10.09	1.40	H		0.032	15.05

8.8.3 RADIATED SPURIOUS EMISSIONS

▣ MODE: LTE B26

▣ MODULATION SIGNAL: 10 MHz QPSK

▣ DISTANCE: 3 meters

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit
26790 (824.0)	1 648.00	-58.65	9.40	-67.96	2.03	H	-60.59	-13.00
	2 472.00	-59.14	10.08	-63.90	2.56	H	-56.38	-13.00
	3 296.00	-60.33	11.00	-62.86	2.93	H	-54.78	-13.00

8.8.4 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
26	1.4	824.0	3.6830	27.976	-66.958	-38.982	-13.00
	3		3.6875	27.976	-67.210	-39.234	
	5		3.6755	27.976	-66.998	-39.022	
	10		3.7104	27.976	-67.225	-39.249	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 94 ~ 97.
2. Conducted Spurious Emissions was Tested QPSK Modulation, Resource Block Size 1 and Resource Block Offset 0
3. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
4. Factor (dB) = Cable Loss + Attenuator + Power Splitter

Frequency Range (GHz)	Factor [dB]
0.03 – 1	25.270
1 – 5	27.976
5 – 10	28.591
10 – 15	29.116
15 – 20	29.489
Above 20(26.5)	30.131

8.8.5 CHANNEL EDGE(Part90)

- Test Channel : 26790(824.0MHz)

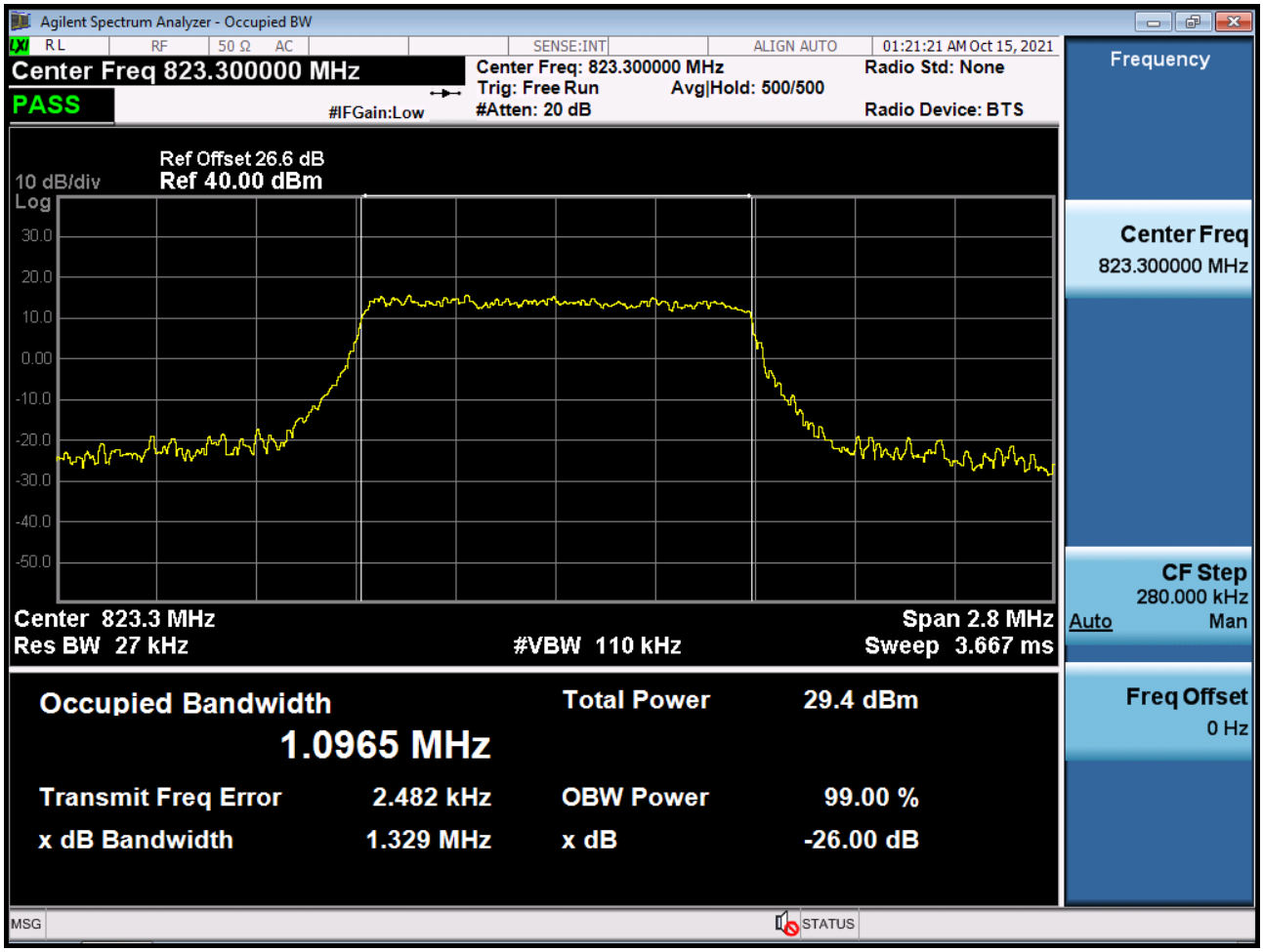
Plots of the EUT's Band Edge are shown Page 98 ~ 109.

8.8.6 BAND EDGE(Part22)

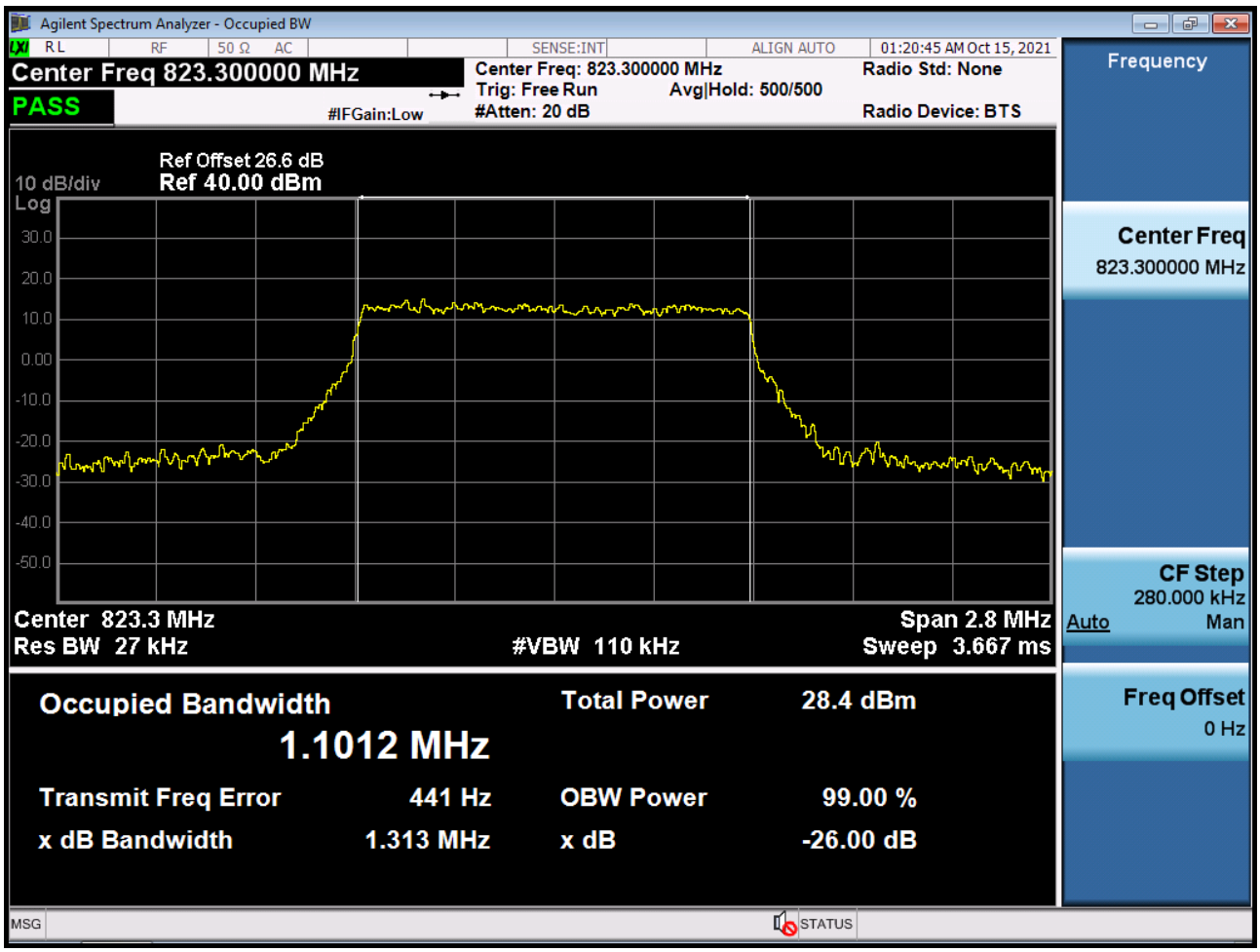
- Test Channel : 26790(824.0 MHz)
- Plots of the EUT's Band Edge are shown Page 110 ~ 117.

9. TEST PLOTS

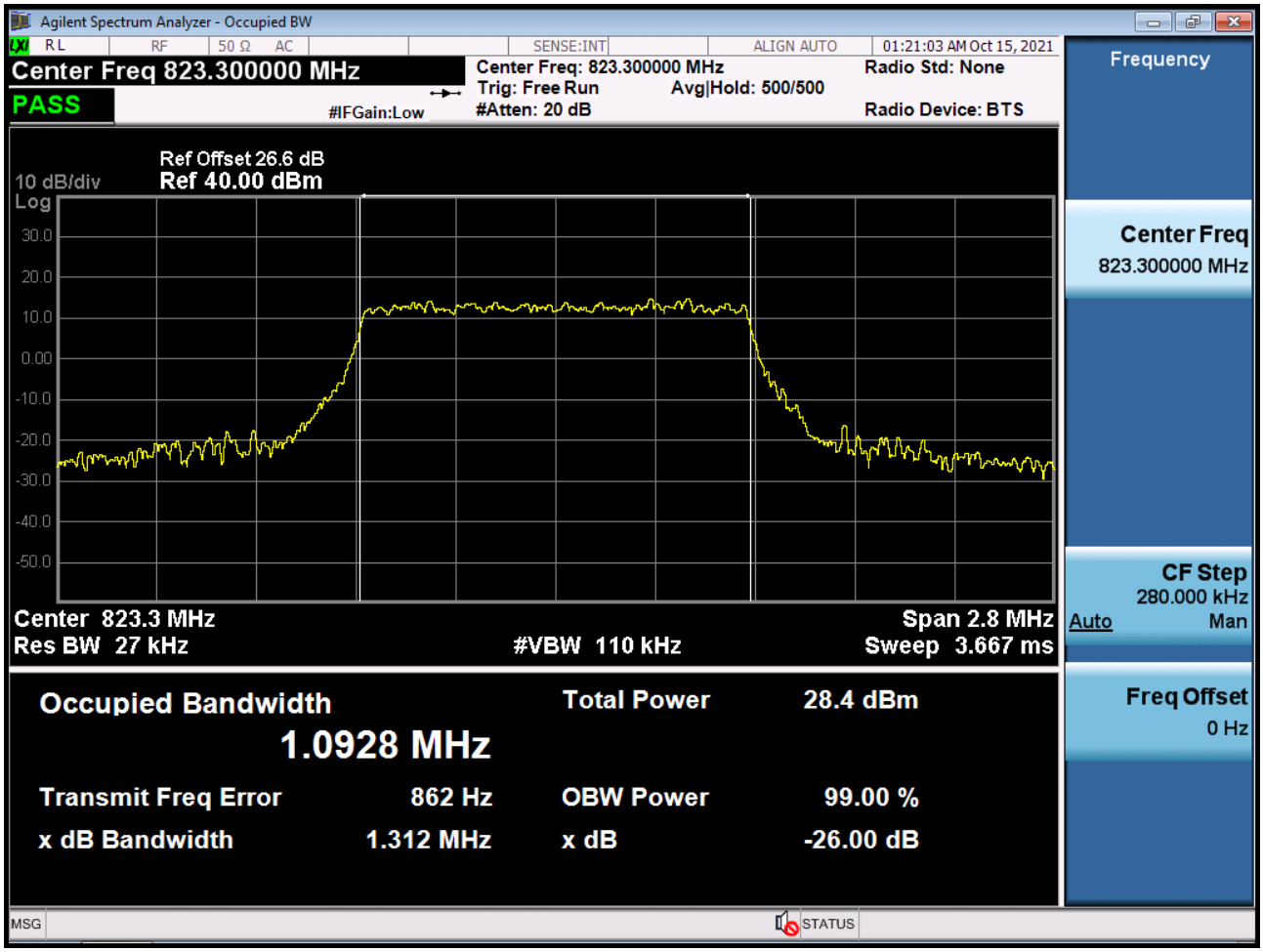
BAND 26. Occupied Bandwidth Plot (1.4 M BW Ch.26783 QPSK RB 6_0)



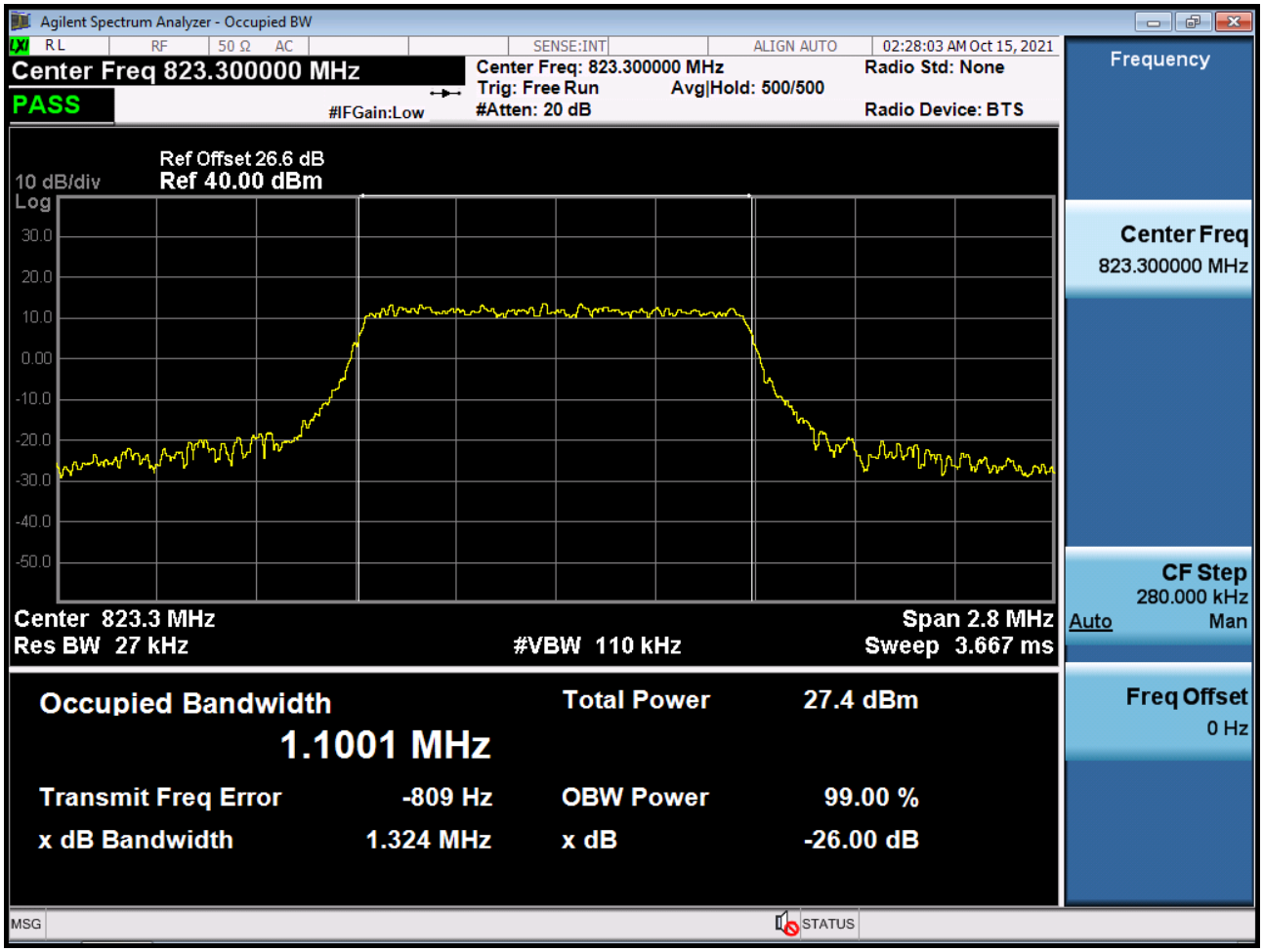
BAND 26. Occupied Bandwidth Plot (1.4 M BW Ch.26783 16QAM RB 6_0)



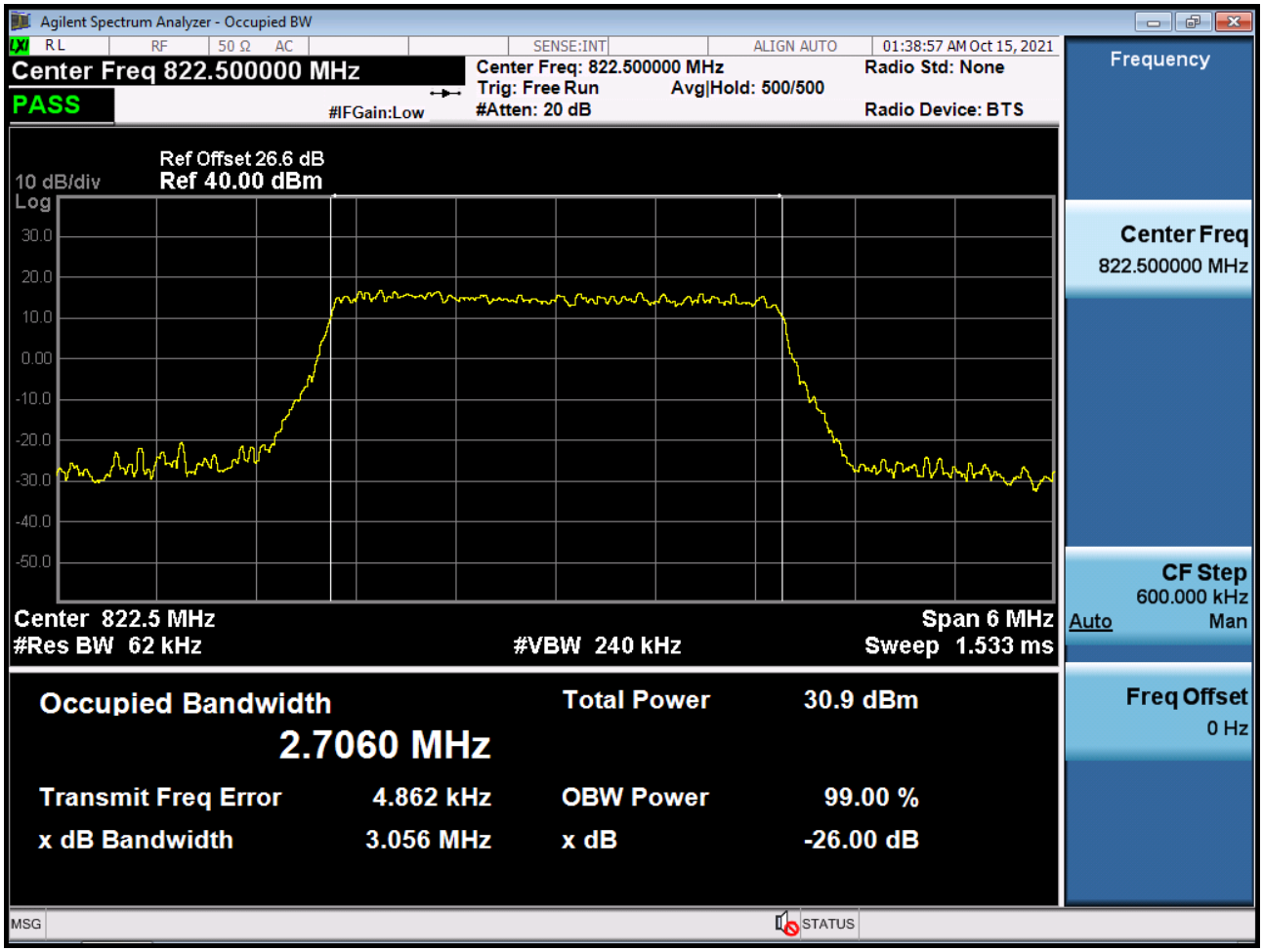
BAND 26. Occupied Bandwidth Plot (1.4 M BW Ch.26783 64QAM RB 6_0)



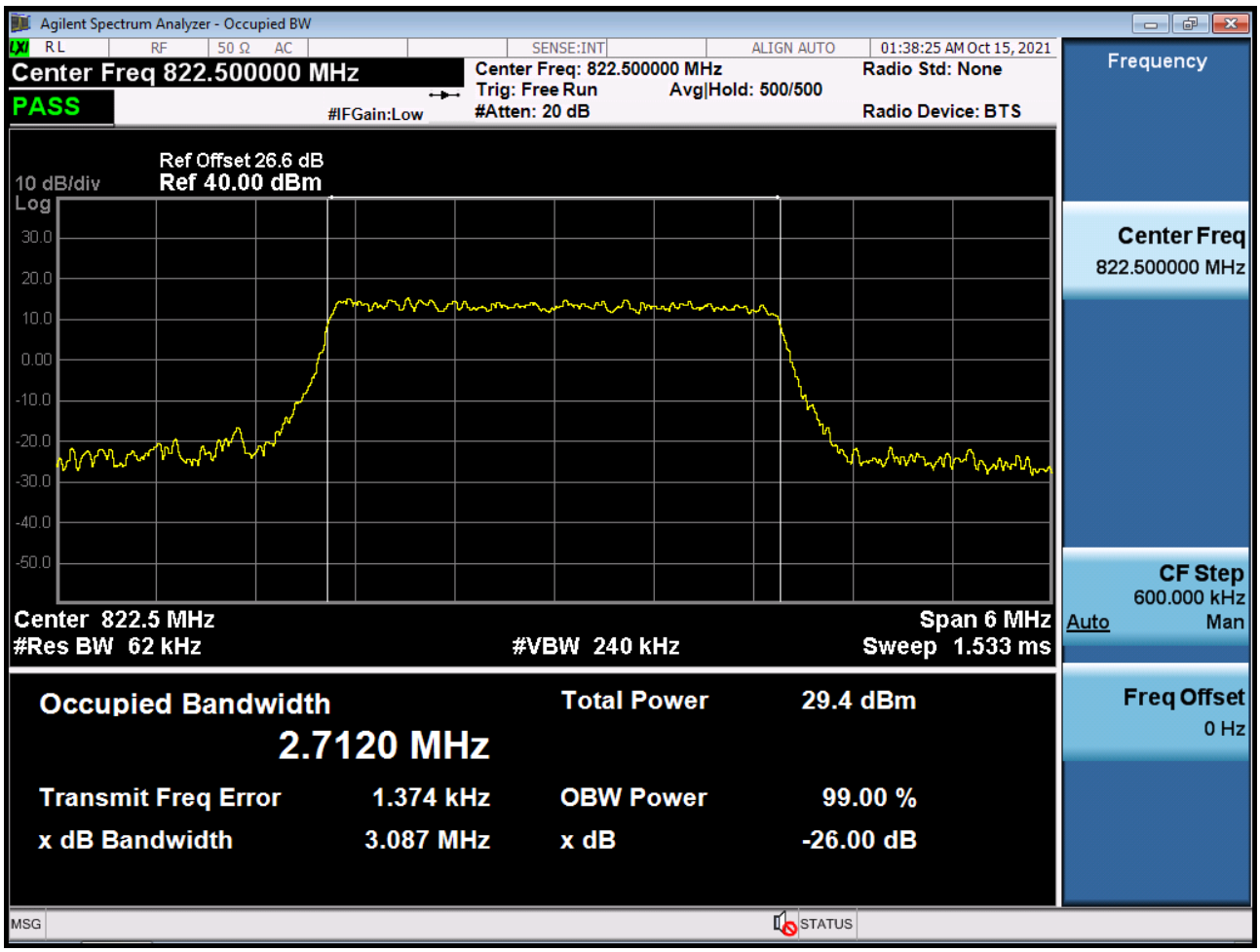
BAND 26. Occupied Bandwidth Plot (1.4 M BW Ch.26783 256QAM RB 6_0)



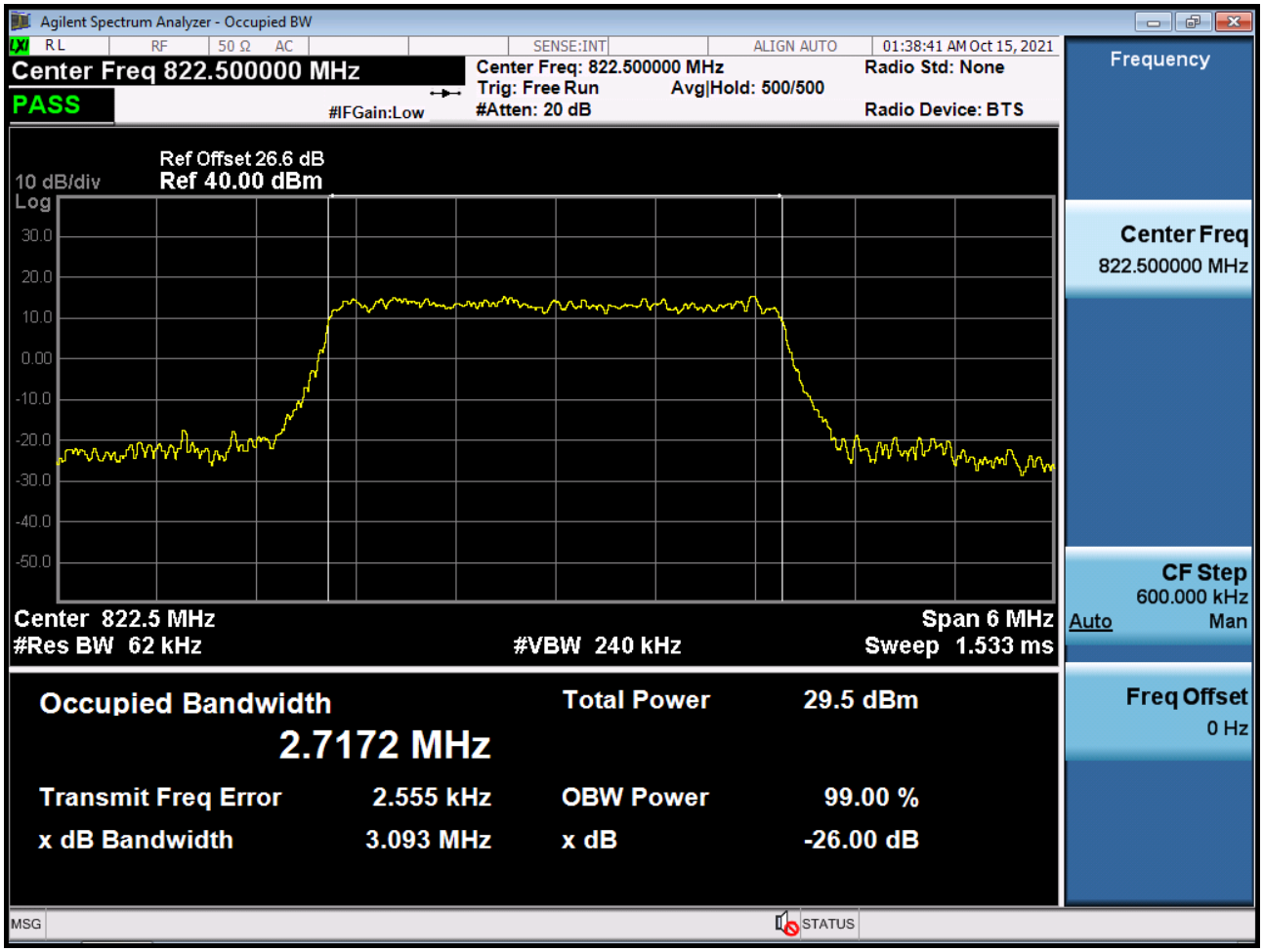
BAND 26. Occupied Bandwidth Plot (3 M BW Ch.26775 QPSK RB 15_0)



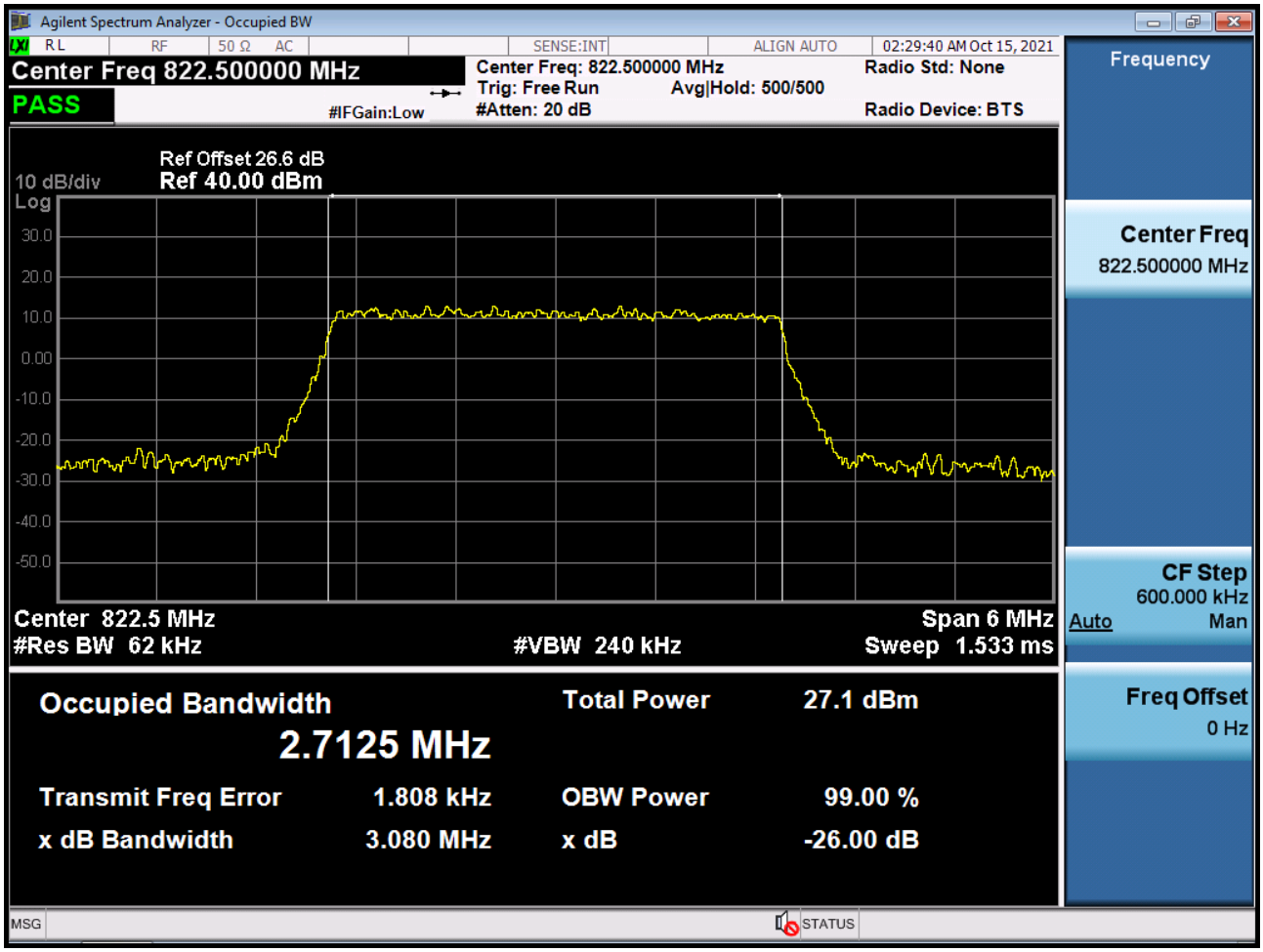
BAND 26. Occupied Bandwidth Plot (3 M BW Ch.26775 16QAM RB 15_0)



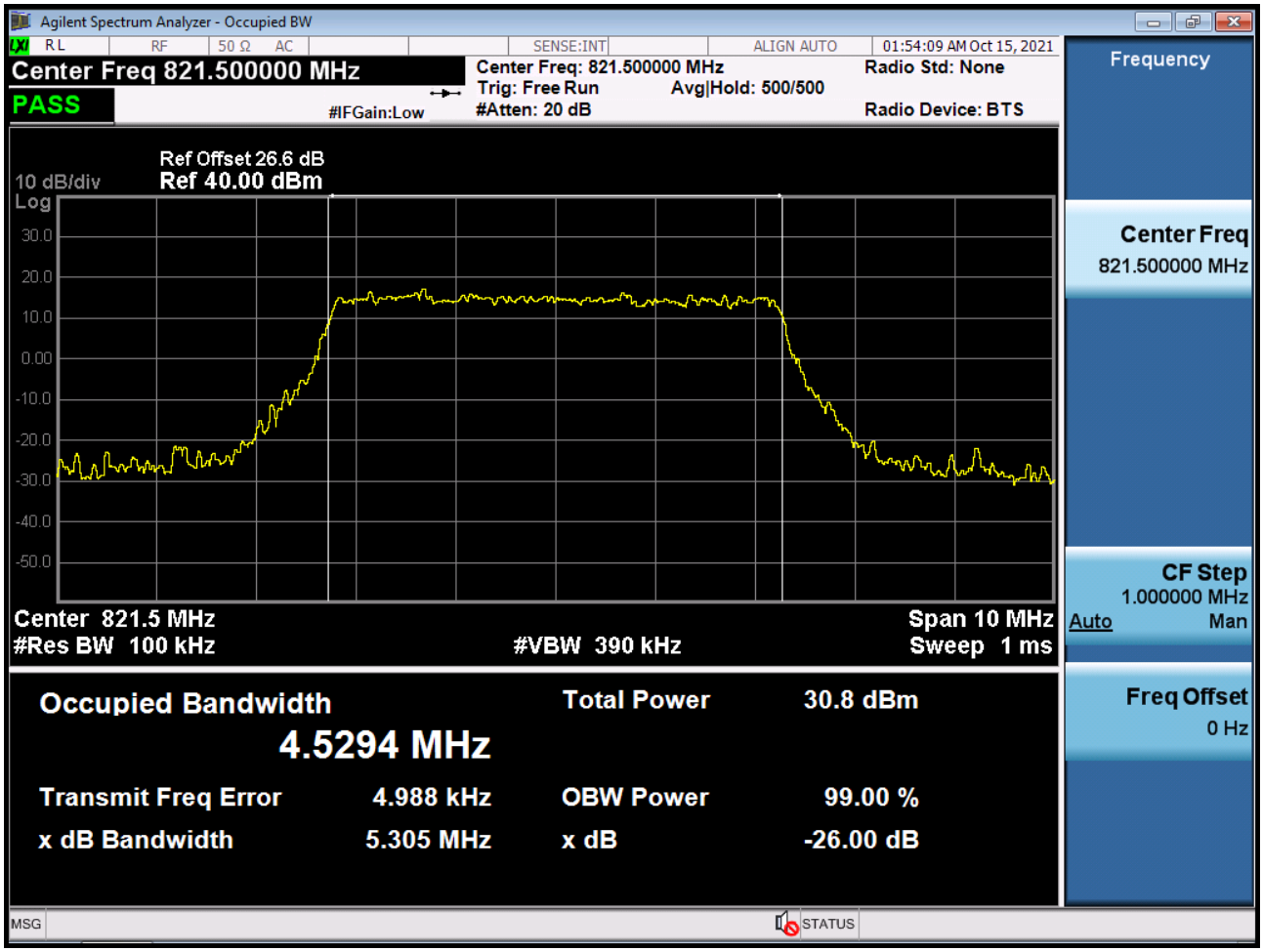
BAND 26. Occupied Bandwidth Plot (3 M BW Ch.26775 64QAM RB 15_0)



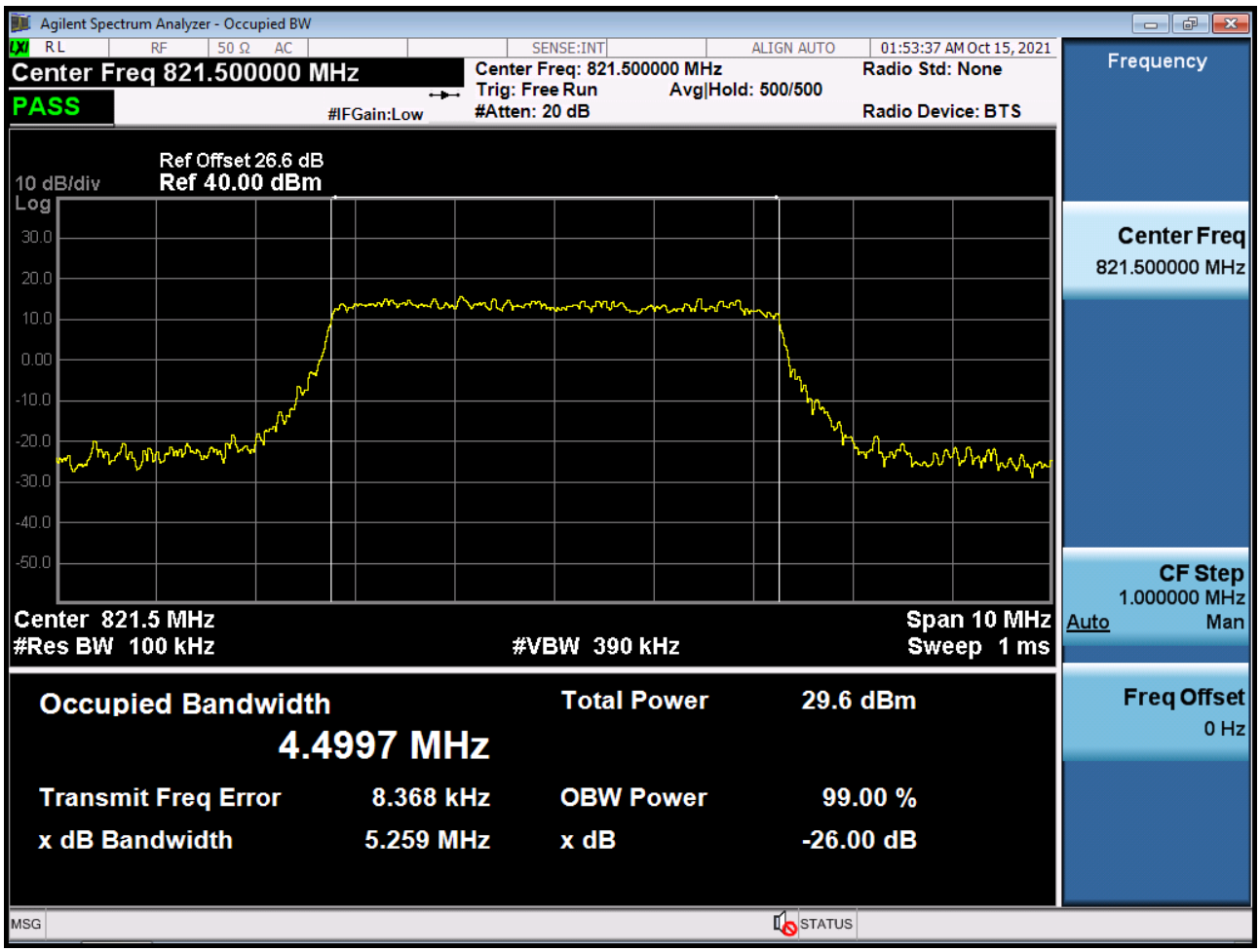
BAND 26. Occupied Bandwidth Plot (3 M BW Ch.26775 256QAM RB 15_0)



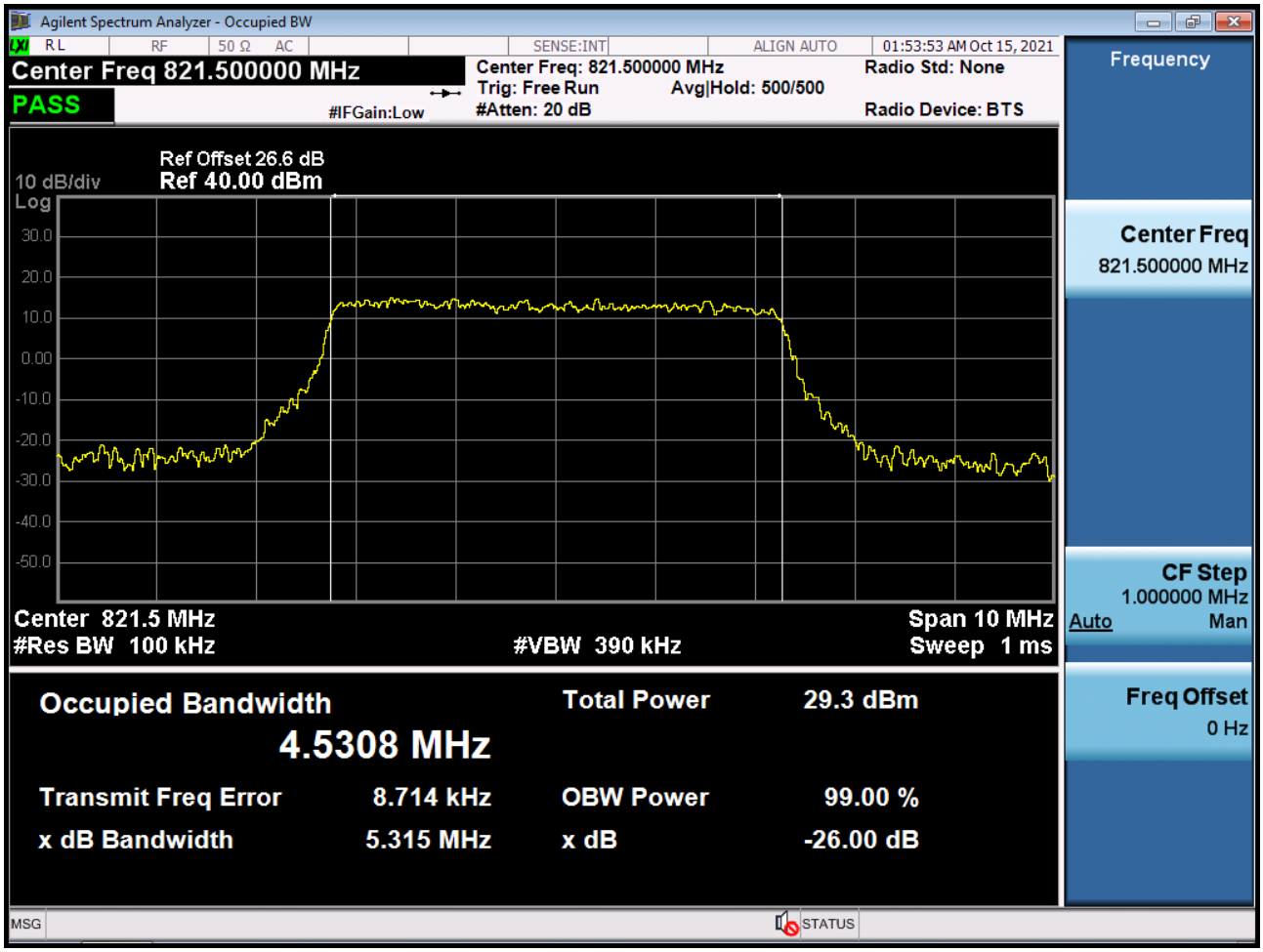
BAND 26. Occupied Bandwidth Plot (5 M BW Ch.26765 QPSK RB 25_0)



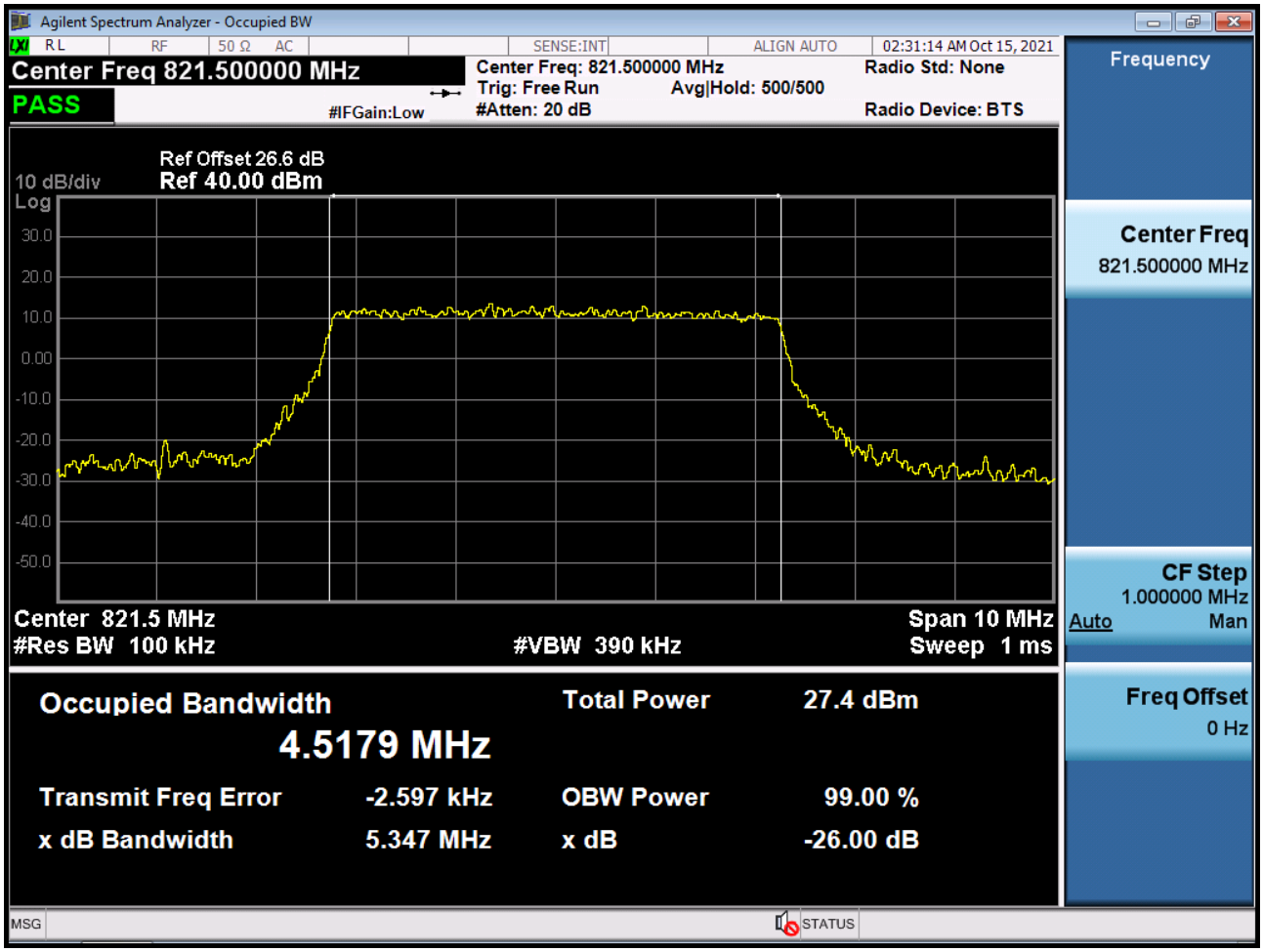
BAND 26. Occupied Bandwidth Plot (5 M BW Ch.26765 16QAM RB 25_0)



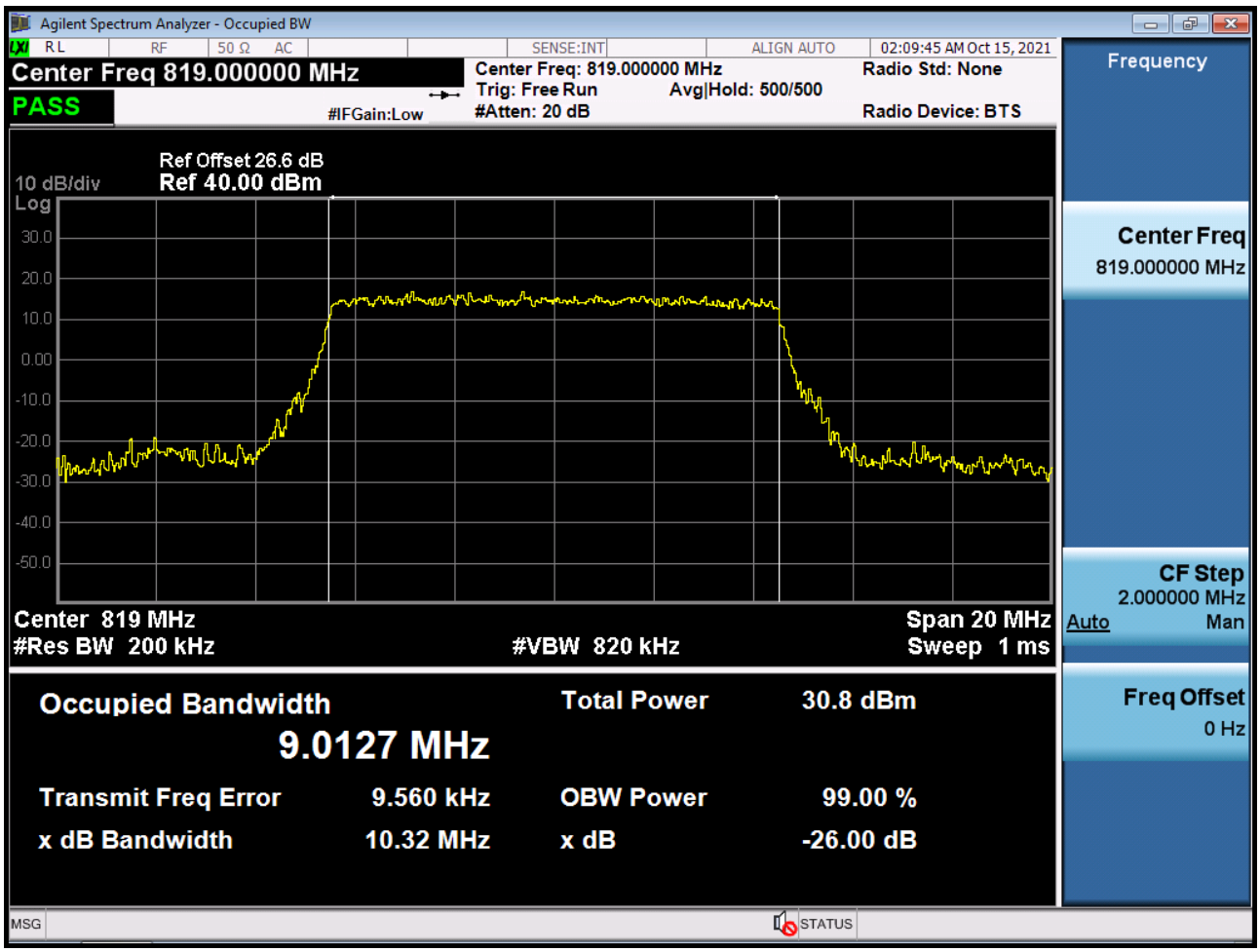
BAND 26. Occupied Bandwidth Plot (5 M BW Ch.26765 64QAM RB 25_0)



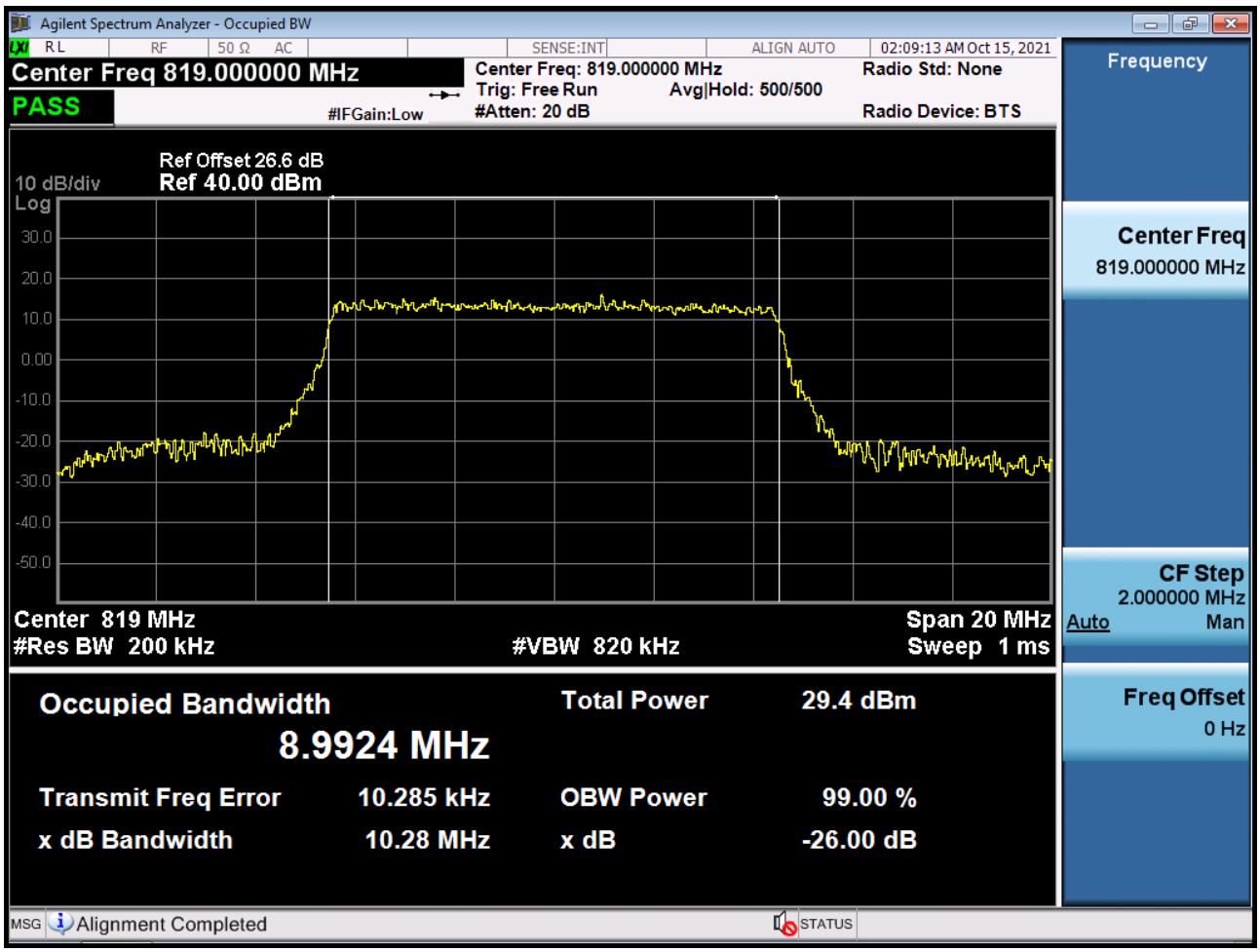
BAND 26. Occupied Bandwidth Plot (5 M BW Ch.26765 256QAM RB 25_0)



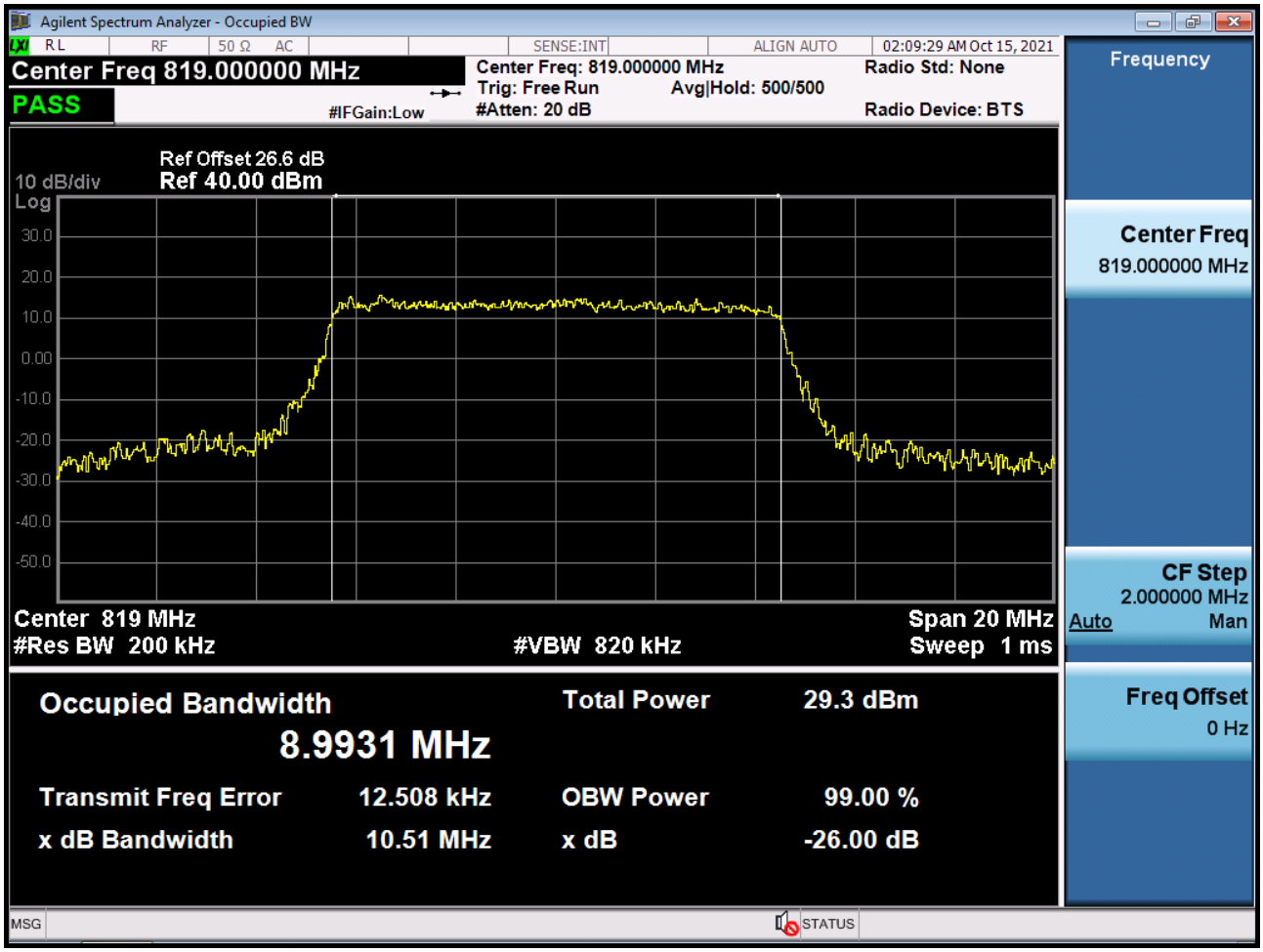
BAND 26. Occupied Bandwidth Plot (10 M BW Ch.26740 QPSK RB 50_0)



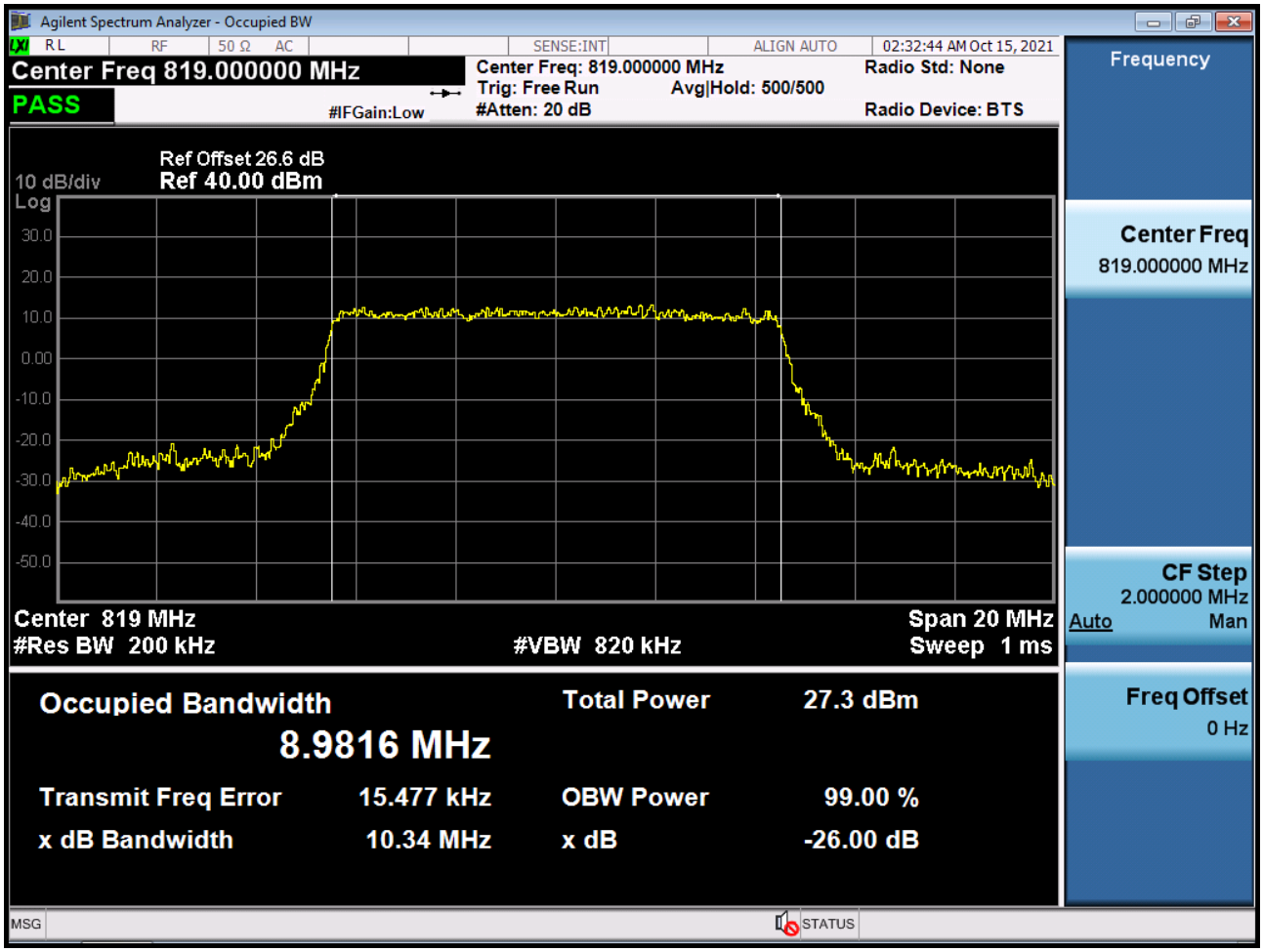
BAND 26. Occupied Bandwidth Plot (10 M BW Ch.26740 16QAM RB 50_0)



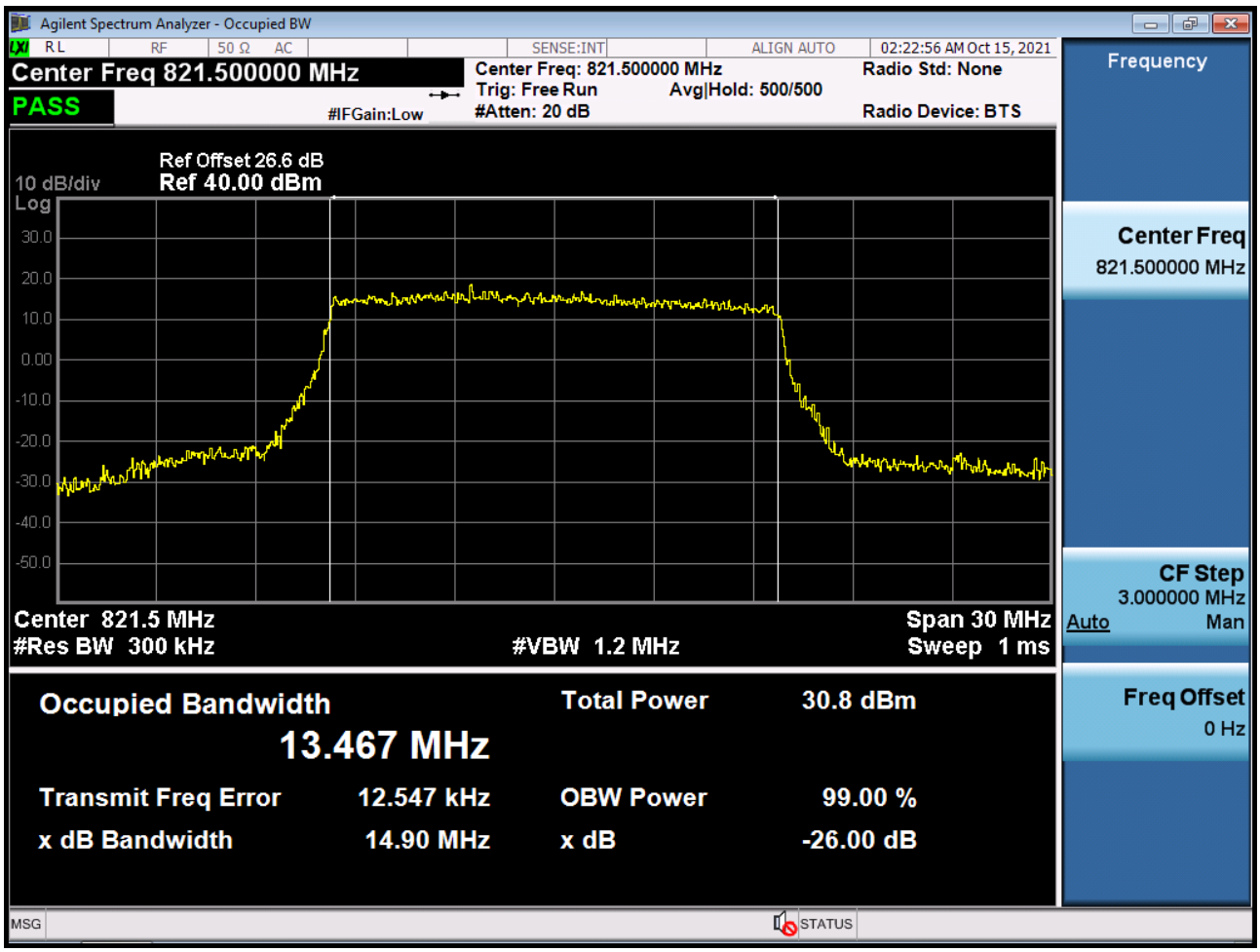
BAND 26. Occupied Bandwidth Plot (10 M BW Ch.26740 64QAM RB 50_0)



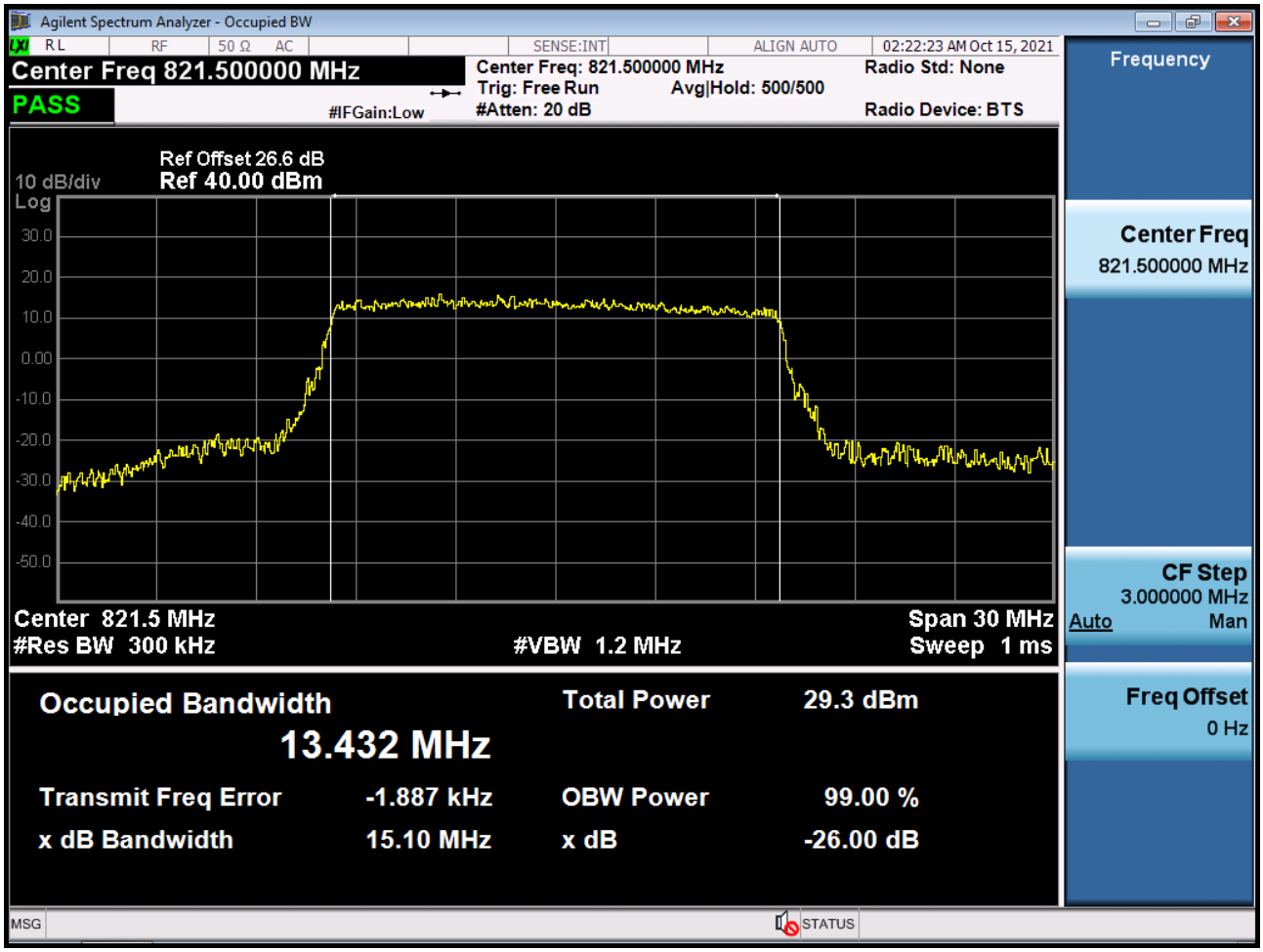
BAND 26. Occupied Bandwidth Plot (10 M BW Ch.26740 256QAM RB 50_0)



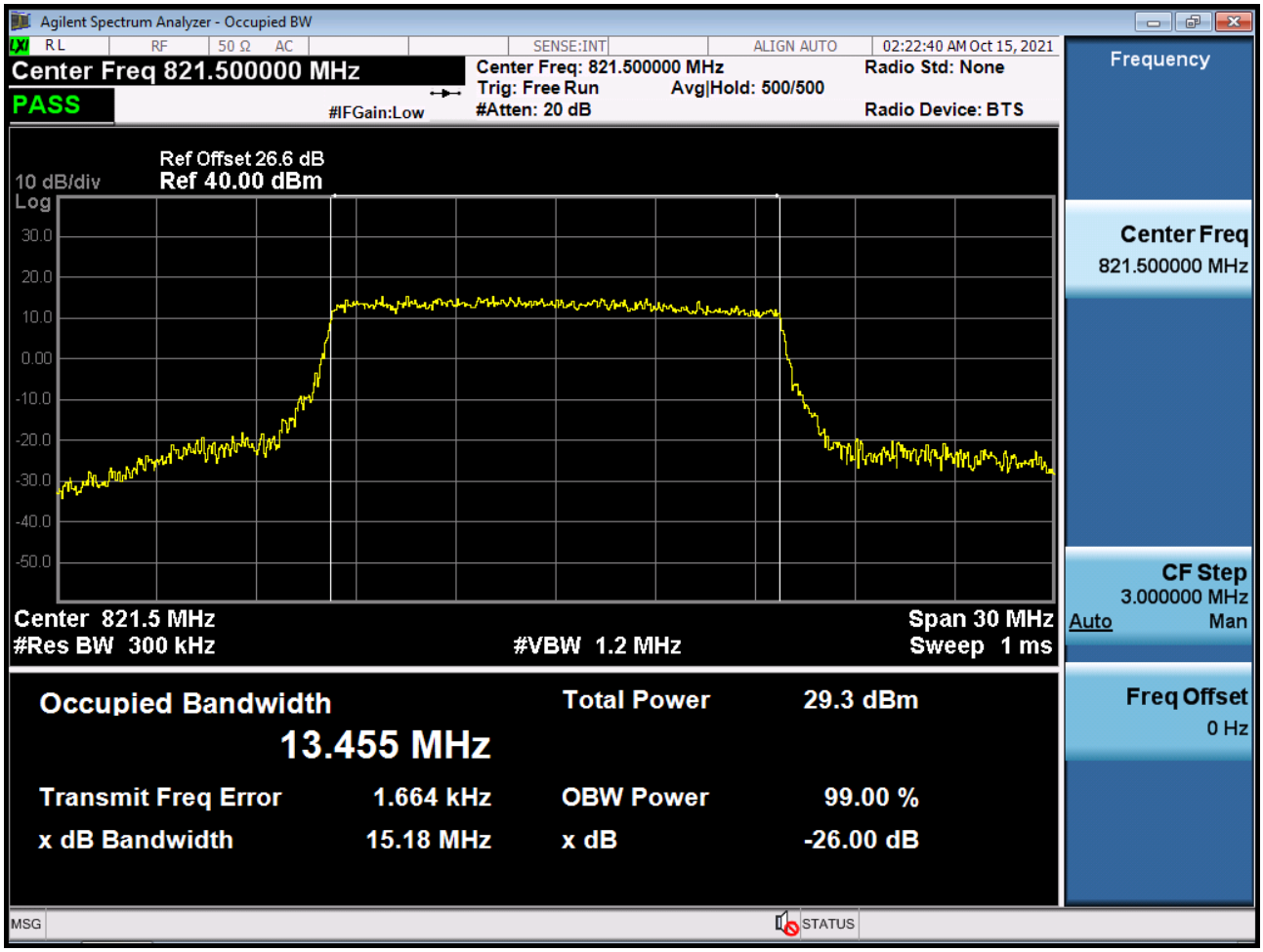
BAND 26. Occupied Bandwidth Plot (15 M BW Ch.26765 QPSK RB 75_0)



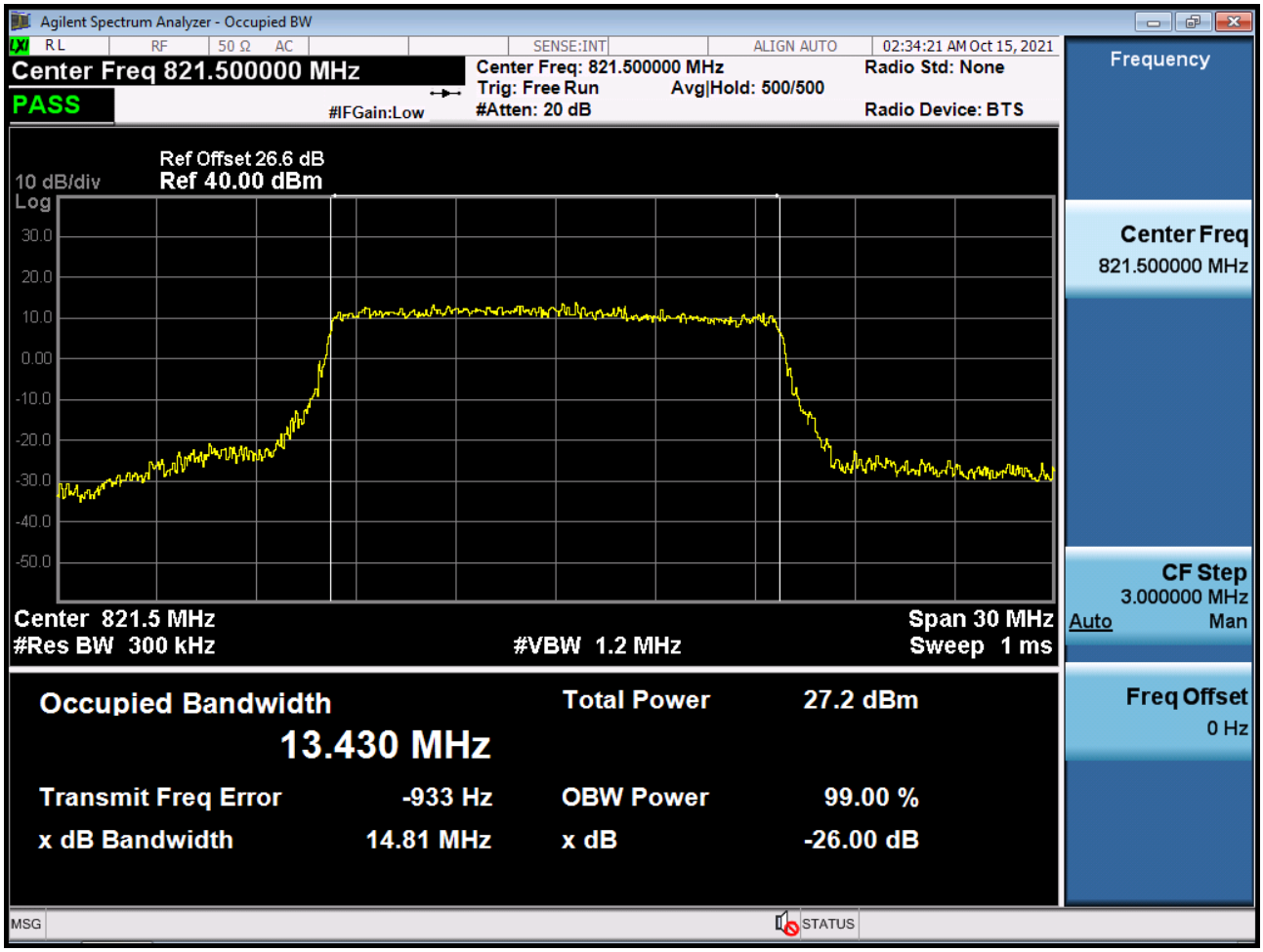
BAND 26. Occupied Bandwidth Plot (15 M BW Ch.26765 16QAM RB 75_0)



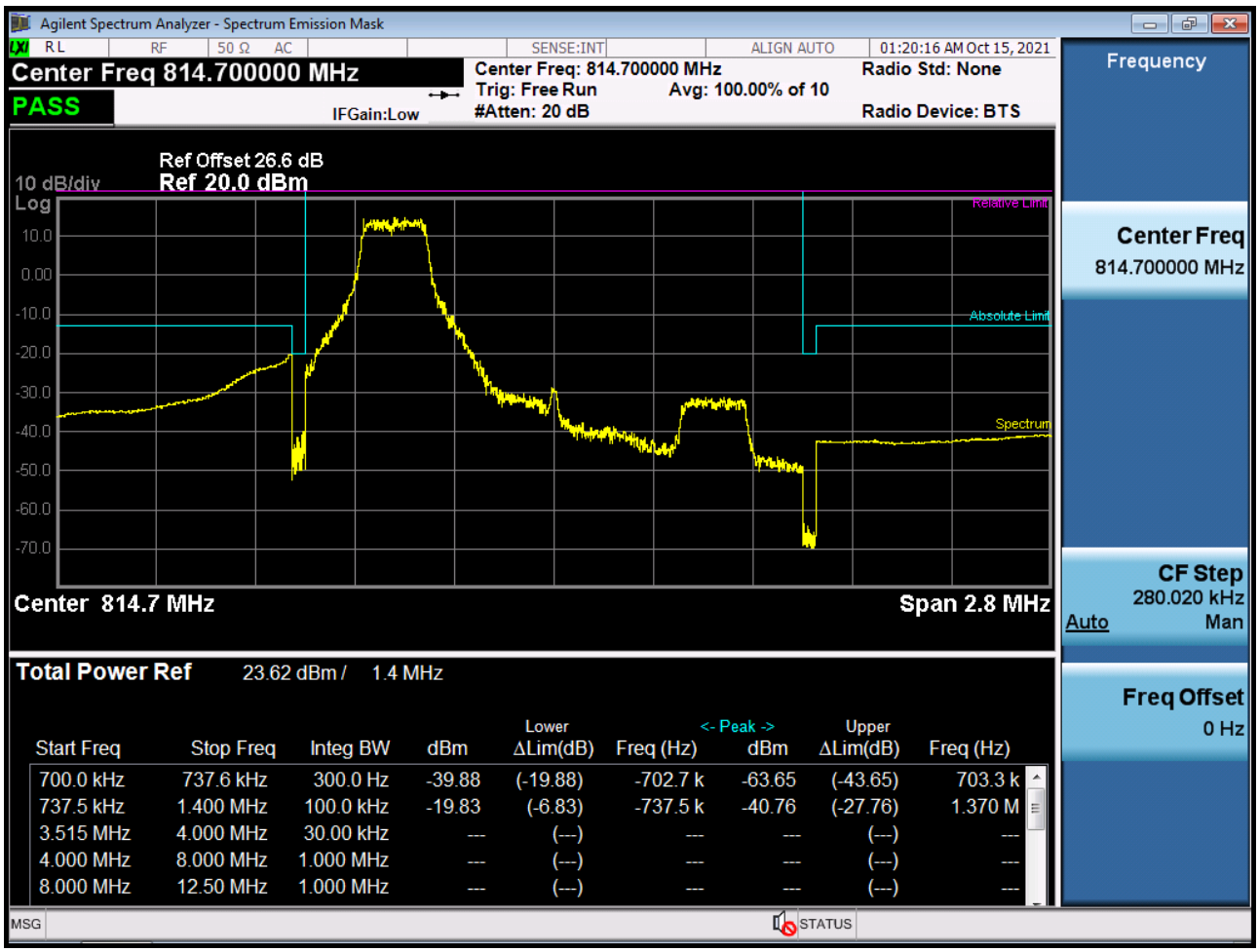
BAND 26. Occupied Bandwidth Plot (15 M BW Ch.26765 64QAM RB 75_0)



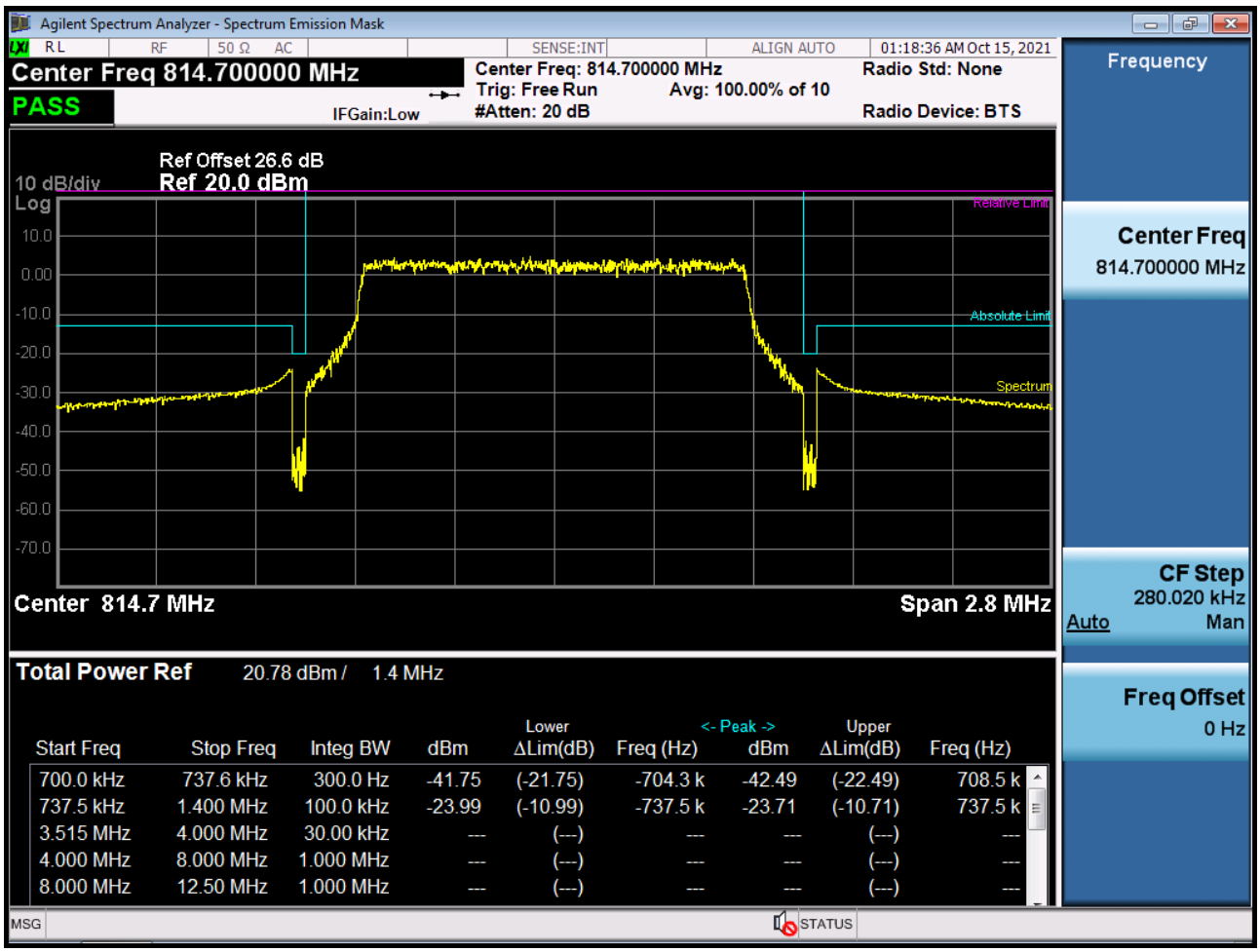
BAND 26. Occupied Bandwidth Plot (15 M BW Ch.26765 256QAM RB 75_0)



BAND 26. Lower Channel Edge Plot (1.4 M BW Ch.26697 QPSK RB 1, Offset 0)

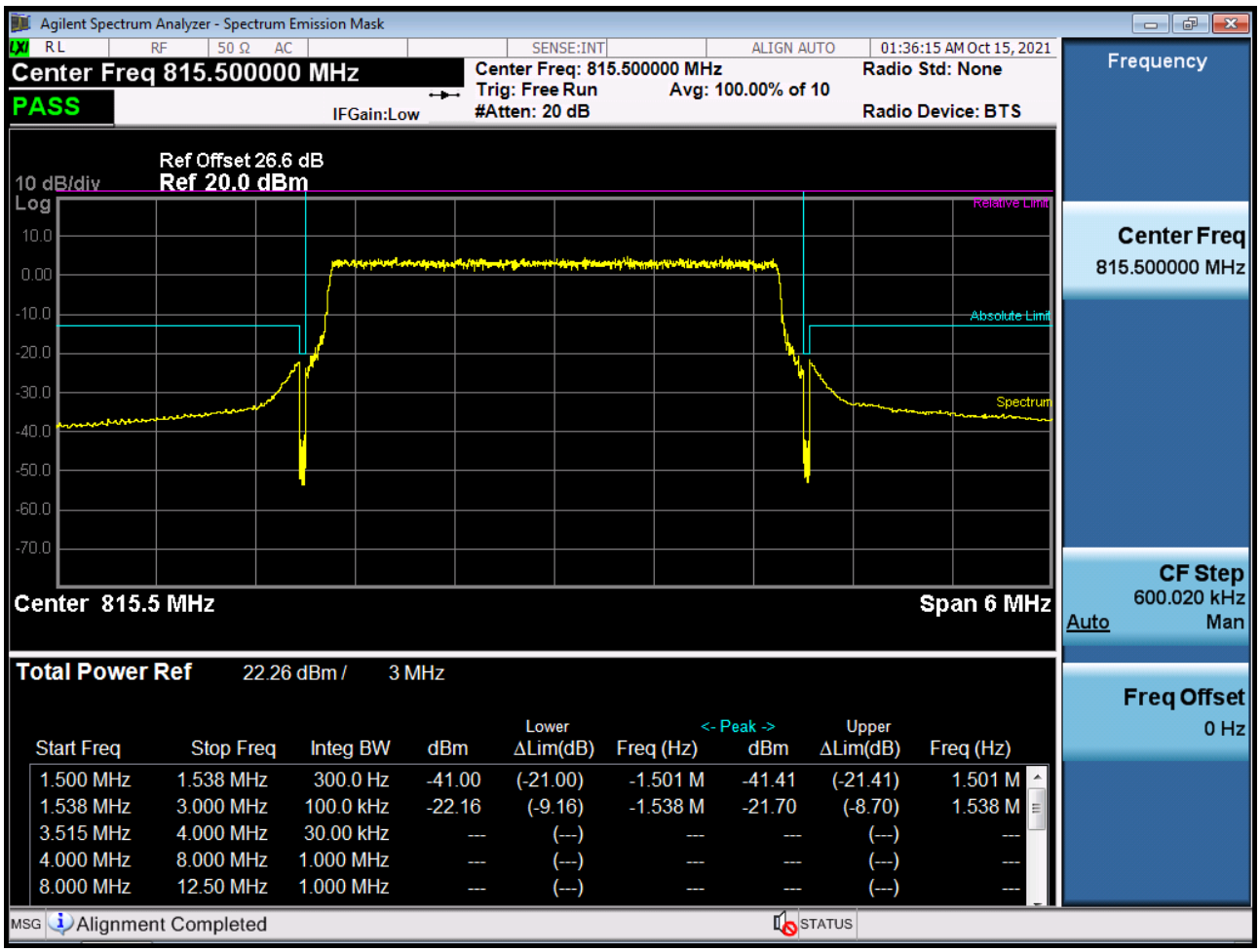


BAND 26. Lower Channel Edge Plot (1.4 M BW Ch.26697 QPSK_RB6_Offset 0)

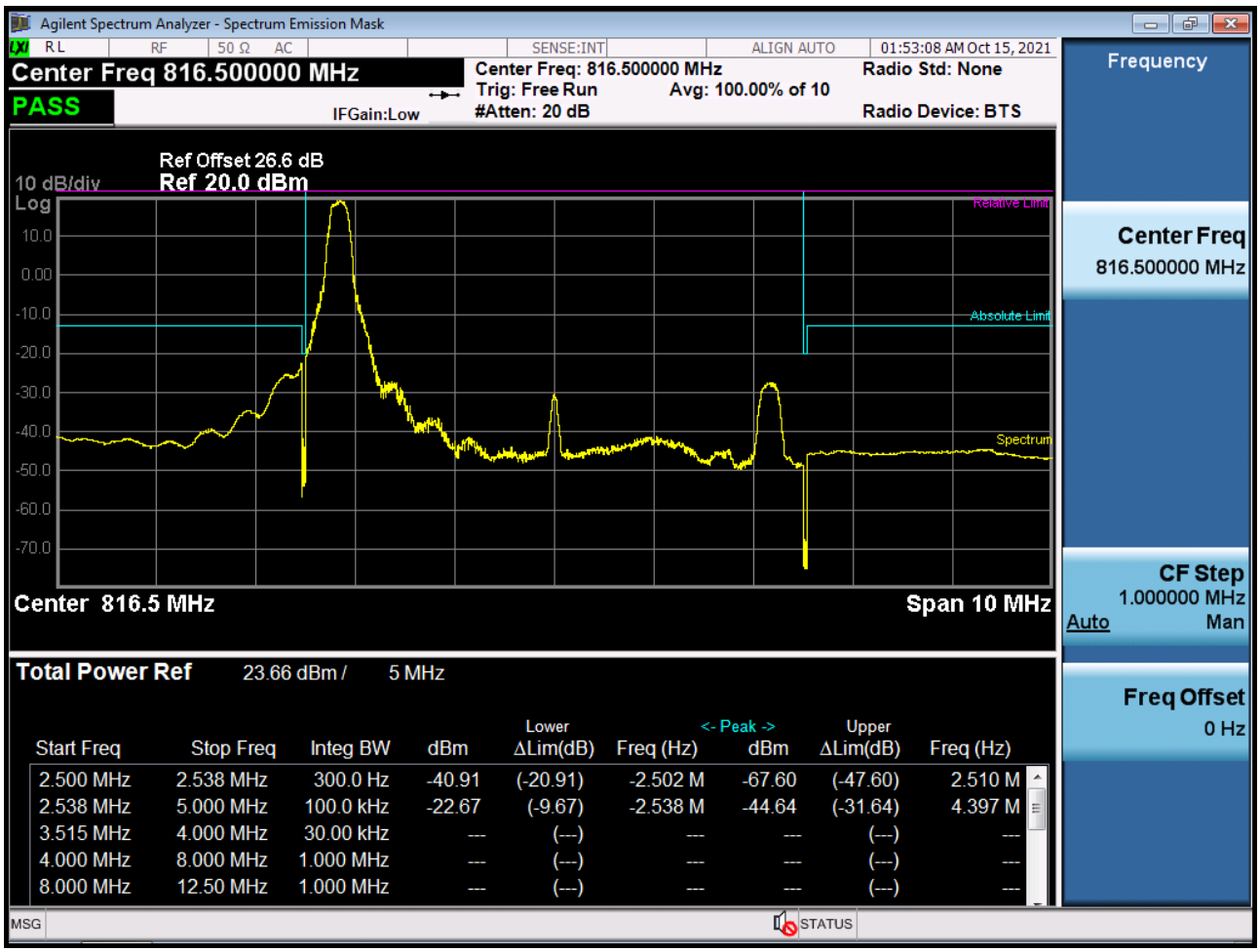


BAND 26. Lower Channel Edge Plot (3 M BW Ch.26705 QPSK RB 1, Offset 0)

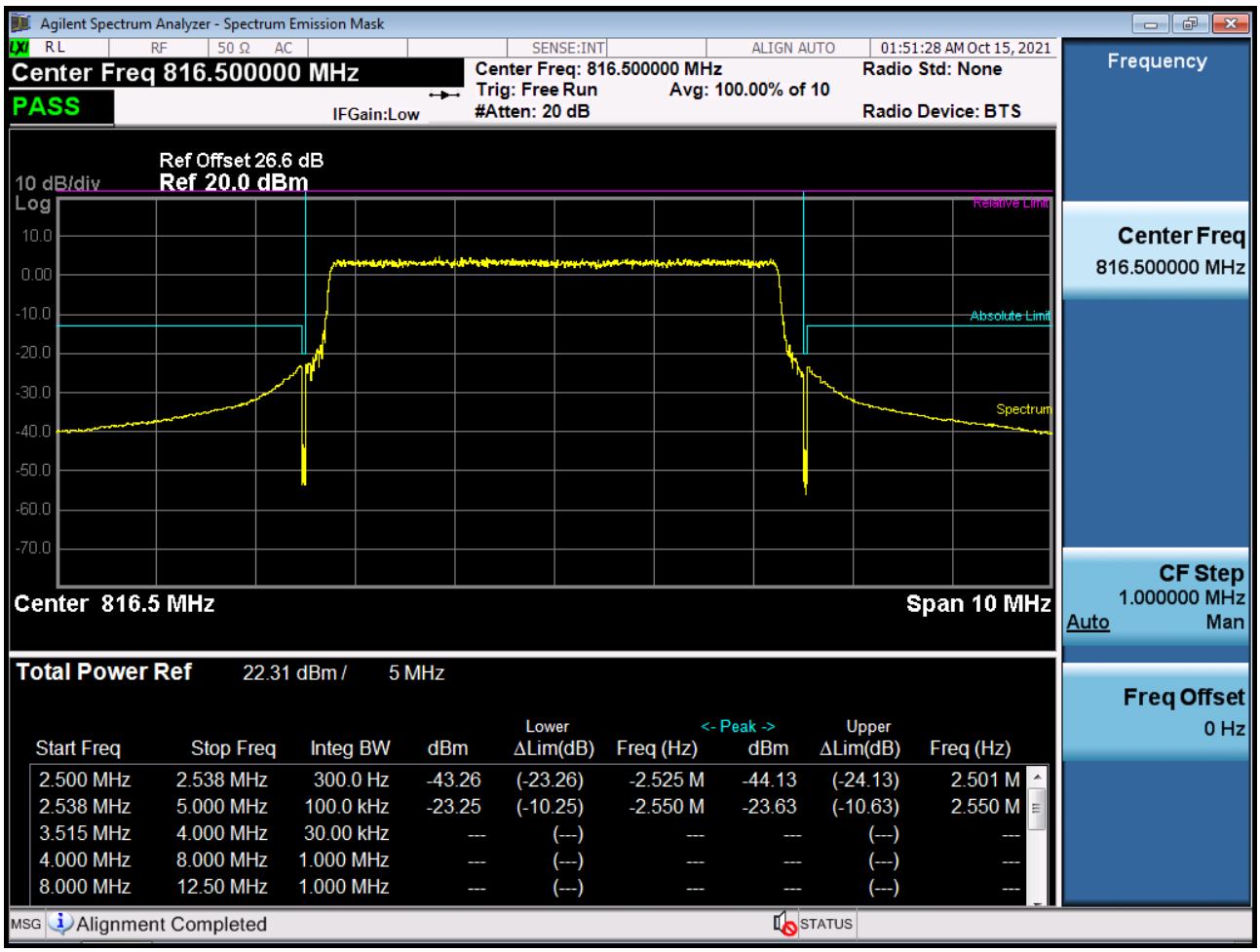
BAND 26. Lower Channel Edge Plot (3 M BW Ch.26705 QPSK_RB15_Offset 0)



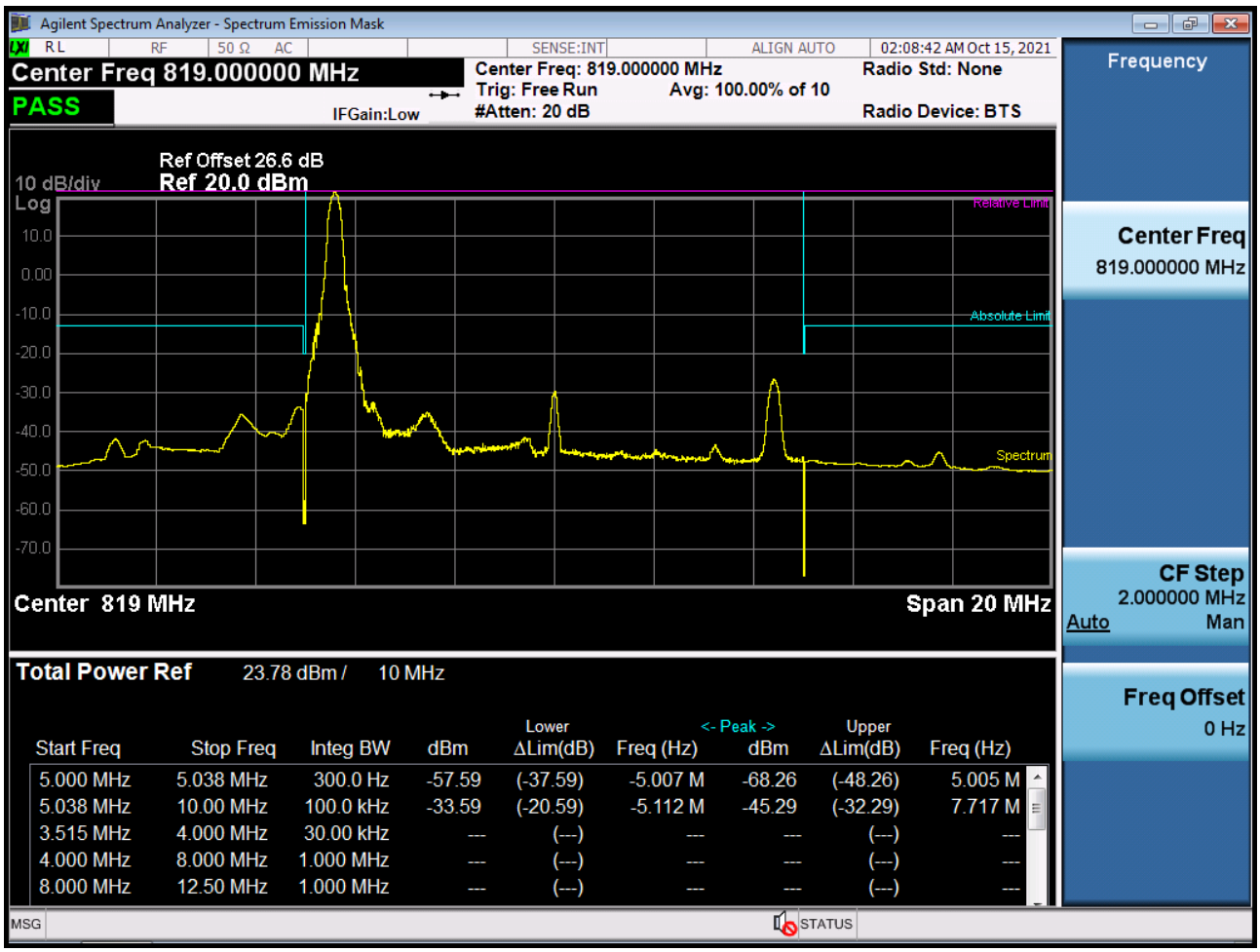
BAND 26. Lower Channel Edge Plot (5 M BW Ch.26715 QPSK RB 1, Offset 0)



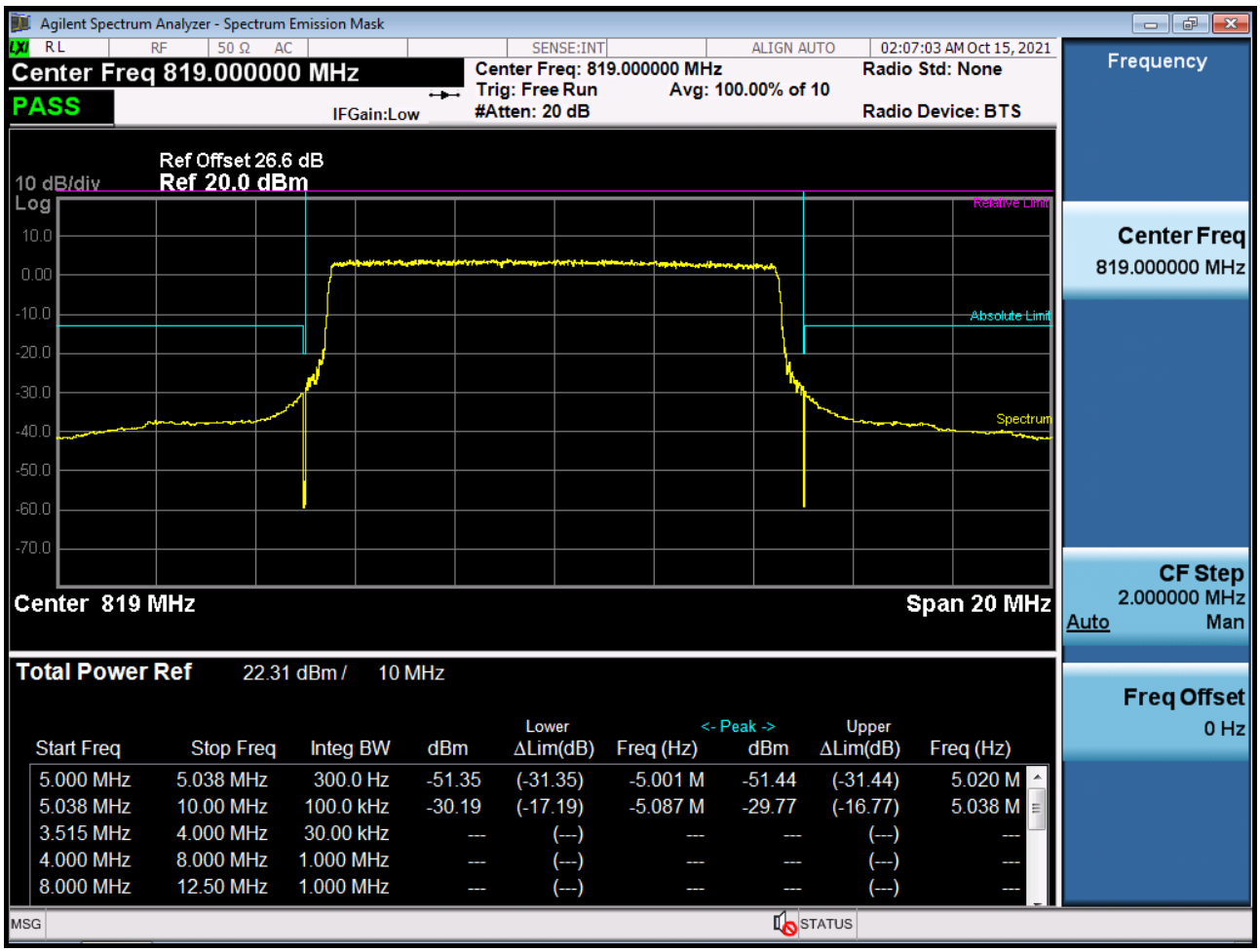
BAND 26. Lower Channel Edge Plot (5 M BW Ch.26715 QPSK_RB25_Offset 0)



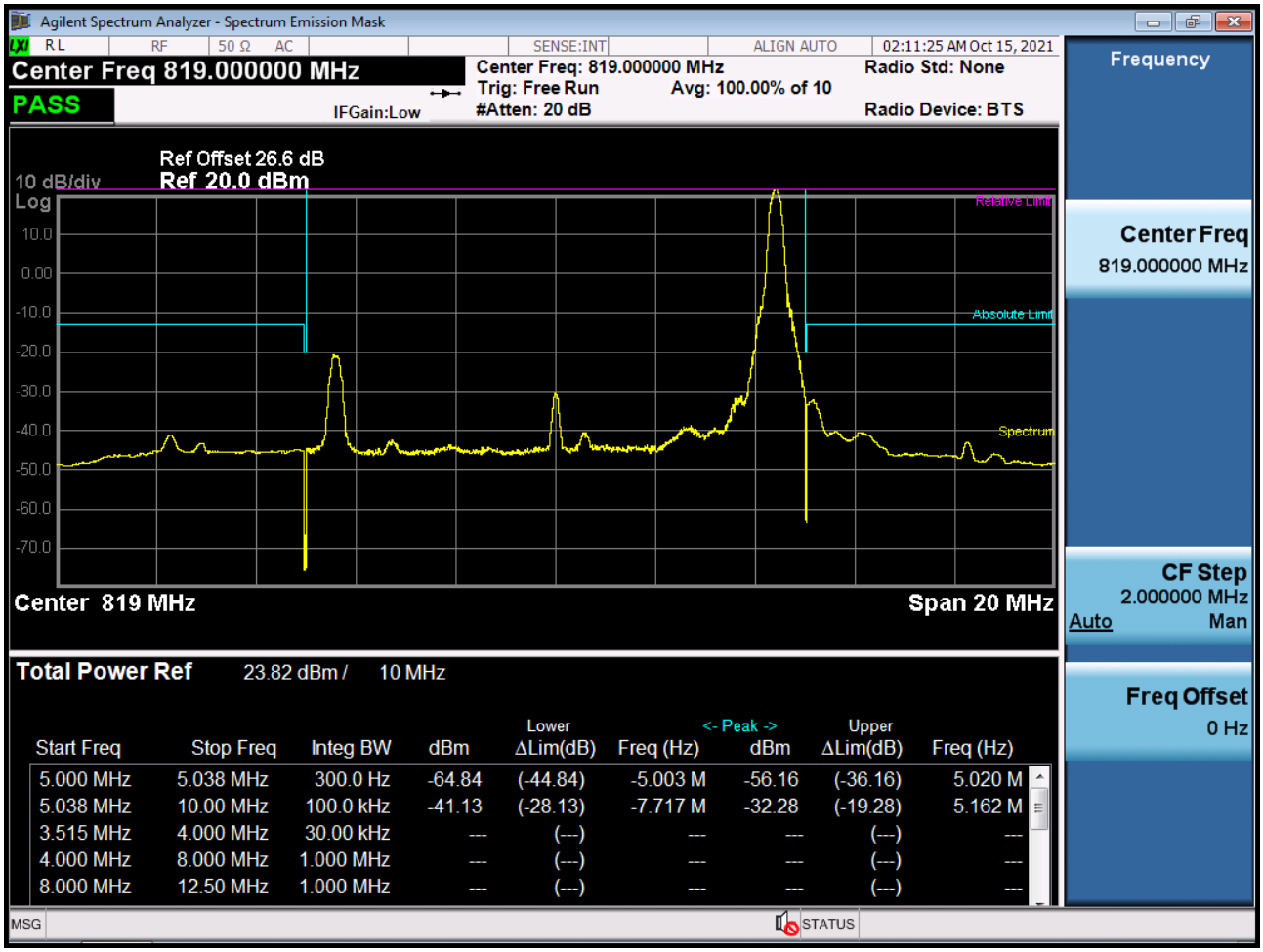
BAND 26. Low Channel Edge Plot (10 M BW Ch.26740 QPSK RB 1, Offset 0)



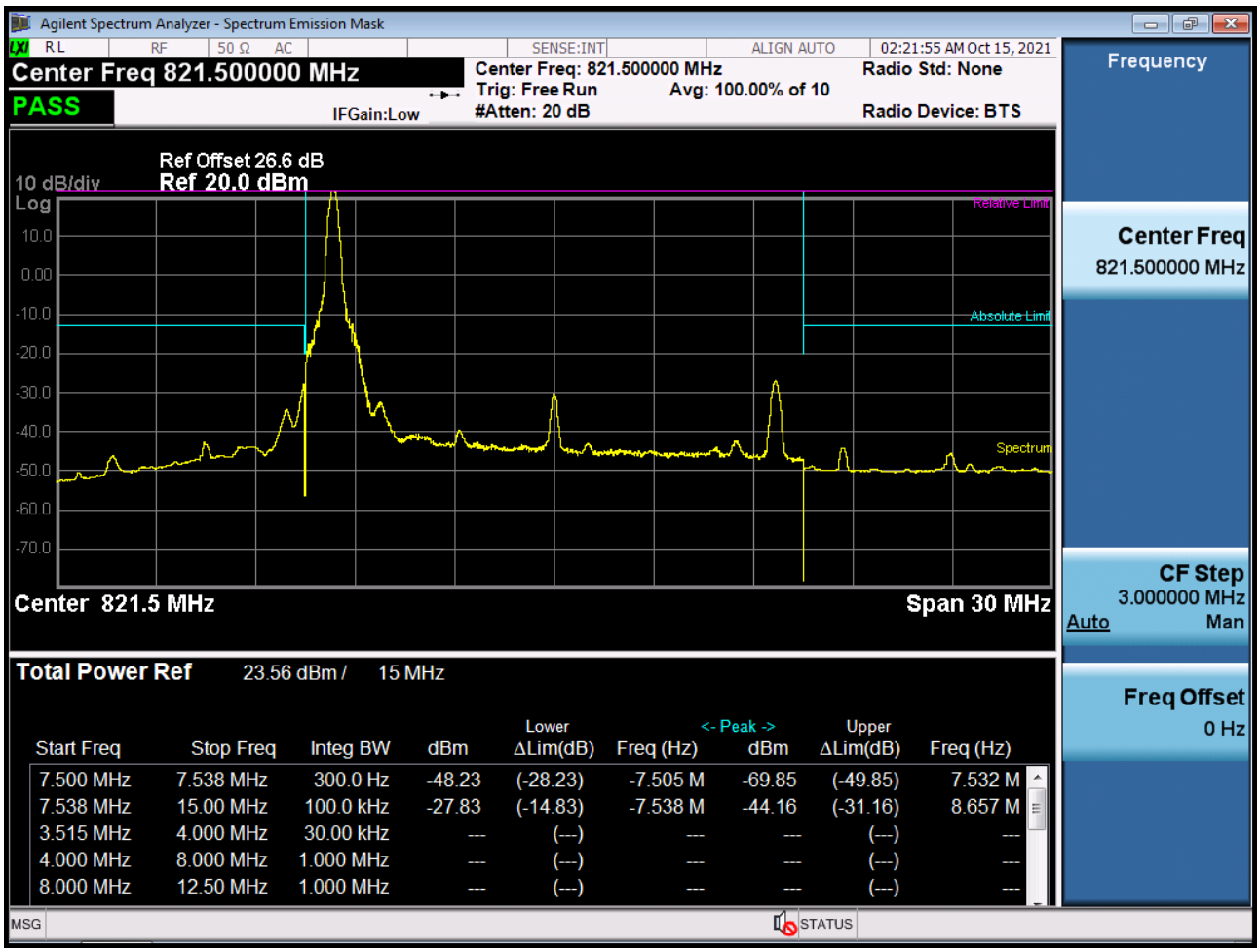
BAND 26. Low Channel Edge Plot (10 M BW Ch.26740 QPSK_RB50_Offset 0)



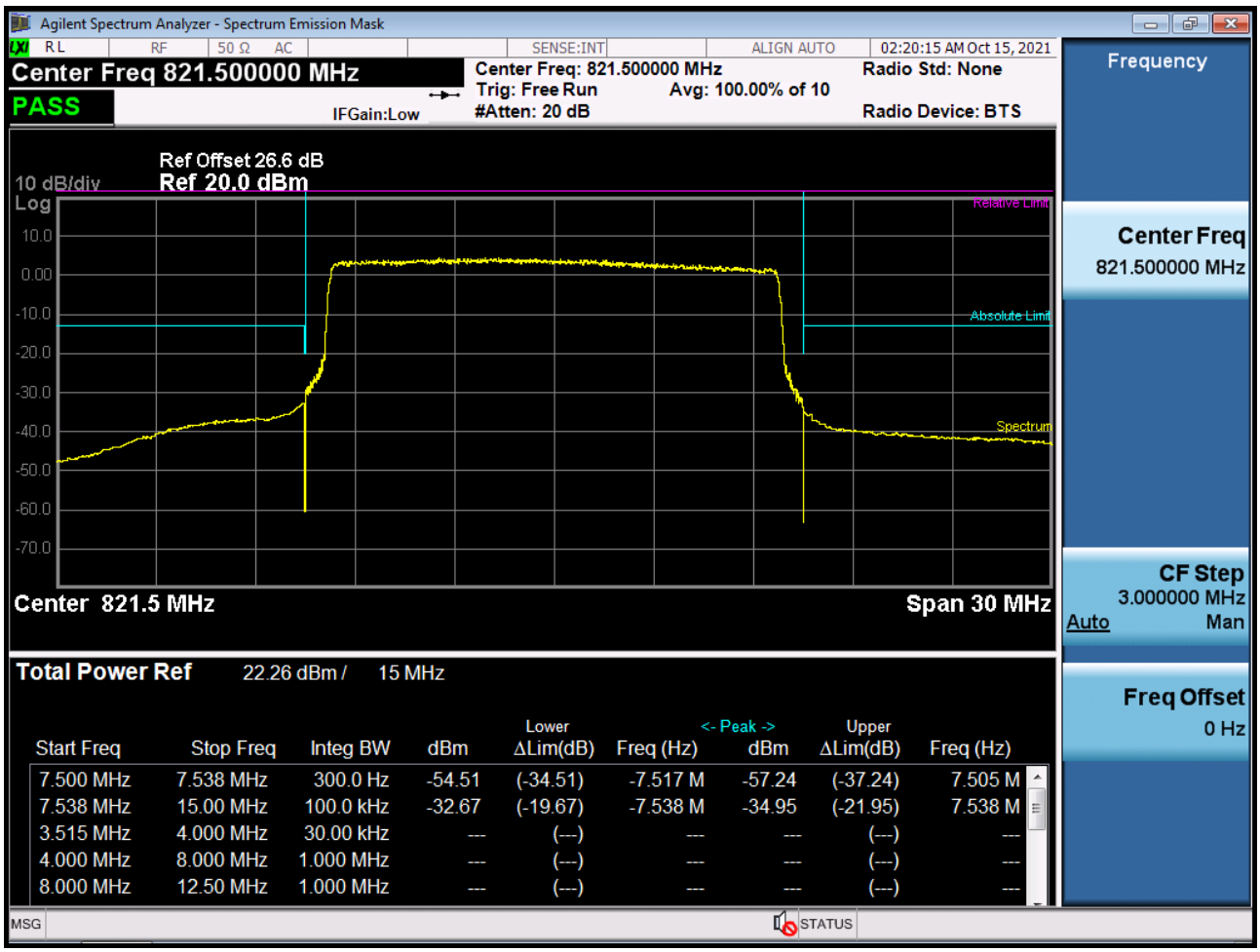
BAND 26. Mid Channel Edge Plot (10 M BW Ch. 26740 QPSK_RB1_Offset 49)



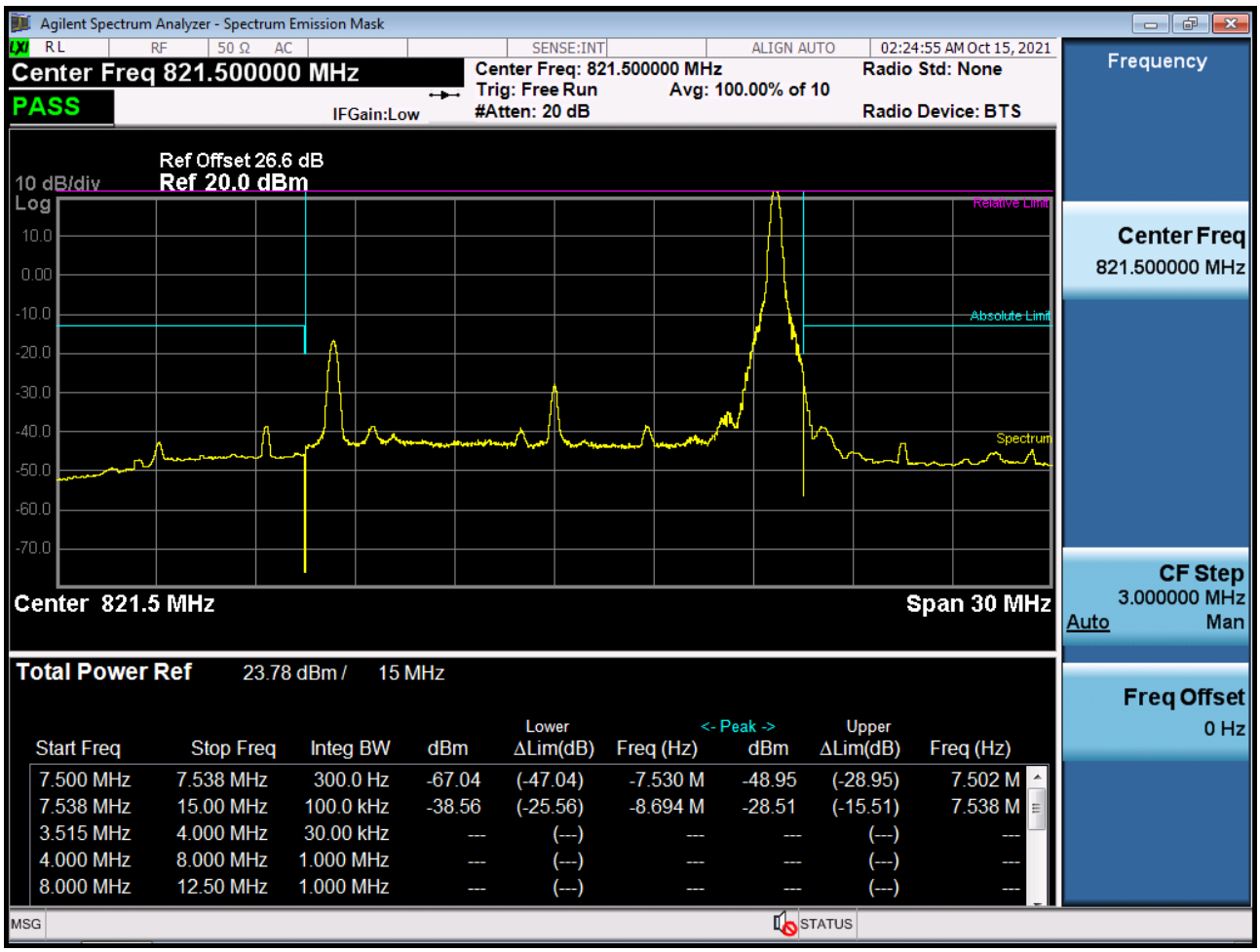
BAND 26. Low Channel Edge Plot (15 M BW Ch.26765 QPSK RB 1, Offset 0)



BAND 26. Low Channel Edge Plot (15 M BW Ch.26765 QPSK RB 75, Offset0)



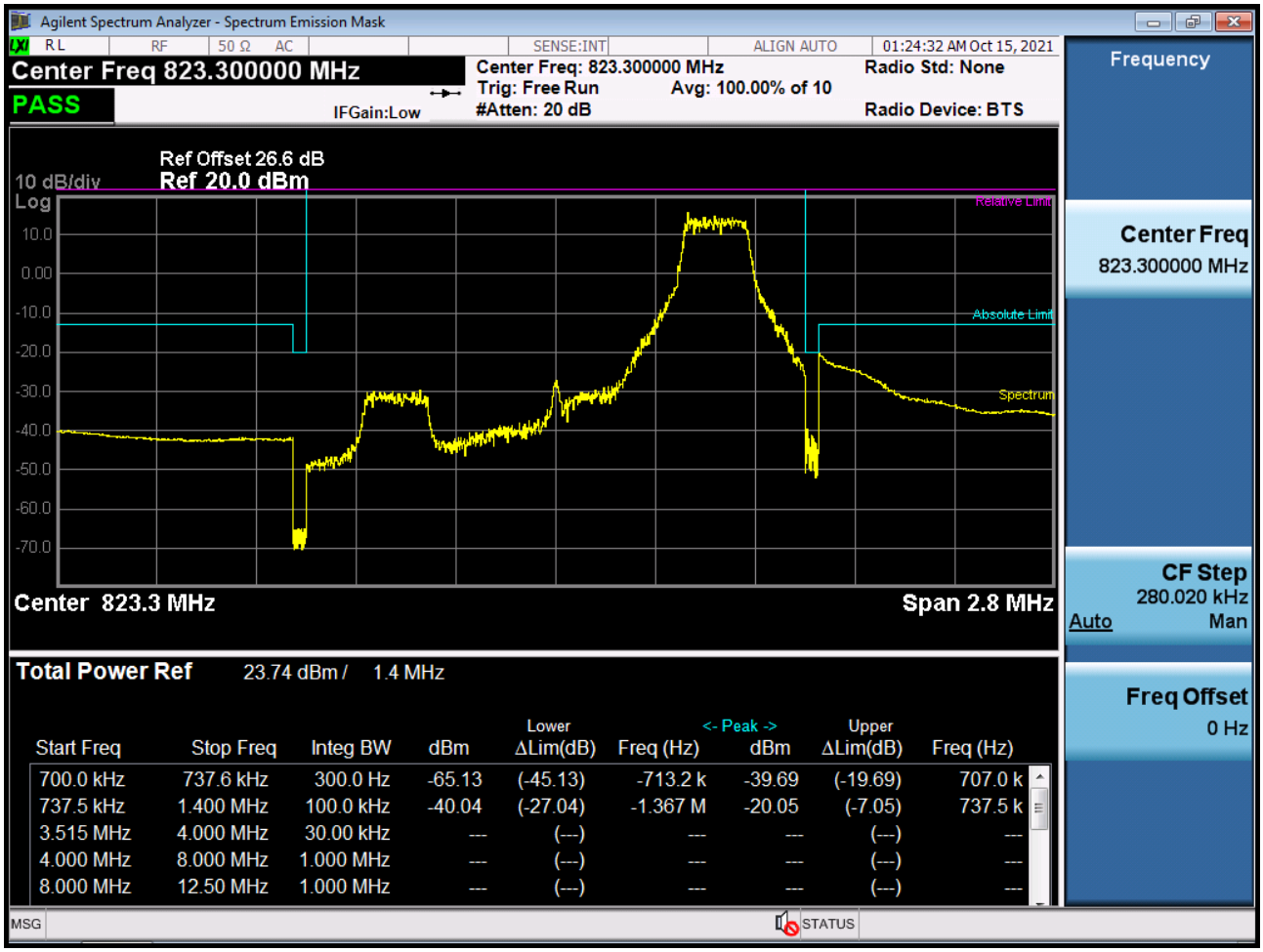
BAND 26. Mid Channel Edge Plot (15 M BW Ch.26765 QPSK_RB1_Offset 74)



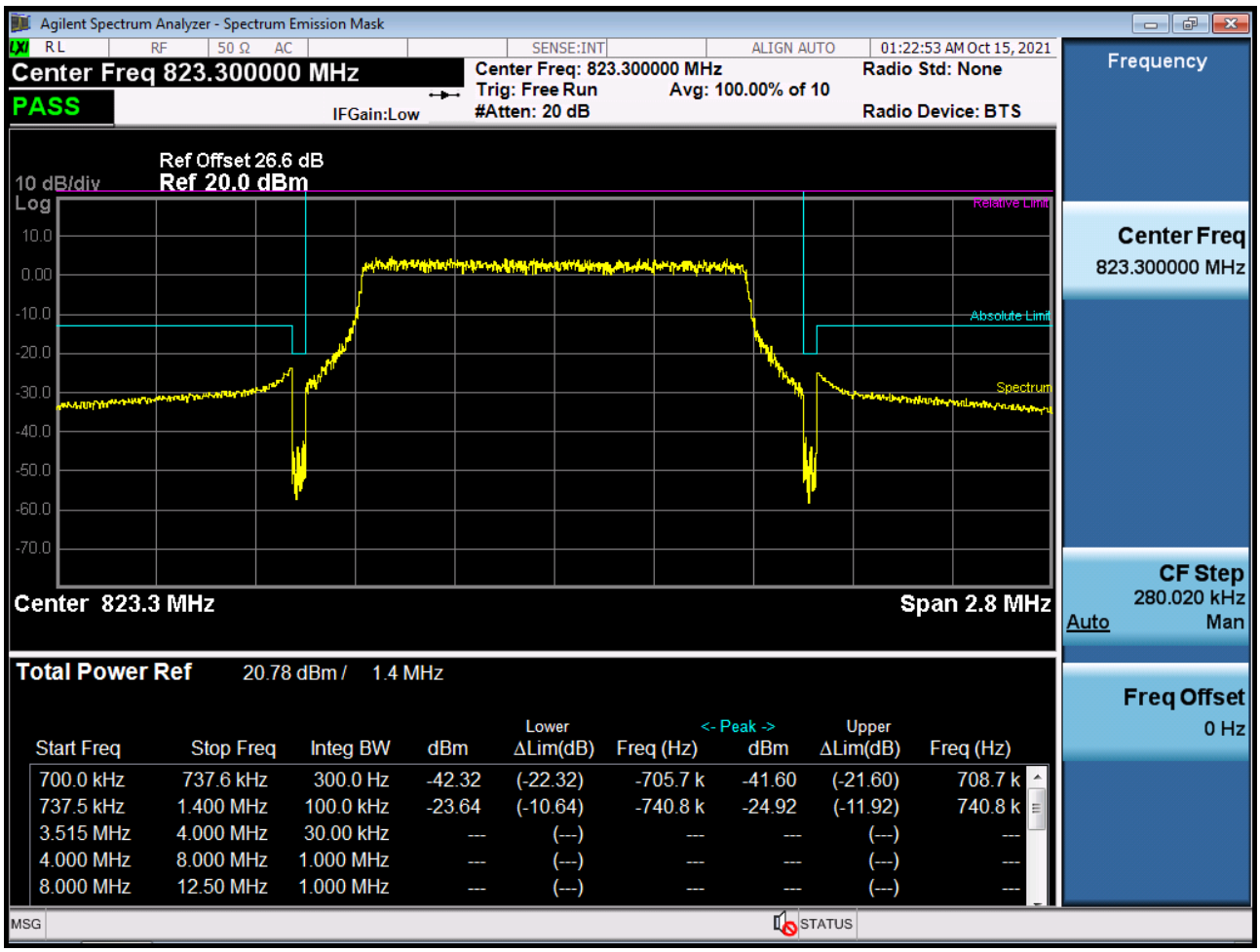
BAND 26. Mid Band Edge Plot (15 M BW Ch.26765 QPSK RB 1, Offset74)

BAND 26. Mid Band Edge Plot (15 M BW Ch.26765 QPSK_RB75_Offset 0)

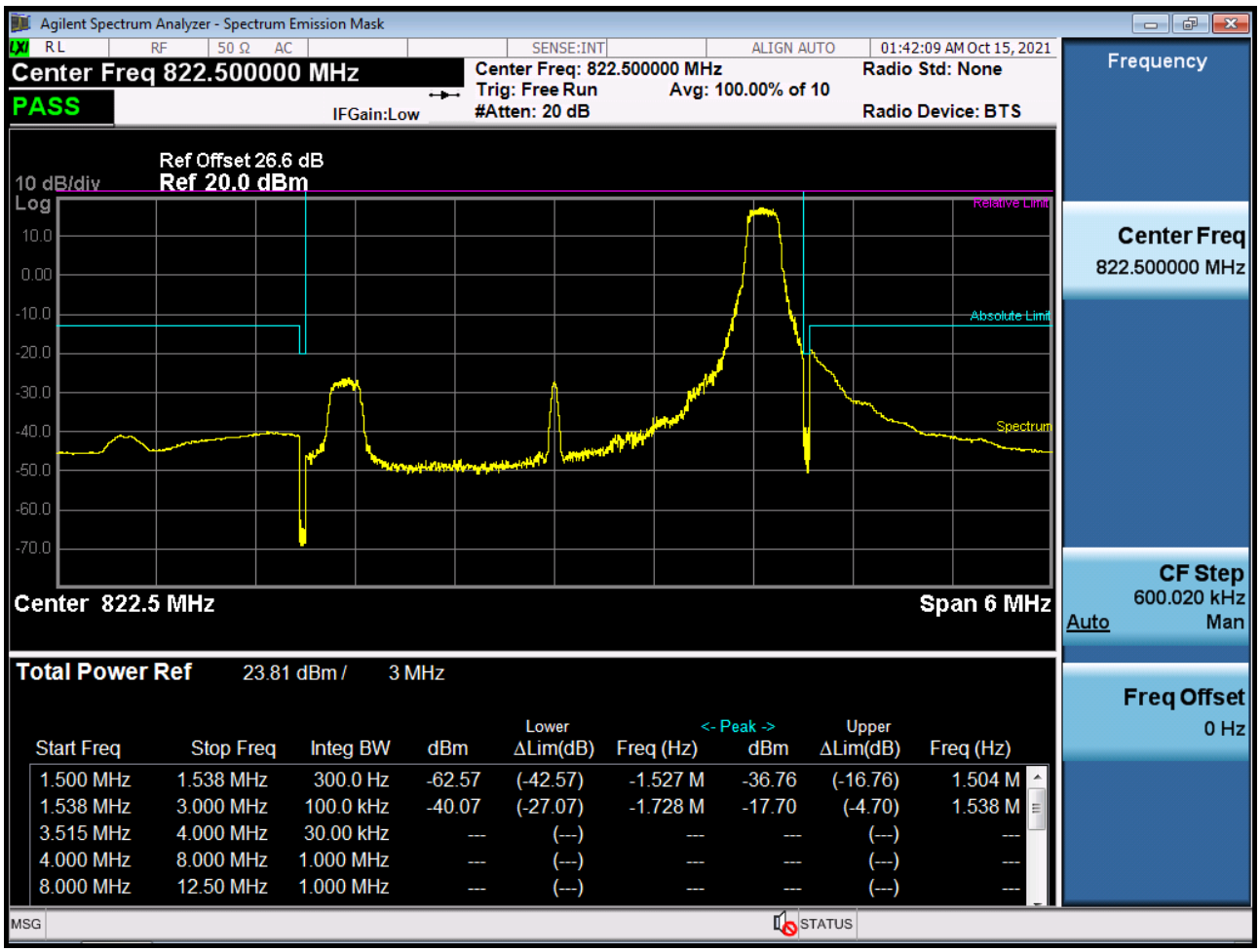
BAND 26. Upper Channel Edge Plot (1.4 M BW Ch.26783 QPSK_RB1_Offset 5)



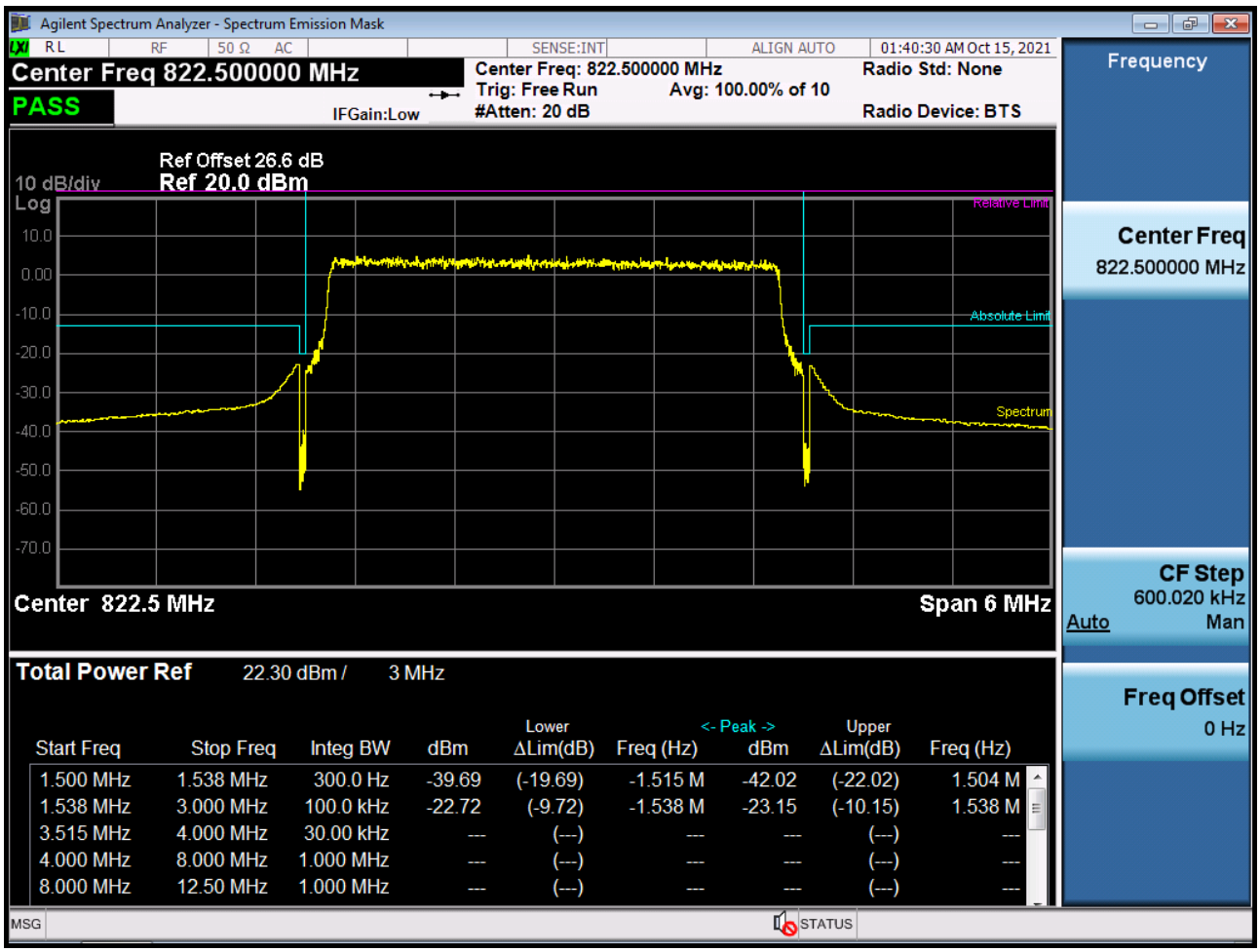
BAND 26. Upper Channel Edge Plot (1.4 M BW Ch.26783 QPSK_RB6_Offset 0)



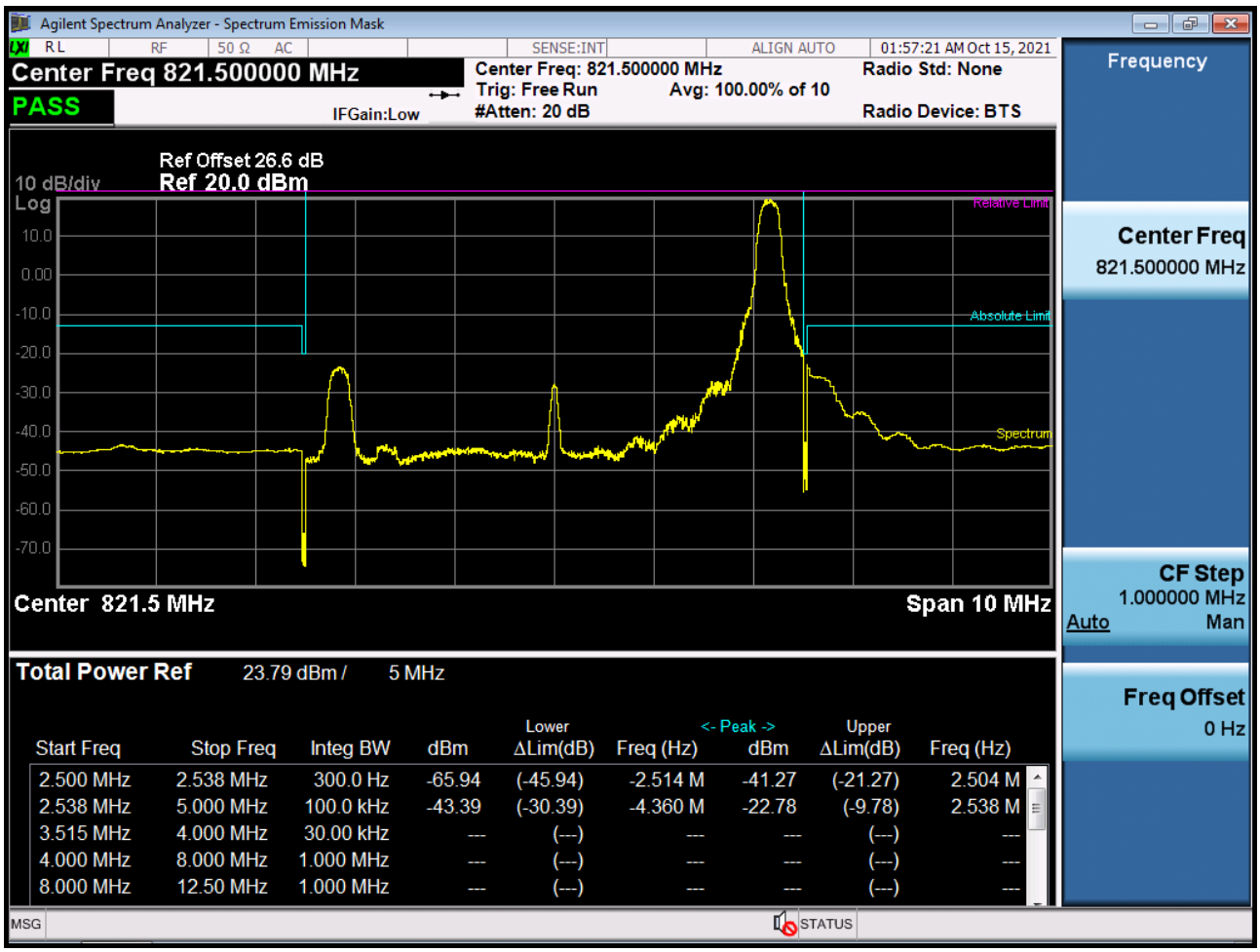
BAND 26. Upper Channel Edge Plot (3 M BW Ch.26775 QPSK_RB1_Offset 14)



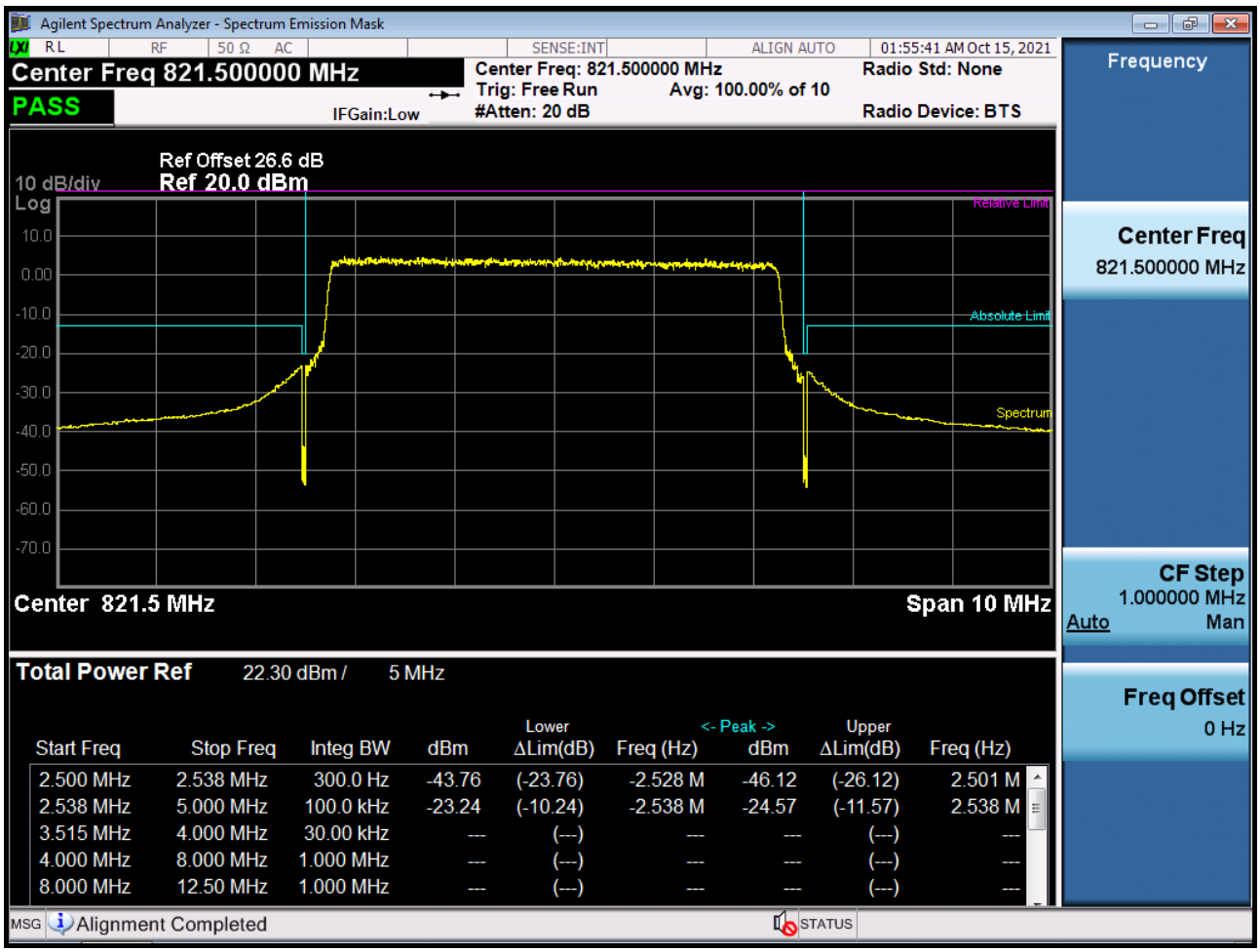
BAND 26. Upper Channel Edge Plot (3 M BW Ch.26775 QPSK_RB15_Offset 0)



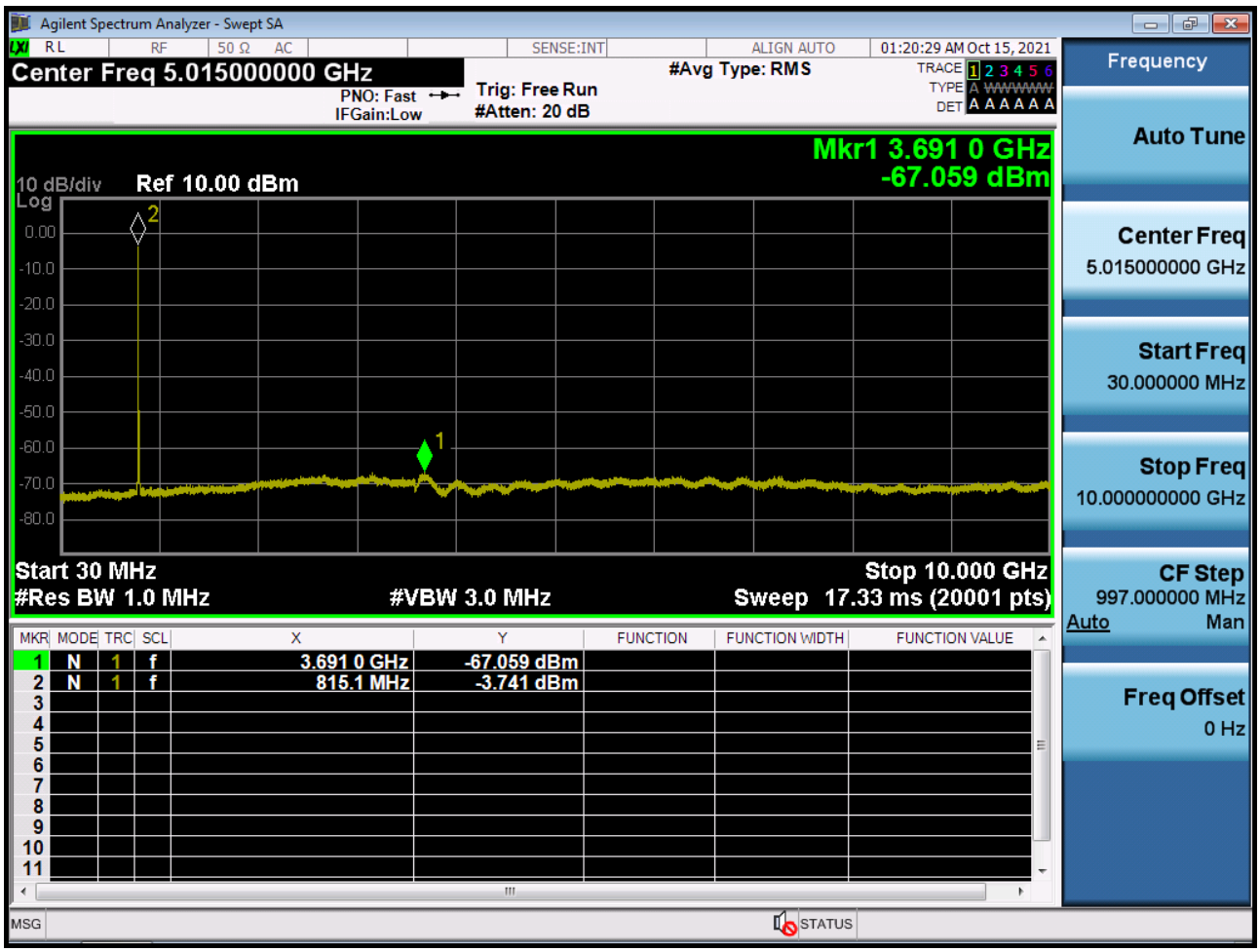
BAND 26. Upper Channel Edge Plot (5 M BW Ch.26765 QPSK_RB1_Offset 24)



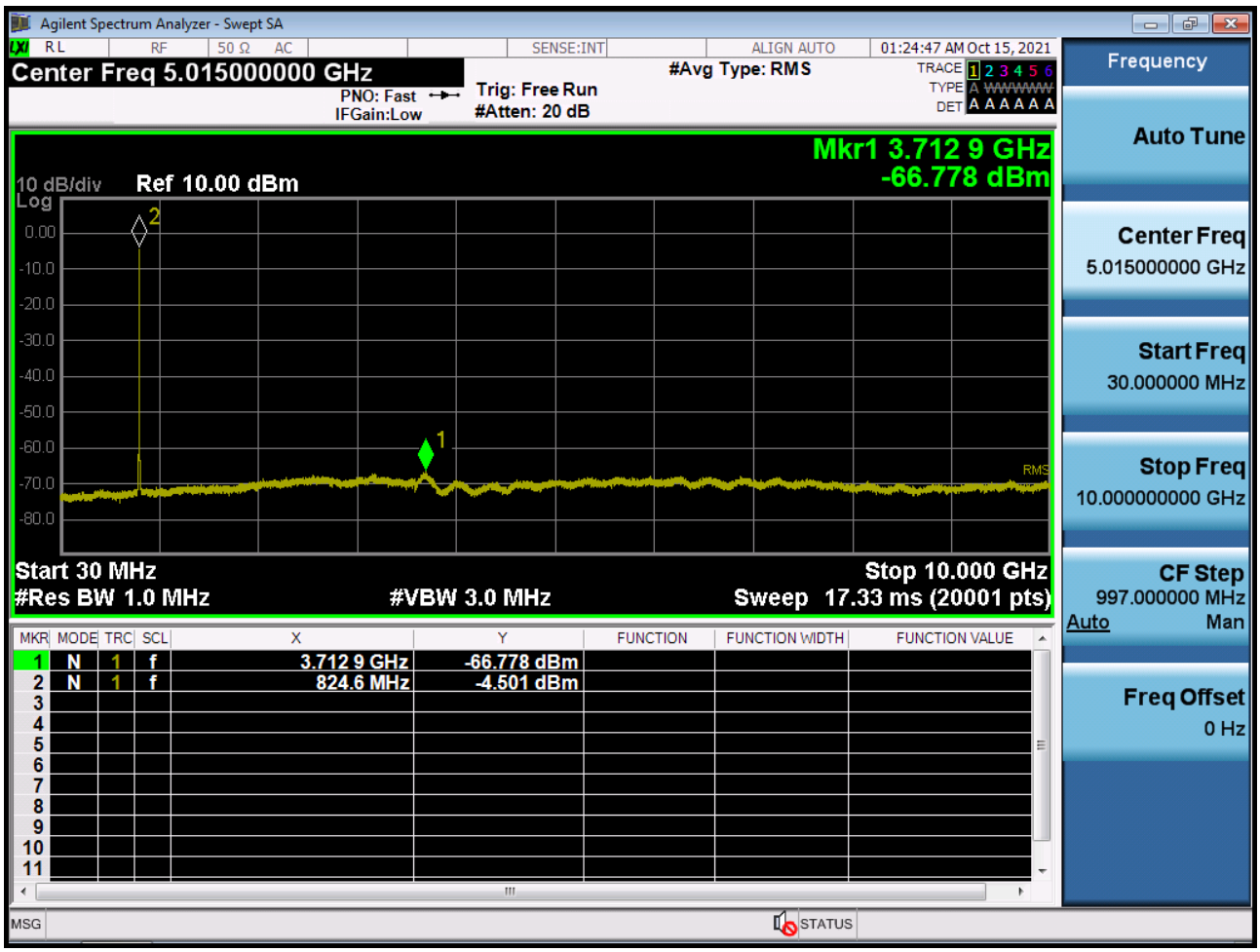
BAND 26. Upper Channel Edge Plot (5 M BW Ch.26765 QPSK_RB25_Offset 0)



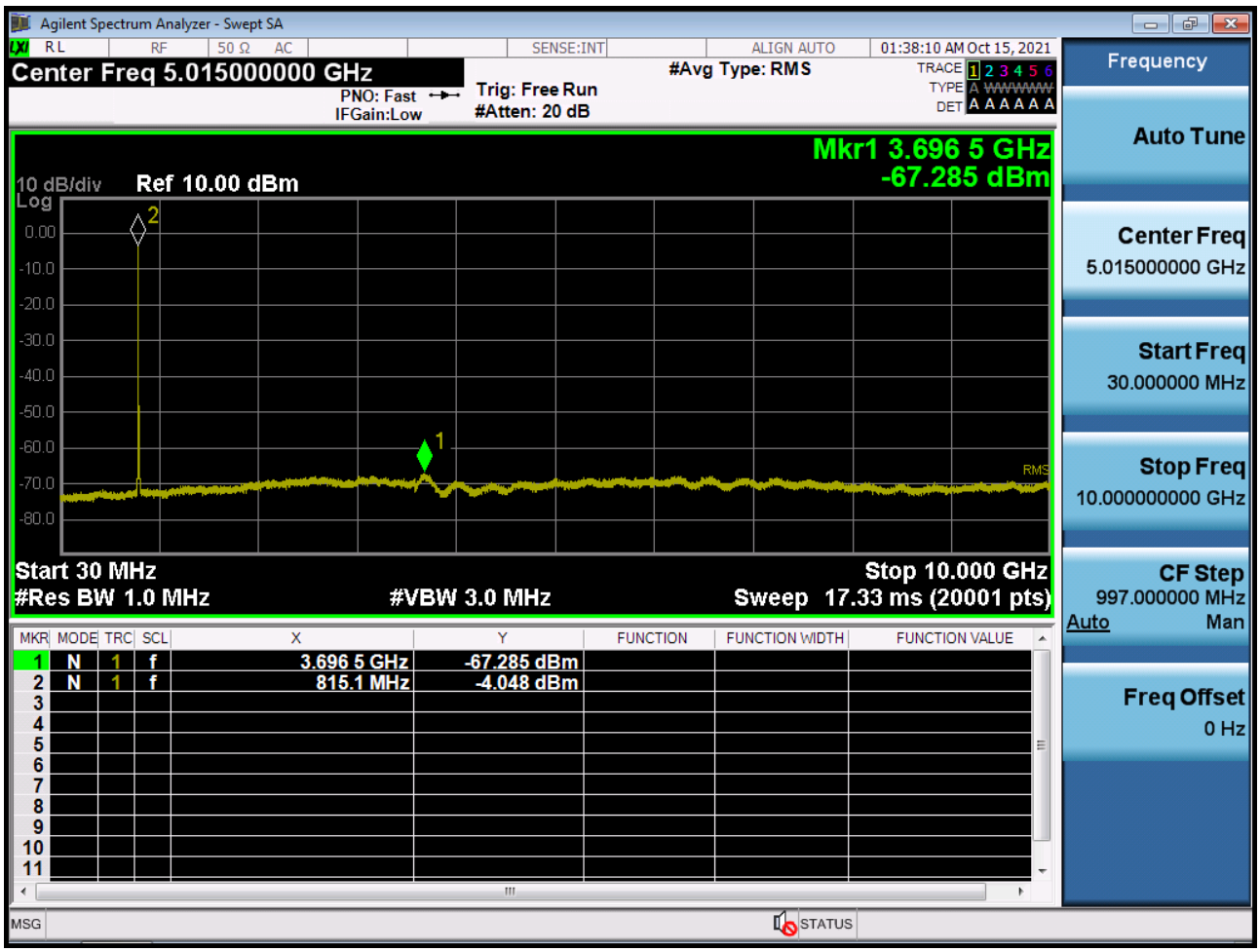
BAND 26. Conducted Spurious (26697 ch_1.4 MHz_QPSK_RB 1_0)



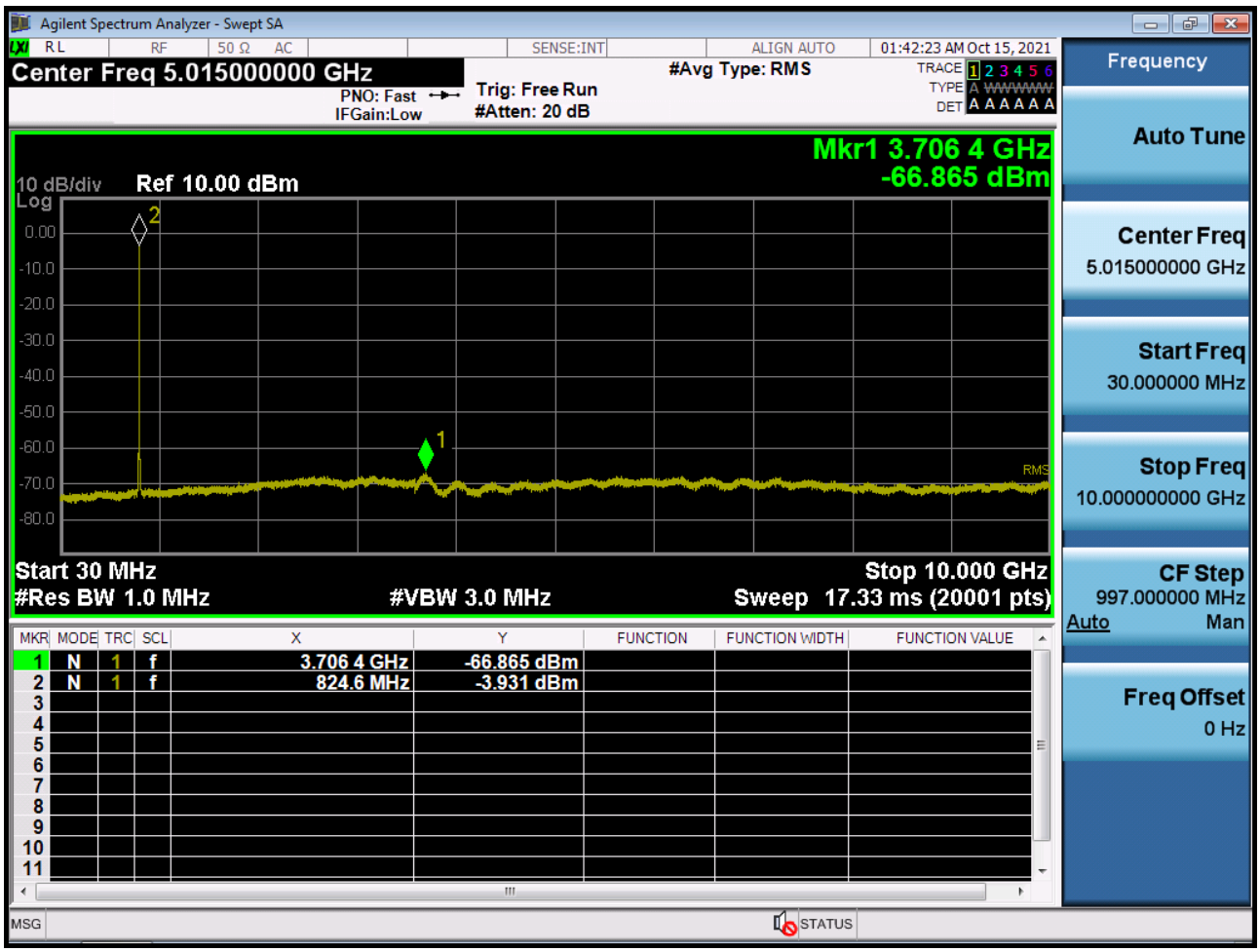
BAND 26. Conducted Spurious (26783 ch_1.4 MHz_QPSK_RB 1_0)



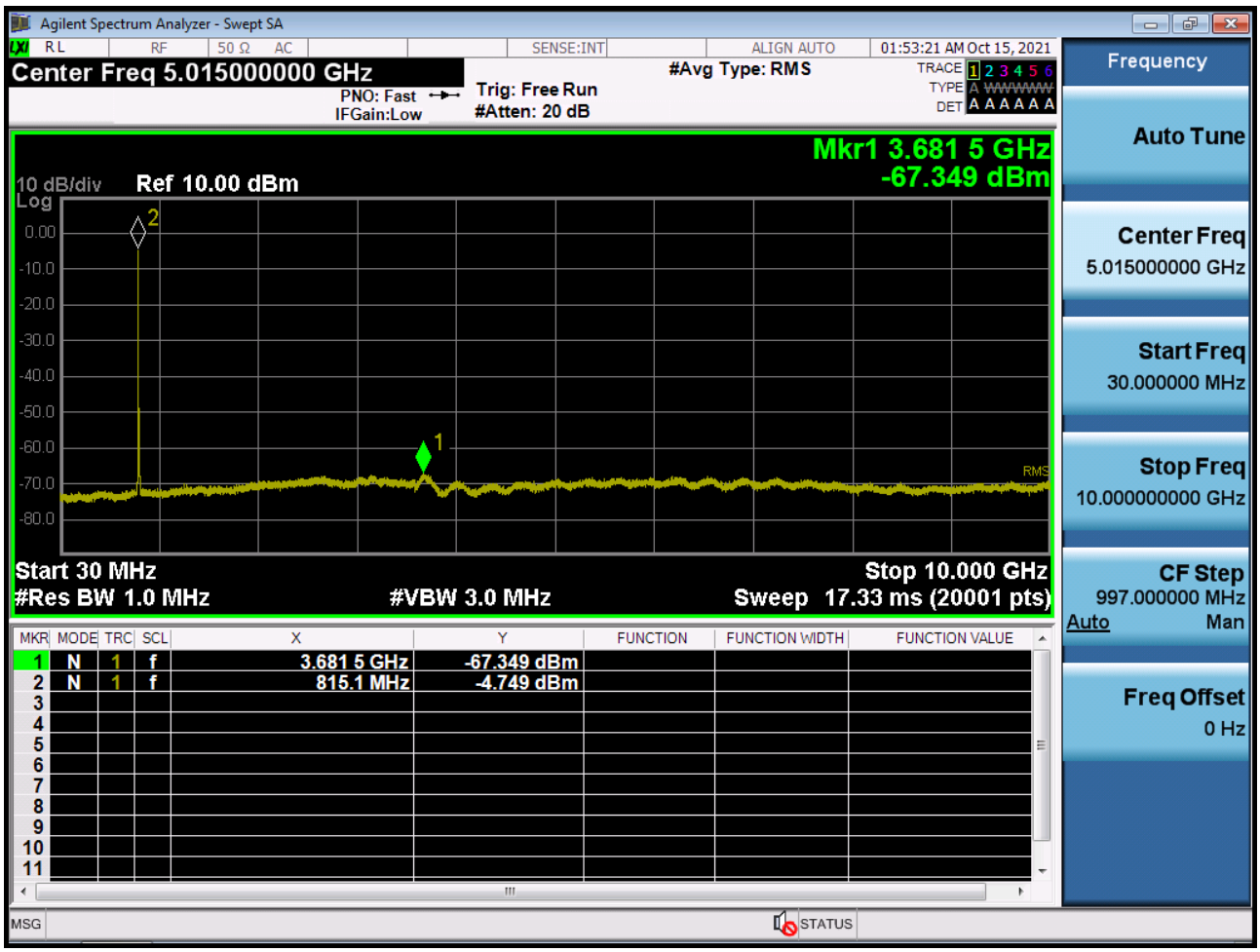
BAND 26. Conducted Spurious (26705 ch_3 MHz_QPSK_RB 1_0)



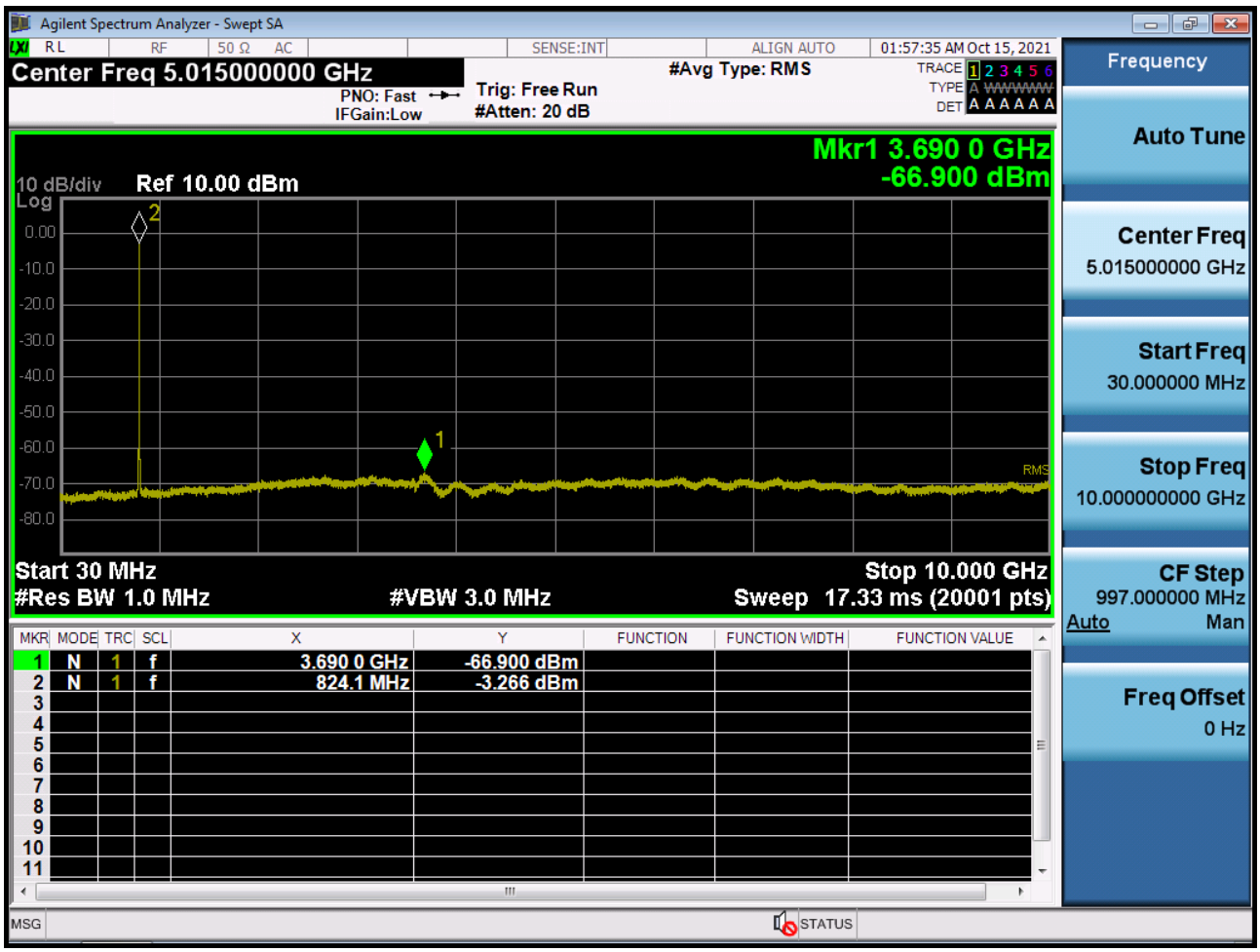
BAND 26. Conducted Spurious (26775 ch_3 MHz_QPSK_RB 1_0)



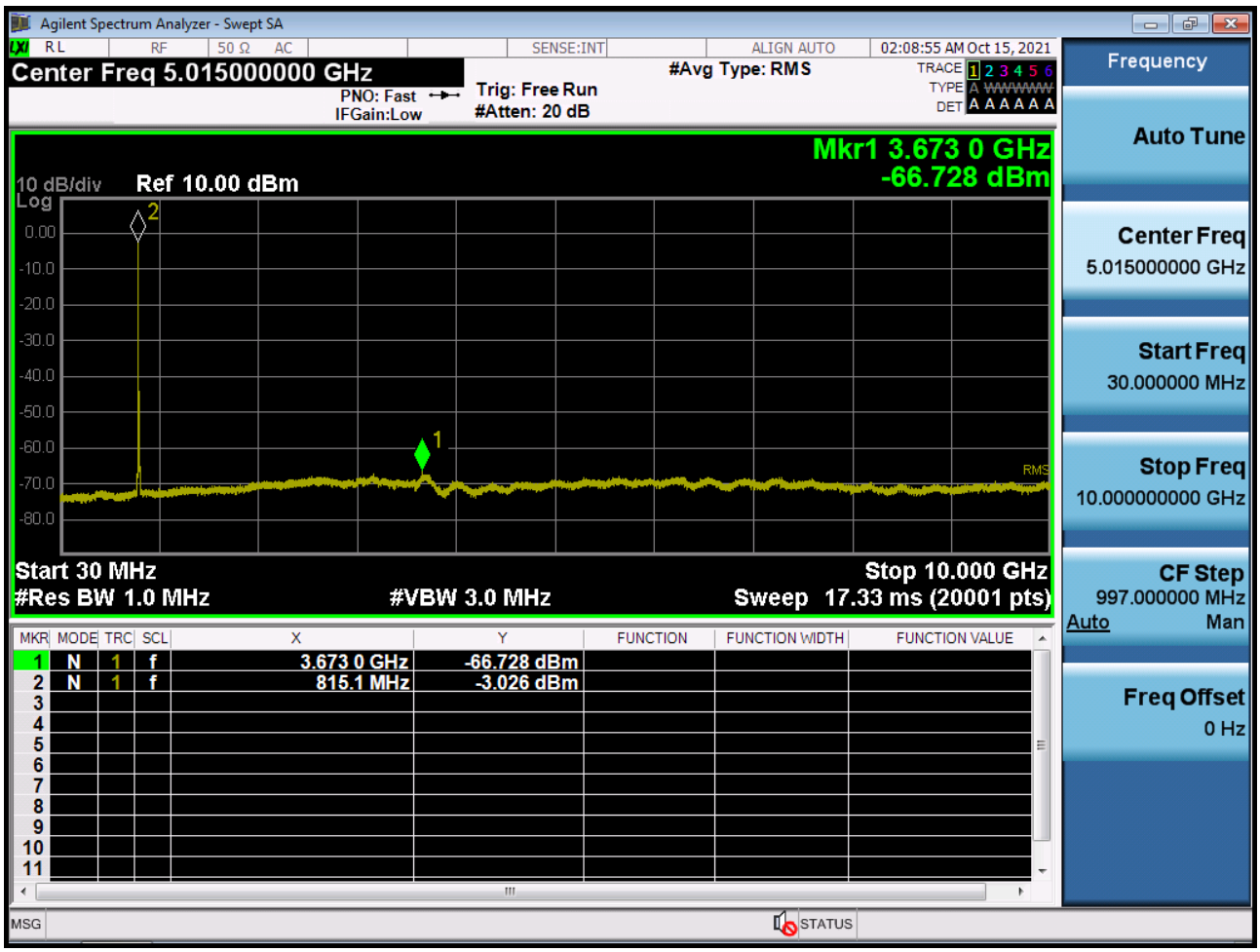
BAND 26. Conducted Spurious (26715 ch_5 MHz_QPSK_RB 1_0)



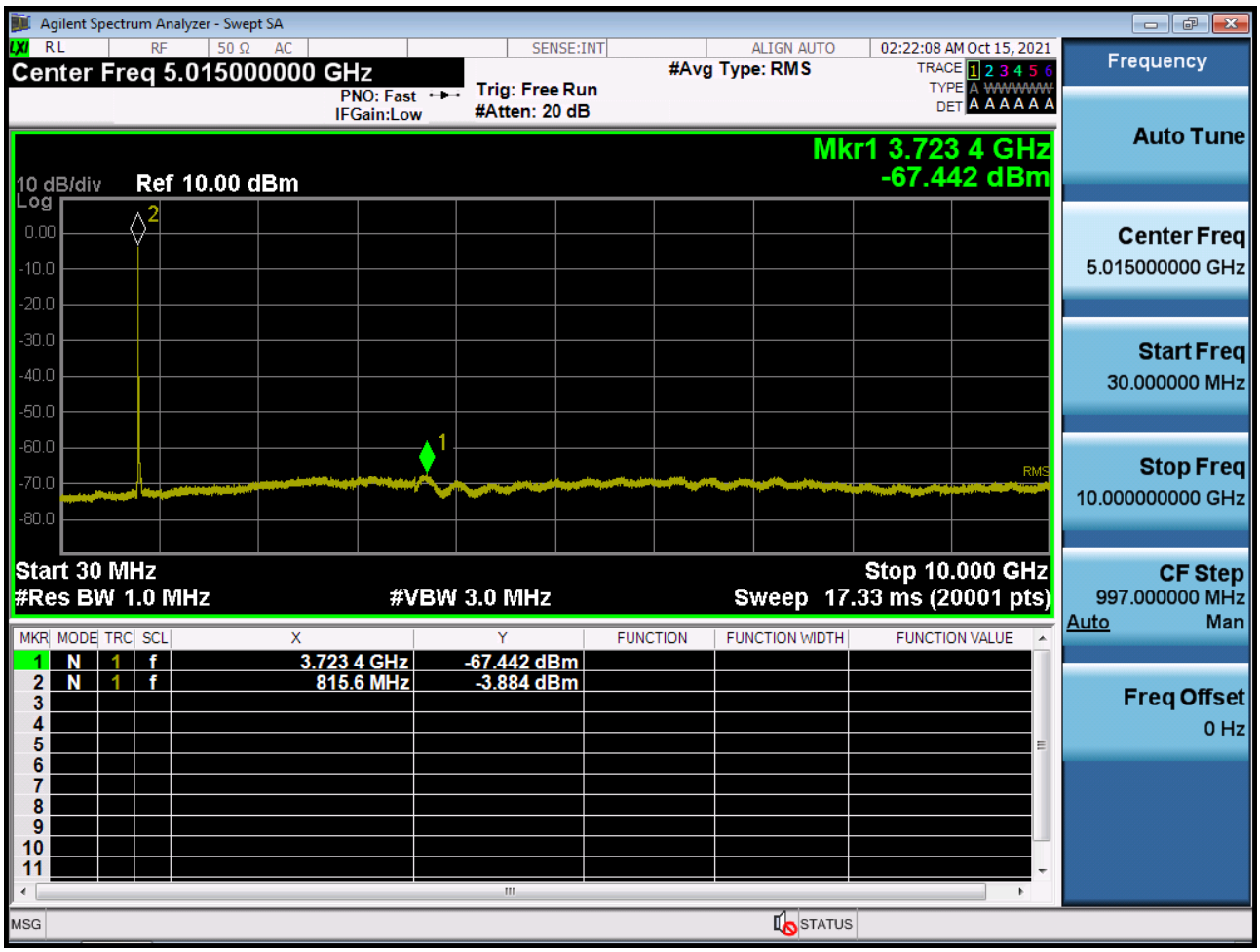
BAND 26. Conducted Spurious (26765 ch_5 MHz_QPSK_RB 1_0)



BAND 26. Conducted Spurious (26740 ch_10 MHz_QPSK_RB 1_0)

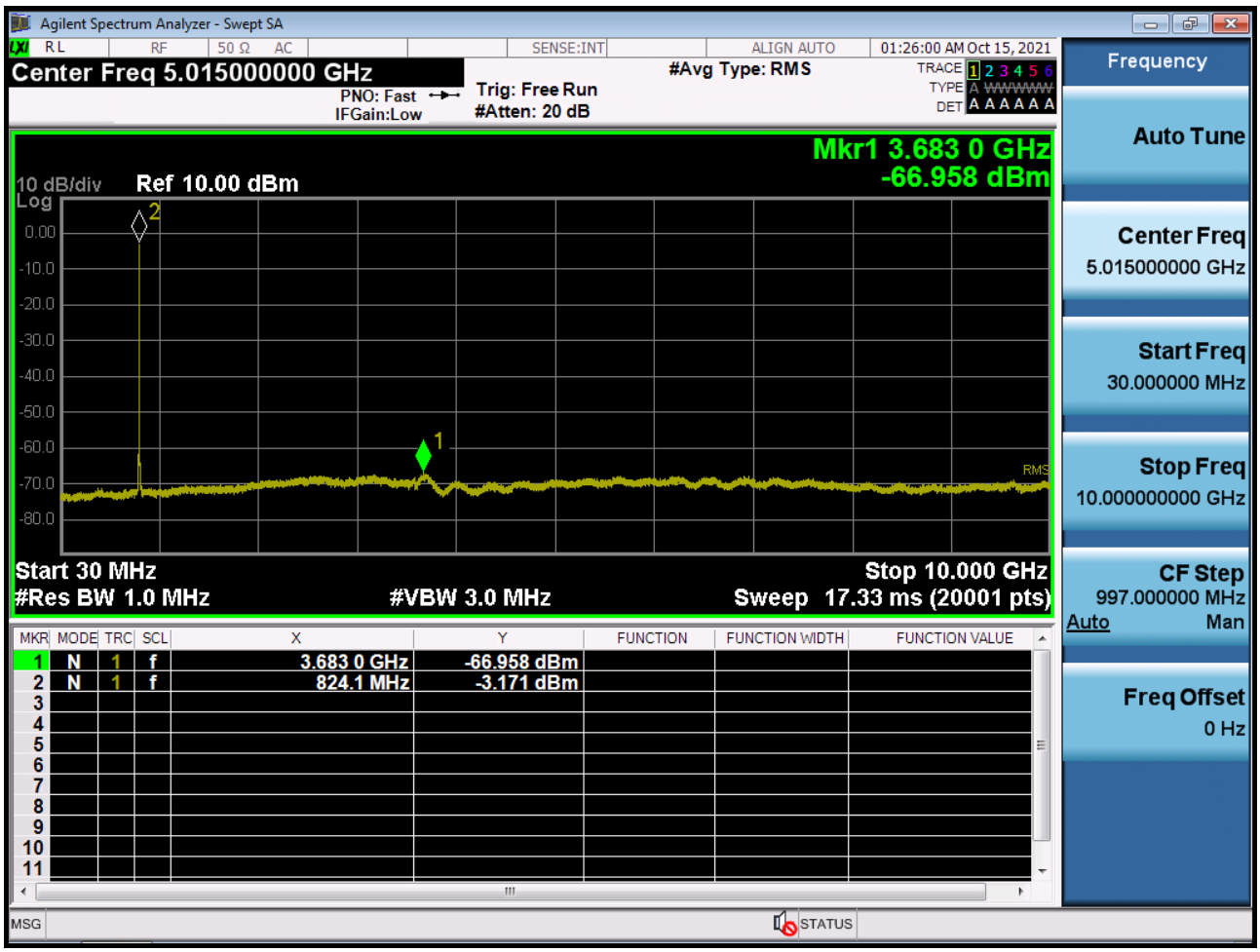


BAND 26. Conducted Spurious (26765 ch_15 MHz_QPSK_RB 1_0)

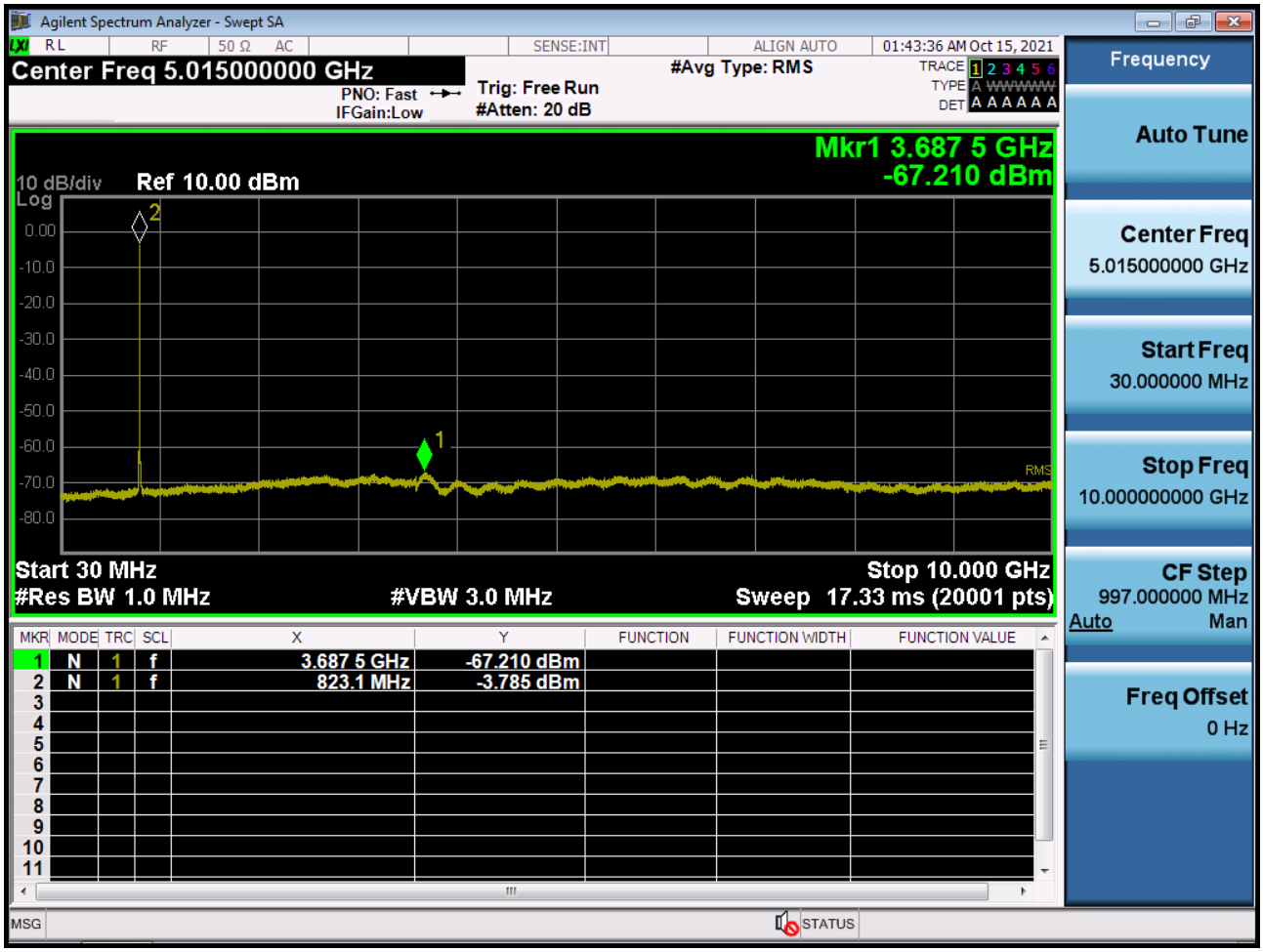


10. TEST PLOTS (STRADDLE CHANNEL)

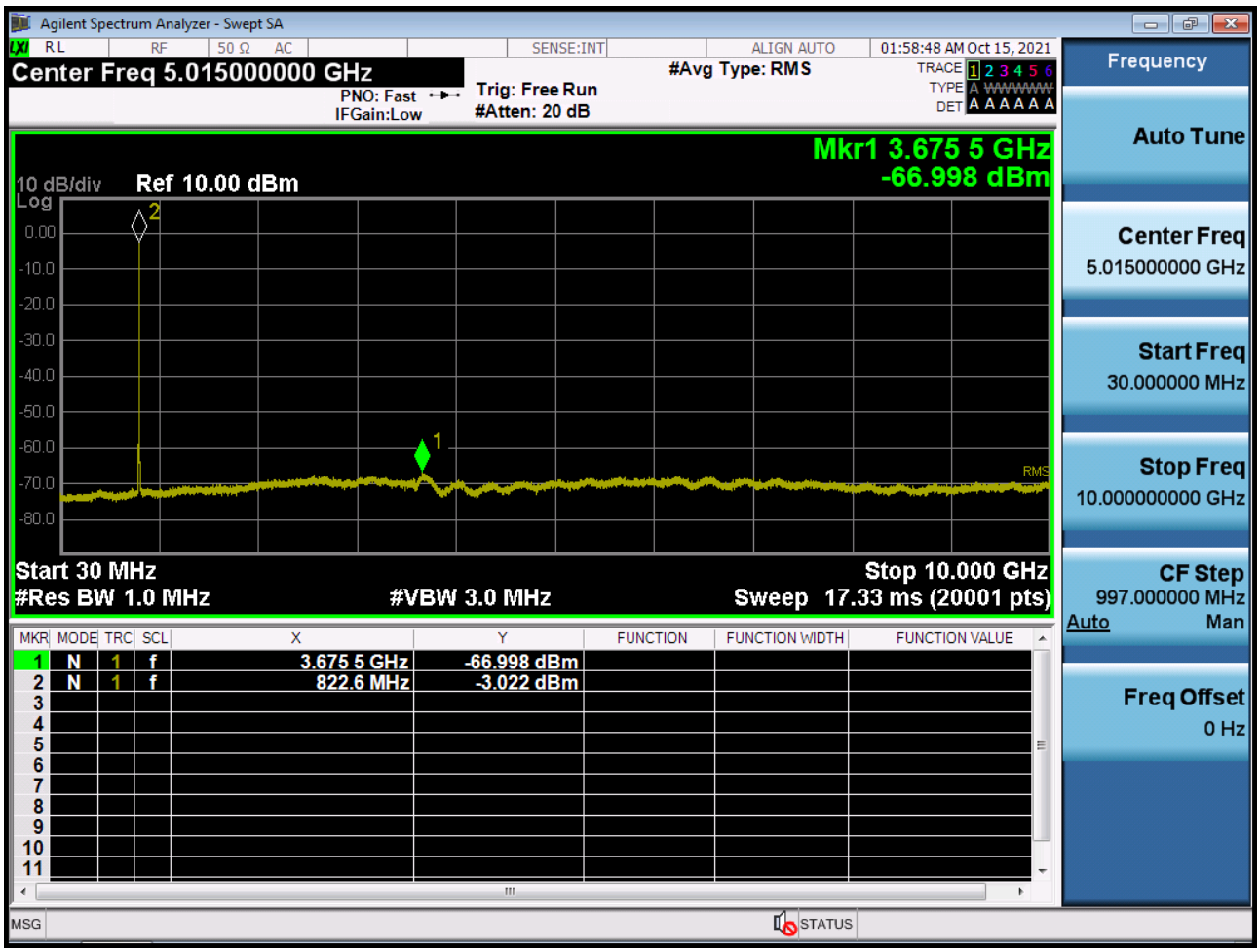
BAND 26. Conducted Spurious (1.4 MHz_QPSK_RB 1_0)



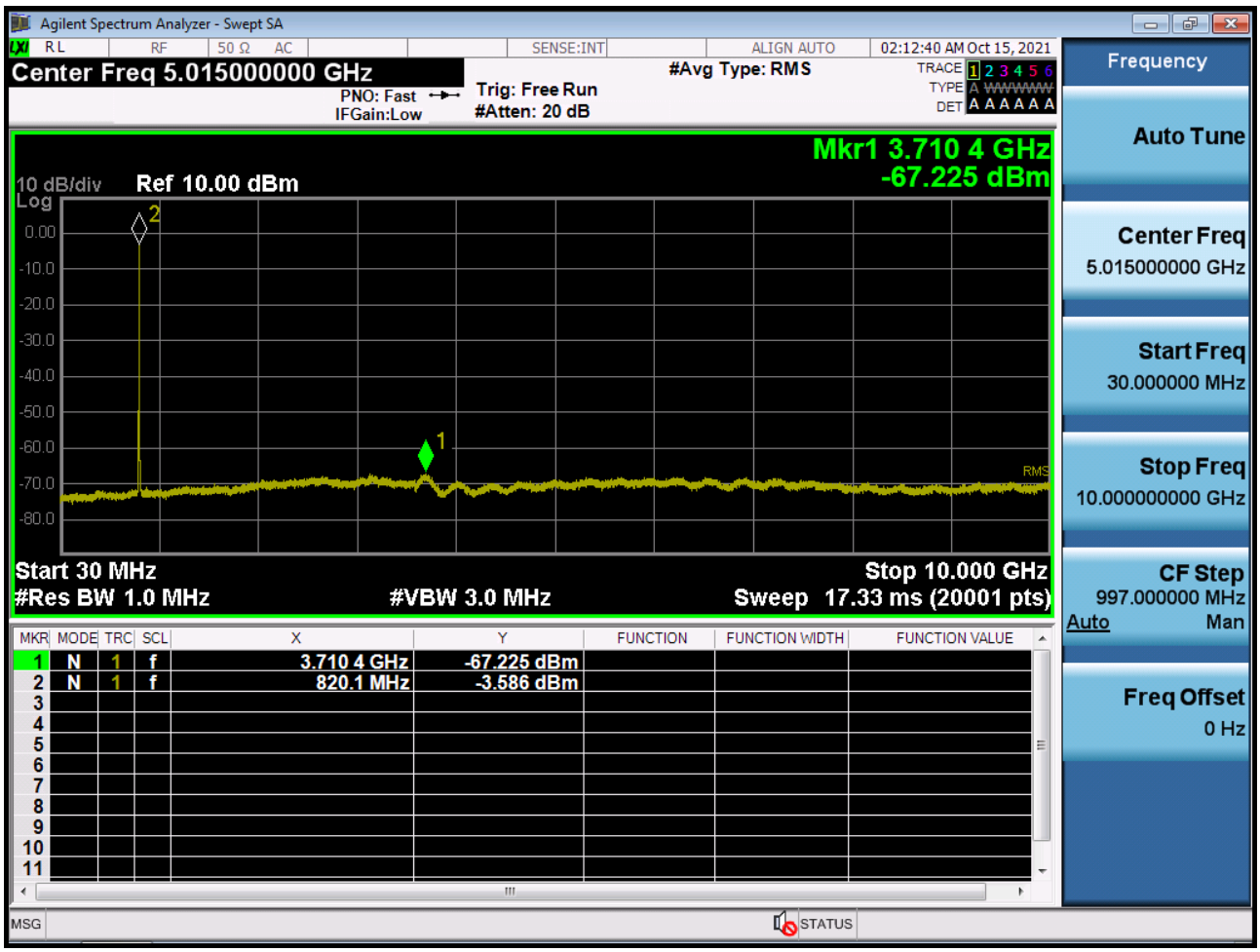
BAND 26. Conducted Spurious (3 MHz_QPSK_RB 1_0)



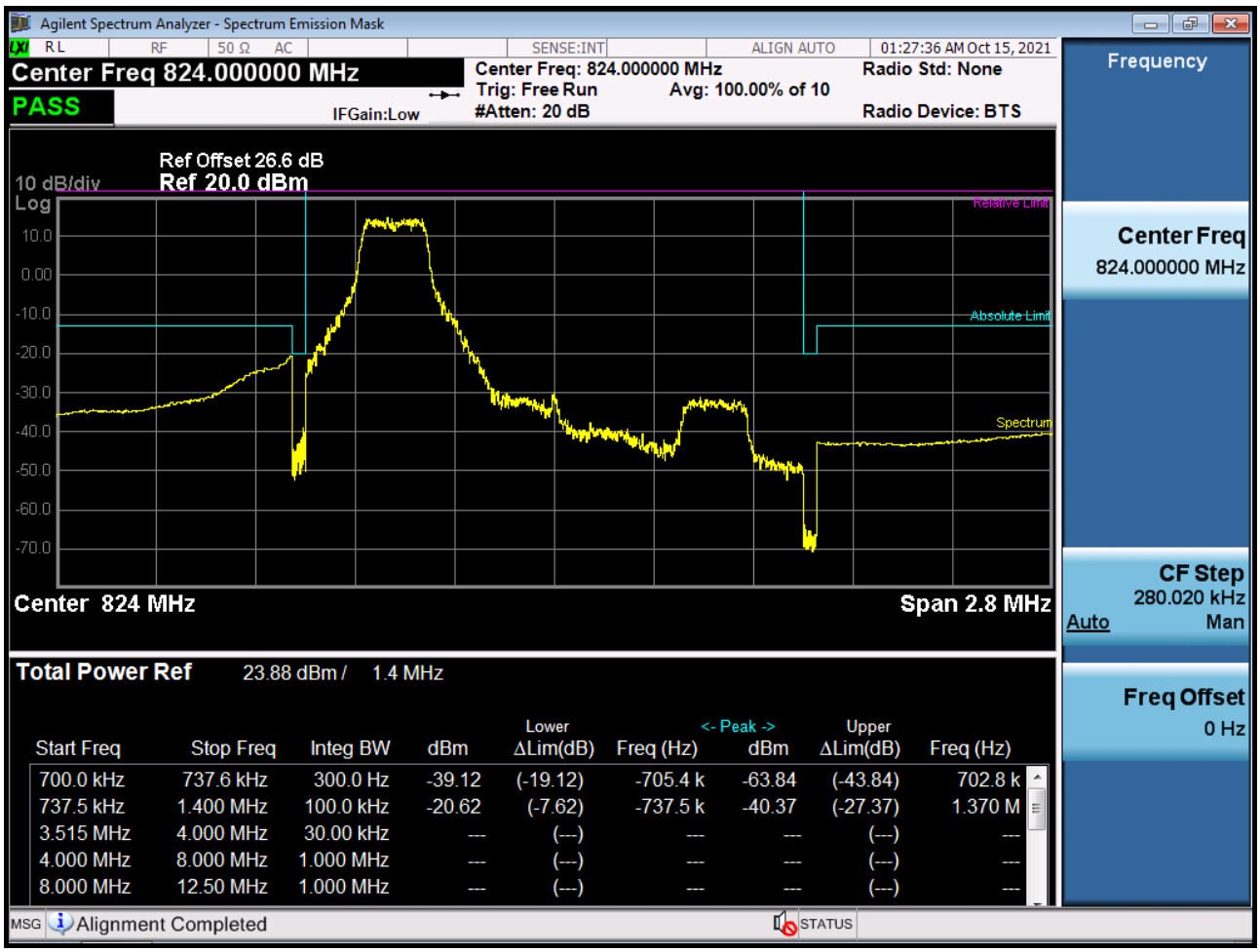
BAND 26. Conducted Spurious (5 MHz_QPSK_RB 1_0)



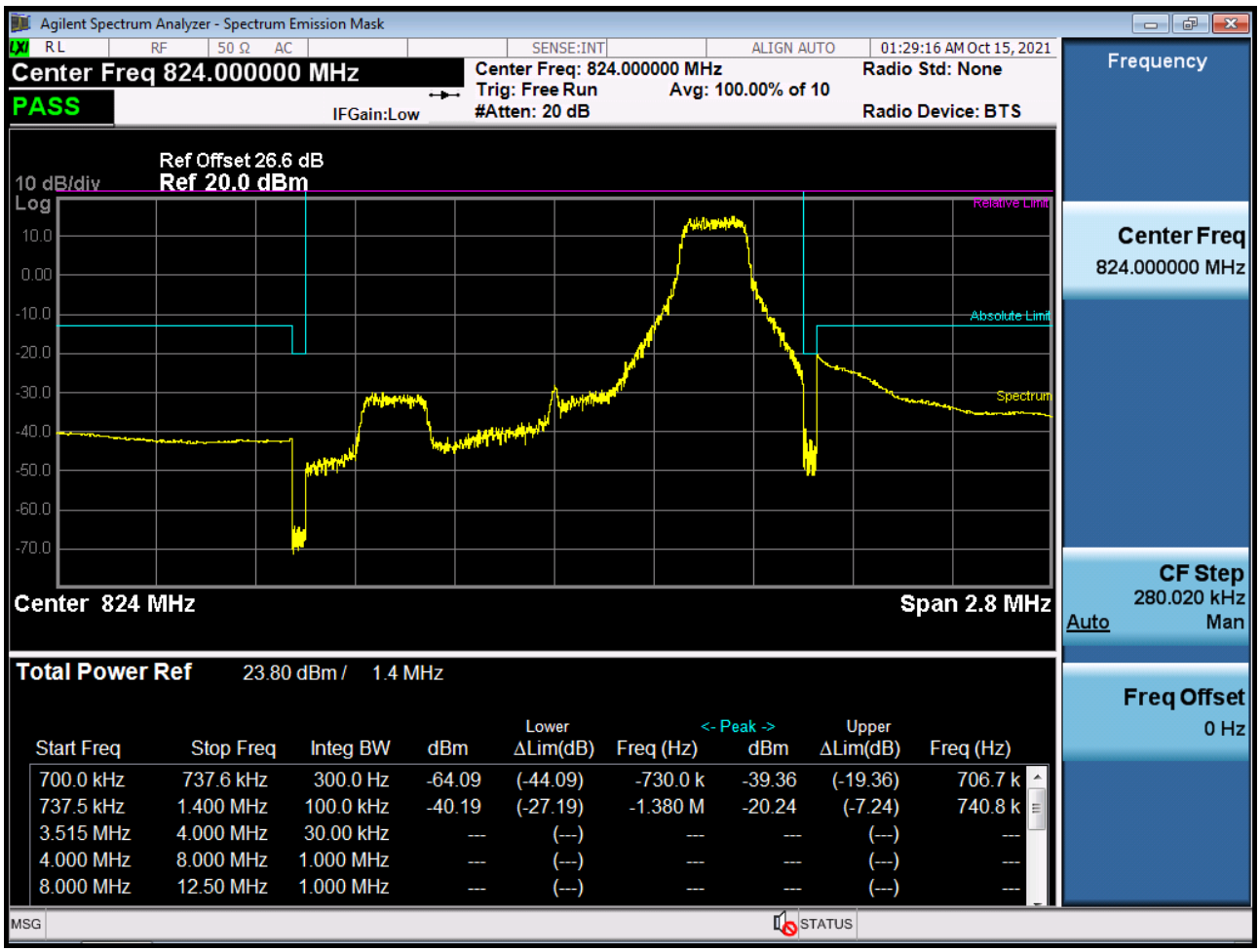
BAND 26. Conducted Spurious (10 MHz_QPSK_RB 1_0)



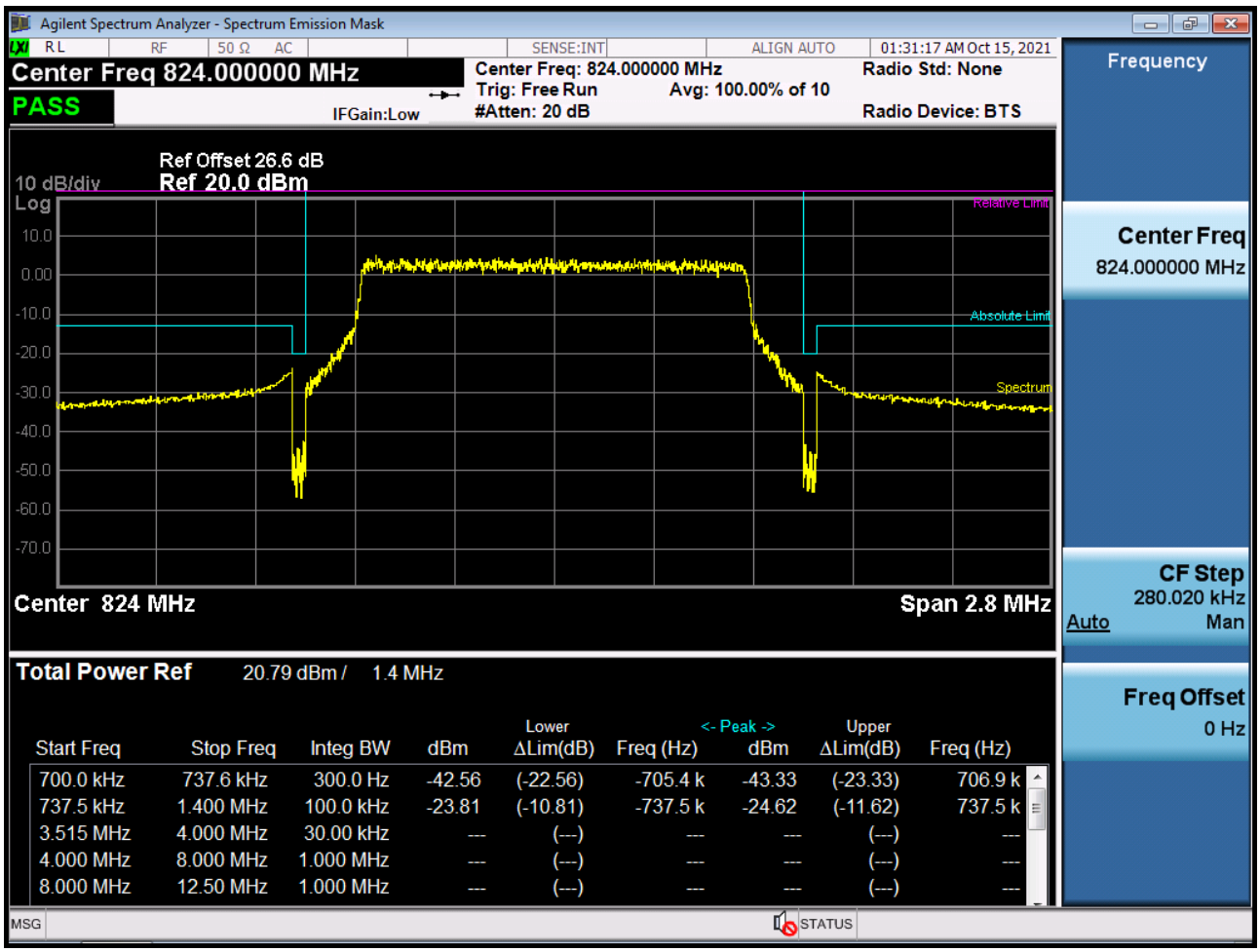
BAND 26. Channel Edge (1.4 MHz_QPSK_RB 1_0)



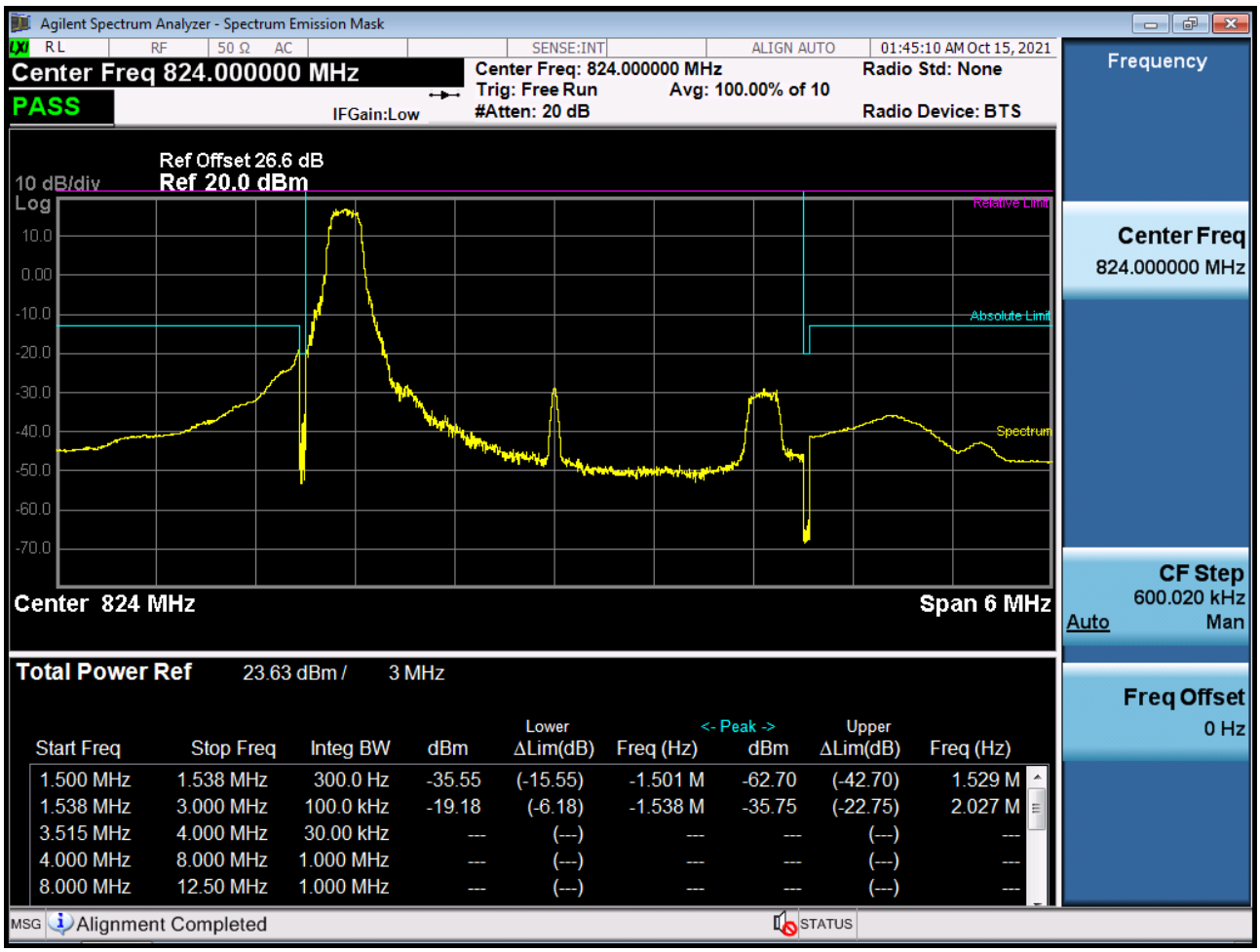
BAND 26. Channel Edge (1.4 MHz_QPSK_RB 1_5)



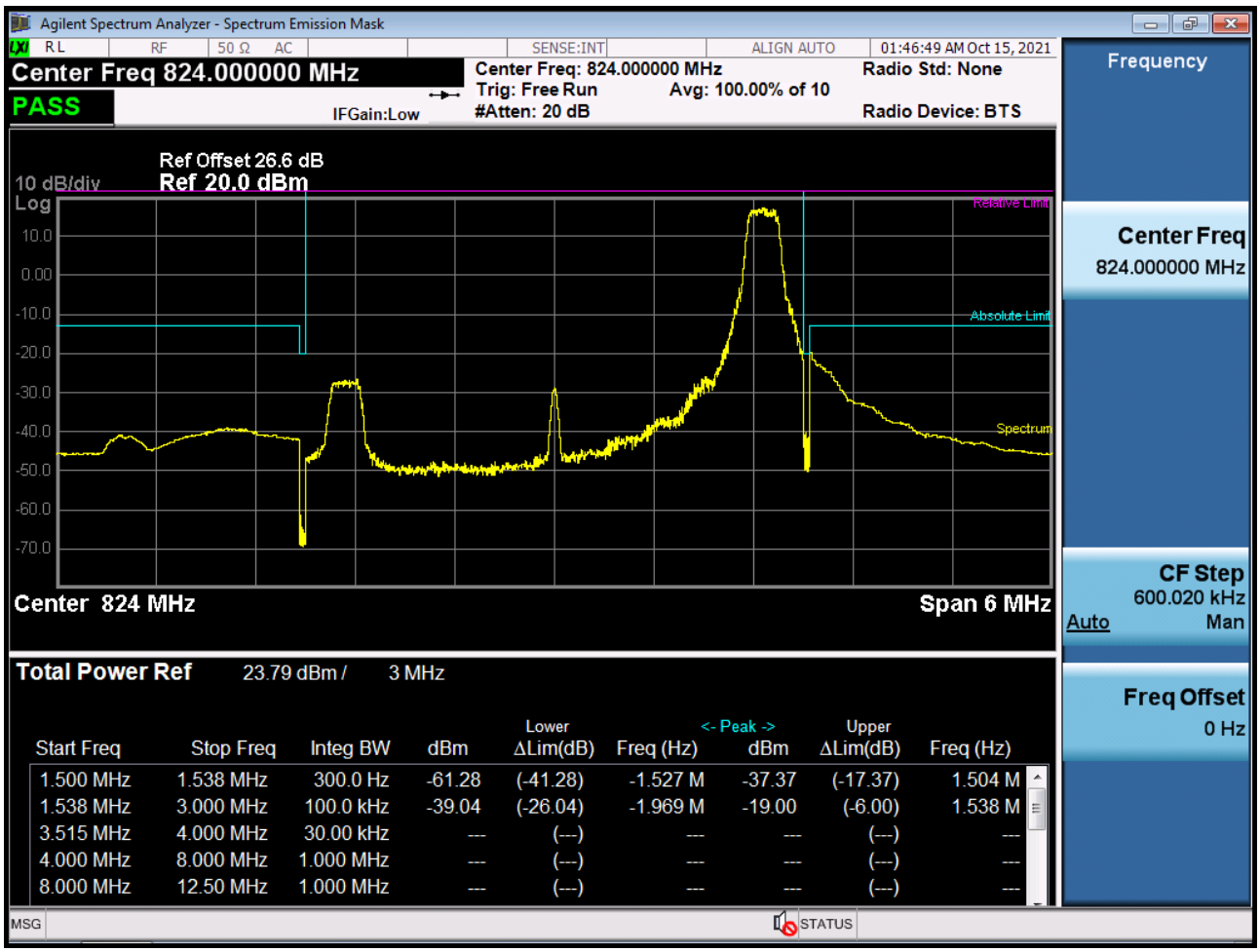
BAND 26. Channel Edge (1.4 MHz_QPSK_Full RB)



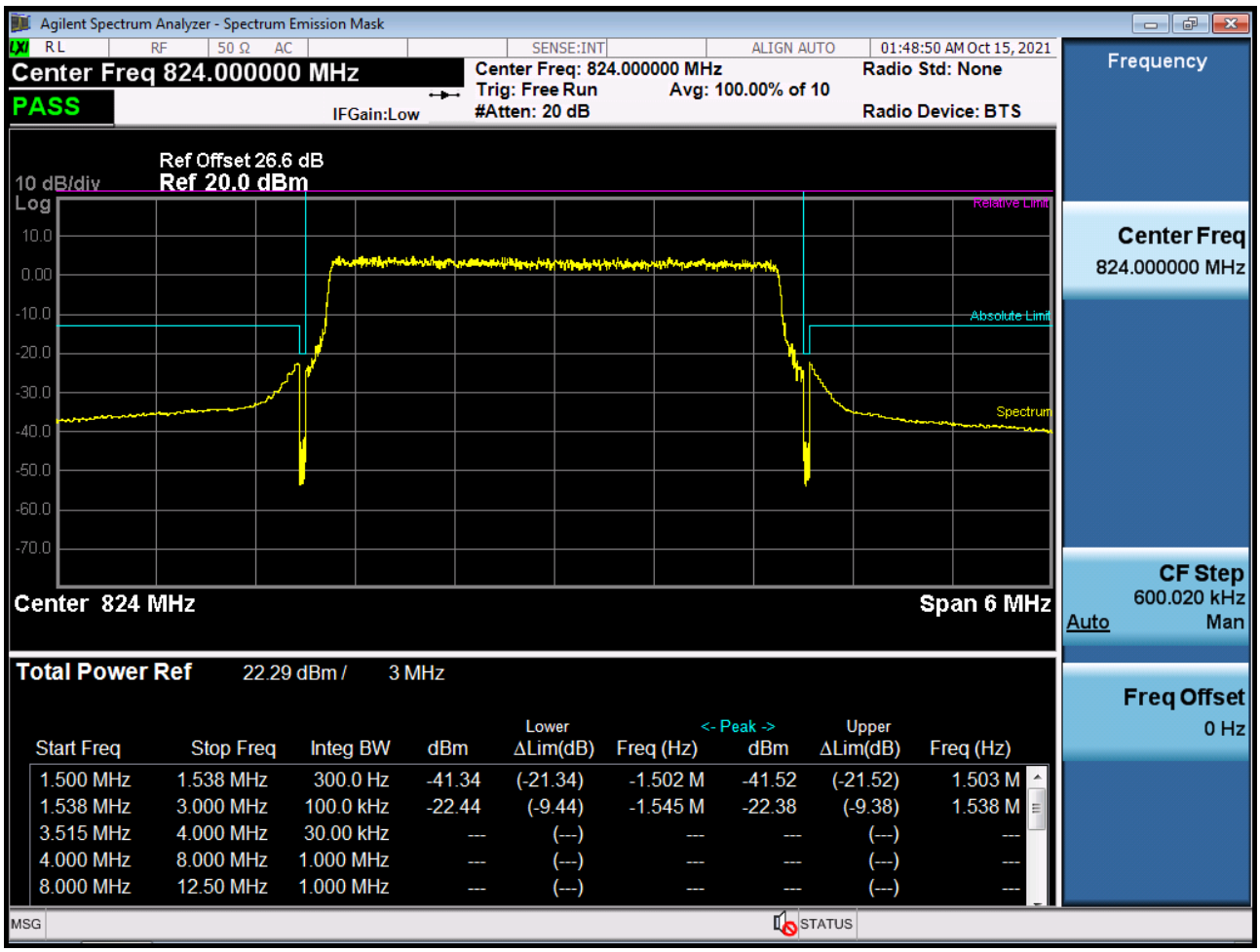
BAND 26. Channel Edge (3 MHz_QPSK_RB 1_0)



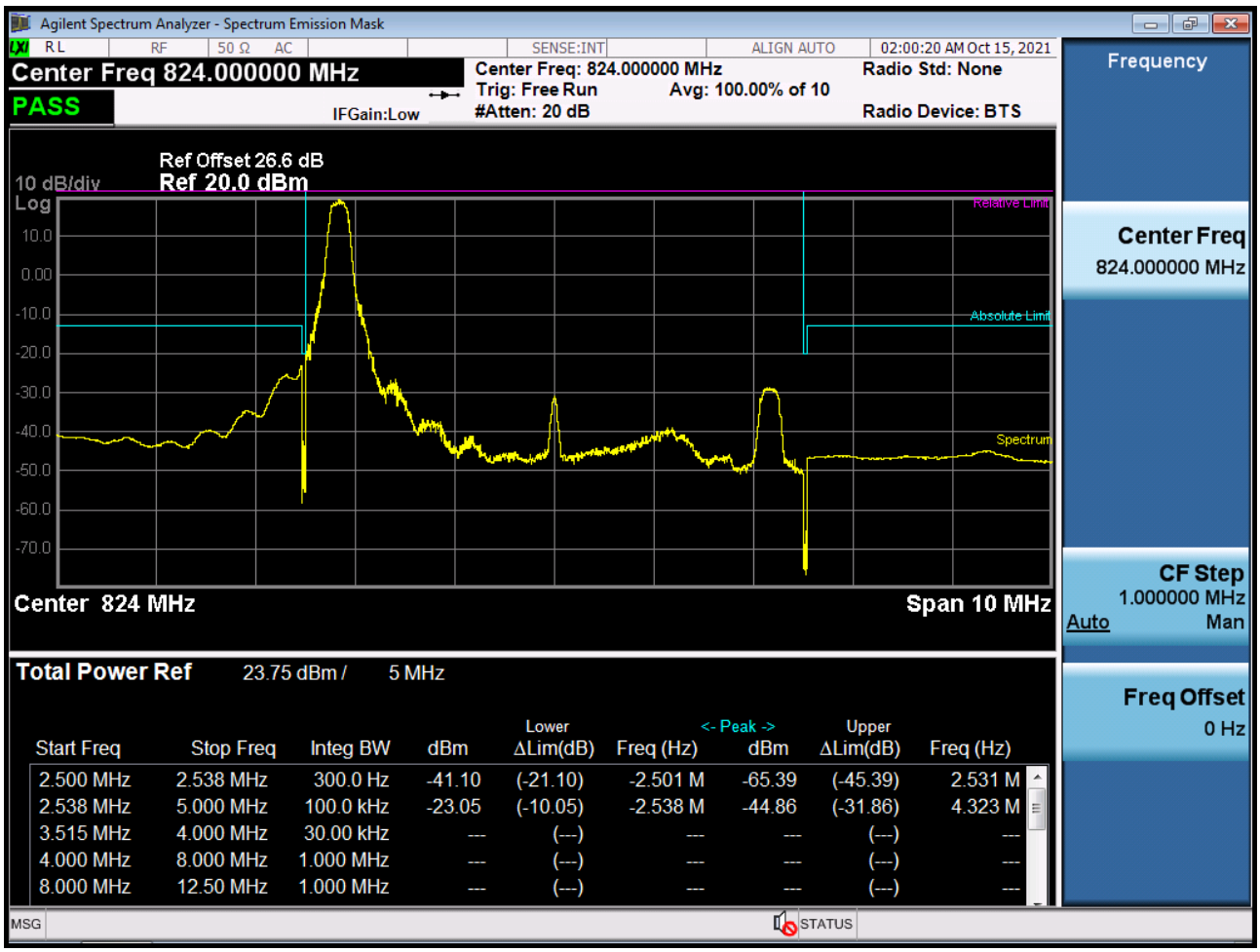
BAND 26. Channel Edge (3 MHz_QPSK_RB 1_14)



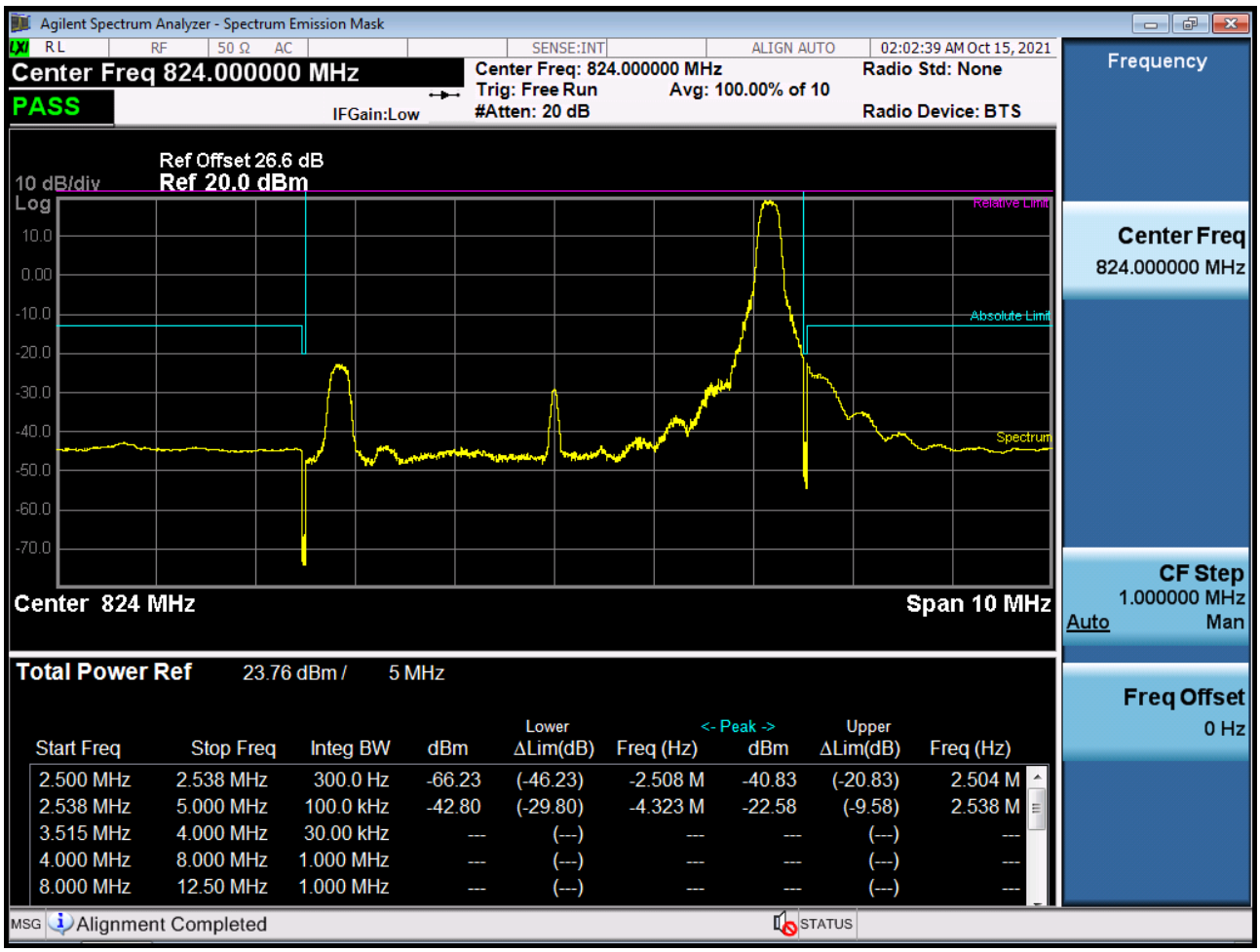
BAND 26. Channel Edge (3 MHz_QPSK_Full RB)



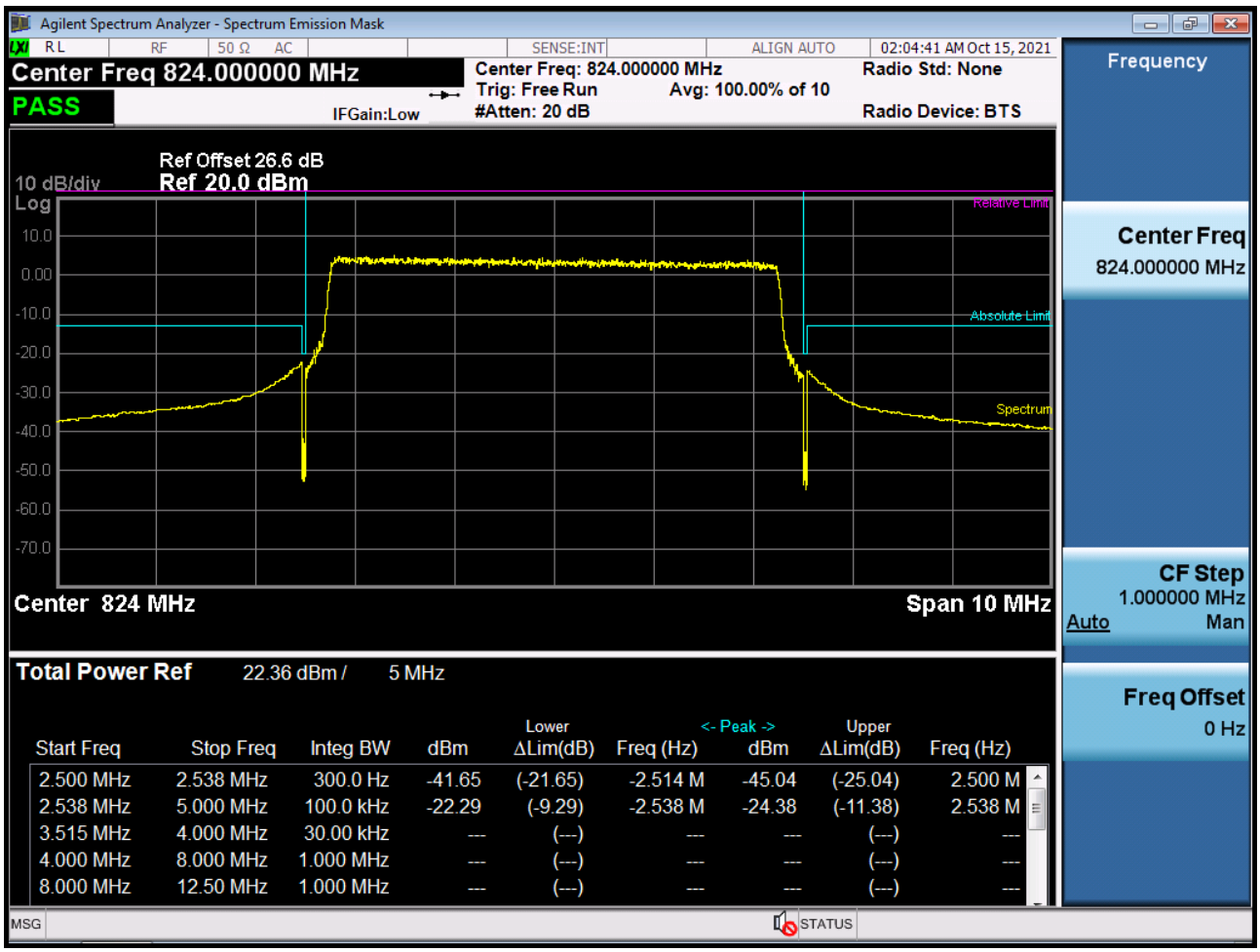
BAND 26. Channel Edge (5 MHz_QPSK_RB 1_0)



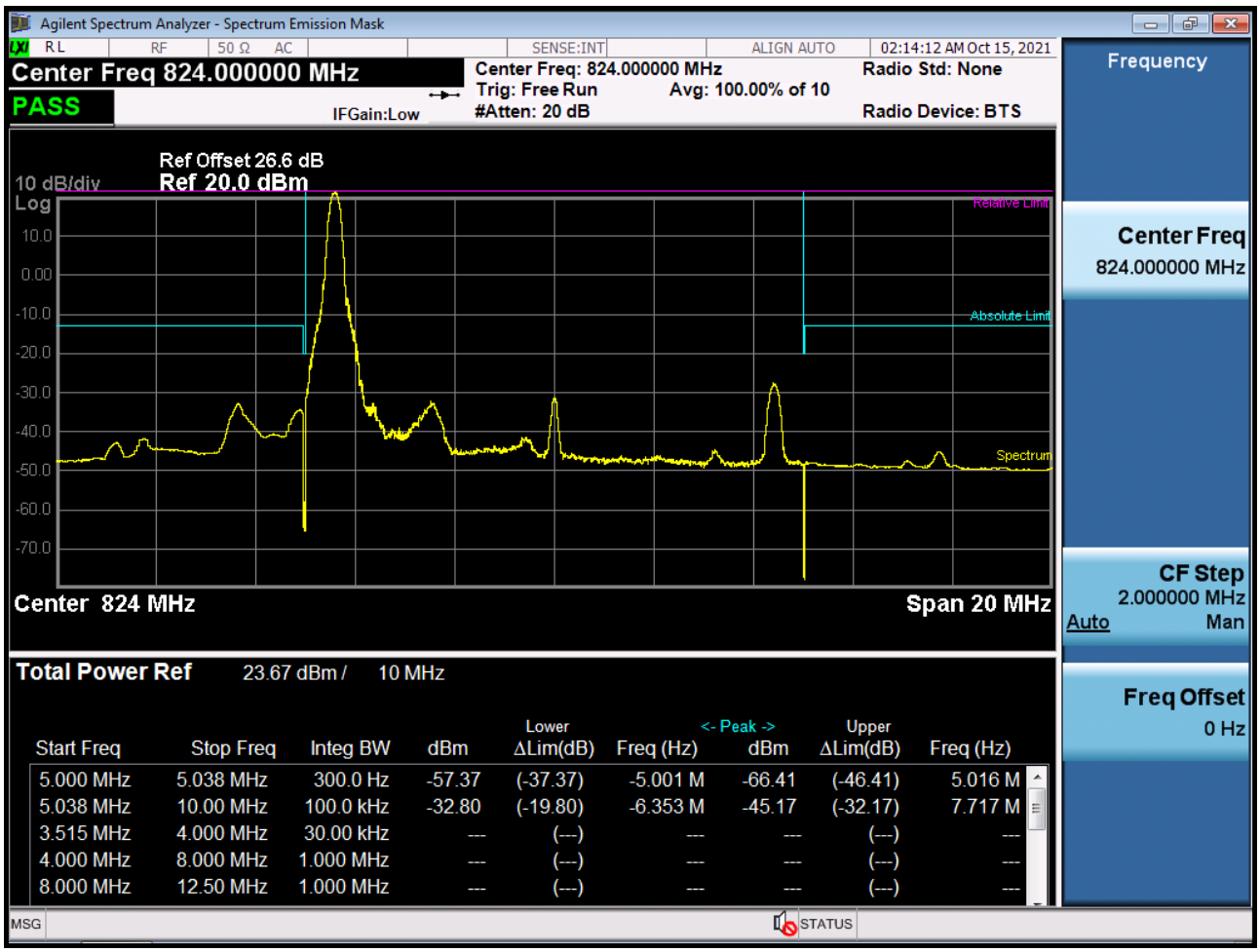
BAND 26. Channel Edge (5 MHz_QPSK_RB 1_24)



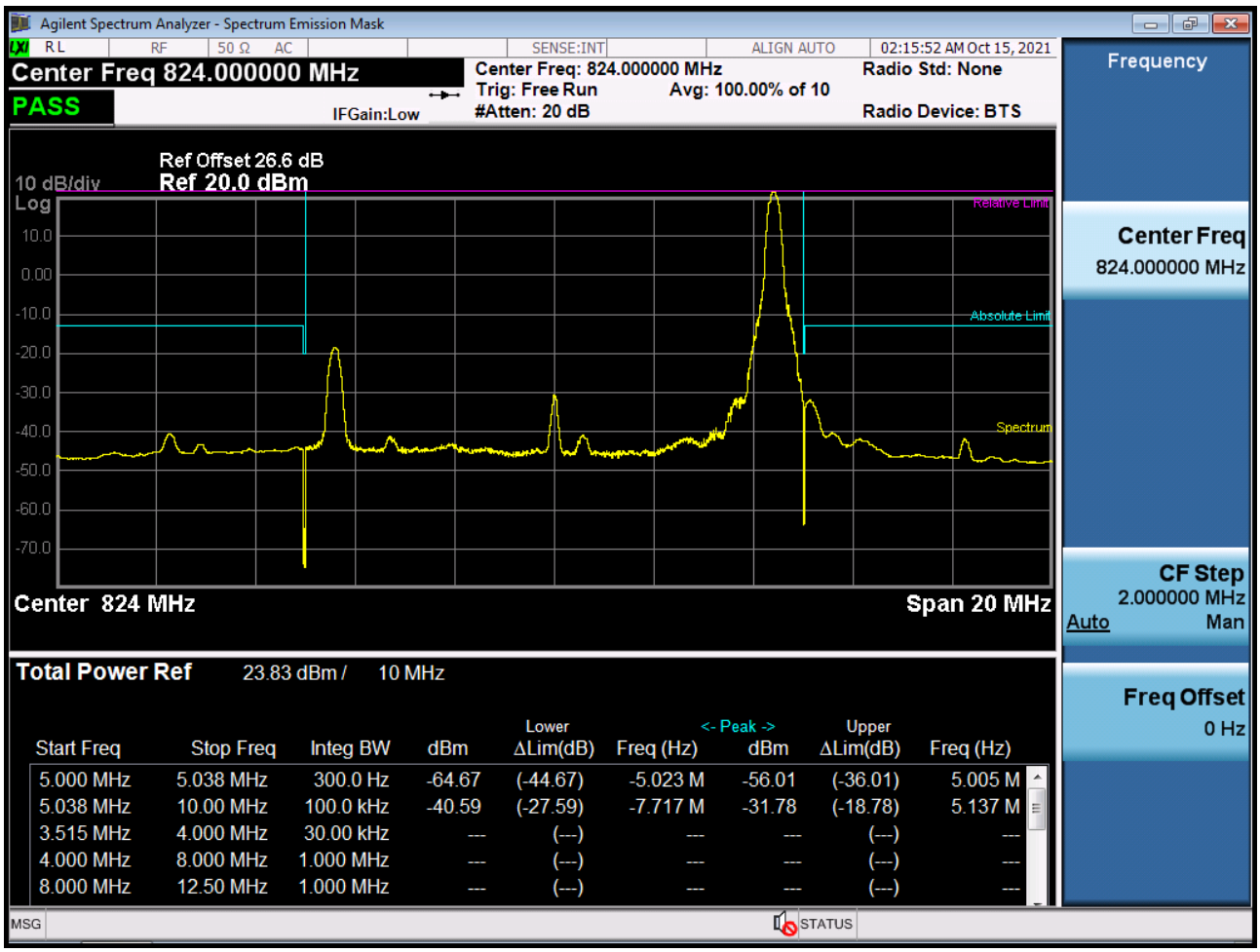
BAND 26. Channel Edge (5 MHz_QPSK_Full RB)



BAND 26. Channel Edge (10 MHz_QPSK_RB 1_0)



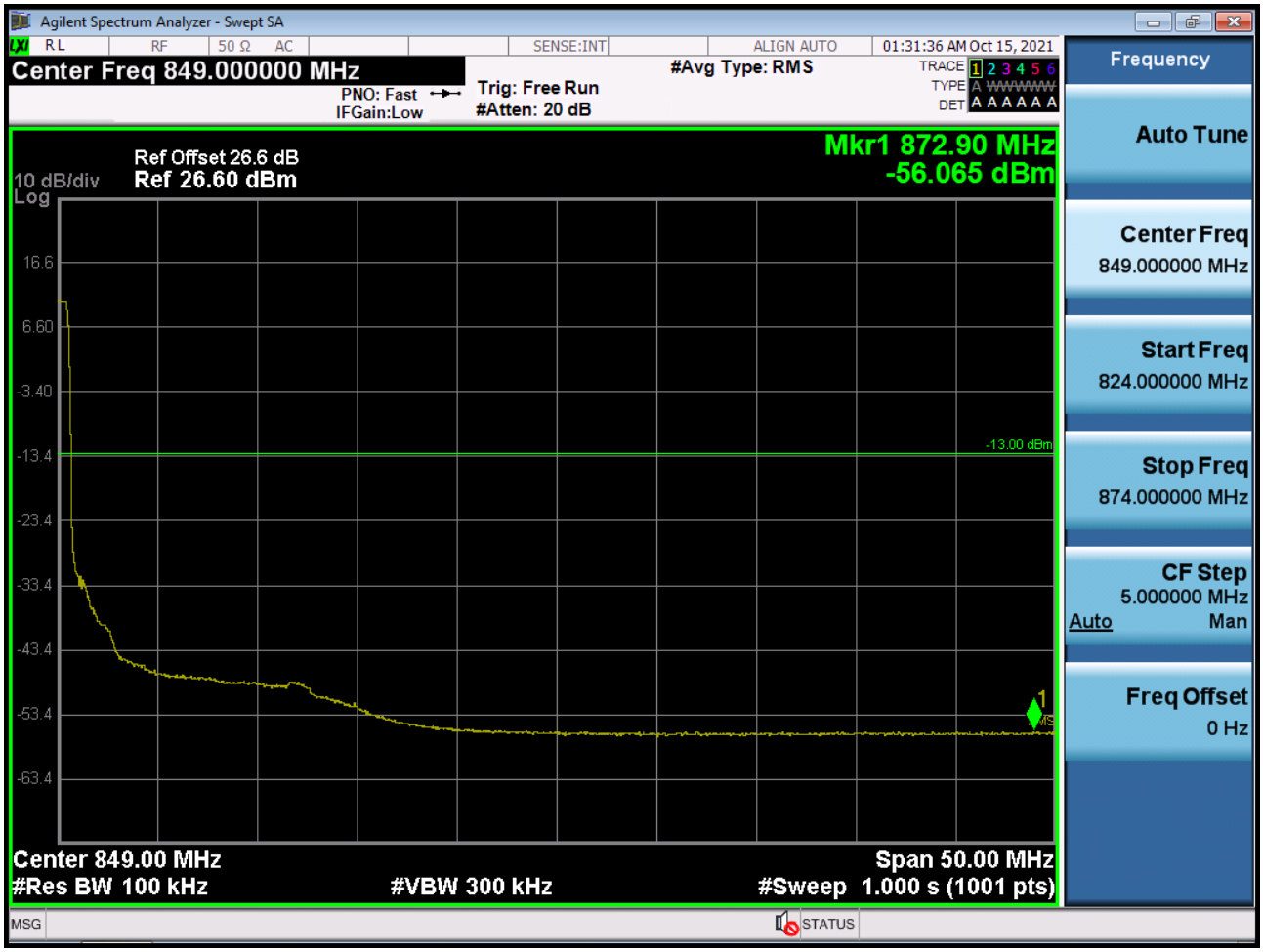
BAND 26. Channel Edge (10 MHz_QPSK_RB 1_49)



BAND 26. Channel Edge (10 MHz_QPSK_Full RB)

BAND 26. Band Edge (1.4 MHz_QPSK_RB 1_5)

BAND 26. Band Edge (1.4 MHz_QPSK_FullRB)



BAND 26. Band Edge (3 MHz_QPSK_RB 1_14)

BAND 26. Band Edge (3 MHz_QPSK_ Full RB)

BAND 26. Band Edge (5 MHz_QPSK_RB 1_24)

BAND 26. Band Edge (5 MHz_QPSK_ Full RB)

BAND 26. Band Edge (10 MHz_QPSK_RB 1_49)

BAND 26. Band Edge (10 MHz_QPSK_ Full RB)

11 ANNEX A_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2110-FC034-P