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FCC/IC 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:
January 13, 2020

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

Report No.: HCT-RF-2001-FI010

FCC ID:	**A3LSMG715U**
IC:	**649E-SMG715W**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**

Model(s):	SM-G715U1
Additional Model(s):	SM-G715W
EUT Type:	Mobile Phone
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§27, §2
IC Rule(s):	RSS-Gen Issue5, RSS-199 Issue 3

	Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	EIRP	
					Max. Power (W)	Max. Power (dBm)
FCC/ IC	Band 41(5)	FCC: 2498.5 – 2687.5 IC: 2502.5 – 2687.5	4M52G7D	QPSK	0.171	22.34
			4M51W7D	16QAM	0.133	21.24
			4M51W7D	64QAM	0.107	20.29
	Band 41(10)	FCC: 2501.0 – 2685.0 IC: 2505.0 – 2685.0	9M03G7D	QPSK	0.169	22.29
			9M00W7D	16QAM	0.130	21.13
			9M00W7D	64QAM	0.105	20.23
	Band 41(15)	FCC: 2503.5 – 2682.5 IC: 2507.5 – 2682.5	13M4G7D	QPSK	0.175	22.44
			13M4W7D	16QAM	0.138	21.40
			13M5W7D	64QAM	0.110	20.41
	Band 41(20)	FCC: 2506.0 – 2680.0 IC: 2510.0 – 2680.0	17M9G7D	QPSK	0.166	22.21
			17M9W7D	16QAM	0.128	21.06
			17M8W7D	64QAM	0.104	20.19

The measurements shown in this report were made in accordance with the procedures specified in CFR47 section §2.947. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.
HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)

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

Report approved by : Kwon Jeong
Manager of Telecommunication Testing Center

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2001-FI010	January 13, 2020	- First Approval Report

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

This laboratory is not accredited for the test results marked *.

The above Test Report is the accredited test result by KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA.(HCT Accreditation No.: KT197)

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:	A3LSMG715U
IC	649E-SMG715W
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§27, §2
IC Rule(s):	RSS-Gen Issue5, RSS-199 Issue 3
EUT Type:	Mobile Phone
Model(s):	SM-G715U1
Additional Model(s):	SM-G715W
FCC Tx Frequency:	2498.5 – 2687.5 : 5 MHz 2501.0 – 2685.0 : 10 MHz 2503.5 – 2682.5 : 15 MHz 2506.0 – 2680.0 : 20 MHz
IC Tx Frequency:	2502.5 – 2687.5 : 5 MHz 2505.0 – 2685.0 : 10 MHz 2507.5 – 2682.5 : 15 MHz 2510.0 – 2680.0 : 20 MHz
Date(s) of Tests:	December 17, 2019 ~ January 08, 2020

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 (HT20/40/80), Bluetooth, BT LE, NFC, ANT+.

2.2. MEASURING INSTRUMENT CALIBRATION

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

2.3. TEST FACILITY

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

3. DESCRIPTION OF TESTS

3.1 TEST PROCEDURE

Test Description	Test Procedure Used
Occupied Bandwidth	- KDB 971168 D01 v03r01 – Section 4.3 - ANSI C63.26-2015 – Section 5.4.4
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	- 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 NormalHz
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 NormalHz for emissions above 1GHz
2. VBW ≥ 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points > 2 x span / RBW
5. Detector = Peak
6. Trace mode = Max Hold
7. The trace was allowed to stabilize
8. Test channel : Low/ Middle/ High
9. Frequency range : We are performed all frequency to 10^{th} harmonics from 9 kHz.

Test Note

1. Measurements value show only up to 3 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
2. The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the test data
3. For spurious emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator and the previously recorded signal was duplicated.
   The spurious emissions is calculated by the following formula;

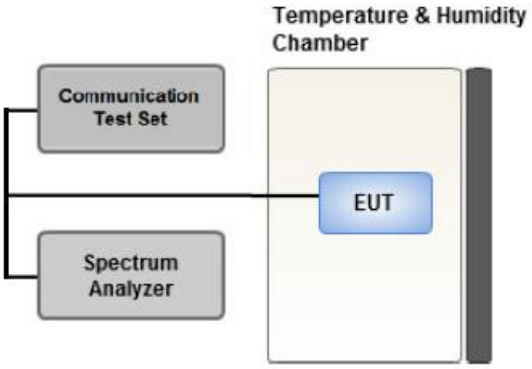
$$Result_{(dBm)} = Pg_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dBi)}$$

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

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

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

3.4 PEAK- TO- AVERAGE RATIO



Test setup

① CCDF Procedure for PAPR

Test Settings

1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Set the measurement interval as follows:
   .- for continuous transmissions, set to 1 ms,
   .- or burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
4. Record the maximum PAPR level associated with a probability of 0.1%.

② Alternate Procedure for PAPR

Use one of the procedures presented in 5.2(ANSI C63.26-2015) to measure the total peak power and record as P_{Pk}.

Use one of the applicable procedures presented 5.2(ANSI C63.26-2015) to measure the total average power and record as P_{Avg}. Determine the P.A.R. from:

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

Test Settings(Peak Power)

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

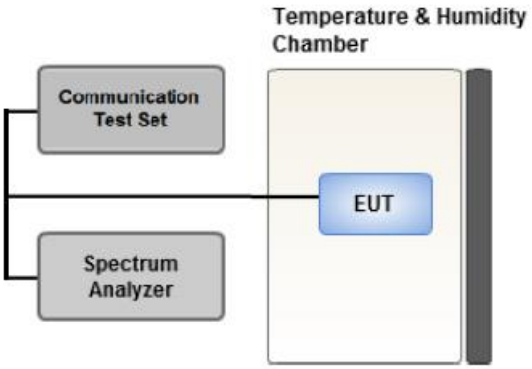
1. Set the RBW ≥ OBW.
2. Set VBW ≥ 3 × RBW.
3. Set span ≥ 2 × OBW.
4. Sweep time ≥ 10 × (number of points in sweep) × (transmission symbol period).
5. Detector = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the peak amplitude level.

Test Settings(Average Power)

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

   Set ≥ [10 × (number of points in sweep) × (transmission period)] for single sweep (automation-compatible) measurement. The transmission period is the (on + off) time.
6. Detector = power averaging (rms).
7. Set sweep trigger to “free run.”
8. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. (To accurately determine the average power over the on and off period of the transmitter, it can be necessary to increase the number of traces to be averaged above 100 or, if using a manually configured sweep time, increase the sweep time.)
9. Use the peak marker function to determine the maximum amplitude level.
10. Add [10 log (1/duty cycle)] to the measured maximum power level to compute the average power during continuous transmission. For example, add [10 log (1/0.25)] = 6 dB if the duty cycle is a constant 25%.

3.5 OCCUPIED BANDWIDTH.



Test setup

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

The EUT makes a call to the communication simulator.

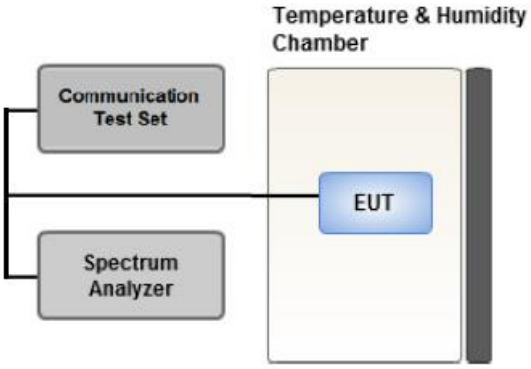
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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

Test Settings

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

3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



Test setup

Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

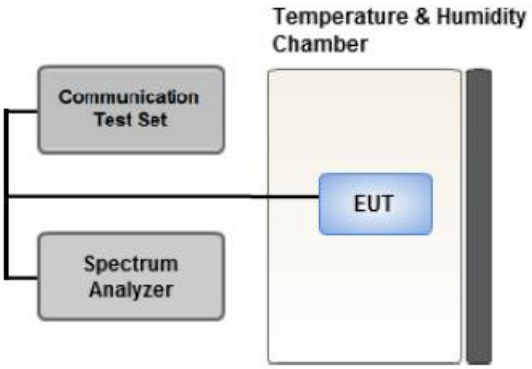
Test Settings

1. RBW = 1 MHz
2. VBW ≥ 3 MHz
3. Detector = RMS
4. Trace Mode = Average
5. Sweep time = auto
6. Number of points in sweep ≥ 2 x Span / RBW

Test Notes

1. Duty Cycle factor already applied on the factor.
   - Duty Cycle factor(dB) = 3.98
   - Factor(dB) = Duty Cycle factor + Cable Loss + Ext. Attenuator + Power Splitter
   - Result(dBm) = Reading + Factor

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.

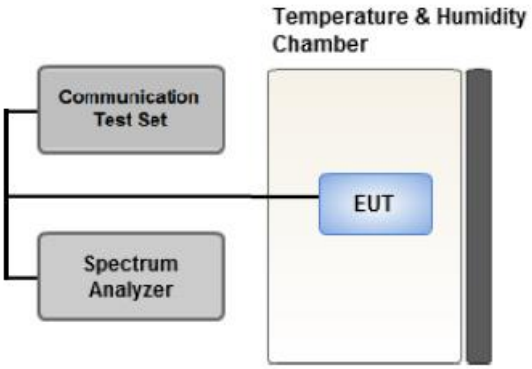
Test Settings

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. Within 1MHz of the channel edge the RBW should be 2% of EBW, then 1 MHz after that.
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

1. The attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge,
2. 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge.
3. 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge.
4. The attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz.
5. 55 + 10 log (P) dB at or below 2490.5 MHz.
6. X is the greater of 6MHz or the actual emission bandwidth
7. 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)

- 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.
- The worst case is reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the test data.
- Please refer to the table below.
- All modes of operation were investigated and the worst case configuration results are reported.
- Please refer to the table below.
- SM-G715U1 & additional models were tested and the worst case results are reported.

(Worst case : SM-G715U1)

[Worst case]

Test Description	Modulation	RB size	RB offset	Axis
Effective Isotropic Radiated Power	QPSK, 16QAM, 64QAM	1	0	Z
Radiated Spurious and Harmonic Emissions	QPSK	1	0	Y

3.10 WORST CASE(CONDUCTED TEST)

- Worst case : Of all modulation, We have tested modulation of the high Conducted Output Power.
  Conducted Output Power value can be confirmed on the SAR report.
- SM-G715U1 & additional models were tested and the worst case results are reported.

(Worst case : SM-G715U1)

[Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset
Occupied Bandwidth	QPSK, 16QAM, 64QAM	5, 10, 15, 20	Mid	Full RB	0
Peak-To-Average Radio	QPSK, 16QAM, 64QAM	5, 10, 15, 20	Mid	Full RB	0
Channel Edge	QPSK	5	Low	1	0
			High	1	24
		10	Low	1	0
			High	1	49
		15	Low	1	0
			High	1	74
		20	Low	1	0
			High	1	99
		5, 10, 15, 20	Low, Mid, High	Full RB	0
Spurious and Harmonic Emissions at Antenna Terminal	QPSK	5, 10, 15, 20	Low, Mid, High	1	0

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	-	06/10/2019	Annual	06/10/2020
T&M SYSTEM	FBSR-02B(WHK3.3/18G-10EF)/H.P.F	-	06/10/2019	Annual	06/10/2020
WAINWRIGHT INSTRUMENT	WHNX6.0/26.5G-6SS/H.P.F	1	03/20/2019	Annual	03/20/2020
Hewlett Packard	11667B / Power Splitter(DC~26.5 GHz)	11275	05/03/2019	Annual	05/03/2020
Agilent	E3632A/DC Power Supply	MY40004326	07/01/2019	Annual	07/01/2020
Schwarzbeck	UHAP/ Dipole Antenna	557	03/29/2019	Biennial	03/29/2021
Schwarzbeck	UHAP/ Dipole Antenna	558	03/29/2019	Biennial	03/29/2021
ESPEC	SU-642 / Chamber	93000717	08/14/2019	Annual	08/14/2020
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	147	08/29/2019	Biennial	08/29/2021
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	9120D-1298	09/25/2019	Biennial	09/25/2021
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170342	04/29/2019	Biennial	04/29/2021
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170124	01/28/2019	Biennial	01/28/2021
Agilent	N9020A/Signal Analyzer(10Hz~26.5GHz)	MY51110063	05/08/2019	Annual	05/08/2020
Hewlett Packard	8493C/ATTENUATOR(20dB)	17280	06/04/2019	Annual	06/04/2020
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	08/23/2018	Biennial	08/23/2020
Schwarzbeck	VULB9160/ Bilog Antenna	9160-3368	08/09/2018	Biennial	08/09/2020
Schwarzbeck	VULB9160/ Hybrid Antenna	760	03/22/2019	Biennial	03/22/2021
Anritsu Corp.	MT8821C/Wideband Radio Communication Tester	6201502997	08/09/2019	Annual	08/09/2020
Anritsu Corp.	MT8820C/Wideband Radio Communication Tester	6201026545	01/30/2019	Annual	01/30/2020
REOHDE & SCHWARZ	SMB100A/ SIGNAL GENERATOR (100kHz~40GHz)	177633	07/15/2019	Annual	07/15/2020
REOHDE & SCHWARZ	ESU40 / EMI TEST RECEIVER	100524	05/17/2019	Annual	05/17/2020
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. 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
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)	IC Section(s)	Test Limit	Test Result
Occupied Bandwidth	§2.1049	RSS Gen(6.7)	N/A	PASS
Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	§2.1051, §27.53(m)(4)	RSS-199(4.5)	■ < 40 + 10log10 (P[Watts]) at Channel edges ■ < 43 + 10log10 (P[Watts]) between 5 and X MHz from Channel edges ■ < 55 + 10log10 (P[Watts]) beyond X MHz beyond from Channel edges ■ < 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz	PASS
Conducted Output Power	§2.1046	-	N/A	See Note1
Peak- to- Average Ratio	§27.50(d)(5)	RSS 199(4.4)	< 13 dB	PASS
Frequency stability / variation of ambient temperature	§2.1055, §27.54	RSS-199(4.3)	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)	IC Section(s)	Test Limit	Test Result
Equivalent Isotropic Radiated Power	§27.50(h)(2)	RSS-199(4.4)	< 2 Watts max. EIRP	PASS
Radiated Spurious and Harmonic Emissions	§2.1053, §27.53(m)(4)	RSS-199(4.5)	< 55 + 10log10 (P[Watts])	PASS
Receiver Spurious Emissions	N/A	RSS Gen(7)	Section 8.8	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
40620	2593.0	-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

16QAM Modulation

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

64QAM 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

8.1.1 FCC

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
2498.5	LTE B41 5 MHz	QPSK	-23.95	12.80	10.70	2.31	V	< 2.00	0.132	21.19
		16-QAM	-24.99	11.76	10.70	2.31	V		0.104	20.15
		64-QAM	-25.89	10.86	10.70	2.31	V		0.084	19.25
2593.0		QPSK	-23.08	13.71	10.98	2.35	V		0.171	22.34
		16-QAM	-24.18	12.61	10.98	2.35	V		0.133	21.24
		64-QAM	-25.13	11.66	10.98	2.35	V		0.107	20.29
2687.5		QPSK	-26.70	10.46	11.10	2.39	V		0.083	19.17
		16-QAM	-27.74	9.42	11.10	2.39	V		0.065	18.13
		64-QAM	-28.74	8.42	11.10	2.39	V		0.052	17.13

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
2501.0	LTE B41 10 MHz	QPSK	-23.93	12.82	10.70	2.31	V	< 2.00	0.132	21.21
		16-QAM	-24.99	11.76	10.70	2.31	V		0.104	20.15
		64-QAM	-25.93	10.82	10.70	2.31	V		0.083	19.21
2593.0		QPSK	-23.13	13.66	10.98	2.35	V		0.169	22.29
		16-QAM	-24.29	12.50	10.98	2.35	V		0.130	21.13
		64-QAM	-25.19	11.60	10.98	2.35	V		0.105	20.23
2685.0		QPSK	-26.45	10.62	11.10	2.39	V		0.086	19.33
		16-QAM	-27.60	9.47	11.10	2.39	V		0.066	18.18
		64-QAM	-28.56	8.51	11.10	2.39	V		0.053	17.22

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
2503.5	LTE B41 15 MHz	QPSK	-23.97	12.78	10.70	2.31	V	< 2.00	0.131	21.17
		16-QAM	-24.91	11.84	10.70	2.31	V		0.105	20.23
		64-QAM	-26.02	10.73	10.70	2.31	V		0.082	19.12
2593.0		QPSK	-22.98	13.81	10.98	2.35	V		0.175	22.44
		16-QAM	-24.02	12.77	10.98	2.35	V		0.138	21.40
		64-QAM	-25.01	11.78	10.98	2.35	V		0.110	20.41
2682.5		QPSK	-26.58	10.40	11.10	2.38	V		0.082	19.12
		16-QAM	-27.65	9.33	11.10	2.38	V		0.064	18.05
		64-QAM	-28.55	8.43	11.10	2.38	V		0.052	17.15

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
2506.0	LTE B41 20 MHz	QPSK	-24.00	12.67	10.73	2.32	V	< 2.00	0.128	21.08
		16-QAM	-24.99	11.68	10.73	2.32	V		0.102	20.09
		64-QAM	-26.08	10.59	10.73	2.32	V		0.079	19.00
2593.0		QPSK	-23.21	13.58	10.98	2.35	V		0.166	22.21
		16-QAM	-24.36	12.43	10.98	2.35	V		0.128	21.06
		64-QAM	-25.23	11.56	10.98	2.35	V		0.104	20.19
2680.0		QPSK	-26.03	10.95	11.10	2.38	V		0.093	19.67
		16-QAM	-27.18	9.80	11.10	2.38	V		0.071	18.52
		64-QAM	-28.11	8.87	11.10	2.38	V		0.057	17.59

8.1.2 IC Low

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
2502.5	LTE B41/ 5 MHz	QPSK	-25.48	11.27	10.70	2.31	V	< 2.00	0.093	19.66
		16-QAM	-26.45	10.30	10.70	2.31	V		0.074	18.69
		64-QAM	-27.60	9.15	10.70	2.31	V		0.057	17.54

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
2505.0	LTE B41/ 10 MHz	QPSK	-25.53	11.14	10.73	2.32	V	< 2.00	0.090	19.55
		16-QAM	-26.63	10.04	10.73	2.32	V		0.070	18.45
		64-QAM	-27.65	9.02	10.73	2.32	V		0.055	17.43

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
2507.5	LTE B41/ 15 MHz	QPSK	-25.04	11.55	10.75	2.32	V	< 2.00	0.100	19.98
		16-QAM	-26.20	10.39	10.75	2.32	V		0.076	18.82
		64-QAM	-27.06	9.53	10.75	2.32	V		0.063	17.96

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
2510.0	LTE B41/ 20 MHz	QPSK	-25.05	11.54	10.75	2.32	V	< 2.00	0.099	19.97
		16-QAM	-26.23	10.36	10.75	2.32	V		0.076	18.79
		64-QAM	-27.28	9.31	10.75	2.32	V		0.059	17.74

8.2 RADIATED SPURIOUS EMISSIONS

8.2.1 FCC

▣ OPERATING FREQUENCY : 2593.0 MHz

▣ MEASURED OUTPUT POWER: 22.34 dBm = 0.171 W

▣ MODE: LTE B41

▣ MODULATION SIGNAL: 5 MHz QPSK

▣ DISTANCE: 1 meters

▣ LIMIT: 55 + 10 log10 (W) = 47.34 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
39675 (2498.5)	4,997.00	-50.15	12.70	-61.94	3.35	H	-52.59	74.93
	7,495.50	-48.10	11.20	-49.78	4.29	V	-42.87	65.21
	9,994.00	-51.01	11.89	-49.32	5.04	H	-42.47	64.81
	12,492.50	-48.72	13.88	-47.15	5.78	H	-39.05	61.39
40620 (2593.0)	5,186.00	-48.11	12.75	-59.88	3.44	H	-50.57	72.91
	7,779.00	-44.25	11.65	-46.89	4.36	H	-39.60	61.94
	10,372.00	-51.38	10.75	-48.12	5.16	H	-42.53	64.87
	12,965.00	-49.03	13.40	-43.60	5.81	V	-36.01	58.35
41565 (2687.5)	5,375.00	-44.86	13.52	-56.13	3.52	H	-46.13	68.47
	8,062.50	-46.75	10.93	-47.36	4.45	H	-40.88	63.22
	10,750.00	-51.62	10.90	-48.04	5.31	H	-42.45	64.79
	13,437.50	-48.87	12.63	-41.85	5.84	V	-35.06	57.40

▣ OPERATING FREQUENCY : 2593.0 MHz

▣ MEASURED OUTPUT POWER: 22.29 dBm = 0.169 W

▣ MODE: LTE B41

▣ MODULATION SIGNAL: 10 MHz QPSK

▣ DISTANCE: 1 meters

▣ LIMIT: 55 + 10 log10 (W) = 47.29 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
39700 (2501.0)	5,002.00	-51.01	12.70	-62.80	3.35	H	-53.45	75.74
	7,503.00	-52.05	11.20	-53.62	4.29	V	-46.71	69.00
	10,004.00	-52.18	10.84	-49.47	5.03	V	-43.66	65.95
	12,505.00	-53.97	13.90	-51.94	5.72	V	-43.76	66.05
40620 (2593.0)	5,186.00	-51.34	12.75	-63.11	3.44	H	-53.80	76.09
	7,779.00	-47.20	11.65	-49.84	4.36	V	-42.55	64.84
	10,372.00	-50.67	10.75	-47.41	5.16	V	-41.82	64.11
	12,965.00	-50.47	13.40	-45.04	5.81	V	-37.45	59.74
41540 (2685.0)	5,370.00	-53.37	13.25	-64.45	3.52	V	-54.72	77.01
	8,055.00	-46.92	10.92	-47.52	4.46	V	-41.06	63.35
	10,740.00	-56.38	10.90	-53.08	5.29	V	-47.47	69.76
	13,425.00	-53.92	12.65	-47.38	5.87	V	-40.60	62.89

▣ OPERATING FREQUENCY : 2593.0 MHz

▣ MEASURED OUTPUT POWER: 22.44 dBm = 0.175 W

▣ MODE: LTE B41

▣ MODULATION SIGNAL: 15 MHz QPSK

▣ DISTANCE: 1 meters

▣ LIMIT: 55 + 10 log10 (W) = 47.44 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
39725 (2503.5)	5,007.00	-49.37	12.65	-60.42	3.35	H	-51.12	73.56
	7,510.50	-51.69	11.25	-53.46	4.29	V	-46.50	68.94
	10,014.00	-52.29	11.02	-49.51	5.03	V	-43.52	65.96
	12,517.50	-55.41	13.90	-53.10	5.66	V	-44.86	67.30
40620 (2593.0)	5,186.00	-49.12	12.75	-60.89	3.44	H	-51.58	74.02
	7,779.00	-49.08	11.65	-51.72	4.36	V	-44.43	66.87
	10,372.00	-51.16	10.75	-47.90	5.16	V	-42.31	64.75
	12,965.00	-48.95	13.40	-43.52	5.81	V	-35.93	58.37
41515 (2682.5)	5,365.00	-51.45	13.27	-62.55	3.52	V	-52.80	75.24
	8,047.50	-47.09	10.90	-47.67	4.46	H	-41.23	63.67
	10,730.00	-55.19	10.90	-52.01	5.25	V	-46.36	68.80
	13,412.50	-52.31	12.68	-45.74	5.87	V	-38.93	61.37

▣ OPERATING FREQUENCY : 2593.0 MHz

▣ MEASURED OUTPUT POWER: 22.21 dBm = 0.166 W

▣ MODE: LTE B41

▣ MODULATION SIGNAL: 20 MHz QPSK

▣ DISTANCE: 1 meters

▣ LIMIT: 55 + 10 log10 (W) = 47.21 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
39750 (2506.0)	5,012.00	-48.99	12.65	-60.04	3.35	H	-50.74	72.95
	7,518.00	-51.19	11.30	-53.18	4.30	V	-46.18	68.39
	10,024.00	-53.29	11.05	-50.43	5.02	H	-44.40	66.61
	12,530.00	-53.87	13.90	-51.31	5.67	H	-43.08	65.29
40620 (2593.0)	5,186.00	-50.25	12.75	-62.02	3.44	H	-52.71	74.92
	7,779.00	-44.82	11.65	-47.46	4.36	H	-40.17	62.38
	10,372.00	-51.89	10.75	-48.63	5.16	V	-43.04	65.25
	12,965.00	-48.63	13.40	-43.20	5.81	V	-35.61	57.82
41490 (2680.0)	5,360.00	-48.13	13.28	-59.25	3.51	H	-49.48	71.69
	8,040.00	-44.38	10.93	-45.03	4.48	H	-38.58	60.79
	10,720.00	-54.71	10.90	-51.92	5.24	V	-46.26	68.47
	13,400.00	-50.78	12.70	-44.19	5.87	V	-37.36	59.57

8.2.2 IC Low

▣ OPERATING FREQUENCY : 2502.5MHz

▣ MEASURED OUTPUT POWER: 19.66 dBm = 0.093 W

▣ MODE: LTE B41

▣ MODULATION SIGNAL: 5 MHz QPSK

▣ DISTANCE: 1 meters

▣ LIMIT: 55 + 10 log10 (W) = 44.66 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
39715 (2502.5)	5,005.00	-46.87	12.65	-57.92	3.35	H	-48.62	68.29
	7,507.50	-46.05	11.25	-47.82	4.29	V	-40.86	60.52
	10,010.00	-52.17	11.02	-49.39	5.03	V	-43.40	63.06
	12,512.50	-50.05	13.90	-47.74	5.66	V	-39.50	59.16

▣ OPERATING FREQUENCY : 2505.0 MHz

▣ MEASURED OUTPUT POWER: 19.55 dBm = 0.090 W

▣ MODE: LTE B41

▣ MODULATION SIGNAL: 10 MHz QPSK

▣ DISTANCE: 1 meters

▣ LIMIT: 55 + 10 log10 (W) = 44.55 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
39740 (2505.0)	5,010.00	-48.57	12.65	-59.62	3.35	V	-50.32	69.87
	7,515.00	-45.86	11.30	-47.85	4.30	V	-40.85	60.41
	10,020.00	-51.85	11.05	-48.99	5.02	V	-42.96	62.51
	12,525.00	-51.89	13.90	-49.33	5.67	V	-41.10	60.65

▣ OPERATING FREQUENCY : 2507.5 MHz

▣ MEASURED OUTPUT POWER: 19.98 dBm = 0.100 W

▣ MODE: LTE B41

▣ MODULATION SIGNAL: 15 MHz QPSK

▣ DISTANCE: 1 meters

▣ LIMIT: 55 + 10 log10 (W) = 44.98 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
39765 (2507.5)	5,015.00	-47.80	12.63	-58.58	3.35	V	-49.31	69.29
	7,522.50	-46.07	11.30	-48.06	4.30	V	-41.06	61.05
	10,030.00	-51.96	11.05	-49.19	5.00	V	-43.14	63.12
	12,537.50	-53.90	13.90	-50.92	5.68	V	-42.70	62.68

▣ OPERATING FREQUENCY : 2510.0 MHz

▣ MEASURED OUTPUT POWER: 19.97 dBm = 0.099 W

▣ MODE: LTE B41

▣ MODULATION SIGNAL: 20 MHz QPSK

▣ DISTANCE: 1 meters

▣ LIMIT: 55 + 10 log10 (W) = 44.97 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
39790 (2510.0)	5,020.00	-49.34	12.60	-59.85	3.35	V	-50.60	70.58
	7,530.00	-44.99	11.30	-47.30	4.29	H	-40.29	60.26
	10,040.00	-52.92	11.13	-50.46	5.02	V	-44.35	64.33
	12,550.00	-51.15	13.90	-48.17	5.73	V	-40.00	59.97

8.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
41	5 MHz	2593.0	QPSK	25	0	5.65
			16-QAM			6.51
			64-QAM			6.97
	10 MHz		QPSK	50		5.87
			16-QAM			6.53
			64-QAM			6.74
	15 MHz		QPSK	75		5.67
			16-QAM			6.45
			64-QAM			6.74
	20 MHz		QPSK	100		5.64
			16-QAM			6.47
			64-QAM			6.75

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 71 ~ 82.

8.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
41	5 MHz	2593.0	QPSK	25	0	4.5163
			16-QAM			4.5082
			64-QAM			4.5123
	10 MHz		QPSK	50		9.0280
			16-QAM			9.0003
			64-QAM			8.9980
	15 MHz		QPSK	75		13.442
			16-QAM			13.416
			64-QAM			13.453
	20 MHz		QPSK	100		17.877
			16-QAM			17.890
			64-QAM			17.807

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 59 ~ 70.

8.5 CONDUCTED SPURIOUS EMISSIONS

8.5.1 FCC

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
41	5	2498.5	26.1345	34.111	-76.624	-42.513	-25.00
		2593.0	12.9544	33.096	-64.892	-31.796	
		2687.5	13.4486	33.096	-71.467	-38.371	
	10	2501.0	26.1428	34.111	-76.618	-42.507	
		2593.0	12.9433	33.096	-67.229	-34.133	
		2685.0	13.4473	33.096	-72.911	-39.815	
	15	2503.5	26.1259	34.111	-76.528	-42.417	
		2593.0	12.9321	33.096	-67.589	-34.493	
		2682.5	13.4461	33.096	-70.993	-37.897	
	20	2506.0	26.1386	34.111	-76.641	-42.530	
		2593.0	12.9210	33.096	-67.822	-34.726	
		2680.0	13.4449	33.096	-71.929	-38.833	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 127 ~ 154.
2. Conducted Spurious Emissions was Tested QPSK Modulation, Resource Block Size 1 and Resource Block Offset 0
3. Duty Cycle factor already applied on the factor.
   - Duty Cycle factor(dB) = 3.98
   - Factor(dB) = Duty Cycle factor + Cable Loss + Ext. Attenuator + Power Splitter
   - Result(dBm) = Reading + Factor

Frequency Range (GHz)	Factor [dB]
0.03 – 1	29.250
1 – 5	31.956
5 – 10	32.571
10 – 15	33.096
15 – 20	33.469
Above 20	34.111

8.5.2 IC Low

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
41	5	2502.5	26.1568	34.111	-76.959	-42.848	-25.00
	10	2505.0	26.1283	34.111	-76.719	-42.608	
	15	2507.5	26.1292	34.111	-76.767	-42.656	
	20	2510.0	26.1976	34.111	-76.790	-42.679	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 155 ~ 162.
2. Conducted Spurious Emissions was Tested QPSK Modulation, Resource Block Size 1 and Resource Block Offset 0
3. Duty Cycle factor already applied on the factor.
   - Duty Cycle factor(dB) = 3.98
   - Factor(dB) = Duty Cycle factor + Cable Loss + Ext. Attenuator + Power Splitter
   - Result(dBm) = Reading + Factor

Frequency Range (GHz)	Factor [dB]
0.03 – 1	29.250
1 – 5	31.956
5 – 10	32.571
10 – 15	33.096
15 – 20	33.469
Above 20	34.111

8.6 CHANNEL EDGE

8.6.1 FCC

Band Width	Frequency (MHz)	Modulation	RB (Size/ Offset)	2 495 MHz ~ 2 496 MHz		C.E ~ (C.E +NormalHz)		2 490.5 MHz ~ 2 495 MHz		(C.E + 1 MHz) ~ (C.E + 5 MHz)		Below 2 490.5 MHz		(C.E + 5 MHz) ~ (C.E + X MHz)		Above (C.E + X MHz)	
				Lower		Upper		Lower		Upper		Lower		Upper		Upper	
5 MHz	2498.5	QPSK	25/0	-21.53		-20.30		-22.12		-23.77		-39.08		-37.24		-39.11	
10 MHz	2501.0	QPSK	50/0	-26.32		-25.76		-24.39		-24.76		-31.30		-31.08		-40.19	
15 MHz	2503.5	QPSK	75/0	-28.41		-26.66		-26.22		-27.13		-31.35		-30.99		-43.41	
20 MHz	2506.0	QPSK	100/0	-29.31		-29.98		-27.18		-28.02		-31.83		-32.00		-45.03	
Limit				-13.0		-10.0		-13.0		-10.0		-25.0		-13.0		-25.0	

Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resoure Block Offset	C.E ~ (C.E ± NormalHz)		(C.E ± 1 MHz) ~ (C.E ± 5 MHz)	
					Lower	Upper	Lower	Upper
5 MHz	2593.0	QPSK	25	0	-21.77	-23.02	-22.24	-24.28
	2687.5	QPSK	25	0	-23.50	-21.87	-28.66	-28.88
10 MHz	2593.0	QPSK	50	0	-25.84	-25.49	-23.20	-24.66
	2685.0	QPSK	50	0	-26.98	-27.43	-31.13	-31.93
15 MHz	2593.0	QPSK	75	0	-27.08	-27.11	-25.33	-27.04
	2682.5	QPSK	75	0	-28.14	-30.20	-33.85	-34.45
20 MHz	2593.0	QPSK	100	0	-27.26	-28.41	-25.68	-27.80
	2680.0	QPSK	100	0	-32.88	-35.64	-34.97	-36.54
Limit					-10.0		-10.0	

Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resoure Block Offset	(C.E ± 5 MHz) ~ (C.E ± X MHz)		Above (C.E ± X MHz)	
					Lower	Upper	Lower	Upper
5 MHz	2593.0	QPSK	25	0	-37.34	-37.36	-39.54	-39.37
	2687.5	QPSK	25	0	-38.96	-39.60	-39.95	-40.69
10 MHz	2593.0	QPSK	50	0	-29.74	-31.64	-40.29	-40.60
	2685.0	QPSK	50	0	-38.41	-39.01	-42.51	-43.46
15 MHz	2593.0	QPSK	75	0	-28.84	-30.96	-41.29	-41.82
	2682.5	QPSK	75	0	-38.71	-39.61	-43.96	-45.27
20 MHz	2593.0	QPSK	100	0	-29.16	-31.69	-42.21	-43.12
	2680.0	QPSK	100	0	-39.13	-40.69	-45.22	-48.38
Limit					-13.0		-25.0	

Note:

1. C.E = Channel Edge
2. X = X is the greater of 6MHz or the actual emission bandwidth.
3. X = 6MHz(5MHz Bandwidth), 10MHz(10MHz Bandwidth), 15MHz(15MHz Bandwidth), 20MHz(20MHz Bandwidth)
4. Plots of the EUT's Channel Edge are shown Page 83 ~ 110. (1RB & Full RB)

8.6.2 IC Low

Band Width	Frequency (MHz)	Modulation	RB (Size/ Offset)	2 500 MHz ~ 2 499 MHz		C.E ~ (C.E +1MHz)		2 499 MHz ~ 2 496 MHz		(C.E + 1 MHz) ~ (C.E + 5 MHz)		2 496 MHz ~ 2 490.5 MHz		(C.E + 5 MHz) ~ (C.E + X MHz)		Below 2 490.5 MHz		Above (C.E + X MHz)	
				Lower		Upper		Lower		Upper		Lower		Upper		Lower		Upper	
5 MHz	2502.5	QPSK	25/0	-23.20		-20.75		-22.14		-23.88		-34.23		-37.32		-45.50		-39.50	
10 MHz	2505.0	QPSK	50/0	-27.28		-25.29		-24.05		-25.52		-28.77		-31.80		-41.51		-41.50	
15 MHz	2507.5	QPSK	75/0	-29.07		-28.19		-26.07		-28.02		-29.42		-31.57		-37.11		-44.49	
20 MHz	2510.0	QPSK	100/0	-29.21		-30.48		-28.05		-28.81		-30.81		-32.66		-36.35		-46.49	
Limit				-10.0				-10.0				-13.0				-25.0			

Note:

1. C.E = Channel Edge
2. X = X is the greater of 6MHz or the actual emission bandwidth.
3. X = 6MHz(5MHz Bandwidth), 10MHz(10MHz Bandwidth), 15MHz(15MHz Bandwidth), 20MHz(20MHz Bandwidth)
4. RB = Resource Block
5. Plots of the EUT's Channel Edge are shown Page 111 ~ 126. (1RB & Full RB)

8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

8.7.1 FCC

▣ MODE: LTE 41

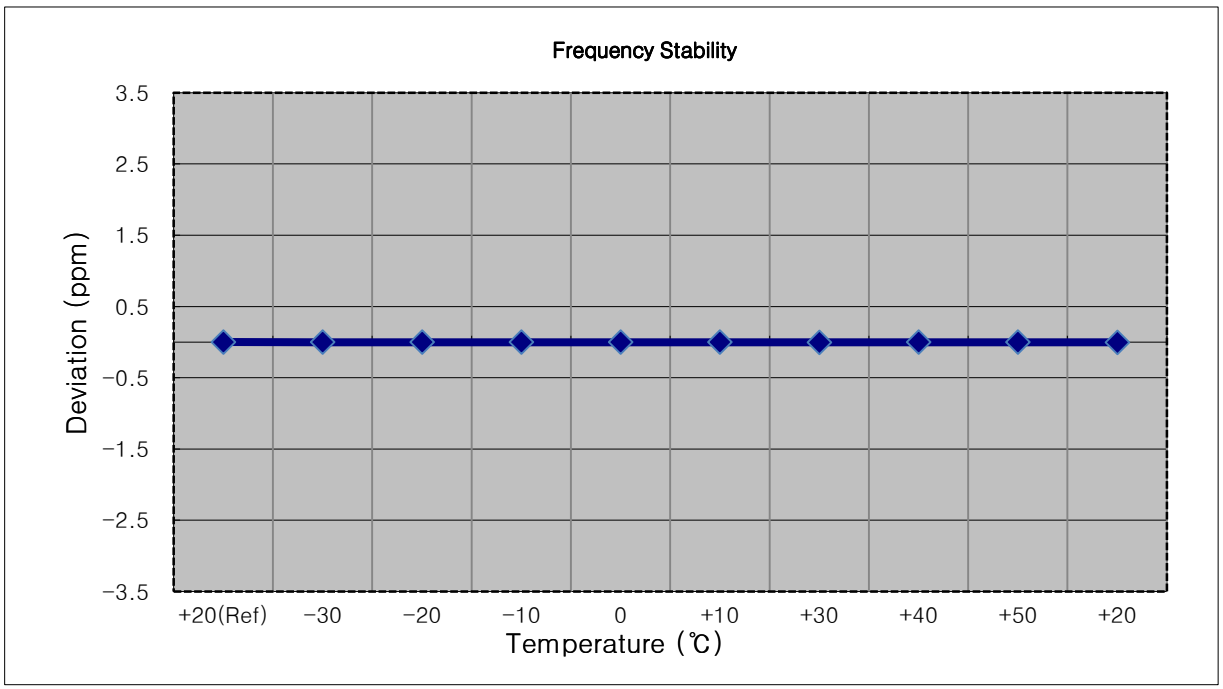
▣ OPERATING FREQUENCY: 2498,500,000 Hz

▣ BANDWIDTH: 39675 (5 MHz)

▣ REFERENCE VOLTAGE: 3.85 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.850	+20(Ref)	2498 499 992	0.0	0.000 000	0.000
100%		-30	2498 499 986	-5.5	0.000 000	-0.002
100%		-20	2498 499 984	-7.5	0.000 000	-0.003
100%		-10	2498 499 984	-7.4	0.000 000	-0.003
100%		0	2498 499 984	-7.7	0.000 000	-0.003
100%		+10	2498 499 984	-7.4	0.000 000	-0.003
100%		+30	2498 499 984	-8.1	0.000 000	-0.003
100%		+40	2498 499 985	-6.9	0.000 000	-0.003
100%		+50	2498 499 988	-3.9	0.000 000	-0.002
85%	3.600	+20	2498 499 983	-8.9	0.000 000	-0.004



▣ MODE: LTE 41

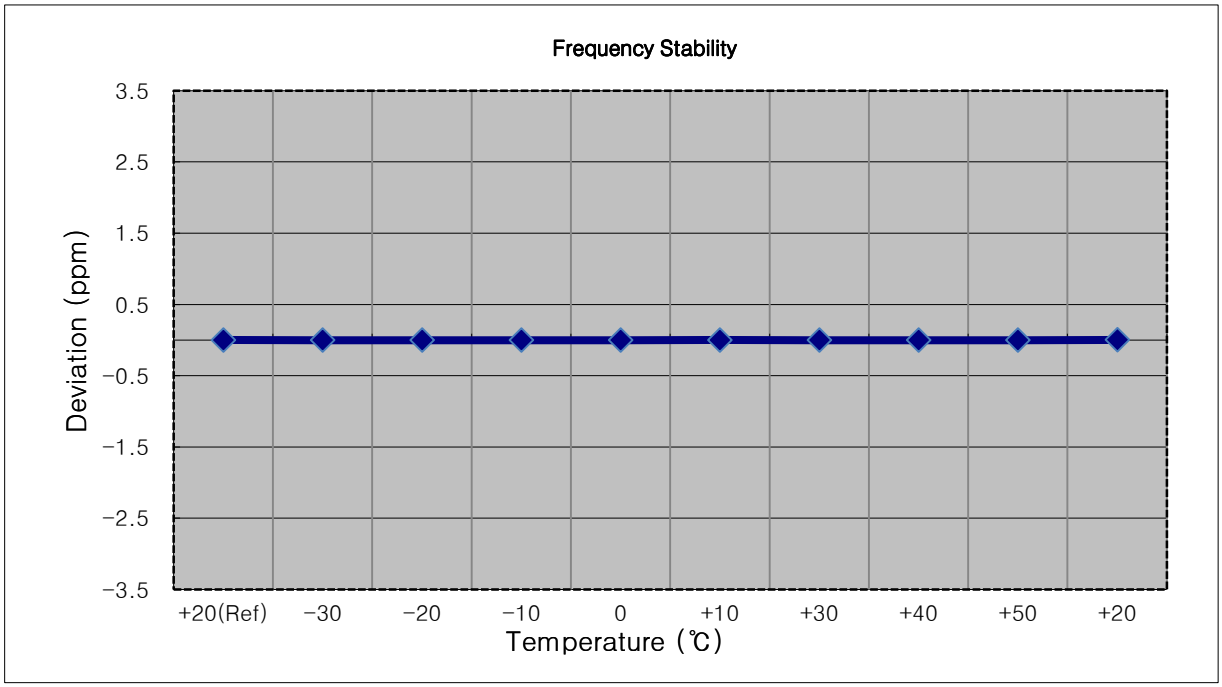
▣ OPERATING FREQUENCY: 2501,000,000 Hz

▣ BANDWIDTH: 39700 (10 MHz)

▣ REFERENCE VOLTAGE: 3.85 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.850	+20(Ref)	2501 000 004	0.0	0.000 000	0.000
100%		-30	2501 000 001	-3.0	0.000 000	-0.001
100%		-20	2501 000 000	-3.4	0.000 000	-0.001
100%		-10	2501 000 001	-2.8	0.000 000	-0.001
100%		0	2501 000 001	-2.2	0.000 000	-0.001
100%		+10	2501 000 007	3.1	0.000 000	0.001
100%		+30	2500 999 997	-6.3	0.000 000	-0.003
100%		+40	2501 000 001	-2.6	0.000 000	-0.001
100%		+50	2500 999 999	-4.3	0.000 000	-0.002
85%	3.600	+20	2501 000 008	4.6	0.000 000	0.002



▣ MODE: LTE 41

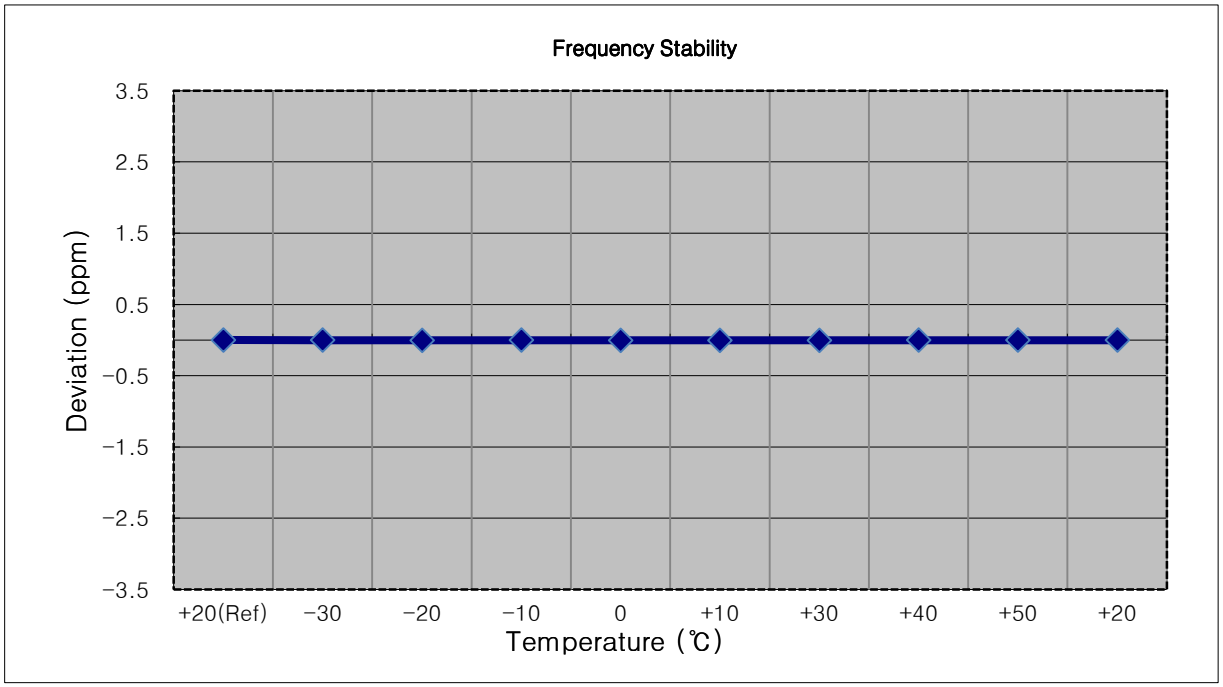
▣ OPERATING FREQUENCY: 2503,500,000 Hz

▣ BANDWIDTH: 39725 (15 MHz)

▣ REFERENCE VOLTAGE: 3.85 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.850	+20(Ref)	2503 499 992	0.0	0.000 000	0.000
100%		-30	2503 499 985	-7.6	0.000 000	-0.003
100%		-20	2503 499 980	-11.7	0.000 000	-0.005
100%		-10	2503 499 985	-7.3	0.000 000	-0.003
100%		0	2503 499 984	-7.8	0.000 000	-0.003
100%		+10	2503 499 983	-8.8	0.000 000	-0.004
100%		+30	2503 499 984	-8.0	0.000 000	-0.003
100%		+40	2503 499 985	-6.7	0.000 000	-0.003
100%		+50	2503 499 984	-7.7	0.000 000	-0.003
85%	3.600	+20	2503 499 985	-7.2	0.000 000	-0.003



▣ MODE: LTE 41

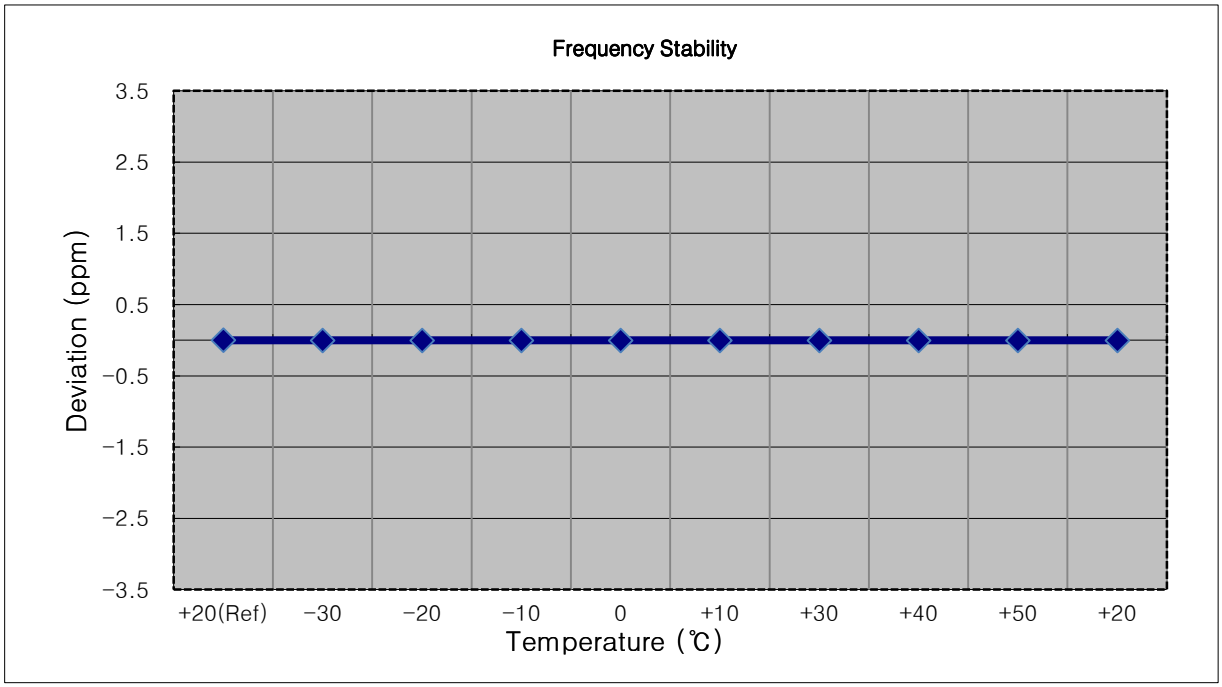
▣ OPERATING FREQUENCY: 2506,000,000 Hz

▣ BANDWIDTH: 39750 (20 MHz)

▣ REFERENCE VOLTAGE: 3.85 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.850	+20(Ref)	2505 999 994	0.0	0.000 000	0.000
100%		-30	2505 999 989	-5.0	0.000 000	-0.002
100%		-20	2505 999 989	-4.7	0.000 000	-0.002
100%		-10	2505 999 988	-5.4	0.000 000	-0.002
100%		0	2505 999 989	-4.4	0.000 000	-0.002
100%		+10	2505 999 987	-7.0	0.000 000	-0.003
100%		+30	2505 999 989	-5.3	0.000 000	-0.002
100%		+40	2505 999 989	-4.6	0.000 000	-0.002
100%		+50	2505 999 988	-5.7	0.000 000	-0.002
85%	3.600	+20	2505 999 987	-7.0	0.000 000	-0.003



▣ MODE: LTE 41

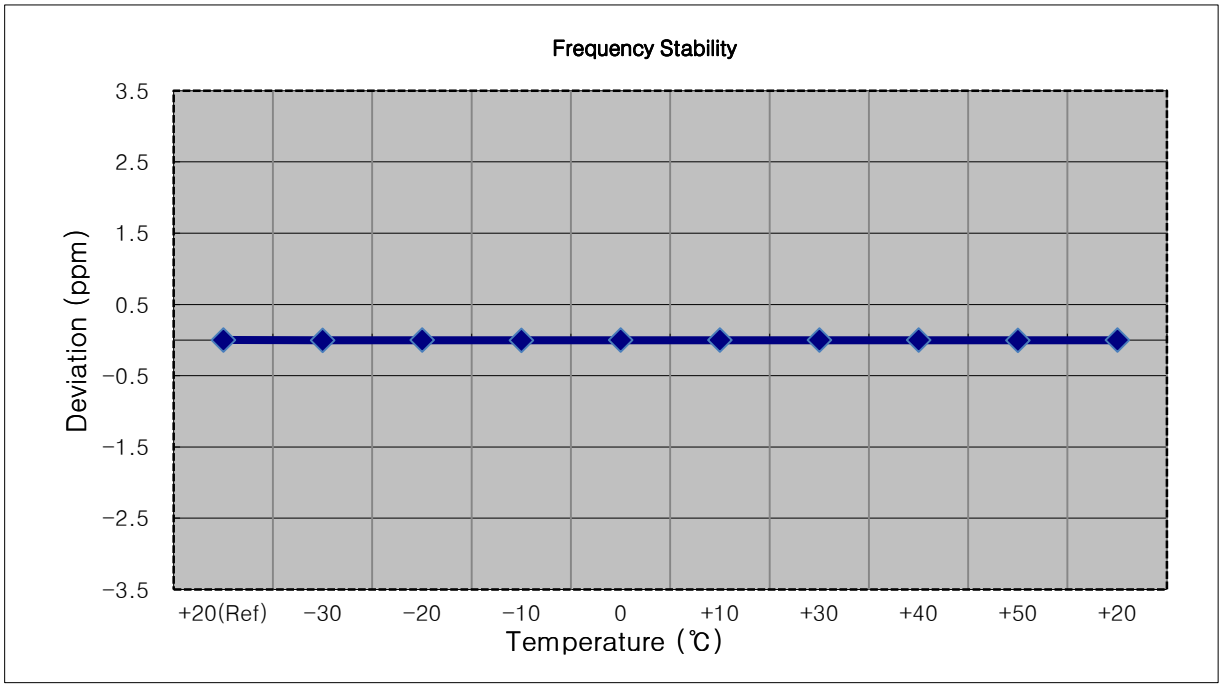
▣ OPERATING FREQUENCY: 2593,000,000 Hz

▣ BANDWIDTH: 40620 (5 MHz)

▣ REFERENCE VOLTAGE: 3.85 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.850	+20(Ref)	2592 999 989	0.0	0.000 000	0.000
100%		-30	2592 999 980	-9.3	0.000 000	-0.004
100%		-20	2592 999 982	-7.1	0.000 000	-0.003
100%		-10	2592 999 981	-8.1	0.000 000	-0.003
100%		0	2592 999 983	-6.8	0.000 000	-0.003
100%		+10	2592 999 983	-6.7	0.000 000	-0.003
100%		+30	2592 999 982	-7.3	0.000 000	-0.003
100%		+40	2592 999 983	-6.4	0.000 000	-0.002
100%		+50	2592 999 979	-10.7	0.000 000	-0.004
85%	3.600	+20	2592 999 983	-6.7	0.000 000	-0.003



▣ MODE: LTE 41

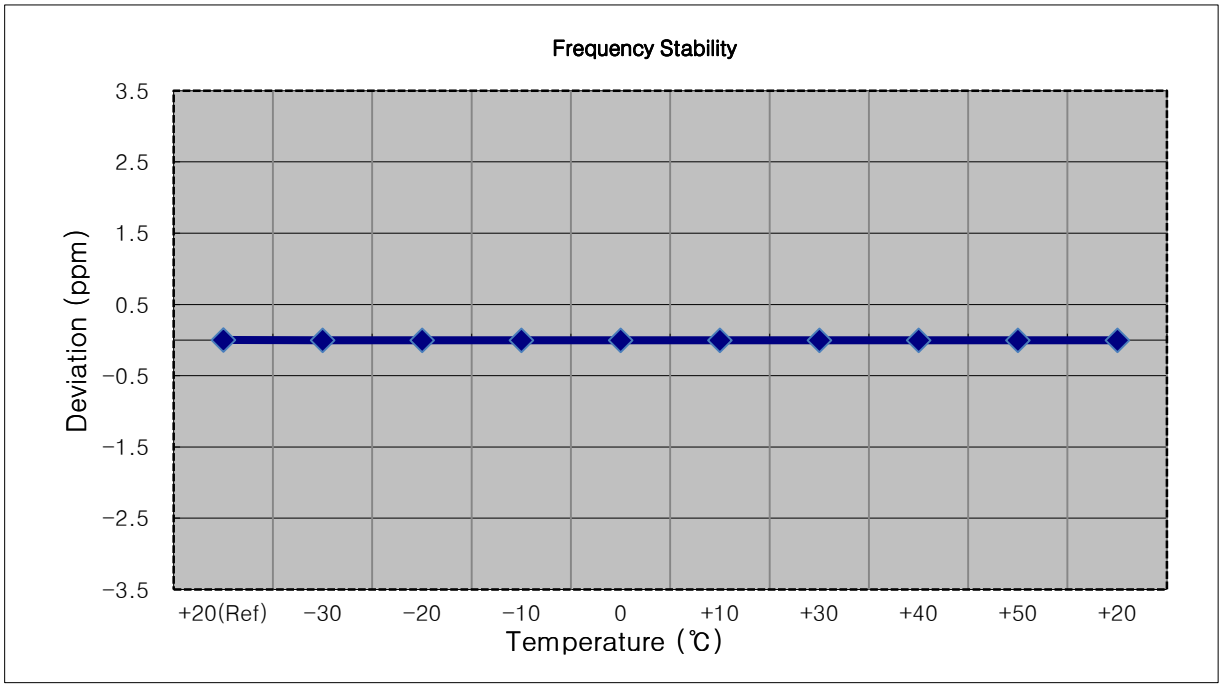
▣ OPERATING FREQUENCY: 2593,000,000 Hz

▣ BANDWIDTH: 40620 (10 MHz)

▣ REFERENCE VOLTAGE: 3.85 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.850	+20(Ref)	2592 999 990	0.0	0.000 000	0.000
100%		-30	2592 999 979	-10.6	0.000 000	-0.004
100%		-20	2592 999 980	-9.9	0.000 000	-0.004
100%		-10	2592 999 980	-9.9	0.000 000	-0.004
100%		0	2592 999 981	-8.5	0.000 000	-0.003
100%		+10	2592 999 981	-9.0	0.000 000	-0.003
100%		+30	2592 999 981	-8.6	0.000 000	-0.003
100%		+40	2592 999 979	-10.6	0.000 000	-0.004
100%		+50	2592 999 981	-9.0	0.000 000	-0.003
85%	3.600	+20	2592 999 982	-8.1	0.000 000	-0.003



▣ MODE: LTE 41

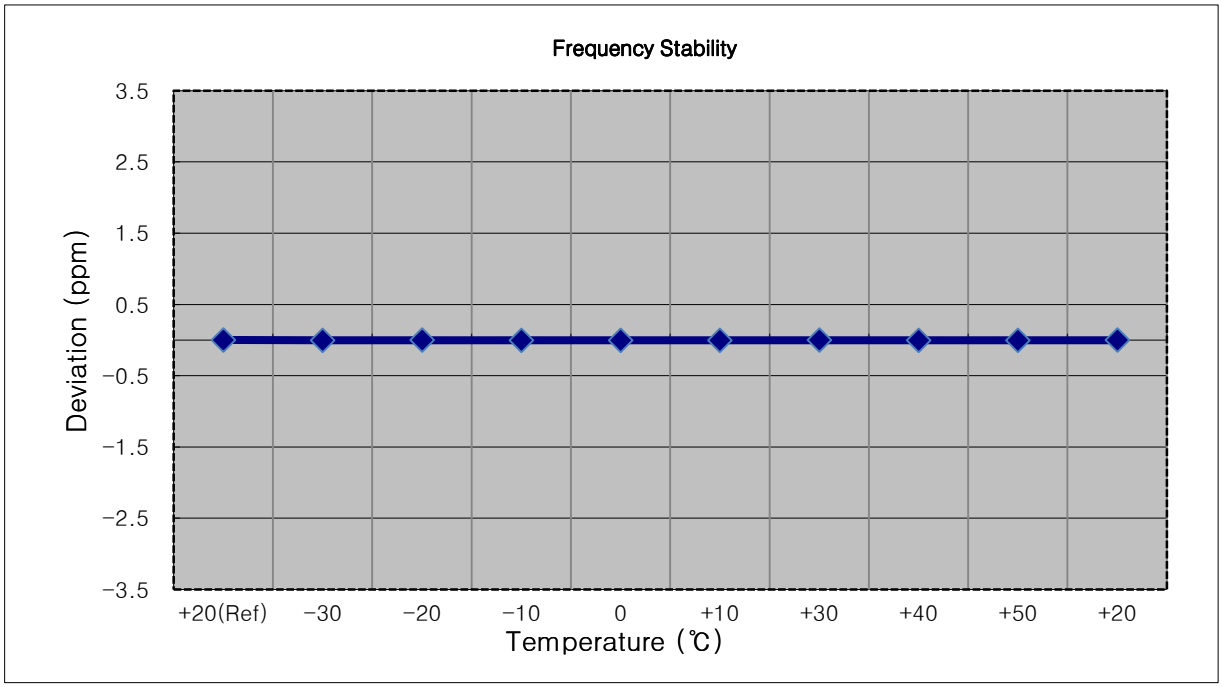
▣ OPERATING FREQUENCY: 2593,000,000 Hz

▣ BANDWIDTH: 40620 (15 MHz)

▣ REFERENCE VOLTAGE: 3.85 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.850	+20(Ref)	2592 999 990	0.0	0.000 000	0.000
100%		-30	2592 999 982	-8.9	0.000 000	-0.003
100%		-20	2592 999 983	-7.4	0.000 000	-0.003
100%		-10	2592 999 981	-9.2	0.000 000	-0.004
100%		0	2592 999 980	-10.7	0.000 000	-0.004
100%		+10	2592 999 982	-8.1	0.000 000	-0.003
100%		+30	2592 999 984	-6.2	0.000 000	-0.002
100%		+40	2592 999 981	-9.6	0.000 000	-0.004
100%		+50	2592 999 981	-9.7	0.000 000	-0.004
85%	3.600	+20	2592 999 984	-6.8	0.000 000	-0.003



▣ MODE: LTE 41

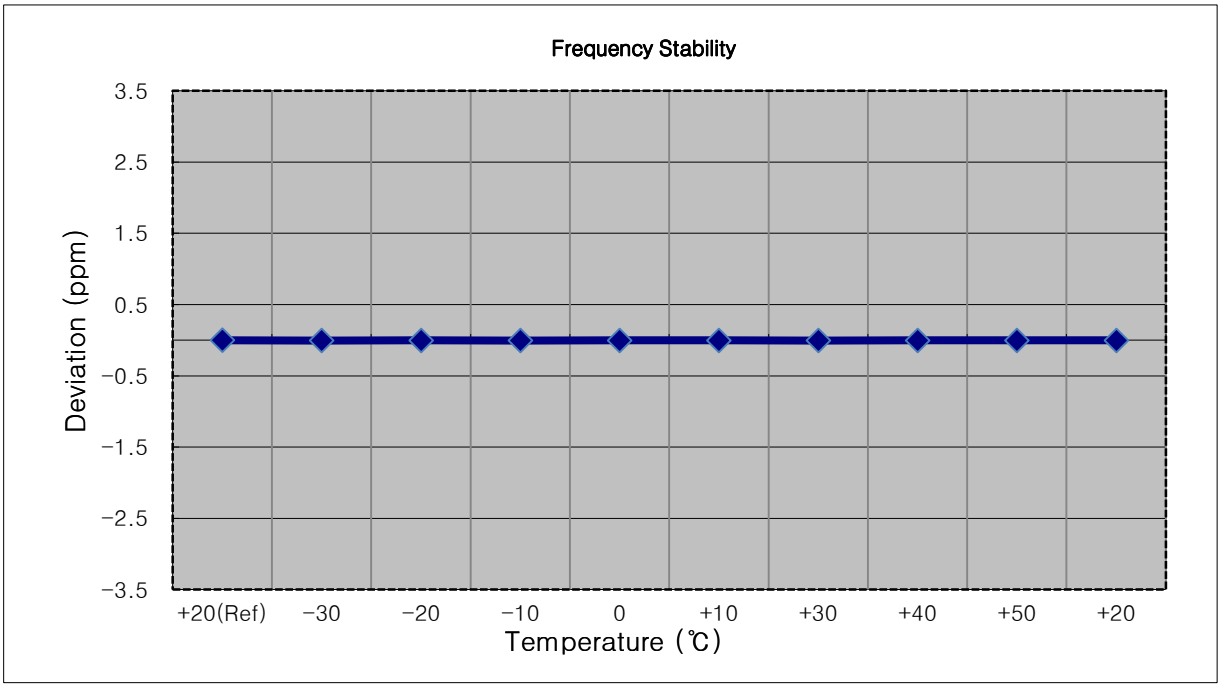
▣ OPERATING FREQUENCY: 2593,000,000 Hz

▣ BANDWIDTH: 40620 (20 MHz)

▣ REFERENCE VOLTAGE: 3.85 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.850	+20(Ref)	2592 999 991	0.0	0.000 000	0.000
100%		-30	2592 999 982	-9.4	0.000 000	-0.004
100%		-20	2592 999 983	-8.2	0.000 000	-0.003
100%		-10	2592 999 982	-9.0	0.000 000	-0.003
100%		0	2592 999 984	-7.6	0.000 000	-0.003
100%		+10	2592 999 983	-8.1	0.000 000	-0.003
100%		+30	2592 999 982	-9.4	0.000 000	-0.004
100%		+40	2592 999 983	-8.5	0.000 000	-0.003
100%		+50	2592 999 983	-8.5	0.000 000	-0.003
85%	3.600	+20	2592 999 985	-6.5	0.000 000	-0.003



▣ MODE: LTE 41

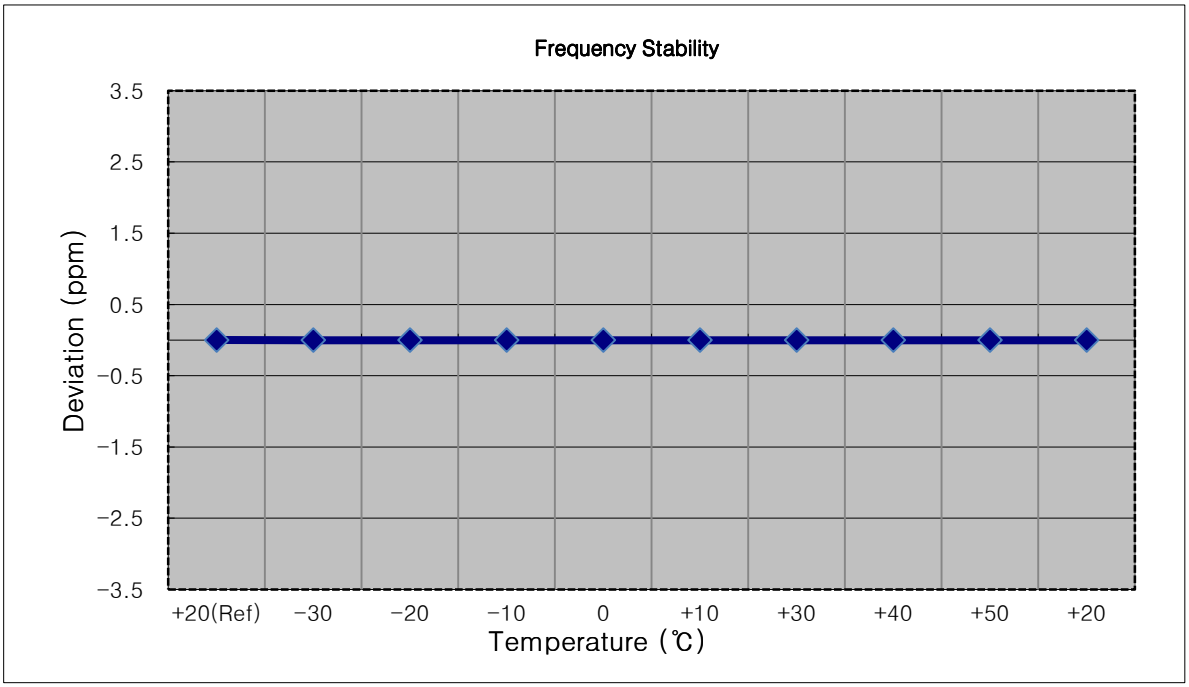
▣ OPERATING FREQUENCY: 2687,500,000 Hz

▣ BANDWIDTH: 41565 (5 MHz)

▣ REFERENCE VOLTAGE: 3.85 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.850	+20(Ref)	2687 499 993	0.0	0.000 000	0.000
100%		-30	2687 499 987	-5.8	0.000 000	-0.002
100%		-20	2687 499 987	-6.3	0.000 000	-0.002
100%		-10	2687 499 986	-7.0	0.000 000	-0.003
100%		0	2687 499 988	-5.7	0.000 000	-0.002
100%		+10	2687 499 988	-4.9	0.000 000	-0.002
100%		+30	2687 499 985	-8.0	0.000 000	-0.003
100%		+40	2687 499 986	-7.7	0.000 000	-0.003
100%		+50	2687 499 986	-7.2	0.000 000	-0.003
85%	3.600	+20	2687 499 986	-7.6	0.000 000	-0.003



▣ MODE: LTE 41

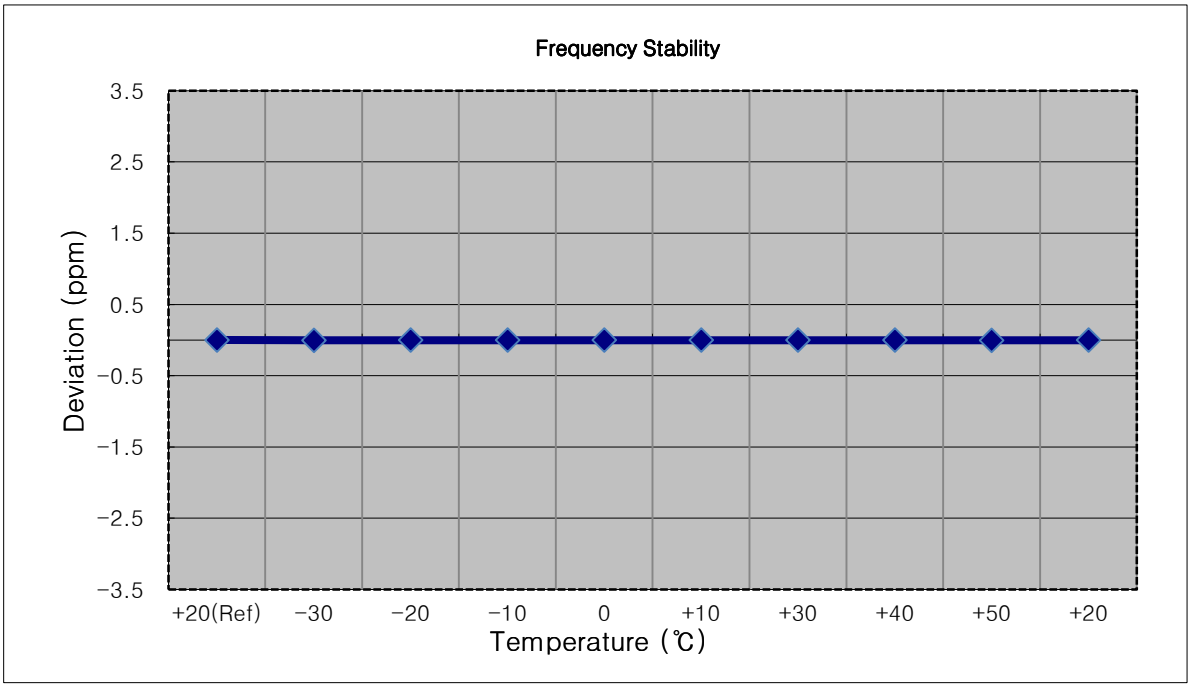
▣ OPERATING FREQUENCY: 2685,000,000 Hz

▣ BANDWIDTH: 41540 (10 MHz)

▣ REFERENCE VOLTAGE: 3.85 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.850	+20(Ref)	2684 999 993	0.0	0.000 000	0.000
100%		-30	2684 999 984	-8.8	0.000 000	-0.003
100%		-20	2684 999 987	-6.1	0.000 000	-0.002
100%		-10	2684 999 985	-7.5	0.000 000	-0.003
100%		0	2684 999 985	-8.1	0.000 000	-0.003
100%		+10	2684 999 987	-6.2	0.000 000	-0.002
100%		+30	2684 999 986	-6.8	0.000 000	-0.003
100%		+40	2684 999 985	-8.2	0.000 000	-0.003
100%		+50	2684 999 984	-9.2	0.000 000	-0.003
85%	3.600	+20	2684 999 985	-7.6	0.000 000	-0.003



▣ MODE: LTE 41

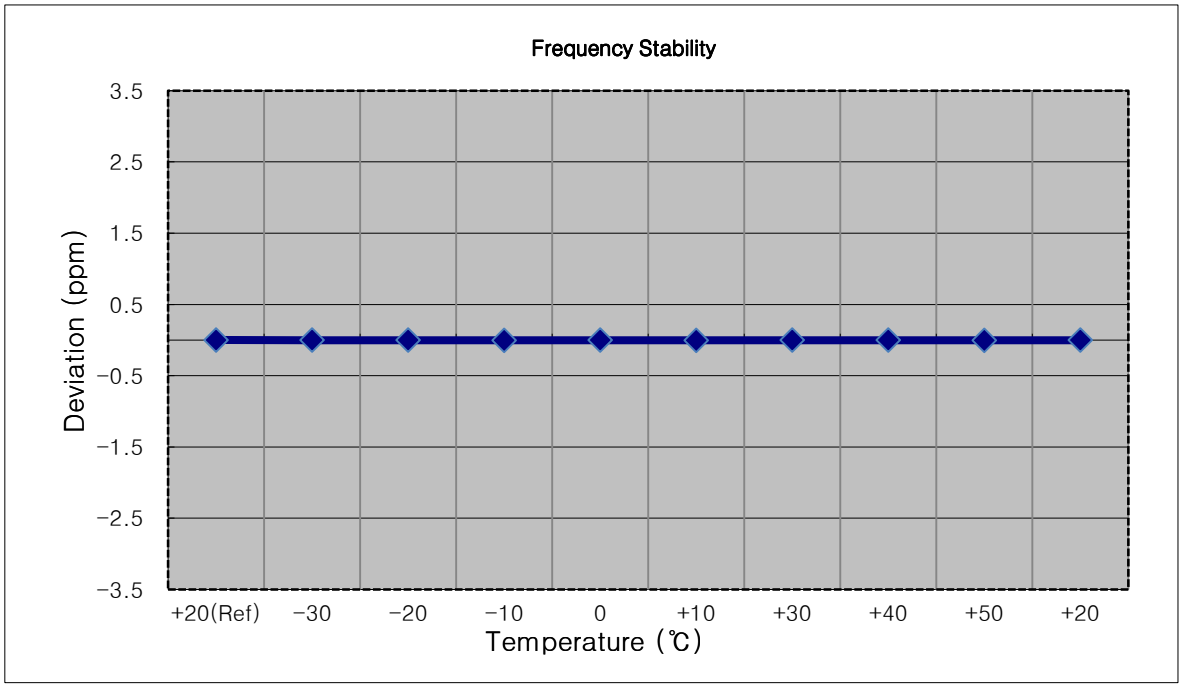
▣ OPERATING FREQUENCY: 2682,500,000 Hz

▣ BANDWIDTH: 41515 (15 MHz)

▣ REFERENCE VOLTAGE: 3.85 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.850	+20(Ref)	2682 499 992	0.0	0.000 000	0.000
100%		-30	2682 499 985	-7.3	0.000 000	-0.003
100%		-20	2682 499 987	-5.5	0.000 000	-0.002
100%		-10	2682 499 984	-8.3	0.000 000	-0.003
100%		0	2682 499 985	-7.9	0.000 000	-0.003
100%		+10	2682 499 984	-8.7	0.000 000	-0.003
100%		+30	2682 499 987	-5.6	0.000 000	-0.002
100%		+40	2682 499 985	-7.3	0.000 000	-0.003
100%		+50	2682 499 983	-9.9	0.000 000	-0.004
85%	3.600	+20	2682 499 986	-6.4	0.000 000	-0.002



▣ MODE: LTE 41

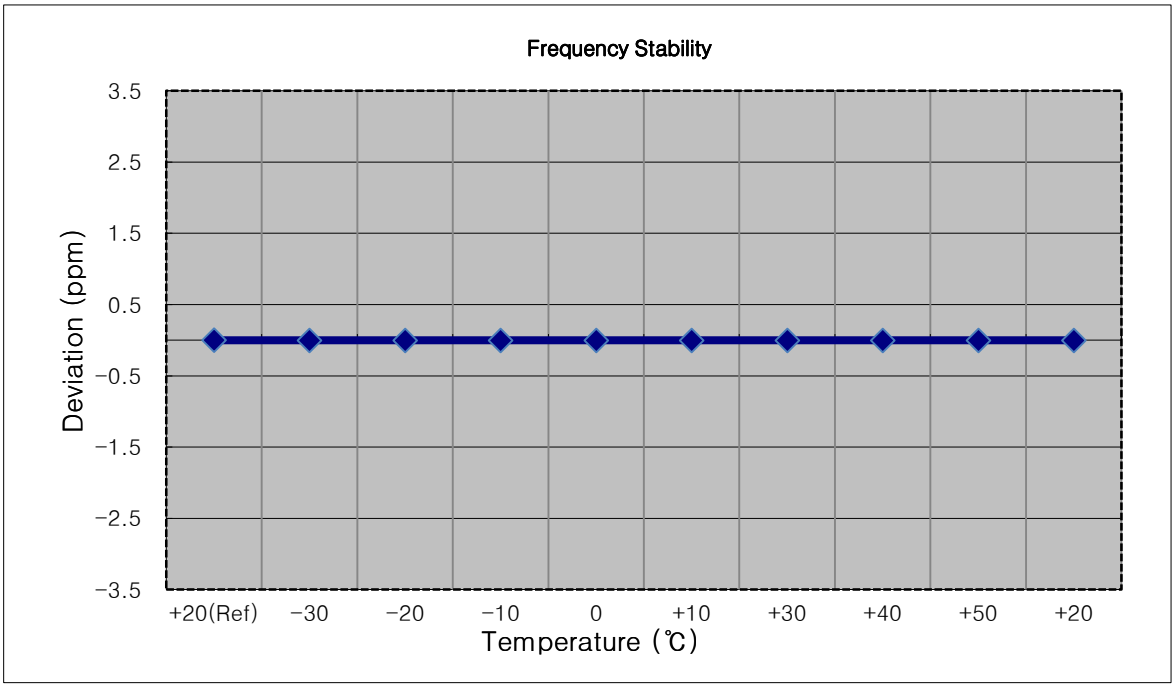
▣ OPERATING FREQUENCY: 2680,000,000 Hz

▣ BANDWIDTH: 41490 (20 MHz)

▣ REFERENCE VOLTAGE: 3.85 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.850	+20(Ref)	2679 999 995	0.0	0.000 000	0.000
100%		-30	2679 999 989	-6.1	0.000 000	-0.002
100%		-20	2679 999 990	-5.1	0.000 000	-0.002
100%		-10	2679 999 990	-5.1	0.000 000	-0.002
100%		0	2679 999 991	-4.1	0.000 000	-0.002
100%		+10	2679 999 992	-3.7	0.000 000	-0.001
100%		+30	2679 999 991	-4.0	0.000 000	-0.001
100%		+40	2679 999 990	-5.4	0.000 000	-0.002
100%		+50	2679 999 988	-7.6	0.000 000	-0.003
85%	3.600	+20	2679 999 990	-5.1	0.000 000	-0.002



8.7.2 IC Low

▣ MODE: LTE 41

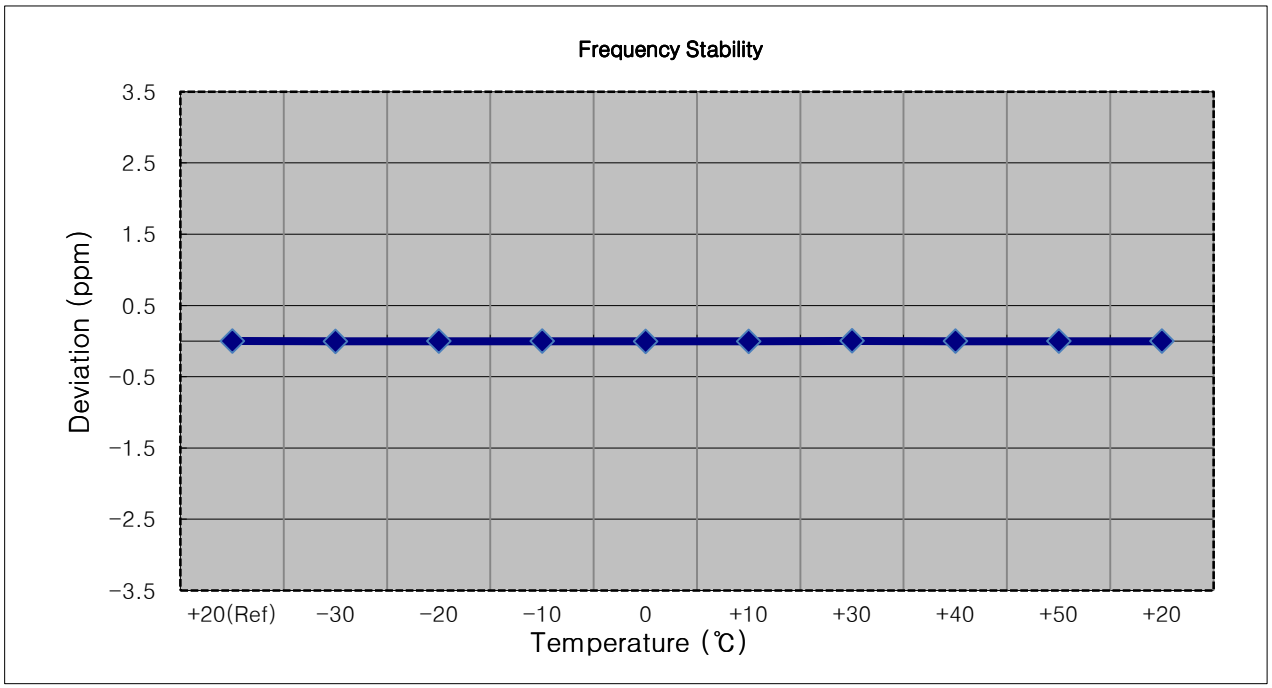
▣ OPERATING FREQUENCY: 2502,500,000 Hz

▣ BANDWIDTH: 39715 (5 MHz)

▣ REFERENCE VOLTAGE: 3.85 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.850	+20(Ref)	2502 499 994	0.0	0.000 000	0.000
100%		-30	2502 499 985	-8.9	0.000 000	-0.004
100%		-20	2502 499 987	-7.1	0.000 000	-0.003
100%		-10	2502 499 987	-6.7	0.000 000	-0.003
100%		0	2502 499 984	-9.2	0.000 000	-0.004
100%		+10	2502 499 985	-8.2	0.000 000	-0.003
100%		+30	2502 499 998	3.9	0.000 000	0.002
100%		+40	2502 499 988	-6.1	0.000 000	-0.002
100%		+50	2502 499 988	-5.5	0.000 000	-0.002
85%	3.600	+20	2502 499 987	-6.9	0.000 000	-0.003



▣ MODE: LTE 41

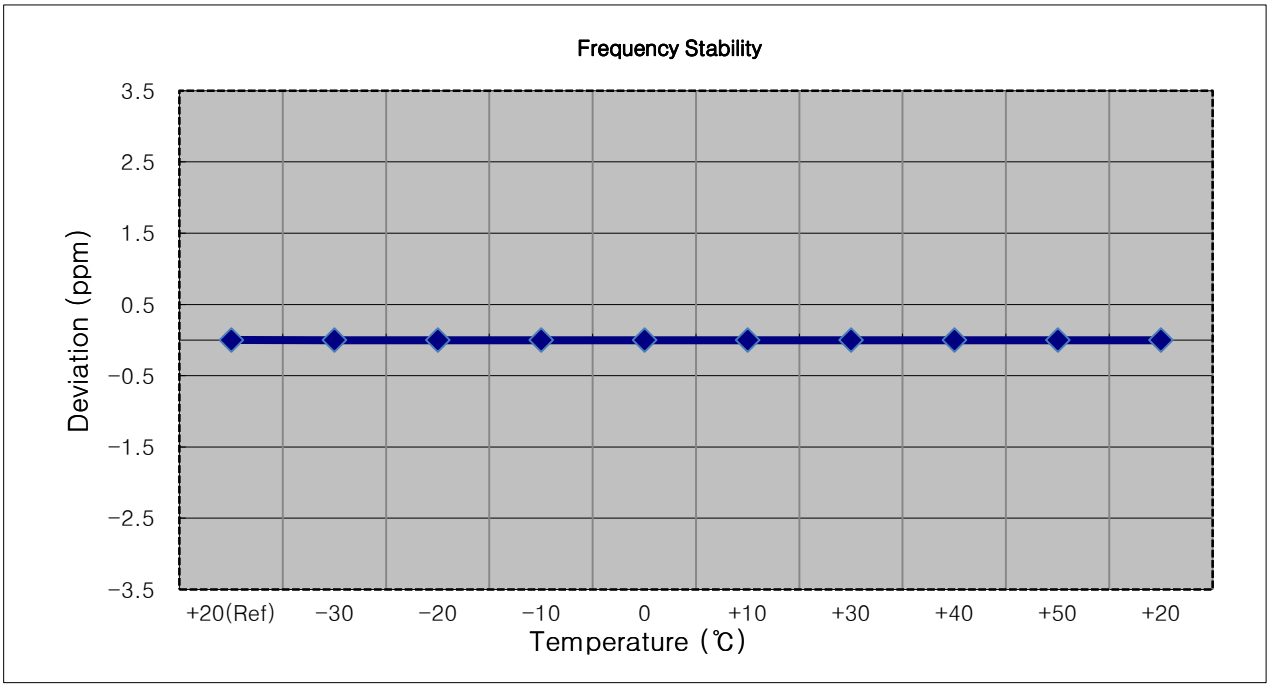
▣ OPERATING FREQUENCY: 2505,000,000 Hz

▣ BANDWIDTH: 39740 (10 MHz)

▣ REFERENCE VOLTAGE: 3.85 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.850	+20(Ref)	2505 000 004	0.0	0.000 000	0.000
100%		-30	2505 000 000	-4.0	0.000 000	-0.002
100%		-20	2504 999 999	-5.2	0.000 000	-0.002
100%		-10	2505 000 000	-4.2	0.000 000	-0.002
100%		0	2504 999 999	-5.3	0.000 000	-0.002
100%		+10	2504 999 998	-6.5	0.000 000	-0.003
100%		+30	2504 999 999	-5.6	0.000 000	-0.002
100%		+40	2504 999 998	-6.4	0.000 000	-0.003
100%		+50	2505 000 000	-4.5	0.000 000	-0.002
85%	3.600	+20	2504 999 999	-5.3	0.000 000	-0.002



▣ MODE: LTE 41

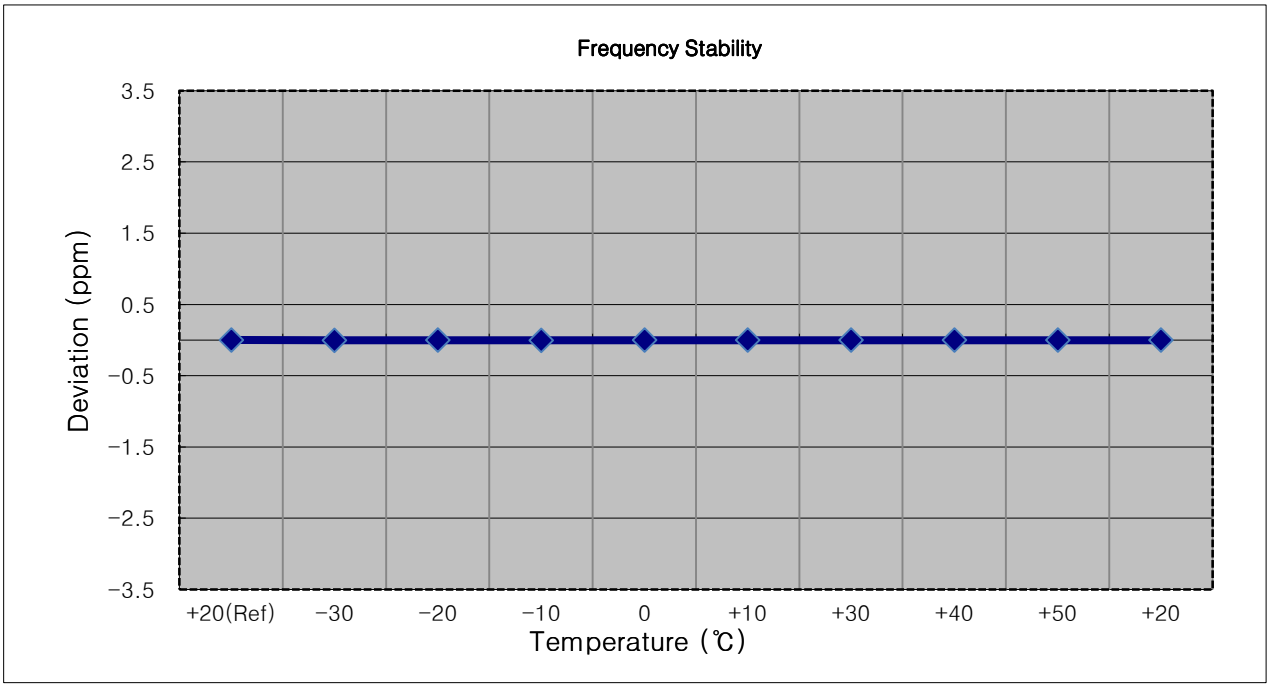
▣ OPERATING FREQUENCY: 2507,500,000 Hz

▣ BANDWIDTH: 39765 (15 MHz)

▣ REFERENCE VOLTAGE: 3.85 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.850	+20(Ref)	2507 499 995	0.0	0.000 000	0.000
100%		-30	2507 499 986	-8.1	0.000 000	-0.003
100%		-20	2507 499 989	-5.1	0.000 000	-0.002
100%		-10	2507 499 986	-8.1	0.000 000	-0.003
100%		0	2507 499 988	-6.3	0.000 000	-0.003
100%		+10	2507 499 988	-6.3	0.000 000	-0.003
100%		+30	2507 499 990	-4.6	0.000 000	-0.002
100%		+40	2507 499 988	-6.7	0.000 000	-0.003
100%		+50	2507 499 990	-5.0	0.000 000	-0.002
85%	3.600	+20	2507 499 990	-4.7	0.000 000	-0.002



▣ MODE: LTE 41

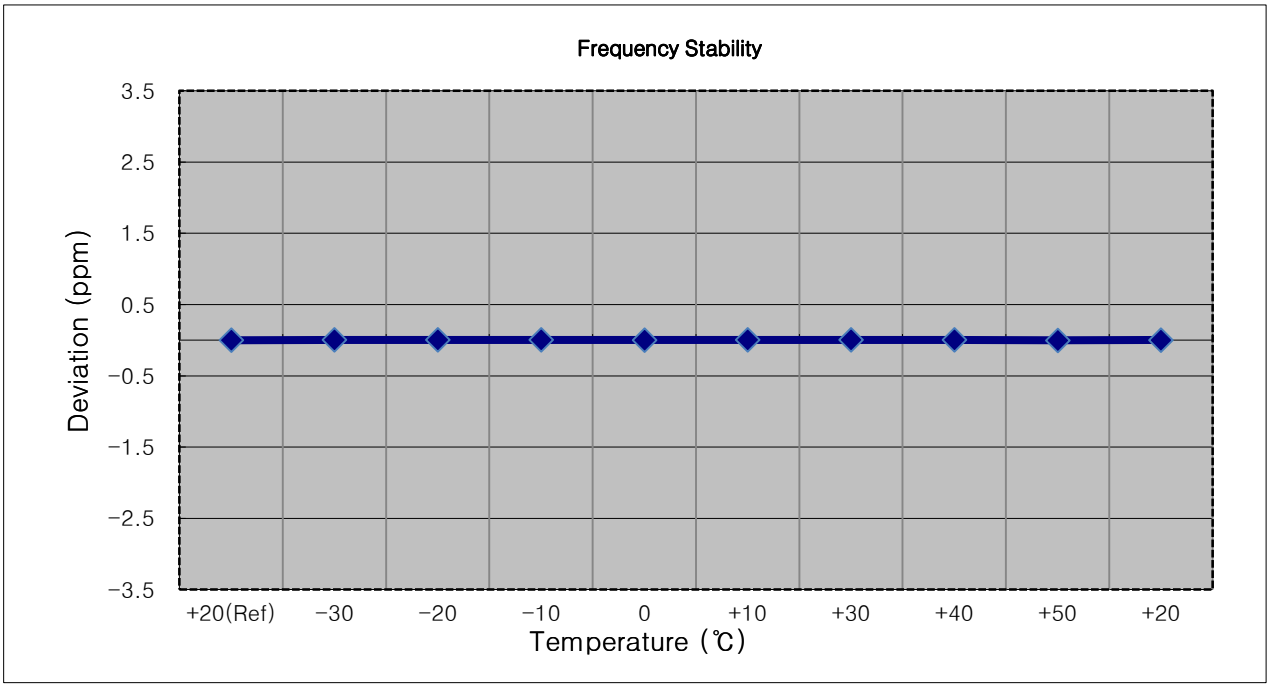
▣ OPERATING FREQUENCY: 2510,000,000 Hz

▣ BANDWIDTH: 39790 (20 MHz)

▣ REFERENCE VOLTAGE: 3.85 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.850	+20(Ref)	2510 000 007	0.0	0.000 000	0.000
100%		-30	2510 000 017	9.3	0.000 000	0.004
100%		-20	2510 000 020	12.3	0.000 000	0.005
100%		-10	2510 000 017	9.9	0.000 000	0.004
100%		0	2510 000 015	7.9	0.000 000	0.003
100%		+10	2510 000 016	8.6	0.000 000	0.003
100%		+30	2510 000 016	8.3	0.000 000	0.003
100%		+40	2510 000 017	9.8	0.000 000	0.004
100%		+50	2510 000 000	-6.8	0.000 000	-0.003
85%	3.600	+20	2510 000 014	6.6	0.000 000	0.003



8.8 RECEIVER SPURIOUS EMISSIONS

Frequency Range : 30 MHz ~ 1 GHz

Frequency	Reading	Ant. factor+Cable loss- Amp Gain	Ant. POL	Total	Limit	Margin
MHz	dBμV	dB /m	(H/V)	dBμV/m	dBμV/m	dB
No Peak Found						

Frequency Range : Above 1 GHz

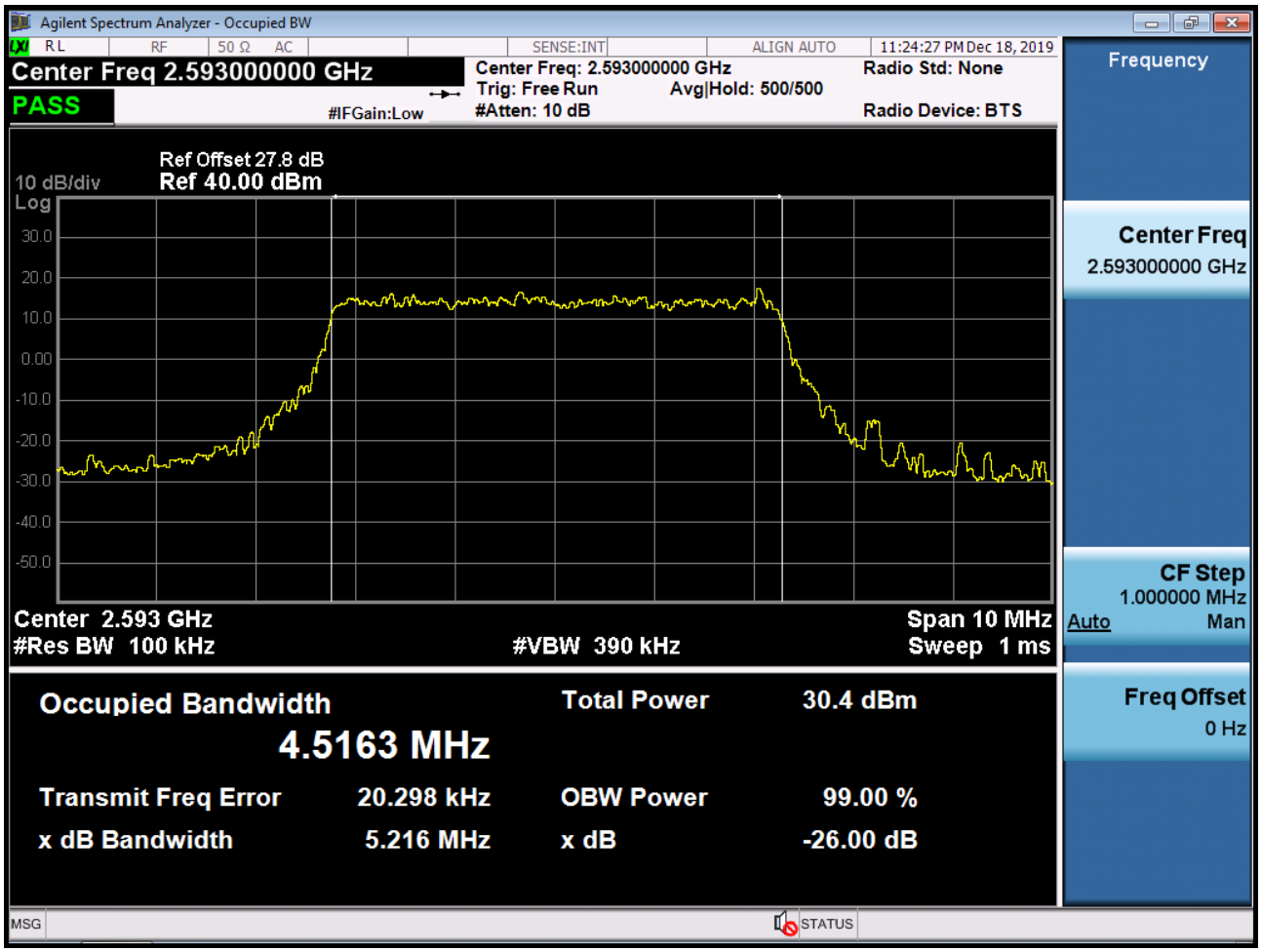
Frequency	Reading	Ant. factor+Cable loss- Amp Gain	Ant. POL	Total	Limit	Margin
MHz	dBμV	dB /m	(H/V)	dBμV/m	dBμV/m	dB
No Peak Found						

Limit

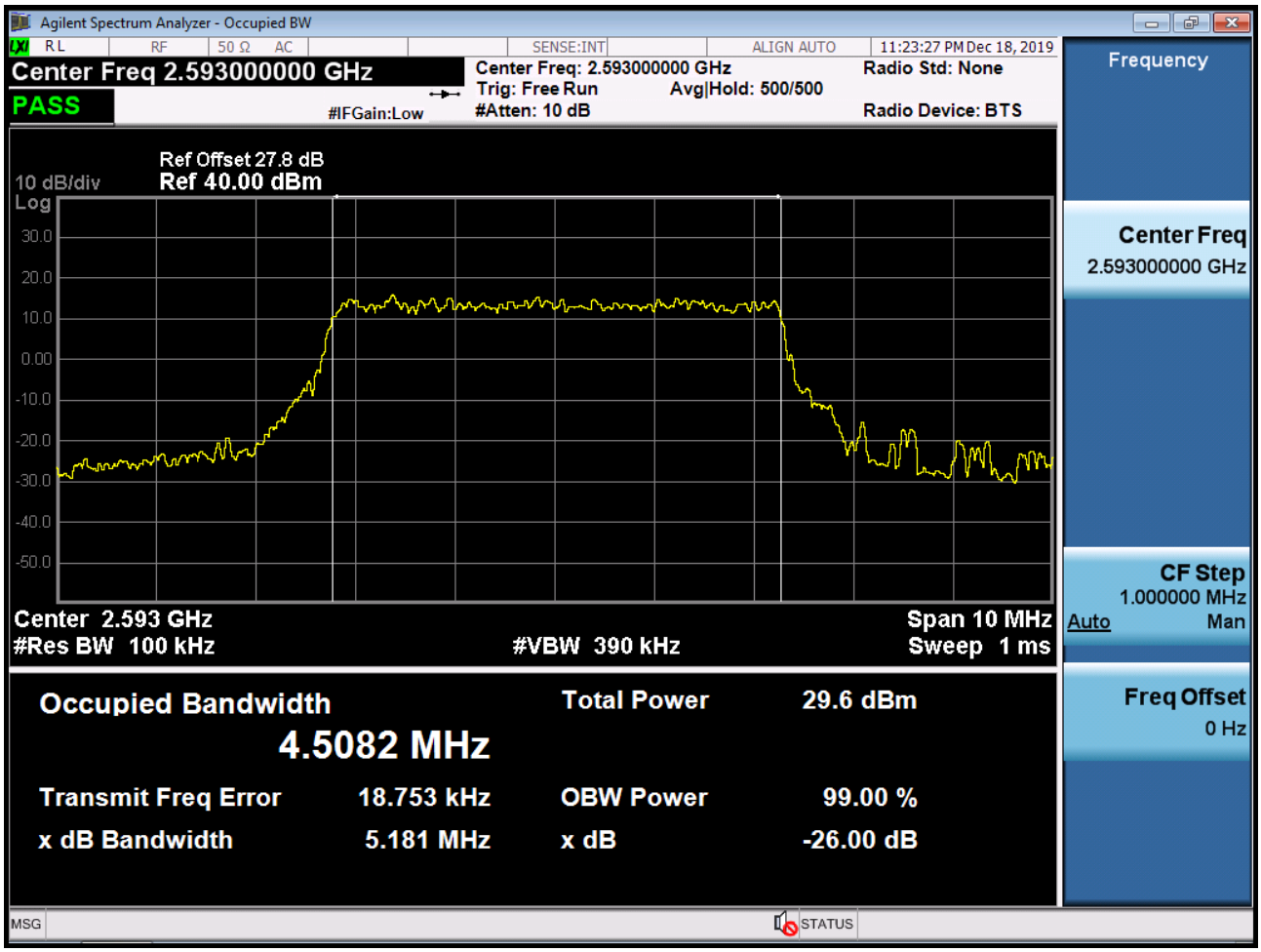
Frequency (MHz)	Field Strength (μv/m at 3 meters)
30 – 88	100
88 - 216	150
216 – 960	200
Above 960	500

9. TEST PLOTS

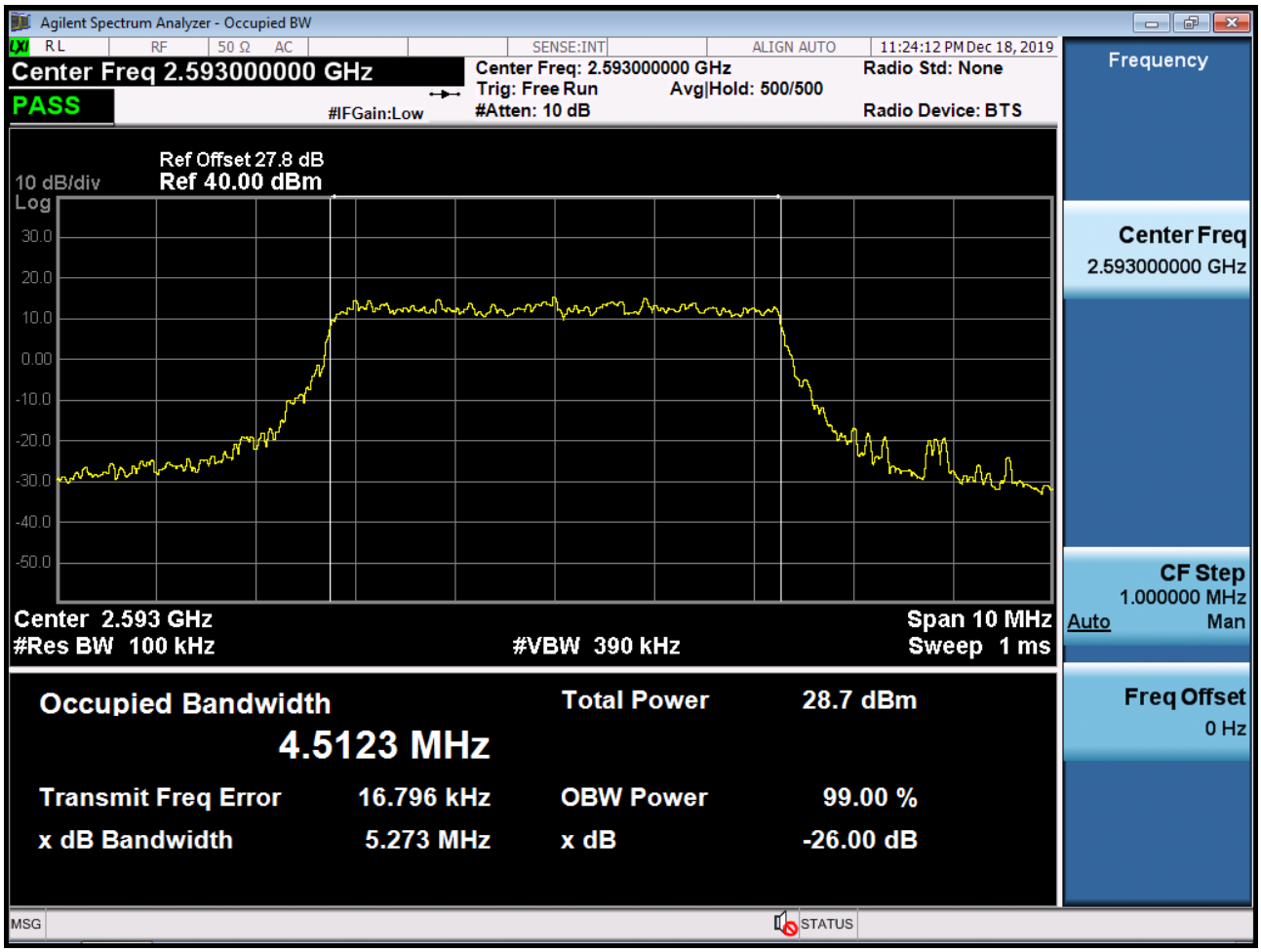
Occupied Bandwidth Plot (5 MHz Ch.40620 QPSK RB 25) (FCC)



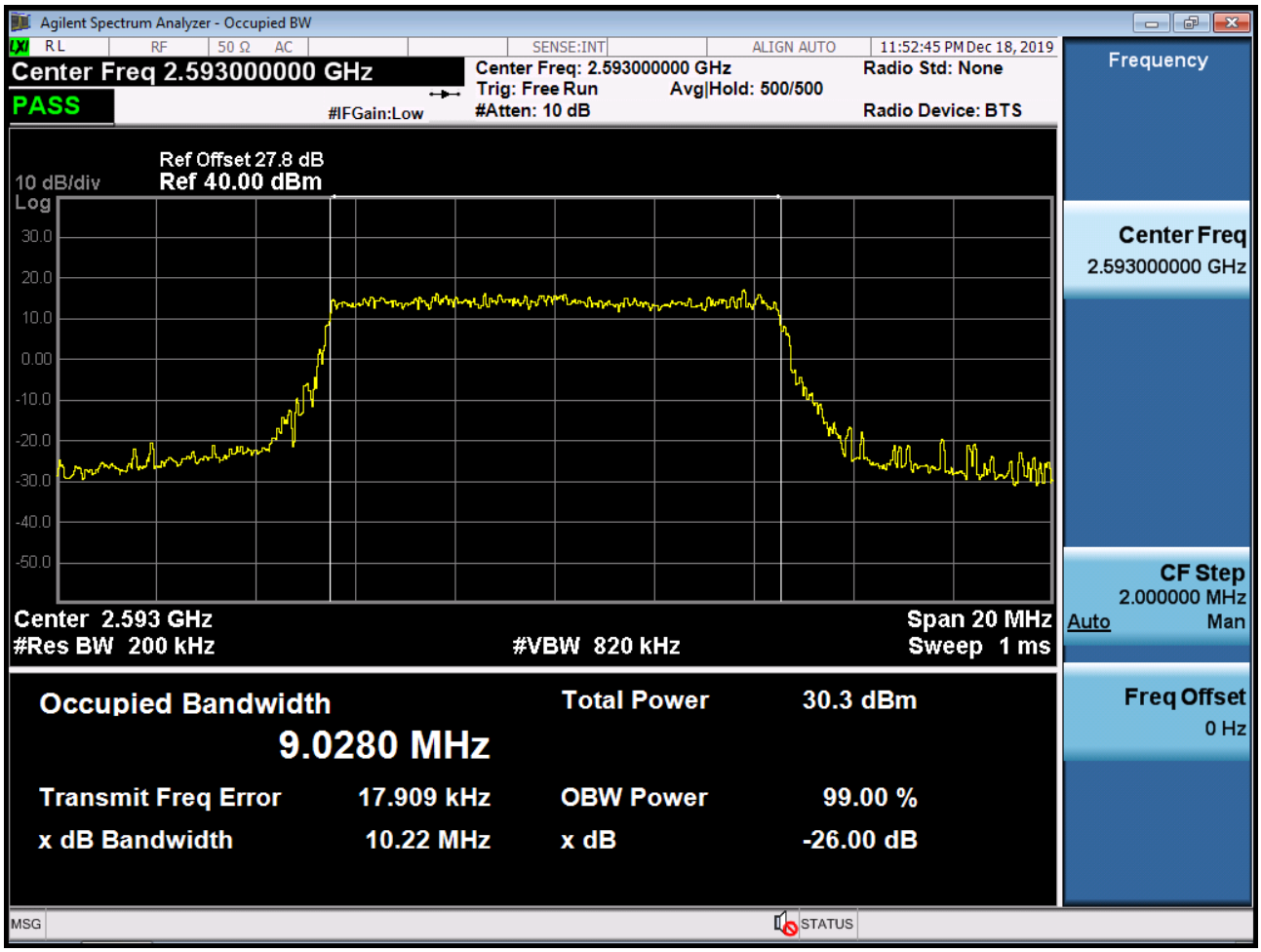
Occupied Bandwidth Plot (5 MHz Ch.40620 16-QAM RB 25) (FCC)



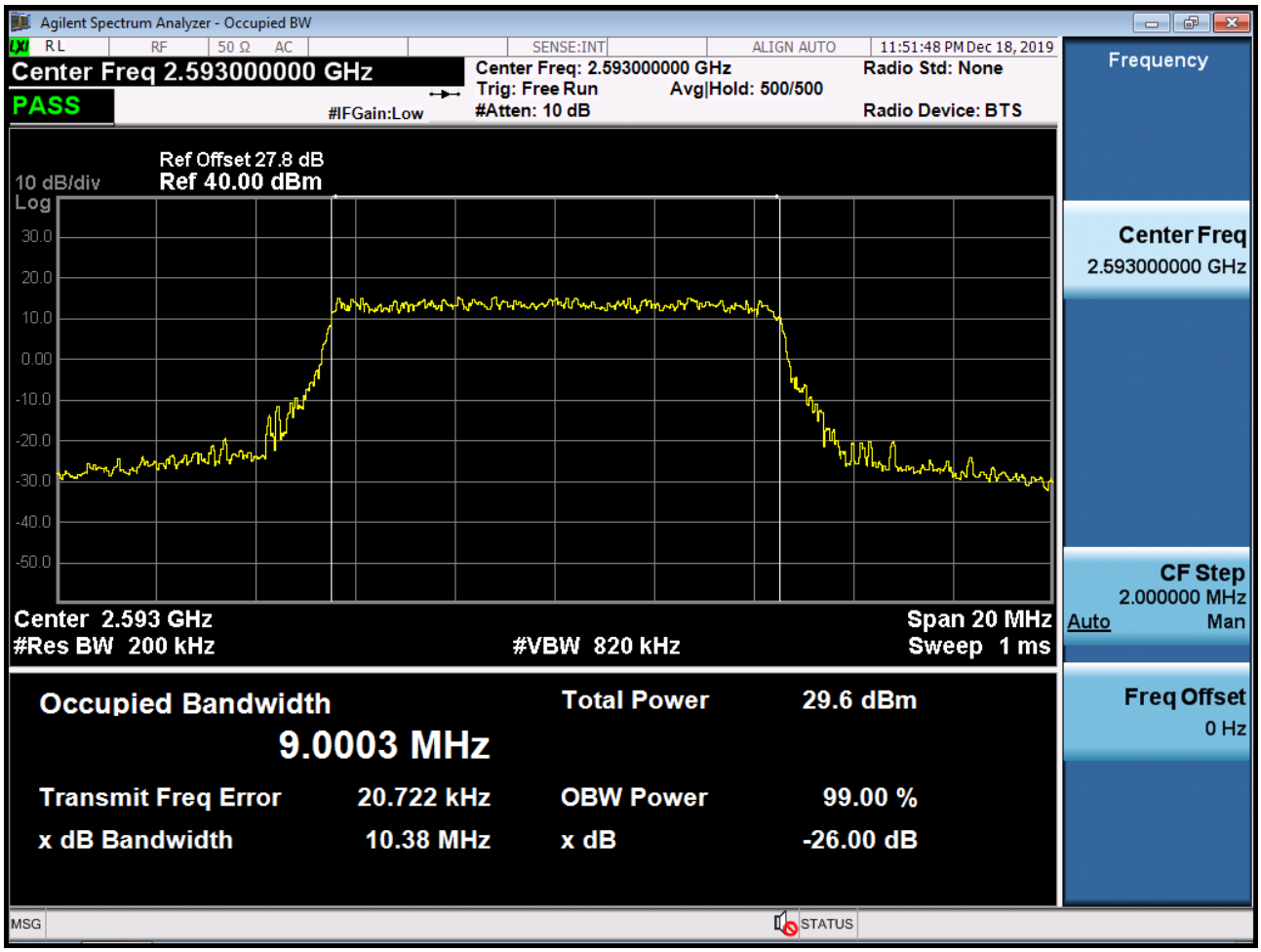
Occupied Bandwidth Plot (5 MHz Ch.40620 64-QAM RB 25) (FCC)



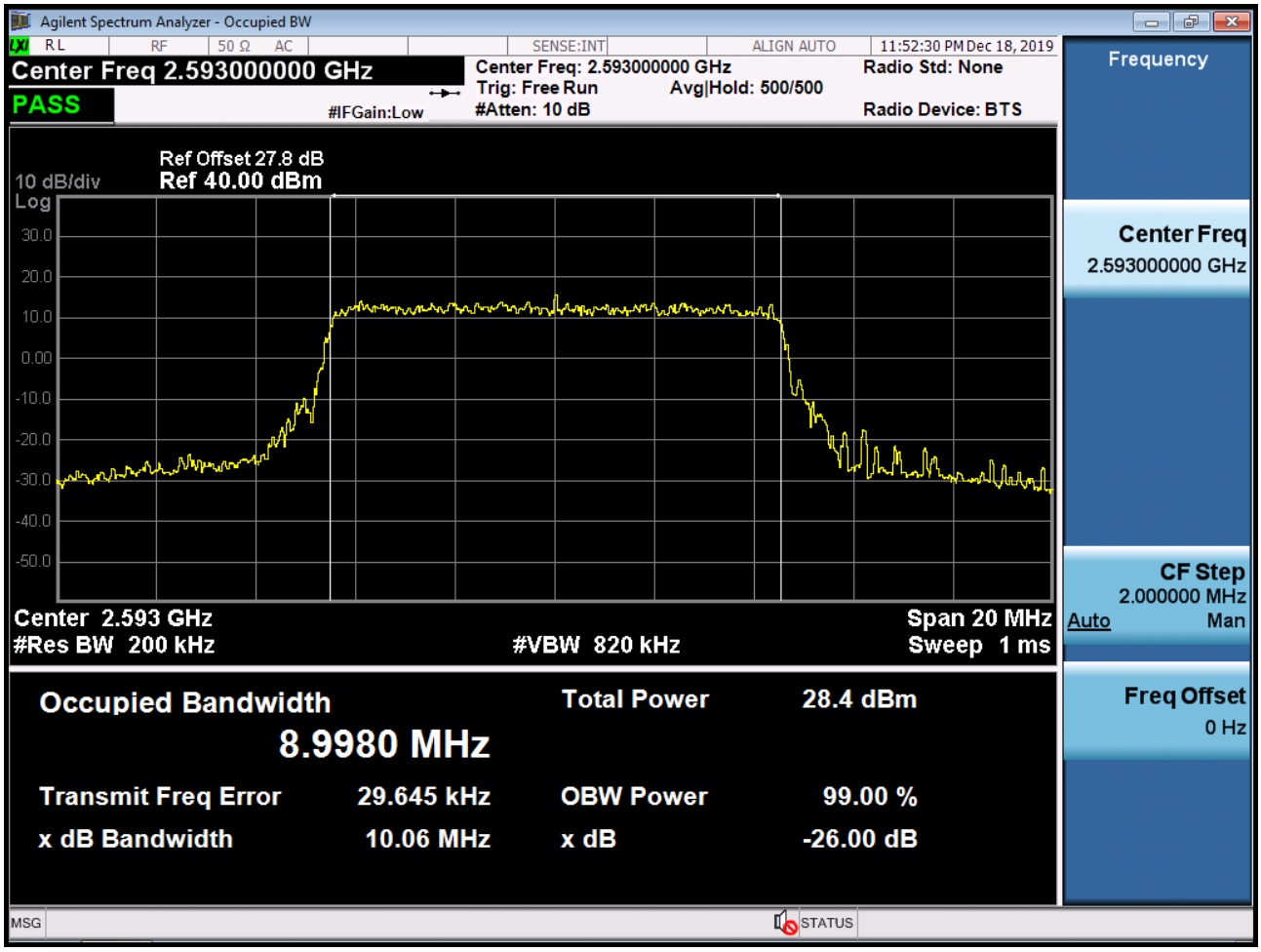
Occupied Bandwidth Plot (10 MHz Ch.40620 QPSK RB 50) (FCC)



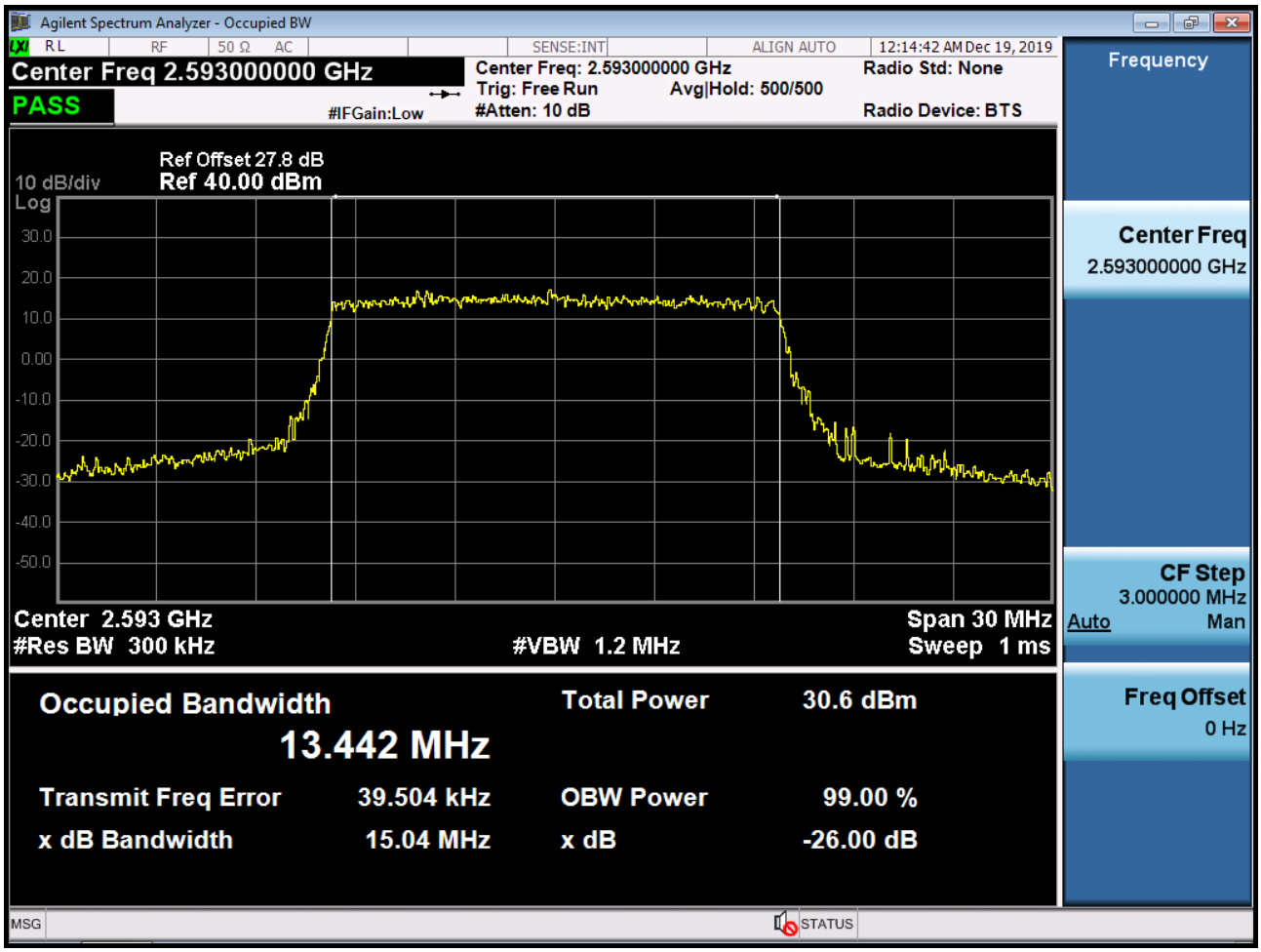
Occupied Bandwidth Plot (10 MHz Ch.40620 16-QAM RB 50) (FCC)



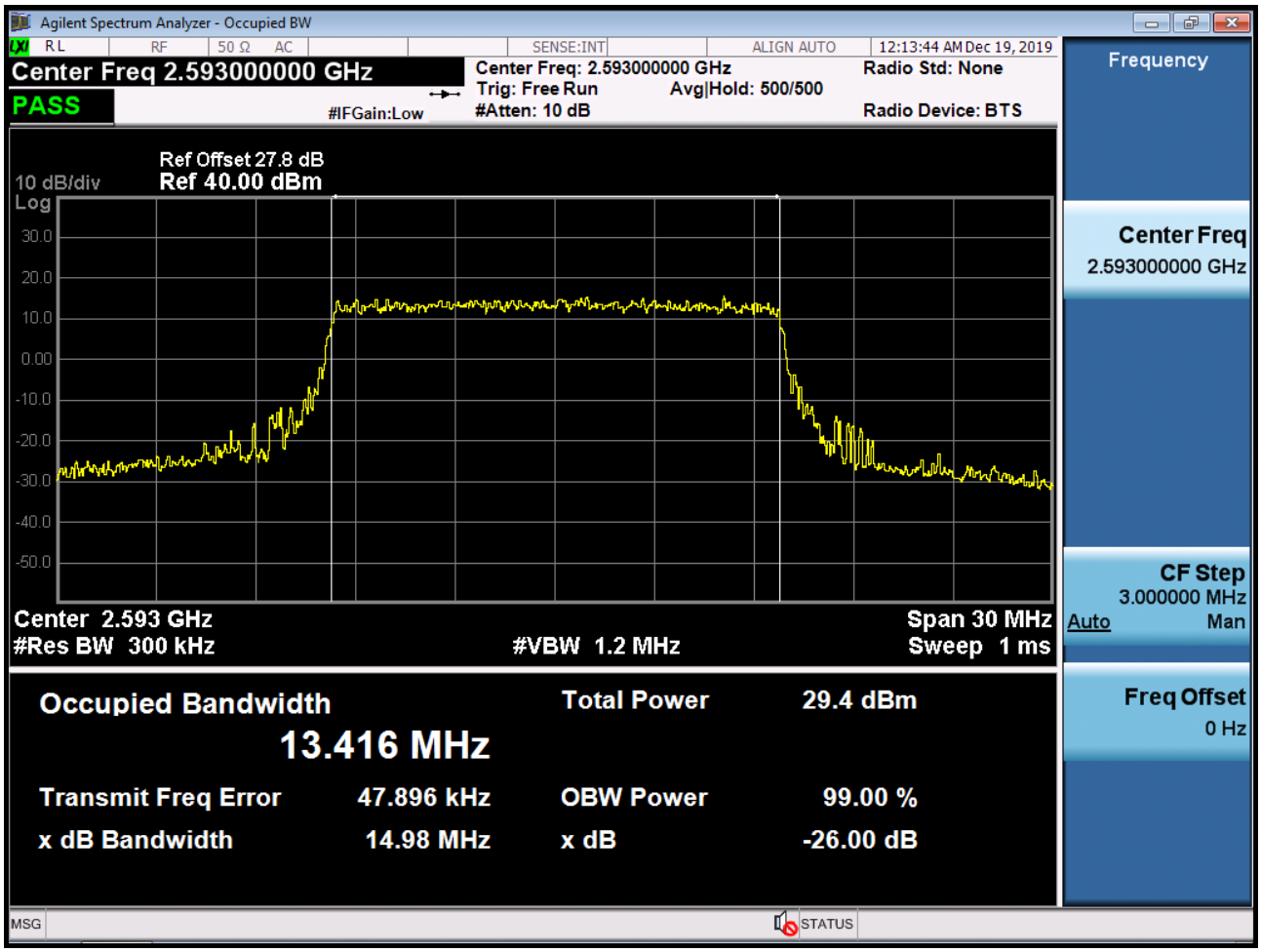
Occupied Bandwidth Plot (10 MHz Ch.40620 64-QAM RB 50) (FCC)



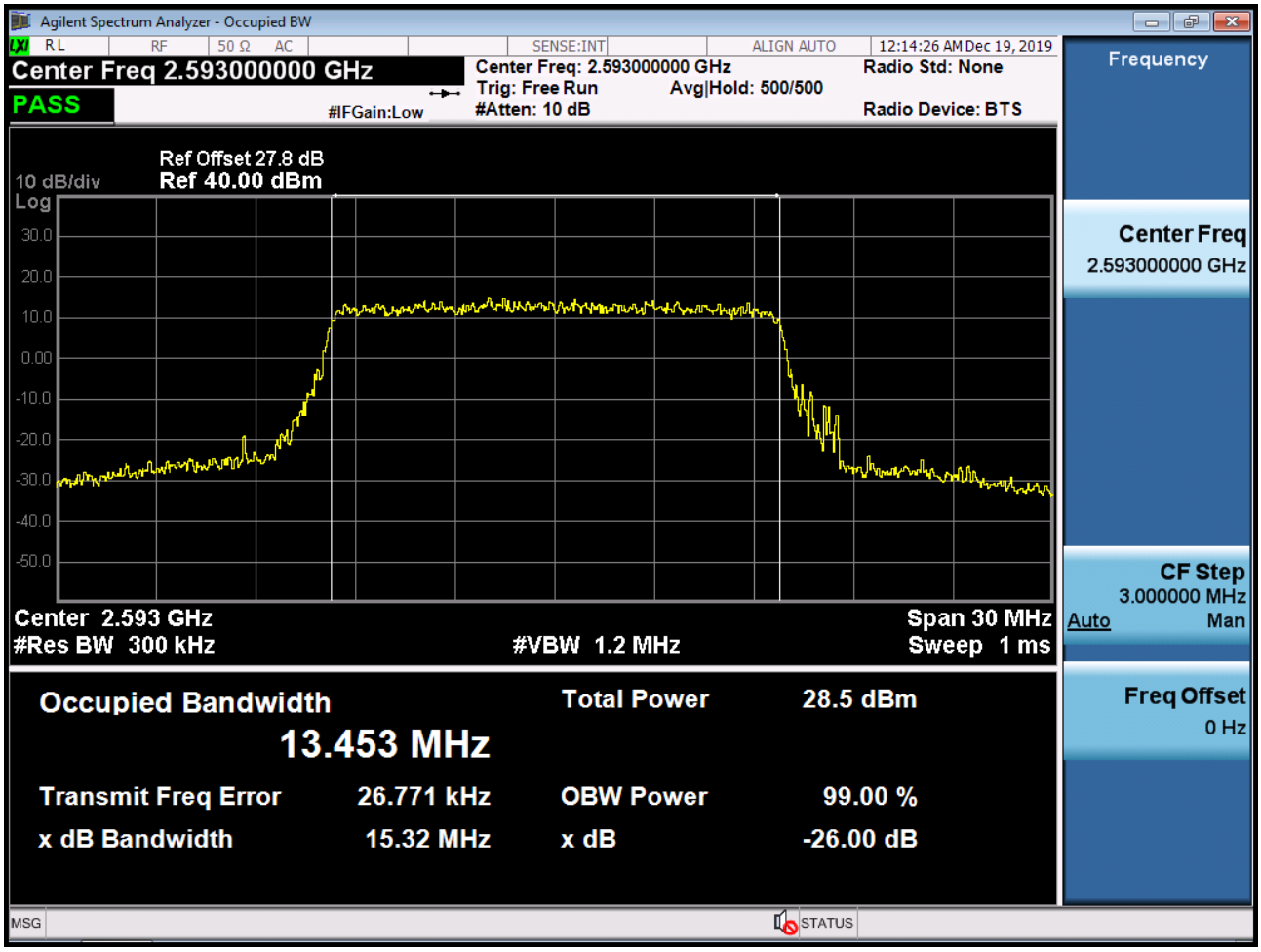
Occupied Bandwidth Plot (15 MHz Ch.40620 QPSK RB 75) (FCC)



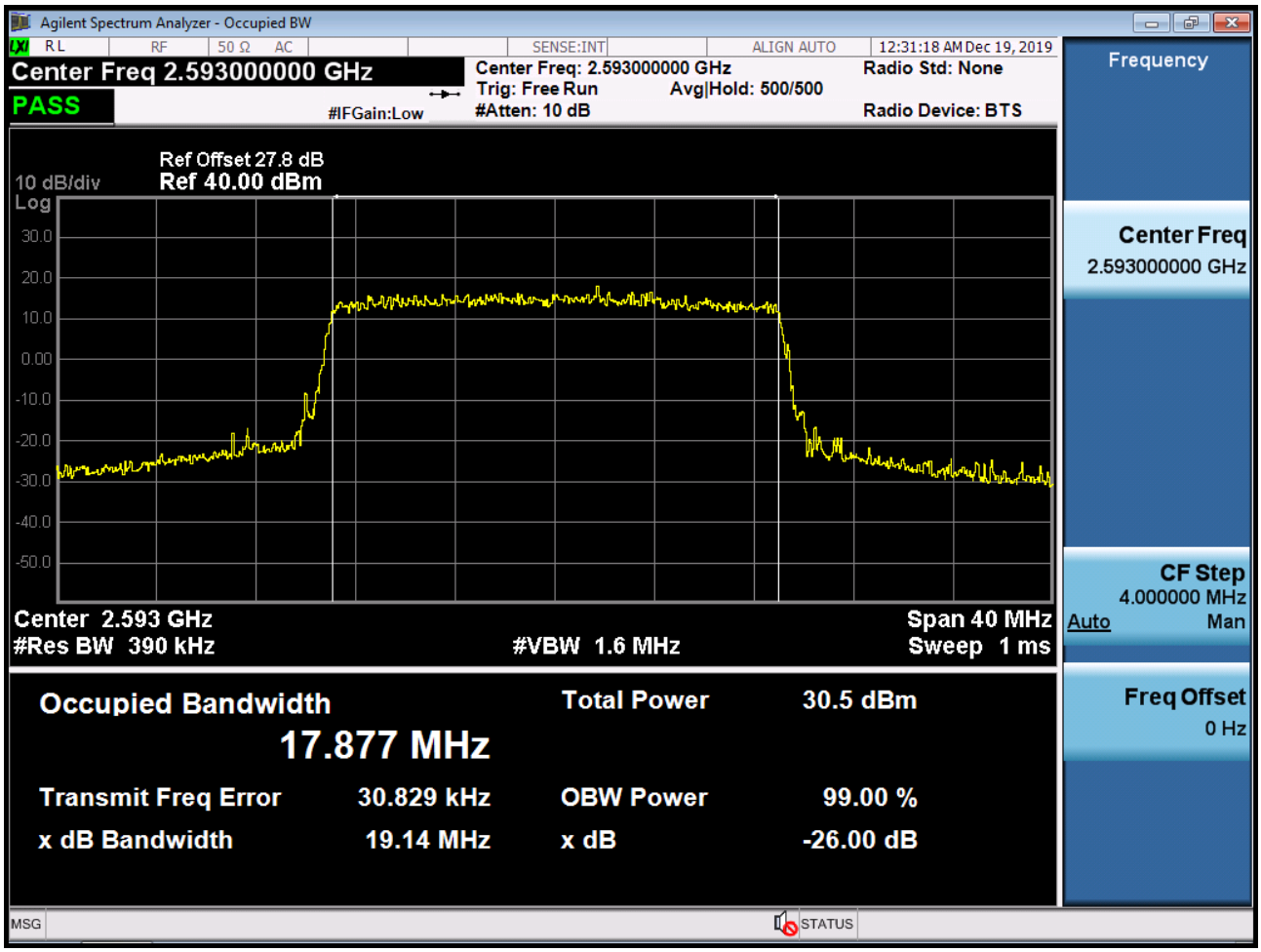
Occupied Bandwidth Plot (15 MHz Ch.40620 16-QAM RB 75) (FCC)



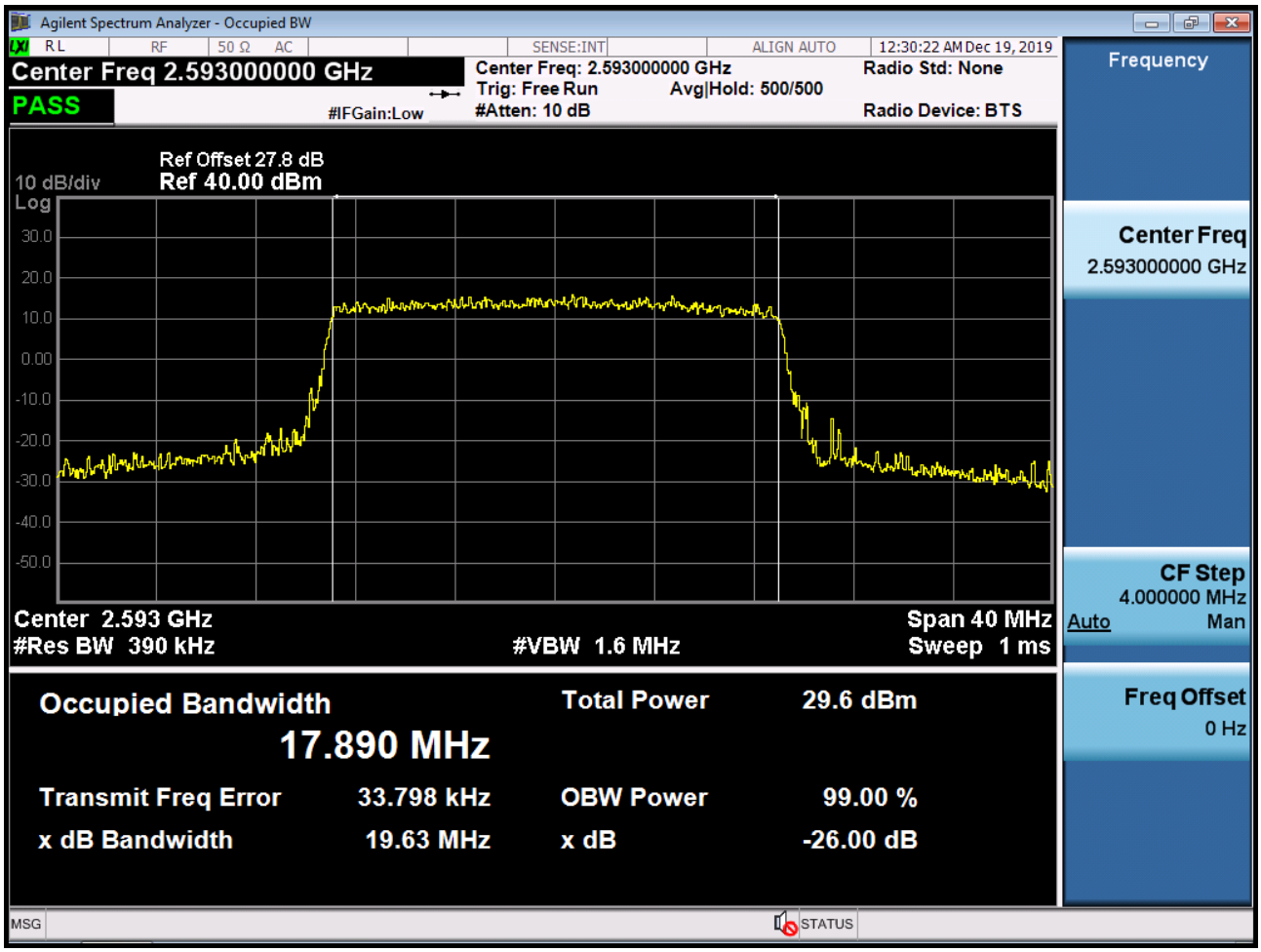
Occupied Bandwidth Plot (15 MHz Ch.40620 64-QAM RB 75) (FCC)



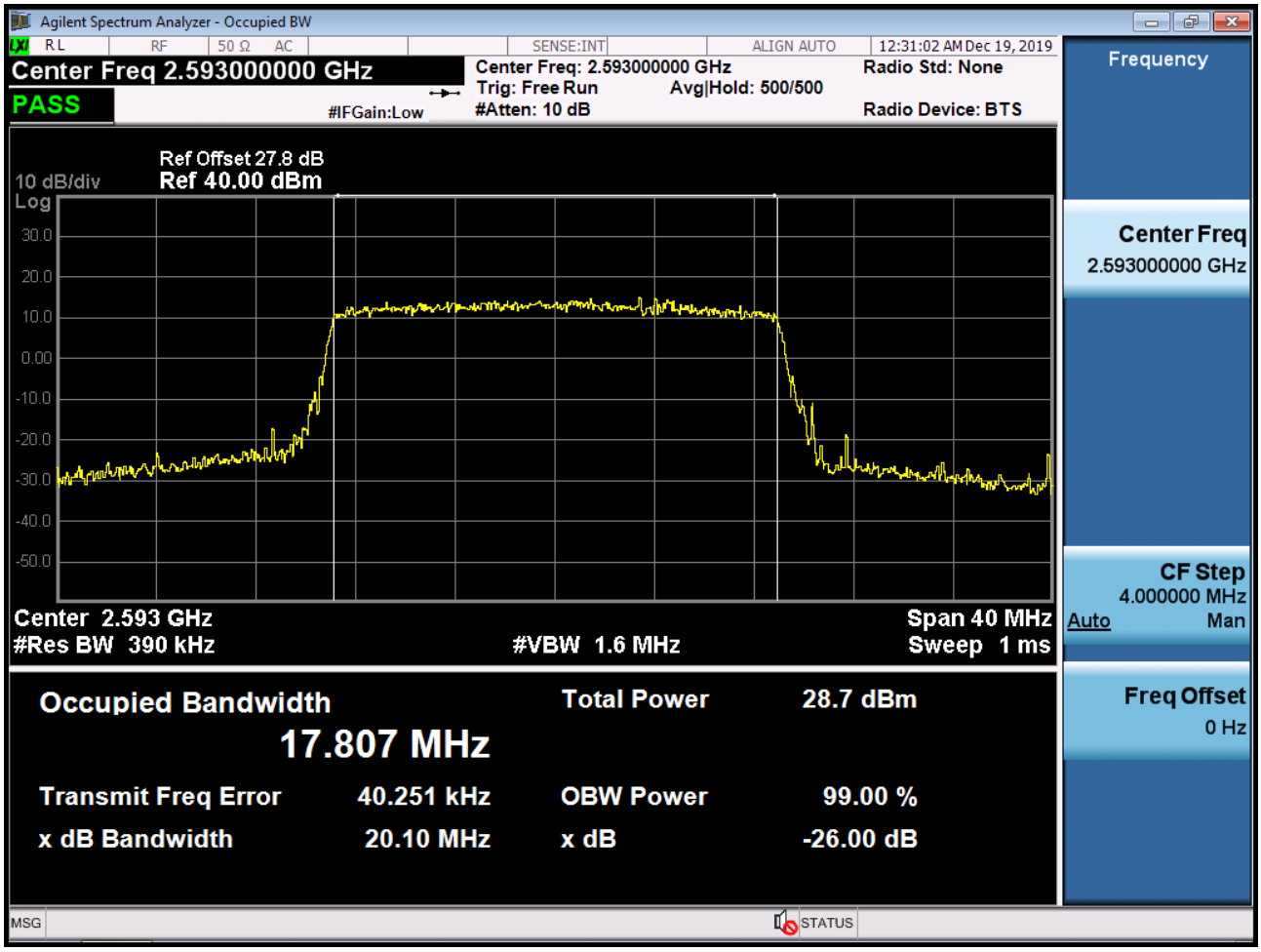
Occupied Bandwidth Plot (20 MHz Ch.40620 QPSK RB 100) (FCC)



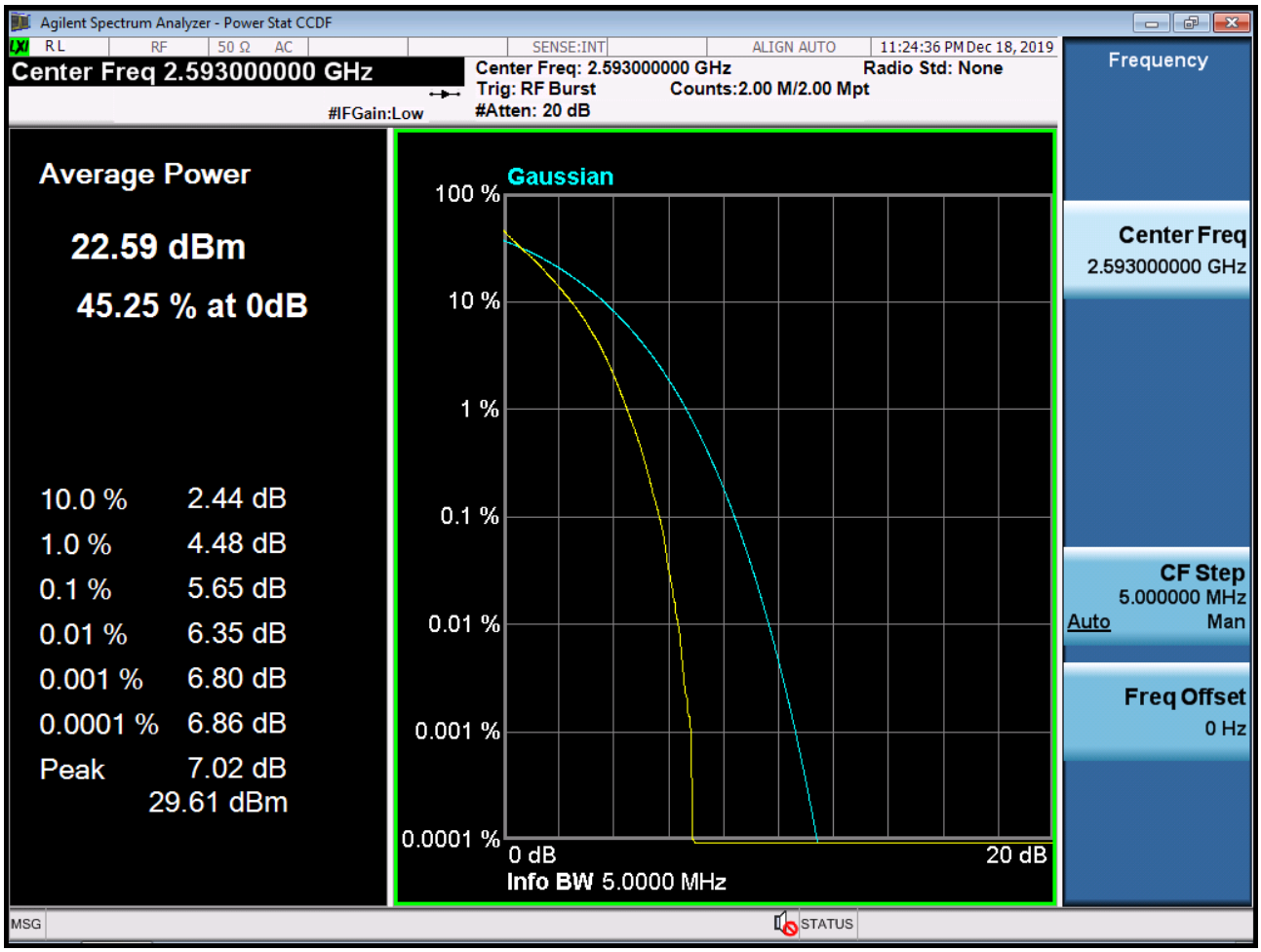
Occupied Bandwidth Plot (20 MHz Ch.40620 16-QAM RB 100) (FCC)



Occupied Bandwidth Plot (20 MHz Ch.40620 64-QAM RB 100) (FCC)



PAR Plot (5M BW_Ch.40620_QPSK_RB25_0) (FCC)

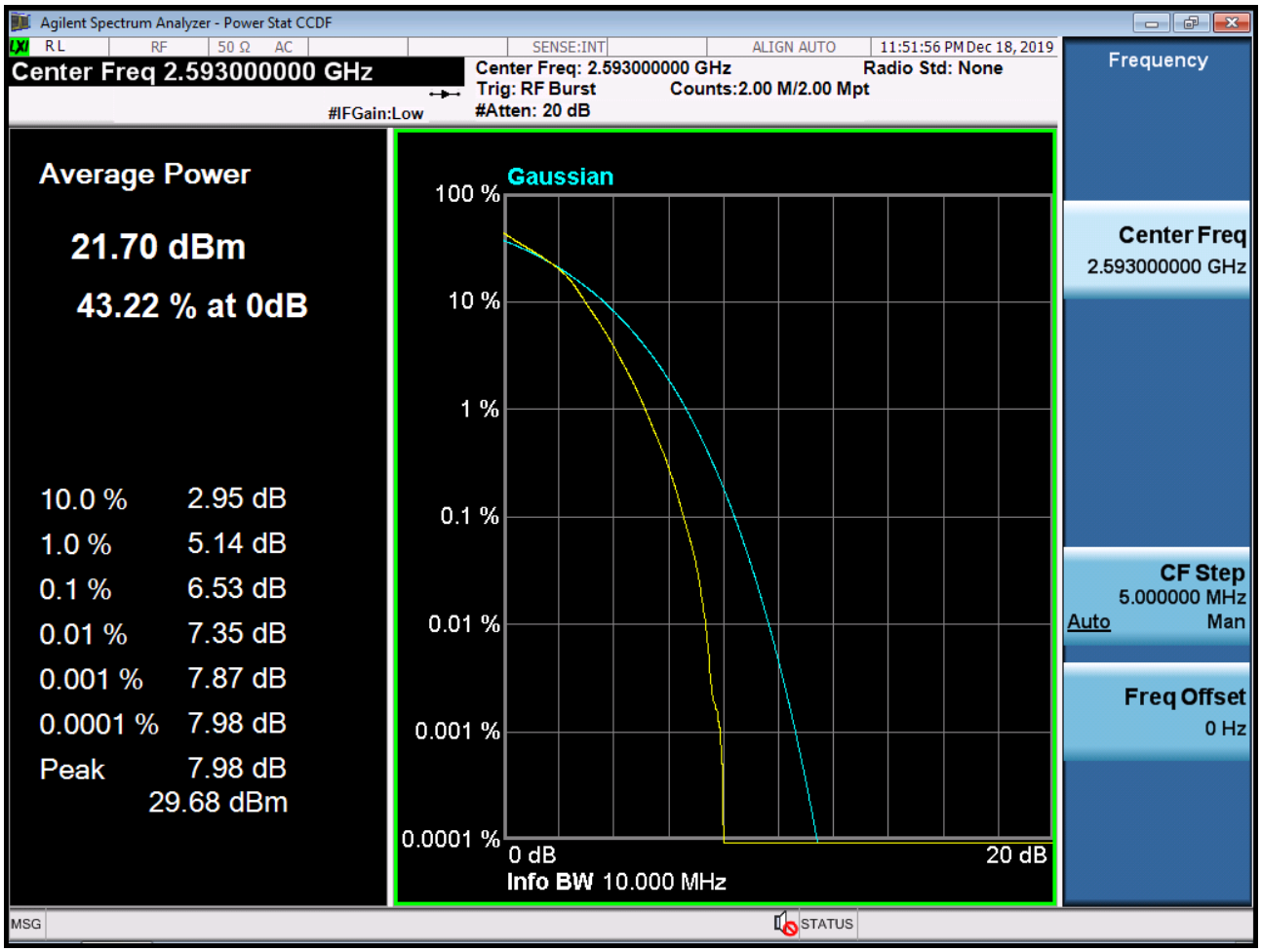


PAR Plot (5M BW_Ch.40620_16QAM_RB25_0) (FCC)

PAR Plot (5M BW_Ch.40620_64QAM_RB25_0) (FCC)

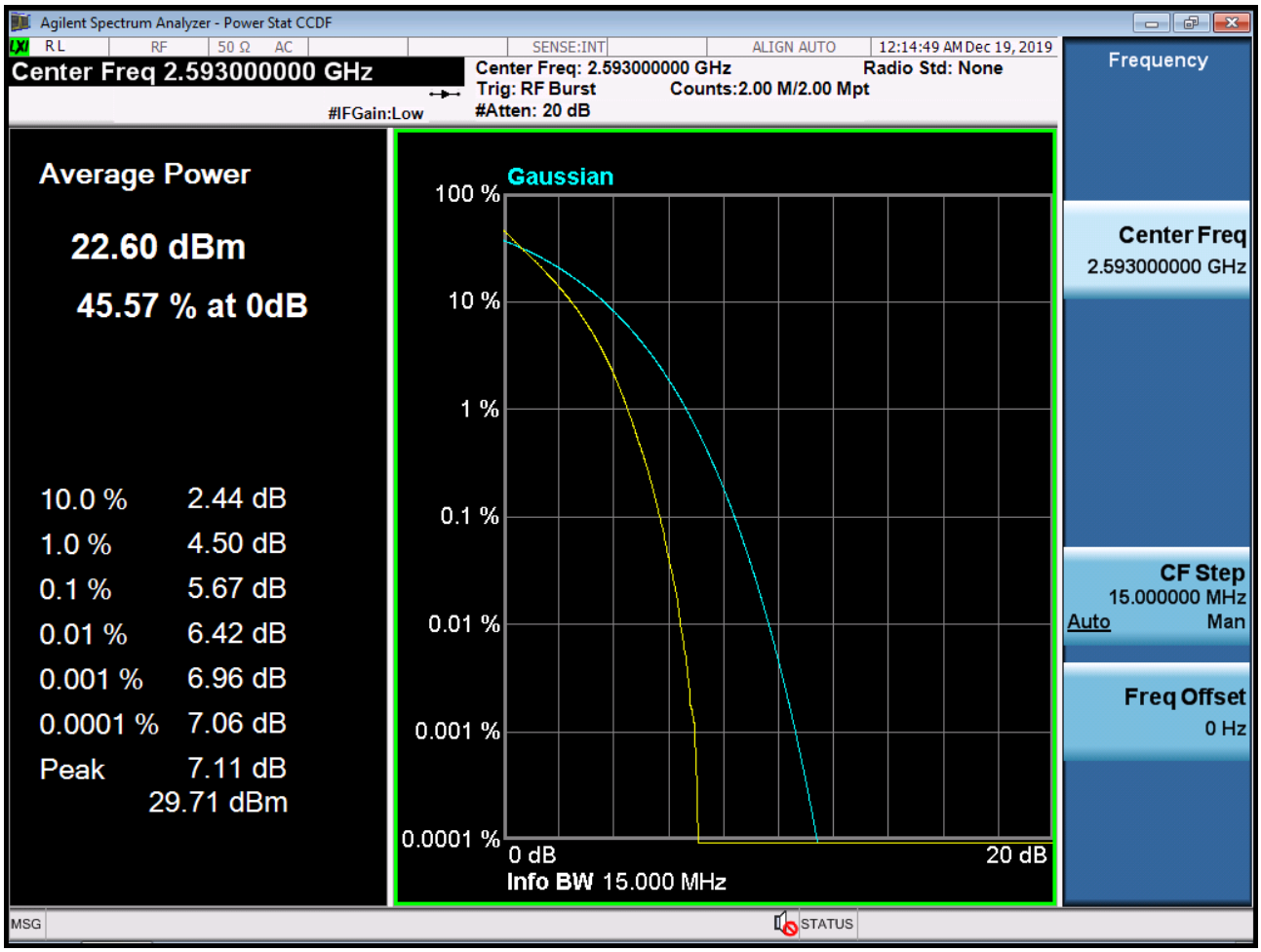
PAR Plot (10M BW_Ch.40620_QPSK_RB50_0) (FCC)

PAR Plot (10M BW_Ch.40620_16QAM_RB50_0) (FCC)

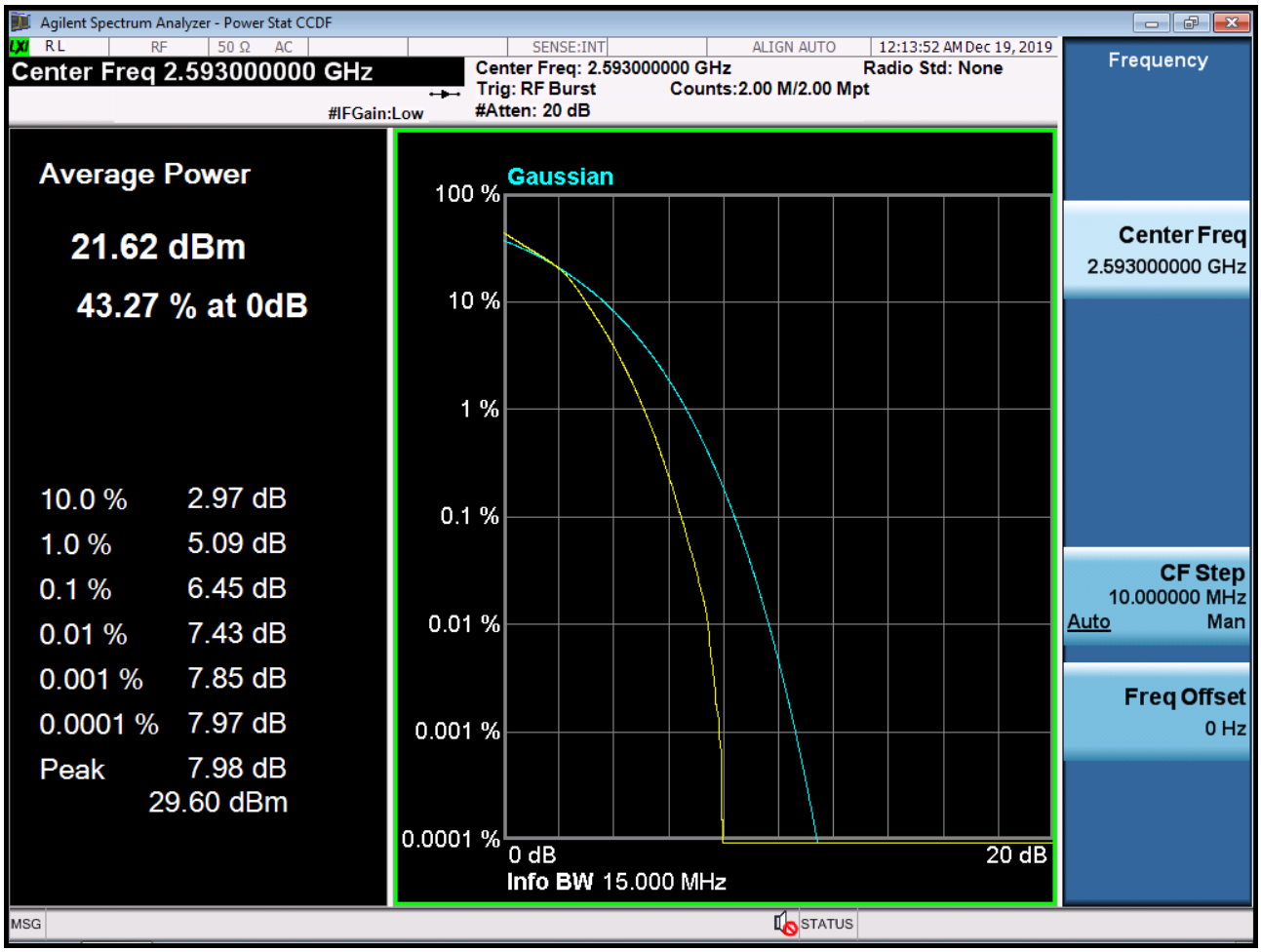


PAR Plot (10M BW_Ch.40620_64QAM_RB50_0) (FCC)

PAR Plot (15M BW_Ch.40620_QPSK_RB75_0) (FCC)

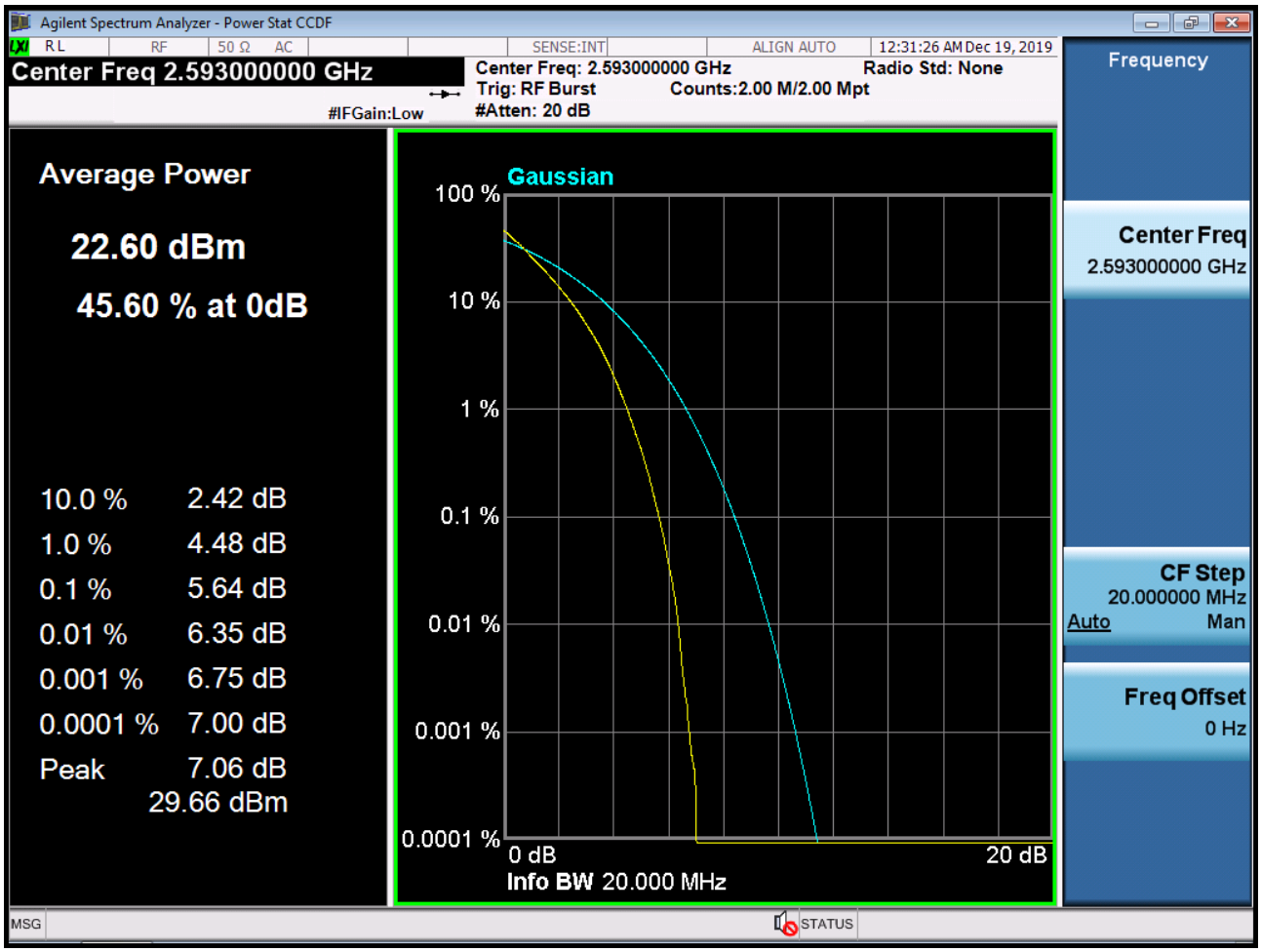


PAR Plot (15M BW_Ch.40620_16QAM_RB75_0) (FCC)

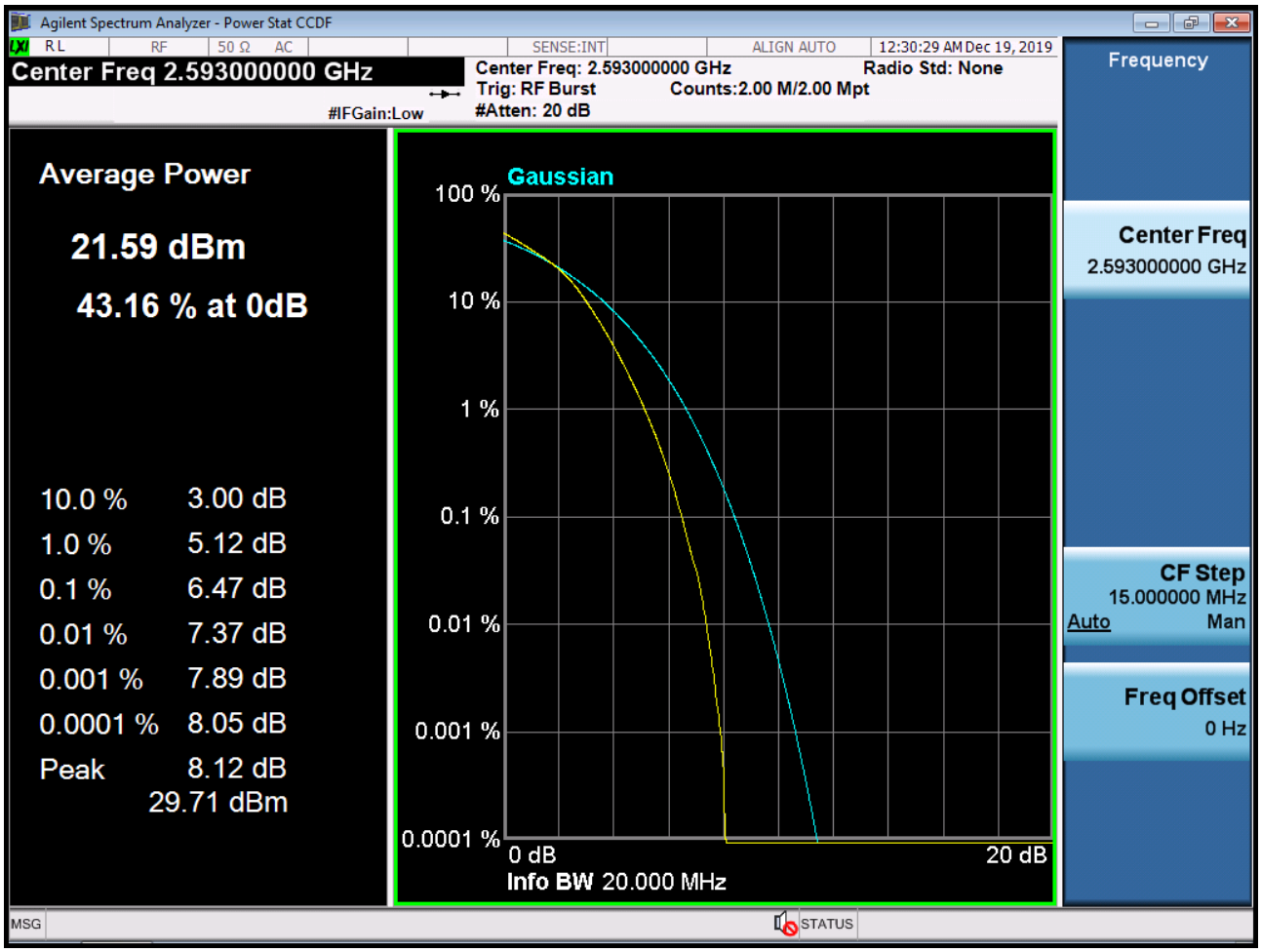


PAR Plot (15M BW_Ch.40620_64QAM_RB75_0) (FCC)

PAR Plot (20M BW_Ch.40620_QPSK_RB100_0) (FCC)

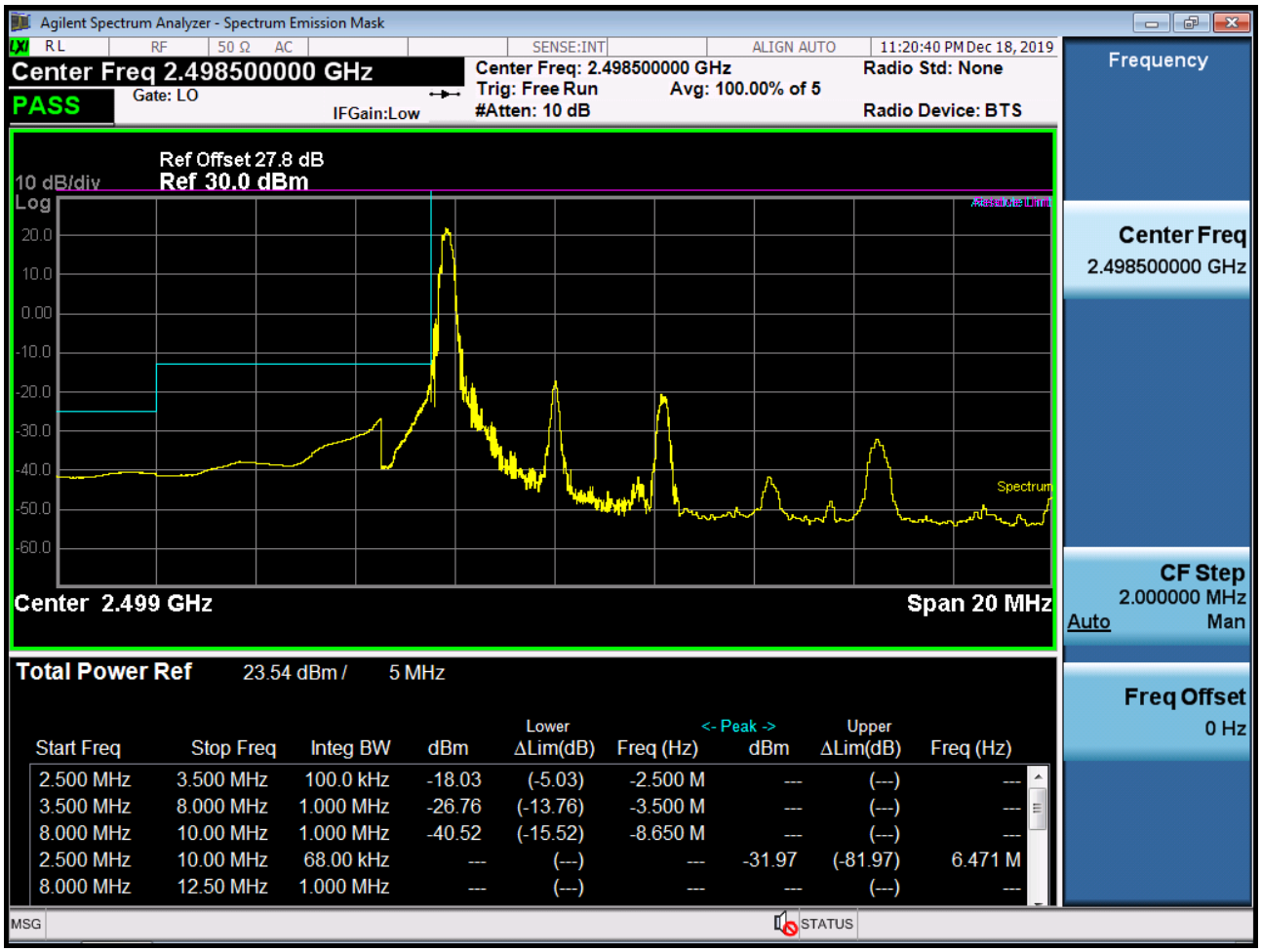


PAR Plot (20M BW_Ch.40620_16QAM_RB100_0) (FCC)

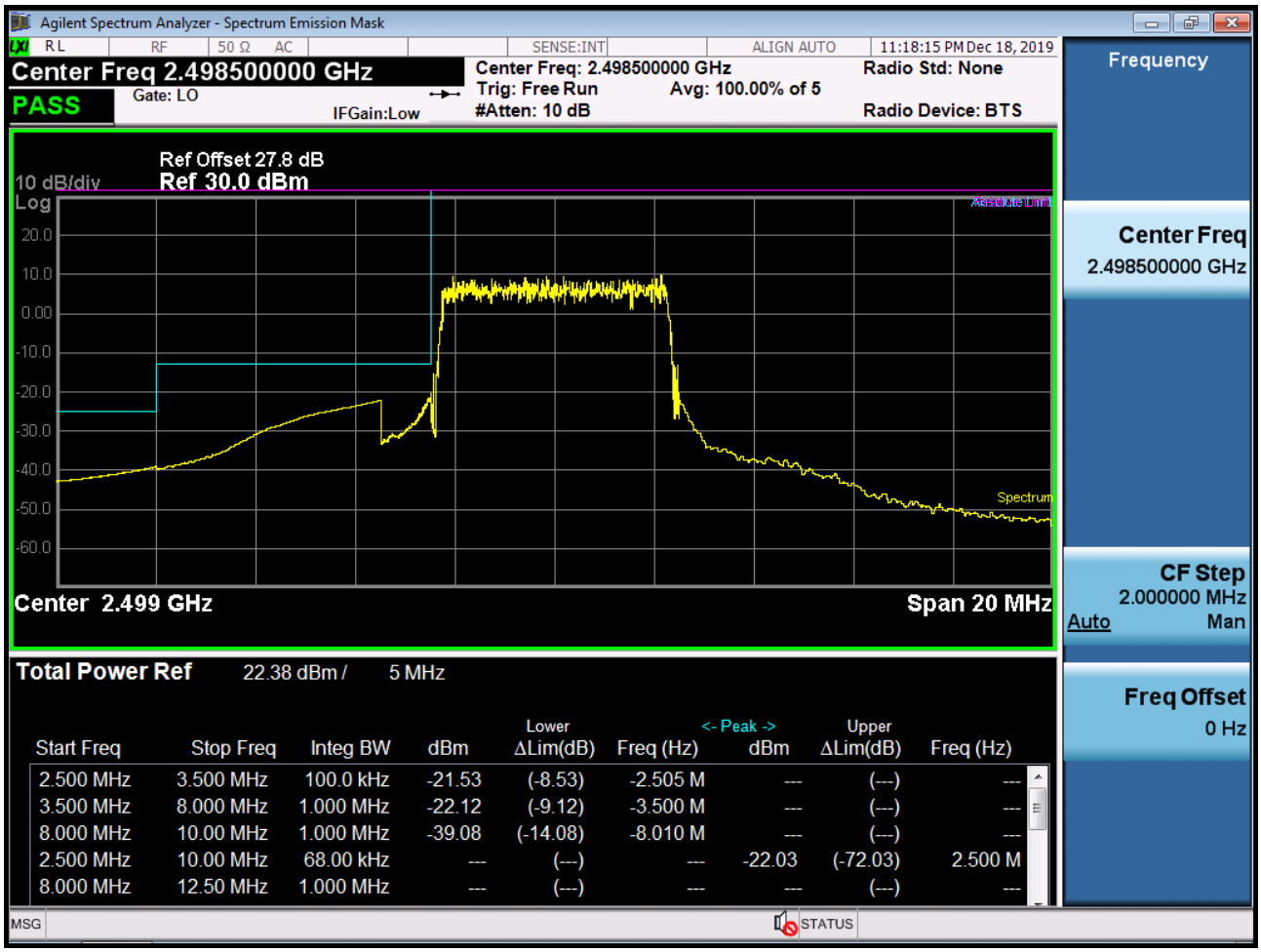


PAR Plot (20M BW_Ch.40620_64QAM_RB100_0) (FCC)

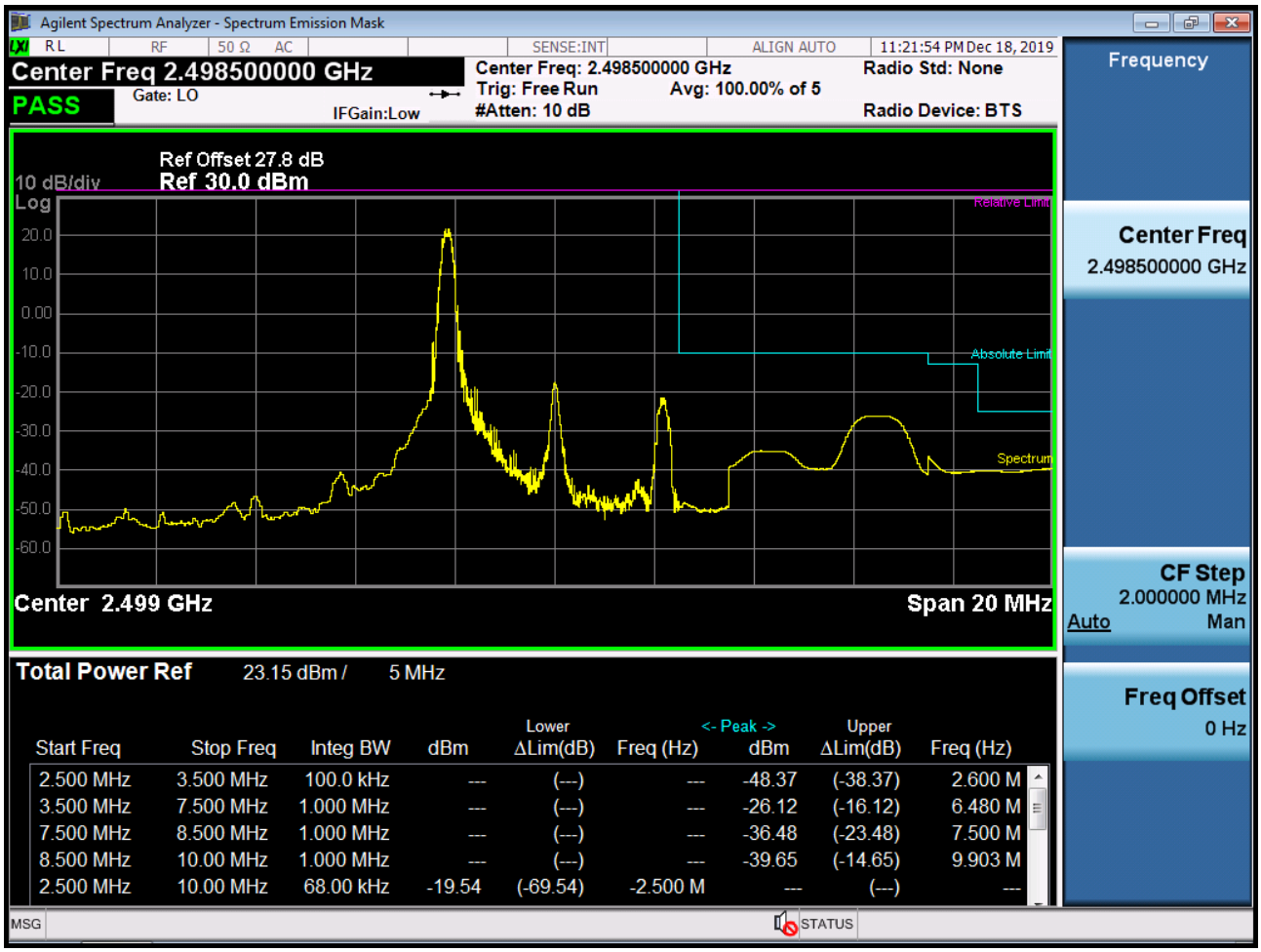
BAND 41. Low Channel Edge Plot (5 MHz Ch.39675 QPSK RB 1, Offset 0)-1(FCC)



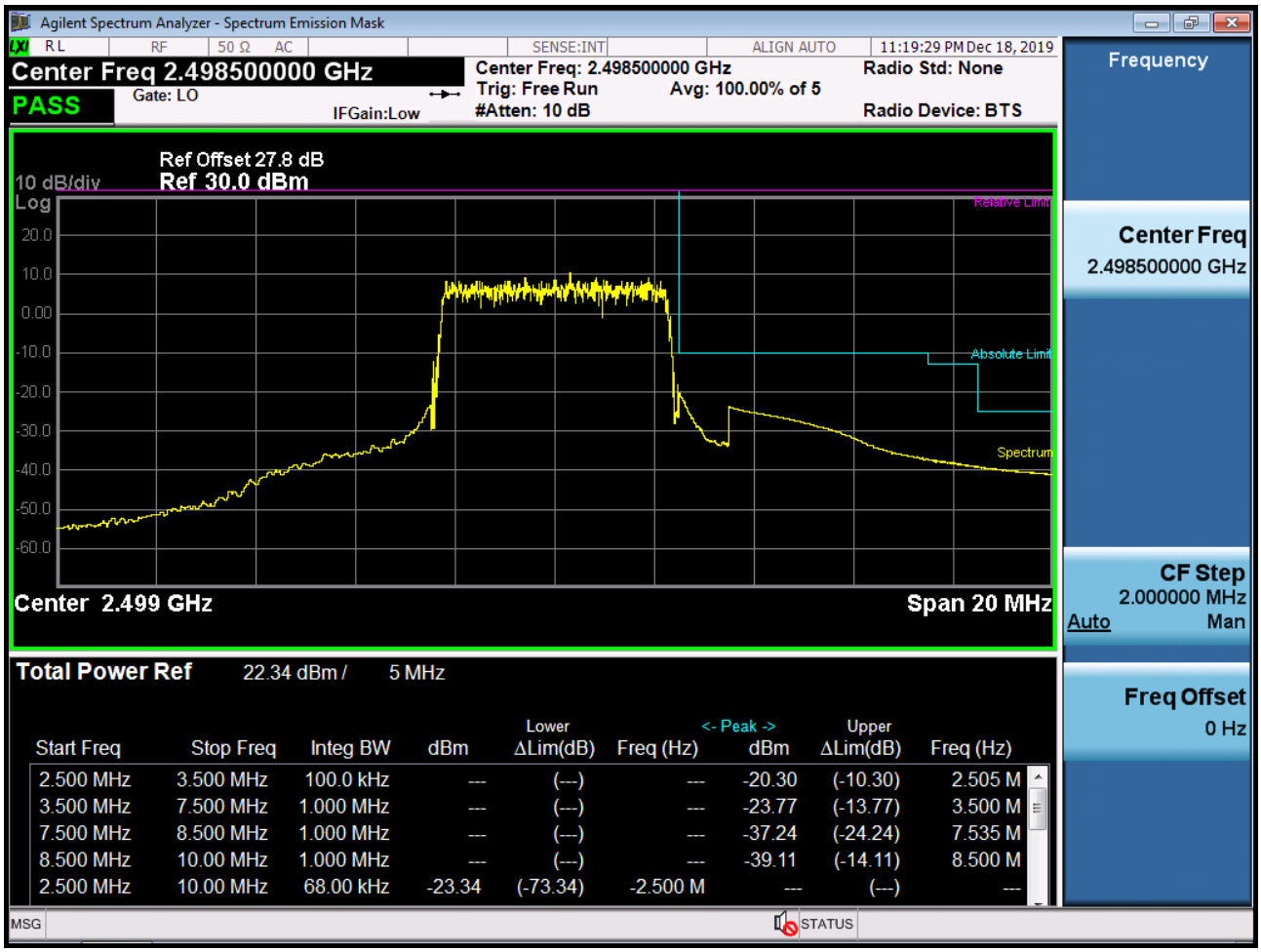
BAND 41. Low Channel Edge Plot (5 MHz Ch.39675 QPSK RB 25, Offset 0)-1(FCC)



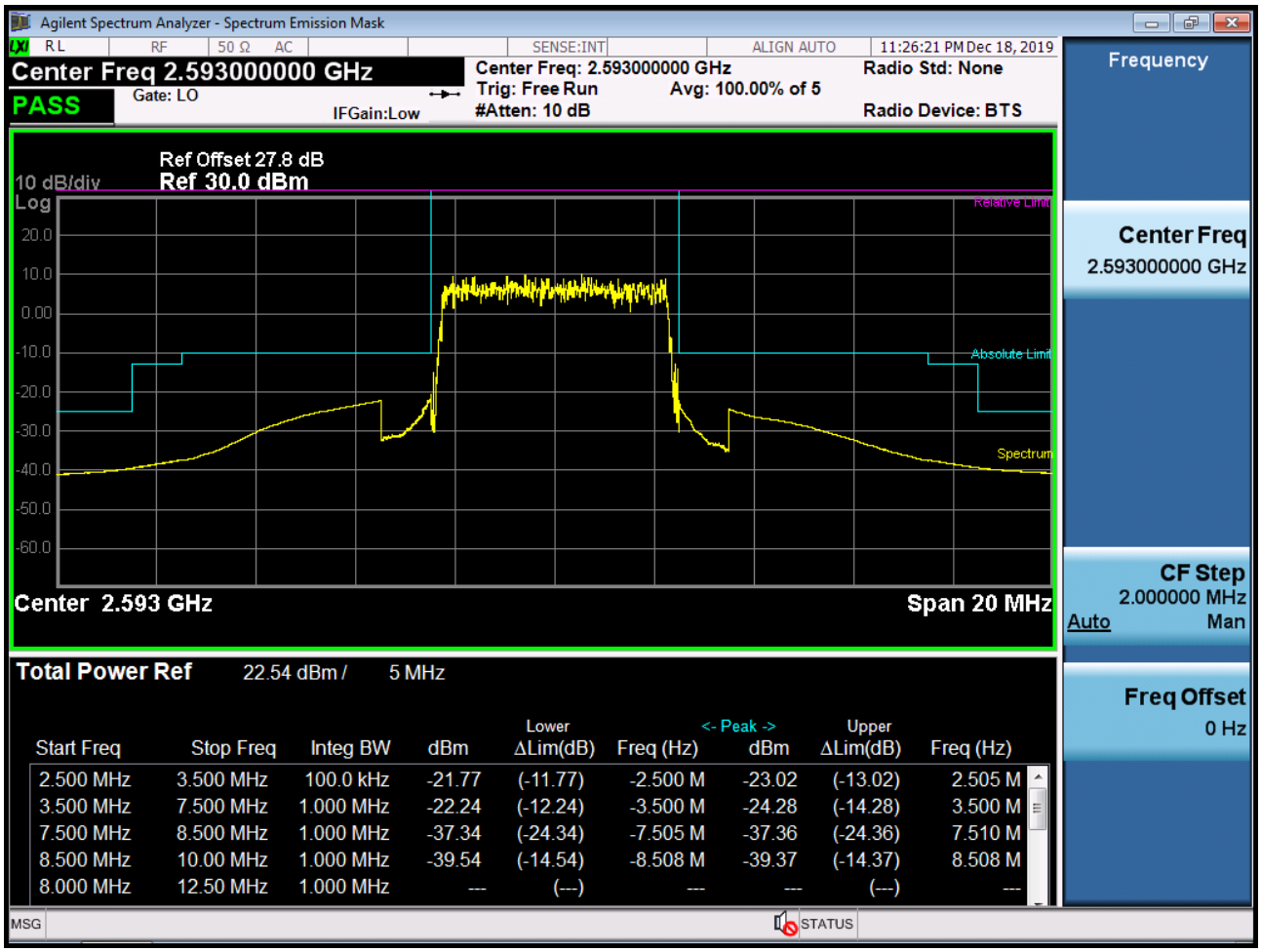
BAND 41. Low Channel Edge Plot (5 MHz Ch.39675 QPSK_RB25_Offset 0)-2(FCC)



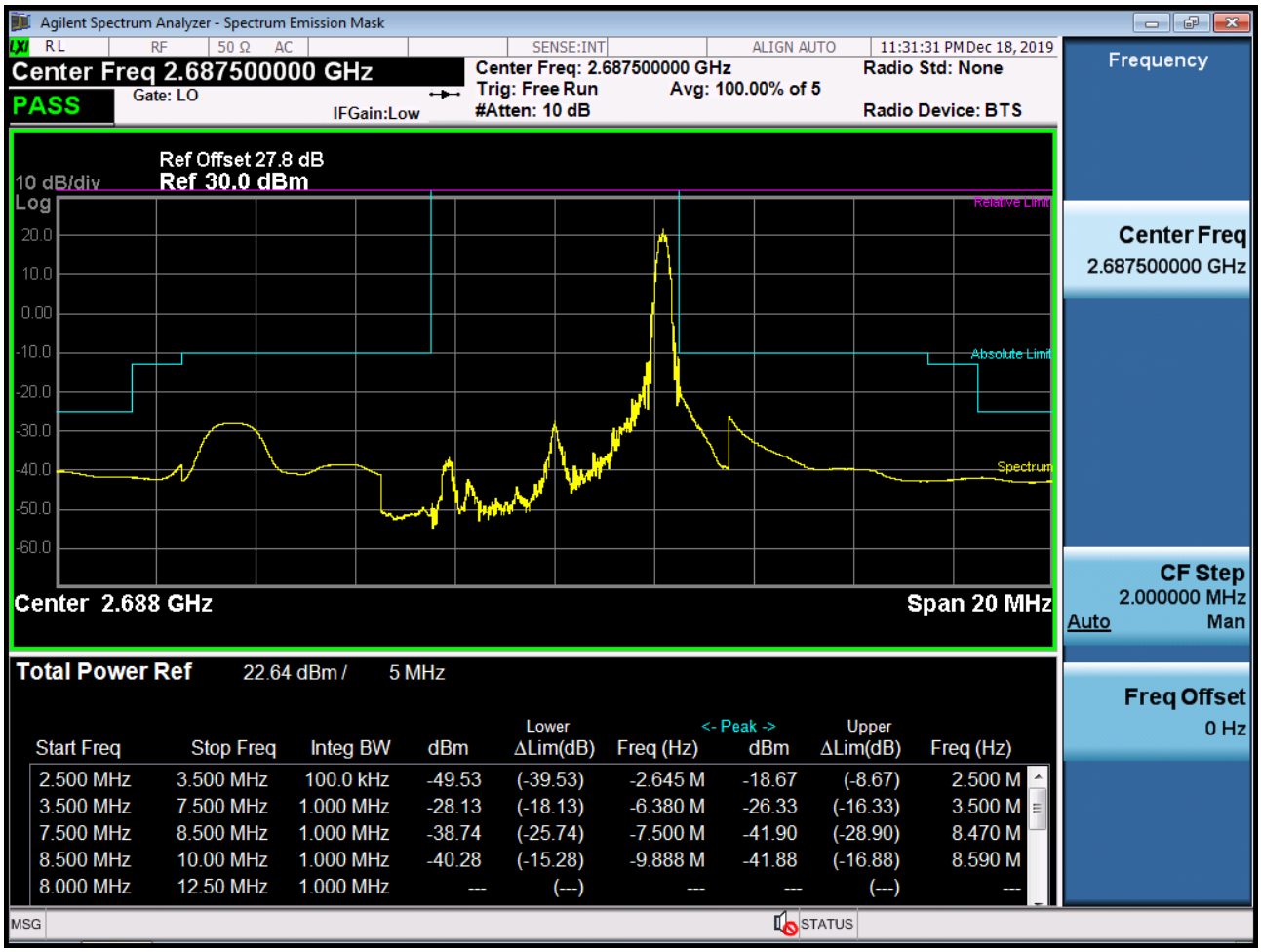
BAND 41. Low Channel Edge Plot (5 MHz Ch.39675 QPSK_RB25_Offset 0)-2(FCC)



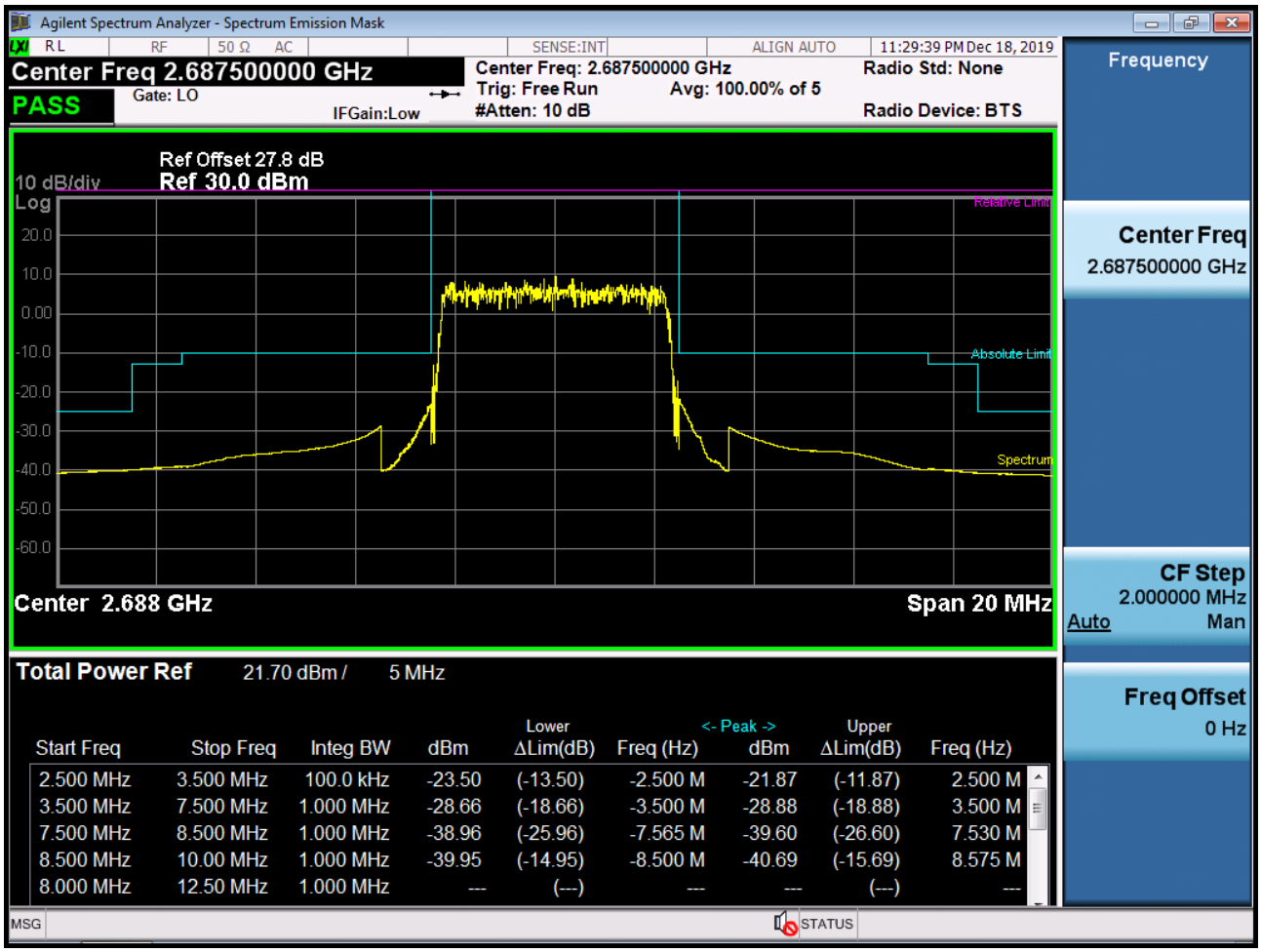
BAND 41. Mid Channel Edge Plot (5 MHz Ch.40620 QPSK RB 25) (FCC)



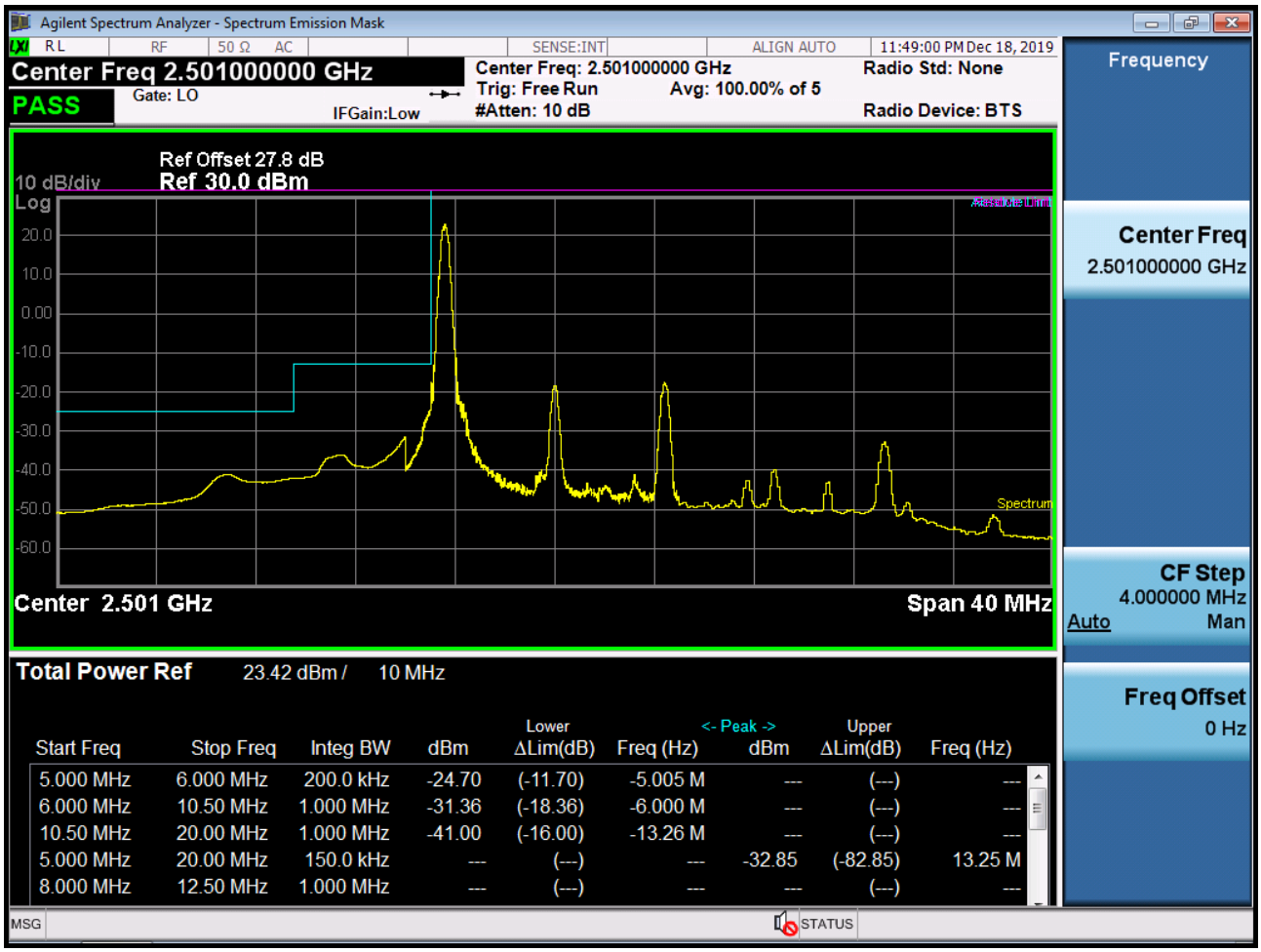
BAND 41. High Channel Edge Plot (5 MHz Ch.41565 QPSK RB 1, Offset 0) (FCC)



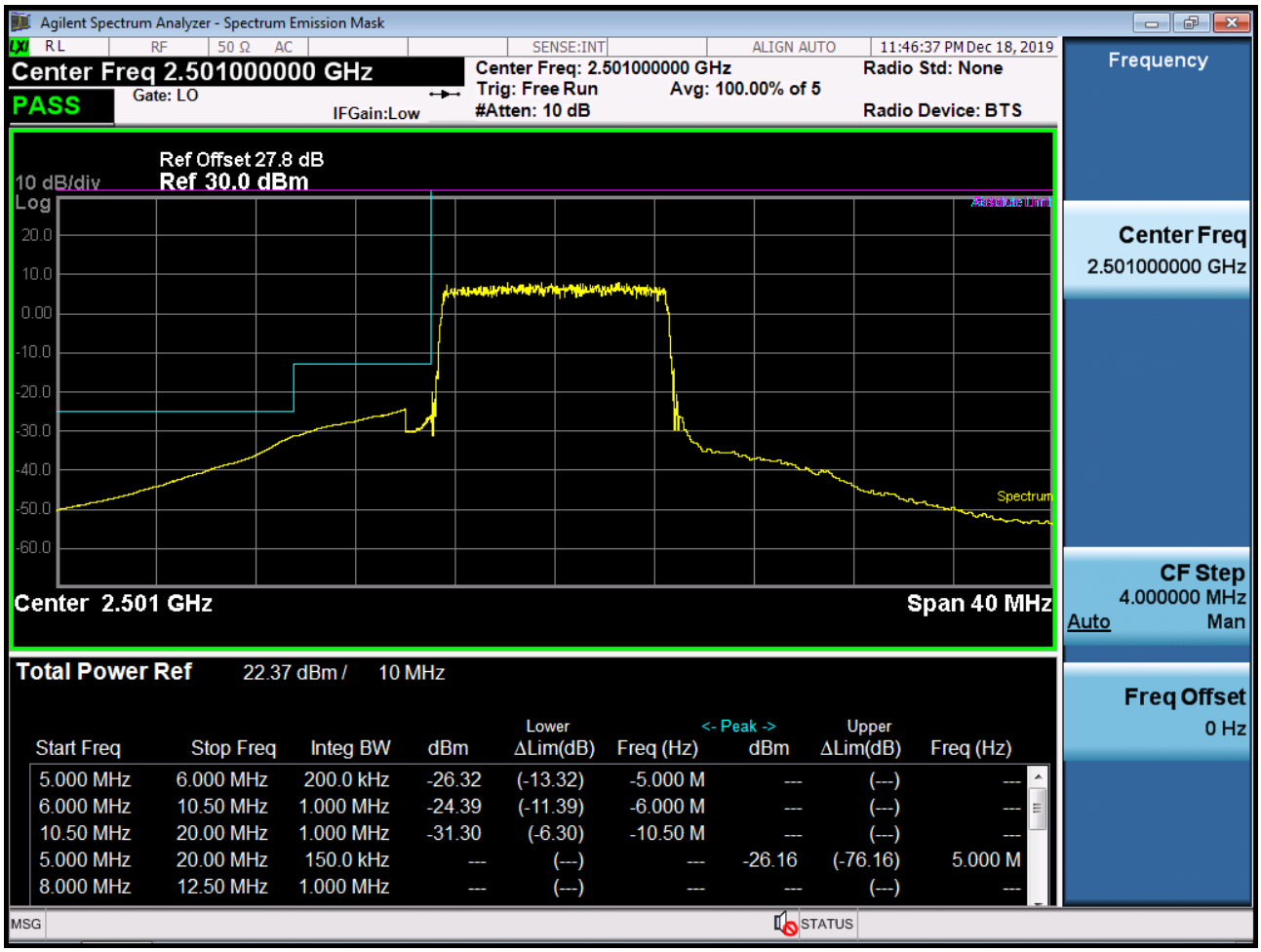
BAND 41. High Channel Edge Plot (5 MHz Ch.41565 QPSK_RB25_Offset 0) (FCC)



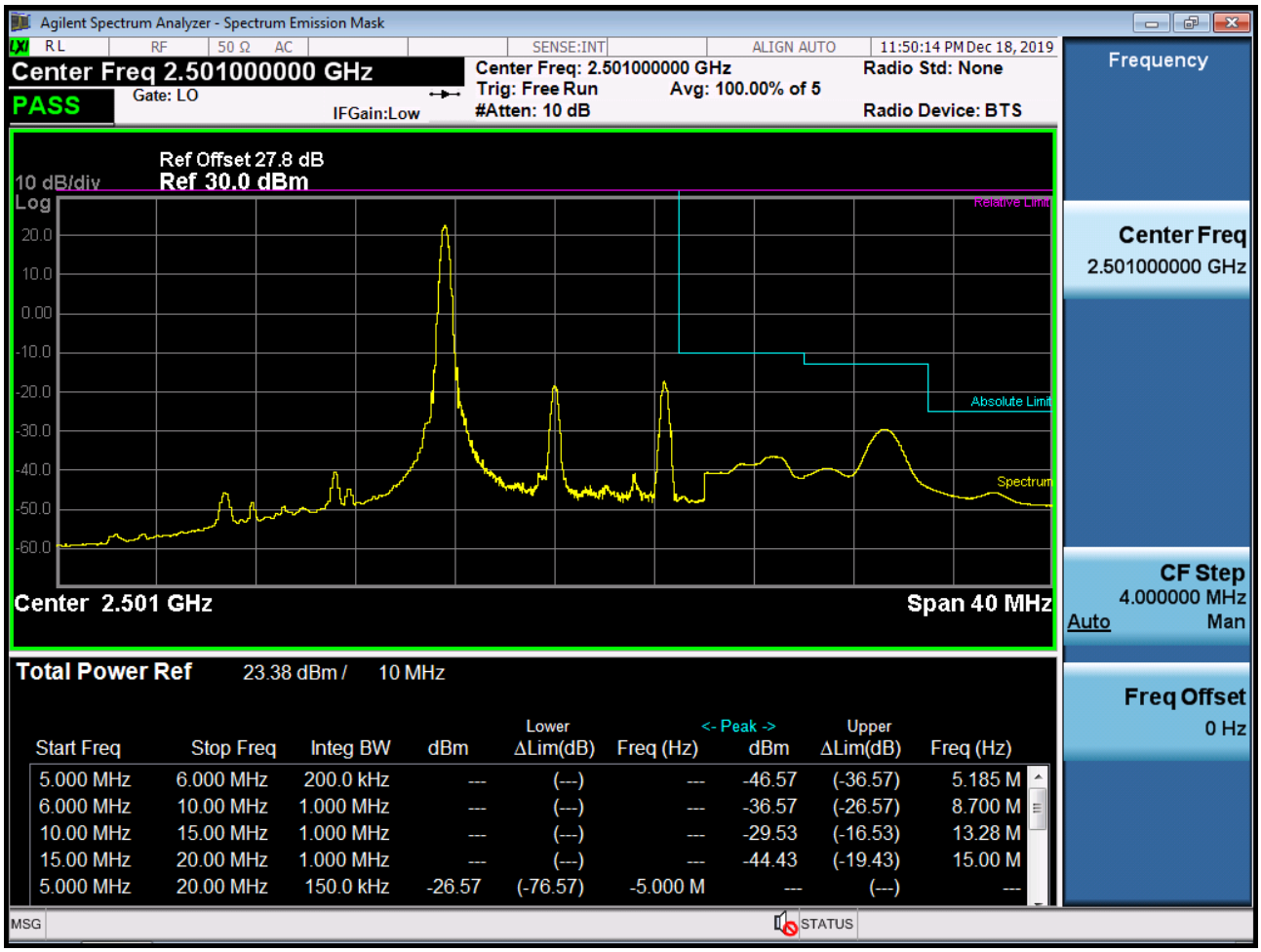
BAND 41. Low Channel Edge Plot (10 MHz Ch.39700 QPSK RB 1, Offset 0)-1(FCC)



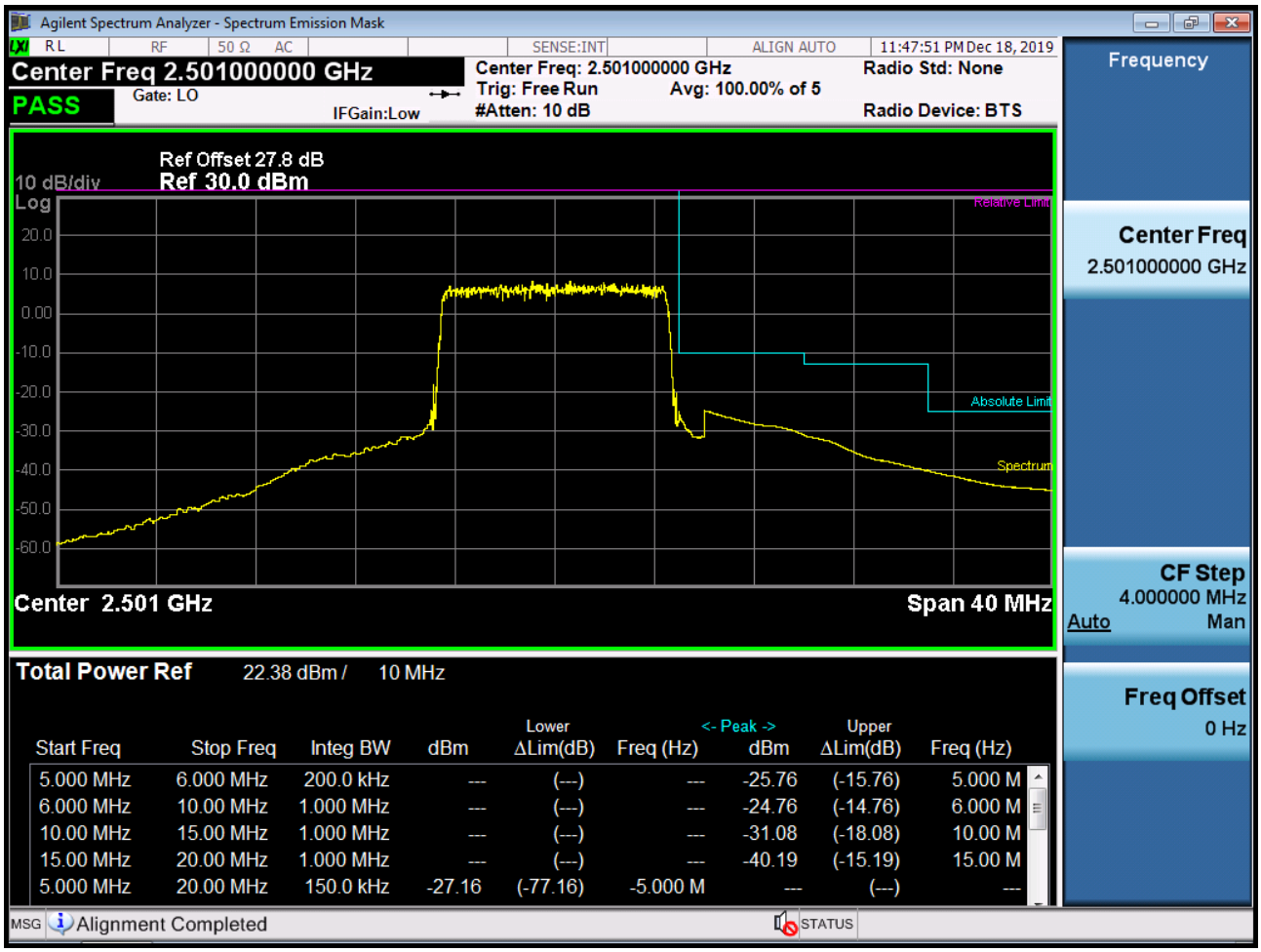
BAND 41. Low Channel Edge Plot (10 MHz Ch.39700 QPSK RB 25, Offset 0)-1(FCC)



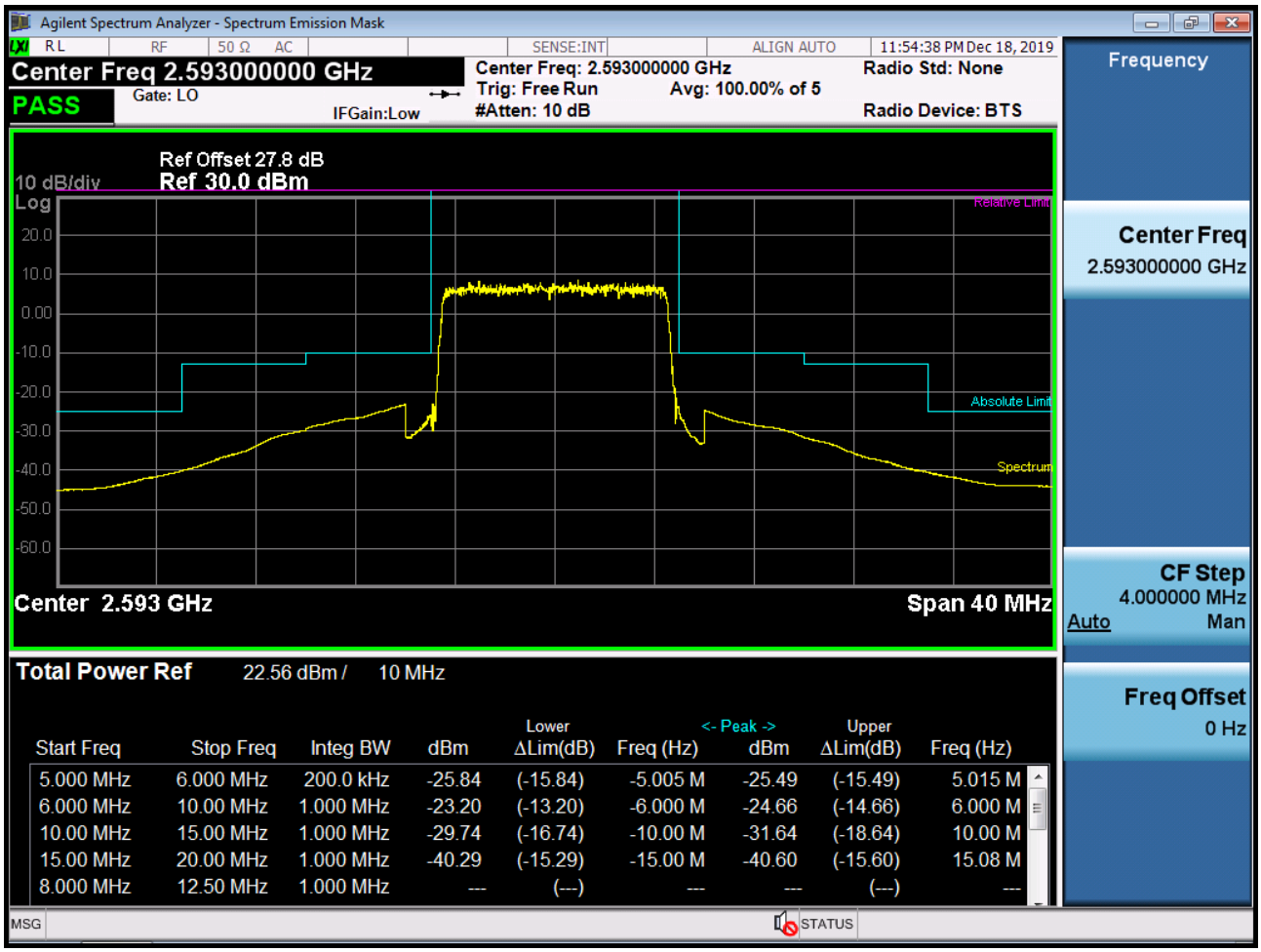
BAND 41. Low Channel Edge Plot (10 MHz Ch.39700 QPSK_RB1_Offset 0)-2(FCC)



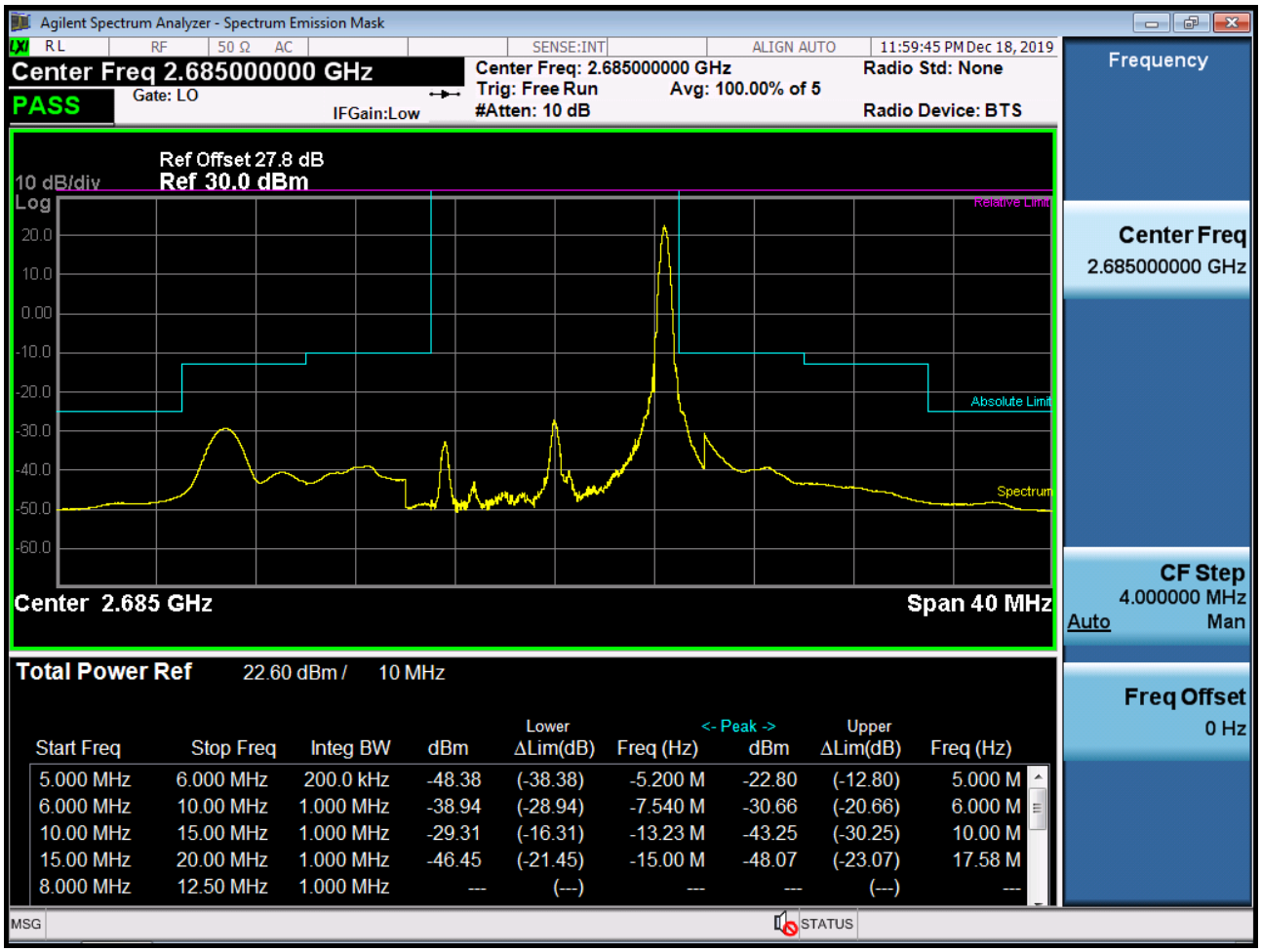
BAND 41. Low Channel Edge Plot (10 MHz Ch.39700 QPSK_RB50_Offset 0)-2(FCC)



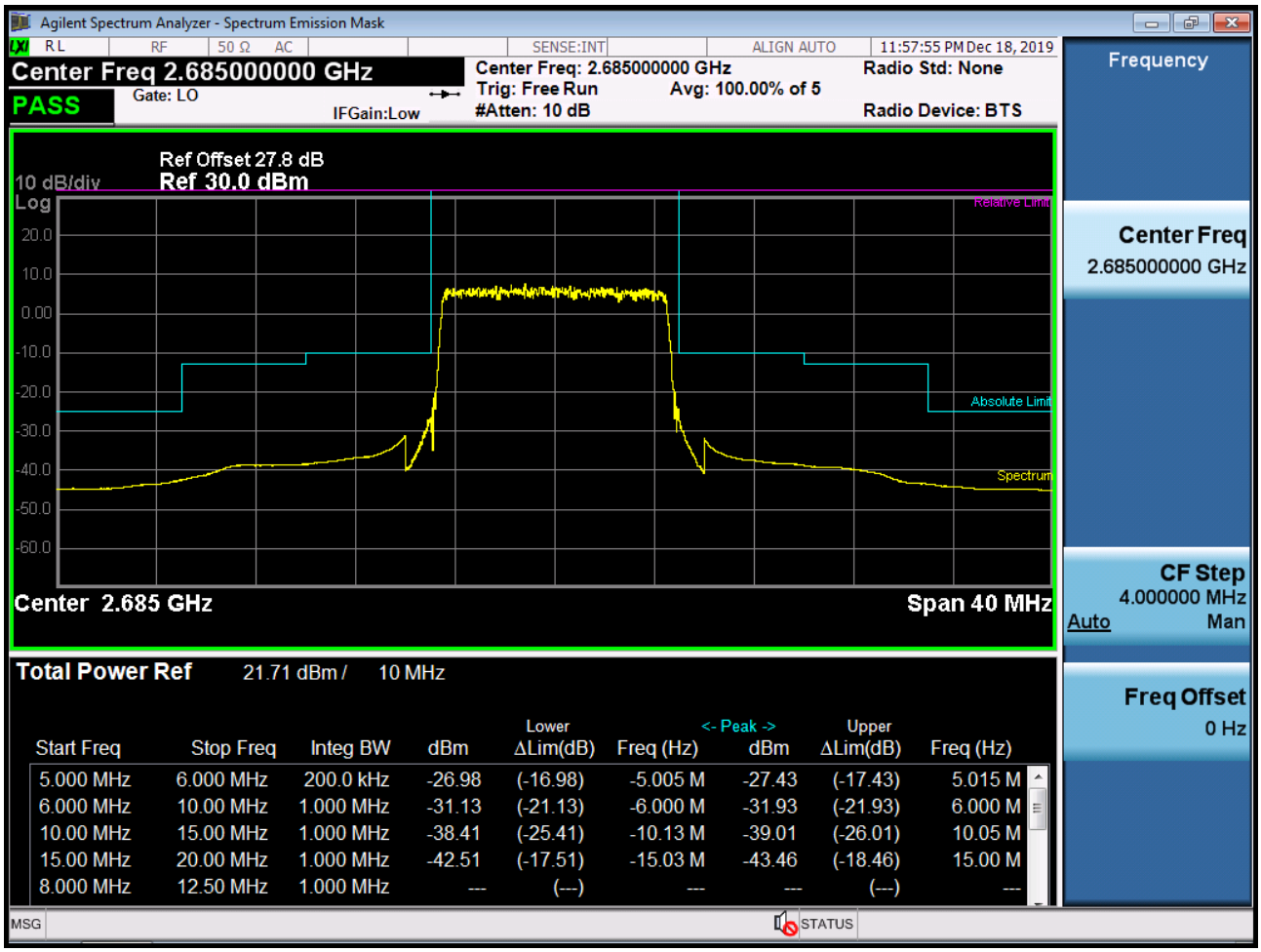
BAND 41. Mid Channel Edge Plot (10 MHz Ch.40620 QPSK RB 50) (FCC)



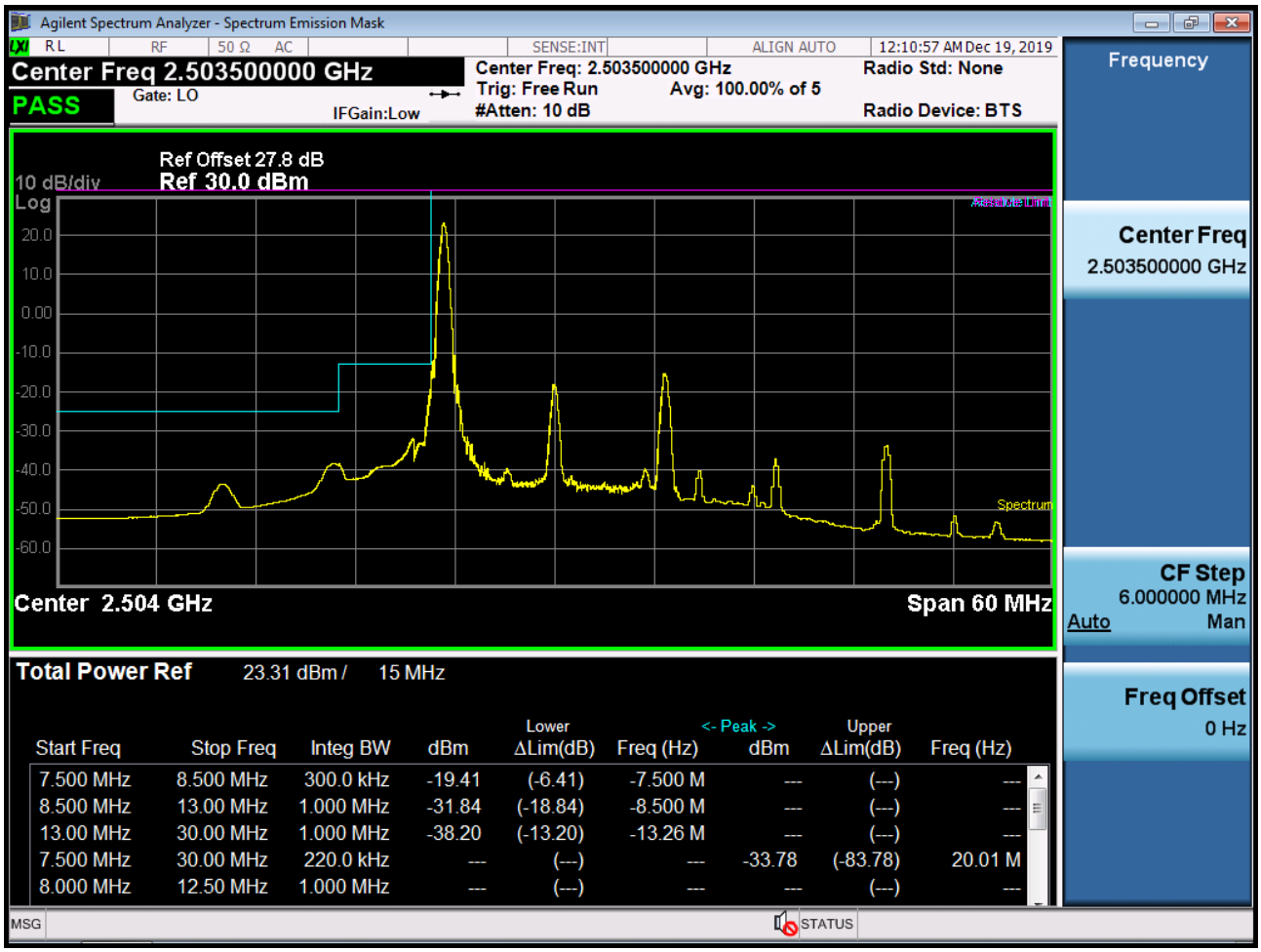
BAND 41. High Channel Edge Plot (10 MHz Ch.41540 QPSK RB 1, Offset 0) (FCC)



BAND 41. High Channel Edge Plot (10 MHz Ch.41540 QPSK_RB50_Offset 0) (FCC)

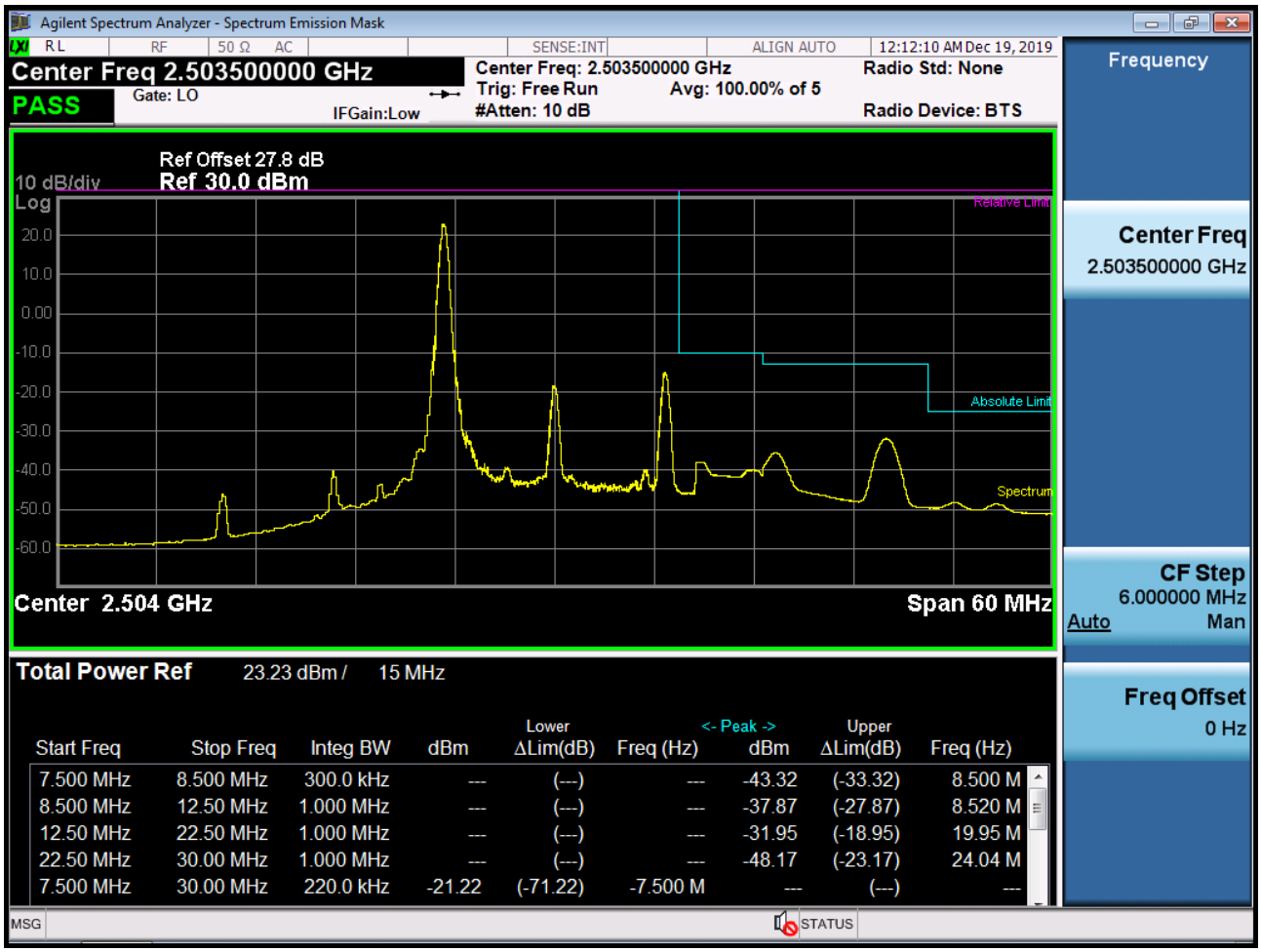


BAND 41. Low Channel Edge Plot (15 MHz Ch.39725 QPSK RB 1, Offset 0)-1(FCC)

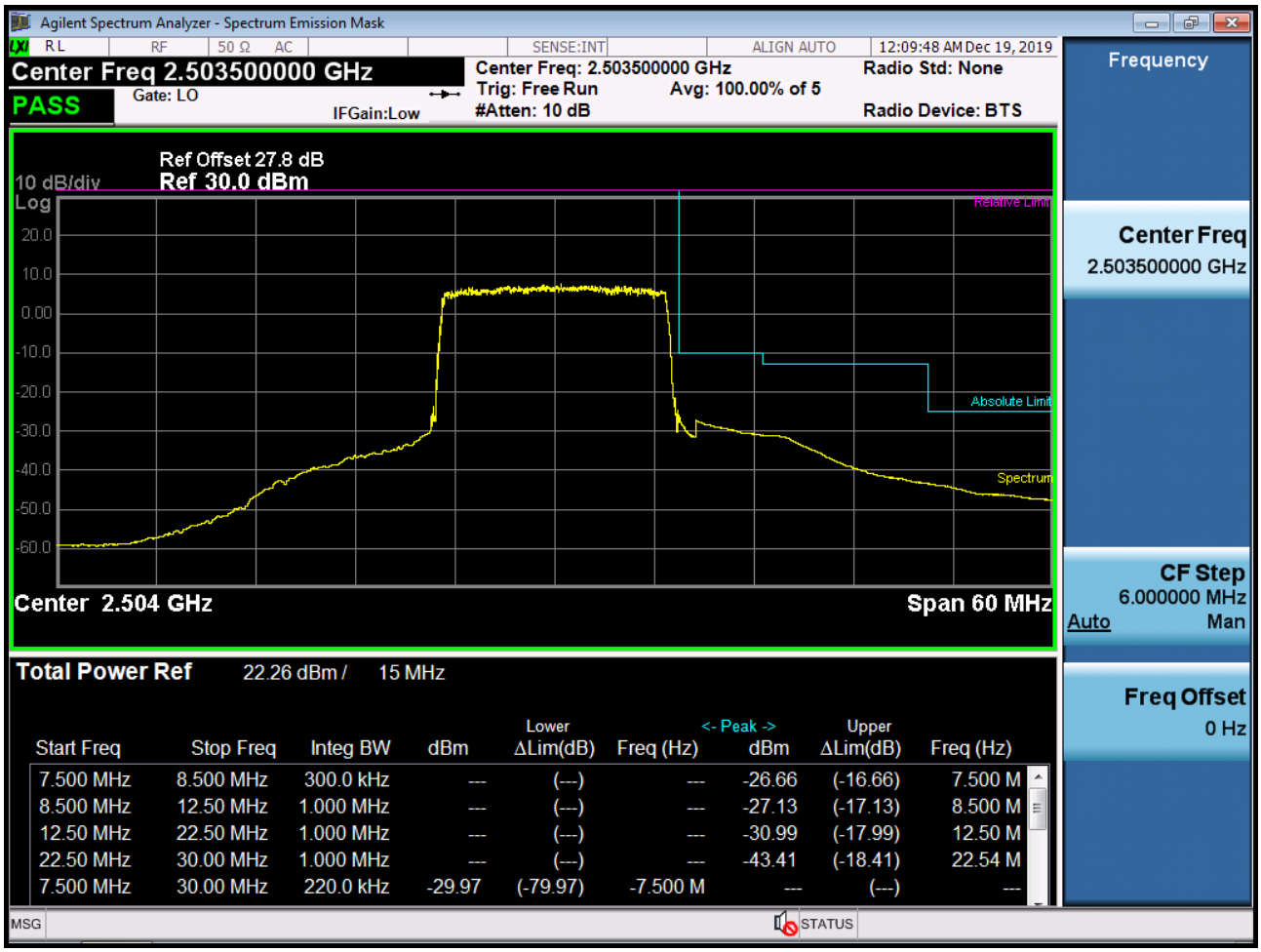


BAND 41. Low Channel Edge Plot (15 MHz Ch.39725 QPSK RB 75, Offset 0)-1(FCC)

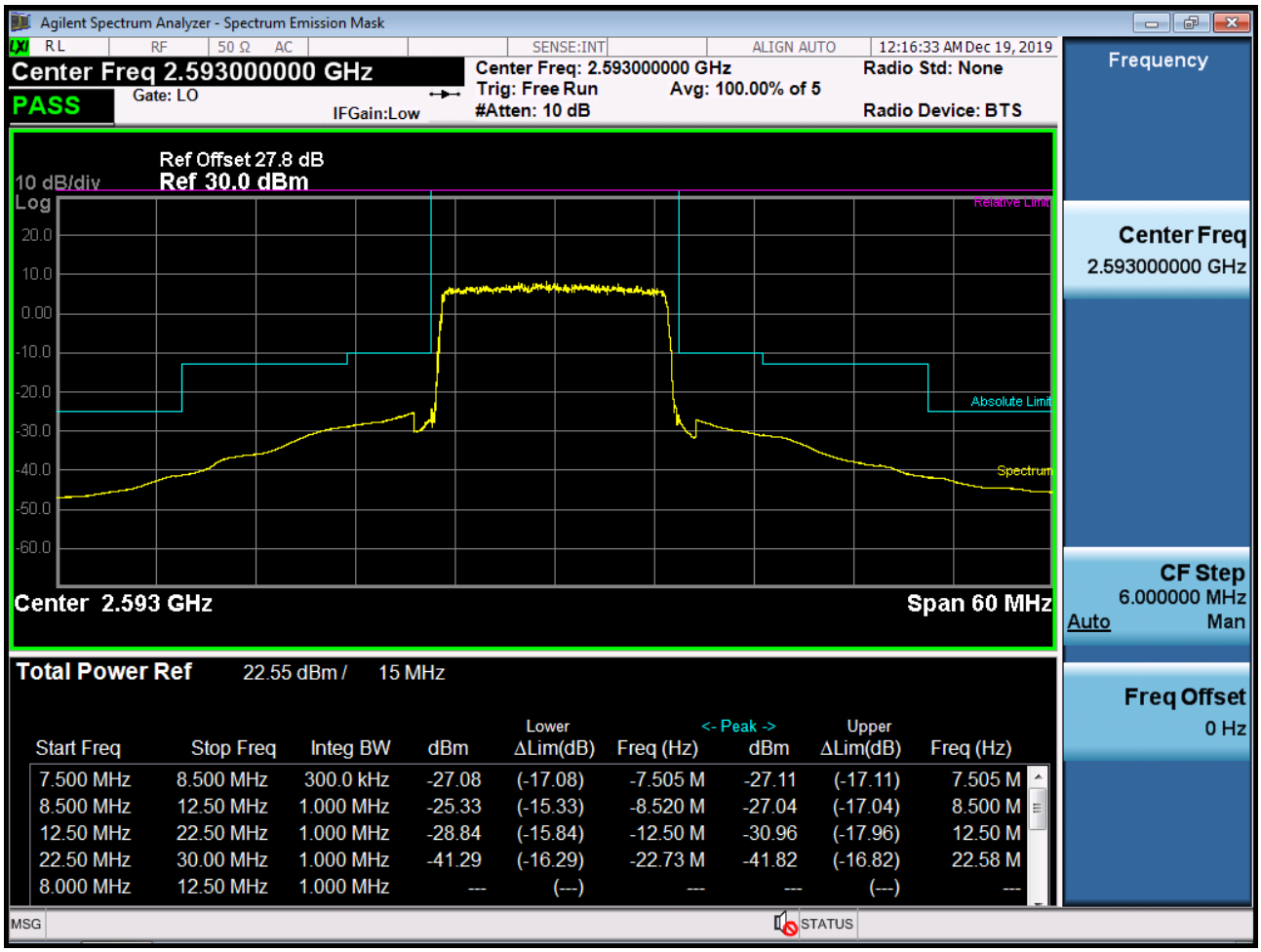
BAND 41. Low Channel Edge Plot (15 MHz Ch.39725 QPSK_RB1_Offset 0)-2(FCC)



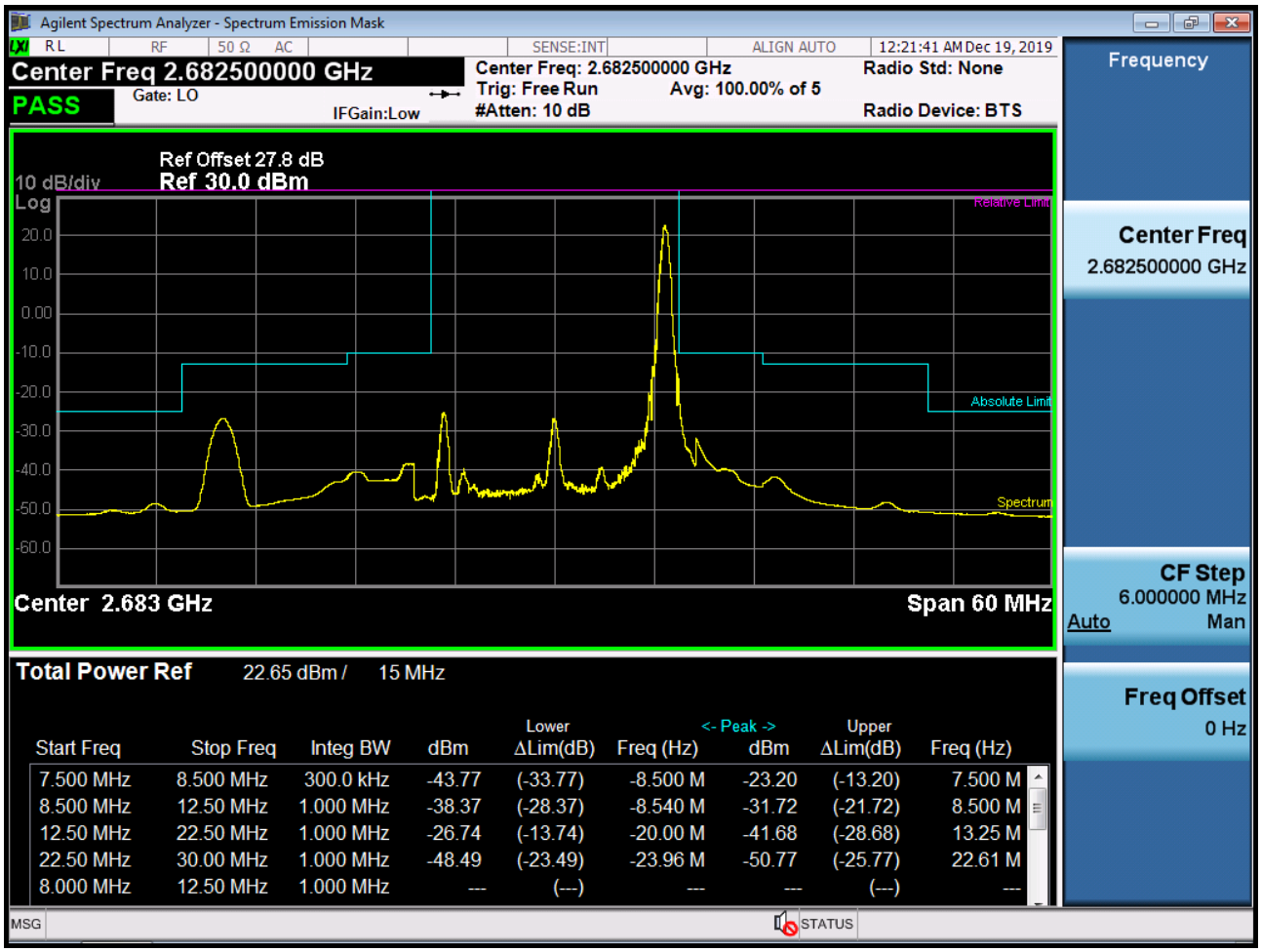
BAND 41. Low Channel Edge Plot (15 MHz Ch.39725 QPSK_RB75_Offset 0)-2(FCC)



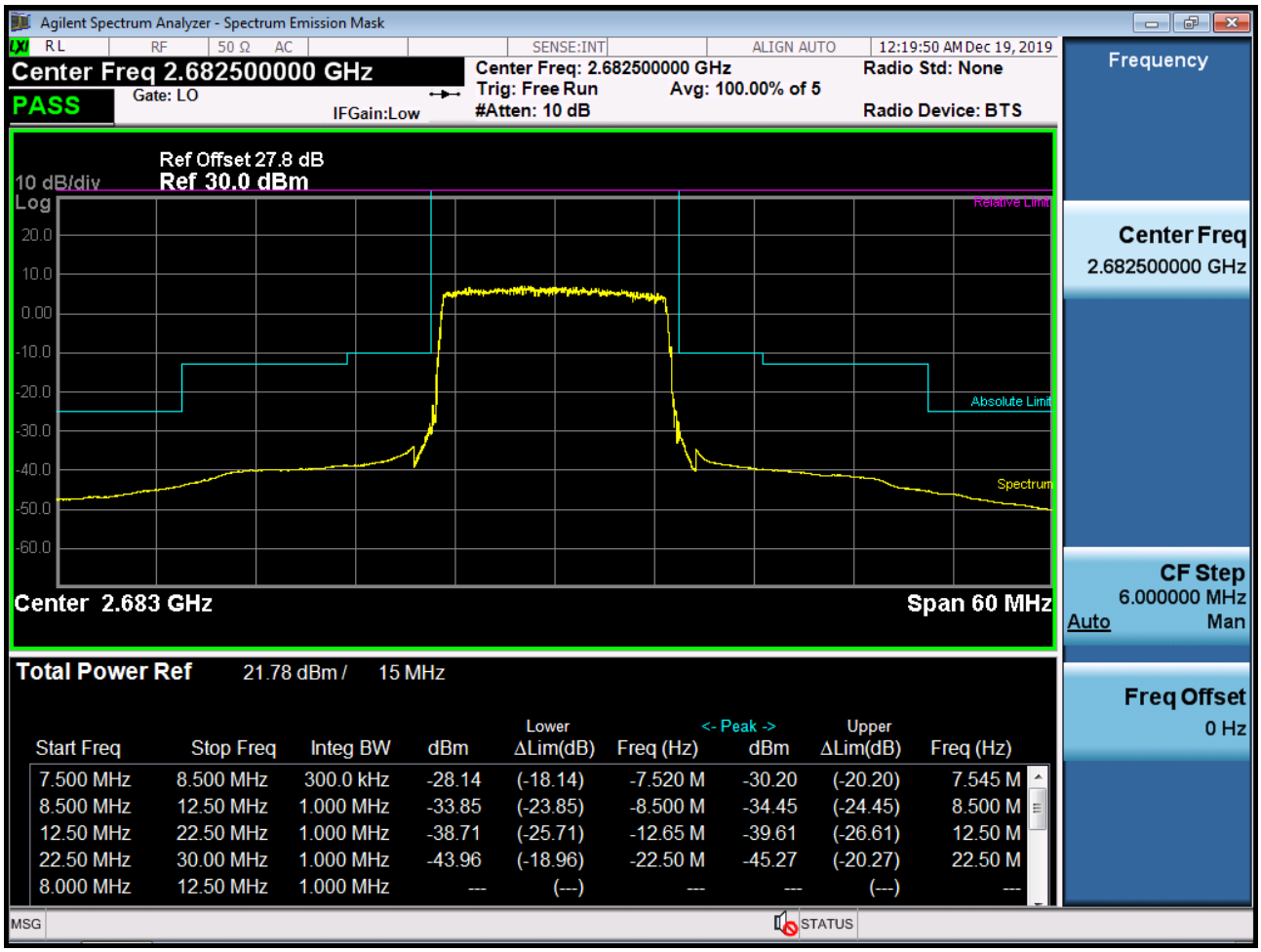
BAND 41. Mid Channel Edge Plot (15 MHz Ch.40620 QPSK RB 75) (FCC)



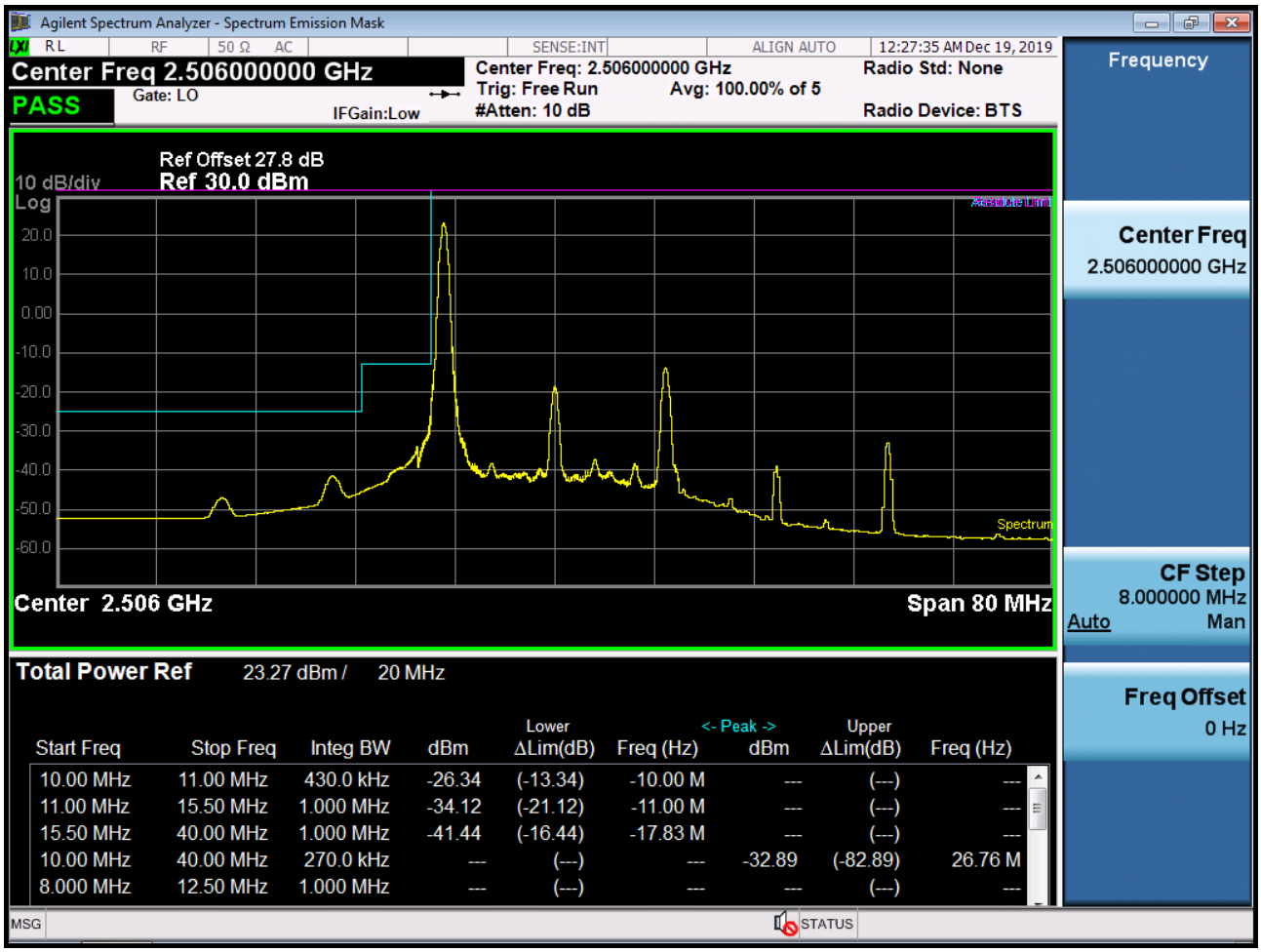
BAND 41. High Channel Edge Plot (15 MHz Ch.41515 QPSK RB 1, Offset 0) (FCC)



BAND 41. High Channel Edge Plot (15 MHz Ch.41515 QPSK_RB75_Offset 0) (FCC)

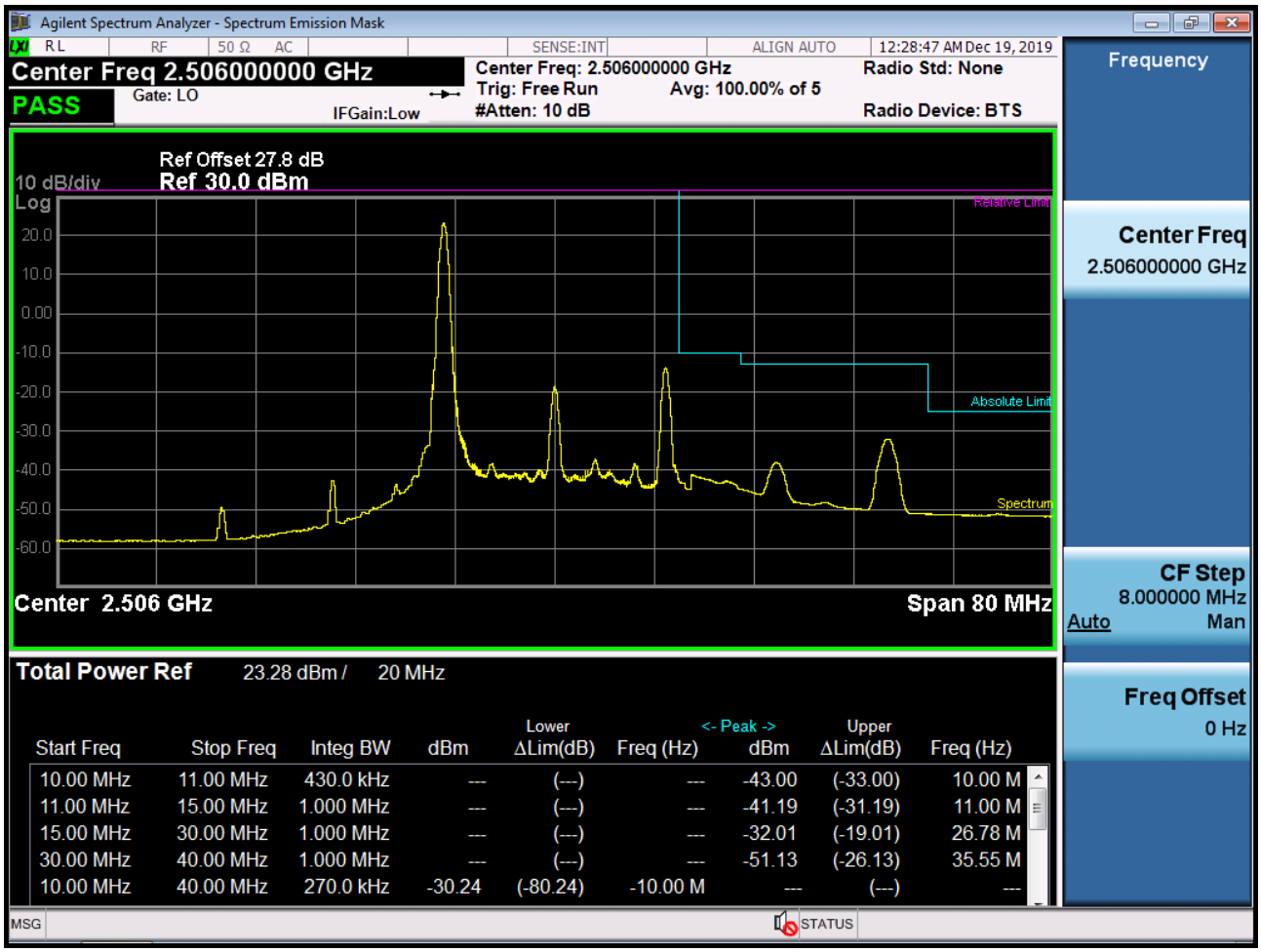


BAND 41. Low Channel Edge Plot (20 MHz Ch.39750 QPSK RB 1, Offset 0)-1(FCC)

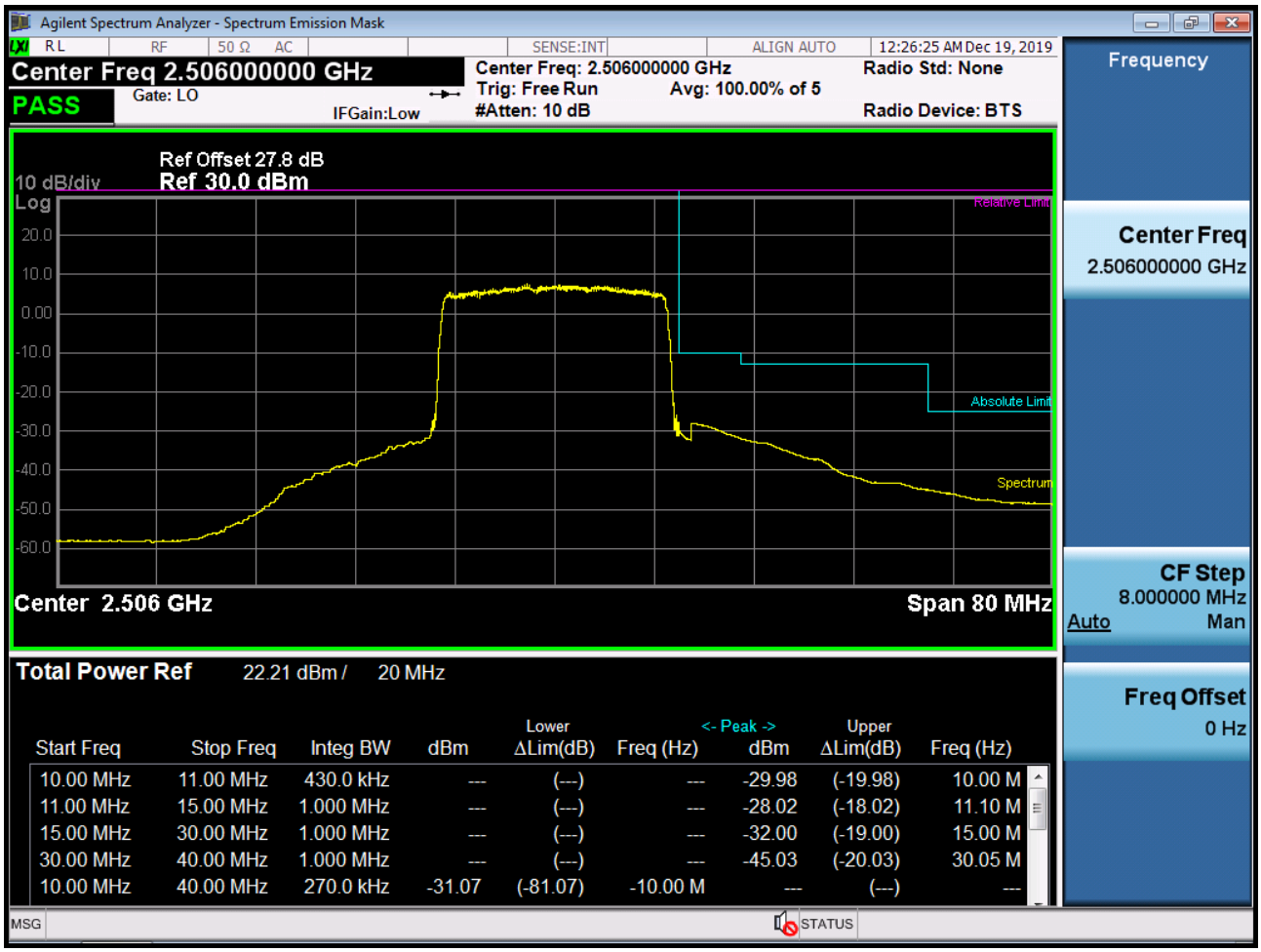


BAND 41. Low Channel Edge Plot (20 MHz Ch.39750 QPSK RB 25, Offset 0)-1(FCC)

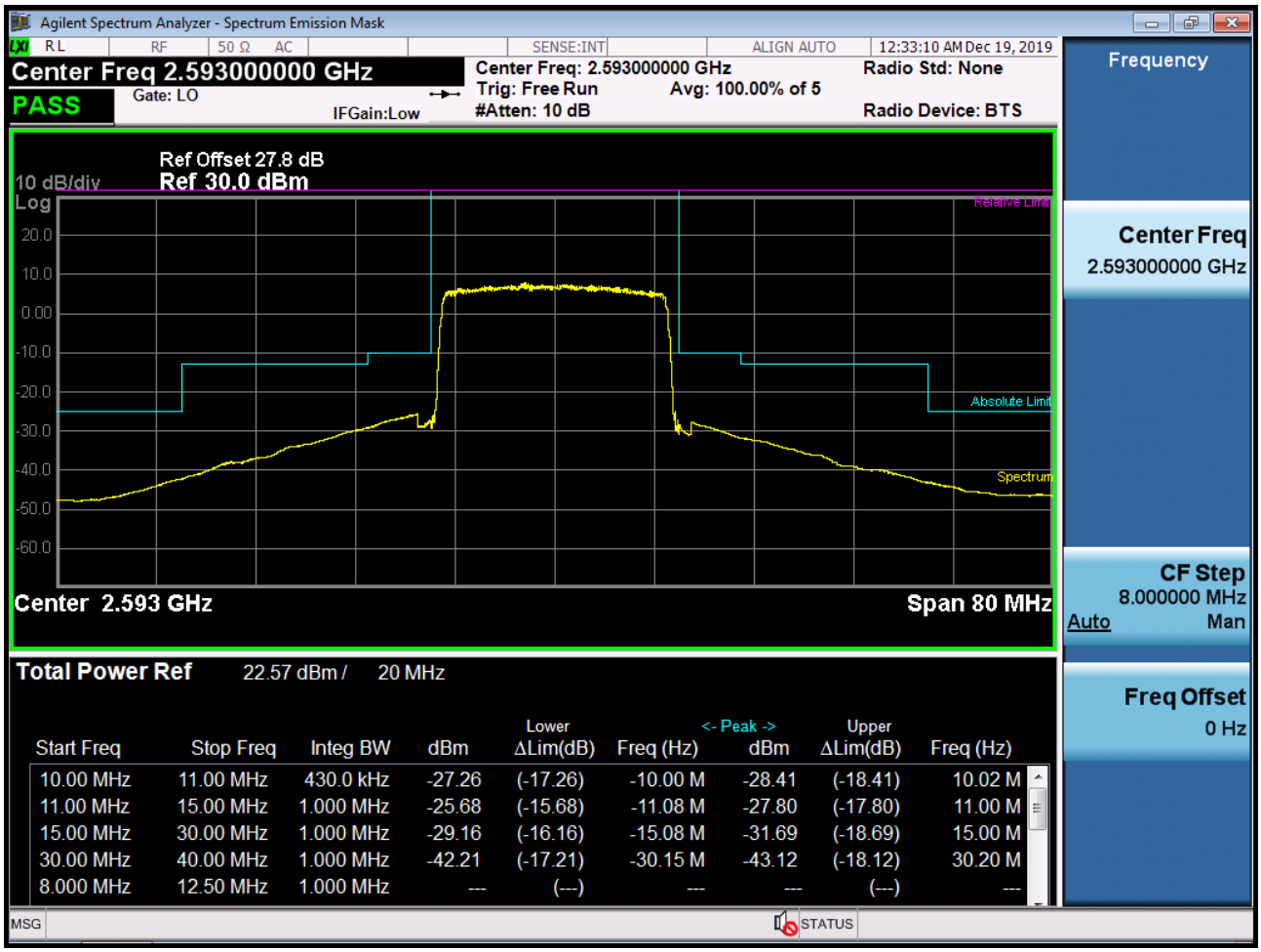
BAND 41. Low Channel Edge Plot (20 MHz Ch.39750 QPSK_RB1_Offset 0)-2(FCC)



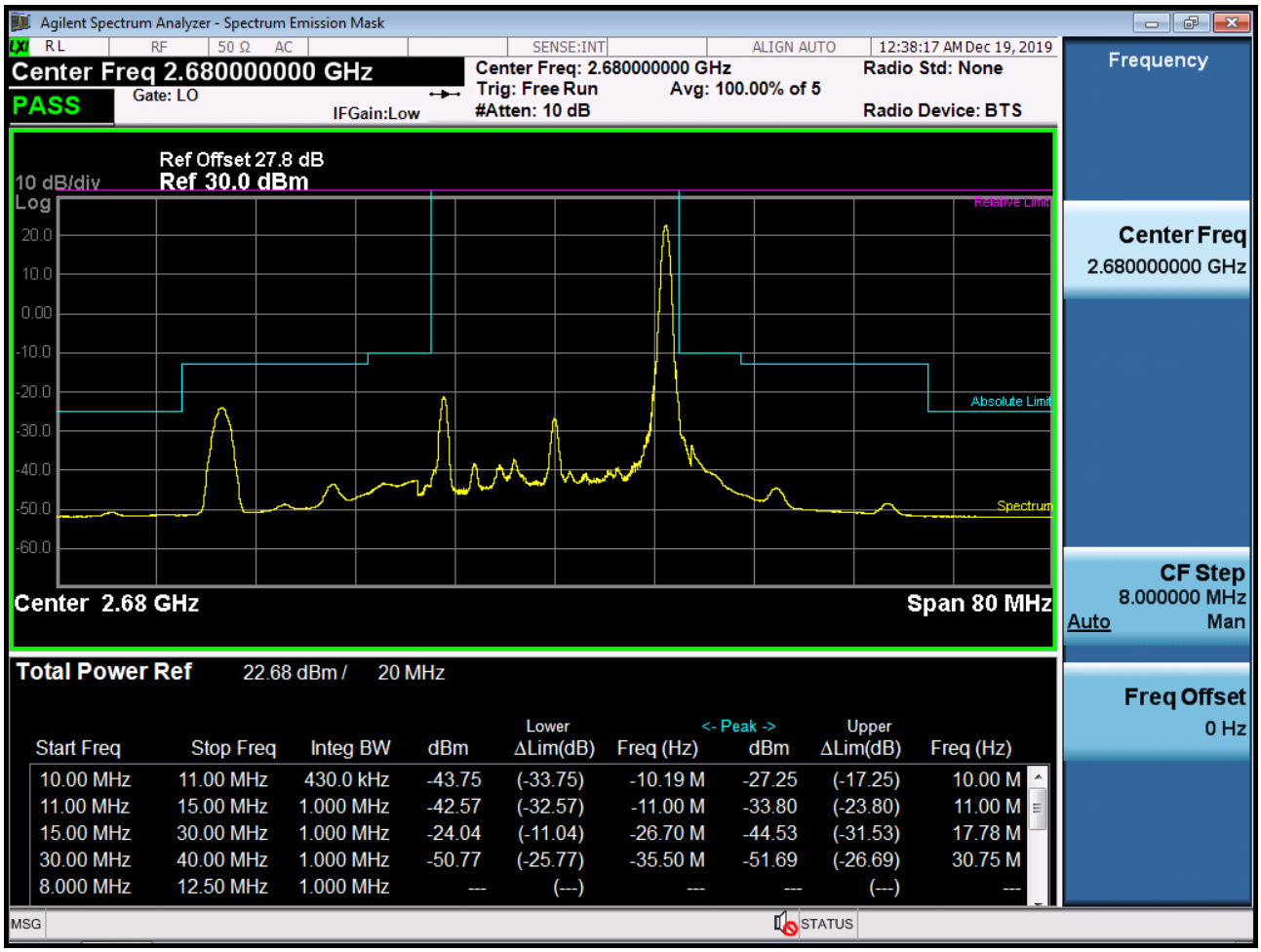
BAND 41. Low Channel Edge Plot (20 MHz Ch.39750 QPSK_RB100_Offset 0)-2(FCC)



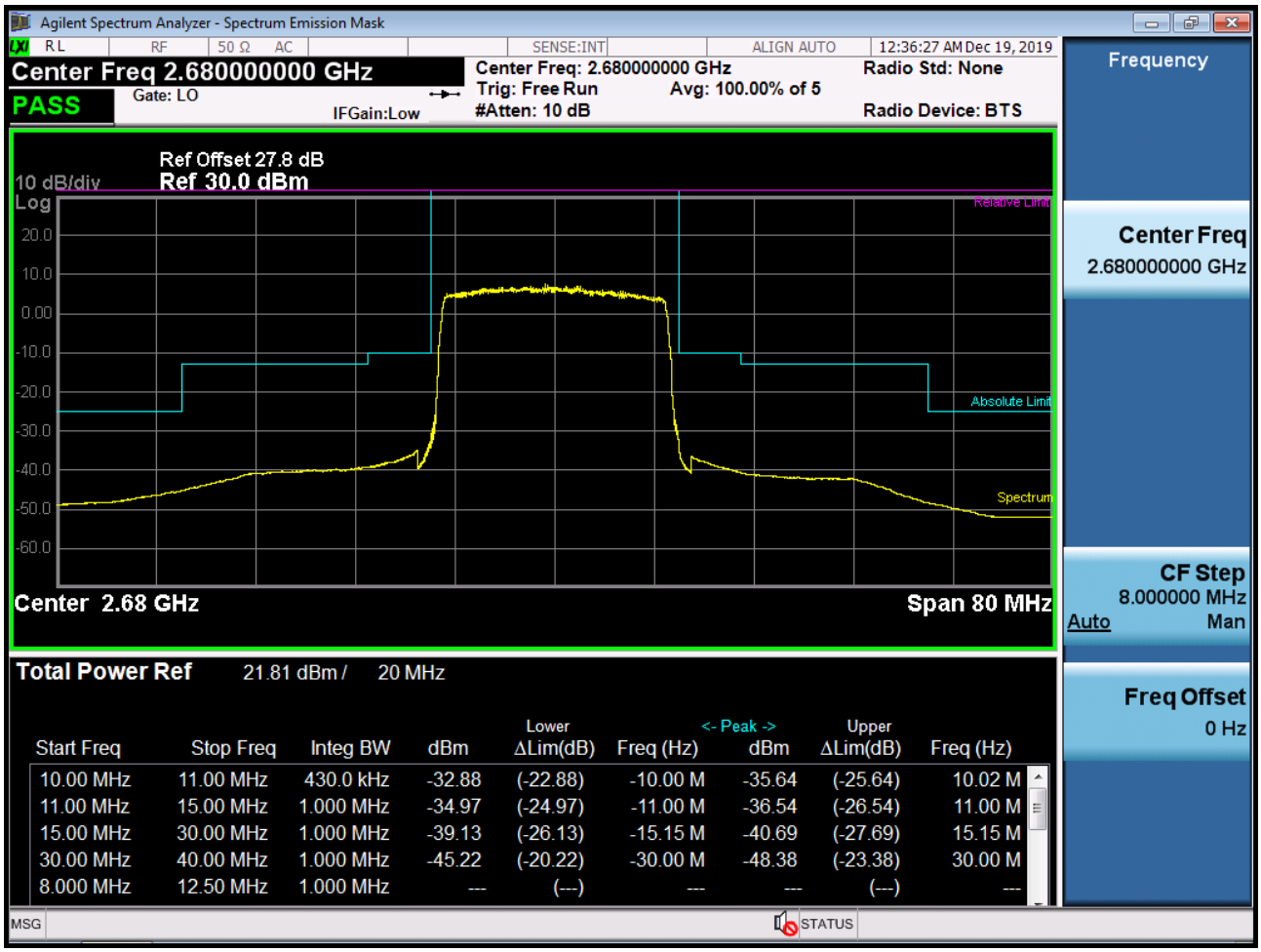
BAND 41. Mid Channel Edge Plot (20 MHz Ch.40620 QPSK RB 100) (FCC)



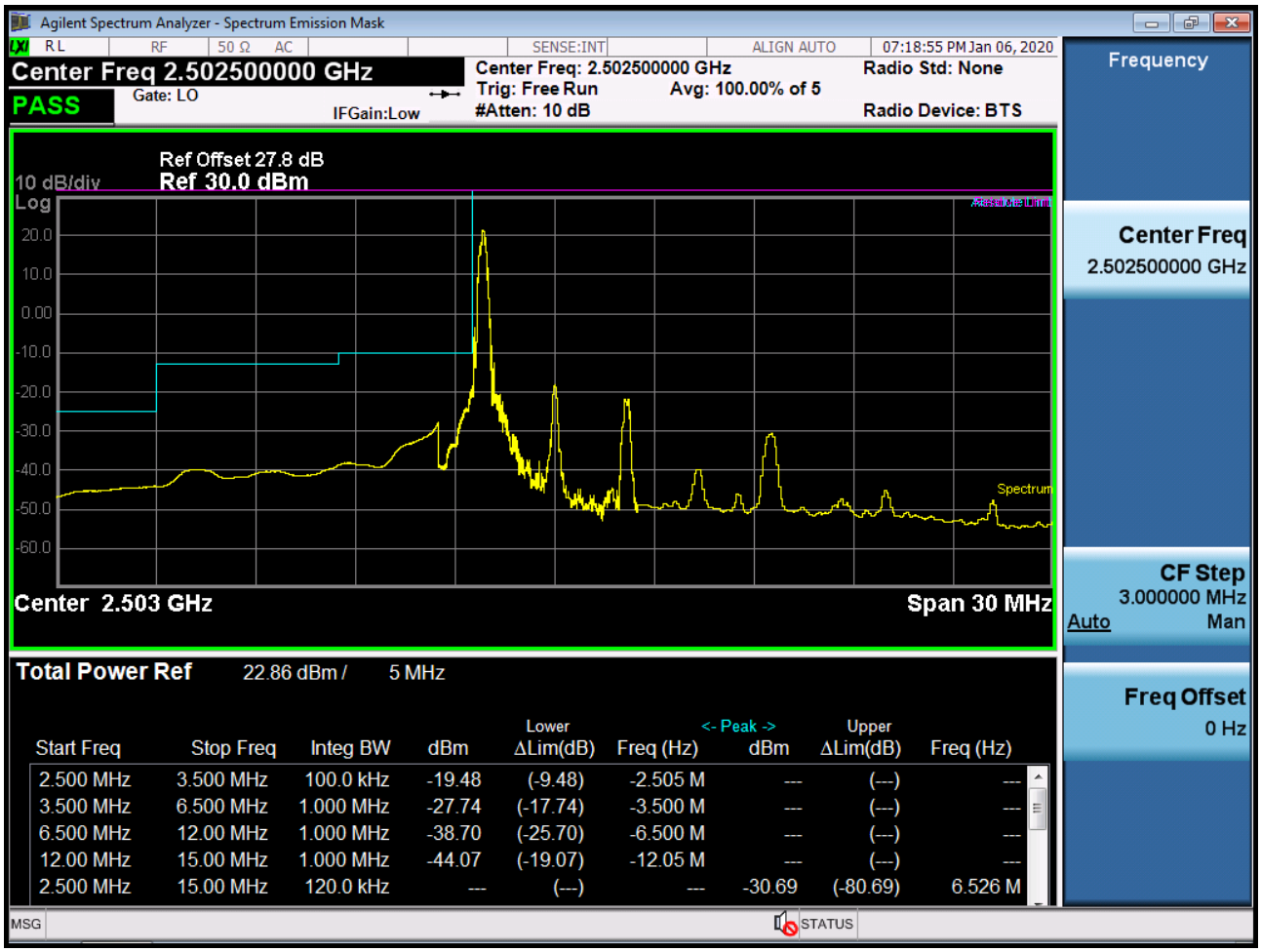
BAND 41. High Channel Edge Plot (20 MHz Ch.41490 QPSK RB 1, Offset 0) (FCC)



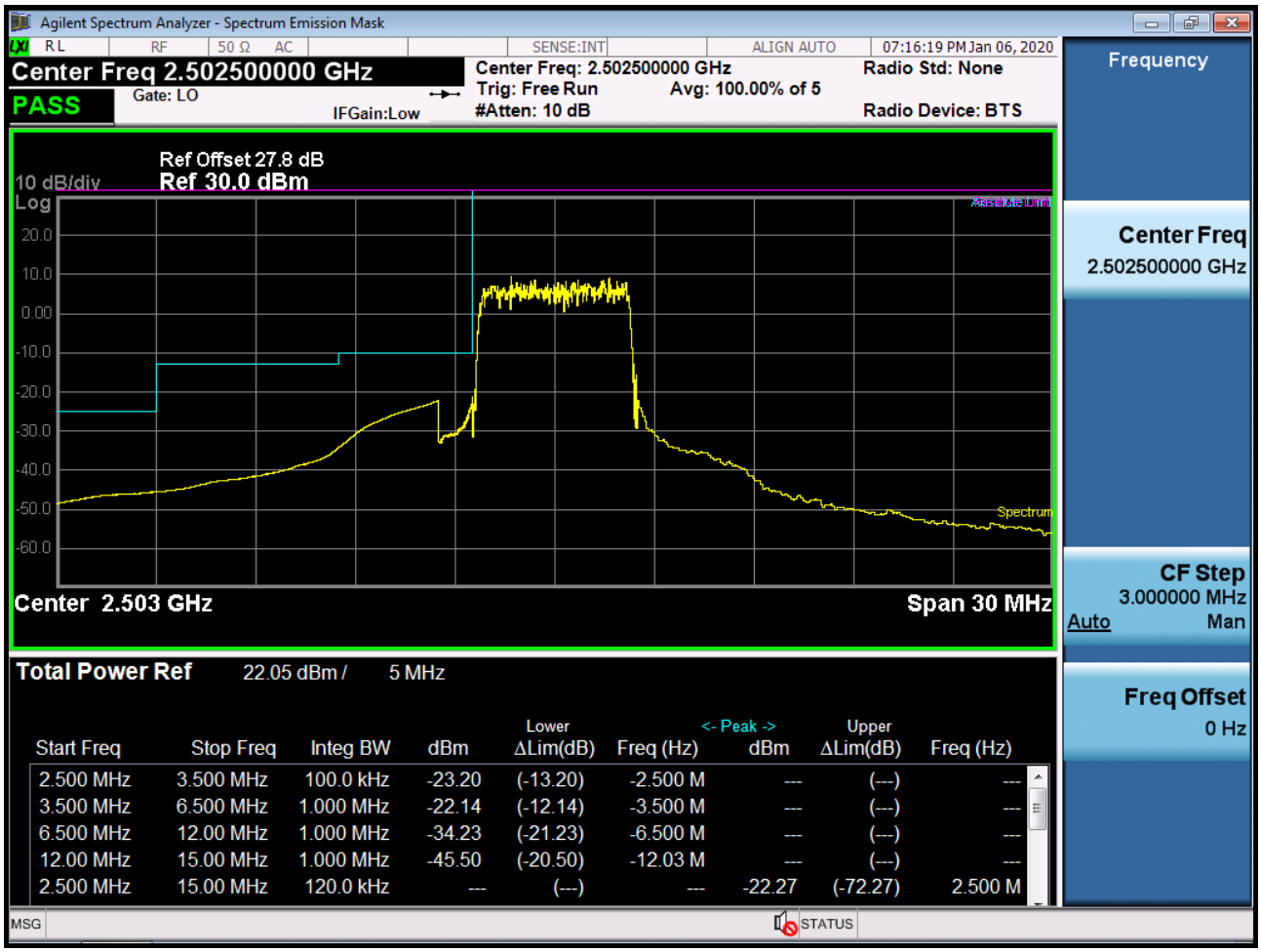
BAND 41. High Channel Edge Plot (20 MHz Ch.41490 QPSK_RB100_Offset 0) (FCC)



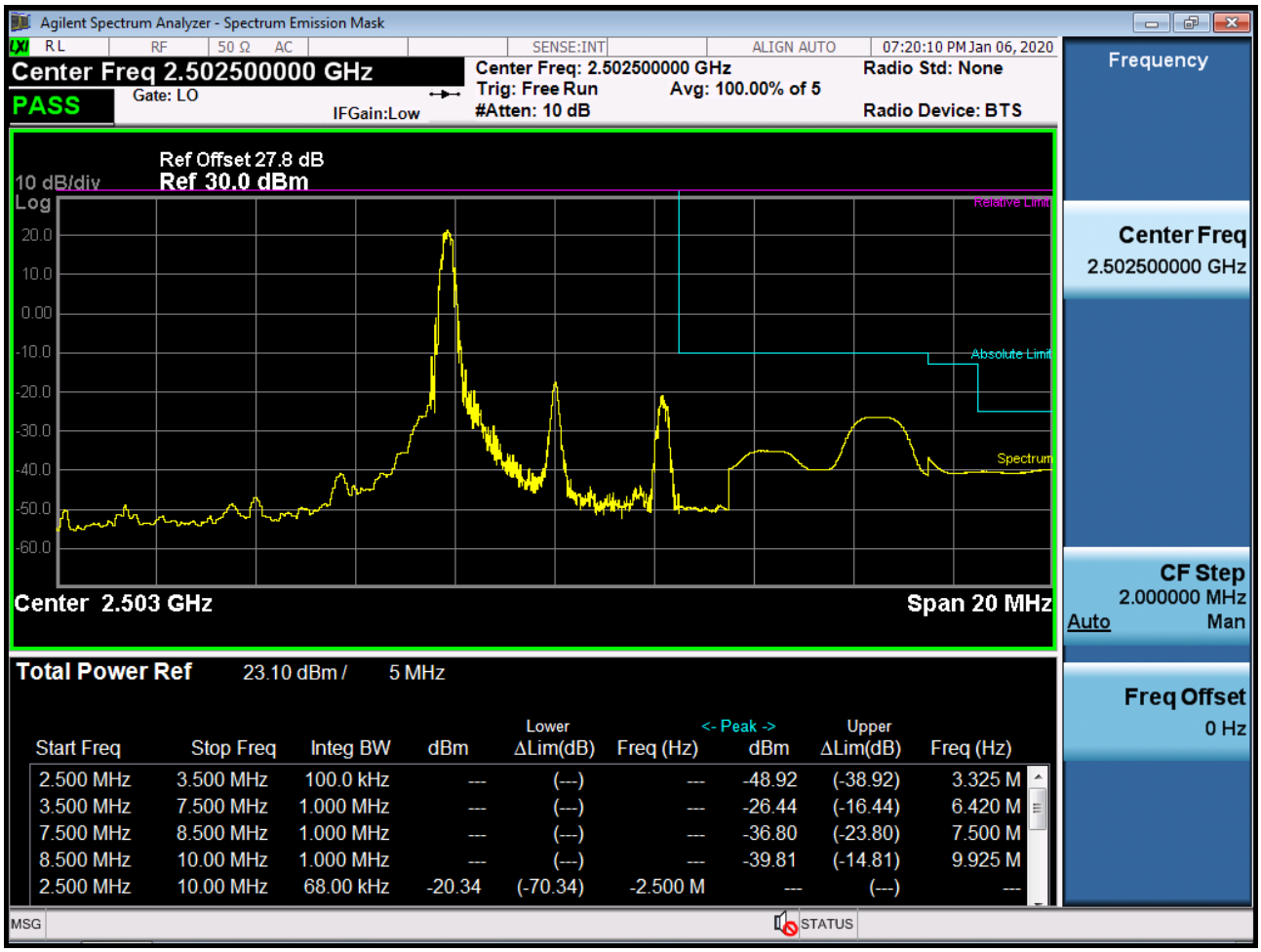
BAND 41. Low Channel Edge Plot (5 MHz Ch.39715 QPSK RB 1, Offset 0)-1 (IC Low)



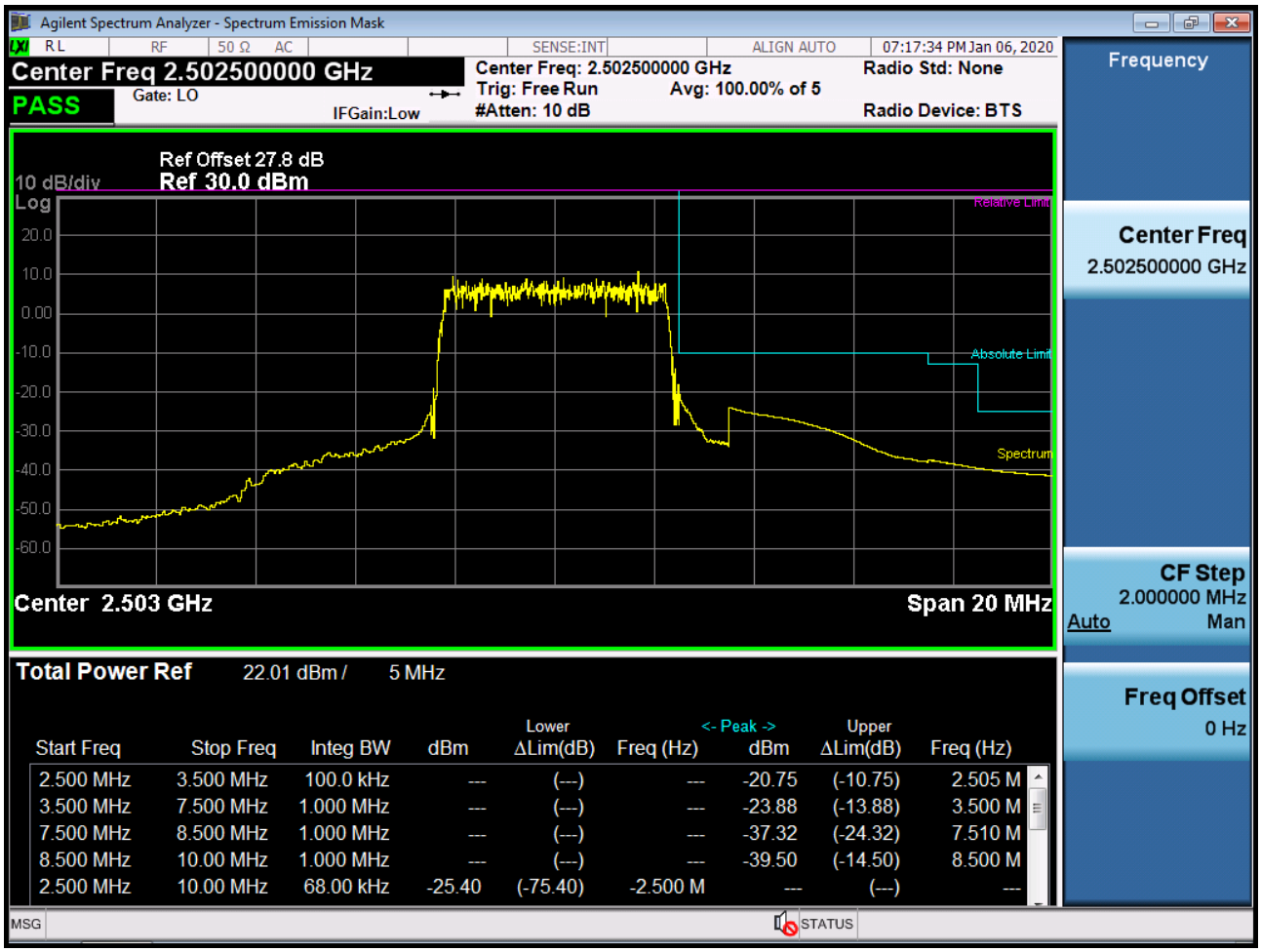
BAND 41. Low Channel Edge Plot (5 MHz Ch.39715 QPSK RB 25, Offset 0)-1 (IC Low)



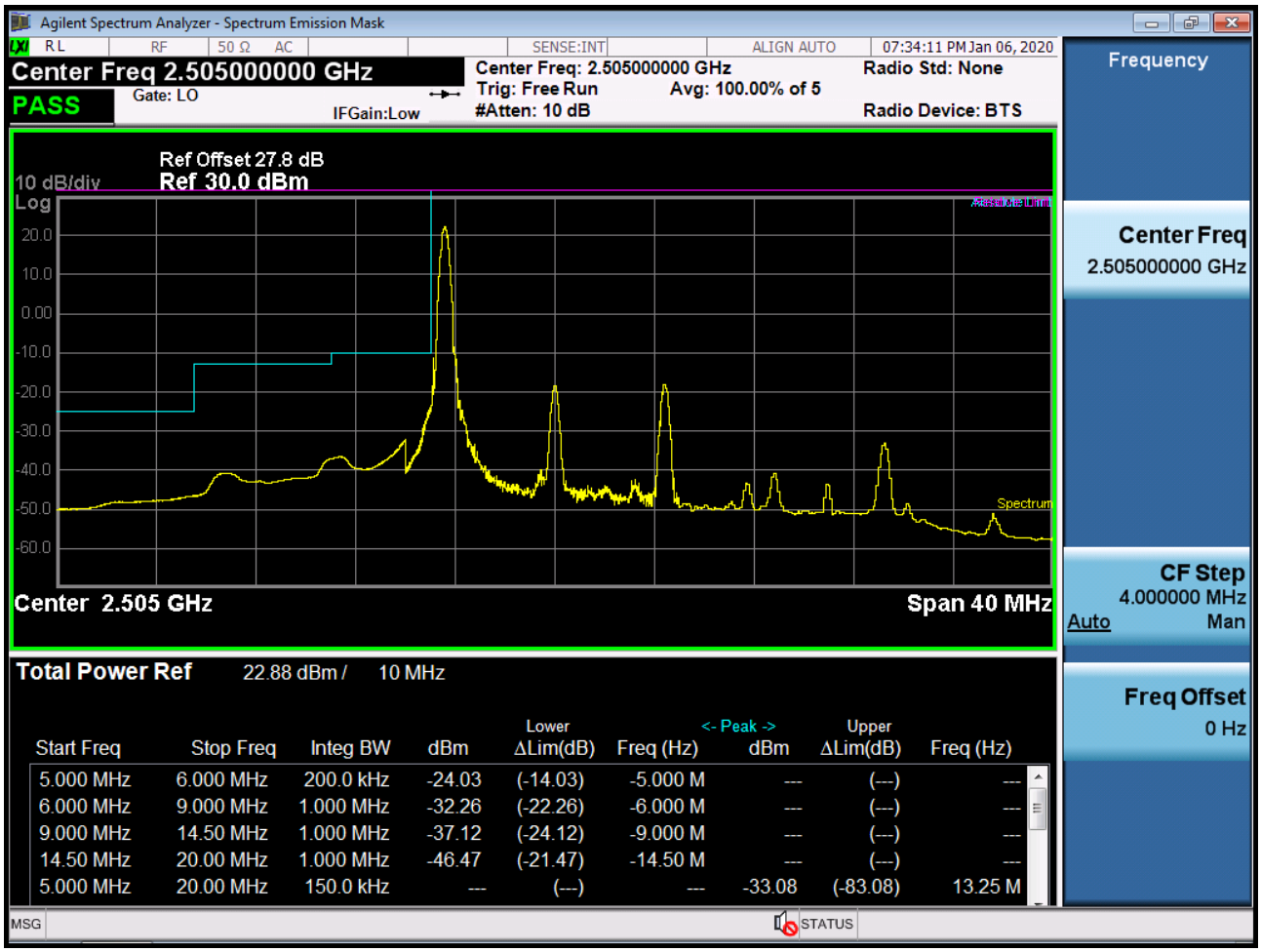
BAND 41. Low Channel Edge Plot (5 MHz Ch.39715 QPSK_RB25_Offset 0)-2 (IC Low)



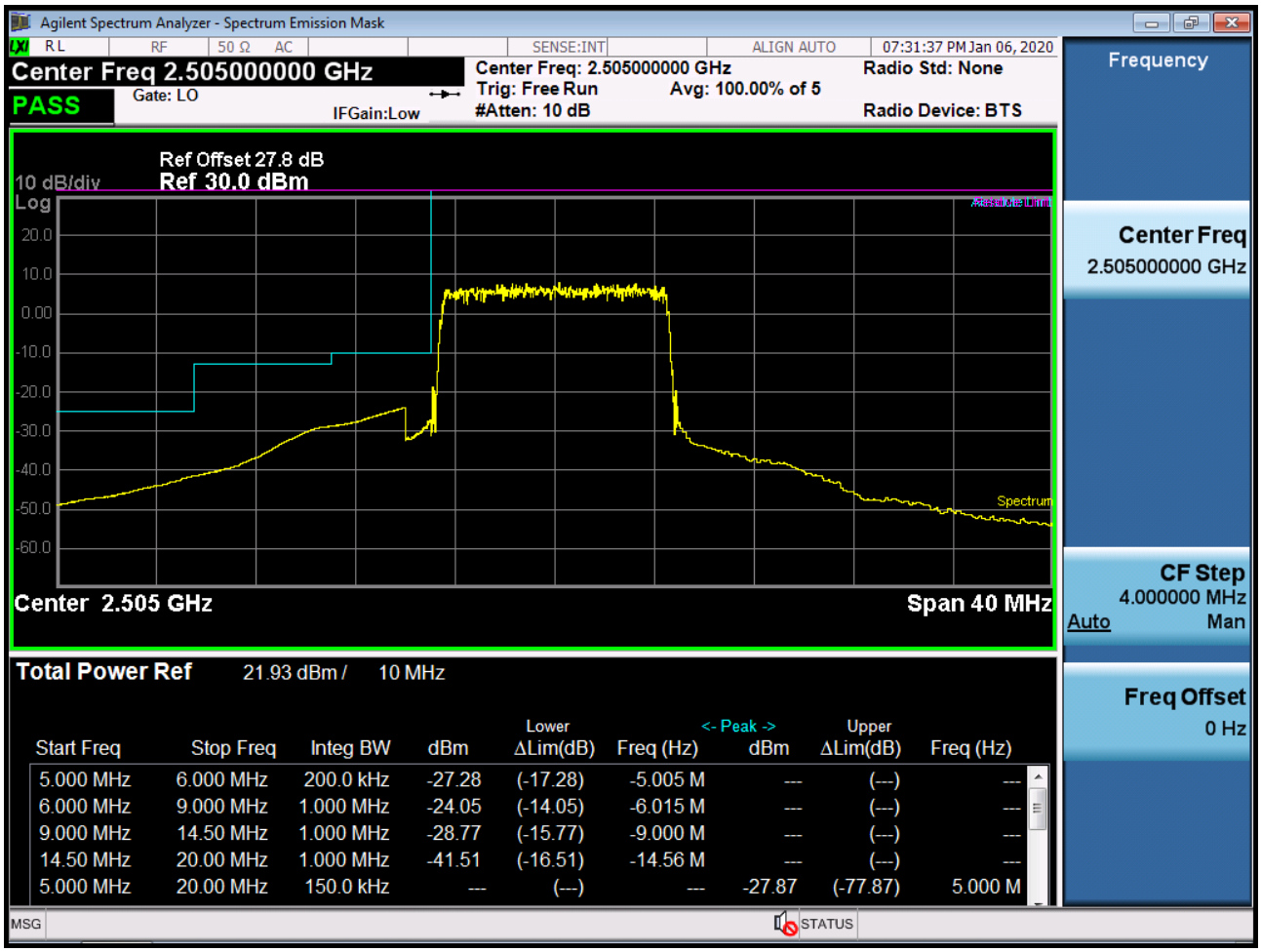
BAND 41. Low Channel Edge Plot (5 MHz Ch.39715 QPSK_RB25_Offset 0)-2 (IC Low)



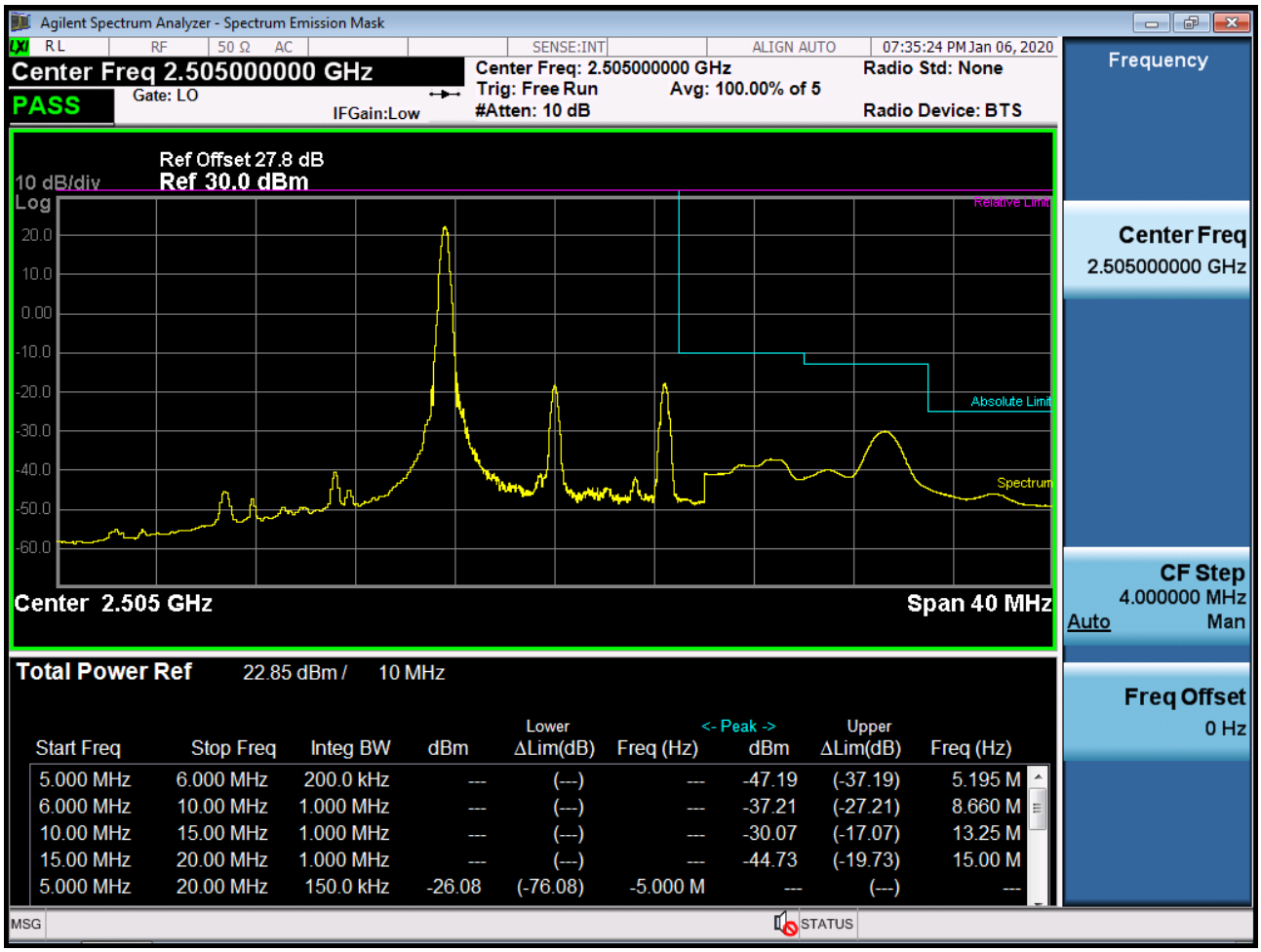
BAND 41. Low Channel Edge Plot (10 MHz Ch.39740 QPSK RB 1, Offset 0)-1 (IC Low)



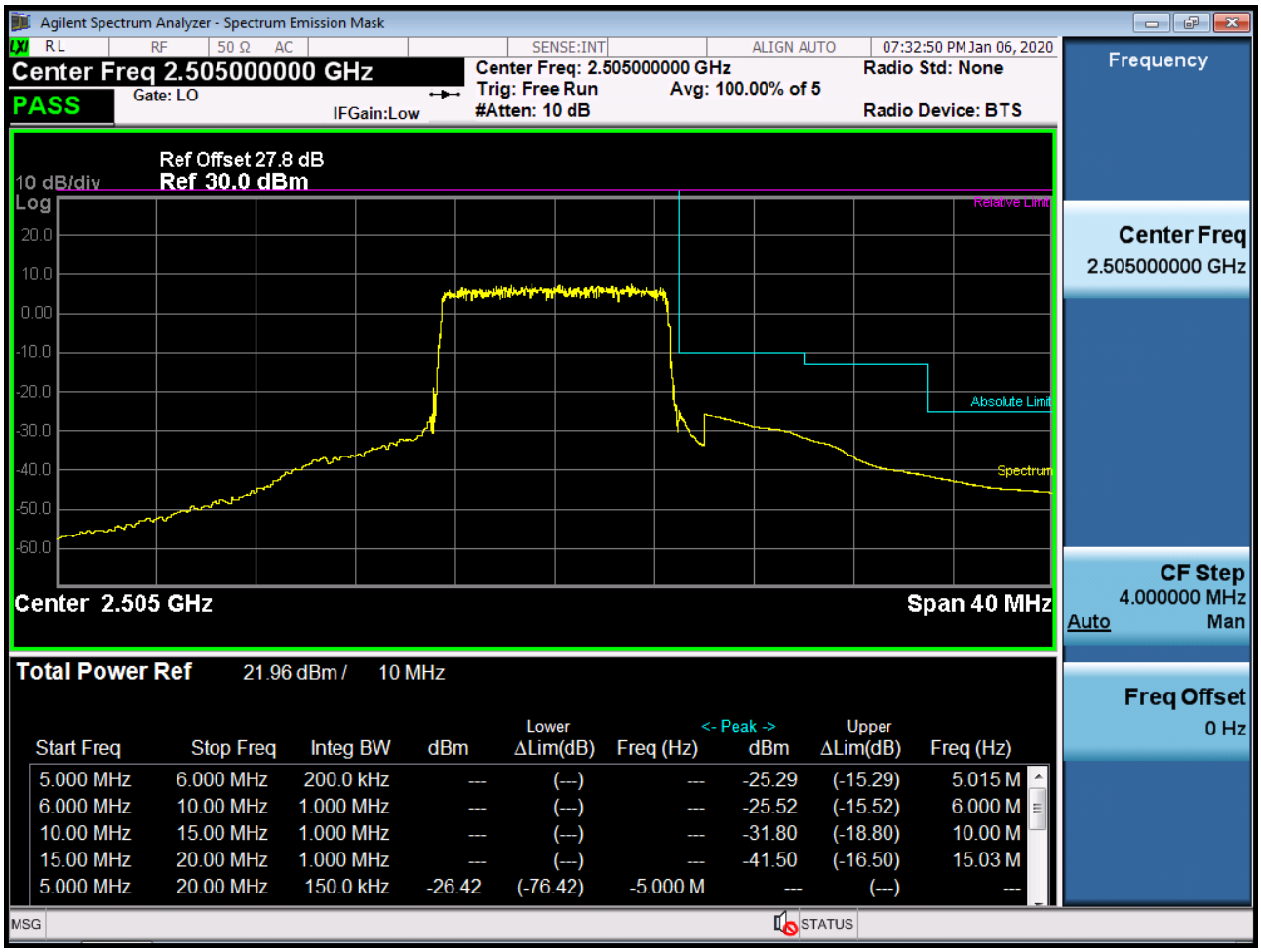
BAND 41. Low Channel Edge Plot (10 MHz Ch.39740 QPSK RB 25, Offset 0)-1 (IC Low)



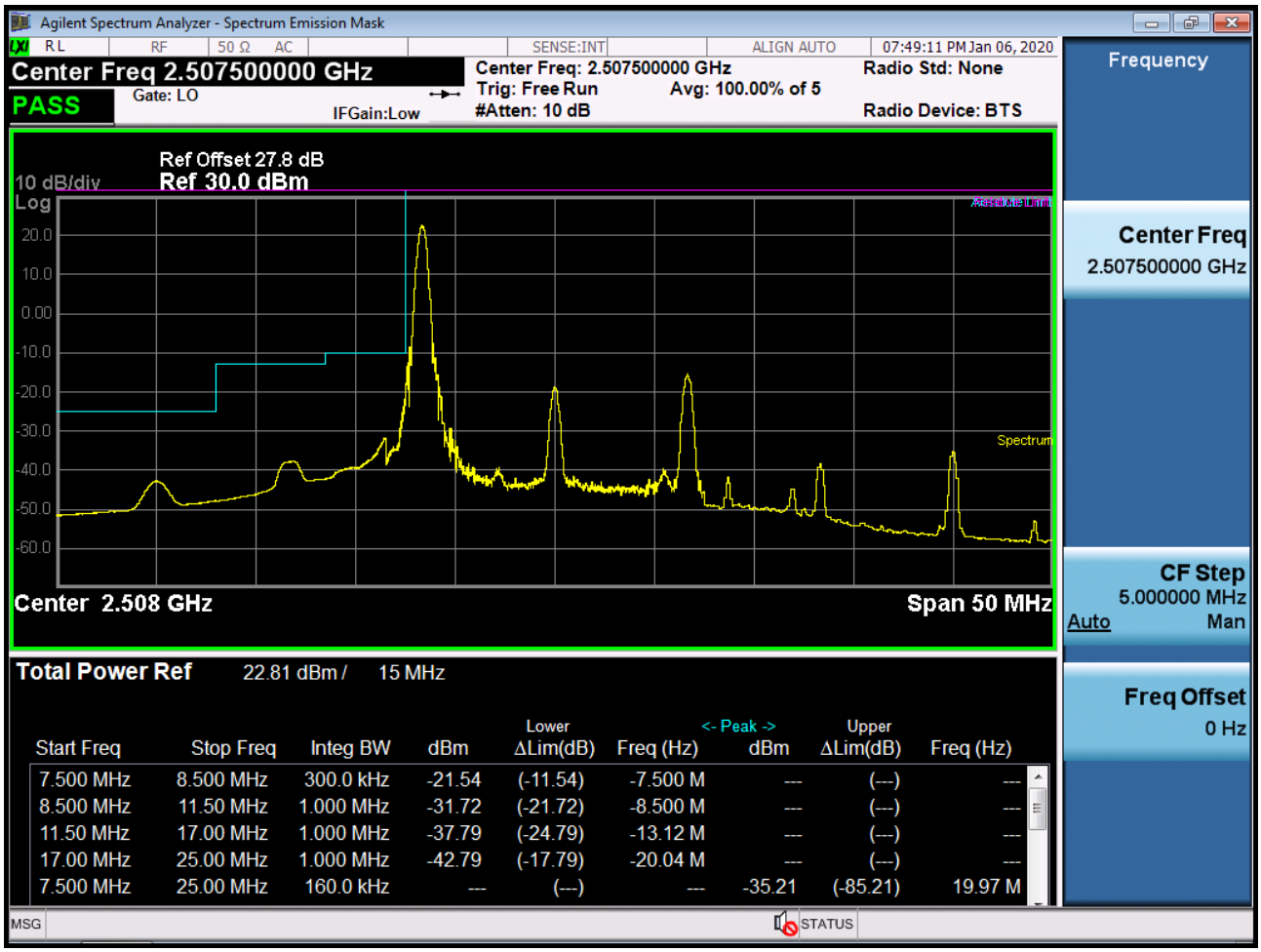
BAND 41. Low Channel Edge Plot (10 MHz Ch.39740 QPSK_RB1_Offset 0)-2 (IC Low)



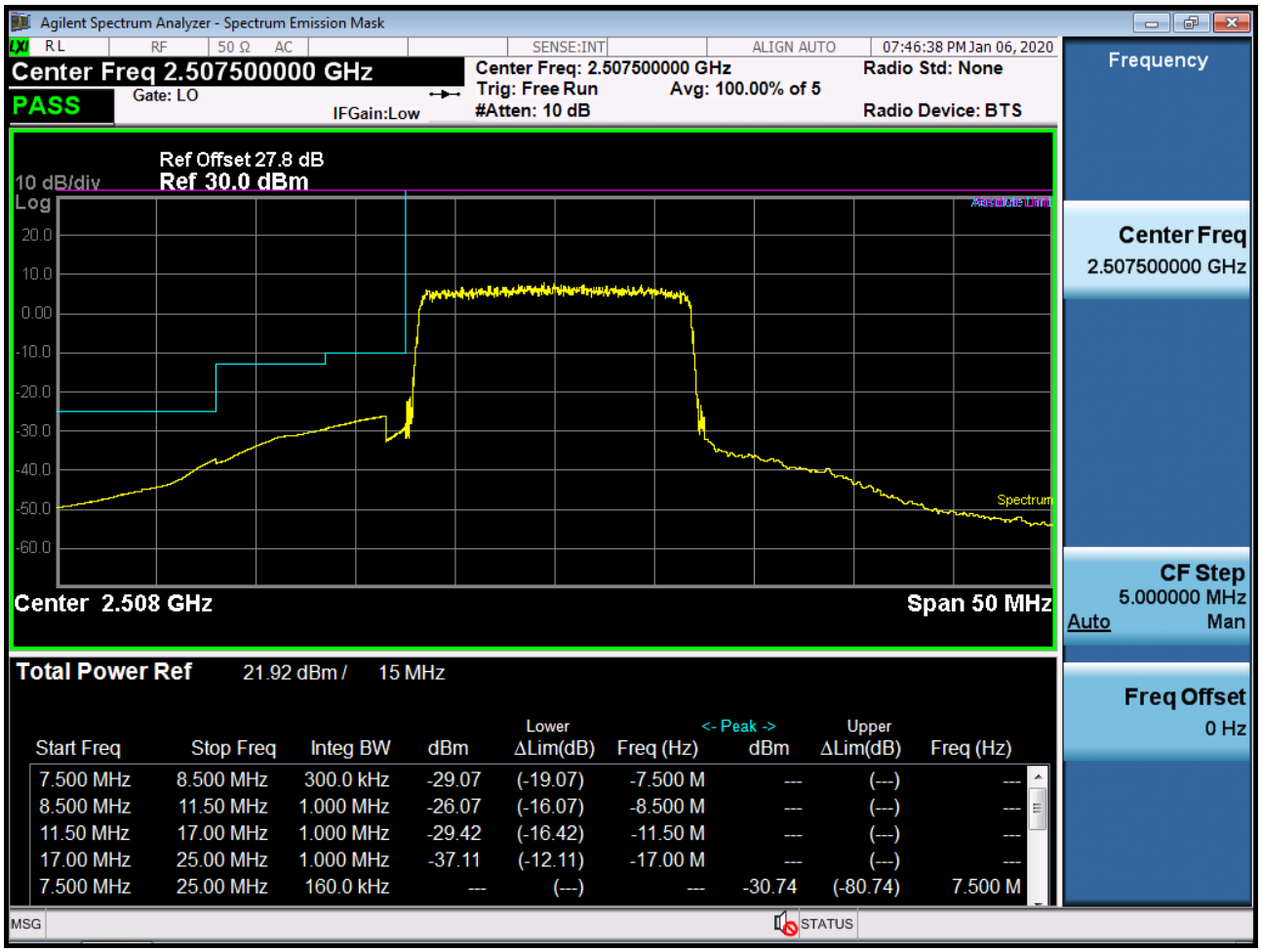
BAND 41. Low Channel Edge Plot (10 MHz Ch.39740 QPSK_RB50_Offset 0)-2 (IC Low)



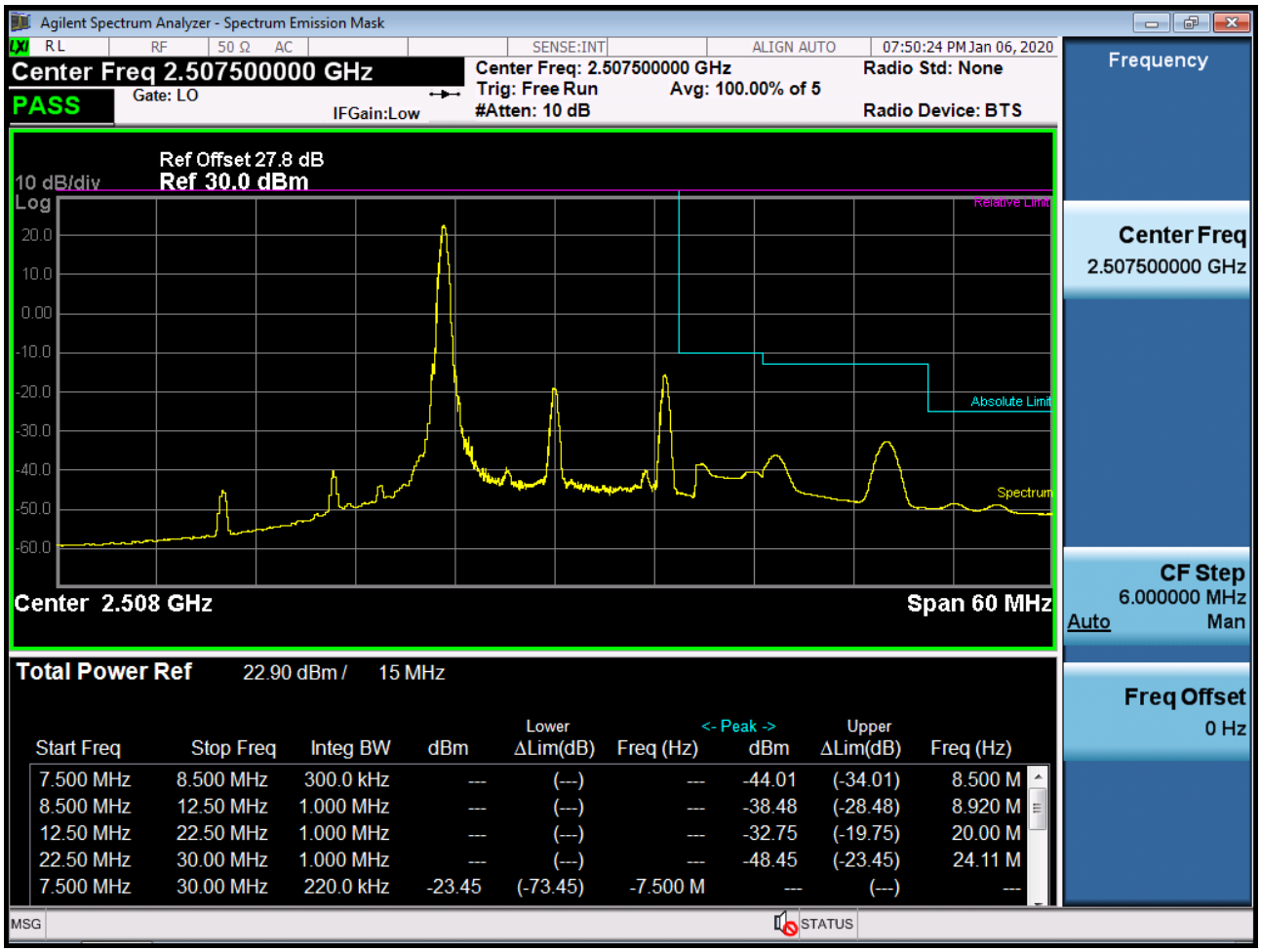
BAND 41. Low Channel Edge Plot (15 MHz Ch.39765 QPSK RB 1, Offset 0)-1(IC Low)



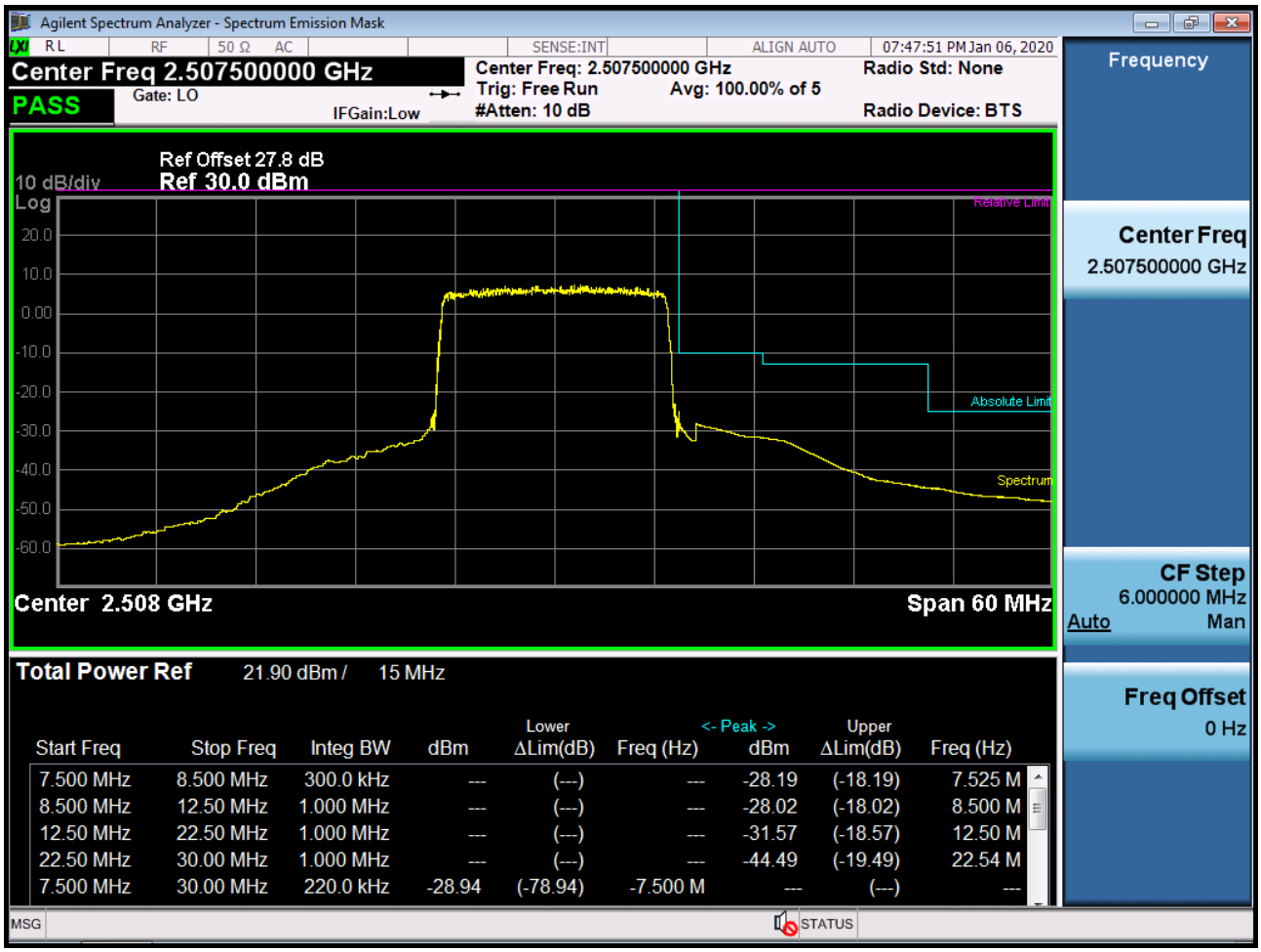
BAND 41. Low Channel Edge Plot (15 MHz Ch.39765 QPSK RB 75, Offset 0)-1(IC Low)



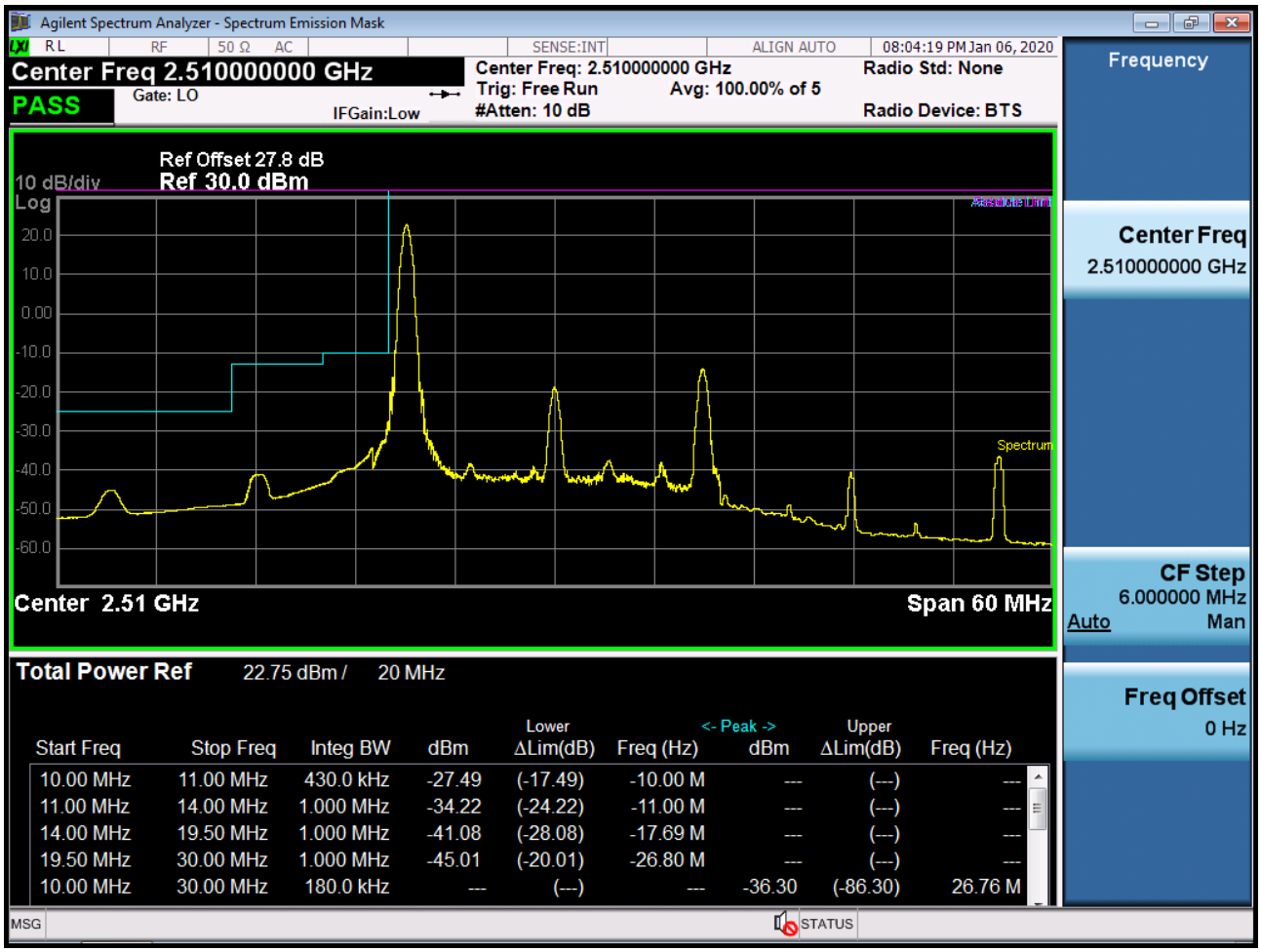
BAND 41. Low Channel Edge Plot (15 MHz Ch.39765 QPSK_RB1_Offset 0)-2(IC Low)



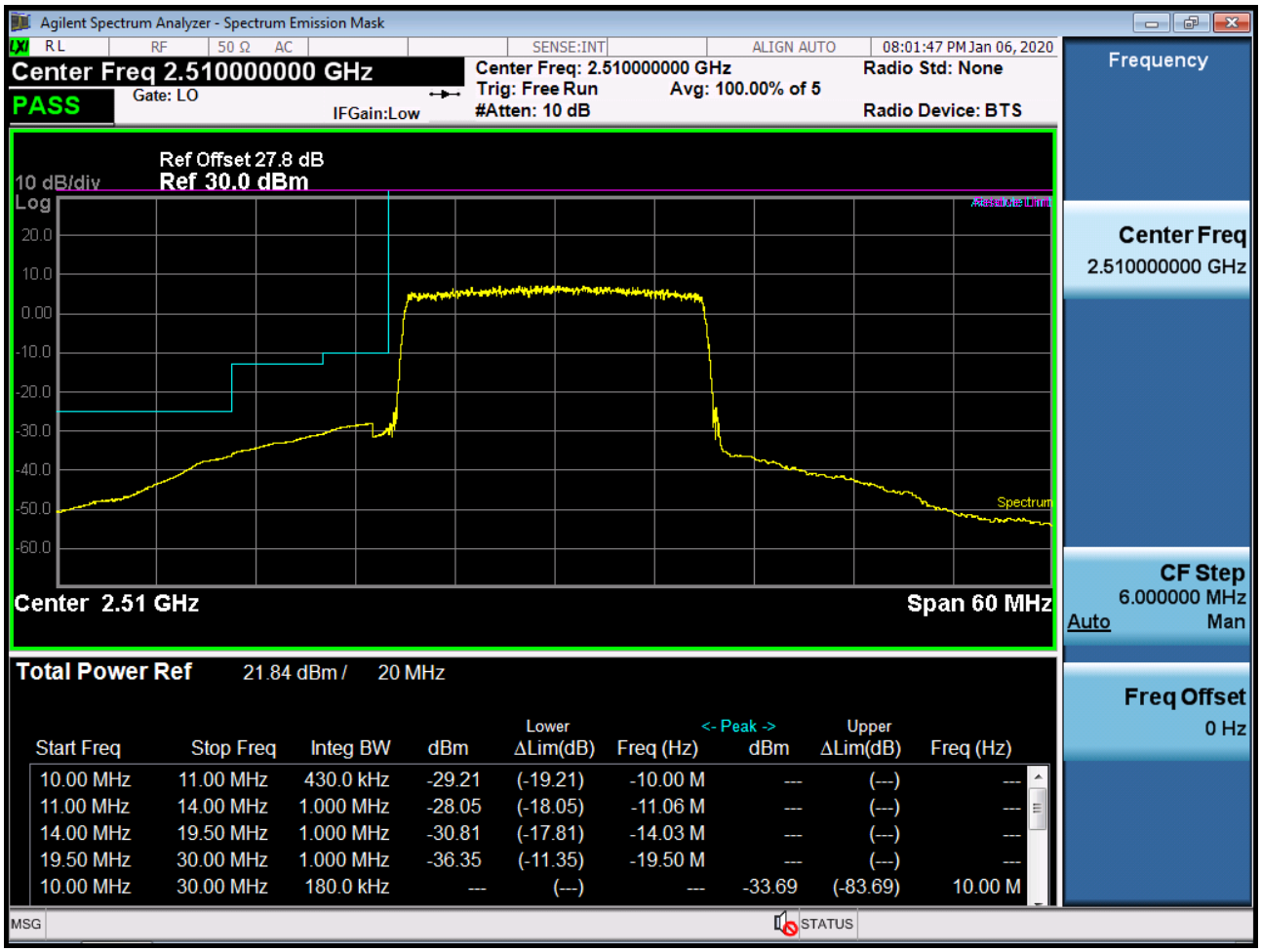
BAND 41. Low Channel Edge Plot (15 MHz Ch.39765 QPSK_RB75_Offset 0)-2(IC Low)



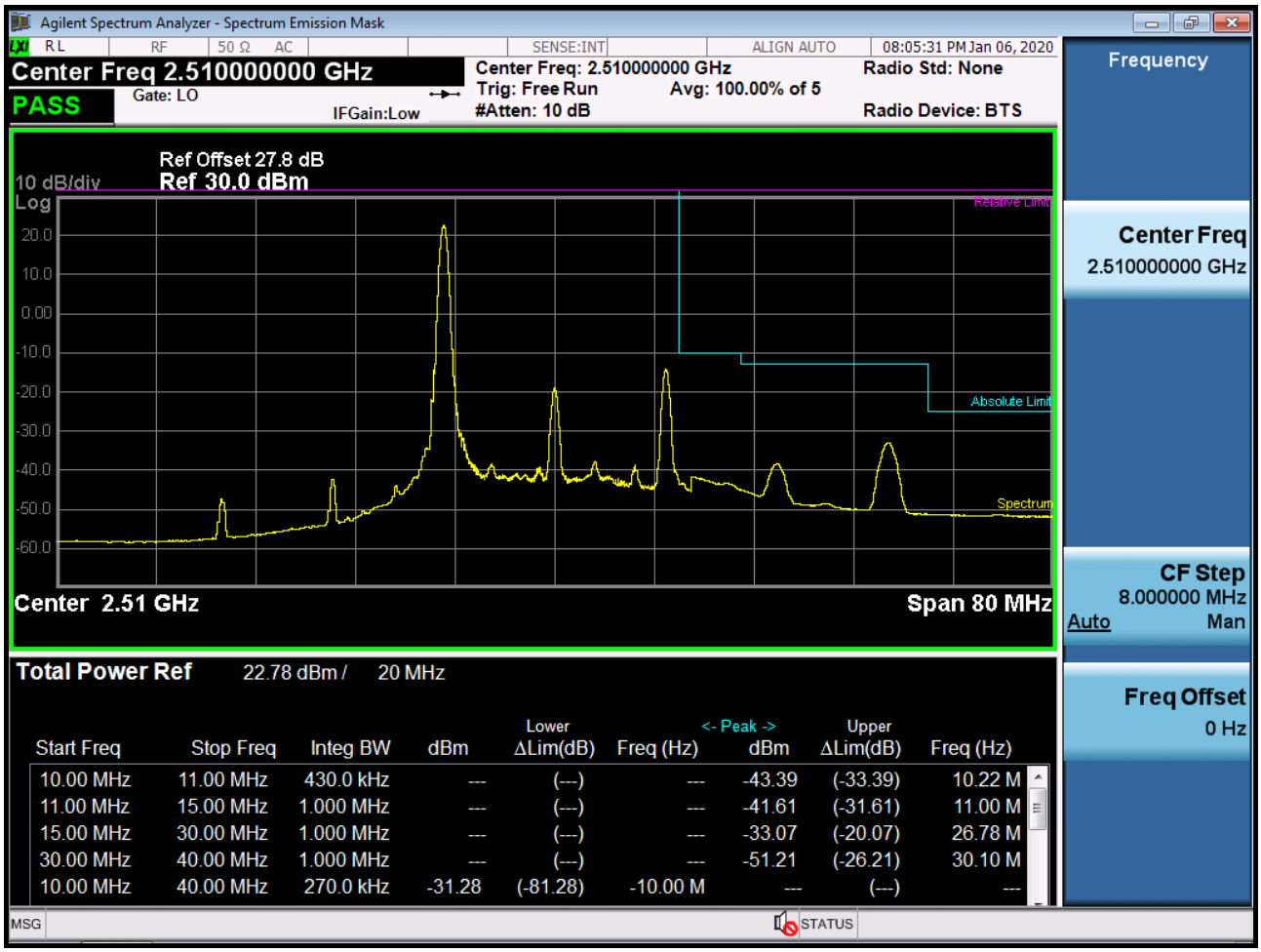
BAND 41. Low Channel Edge Plot (20 MHz Ch.39790 QPSK RB 1, Offset 0)-1(IC Low)



BAND 41. Low Channel Edge Plot (20 MHz Ch.39790 QPSK RB 25, Offset 0)-1(IC Low)

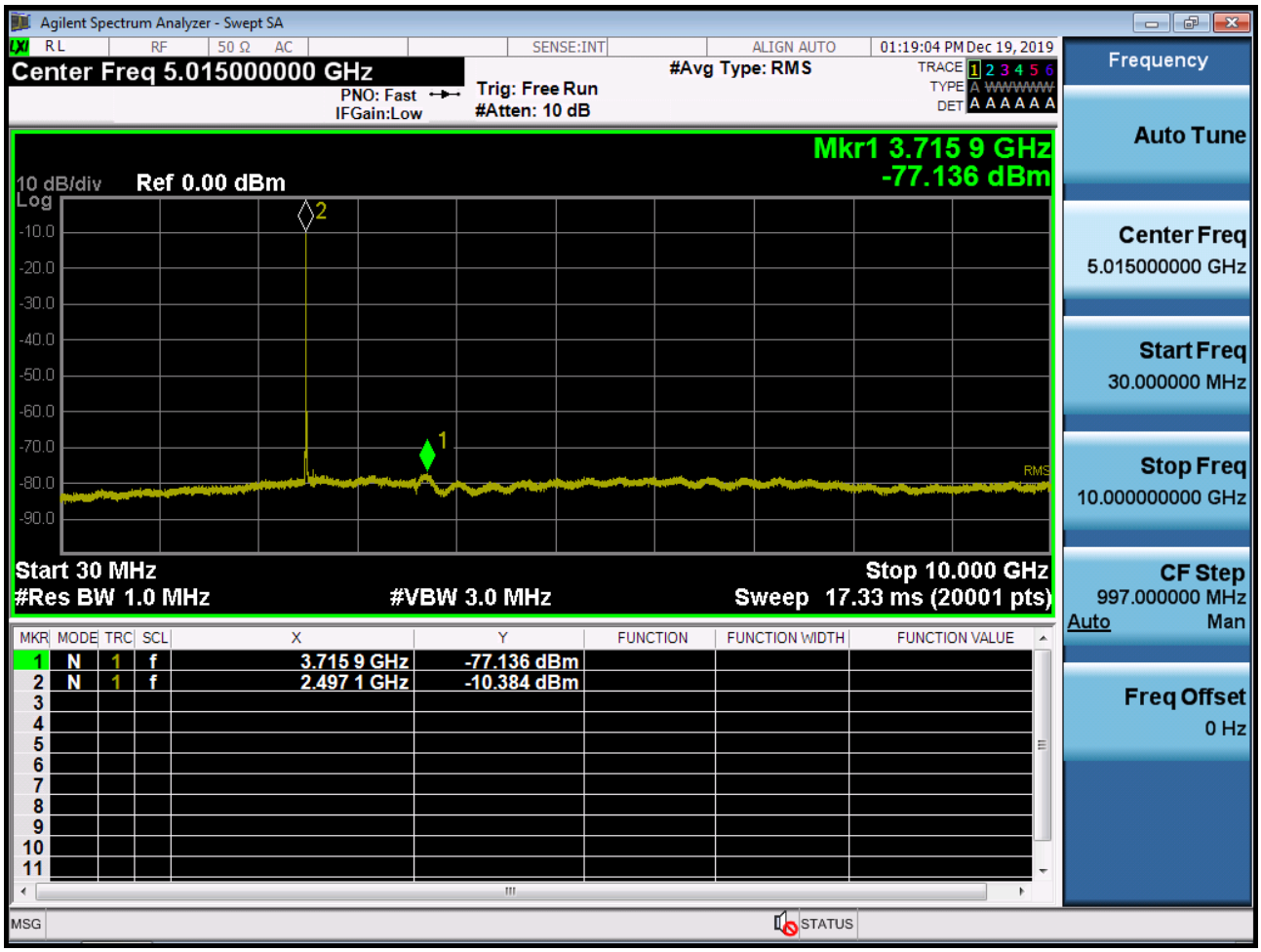


BAND 41. Low Channel Edge Plot (20 MHz Ch.39790 QPSK_RB1_Offset 0)-2(IC Low)



BAND 41. Low Channel Edge Plot (20 MHz Ch.39790 QPSK_RB100_Offset 0)-2(IC Low)

Conducted Spurious Plot 1 (5 MHz Ch.39675 QPSK RB 1, Offset 0) (FCC)



Conducted Spurious Plot 2 (5 MHz Ch. 39675 QPSK RB 1, Offset 0) (FCC)

Conducted Spurious Plot 1 (5 MHz Ch.40620 QPSK RB 1, Offset 0) (FCC)