TEST REPORT

FCC LTE B48 Test for SM-X528U
Certification

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2502-FC012-R1

DATE OF ISSUE
February 18, 2025

Tested by
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Applicant	**SAMSUNG Electronics Co., Ltd.** 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Product Name Model Name	Tablet SM-X528U
Date of Test	January 02, 2025 ~ February 07, 2025
FCC ID	A3LSMX528U
Location of Test	■ Permanent Testing Lab ☐ On Site Testing (Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea)
FCC Classification:	Citizens Band End User Devices (CBE)
Test Standard Used	FCC Rule Part: § 96
Test Results	PASS

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	February 10, 2025	Initial Release
1	February 18, 2025	Revised the FCC Classification. (page 2, 5)

Notice

Content
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)
The results shown in this test report only apply to the sample(s), as received, provided by the applicant, unless otherwise stated. The test results have only been applied with the test methods required by the standard(s).
The laboratory is not accredited for the test results marked *. Information provided by the applicant is marked **. Test results provided by external providers are marked ***.
When confirmation of authenticity of this test report is required, please contact www.hct.co.kr
The test results in this test report are not associated with the ((KS Q) ISO/IEC 17025) accreditation by KOLAS (Korea Laboratory Accreditation Scheme) / A2LA (American Association for Laboratory Accreditation) that are under the ILAC (International Laboratory Accreditation Cooperation) Mutual Recognition Agreement (MRA).

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:	A3LSMX528U
Application Type:	Certification
FCC Classification:	Citizens Band End User Devices (CBE)
FCC Rule Part(s):	§ 96
EUT Type:	Tablet
Model(s):	SM-X528U
Tx Frequency:	3552.5 – 3697.5 : 5 MHz 3555.0 – 3695.0 : 10 MHz 3557.5 – 3692.5 : 15 MHz 3560.0 – 3690.0 : 20 MHz
Date(s) of Tests:	January 02, 2025 ~ February 07, 2025
Serial number:	Radiated : R32XC00A61F Conducted : R32XC00A9JV

1.1. MAXIMUM OUTPUT POWER

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	EIRP	
				Max. Power (W)	Max. Power (dBm/ 10 MHz)
LTE – Band 48 (5)	3552.5 – 3697.5	4M50G7D	QPSK	0.138	21.41
		4M50W7D	16QAM	0.119	20.76
		4M53W7D	64QAM	0.092	19.64
		4M53W7D	256QAM	0.047	16.71
LTE – Band 48 (10)	3555.0 – 3695.0	9M02G7D	QPSK	0.139	21.44
		8M99W7D	16QAM	0.123	20.90
		8M96W7D	64QAM	0.090	19.55
		8M92W7D	256QAM	0.045	16.57
LTE – Band 48 (15)	3557.5 – 3692.5	13M5G7D	QPSK	0.136	21.34
		13M6W7D	16QAM	0.116	20.66
		13M4W7D	64QAM	0.091	19.59
		13M5W7D	256QAM	0.046	16.65
LTE – Band 48 (20)	3560.0 – 3690.0	18M0G7D	QPSK	0.150	21.75
		18M0W7D	16QAM	0.131	21.18
		17M9W7D	64QAM	0.096	19.83
		17M9W7D	256QAM	0.047	16.69

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

Please refer to the [3G] Test Report.

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, Republic 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 - KDB 940660 D01 v01
Channel Edge/ ACLR	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7 - KDB 940660 D01 v01
Spurious and Harmonic Emissions at Antenna Terminal	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7 - KDB 940660 D01 v01
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 - KDB 940660 D01 v01
Frequency stability	- ANSI C63.26-2015 – Section 5.6 - KDB 940660 D01 v01
Radiated Power	- ANSI C63.26-2015 – Section 5.2.4.4 - KDB 971168 D01 v03r01 – Section 5.8 - KDB 940660 D01 v01
Radiated Spurious and Harmonic Emissions	- ANSI C63.26-2015 – Section 5.5.3 - KDB 971168 D01 v03r01 – Section 5.8 - KDB 940660 D01 v01
End User Device Additional Requirement (CBSD Protocol)	- KDB 940660 D01 v01 - WINNF-TS-0122 V1.0.2

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.

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.

3.3 RADIATED SPURIOUS EMISSIONS

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

Radiated Spurious Emission Measurements at 3 meters by Substitution Method.

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;

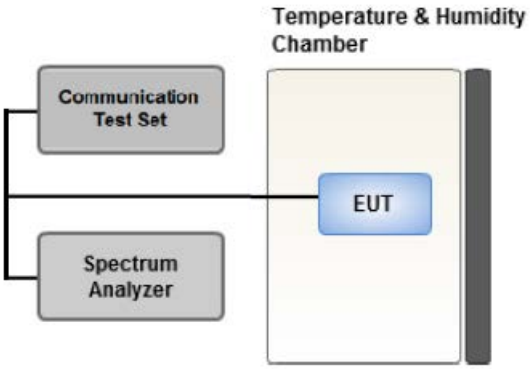
$$\text{Result}_{(dBm)} = \text{Pg}_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dBi)}$$

   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.

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

3.4 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 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)

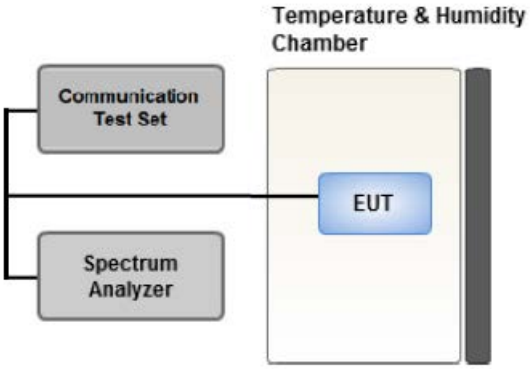
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW ≥ 3 × RBW.

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.



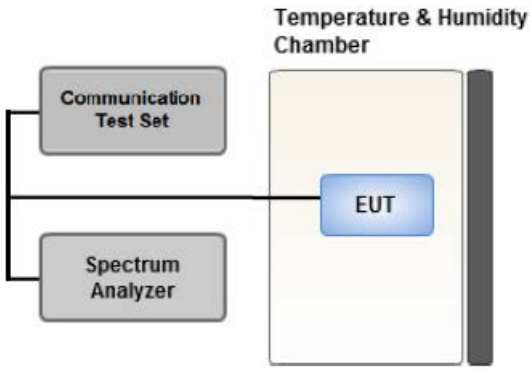
Test setup

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 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.

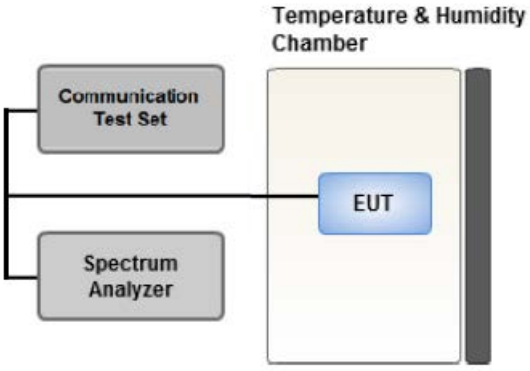
All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

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 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 1 MHz 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

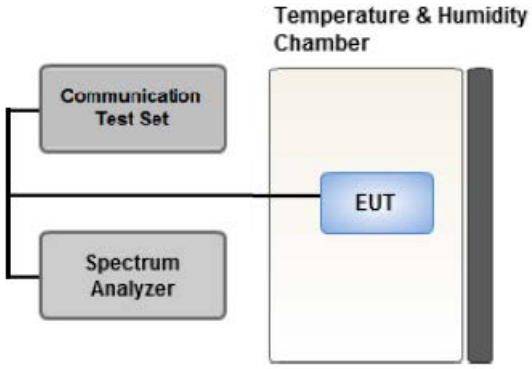
Test Notes

The conducted power of any emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed －13 dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any emission shall not exceed －25 dBm/MHz.

The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/Mhz

Where Margin < 1 dB the emission level is either corrected by 10 log(1 MHz/ RB) or the emission is integrated over a 1 MHz bandwidth to determine the final result. When using the integration method the integration window is either centered on the emission or, for emissions at the band edge, centered by an offset of 500 kHz from the block edge so that the integration window is the 1 MHz adjacent to the block edge.

3.8 Adjacent Channel Leakage Ratio



Test setup

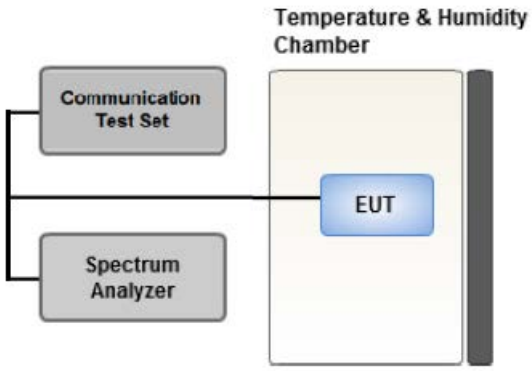
Test Settings

1. Use ACP measurement function of Spectrum analyzer to measure adjacent channel leakage ratio
2. Integ BW = Assigned channel bandwidth
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW
7. Trace mode = trace average
8. Sweep time = 1 s
9. The trace was allowed to stabilize

Test Notes

the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.

3.9 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:

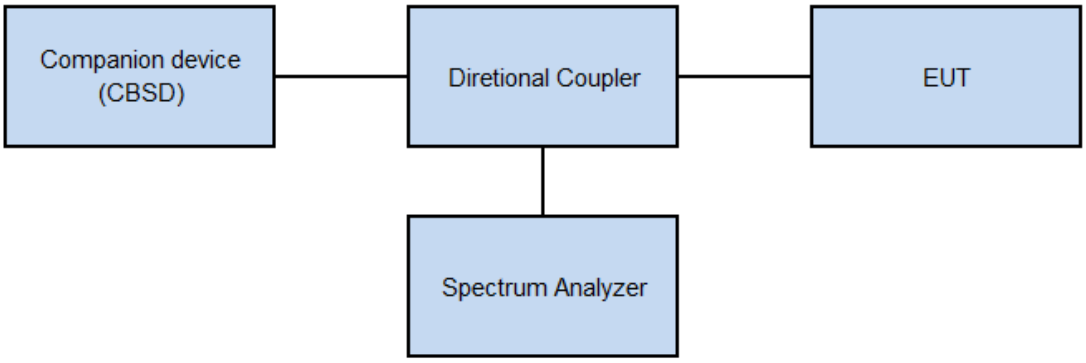
   .- Unless otherwise specified, vary primary supply voltage from 85 % to 115 % of the nominal value for other than hand carried battery equipment.

   .- 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.

3.10 End User Device Additional Requirement (CBSD Protocol)



Test setup

Test Overview

End user device additional requirements (CBSD Protocol) are tested per the test procedures listed below. During testing, the EUT is connected to a certified CBSD (FCC ID: 2AS48SC-220) as a companion device to show compliance with Part 96.47.

End User Devices may operate only if they can positively receive and decode an authorization signal transmitted by a CBSD, including the frequencies and power limits for their operation.

Test Settings

a. Setup companion device with 3570 MHz & 3610 MHz.

b. Enable AP service from companion device.

c. EUT is connected to a companion device.

c. Check EUT Tx frequency and power.

d. Disable AP service from companion device and check EUT stop transmission within 10 s.

3.11 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.
  Mode : Stand alone, Stand alone + External accessories (Earphone, Keyboard, AC adapter, etc)
  Worst case : Stand alone
- All simultaneous transmission scenarios of operation were investigated, and the test results showed no additional significant emissions relative to the least restrictive limit were observed.
  Therefore, only the worst case(stand-alone) results were reported.
- The worst case is reported with the EUT positioning, modulations, and paging service configurations shown in the test data
- Please refer to the table below.

[Worst case]

Test Description	Modulation	RB size	RB offset	Axis
Effective Isotropic Radiated Power	QPSK, 16QAM, 64QAM, 256QAM	See Section 8.1		X
Radiated Spurious and Harmonic Emissions	QPSK	See Section 8.2		Y

3.12 WORST CASE(CONDUCTED TEST)

- All modes of operation were investigated and the worst case configuration results are reported.

[Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset
Occupied Bandwidth	QPSK, 16QAM, 64QAM, 256QAM	5, 10, 15, 20	Mid	Full RB	0
Peak-To-Average Radio	QPSK, 16QAM, 64QAM, 256QAM	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

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
RF Switching System	Switch box(1.2 G HPF+LNA)	HCT CO., LTD.,	F1L1	11/11/2025	Annual
RF Switching System	Switch box(3.3 G HPF+LNA)	HCT CO., LTD.,	F1L2	11/11/2025	Annual
RF Switching System	Switch box(LNA)	HCT CO., LTD.,	F1L4	11/11/2025	Annual
RF Switching System	Switch box(6 G HPF+LNA)	HCT CO., LTD.,	F1L7	11/11/2025	Annual
Power Amplifier	CBL18265035	CERNEX	22966	11/07/2025	Annual
Power Amplifier	CBL26405040	CERNEX	25956	02/26/2025	Annual
Power Splitter(DC ~ 26.5 GHz)	11667B	Hewlett Packard	5001	04/17/2025	Annual
DC Power Supply	E3632A	Agilent	MY40010147	08/06/2025	Annual
Dipole Antenna	UHAP	Schwarzbeck	01274	03/10/2026	Biennial
Dipole Antenna	UHAP	Schwarzbeck	01288	08/07/2026	Biennial
Chamber	SU-642	ESPEC	93008124	02/19/2025	Annual
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	147	08/17/2025	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	9120D-1298	09/11/2025	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/20/2026	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170124	03/28/2025	Biennial
Signal Analyzer(10 Hz ~ 26.5 GHz)	N9020A	Agilent	MY52090906	04/19/2025	Annual
ATTENUATOR(20 dB)	8493C	Hewlett Packard	17280	04/17/2025	Annual
Spectrum Analyzer(10 Hz ~ 40 GHz)	FSV40	REOHDE & SCHWARZ	100931	08/06/2025	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/05/2025	Annual
Loop Antenna(9 kHz ~ 30 MHz)	FMZB1513	Schwarzbeck	1513-333	03/07/2026	Biennial
Trilog Broadband Antenna	VULB9168	Schwarzbeck	895	08/28/2026	Biennial
Trilog Broadband Antenna	VULB9168	Schwarzbeck	1135	08/19/2026	Biennial
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262094331	11/13/2025	Annual
Radio Communication Test Station	MT8000A	Anritsu Corp.	6272613402	08/28/2025	Annual
SIGNAL GENERATOR (100 kHz ~ 40 GHz)	SMB100A	REOHDE & SCHWARZ	177633	07/26/2025	Annual
Signal Analyzer(5 Hz ~ 40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/17/2025	Annual
Signal & Spectrum Analyzer (2 Hz~67 GHz)	FSW67	REOHDE & SCHWARZ	101736	05/23/2025	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 (±kHz)
Occupied Bandwidth	95 (Confidence level about 95 %, k=2)
Frequency stability	28 (Confidence level about 95 %, k=2)

Parameter	Expanded Uncertainty (±dB)
Block Edge	0.70 (Confidence level about 95 %, k=2)
Conducted Spurious Emissions	1.18 (Confidence level about 95 %, k=2)
Peak- to- Average Ratio	0.68 (Confidence level about 95 %, k=2)
Radiated Power	4.74 (Confidence level about 95 %, k=2)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.36 (Confidence level about 95 %, k=2)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.70 (Confidence level about 95 %, k=2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.52 (Confidence level about 95 %, k=2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.66 (Confidence level about 95 %, k=2)
Radiated Disturbance (Above 40 GHz)	5.58 (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
Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	§ 2.1051, § 96.41(e)	■ -13 dBm/Mhz at frequencies within 0-10 MHz of channel edge ■ -25 dBm/MHz at frequencies greater than 10 MHz above and below channel edge ■ -40 dBm/MHz at frequencies below 3530 MHz and above 3720 MHz	PASS
Adjacent Channel Leakage Ratio	§ 96.41(e)	At least 30 dB.	PASS
Conducted Output Power	§ 2.1046	N/A	See Note1
Frequency stability / variation of ambient temperature	§ 2.1055,	Emission must remain in band	PASS
Peak- to- Average Ratio	§ 96.41	< 13 dB	PASS
End User Device Additional Requirements (CBSD Protocol)	§ 96.47	End User Devices may operate only if they can positively receive and decode an authorization signal transmitted by a CBSD, including the frequencies and power limits for their operation. An End User Device must discontinue operations, change frequencies, or change its operational power level within 10 seconds of receiving instructions from its associated CBSD.	PASS

Note:

1. See SAR Report
2. The EUT is an End User Device

6.2 Test Condition: Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Equivalent Isotropic Radiated Power	§ 96.41(b)	23 dBm/10 MHz	PASS
Radiated Spurious and Harmonic Emissions	§ 2.1053, § 96.41(e)	-40 dBm/MHz	PASS

7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

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

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

1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.
2) During the test, the turn table is rotated until the maximum signal is found.
3) Record the field strength meter's level.
4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
6) The signal generator output level with Ant. Gain and cable loss are the rating of effective radiated power.

7.2 EIRP Sample Calculation

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

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

1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.
2) During the test, the turn table is rotated until the maximum signal is found.
3) Record the field strength meter's level.
4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
6) The signal generator output level with Ant. Gain and cable loss are the rating of equivalent isotropic radiated power.

7.3. Emission Designator

GSM Emission Designator

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

EDGE Emission Designator

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

WCDMA Emission Designator

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

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 EQUIVALENT ISOTROPIC RADIATED POWER

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	EIRP dBm/10 MHz	Limit	RB Size	RB Offset
3552.5	LTE B48/ 5 MHz	QPSK	-27.10	12.01	12.39	3.09	H	21.31	23.0	1	0
		16-QAM	-27.76	11.35	12.39	3.09	H	20.65			
		64-QAM	-28.89	10.22	12.39	3.09	H	19.52			
		256-QAM	-31.83	7.28	12.39	3.09	H	16.58			
3625.0		QPSK	-27.49	11.87	12.25	3.13	H	20.99		1	0
		16-QAM	-28.14	11.22	12.25	3.13	H	20.34			
		64-QAM	-29.27	10.09	12.25	3.13	H	19.21			
		256-QAM	-32.21	7.15	12.25	3.13	H	16.27			
3697.5		QPSK	-27.37	12.18	12.30	3.07	H	21.41		1	13
		16-QAM	-28.02	11.53	12.30	3.07	H	20.76			
		64-QAM	-29.14	10.41	12.30	3.07	H	19.64			
		256-QAM	-32.07	7.48	12.30	3.07	H	16.71			

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	EIRP dBm/10 MHz	Limit	RB Size	RB Offset
3555.0	LTE B48/ 10 MHz	QPSK	-27.20	11.91	12.39	3.09	H	21.21	23.0	1	0
		16-QAM	-27.86	11.25	12.39	3.09	H	20.55			
		64-QAM	-28.86	10.25	12.39	3.09	H	19.55			
		256-QAM	-31.84	7.27	12.39	3.09	H	16.57			
3625.0		QPSK	-27.56	11.80	12.25	3.13	H	20.92		1	0
		16-QAM	-28.22	11.14	12.25	3.13	H	20.26			
		64-QAM	-29.22	10.14	12.25	3.13	H	19.26			
		256-QAM	-32.21	7.15	12.25	3.13	H	16.27			
3695.0		QPSK	-27.25	12.23	12.29	3.08	H	21.44		1	25
		16-QAM	-27.79	11.69	12.29	3.08	H	20.90			
		64-QAM	-29.19	10.29	12.29	3.08	H	19.50			
		256-QAM	-32.32	7.16	12.29	3.08	H	16.37			

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	EIRP dBm/10 MHz	Limit	RB Size	RB Offset
3557.5	LTE B48/ 15 MHz	QPSK	-27.17	11.90	12.38	3.09	H	21.19	23.0	1	0
		16-QAM	-27.83	11.24	12.38	3.09	H	20.53			
		64-QAM	-28.90	10.17	12.38	3.09	H	19.46			
		256-QAM	-31.88	7.19	12.38	3.09	H	16.48			
3625.0		QPSK	-27.58	11.78	12.25	3.13	H	20.90		1	0
		16-QAM	-28.26	11.10	12.25	3.13	H	20.22			
		64-QAM	-29.31	10.05	12.25	3.13	H	19.17			
		256-QAM	-32.30	7.06	12.25	3.13	H	16.18			
3692.5		QPSK	-27.35	12.13	12.29	3.08	H	21.34		1	38
		16-QAM	-28.03	11.45	12.29	3.08	H	20.66			
		64-QAM	-29.10	10.38	12.29	3.08	H	19.59			
		256-QAM	-32.04	7.44	12.29	3.08	H	16.65			

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	EIRP dBm/10 MHz	Limit	RB Size	RB Offset
3560.0	LTE B48/ 20 MHz	QPSK	-27.23	11.84	12.38	3.09	H	21.13	23.0	1	0
		16-QAM	-27.87	11.20	12.38	3.09	H	20.49			
		64-QAM	-28.91	10.16	12.38	3.09	H	19.45			
		256-QAM	-31.88	7.19	12.38	3.09	H	16.48			
3625.0		QPSK	-27.66	11.70	12.25	3.13	H	20.82		1	0
		16-QAM	-28.17	11.19	12.25	3.13	H	20.31			
		64-QAM	-29.26	10.10	12.25	3.13	H	19.22			
		256-QAM	-32.18	7.18	12.25	3.13	H	16.30			
3690.0		QPSK	-26.85	12.55	12.28	3.08	H	21.75		1	50
		16-QAM	-27.42	11.98	12.28	3.08	H	21.18			
		64-QAM	-28.77	10.63	12.28	3.08	H	19.83			
		256-QAM	-31.91	7.49	12.28	3.08	H	16.69			

8.2 RADIATED SPURIOUS EMISSIONS

▣ MODE: LTE B48

▣ MODULATION SIGNAL: 5 MHz QPSK

▣ DISTANCE: 1 meters

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)	Detector	RB	
										Size	Offset
55265 (3552.5)	7 105.00	-38.59	11.07	-52.32	4.48	V	-45.73	-40.00	Average	1	0
	10 657.50	-39.84	10.63	-48.84	5.67	H	-43.88	-40.00	Peak		
	14 210.00	-45.30	11.62	-49.26	6.66	V	-44.30	-40.00	Peak		
55990 (3625.0)	7 250.00	-37.25	10.99	-53.85	4.53	V	-47.39	-40.00	Peak	1	0
	10 875.00	-42.82	10.43	-51.21	5.82	H	-46.60	-40.00	Average		
	14 500.00	-46.31	11.52	-50.71	6.69	H	-45.88	-40.00	Peak		
56715 (3697.5)	7 395.00	-42.47	10.91	-56.81	4.59	V	-50.49	-40.00	Peak	1	13
	11 092.50	-41.25	10.91	-49.91	5.88	V	-44.88	-40.00	Peak		
	14 790.00	-46.03	11.64	-51.93	6.73	V	-47.02	-40.00	Peak		

▣ MODE: LTE B48

▣ MODULATION SIGNAL: 10 MHz QPSK

▣ DISTANCE: 1 meters

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)	Detector	RB	
										Size	Offset
55290 (3555.0)	7 110.00	-39.16	11.07	-52.68	4.48	H	-46.09	-40.00	Average	1	0
	10 665.00	-43.10	10.63	-52.11	5.68	V	-47.16	-40.00	Peak		
	14 220.00	-46.77	11.62	-50.92	6.63	V	-45.93	-40.00	Peak		
55990 (3625.0)	7 250.00	-37.67	10.99	-54.27	4.53	H	-47.81	-40.00	Peak	1	0
	10 875.00	-40.05	10.43	-48.44	5.82	V	-43.83	-40.00	Peak		
	14 500.00	-46.20	11.52	-50.60	6.69	V	-45.77	-40.00	Peak		
56690 (3695.0)	7 390.00	-41.17	10.94	-55.74	4.60	H	-49.40	-40.00	Peak	1	25
	11 085.00	-40.00	10.80	-48.81	5.85	V	-43.86	-40.00	Peak		
	14 780.00	-47.07	11.64	-53.11	6.73	V	-48.20	-40.00	Peak		

▣ MODE: LTE B48

▣ MODULATION SIGNAL: 15 MHz QPSK

▣ DISTANCE: 1 meters

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)	Detector	RB	
										Size	Offset
55315 (3557.5)	7 115.00	-39.23	11.07	-52.91	4.47	H	-46.31	-40.00	Average	1	0
	10 672.50	-42.90	10.63	-51.89	5.70	V	-46.96	-40.00	Peak		
	14 230.00	-47.56	11.62	-51.90	6.58	V	-46.86	-40.00	Peak		
55990 (3625.0)	7 250.00	-36.72	10.99	-53.32	4.53	H	-46.86	-40.00	Peak	1	0
	10 875.00	-39.26	10.43	-47.65	5.82	V	-43.04	-40.00	Peak		
	14 500.00	-46.04	11.52	-50.44	6.69	V	-45.61	-40.00	Peak		
56665 (3692.5)	7 385.00	-41.41	10.94	-56.30	4.61	V	-49.97	-40.00	Peak	1	38
	11 077.50	-40.48	10.80	-49.36	5.84	V	-44.40	-40.00	Peak		
	14 770.00	-45.97	11.64	-52.20	6.72	V	-47.28	-40.00	Peak		

▣ MODE: LTE B48

▣ MODULATION SIGNAL: 20 MHz QPSK

▣ DISTANCE: 1 meters

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)	Detector	RB	
										Size	Offset
55340 (3560.0)	7 120.00	-36.11	11.07	-49.95	4.46	H	-43.34	-40.00	Peak	1	0
	10 680.00	-38.98	10.63	-47.94	5.71	H	-43.02	-40.00	Peak		
	14 240.00	-46.88	11.62	-50.91	6.54	H	-45.83	-40.00	Peak		
55990 (3625.0)	7 250.00	-36.41	10.99	-53.01	4.53	H	-46.55	-40.00	Peak	1	0
	10 875.00	-43.04	10.43	-51.43	5.82	V	-46.82	-40.00	Average		
	14 500.00	-45.96	11.52	-50.36	6.69	V	-45.53	-40.00	Peak		
56640 (3690.0)	7 380.00	-40.53	10.94	-55.76	4.61	V	-49.43	-40.00	Peak	1	50
	11 070.00	-39.63	10.80	-48.62	5.79	V	-43.61	-40.00	Peak		
	14 760.00	-46.22	11.64	-52.67	6.71	V	-47.74	-40.00	Peak		

8.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
48	5 MHz	3625.0	QPSK	25	0	5.68
			16-QAM			6.62
			64-QAM			6.89
			256-QAM			6.65
	10 MHz		QPSK	50		5.82
			16-QAM			7.16
			64-QAM			6.70
			256-QAM			6.80
	15 MHz		QPSK	75		5.70
			16-QAM			6.38
			64-QAM			6.63
			256-QAM			7.00
	20 MHz		QPSK	100		5.76
			16-QAM			6.34
			64-QAM			6.59
			256-QAM			6.80

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 70 ~ 85.

8.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
48	5 MHz	3625.0	QPSK	25	0	4.4989
			16-QAM			4.4974
			64-QAM			4.5328
			256-QAM			4.5322
	10 MHz		QPSK	50		9.0236
			16-QAM			8.9855
			64-QAM			8.9553
			256-QAM			8.9211
	15 MHz		QPSK	75		13.468
			16-QAM			13.570
			64-QAM			13.407
			256-QAM			13.467
	20 MHz		QPSK	100		17.985
			16-QAM			17.996
			64-QAM			17.928
			256-QAM			17.877

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 54 ~ 69.

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)
48	5	3552.5	7.1006	32.570	-78.569	-45.999	-40.00
		3625.0	3.4190	31.955	-80.649	-48.694	
		3697.5	7.3907	32.570	-83.691	-51.121	
	10	3555.0	7.1011	32.570	-78.583	-46.013	
		3625.0	3.8273	31.955	-80.728	-48.773	
		3695.0	7.3812	32.570	-83.586	-51.016	
	15	3557.5	7.1016	32.570	-79.205	-46.635	
		3625.0	3.8233	31.955	-80.522	-48.567	
		3692.5	7.3718	32.570	-83.744	-51.174	
	20	3560.0	7.1021	32.570	-78.082	-45.512	
		3625.0	3.8218	31.955	-80.976	-49.021	
		3690.0	3.8038	31.955	-80.259	-48.304	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 142 ~ 165.
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) = 3.979
4. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB) + Duty Cycle factor(dB)
5. Factor (dB) = Cable Loss + Attenuator + Power Splitter

Frequency Range (GHz)	Factor [dB]
0.03 – 1	29.249
1 – 5	31.955
5 – 10	32.570
10 – 15	33.095
15 – 20	33.468
Above 20(26.5)	34.110

8.6 CHANNEL EDGE

BW (MHz)	RB (Size/ Offset)	Freq. (MHz)	Outside of the authorized band (dBm)							
			Lower Side(MHz)				Upper Side(MHz)			
			Below 3530 MHz	-[B]MHz ~ 3530 MHz	-1 MHz ~ -[B]MHz	0 MHz ~ -1 MHz	0 MHz ~ +1 MHz	1 MHz ~ +[B]MHz	+[B]MHz ~ 3720 MHz	Above 3720 MHz
5	25/0	3552.5	-46.40	-38.63	-27.55	-26.44	-26.83	-25.70	-37.32	-
		3625.0	-	-37.52	-26.51	-26.28	-26.69	-24.65	-36.27	-
		3697.5	-	-36.78	-26.02	-26.13	-26.88	-24.42	-35.70	-45.43
10	50/0	3555.0	-46.89	-40.56	-28.99	-30.64	-30.00	-27.28	-40.23	-
		3625.0	-	-39.77	-27.91	-30.34	-29.72	-26.54	-39.47	-
		3695.0	-	-39.35	-27.59	-30.51	-29.83	-26.29	-38.89	-45.73
15	75/0	3557.5	-44.72	-35.92	-30.39	-32.11	-31.67	-28.92	-42.56	-
		3625.0	-	-41.64	-29.25	-31.72	-31.36	-28.18	-41.81	-
		3692.5	-	-40.95	-28.89	-31.69	-31.36	-27.79	-33.38	-43.23
20	100/0	3560.0	-44.02	-35.15	-31.43	-34.72	-33.63	-30.22	-44.09	-
		3625.0	-	-42.85	-30.29	-34.11	-33.31	-29.62	-42.66	-
		3690.0	-	-42.29	-30.03	-34.00	-33.33	-29.29	-32.97	-42.05
Limit (dBm)			-40.00	-25.00	-13.00	-13.00	-13.00	-13.00	-25.00	-40.00

Note:

1. C.E = Channel Edge
2. Plots of the EUT's Channel Edge are shown Page 98 ~ 141.

BW (MHz)	RB (Size/ Offset)	Freq. (MHz)	Outside of the authorized band (dBm)							
			Lower Side(MHz)				Upper Side(MHz)			
			Below 3530 MHz	-[B]MHz ~ 3530 MHz	-1 MHz ~ -[B]MHz	0 MHz ~ -1 MHz	0 MHz ~ +1 MHz	1 MHz ~ +[B]MHz	+[B]MHz ~ 3720 MHz	Above 3720 MHz
5	Lower Side: 1/0 Upper Side: 1/24	3552.5	-46.22	-39.02	-29.89	-24.11	-23.46	-29.66	-39.51	-
		3625.0	-	-38.80	-29.84	-23.90	-23.24	-29.42	-39.36	-
		3697.5	-	-38.75	-29.76	-23.96	-23.17	-29.42	-39.38	-45.39
10	Lower Side: 1/0 Upper Side: 1/49	3555.0	-46.93	-42.07	-31.99	-33.09	-31.81	-33.66	-42.44	-
		3625.0	-	-41.76	-32.19	-32.95	-31.70	-33.49	-41.95	-
		3695.0	-	-41.46	-32.12	-33.20	-31.76	-33.46	-41.96	-45.75
15	Lower Side: 1/0 Upper Side: 1/74	3557.5	-45.92	-41.90	-31.66	-25.87	-24.96	-33.16	-44.36	-
		3625.0	-	-44.17	-31.81	-25.70	-24.76	-33.02	-44.12	-
		3692.5	-	-43.46	-31.72	-25.95	-24.77	-32.92	-42.29	-45.29
20	Lower Side: 1/0 Upper Side: 1/99	3560.0	-46.41	-41.93	-31.88	-34.16	-33.72	-33.60	-47.13	-
		3625.0	-	-45.77	-32.11	-34.01	-33.45	-33.63	-45.49	-
		3690.0	-	-45.37	-31.96	-33.94	-33.24	-33.09	-42.36	-45.33
Limit (dBm)			-40.00	-25.00	-13.00	-13.00	-13.00	-13.00	-25.00	-40.00

Note:

1. C.E = Channel Edge
2. Plots of the EUT's Channel Edge are shown Page 98 ~ 141.

8.7 Adjacent Channel Leakage Ratio(ACLR)

Band Width	RB (Size/ Offset)	Frequency (MHz)	Adjacent Channel Leakage Ratio(dB)	
			Lower Side	Upper Side
5 MHz	25/0	3552.5	40.77	40.15
		3625.0	40.24	39.62
		3697.5	39.91	39.35
10 MHz	50/0	3555.0	43.00	41.70
		3625.0	42.01	41.06
		3695.0	41.54	40.54
15 MHz	75/0	3557.5	43.22	42.14
		3625.0	42.07	41.48
		3692.5	41.61	40.90
20 MHz	100/0	3560.0	43.48	42.37
		3625.0	42.29	41.82
		3690.0	41.88	41.22
Limit (dB)			ACLR > 30 dB	ACLR > 30 dB

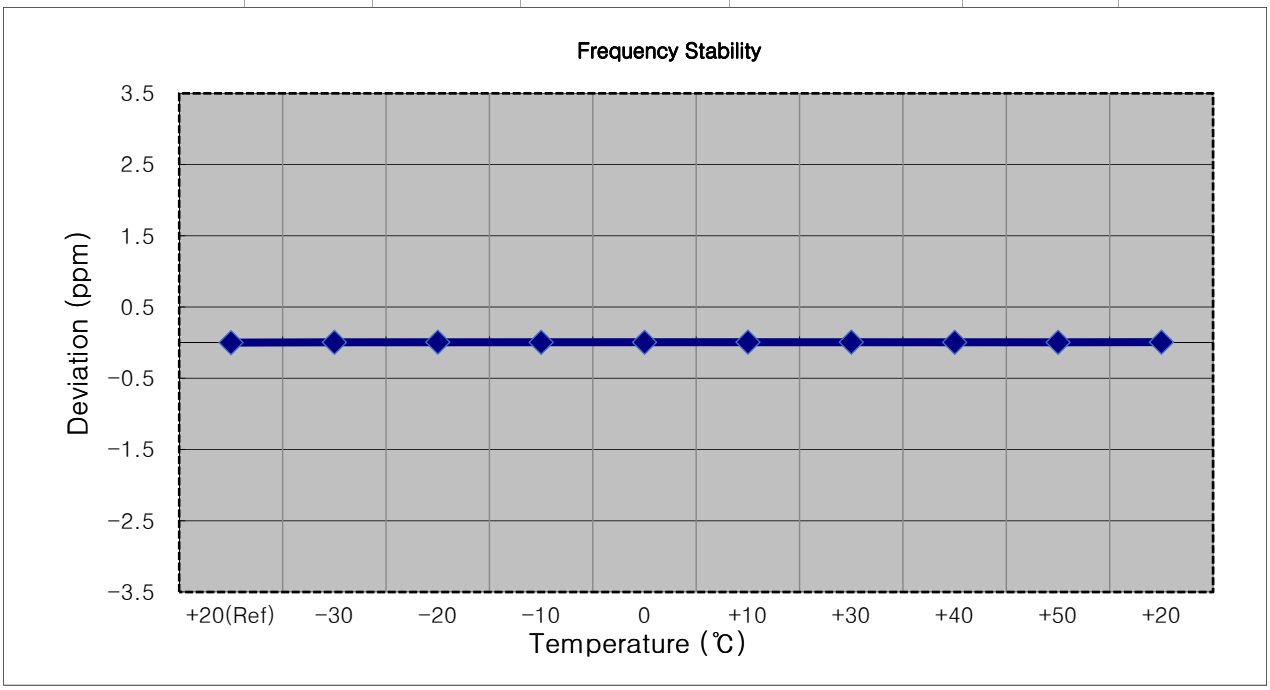
Note:

1. Duty Cycle factor already applied on the factor.
 - Duty Cycle factor(dB) = 3.979
 - Factor(dB) = Duty Cycle factor + Cable Loss + Ext. Attenuator + Power Splitter
2. Plots of the EUT's Adjacent Channel Leakage Ratio(ACLR) are shown Page 86 ~ 97.

8.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

- ▣ OPERATING FREQUENCY: 3,552,500,000 Hz
- ▣ BANDWIDTH: 5 MHz
- ▣ REFERENCE VOLTAGE: 3.860 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	(Hz)	(%)	
100 %	3.860	+20(Ref)	3552 500 020	0.0	0.000 000	0.000
100 %		-30	3552 500 034	13.7	0.000 000	0.004
100 %		-20	3552 500 040	19.5	0.000 001	0.005
100 %		-10	3552 500 038	17.6	0.000 000	0.005
100 %		0	3552 500 038	18.3	0.000 001	0.005
100 %		+10	3552 500 040	19.6	0.000 001	0.006
100 %		+30	3552 500 041	20.6	0.000 001	0.006
100 %		+40	3552 500 036	15.4	0.000 000	0.004
100 %		+50	3552 500 039	18.6	0.000 001	0.005
Batt. Endpoint	3.400	+20	3552 500 040	19.7	0.000 001	0.006



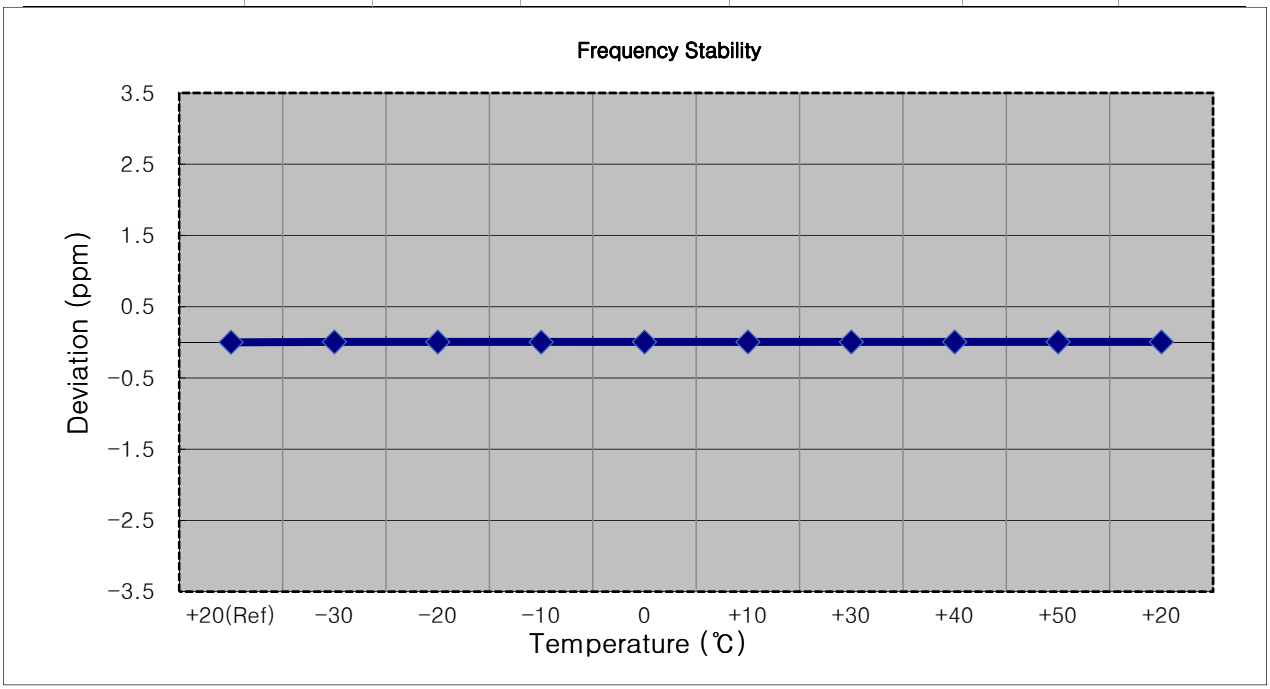
▣ OPERATING FREQUENCY: 3,555,000,000 Hz

▣ BANDWIDTH: 10 MHz

▣ REFERENCE VOLTAGE: 3.860 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	(Hz)	(%)	
100 %	3.860	+20(Ref)	3555 000 026	0.0	0.000 000	0.000
100 %		-30	3555 000 044	18.0	0.000 001	0.005
100 %		-20	3555 000 042	16.3	0.000 000	0.005
100 %		-10	3555 000 038	12.5	0.000 000	0.004
100 %		0	3555 000 043	17.7	0.000 000	0.005
100 %		+10	3555 000 044	18.1	0.000 001	0.005
100 %		+30	3555 000 043	17.5	0.000 000	0.005
100 %		+40	3555 000 043	17.3	0.000 000	0.005
100 %		+50	3555 000 041	15.0	0.000 000	0.004
Batt. Endpoint	3.400	+20	3555 000 043	17.8	0.000 001	0.005



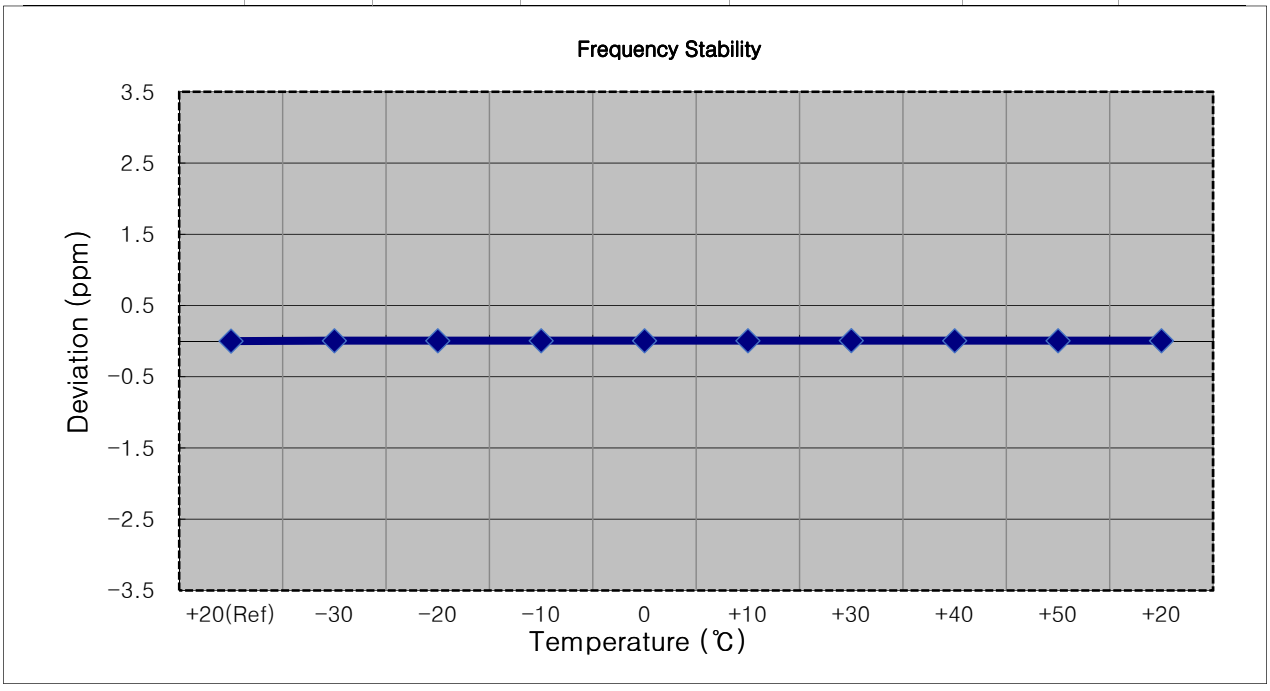
▣ OPERATING FREQUENCY: 3,557,500,000 Hz

▣ BANDWIDTH: 15 MHz

▣ REFERENCE VOLTAGE: 3.860 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	(Hz)	(%)	
100 %	3.860	+20(Ref)	3557 500 020	0.0	0.000 000	0.000
100 %		-30	3557 500 040	20.7	0.000 001	0.006
100 %		-20	3557 500 040	20.3	0.000 001	0.006
100 %		-10	3557 500 036	16.1	0.000 000	0.005
100 %		0	3557 500 037	17.6	0.000 000	0.005
100 %		+10	3557 500 038	18.3	0.000 001	0.005
100 %		+30	3557 500 044	24.3	0.000 001	0.007
100 %		+40	3557 500 039	19.0	0.000 001	0.005
100 %		+50	3557 500 043	22.9	0.000 001	0.006
Batt. Endpoint	3.400	+20	3557 500 038	18.7	0.000 001	0.005



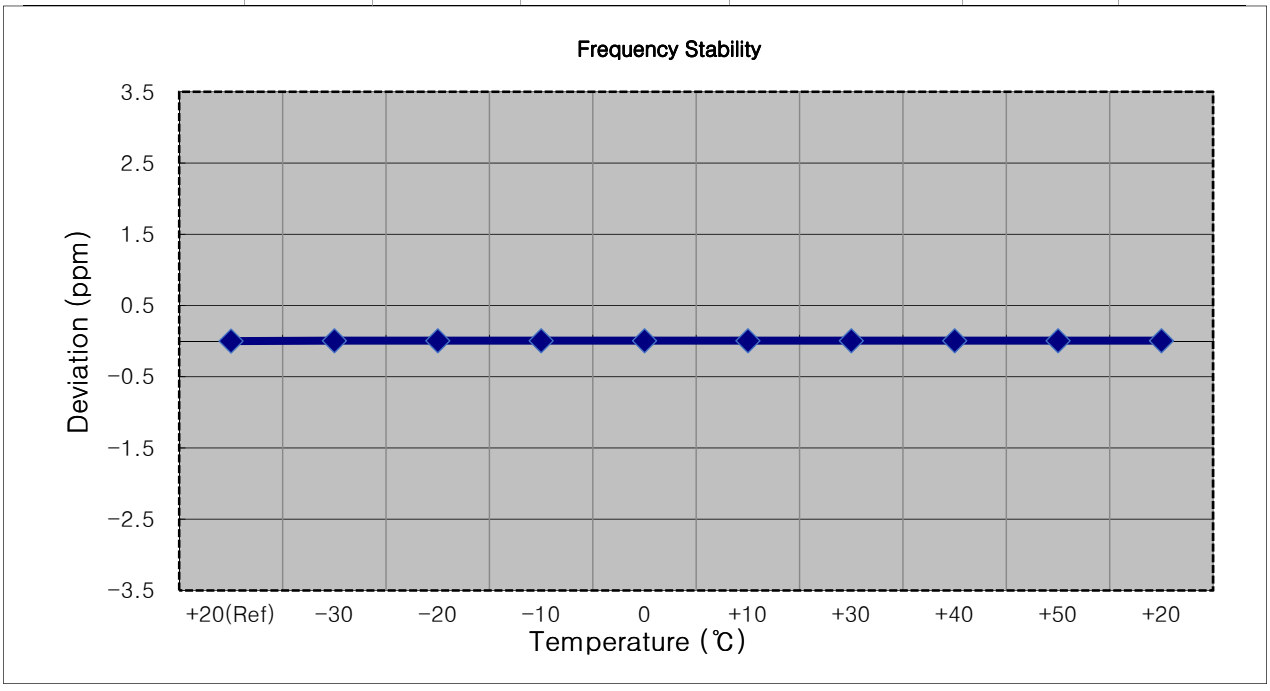
▣ OPERATING FREQUENCY: 3,560,000,000 Hz

▣ BANDWIDTH: 20 MHz

▣ REFERENCE VOLTAGE: 3.860 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	(Hz)	(%)	
100 %	3.860	+20(Ref)	3560 000 016	0.0	0.000 000	0.000
100 %		-30	3560 000 034	17.7	0.000 000	0.005
100 %		-20	3560 000 034	17.8	0.000 000	0.005
100 %		-10	3560 000 033	16.5	0.000 000	0.005
100 %		0	3560 000 033	16.7	0.000 000	0.005
100 %		+10	3560 000 035	18.4	0.000 001	0.005
100 %		+30	3560 000 033	17.2	0.000 000	0.005
100 %		+40	3560 000 038	22.2	0.000 001	0.006
100 %		+50	3560 000 033	16.4	0.000 000	0.005
Batt. Endpoint	3.400	+20	3560 000 035	19.3	0.000 001	0.005



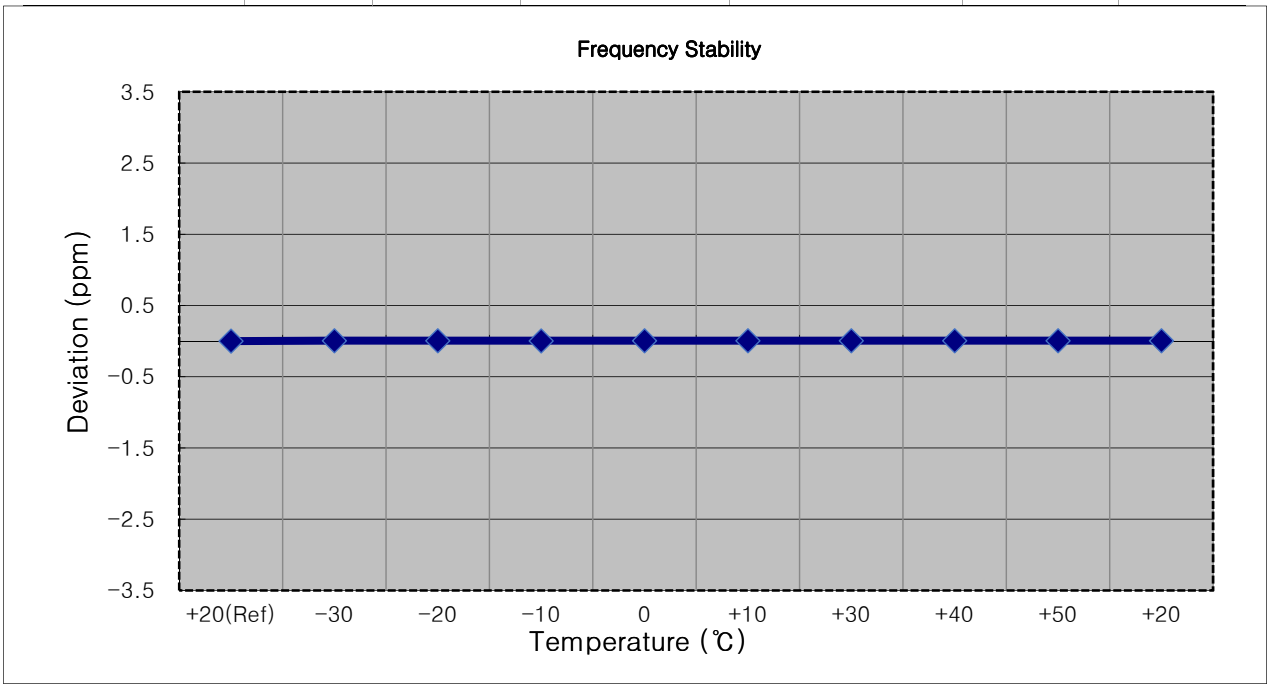
▣ OPERATING FREQUENCY: 3,625,000,000 Hz

▣ BANDWIDTH: 5 MHz

▣ REFERENCE VOLTAGE: 3.860 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	(Hz)	(%)	
100 %	3.860	+20(Ref)	3625 000 020	0.0	0.000 000	0.000
100 %		-30	3625 000 039	18.8	0.000 001	0.005
100 %		-20	3625 000 039	18.6	0.000 001	0.005
100 %		-10	3625 000 036	16.1	0.000 000	0.004
100 %		0	3625 000 039	18.4	0.000 001	0.005
100 %		+10	3625 000 037	16.7	0.000 000	0.005
100 %		+30	3625 000 038	18.1	0.000 000	0.005
100 %		+40	3625 000 039	18.4	0.000 001	0.005
100 %		+50	3625 000 038	17.7	0.000 000	0.005
Batt. Endpoint	3.400	+20	3625 000 041	21.2	0.000 001	0.006



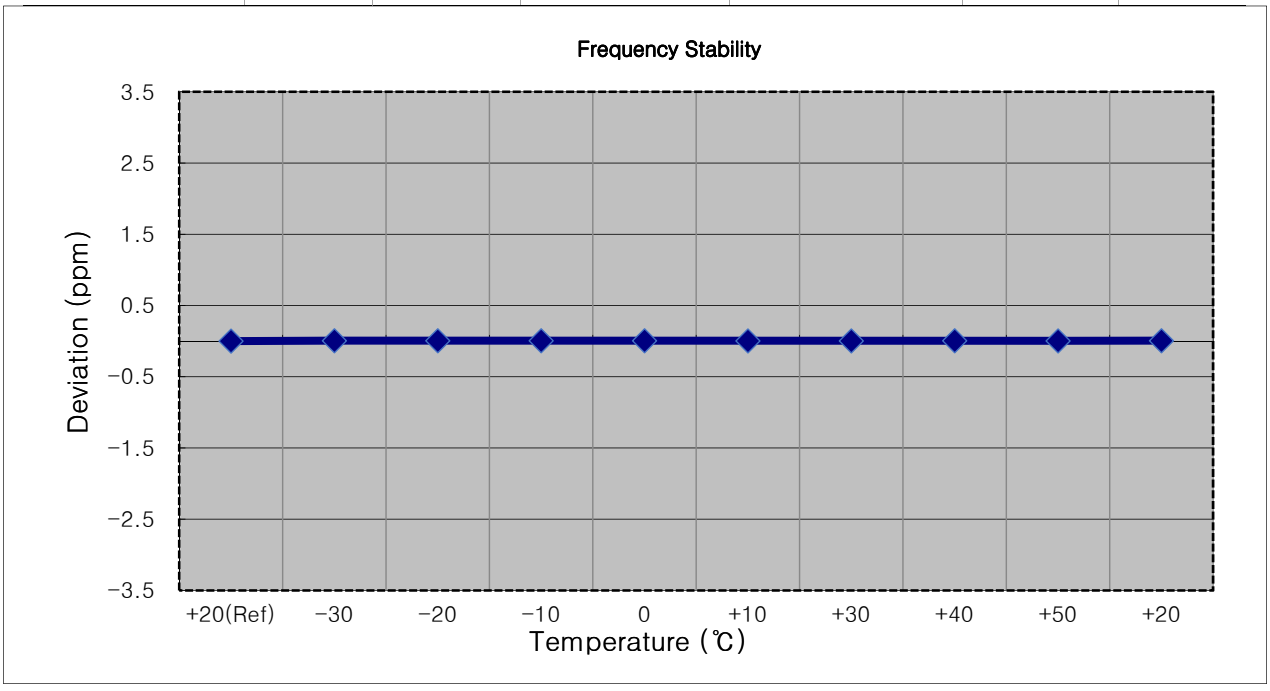
▣ OPERATING FREQUENCY: 3,625,000,000 Hz

▣ BANDWIDTH: 10 MHz

▣ REFERENCE VOLTAGE: 3.860 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	(Hz)	(%)	
100 %	3.860	+20(Ref)	3625 000 016	0.0	0.000 000	0.000
100 %		-30	3625 000 036	20.0	0.000 001	0.006
100 %		-20	3625 000 034	18.4	0.000 001	0.005
100 %		-10	3625 000 038	22.1	0.000 001	0.006
100 %		0	3625 000 038	22.4	0.000 001	0.006
100 %		+10	3625 000 032	15.5	0.000 000	0.004
100 %		+30	3625 000 030	13.8	0.000 000	0.004
100 %		+40	3625 000 033	17.4	0.000 000	0.005
100 %		+50	3625 000 030	13.5	0.000 000	0.004
Batt. Endpoint	3.400	+20	3625 000 036	20.2	0.000 001	0.006



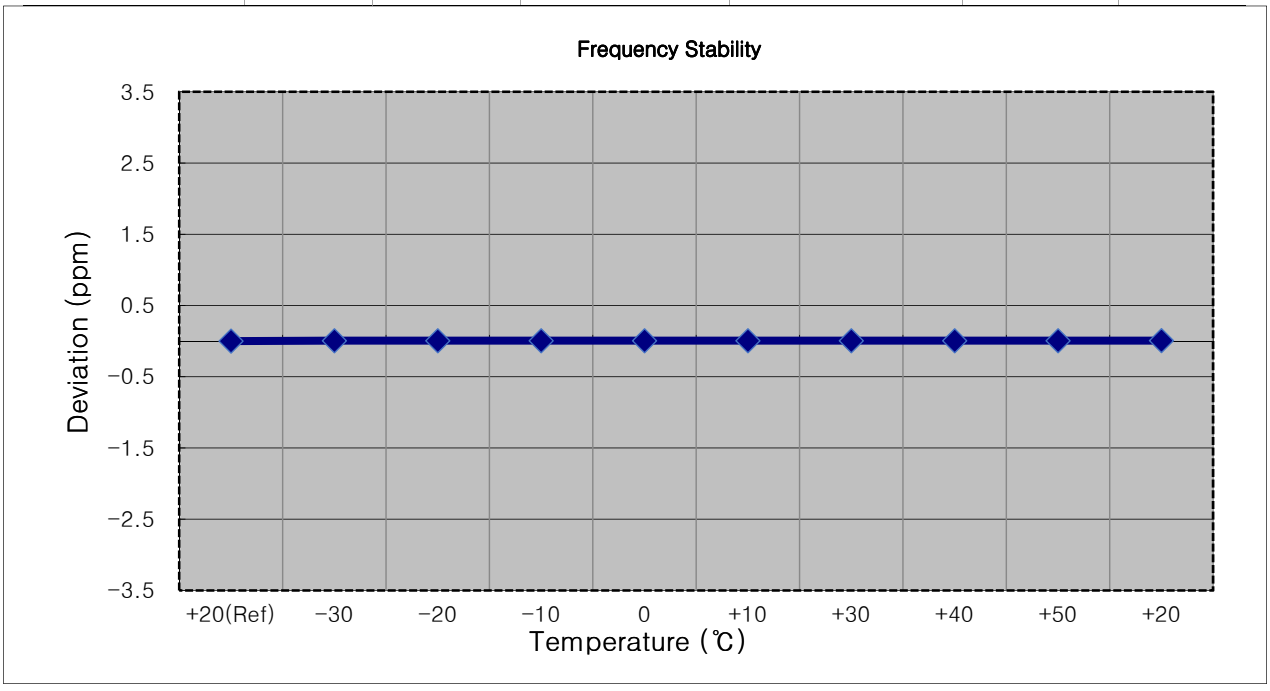
▣ OPERATING FREQUENCY: 3,625,000,000 Hz

▣ BANDWIDTH: 15 MHz

▣ REFERENCE VOLTAGE: 3.860 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	(Hz)	(%)	
100 %	3.860	+20(Ref)	3625 000 018	0.0	0.000 000	0.000
100 %		-30	3625 000 037	19.0	0.000 001	0.005
100 %		-20	3625 000 035	16.9	0.000 000	0.005
100 %		-10	3625 000 036	18.0	0.000 000	0.005
100 %		0	3625 000 038	19.3	0.000 001	0.005
100 %		+10	3625 000 041	22.3	0.000 001	0.006
100 %		+30	3625 000 041	23.0	0.000 001	0.006
100 %		+40	3625 000 036	17.7	0.000 000	0.005
100 %		+50	3625 000 038	19.4	0.000 001	0.005
Batt. Endpoint	3.400	+20	3625 000 044	25.7	0.000 001	0.007



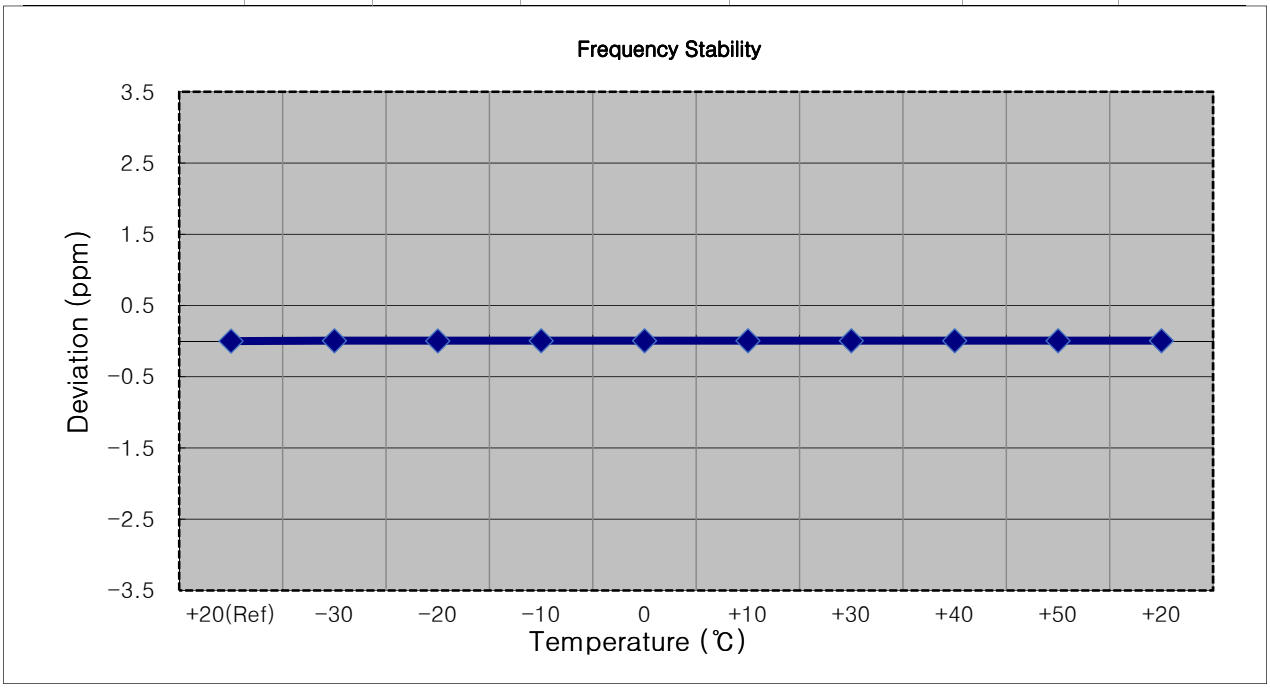
▣ OPERATING FREQUENCY: 3,625,000,000 Hz

▣ BANDWIDTH: 20 MHz

▣ REFERENCE VOLTAGE: 3.860 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	(Hz)	(%)	
100 %	3.860	+20(Ref)	3625 000 024	0.0	0.000 000	0.000
100 %		-30	3625 000 046	22.7	0.000 001	0.006
100 %		-20	3625 000 038	14.8	0.000 000	0.004
100 %		-10	3625 000 044	20.0	0.000 001	0.006
100 %		0	3625 000 043	19.5	0.000 001	0.005
100 %		+10	3625 000 046	22.4	0.000 001	0.006
100 %		+30	3625 000 042	18.8	0.000 001	0.005
100 %		+40	3625 000 044	20.9	0.000 001	0.006
100 %		+50	3625 000 044	20.2	0.000 001	0.006
Batt. Endpoint	3.400	+20	3625 000 042	18.3	0.000 001	0.005



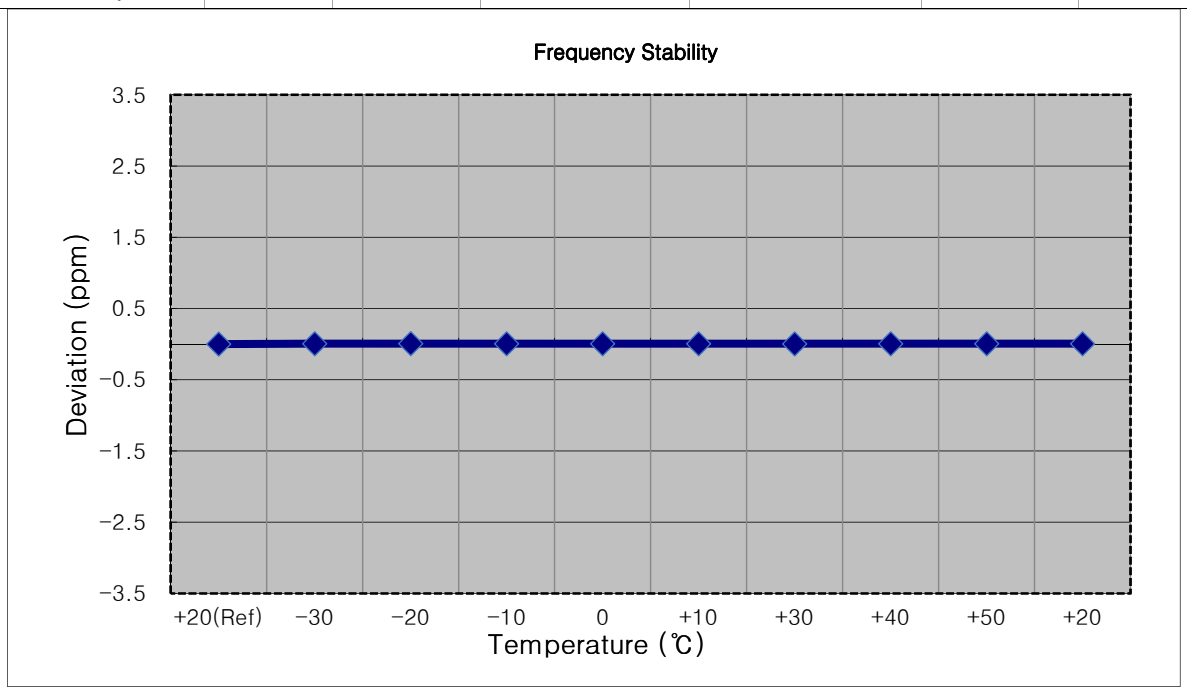
▣ OPERATING FREQUENCY: 3,697,500,000 Hz

▣ BANDWIDTH: 5 MHz

▣ REFERENCE VOLTAGE: 3.860 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	(Hz)	(%)	
100 %	3.860	+20(Ref)	3697 500 021	0.0	0.000 000	0.000
100 %		-30	3697 500 046	24.7	0.000 001	0.007
100 %		-20	3697 500 047	25.5	0.000 001	0.007
100 %		-10	3697 500 046	24.3	0.000 001	0.007
100 %		0	3697 500 044	22.7	0.000 001	0.006
100 %		+10	3697 500 044	22.3	0.000 001	0.006
100 %		+30	3697 500 038	16.4	0.000 000	0.004
100 %		+40	3697 500 044	22.2	0.000 001	0.006
100 %		+50	3697 500 041	20.1	0.000 001	0.005
Batt. Endpoint	3.400	+20	3697 500 039	18.1	0.000 000	0.005



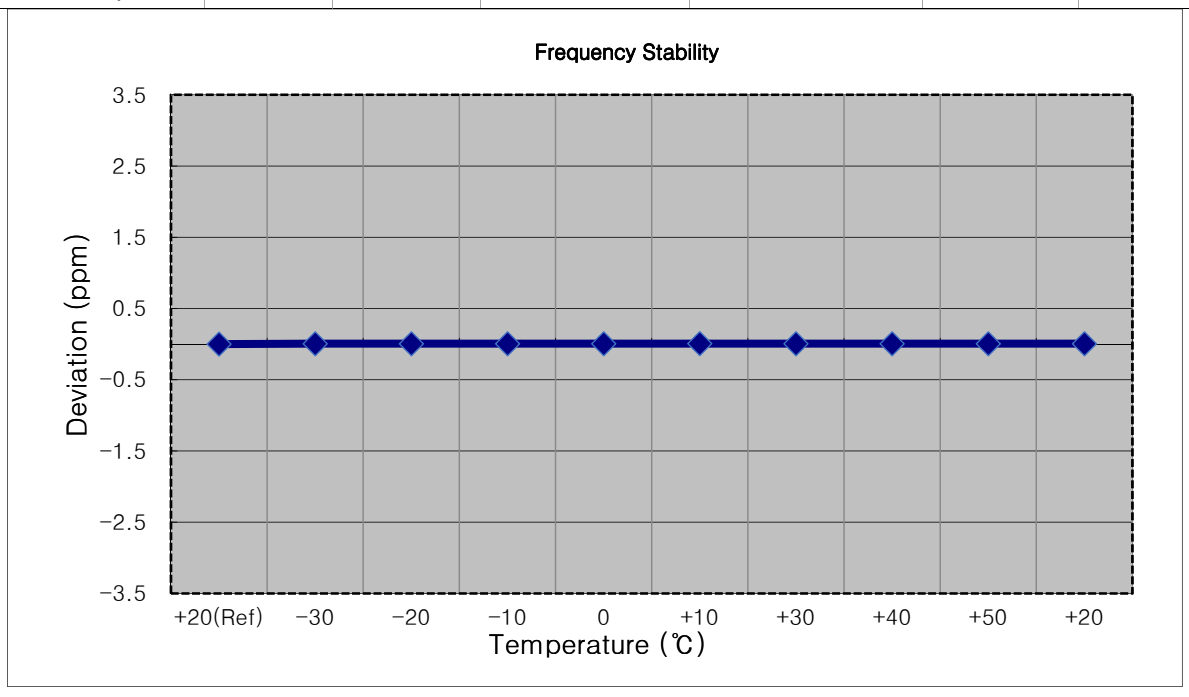
▣ OPERATING FREQUENCY: 3,695,000,000 Hz

▣ BANDWIDTH: 10 MHz

▣ REFERENCE VOLTAGE: 3.860 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	(Hz)	(%)	
100 %	3.860	+20(Ref)	3695 000 023	0.0	0.000 000	0.000
100 %		-30	3695 000 043	19.9	0.000 001	0.005
100 %		-20	3695 000 045	21.9	0.000 001	0.006
100 %		-10	3695 000 045	22.5	0.000 001	0.006
100 %		0	3695 000 042	19.4	0.000 001	0.005
100 %		+10	3695 000 048	24.9	0.000 001	0.007
100 %		+30	3695 000 041	18.3	0.000 000	0.005
100 %		+40	3695 000 039	16.8	0.000 000	0.005
100 %		+50	3695 000 042	19.4	0.000 001	0.005
Batt. Endpoint	3.400	+20	3695 000 043	20.3	0.000 001	0.005



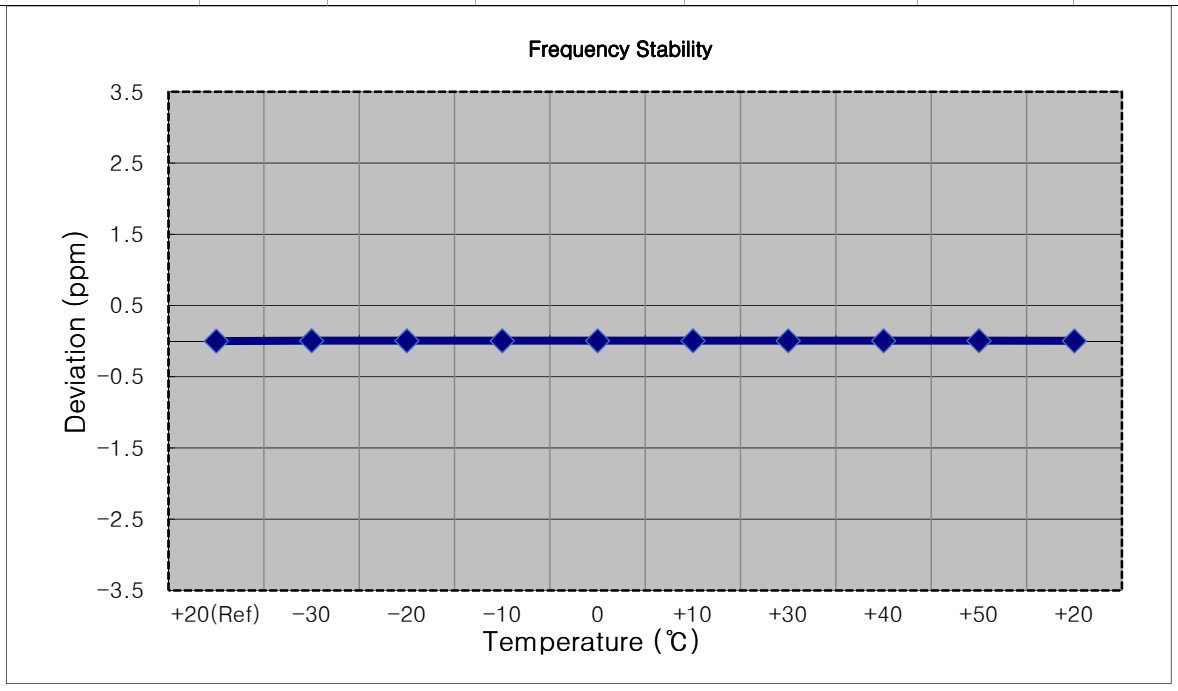
▣ OPERATING FREQUENCY: 3,692,500,000 Hz

▣ BANDWIDTH: 15 MHz

▣ REFERENCE VOLTAGE: 3.860 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	(Hz)	(%)	
100 %	3.860	+20(Ref)	3692 500 020	0.0	0.000 000	0.000
100 %		-30	3692 500 041	21.1	0.000 001	0.006
100 %		-20	3692 500 040	20.3	0.000 001	0.005
100 %		-10	3692 500 041	21.4	0.000 001	0.006
100 %		0	3692 500 036	16.7	0.000 000	0.005
100 %		+10	3692 500 044	24.3	0.000 001	0.007
100 %		+30	3692 500 042	22.0	0.000 001	0.006
100 %		+40	3692 500 042	22.1	0.000 001	0.006
100 %		+50	3692 500 042	22.0	0.000 001	0.006
Batt. Endpoint	3.400	+20	3692 500 033	13.8	0.000 000	0.004



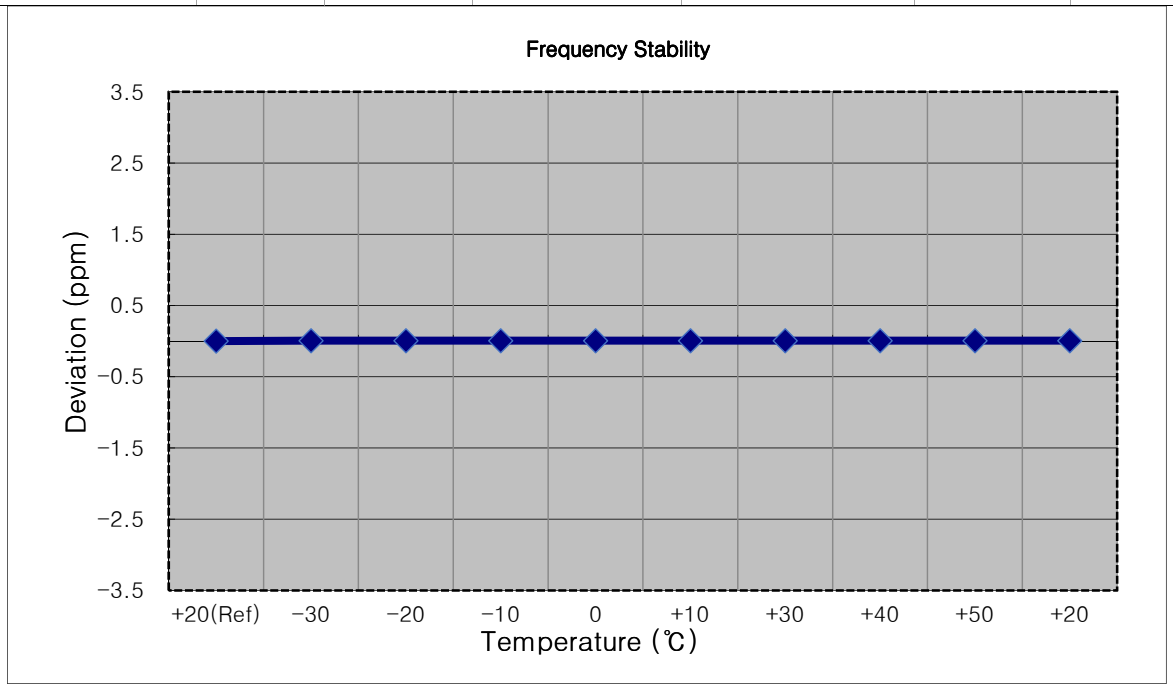
▣ OPERATING FREQUENCY: 3,690,000,000 Hz

▣ BANDWIDTH: 20 MHz

▣ REFERENCE VOLTAGE: 3.860 VDC

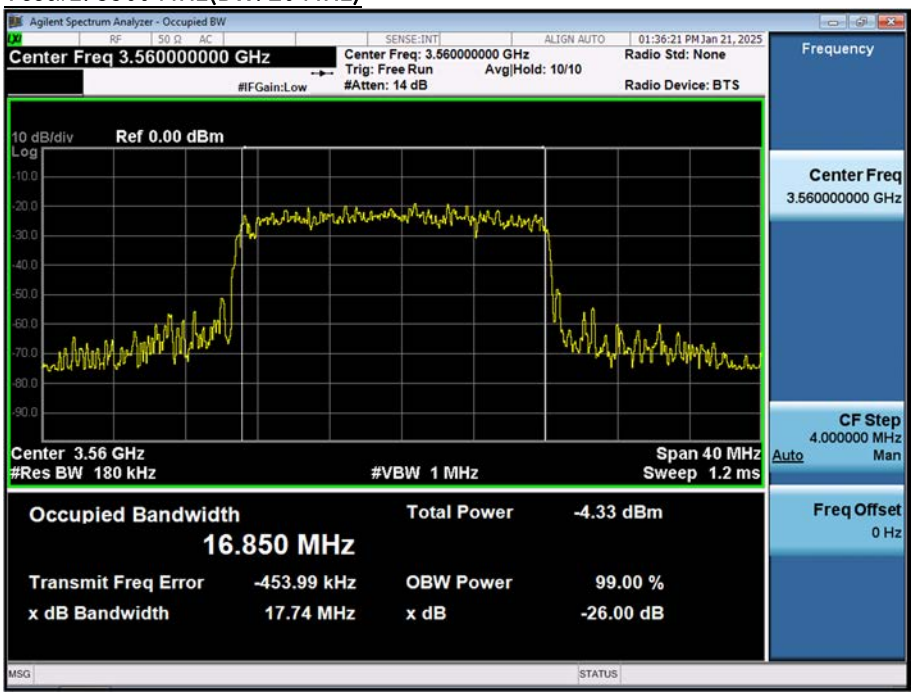
▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	(Hz)	(%)	
100 %	3.860	+20(Ref)	3690 000 020	0.0	0.000 000	0.000
100 %		-30	3690 000 039	19.3	0.000 001	0.005
100 %		-20	3690 000 043	22.6	0.000 001	0.006
100 %		-10	3690 000 041	21.0	0.000 001	0.006
100 %		0	3690 000 043	22.6	0.000 001	0.006
100 %		+10	3690 000 038	17.5	0.000 000	0.005
100 %		+30	3690 000 039	19.0	0.000 001	0.005
100 %		+40	3690 000 039	18.6	0.000 001	0.005
100 %		+50	3690 000 041	20.8	0.000 001	0.006
Batt. Endpoint	3.400	+20	3690 000 038	18.3	0.000 000	0.005



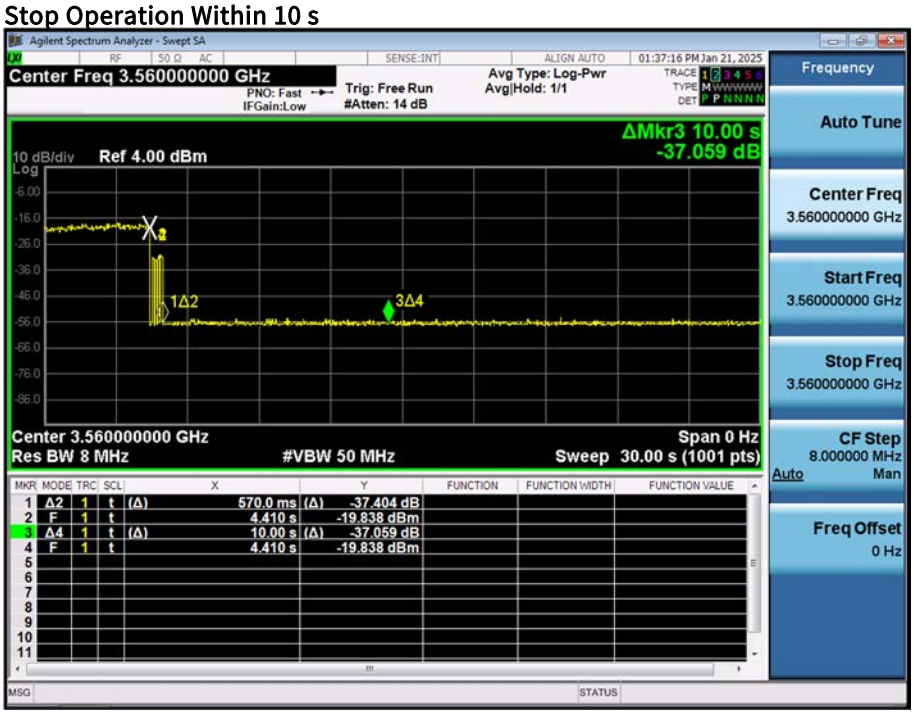
8.9 End User Device Additional Requirements (CBSD Protocol)

Test#1: 3560 MHz(BW: 20 MHz)



Operation Mode

Stop Operation Within 10 s



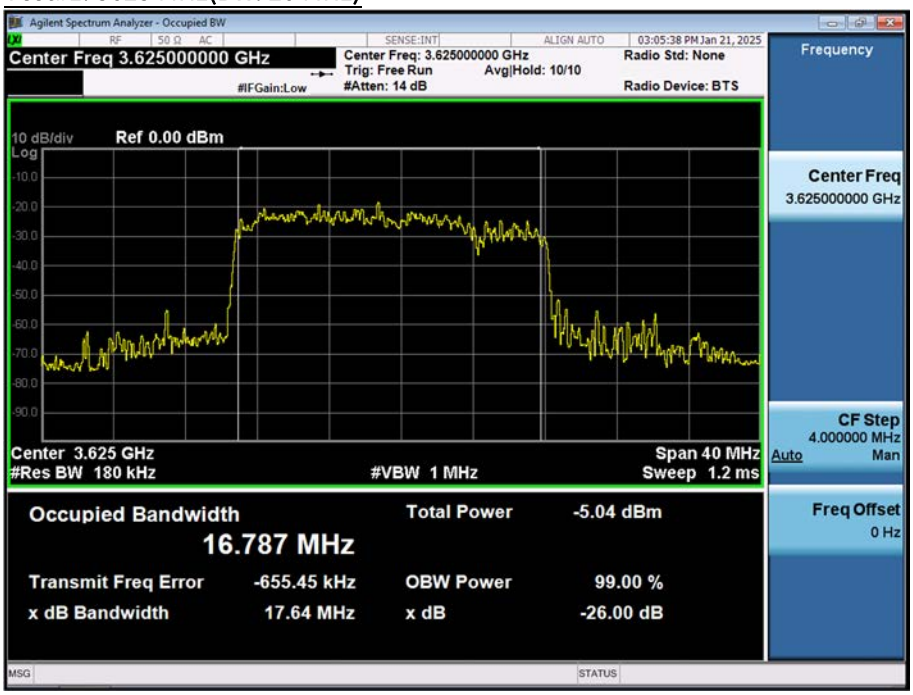
Note:

Marker 2: CBSD sends instructions to discontinue LTE operations.

Marker 1△2: EUT discontinues operation. (4.410 s)

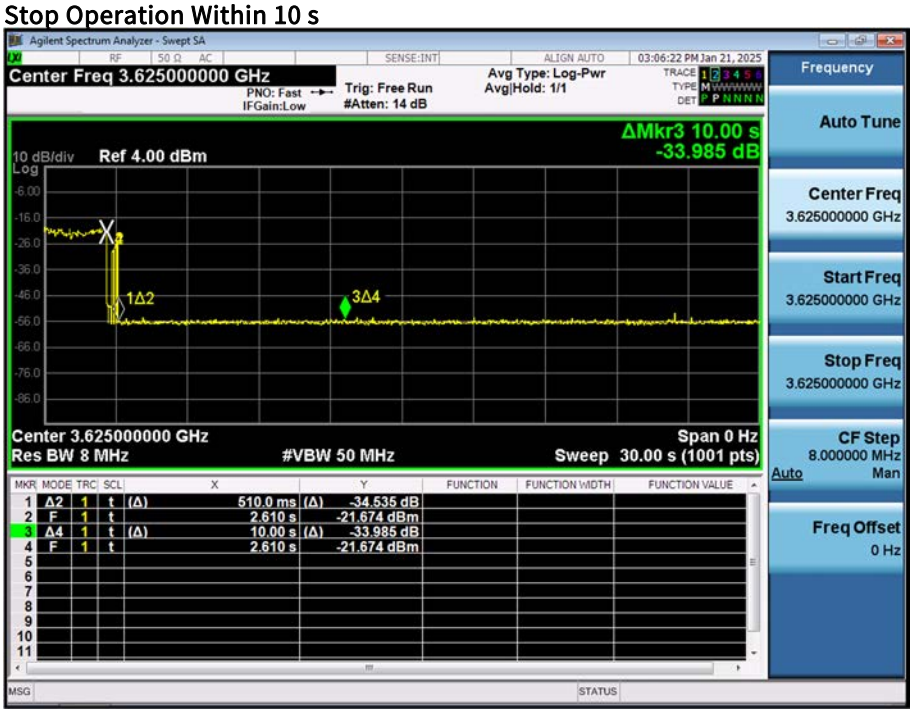
Marker 3△4: 10 seconds elapsed time from CBSD sending instructions to EUT.(10.0 s)

Test#1: 3625 MHz(BW: 20 MHz)



Operation Mode

Stop Operation Within 10 s



Note:

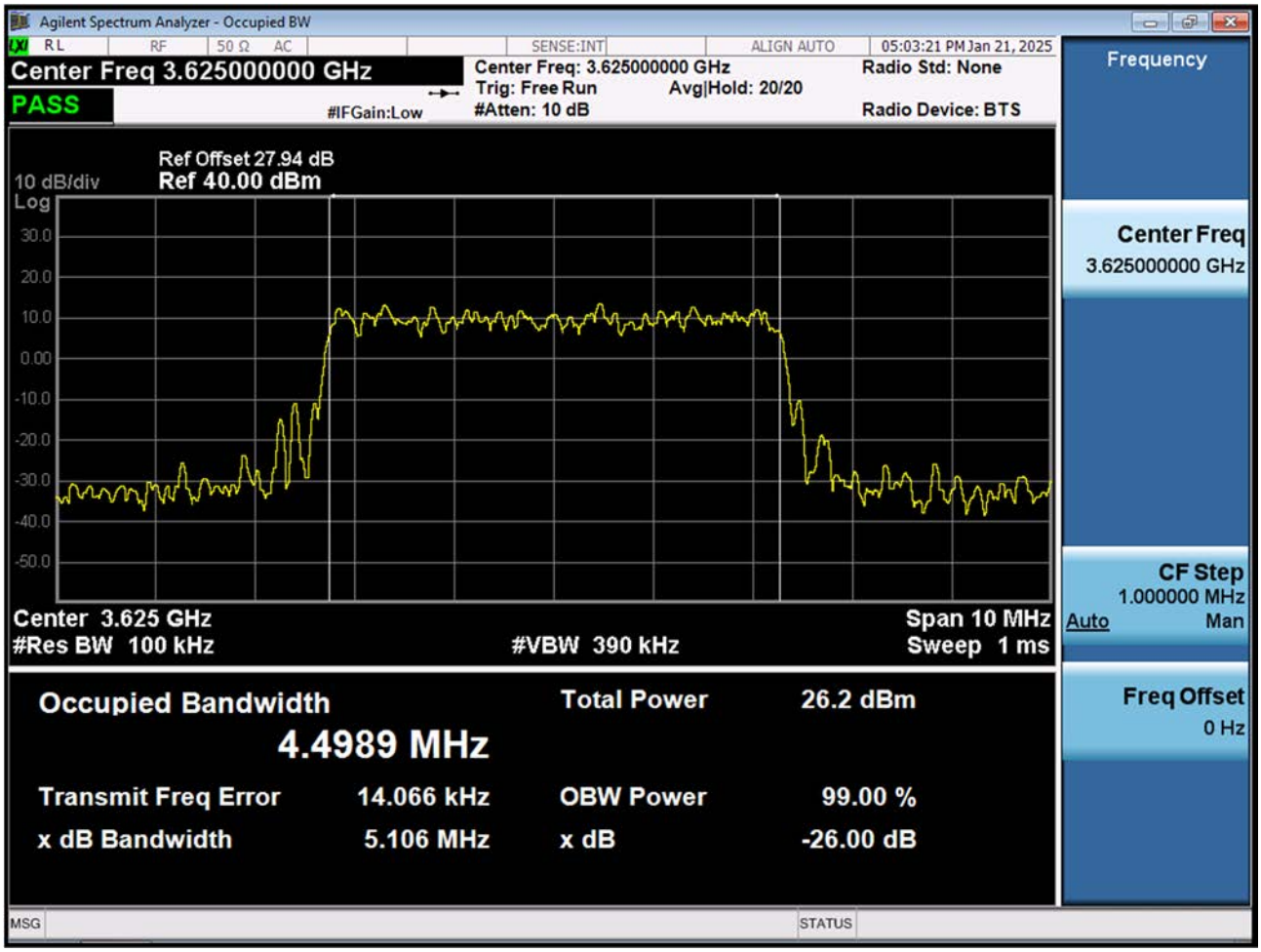
Marker 2: CBSD sends instructions to discontinue LTE operations.

Marker 1△2: EUT discontinues operation. (2.610 s)

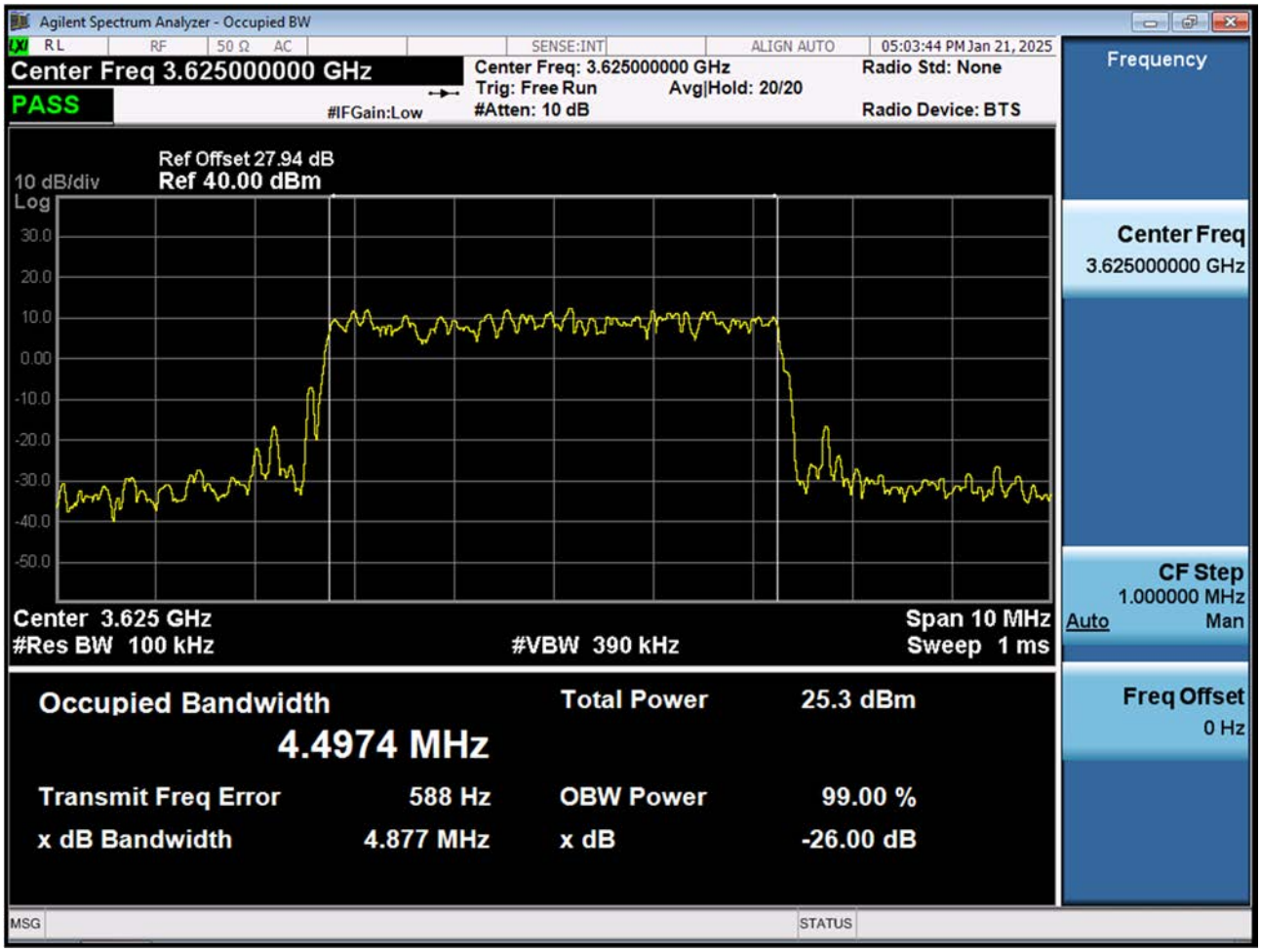
Marker 3△4: 10 seconds elapsed time from CBSD sending instructions to EUT.(10.0 s)

9. TEST PLOTS

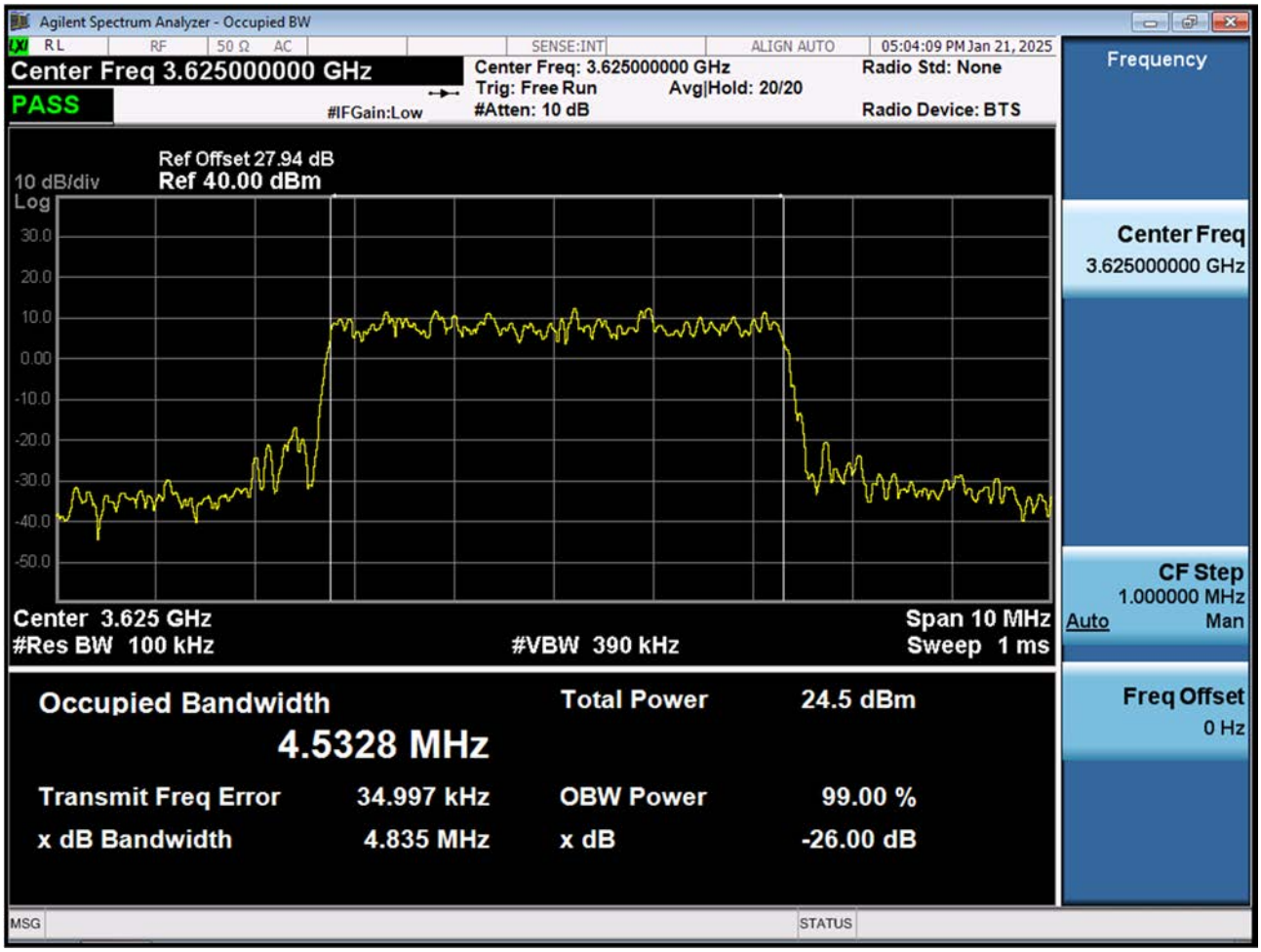
BAND 48. Occupied Bandwidth Plot (5 MHz Ch.55990 QPSK RB 25)



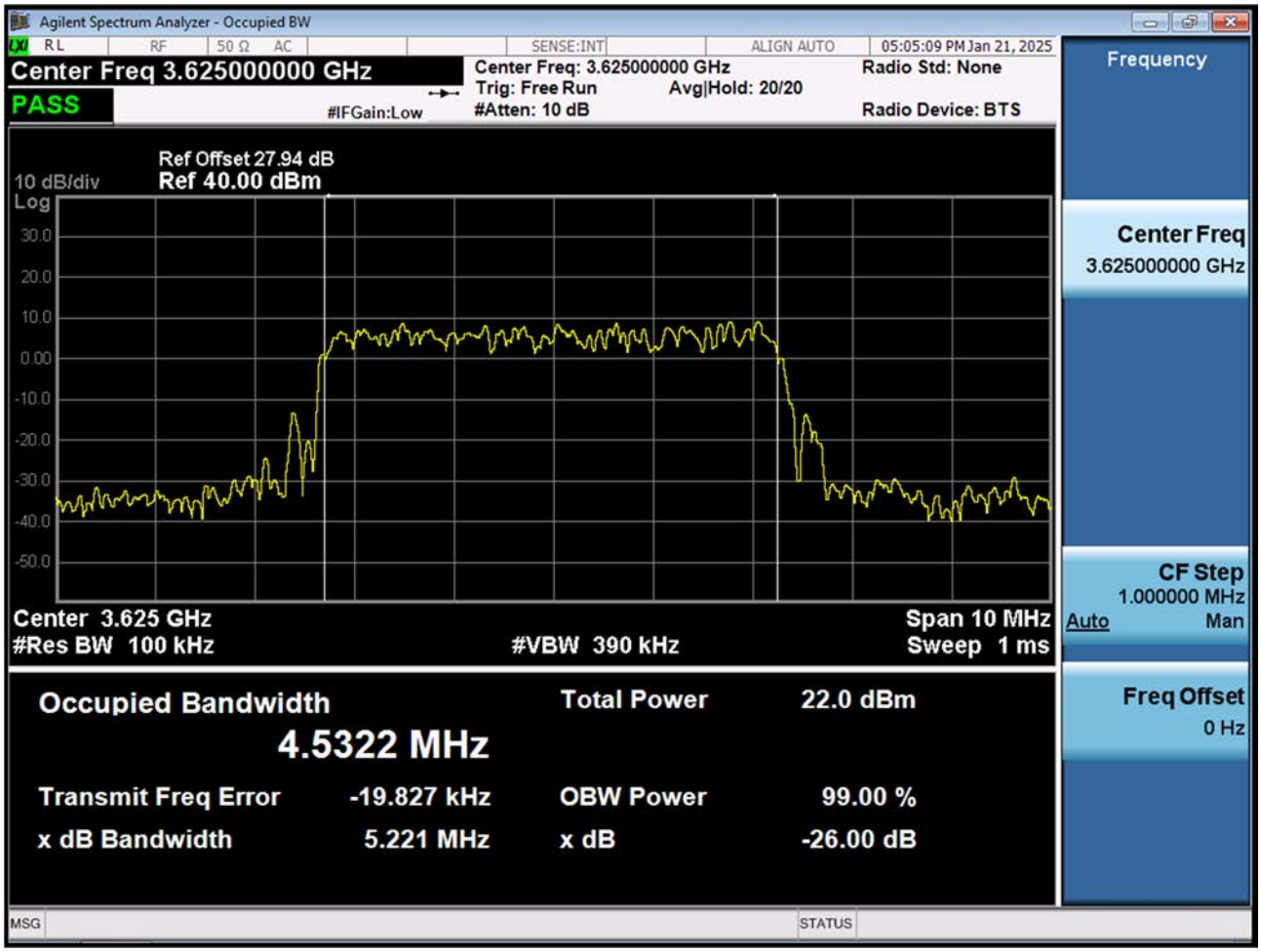
BAND 48. Occupied Bandwidth Plot (5 MHz Ch.55990 16-QAM RB 25)



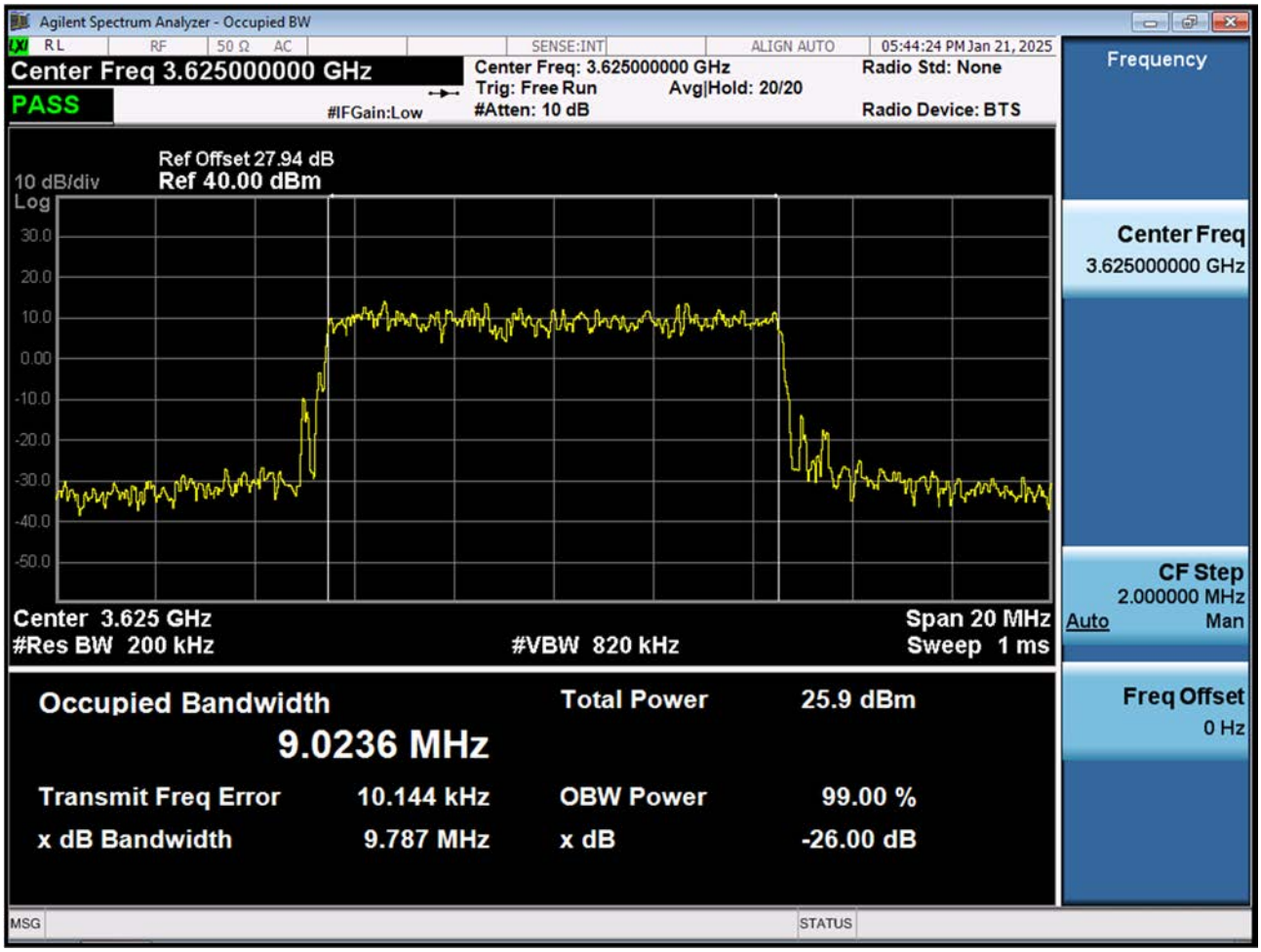
BAND 48. Occupied Bandwidth Plot (5 MHz Ch.55990 64-QAM RB 25)



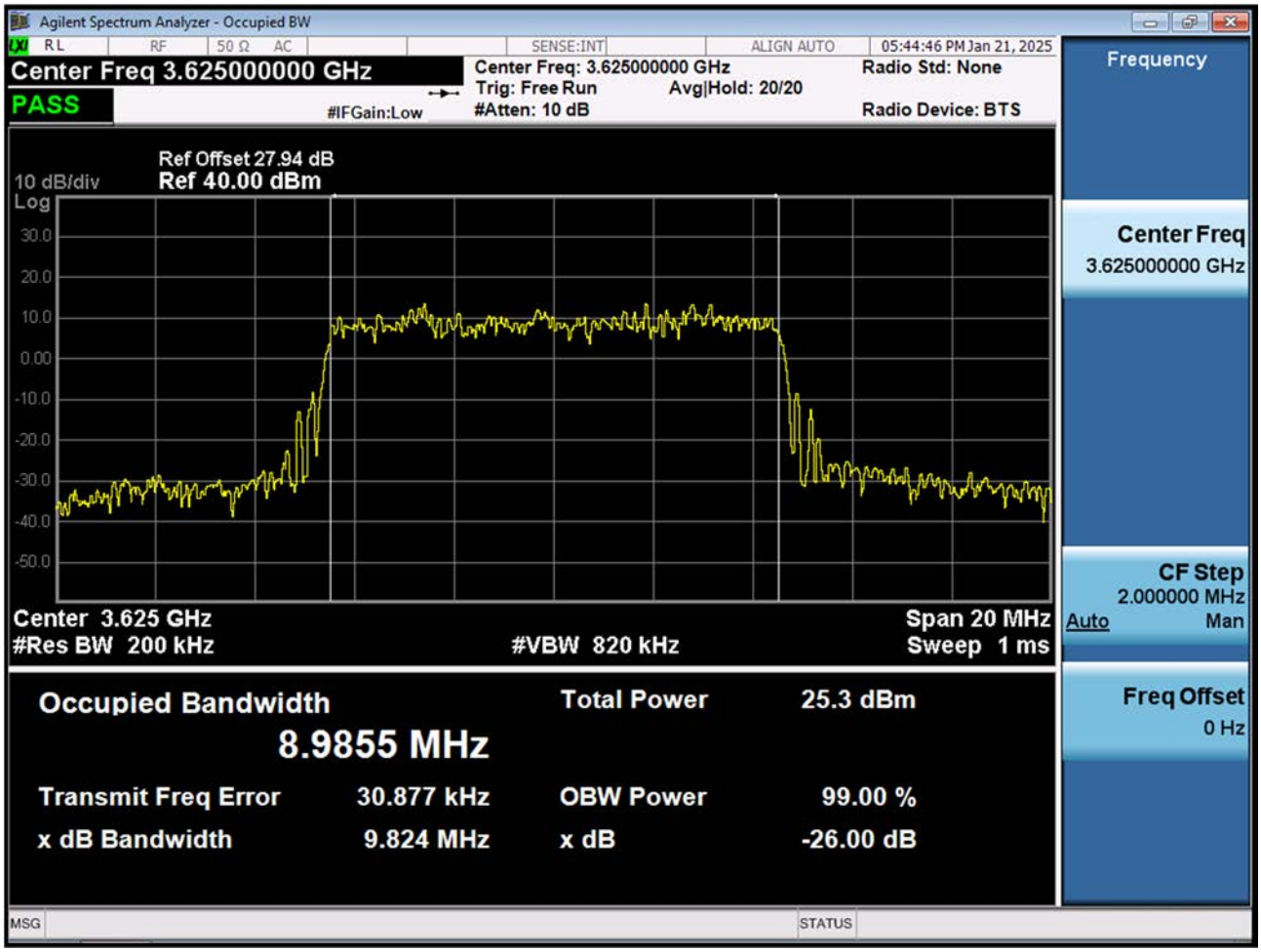
BAND 48. Occupied Bandwidth Plot (5 MHz Ch.55990 256-QAM RB 25)



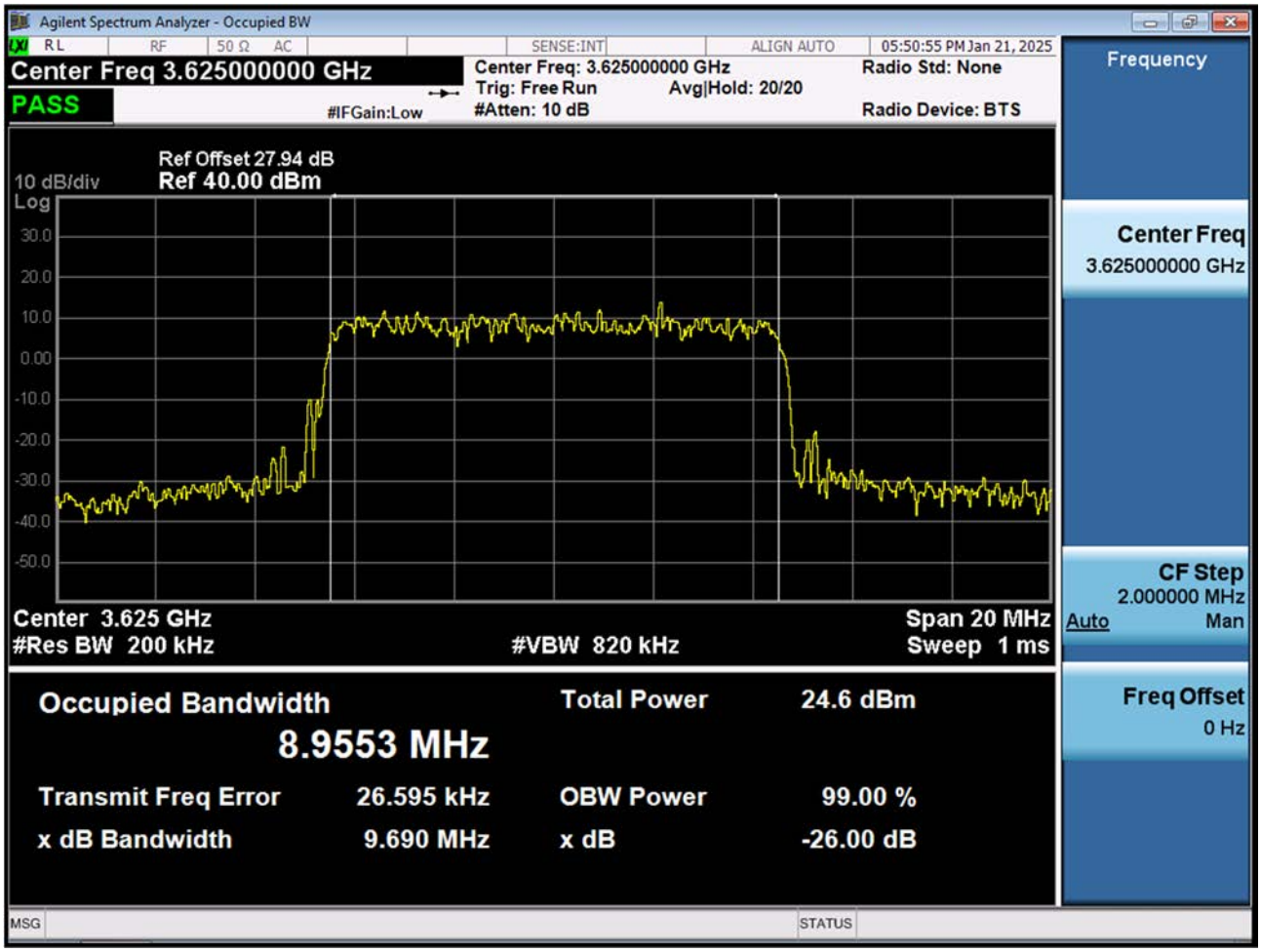
BAND 48. Occupied Bandwidth Plot (10 MHz Ch.55990 QPSK RB 50)



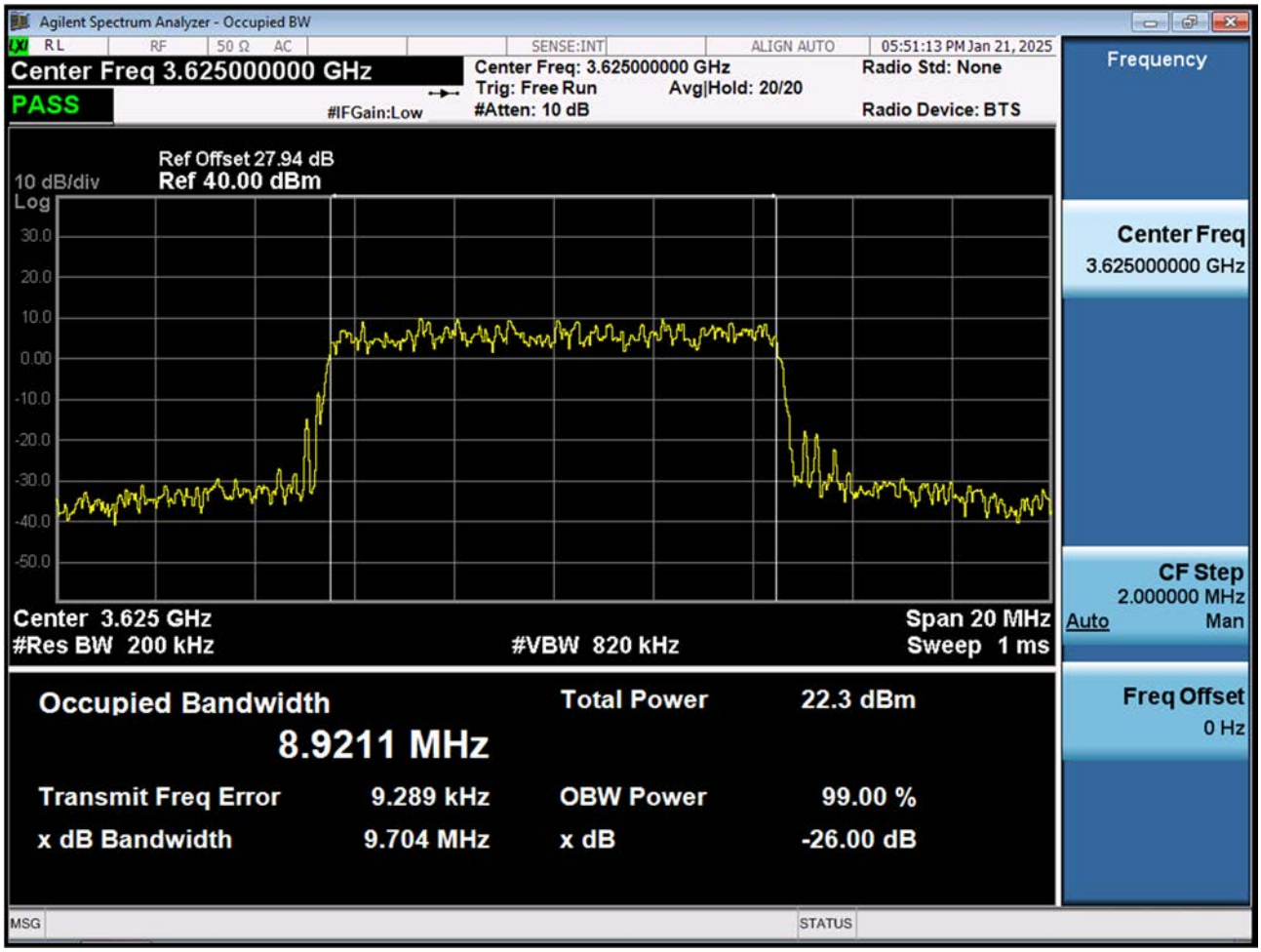
BAND 48. Occupied Bandwidth Plot (10 MHz Ch.55990 16-QAM RB 50)



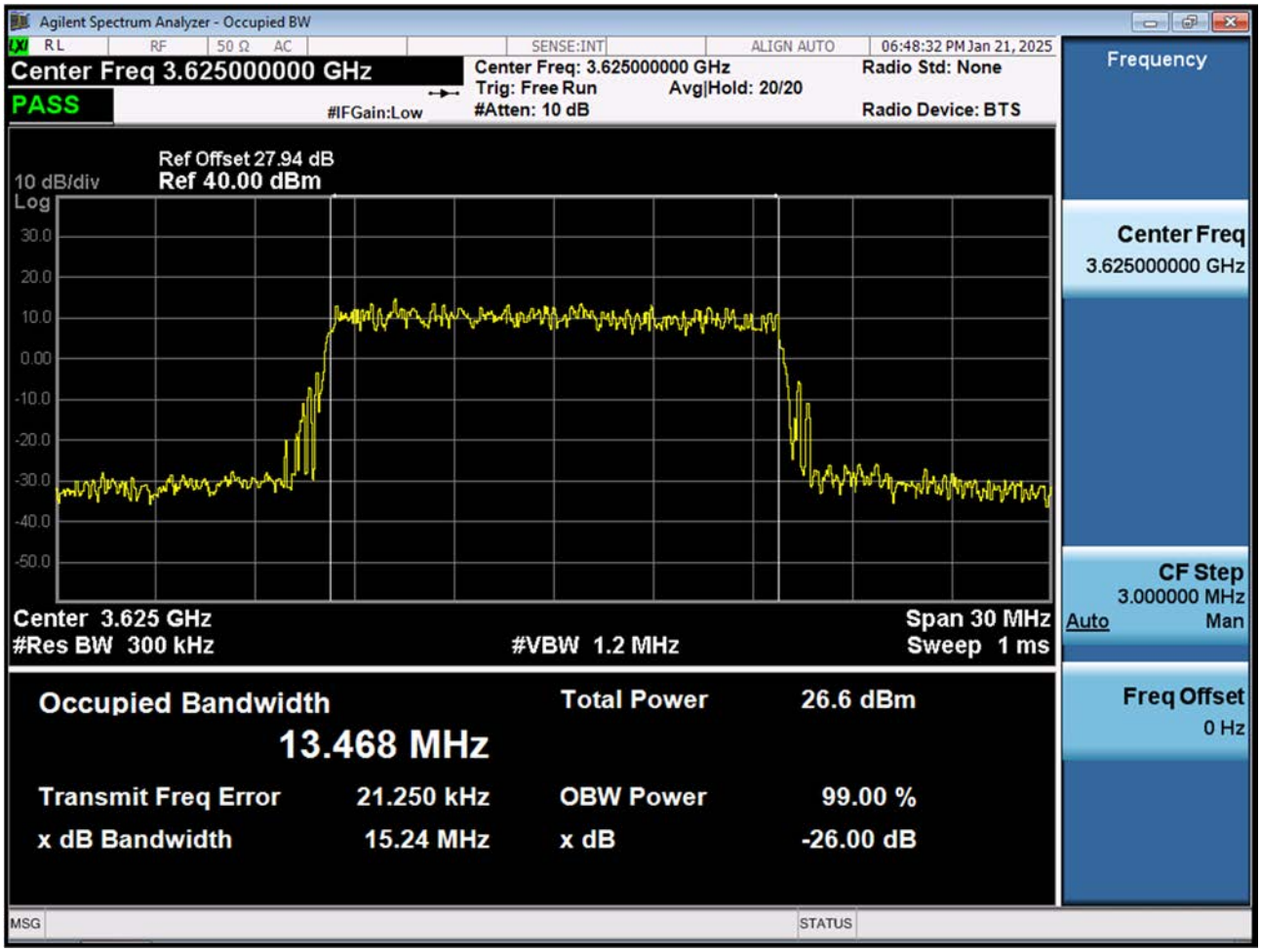
BAND 48. Occupied Bandwidth Plot (10 MHz Ch.55990 64-QAM RB 50)



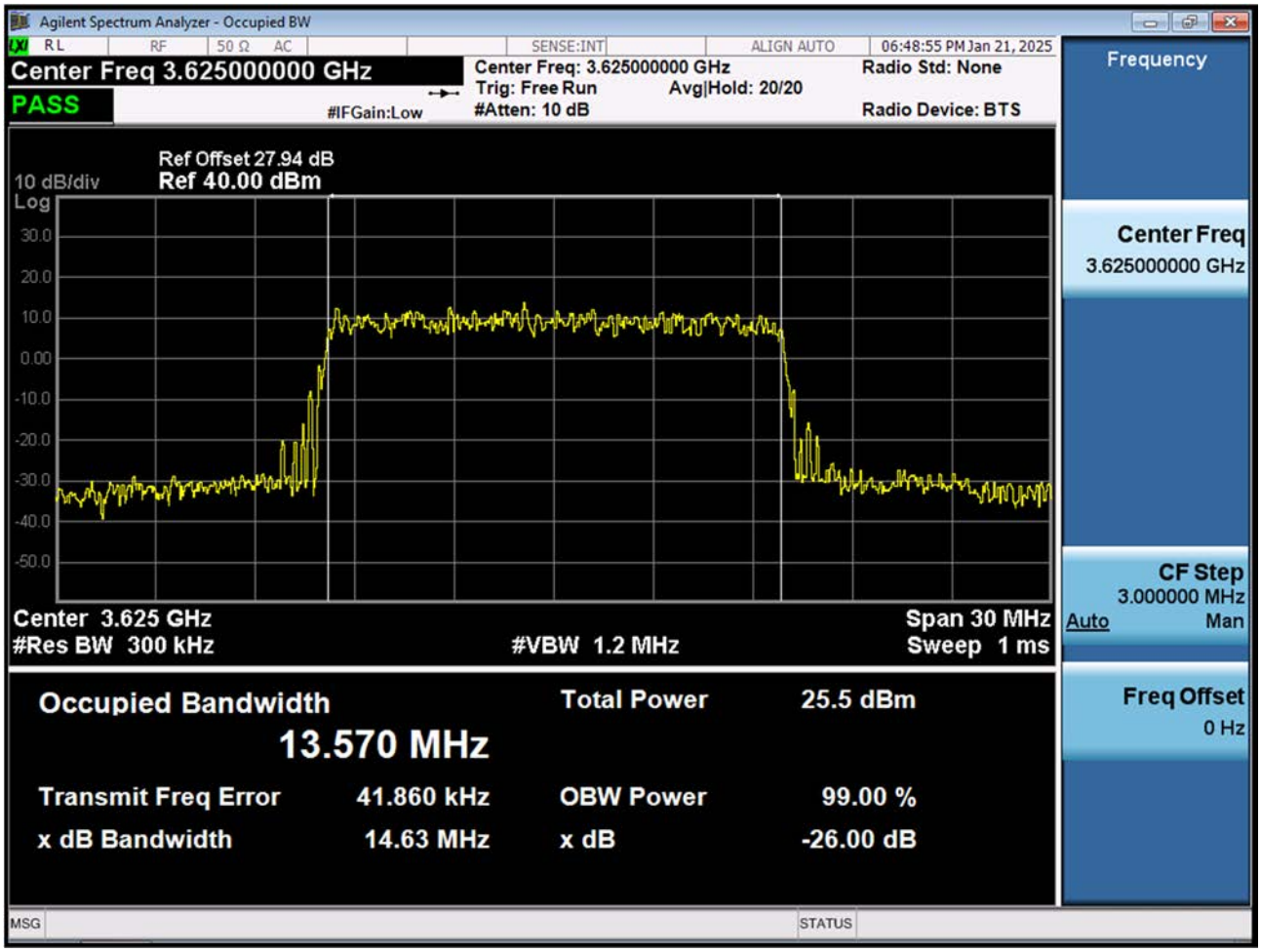
BAND 48. Occupied Bandwidth Plot (10 MHz Ch.55990 256-QAM RB 50)



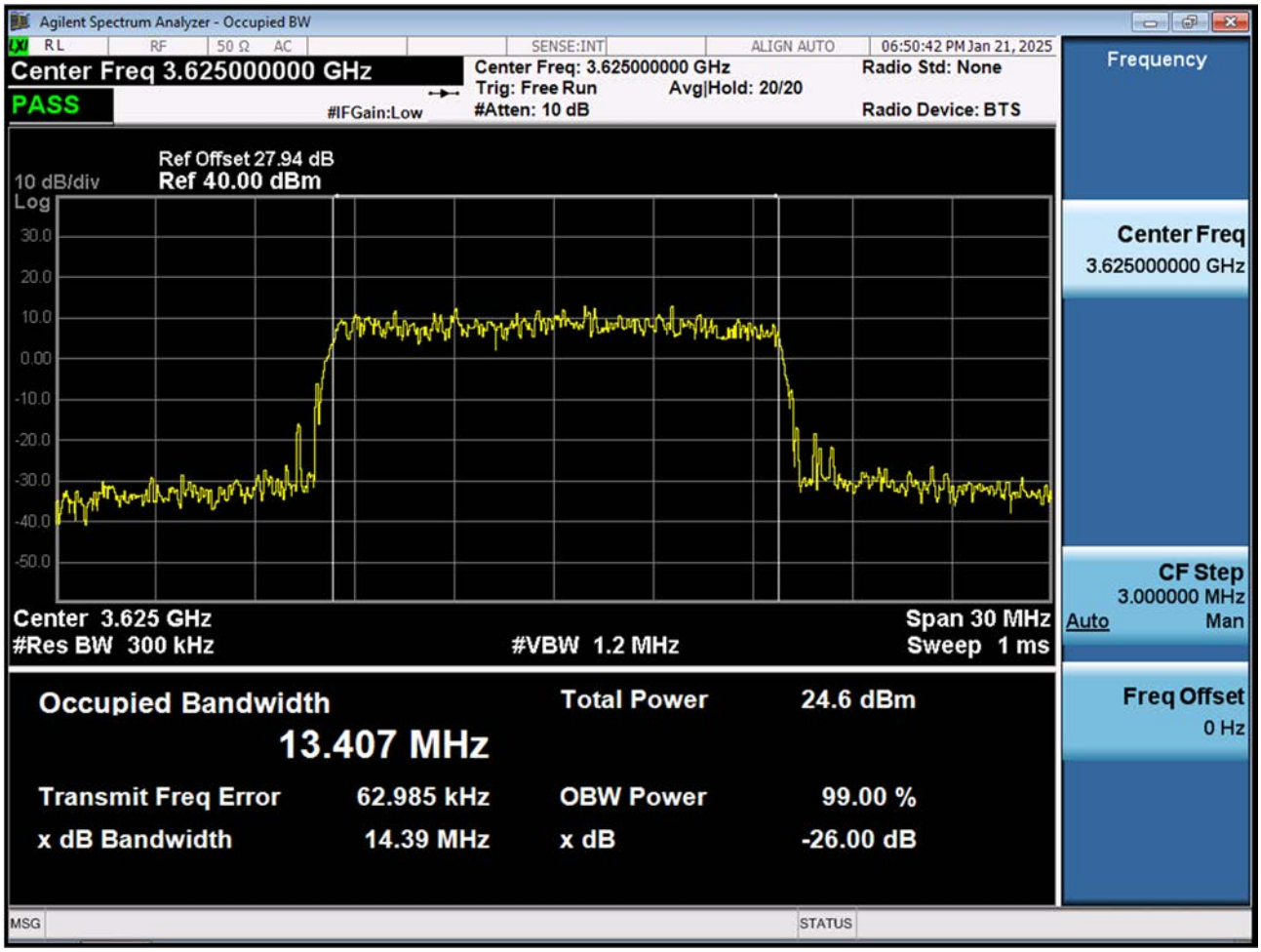
BAND 48. Occupied Bandwidth Plot (15 MHz Ch.55990 QPSK RB 75)



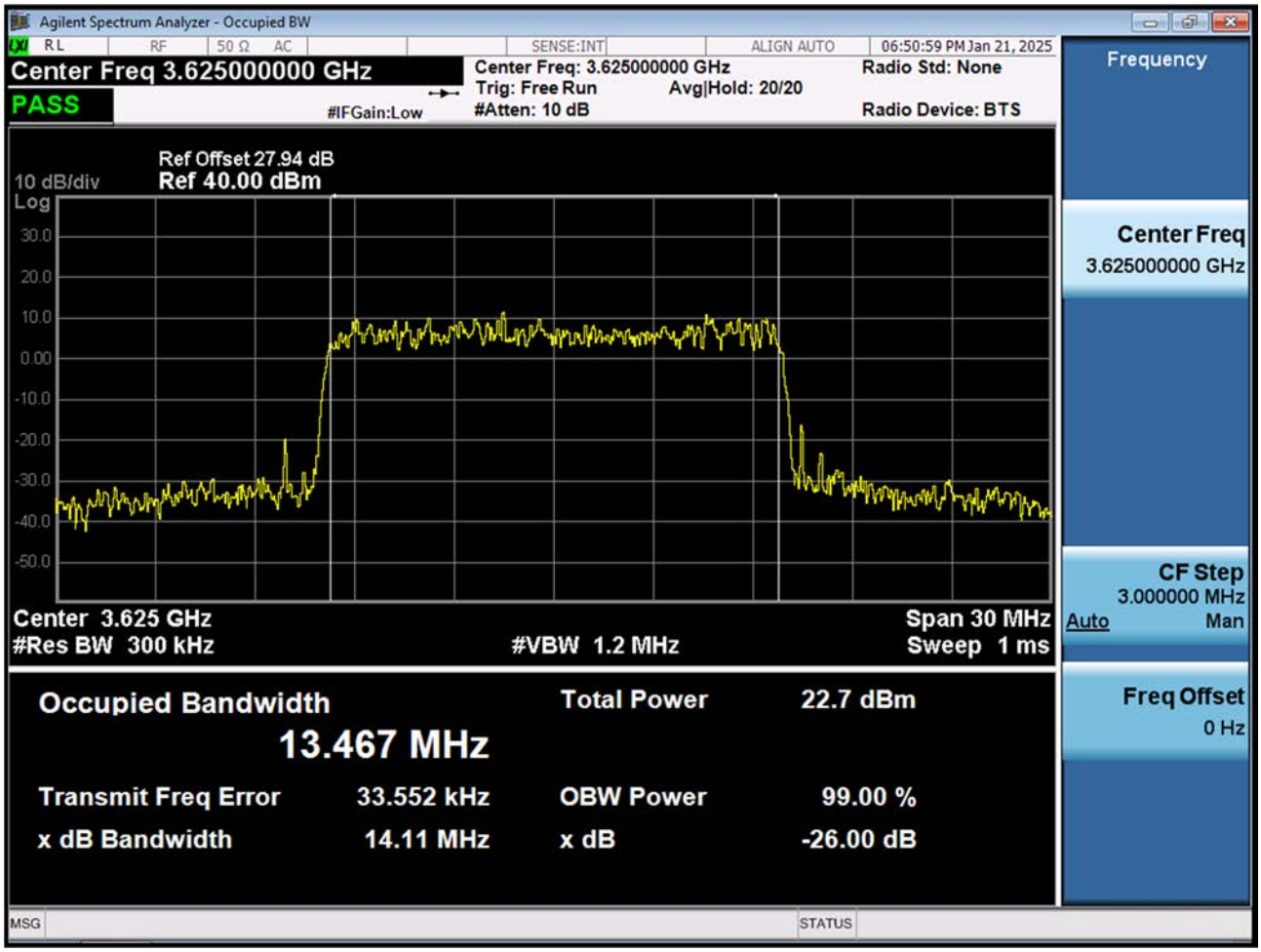
BAND 48. Occupied Bandwidth Plot (15 MHz Ch.55990 16-QAM RB 75)



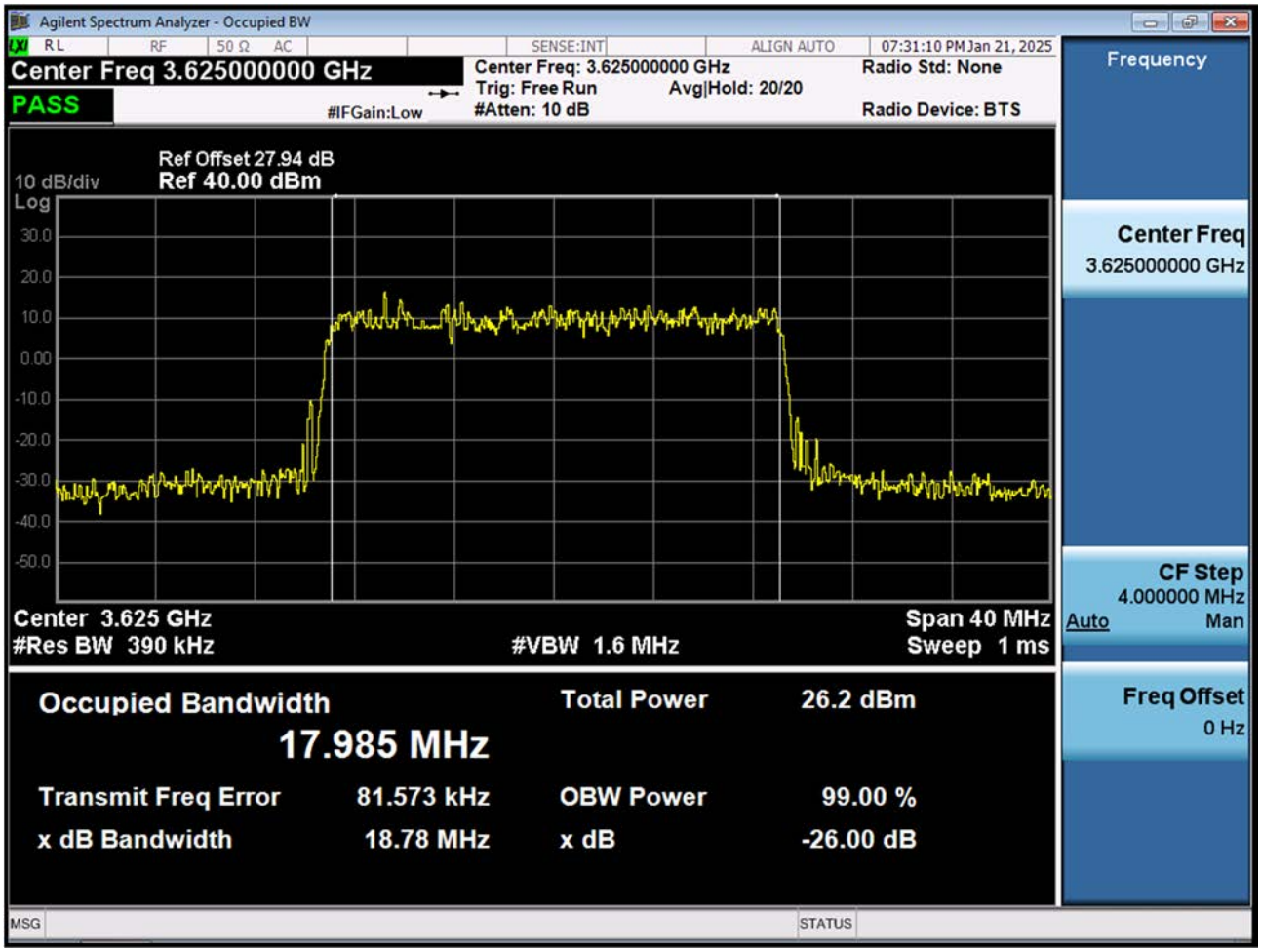
BAND 48. Occupied Bandwidth Plot (15 MHz Ch.55990 64-QAM RB 75)



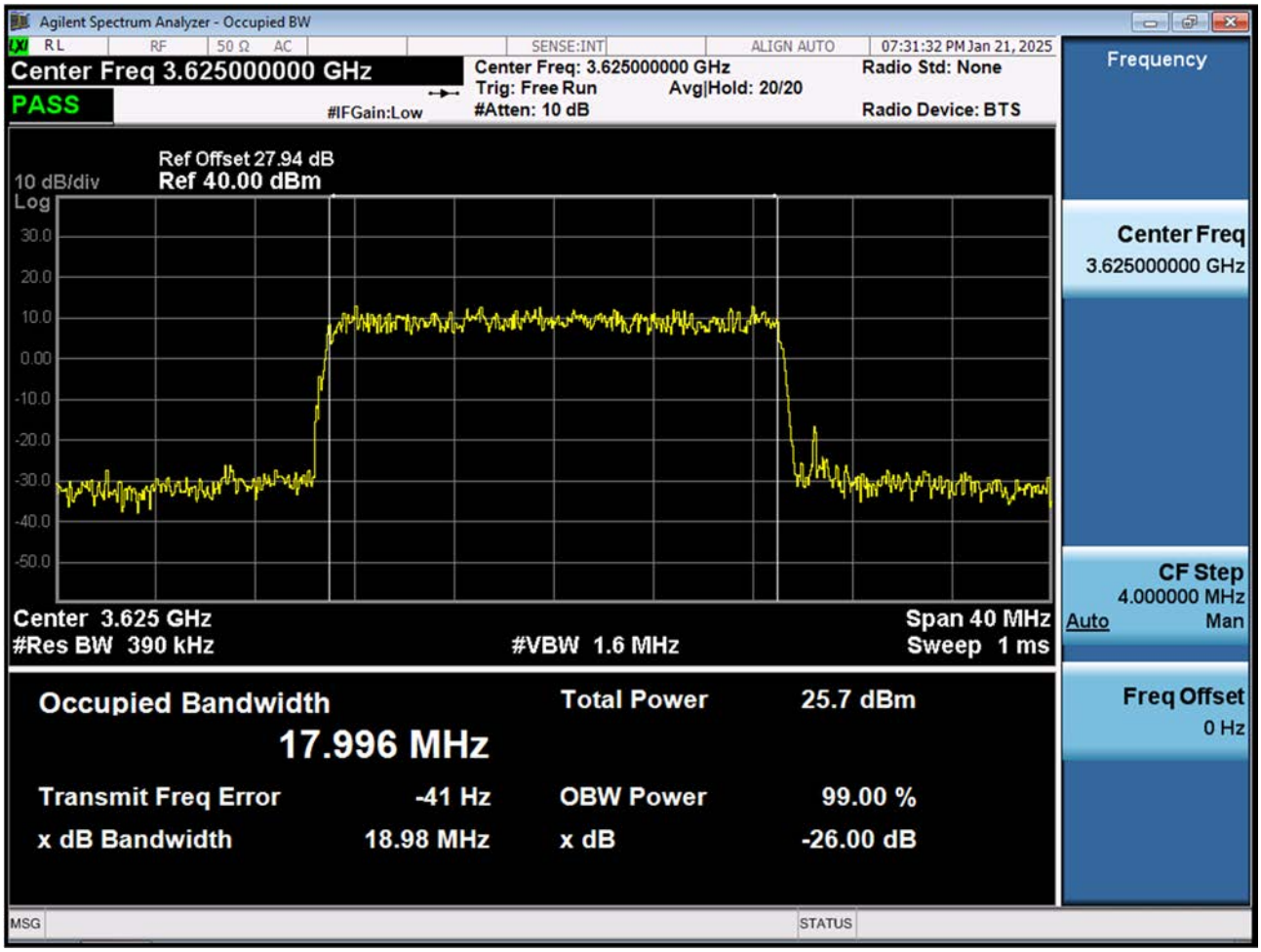
BAND 48. Occupied Bandwidth Plot (15 MHz Ch.55990 256-QAM RB 75)



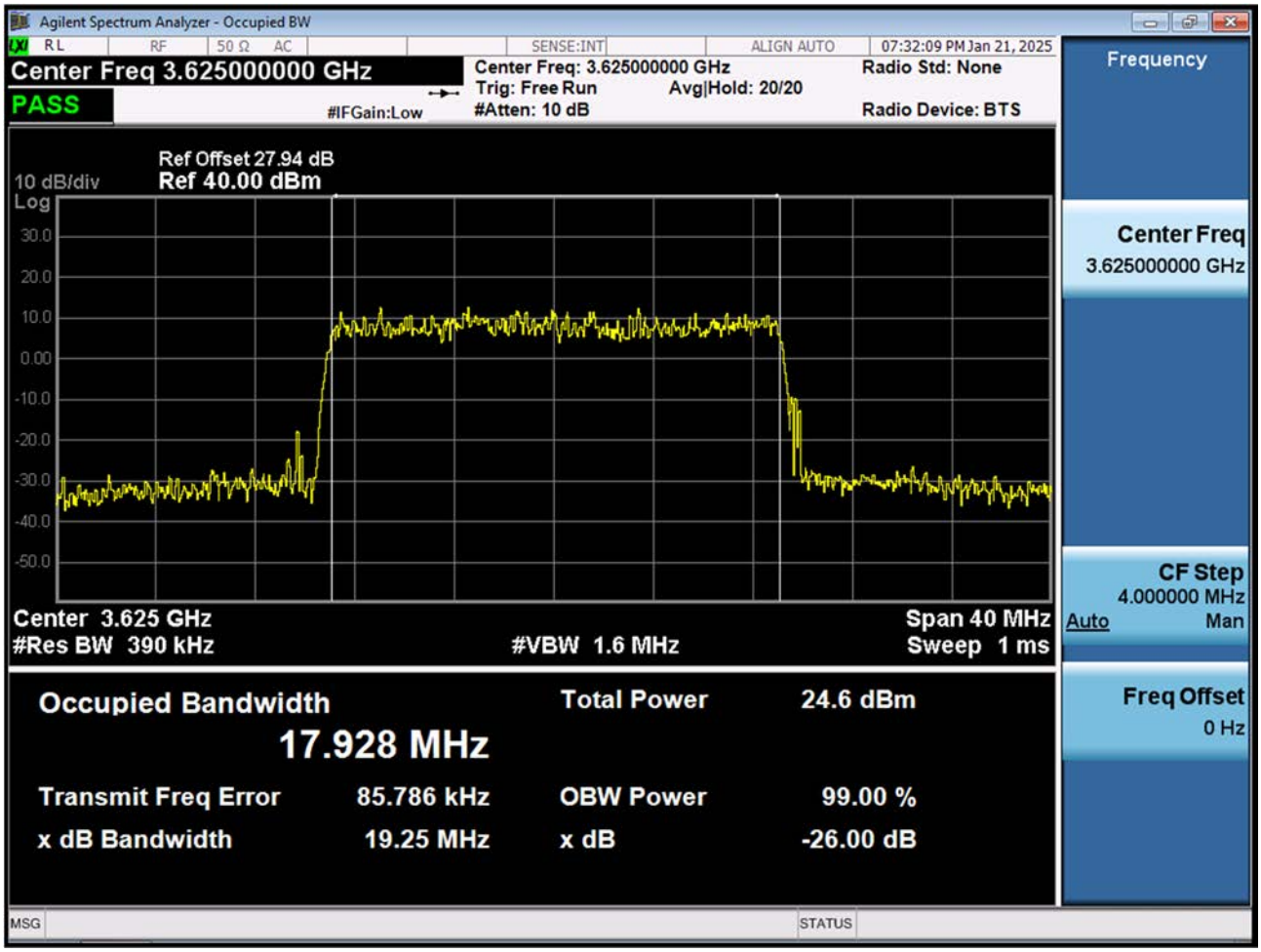
BAND 48. Occupied Bandwidth Plot (20 MHz Ch.55990 QPSK RB 100)



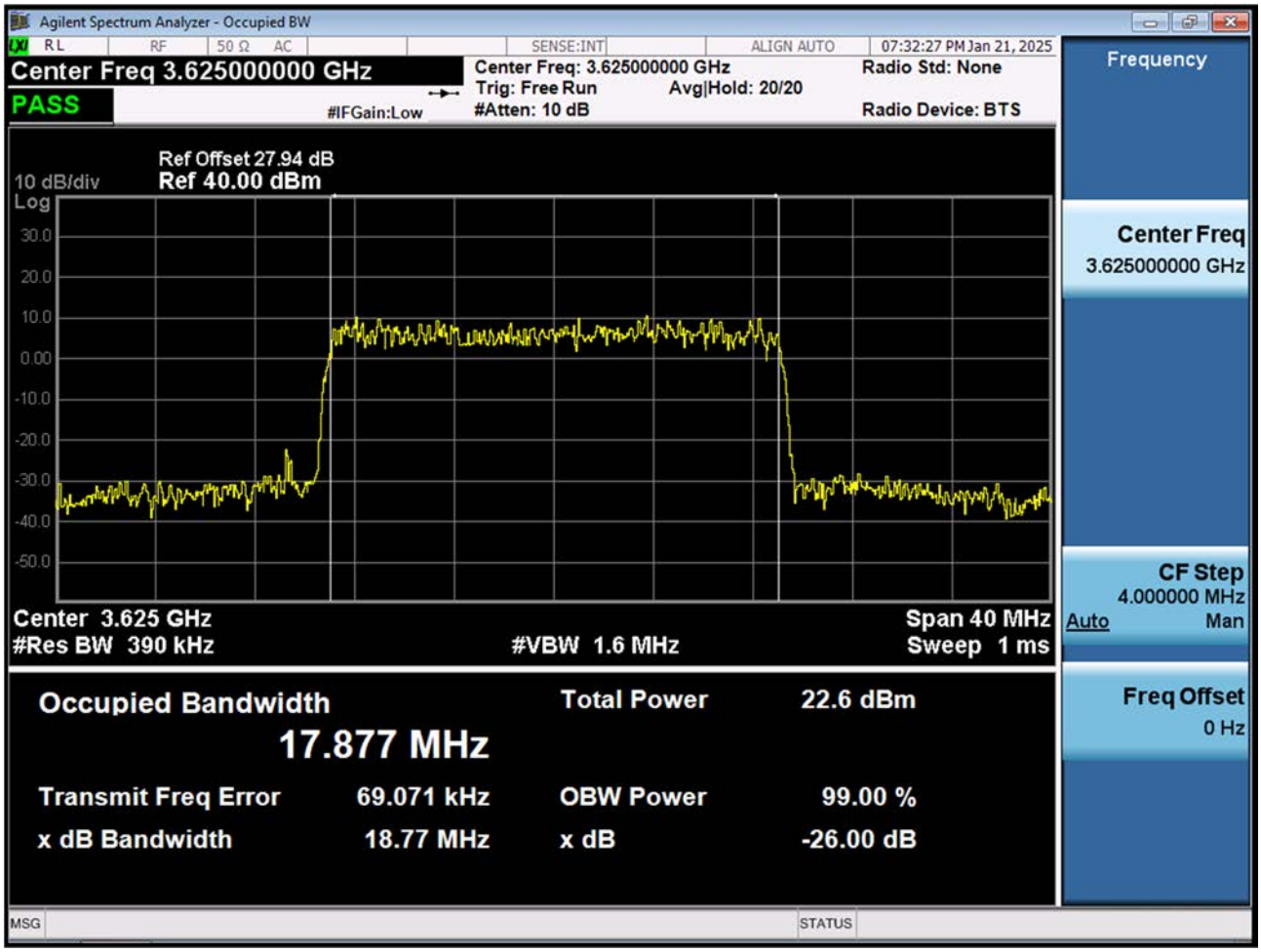
BAND 48. Occupied Bandwidth Plot (20 MHz Ch.55990 16-QAM RB 100)



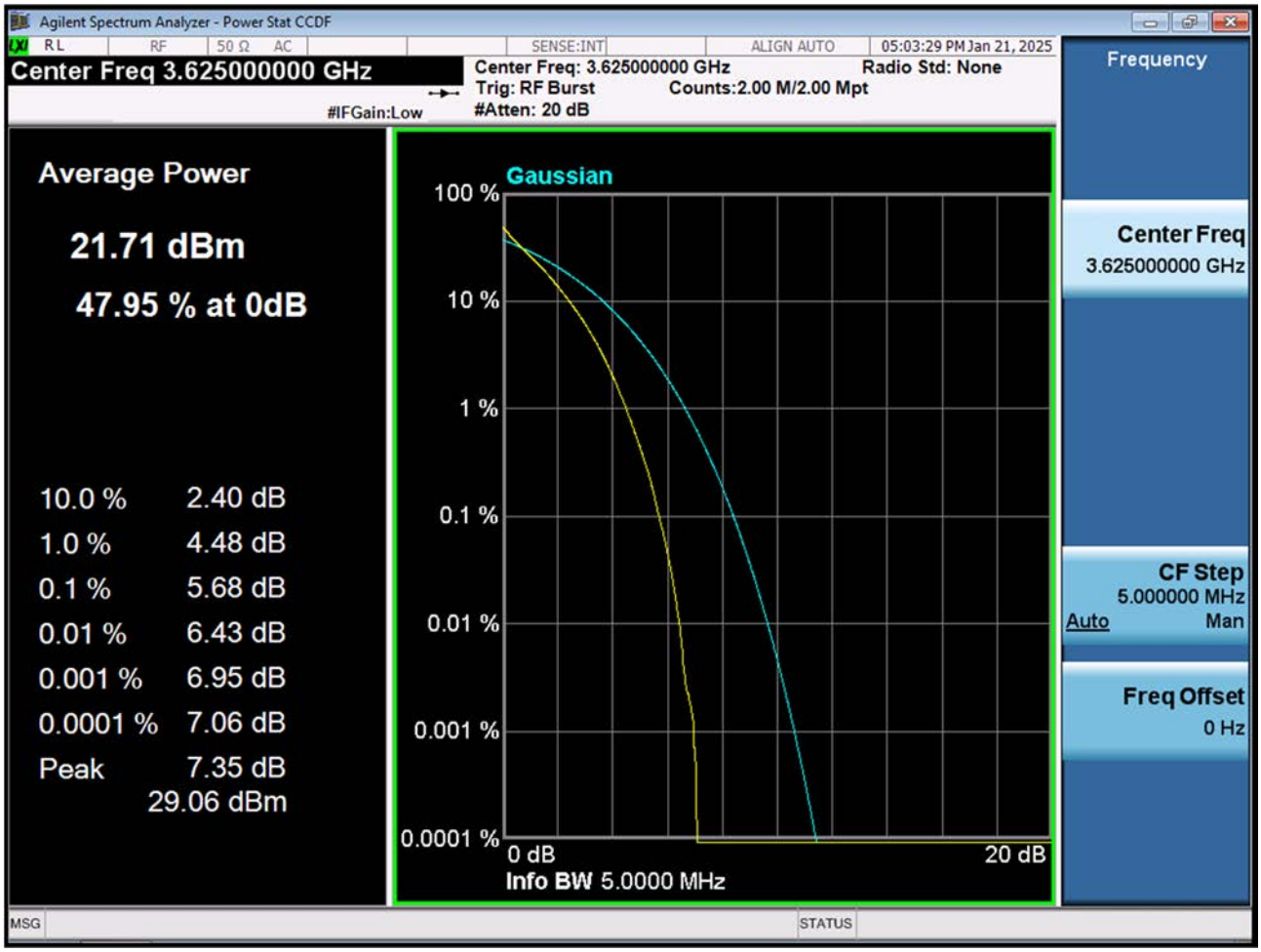
BAND 48. Occupied Bandwidth Plot (20 MHz Ch.55990 64-QAM RB 100)



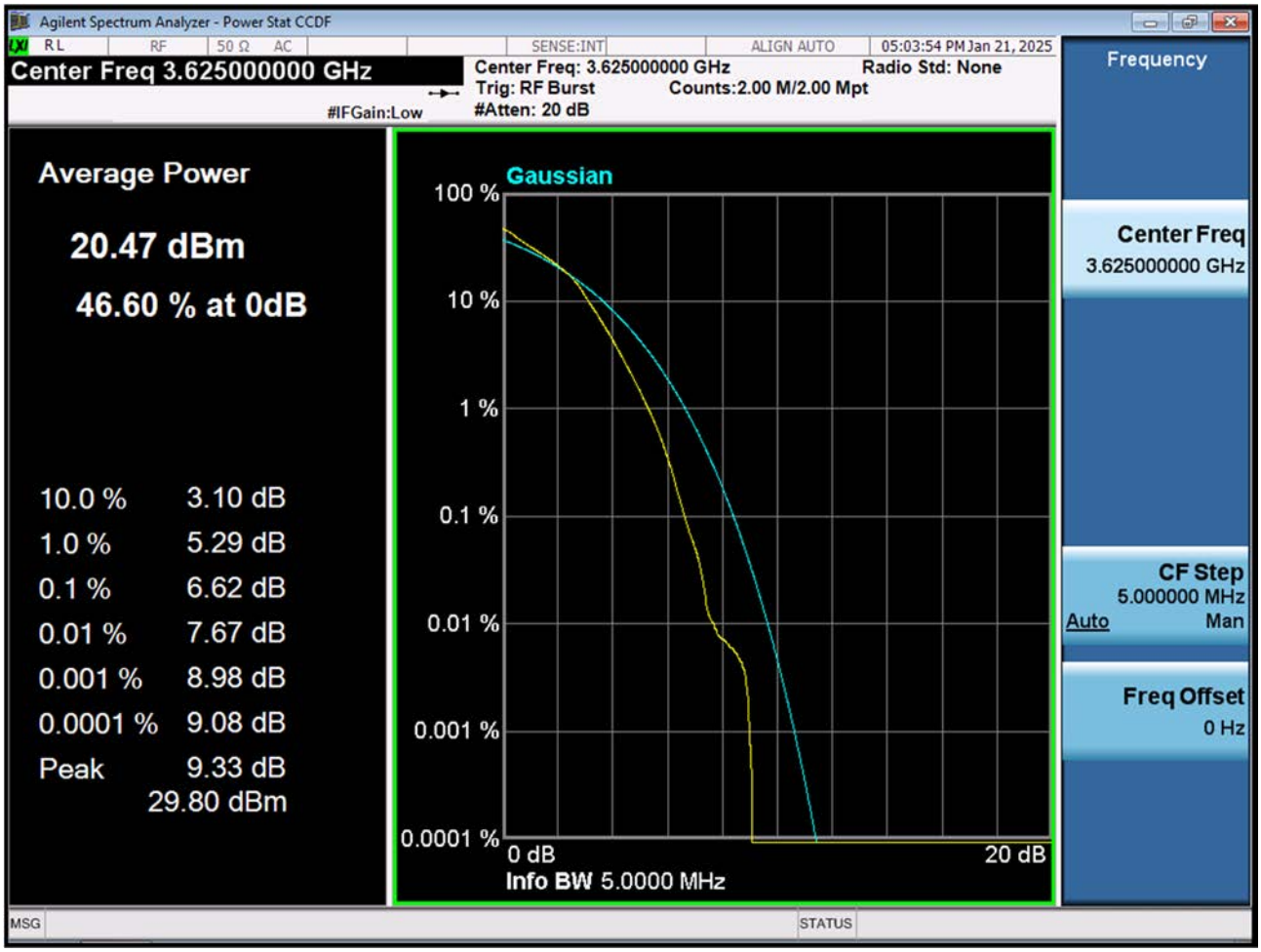
BAND 48. Occupied Bandwidth Plot (20 MHz Ch.55990 256-QAM RB 100)



BAND 48. PAR Plot (5 M BW_Ch.55990_QPSK_RB25_0)

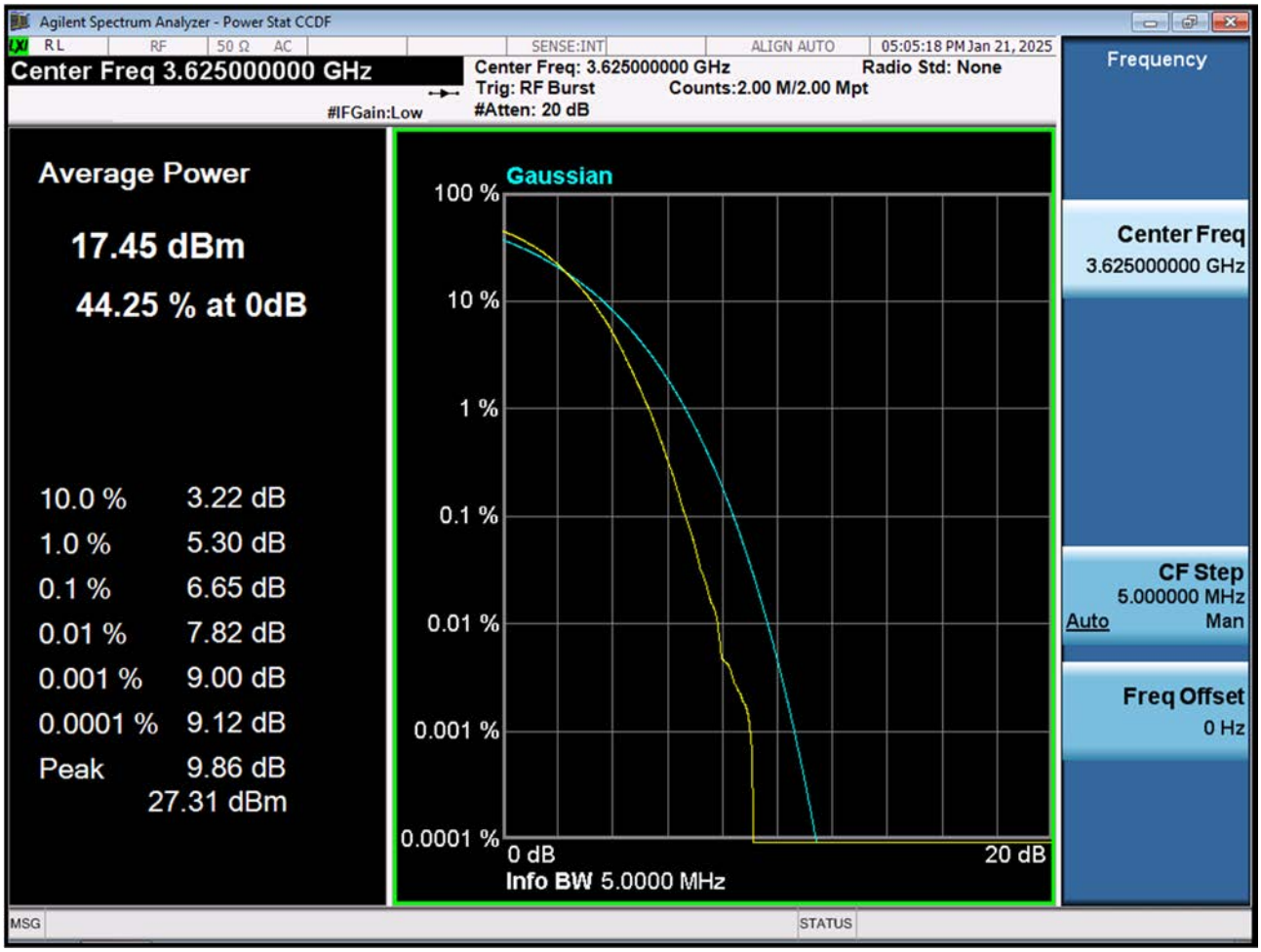


BAND 48. PAR Plot (5 M BW_Ch.55990_16QAM_RB25_0)

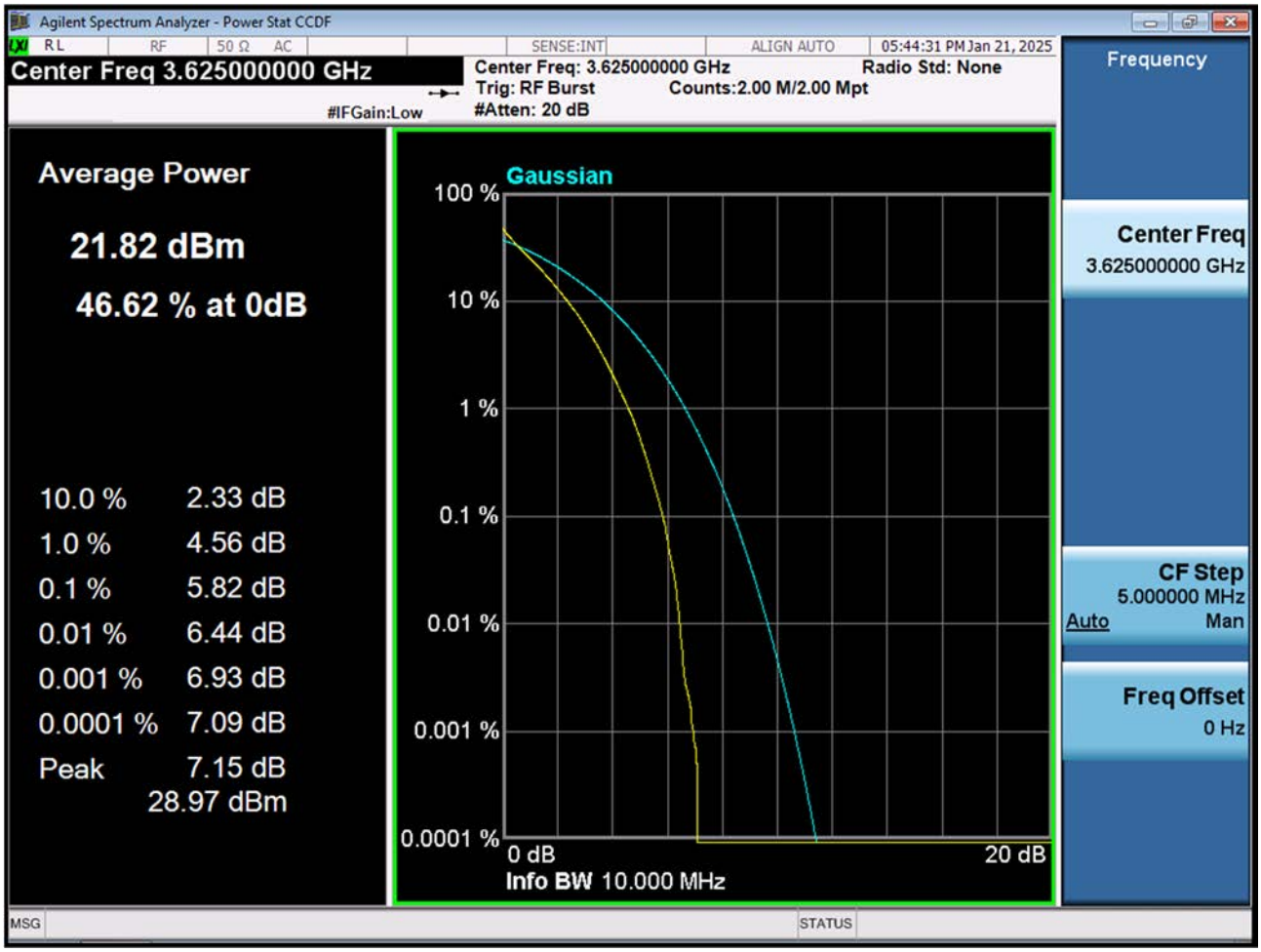


BAND 48. PAR Plot (5 M BW_Ch.55990_64QAM_RB25_0)

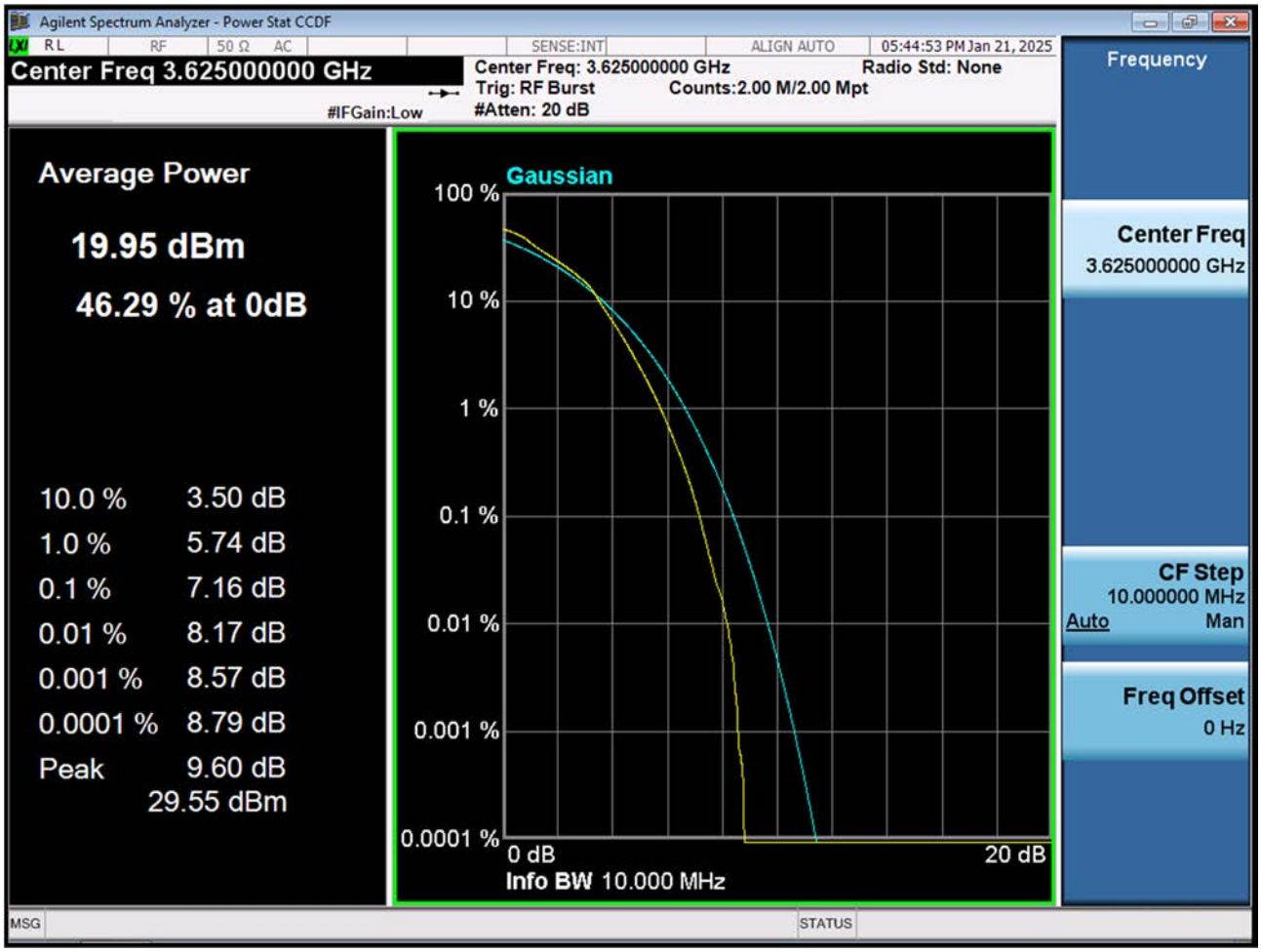
BAND 48. PAR Plot (5 M BW_Ch.55990_256QAM_RB25_0)



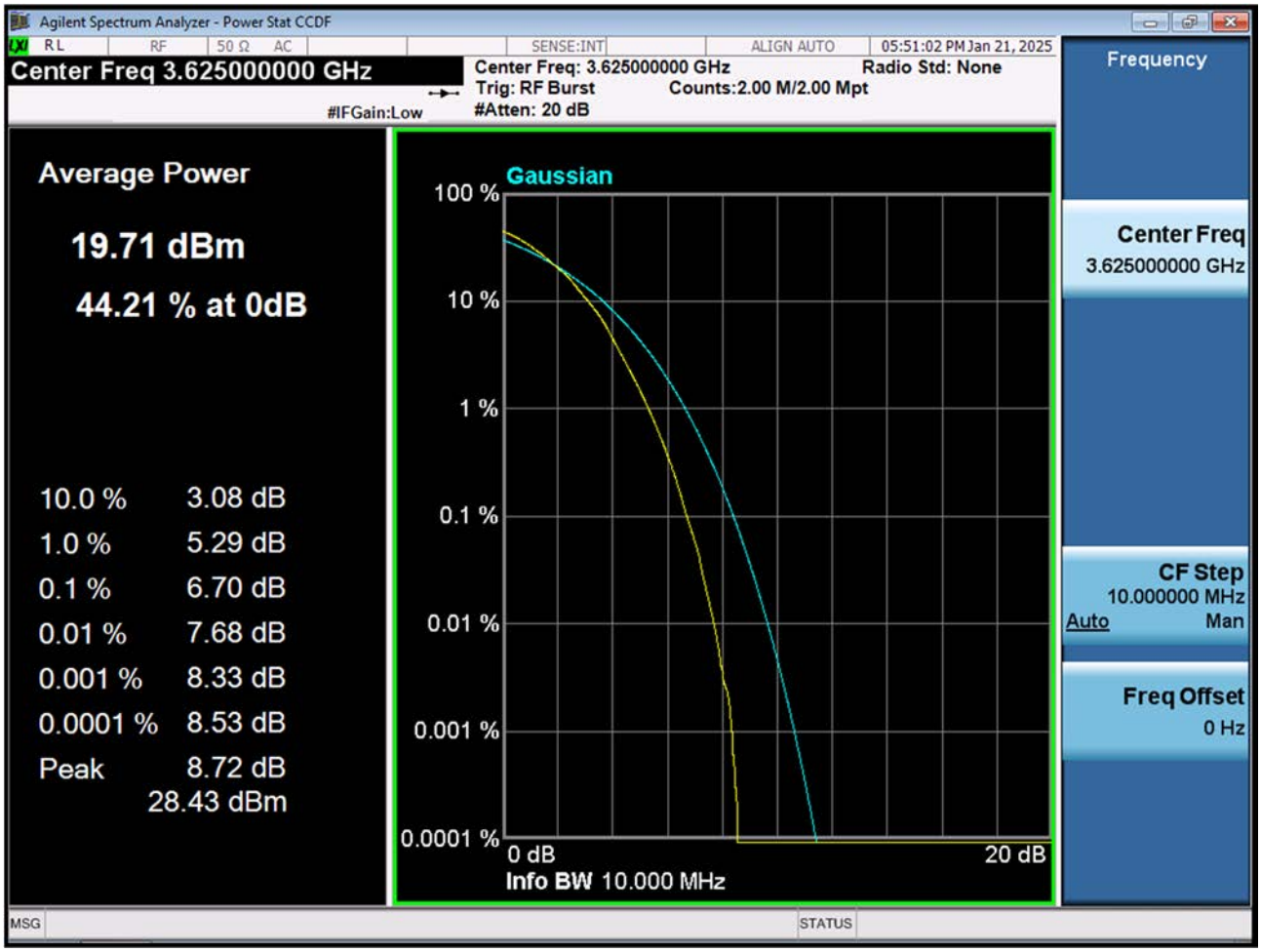
BAND 48. PAR Plot (10 M BW_Ch.55990_QPSK_RB50_0)



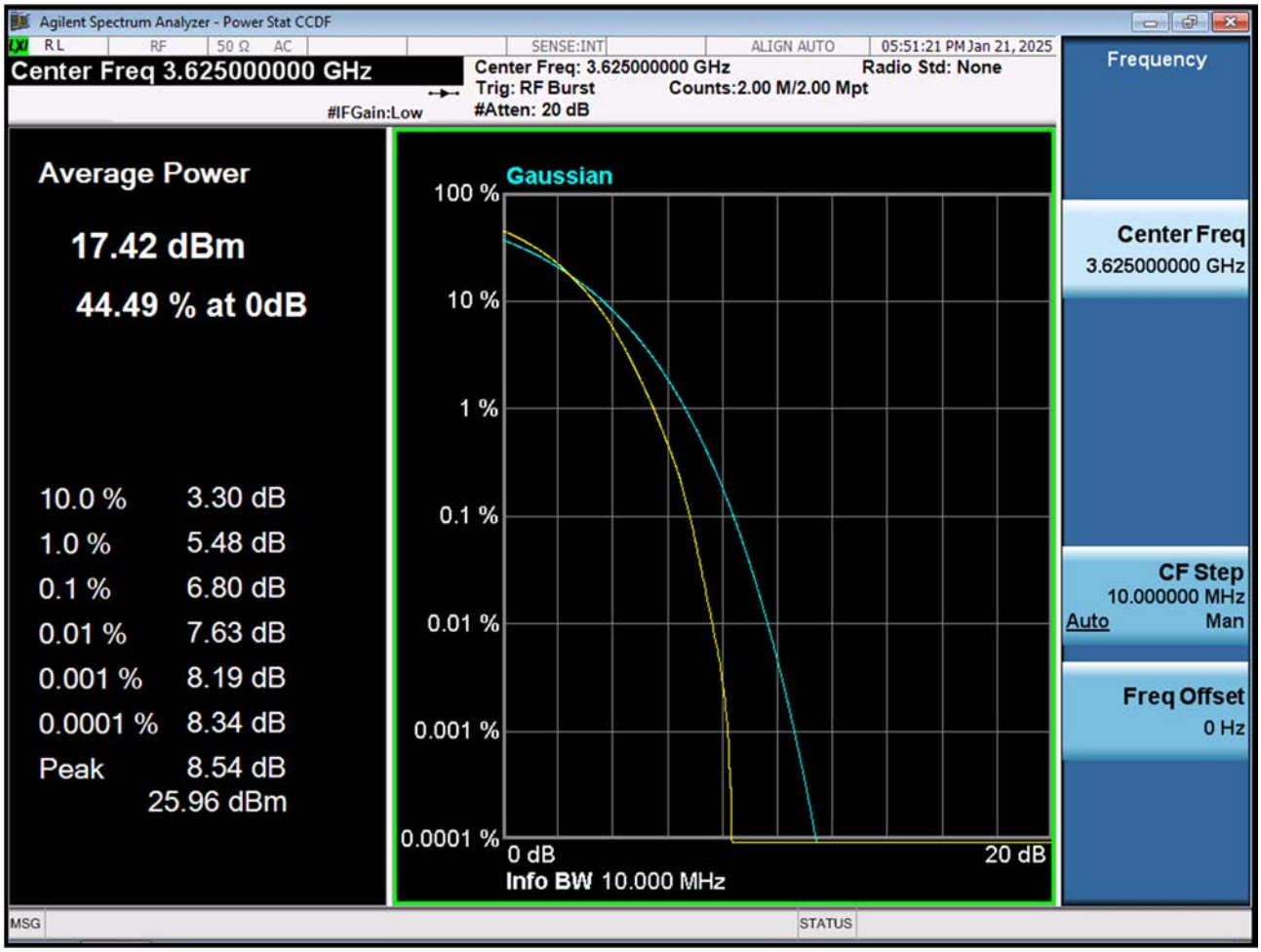
BAND 48. PAR Plot (10 M BW_Ch.55990_16QAM_RB50_0)



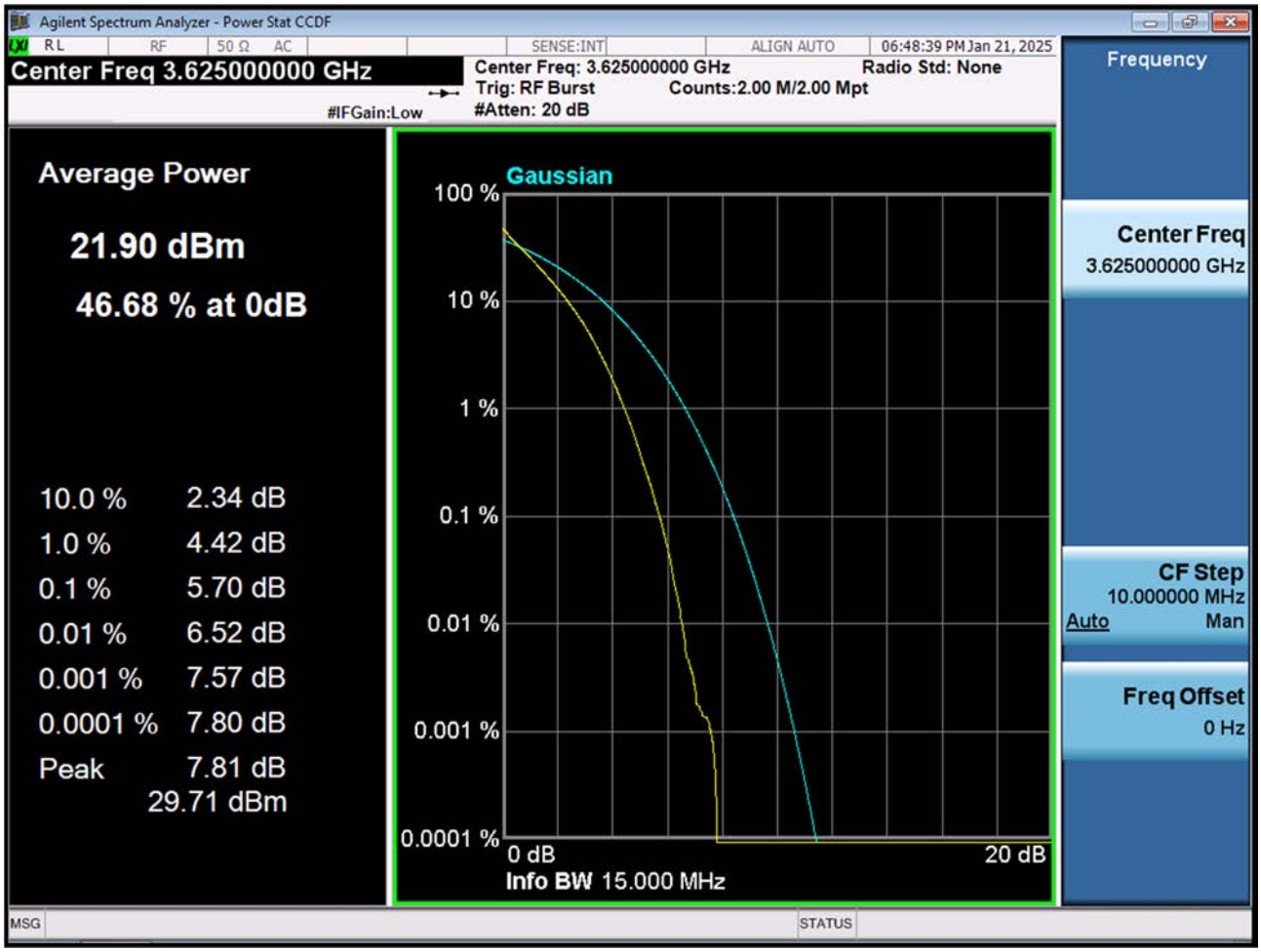
BAND 48. PAR Plot (10 M BW_Ch.55990_64QAM_RB50_0)



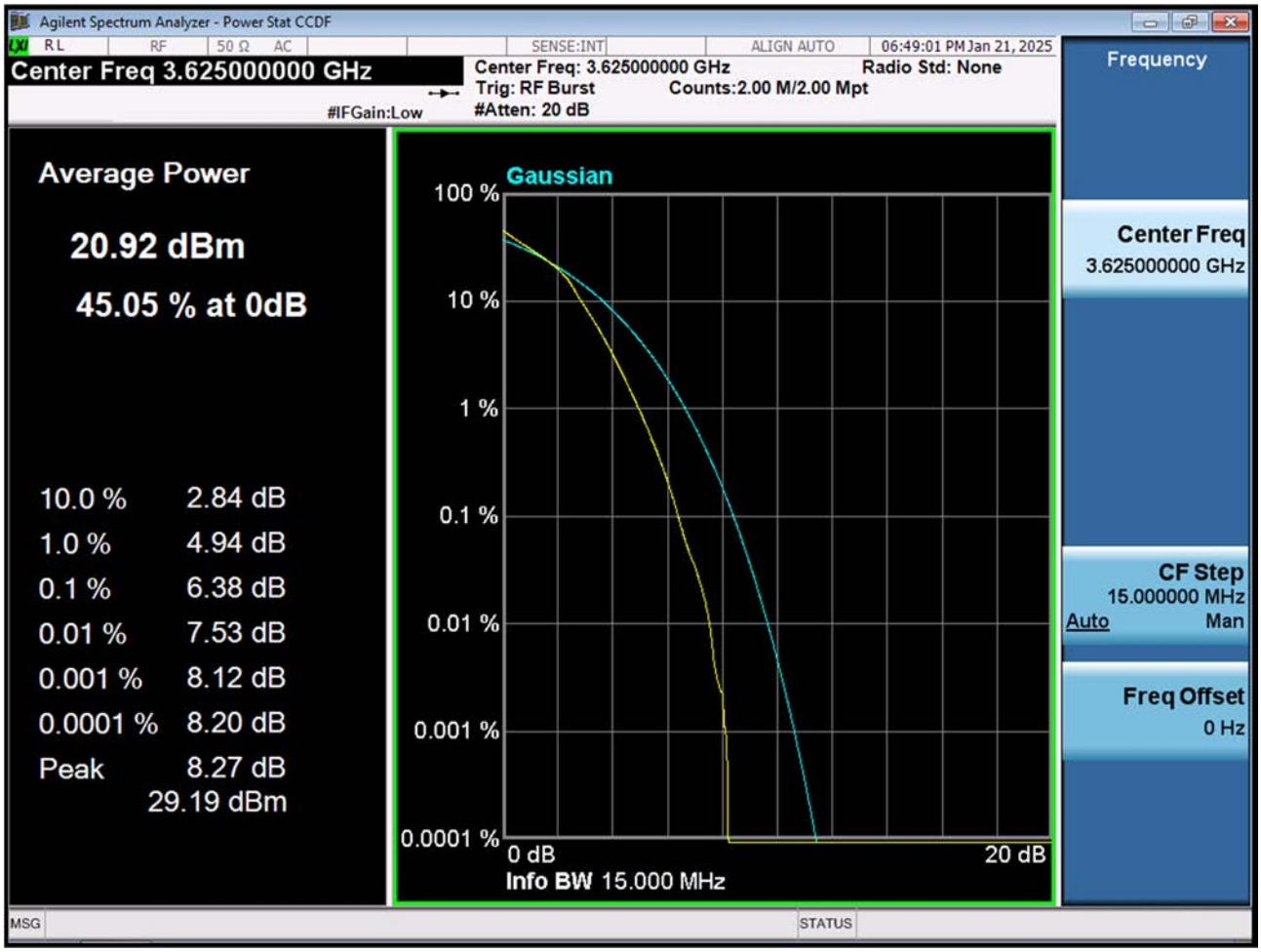
BAND 48. PAR Plot (10 M BW_Ch.55990_256QAM_RB50_0)



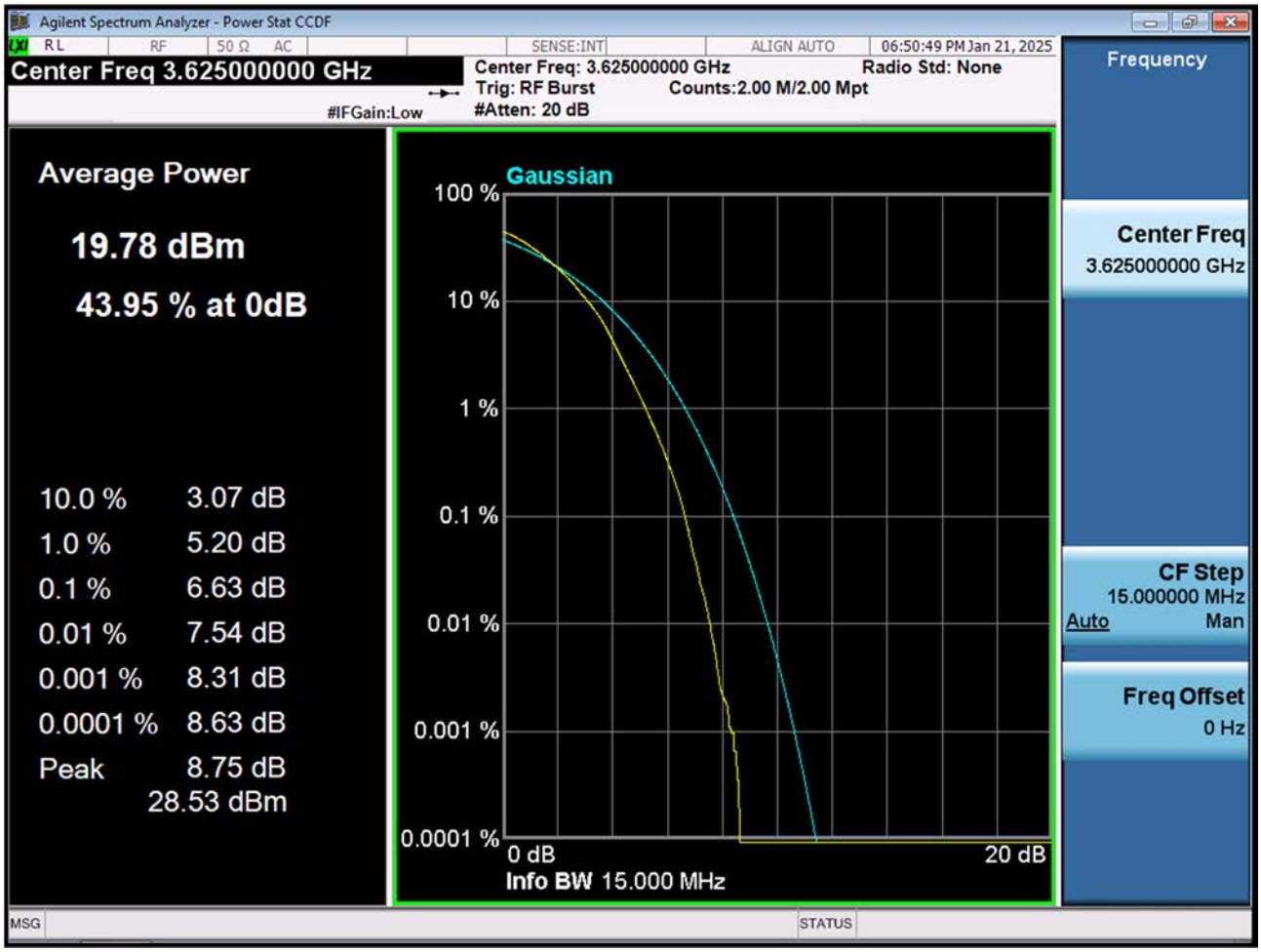
BAND 48. PAR Plot (15 M BW_Ch.55990_QPSK_RB75_0)



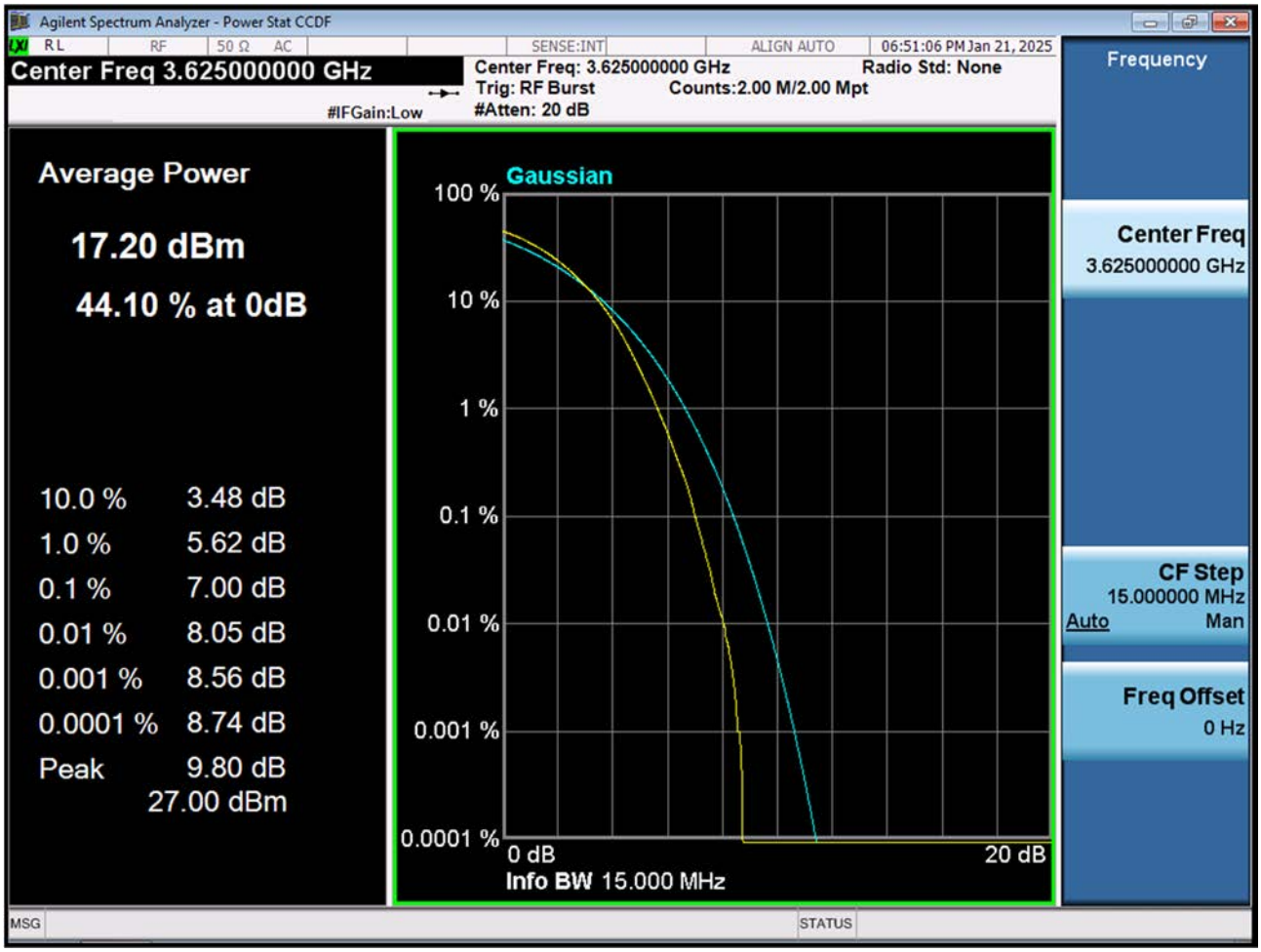
BAND 48. PAR Plot (15 M BW_Ch.55990_16QAM_RB75_0)



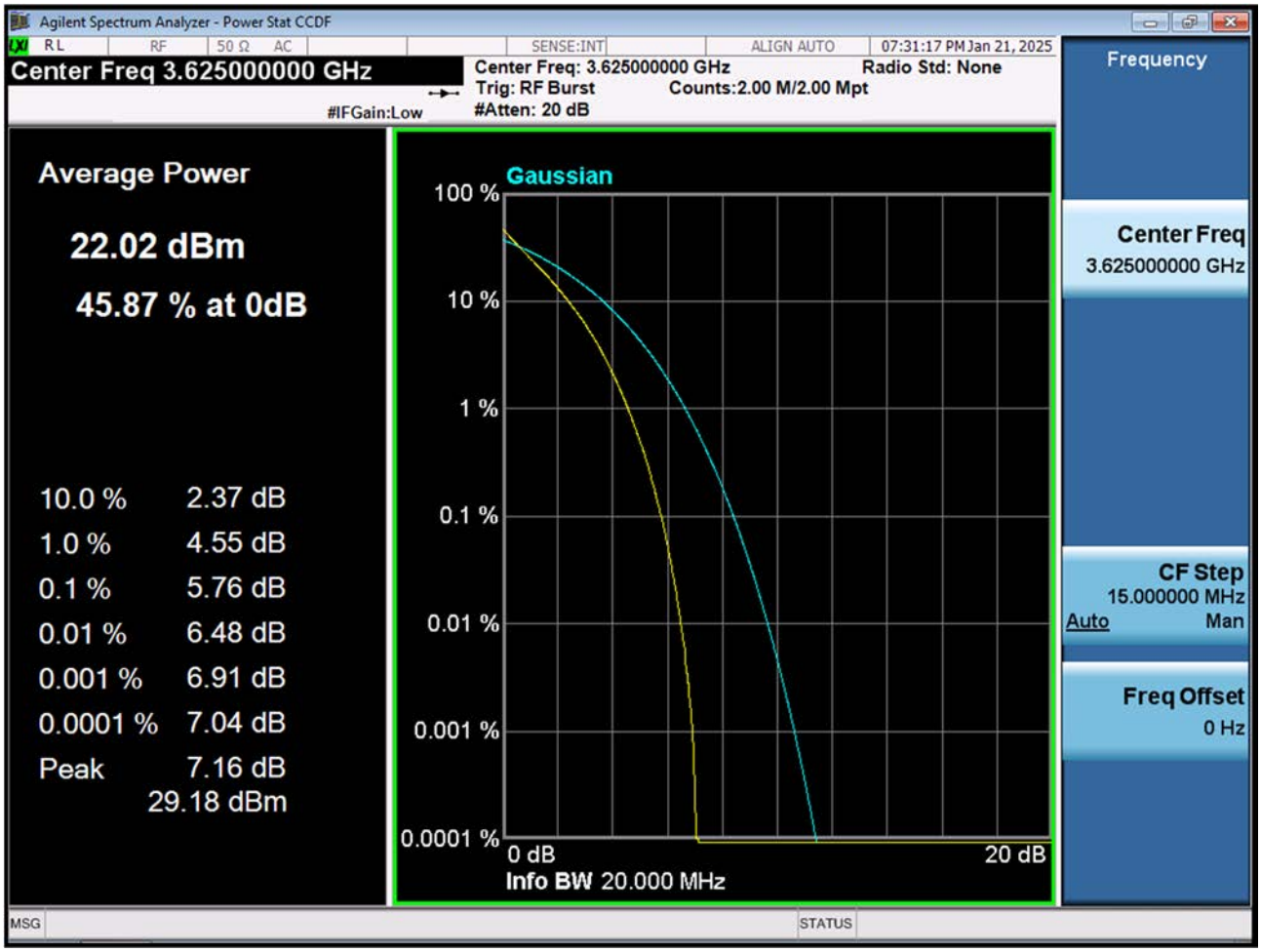
BAND 48. PAR Plot (15 M BW_Ch.55990_64QAM_RB75_0)



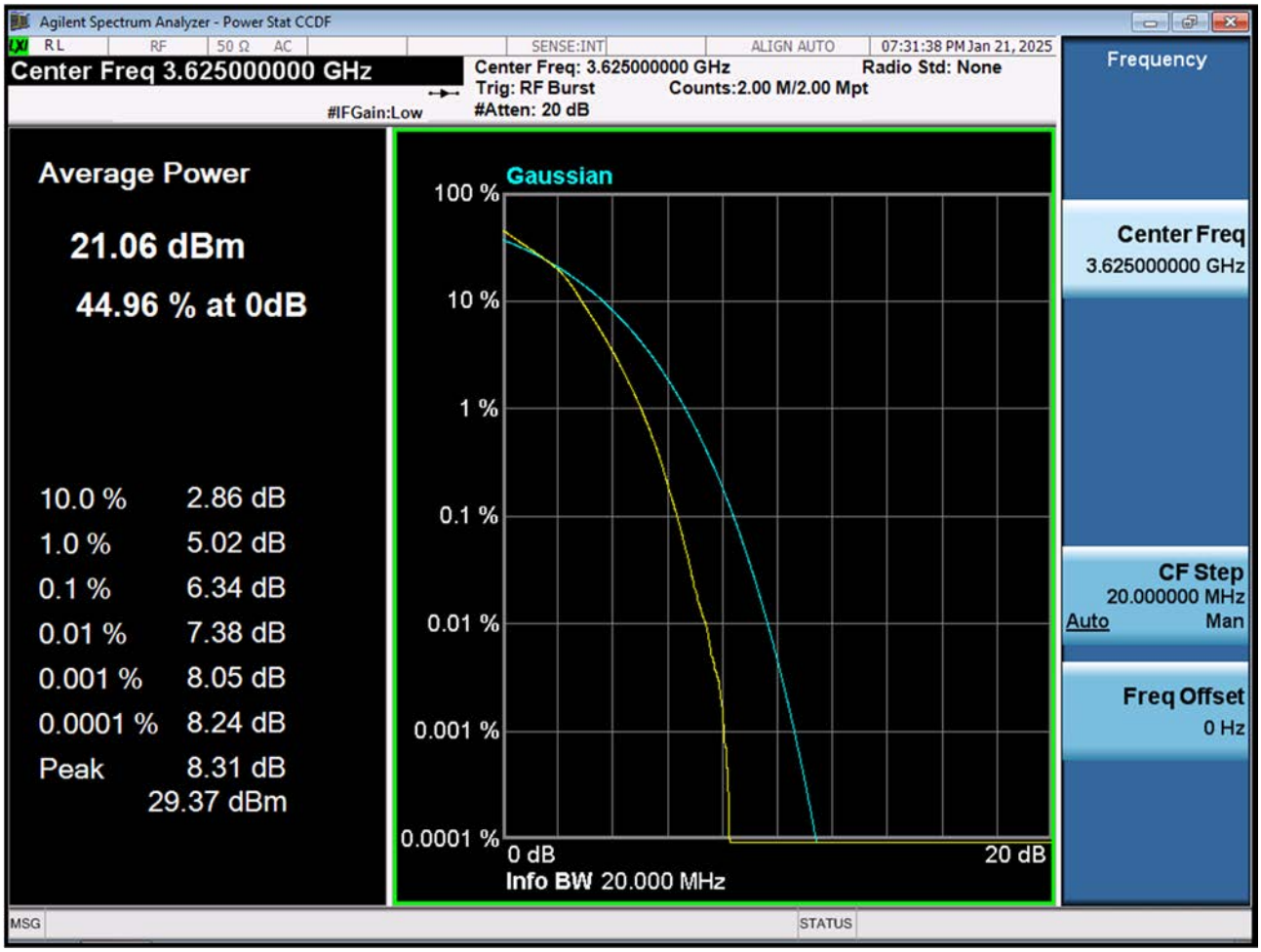
BAND 48. PAR Plot (15 M BW_Ch.55990_256QAM_RB75_0)



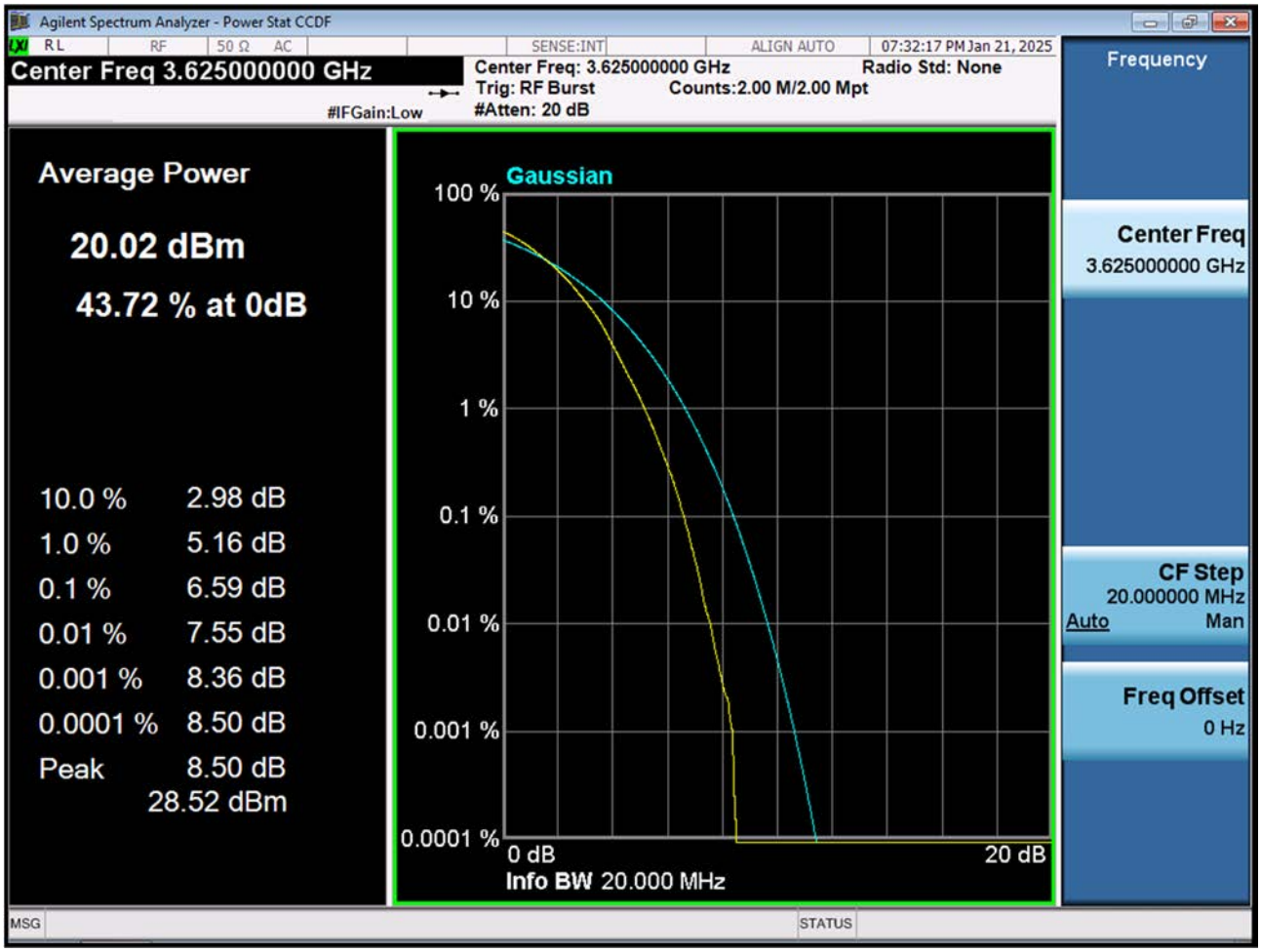
BAND 48. PAR Plot (20 M BW_Ch.55990_QPSK_RB100_0)



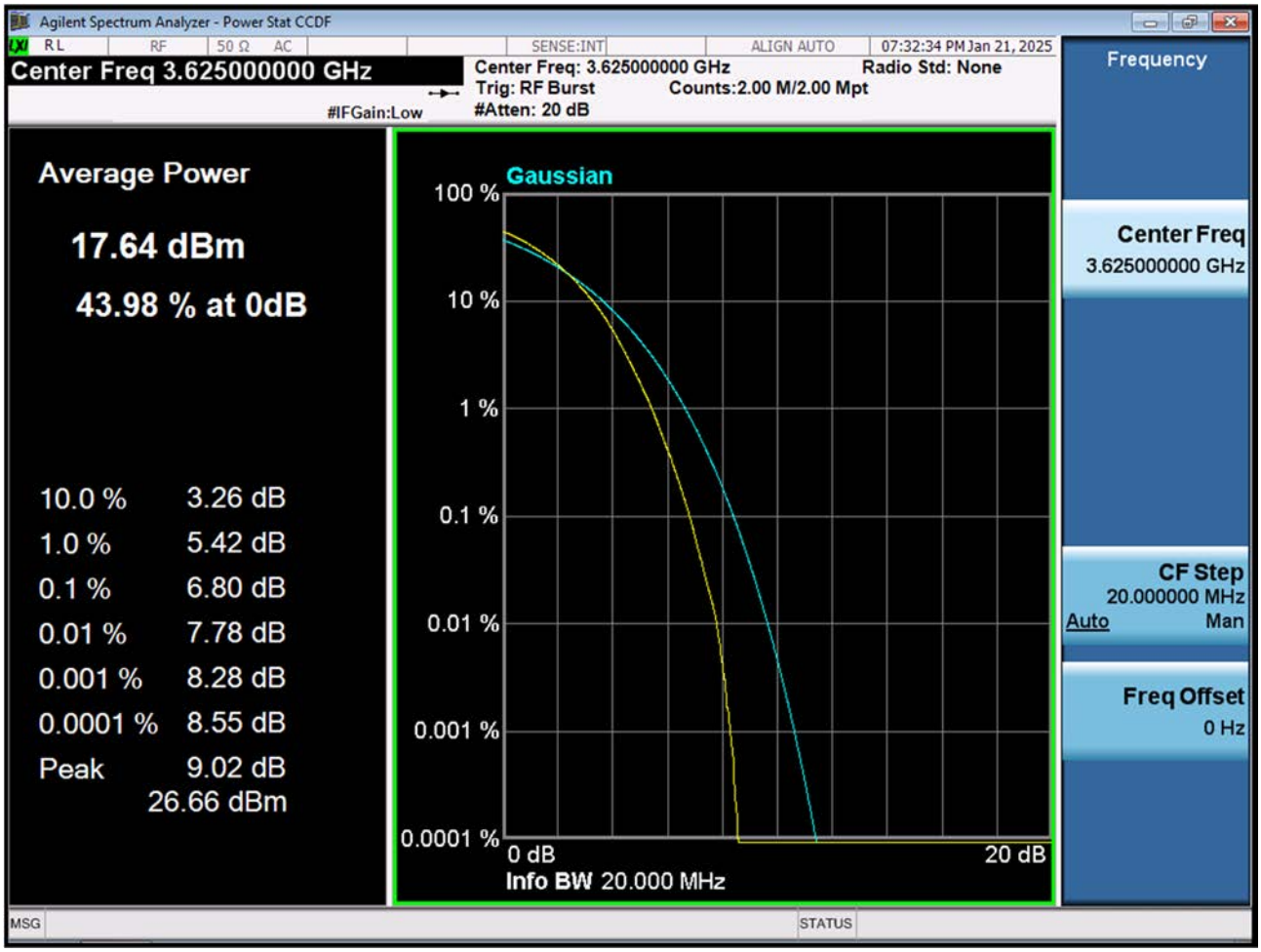
BAND 48. PAR Plot (20 M BW_Ch.55990_16QAM_RB100_0)



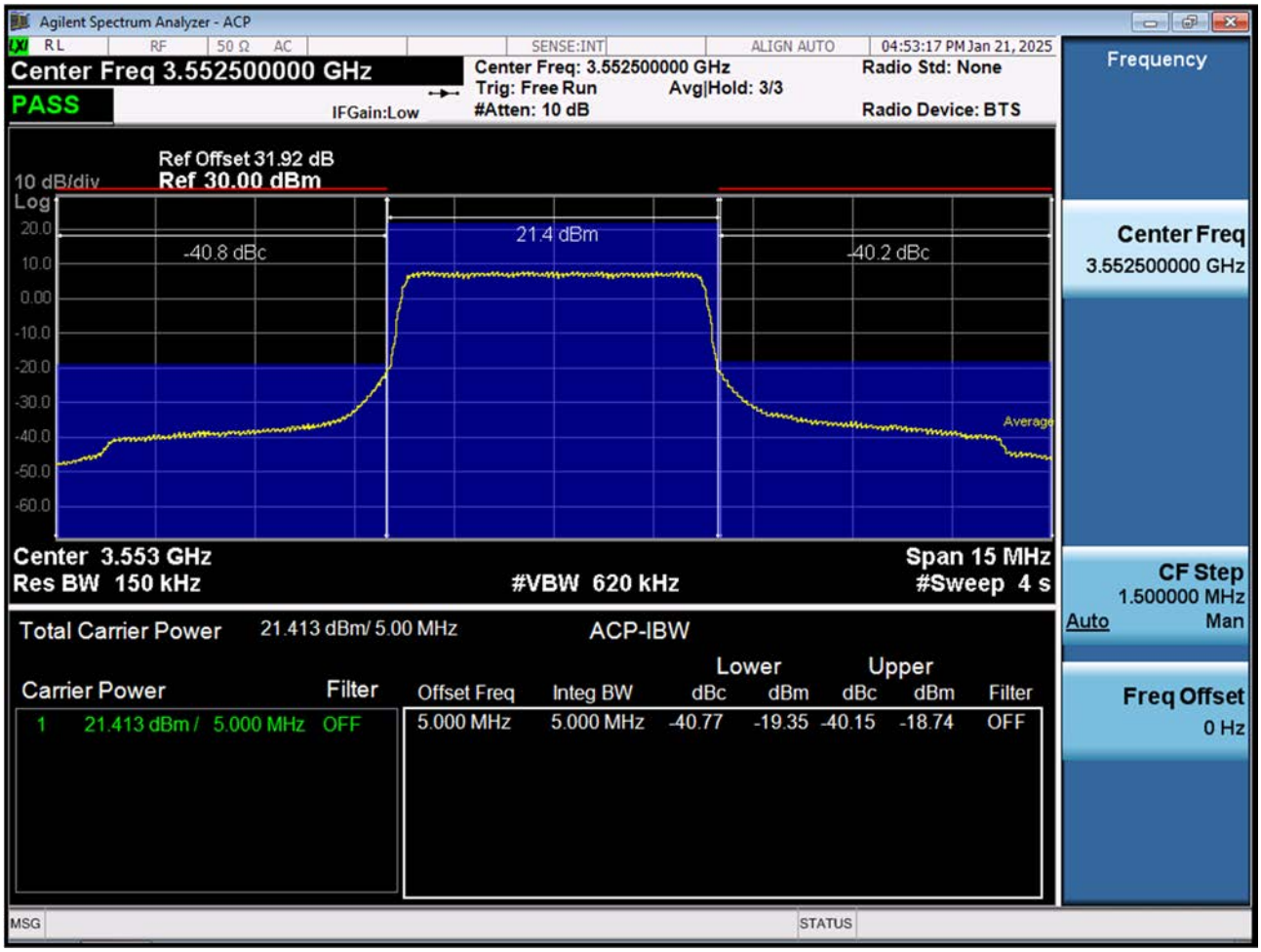
BAND 48. PAR Plot (20 M BW_Ch.55990_64QAM_RB100_0)



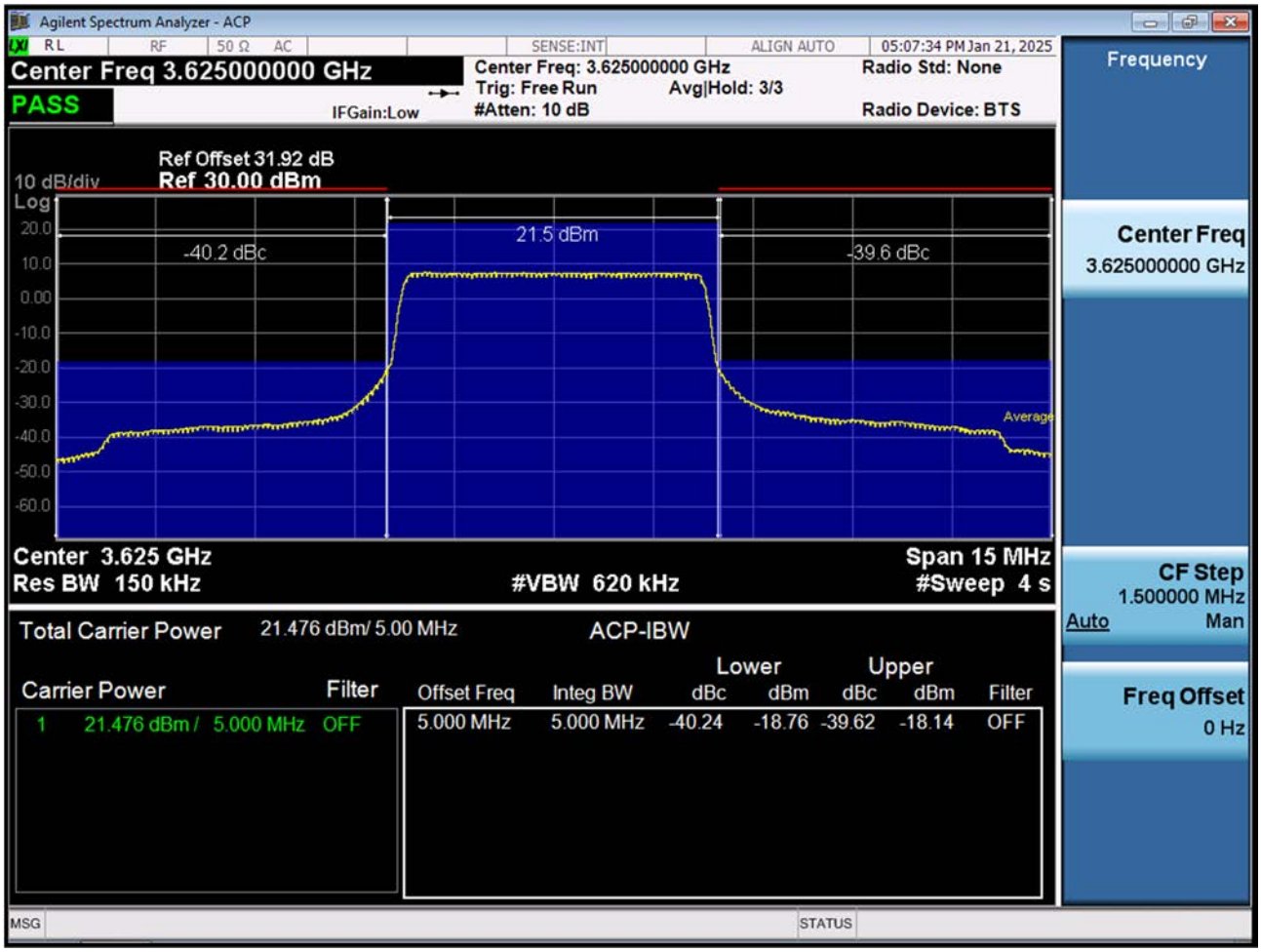
BAND 48. PAR Plot (20 M BW_Ch.55990_256QAM_RB100_0)



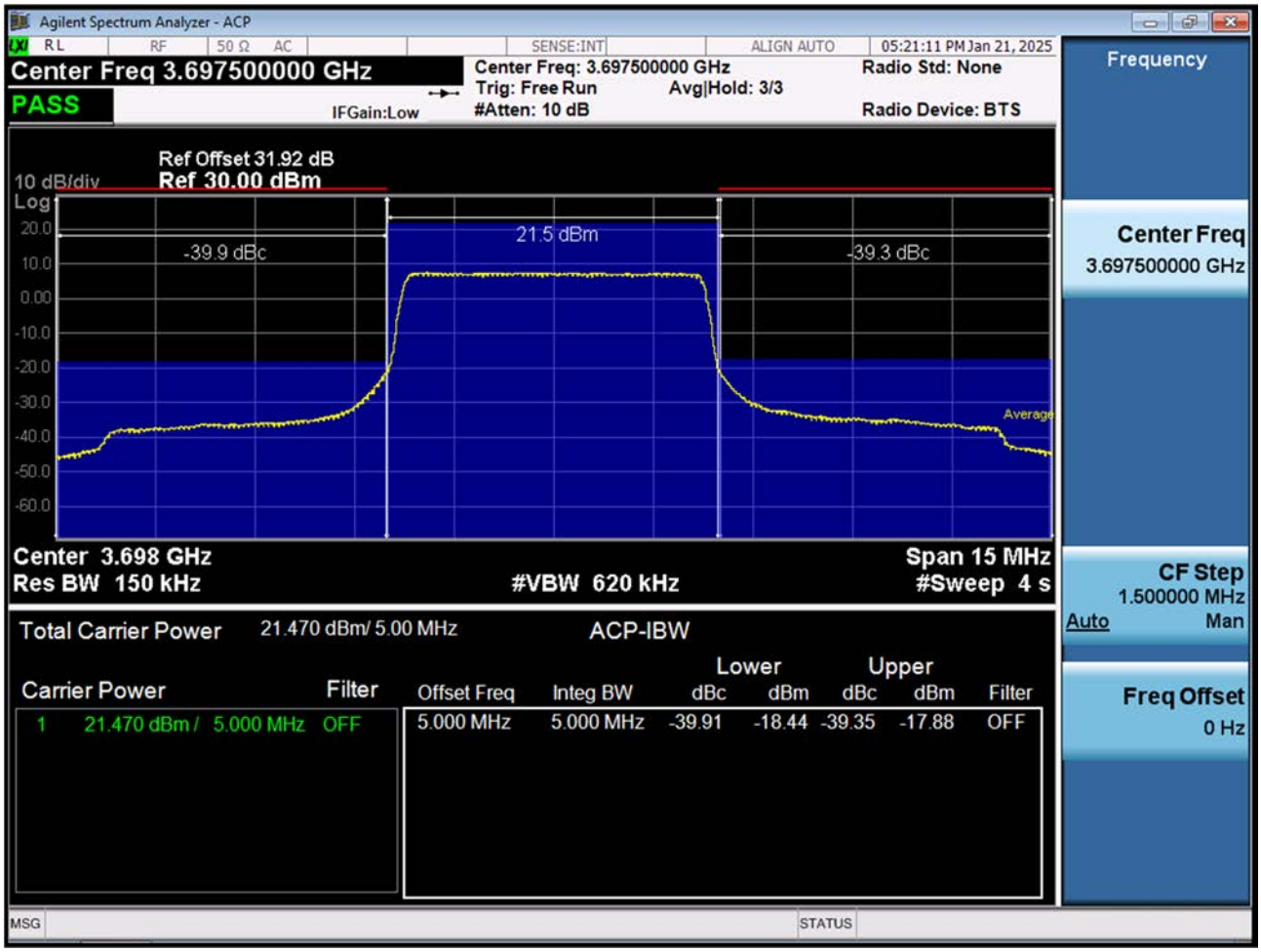
BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (5 MHz Ch.55265 QPSK RB 25, Offset 0)



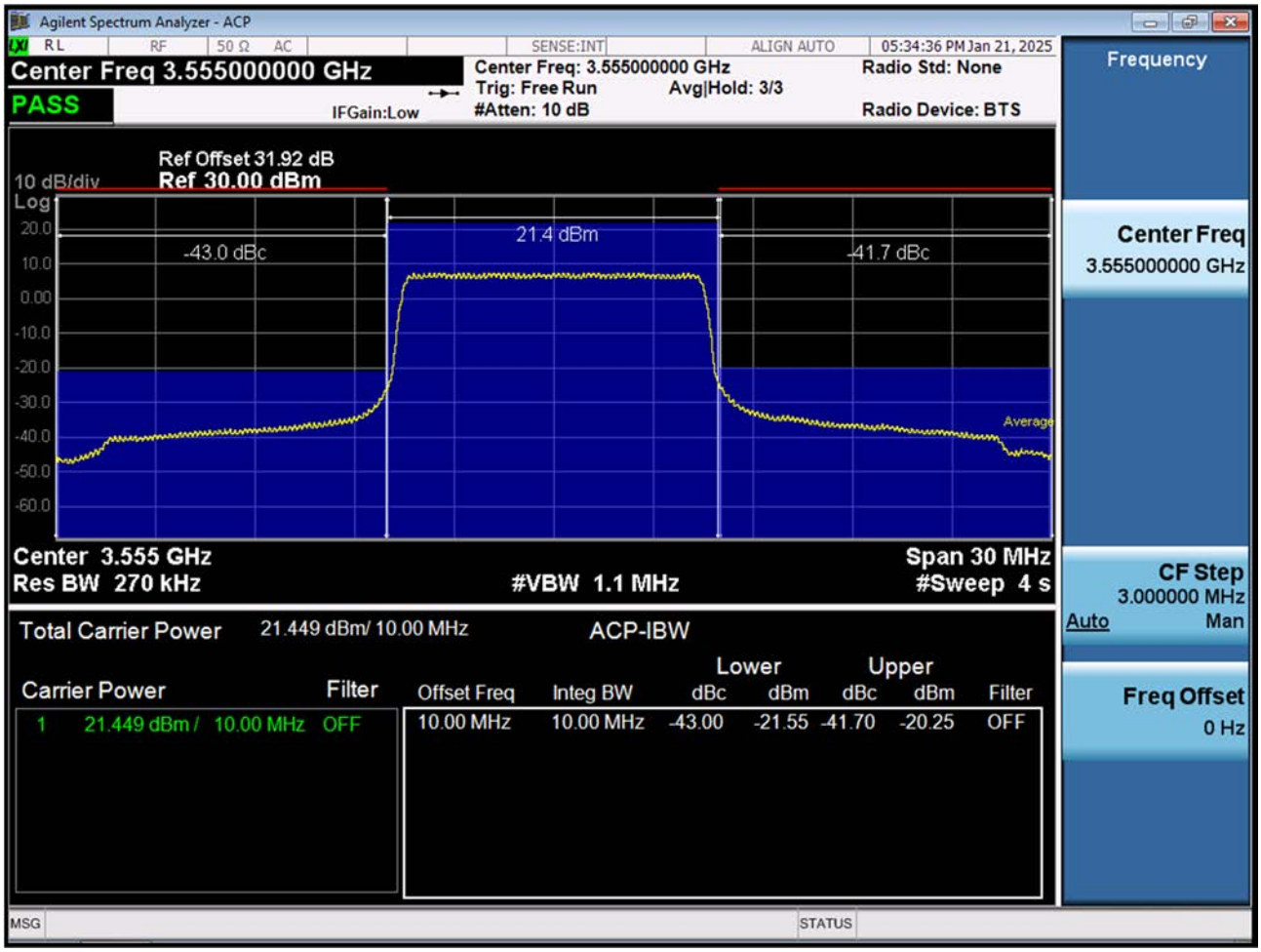
BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (5 MHz Ch.55990 QPSK RB 25, Offset 0)



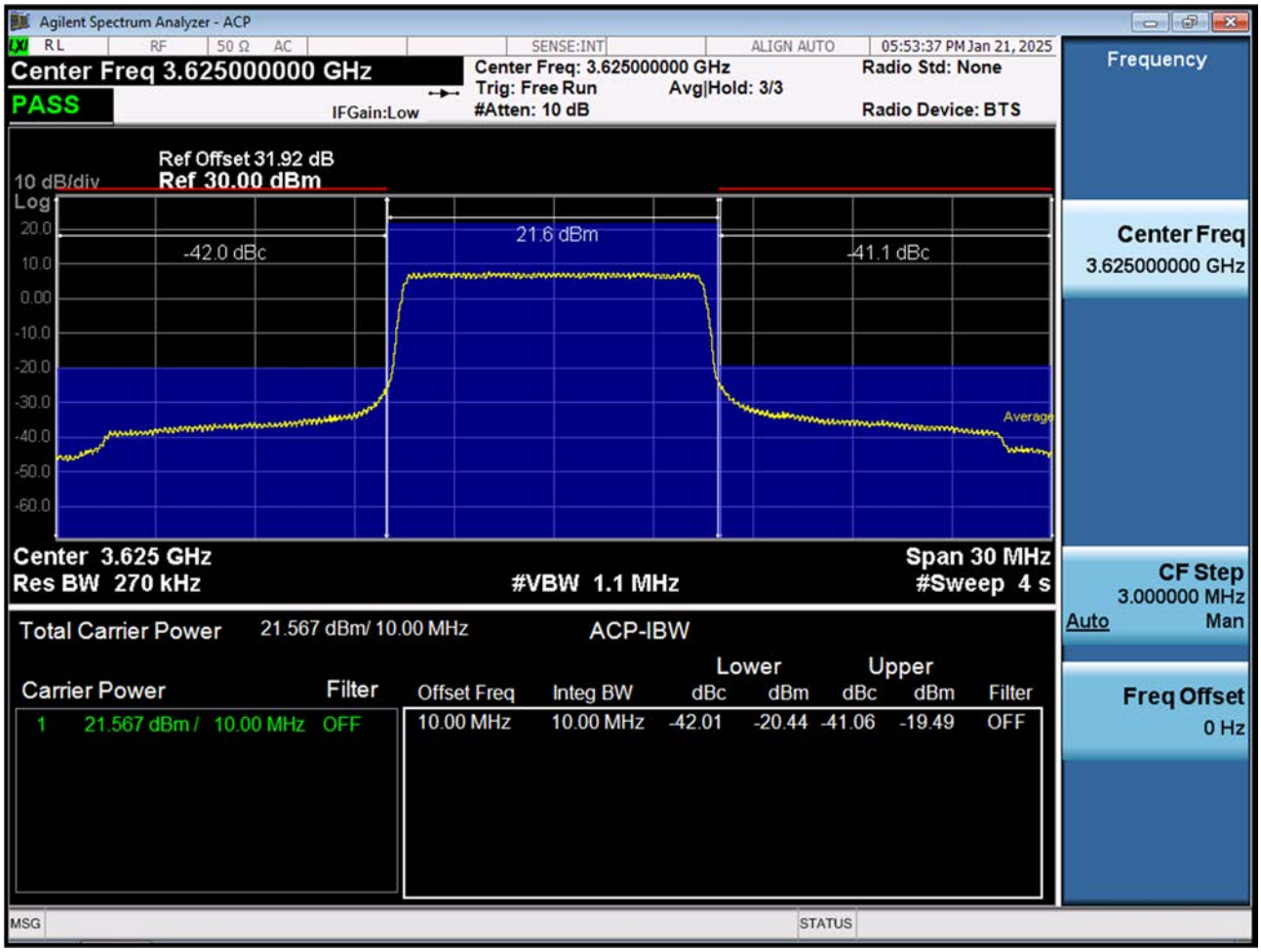
BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (5 MHz Ch.56715 QPSK RB 25, Offset 0)



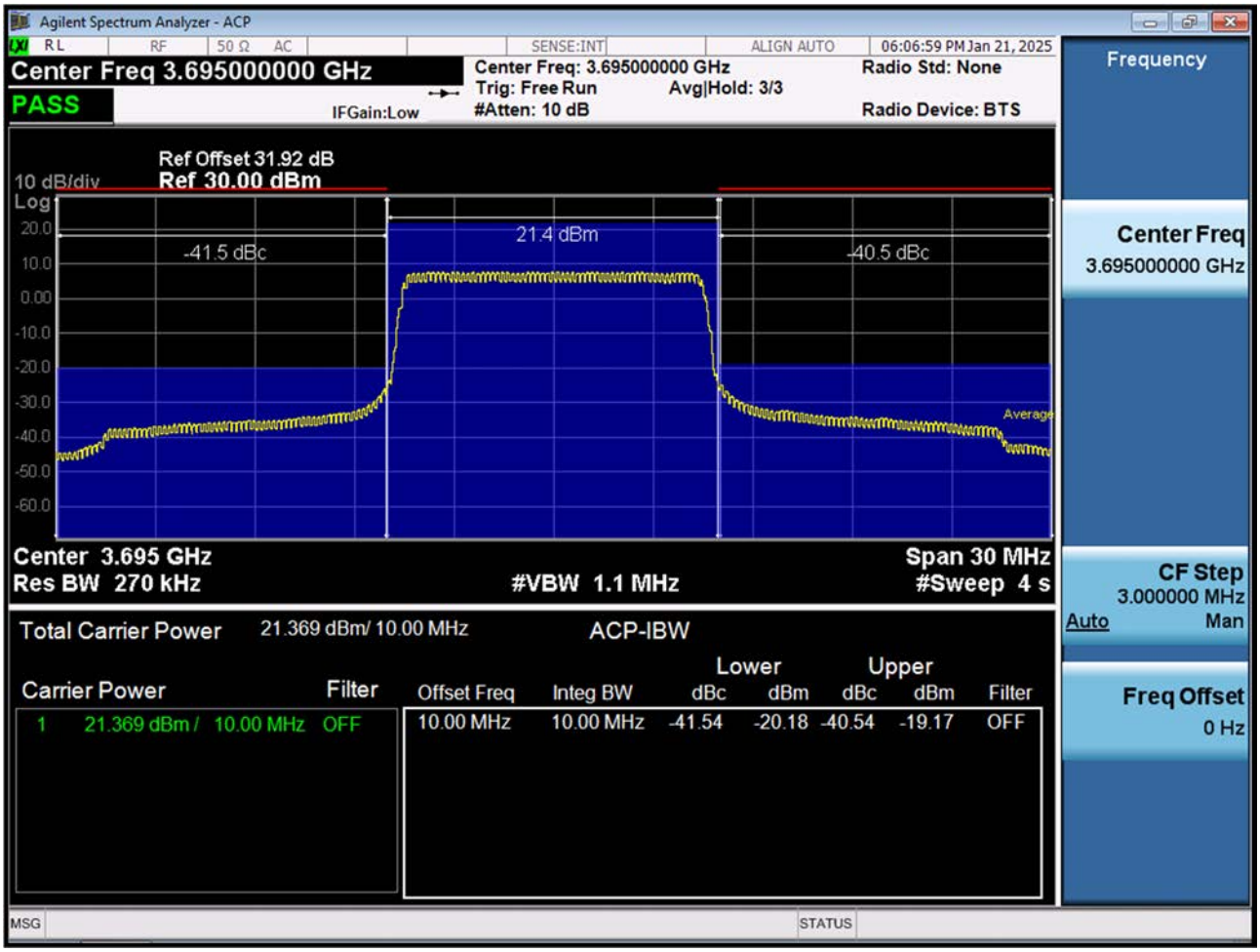
BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (10 MHz Ch.55290 QPSK RB 50, Offset 0)



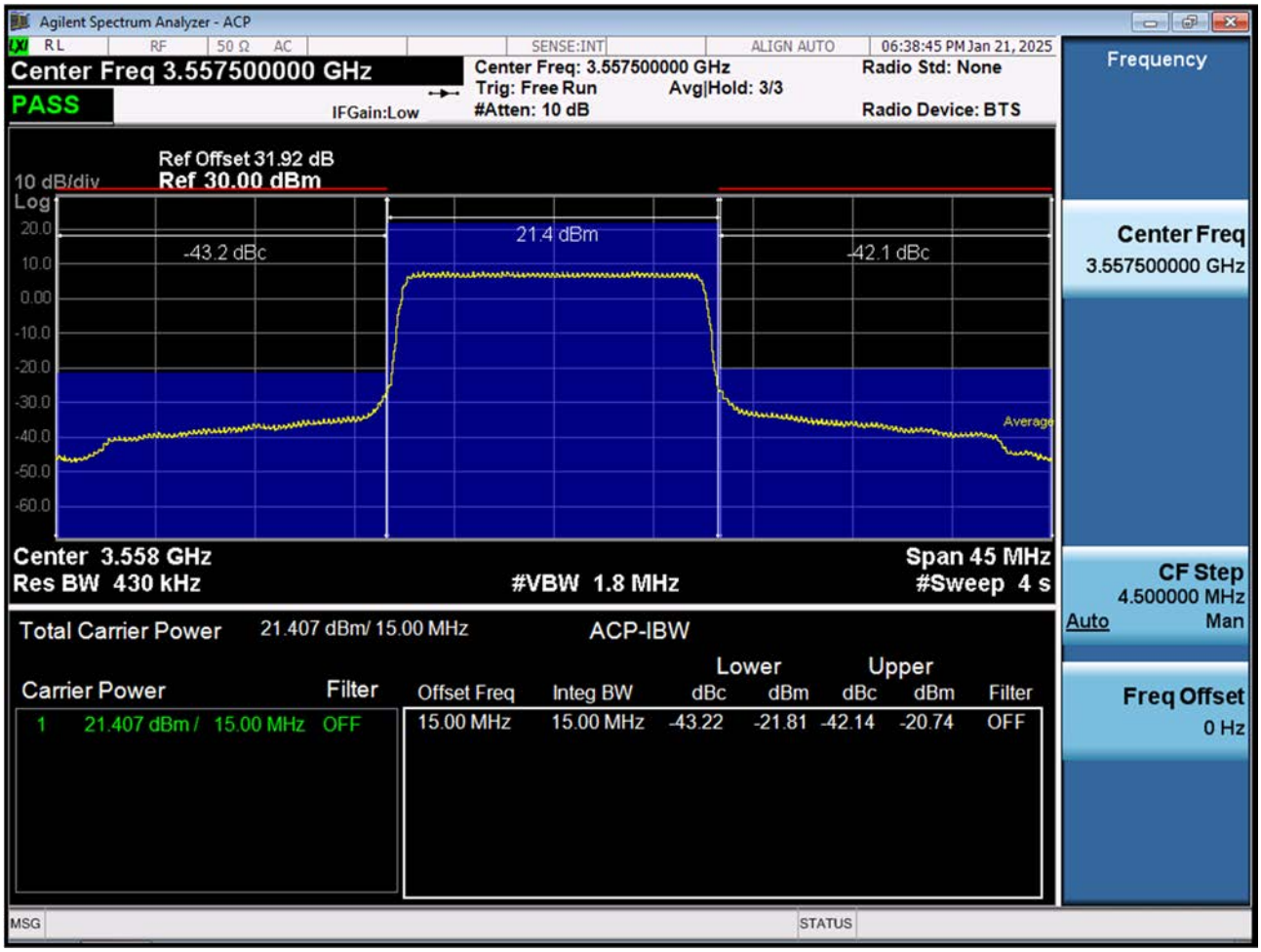
BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (10 MHz Ch.55990 QPSK RB 50, Offset 0)



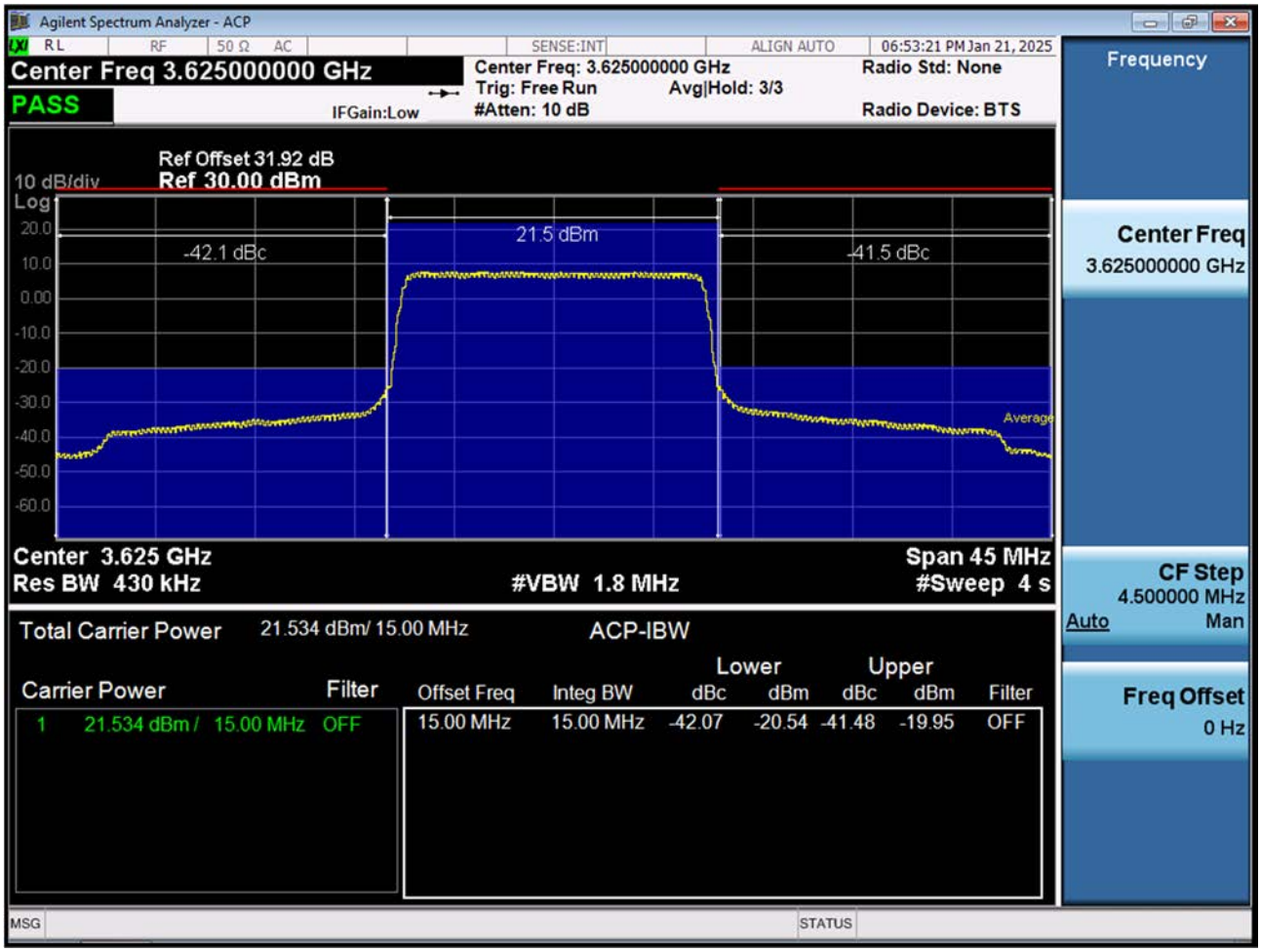
BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (10 MHz Ch. 56690 QPSK RB 50, Offset 0)



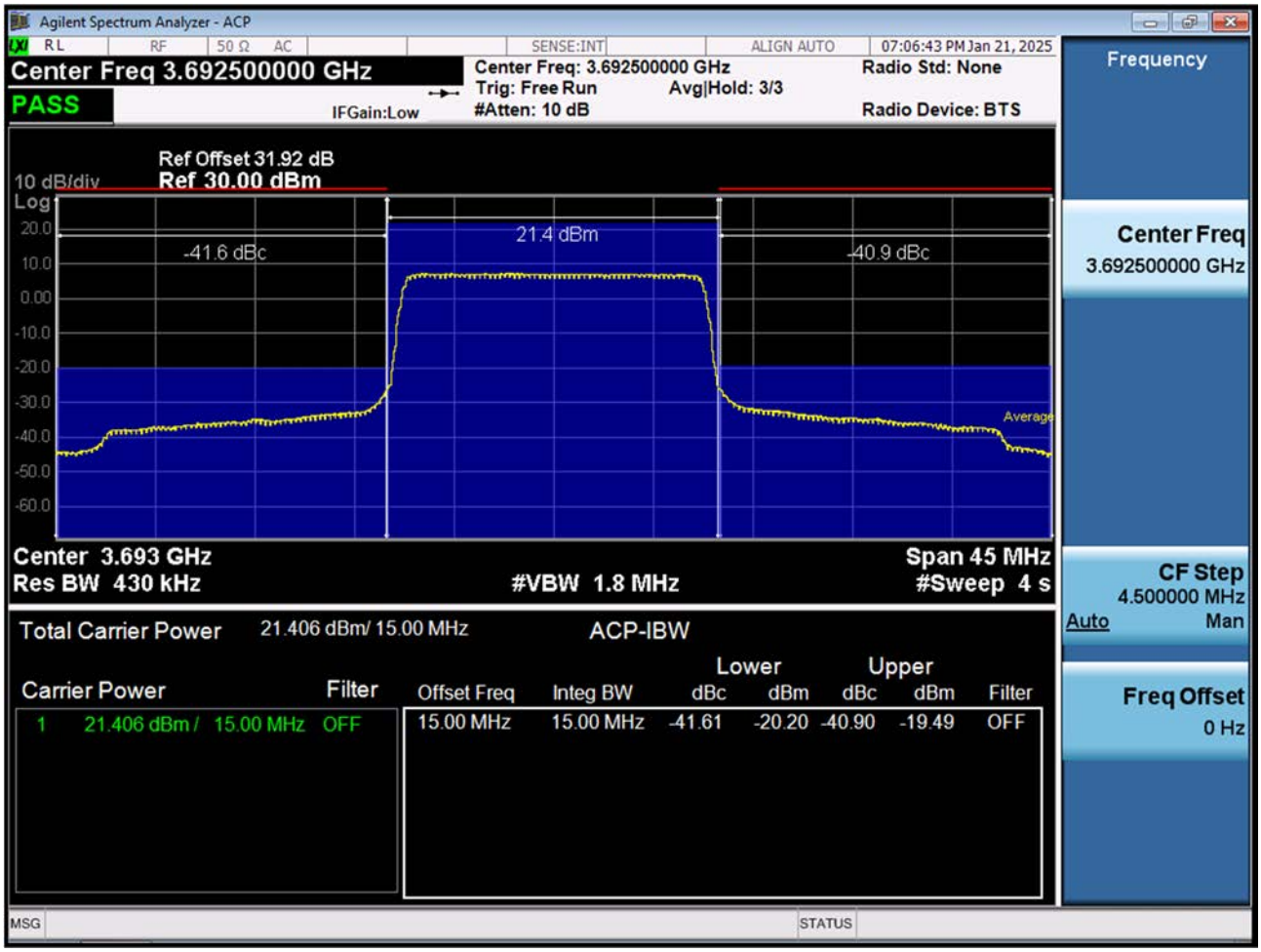
BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (15 MHz Ch.55315 QPSK RB 75, Offset 0)



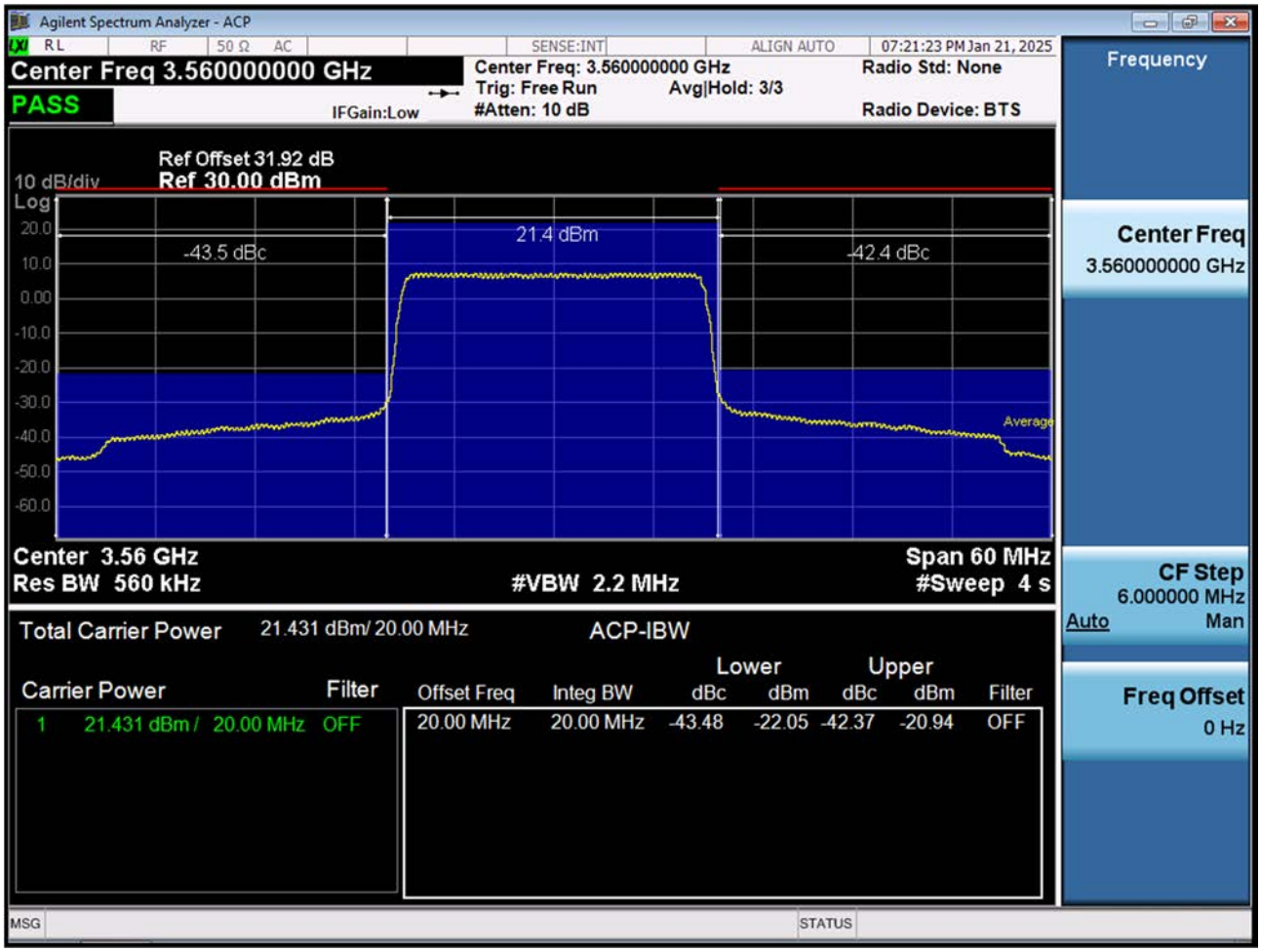
BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (15 MHz Ch.55990 QPSK RB 75, Offset 0)



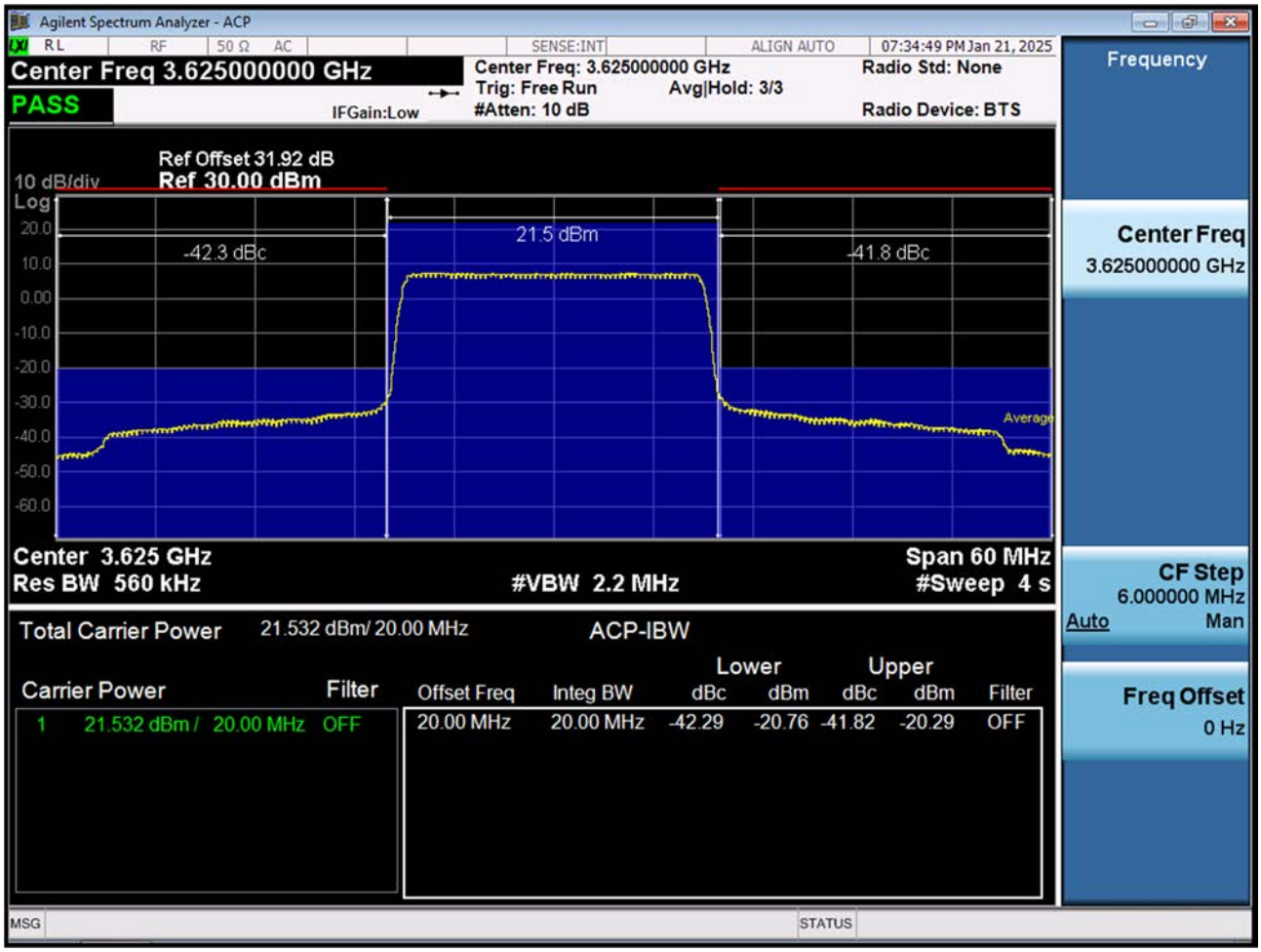
BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (15 MHz Ch.56665 QPSK RB 75, Offset 0)



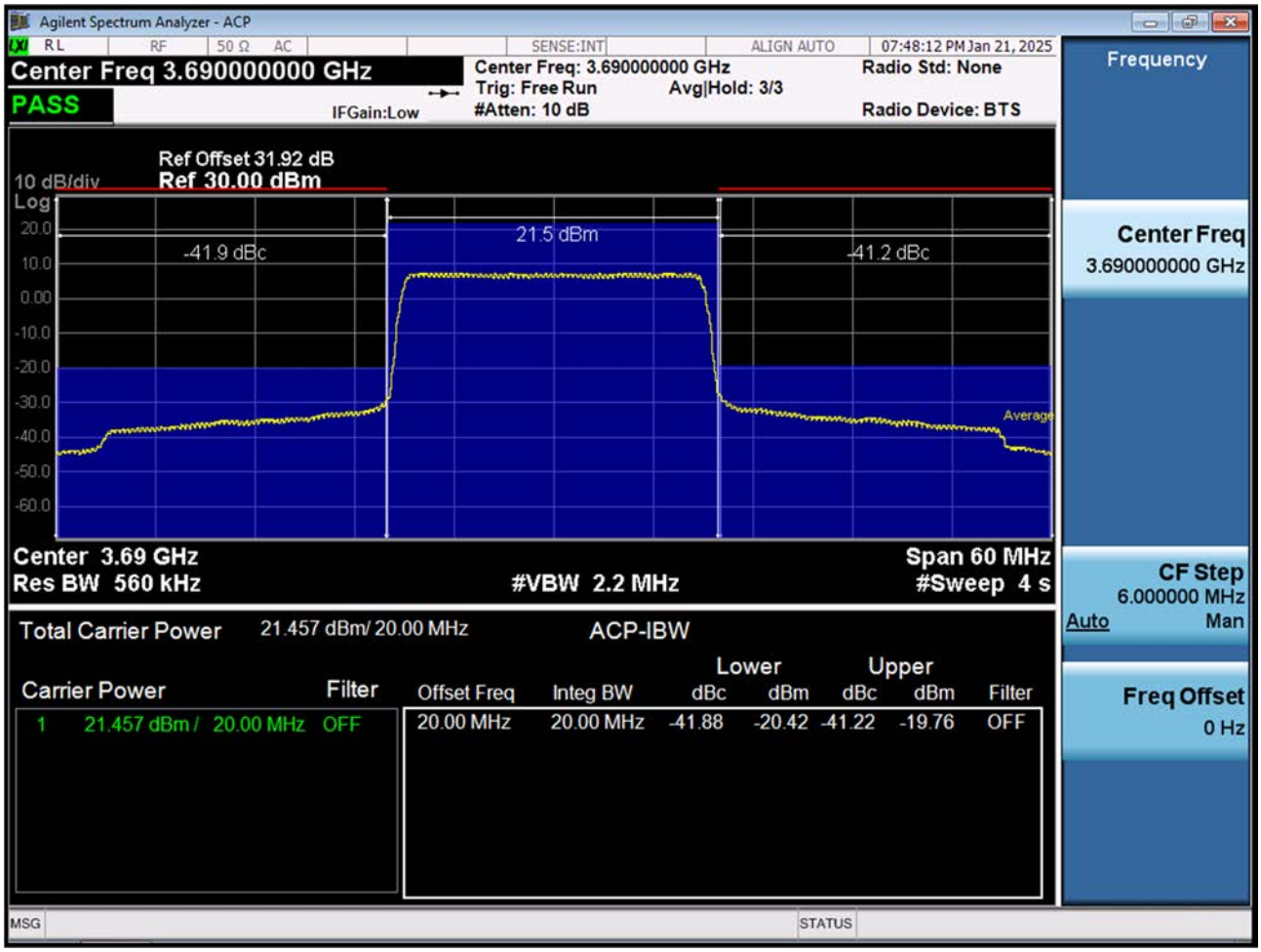
BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (20 MHz Ch.55340 QPSK RB 100, Offset 0)



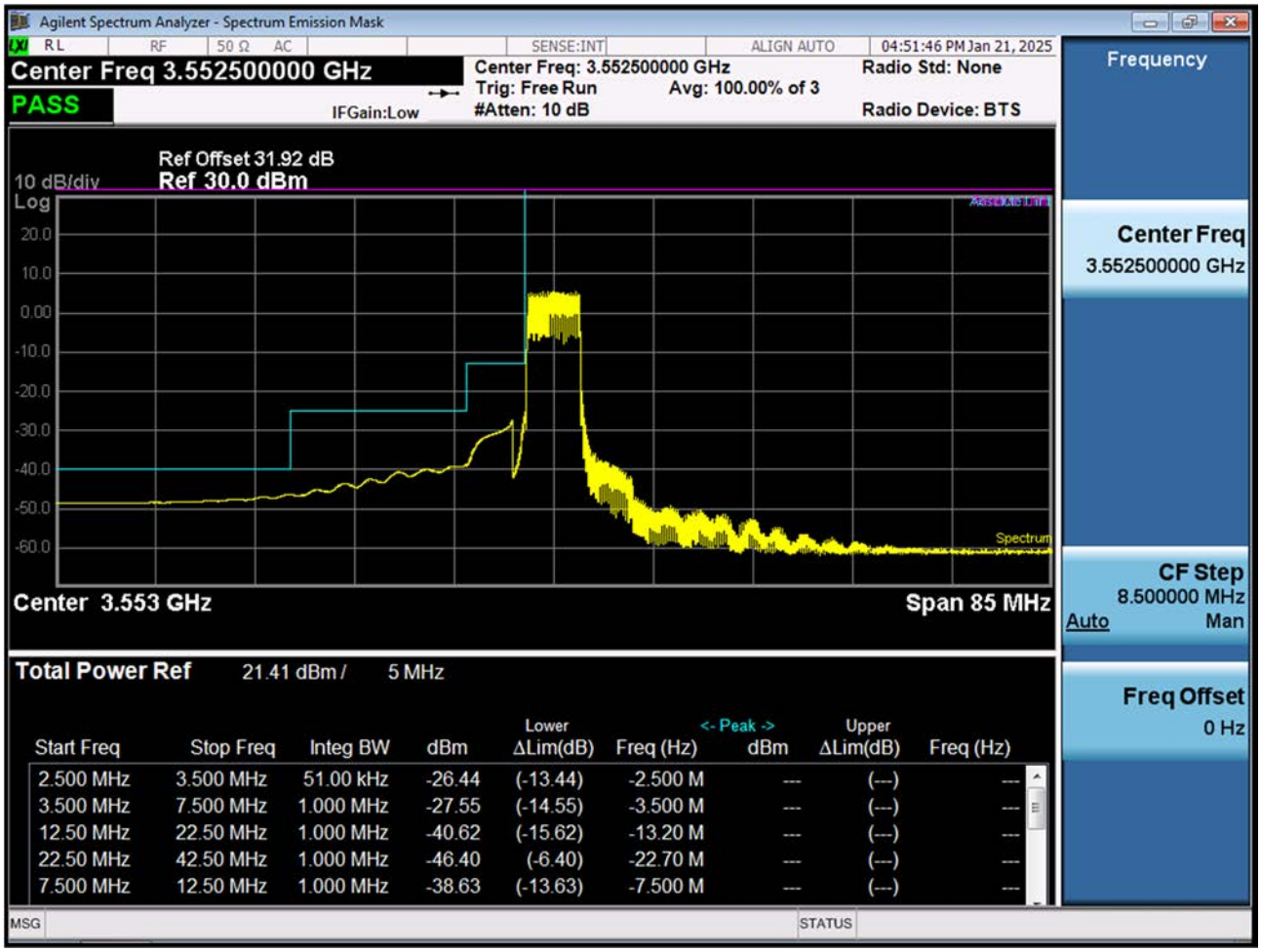
BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (20 MHz Ch.55990 QPSK RB 100, Offset 0)



BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (20 MHz Ch.56640 QPSK RB 100, Offset 0)



BAND 48. 5 M BandEdge(Lower)_Low_3552.5 MHz_QPSK_Full RB



BAND 48. 5 M_BandEdge(Upper)_Low_3552.5 MHz_QPSK_Full RB

BAND 48. 5 M_BandEdge(Lower)_Low_3552.5 MHz_QPSK_1RB