TEST REPORT

FCC LTE B26(Part90) Test for SM-S931U
Certification

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2410-FC013

DATE OF ISSUE
October 29, 2024

Tested by
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TEST REPORT

REPORT NO.
HCT-RF-2410-FC013

DATE OF ISSUE
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Additional Model
SM-S931U1

Applicant	**SAMSUNG Electronics Co., Ltd.** 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Product Name Model Name	Mobile Phone SM-S931U
Date of Test	August 21, 2024 ~ October 28, 2024
FCC ID	A3LSMS931U
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:	PCS Licensed Transmitter Held to Ear (PCE)
Test Standard Used	FCC Rule Part: § 90, § 22
Test Results	PASS

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REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	October 29, 2024	Initial Release

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).

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CONTENTS

1. GENERAL INFORMATION 6
1.1.MAXIMUM OUTPUT POWER 7
2. INTRODUCTION 8
2.1. DESCRIPTION OF EUT 8
2.2. MEASURING INSTRUMENT CALIBRATION 8
2.3. TEST FACILITY 8
3. DESCRIPTION OF TESTS 9
3.1 TEST PROCEDURE 9
3.2 CONDUCTED OUTPUT POWER 10
3.3 RADIATED POWER 11
3.4 RADIATED SPURIOUS EMISSIONS 12
3.5 OCCUPIED BANDWIDTH. 13
3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL 14
3.7 CHANNEL EDGE 15
3.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE 16
3.9 WORST CASE(RADIATED TEST) 17
3.10 WORST CASE(CONDUCTED TEST) 18
4. LIST OF TEST EQUIPMENT 19
5. MEASUREMENT UNCERTAINTY 20
6. SUMMARY OF TEST RESULTS 21
7. SAMPLE CALCULATION 22
8. TEST DATA(Main 1 ANT) 24
8.1 CONDUCTED OUTPUT POWER 24
8.2 EFFECTIVE RADIATED POWER 29
8.3 RADIATED SPURIOUS EMISSIONS 31
8.4 OCCUPIED BANDWIDTH 32
8.5 CONDUCTED SPURIOUS EMISSIONS 33
8.6 CHANNEL EDGE 33
8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE 34
8.8 STRADDLE CHANNEL 39
8.8.1 CONDUCTED OUTPUT POWER 39
8.8.2 EFFECTIVE RADIATED POWER 43
8.8.3 RADIATED SPURIOUS EMISSIONS 44
8.8.4 CONDUCTED SPURIOUS EMISSIONS 45
8.8.5 CHANNEL EDGE(Part90) 45
8.8.6 BAND EDGE(Part22) 45
9. TEST DATA(Sub 1 ANT) 46
9.1 CONDUCTED OUTPUT POWER 46
9.2 EFFECTIVE RADIATED POWER 51
9.3 RADIATED SPURIOUS EMISSIONS 53
9.4 OCCUPIED BANDWIDTH 54
9.5 CONDUCTED SPURIOUS EMISSIONS 55
9.6 CHANNEL EDGE 55
9.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE 56
9.8 STRADDLE CHANNEL 61

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9.8.1 CONDUCTED OUTPUT POWER 61
9.8.2 EFFECTIVE RADIATED POWER 65
9.8.3 RADIATED SPURIOUS EMISSIONS 66
9.8.4 CONDUCTED SPURIOUS EMISSIONS 67
9.8.5 CHANNEL EDGE(Part90) 67
9.8.6 BAND EDGE(Part22) 67
10. TEST PLOTS(Main 1 ANT) 68
11. TEST PLOTS (STRADDLE CHANNEL) 117
12. TEST PLOTS(Sub 1 ANT) 142
13. TEST PLOTS (STRADDLE CHANNEL) 191
14. ANNEX A_ TEST SETUP PHOTO 216

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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:	A3LSMS931U
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§ 90, § 22
EUT Type:	Mobile phone
Model(s):	SM-S931U
Additional Model(s)	SM-S931U1
Tx Frequency:	814.7 MHz – 824.0 MHz (LTE – Band 26 (1.4 MHz)) 815.5 MHz – 824.0 MHz (LTE – Band 26 (3 MHz)) 816.5 MHz – 824.0 MHz (LTE – Band 26 (5 MHz)) 819.0 MHz – 824.0 MHz (LTE – Band 26 (10 MHz)) 821.5 MHz (LTE – Band 26 (15 MHz))
Date(s) of Tests:	August 21, 2024 ~ October 28, 2024
Serial number:	Radiated : R3CXA0930NH Conducted : R3CX70H9H0B

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1.1. MAXIMUM OUTPUT POWER

Main 1 ANT

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	Conducted Output Power	
				Max. Power (W)	Max. Power (dBm)
LTE – Band26 (1.4)	814.7 – 824.0	1M10G7D	QPSK	0.273	24.36
		1M10W7D	16QAM	0.238	23.77
		1M10W7D	64QAM	0.185	22.67
		1M10W7D	256QAM	0.088	19.46
LTE – Band26 (3)	815.5 – 824.0	2M72G7D	QPSK	0.265	24.23
		2M72W7D	16QAM	0.232	23.66
		2M71W7D	64QAM	0.187	22.72
		2M72W7D	256QAM	0.086	19.32
LTE – Band26 (5)	816.5 – 824.0	4M51G7D	QPSK	0.268	24.28
		4M51W7D	16QAM	0.222	23.47
		4M51W7D	64QAM	0.184	22.65
		4M52W7D	256QAM	0.088	19.44
LTE – Band26 (10)	819.0 – 824.0	9M03G7D	QPSK	0.277	24.42
		9M05W7D	16QAM	0.247	23.92
		9M01W7D	64QAM	0.188	22.75
		8M98W7D	256QAM	0.090	19.52
LTE – Band26 (15)	821.5	13M5G7D	QPSK	0.281	24.48
		13M5W7D	16QAM	0.238	23.76
		13M5W7D	64QAM	0.181	22.58
		13M5W7D	256QAM	0.090	19.53

Sub 1 ANT

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	Conducted Output Power	
				Max. Power (W)	Max. Power (dBm)
LTE – Band26 (1.4)	814.7 – 824.0	1M10G7D	QPSK	0.254	24.04
		1M10W7D	16QAM	0.223	23.49
		1M10W7D	64QAM	0.173	22.37
		1M11W7D	256QAM	0.082	19.16
LTE – Band26 (3)	815.5 – 824.0	2M72G7D	QPSK	0.252	24.01
		2M72W7D	16QAM	0.210	23.22
		2M72W7D	64QAM	0.167	22.24
		2M71W7D	256QAM	0.081	19.07
LTE – Band26 (5)	816.5 – 824.0	4M51G7D	QPSK	0.262	24.18
		4M53W7D	16QAM	0.218	23.38
		4M51W7D	64QAM	0.165	22.18
		4M50W7D	256QAM	0.081	19.08
LTE – Band26 (10)	819.0 – 824.0	9M02G7D	QPSK	0.252	24.01
		9M01W7D	16QAM	0.204	23.10
		9M01W7D	64QAM	0.173	22.37
		9M01W7D	256QAM	0.080	19.03
LTE – Band26 (15)	821.5	13M5G7D	QPSK	0.281	24.49
		13M5W7D	16QAM	0.230	23.61
		13M5W7D	64QAM	0.185	22.67
		13M5W7D	256QAM	0.078	18.94

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2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a Mobile Phone with GSM/GPRS/EGPRS/UMTS and LTE, Sub 6, mmWave.
It also supports IEEE 802.11 a/b/g/n/ac/ax/be (20/40/80/160/320 MHz), Bluetooth(iPA, ePA), BT LE(iPA, ePA), NFC, WPT, WIFI 6E.

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**

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3. DESCRIPTION OF TESTS

3.1 TEST PROCEDURE

Test Description	Test Procedure Used
Occupied Bandwidth	- KDB 971168 D01 v03r01 – Section 4.3 - ANSI C63.26-2015 – Section 5.4.4
Channel Edge	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Spurious and Harmonic Emissions at Antenna Terminal	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Conducted Output Power	- KDB 971168 D01 v03r01 - Section 5.2.4 - ANSI C63.26-2015 - Section 5.2.1 & 5.2.4.2
Frequency stability	- ANSI C63.26-2015 – Section 5.6
Effective Radiated Power/ Effective Isotropic Radiated Power	- KDB 971168 D01 v03r01 – Section 5.2 & 5.8 - ANSI/TIA-603-E-2016 – Section 2.2.17
Radiated Spurious and Harmonic Emissions	- KDB 971168 D01 v03r01 – Section 6.2 - ANSI/TIA-603-E-2016 – Section 2.2.12

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3.2 CONDUCTED OUTPUT POWER

Test Overview

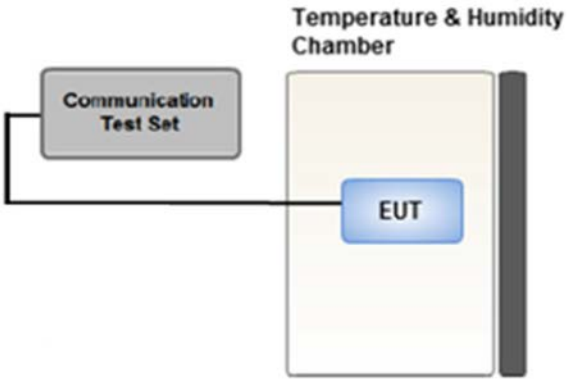
According to ANSI C63.26-2015 Section 5.2.1 when measuring the maximum RF output power from such devices, control over the EUT must be provided either through special test software (provided by manufacturer specifically for compliance testing, but not accessible by an end user) or through use of a base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

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

Test Procedure

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

Test setup



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3.3 RADIATED POWER

Test Overview

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

Test Settings

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

Test Note

1. The turntable is rotated through 360 degrees, and the receiving antenna scans in order to determine the level of the maximized emission.
2. A half wave dipole is then substituted in place of the EUT. For emissions above 1 GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator and the previously recorded signal was duplicated.
   The power is calculated by the following formula;
   $$P_{d\ (dBm)} = P_{g\ (dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dB)}$$
   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.

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3.4 RADIATED SPURIOUS EMISSIONS

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

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

Test Settings

1. RBW = 100 kHz for emissions below 1 GHz and 1 MHz for emissions above 1 GHz
2. VBW ≥ 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points > 2 x span / RBW
5. Detector = Peak
6. Trace mode = Max Hold
7. The trace was allowed to stabilize
8. Test channel : Low/ Middle/ High
9. Frequency range : We are performed all frequency to 10th 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.

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

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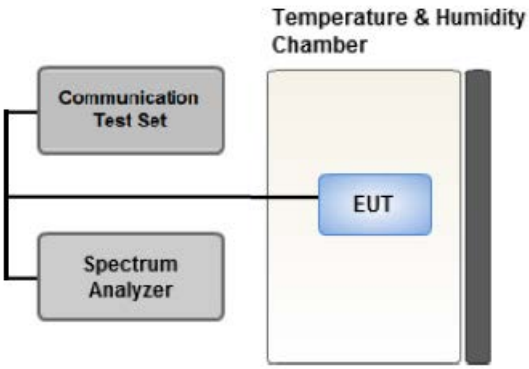
3.5 OCCUPIED BANDWIDTH.



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

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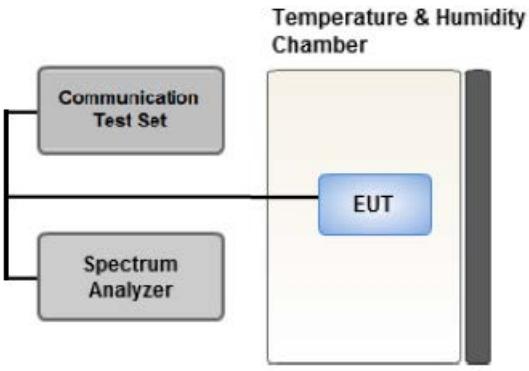
3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



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

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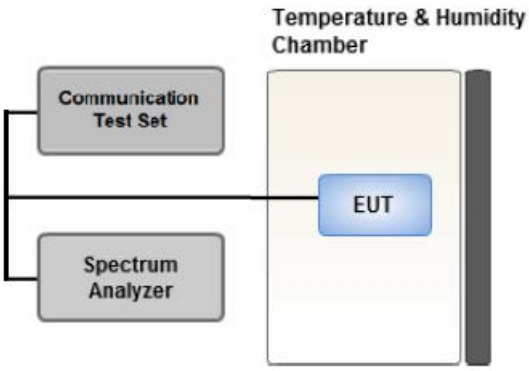
3.7 CHANNEL EDGE



Test setup

Test Overview

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

Test Settings

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW :
   .- EA licensee's frequency block by up to and including 37.5 kHz : 300 Hz
   .- EA licensee's frequency block greater than 37.5 kHz : 100 kHz
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW
7. Trace mode = trace average
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Test Notes

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

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

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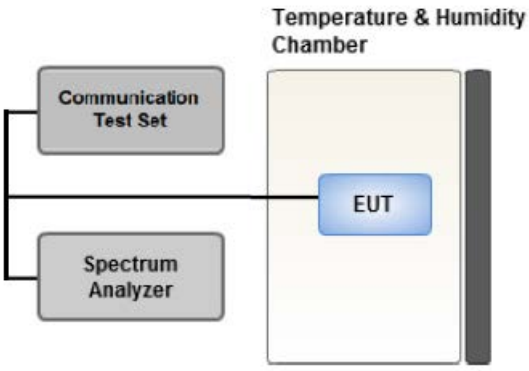
3.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE



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.

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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.
  Mode : Stand alone, Stand alone + External accessories (Earphone, 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.
- In the case of radiated spurious emissions, all bandwidth of operation were investigated and the worst case bandwidth results are reported. (Worst case : 3 MHz(Main 1 ANT), 15 MHz(Sub 1 ANT))
- The worst case is reported with the EUT positioning, modulations, and paging service configurations shown in the test data.
- All modes of operation were tested and the worst case results are reported.
- Please refer to the table below.
- SM-S931U & additional models were tested and the worst case results are reported.
  (Worst case : SM-S931U)

[Main 1 ANT Worst case]

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

[Sub 1 ANT Worst case]

Test Description	Modulation	RB size	RB offset	Axis
Effective Radiated Power	QPSK, 16QAM, 64QAM, 256QAM	See Section 9.1		X
Radiated Spurious and Harmonic Emissions	QPSK	See Section 9.2		Y

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3.10 WORST CASE(CONDUCTED TEST)

- Worst case : Of all modulation, We have tested modulation of the high Conducted Output Power.
- SM-S931U & additional models were tested and the worst case results are reported.
  (Worst case : SM-S931U)

[Worst case]

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

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4. LIST OF TEST EQUIPMENT

Equipment	Model	Manufacture	Serial No.	Due to Calibration	Calibration Interval
RF Switching System	Switch box(1.2 G HPF+LNA)	HCT CO., LTD.,	F1L1	08/21/2025	Annual
RF Switching System	Switch box(3.3 G HPF+LNA)	HCT CO., LTD.,	F1L2	08/21/2025	Annual
RF Switching System	Switch box(LNA)	HCT CO., LTD.,	F1L4	08/21/2025	Annual
RF Switching System	Switch box(6 G HPF+LNA)	HCT CO., LTD.,	F1L7	08/21/2025	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	11/17/2024	Annual
Wideband Radio Communication Tester	MT8820C	Anritsu Corp.	6201026545	12/11/2024	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
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).

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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)	1.98 (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)

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6. SUMMARY OF TEST RESULTS

6.1 Test Condition : Conducted Test

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

6.2 Test Condition : Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Effective Radiated Power	§ 22.913(a)(5)	< 7 Watts max. ERP (Only 15 MHz B.W)	PASS
Radiated Spurious and Harmonic Emissions	§ 2.1053, § 90.691 § 22.917(a)	< 43 + 10log10 (P[Watts]) for all out-of band emissions	PASS

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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.

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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

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8. TEST DATA(Main 1 ANT)

8.1 CONDUCTED OUTPUT POWER

Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm)				Limit (W)
				814.7 MHz		823.3 MHz		
				dBm	W	dBm	W	
1.4	QPSK	1	0	24.34	0.272	24.32	0.271	100
		1	3	24.34	0.272	24.31	0.270	100
		1	5	24.18	0.262	24.16	0.261	100
		3	0	24.36	0.273	24.35	0.272	100
		3	1	24.17	0.261	24.13	0.259	100
		3	3	24.30	0.269	24.28	0.268	100
		6	0	22.68	0.185	22.64	0.184	100
	16QAM	1	0	23.77	0.238	23.74	0.237	100
		1	3	23.53	0.225	23.51	0.224	100
		1	5	23.67	0.233	23.64	0.231	100
		3	0	23.56	0.227	23.55	0.226	100
		3	1	23.39	0.218	23.36	0.217	100
		3	3	23.57	0.228	23.56	0.227	100
		6	0	22.30	0.170	22.26	0.168	100
	64QAM	1	0	22.53	0.179	22.51	0.178	100
		1	3	22.67	0.185	22.64	0.184	100
		1	5	22.50	0.178	22.48	0.177	100
		3	0	22.44	0.175	22.42	0.175	100
		3	1	22.36	0.172	22.34	0.171	100
		3	3	22.37	0.173	22.33	0.171	100
		6	0	21.23	0.133	21.19	0.132	100
	256QAM	1	0	19.28	0.085	19.25	0.084	100
		1	3	19.46	0.088	19.43	0.088	100
		1	5	19.31	0.085	19.30	0.085	100
		3	0	19.37	0.086	19.35	0.086	100
		3	1	19.23	0.084	19.19	0.083	100
		3	3	19.34	0.086	19.34	0.086	100
		6	0	19.18	0.083	19.15	0.082	100

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Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm)				Limit (W)
				815.5 MHz		822.5 MHz		
				dBm	W	dBm	W	
3	QPSK	1	0	24.15	0.260	24.12	0.258	100
		1	7	24.21	0.264	24.20	0.263	100
		1	14	24.23	0.265	24.20	0.263	100
		8	0	23.29	0.213	23.27	0.213	100
		8	3	23.30	0.214	23.26	0.212	100
		8	7	23.28	0.213	23.26	0.212	100
		15	0	23.26	0.212	23.23	0.210	100
	16QAM	1	0	23.53	0.225	23.51	0.224	100
		1	7	23.65	0.232	23.62	0.230	100
		1	14	23.66	0.232	23.64	0.231	100
		8	0	22.32	0.171	22.30	0.170	100
		8	3	22.31	0.170	22.30	0.170	100
		8	7	22.40	0.174	22.37	0.173	100
		15	0	22.30	0.170	22.28	0.169	100
	64QAM	1	0	22.58	0.181	22.55	0.180	100
		1	7	22.72	0.187	22.71	0.187	100
		1	14	22.45	0.176	22.45	0.176	100
		8	0	21.33	0.136	21.29	0.135	100
		8	3	21.33	0.136	21.33	0.136	100
		8	7	21.35	0.136	21.32	0.136	100
		15	0	21.31	0.135	21.29	0.134	100
	256QAM	1	0	19.30	0.085	19.28	0.085	100
		1	7	19.18	0.083	19.14	0.082	100
		1	14	19.07	0.081	19.07	0.081	100
		8	0	19.24	0.084	19.20	0.083	100
		8	3	19.32	0.086	19.31	0.085	100
		8	7	19.31	0.085	19.28	0.085	100
		15	0	19.30	0.085	19.26	0.084	100

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Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm)				Limit (W)
				816.5 MHz		821.5 MHz		
				dBm	W	dBm	W	
5	QPSK	1	0	24.17	0.261	24.17	0.261	100
		1	12	24.28	0.268	24.24	0.266	100
		1	24	24.23	0.265	24.19	0.263	100
		12	0	23.23	0.210	23.20	0.209	100
		12	6	23.31	0.214	23.27	0.212	100
		12	11	23.33	0.215	23.33	0.215	100
		25	0	23.29	0.213	23.27	0.213	100
	16QAM	1	0	23.42	0.220	23.40	0.219	100
		1	12	23.47	0.222	23.45	0.222	100
		1	24	23.35	0.216	23.33	0.215	100
		12	0	22.19	0.166	22.17	0.165	100
		12	6	22.40	0.174	22.40	0.174	100
		12	11	22.33	0.171	22.32	0.171	100
		25	0	22.29	0.169	22.28	0.169	100
	64QAM	1	0	22.31	0.170	22.28	0.169	100
		1	12	22.65	0.184	22.63	0.183	100
		1	24	22.38	0.173	22.35	0.172	100
		12	0	21.27	0.134	21.26	0.134	100
		12	6	21.34	0.136	21.32	0.136	100
		12	11	21.24	0.133	21.20	0.132	100
		25	0	21.26	0.134	21.22	0.132	100
	256QAM	1	0	19.10	0.081	19.07	0.081	100
		1	12	19.39	0.087	19.37	0.086	100
		1	24	19.44	0.088	19.43	0.088	100
		12	0	19.15	0.082	19.14	0.082	100
		12	6	19.29	0.085	19.27	0.084	100
		12	11	19.30	0.085	19.26	0.084	100
		25	0	19.22	0.084	19.19	0.083	100

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Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm) 819 MHz		Limit (W)
				dBm	W	
10	QPSK	1	0	24.34	0.272	100
		1	24	24.35	0.273	100
		1	49	24.42	0.277	100
		25	0	23.24	0.211	100
		25	12	23.33	0.215	100
		25	24	23.27	0.212	100
		50	0	23.28	0.213	100
	16QAM	1	0	23.92	0.247	100
		1	24	23.55	0.226	100
		1	49	23.16	0.207	100
		25	0	22.27	0.169	100
		25	12	22.30	0.170	100
		25	24	22.26	0.168	100
		50	0	22.36	0.172	100
	64QAM	1	0	22.22	0.167	100
		1	24	22.39	0.173	100
		1	49	22.75	0.188	100
		25	0	21.21	0.132	100
		25	12	21.36	0.137	100
		25	24	21.32	0.135	100
		50	0	21.35	0.136	100
	256QAM	1	0	19.28	0.085	100
		1	24	19.52	0.089	100
		1	49	19.29	0.085	100
		25	0	19.21	0.083	100
		25	12	19.31	0.085	100
		25	24	19.29	0.085	100
		50	0	19.31	0.085	100

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Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm) 821.5 MHz		Limit (W)
				dBm	W	
15	QPSK	1	0	24.42	0.277	100
		1	36	24.48	0.280	100
		1	74	24.21	0.264	100
		36	0	23.24	0.211	100
		36	18	23.19	0.208	100
		36	39	23.26	0.212	100
		75	0	23.18	0.208	100
	16QAM	1	0	23.76	0.238	100
		1	36	23.42	0.220	100
		1	74	23.32	0.215	100
		36	0	22.27	0.169	100
		36	18	22.22	0.167	100
		36	39	22.19	0.166	100
		75	0	22.24	0.167	100
	64QAM	1	0	22.54	0.180	100
		1	36	22.58	0.181	100
		1	74	22.34	0.171	100
		36	0	21.25	0.133	100
		36	18	21.28	0.134	100
		36	39	21.21	0.132	100
		75	0	21.22	0.132	100
	256QAM	1	0	19.46	0.088	100
		1	36	19.53	0.090	100
		1	74	19.24	0.084	100
		36	0	19.22	0.084	100
		36	18	19.23	0.084	100
		36	39	19.14	0.082	100
		75	0	19.26	0.084	100

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8.2 EFFECTIVE RADIATED POWER

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
814.7	LTE B26/ 1.4 MHz	QPSK	-35.09	27.35	-10.29	1.44	V	< 100	0.037	15.62	1	5
		16QAM	-35.71	26.73	-10.29	1.44	V		0.032	15.00		
		64QAM	-36.79	25.65	-10.29	1.44	V		0.025	13.92		
		256QAM	-40.02	22.42	-10.29	1.44	V		0.012	10.69		
823.3		QPSK	-34.33	28.01	-10.25	1.44	V		0.043	16.32	1	3
		16QAM	-34.96	27.38	-10.25	1.44	V		0.037	15.69		
		64QAM	-36.09	26.25	-10.25	1.44	V		0.029	14.56		
		256QAM	-39.23	23.11	-10.25	1.44	V		0.014	11.42		

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
815.5	LTE B26/ 3 MHz	QPSK	-34.84	27.56	-10.29	1.44	V	< 100	0.038	15.83	1	14
		16QAM	-35.54	26.86	-10.29	1.44	V		0.033	15.13		
		64QAM	-36.66	25.74	-10.29	1.44	V		0.025	14.01		
		256QAM	-39.86	22.54	-10.29	1.44	V		0.012	10.81		
822.5		QPSK	-34.31	28.07	-10.25	1.44	V		0.043	16.38	1	8
		16QAM	-35.06	27.32	-10.25	1.44	V		0.037	15.63		
		64QAM	-36.11	26.27	-10.25	1.44	V		0.029	14.58		
		256QAM	-39.24	23.14	-10.25	1.44	V		0.014	11.45		

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Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
816.5	LTE B26/ 5 MHz	QPSK	-34.92	27.43	-10.28	1.44	V	< 100	0.037	15.71	1	24
		16QAM	-35.68	26.67	-10.28	1.44	V		0.031	14.95		
		64QAM	-36.78	25.57	-10.28	1.44	V		0.024	13.85		
		256QAM	-39.92	22.43	-10.28	1.44	V		0.012	10.71		
821.5		QPSK	-34.55	27.89	-10.26	1.44	V		0.042	16.19	1	13
		16QAM	-35.38	27.06	-10.26	1.44	V		0.034	15.36		
		64QAM	-36.51	25.93	-10.26	1.44	V		0.027	14.23		
		256QAM	-39.61	22.83	-10.26	1.44	V		0.013	11.13		

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
819.0	LTE B26/ 10 MHz	QPSK	-34.55	27.87	-10.27	1.44	V	< 100	0.041	16.16	1	49
		16QAM	-35.39	27.03	-10.27	1.44	V		0.034	15.32		
		64QAM	-36.47	25.95	-10.27	1.44	V		0.027	14.24		
		256QAM	-39.56	22.86	-10.27	1.44	V		0.013	11.15		

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
821.5	LTE B26/ 15 MHz	QPSK	-34.46	27.98	-10.26	1.44	V	< 7.00	0.042	16.28	1	74
		16QAM	-35.25	27.19	-10.26	1.44	V		0.035	15.49		
		64QAM	-36.44	26.00	-10.26	1.44	V		0.027	14.30		
		256QAM	-39.54	22.90	-10.26	1.44	V		0.013	11.20		

Note

1. Limit: None (for reporting purposes only)

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8.3 RADIATED SPURIOUS EMISSIONS

▣ MODE: LTE B26

▣ MODULATION SIGNAL: 3 MHz QPSK

▣ DISTANCE: 3 meters

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit	Size	
									Size	Offset
26705 (815.5)	1 631.00	-47.58	9.50	-66.16	1.98	V	-58.64	-13.00	1	14
	2 446.50	-38.23	10.28	-54.11	2.50	V	-46.33	-13.00		
	3 262.00	-47.91	11.86	-62.68	2.96	H	-53.78	-13.00		
26775 (822.5)	1 645.00	-48.63	9.65	-67.23	2.00	H	-59.58	-13.00	1	8
	2 467.50	-38.52	10.46	-54.36	2.59	V	-46.49	-13.00		
	3 290.00	-48.39	12.04	-63.41	2.94	H	-54.31	-13.00		

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8.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
Band 26	1.4 MHz	823.3	QPSK	6	0	1.0986
			16QAM			1.0992
			64QAM			1.0986
			256QAM			1.0983
	3 MHz	822.5	QPSK	15		2.7191
			16QAM			2.7217
			64QAM			2.7091
			256QAM			2.7159
	5 MHz	821.5	QPSK	25		4.5127
			16QAM			4.5114
			64QAM			4.5088
			256QAM			4.5154
	10 MHz	819.0	QPSK	50		9.0331
			16QAM			9.0474
			64QAM			9.0125
			256QAM			8.9835
	15 MHz	821.5	QPSK	75		13.491
			16QAM			13.496
			64QAM			13.458
			256QAM			13.517

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 69 ~ 88.

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8.5 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
26	1.4	814.7	3.1740	27.976	-67.228	-39.252	-13.00
		823.3	3.1661	27.976	-67.232	-39.256	
	3	815.5	3.6850	27.976	-67.053	-39.077	
		822.5	3.7079	27.976	-67.205	-39.229	
	5	816.5	3.7134	27.976	-67.176	-39.200	
		821.5	3.7109	27.976	-67.299	-39.323	
	10	819.0	3.6985	27.976	-67.256	-39.280	
	15	821.5	3.6725	27.976	-67.107	-39.131	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 109 ~ 116.
2. Conducted Spurious Emissions was Tested QPSK Modulation, Resource Block Size 1 and Resource Block Offset 0
3. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
4. Factor (dB) = Cable Loss + Ext. Attenuator + Power Splitter

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

8.6 CHANNEL EDGE

- Plots of the EUT's Band Edge are shown Page 89 ~ 108.

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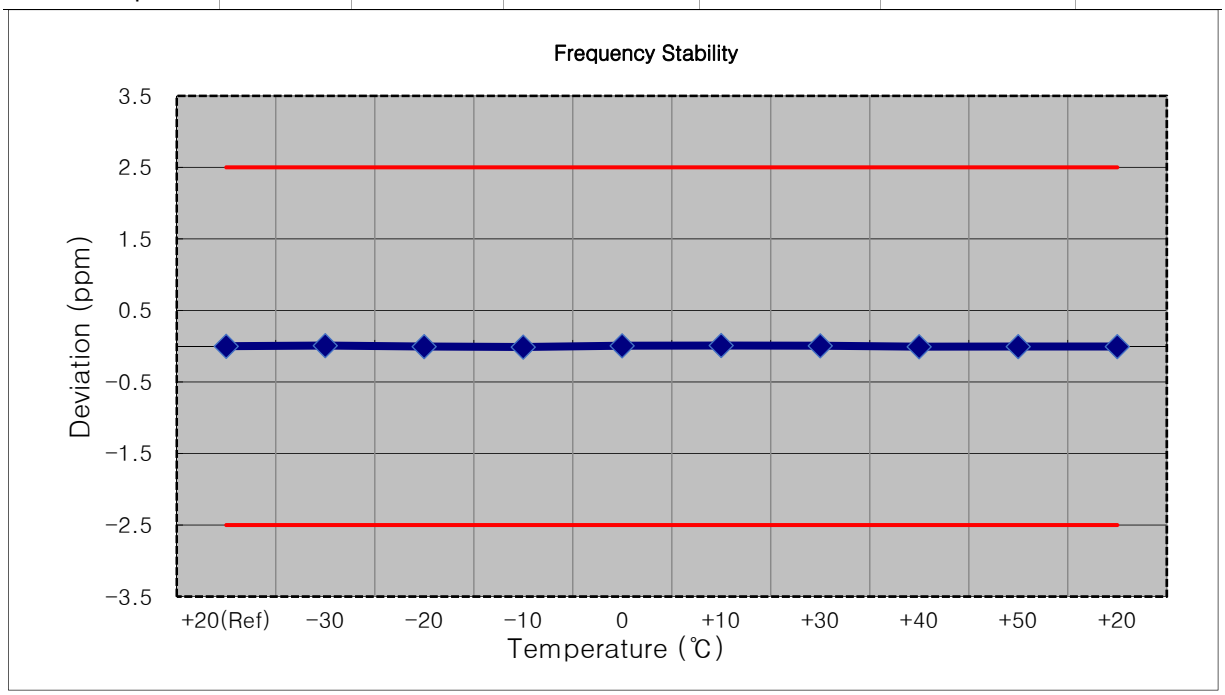
8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

- ▣ MODE: LTE 26
- ▣ OPERATING FREQUENCY: 814,700,000 Hz
- ▣ CHANNEL: 26697(1.4 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	814 700 005	0.0	0.000 000	0.000
100 %		-30	814 700 011	6.4	0.000 001	0.008
100 %		-20	814 700 001	-4.1	-0.000 001	-0.005
100 %		-10	814 699 996	-8.9	-0.000 001	-0.011
100 %		0	814 700 011	6.0	0.000 001	0.007
100 %		+10	814 700 013	8.5	0.000 001	0.010
100 %		+30	814 700 011	5.6	0.000 001	0.007
100 %		+40	814 700 000	-5.2	-0.000 001	-0.006
100 %		+50	814 700 001	-3.7	0.000 000	-0.005
Batt. Endpoint	3.300	+20	814 700 000	-4.6	-0.000 001	-0.006



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▣ MODE: LTE 26

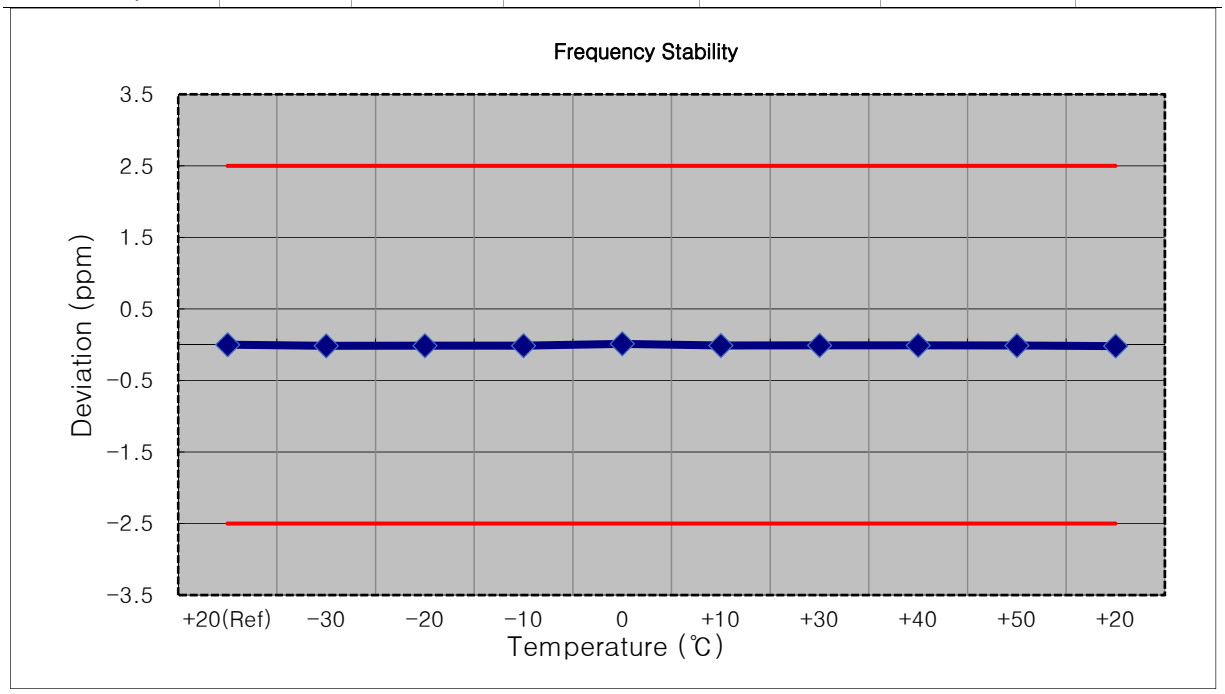
▣ OPERATING FREQUENCY: 815,500,000 Hz

▣ CHANNEL: 26705(3 MHz)

▣ REFERENCE VOLTAGE: 3.880 VDC

▣ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	815 500 013	0.0	0.000 000	0.000
100 %		-30	815 500 000	-12.8	-0.000 002	-0.016
100 %		-20	815 500 001	-12.1	-0.000 001	-0.015
100 %		-10	815 500 002	-11.2	-0.000 001	-0.014
100 %		0	815 500 023	9.6	0.000 001	0.012
100 %		+10	815 500 004	-9.5	-0.000 001	-0.012
100 %		+30	815 500 006	-7.6	-0.000 001	-0.009
100 %		+40	815 500 006	-7.1	-0.000 001	-0.009
100 %		+50	815 500 004	-9.2	-0.000 001	-0.011
Batt. Endpoint	3.300	+20	815 499 997	-15.9	-0.000 002	-0.019



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▣ MODE: LTE 26

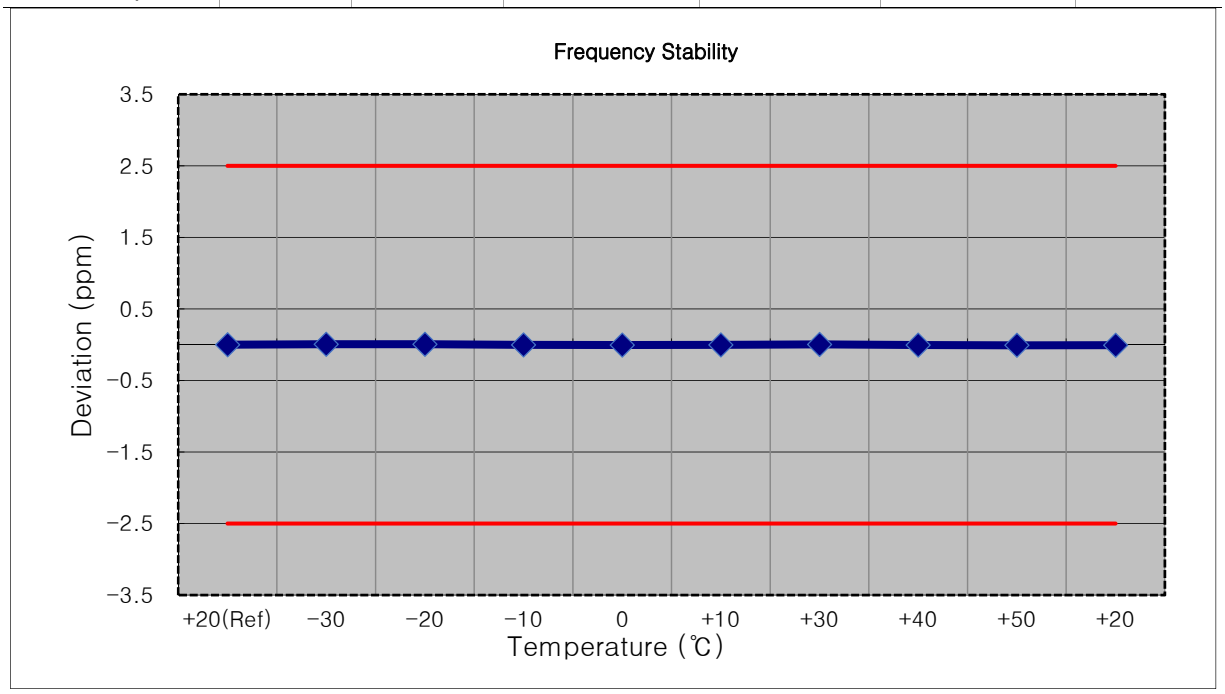
▣ OPERATING FREQUENCY: 816,500,000 Hz

▣ CHANNEL: 26715(5 MHz)

▣ REFERENCE VOLTAGE: 3.880 VDC

▣ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	816 500 004	0.0	0.000 000	0.000
100 %		-30	816 500 009	4.8	0.000 001	0.006
100 %		-20	816 500 009	4.9	0.000 001	0.006
100 %		-10	816 500 001	-2.7	0.000 000	-0.003
100 %		0	816 500 000	-3.5	0.000 000	-0.004
100 %		+10	816 500 002	-1.9	0.000 000	-0.002
100 %		+30	816 500 006	2.4	0.000 000	0.003
100 %		+40	816 500 000	-3.8	0.000 000	-0.005
100 %		+50	816 499 998	-6.4	-0.000 001	-0.008
Batt. Endpoint	3.300	+20	816 499 998	-5.7	-0.000 001	-0.007



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▣ MODE: LTE 26

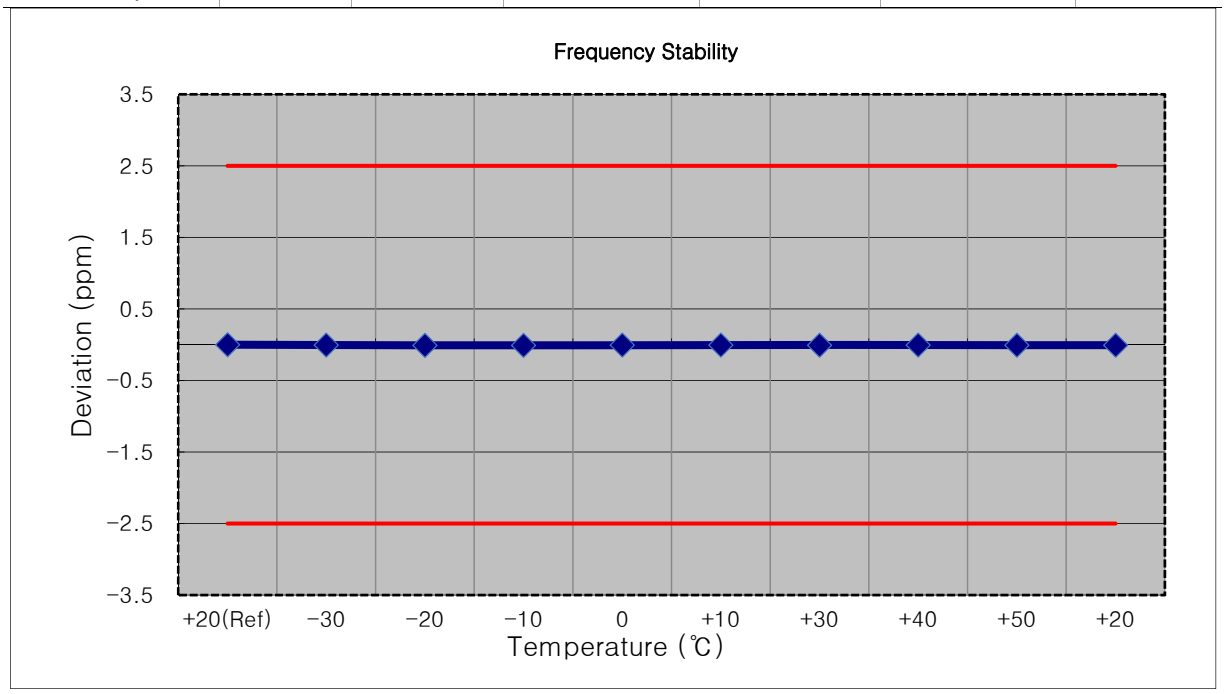
▣ OPERATING FREQUENCY: 819,000,000 Hz

▣ CHANNEL: 26740(10 MHz)

▣ REFERENCE VOLTAGE: 3.880 VDC

▣ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	818 999 994	0.0	0.000 000	0.000
100 %		-30	818 999 990	-4.4	-0.000 001	-0.005
100 %		-20	818 999 987	-7.7	-0.000 001	-0.009
100 %		-10	818 999 986	-8.4	-0.000 001	-0.010
100 %		0	818 999 990	-4.5	-0.000 001	-0.005
100 %		+10	818 999 989	-5.2	-0.000 001	-0.006
100 %		+30	818 999 988	-6.7	-0.000 001	-0.008
100 %		+40	818 999 989	-5.2	-0.000 001	-0.006
100 %		+50	818 999 988	-6.2	-0.000 001	-0.008
Batt. Endpoint	3.300	+20	818 999 988	-5.8	-0.000 001	-0.007



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▣ MODE: LTE 26

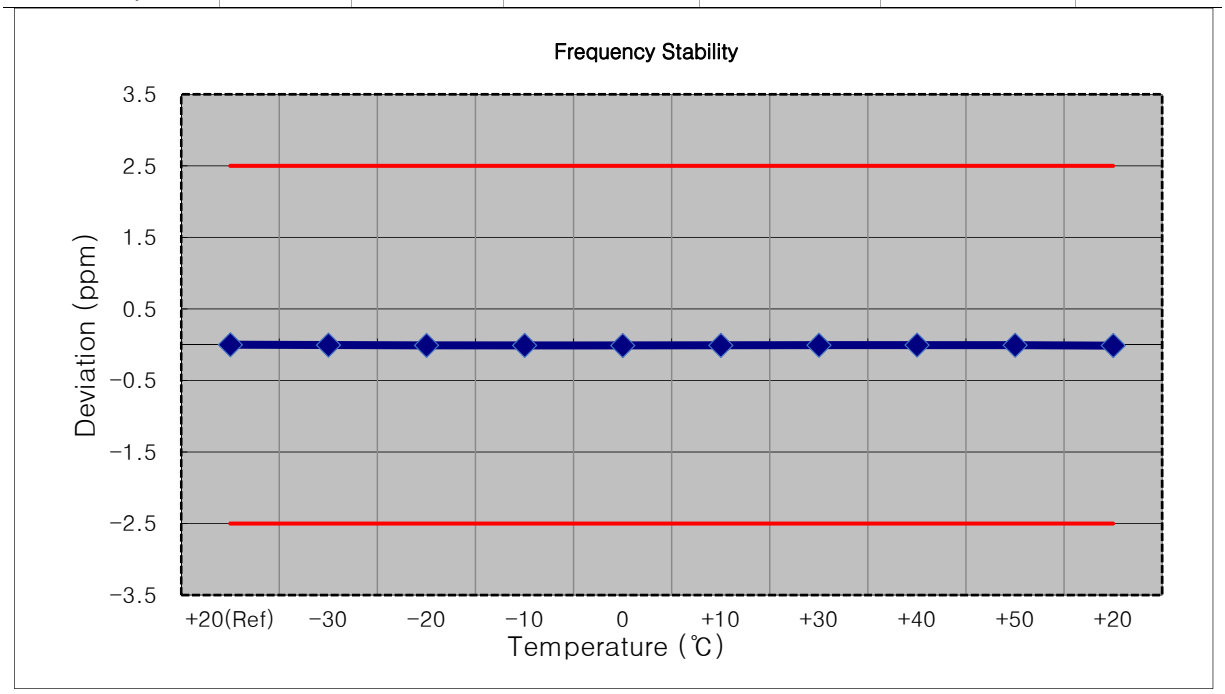
▣ OPERATING FREQUENCY: 821,500,000 Hz

▣ CHANNEL: 26765(15 MHz)

▣ REFERENCE VOLTAGE: 3.880 VDC

▣ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	821 499 995	0.0	0.000 000	0.000
100 %		-30	821 499 990	-5.0	-0.000 001	-0.006
100 %		-20	821 499 988	-7.9	-0.000 001	-0.010
100 %		-10	821 499 988	-7.4	-0.000 001	-0.009
100 %		0	821 499 986	-9.1	-0.000 001	-0.011
100 %		+10	821 499 988	-7.1	-0.000 001	-0.009
100 %		+30	821 499 989	-6.5	-0.000 001	-0.008
100 %		+40	821 499 990	-5.2	-0.000 001	-0.006
100 %		+50	821 499 989	-6.1	-0.000 001	-0.007
Batt. Endpoint	3.300	+20	821 499 985	-10.5	-0.000 001	-0.013



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8.8 STRADDLE CHANNEL

8.8.1 CONDUCTED OUTPUT POWER

Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm) 824 MHz		Limit (W)
				dBm	W	
1.4	QPSK	1	0	24.32	0.270	100
		1	3	24.32	0.271	100
		1	5	24.18	0.262	100
		3	0	24.34	0.271	100
		3	1	24.16	0.261	100
		3	3	24.28	0.268	100
		6	0	22.65	0.184	100
	16QAM	1	0	23.75	0.237	100
		1	3	23.51	0.224	100
		1	5	23.63	0.231	100
		3	0	23.52	0.225	100
		3	1	23.37	0.217	100
		3	3	23.54	0.226	100
		6	0	22.29	0.169	100
	64QAM	1	0	22.51	0.178	100
		1	3	22.64	0.184	100
		1	5	22.48	0.177	100
		3	0	22.43	0.175	100
		3	1	22.35	0.172	100
		3	3	22.34	0.171	100
		6	0	21.20	0.132	100
	256QAM	1	0	19.26	0.084	100
		1	3	19.43	0.088	100
		1	5	19.29	0.085	100
		3	0	19.36	0.086	100
		3	1	19.20	0.083	100
		3	3	19.30	0.085	100
		6	0	19.14	0.082	100

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Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm) 824 MHz		Limit (W)
				dBm	W	
3	QPSK	1	0	24.12	0.258	100
		1	7	24.17	0.261	100
		1	14	24.20	0.263	100
		8	0	23.26	0.212	100
		8	3	23.27	0.212	100
		8	7	23.25	0.211	100
		15	0	23.24	0.211	100
	16QAM	1	0	23.51	0.225	100
		1	7	23.64	0.231	100
		1	14	23.65	0.232	100
		8	0	22.30	0.170	100
		8	3	22.30	0.170	100
		8	7	22.39	0.174	100
		15	0	22.27	0.169	100
	64QAM	1	0	22.58	0.181	100
		1	7	22.70	0.186	100
		1	14	22.44	0.175	100
		8	0	21.29	0.135	100
		8	3	21.32	0.135	100
		8	7	21.32	0.136	100
		15	0	21.29	0.135	100
	256QAM	1	0	19.29	0.085	100
		1	7	19.15	0.082	100
		1	14	19.04	0.080	100
		8	0	19.24	0.084	100
		8	3	19.29	0.085	100
		8	7	19.30	0.085	100
		15	0	19.27	0.084	100

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Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm) 824 MHz		Limit (W)
				dBm	W	
5	QPSK	1	0	24.15	0.260	100
		1	12	24.28	0.268	100
		1	24	24.19	0.263	100
		12	0	23.22	0.210	100
		12	6	23.29	0.213	100
		12	11	23.31	0.214	100
		25	0	23.27	0.212	100
	16QAM	1	0	23.38	0.218	100
		1	12	23.44	0.221	100
		1	24	23.35	0.216	100
		12	0	22.16	0.164	100
		12	6	22.39	0.173	100
		12	11	22.32	0.171	100
		25	0	22.26	0.168	100
	64QAM	1	0	22.28	0.169	100
		1	12	22.64	0.184	100
		1	24	22.34	0.172	100
		12	0	21.25	0.133	100
		12	6	21.31	0.135	100
		12	11	21.21	0.132	100
		25	0	21.22	0.132	100
	256QAM	1	0	19.09	0.081	100
		1	12	19.36	0.086	100
		1	24	19.41	0.087	100
		12	0	19.15	0.082	100
		12	6	19.27	0.085	100
		12	11	19.29	0.085	100
		25	0	19.18	0.083	100

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Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm) 824 MHz dBm	Max. output power(dBm) 824 MHz W	Limit (W)
10	QPSK	1	0	24.35	0.272	100
		1	24	24.38	0.274	100
		1	49	24.40	0.276	100
		25	0	23.23	0.210	100
		25	12	23.31	0.214	100
		25	24	23.28	0.213	100
		50	0	23.25	0.211	100
	16QAM	1	0	23.92	0.246	100
		1	24	23.54	0.226	100
		1	49	23.16	0.207	100
		25	0	22.28	0.169	100
		25	12	22.31	0.170	100
		25	24	22.29	0.169	100
		50	0	22.36	0.172	100
	64QAM	1	0	22.22	0.167	100
		1	24	22.42	0.175	100
		1	49	22.74	0.188	100
		25	0	21.22	0.132	100
		25	12	21.36	0.137	100
		25	24	21.33	0.136	100
		50	0	21.33	0.136	100
	256QAM	1	0	19.30	0.085	100
		1	24	19.53	0.090	100
		1	49	19.27	0.085	100
		25	0	19.19	0.083	100
		25	12	19.30	0.085	100
		25	24	19.32	0.085	100
		50	0	19.28	0.085	100

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8.8.2 EFFECTIVE RADIATED POWER

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
824.0	LTE B26/ 1.4 MHz	QPSK	-34.23	28.07	-10.24	1.44	V	< 7.00	0.044	16.39	1	5
		16QAM	-34.95	27.35	-10.24	1.44	V		0.037	15.67		
		64QAM	-36.03	26.27	-10.24	1.44	V		0.029	14.59		
		256QAM	-39.23	23.07	-10.24	1.44	V		0.014	11.39		

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
824.0	LTE B26/ 3 MHz	QPSK	-34.58	27.72	-10.24	1.44	V	< 7.00	0.040	16.04	1	14
		16QAM	-35.33	26.97	-10.24	1.44	V		0.034	15.29		
		64QAM	-36.38	25.92	-10.24	1.44	V		0.027	14.24		
		256QAM	-39.60	22.70	-10.24	1.44	V		0.013	11.02		

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
824.0	LTE B26/ 5 MHz	QPSK	-34.56	27.74	-10.24	1.44	V	< 7.00	0.040	16.06	1	24
		16QAM	-35.30	27.00	-10.24	1.44	V		0.034	15.32		
		64QAM	-36.41	25.89	-10.24	1.44	V		0.026	14.21		
		256QAM	-39.57	22.73	-10.24	1.44	V		0.013	11.05		

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
824.0	LTE B26/ 10 MHz	QPSK	-34.45	27.85	-10.24	1.44	V	< 7.00	0.041	16.17	1	49
		16QAM	-35.22	27.08	-10.24	1.44	V		0.035	15.40		
		64QAM	-36.35	25.95	-10.24	1.44	V		0.027	14.27		
		256QAM	-39.43	22.87	-10.24	1.44	V		0.013	11.19		

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8.8.3 RADIATED SPURIOUS EMISSIONS

- ▣ MODE: LTE B26(Straddle)
- ▣ MODULATION SIGNAL: 1.4 MHz QPSK
- ▣ DISTANCE: 3 meters

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit	RB	
									Size	Offset
26790 (824.0)	1 648.00	-46.81	9.70	-65.47	2.02	H	-57.79	-13.00	1	5
	2 472.00	-37.44	10.46	-53.28	2.59	H	-45.41	-13.00		
	3 296.00	-48.24	12.07	-63.21	2.95	H	-54.09	-13.00		

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8.8.4 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
26	1.4	824.0	3.7044	27.976	-67.176	-39.200	-13.00
	3		3.6925	27.976	-67.082	-39.106	
	5		3.7039	27.976	-67.289	-39.313	
	10		3.7229	27.976	-67.276	-39.300	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 118 ~ 121.
2. Conducted Spurious Emissions was Tested QPSK Modulation, Resource Block Size 1 and Resource Block Offset 0
3. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
4. Factor (dB) = Cable Loss + Attenuator + Power Splitter

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

8.8.5 CHANNEL EDGE(Part90)

- Test Channel : 26790(824.0MHz)
- Plots of the EUT's Band Edge are shown Page 122 ~ 133.

8.8.6 BAND EDGE(Part22)

- Test Channel : 26790(824.0 MHz)
- Plots of the EUT's Band Edge are shown Page 134 ~ 141.

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9. TEST DATA(Sub 1 ANT)

9.1 CONDUCTED OUTPUT POWER

Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm)				Limit (W)
				814.7 MHz		823.3 MHz		
				dBm	W	dBm	W	
1.4	QPSK	1	0	23.94	0.248	23.93	0.247	100
		1	3	23.85	0.243	23.84	0.242	100
		1	5	23.85	0.243	23.84	0.242	100
		3	0	24.04	0.254	24.03	0.253	100
		3	1	24.00	0.251	23.99	0.251	100
		3	3	23.90	0.245	23.86	0.243	100
		6	0	22.34	0.171	22.30	0.170	100
	16QAM	1	0	23.49	0.223	23.49	0.223	100
		1	3	23.18	0.208	23.15	0.207	100
		1	5	23.25	0.211	23.23	0.210	100
		3	0	23.24	0.211	23.22	0.210	100
		3	1	23.14	0.206	23.14	0.206	100
		3	3	23.09	0.204	23.05	0.202	100
		6	0	22.03	0.160	22.01	0.159	100
	64QAM	1	0	22.37	0.173	22.35	0.172	100
		1	3	22.21	0.166	22.20	0.166	100
		1	5	22.15	0.164	22.14	0.164	100
		3	0	22.23	0.167	22.19	0.166	100
		3	1	22.28	0.169	22.28	0.169	100
		3	3	22.05	0.160	22.02	0.159	100
		6	0	21.05	0.127	21.04	0.127	100
	256QAM	1	0	19.16	0.082	19.13	0.082	100
		1	3	19.05	0.080	19.03	0.080	100
		1	5	19.03	0.080	19.01	0.080	100
		3	0	19.14	0.082	19.13	0.082	100
		3	1	18.90	0.078	18.90	0.078	100
		3	3	19.00	0.079	19.00	0.079	100
		6	0	18.94	0.078	18.93	0.078	100

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Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm)				Limit (W)
				815.5 MHz		822.5 MHz		
				dBm	W	dBm	W	
3	QPSK	1	0	24.01	0.252	24.00	0.251	100
		1	7	23.93	0.247	23.91	0.246	100
		1	14	23.78	0.239	23.74	0.237	100
		8	0	23.02	0.200	23.01	0.200	100
		8	3	23.05	0.202	23.04	0.201	100
		8	7	22.94	0.197	22.92	0.196	100
		15	0	23.00	0.200	22.98	0.199	100
	16QAM	1	0	23.02	0.200	22.98	0.199	100
		1	7	23.18	0.208	23.15	0.207	100
		1	14	23.22	0.210	23.21	0.209	100
		8	0	21.99	0.158	21.96	0.157	100
		8	3	22.05	0.160	22.04	0.160	100
		8	7	21.99	0.158	21.97	0.158	100
		15	0	22.05	0.160	22.05	0.160	100
	64QAM	1	0	22.18	0.165	22.14	0.164	100
		1	7	22.24	0.167	22.22	0.167	100
		1	14	21.87	0.154	21.84	0.153	100
		8	0	21.06	0.128	21.03	0.127	100
		8	3	21.07	0.128	21.03	0.127	100
		8	7	21.04	0.127	21.00	0.126	100
		15	0	20.96	0.125	20.95	0.125	100
	256QAM	1	0	18.91	0.078	18.89	0.077	100
		1	7	18.99	0.079	18.98	0.079	100
		1	14	18.94	0.078	18.90	0.078	100
		8	0	19.07	0.081	19.03	0.080	100
		8	3	18.86	0.077	18.85	0.077	100
		8	7	18.97	0.079	18.94	0.078	100
		15	0	18.90	0.078	18.88	0.077	100

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Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm)				Limit (W)
				816.5 MHz		821.5 MHz		
				dBm	W	dBm	W	
5	QPSK	1	0	23.98	0.250	23.96	0.249	100
		1	12	24.18	0.262	24.17	0.261	100
		1	24	23.92	0.247	23.89	0.245	100
		12	0	22.90	0.195	22.86	0.193	100
		12	6	23.02	0.200	23.01	0.200	100
		12	11	22.92	0.196	22.91	0.195	100
		25	0	22.93	0.196	22.89	0.195	100
	16QAM	1	0	23.38	0.218	23.37	0.217	100
		1	12	23.26	0.212	23.25	0.211	100
		1	24	23.29	0.213	23.28	0.213	100
		12	0	21.92	0.156	21.88	0.154	100
		12	6	22.04	0.160	22.02	0.159	100
		12	11	22.01	0.159	22.00	0.159	100
		25	0	21.92	0.156	21.91	0.155	100
	64QAM	1	0	22.18	0.165	22.16	0.164	100
		1	12	22.10	0.162	22.07	0.161	100
		1	24	21.67	0.147	21.64	0.146	100
		12	0	20.91	0.123	20.89	0.123	100
		12	6	20.97	0.125	20.95	0.125	100
		12	11	21.11	0.129	21.08	0.128	100
		25	0	20.93	0.124	20.92	0.124	100
	256QAM	1	0	19.08	0.081	19.04	0.080	100
		1	12	19.05	0.080	19.02	0.080	100
		1	24	18.91	0.078	18.90	0.078	100
		12	0	18.94	0.078	18.93	0.078	100
		12	6	19.05	0.080	19.04	0.080	100
		12	11	18.88	0.077	18.87	0.077	100
		25	0	18.93	0.078	18.92	0.078	100

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Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm) 819 MHz		Limit (W)
				dBm	W	
10	QPSK	1	0	23.97	0.250	100
		1	24	24.01	0.252	100
		1	49	23.84	0.242	100
		25	0	22.93	0.196	100
		25	12	22.96	0.198	100
		25	24	22.98	0.199	100
		50	0	22.99	0.199	100
	16QAM	1	0	23.10	0.204	100
		1	24	23.05	0.202	100
		1	49	22.85	0.193	100
		25	0	21.97	0.158	100
		25	12	22.04	0.160	100
		25	24	21.96	0.157	100
		50	0	21.98	0.158	100
	64QAM	1	0	21.93	0.156	100
		1	24	22.37	0.172	100
		1	49	21.86	0.154	100
		25	0	20.98	0.125	100
		25	12	21.27	0.134	100
		25	24	20.98	0.125	100
		50	0	21.01	0.126	100
	256QAM	1	0	18.95	0.079	100
		1	24	18.89	0.077	100
		1	49	19.03	0.080	100
		25	0	18.90	0.078	100
		25	12	18.98	0.079	100
		25	24	18.97	0.079	100
		50	0	18.95	0.078	100

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Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm) 821.5 MHz		Limit (W)
				dBm	W	
15	QPSK	1	0	23.96	0.249	100
		1	36	24.49	0.281	100
		1	74	24.01	0.252	100
		36	0	22.83	0.192	100
		36	18	22.81	0.191	100
		36	39	22.75	0.188	100
		75	0	22.83	0.192	100
	16QAM	1	0	23.61	0.230	100
		1	36	22.87	0.194	100
		1	74	22.85	0.193	100
		36	0	21.87	0.154	100
		36	18	21.85	0.153	100
		36	39	21.76	0.150	100
		75	0	21.86	0.153	100
	64QAM	1	0	21.97	0.157	100
		1	36	22.67	0.185	100
		1	74	21.85	0.153	100
		36	0	20.94	0.124	100
		36	18	20.84	0.121	100
		36	39	20.68	0.117	100
		75	0	20.83	0.121	100
	256QAM	1	0	18.92	0.078	100
		1	36	18.94	0.078	100
		1	74	18.92	0.078	100
		36	0	18.83	0.076	100
		36	18	18.80	0.076	100
		36	39	18.72	0.074	100
		75	0	18.73	0.075	100

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9.2 EFFECTIVE RADIATED POWER

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
814.7	LTE B26/ 1.4 MHz	QPSK	-32.36	30.08	-10.29	1.44	H	< 100	0.068	18.35	1	0
		16QAM	-32.96	29.48	-10.29	1.44	H		0.060	17.75		
		64QAM	-34.09	28.35	-10.29	1.44	H		0.046	16.62		
		256QAM	-37.25	25.19	-10.29	1.44	H		0.022	13.46		
823.3		QPSK	-32.73	29.61	-10.25	1.44	H		0.062	17.92	1	0
		16QAM	-33.40	28.94	-10.25	1.44	H		0.053	17.25		
		64QAM	-34.47	27.87	-10.25	1.44	H		0.042	16.18		
		256QAM	-37.59	24.75	-10.25	1.44	H		0.020	13.06		

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
815.5	LTE B26/ 3 MHz	QPSK	-32.30	30.10	-10.29	1.44	H	< 100	0.069	18.37	1	0
		16QAM	-33.00	29.40	-10.29	1.44	H		0.059	17.67		
		64QAM	-34.10	28.30	-10.29	1.44	H		0.045	16.57		
		256QAM	-37.34	25.06	-10.29	1.44	H		0.022	13.33		
822.5		QPSK	-32.65	29.73	-10.25	1.44	H		0.064	18.04	1	0
		16QAM	-33.30	29.08	-10.25	1.44	H		0.055	17.39		
		64QAM	-34.37	28.01	-10.25	1.44	H		0.043	16.32		
		256QAM	-37.55	24.83	-10.25	1.44	H		0.021	13.14		

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Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
816.5	LTE B26/ 5 MHz	QPSK	-32.22	30.13	-10.28	1.44	H	< 100	0.069	18.41	1	0
		16QAM	-32.92	29.43	-10.28	1.44	H		0.059	17.71		
		64QAM	-34.04	28.31	-10.28	1.44	H		0.046	16.59		
		256QAM	-37.33	25.02	-10.28	1.44	H		0.021	13.30		
821.5		QPSK	-32.59	29.85	-10.26	1.44	H		0.065	18.15	1	0
		16QAM	-33.11	29.33	-10.26	1.44	H		0.058	17.63		
		64QAM	-34.25	28.19	-10.26	1.44	H		0.045	16.49		
		256QAM	-37.49	24.95	-10.26	1.44	H		0.021	13.25		

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
819.0	LTE B26/ 10 MHz	QPSK	-32.32	30.10	-10.27	1.44	H	< 100	0.069	18.39	1	0
		16QAM	-33.09	29.33	-10.27	1.44	H		0.058	17.62		
		64QAM	-34.19	28.23	-10.27	1.44	H		0.045	16.52		
		256QAM	-37.30	25.12	-10.27	1.44	H		0.022	13.41		

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
821.5	LTE B26/ 15 MHz	QPSK	-32.31	30.13	-10.26	1.44	H	< 7.00	0.070	18.43	1	0
		16QAM	-33.08	29.36	-10.26	1.44	H		0.058	17.66		
		64QAM	-34.15	28.29	-10.26	1.44	H		0.046	16.59		
		256QAM	-37.30	25.14	-10.26	1.44	H		0.022	13.44		

Note

1. Limit: None (for reporting purposes only)

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9.3 RADIATED SPURIOUS EMISSIONS

▣ MODE: LTE B26

▣ MODULATION SIGNAL: 15 MHz QPSK

▣ DISTANCE: 3 meters

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit	Size	
									Size	Offset
26765 (821.5)	1 643.00	-44.30	9.65	-62.90	2.00	V	-55.25	-13.00	1	0
	2 464.50	-42.97	10.42	-58.85	2.59	V	-51.02	-13.00		
	3 286.00	-43.33	12.01	-58.18	2.95	V	-49.12	-13.00		

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9.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
Band 26	1.4 MHz	823.3	QPSK	6	0	1.0999
			16QAM			1.1000
			64QAM			1.1017
			256QAM			1.1046
	3 MHz	822.5	QPSK	15		2.7150
			16QAM			2.7191
			64QAM			2.7174
			256QAM			2.7077
	5 MHz	821.5	QPSK	25		4.5133
			16QAM			4.5266
			64QAM			4.5067
			256QAM			4.5032
	10 MHz	819.0	QPSK	50		9.0225
			16QAM			9.0065
			64QAM			9.0045
			256QAM			9.0095
	15 MHz	821.5	QPSK	75		13.516
			16QAM			13.535
			64QAM			13.513
			256QAM			13.511

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 143 ~ 162.

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9.5 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
26	1.4	814.7	3.6875	27.976	-67.398	-39.422	-13.00
		823.3	3.6925	27.976	-67.112	-39.136	
	3	815.5	3.6740	27.976	-67.295	-39.319	
		822.5	3.0494	27.976	-67.409	-39.433	
	5	816.5	3.1815	27.976	-67.301	-39.325	
		821.5	3.6890	27.976	-67.250	-39.274	
	10	819.0	3.7010	27.976	-67.395	-39.419	
	15	821.5	3.6920	27.976	-67.255	-39.279	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 183 ~ 190.
2. Conducted Spurious Emissions was Tested QPSK Modulation, Resource Block Size 1 and Resource Block Offset 0
3. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
4. Factor (dB) = Cable Loss + Ext. Attenuator + Power Splitter

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

9.6 CHANNEL EDGE

- Plots of the EUT's Band Edge are shown Page 163 ~ 182.

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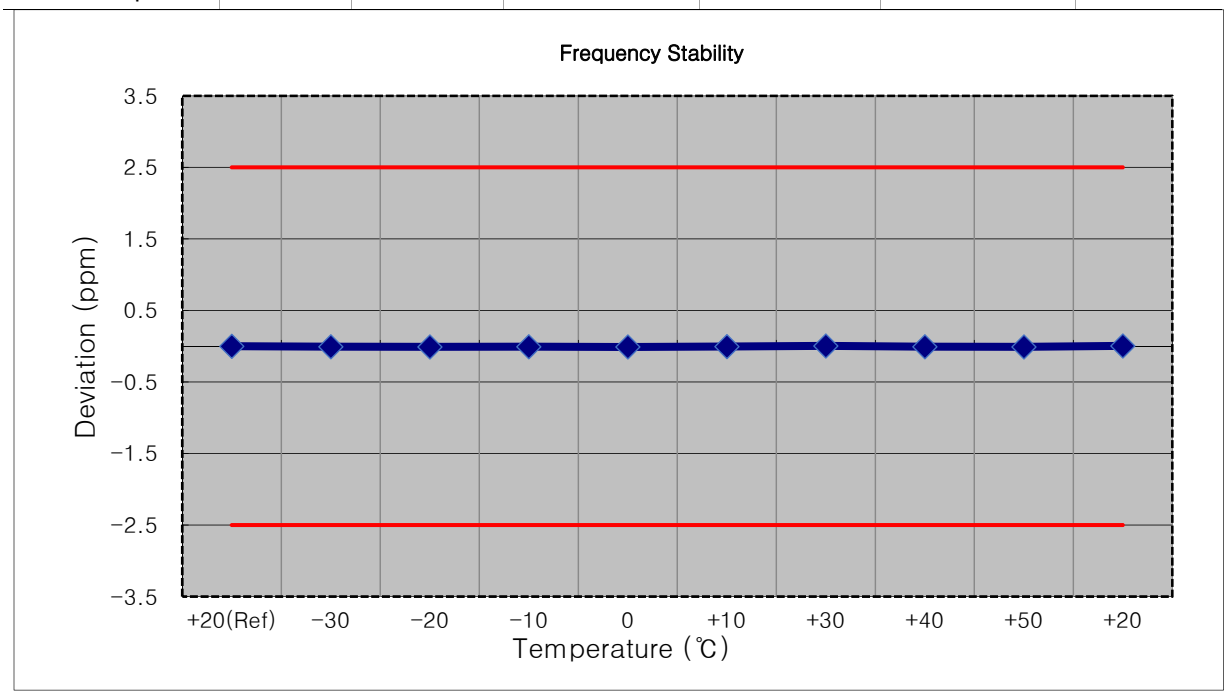
9.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

- ▣ MODE: LTE 26
- ▣ OPERATING FREQUENCY: 814,700,000 Hz
- ▣ CHANNEL: 26697(1.4 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	814 700 005	0.0	0.000 000	0.000
100 %		-30	814 699 999	-5.8	-0.000 001	-0.007
100 %		-20	814 699 998	-7.0	-0.000 001	-0.009
100 %		-10	814 700 000	-5.7	-0.000 001	-0.007
100 %		0	814 699 997	-8.1	-0.000 001	-0.010
100 %		+10	814 700 001	-4.4	-0.000 001	-0.005
100 %		+30	814 700 009	3.8	0.000 000	0.005
100 %		+40	814 700 000	-5.3	-0.000 001	-0.007
100 %		+50	814 699 998	-7.1	-0.000 001	-0.009
Batt. Endpoint	3.300	+20	814 700 009	3.3	0.000 000	0.004



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▣ MODE: LTE 26

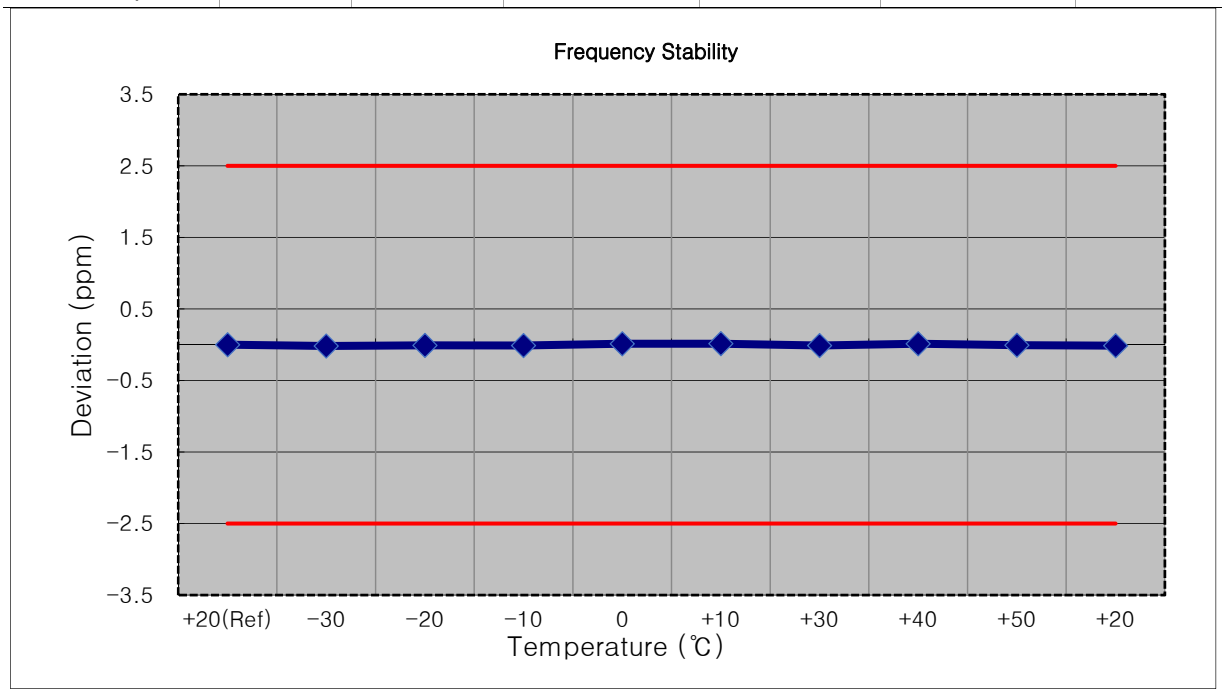
▣ OPERATING FREQUENCY: 815,500,000 Hz

▣ CHANNEL: 26705(3 MHz)

▣ REFERENCE VOLTAGE: 3.880 VDC

▣ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	815 499 985	0.0	0.000 000	0.000
100 %		-30	815 499 970	-14.7	-0.000 002	-0.018
100 %		-20	815 499 977	-8.5	-0.000 001	-0.010
100 %		-10	815 499 976	-9.5	-0.000 001	-0.012
100 %		0	815 499 996	10.5	0.000 001	0.013
100 %		+10	815 499 997	11.5	0.000 001	0.014
100 %		+30	815 499 976	-9.0	-0.000 001	-0.011
100 %		+40	815 499 995	9.9	0.000 001	0.012
100 %		+50	815 499 980	-5.2	-0.000 001	-0.006
Batt. Endpoint	3.300	+20	815 499 974	-11.5	-0.000 001	-0.014



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▣ MODE: LTE 26

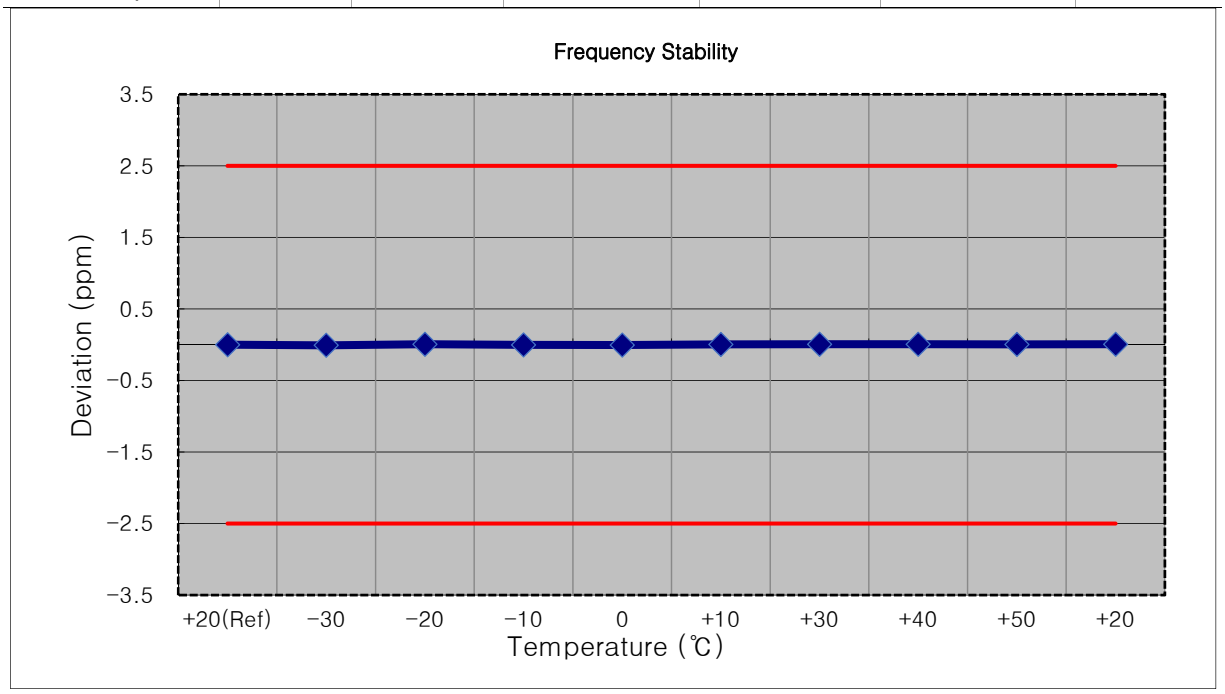
▣ OPERATING FREQUENCY: 816,500,000 Hz

▣ CHANNEL: 26715(5 MHz)

▣ REFERENCE VOLTAGE: 3.880 VDC

▣ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	816 499 997	0.0	0.000 000	0.000
100 %		-30	816 499 990	-6.3	-0.000 001	-0.008
100 %		-20	816 500 001	4.2	0.000 001	0.005
100 %		-10	816 499 993	-3.1	0.000 000	-0.004
100 %		0	816 499 991	-5.1	-0.000 001	-0.006
100 %		+10	816 500 000	3.6	0.000 000	0.004
100 %		+30	816 500 001	4.8	0.000 001	0.006
100 %		+40	816 500 001	4.6	0.000 001	0.006
100 %		+50	816 499 999	2.8	0.000 000	0.003
Batt. Endpoint	3.300	+20	816 500 001	4.5	0.000 001	0.006



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▣ MODE: LTE 26

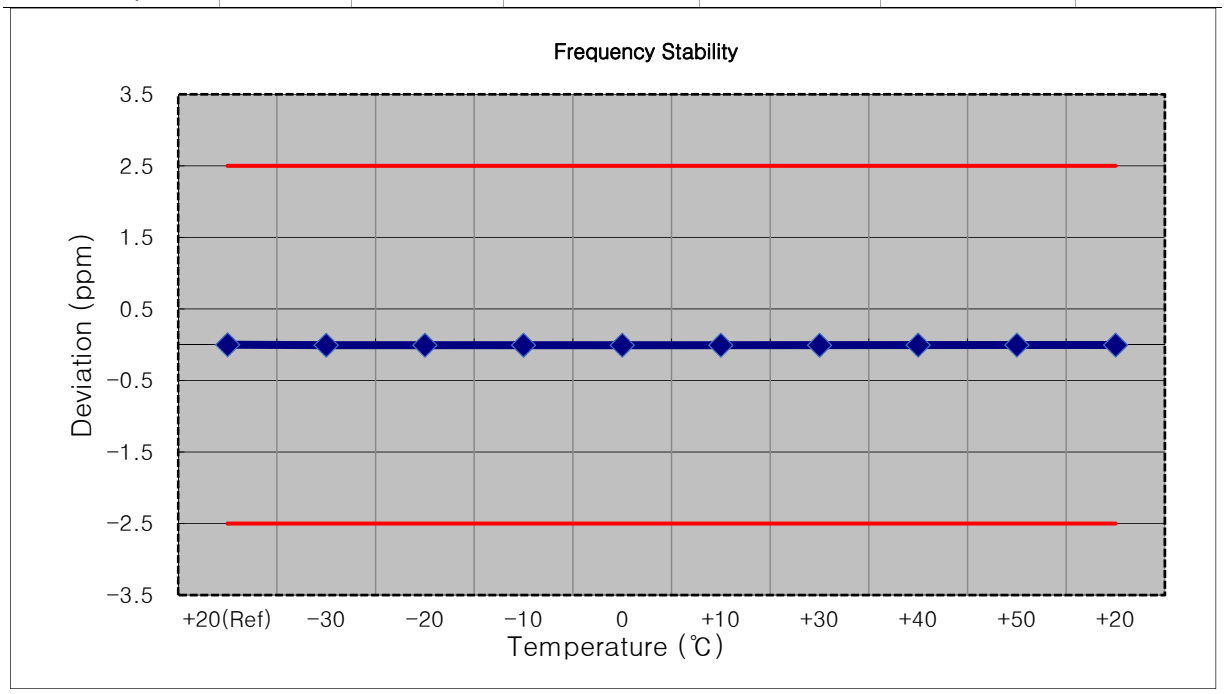
▣ OPERATING FREQUENCY: 819,000,000 Hz

▣ CHANNEL: 26740(10 MHz)

▣ REFERENCE VOLTAGE: 3.880 VDC

▣ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	818 999 994	0.0	0.000 000	0.000
100 %		-30	818 999 988	-5.8	-0.000 001	-0.007
100 %		-20	818 999 987	-6.7	-0.000 001	-0.008
100 %		-10	818 999 988	-5.7	-0.000 001	-0.007
100 %		0	818 999 988	-5.4	-0.000 001	-0.007
100 %		+10	818 999 988	-6.2	-0.000 001	-0.008
100 %		+30	818 999 988	-6.2	-0.000 001	-0.008
100 %		+40	818 999 989	-4.6	-0.000 001	-0.006
100 %		+50	818 999 989	-4.8	-0.000 001	-0.006
Batt. Endpoint	3.300	+20	818 999 989	-4.8	-0.000 001	-0.006



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▣ MODE: LTE 26

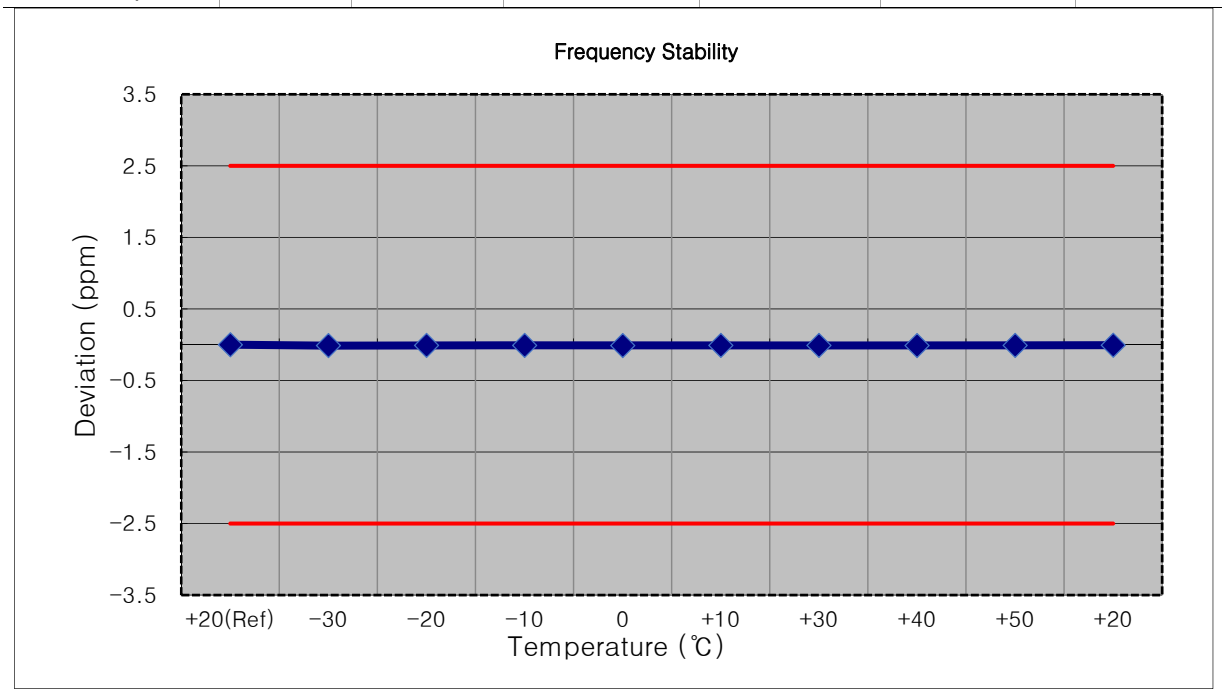
▣ OPERATING FREQUENCY: 821,500,000 Hz

▣ CHANNEL: 26765(15 MHz)

▣ REFERENCE VOLTAGE: 3.880 VDC

▣ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	821 499 992	0.0	0.000 000	0.000
100 %		-30	821 499 982	-9.9	-0.000 001	-0.012
100 %		-20	821 499 984	-7.7	-0.000 001	-0.009
100 %		-10	821 499 984	-7.8	-0.000 001	-0.009
100 %		0	821 499 983	-9.5	-0.000 001	-0.012
100 %		+10	821 499 985	-7.1	-0.000 001	-0.009
100 %		+30	821 499 984	-8.4	-0.000 001	-0.010
100 %		+40	821 499 983	-9.2	-0.000 001	-0.011
100 %		+50	821 499 985	-7.4	-0.000 001	-0.009
Batt. Endpoint	3.300	+20	821 499 985	-7.0	-0.000 001	-0.009



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9.8 STRADDLE CHANNEL

9.8.1 CONDUCTED OUTPUT POWER

Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm) 824 MHz		Limit (W)
				dBm	W	
1.4	QPSK	1	0	23.91	0.246	100
		1	3	23.85	0.243	100
		1	5	23.84	0.242	100
		3	0	24.03	0.253	100
		3	1	23.98	0.250	100
		3	3	23.88	0.244	100
		6	0	22.31	0.170	100
	16QAM	1	0	23.46	0.222	100
		1	3	23.15	0.206	100
		1	5	23.22	0.210	100
		3	0	23.21	0.210	100
		3	1	23.10	0.204	100
		3	3	23.07	0.203	100
		6	0	22.01	0.159	100
	64QAM	1	0	22.33	0.171	100
		1	3	22.21	0.166	100
		1	5	22.11	0.163	100
		3	0	22.19	0.166	100
		3	1	22.27	0.169	100
		3	3	22.03	0.160	100
		6	0	21.03	0.127	100
	256QAM	1	0	19.15	0.082	100
		1	3	19.02	0.080	100
		1	5	19.00	0.079	100
		3	0	19.14	0.082	100
		3	1	18.88	0.077	100
		3	3	18.99	0.079	100
		6	0	18.93	0.078	100

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Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm) 824 MHz		Limit (W)
				dBm	W	
3	QPSK	1	0	23.97	0.250	100
		1	7	23.89	0.245	100
		1	14	23.77	0.238	100
		8	0	23.00	0.200	100
		8	3	23.04	0.201	100
		8	7	22.92	0.196	100
		15	0	22.96	0.198	100
	16QAM	1	0	22.99	0.199	100
		1	7	23.15	0.207	100
		1	14	23.21	0.209	100
		8	0	21.97	0.157	100
		8	3	22.04	0.160	100
		8	7	21.98	0.158	100
		15	0	22.01	0.159	100
	64QAM	1	0	22.16	0.164	100
		1	7	22.20	0.166	100
		1	14	21.83	0.152	100
		8	0	21.05	0.127	100
		8	3	21.04	0.127	100
		8	7	21.03	0.127	100
		15	0	20.93	0.124	100
	256QAM	1	0	18.88	0.077	100
		1	7	18.97	0.079	100
		1	14	18.90	0.078	100
		8	0	19.03	0.080	100
		8	3	18.84	0.077	100
		8	7	18.95	0.078	100
		15	0	18.88	0.077	100

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Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm) 824 MHz dBm	Max. output power(dBm) 824 MHz W	Limit (W)
5	QPSK	1	0	23.96	0.249	100
		1	12	24.15	0.260	100
		1	24	23.89	0.245	100
		12	0	22.88	0.194	100
		12	6	23.00	0.199	100
		12	11	22.89	0.195	100
		25	0	22.92	0.196	100
	16QAM	1	0	23.37	0.217	100
		1	12	23.23	0.210	100
		1	24	23.25	0.212	100
		12	0	21.89	0.155	100
		12	6	22.01	0.159	100
		12	11	21.97	0.157	100
		25	0	21.92	0.156	100
	64QAM	1	0	22.17	0.165	100
		1	12	22.08	0.161	100
		1	24	21.65	0.146	100
		12	0	20.89	0.123	100
		12	6	20.96	0.125	100
		12	11	21.08	0.128	100
		25	0	20.89	0.123	100
	256QAM	1	0	19.08	0.081	100
		1	12	19.01	0.080	100
		1	24	18.88	0.077	100
		12	0	18.92	0.078	100
		12	6	19.03	0.080	100
		12	11	18.84	0.077	100
		25	0	18.91	0.078	100

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Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm) 824 MHz dBm	Max. output power(dBm) 824 MHz W	Limit (W)
10	QPSK	1	0	23.98	0.250	100
		1	24	24.02	0.252	100
		1	49	23.81	0.241	100
		25	0	22.92	0.196	100
		25	12	22.97	0.198	100
		25	24	22.99	0.199	100
		50	0	22.99	0.199	100
	16QAM	1	0	23.10	0.204	100
		1	24	23.03	0.201	100
		1	49	22.83	0.192	100
		25	0	21.95	0.157	100
		25	12	22.05	0.160	100
		25	24	21.96	0.157	100
		50	0	21.98	0.158	100
	64QAM	1	0	21.93	0.156	100
		1	24	22.34	0.171	100
		1	49	21.85	0.153	100
		25	0	20.99	0.125	100
		25	12	21.28	0.134	100
		25	24	20.97	0.125	100
		50	0	20.99	0.126	100
	256QAM	1	0	18.96	0.079	100
		1	24	18.89	0.078	100
		1	49	19.01	0.080	100
		25	0	18.92	0.078	100
		25	12	19.00	0.079	100
		25	24	18.95	0.079	100
		50	0	18.94	0.078	100

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9.8.2 EFFECTIVE RADIATED POWER

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
824.0	LTE B26/ 1.4 MHz	QPSK	-32.67	29.63	-10.24	1.44	H	< 7.00	0.062	17.95	1	0
		16QAM	-33.46	28.84	-10.24	1.44	H		0.052	17.16		
		64QAM	-34.54	27.76	-10.24	1.44	H		0.041	16.08		
		256QAM	-37.62	24.68	-10.24	1.44	H		0.020	13.00		

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
824.0	LTE B26/ 3 MHz	QPSK	-32.54	29.76	-10.24	1.44	H	< 7.00	0.064	18.08	1	0
		16QAM	-33.38	28.92	-10.24	1.44	H		0.053	17.24		
		64QAM	-34.45	27.85	-10.24	1.44	H		0.041	16.17		
		256QAM	-37.57	24.73	-10.24	1.44	H		0.020	13.05		

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
824.0	LTE B26/ 5 MHz	QPSK	-32.58	29.72	-10.24	1.44	H	< 7.00	0.064	18.04	1	0
		16QAM	-33.25	29.05	-10.24	1.44	H		0.055	17.37		
		64QAM	-34.36	27.94	-10.24	1.44	H		0.042	16.26		
		256QAM	-37.54	24.76	-10.24	1.44	H		0.020	13.08		

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
824.0	LTE B26/ 10 MHz	QPSK	-32.67	29.63	-10.24	1.44	H	< 7.00	0.062	17.95	1	0
		16QAM	-33.31	28.99	-10.24	1.44	H		0.054	17.31		
		64QAM	-34.40	27.90	-10.24	1.44	H		0.042	16.22		
		256QAM	-37.50	24.80	-10.24	1.44	H		0.021	13.12		

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9.8.3 RADIATED SPURIOUS EMISSIONS

▣ MODE: LTE B26(Straddle)

▣ MODULATION SIGNAL: 3 MHz QPSK

▣ DISTANCE: 3 meters

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit	RB	
									Size	Offset
26790 (824.0)	1 648.00	-43.61	9.70	-62.27	2.02	V	-54.59	-13.00	1	0
	2 472.00	-41.57	10.46	-57.41	2.59	V	-49.54	-13.00		
	3 296.00	-44.12	12.07	-59.09	2.95	V	-49.97	-13.00		

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9.8.4 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
26	1.4	824.0	3.1666	27.976	-67.276	-39.300	-13.00
	3		3.7020	27.976	-67.123	-39.147	
	5		3.7020	27.976	-67.256	-39.280	
	10		3.7229	27.976	-67.390	-39.414	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 192 ~ 195.
2. Conducted Spurious Emissions was Tested QPSK Modulation, Resource Block Size 1 and Resource Block Offset 0
3. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
4. Factor (dB) = Cable Loss + Attenuator + Power Splitter

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

9.8.5 CHANNEL EDGE(Part90)

- Test Channel : 26790(824.0MHz)
- Plots of the EUT's Band Edge are shown Page 196 ~ 207.

9.8.6 BAND EDGE(Part22)

- Test Channel : 26790(824.0 MHz)
- Plots of the EUT's Band Edge are shown Page 208 ~ 215.

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10. TEST PLOTS(Main 1 ANT)

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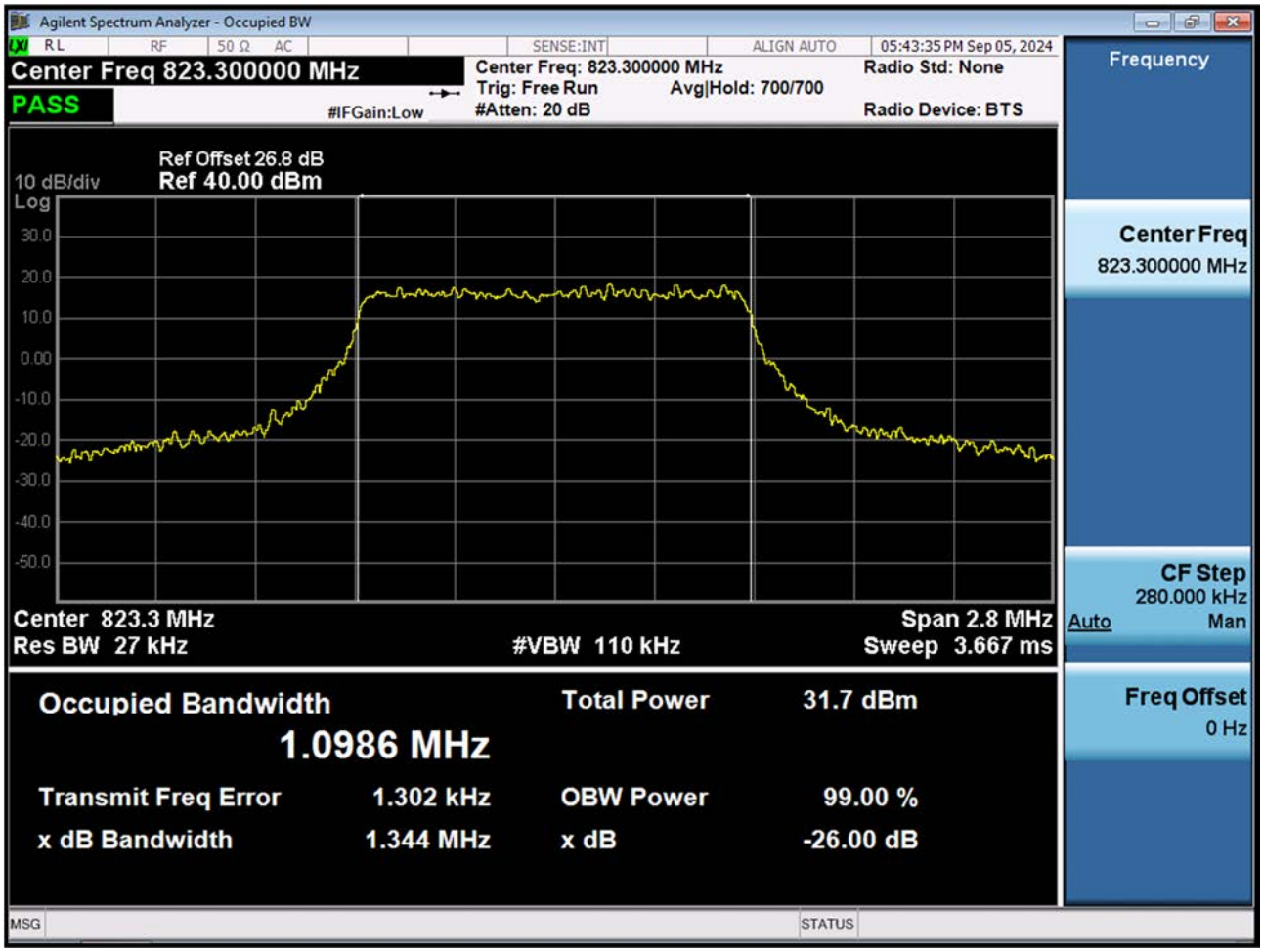
BAND 26. Occupied Bandwidth Plot (1.4 M BW Ch.26783 QPSK RB 6_0)



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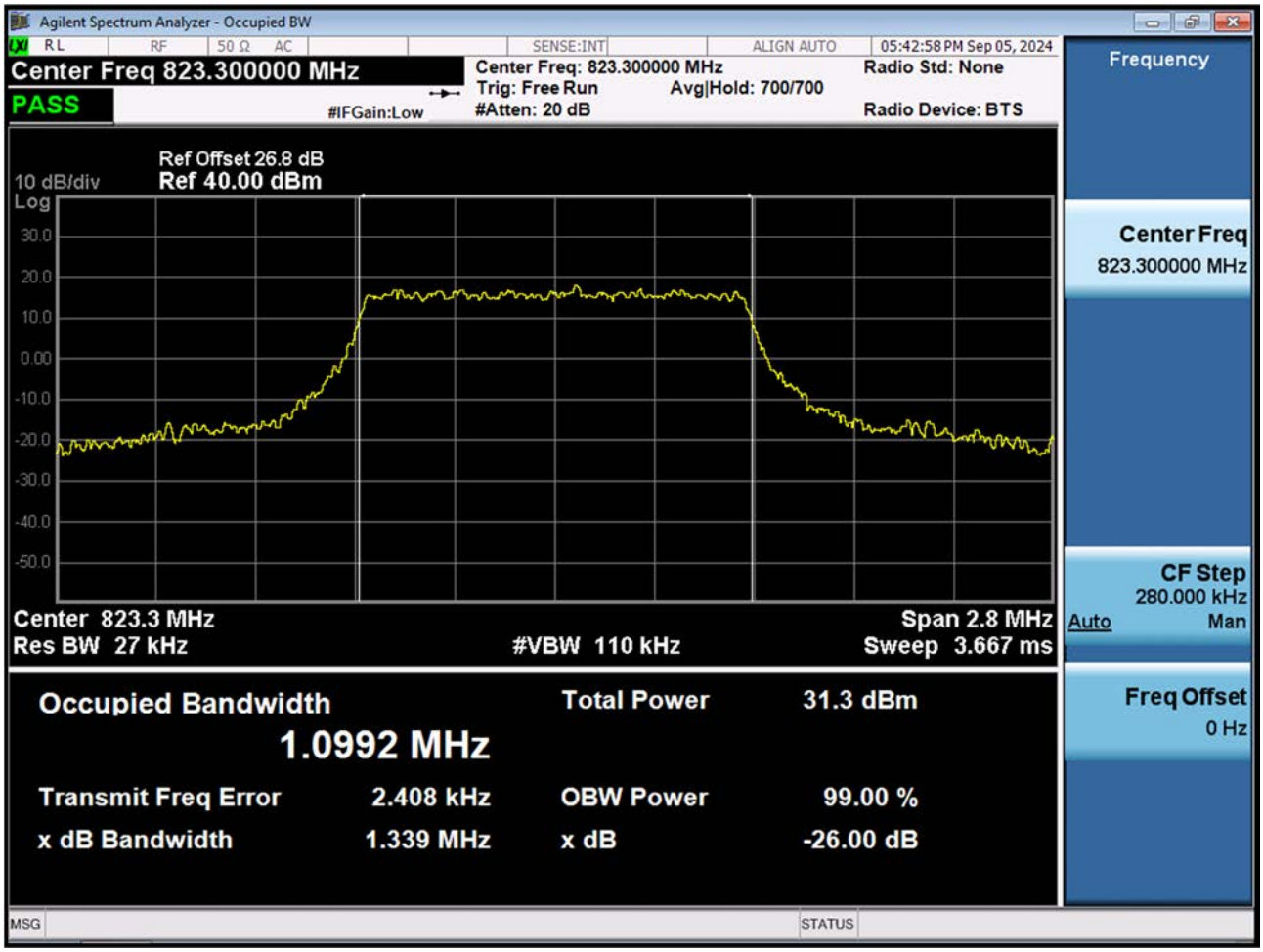
BAND 26. Occupied Bandwidth Plot (1.4 M BW Ch.26783 16QAM RB 6_0)



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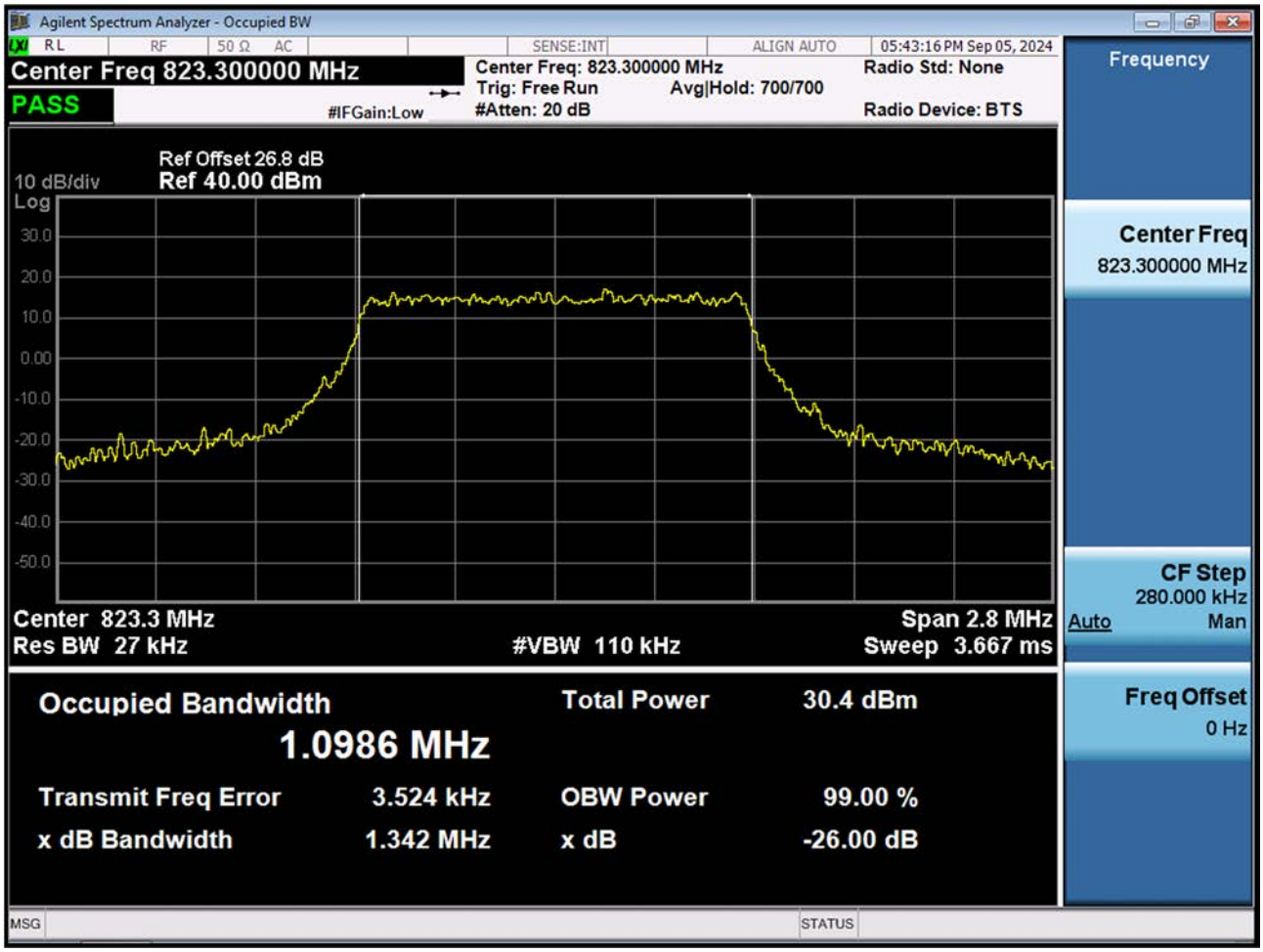
BAND 26. Occupied Bandwidth Plot (1.4 M BW Ch.26783 64QAM RB 6_0)



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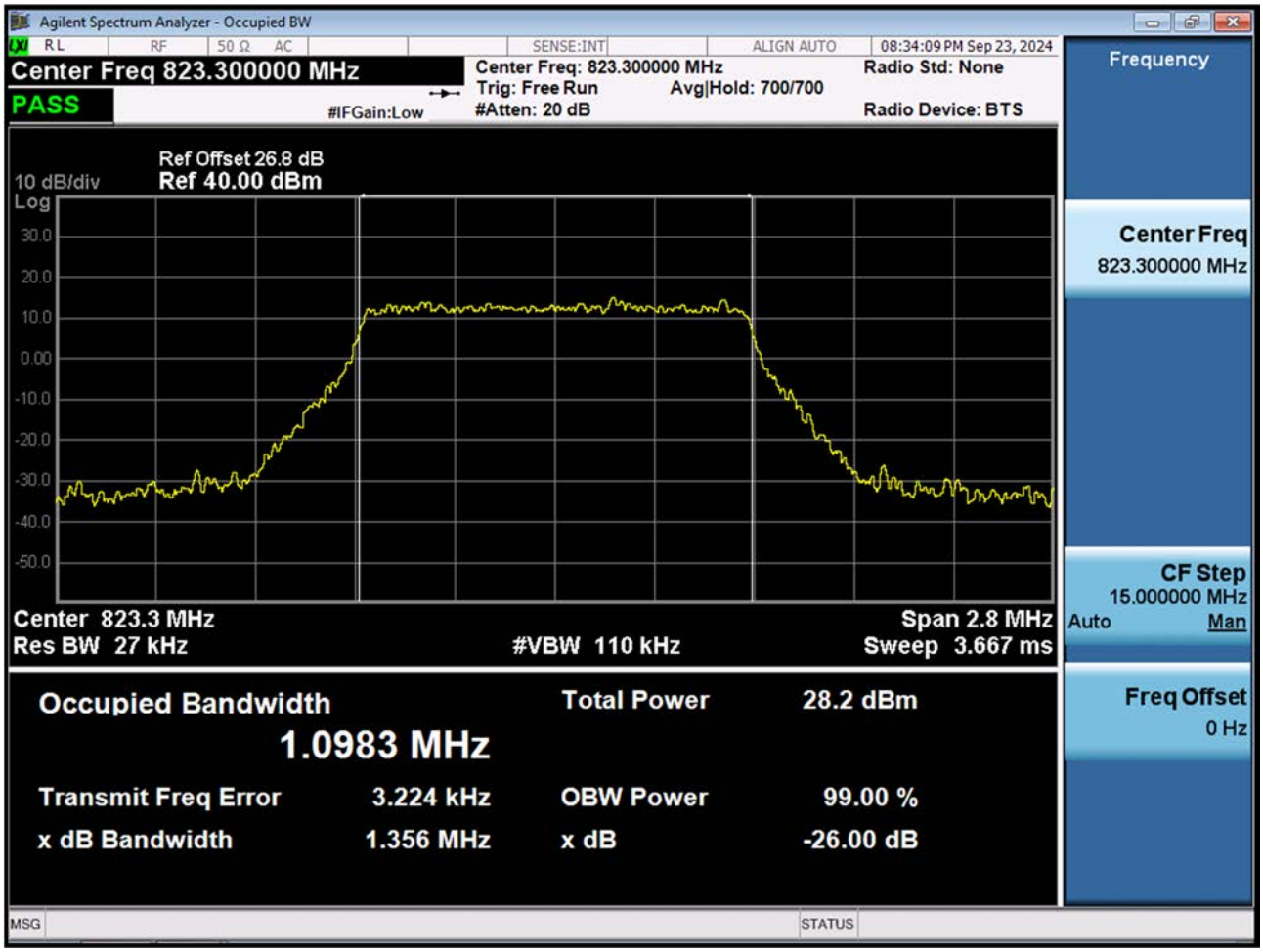
BAND 26. Occupied Bandwidth Plot (1.4 M BW Ch.26783 256QAM RB 6_0)



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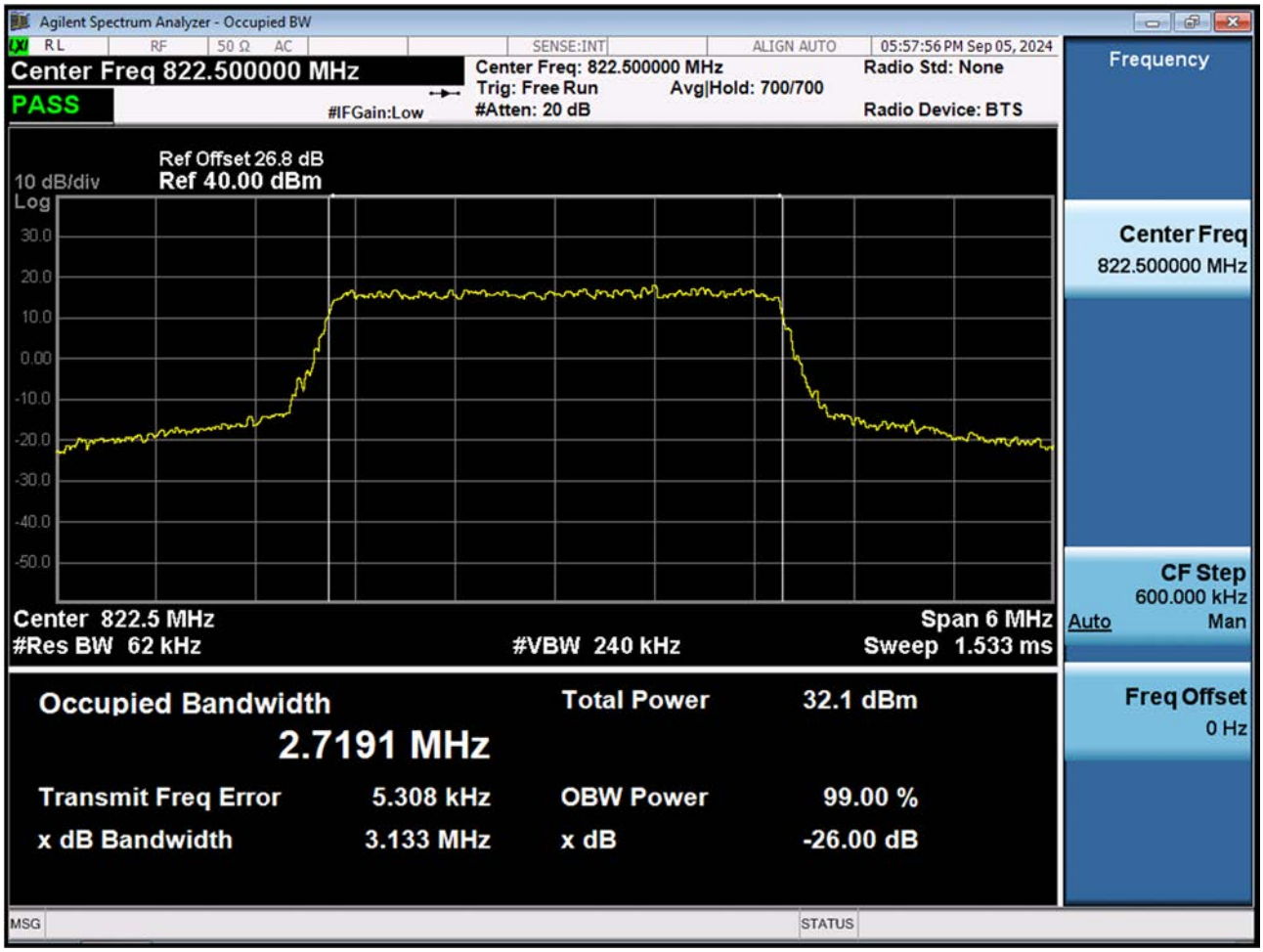
BAND 26. Occupied Bandwidth Plot (3 M BW Ch.26775 QPSK RB 15_0)



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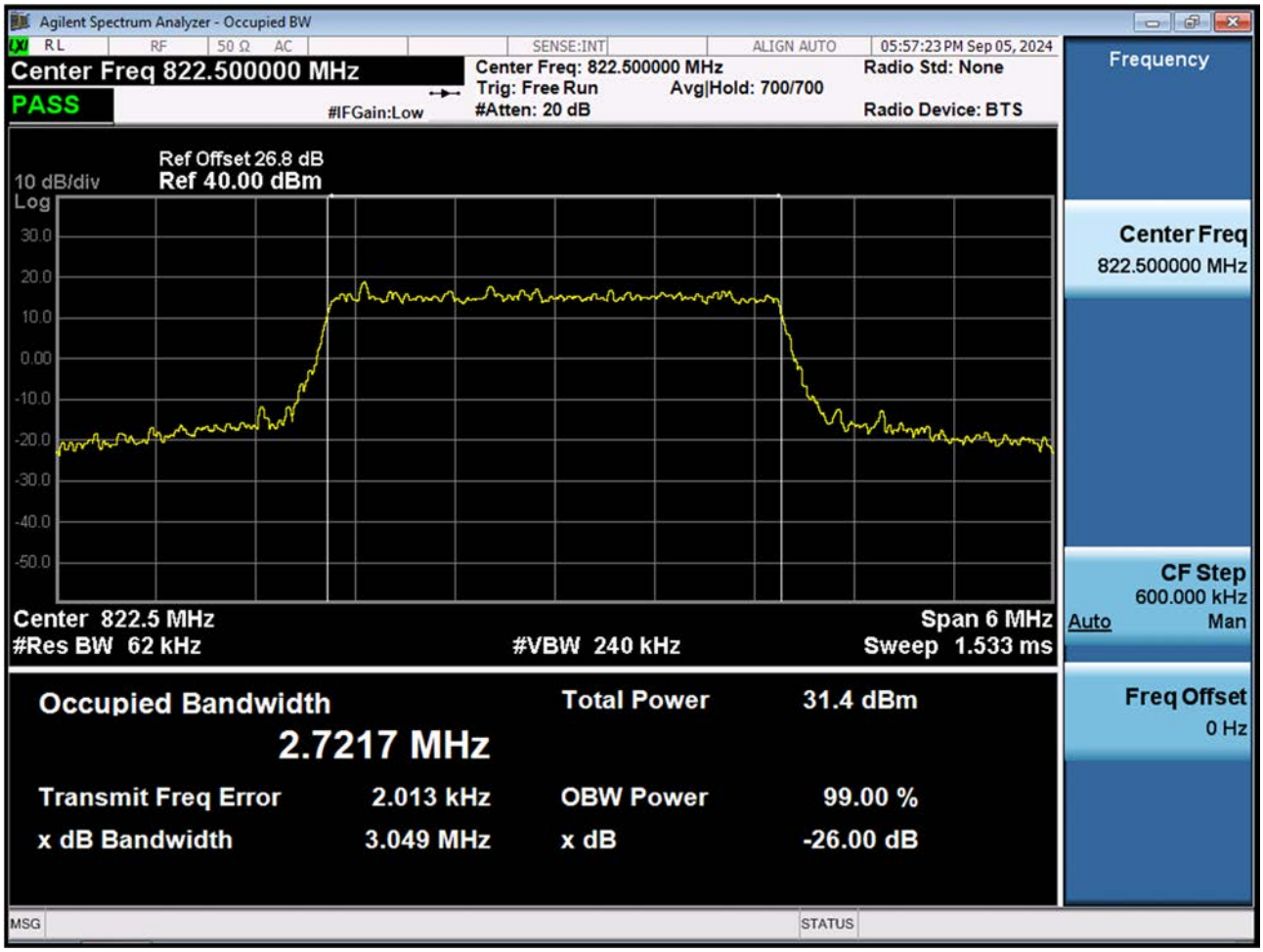
BAND 26. Occupied Bandwidth Plot (3 M BW Ch.26775 16QAM RB 15_0)



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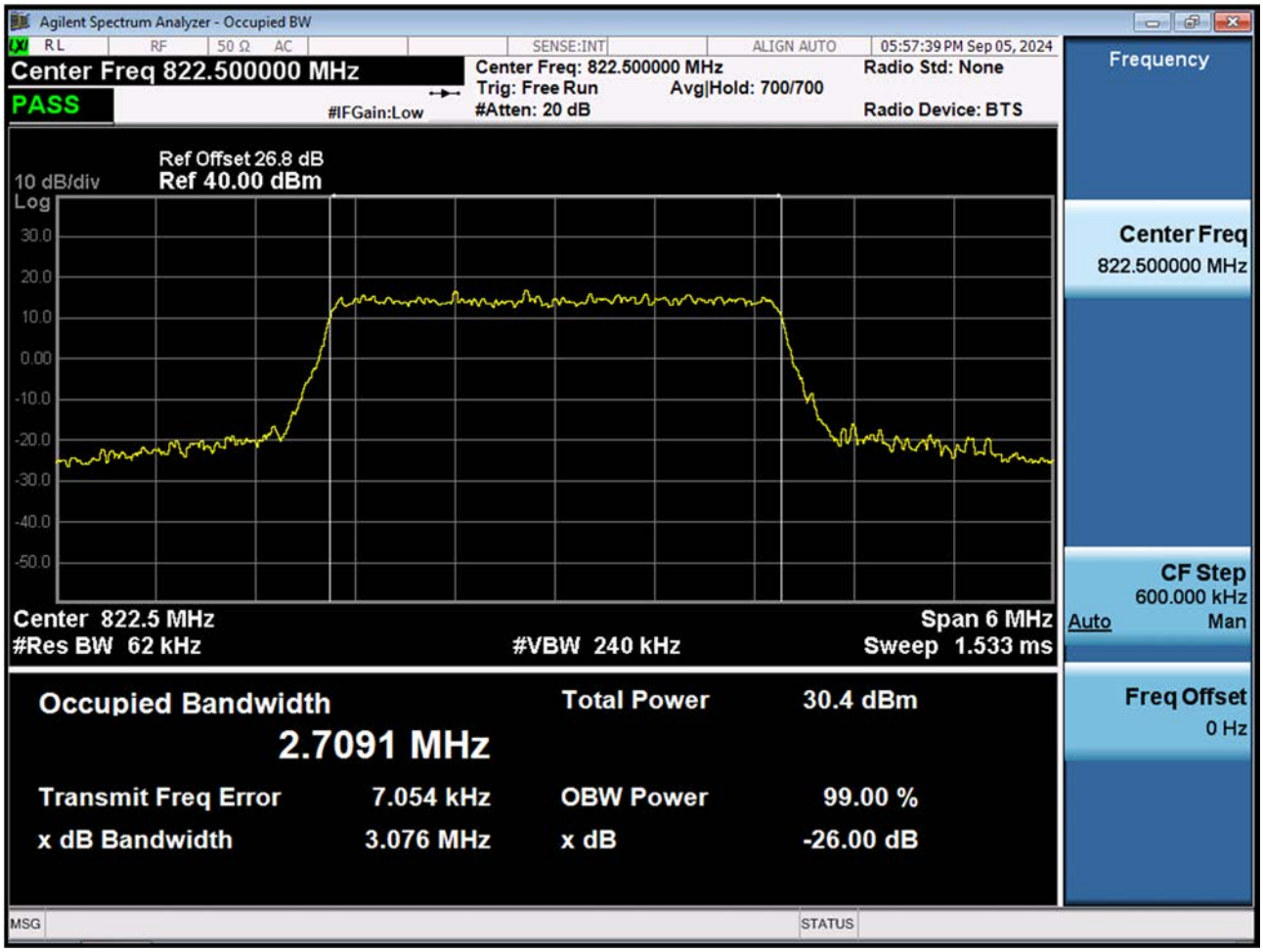
BAND 26. Occupied Bandwidth Plot (3 M BW Ch.26775 64QAM RB 15_0)



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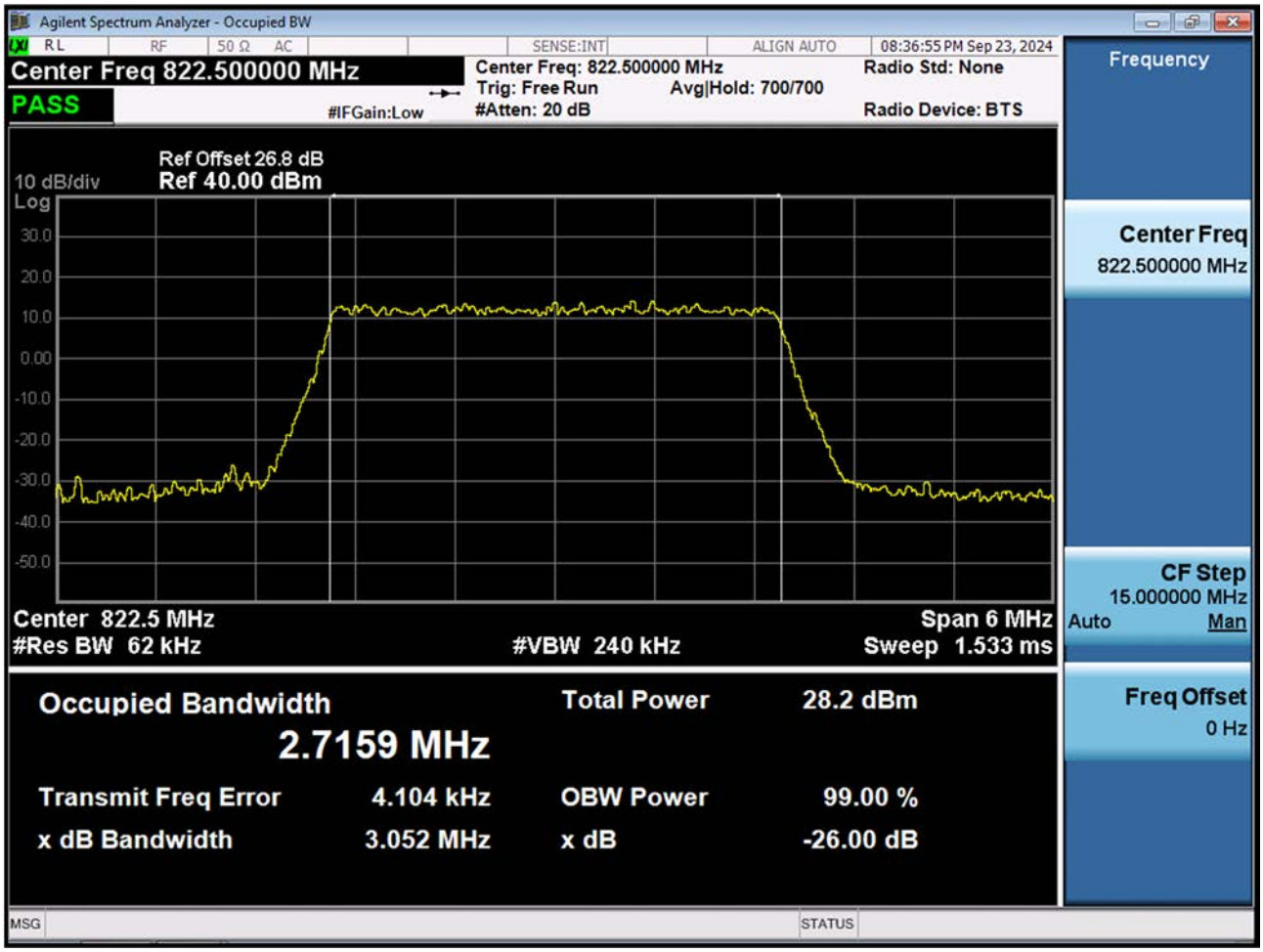
BAND 26. Occupied Bandwidth Plot (3 M BW Ch.26775 256QAM RB 15_0)



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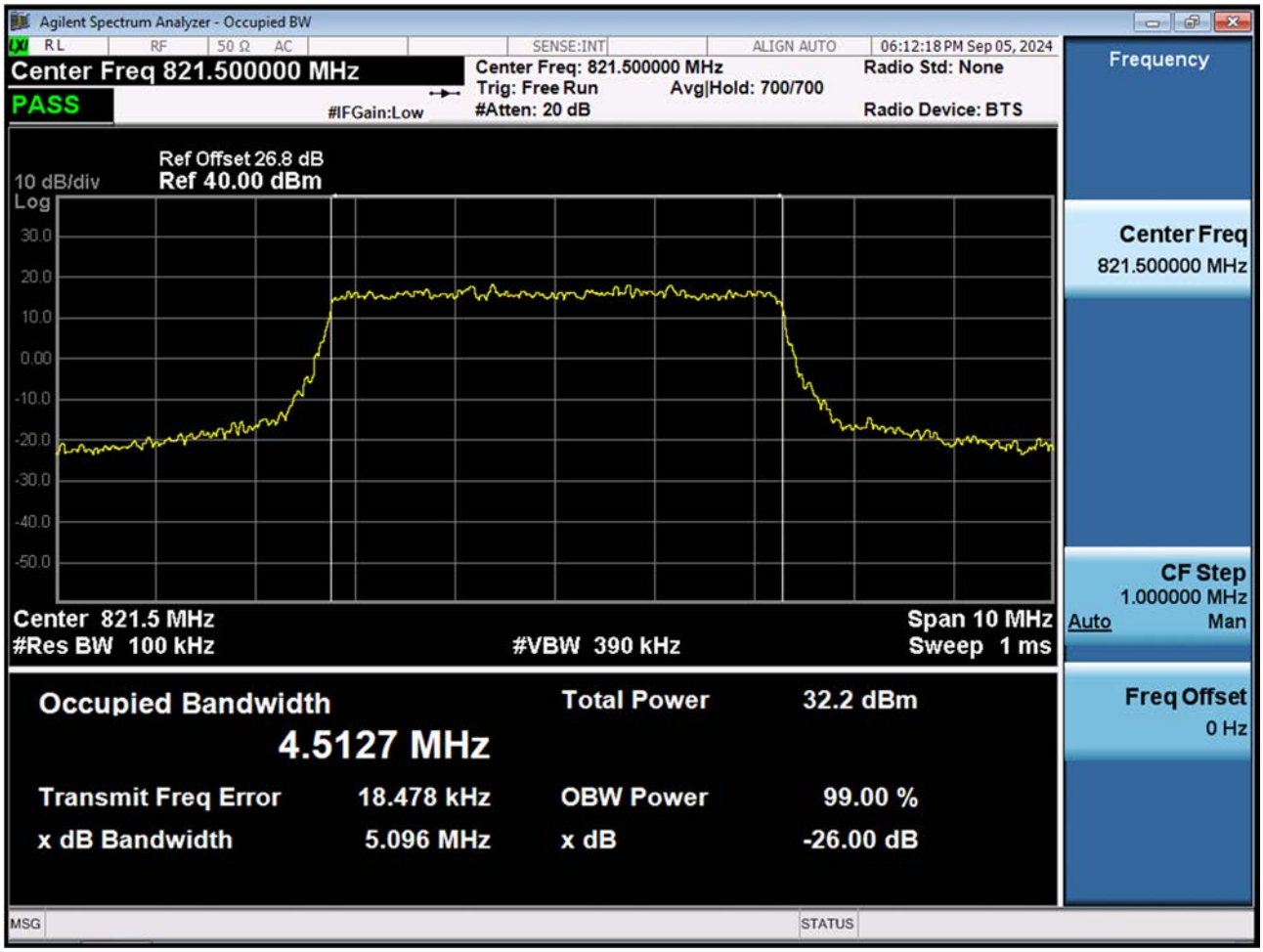
BAND 26. Occupied Bandwidth Plot (5 M BW Ch.26765 QPSK RB 25_0)



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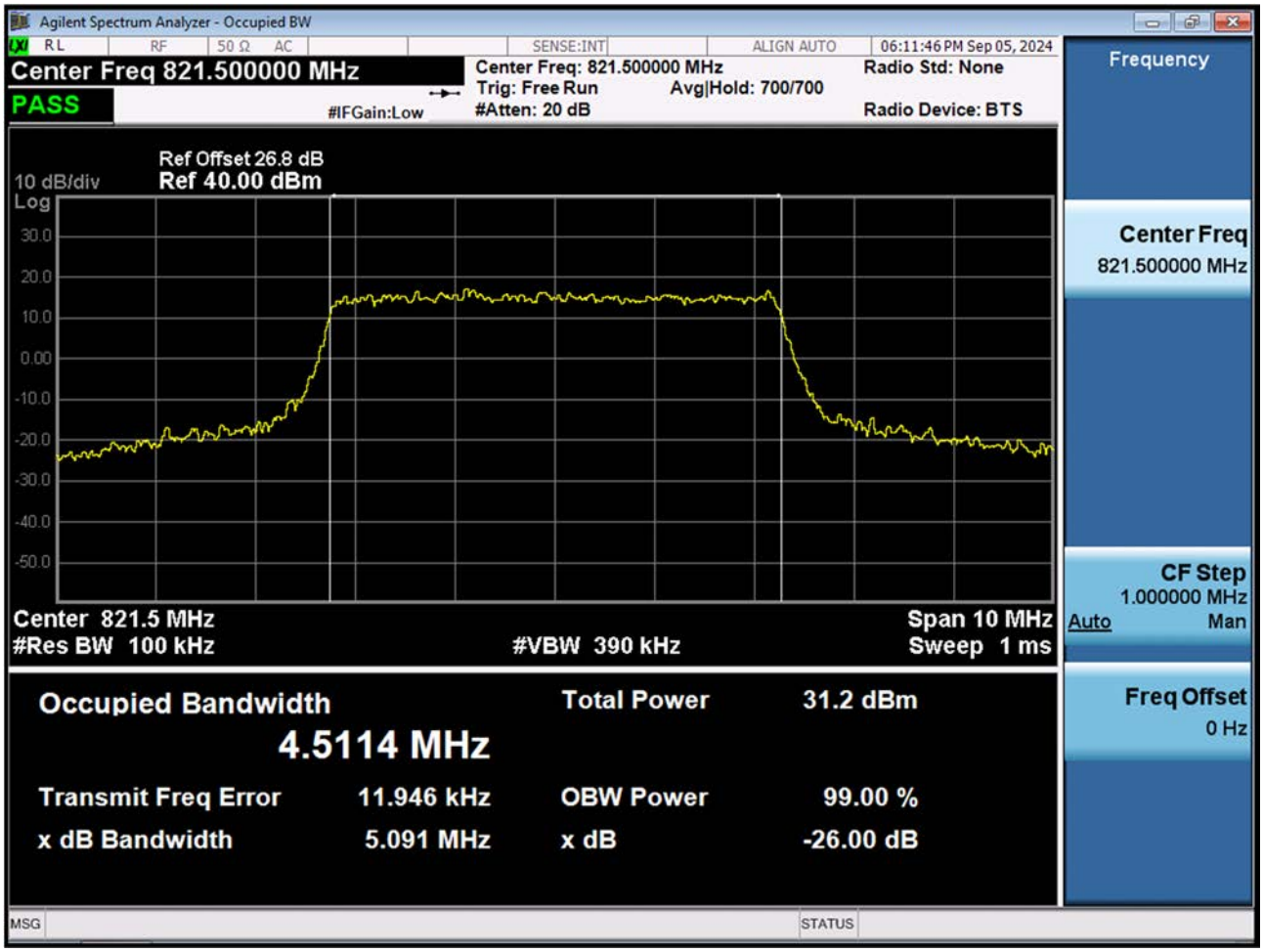
BAND 26. Occupied Bandwidth Plot (5 M BW Ch.26765 16QAM RB 25_0)



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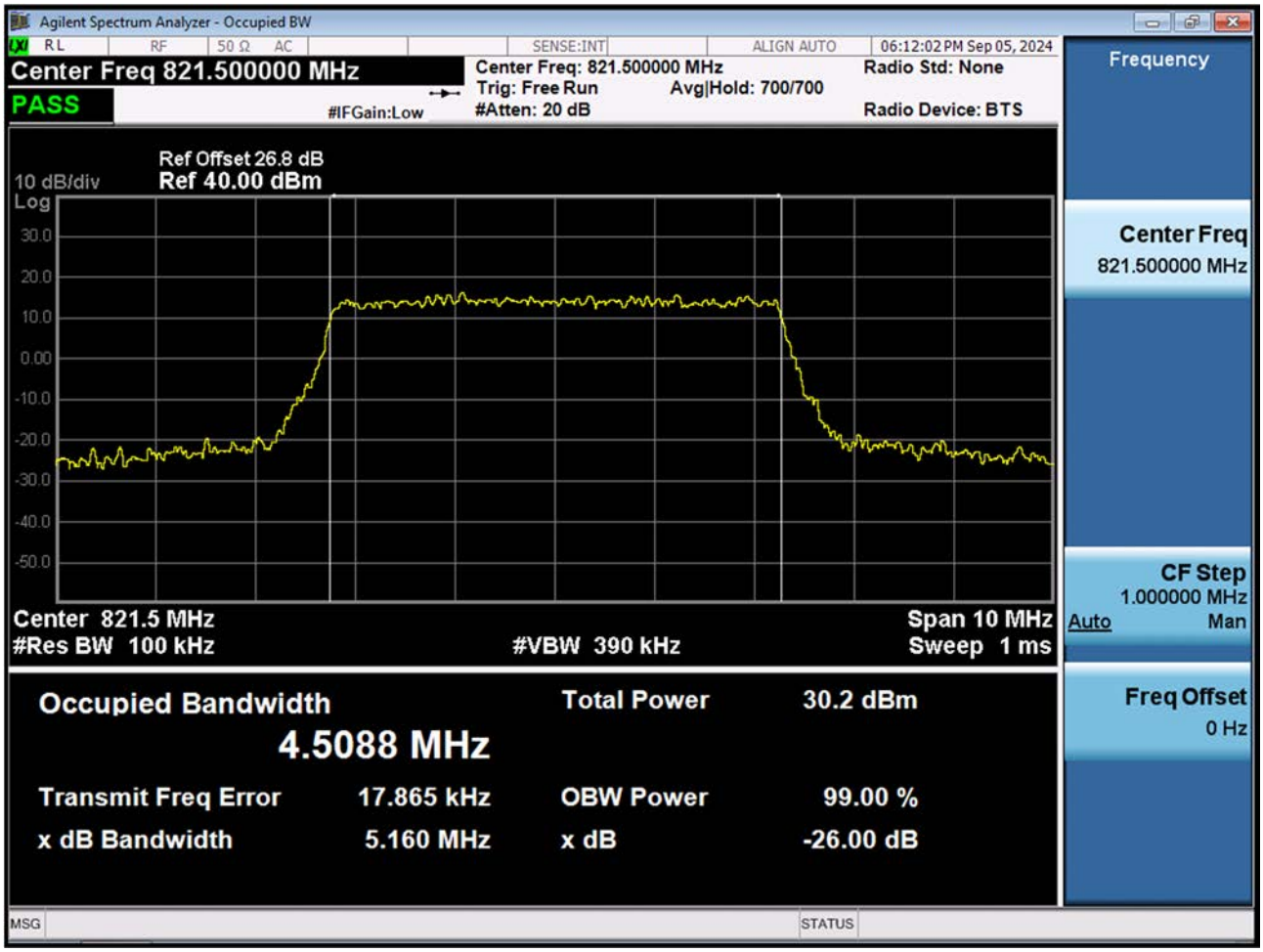
BAND 26. Occupied Bandwidth Plot (5 M BW Ch.26765 64QAM RB 25_0)



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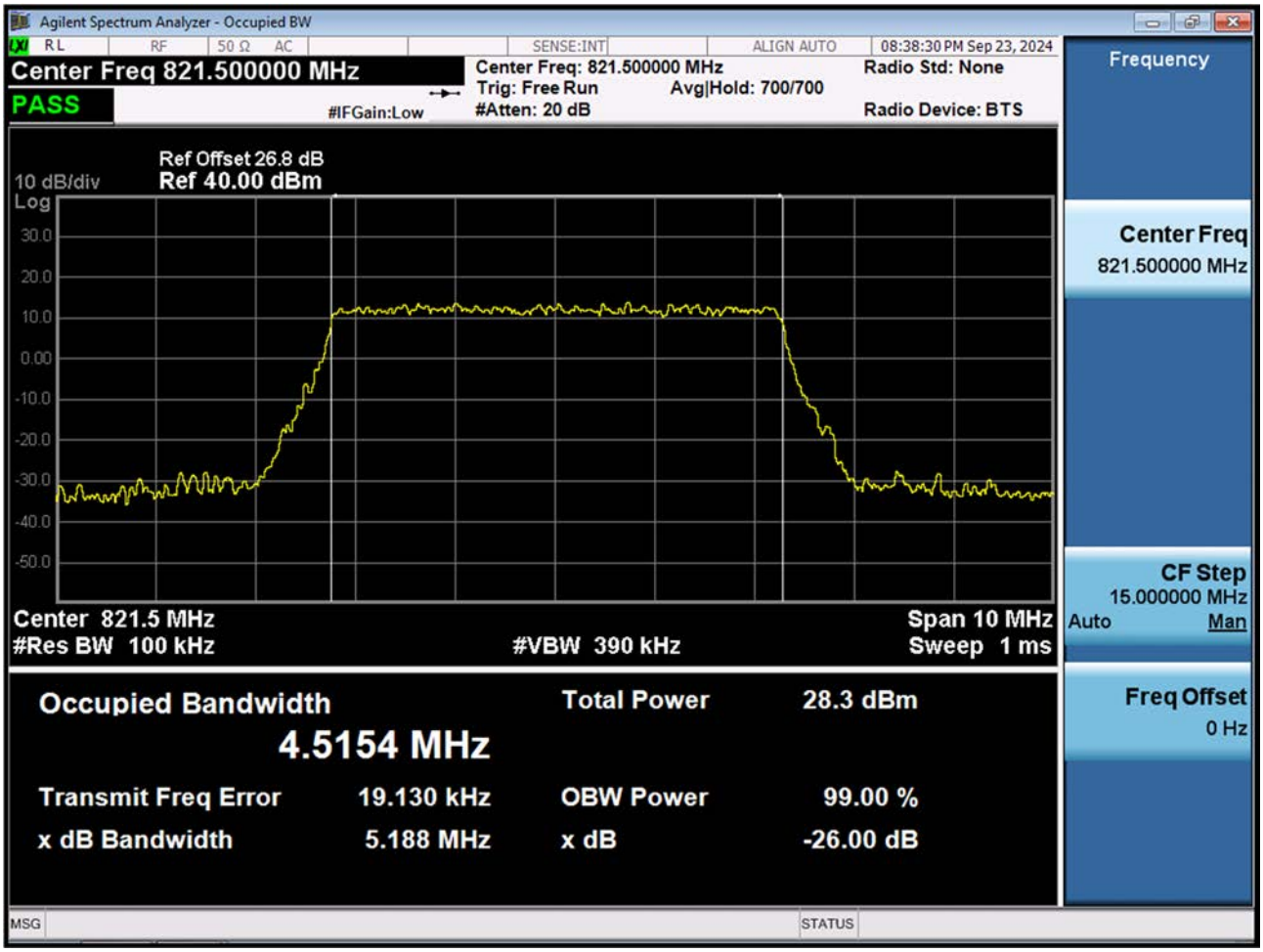
BAND 26. Occupied Bandwidth Plot (5 M BW Ch.26765 256QAM RB 25_0)



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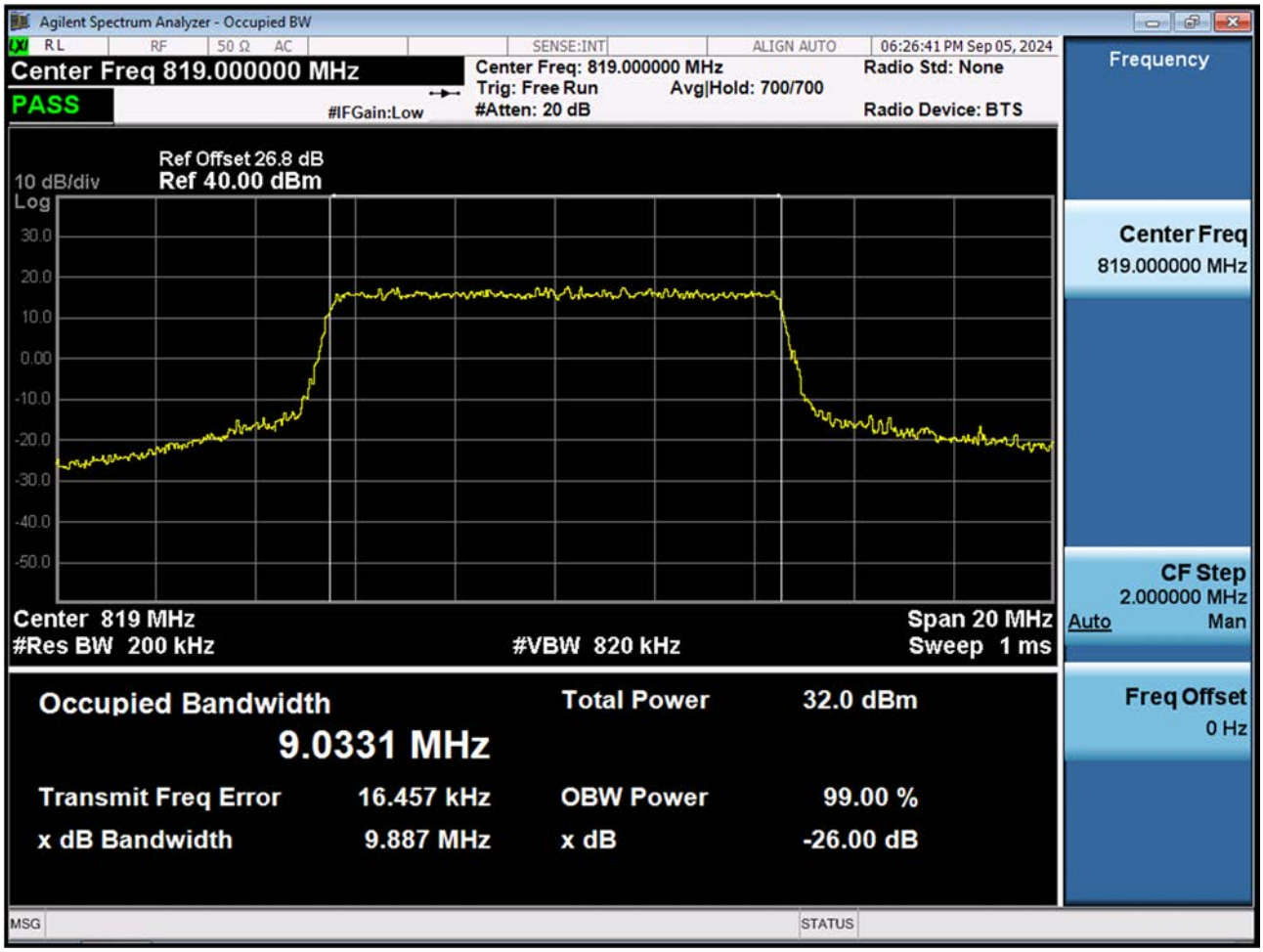
BAND 26. Occupied Bandwidth Plot (10 M BW Ch.26740 QPSK RB 50_0)



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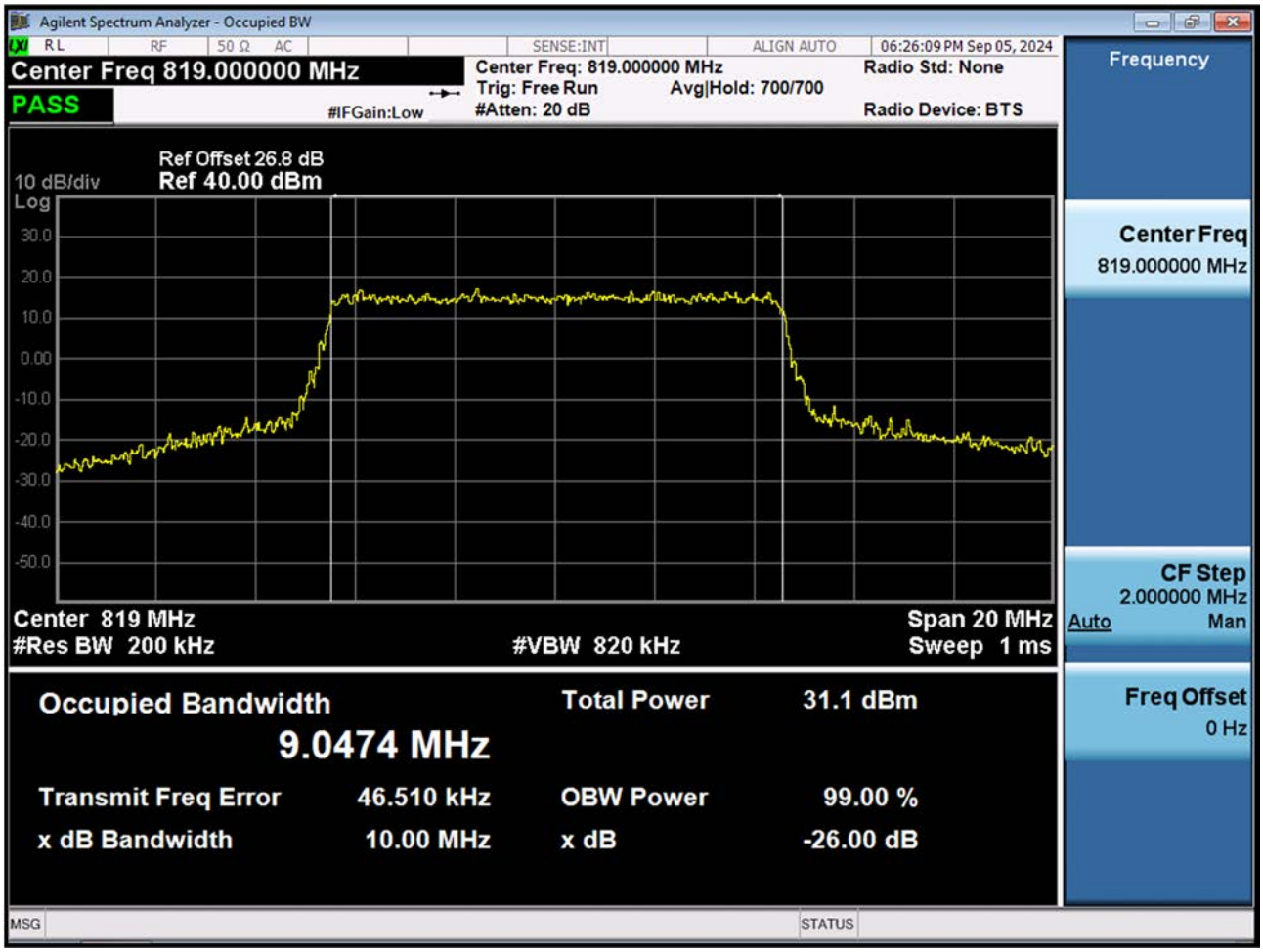
BAND 26. Occupied Bandwidth Plot (10 M BW Ch.26740 16QAM RB 50_0)



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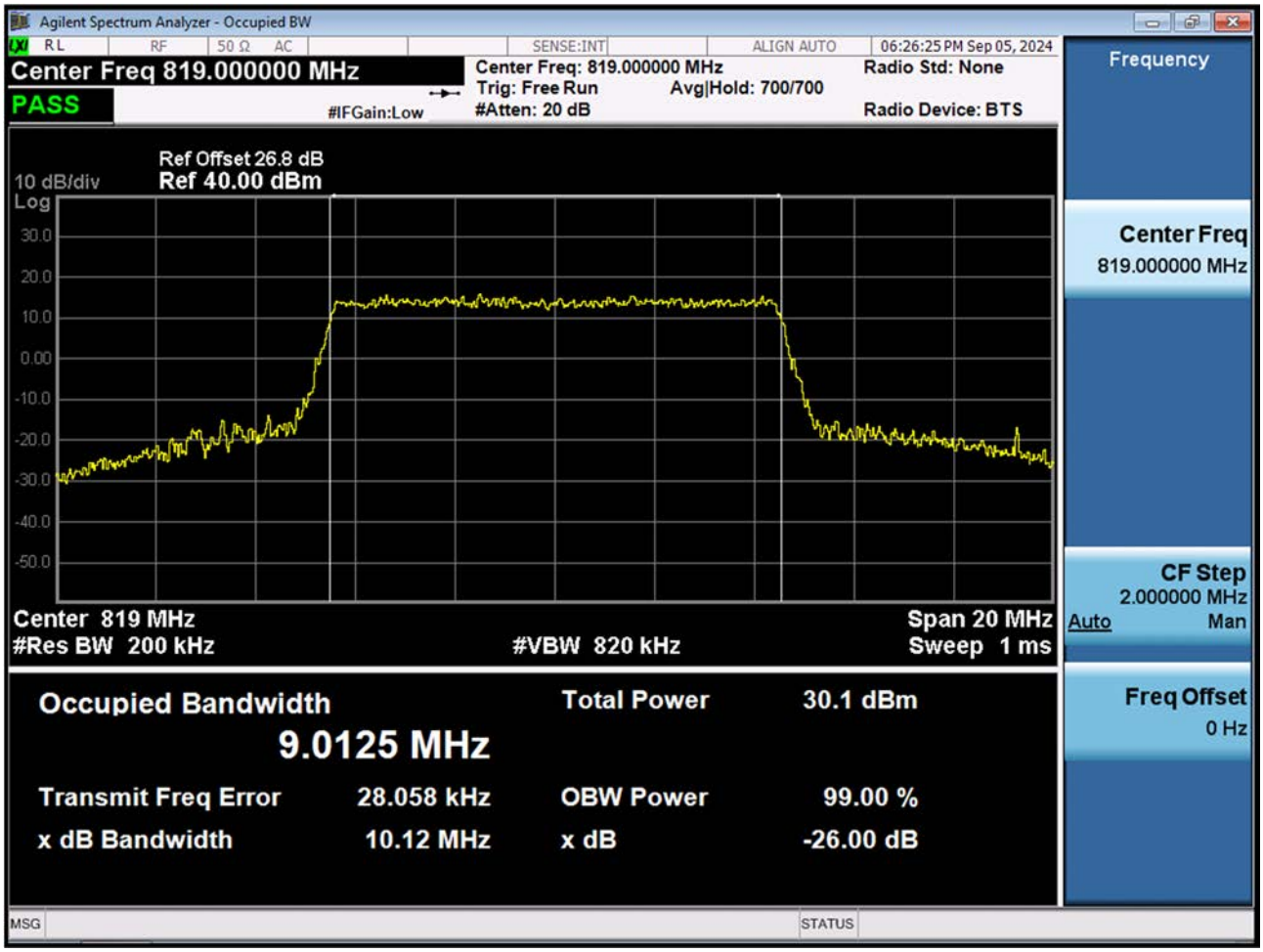
BAND 26. Occupied Bandwidth Plot (10 M BW Ch.26740 64QAM RB 50_0)



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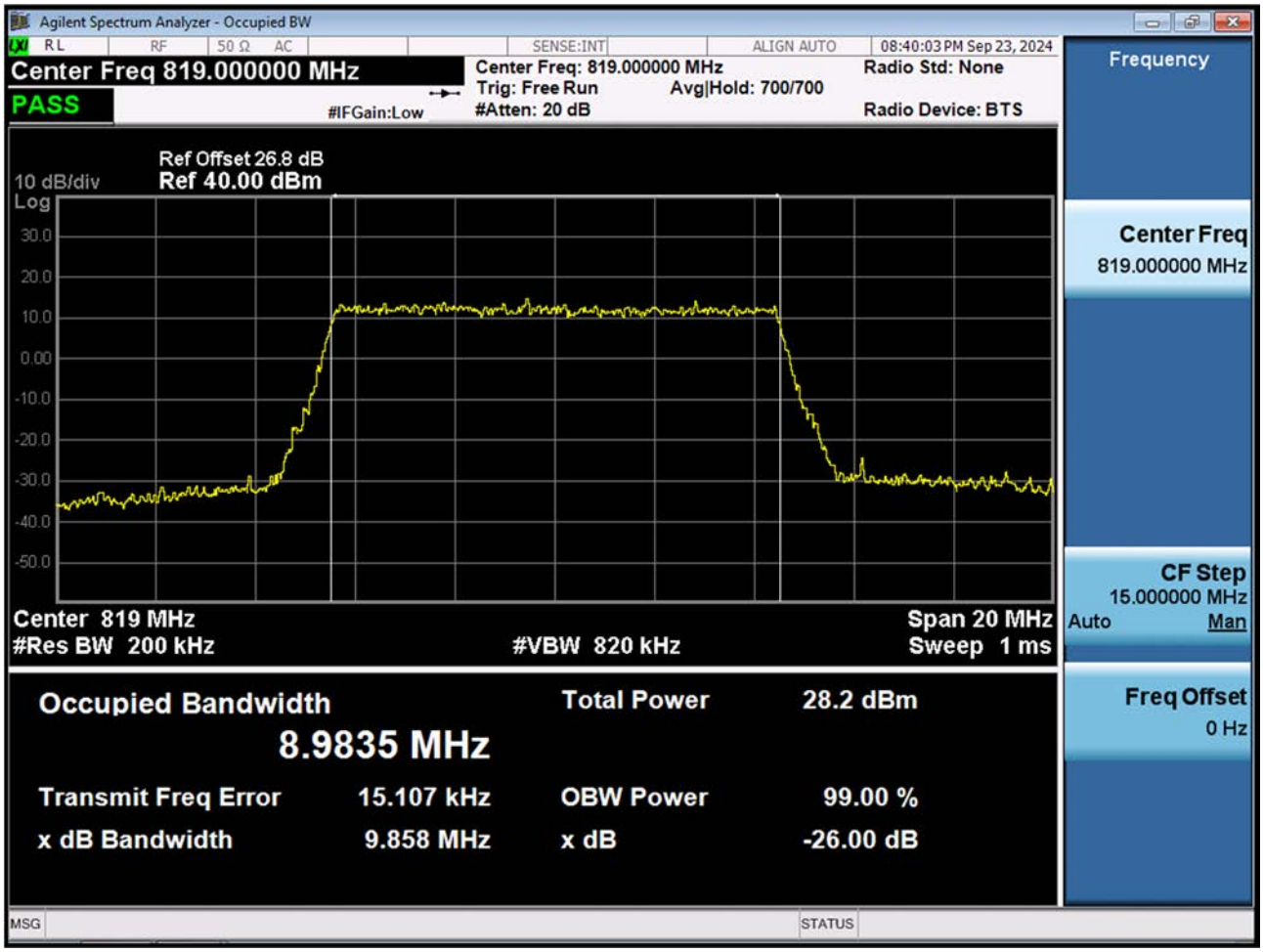
BAND 26. Occupied Bandwidth Plot (10 M BW Ch.26740 256QAM RB 50_0)



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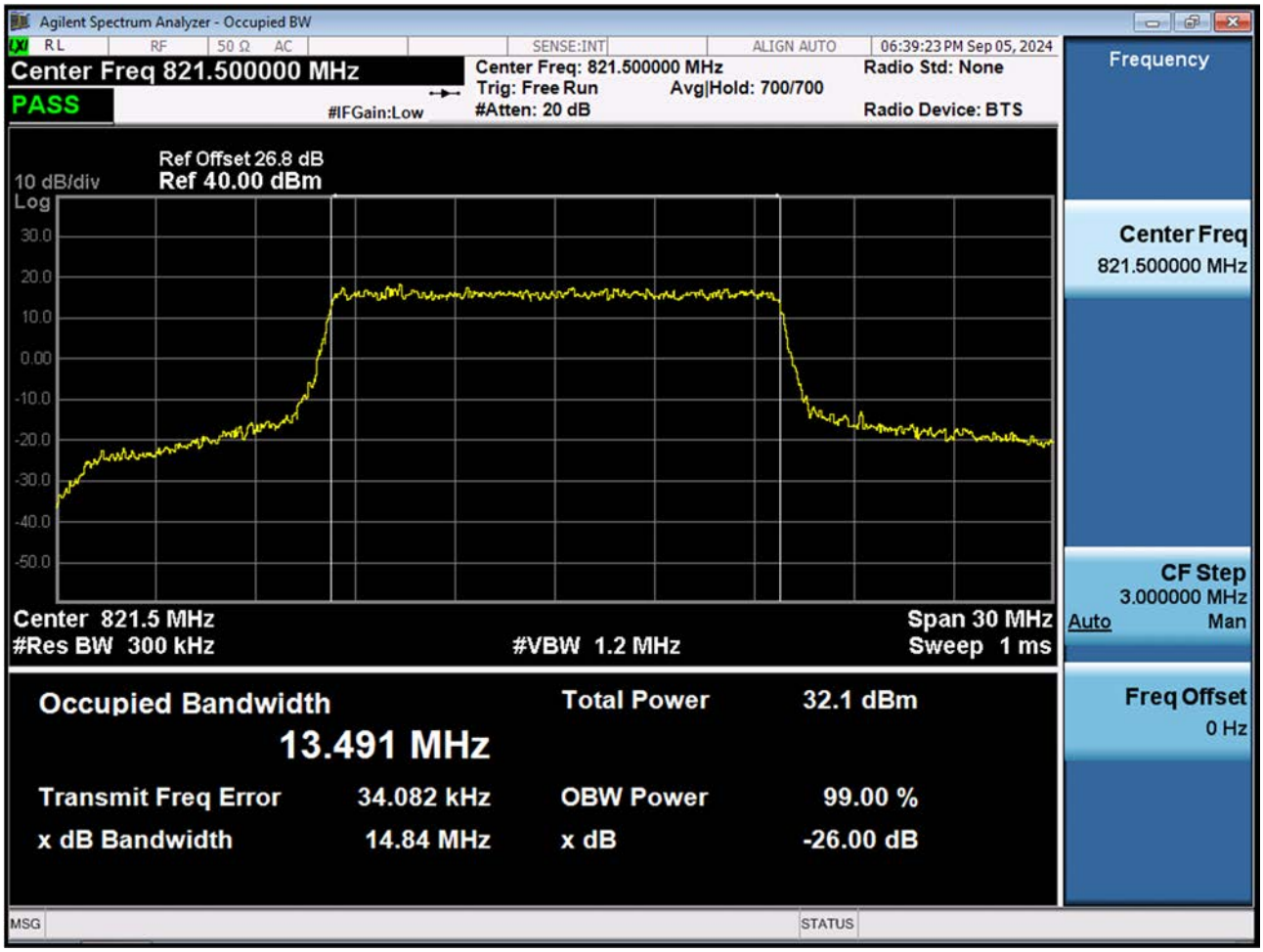
BAND 26. Occupied Bandwidth Plot (15 M BW Ch.26765 QPSK RB 75_0)



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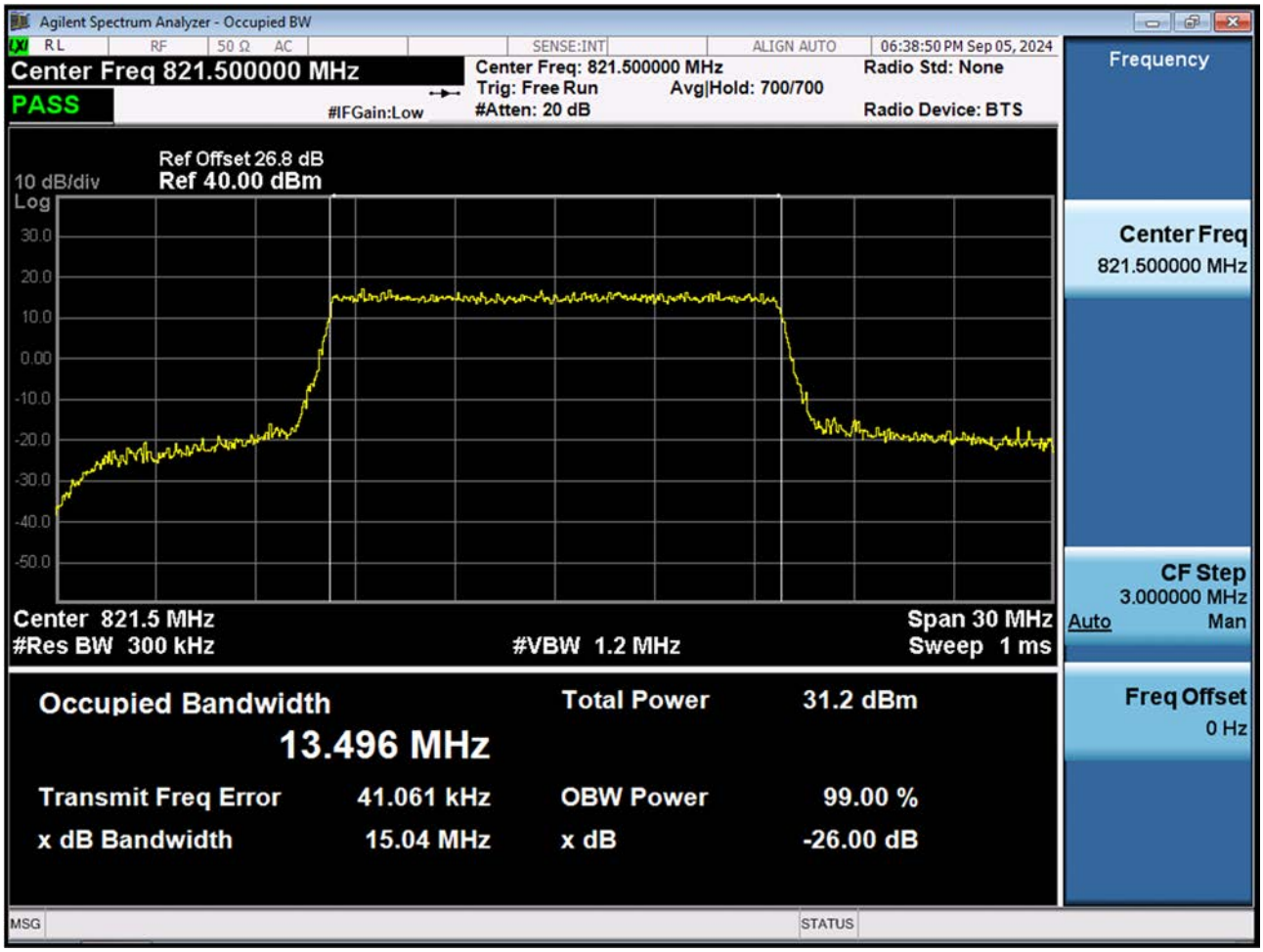
BAND 26. Occupied Bandwidth Plot (15 M BW Ch.26765 16QAM RB 75_0)



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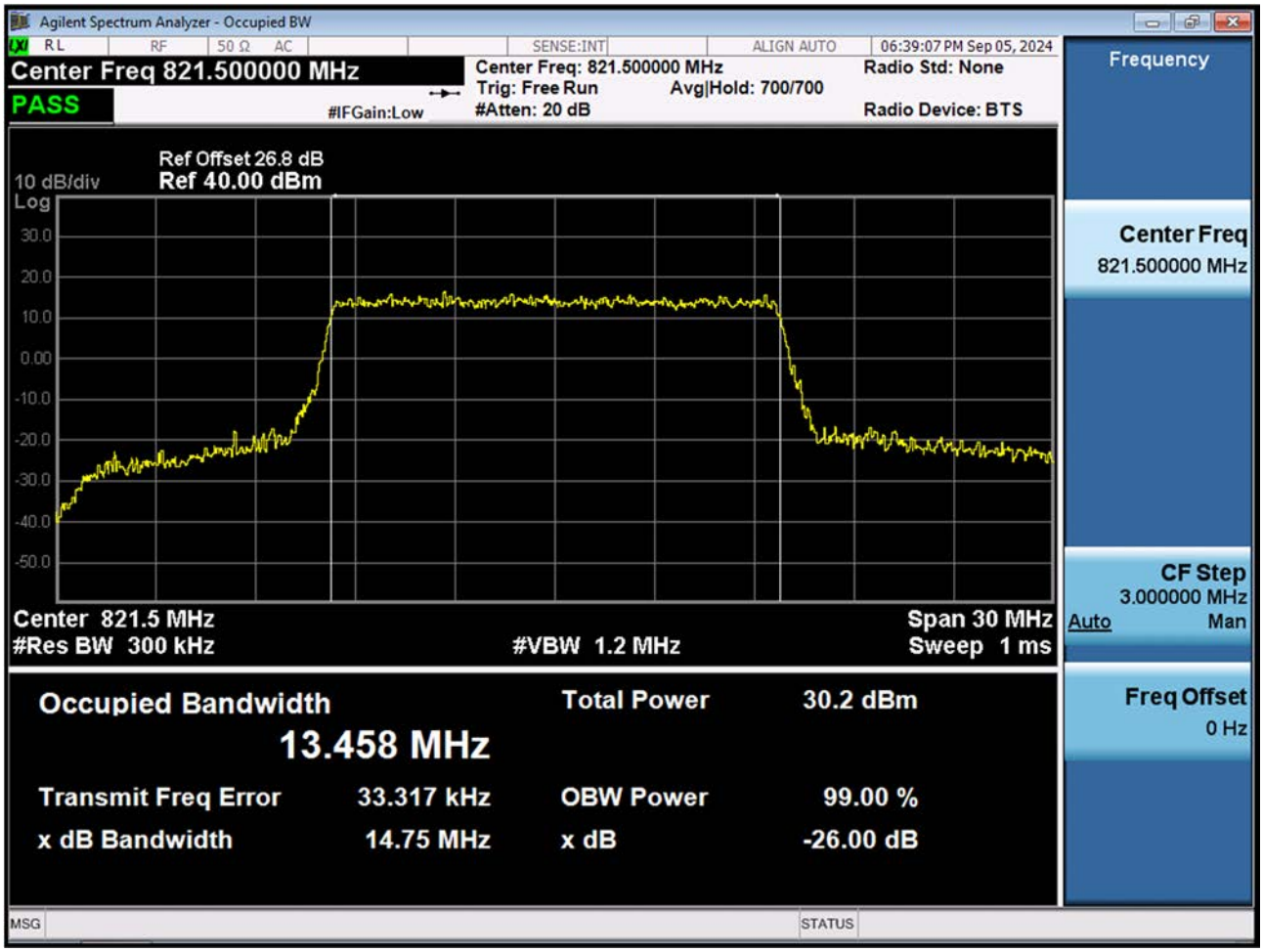
BAND 26. Occupied Bandwidth Plot (15 M BW Ch.26765 64QAM RB 75_0)



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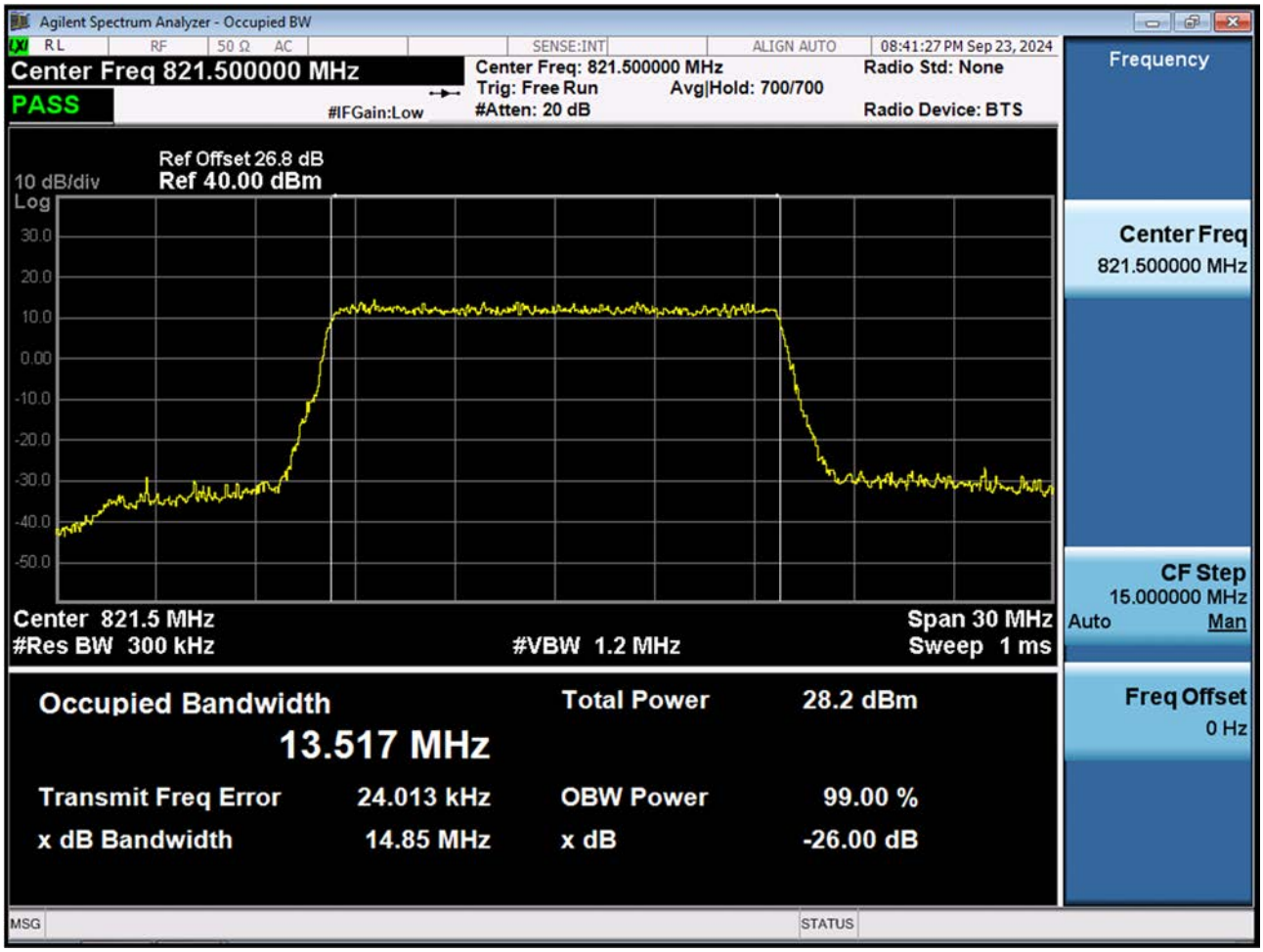
BAND 26. Occupied Bandwidth Plot (15 M BW Ch.26765 256QAM RB 75_0)



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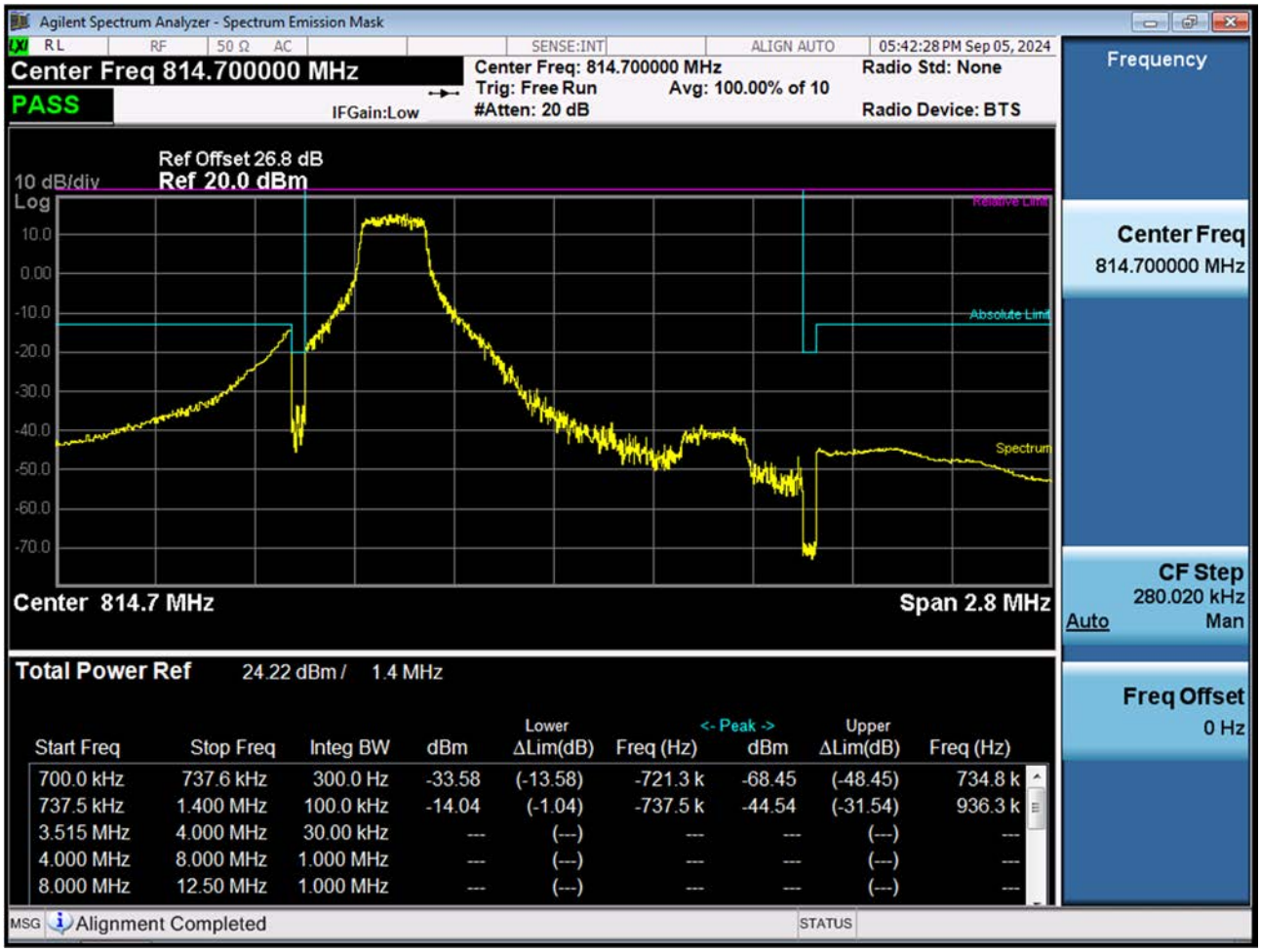
BAND 26. Lower Channel Edge Plot (1.4 M BW Ch.26697 QPSK RB 1, Offset 0)



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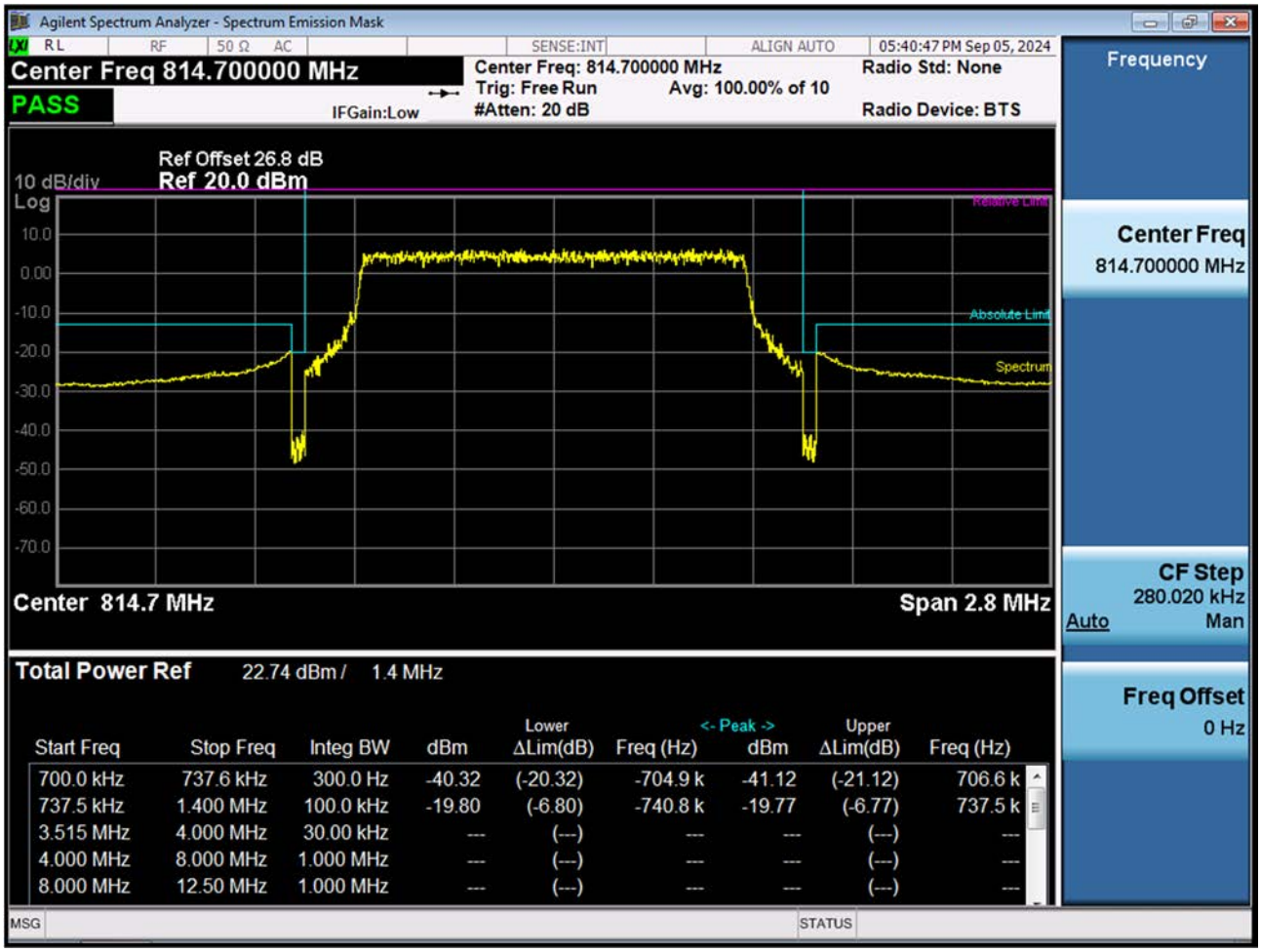
BAND 26. Lower Channel Edge Plot (1.4 M BW Ch.26697 QPSK_RB6_Offset 0)



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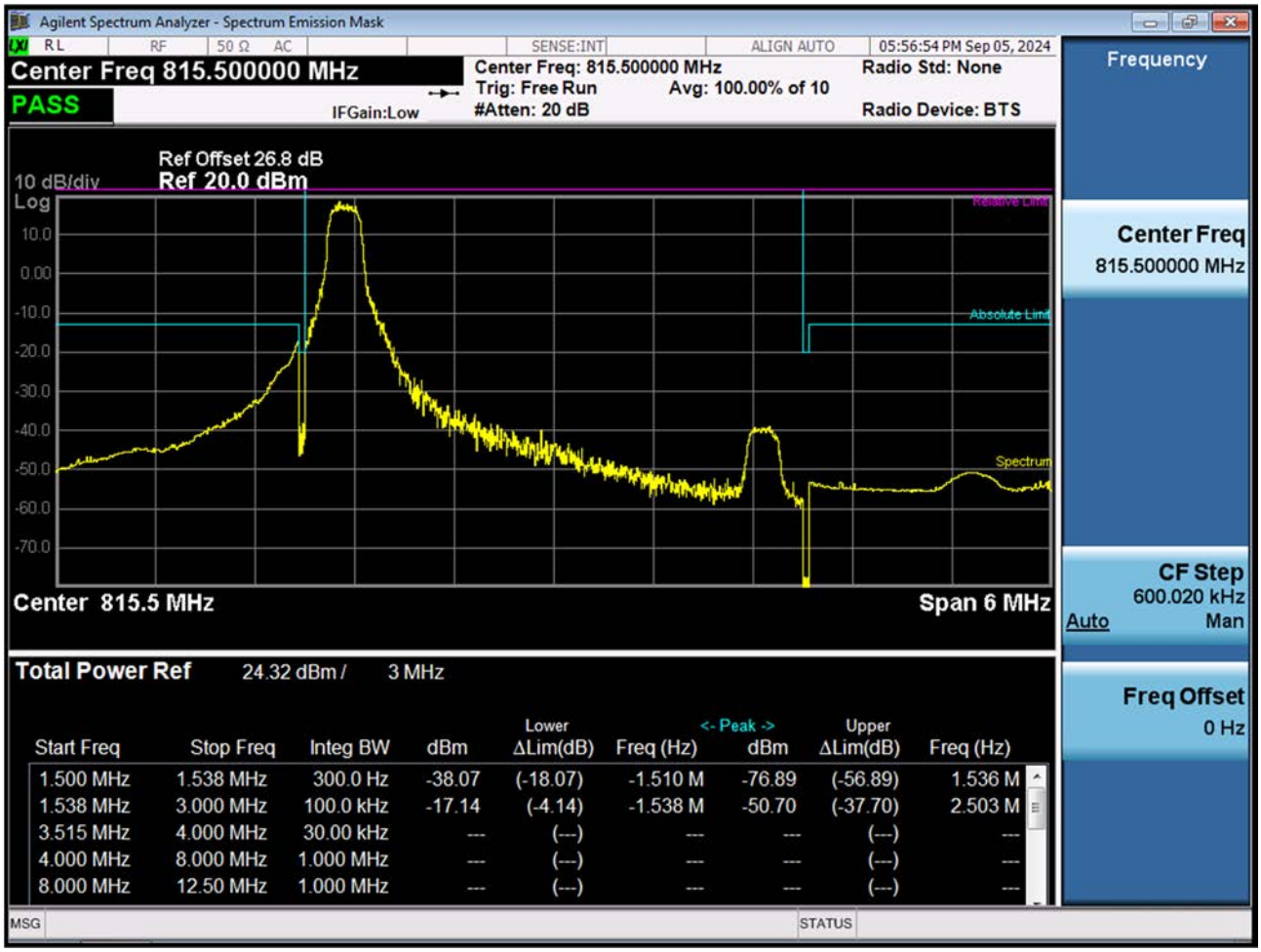
BAND 26. Lower Channel Edge Plot (3 M BW Ch.26705 QPSK RB 1, Offset 0)



Start Freq	Stop Freq	Integ BW	dBm	Lower ΔLim(dB)	Freq (Hz)	<- Peak -> dBm	Upper ΔLim(dB)	Freq (Hz)
1.500 MHz	1.538 MHz	300.0 Hz	-38.07	(-18.07)	-1.510 M	-76.89	(-56.89)	1.536 M
1.538 MHz	3.000 MHz	100.0 kHz	-17.14	(-4.14)	-1.538 M	-50.70	(-37.70)	2.503 M
3.515 MHz	4.000 MHz	30.00 kHz	---	(---)	---	---	(---)	---
4.000 MHz	8.000 MHz	1.000 MHz	---	(---)	---	---	(---)	---
8.000 MHz	12.50 MHz	1.000 MHz	---	(---)	---	---	(---)	---

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

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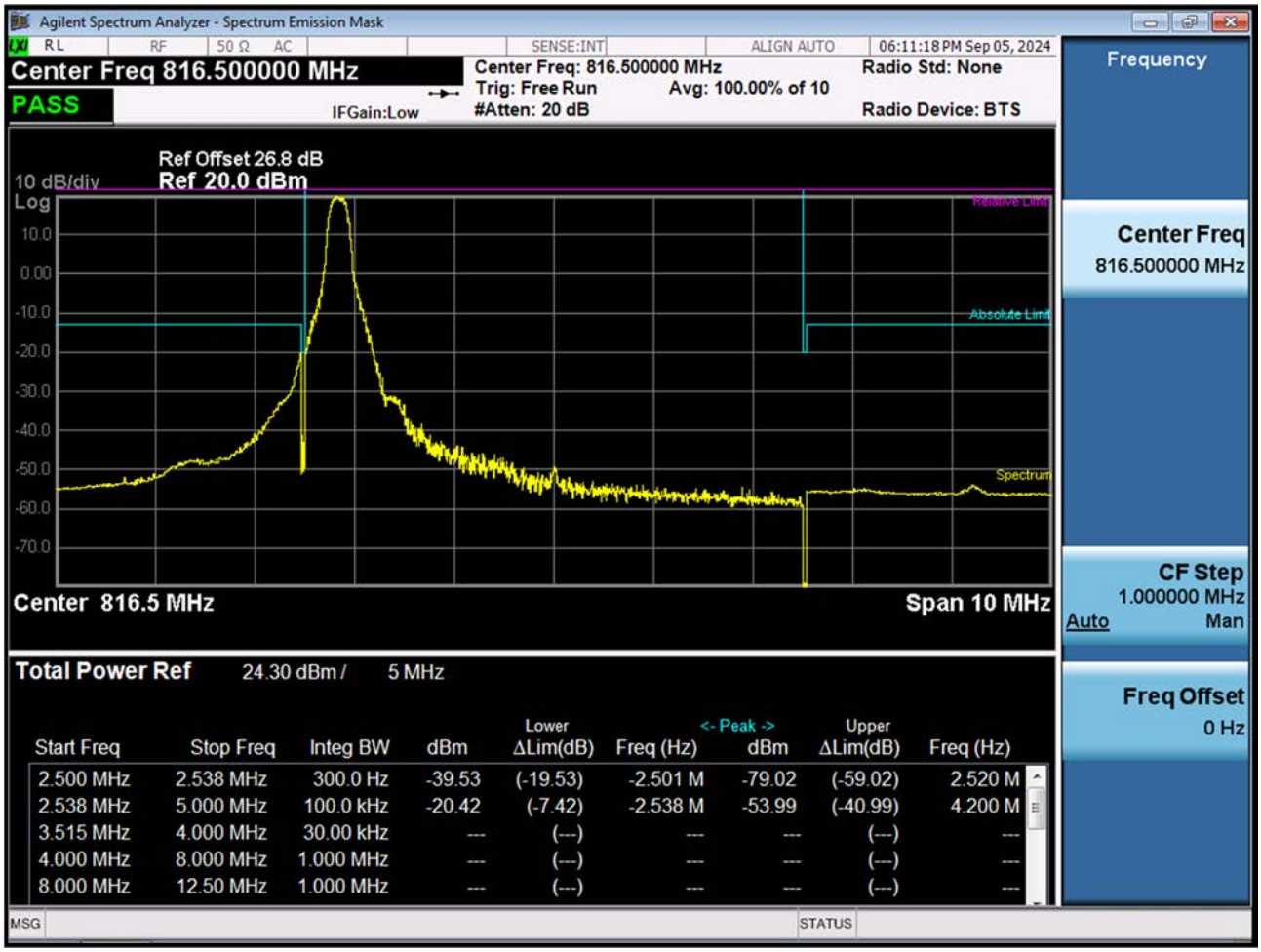
BAND 26. Lower Channel Edge Plot (5 M BW Ch.26715 QPSK RB 1, Offset 0)



Start Freq	Stop Freq	Integ BW	dBm	Lower ΔLim(dB)	Freq (Hz)	<- Peak -> dBm	Upper ΔLim(dB)	Freq (Hz)
2.500 MHz	2.538 MHz	300.0 Hz	-39.53	(-19.53)	-2.501 M	-79.02	(-59.02)	2.520 M
2.538 MHz	5.000 MHz	100.0 kHz	-20.42	(-7.42)	-2.538 M	-53.99	(-40.99)	4.200 M
3.515 MHz	4.000 MHz	30.00 kHz	---	(---)	---	---	(---)	---
4.000 MHz	8.000 MHz	1.000 MHz	---	(---)	---	---	(---)	---
8.000 MHz	12.50 MHz	1.000 MHz	---	(---)	---	---	(---)	---

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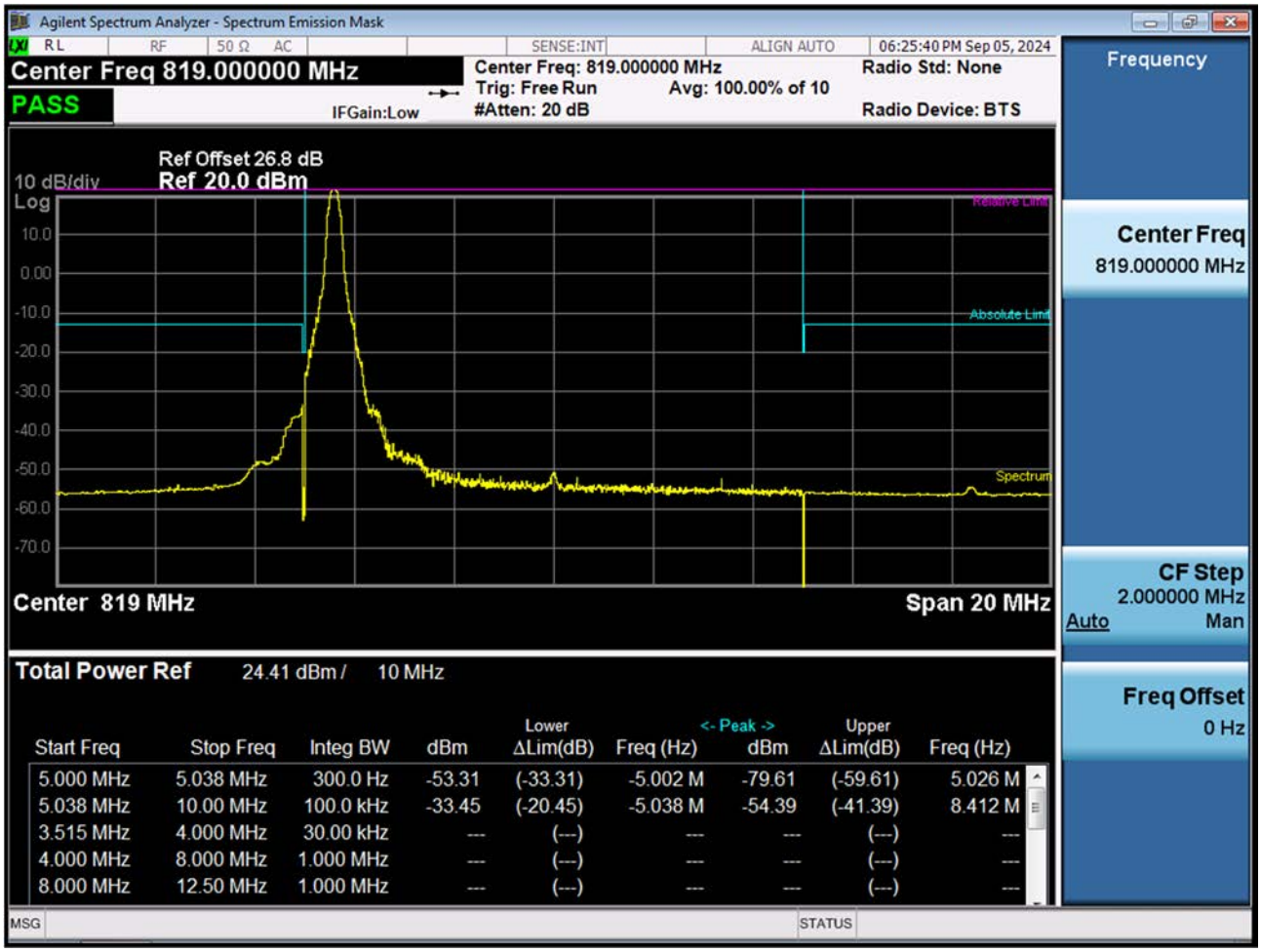
BAND 26. Lower Channel Edge Plot (5 M BW Ch.26715 QPSK_RB25_Offset 0)

The report shall not be (partly) reproduced except in full without approval of the laboratory.

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



Start Freq	Stop Freq	Integ BW	dBm	Lower ΔLim(dB)	Freq (Hz)	<- Peak -> dBm	Upper ΔLim(dB)	Freq (Hz)
5.000 MHz	5.038 MHz	300.0 Hz	-53.31	(-33.31)	-5.002 M	-79.61	(-59.61)	5.026 M
5.038 MHz	10.00 MHz	100.0 kHz	-33.45	(-20.45)	-5.038 M	-54.39	(-41.39)	8.412 M
3.515 MHz	4.000 MHz	30.00 kHz	---	(---)	---	---	(---)	---
4.000 MHz	8.000 MHz	1.000 MHz	---	(---)	---	---	(---)	---
8.000 MHz	12.50 MHz	1.000 MHz	---	(---)	---	---	(---)	---

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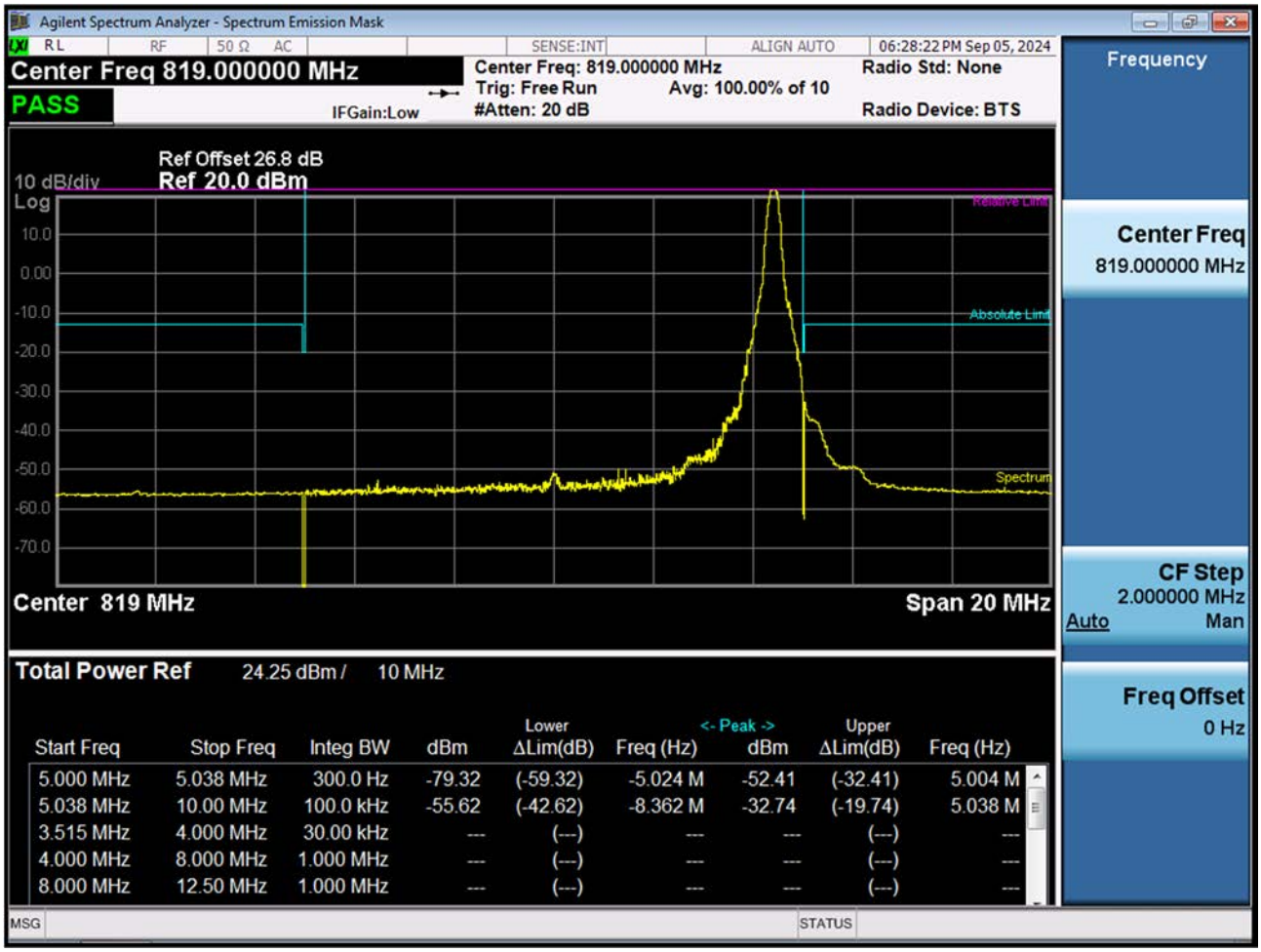
BAND 26. Low Channel Edge Plot (10 M BW Ch.26740 QPSK_RB50_Offset 0)

The report shall not be (partly) reproduced except in full without approval of the laboratory.

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



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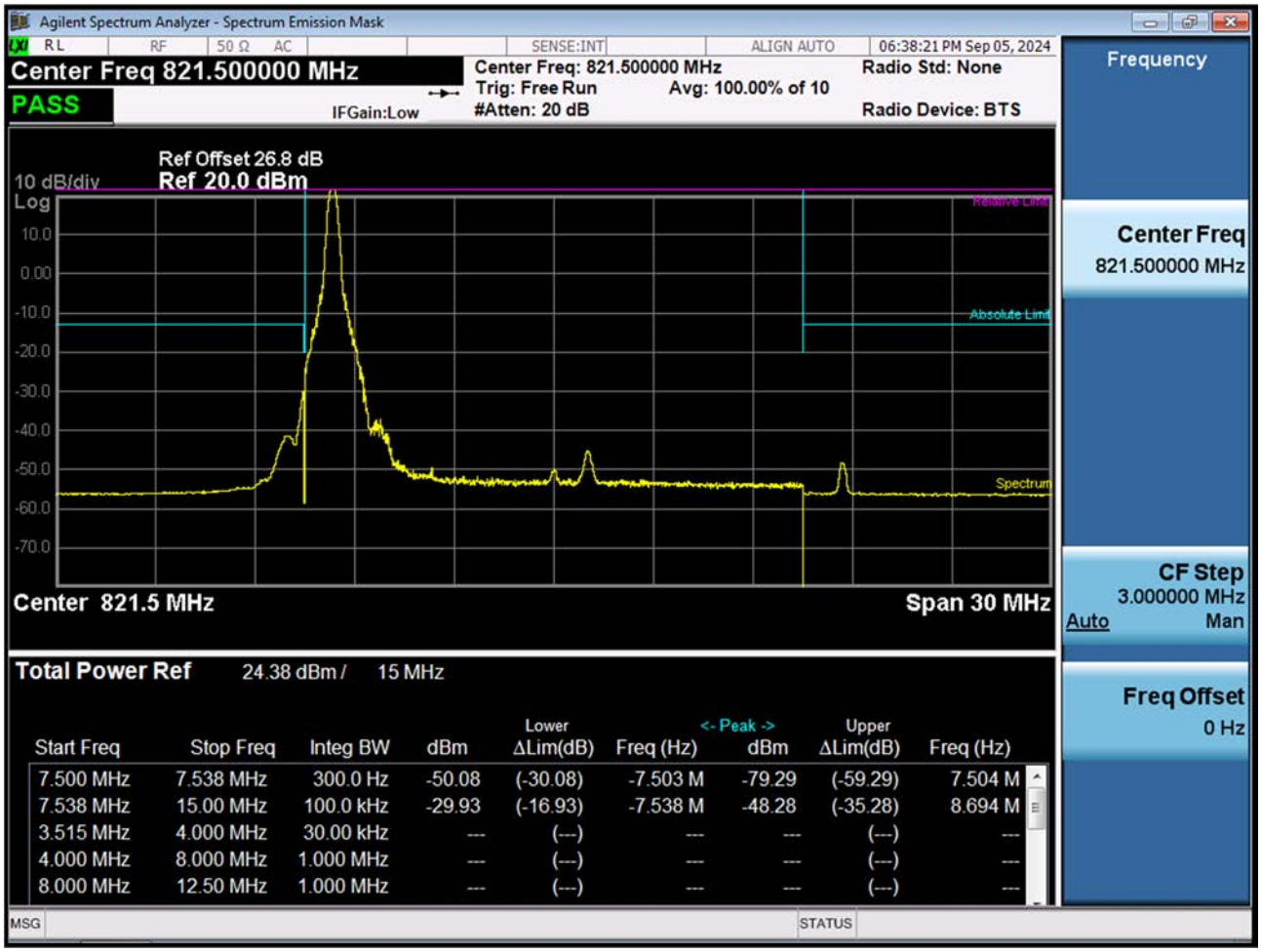
BAND 26. Low Channel Edge Plot (15 M BW Ch.26765 QPSK RB 1, Offset 0)



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

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

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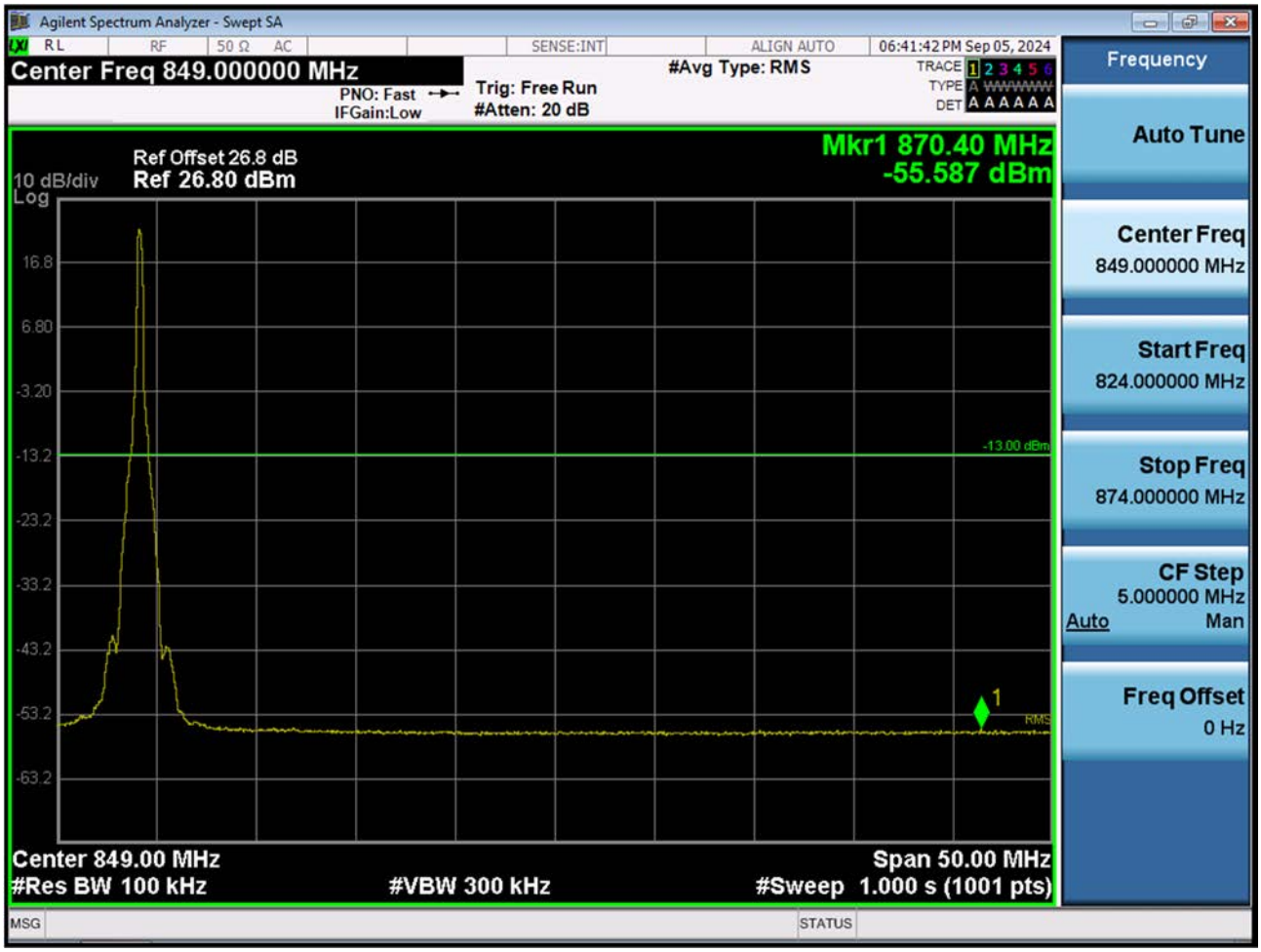
BAND 26. Mid Band Edge Plot (15 M BW Ch.26765 QPSK RB 1, Offset74)



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

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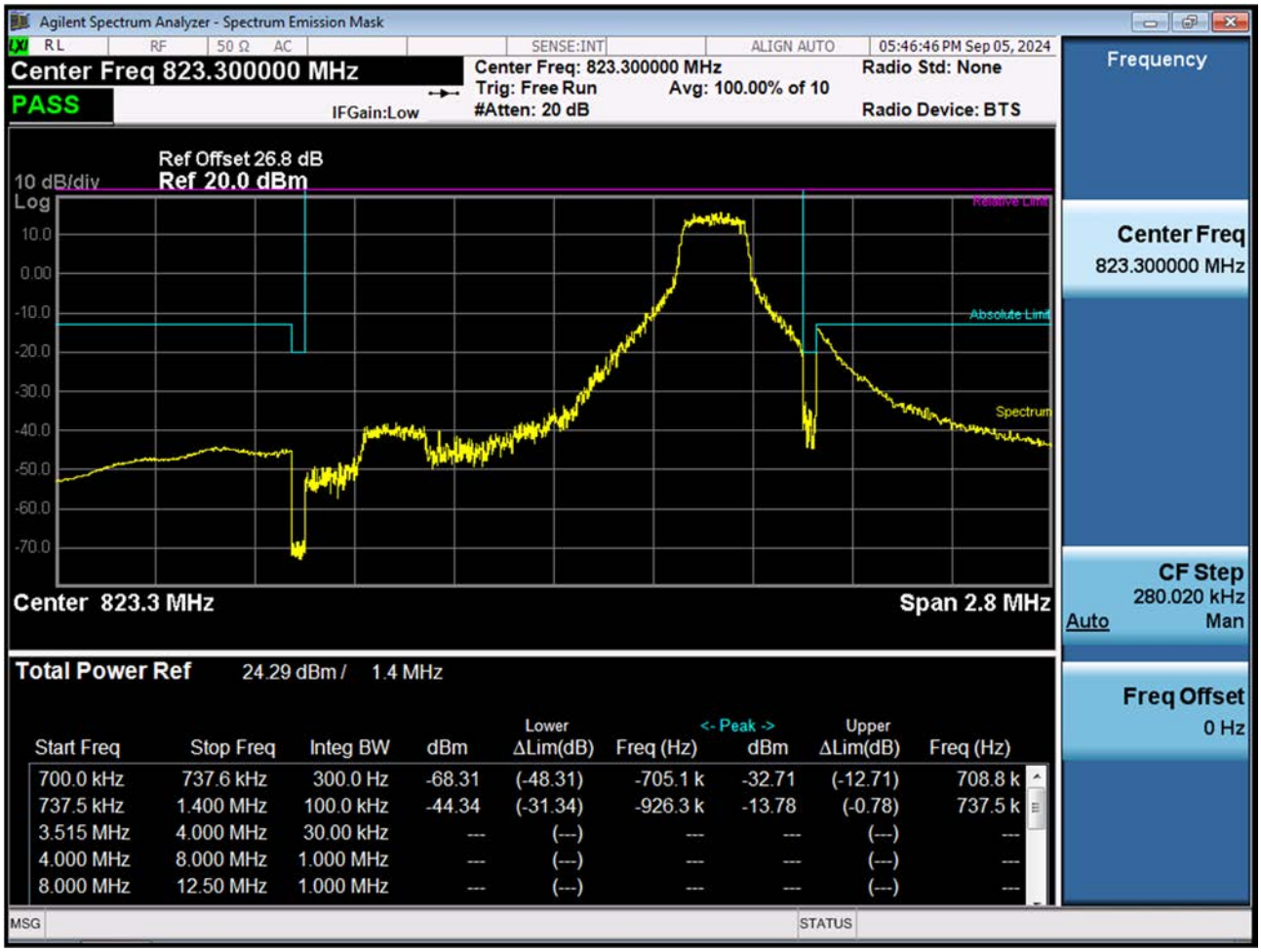
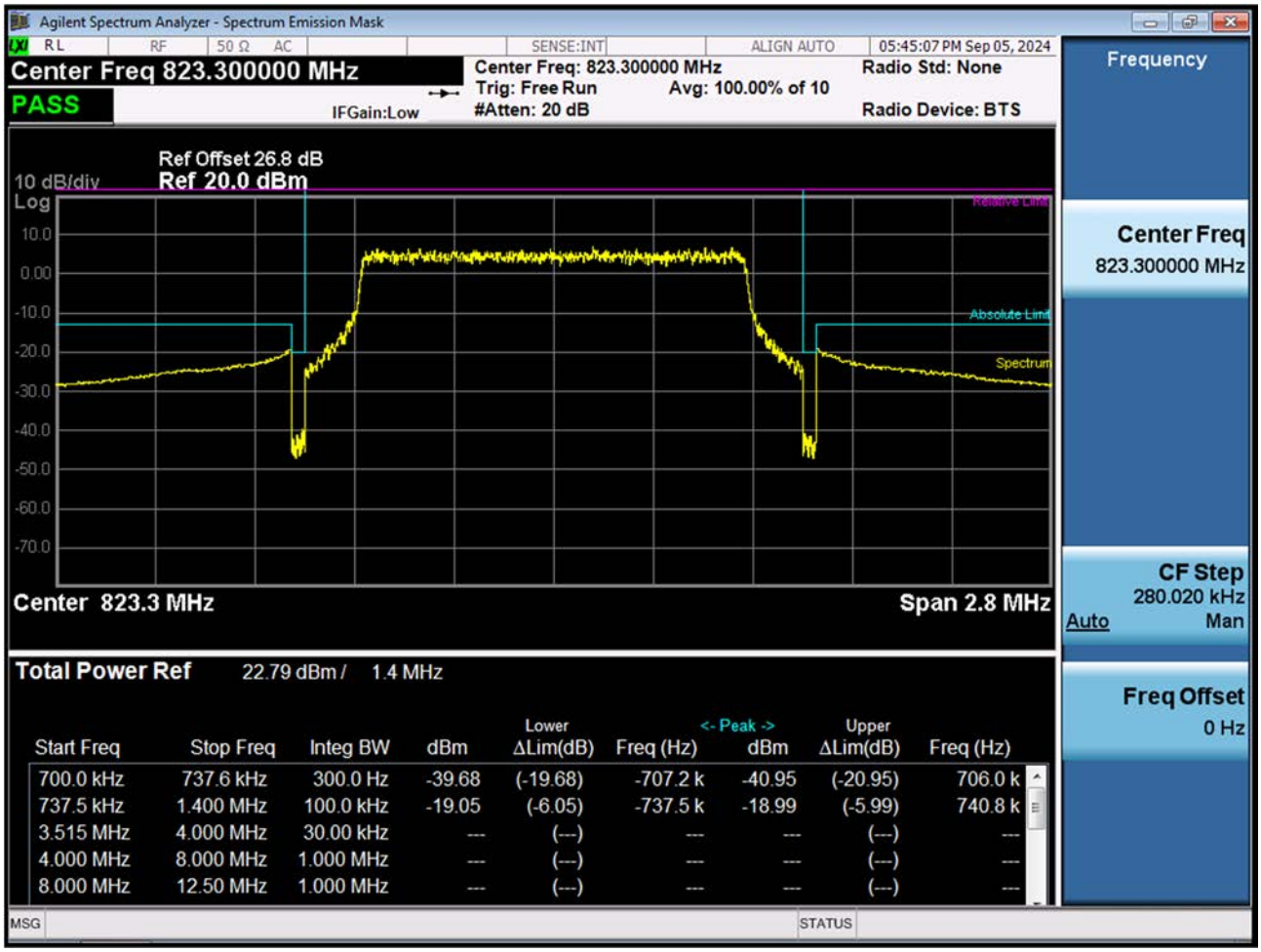
BAND 26. Upper Channel Edge Plot (1.4 M BW Ch.26783 QPSK_RB1_Offset 5)



The report shall not be (partly) reproduced except in full without approval of the laboratory.

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



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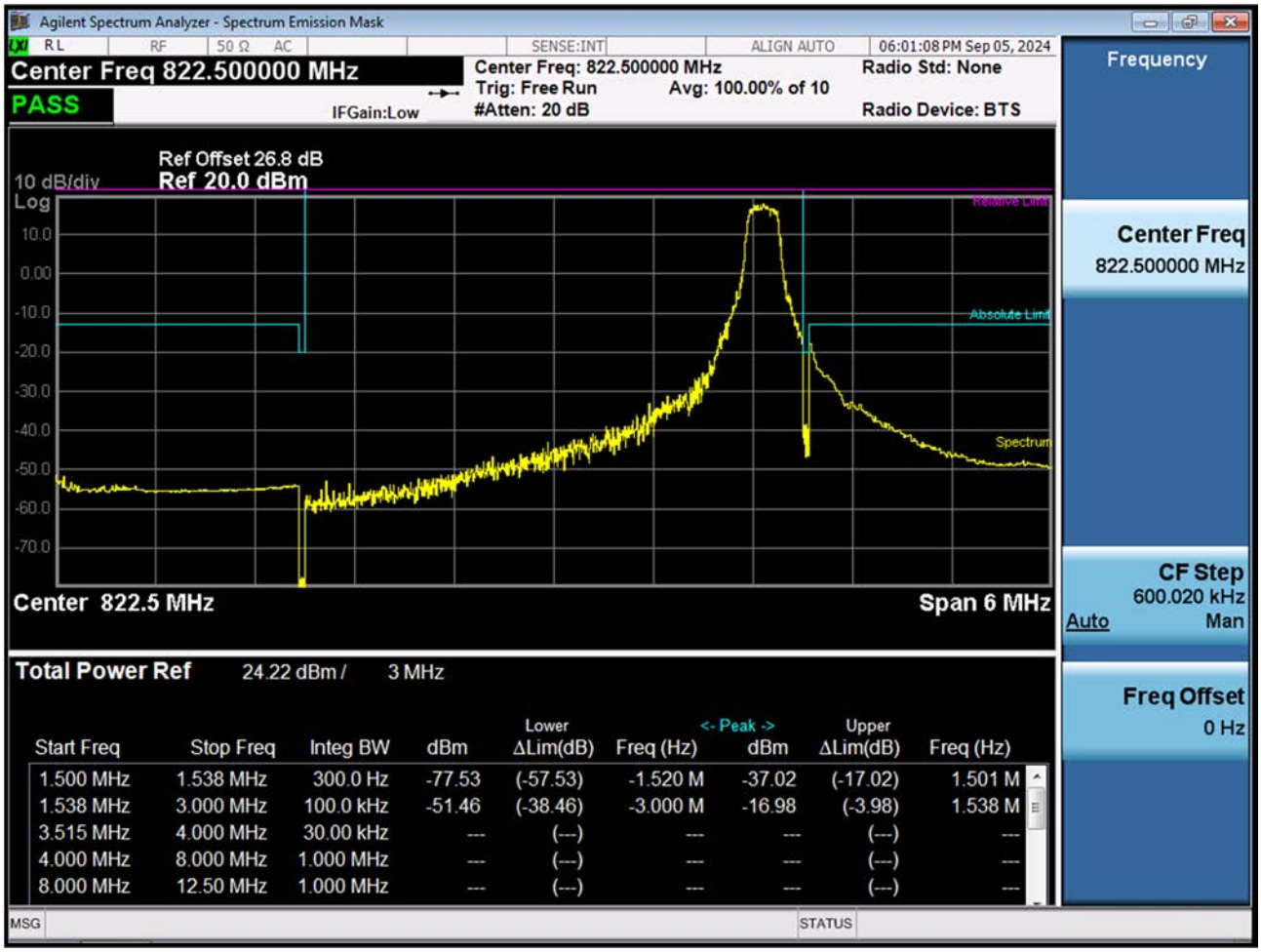
BAND 26. Upper Channel Edge Plot (3 M BW Ch.26775 QPSK_RB1_Offset 14)



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

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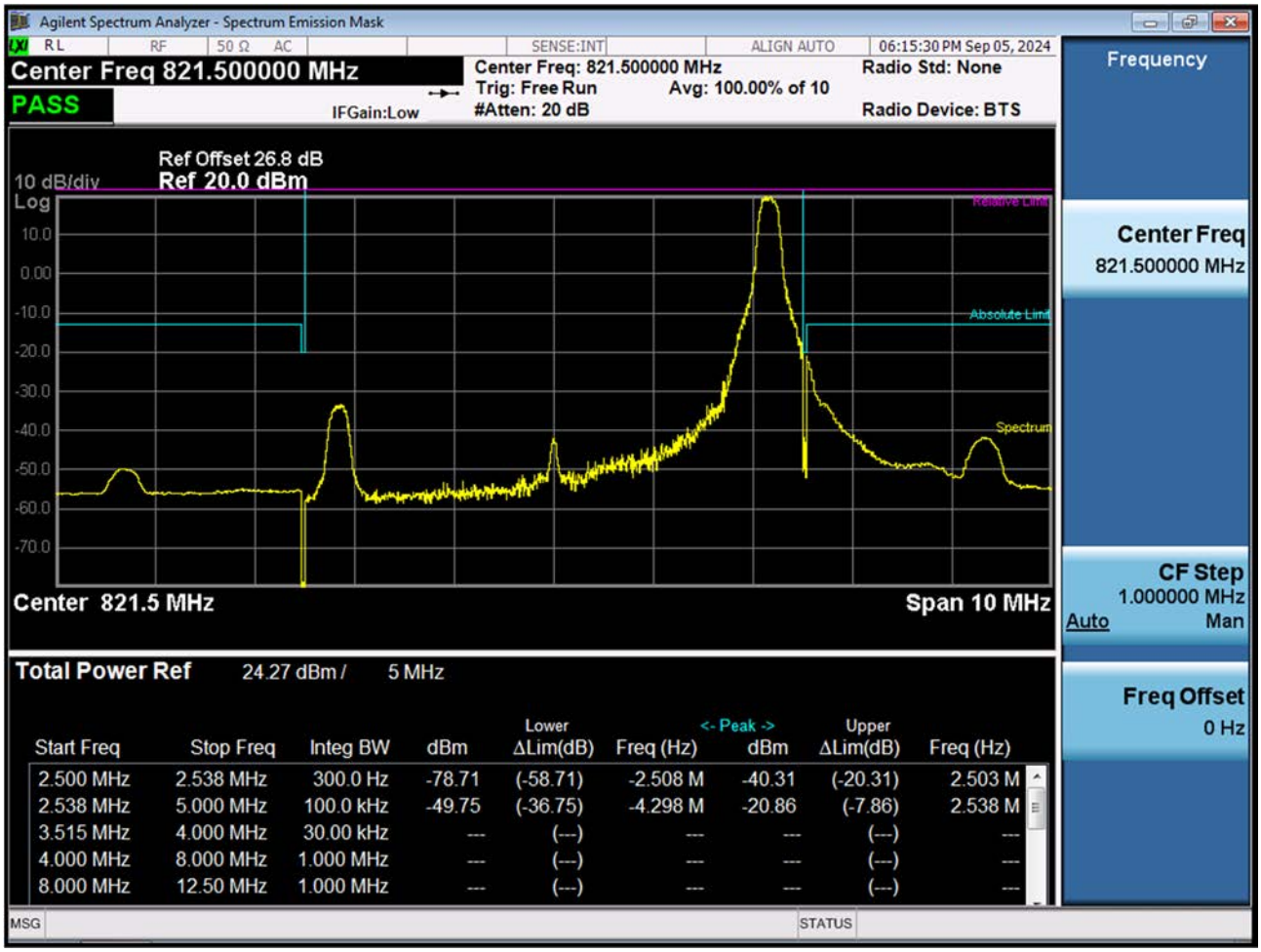
BAND 26. Upper Channel Edge Plot (5 M BW Ch.26765 QPSK_RB1_Offset 24)



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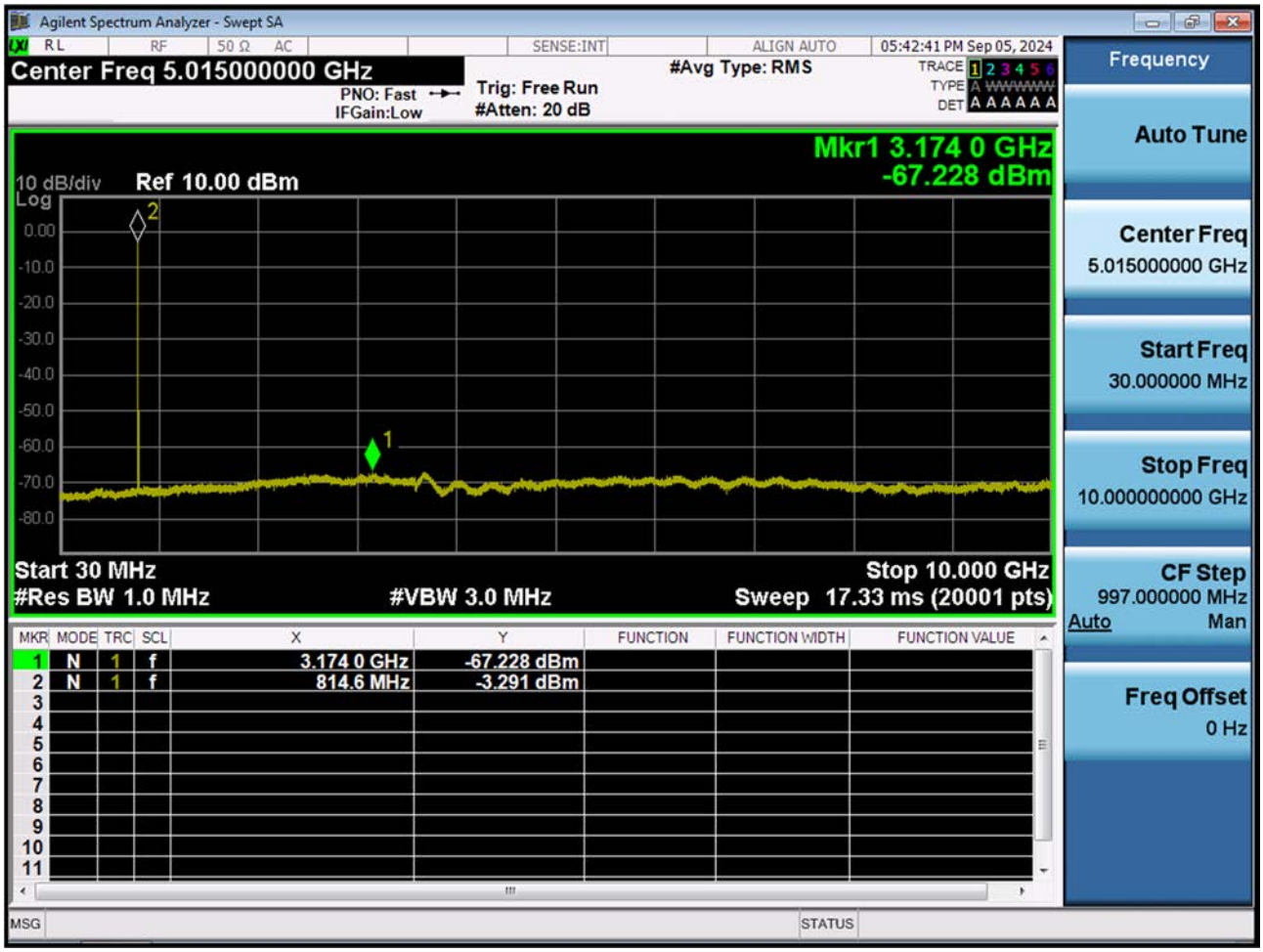
BAND 26. Upper Channel Edge Plot (5 M BW Ch.26765 QPSK_RB25_Offset 0)

The report shall not be (partly) reproduced except in full without approval of the laboratory.

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



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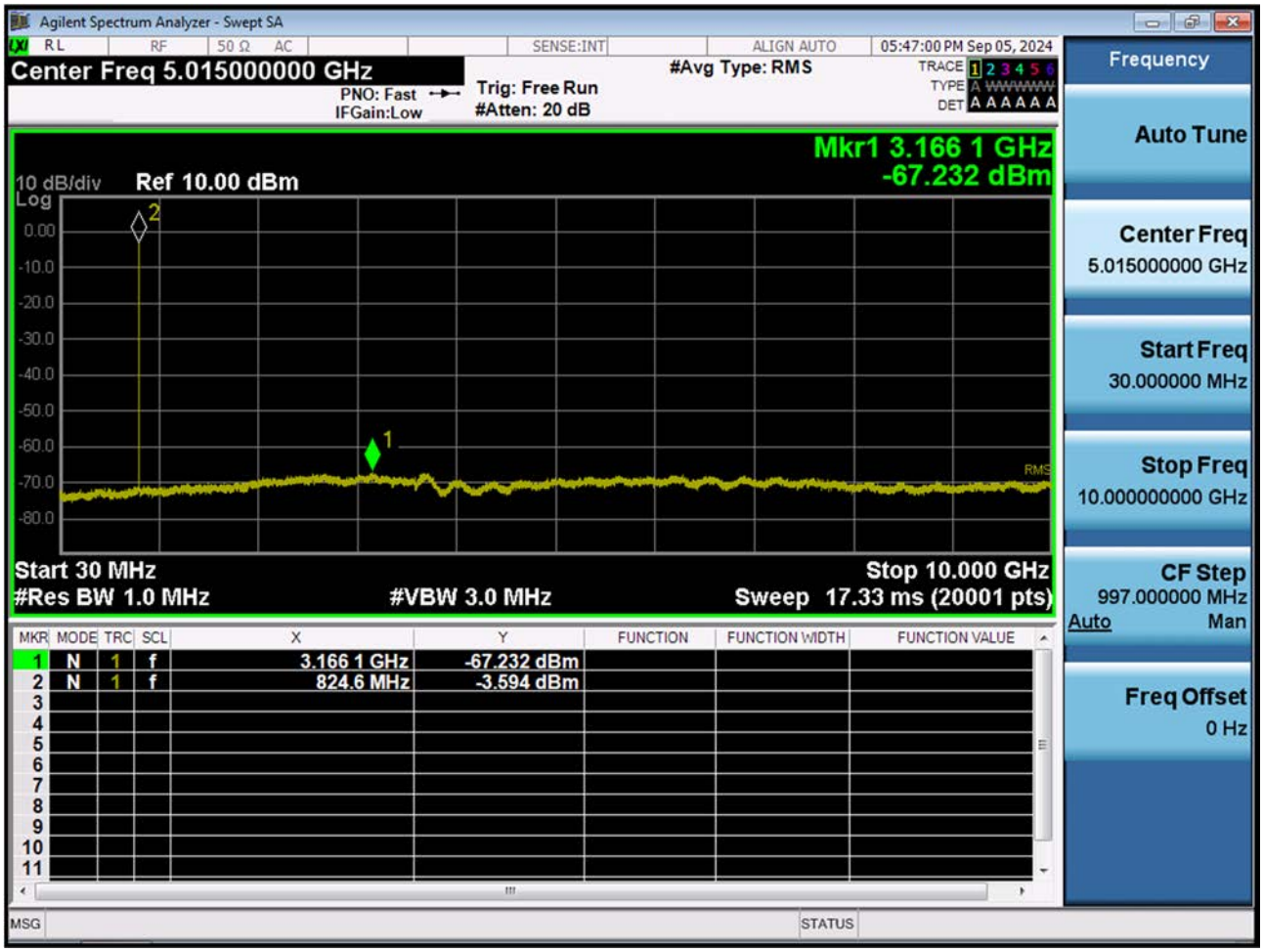
BAND 26. Conducted Spurious (26783 ch_1.4 MHz_QPSK_RB 1_0)



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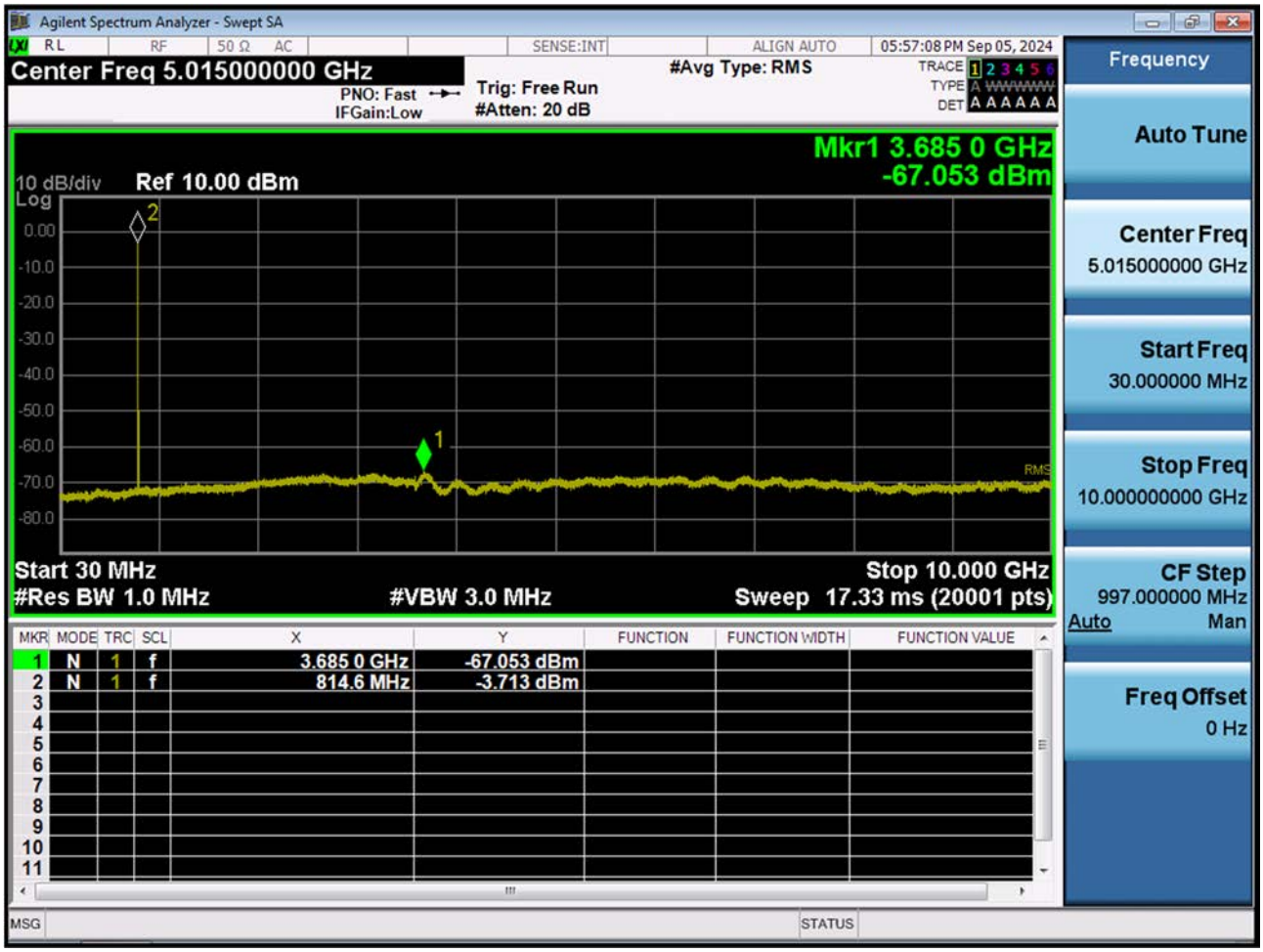
BAND 26. Conducted Spurious (26705 ch_3 MHz_QPSK_RB 1_0)



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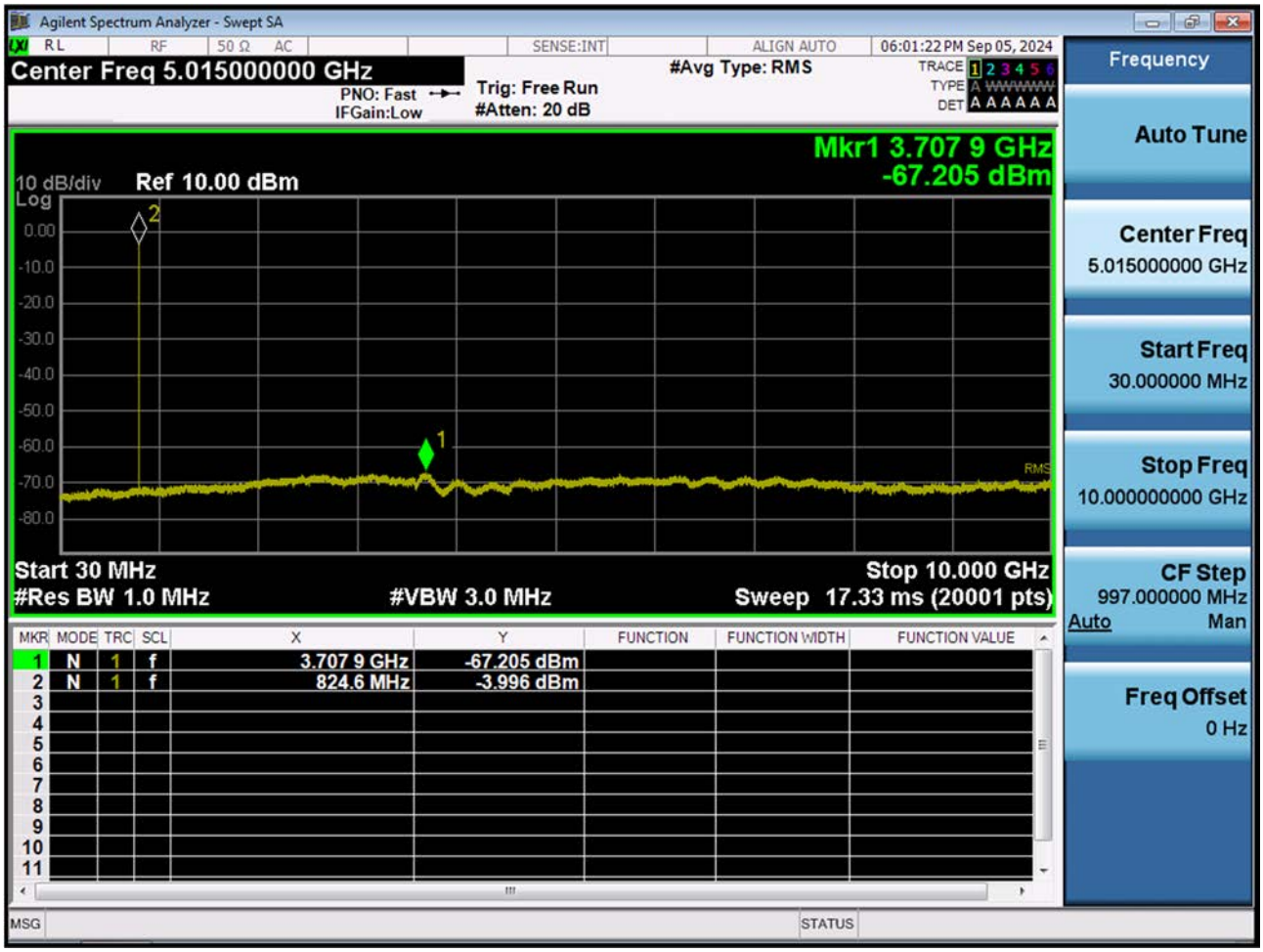
BAND 26. Conducted Spurious (26775 ch_3 MHz_QPSK_RB 1_0)



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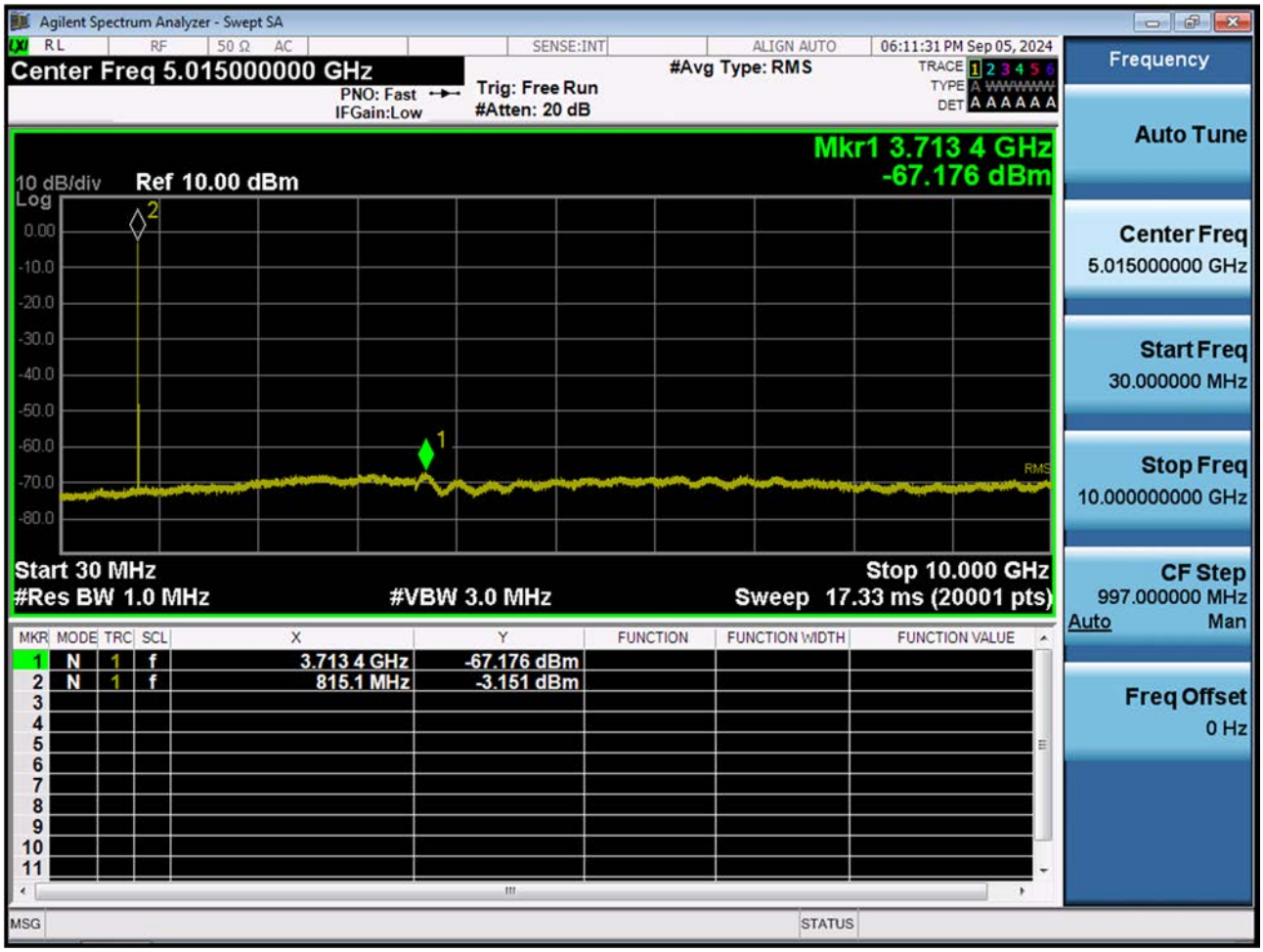
BAND 26. Conducted Spurious (26715 ch_5 MHz_QPSK_RB 1_0)



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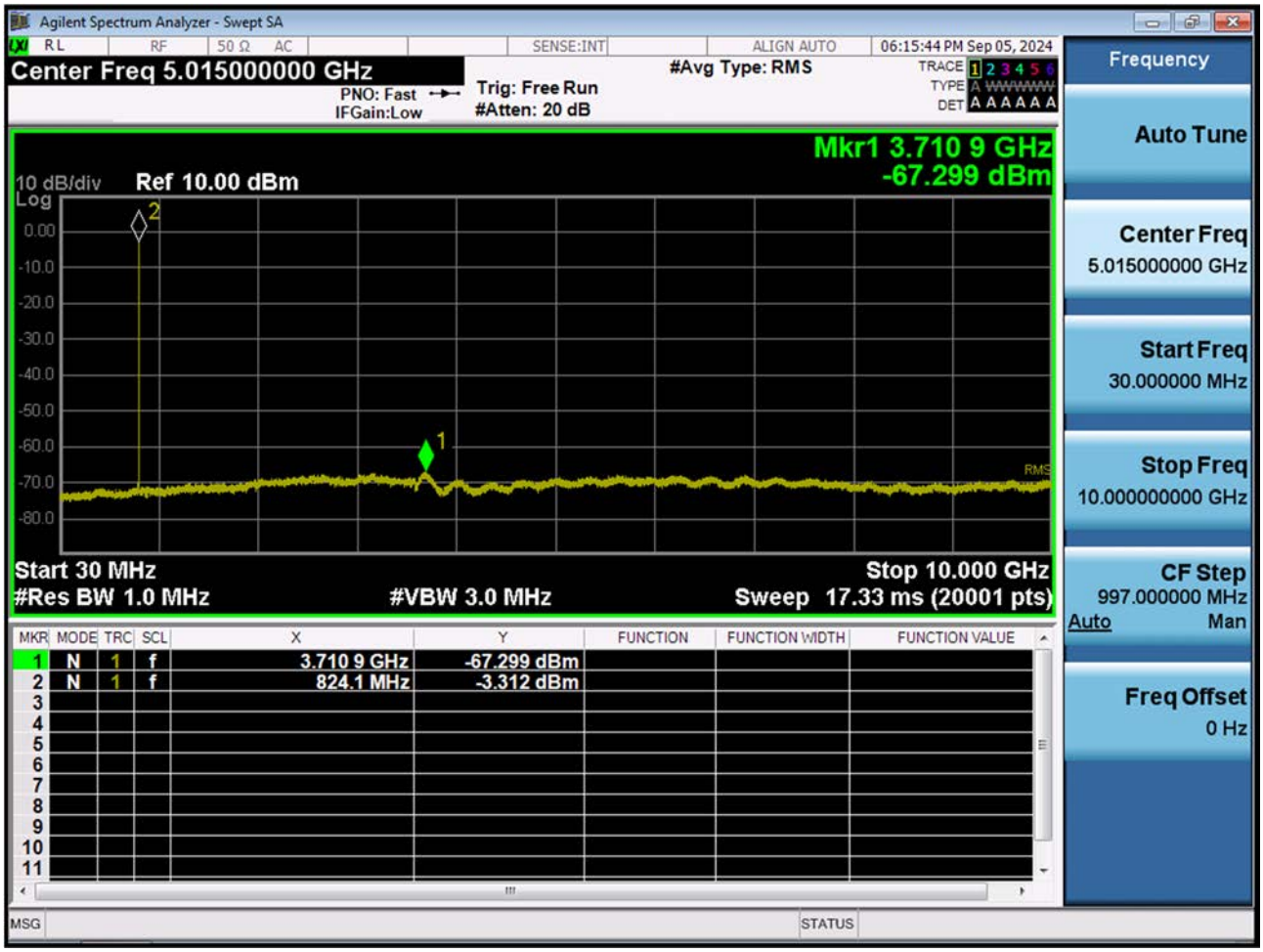
BAND 26. Conducted Spurious (26765 ch_5 MHz_QPSK_RB 1_0)



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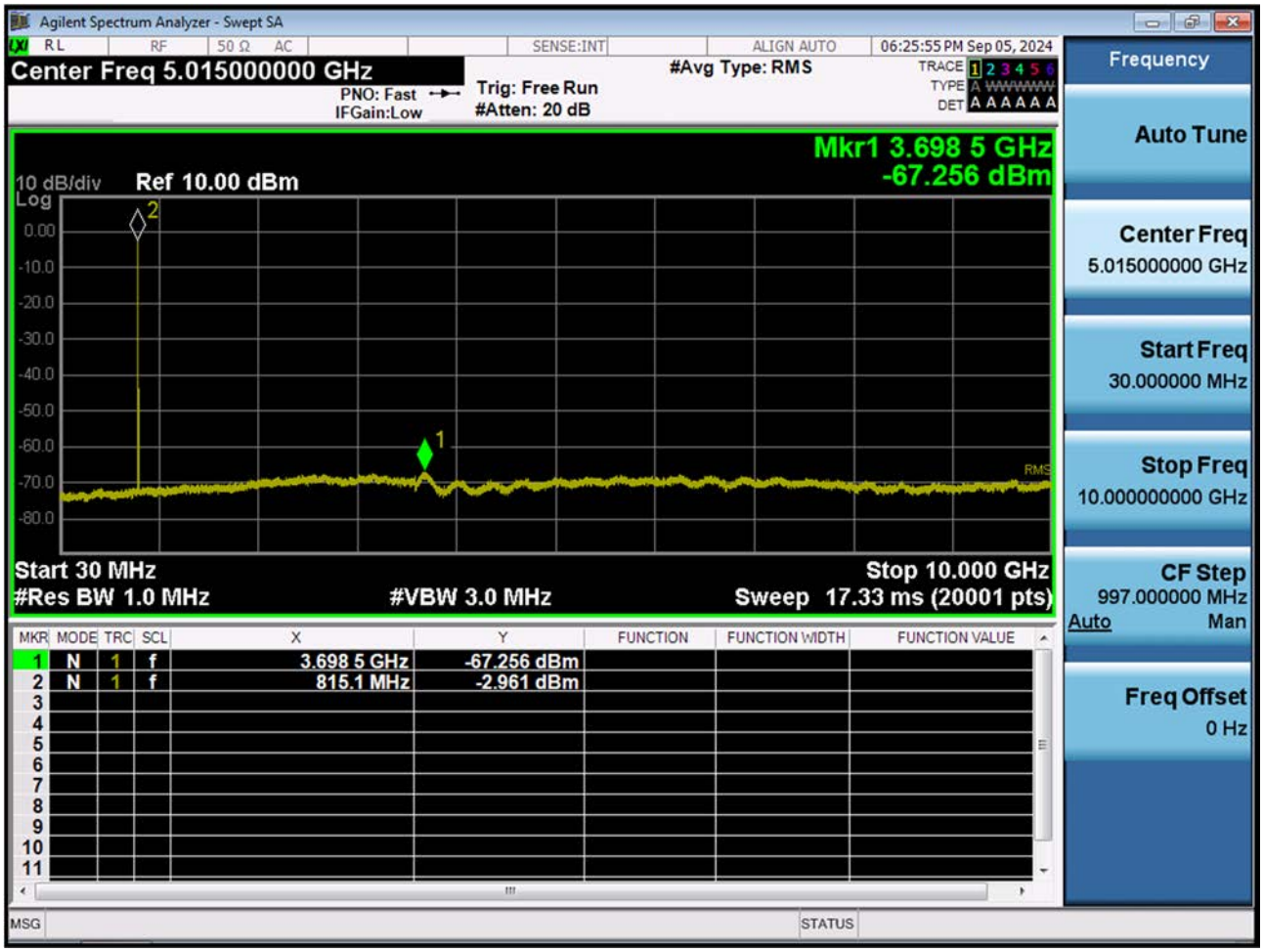
BAND 26. Conducted Spurious (26740 ch_10 MHz_QPSK_RB 1_0)



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