

# **TEST REPORT**

FCC LTE B26(Part22) Test for SM-X526B

Certification

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

REPORT NO. HCT-RF-2502-FC042

**DATE OF ISSUE** February 17, 2025

> Tested by Jae Ryang Do

**Technical Manager** Jong Seok Lee

> HCT CO., LTD. BongJai Huh



# HCT CO.,LTD.

2-6, 73, 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea Tel. +82 31 645 6300 Fax. +82 31 645 6401

# TEST REPORT

REPORT NO. HCT-RF-2502-FC042

**DATE OF ISSUE** February 17, 2025

Applicant	SAMSUNG Electronics Co., Ltd. 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Product Name	Tablet
Model Name	SM-X526B
Date of Test	December 26, 2024 ~ February 12, 2025
FCC ID	A3LSMX526B
Location of Test	■ Permanent Testing Lab □ On Site Testing (Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggido, Republic of Korea)
FCC Classification:	PCS Licensed Transmitter (PCB)
Test Standard Used	FCC Rule Part: § 22
Test Results	PASS

F-TP22-03 (Rev. 06) Page 2 of 122



### **REVISION HISTORY**

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

Revision No.	Date of Issue	Description
0	February 17, 2025	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).

F-TP22-03 (Rev. 06) Page 3 of 122



# **CONTENTS**

1. GENERAL INFORMATION	5
1.1. MAXIMUM OUTPUT POWER	6
2. INTRODUCTION	7
2.1. DESCRIPTION OF EUT	7
2.2. MEASURING INSTRUMENT CALIBRATION	7
2.3. TEST FACILITY	7
3. DESCRIPTION OF TESTS	8
3.1 TEST PROCEDURE	8
3.2 RADIATED POWER	9
3.3 RADIATED SPURIOUS EMISSIONS	10
3.4 PEAK- TO- AVERAGE RATIO	11
3.5 OCCUPIED BANDWIDTH.	12
3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL	13
3.7 BAND EDGE	14
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	24
8.1 EFFECTIVE RADIATED POWER	24
8.2 RADIATED SPURIOUS EMISSIONS	27
8.3 PEAK-TO-AVERAGE RATIO	28
8.4 OCCUPIED BANDWIDTH	29
8.5 CONDUCTED SPURIOUS EMISSIONS	30
8.6 BAND EDGE	30
8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE	31
9. TEST PLOTS	36
10. ANNEX A TEST SETUP PHOTO	122



# **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:	A3LSMX526B
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	§ 22
EUT Type:	Tablet
Model(s):	SM-X526B
	824.7 MHz – 848.3 MHz (LTE – Band 26 (1.4 MHz))
	825.5 MHz – 847.5 MHz (LTE – Band 26 (3 MHz))
Tx Frequency:	826.5 MHz – 846.5 MHz (LTE – Band 26 (5 MHz))
	829.0 MHz – 844.0 MHz (LTE – Band 26 (10 MHz))
	831.5 MHz – 841.5 MHz (LTE – Band 26 (15 MHz))
Date(s) of Tests:	December 26, 2024 ~ February 12, 2025
	Radiated: R32XC00B7ZP
Serial number:	Conducted : R32XC00AZFB

F-TP22-03 (Rev. 06) Page 5 of 122



## 1.1. MAXIMUM OUTPUT POWER

Mode	T., F.,	Emission Designator		ERP		
(MHz)	Tx Frequency (MHz)		Modulation	Max. Power (W)	Max. Power (dBm)	
		1M10G7D	QPSK	0.182	22.59	
ITE Daniel 20 (1.4)	0247 0402	1M10W7D	16QAM	0.154	21.88	
LTE – Band 26 (1.4)	824.7 – 848.3	1M10W7D	64QAM	0.121	20.83	
		1M10W7D	256QAM	0.060	17.78	
		2M72G7D	QPSK	0.177	22.49	
ITC   David 2C (2)	025 5 047 5	2M71W7D	16QAM	0.151	21.80	
LTE – Band 26 (3)	825.5 – 847.5	2M70W7D	64QAM	0.119	20.75	
		2M71W7D	256QAM	0.058	17.67	
		4M53G7D	QPSK	0.175	22.44	
ITE   David 20 (E)	020 5 040 5	4M51W7D	16QAM	0.150	21.76	
LTE – Band 26 (5)	826.5 – 846.5	4M52W7D	64QAM	0.117	20.69	
		4M53W7D	256QAM	0.057	17.58	
		9M03G7D	QPSK	0.179	22.54	
ITE David 20 (10)	829.0 – 844.0	9M02W7D	16QAM	0.149	21.74	
LTE – Band 26 (10)	829.0 - 844.0	8M99W7D	64QAM	0.117	20.68	
		9M02W7D	256QAM	0.059	17.71	
		13M5G7D	QPSK	0.196	22.93	
ITE   Danid 26 /15\	021 F 041 F	13M5W7D	16QAM	0.153	21.85	
LTE – Band 26 (15)	831.5 – 841.5	13M5W7D	64QAM	0.121	20.81	
		13M5W7D	256QAM	0.060	17.77	

F-TP22-03 (Rev. 06) Page 6 of 122



## 2. INTRODUCTION

## 2.1. DESCRIPTION OF EUT

Please refer to the [2G3G] 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

F-TP22-03 (Rev. 06) Page 7 of 122



# 3. DESCRIPTION OF TESTS

# **3.1 TEST PROCEDURE**

Test Description	Test Procedure Used
Occupied Bandwidth	- KDB 971168 D01 v03r01 - Section 4.3 - ANSI C63.26-2015 - Section 5.4.4
Band Edge	- KDB 971168 D01 v03r01 - Section 6.0 - ANSI C63.26-2015 - Section 5.7
Spurious and Harmonic Emissions at Antenna Terminal	- KDB 971168 D01 v03r01 - Section 6.0 - ANSI C63.26-2015 - Section 5.7
Conducted Output Power	- N/A (See SAR Report)
Peak- to- Average Ratio	- KDB 971168 D01 v03r01 - Section 5.7 - ANSI C63.26-2015 - Section 5.2.3.4
Frequency stability	- ANSI C63.26-2015 – Section 5.6
Radiated Power	- ANSI C63.26-2015 - Section 5.2.4.4 - KDB 971168 D01 v03r01 - Section 5.8
Radiated Spurious and Harmonic Emissions	- ANSI C63.26-2015 – Section 5.5.3 - KDB 971168 D01 v03r01 – Section 5.8

F-TP22-03 (Rev. 06) Page 8 of 122



#### 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  $\geq$  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;

$$P_{d (dBm)} = Pg_{(dBm)} - cable loss_{(dB)} + antenna gain_{(dB)}$$

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.

F-TP22-03 (Rev. 06) Page 9 of 122



#### 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  $\geq$  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<sup>th</sup> harmonics from 9 kHz.

#### **Test Note**

- 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;

Result (dBm) = Pg (dBm) - cable loss (dB) + antenna gain (dBi)

Where: Pg is the generator output power into the substitution antenna.

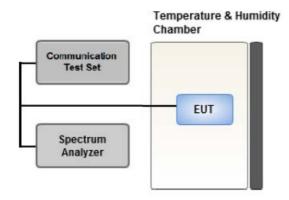
If the fundamental frequency is below 1 GHz, RF output power has been converted to EIRP.

EIRP (dBm) = ERP (dBm) + 2.15

F-TP22-03 (Rev. 06) Page 10 of 122



#### 3.4 PEAK- TO- AVERAGE RATIO



**Test setup** 

#### ① CCDF Procedure for PAPR

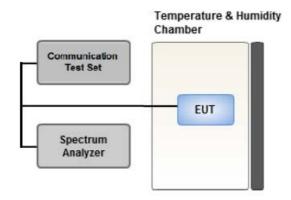
# **Test Settings**

- 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:
  - $% \left( 1\right) =\left( 1\right) +\left( 1\right) +\left($
  - .- 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 %.

F-TP22-03 (Rev. 06) Page 11 of 122



#### 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

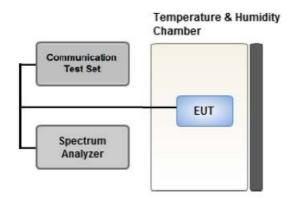
# **Test Settings**

- 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  $\geq$  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

F-TP22-03 (Rev. 06) Page 12 of 122



#### 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.

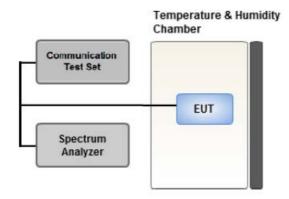
## **Test Settings**

- 1. RBW = 1 MHz
- 2. VBW  $\geq$  3 MHz
- 3. Detector = Peak
- 4. Trace Mode = Max Hold
- 5. Sweep time = auto
- 6. Number of points in sweep ≥ 2 x Span / RBW

F-TP22-03 (Rev. 06) Page 13 of 122



#### 3.7 BAND EDGE



**Test setup** 

## **Test Overview**

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

## **Test Settings**

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

F-TP22-03 (Rev. 06) Page 14 of 122



#### **Test Notes**

According to FCC 22.917, 24.238, 27.53 specified that power of any emission outside of The authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. All measurements were done at 2 channels(low and high operational frequency range.)

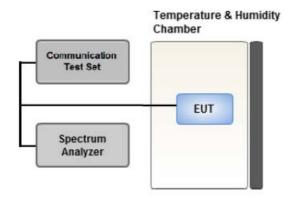
The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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.

F-TP22-03 (Rev. 06) Page 15 of 122



## 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  $10\,^{\circ}$ C intervals ranging from -30  $^{\circ}$ C to +50  $^{\circ}$ C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

F-TP22-03 (Rev. 06) Page 16 of 122



# 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: 15 MHz)
- 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
	QPSK,			
Effective Dedicted Device	16QAM,	See Section 8.1		V
Effective Radiated Power	64QAM,		Ction 8.1	X
	256QAM			
Radiated Spurious and Harmonic Emissions	QPSK	See Se	ction 8.2	Z

F-TP22-03 (Rev. 06) Page 17 of 122



# 3.10 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	1.4, 3, 5, 10, 15	Mid	Full RB	0
Peak-To-Average Ratio	QPSK, 16QAM, 64QAM, 256QAM	1.4, 3, 5, 10,	Mid	Full RB	0
		1.4	Low	1	0
	QPSK	1.4	High	1	5
		3	Low	1	0
			High	1	14
		5	Low	1	0
Band Edge			High	1	24
Band Edge		10	Low	1	0
			High	1	49
		15	Low	1	0
			High	1	74
		1.4, 3, 5, 10,	Low,	Full RB	0
		15	High	FUII RD	U
Spurious and Harmonic Emissions at Antenna Terminal	QPSK	1.4, 3, 5, 10, 15	Low, Mid, High	1	0

F-TP22-03 (Rev. 06) Page 18 of 122



# 4. LIST OF TEST EQUIPMENT

Equipment	Model	Manufacture	Serial No.	Due to Calibration	Calibration Interval
RF Switching System	Switch box(1 G HPF+LNA)	HCT CO., LTD.,	F2L2	12/12/2025	Annual
RF Switching System	Switch box(3 G HPF+LNA)	HCT CO., LTD.,	F2L3	12/12/2025	Annual
RF Switching System	Switch box(LNA)	HCT CO., LTD.,	F2L5	12/12/2025	Annual
RF Switching System	Switch box(6 G HPF+LNA)	HCT CO., LTD.,	F2L14	12/12/2025	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	03197	11/28/2025	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	03201	11/28/2025	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	ROHDE & SCHWARZ	101733	09/19/2025	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
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).

F-TP22-03 (Rev. 06) Page 19 of 122



## 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 %, <i>k</i> =2)
Frequency stability	28 (Confidence level about 95 %, <i>k</i> =2)
Parameter	Expanded Uncertainty (±dB)
Block Edge	0.70 (Confidence level about 95 %, <i>k</i> =2)
Conducted Spurious Emissions	1.18 (Confidence level about 95 %, <i>k</i> =2)
Peak- to- Average Ratio	0.68 (Confidence level about 95 %, <i>k</i> =2)
Radiated Power	4.74 (Confidence level about 95 %, <i>k</i> =2)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.36 (Confidence level about 95 %, <i>k</i> =2)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.70 (Confidence level about 95 %, <i>k</i> =2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.52 (Confidence level about 95 %, <i>k</i> =2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.66 (Confidence level about 95 %, <i>k</i> =2)
Radiated Disturbance (Above 40 GHz)	5.58 (Confidence level about 95 %, <i>k</i> =2)

F-TP22-03 (Rev. 06) Page 20 of 122



# **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, § 22.917(a)	< 43 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions	PASS
Conducted Output Power	§ 2.1046	N/A	See Note1
Peak- to- Average Ratio	§ 22.913(d)	< 13 dB	PASS
Frequency stability / variation of ambient temperature	§ 2.1055, § 22.355	< 2.5 ppm	PASS

# Note:

1. See SAR Report

6.2 Test Condition: Radiated Test

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

F-TP22-03 (Rev. 06) Page 21 of 122



#### 7. SAMPLE CALCULATION

## 7.1 ERP Sample Calculation

Ch.	/ Freq.	Measured	Substitute	Ant. Gain	C.1	Dal	ERP	
channel	Freq.(MHz)	Level (dBm)	Level (dBm)	(dBd)	C.L	Pol.	W	dBm
128	824.20	-21.37	38.40	-10.61	0.95	Н	0.483	26.84

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

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

## 7.2 EIRP Sample Calculation

Ch.	/ Freq.	Measured	Substitute	Ant. Gain	CI	Pol.	EIRP		
channel	Freq.(MHz)	Level (dBm)	Level (dBm)	(dBi)	C.L	POI.	w	dBm	
20175	1,732.50	-15.75	18.45	9.90	1.76	Н	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.

F-TP22-03 (Rev. 06) Page 22 of 122



# 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)

## **WCDMA Emission Designator**

Emission Designator = 4M17F9W

WCDMA BW = 4.17 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

## **QAM Modulation**

Emission Designator = 4M48W7D

LTE BW = 4.48 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

## **EDGE Emission Designator**

Emission Designator = 249KG7W

GSM BW = 249 kHz

G = Phase Modulation

7 = Quantized/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

F-TP22-03 (Rev. 06) Page 23 of 122



# 8. TEST DATA

# **8.1 EFFECTIVE RADIATED POWER**

	Mad/		Management	Substitute	Ant Cain			Limit	E	RP	RB	
Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Level (dBm)	Ant. Gain (dBd)	C.L	Pol	w	w	dBm	Size	Offset
		QPSK	-29.01	33.98	-9.95	1.44	Н		0.182	22.59		
0247		16-QAM	-29.72	33.27	-9.95	1.44	Н		0.154	21.88	1	1.4
824.7		64-QAM	-30.77	32.22	-9.95	1.44	Н		0.121	20.83	1	14
		256-QAM	-33.82	29.17	-9.95	1.44	Н		0.060	17.78		
		QPSK	-29.27	33.59	-9.90	1.45	Н		0.167	22.24		
02C E	LTE 26	16-QAM	-29.96	32.90	-9.90	1.45	Н	<	0.143	21.55	1	0
836.5	(1.4 MHz)	64-QAM	-31.05	31.81	-9.90	1.45	Н	7.00	0.111	20.46	1	0
		256-QAM	-34.15	28.71	-9.90	1.45	Н		0.054	17.36		
		QPSK	-29.74	33.35	-9.85	1.45	Н		0.160	22.05		
040.3		16-QAM	-30.46	32.63	-9.85	1.45	Н		0.136	21.33	•	
848.3	48.3	64-QAM	-31.53	31.56	-9.85	1.45	Н		0.106	20.26	1	0
		256-QAM	-34.59	28.50	-9.85	1.45	Н		0.052	17.20		

F===	Mad/		Manager	Substitute	Ant Coin			Limit	E	RP	R	B
Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Level (dBm)	Ant. Gain (dBd)	C.L	Pol	w	w	dBm	Size	Offset
		QPSK	-29.08	33.88	-9.95	1.44	Н		0.177	22.49		
025.5		16-QAM	-29.77	33.19	-9.95	1.44	Н		0.151	21.80	1	
825.5		64-QAM	-30.82	32.14	-9.95	1.44	Н		0.119	20.75	1	0
		256-QAM	-33.90	29.06	-9.95	1.44	Н		0.058	17.67		
		QPSK	-29.28	33.58	-9.90	1.45	Н		0.167	22.23		
026 5	LTE 26	16-QAM	-29.94	32.92	-9.90	1.45	Н	<	0.144	21.57		
836.5	(3 MHz)	64-QAM	-31.01	31.85	-9.90	1.45	Н	7.00	0.112	20.50	1	0
		256-QAM	-34.11	28.75	-9.90	1.45	Н		0.055	17.40		
		QPSK	-29.78	33.44	-9.85	1.45	Н		0.164	22.14		
		16-QAM	-30.47	32.75	-9.85	1.45	Н	-	0.140	21.45		
847.5		64-QAM	-31.54	31.68	-9.85	1.45	Н		0.109	20.38	1	0
		256-QAM	-34.63	28.59	-9.85	1.45	Н		0.054	17.29		

F-TP22-03 (Rev. 06) Page 24 of 122



	N4 1 /		Manageman	Substitute	Ant Cain			Limit	EI	RP	RB	
Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Level (dBm)	Ant. Gain (dBd)	C.L	Pol	W	w	dBm	Size	Offset
		QPSK	-29.08	33.83	-9.95	1.44	Н		0.175	22.44		
92C E		16-QAM	-29.76	33.15	-9.95	1.44	Н		0.150	21.76	1	0
826.5		64-QAM	-30.83	32.08	-9.95	1.44	Н		0.117	20.69	1	0
		256-QAM	-33.94	28.97	-9.95	1.44	Н		0.057	17.58		
		QPSK	-29.10	33.76	-9.90	1.45	Н		0.174	22.41		
026 5	LTE 26	16-QAM	-29.81	33.05	-9.90	1.45	Н	<	0.148	21.70		
836.5	(5 MHz)	64-QAM	-30.88	31.98	-9.90	1.45	Н	7.00	0.116	20.63	1	0
		256-QAM	-33.97	28.89	-9.90	1.45	Н		0.057	17.54		
		QPSK	-29.56	33.73	-9.85	1.45	Н		0.175	22.43		
0.46 5		16-QAM	-30.24	33.05	-9.85	1.45	Н		0.150	21.75		
846.5		64-QAM	-31.33	31.96	-9.85	1.45	Н		0.116	20.66	1	0
		256-QAM	-34.43	28.86	-9.85	1.45	Н			17.56		

From	Mod/		Measured	Substitute	Ant Cain			Limit	El	RP	R	RB
Freq (MHz)	Bandwidth	Modulation	Level (dBm)	Level (dBm)	Ant. Gain (dBd)	C.L	Pol	W	w	dBm	Size	Offset
		QPSK	-29.01	33.84	-9.95	1.44	Н		0.176	22.45		
020.0		16-QAM	-29.78	33.07	-9.95	1.44	Н		0.147	21.68	1	0
829.0		64-QAM	-30.84	32.01	-9.95	1.44	Н		0.115	20.62	1	0
		256-QAM	-33.84	29.01	-9.95	1.44	Н		0.058	17.62		
		QPSK	-28.97	33.89	-9.90	1.45	Н		0.179	22.54		
026 5	LTE 26	16-QAM	-29.77	33.09	-9.90	1.45	Н	<	0.149	21.74	1	0
836.5	(10 MHz)	64-QAM	-30.83	32.03	-9.90	1.45	Н	7.00	0.117	20.68	1	0
		256-QAM	-33.80	29.06	-9.90	1.45	Н		0.059	17.71		
		QPSK	-29.45	33.79	-9.85	1.45	Н		0.177	22.49		
044.0		16-QAM	-30.25	32.99	-9.85	1.45	Н		0.148	21.69	1	0
844.0		64-QAM	-31.32	31.92	-9.85	1.45	Н		0.115	20.62	1	0
		256-QAM	-34.33	28.91	-9.85	1.45	Н		0.058	17.61		

F-TP22-03 (Rev. 06) Page 25 of 122



F	NA 1 /		Manageral	Substitute	Ant Cain			Limit	ERP		RB	
Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Level (dBm)	Ant. Gain (dBd)	C.L	Pol	W	w	dBm	Size	Offset
		QPSK	-28.95	33.81	-9.95	1.45	Н		0.174	22.41		
021 5		16-QAM	-29.66	33.10	-9.95	1.45	Н		0.148	21.70		
831.5		64-QAM	-30.73	32.03	-9.95	1.45	Н		0.116	20.63	1	0
		256-QAM	-33.79	28.97	-9.95	1.45	Н		0.057	17.57		
		QPSK	-28.58	34.28	-9.90	1.45	Н		0.196	22.93		
026 5	LTE 26	16-QAM	-29.66	33.20	-9.90	1.45	Н	<	0.153	21.85		
836.5	(15 MHz)	64-QAM	-30.70	32.16	-9.90	1.45	Н	7.00	0.121	20.81	1	0
		256-QAM	-33.74	29.12	-9.90	1.45	Н		0.060	17.77		
		QPSK	-29.41	33.67	-9.85	1.45	Н		0.173	22.37		
044.5		16-QAM	-30.20	32.88	-9.85	1.45	Н		0.144	21.58		
841.5		64-QAM	-31.26	31.82	-9.85	1.45	Н		0.113	20.52	1	0
		256-QAM	-34.26	28.82	-9.85	1.45	Н		0.056	17.52		

F-TP22-03 (Rev. 06) Page 26 of 122



## **8.2 RADIATED SPURIOUS EMISSIONS**

■ MODE: <u>LTE 26</u>

■ MODULATION SIGNAL: <u>15 MHz QPSK</u>

■ DISTANCE: <u>3 meters</u>

		Measured	Ant. Gain		- <i>C</i> I		Result		F	RB
Ch	Freq (MHz)	Level (dBm)	(dBi)	Level (dBm)	C.L	Pol	(dBm)	Limit	Size	Offset
	1 663.00	-50.20	9.54	-65.38	2.04	V	-57.88	-13.00		
26865 (831.5)	2 494.50	-46.35	10.28	-57.59	2.50	Н	-49.81	-13.00	1	0
(002.0)	3 326.00	-53.61	11.10	-62.12	2.99	V	-54.01	-13.00		
	1 673.00	-49.14	9.60	-64.41	2.05	Н	-56.86	-13.00		
26915 (836.5)	2 509.50	-52.70	10.26	-63.98	2.51	V	-56.23	-13.00	1	0
(000.0)	3 346.00	-53.74	11.10	-62.40	2.96	Н	-54.26	-13.00		
	1 683.00	-50.20	9.66	-65.48	2.06	V	-57.88	-13.00		
26965 (841.5)	2 524.50	-48.13	10.25	-59.41	2.54	Н	-51.70	-13.00	1	0
	3 366.00	-53.68	11.13	-62.58	2.96	V	-54.41	-13.00		

F-TP22-03 (Rev. 06) Page 27 of 122



## **8.3 PEAK-TO-AVERAGE RATIO**

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
			QPSK			5.41
	1 4 14 14		16-QAM			6.05
	1.4 MHz		64-QAM	6		6.36
			256-QAM			6.38
			QPSK			5.43
	2 MH-		16-QAM	15		6.02
	3 MHz		64-QAM	15		6.31
			256-QAM			6.44
			QPSK			5.40
26	5 MHz	836.5	16-QAM	25	0	6.01
20	3 MHZ	830.5	64-QAM	25	0	6.27
			256-QAM			6.47
		QPSK 16-QAM		5.51		
	10 MH-		16-QAM	F0		6.06
	10 MHz		64-QAM	50		6.33
			256-QAM			6.44
			QPSK			5.41
	1 F MI I-		16-QAM			6.03
	15 MHz		64-QAM	75		6.32
			256-QAM			6.45

# Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 57  $\sim$  76.

F-TP22-03 (Rev. 06) Page 28 of 122



## **8.4 OCCUPIED BANDWIDTH**

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)	
			QPSK			1.0981	
	1 4 14 14		16-QAM	6		1.0969	
	1.4 MHz		64-QAM	6		1.0969	
			256-QAM			1.0946	
			QPSK			2.7170	
	2 MH-		16-QAM	15		2.7087	
	3 MHz		64-QAM	15		2.7026	
			256-QAM			2.7112	
			QPSK			4.5340	
26	E MII-	026.5	16-QAM	25		4.5122	
26	5 MHz	836.5	64-QAM	25	0	4.5239	
			256-QAM			4.5322	
				QPSK			9.0283
	10 MH-		16-QAM	F0		9.0163	
	10 MHz		64-QAM	50		8.9875	
			256-QAM			9.0193	
			QPSK			13.467	
	1.F. M.L.		16-QAM			13.484	
	15 MHz		64-QAM 75			13.462	
			256-QAM			13.472	

# Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 37 ~ 56.

F-TP22-03 (Rev. 06) Page 29 of 122



## **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)
		824.7	5.6431	28.591	-57.735	-29.144	
	1.4	836.5	3.1606	27.976	-58.129	-30.153	
		848.3	3.6591	27.976	-57.840	-29.864	
		826.5	5.5534	28.591	-57.756	-29.165	
	3	836.5	3.7189	27.976	-57.899	-29.923	
		846.5	3.6890	27.976	-57.300	-29.324	
		826.5	3.1706	27.976	-57.713	-29.737	
26	5	836.5	2.5624	27.976	-58.455	-30.479	-13.00
		846.5	2.5823	27.976	-57.915	-29.939	
		829.0	3.0310	27.976	-58.365	-30.389	
	10	836.5	3.7289	27.976	-58.511	-30.535	
		844.0	3.6691	27.976	-58.061	-30.085	
		831.5	3.7289	27.976	-57.897	-29.921	
	15	836.5	3.2902	27.976	-58.132	-30.156	
		841.5	3.0609	27.976	-57.048	-29.072	

## Note:

- 1. Plots of the EUT's Conducted Spurious Emissions are shown Page 107  $\sim$  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 + 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 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 77 ~ 106.

F-TP22-03 (Rev. 06) Page 30 of 122



# 8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

■ MODE: LTE 26

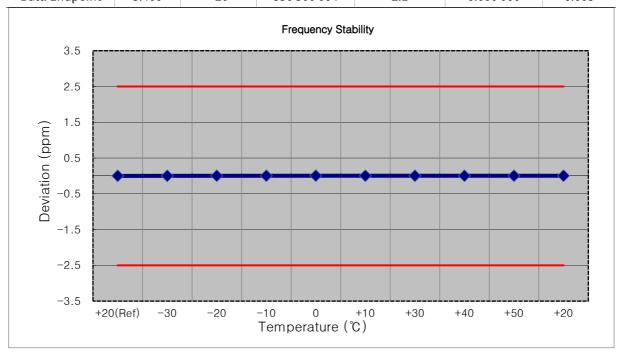
 ■ OPERATING FREQUENCY:
 836,500,000 Hz

 ■ CHANNEL:
 26915 (1.4 MHz)

■ REFERENCE VOLTAGE: <u>3.860 VDC</u>

■ DEVIATION LIMIT:  $\pm$  0.000 25 % or 2.5 ppm

Voltage	Power	Temp.	Frequency	Frequency	Deviation	
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	ppm
100 %		+20(Ref)	836 500 001	0.0	0.000 000	0.000
100 %		-30	836 500 003	1.4	0.000 000	0.002
100 %		-20	836 500 004	2.4	0.000 000	0.003
100 %		-10	836 500 005	3.3	0.000 000	0.004
100 %	3.860	0	836 500 005	3.7	0.000 000	0.004
100 %		+10	836 500 003	1.7	0.000 000	0.002
100 %		+30	836 500 004	2.7	0.000 000	0.003
100 %		+40	836 500 004	2.3	0.000 000	0.003
100 %		+50	836 500 004	2.3	0.000 000	0.003
Batt. Endpoint	3.400	+20	836 500 004	2.1	0.000 000	0.003



F-TP22-03 (Rev. 06) Page 31 of 122



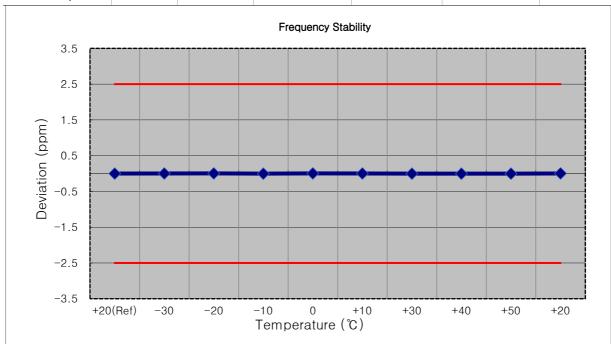
■ OPERATING FREQUENCY: 836,500,000 Hz

■ CHANNEL: 26915 (3 MHz)

■ REFERENCE VOLTAGE: 3.860 VDC

■ DEVIATION LIMIT:  $\pm 0.000 25 \%$  or 2.5 ppm

Voltage	Power	Temp.	Frequency	Frequency	Deviation	
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	ppm
100 %		+20(Ref)	836 500 002	0.0	0.000 000	0.000
100 %		-30	836 500 004	1.7	0.000 000	0.002
100 %	3.860	-20	836 500 004	2.3	0.000 000	0.003
100 %		-10	836 500 000	-2.3	0.000 000	-0.003
100 %		0	836 500 004	2.3	0.000 000	0.003
100 %		+10	836 500 004	1.7	0.000 000	0.002
100 %	-	+30	836 500 000	-1.6	0.000 000	-0.002
100 %		+40	836 500 000	-1.7	0.000 000	-0.002
100 %		+50	836 500 000	-2.0	0.000 000	-0.002
Batt. Endpoint	3.400	+20	836 500 005	2.9	0.000 000	0.003



F-TP22-03 (Rev. 06) Page 32 of 122



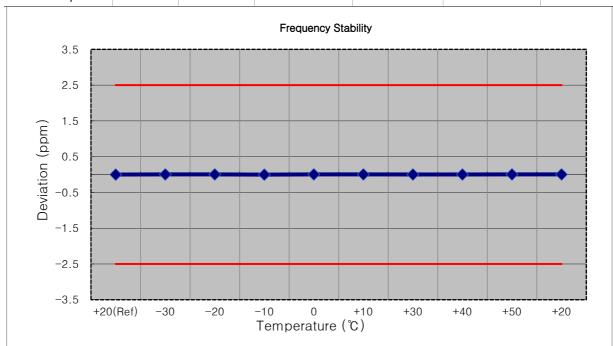
■ OPERATING FREQUENCY: 836,500,000 Hz

■ CHANNEL: 26915 (5 MHz)

■ REFERENCE VOLTAGE: 3.860 VDC

■ DEVIATION LIMIT:  $\pm 0.000 25 \%$  or 2.5 ppm

Voltage (%)	Power	Temp.	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
	(VDC)					
100 %		+20(Ref)	836 500 003	0.0	0.000 000	0.000
100 %		-30	836 500 005	2.8	0.000 000	0.003
100 %		-20	836 500 005	2.2	0.000 000	0.003
100 %		-10	836 500 001	-2.0	0.000 000	-0.002
100 %	3.860	0	836 500 006	3.0	0.000 000	0.004
100 %		+10	836 500 006	3.1	0.000 000	0.004
100 %		+30	836 500 004	1.8	0.000 000	0.002
100 %		+40	836 500 004	1.8	0.000 000	0.002
100 %		+50	836 500 005	2.7	0.000 000	0.003
att. Endpoint	3.400	+20	836 500 005	2.5	0.000 000	0.003



F-TP22-03 (Rev. 06) Page 33 of 122

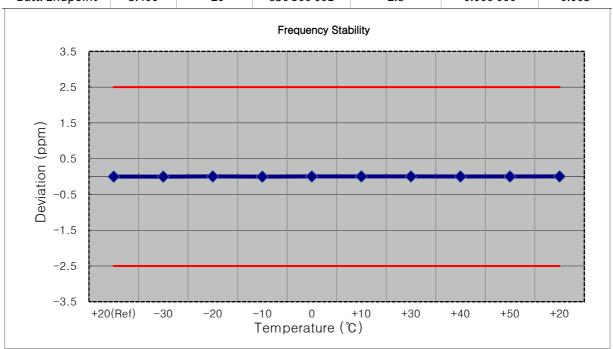


■ OPERATING FREQUENCY: 836,500,000 Hz
 ■ CHANNEL: 26915 (10 MHz)

■ REFERENCE VOLTAGE: 3.860 VDC

■ DEVIATION LIMIT:  $\pm 0.000 25 \%$  or 2.5 ppm

Voltage	Power	Temp.	Frequency	Frequency	Deviation	
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	- ppm
100 %		+20(Ref)	836 499 998	0.0	0.000 000	0.000
100 %		-30	836 499 995	-2.5	0.000 000	-0.003
100 %	3.860	-20	836 500 000	2.5	0.000 000	0.003
100 %		-10	836 499 996	-1.6	0.000 000	-0.002
100 %		0	836 500 001	3.0	0.000 000	0.004
100 %		+10	836 500 002	3.9	0.000 000	0.005
100 %		+30	836 500 001	3.1	0.000 000	0.004
100 %		+40	836 500 000	2.0	0.000 000	0.002
100 %		+50	836 500 000	2.0	0.000 000	0.002
Batt. Endpoint	3.400	+20	836 500 001	2.8	0.000 000	0.003



F-TP22-03 (Rev. 06) Page 34 of 122

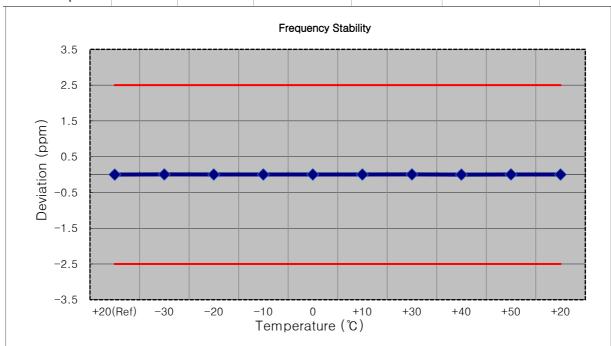


■ OPERATING FREQUENCY: 836,500,000 Hz
 ■ CHANNEL: 26915 (15 MHz)

■ REFERENCE VOLTAGE: 3.860 VDC

■ DEVIATION LIMIT:  $\pm 0.000 25 \%$  or 2.5 ppm

Voltage (%)	Power	Temp.	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
	(VDC)					
100 %		+20(Ref)	836 499 997	0.0	0.000 000	0.000
100 %		-30	836 500 000	2.3	0.000 000	0.003
100 %		-20	836 500 000	1.6	0.000 000	0.002
100 %		-10	836 499 999	1.5	0.000 000	0.002
100 %	3.860	0	836 499 999	1.2	0.000 000	0.001
100 %		+10	836 500 000	2.1	0.000 000	0.003
100 %		+30	836 500 000	2.3	0.000 000	0.003
100 %		+40	836 499 997	-1.2	0.000 000	-0.001
100 %		+50	836 500 001	2.9	0.000 000	0.003
att. Endpoint	3.400	+20	836 500 000	1.7	0.000 000	0.002



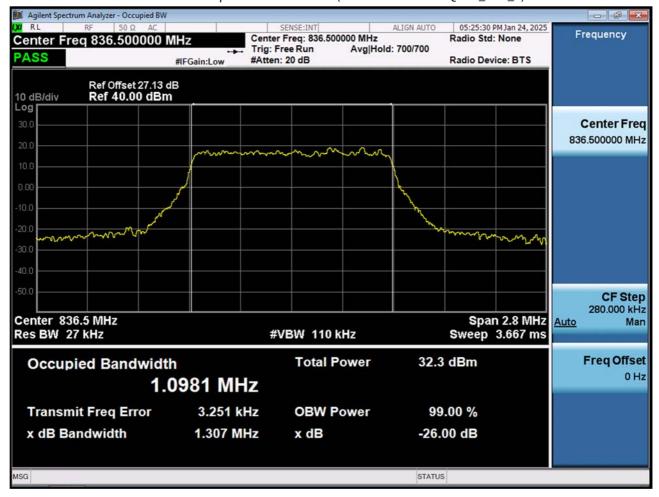
F-TP22-03 (Rev. 06) Page 35 of 122



# 9. TEST PLOTS

F-TP22-03 (Rev. 06) Page 36 of 122

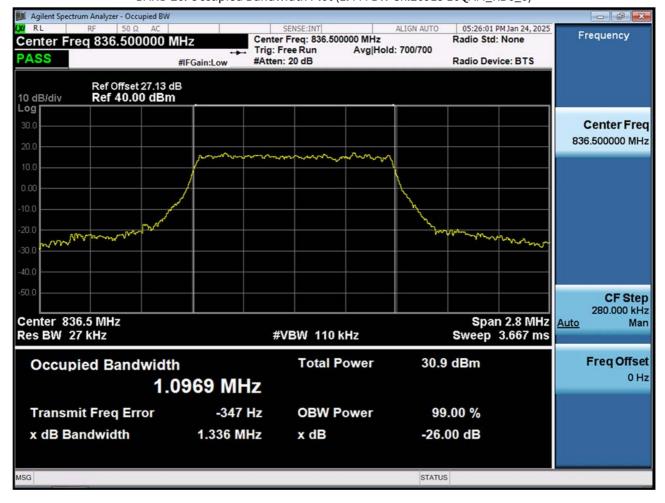




BAND 26. Occupied Bandwidth Plot (1.4 M BW Ch.26915 QPSK\_RB6\_0)

F-TP22-03 (Rev. 06) Page 37 of 122

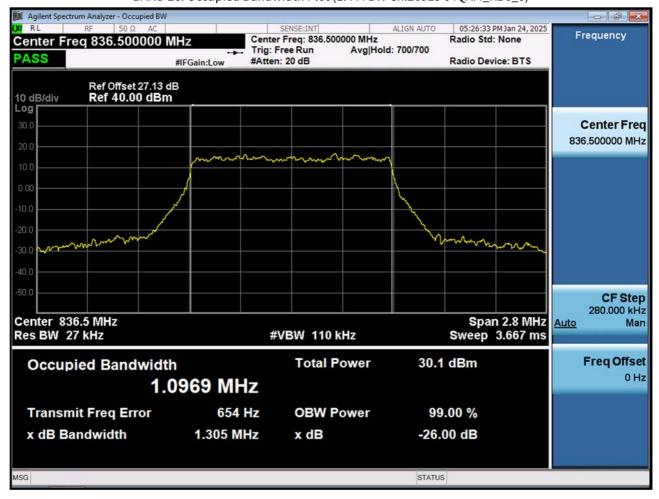




BAND 26. Occupied Bandwidth Plot (1.4 M BW Ch.26915 16QAM\_RB6\_0)

F-TP22-03 (Rev. 06) Page 38 of 122

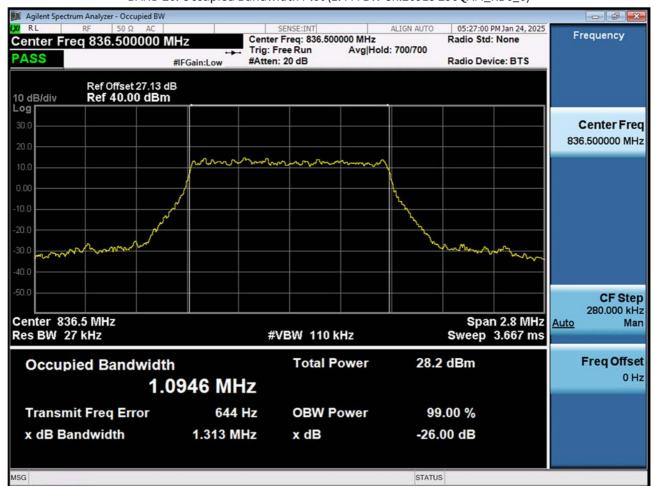




BAND 26. Occupied Bandwidth Plot (1.4 M BW Ch.26915 64QAM\_RB6\_0)

F-TP22-03 (Rev. 06) Page 39 of 122

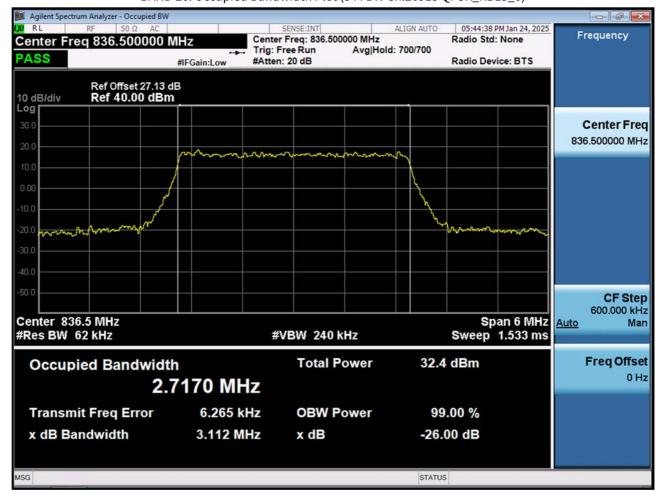




BAND 26. Occupied Bandwidth Plot (1.4 M BW Ch.26915 256QAM\_RB6\_0)

F-TP22-03 (Rev. 06) Page 40 of 122

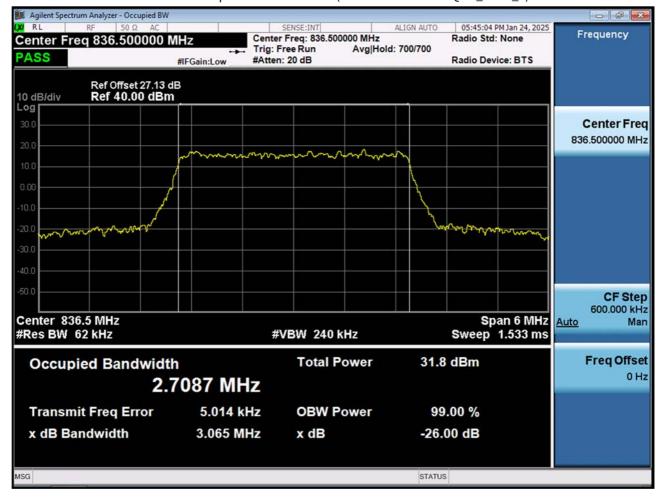




BAND 26. Occupied Bandwidth Plot (3 M BW Ch.26915 QPSK\_RB15\_0)

F-TP22-03 (Rev. 06) Page 41 of 122

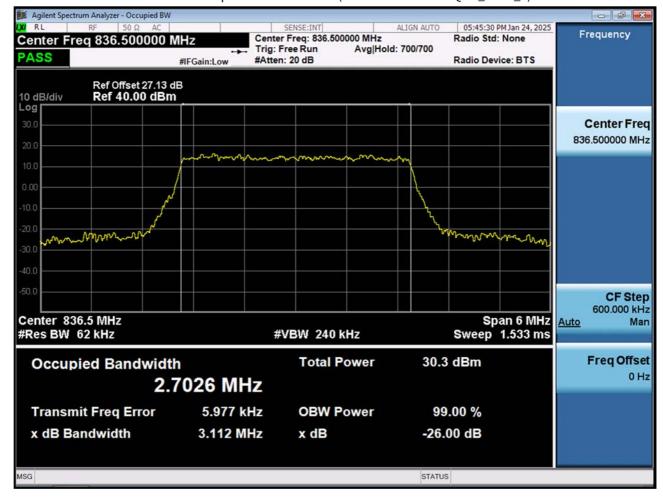




BAND 26. Occupied Bandwidth Plot (3 M BW Ch.26915 16QAM\_RB15\_0)

F-TP22-03 (Rev. 06) Page 42 of 122

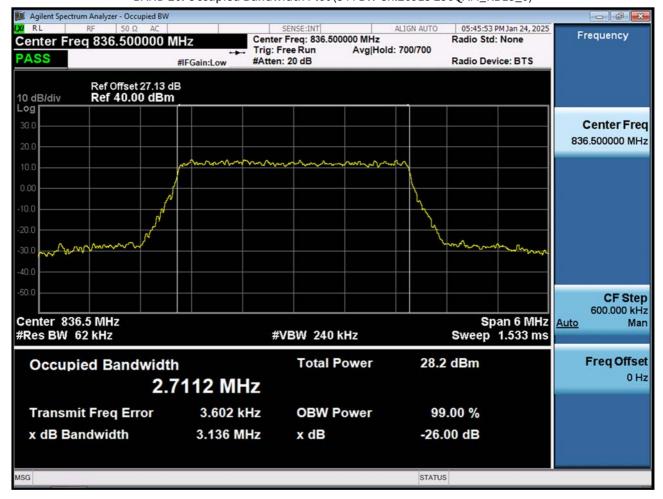




BAND 26. Occupied Bandwidth Plot (3 M BW Ch.26915 64QAM\_RB15\_0)

F-TP22-03 (Rev. 06) Page 43 of 122

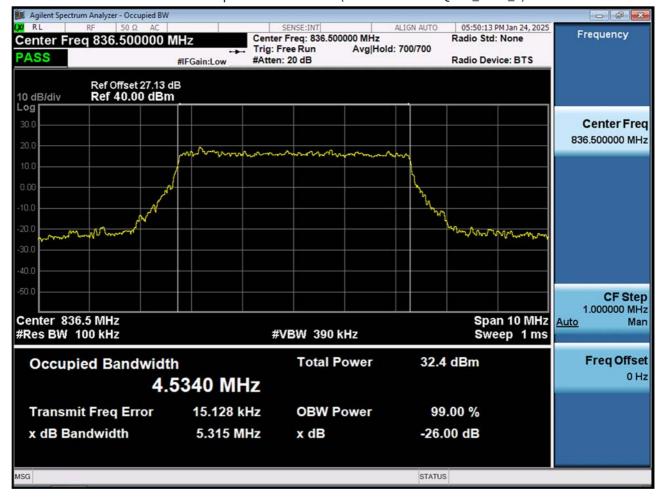




BAND 26. Occupied Bandwidth Plot (3 M BW Ch.26915 256QAM\_RB15\_0)

F-TP22-03 (Rev. 06) Page 44 of 122

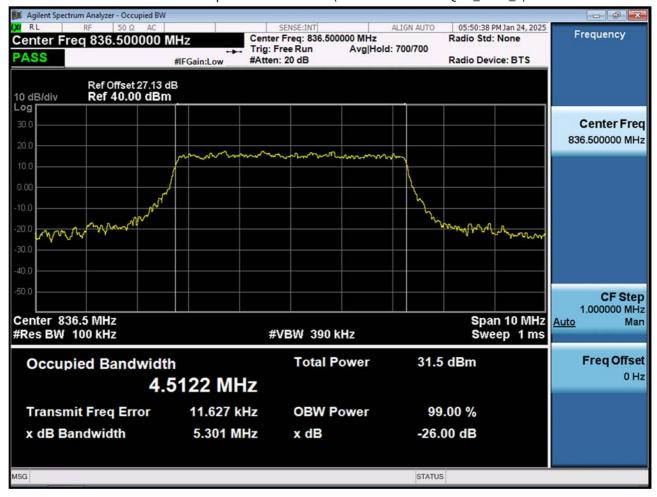




BAND 26. Occupied Bandwidth Plot (5 M BW Ch.26915 QPSK\_RB25\_0)

F-TP22-03 (Rev. 06) Page 45 of 122

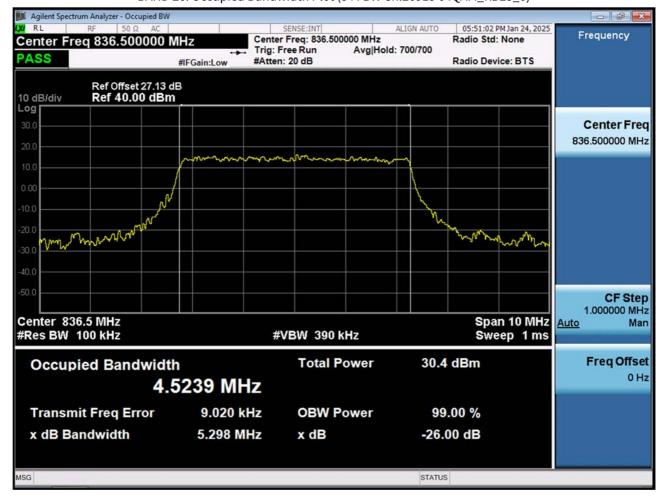




BAND 26. Occupied Bandwidth Plot (5 M BW Ch.26915 16QAM\_RB25\_0)

F-TP22-03 (Rev. 06) Page 46 of 122

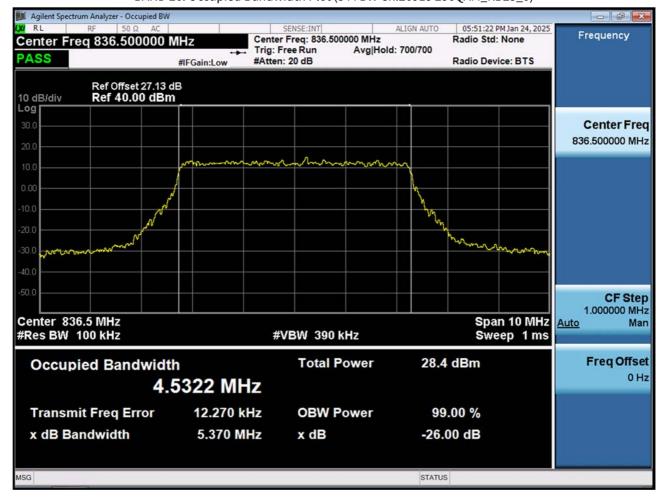




BAND 26. Occupied Bandwidth Plot (5 M BW Ch.26915 64QAM\_RB25\_0)

F-TP22-03 (Rev. 06) Page 47 of 122

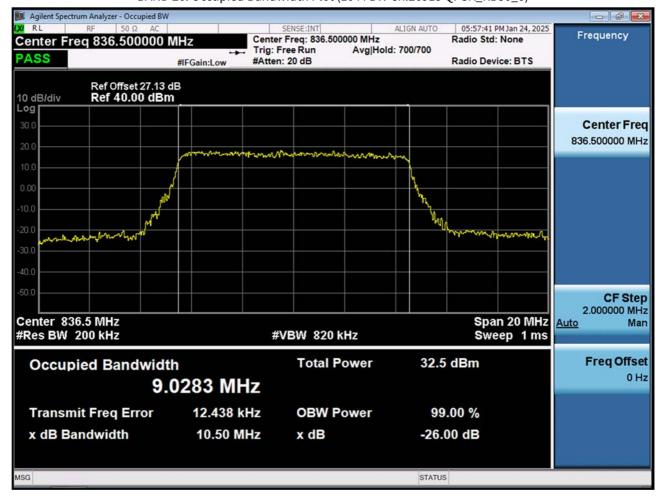




BAND 26. Occupied Bandwidth Plot (5 M BW Ch.26915 256QAM\_RB25\_0)

F-TP22-03 (Rev. 06) Page 48 of 122





BAND 26. Occupied Bandwidth Plot (10 M BW Ch.26915 QPSK\_RB50\_0)

F-TP22-03 (Rev. 06) Page 49 of 122





BAND 26. Occupied Bandwidth Plot (10 M BW Ch.26915 16QAM\_RB50\_0)

F-TP22-03 (Rev. 06) Page 50 of 122





BAND 26. Occupied Bandwidth Plot (10 M BW Ch.26915 64QAM\_RB50\_0)

F-TP22-03 (Rev. 06) Page 51 of 122

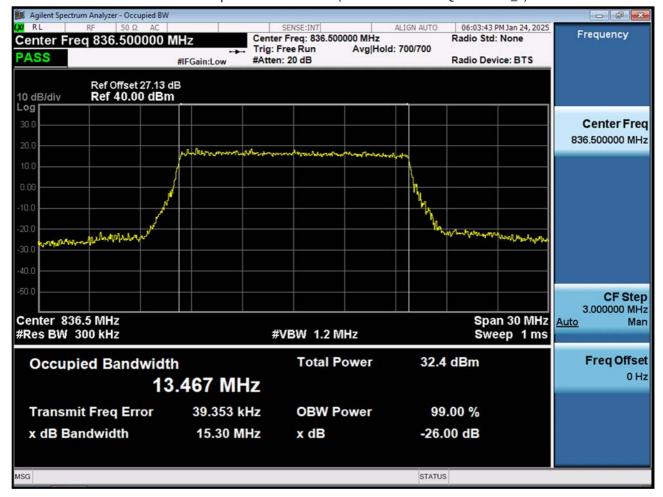




BAND 26. Occupied Bandwidth Plot (10 M BW Ch.26915 256QAM\_RB50\_0)

F-TP22-03 (Rev. 06) Page 52 of 122

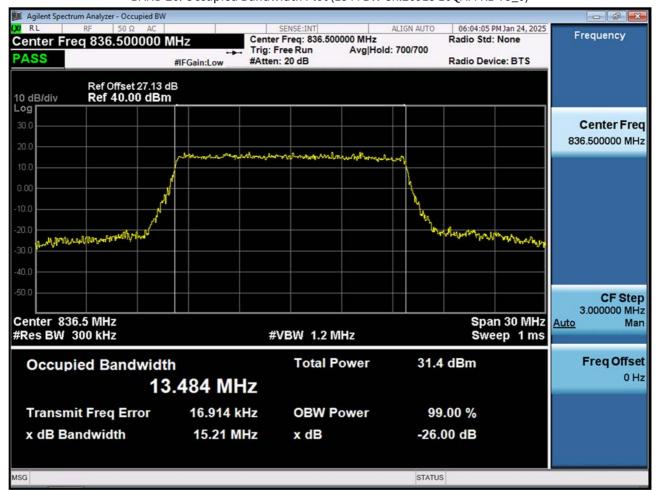




BAND 26. Occupied Bandwidth Plot (15 M BW Ch.26915 QPSK RB 75\_0)

F-TP22-03 (Rev. 06) Page 53 of 122

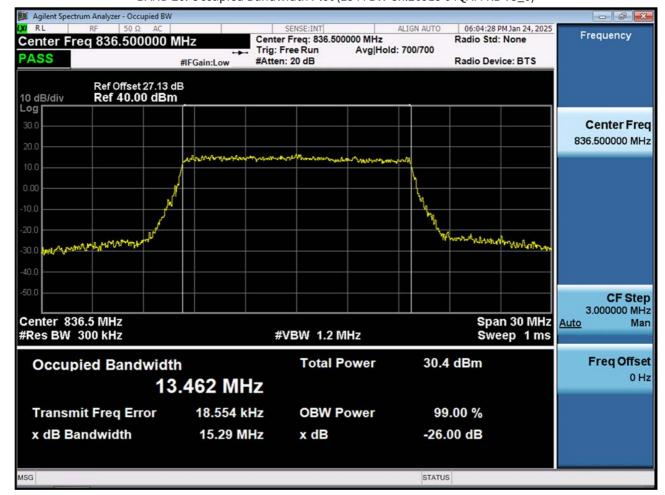




BAND 26. Occupied Bandwidth Plot (15 M BW Ch.26915 16QAM RB 75\_0)

F-TP22-03 (Rev. 06) Page 54 of 122

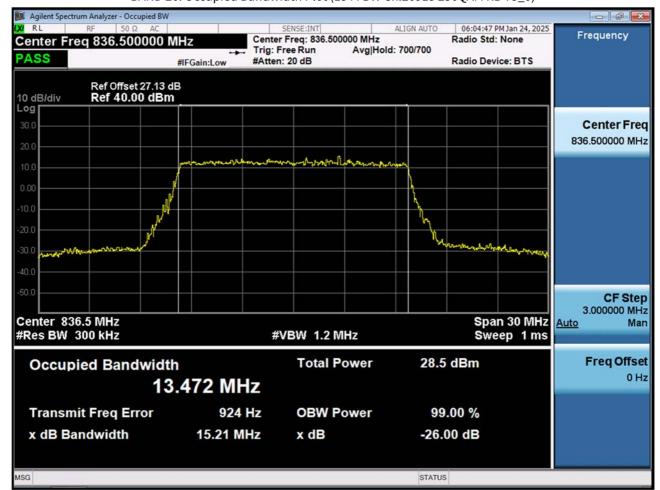




BAND 26. Occupied Bandwidth Plot (15 M BW Ch.26915 64QAM RB 75\_0)

F-TP22-03 (Rev. 06) Page 55 of 122

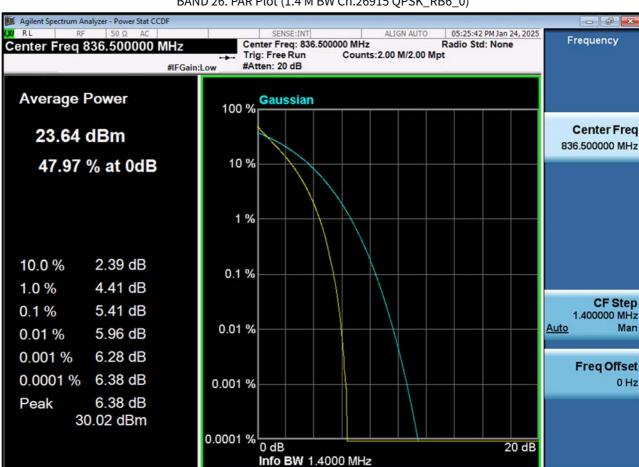




BAND 26. Occupied Bandwidth Plot (15 M BW Ch.26915 256QAM RB 75\_0)

F-TP22-03 (Rev. 06) Page 56 of 122



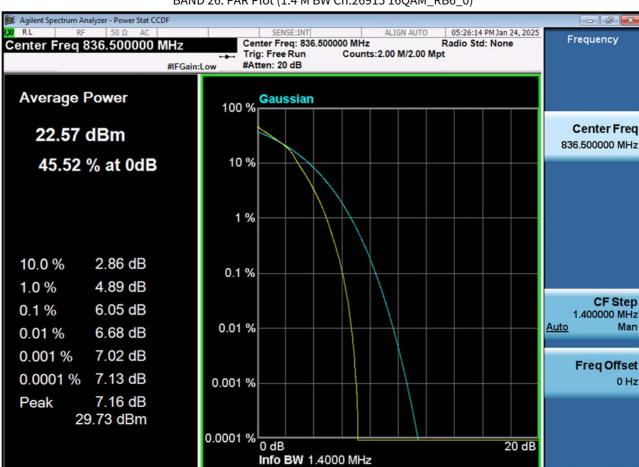


STATUS

BAND 26. PAR Plot (1.4 M BW Ch.26915 QPSK\_RB6\_0)

F-TP22-03 (Rev. 06) Page 57 of 122



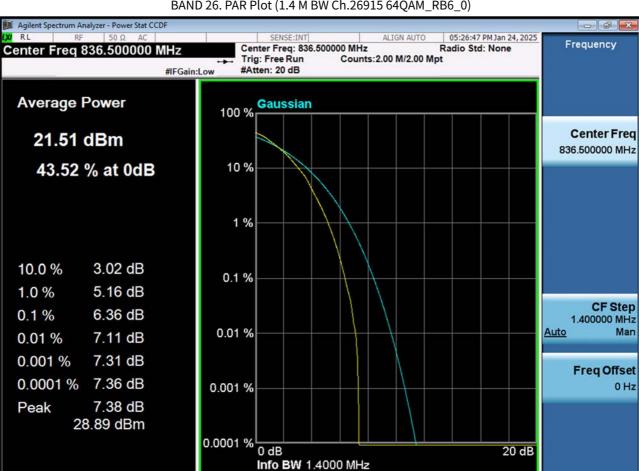


STATUS

BAND 26. PAR Plot (1.4 M BW Ch.26915 16QAM\_RB6\_0)

F-TP22-03 (Rev. 06) Page 58 of 122



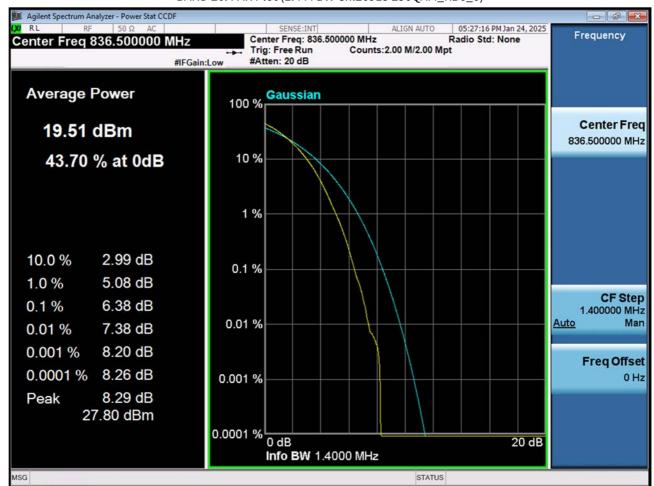


STATUS

BAND 26. PAR Plot (1.4 M BW Ch.26915 64QAM\_RB6\_0)

F-TP22-03 (Rev. 06) Page 59 of 122

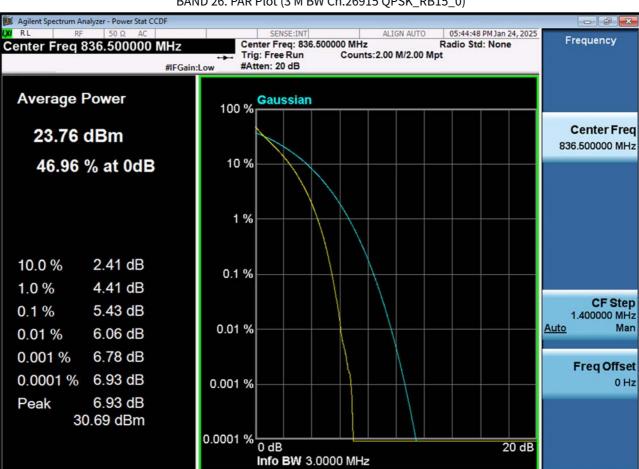




BAND 26. PAR Plot (1.4 M BW Ch.26915 256QAM\_RB6\_0)

F-TP22-03 (Rev. 06) Page 60 of 122





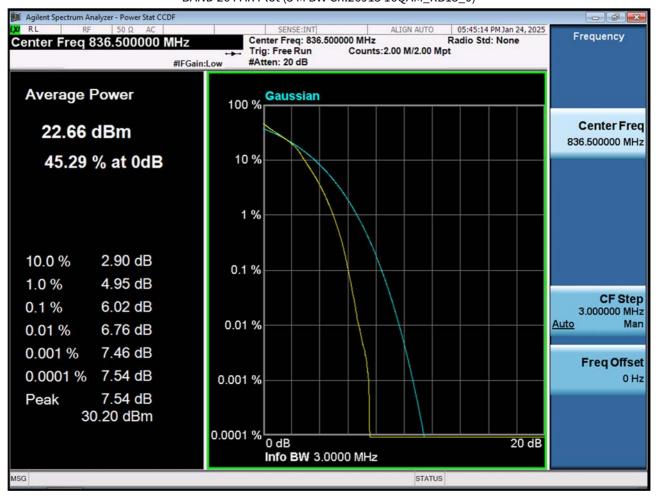
STATUS

BAND 26. PAR Plot (3 M BW Ch.26915 QPSK\_RB15\_0)

F-TP22-03 (Rev. 06) Page 61 of 122



## BAND 26 PAR Plot (3 M BW Ch.26915 16QAM\_RB15\_0)



F-TP22-03 (Rev. 06) Page 62 of 122





BAND 26. PAR Plot (3 M BW Ch.26915 64QAM\_RB15\_0)

F-TP22-03 (Rev. 06) Page 63 of 122



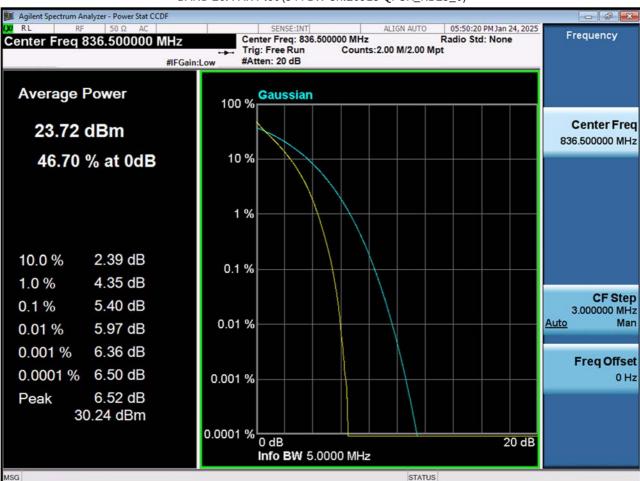
## Agilent Spectrum Analyzer - Power Stat CCDF 05:46:03 PM Jan 24, 2025 Frequency Center Freq 836.500000 MHz Center Freq: 836.500000 MHz Radio Std: None Counts: 2.00 M/2.00 Mpt Trig: Free Run #Atten: 20 dB #IFGain:Low **Average Power** Gaussian 100 % Center Freq 19.59 dBm 836.500000 MHz 44.02 % at 0dB 10 % 1 % 10.0 % 2.97 dB 0.1 % 1.0 % 5.12 dB **CF Step** 0.1% 6.44 dB 3.000000 MHz Auto Man 0.01 % 0.01 % 7.31 dB 7.83 dB 0.001 % **Freq Offset** 0.0001 % 8.03 dB 0.001 % 0 Hz Peak 8.03 dB 27.62 dBm 0.0001 % O dB 20 dB Info BW 3.0000 MHz

STATUS

BAND 26. PAR Plot (3 M BW Ch.26915 256QAM\_RB15\_0)

F-TP22-03 (Rev. 06) Page 64 of 122

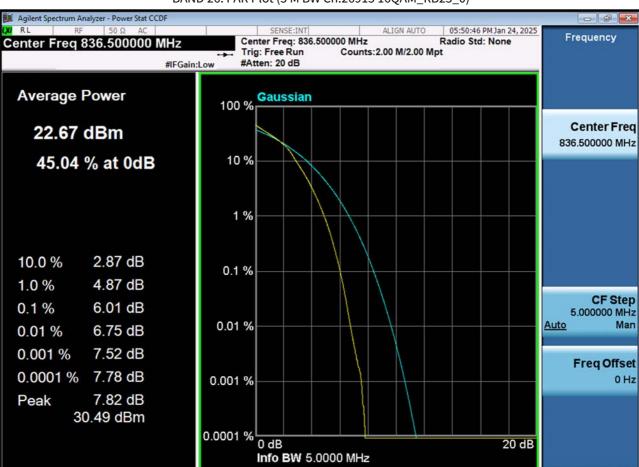




BAND 26. PAR Plot (5 M BW Ch.26915 QPSK\_RB25\_0)

F-TP22-03 (Rev. 06) Page 65 of 122



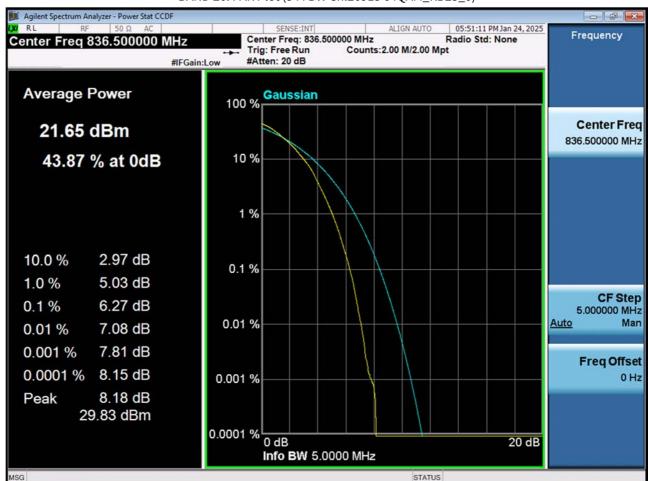


STATUS

BAND 26. PAR Plot (5 M BW Ch.26915 16QAM\_RB25\_0)

F-TP22-03 (Rev. 06) Page 66 of 122

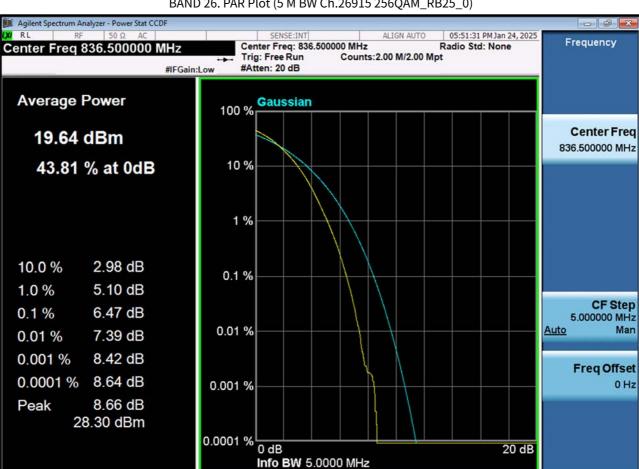




BAND 26. PAR Plot (5 M BW Ch.26915 64QAM\_RB25\_0)

F-TP22-03 (Rev. 06) Page 67 of 122



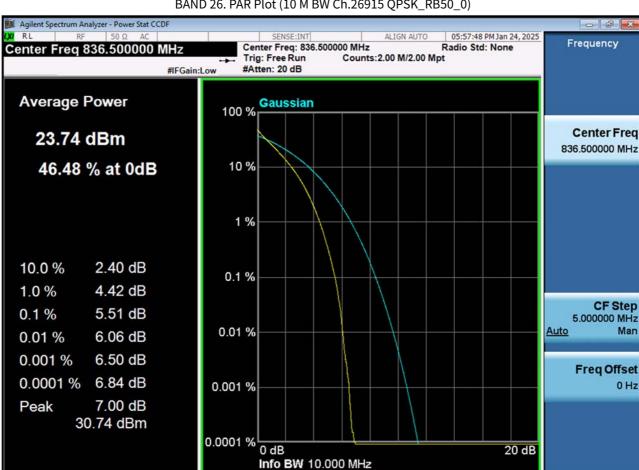


STATUS

## BAND 26. PAR Plot (5 M BW Ch.26915 256QAM\_RB25\_0)

F-TP22-03 (Rev. 06) Page 68 of 122



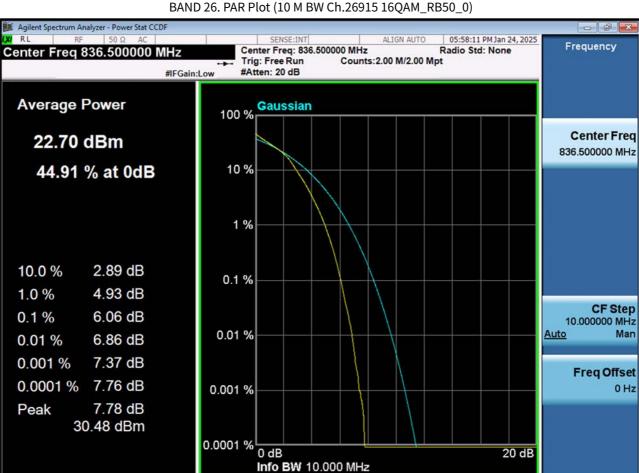


STATUS

BAND 26. PAR Plot (10 M BW Ch.26915 QPSK\_RB50\_0)

F-TP22-03 (Rev. 06) Page 69 of 122

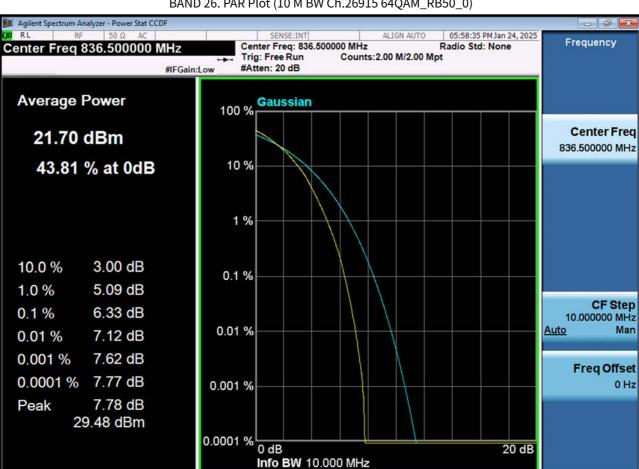




STATUS

F-TP22-03 (Rev. 06) Page 70 of 122



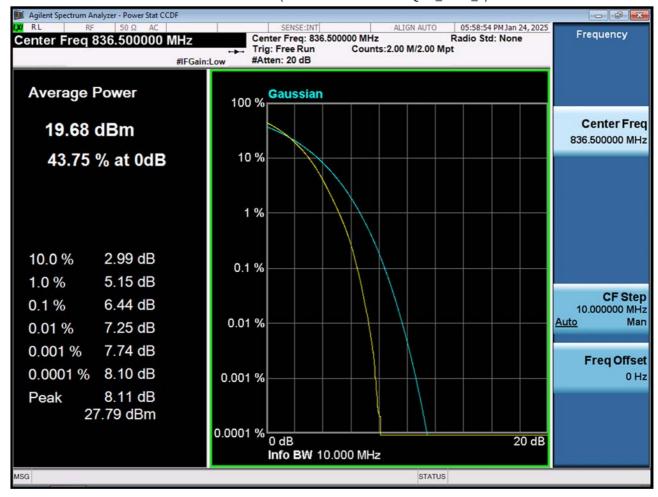


STATUS

## BAND 26. PAR Plot (10 M BW Ch.26915 64QAM\_RB50\_0)

F-TP22-03 (Rev. 06) Page 71 of 122





BAND 26. PAR Plot (10 M BW Ch. 26915 256QAM\_RB50\_0)

F-TP22-03 (Rev. 06) Page 72 of 122

Freq Offset

20 dB

0 Hz



6.45 dB

6.97 dB

30.70 dBm

0.001 %

0.0001 %

0 dB

Info BW 15.000 MHz

0.001 %

Peak

MSG

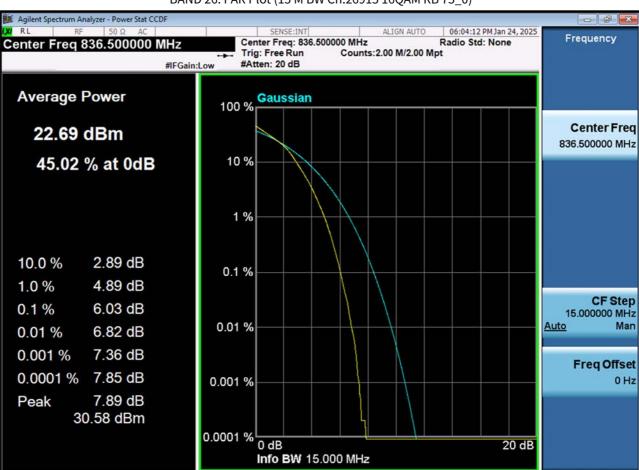
0.0001 % 6.94 dB

#### Agilent Spectrum Analyzer - Power Stat CCDF 06:03:49 PM Jan 24, 2025 ALIGN AUTO Frequency Center Freq 836.500000 MHz Center Freq: 836.500000 MHz Radio Std: None Trig: Free Run Counts: 2.00 M/2.00 Mpt #IFGain:Low #Atten: 20 dB 100 % Gaussian **Average Power** Center Freq 23.73 dBm 836.500000 MHz 46.52 % at 0dB 10 % 1 % 10.0 % 2.37 dB 0.1 % 4.37 dB 1.0 % **CF Step** 0.1% 5.41 dB 10.000000 MHz 0.01 % **Auto** Man 6.06 dB 0.01 %

BAND 26. PAR Plot (15 M BW Ch.26915 QPSK RB 75\_0)

F-TP22-03 (Rev. 06) Page 73 of 122



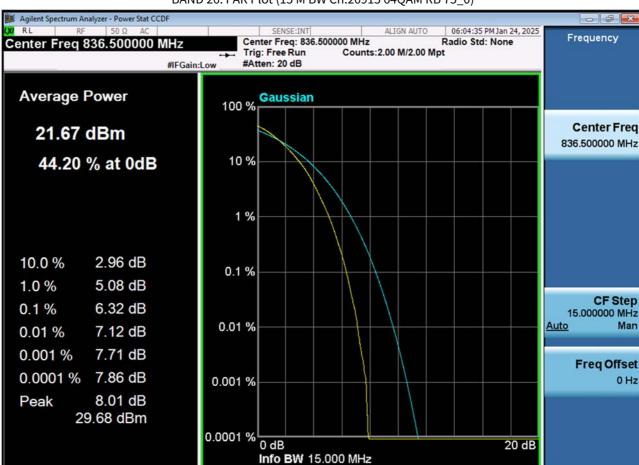


STATUS

BAND 26. PAR Plot (15 M BW Ch.26915 16QAM RB 75\_0)

F-TP22-03 (Rev. 06) Page 74 of 122



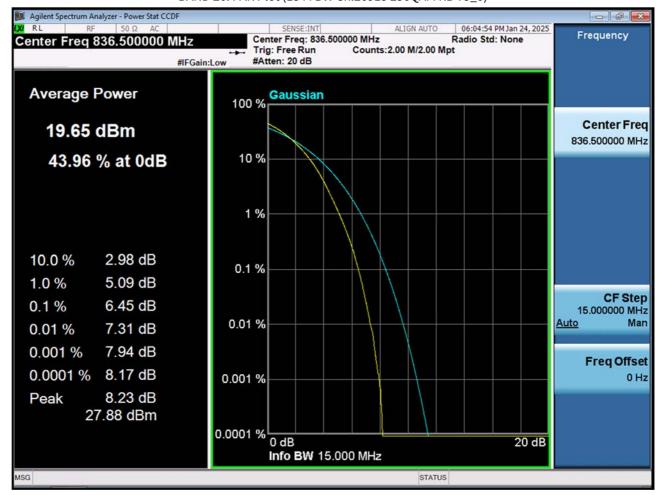


STATUS

BAND 26. PAR Plot (15 M BW Ch.26915 64QAM RB 75\_0)

F-TP22-03 (Rev. 06) Page 75 of 122





BAND 26. PAR Plot (15 M BW Ch.26915 256QAM RB 75\_0)

F-TP22-03 (Rev. 06) Page 76 of 122



#Res BW 15 kHz

MSG



#Sweep 2.000 s (1001 pts)

STATUS

**#VBW 47 kHz** 

BAND 26. Lower Band Edge Plot (1.4 M BW Ch.26797 QPSK\_RB1\_Offset 0)

F-TP22-03 (Rev. 06) Page 77 of 122

Span 4.000 MHz

#Sweep 2.000 s (1001 pts)

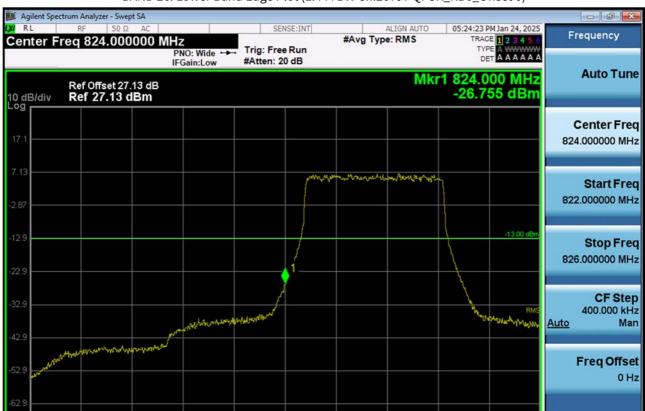
STATUS



Center 824.000 MHz

#Res BW 15 kHz

MSG



**#VBW 47 kHz** 

BAND 26. Lower Band Edge Plot (1.4 M BW Ch.26797 QPSK\_RB6\_Offset 0)

F-TP22-03 (Rev. 06) Page 78 of 122



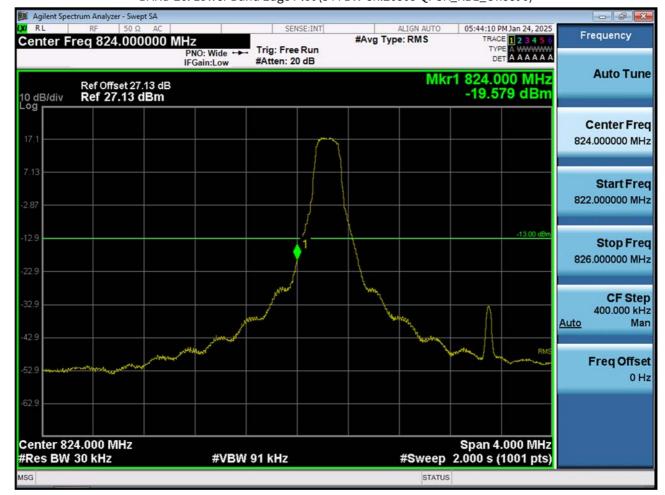


STATUS

BAND 26. Lower Extended Band Edge Plot (1.4 M BW Ch.26797 QPSK\_RB6\_0)

F-TP22-03 (Rev. 06) Page 79 of 122





BAND 26. Lower Band Edge Plot (3 M BW Ch.26805 QPSK\_RB1\_Offset 0)

F-TP22-03 (Rev. 06) Page 80 of 122

Span 4.000 MHz

#Sweep 2.000 s (1001 pts)

STATUS



Center 824.000 MHz

MSG Alignment Completed

#Res BW 30 kHz

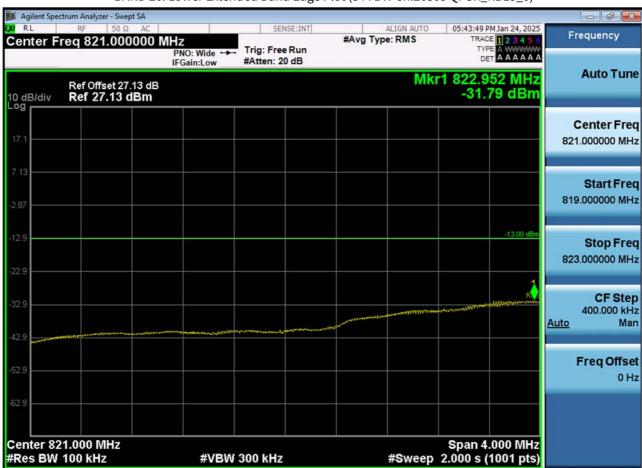


**#VBW 91 kHz** 

BAND 26. Lower Band Edge Plot (3 M BW Ch.26805 QPSK\_RB15\_Offset 0)

F-TP22-03 (Rev. 06) Page 81 of 122





STATUS

BAND 26. Lower Extended Band Edge Plot (3 M BW Ch.26805 QPSK\_RB15\_0)

F-TP22-03 (Rev. 06) Page 82 of 122





BAND 26. Lower Band Edge Plot (5 M BW Ch.26815 QPSK\_RB1\_Offset 0)

F-TP22-03 (Rev. 06) Page 83 of 122



#Res BW 51 kHz

MSG



#Sweep 2.000 s (1001 pts)

STATUS

**#VBW 160 kHz** 

BAND 26. Lower Band Edge Plot (5 M BW Ch.26815 QPSK\_RB25\_Offset 0)

F-TP22-03 (Rev. 06) Page 84 of 122



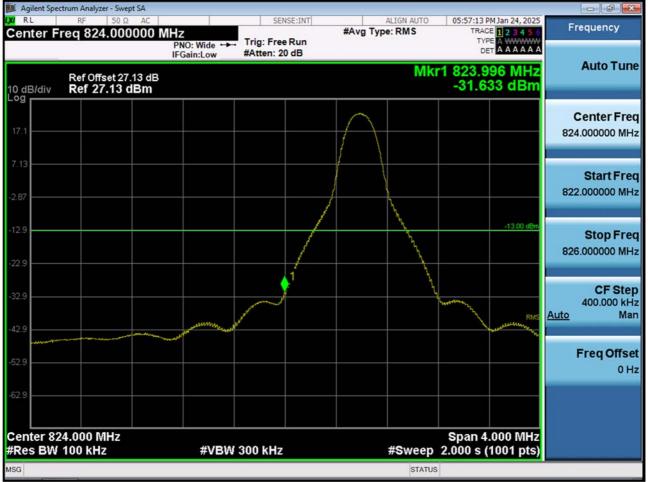


BAND 26. Lower Extended Band Edge Plot (5 M BW Ch.26815 QPSK\_RB25\_0)

F-TP22-03 (Rev. 06) Page 85 of 122



# BAND 26. Lower Band Edge Plot (10 M BW Ch.26840 QPSK\_RB1\_Offset 0) wept SA



F-TP22-03 (Rev. 06) Page 86 of 122





STATUS

BAND 26. Lower Band Edge Plot (10 M BW Ch.26840 QPSK\_RB50\_Offset 0)

F-TP22-03 (Rev. 06) Page 87 of 122



## BAND 26. Lower Extended Band Edge Plot (10 M BW Ch.26840 QPSK\_RB50\_0)

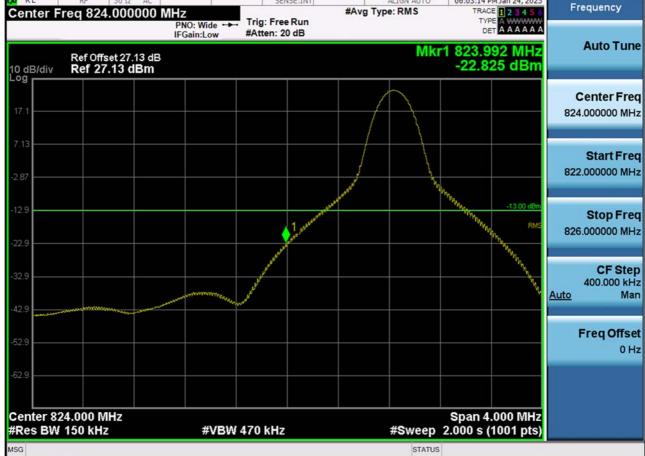


F-TP22-03 (Rev. 06) Page 88 of 122



### K RL SENSE:INT ALIGN AUTO #Avg Type: RMS Trig: Free Run

BAND 26. Lower Band Edge Plot (15 M BW Ch.26865 QPSK\_RB1\_Offset 0)



F-TP22-03 (Rev. 06) Page 89 of 122





STATUS

BAND 26. Lower Band Edge Plot (15 M BW Ch.26865 QPSK\_RB75\_Offset 0)

F-TP22-03 (Rev. 06) Page 90 of 122



## BAND 26. Lower Extended Band Edge Plot (15 M BW Ch.26865 QPSK\_RB75\_0)



F-TP22-03 (Rev. 06) Page 91 of 122