

# TEST REPORT

FCC LTE Test for IML-C6400W  
Certification

**APPLICANT**  
Infomark Co.,Ltd.

**REPORT NO.**  
HCT-RF-2301-FC010

**DATE OF ISSUE**  
January 6, 2023

**Tested by**  
Jae Mun Do



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# TEST REPORT

FCC LTE Test for  
IML-C6400W

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**Additional Model**

-

**Applicant**

**Infomark Co.,Ltd.**

8F, 321, Hwangsaoul-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, 13590, KOREA

**Eut Type  
Model Name**

LTE Mobile WiFi  
IML-C6400W

**FCC Classification:**

Licensed Non-Broadcast Station Transmitter (TNB)

**FCC Rule Part(s):**

§ 22, § 2

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

This test results were applied only to the test methods required by the standard.

## REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	January 06,2023	Initial Release

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)

If this report is required to confirmation of authenticity, please contact to [www.hct.co.kr](http://www.hct.co.kr)

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## MEASUREMENT REPORT

### 1. GENERAL INFORMATION

Applicant Name:	Infomark Co.,Ltd
Address:	3F, Humaxvillage, 216 Hwangsaek-ro, Bundang-gu, Seongnam-si Gyeonggi-do, 13595, Korea
Application Type:	Certification
FCC Classification:	Licensed Non-Broadcast Station Transmitter (TNB)
FCC Rule(s):	§ 22, § 2
EUT Type:	LTE Mobile WiFi
Model(s):	IML-C6400W
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 03, 2022 ~ January 3, 2023
Serial number:	Radiated: 980084 Conducted: 980090

### 1.1. MAXIMUM OUTPUT POWER

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	ERP	
				Max. Power (W)	Max. Power (dBm)
LTE – Band26 (5)	826.5 – 846.5	4M51G7D	QPSK	0.065	18.160
		4M49W7D	16QAM	0.055	17.430
LTE – Band26 (10)	829.0 – 844.0	8M97G7D	QPSK	0.059	17.680
		8M97W7D	16QAM	0.050	16.960
LTE – Band26 (15)	831.5 – 841.5	13M4G7D	QPSK	0.056	17.490
		13M4W7D	16QAM	0.048	16.780

## 2. INTRODUCTION

### 2.1. DESCRIPTION OF EUT

The EUT was a LTE Mobile WiFi with LTE.  
It also supports IEEE 802.11 b/g/n (20/40 MHz), LoRa.

### 2.2. MEASURING INSTRUMENT CALIBRATION

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

### 2.3. TEST FACILITY

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

### 3. DESCRIPTION OF TESTS

#### 3.1. TEST PROCEDURE

Test Description	Test Procedure Used
Occupied Bandwidth	- KDB 971168 D01 v03r01 – Section 4.3 - ANSI C63.26-2015 – Section 5.4.4
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
Peak- to- Average Ratio	- KDB 971168 D01 v03r01 – Section 5.7 - ANSI C63.26-2015 – Section 5.2.3.4
Conducted Output Power	- N/A (See SAR Report)
Frequency stability	- ANSI C63.26-2015 – Section 5.6
Effective Radiated Power/ Effective Isotropic Radiated Power	- KDB 971168 D01 v03r01 – Section 5.2 & 5.8 - ANSI/TIA-603-E-2016 – Section 2.2.17
Radiated Spurious and Harmonic Emissions	- KDB 971168 D01 v03r01 – Section 6.2 - ANSI/TIA-603-E-2016 – Section 2.2.12



### 3.2. RADIATED POWER

#### Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

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

#### Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5 % of the expected OBW, not to exceed 1 MHz
3. VBW  $\geq 3 \times$  RBW
4. Span = 1.5 times the OBW
5. No. of sweep points  $> 2 \times$  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;

$$P_d \text{ (dBm)} = P_g \text{ (dBm)} - \text{cable loss (dB)} + \text{antenna gain (dB)}$$

Where:  $P_d$  is the dipole equivalent power and  $P_g$  is the generator output power into the substitution antenna.

3. The maximum value is calculated by adding the forward power to the calibrated source plus its appropriate gain value.

These steps are repeated with the receiving antenna in both vertical and horizontal polarization. the difference

between the gain of the horn and an isotropic antenna are taken into consideration

4. The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
5. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

### 3.3. RADIATED SPURIOUS EMISSIONS

#### Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

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

#### Test Settings

1. RBW = 100 kHz for emissions below 1 GHz and 1MHz for emissions above 1 GHz
2. VBW  $\geq 3 \times$  RBW
3. Span = 1.5 times the OBW
4. No. of sweep points  $> 2 \times$  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

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

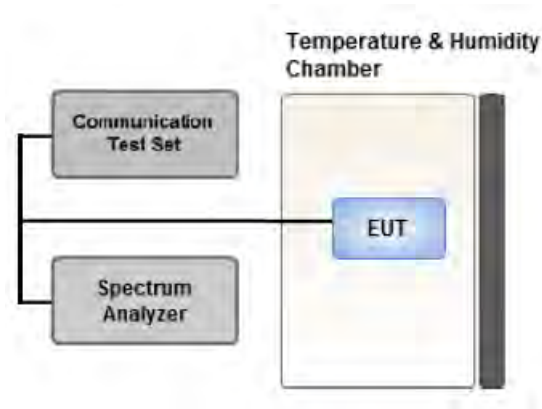
$$\text{Result}_{(\text{dBm})} = P_g_{(\text{dBm})} - \text{cable loss}_{(\text{dB})} + \text{antenna gain}_{(\text{dBi})}$$

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.

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

### 3.4. PEAK- TO- AVERAGE RATIO



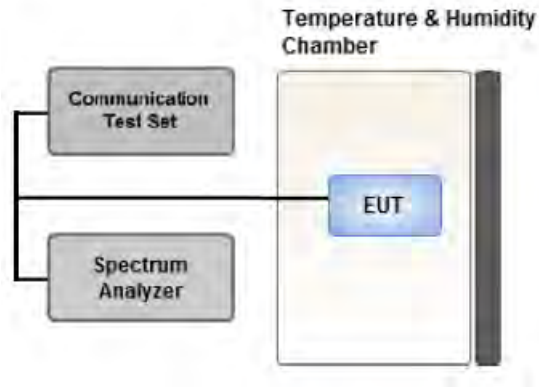
Test setup

#### ① CCDF Procedure for PAPR

##### Test Settings

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

### 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.

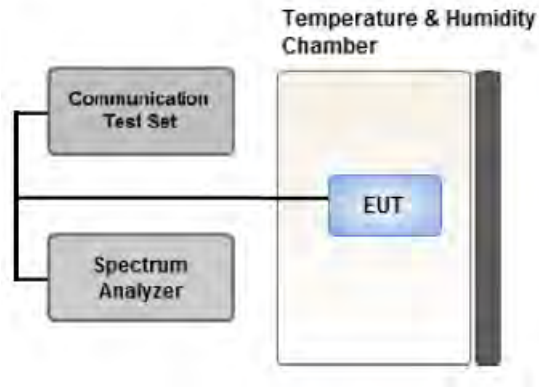
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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  $\geq 3 \times$  RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5 % of the 99 % occupied bandwidth observed in Step 7

### 3.6. SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



Test setup

#### Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic.

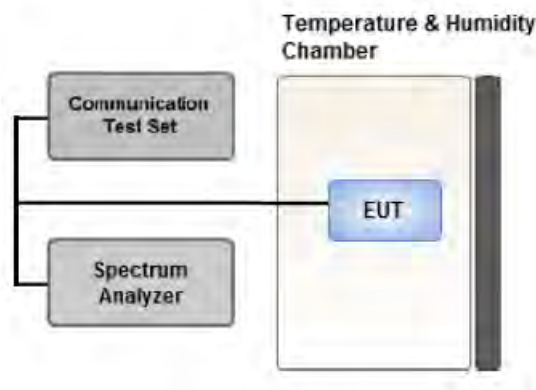
All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

#### Test Settings

1. RBW = 1 MHz
2. VBW  $\geq$  3 MHz
3. Detector = RMS
4. Trace Mode = trace average
5. Sweep time = auto
6. Number of points in sweep  $\geq$  2 x Span / RBW

### 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

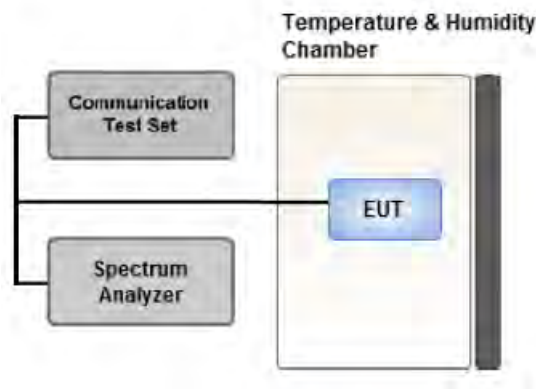
1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW > 1 % of the emission bandwidth
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points  $\geq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

##### 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  $10 \log(1 \text{ MHz/ RB})$  or the emission is integrated over a 1 MHz bandwidth to determine the final result. When using the integration method the integration window is either centered on the emission or, for emissions at the band edge, centered by an offset of 500 kHz from the block edge so that the integration window is the 1 MHz adjacent to the block edge.

### 3.8. FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE



**Test setup**

#### **Test Overview**

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015.

The frequency stability of the transmitter is measured by:

1. Temperature:

The temperature is varied from -30 °C to +50 °C in 10 °C increments using an environmental chamber.

2. Primary Supply Voltage:

- .- Unless otherwise specified, vary primary supply voltage from 85 % to 115 % of the nominal value for other than hand carried battery equipment.
- .- For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.

#### **Test Settings**

1. The carrier frequency of the transmitter is measured at room temperature (20 °C to provide a reference).
2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10 °C intervals ranging from -30 °C to +50 °C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

### 3.9. WORST CASE(RADIATED TEST)

- The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
- All modes of operation were investigated and the worst case configuration results are reported.  
Mode : Stand alone, Stand alone + External accessories (AC adapter, etc)  
Worst case : Stand alone
- In the case of radiated spurious emissions, all bandwidth of operation were investigated and the worst case bandwidth results are reported. (Worst case : 5 MHz)
- The worst case is reported with the EUT positioning, modulations, and paging service configurations shown in the test data

[ Worst case ]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset	Axis
Effective Radiated Power	QPSK, 16QAM	5	Low	1	0	Z
			Mid, High	1	24	
		10	Low, High	1	0	
			Mid	1	49	
		15	Low, Mid	1	0	
			High	1	38	
Radiated Spurious and Harmonic Emissions	QPSK	5	Low	1	0	X
			Mid, High	1	24	



### 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	5, 10, 15	Mid	Full RB	0
Peak-To-Average Ratio	QPSK, 16QAM	5, 10, 15	Mid	Full RB	0
Band Edge	QPSK	5	Low	1	0
			High	1	24
		10	Low	1	0
			High	1	49
		15	Low	1	0
			High	1	74
	QPSK	5, 10, 15	Low, High	Full RB	0
			Low, Mid, High	1	0
Spurious and Harmonic Emissions at Antenna Terminal	QPSK	5, 10, 15	Low, Mid, High	1	0

#### 4. LIST OF TEST EQUIPMENT

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
H.P.F	FBSR-02B(WHK1.2/15 G-10EF)	T&M SYSTEM	-	02/18/2023	Annual
H.P.F	FBSR-02B(WHK3.3/18 G-10EF)	T&M SYSTEM	-	02/18/2023	Annual
Power Splitter(DC ~ 26.5 GHz)	11667B	Hewlett Packard	11275	03/11/2023	Annual
DC Power Supply	E3632A	Agilent	MY40010147	06/21/2023	Annual
Dipole Antenna	UHAP	Schwarzbeck	557	04/05/2023	Biennial
Dipole Antenna	UHAP	Schwarzbeck	558	04/05/2023	Biennial
Chamber	SU-642	ESPEC	93008124	03/04/2023	Annual
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	147	08/30/2023	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	9120D-1298	09/15/2023	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/29/2024	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170124	04/12/2023	Biennial
Signal Analyzer(10 Hz ~ 26.5 GHz)	N9020A	Agilent	MY52090906	05/02/2023	Annual
ATTENUATOR(20 dB)	8493C	Hewlett Packard	17280	05/18/2023	Annual
Spectrum Analyzer(10 Hz ~ 40 GHz)	FSV40	REOHDE & SCHWARZ	100931	08/29/2023	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/18/2023	Annual
Loop Antenna(9 kHz ~ 30 MHz)	FMZB1513	Schwarzbeck	1513-333	03/17/2024	Biennial
Bilog Antenna	VULB9160	Schwarzbeck	3150	03/03/2023	Biennial
Hybrid Antenna	VULB9168	Schwarzbeck	760	02/22/2023	Biennial
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262116770	07/05/2023	Annual
Wideband Radio Communication Tester	MT8820C	Anritsu Corp.	6201026545	01/05/2023	Annual
SIGNAL GENERATOR (100 kHz ~ 40 GHz)	SMB100A	REOHDE & SCHWARZ	177633	07/05/2023	Annual
Signal Analyzer(5 Hz ~ 40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/30/2023	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	HCT CO., LTD.,	-	-	-

**Note:**

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

## 5. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4:2014.

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

Parameter	Expanded Uncertainty ( $\pm$ dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	2.00 (Confidence level about 95 %, $k=2$ )
Radiated Disturbance (9 kHz ~ 30 MHz)	4.40 (Confidence level about 95 %, $k=2$ )
Radiated Disturbance (30 MHz ~ 1 GHz)	5.74 (Confidence level about 95 %, $k=2$ )
Radiated Disturbance (1 GHz ~ 18 GHz)	5.51 (Confidence level about 95 %, $k=2$ )
Radiated Disturbance (18 GHz ~ 40 GHz)	5.92 (Confidence level about 95 %, $k=2$ )
Radiated Disturbance (Above 40 GHz)	5.48 (Confidence level about 95 %, $k=2$ )

## 6. SUMMARY OF TEST RESULTS

### 6.1. Test Condition : Conducted Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Occupied Bandwidth	§ 2.1049	N/A	PASS
Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	§ 2.1051, § 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	<u>See Note1</u>
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 Emissions	§ 2.1053, § 22.917(a)	< 43 + 10log10 (P[Watts]) for all out-of band emissions	PASS

## 7. SAMPLE CALCULATION

### 7.1 ERP Sample Calculation

Ch./ Freq.		Measured 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

$$\text{ERP} = \text{Substitute LEVEL(dBm)} + \text{Ant. Gain} - \text{CL(Cable Loss)}$$

- 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

$$\text{EIRP} = \text{Substitute LEVEL(dBm)} + \text{Ant. Gain} - \text{CL(Cable Loss)}$$

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

### 7.3. Emission Designator

#### GSM Emission Designator

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

#### EDGE Emission Designator

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

#### WCDMA Emission Designator

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

#### QPSK Modulation

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

#### QAM Modulation

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

## 8. TEST DATA

### 8.1. EFFECTIVE RADIATED POWER

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP	
								W	W	dBm
826.5	LTE 26 (5 MHz)	QPSK	-31.35	29.81	-10.24	1.42	H	< 7.00	0.065	18.16
		16-QAM	-32.08	29.08	-10.24	1.42	H		0.055	17.43
836.5		QPSK	-34.45	26.63	-10.19	1.43	H		0.032	15.01
		16-QAM	-35.17	25.91	-10.19	1.43	H		0.027	14.29
846.5		QPSK	-36.18	25.06	-10.15	1.43	H		0.022	13.48
		16-QAM	-36.93	24.31	-10.15	1.43	H		0.019	12.73

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP	
								W	W	dBm
829.0	LTE 26 (10 MHz)	QPSK	-31.82	29.32	-10.22	1.42	H	< 7.00	0.059	17.68
		16-QAM	-32.54	28.60	-10.22	1.42	H		0.050	16.96
836.5		QPSK	-34.37	26.71	-10.19	1.43	H		0.032	15.09
		16-QAM	-35.08	26.00	-10.19	1.43	H		0.027	14.38
844.0		QPSK	-34.50	26.78	-10.14	1.43	H		0.033	15.21
		16-QAM	-35.18	26.10	-10.14	1.43	H		0.028	14.53

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP	
								W	W	dBm
831.5	LTE B26 (15 MHz)	QPSK	-32.03	29.12	-10.21	1.42	H	< 7.00	0.056	17.49
		16-QAM	-32.74	28.41	-10.21	1.42	H		0.048	16.78
836.5		QPSK	-34.82	26.26	-10.19	1.43	H		0.029	14.64
		16-QAM	-35.56	25.52	-10.19	1.43	H		0.025	13.90
841.5		QPSK	-34.34	26.85	-10.17	1.43	H		0.034	15.25
		16-QAM	-34.96	26.23	-10.17	1.43	H		0.029	14.63

## 8.2. RADIATED SPURIOUS EMISSIONS

□ MODE: LTE B26  
 □ MODULATION SIGNAL: 5 MHz QPSK  
 □ DISTANCE: 3 meters

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBd)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit
26815 (826.5)	1 653.00	-45.96	9.70	-56.55	2.04	H	-48.89	-13.00
	2 479.50	-43.70	10.54	-48.63	2.49	H	-40.58	-13.00
	3 306.00	-44.49	12.13	-45.30	2.98	H	-36.16	-13.00
	4 132.50	-54.46	12.54	-52.36	3.37	V	-43.19	-13.00
26915 (836.5)	1 673.00	-42.47	9.82	-53.20	2.06	V	-45.44	-13.00
	2 509.50	-44.21	10.70	-47.84	2.49	H	-39.63	-13.00
	3 346.00	-39.08	12.37	-40.44	3.01	V	-31.08	-13.00
27015 (846.5)	1 693.00	-42.30	9.94	-52.65	2.05	V	-44.76	-13.00
	2 539.50	-44.61	10.70	-48.75	2.53	H	-40.58	-13.00
	3 386.00	-36.53	12.54	-37.81	2.98	V	-28.24	-13.00



### 8.3. PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
26	5 MHz	836.5	QPSK	25	0	5.71
			16-QAM			6.41
	10 MHz		QPSK	50		5.65
			16-QAM			6.37
	15 MHz		QPSK	75		5.50
			16-QAM			6.31

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 38 ~ 43.

#### 8.4. OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
26	5 MHz	836.5	QPSK	25	0	4.5143
			16-QAM			4.4846
	10 MHz		QPSK	50		8.9656
			16-QAM			8.9649
	15 MHz		QPSK	75		13.375
			16-QAM			13.385

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 32 ~ 37.

## 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	5	826.5	3.6775	27.976	-67.207	-39.231	-13.00
		836.5	3.6935	27.976	-67.057	-39.081	
		846.5	3.6960	27.976	-67.038	-39.062	
	10	829.0	3.7024	27.976	-67.313	-39.337	
		836.5	3.7109	27.976	-67.264	-39.288	
		844.0	3.7124	27.976	-66.538	-38.562	
	15	831.5	3.7089	27.976	-66.939	-38.963	
		836.5	3.7149	27.976	-67.200	-39.224	
		841.5	3.6965	27.976	-67.166	-39.190	

### Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 62 ~ 70.
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

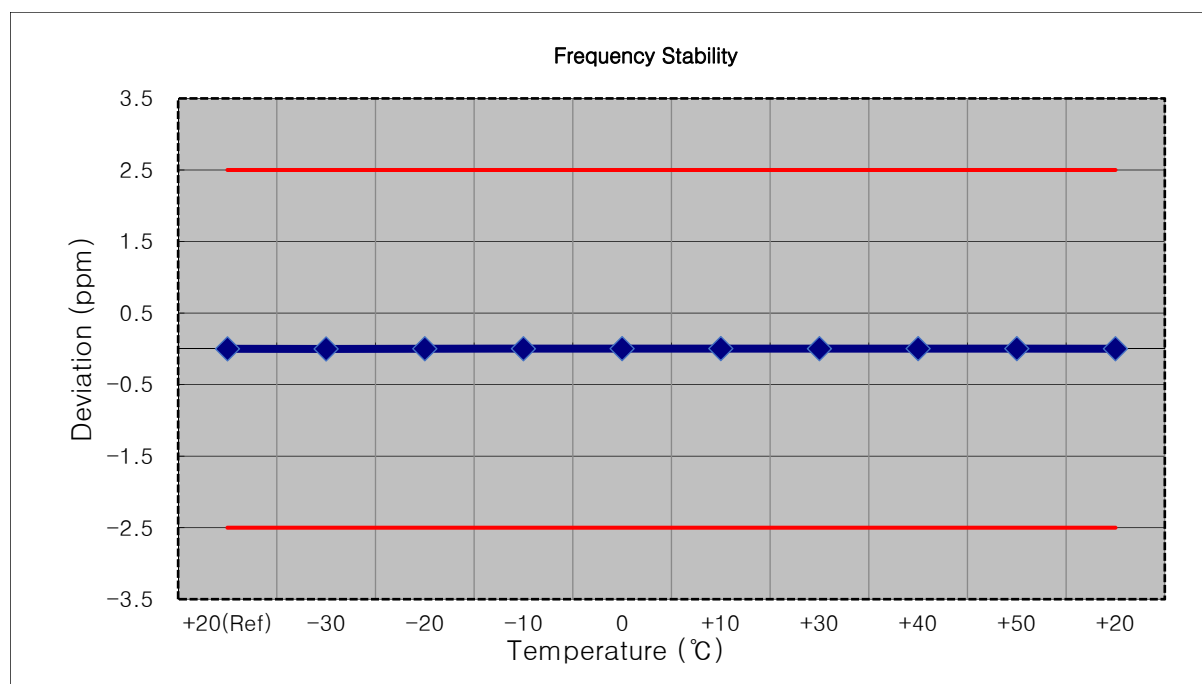
## 8.6. BAND EDGE

- Plots of the EUT's Band Edge are shown Page 44 ~ 61.

## 8.7. FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

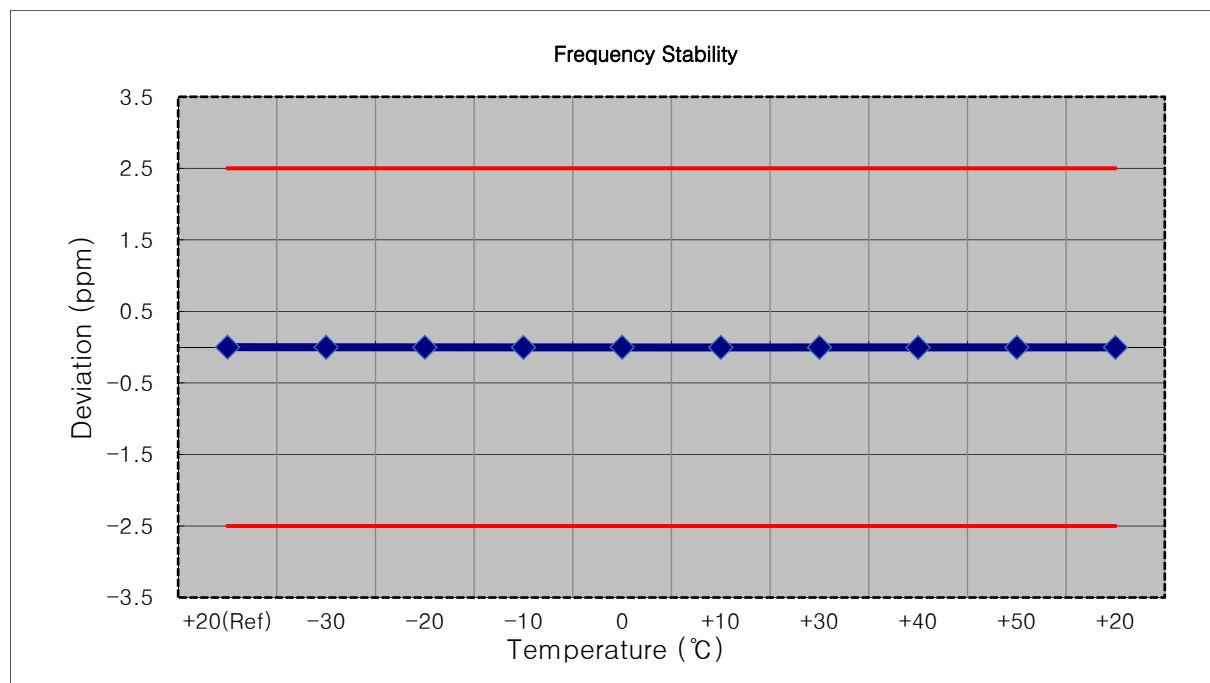
MODE:	<u>LTE 26</u>
OPERATING FREQUENCY:	<u>836,500,000 Hz</u>
CHANNEL:	<u>26915 (5 MHz)</u>
REFERENCE VOLTAGE:	<u>3.800 VDC</u>
DEVIATION LIMIT:	<u>± 0.000 25 % or 2.5 ppm</u>

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100 %	3.800	+20(Ref)	836 499 997	0.0	0.000 000	0.000
100 %		-30	836 499 996	-1.5	0.000 000	-0.002
100 %		-20	836 499 998	1.2	0.000 000	0.001
100 %		-10	836 499 998	1.3	0.000 000	0.002
100 %		0	836 500 000	2.5	0.000 000	0.003
100 %		+10	836 500 000	3.1	0.000 000	0.004
100 %		+30	836 499 999	2.0	0.000 000	0.002
100 %		+40	836 499 999	2.1	0.000 000	0.003
100 %		+50	836 499 999	2.2	0.000 000	0.003
Batt. Endpoint	3.000	+20	836 499 998	0.8	0.000 000	0.001



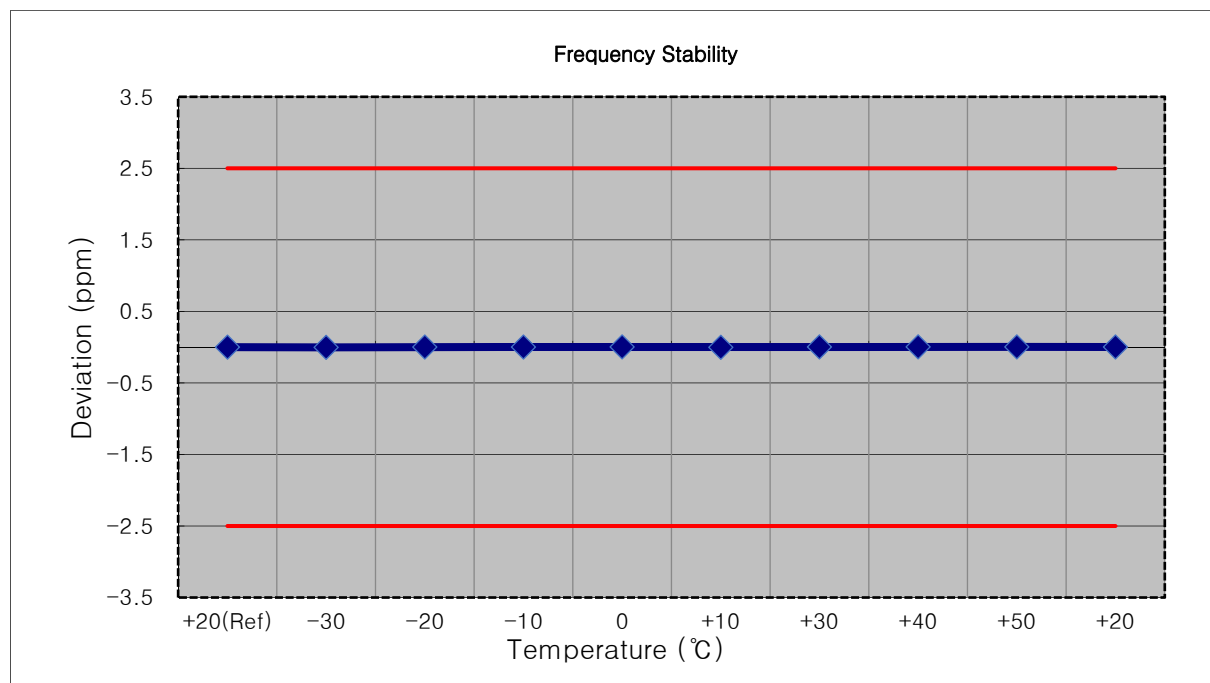
□ MODE: LTE 26  
 □ OPERATING FREQUENCY: 836,500,000 Hz  
 □ CHANNEL: 26915 (10 MHz)  
 □ REFERENCE VOLTAGE: 3.800 VDC  
 □ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100 %	3.800	+20(Ref)	836 499 997	0.0	0.000 000	0.000
100 %		-30	836 499 995	-1.5	0.000 000	-0.002
100 %		-20	836 499 994	-2.5	0.000 000	-0.003
100 %		-10	836 499 993	-3.6	0.000 000	-0.004
100 %		0	836 499 995	-1.4	0.000 000	-0.002
100 %		+10	836 499 994	-3.2	0.000 000	-0.004
100 %		+30	836 499 993	-3.4	0.000 000	-0.004
100 %		+40	836 499 993	-4.0	0.000 000	-0.005
100 %		+50	836 499 994	-2.8	0.000 000	-0.003
Batt. Endpoint	3.000	+20	836 499 994	-3.1	0.000 000	-0.004



□ MODE: LTE B26  
 □ OPERATING FREQUENCY: 836,500,000 Hz  
 □ CHANNEL: 26915 (15 MHz)  
 □ REFERENCE VOLTAGE: 3.800 VDC  
 □ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100 %	3.800	+20(Ref)	836 500 002	0.0	0.000 000	0.000
100 %		-30	836 499 995	-2.2	0.000 000	-0.003
100 %		-20	836 499 998	1.1	0.000 000	0.001
100 %		-10	836 499 998	1.3	0.000 000	0.002
100 %		0	836 500 000	2.8	0.000 000	0.003
100 %		+10	836 499 995	-1.5	0.000 000	-0.002
100 %		+30	836 500 000	2.8	0.000 000	0.003
100 %		+40	836 500 000	3.0	0.000 000	0.004
100 %		+50	836 500 000	2.9	0.000 000	0.003
Batt. Endpoint	3.000	+20	836 499 999	1.8	0.000 000	0.002



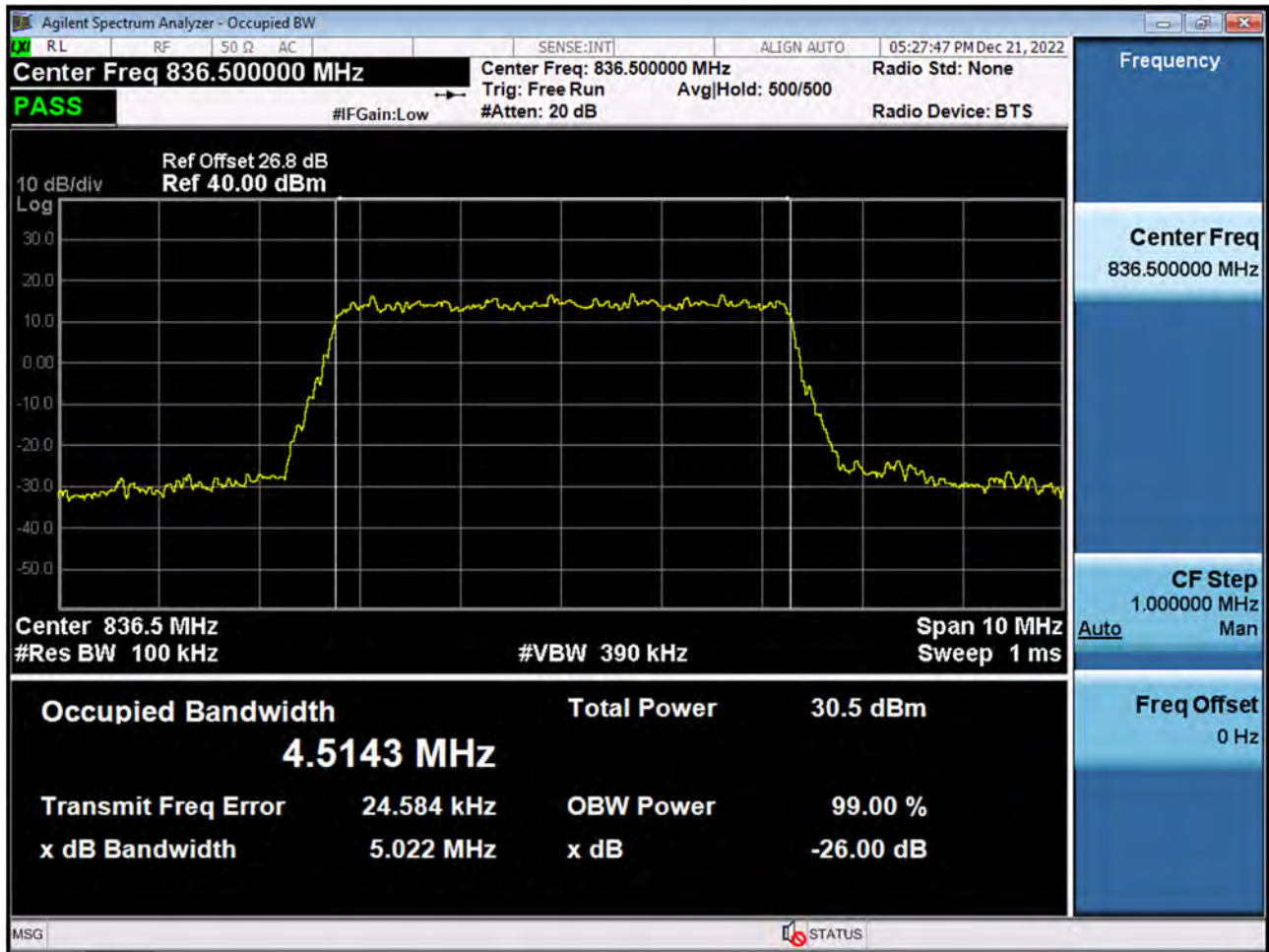


## 9. TEST PLOTS

고객비밀  
CUSTOMER SECRET

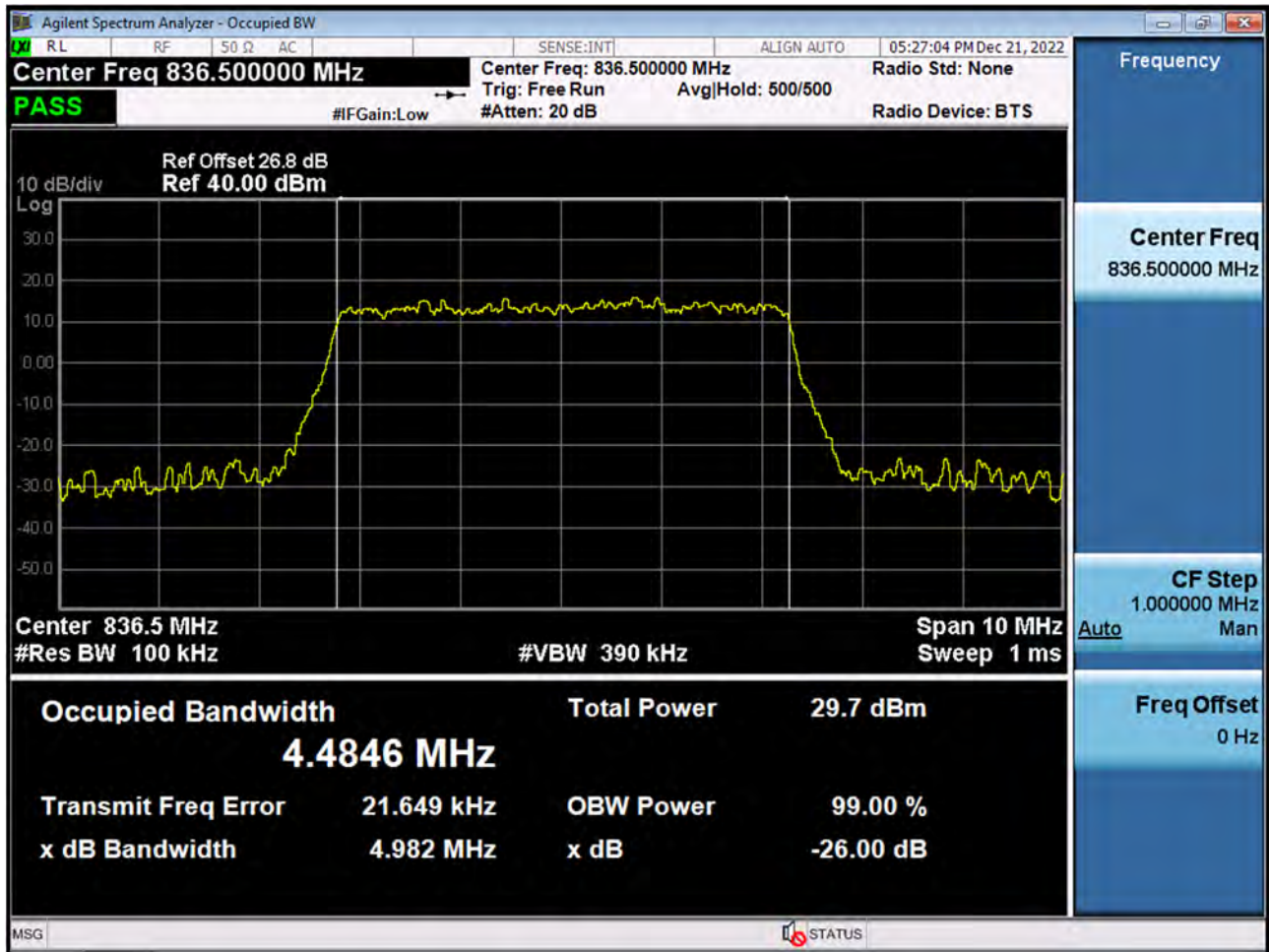
Report No. HCT-RF-2301-FC010

BAND26. Occupied Bandwidth Plot (5 M BW Ch.26915 QPSK\_RB25\_0)

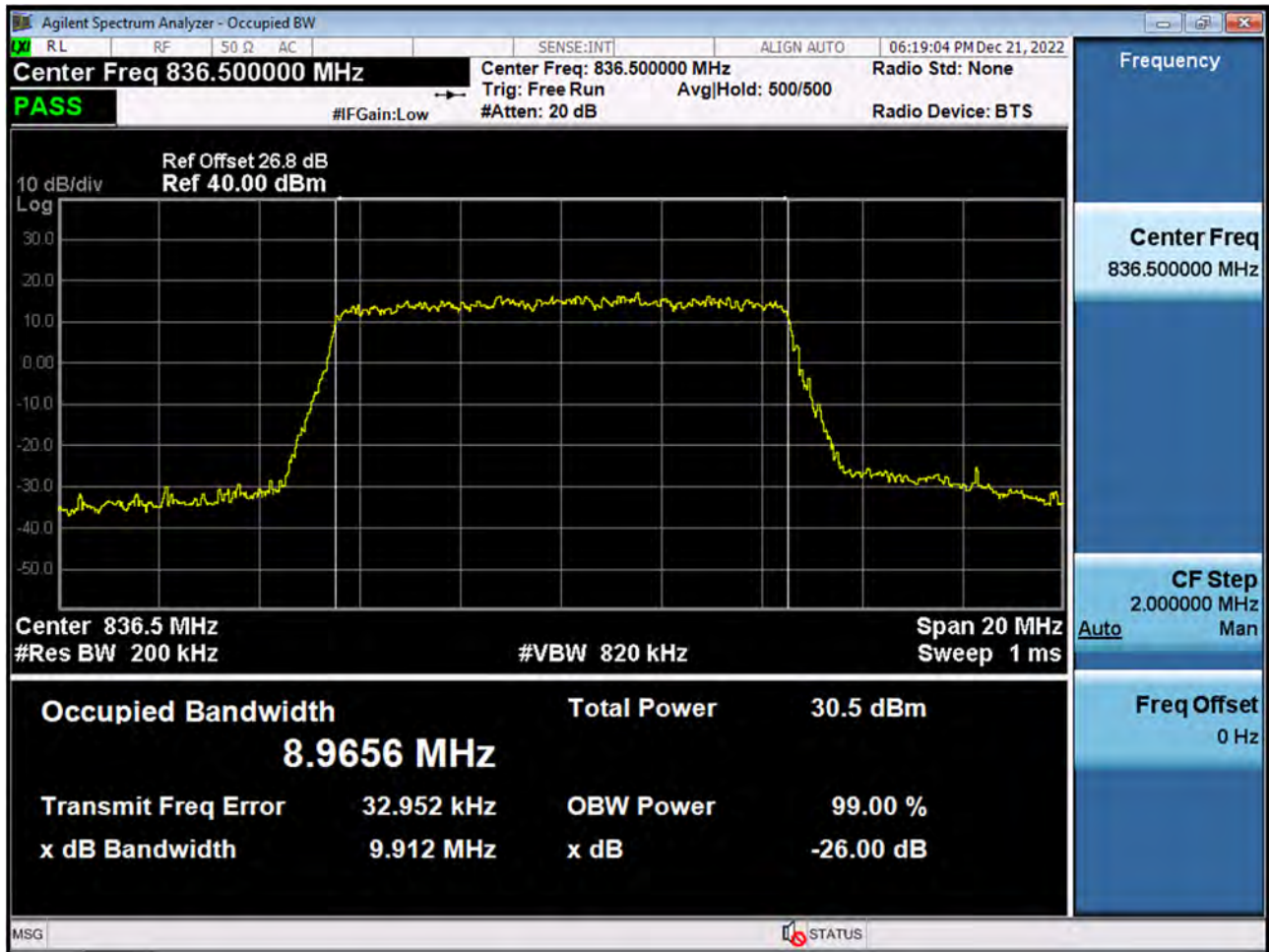




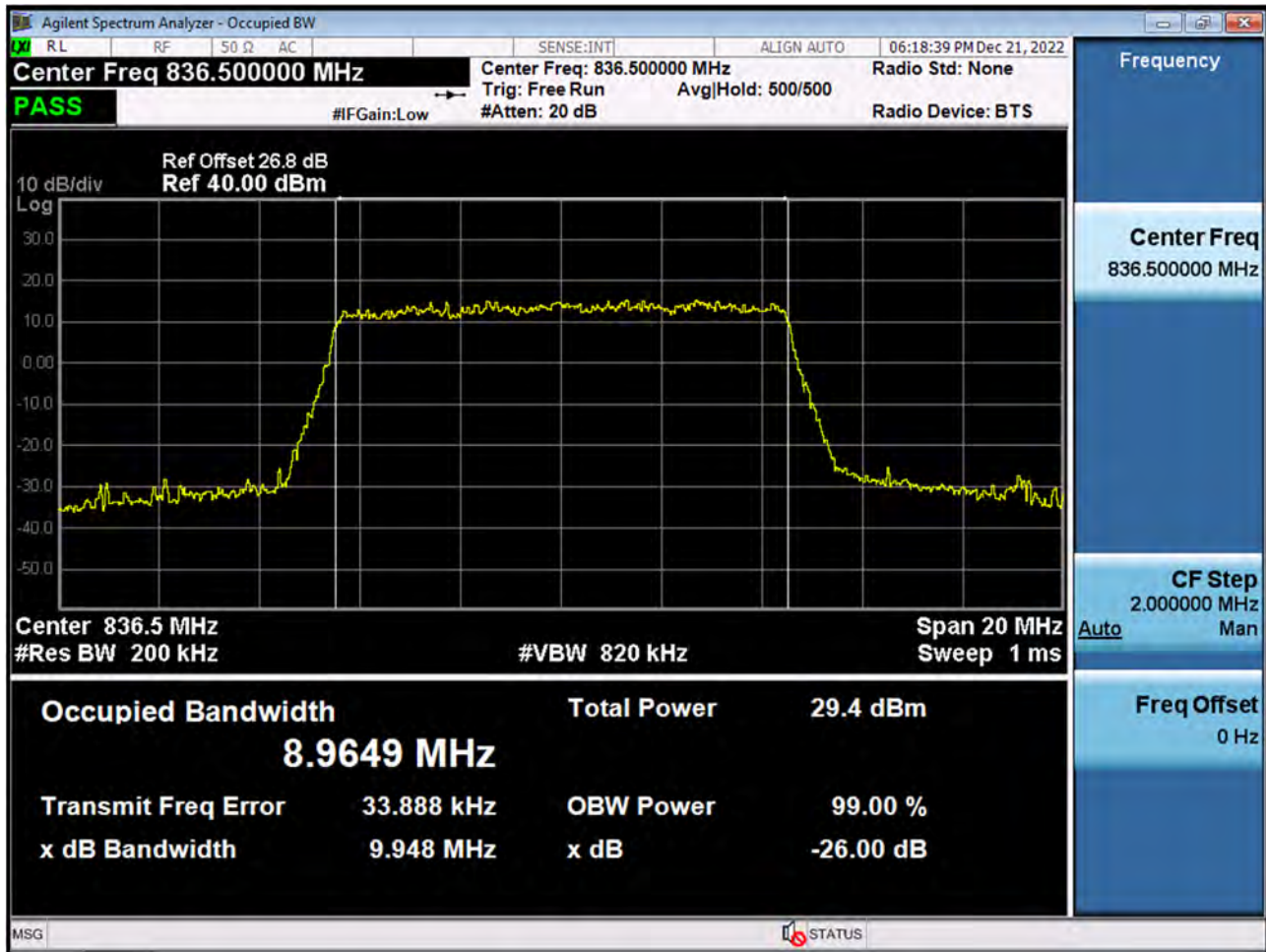
BAND26. Occupied Bandwidth Plot (5 M BW Ch.26915 16QAM\_RB25\_0)



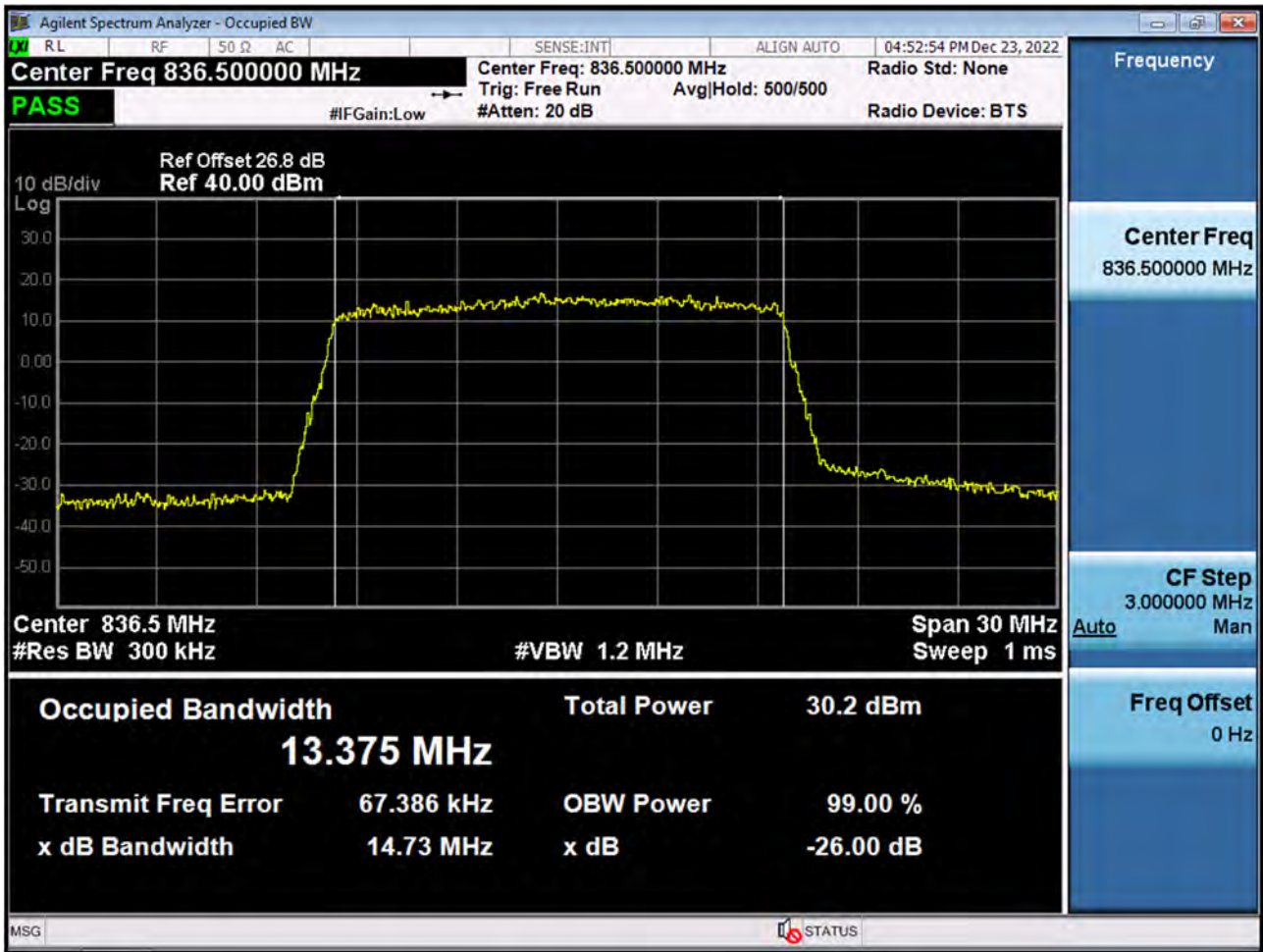
BAND26. Occupied Bandwidth Plot (10 M BW Ch.26915 QPSK\_RB50\_0)



BAND26. Occupied Bandwidth Plot (10 M BW Ch.26915 16QAM\_RB50\_0)

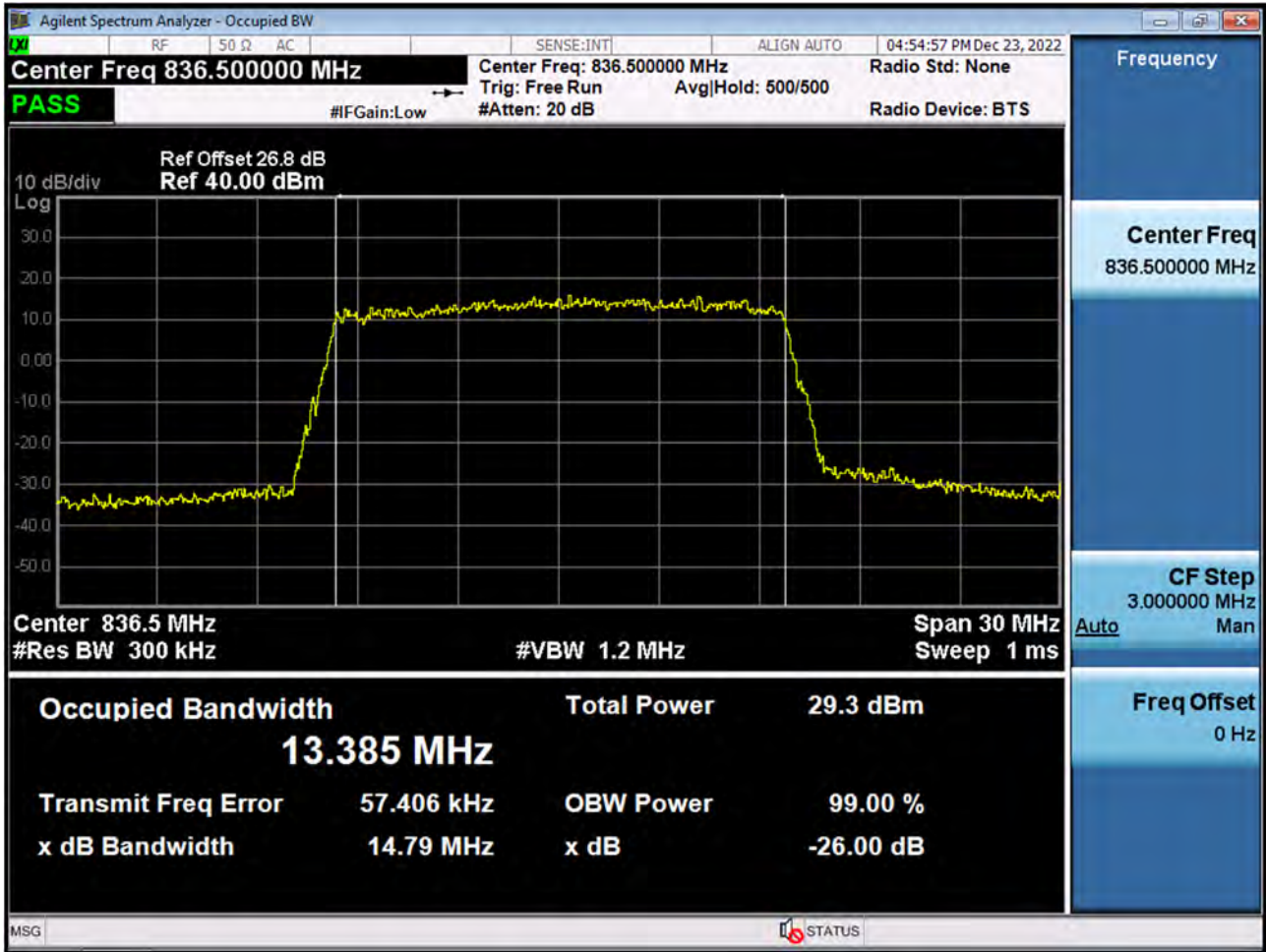


BAND 26. Occupied Bandwidth Plot (15 M BW Ch.26915 QPSK RB 75\_0)

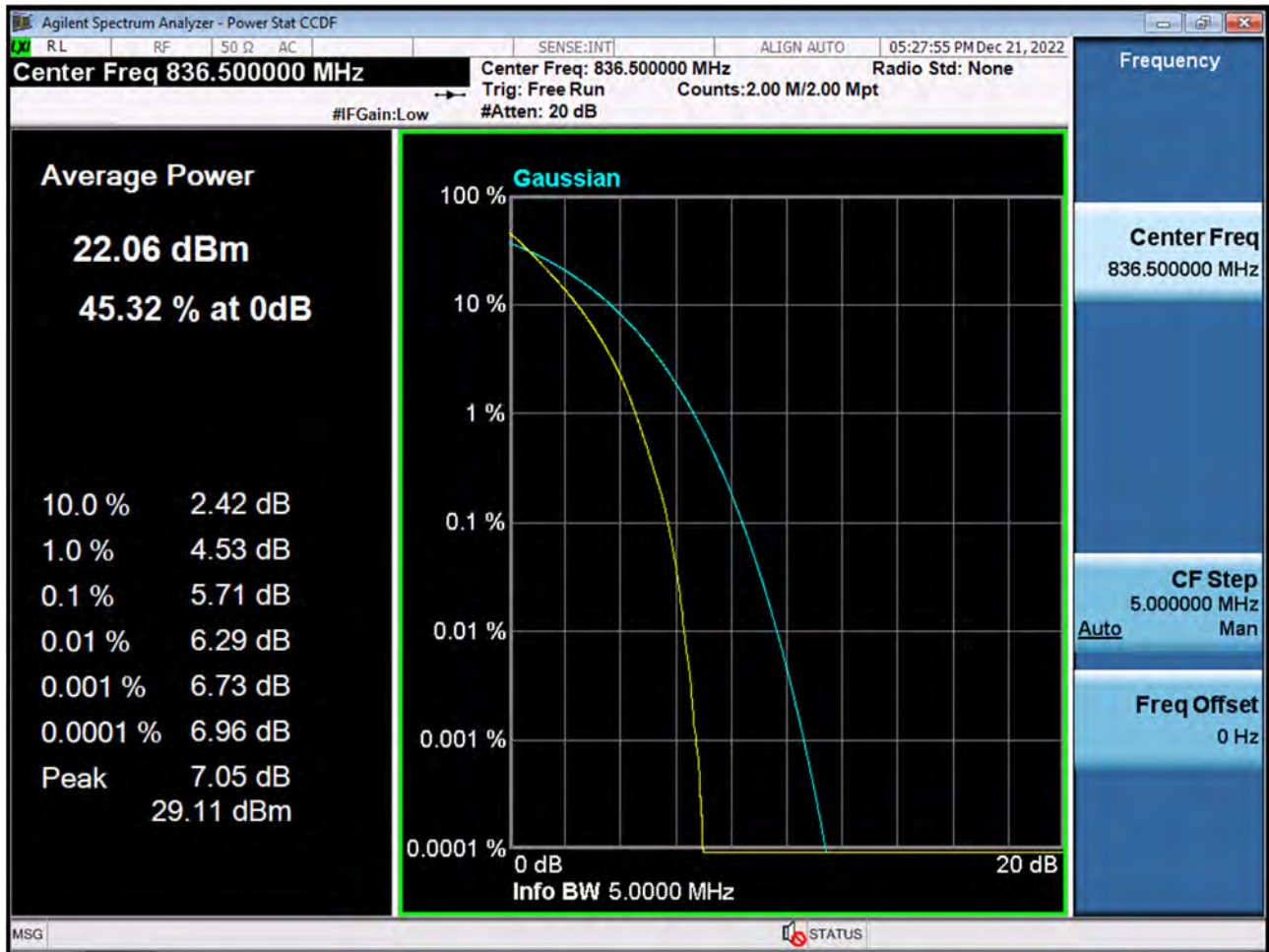




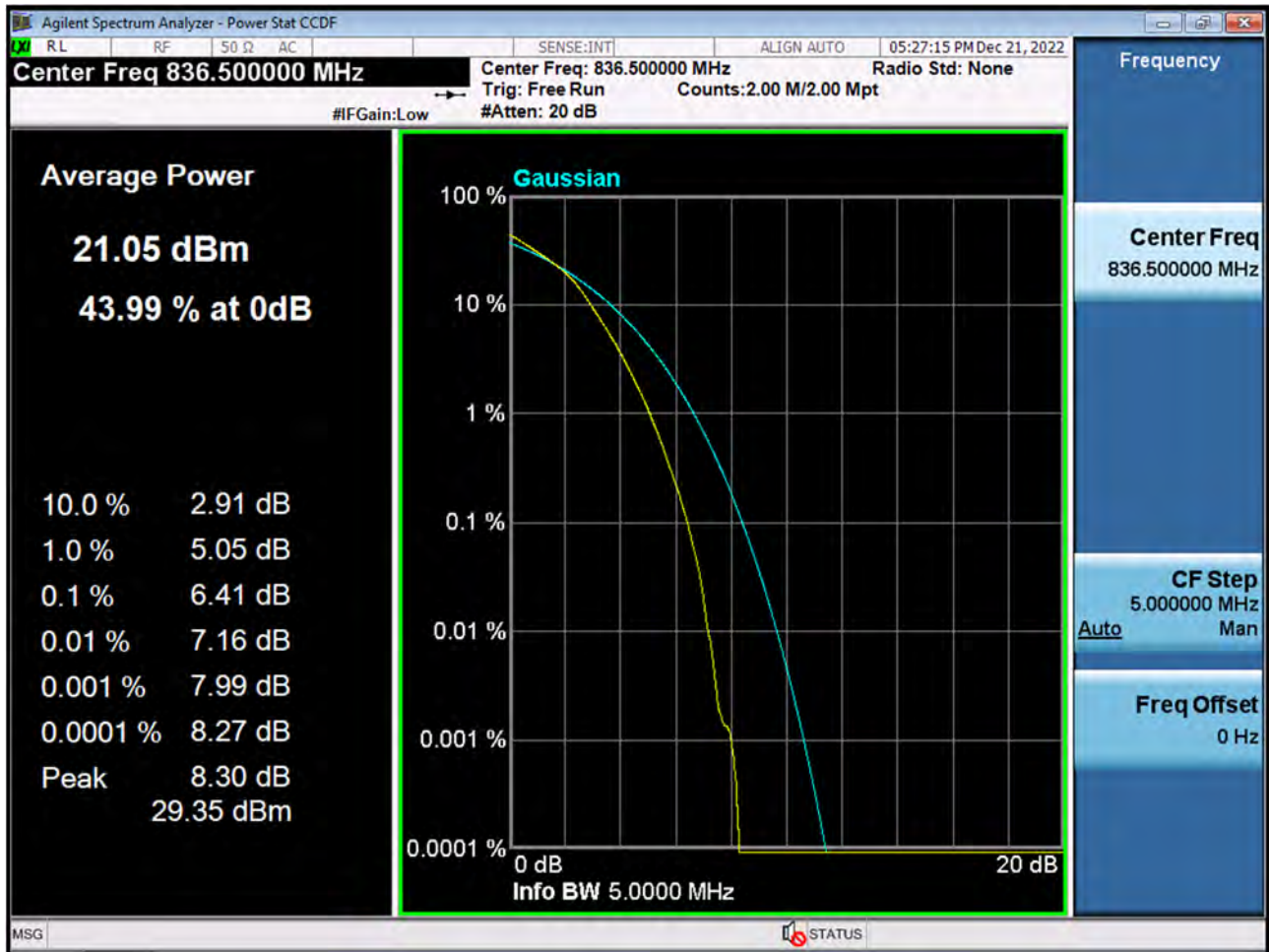
BAND 26. Occupied Bandwidth Plot (15 M BW Ch.26915 16QAM RB 75\_0)



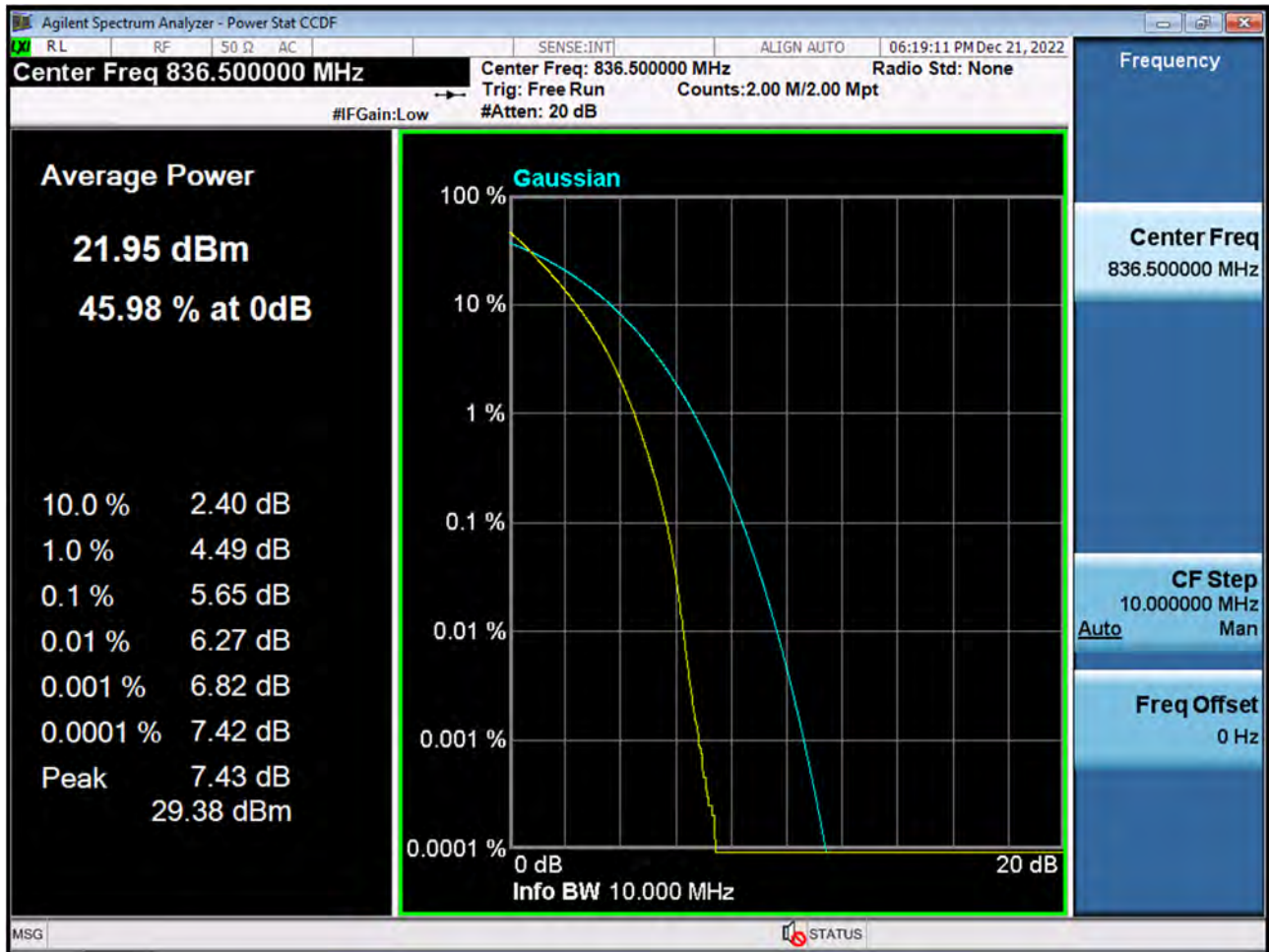
BAND26. PAR Plot (5 M BW Ch.26915 QPSK\_RB25\_0)



BAND26. PAR Plot (5 M BW Ch.26915 16QAM\_RB25\_0)

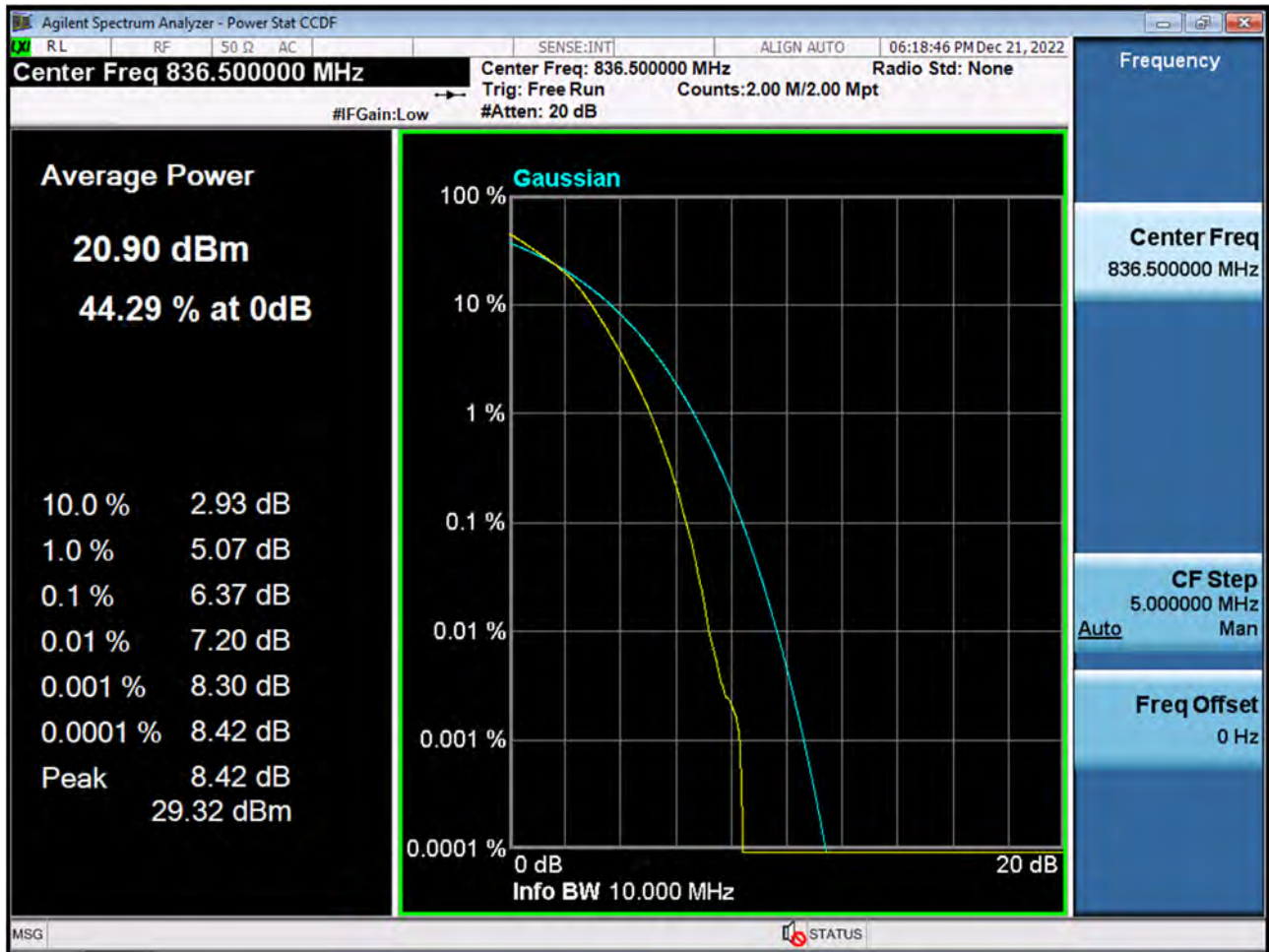


BAND26. PAR Plot (10 M BW Ch.26915 QPSK\_RB50\_0)

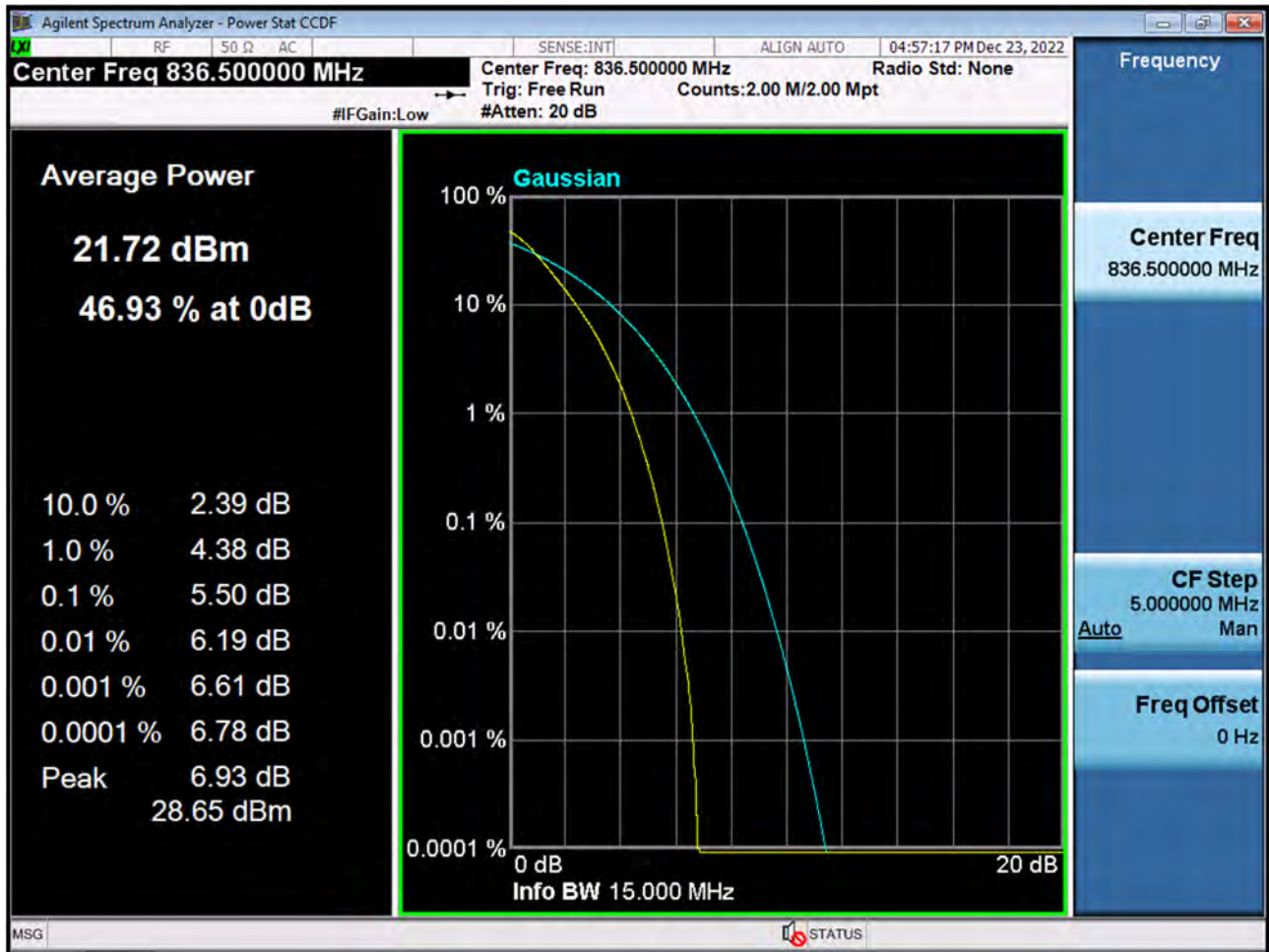




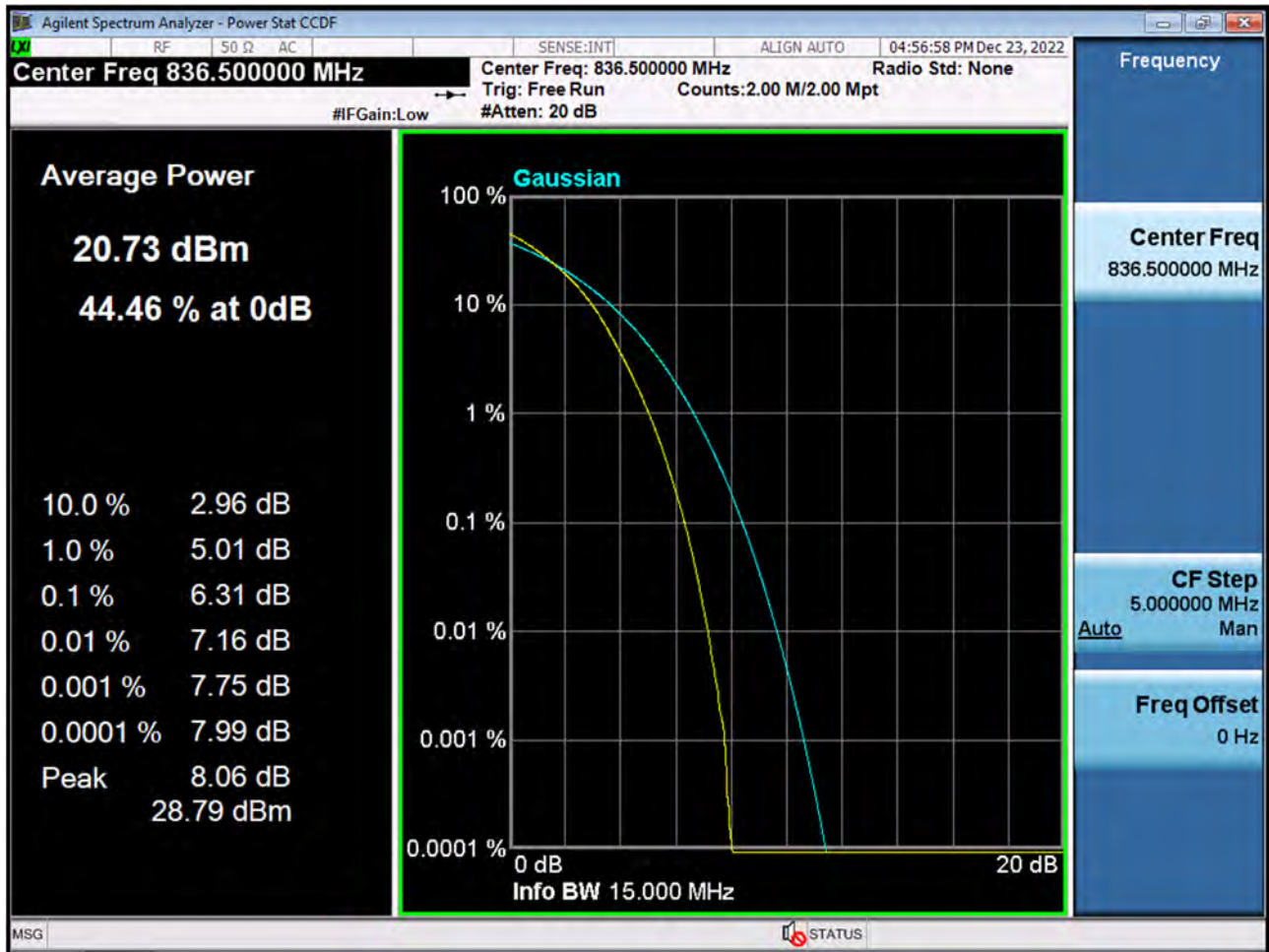
BAND26. PAR Plot (10 M BW Ch.26915 16QAM\_RB50\_0)



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



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



BAND26. Lower Band Edge Plot (5 M BW Ch.26815 QPSK\_RB1\_Offset 0)



BAND26. Lower Band Edge Plot (5 M BW Ch.26815 QPSK\_RB25\_Offset 0)





BAND26. Lower Extended Band Edge Plot (5 M BW Ch.26815 QPSK\_RB25\_0)



BAND26. Lower Band Edge Plot (10 M BW Ch.26840 QPSK\_RB1\_Offset 0)



BAND26. Lower Band Edge Plot (10 M BW Ch.26840 QPSK\_RB50\_Offset 0)





BAND26. Lower Extended Band Edge Plot (10 M BW Ch.26840 QPSK\_RB50\_0)



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



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



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

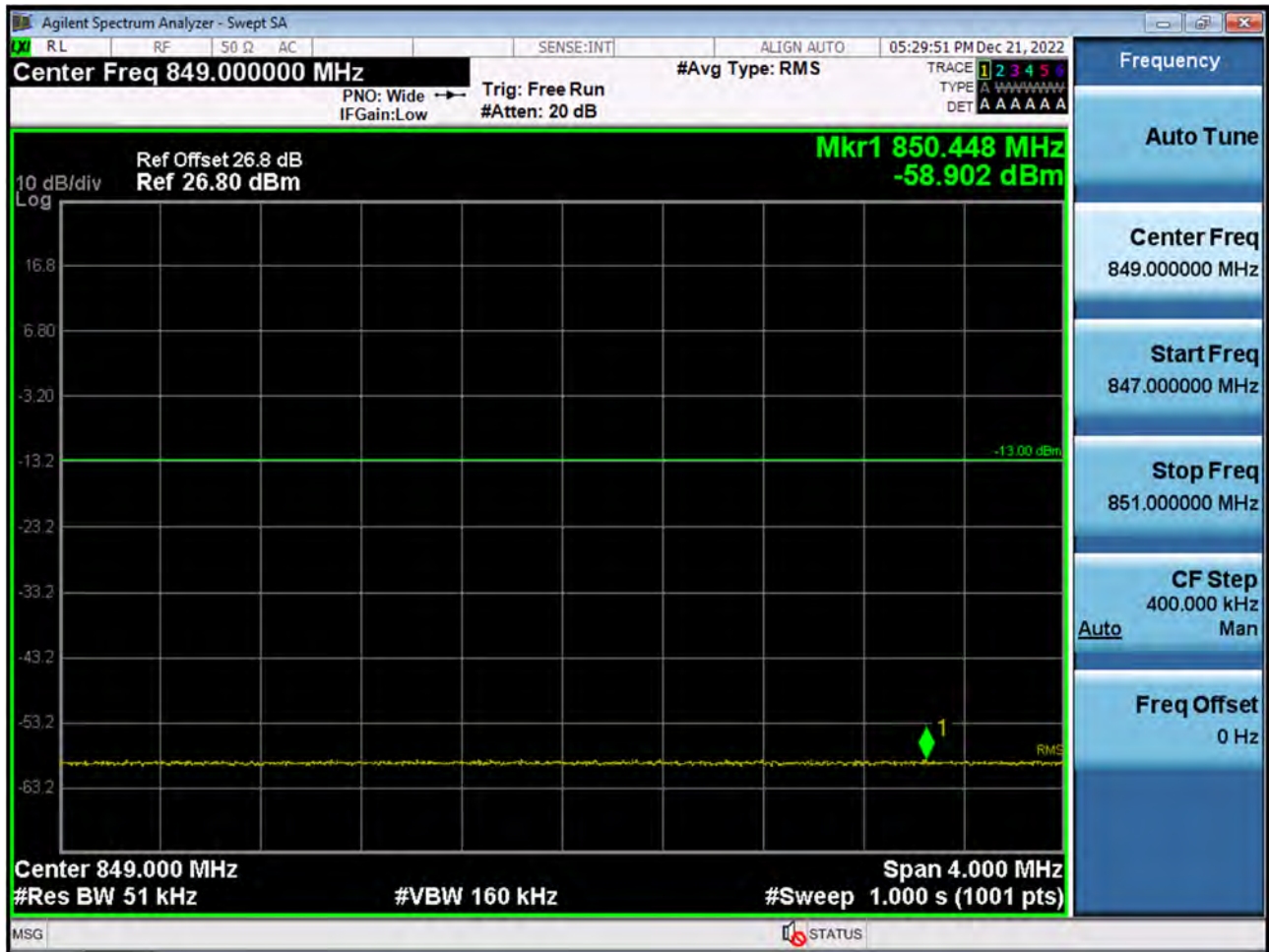




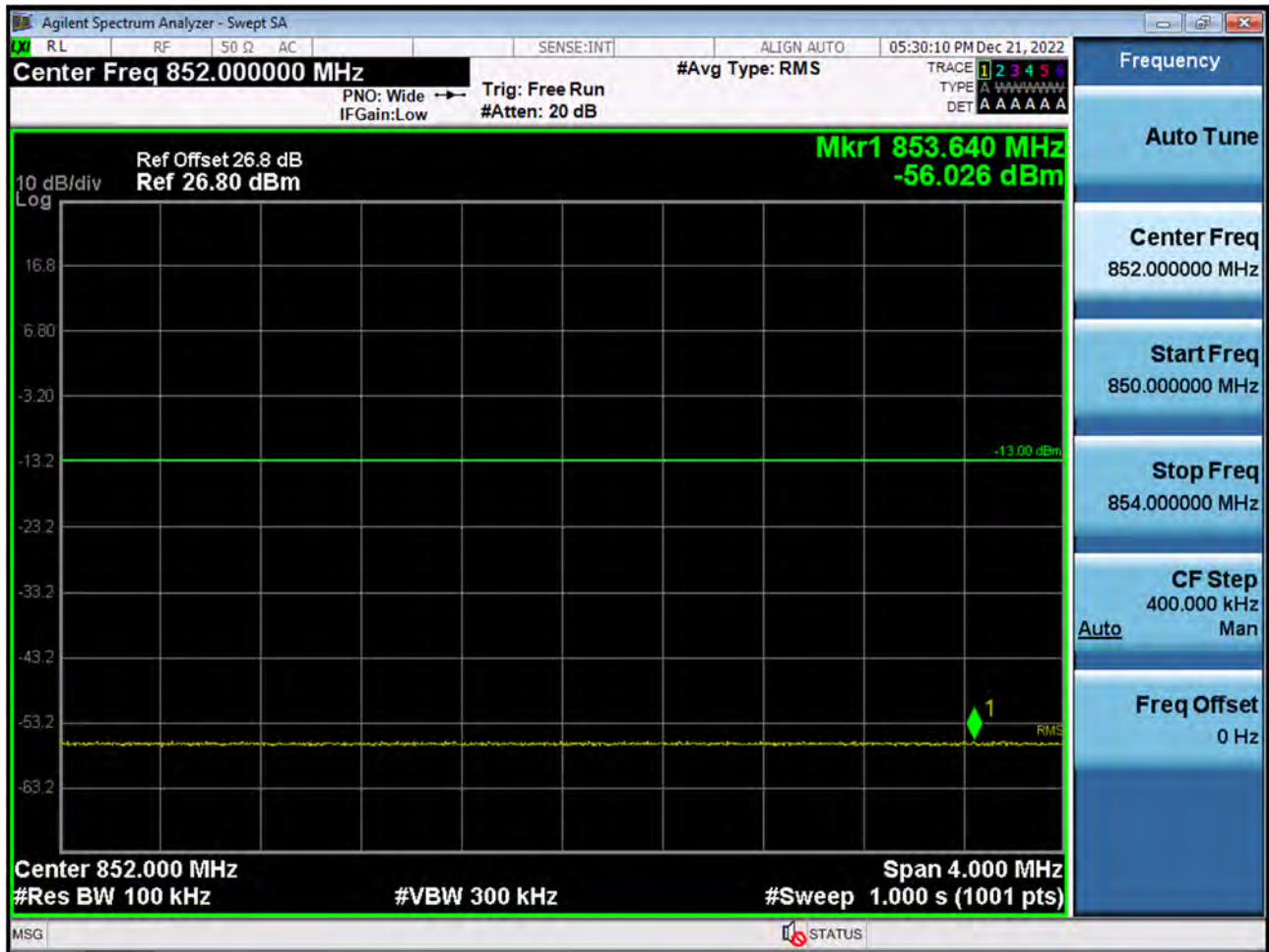
BAND26. Upper Band Edge Plot (5 M BW Ch.27015 QPSK\_RB1\_Offset 24)



BAND26. Upper Band Edge Plot (5 M BW Ch.27015 QPSK\_RB25\_Offset 0)



BAND26. Upper Extended Band Edge Plot (5 M BW Ch.27015 QPSK\_RB25\_0)



BAND26. Upper Band Edge Plot (10 M BW Ch.26990 QPSK\_RB1\_Offset 49)





BAND26. Upper Band Edge Plot (10 M BW Ch.26990 QPSK\_RB50\_Offset 0)



BAND26. Upper Extended Band Edge Plot (10 M BW Ch.26990 QPSK\_RB50\_0)



BAND 26. Upper Band Edge Plot (15 M BW Ch.26965 QPSK\_RB1\_Offset 74)



BAND 26. Upper Band Edge Plot (15 M BW Ch.26965 QPSK\_RB75\_Offset 0)

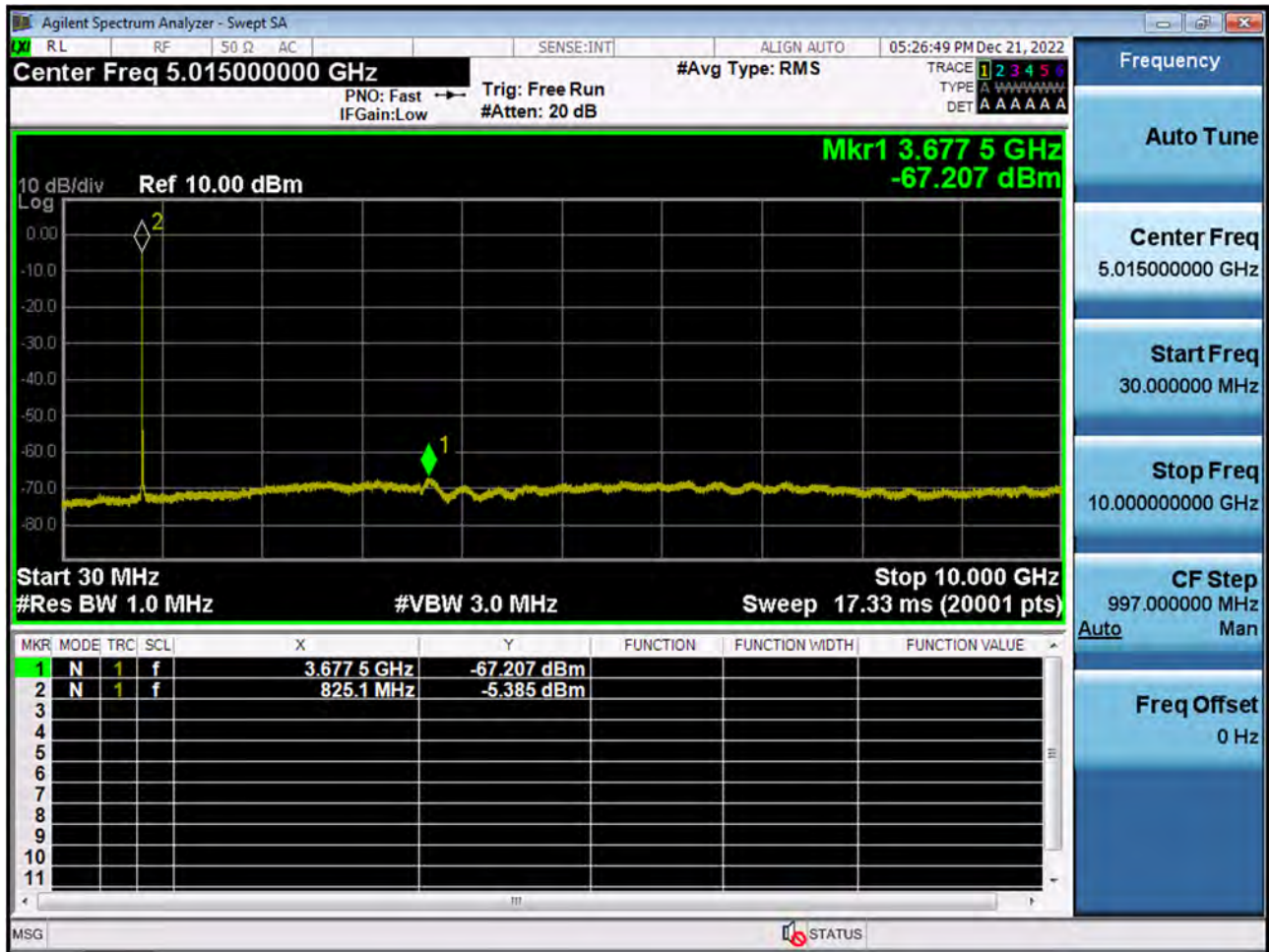




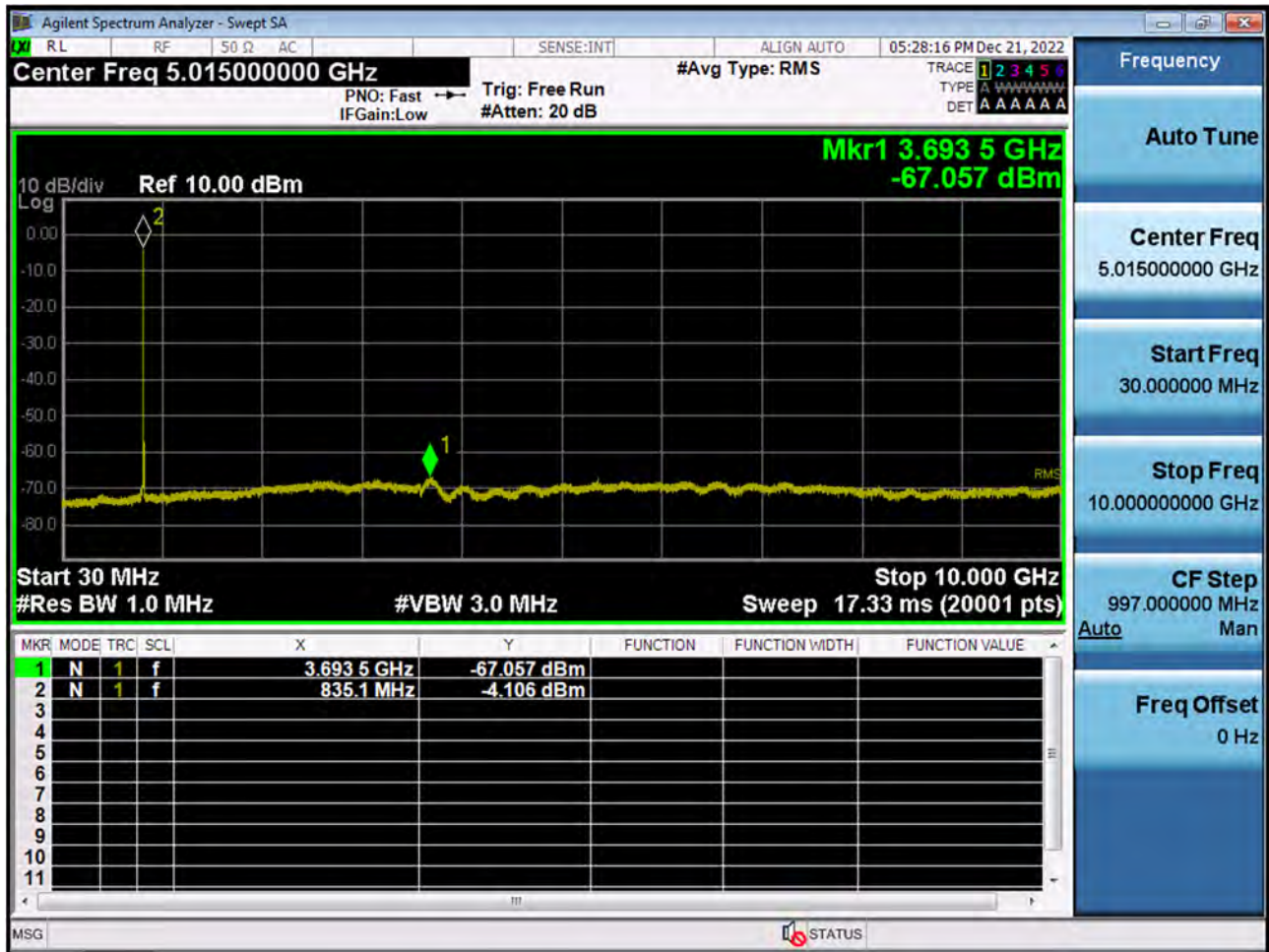
## BAND 26. Upper Extended Band Edge Plot (15 M BW Ch.26965 QPSK\_RB75\_0)



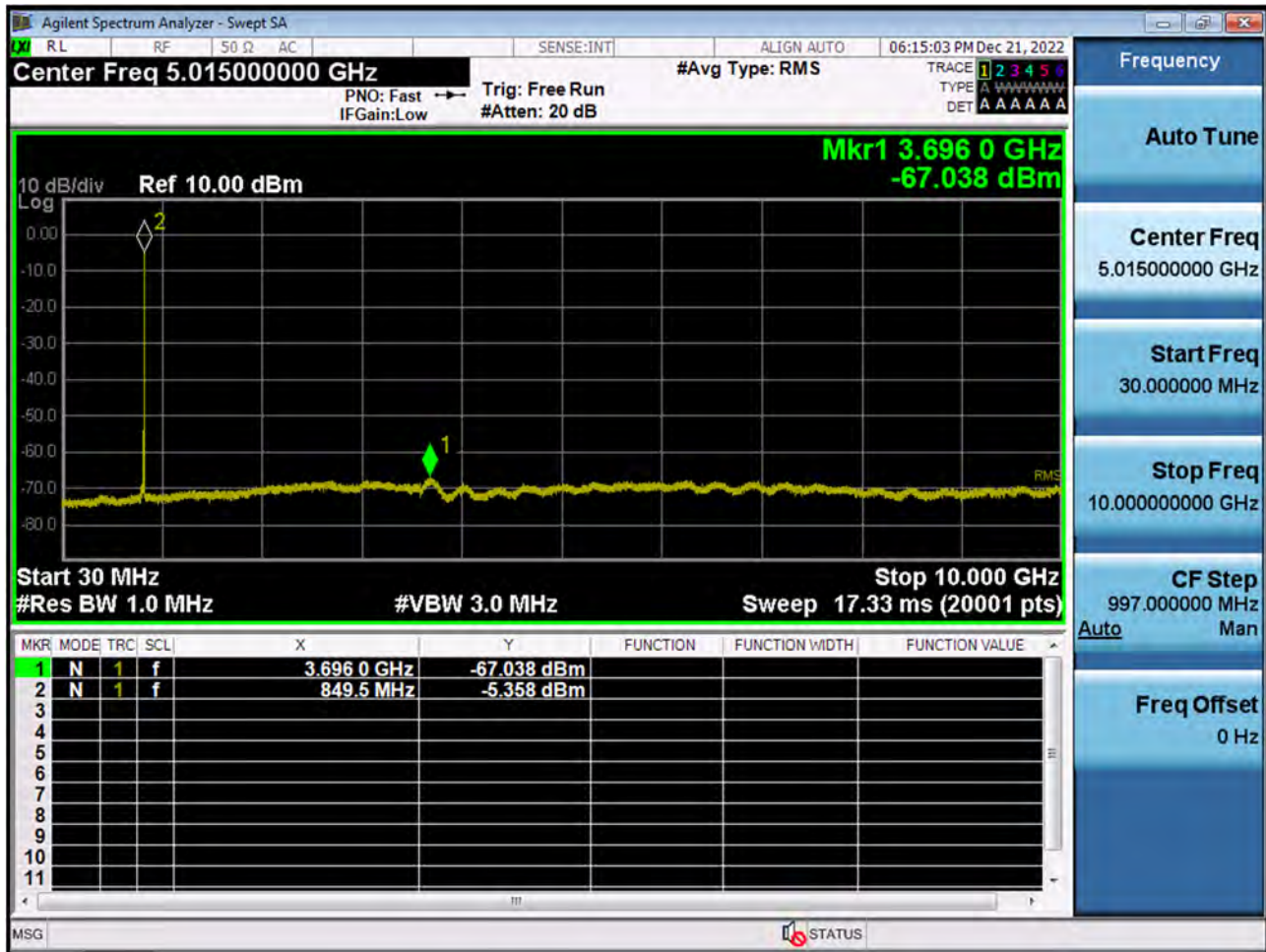
BAND26. Conducted Spurious Plot (26815ch\_5 MHz\_QPSK\_RB 1\_0)



BAND26. Conducted Spurious Plot (26915ch\_5 MHz\_QPSK\_RB 1\_0)

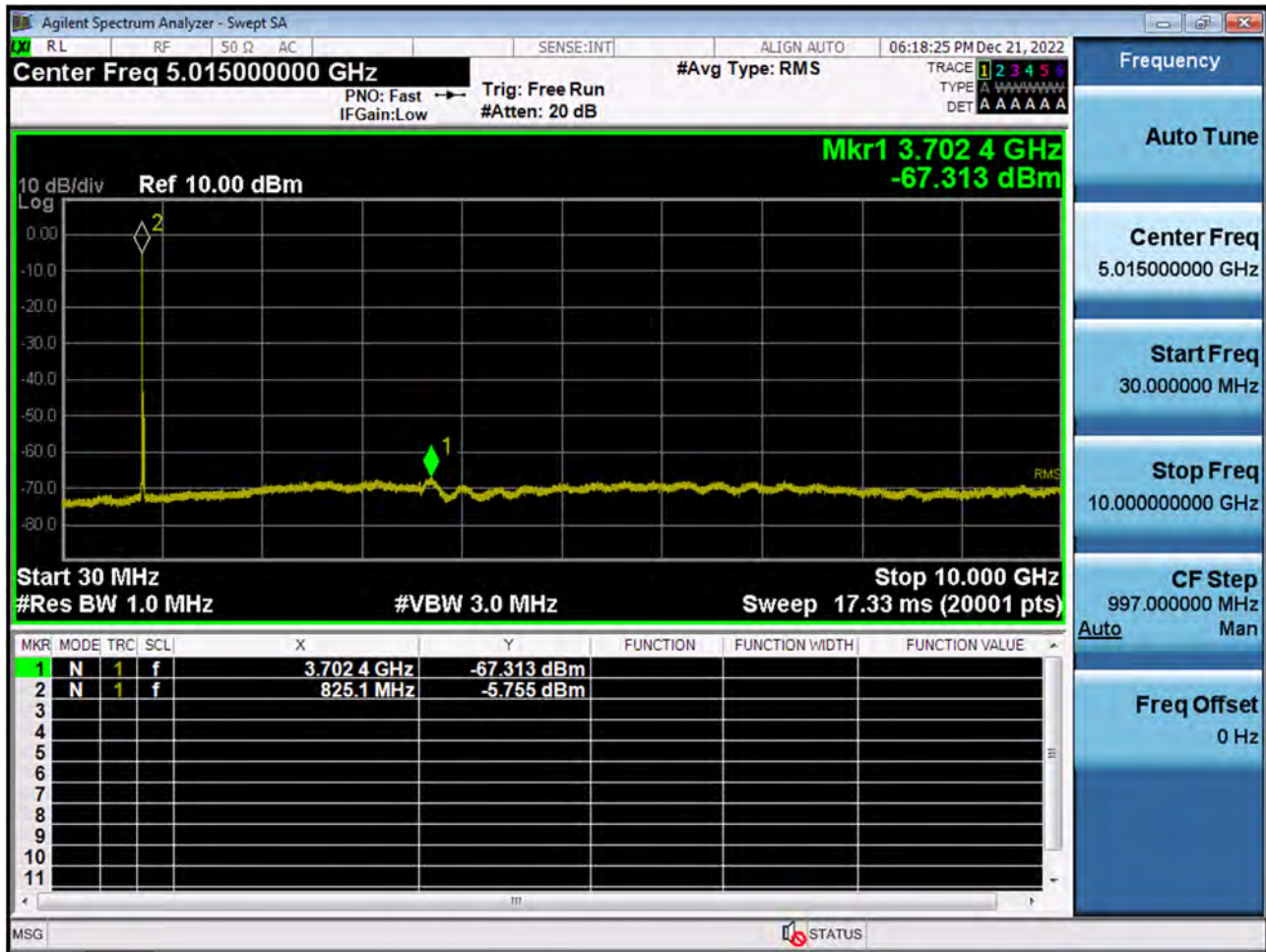


BAND26. Conducted Spurious Plot (27015ch\_5 MHz\_QPSK\_RB 1\_0)

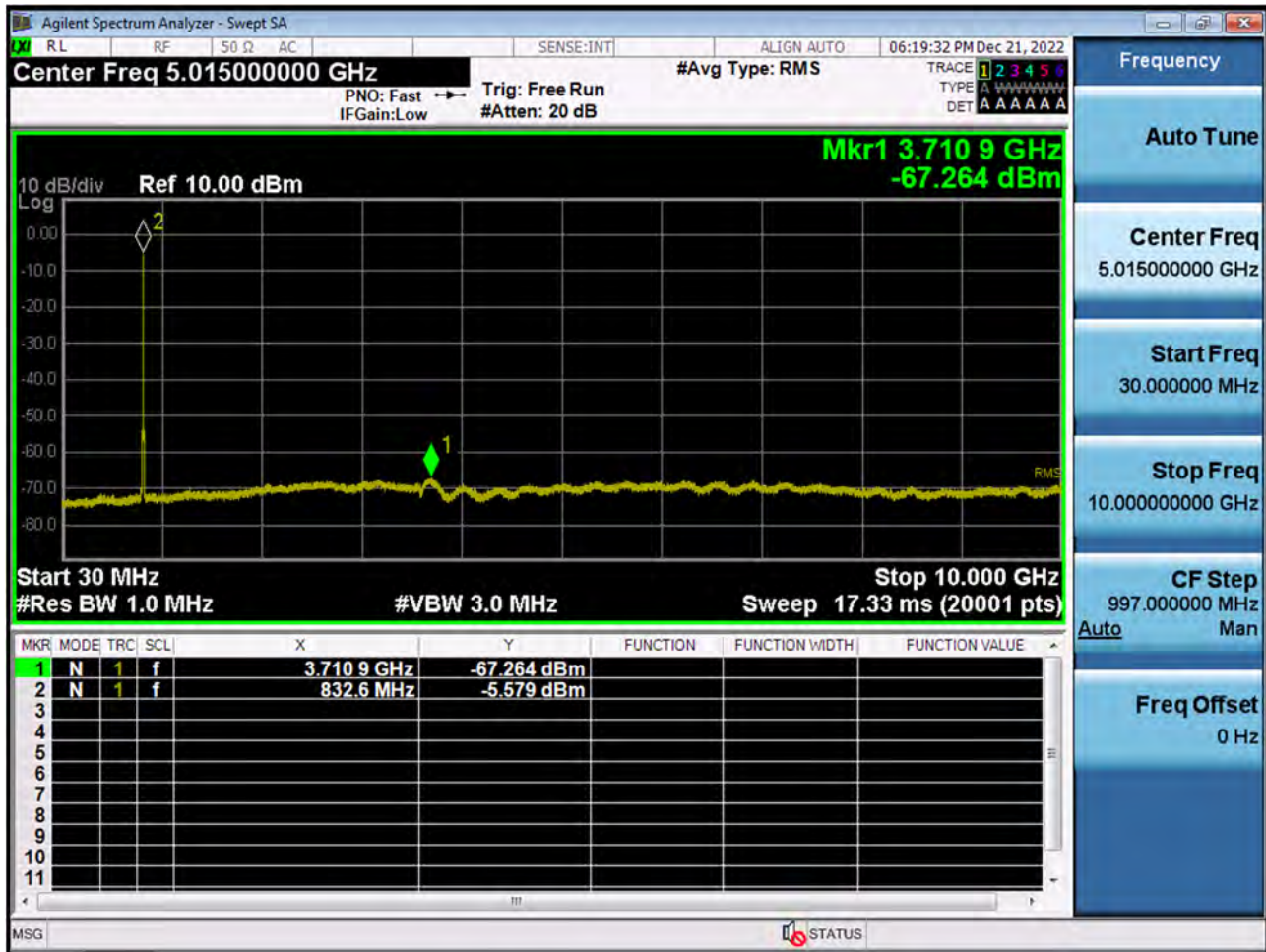




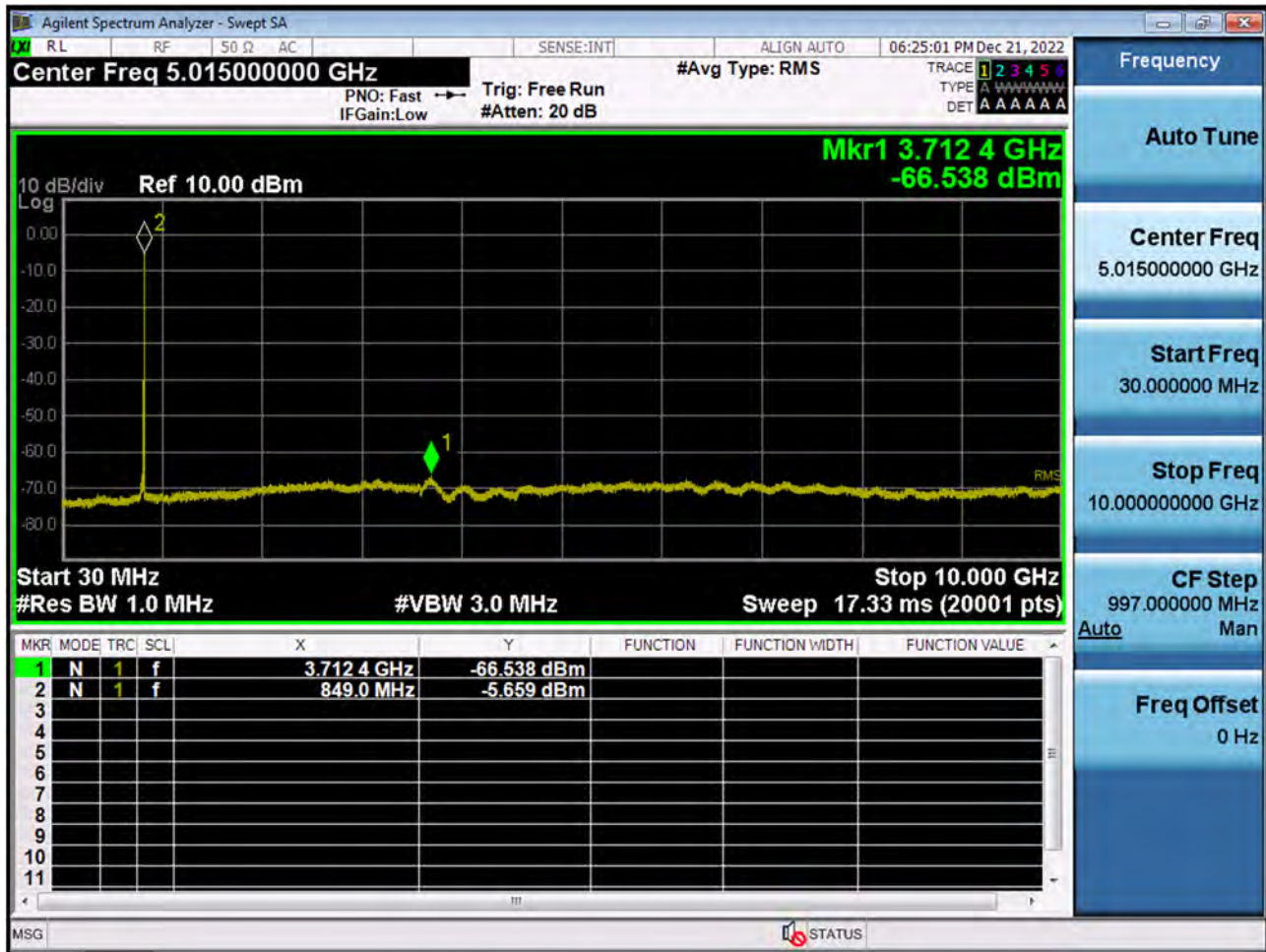
BAND26. Conducted Spurious Plot (26840ch\_10 MHz\_QPSK\_RB 1\_0)



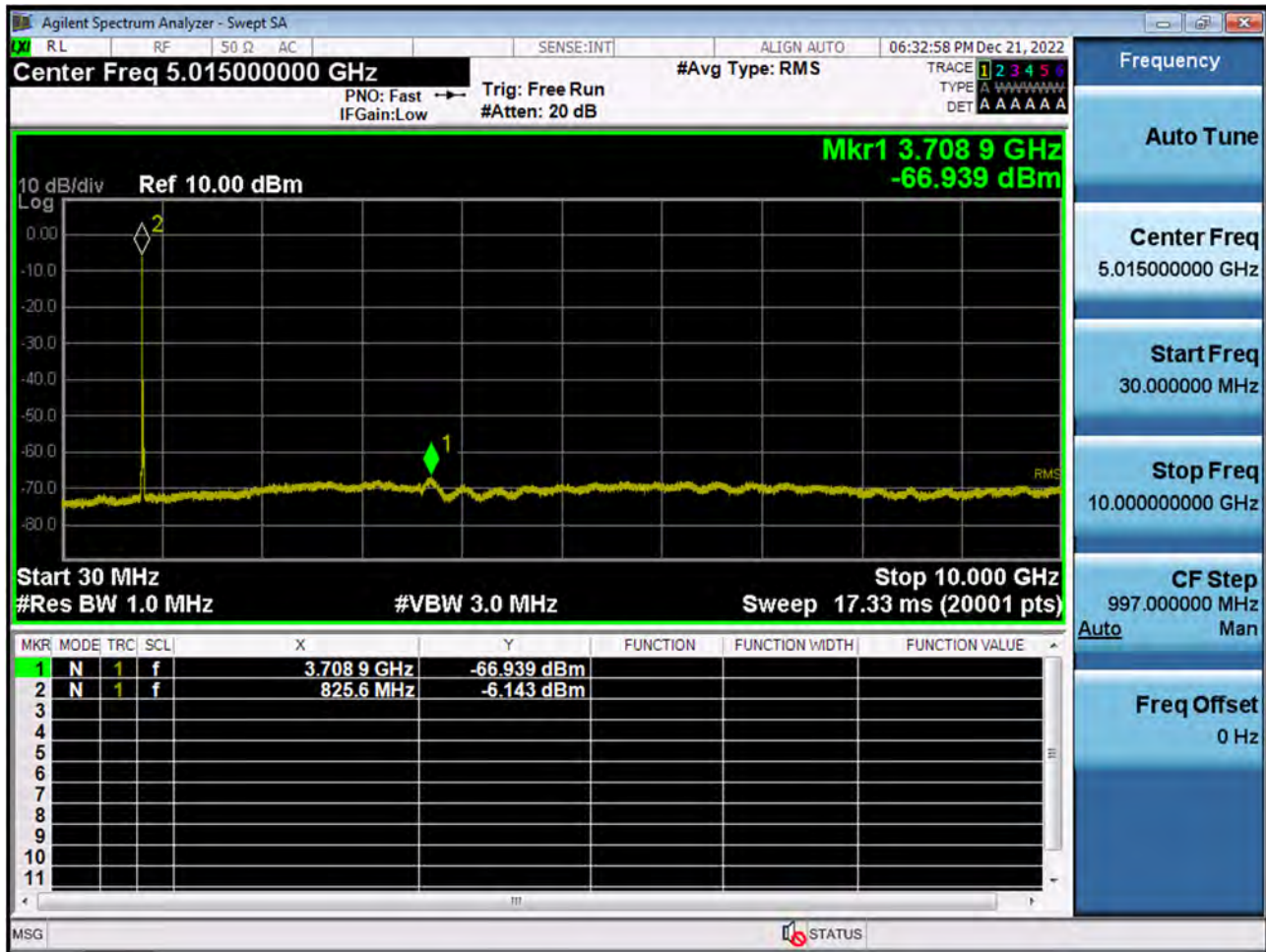
BAND26. Conducted Spurious Plot (26915ch\_10 MHz\_QPSK\_RB 1\_0)



BAND26. Conducted Spurious Plot (26990ch\_10 MHz\_QPSK\_RB 1\_0)

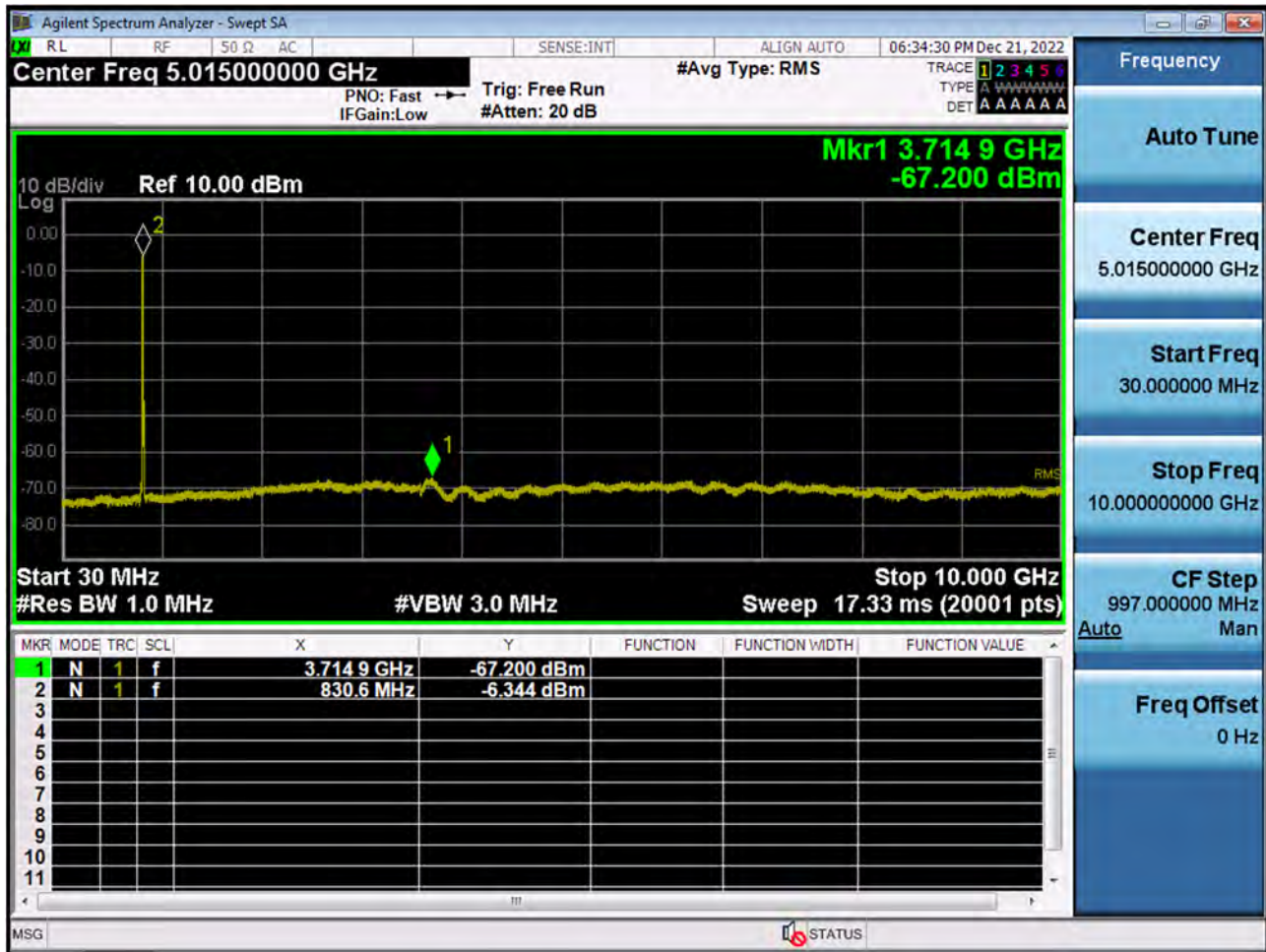


## BAND 26. Conducted Spurious (26865ch\_15 MHz\_QPSK\_RB 1\_0)

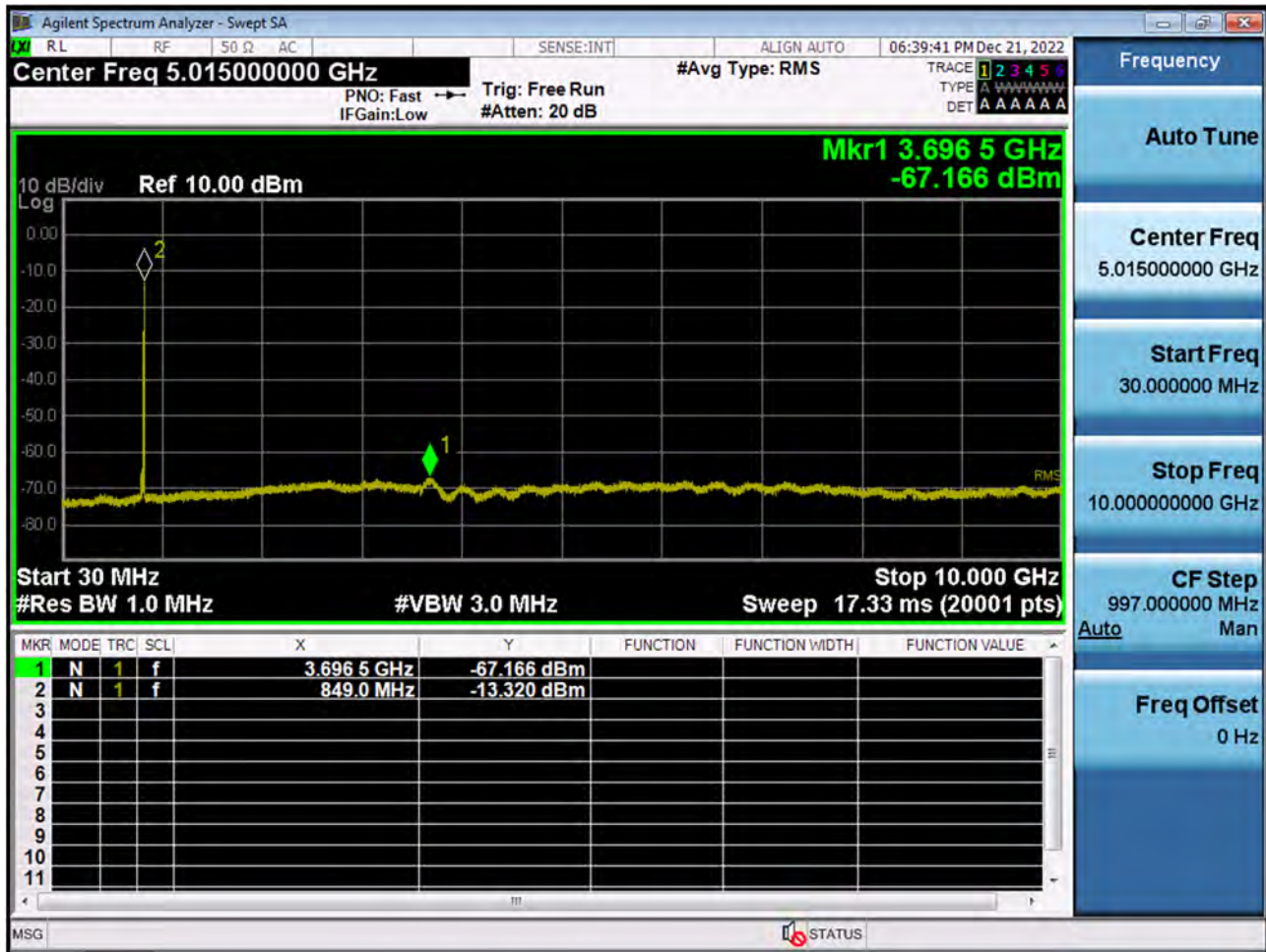




BAND 26. Conducted Spurious (26915ch\_15 MHz\_QPSK\_RB 1\_0)



BAND 26. Conducted Spurious (26965ch\_15 MHz\_QPSK\_RB 1\_0)



## 10. ANNEX A\_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2301-FC010-P