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TEST REPORT

FCC LTE B12(17) Test for SM-P625
Certification

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2402-FC005-R1

DATE OF ISSUE
February 20, 2024

Tested by
Jae Mun Do

Technical Manager
Jong Seok Lee

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TEST REPORT

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Additional Model
-

Applicant	**SAMSUNG Electronics Co., Ltd.** 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Product Name Model Name	Tablet SM-P625
Date of Test	January 19, 2024 ~ February 07, 2024
FCC ID	A3LSMP625
Location of Test	■ Permanent Testing Lab ☐ On Site Testing (Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea)
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	§ 27

REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	February 16, 2024	Initial Release
0	February 20, 2024	Deleted the Additional Model

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).
When confirmation of authenticity of this test report is required, please contact www.hct.co.kr
The test results in this test report are not associated with the ((KS Q) ISO/IEC 17025) accreditation by KOLAS (Korea Laboratory Accreditation Scheme) / A2LA (American Association for Laboratory Accreditation) that are under the ILAC (International Laboratory Accreditation Cooperation) Mutual Recognition Agreement (MRA).

CONTENTS

MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name:	SAMSUNG Electronics Co., Ltd.
Address:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
FCC ID:	A3LSMP625
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	§ 27
EUT Type:	Tablet
Model(s):	SM-P625
Additional Model(s)	-
Tx Frequency:	699.7 MHz – 715.3 MHz (LTE – Band 12 (1.4 MHz)) 700.5 MHz – 714.5 MHz (LTE – Band 12 (3 MHz)) 701.5 MHz – 713.5 MHz (LTE – Band 12/17 (5 MHz)) 704.0 MHz – 711.0 MHz (LTE – Band 12/17 (10 MHz))
Date(s) of Tests:	January 19, 2024 ~ February 07, 2024
Serial number:	Radiated : R32WC0037CL Conducted : R32WC003BFW

1.1. MAXIMUM OUTPUT POWER

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	ERP	
				Max. Power (W)	Max. Power (dBm)
LTE – Band12 (1.4)	699.7 – 715.3	1M10G7D	QPSK	0.059	17.73
		1M09W7D	16QAM	0.049	16.87
		1M09W7D	64QAM	0.039	15.92
		1M10W7D	256QAM	0.019	12.85
LTE – Band12 (3)	700.5 – 714.5	2M72G7D	QPSK	0.059	17.71
		2M71W7D	16QAM	0.048	16.85
		2M72W7D	64QAM	0.039	15.94
		2M71W7D	256QAM	0.019	12.81
LTE – Band12/17 (5)	701.5 – 713.5	4M53G7D	QPSK	0.059	17.70
		4M52W7D	16QAM	0.049	16.90
		4M52W7D	64QAM	0.039	15.93
		4M52W7D	256QAM	0.019	12.77
LTE – Band12/17 (10)	704.0 – 711.0	9M00G7D	QPSK	0.058	17.64
		9M00W7D	16QAM	0.048	16.83
		9M01W7D	64QAM	0.038	15.84
		8M99W7D	256QAM	0.019	12.76

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a Mobile Phone with GSM/GPRS/EGPRS/UMTS and LTE.
It also supports IEEE 802.11 a/b/g/n/ac (20/40/80 MHz), Bluetooth, BT LE, iPA.

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
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 ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points > 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

Test Note

1. The turntable is rotated through 360 degrees, and the receiving antenna scans in order to determine the level of the maximized emission.
2. A half wave dipole is then substituted in place of the EUT. For emissions above 1 GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator and the previously recorded signal was duplicated.
   The power is calculated by the following formula;

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

   Where: P_d is the dipole equivalent power and P_g is the generator output power into the substitution antenna.
3. The maximum value is calculated by adding the forward power to the calibrated source plus its appropriate gain value.
   These steps are repeated with the receiving antenna in both vertical and horizontal polarization.
   the difference between the gain of the horn and an isotropic antenna are taken into consideration
4. The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
5. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

3.3 RADIATED SPURIOUS EMISSIONS

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

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

Test Settings

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

Test Note

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

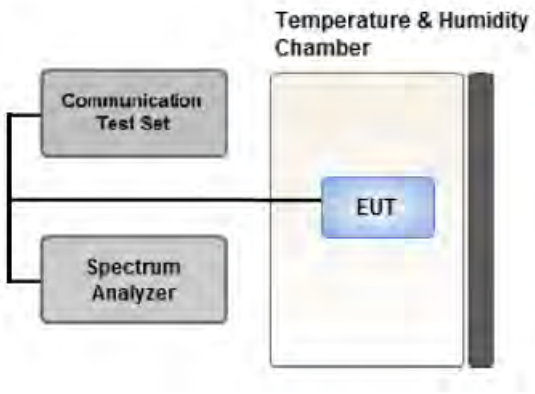
$$\text{Result}_{(dBm)} = \text{Pg}_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dBi)}$$

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

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

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

3.4 OCCUPIED BANDWIDTH.



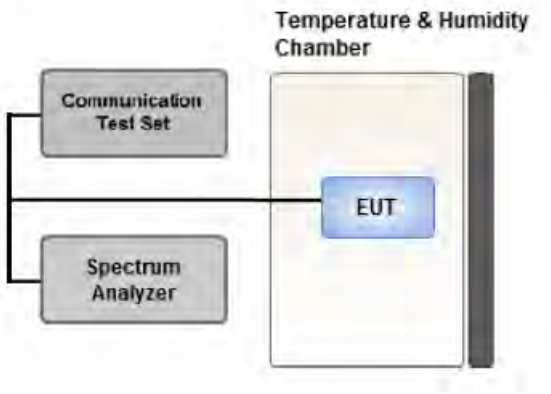
Test setup

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.
The EUT makes a call to the communication simulator.
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.
Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth

Test Settings

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

3.5 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



Test setup

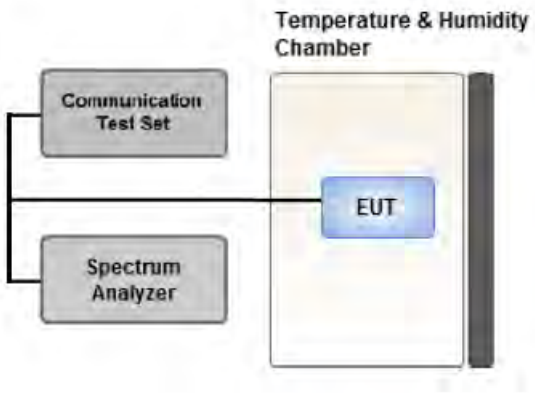
Test Overview

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

Test Settings

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

3.6 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

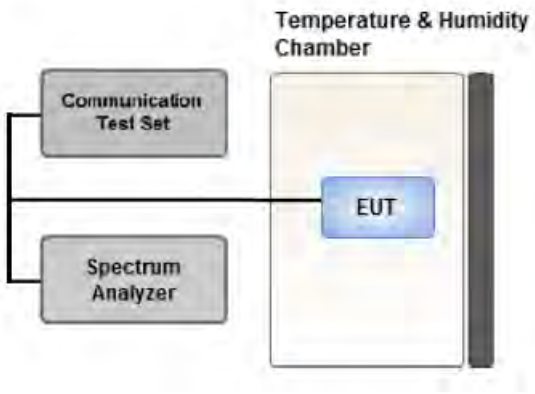
1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW > 1 % of the emission bandwidth
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW
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 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.

3.7 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.

3.8 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
- We were performed the RSE test in condition of co-location.
  Mode : Stand alone, Simultaneous transmission scenarios
  Worst case : Stand alone
- In the case of radiated spurious emissions, all bandwidth of operation was investigated and the worst case bandwidth results are reported. (Worst case : 1.4 MHz)
- The worst case is reported with the EUT positioning, modulations, and paging service configurations shown in the test data.
- LTE Band 12 (699 – 716 MHz, 5/10 MHz bandwidth) overlaps the entire frequency range of LTE Band 17 (704 - 716 MHz) and they have the same Tune-up power.
  Therefore, test data provided in this report covers Band 17 as well as Band 12.
- Please refer to the table below.

[Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset	Axis
Effective Radiated Power	QPSK, 16QAM, 64QAM, 256QAM	1.4	Low, Mid, High	1	5	Y
		3	Low, Mid	1	14	
			High	1	0	
		5	Low, Mid	1	24	
			High	1	0	
		10	Low, Mid, High	1	49	
Radiated Spurious and Harmonic Emissions	QPSK	1.4	Low, Mid, High	1	5	Y

3.9 WORST CASE(CONDUCTED TEST)

- All modes of operation were investigated and the worst case configuration results are reported.
- LTE Band 12 (699 – 716 MHz, 5/10 MHz bandwidth) overlaps the entire frequency range of LTE Band 17 (704 - 716 MHz) and they have the same Tune-up power.
Therefore, test data provided in this report covers Band 17 as well as Band 12.

[Worst case]

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

4. LIST OF TEST EQUIPMENT

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
RF Switching System	FBSR-02B(1.2G HPF+LNA)	T&M SYSTEM	F1L1	12/11/2024	Annual
RF Switching System	FBSR-02B(3.3G HPF+LNA)	T&M SYSTEM	F1L2	12/11/2024	Annual
Power Splitter(DC ~ 26.5 GHz)	11667B	Hewlett Packard	5001	04/19/2024	Annual
DC Power Supply	E3632A	Agilent	MY40010147	06/23/2024	Annual
Dipole Antenna	UHAP	Schwarzbeck	557	03/09/2025	Biennial
Dipole Antenna	UHAP	Schwarzbeck	558	03/09/2025	Biennial
Chamber	SU-642	ESPEC	93008124	02/22/2024	Annual
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	147	08/17/2025	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	9120D-1298	09/11/2025	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/29/2024	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170124	03/28/2025	Biennial
Signal Analyzer(10 Hz ~ 26.5 GHz)	N9020A	Agilent	MY52090906	04/20/2024	Annual
ATTENUATOR(20 dB)	8493C	Hewlett Packard	17280	04/19/2024	Annual
Spectrum Analyzer(10 Hz ~ 40 GHz)	FSV40	REOHDE & SCHWARZ	100931	08/17/2024	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/10/2024	Annual
Loop Antenna(9 kHz ~ 30 MHz)	FMZB1513	Schwarzbeck	1513-333	03/17/2024	Biennial
Trilog Broadband Antenna	VULB9168	Schwarzbeck	895	08/16/2024	Biennial
Trilog Broadband Antenna	VULB9168	Schwarzbeck	1135	03/21/2024	Biennial
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262094331	11/17/2024	Annual
Wideband Radio Communication Tester	MT8820C	Anritsu Corp.	6201026545	12/11/2024	Annual
SIGNAL GENERATOR (100 kHz ~ 40 GHz)	SMB100A	REOHDE & SCHWARZ	177633	06/22/2024	Annual
Signal Analyzer(5 Hz ~ 40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/24/2024	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	HCT CO., LTD.,	-	-	-

Note:

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

5. MEASUREMENT UNCERTAINTY

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

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

Parameter	Expanded Uncertainty (±dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.98 (Confidence level about 95 %, k=2)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.36 (Confidence level about 95 %, k=2)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.70 (Confidence level about 95 %, k=2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.52 (Confidence level about 95 %, k=2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.66 (Confidence level about 95 %, k=2)
Radiated Disturbance (Above 40 GHz)	5.58 (Confidence level about 95 %, k=2)

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, § 27.53(g)	< 43 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions	PASS
Conducted Output Power	§ 2.1046	N/A	See Note1
Frequency stability / variation of ambient temperature	§ 2.1055, § 27.54	Emission must remain in band	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	§ 27.50(c)(10)	< 3 Watts max. ERP	PASS
Radiated Spurious and Harmonic Emissions	§ 2.1053, § 27.53(g)	< 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

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

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

7.2 EIRP Sample Calculation

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

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

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

7.3. Emission Designator

GSM Emission Designator

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

EDGE Emission Designator

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

WCDMA Emission Designator

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

QPSK Modulation

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

QAM Modulation

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

8. TEST DATA

8.1 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
699.7	LTE B12 (1.4 MHz)	QPSK	-31.35	27.77	-9.55	1.28	V	< 3.00	0.049	16.94
		16-QAM	-32.21	26.91	-9.55	1.28	V		0.041	16.08
		64-QAM	-33.15	25.97	-9.55	1.28	V		0.033	15.14
		256-QAM	-36.25	22.87	-9.55	1.28	V		0.016	12.04
707.5		QPSK	-30.81	28.03	-9.55	1.28	V		0.052	17.20
		16-QAM	-31.64	27.20	-9.55	1.28	V		0.043	16.37
		64-QAM	-32.61	26.23	-9.55	1.28	V		0.035	15.40
		256-QAM	-35.70	23.14	-9.55	1.28	V		0.017	12.31
715.3		QPSK	-30.69	28.56	-9.55	1.28	V		0.059	17.73
		16-QAM	-31.55	27.70	-9.55	1.28	V		0.049	16.87
		64-QAM	-32.50	26.75	-9.55	1.28	V		0.039	15.92
		256-QAM	-35.57	23.68	-9.55	1.28	V		0.019	12.85

Freq (MHz)	Mod (Bandwidth)	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP	
								W	W	dBm
700.5	LTE B12 (3 MHz)	QPSK	-31.21	27.84	-9.55	1.28	V	< 3.00	0.050	17.01
		16-QAM	-32.00	27.05	-9.55	1.28	V		0.042	16.22
		64-QAM	-32.97	26.08	-9.55	1.28	V		0.033	15.25
		256-QAM	-36.09	22.96	-9.55	1.28	V		0.016	12.13
707.5		QPSK	-30.71	28.13	-9.55	1.28	V		0.054	17.30
		16-QAM	-31.54	27.30	-9.55	1.28	V		0.044	16.47
		64-QAM	-32.50	26.34	-9.55	1.28	V		0.036	15.51
		256-QAM	-35.60	23.24	-9.55	1.28	V		0.017	12.41
714.5		QPSK	-30.67	28.54	-9.55	1.28	V		0.059	17.71
		16-QAM	-31.53	27.68	-9.55	1.28	V		0.048	16.85
		64-QAM	-32.44	26.77	-9.55	1.28	V		0.039	15.94
		256-QAM	-35.57	23.64	-9.55	1.28	V		0.019	12.81

Freq (MHz)	Mod (Bandwidth)	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP	
								W	W	dBm
701.5	LTE B12 (5 MHz)	QPSK	-31.01	27.94	-9.55	1.28	V	< 3.00	0.051	17.11
		16-QAM	-31.80	27.15	-9.55	1.28	V		0.043	16.32
		64-QAM	-32.76	26.19	-9.55	1.28	V		0.034	15.36
		256-QAM	-35.96	22.99	-9.55	1.28	V		0.016	12.16
707.5		QPSK	-30.59	28.25	-9.55	1.28	V		0.055	17.42
		16-QAM	-31.43	27.41	-9.55	1.28	V		0.046	16.58
		64-QAM	-32.43	26.41	-9.55	1.28	V		0.036	15.58
		256-QAM	-35.59	23.25	-9.55	1.28	V		0.017	12.42
713.5		QPSK	-30.60	28.53	-9.55	1.28	V		0.059	17.70
		16-QAM	-31.40	27.73	-9.55	1.28	V		0.049	16.90
		64-QAM	-32.37	26.76	-9.55	1.28	V		0.039	15.93
		256-QAM	-35.53	23.60	-9.55	1.28	V		0.019	12.77

Freq (MHz)	Mod (Bandwidth)	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP	
								W	W	dBm
704.0	LTE B12 (10 MHz)	QPSK	-30.71	28.20	-9.55	1.28	V	< 3.00	0.055	17.37
		16-QAM	-31.51	27.40	-9.55	1.28	V		0.045	16.57
		64-QAM	-32.50	26.41	-9.55	1.28	V		0.036	15.58
		256-QAM	-35.61	23.30	-9.55	1.28	V		0.018	12.47
707.5		QPSK	-30.49	28.35	-9.55	1.28	V		0.056	17.52
		16-QAM	-31.33	27.51	-9.55	1.28	V		0.047	16.68
		64-QAM	-32.37	26.47	-9.55	1.28	V		0.037	15.64
		256-QAM	-35.45	23.39	-9.55	1.28	V		0.018	12.56
711.0		QPSK	-30.58	28.47	-9.55	1.28	V		0.058	17.64
		16-QAM	-31.39	27.66	-9.55	1.28	V		0.048	16.83
		64-QAM	-32.38	26.67	-9.55	1.28	V		0.038	15.84
		256-QAM	-35.46	23.59	-9.55	1.28	V		0.019	12.76

8.2 RADIATED SPURIOUS EMISSIONS

▣ MODE: LTE B12(17)

▣ MODULATION SIGNAL: 1.4 MHz QPSK

▣ DISTANCE: 3 meters

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit
23017 (699.7)	1 399.40	-58.35	7.40	-63.75	1.80	H	-58.15	-13.00
	2 099.10	-58.70	9.10	-64.06	2.28	H	-57.24	-13.00
	2 798.80	-59.36	10.30	-63.23	2.68	H	-55.61	-13.00
	3 498.50	-59.88	11.30	-62.53	3.00	H	-54.23	-13.00
	4 198.20	-62.20	11.20	-61.84	3.30	H	-53.94	-13.00
23095 (707.5)	1 415.00	-59.22	7.40	-65.67	1.80	V	-60.07	-13.00
	2 122.50	-59.40	9.10	-64.60	2.28	V	-57.78	-13.00
	2 830.00	-59.33	10.30	-63.76	2.69	V	-56.15	-13.00
	3 537.50	-61.02	11.30	-63.29	3.00	V	-54.99	-13.00
	4 245.00	-61.41	11.20	-60.96	3.31	V	-53.07	-13.00
23173 (715.3)	1 430.60	-58.01	7.40	-64.53	1.81	V	-58.94	-13.00
	2 145.90	-54.99	9.05	-60.01	2.33	V	-53.29	-13.00
	2 861.20	-60.40	10.30	-63.85	2.72	V	-56.27	-13.00
	3 576.50	-59.24	11.40	-61.30	3.00	V	-52.90	-13.00
	4 291.80	-59.77	11.20	-58.53	3.33	V	-50.66	-13.00

8.3 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
12	1.4 MHz	707.5	QPSK	6	0	1.0971
			16-QAM			1.0936
			64-QAM			1.0938
			256-QAM			1.1000
	3 MHz		QPSK	15		2.7218
			16-QAM			2.7143
			64-QAM			2.7162
			256-QAM			2.7070
12(17)	5 MHz		QPSK	25		4.5310
			16-QAM			4.5222
			64-QAM			4.5210
			256-QAM			4.5162
	10 MHz		QPSK	50		8.9966
			16-QAM			8.9949
			64-QAM			9.0111
			256-QAM			8.9940

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 41 ~ 56.

8.4 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
12	1.4	699.7	3.6830	27.976	-67.220	-39.244	-13.00
		707.5	3.7059	27.976	-67.021	-39.045	
		715.3	3.7005	27.976	-67.178	-39.202	
	3	700.5	3.7054	27.976	-67.244	-39.268	
		707.5	3.6875	27.976	-67.114	-39.138	
		714.5	3.7094	27.976	-67.100	-39.124	
12(17)	5	701.5	3.7124	27.976	-67.249	-39.273	
		707.5	3.6990	27.976	-67.451	-39.475	
		713.5	3.7079	27.976	-67.423	-39.447	
	10	704.0	3.6970	27.976	-67.126	-39.150	
		707.5	3.7124	27.976	-67.208	-39.232	
		711.0	3.6735	27.976	-67.371	-39.395	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 85 ~ 96.
2. Conducted Spurious Emissions was Tested QPSK Modulation, Resource Block Size 1 and Resource Block Offset 0
3. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
4. Factor (dB) = Cable Loss + Attenuator + Power Splitter

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

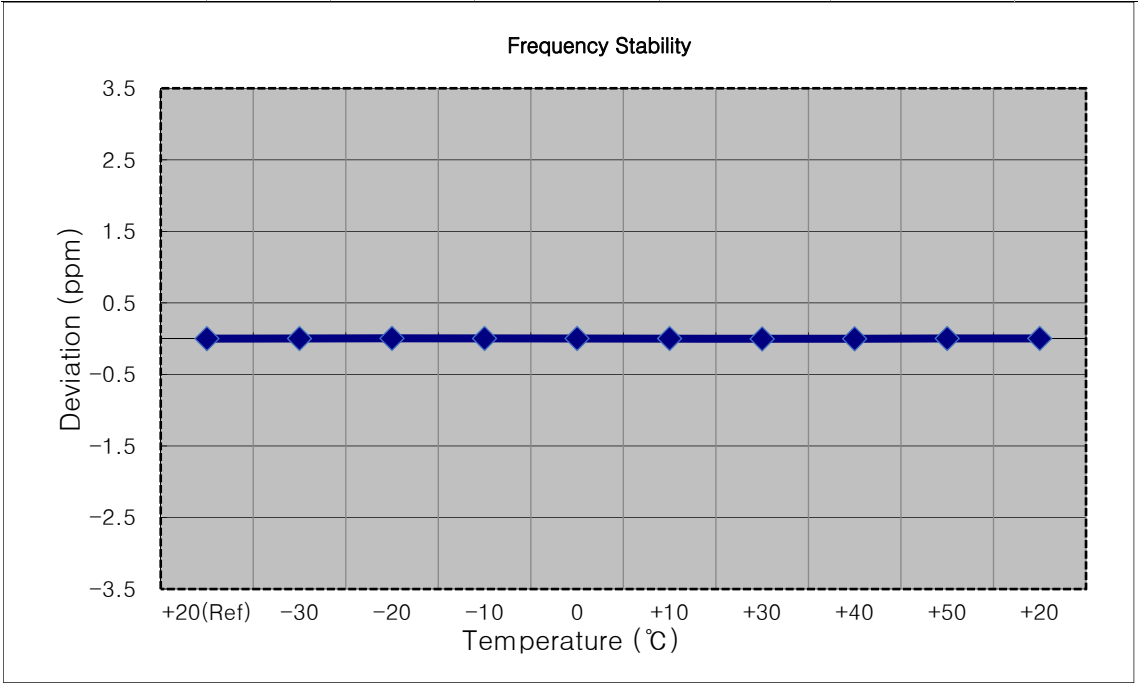
8.5 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 57 ~ 84.

8.6 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

- ▣ MODE: LTE B12
- ▣ OPERATING FREQUENCY: 699,700,000 Hz
- ▣ CHANNEL: 23017 (1.4 MHz)
- ▣ REFERENCE VOLTAGE: 3.850 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100 %	3.850	+20(Ref)	699 699 998	0.0	0.000 000	0.000
100 %		-30	699 699 999	1.3	0.000 000	0.002
100 %		-20	699 700 001	2.8	0.000 000	0.004
100 %		-10	699 700 000	2.0	0.000 000	0.003
100 %		0	699 700 000	1.6	0.000 000	0.002
100 %		+10	699 699 999	1.4	0.000 000	0.002
100 %		+30	699 699 996	-2.5	0.000 000	-0.004
100 %		+40	699 699 997	-1.5	0.000 000	-0.002
100 %		+50	699 700 000	2.0	0.000 000	0.003
Batt. Endpoint	3.400	+20	699 700 000	2.0	0.000 000	0.003



▣ MODE: LTE B12

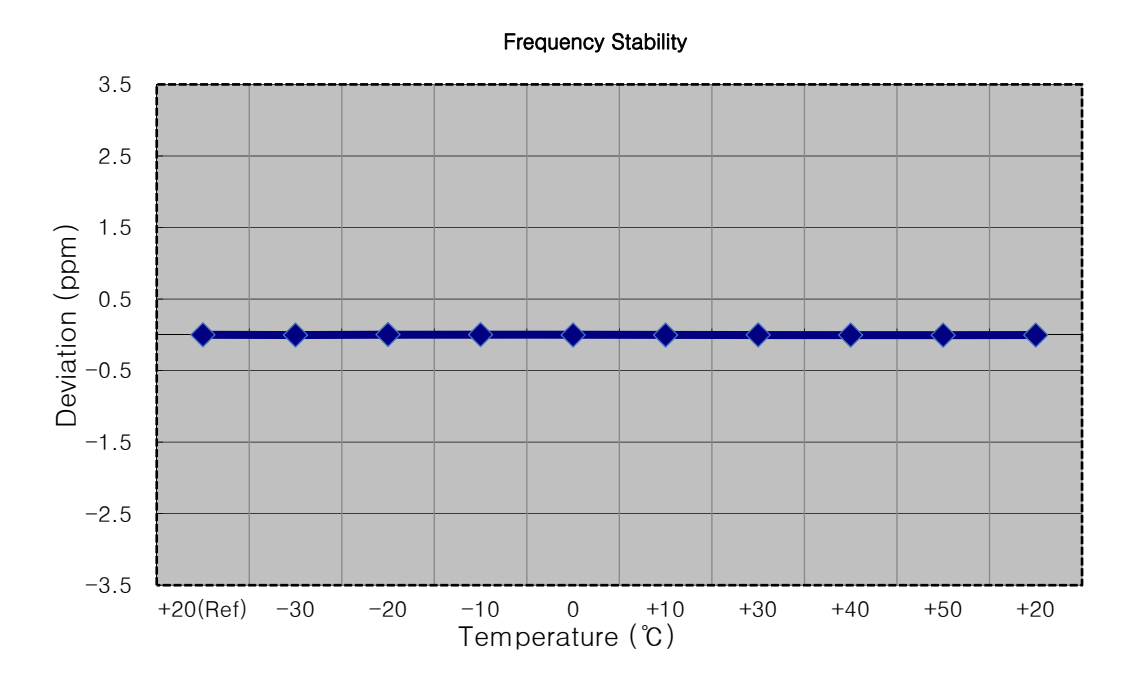
▣ OPERATING FREQUENCY: 700,500,000 Hz

▣ CHANNEL: 23025 (3 MHz)

▣ REFERENCE VOLTAGE: 3.850 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	Error (Hz)	(%)	
100 %	3.850	+20(Ref)	700 500 002	0.0	0.000 000	0.000
100 %		-30	700 500 000	-2.6	0.000 000	-0.004
100 %		-20	700 500 005	3.1	0.000 000	0.004
100 %		-10	700 500 004	1.6	0.000 000	0.002
100 %		0	700 500 000	-1.8	0.000 000	-0.003
100 %		+10	700 500 000	-2.2	0.000 000	-0.003
100 %		+30	700 500 001	-1.0	0.000 000	-0.001
100 %		+40	700 500 000	-2.2	0.000 000	-0.003
100 %		+50	700 499 999	-3.3	0.000 000	-0.005
Batt. Endpoint	3.400	+20	700 500 000	-2.6	0.000 000	-0.004



▣ MODE: LTE B12/17

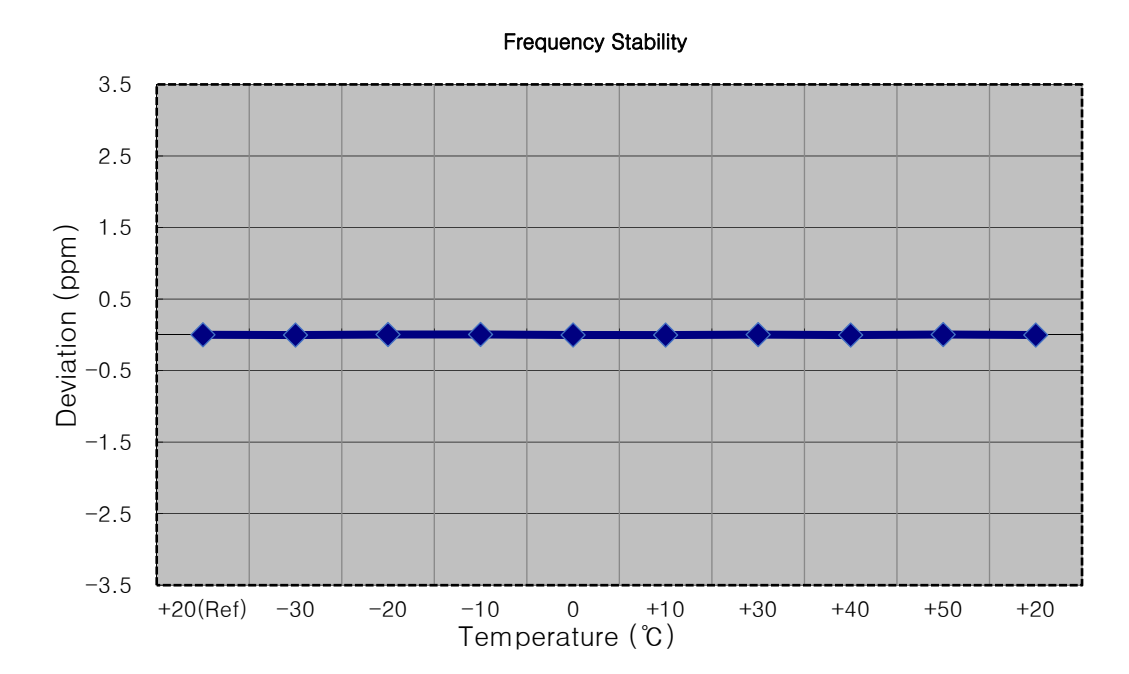
▣ OPERATING FREQUENCY: 701,500,000 Hz

▣ CHANNEL: 23035 (5 MHz)

▣ REFERENCE VOLTAGE: 3.850 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	Error (Hz)	(%)	
100 %	3.850	+20(Ref)	701 499 997	0.0	0.000 000	0.000
100 %		-30	701 499 995	-2.4	0.000 000	-0.003
100 %		-20	701 500 000	2.7	0.000 000	0.004
100 %		-10	701 500 001	3.4	0.000 000	0.005
100 %		0	701 499 995	-2.1	0.000 000	-0.003
100 %		+10	701 499 995	-2.4	0.000 000	-0.003
100 %		+30	701 499 999	1.7	0.000 000	0.002
100 %		+40	701 499 995	-2.5	0.000 000	-0.004
100 %		+50	701 500 000	2.5	0.000 000	0.004
Batt. Endpoint	3.400	+20	701 499 995	-2.2	0.000 000	-0.003



▣ MODE: LTE B12/17

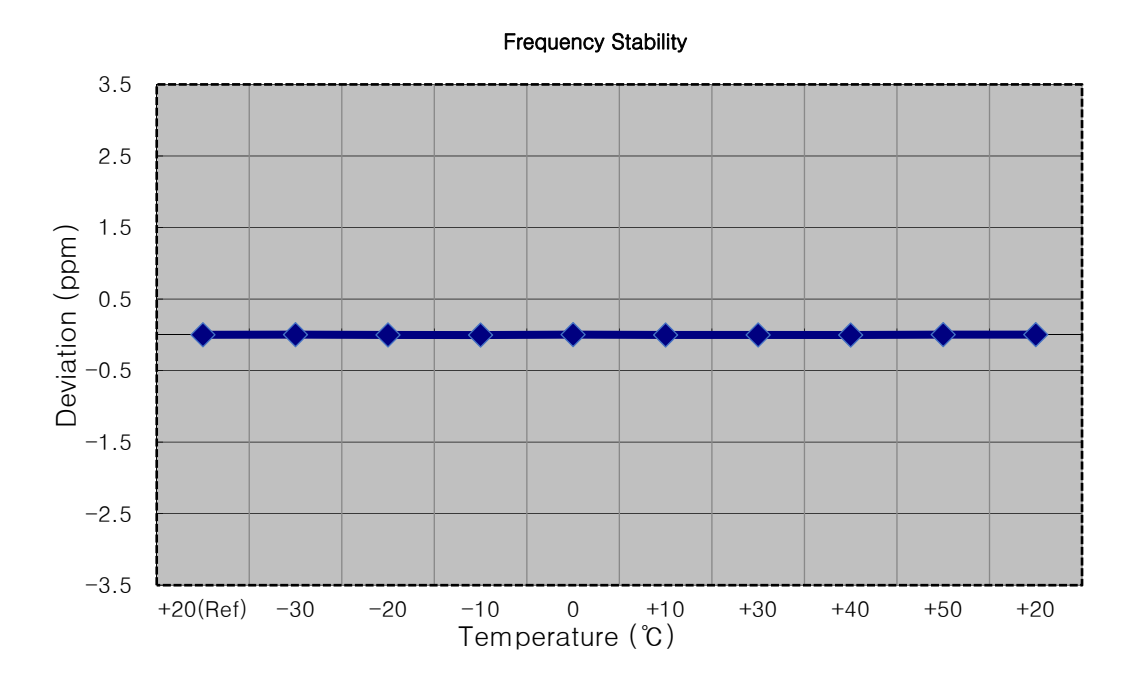
▣ OPERATING FREQUENCY: 704,000,000 Hz

▣ CHANNEL: 23060 (10 MHz)

▣ REFERENCE VOLTAGE: 3.850 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	Error (Hz)	(%)	
100 %	3.850	+20(Ref)	703 999 998	0.0	0.000 000	0.000
100 %		-30	704 000 000	1.5	0.000 000	0.002
100 %		-20	703 999 997	-1.5	0.000 000	-0.002
100 %		-10	703 999 996	-2.5	0.000 000	-0.004
100 %		0	704 000 000	1.7	0.000 000	0.002
100 %		+10	703 999 997	-1.8	0.000 000	-0.003
100 %		+30	703 999 997	-1.5	0.000 000	-0.002
100 %		+40	703 999 996	-2.3	0.000 000	-0.003
100 %		+50	704 000 000	1.6	0.000 000	0.002
Batt. Endpoint	3.400	+20	704 000 000	1.9	0.000 000	0.003



▣ MODE: LTE B12

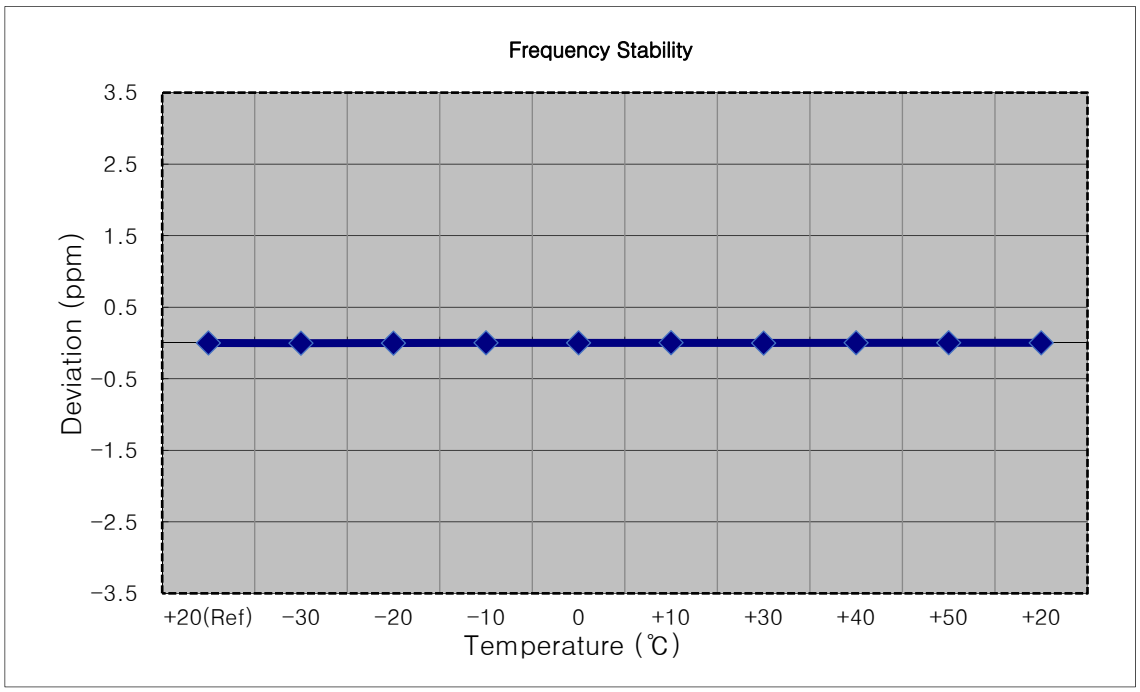
▣ OPERATING FREQUENCY: 707,500,000 Hz

▣ CHANNEL: 23095 (1.4 MHz)

▣ REFERENCE VOLTAGE: 3.850 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	Error (Hz)	(%)	
100 %	3.850	+20(Ref)	707 499 998	0.0	0.000 000	0.000
100 %		-30	707 499 996	-2.1	0.000 000	-0.003
100 %		-20	707 499 996	-1.9	0.000 000	-0.003
100 %		-10	707 500 000	1.6	0.000 000	0.002
100 %		0	707 499 999	1.1	0.000 000	0.002
100 %		+10	707 500 001	2.7	0.000 000	0.004
100 %		+30	707 499 997	-1.5	0.000 000	-0.002
100 %		+40	707 500 000	2.0	0.000 000	0.003
100 %		+50	707 500 000	2.1	0.000 000	0.003
Batt. Endpoint	3.400	+20	707 500 000	1.4	0.000 000	0.002



▣ MODE: LTE B12

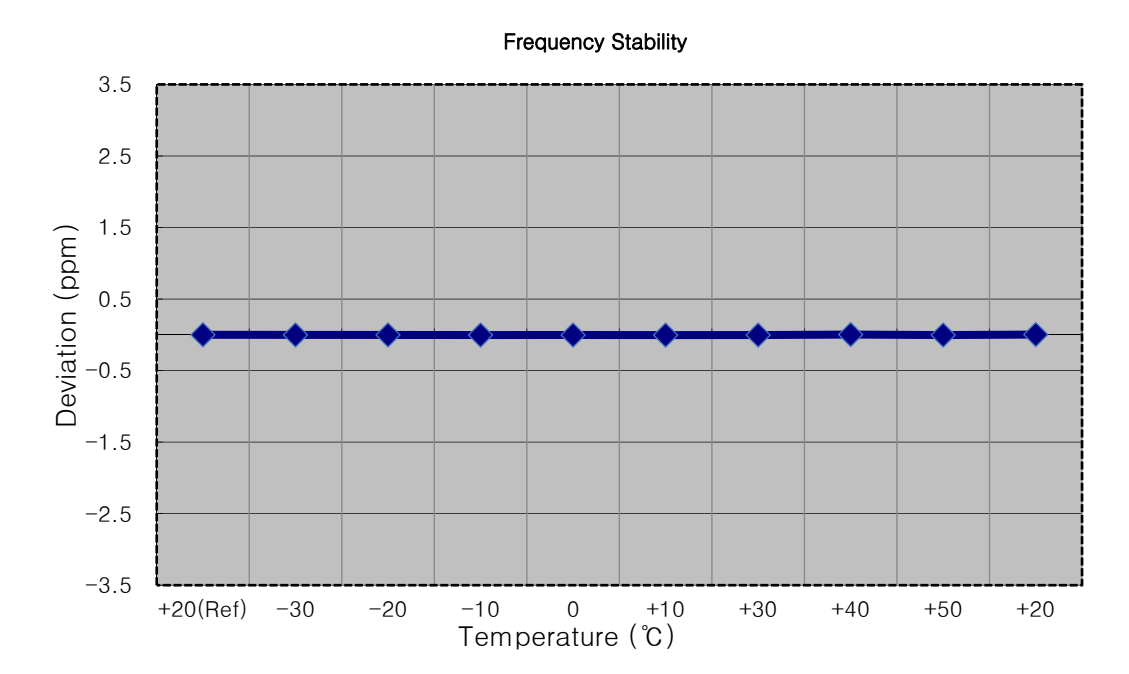
▣ OPERATING FREQUENCY: 707,500,000 Hz

▣ CHANNEL: 23095 (3 MHz)

▣ REFERENCE VOLTAGE: 3.850 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	Error (Hz)	(%)	
100 %	3.850	+20(Ref)	707 500 002	0.0	0.000 000	0.000
100 %		-30	707 500 001	-1.3	0.000 000	-0.002
100 %		-20	707 500 001	-1.4	0.000 000	-0.002
100 %		-10	707 500 000	-2.6	0.000 000	-0.004
100 %		0	707 500 000	-2.2	0.000 000	-0.003
100 %		+10	707 500 000	-2.8	0.000 000	-0.004
100 %		+30	707 500 000	-2.4	0.000 000	-0.003
100 %		+40	707 500 005	2.5	0.000 000	0.004
100 %		+50	707 500 000	-2.4	0.000 000	-0.003
Batt. Endpoint	3.400	+20	707 500 005	2.1	0.000 000	0.003



▣ MODE: LTE B12/17

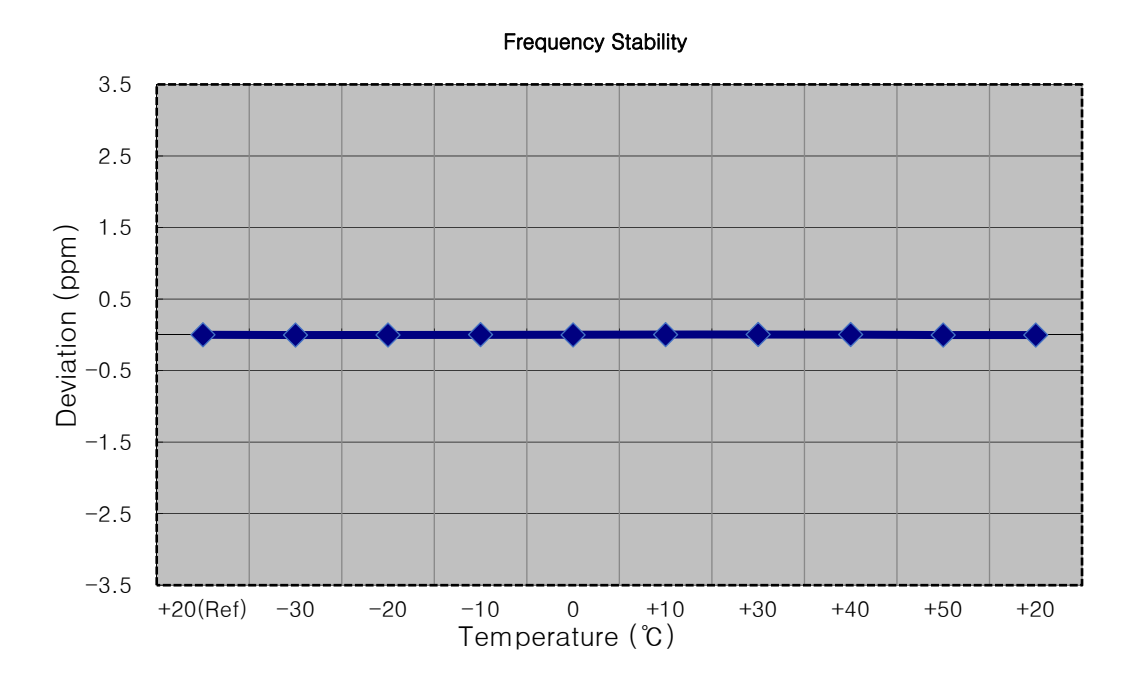
▣ OPERATING FREQUENCY: 707,500,000 Hz

▣ CHANNEL: 23095 (5 MHz)

▣ REFERENCE VOLTAGE: 3.850 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	Error (Hz)	(%)	
100 %	3.850	+20(Ref)	707 500 002	0.0	0.000 000	0.000
100 %		-30	707 500 000	-2.6	0.000 000	-0.004
100 %		-20	707 500 001	-1.8	0.000 000	-0.003
100 %		-10	707 500 004	1.8	0.000 000	0.003
100 %		0	707 500 001	-1.5	0.000 000	-0.002
100 %		+10	707 500 004	2.0	0.000 000	0.003
100 %		+30	707 500 006	3.5	0.000 000	0.005
100 %		+40	707 500 005	2.8	0.000 000	0.004
100 %		+50	707 500 000	-2.4	0.000 000	-0.003
Batt. Endpoint	3.400	+20	707 500 000	-2.6	0.000 000	-0.004



▣ MODE: LTE B12/17

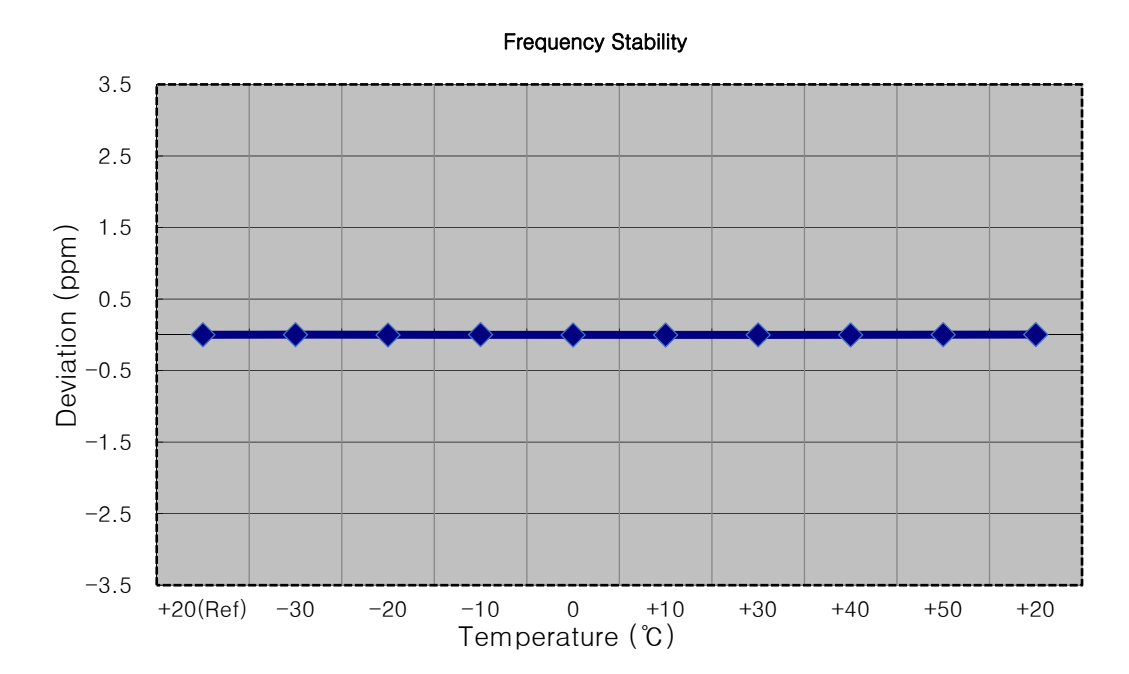
▣ OPERATING FREQUENCY: 707,500,000 Hz

▣ CHANNEL: 23095 (10 MHz)

▣ REFERENCE VOLTAGE: 3.850 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	Error (Hz)	(%)	
100 %	3.850	+20(Ref)	707 500 002	0.0	0.000 000	0.000
100 %		-30	707 500 003	1.5	0.000 000	0.002
100 %		-20	707 500 000	-1.8	0.000 000	-0.003
100 %		-10	707 500 004	1.7	0.000 000	0.002
100 %		0	707 500 000	-2.1	0.000 000	-0.003
100 %		+10	707 500 000	-1.8	0.000 000	-0.003
100 %		+30	707 500 001	-0.8	0.000 000	-0.001
100 %		+40	707 500 001	-1.3	0.000 000	-0.002
100 %		+50	707 500 003	1.3	0.000 000	0.002
Batt. Endpoint	3.400	+20	707 500 004	2.1	0.000 000	0.003



▣ MODE: LTE B12

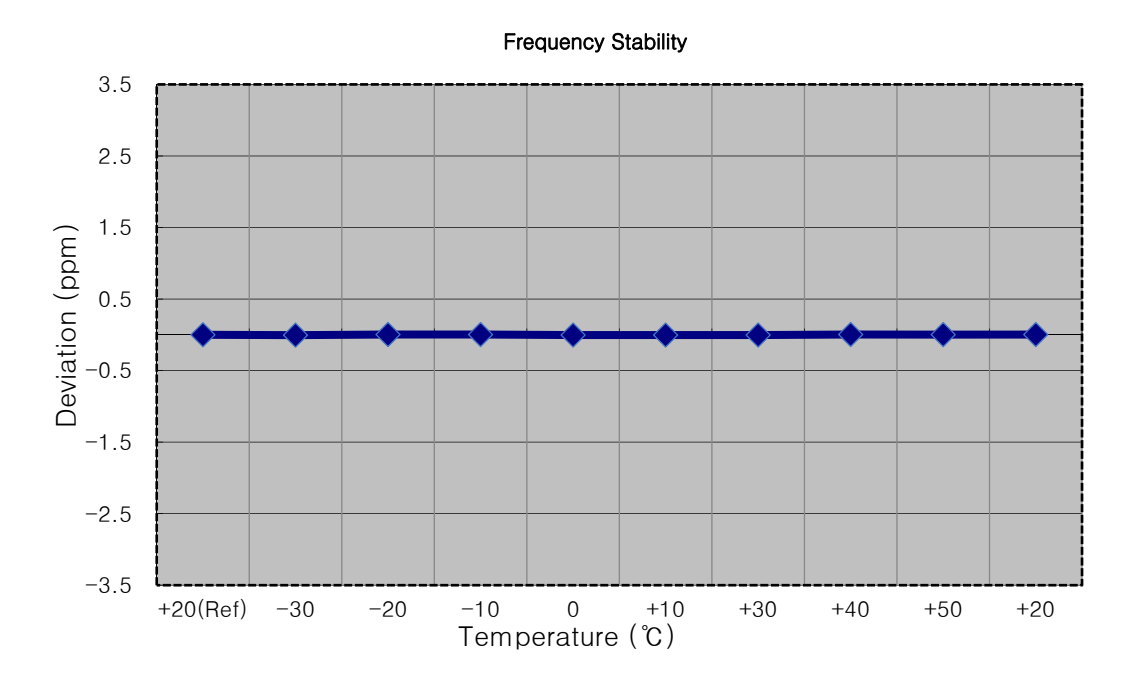
▣ OPERATING FREQUENCY: 715,300,000 Hz

▣ CHANNEL: 23173 (1.4 MHz)

▣ REFERENCE VOLTAGE: 3.850 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	Error (Hz)	(%)	
100 %	3.850	+20(Ref)	715 300 002	0.0	0.000 000	0.000
100 %		-30	715 299 999	-3.3	0.000 000	-0.005
100 %		-20	715 300 005	2.7	0.000 000	0.004
100 %		-10	715 300 005	2.6	0.000 000	0.004
100 %		0	715 299 999	-2.5	0.000 000	-0.003
100 %		+10	715 299 999	-2.5	0.000 000	-0.003
100 %		+30	715 299 999	-2.5	0.000 000	-0.003
100 %		+40	715 300 005	3.0	0.000 000	0.004
100 %		+50	715 300 004	1.7	0.000 000	0.002
Batt. Endpoint	3.400	+20	715 300 004	2.2	0.000 000	0.003



▣ MODE: LTE B12

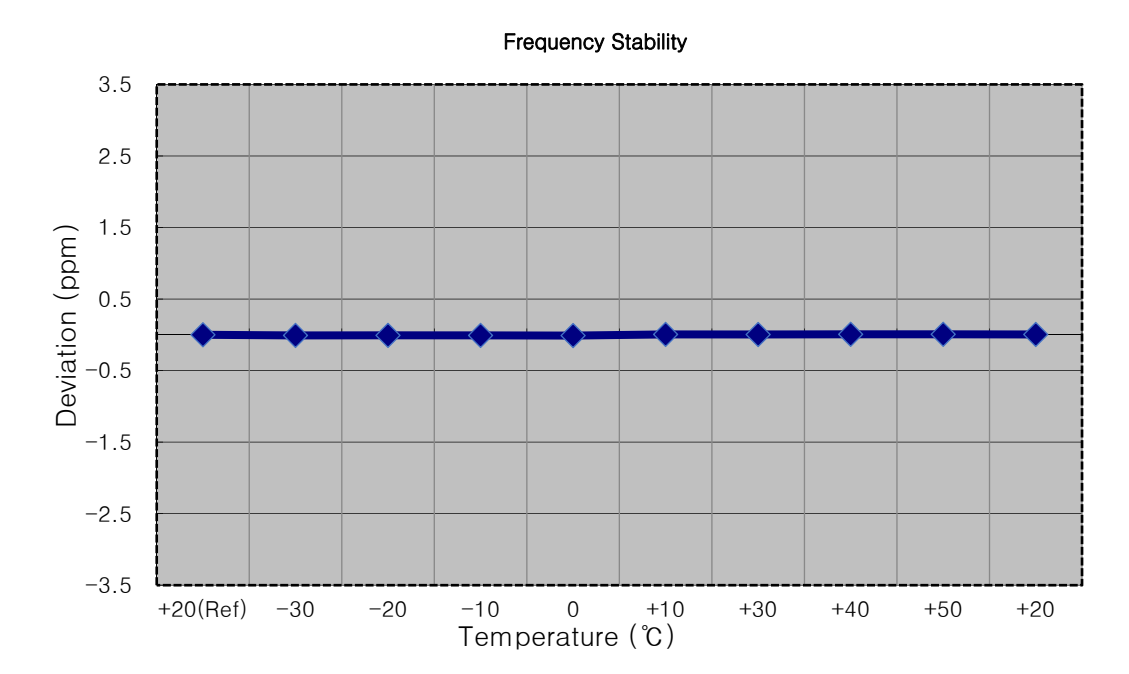
▣ OPERATING FREQUENCY: 714,500,000 Hz

▣ CHANNEL: 23165 (3 MHz)

▣ REFERENCE VOLTAGE: 3.850 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	Error (Hz)	(%)	
100 %	3.850	+20(Ref)	714 499 992	0.0	0.000 000	0.000
100 %		-30	714 499 986	-6.2	-0.000 001	-0.009
100 %		-20	714 499 986	-5.5	-0.000 001	-0.008
100 %		-10	714 499 986	-6.0	-0.000 001	-0.008
100 %		0	714 499 984	-8.0	-0.000 001	-0.011
100 %		+10	714 499 996	3.9	0.000 001	0.005
100 %		+30	714 499 995	3.1	0.000 000	0.004
100 %		+40	714 499 997	4.8	0.000 001	0.007
100 %		+50	714 499 997	5.2	0.000 001	0.007
Batt. Endpoint	3.400	+20	714 499 995	3.2	0.000 000	0.004



▣ MODE: LTE B12/17

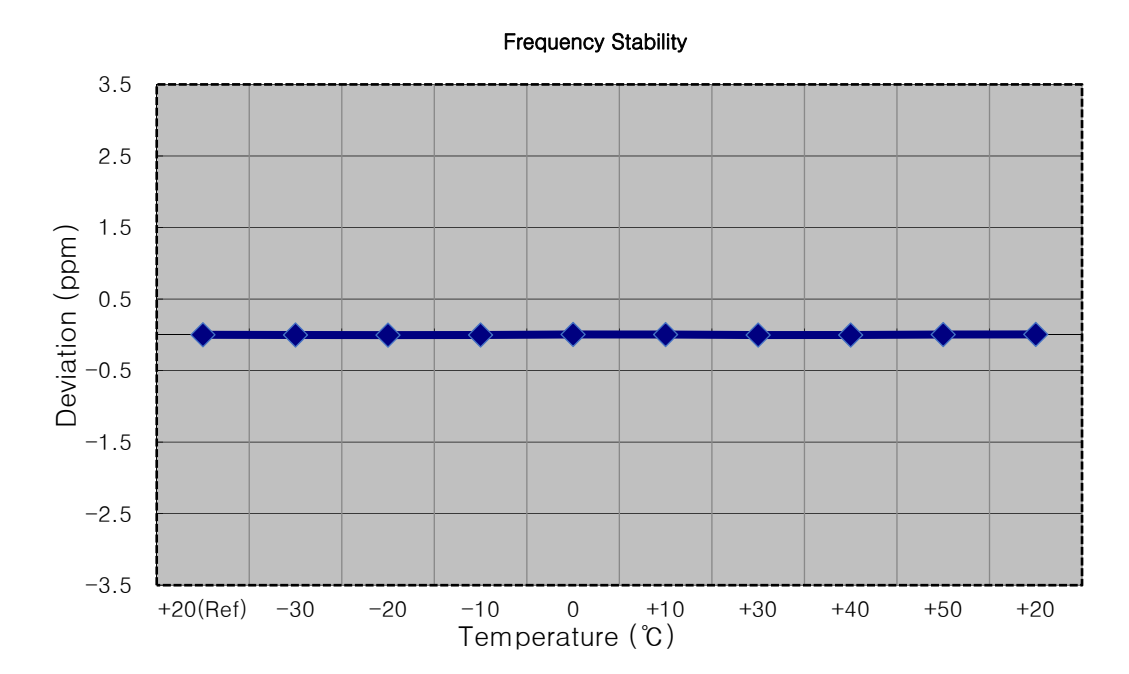
▣ OPERATING FREQUENCY: 713,500,000 Hz

▣ CHANNEL: 23155 (5 MHz)

▣ REFERENCE VOLTAGE: 3.850 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	Error (Hz)	(%)	
100 %	3.850	+20(Ref)	713 499 997	0.0	0.000 000	0.000
100 %		-30	713 499 995	-1.9	0.000 000	-0.003
100 %		-20	713 499 994	-3.1	0.000 000	-0.004
100 %		-10	713 499 995	-2.1	0.000 000	-0.003
100 %		0	713 500 000	3.3	0.000 000	0.005
100 %		+10	713 499 999	2.5	0.000 000	0.004
100 %		+30	713 499 994	-2.5	0.000 000	-0.004
100 %		+40	713 499 994	-2.3	0.000 000	-0.003
100 %		+50	713 499 999	2.5	0.000 000	0.004
Batt. Endpoint	3.400	+20	713 500 000	3.8	0.000 001	0.005



▣ MODE: LTE B12/17

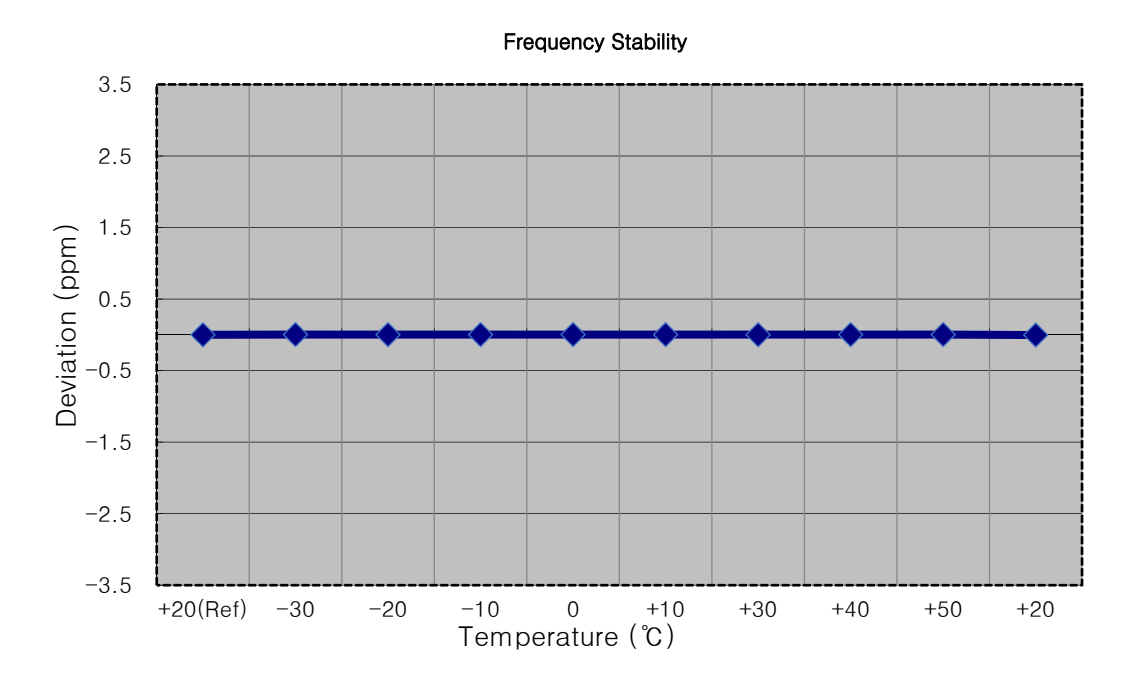
▣ OPERATING FREQUENCY: 711,000,000 Hz

▣ CHANNEL: 23130 (10 MHz)

▣ REFERENCE VOLTAGE: 3.850 VDC

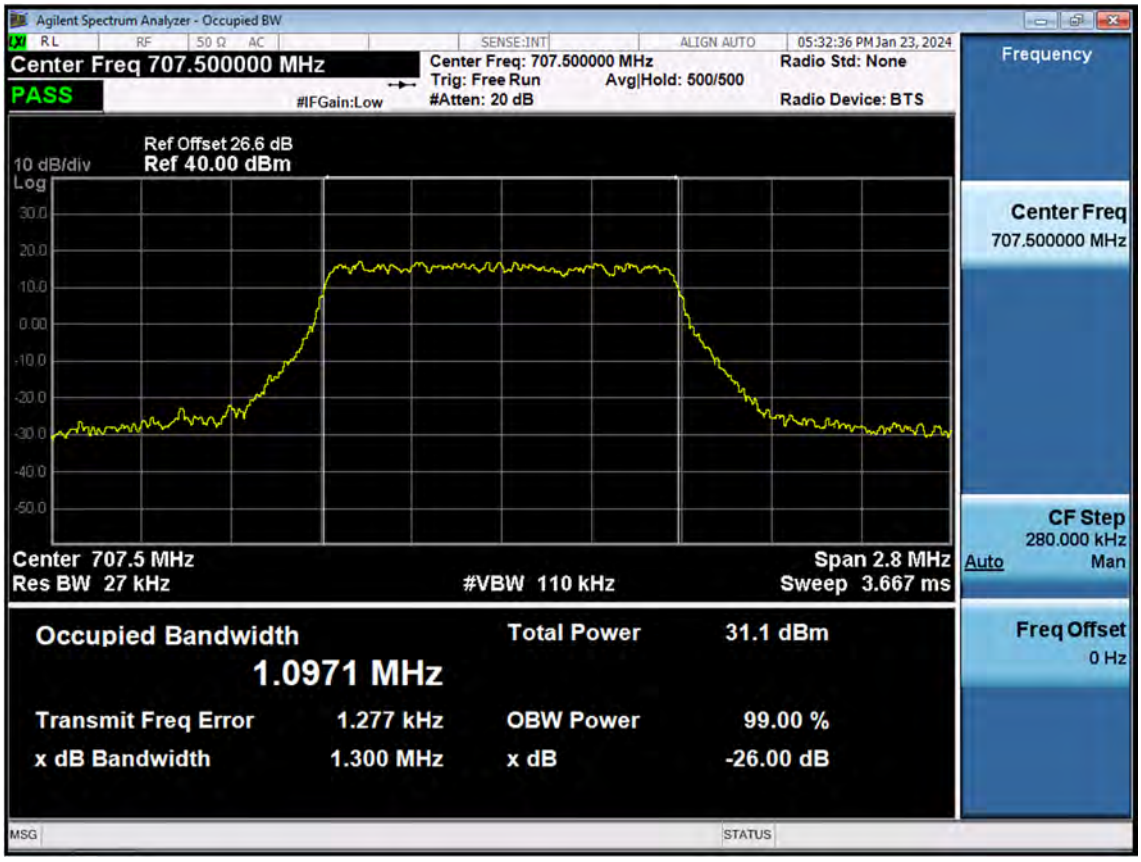
▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	Error (Hz)	(%)	
100 %	3.850	+20(Ref)	711 000 003	0.0	0.000 000	0.000
100 %		-30	711 000 006	2.2	0.000 000	0.003
100 %		-20	711 000 005	1.7	0.000 000	0.002
100 %		-10	711 000 005	1.8	0.000 000	0.003
100 %		0	711 000 006	2.4	0.000 000	0.003
100 %		+10	711 000 005	2.0	0.000 000	0.003
100 %		+30	711 000 004	1.0	0.000 000	0.001
100 %		+40	711 000 005	1.9	0.000 000	0.003
100 %		+50	711 000 006	2.6	0.000 000	0.004
Batt. Endpoint	3.400	+20	711 000 001	-2.6	0.000 000	-0.004

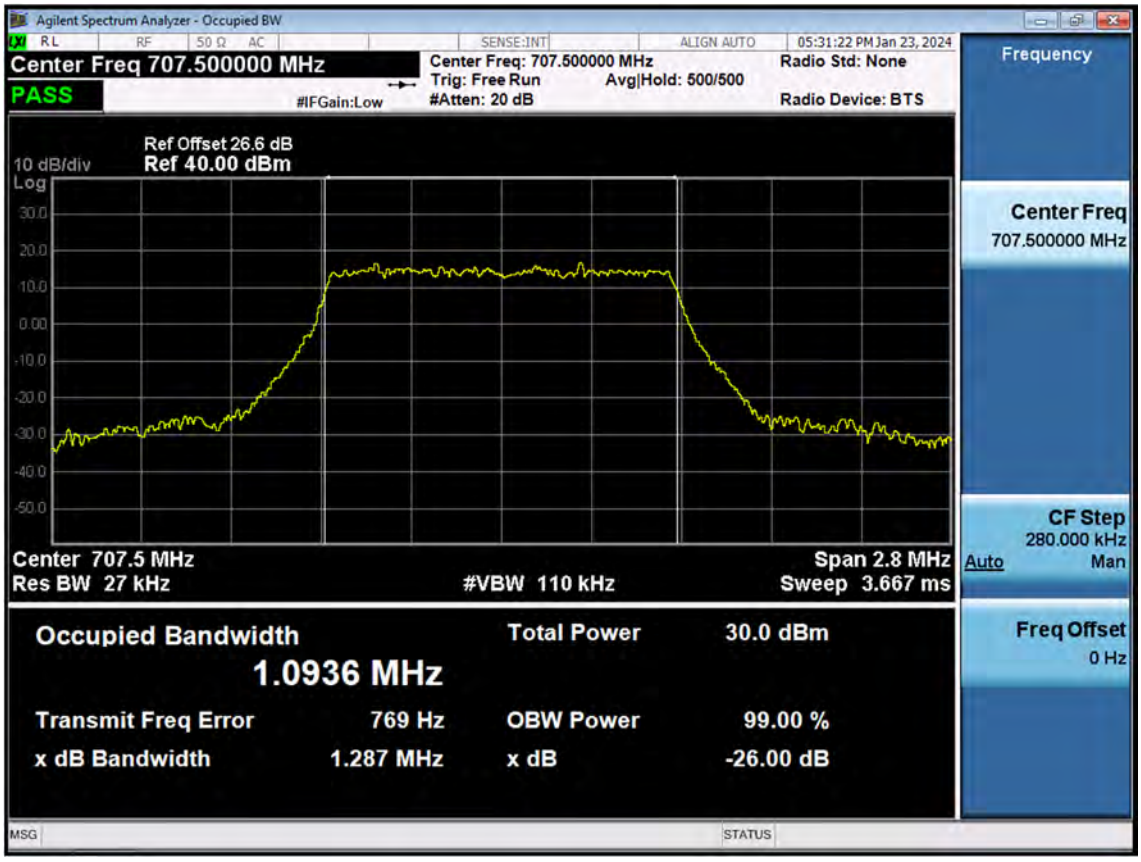


9. TEST PLOTS

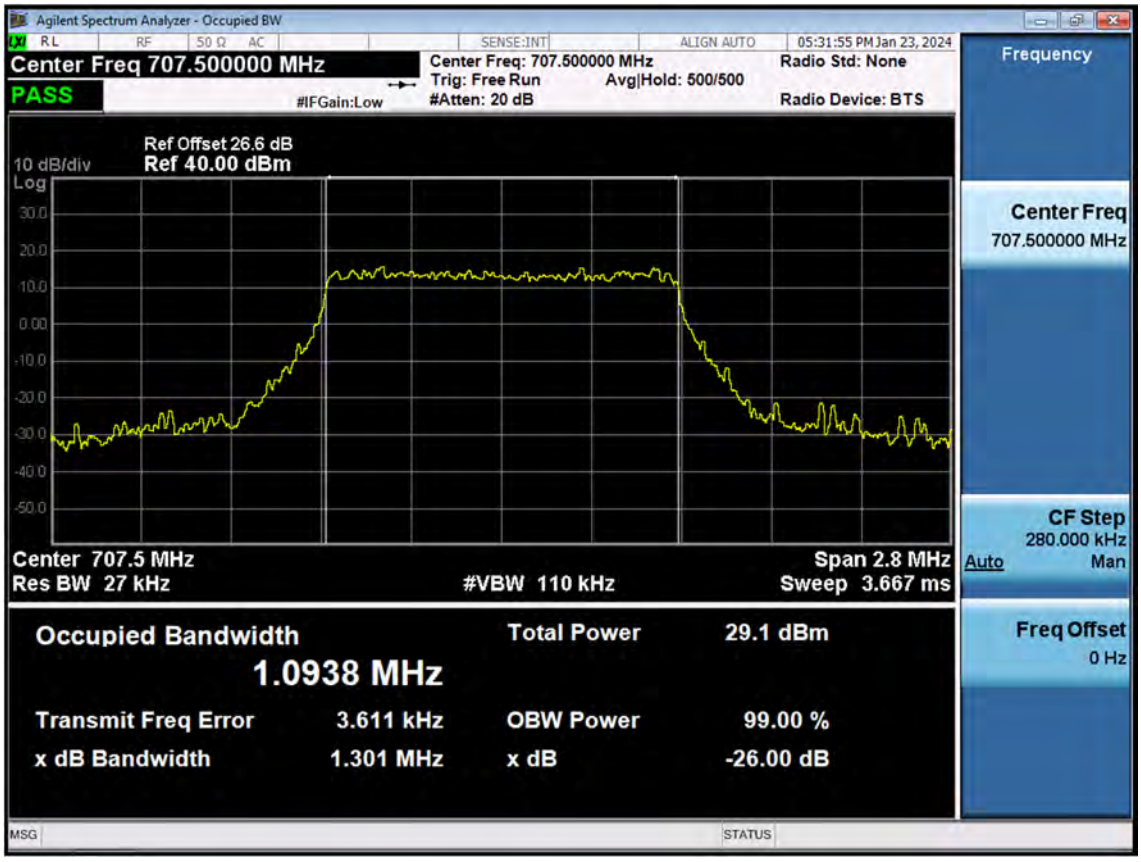
BAND 12. Occupied Bandwidth Plot (1.4 M BW Ch.23095 QPSK_RB6_0)



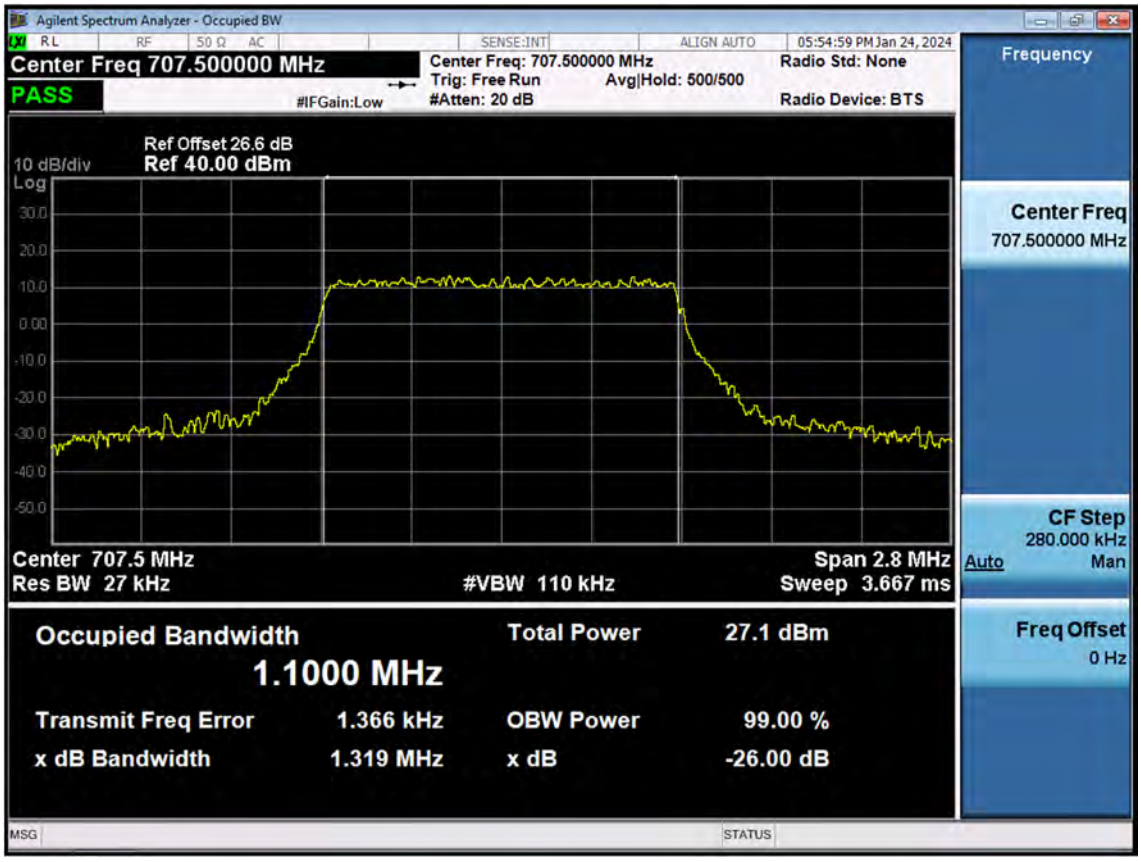
BAND 12. Occupied Bandwidth Plot (1.4 M BW Ch.23095 16QAM_RB6_0)



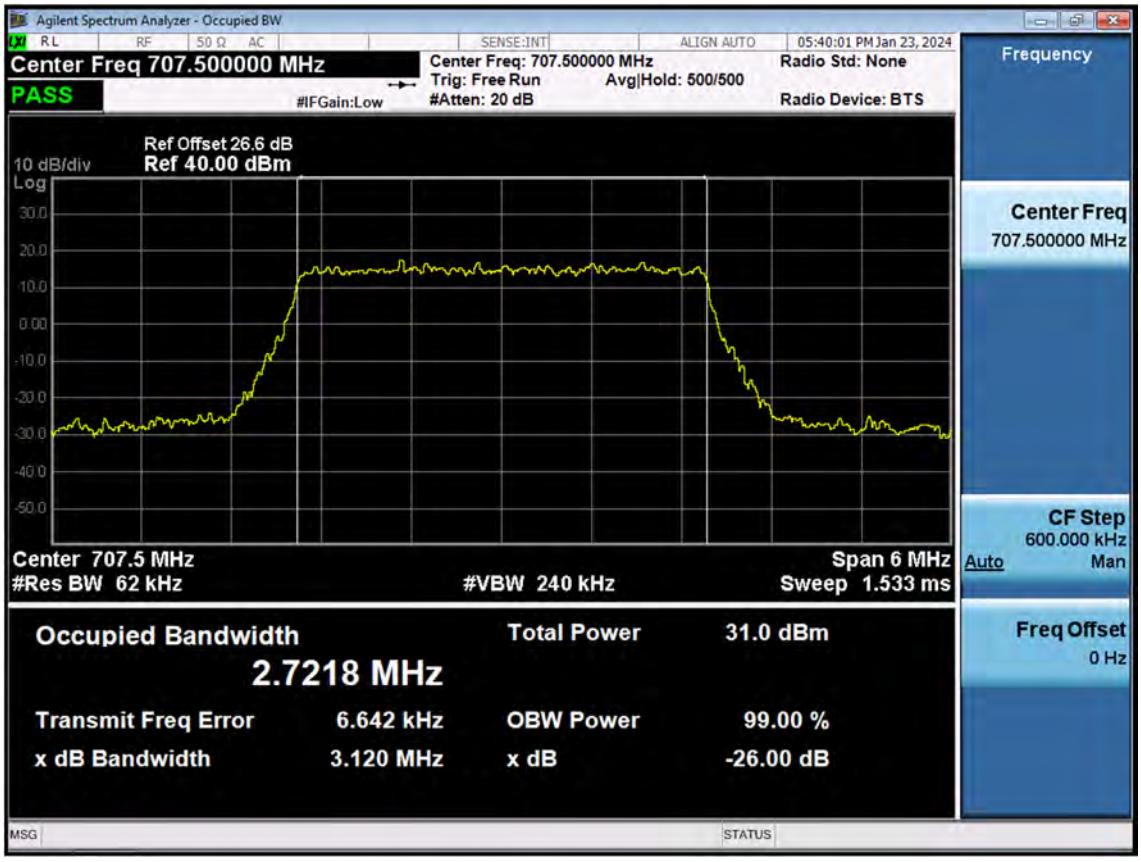
BAND 12. Occupied Bandwidth Plot (1.4 M BW Ch.23095 64QAM_RB6_0)



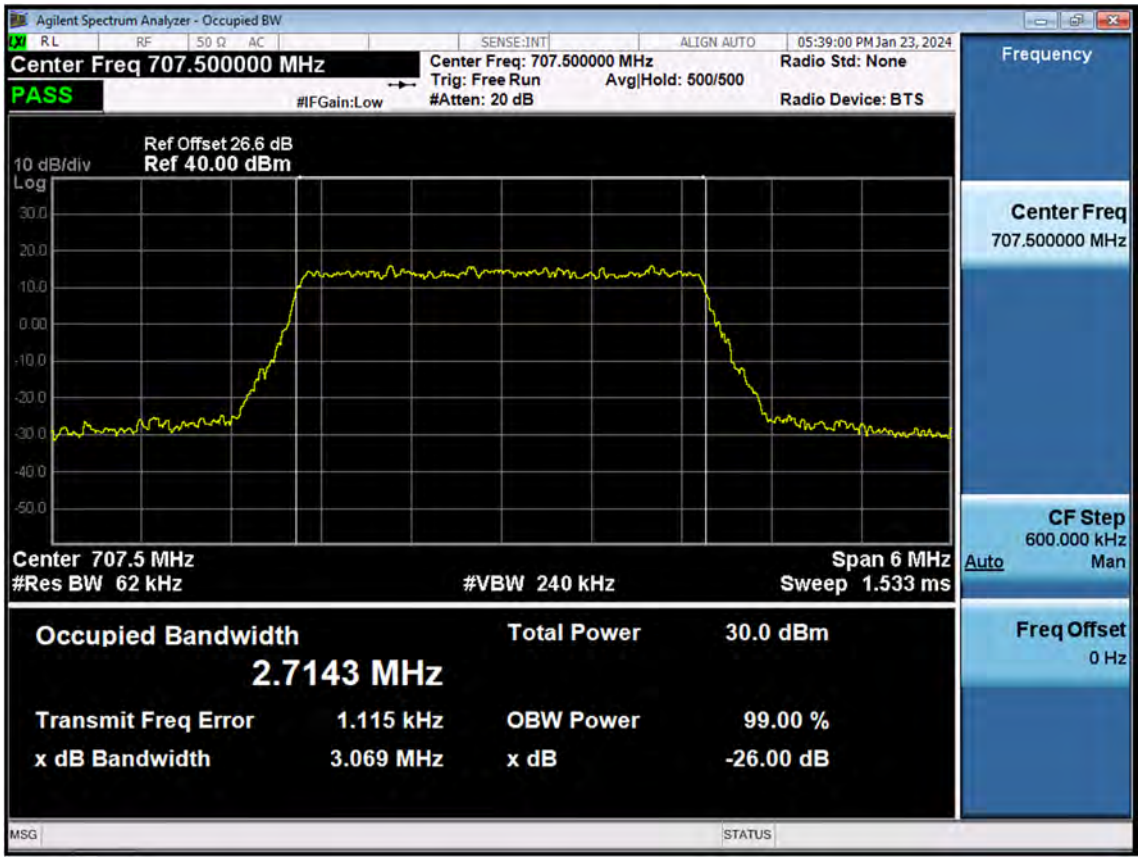
BAND 12. Occupied Bandwidth Plot (1.4 M BW Ch.23095 256QAM_RB6_0)



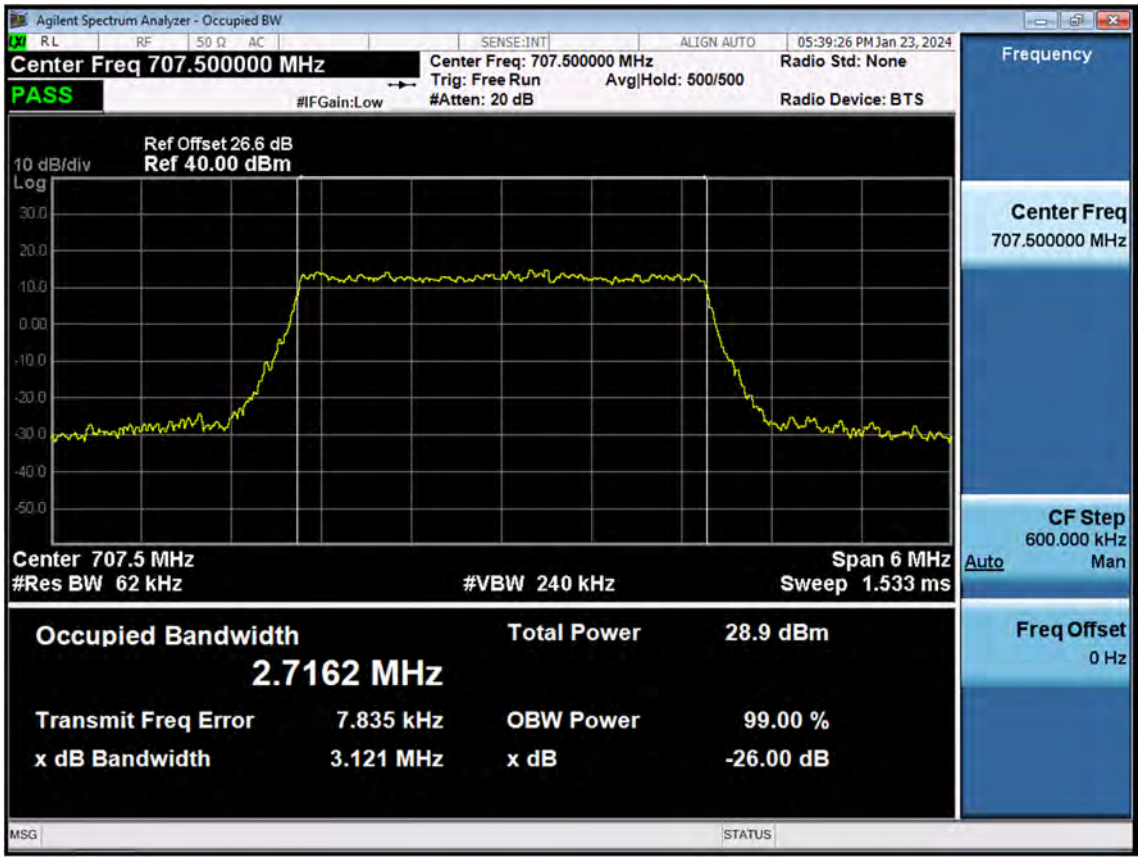
BAND 12. Occupied Bandwidth Plot (3 M BW Ch.23095 QPSK_RB15_0)



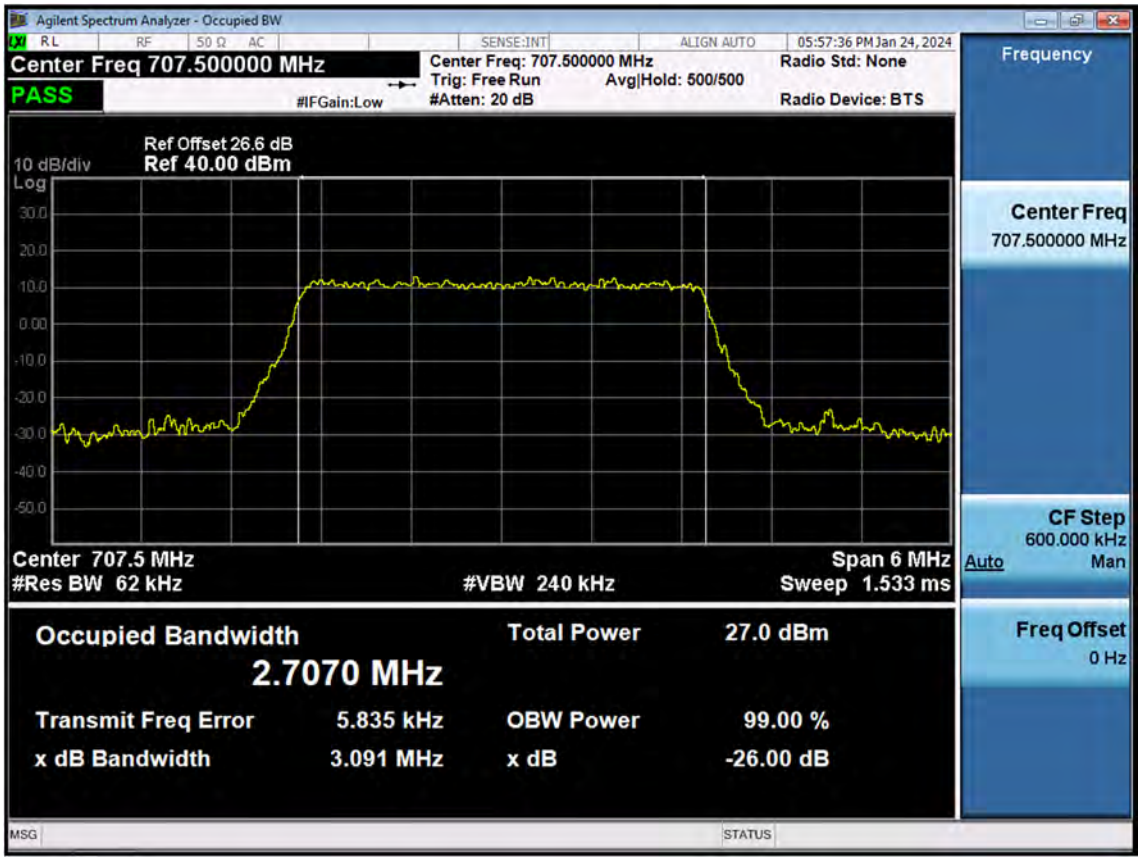
BAND 12. Occupied Bandwidth Plot (3 M BW Ch.23095 16QAM_RB15_0)



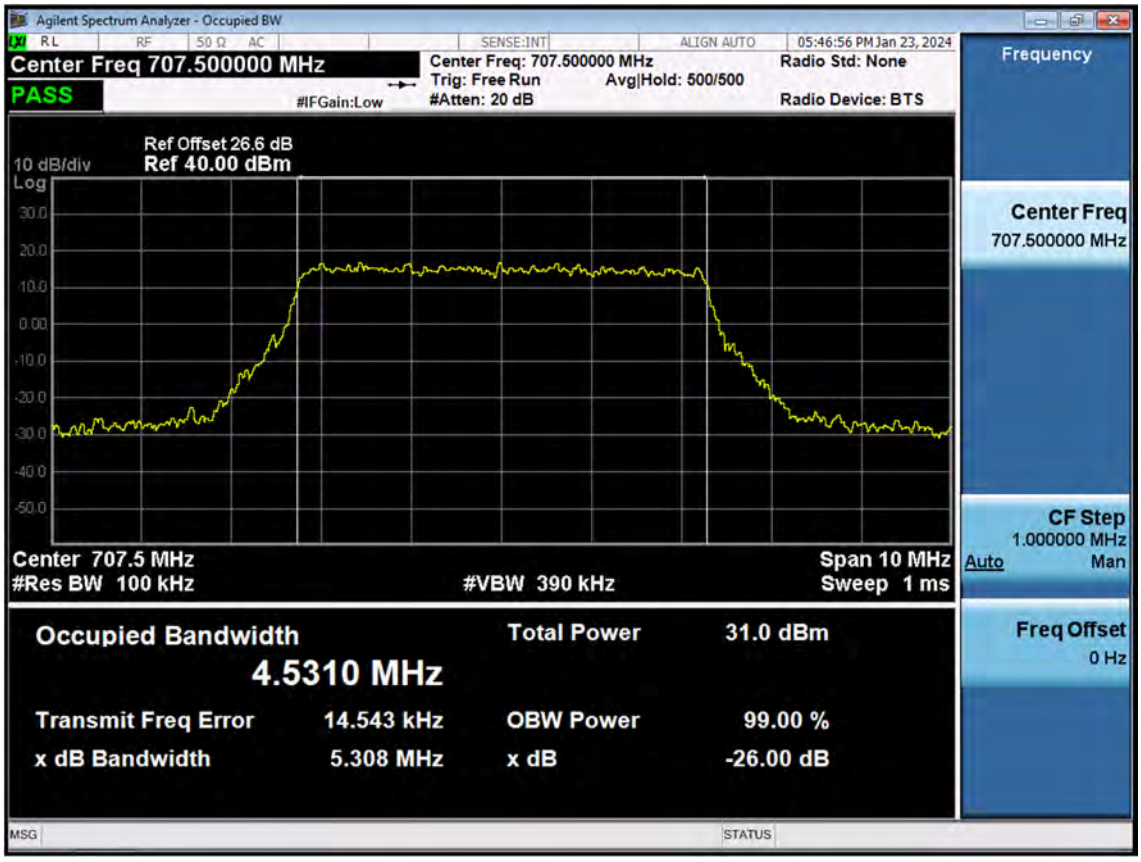
BAND 12. Occupied Bandwidth Plot (3 M BW Ch.23095 64QAM_RB15_0)



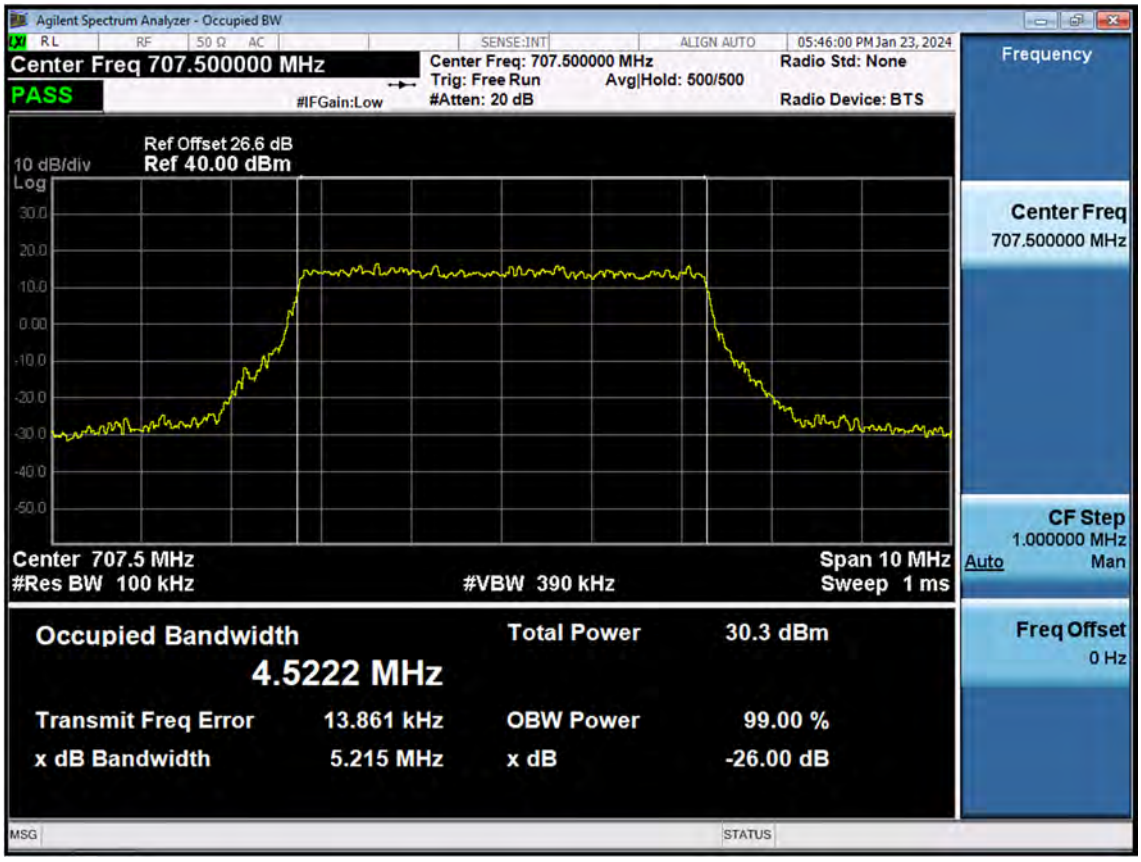
BAND 12. Occupied Bandwidth Plot (3 M BW Ch.23095 256QAM_RB15_0)



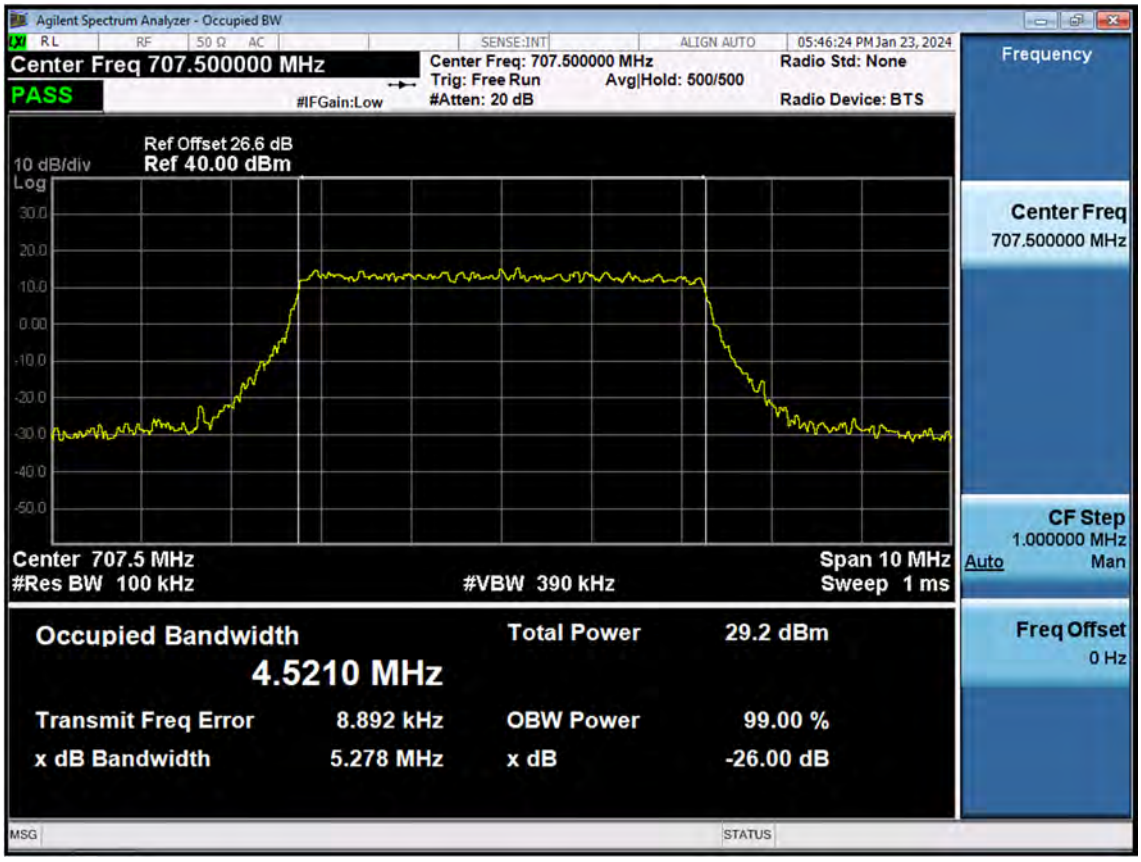
BAND 12/17. Occupied Bandwidth Plot (5 M BW Ch.23095 QPSK_RB25_0)



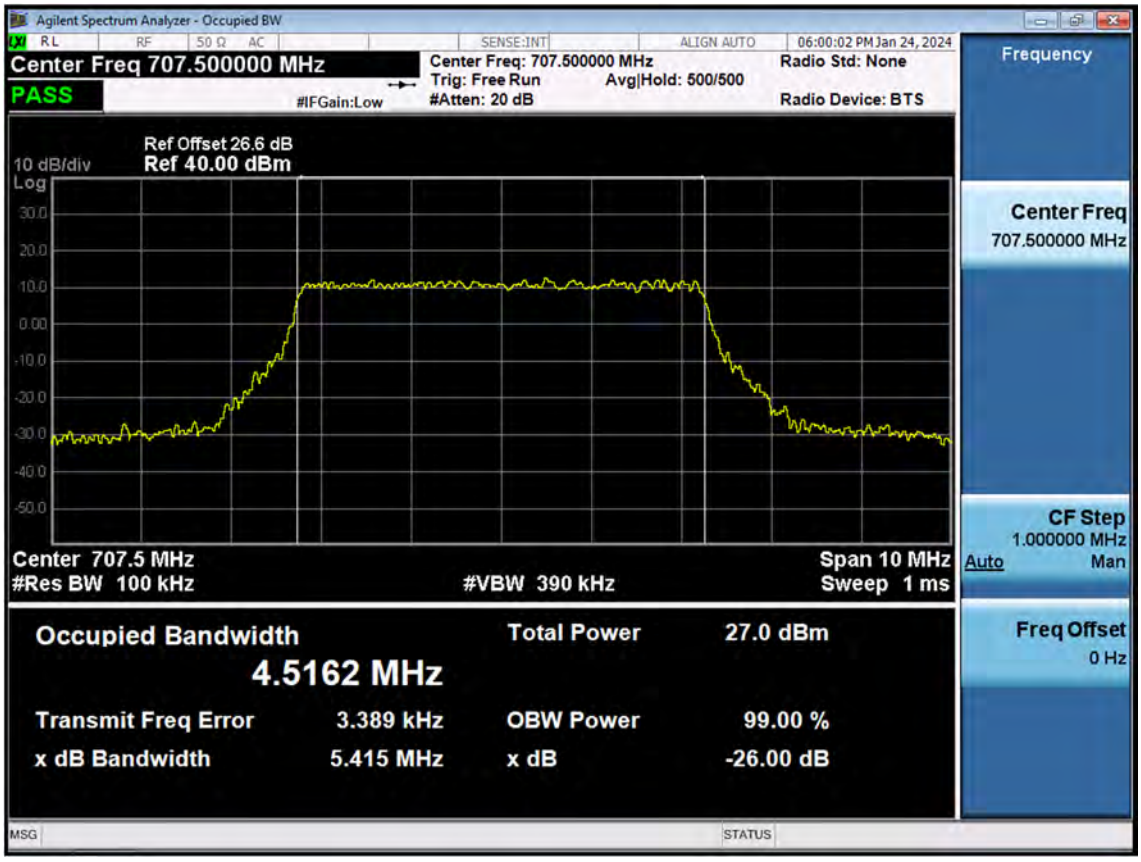
BAND 12/17. Occupied Bandwidth Plot (5 M BW Ch.23095 16QAM_RB25_0)



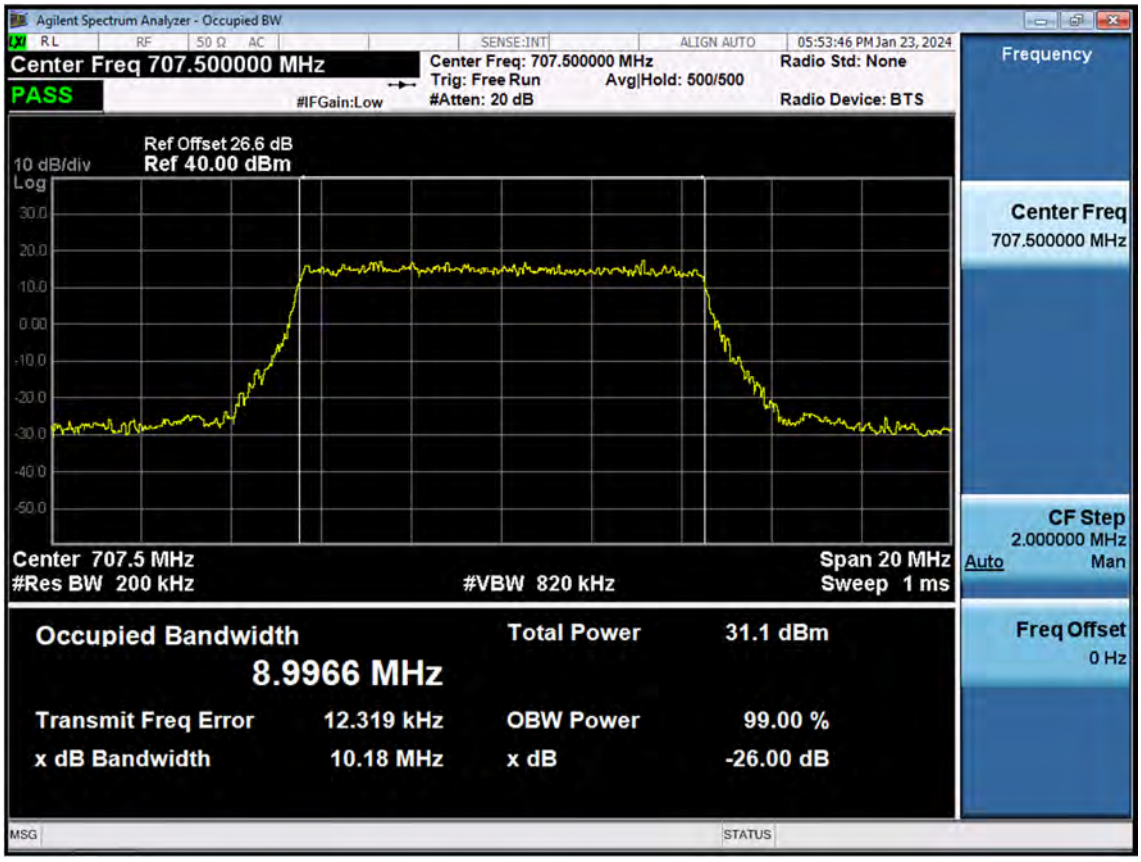
BAND 12/17. Occupied Bandwidth Plot (5 M BW Ch.23095 64QAM_RB25_0)



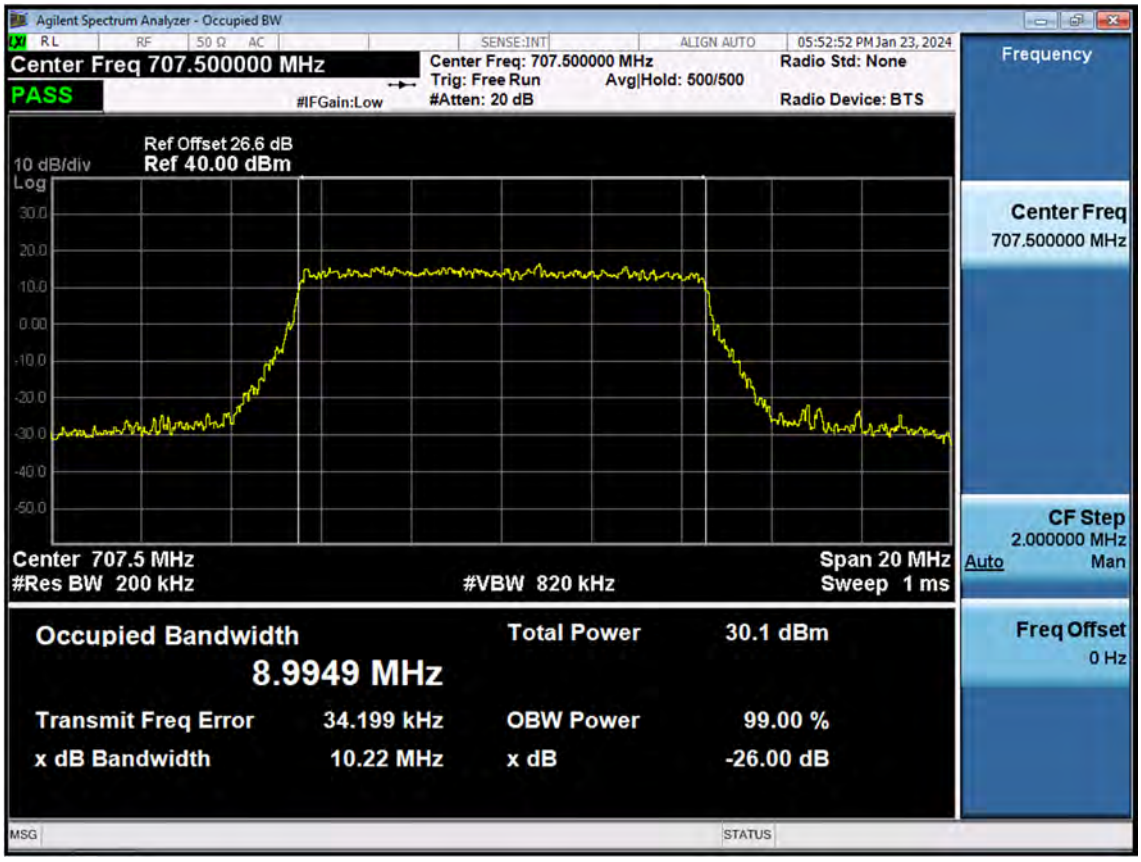
BAND 12/17. Occupied Bandwidth Plot (5 M BW Ch.23095 256QAM_RB25_0)



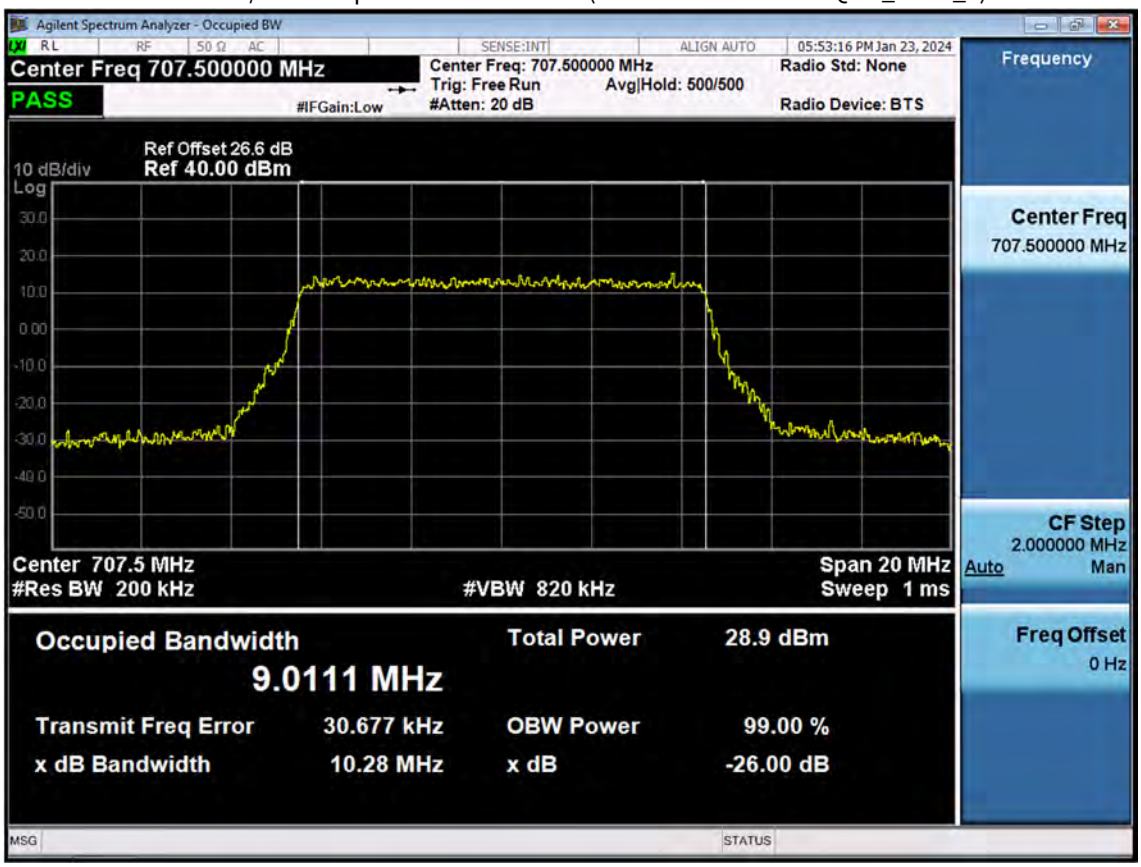
BAND 12/17. Occupied Bandwidth Plot (10 M BW Ch.23095 QPSK_RB50_0)



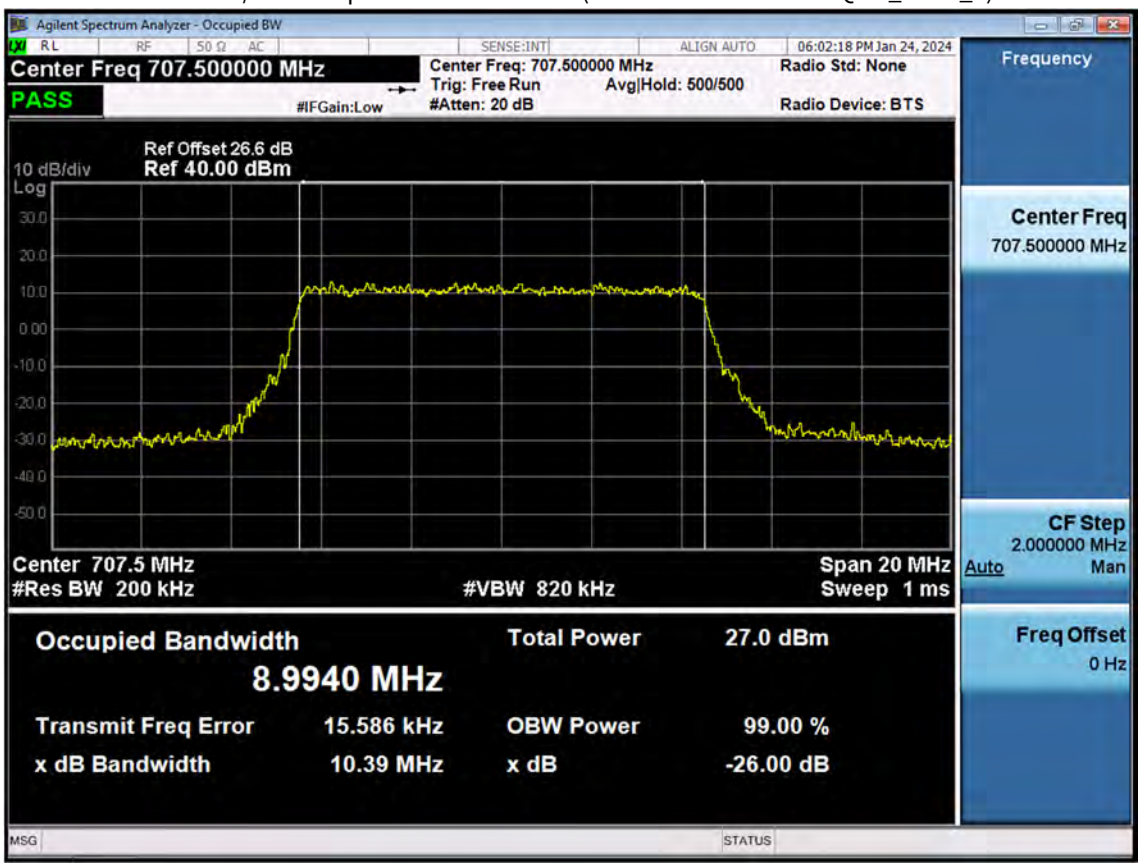
BAND 12/17. Occupied Bandwidth Plot (10 M BW Ch.23095 16QAM_RB50_0)



BAND 12/17. Occupied Bandwidth Plot (10 M BW Ch.23095 64QAM_RB50_0)



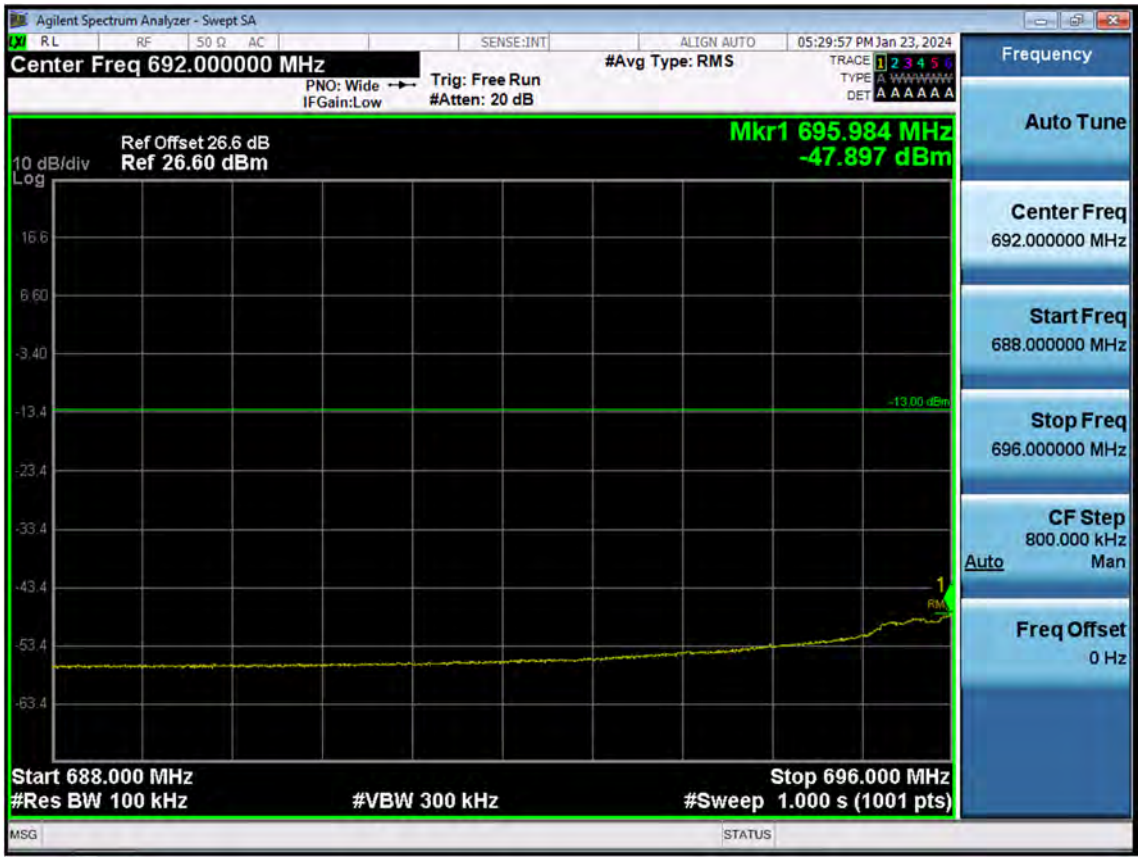
BAND 12/17. Occupied Bandwidth Plot (10 M BW Ch.23095 256QAM_RB50_0)



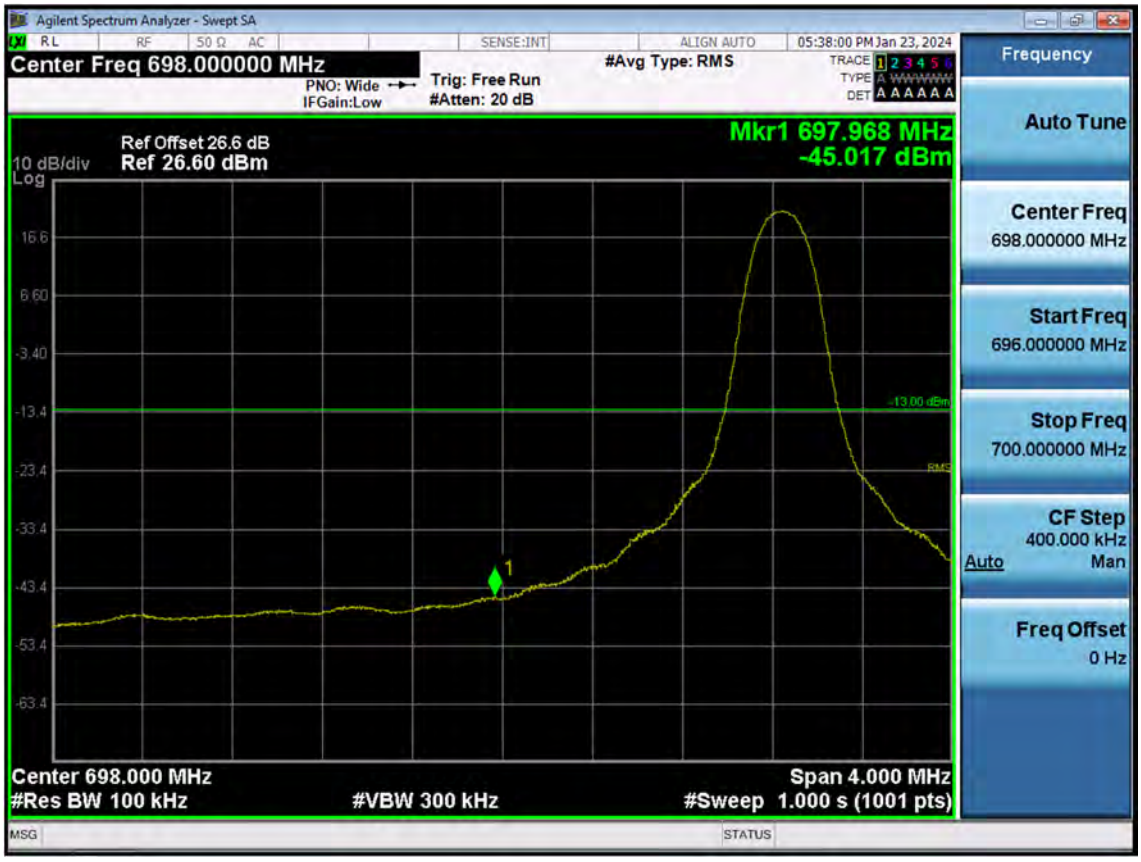
BAND 12. Lower Band Edge Plot (1.4 M BW Ch.23017 QPSK_RB1_Offset 0)

BAND 12. Lower Band Edge Plot (1.4 M BW Ch.23017 QPSK_RB6_Offset 0)

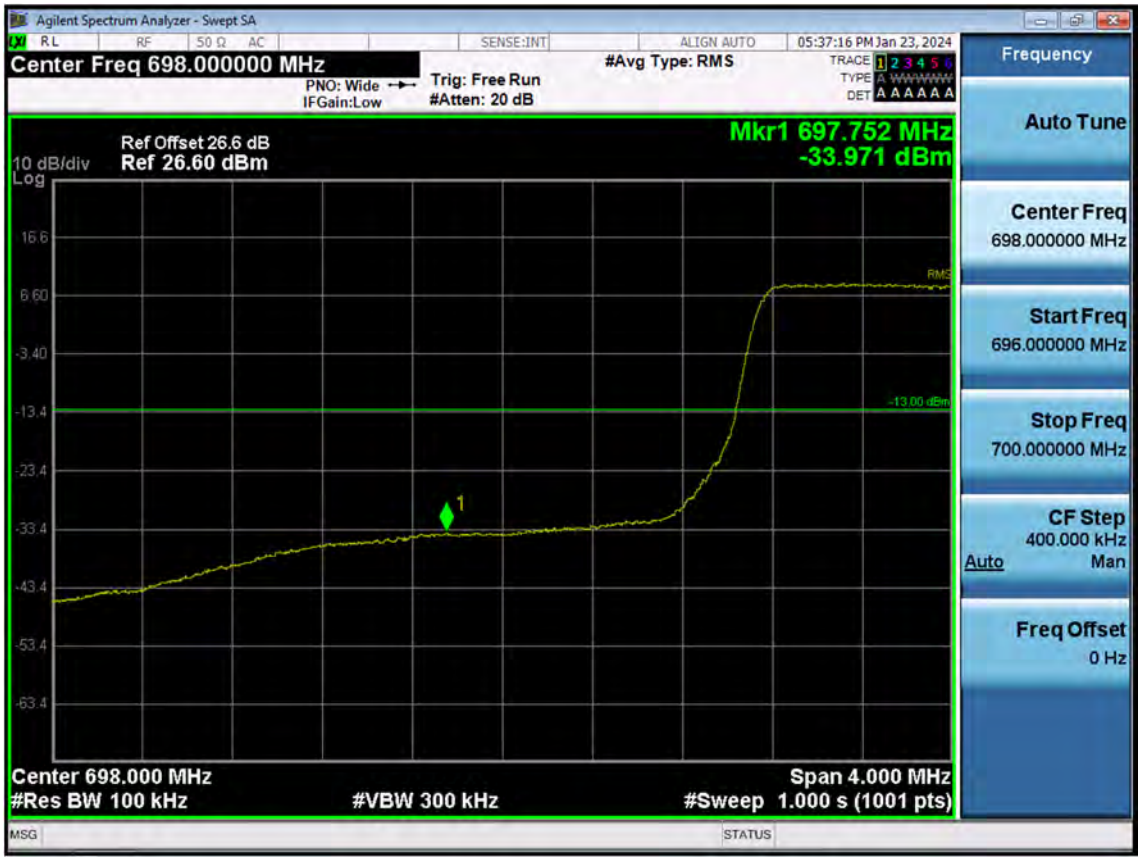
BAND 12. Lower Extended Band Edge Plot (1.4 M BW Ch.23017 QPSK_RB6_0)



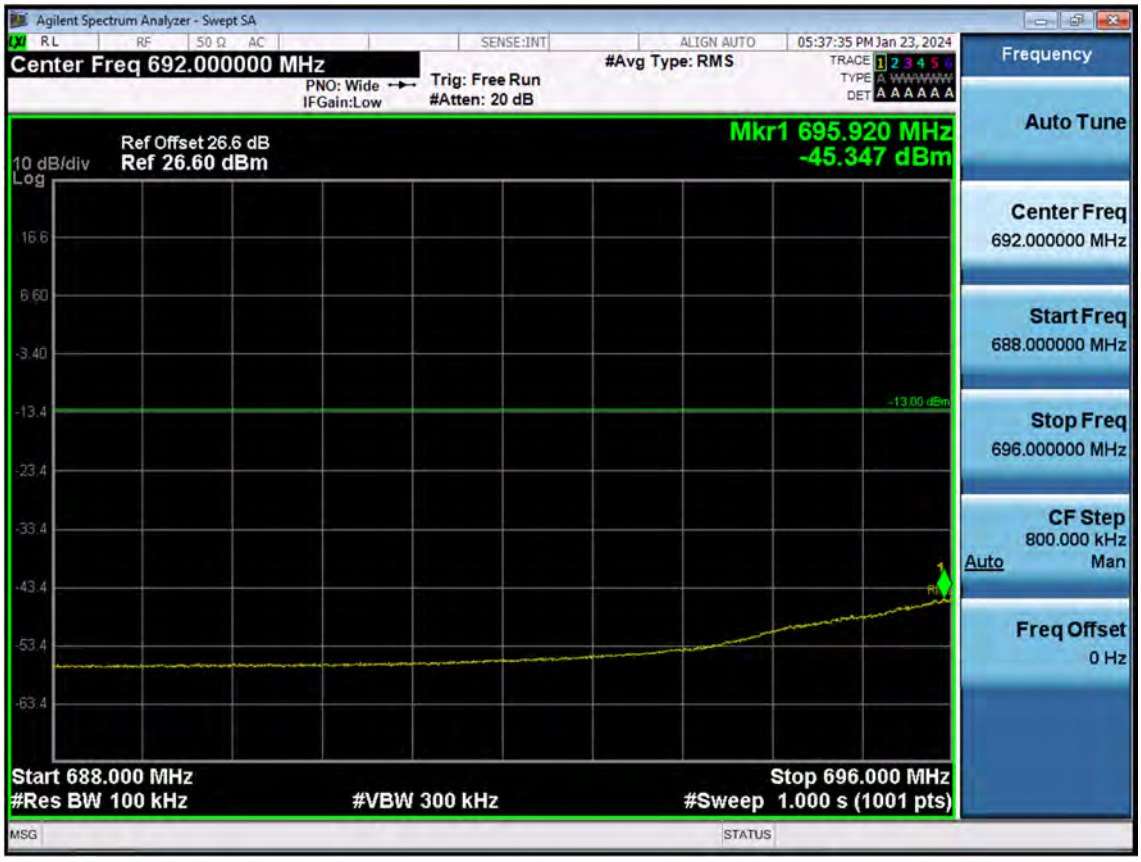
BAND 12. Lower Band Edge Plot (3 M BW Ch.23025 QPSK_RB1_Offset 0)



BAND 12. Lower Band Edge Plot (3 M BW Ch.23025 QPSK_RB15_Offset 0)



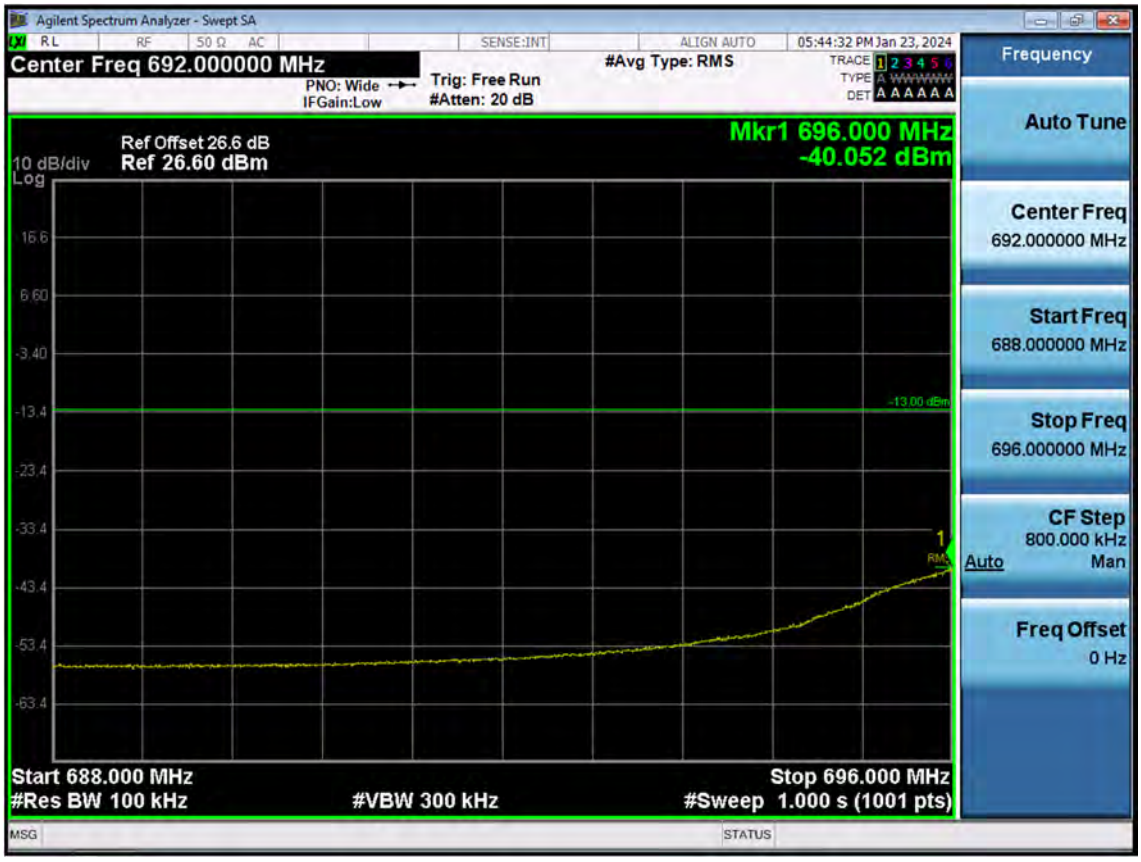
BAND 12. Lower Extended Band Edge Plot (3 M BW Ch.23025 QPSK_RB15_0)



BAND 12/17. Lower Band Edge Plot (5 M BW Ch.23035 QPSK_RB1_Offset 0)

BAND 12/17. Lower Band Edge Plot (5 M BW Ch.23035 QPSK_RB25_Offset 0)

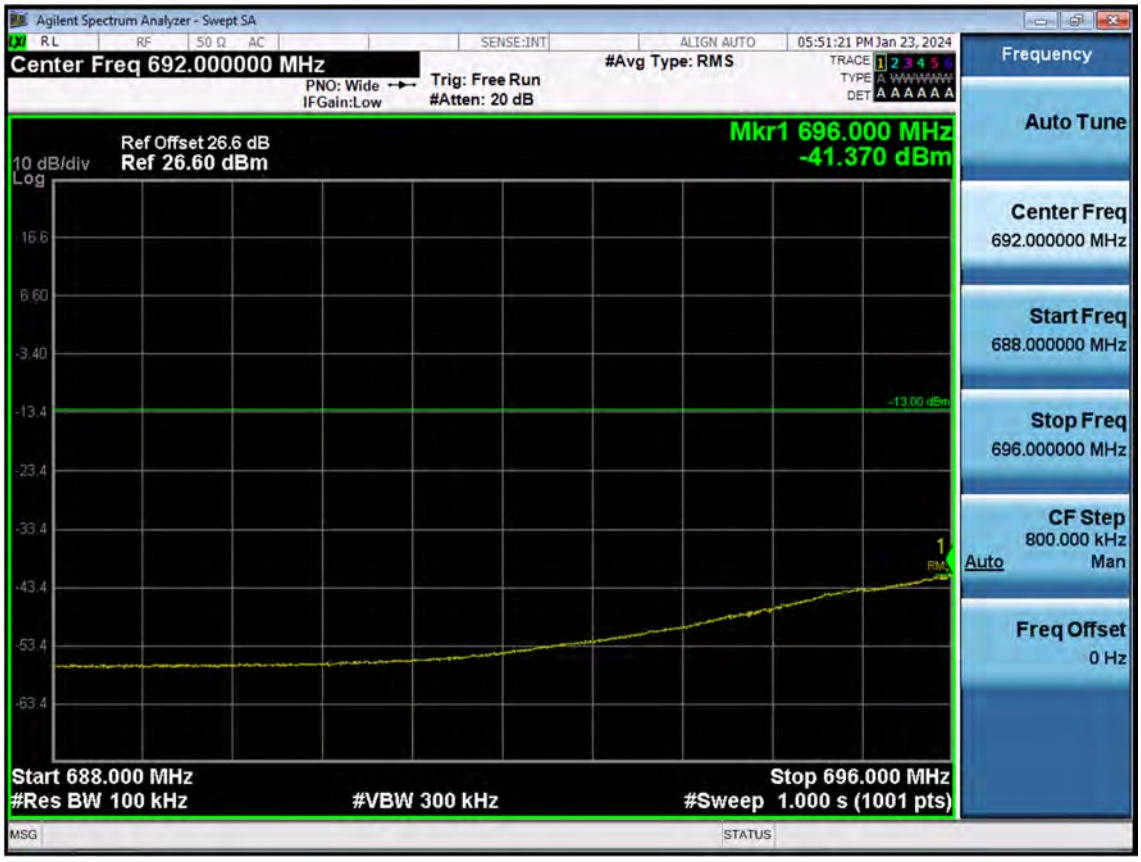
BAND 12/17. Lower Extended Band Edge Plot (5 M BW Ch.23035 QPSK_RB25_0)



BAND 12/17. Lower Band Edge Plot (10 M BW Ch.23060 QPSK_RB1_Offset 0)

BAND 12/17. Lower Band Edge Plot (10 M BW Ch.23060 QPSK_RB50_Offset 0)

BAND 12/17. Lower Extended Band Edge Plot (10 M BW Ch.23060 QPSK_RB50_0)

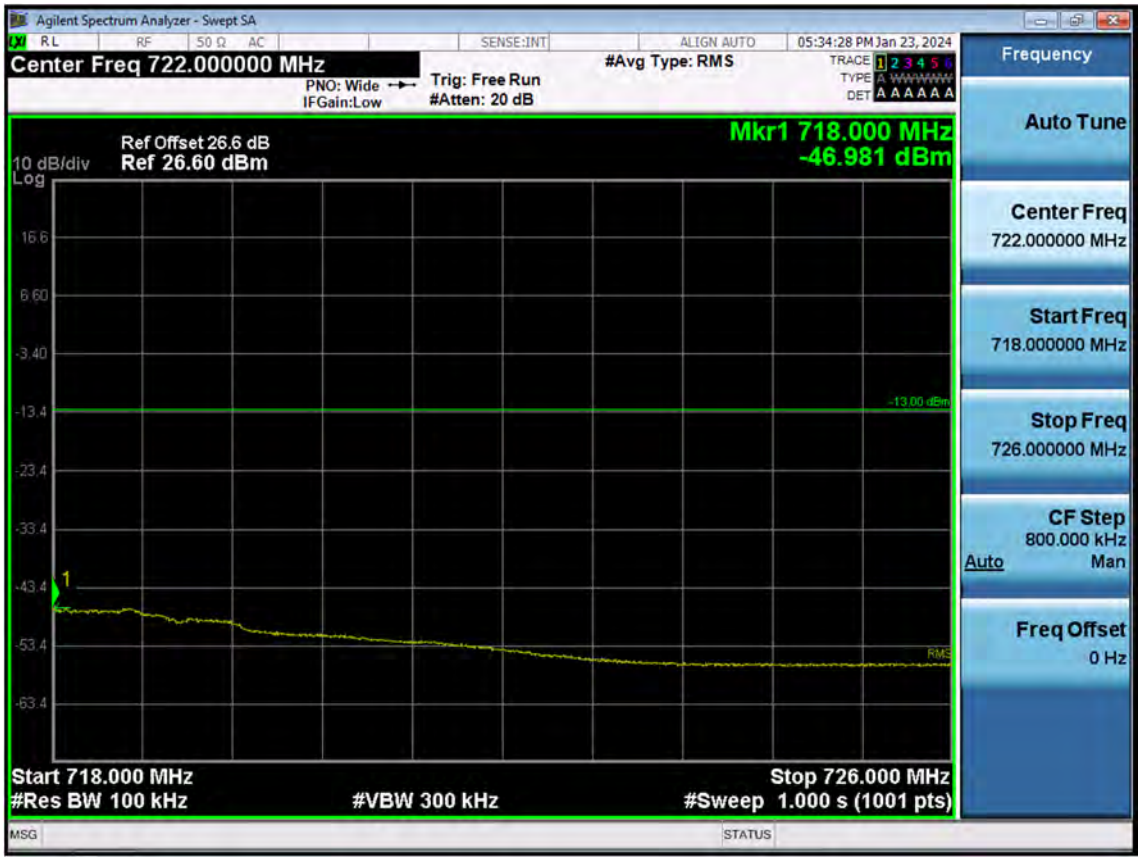


BAND 12. Upper Band Edge Plot (1.4 M BW Ch.23173 QPSK_RB1_Offset 5)_1

BAND 12. Upper Band Edge Plot (1.4 M BW Ch.23173 QPSK_RB1_Offset 5)_2

BAND 12. Upper Band Edge Plot (1.4 M BW Ch.23173 QPSK_RB6_Offset 0)

BAND 12. Upper Extended Band Edge Plot (1.4 M BW Ch.23173 QPSK_RB6_0)

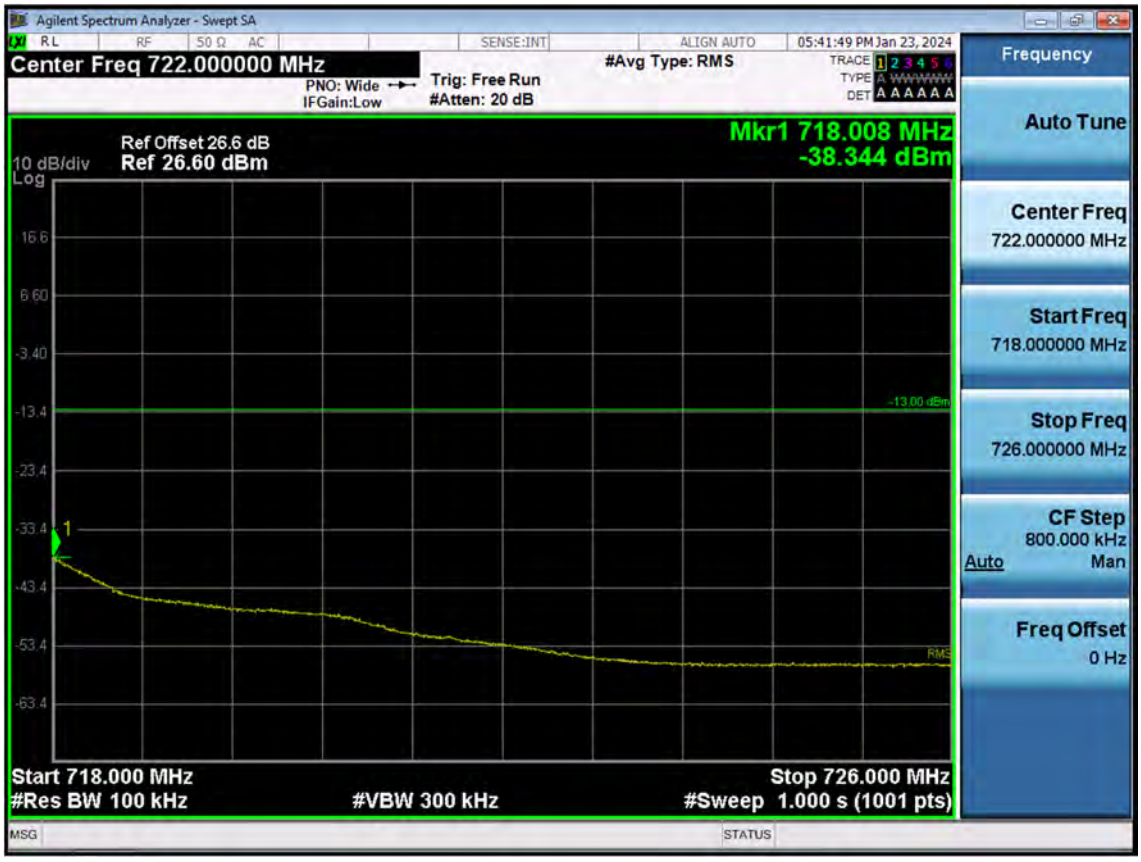


BAND 12. Upper Band Edge Plot (3 M BW Ch.23165 QPSK_RB1_Offset 14)-1

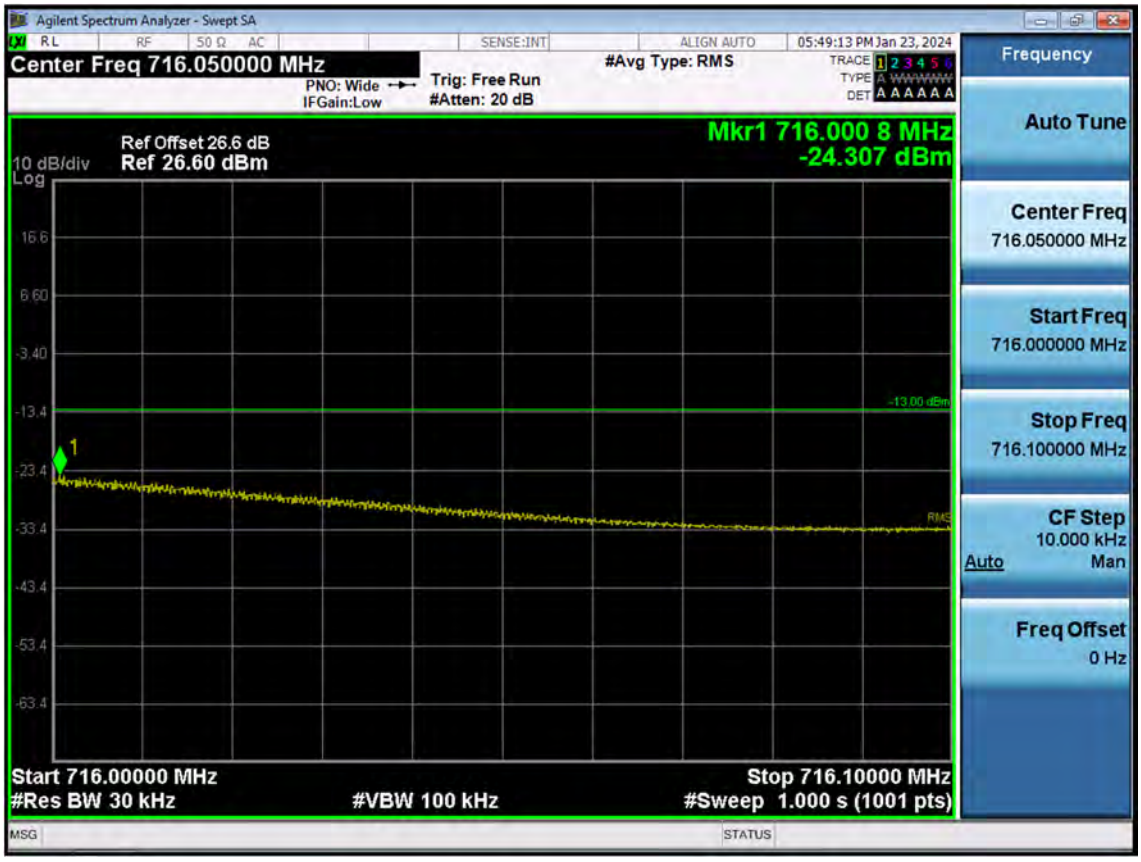
BAND 12. Upper Band Edge Plot (3 M BW Ch.23165 QPSK_RB1_Offset 14)-2

BAND 12. Upper Band Edge Plot (3 M BW Ch.23165 QPSK_RB15_Offset 0)

BAND 12. Upper Extended Band Edge Plot (3 M BW Ch.23165 QPSK_RB15_0)



BAND 12/17. Upper Band Edge Plot (5 M BW Ch.23155 QPSK_RB1_Offset 24)_1

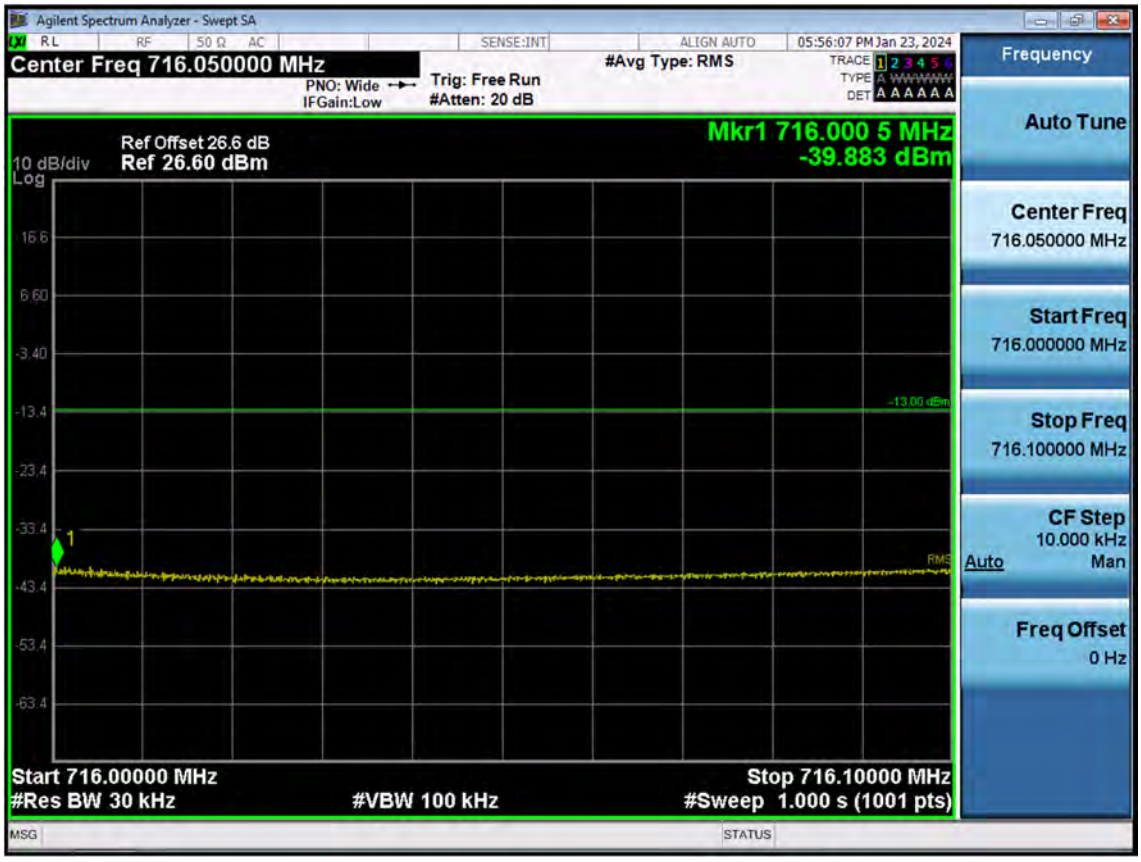


BAND 12/17. Upper Band Edge Plot (5 M BW Ch.23155 QPSK_RB1_Offset 24)_2

BAND 12/17. Upper Band Edge Plot (5 M BW Ch.23155 QPSK_RB25_Offset 0)

BAND 12/17. Upper Extended Band Edge Plot (5 M BW Ch.23155 QPSK_RB25_0)

BAND 12/17. Upper Band Edge Plot (10 M BW Ch.23130 QPSK_RB1_Offset 49)_1

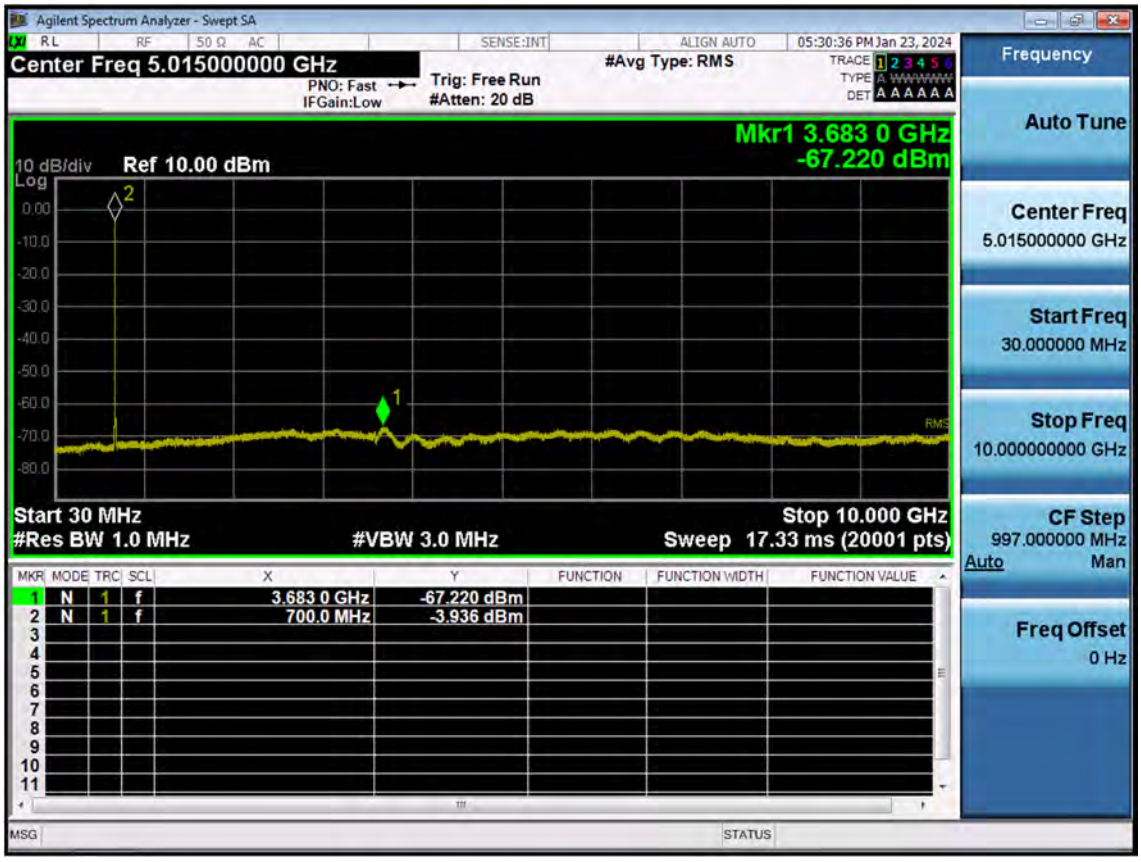


BAND 12/17. Upper Band Edge Plot (10 M BW Ch.23130 QPSK_RB1_Offset 49)_2

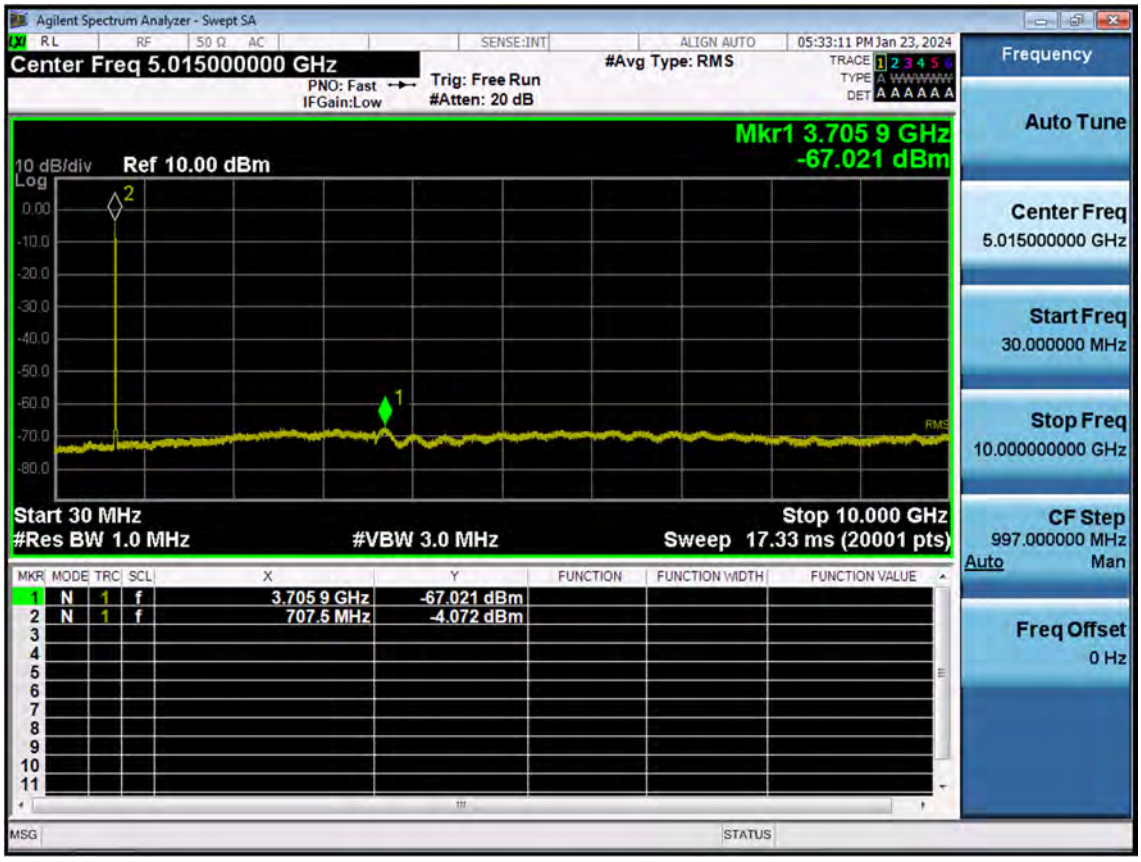
BAND 12/17. Upper Band Edge Plot (10 M BW Ch.23130 QPSK_RB50_Offset 0)

BAND 12/17. Upper Extended Band Edge Plot (10 M BW Ch.23130 QPSK_RB50_0)

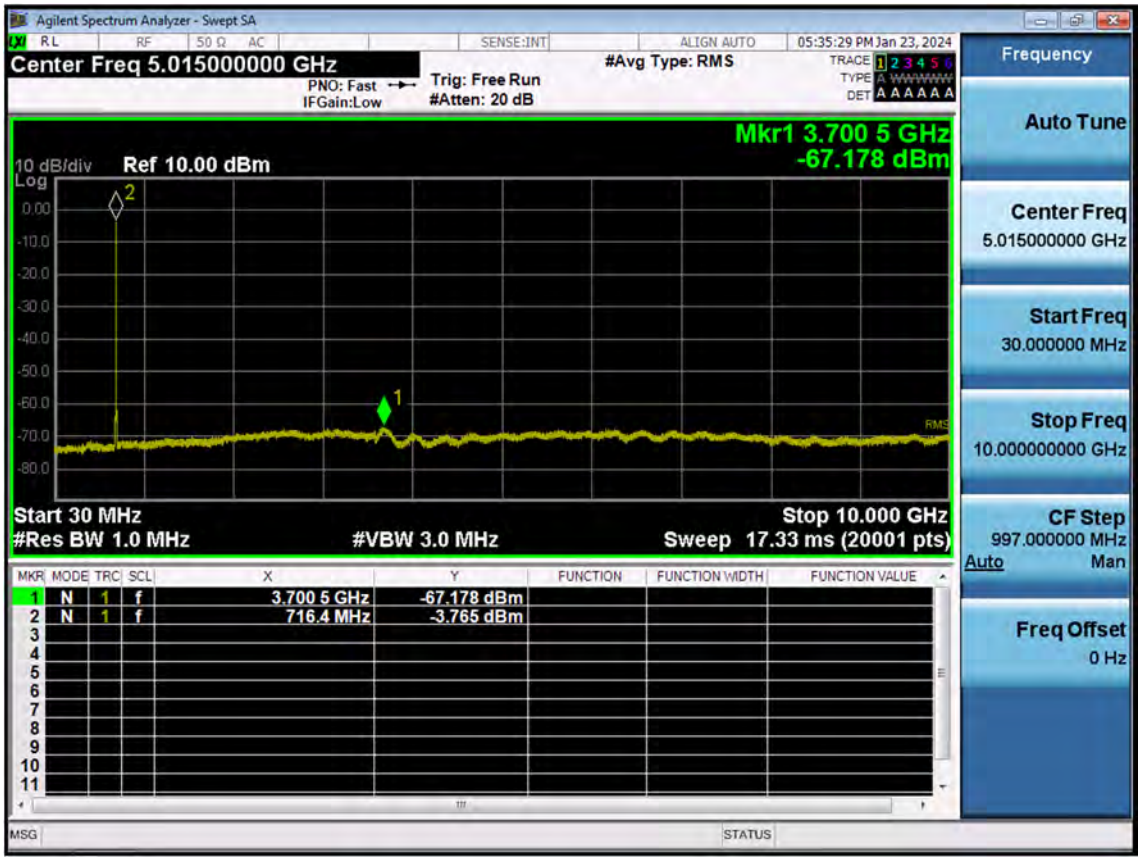
BAND 12. Conducted Spurious Plot _ (23017ch_1.4 MHz_QPSK_RB 1_0)



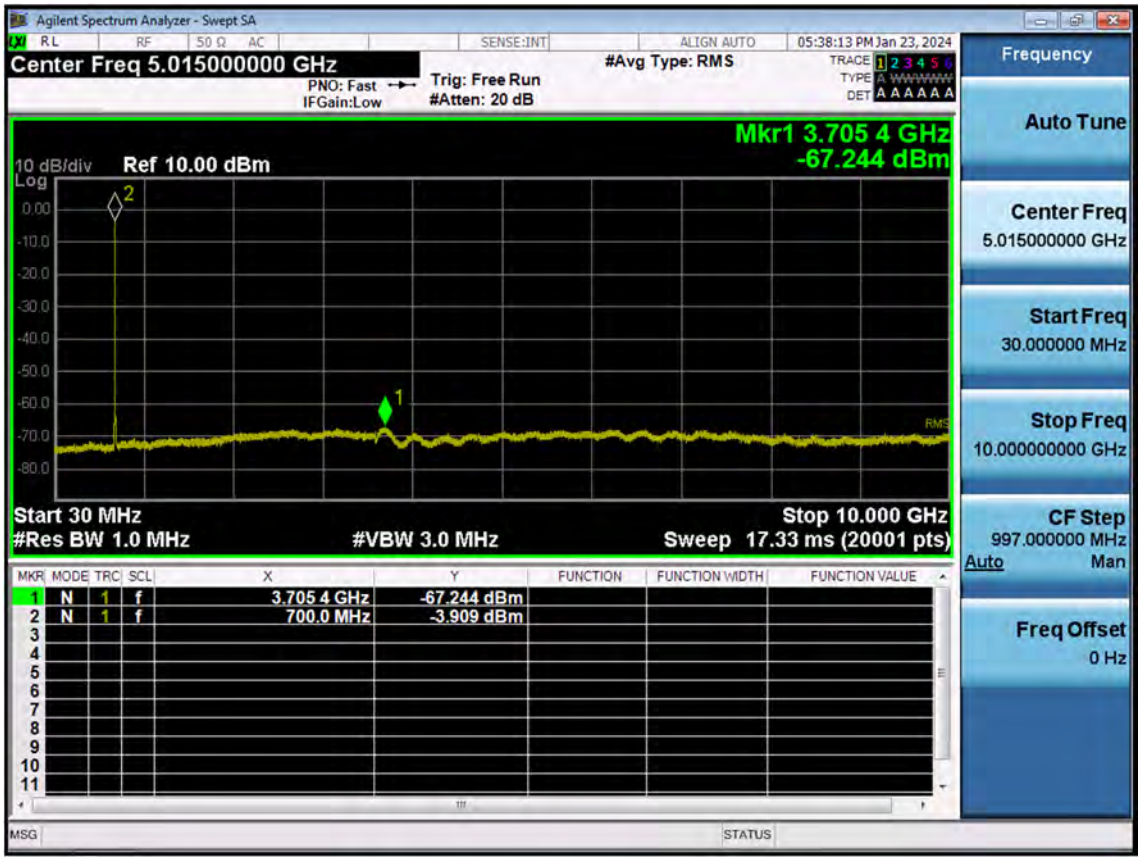
BAND 12. Conducted Spurious Plot _ (23095ch_1.4 MHz_QPSK_RB 1_0)



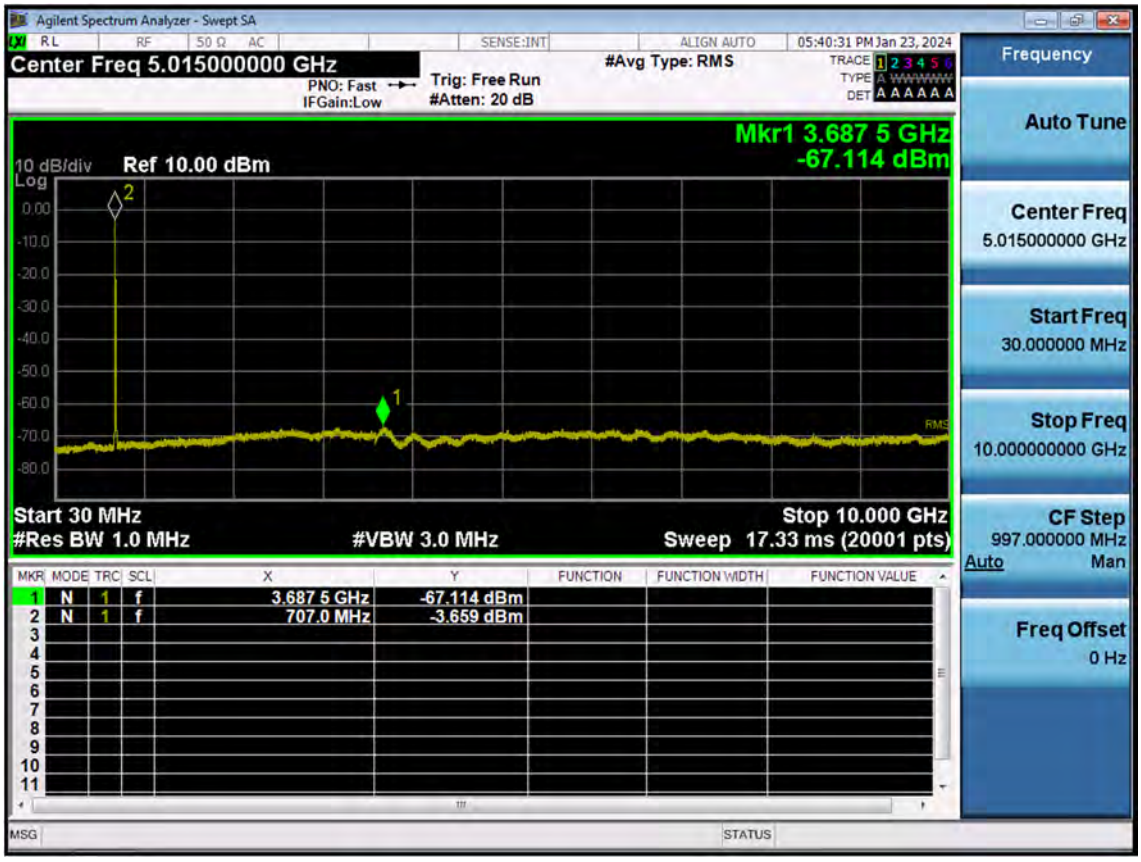
BAND 12. Conducted Spurious Plot _ (23173ch_1.4 MHz_QPSK_RB 1_0)



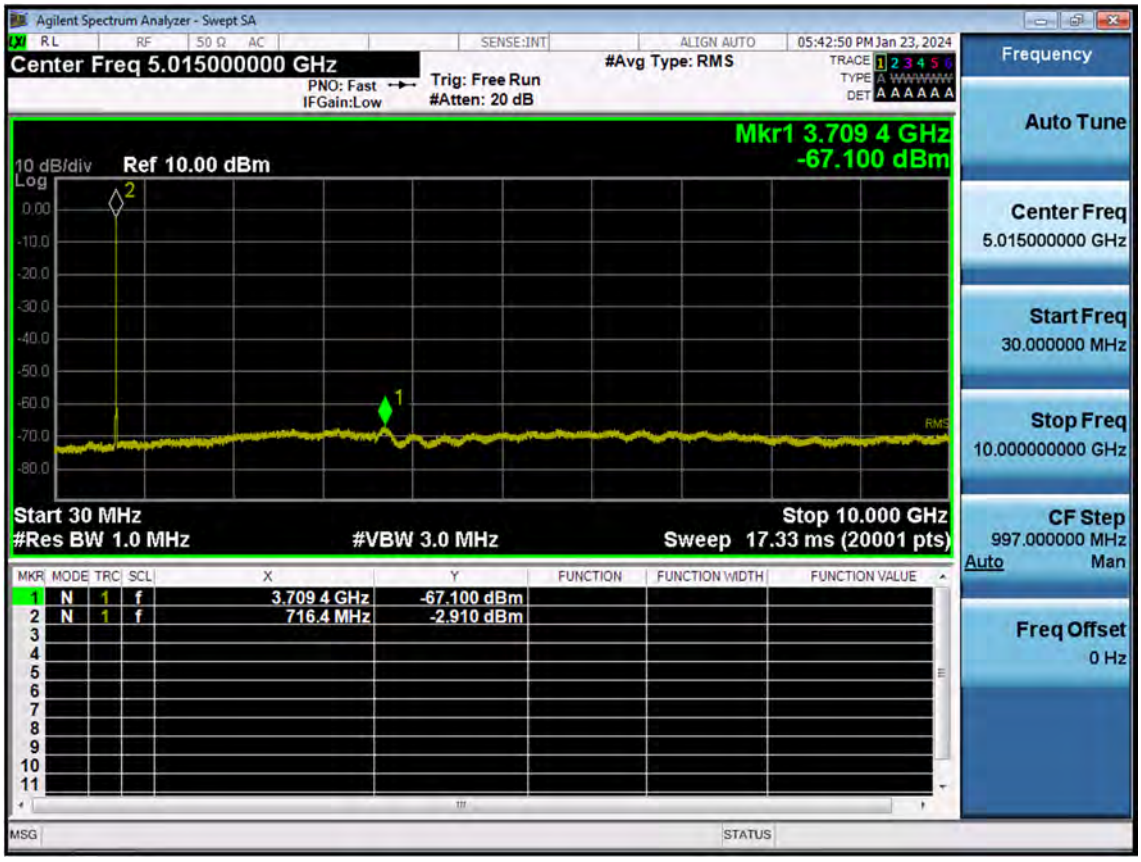
BAND 12. Conducted Spurious Plot _ (23025ch_3 MHz_QPSK_RB 1_0)



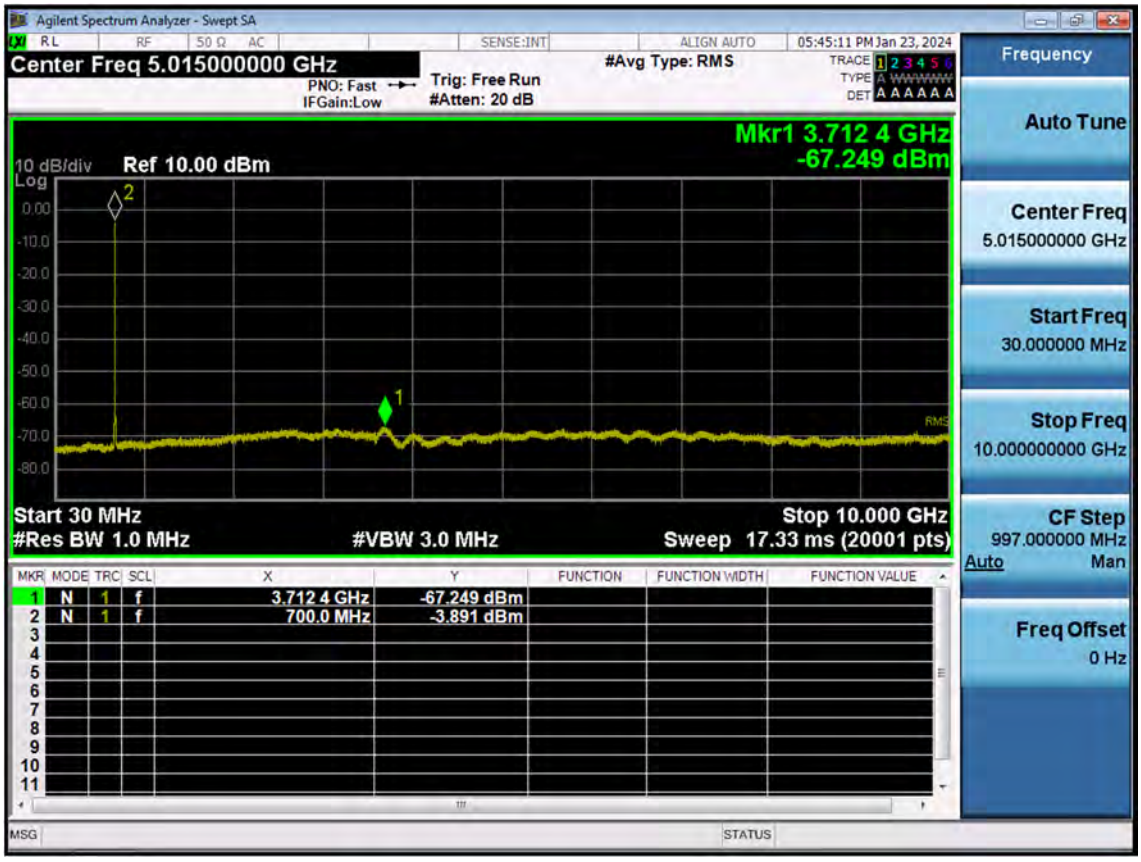
BAND 12. Conducted Spurious Plot _ (23095ch_3 MHz_QPSK_RB 1_0)



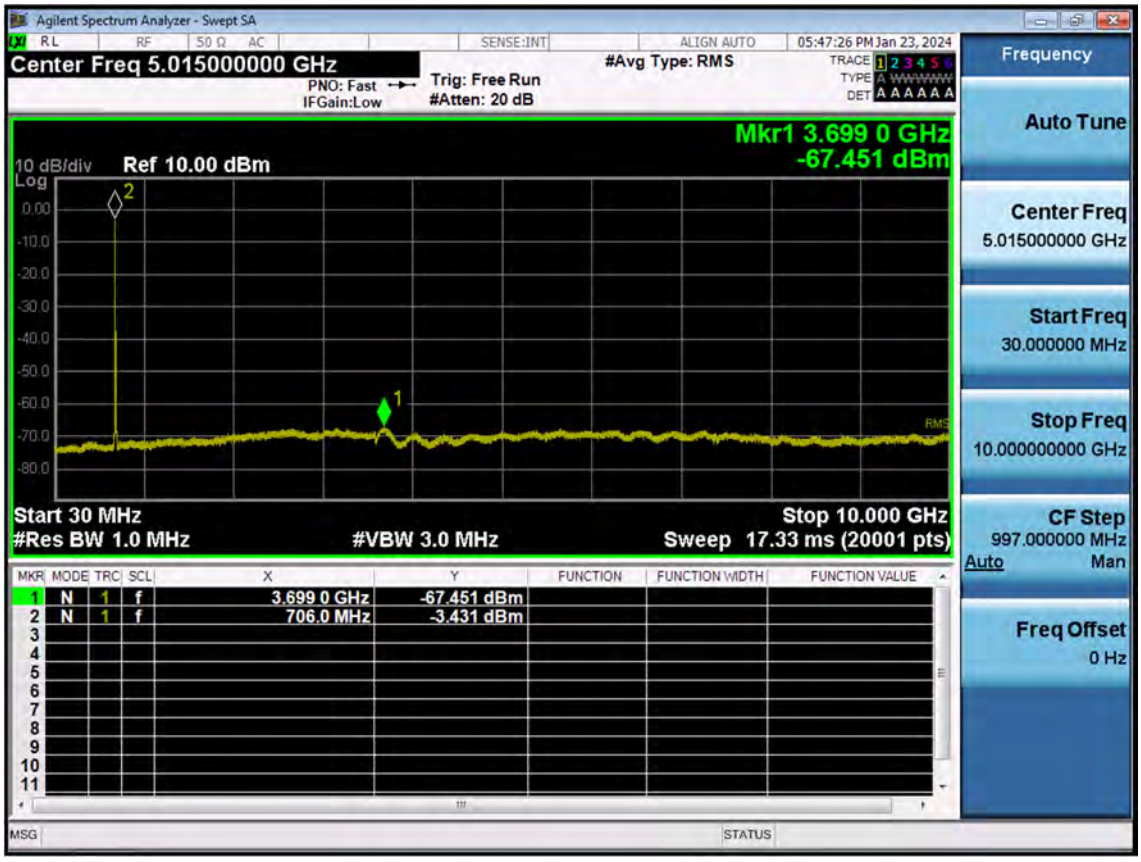
BAND 12. Conducted Spurious Plot _ (23165ch_3 MHz_QPSK_RB 1_0)



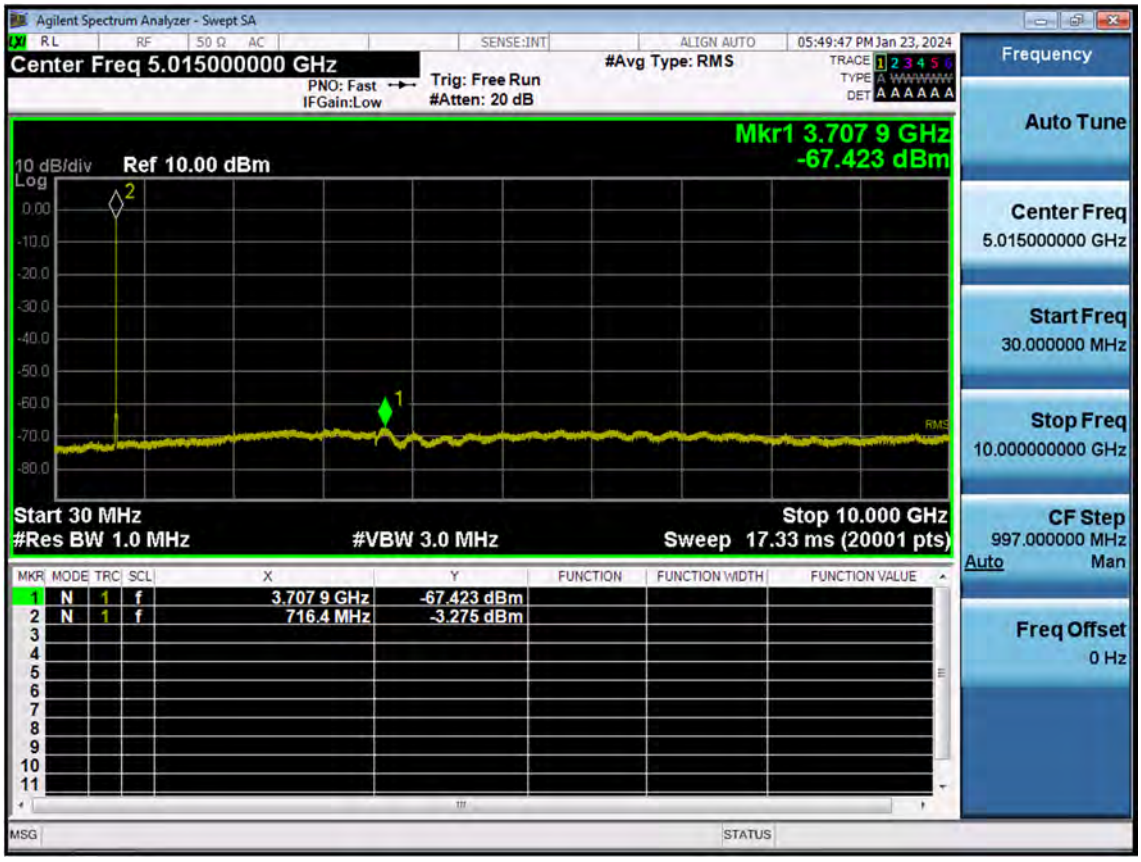
BAND 12/17. Conducted Spurious Plot _ (23035ch_5 MHz_QPSK_RB 1_0)



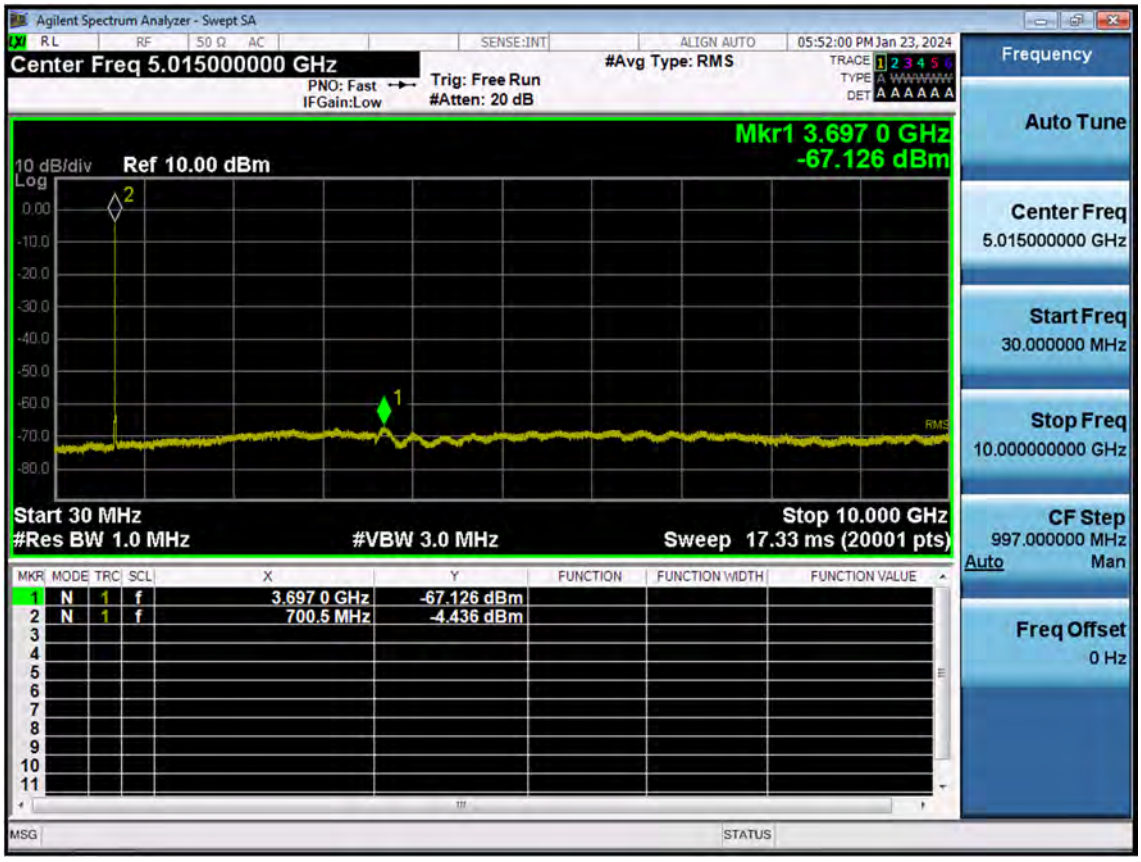
BAND 12/17. Conducted Spurious Plot _ (23095ch_5 MHz_QPSK_RB 1_0)



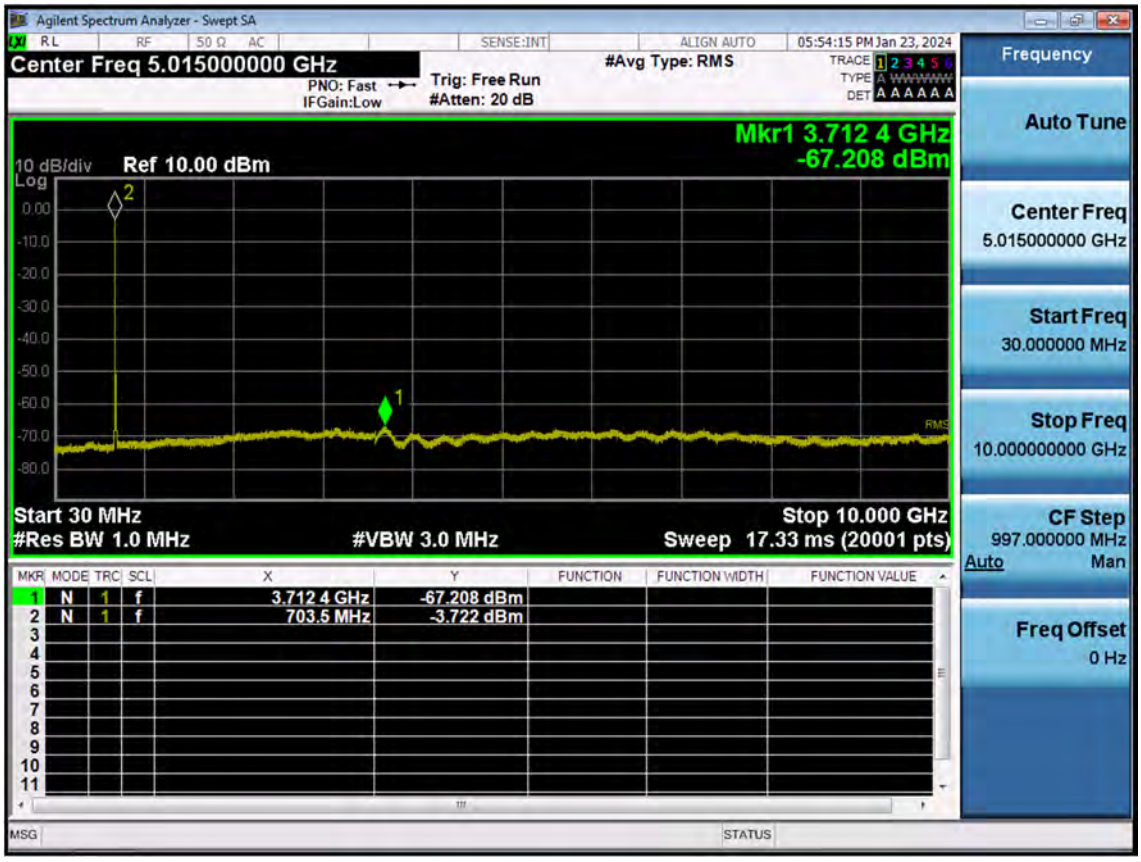
BAND 12/17. Conducted Spurious Plot _ (23155ch_5 MHz_QPSK_RB 1_0)



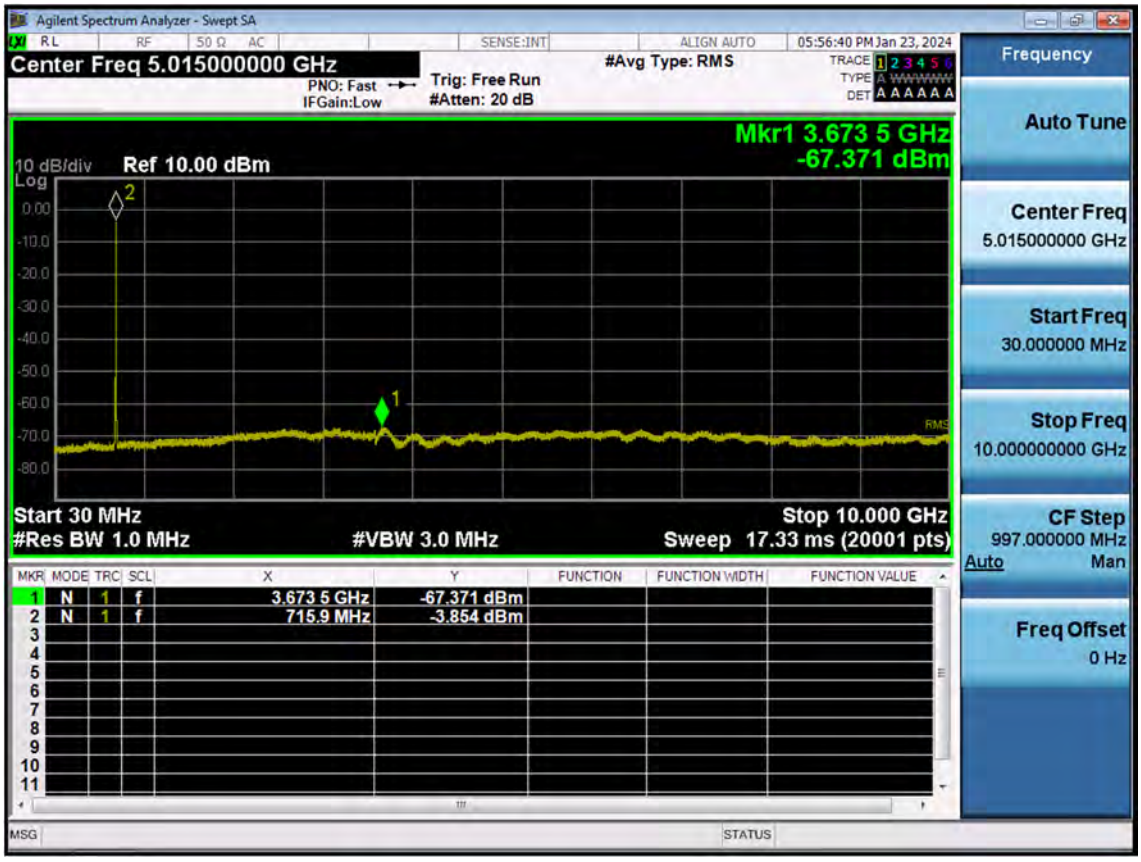
BAND 12/17. Conducted Spurious Plot _ (23060ch_10 MHz_QPSK_RB 1_0)



BAND 12/17. Conducted Spurious Plot _ (23095ch_10 MHz_QPSK_RB 1_0)



BAND 12/17. Conducted Spurious Plot _ (23130ch_10 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-2402-FC005-P