

TEST REPORT

FCC LTE B4 Test for TWG18ANECN
Class II Permissive Change

APPLICANT
LG Electronics Inc.

REPORT NO.
HCT-RF-2107-FC026

DATE OF ISSUE
July 9, 2021

Tested by
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TEST REPORT

FCC LTE Test for
TWG18ANECN

REPORT NO.

HCT-RF-2107-FC026

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Additional Model

TWG10ANEN

Applicant

LG Electronics Inc.

222, LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, 451-713, Korea

**Eut Type
Model Name**

Car telematics device

TWG18ANECN

FCC ID

BEJLTTWG10N

FCC Rule Part(s):

§ 27, § 2

FCC Classification:

PCS Licensed Transmitter (PCB)

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	July 09, 2021	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

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MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name:	LG Electronics Inc.
Address:	222, LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, 451-713, Korea
FCC ID:	BEJLTTWG10N
Application Type:	Class II Permissive Change
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule(s):	§ 27, § 2
EUT Type:	Car telematics device
Model(s):	TWG18ANECON
Additional Model:	TWG10ANEN
Tx Frequency:	1710.7 MHz – 1754.3 MHz (LTE – Band 4 (1.4 MHz)) 1711.5 MHz – 1753.5 MHz (LTE – Band 4 (3 MHz)) 1712.5 MHz – 1752.5 MHz (LTE – Band 4 (5 MHz)) 1715.0 MHz – 1750.0 MHz (LTE – Band 4 (10 MHz)) 1717.5 MHz – 1747.5 MHz (LTE – Band 4 (15 MHz)) 1720.0 MHz – 1745.0 MHz (LTE – Band 4 (20 MHz))
Date(s) of Tests:	May 03, 2021 ~ June 28, 2021
Serial number:	Radiated: TWG18ANECON-02 Conducted: TWG18ANECON-01

1.1. MAXIMUM OUTPUT POWER

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	EIRP	
				Max. Power (W)	Max. Power (dBm)
LTE – Band4 (1.4)	1710.7 – 1754.3	1M09G7D	QPSK	0.058	17.63
		1M10W7D	16QAM	0.049	16.88
LTE – Band4 (3)	1711.5 – 1753.5	2M71G7D	QPSK	0.057	17.55
		2M72W7D	16QAM	0.045	16.58
LTE – Band4 (5)	1712.5 – 1752.5	4M52G7D	QPSK	0.058	17.64
		4M50W7D	16QAM	0.045	16.58
LTE – Band4 (10)	1715.0 – 1750.0	8M96G7D	QPSK	0.056	17.52
		8M94W7D	16QAM	0.048	16.81
LTE – Band4 (15)	1717.5 – 1747.5	13M5G7D	QPSK	0.057	17.57
		13M5W7D	16QAM	0.049	16.88
LTE – Band4 (20)	1720.0 – 1745.0	17M9G7D	QPSK	0.059	17.72
		17M9W7D	16QAM	0.050	17.01

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a Car telematics device with GSM/GPRS/EGPRS/UMTS and LTE.

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

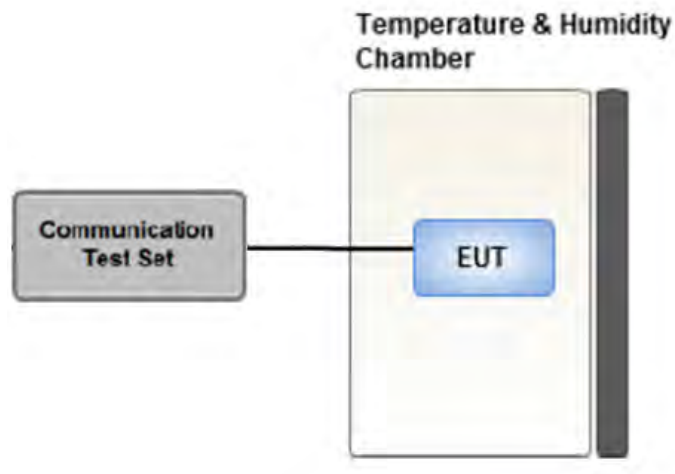
The Fully-anechoic chamber and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA.

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	- KDB 971168 D01 v03r01 – Section 5.2
Peak- to- Average Ratio	- KDB 971168 D01 v03r01 – Section 5.7 - ANSI C63.26-2015 – Section 5.2.3.4 - ANSI C63.26-2015 – Section 5.2.6(only GSM)
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 CONDUCTED OUTPUT POWER



Test setup

Test Overview

When an average power meter is used to perform RF output power measurements, the fundamental condition that measurements be performed only over durations of active transmissions at maximum output power level applies.

Conducted Output Power was tested in accordance with KDB971168 D01 Power Meas License Digital Systems v03r01, Section 5.2.

3.3 RADIATED POWER

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

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

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
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 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 power is calculated by the following formula;

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

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

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

These steps are repeated with the receiving antenna in both vertical and horizontal polarization. the difference between the gain of the horn and an isotropic antenna are taken into consideration

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

3.4 RADIATED SPURIOUS EMISSIONS

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

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

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
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 10th harmonics from 9 kHz.

Test Note

1. Measurements value show only up to 3 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
2. The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the test dat
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;

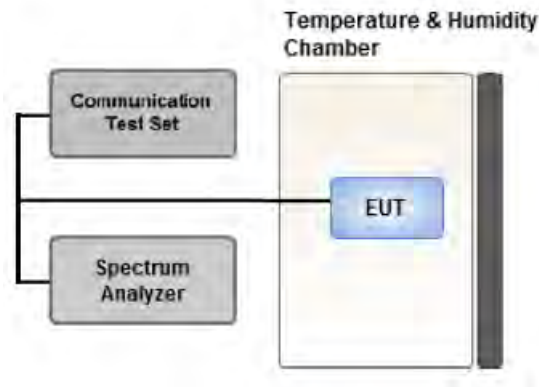
$$\text{Result}_{(\text{dBm})} = P_{g(\text{dBm})} - \text{cable loss}_{(\text{dB})} + \text{antenna gain}_{(\text{dBi})}$$

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

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

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

3.5 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%.

② Alternate Procedure for PAPR

Use one of the procedures presented in 5.2(ANSI C63.26-2015) to measure the total peak power and record as P_{Pk} .

Use one of the applicable procedures presented 5.2(ANSI C63.26-2015) to measure the total average power and record as P_{Avg} . Determine the P.A.R. from:

$$P.A.R_{(dB)} = P_{Pk (dBm)} - P_{Avg (dBm)} \quad (P_{Avg} = \text{Average Power} + \text{Duty cycle Factor})$$

Test Settings(Peak Power)

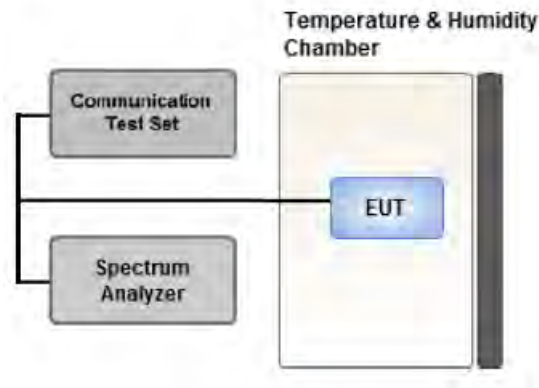
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW $\geq 3 \times$ RBW.

1. Set the RBW $\geq$ OBW.
2. Set VBW $\geq 3 \times$ RBW.
3. Set span $\geq 2 \times$ OBW.
4. Sweep time $\geq 10 \times$ (number of points in sweep) $\times$ (transmission symbol period).
5. Detector = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the peak amplitude level.

Test Settings(Average Power)

1. Set span to $2 \times$ to $3 \times$ the OBW.
2. Set RBW $\geq$ OBW.
3. Set VBW $\geq 3 \times$ RBW.
4. Set number of measurement points in sweep $\geq 2 \times$ span / RBW.
5. Sweep time:
Set $\geq [10 \times (\text{number of points in sweep}) \times (\text{transmission period})]$ for single sweep (automation-compatible) measurement. The transmission period is the (on + off) time.
6. Detector = power averaging (rms).
7. Set sweep trigger to "free run."
8. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. (To accurately determine the average power over the on and off period of the transmitter, it can be necessary to increase the number of traces to be averaged above 100 or, if using a manually configured sweep time, increase the sweep time.)
9. Use the peak marker function to determine the maximum amplitude level.
10. Add $[10 \times \log (1/\text{duty cycle})]$ to the measured maximum power level to compute the average power during continuous transmission. For example, add $[10 \times \log (1/0.25)] = 6$ dB if the duty cycle is a constant 25%.

3.6 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.

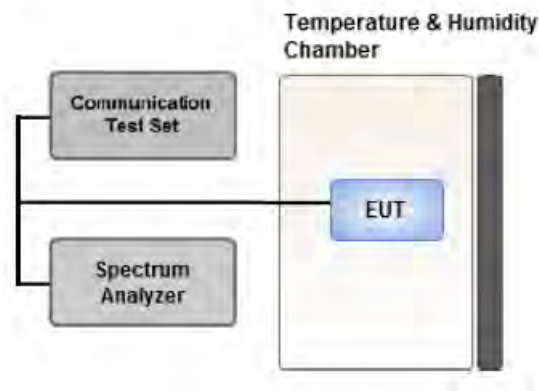
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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 26dB 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

3.7 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



Test setup

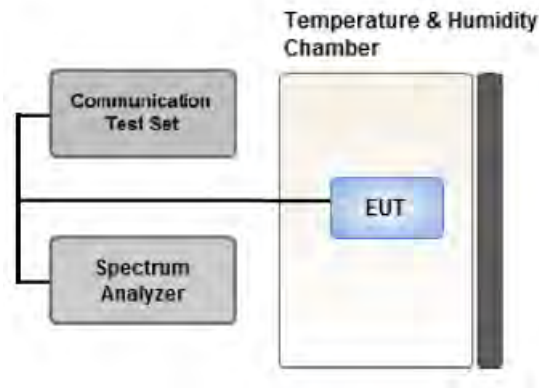
Test Overview

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 $\geq 2 \times \text{Span} / \text{RBW}$

3.8 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

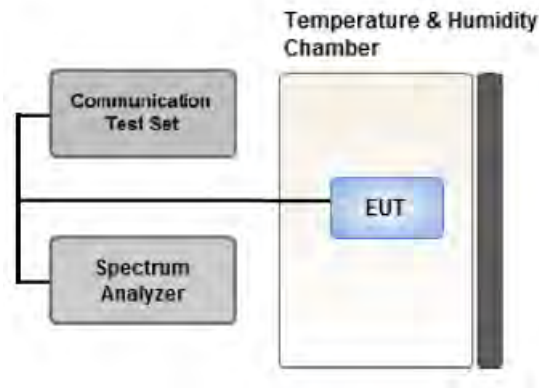
Test Notes

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 $43 + 10 \times \log(P)$ 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.

3.9 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE



Test setup

Test Overview

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

The frequency stability of the transmitter is measured by:

1. Temperature:

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

2. Primary Supply Voltage:

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

.- For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.

Test Settings

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

3.10 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.
 - The worst case is reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the test data.
 - Please refer to the table below.
 - TWG18ANECN & additional models were tested and the worst case results are reported.
- (Worst case : TWG18ANECN)

[Worst case]

Test Description	Modulation	RB size	RB offset	Axis
Effective Isotropic Radiated Power	QPSK, 16QAM	1	0	X
Radiated Spurious and Harmonic Emissions	QPSK	1	0	X

3.11 WORST CASE(CONDUCTED TEST)

- All modes of operation were investigated and the worst case configuration results are reported.
- TWG18ANECN & additional models were tested and the worst case results are reported.

(Worst case : TWG18ANECN)

[Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset
Occupied Bandwidth	QPSK, 16QAM	1.4, 3, 5, 10, 15, 20	Mid	Full RB	0
Peak-To-Average Ratio	QPSK, 16QAM	1.4, 3, 5, 10, 15, 20	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
		15	Low	1	0
			High	1	74
		20	Low	1	0
			High	1	99
		1.4, 3, 5, 10, 15, 20	Low, High	Full RB	0
Spurious and Harmonic Emissions at Antenna Terminal	QPSK	1.4, 3, 5, 10, 15, 20	Low, Mid, High	1	0

4. LIST OF TEST EQUIPMENT

Manufacture	Model/ Equipment	Serial Number	Calibration Date	Calibration Interval	Calibration Due
T&M SYSTEM	FBSR-02B(WHK1.2/15G-10EF)/H.P.F	-	03/02/2021	Annual	03/02/2022
T&M SYSTEM	FBSR-02B(WHK3.3/18G-10EF)/H.P.F	-	03/02/2021	Annual	03/02/2022
Hewlett Packard	11667B / Power Splitter(DC~26.5 GHz)	11275	04/07/2021	Annual	04/07/2022
Hewlett Packard	E3632A/DC Power Supply	MY40004427	09/16/2020	Annual	09/16/2021
Schwarzbeck	UHAP/ Dipole Antenna	557	04/05/2021	Biennial	04/05/2023
Schwarzbeck	UHAP/ Dipole Antenna	558	04/05/2021	Biennial	04/05/2023
ESPEC	SU-642 / Chamber	93008124	03/15/2021	Annual	03/15/2022
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	147	08/29/2019	Biennial	08/29/2021
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	9120D-1298	09/25/2019	Biennial	09/25/2021
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170342	10/13/2020	Biennial	10/13/2022
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170124	02/11/2020	Biennial	02/11/2022
Agilent	N9020A/Signal Analyzer(10Hz~26.5GHz)	MY50200093	11/17/2020	Annual	11/17/2021
Hewlett Packard	8493C/ATTENUATOR(20dB)	17280	06/01/2021	Annual	06/01/2022
REOHDE & SCHWARZ	FSV40/Spectrum Analyzer(10Hz~40GHz)	100931	10/14/2020	Annual	10/14/2021
Agilent	8960 (E5515C)/ Base Station	MY48360800	08/26/2020	Annual	08/26/2021
Schwarzbeck	FMZB1513/ Loop Antenna(9kHz~30MHz)	1513-333	03/19/2020	Biennial	03/19/2022
Schwarzbeck	VULB9160/ Bilog Antenna	3150	03/03/2021	Biennial	03/03/2023
Schwarzbeck	VULB9168/ Hybrid Antenna	760	02/22/2021	Biennial	02/22/2023
Anritsu Corp.	MT8821C/Wideband Radio Communication Tester	6262116770	07/22/2020	Annual	07/22/2021
Anritsu Corp.	MT8820C/Wideband Radio Communication Tester	6201026545	01/07/2021	Annual	01/07/2022
REOHDE & SCHWARZ	SMB100A/ SIGNAL GENERATOR (100kHz~40GHz)	177633	07/13/2020	Annual	07/13/2021
KEYSIGHT	N9030B / Signal Analyzer(5Hz~40.0GHz)	MY55480167	06/02/2021	Annual	06/02/2022
HCT CO., LTD.,	FCC LTE Mobile Conducted RF Automation Test Software	-	-	-	-

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)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70
Radiated Disturbance (18 GHz ~ 40 GHz)	5.05

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(h)	< 43 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions	PASS
Conducted Output Power	§ 2.1046	N/A	PASS
Peak- to- Average Ratio	§ 27.50(d)(5)	< 13 dB	PASS
Frequency stability / variation of ambient temperature	§ 2.1055, § 27.54	Emission must remain in band	PASS

6.2 Test Condition : Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Equivalent Isotropic Radiated Power	§ 27.50(d)(4)	< 1 Watts max. EIRP	PASS
Radiated Spurious and Harmonic Emissions	§ 2.1053, § 27.53(h)	< 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 CONDUCTED OUTPUT POWER

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				19957	20175	20393
				1710.7 MHz	1732.5 MHz	1754.3 MHz
1.4 MHz	QPSK	1	0	23.55	23.04	23.15
		1	3	23.47	23.01	23.09
		1	5	23.51	23.07	23.09
		3	0	23.46	23.03	23.09
		3	1	23.43	22.96	23.11
		3	3	23.38	23.01	23.05
		6	0	22.41	22.03	22.23
	16QAM	1	0	22.47	22.08	22.27
		1	3	22.33	22.06	22.16
		1	5	22.39	22.01	22.10
		3	0	22.43	22.06	22.21
		3	1	22.30	22.05	22.17
		3	3	22.40	22.07	22.18
		6	0	21.48	21.11	21.23

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				19965	20175	20385
				1711.5 MHz	1732.5 MHz	1753.5 MHz
3 MHz	QPSK	1	0	23.36	23.08	23.11
		1	7	23.30	22.98	23.15
		1	14	23.35	23.05	23.10
		8	0	22.38	22.11	22.16
		8	3	22.38	22.08	22.24
		8	7	22.34	22.08	22.25
		15	0	22.41	22.02	22.27
	16QAM	1	0	22.35	22.08	22.08
		1	7	22.30	21.96	22.27
		1	14	22.26	22.09	22.10
		8	0	21.44	21.13	21.16
		8	3	21.46	21.03	21.28
		8	7	21.42	21.17	21.24
		15	0	21.45	21.07	21.28

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				19975	20175	20375
				1712.5 MHz	1732.5 MHz	1752.5 MHz
5 MHz	QPSK	1	0	23.28	23.06	23.16
		1	12	23.38	22.99	23.07
		1	24	23.30	22.99	23.20
		12	0	22.45	22.15	22.26
		12	6	22.45	22.09	22.15
		12	11	22.40	22.13	22.14
		25	0	22.30	22.04	22.13
	16QAM	1	0	22.58	22.11	22.28
		1	12	22.28	21.98	22.04
		1	24	22.29	22.03	22.22
		12	0	21.51	21.16	21.22
		12	6	21.49	21.07	21.21
		12	11	21.38	21.13	21.17
		25	0	21.34	21.09	21.24

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				20000	20175	20350
				1715 MHz	1732.5 MHz	1750 MHz
10 MHz	QPSK	1	0	22.96	23.05	23.05
		1	24	23.31	23.07	23.19
		1	49	23.04	22.89	23.26
		25	0	22.31	22.15	22.19
		25	12	22.37	22.10	22.23
		25	24	22.16	22.05	22.22
		50	0	22.29	22.01	22.05
	16QAM	1	0	22.23	22.14	22.16
		1	24	22.13	22.05	22.21
		1	49	21.92	21.85	22.15
		25	0	21.40	21.17	21.21
		25	12	21.40	21.07	21.26
		25	24	21.17	21.10	21.19
		50	0	21.30	21.06	21.07

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				20025	20175	20325
				1717.5 MHz	1732.5 MHz	1747.5 MHz
15 MHz	QPSK	1	0	22.91	23.20	23.34
		1	36	23.26	23.11	23.08
		1	74	23.08	23.08	23.22
		36	0	22.38	22.22	22.15
		36	18	22.20	22.19	22.16
		36	39	22.26	22.13	22.27
		75	0	22.23	22.04	22.19
	16QAM	1	0	22.25	22.25	22.41
		1	36	22.32	22.11	22.16
		1	74	22.06	22.11	22.28
		36	0	21.44	21.31	21.23
		36	18	21.30	21.21	21.32
		36	39	21.28	21.16	21.29
		75	0	21.31	21.15	21.20

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				20050	20175	20300
				1720 MHz	1732.5 MHz	1745 MHz
20 MHz	QPSK	1	0	22.87	23.29	23.15
		1	49	23.22	23.21	23.16
		1	99	23.04	23.26	23.15
		50	0	22.34	22.19	22.16
		50	25	22.20	22.09	22.17
		50	49	22.09	22.11	22.18
		100	0	22.22	22.09	22.15
	16QAM	1	0	22.13	22.37	22.13
		1	49	22.16	22.23	22.19
		1	99	21.98	22.24	22.24
		50	0	21.47	21.30	21.22
		50	25	21.29	21.16	21.19
		50	49	21.11	21.19	21.20
		100	0	21.25	21.14	21.19

8.2 EQUIVALENT ISOTROPIC RADIATED POWER

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1710.7	LTE B4 1.4 MHz	QPSK	-23.87	9.77	9.85	2.05	V	< 1.00	0.057	17.57
		16-QAM	-24.56	9.08	9.85	2.05	V		0.049	16.88
QPSK		-23.95	9.78	9.90	2.05	V	0.058		17.63	
16-QAM		-25.04	8.69	9.90	2.05	V	0.045		16.54	
QPSK		-24.98	8.74	10.02	2.06	V	0.047		16.70	
16-QAM		-26.05	7.67	10.02	2.06	V	0.037		15.63	
1732.5										
1754.3										

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1711.5	LTE B4 3 MHz	QPSK	-24.16	9.48	9.85	2.05	V	< 1.00	0.053	17.28
		16-QAM	-24.86	8.78	9.85	2.05	V		0.045	16.58
QPSK		-24.03	9.70	9.90	2.05	V	0.057		17.55	
16-QAM		-25.02	8.71	9.90	2.05	V	0.045		16.56	
QPSK		-24.95	8.80	10.00	2.06	V	0.047		16.74	
16-QAM		-26.03	7.72	10.00	2.06	V	0.037		15.66	

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1712.5	LTE B4 5 MHz	QPSK	-24.29	9.35	9.85	2.05	V	< 1.00	0.052	17.15
		16-QAM	-24.97	8.67	9.85	2.05	V		0.044	16.47
QPSK		-23.94	9.79	9.90	2.05	V	0.058		17.64	
16-QAM		-25.00	8.73	9.90	2.05	V	0.045		16.58	
1752.5		QPSK	-24.81	8.94	10.00	2.06	V		0.049	16.88
		16-QAM	-25.65	8.10	10.00	2.06	V		0.040	16.04

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1715.0	LTE B4 10 MHz	QPSK	-24.62	9.03	9.88	2.05	V	< 1.00	0.048	16.85
		16-QAM	-25.31	8.34	9.88	2.05	V		0.041	16.16
QPSK		-24.06	9.67	9.90	2.05	V	0.056		17.52	
16-QAM		-24.77	8.96	9.90	2.05	V	0.048		16.81	
1750.0		QPSK	-25.14	8.61	10.00	2.06	V		0.045	16.55
		16-QAM	-26.06	7.69	10.00	2.06	V		0.037	15.63

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1717.5	LTE B4 15 MHz	QPSK	-24.61	9.05	9.90	2.05	V	< 1.00	0.049	16.90
		16-QAM	-25.30	8.36	9.90	2.05	V		0.042	16.21
QPSK		-24.01	9.72	9.90	2.05	V	0.057		17.57	
16-QAM		-24.70	9.03	9.90	2.05	V	0.049		16.88	
1747.5		QPSK	-24.84	8.91	10.00	2.06	V		0.048	16.85
		16-QAM	-25.67	8.08	10.00	2.06	V		0.040	16.02

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1720.0	LTE B4 20 MHz	QPSK	-24.58	9.08	9.90	2.05	V	< 1.00	0.049	16.93
		16-QAM	-25.29	8.37	9.90	2.05	V		0.042	16.22
QPSK		-23.86	9.87	9.90	2.05	V	0.059		17.72	
16-QAM		-24.57	9.16	9.90	2.05	V	0.050		17.01	
1745.0		QPSK	-24.63	9.14	9.98	2.06	V		0.051	17.06
		16-QAM	-25.51	8.26	9.98	2.06	V		0.041	16.18

8.3 RADIATED SPURIOUS EMISSIONS

- ▣ OPERATING FREQUENCY: 1732.5 MHz
- ▣ MEASURED OUTPUT POWER: 17.63 dBm = 0.058 W
- ▣ MODE: LTE B4
- ▣ MODULATION SIGNAL: 1.4 MHz QPSK
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: $43 + 10 \log_{10} (W) =$ 30.63 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
19957 (1710.7)	3 421.40	-48.49	12.60	-54.50	2.95	V	-44.85	62.48
	5 132.10	-46.04	12.40	-43.35	3.67	V	-34.62	52.25
	6 842.80	-56.59	12.23	-50.22	4.25	V	-42.24	59.87
20175 (1732.5)	3 465.00	-46.38	12.43	-52.12	2.97	V	-42.66	60.29
	5 197.50	-45.11	12.90	-43.69	3.70	V	-34.49	52.12
	6 930.00	-56.71	12.05	-49.41	4.28	H	-41.64	59.27
	8 662.50	-47.85	11.48	-34.41	4.85	H	-27.78	45.41
20393 (1754.3)	3 508.60	-46.12	12.25	-51.82	2.98	V	-42.55	60.18
	5 262.90	-38.14	13.25	-37.33	3.71	V	-27.79	45.42
	7 017.20	-57.15	11.60	-48.51	4.32	V	-41.23	58.86
	8 771.50	-47.55	11.25	-33.32	4.88	V	-26.95	44.58

- ▣ OPERATING FREQUENCY: 1732.5 MHz
- ▣ MEASURED OUTPUT POWER: 17.55 dBm = 0.057 W
- ▣ MODE: LTE B4
- ▣ MODULATION SIGNAL: 3 MHz QPSK
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: $43 + 10 \log_{10} (W) =$ 30.55 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
19965 (1711.5)	3 423.00	-47.95	12.60	-53.96	2.95	V	-44.31	61.86
	5 134.50	-45.95	12.43	-43.18	3.67	V	-34.42	51.97
	6 846.00	-56.49	12.22	-50.00	4.25	V	-42.03	59.58
	8 557.50	-55.63	11.68	-42.40	4.81	H	-35.53	53.08
20175 (1732.5)	3 465.00	-45.31	12.43	-51.05	2.97	V	-41.59	59.14
	5 197.50	-48.33	12.90	-46.91	3.70	V	-37.71	55.26
	6 930.00	-57.32	12.05	-50.02	4.28	V	-42.25	59.80
	8 662.50	-54.11	11.48	-40.67	4.85	H	-34.04	51.59
20385 (1753.5)	3 507.00	-46.55	12.25	-52.25	2.98	V	-42.98	60.53
	5 260.50	-42.71	13.25	-41.90	3.71	V	-32.36	49.91
	7 014.00	-54.03	11.63	-45.70	4.32	V	-38.40	55.95
	8 767.50	-45.38	11.25	-31.15	4.88	V	-24.78	42.33

□ OPERATING FREQUENCY: 1732.5 MHz
 □ MEASURED OUTPUT POWER: 17.64 dBm = 0.058 W
 □ MODE: LTE B4
 □ MODULATION SIGNAL: 5 MHz QPSK
 □ DISTANCE: 3 meters
 □ LIMIT: $43 + 10 \log_{10} (W) =$ 30.64 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
19975 (1712.5)	3 425.00	-47.81	12.60	-53.71	2.96	V	-44.06	61.70
	5 137.50	-44.73	12.45	-41.88	3.66	V	-33.09	50.73
	6 850.00	-57.33	12.20	-50.71	4.25	V	-42.76	60.40
20175 (1732.5)	3 465.00	-45.56	12.43	-51.30	2.97	V	-41.84	59.48
	5 197.50	-44.74	12.90	-43.32	3.70	V	-34.12	51.76
	6 930.00	-56.73	12.05	-49.43	4.28	V	-41.66	59.30
	8 662.50	-54.60	11.48	-41.16	4.85	V	-34.53	52.17
20375 (1752.5)	3 505.00	-44.76	12.28	-50.54	2.98	V	-41.24	58.88
	5 257.50	-40.73	13.25	-39.92	3.71	V	-30.38	48.02
	7 010.00	-57.02	11.65	-49.00	4.32	V	-41.67	59.31
	8 762.50	-43.09	11.28	-29.01	4.87	H	-22.60	40.24

- OPERATING FREQUENCY:

1732.5 MHz
- MEASURED OUTPUT POWER:

17.52 dBm = 0.056 W
- MODE:

LTE B4
- MODULATION SIGNAL:

10 MHz QPSK
- DISTANCE:

3 meters
- LIMIT: $43 + 10 \log_{10} (W) =$

30.52 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
20000 (1715.0)	3 430.00	-48.24	12.60	-54.03	2.96	V	-44.39	61.91
	5 145.00	-50.05	12.48	-47.34	3.66	V	-38.52	56.04
	6 860.00	-57.03	12.18	-50.25	4.27	H	-42.34	59.86
20175 (1732.5)	3 465.00	-45.18	12.43	-50.92	2.97	V	-41.46	58.98
	5 197.50	-45.91	12.90	-44.49	3.70	V	-35.29	52.81
	6 930.00	-56.41	12.05	-49.11	4.28	V	-41.34	58.86
20350 (1750.0)	3 500.00	-47.13	12.30	-52.99	2.98	V	-43.67	61.19
	5 250.00	-43.14	13.20	-42.28	3.71	V	-32.79	50.31
	7 000.00	-54.43	11.70	-46.32	4.31	V	-38.93	56.45
	8 750.00	-44.86	11.30	-30.56	4.88	H	-24.14	41.66

□ OPERATING FREQUENCY: 1732.5 MHz
 □ MEASURED OUTPUT POWER: 17.57 dBm = 0.057 W
 □ MODE: LTE B4
 □ MODULATION SIGNAL: 15 MHz QPSK
 □ DISTANCE: 3 meters
 □ LIMIT: $43 + 10 \log_{10} (W) =$ 30.57 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
20025 (1717.5)	3 435.00	-48.02	12.58	-53.83	2.97	V	-44.22	61.79
	5 152.50	-48.54	12.50	-45.97	3.65	V	-37.12	54.69
	6 870.00	-56.67	12.15	-50.05	4.27	V	-42.17	59.74
20175 (1732.5)	3 465.00	-46.77	12.43	-52.51	2.97	V	-43.05	60.62
	5 197.50	-44.21	12.90	-42.79	3.70	V	-33.59	51.16
	6 930.00	-56.90	12.05	-49.60	4.28	H	-41.83	59.40
20325 (1747.5)	3 495.00	-48.30	12.33	-54.03	2.98	V	-44.68	62.25
	5 242.50	-48.08	13.13	-47.12	3.70	V	-37.69	55.26
	6 990.00	-54.99	11.78	-46.68	4.29	V	-39.19	56.76
	8 737.50	-44.89	11.33	-30.48	4.88	V	-24.03	41.60

- ▣ OPERATING FREQUENCY: 1732.5 MHz
- ▣ MEASURED OUTPUT POWER: 17.72 dBm = 0.059 W
- ▣ MODE: LTE B4
- ▣ MODULATION SIGNAL: 20 MHz QPSK
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: $43 + 10 \log_{10} (W) =$ 30.72 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
20050 (1720.0)	3 440.00	-47.54	12.55	-53.37	2.97	V	-43.79	61.51
	5 160.00	-50.71	12.60	-48.30	3.65	V	-39.35	57.07
	6 880.00	-56.71	12.15	-50.21	4.27	H	-42.33	60.05
20175 (1732.5)	3 465.00	-47.00	12.43	-52.74	2.97	V	-43.28	61.00
	5 197.50	-46.99	12.90	-45.57	3.70	V	-36.37	54.09
	6 930.00	-56.95	12.05	-49.65	4.28	V	-41.88	59.60
	8 662.50	-53.30	11.48	-39.86	4.85	H	-33.23	50.95
20300 (1745.0)	3 490.00	-47.74	12.35	-53.34	2.97	V	-43.96	61.68
	5 235.00	-44.89	13.09	-43.93	3.70	V	-34.53	52.25
	6 980.00	-56.10	11.85	-47.93	4.28	V	-40.36	58.08
	8 725.00	-50.61	11.35	-36.55	4.85	H	-30.05	47.77

8.4 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
4	1.4 MHz	1732.5	QPSK	6	0	5.96
			16-QAM			6.63
	3 MHz		QPSK	15		5.87
			16-QAM			6.55
	5 MHz		QPSK	25		5.72
			16-QAM			6.49
	10 MHz		QPSK	50		5.79
			16-QAM			6.44
	15 MHz		QPSK	75		5.71
			16-QAM			6.42
	20 MHz		QPSK	100		5.70
			16-QAM			6.46

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 110 ~ 121.

8.5 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
4	1.4 MHz	1732.5	QPSK	6	0	1.0944
			16-QAM			1.0958
	3 MHz		QPSK	15		2.7095
			16-QAM			2.7146
	5 MHz		QPSK	25		4.5145
			16-QAM			4.4953
	10 MHz		QPSK	50		8.9605
			16-QAM			8.9420
	15 MHz		QPSK	75		13.493
			16-QAM			13.469
	20 MHz		QPSK	100		17.908
			16-QAM			17.942

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 98 ~ 109.

8.6 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
4	1.4	1710.7	3.4213	28.976	-71.600	-42.624	-13.00
		1732.5	3.4647	28.976	-71.992	-43.016	
		1754.3	3.5100	28.976	-72.528	-43.552	
	3	1711.5	3.4213	28.976	-72.023	-43.047	
		1732.5	3.4632	28.976	-71.705	-42.729	
		1753.5	3.5100	28.976	-73.084	-44.108	
	5	1712.5	3.4213	28.976	-72.394	-43.418	
		1732.5	3.4612	28.976	-72.464	-43.488	
		1752.5	3.5100	28.976	-72.914	-43.938	
	10	1715.0	3.4218	28.976	-72.576	-43.600	
		1732.5	3.4567	28.976	-73.127	-44.151	
		1750.0	3.5095	28.976	-72.185	-43.209	
	15	1717.5	3.4223	28.976	-72.359	-43.383	
		1732.5	3.4522	28.976	-74.221	-45.245	
		1747.5	3.5090	28.976	-73.488	-44.512	
	20	1720.0	3.4228	28.976	-72.844	-43.868	
		1732.5	3.4477	28.976	-73.976	-45.000	
		1745.0	3.5085	28.976	-72.699	-43.723	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 122 ~ 157.
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	26.270
1 – 5	28.976
5 – 10	29.591
10 – 15	30.116
15 – 20	30.489
Above 20(26.5)	31.131

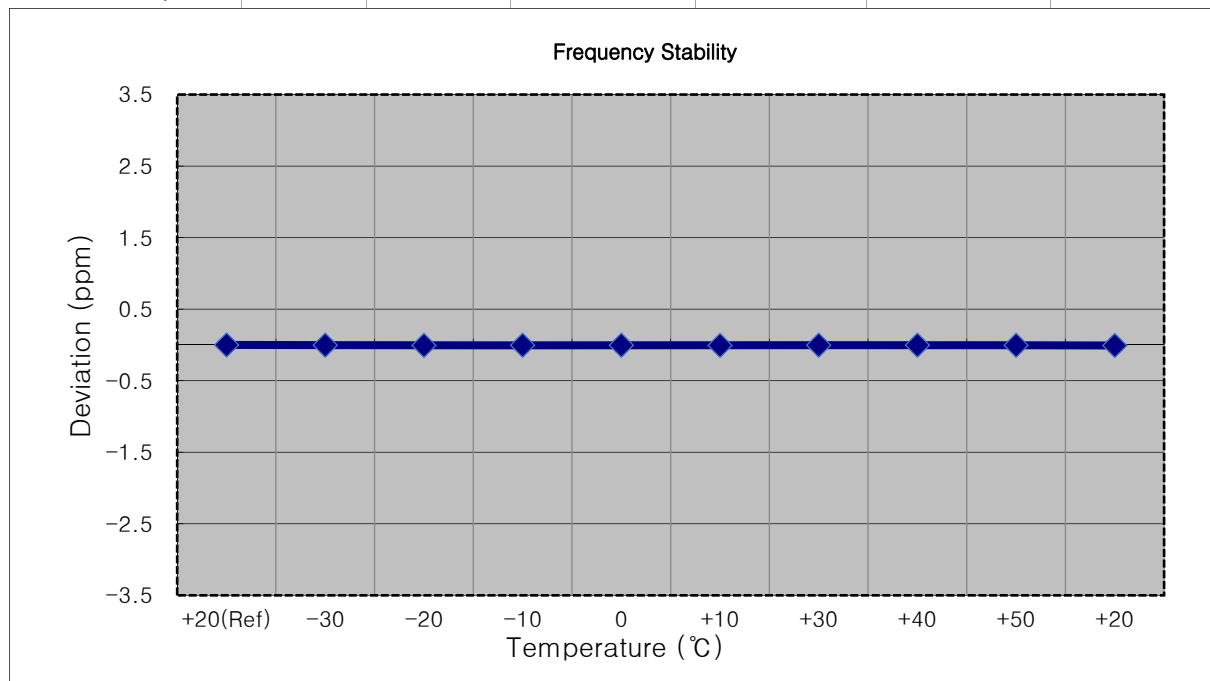
8.7 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 62 ~ 97.

8.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

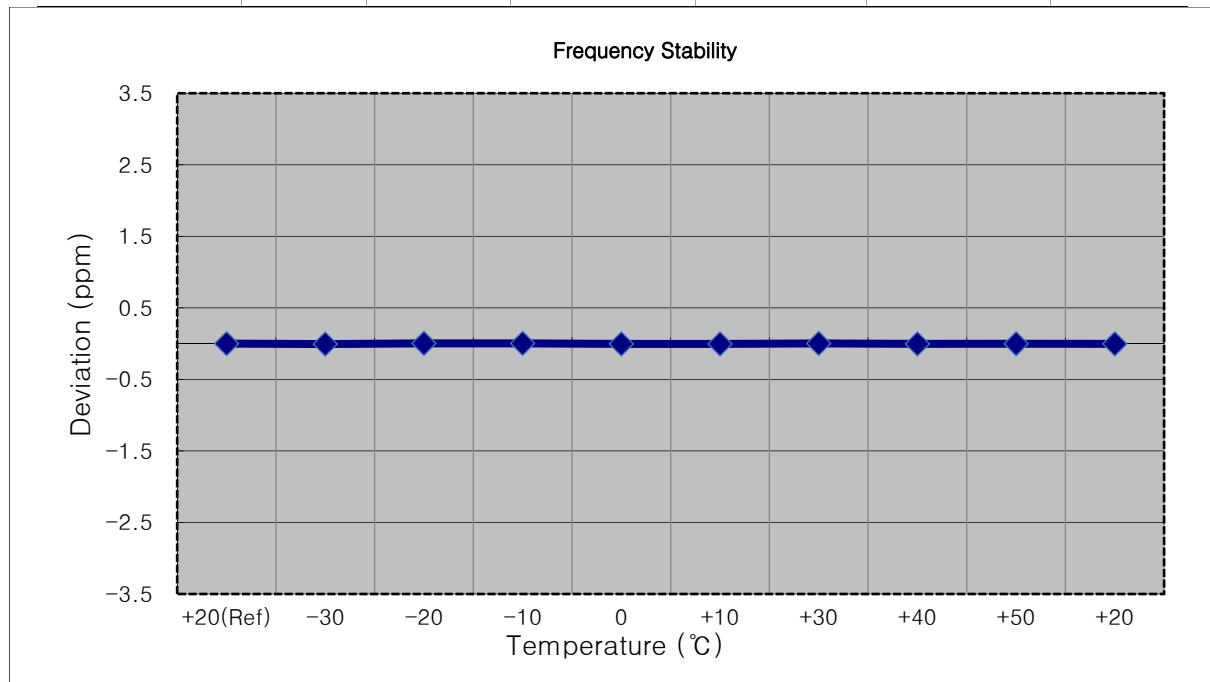
- MODE: LTE 4
- OPERATING FREQUENCY: 1710,700,000 Hz
- CHANNEL: 19957 (1.4 MHz)
- REFERENCE VOLTAGE: 12.000 VDC
- DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	12.000	+20(Ref)	1710 699 994	0.0	0.000 000	0.000
100%		-30	1710 699 989	-5.0	0.000 000	-0.003
100%		-20	1710 699 984	-10.4	-0.000 001	-0.006
100%		-10	1710 699 988	-6.1	0.000 000	-0.004
100%		0	1710 699 988	-6.5	0.000 000	-0.004
100%		+10	1710 699 983	-11.1	-0.000 001	-0.006
100%		+30	1710 699 989	-5.4	0.000 000	-0.003
100%		+40	1710 699 989	-4.9	0.000 000	-0.003
100%		+50	1710 699 987	-7.4	0.000 000	-0.004
Batt. Endpoint	10.200	+20	1710 699 981	-13.2	-0.000 001	-0.008



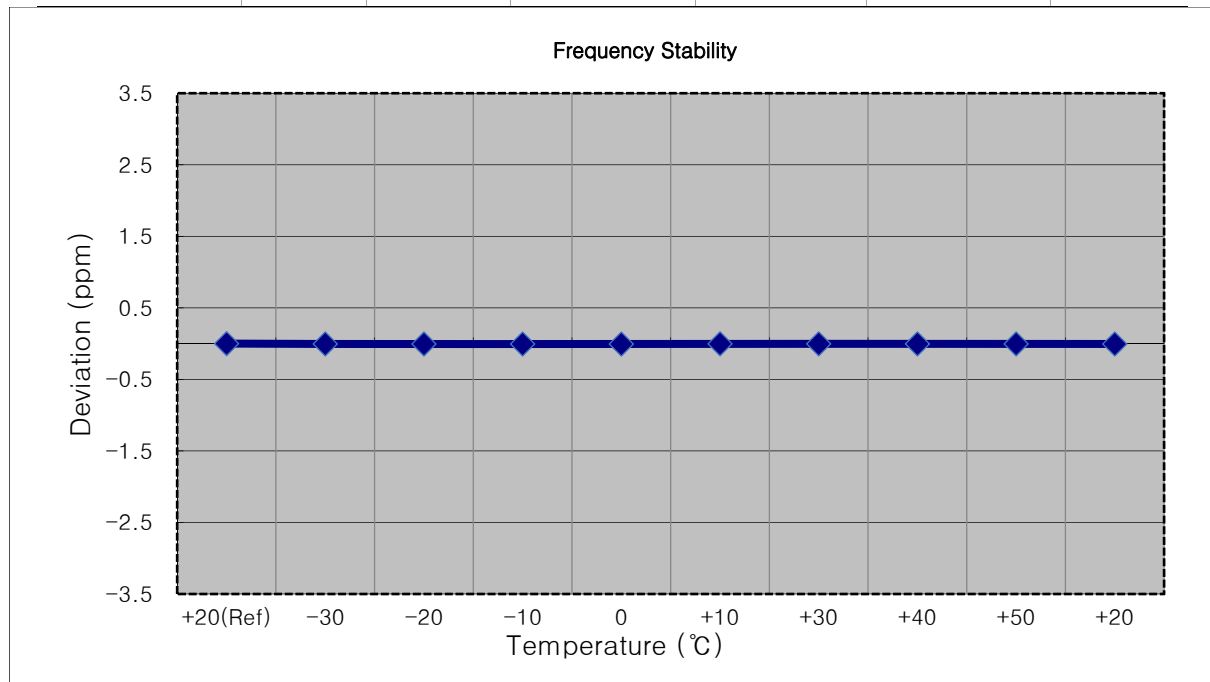
- MODE:
LTE 4
- OPERATING FREQUENCY:
1711,500,000 Hz
- CHANNEL:
19965 (3 MHz)
- REFERENCE VOLTAGE:
12.000 VDC
- DEVIATION LIMIT:
Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100%	12.000	+20(Ref)	1711 499 994	0.0	0.000 000	0.000
100%		-30	1711 499 983	-10.6	-0.000 001	-0.006
100%		-20	1711 500 000	6.0	0.000 000	0.004
100%		-10	1711 500 000	5.7	0.000 000	0.003
100%		0	1711 499 987	-6.5	0.000 000	-0.004
100%		+10	1711 499 987	-6.6	0.000 000	-0.004
100%		+30	1711 499 999	4.8	0.000 000	0.003
100%		+40	1711 499 988	-6.0	0.000 000	-0.004
100%		+50	1711 499 991	-3.1	0.000 000	-0.002
Batt. Endpoint	10.200	+20	1711 499 989	-5.2	0.000 000	-0.003



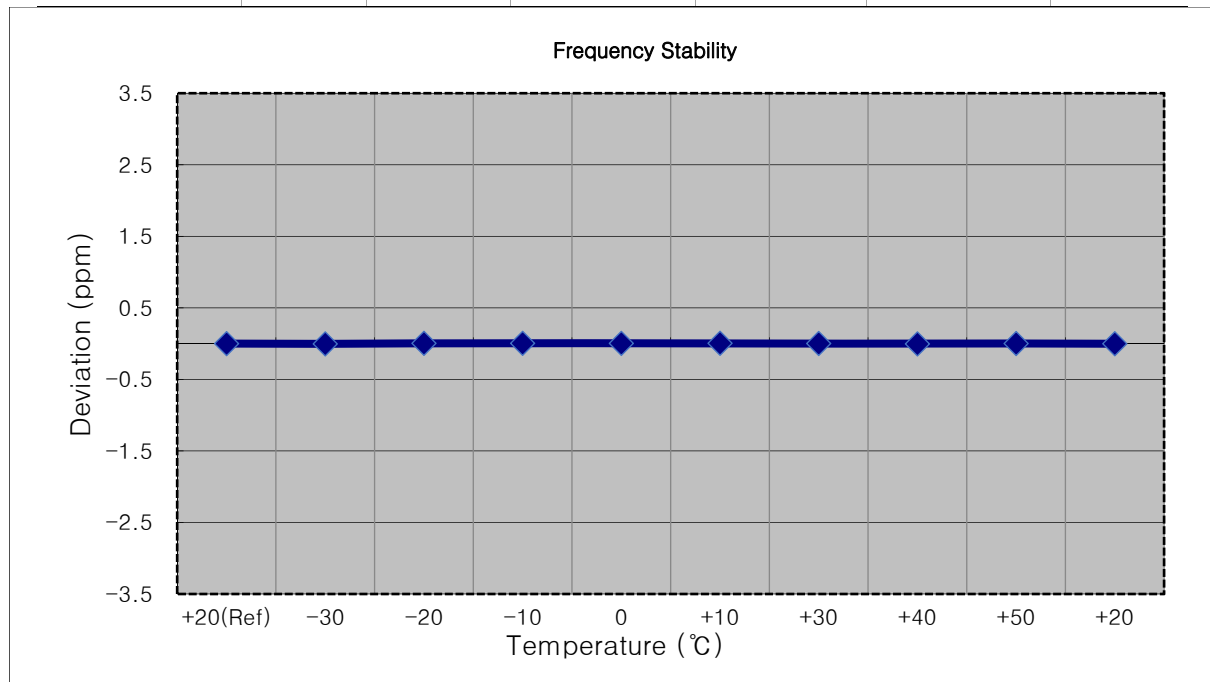
- MODE: LTE 4
 □ OPERATING FREQUENCY: 1712,500,000 Hz
 □ CHANNEL: 19975 (5 MHz)
 □ REFERENCE VOLTAGE: 12.000 VDC
 □ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	12.000	+20(Ref)	1712 499 990	0.0	0.000 000	0.000
100%		-30	1712 499 982	-7.9	0.000 000	-0.005
100%		-20	1712 499 981	-9.1	-0.000 001	-0.005
100%		-10	1712 499 980	-9.5	-0.000 001	-0.006
100%		0	1712 499 979	-10.5	-0.000 001	-0.006
100%		+10	1712 499 986	-4.1	0.000 000	-0.002
100%		+30	1712 499 984	-5.6	0.000 000	-0.003
100%		+40	1712 499 983	-6.5	0.000 000	-0.004
100%		+50	1712 499 983	-6.5	0.000 000	-0.004
Batt. Endpoint	10.200	+20	1712 499 981	-8.8	-0.000 001	-0.005



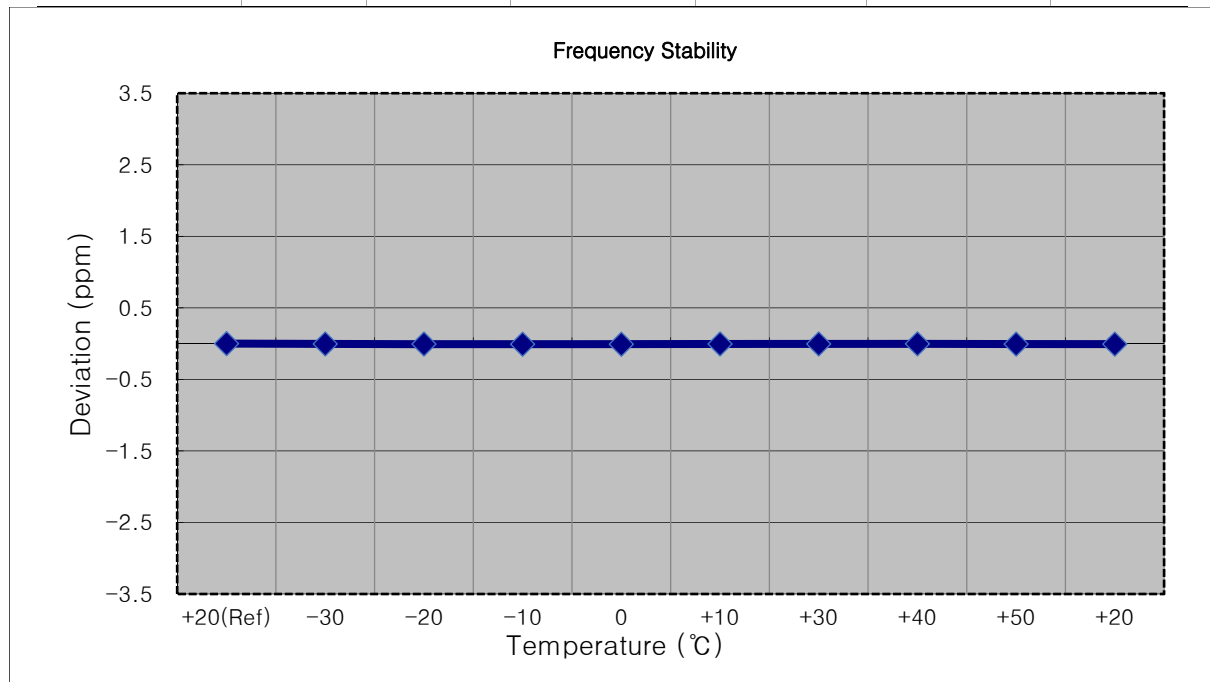
- MODE:
LTE 4
- OPERATING FREQUENCY:
1715,000,000 Hz
- CHANNEL:
20000 (10 MHz)
- REFERENCE VOLTAGE:
12.000 VDC
- DEVIATION LIMIT:
Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100%	12.000	+20(Ref)	1714 999 995	0.0	0.000 000	0.000
100%		-30	1714 999 989	-6.0	0.000 000	-0.003
100%		-20	1715 000 003	7.8	0.000 000	0.005
100%		-10	1715 000 002	7.3	0.000 000	0.004
100%		0	1715 000 001	5.9	0.000 000	0.003
100%		+10	1715 000 004	9.2	0.000 001	0.005
100%		+30	1714 999 999	4.2	0.000 000	0.002
100%		+40	1714 999 989	-6.2	0.000 000	-0.004
100%		+50	1714 999 998	3.0	0.000 000	0.002
Batt. Endpoint	10.200	+20	1714 999 992	-3.0	0.000 000	-0.002



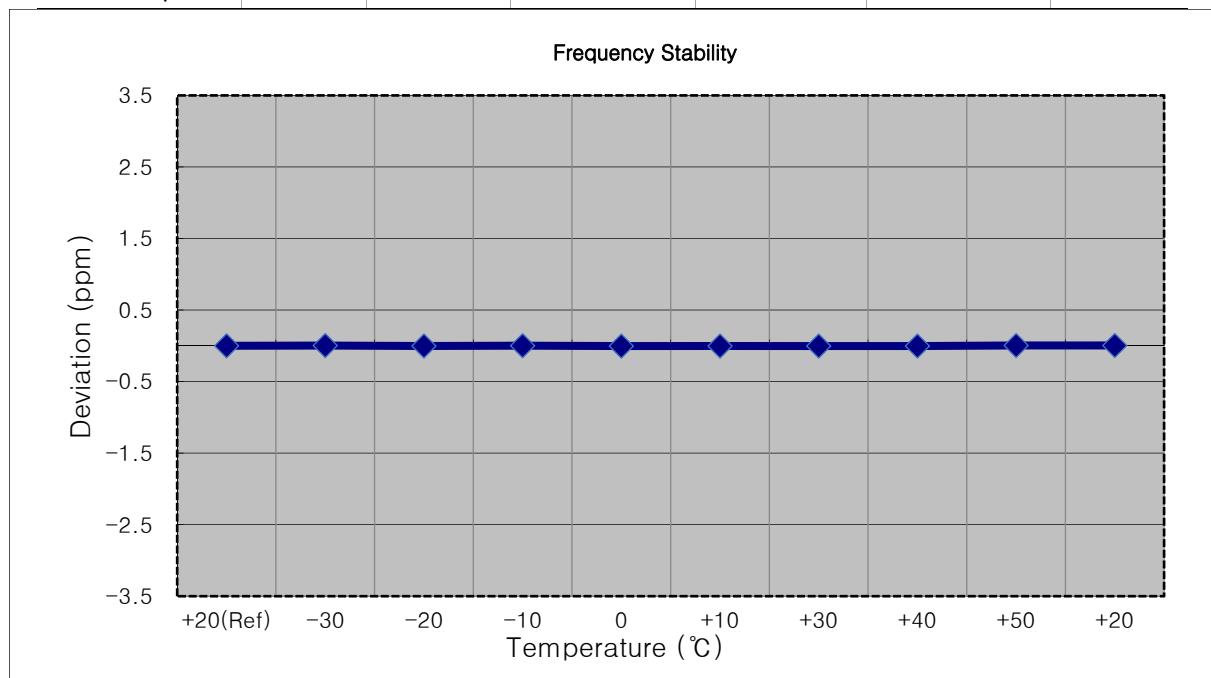
- MODE: LTE 4
 □ OPERATING FREQUENCY: 1717,500,000 Hz
 □ CHANNEL: 20025 (15 MHz)
 □ REFERENCE VOLTAGE: 12.000 VDC
 □ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	12.000	+20(Ref)	1717 499 991	0.0	0.000 000	0.000
100%		-30	1717 499 984	-7.5	0.000 000	-0.004
100%		-20	1717 499 980	-10.9	-0.000 001	-0.006
100%		-10	1717 499 977	-14.3	-0.000 001	-0.008
100%		0	1717 499 977	-14.5	-0.000 001	-0.008
100%		+10	1717 499 984	-7.2	0.000 000	-0.004
100%		+30	1717 499 984	-7.5	0.000 000	-0.004
100%		+40	1717 499 985	-5.7	0.000 000	-0.003
100%		+50	1717 499 980	-11.3	-0.000 001	-0.007
Batt. Endpoint	10.200	+20	1717 499 979	-11.8	-0.000 001	-0.007



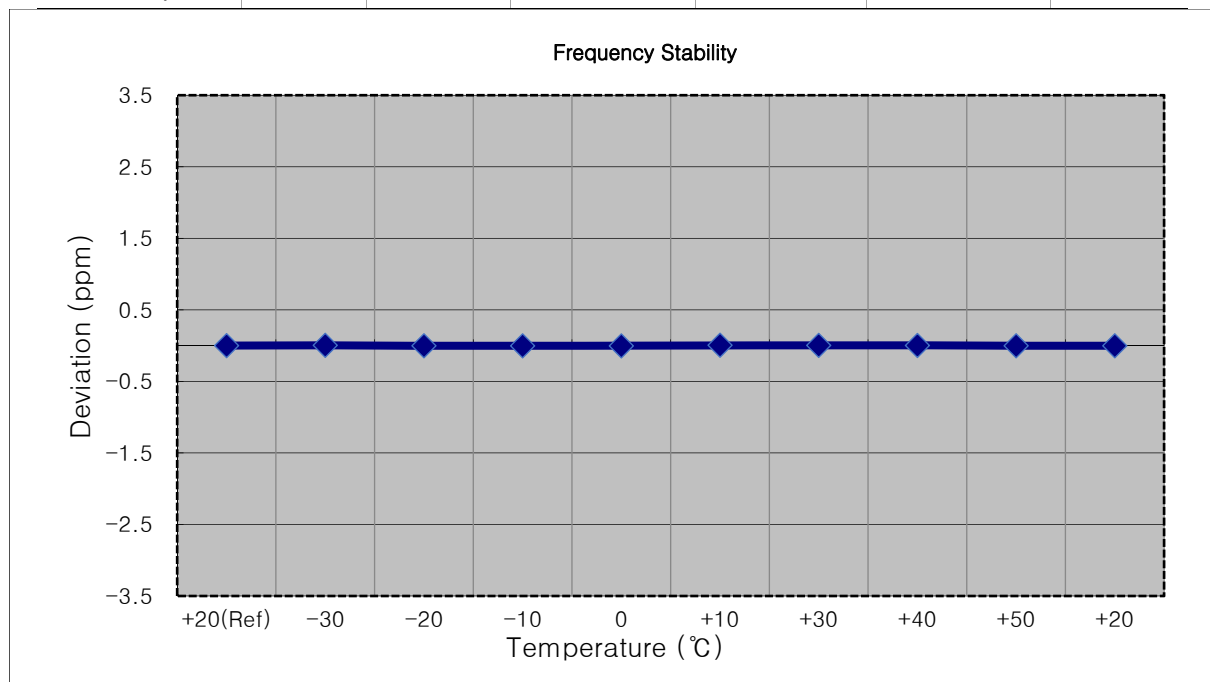
- MODE:
LTE 4
- OPERATING FREQUENCY:
1720,000,000 Hz
- CHANNEL:
20050 (20 MHz)
- REFERENCE VOLTAGE:
12.000 VDC
- DEVIATION LIMIT:
Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100%	12.000	+20(Ref)	1719 999 997	0.0	0.000 000	0.000
100%		-30	1720 000 003	5.8	0.000 000	0.003
100%		-20	1719 999 993	-4.3	0.000 000	-0.003
100%		-10	1720 000 000	2.7	0.000 000	0.002
100%		0	1719 999 991	-6.2	0.000 000	-0.004
100%		+10	1719 999 992	-5.1	0.000 000	-0.003
100%		+30	1719 999 991	-5.9	0.000 000	-0.003
100%		+40	1719 999 991	-6.0	0.000 000	-0.003
100%		+50	1720 000 005	7.8	0.000 000	0.005
Batt. Endpoint	10.200	+20	1720 000 005	7.4	0.000 000	0.004



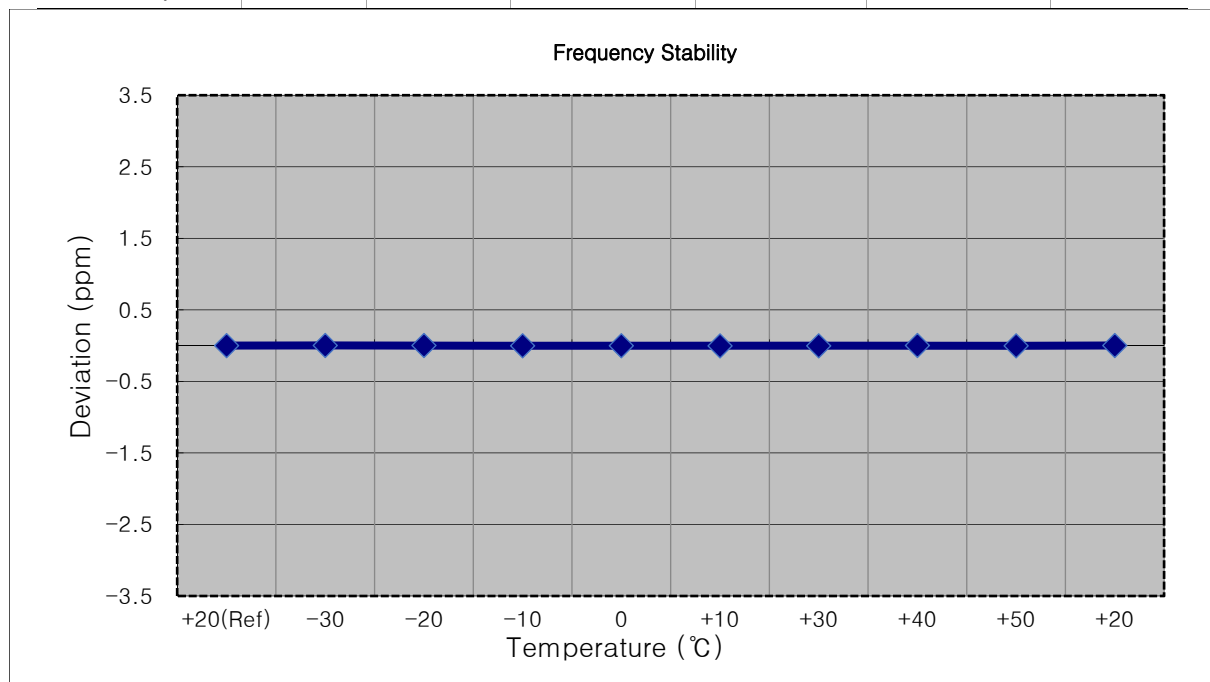
- MODE: LTE 4
- OPERATING FREQUENCY: 1732,500,000 Hz
- CHANNEL: 20175 (1.4 MHz)
- REFERENCE VOLTAGE: 12.000 VDC
- DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	12.000	+20(Ref)	1732 500 007	0.0	0.000 000	0.000
100%		-30	1732 500 014	7.2	0.000 000	0.004
100%		-20	1732 500 003	-3.8	0.000 000	-0.002
100%		-10	1732 500 002	-4.7	0.000 000	-0.003
100%		0	1732 500 001	-5.9	0.000 000	-0.003
100%		+10	1732 500 017	10.2	0.000 001	0.006
100%		+30	1732 500 013	6.1	0.000 000	0.004
100%		+40	1732 500 011	4.4	0.000 000	0.003
100%		+50	1732 500 003	-3.3	0.000 000	-0.002
Batt. Endpoint	10.200	+20	1732 500 003	-3.6	0.000 000	-0.002



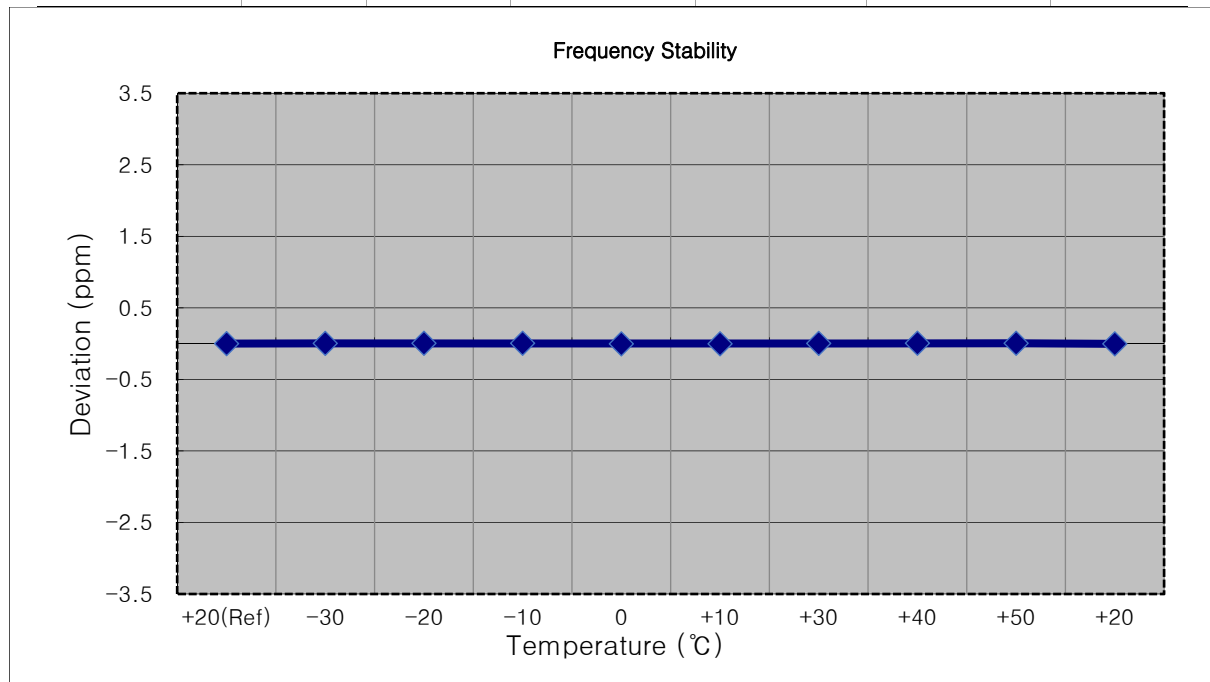
- ☐ MODE: LTE 4
- ☐ OPERATING FREQUENCY: 1732,500,000 Hz
- ☐ CHANNEL: 20175 (3 MHz)
- ☐ REFERENCE VOLTAGE: 12.000 VDC
- ☐ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100%	12.000	+20(Ref)	1732 500 006	0.0	0.000 000	0.000
100%		-30	1732 500 011	4.2	0.000 000	0.002
100%		-20	1732 500 010	3.6	0.000 000	0.002
100%		-10	1732 500 003	-3.9	0.000 000	-0.002
100%		0	1732 500 004	-2.7	0.000 000	-0.002
100%		+10	1732 500 000	-6.4	0.000 000	-0.004
100%		+30	1732 500 001	-5.1	0.000 000	-0.003
100%		+40	1732 500 011	4.1	0.000 000	0.002
100%		+50	1732 500 001	-5.0	0.000 000	-0.003
Batt. Endpoint	10.200	+20	1732 500 010	3.1	0.000 000	0.002



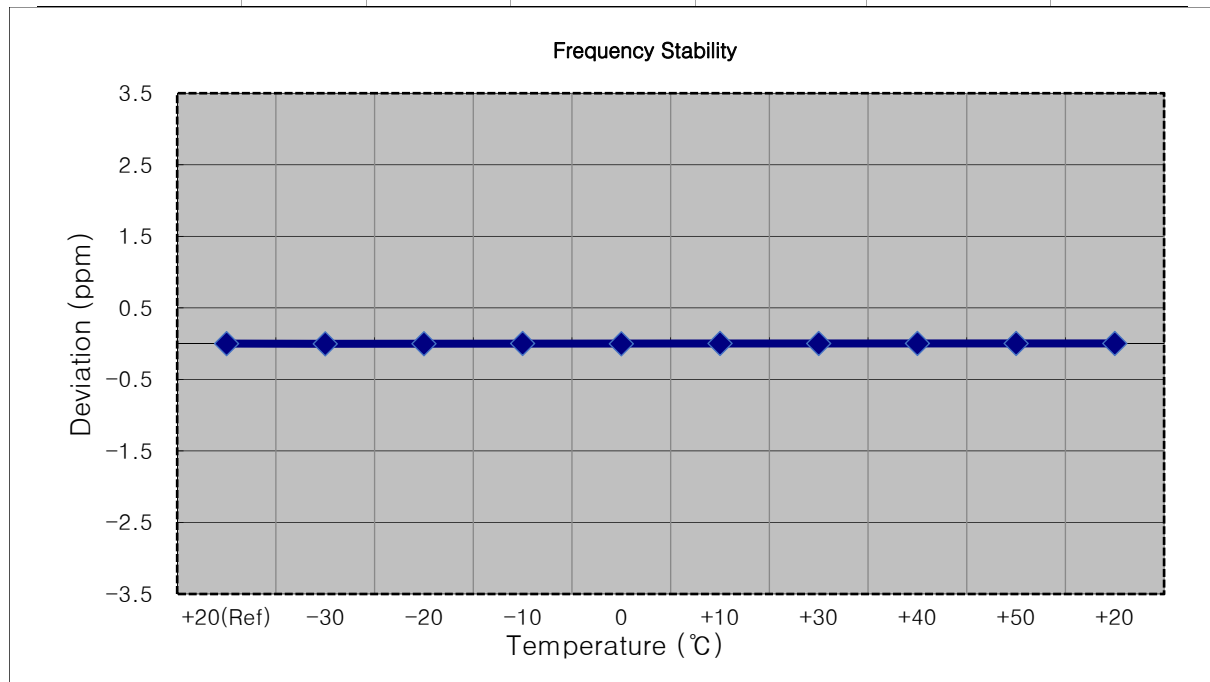
- MODE:
LTE 4
- OPERATING FREQUENCY:
1732,500,000 Hz
- CHANNEL:
20175 (5 MHz)
- REFERENCE VOLTAGE:
12.000 VDC
- DEVIATION LIMIT:
Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100%	12.000	+20(Ref)	1732 500 007	0.0	0.000 000	0.000
100%		-30	1732 500 013	5.8	0.000 000	0.003
100%		-20	1732 500 016	9.2	0.000 001	0.005
100%		-10	1732 500 015	8.5	0.000 000	0.005
100%		0	1732 500 002	-5.1	0.000 000	-0.003
100%		+10	1732 500 003	-4.3	0.000 000	-0.002
100%		+30	1732 500 014	7.0	0.000 000	0.004
100%		+40	1732 500 017	10.3	0.000 001	0.006
100%		+50	1732 500 016	8.9	0.000 001	0.005
Batt. Endpoint	10.200	+20	1732 500 002	-5.3	0.000 000	-0.003



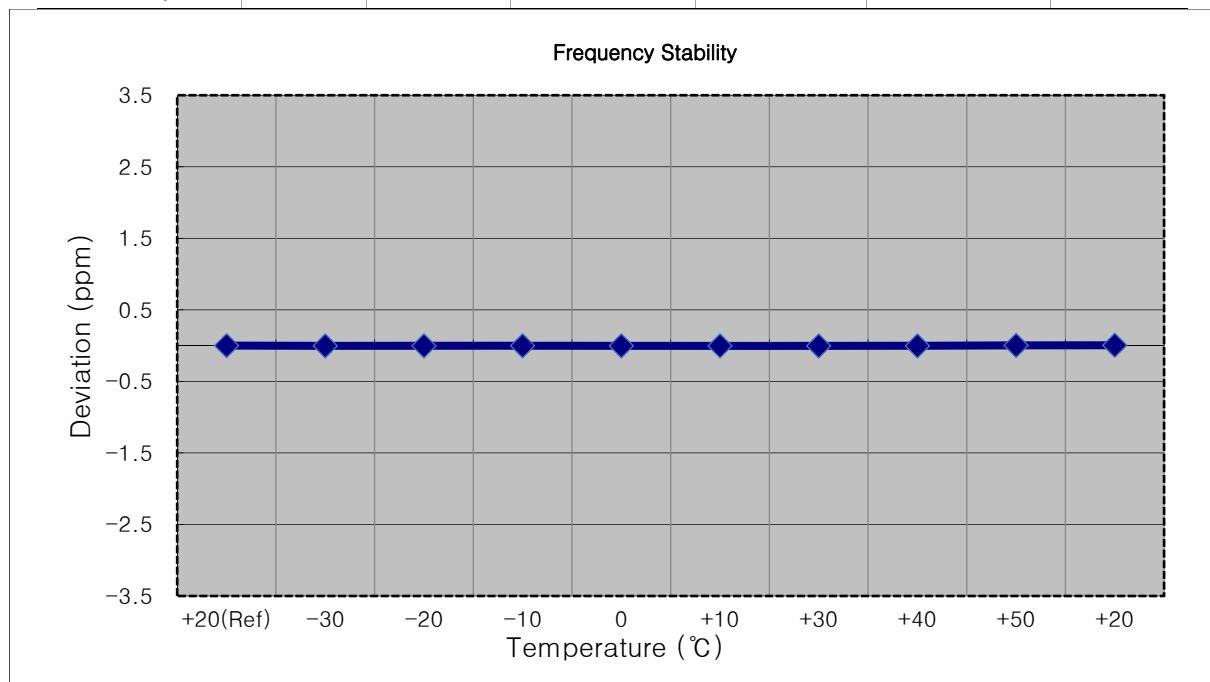
- MODE:
LTE 4
- OPERATING FREQUENCY:
1732,500,000 Hz
- CHANNEL:
20175 (10 MHz)
- REFERENCE VOLTAGE:
12.000 VDC
- DEVIATION LIMIT:
Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100%	12.000	+20(Ref)	1732 499 994	0.0	0.000 000	0.000
100%		-30	1732 499 989	-4.8	0.000 000	-0.003
100%		-20	1732 499 991	-3.1	0.000 000	-0.002
100%		-10	1732 499 997	3.2	0.000 000	0.002
100%		0	1732 499 990	-4.3	0.000 000	-0.002
100%		+10	1732 499 998	4.5	0.000 000	0.003
100%		+30	1732 499 998	4.4	0.000 000	0.003
100%		+40	1732 499 999	4.6	0.000 000	0.003
100%		+50	1732 499 998	4.0	0.000 000	0.002
Batt. Endpoint	10.200	+20	1732 499 998	4.3	0.000 000	0.002



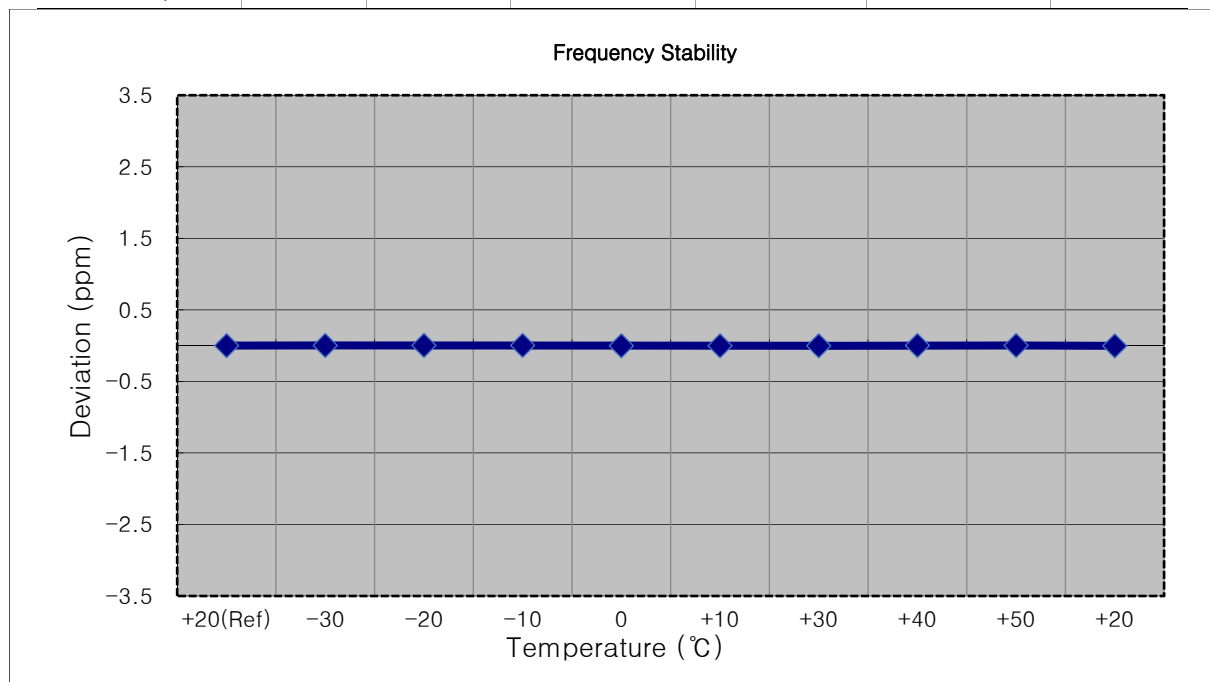
- MODE: LTE 4
 □ OPERATING FREQUENCY: 1732,500,000 Hz
 □ CHANNEL: 20175 (15 MHz)
 □ REFERENCE VOLTAGE: 12.000 VDC
 □ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	12.000	+20(Ref)	1732 499 993	0.0	0.000 000	0.000
100%		-30	1732 499 987	-6.0	0.000 000	-0.003
100%		-20	1732 499 988	-5.4	0.000 000	-0.003
100%		-10	1732 499 989	-4.1	0.000 000	-0.002
100%		0	1732 499 988	-4.8	0.000 000	-0.003
100%		+10	1732 499 988	-5.3	0.000 000	-0.003
100%		+30	1732 499 986	-7.5	0.000 000	-0.004
100%		+40	1732 499 987	-6.0	0.000 000	-0.003
100%		+50	1732 499 999	5.7	0.000 000	0.003
Batt. Endpoint	10.200	+20	1732 500 002	8.7	0.000 001	0.005



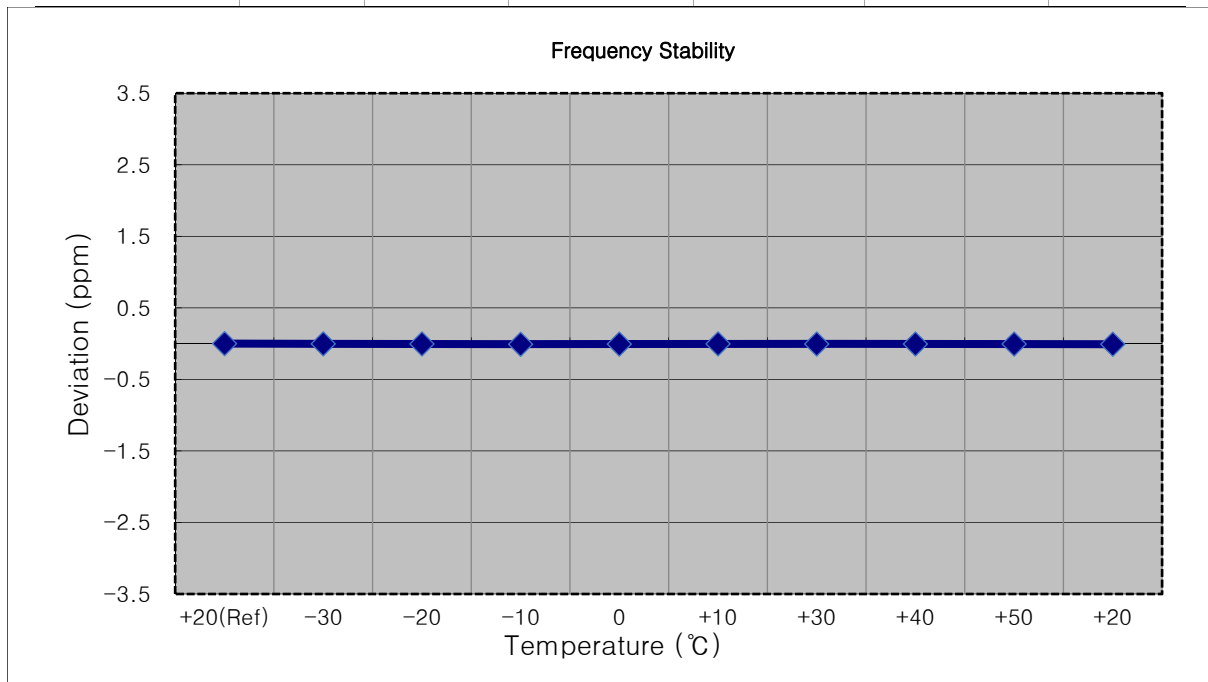
- MODE: LTE 4
 □ OPERATING FREQUENCY: 1732,500,000 Hz
 □ CHANNEL: 20175 (20 MHz)
 □ REFERENCE VOLTAGE: 12.000 VDC
 □ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	12.000	+20(Ref)	1732 500 003	0.0	0.000 000	0.000
100%		-30	1732 500 008	4.4	0.000 000	0.003
100%		-20	1732 500 009	5.6	0.000 000	0.003
100%		-10	1732 500 008	4.5	0.000 000	0.003
100%		0	1732 499 999	-4.3	0.000 000	-0.002
100%		+10	1732 499 999	-4.5	0.000 000	-0.003
100%		+30	1732 499 999	-4.4	0.000 000	-0.003
100%		+40	1732 500 007	3.5	0.000 000	0.002
100%		+50	1732 500 007	3.6	0.000 000	0.002
Batt. Endpoint	10.200	+20	1732 499 997	-6.5	0.000 000	-0.004



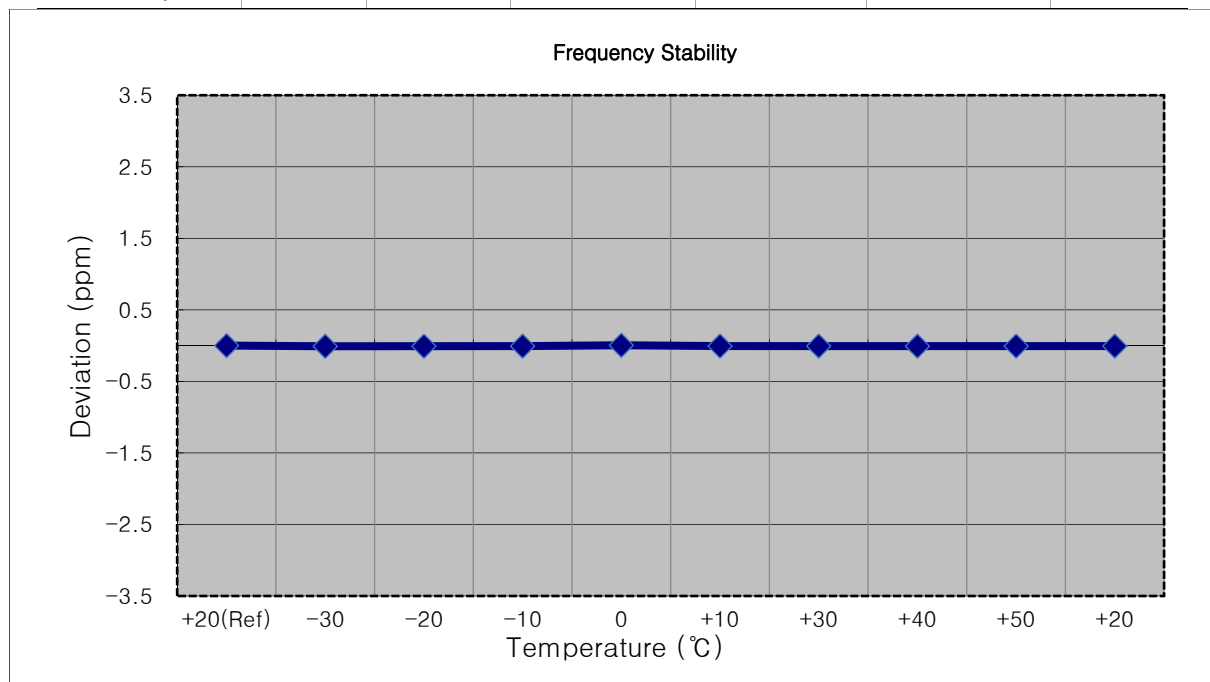
- MODE:
LTE 4
- OPERATING FREQUENCY:
1754,300,000 Hz
- CHANNEL:
20393 (1.4 MHz)
- REFERENCE VOLTAGE:
12.000 VDC
- DEVIATION LIMIT:
Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100%	12.000	+20(Ref)	1754 299 993	0.0	0.000 000	0.000
100%		-30	1754 299 988	-5.6	0.000 000	-0.003
100%		-20	1754 299 986	-7.8	0.000 000	-0.004
100%		-10	1754 299 978	-15.6	-0.000 001	-0.009
100%		0	1754 299 982	-11.5	-0.000 001	-0.007
100%		+10	1754 299 988	-5.1	0.000 000	-0.003
100%		+30	1754 299 984	-9.0	-0.000 001	-0.005
100%		+40	1754 299 984	-9.0	-0.000 001	-0.005
100%		+50	1754 299 983	-10.7	-0.000 001	-0.006
Batt. Endpoint	10.200	+20	1754 299 979	-14.5	-0.000 001	-0.008



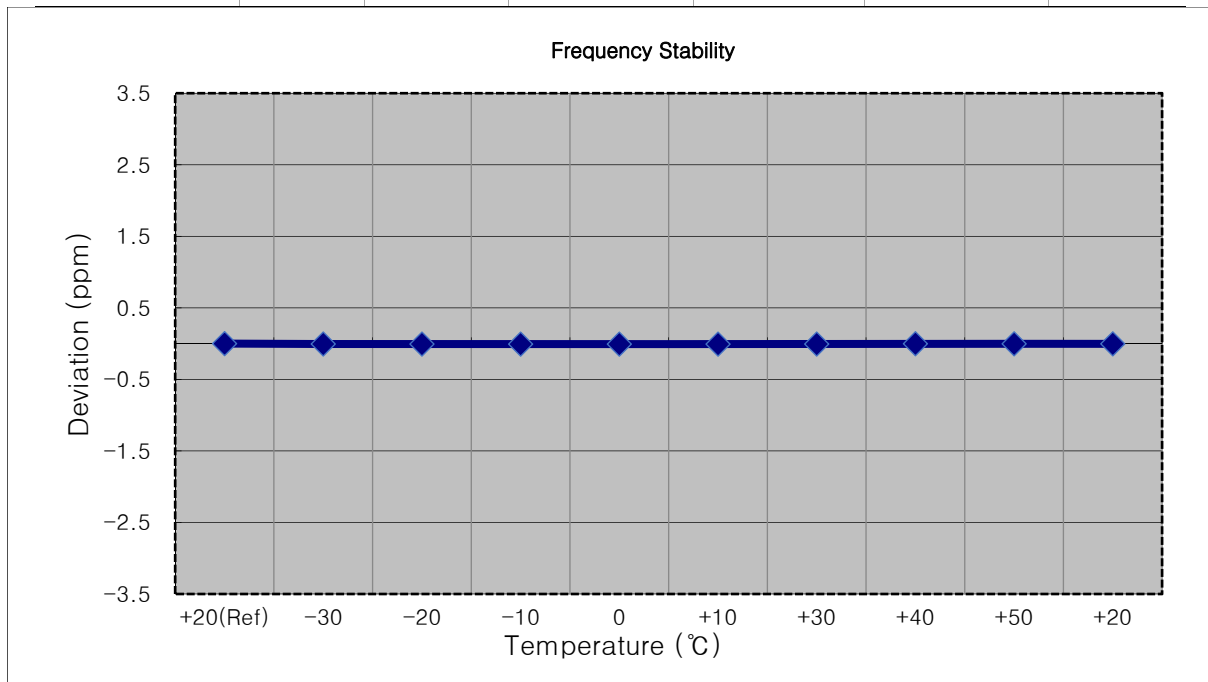
- ☐ MODE: LTE 4
- ☐ OPERATING FREQUENCY: 1753,500,000 Hz
- ☐ CHANNEL: 20385 (3 MHz)
- ☐ REFERENCE VOLTAGE: 12.000 VDC
- ☐ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100%	12.000	+20(Ref)	1753 499 988	0.0	0.000 000	0.000
100%		-30	1753 499 972	-16.4	-0.000 001	-0.009
100%		-20	1753 499 974	-14.4	-0.000 001	-0.008
100%		-10	1753 499 976	-12.6	-0.000 001	-0.007
100%		0	1753 499 997	8.4	0.000 000	0.005
100%		+10	1753 499 977	-10.7	-0.000 001	-0.006
100%		+30	1753 499 976	-12.3	-0.000 001	-0.007
100%		+40	1753 499 975	-12.8	-0.000 001	-0.007
100%		+50	1753 499 976	-12.4	-0.000 001	-0.007
Batt. Endpoint	10.200	+20	1753 499 977	-11.3	-0.000 001	-0.006



- MODE: LTE 4
 □ OPERATING FREQUENCY: 1752,500,000 Hz
 □ CHANNEL: 20375 (5 MHz)
 □ REFERENCE VOLTAGE: 12.000 VDC
 □ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	12.000	+20(Ref)	1752 499 993	0.0	0.000 000	0.000
100%		-30	1752 499 984	-9.7	-0.000 001	-0.006
100%		-20	1752 499 983	-10.1	-0.000 001	-0.006
100%		-10	1752 499 982	-11.3	-0.000 001	-0.006
100%		0	1752 499 981	-12.0	-0.000 001	-0.007
100%		+10	1752 499 982	-11.8	-0.000 001	-0.007
100%		+30	1752 499 983	-10.6	-0.000 001	-0.006
100%		+40	1752 499 990	-2.9	0.000 000	-0.002
100%		+50	1752 499 988	-5.0	0.000 000	-0.003
Batt. Endpoint	10.200	+20	1752 499 988	-5.6	0.000 000	-0.003



- MODE:

OPERATING FREQUENCY:

CHANNEL:

REFERENCE VOLTAGE:

DEVIATION LIMIT:

LTE 4

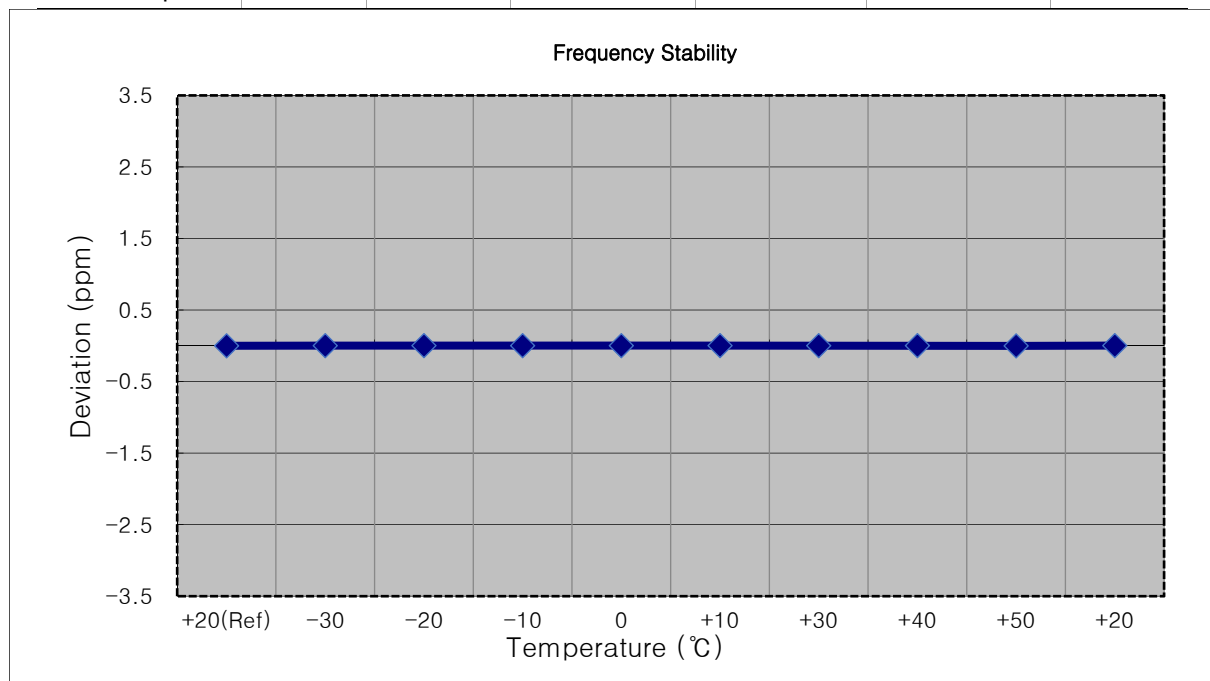
1750,000,000 Hz

20350 (10 MHz)

12.000 VDC

Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	12.000	+20(Ref)	1750 000 005	0.0	0.000 000	0.000
100%		-30	1750 000 009	3.8	0.000 000	0.002
100%		-20	1750 000 011	5.4	0.000 000	0.003
100%		-10	1750 000 008	3.2	0.000 000	0.002
100%		0	1750 000 009	3.8	0.000 000	0.002
100%		+10	1750 000 009	4.3	0.000 000	0.002
100%		+30	1750 000 008	3.3	0.000 000	0.002
100%		+40	1750 000 010	4.5	0.000 000	0.003
100%		+50	1750 000 003	-2.2	0.000 000	-0.001
Batt. Endpoint	10.200	+20	1750 000 010	5.0	0.000 000	0.003



- MODE:

LTE 4
- OPERATING FREQUENCY:

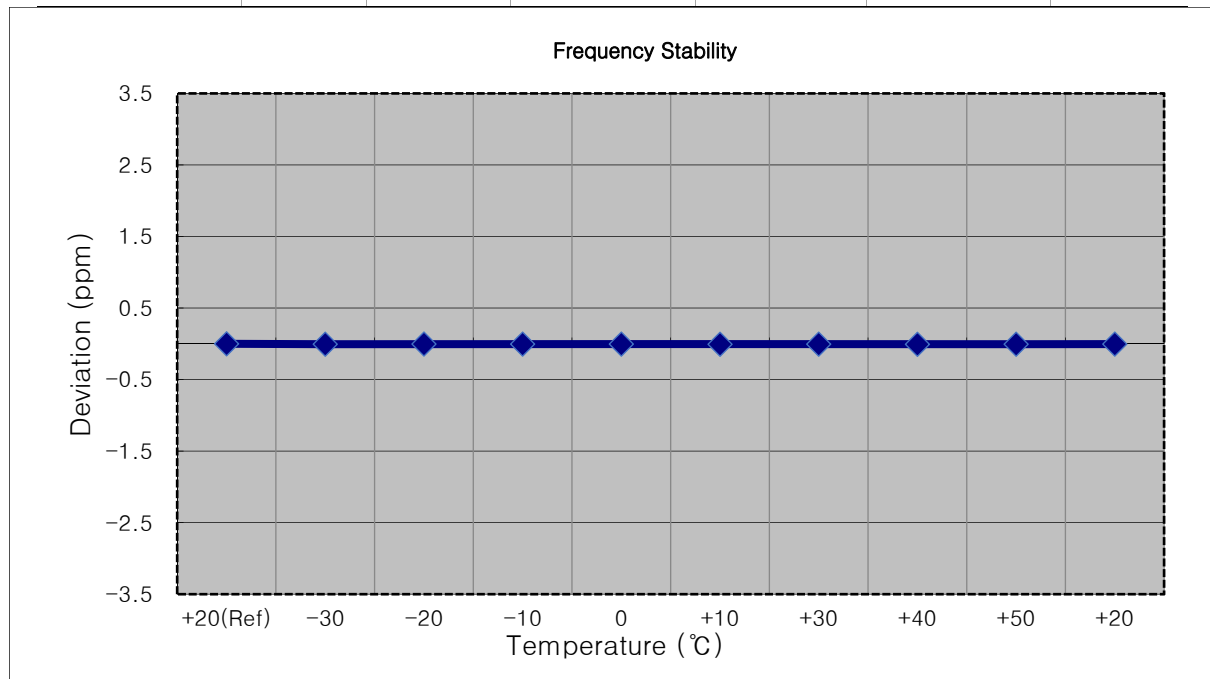
1747,500,000 Hz
- CHANNEL:

20325 (15 MHz)
- REFERENCE VOLTAGE:

12.000 VDC
- DEVIATION LIMIT:

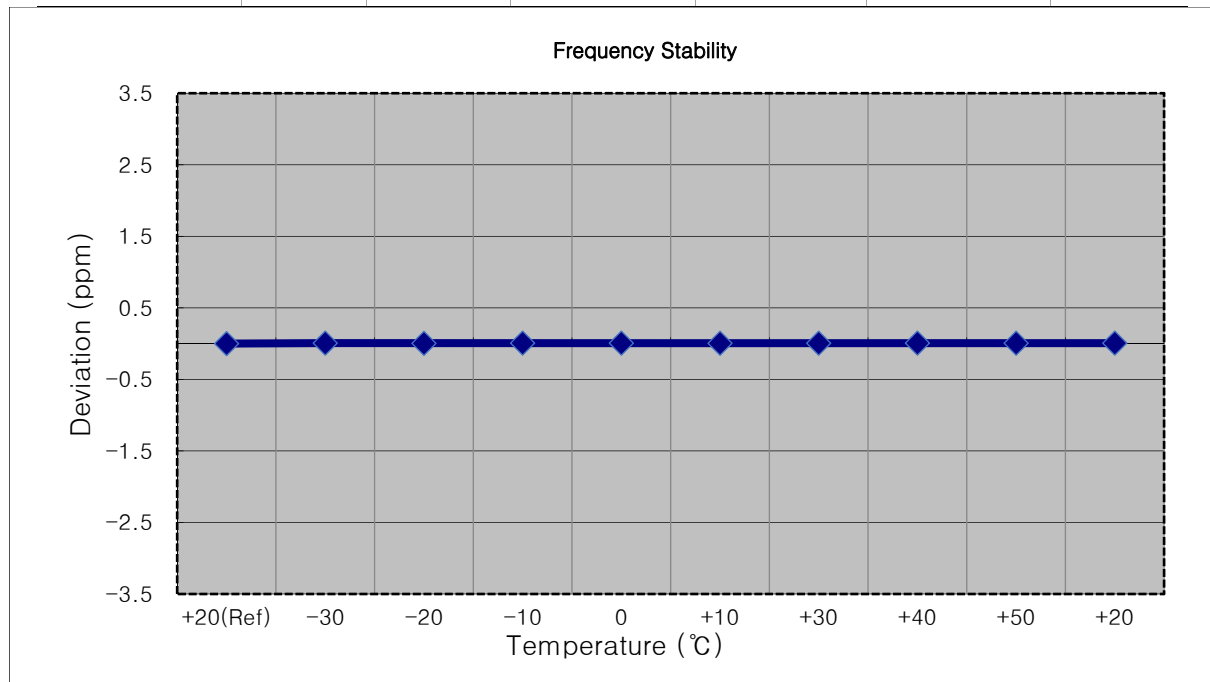
Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100%	12.000	+20(Ref)	1747 499 993	0.0	0.000 000	0.000
100%		-30	1747 499 984	-9.5	-0.000 001	-0.005
100%		-20	1747 499 987	-5.9	0.000 000	-0.003
100%		-10	1747 499 986	-6.9	0.000 000	-0.004
100%		0	1747 499 987	-6.2	0.000 000	-0.004
100%		+10	1747 499 983	-10.7	-0.000 001	-0.006
100%		+30	1747 499 985	-7.9	0.000 000	-0.005
100%		+40	1747 499 981	-11.9	-0.000 001	-0.007
100%		+50	1747 499 984	-9.5	-0.000 001	-0.005
Batt. Endpoint	10.200	+20	1747 499 986	-7.0	0.000 000	-0.004



- ☐ MODE: LTE 4
- ☐ OPERATING FREQUENCY: 1745,000,000 Hz
- ☐ CHANNEL: 20300 (20 MHz)
- ☐ REFERENCE VOLTAGE: 12.000 VDC
- ☐ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100%	12.000	+20(Ref)	1745 000 003	0.0	0.000 000	0.000
100%		-30	1745 000 014	11.7	0.000 001	0.007
100%		-20	1745 000 009	6.2	0.000 000	0.004
100%		-10	1745 000 016	13.1	0.000 001	0.008
100%		0	1745 000 015	12.1	0.000 001	0.007
100%		+10	1745 000 012	9.3	0.000 001	0.005
100%		+30	1745 000 013	10.3	0.000 001	0.006
100%		+40	1745 000 015	12.5	0.000 001	0.007
100%		+50	1745 000 013	10.7	0.000 001	0.006
Batt. Endpoint	10.200	+20	1745 000 014	11.4	0.000 001	0.007





9. TEST PLOTS

고객비밀
CUSTOMER SECRET

Report No. HCT-RF-2107-FC026

BW1.4M_BandEdge_Lowest Channel_QPSK_FullRB(1)



BW1.4M_BandEdge_Lowest Channel_QPSK_FullRB(2)



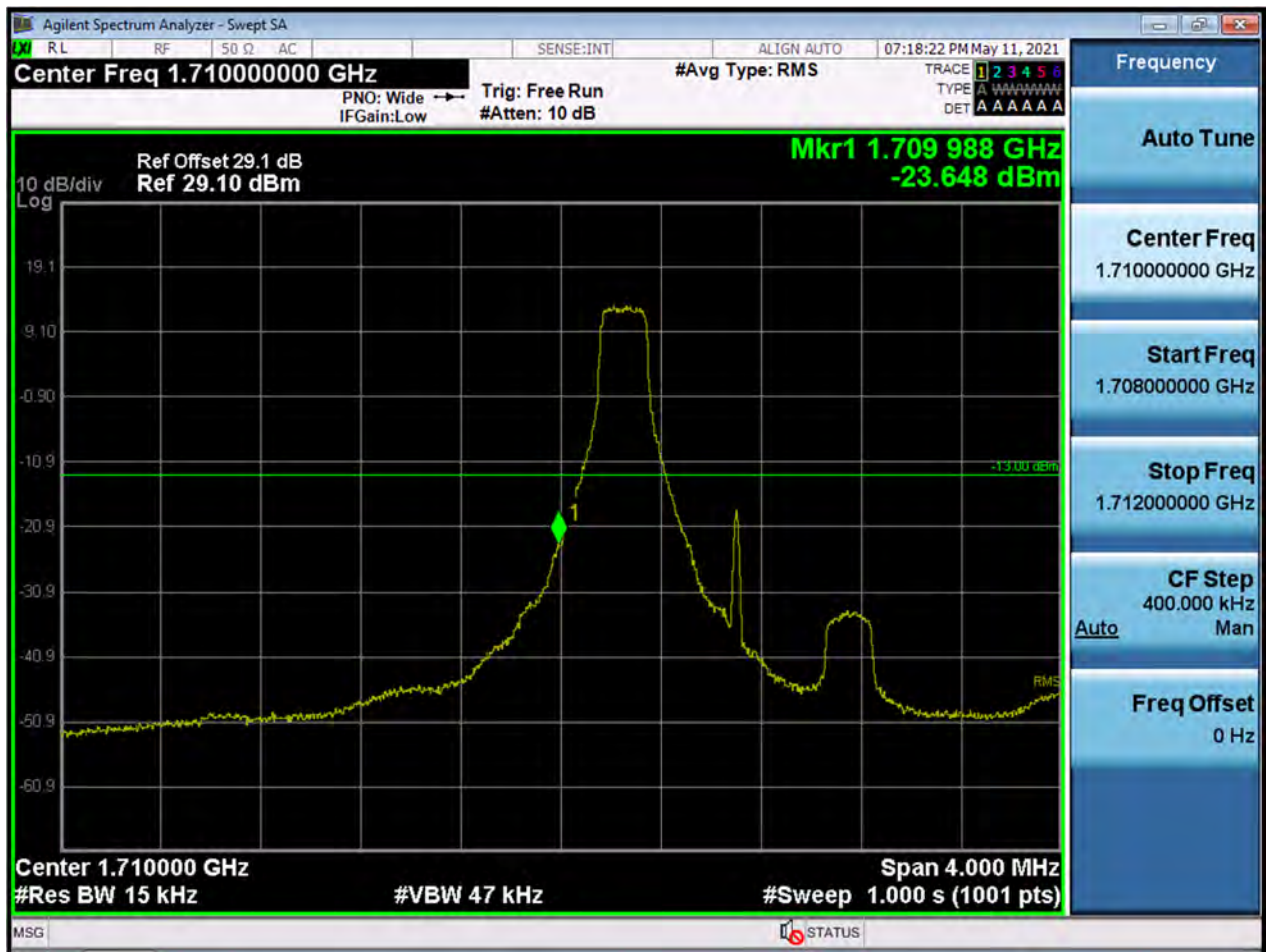
BW1.4M_BandEdge_Highest Channel_QPSK_FullRB(1)



BW1.4M_BandEdge_Highest Channel_QPSK_FullRB(2)



BW1.4M_BandEdge_Lowest Channel_QPSK_1RB



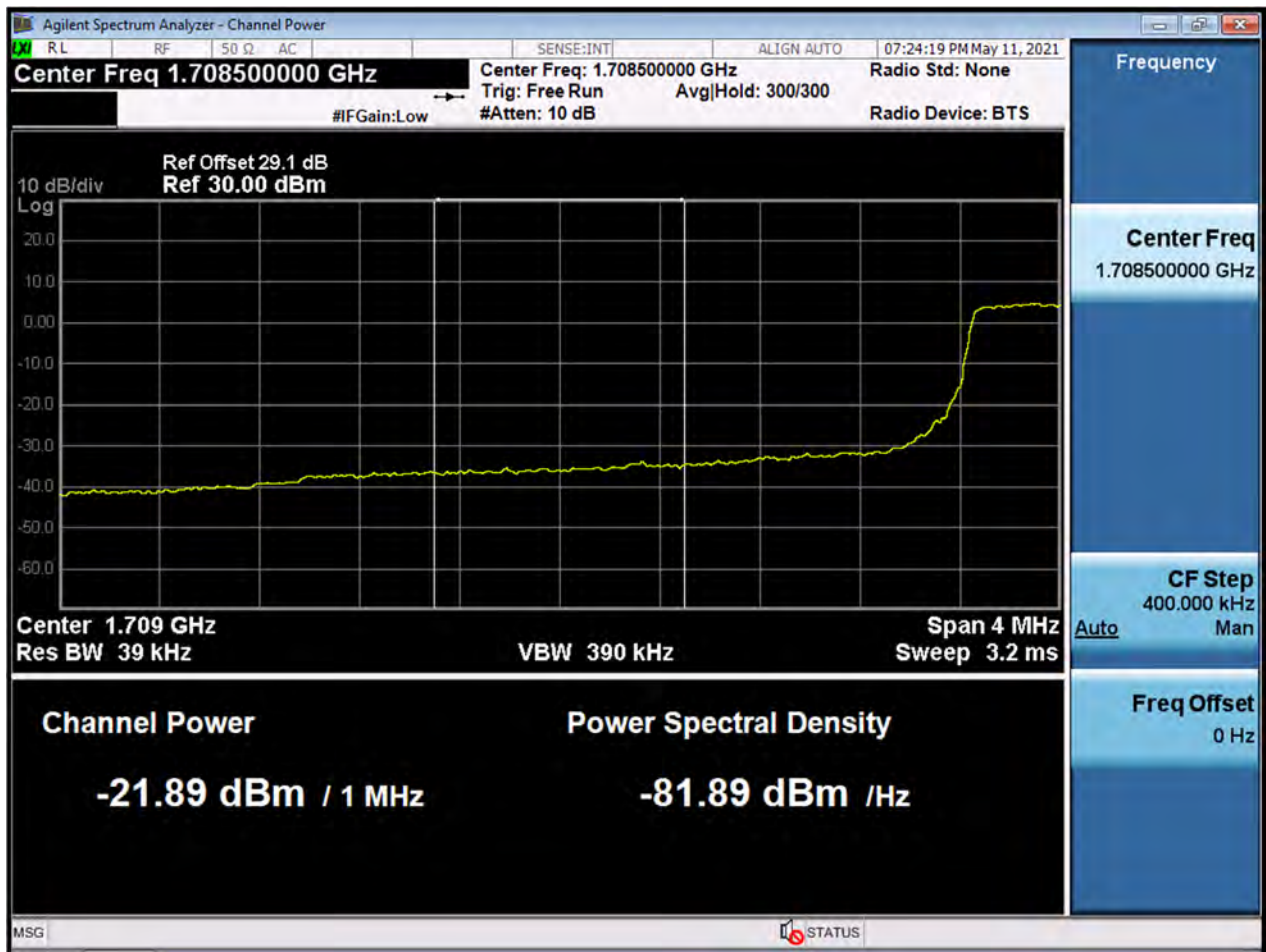
BW1.4M_BandEdge_Highest Channel_QPSK_1RB



BW3M_BandEdge_Lowest Channel_QPSK_FullRB(1)



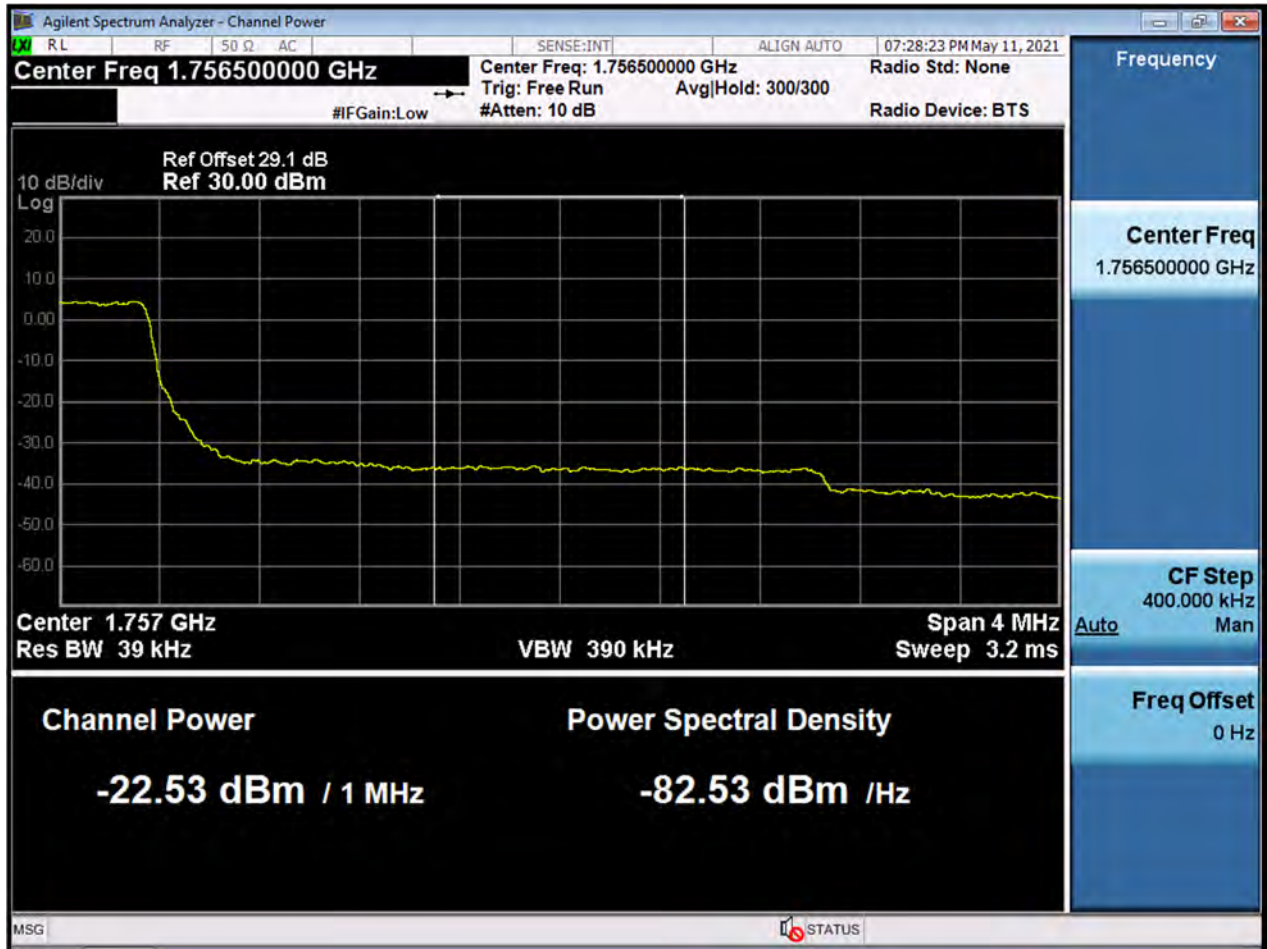
BW3M_BandEdge_Lowest Channel_QPSK_FullRB(2)



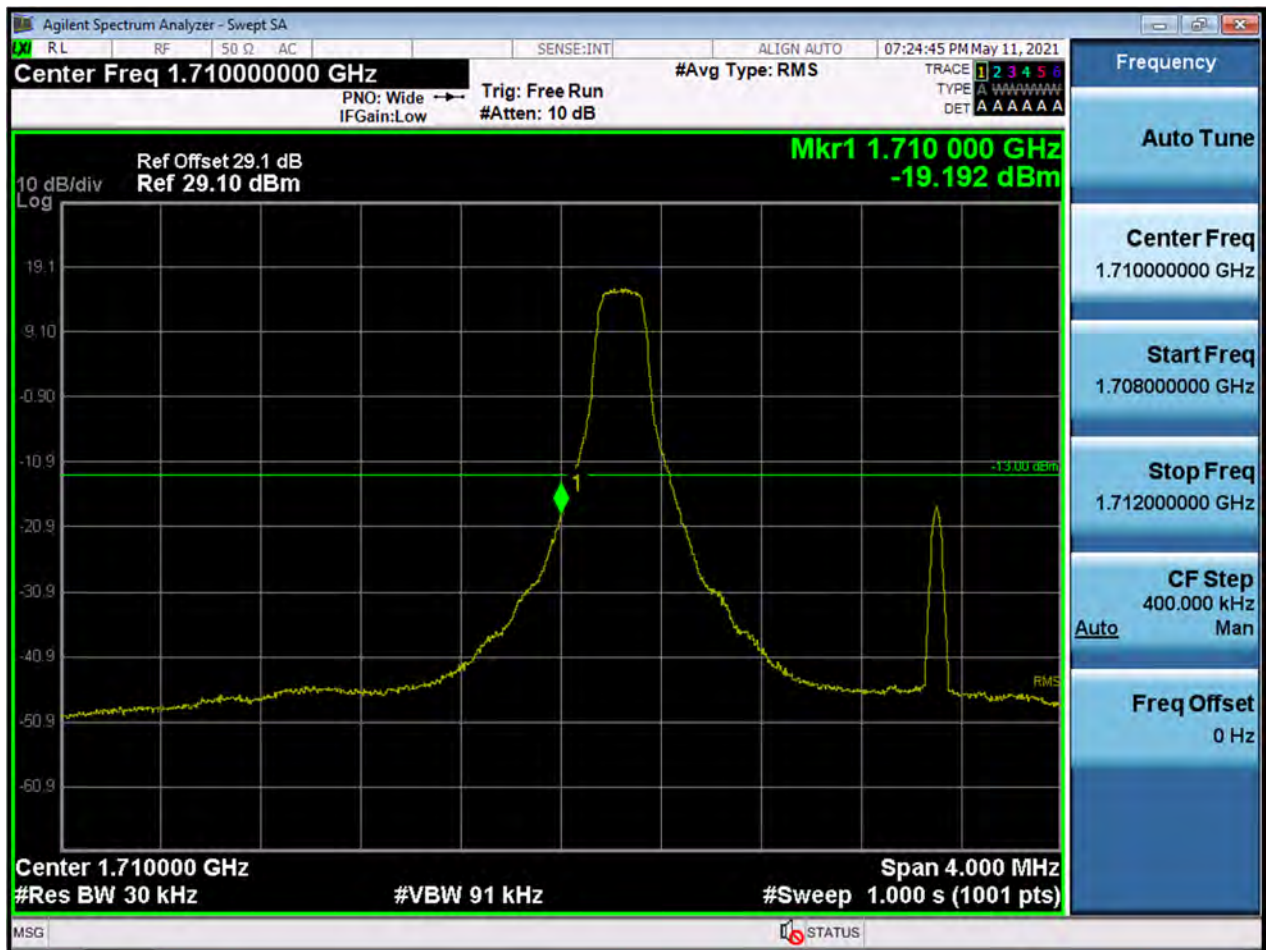
BW3M_BandEdge_Highest Channel_QPSK_FullRB(1)



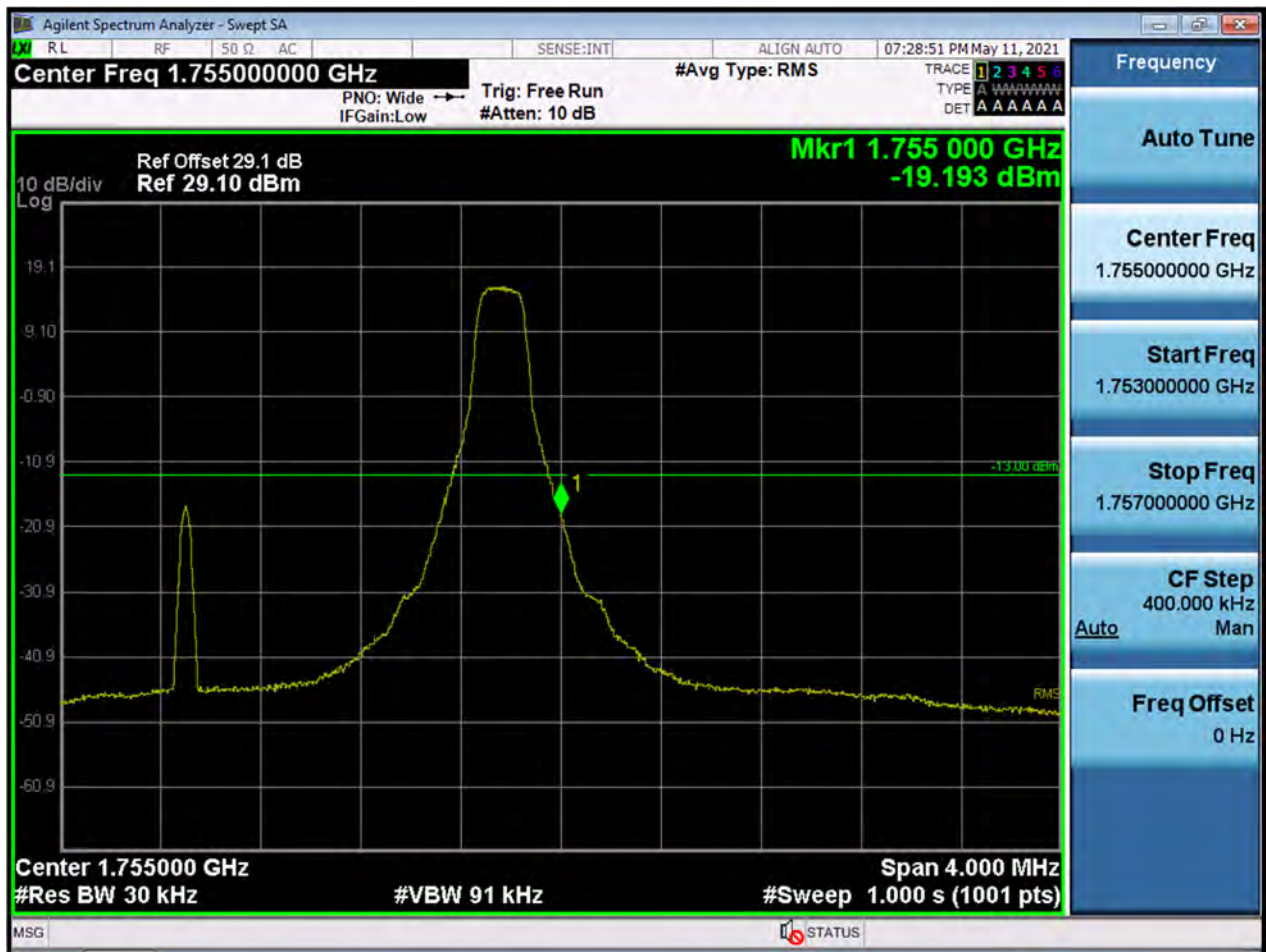
BW3M_BandEdge_Highest Channel_QPSK_FullRB(2)



BW3M_BandEdge_Lowest Channel_QPSK_1RB



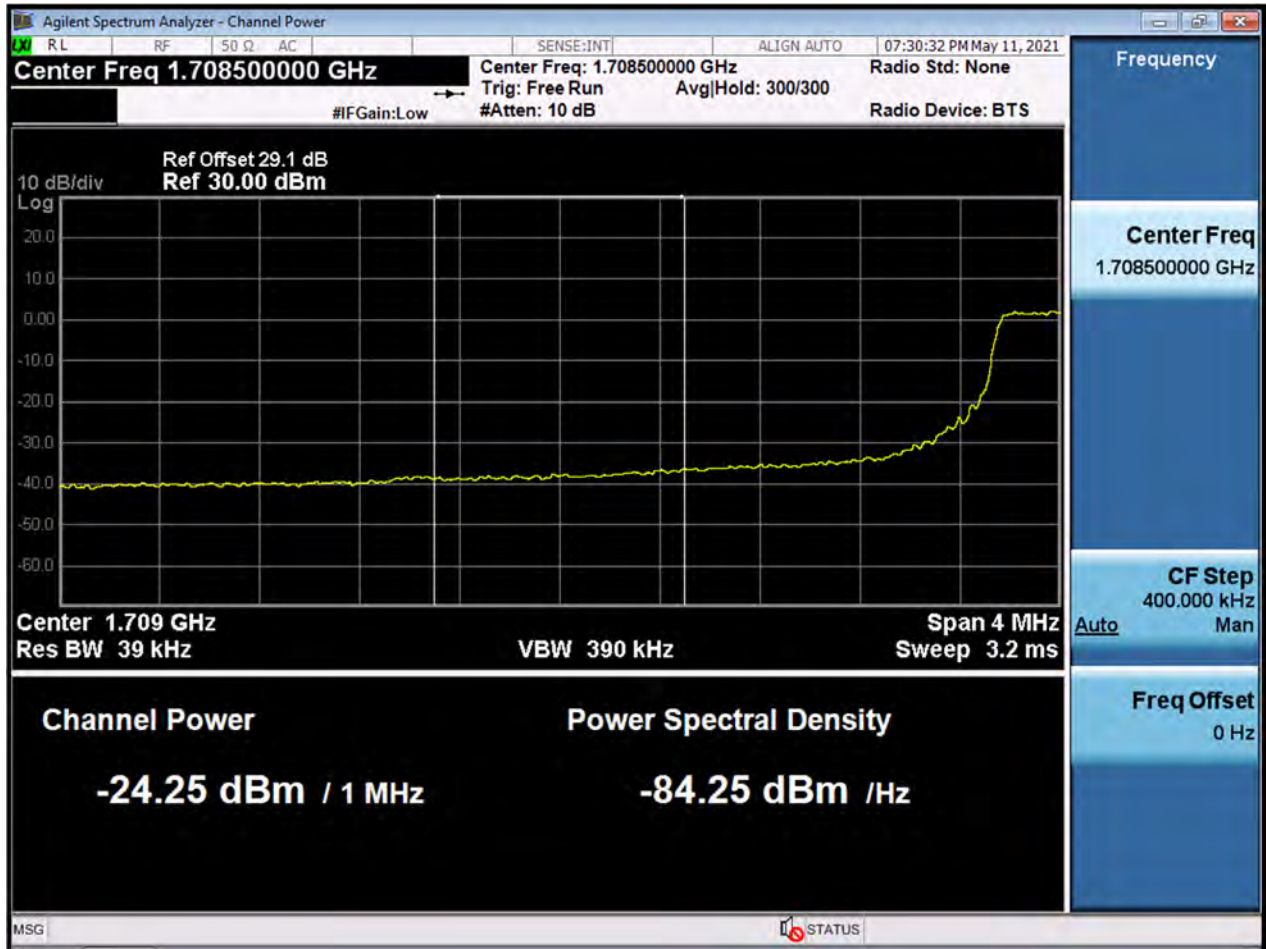
BW3M_BandEdge_Highest Channel_QPSK_1RB



BW5M_BandEdge_Lowest Channel_QPSK_FullRB(1)



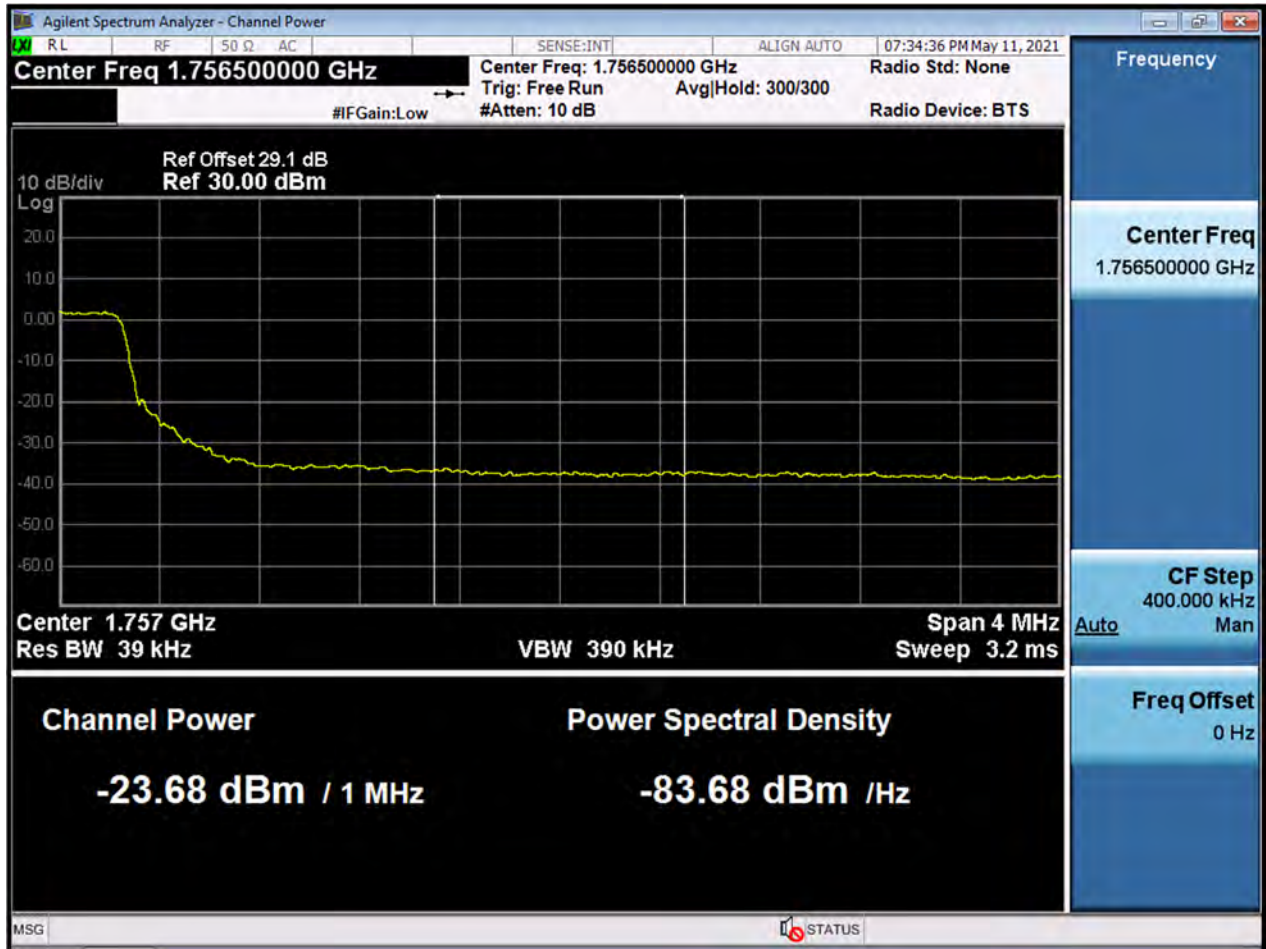
BW5M_BandEdge_Lowest Channel_QPSK_FullRB(2)



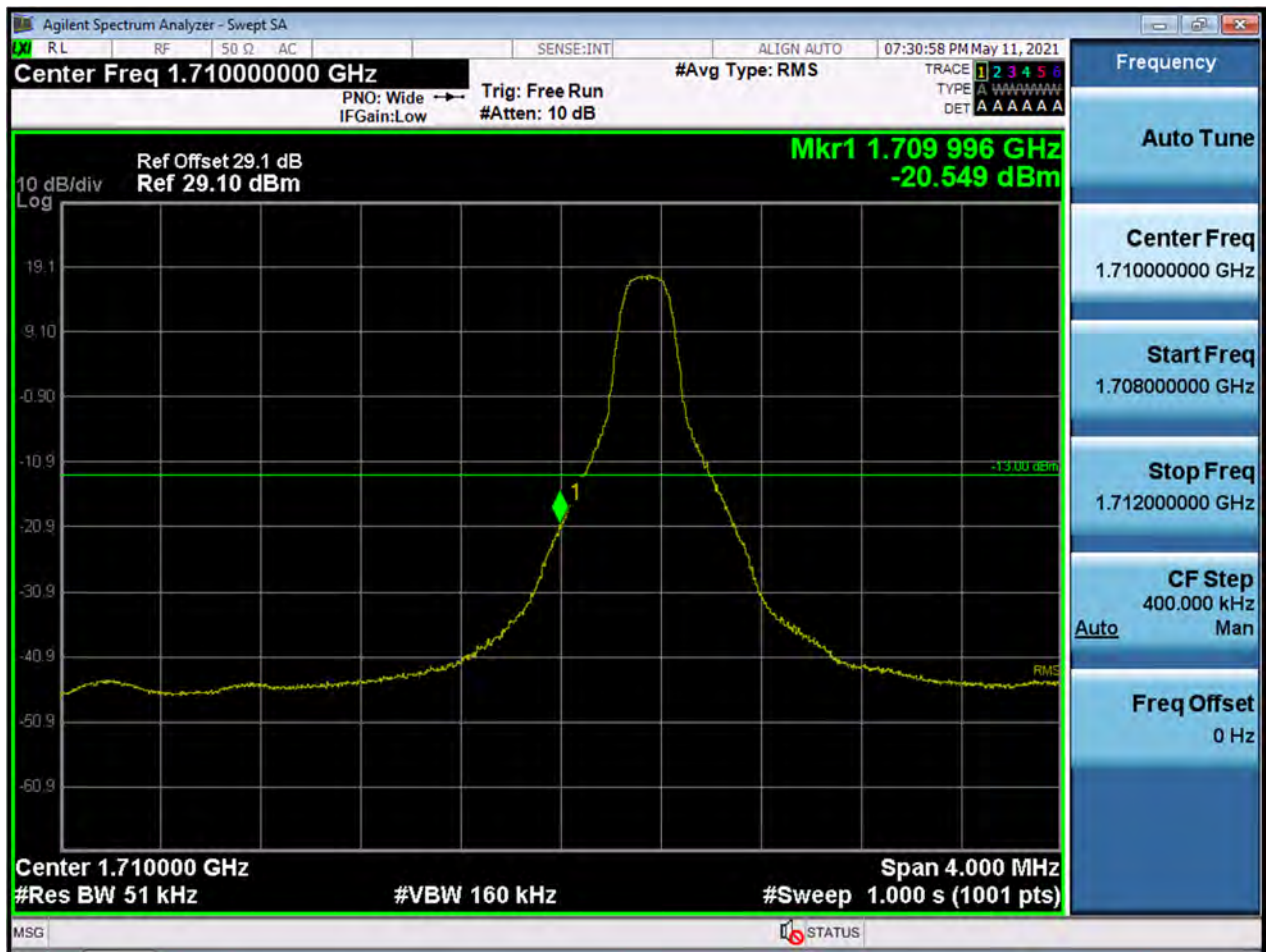
BW5M_BandEdge_Highest Channel_QPSK_FullRB(1)



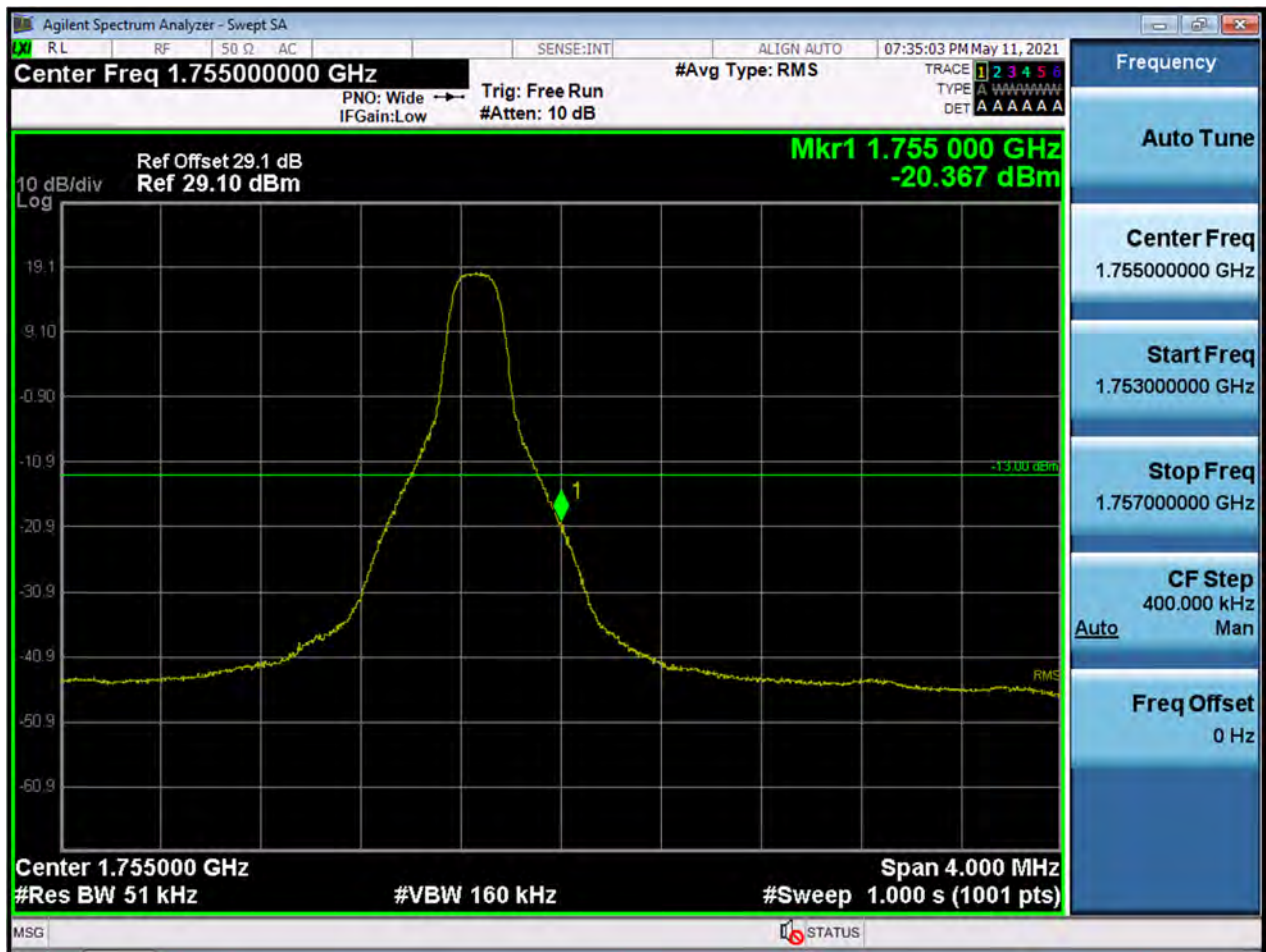
BW5M_BandEdge_Highest Channel_QPSK_FullRB(2)



BW5M_BandEdge_Lowest Channel_QPSK_1RB



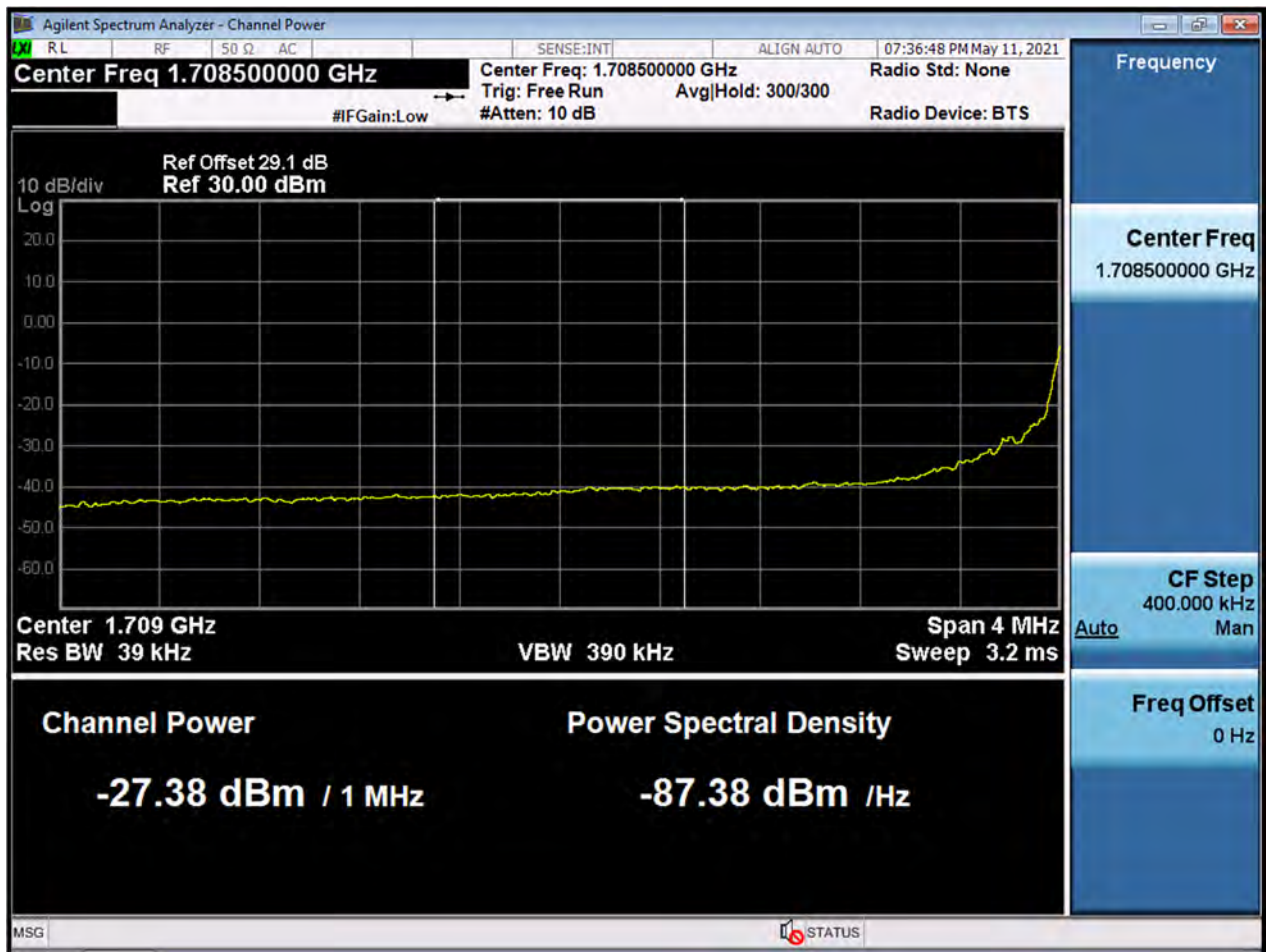
BW5M_BandEdge_Highest Channel_QPSK_1RB



BW10M_BandEdge_Lowest Channel_QPSK_FullRB(1)



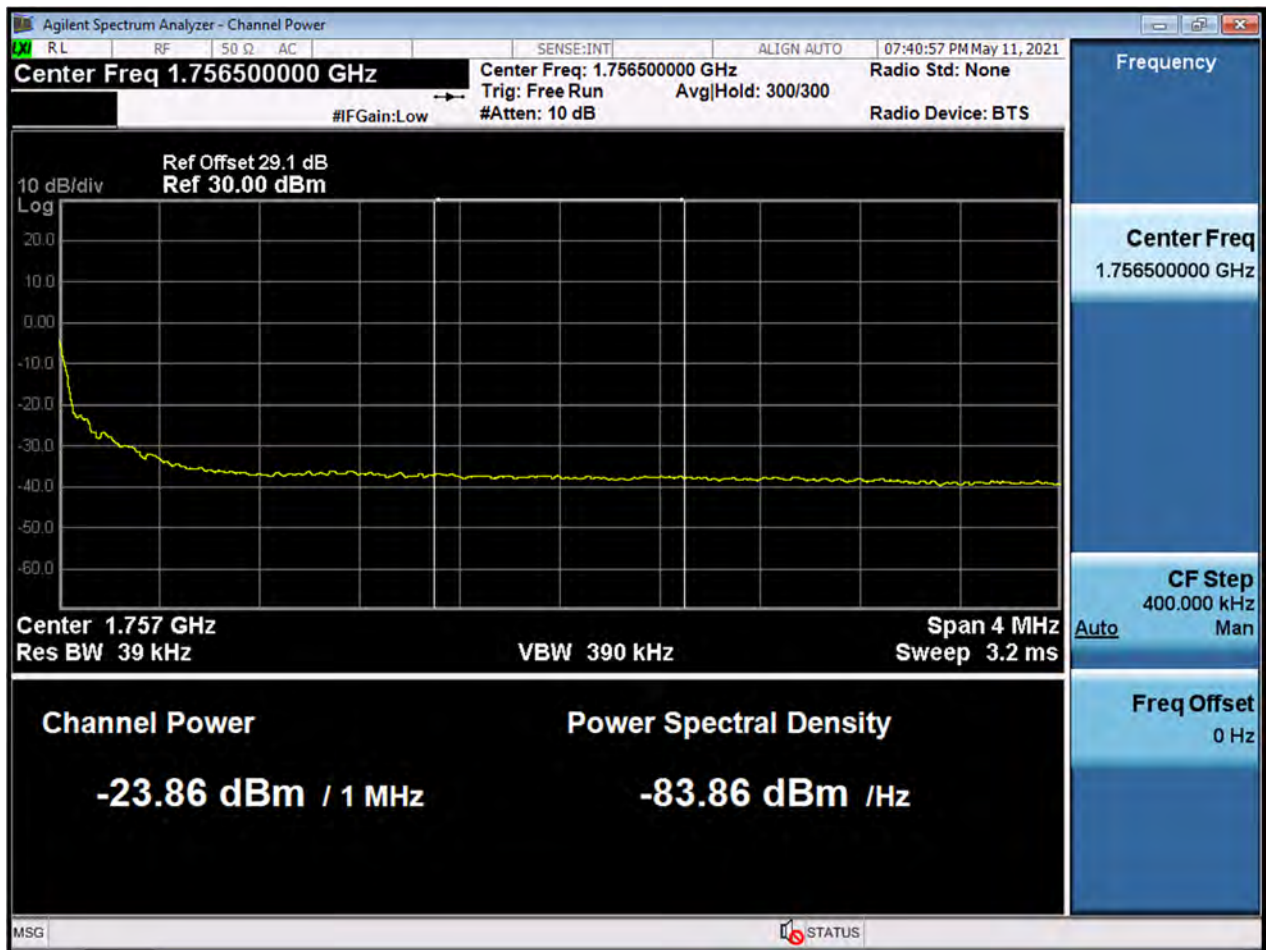
BW10M_BandEdge_Lowest Channel_QPSK_FullRB(2)



BW10M_BandEdge_Highest Channel_QPSK_FullRB(1)



BW10M_BandEdge_Highest Channel_QPSK_FullRB(2)



BW10M_BandEdge_Lowest Channel_QPSK_1RB



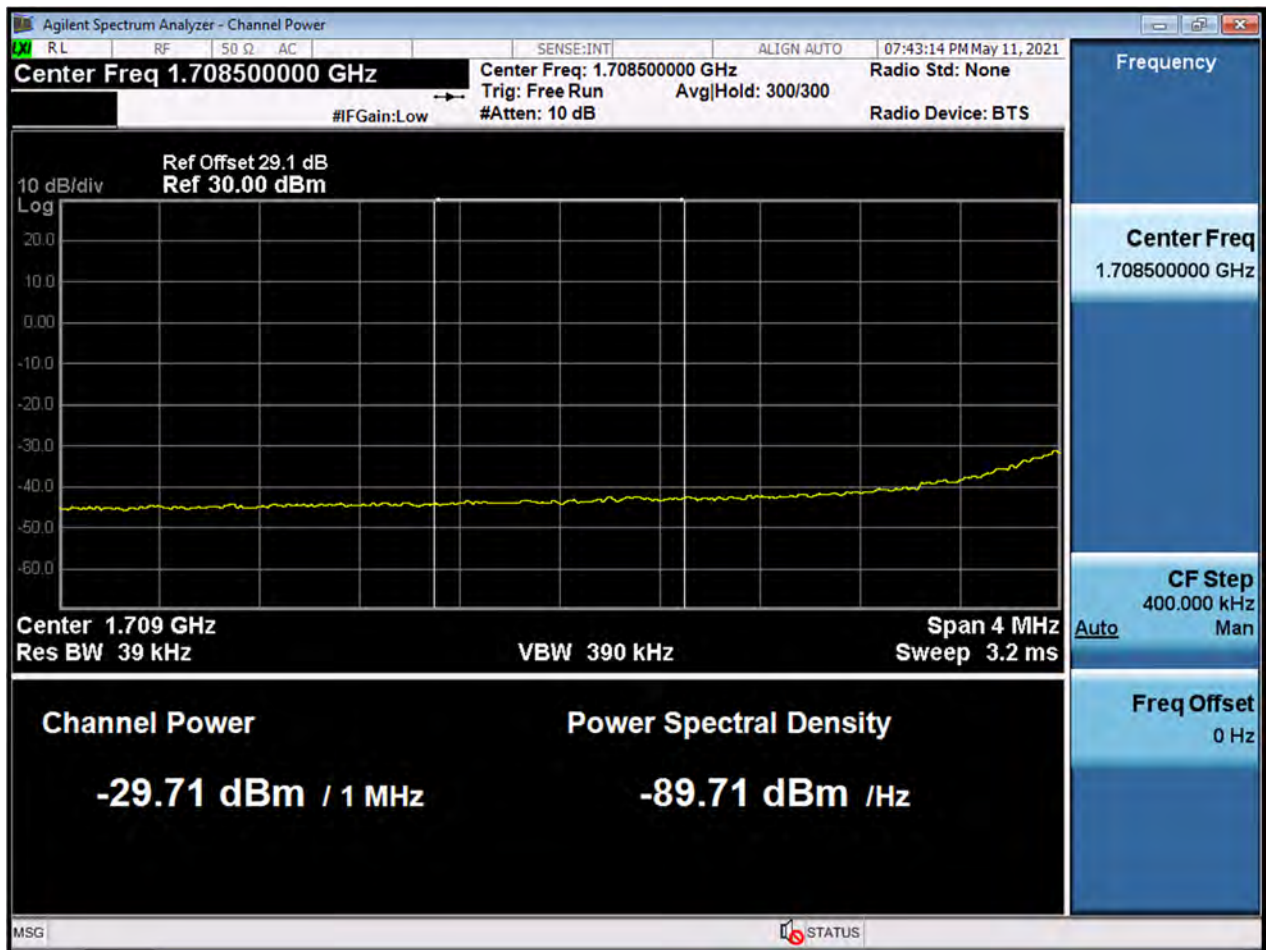
BW10M_BandEdge_Highest Channel_QPSK_1RB



BW15M_BandEdge_Lowest Channel_QPSK_FullRB(1)



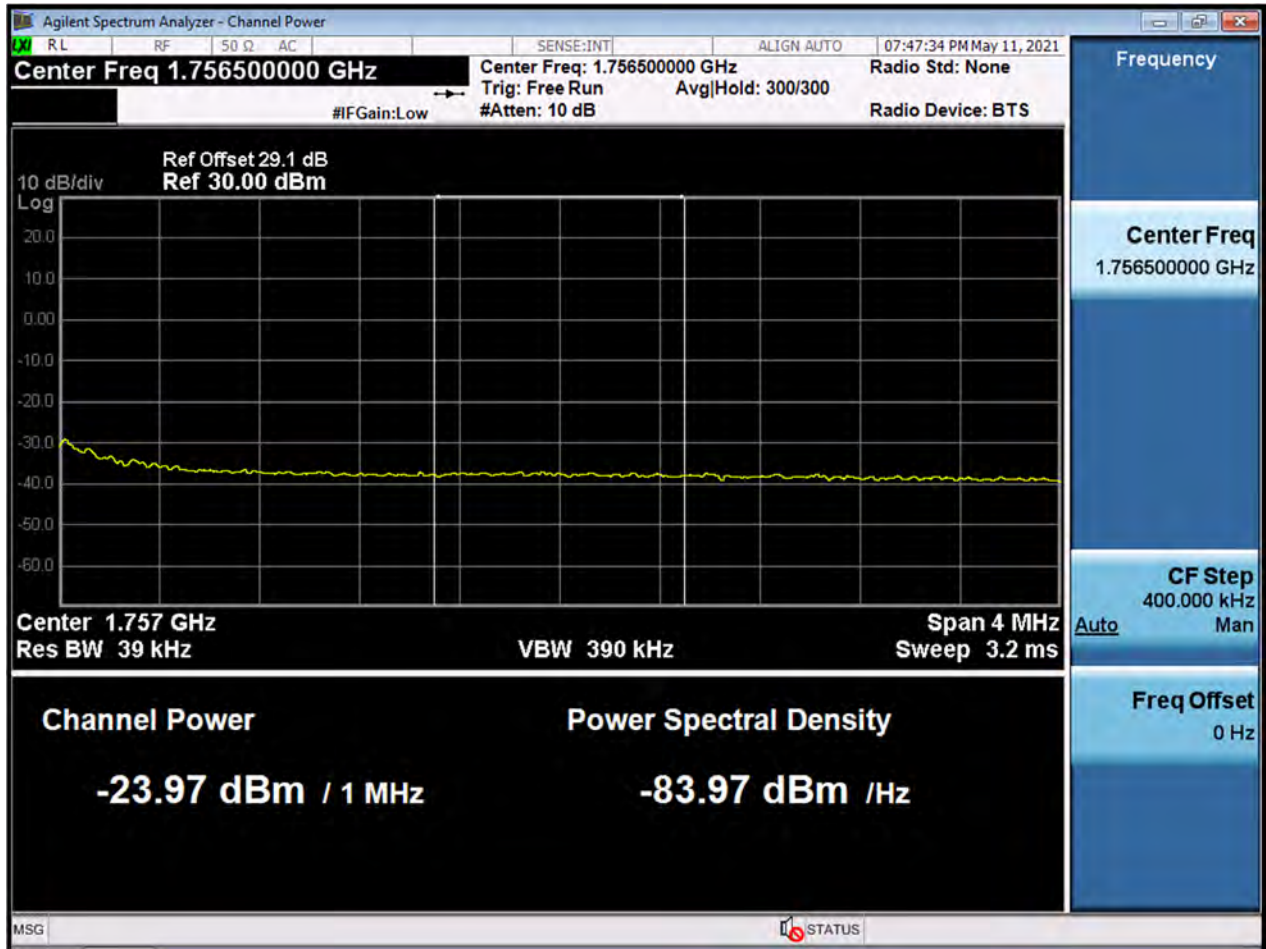
BW15M_BandEdge_Lowest Channel_QPSK_FullRB(2)



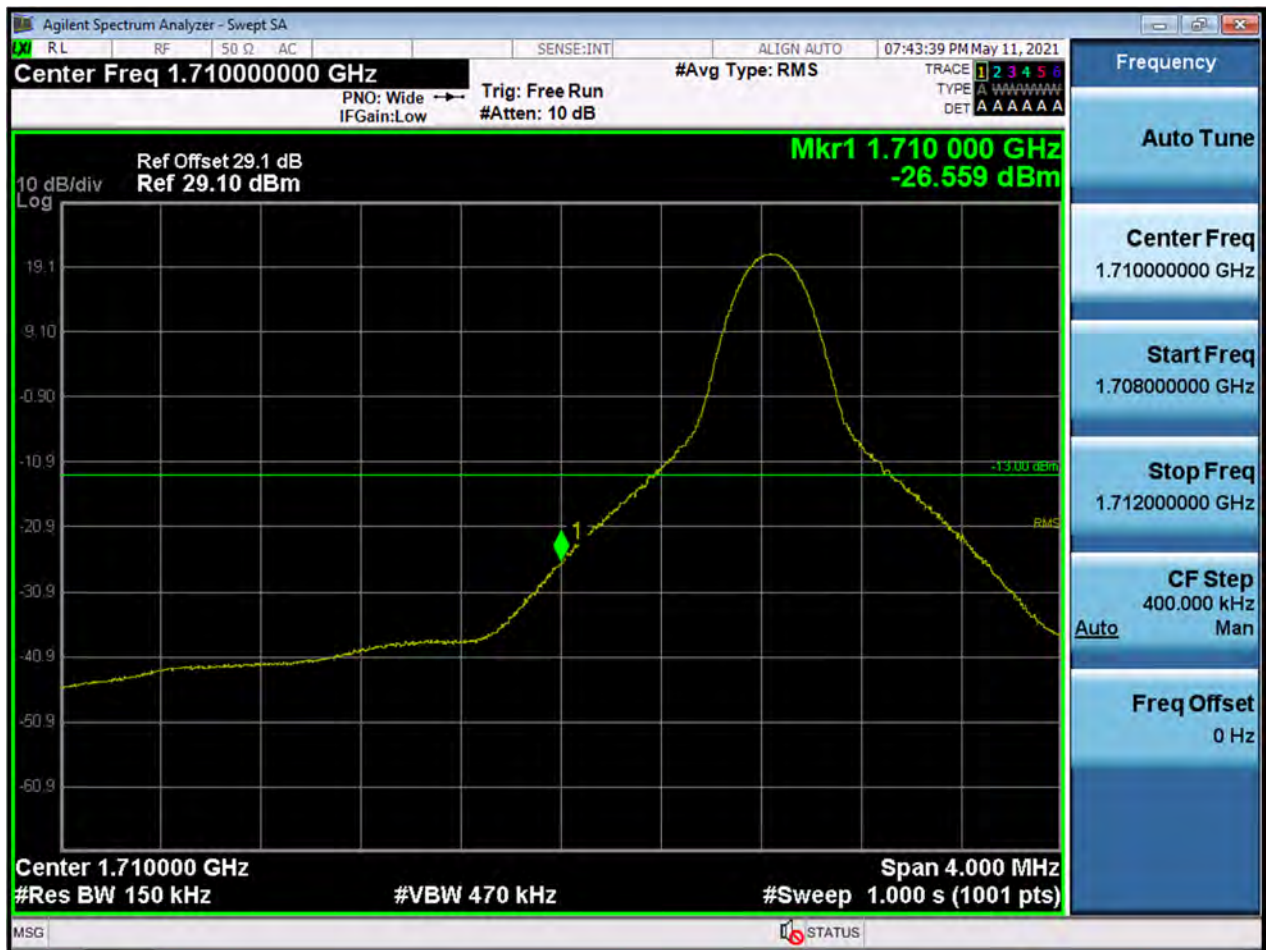
BW15M_BandEdge_Highest Channel_QPSK_FullRB(1)



BW15M_BandEdge_Highest Channel_QPSK_FullRB(2)



BW15M_BandEdge_Lowest Channel_QPSK_1RB



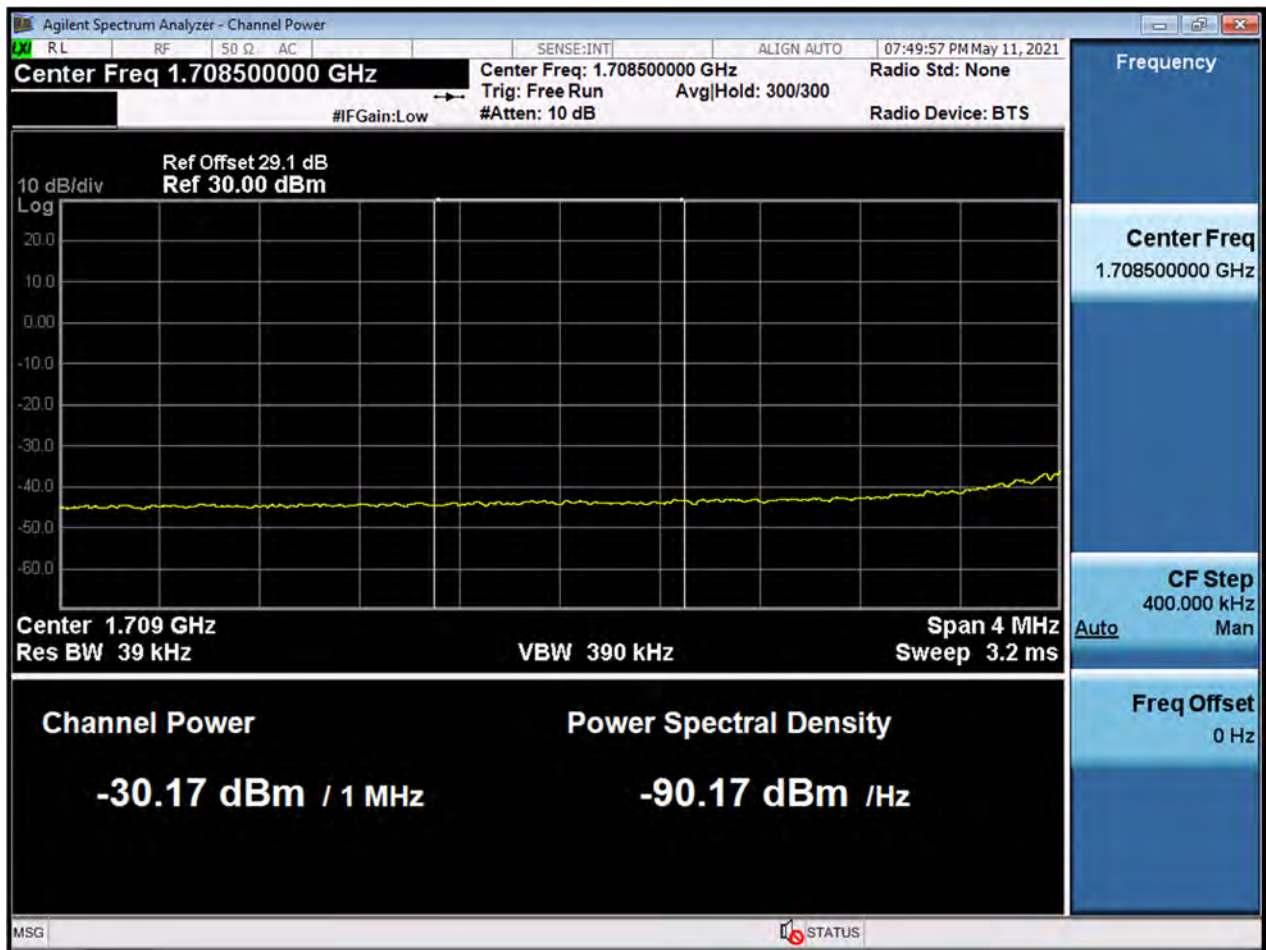
BW15M_BandEdge_Highest Channel_QPSK_1RB



BW20M_BandEdge_Lowest Channel_QPSK_FullRB(1)



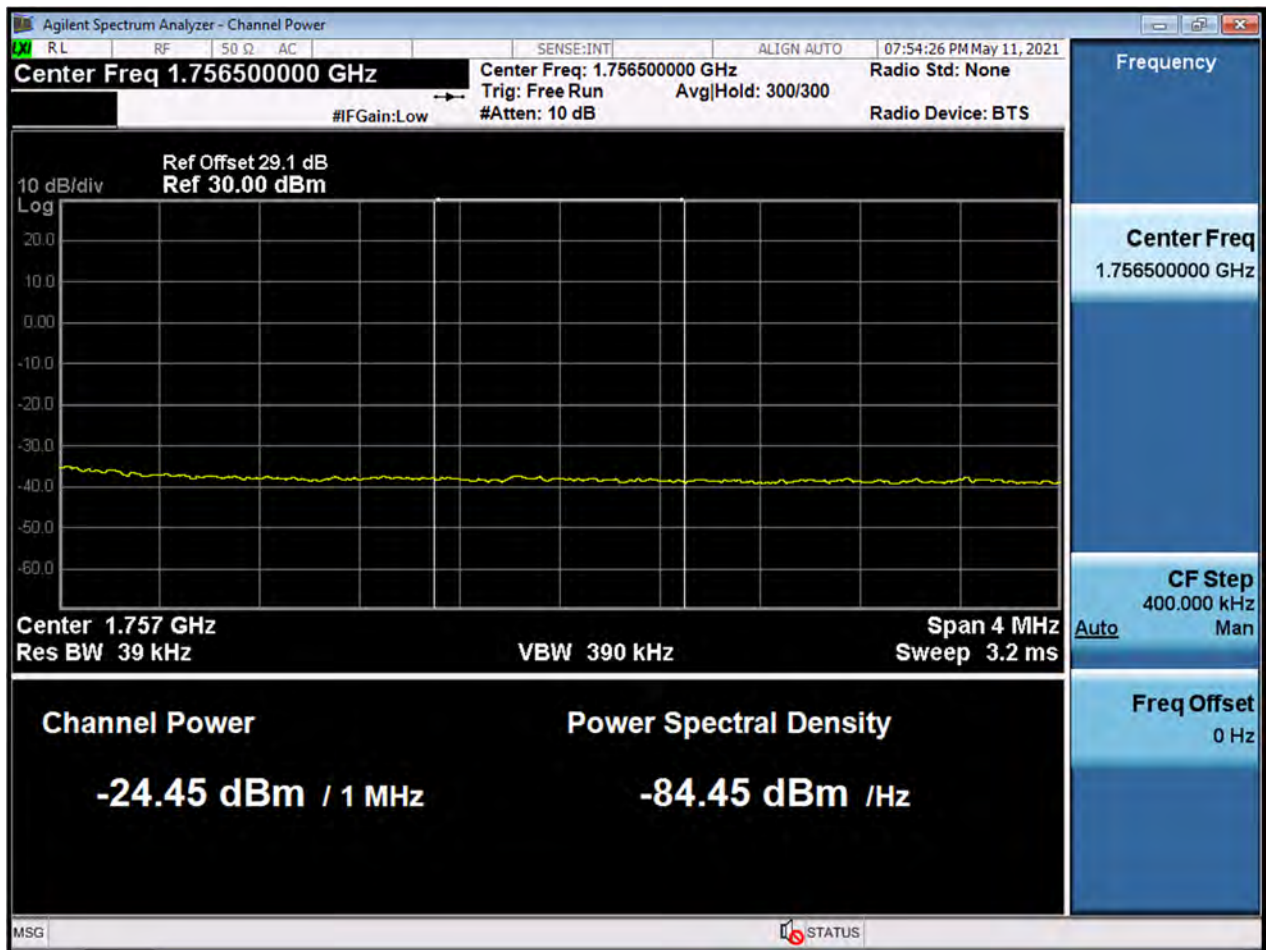
BW20M_BandEdge_Lowest Channel_QPSK_FullRB(2)



BW20M_BandEdge_Highest Channel_QPSK_FullRB(1)



BW20M_BandEdge_Highest Channel_QPSK_FullRB(2)



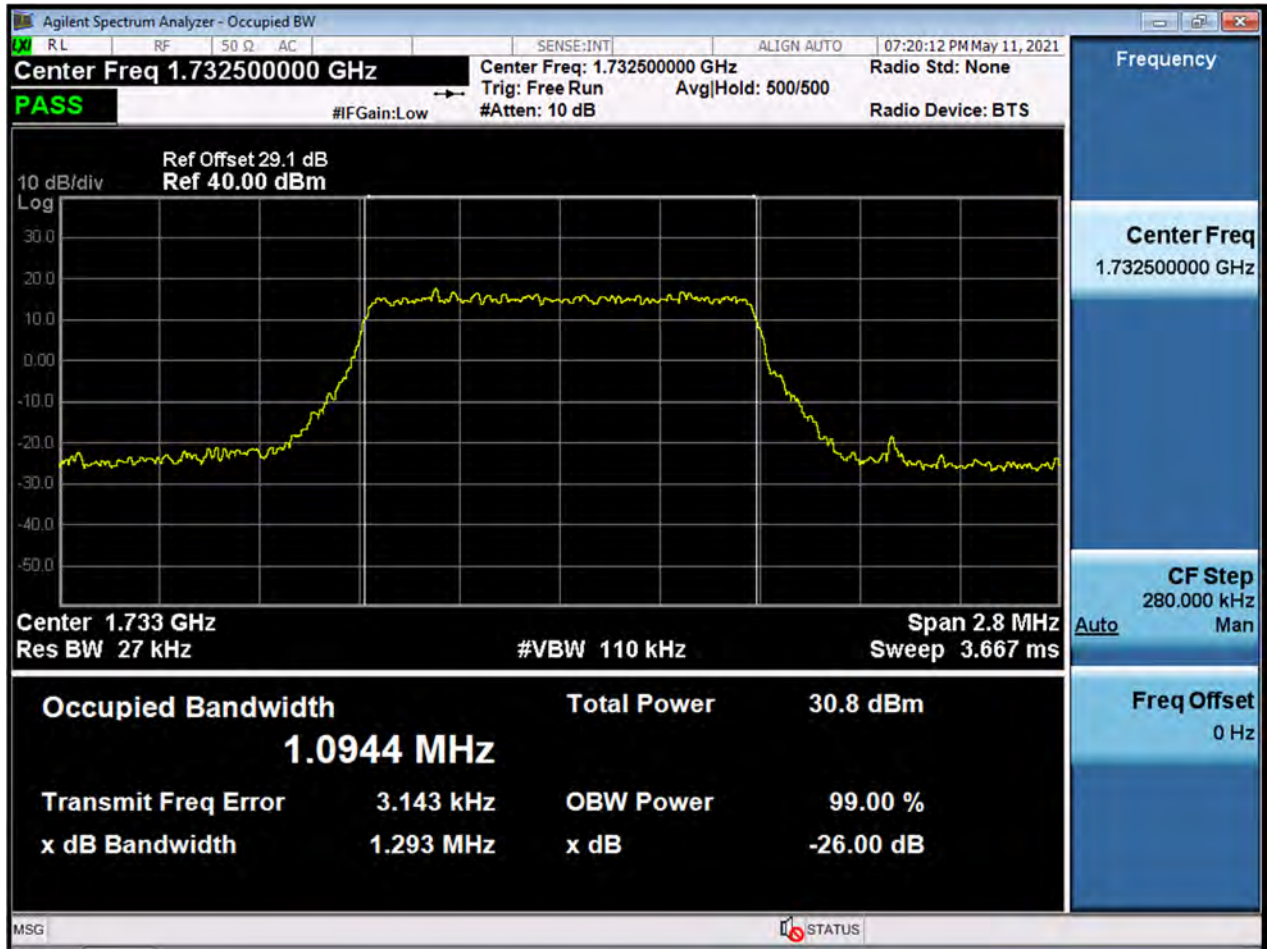
BW20M_BandEdge_Lowest Channel_QPSK_1RB



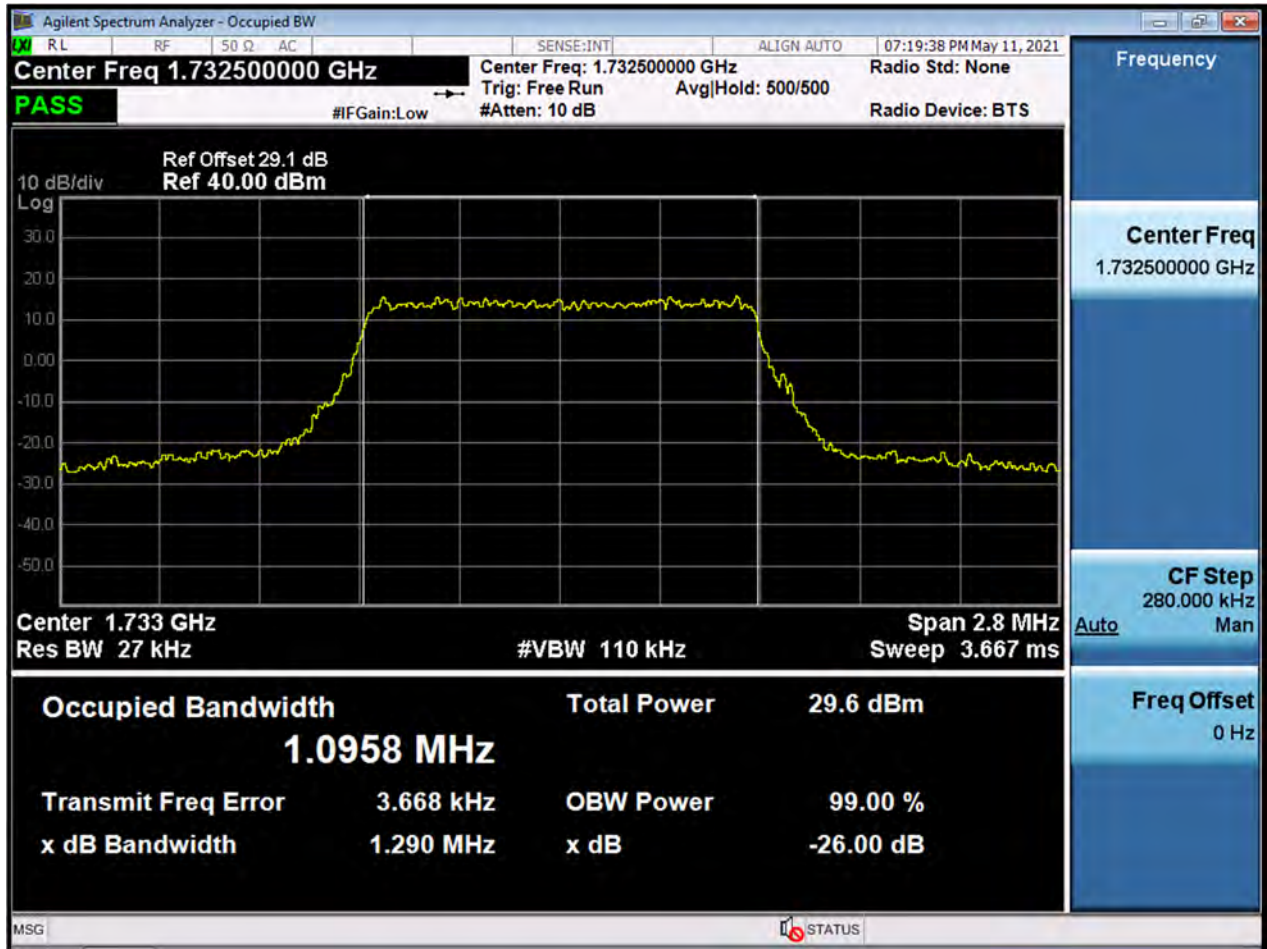
BW20M_BandEdge_Highest Channel_QPSK_1RB



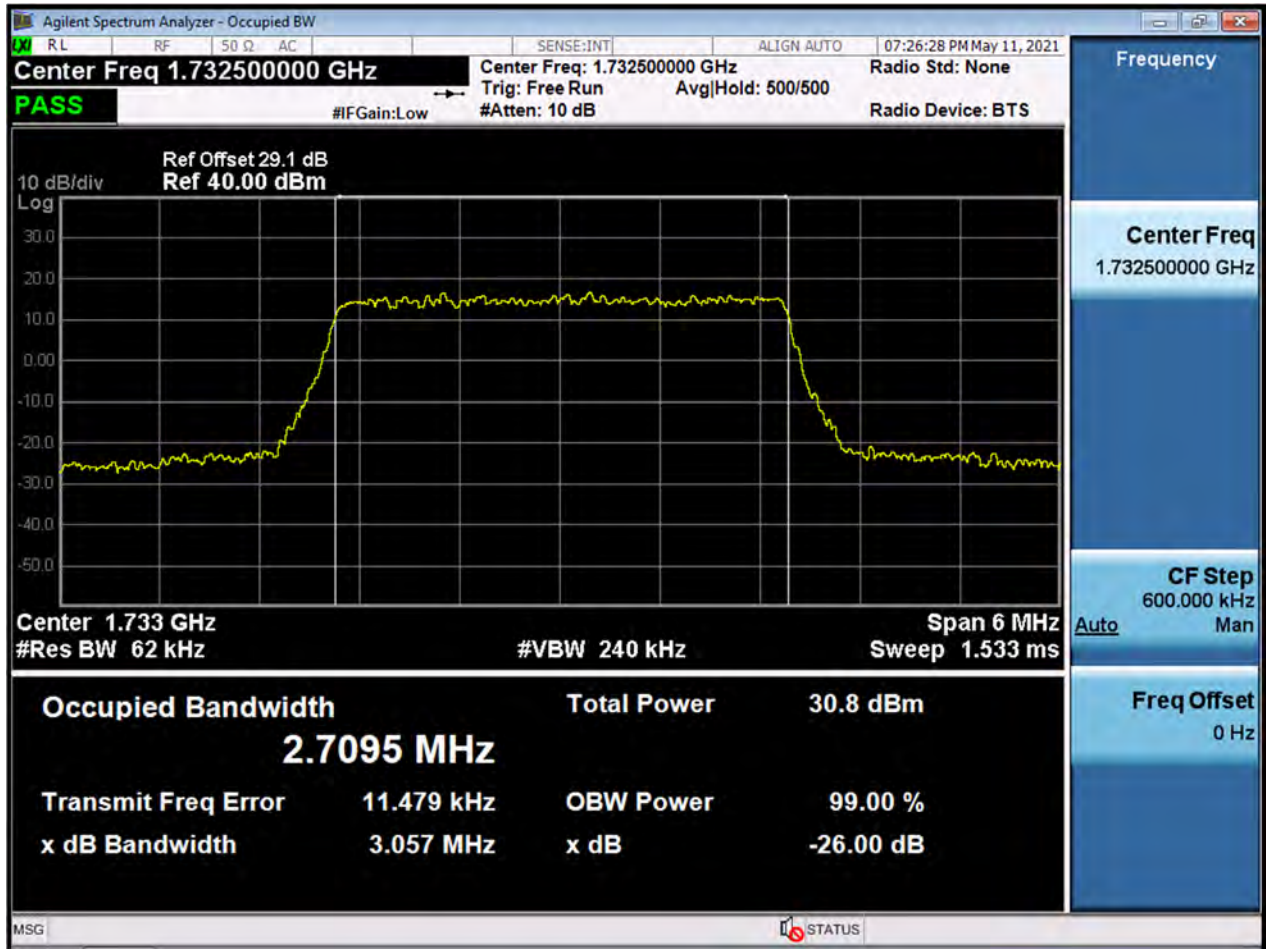
BW1.4M_OBW_Middle Channel_QPSK_FullRB



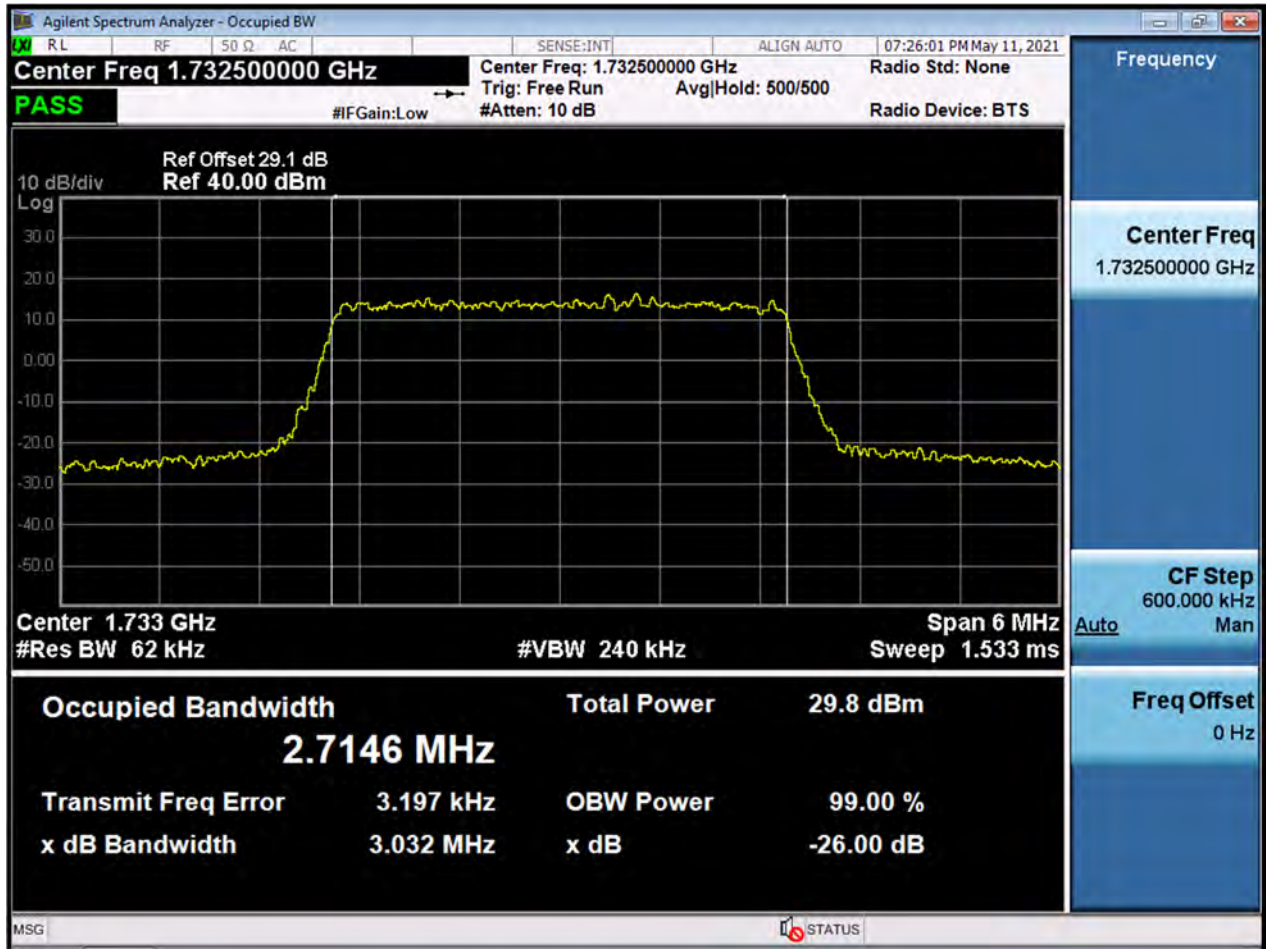
BW1.4M_OBW_Middle Channel_16QAM_FullRB



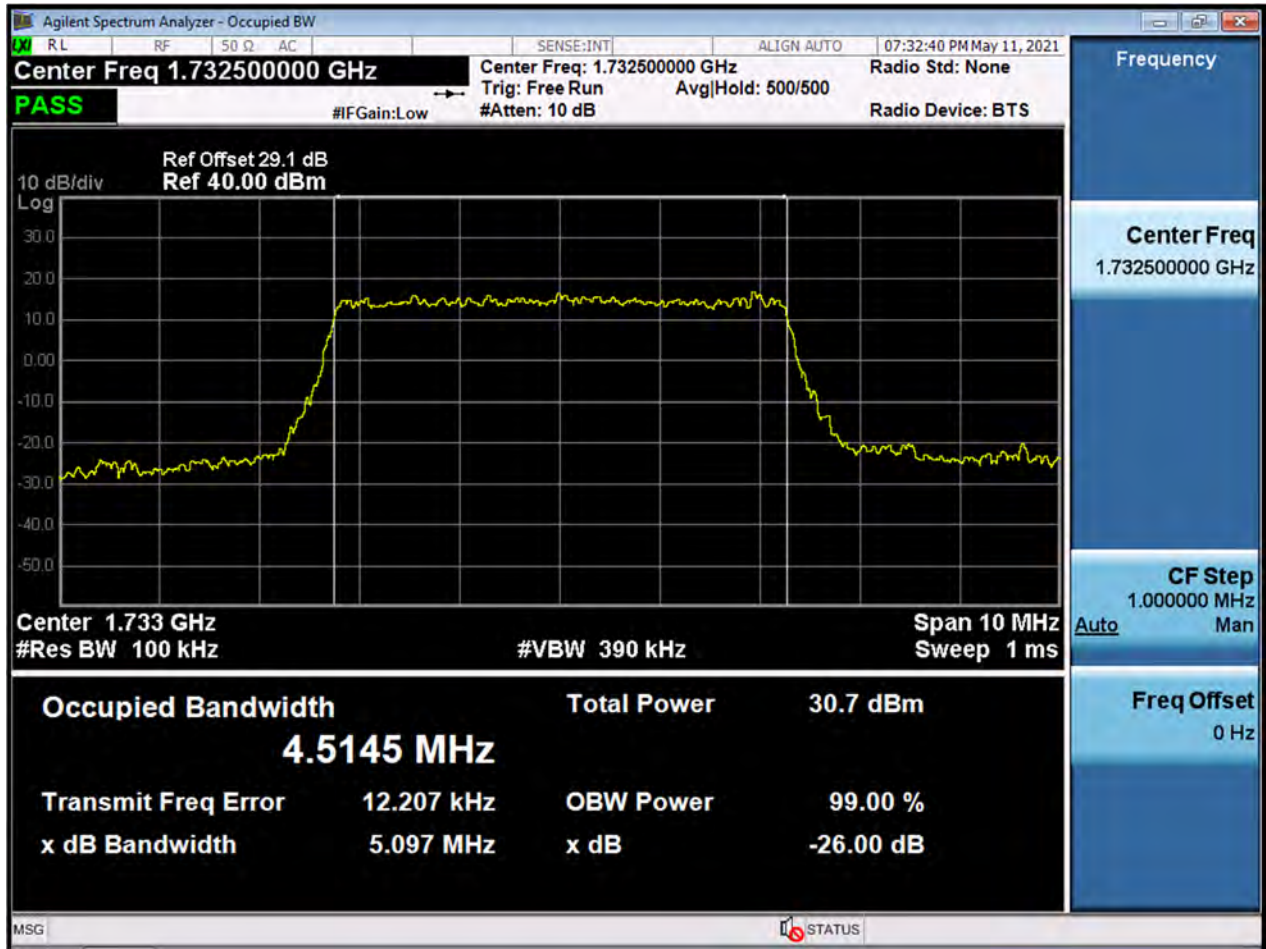
BW3M_OBW_Middle Channel_QPSK_FullRB



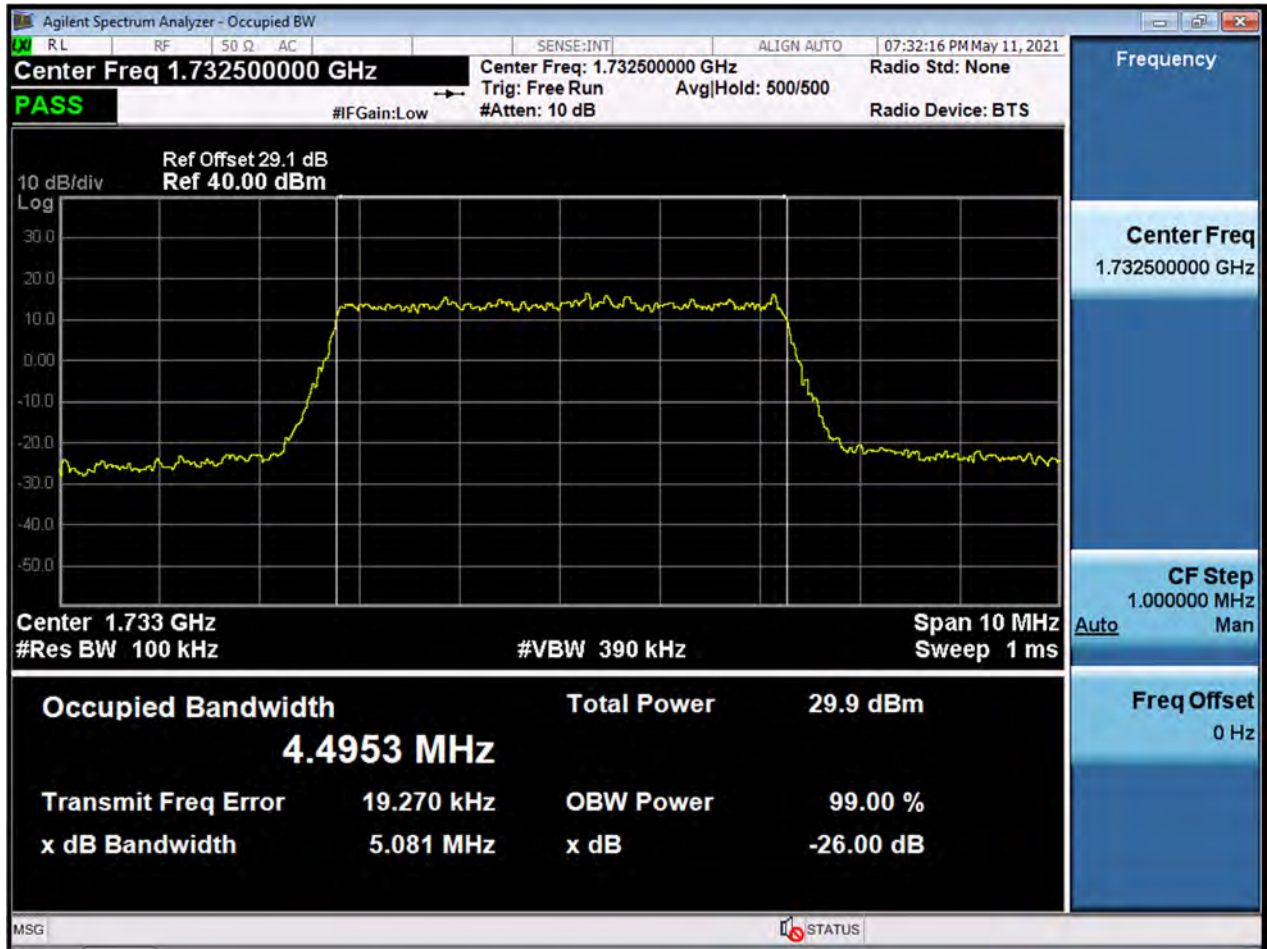
BW3M_OBW_Middle Channel_16QAM_FullRB



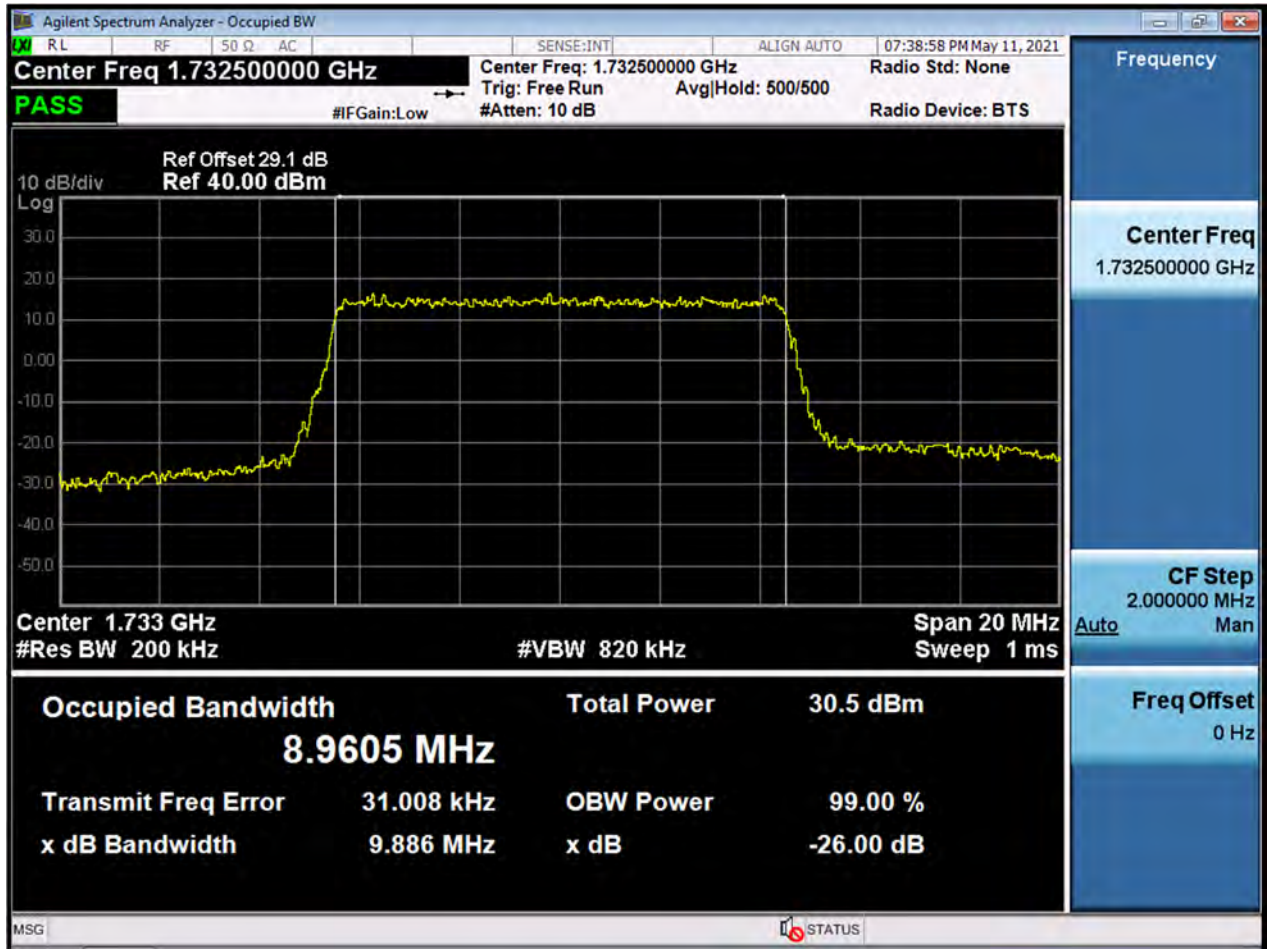
BW5M_OBW_Middle Channel_QPSK_FullRB



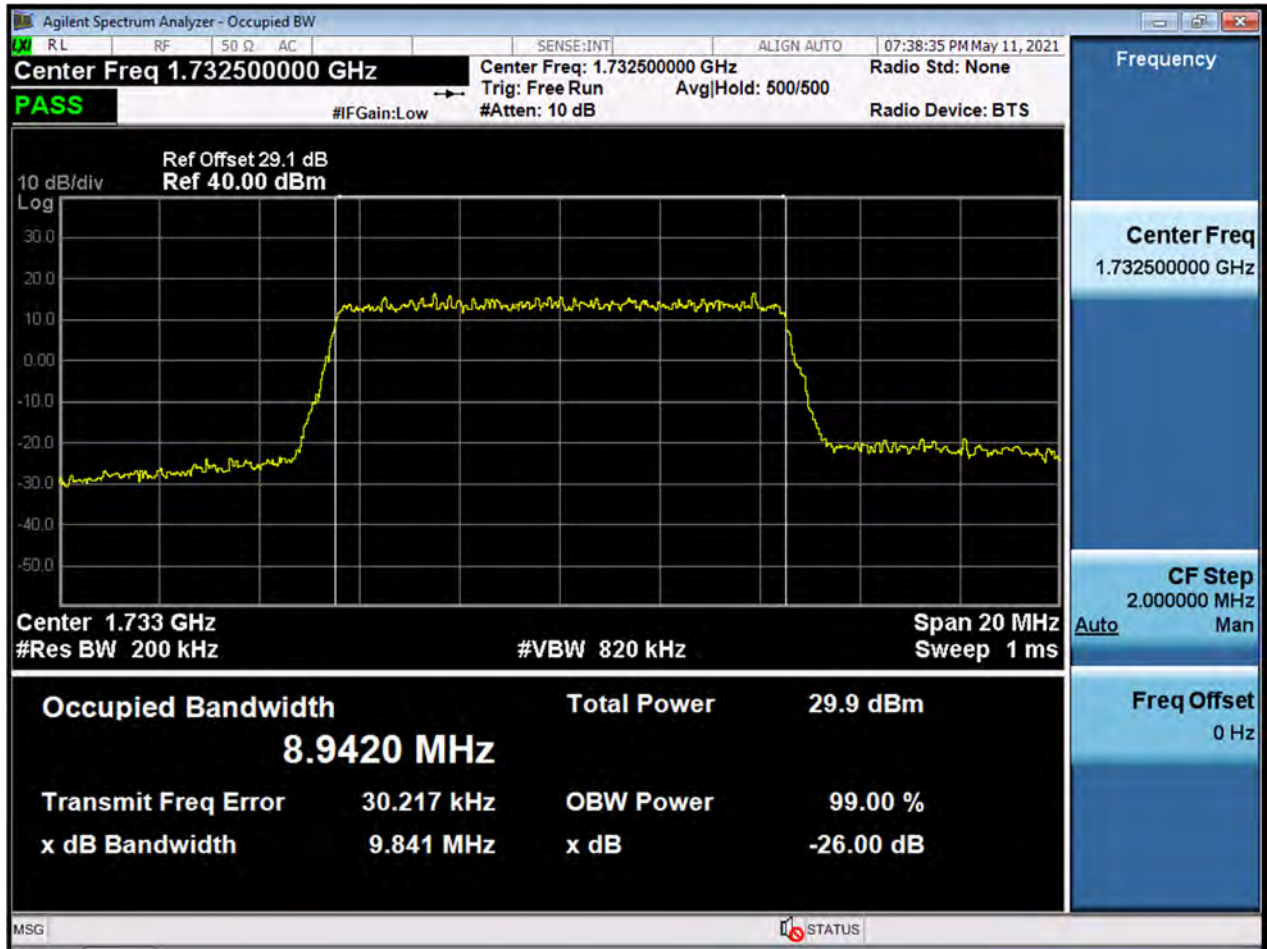
BW5M_OBW_Middle Channel_16QAM_FullRB



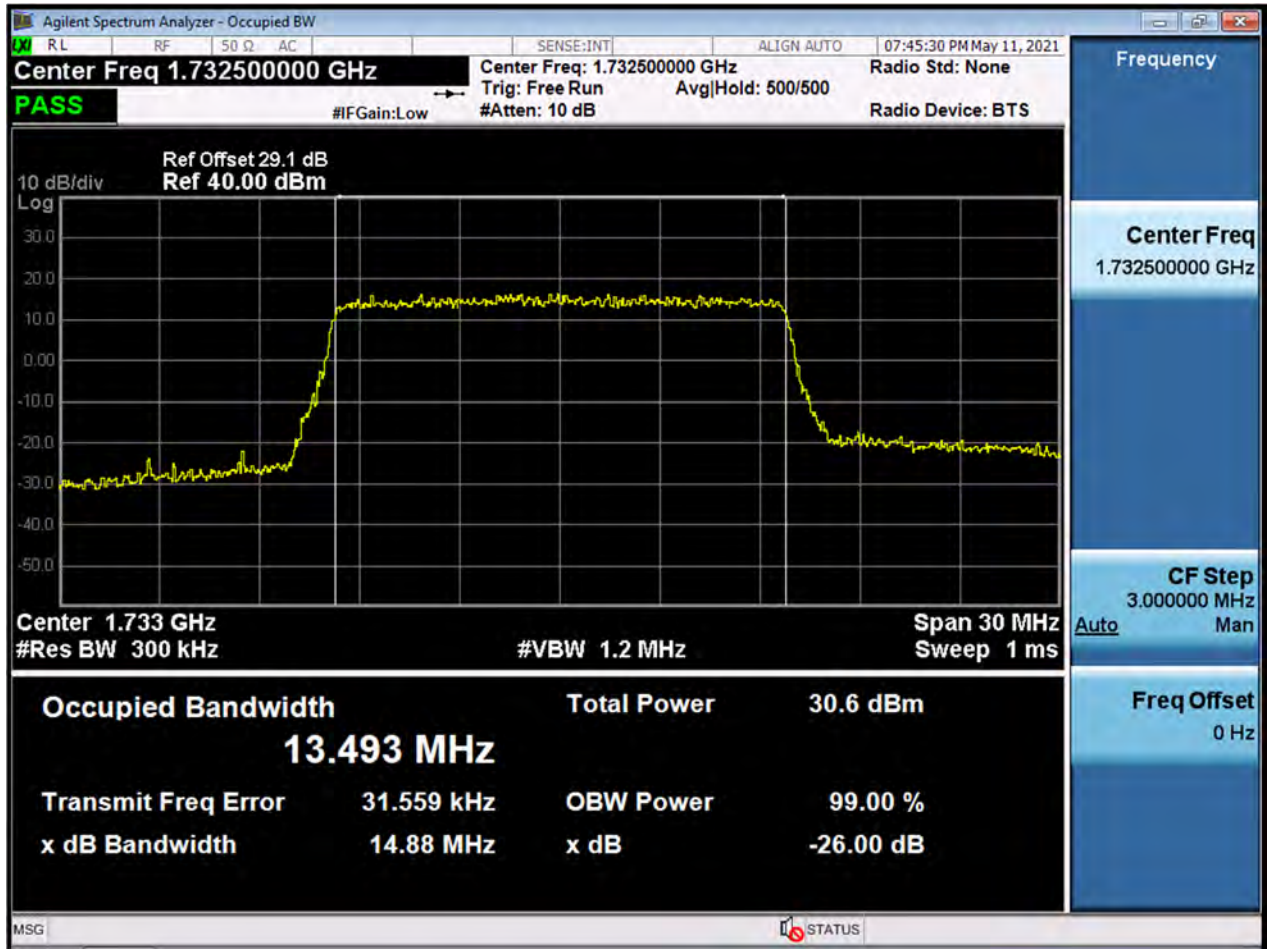
BW10M_OBW_Middle Channel_QPSK_FullRB



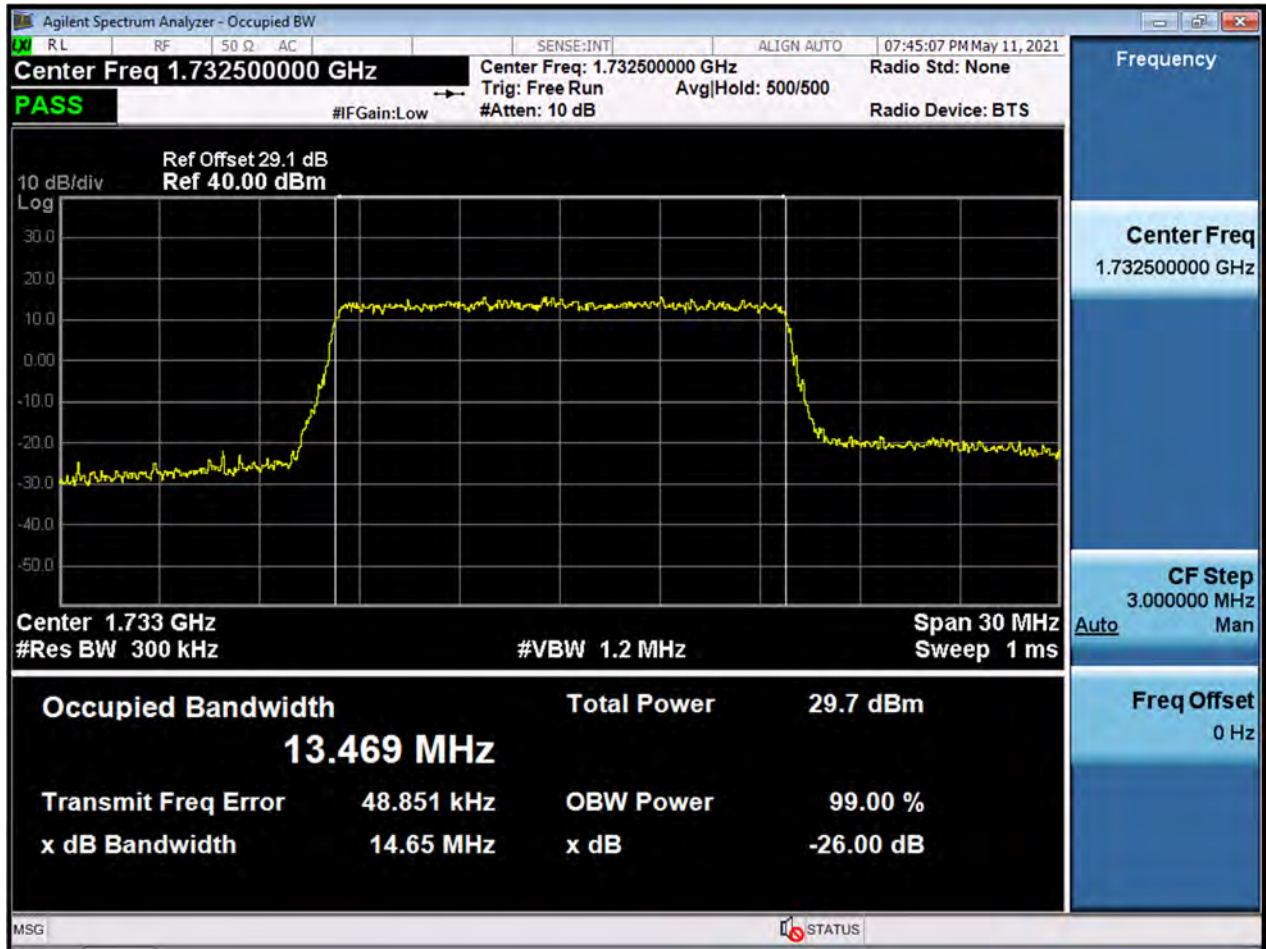
BW10M_OBW_Middle Channel_16QAM_FullRB



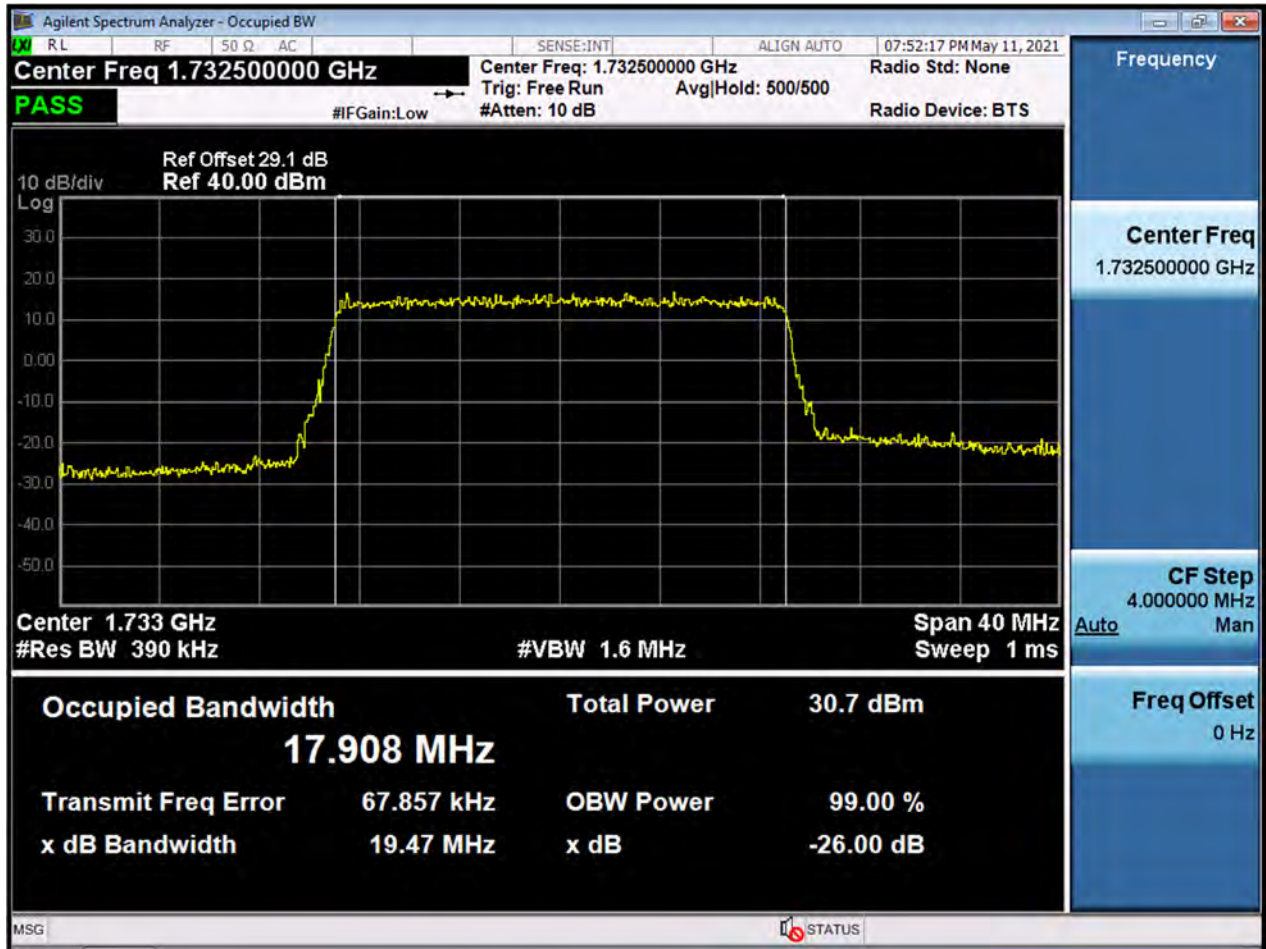
BW15M_OBW_Middle Channel_QPSK_FullRB



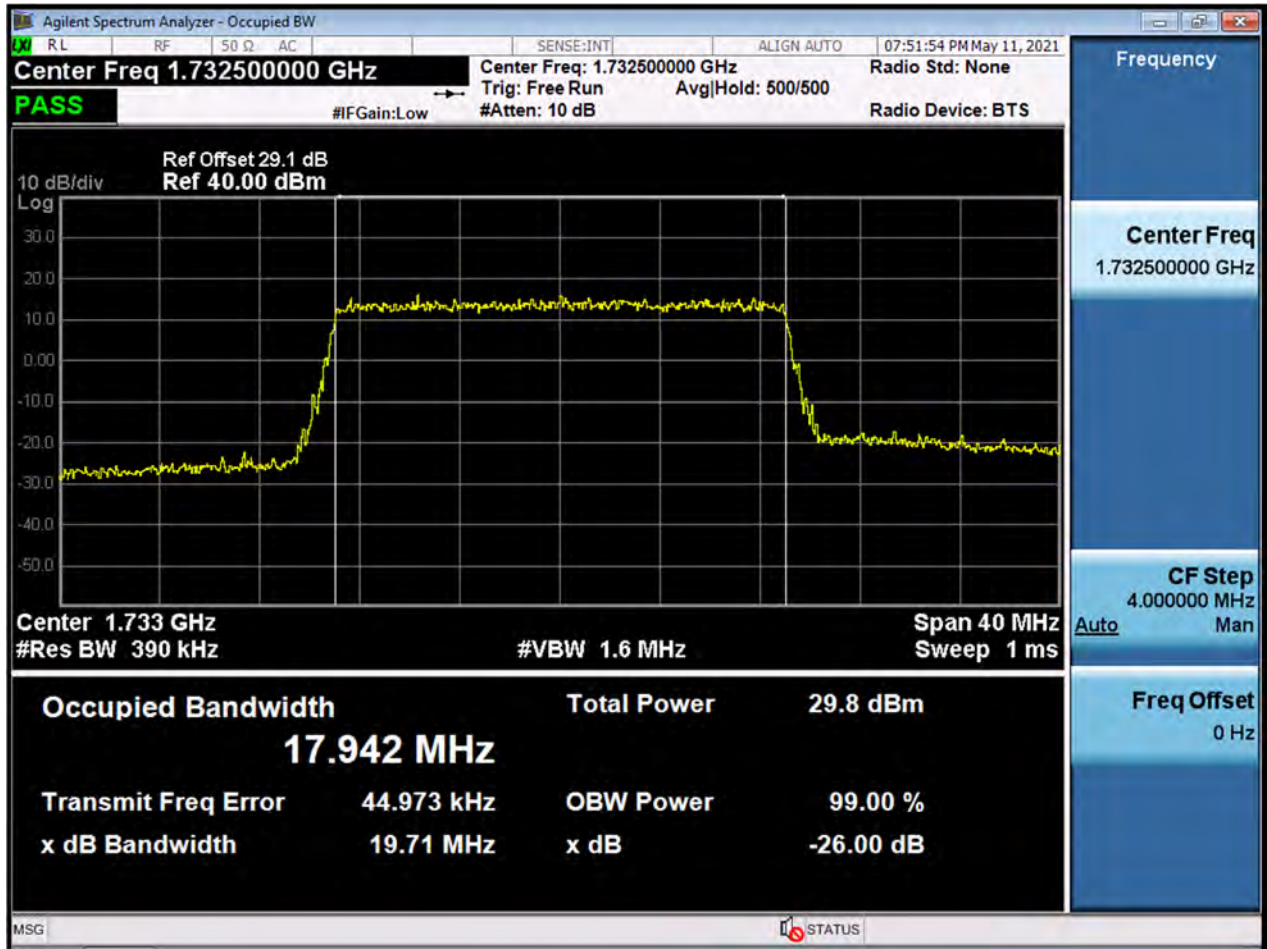
BW15M_OBW_Middle Channel_16QAM_FullRB



BW20M_OBW_Middle Channel_QPSK_FullRB



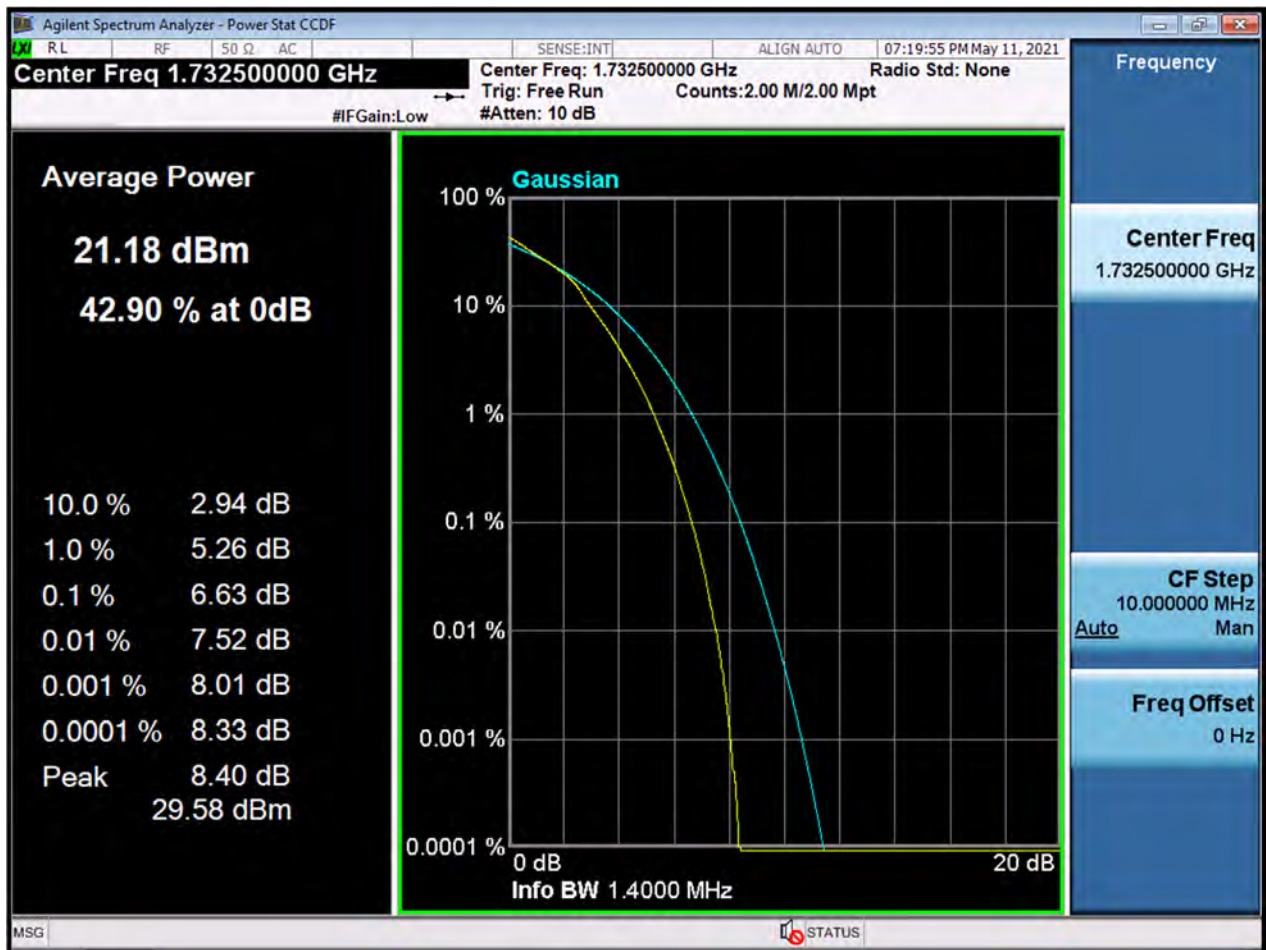
BW20M_OBW_Middle Channel_16QAM_FullRB



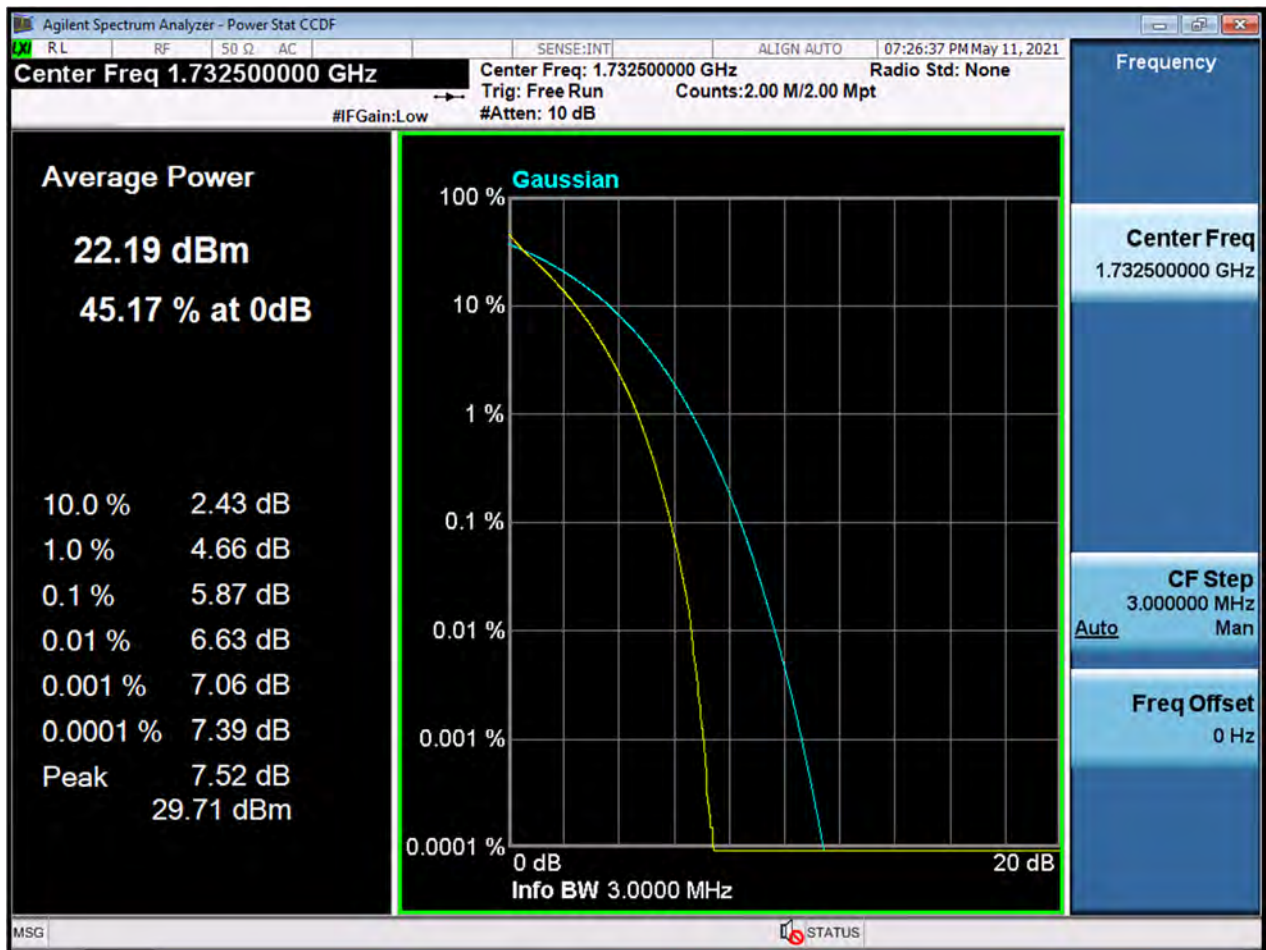
BW1.4M_PAR_Middle Channel_QPSK_FullRB



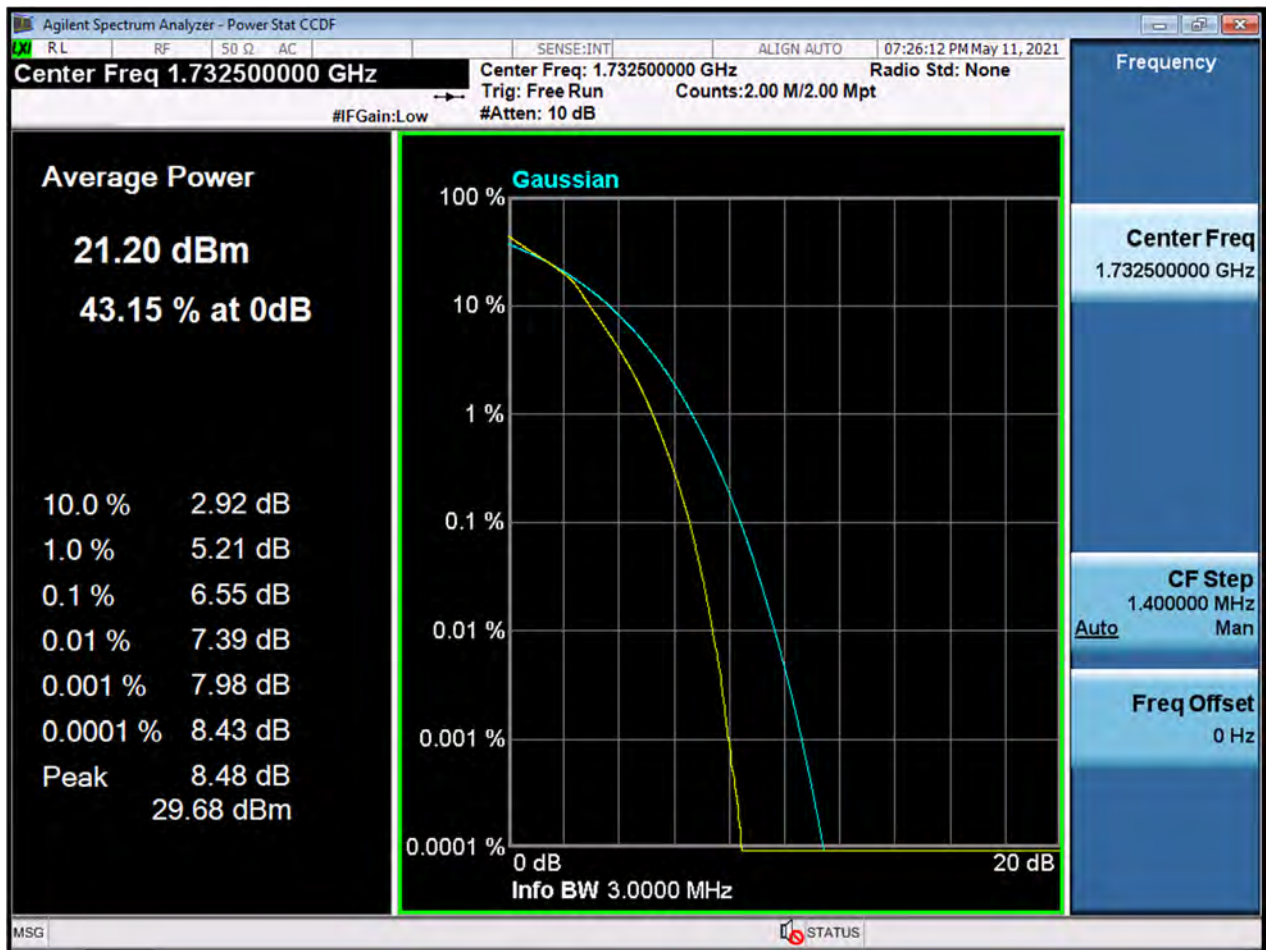
BW1.4M_PAR_Middle Channel_16QAM_FullRB



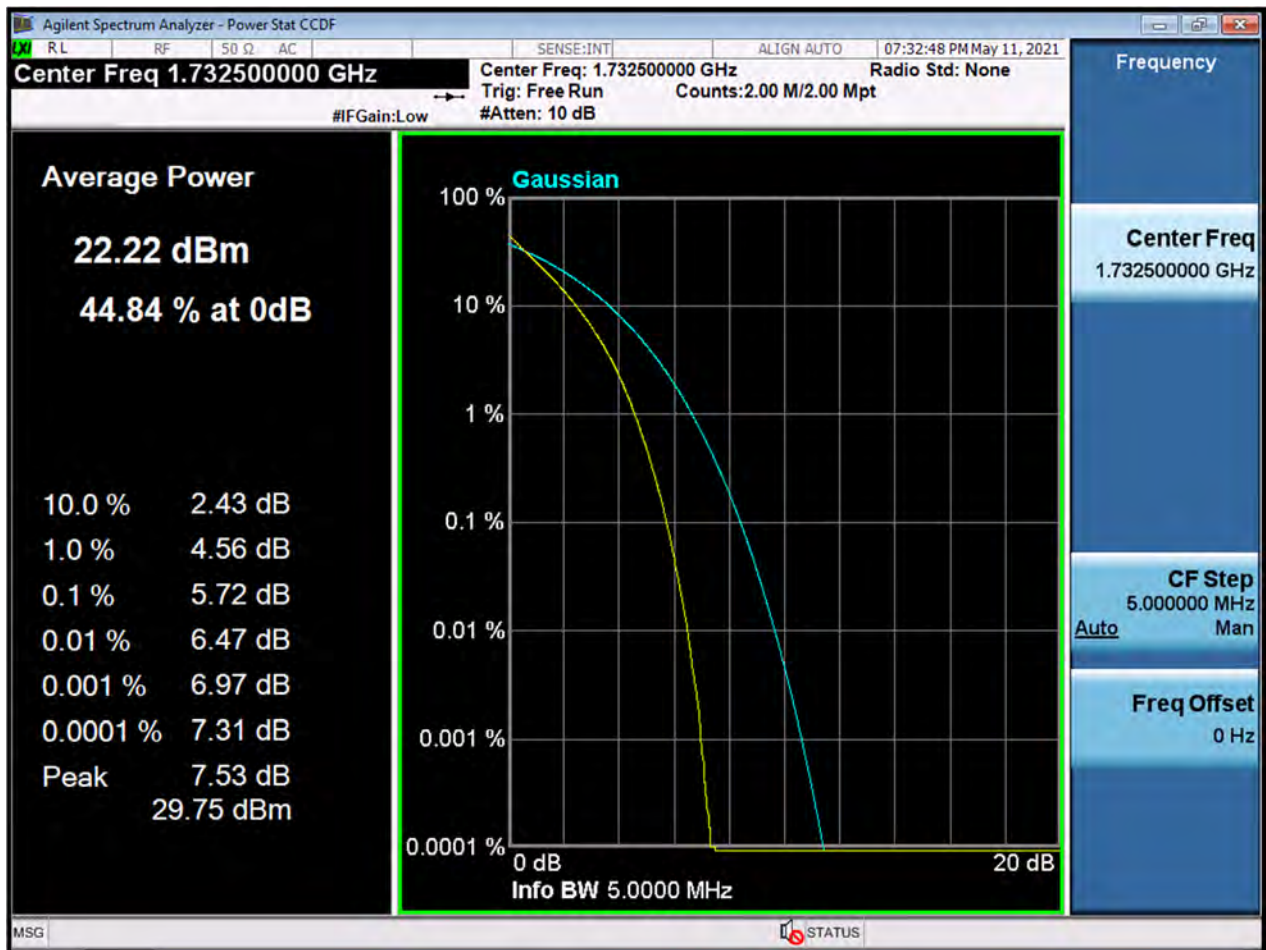
BW3M_PAR_Middle Channel_QPSK_FullRB



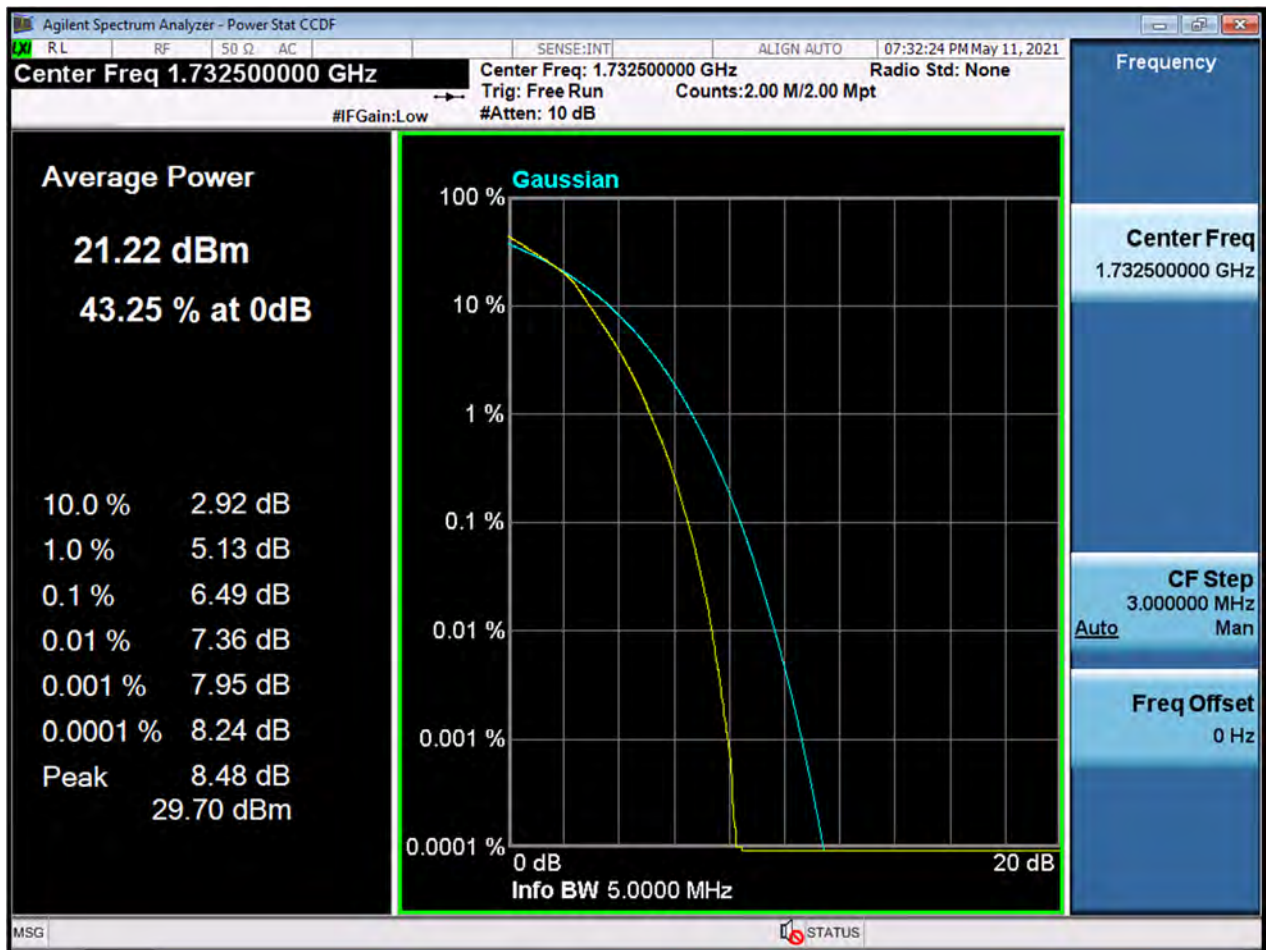
BW3M_PAR_Middle Channel_16QAM_FullRB



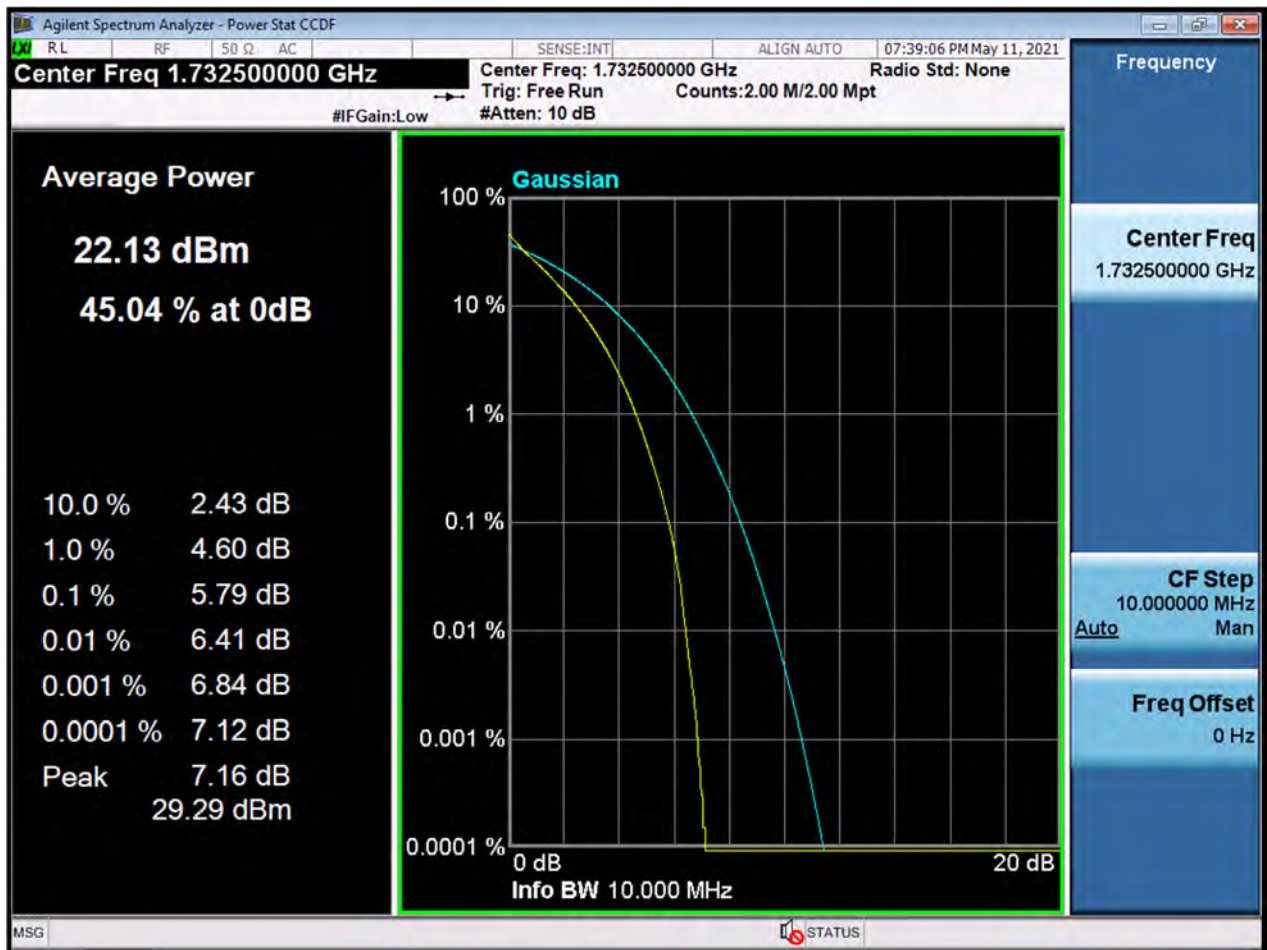
BW5M_PAR_Middle Channel_QPSK_FullRB



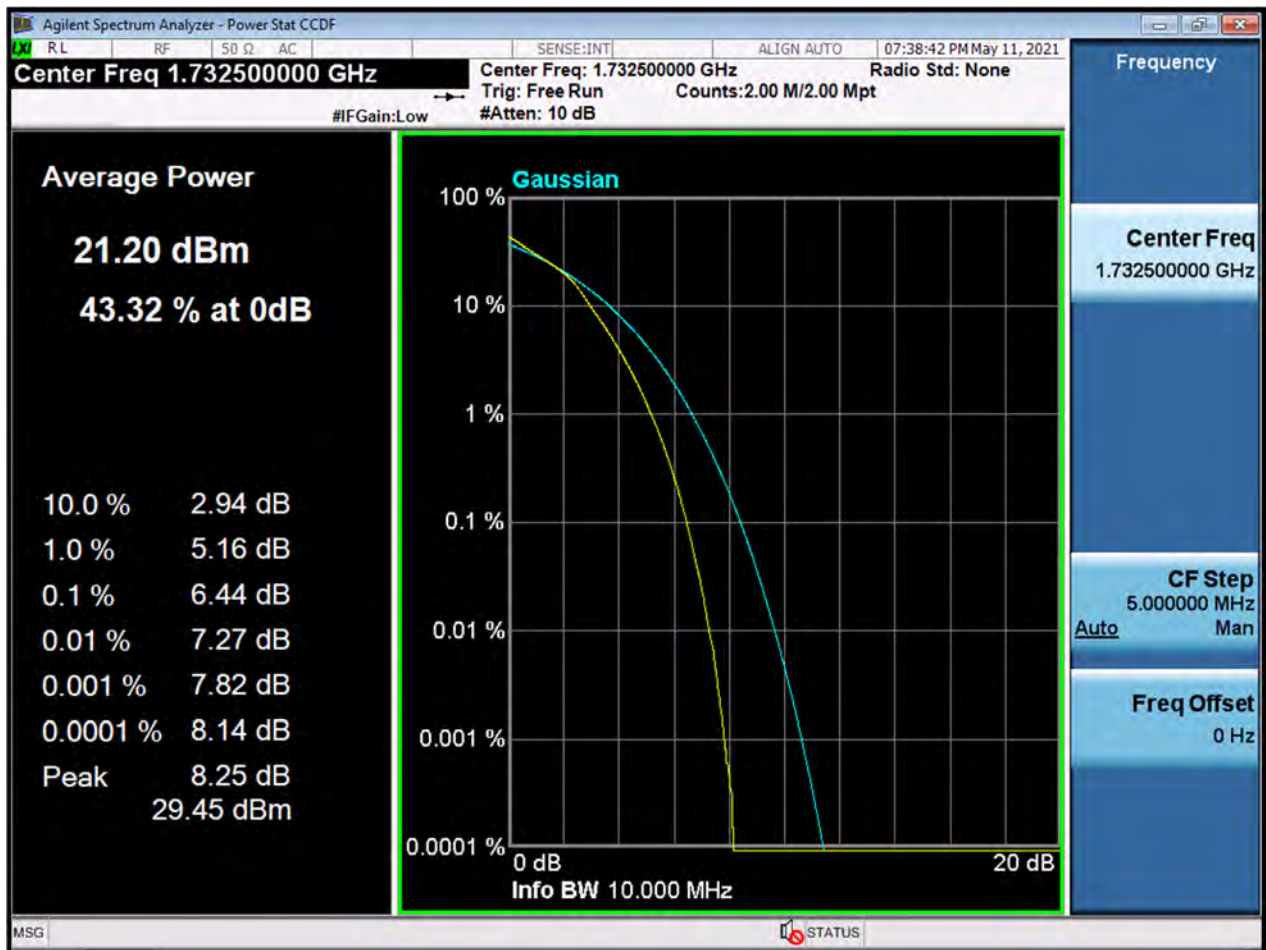
BW5M_PAR_Middle Channel_16QAM_FullRB



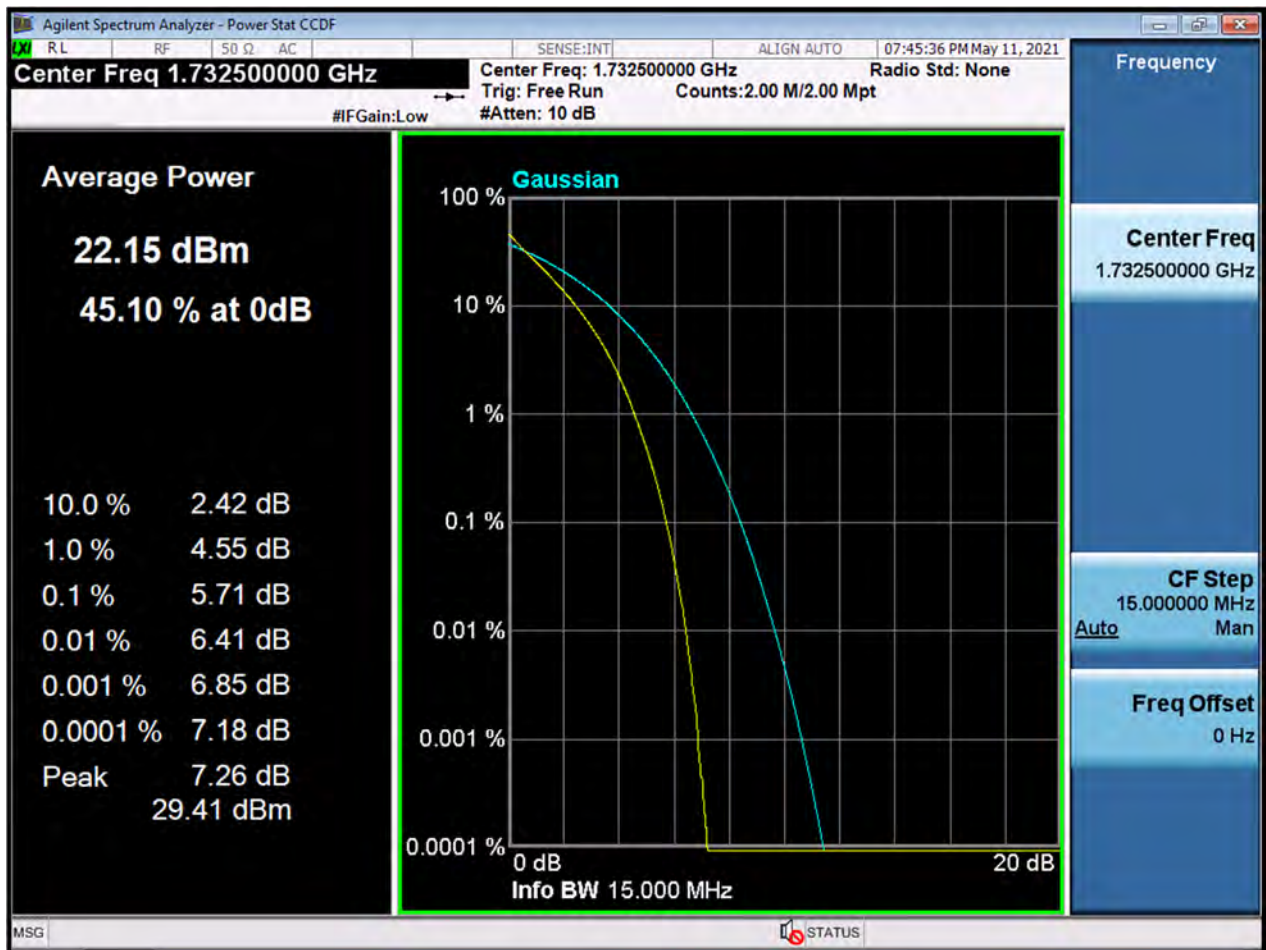
BW10M_PAR_Middle Channelz_QPSK_FullRB



BW10M_PAR_Middle Channel_16QAM_FullRB



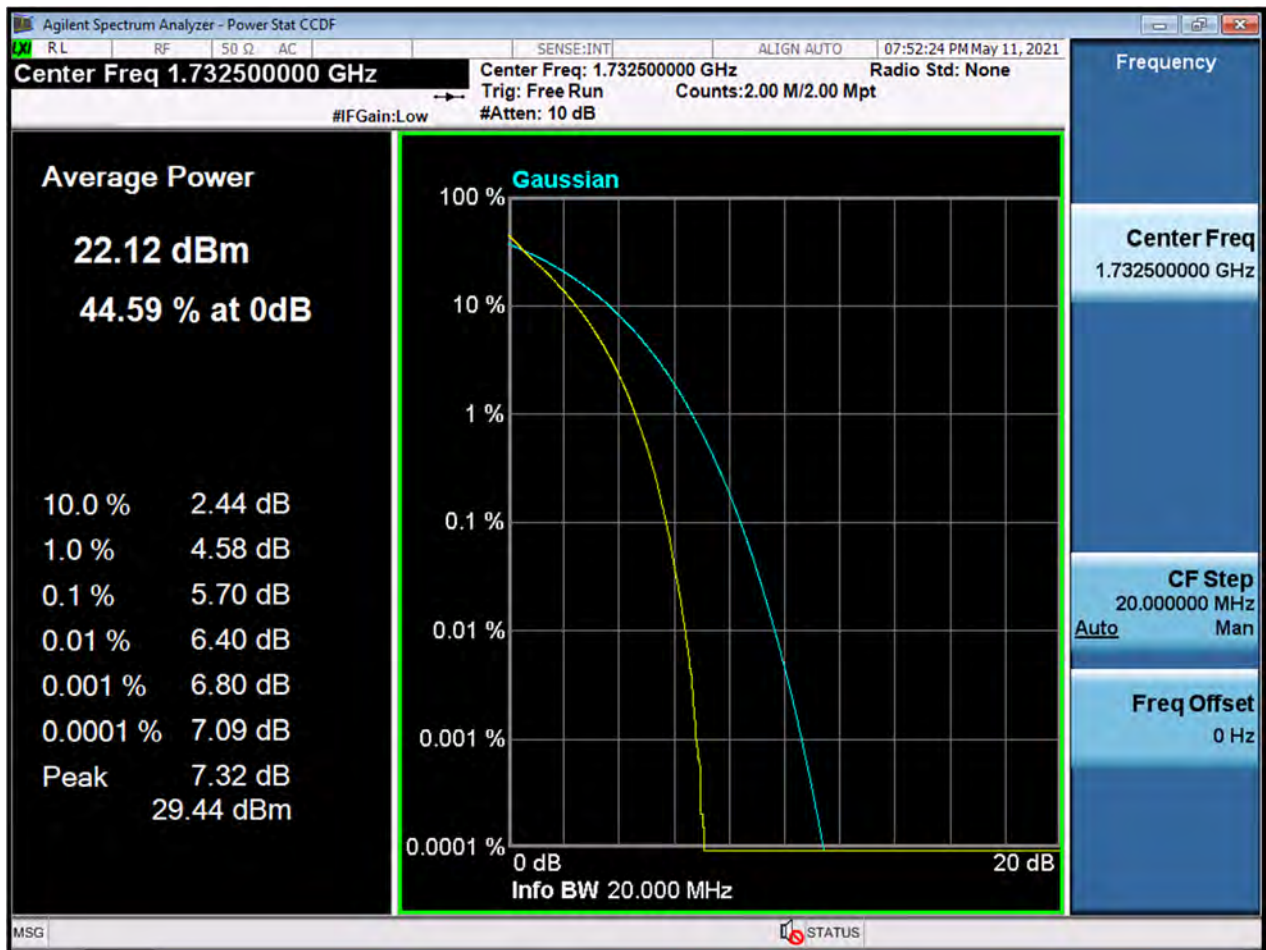
BW15M_PAR_Middle Channel_QPSK_FullRB



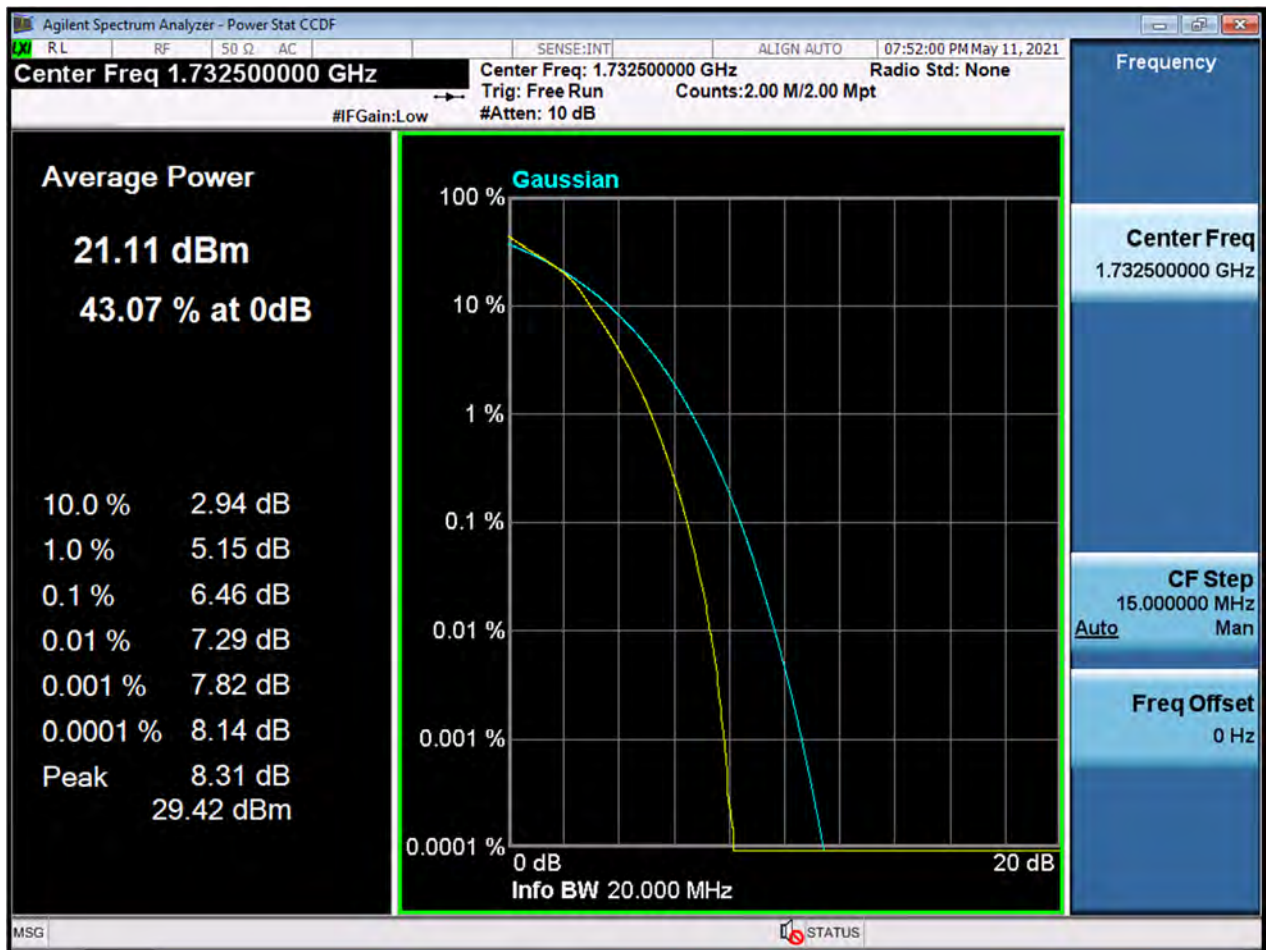
BW15M_PAR_Middle Channel_16QAM_FullRB



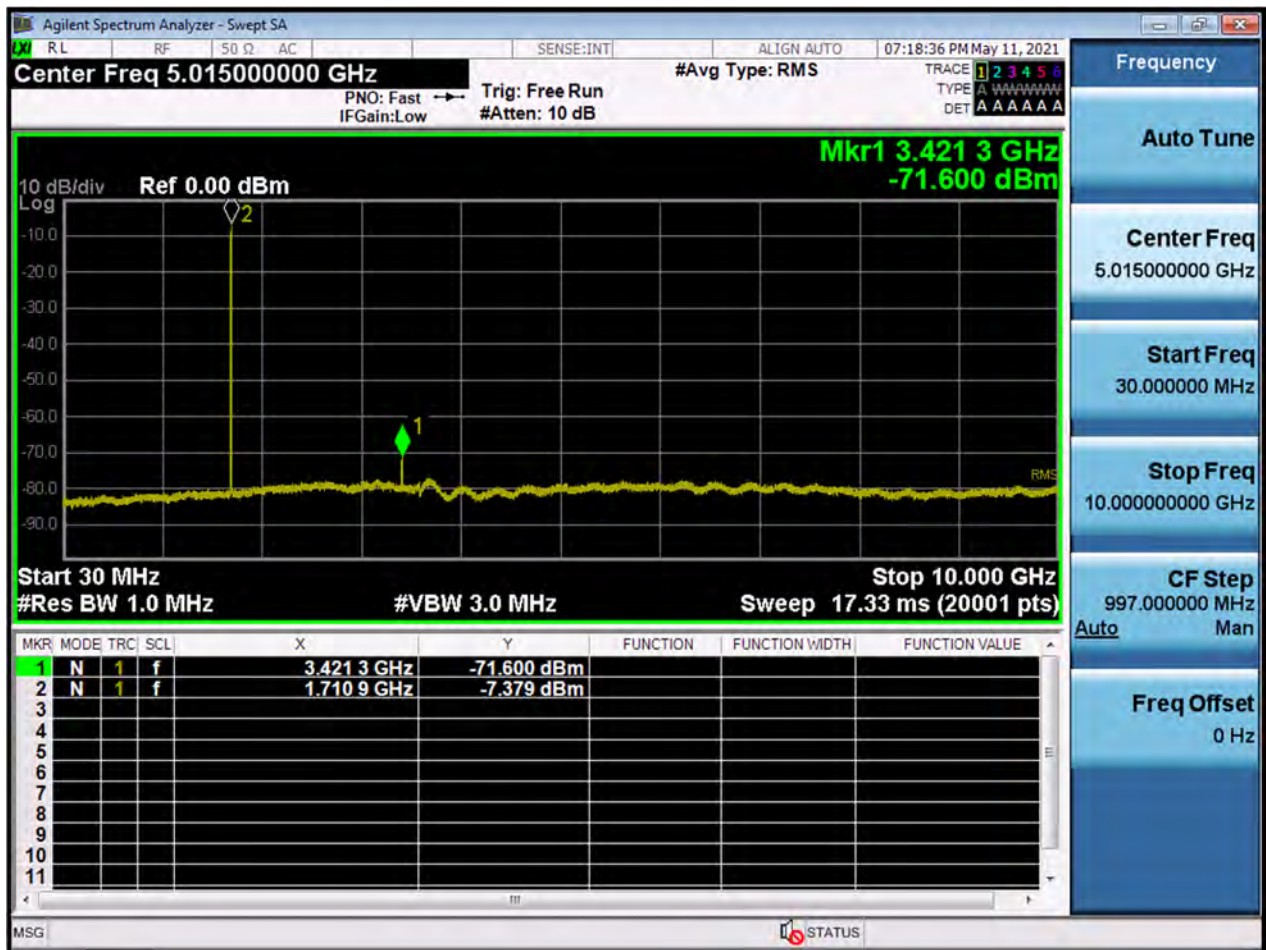
BW20M_PAR_Middle Channel_QPSK_FullRB



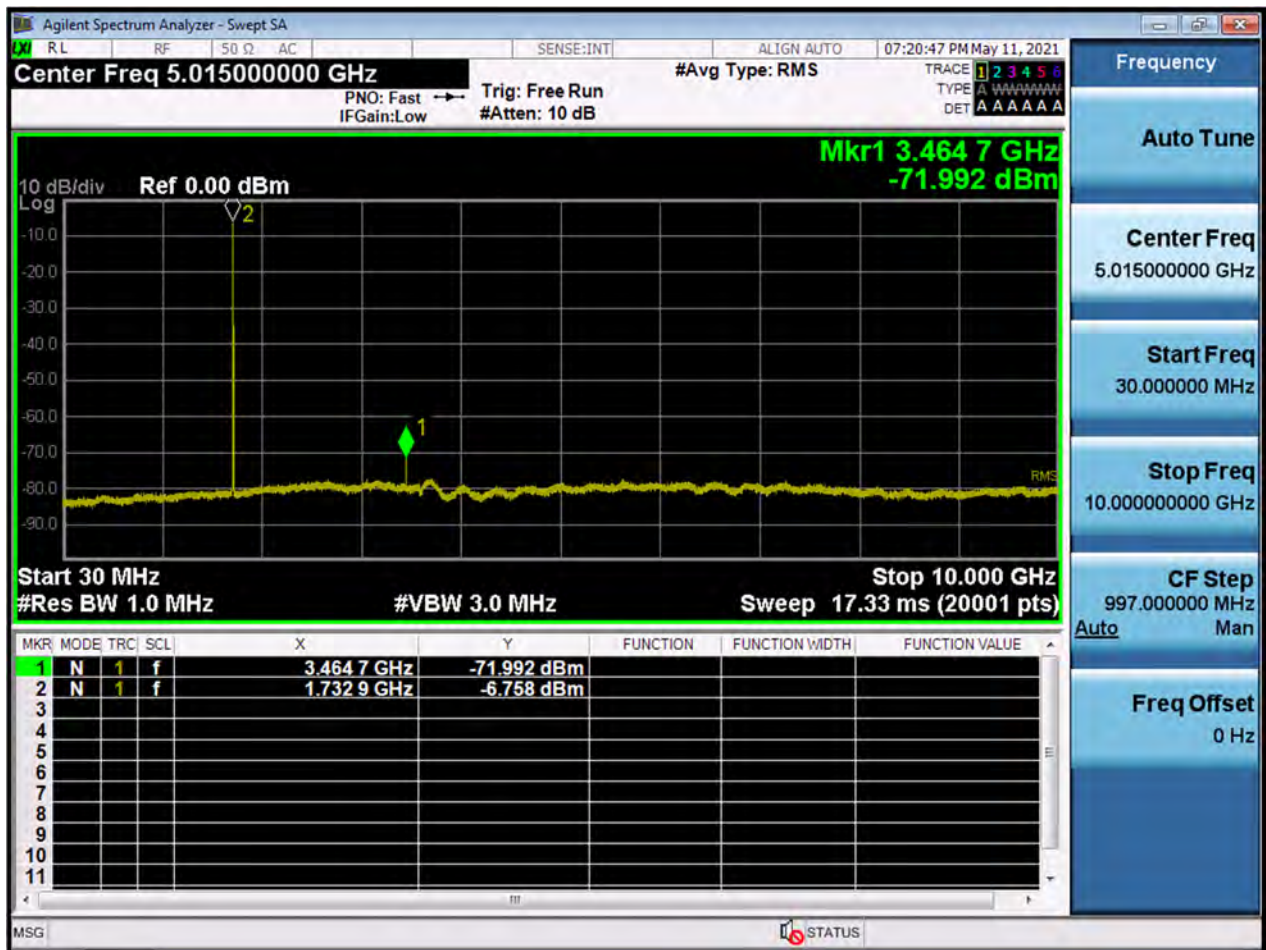
BW20M_PAR_Middle Channel_16QAM_FullRB



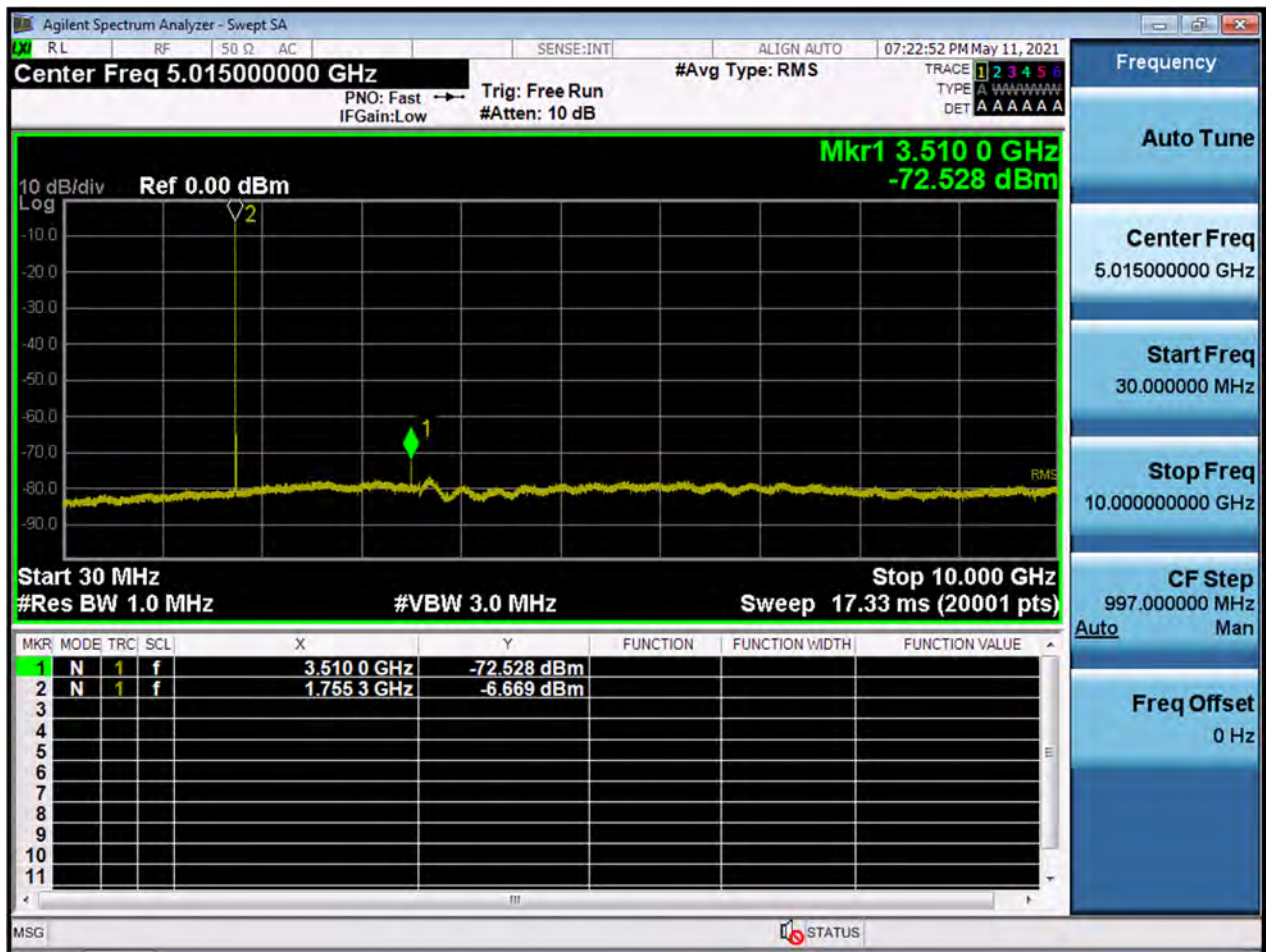
BW1.4M_CSE(30M-10G)_Lowest Channel_QPSK_1RB



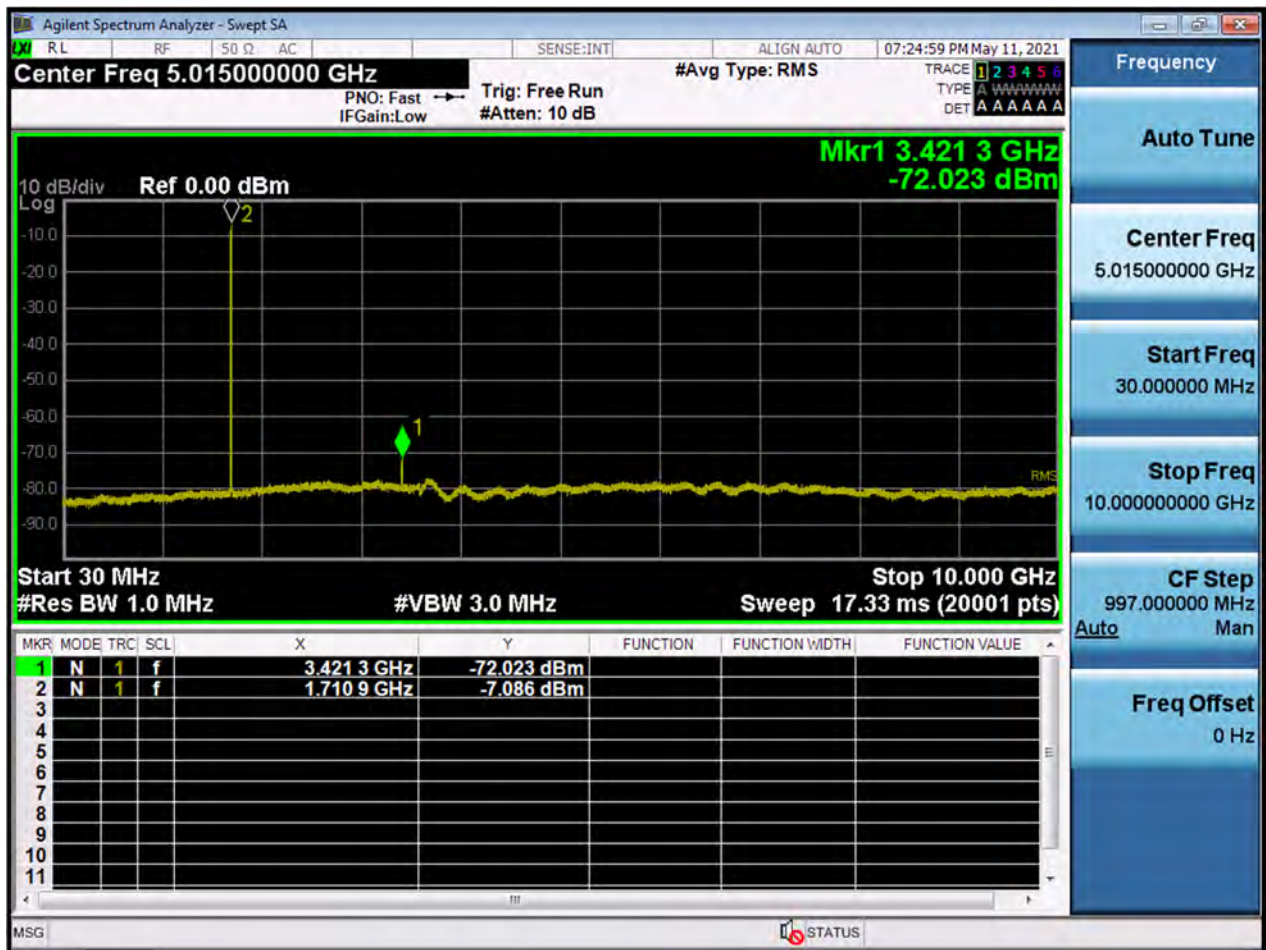
BW1.4M_CSE(30M-10G)_Middle Channel_QPSK_1RB



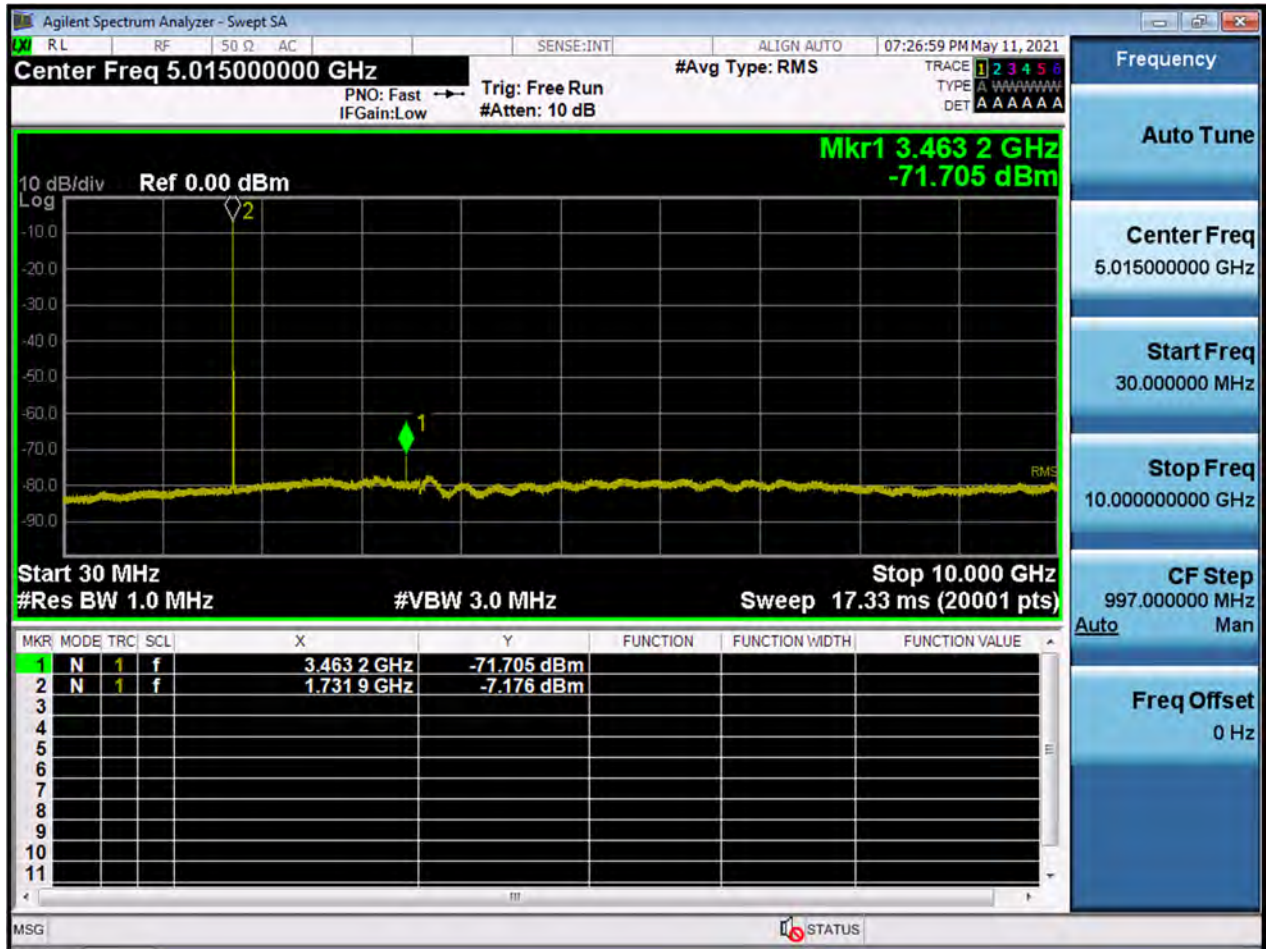
BW1.4M_CSE(30M-10G)_Highest Channel_QPSK_1RB



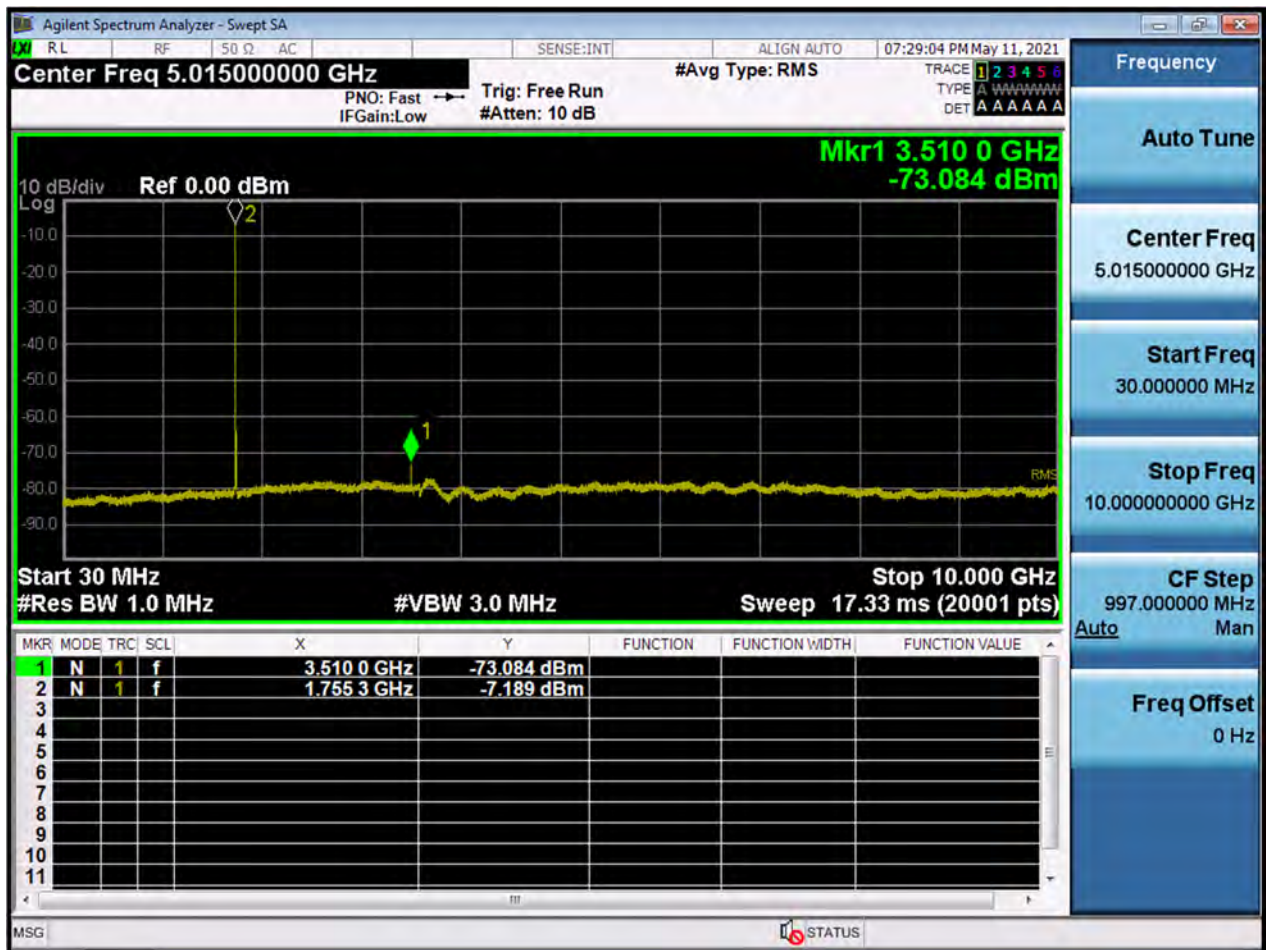
BW3M_CSE(30M-10G)_Lowest Channel_QPSK_1RB



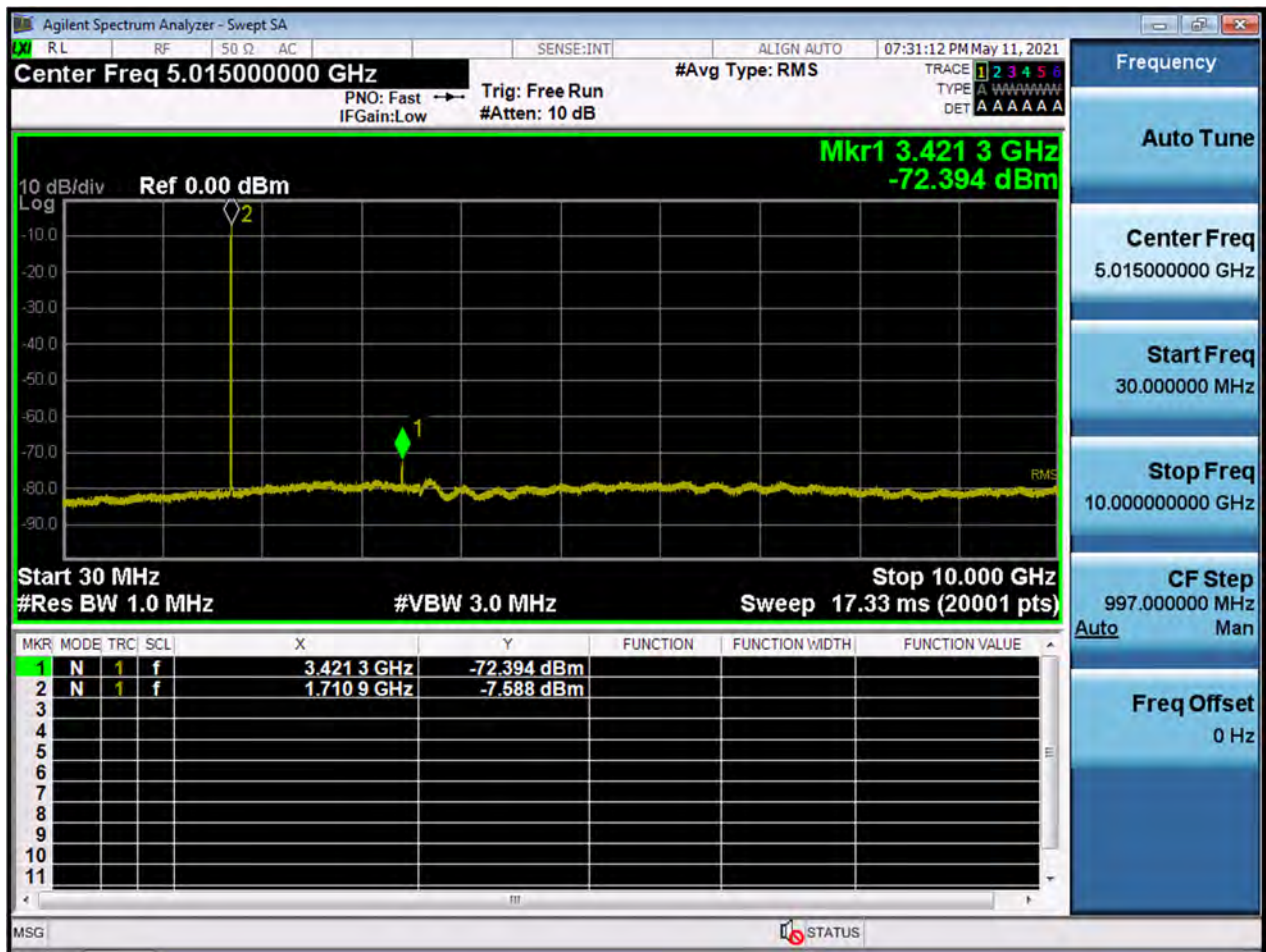
BW3M_CSE(30M-10G)_Middle Channel_QPSK_1RB



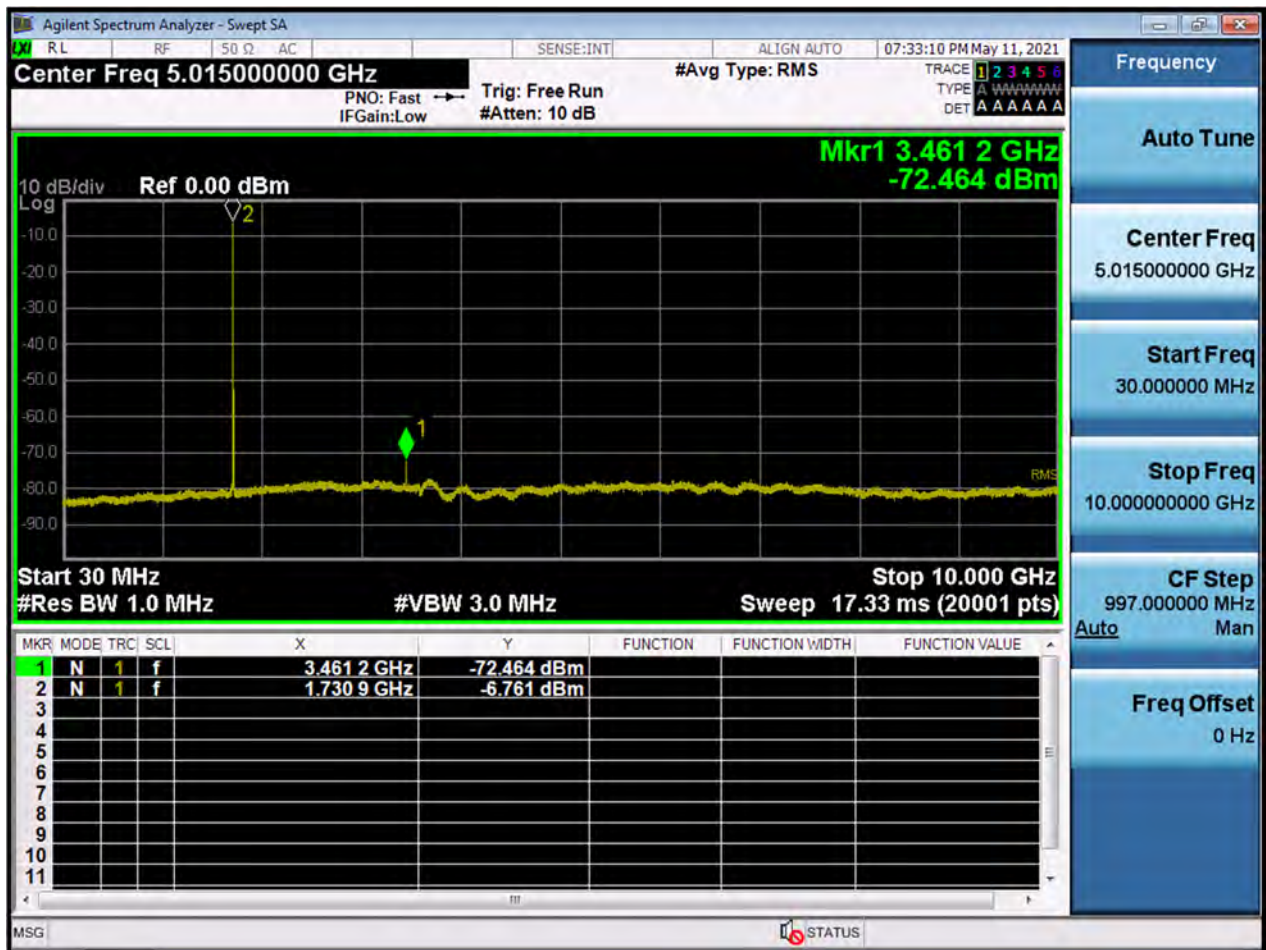
BW3M_CSE(30M-10G)_Highest Channel_QPSK_1RB



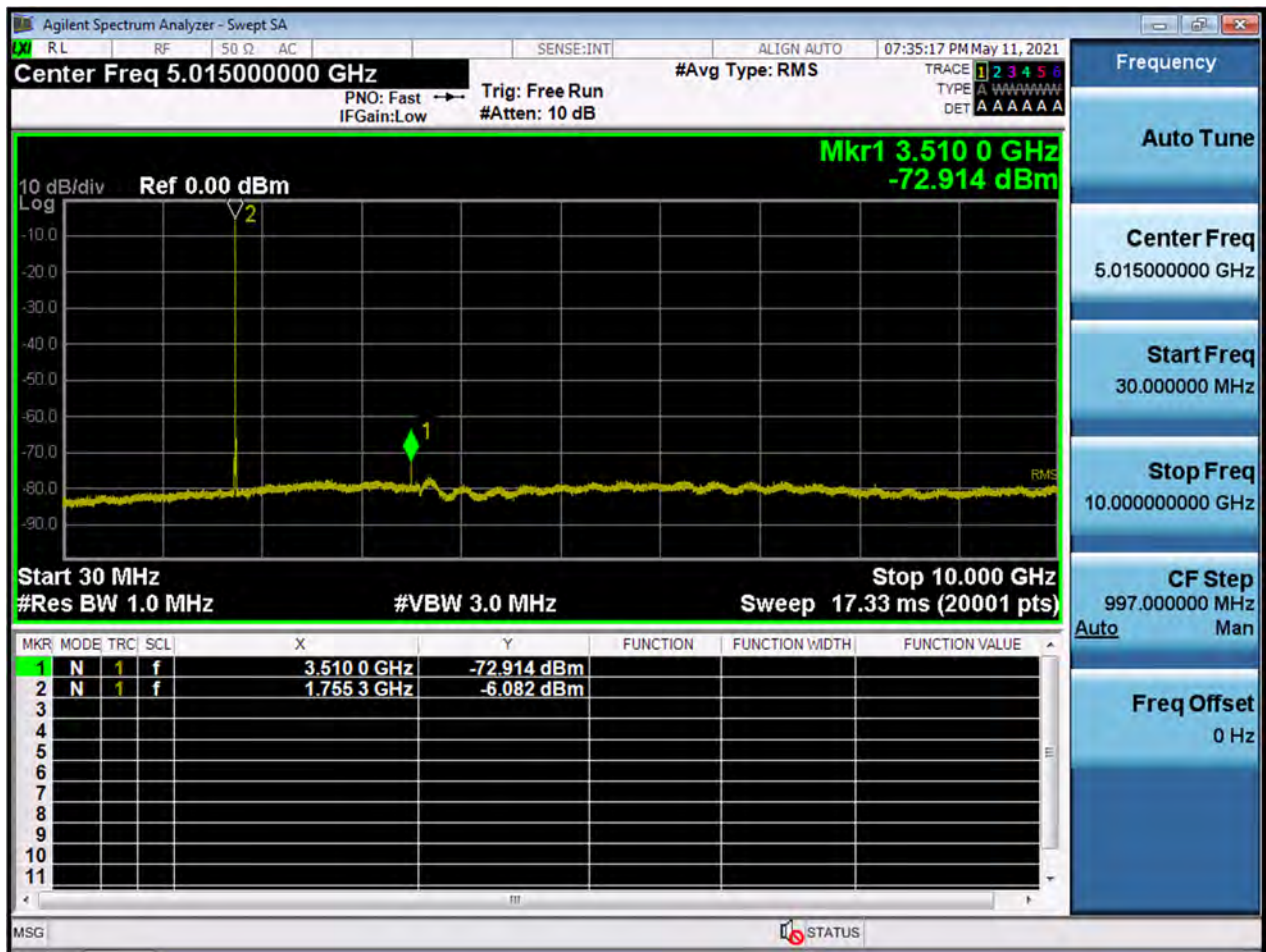
BW5M_CSE(30M-10G)_Lowest Channel_QPSK_1RB



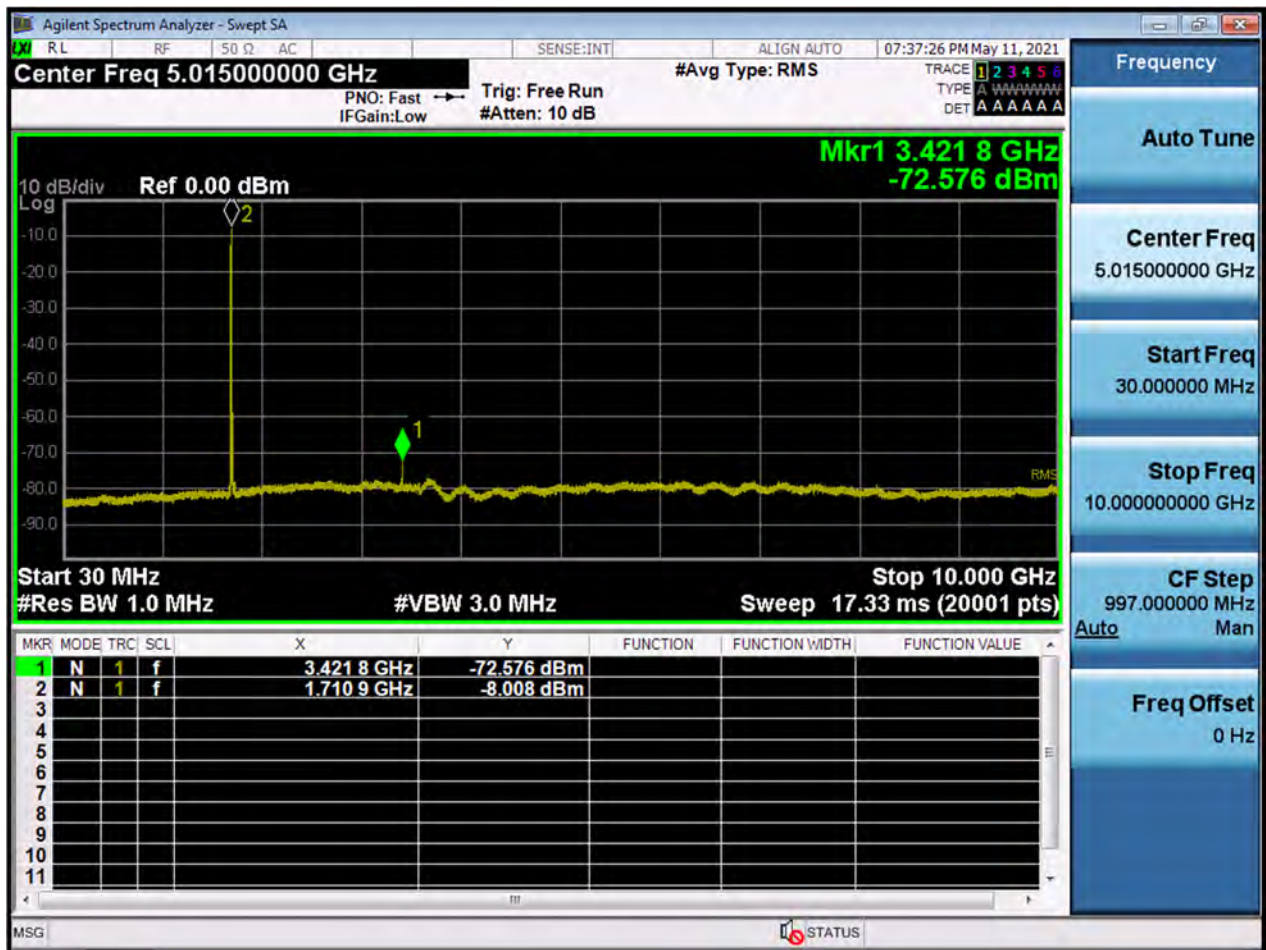
BW5M_CSE(30M-10G)_Middle Channel_QPSK_1RB



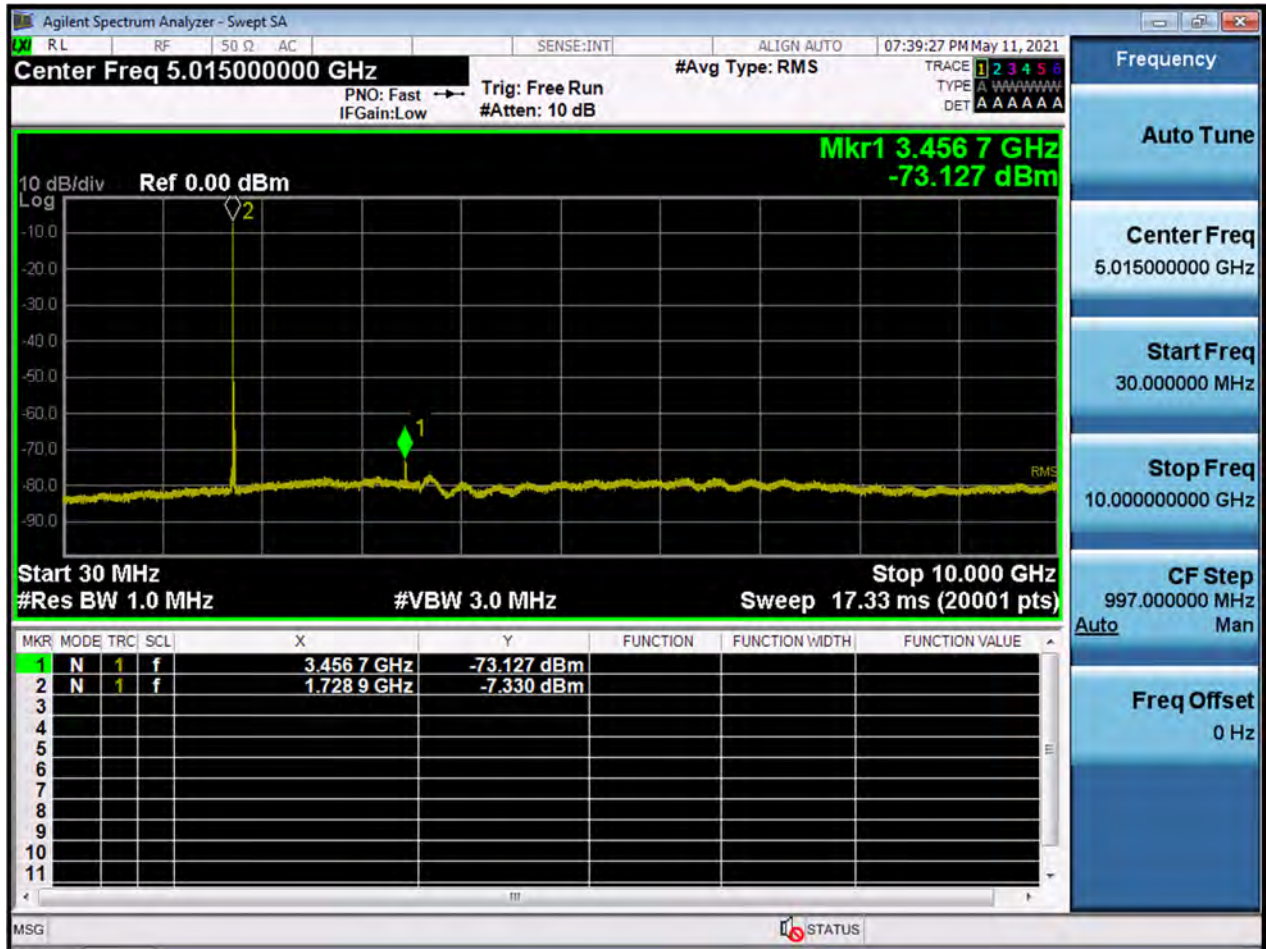
BW5M_CSE(30M-10G)_Highest Channel_QPSK_1RB



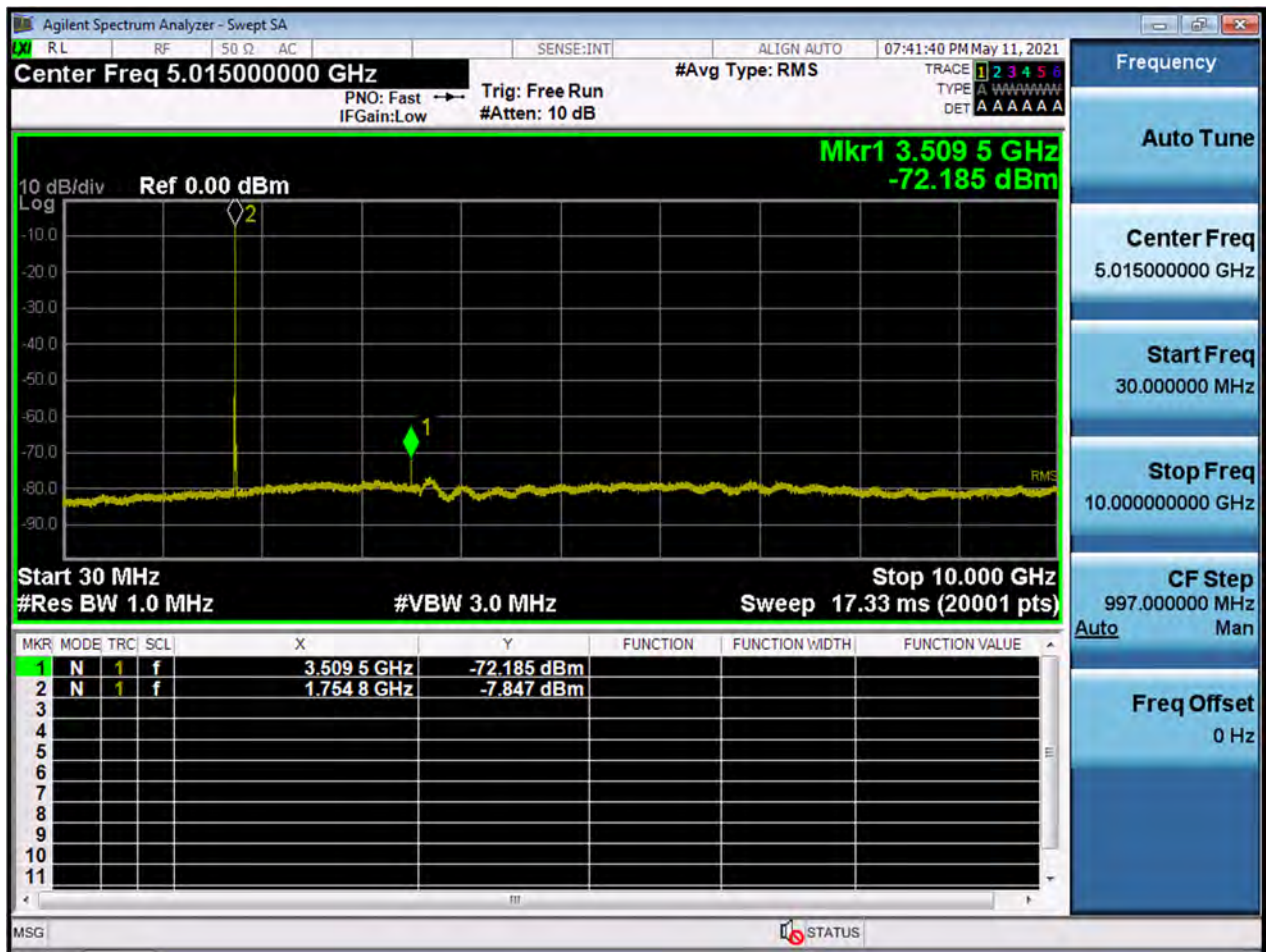
BW10M_CSE(30M-10G)_Lowest Channel_QPSK_1RB



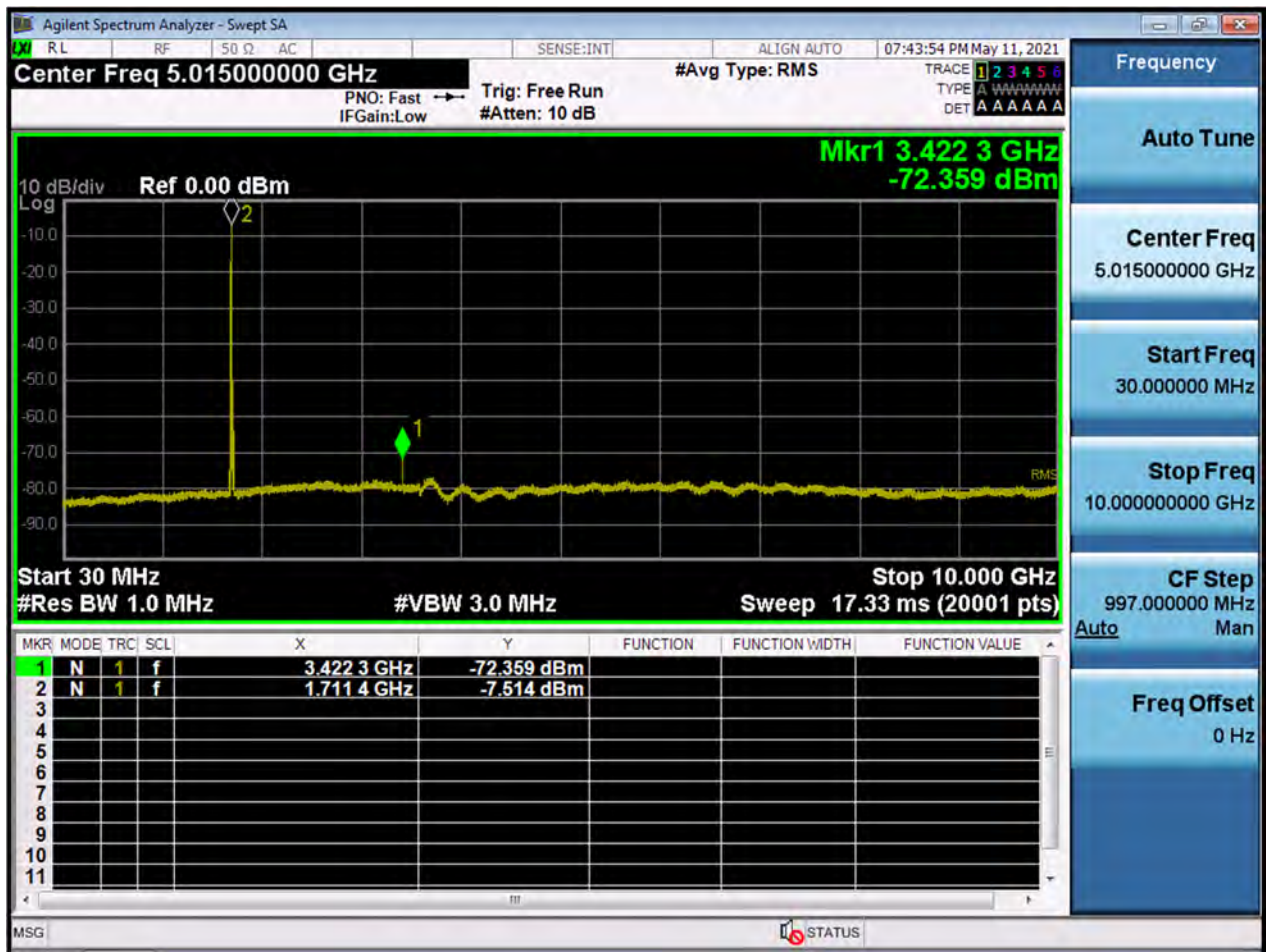
BW10M_CSE(30M-10G)_Middle Channel_QPSK_1RB



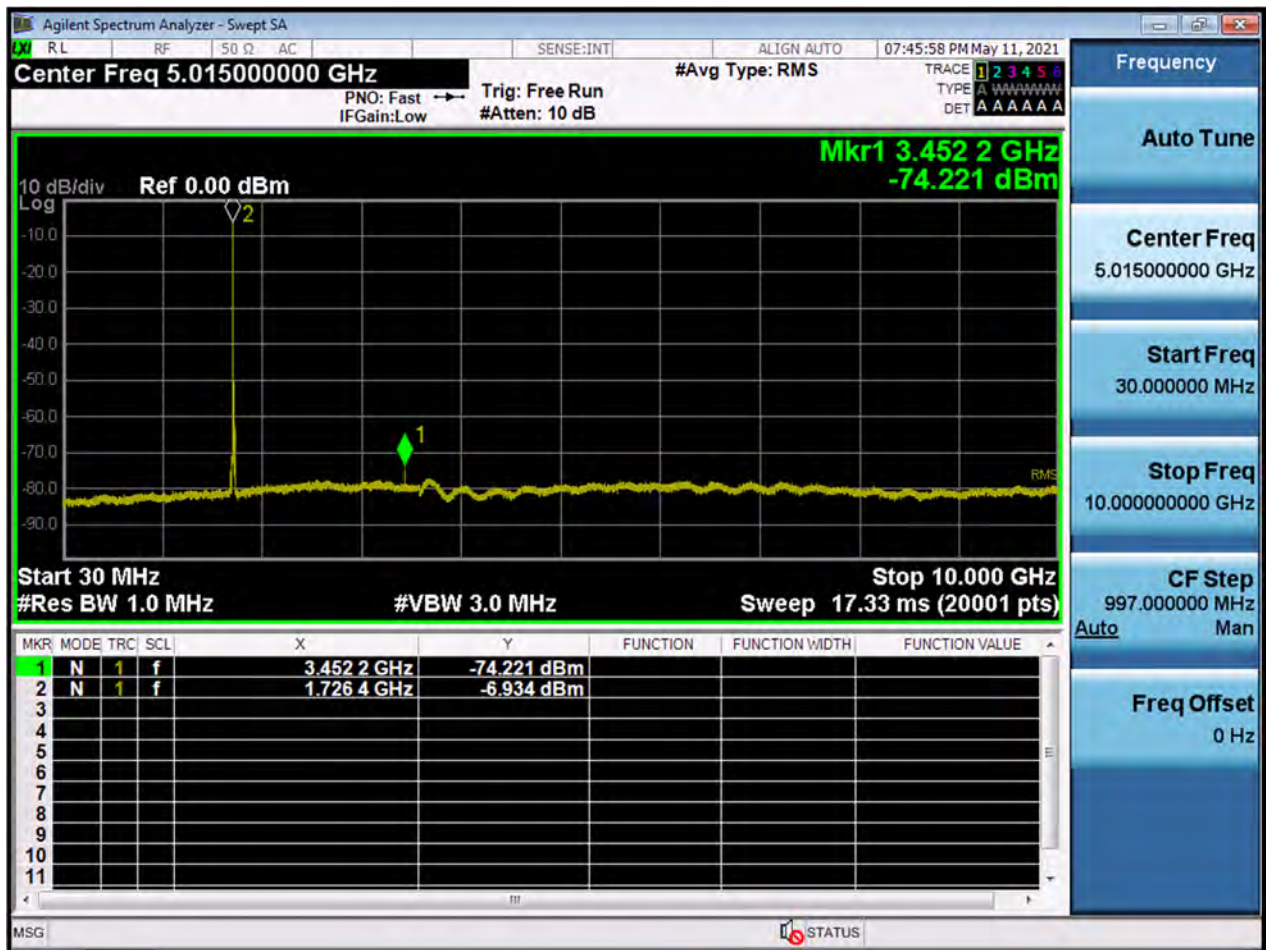
BW10M_CSE(30M-10G)_Highest Channel_QPSK_1RB



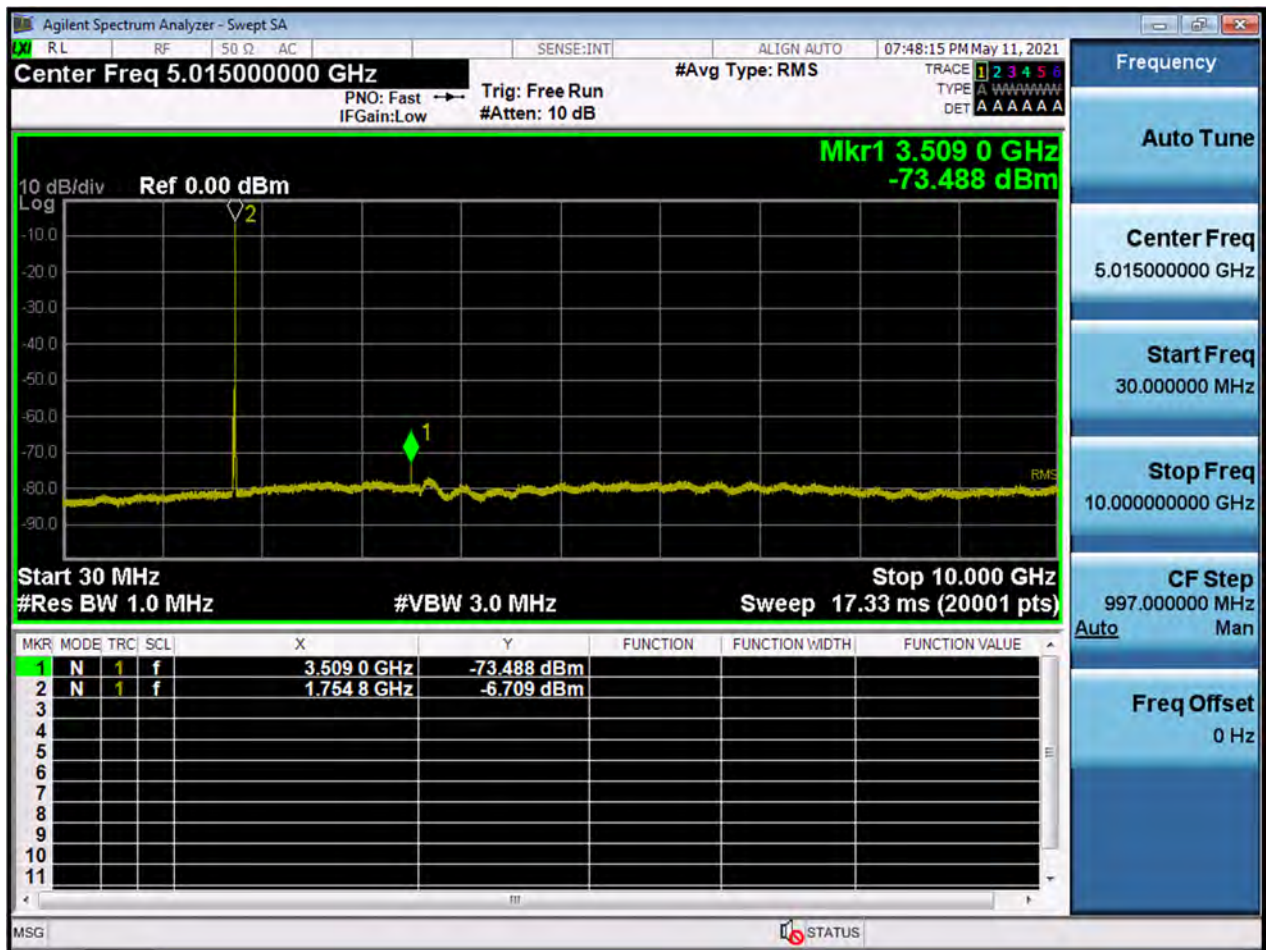
BW15M_CSE(30M-10G)_Lowest Channel_QPSK_1RB



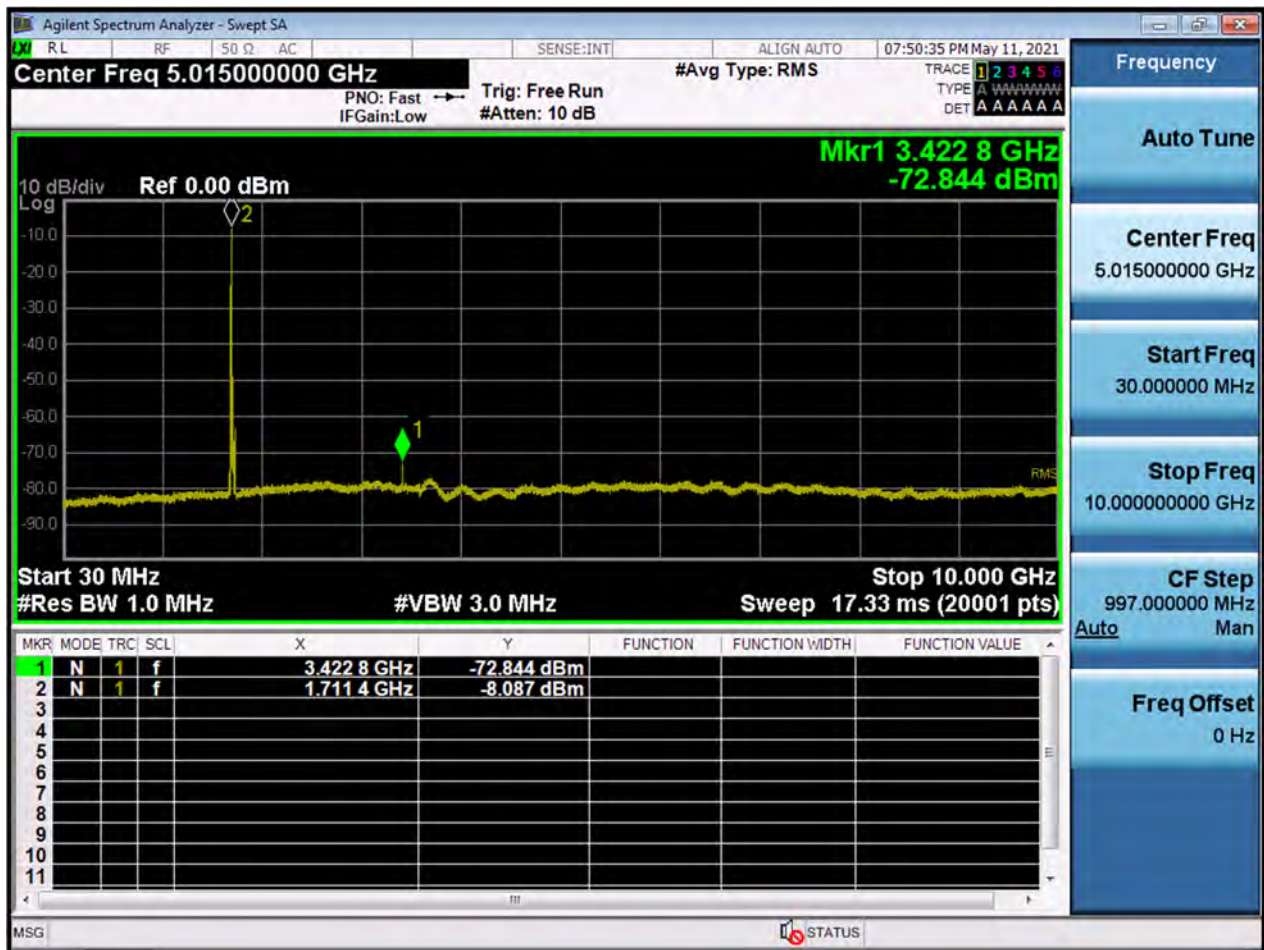
BW15M_CSE(30M-10G)_Middle Channel_QPSK_1RB



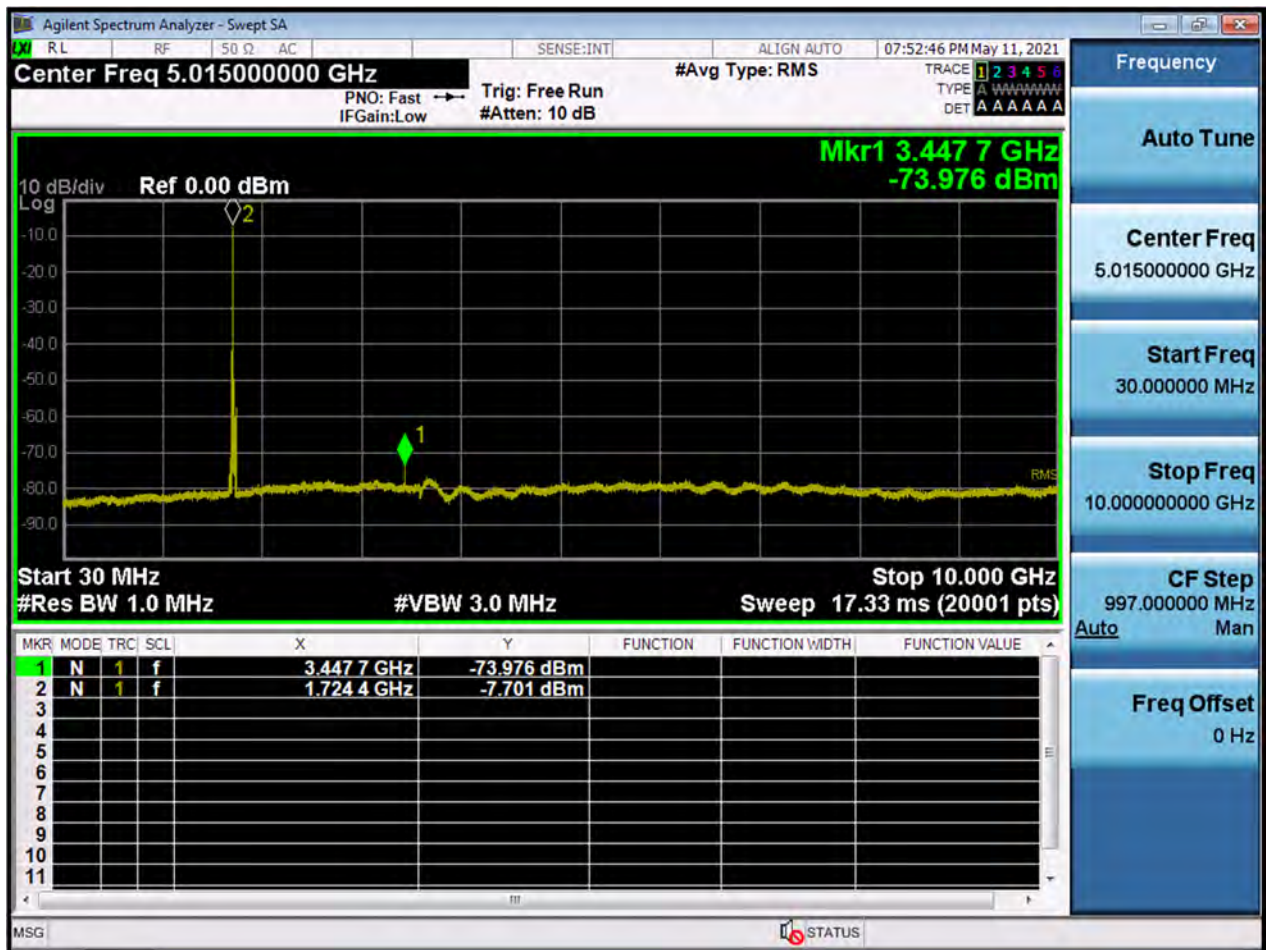
BW15M_CSE(30M-10G)_Highest Channel_QPSK_1RB



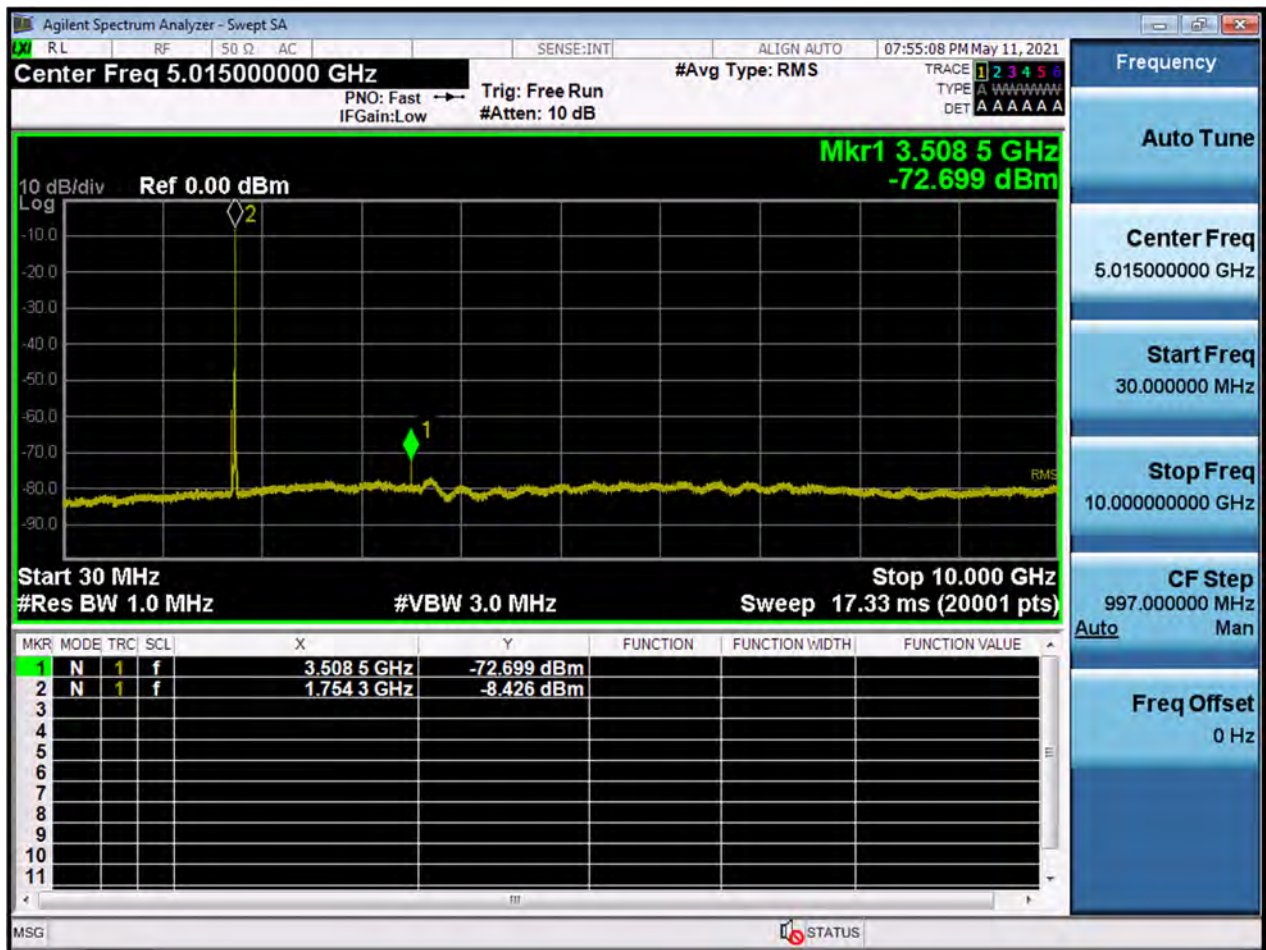
BW20M_CSE(30M-10G)_Lowest Channel_QPSK_1RB



BW20M_CSE(30M-10G)_Middle Channel_QPSK_1RB



BW20M_CSE(30M-10G)_Highest Channel_QPSK_1RB



BW1.4M_CSE(10G-26.5G)_Lowest Channel_QPSK_1RB



BW1.4M_CSE(10G-26.5G)_Middle Channel_QPSK_1RB



BW1.4M_CSE(10G-26.5G)_Highest Channel_QPSK_1RB



BW3M_CSE(10G-26.5G)_Lowest Channel_QPSK_1RB



BW3M_CSE(10G-26.5G)_Middle Channel_QPSK_1RB



BW3M_CSE(10G-26.5G)_Highest Channel_QPSK_1RB



BW5M_CSE(10G-26.5G)_Lowest Channel_QPSK_1RB



BW5M_CSE(10G-26.5G)_Middle Channel_QPSK_1RB



BW5M_CSE(10G-26.5G)_Highest Channel_QPSK_1RB



BW10M_CSE(10G-26.5G)_Lowest Channel_QPSK_1RB



BW10M_CSE(10G-26.5G)_Middle Channel_QPSK_1RB



BW10M_CSE(10G-26.5G)_Highest Channel_QPSK_1RB



BW15M_CSE(10G-26.5G)_Lowest Channel_QPSK_1RB



BW15M_CSE(10G-26.5G)_Middle Channel_QPSK_1RB



BW15M_CSE(10G-26.5G)_Highest Channel_QPSK_1RB



BW20M_CSE(10G-26.5G)_Lowest Channel_QPSK_1RB



BW20M_CSE(10G-26.5G)_Middle Channel_QPSK_1RB



BW20M_CSE(10G-26.5G)_Highest Channel_QPSK_1RB



10 ANNEX A_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2107-FC026-P