

FCC LTE REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Date of Issue:
December 27, 2022

Address:
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Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Location:
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Report No.: HCT-RF-2212-FC005

FCC ID: A3LSMM146B

APPLICANT: SAMSUNG Electronics Co., Ltd.

Model(s): SM-M146B/DSN
 EUT Type: Mobile phone
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 FCC Rule Part(s): §24, §2

Main 2 Ant

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	EIRP	
				Max. Power (W)	Max. Power (dBm)
LTE – Band2 (1.4)	1850.7 - 1909.3	1M11G7D	QPSK	0.346	25.39
		1M10W7D	16QAM	0.274	24.38
		1M10W7D	64QAM	0.222	23.47
		1M09W7D	256QAM	0.113	20.54
LTE – Band2 (3)	1851.5 - 1908.5	2M72G7D	QPSK	0.353	25.48
		2M73W7D	16QAM	0.280	24.47
		2M72W7D	64QAM	0.228	23.57
		2M72W7D	256QAM	0.117	20.67
LTE – Band2 (5)	1852.5 - 1907.5	4M53G7D	QPSK	0.356	25.52
		4M53W7D	16QAM	0.285	24.55
		4M53W7D	64QAM	0.232	23.65
		4M53W7D	256QAM	0.117	20.70
LTE – Band2 (10)	1855.0 - 1905.0	9M03G7D	QPSK	0.367	25.65
		9M01W7D	16QAM	0.299	24.75
		9M03W7D	64QAM	0.238	23.77
		9M01W7D	256QAM	0.119	20.74
LTE – Band2 (15)	1857.5 - 1902.5	13M5G7D	QPSK	0.363	25.60
		13M5W7D	16QAM	0.299	24.75
		13M5W7D	64QAM	0.238	23.76
		13M5W7D	256QAM	0.118	20.73
LTE – Band2 (20)	1860.0 - 1900.0	18M0G7D	QPSK	0.354	25.49
		18M0W7D	16QAM	0.289	24.61
		18M0W7D	64QAM	0.232	23.66
		18M0W7D	256QAM	0.118	20.73

Main 3 Ant

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	EIRP	
				Max. Power (W)	Max. Power (dBm)
LTE – Band2 (1.4)	1850.7 - 1909.3	1M10G7D	QPSK	0.123	20.90
		1M10W7D	16QAM	0.095	19.80
		1M11W7D	64QAM	0.076	18.82
		1M10W7D	256QAM	0.039	15.90
LTE – Band2 (3)	1851.5 - 1908.5	2M72G7D	QPSK	0.123	20.89
		2M74W7D	16QAM	0.095	19.76
		2M72W7D	64QAM	0.076	18.78
		2M72W7D	256QAM	0.039	15.93
LTE – Band2 (5)	1852.5 - 1907.5	4M53G7D	QPSK	0.123	20.90
		4M53W7D	16QAM	0.095	19.77
		4M53W7D	64QAM	0.077	18.87
		4M51W7D	256QAM	0.039	15.86
LTE – Band2 (10)	1855.0 - 1905.0	9M03G7D	QPSK	0.117	20.69
		9M02W7D	16QAM	0.091	19.59
		9M05W7D	64QAM	0.072	18.58
		9M03W7D	256QAM	0.037	15.66
LTE – Band2 (15)	1857.5 - 1902.5	13M5G7D	QPSK	0.116	20.66
		13M5W7D	16QAM	0.089	19.49
		13M5W7D	64QAM	0.072	18.57
		13M5W7D	256QAM	0.036	15.62
LTE – Band2 (20)	1860.0 - 1900.0	18M0G7D	QPSK	0.118	20.73
		18M0W7D	16QAM	0.090	19.53
		18M0W7D	64QAM	0.073	18.63
		18M0W7D	256QAM	0.037	15.71

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)

Report No.: HCT-RF-2212-FC005

REVIEWED BY

유권우



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Engineer of Telecommunication Testing Center

Report approved by : Jong Seok Lee
Manager of Telecommunication Testing Center

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

This laboratory is not accredited for the test results marked *.

The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2212-FC005	December 27, 2022	- First Approval Report

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

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MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name:	SAMSUNG Electronics Co., Ltd.
Address:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
FCC ID:	A3LSMM146B
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§24, §2
EUT Type:	Mobile phone
Model(s):	SM-M146B/DSN
Tx Frequency:	1850.7 MHz – 1909.3 MHz (LTE – Band2 (1.4 MHz)) 1851.5 MHz – 1908.5 MHz (LTE – Band2 (3 MHz)) 1852.5 MHz – 1907.5 MHz (LTE – Band2 (5 MHz)) 1855.0 MHz – 1905.0 MHz (LTE – Band2 (10 MHz)) 1857.5 MHz – 1902.5 MHz (LTE – Band2 (15 MHz)) 1860.0 MHz – 1900.0 MHz (LTE – Band2 (20 MHz))
Date(s) of Tests:	November 15, 2022 ~ December 23, 2022
Serial number:	Radiated: R3CTA0GVPVT (Main2 Ant), R3CTA0GVRHP(Main3 Ant), Conducted: R3CTA0GW2KB (Main2 Ant), 6a685f84d5357ece (Main3 Ant)

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a Mobile Phone with GSM/GPRS/EGPRS/UMTS and LTE, Sub6.

It also supports IEEE 802.11 a/b/g/n/ac (20/40/80 MHz), NFC, Bluetooth, BT LE.

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)
Peak- to- Average Ratio	- KDB 971168 D01 v03r01 – Section 5.7 - ANSI C63.26-2015 – Section 5.2.3.4
Frequency stability	- ANSI C63.26-2015 – Section 5.6
Effective Radiated Power/ Effective Isotropic Radiated Power	- KDB 971168 D01 v03r01 – Section 5.2 & 5.8 - ANSI/TIA-603-E-2016 – Section 2.2.17
Radiated Spurious and Harmonic Emissions	- KDB 971168 D01 v03r01 – Section 6.2 - ANSI/TIA-603-E-2016 – Section 2.2.12

3.2 RADIATED POWER

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

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

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5 % of the expected OBW, not to exceed 1 MHz
3. VBW \geq 3 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;

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

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

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

3.3 RADIATED SPURIOUS EMISSIONS

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

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

Test Settings

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

Test Note

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

The spurious emissions is calculated by the following formula;

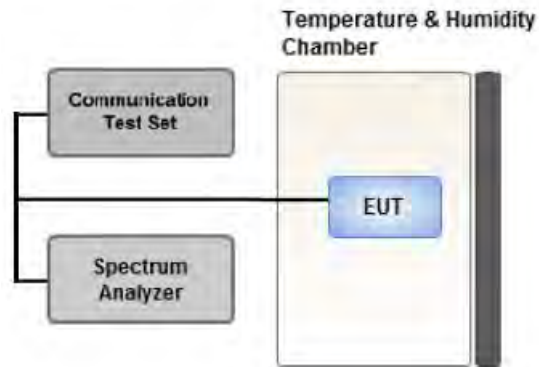
$$\text{Result}_{(\text{dBm})} = P_g_{(\text{dBm})} - \text{cable loss}_{(\text{dB})} + \text{antenna gain}_{(\text{dBi})}$$

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

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

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

3.4 PEAK- TO- AVERAGE RATIO



Test setup

① CCDF Procedure for PAPR

Test Settings

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

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)

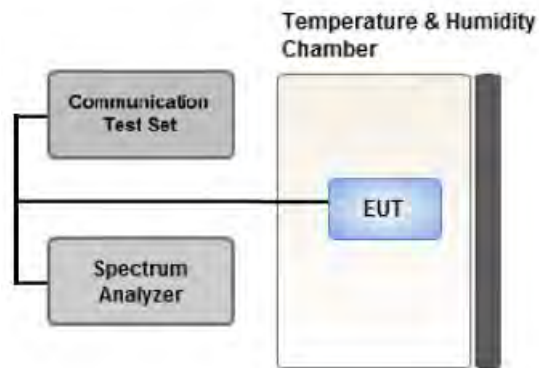
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW $\geq 3 \times$ RBW.

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 $[10 \log (1/\text{duty cycle})]$ to the measured maximum power level to compute the average power during continuous transmission. For example, add $[10 \log (1/0.25)] = 6$ dB if the duty cycle is a constant 25 %.

3.5 OCCUPIED BANDWIDTH.



Test setup

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

The EUT makes a call to the communication simulator.

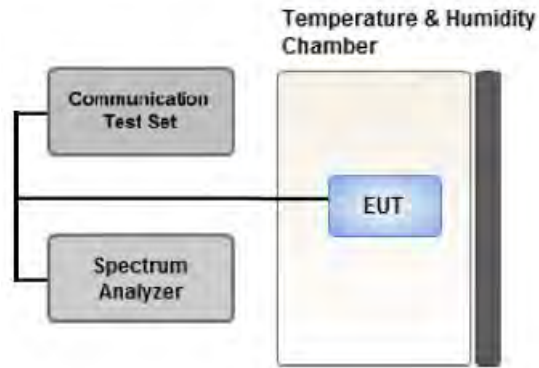
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth

Test Settings

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

3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



Test setup

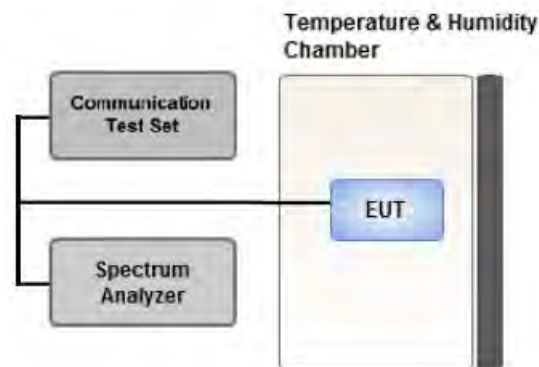
Test Overview

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

Test Settings

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

3.7 BAND EDGE



Test setup

Test Overview

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

Test Settings

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

Test Notes

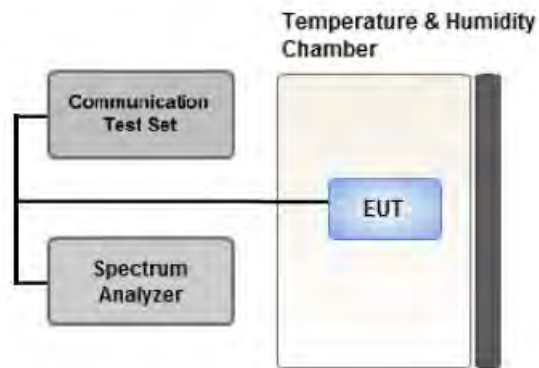
According to FCC 22.917, 24.238, 27.53 specified that power of any emission outside of The authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. In the 1 MHz bands immediately outside and adjacent to the frequency block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

All measurements were done at 2 channels (low and high operational frequency range.)

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

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

3.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE



Test setup

Test Overview

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

The frequency stability of the transmitter is measured by:

1. Temperature:

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

2. Primary Supply Voltage:

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

Test Settings

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

3.9 WORST CASE(RADIATED TEST)

- The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
- All modes of operation were investigated and the worst case configuration results are reported.
 Mode : Stand alone, Stand alone + External accessories (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 were investigated and the worst case bandwidth results are reported.
 (Main 2 Ant Worst case : 10 MHz)
 (Main 3 Ant Worst case : 1.4 MHz)
- The worst case is reported with the EUT positioning, modulations, and paging service configurations shown in the test data.
- Please refer to the table below.

[Main 2 Ant Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset	Axis			
Effective Isotropic Radiated Power	QPSK, 16QAM, 64QAM, 256QAM	1.4	Low, Mid	1	5	Z			
			High	1	0				
		3	Low, Mid	1	14				
			High	1	0				
		5	Low, Mid	1	24				
			High	1	0				
		10	Low, Mid	1	49				
			High	1	0				
		15	Low, Mid	1	74				
			High	1	0				
		20	Low, Mid	1	99				
			High	1	0				
		Radiated Spurious and Harmonic Emissions	QPSK	10	Low, Mid		1	49	Y
					High		1	0	

[Main 3 Ant Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset	Axis
Effective Isotropic Radiated Power	QPSK, 16QAM, 64QAM, 256QAM	1.4	Low, Mid, High	1	0	Z
		3				
		5				
		10				
		15				
		20				
Radiated Spurious and Harmonic Emissions	QPSK	1.4	Low, Mid, High	1	0	Z

3.10 WORST CASE(CONDUCTED TEST)

[Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset		
Occupied Bandwidth	QPSK, 16QAM, 64QAM, 256QAM	1.4, 3, 5, 10, 15, 20	Mid	Full RB	0		
Peak-To-Average Ratio	QPSK, 16QAM, 64QAM, 256QAM	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

- All modes of operation were investigated and the worst case configuration results are reported.

4. LIST OF TEST EQUIPMENT

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
H.P.F	FBSR-02B(WHK1.2/15 G-10EF)	T&M SYSTEM	-	02/18/2023	Annual
H.P.F	FBSR-02B(WHK3.3/18 G-10EF)	T&M SYSTEM	-	02/18/2023	Annual
Power Splitter(DC ~ 26.5 GHz)	11667B	Hewlett Packard	11275	03/11/2023	Annual
DC Power Supply	E3632A	Agilent	MY40010147	06/21/2023	Annual
Dipole Antenna	UHAP	Schwarzbeck	557	04/05/2023	Biennial
Dipole Antenna	UHAP	Schwarzbeck	558	04/05/2023	Biennial
Chamber	SU-642	ESPEC	93008124	03/04/2023	Annual
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	147	08/30/2023	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	9120D-1298	09/15/2023	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/29/2024	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170124	04/12/2023	Biennial
Signal Analyzer(10 Hz ~ 26.5 GHz)	N9020A	Agilent	MY52090906	05/02/2023	Annual
ATTENUATOR(20 dB)	8493C	Hewlett Packard	17280	05/18/2023	Annual
Spectrum Analyzer(10 Hz ~ 40 GHz)	FSV40	REOHDE & SCHWARZ	100931	08/29/2023	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/18/2023	Annual
Loop Antenna(9 kHz ~ 30 MHz)	FMZB1513	Schwarzbeck	1513-333	03/17/2024	Biennial
Bilog Antenna	VULB9160	Schwarzbeck	3150	03/03/2023	Biennial
Hybrid Antenna	VULB9168	Schwarzbeck	760	02/22/2023	Biennial
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262116770	07/05/2023	Annual
Wideband Radio Communication Tester	MT8000A	Anritsu Corp.	6262302511	05/18/2023	Annual
SIGNAL GENERATOR (100 kHz ~ 40 GHz)	SMB100A	REOHDE & SCHWARZ	177633	07/05/2023	Annual
Signal Analyzer(5 Hz ~ 40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/30/2023	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	HCT CO., LTD.,	-	-	-

Note:

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

6. SUMMARY OF TEST RESULTS

6.1 Test Condition : Conducted Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Occupied Bandwidth	§2.1049	N/A	PASS
Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	§2.1051, §24.238(a)	< 43 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions	PASS
Conducted Output Power	§2.1046	N/A	<u>See Note1</u>
Peak- to- Average Ratio	§24.232(d)	< 13 dB	PASS
Frequency stability / variation of ambient temperature	§24.235	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
Equivalent Isotropic Radiated Power	§24.232(c)	< 2 Watts max. EIRP	PASS
Radiated Spurious and Harmonic Emissions	§2.1053, §24.238(a)	< 43 + 10log10 (P[Watts]) for all out-of band emissions	PASS

7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

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

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 (Main 2 Ant)

8.1 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	dBm
1850.7	LTE B2/ 1.4 MHz	QPSK	-17.71	16.07	10.40	2.13	V	< 2.00	0.272	24.34	
		16-QAM	-18.70	15.08	10.40	2.13	V		0.216	23.35	
		64-QAM	-19.73	14.05	10.40	2.13	V		0.171	22.32	
		256-QAM	-22.50	11.28	10.40	2.13	V		0.090	19.55	
1880.0		QPSK	-17.52	17.10	10.40	2.23	V		0.337	25.27	
		16-QAM	-18.46	16.16	10.40	2.23	V		0.271	24.33	
		64-QAM	-19.45	15.17	10.40	2.23	V		0.216	23.34	
		256-QAM	-22.35	12.27	10.40	2.23	V		0.111	20.44	
1909.3		QPSK	-17.44	17.13	10.40	2.14	V		0.346	25.39	
		16-QAM	-18.45	16.12	10.40	2.14	V		0.274	24.38	
		64-QAM	-19.36	15.21	10.40	2.14	V		0.222	23.47	
		256-QAM	-22.29	12.28	10.40	2.14	V		0.113	20.54	

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit		EIRP	
								W	W	dBm	dBm
1851.5	LTE B2/ 3 MHz	QPSK	-17.78	16.00	10.40	2.13	V	< 2.00	0.267	24.27	
		16-QAM	-18.78	15.00	10.40	2.13	V		0.212	23.27	
		64-QAM	-19.86	13.92	10.40	2.13	V		0.166	22.19	
		256-QAM	-22.61	11.17	10.40	2.13	V		0.088	19.44	
1880.0		QPSK	-17.43	17.19	10.40	2.23	V		0.344	25.36	
		16-QAM	-18.32	16.30	10.40	2.23	V		0.280	24.47	
		64-QAM	-19.34	15.28	10.40	2.23	V		0.221	23.45	
		256-QAM	-22.27	12.35	10.40	2.23	V		0.113	20.52	
1908.5		QPSK	-17.35	17.22	10.40	2.14	V		0.353	25.48	
		16-QAM	-18.45	16.12	10.40	2.14	V		0.274	24.38	
		64-QAM	-19.26	15.31	10.40	2.14	V		0.228	23.57	
		256-QAM	-22.16	12.41	10.40	2.14	V		0.117	20.67	

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit		EIRP	
								W	W	dBm	dBm
1852.5	LTE B2/ 5 MHz	QPSK	-17.70	16.08	10.40	2.13	V	< 2.00	0.272	24.35	
		16-QAM	-18.70	15.08	10.40	2.13	V		0.216	23.35	
		64-QAM	-19.72	14.06	10.40	2.13	V		0.171	22.33	
		256-QAM	-22.51	11.27	10.40	2.13	V		0.090	19.54	
1880.0		QPSK	-17.27	17.35	10.40	2.23	V		0.356	25.52	
		16-QAM	-18.24	16.38	10.40	2.23	V		0.285	24.55	
		64-QAM	-19.17	15.45	10.40	2.23	V		0.230	23.62	
		256-QAM	-22.14	12.48	10.40	2.23	V		0.116	20.65	
1907.5		QPSK	-17.36	17.21	10.40	2.14	V		0.352	25.47	
		16-QAM	-18.34	16.23	10.40	2.14	V		0.281	24.49	
		64-QAM	-19.18	15.39	10.40	2.14	V		0.232	23.65	
		256-QAM	-22.13	12.44	10.40	2.14	V		0.117	20.70	

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit		EIRP	
								W	W	dBm	dBm
1855.0	LTE B2/ 10 MHz	QPSK	-17.67	16.29	10.40	2.15	V	< 2.00	0.284	24.54	
		16-QAM	-18.64	15.32	10.40	2.15	V		0.228	23.57	
		64-QAM	-19.65	14.31	10.40	2.15	V		0.180	22.56	
		256-QAM	-22.50	11.46	10.40	2.15	V		0.094	19.71	
1880.0		QPSK	-17.27	17.35	10.40	2.23	V		0.356	25.52	
		16-QAM	-18.17	16.45	10.40	2.23	V		0.290	24.62	
		64-QAM	-19.12	15.50	10.40	2.23	V		0.233	23.67	
		256-QAM	-22.15	12.47	10.40	2.23	V		0.116	20.64	
1905.0		QPSK	-17.17	17.41	10.40	2.16	V		0.367	25.65	
		16-QAM	-18.07	16.51	10.40	2.16	V		0.299	24.75	
		64-QAM	-19.05	15.53	10.40	2.16	V		0.238	23.77	
		256-QAM	-22.08	12.50	10.40	2.16	V		0.119	20.74	

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit		EIRP	
								W	W	dBm	dBm
1857.5	LTE B2/ 15 MHz	QPSK	-17.43	16.71	10.40	2.17	V	< 2.00	0.312	24.94	
		16-QAM	-18.33	15.81	10.40	2.17	V		0.254	24.04	
		64-QAM	-19.28	14.86	10.40	2.17	V		0.204	23.09	
		256-QAM	-22.29	11.85	10.40	2.17	V		0.102	20.08	
1880.0		QPSK	-17.37	17.25	10.40	2.23	V		0.348	25.42	
		16-QAM	-18.25	16.37	10.40	2.23	V		0.284	24.54	
		64-QAM	-19.20	15.42	10.40	2.23	V		0.229	23.59	
		256-QAM	-22.18	12.44	10.40	2.23	V		0.115	20.61	
1902.5		QPSK	-17.21	17.38	10.40	2.18	V		0.363	25.60	
		16-QAM	-18.06	16.53	10.40	2.18	V		0.299	24.75	
		64-QAM	-19.05	15.54	10.40	2.18	V		0.238	23.76	
		256-QAM	-22.08	12.51	10.40	2.18	V		0.118	20.73	

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit		EIRP	
								W	W	dBm	dBm
1860.0	LTE B2/ 20 MHz	QPSK	-17.45	16.69	10.40	2.17	V	< 2.00	0.310	24.92	
		16-QAM	-18.26	15.88	10.40	2.17	V		0.258	24.11	
		64-QAM	-19.24	14.90	10.40	2.17	V		0.206	23.13	
		256-QAM	-22.27	11.87	10.40	2.17	V		0.102	20.10	
1880.0		QPSK	-17.30	17.32	10.40	2.23	V		0.354	25.49	
		16-QAM	-18.18	16.44	10.40	2.23	V		0.289	24.61	
		64-QAM	-19.13	15.49	10.40	2.23	V		0.232	23.66	
		256-QAM	-22.06	12.56	10.40	2.23	V		0.118	20.73	
1900.0		QPSK	-17.48	17.11	10.40	2.18	V		0.341	25.33	
		16-QAM	-18.35	16.24	10.40	2.18	V		0.279	24.46	
		64-QAM	-19.30	15.29	10.40	2.18	V		0.224	23.51	
		256-QAM	-22.31	12.28	10.40	2.18	V		0.112	20.50	

8.2 RADIATED SPURIOUS EMISSIONS

- ▣ OPERATING FREQUENCY: 1905.0 MHz
- ▣ MEASURED OUTPUT POWER: 25.65 dBm = 0.367 W
- ▣ MODE: LTE B2
- ▣ MODULATION SIGNAL: 10 MHz QPSK
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: $43 + 10 \log_{10}(W) =$ 38.65 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
18650 (1855.0)	3 710.00	-55.49	12.30	-60.60	3.14	V	-51.44	77.08
	5 565.00	-57.10	13.30	-55.01	3.90	V	-45.61	71.26
	7 420.00	-56.73	10.80	-46.57	4.57	H	-40.34	65.99
18900 (1880.0)	3 760.00	-54.66	12.32	-59.16	3.08	V	-49.92	75.57
	5 640.00	-55.80	13.10	-53.99	3.90	H	-44.79	70.44
	7 520.00	-56.98	10.84	-46.40	4.61	H	-40.17	65.82
19150 (1905.0)	3 810.00	-53.93	12.40	-58.35	3.12	V	-49.07	74.72
	5 715.00	-56.44	13.07	-54.07	3.96	H	-44.95	70.60
	7 620.00	-55.73	11.18	-45.24	4.65	H	-38.71	64.36

8.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
2	1.4 MHz	1880.0	QPSK	6	0	4.91
			16-QAM	6	0	5.58
			64-QAM	6	0	6.01
			256-QAM	6	0	6.66
	3 MHz		QPSK	15	0	5.11
			16-QAM	15	0	5.81
			64-QAM	15	0	6.11
			256-QAM	15	0	6.51
	5 MHz		QPSK	25	0	5.02
			16-QAM	25	0	5.73
			64-QAM	25	0	6.08
			256-QAM	25	0	6.48
	10 MHz		QPSK	50	0	5.02
			16-QAM	50	0	5.77
			64-QAM	50	0	6.10
			256-QAM	50	0	6.48
	15 MHz		QPSK	75	0	5.20
			16-QAM	75	0	5.88
			64-QAM	75	0	6.15
			256-QAM	75	0	6.45
20 MHz	QPSK	100	0	5.13		
	16-QAM	100	0	5.88		
	64-QAM	100	0	6.12		
	256-QAM	100	0	6.47		

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 108 ~ 131.

8.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
2	1.4 MHz	1880.0	QPSK	6	0	1.1049
			16-QAM	6	0	1.1002
			64-QAM	6	0	1.1023
			256-QAM	6	0	1.0938
	3 MHz		QPSK	15	0	2.7195
			16-QAM	15	0	2.7260
			64-QAM	15	0	2.7168
			256-QAM	15	0	2.7180
	5 MHz		QPSK	25	0	4.5270
			16-QAM	25	0	4.5325
			64-QAM	25	0	4.5339
			256-QAM	25	0	4.5294
	10 MHz		QPSK	50	0	9.0329
			16-QAM	50	0	9.0073
			64-QAM	50	0	9.0265
			256-QAM	50	0	9.0091
	15 MHz		QPSK	75	0	13.480
			16-QAM	75	0	13.472
			64-QAM	75	0	13.455
			256-QAM	75	0	13.445
20 MHz	QPSK	100	0	17.986		
	16-QAM	100	0	17.966		
	64-QAM	100	0	17.954		
	256-QAM	100	0	17.945		

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 83 ~ 107.

8.5 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
2	1.4	1850.7	3.7054	27.976	-77.369	-49.393	-13.00
		1880.0	3.7149	27.976	-77.360	-49.384	
		1909.3	3.6745	27.976	-77.472	-49.496	
	3	1851.5	3.7164	27.976	-77.305	-49.329	
		1880.0	3.6825	27.976	-77.384	-49.408	
		1908.5	3.6695	27.976	-77.376	-49.400	
	5	1852.5	3.6790	27.976	-77.366	-49.390	
		1880.0	3.6955	27.976	-77.465	-49.489	
		1907.5	3.6910	27.976	-77.328	-49.352	
	10	1855.0	3.6840	27.976	-77.275	-49.299	
		1880.0	3.7139	27.976	-77.248	-49.272	
		1905.0	3.6616	27.976	-77.327	-49.351	
	15	1857.5	3.7020	27.976	-77.359	-49.383	
		1880.0	3.6890	27.976	-77.283	-49.307	
		1902.5	3.6960	27.976	-77.079	-49.103	
	20	1860.0	3.6880	27.976	-77.282	-49.306	
		1880.0	3.7064	27.976	-77.202	-49.226	
		1900.0	3.7044	27.976	-77.551	-49.575	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 132 ~ 137.
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

8.6 BAND EDGE

Lower Band Edge & Extended Band Edge

Band	Band Width (MHz)	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Frequency of Maximum Harmonic (MHz)	Maximum Data (dBm)	Limit (dBm)
2	1.4	1850.7	QPSK	1	0	1850.000	-22.791	<-13.00
			QPSK	6	0	1850.000	-23.355	
		(Extended)	QPSK	6	0	1848.500	-28.07	
	3	1851.5	QPSK	1	0	1850.000	-17.573	
			QPSK	15	0	1850.000	-21.457	
		(Extended)	QPSK	15	0	1848.500	-17.16	
	5	1852.5	QPSK	1	0	1850.000	-19.483	
			QPSK	25	0	1850.000	-21.137	
		(Extended)	QPSK	25	0	1848.500	-15.89	
	10	1855.0	QPSK	1	0	1850.000	-30.424	
			QPSK	50	0	1849.992	-22.659	
		(Extended)	QPSK	50	0	1848.500	-16.96	
	15	1857.5	QPSK	1	0	1849.996	-21.701	
			QPSK	75	0	1849.996	-26.170	
		(Extended)	QPSK	75	0	1848.500	-20.87	
	20	1860.0	QPSK	1	0	1849.996	-31.070	
QPSK			100	0	1849.976	-27.416		
(Extended)		QPSK	100	0	1848.500	-22.50		

Upper Band Edge & Extended Band Edge

Band	Band Width (MHz)	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Frequency of Maximum Harmonic (MHz)	Maximum Data (dBm)	Limit (dBm)
2	1.4	1909.3	QPSK	1	5	1910.000	-20.946	<-13.00
			QPSK	6	0	1910.000	-21.913	
		(Extended)	QPSK	6	0	1911.500	-29.20	
	3	1908.5	QPSK	1	14	1910.000	-15.309	
			QPSK	15	0	1910.000	-20.628	
		(Extended)	QPSK	15	0	1911.500	-15.68	
	5	1907.5	QPSK	1	24	1910.000	-19.693	
			QPSK	25	0	1910.044	-20.980	
		(Extended)	QPSK	25	0	1911.500	-15.18	
	10	1905.0	QPSK	1	49	1910.004	-28.428	
			QPSK	50	0	1910.000	-22.844	
		(Extended)	QPSK	50	0	1911.500	-17.27	
	15	1902.5	QPSK	1	74	1910.016	-21.511	
			QPSK	75	0	1910.008	-26.855	
		(Extended)	QPSK	75	0	1911.500	-21.92	
	20	1900.0	QPSK	1	99	1910.004	-29.889	
QPSK			100	0	1910.000	-27.273		
(Extended)		QPSK	100	0	1911.500	-22.79		

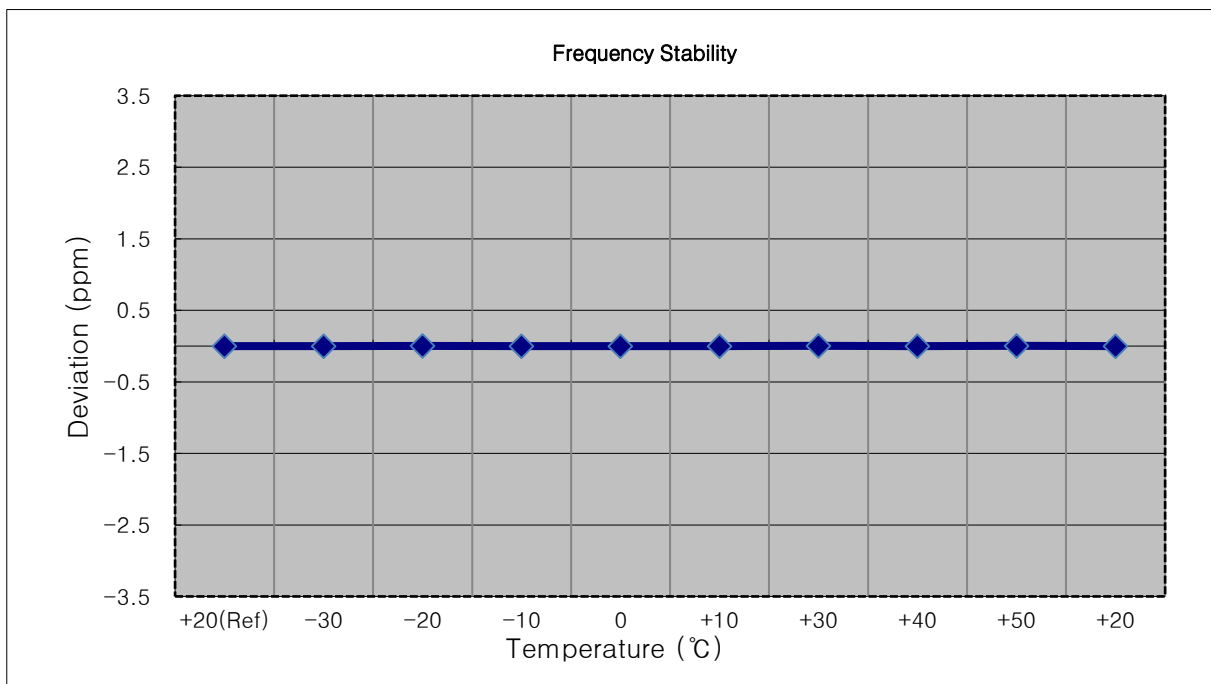
Note:

1. Plots of the EUT's Band Edge are shown Page 78 ~ 83.

8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

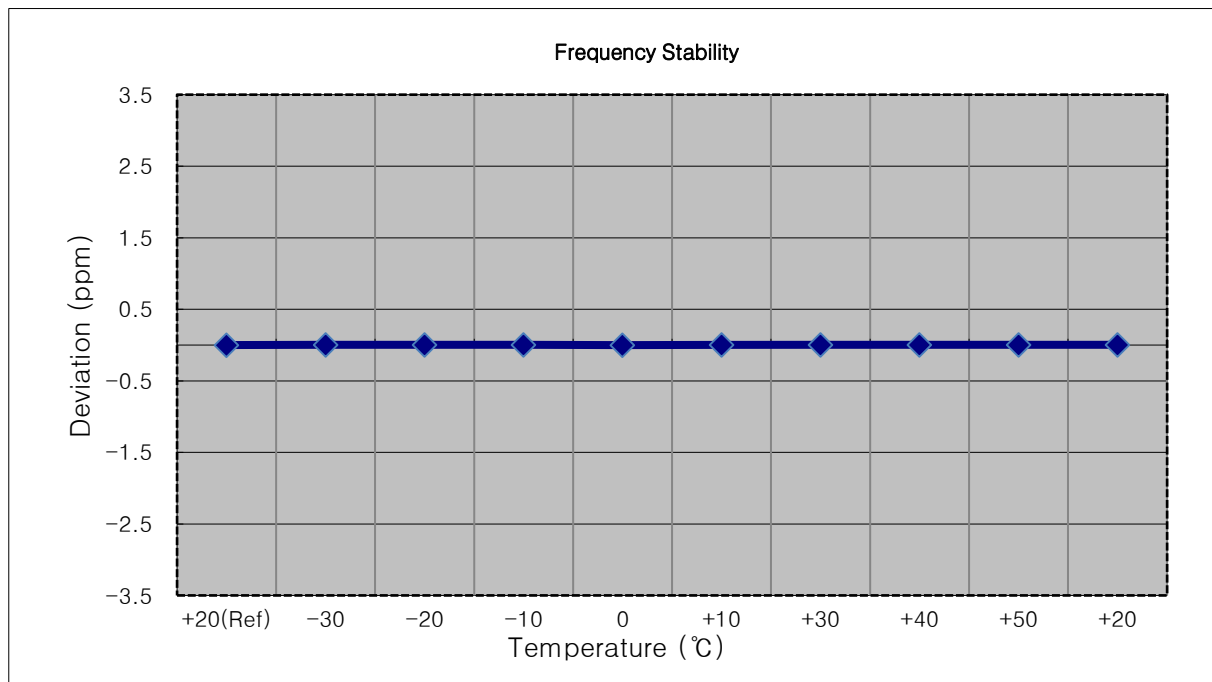
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1850,700,000 Hz
- ▣ CHANNEL: 18607 (1.4 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1850 700 003	0.0	0.000 000	0.000
100 %		-30	1850 700 006	2.4	0.000 000	0.001
100 %		-20	1850 700 007	4.0	0.000 000	0.002
100 %		-10	1850 700 005	1.8	0.000 000	0.001
100 %		0	1850 700 002	-1.7	0.000 000	-0.001
100 %		+10	1850 700 005	1.8	0.000 000	0.001
100 %		+30	1850 700 007	3.6	0.000 000	0.002
100 %		+40	1850 700 001	-2.4	0.000 000	-0.001
100 %		+50	1850 700 006	3.0	0.000 000	0.002
Batt. Endpoint		3.400	+20	1850 700 002	-1.6	0.000 000



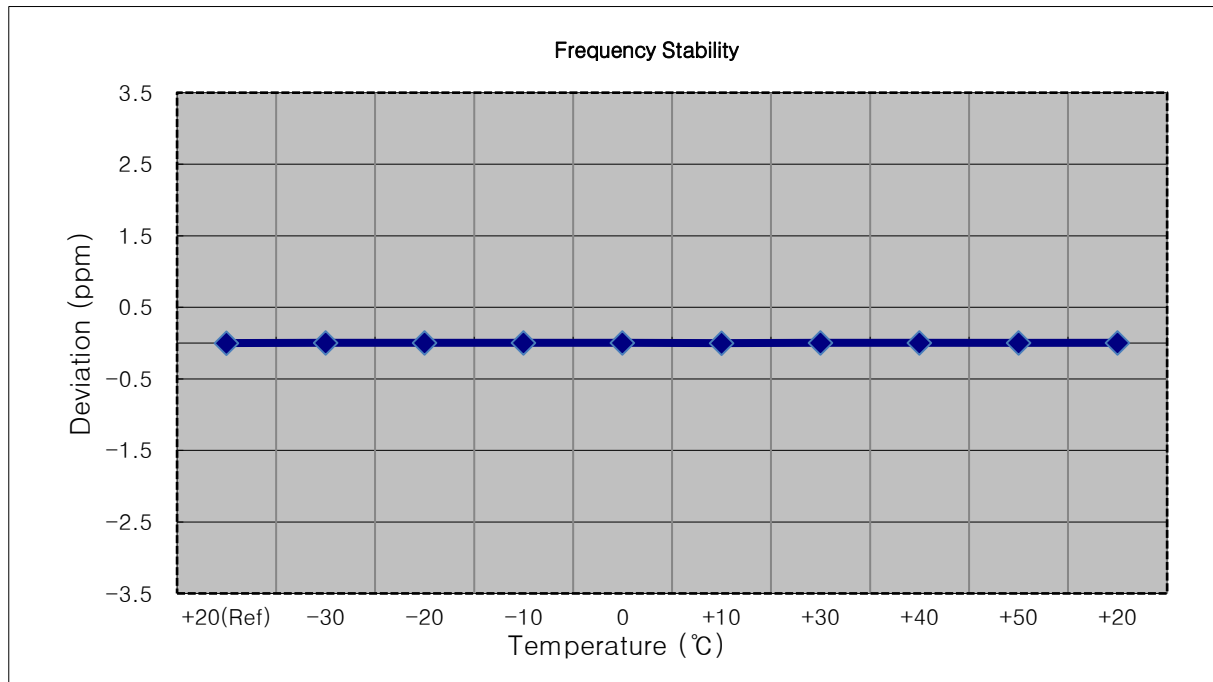
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1851,500,000 Hz
- ▣ CHANNEL: 18615 (3 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1851 500 004	0.0	0.000 000	0.000
100 %		-30	1851 500 008	4.1	0.000 000	0.002
100 %		-20	1851 500 008	4.2	0.000 000	0.002
100 %		-10	1851 500 006	2.8	0.000 000	0.002
100 %		0	1851 500 006	2.7	0.000 000	0.001
100 %		+10	1851 500 008	4.7	0.000 000	0.003
100 %		+30	1851 500 008	4.4	0.000 000	0.002
100 %		+40	1851 500 008	4.1	0.000 000	0.002
100 %		+50	1851 500 007	2.9	0.000 000	0.002
Batt. Endpoint		3.400	+20	1851 500 007	3.7	0.000 000



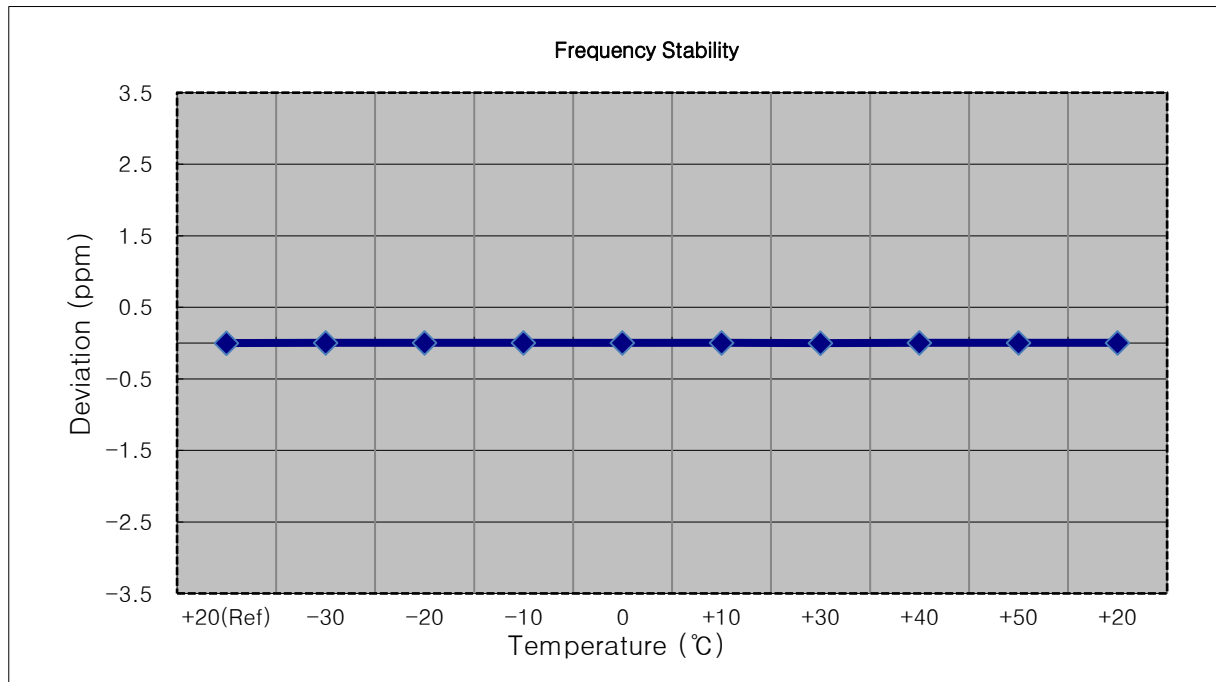
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1852,500,000 Hz
- ▣ CHANNEL: 18625 (5 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1852 500 003	0.0	0.000 000	0.000
100 %		-30	1852 500 007	3.4	0.000 000	0.002
100 %		-20	1852 500 007	4.2	0.000 000	0.002
100 %		-10	1852 500 007	4.0	0.000 000	0.002
100 %		0	1852 500 008	4.8	0.000 000	0.003
100 %		+10	1852 500 005	2.0	0.000 000	0.001
100 %		+30	1852 500 007	3.7	0.000 000	0.002
100 %		+40	1852 500 008	4.4	0.000 000	0.002
100 %		+50	1852 500 008	5.3	0.000 000	0.003
Batt. Endpoint		3.400	+20	1852 500 006	3.3	0.000 000



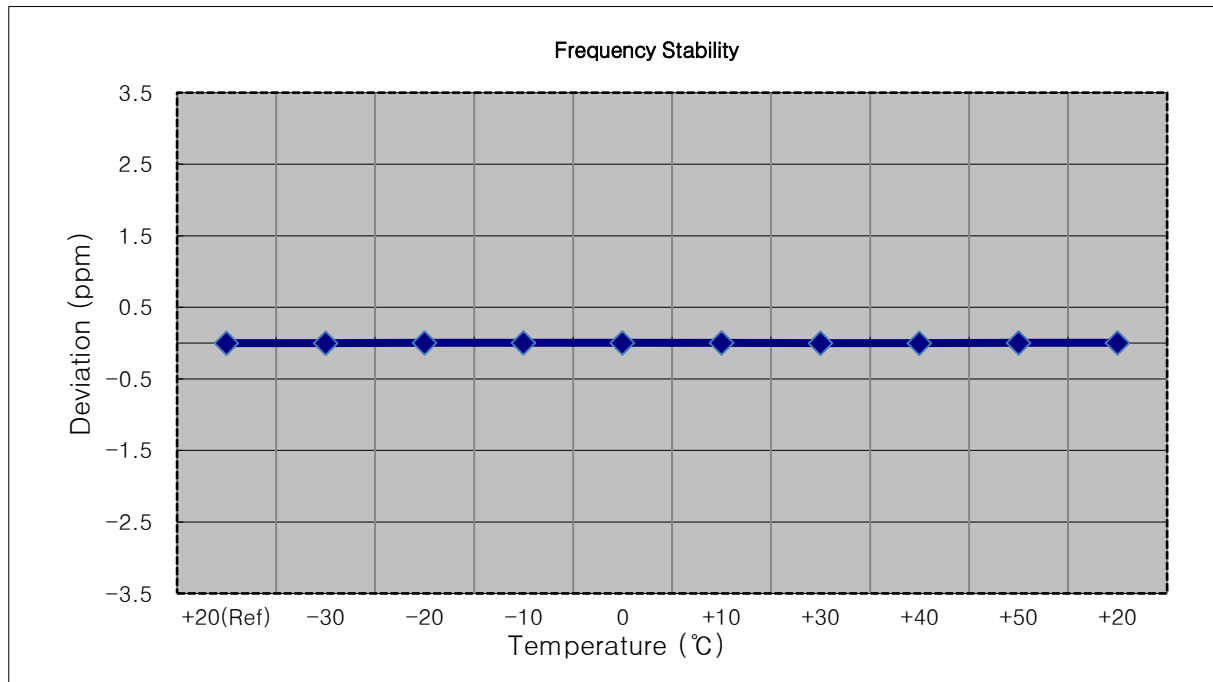
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1855,000,000 Hz
- ▣ CHANNEL: 18650 (10 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1855 000 005	0.0	0.000 000	0.000
100 %		-30	1855 000 008	3.4	0.000 000	0.002
100 %		-20	1855 000 010	5.1	0.000 000	0.003
100 %		-10	1855 000 009	4.1	0.000 000	0.002
100 %		0	1855 000 010	5.2	0.000 000	0.003
100 %		+10	1855 000 008	3.6	0.000 000	0.002
100 %		+30	1855 000 007	1.8	0.000 000	0.001
100 %		+40	1855 000 008	3.2	0.000 000	0.002
100 %		+50	1855 000 009	3.9	0.000 000	0.002
Batt. Endpoint		3.400	+20	1855 000 008	2.8	0.000 000



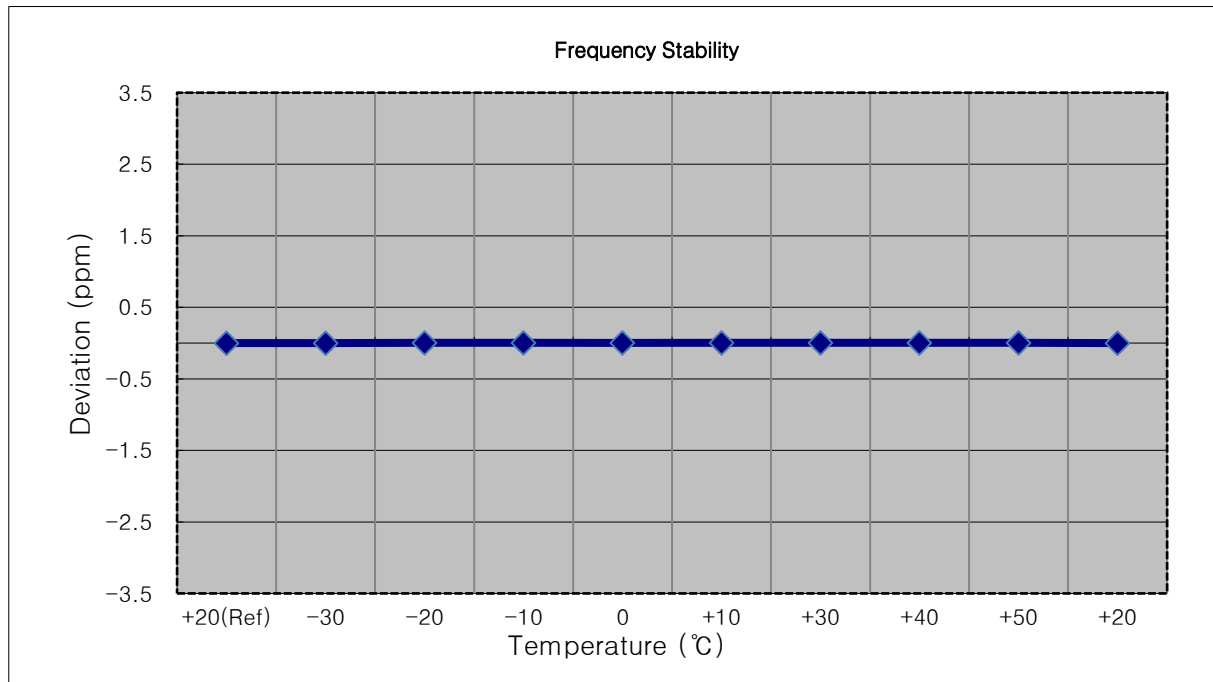
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1857,500,000 Hz
- ▣ CHANNEL: 18675 (15 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1857 500 002	0.0	0.000 000	0.000
100 %		-30	1857 500 001	-1.2	0.000 000	-0.001
100 %		-20	1857 500 005	3.3	0.000 000	0.002
100 %		-10	1857 500 006	4.0	0.000 000	0.002
100 %		0	1857 500 005	3.0	0.000 000	0.002
100 %		+10	1857 500 007	4.9	0.000 000	0.003
100 %		+30	1857 500 004	2.2	0.000 000	0.001
100 %		+40	1857 500 004	2.1	0.000 000	0.001
100 %		+50	1857 500 006	3.9	0.000 000	0.002
Batt. Endpoint	3.400	+20	1857 500 005	3.1	0.000 000	0.002



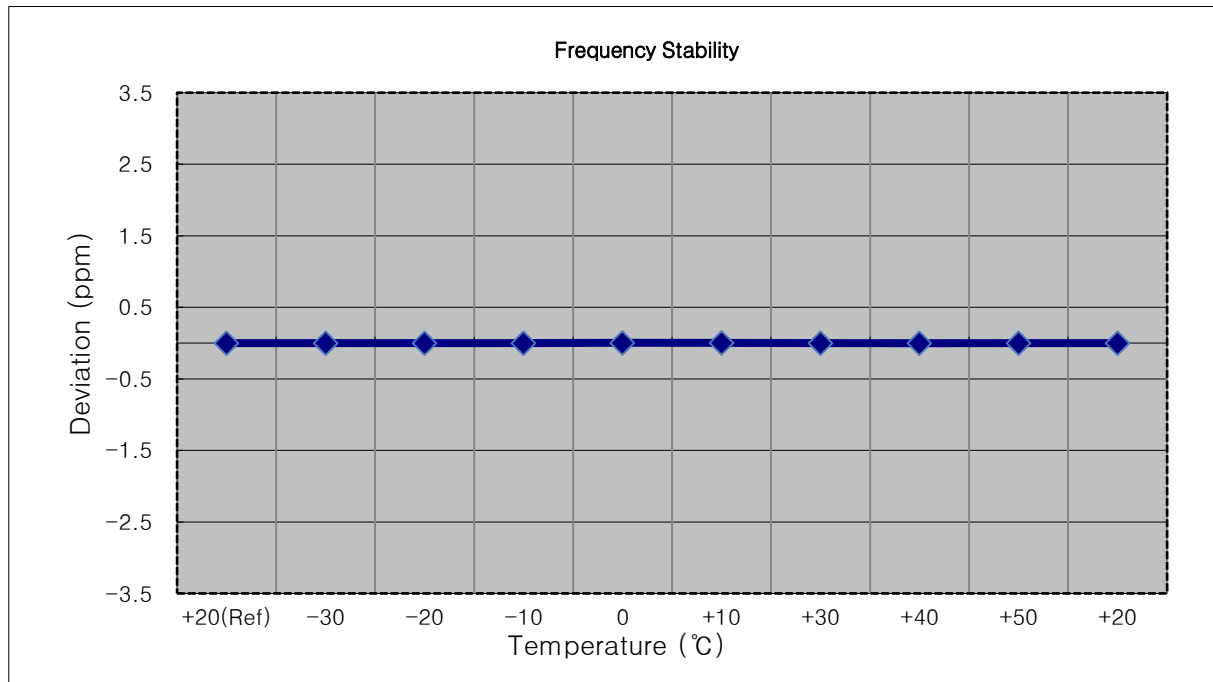
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1860,000,000 Hz
- ▣ CHANNEL: 18700 (20 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1860 000 003	0.0	0.000 000	0.000
100 %		-30	1860 000 006	2.7	0.000 000	0.001
100 %		-20	1860 000 006	3.3	0.000 000	0.002
100 %		-10	1860 000 006	3.4	0.000 000	0.002
100 %		0	1860 000 007	4.4	0.000 000	0.002
100 %		+10	1860 000 006	3.3	0.000 000	0.002
100 %		+30	1860 000 006	3.2	0.000 000	0.002
100 %		+40	1860 000 006	3.2	0.000 000	0.002
100 %		+50	1860 000 006	2.9	0.000 000	0.002
Batt. Endpoint	3.400	+20	1860 000 005	2.1	0.000 000	0.001



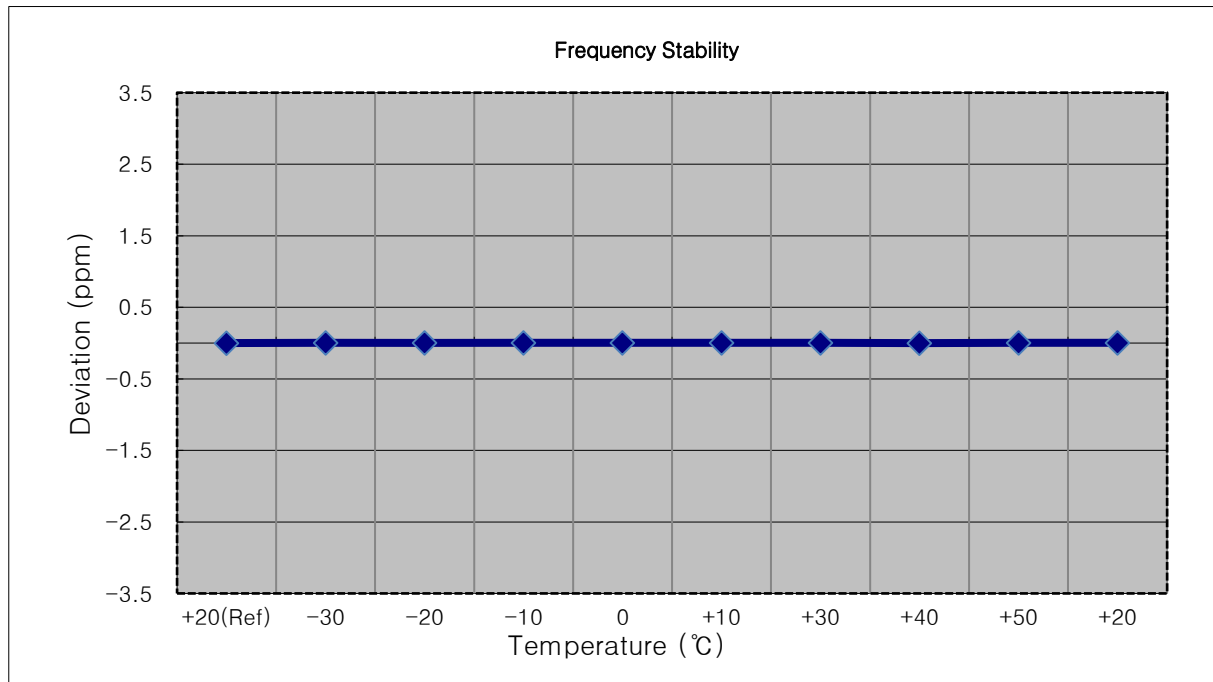
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (1.4 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1879 999 998	0.0	0.000 000	0.000
100 %		-30	1879 999 996	-2.0	0.000 000	-0.001
100 %		-20	1879 999 995	-2.7	0.000 000	-0.001
100 %		-10	1880 000 001	2.4	0.000 000	0.001
100 %		0	1880 000 002	4.1	0.000 000	0.002
100 %		+10	1880 000 003	4.6	0.000 000	0.002
100 %		+30	1880 000 000	2.2	0.000 000	0.001
100 %		+40	1879 999 994	-4.3	0.000 000	-0.002
100 %		+50	1879 999 996	-2.6	0.000 000	-0.001
Batt. Endpoint		3.400	+20	1879 999 996	-2.3	0.000 000



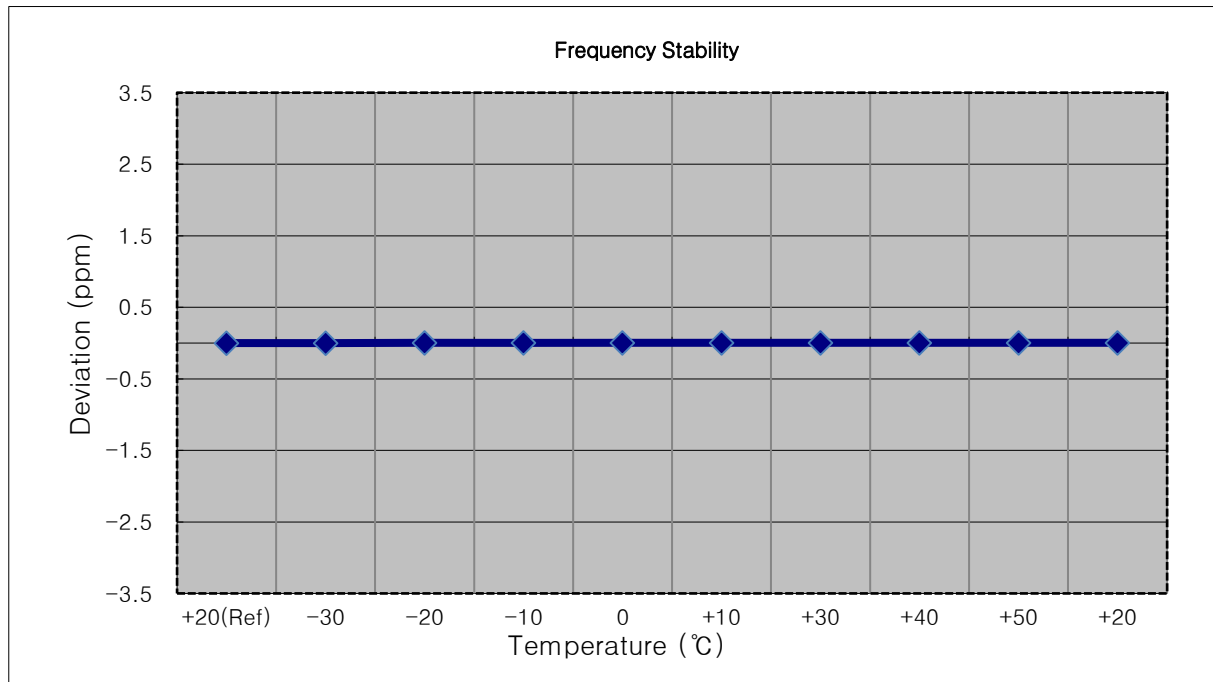
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (3 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1880 000 004	0.0	0.000 000	0.000
100 %		-30	1880 000 007	3.2	0.000 000	0.002
100 %		-20	1880 000 008	4.0	0.000 000	0.002
100 %		-10	1880 000 007	3.3	0.000 000	0.002
100 %		0	1880 000 008	3.8	0.000 000	0.002
100 %		+10	1880 000 007	2.8	0.000 000	0.001
100 %		+30	1880 000 007	3.3	0.000 000	0.002
100 %		+40	1880 000 007	2.5	0.000 000	0.001
100 %		+50	1880 000 007	3.4	0.000 000	0.002
Batt. Endpoint		3.400	+20	1880 000 007	3.4	0.000 000



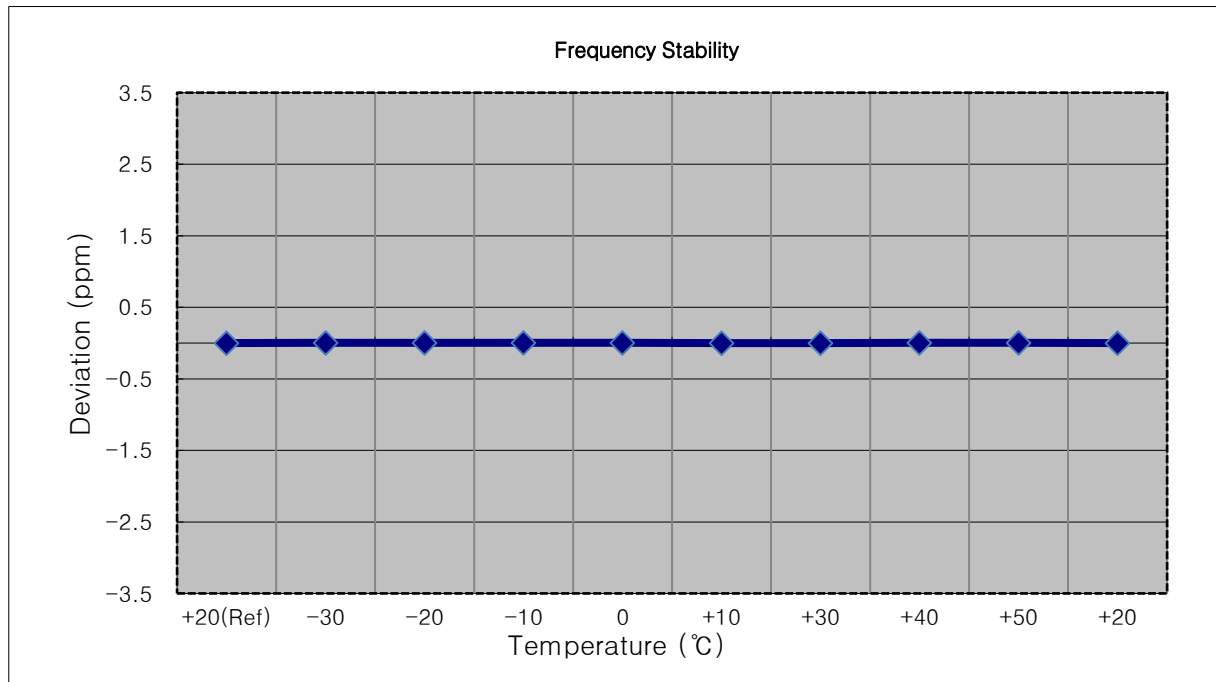
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (5 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1880 000 006	0.0	0.000 000	0.000
100 %		-30	1880 000 008	2.3	0.000 000	0.001
100 %		-20	1880 000 010	4.0	0.000 000	0.002
100 %		-10	1880 000 010	4.7	0.000 000	0.002
100 %		0	1880 000 010	4.6	0.000 000	0.002
100 %		+10	1880 000 009	3.5	0.000 000	0.002
100 %		+30	1880 000 009	3.8	0.000 000	0.002
100 %		+40	1880 000 010	4.1	0.000 000	0.002
100 %		+50	1880 000 009	3.0	0.000 000	0.002
Batt. Endpoint	3.400	+20	1880 000 009	3.8	0.000 000	0.002



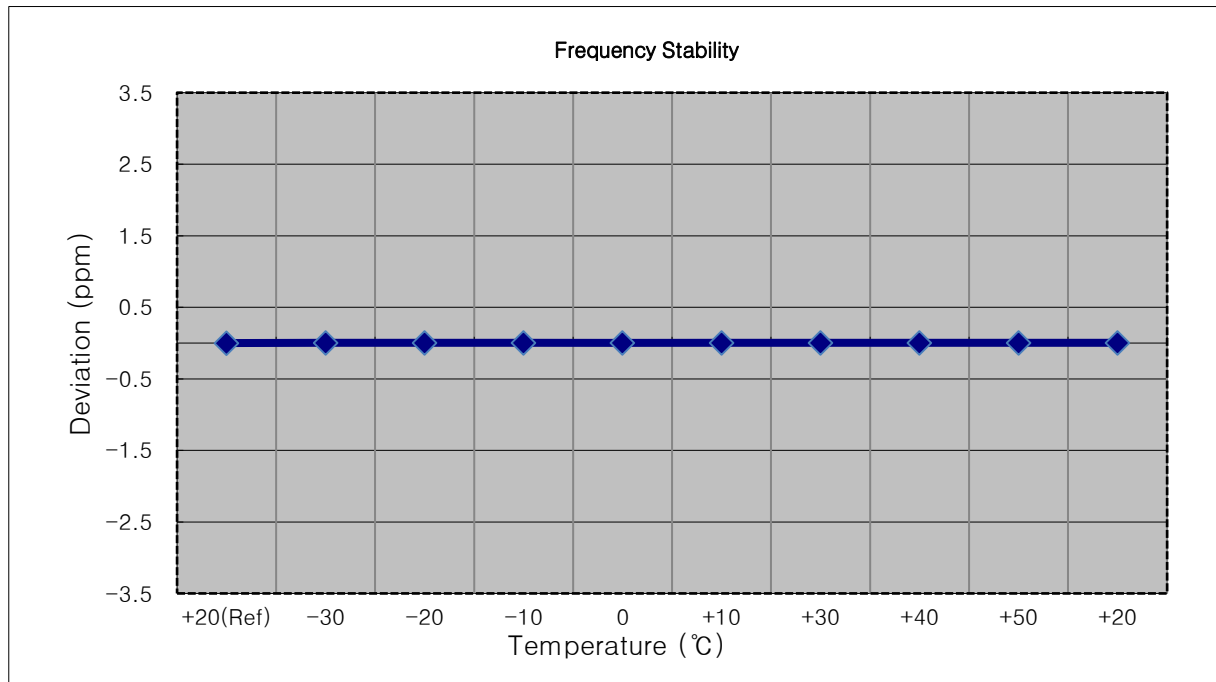
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (10 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1880 000 003	0.0	0.000 000	0.000
100 %		-30	1880 000 006	3.2	0.000 000	0.002
100 %		-20	1880 000 009	5.5	0.000 000	0.003
100 %		-10	1880 000 008	5.4	0.000 000	0.003
100 %		0	1880 000 006	2.8	0.000 000	0.001
100 %		+10	1880 000 006	2.6	0.000 000	0.001
100 %		+30	1880 000 006	2.6	0.000 000	0.001
100 %		+40	1880 000 006	3.0	0.000 000	0.002
100 %		+50	1880 000 007	3.6	0.000 000	0.002
Batt. Endpoint	3.400	+20	1880 000 005	2.4	0.000 000	0.001



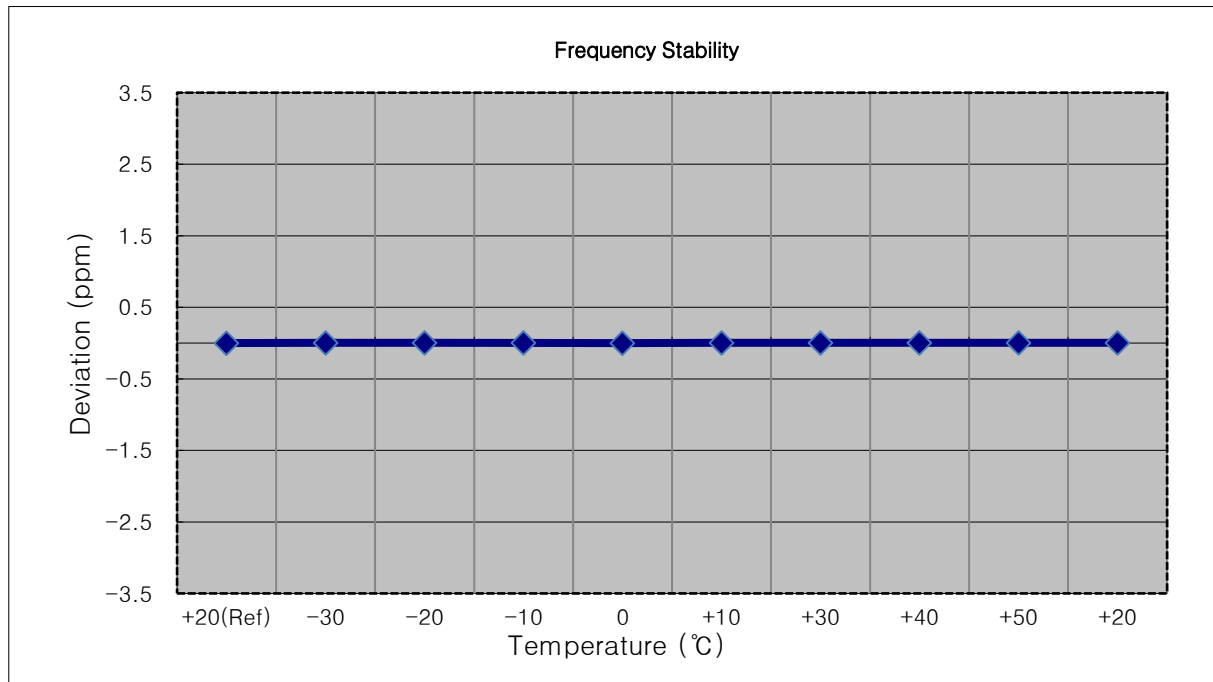
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (15 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1880 000 004	0.0	0.000 000	0.000
100 %		-30	1880 000 007	3.3	0.000 000	0.002
100 %		-20	1880 000 008	4.2	0.000 000	0.002
100 %		-10	1880 000 008	3.8	0.000 000	0.002
100 %		0	1880 000 009	4.6	0.000 000	0.002
100 %		+10	1880 000 008	3.8	0.000 000	0.002
100 %		+30	1880 000 007	3.4	0.000 000	0.002
100 %		+40	1880 000 007	2.8	0.000 000	0.001
100 %		+50	1880 000 007	3.1	0.000 000	0.002
Batt. Endpoint	3.400	+20	1880 000 007	2.9	0.000 000	0.002



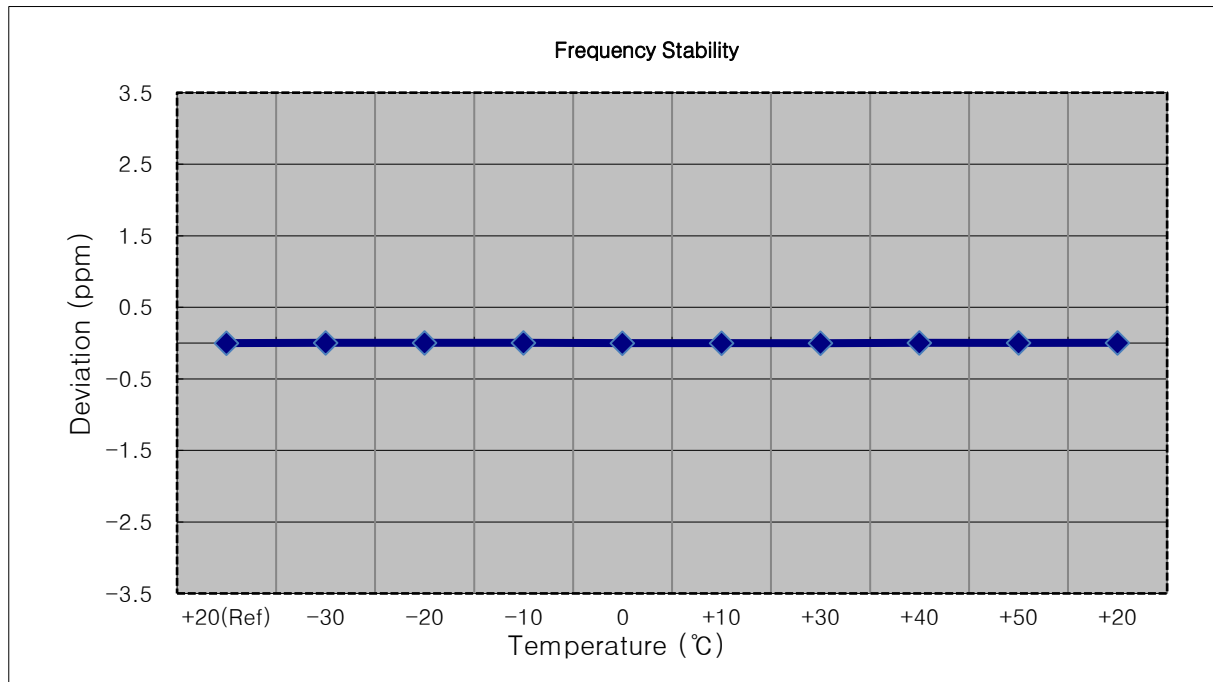
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (20 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1880 000 003	0.0	0.000 000	0.000
100 %		-30	1880 000 006	3.3	0.000 000	0.002
100 %		-20	1880 000 006	3.4	0.000 000	0.002
100 %		-10	1880 000 007	3.9	0.000 000	0.002
100 %		0	1880 000 005	2.7	0.000 000	0.001
100 %		+10	1880 000 006	3.4	0.000 000	0.002
100 %		+30	1880 000 006	3.1	0.000 000	0.002
100 %		+40	1880 000 006	3.6	0.000 000	0.002
100 %		+50	1880 000 006	3.7	0.000 000	0.002
Batt. Endpoint	3.400	+20	1880 000 006	3.2	0.000 000	0.002



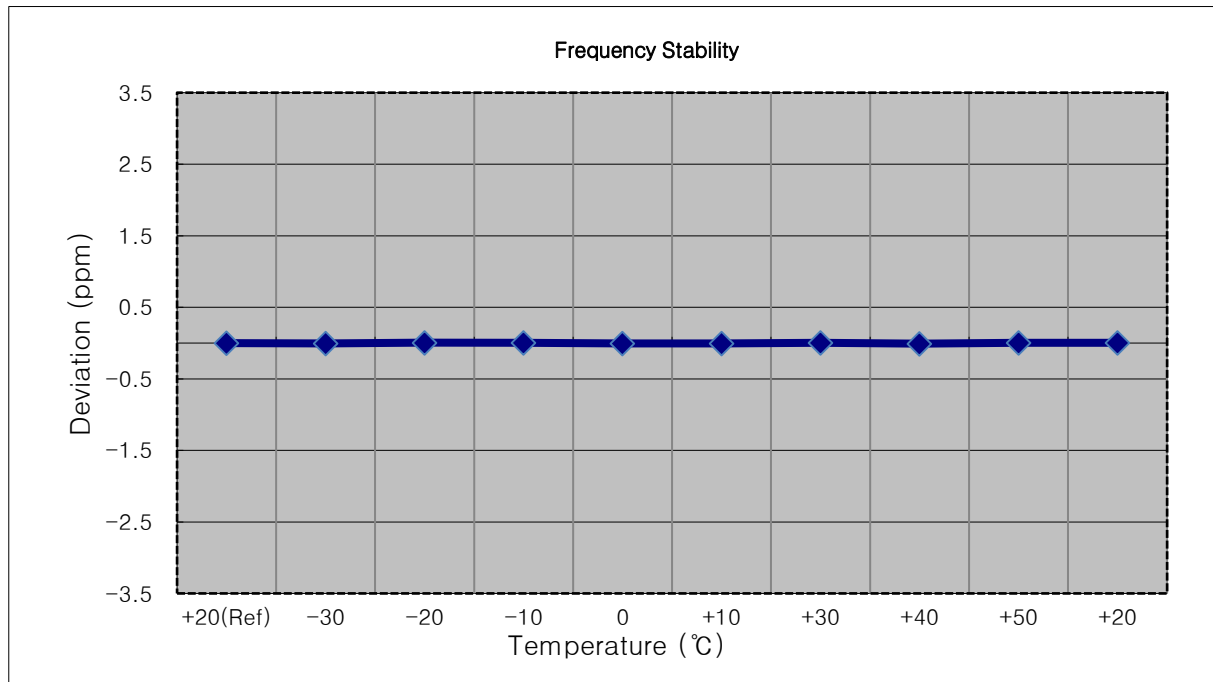
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1909,300,000 Hz
- ▣ CHANNEL: 19193 (1.4 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1909 300 004	0.0	0.000 000	0.000
100 %		-30	1909 300 007	3.0	0.000 000	0.002
100 %		-20	1909 300 008	3.5	0.000 000	0.002
100 %		-10	1909 300 007	3.0	0.000 000	0.002
100 %		0	1909 300 001	-3.7	0.000 000	-0.002
100 %		+10	1909 300 001	-3.7	0.000 000	-0.002
100 %		+30	1909 300 000	-4.0	0.000 000	-0.002
100 %		+40	1909 300 008	3.5	0.000 000	0.002
100 %		+50	1909 300 009	4.3	0.000 000	0.002
Batt. Endpoint	3.400	+20	1909 300 008	3.7	0.000 000	0.002



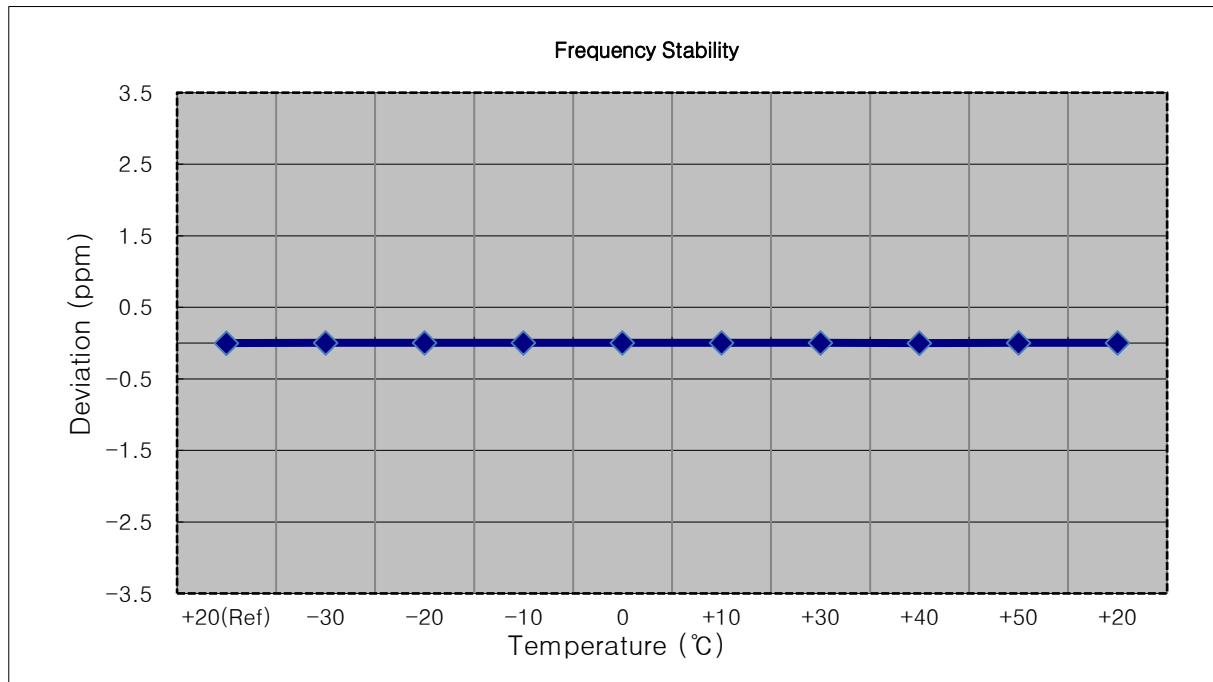
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1908,500,000 Hz
- ▣ CHANNEL: 19185 (3 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1908 500 009	0.0	0.000 000	0.000
100 %		-30	1908 500 000	-8.6	0.000 000	-0.005
100 %		-20	1908 500 020	11.0	0.000 001	0.006
100 %		-10	1908 500 016	7.2	0.000 000	0.004
100 %		0	1908 500 001	-7.8	0.000 000	-0.004
100 %		+10	1908 499 995	-13.9	-0.000 001	-0.007
100 %		+30	1908 500 017	8.3	0.000 000	0.004
100 %		+40	1908 499 993	-15.4	-0.000 001	-0.008
100 %		+50	1908 500 018	8.9	0.000 000	0.005
Batt. Endpoint	3.400	+20	1908 500 017	8.7	0.000 000	0.005



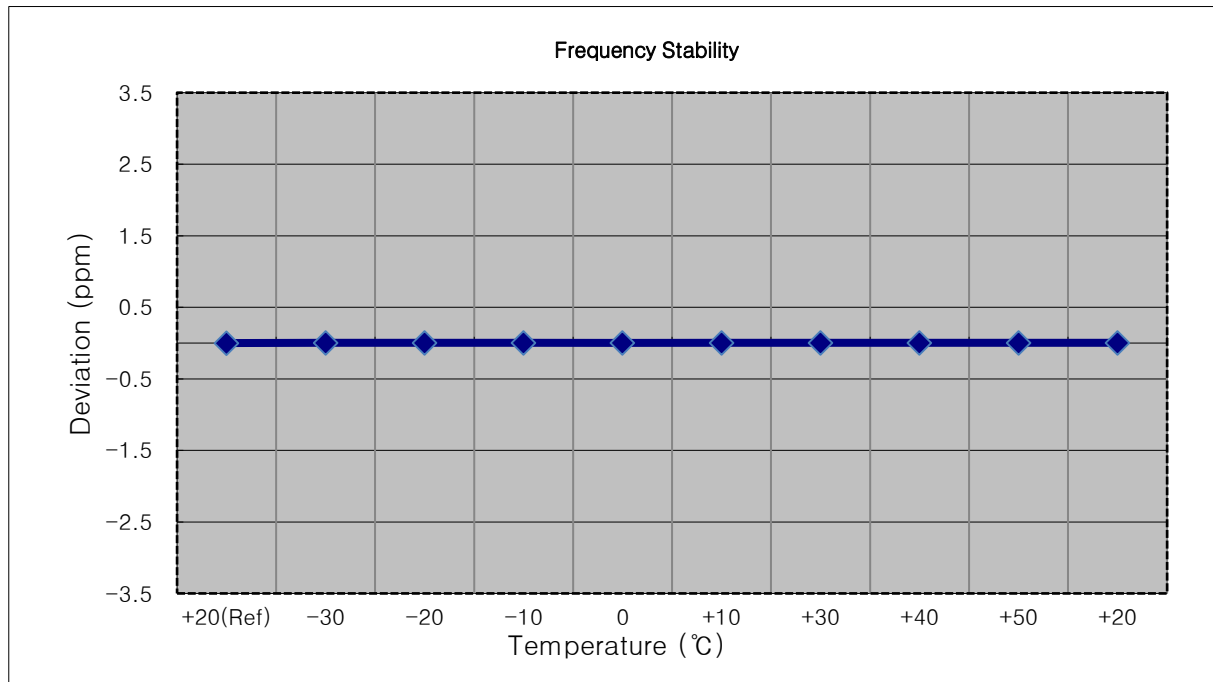
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1907,500,000 Hz
- ▣ CHANNEL: 19175 (5 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1907 500 004	0.0	0.000 000	0.000
100 %		-30	1907 500 007	2.8	0.000 000	0.001
100 %		-20	1907 500 008	3.7	0.000 000	0.002
100 %		-10	1907 500 009	4.3	0.000 000	0.002
100 %		0	1907 500 010	5.5	0.000 000	0.003
100 %		+10	1907 500 009	4.8	0.000 000	0.003
100 %		+30	1907 500 008	3.4	0.000 000	0.002
100 %		+40	1907 500 007	2.7	0.000 000	0.001
100 %		+50	1907 500 011	6.9	0.000 000	0.004
Batt. Endpoint		3.400	+20	1907 500 008	3.2	0.000 000



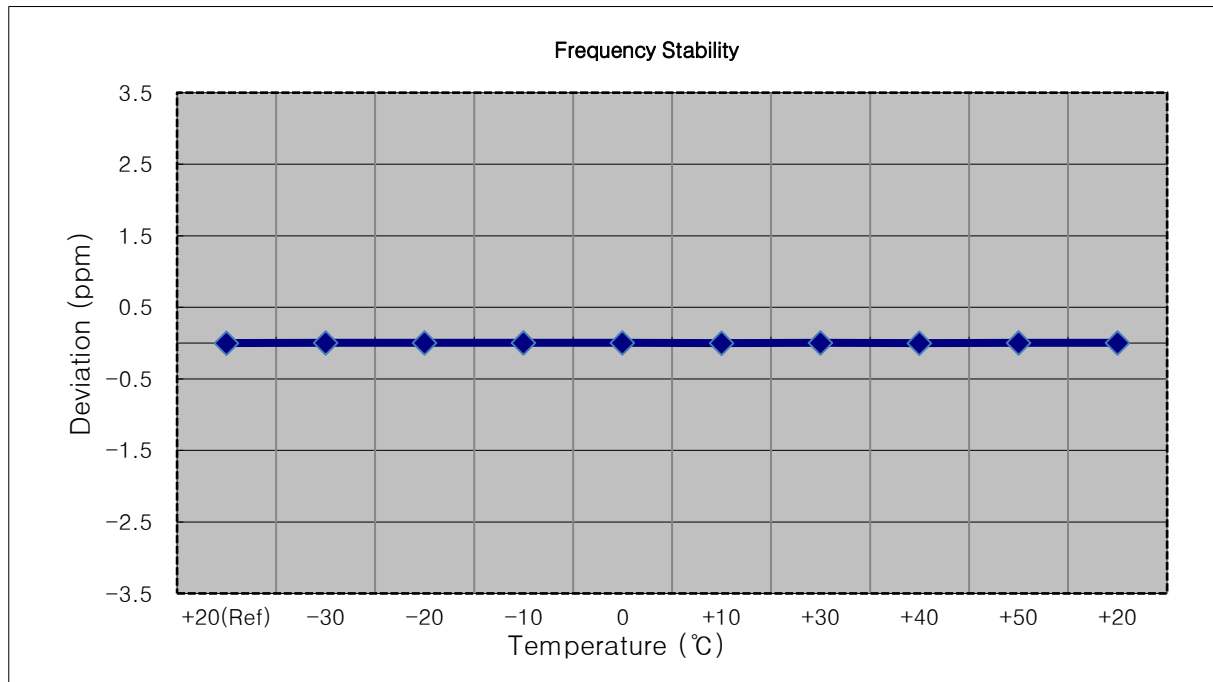
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1905,000,000 Hz
- ▣ CHANNEL: 19150 (10 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1905 000 002	0.0	0.000 000	0.000
100 %		-30	1905 000 006	3.3	0.000 000	0.002
100 %		-20	1905 000 006	4.1	0.000 000	0.002
100 %		-10	1905 000 006	3.7	0.000 000	0.002
100 %		0	1905 000 007	4.5	0.000 000	0.002
100 %		+10	1905 000 006	3.8	0.000 000	0.002
100 %		+30	1905 000 006	3.5	0.000 000	0.002
100 %		+40	1905 000 006	4.2	0.000 000	0.002
100 %		+50	1905 000 006	4.0	0.000 000	0.002
Batt. Endpoint	3.400	+20	1905 000 007	4.4	0.000 000	0.002



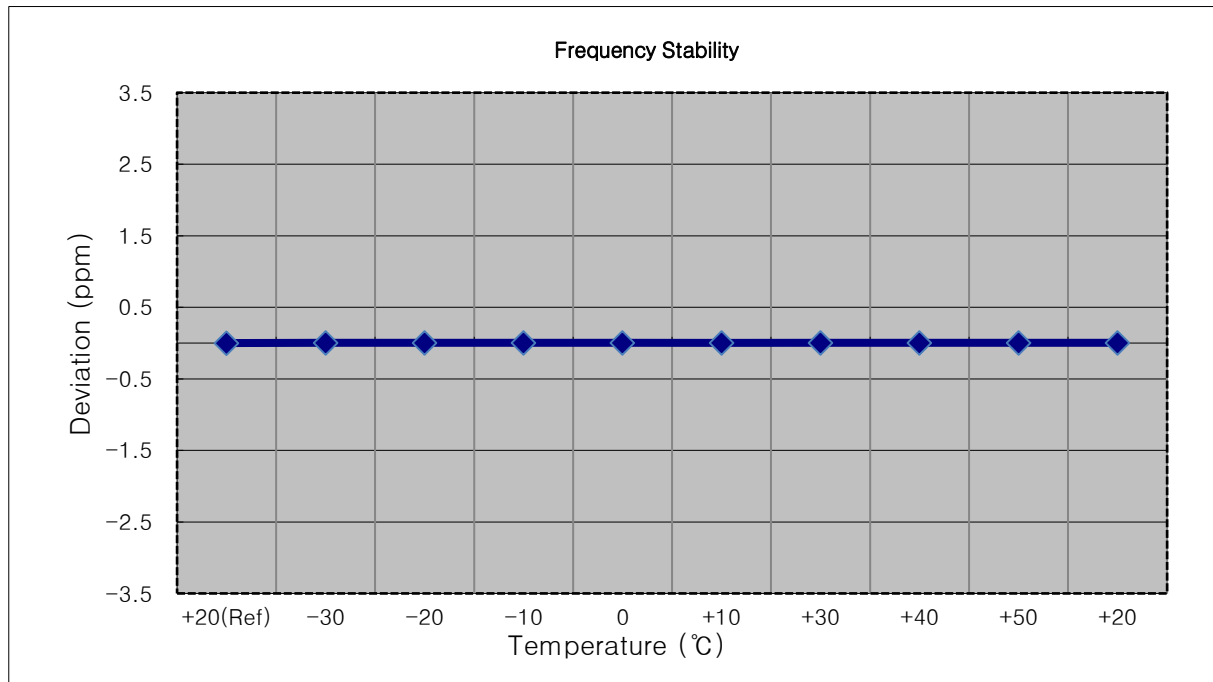
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1902,500,000 Hz
- ▣ CHANNEL: 19125 (15 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1902 500 005	0.0	0.000 000	0.000
100 %		-30	1902 500 010	4.5	0.000 000	0.002
100 %		-20	1902 500 009	3.7	0.000 000	0.002
100 %		-10	1902 500 009	3.6	0.000 000	0.002
100 %		0	1902 500 009	3.8	0.000 000	0.002
100 %		+10	1902 500 008	2.5	0.000 000	0.001
100 %		+30	1902 500 009	3.7	0.000 000	0.002
100 %		+40	1902 500 008	2.6	0.000 000	0.001
100 %		+50	1902 500 011	6.2	0.000 000	0.003
Batt. Endpoint	3.400	+20	1902 500 011	5.4	0.000 000	0.003



- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1900,000,000 Hz
- ▣ CHANNEL: 19100 (20 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1900 000 003	0.0	0.000 000	0.000
100 %		-30	1900 000 007	4.3	0.000 000	0.002
100 %		-20	1900 000 006	3.4	0.000 000	0.002
100 %		-10	1900 000 007	4.5	0.000 000	0.002
100 %		0	1900 000 006	3.7	0.000 000	0.002
100 %		+10	1900 000 007	4.8	0.000 000	0.003
100 %		+30	1900 000 007	4.5	0.000 000	0.002
100 %		+40	1900 000 006	3.2	0.000 000	0.002
100 %		+50	1900 000 007	4.2	0.000 000	0.002
Batt. Endpoint		3.400	+20	1900 000 007	4.6	0.000 000



9. TEST DATA (Main 3 Ant)

9.1 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	dBm
1850.7	LTE B2/ 1.4 MHz	QPSK	-20.80	13.02	10.00	2.12	H	< 2.00	0.123	20.90	
		16-QAM	-21.90	11.92	10.00	2.12	H		0.095	19.80	
		64-QAM	-22.88	10.94	10.00	2.12	H		0.076	18.82	
		256-QAM	-25.80	8.02	10.00	2.12	H		0.039	15.90	
1880.0		QPSK	-20.69	12.91	10.00	2.21	H		0.117	20.70	
		16-QAM	-21.95	11.65	10.00	2.21	H		0.088	19.44	
		64-QAM	-22.82	10.78	10.00	2.21	H		0.072	18.57	
		256-QAM	-25.69	7.91	10.00	2.21	H		0.037	15.70	
1909.3		QPSK	-21.88	12.14	10.01	2.11	H		0.101	20.04	
		16-QAM	-23.10	10.92	10.01	2.11	H		0.076	18.82	
		64-QAM	-23.98	10.04	10.01	2.11	H		0.062	17.94	
		256-QAM	-26.86	7.16	10.01	2.11	H		0.032	15.06	

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit		EIRP	
								W	W	dBm	dBm
1851.5	LTE B2/ 3 MHz	QPSK	-20.81	13.01	10.00	2.12	H	< 2.00	0.123	20.89	
		16-QAM	-21.94	11.88	10.00	2.12	H		0.095	19.76	
		64-QAM	-22.92	10.90	10.00	2.12	H		0.076	18.78	
		256-QAM	-25.77	8.05	10.00	2.12	H		0.039	15.93	
1880.0		QPSK	-20.67	12.93	10.00	2.21	H		0.118	20.72	
		16-QAM	-21.85	11.75	10.00	2.21	H		0.090	19.54	
		64-QAM	-22.81	10.79	10.00	2.21	H		0.072	18.58	
		256-QAM	-25.71	7.89	10.00	2.21	H		0.037	15.68	
1908.5		QPSK	-22.04	11.98	10.01	2.11	H		0.097	19.88	
		16-QAM	-23.21	10.81	10.01	2.11	H		0.074	18.71	
		64-QAM	-24.14	9.88	10.01	2.11	H		0.060	17.78	
		256-QAM	-27.04	6.98	10.01	2.11	H		0.031	14.88	

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit		EIRP	
								W	W	dBm	dBm
1852.5	LTE B2/ 5 MHz	QPSK	-20.80	13.02	10.00	2.12	H	< 2.00	0.123	20.90	
		16-QAM	-21.93	11.89	10.00	2.12	H		0.095	19.77	
		64-QAM	-22.83	10.99	10.00	2.12	H		0.077	18.87	
		256-QAM	-25.84	7.98	10.00	2.12	H		0.039	15.86	
1880.0		QPSK	-20.66	12.94	10.00	2.21	H		0.118	20.73	
		16-QAM	-21.88	11.72	10.00	2.21	H		0.089	19.51	
		64-QAM	-22.76	10.84	10.00	2.21	H		0.073	18.63	
		256-QAM	-25.71	7.89	10.00	2.21	H		0.037	15.68	
1907.5		QPSK	-21.65	12.37	10.01	2.11	H		0.106	20.27	
		16-QAM	-22.89	11.13	10.01	2.11	H		0.080	19.03	
		64-QAM	-23.73	10.29	10.01	2.11	H		0.066	18.19	
		256-QAM	-26.61	7.41	10.01	2.11	H		0.034	15.31	

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit		EIRP	
								W	W	dBm	dBm
1855.0	LTE B2/ 10 MHz	QPSK	-20.77	12.82	10.00	2.15	H	< 2.00	0.117	20.67	
		16-QAM	-21.85	11.74	10.00	2.15	H		0.091	19.59	
		64-QAM	-22.86	10.73	10.00	2.15	H		0.072	18.58	
		256-QAM	-25.78	7.81	10.00	2.15	H		0.037	15.66	
1880.0		QPSK	-20.70	12.90	10.00	2.21	H		0.117	20.69	
		16-QAM	-21.93	11.67	10.00	2.21	H		0.088	19.46	
		64-QAM	-22.84	10.76	10.00	2.21	H		0.072	18.55	
		256-QAM	-25.74	7.86	10.00	2.21	H		0.037	15.65	
1905.0		QPSK	-21.68	12.29	10.01	2.13	H		0.104	20.17	
		16-QAM	-22.77	11.20	10.01	2.13	H		0.081	19.08	
		64-QAM	-23.70	10.27	10.01	2.13	H		0.065	18.15	
		256-QAM	-26.57	7.40	10.01	2.13	H		0.034	15.28	

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit		EIRP	
								W	W	dBm	dBm
1857.5	LTE B2/ 15 MHz	QPSK	-20.75	12.59	10.00	2.17	H	< 2.00	0.110	20.42	
		16-QAM	-21.81	11.53	10.00	2.17	H		0.086	19.36	
		64-QAM	-22.76	10.58	10.00	2.17	H		0.069	18.41	
		256-QAM	-25.79	7.55	10.00	2.17	H		0.035	15.38	
1880.0		QPSK	-20.73	12.87	10.00	2.21	H		0.116	20.66	
		16-QAM	-21.90	11.70	10.00	2.21	H		0.089	19.49	
		64-QAM	-22.82	10.78	10.00	2.21	H		0.072	18.57	
		256-QAM	-25.77	7.83	10.00	2.21	H		0.036	15.62	
1902.5		QPSK	-21.65	12.26	10.01	2.15	H		0.103	20.12	
		16-QAM	-22.75	11.16	10.01	2.15	H		0.080	19.02	
		64-QAM	-23.68	10.23	10.01	2.15	H		0.064	18.09	
		256-QAM	-26.62	7.29	10.01	2.15	H		0.033	15.15	

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit		EIRP	
								W	W	dBm	dBm
1860.0	LTE B2/ 20 MHz	QPSK	-20.74	12.60	10.00	2.17	H	< 2.00	0.110	20.43	
		16-QAM	-21.86	11.48	10.00	2.17	H		0.085	19.31	
		64-QAM	-22.72	10.62	10.00	2.17	H		0.070	18.45	
		256-QAM	-25.68	7.66	10.00	2.17	H		0.035	15.49	
1880.0		QPSK	-20.66	12.94	10.00	2.21	H		0.118	20.73	
		16-QAM	-21.86	11.74	10.00	2.21	H		0.090	19.53	
		64-QAM	-22.76	10.84	10.00	2.21	H		0.073	18.63	
		256-QAM	-25.68	7.92	10.00	2.21	H		0.037	15.71	
1900.0		QPSK	-21.43	12.48	10.01	2.15	H		0.108	20.34	
		16-QAM	-22.60	11.31	10.01	2.15	H		0.083	19.17	
		64-QAM	-23.50	10.41	10.01	2.15	H		0.067	18.27	
		256-QAM	-26.40	7.51	10.01	2.15	H		0.034	15.37	

9.2 RADIATED SPURIOUS EMISSIONS

- ▣ OPERATING FREQUENCY: 1850.7 MHz
- ▣ MEASURED OUTPUT POWER: 20.90 dBm = 0.123 W
- ▣ MODE: LTE B2
- ▣ MODULATION SIGNAL: 1.4 MHz QPSK
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: $43 + 10 \log_{10}(W) =$ 33.90 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
18607 (1850.7)	3 701.40	-59.72	11.40	-60.60	3.07	H	-52.27	73.17
	5 552.10	-61.17	11.80	-55.70	3.79	H	-47.69	68.59
	7 402.80	-63.44	10.80	-48.89	4.47	H	-42.56	63.46
	9 253.50	-62.09	10.80	-47.50	5.12	H	-41.82	62.72
	11 104.20	-63.77	11.30	-45.15	5.59	H	-39.44	60.34
18900 (1880.0)	3 760.00	-61.34	11.30	-61.47	3.07	V	-53.24	74.14
	5 640.00	-61.50	11.90	-55.90	3.89	V	-47.89	68.79
	7 520.00	-62.74	11.10	-48.51	4.51	V	-41.92	62.82
	9 400.00	-61.87	10.80	-46.59	5.07	V	-40.86	61.76
	11 280.00	-63.67	11.40	-44.37	5.62	V	-38.59	59.49
19193 (1909.3)	3 818.60	-60.93	11.10	-60.01	3.10	V	-52.01	72.91
	5 727.90	-63.17	11.70	-56.86	3.85	V	-49.01	69.91
	7 637.20	-65.10	11.20	-51.52	4.53	V	-44.85	65.75
	9 546.50	-62.98	10.95	-47.87	5.16	V	-42.07	62.98
	11 455.80	-65.42	11.40	-45.56	5.69	V	-39.84	60.74

9.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
2	1.4 MHz	1880.0	QPSK	6	0	4.55
			16-QAM	6	0	5.35
			64-QAM	6	0	5.86
			256-QAM	6	0	6.28
	3 MHz		QPSK	15	0	4.88
			16-QAM	15	0	5.58
			64-QAM	15	0	5.97
			256-QAM	15	0	6.39
	5 MHz		QPSK	25	0	4.86
			16-QAM	25	0	5.58
			64-QAM	25	0	5.98
			256-QAM	25	0	6.34
	10 MHz		QPSK	50	0	4.92
			16-QAM	50	0	5.60
			64-QAM	50	0	5.95
			256-QAM	50	0	6.32
	15 MHz		QPSK	75	0	5.03
			16-QAM	75	0	5.72
			64-QAM	75	0	6.02
			256-QAM	75	0	6.27
20 MHz	QPSK	100	0	5.03		
	16-QAM	100	0	5.76		
	64-QAM	100	0	6.03		
	256-QAM	100	0	6.33		

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 169 ~ 192.

9.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
2	1.4 MHz	1880.0	QPSK	6	0	1.1014
			16-QAM	6	0	1.0992
			64-QAM	6	0	1.1063
			256-QAM	6	0	1.1036
	3 MHz		QPSK	15	0	2.7241
			16-QAM	15	0	2.7431
			64-QAM	15	0	2.7147
			256-QAM	15	0	2.7168
	5 MHz		QPSK	25	0	4.5332
			16-QAM	25	0	4.5338
			64-QAM	25	0	4.5246
			256-QAM	25	0	4.5096
	10 MHz		QPSK	50	0	9.0302
			16-QAM	50	0	9.0150
			64-QAM	50	0	9.0449
			256-QAM	50	0	9.0323
	15 MHz		QPSK	75	0	13.467
			16-QAM	75	0	13.485
			64-QAM	75	0	13.464
			256-QAM	75	0	13.493
20 MHz	QPSK	100	0	17.960		
	16-QAM	100	0	17.981		
	64-QAM	100	0	17.961		
	256-QAM	100	0	17.945		

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 145 ~ 168.

9.5 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
2	1.4	1850.7	3.7104	29.276	-67.176	-37.900	-13.00
		1880.0	3.6790	29.276	-67.083	-37.807	
		1909.3	3.6985	29.276	-67.196	-37.920	
	3	1851.5	3.7159	29.276	-67.488	-38.212	
		1880.0	3.6880	29.276	-67.470	-38.194	
		1908.5	3.6825	29.276	-67.274	-37.998	
	5	1852.5	3.6681	29.276	-67.610	-38.334	
		1880.0	3.7234	29.276	-67.289	-38.013	
		1907.5	3.7000	29.276	-67.271	-37.995	
	10	1855.0	3.6955	29.276	-67.288	-38.012	
		1880.0	3.6815	29.276	-67.272	-37.996	
		1905.0	3.6980	29.276	-66.860	-37.584	
	15	1857.5	3.7099	29.276	-67.550	-38.274	
		1880.0	3.7010	29.276	-67.245	-37.969	
		1902.5	3.7039	29.276	-67.244	-37.968	
	20	1860.0	3.6760	29.276	-67.360	-38.084	
		1880.0	3.6975	29.276	-67.401	-38.125	
		1900.0	3.6840	29.276	-67.204	-37.928	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 193 ~ 198.
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	26.570
1 – 5	29.276
5 – 10	29.891
10 – 15	30.416
15 – 20	30.789
Above 20(26.5)	31.431

9.6 BAND EDGE

Lower Band Edge & Extended Band Edge

Band	Band Width (MHz)	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Frequency of Maximum Harmonic (MHz)	Maximum Data (dBm)	Limit (dBm)
2	1.4	1850.7	QPSK	1	0	1849.996	-24.556	<-13.00
			QPSK	6	0	1850.000	-26.341	
		(Extended)	QPSK	6	0	1848.500	-30.05	
	3	1851.5	QPSK	1	0	1849.996	-19.861	
			QPSK	15	0	1850.000	-24.079	
		(Extended)	QPSK	15	0	1848.500	-23.65	
	5	1852.5	QPSK	1	0	1850.000	-21.070	
			QPSK	25	0	1849.992	-23.455	
		(Extended)	QPSK	25	0	1848.500	-23.68	
	10	1855.0	QPSK	1	0	1850.000	-31.401	
			QPSK	50	0	1850.000	-27.578	
		(Extended)	QPSK	50	0	1848.500	-24.39	
	15	1857.5	QPSK	1	0	1849.996	-22.007	
			QPSK	75	0	1850.000	-29.474	
		(Extended)	QPSK	75	0	1848.500	-26.54	
	20	1860.0	QPSK	1	0	1850.000	-31.689	
QPSK			100	0	1849.988	-30.467		
(Extended)		QPSK	100	0	1848.500	-26.30		

Upper Band Edge & Extended Band Edge

Band	Band Width (MHz)	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Frequency of Maximum Harmonic (MHz)	Maximum Data (dBm)	Limit (dBm)
2	1.4	1909.3	QPSK	1	5	1910.000	-22.870	<-13.00
			QPSK	6	0	1910.000	-23.429	
		(Extended)	QPSK	6	0	1911.500	-30.66	
	3	1908.5	QPSK	1	14	1910.000	-16.790	
			QPSK	15	0	1910.000	-16.820	
		(Extended)	QPSK	15	0	1911.500	-18.730	
	5	1907.5	QPSK	1	24	1910.000	-25.029	
			QPSK	25	0	1910.032	-24.487	
		(Extended)	QPSK	25	0	1911.500	-19.04	
	10	1905.0	QPSK	1	49	1910.004	-35.244	
			QPSK	50	0	1910.008	-23.513	
		(Extended)	QPSK	50	0	1911.500	-18.76	
	15	1902.5	QPSK	1	74	1910.000	-28.281	
			QPSK	75	0	1910.036	-24.881	
		(Extended)	QPSK	75	0	1911.500	-20.45	
	20	1900.0	QPSK	1	99	1910.004	-35.498	
QPSK			100	0	1910.008	-26.901		
(Extended)		QPSK	100	0	1911.500	-22.85		

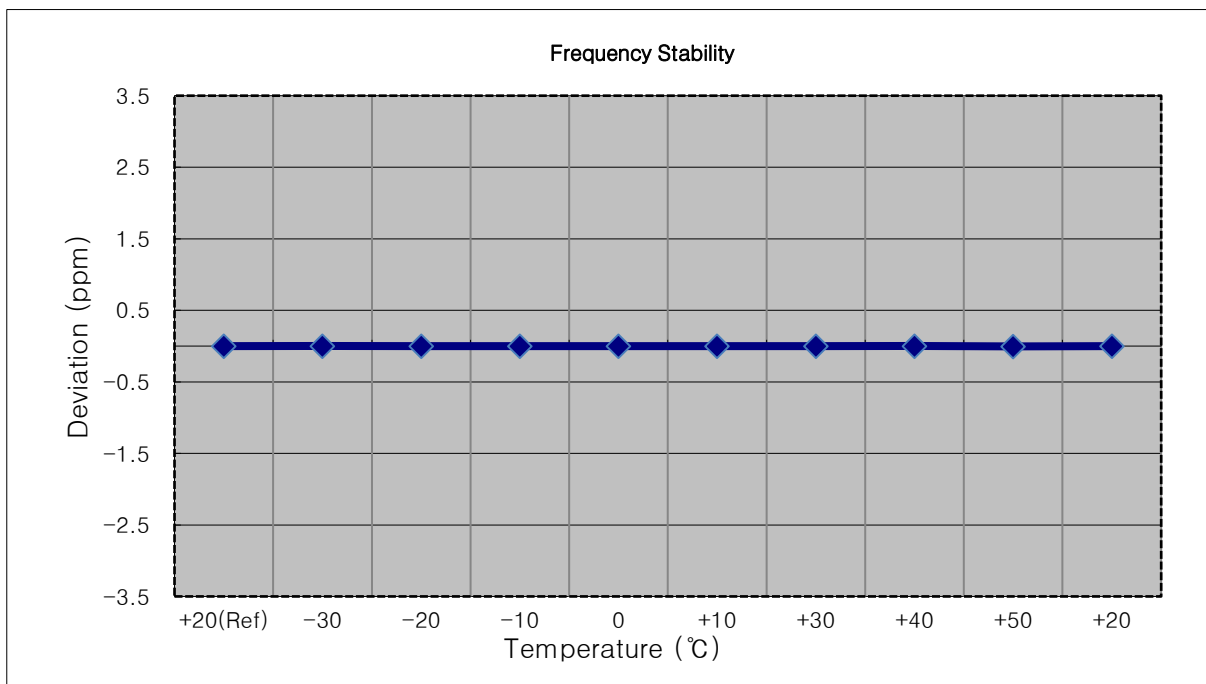
Note:

1. Plots of the EUT's Band Edge are shown Page 139 ~ 144.

9.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

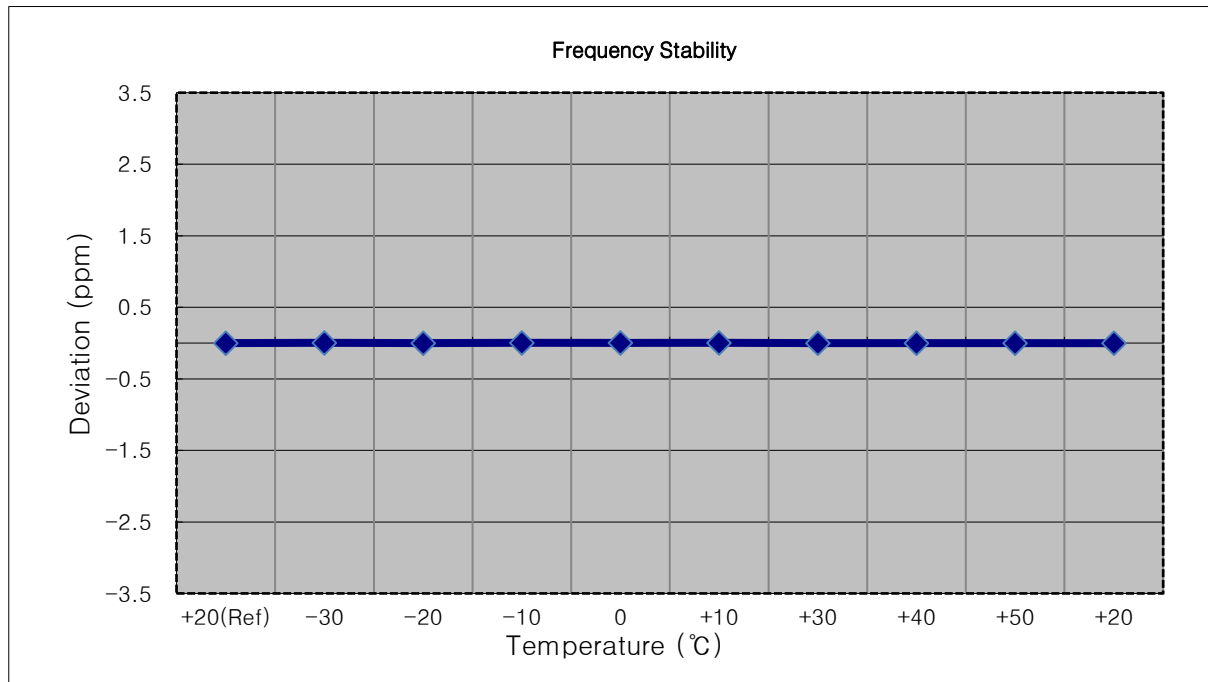
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1850,700,000 Hz
- ▣ CHANNEL: 18607 (1.4 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1850 700 002	0.0	0.000 000	0.000
100 %		-30	1850 700 004	2.4	0.000 000	0.001
100 %		-20	1850 700 000	-2.3	0.000 000	-0.001
100 %		-10	1850 700 003	1.3	0.000 000	0.001
100 %		0	1850 700 004	2.0	0.000 000	0.001
100 %		+10	1850 700 004	1.9	0.000 000	0.001
100 %		+30	1850 699 999	-2.6	0.000 000	-0.001
100 %		+40	1850 700 004	2.4	0.000 000	0.001
100 %		+50	1850 699 993	-8.5	0.000 000	-0.005
Batt. Endpoint		3.400	+20	1850 700 000	-1.6	0.000 000



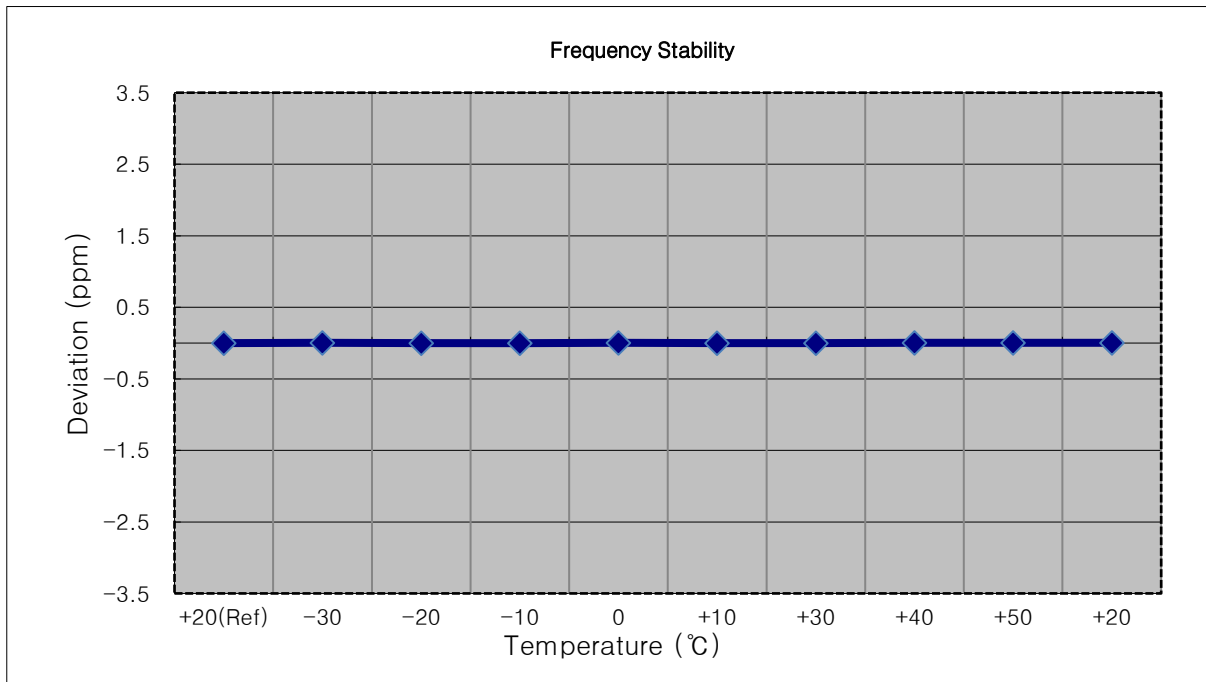
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1851,500,000 Hz
- ▣ CHANNEL: 18615 (3 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1851 500 006	0.0	0.000 000	0.000
100 %		-30	1851 500 009	3.2	0.000 000	0.002
100 %		-20	1851 500 004	-2.2	0.000 000	-0.001
100 %		-10	1851 500 009	2.9	0.000 000	0.002
100 %		0	1851 500 010	4.2	0.000 000	0.002
100 %		+10	1851 500 009	3.5	0.000 000	0.002
100 %		+30	1851 500 008	2.3	0.000 000	0.001
100 %		+40	1851 500 005	-1.0	0.000 000	-0.001
100 %		+50	1851 500 008	2.1	0.000 000	0.001
Batt. Endpoint		3.400	+20	1851 500 003	-3.2	0.000 000



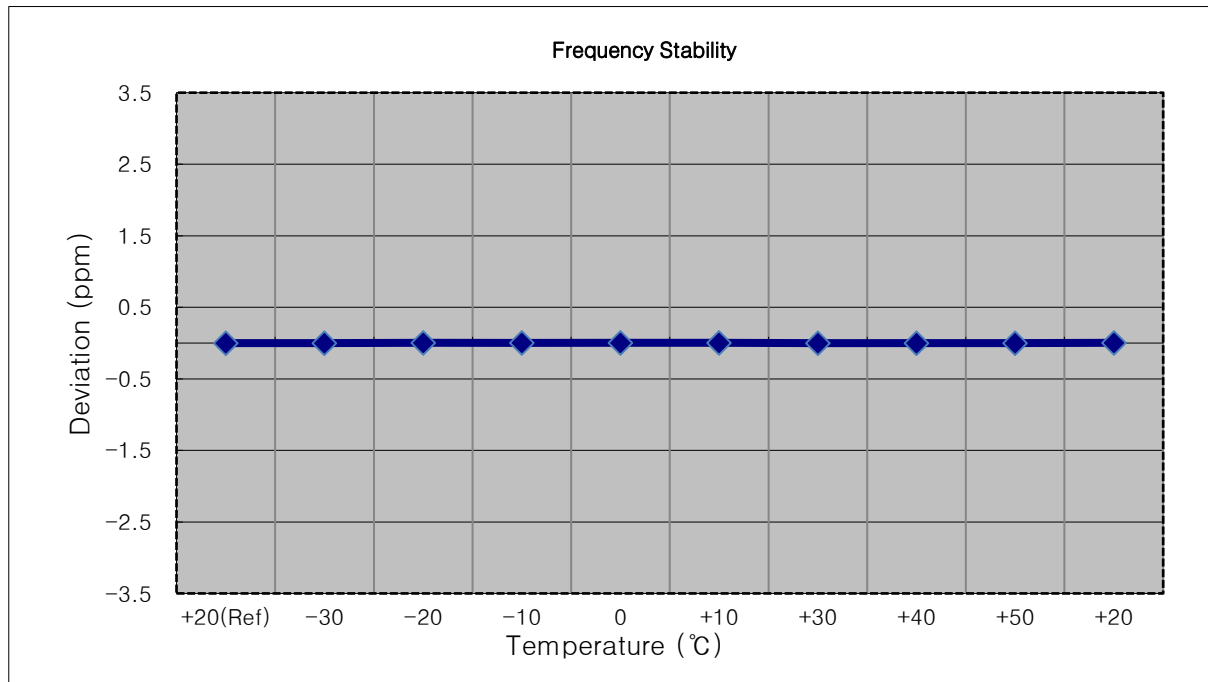
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1852,500,000 Hz
- ▣ CHANNEL: 18625 (5 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1852 499 997	0.0	0.000 000	0.000
100 %		-30	1852 500 000	3.0	0.000 000	0.002
100 %		-20	1852 499 999	2.1	0.000 000	0.001
100 %		-10	1852 499 995	-2.6	0.000 000	-0.001
100 %		0	1852 500 001	3.6	0.000 000	0.002
100 %		+10	1852 499 995	-2.0	0.000 000	-0.001
100 %		+30	1852 499 999	1.9	0.000 000	0.001
100 %		+40	1852 500 004	7.0	0.000 000	0.004
100 %		+50	1852 500 000	2.9	0.000 000	0.002
Batt. Endpoint	3.400	+20	1852 500 002	4.7	0.000 000	0.003



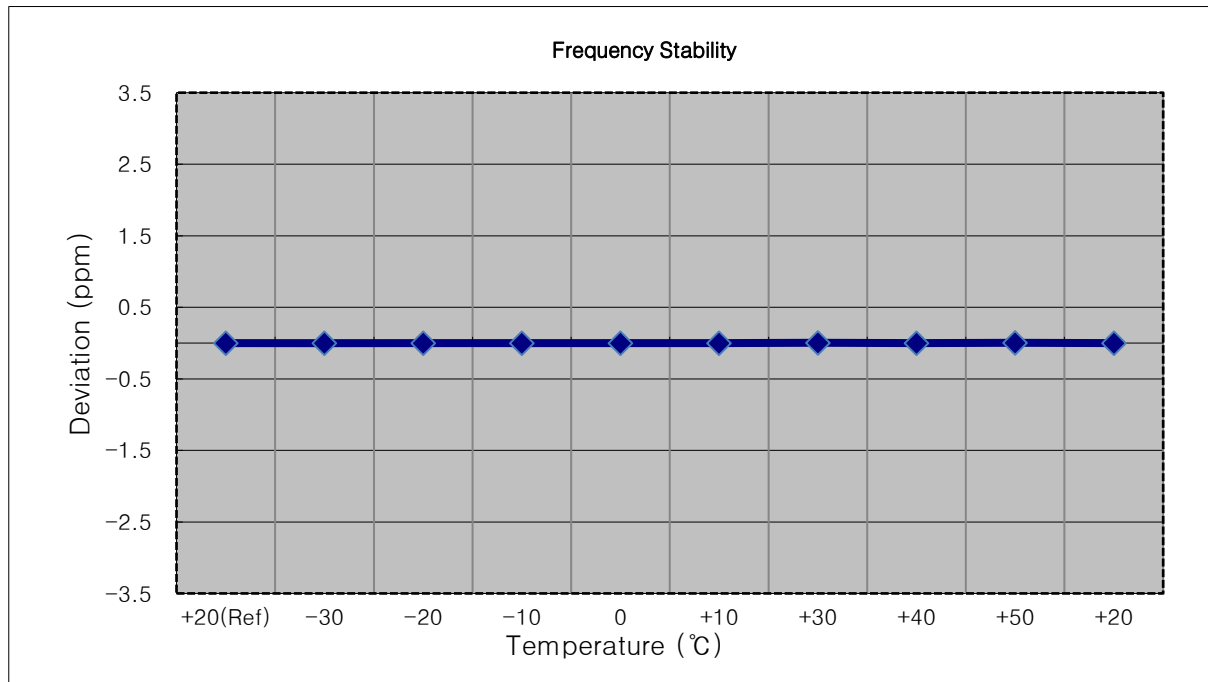
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1855,000,000 Hz
- ▣ CHANNEL: 18650 (10 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1855 000 003	0.0	0.000 000	0.000
100 %		-30	1855 000 005	2.3	0.000 000	0.001
100 %		-20	1855 000 005	2.9	0.000 000	0.002
100 %		-10	1855 000 007	4.1	0.000 000	0.002
100 %		0	1855 000 005	2.9	0.000 000	0.002
100 %		+10	1855 000 006	3.1	0.000 000	0.002
100 %		+30	1855 000 001	-1.8	0.000 000	-0.001
100 %		+40	1855 000 005	2.4	0.000 000	0.001
100 %		+50	1855 000 005	2.6	0.000 000	0.001
Batt. Endpoint		3.400	+20	1855 000 006	3.3	0.000 000



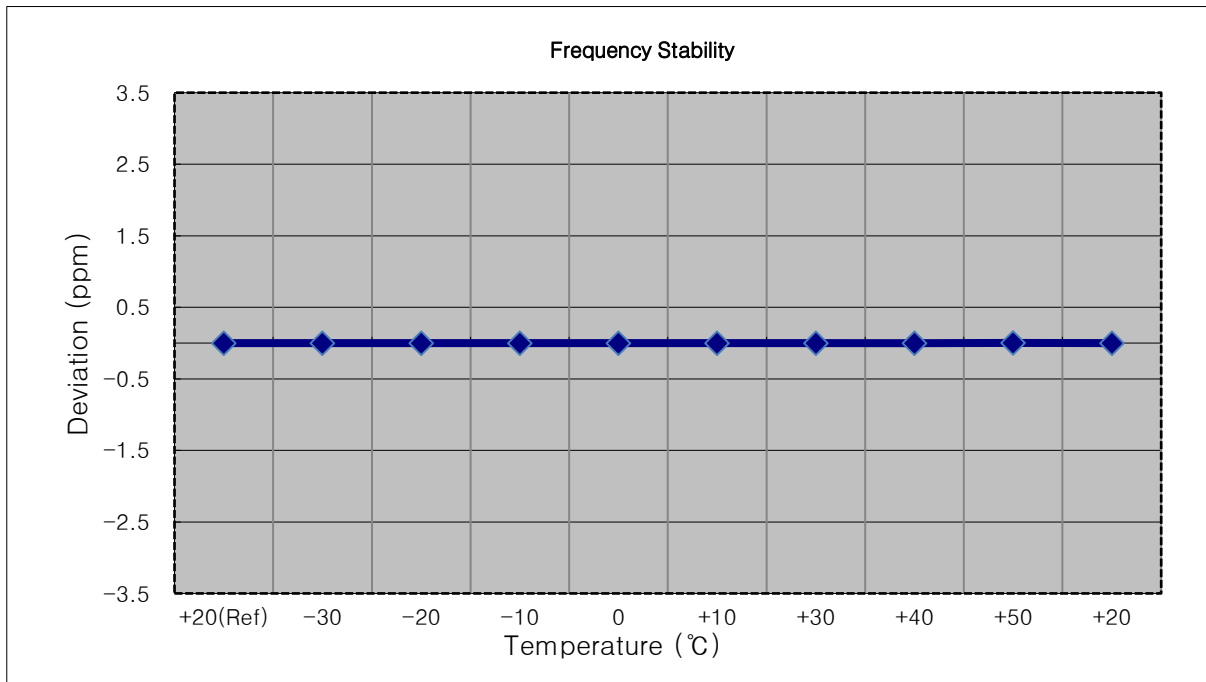
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1857,500,000 Hz
- ▣ CHANNEL: 18675 (15 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1857 500 002	0.0	0.000 000	0.000
100 %		-30	1857 499 999	-2.7	0.000 000	-0.001
100 %		-20	1857 500 003	1.4	0.000 000	0.001
100 %		-10	1857 500 003	1.6	0.000 000	0.001
100 %		0	1857 500 003	1.6	0.000 000	0.001
100 %		+10	1857 500 004	2.1	0.000 000	0.001
100 %		+30	1857 500 010	7.9	0.000 000	0.004
100 %		+40	1857 500 004	2.7	0.000 000	0.001
100 %		+50	1857 500 008	6.2	0.000 000	0.003
Batt. Endpoint	3.400	+20	1857 500 004	2.2	0.000 000	0.001



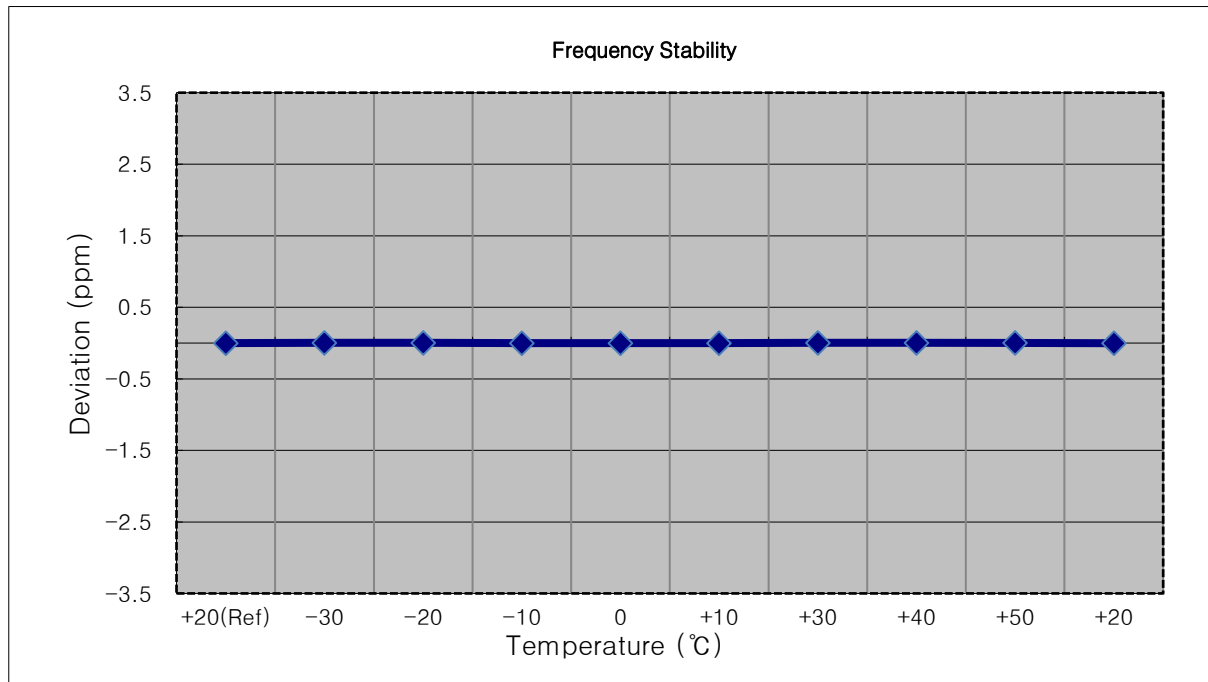
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1860,000,000 Hz
- ▣ CHANNEL: 18700 (20 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1860 000 002	0.0	0.000 000	0.000
100 %		-30	1859 999 999	-3.4	0.000 000	-0.002
100 %		-20	1860 000 005	2.3	0.000 000	0.001
100 %		-10	1860 000 004	1.7	0.000 000	0.001
100 %		0	1860 000 004	1.6	0.000 000	0.001
100 %		+10	1860 000 001	-1.3	0.000 000	-0.001
100 %		+30	1860 000 000	-2.2	0.000 000	-0.001
100 %		+40	1859 999 998	-3.8	0.000 000	-0.002
100 %		+50	1860 000 006	3.3	0.000 000	0.002
Batt. Endpoint		3.400	+20	1860 000 005	2.4	0.000 000



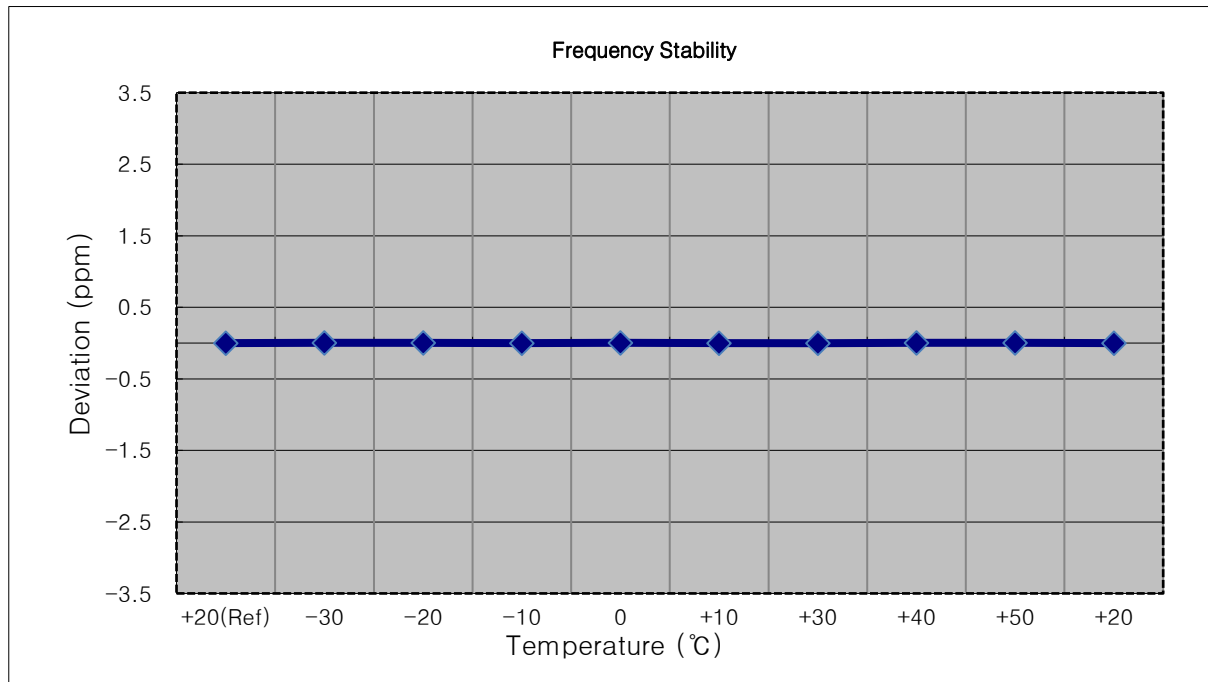
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (1.4 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1880 000 004	0.0	0.000 000	0.000
100 %		-30	1880 000 008	3.3	0.000 000	0.002
100 %		-20	1880 000 008	3.4	0.000 000	0.002
100 %		-10	1880 000 003	-1.1	0.000 000	-0.001
100 %		0	1880 000 007	2.4	0.000 000	0.001
100 %		+10	1880 000 007	2.7	0.000 000	0.001
100 %		+30	1880 000 007	2.8	0.000 000	0.001
100 %		+40	1880 000 007	2.8	0.000 000	0.001
100 %		+50	1880 000 008	3.5	0.000 000	0.002
Batt. Endpoint	3.400	+20	1880 000 000	-4.1	0.000 000	-0.002



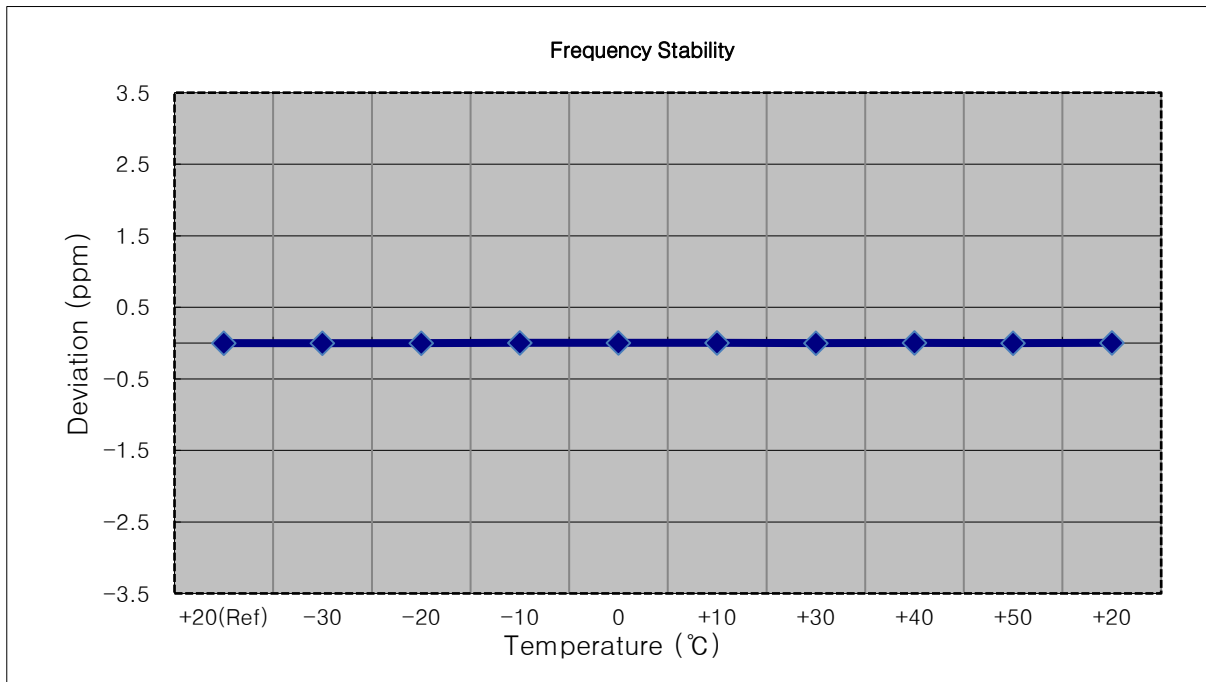
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (3 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1879 999 996	0.0	0.000 000	0.000
100 %		-30	1880 000 000	3.4	0.000 000	0.002
100 %		-20	1880 000 002	5.2	0.000 000	0.003
100 %		-10	1879 999 993	-3.7	0.000 000	-0.002
100 %		0	1880 000 000	3.9	0.000 000	0.002
100 %		+10	1879 999 999	2.1	0.000 000	0.001
100 %		+30	1879 999 992	-4.1	0.000 000	-0.002
100 %		+40	1880 000 000	3.8	0.000 000	0.002
100 %		+50	1880 000 000	3.1	0.000 000	0.002
Batt. Endpoint	3.400	+20	1879 999 993	-3.6	0.000 000	-0.002



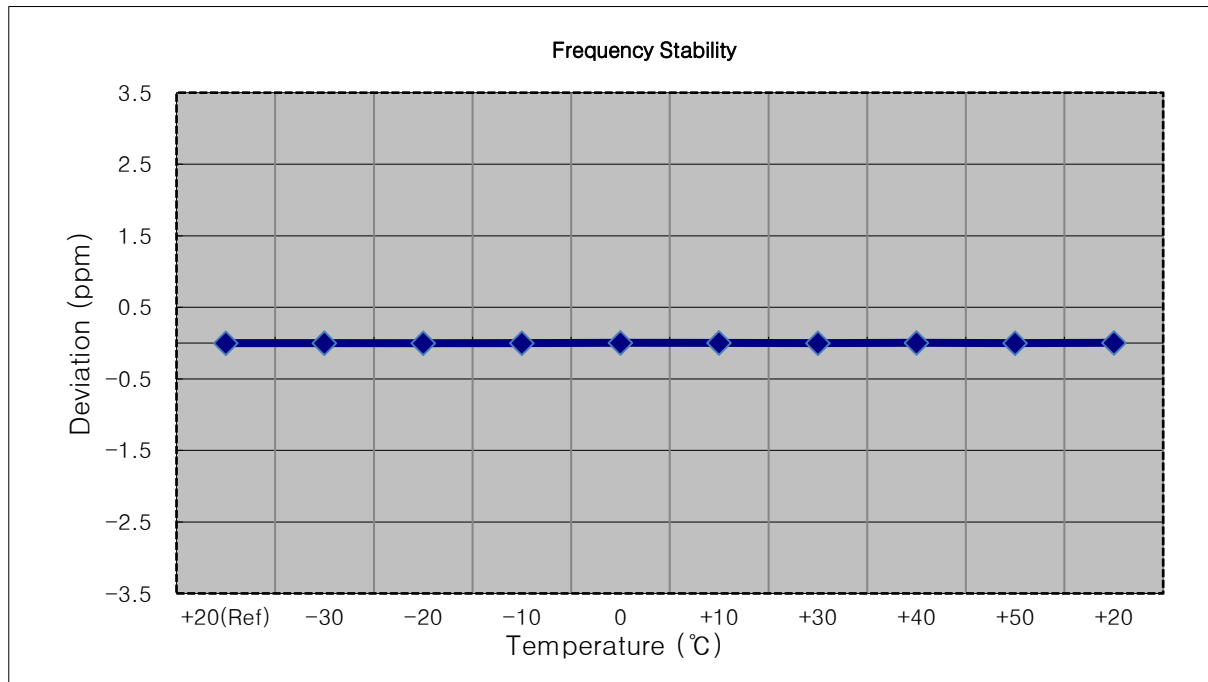
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (5 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1879 999 996	0.0	0.000 000	0.000
100 %		-30	1879 999 992	-3.9	0.000 000	-0.002
100 %		-20	1879 999 993	-3.1	0.000 000	-0.002
100 %		-10	1880 000 000	3.5	0.000 000	0.002
100 %		0	1879 999 999	3.1	0.000 000	0.002
100 %		+10	1879 999 999	3.1	0.000 000	0.002
100 %		+30	1879 999 999	2.6	0.000 000	0.001
100 %		+40	1880 000 001	5.0	0.000 000	0.003
100 %		+50	1879 999 995	-1.2	0.000 000	-0.001
Batt. Endpoint		3.400	+20	1879 999 999	3.1	0.000 000



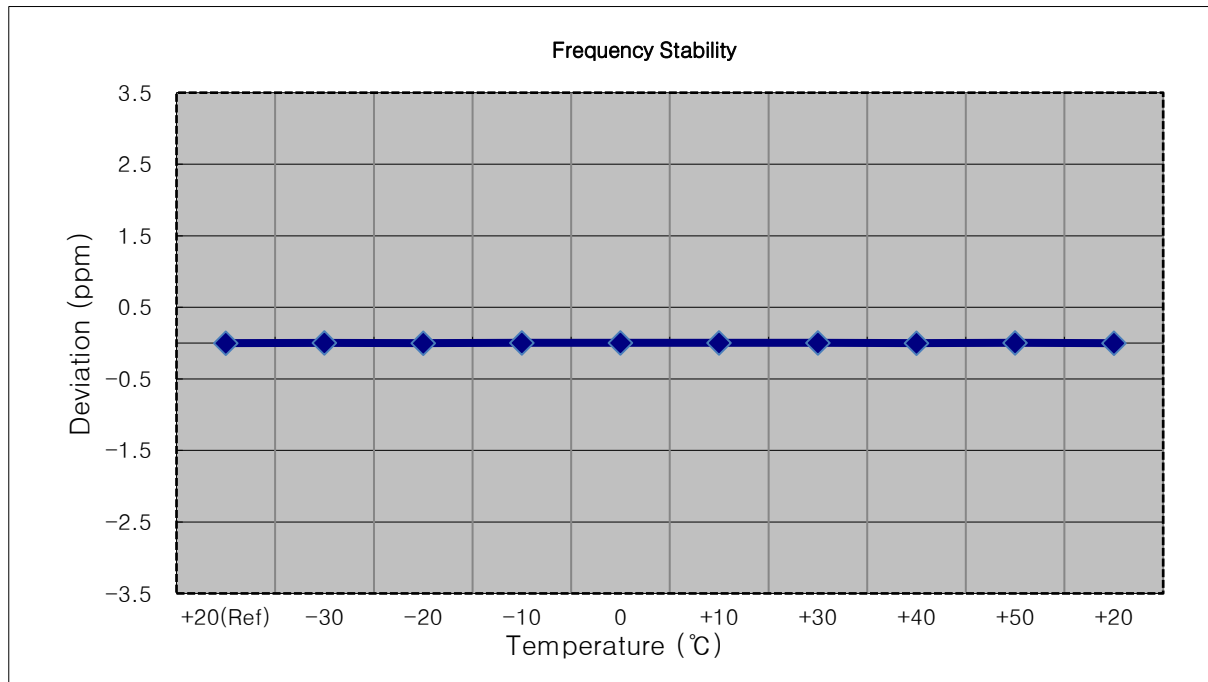
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (10 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1880 000 002	0.0	0.000 000	0.000
100 %		-30	1880 000 000	-1.6	0.000 000	-0.001
100 %		-20	1879 999 998	-3.6	0.000 000	-0.002
100 %		-10	1879 999 999	-2.5	0.000 000	-0.001
100 %		0	1880 000 005	3.0	0.000 000	0.002
100 %		+10	1880 000 006	4.2	0.000 000	0.002
100 %		+30	1879 999 999	-2.2	0.000 000	-0.001
100 %		+40	1880 000 005	3.2	0.000 000	0.002
100 %		+50	1879 999 999	-2.7	0.000 000	-0.001
Batt. Endpoint	3.400	+20	1880 000 005	3.7	0.000 000	0.002



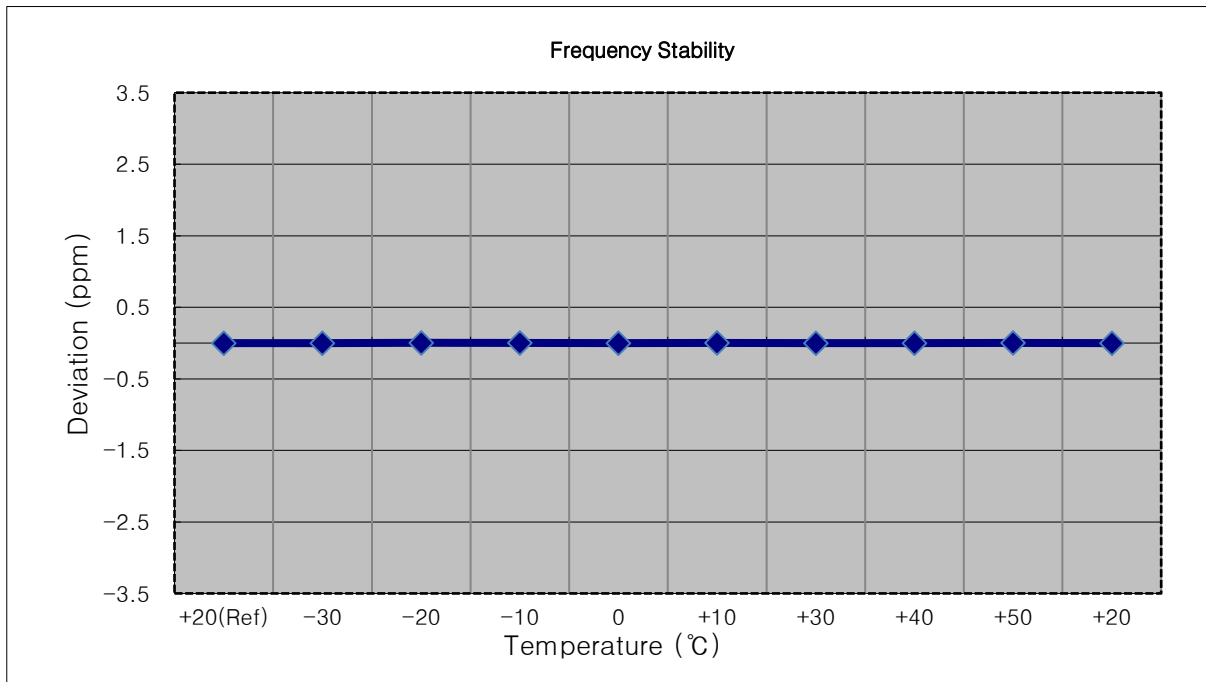
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (15 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1880 000 001	0.0	0.000 000	0.000
100 %		-30	1880 000 005	3.9	0.000 000	0.002
100 %		-20	1880 000 004	2.4	0.000 000	0.001
100 %		-10	1880 000 005	3.2	0.000 000	0.002
100 %		0	1880 000 004	2.9	0.000 000	0.002
100 %		+10	1880 000 004	3.1	0.000 000	0.002
100 %		+30	1880 000 005	3.8	0.000 000	0.002
100 %		+40	1880 000 004	2.3	0.000 000	0.001
100 %		+50	1880 000 004	2.9	0.000 000	0.002
Batt. Endpoint	3.400	+20	1879 999 999	-2.6	0.000 000	-0.001



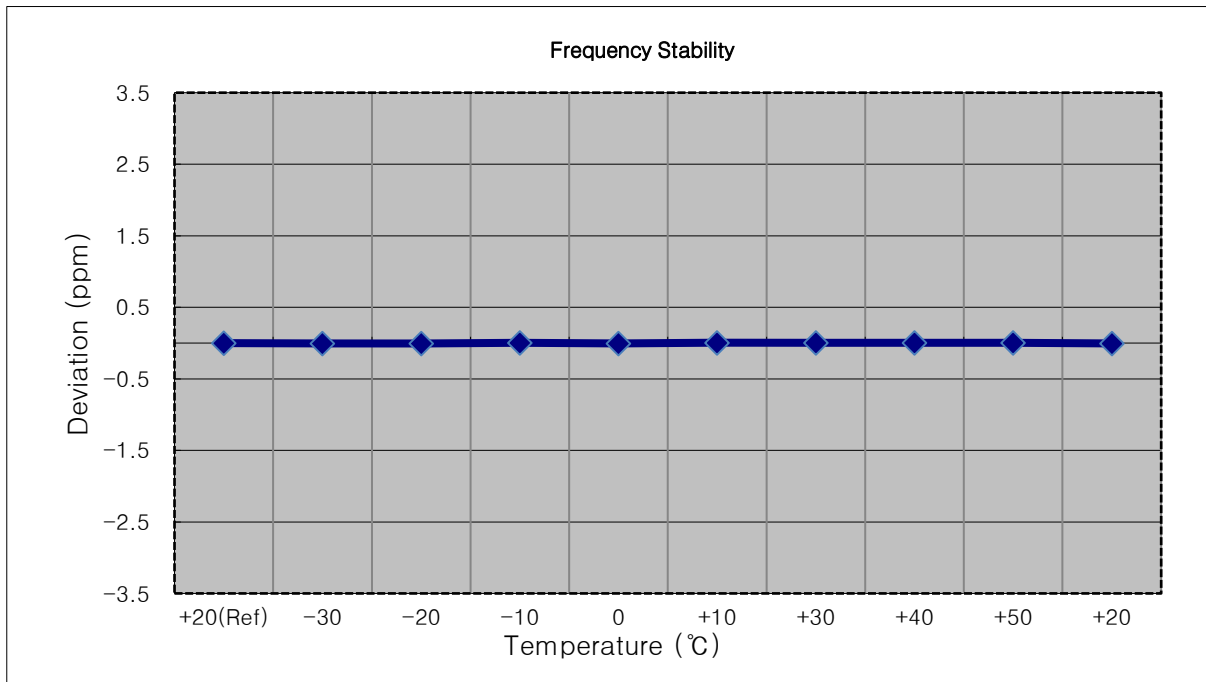
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (20 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1880 000 003	0.0	0.000 000	0.000
100 %		-30	1880 000 001	-2.1	0.000 000	-0.001
100 %		-20	1880 000 006	2.9	0.000 000	0.002
100 %		-10	1880 000 006	3.1	0.000 000	0.002
100 %		0	1880 000 005	2.0	0.000 000	0.001
100 %		+10	1880 000 006	3.1	0.000 000	0.002
100 %		+30	1880 000 005	2.6	0.000 000	0.001
100 %		+40	1880 000 005	2.4	0.000 000	0.001
100 %		+50	1880 000 006	3.1	0.000 000	0.002
Batt. Endpoint	3.400	+20	1880 000 005	2.7	0.000 000	0.001



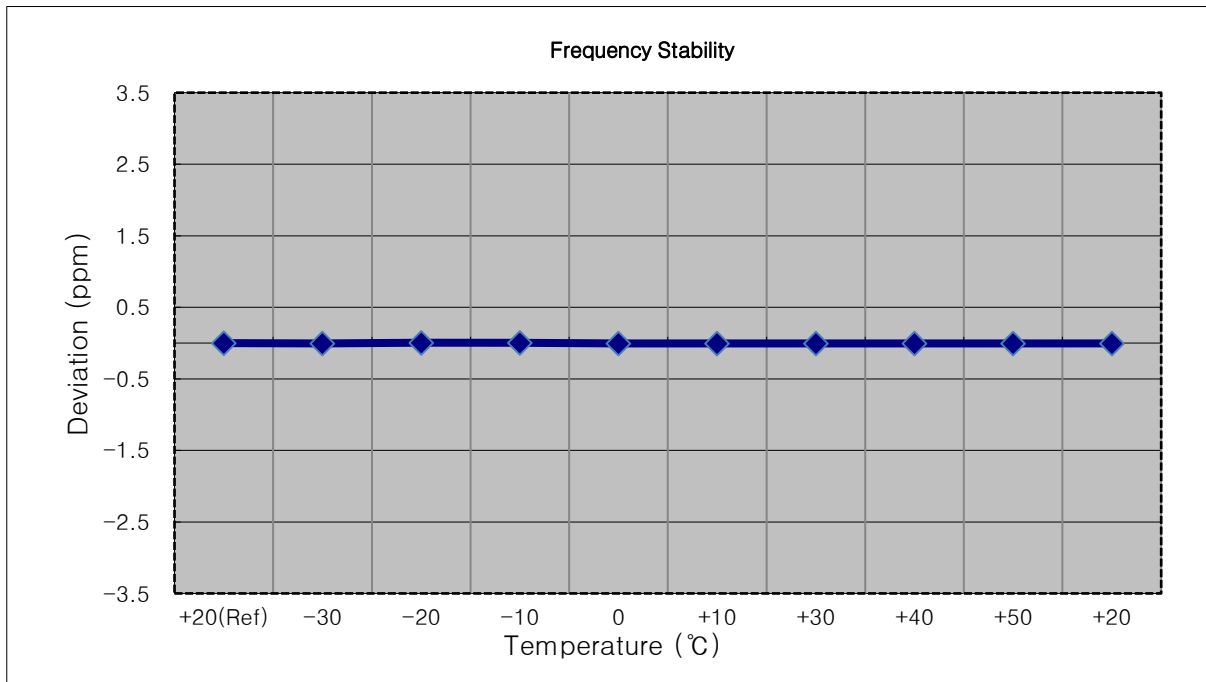
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1909,300,000 Hz
- ▣ CHANNEL: 19193 (1.4 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1909 300 007	0.0	0.000 000	0.000
100 %		-30	1909 300 000	-6.6	0.000 000	-0.003
100 %		-20	1909 299 995	-11.4	-0.000 001	-0.006
100 %		-10	1909 300 016	9.1	0.000 000	0.005
100 %		0	1909 300 000	-6.7	0.000 000	-0.004
100 %		+10	1909 300 017	9.8	0.000 001	0.005
100 %		+30	1909 300 013	6.5	0.000 000	0.003
100 %		+40	1909 300 016	9.4	0.000 000	0.005
100 %		+50	1909 300 012	5.2	0.000 000	0.003
Batt. Endpoint		3.400	+20	1909 299 999	-7.7	0.000 000



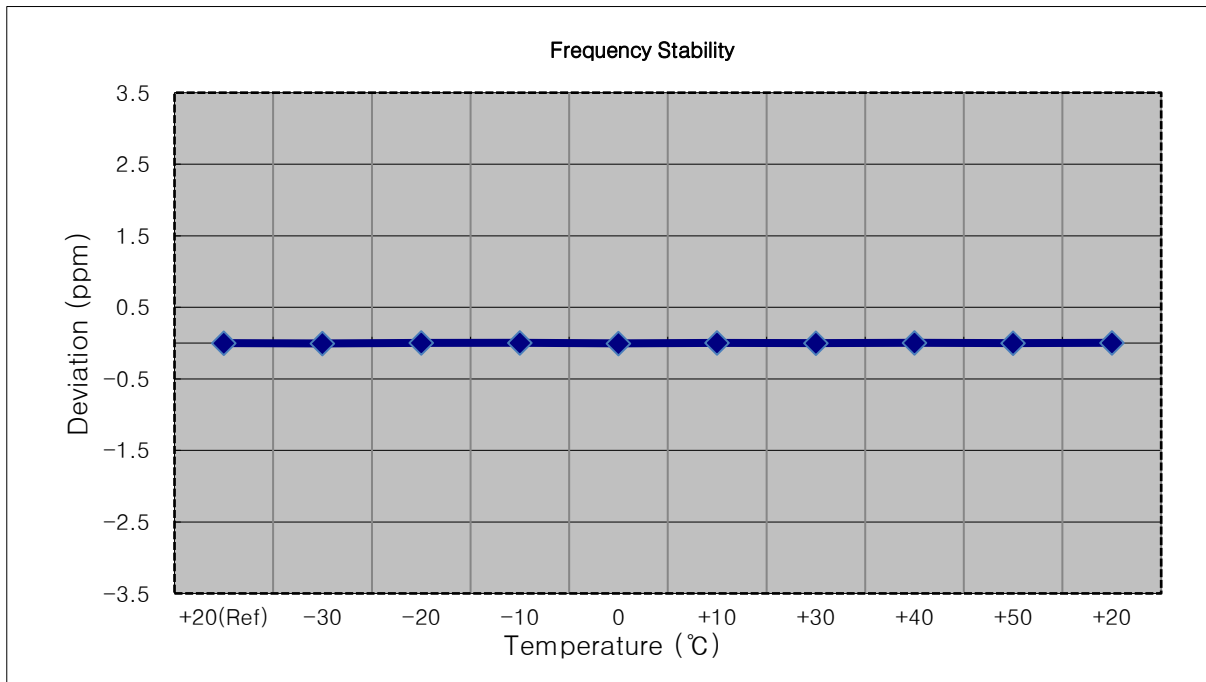
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1908,500,000 Hz
- ▣ CHANNEL: 19185 (3 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1908 499 992	0.0	0.000 000	0.000
100 %		-30	1908 499 983	-8.5	0.000 000	-0.004
100 %		-20	1908 500 001	9.2	0.000 000	0.005
100 %		-10	1908 500 000	8.4	0.000 000	0.004
100 %		0	1908 499 985	-6.7	0.000 000	-0.004
100 %		+10	1908 499 983	-8.1	0.000 000	-0.004
100 %		+30	1908 499 983	-9.0	0.000 000	-0.005
100 %		+40	1908 499 983	-8.7	0.000 000	-0.005
100 %		+50	1908 499 983	-8.7	0.000 000	-0.005
Batt. Endpoint	3.400	+20	1908 499 982	-9.1	0.000 000	-0.005



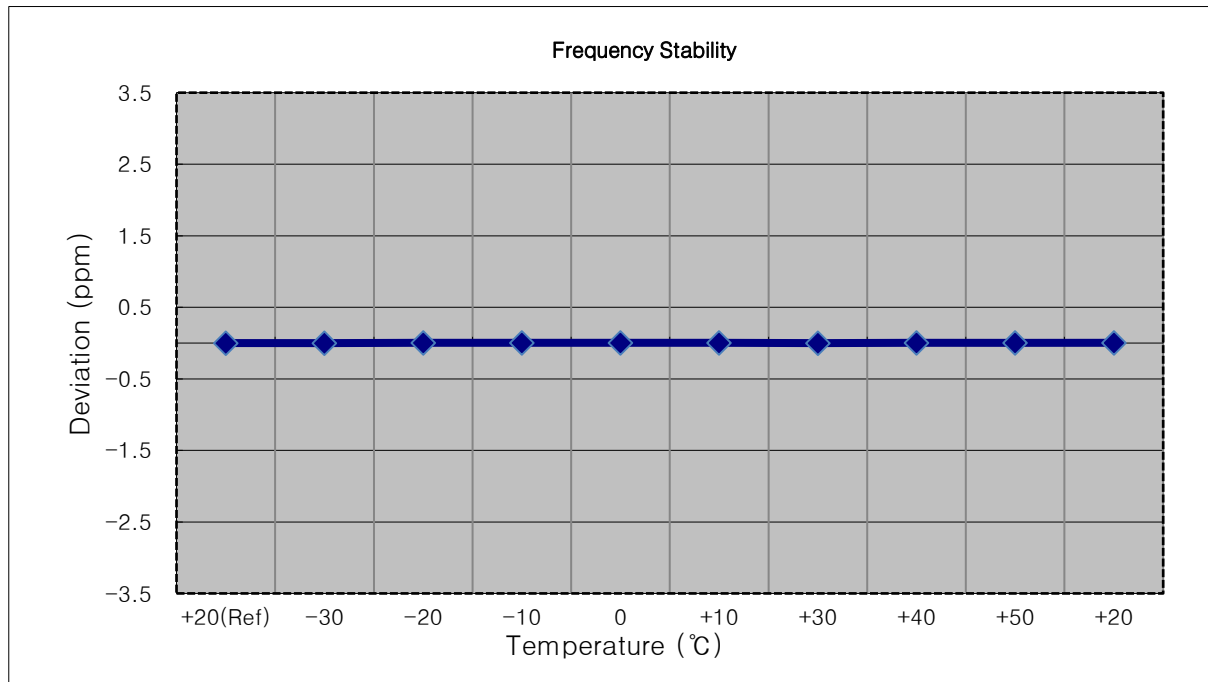
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1907,500,000 Hz
- ▣ CHANNEL: 19175 (5 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1907 500 003	0.0	0.000 000	0.000
100 %		-30	1907 499 996	-7.2	0.000 000	-0.004
100 %		-20	1907 500 008	4.2	0.000 000	0.002
100 %		-10	1907 500 007	3.7	0.000 000	0.002
100 %		0	1907 499 996	-7.7	0.000 000	-0.004
100 %		+10	1907 500 008	4.2	0.000 000	0.002
100 %		+30	1907 500 006	2.4	0.000 000	0.001
100 %		+40	1907 500 007	3.5	0.000 000	0.002
100 %		+50	1907 500 000	-3.2	0.000 000	-0.002
Batt. Endpoint		3.400	+20	1907 500 006	2.9	0.000 000



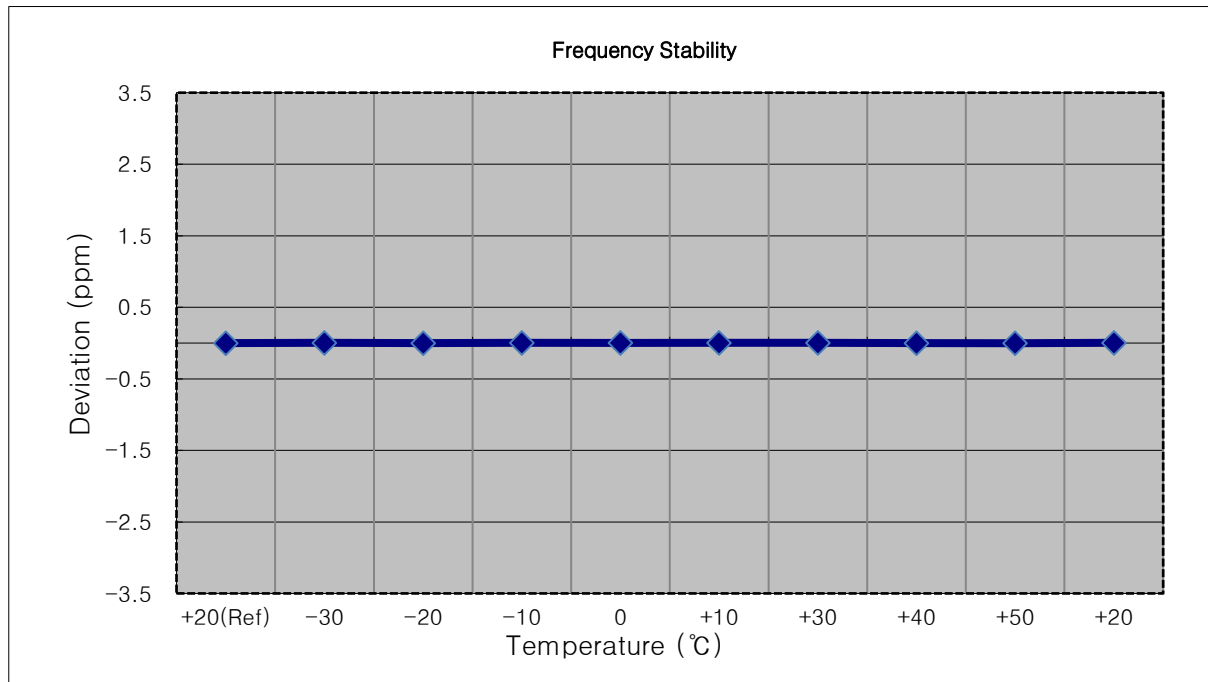
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1905,000,000 Hz
- ▣ CHANNEL: 19150 (10 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1905 000 003	0.0	0.000 000	0.000
100 %		-30	1905 000 005	2.1	0.000 000	0.001
100 %		-20	1905 000 007	3.8	0.000 000	0.002
100 %		-10	1905 000 006	3.3	0.000 000	0.002
100 %		0	1905 000 006	3.2	0.000 000	0.002
100 %		+10	1905 000 007	3.9	0.000 000	0.002
100 %		+30	1905 000 005	2.4	0.000 000	0.001
100 %		+40	1905 000 007	4.1	0.000 000	0.002
100 %		+50	1905 000 009	5.7	0.000 000	0.003
Batt. Endpoint		3.400	+20	1905 000 007	4.0	0.000 000



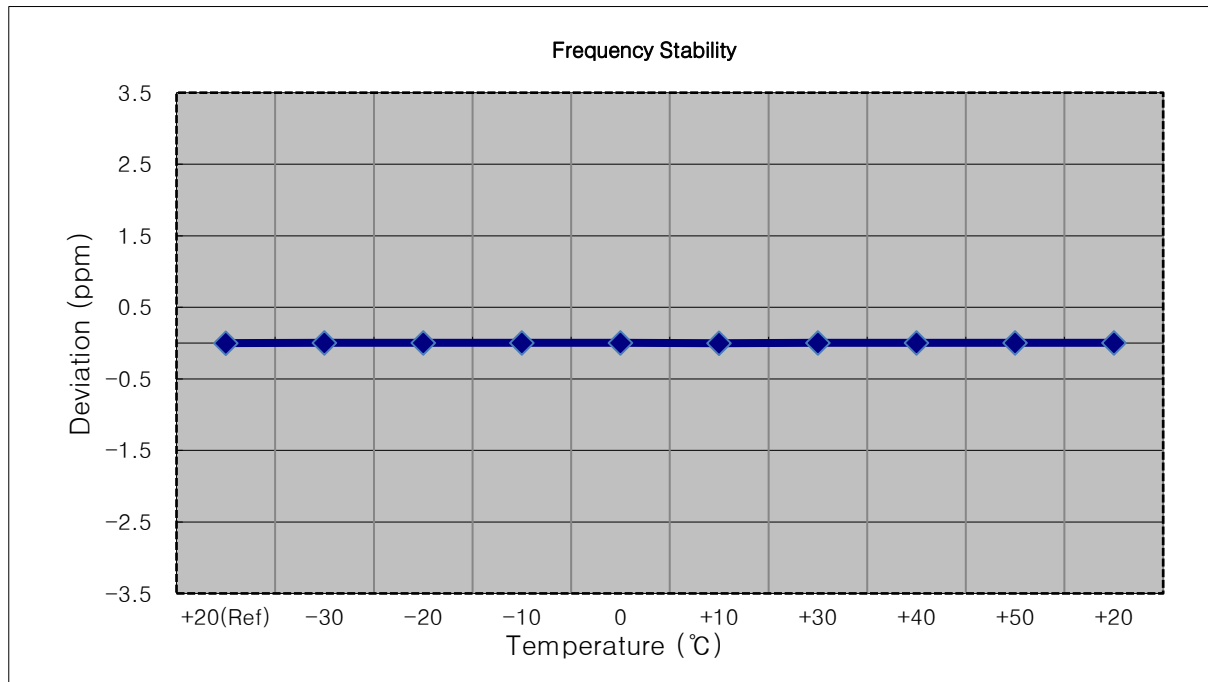
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1902,500,000 Hz
- ▣ CHANNEL: 19125 (15 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1902 500 003	0.0	0.000 000	0.000
100 %		-30	1902 500 006	3.1	0.000 000	0.002
100 %		-20	1902 500 000	-3.0	0.000 000	-0.002
100 %		-10	1902 500 006	2.9	0.000 000	0.002
100 %		0	1902 500 007	3.6	0.000 000	0.002
100 %		+10	1902 500 006	2.8	0.000 000	0.001
100 %		+30	1902 500 006	3.2	0.000 000	0.002
100 %		+40	1902 500 001	-2.2	0.000 000	-0.001
100 %		+50	1902 499 999	-4.3	0.000 000	-0.002
Batt. Endpoint		3.400	+20	1902 500 006	3.4	0.000 000



- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1900,000,000 Hz
- ▣ CHANNEL: 19100 (20 MHz)
- ▣ REFERENCE VOLTAGE: 4.200 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1900 000 005	0.0	0.000 000	0.000
100 %		-30	1900 000 008	3.3	0.000 000	0.002
100 %		-20	1900 000 010	4.6	0.000 000	0.002
100 %		-10	1900 000 009	3.6	0.000 000	0.002
100 %		0	1900 000 009	4.2	0.000 000	0.002
100 %		+10	1900 000 001	-4.2	0.000 000	-0.002
100 %		+30	1900 000 009	3.9	0.000 000	0.002
100 %		+40	1900 000 011	6.0	0.000 000	0.003
100 %		+50	1900 000 009	3.5	0.000 000	0.002
Batt. Endpoint		3.400	+20	1900 000 010	5.3	0.000 000



10. TEST PLOTS (Main 2 Ant)

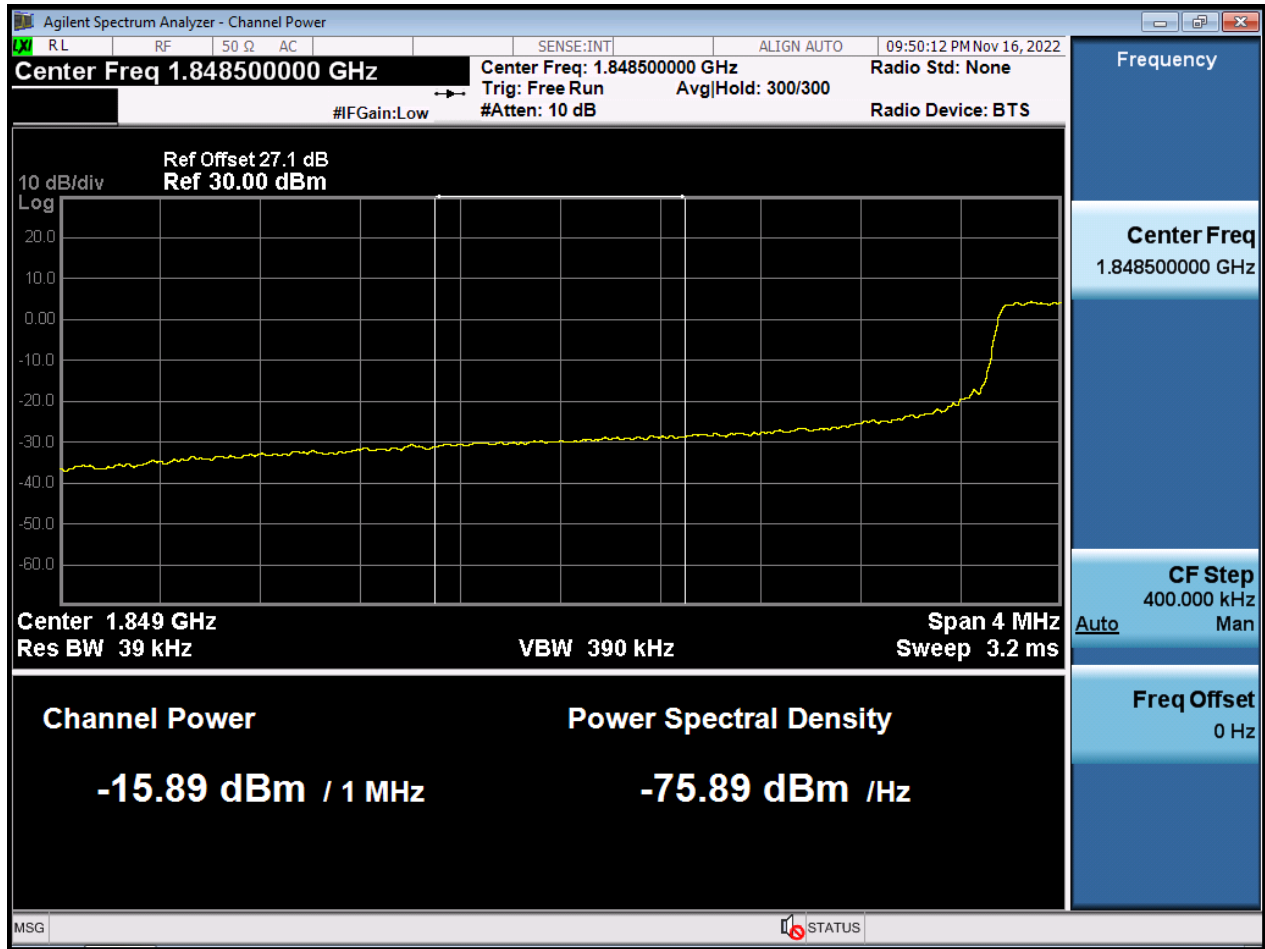
BW5 M_BandEdge_Lowest Channel_QPSK_FullIRB(1)



Note:

In order to simplify the report, attached plots were only the Worst case. (BW : 5 MHz)

BW5 M_BandEdge_Lowest Channel_QPSK_FullIRB(2)



Note:

In order to simplify the report, attached plots were only the Worst case. (BW : 5 MHz)

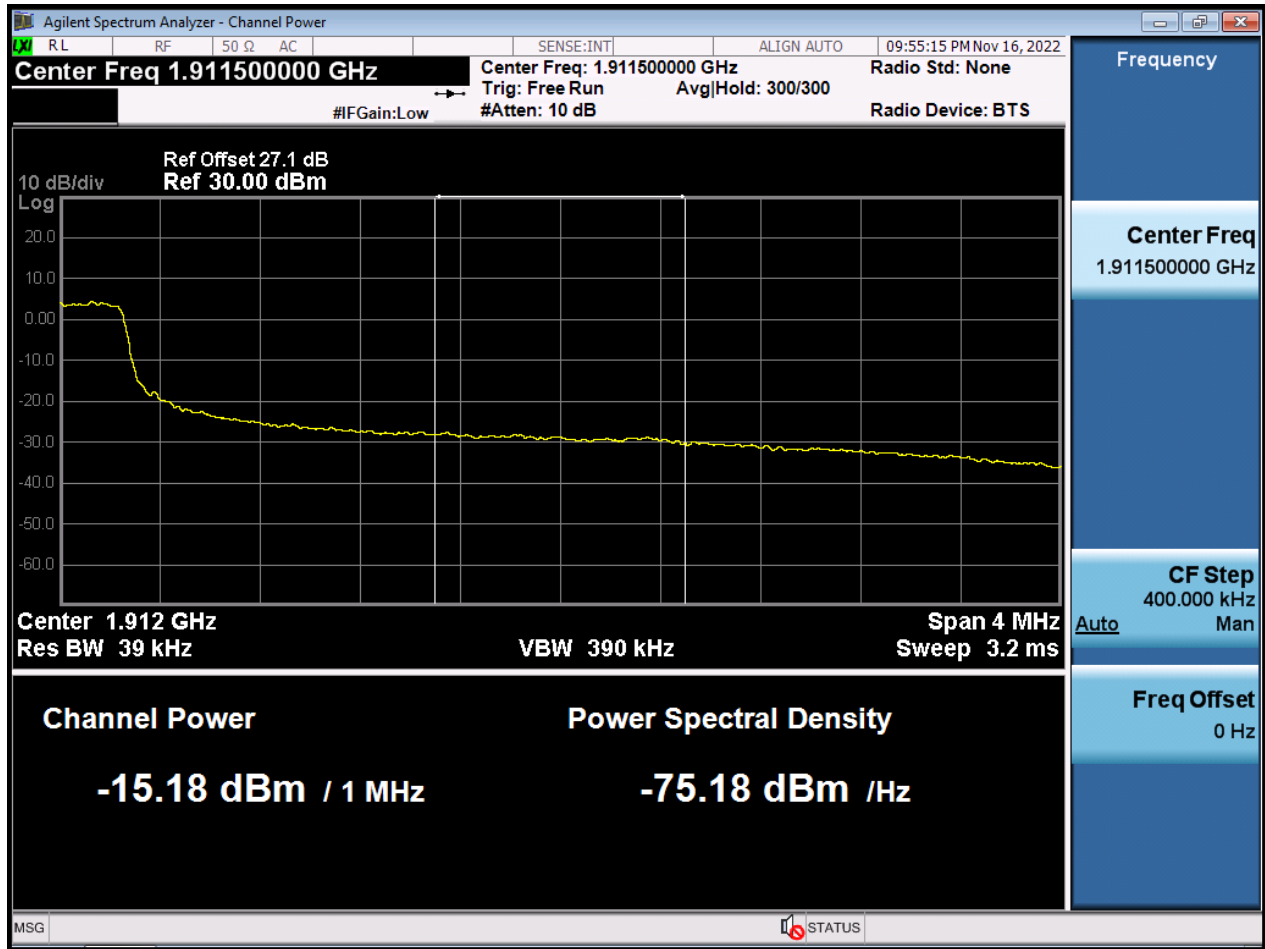
BW5 M_BandEdge_Highest Channel_QPSK_FullRB(1)



Note:

In order to simplify the report, attached plots were only the Worst case. (BW : 5 MHz)

BW5 M_BandEdge_Highest Channel_QPSK_FullRB(2)



Note:

In order to simplify the report, attached plots were only the Worst case. (BW : 5 MHz)

BW5 M_BandEdge_Lowest Channel_QPSK_1RB



Note:

In order to simplify the report, attached plots were only the Worst case. (BW : 5 MHz)

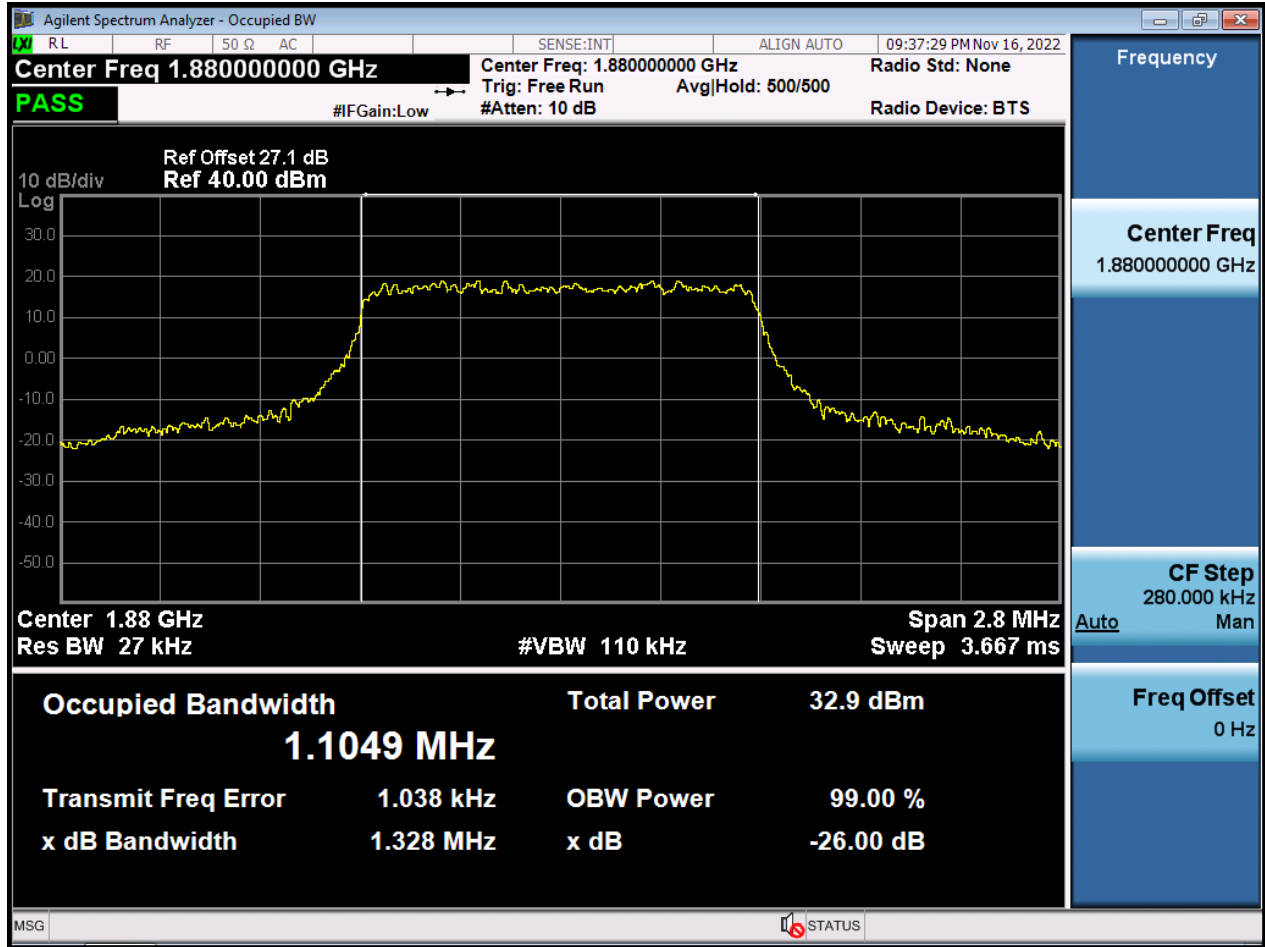
BW5 M_BandEdge_Highest Channel_QPSK_1RB



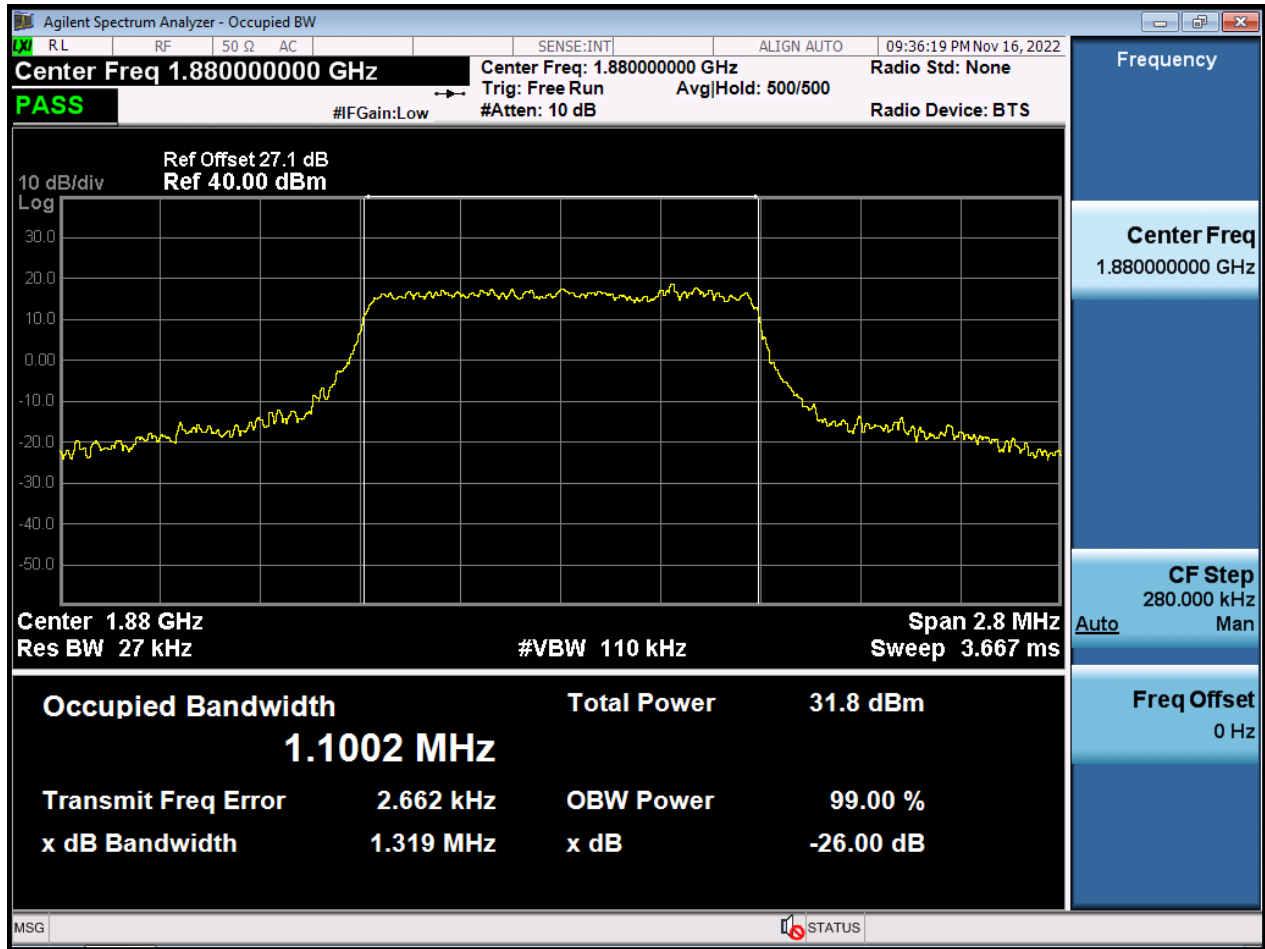
Note:

In order to simplify the report, attached plots were only the Worst case. (BW : 5 MHz)

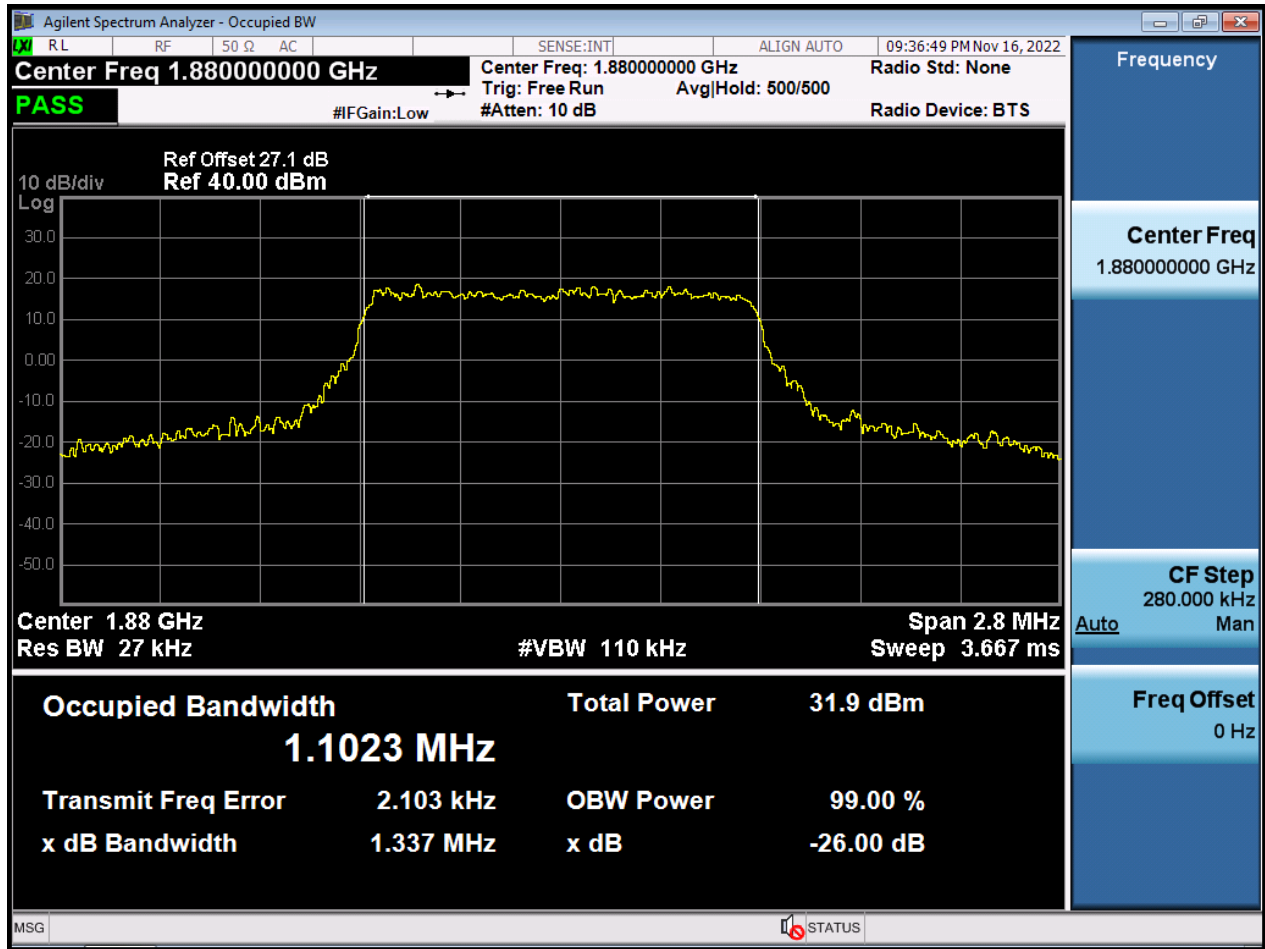
BW1.4 M_OBW_Middle Channel_QPSK_FullRB



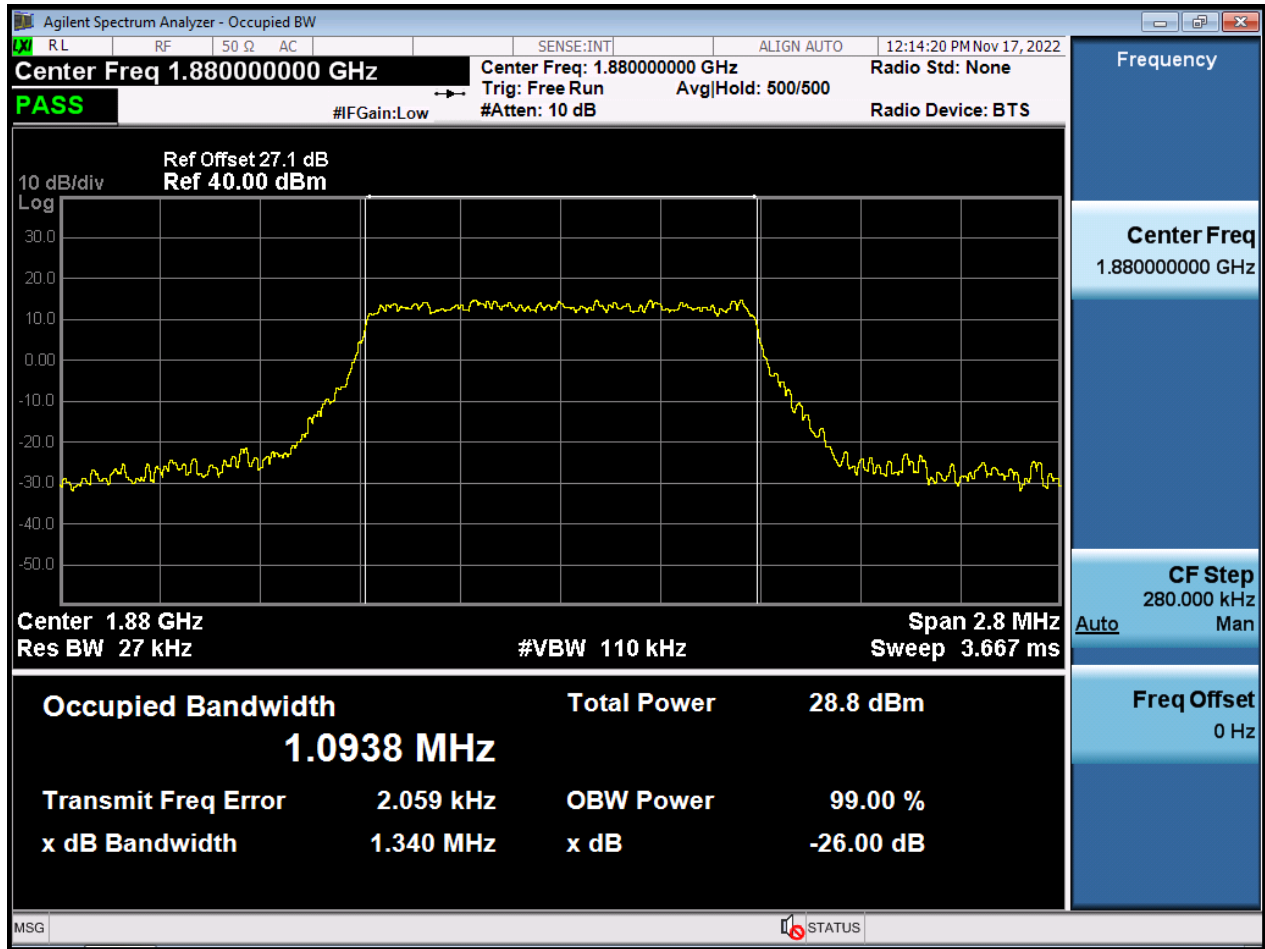
BW1.4 M_OBW_Middle Channel_16QAM_FullRB



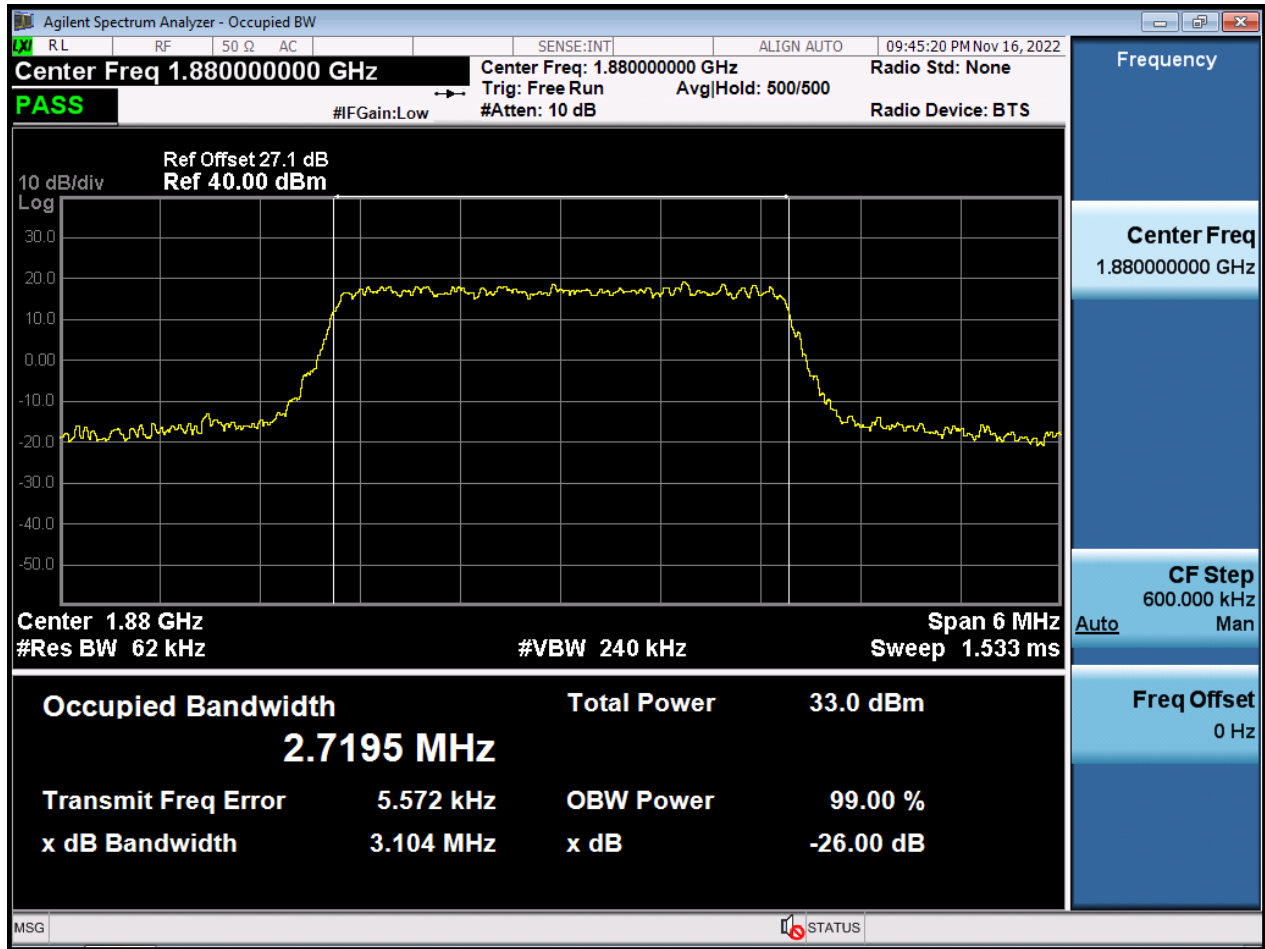
BW1.4 M_OBW_Middle Channel_64QAM_FullIRB



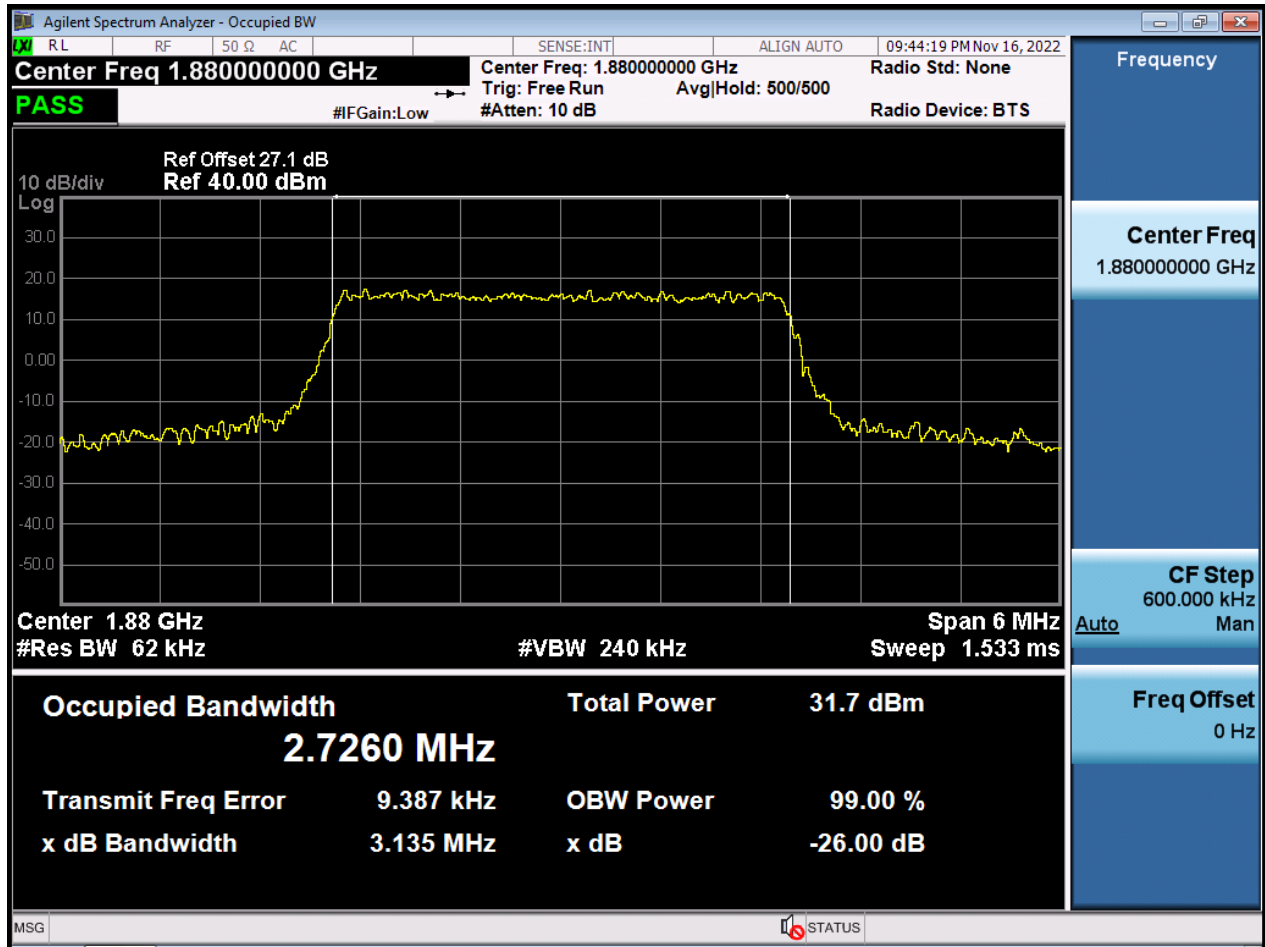
BW1.4 M_OBW_Middle Channel_256QAM_FullRB



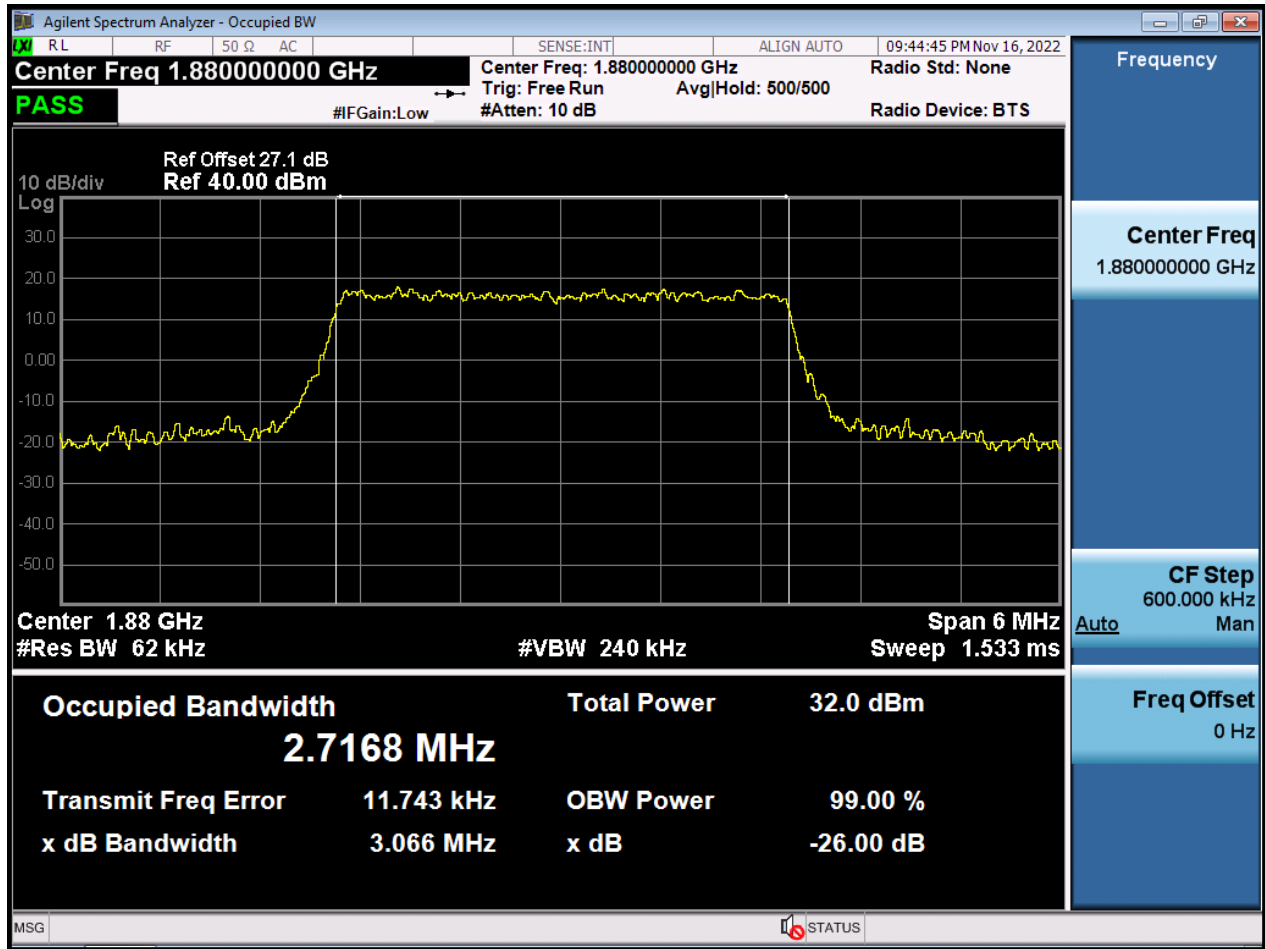
BW3 M_OBW_Middle Channel_QPSK_FullRB



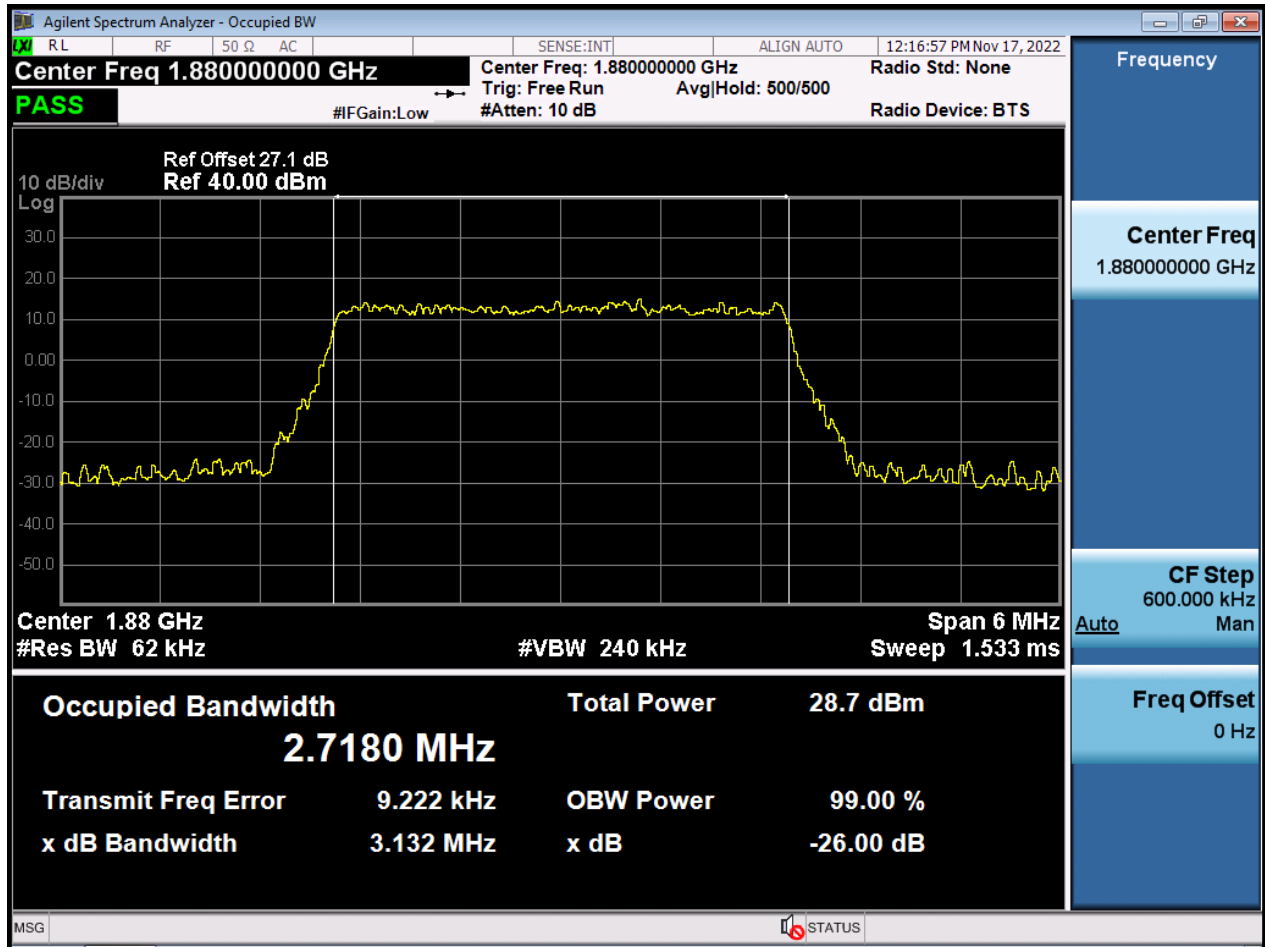
BW3 M_OBW_Middle Channel_16QAM_FullRB



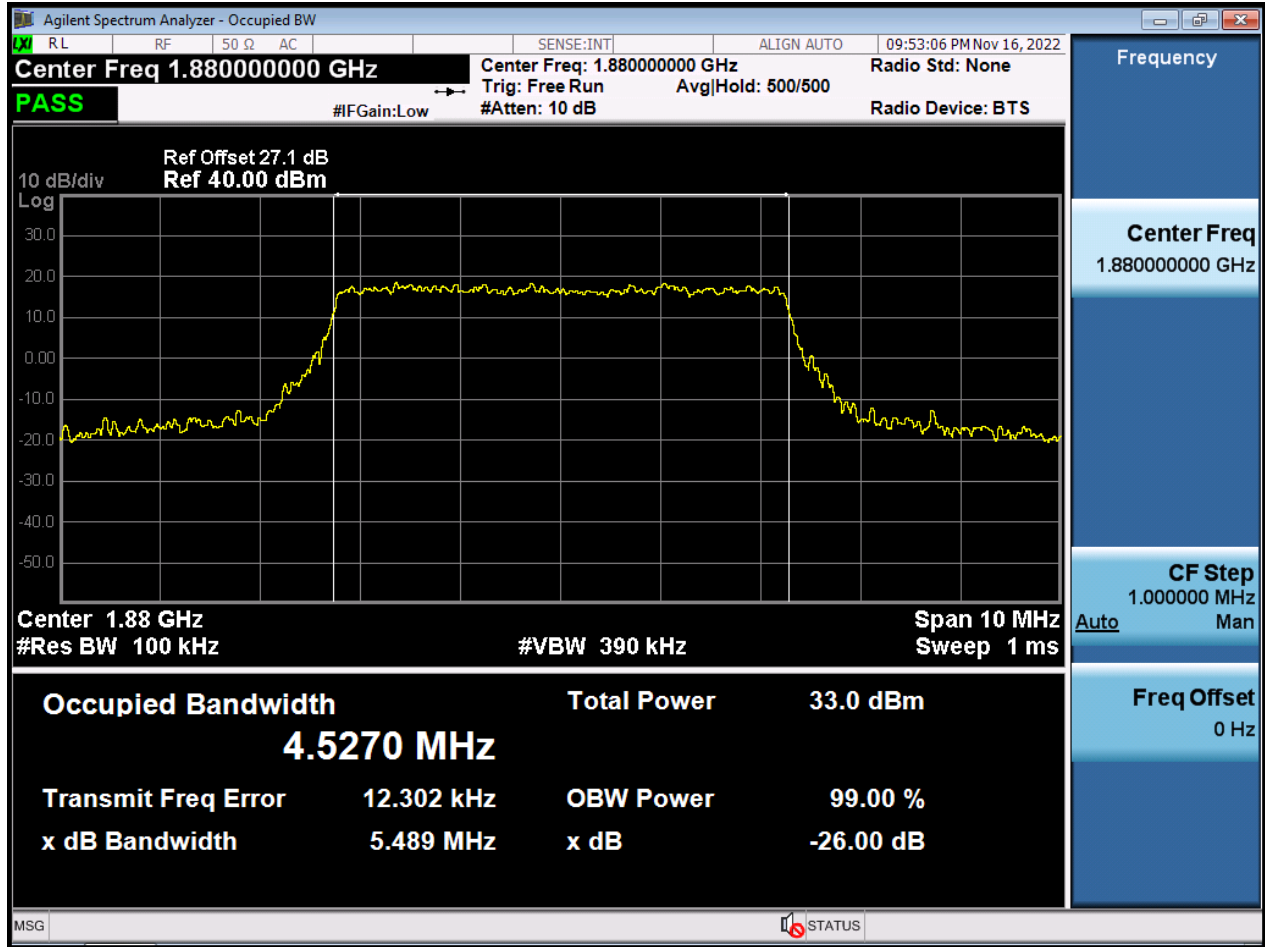
BW3 M_OBW_Middle Channel_64QAM_FullRB



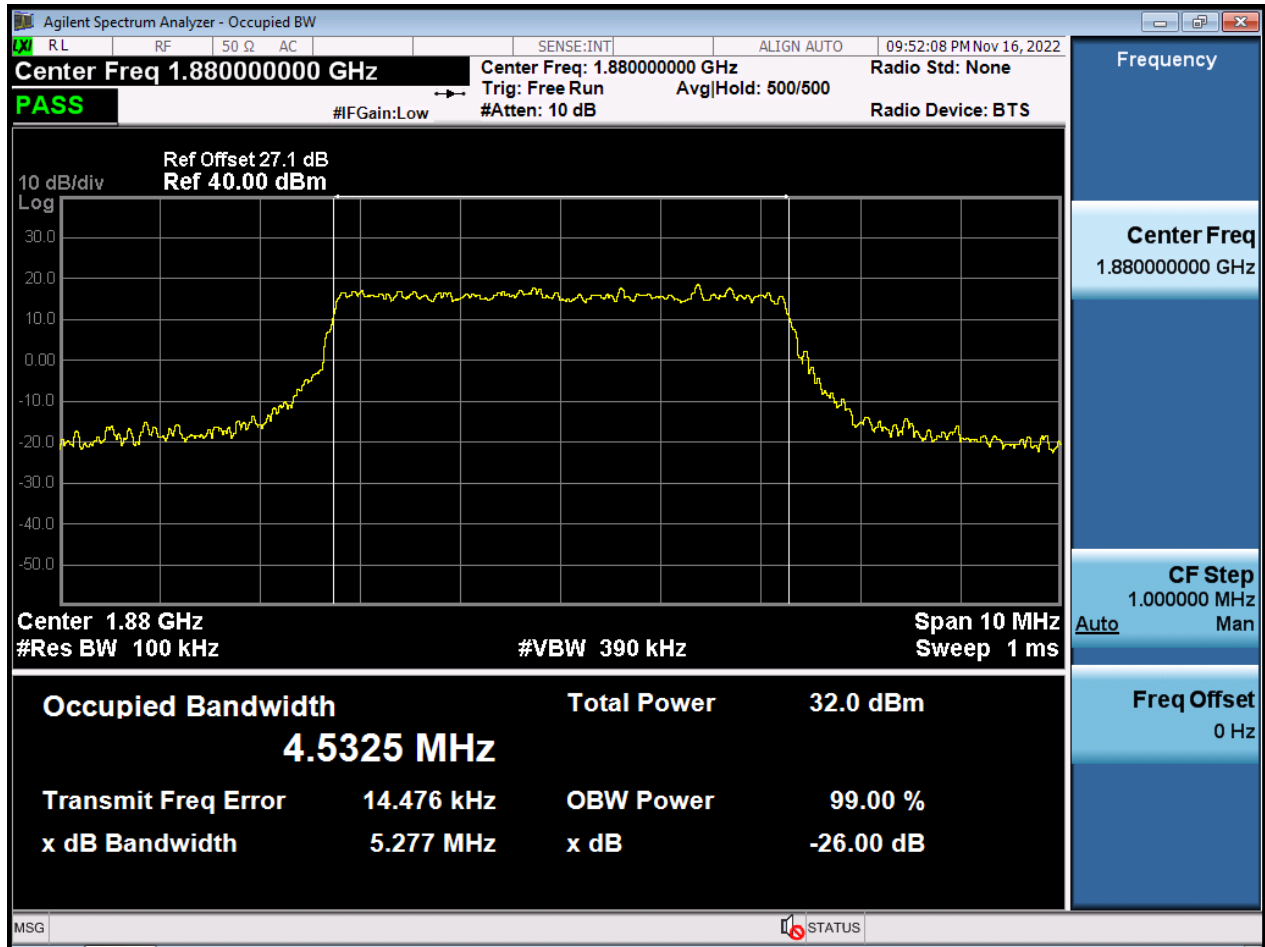
BW3 M_OBW_Middle Channel_256QAM_FullIRB



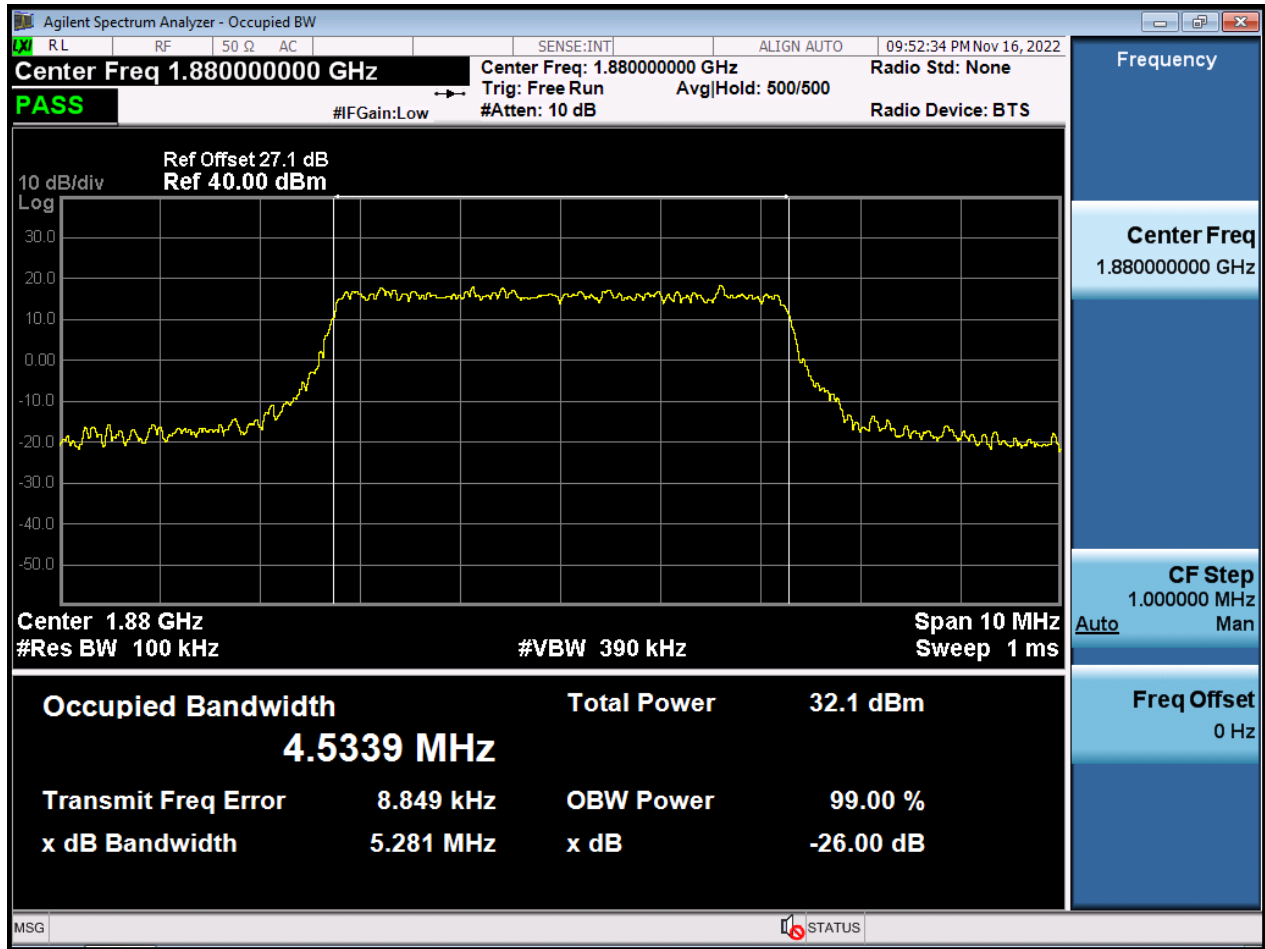
BW5 M_OBW_Middle Channel_QPSK_FullIRB



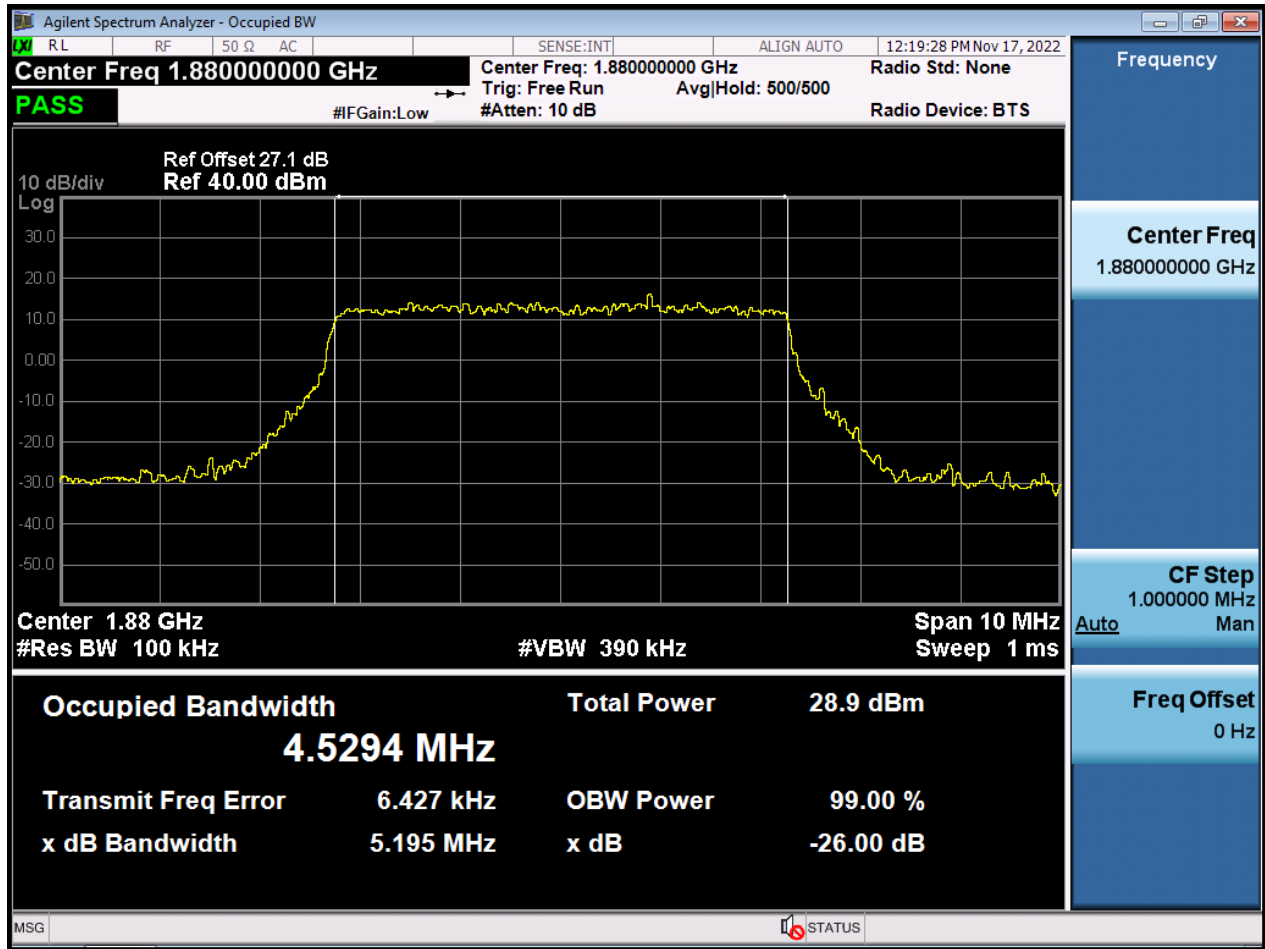
BW5 M_OBW_Middle Channel_16QAM_FullRB



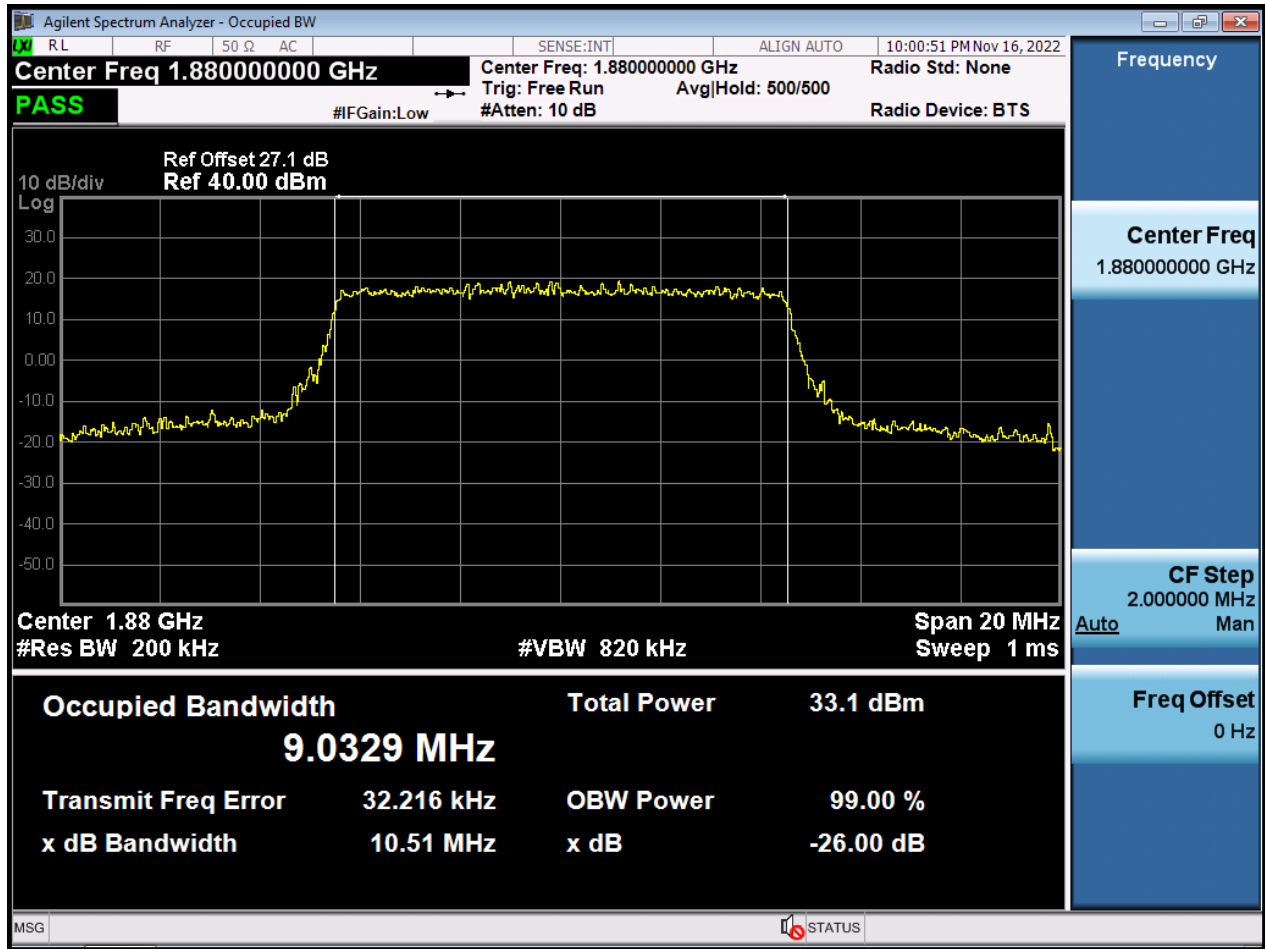
BW5 M_OBW_Middle Channel_64QAM_FullRB



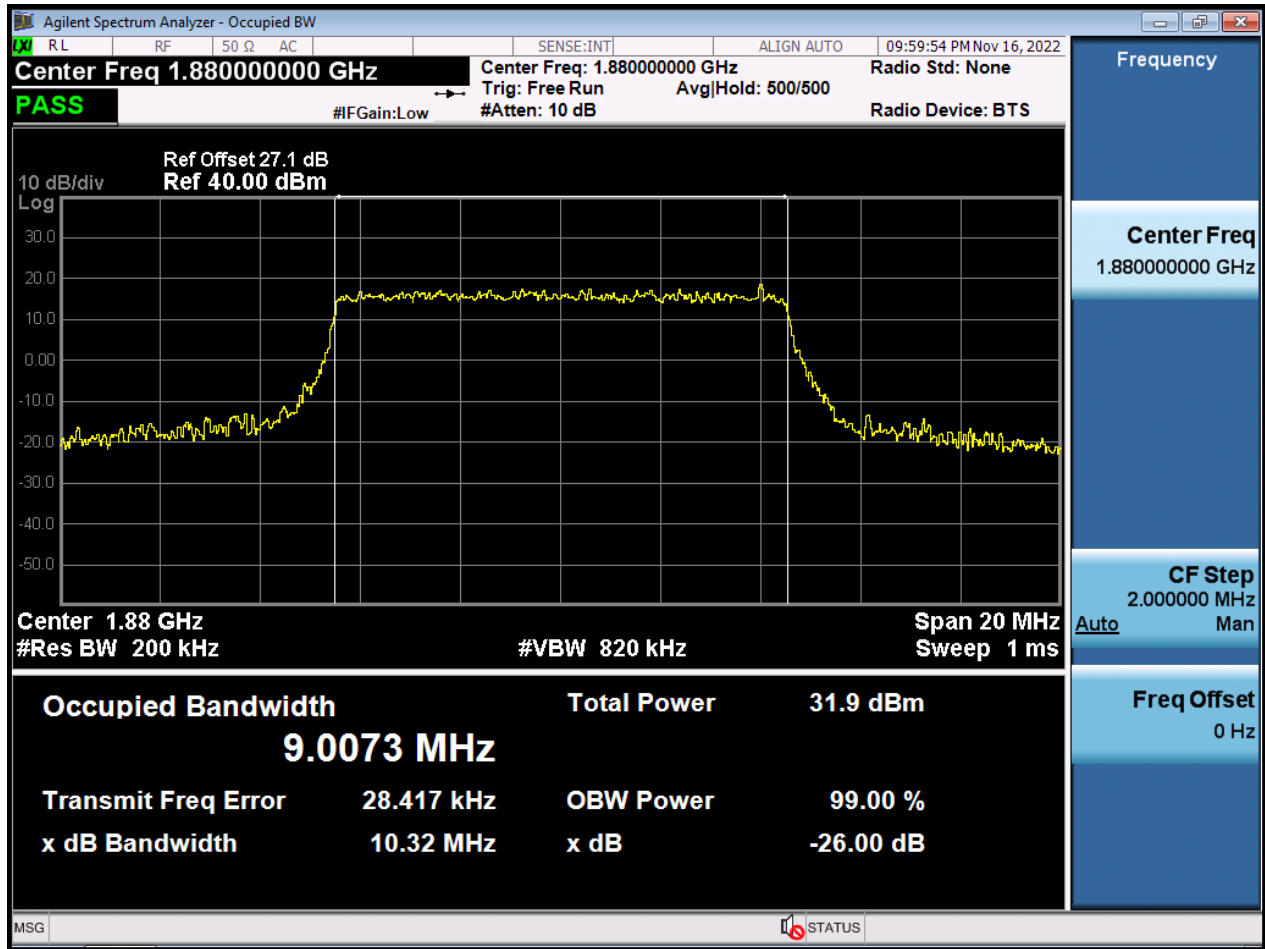
BW5 M_OBW_Middle Channel_256QAM_FullRB



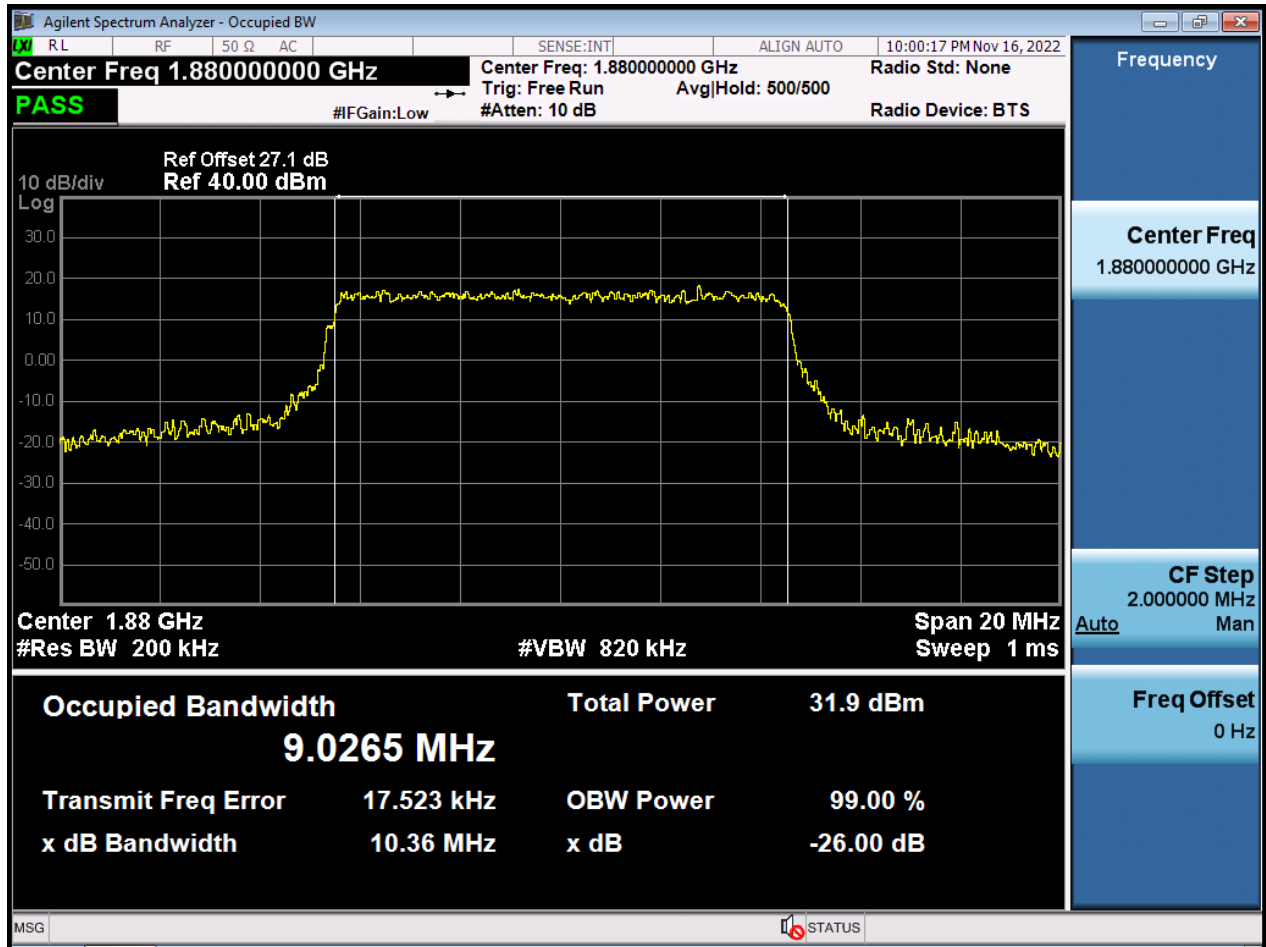
BW10 M_OBW_Middle Channel_QPSK_FullRB



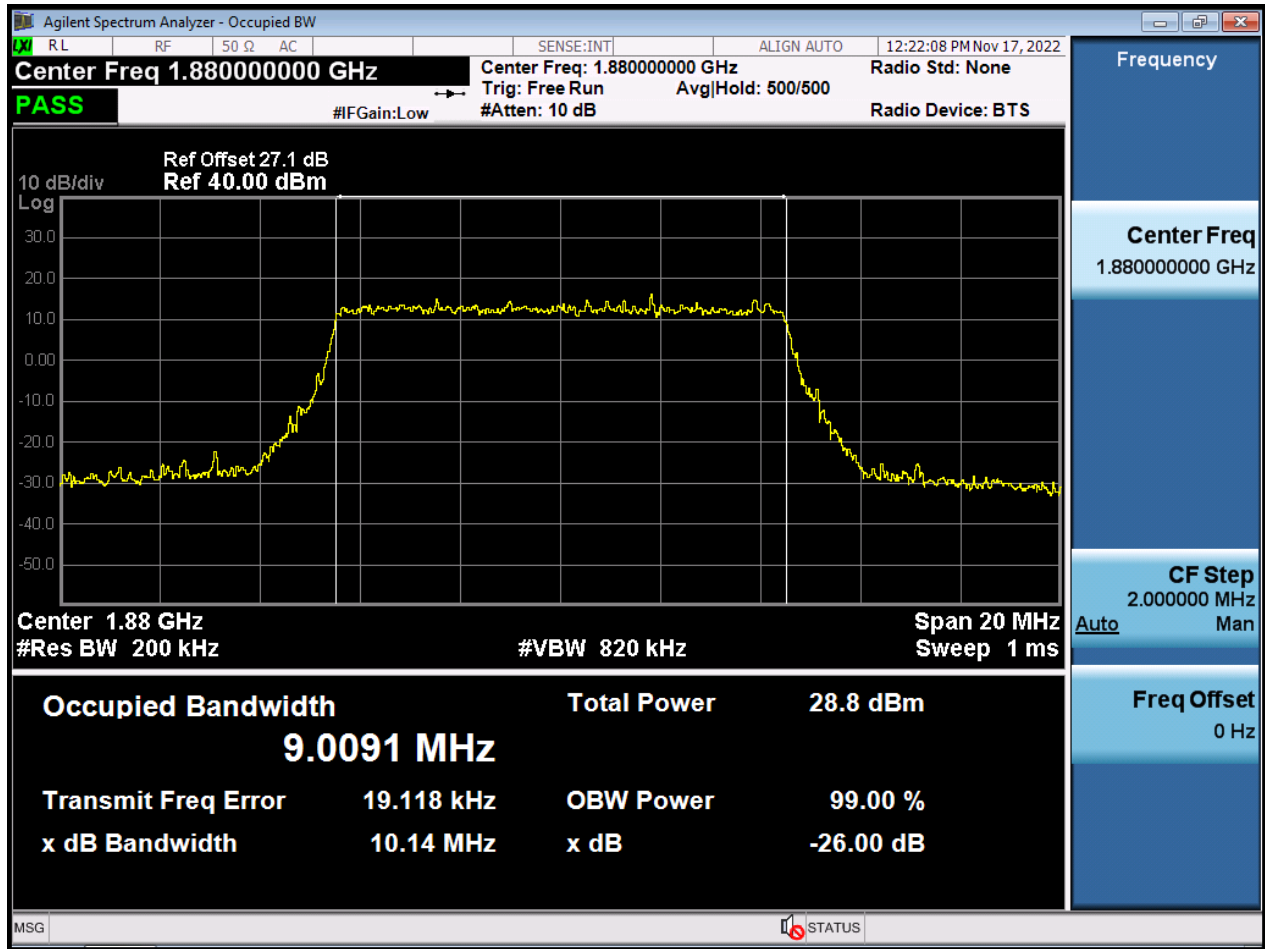
BW10 M_OBW_Middle Channel_16QAM_FullIRB



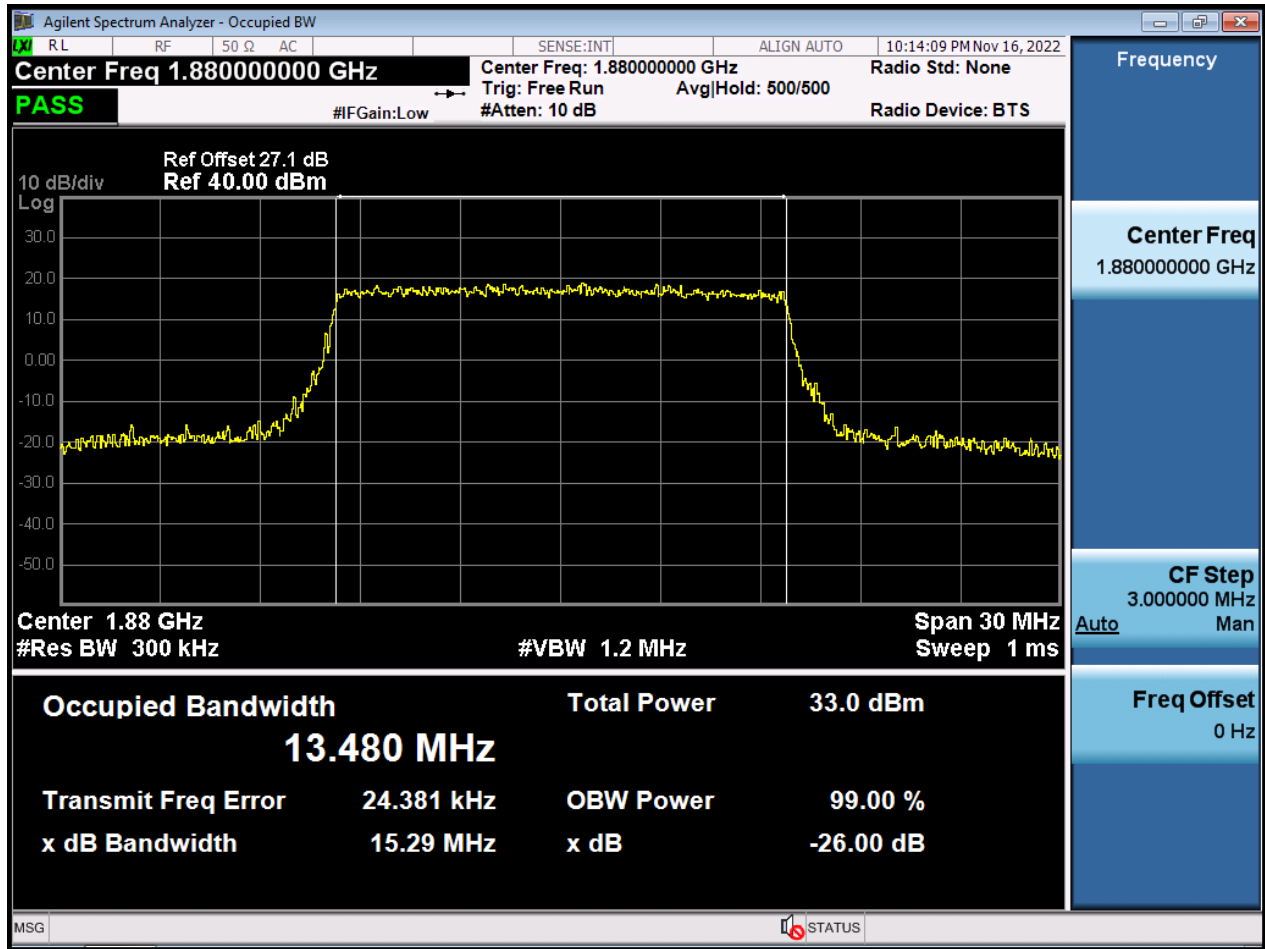
BW10 M_OBW_Middle Channel_64QAM_FullIRB



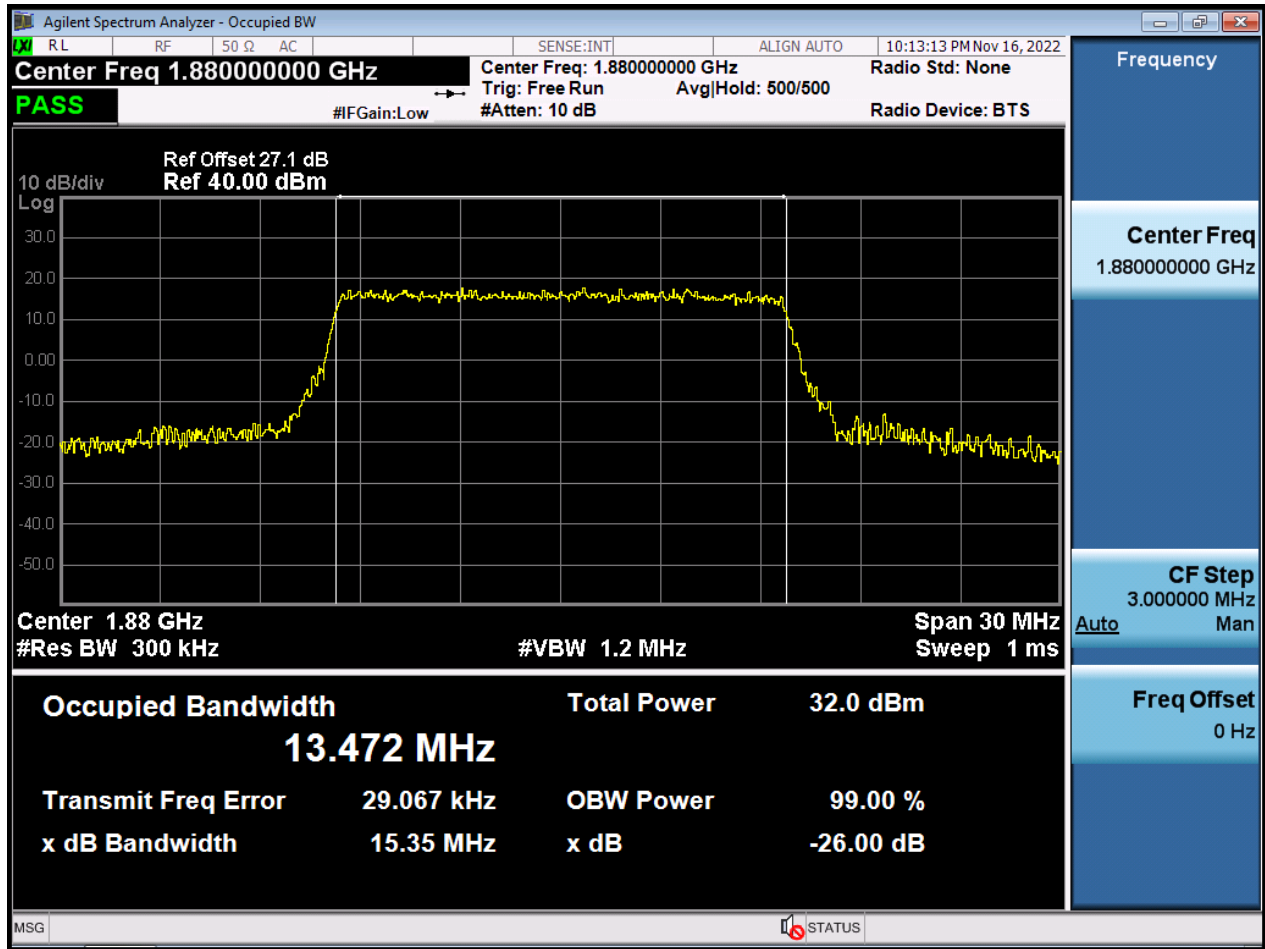
BW10 M_OBW_Middle Channel_256QAM_FullIRB



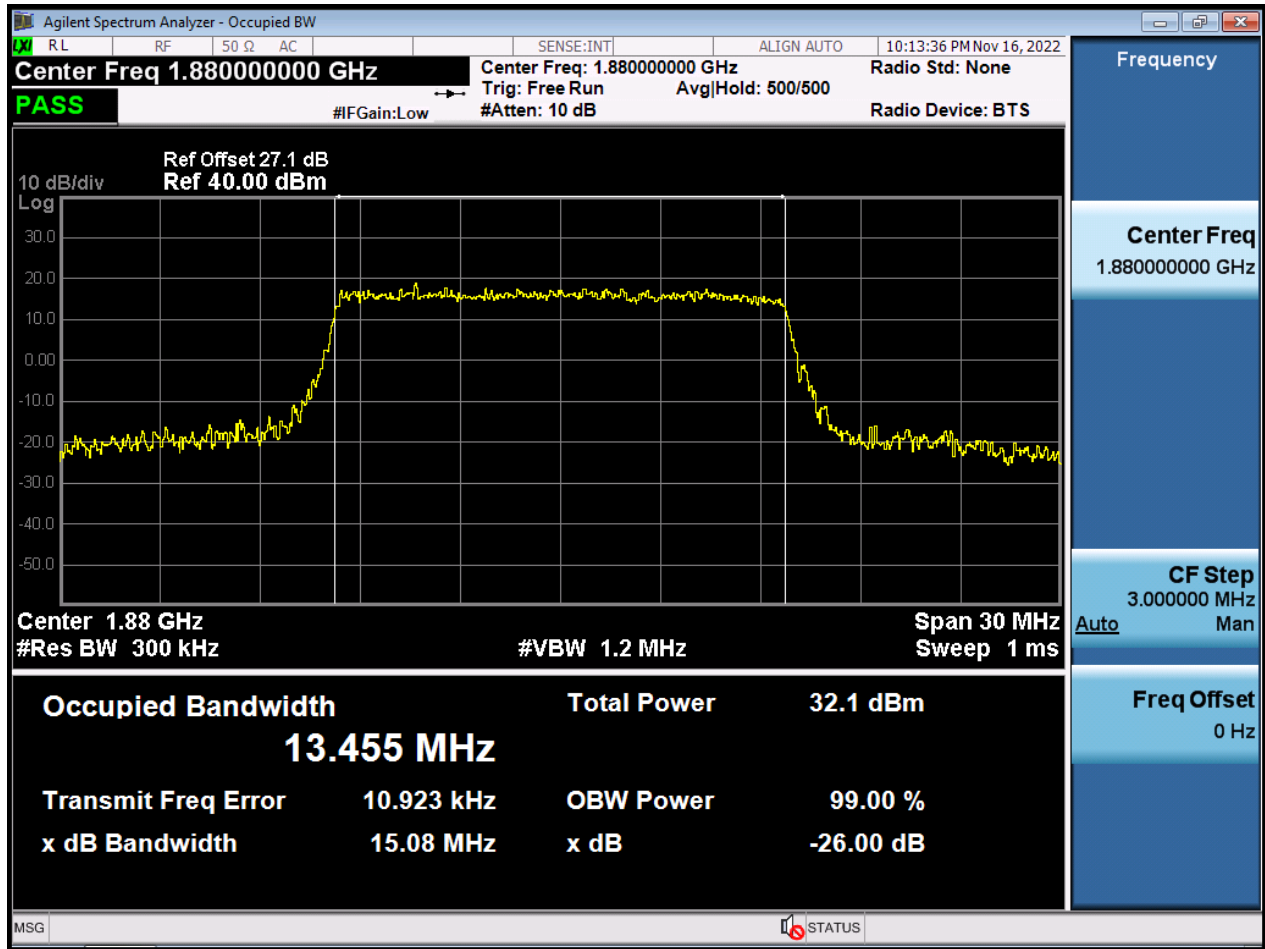
BW15 M_OBW_Middle Channel_QPSK_FullRB



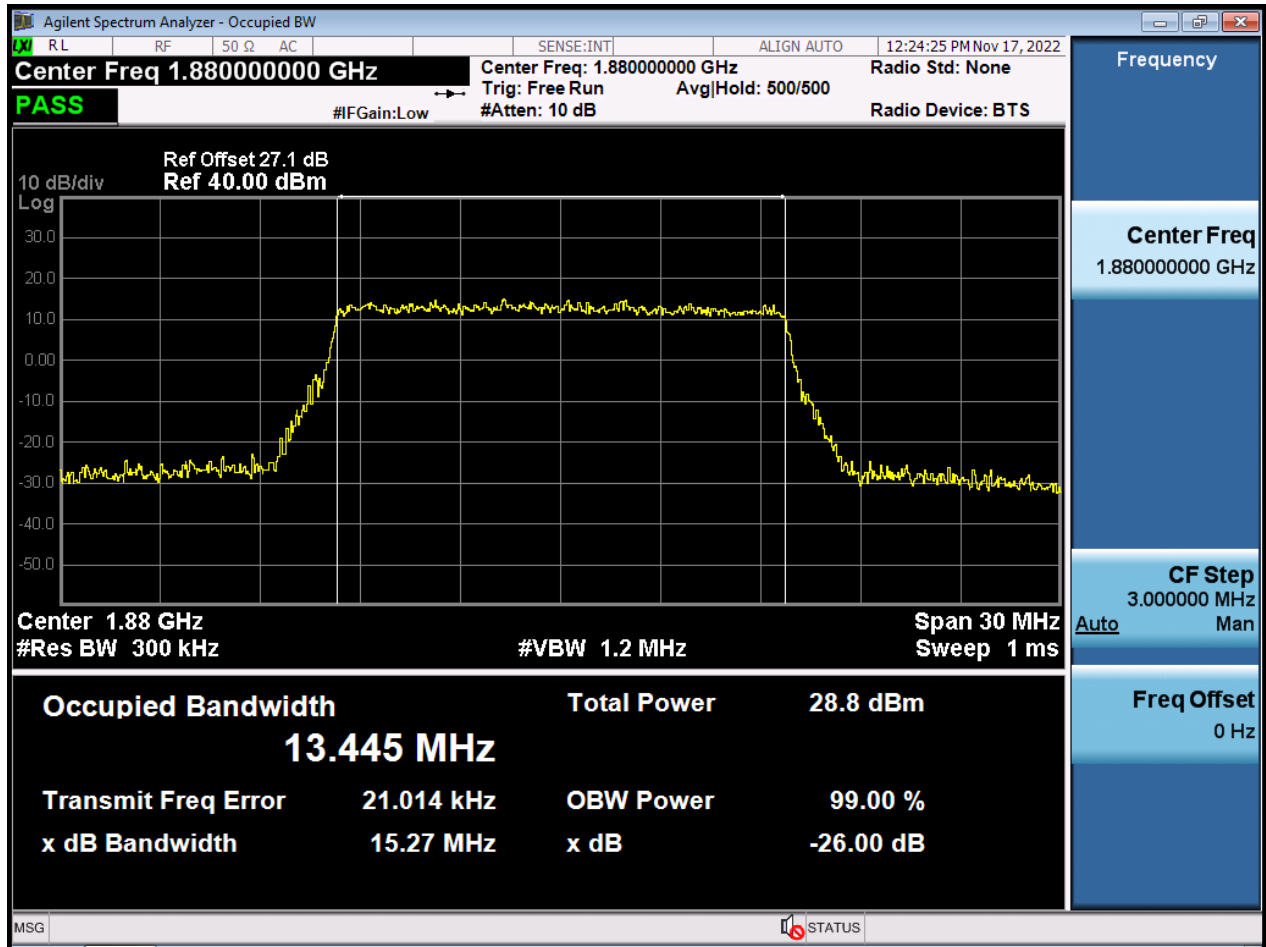
BW15 M_OBW_Middle Channel_16QAM_FullIRB



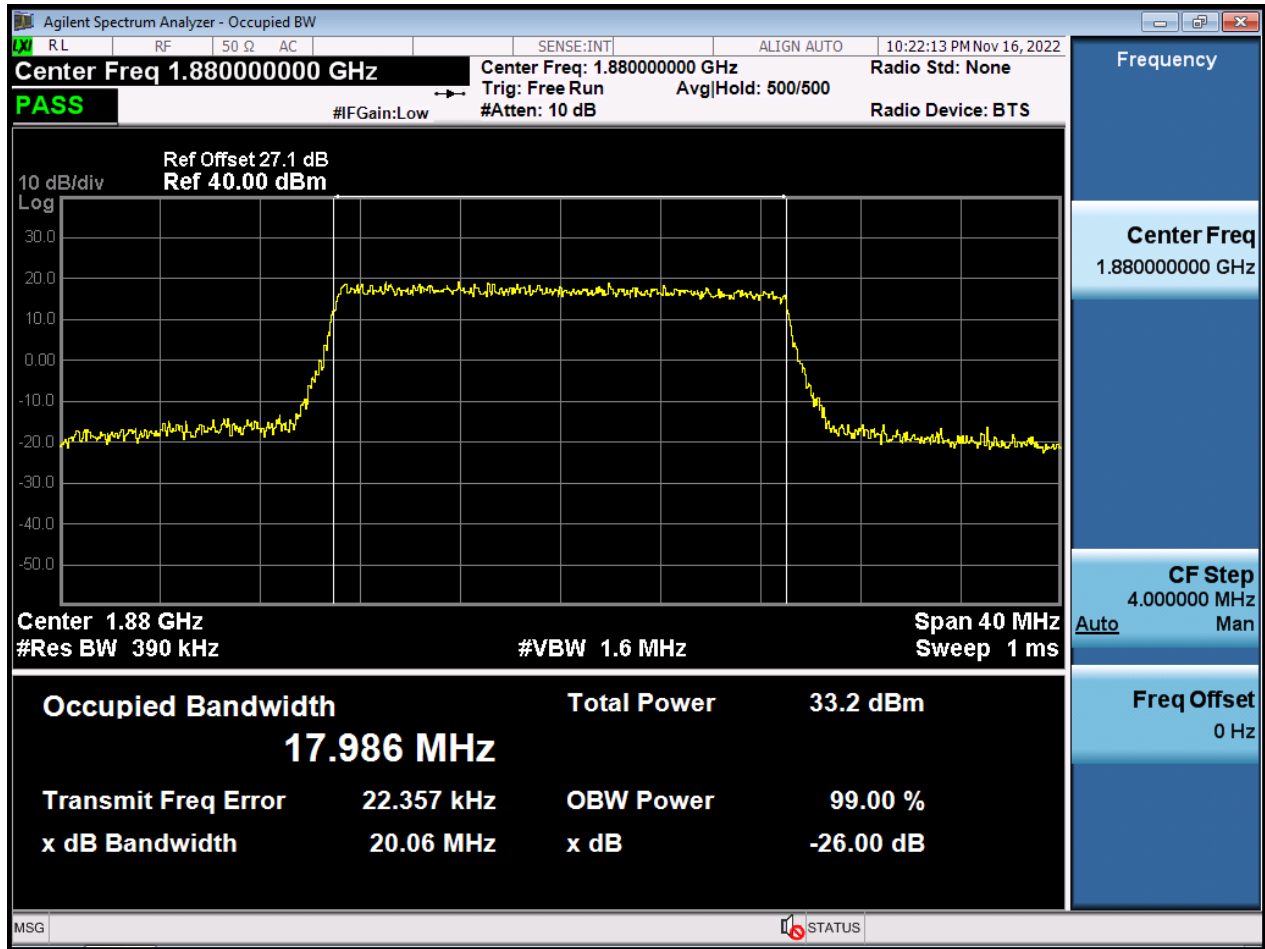
BW15 M_OBW_Middle Channel_64QAM_FullIRB



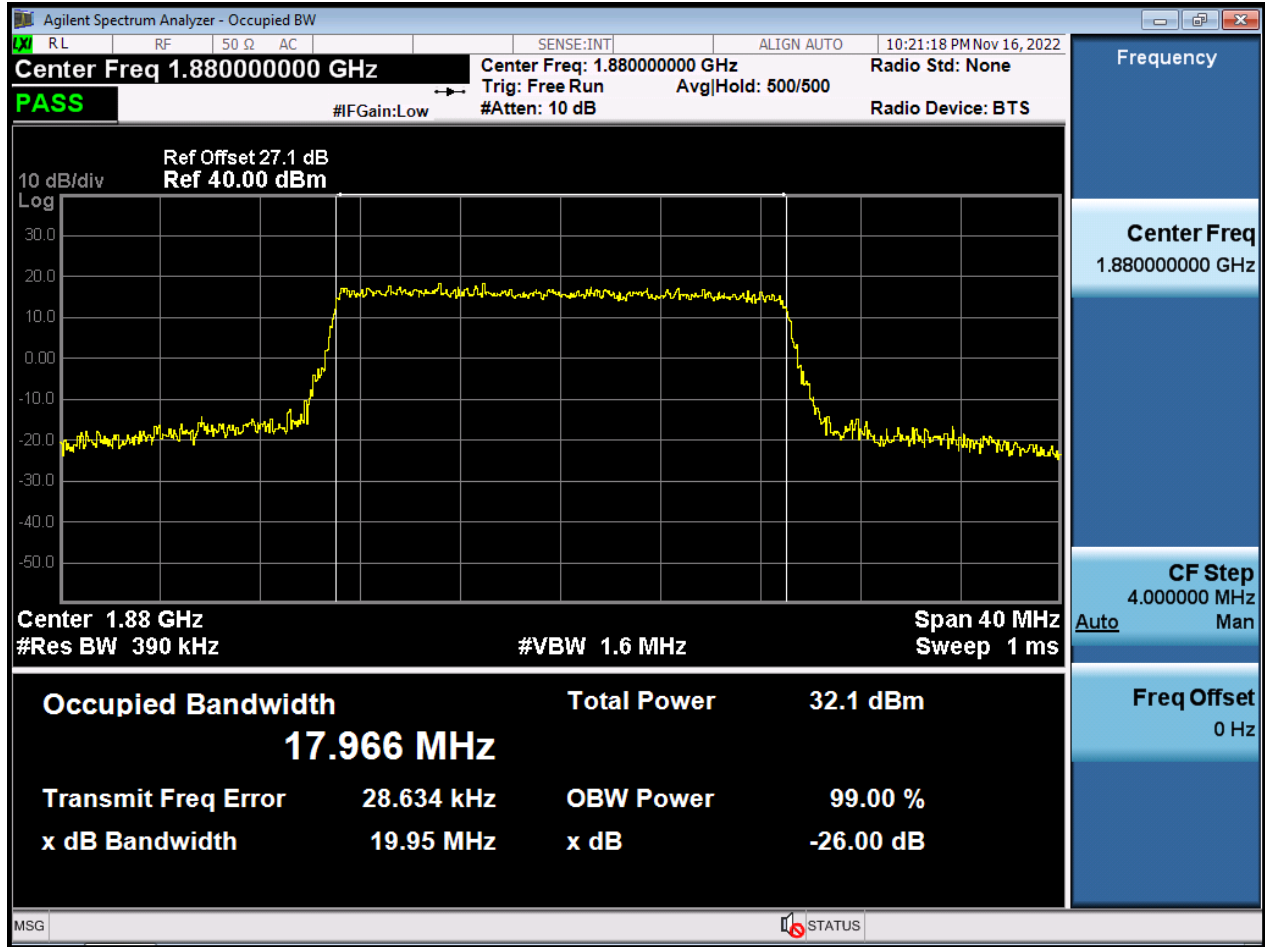
BW15 M_OBW_Middle Channel_256QAM_FullIRB



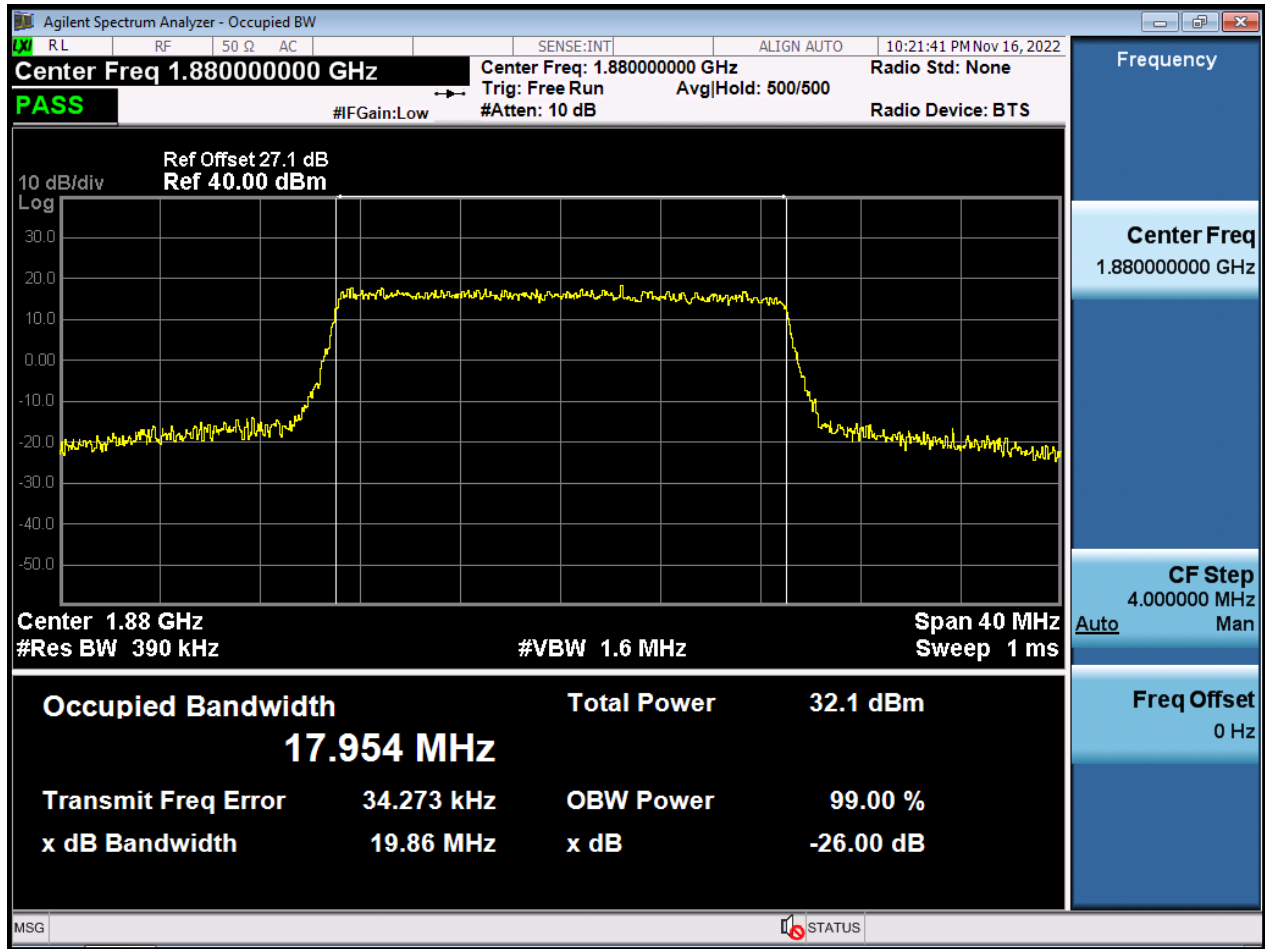
BW20 M_OBW_Middle Channel_QPSK_FullIRB



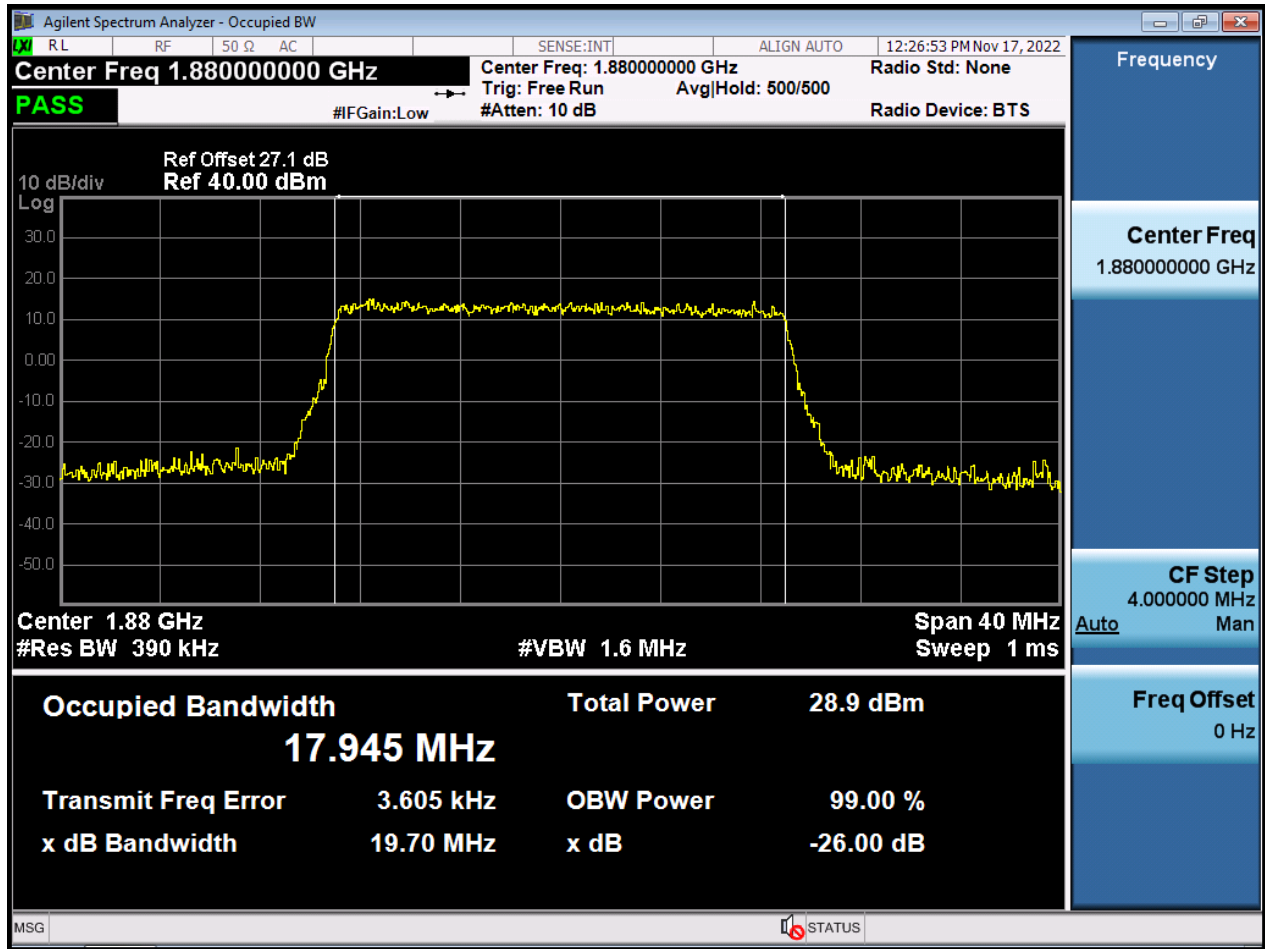
BW20 M_OBW_Middle Channel_16QAM_FullIRB



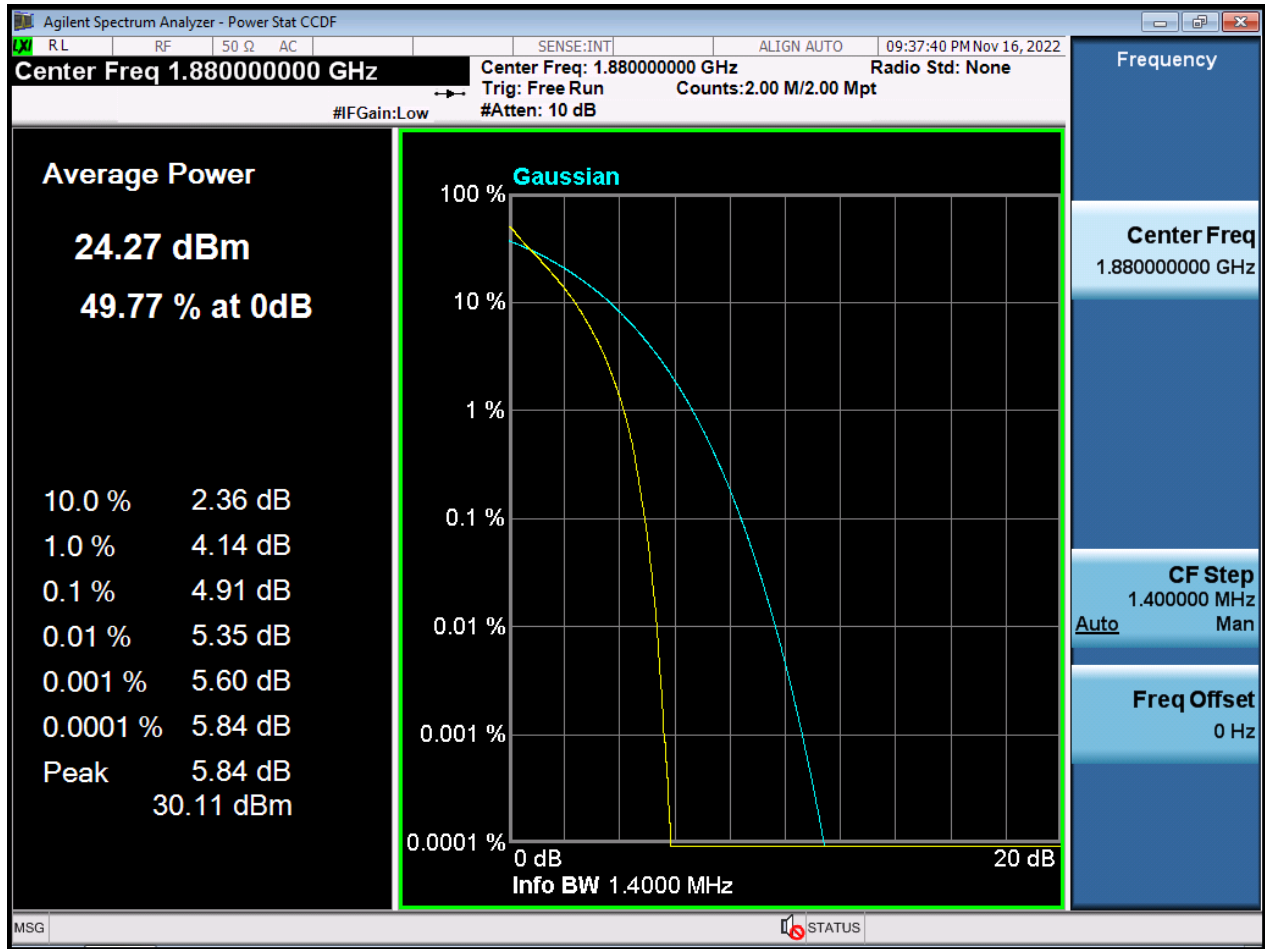
BW20 M_OBW_Middle Channel_64QAM_FullIRB



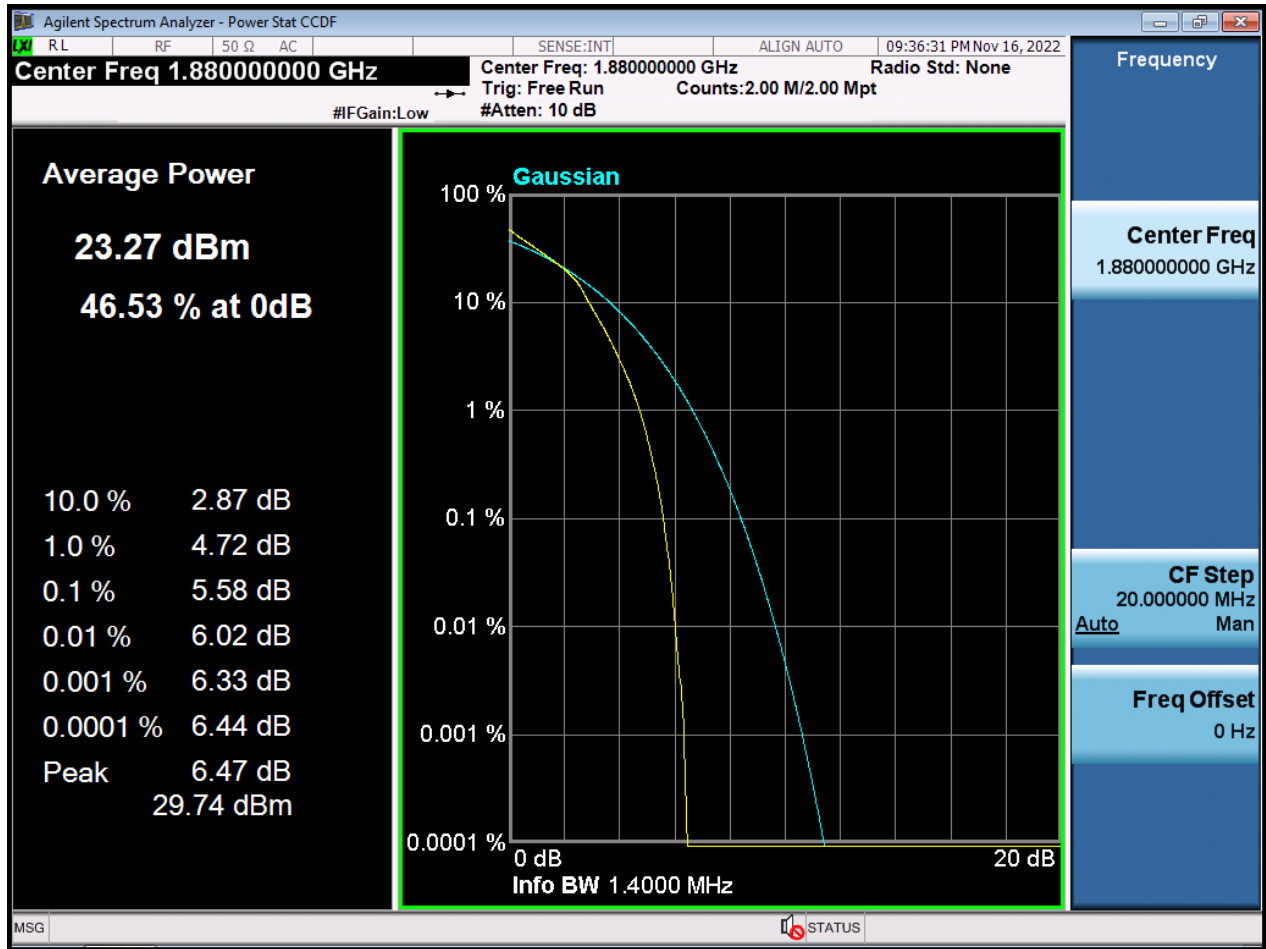
BW20 M_OBW_Middle Channel_256QAM_FullIRB



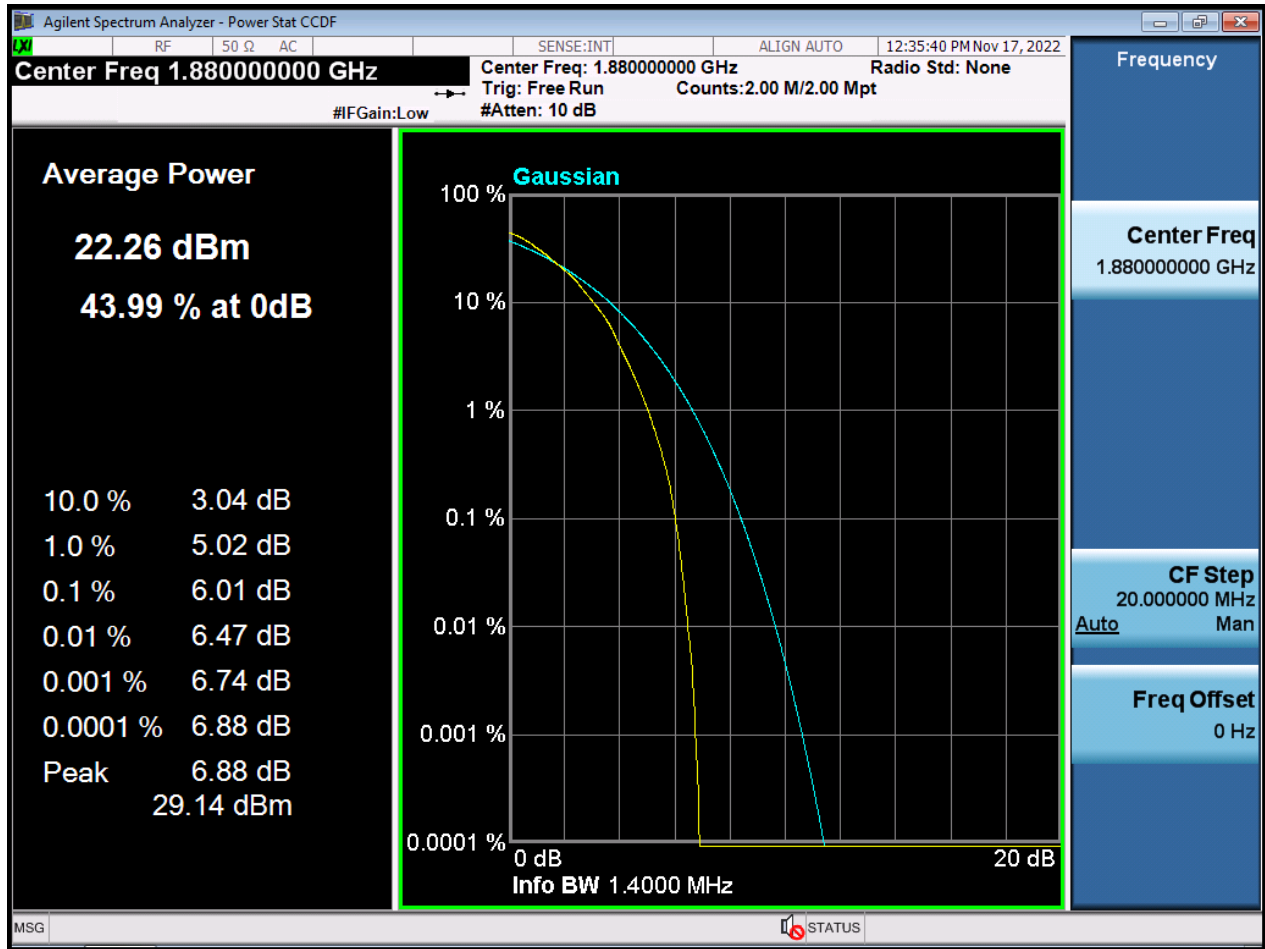
BW1.4 M_PAR_Middle Channel_QPSK_FullRB



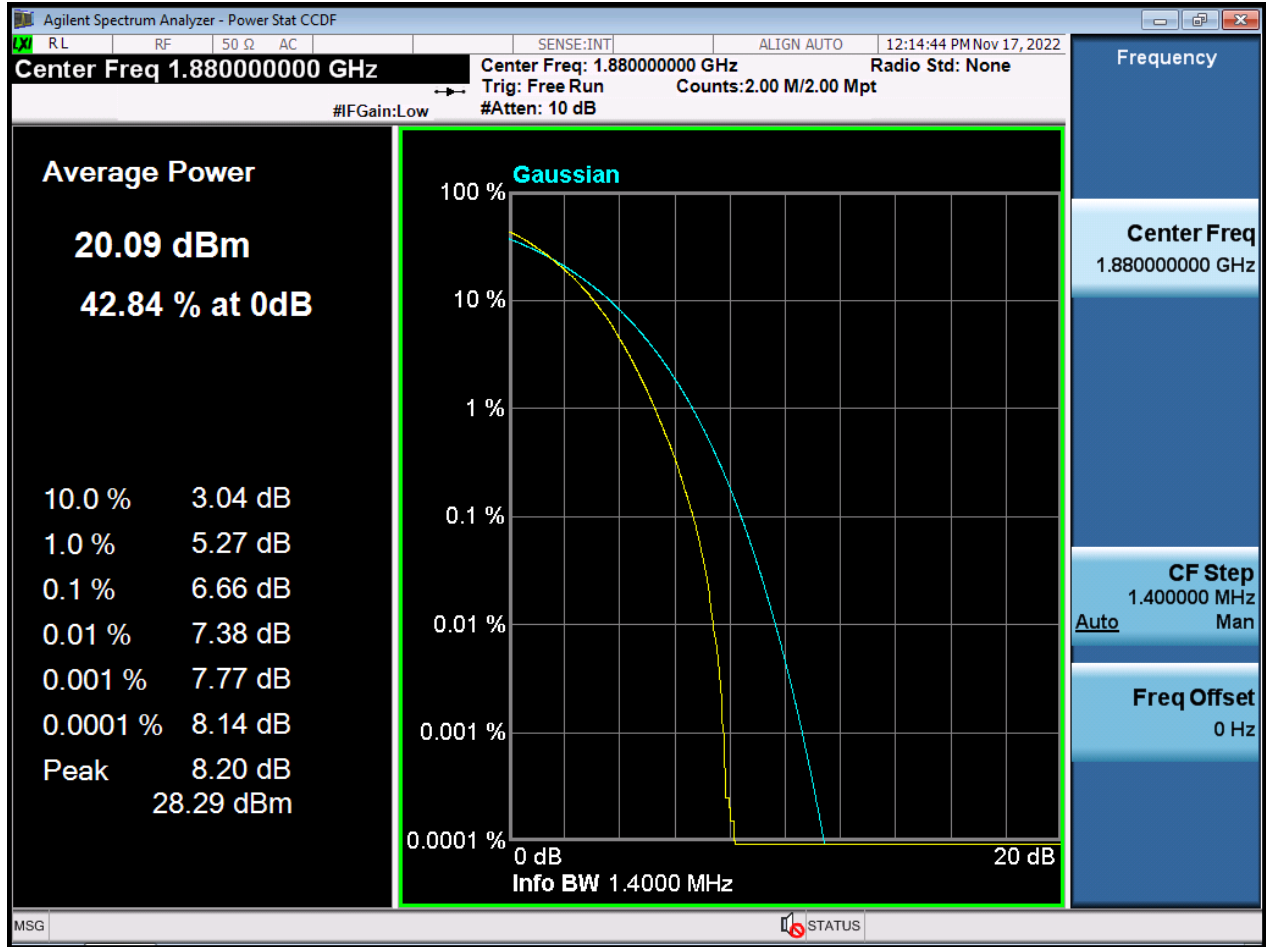
BW1.4 M_PAR_Middle Channel_16QAM_FullIRB



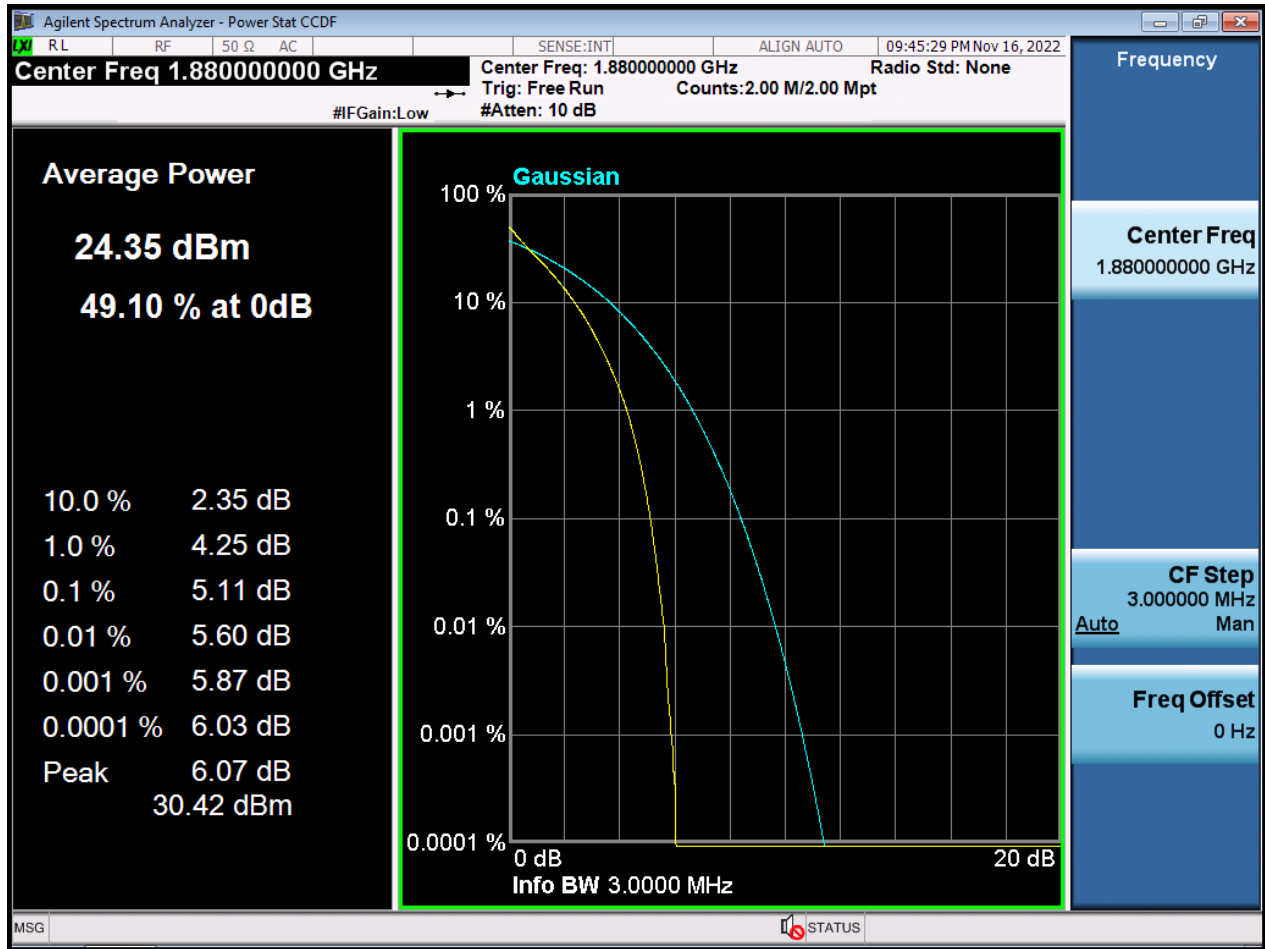
BW1.4 M_PAR_Middle Channel_64QAM_FullIRB



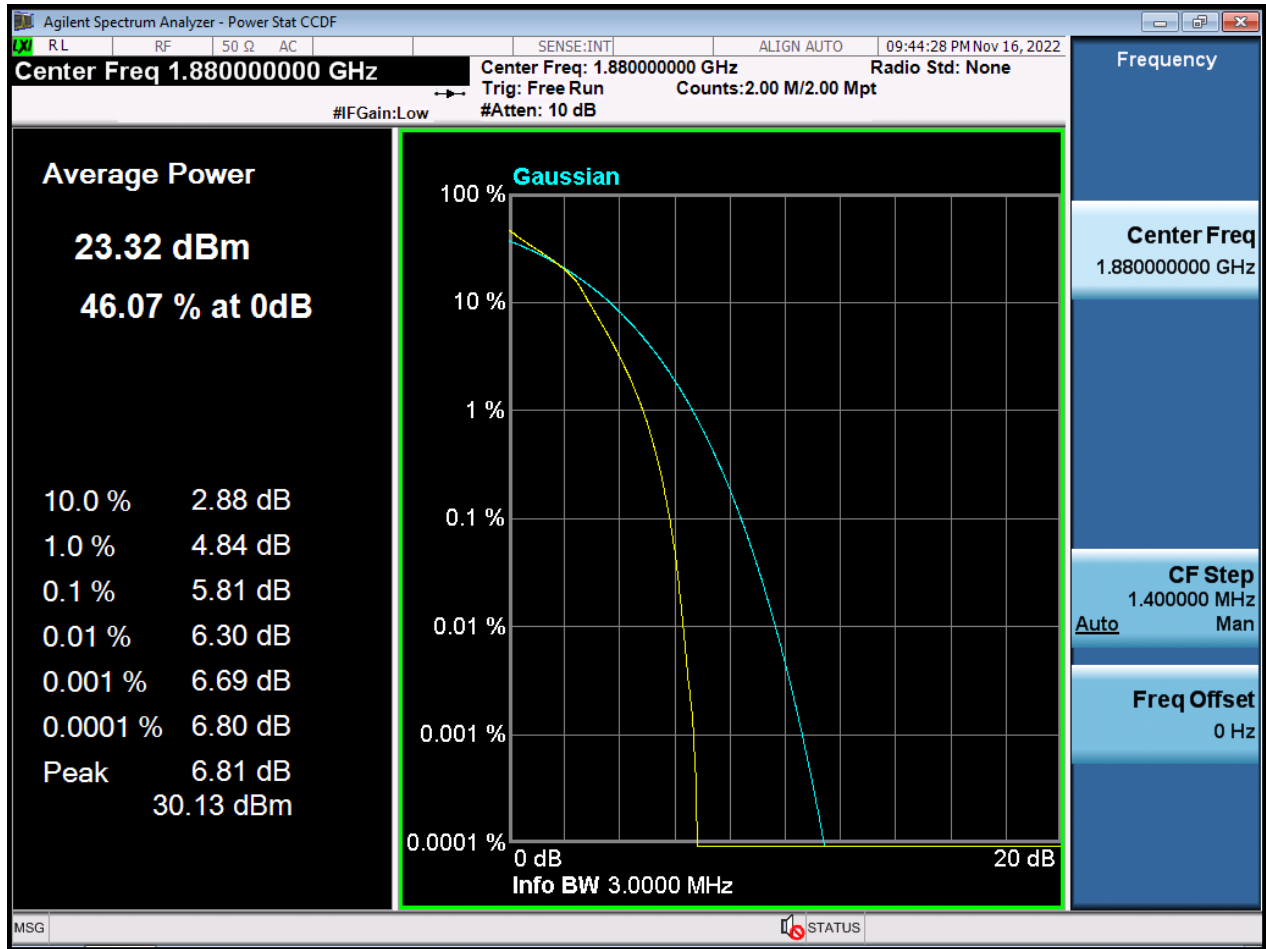
BW1.4 M_PAR_Middle Channel_256QAM_FullRB



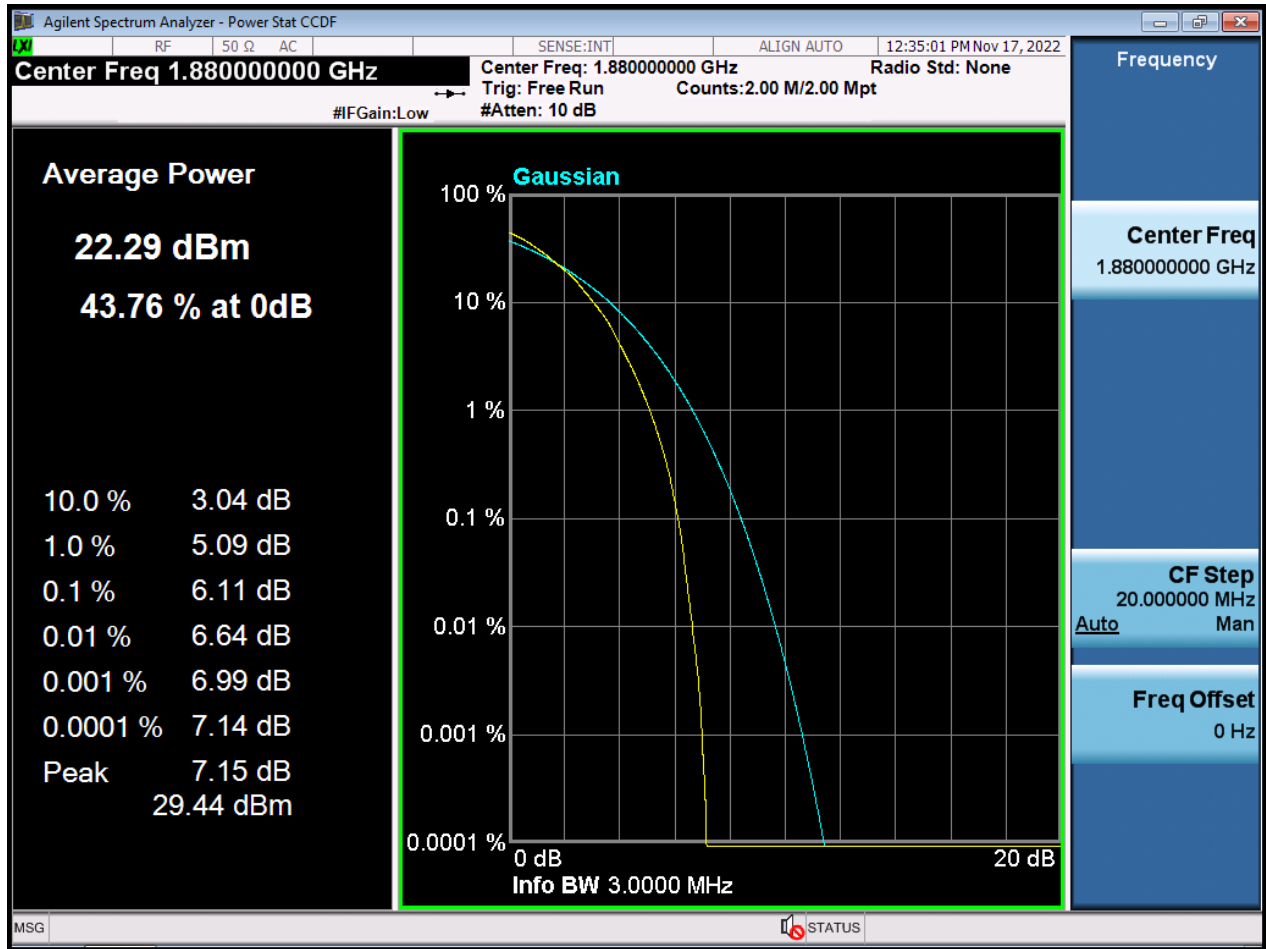
BW3 M_PAR_Middle Channel_QPSK_FullIRB



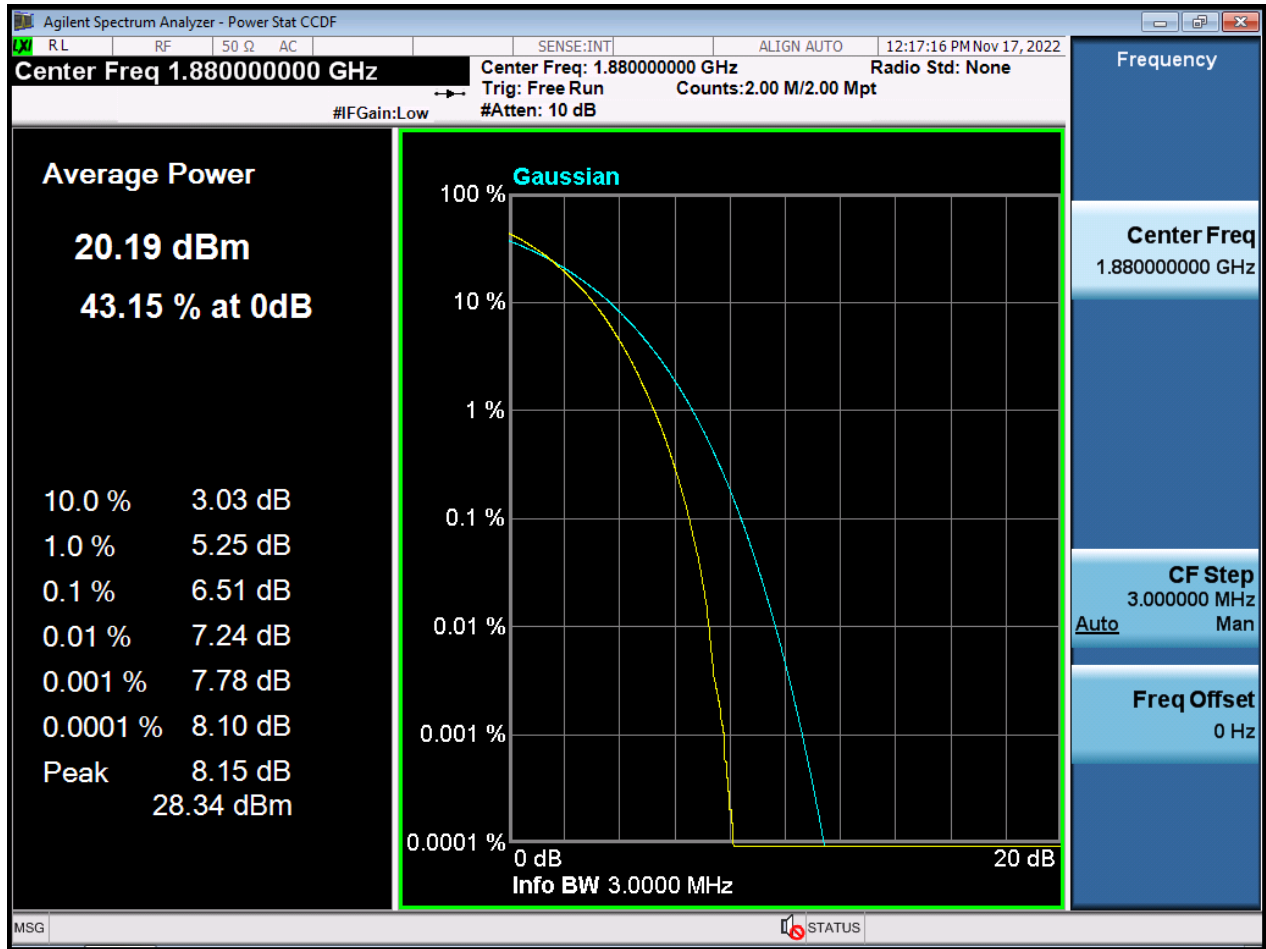
BW3 M_PAR_Middle Channel_16QAM_FullRB



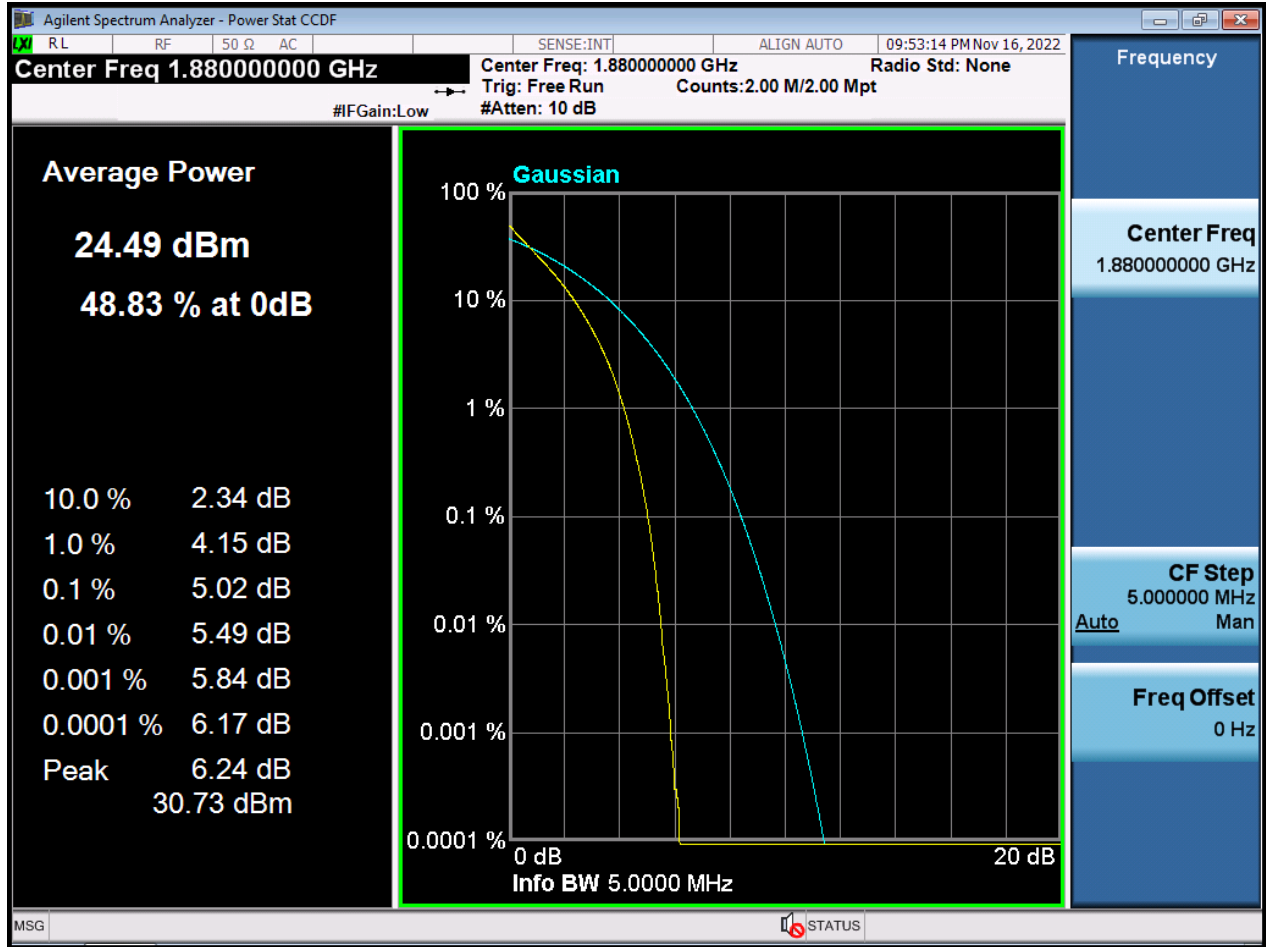
BW3 M_PAR_Middle Channel_64QAM_FullRB



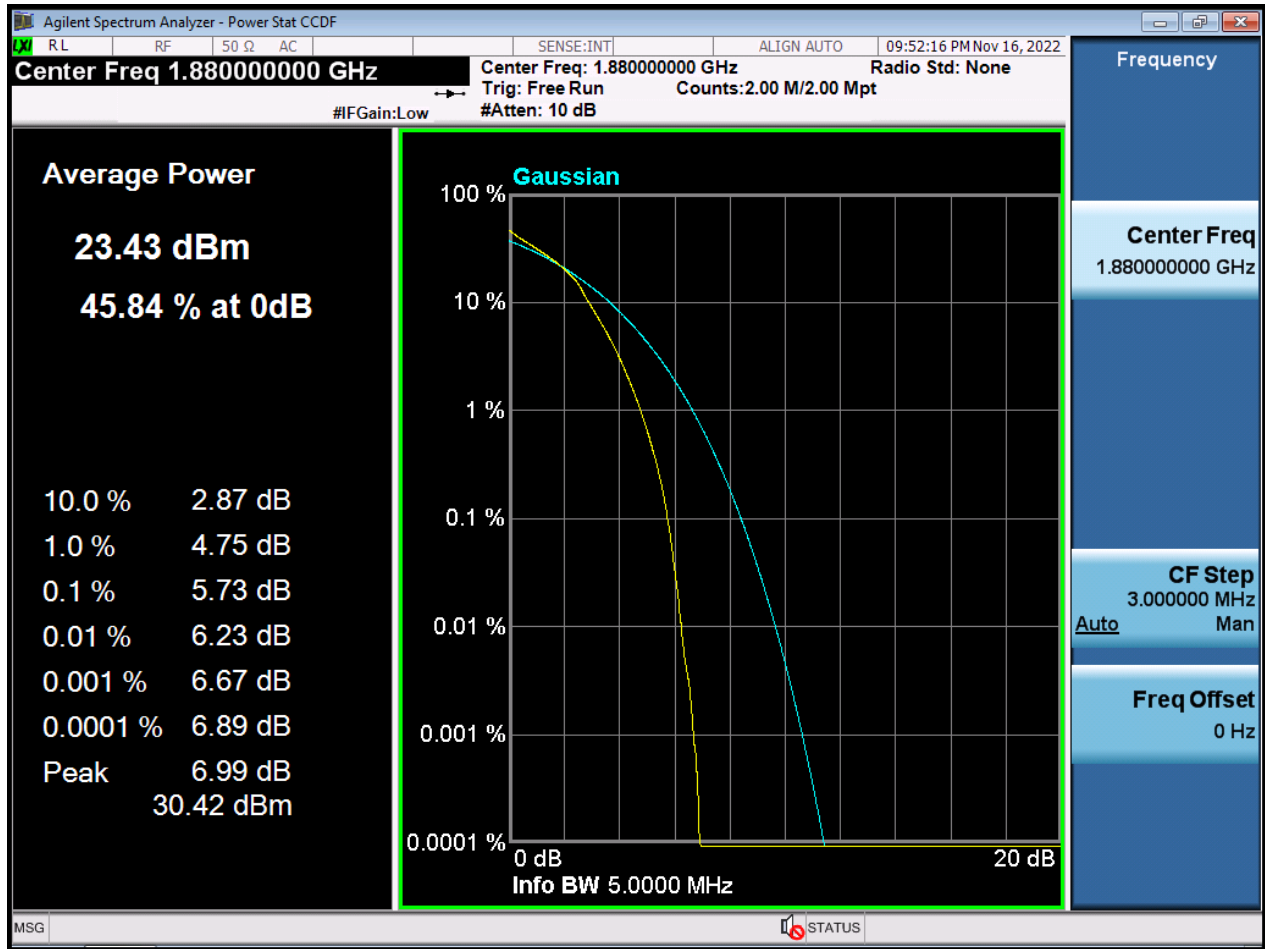
BW3 M_PAR_Middle Channel_256QAM_FullRB



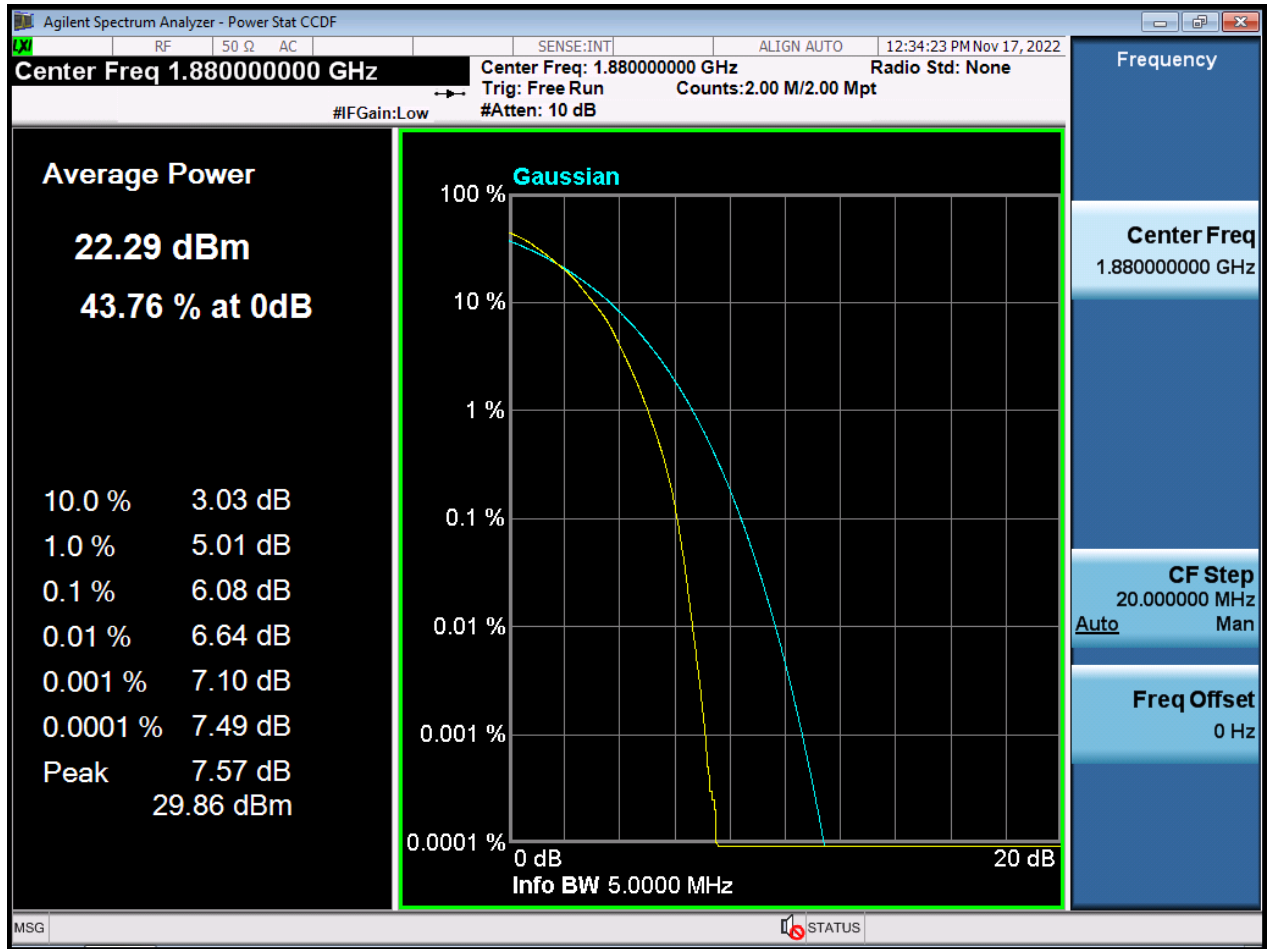
BW5 M_PAR_Middle Channel_QPSK_FullIRB



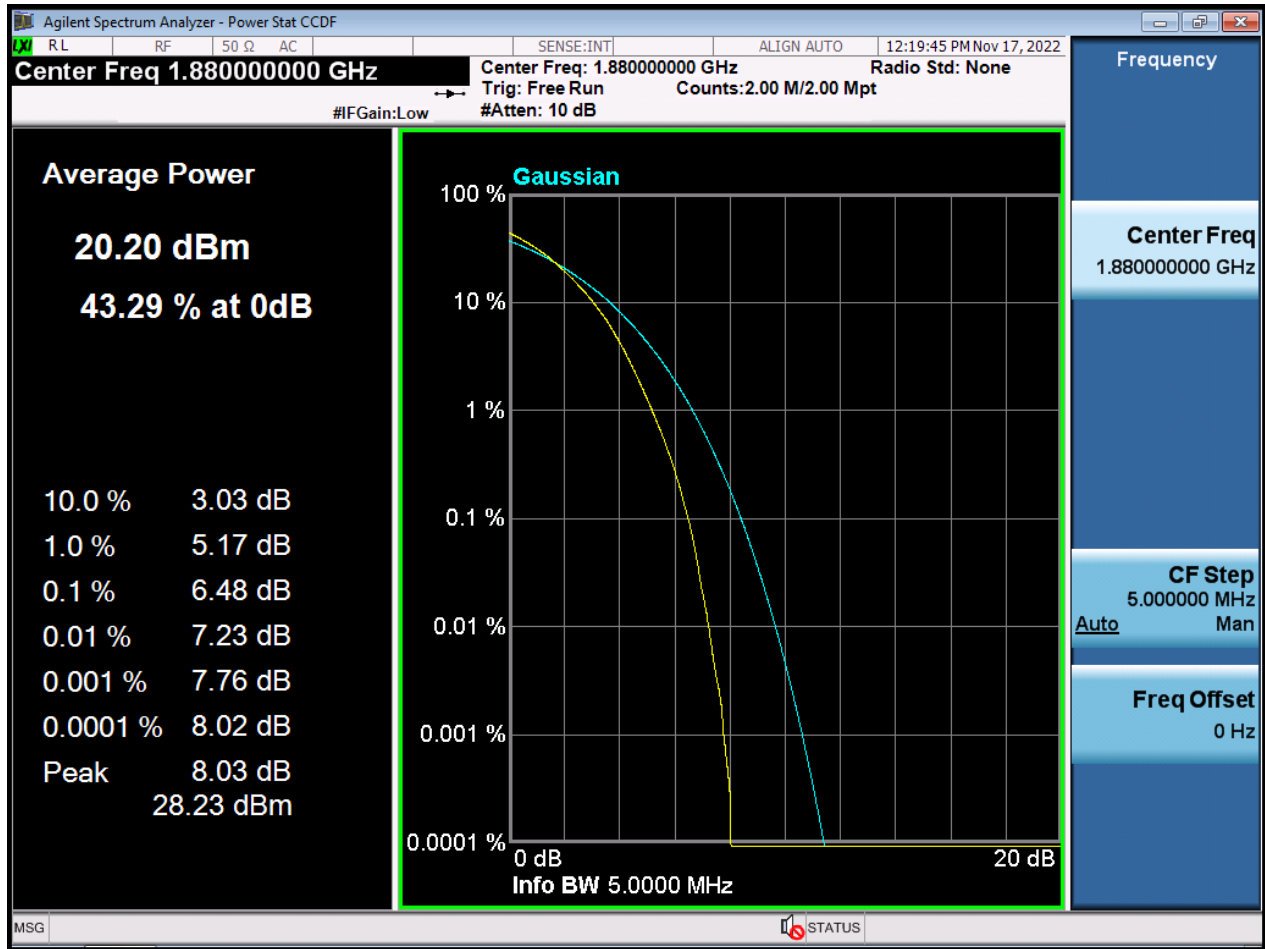
BW5 M_PAR_Middle Channel_16QAM_FullRB



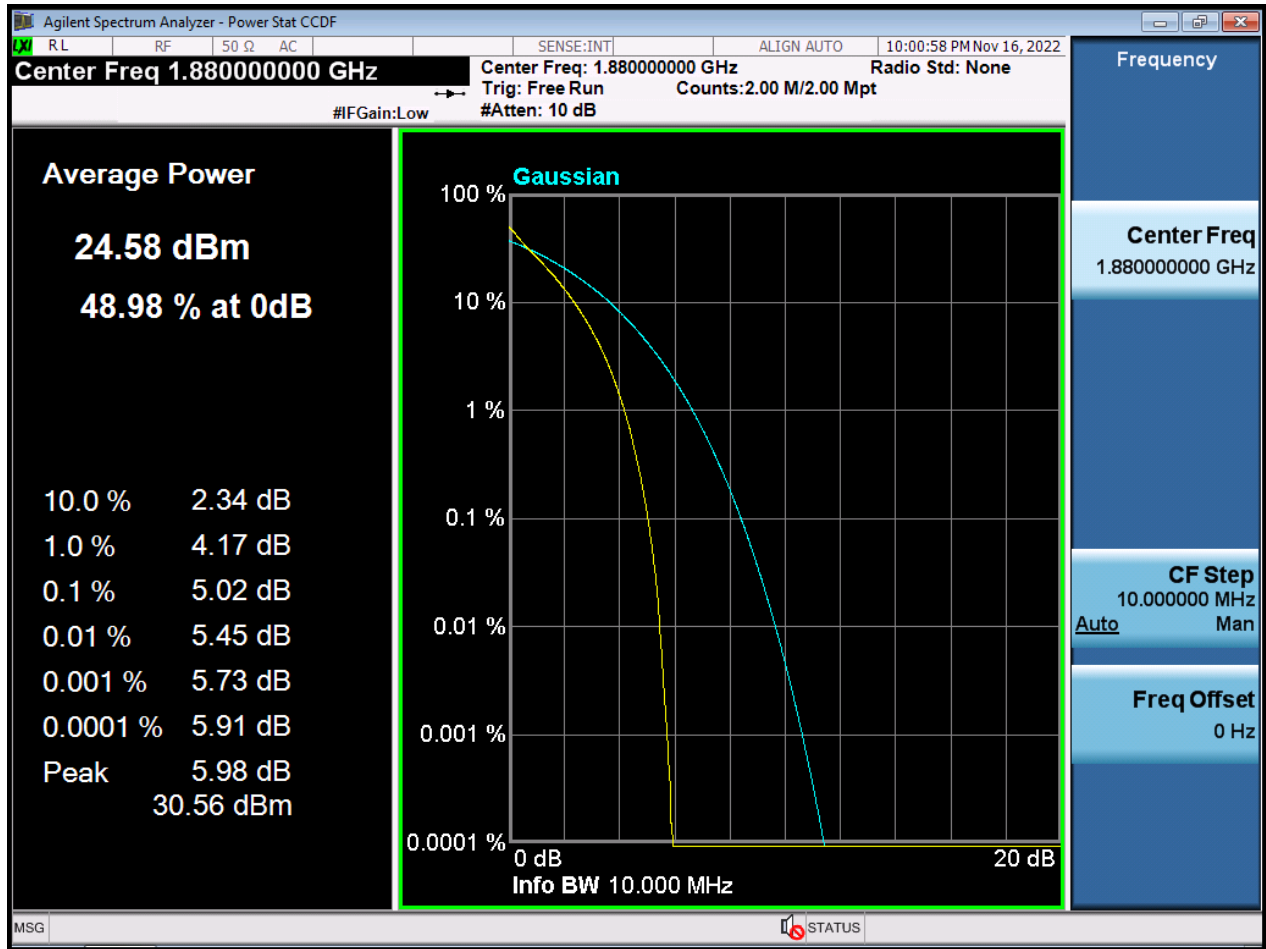
BW5 M_PAR_Middle Channel_64QAM_FullRB



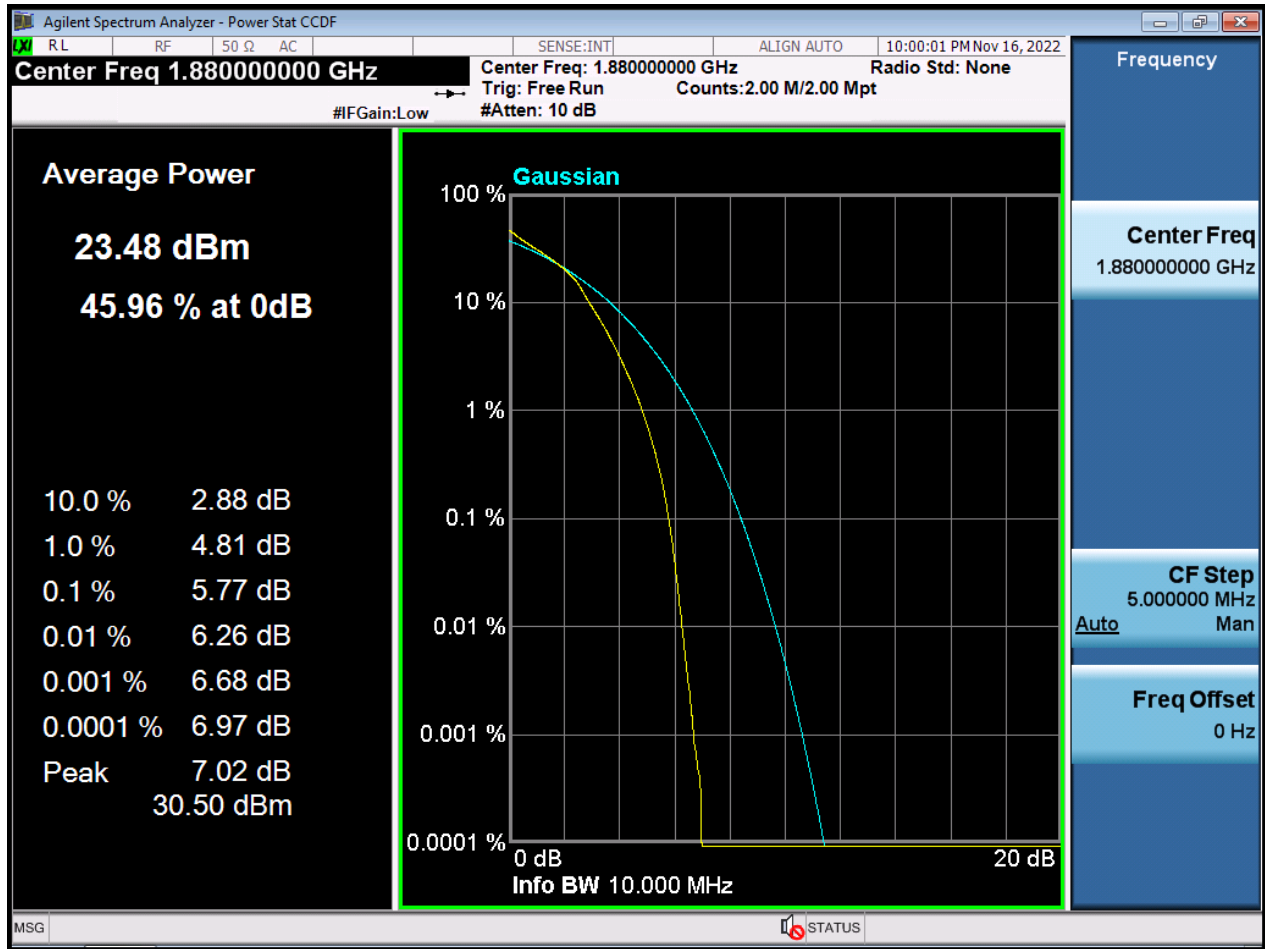
BW5 M_PAR_Middle Channel_256QAM_FullRB



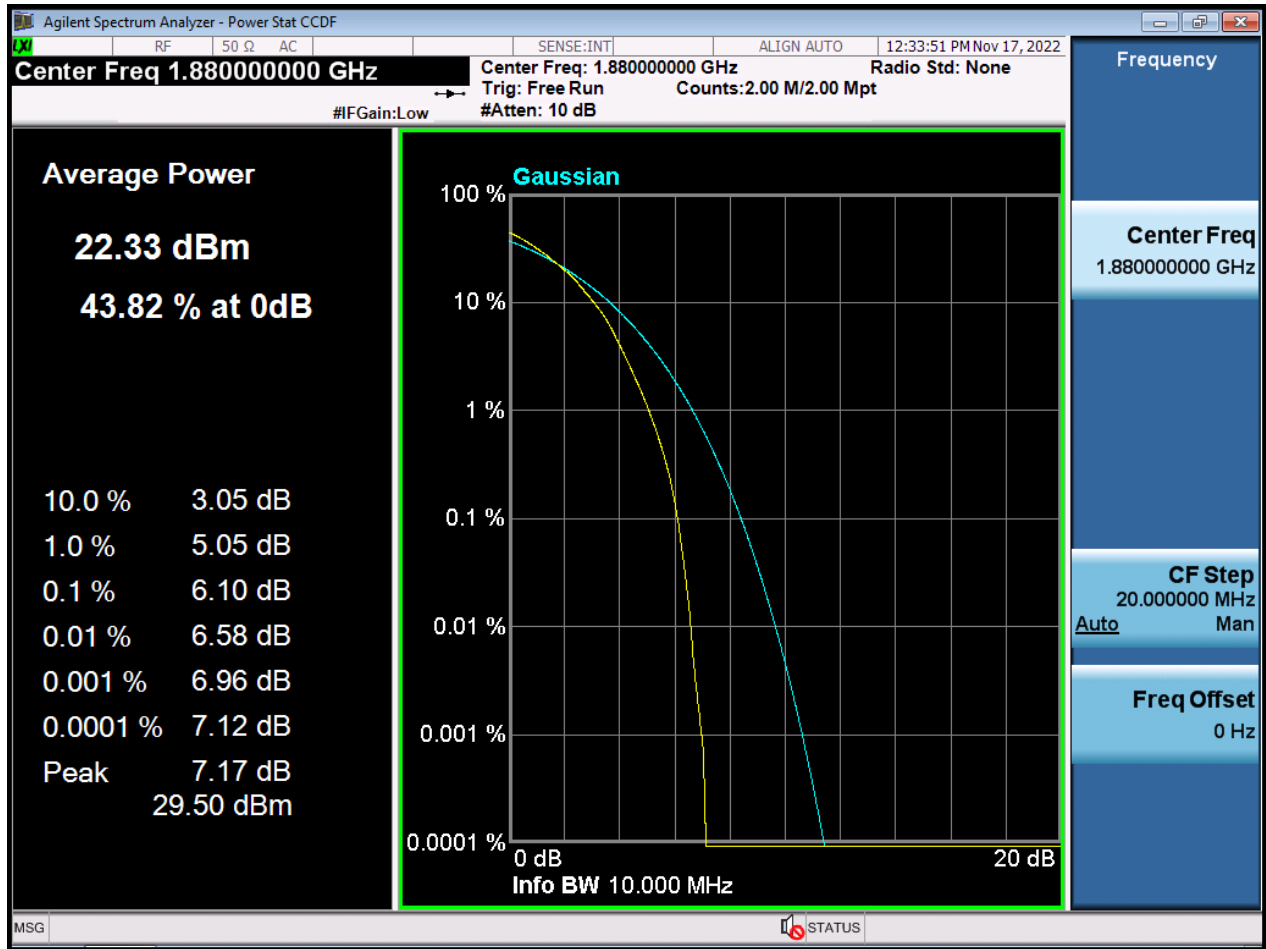
BW10 M_PAR_Middle Channelz_QPSK_FullRB



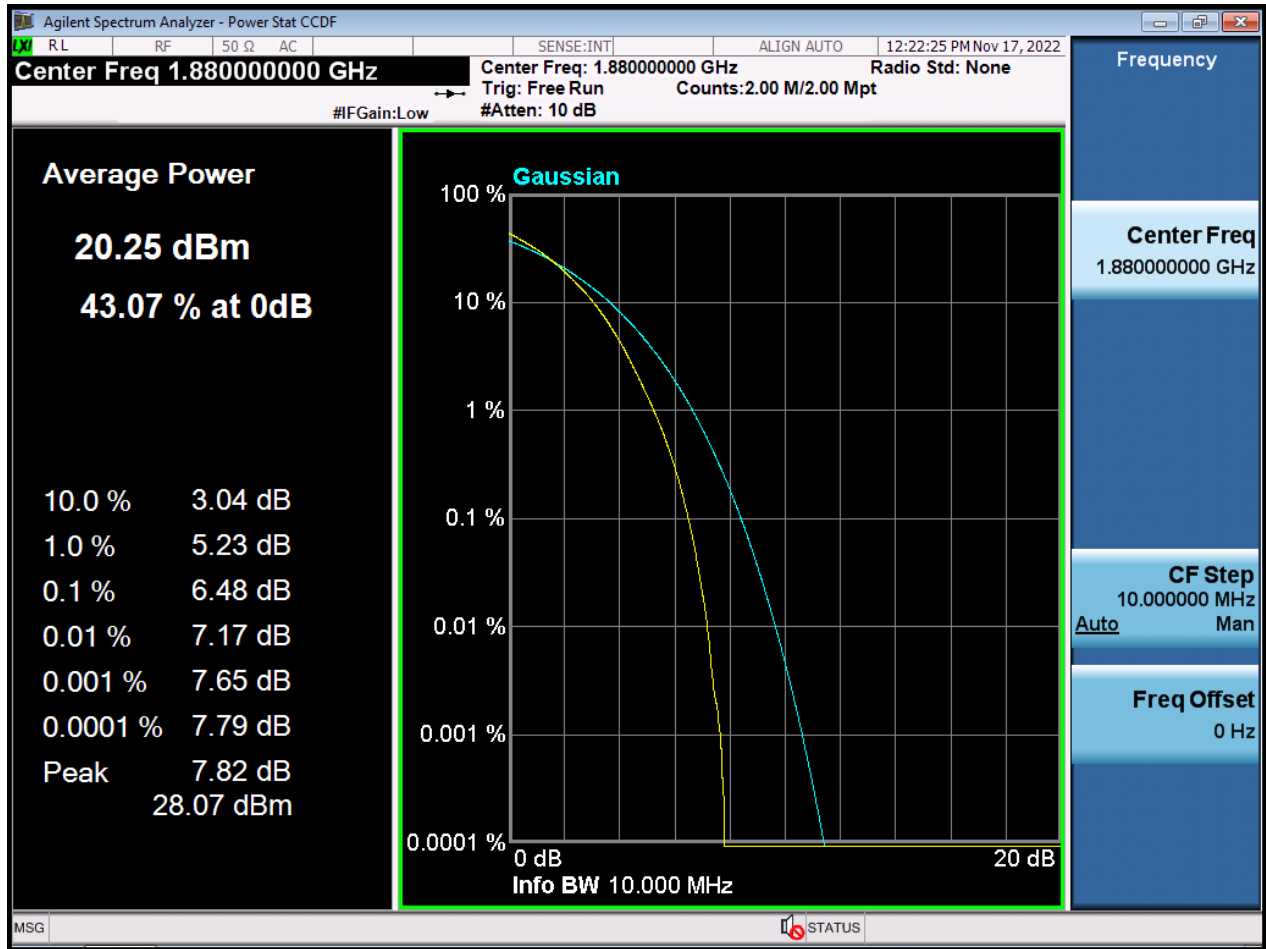
BW10 M_PAR_Middle Channel_16QAM_FullRB



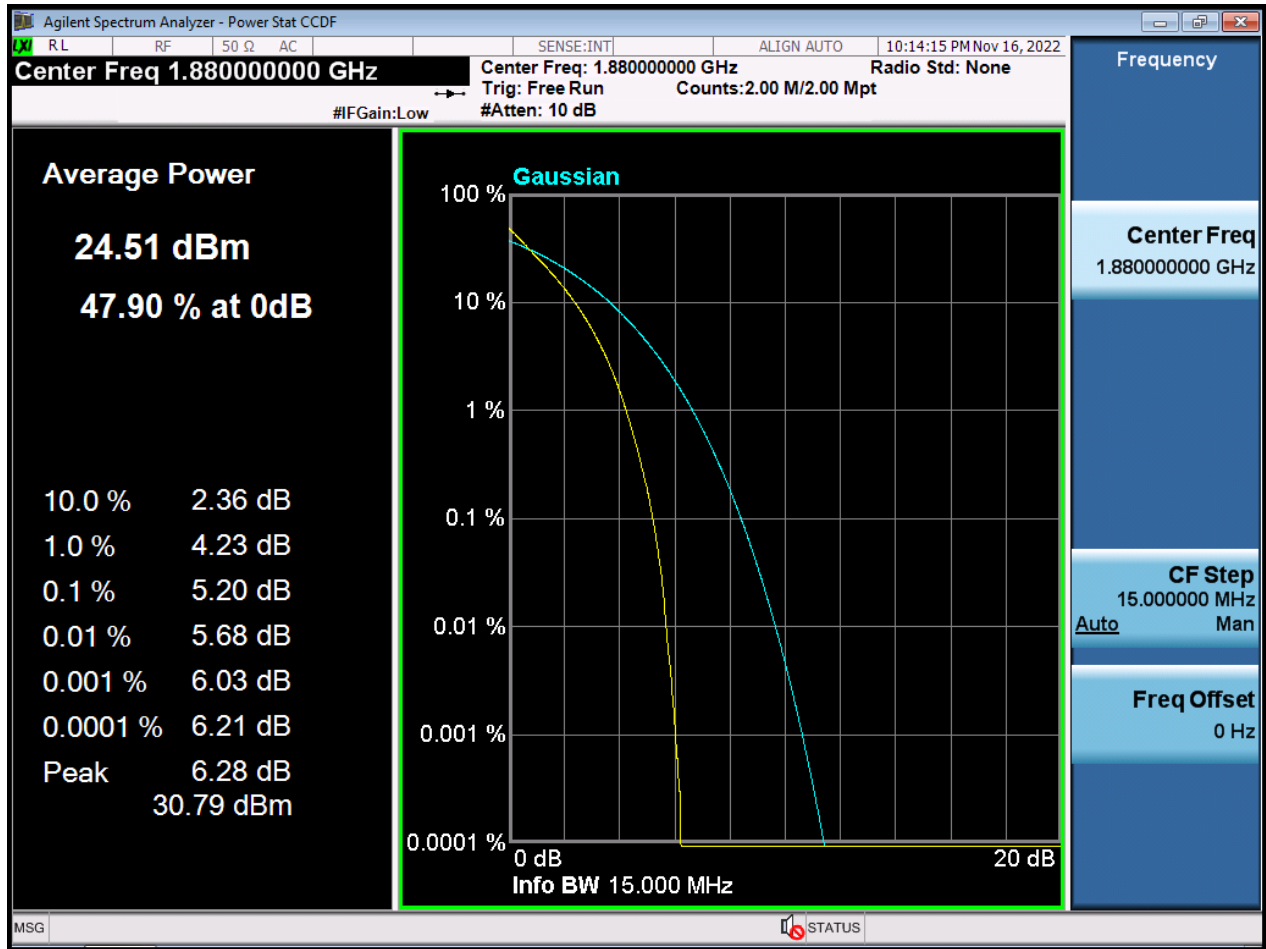
BW10 M_PAR_Middle Channel_64QAM_FullRB



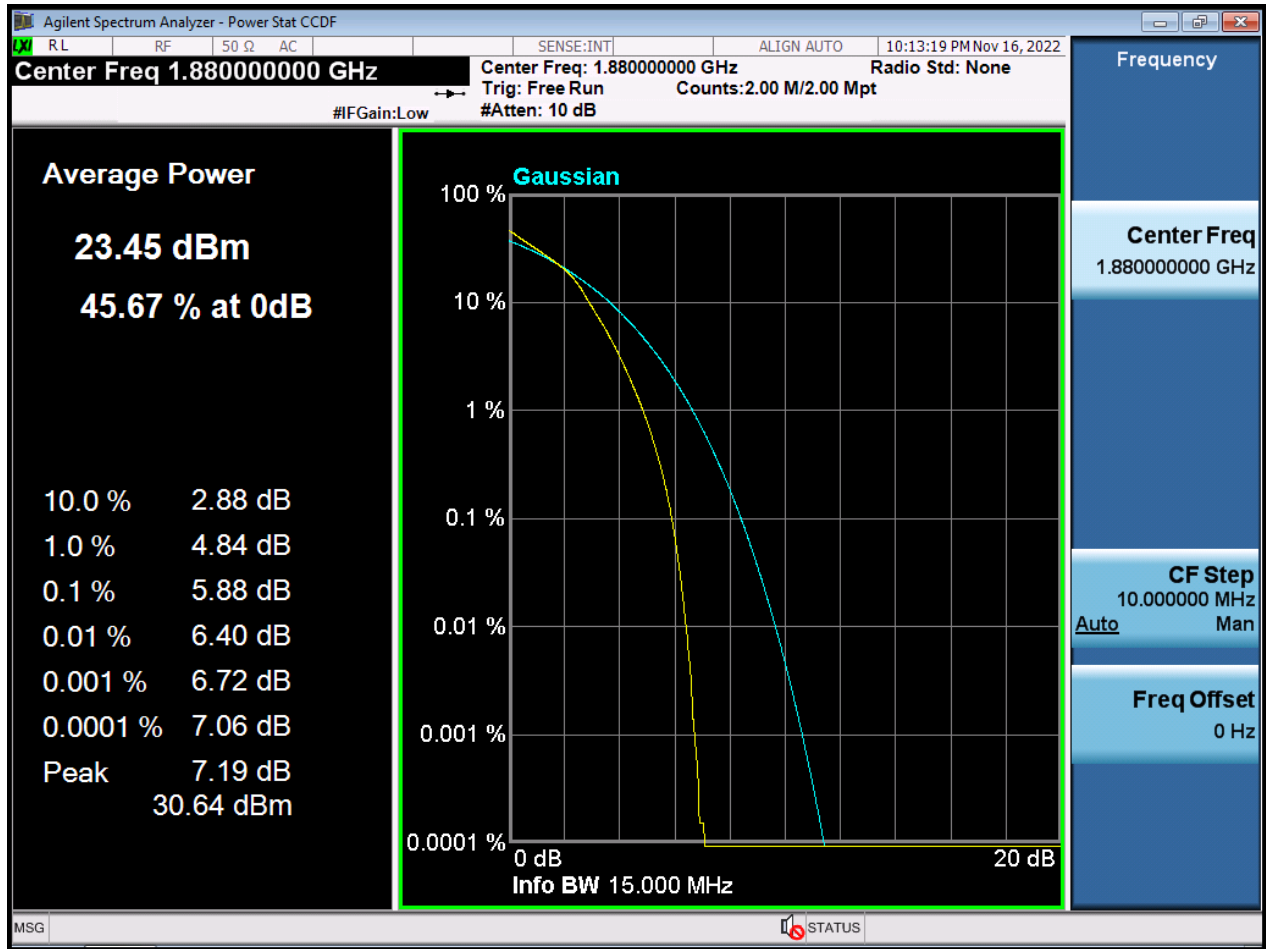
BW10 M_PAR_Middle Channel_256QAM_FullIRB



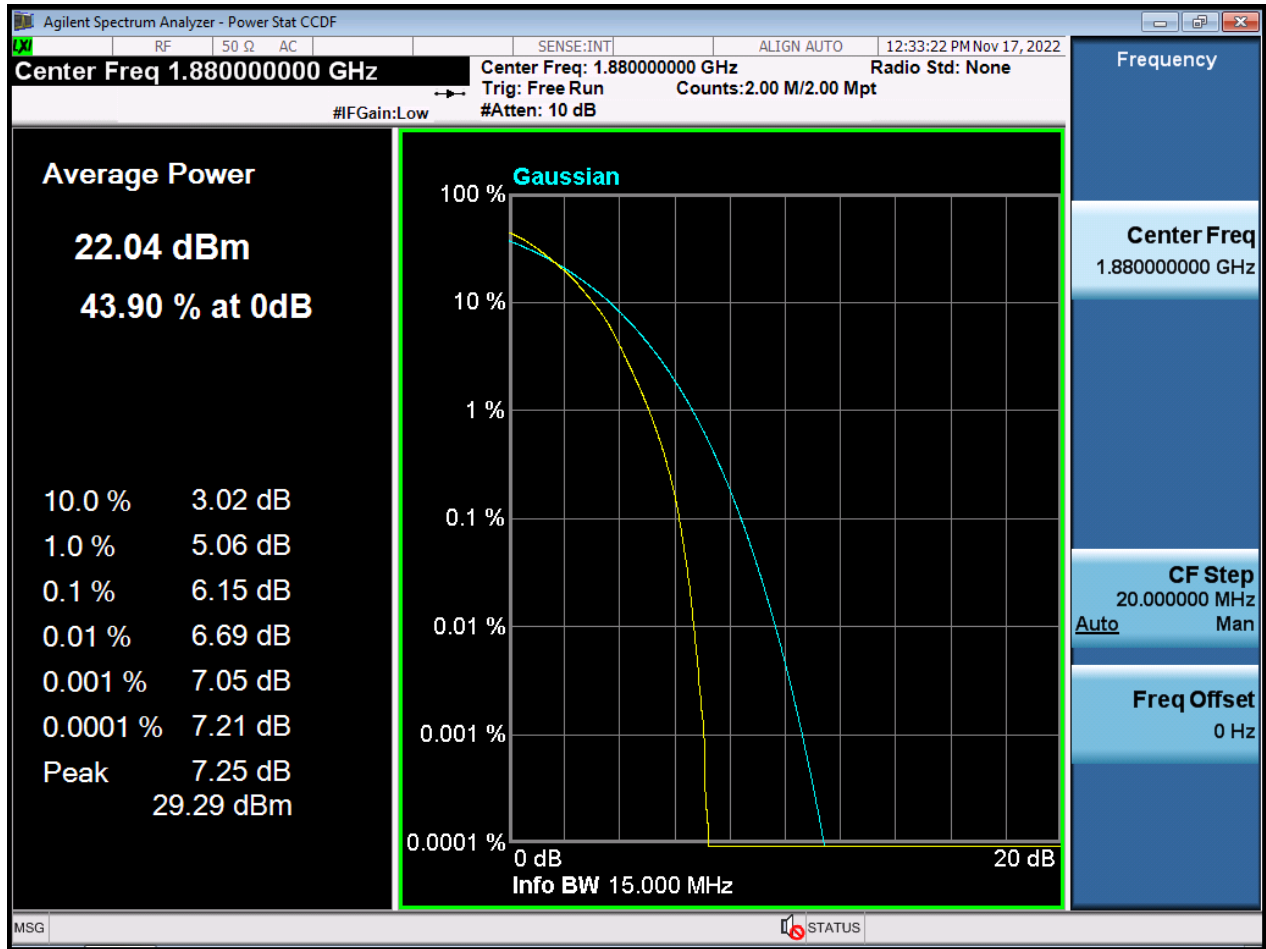
BW15 M_PAR_Middle Channel_QPSK_FullRB



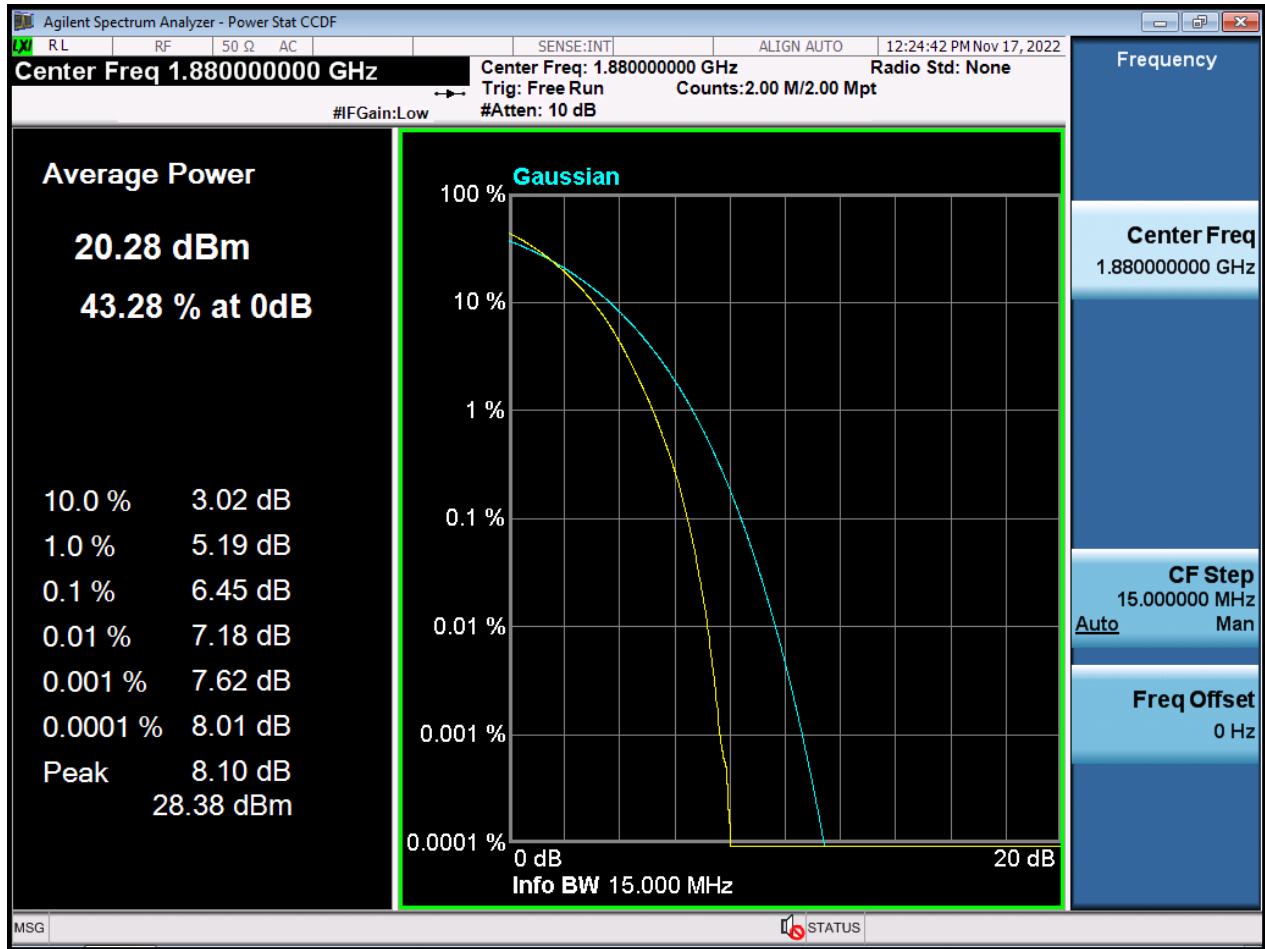
BW15 M_PAR_Middle Channel_16QAM_FullRB



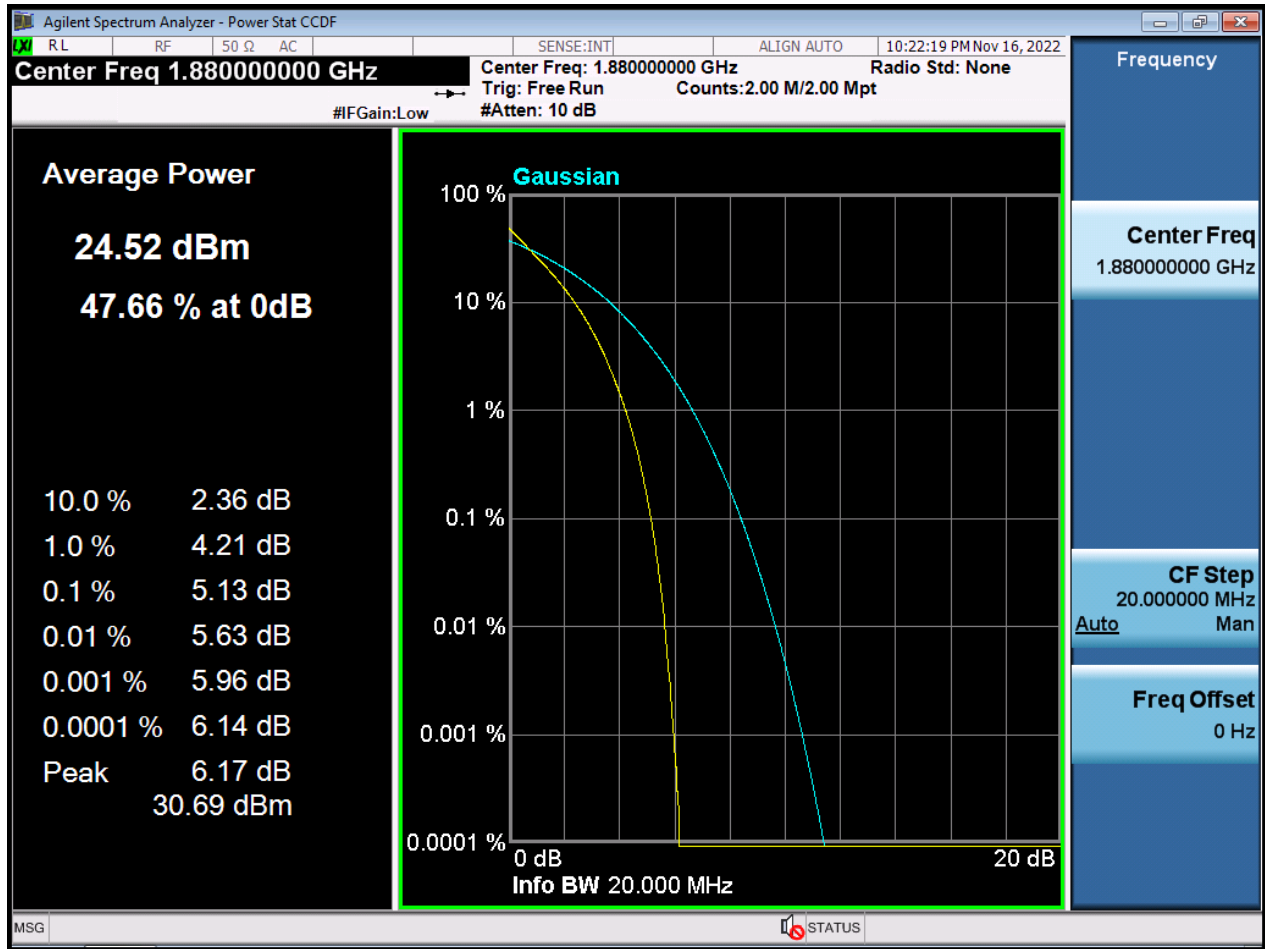
BW15 M_PAR_Middle Channel_64QAM_FullRB



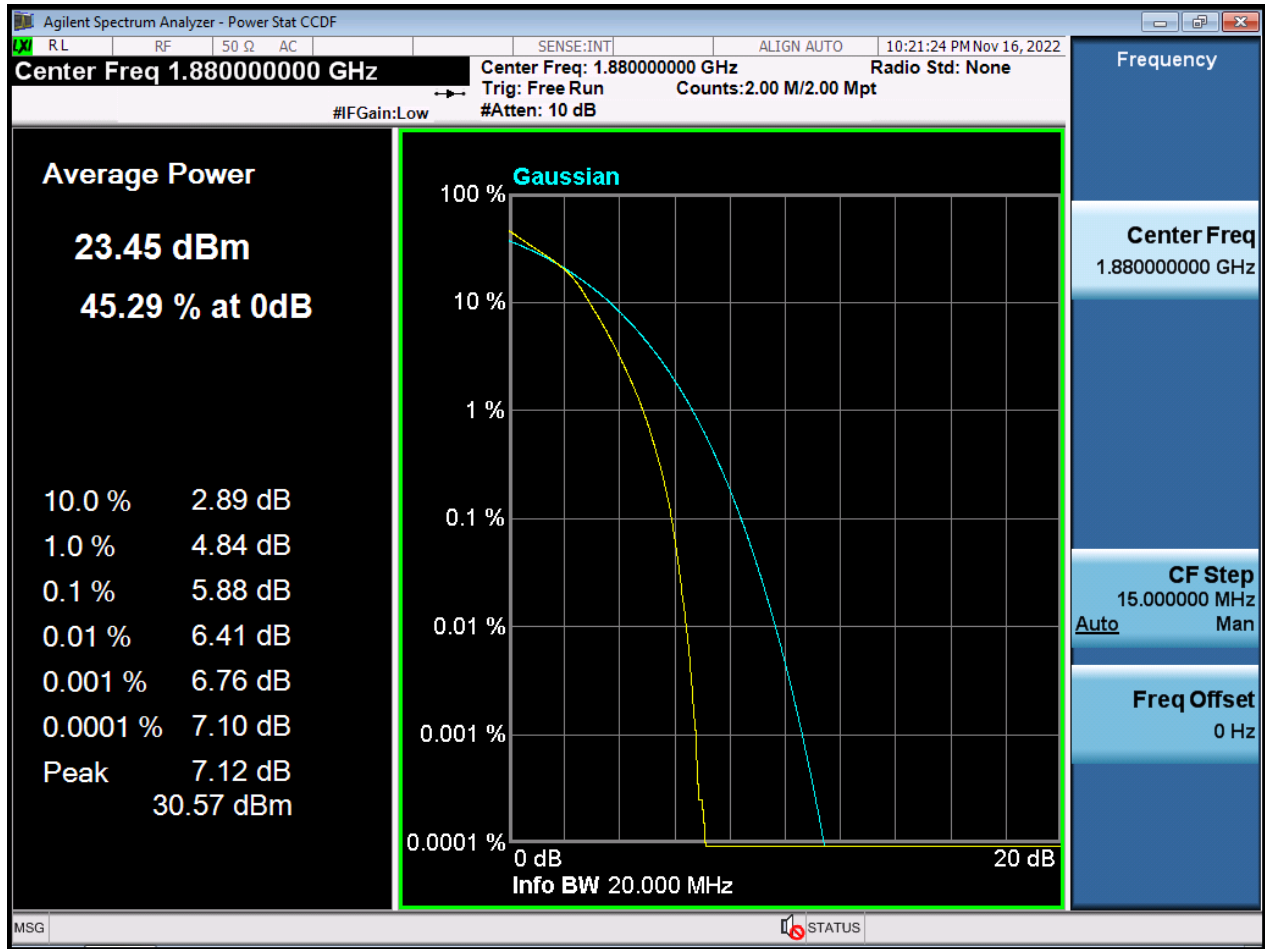
BW15 M_PAR_Middle Channel_256QAM_FullIRB



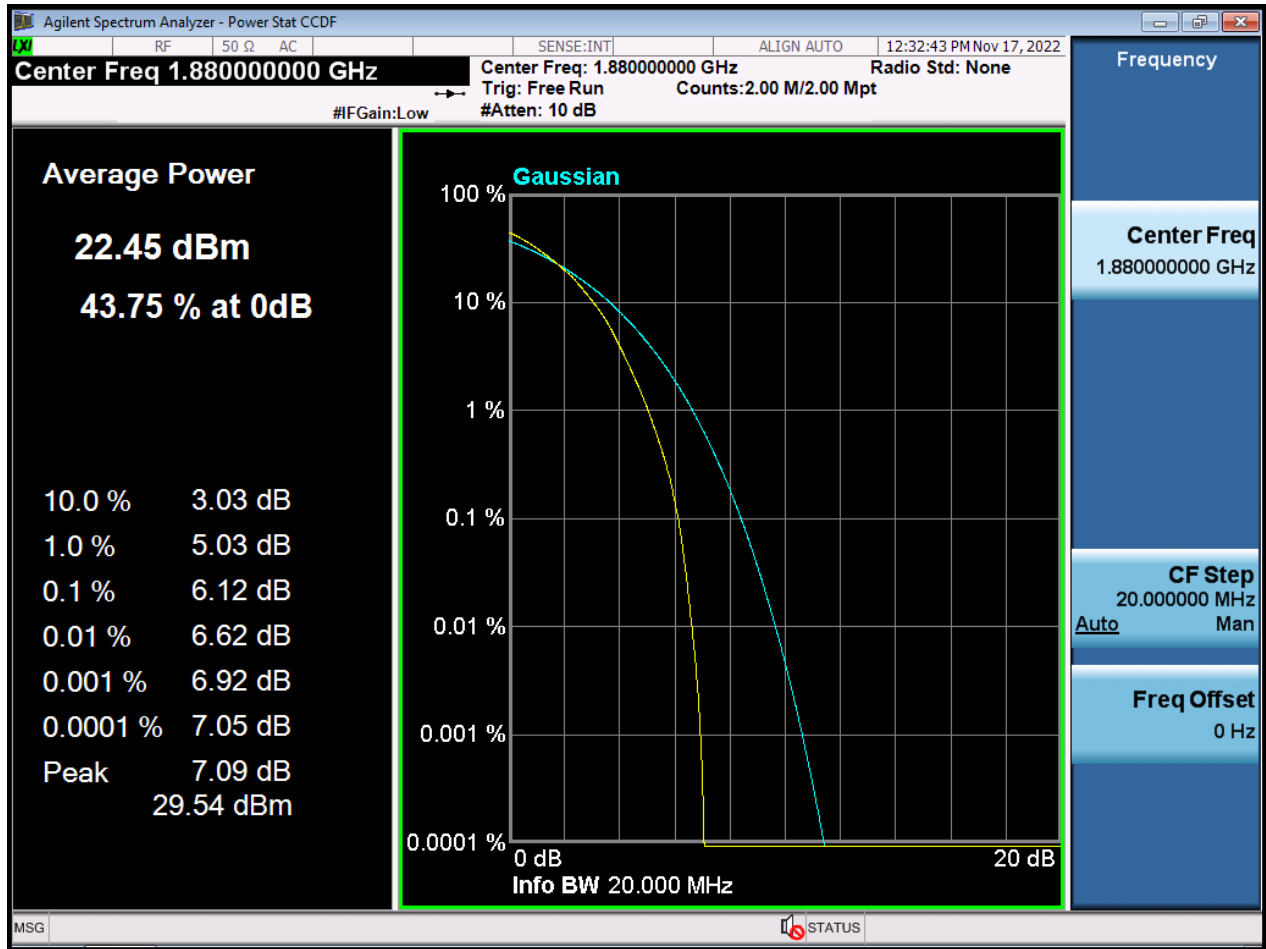
BW20 M_PAR_Middle Channel_QPSK_FullRB



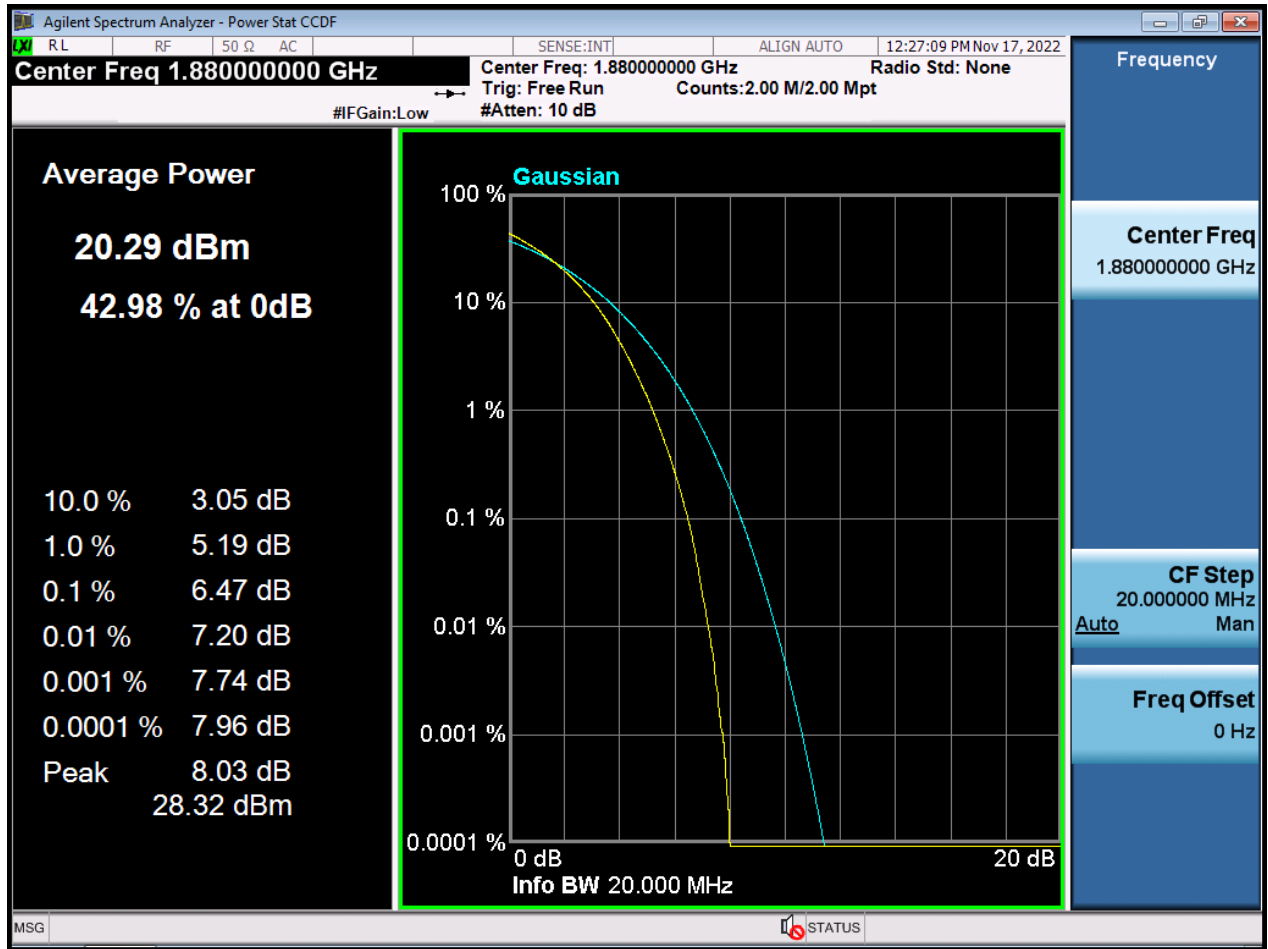
BW20 M_PAR_Middle Channel_16QAM_FullRB



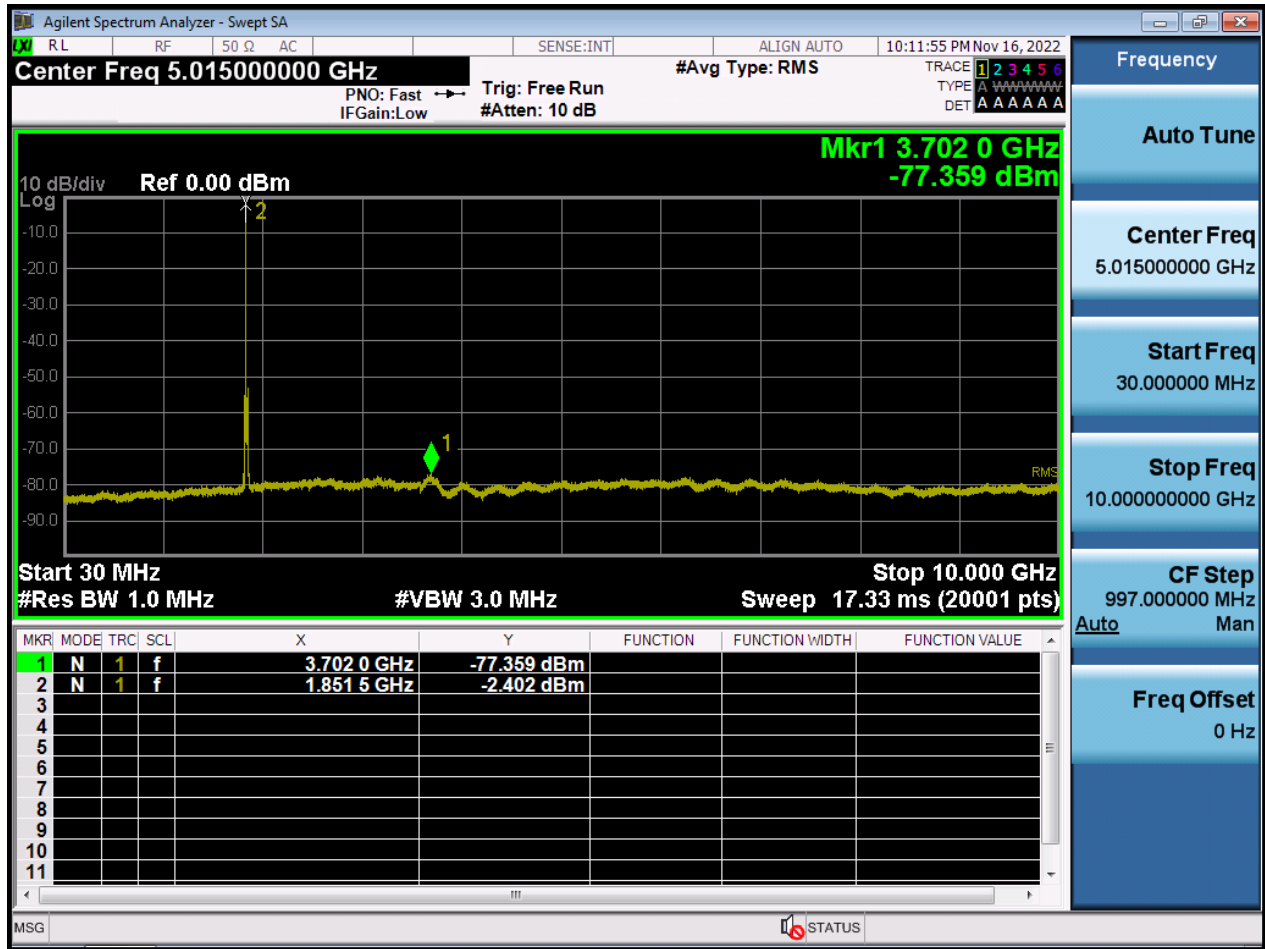
BW20 M_PAR_Middle Channel_64QAM_FullRB



BW20 M_PAR_Middle Channel_256QAM_FullIRB



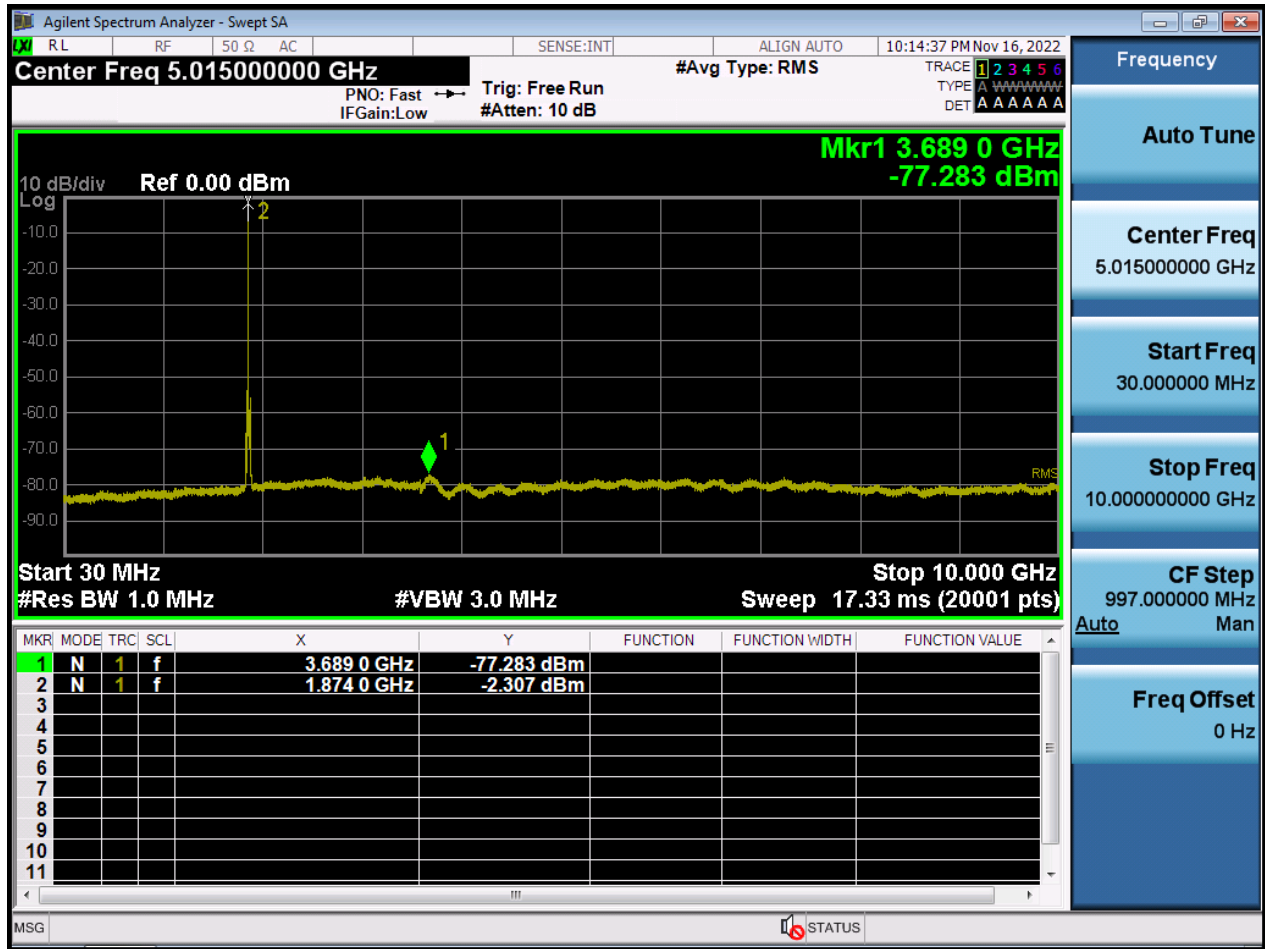
BW15 M_CSE(30 M-10 G)_Lowest Channel_QPSK_1RB



Note:

In order to simplify the report, attached plots were only the Worst case. (BW : 15 MHz)

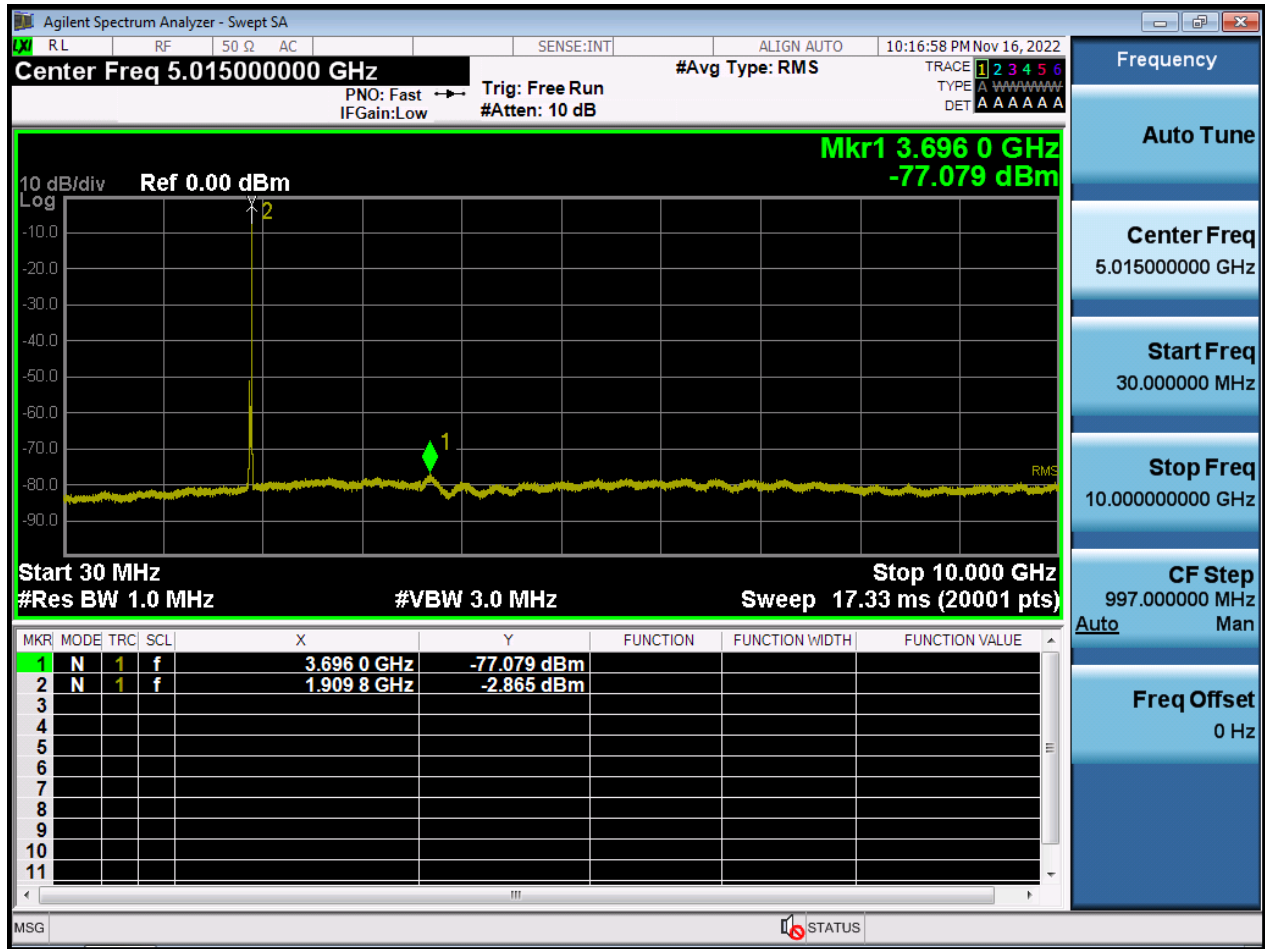
BW15 M_CSE(30 M-10 G)_Middle Channel_QPSK_1RB



Note:

In order to simplify the report, attached plots were only the Worst case. (BW : 15 MHz)

BW15 M_CSE(30 M-10 G)_Highest Channel_QPSK_1RB



Note:

In order to simplify the report, attached plots were only the Worst case. (BW : 15 MHz)

BW15 M_CSE(10 G-26.5 G)_Lowest Channel_QPSK_1RB



Note:

In order to simplify the report, attached plots were only the Worst case. (BW : 15 MHz)

BW15 M_CSE(10 G-26.5 G)_Middle Channel_QPSK_1RB



Note:

In order to simplify the report, attached plots were only the Worst case. (BW : 15 MHz)

BW15 M_CSE(10 G-26.5 G)_Highest Channel_QPSK_1RB



Note:

In order to simplify the report, attached plots were only the Worst case. (BW : 15 MHz)

11. TEST PLOTS (Main 3 Ant)

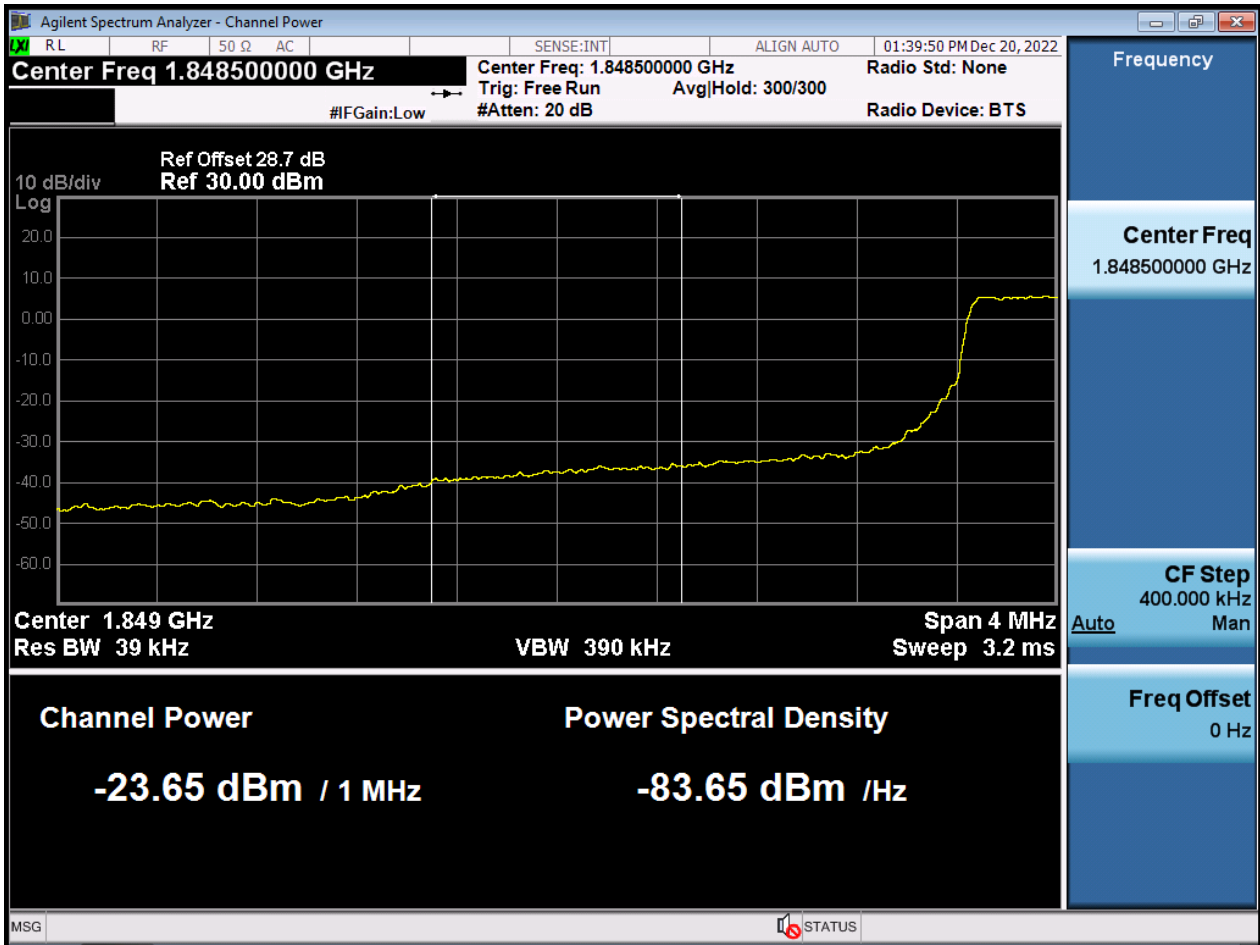
BW3 M_BandEdge_Lowest Channel_QPSK_FullIRB(1)



Note:

In order to simplify the report, attached plots were only the Worst case. (BW : 3 MHz)

BW3 M_BandEdge_Lowest Channel_QPSK_FullIRB(2)



Note:

In order to simplify the report, attached plots were only the Worst case. (BW : 3 MHz)

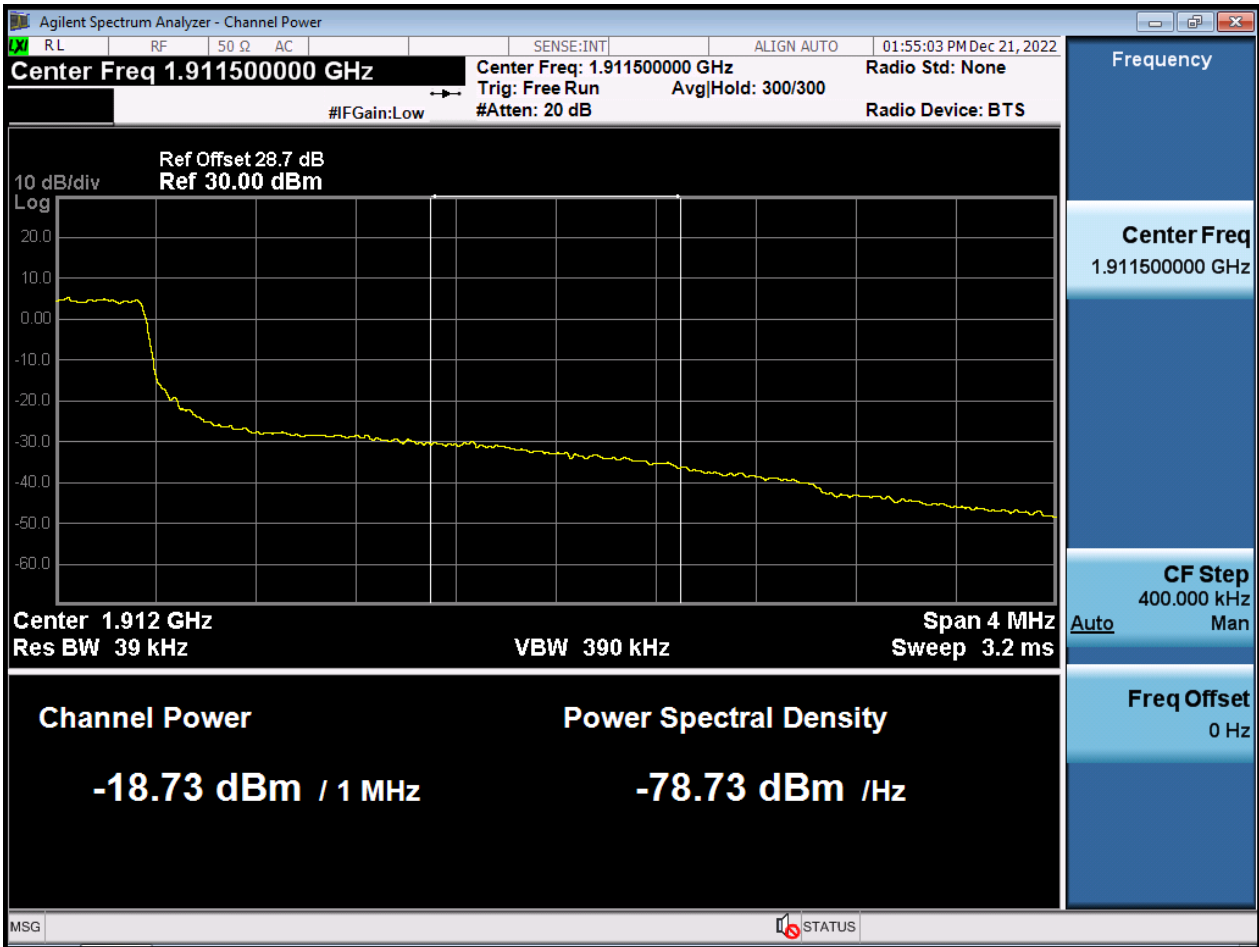
BW3 M_BandEdge_Highest Channel_QPSK_FullRB(1)



Note:

In order to simplify the report, attached plots were only the Worst case. (BW : 3 MHz)

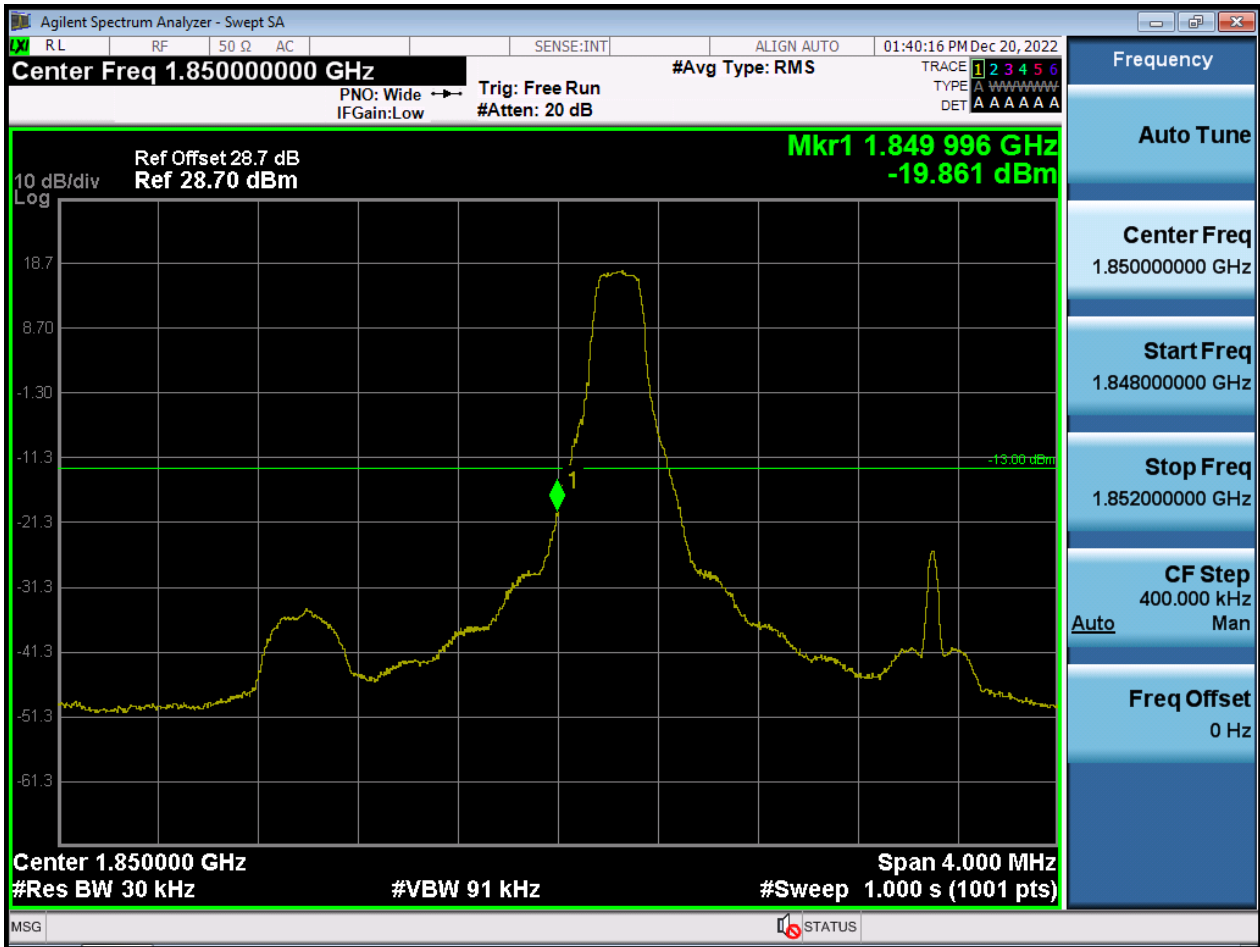
BW3 M_BandEdge_Highest Channel_QPSK_FullRB(2)



Note:

In order to simplify the report, attached plots were only the Worst case. (BW : 3 MHz)

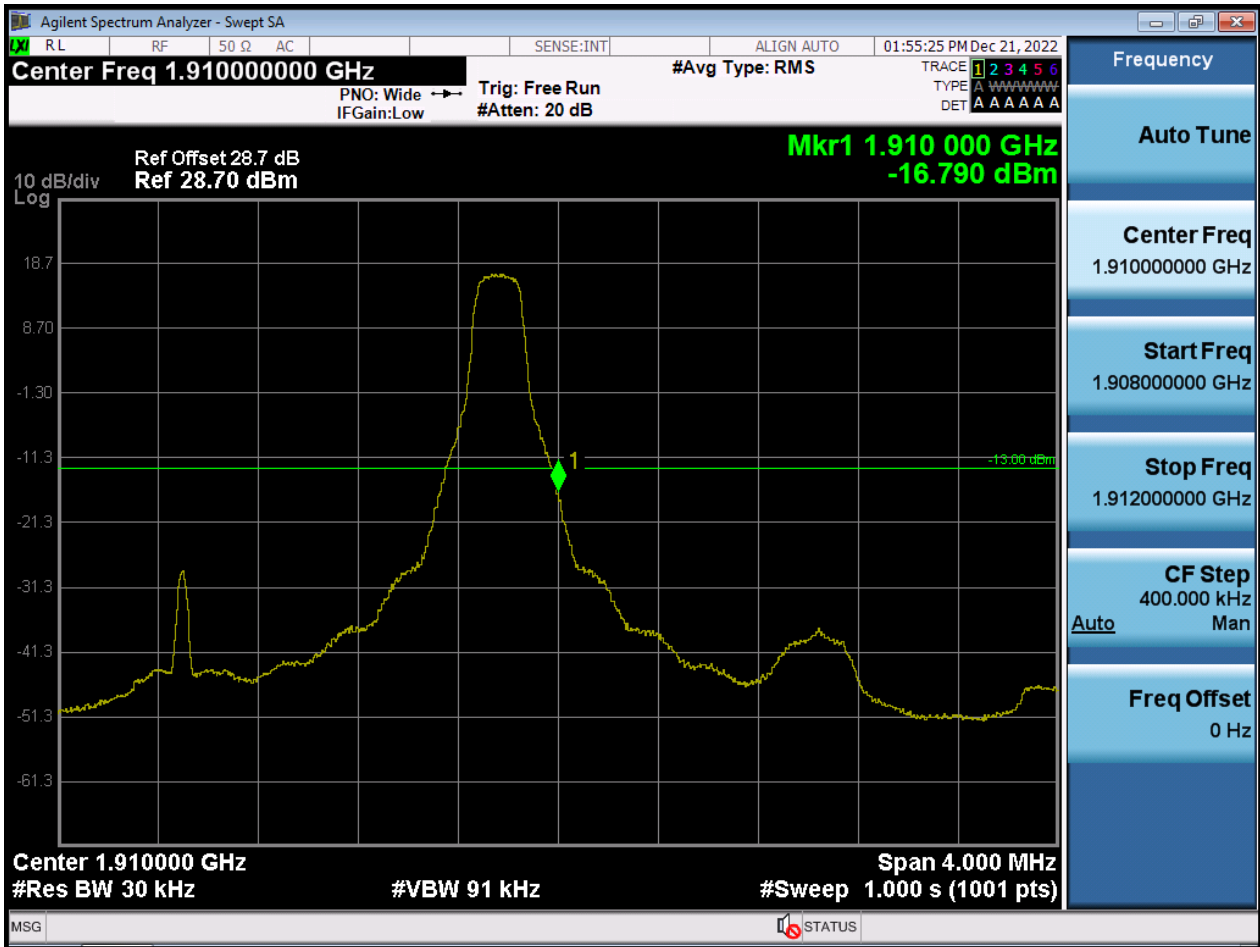
BW3 M_BandEdge_Lowest Channel_QPSK_1RB



Note:

In order to simplify the report, attached plots were only the Worst case. (BW : 3 MHz)

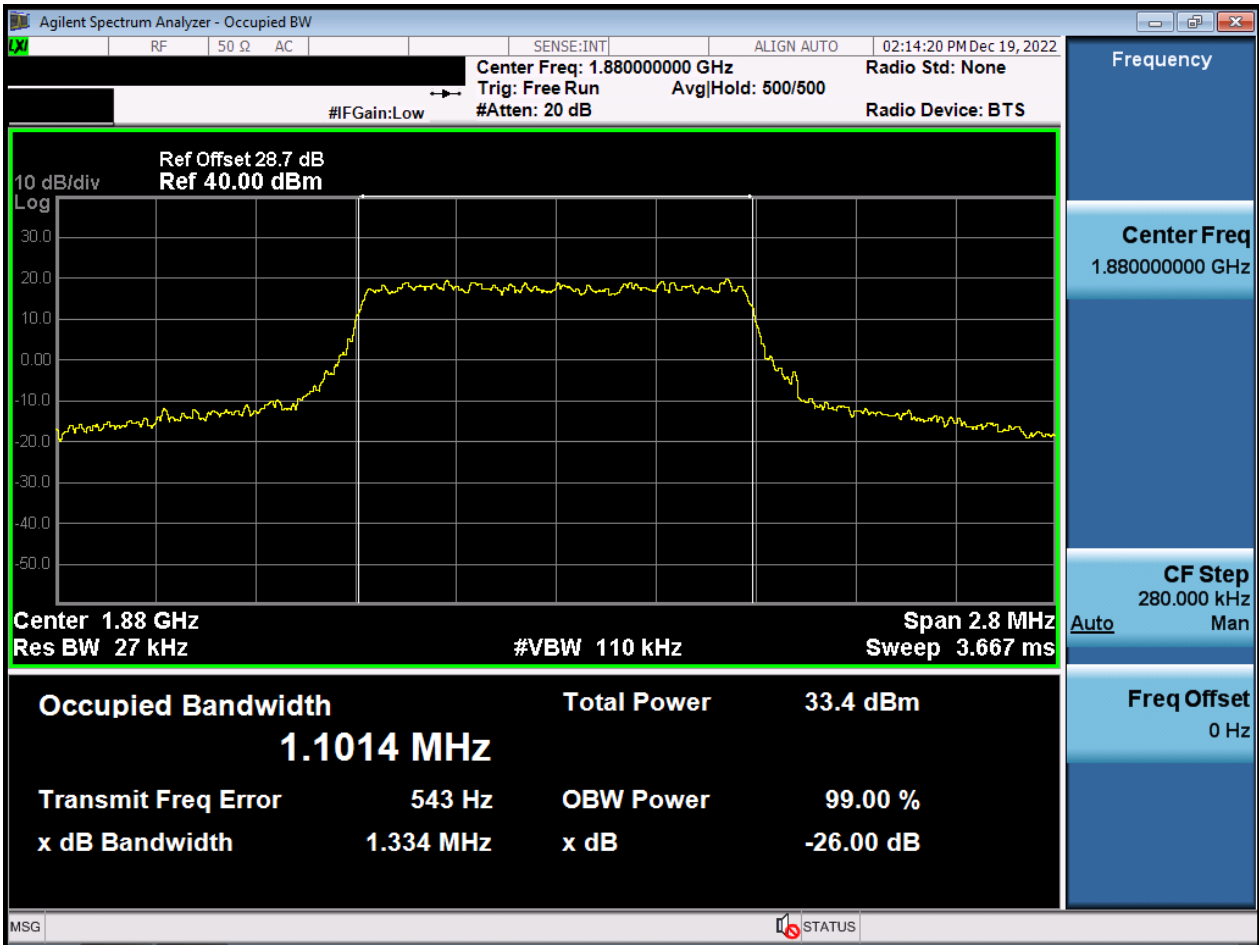
BW3 M_BandEdge_Highest Channel_QPSK_1RB



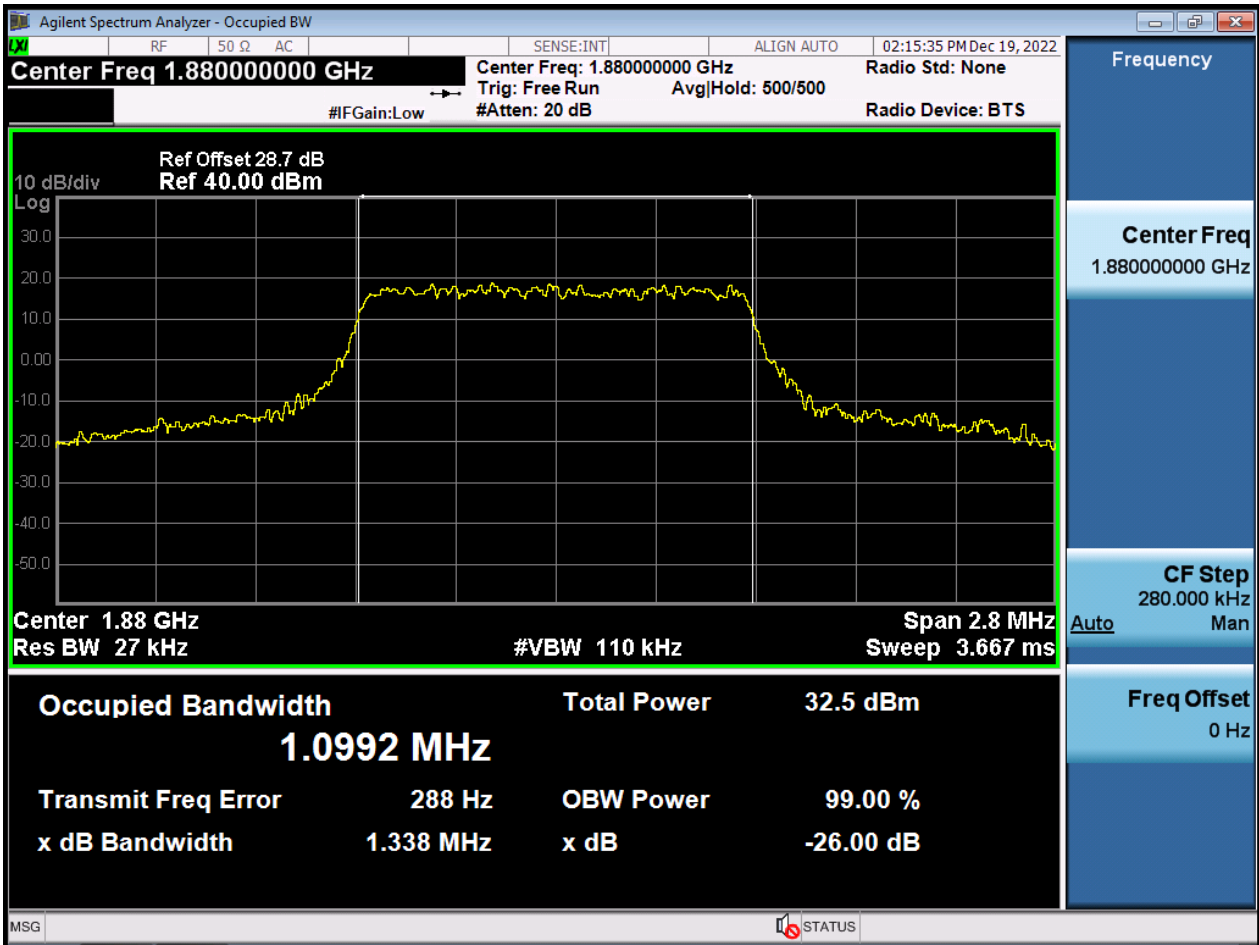
Note:

In order to simplify the report, attached plots were only the Worst case. (BW : 3 MHz)

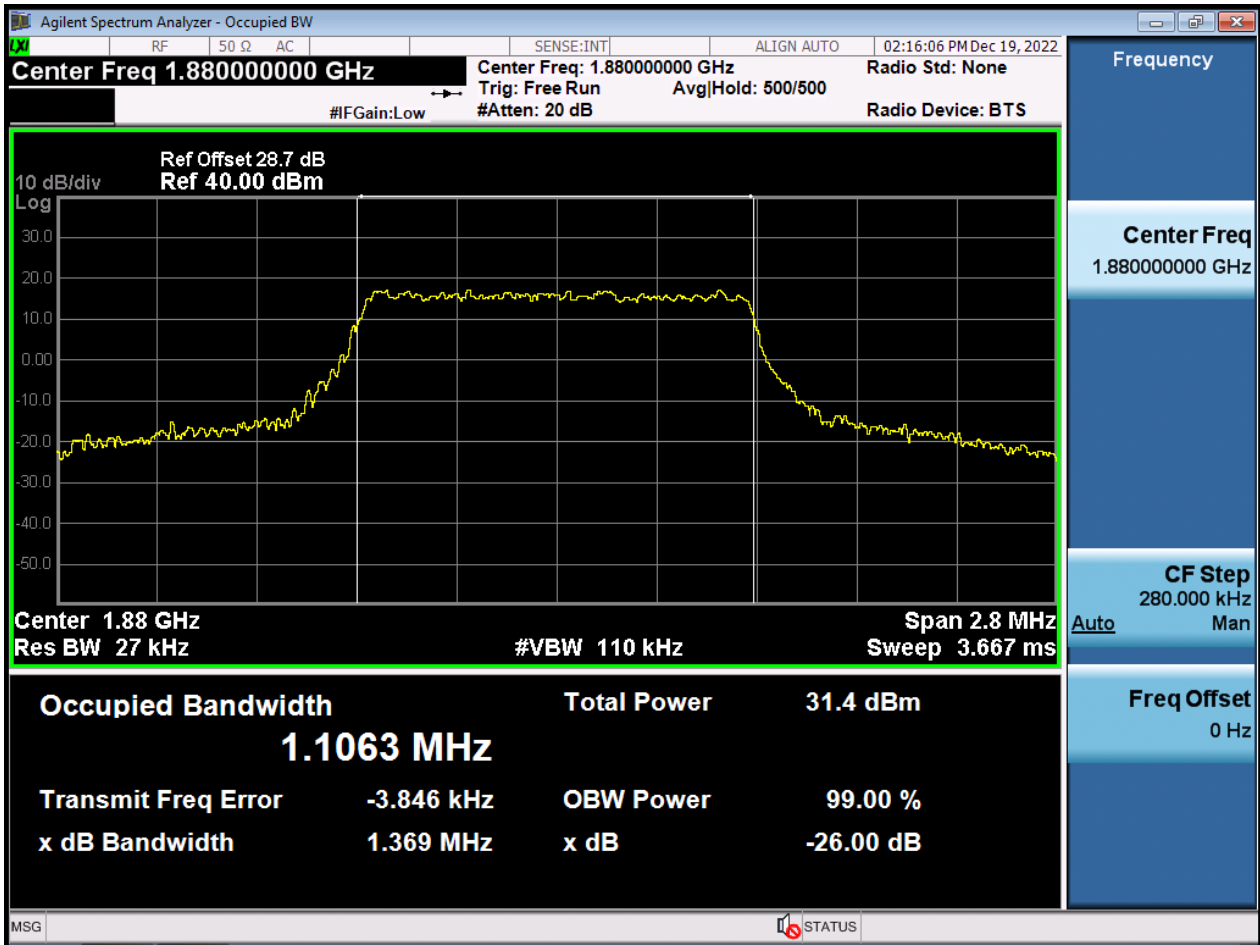
BW1.4 M_OBW_Middle Channel_QPSK_FullIRB



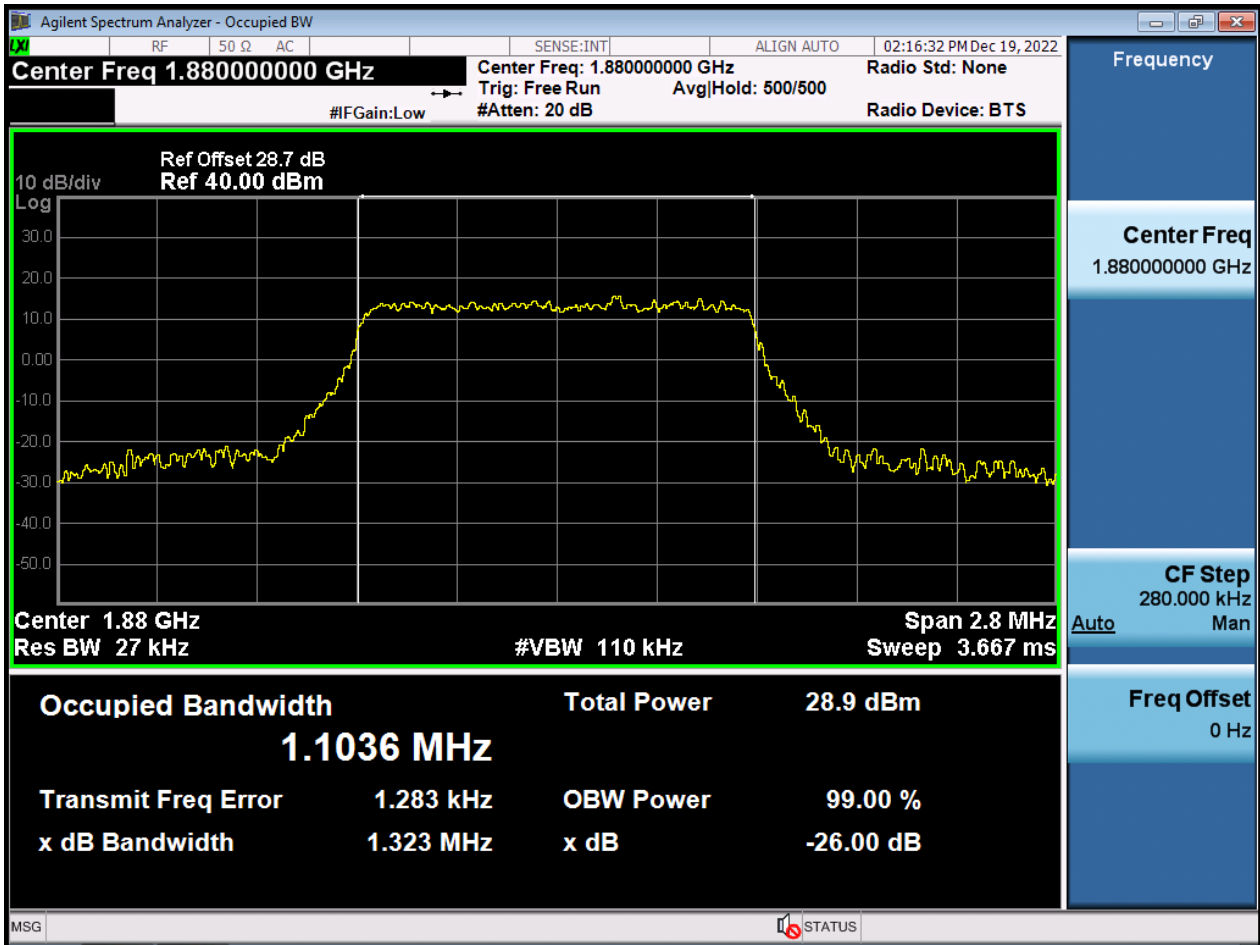
BW1.4 M_OBW_Middle Channel_16QAM_FullIRB



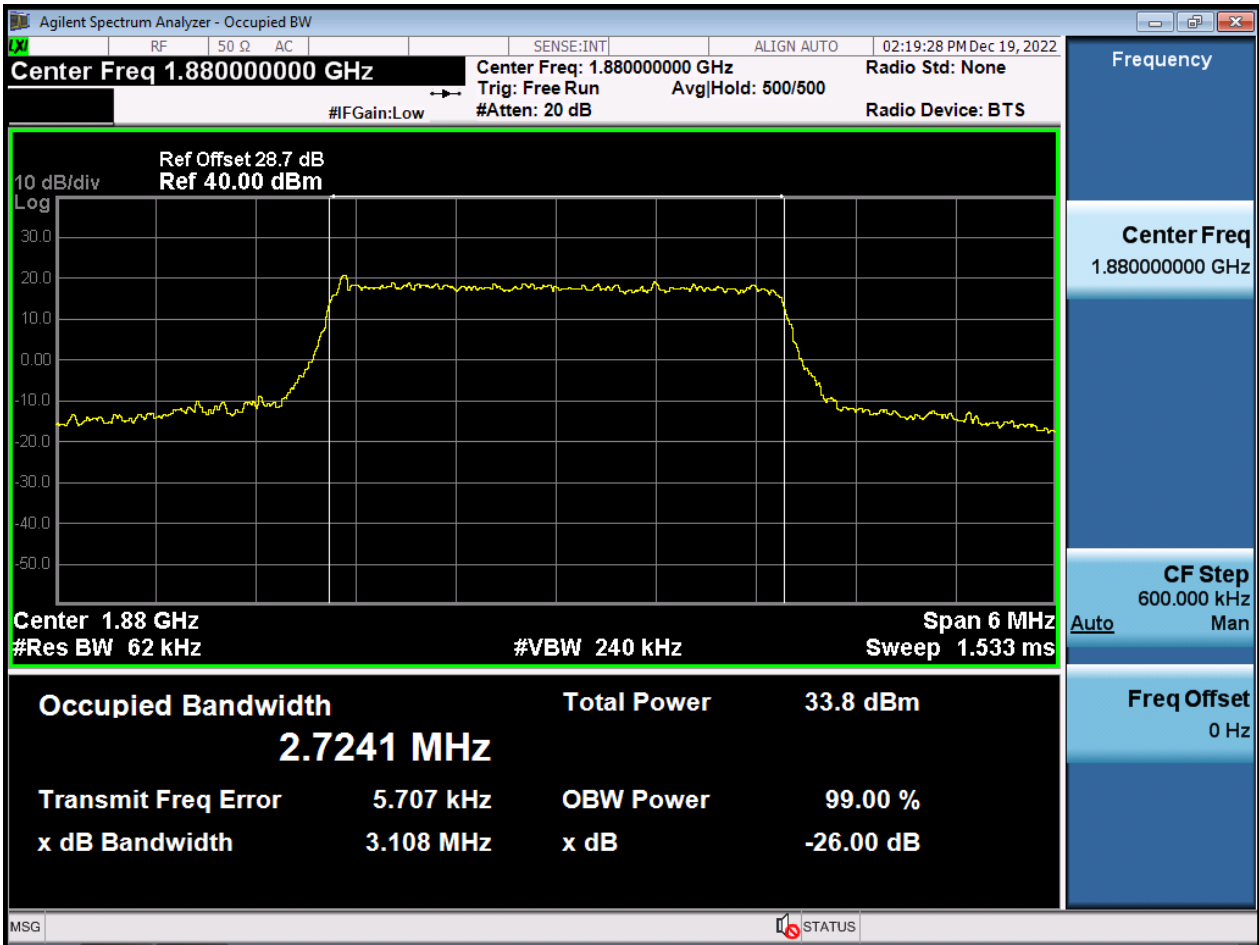
BW1.4 M_OBW_Middle Channel_64QAM_FullIRB



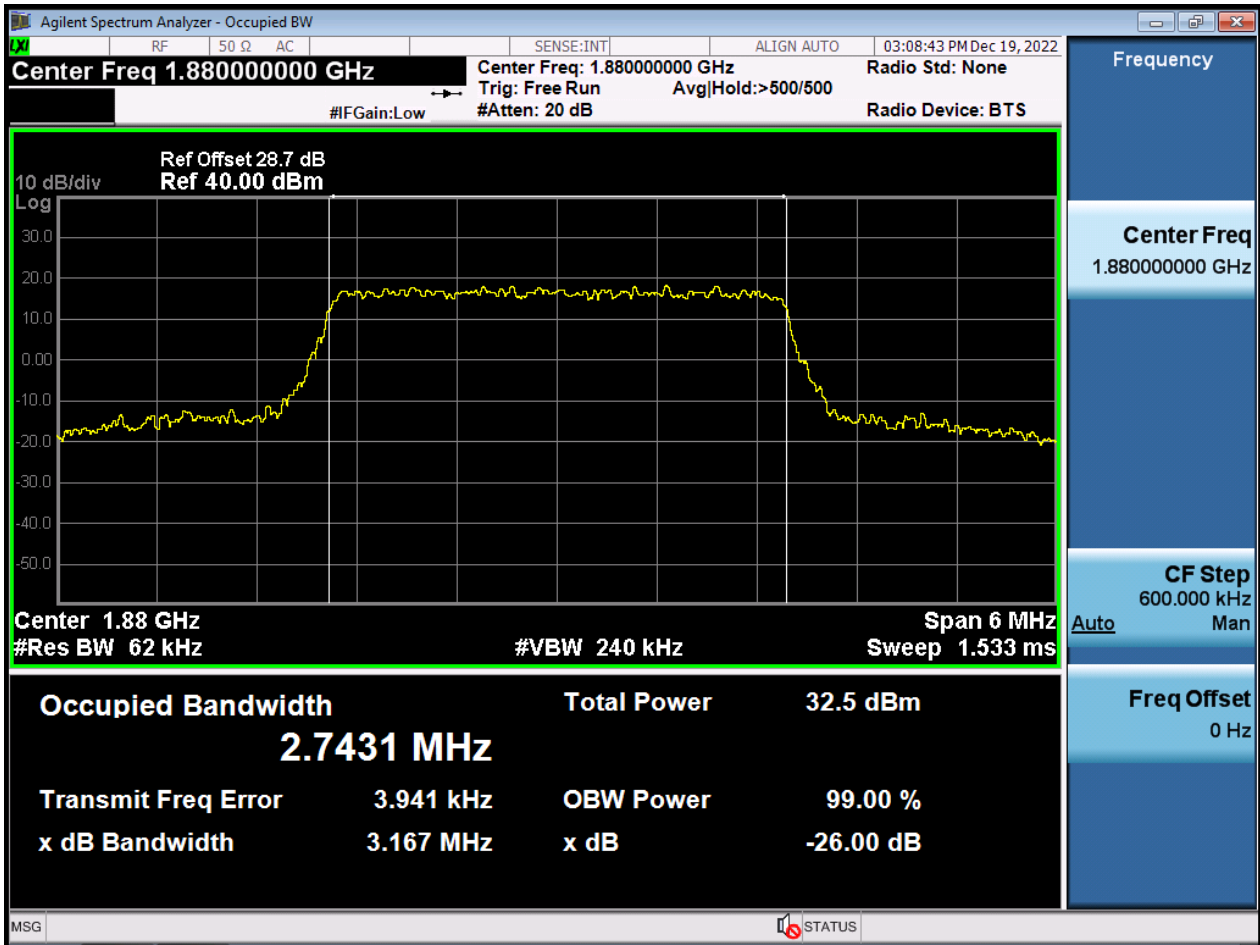
BW1.4 M_OBW_Middle Channel_256QAM_FullRB



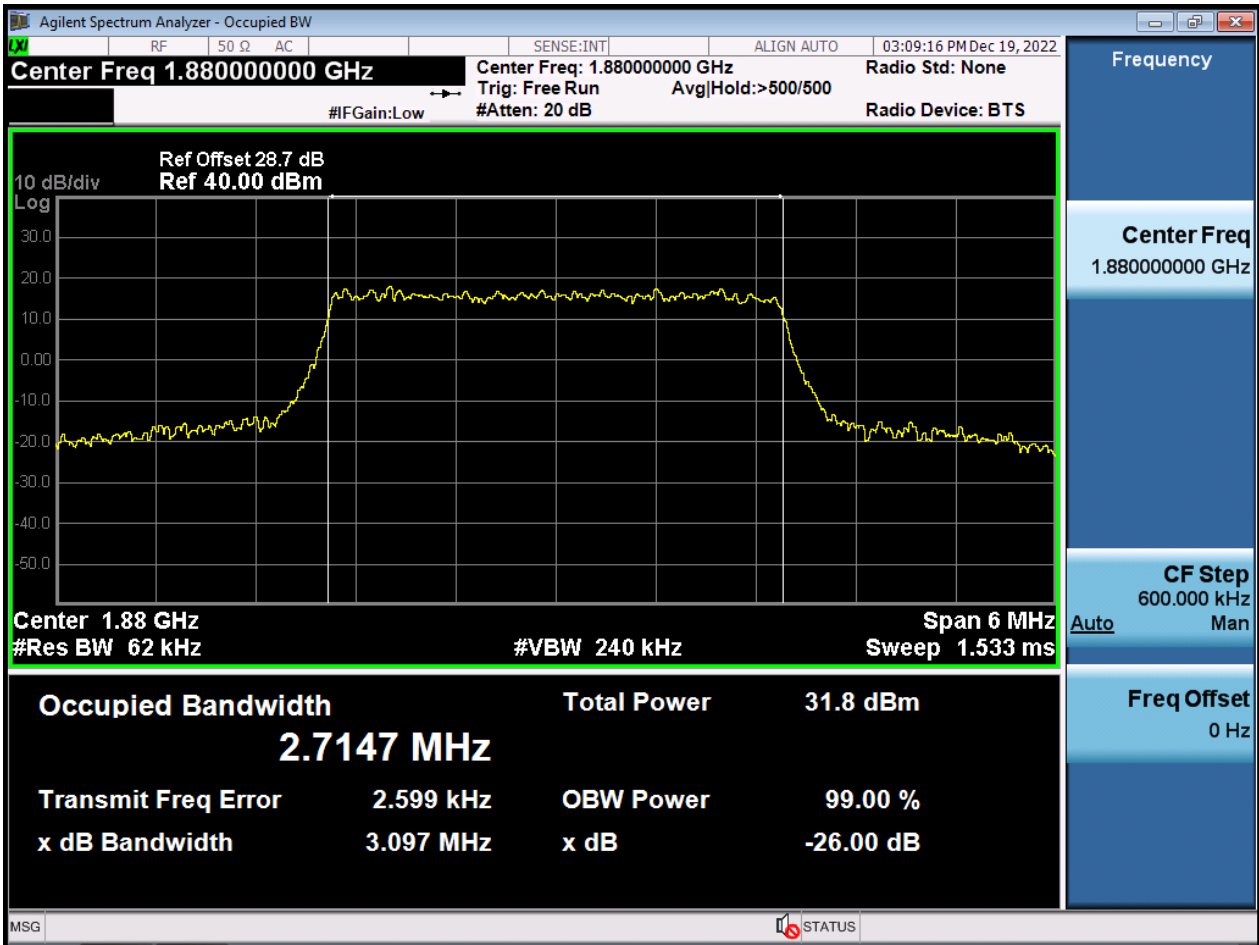
BW3 M_OBW_Middle Channel_QPSK_FullIRB



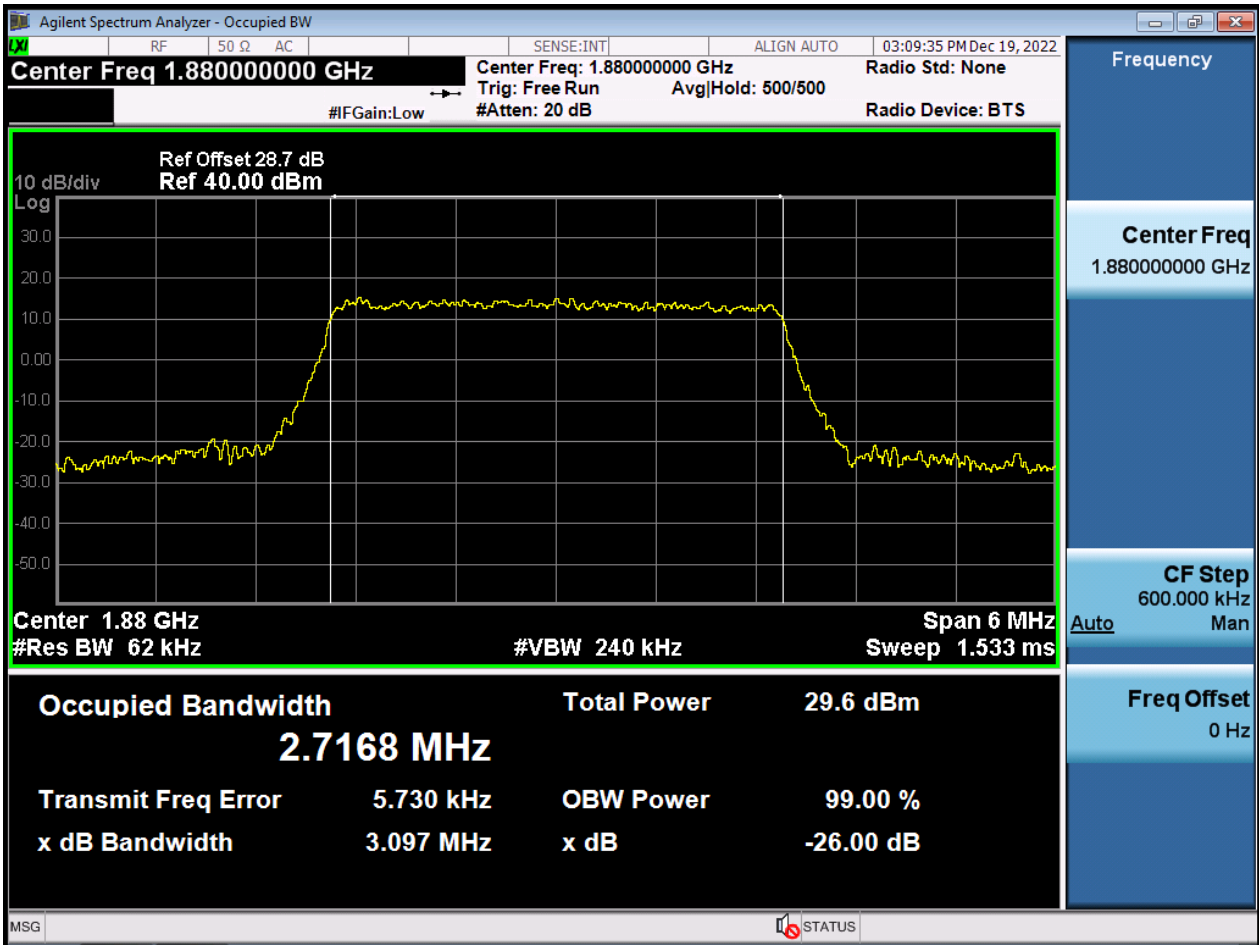
BW3 M_OBW_Middle Channel_16QAM_FullIRB



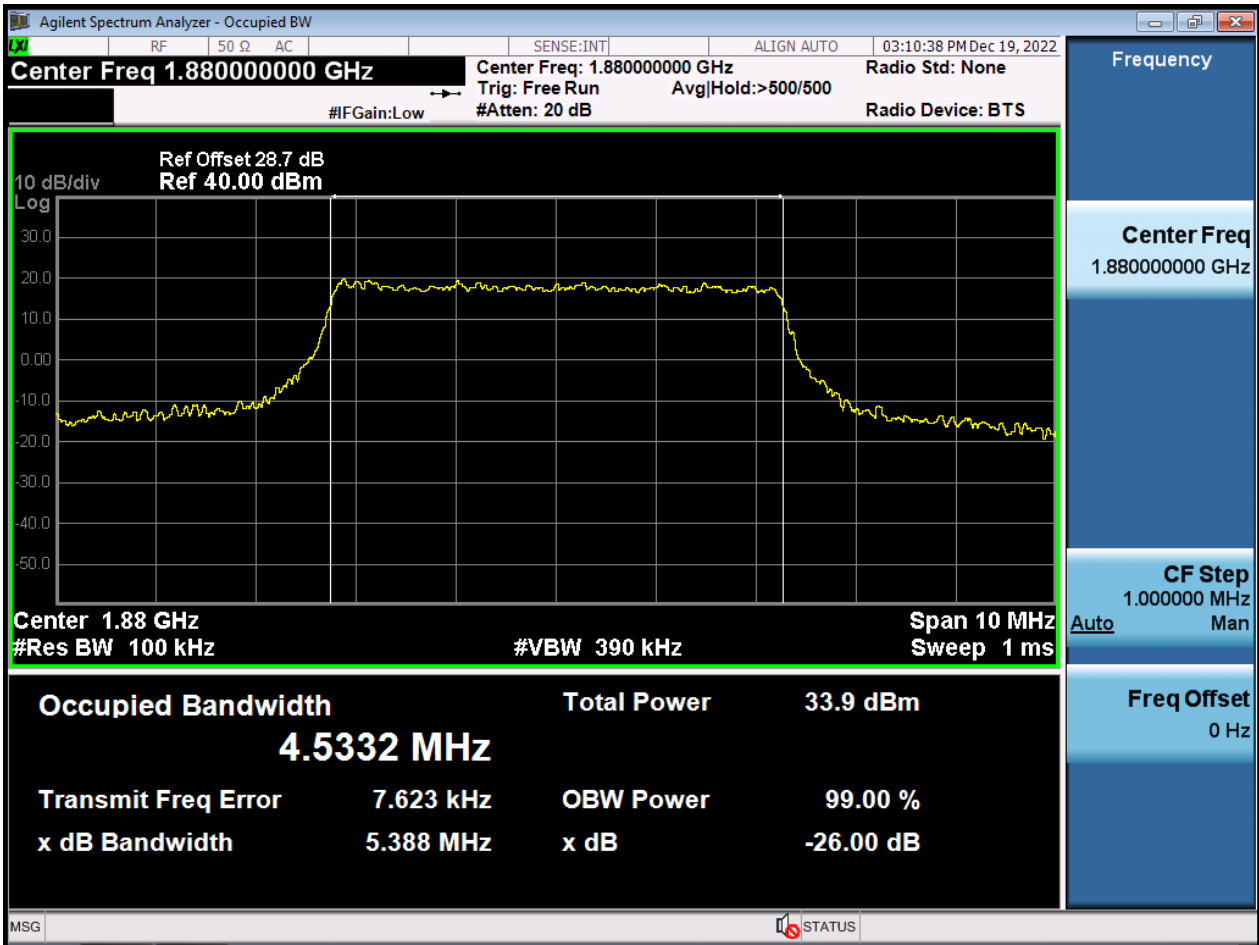
BW3 M_OBW_Middle Channel_64QAM_FullRB



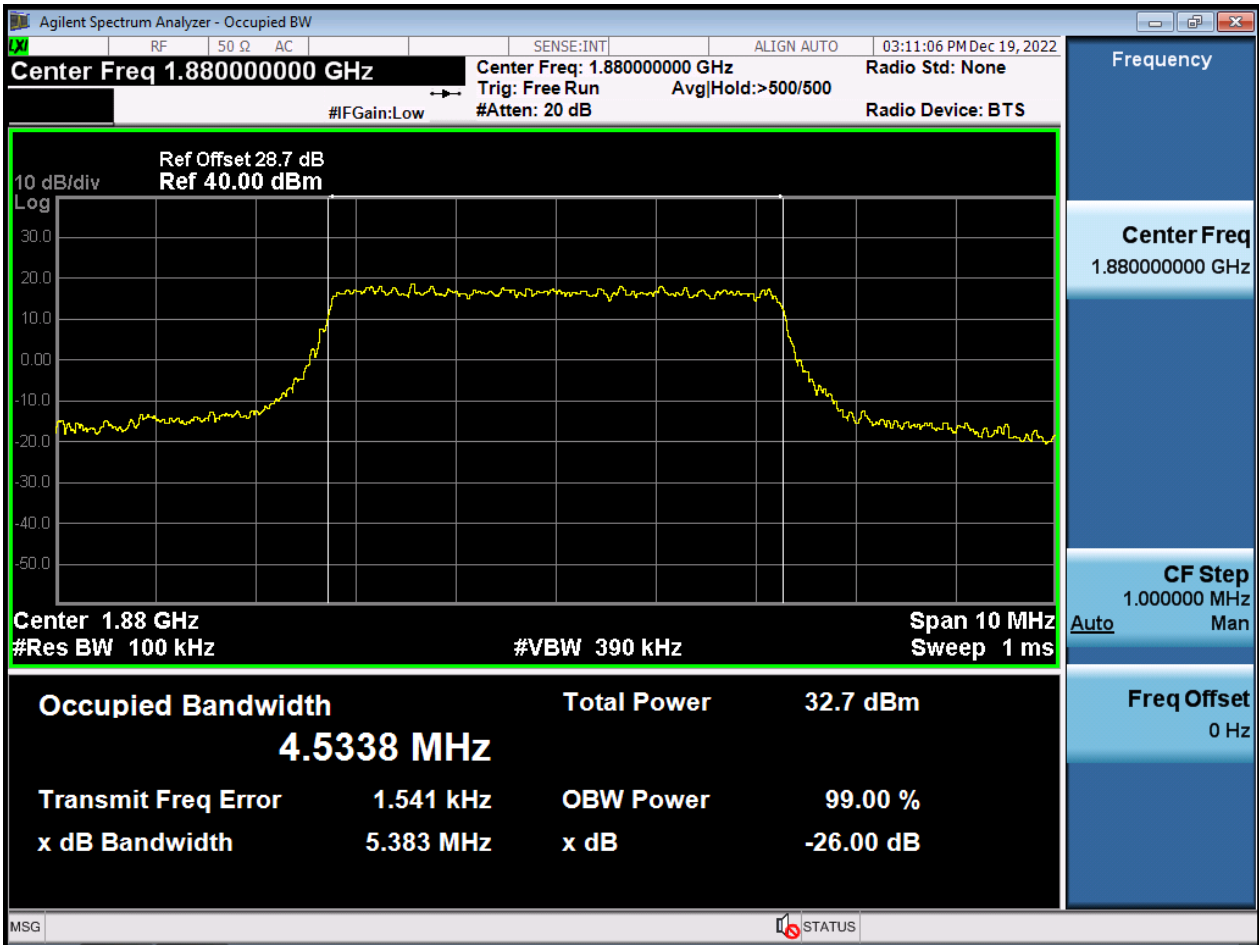
BW3 M_OBW_Middle Channel_256QAM_FullIRB



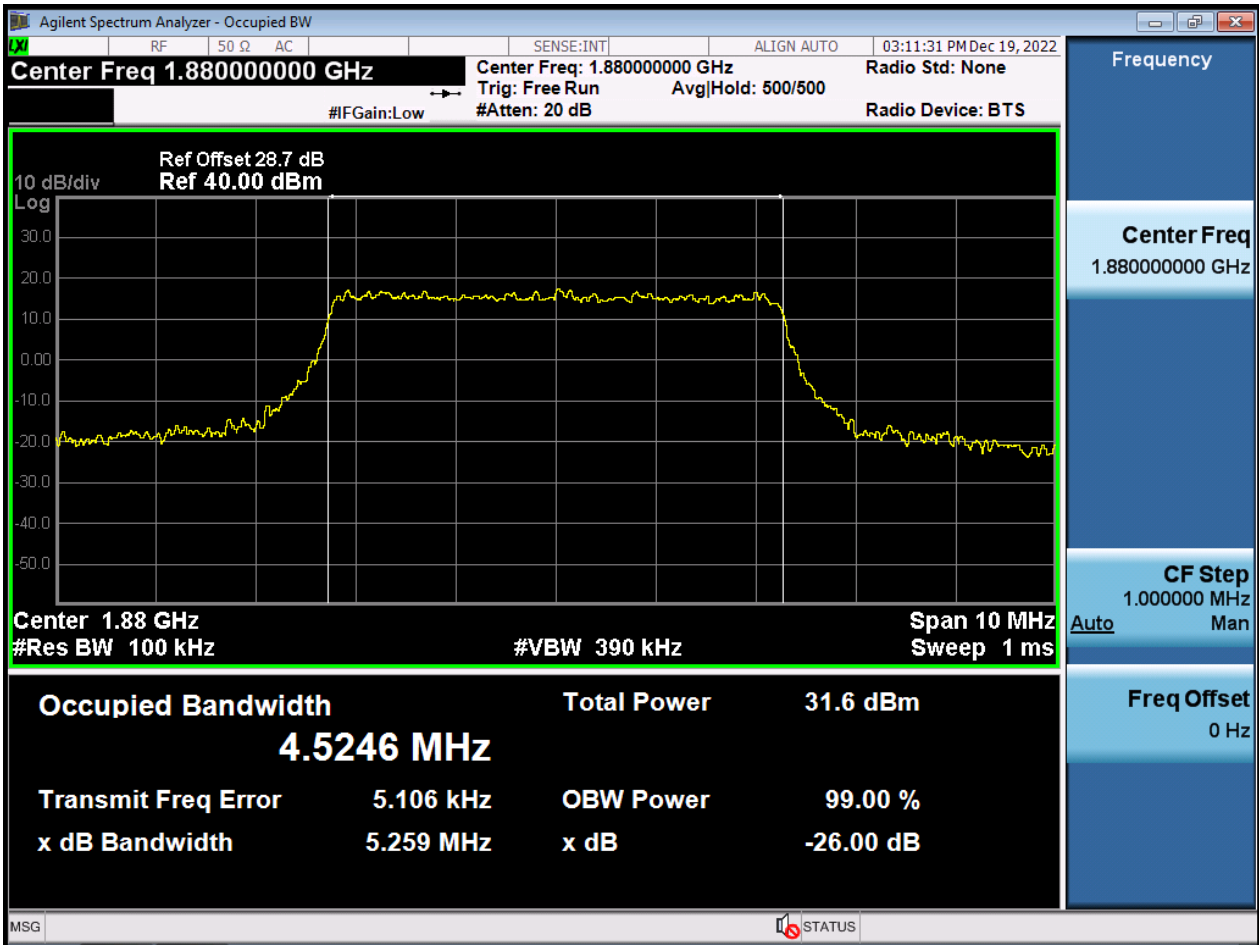
BW5 M_OBW_Middle Channel_QPSK_FullIRB



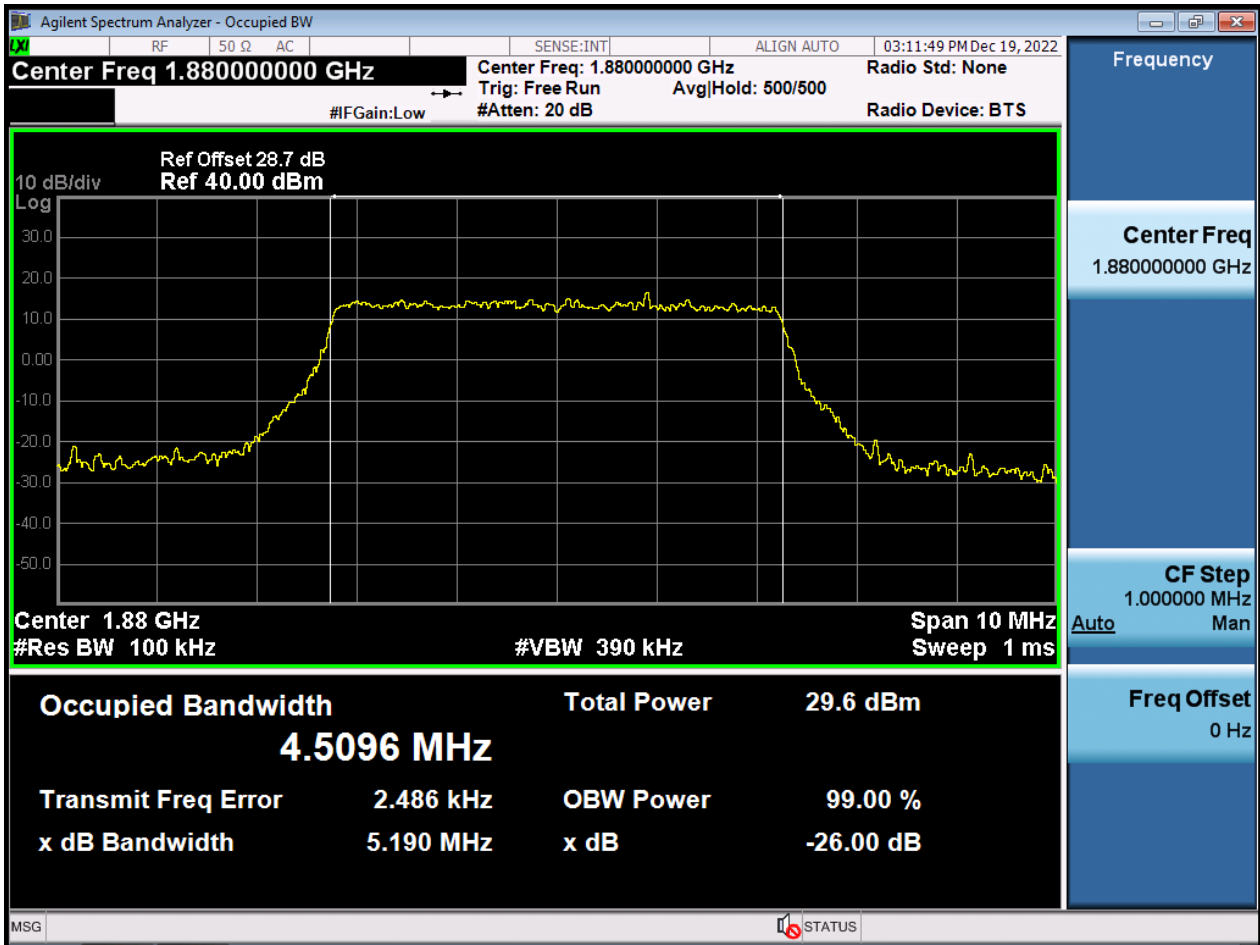
BW5 M_OBW_Middle Channel_16QAM_FullIRB



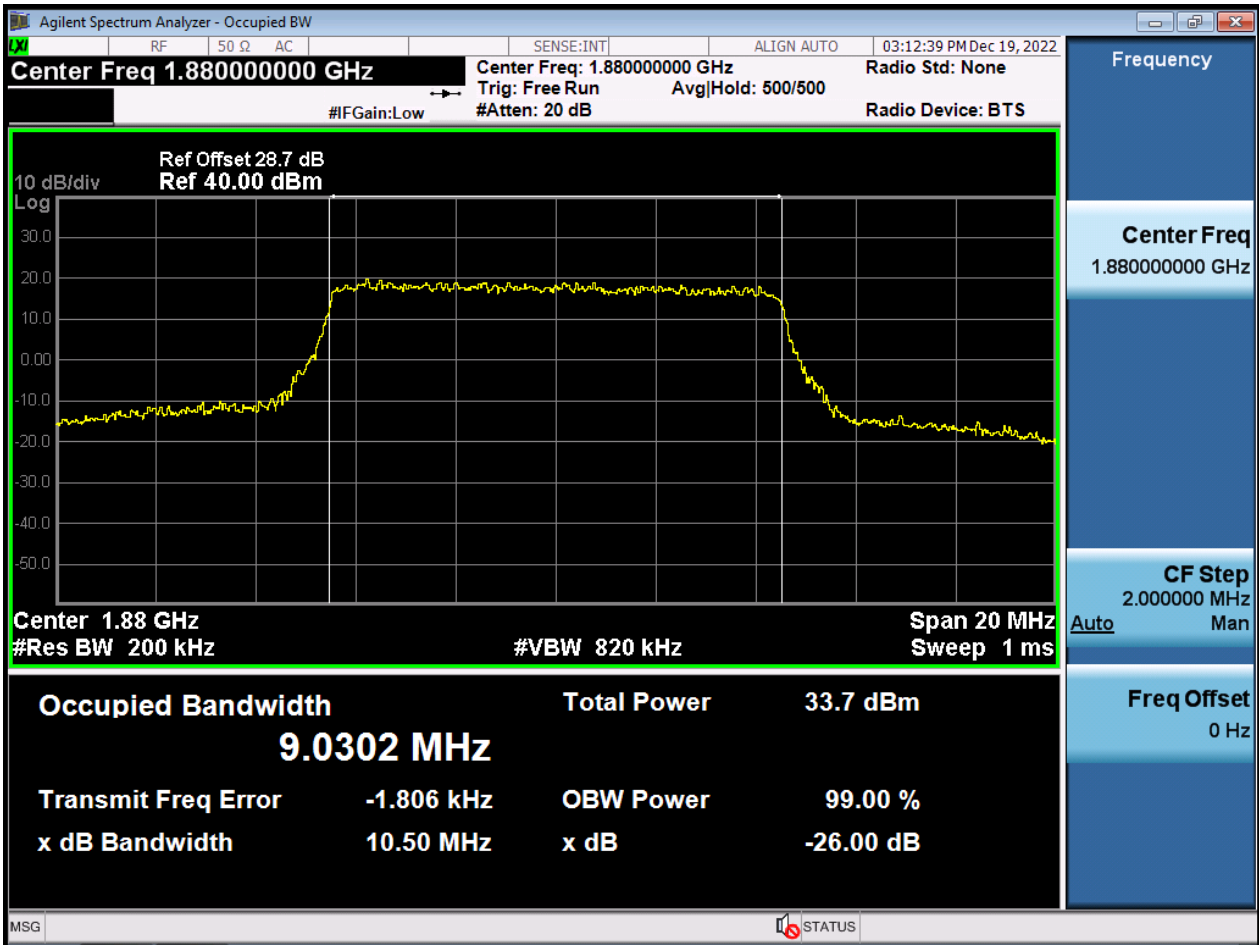
BW5 M_OBW_Middle Channel_64QAM_FullIRB



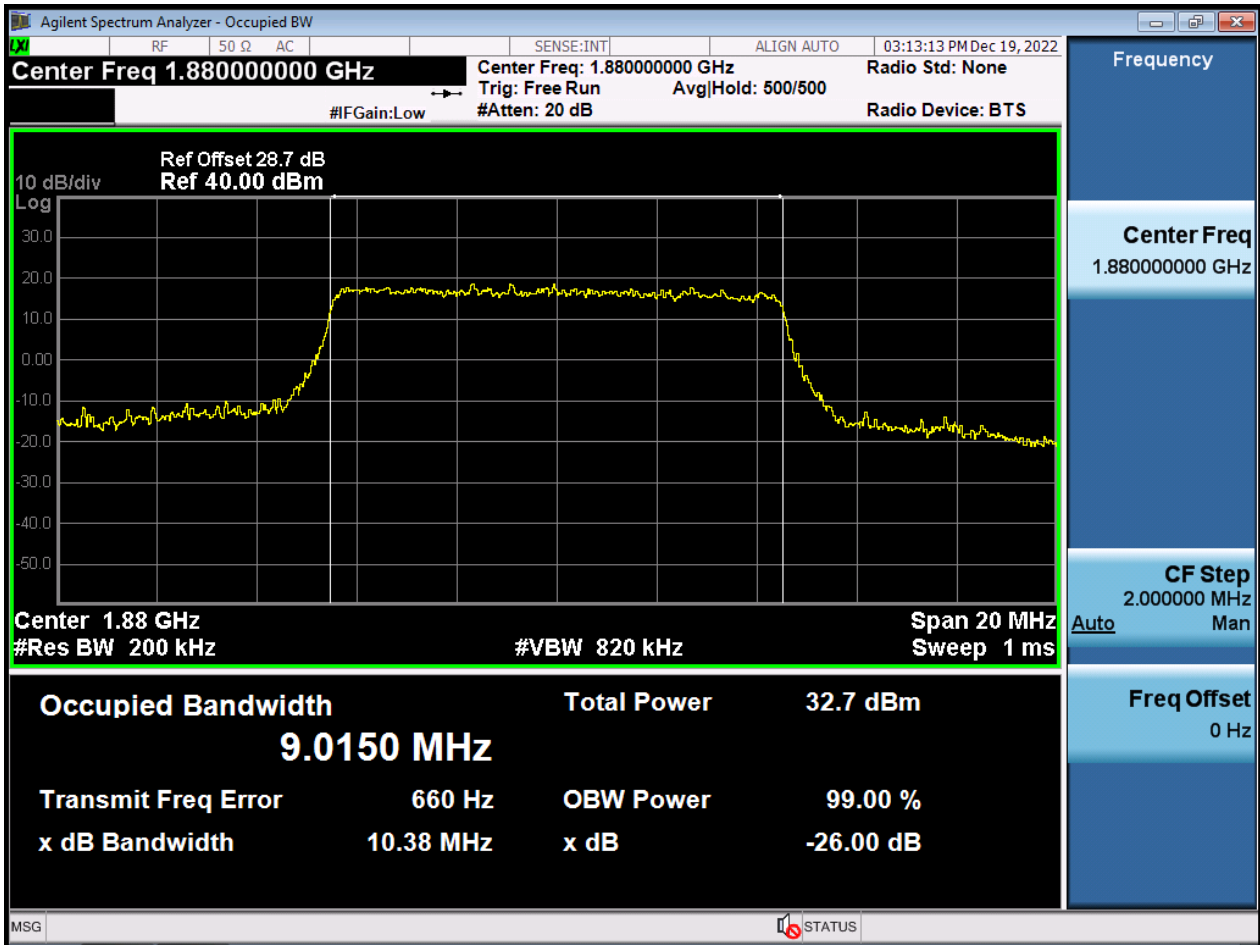
BW5 M_OBW_Middle Channel_256QAM_FullIRB



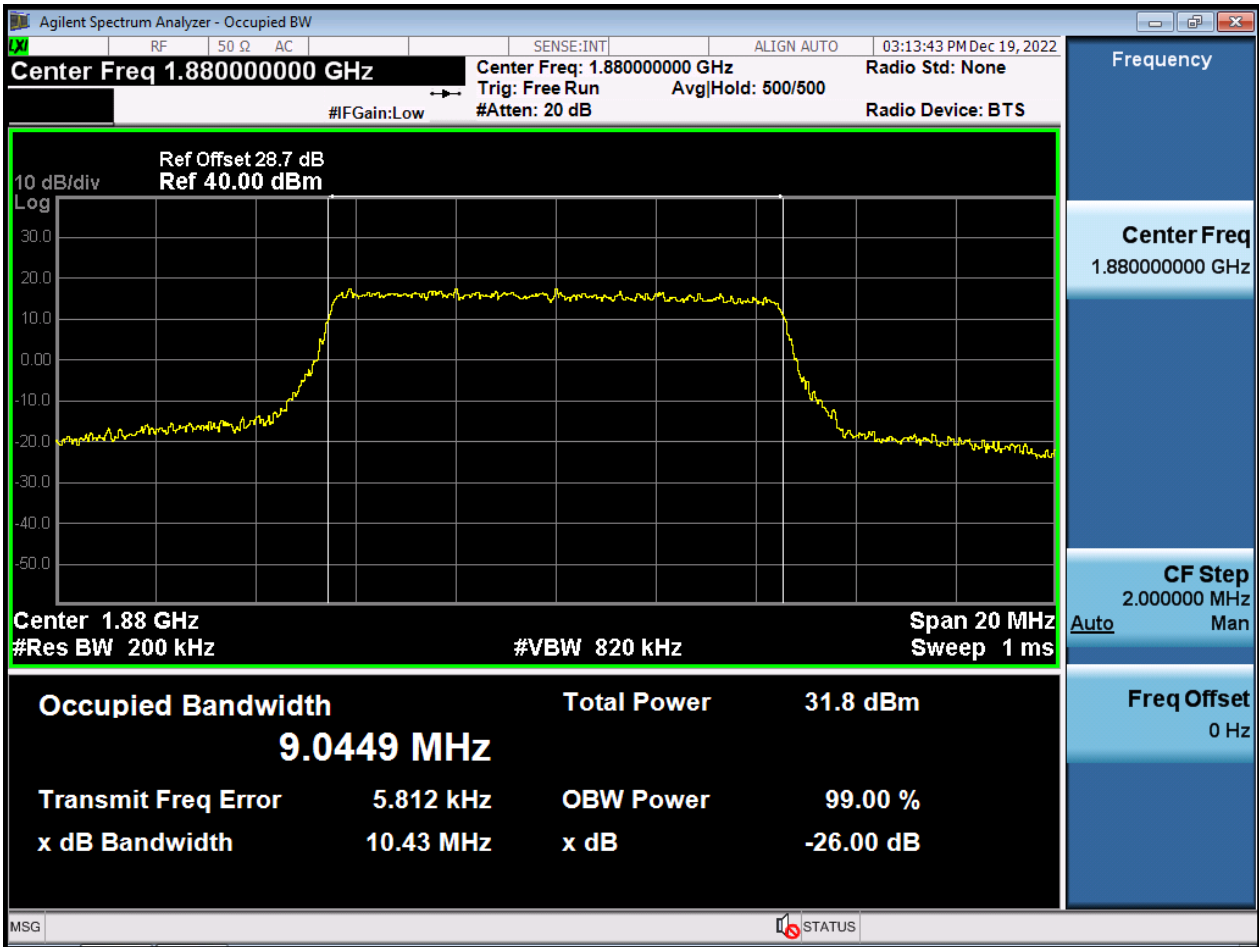
BW10 M_OBW_Middle Channel_QPSK_FullIRB



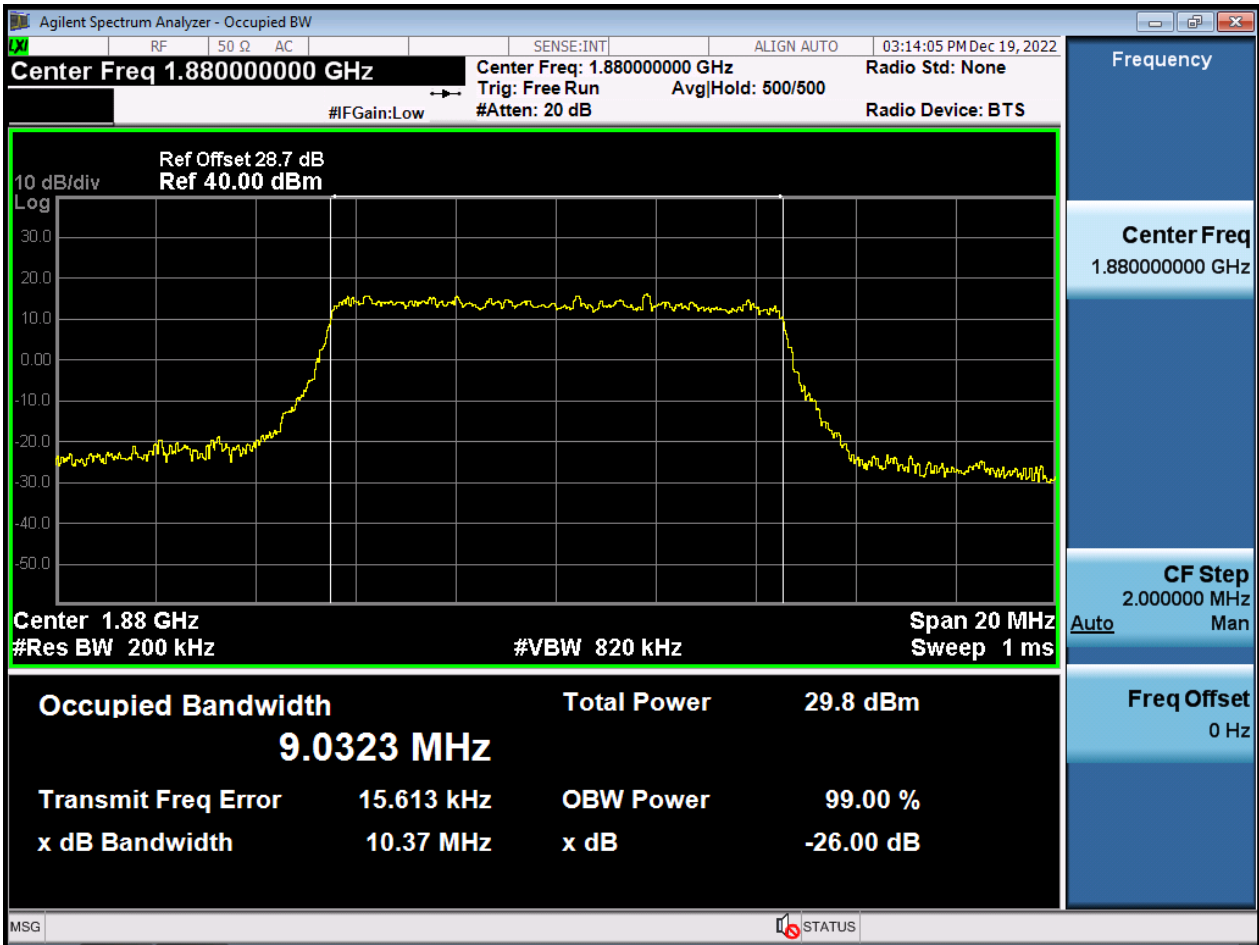
BW10 M_OBW_Middle Channel_16QAM_FullIRB



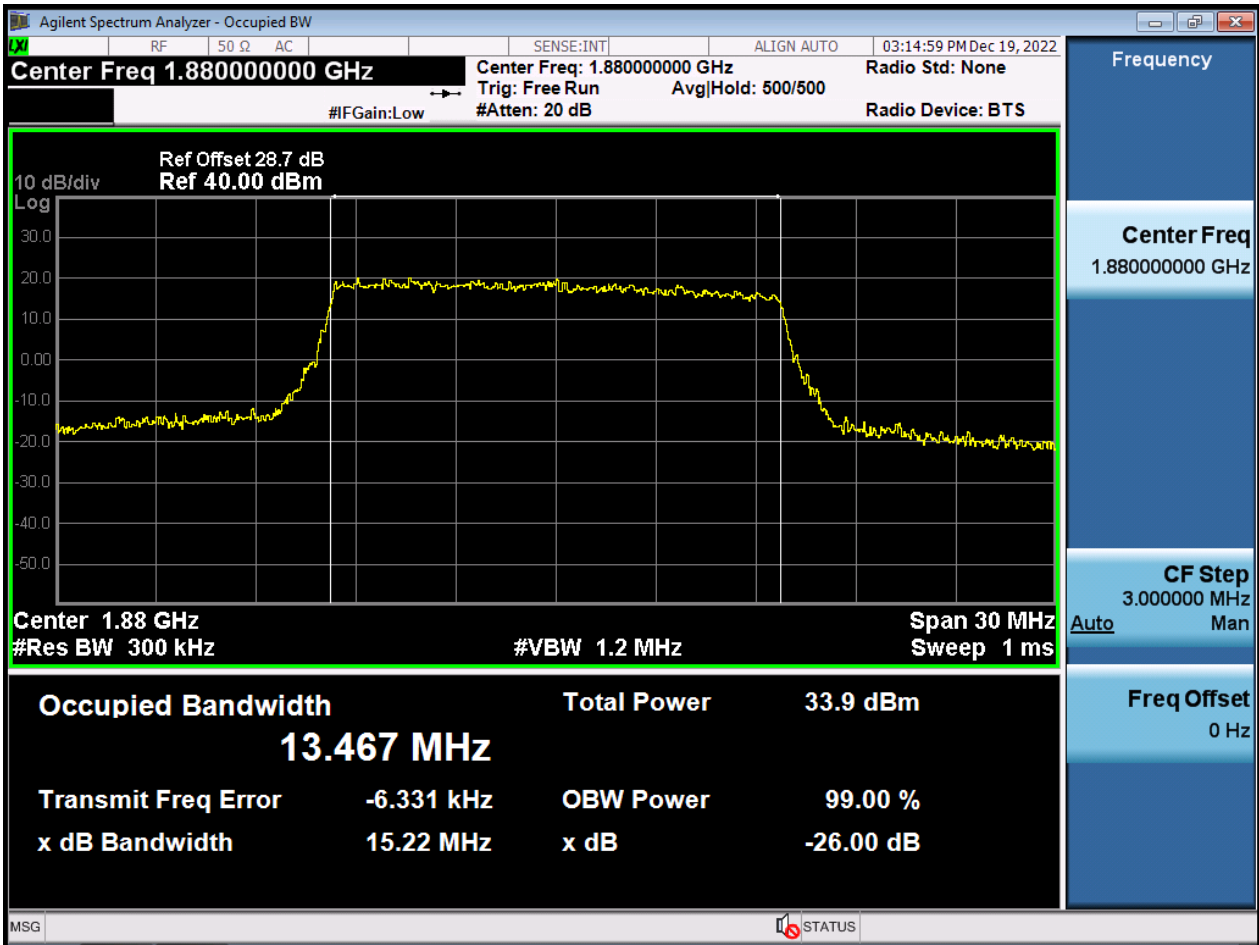
BW10 M_OBW_Middle Channel_64QAM_FullIRB



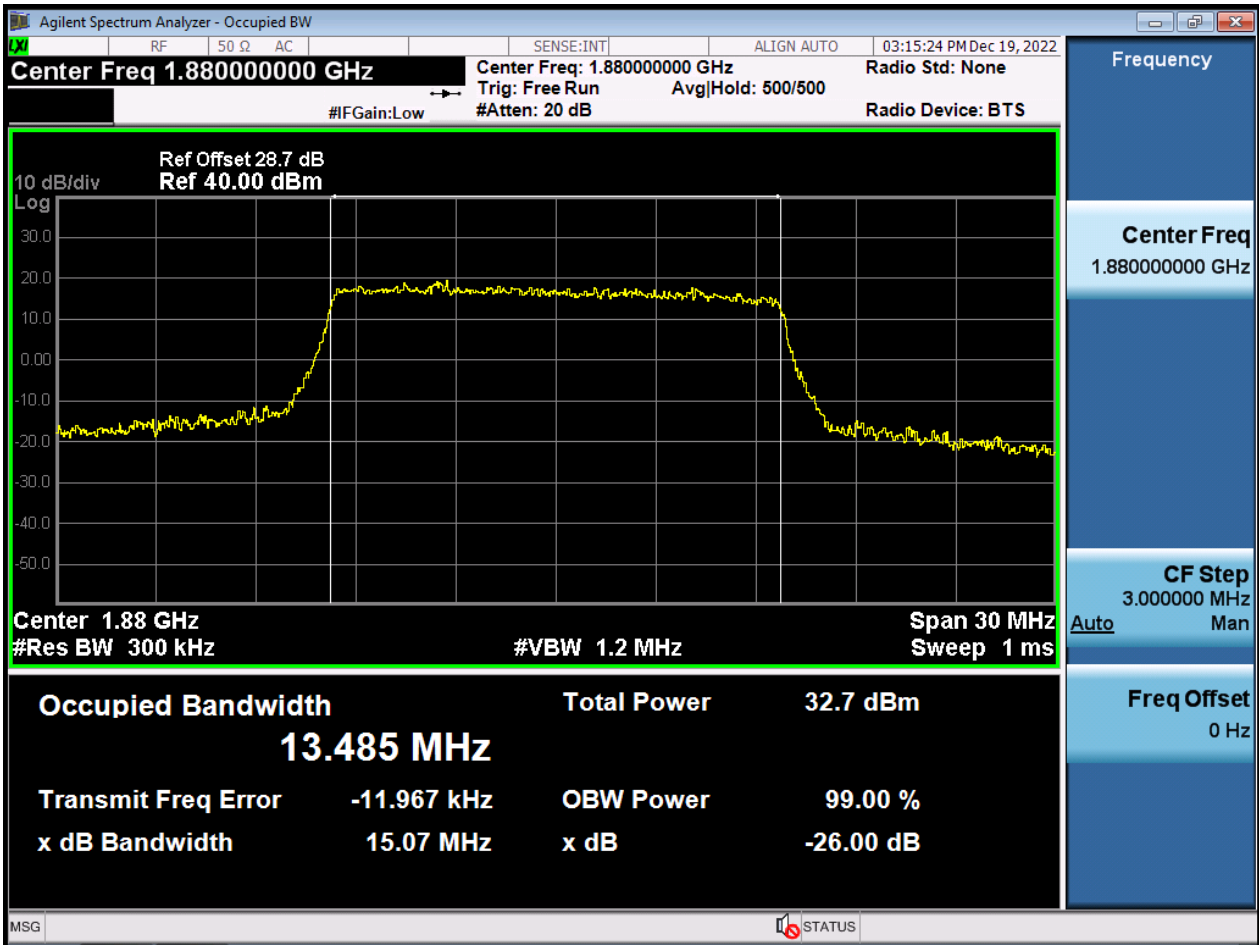
BW10 M_OBW_Middle Channel_256QAM_FullIRB



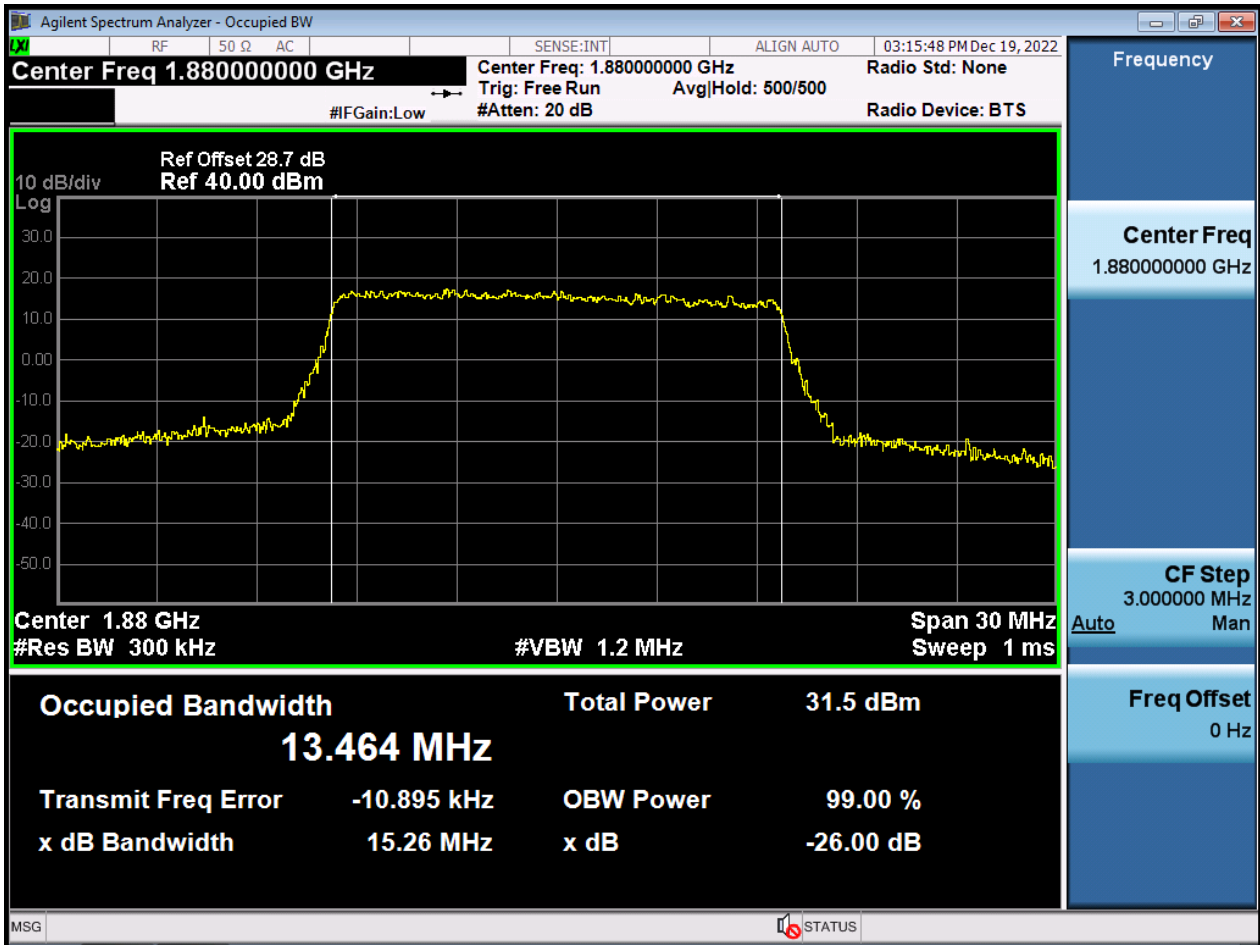
BW15 M_OBW_Middle Channel_QPSK_FullIRB



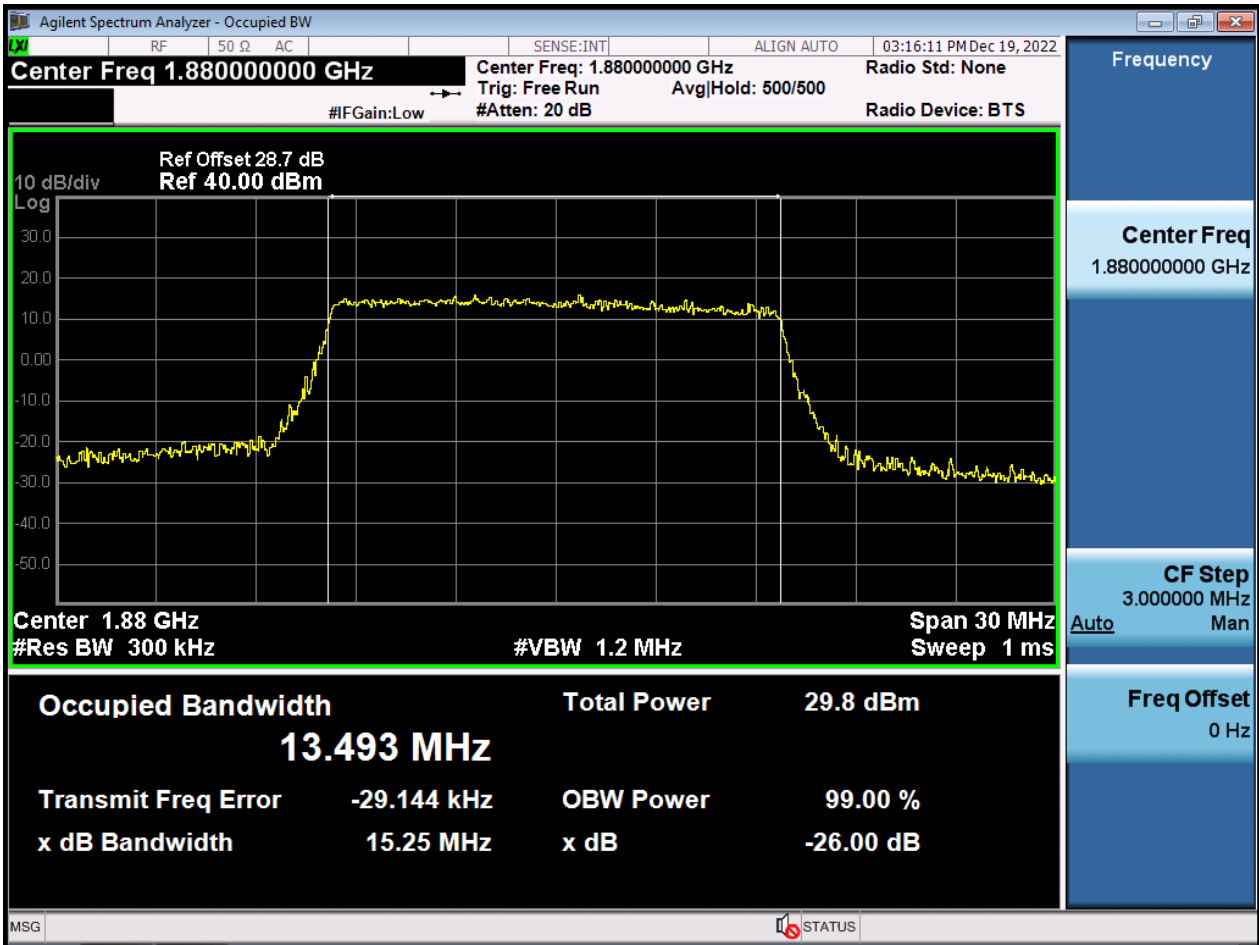
BW15 M_OBW_Middle Channel_16QAM_FullIRB



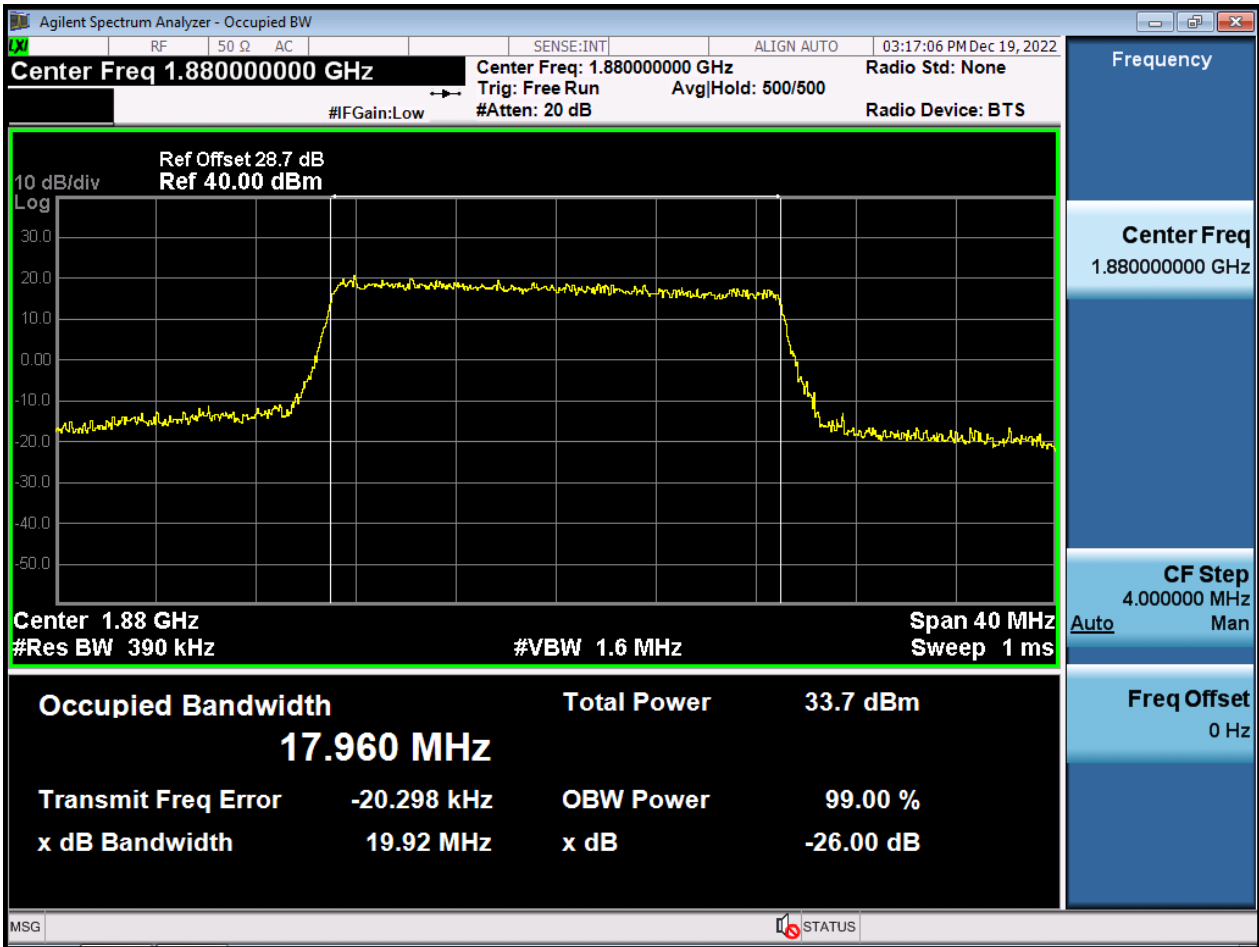
BW15 M_OBW_Middle Channel_64QAM_FullIRB



BW15 M_OBW_Middle Channel_256QAM_FullIRB



BW20 M_OBW_Middle Channel_QPSK_FullIRB



BW20 M_OBW_Middle Channel_16QAM_FullIRB

