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FCC LTE REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Address:
129, Samsung-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Date of Issue:
November 24, 2022

Location:
HCT CO., LTD.,
74, Seoicheon-ro 578beon-gil, Majang-myeon,
Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Report No.: HCT-RF-2211-FC031

FCC ID:	**A3LSMA146M**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**

Model(s):	SM-A146M/DS
Additional Model(s):	SM-A146M
EUT Type:	Mobile phone
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§24, §2

Main2 Antenna

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	0.256	24.08
		1M10W7D	16QAM	0.210	23.22
		1M10W7D	64QAM	0.169	22.27
		1M11W7D	256QAM	0.084	19.22
LTE – Band2 (3)	1851.5 - 1908.5	2M72G7D	QPSK	0.257	24.10
		2M72W7D	16QAM	0.210	23.22
		2M70W7D	64QAM	0.166	22.19
		2M72W7D	256QAM	0.083	19.20
LTE – Band2 (5)	1852.5 - 1907.5	4M53G7D	QPSK	0.261	24.16
		4M52W7D	16QAM	0.217	23.37
		4M52W7D	64QAM	0.175	22.42
		4M53W7D	256QAM	0.086	19.36
LTE – Band2 (10)	1855.0 - 1905.0	8M99G7D	QPSK	0.290	24.62
		9M03W7D	16QAM	0.248	23.94
		9M00W7D	64QAM	0.199	22.98
		9M03W7D	256QAM	0.099	19.96
LTE – Band2 (15)	1857.5 - 1902.5	13M5G7D	QPSK	0.236	23.72
		13M5W7D	16QAM	0.198	22.97
		13M5W7D	64QAM	0.159	22.02
		13M5W7D	256QAM	0.078	18.94
LTE – Band2 (20)	1860.0 - 1900.0	17M9G7D	QPSK	0.249	23.97
		18M0W7D	16QAM	0.210	23.22
		18M0W7D	64QAM	0.166	22.20
		18M0W7D	256QAM	0.083	19.17

Main3 Antenna

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	0.109	20.38
		1M09W7D	16QAM	0.094	19.74
		1M10W7D	64QAM	0.077	18.87
		1M09W7D	256QAM	0.038	15.75
LTE – Band2 (3)	1851.5 - 1908.5	2M71G7D	QPSK	0.123	20.90
		2M74W7D	16QAM	0.099	19.97
		2M75W7D	64QAM	0.079	18.96
		2M76W7D	256QAM	0.039	15.95
LTE – Band2 (5)	1852.5 - 1907.5	4M52G7D	QPSK	0.122	20.86
		4M52W7D	16QAM	0.099	19.95
		4M53W7D	64QAM	0.080	19.02
		4M53W7D	256QAM	0.040	16.04
LTE – Band2 (10)	1855.0 - 1905.0	9M02G7D	QPSK	0.142	21.52
		9M04W7D	16QAM	0.119	20.75
		8M99W7D	64QAM	0.094	19.75
		9M01W7D	256QAM	0.047	16.76
LTE – Band2 (15)	1857.5 - 1902.5	13M5G7D	QPSK	0.140	21.46
		13M5W7D	16QAM	0.117	20.69
		13M5W7D	64QAM	0.092	19.66
		13M5W7D	256QAM	0.047	16.69
LTE – Band2 (20)	1860.0 - 1900.0	17M9G7D	QPSK	0.131	21.17
		18M0W7D	16QAM	0.108	20.35
		18M0W7D	64QAM	0.085	19.27
		17M9W7D	256QAM	0.043	16.37

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)

REVIEWED BY

Report prepared by : Jae Mun Do
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)

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2211-FC031	November 24, 2022	- First Approval Report

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

Table of Contents

MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name:	SAMSUNG Electronics Co., Ltd.
Address:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
FCC ID:	A3LSMA146M
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-A146M/DS
Additional Model(s):	SM-A146M
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:	September 21, 2022~ October 25, 2022
Serial number:	Radiated: 654569e87d337ece (Main2 Ant), R93T9002TNA (Main3 Ant) Conducted: R93T8000BCB (Main2 Ant), R93T8000LGL (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), 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 ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points > 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

Test Note

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

   The power is calculated by the following formula;

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

   Where: P_{d} is the dipole equivalent power and P_{g} is the generator output power into the substitution antenna.

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

3.3 RADIATED SPURIOUS EMISSIONS

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

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

Test Settings

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

Test Note

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

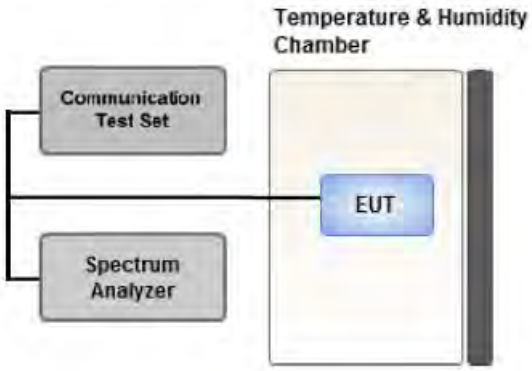
$$\text{Result}_{(dBm)} = Pg_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dBi)}$$

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

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

$$EIRP_{(dBm)} = ERP_{(dBm)} + 2.15$$

3.4 PEAK- TO- AVERAGE RATIO



Test setup

① CCDF Procedure for PAPR

Test Settings

1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Set the measurement interval as follows:
   .- 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 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)

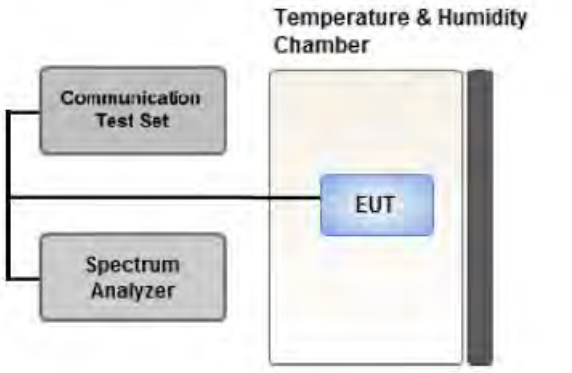
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW ≥ 3 × RBW.

1. Set the RBW ≥ OBW.
2. Set VBW ≥ 3 × RBW.
3. Set span ≥ 2 × OBW.
4. Sweep time ≥ 10 × (number of points in sweep) × (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 × to 3 × the OBW.
2. Set RBW ≥ OBW.
3. Set VBW ≥ 3 × RBW.
4. Set number of measurement points in sweep ≥ 2 × span / RBW.
5. Sweep time:
   Set ≥ [10 × (number of points in sweep) × (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/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

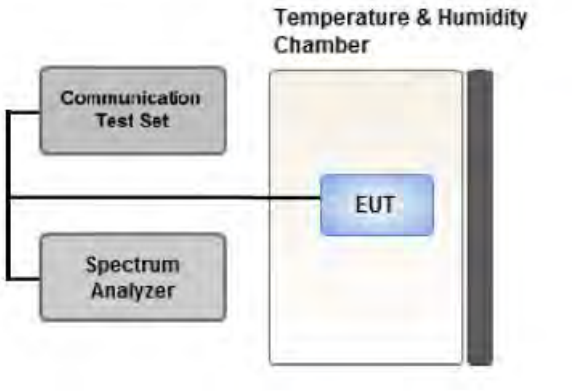
The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

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 ≥ 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

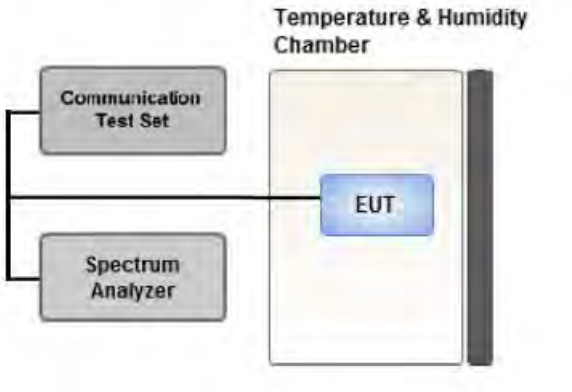
Test Overview

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 ≥ 3 MHz
3. Detector = RMS
4. Trace Mode = Average
5. Sweep time = auto
6. Number of points in sweep ≥ 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

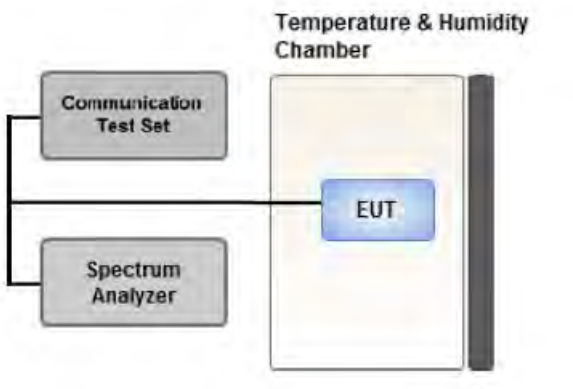
1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW > 1 % of the emission bandwidth
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW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

Test Notes

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

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

3.8 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. (Worst case : 10 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.
- SM-A146M/DS & additional models were tested and the worst case results are reported.

(Worst case : SM-A146M/DS)

[Main2 Ant Worst case]

Test Description	Modulation	RB size	RB offset	Axis
Effective Radiated Power	QPSK, 16QAM, 64QAM, 256QAM	1	0	Z
Radiated Spurious and Harmonic Emissions	QPSK	1	0	X

[Main3 Ant Worst case]

Test Description	Modulation	RB size	RB offset	Axis
Effective Radiated Power	QPSK, 16QAM, 64QAM, 256QAM	1	0	X
Radiated Spurious and Harmonic Emissions	QPSK	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.
- SM-A146M/DS & additional models were tested and the worst case results are reported.
  (Worst case : SM-A146M/DS)

4. LIST OF TEST EQUIPMENT

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
H.P.F	FBSR-02B(WHK1.2/15 G-10EF)	T&M SYSTEM	-	02/18/2023	Annual
H.P.F	FBSR-02B(WHK3.3/18 G-10EF)	T&M SYSTEM	-	02/18/2023	Annual
Power Splitter(DC ~ 26.5 GHz)	11667B	Hewlett Packard	11275	03/11/2023	Annual
DC Power Supply	E3632A	Agilent	MY40010147	06/21/2023	Annual
Dipole Antenna	UHAP	Schwarzbeck	557	04/05/2023	Biennial
Dipole Antenna	UHAP	Schwarzbeck	558	04/05/2023	Biennial
Chamber	SU-642	ESPEC	93008124	03/04/2023	Annual
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	147	08/30/2023	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	9120D-1298	09/15/2023	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/29/2024	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170124	04/12/2023	Biennial
Signal Analyzer(10 Hz ~ 26.5 GHz)	N9020A	Agilent	MY52090906	05/02/2023	Annual
ATTENUATOR(20 dB)	8493C	Hewlett Packard	17280	05/18/2023	Annual
Spectrum Analyzer(10 Hz ~ 40 GHz)	FSV40	REOHDE & SCHWARZ	100931	08/29/2023	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/18/2023	Annual
Loop Antenna(9 kHz ~ 30 MHz)	FMZB1513	Schwarzbeck	1513-333	03/17/2024	Biennial
Bilog Antenna	VULB9160	Schwarzbeck	3150	03/03/2023	Biennial
Hybrid Antenna	VULB9168	Schwarzbeck	760	02/22/2023	Biennial
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262116770	07/05/2023	Annual
Wideband Radio Communication Tester	MT8820C	Anritsu Corp.	6200863156	12/29/2022	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 (±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	**See Note1**
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 (Main2 Antenna)

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
1850.7	LTE B2/ 1.4 MHz	QPSK	-19.47	14.31	10.40	2.13	V	< 2.00	0.181	22.58
		16-QAM	-20.27	13.51	10.40	2.13	V		0.151	21.78
		64-QAM	-21.26	12.52	10.40	2.13	V		0.120	20.79
		256-QAM	-24.30	9.48	10.40	2.13	V		0.060	17.75
1880.0		QPSK	-19.27	15.35	10.40	2.23	V		0.225	23.52
		16-QAM	-20.01	14.61	10.40	2.23	V		0.190	22.78
		64-QAM	-21.03	13.59	10.40	2.23	V		0.150	21.76
		256-QAM	-24.11	10.51	10.40	2.23	V		0.074	18.68
1909.3		QPSK	-18.75	15.82	10.40	2.14	V		0.256	24.08
		16-QAM	-19.61	14.96	10.40	2.14	V		0.210	23.22
		64-QAM	-20.56	14.01	10.40	2.14	V		0.169	22.27
		256-QAM	-23.61	10.96	10.40	2.14	V		0.084	19.22

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1851.5	LTE B2/ 3 MHz	QPSK	-19.50	14.28	10.40	2.13	V	< 2.00	0.180	22.55
		16-QAM	-20.30	13.48	10.40	2.13	V		0.150	21.75
		64-QAM	-21.34	12.44	10.40	2.13	V		0.118	20.71
		256-QAM	-24.32	9.46	10.40	2.13	V		0.059	17.73
1880.0		QPSK	-19.27	15.35	10.40	2.23	V		0.225	23.52
		16-QAM	-20.10	14.52	10.40	2.23	V		0.186	22.69
		64-QAM	-21.13	13.49	10.40	2.23	V		0.147	21.66
		256-QAM	-24.14	10.48	10.40	2.23	V		0.073	18.65
1908.5		QPSK	-18.73	15.84	10.40	2.14	V		0.257	24.10
		16-QAM	-19.61	14.96	10.40	2.14	V		0.210	23.22
		64-QAM	-20.64	13.93	10.40	2.14	V		0.166	22.19
		256-QAM	-23.63	10.94	10.40	2.14	V		0.083	19.20

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1852.5	LTE B2/ 5 MHz	QPSK	-19.13	14.65	10.40	2.13	V	< 2.00	0.196	22.92
		16-QAM	-19.96	13.82	10.40	2.13	V		0.162	22.09
		64-QAM	-20.89	12.89	10.40	2.13	V		0.131	21.16
		256-QAM	-23.97	9.81	10.40	2.13	V		0.064	18.08
1880.0		QPSK	-19.32	15.30	10.40	2.23	V		0.222	23.47
		16-QAM	-20.14	14.48	10.40	2.23	V		0.184	22.65
		64-QAM	-21.14	13.48	10.40	2.23	V		0.146	21.65
		256-QAM	-24.22	10.40	10.40	2.23	V		0.072	18.57
1907.5		QPSK	-18.67	15.90	10.40	2.14	V		0.261	24.16
		16-QAM	-19.46	15.11	10.40	2.14	V		0.217	23.37
		64-QAM	-20.41	14.16	10.40	2.14	V		0.175	22.42
		256-QAM	-23.47	11.10	10.40	2.14	V		0.086	19.36

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1855.0	LTE B2/ 10 MHz	QPSK	-19.42	14.54	10.40	2.15	V	< 2.00	0.190	22.79
		16-QAM	-20.28	13.68	10.40	2.15	V		0.156	21.93
		64-QAM	-21.23	12.73	10.40	2.15	V		0.125	20.98
		256-QAM	-24.25	9.71	10.40	2.15	V		0.063	17.96
1880.0		QPSK	-18.93	15.69	10.40	2.23	V		0.243	23.86
		16-QAM	-19.74	14.88	10.40	2.23	V		0.202	23.05
		64-QAM	-20.81	13.81	10.40	2.23	V		0.158	21.98
		256-QAM	-23.81	10.81	10.40	2.23	V		0.079	18.98
1905.0		QPSK	-18.20	16.38	10.40	2.16	V		0.290	24.62
		16-QAM	-18.88	15.70	10.40	2.16	V		0.248	23.94
		64-QAM	-19.84	14.74	10.40	2.16	V		0.199	22.98
		256-QAM	-22.86	11.72	10.40	2.16	V		0.099	19.96

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1857.5	LTE B2/ 15 MHz	QPSK	-19.04	15.10	10.40	2.17	V	< 2.00	0.215	23.33
		16-QAM	-19.85	14.29	10.40	2.17	V		0.179	22.52
		64-QAM	-20.89	13.25	10.40	2.17	V		0.141	21.48
		256-QAM	-23.91	10.23	10.40	2.17	V		0.070	18.46
1880.0		QPSK	-19.27	15.35	10.40	2.23	V		0.225	23.52
		16-QAM	-20.03	14.59	10.40	2.23	V		0.189	22.76
		64-QAM	-21.12	13.50	10.40	2.23	V		0.147	21.67
		256-QAM	-24.11	10.51	10.40	2.23	V		0.074	18.68
1902.5		QPSK	-19.09	15.50	10.40	2.18	V		0.236	23.72
		16-QAM	-19.84	14.75	10.40	2.18	V		0.198	22.97
		64-QAM	-20.79	13.80	10.40	2.18	V		0.159	22.02
		256-QAM	-23.87	10.72	10.40	2.18	V		0.078	18.94

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1860.0	LTE B2/ 20 MHz	QPSK	-19.24	14.90	10.40	2.17	V	< 2.00	0.206	23.13
		16-QAM	-20.05	14.09	10.40	2.17	V		0.171	22.32
		64-QAM	-21.03	13.11	10.40	2.17	V		0.136	21.34
		256-QAM	-24.06	10.08	10.40	2.17	V		0.068	18.31
1880.0		QPSK	-19.24	15.38	10.40	2.23	V		0.227	23.55
		16-QAM	-20.06	14.56	10.40	2.23	V		0.188	22.73
		64-QAM	-21.02	13.60	10.40	2.23	V		0.150	21.77
		256-QAM	-24.04	10.58	10.40	2.23	V		0.075	18.75
1900.0		QPSK	-18.84	15.75	10.40	2.18	V		0.249	23.97
		16-QAM	-19.59	15.00	10.40	2.18	V		0.210	23.22
		64-QAM	-20.61	13.98	10.40	2.18	V		0.166	22.20
		256-QAM	-23.64	10.95	10.40	2.18	V		0.083	19.17

8.2 RADIATED SPURIOUS EMISSIONS

▣ OPERATING FREQUENCY: 1905.0 MHz

▣ MEASURED OUTPUT POWER: 24.62 dBm = 0.290 W

▣ MODE: LTE B2

▣ MODULATION SIGNAL: 10 MHz QPSK

▣ DISTANCE: 3 meters

▣ LIMIT: 43 + 10 log10 (W) = 37.62 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	-55.10	12.30	-60.21	3.14	H	-51.05	75.66
	5 565.00	-56.20	13.30	-54.11	3.90	V	-44.71	69.33
	7 420.00	-56.88	10.80	-46.72	4.57	V	-40.49	65.11
18900 (1880.0)	3 760.00	-54.99	12.32	-59.49	3.08	H	-50.25	74.87
	5 640.00	-56.33	13.10	-54.52	3.90	H	-45.32	69.94
	7 520.00	-57.25	10.84	-46.67	4.61	H	-40.44	65.06
19150 (1905.0)	3 810.00	-55.41	12.40	-59.83	3.12	V	-50.55	75.17
	5 715.00	-55.83	13.07	-53.46	3.96	H	-44.34	68.96
	7 620.00	-57.05	11.18	-46.56	4.65	H	-40.03	64.65

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	5.58
			16-QAM	6	0	6.10
			64-QAM	6	0	6.42
			256-QAM	6	0	6.56
	3 MHz		QPSK	15	0	5.64
			16-QAM	15	0	6.21
			64-QAM	15	0	6.44
			256-QAM	15	0	6.45
	5 MHz		QPSK	25	0	5.53
			16-QAM	25	0	6.12
			64-QAM	25	0	6.43
			256-QAM	25	0	6.40
	10 MHz		QPSK	50	0	5.66
			16-QAM	50	0	6.17
			64-QAM	50	0	6.40
			256-QAM	50	0	6.42
	15 MHz		QPSK	75	0	5.52
			16-QAM	75	0	6.17
			64-QAM	75	0	6.36
			256-QAM	75	0	6.41
	20 MHz		QPSK	100	0	5.46
			16-QAM	100	0	6.14
			64-QAM	100	0	6.25
			256-QAM	100	0	6.42

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 137 ~ 160.

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	1.1028
			16-QAM	6	0	1.0963
			64-QAM	6	0	1.0999
			256-QAM	6	0	1.1089
	3 MHz		QPSK	15	0	2.7172
			16-QAM	15	0	2.7157
			64-QAM	15	0	2.6982
			256-QAM	15	0	2.7174
	5 MHz		QPSK	25	0	4.5286
			16-QAM	25	0	4.5203
			64-QAM	25	0	4.5204
			256-QAM	25	0	4.5334
	10 MHz		QPSK	50	0	8.9859
			16-QAM	50	0	9.0313
			64-QAM	50	0	9.0026
			256-QAM	50	0	9.0288
	15 MHz		QPSK	75	0	13.451
			16-QAM	75	0	13.459
			64-QAM	75	0	13.476
			256-QAM	75	0	13.456
	20 MHz		QPSK	100	0	17.913
			16-QAM	100	0	17.952
			64-QAM	100	0	17.949
			256-QAM	100	0	17.968

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 113 ~ 136.

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	3.7059	27.976	-77.498	-49.522	-13.00
		1880.0	3.6860	27.976	-77.233	-49.257	
		1909.3	3.6965	27.976	-77.240	-49.264	
	3	1851.5	3.7049	27.976	-77.139	-49.163	
		1880.0	3.6865	27.976	-77.503	-49.527	
		1908.5	3.7104	27.976	-77.426	-49.450	
	5	1852.5	2.5788	27.976	-77.234	-49.258	
		1880.0	3.6950	27.976	-77.290	-49.314	
		1907.5	3.7024	27.976	-77.332	-49.356	
	10	1855.0	3.6870	27.976	-77.143	-49.167	
		1880.0	3.1656	27.976	-77.245	-49.269	
		1905.0	3.7149	27.976	-76.826	-48.850	
	15	1857.5	3.6950	27.976	-77.148	-49.172	
		1880.0	3.7074	27.976	-77.377	-49.401	
		1902.5	3.7059	27.976	-77.463	-49.487	
	20	1860.0	3.6930	27.976	-76.996	-49.020	
		1880.0	3.7159	27.976	-76.975	-48.999	
		1900.0	3.6930	27.976	-77.279	-49.303	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 161 ~ 196.
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

- Plots of the EUT's Band Edge are shown Page 77 ~ 112.

8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

▣ MODE: LTE B2

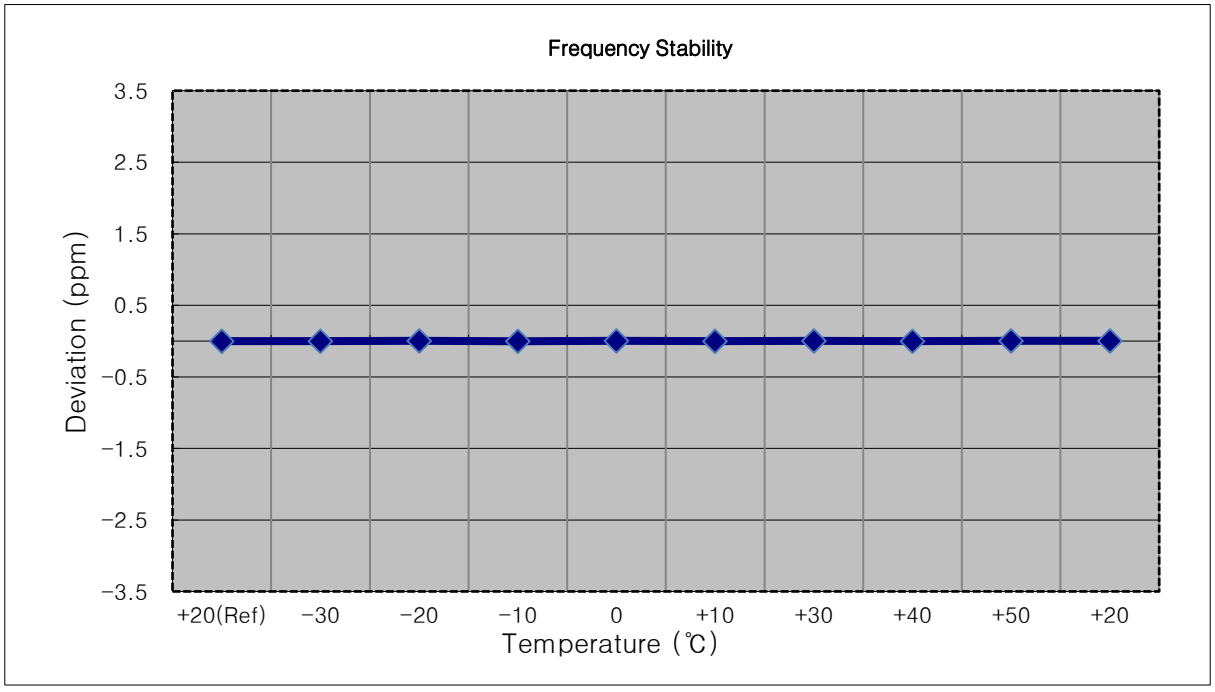
▣ OPERATING FREQUENCY: 1850,700,000 Hz

▣ CHANNEL: 18607 (1.4 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1850 700 006	0.0	0.000 000	0.000
100 %		-30	1850 700 002	-3.6	0.000 000	-0.002
100 %		-20	1850 700 010	4.4	0.000 000	0.002
100 %		-10	1850 700 001	-4.9	0.000 000	-0.003
100 %		0	1850 700 010	4.3	0.000 000	0.002
100 %		+10	1850 700 002	-3.5	0.000 000	-0.002
100 %		+30	1850 700 012	5.7	0.000 000	0.003
100 %		+40	1850 700 003	-3.1	0.000 000	-0.002
100 %		+50	1850 700 011	5.2	0.000 000	0.003
Batt. Endpoint	3.400	+20	1850 700 011	5.2	0.000 000	0.003



▣ MODE: LTE B2

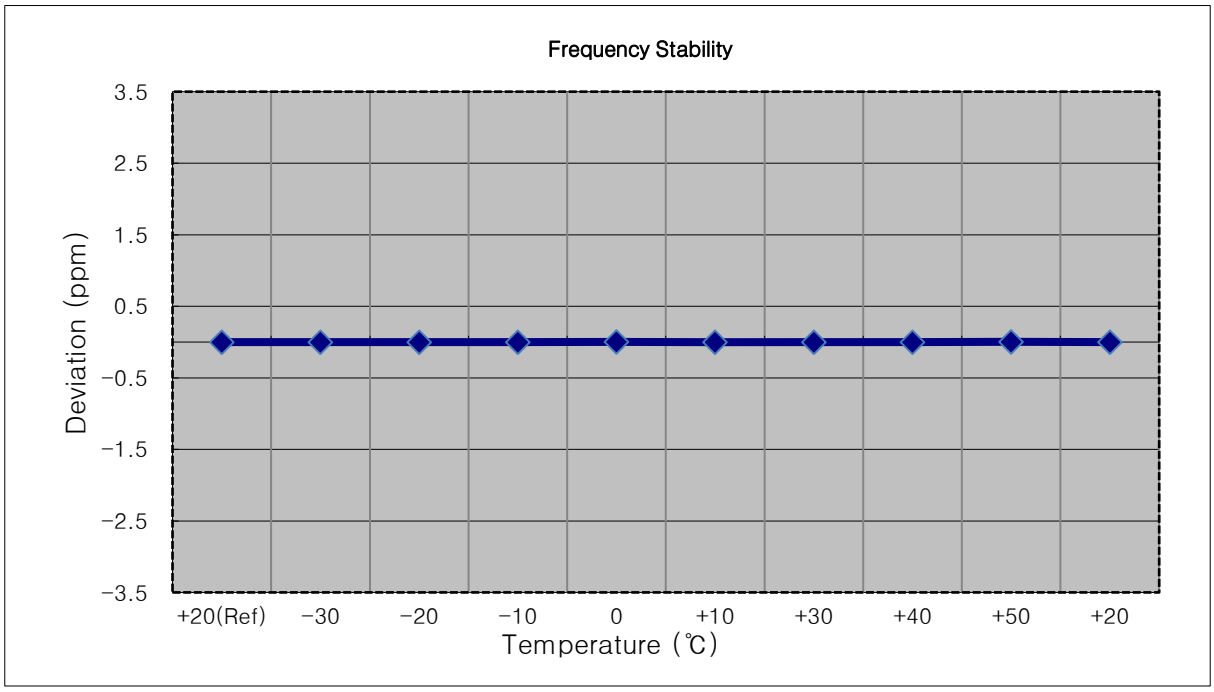
▣ OPERATING FREQUENCY: 1851,500,000 Hz

▣ CHANNEL: 18615 (3 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	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 500 001	-2.9	0.000 000	-0.002
100 %		-20	1851 500 007	2.6	0.000 000	0.001
100 %		-10	1851 500 002	-2.5	0.000 000	-0.001
100 %		0	1851 500 008	4.0	0.000 000	0.002
100 %		+10	1851 500 001	-3.3	0.000 000	-0.002
100 %		+30	1851 500 006	2.3	0.000 000	0.001
100 %		+40	1851 500 007	2.6	0.000 000	0.001
100 %		+50	1851 500 008	3.7	0.000 000	0.002
Batt. Endpoint	3.400	+20	1851 500 001	-2.7	0.000 000	-0.001



▣ MODE: LTE B2

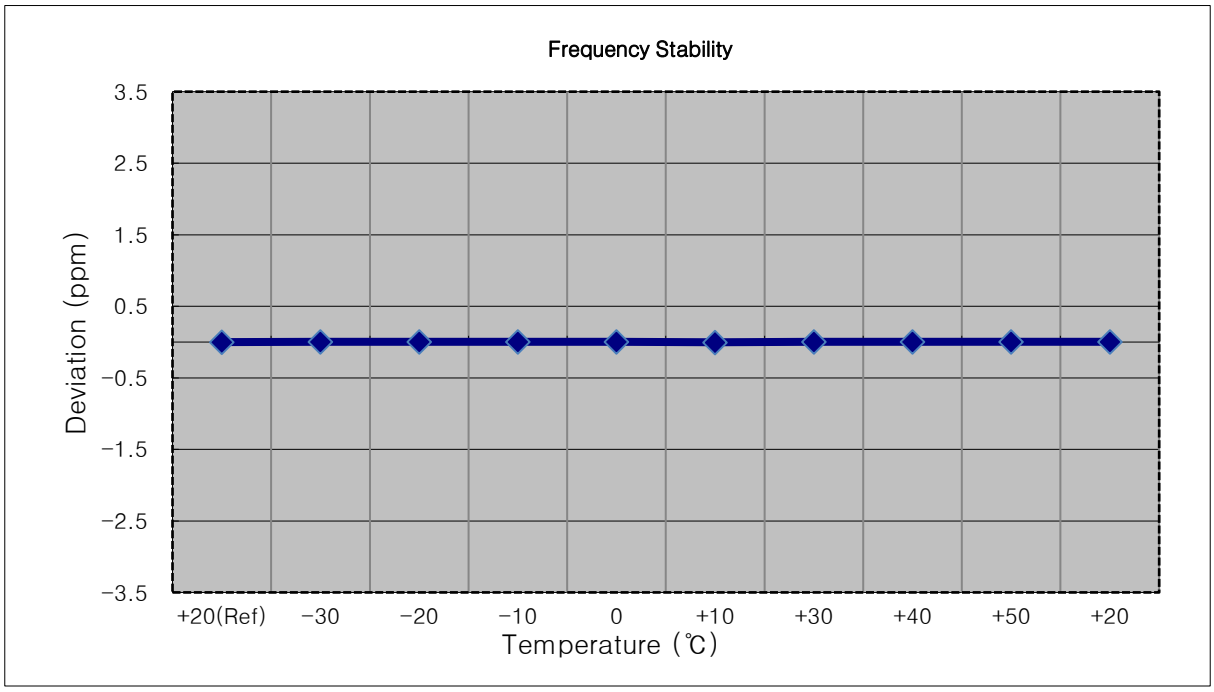
▣ OPERATING FREQUENCY: 1852,500,000 Hz

▣ CHANNEL: 18625 (5 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1852 499 995	0.0	0.000 000	0.000
100 %		-30	1852 499 999	4.1	0.000 000	0.002
100 %		-20	1852 500 002	6.5	0.000 000	0.004
100 %		-10	1852 500 001	5.5	0.000 000	0.003
100 %		0	1852 500 000	4.8	0.000 000	0.003
100 %		+10	1852 499 989	-5.7	0.000 000	-0.003
100 %		+30	1852 500 000	4.6	0.000 000	0.002
100 %		+40	1852 499 998	3.3	0.000 000	0.002
100 %		+50	1852 500 003	7.4	0.000 000	0.004
Batt. Endpoint	3.400	+20	1852 500 002	6.4	0.000 000	0.003



▣ MODE: LTE B2

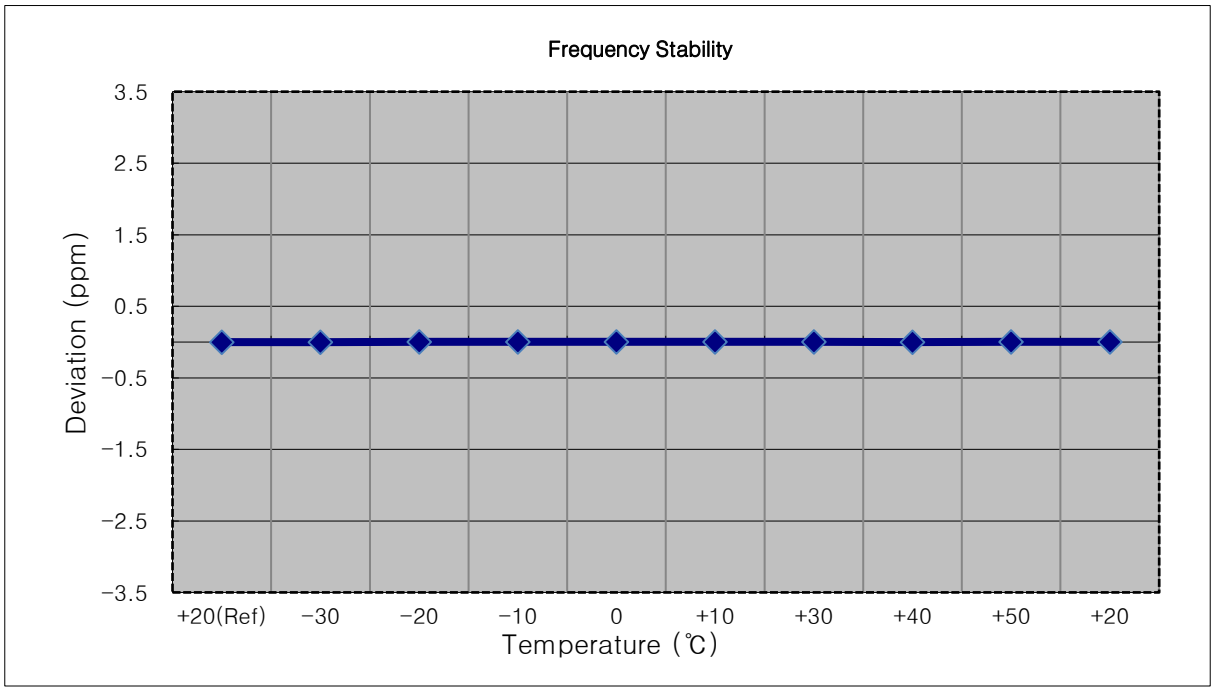
▣ OPERATING FREQUENCY: 1855,000,000 Hz

▣ CHANNEL: 18650 (10 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1855 000 004	0.0	0.000 000	0.000
100 %		-30	1855 000 001	-3.1	0.000 000	-0.002
100 %		-20	1855 000 011	6.5	0.000 000	0.004
100 %		-10	1855 000 009	4.6	0.000 000	0.002
100 %		0	1855 000 007	3.1	0.000 000	0.002
100 %		+10	1855 000 008	4.3	0.000 000	0.002
100 %		+30	1855 000 009	5.1	0.000 000	0.003
100 %		+40	1855 000 006	1.5	0.000 000	0.001
100 %		+50	1855 000 008	4.0	0.000 000	0.002
Batt. Endpoint	3.400	+20	1855 000 009	5.2	0.000 000	0.003



▣ MODE: LTE B2

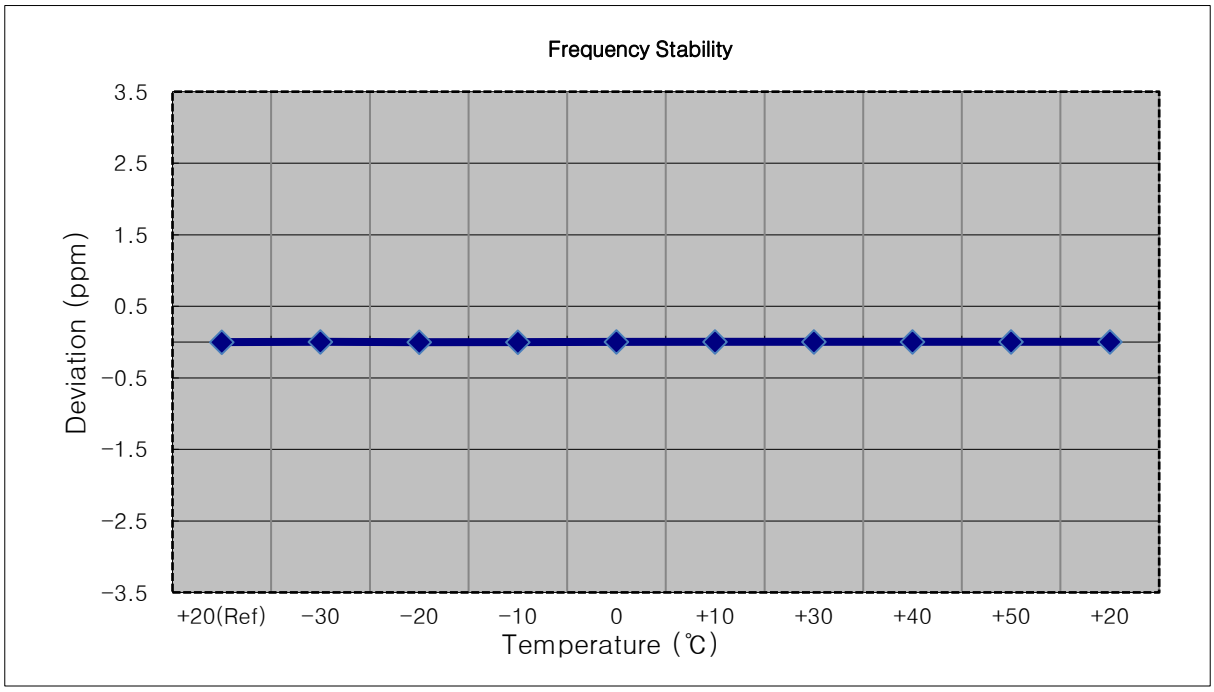
▣ OPERATING FREQUENCY: 1857,500,000 Hz

▣ CHANNEL: 18675 (15 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1857 500 003	0.0	0.000 000	0.000
100 %		-30	1857 500 006	3.1	0.000 000	0.002
100 %		-20	1857 500 000	-3.6	0.000 000	-0.002
100 %		-10	1857 500 001	-2.6	0.000 000	-0.001
100 %		0	1857 500 008	5.1	0.000 000	0.003
100 %		+10	1857 500 008	4.4	0.000 000	0.002
100 %		+30	1857 500 007	3.6	0.000 000	0.002
100 %		+40	1857 500 007	4.0	0.000 000	0.002
100 %		+50	1857 500 006	2.8	0.000 000	0.002
Batt. Endpoint	3.400	+20	1857 500 007	3.8	0.000 000	0.002



▣ MODE: LTE B2

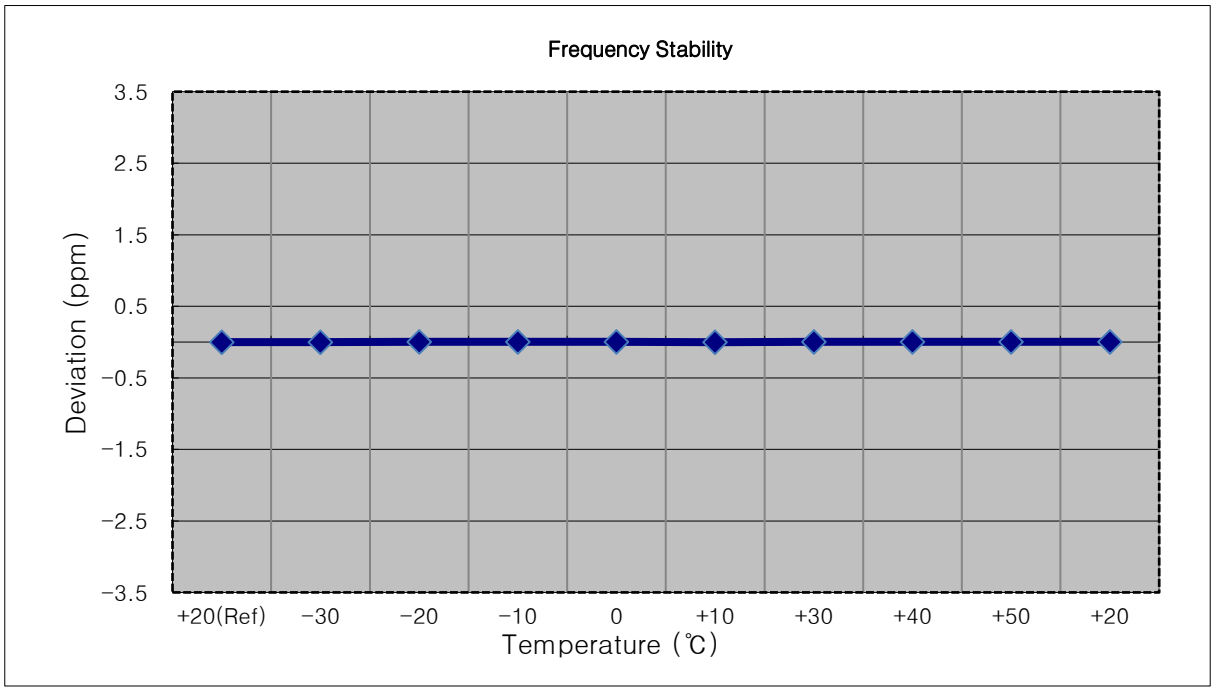
▣ OPERATING FREQUENCY: 1860,000,000 Hz

▣ CHANNEL: 18700 (20 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1860 000 006	0.0	0.000 000	0.000
100 %		-30	1860 000 002	-3.6	0.000 000	-0.002
100 %		-20	1860 000 011	5.3	0.000 000	0.003
100 %		-10	1860 000 011	5.0	0.000 000	0.003
100 %		0	1860 000 009	3.7	0.000 000	0.002
100 %		+10	1860 000 002	-4.2	0.000 000	-0.002
100 %		+30	1860 000 009	2.9	0.000 000	0.002
100 %		+40	1860 000 011	5.4	0.000 000	0.003
100 %		+50	1860 000 013	6.8	0.000 000	0.004
Batt. Endpoint	3.400	+20	1860 000 009	3.5	0.000 000	0.002



▣ MODE: LTE B2

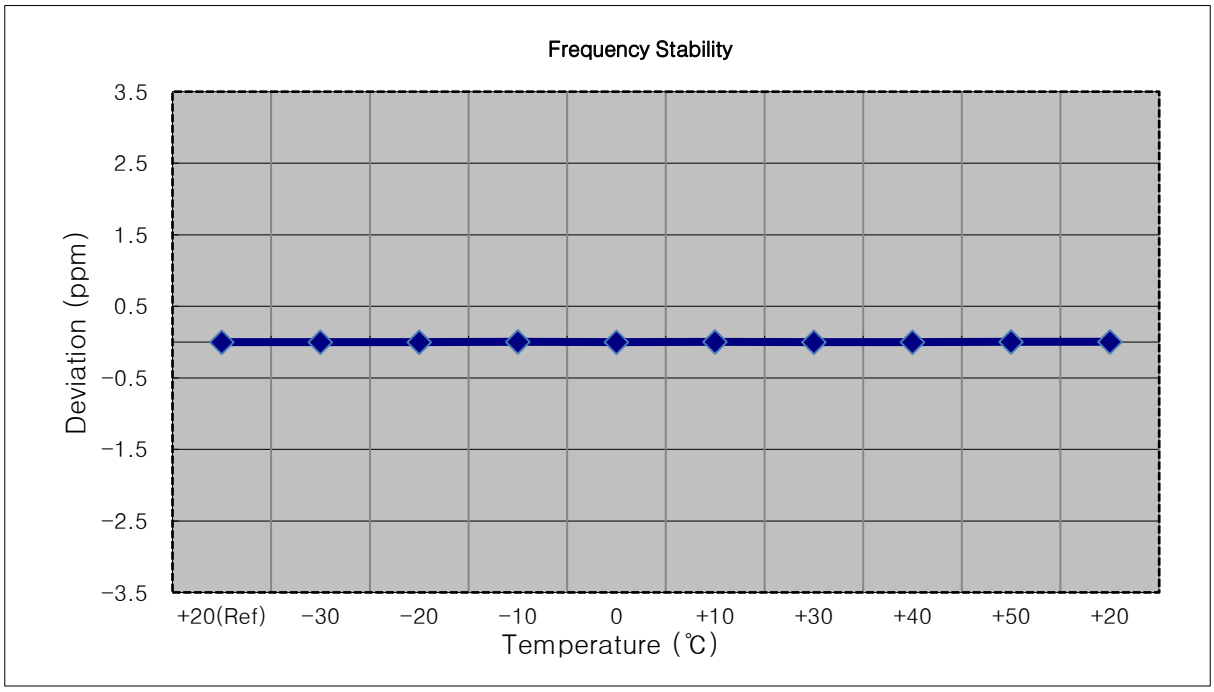
▣ OPERATING FREQUENCY: 1880,000,000 Hz

▣ CHANNEL: 18900 (1.4 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	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 000 005	2.5	0.000 000	0.001
100 %		-20	1880 000 001	-1.8	0.000 000	-0.001
100 %		-10	1880 000 006	3.1	0.000 000	0.002
100 %		0	1880 000 005	2.7	0.000 000	0.001
100 %		+10	1880 000 007	4.8	0.000 000	0.003
100 %		+30	1880 000 001	-1.1	0.000 000	-0.001
100 %		+40	1880 000 005	2.3	0.000 000	0.001
100 %		+50	1880 000 005	3.0	0.000 000	0.002
Batt. Endpoint	3.400	+20	1880 000 007	4.1	0.000 000	0.002



▣ MODE: LTE B2

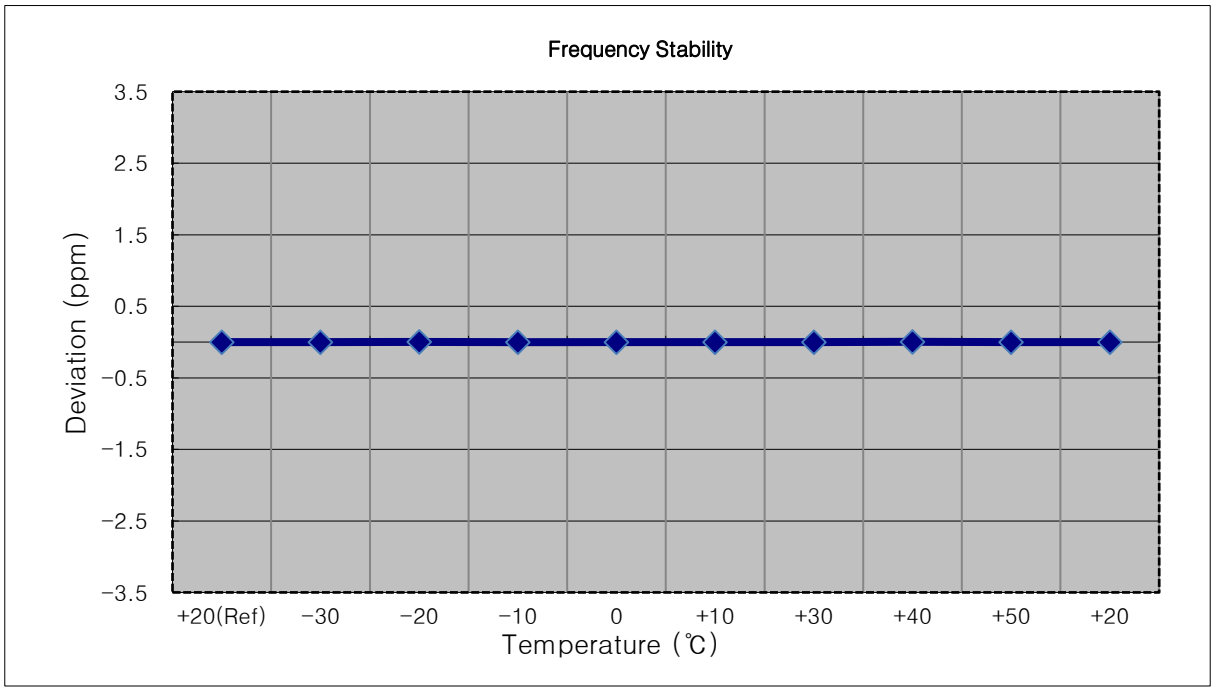
▣ OPERATING FREQUENCY: 1880,000,000 Hz

▣ CHANNEL: 18900 (3 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	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	-1.9	0.000 000	-0.001
100 %		-20	1880 000 002	3.2	0.000 000	0.002
100 %		-10	1879 999 995	-3.0	0.000 000	-0.002
100 %		0	1880 000 001	2.3	0.000 000	0.001
100 %		+10	1880 000 000	2.1	0.000 000	0.001
100 %		+30	1879 999 996	-2.4	0.000 000	-0.001
100 %		+40	1880 000 001	2.8	0.000 000	0.001
100 %		+50	1880 000 001	2.4	0.000 000	0.001
Batt. Endpoint	3.400	+20	1880 000 001	2.6	0.000 000	0.001



▣ MODE: LTE B2

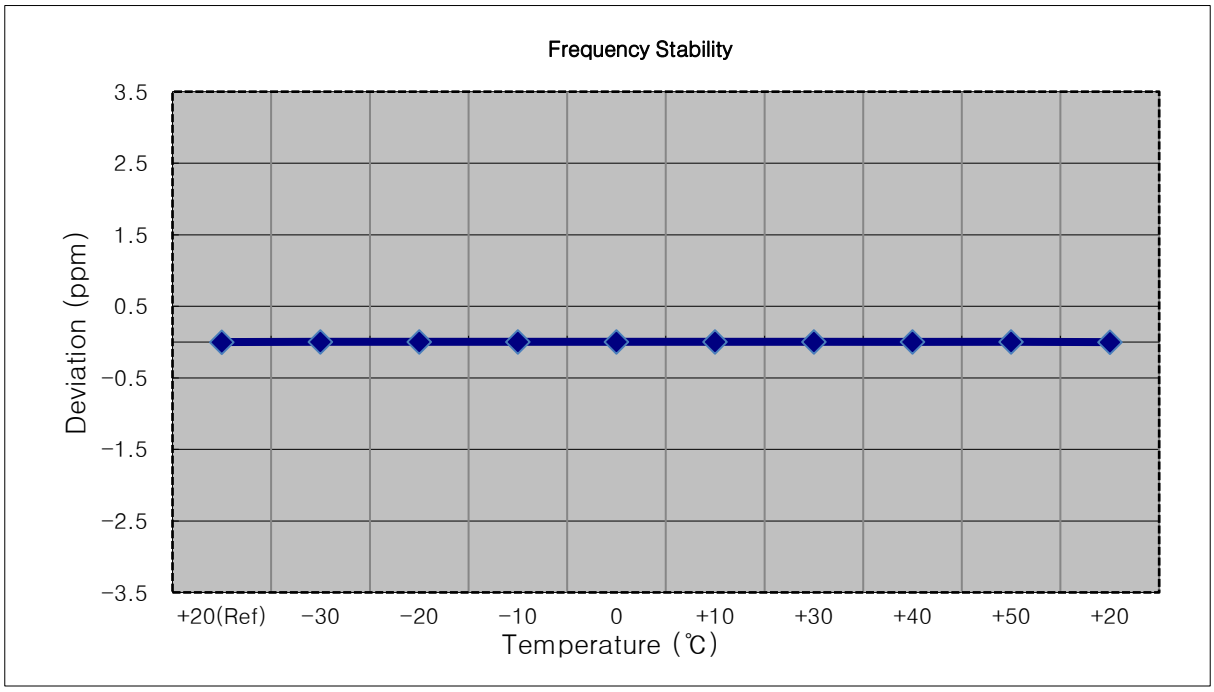
▣ OPERATING FREQUENCY: 1880,000,000 Hz

▣ CHANNEL: 18900 (5 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	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	3.6	0.000 000	0.002
100 %		-20	1880 000 007	3.4	0.000 000	0.002
100 %		-10	1880 000 008	4.2	0.000 000	0.002
100 %		0	1880 000 007	3.4	0.000 000	0.002
100 %		+10	1880 000 008	4.1	0.000 000	0.002
100 %		+30	1880 000 007	3.0	0.000 000	0.002
100 %		+40	1880 000 008	4.5	0.000 000	0.002
100 %		+50	1880 000 007	3.8	0.000 000	0.002
Batt. Endpoint	3.400	+20	1880 000 006	2.4	0.000 000	0.001



▣ MODE: LTE B2

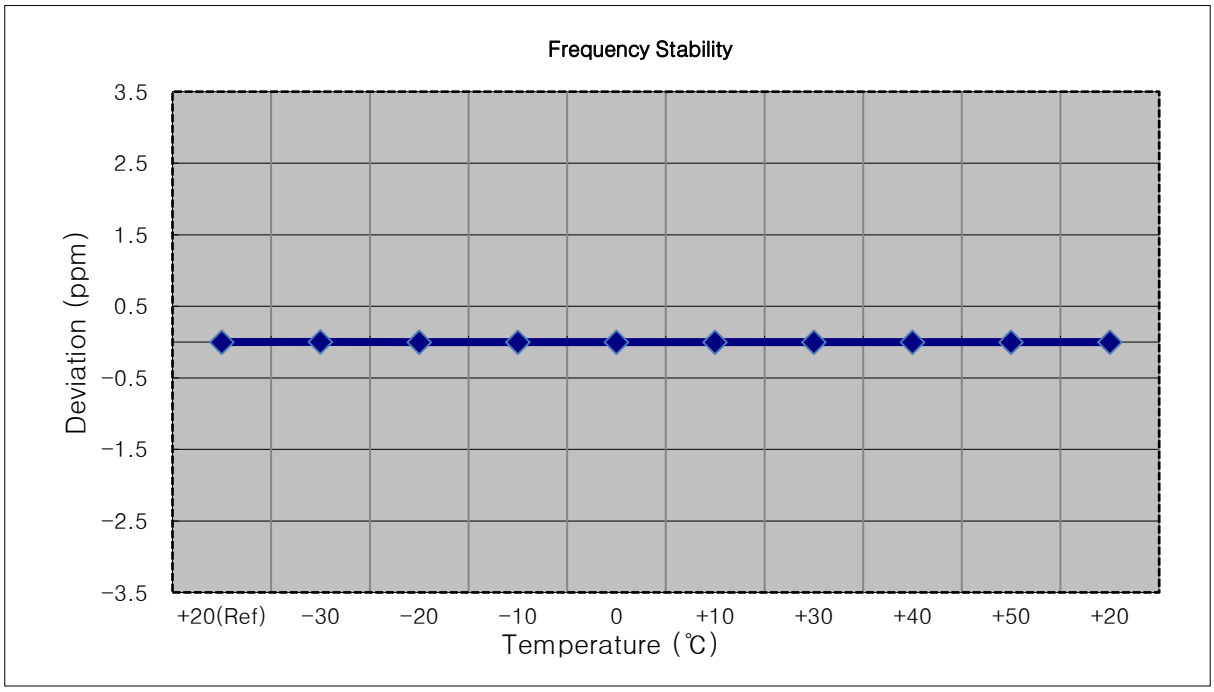
▣ OPERATING FREQUENCY: 1880,000,000 Hz

▣ CHANNEL: 18900 (10 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	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 000 005	3.1	0.000 000	0.002
100 %		-20	1880 000 004	1.8	0.000 000	0.001
100 %		-10	1880 000 005	2.6	0.000 000	0.001
100 %		0	1880 000 004	2.1	0.000 000	0.001
100 %		+10	1880 000 004	2.0	0.000 000	0.001
100 %		+30	1880 000 004	2.4	0.000 000	0.001
100 %		+40	1880 000 004	2.2	0.000 000	0.001
100 %		+50	1880 000 003	1.4	0.000 000	0.001
Batt. Endpoint	3.400	+20	1880 000 004	1.6	0.000 000	0.001



▣ MODE: LTE B2

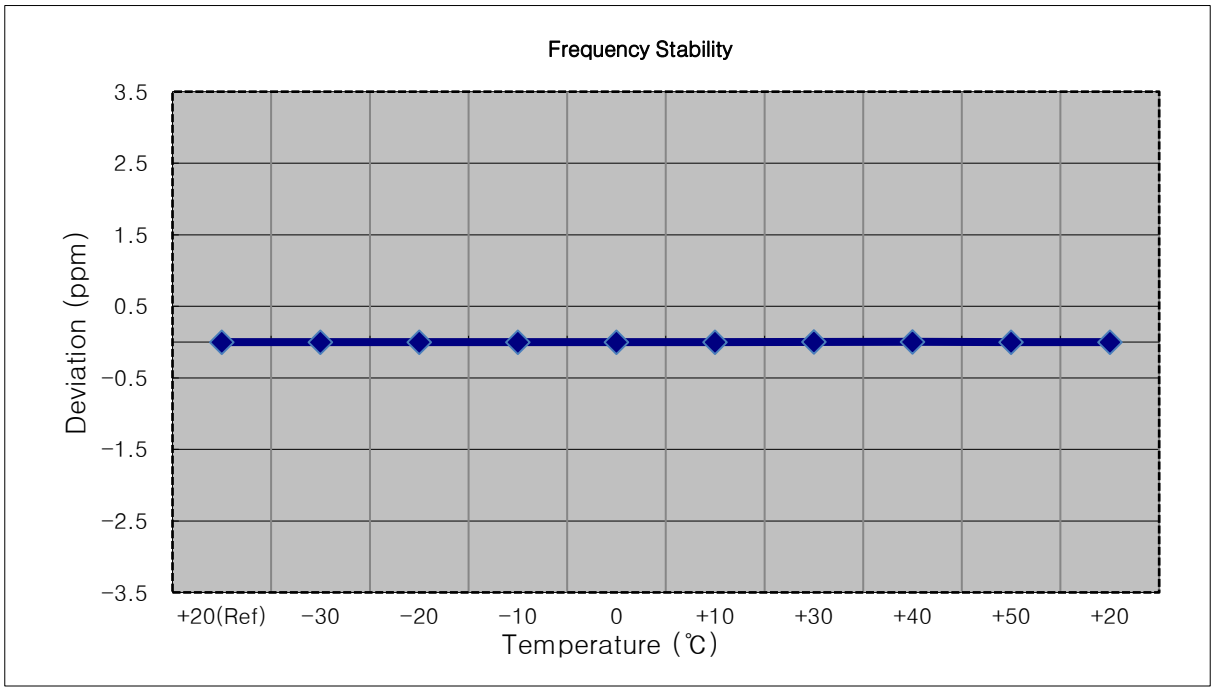
▣ OPERATING FREQUENCY: 1880,000,000 Hz

▣ CHANNEL: 18900 (15 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	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 000 004	1.7	0.000 000	0.001
100 %		-20	1880 000 004	1.7	0.000 000	0.001
100 %		-10	1880 000 004	1.9	0.000 000	0.001
100 %		0	1880 000 005	2.5	0.000 000	0.001
100 %		+10	1880 000 001	-1.7	0.000 000	-0.001
100 %		+30	1880 000 005	2.9	0.000 000	0.002
100 %		+40	1880 000 005	2.8	0.000 000	0.001
100 %		+50	1880 000 005	2.7	0.000 000	0.001
Batt. Endpoint	3.400	+20	1880 000 004	1.7	0.000 000	0.001



▣ MODE: LTE B2

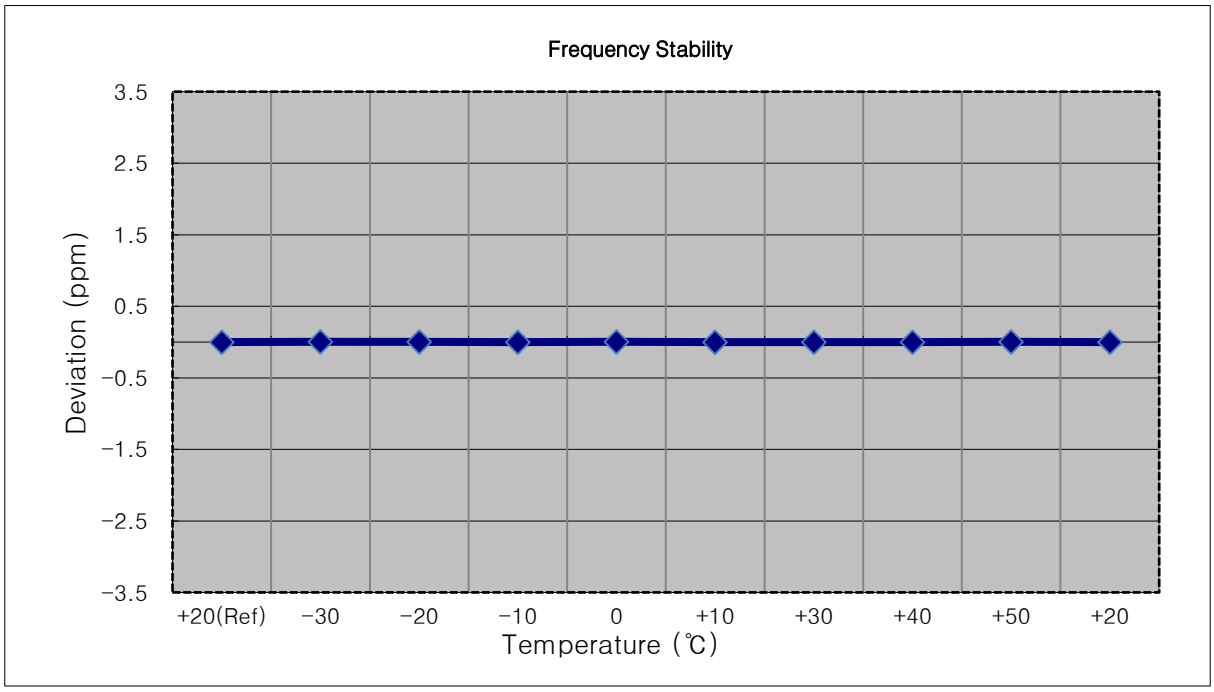
▣ OPERATING FREQUENCY: 1880,000,000 Hz

▣ CHANNEL: 18900 (20 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	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 000 005	3.2	0.000 000	0.002
100 %		-20	1880 000 007	5.2	0.000 000	0.003
100 %		-10	1880 000 005	2.5	0.000 000	0.001
100 %		0	1880 000 005	2.8	0.000 000	0.001
100 %		+10	1880 000 005	2.5	0.000 000	0.001
100 %		+30	1880 000 005	2.6	0.000 000	0.001
100 %		+40	1880 000 005	2.5	0.000 000	0.001
100 %		+50	1880 000 005	3.0	0.000 000	0.002
Batt. Endpoint	3.400	+20	1880 000 004	1.3	0.000 000	0.001



▣ MODE: LTE B2

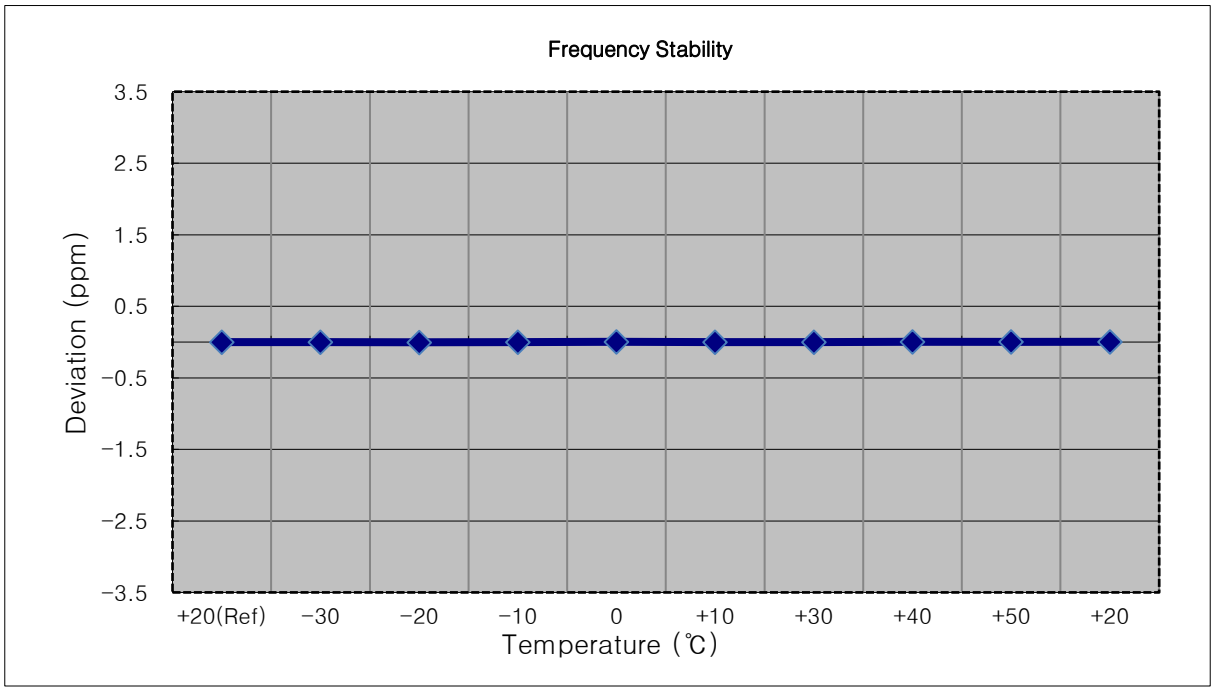
▣ OPERATING FREQUENCY: 1909,300,000 Hz

▣ CHANNEL: 19193 (1.4 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1909 299 997	0.0	0.000 000	0.000
100 %		-30	1909 299 992	-4.9	0.000 000	-0.003
100 %		-20	1909 299 991	-5.9	0.000 000	-0.003
100 %		-10	1909 299 999	2.7	0.000 000	0.001
100 %		0	1909 300 000	3.1	0.000 000	0.002
100 %		+10	1909 299 994	-2.3	0.000 000	-0.001
100 %		+30	1909 299 991	-5.4	0.000 000	-0.003
100 %		+40	1909 299 999	2.8	0.000 000	0.001
100 %		+50	1909 300 002	5.1	0.000 000	0.003
Batt. Endpoint	3.400	+20	1909 300 001	4.1	0.000 000	0.002



▣ MODE: LTE B2

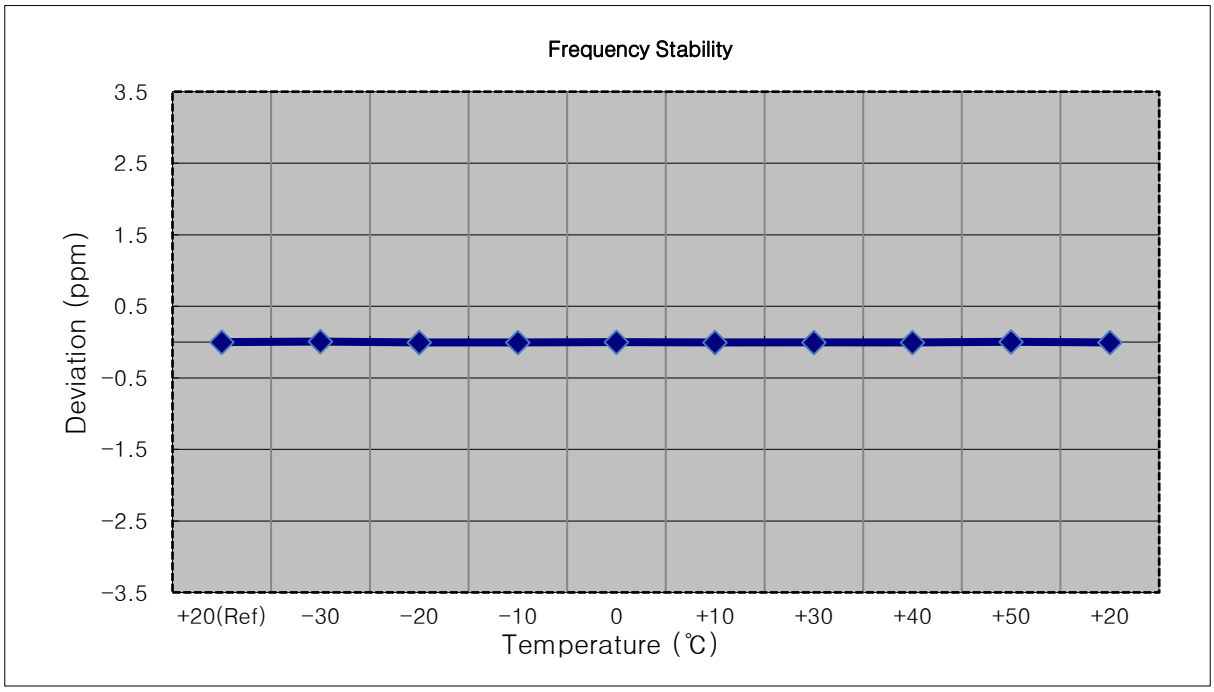
▣ OPERATING FREQUENCY: 1908,500,000 Hz

▣ CHANNEL: 19185 (3 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1908 499 993	0.0	0.000 000	0.000
100 %		-30	1908 500 006	12.5	0.000 001	0.007
100 %		-20	1908 499 987	-5.8	0.000 000	-0.003
100 %		-10	1908 499 987	-6.6	0.000 000	-0.003
100 %		0	1908 499 988	-5.0	0.000 000	-0.003
100 %		+10	1908 499 987	-6.4	0.000 000	-0.003
100 %		+30	1908 499 984	-8.8	0.000 000	-0.005
100 %		+40	1908 499 985	-8.4	0.000 000	-0.004
100 %		+50	1908 499 999	5.5	0.000 000	0.003
Batt. Endpoint	3.400	+20	1908 499 985	-8.2	0.000 000	-0.004



▣ MODE: LTE B2

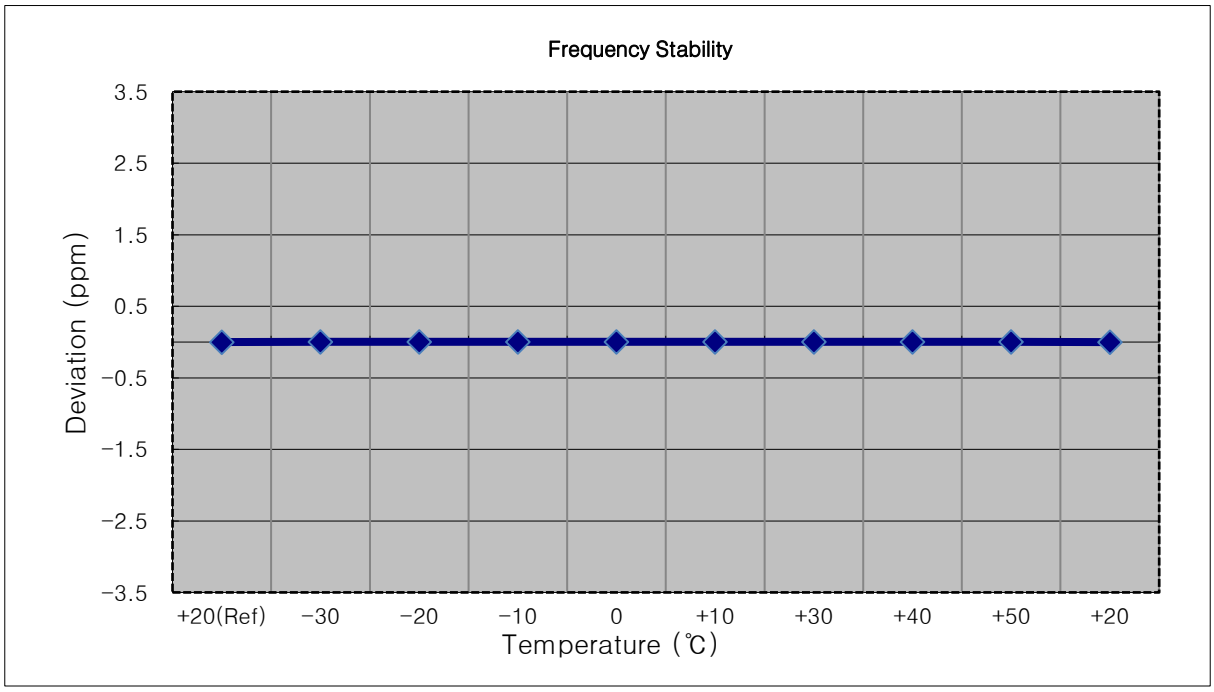
▣ OPERATING FREQUENCY: 1907,500,000 Hz

▣ CHANNEL: 19175 (5 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1907 500 002	0.0	0.000 000	0.000
100 %		-30	1907 500 006	4.1	0.000 000	0.002
100 %		-20	1907 500 008	5.5	0.000 000	0.003
100 %		-10	1907 500 006	3.2	0.000 000	0.002
100 %		0	1907 500 007	4.9	0.000 000	0.003
100 %		+10	1907 500 005	2.9	0.000 000	0.002
100 %		+30	1907 500 007	4.7	0.000 000	0.002
100 %		+40	1907 500 005	2.8	0.000 000	0.001
100 %		+50	1907 500 008	6.1	0.000 000	0.003
Batt. Endpoint	3.400	+20	1907 500 004	1.8	0.000 000	0.001



▣ MODE: LTE B2

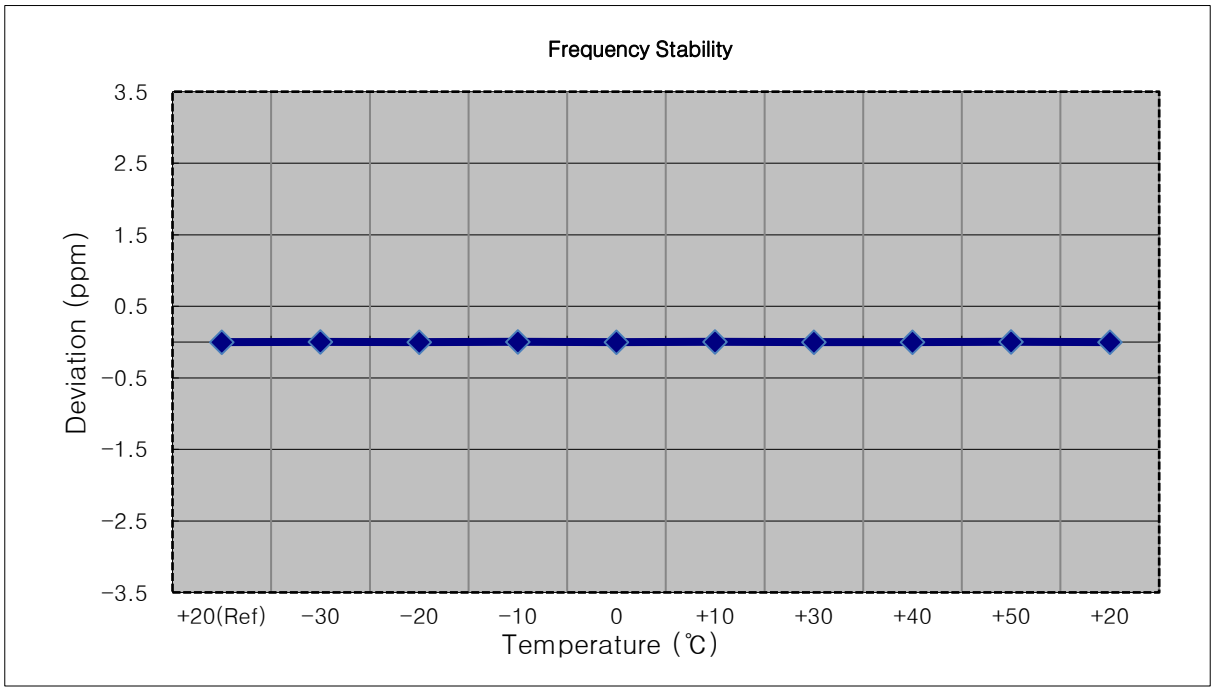
▣ OPERATING FREQUENCY: 1905,000,000 Hz

▣ CHANNEL: 19150 (10 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	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 000 007	4.3	0.000 000	0.002
100 %		-20	1905 000 005	2.4	0.000 000	0.001
100 %		-10	1905 000 006	3.3	0.000 000	0.002
100 %		0	1905 000 001	-2.1	0.000 000	-0.001
100 %		+10	1905 000 006	3.2	0.000 000	0.002
100 %		+30	1905 000 006	2.7	0.000 000	0.001
100 %		+40	1905 000 005	2.4	0.000 000	0.001
100 %		+50	1905 000 007	3.7	0.000 000	0.002
Batt. Endpoint	3.400	+20	1905 000 006	2.6	0.000 000	0.001



▣ MODE: LTE B2

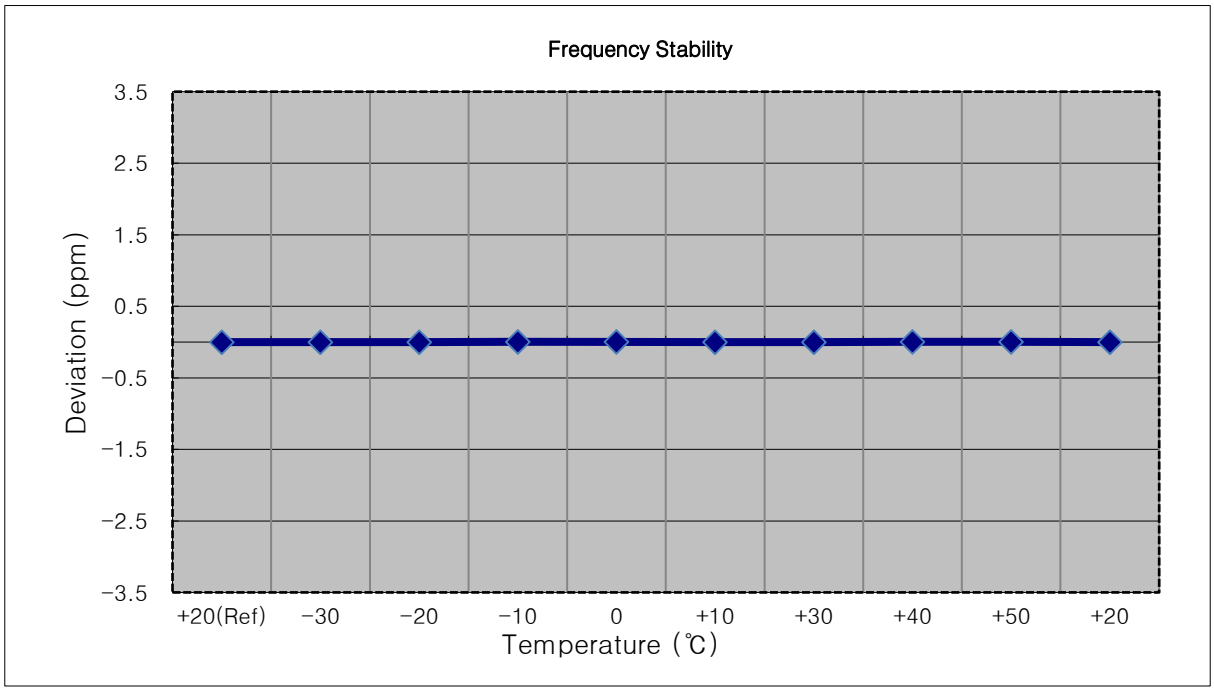
▣ OPERATING FREQUENCY: 1902,500,000 Hz

▣ CHANNEL: 19125 (15 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1902 500 004	0.0	0.000 000	0.000
100 %		-30	1902 500 002	-1.4	0.000 000	-0.001
100 %		-20	1902 500 006	2.1	0.000 000	0.001
100 %		-10	1902 500 007	3.3	0.000 000	0.002
100 %		0	1902 500 007	3.9	0.000 000	0.002
100 %		+10	1902 500 006	2.7	0.000 000	0.001
100 %		+30	1902 500 006	2.5	0.000 000	0.001
100 %		+40	1902 500 007	3.1	0.000 000	0.002
100 %		+50	1902 500 007	3.8	0.000 000	0.002
Batt. Endpoint	3.400	+20	1902 500 006	2.1	0.000 000	0.001



▣ MODE: LTE B2

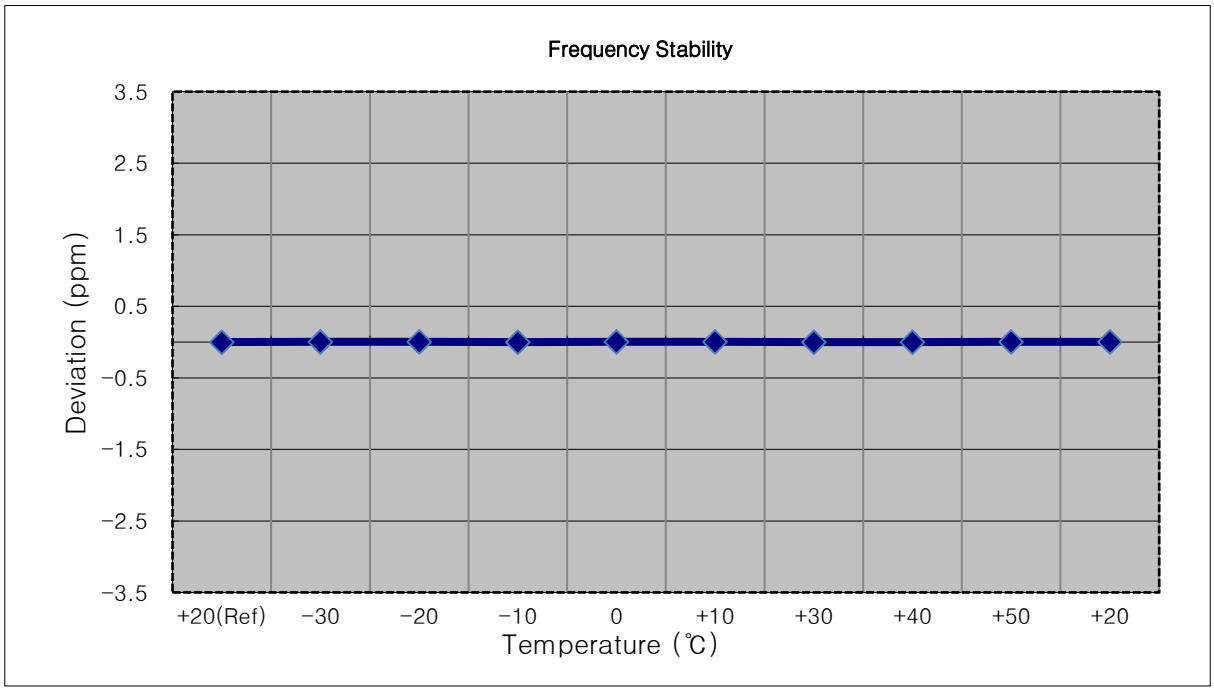
▣ OPERATING FREQUENCY: 1900,000,000 Hz

▣ CHANNEL: 19100 (20 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	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 000 006	3.5	0.000 000	0.002
100 %		-20	1900 000 007	3.8	0.000 000	0.002
100 %		-10	1900 000 005	2.6	0.000 000	0.001
100 %		0	1900 000 006	3.5	0.000 000	0.002
100 %		+10	1900 000 006	3.2	0.000 000	0.002
100 %		+30	1900 000 005	2.7	0.000 000	0.001
100 %		+40	1900 000 005	2.7	0.000 000	0.001
100 %		+50	1900 000 006	3.2	0.000 000	0.002
Batt. Endpoint	3.400	+20	1900 000 007	4.1	0.000 000	0.002



9. TEST DATA (Main3 Antenna)

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
1850.7	LTE B2/ 1.4 MHz	QPSK	-21.77	12.05	10.00	2.12	H	< 2.00	0.099	19.93
		16-QAM	-22.74	11.08	10.00	2.12	H		0.079	18.96
		64-QAM	-23.88	9.94	10.00	2.12	H		0.061	17.82
		256-QAM	-26.79	7.03	10.00	2.12	H		0.031	14.91
1880.0		QPSK	-21.11	12.49	10.00	2.21	H		0.107	20.28
		16-QAM	-21.91	11.69	10.00	2.21	H		0.089	19.48
		64-QAM	-23.07	10.53	10.00	2.21	H		0.068	18.32
		256-QAM	-26.01	7.59	10.00	2.21	H		0.035	15.38
1909.3		QPSK	-21.54	12.48	10.01	2.11	H		0.109	20.38
		16-QAM	-22.18	11.84	10.01	2.11	H		0.094	19.74
		64-QAM	-23.05	10.97	10.01	2.11	H		0.077	18.87
		256-QAM	-26.17	7.85	10.01	2.11	H		0.038	15.75

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1851.5	LTE B2/ 3 MHz	QPSK	-22.00	11.82	10.00	2.12	H	< 2.00	0.093	19.70
		16-QAM	-22.90	10.92	10.00	2.12	H		0.076	18.80
		64-QAM	-23.89	9.93	10.00	2.12	H		0.060	17.81
		256-QAM	-26.85	6.97	10.00	2.12	H		0.031	14.85
1880.0		QPSK	-21.26	12.34	10.00	2.21	H		0.103	20.13
		16-QAM	-22.08	11.52	10.00	2.21	H		0.085	19.31
		64-QAM	-23.11	10.49	10.00	2.21	H		0.067	18.28
		256-QAM	-26.09	7.51	10.00	2.21	H		0.034	15.30
1908.5		QPSK	-21.02	13.00	10.01	2.11	H		0.123	20.90
		16-QAM	-21.95	12.07	10.01	2.11	H		0.099	19.97
		64-QAM	-22.96	11.06	10.01	2.11	H		0.079	18.96
		256-QAM	-25.97	8.05	10.01	2.11	H		0.039	15.95

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1852.5	LTE B2/ 5 MHz	QPSK	-21.84	11.98	10.00	2.12	H	< 2.00	0.097	19.86
		16-QAM	-22.64	11.18	10.00	2.12	H		0.081	19.06
		64-QAM	-23.72	10.10	10.00	2.12	H		0.063	17.98
		256-QAM	-26.75	7.07	10.00	2.12	H		0.031	14.95
1880.0		QPSK	-21.00	12.60	10.00	2.21	H		0.109	20.39
		16-QAM	-21.82	11.78	10.00	2.21	H		0.091	19.57
		64-QAM	-22.90	10.70	10.00	2.21	H		0.071	18.49
		256-QAM	-25.85	7.75	10.00	2.21	H		0.036	15.54
1907.5		QPSK	-21.06	12.96	10.01	2.11	H		0.122	20.86
		16-QAM	-21.97	12.05	10.01	2.11	H		0.099	19.95
		64-QAM	-22.90	11.12	10.01	2.11	H		0.080	19.02
		256-QAM	-25.88	8.14	10.01	2.11	H		0.040	16.04

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1855.0	LTE B2/ 10 MHz	QPSK	-21.75	11.84	10.00	2.15	H	< 2.00	0.093	19.69
		16-QAM	-22.58	11.01	10.00	2.15	H		0.077	18.86
		64-QAM	-23.63	9.96	10.00	2.15	H		0.060	17.81
		256-QAM	-26.63	6.96	10.00	2.15	H		0.030	14.81
1880.0		QPSK	-21.11	12.49	10.00	2.21	H		0.107	20.28
		16-QAM	-21.93	11.67	10.00	2.21	H		0.088	19.46
		64-QAM	-22.92	10.68	10.00	2.21	H		0.070	18.47
		256-QAM	-26.00	7.60	10.00	2.21	H		0.035	15.39
1905.0		QPSK	-20.33	13.64	10.01	2.13	H		0.142	21.52
		16-QAM	-21.10	12.87	10.01	2.13	H		0.119	20.75
		64-QAM	-22.10	11.87	10.01	2.13	H		0.094	19.75
		256-QAM	-25.09	8.88	10.01	2.13	H		0.047	16.76

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1857.5	LTE B2/ 15 MHz	QPSK	-21.65	11.69	10.00	2.17	H	< 2.00	0.090	19.52
		16-QAM	-22.48	10.86	10.00	2.17	H		0.074	18.69
		64-QAM	-23.50	9.84	10.00	2.17	H		0.059	17.67
		256-QAM	-26.57	6.77	10.00	2.17	H		0.029	14.60
1880.0		QPSK	-21.24	12.36	10.00	2.21	H		0.104	20.15
		16-QAM	-22.02	11.58	10.00	2.21	H		0.087	19.37
		64-QAM	-23.04	10.56	10.00	2.21	H		0.068	18.35
		256-QAM	-26.10	7.50	10.00	2.21	H		0.034	15.29
1902.5		QPSK	-20.31	13.60	10.01	2.15	H		0.140	21.46
		16-QAM	-21.08	12.83	10.01	2.15	H		0.117	20.69
		64-QAM	-22.11	11.80	10.01	2.15	H		0.092	19.66
		256-QAM	-25.08	8.83	10.01	2.15	H		0.047	16.69

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1860.0	LTE B2/ 20 MHz	QPSK	-21.50	11.84	10.00	2.17	H	< 2.00	0.093	19.67
		16-QAM	-22.44	10.90	10.00	2.17	H		0.075	18.73
		64-QAM	-23.49	9.85	10.00	2.17	H		0.059	17.68
		256-QAM	-26.40	6.94	10.00	2.17	H		0.030	14.77
1880.0		QPSK	-21.23	12.37	10.00	2.21	H		0.104	20.16
		16-QAM	-22.10	11.50	10.00	2.21	H		0.085	19.29
		64-QAM	-23.04	10.56	10.00	2.21	H		0.068	18.35
		256-QAM	-26.09	7.51	10.00	2.21	H		0.034	15.30
1900.0		QPSK	-20.60	13.31	10.01	2.15	H		0.131	21.17
		16-QAM	-21.42	12.49	10.01	2.15	H		0.108	20.35
		64-QAM	-22.50	11.41	10.01	2.15	H		0.085	19.27
		256-QAM	-25.40	8.51	10.01	2.15	H		0.043	16.37

9.2 RADIATED SPURIOUS EMISSIONS

▣ OPERATING FREQUENCY: 1905.0 MHz

▣ MEASURED OUTPUT POWER: 21.52 dBm = 0.142 W

▣ MODE: LTE B2

▣ MODULATION SIGNAL: 10 MHz QPSK

▣ DISTANCE: 3 meters

▣ LIMIT: 43 + 10 log10 (W) = 34.52 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	-54.67	11.40	-55.05	3.11	H	-46.76	68.28
	5 565.00	-48.17	11.90	-42.49	3.85	H	-34.44	55.96
	7 420.00	-63.68	10.80	-48.74	4.46	V	-42.40	63.92
	9 275.00	-61.04	10.80	-46.46	5.07	V	-40.72	62.24
	11 130.00	-63.51	11.30	-45.15	5.61	V	-39.46	60.98
18900 (1880.0)	3 760.00	-56.61	11.30	-56.74	3.07	H	-48.51	70.03
	5 640.00	-47.86	11.90	-42.26	3.89	H	-34.25	55.77
	7 520.00	-64.14	11.10	-49.91	4.51	H	-43.32	64.84
	9 400.00	-59.88	10.80	-44.60	5.07	V	-38.87	60.39
	11 280.00	-63.80	11.40	-44.50	5.62	V	-38.72	60.24
19150 (1905.0)	3 810.00	-57.61	11.10	-57.37	3.10	H	-49.37	70.89
	5 715.00	-48.00	11.70	-42.44	3.84	H	-34.58	56.10
	7 620.00	-61.30	11.20	-47.88	4.52	H	-41.20	62.72
	9 525.00	-63.04	10.90	-47.27	5.12	H	-41.49	63.01
	11 430.00	-63.25	11.40	-43.93	5.67	H	-38.20	59.72

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	5.75
			16-QAM	6	0	6.26
			64-QAM	6	0	6.46
			256-QAM	6	0	6.44
	3 MHz		QPSK	15	0	5.75
			16-QAM	15	0	6.34
			64-QAM	15	0	6.51
			256-QAM	15	0	6.56
	5 MHz		QPSK	25	0	5.69
			16-QAM	25	0	6.29
			64-QAM	25	0	6.48
			256-QAM	25	0	6.50
	10 MHz		QPSK	50	0	5.76
			16-QAM	50	0	6.29
			64-QAM	50	0	6.48
			256-QAM	50	0	6.41
	15 MHz		QPSK	75	0	5.62
			16-QAM	75	0	6.26
			64-QAM	75	0	6.49
			256-QAM	75	0	6.42
	20 MHz		QPSK	100	0	5.63
			16-QAM	100	0	6.26
			64-QAM	100	0	6.40
			256-QAM	100	0	6.43

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 258 ~ 281.

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	1.0978
			16-QAM	6	0	1.0943
			64-QAM	6	0	1.0974
			256-QAM	6	0	1.0896
	3 MHz		QPSK	15	0	2.7049
			16-QAM	15	0	2.7397
			64-QAM	15	0	2.7451
			256-QAM	15	0	2.7574
	5 MHz		QPSK	25	0	4.5239
			16-QAM	25	0	4.5214
			64-QAM	25	0	4.5248
			256-QAM	25	0	4.5256
	10 MHz		QPSK	50	0	9.0242
			16-QAM	50	0	9.0358
			64-QAM	50	0	8.9938
			256-QAM	50	0	9.0122
	15 MHz		QPSK	75	0	13.465
			16-QAM	75	0	13.480
			64-QAM	75	0	13.477
			256-QAM	75	0	13.484
	20 MHz		QPSK	100	0	17.942
			16-QAM	100	0	18.020
			64-QAM	100	0	17.954
			256-QAM	100	0	17.933

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 234 ~ 257.

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	3.8176	27.976	-80.357	-52.381	-13.00
		1880.0	8.2562	28.591	-79.863	-51.272	
		1909.3	9.0902	28.591	-80.751	-52.160	
	3	1851.5	8.8624	28.591	-80.661	-52.070	
		1880.0	1.9607	27.976	-79.915	-51.939	
		1908.5	1.9886	27.976	-77.979	-50.003	
	5	1852.5	8.8465	28.591	-80.722	-52.131	
		1880.0	1.9607	27.976	-79.822	-51.846	
		1907.5	1.9881	27.976	-78.142	-50.166	
	10	1855.0	4.9043	27.976	-80.329	-52.353	
		1880.0	1.9622	27.976	-79.229	-51.253	
		1905.0	1.9876	27.976	-78.010	-50.034	
	15	1857.5	9.0858	28.591	-80.886	-52.295	
		1880.0	1.9647	27.976	-77.960	-49.984	
		1902.5	1.9886	27.976	-77.908	-49.932	
	20	1860.0	9.4367	28.591	-80.172	-51.581	
		1880.0	1.9667	27.976	-76.985	-49.009	
		1900.0	1.9856	27.976	-78.304	-50.328	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 282 ~ 317.
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

9.6 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 198 ~ 233.

9.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

▣ MODE: LTE B2

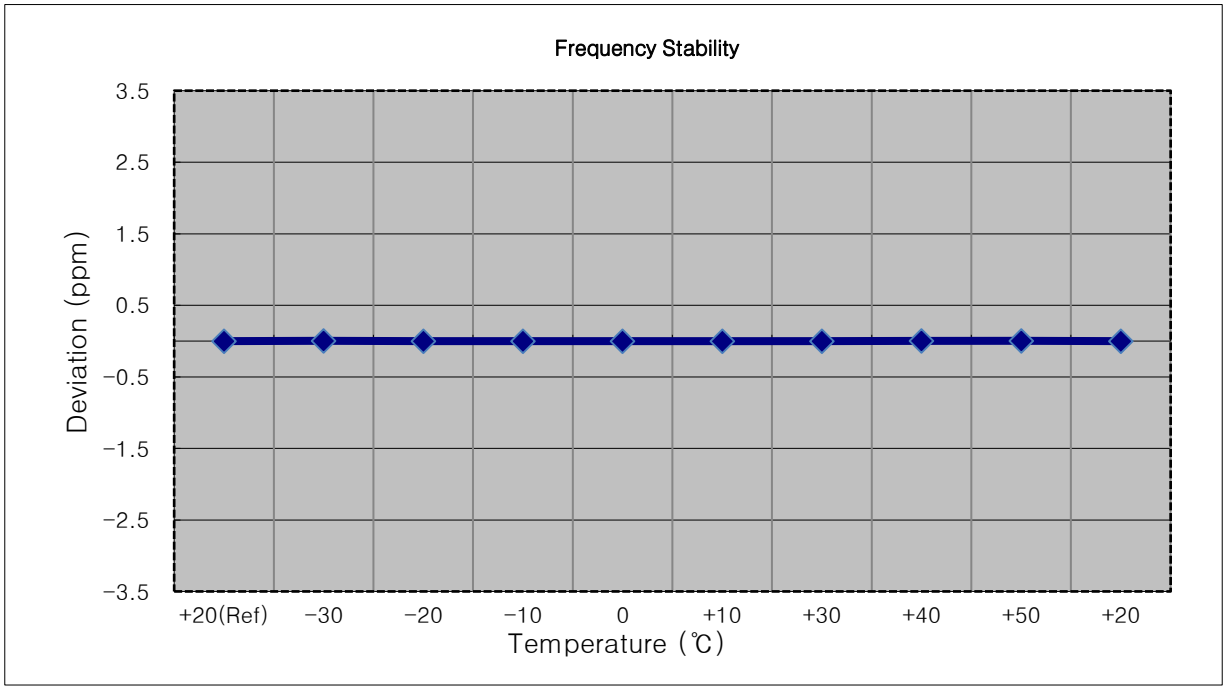
▣ OPERATING FREQUENCY: 1850,700,000 Hz

▣ CHANNEL: 18607 (1.4 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	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	3.3	0.000 000	0.002
100 %		-20	1850 700 002	-0.6	0.000 000	0.000
100 %		-10	1850 700 004	1.0	0.000 000	0.001
100 %		0	1850 700 003	0.4	0.000 000	0.000
100 %		+10	1850 700 001	-2.1	0.000 000	-0.001
100 %		+30	1850 700 003	0.0	0.000 000	0.000
100 %		+40	1850 700 008	4.7	0.000 000	0.003
100 %		+50	1850 700 007	4.0	0.000 000	0.002
Batt. Endpoint	3.400	+20	1850 700 003	0.1	0.000 000	0.000



▣ MODE: LTE B2

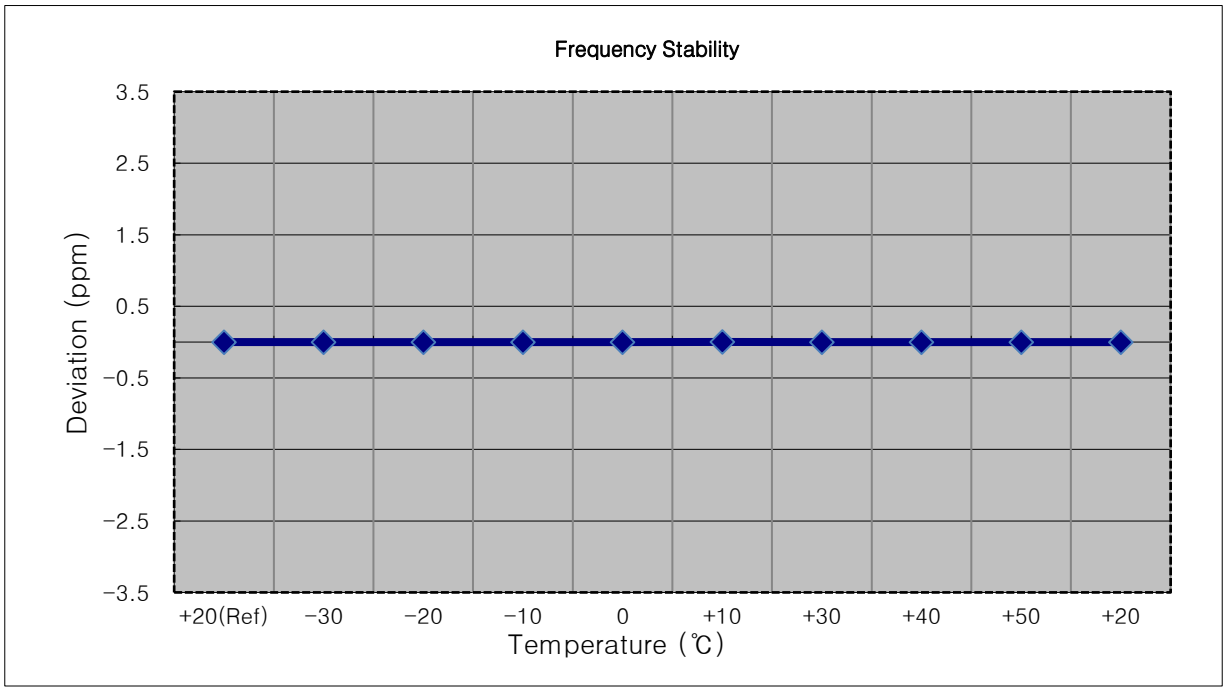
▣ OPERATING FREQUENCY: 1851,500,000 Hz

▣ CHANNEL: 18615 (3 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1851 500 000	0.0	0.000 000	0.000
100 %		-30	1851 500 001	1.0	0.000 000	0.001
100 %		-20	1851 500 002	2.1	0.000 000	0.001
100 %		-10	1851 500 002	1.5	0.000 000	0.001
100 %		0	1851 500 003	2.5	0.000 000	0.001
100 %		+10	1851 500 003	2.8	0.000 000	0.002
100 %		+30	1851 500 001	0.5	0.000 000	0.000
100 %		+40	1851 500 002	2.2	0.000 000	0.001
100 %		+50	1851 500 002	2.1	0.000 000	0.001
Batt. Endpoint	3.400	+20	1851 500 002	2.0	0.000 000	0.001



▣ MODE: LTE B2

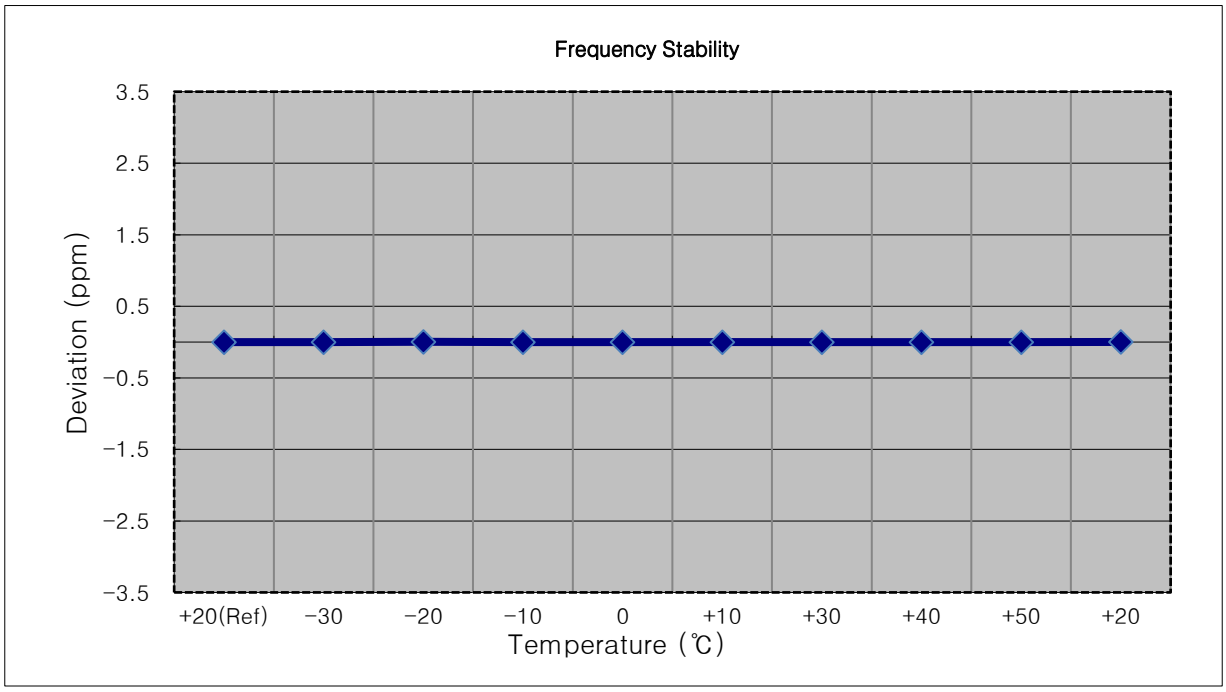
▣ OPERATING FREQUENCY: 1852,500,000 Hz

▣ CHANNEL: 18625 (5 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1852 500 001	0.0	0.000 000	0.000
100 %		-30	1852 500 003	2.1	0.000 000	0.001
100 %		-20	1852 500 004	2.8	0.000 000	0.001
100 %		-10	1852 500 002	1.4	0.000 000	0.001
100 %		0	1852 500 003	2.4	0.000 000	0.001
100 %		+10	1852 500 001	0.0	0.000 000	0.000
100 %		+30	1852 500 004	2.5	0.000 000	0.001
100 %		+40	1852 500 003	1.5	0.000 000	0.001
100 %		+50	1852 500 002	1.2	0.000 000	0.001
Batt. Endpoint	3.400	+20	1852 500 004	2.8	0.000 000	0.002



▣ MODE: LTE B2

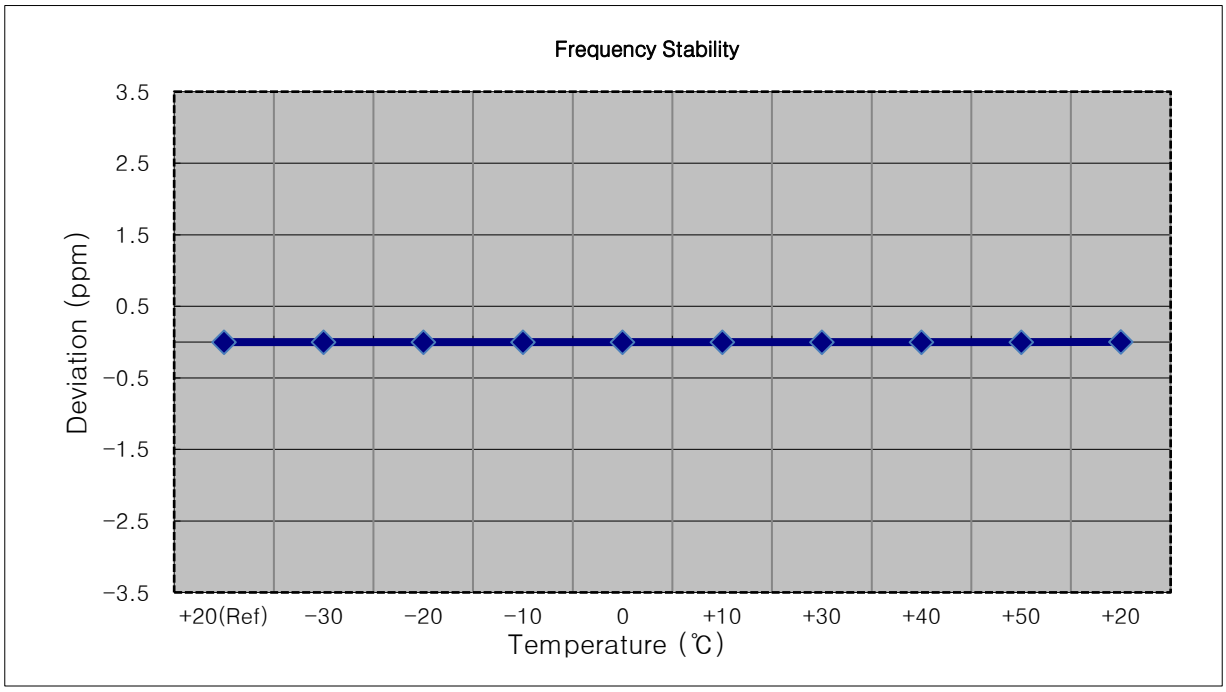
▣ OPERATING FREQUENCY: 1855,000,000 Hz

▣ CHANNEL: 18650 (10 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1855 000 002	0.0	0.000 000	0.000
100 %		-30	1855 000 003	0.7	0.000 000	0.000
100 %		-20	1855 000 003	0.6	0.000 000	0.000
100 %		-10	1855 000 002	-0.2	0.000 000	0.000
100 %		0	1855 000 001	-1.1	0.000 000	-0.001
100 %		+10	1855 000 002	-0.9	0.000 000	0.000
100 %		+30	1855 000 002	0.1	0.000 000	0.000
100 %		+40	1855 000 001	-1.0	0.000 000	-0.001
100 %		+50	1855 000 003	0.7	0.000 000	0.000
Batt. Endpoint	3.400	+20	1855 000 005	3.1	0.000 000	0.002



▣ MODE: LTE B2

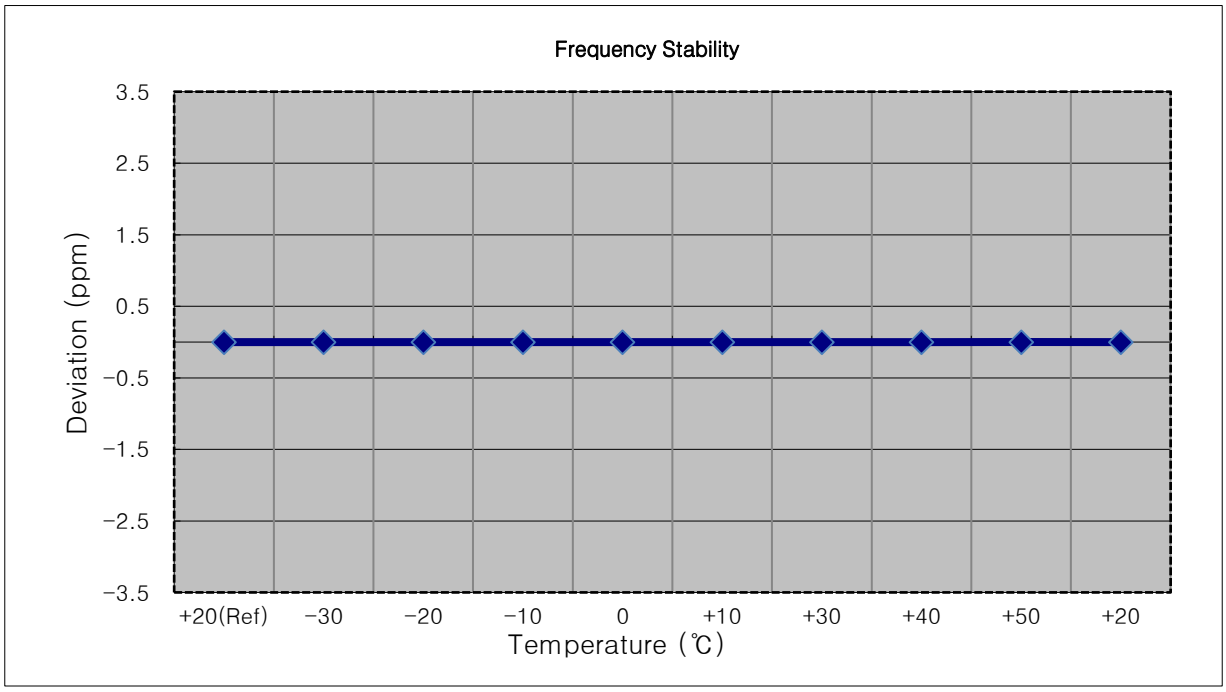
▣ OPERATING FREQUENCY: 1857,500,000 Hz

▣ CHANNEL: 18675 (15 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	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 500 003	1.5	0.000 000	0.001
100 %		-20	1857 500 003	1.0	0.000 000	0.001
100 %		-10	1857 500 001	-0.2	0.000 000	0.000
100 %		0	1857 500 003	1.1	0.000 000	0.001
100 %		+10	1857 500 003	1.2	0.000 000	0.001
100 %		+30	1857 500 002	0.2	0.000 000	0.000
100 %		+40	1857 500 000	-1.8	0.000 000	-0.001
100 %		+50	1857 500 003	1.6	0.000 000	0.001
Batt. Endpoint	3.400	+20	1857 500 003	1.1	0.000 000	0.001



▣ MODE: LTE B2

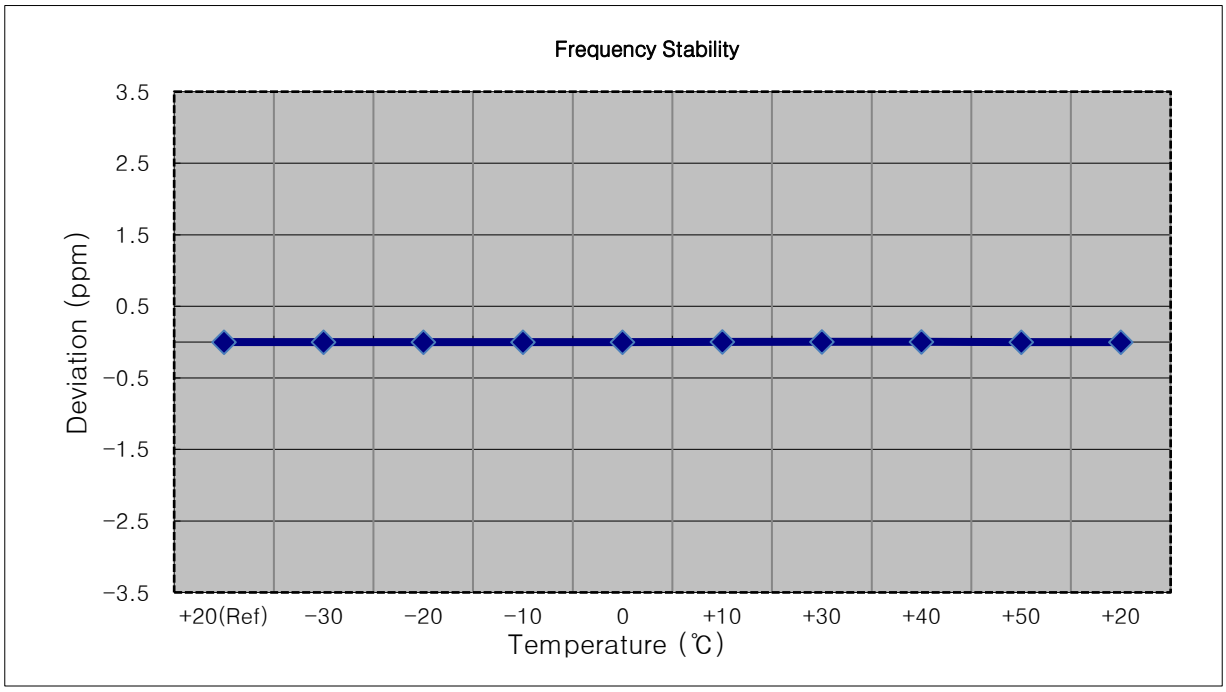
▣ OPERATING FREQUENCY: 1860,000,000 Hz

▣ CHANNEL: 18700 (20 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1859 999 001	0.0	0.000 000	0.000
100 %		-30	1859 999 003	1.6	0.000 000	0.001
100 %		-20	1859 999 002	0.7	0.000 000	0.000
100 %		-10	1859 999 003	2.3	0.000 000	0.001
100 %		0	1859 999 004	2.6	0.000 000	0.001
100 %		+10	1859 999 005	4.2	0.000 000	0.002
100 %		+30	1859 999 004	3.2	0.000 000	0.002
100 %		+40	1859 999 005	3.5	0.000 000	0.002
100 %		+50	1859 999 002	1.1	0.000 000	0.001
Batt. Endpoint	3.400	+20	1859 999 002	0.8	0.000 000	0.000



▣ MODE: LTE B2

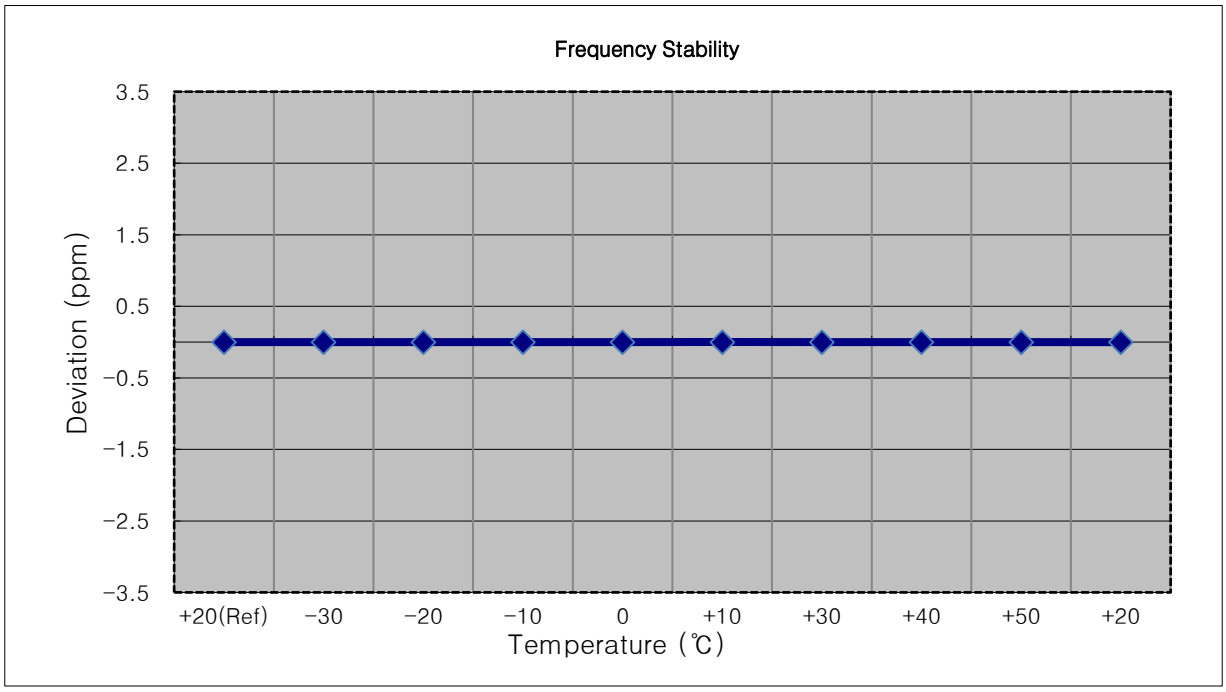
▣ OPERATING FREQUENCY: 1880,000,000 Hz

▣ CHANNEL: 18900 (1.4 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	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 000 002	0.0	0.000 000	0.000
100 %		-20	1880 000 003	1.3	0.000 000	0.001
100 %		-10	1880 000 002	0.5	0.000 000	0.000
100 %		0	1880 000 001	-0.6	0.000 000	0.000
100 %		+10	1880 000 004	2.2	0.000 000	0.001
100 %		+30	1880 000 000	-1.8	0.000 000	-0.001
100 %		+40	1880 000 001	-0.5	0.000 000	0.000
100 %		+50	1880 000 003	1.2	0.000 000	0.001
Batt. Endpoint	3.400	+20	1879 999 999	-2.8	0.000 000	-0.001



▣ MODE: LTE B2

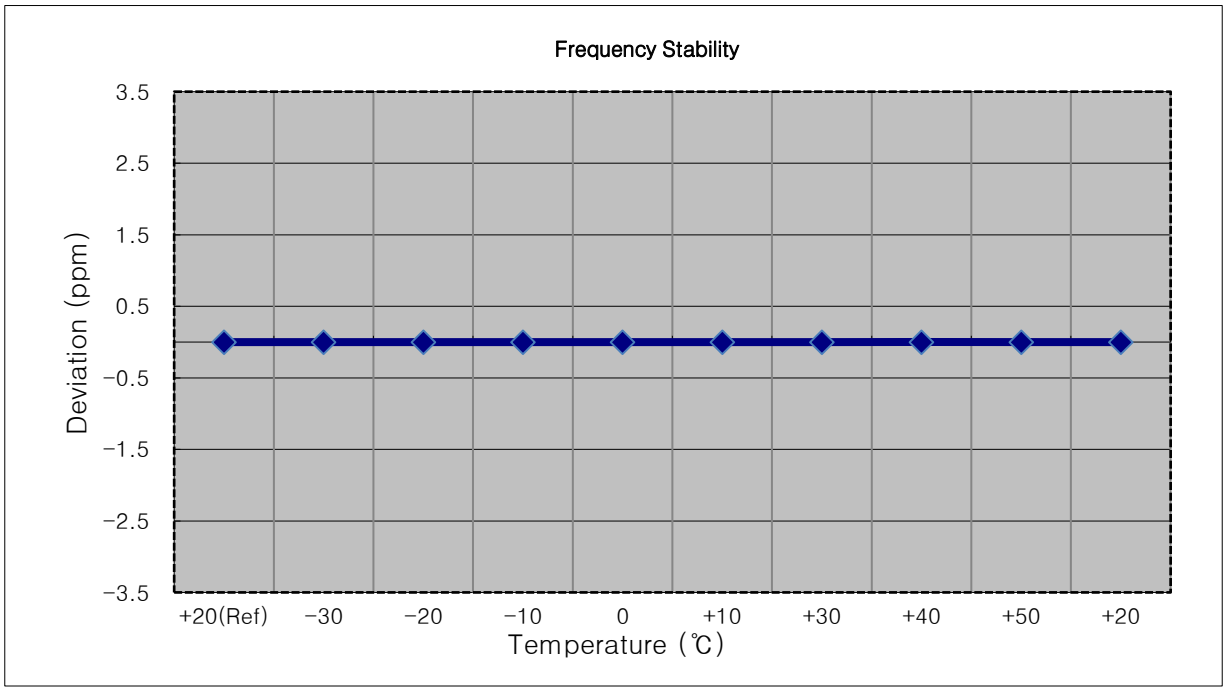
▣ OPERATING FREQUENCY: 1880,000,000 Hz

▣ CHANNEL: 18900 (3 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1879 999 999	0.0	0.000 000	0.000
100 %		-30	1880 000 000	1.7	0.000 000	0.001
100 %		-20	1879 999 999	-0.1	0.000 000	0.000
100 %		-10	1879 999 999	0.1	0.000 000	0.000
100 %		0	1880 000 000	0.9	0.000 000	0.000
100 %		+10	1880 000 000	1.7	0.000 000	0.001
100 %		+30	1880 000 000	0.9	0.000 000	0.000
100 %		+40	1880 000 000	1.8	0.000 000	0.001
100 %		+50	1879 999 998	-0.5	0.000 000	0.000
Batt. Endpoint	3.400	+20	1879 999 999	0.1	0.000 000	0.000



▣ MODE: LTE B2

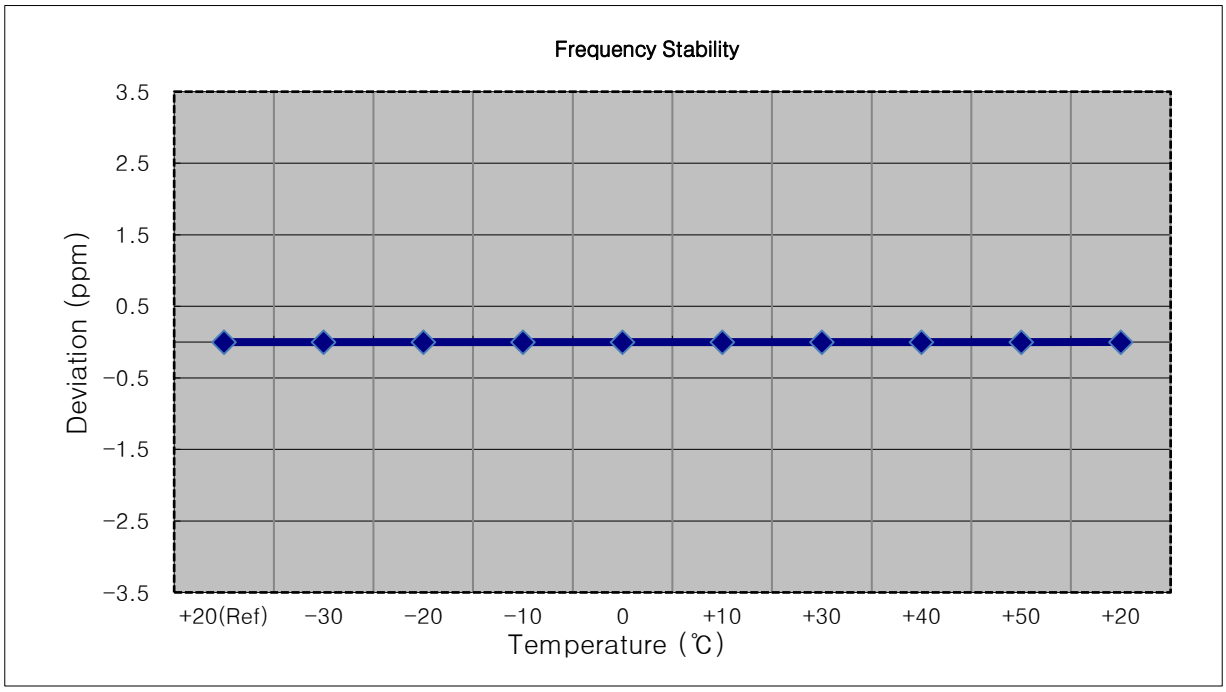
▣ OPERATING FREQUENCY: 1880,000,000 Hz

▣ CHANNEL: 18900 (5 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	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 000 002	0.1	0.000 000	0.000
100 %		-20	1880 000 003	0.3	0.000 000	0.000
100 %		-10	1880 000 004	1.3	0.000 000	0.001
100 %		0	1880 000 004	1.4	0.000 000	0.001
100 %		+10	1880 000 002	0.0	0.000 000	0.000
100 %		+30	1880 000 001	-1.2	0.000 000	-0.001
100 %		+40	1880 000 003	0.3	0.000 000	0.000
100 %		+50	1880 000 003	1.2	0.000 000	0.001
Batt. Endpoint	3.400	+20	1880 000 004	1.8	0.000 000	0.001



▣ MODE: LTE B2

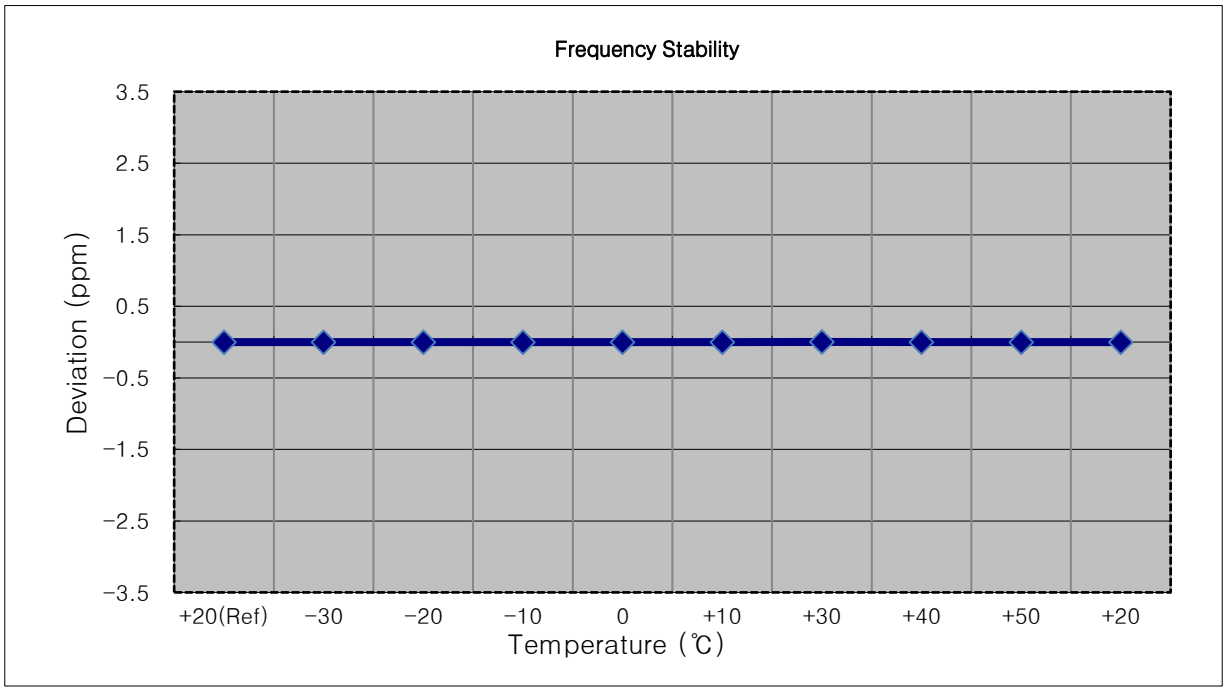
▣ OPERATING FREQUENCY: 1880,000,000 Hz

▣ CHANNEL: 18900 (10 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	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 000 004	1.0	0.000 000	0.001
100 %		-20	1880 000 004	1.4	0.000 000	0.001
100 %		-10	1880 000 003	0.0	0.000 000	0.000
100 %		0	1880 000 005	2.1	0.000 000	0.001
100 %		+10	1880 000 005	2.0	0.000 000	0.001
100 %		+30	1880 000 006	3.1	0.000 000	0.002
100 %		+40	1880 000 002	-1.1	0.000 000	-0.001
100 %		+50	1880 000 004	1.7	0.000 000	0.001
Batt. Endpoint	3.400	+20	1880 000 003	0.3	0.000 000	0.000



▣ MODE: LTE B2

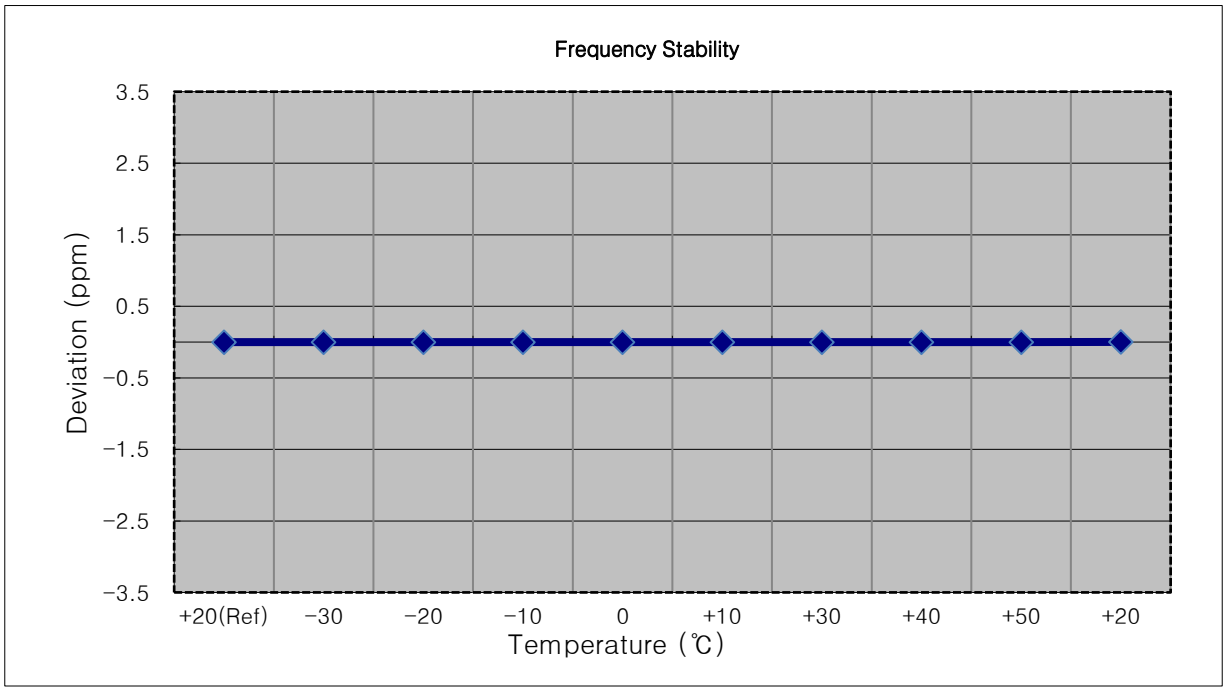
▣ OPERATING FREQUENCY: 1880,000,000 Hz

▣ CHANNEL: 18900 (15 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	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 000 003	0.5	0.000 000	0.000
100 %		-20	1880 000 005	2.5	0.000 000	0.001
100 %		-10	1880 000 002	-0.5	0.000 000	0.000
100 %		0	1880 000 005	2.5	0.000 000	0.001
100 %		+10	1880 000 003	0.8	0.000 000	0.000
100 %		+30	1880 000 003	1.4	0.000 000	0.001
100 %		+40	1880 000 005	2.6	0.000 000	0.001
100 %		+50	1880 000 003	0.5	0.000 000	0.000
Batt. Endpoint	3.400	+20	1880 000 005	3.4	0.000 000	0.002



▣ MODE: LTE B2

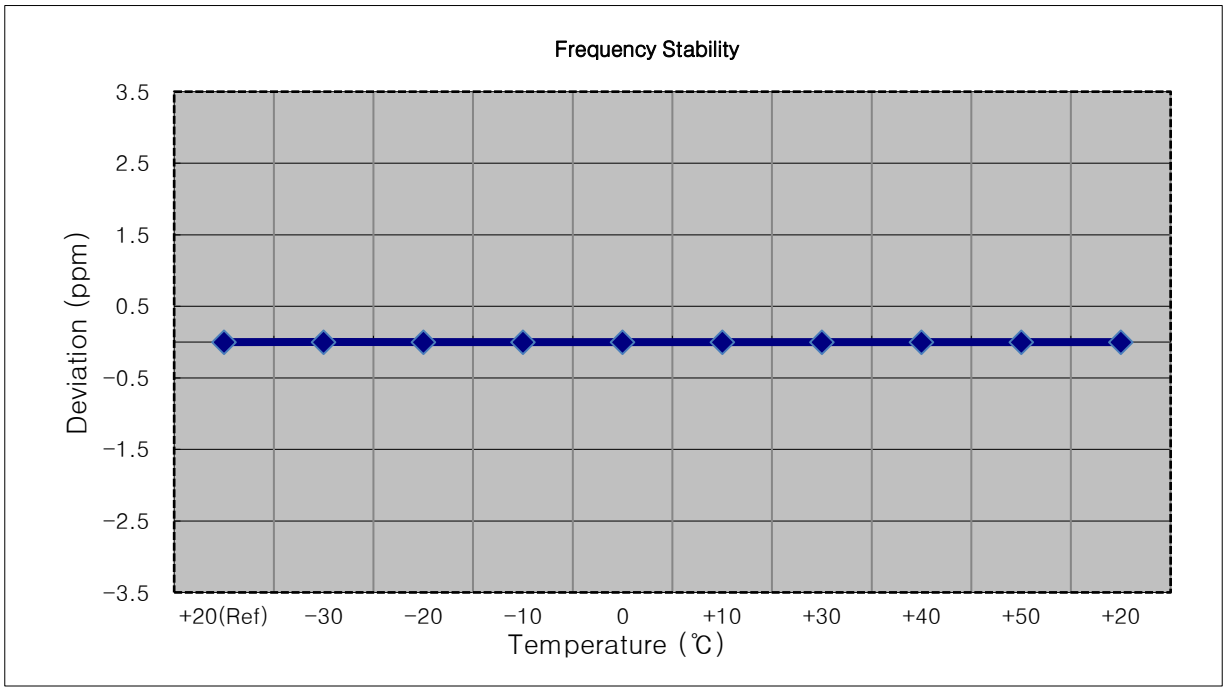
▣ OPERATING FREQUENCY: 1880,000,000 Hz

▣ CHANNEL: 18900 (20 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	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 000 003	1.9	0.000 000	0.001
100 %		-20	1880 000 001	-0.4	0.000 000	0.000
100 %		-10	1880 000 003	1.5	0.000 000	0.001
100 %		0	1880 000 003	1.4	0.000 000	0.001
100 %		+10	1880 000 001	0.0	0.000 000	0.000
100 %		+30	1880 000 003	1.3	0.000 000	0.001
100 %		+40	1880 000 003	1.5	0.000 000	0.001
100 %		+50	1880 000 003	1.1	0.000 000	0.001
Batt. Endpoint	3.400	+20	1880 000 002	0.3	0.000 000	0.000



▣ MODE: LTE B2

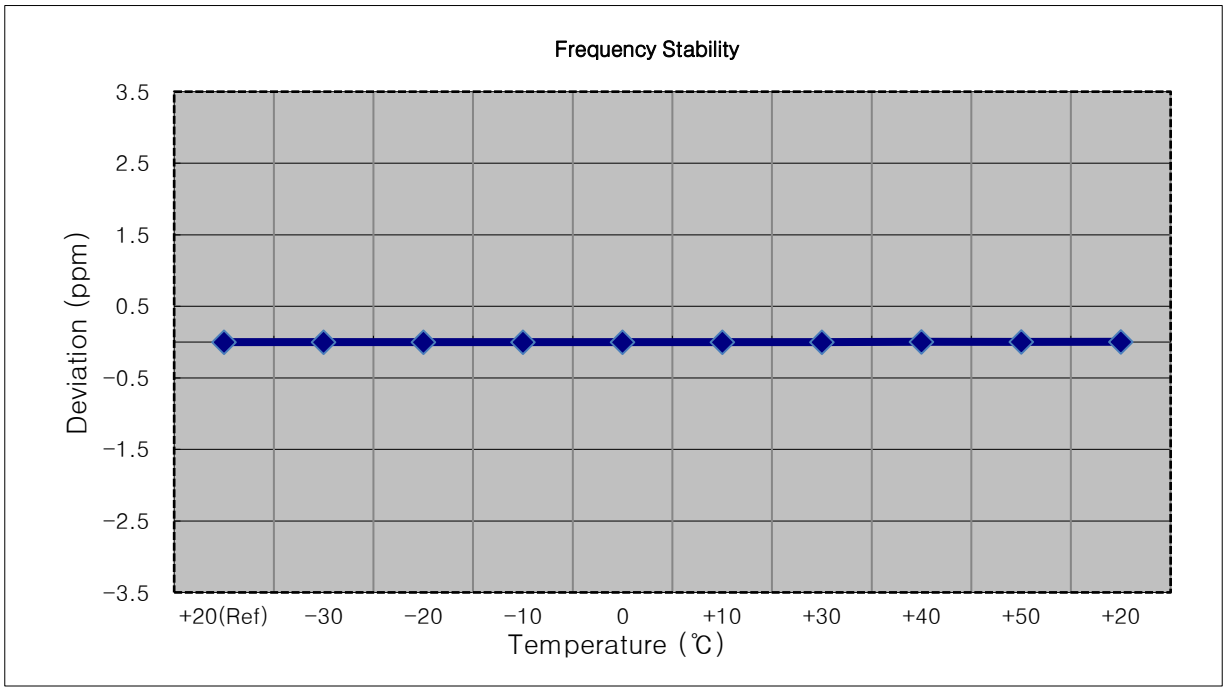
▣ OPERATING FREQUENCY: 1909,300,000 Hz

▣ CHANNEL: 19193 (1.4 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1909 299 999	0.0	0.000 000	0.000
100 %		-30	1909 299 998	-1.1	0.000 000	-0.001
100 %		-20	1909 300 002	2.6	0.000 000	0.001
100 %		-10	1909 300 001	1.9	0.000 000	0.001
100 %		0	1909 300 001	1.6	0.000 000	0.001
100 %		+10	1909 300 000	0.6	0.000 000	0.000
100 %		+30	1909 300 001	2.2	0.000 000	0.001
100 %		+40	1909 300 002	3.1	0.000 000	0.002
100 %		+50	1909 300 004	4.5	0.000 000	0.002
Batt. Endpoint	3.400	+20	1909 300 002	3.0	0.000 000	0.002



▣ MODE: LTE B2

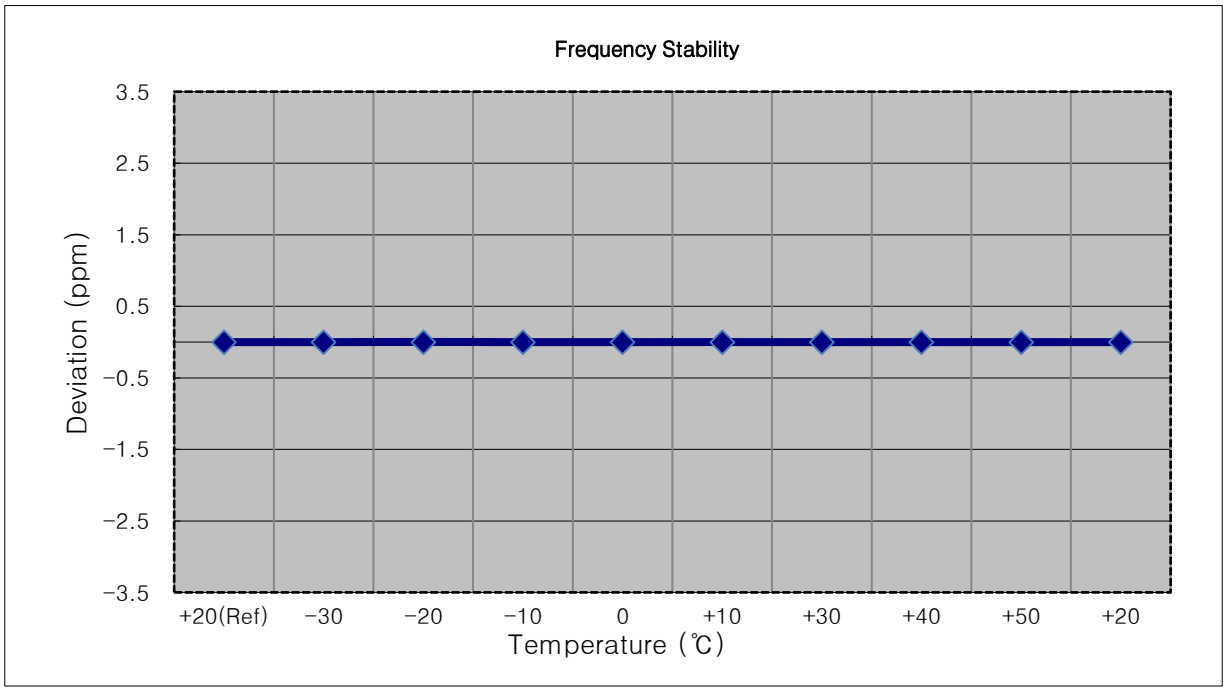
▣ OPERATING FREQUENCY: 1908,500,000 Hz

▣ CHANNEL: 19185 (3 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1908 499 999	0.0	0.000 000	0.000
100 %		-30	1908 500 000	1.2	0.000 000	0.001
100 %		-20	1908 500 001	2.6	0.000 000	0.001
100 %		-10	1908 500 000	1.0	0.000 000	0.001
100 %		0	1908 500 000	1.5	0.000 000	0.001
100 %		+10	1908 499 998	-0.2	0.000 000	0.000
100 %		+30	1908 500 000	1.3	0.000 000	0.001
100 %		+40	1908 500 000	1.2	0.000 000	0.001
100 %		+50	1908 500 000	1.6	0.000 000	0.001
Batt. Endpoint	3.400	+20	1908 500 000	1.1	0.000 000	0.001



▣ MODE: LTE B2

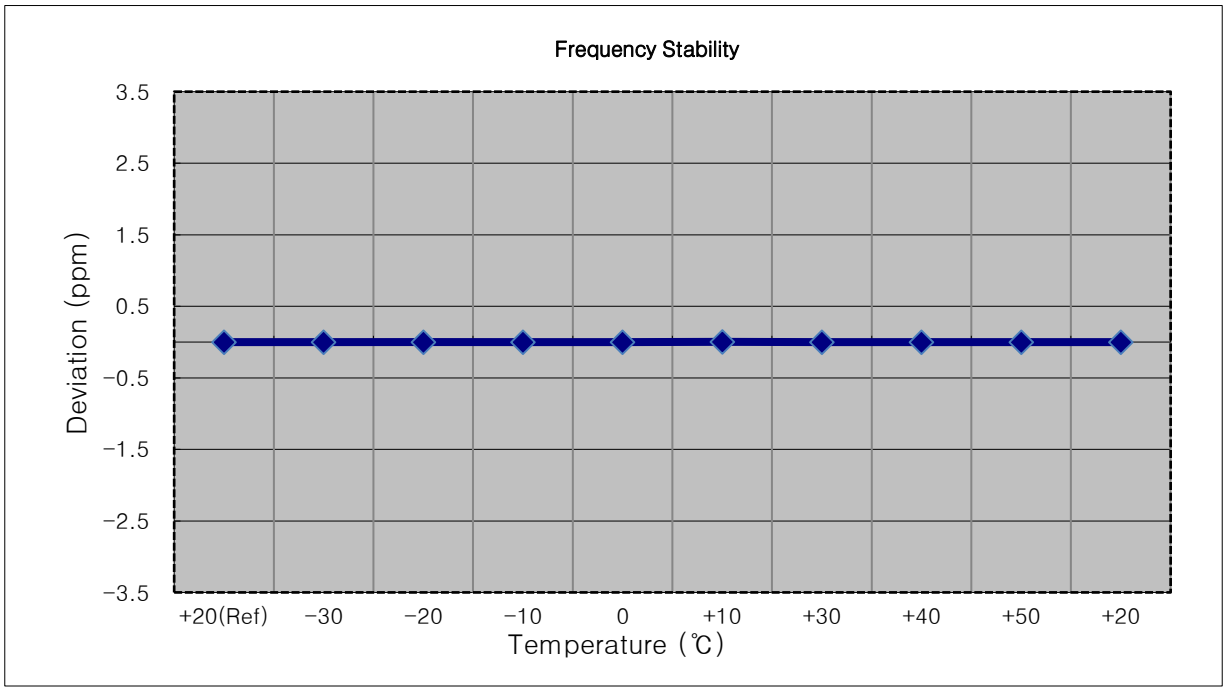
▣ OPERATING FREQUENCY: 1907,500,000 Hz

▣ CHANNEL: 19175 (5 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1907 499 999	0.0	0.000 000	0.000
100 %		-30	1907 499 999	-0.1	0.000 000	0.000
100 %		-20	1907 499 999	-0.3	0.000 000	0.000
100 %		-10	1907 499 999	0.3	0.000 000	0.000
100 %		0	1907 500 002	2.8	0.000 000	0.001
100 %		+10	1907 500 005	5.8	0.000 000	0.003
100 %		+30	1907 499 999	0.1	0.000 000	0.000
100 %		+40	1907 500 001	2.4	0.000 000	0.001
100 %		+50	1907 500 002	2.7	0.000 000	0.001
Batt. Endpoint	3.400	+20	1907 500 000	0.7	0.000 000	0.000



▣ MODE: LTE B2

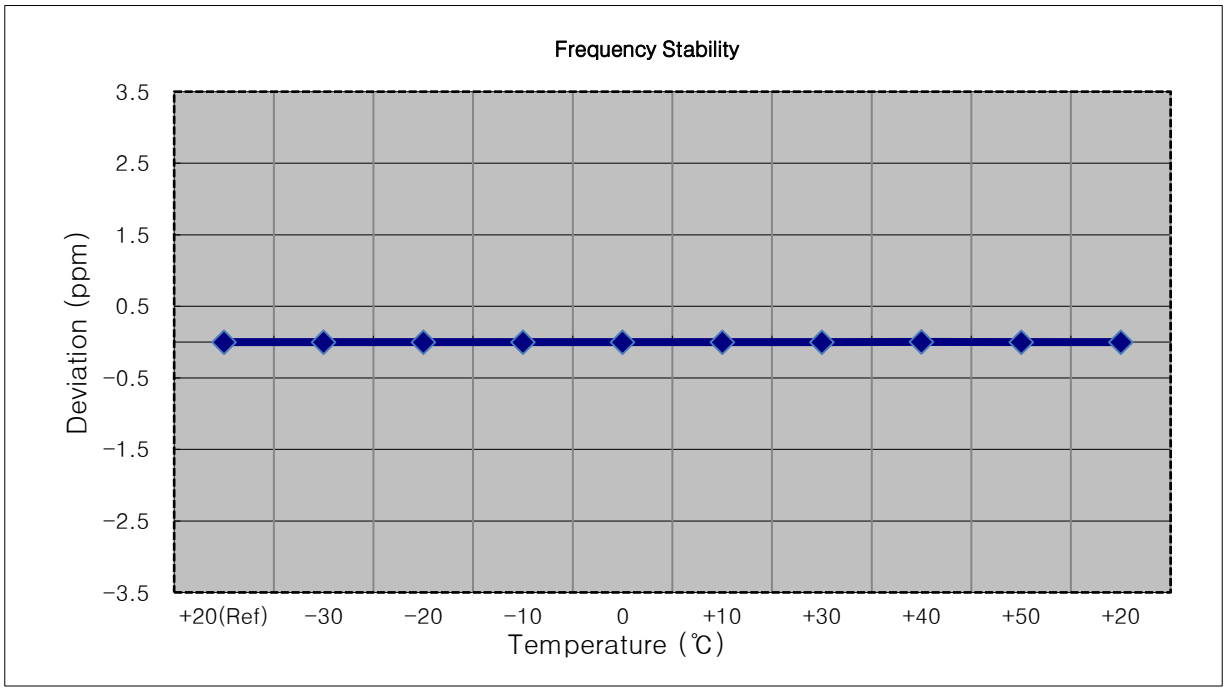
▣ OPERATING FREQUENCY: 1905,000,000 Hz

▣ CHANNEL: 19150 (10 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1905 000 001	0.0	0.000 000	0.000
100 %		-30	1905 000 002	1.0	0.000 000	0.001
100 %		-20	1905 000 000	-0.1	0.000 000	0.000
100 %		-10	1905 000 001	0.0	0.000 000	0.000
100 %		0	1905 000 001	0.1	0.000 000	0.000
100 %		+10	1905 000 003	2.1	0.000 000	0.001
100 %		+30	1905 000 002	1.9	0.000 000	0.001
100 %		+40	1905 000 004	3.6	0.000 000	0.002
100 %		+50	1905 000 000	-1.0	0.000 000	-0.001
Batt. Endpoint	3.400	+20	1905 000 000	-0.5	0.000 000	0.000



▣ MODE: LTE B2

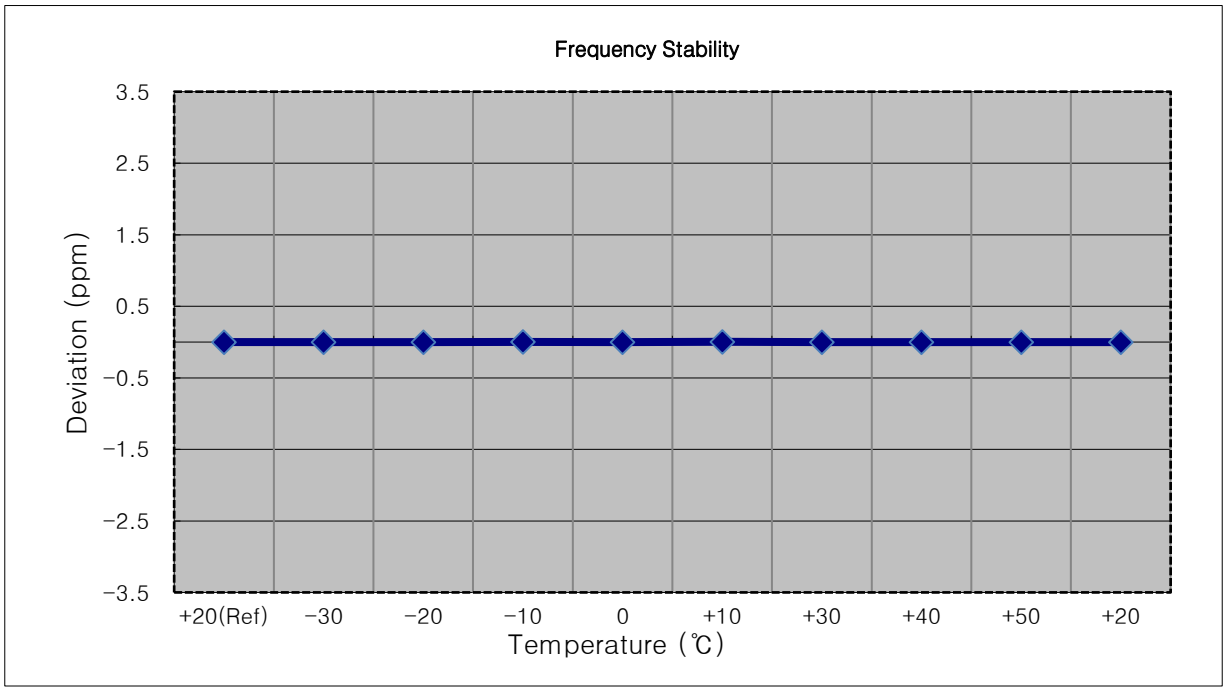
▣ OPERATING FREQUENCY: 1902,500,000 Hz

▣ CHANNEL: 19125 (15 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1902 499 998	0.0	0.000 000	0.000
100 %		-30	1902 499 999	0.4	0.000 000	0.000
100 %		-20	1902 500 000	1.4	0.000 000	0.001
100 %		-10	1902 500 002	3.4	0.000 000	0.002
100 %		0	1902 500 001	2.4	0.000 000	0.001
100 %		+10	1902 500 001	3.2	0.000 000	0.002
100 %		+30	1902 500 001	2.5	0.000 000	0.001
100 %		+40	1902 499 999	0.7	0.000 000	0.000
100 %		+50	1902 500 000	1.6	0.000 000	0.001
Batt. Endpoint	3.400	+20	1902 499 998	0.0	0.000 000	0.000



▣ MODE: LTE B2

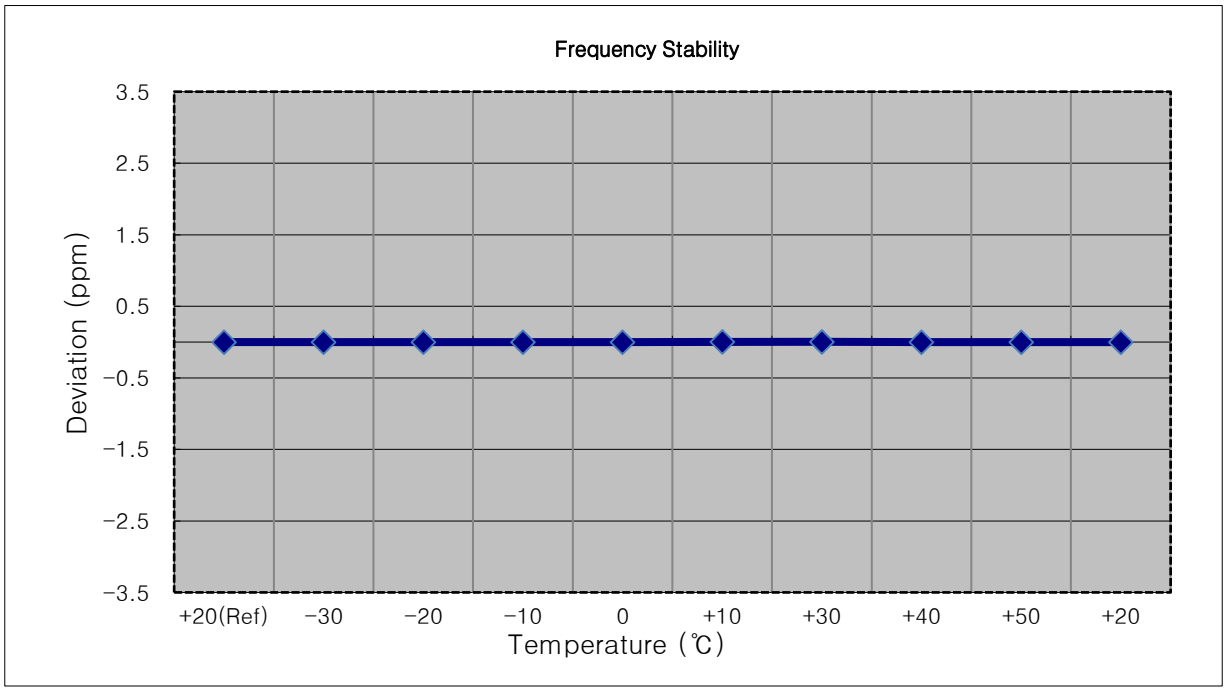
▣ OPERATING FREQUENCY: 1900,000,000 Hz

▣ CHANNEL: 19100 (20 MHz)

▣ REFERENCE VOLTAGE: 4.200 VDC

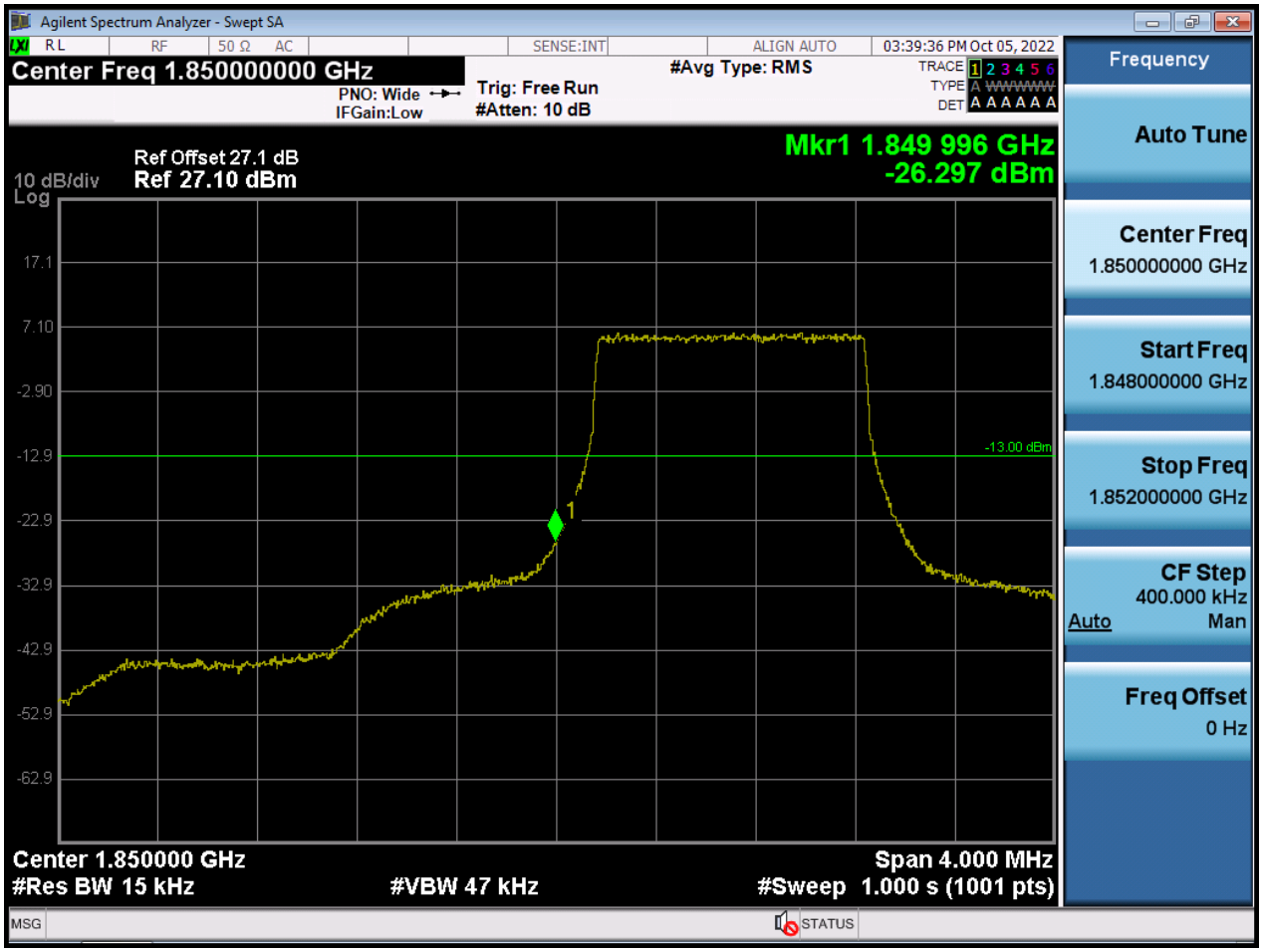
▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	4.200	+20(Ref)	1900 000 001	0.0	0.000 000	0.000
100 %		-30	1900 000 001	0.1	0.000 000	0.000
100 %		-20	1900 000 001	0.2	0.000 000	0.000
100 %		-10	1900 000 003	2.5	0.000 000	0.001
100 %		0	1900 000 002	1.2	0.000 000	0.001
100 %		+10	1900 000 005	3.7	0.000 000	0.002
100 %		+30	1900 000 004	3.2	0.000 000	0.002
100 %		+40	1900 000 001	0.4	0.000 000	0.000
100 %		+50	1900 000 002	1.2	0.000 000	0.001
Batt. Endpoint	3.400	+20	1900 000 002	0.6	0.000 000	0.000

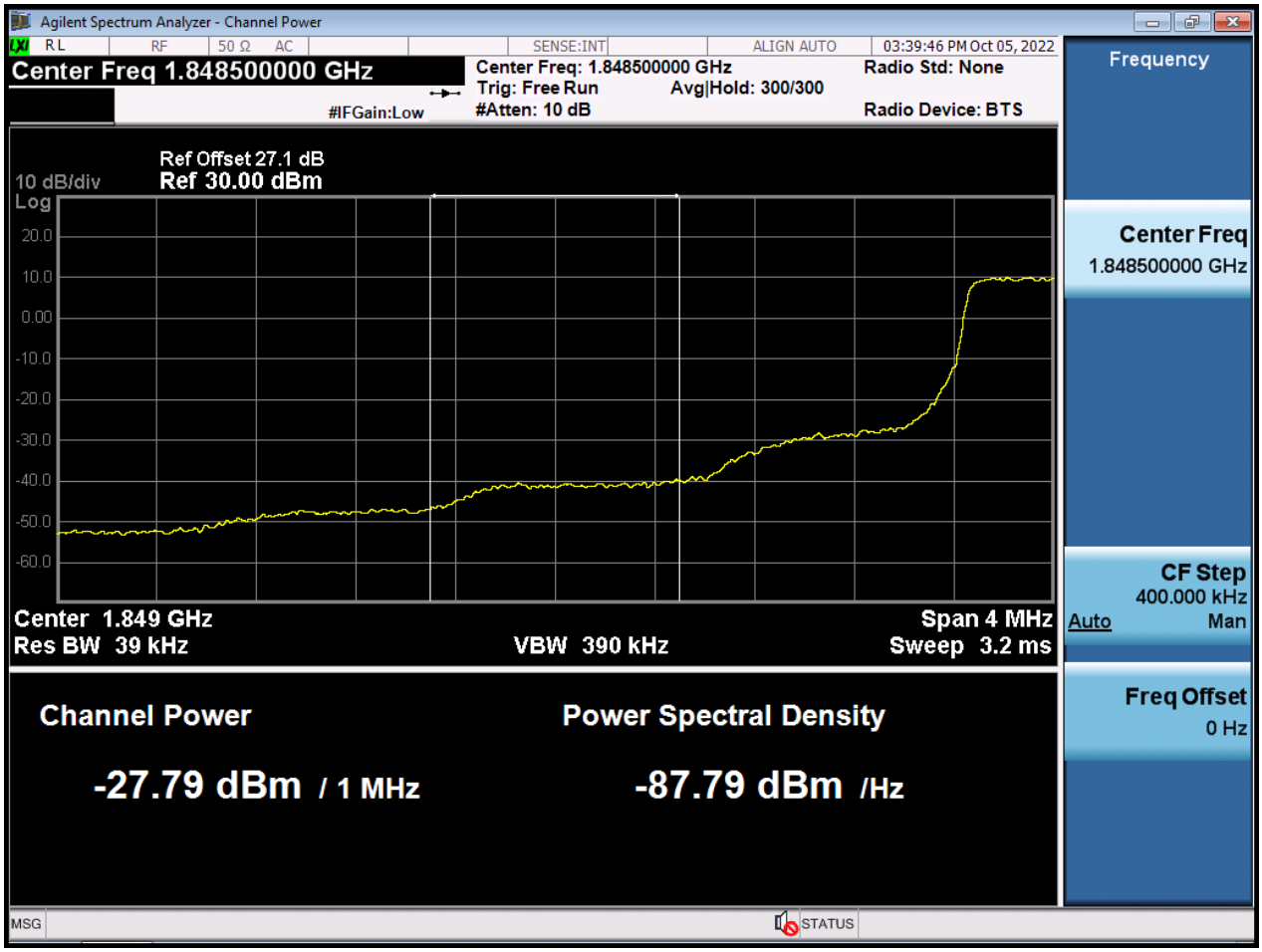


10. TEST PLOTS(Main2 Antenna)

BW1.4 M_BandEdge_Lowest Channel_QPSK_FullRB(1)

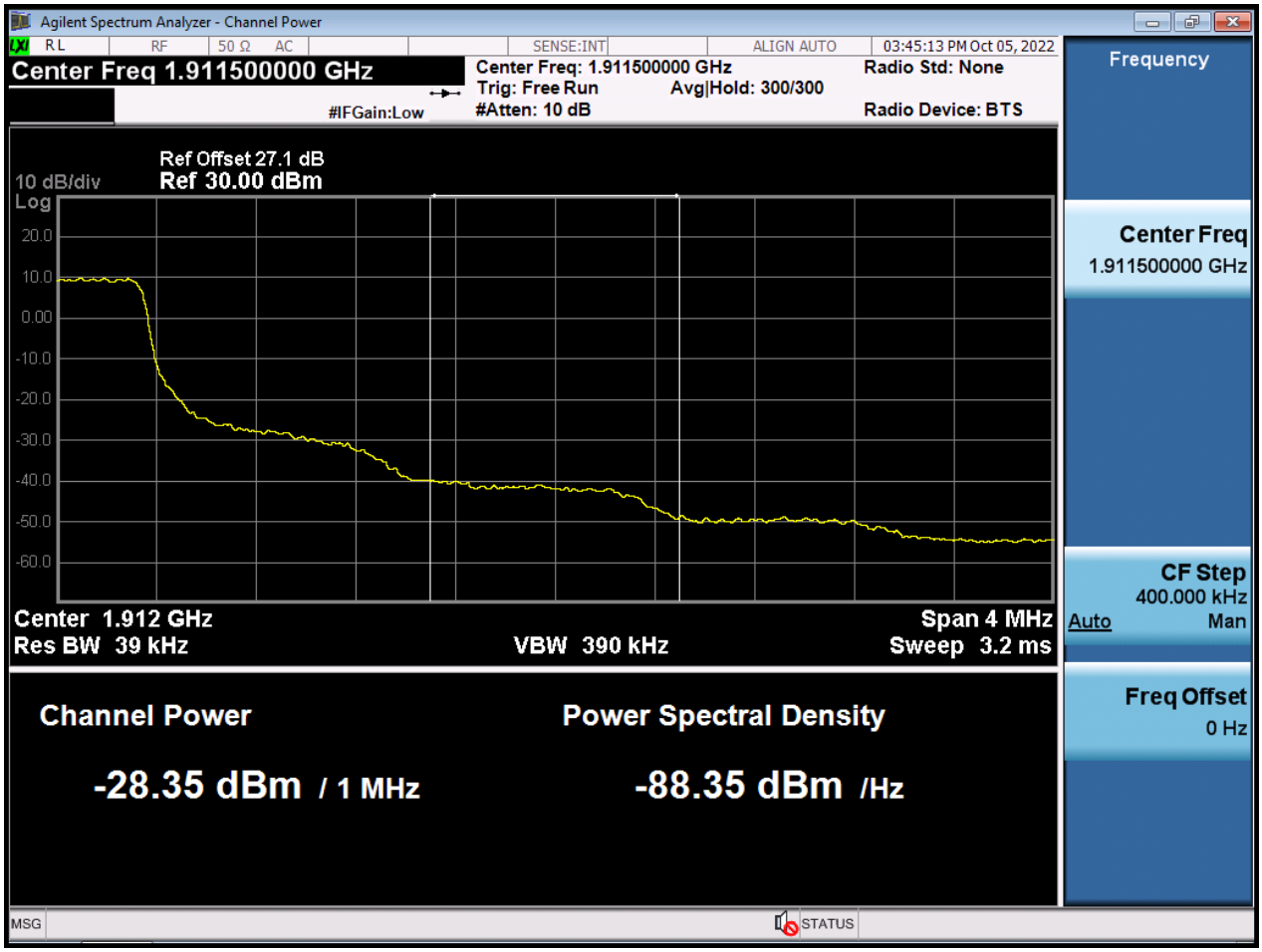


BW1.4 M_BandEdge_Lowest Channel_QPSK_FullRB(2)

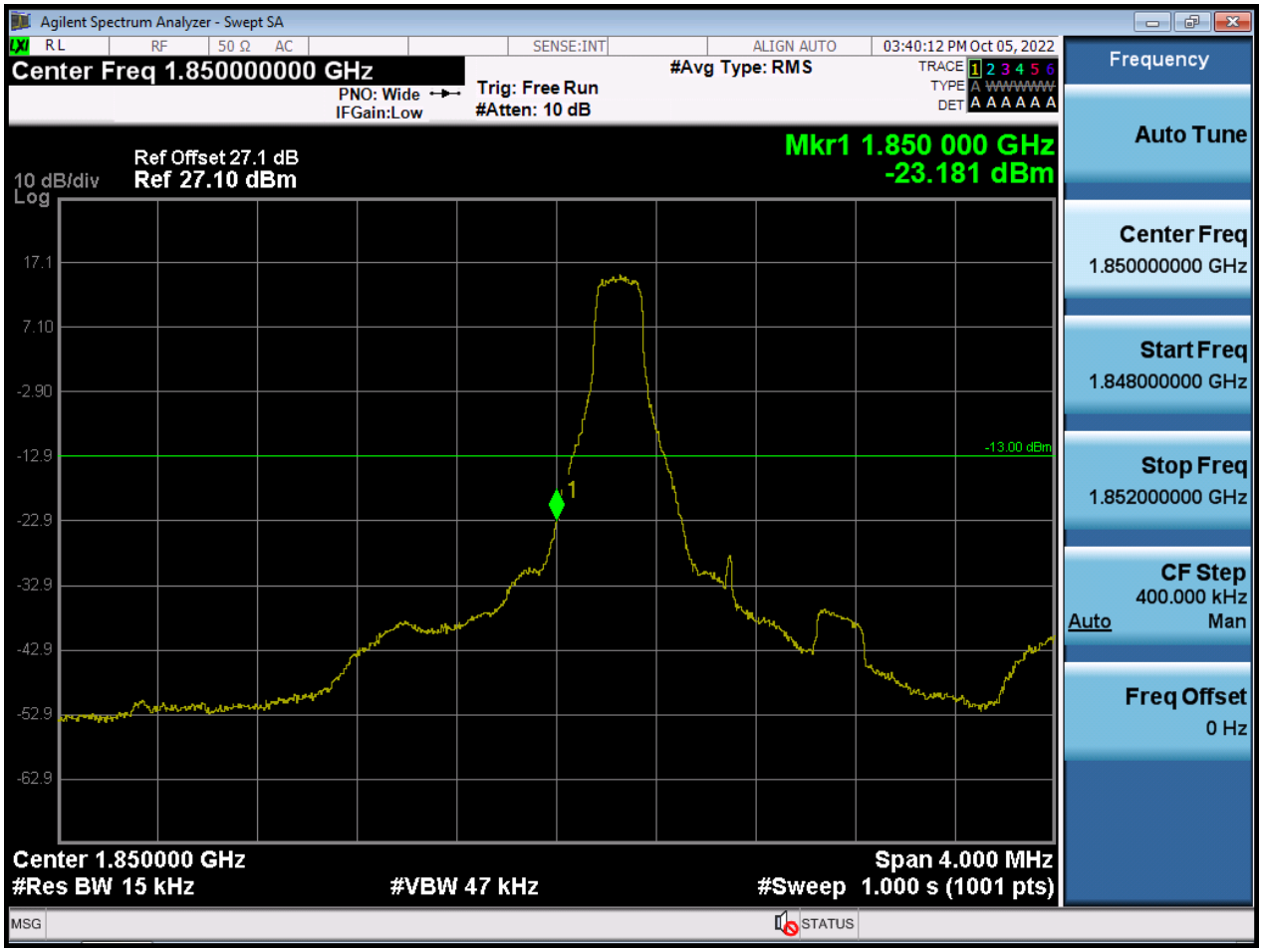


BW1.4 M_BandEdge_Highest Channel_QPSK_FullRB(1)

BW1.4 M_BandEdge_Highest Channel_QPSK_FullRB(2)



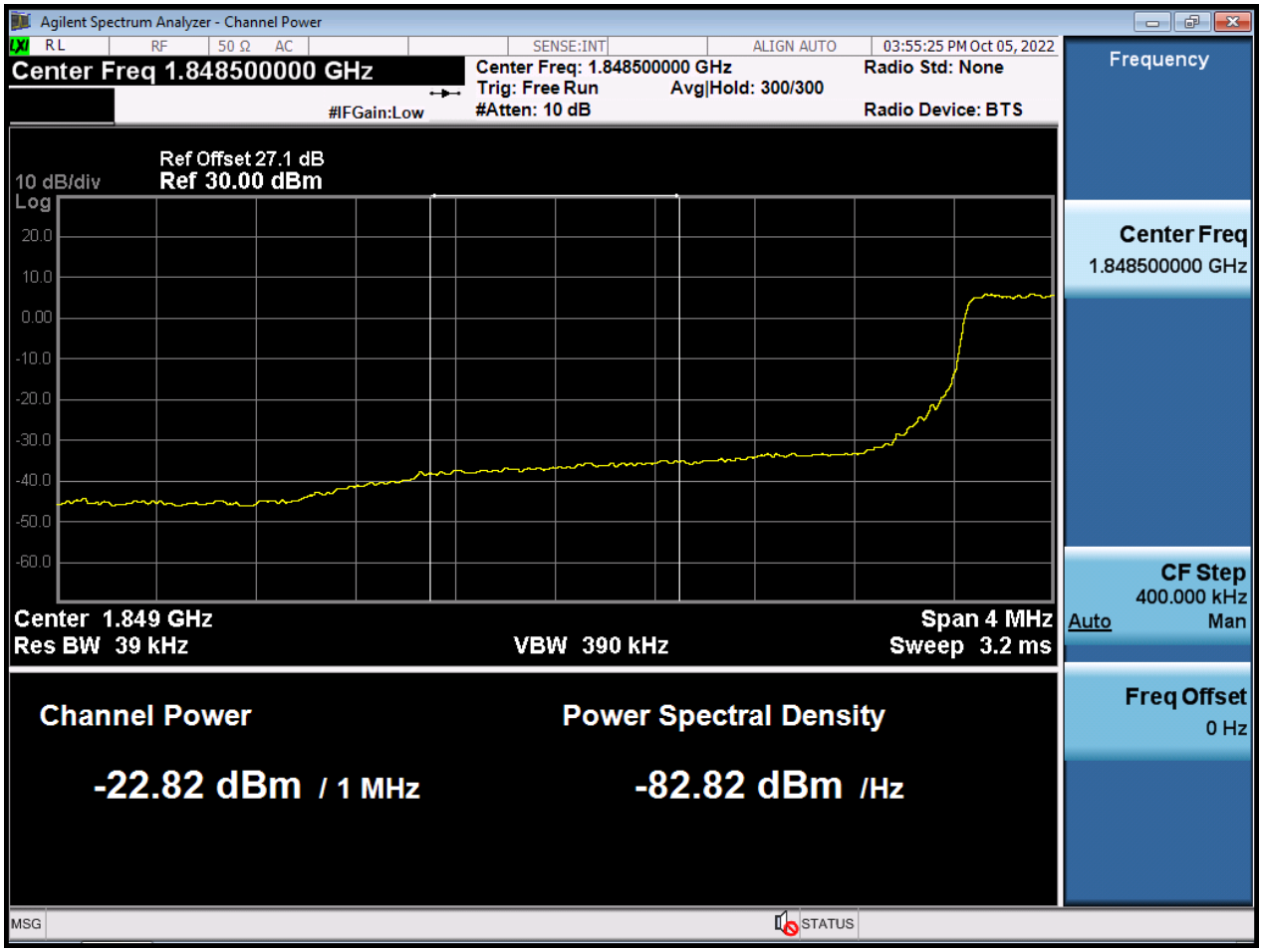
BW1.4 M_BandEdge_Lowest Channel_QPSK_1RB



BW1.4 M_BandEdge_Highest Channel_QPSK_1RB

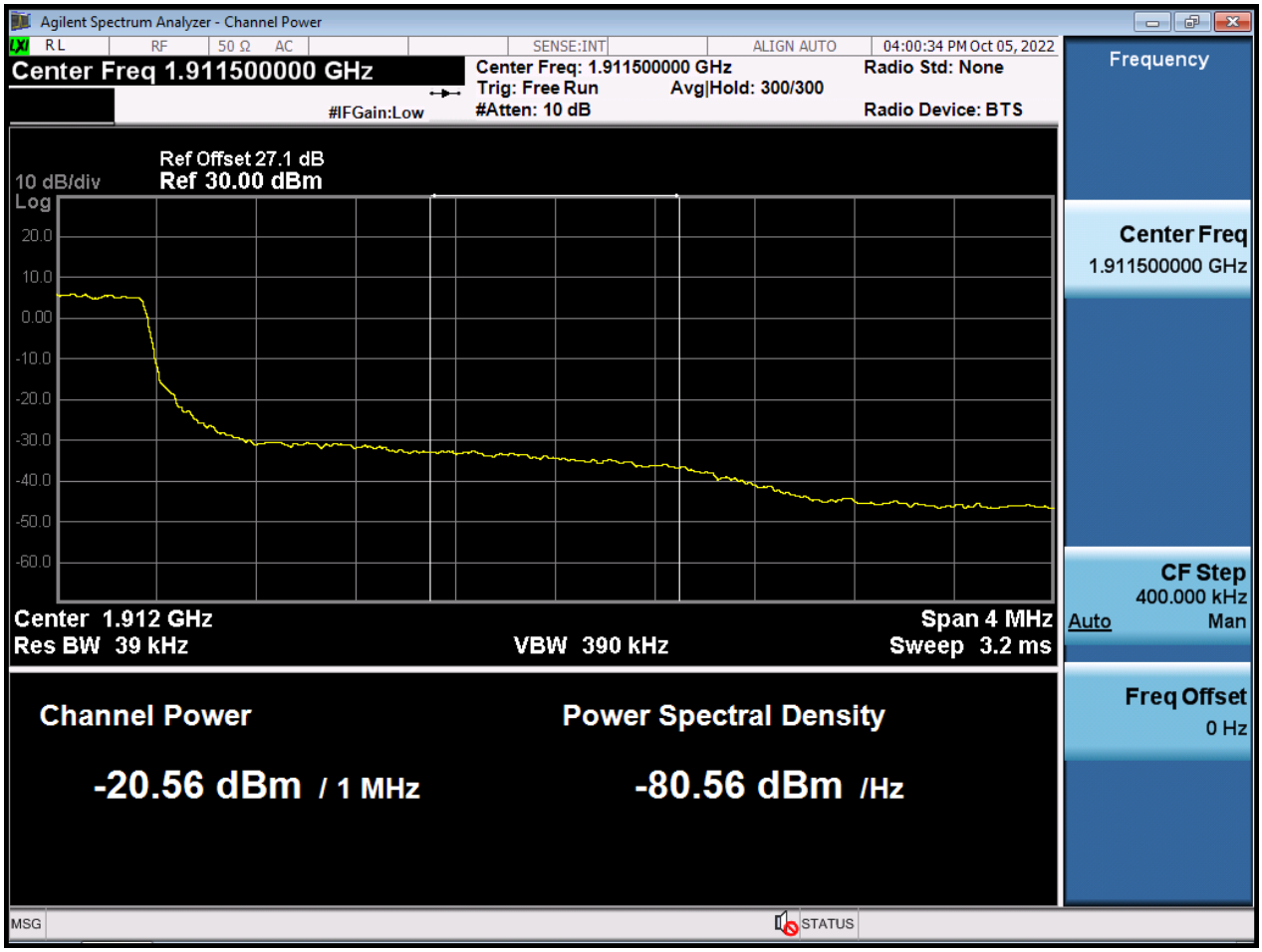
BW3 M_BandEdge_Lowest Channel_QPSK_FullRB(1)

BW3 M_BandEdge_Lowest Channel_QPSK_FullRB(2)

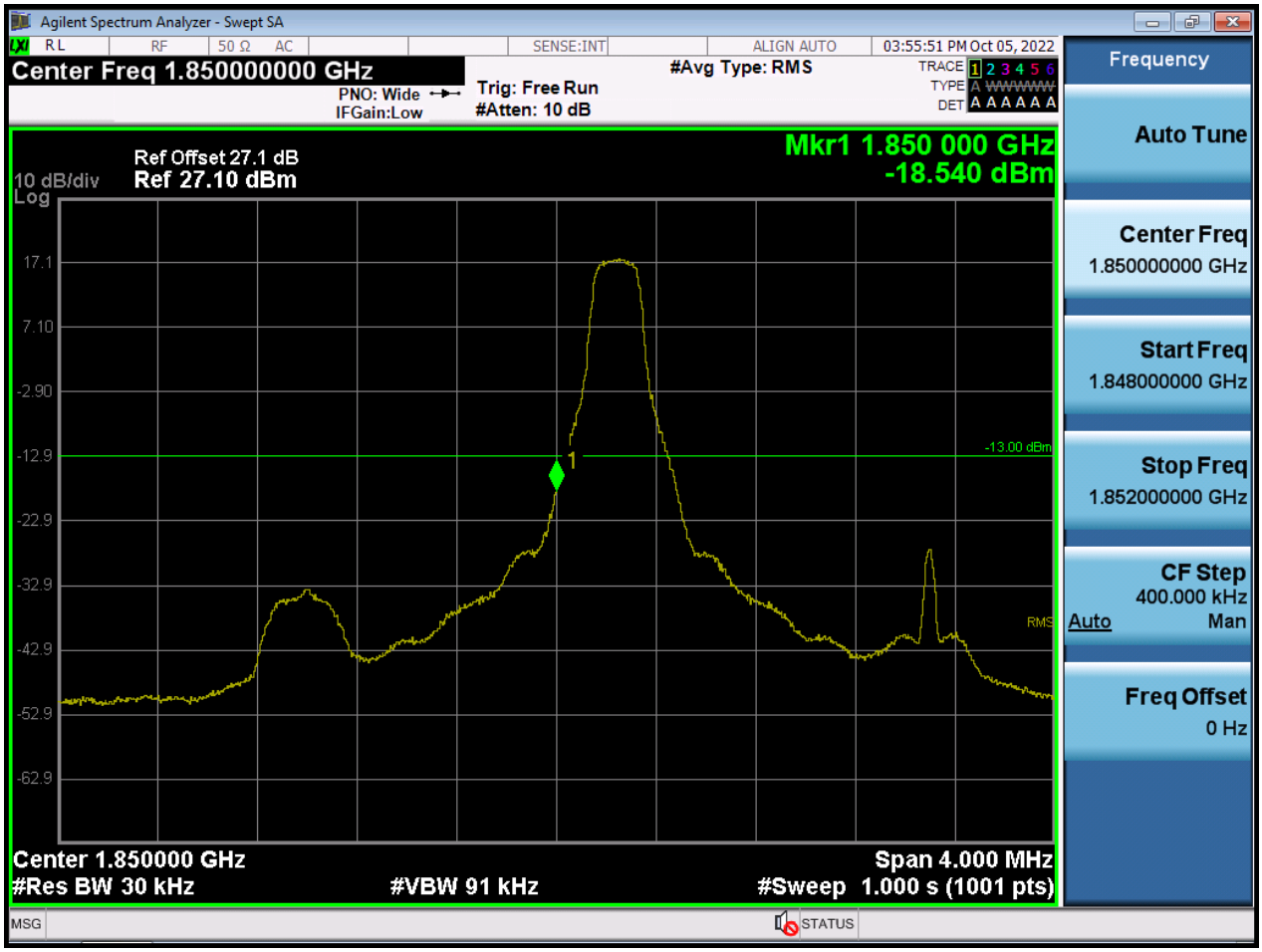


BW3 M_BandEdge_Highest Channel_QPSK_FullRB(1)

BW3 M_BandEdge_Highest Channel_QPSK_FullRB(2)



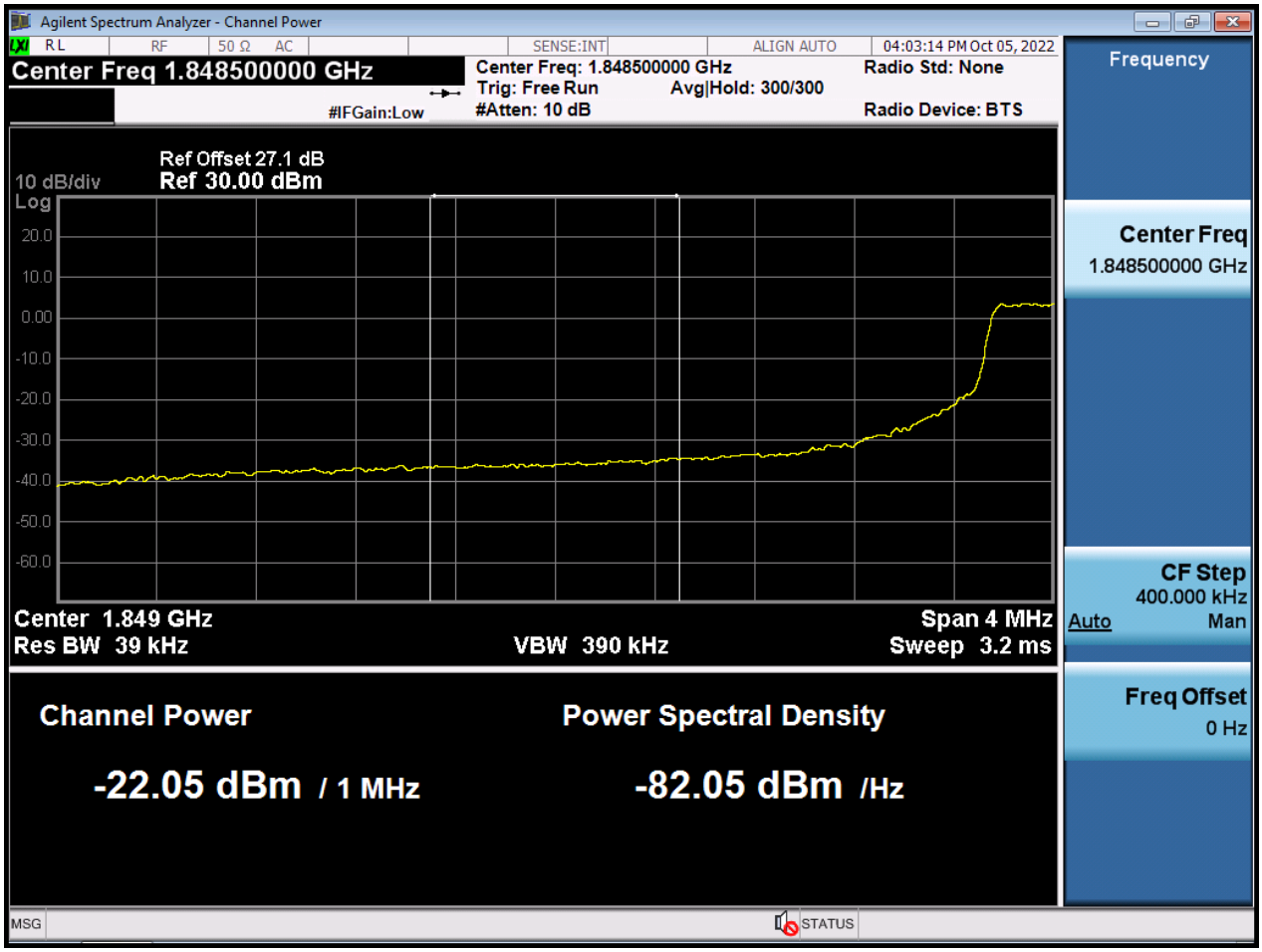
BW3 M_BandEdge_Lowest Channel_QPSK_1RB



BW3 M_BandEdge_Highest Channel_QPSK_1RB

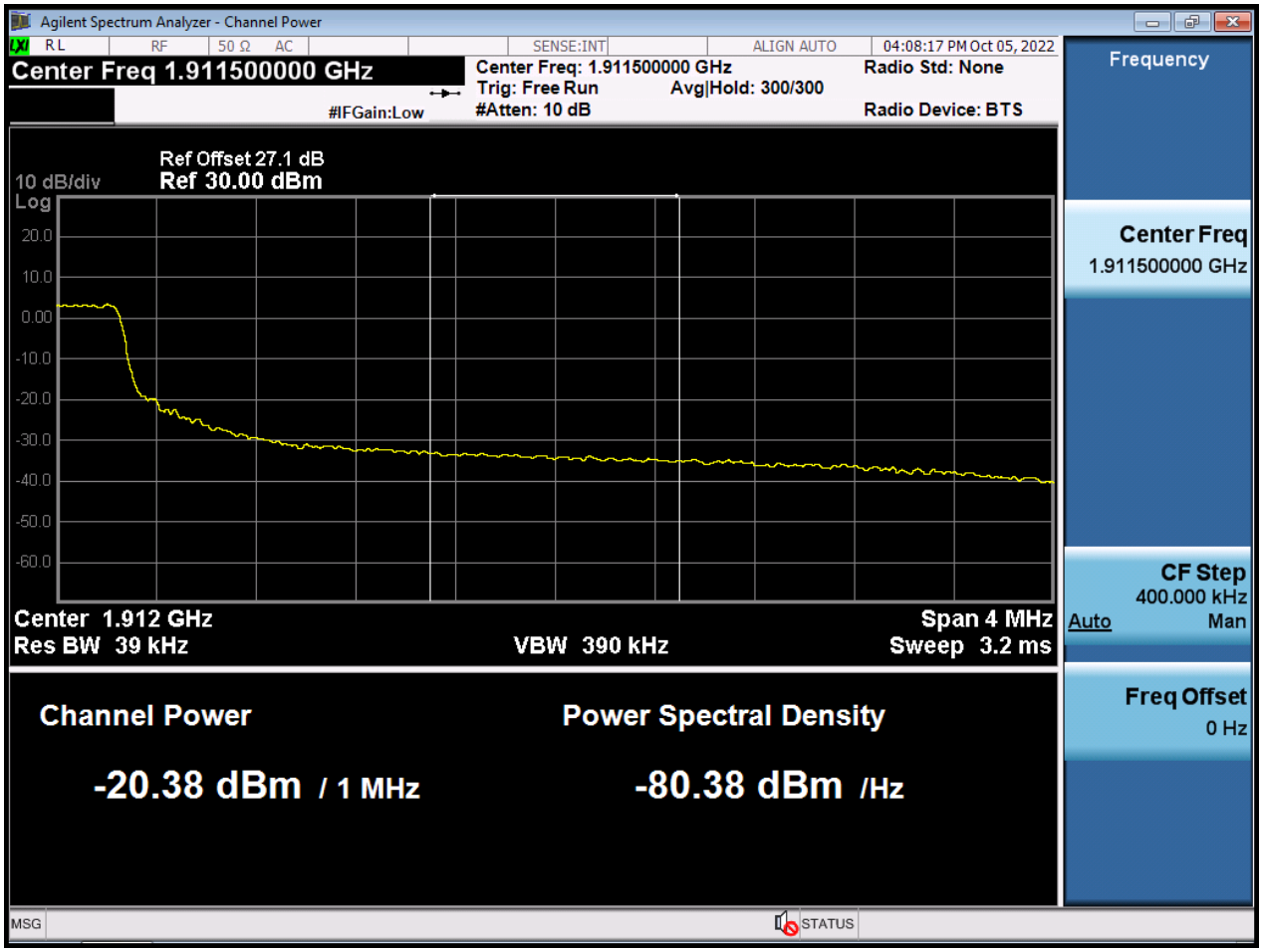
BW5 M_BandEdge_Lowest Channel_QPSK_FullRB(1)

BW5 M_BandEdge_Lowest Channel_QPSK_FullRB(2)

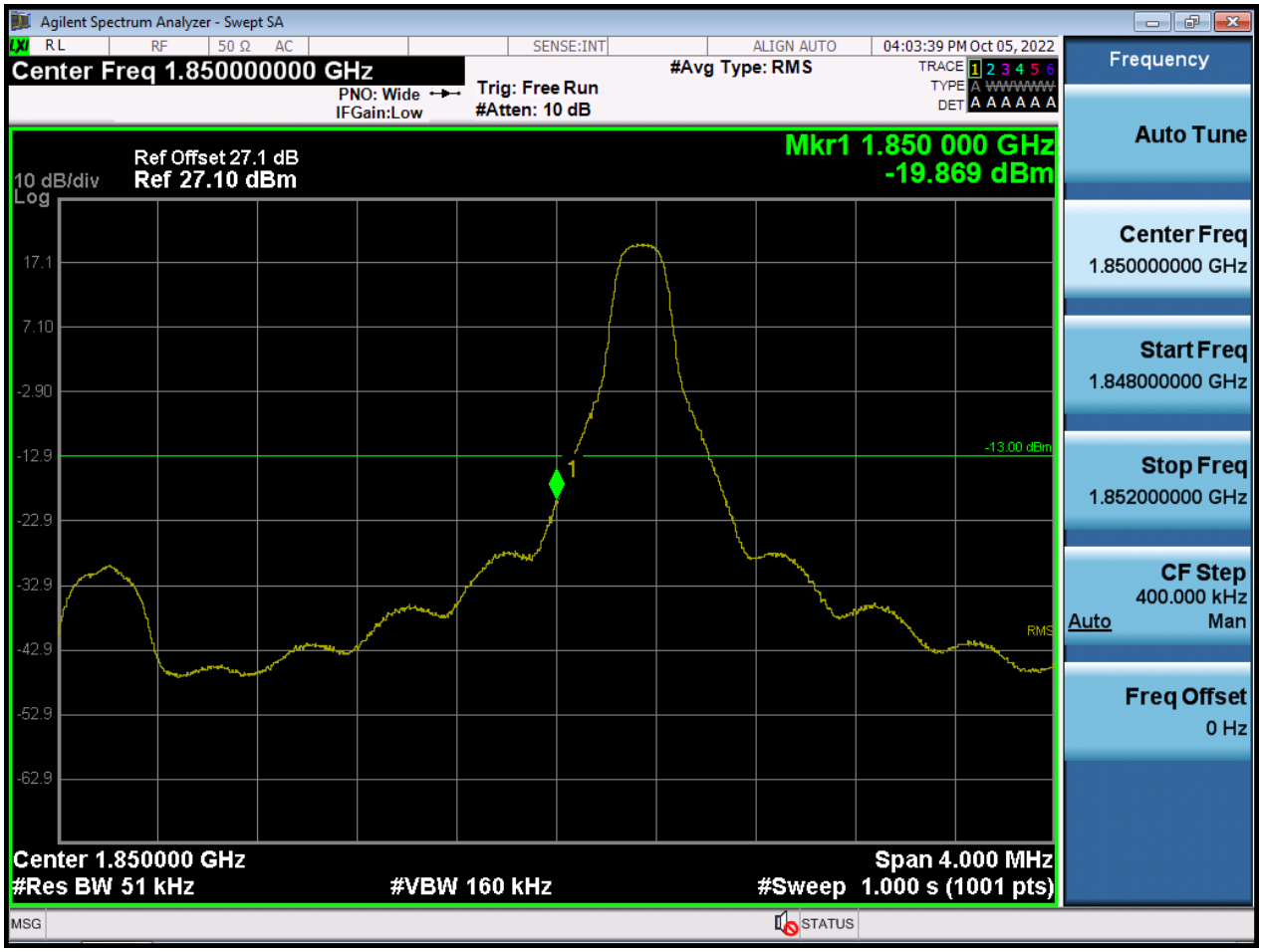


BW5 M_BandEdge_Highest Channel_QPSK_FullRB(1)

BW5 M_BandEdge_Highest Channel_QPSK_FullRB(2)



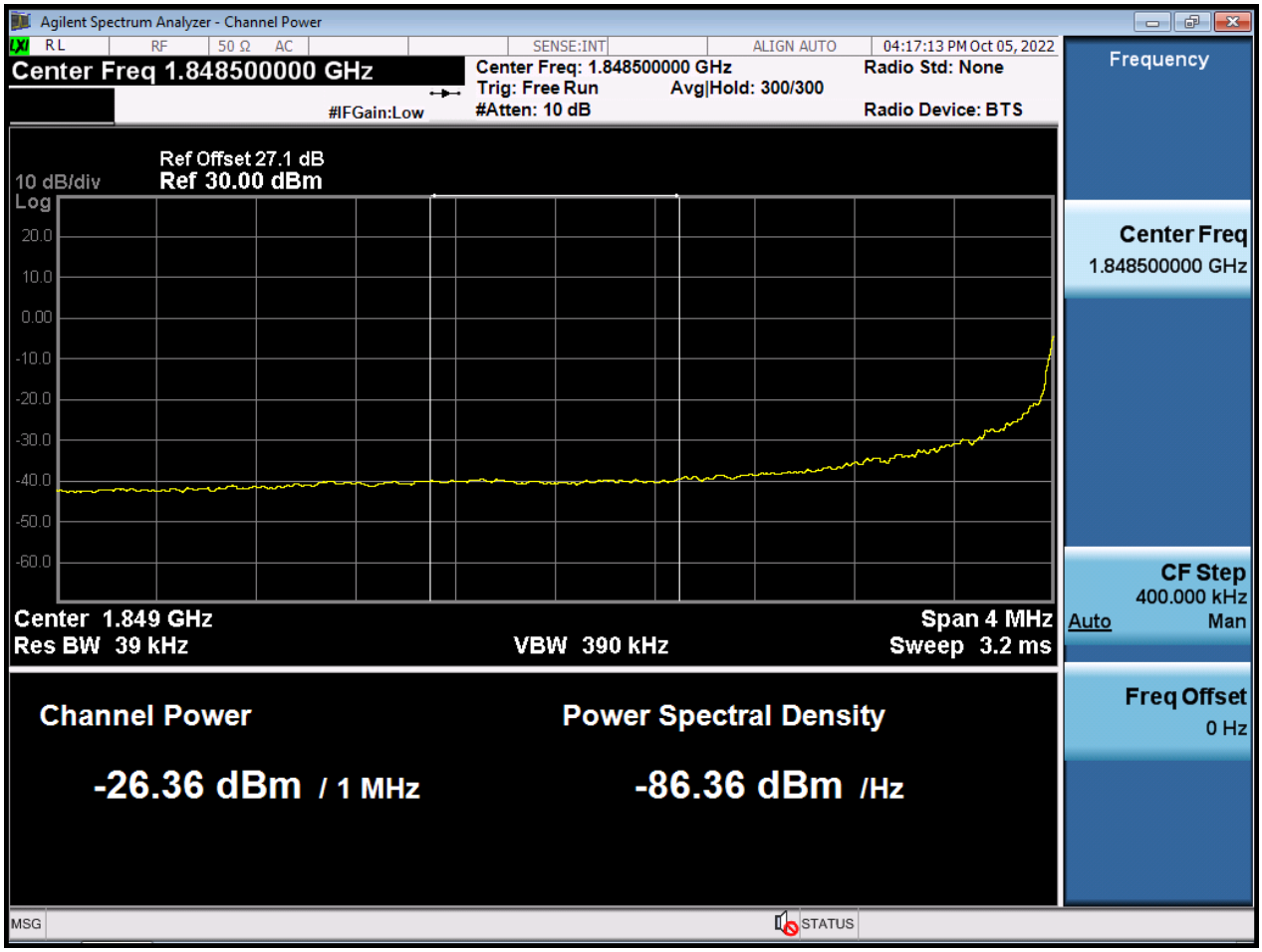
BW5 M_BandEdge_Lowest Channel_QPSK_1RB



BW5 M_BandEdge_Highest Channel_QPSK_1RB

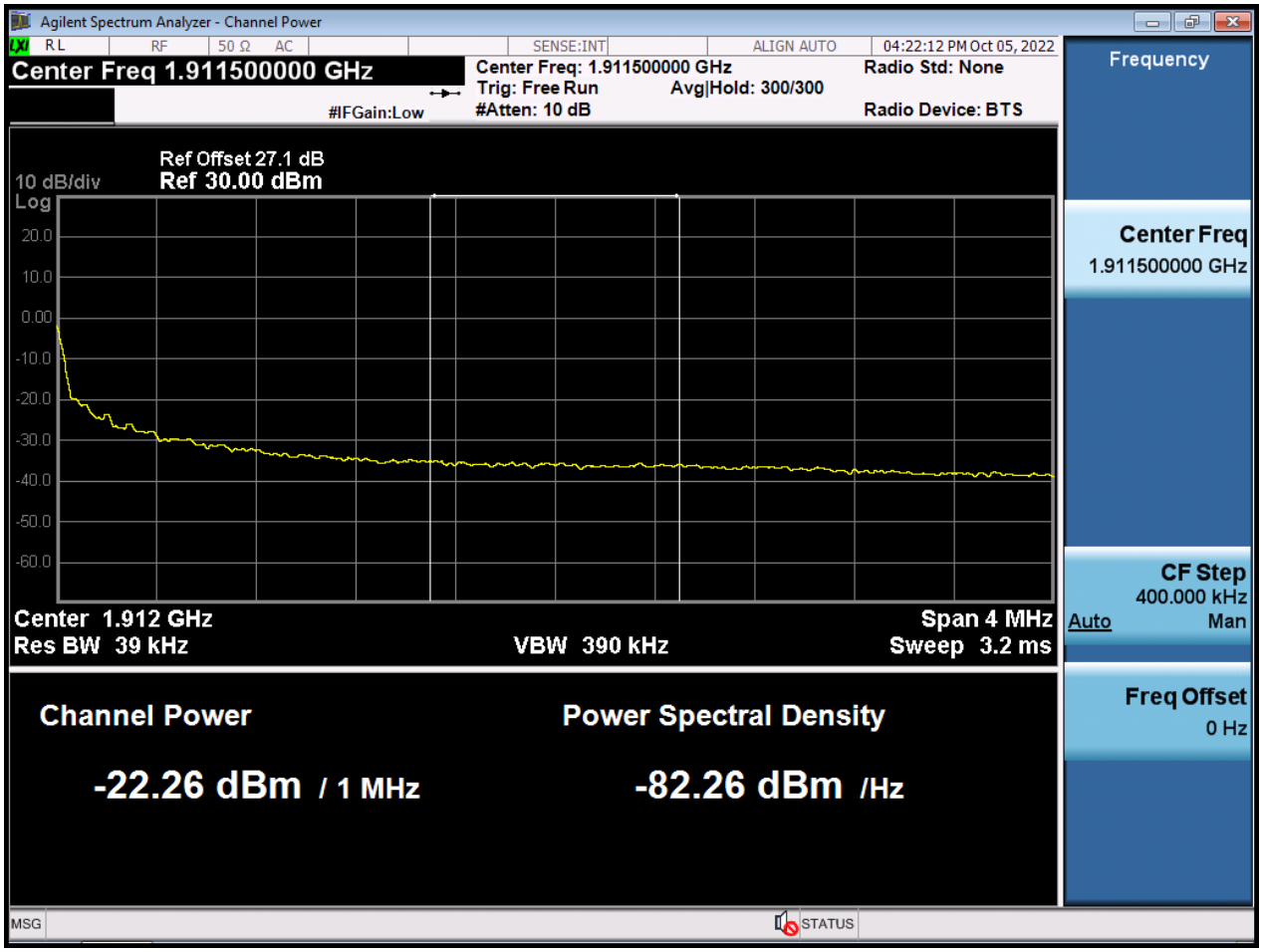
BW10 M_BandEdge_Lowest Channel_QPSK_FullRB(1)

BW10 M_BandEdge_Lowest Channel_QPSK_FullRB(2)



BW10 M_BandEdge_Highest Channel_QPSK_FullRB(1)

BW10 M_BandEdge_Highest Channel_QPSK_FullRB(2)

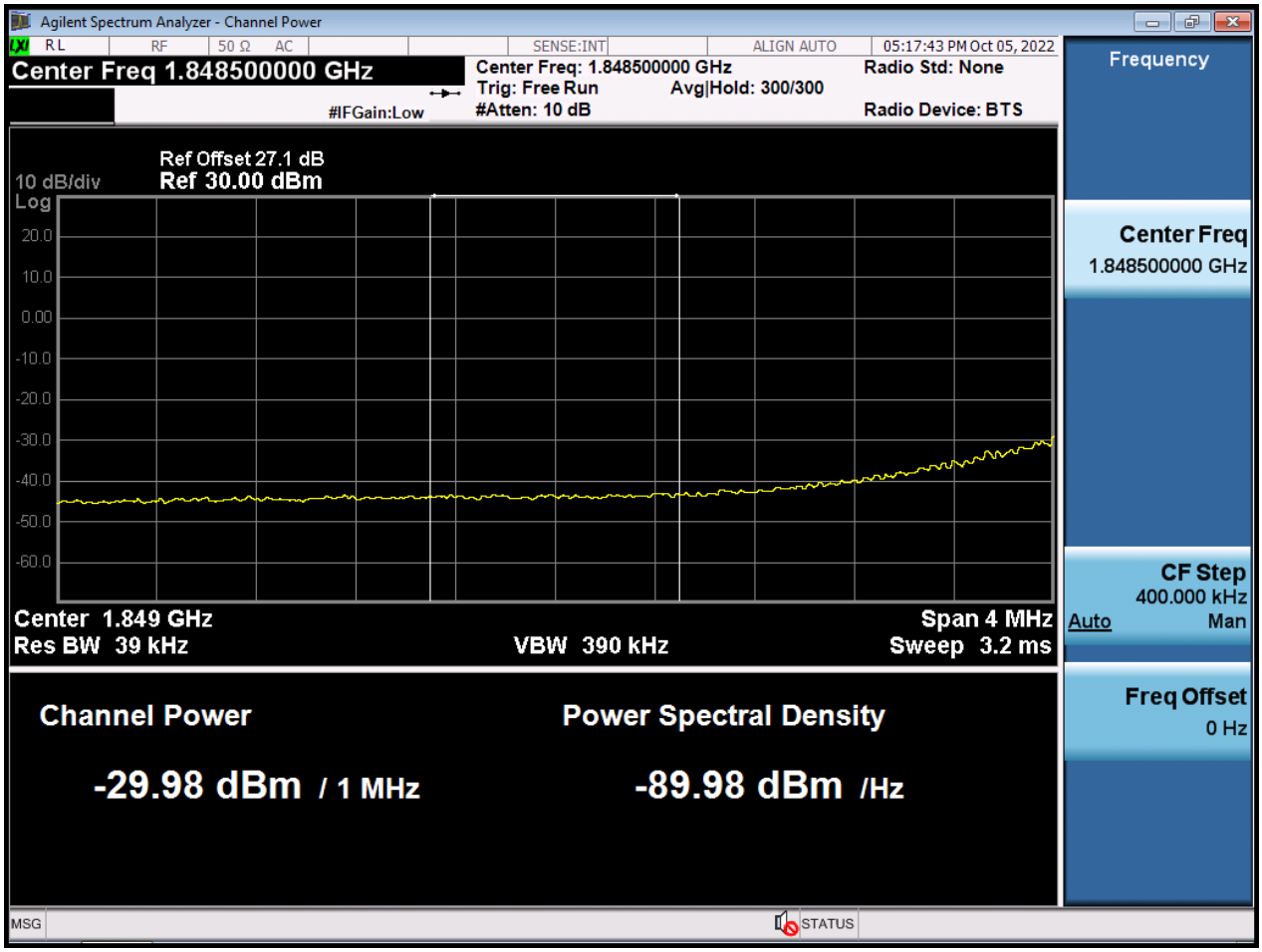


BW10 M_BandEdge_Lowest Channel_QPSK_1RB

BW10 M_BandEdge_Highest Channel_QPSK_1RB

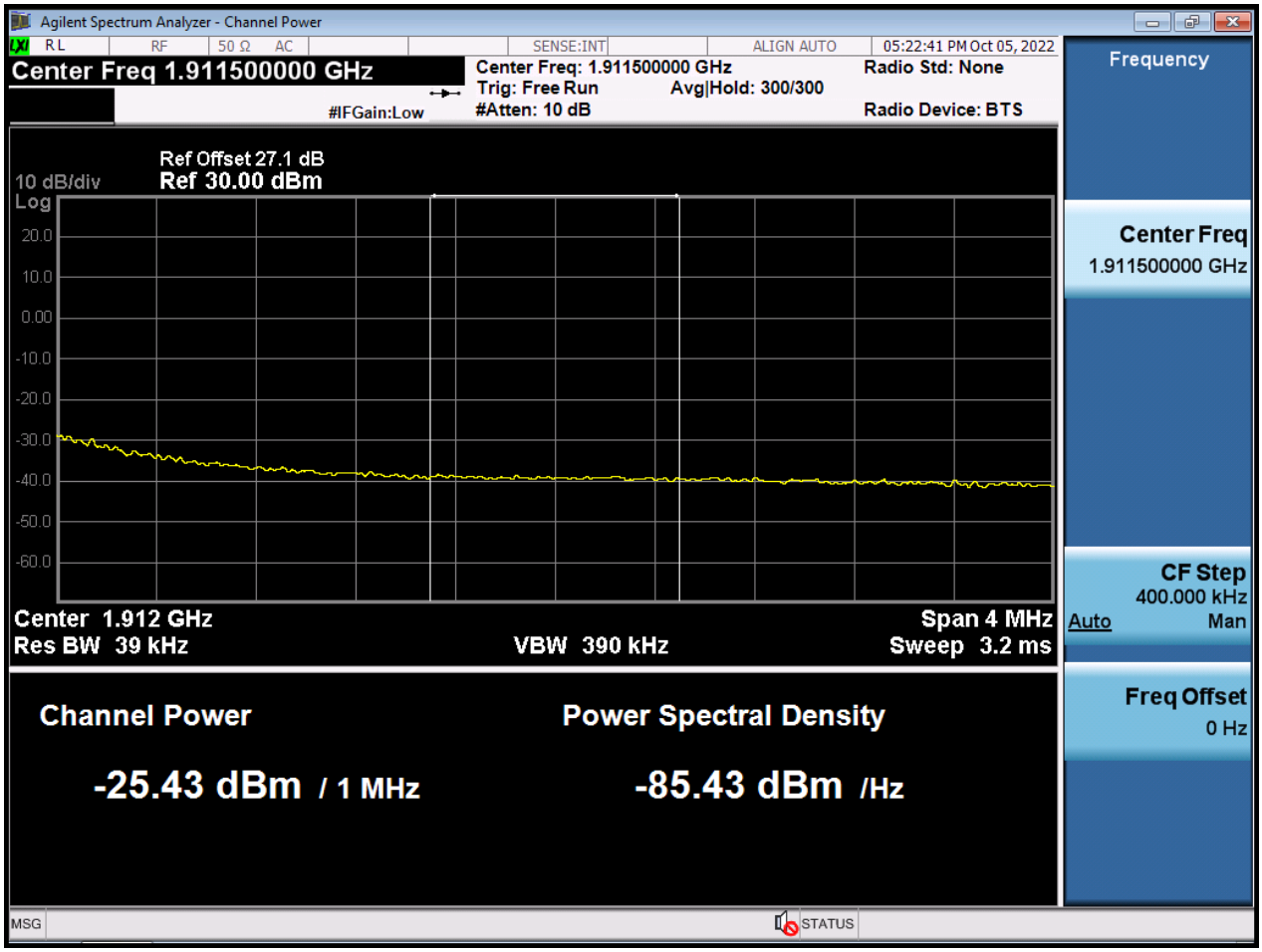
BW15 M_BandEdge_Lowest Channel_QPSK_FullRB(1)

BW15 M_BandEdge_Lowest Channel_QPSK_FullRB(2)



BW15 M_BandEdge_Highest Channel_QPSK_FullRB(1)

BW15 M_BandEdge_Highest Channel_QPSK_FullRB(2)

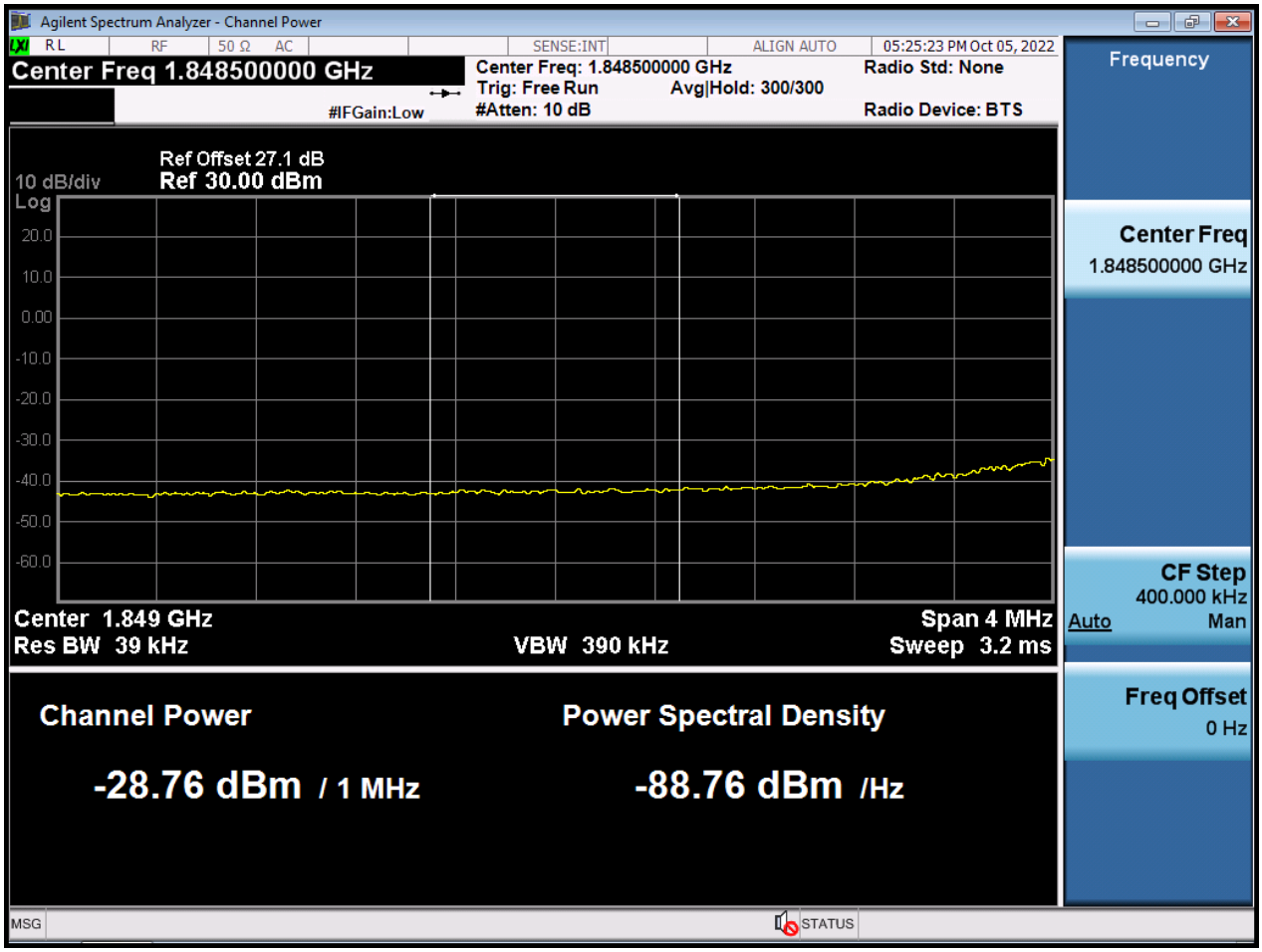


BW15 M_BandEdge_Lowest Channel_QPSK_1RB

BW15 M_BandEdge_Highest Channel_QPSK_1RB

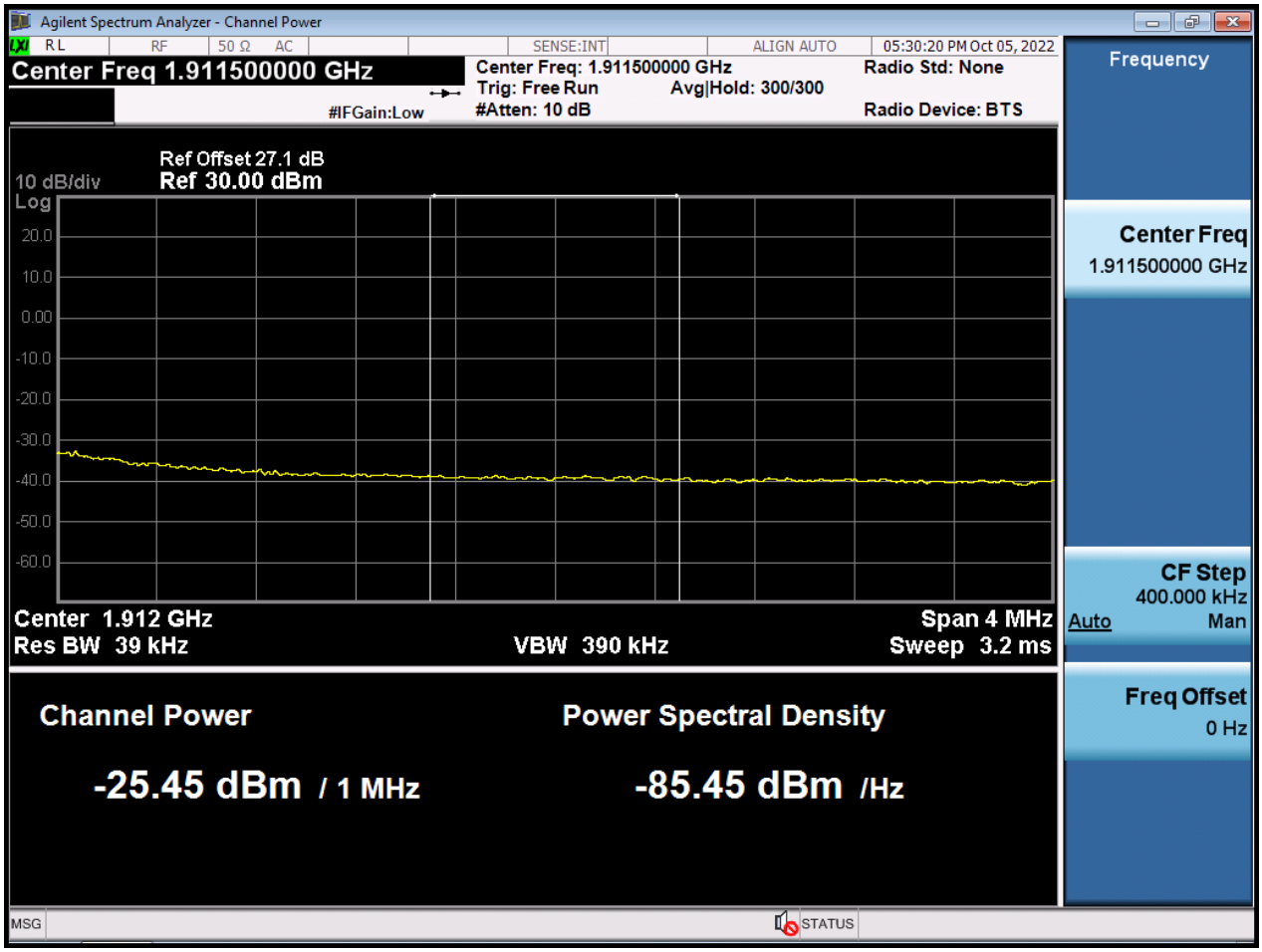
BW20 M_BandEdge_Lowest Channel_QPSK_FullRB(1)

BW20 M_BandEdge_Lowest Channel_QPSK_FullRB(2)



BW20 M_BandEdge_Highest Channel_QPSK_FullRB(1)

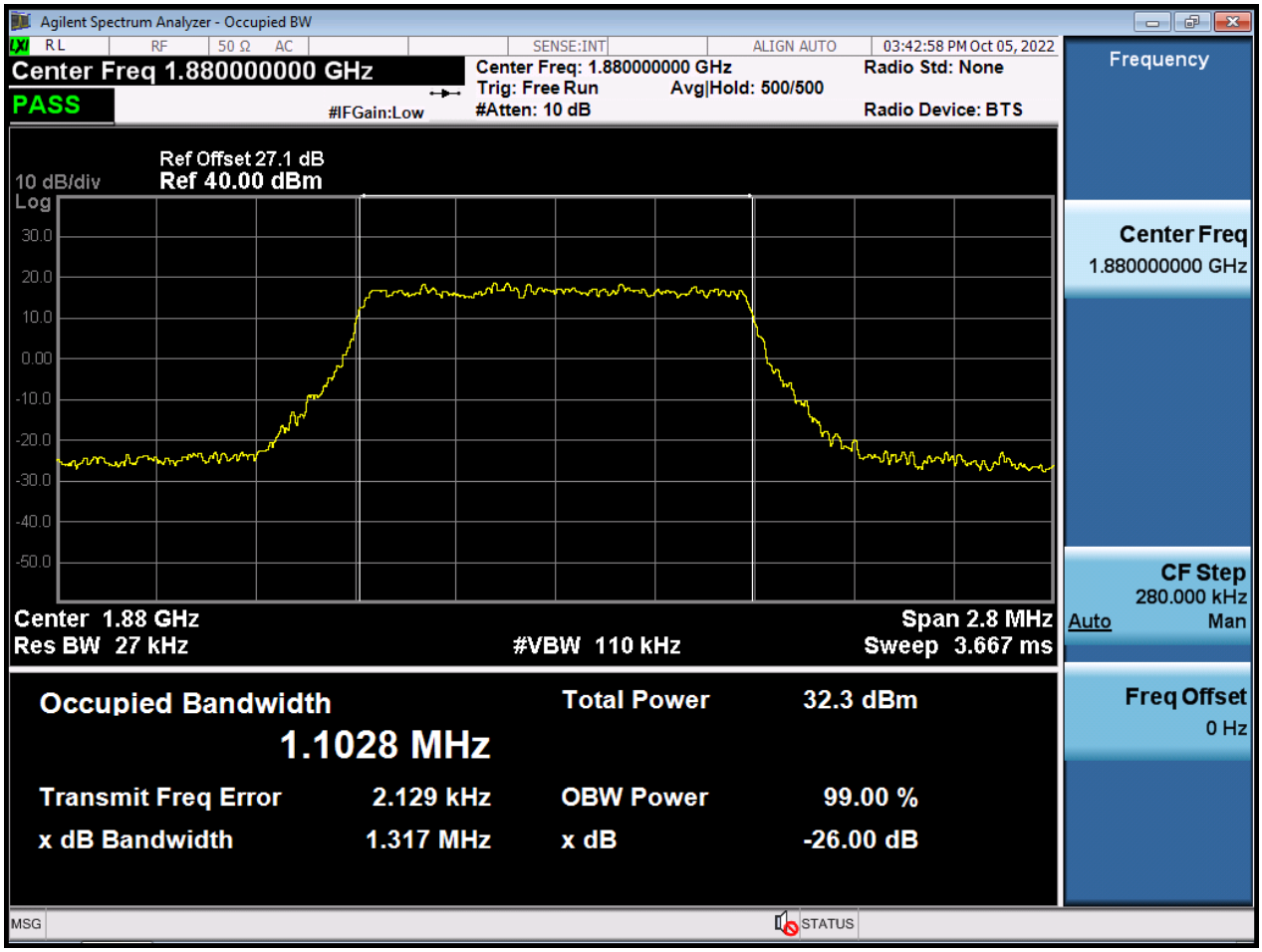
BW20 M_BandEdge_Highest Channel_QPSK_FullRB(2)



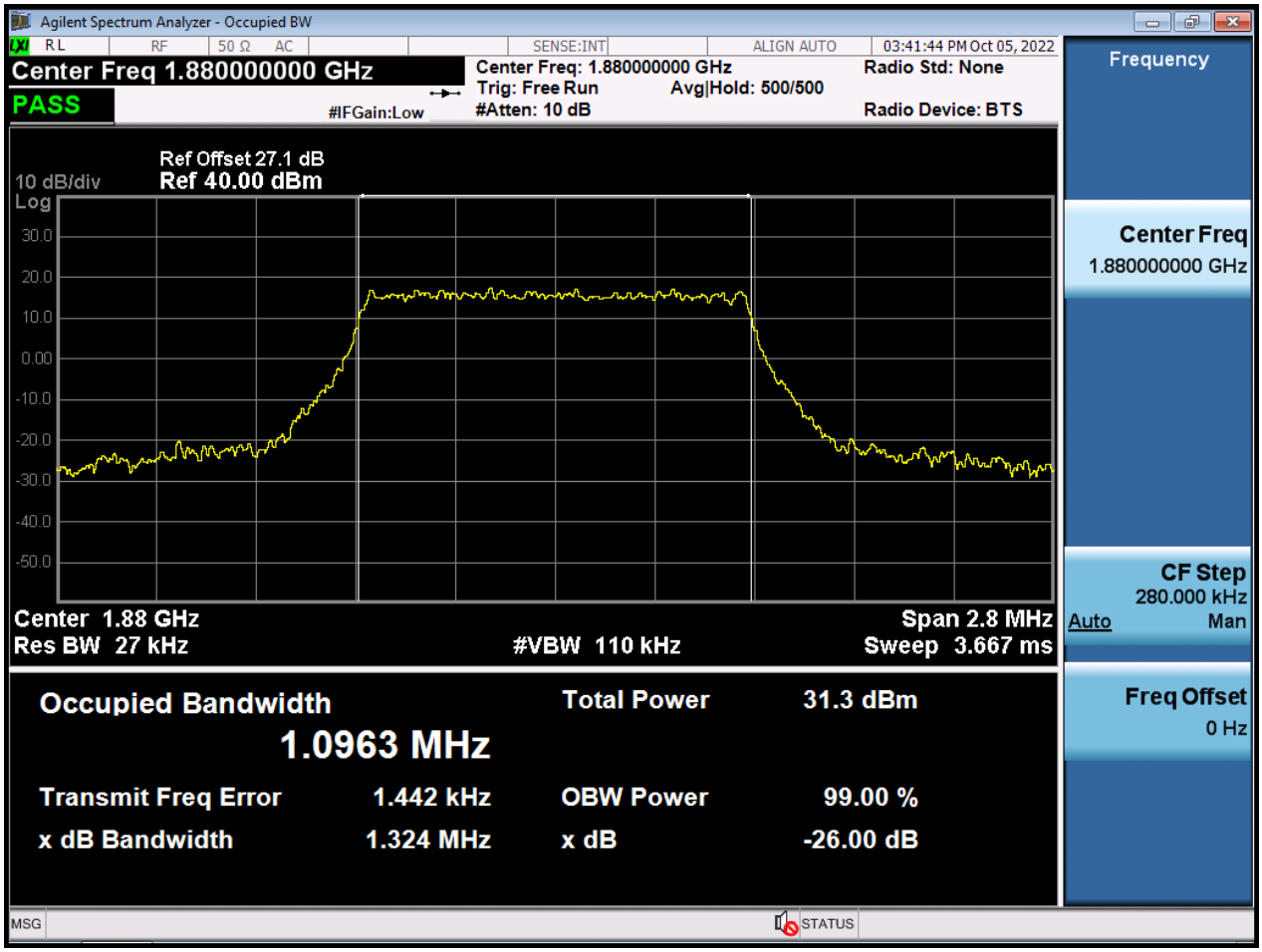
BW20 M_BandEdge_Lowest Channel_QPSK_1RB

BW20 M_BandEdge_Highest Channel_QPSK_1RB

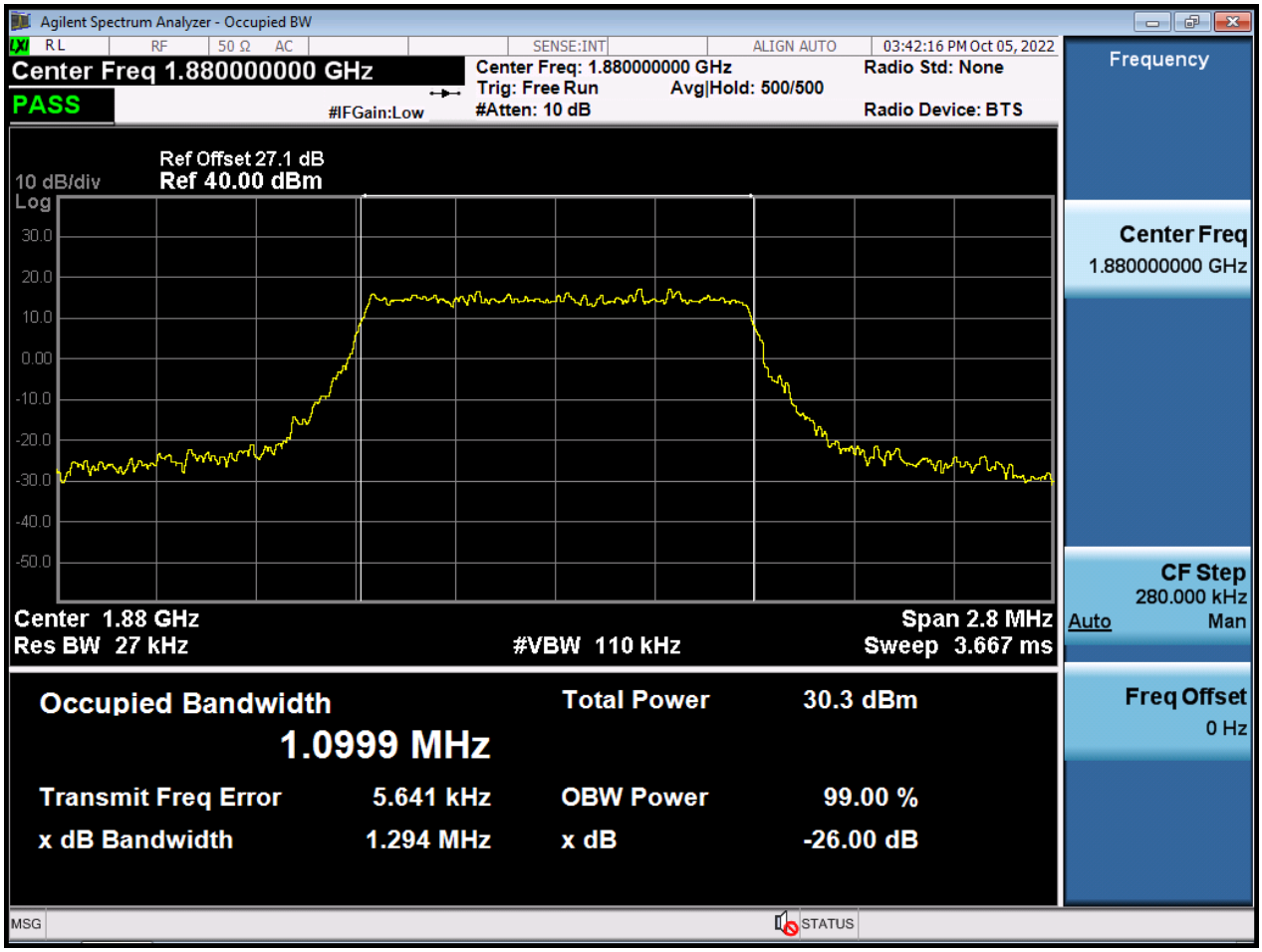
BW1.4 M_OBW_Middle Channel_QPSK_FullRB



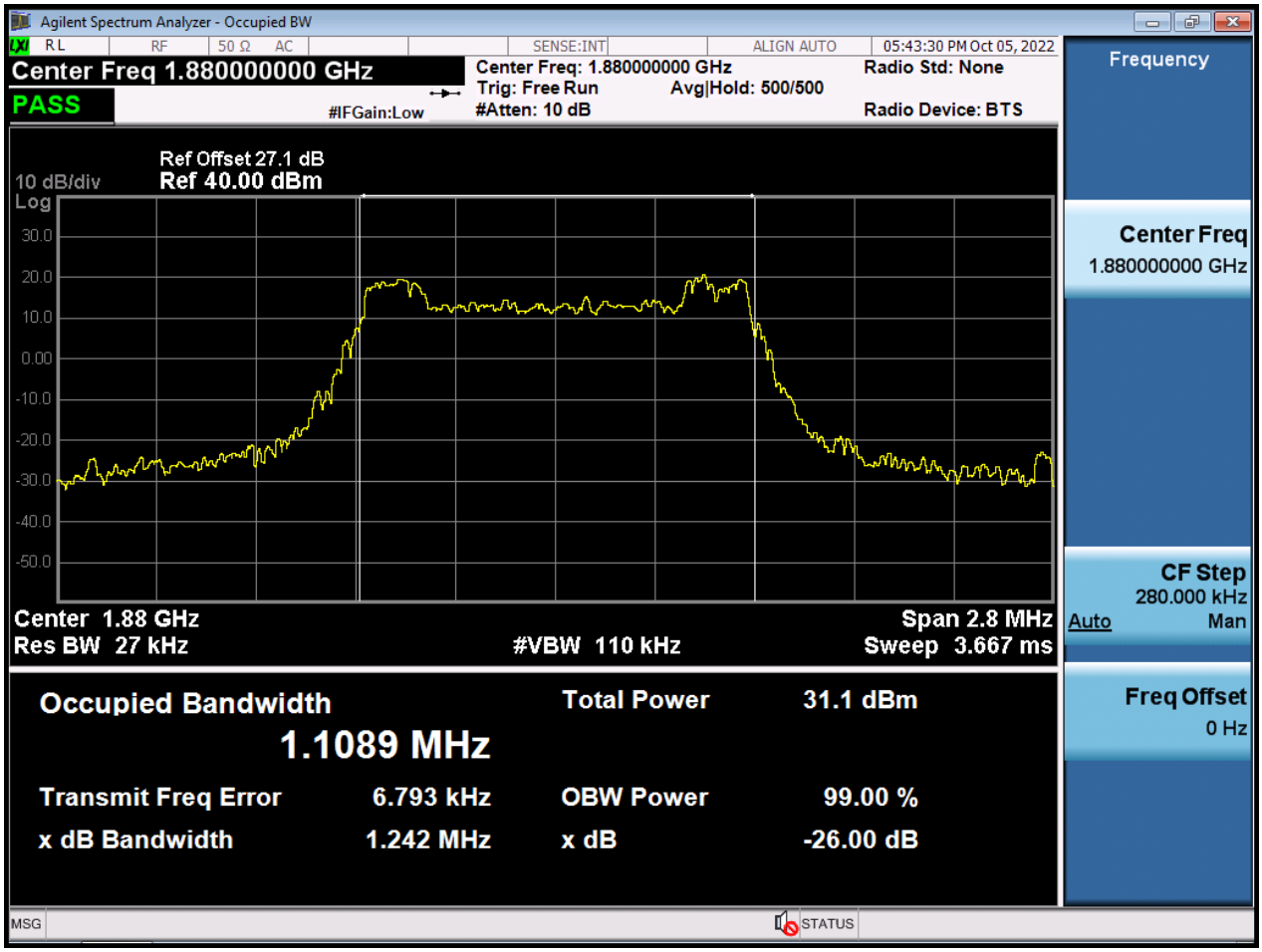
BW1.4 M_OBW_Middle Channel_16QAM_FullRB



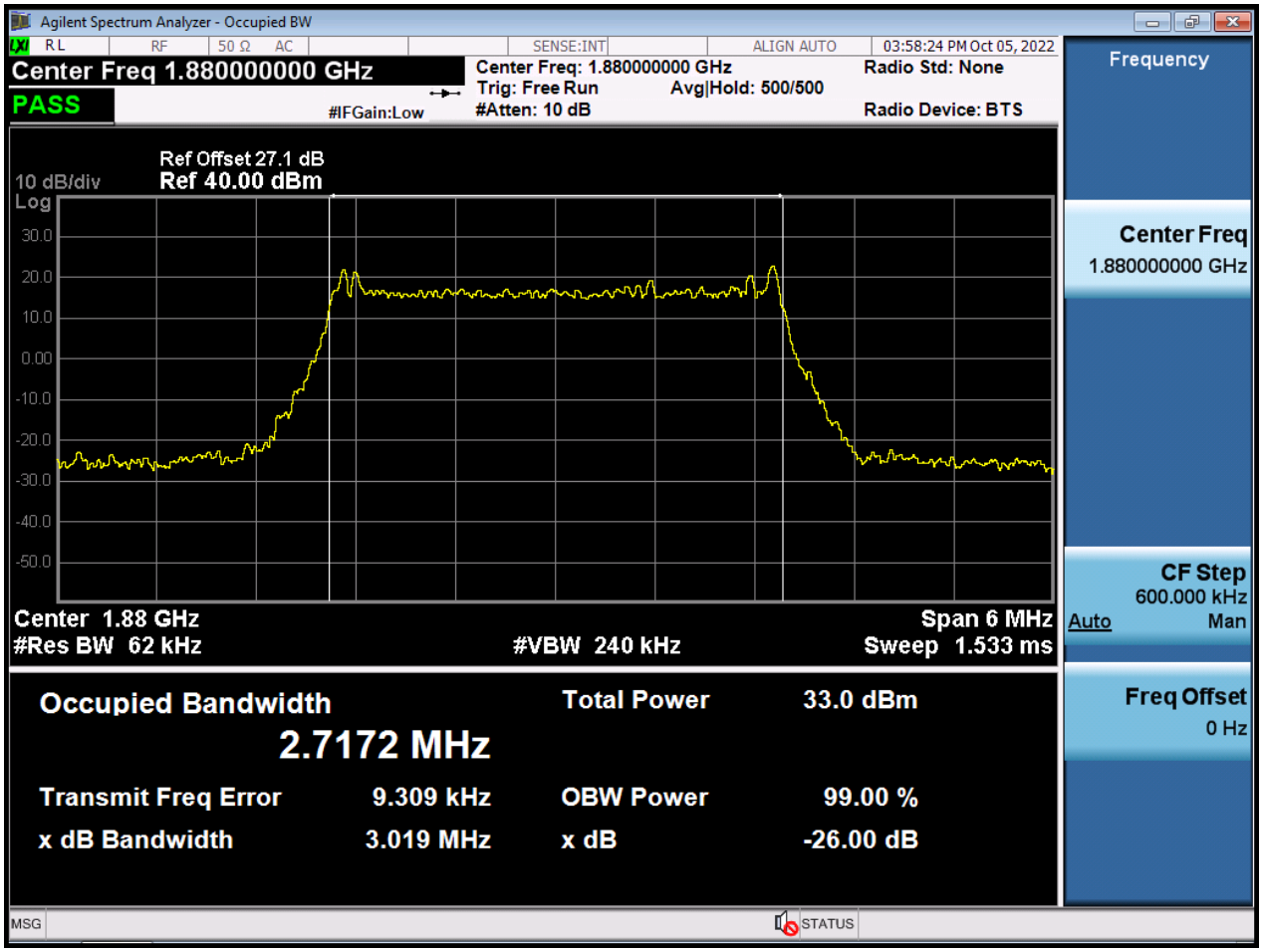
BW1.4 M_OBW_Middle Channel_64QAM_FullRB



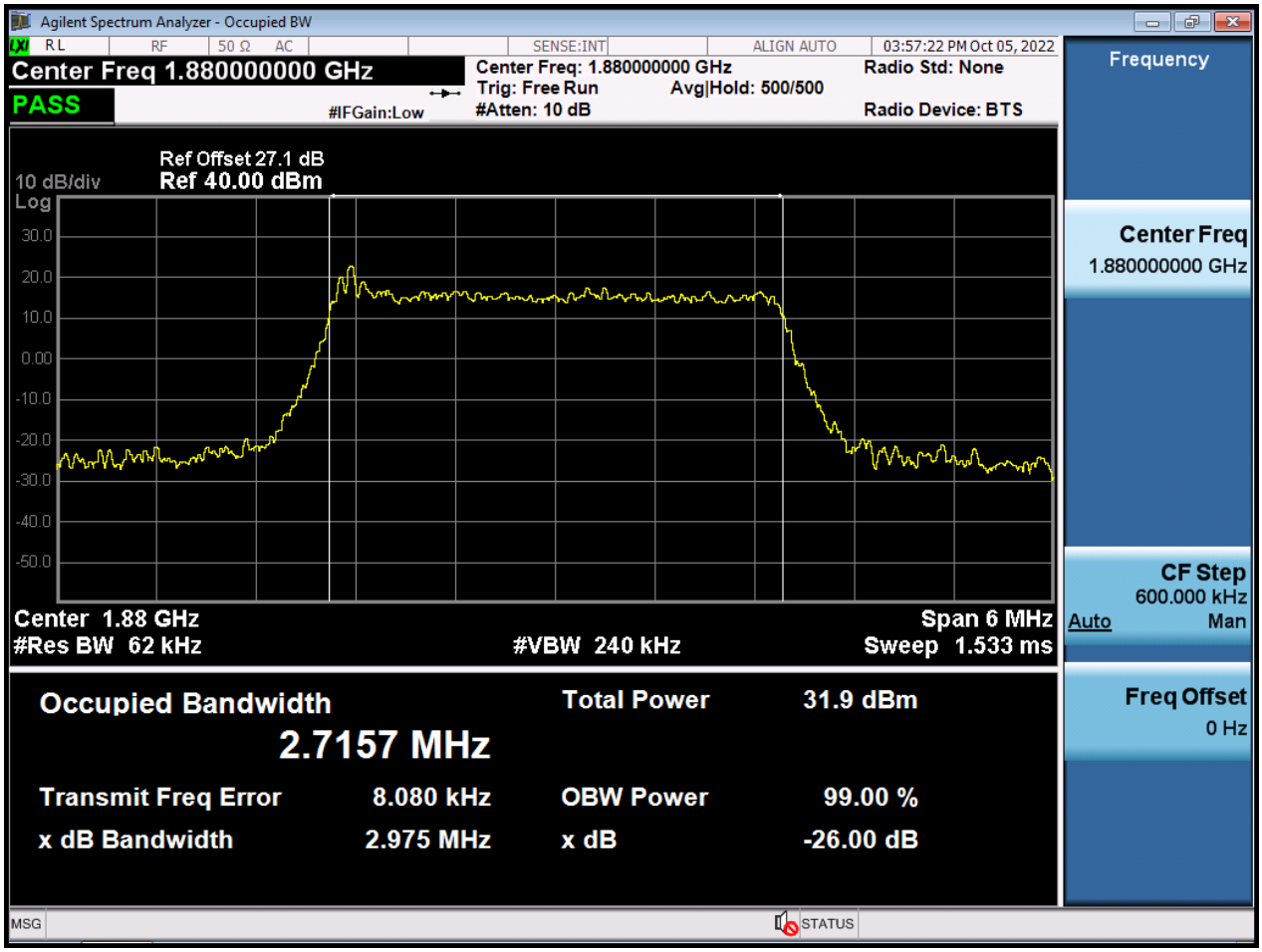
BW1.4 M_OBW_Middle Channel_256QAM_FullRB



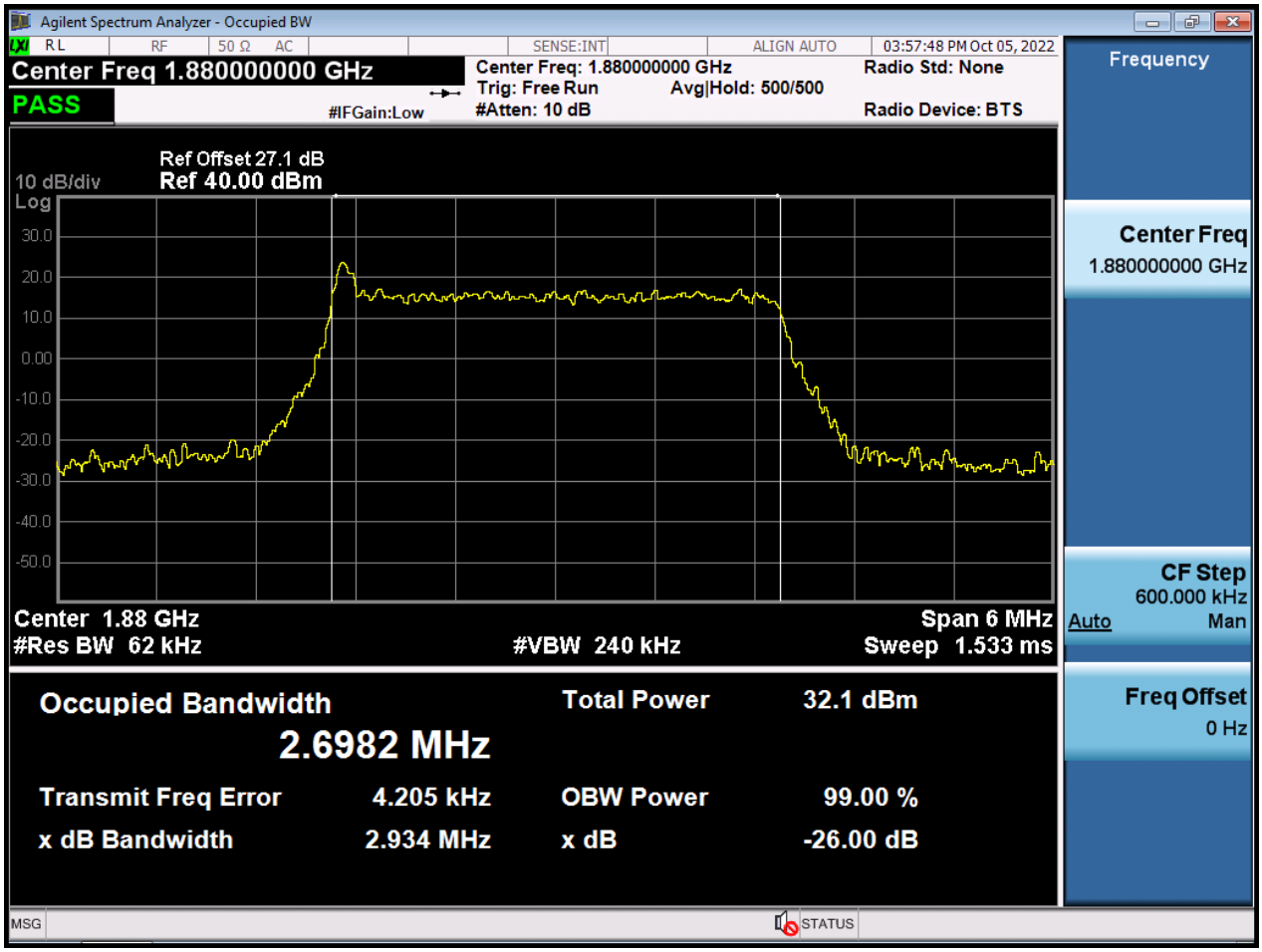
BW3 M_OBW_Middle Channel_QPSK_FullRB



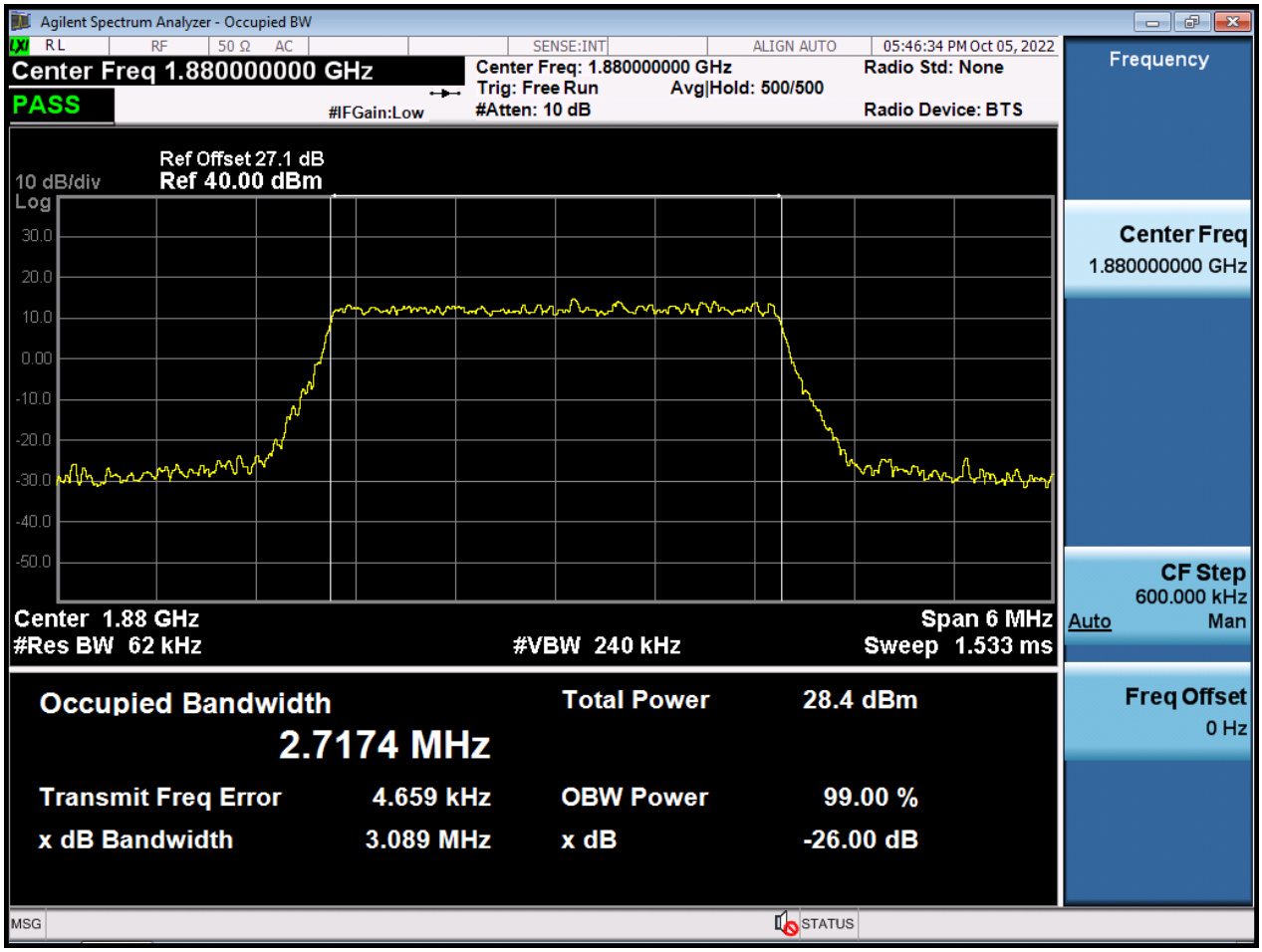
BW3 M_OBW_Middle Channel_16QAM_FullRB



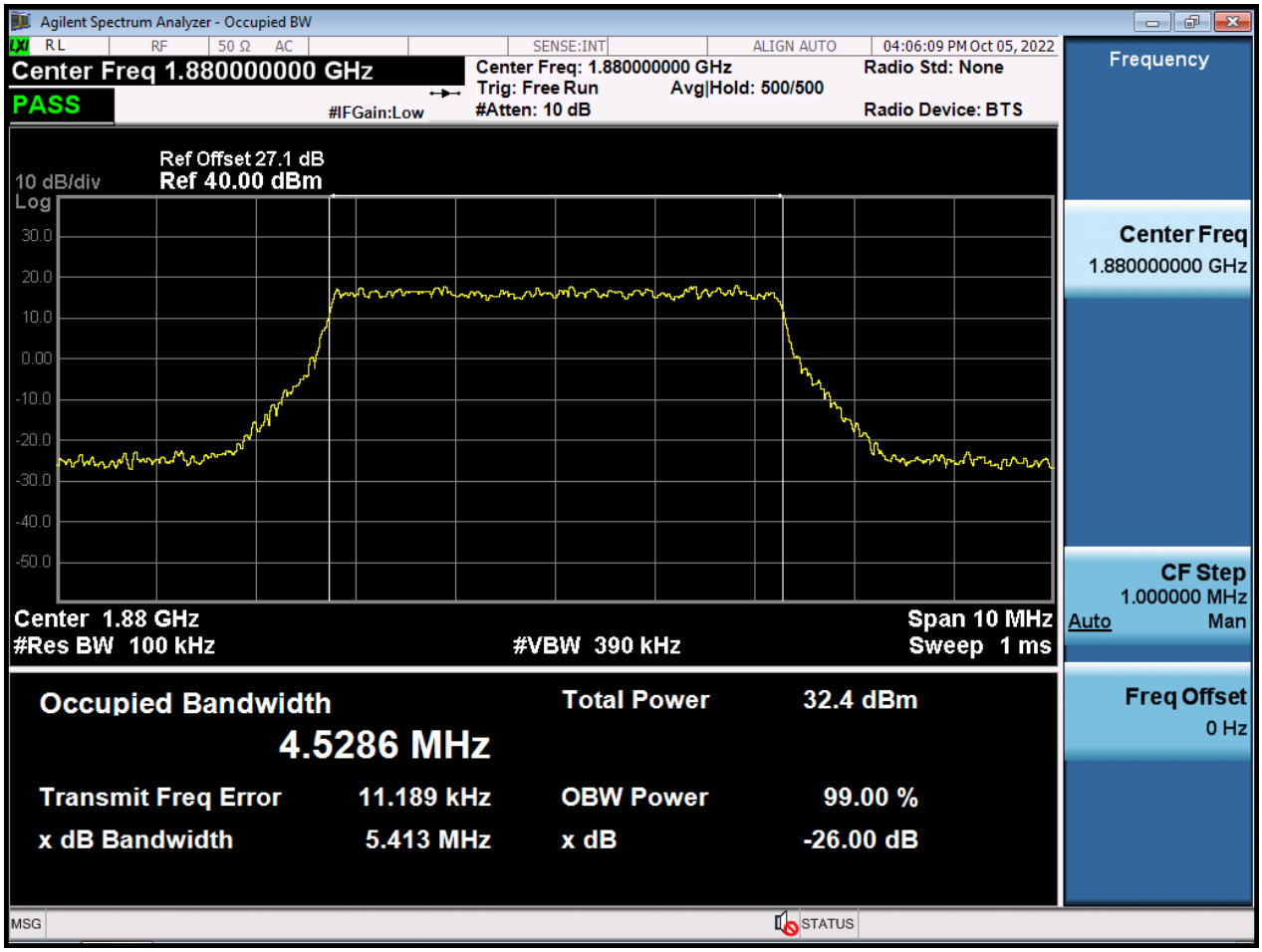
BW3 M_OBW_Middle Channel_64QAM_FullRB



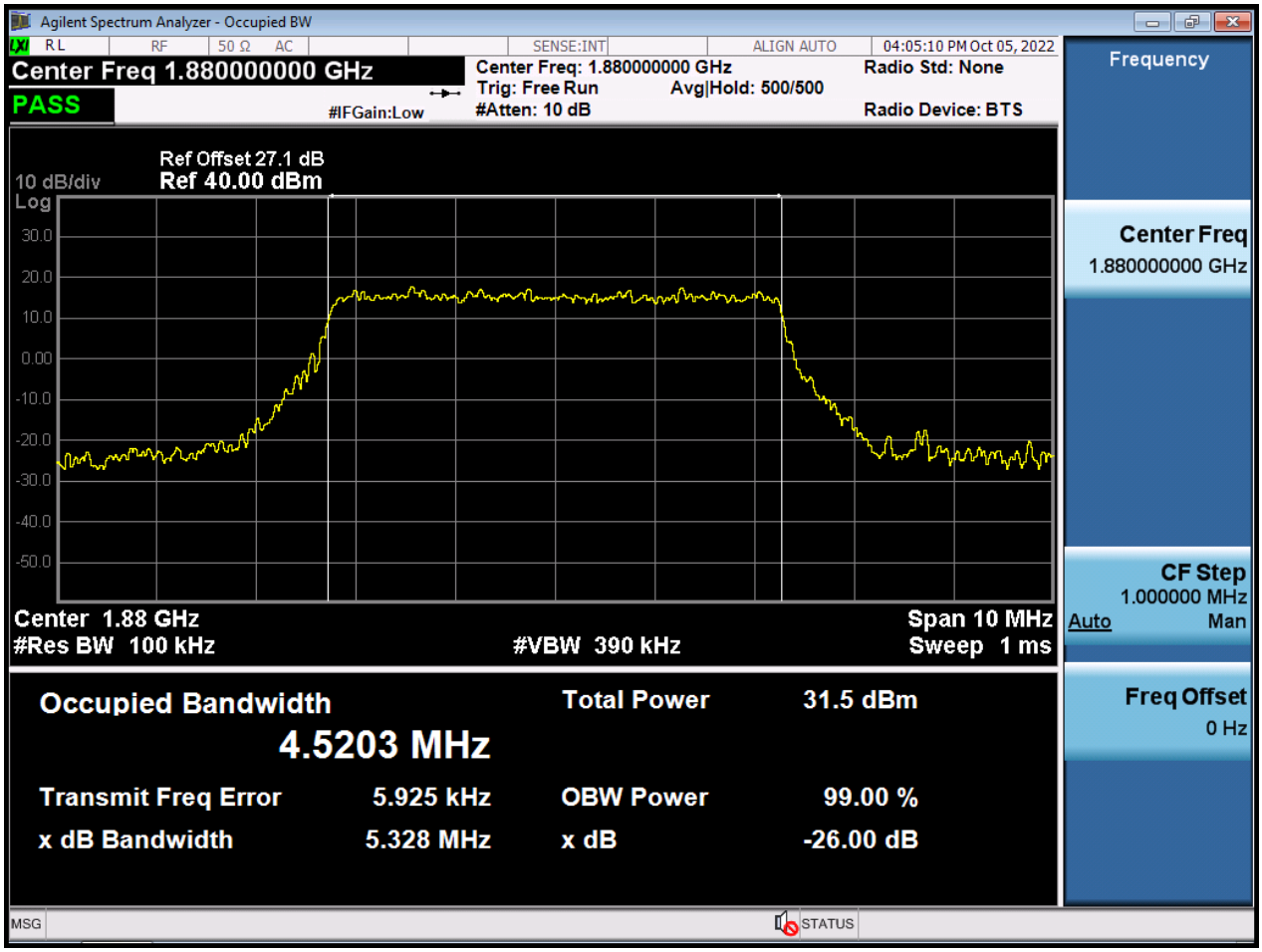
BW3 M_OBW_Middle Channel_256QAM_FullRB



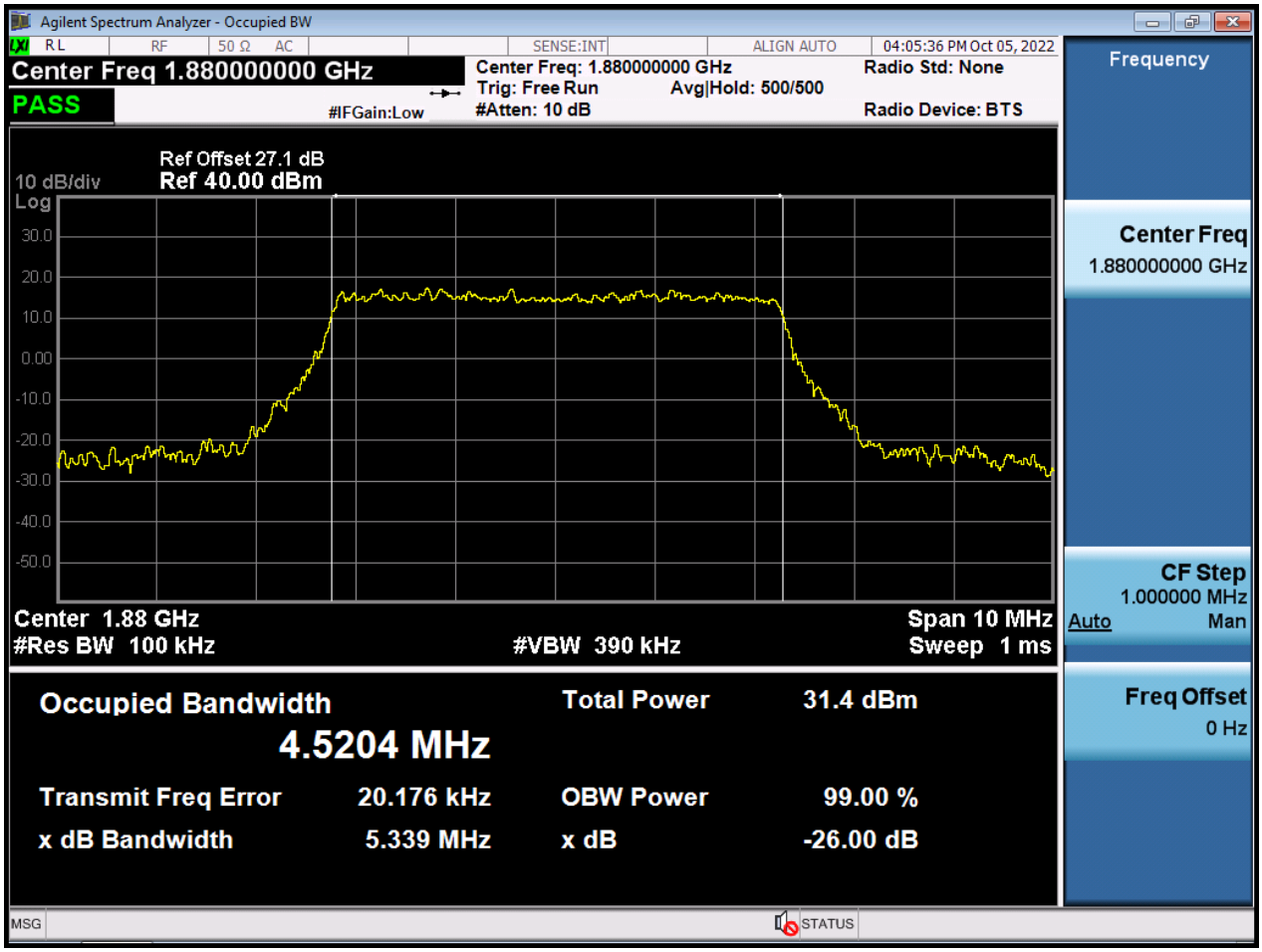
BW5 M_OBW_Middle Channel_QPSK_FullRB



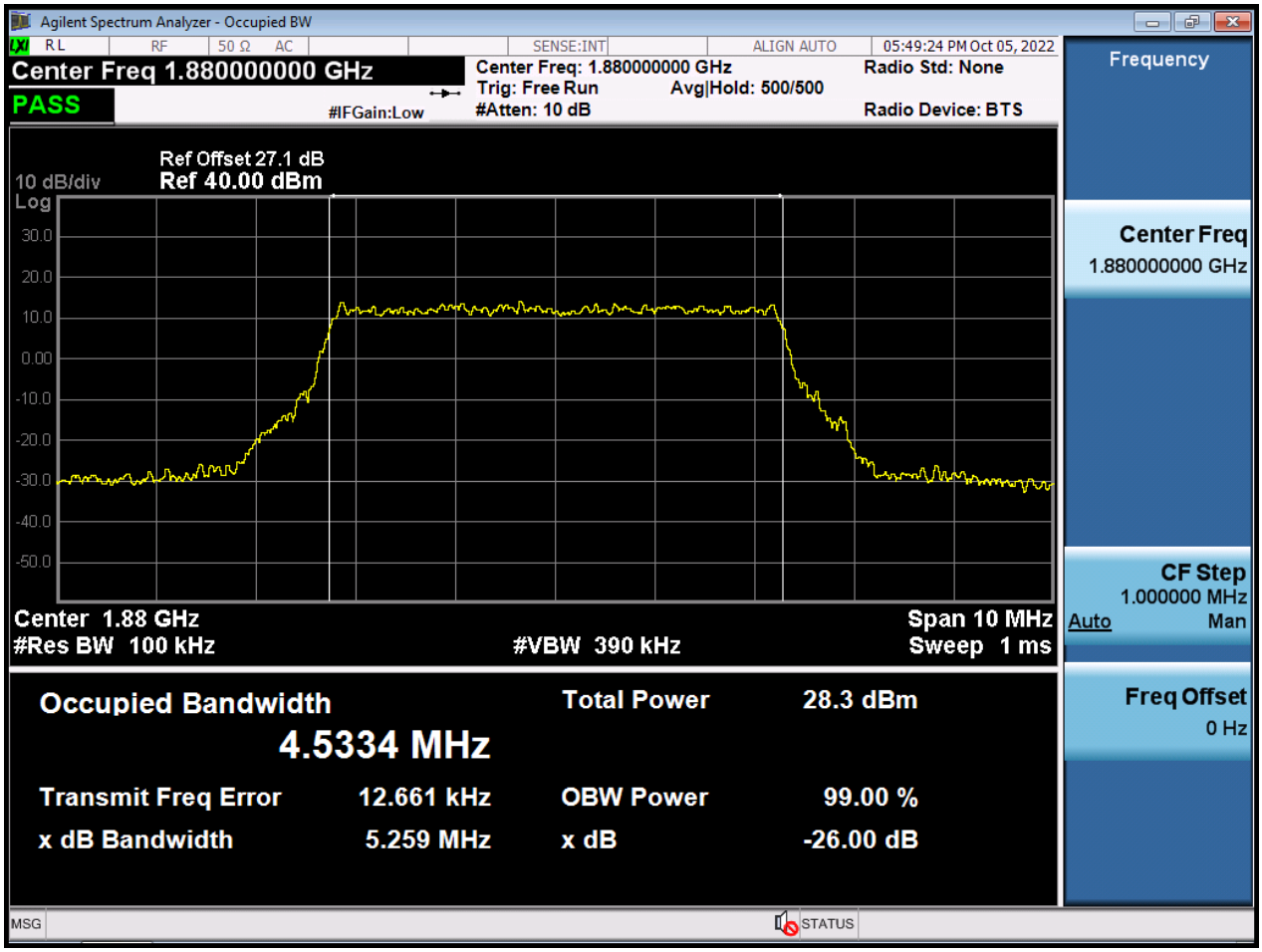
BW5 M_OBW_Middle Channel_16QAM_FullRB



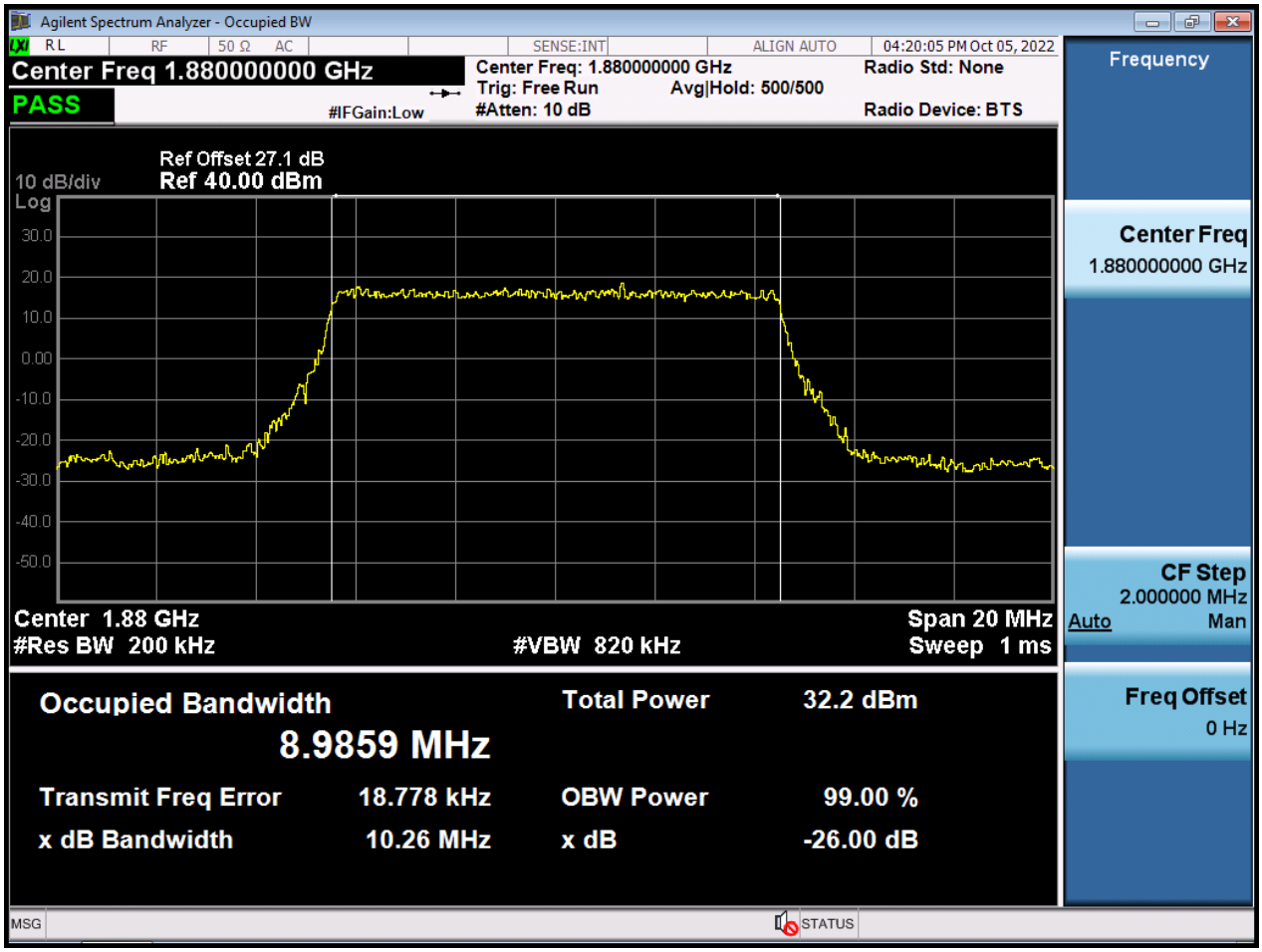
BW5 M_OBW_Middle Channel_64QAM_FullRB



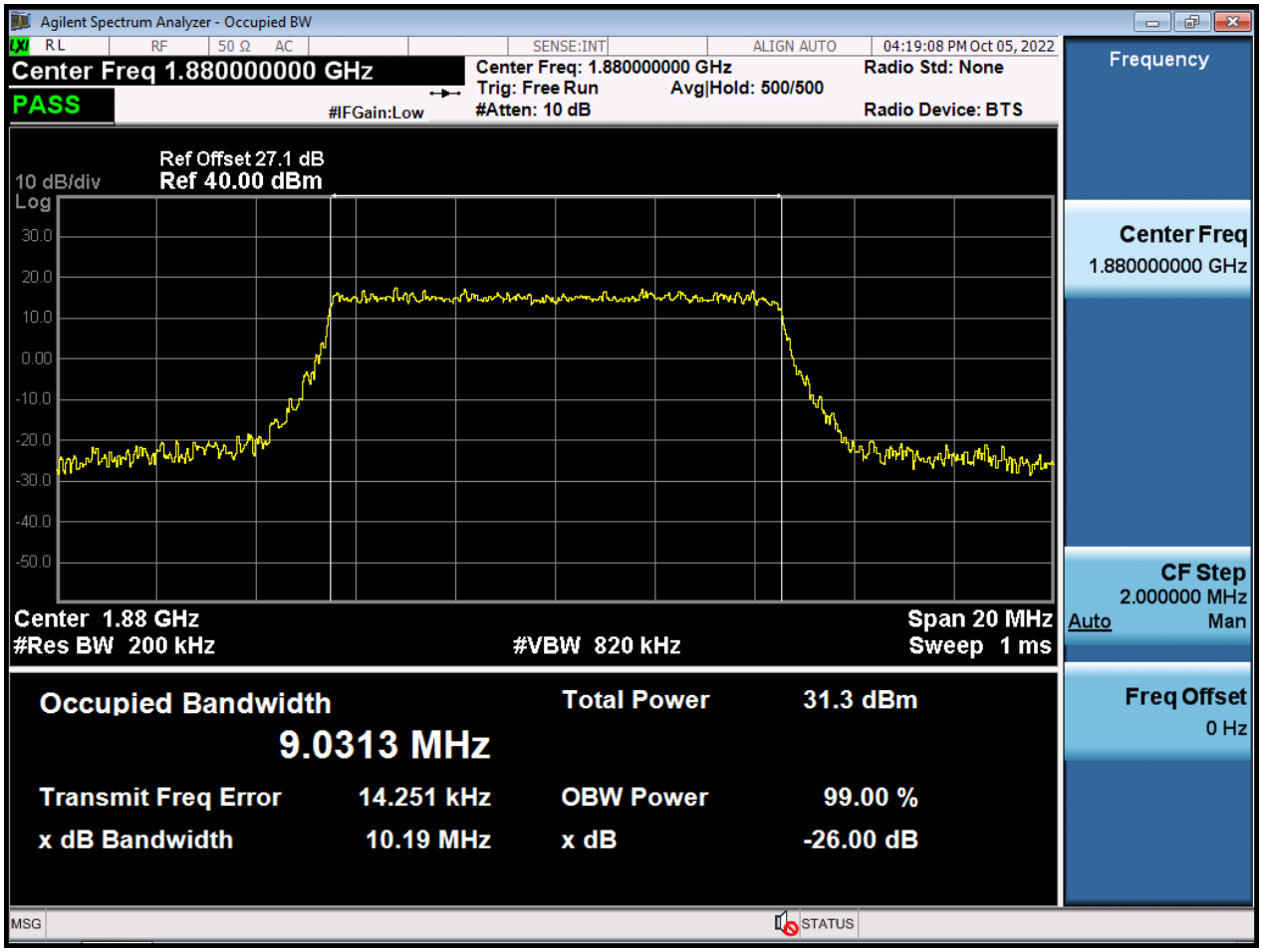
BW5 M_OBW_Middle Channel_256QAM_FullRB



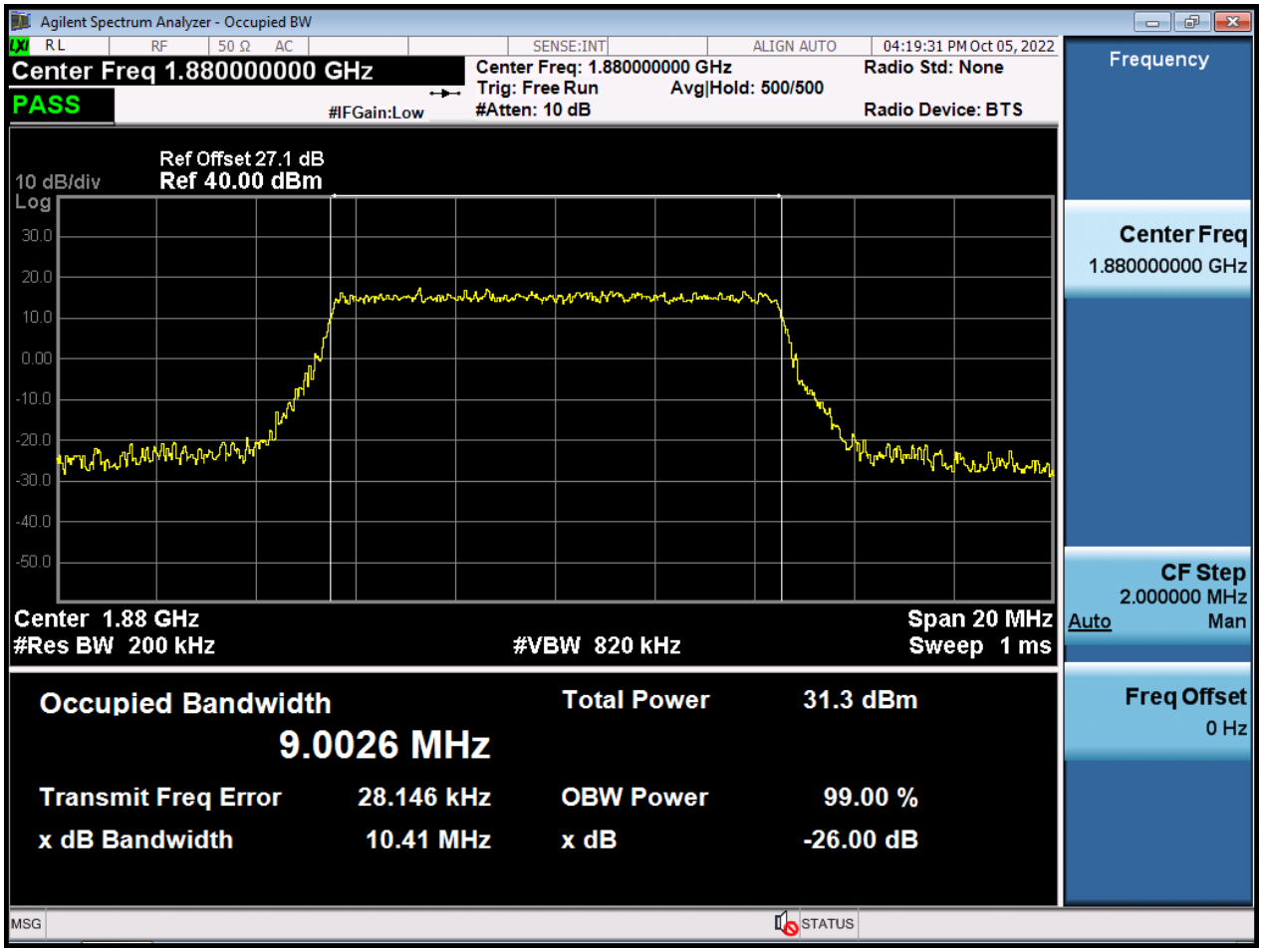
BW10 M_OBW_Middle Channel_QPSK_FullRB



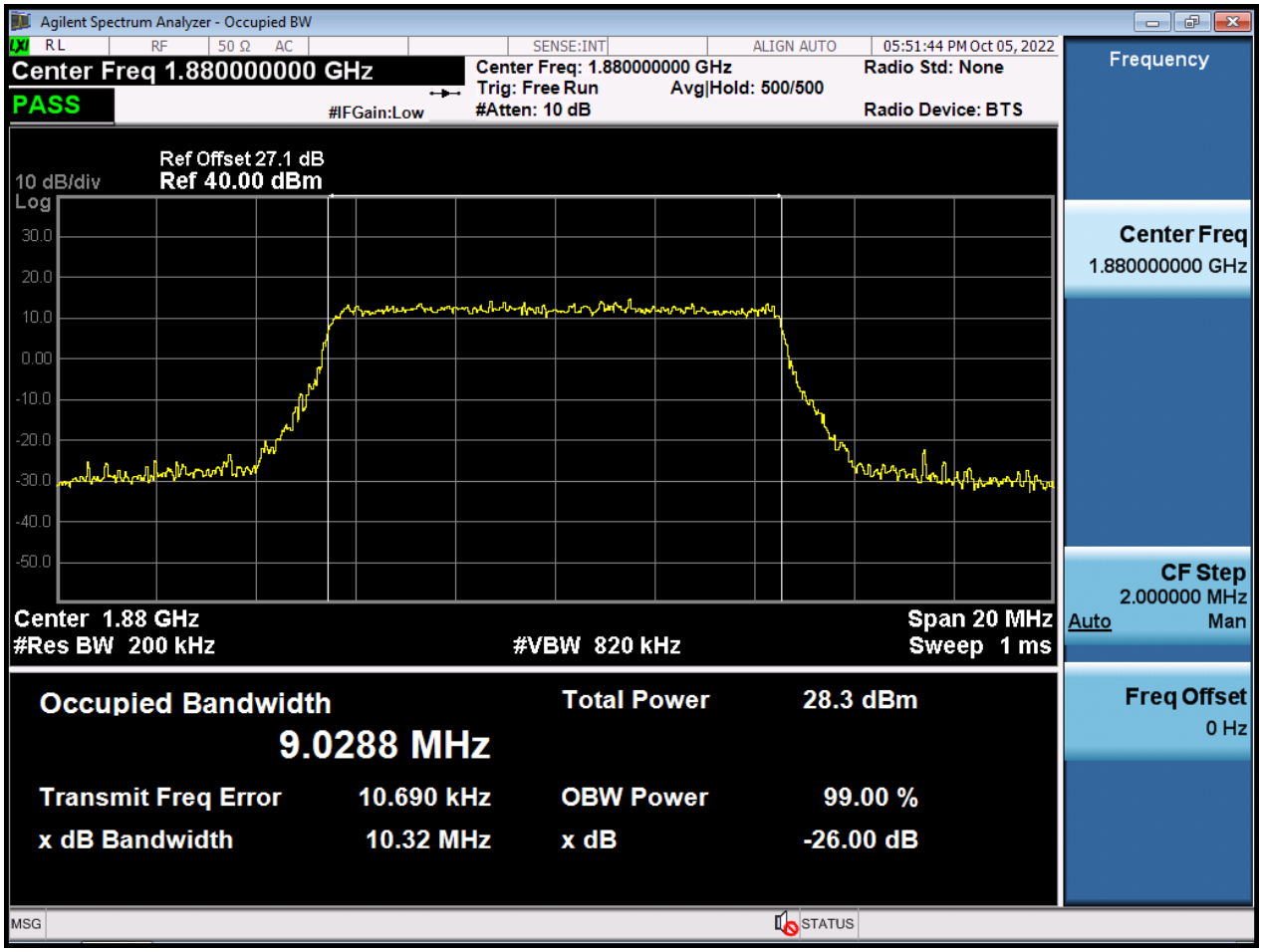
BW10 M_OBW_Middle Channel_16QAM_FullRB



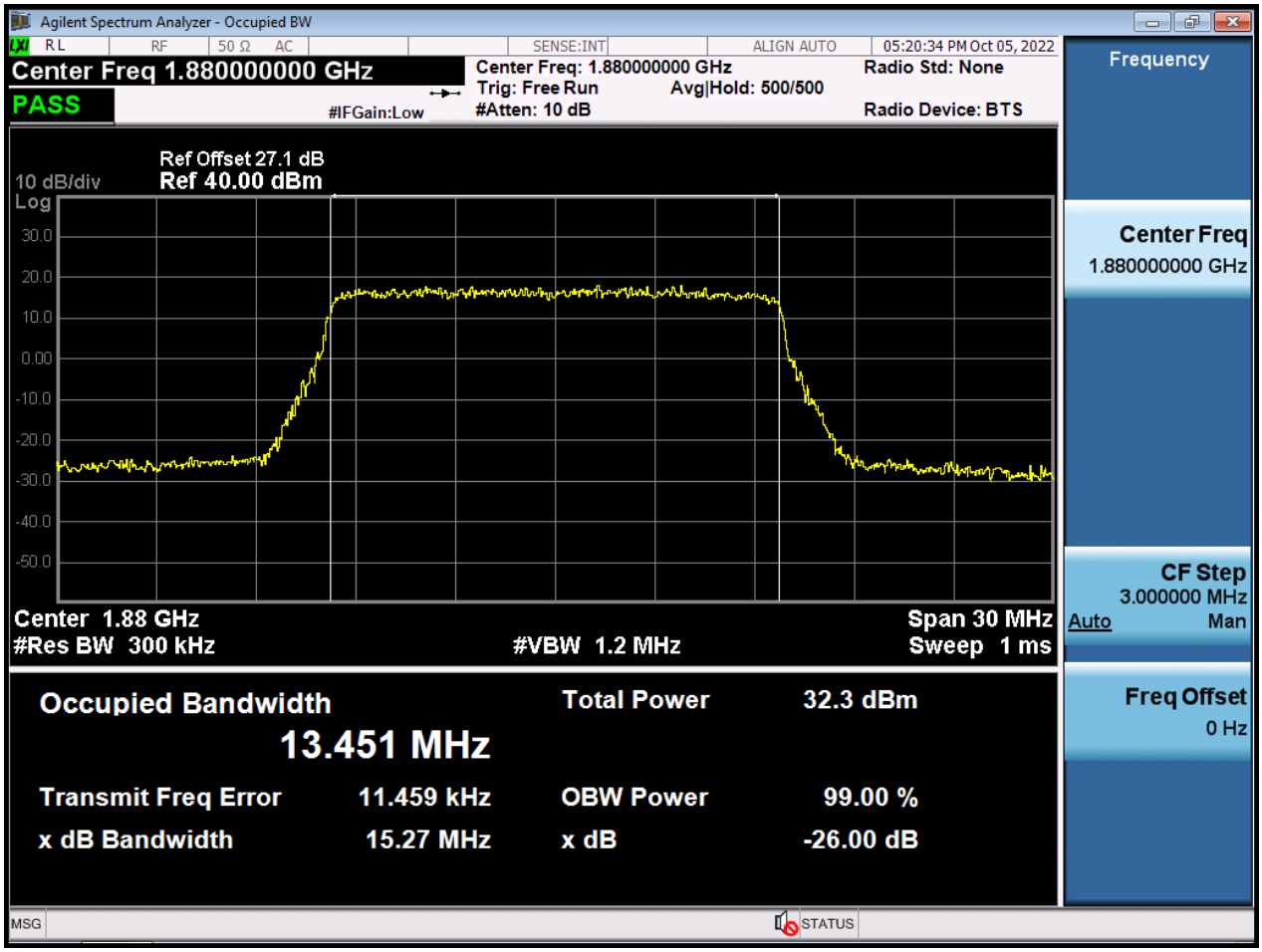
BW10 M_OBW_Middle Channel_64QAM_FullRB



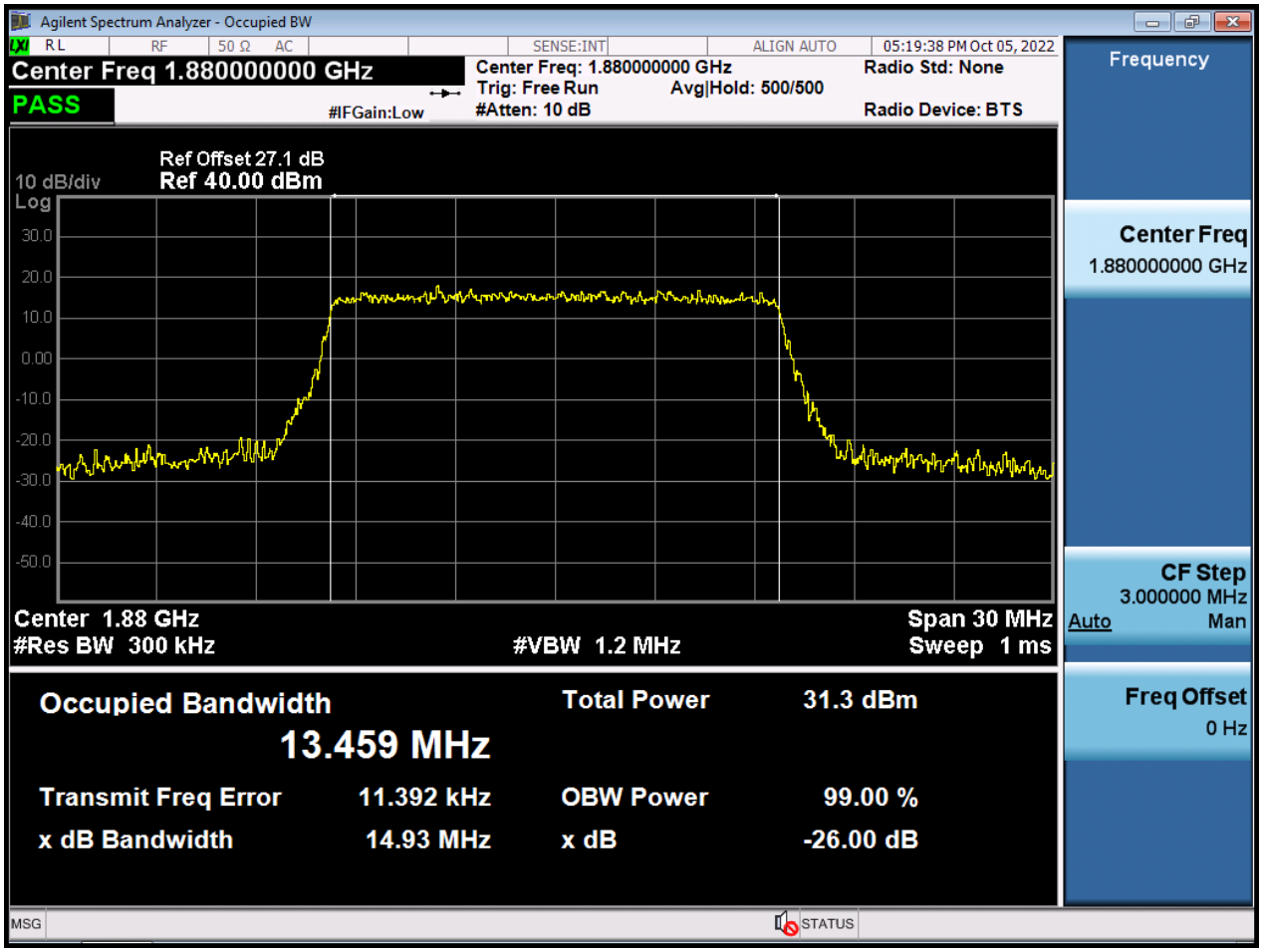
BW10 M_OBW_Middle Channel_256QAM_FullRB



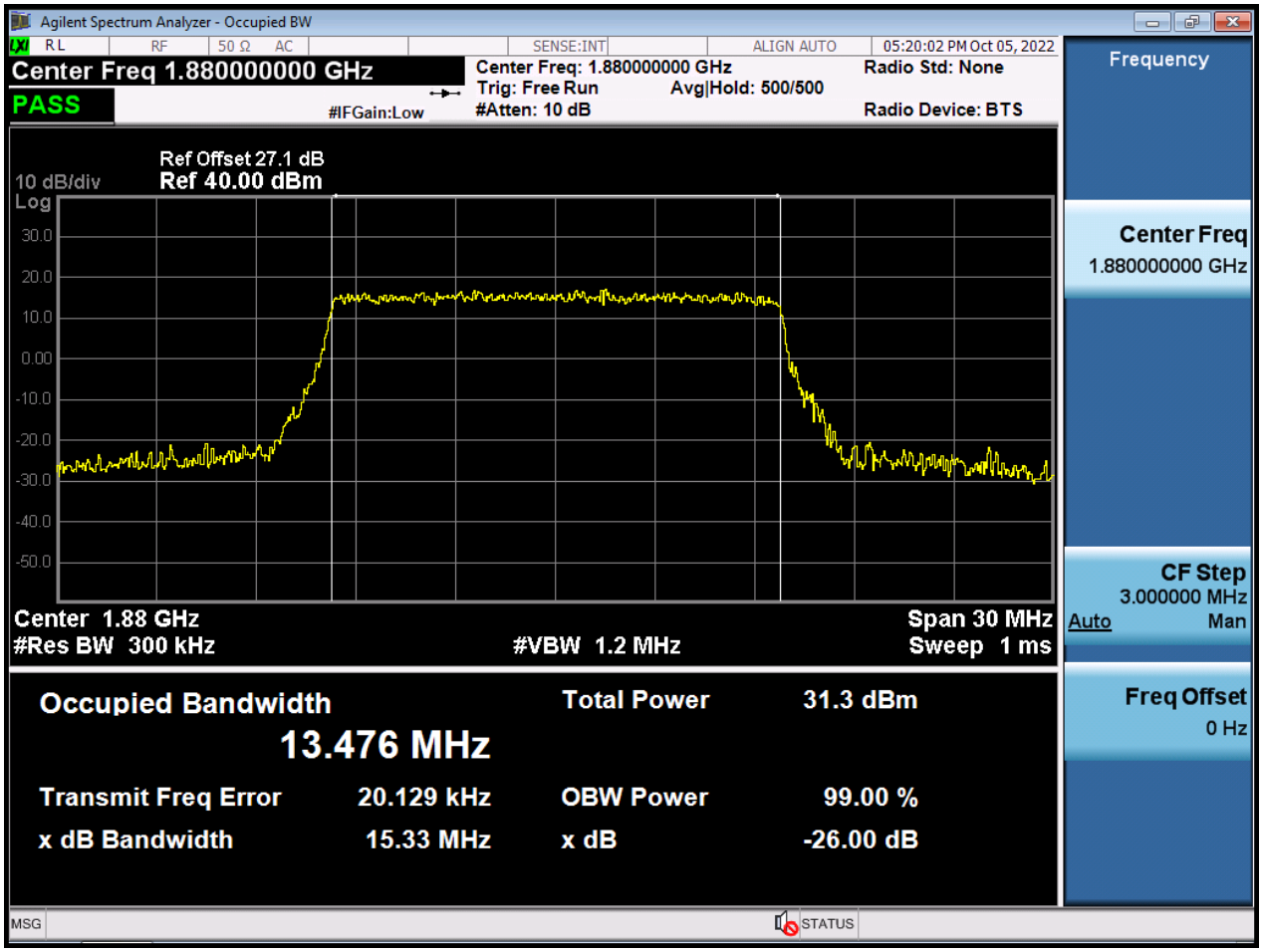
BW15 M_OBW_Middle Channel_QPSK_FullRB



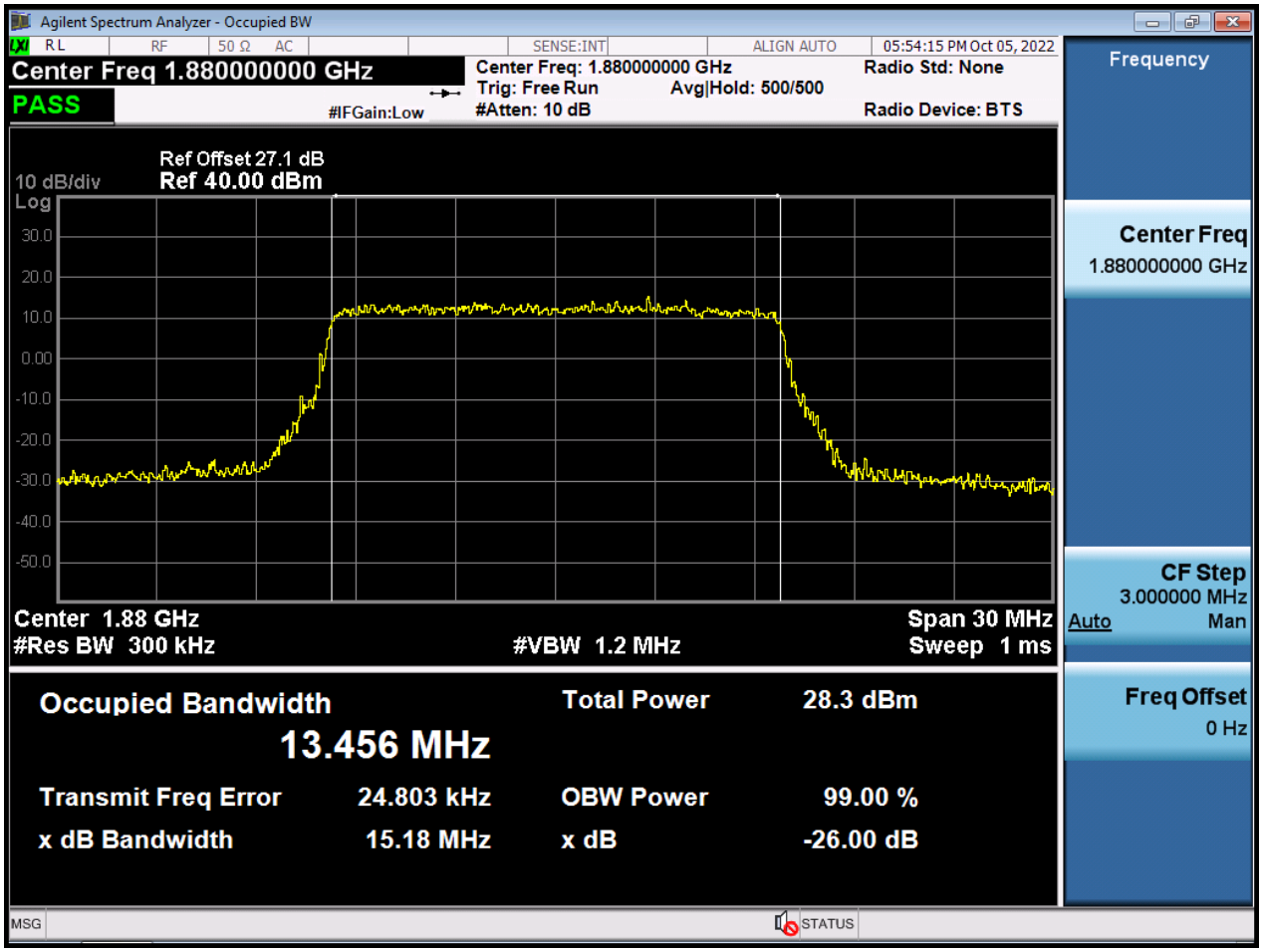
BW15 M_OBW_Middle Channel_16QAM_FullRB



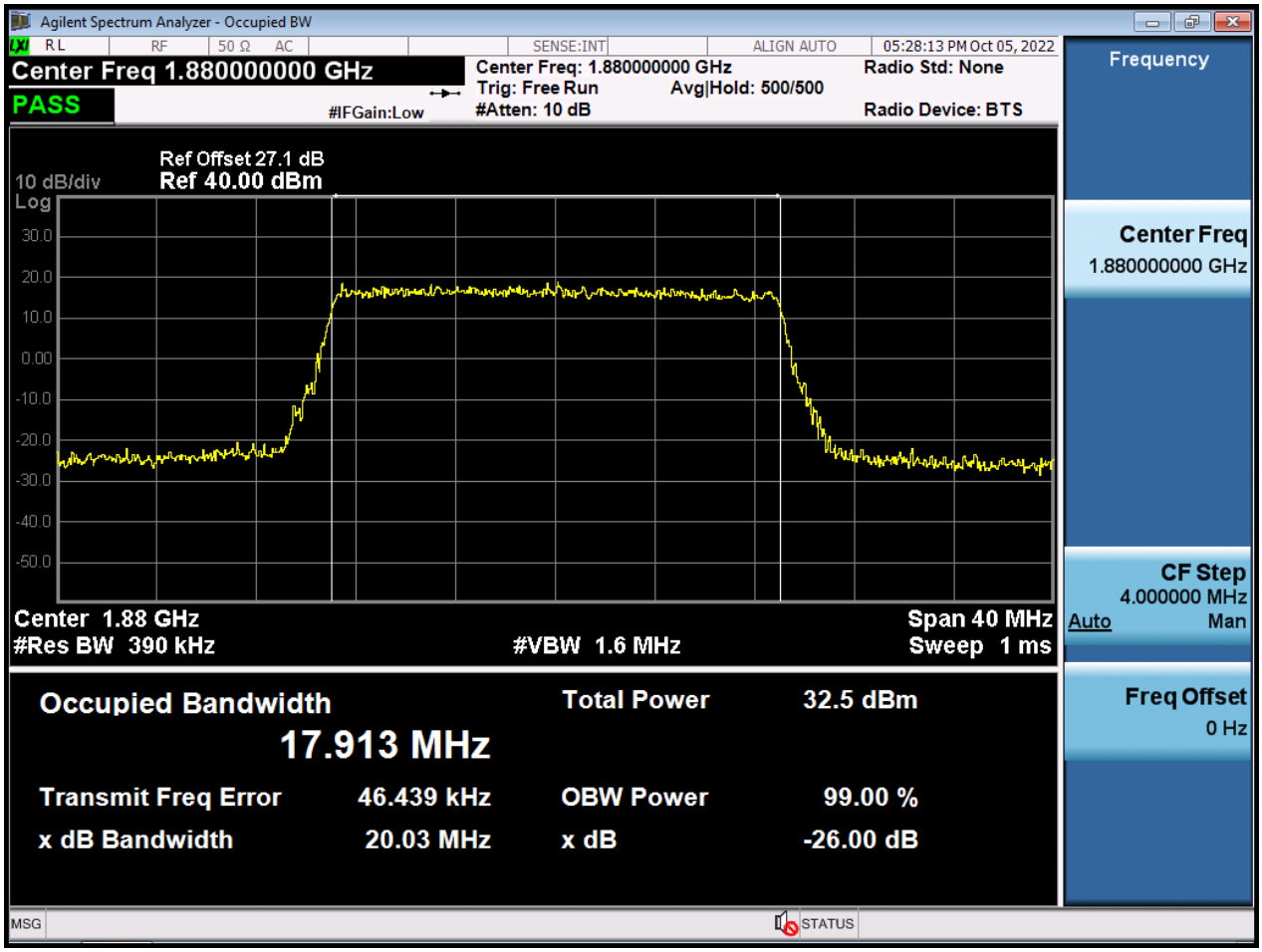
BW15 M_OBW_Middle Channel_64QAM_FullRB



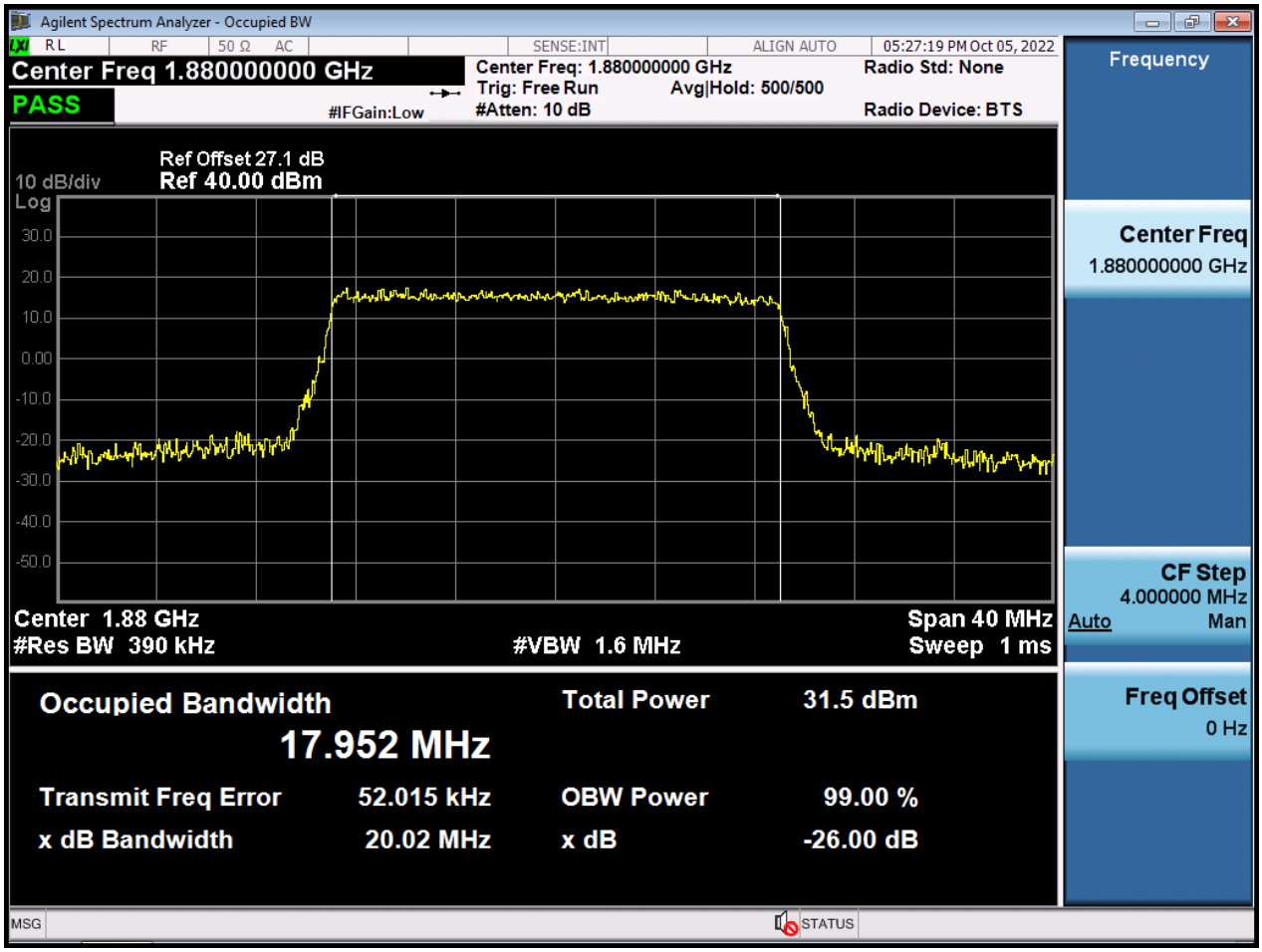
BW15 M_OBW_Middle Channel_256QAM_FullRB



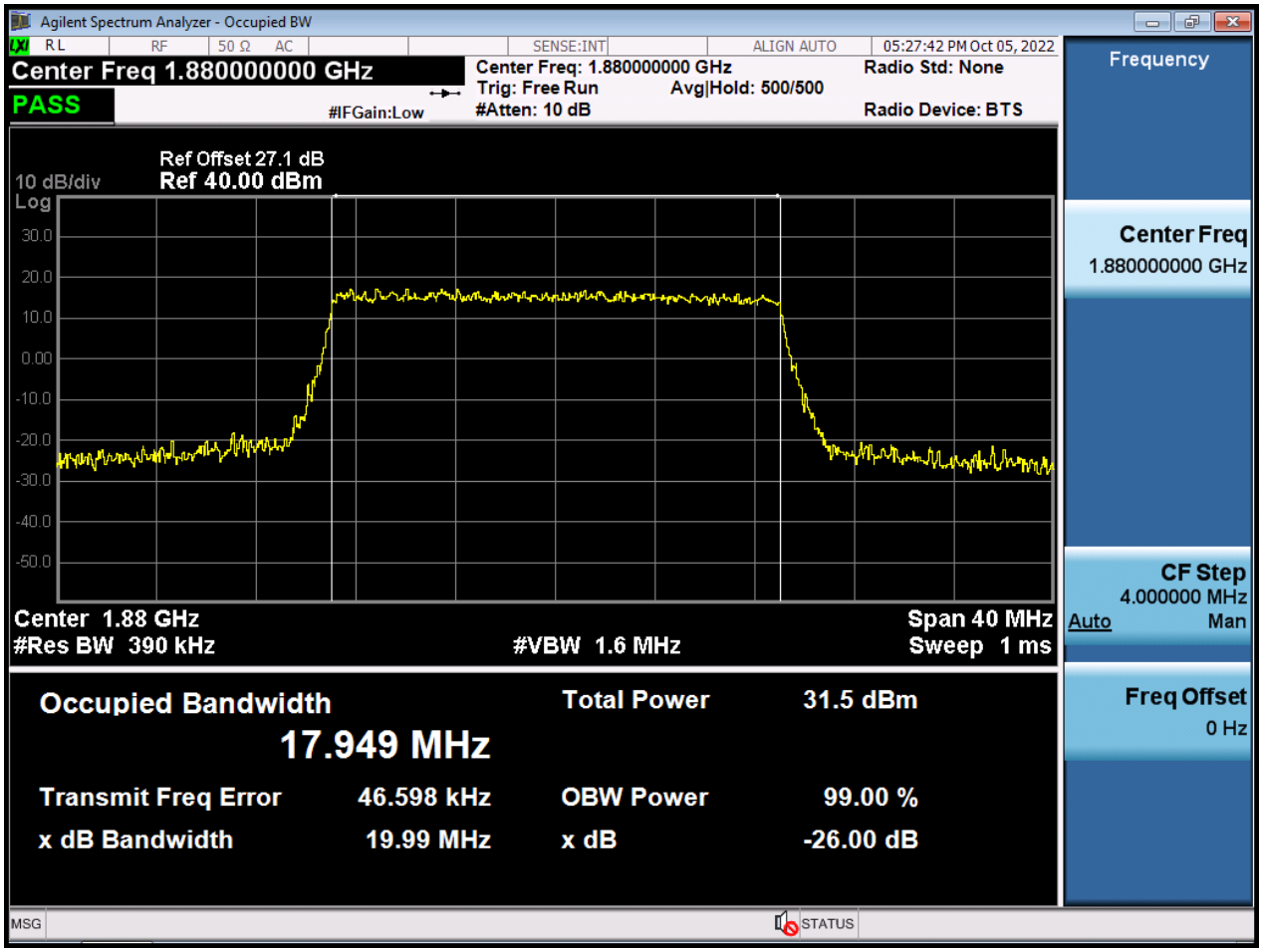
BW20 M_OBW_Middle Channel_QPSK_FullRB



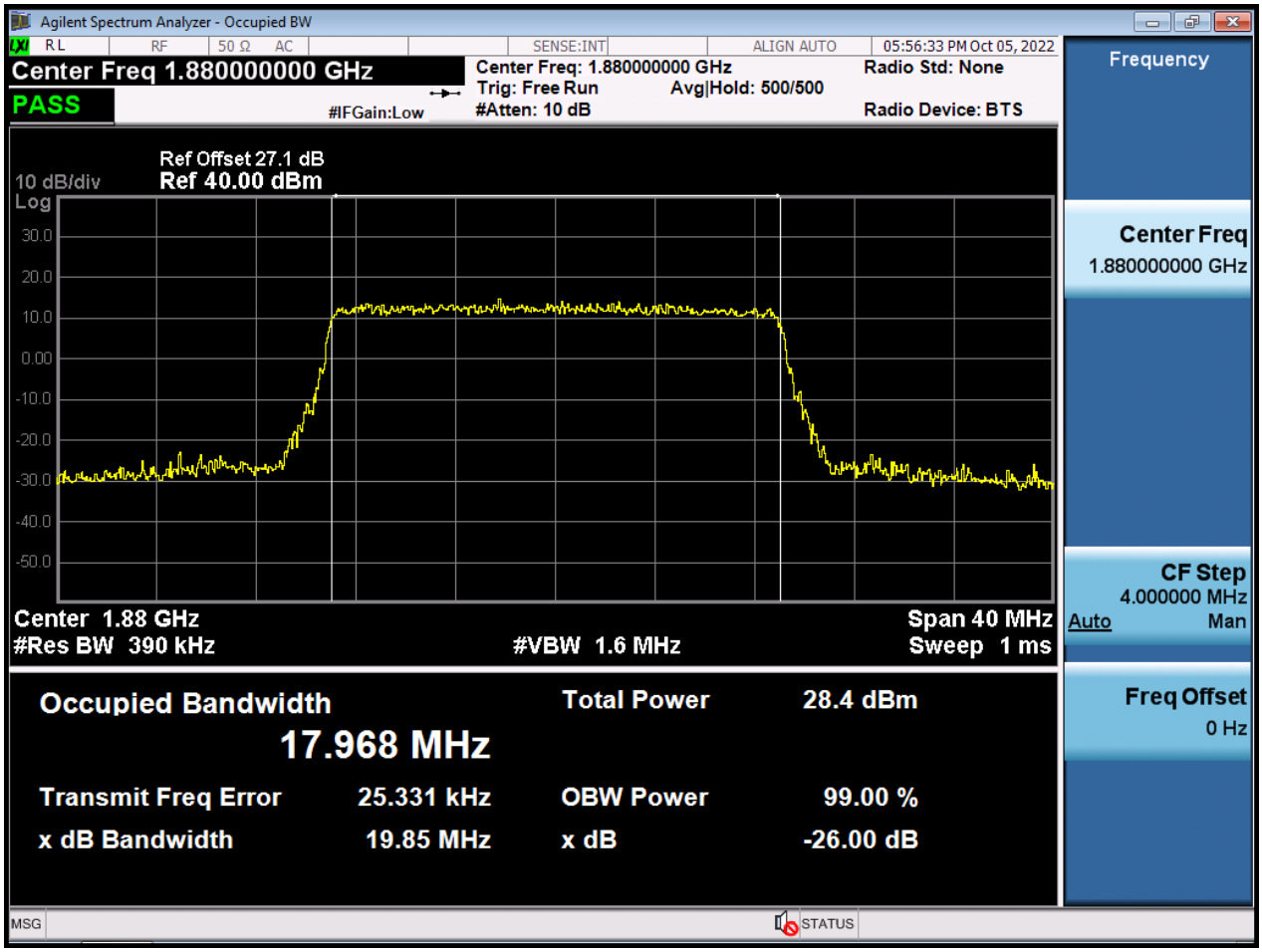
BW20 M_OBW_Middle Channel_16QAM_FullRB



BW20 M_OBW_Middle Channel_64QAM_FullRB

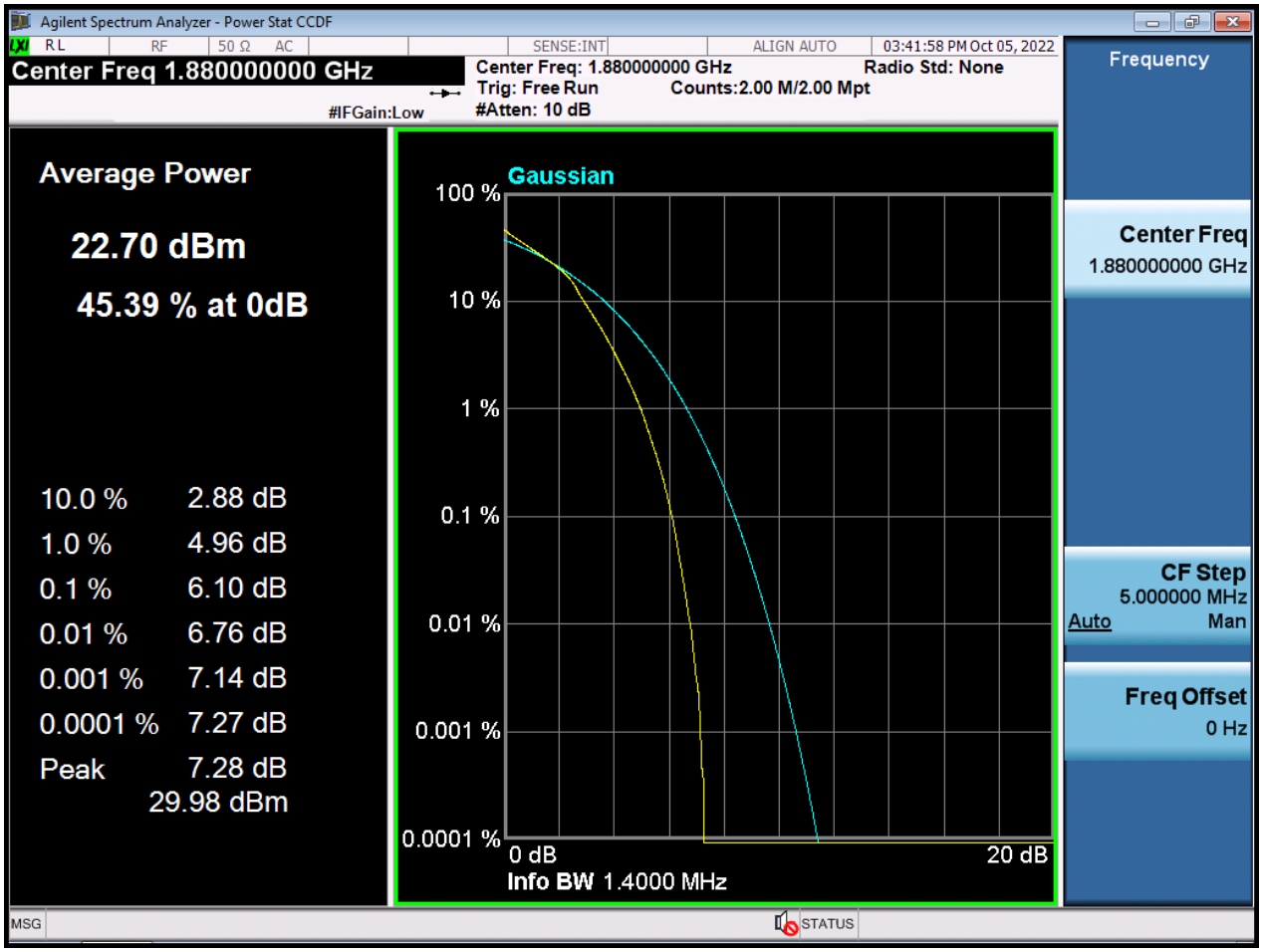


BW20 M_OBW_Middle Channel_256QAM_FullRB

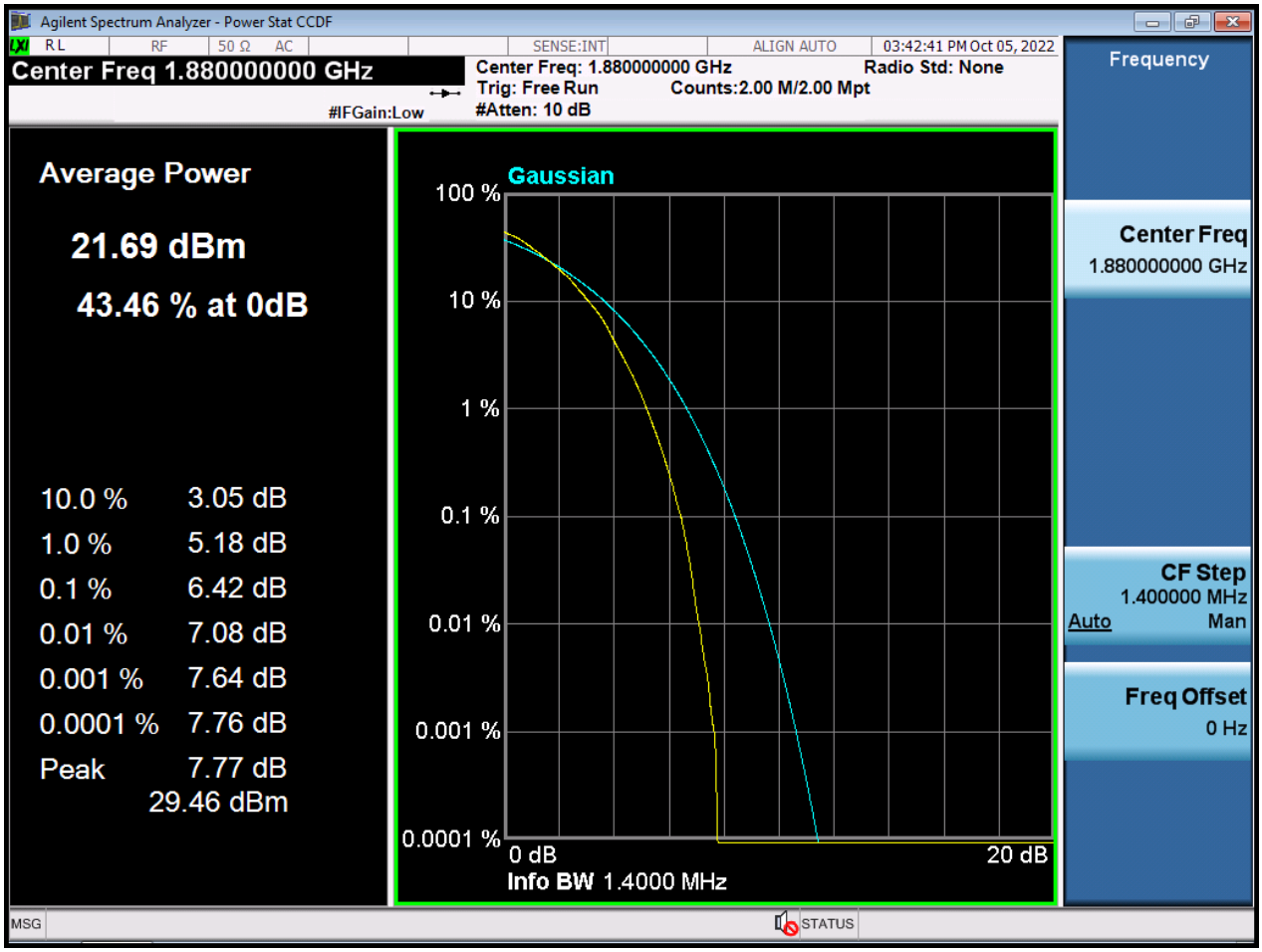


BW1.4 M_PAR_Middle Channel_QPSK_FullRB

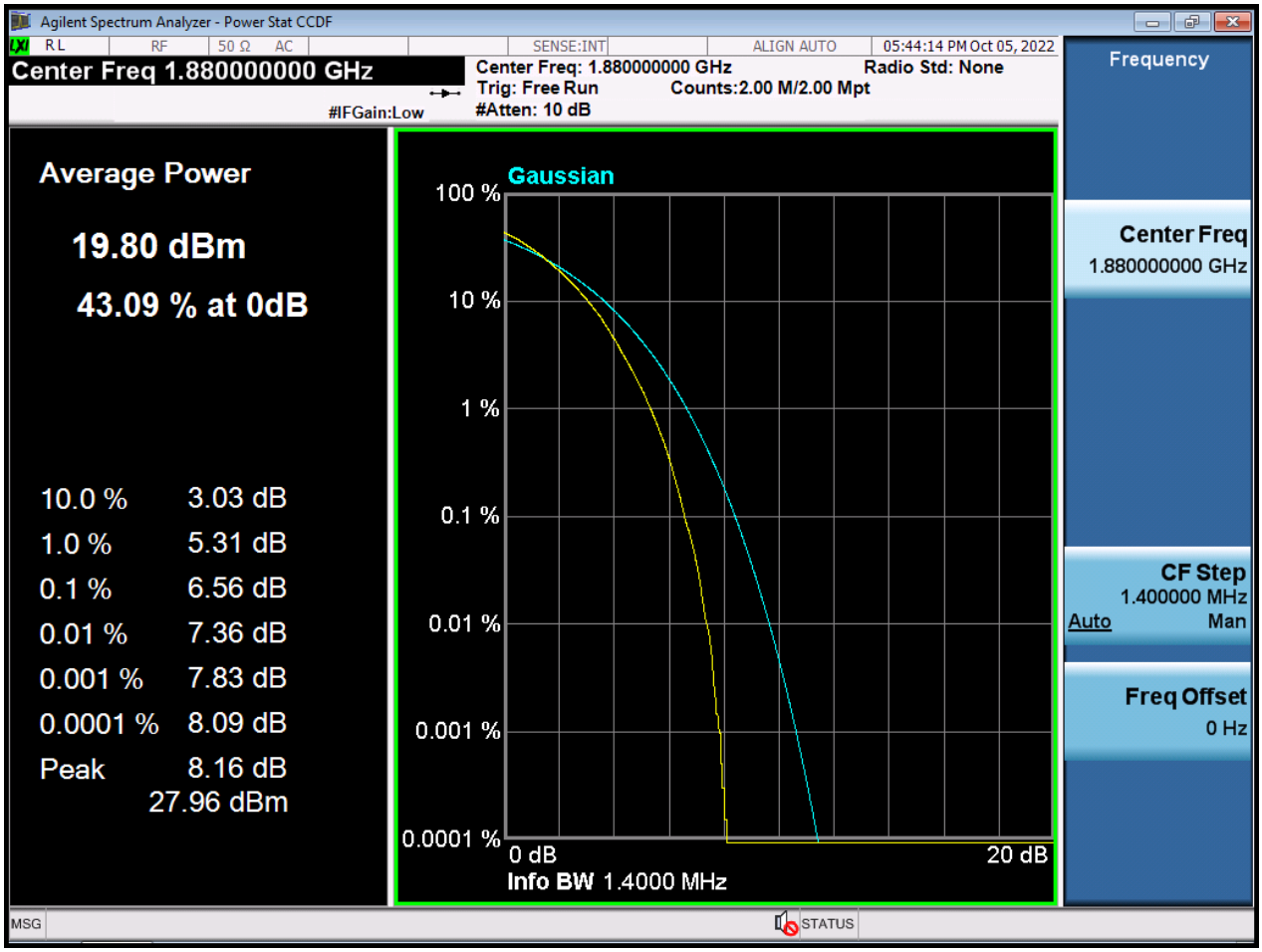
BW1.4 M_PAR_Middle Channel_16QAM_FullRB



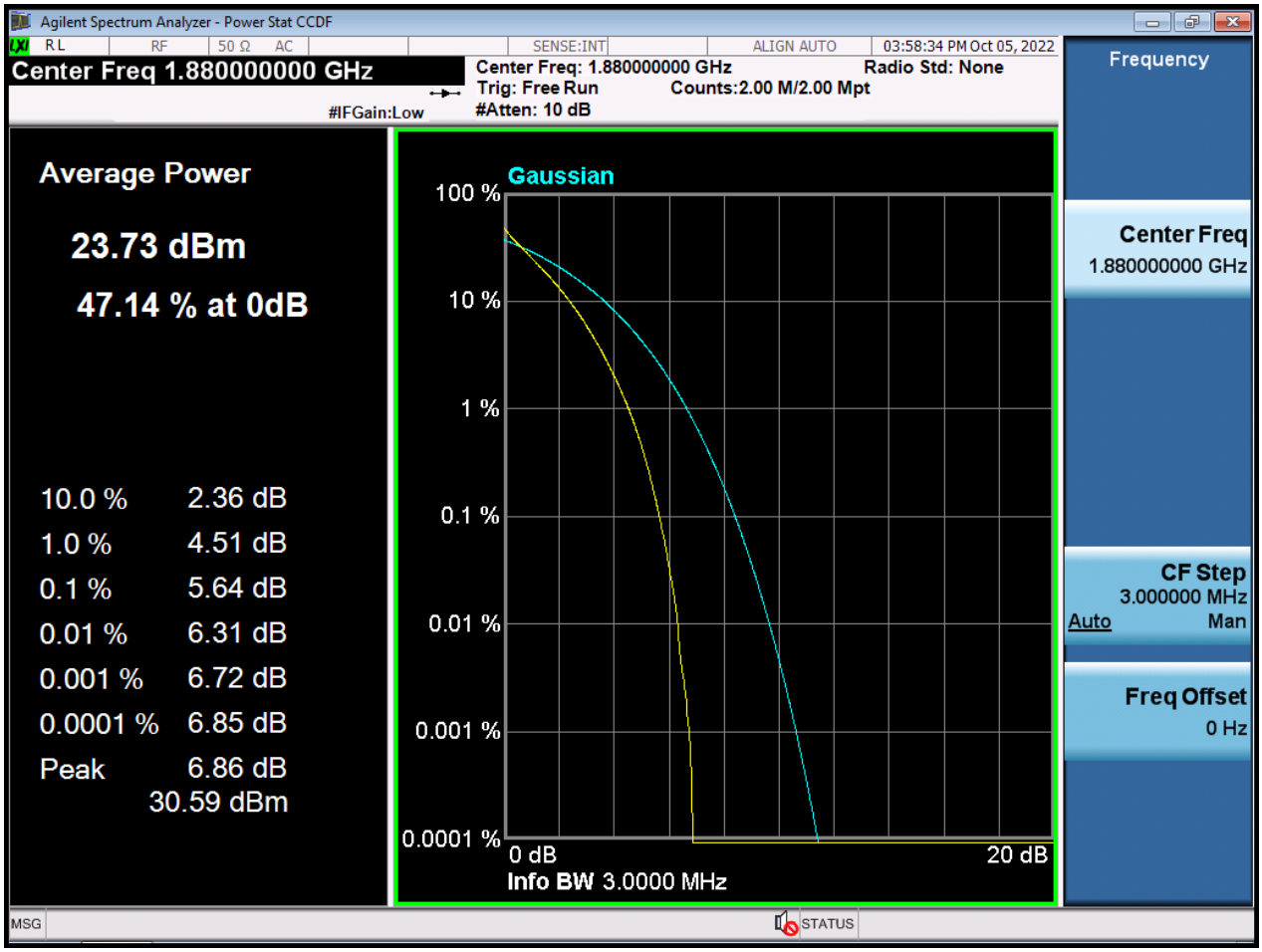
BW1.4 M_PAR_Middle Channel_64QAM_FullRB



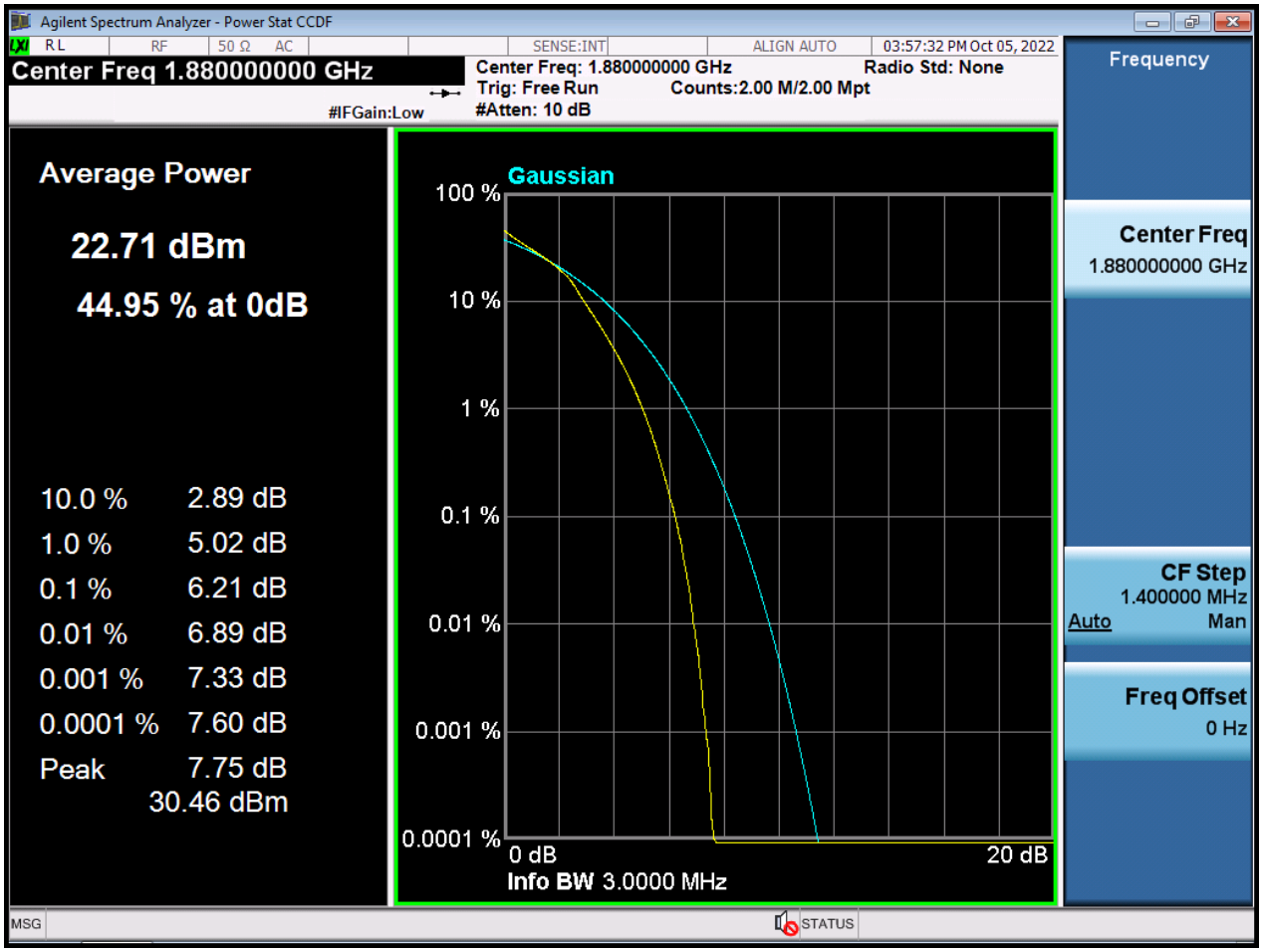
BW1.4 M_PAR_Middle Channel_256QAM_FullRB



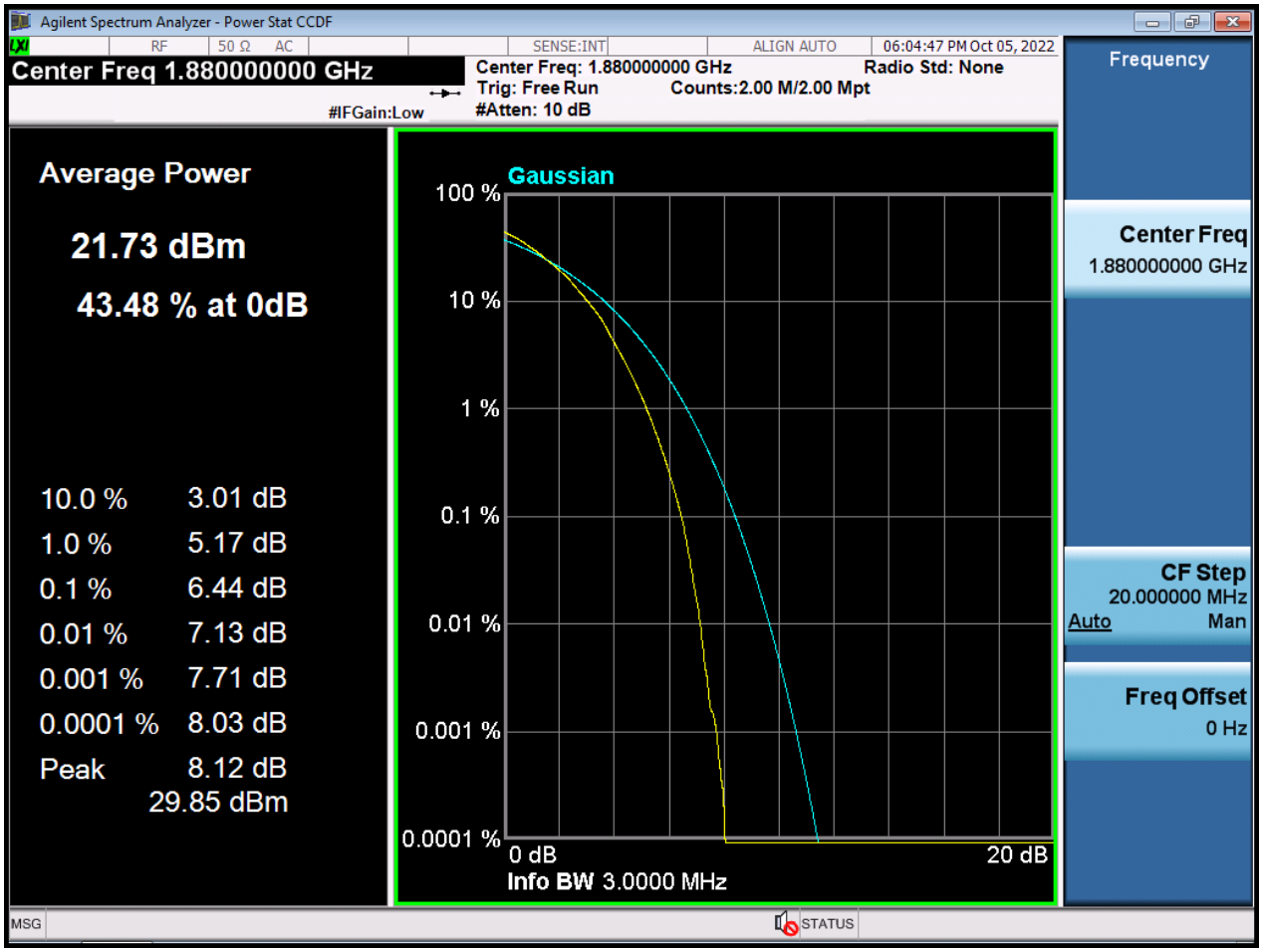
BW3 M_PAR_Middle Channel_QPSK_FullRB



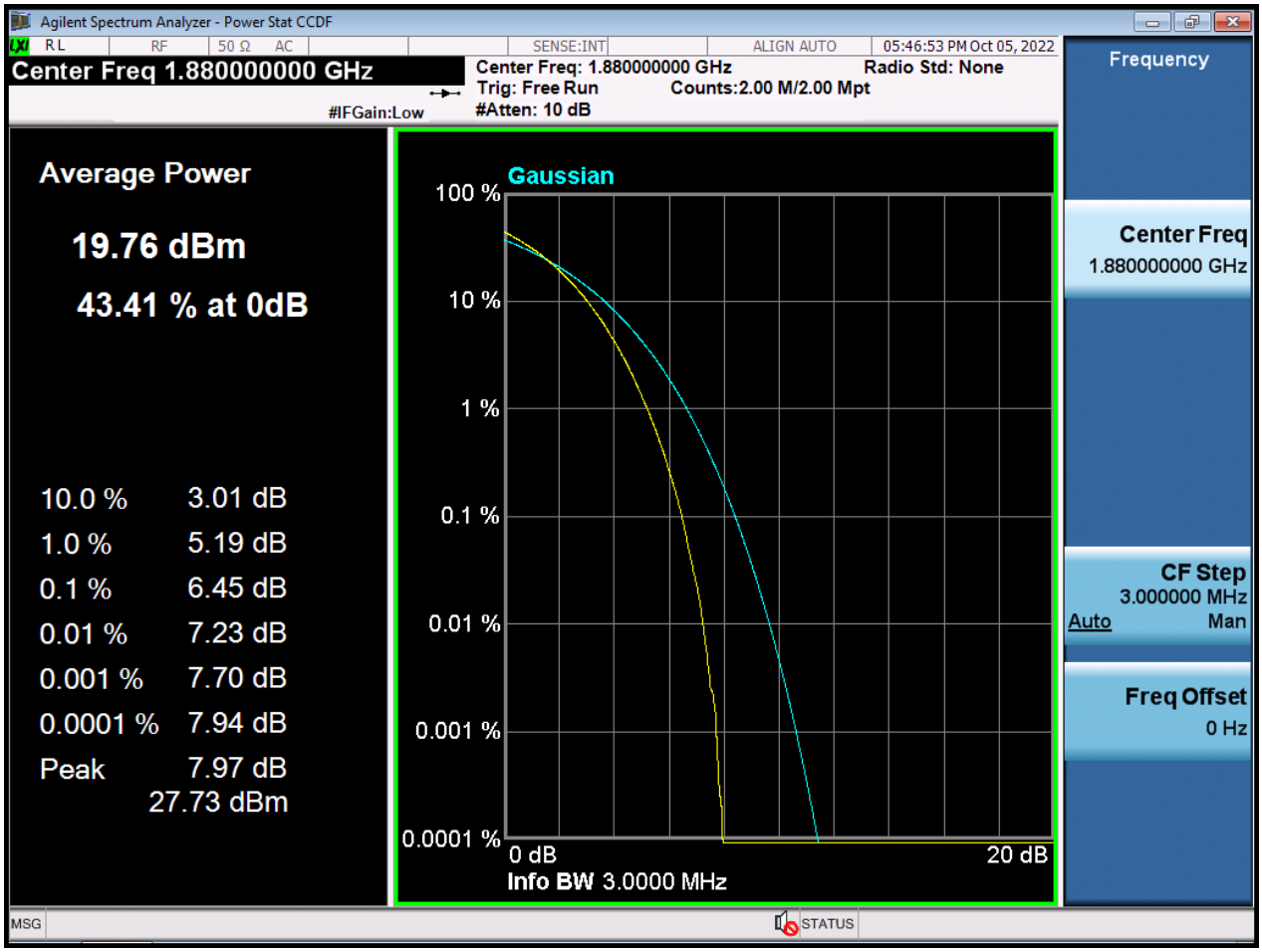
BW3 M_PAR_Middle Channel_16QAM_FullRB



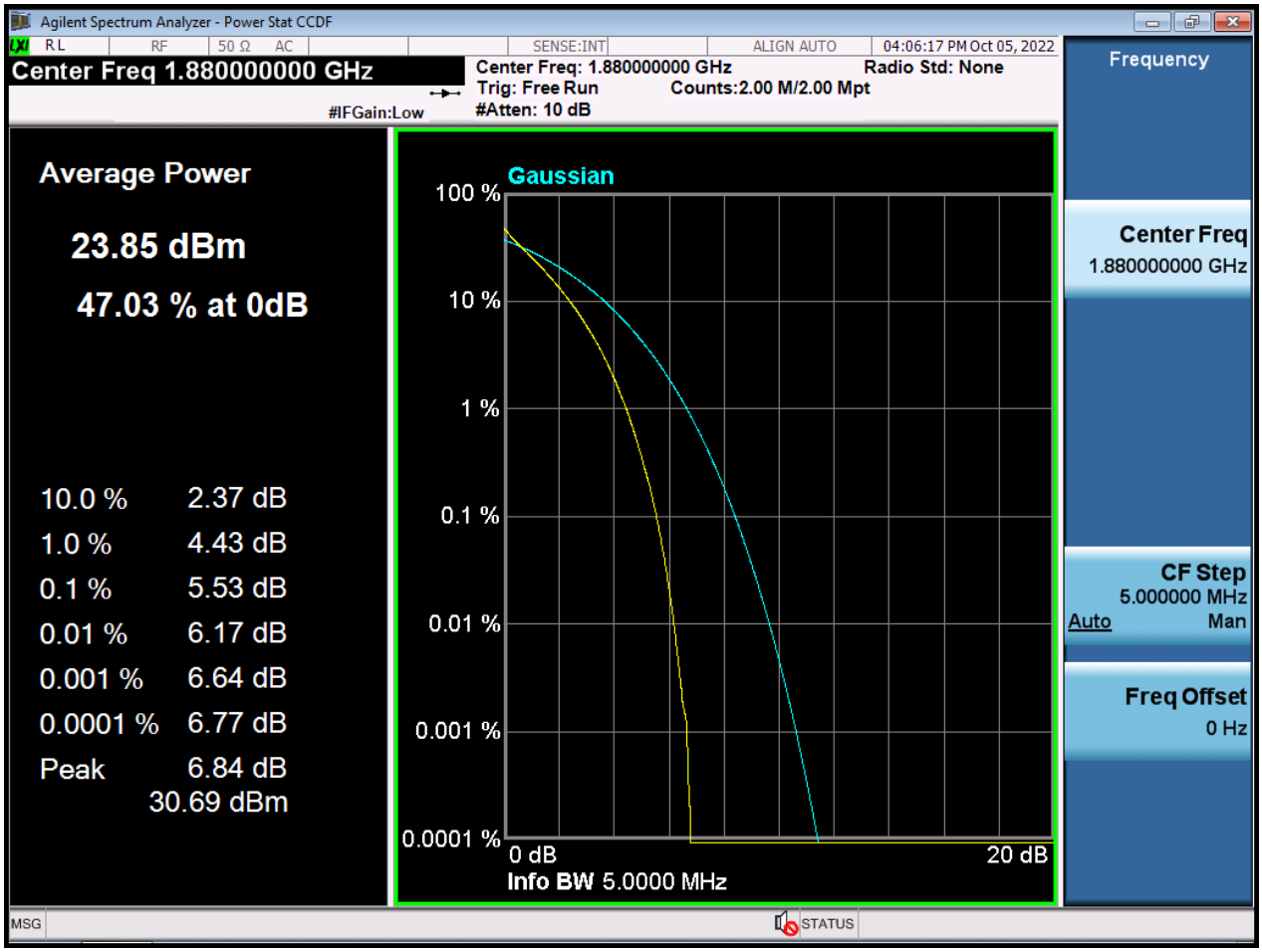
BW3 M_PAR_Middle Channel_64QAM_FullRB



BW3 M_PAR_Middle Channel_256QAM_FullRB

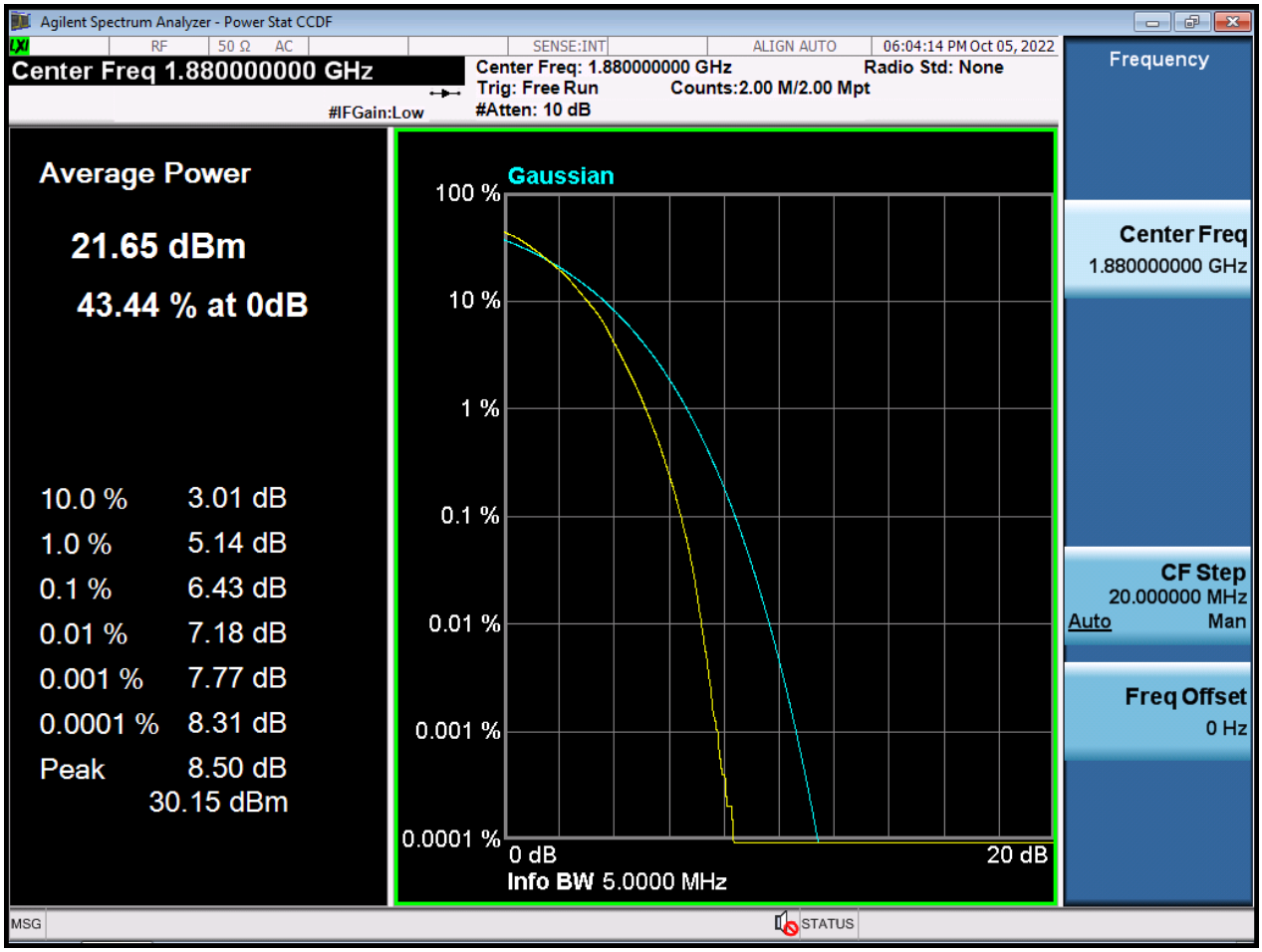


BW5 M_PAR_Middle Channel_QPSK_FullRB



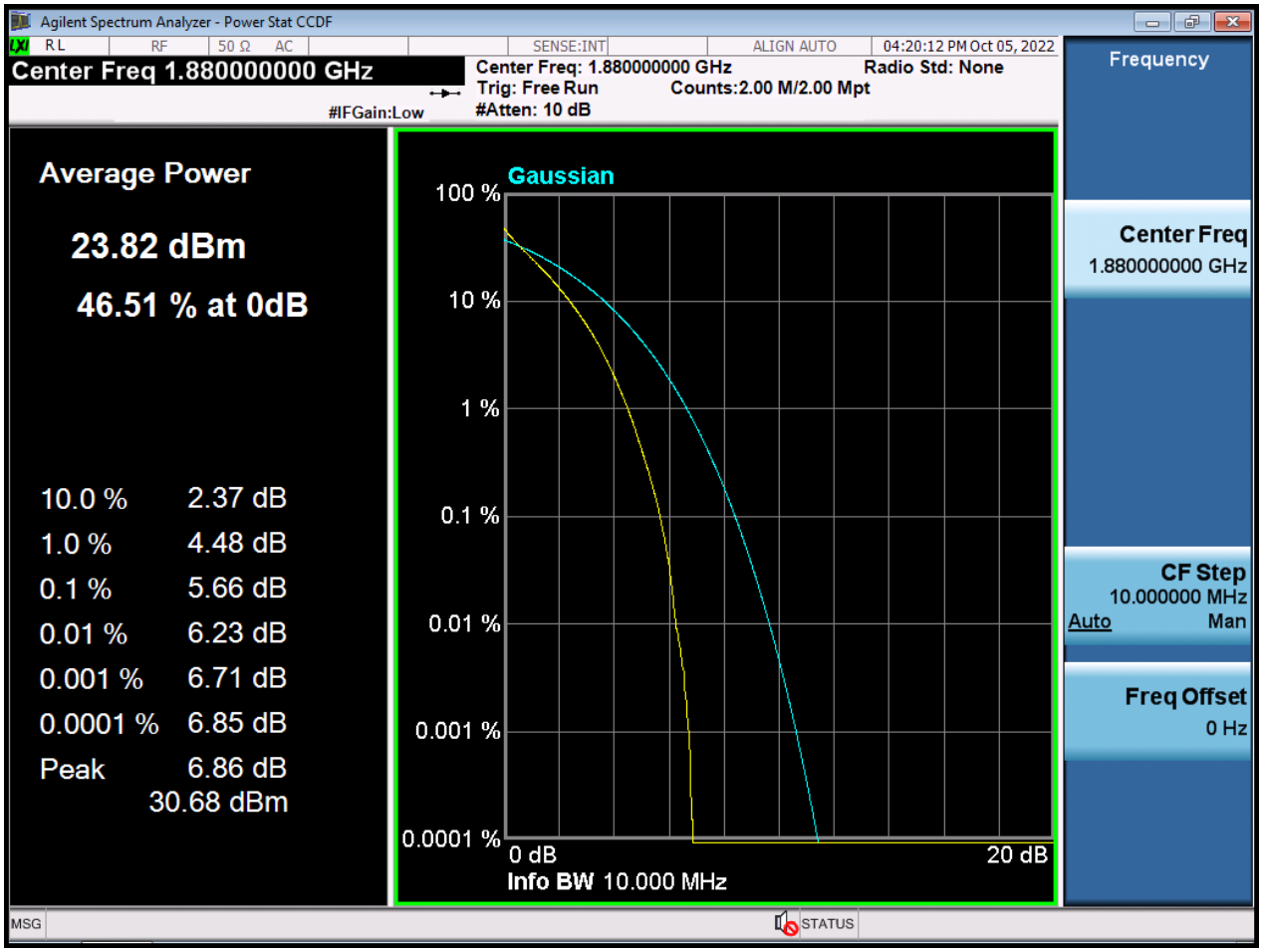
BW5 M_PAR_Middle Channel_16QAM_FullRB

BW5 M_PAR_Middle Channel_64QAM_FullRB

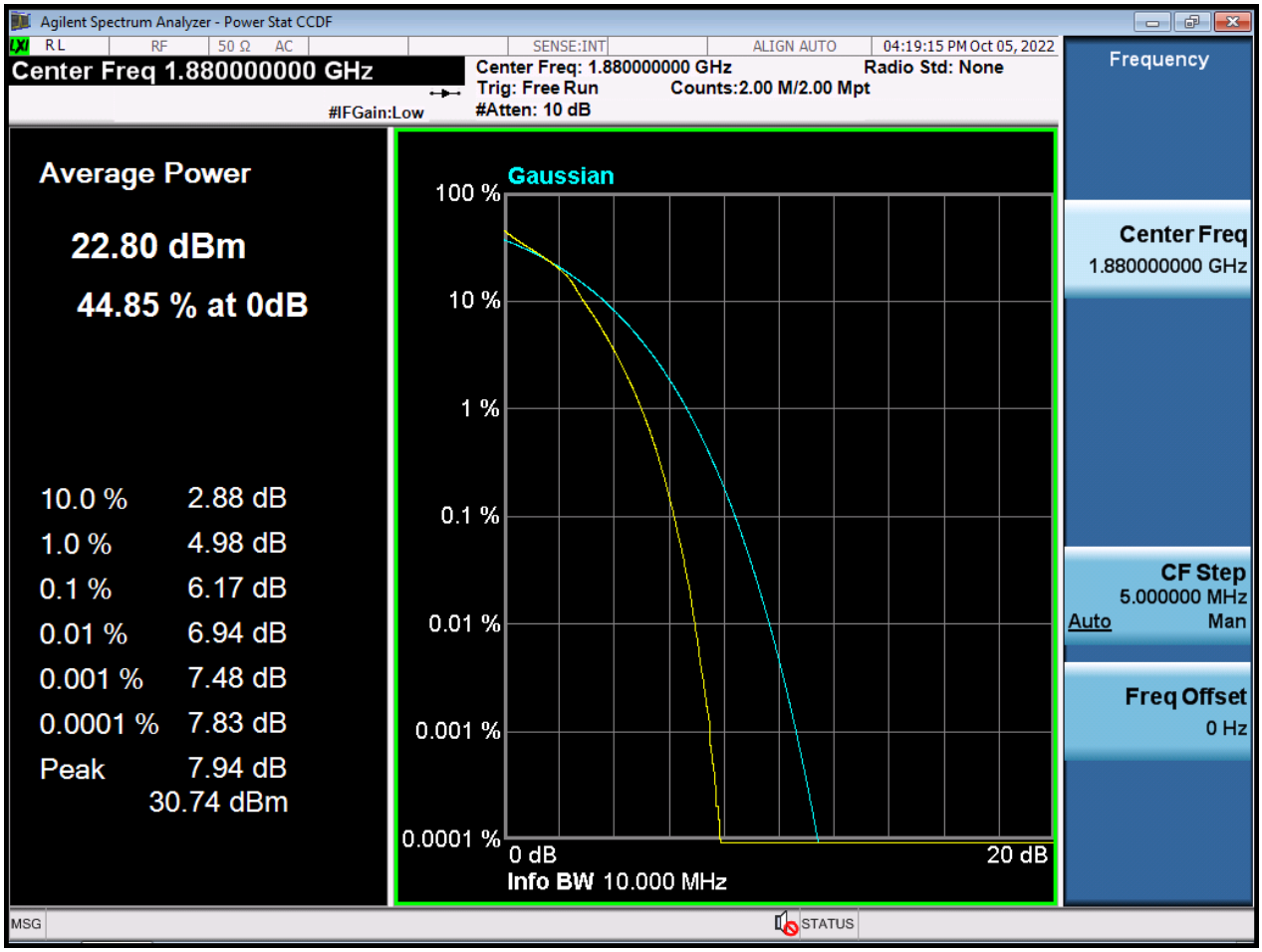


BW5 M_PAR_Middle Channel_256QAM_FullRB

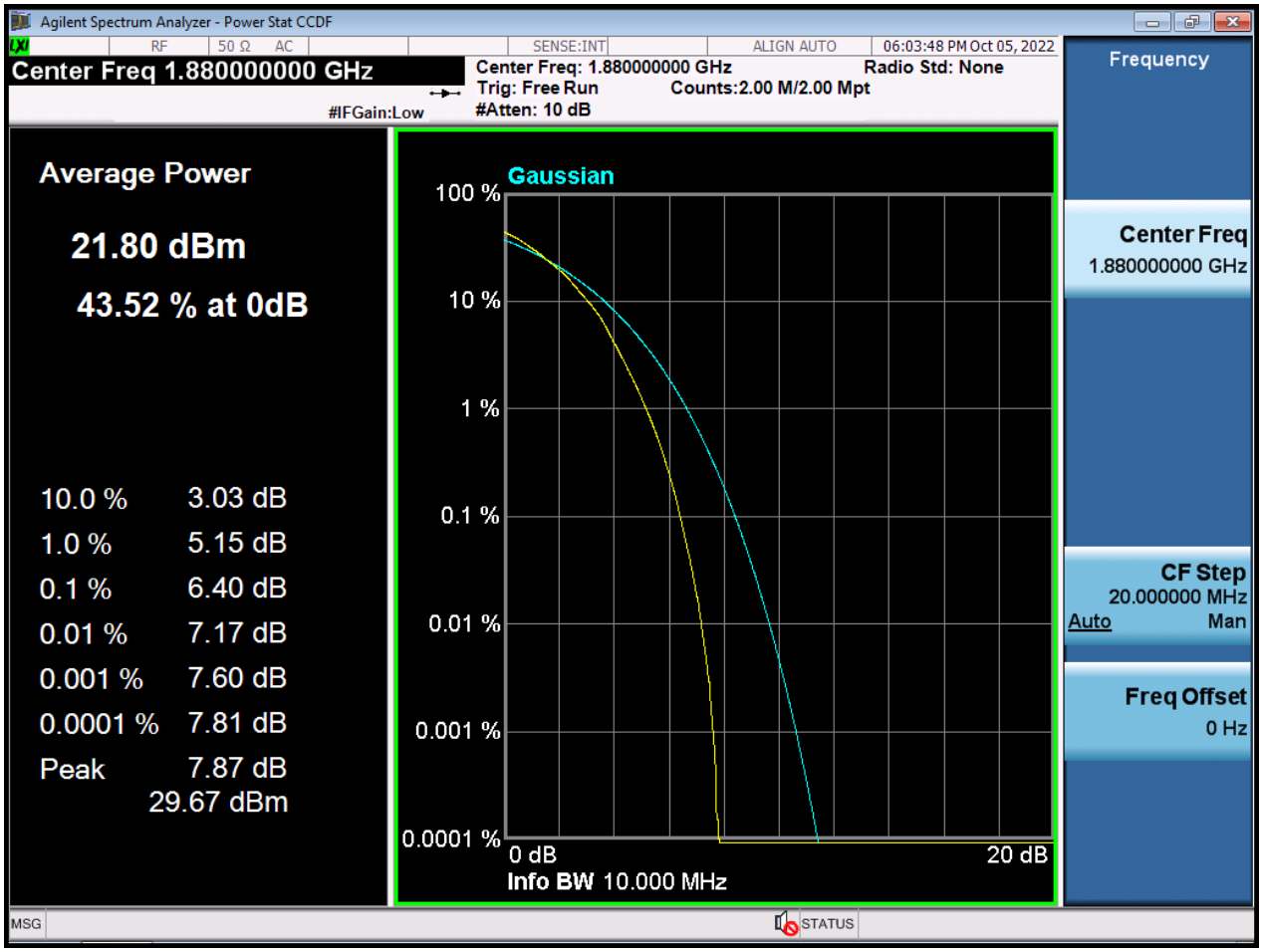
BW10 M_PAR_Middle Channelz_QPSK_FullRB



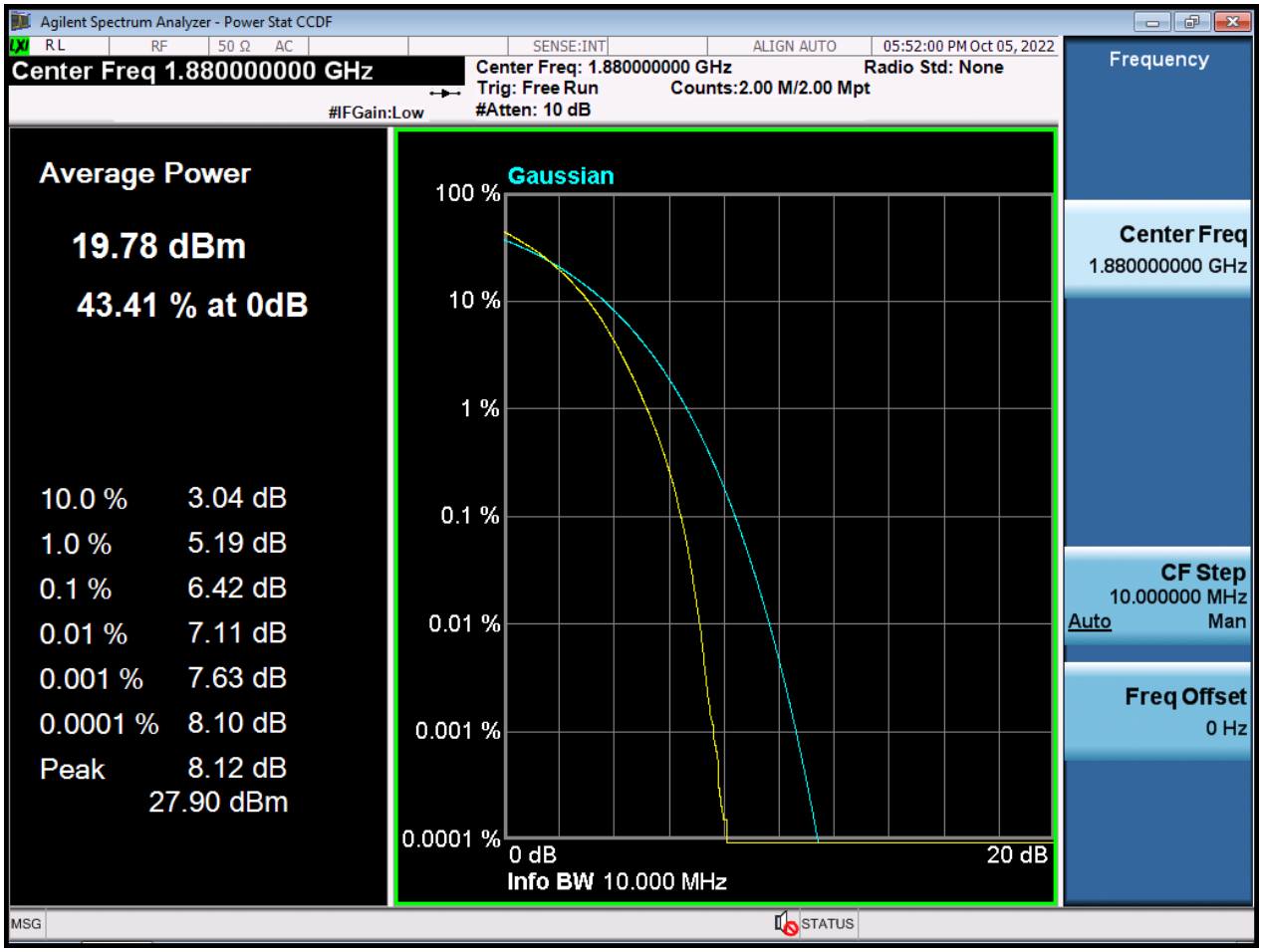
BW10 M_PAR_Middle Channel_16QAM_FullRB



BW10 M_PAR_Middle Channel_64QAM_FullRB

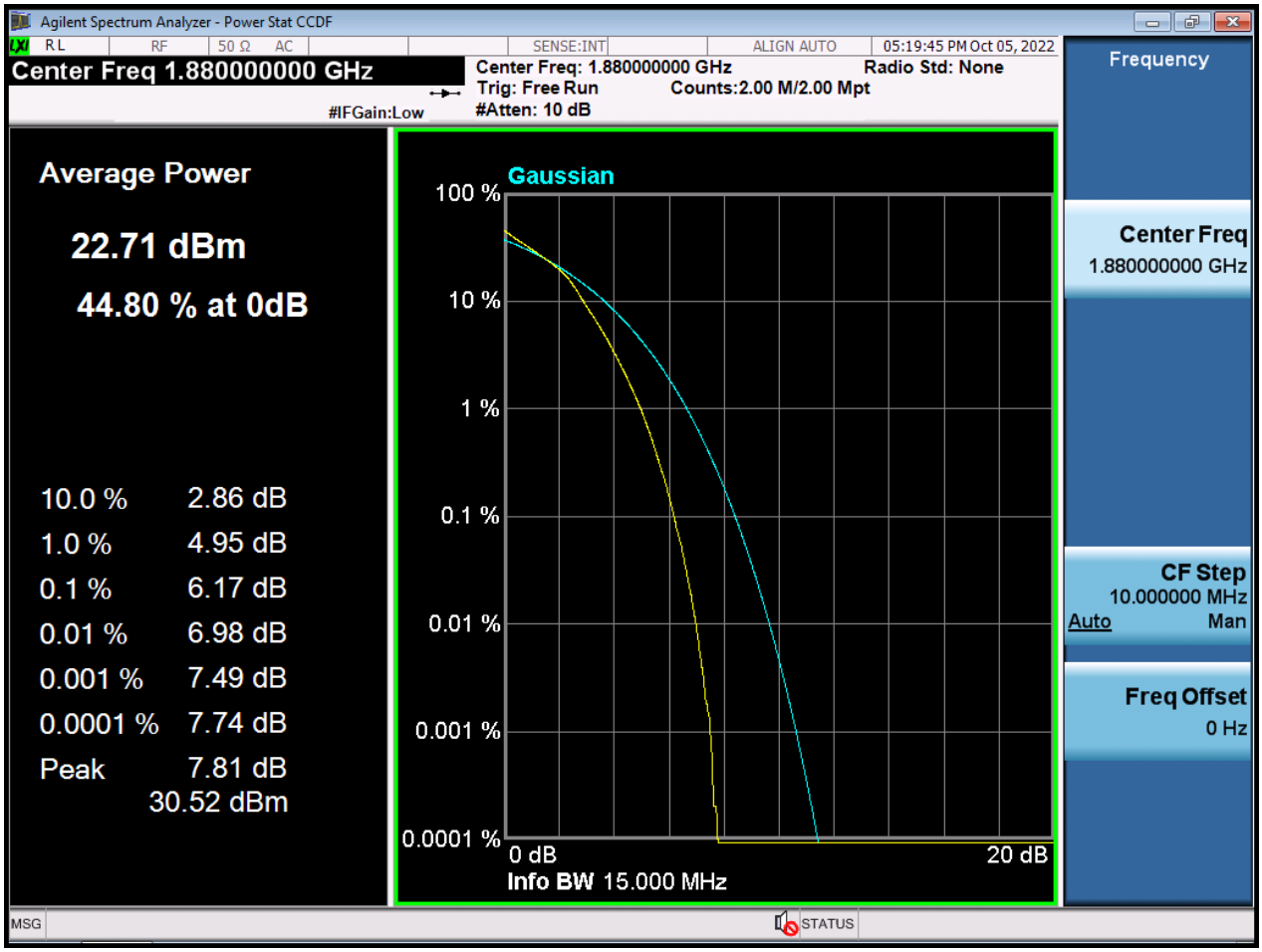


BW10 M_PAR_Middle Channel_256QAM_FullRB

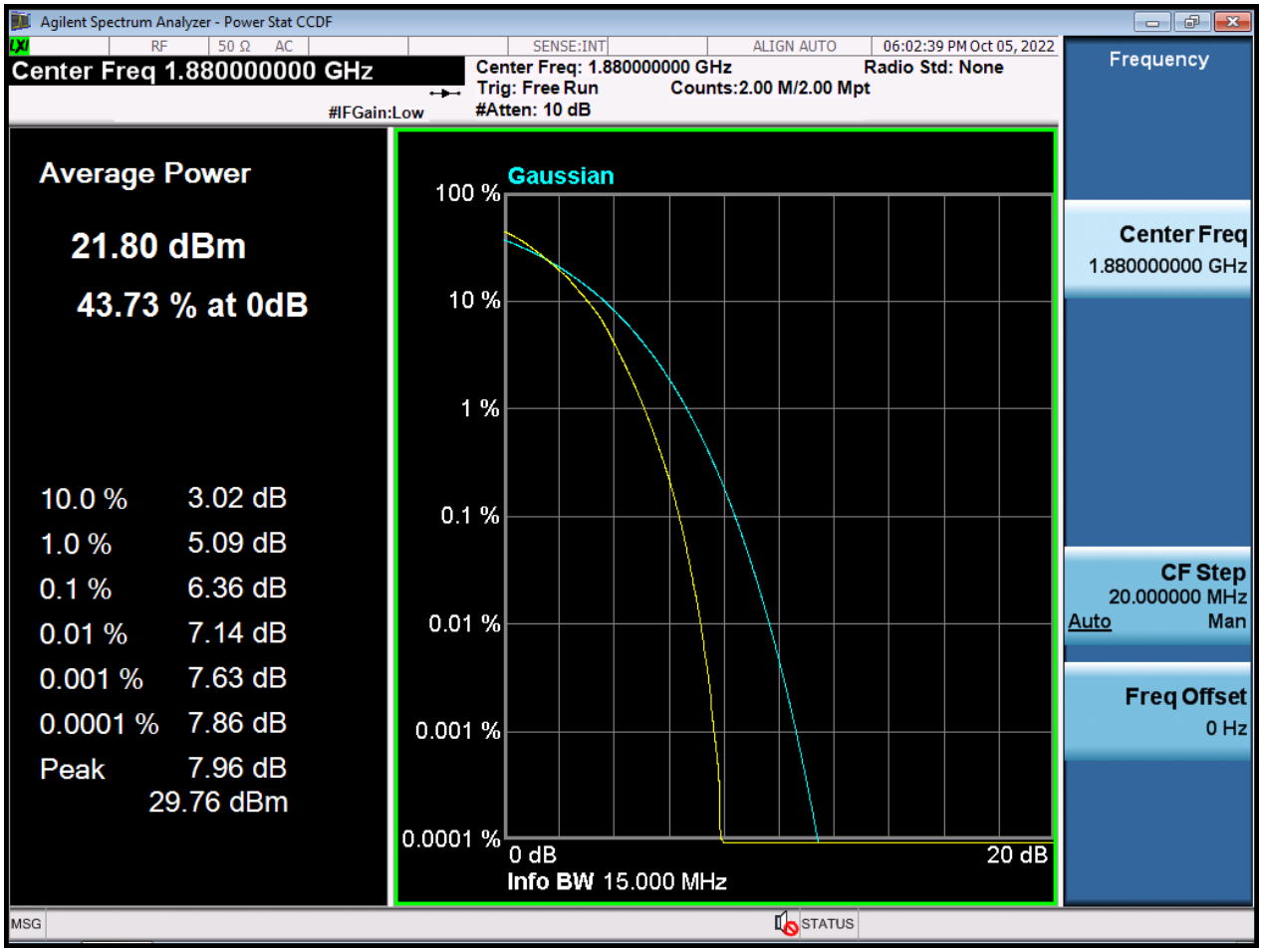


BW15 M_PAR_Middle Channel_QPSK_FullRB

BW15 M_PAR_Middle Channel_16QAM_FullRB

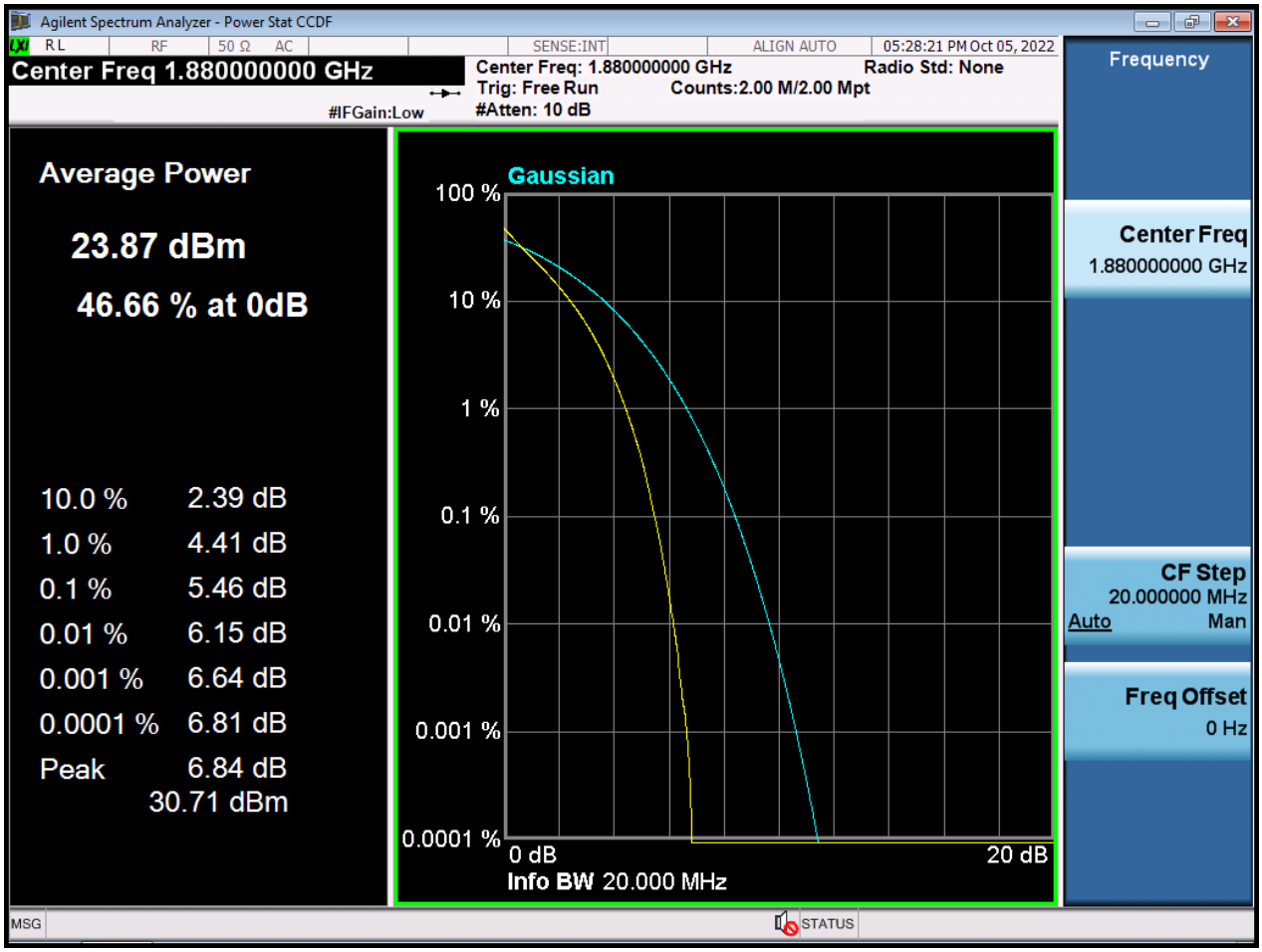


BW15 M_PAR_Middle Channel_64QAM_FullRB

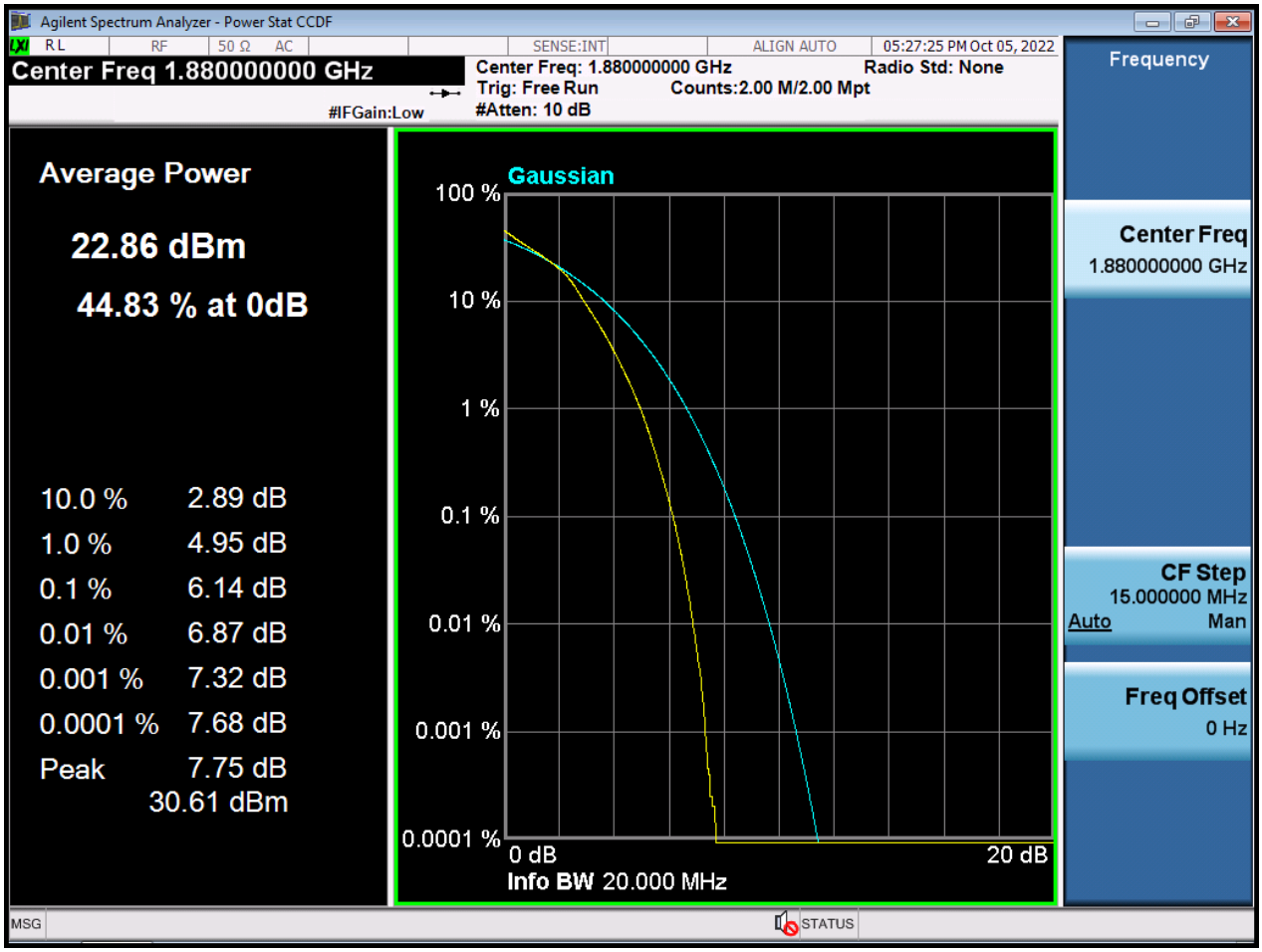


BW15 M_PAR_Middle Channel_256QAM_FullRB

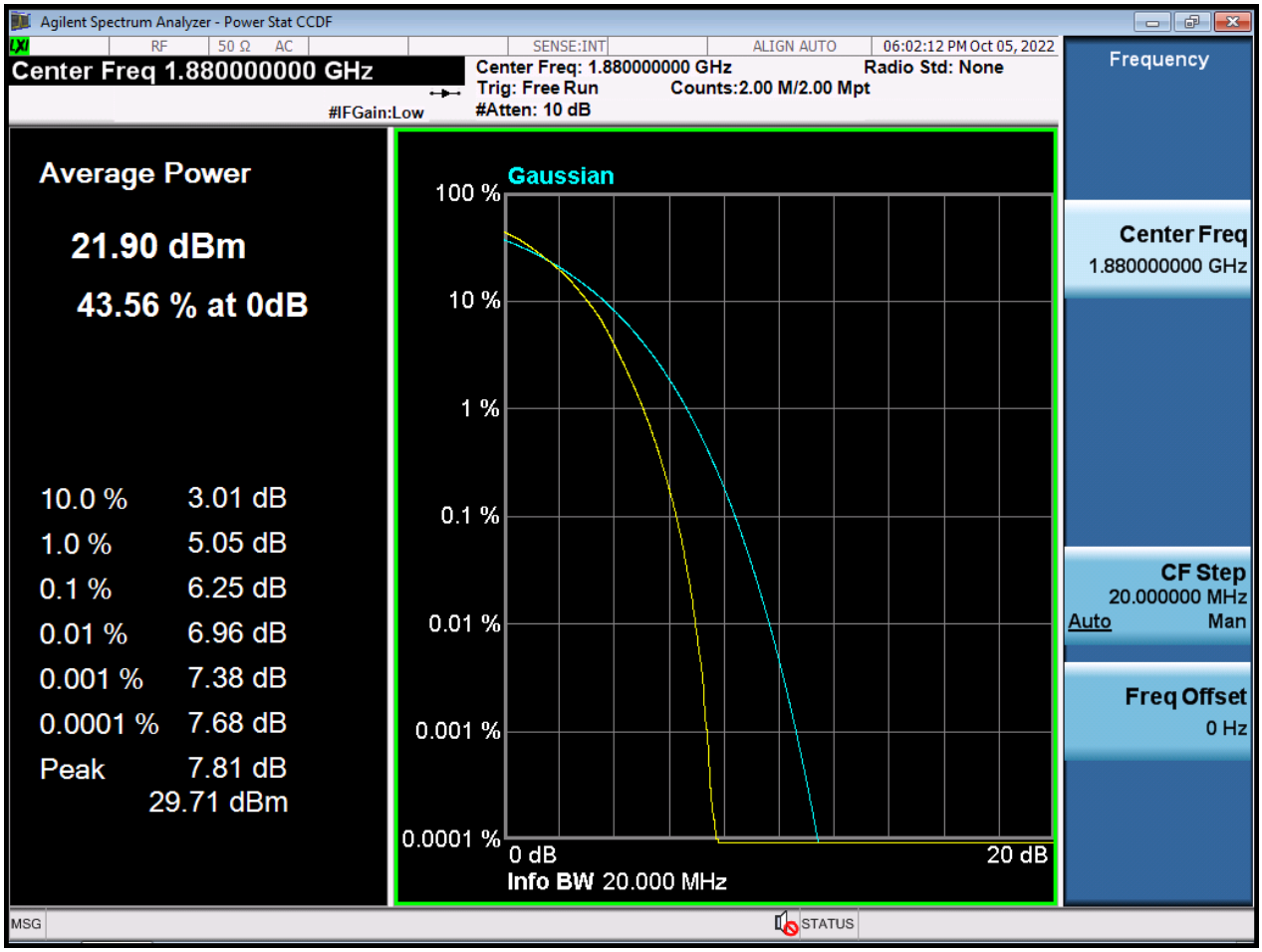
BW20 M_PAR_Middle Channel_QPSK_FullRB



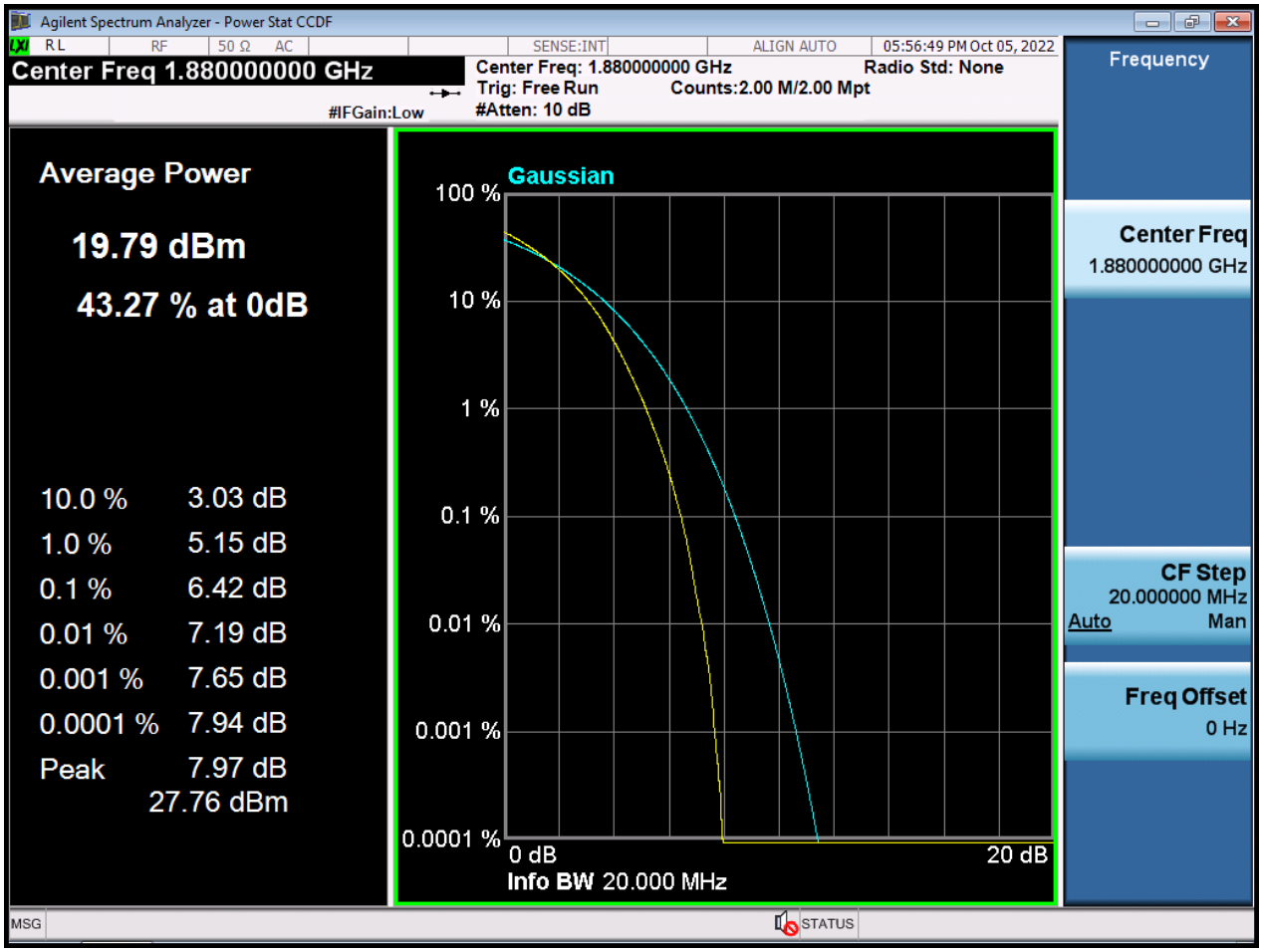
BW20 M_PAR_Middle Channel_16QAM_FullRB



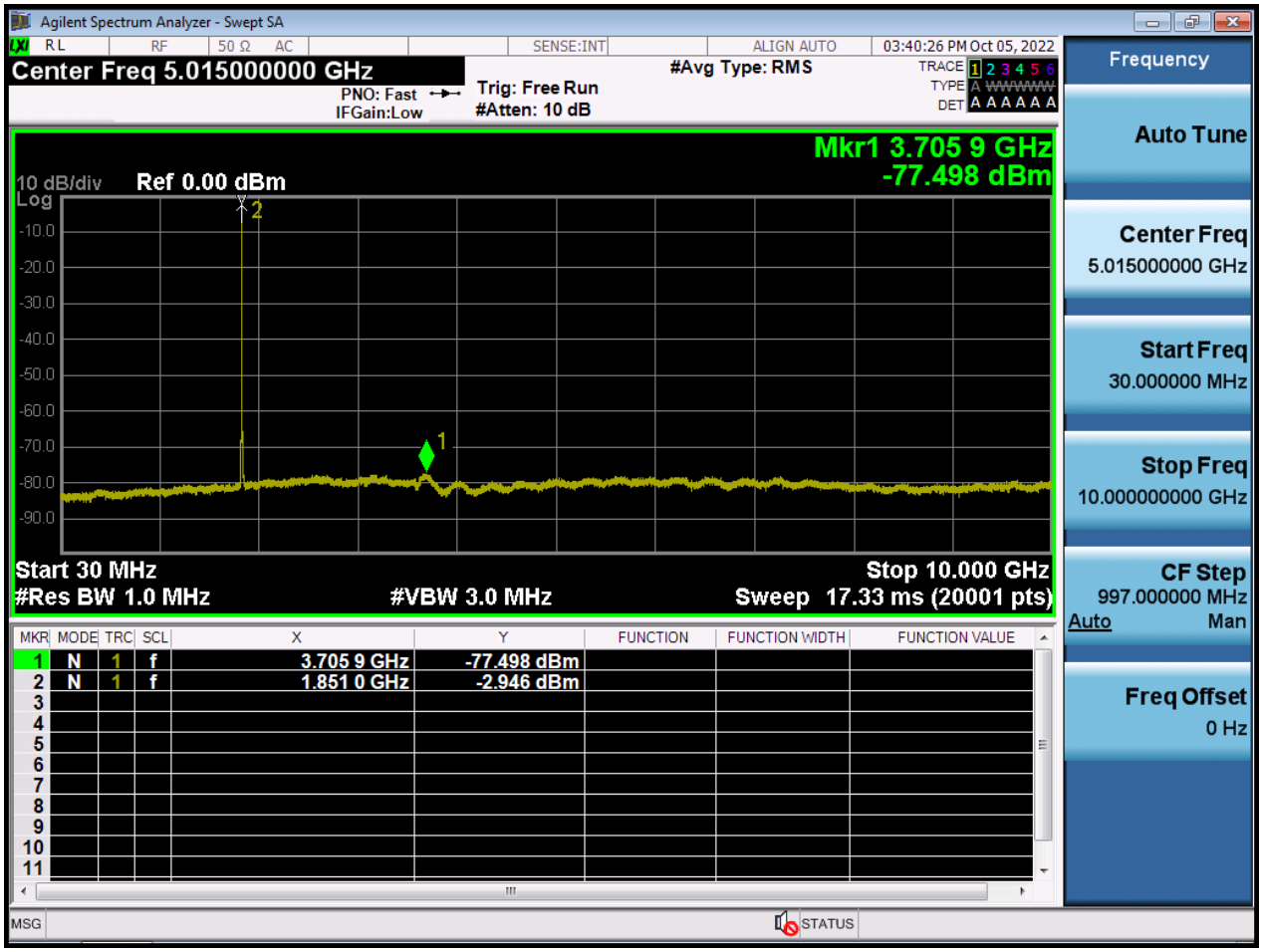
BW20 M_PAR_Middle Channel_64QAM_FullRB



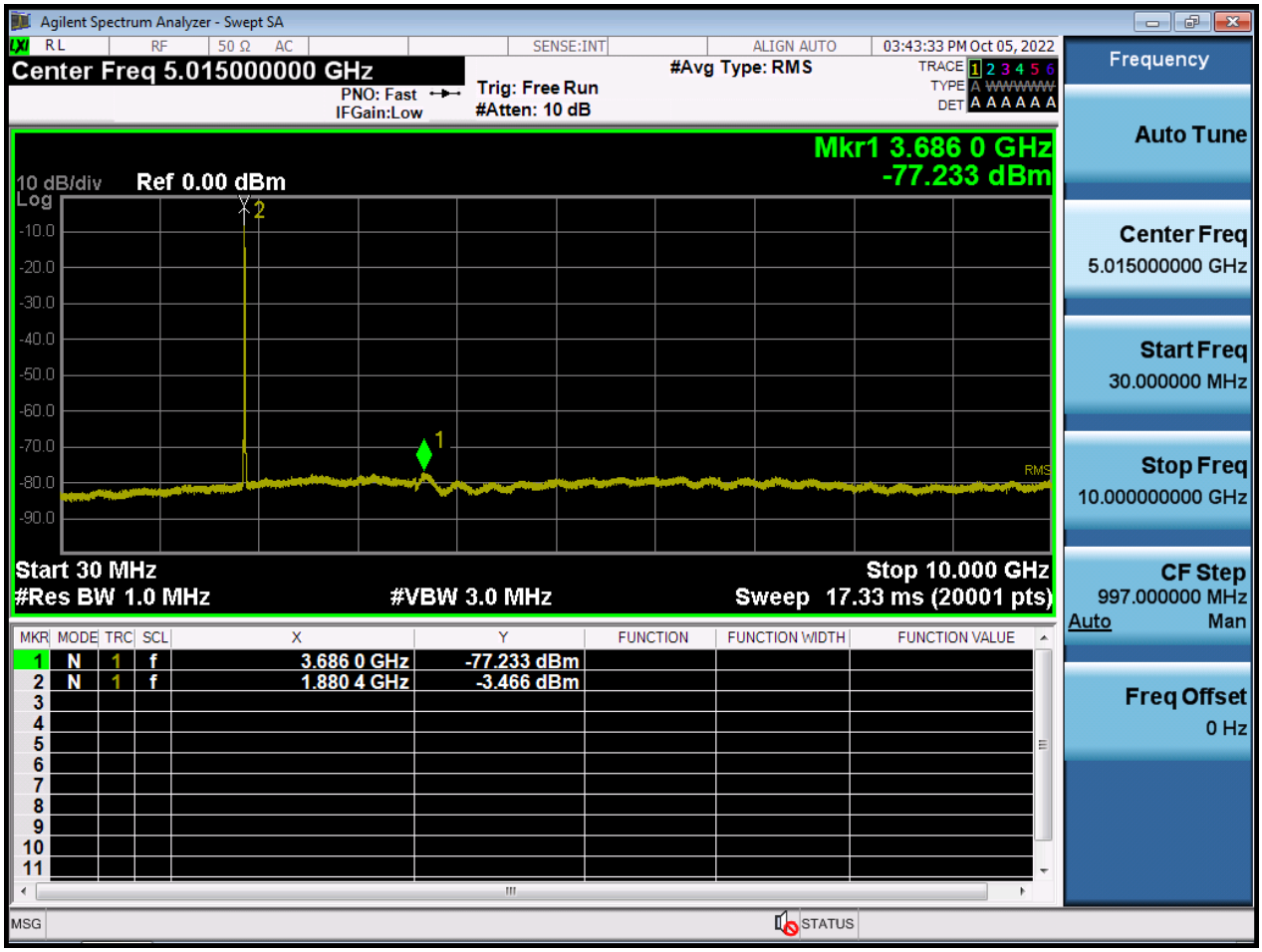
BW20 M_PAR_Middle Channel_256QAM_FullRB



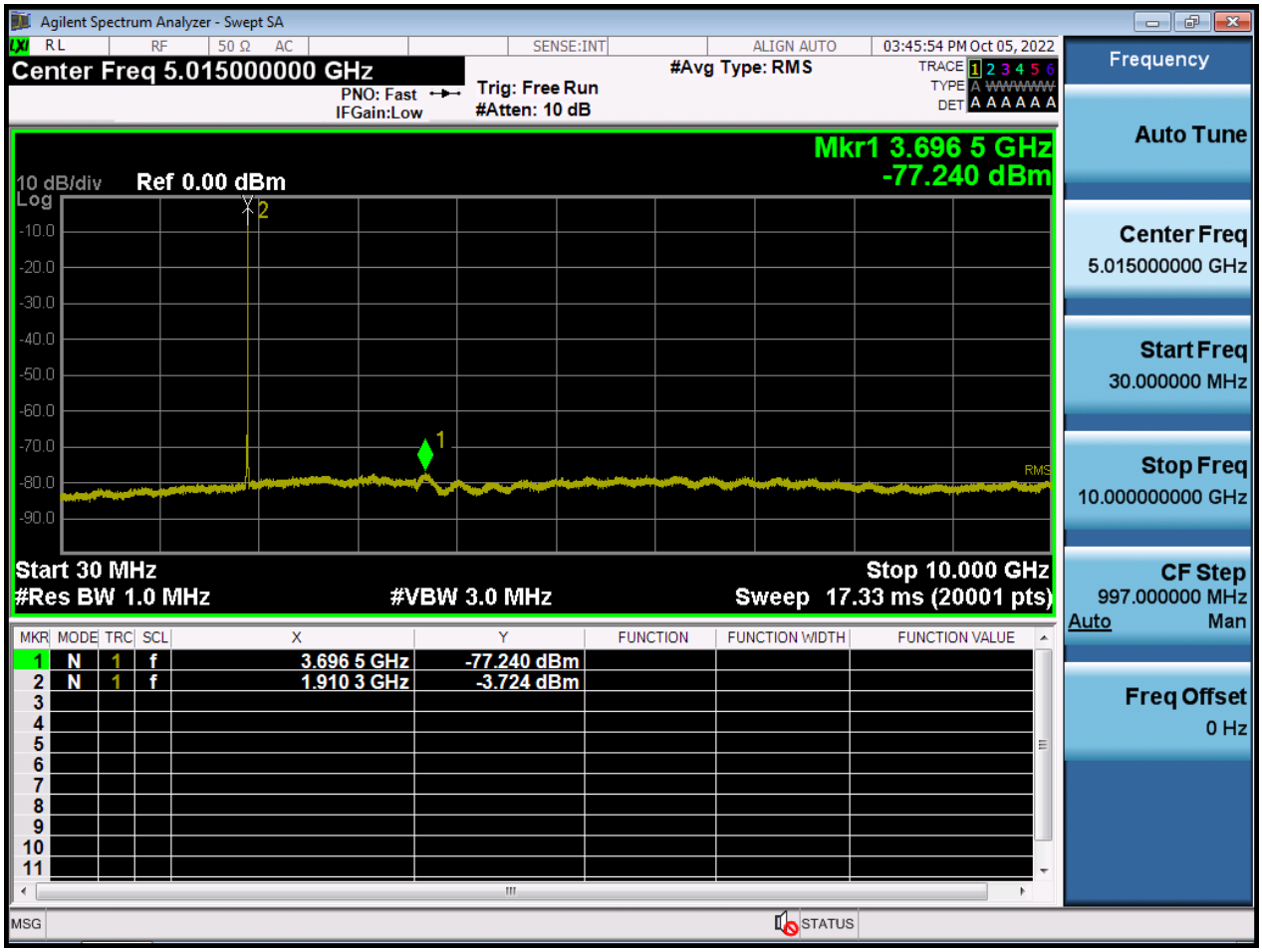
BW1.4 M_CSE(30 M-10 G)_Lowest Channel_QPSK_1RB



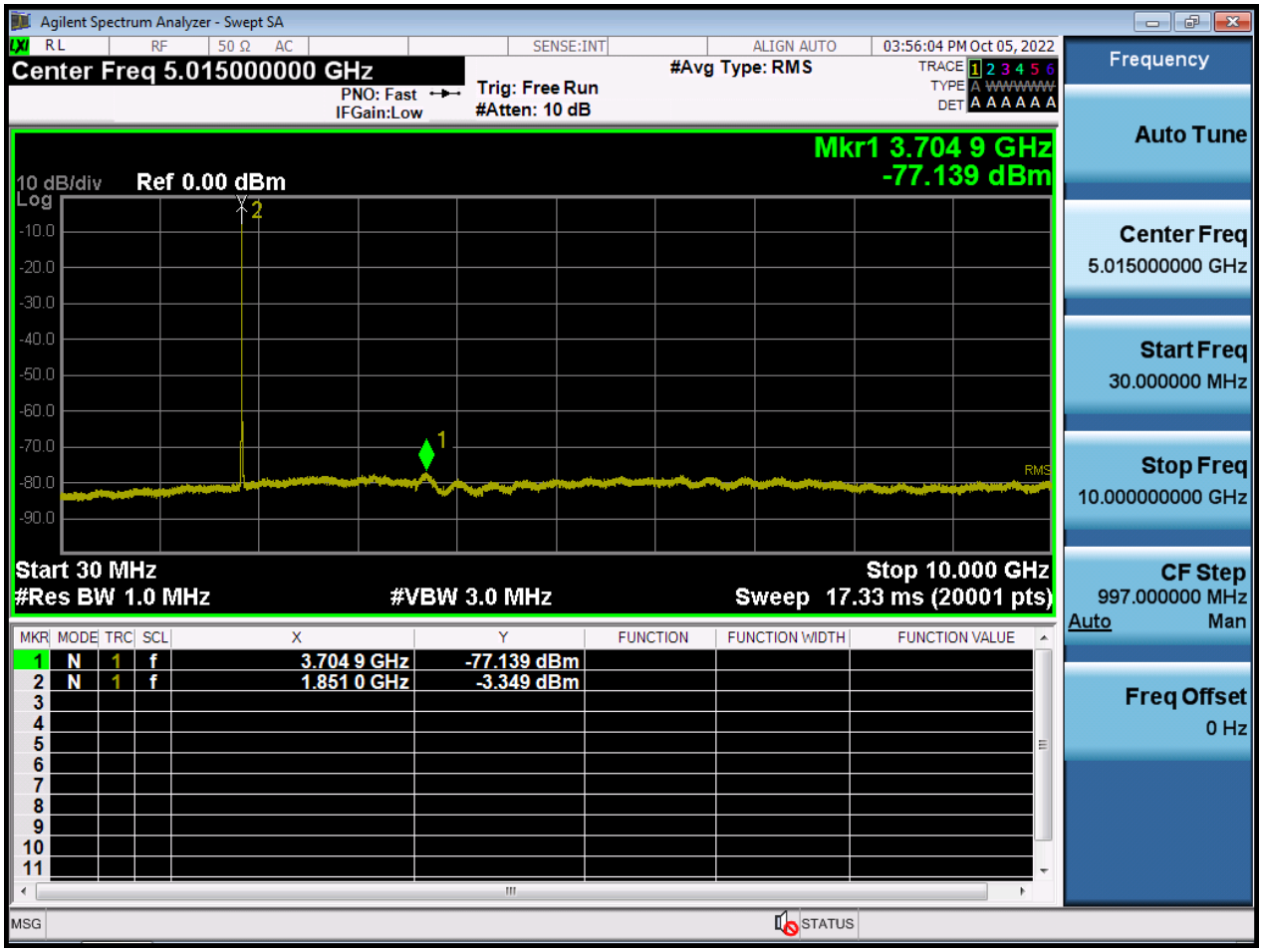
BW1.4 M_CSE(30 M-10 G)_Middle Channel_QPSK_1RB



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



BW3 M_CSE(30 M-10 G)_Lowest Channel_QPSK_1RB



BW3 M_CSE(30 M-10 G)_Middle Channel_QPSK_1RB