

TEST REPORT

FCC LTE B2 Test for SM-F741B
Certification

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2405-FC002

DATE OF ISSUE
May 3, 2024

Tested by
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**TEST
REPORT**

REPORT NO.
HCT-RF-2405-FC002

DATE OF ISSUE
May 03, 2024

Additional Model
-

Applicant **SAMSUNG Electronics Co., Ltd.**
129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Product Name Mobile Phone
Model Name SM-F741B

Date of Test March 12, 2024 ~ April 29, 2024

FCC ID A3LSMF741B

Location of Test Permanent Testing Lab On Site Testing
(Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 Republic of Korea)

FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)

FCC Rule Part(s): § 24

REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	May 03, 2024	Initial Release

Notice

Content

The measurements shown in this report were made in accordance with the procedures specified in CFR47 section § 2.947. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S.C.853(a)

The results shown in this test report only apply to the sample(s), as received, provided by the applicant, unless otherwise stated.

The test results have only been applied with the test methods required by the standard(s).

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

Information provided by the applicant is marked **.

Test results provided by external providers are marked ***.

When confirmation of authenticity of this test report is required, please contact www.hct.co.kr

The test results in this test report are not associated with the ((KS Q) ISO/IEC 17025) accreditation by KOLAS (Korea Laboratory Accreditation Scheme) / A2LA (American Association for Laboratory Accreditation) that are under the ILAC (International Laboratory Accreditation Cooperation) Mutual Recognition Agreement (MRA).

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MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name:	SAMSUNG Electronics Co., Ltd.
Address:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
FCC ID:	A3LSMF741B
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§ 24
EUT Type:	Mobile phone
Model(s):	SM-F741B
Additional Model(s)	-
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:	March 12, 2024 ~ April 29, 2024
Serial number:	Radiated : R3CX30N98SV Conducted : R3CX30N96FZ

1.1. MAXIMUM OUTPUT POWER

Main 1 Ant

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	EIRP	
				Max. Power (W)	Max. Power (dBm)
LTE – Band2 (1.4)	1850.7 - 1909.3	1M10G7D	QPSK	0.201	23.04
		1M10W7D	16QAM	0.168	22.25
		1M10W7D	64QAM	0.132	21.22
		1M10W7D	256QAM	0.065	18.14
LTE – Band2 (3)	1851.5 - 1908.5	2M71G7D	QPSK	0.201	23.04
		2M71W7D	16QAM	0.169	22.27
		2M71W7D	64QAM	0.132	21.21
		2M71W7D	256QAM	0.064	18.08
LTE – Band2 (5)	1852.5 - 1907.5	4M51G7D	QPSK	0.209	23.21
		4M51W7D	16QAM	0.176	22.45
		4M51W7D	64QAM	0.137	21.37
		4M52W7D	256QAM	0.066	18.17
LTE – Band2 (10)	1855.0 - 1905.0	9M01G7D	QPSK	0.218	23.38
		9M01W7D	16QAM	0.179	22.52
		9M00W7D	64QAM	0.140	21.47
		8M99W7D	256QAM	0.069	18.37
LTE – Band2 (15)	1857.5 - 1902.5	13M5G7D	QPSK	0.217	23.37
		13M5W7D	16QAM	0.179	22.52
		13M5W7D	64QAM	0.141	21.49
		13M5W7D	256QAM	0.069	18.39
LTE – Band2 (20)	1860.0 - 1900.0	18M0G7D	QPSK	0.217	23.36
		18M0W7D	16QAM	0.178	22.50
		18M0W7D	64QAM	0.139	21.44
		18M0W7D	256QAM	0.069	18.38

Sub 5 Ant

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	EIRP	
				Max. Power (W)	Max. Power (dBm)
LTE – Band2 (1.4)	1850.7 - 1909.3	1M10G7D	QPSK	0.155	21.89
		1M09W7D	16QAM	0.128	21.08
		1M10W7D	64QAM	0.101	20.04
		1M10W7D	256QAM	0.050	16.97
LTE – Band2 (3)	1851.5 - 1908.5	2M71G7D	QPSK	0.154	21.86
		2M71W7D	16QAM	0.127	21.04
		2M71W7D	64QAM	0.100	20.01
		2M71W7D	256QAM	0.049	16.94
LTE – Band2 (5)	1852.5 - 1907.5	4M51G7D	QPSK	0.159	22.00
		4M51W7D	16QAM	0.133	21.24
		4M50W7D	64QAM	0.103	20.14
		4M51W7D	256QAM	0.051	17.04
LTE – Band2 (10)	1855.0 - 1905.0	9M00G7D	QPSK	0.163	22.12
		8M97W7D	16QAM	0.135	21.29
		9M01W7D	64QAM	0.106	20.26
		9M00W7D	256QAM	0.053	17.21
LTE – Band2 (15)	1857.5 - 1902.5	13M5G7D	QPSK	0.161	22.08
		13M5W7D	16QAM	0.133	21.24
		13M5W7D	64QAM	0.104	20.18
		13M5W7D	256QAM	0.051	17.08
LTE – Band2 (20)	1860.0 - 1900.0	17M9G7D	QPSK	0.159	22.02
		18M0W7D	16QAM	0.129	21.11
		18M0W7D	64QAM	0.102	20.07
		17M9W7D	256QAM	0.050	16.99

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a Mobile Phone with GSM/GPRS/EGPRS/UMTS and LTE, Sub 6. It also supports IEEE 802.11 a/b/g/n/ac/ax (20/40/80/160 MHz), Bluetooth(iPA, ePA), BT LE(iPA, ePA), NFC, WPT, WIFI 6E.

2.2. MEASURING INSTRUMENT CALIBRATION

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

2.3. TEST FACILITY

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

3. DESCRIPTION OF TESTS

3.1 TEST PROCEDURE

Test Description	Test Procedure Used
Occupied Bandwidth	- KDB 971168 D01 v03r01 – Section 4.3 - ANSI C63.26-2015 – Section 5.4.4
Band Edge	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Spurious and Harmonic Emissions at Antenna Terminal	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Conducted Output Power	- N/A (See SAR Report)
Peak- to- Average Ratio	- KDB 971168 D01 v03r01 – Section 5.7 - ANSI C63.26-2015 – Section 5.2.3.4
Frequency stability	- ANSI C63.26-2015 – Section 5.6
Effective Radiated Power/ Effective Isotropic Radiated Power	- KDB 971168 D01 v03r01 – Section 5.2 & 5.8 - ANSI/TIA-603-E-2016 – Section 2.2.17
Radiated Spurious and Harmonic Emissions	- KDB 971168 D01 v03r01 – Section 6.2 - ANSI/TIA-603-E-2016 – Section 2.2.12

3.2 RADIATED POWER

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

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

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5 % of the expected OBW, not to exceed 1 MHz
3. VBW \geq 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points > 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

Test Note

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

The power is calculated by the following formula;

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

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

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

3.3 RADIATED SPURIOUS EMISSIONS

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

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

Test Settings

1. RBW = 100 kHz for emissions below 1 GHz and 1 MHz for emissions above 1 GHz
2. VBW \geq 3 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 10th harmonics from 9 kHz.

Test Note

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

The spurious emissions is calculated by the following formula;

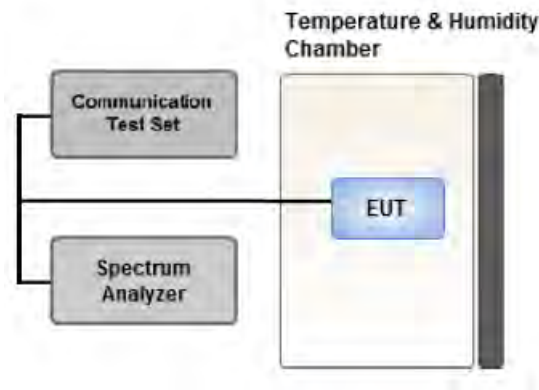
$$\text{Result}_{(dBm)} = P_g_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dBi)}$$

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

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

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

3.4 PEAK- TO- AVERAGE RATIO



Test setup

① CCDF Procedure for PAPR

Test Settings

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

② Alternate Procedure for PAPR

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

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

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

Test Settings(Peak Power)

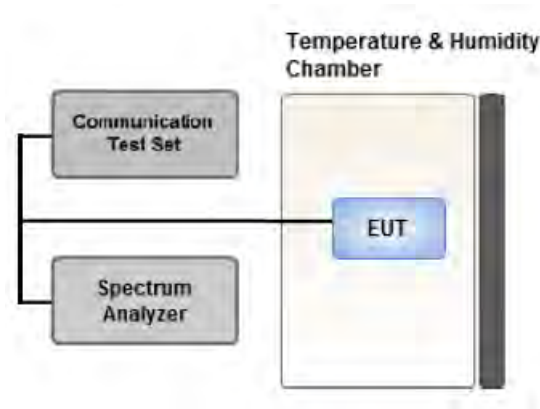
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW $\geq 3 \times$ RBW.

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

Test Settings(Average Power)

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

3.5 OCCUPIED BANDWIDTH.



Test setup

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

The EUT makes a call to the communication simulator.

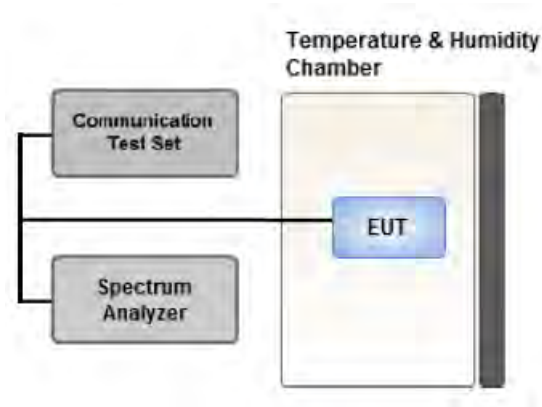
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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

Test Settings

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

3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



Test setup

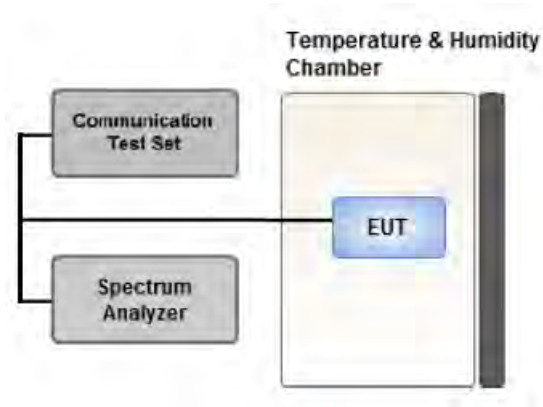
Test Overview

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

Test Settings

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

3.7 BAND EDGE



Test setup

Test Overview

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

Test Settings

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

Test Notes

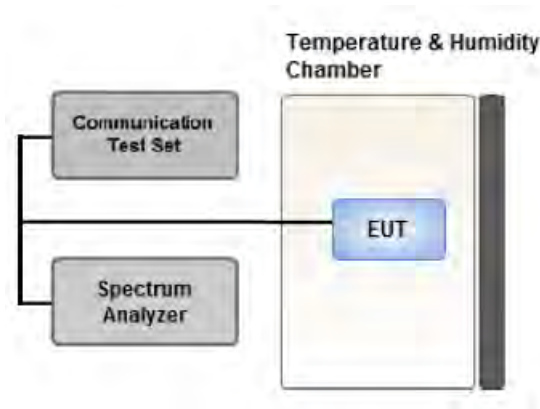
According to FCC 22.917, 24.238, 27.53 specified that power of any emission outside of The authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. In the 1 MHz bands immediately outside and adjacent to the frequency block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

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

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

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

3.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE



Test setup

Test Overview

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

The frequency stability of the transmitter is measured by:

1. Temperature:

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

2. Primary Supply Voltage:

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

Test Settings

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

3.9 WORST CASE(RADIATED TEST)

- The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
- All modes of operation were investigated and the worst case configuration results are reported.
 Mode : Stand alone, Stand alone + External accessories (Earphone, AC adapter, etc.)
 Worst case : Stand alone
- We were performed the RSE test in condition of co-location.
 Mode : Stand alone, Simultaneous transmission scenarios
 Worst case : Stand alone
- In the case of radiated spurious emissions, all bandwidth of operation was investigated and the worst case bandwidth results are reported. (Worst case :10 MHz(Main 1 Ant), 10 MHz(Sub 5 Ant))
- The EUT was tested in three modes(Open, Half-open, Closed), the worst case configuration results are reported.
 Worst case: Main 1 Ant, Sub 5 Ant: Half-open.
- The worst case is reported with the EUT positioning, modulations, and paging service configurations shown in the test data.
- Please refer to the table below.

[Main 1 Ant Worst case]

Test Description	Modulation	RB size	RB offset	Axis
Effective isotropic Radiated Power	QPSK, 16QAM, 64QAM, 256QAM	See Section 8.1		X
Radiated Spurious and Harmonic Emissions	QPSK	See Section 8.2		Y

[Sub 5 Ant Worst case]

Test Description	Modulation	RB size	RB offset	Axis
Effective isotropic Radiated Power	QPSK, 16QAM, 64QAM, 256QAM	See Section 9.1		Y
Radiated Spurious and Harmonic Emissions	QPSK	See Section 9.2		Y

3.10 WORST CASE(CONDUCTED TEST)

[Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset		
Occupied Bandwidth	QPSK, 16QAM, 64QAM, 256QAM	1.4, 3, 5, 10, 15, 20	Mid	Full RB	0		
Peak-To-Average Ratio	QPSK, 16QAM, 64QAM, 256QAM	1.4, 3, 5, 10, 15, 20	Mid	Full RB	0		
Band Edge	QPSK	1.4	Low	1	0		
			High	1	5		
		3	Low	1	0		
			High	1	14		
		5	Low	1	0		
			High	1	24		
		10	Low	1	0		
			High	1	49		
		15	Low	1	0		
			High	1	74		
		20	Low	1	0		
			High	1	99		
				1.4, 3, 5, 10, 15, 20	Low, High	Full RB	0
		Spurious and Harmonic Emissions at Antenna Terminal	QPSK	1.4, 3, 5, 10, 15, 20	Low, Mid, High	1	0

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

4. LIST OF TEST EQUIPMENT

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
RF Switching System	FBSR-02B(1.2G HPF+LNA)	T&M SYSTEM	F1L1	12/11/2024	Annual
RF Switching System	FBSR-02B(3.3G HPF+LNA)	T&M SYSTEM	F1L2	12/11/2024	Annual
Power Splitter(DC ~ 26.5 GHz)	11667B	Hewlett Packard	5001	04/17/2025	Annual
DC Power Supply	E3632A	Agilent	MY40010147	06/23/2024	Annual
Dipole Antenna	UHAP	Schwarzbeck	557	03/09/2025	Biennial
Dipole Antenna	UHAP	Schwarzbeck	558	03/09/2025	Biennial
Chamber	SU-642	ESPEC	93008124	02/19/2025	Annual
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	147	08/17/2025	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	9120D-1298	09/11/2025	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/29/2024	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170124	03/28/2025	Biennial
Signal Analyzer(10 Hz ~ 26.5 GHz)	N9020A	Agilent	MY52090906	04/19/2025	Annual
ATTENUATOR(20 dB)	8493C	Hewlett Packard	17280	04/17/2025	Annual
Spectrum Analyzer(10 Hz ~ 40 GHz)	FSV40	REOHDE & SCHWARZ	100931	08/17/2024	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/10/2024	Annual
Loop Antenna(9 kHz ~ 30 MHz)	FMZB1513	Schwarzbeck	1513-333	03/07/2026	Biennial
Trilog Broadband Antenna	VULB9168	Schwarzbeck	895	09/16/2024	Biennial
Trilog Broadband Antenna	VULB9168	Schwarzbeck	1135	09/16/2024	Biennial
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262094331	11/17/2024	Annual
Wideband Radio Communication Tester	MT8820C	Anritsu Corp.	6201026545	12/11/2024	Annual
SIGNAL GENERATOR (100 kHz ~ 40 GHz)	SMB100A	REOHDE & SCHWARZ	177633	06/22/2024	Annual
Signal Analyzer(5 Hz ~ 40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/24/2024	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	HCT CO., LTD.,	-	-	-

Note:

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

5. MEASUREMENT UNCERTAINTY

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

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

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

6. SUMMARY OF TEST RESULTS

6.1 Test Condition: Conducted Test

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

Note:

1. See SAR Report

6.2 Test Condition: Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Equivalent Isotropic Radiated Power	§ 24.232(c)	< 2 Watts max. EIRP	PASS
Radiated Spurious and Harmonic Emissions	§ 2.1053, § 24.238(a)	< 43 + 10log10 (P[Watts]) for all out-of band emissions	PASS

7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

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

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

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

7.2 EIRP Sample Calculation

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

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

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

7.3. Emission Designator

GSM Emission Designator

Emission Designator = 249KGXW

GSM BW = 249 kHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

EDGE Emission Designator

Emission Designator = 249KG7W

GSM BW = 249 kHz

G = Phase Modulation

7 = Quantized/Digital Info

W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M17F9W

WCDMA BW = 4.17 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

QPSK Modulation

Emission Designator = 4M48G7D

LTE BW = 4.48 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

QAM Modulation

Emission Designator = 4M48W7D

LTE BW = 4.48 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

8. TEST DATA (Main 1 Ant)

8.1 EQUIVALENT ISOTROPIC RADIATED POWER

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
								W	W	dBm	Size	Offset
1850.7	LTE B2/ 1.4 MHz	QPSK	-19.01	14.88	10.31	2.30	H	< 2.00	0.195	22.89	1	0
		16-QAM	-19.85	14.04	10.31	2.30	H		0.160	22.05		
		64-QAM	-20.87	13.02	10.31	2.30	H		0.127	21.03		
		256-QAM	-23.90	9.99	10.31	2.30	H		0.063	18.00		
1880.0		QPSK	-19.68	15.02	10.35	2.33	H		0.201	23.04	1	0
		16-QAM	-20.47	14.23	10.35	2.33	H		0.168	22.25		
		64-QAM	-21.50	13.20	10.35	2.33	H		0.132	21.22		
		256-QAM	-24.58	10.12	10.35	2.33	H		0.065	18.14		
1909.3		QPSK	-19.93	14.11	10.40	2.29	H		0.167	22.22	1	0
		16-QAM	-20.76	13.28	10.40	2.29	H		0.138	21.39		
		64-QAM	-21.74	12.30	10.40	2.29	H		0.110	20.41		
		256-QAM	-24.68	9.36	10.40	2.29	H		0.056	17.47		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
								W	W	dBm	Size	Offset
1851.5	LTE B2/ 3 MHz	QPSK	-19.18	14.71	10.31	2.30	H	< 2.00	0.187	22.72	1	0
		16-QAM	-19.97	13.92	10.31	2.30	H		0.156	21.93		
		64-QAM	-21.04	12.85	10.31	2.30	H		0.122	20.86		
		256-QAM	-23.97	9.92	10.31	2.30	H		0.062	17.93		
1880.0		QPSK	-19.68	15.02	10.35	2.33	H		0.201	23.04	1	0
		16-QAM	-20.45	14.25	10.35	2.33	H		0.169	22.27		
		64-QAM	-21.51	13.19	10.35	2.33	H		0.132	21.21		
		256-QAM	-24.64	10.06	10.35	2.33	H		0.064	18.08		
1908.5		QPSK	-19.69	14.35	10.40	2.29	H		0.176	22.46	1	0
		16-QAM	-20.48	13.56	10.40	2.29	H		0.147	21.67		
		64-QAM	-21.52	12.52	10.40	2.29	H		0.116	20.63		
		256-QAM	-24.65	9.39	10.40	2.29	H		0.056	17.50		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
								W	W	dBm	Size	Offset
1852.5	LTE B2/ 5 MHz	QPSK	-19.06	14.83	10.31	2.30	H	< 2.00	0.192	22.84	1	0
		16-QAM	-19.85	14.04	10.31	2.30	H		0.160	22.05		
		64-QAM	-20.90	12.99	10.31	2.30	H		0.126	21.00		
		256-QAM	-23.98	9.91	10.31	2.30	H		0.062	17.92		
1880.0		QPSK	-19.51	15.19	10.35	2.33	H		0.209	23.21	1	0
		16-QAM	-20.27	14.43	10.35	2.33	H		0.176	22.45		
		64-QAM	-21.35	13.35	10.35	2.33	H		0.137	21.37		
		256-QAM	-24.55	10.15	10.35	2.33	H		0.066	18.17		
1907.5		QPSK	-19.66	14.38	10.40	2.29	H		0.177	22.49	1	0
		16-QAM	-20.42	13.62	10.40	2.29	H		0.149	21.73		
		64-QAM	-21.52	12.52	10.40	2.29	H		0.116	20.63		
		256-QAM	-24.70	9.34	10.40	2.29	H		0.056	17.45		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
								W	W	dBm	Size	Offset
1855.0	LTE B2/ 10 MHz	QPSK	-19.00	14.91	10.32	2.25	H	< 2.00	0.199	22.98	1	0
		16-QAM	-19.85	14.06	10.32	2.25	H		0.163	22.13		
		64-QAM	-20.89	13.02	10.32	2.25	H		0.128	21.09		
		256-QAM	-23.92	9.99	10.32	2.25	H		0.064	18.06		
1880.0		QPSK	-19.34	15.36	10.35	2.33	H		0.218	23.38	1	0
		16-QAM	-20.20	14.50	10.35	2.33	H		0.179	22.52		
		64-QAM	-21.25	13.45	10.35	2.33	H		0.140	21.47		
		256-QAM	-24.35	10.35	10.35	2.33	H		0.069	18.37		
1905.0		QPSK	-19.56	14.59	10.39	2.30	H		0.186	22.69	1	0
		16-QAM	-20.39	13.76	10.39	2.30	H		0.153	21.86		
		64-QAM	-21.43	12.72	10.39	2.30	H		0.121	20.82		
		256-QAM	-24.57	9.58	10.39	2.30	H		0.059	17.68		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
								W	W	dBm	Size	Offset
1857.5	LTE B2/ 15 MHz	QPSK	-18.95	15.05	10.32	2.26	H	< 2.00	0.205	23.11	1	0
		16-QAM	-19.82	14.18	10.32	2.26	H		0.167	22.24		
		64-QAM	-20.95	13.05	10.32	2.26	H		0.129	21.11		
		256-QAM	-24.08	9.92	10.32	2.26	H		0.063	17.98		
1880.0		QPSK	-19.35	15.35	10.35	2.33	H		0.217	23.37	1	0
		16-QAM	-20.20	14.50	10.35	2.33	H		0.179	22.52		
		64-QAM	-21.23	13.47	10.35	2.33	H		0.141	21.49		
		256-QAM	-24.33	10.37	10.35	2.33	H		0.069	18.39		
1902.5		QPSK	-19.37	14.90	10.38	2.30	H		0.198	22.98	1	0
		16-QAM	-20.30	13.97	10.38	2.30	H		0.160	22.05		
		64-QAM	-21.34	12.93	10.38	2.30	H		0.126	21.01		
		256-QAM	-24.45	9.82	10.38	2.30	H		0.062	17.90		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
								W	W	dBm	Size	Offset
1860.0	LTE B2/ 20 MHz	QPSK	-18.97	15.03	10.32	2.26	H	< 2.00	0.204	23.09	1	0
		16-QAM	-19.94	14.06	10.32	2.26	H		0.163	22.12		
		64-QAM	-20.93	13.07	10.32	2.26	H		0.130	21.13		
		256-QAM	-24.08	9.92	10.32	2.26	H		0.063	17.98		
1880.0		QPSK	-19.36	15.34	10.35	2.33	H		0.217	23.36	1	0
		16-QAM	-20.22	14.48	10.35	2.33	H		0.178	22.50		
		64-QAM	-21.28	13.42	10.35	2.33	H		0.139	21.44		
		256-QAM	-24.34	10.36	10.35	2.33	H		0.069	18.38		
1900.0		QPSK	-19.23	15.04	10.38	2.30	H		0.205	23.12	1	0
		16-QAM	-20.07	14.20	10.38	2.30	H		0.169	22.28		
		64-QAM	-21.08	13.19	10.38	2.30	H		0.134	21.27		
		256-QAM	-24.21	10.06	10.38	2.30	H		0.065	18.14		

8.2 RADIATED SPURIOUS EMISSIONS

▣ OPERATING FREQUENCY:	<u>1880.0 MHz</u>
▣ MEASURED OUTPUT POWER:	<u>23.38 dBm = 0.218 W</u>
▣ MODE:	<u>LTE B2</u>
▣ MODULATION SIGNAL:	<u>10 MHz QPSK</u>
▣ DISTANCE:	<u>3 meters</u>
▣ LIMIT: $43 + 10 \log_{10}(W) =$	<u>36.38 dBc</u>

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc	RB	
									Size	Offset
18650 (1855.0)	3 710.00	-54.05	12.28	-59.11	3.15	V	-49.98	73.36	1	0
	5 565.00	-54.97	13.05	-53.23	3.93	H	-44.10	67.48		
	7 420.00	-56.57	10.78	-46.34	4.68	V	-40.24	63.62		
18900 (1880.0)	3 760.00	-54.46	12.22	-59.09	3.27	V	-50.14	73.52	1	0
	5 640.00	-56.84	13.12	-54.57	4.07	H	-45.52	68.90		
	7 520.00	-58.00	10.82	-47.19	4.71	V	-41.08	64.46		
19150 (1905.0)	3 810.00	-54.85	12.15	-59.90	3.23	H	-50.98	74.36	1	0
	5 715.00	-57.73	13.08	-55.13	4.16	V	-46.21	69.59		
	7 620.00	-57.24	11.14	-46.89	4.75	H	-40.50	63.88		

8.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
2	1.4 MHz	1880.0	QPSK	6	0	4.45
			16-QAM	6	0	5.56
			64-QAM	6	0	6.43
			256-QAM	6	0	6.90
	3 MHz		QPSK	15	0	4.38
			16-QAM	15	0	5.42
			64-QAM	15	0	6.45
			256-QAM	15	0	6.88
	5 MHz		QPSK	25	0	4.44
			16-QAM	25	0	5.52
			64-QAM	25	0	6.36
			256-QAM	25	0	6.82
	10 MHz		QPSK	50	0	4.52
			16-QAM	50	0	5.56
			64-QAM	50	0	6.42
			256-QAM	50	0	6.80
	15 MHz		QPSK	75	0	4.45
			16-QAM	75	0	5.49
			64-QAM	75	0	6.38
			256-QAM	75	0	6.83
20 MHz	QPSK	100	0	4.51		
	16-QAM	100	0	5.57		
	64-QAM	100	0	6.43		
	256-QAM	100	0	6.85		

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 139 ~ 162.

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	1.0958
			16-QAM	6	0	1.0986
			64-QAM	6	0	1.0974
			256-QAM	6	0	1.0961
	3 MHz		QPSK	15	0	2.7113
			16-QAM	15	0	2.7055
			64-QAM	15	0	2.7075
			256-QAM	15	0	2.7082
	5 MHz		QPSK	25	0	4.5113
			16-QAM	25	0	4.5107
			64-QAM	25	0	4.5065
			256-QAM	25	0	4.5158
	10 MHz		QPSK	50	0	9.0050
			16-QAM	50	0	9.0111
			64-QAM	50	0	8.9973
			256-QAM	50	0	8.9858
	15 MHz		QPSK	75	0	13.487
			16-QAM	75	0	13.512
			64-QAM	75	0	13.539
			256-QAM	75	0	13.500
20 MHz	QPSK	100	0	17.992		
	16-QAM	100	0	18.008		
	64-QAM	100	0	18.027		
	256-QAM	100	0	17.945		

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 115 ~ 138.

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	8.2772	28.591	-70.718	-42.127	-13.00
		1880.0	9.4202	28.591	-70.425	-41.834	
		1909.3	7.4636	28.591	-70.854	-42.263	
	3	1851.5	8.0309	28.591	-70.404	-41.813	
		1880.0	5.4985	28.591	-71.124	-42.533	
		1908.5	8.2862	28.591	-71.119	-42.528	
	5	1852.5	9.4546	28.591	-69.893	-41.302	
		1880.0	4.0654	27.976	-71.110	-43.134	
		1907.5	9.4332	28.591	-70.449	-41.858	
	10	1855.0	7.1331	28.591	-71.029	-42.438	
		1880.0	4.9213	27.976	-70.400	-42.424	
		1905.0	4.0459	27.976	-69.741	-41.765	
	15	1857.5	3.7663	27.976	-70.422	-42.446	
		1880.0	4.0065	27.976	-70.252	-42.276	
		1902.5	4.0409	27.976	-70.566	-42.590	
	20	1860.0	5.4921	28.591	-70.890	-42.299	
		1880.0	9.6840	28.591	-70.394	-41.803	
		1900.0	8.2478	28.591	-70.009	-41.418	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 163 ~ 198.
2. Conducted Spurious Emissions was Tested QPSK Modulation, Resource Block Size 1 and Resource Block Offset 0
3. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
4. Factor (dB) = Cable Loss + Attenuator + Power Splitter

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

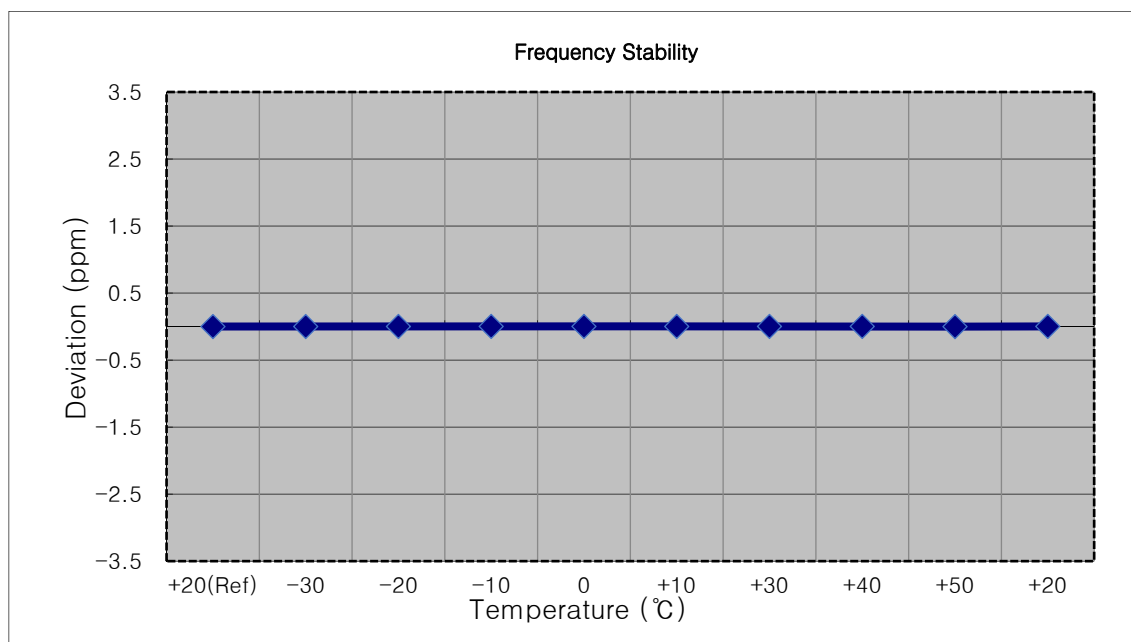
8.6 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 79 ~ 114.

8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

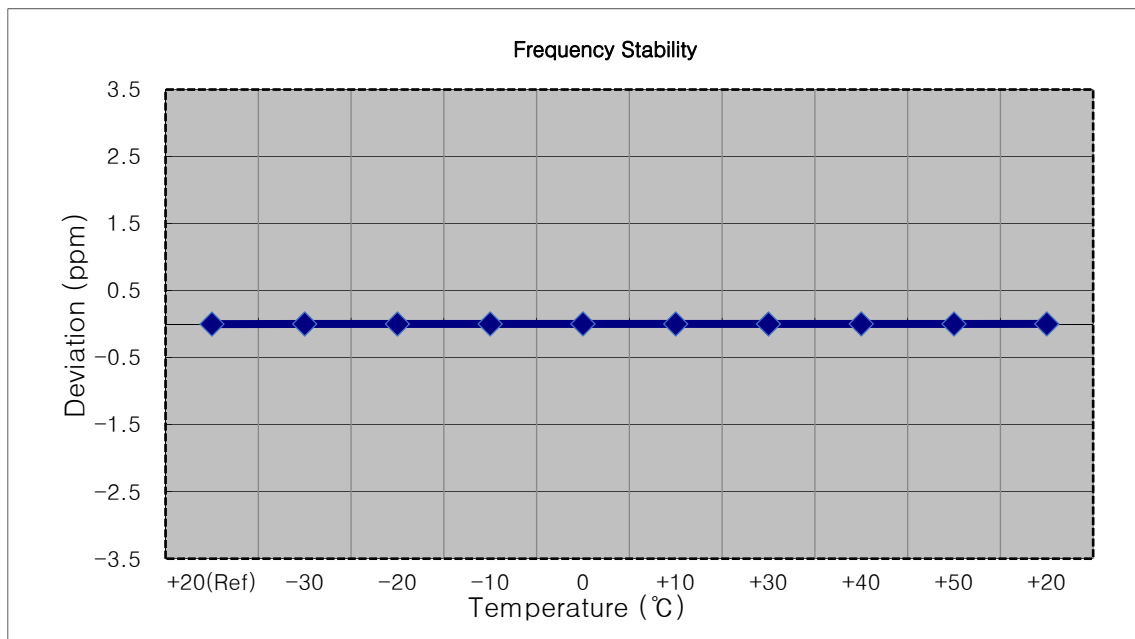
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1850,700,000 Hz
- ▣ CHANNEL: 18607 (1.4 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm	
100 %	3.880	+20(Ref)	1850 700 004	0.0	0.000 000	0.000	
100 %		-30	1850 700 006	1.8	0.000 000	0.001	
100 %		-20	1850 700 007	2.9	0.000 000	0.002	
100 %		-10	1850 700 008	3.8	0.000 000	0.002	
100 %		0	1850 700 008	4.4	0.000 000	0.002	
100 %		+10	1850 700 007	3.0	0.000 000	0.002	
100 %		+30	1850 700 008	4.2	0.000 000	0.002	
100 %		+40	1850 700 008	4.0	0.000 000	0.002	
100 %		+50	1850 700 002	1850 700 002	-2.0	0.000 000	-0.001
Batt. Endpoint		3.300	+20	1850 700 008	4.2	0.000 000	0.002



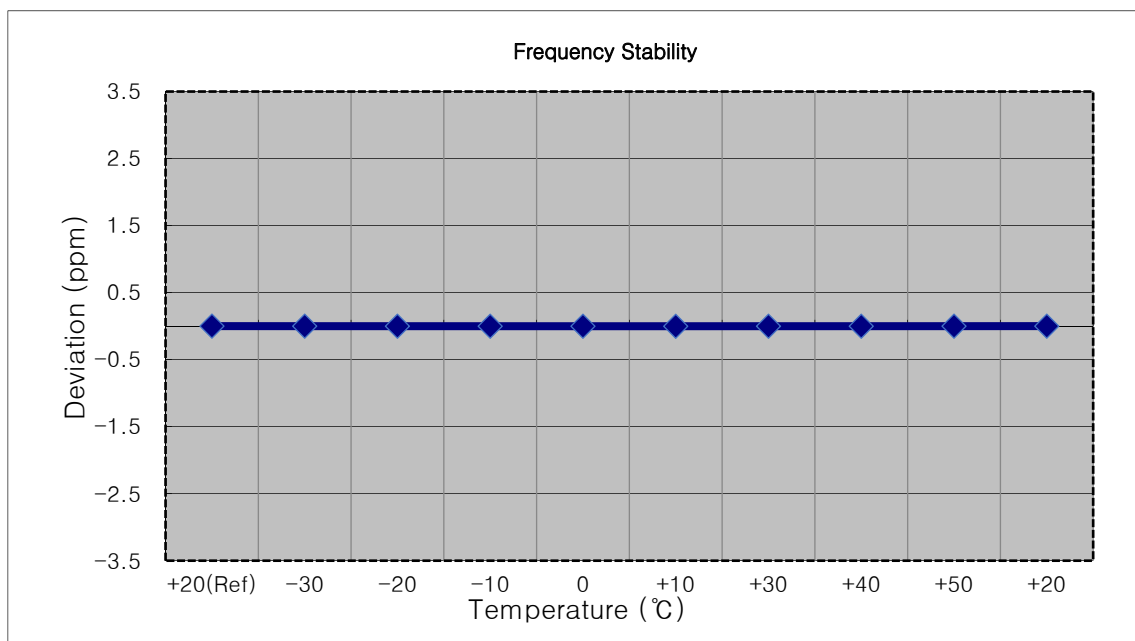
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1851,500,000 Hz
- ▣ CHANNEL: 18615 (3 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1851 500 005	0.0	0.000 000	0.000
100 %		-30	1851 500 009	3.8	0.000 000	0.002
100 %		-20	1851 500 008	2.6	0.000 000	0.001
100 %		-10	1851 500 009	4.1	0.000 000	0.002
100 %		0	1851 500 011	5.9	0.000 000	0.003
100 %		+10	1851 500 009	3.8	0.000 000	0.002
100 %		+30	1851 500 007	2.2	0.000 000	0.001
100 %		+40	1851 500 010	5.0	0.000 000	0.003
100 %		+50	1851 500 008	3.0	0.000 000	0.002
Batt. Endpoint		3.300	+20	1851 500 009	4.1	0.000 000



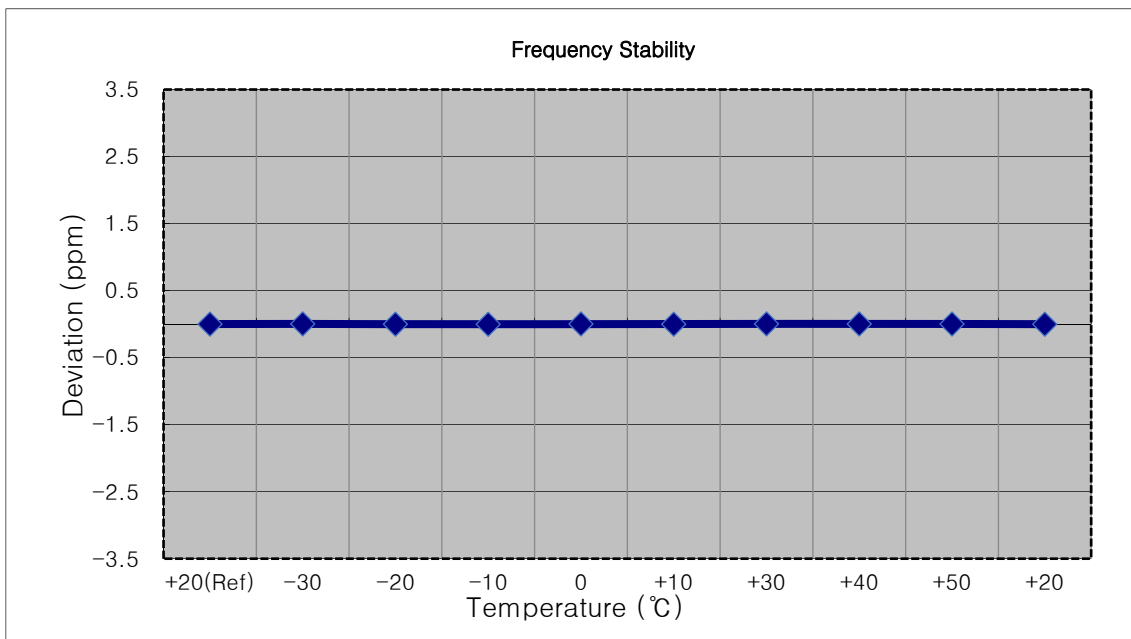
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1852,500,000 Hz
- ▣ CHANNEL: 18625 (5 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1852 500 003	0.0	0.000 000	0.000
100 %		-30	1852 500 000	-2.2	0.000 000	-0.001
100 %		-20	1852 499 999	-3.9	0.000 000	-0.002
100 %		-10	1852 499 999	-3.7	0.000 000	-0.002
100 %		0	1852 500 000	-2.8	0.000 000	-0.002
100 %		+10	1852 499 997	-5.1	0.000 000	-0.003
100 %		+30	1852 499 999	-3.3	0.000 000	-0.002
100 %		+40	1852 500 000	-3.0	0.000 000	-0.002
100 %		+50	1852 500 000	-2.1	0.000 000	-0.001
Batt. Endpoint		3.300	+20	1852 500 001	-2.0	0.000 000



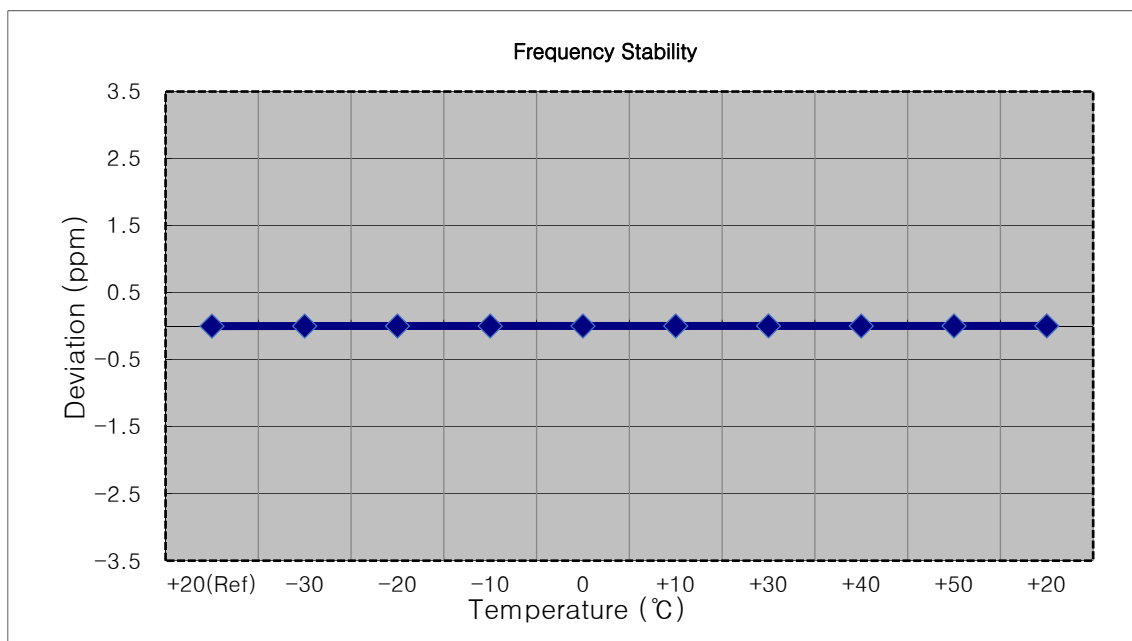
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1855,000,000 Hz
- ▣ CHANNEL: 18650 (10 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1854 999 998	0.0	0.000 000	0.000
100 %		-30	1855 000 003	5.0	0.000 000	0.003
100 %		-20	1854 999 994	-3.6	0.000 000	-0.002
100 %		-10	1854 999 993	-5.0	0.000 000	-0.003
100 %		0	1855 000 002	3.6	0.000 000	0.002
100 %		+10	1854 999 995	-3.2	0.000 000	-0.002
100 %		+30	1855 000 004	5.7	0.000 000	0.003
100 %		+40	1855 000 002	4.0	0.000 000	0.002
100 %		+50	1855 000 001	2.9	0.000 000	0.002
Batt. Endpoint		3.300	+20	1854 999 995	-3.0	0.000 000



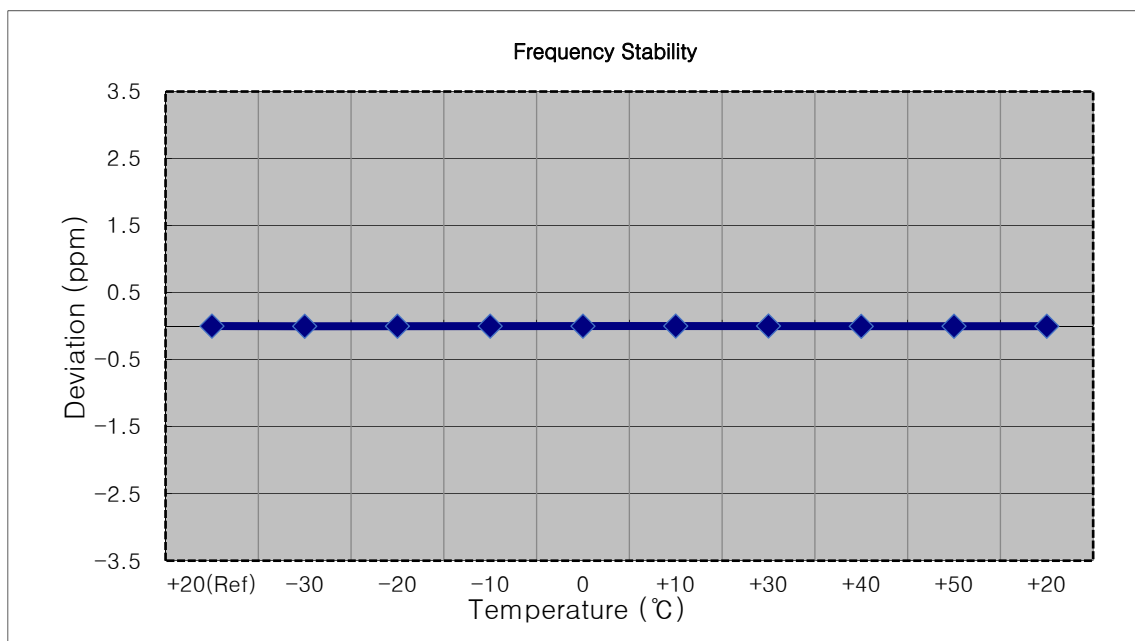
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1857,500,000 Hz
- ▣ CHANNEL: 18675 (15 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1857 500 005	0.0	0.000 000	0.000
100 %		-30	1857 500 006	1.6	0.000 000	0.001
100 %		-20	1857 500 007	2.2	0.000 000	0.001
100 %		-10	1857 500 007	2.2	0.000 000	0.001
100 %		0	1857 500 007	2.9	0.000 000	0.002
100 %		+10	1857 500 008	3.5	0.000 000	0.002
100 %		+30	1857 500 010	5.6	0.000 000	0.003
100 %		+40	1857 500 007	2.6	0.000 000	0.001
100 %		+50	1857 500 008	3.4	0.000 000	0.002
Batt. Endpoint		3.300	+20	1857 500 009	4.7	0.000 000



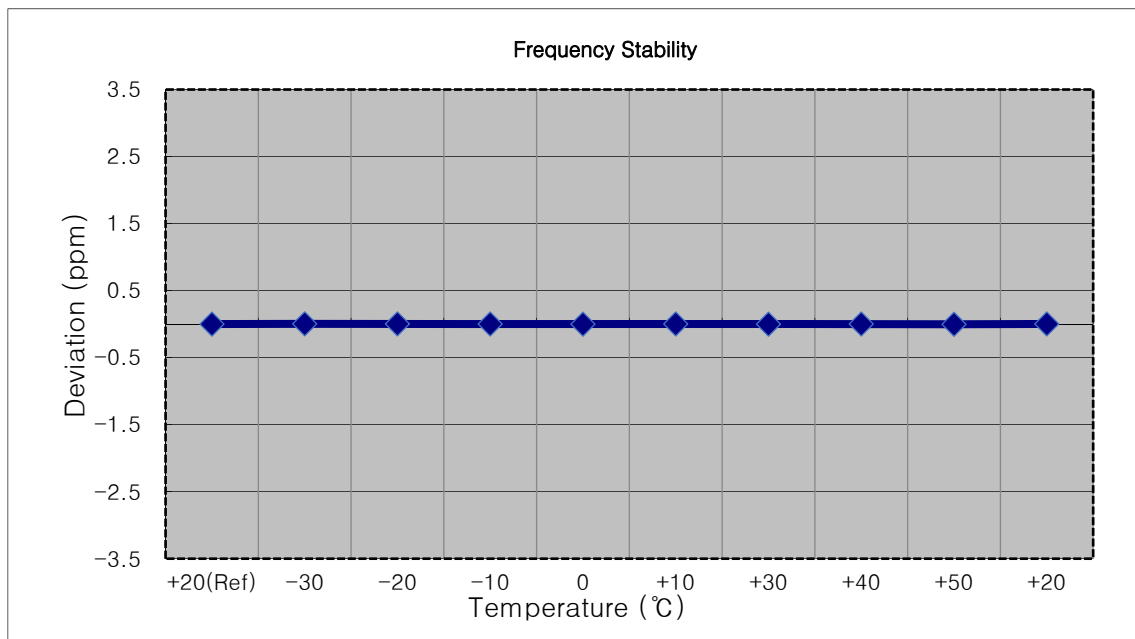
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1860,000,000 Hz
- ▣ CHANNEL: 18700 (20 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1860 000 004	0.0	0.000 000	0.000
100 %		-30	1859 999 998	-5.2	0.000 000	-0.003
100 %		-20	1860 000 001	-2.8	0.000 000	-0.002
100 %		-10	1860 000 001	-2.4	0.000 000	-0.001
100 %		0	1860 000 002	-2.0	0.000 000	-0.001
100 %		+10	1860 000 005	1.3	0.000 000	0.001
100 %		+30	1860 000 006	2.0	0.000 000	0.001
100 %		+40	1859 999 998	-5.8	0.000 000	-0.003
100 %		+50	1860 000 000	-4.0	0.000 000	-0.002
Batt. Endpoint		3.300	+20	1860 000 000	-3.3	0.000 000



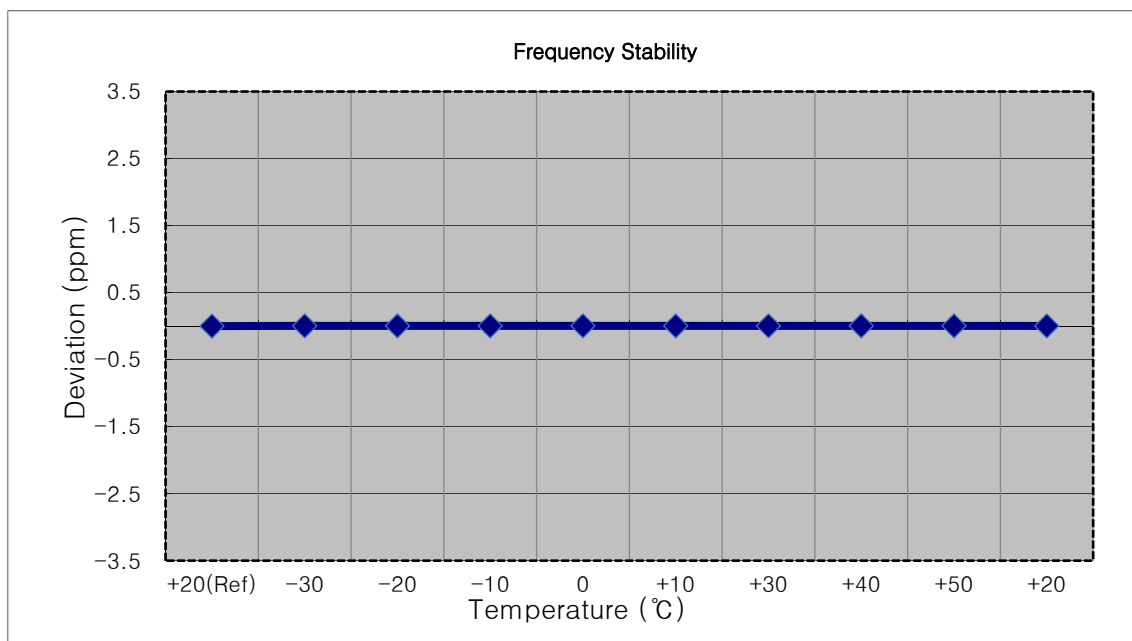
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (1.4 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1880 000 005	0.0	0.000 000	0.000
100 %		-30	1880 000 012	7.4	0.000 000	0.004
100 %		-20	1880 000 011	5.9	0.000 000	0.003
100 %		-10	1880 000 007	2.6	0.000 000	0.001
100 %		0	1880 000 003	-2.3	0.000 000	-0.001
100 %		+10	1880 000 009	3.8	0.000 000	0.002
100 %		+30	1880 000 003	-1.6	0.000 000	-0.001
100 %		+40	1880 000 007	2.5	0.000 000	0.001
100 %		+50	1880 000 000	-4.5	0.000 000	-0.002
Batt. Endpoint		3.300	+20	1880 000 008	3.4	0.000 000



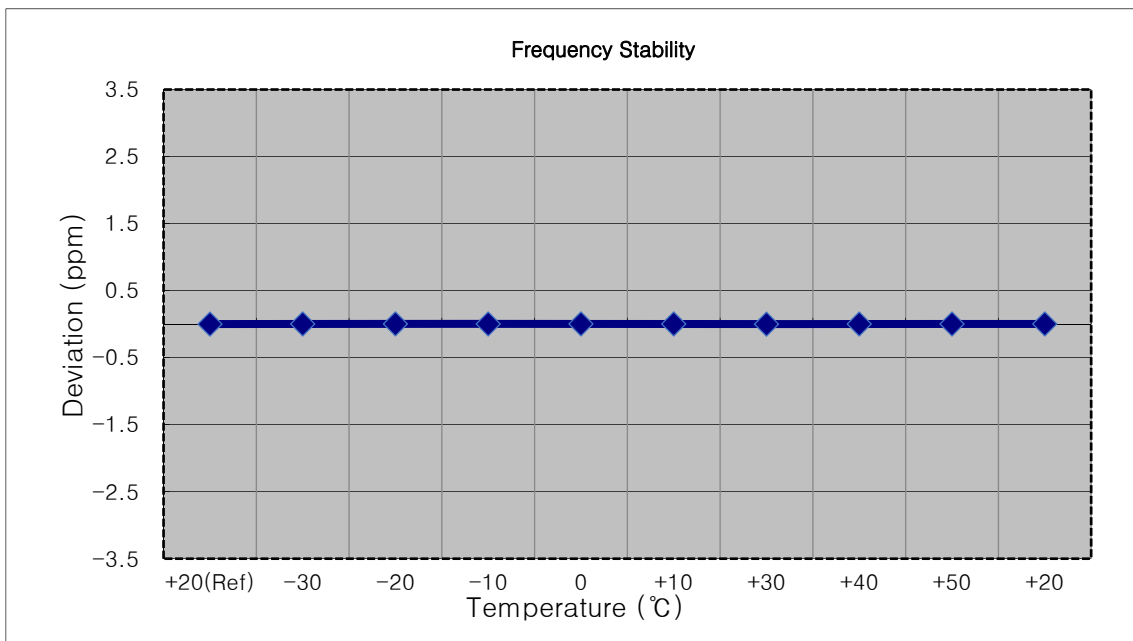
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (3 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1880 000 006	0.0	0.000 000	0.000
100 %		-30	1880 000 012	6.0	0.000 000	0.003
100 %		-20	1880 000 013	7.1	0.000 000	0.004
100 %		-10	1880 000 010	3.5	0.000 000	0.002
100 %		0	1880 000 013	6.6	0.000 000	0.004
100 %		+10	1880 000 012	6.0	0.000 000	0.003
100 %		+30	1880 000 012	6.3	0.000 000	0.003
100 %		+40	1880 000 013	6.7	0.000 000	0.004
100 %		+50	1880 000 011	5.0	0.000 000	0.003
Batt. Endpoint		3.300	+20	1880 000 012	5.6	0.000 000



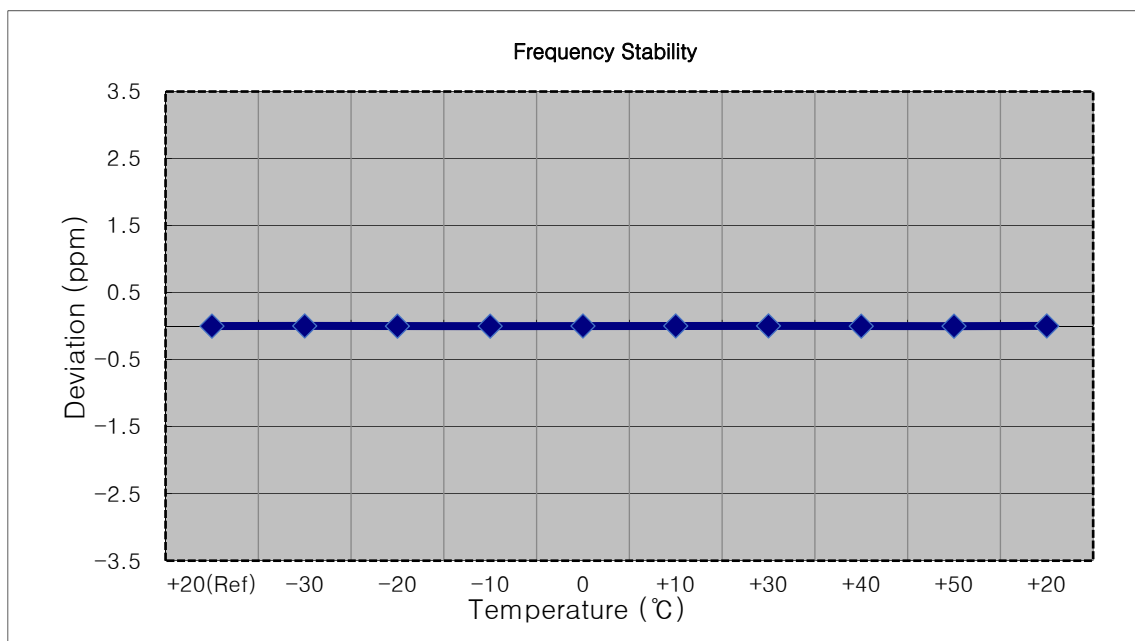
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (5 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1880 000 002	0.0	0.000 000	0.000
100 %		-30	1880 000 006	3.9	0.000 000	0.002
100 %		-20	1880 000 007	4.9	0.000 000	0.003
100 %		-10	1880 000 007	4.3	0.000 000	0.002
100 %		0	1880 000 008	5.5	0.000 000	0.003
100 %		+10	1880 000 006	3.8	0.000 000	0.002
100 %		+30	1880 000 000	-2.3	0.000 000	-0.001
100 %		+40	1880 000 005	3.1	0.000 000	0.002
100 %		+50	1880 000 005	2.8	0.000 000	0.001
Batt. Endpoint		3.300	+20	1880 000 005	3.2	0.000 000



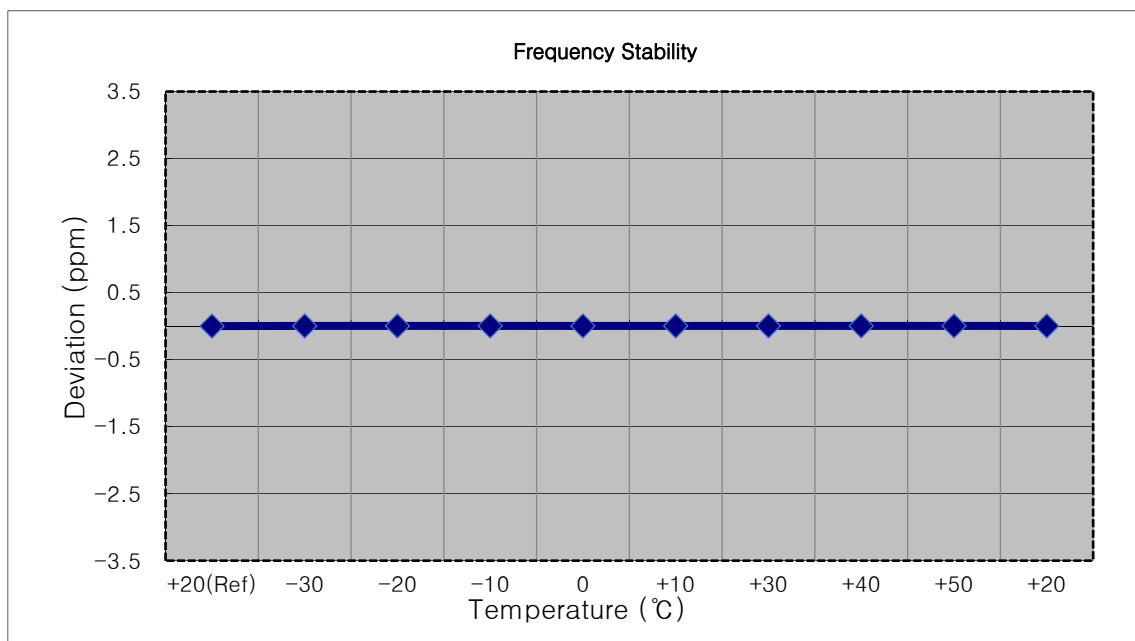
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (10 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1880 000 003	0.0	0.000 000	0.000
100 %		-30	1880 000 008	4.6	0.000 000	0.002
100 %		-20	1880 000 002	-1.8	0.000 000	-0.001
100 %		-10	1880 000 001	-2.7	0.000 000	-0.001
100 %		0	1880 000 006	2.3	0.000 000	0.001
100 %		+10	1880 000 007	3.2	0.000 000	0.002
100 %		+30	1880 000 008	4.7	0.000 000	0.002
100 %		+40	1880 000 001	-2.1	0.000 000	-0.001
100 %		+50	1880 000 001	-2.1	0.000 000	-0.001
Batt. Endpoint		3.300	+20	1880 000 008	4.5	0.000 000



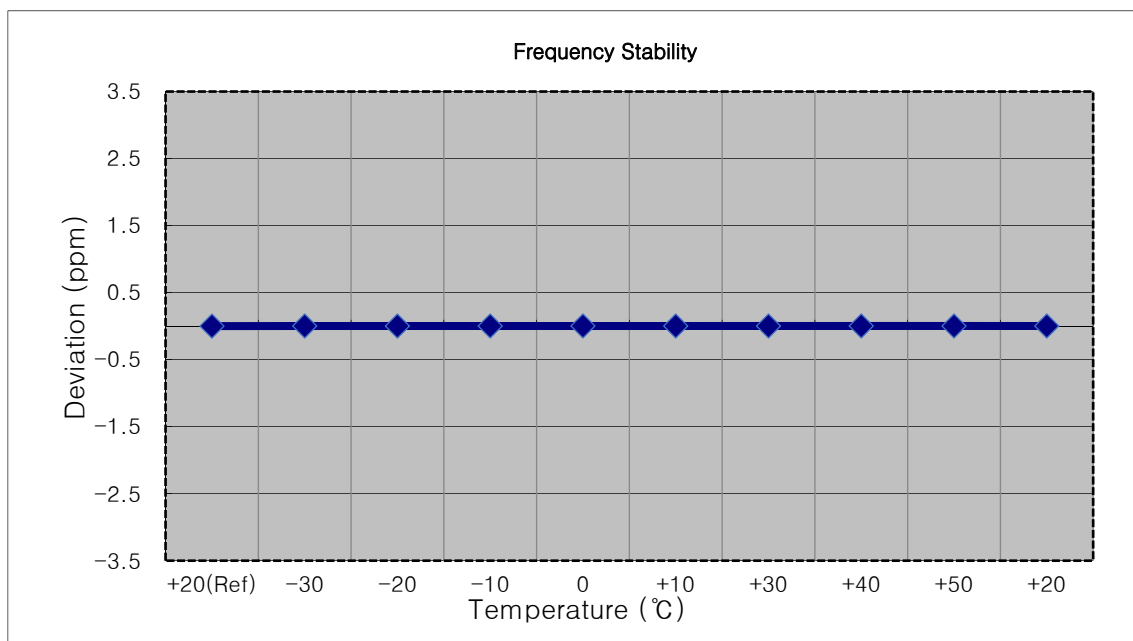
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (15 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1880 000 004	0.0	0.000 000	0.000
100 %		-30	1880 000 008	4.2	0.000 000	0.002
100 %		-20	1880 000 008	4.1	0.000 000	0.002
100 %		-10	1880 000 009	5.0	0.000 000	0.003
100 %		0	1880 000 007	3.3	0.000 000	0.002
100 %		+10	1880 000 008	4.5	0.000 000	0.002
100 %		+30	1880 000 009	4.9	0.000 000	0.003
100 %		+40	1880 000 009	5.0	0.000 000	0.003
100 %		+50	1880 000 009	5.1	0.000 000	0.003
Batt. Endpoint		3.300	+20	1880 000 008	3.9	0.000 000



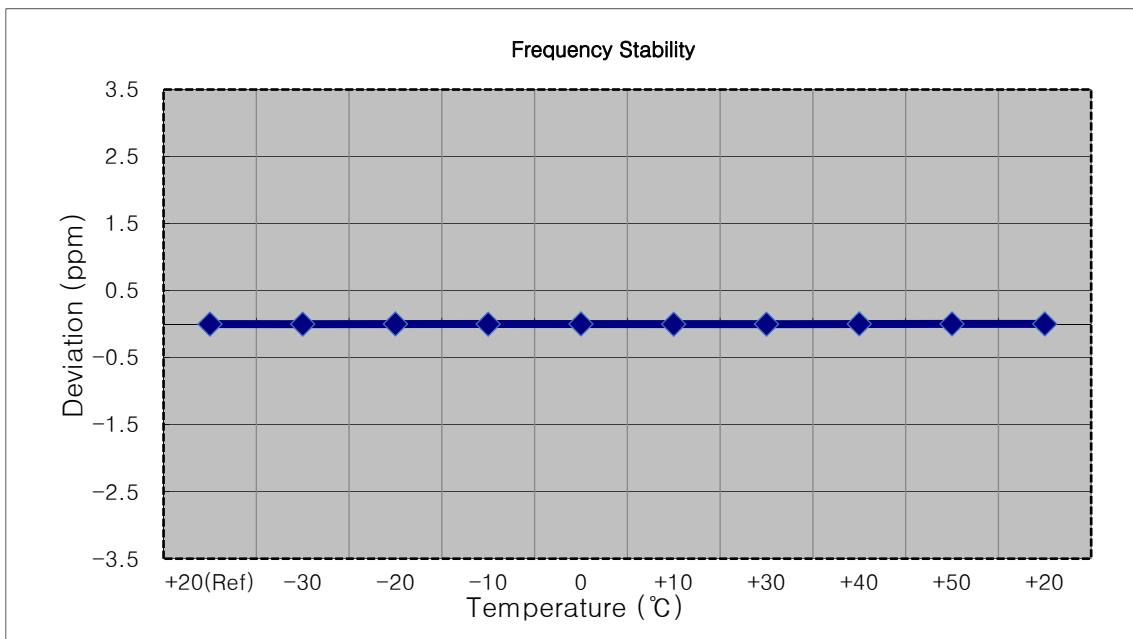
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (20 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1880 000 005	0.0	0.000 000	0.000
100 %		-30	1880 000 007	2.0	0.000 000	0.001
100 %		-20	1880 000 007	1.5	0.000 000	0.001
100 %		-10	1880 000 007	2.1	0.000 000	0.001
100 %		0	1880 000 009	3.7	0.000 000	0.002
100 %		+10	1880 000 008	3.0	0.000 000	0.002
100 %		+30	1880 000 007	2.2	0.000 000	0.001
100 %		+40	1880 000 010	4.5	0.000 000	0.002
100 %		+50	1880 000 008	2.6	0.000 000	0.001
Batt. Endpoint		3.300	+20	1880 000 007	2.0	0.000 000



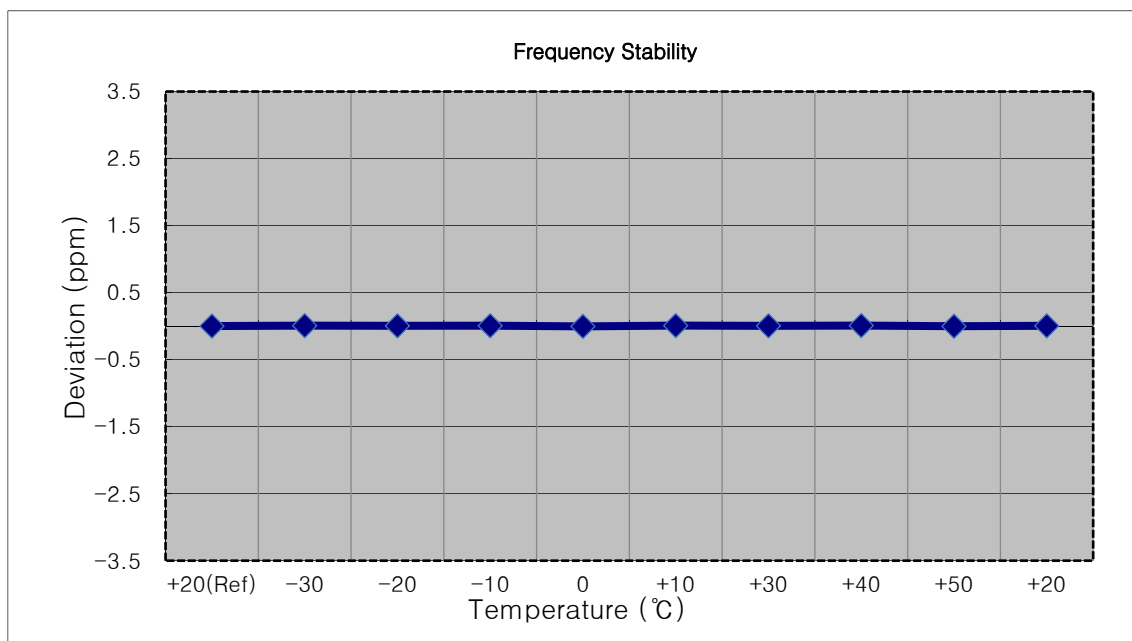
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1909,300,000 Hz
- ▣ CHANNEL: 19193 (1.4 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1909 300 004	0.0	0.000 000	0.000
100 %		-30	1909 300 001	-2.8	0.000 000	-0.001
100 %		-20	1909 300 009	4.5	0.000 000	0.002
100 %		-10	1909 300 002	-2.5	0.000 000	-0.001
100 %		0	1909 300 008	4.1	0.000 000	0.002
100 %		+10	1909 300 000	-4.2	0.000 000	-0.002
100 %		+30	1909 300 001	-2.6	0.000 000	-0.001
100 %		+40	1909 300 009	5.0	0.000 000	0.003
100 %		+50	1909 300 009	5.2	0.000 000	0.003
Batt. Endpoint		3.300	+20	1909 300 008	4.4	0.000 000



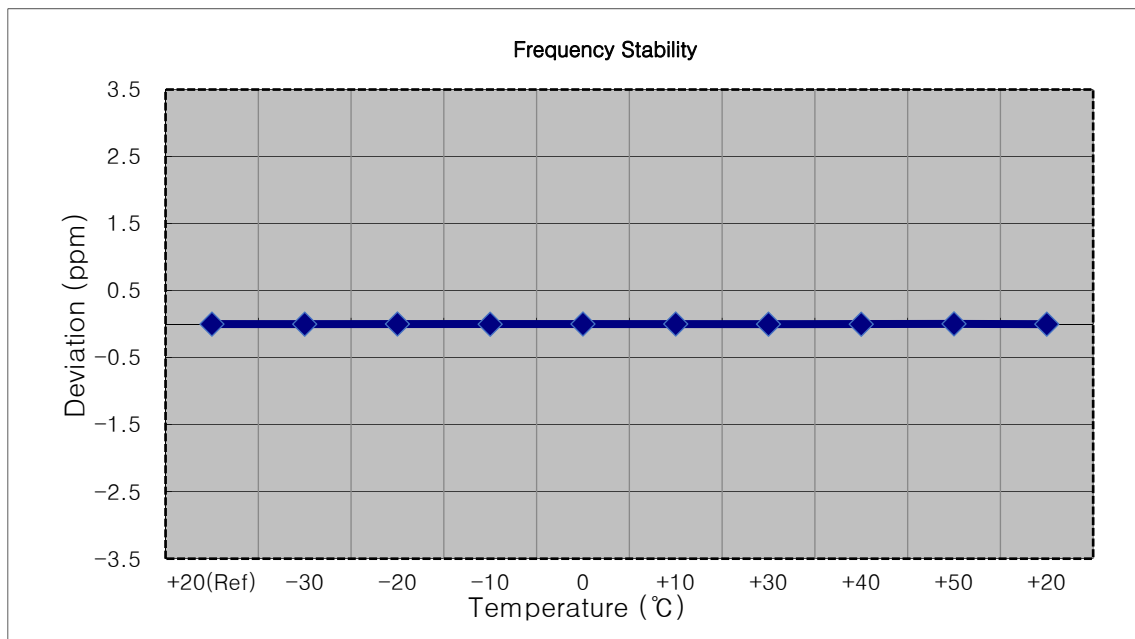
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1908,500,000 Hz
- ▣ CHANNEL: 19185 (3 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1908 500 014	0.0	0.000 000	0.000
100 %		-30	1908 500 026	11.9	0.000 001	0.006
100 %		-20	1908 500 022	7.3	0.000 000	0.004
100 %		-10	1908 500 025	10.6	0.000 001	0.006
100 %		0	1908 500 007	-7.7	0.000 000	-0.004
100 %		+10	1908 500 028	13.3	0.000 001	0.007
100 %		+30	1908 500 021	6.6	0.000 000	0.003
100 %		+40	1908 500 029	14.6	0.000 001	0.008
100 %		+50	1908 500 009	-5.0	0.000 000	-0.003
Batt. Endpoint		3.300	+20	1908 500 022	7.2	0.000 000



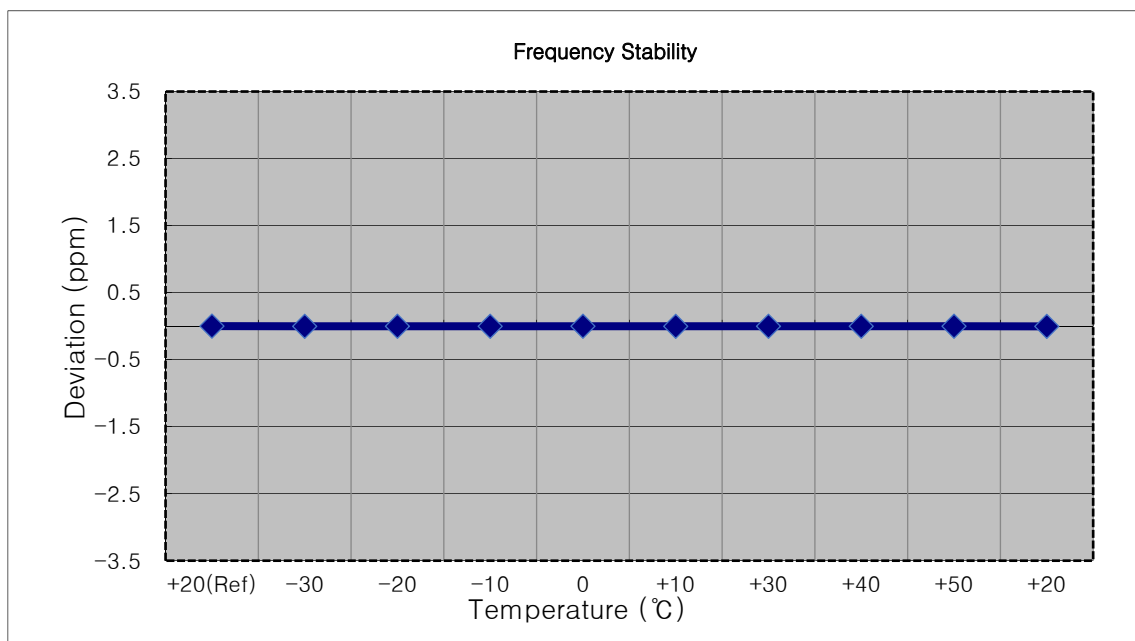
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1907,500,000 Hz
- ▣ CHANNEL: 19175 (5 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1907 499 997	0.0	0.000 000	0.000
100 %		-30	1907 499 996	-1.5	0.000 000	-0.001
100 %		-20	1907 499 999	2.0	0.000 000	0.001
100 %		-10	1907 499 993	-3.7	0.000 000	-0.002
100 %		0	1907 499 999	2.1	0.000 000	0.001
100 %		+10	1907 500 000	2.8	0.000 000	0.001
100 %		+30	1907 499 994	-2.8	0.000 000	-0.001
100 %		+40	1907 499 994	-2.9	0.000 000	-0.002
100 %		+50	1907 500 003	6.0	0.000 000	0.003
Batt. Endpoint		3.300	+20	1907 499 994	-2.6	0.000 000



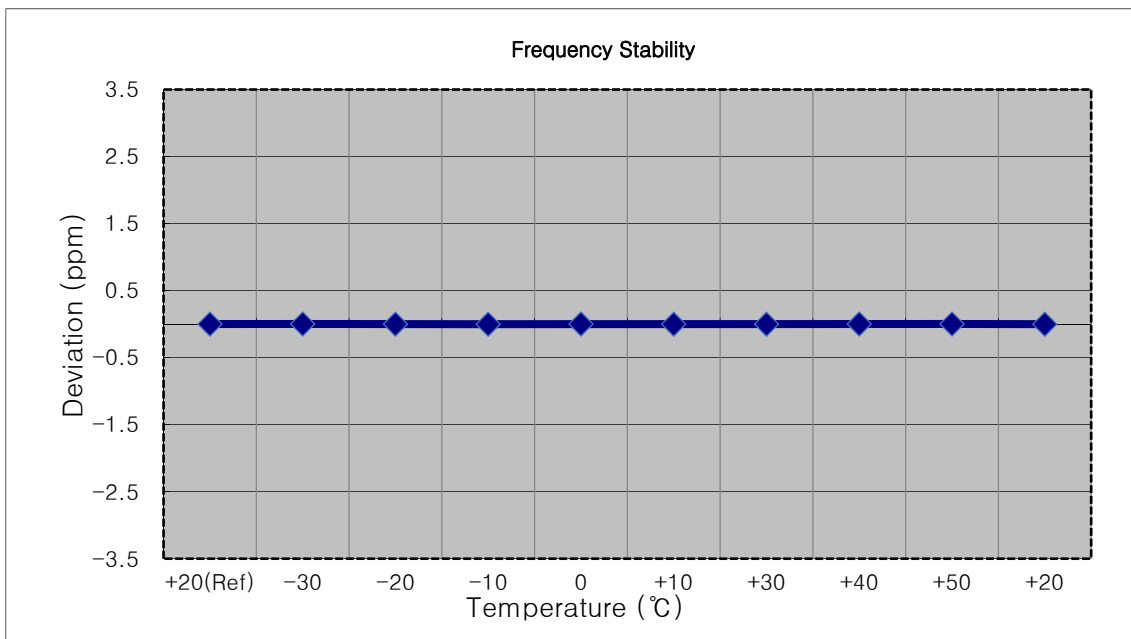
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1905,000,000 Hz
- ▣ CHANNEL: 19150 (10 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1904 999 995	0.0	0.000 000	0.000
100 %		-30	1904 999 989	-6.1	0.000 000	-0.003
100 %		-20	1904 999 989	-5.4	0.000 000	-0.003
100 %		-10	1904 999 990	-4.4	0.000 000	-0.002
100 %		0	1904 999 991	-3.4	0.000 000	-0.002
100 %		+10	1904 999 988	-7.2	0.000 000	-0.004
100 %		+30	1904 999 989	-5.6	0.000 000	-0.003
100 %		+40	1904 999 990	-4.8	0.000 000	-0.003
100 %		+50	1904 999 991	-4.0	0.000 000	-0.002
Batt. Endpoint		3.300	+20	1904 999 987	-8.1	0.000 000



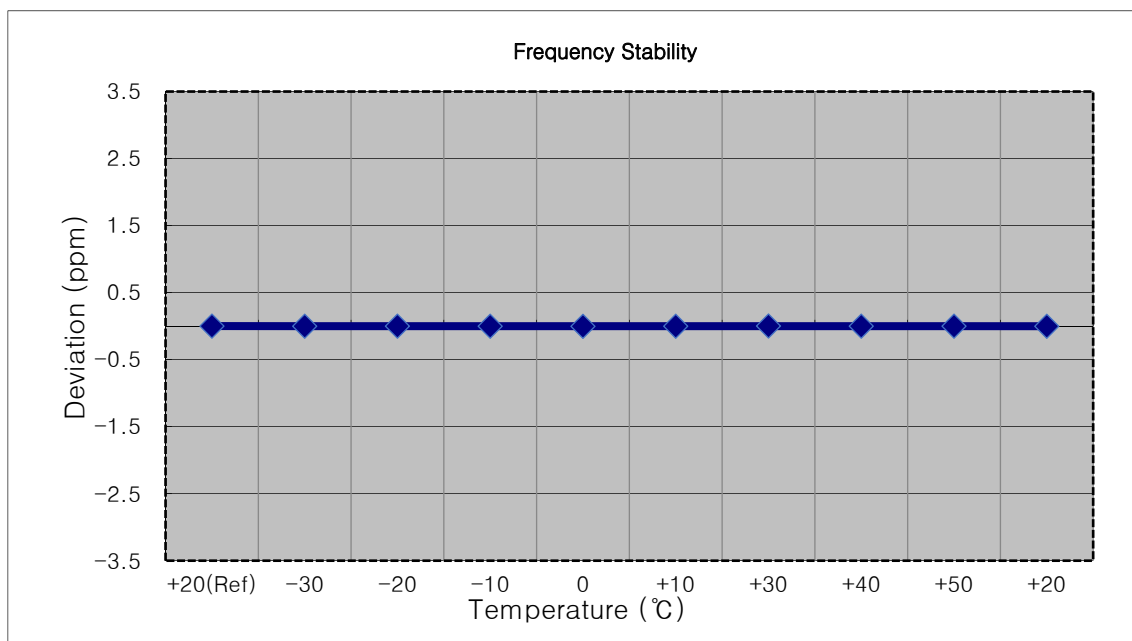
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1902,500,000 Hz
- ▣ CHANNEL: 19125 (15 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1902 500 004	0.0	0.000 000	0.000
100 %		-30	1902 500 007	2.5	0.000 000	0.001
100 %		-20	1902 500 001	-2.6	0.000 000	-0.001
100 %		-10	1902 500 000	-4.5	0.000 000	-0.002
100 %		0	1902 500 007	3.2	0.000 000	0.002
100 %		+10	1902 500 001	-3.2	0.000 000	-0.002
100 %		+30	1902 500 000	-3.7	0.000 000	-0.002
100 %		+40	1902 500 007	2.5	0.000 000	0.001
100 %		+50	1902 500 007	2.8	0.000 000	0.001
Batt. Endpoint		3.300	+20	1902 500 001	-3.2	0.000 000



- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1900,000,000 Hz
- ▣ CHANNEL: 19100 (20 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1899 999 997	0.0	0.000 000	0.000
100 %		-30	1899 999 994	-3.1	0.000 000	-0.002
100 %		-20	1899 999 994	-2.7	0.000 000	-0.001
100 %		-10	1899 999 993	-3.5	0.000 000	-0.002
100 %		0	1899 999 990	-7.1	0.000 000	-0.004
100 %		+10	1899 999 994	-2.9	0.000 000	-0.002
100 %		+30	1899 999 999	2.3	0.000 000	0.001
100 %		+40	1899 999 994	-2.6	0.000 000	-0.001
100 %		+50	1899 999 995	-2.4	0.000 000	-0.001
Batt. Endpoint		3.300	+20	1899 999 992	-4.7	0.000 000



9. TEST DATA (Sub 5 Ant)

9.1 EQUIVALENT ISOTROPIC RADIATED POWER

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
								W	W	dBm	Size	Offset
1850.7	LTE B2/ 1.4 MHz	QPSK	-20.23	13.66	10.31	2.30	H	< 2.00	0.147	21.67	1	0
		16-QAM	-21.04	12.85	10.31	2.30	H		0.122	20.86		
		64-QAM	-22.04	11.85	10.31	2.30	H		0.097	19.86		
		256-QAM	-25.08	8.81	10.31	2.30	H		0.048	16.82		
1880.0		QPSK	-20.83	13.87	10.35	2.33	H		0.155	21.89	1	0
		16-QAM	-21.64	13.06	10.35	2.33	H		0.128	21.08		
		64-QAM	-22.68	12.02	10.35	2.33	H		0.101	20.04		
		256-QAM	-25.75	8.95	10.35	2.33	H		0.050	16.97		
1909.3		QPSK	-21.22	12.82	10.40	2.29	H		0.124	20.93	1	0
		16-QAM	-22.05	11.99	10.40	2.29	H		0.102	20.10		
		64-QAM	-23.04	11.00	10.40	2.29	H		0.082	19.11		
		256-QAM	-26.09	7.95	10.40	2.29	H		0.040	16.06		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
								W	W	dBm	Size	Offset
1851.5	LTE B2/ 3 MHz	QPSK	-20.26	13.63	10.31	2.30	H	< 2.00	0.146	21.64	1	0
		16-QAM	-21.02	12.87	10.31	2.30	H		0.122	20.88		
		64-QAM	-22.07	11.82	10.31	2.30	H		0.096	19.83		
		256-QAM	-25.16	8.73	10.31	2.30	H		0.047	16.74		
1880.0		QPSK	-20.86	13.84	10.35	2.33	H		0.153	21.86	1	0
		16-QAM	-21.68	13.02	10.35	2.33	H		0.127	21.04		
		64-QAM	-22.71	11.99	10.35	2.33	H		0.100	20.01		
		256-QAM	-25.78	8.92	10.35	2.33	H		0.049	16.94		
1908.5		QPSK	-21.18	12.86	10.40	2.29	H		0.125	20.97	1	0
		16-QAM	-21.95	12.09	10.40	2.29	H		0.105	20.20		
		64-QAM	-22.99	11.05	10.40	2.29	H		0.082	19.16		
		256-QAM	-26.07	7.97	10.40	2.29	H		0.041	16.08		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
								W	W	dBm	Size	Offset
1852.5	LTE B2/ 5 MHz	QPSK	-20.25	13.64	10.31	2.30	H	< 2.00	0.146	21.65	1	0
		16-QAM	-21.00	12.89	10.31	2.30	H		0.123	20.90		
		64-QAM	-22.05	11.84	10.31	2.30	H		0.097	19.85		
		256-QAM	-25.08	8.81	10.31	2.30	H		0.048	16.82		
1880.0		QPSK	-20.72	13.98	10.35	2.33	H		0.158	22.00	1	0
		16-QAM	-21.48	13.22	10.35	2.33	H		0.133	21.24		
		64-QAM	-22.58	12.12	10.35	2.33	H		0.103	20.14		
		256-QAM	-25.68	9.02	10.35	2.33	H		0.051	17.04		
1907.5		QPSK	-20.93	13.11	10.40	2.29	H		0.132	21.22	1	0
		16-QAM	-21.67	12.37	10.40	2.29	H		0.112	20.48		
		64-QAM	-22.72	11.32	10.40	2.29	H		0.088	19.43		
		256-QAM	-25.83	8.21	10.40	2.29	H		0.043	16.32		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
								W	W	dBm	Size	Offset
1855.0	LTE B2/ 10 MHz	QPSK	-20.23	13.68	10.32	2.25	H	< 2.00	0.150	21.75	1	0
		16-QAM	-21.03	12.88	10.32	2.25	H		0.124	20.95		
		64-QAM	-22.08	11.83	10.32	2.25	H		0.098	19.90		
		256-QAM	-25.08	8.83	10.32	2.25	H		0.049	16.90		
1880.0		QPSK	-20.60	14.10	10.35	2.33	H		0.163	22.12	1	0
		16-QAM	-21.43	13.27	10.35	2.33	H		0.135	21.29		
		64-QAM	-22.46	12.24	10.35	2.33	H		0.106	20.26		
		256-QAM	-25.51	9.19	10.35	2.33	H		0.053	17.21		
1905.0		QPSK	-20.97	13.18	10.39	2.30	H		0.134	21.28	1	0
		16-QAM	-21.73	12.42	10.39	2.30	H		0.113	20.52		
		64-QAM	-22.84	11.31	10.39	2.30	H		0.087	19.41		
		256-QAM	-25.90	8.25	10.39	2.30	H		0.043	16.35		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
								W	W	dBm	Size	Offset
1857.5	LTE B2/ 15 MHz	QPSK	-20.29	13.71	10.32	2.26	H	< 2.00	0.150	21.77	1	0
		16-QAM	-21.14	12.86	10.32	2.26	H		0.124	20.92		
		64-QAM	-22.16	11.84	10.32	2.26	H		0.098	19.90		
		256-QAM	-25.25	8.75	10.32	2.26	H		0.048	16.81		
1880.0		QPSK	-20.64	14.06	10.35	2.33	H		0.161	22.08	1	0
		16-QAM	-21.48	13.22	10.35	2.33	H		0.133	21.24		
		64-QAM	-22.54	12.16	10.35	2.33	H		0.104	20.18		
		256-QAM	-25.64	9.06	10.35	2.33	H		0.051	17.08		
1902.5		QPSK	-21.06	13.21	10.38	2.30	H		0.135	21.29	1	0
		16-QAM	-21.92	12.35	10.38	2.30	H		0.110	20.43		
		64-QAM	-22.97	11.30	10.38	2.30	H		0.087	19.38		
		256-QAM	-26.04	8.23	10.38	2.30	H		0.043	16.31		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
								W	W	dBm	Size	Offset
1860.0	LTE B2/ 20 MHz	QPSK	-20.31	13.69	10.32	2.26	H	< 2.00	0.150	21.75	1	0
		16-QAM	-21.18	12.82	10.32	2.26	H		0.123	20.88		
		64-QAM	-22.19	11.81	10.32	2.26	H		0.097	19.87		
		256-QAM	-25.30	8.70	10.32	2.26	H		0.047	16.76		
1880.0		QPSK	-20.70	14.00	10.35	2.33	H		0.159	22.02	1	0
		16-QAM	-21.61	13.09	10.35	2.33	H		0.129	21.11		
		64-QAM	-22.65	12.05	10.35	2.33	H		0.102	20.07		
		256-QAM	-25.73	8.97	10.35	2.33	H		0.050	16.99		
1900.0		QPSK	-20.95	13.32	10.38	2.30	H		0.138	21.40	1	0
		16-QAM	-21.84	12.43	10.38	2.30	H		0.112	20.51		
		64-QAM	-22.86	11.41	10.38	2.30	H		0.089	19.49		
		256-QAM	-25.97	8.30	10.38	2.30	H		0.043	16.38		

9.2 RADIATED SPURIOUS EMISSIONS

▣ OPERATING FREQUENCY:	<u>1880.0 MHz</u>
▣ MEASURED OUTPUT POWER:	<u>22.12 dBm = 0.163 W</u>
▣ MODE:	<u>LTE B2</u>
▣ MODULATION SIGNAL:	<u>10 MHz QPSK</u>
▣ DISTANCE:	<u>3 meters</u>
▣ LIMIT: $43 + 10 \log_{10}(W) =$	<u>35.12 dBc</u>

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc	RB	
									Size	Offset
18650 (1855.0)	3 710.00	-49.75	12.28	-54.81	3.15	H	-45.68	67.80	1	0
	5 565.00	-52.68	13.05	-50.94	3.93	H	-41.81	63.93		
	7 420.00	-52.26	10.78	-42.03	4.68	H	-35.93	58.05		
18900 (1880.0)	3 760.00	-51.16	12.22	-55.79	3.27	H	-46.84	68.96	1	0
	5 640.00	-52.89	13.12	-50.62	4.07	V	-41.57	63.69		
	7 520.00	-53.74	10.82	-42.93	4.71	V	-36.82	58.94		
19150 (1905.0)	3 810.00	-50.97	12.15	-56.02	3.23	V	-47.10	69.22	1	0
	5 715.00	-52.71	13.08	-50.11	4.16	H	-41.19	63.31		
	7 620.00	-53.91	11.14	-43.56	4.75	V	-37.17	59.29		

9.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
2	1.4 MHz	1880.0	QPSK	6	0	4.75
			16-QAM	6	0	6.07
			64-QAM	6	0	6.51
			256-QAM	6	0	6.69
	3 MHz		QPSK	15	0	4.68
			16-QAM	15	0	6.05
			64-QAM	15	0	6.47
			256-QAM	15	0	6.66
	5 MHz		QPSK	25	0	4.76
			16-QAM	25	0	5.79
			64-QAM	25	0	6.46
			256-QAM	25	0	6.62
	10 MHz		QPSK	50	0	4.79
			16-QAM	50	0	5.83
			64-QAM	50	0	6.38
			256-QAM	50	0	6.60
	15 MHz		QPSK	75	0	4.74
			16-QAM	75	0	5.90
			64-QAM	75	0	6.44
			256-QAM	75	0	6.67
20 MHz	QPSK	100	0	4.73		
	16-QAM	100	0	5.74		
	64-QAM	100	0	6.35		
	256-QAM	100	0	6.63		

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 260 ~ 283.

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	1.0947
			16-QAM	6	0	1.0908
			64-QAM	6	0	1.0969
			256-QAM	6	0	1.0956
	3 MHz		QPSK	15	0	2.7114
			16-QAM	15	0	2.7087
			64-QAM	15	0	2.7059
			256-QAM	15	0	2.7106
	5 MHz		QPSK	25	0	4.5088
			16-QAM	25	0	4.5109
			64-QAM	25	0	4.5016
			256-QAM	25	0	4.5136
	10 MHz		QPSK	50	0	9.0015
			16-QAM	50	0	8.9741
			64-QAM	50	0	9.0105
			256-QAM	50	0	8.9951
	15 MHz		QPSK	75	0	13.506
			16-QAM	75	0	13.478
			64-QAM	75	0	13.464
			256-QAM	75	0	13.483
20 MHz	QPSK	100	0	17.943		
	16-QAM	100	0	18.033		
	64-QAM	100	0	18.015		
	256-QAM	100	0	17.932		

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 236 ~ 259.

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	4.9746	27.976	-70.568	-42.592	-13.00
		1880.0	8.6476	28.591	-70.442	-41.851	
		1909.3	9.3928	28.591	-70.058	-41.467	
	3	1851.5	5.2313	28.591	-70.131	-41.540	
		1880.0	8.2996	28.591	-70.381	-41.790	
		1908.5	7.2258	28.591	-70.491	-41.900	
	5	1852.5	8.2787	28.591	-70.249	-41.658	
		1880.0	9.1142	28.591	-69.958	-41.367	
		1907.5	8.0858	28.591	-71.102	-42.511	
	10	1855.0	6.0469	28.591	-70.908	-42.317	
		1880.0	6.0309	28.591	-70.140	-41.549	
		1905.0	7.9925	28.591	-69.701	-41.110	
	15	1857.5	4.0160	27.976	-69.372	-41.396	
		1880.0	9.6929	28.591	-70.312	-41.721	
		1902.5	9.9831	28.591	-70.450	-41.859	
	20	1860.0	8.3056	28.591	-70.748	-42.157	
		1880.0	3.7588	27.976	-71.036	-43.060	
		1900.0	3.7299	27.976	-70.681	-42.705	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 284 ~ 319.
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

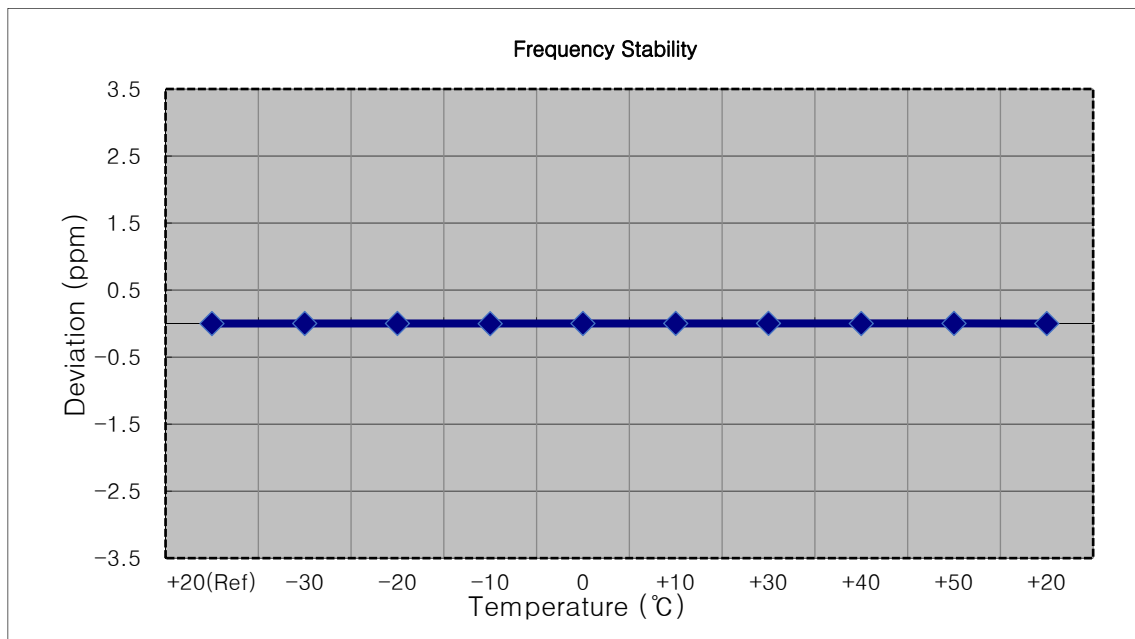
9.6 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 200 ~ 235.

9.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

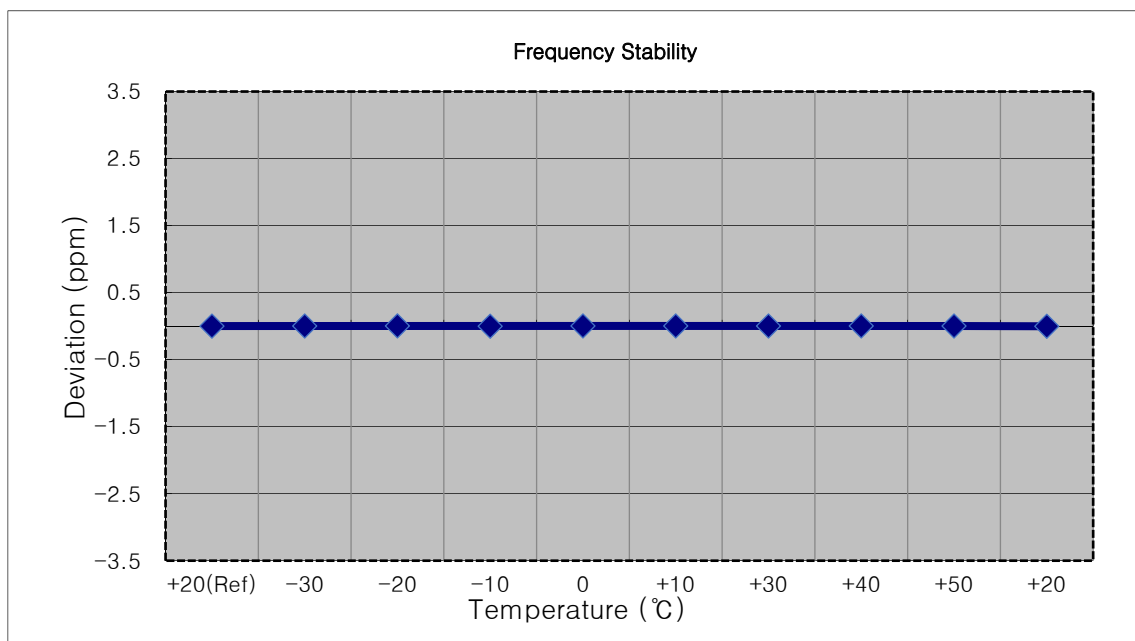
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1850,700,000 Hz
- ▣ CHANNEL: 18607 (1.4 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1850 699 999	0.0	0.000 000	0.000
100 %		-30	1850 700 001	2.3	0.000 000	0.001
100 %		-20	1850 700 002	3.4	0.000 000	0.002
100 %		-10	1850 699 995	-3.9	0.000 000	-0.002
100 %		0	1850 700 002	3.1	0.000 000	0.002
100 %		+10	1850 700 004	4.9	0.000 000	0.003
100 %		+30	1850 700 004	5.2	0.000 000	0.003
100 %		+40	1850 700 000	1.4	0.000 000	0.001
100 %		+50	1850 700 003	4.4	0.000 000	0.002
Batt. Endpoint		3.300	+20	1850 699 998	-0.9	0.000 000



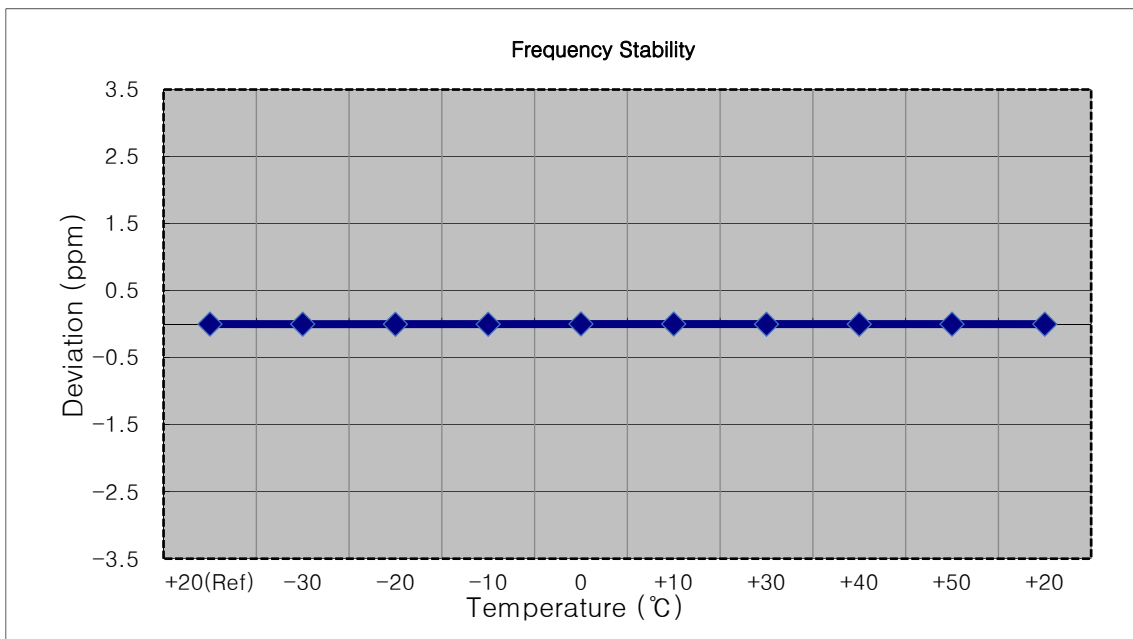
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1851,500,000 Hz
- ▣ CHANNEL: 18615 (3 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1851 500 001	0.0	0.000 000	0.000
100 %		-30	1851 500 004	2.4	0.000 000	0.001
100 %		-20	1851 500 007	5.3	0.000 000	0.003
100 %		-10	1851 499 999	-2.9	0.000 000	-0.002
100 %		0	1851 500 006	4.6	0.000 000	0.002
100 %		+10	1851 500 005	4.0	0.000 000	0.002
100 %		+30	1851 500 005	3.1	0.000 000	0.002
100 %		+40	1851 500 005	3.3	0.000 000	0.002
100 %		+50	1851 500 004	2.4	0.000 000	0.001
Batt. Endpoint		3.300	+20	1851 499 997	-4.9	0.000 000



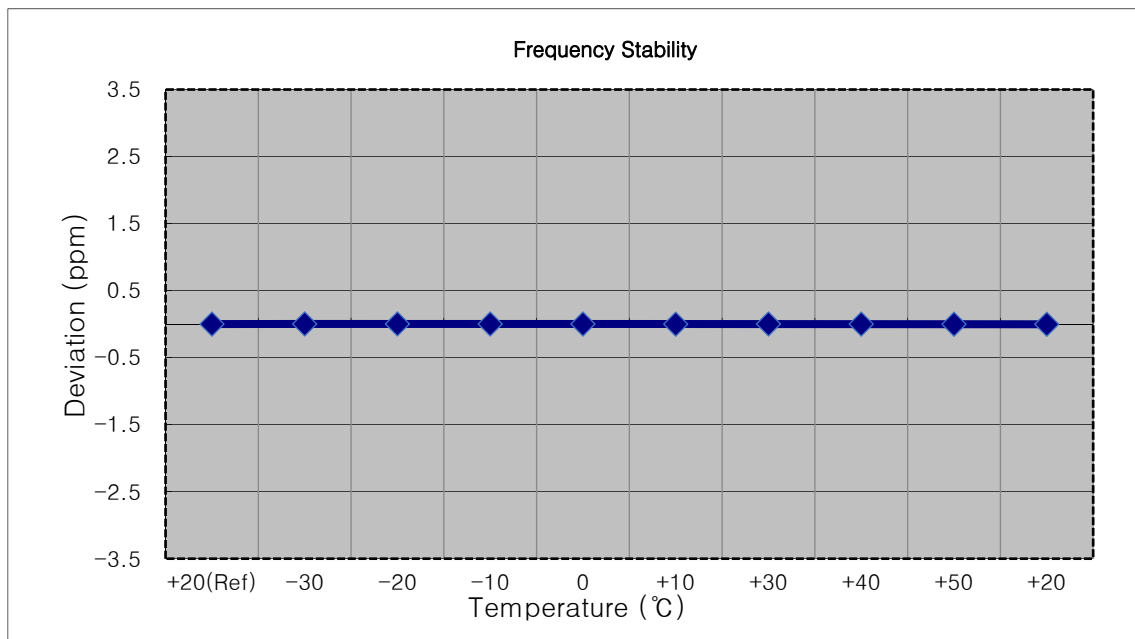
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1852,500,000 Hz
- ▣ CHANNEL: 18625 (5 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1852 499 997	0.0	0.000 000	0.000
100 %		-30	1852 499 995	-2.4	0.000 000	-0.001
100 %		-20	1852 499 994	-3.4	0.000 000	-0.002
100 %		-10	1852 499 994	-3.2	0.000 000	-0.002
100 %		0	1852 500 001	3.4	0.000 000	0.002
100 %		+10	1852 500 000	2.2	0.000 000	0.001
100 %		+30	1852 499 994	-3.0	0.000 000	-0.002
100 %		+40	1852 499 994	-3.1	0.000 000	-0.002
100 %		+50	1852 499 995	-2.0	0.000 000	-0.001
Batt. Endpoint		3.300	+20	1852 499 995	-2.4	0.000 000



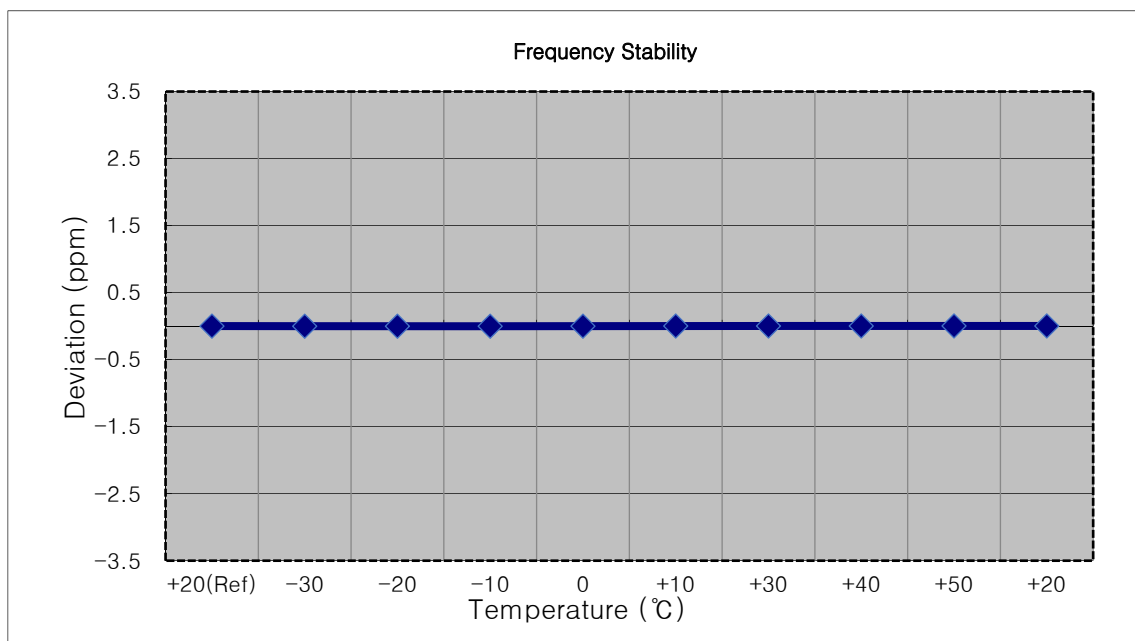
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1855,000,000 Hz
- ▣ CHANNEL: 18650 (10 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1854 999 997	0.0	0.000 000	0.000
100 %		-30	1855 000 002	4.4	0.000 000	0.002
100 %		-20	1855 000 001	3.6	0.000 000	0.002
100 %		-10	1855 000 000	2.8	0.000 000	0.002
100 %		0	1854 999 999	1.7	0.000 000	0.001
100 %		+10	1854 999 996	-1.5	0.000 000	-0.001
100 %		+30	1855 000 001	3.6	0.000 000	0.002
100 %		+40	1854 999 996	-0.8	0.000 000	0.000
100 %		+50	1854 999 994	-3.6	0.000 000	-0.002
Batt. Endpoint		3.300	+20	1854 999 992	-4.7	0.000 000



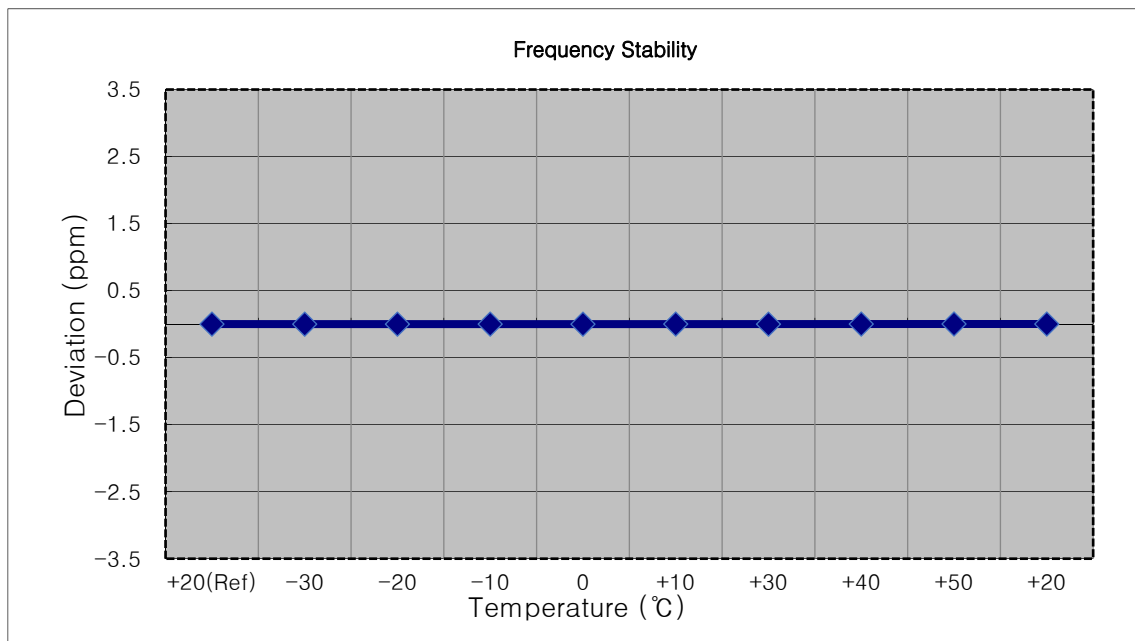
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1857,500,000 Hz
- ▣ CHANNEL: 18675 (15 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1857 500 002	0.0	0.000 000	0.000
100 %		-30	1857 499 999	-3.0	0.000 000	-0.002
100 %		-20	1857 499 998	-3.3	0.000 000	-0.002
100 %		-10	1857 499 998	-3.3	0.000 000	-0.002
100 %		0	1857 499 999	-2.5	0.000 000	-0.001
100 %		+10	1857 500 004	2.3	0.000 000	0.001
100 %		+30	1857 500 004	1.9	0.000 000	0.001
100 %		+40	1857 500 004	2.5	0.000 000	0.001
100 %		+50	1857 500 006	4.0	0.000 000	0.002
Batt. Endpoint		3.300	+20	1857 500 006	4.0	0.000 000



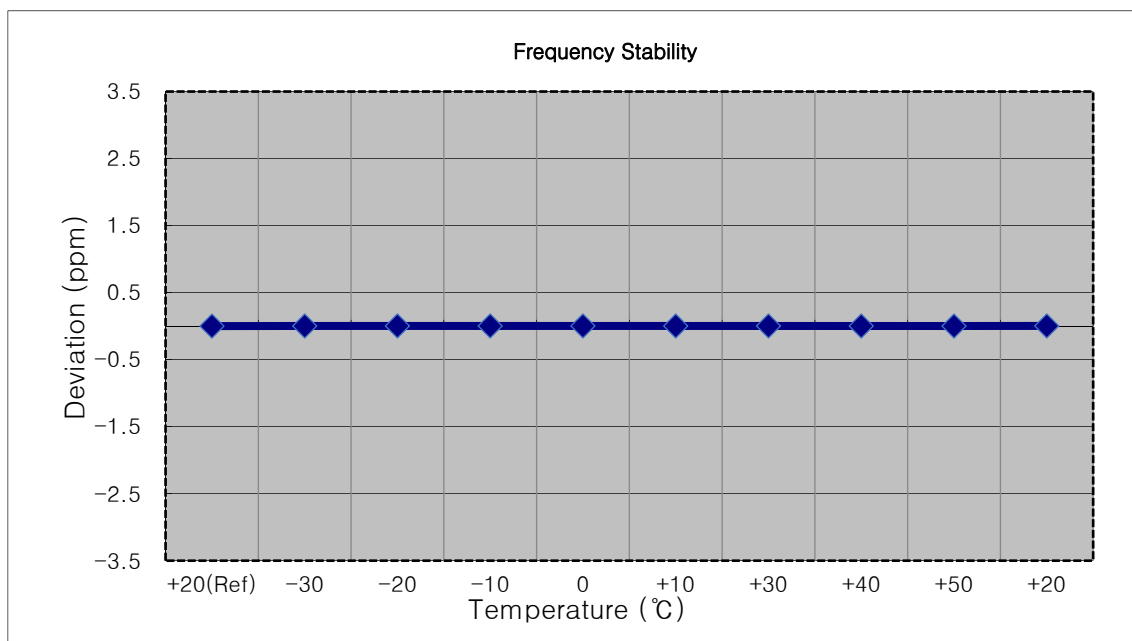
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1860,000,000 Hz
- ▣ CHANNEL: 18700 (20 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1859 999 997	0.0	0.000 000	0.000
100 %		-30	1859 999 996	-1.6	0.000 000	-0.001
100 %		-20	1859 999 995	-2.1	0.000 000	-0.001
100 %		-10	1859 999 996	-1.2	0.000 000	-0.001
100 %		0	1859 999 996	-1.5	0.000 000	-0.001
100 %		+10	1859 999 999	1.6	0.000 000	0.001
100 %		+30	1859 999 994	-2.7	0.000 000	-0.001
100 %		+40	1859 999 998	0.9	0.000 000	0.000
100 %		+50	1859 999 999	2.1	0.000 000	0.001
Batt. Endpoint		3.300	+20	1859 999 999	1.4	0.000 000



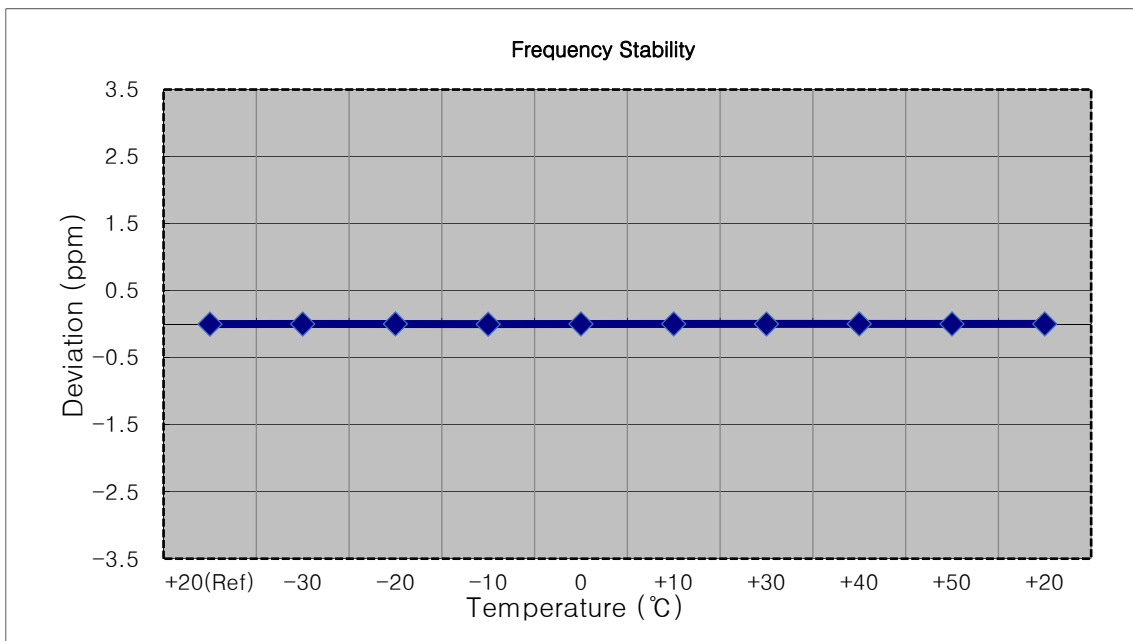
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (1.4 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1880 000 004	0.0	0.000 000	0.000
100 %		-30	1880 000 006	2.9	0.000 000	0.002
100 %		-20	1880 000 007	3.7	0.000 000	0.002
100 %		-10	1880 000 008	4.1	0.000 000	0.002
100 %		0	1880 000 007	3.5	0.000 000	0.002
100 %		+10	1880 000 007	3.1	0.000 000	0.002
100 %		+30	1880 000 008	4.1	0.000 000	0.002
100 %		+40	1880 000 006	2.1	0.000 000	0.001
100 %		+50	1880 000 005	1.6	0.000 000	0.001
Batt. Endpoint		3.300	+20	1880 000 008	4.0	0.000 000



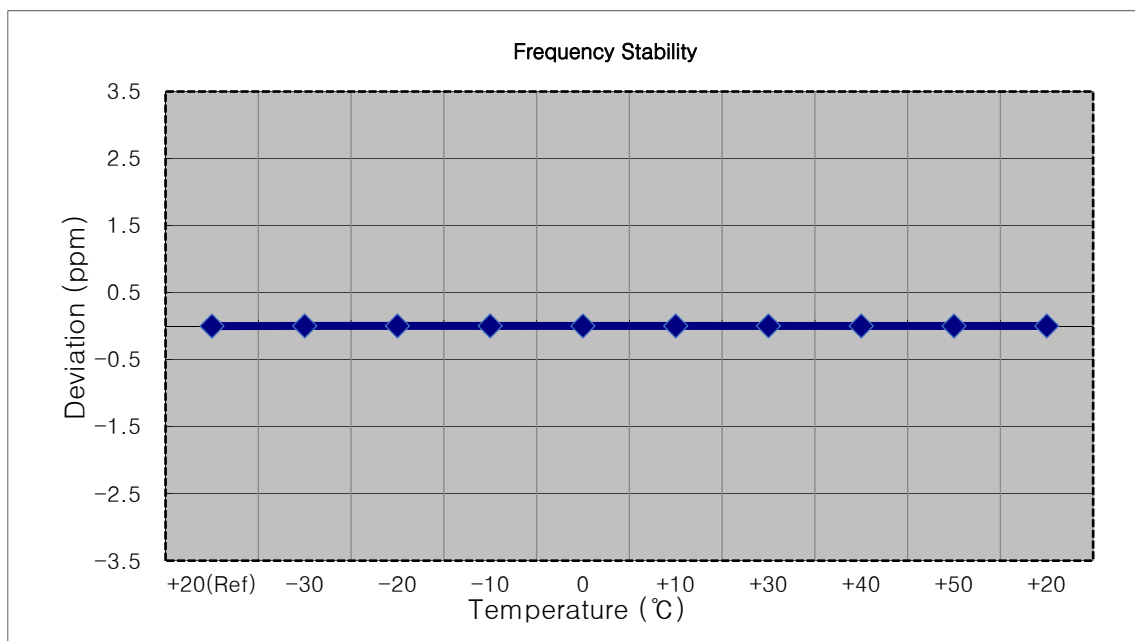
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (3 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1880 000 004	0.0	0.000 000	0.000
100 %		-30	1880 000 007	2.8	0.000 000	0.001
100 %		-20	1880 000 009	5.1	0.000 000	0.003
100 %		-10	1880 000 000	-4.2	0.000 000	-0.002
100 %		0	1880 000 007	3.2	0.000 000	0.002
100 %		+10	1880 000 008	4.6	0.000 000	0.002
100 %		+30	1880 000 006	2.6	0.000 000	0.001
100 %		+40	1880 000 009	5.5	0.000 000	0.003
100 %		+50	1880 000 008	3.9	0.000 000	0.002
Batt. Endpoint		3.300	+20	1880 000 008	4.3	0.000 000



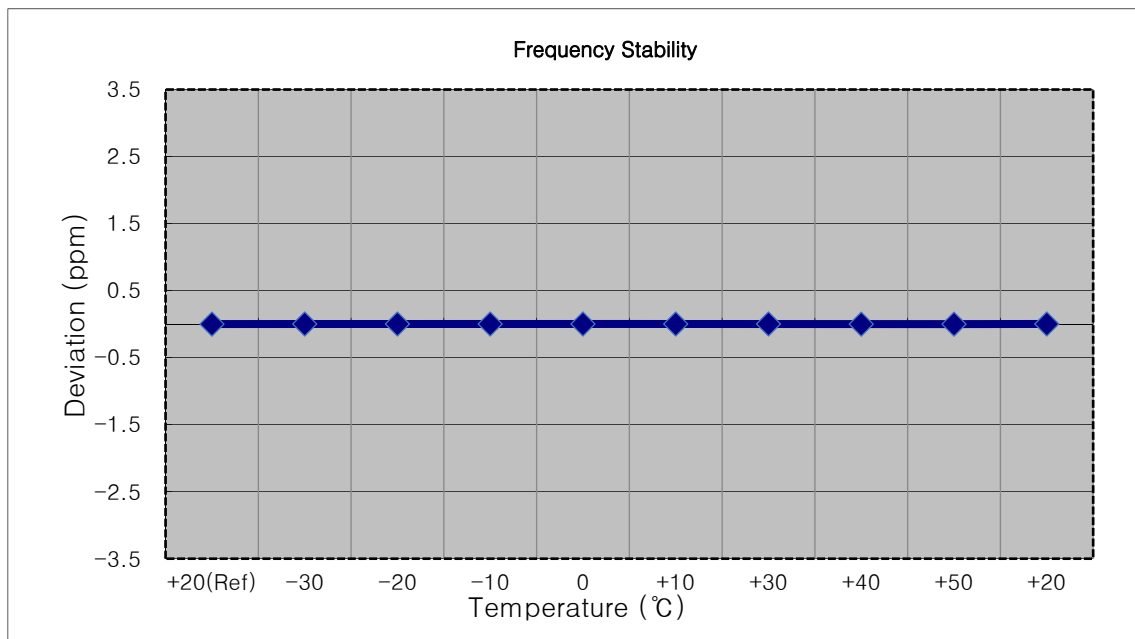
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (5 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1880 000 004	0.0	0.000 000	0.000
100 %		-30	1880 000 008	4.4	0.000 000	0.002
100 %		-20	1880 000 007	3.5	0.000 000	0.002
100 %		-10	1880 000 007	3.5	0.000 000	0.002
100 %		0	1880 000 008	4.4	0.000 000	0.002
100 %		+10	1880 000 007	3.2	0.000 000	0.002
100 %		+30	1880 000 008	4.7	0.000 000	0.002
100 %		+40	1880 000 007	3.8	0.000 000	0.002
100 %		+50	1880 000 006	2.6	0.000 000	0.001
Batt. Endpoint		3.300	+20	1880 000 007	3.7	0.000 000



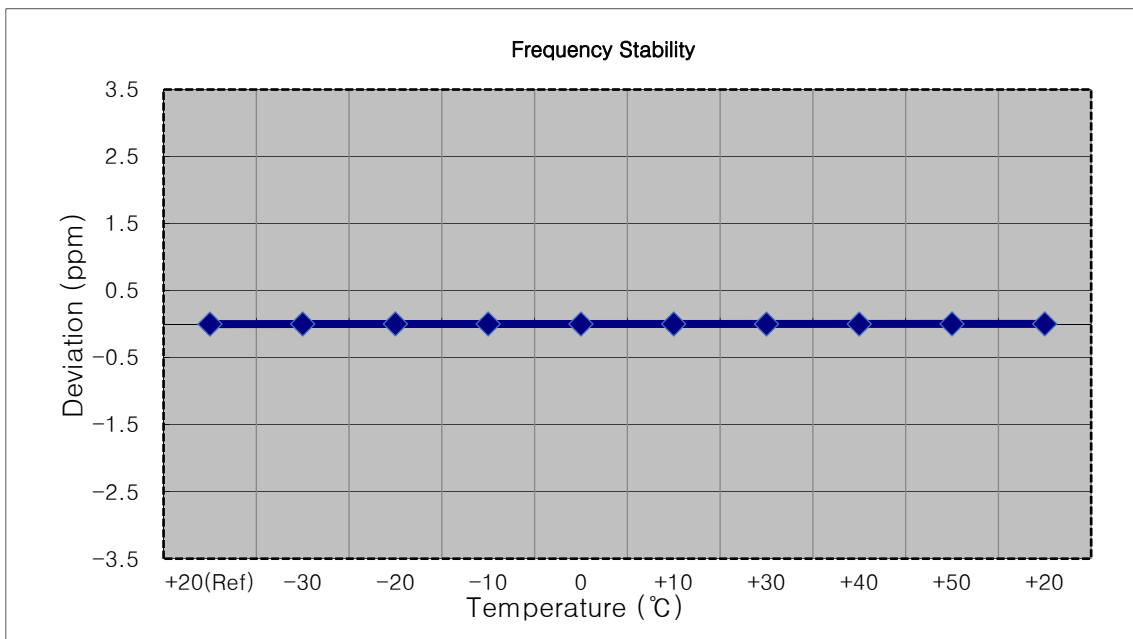
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (10 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1880 000 002	0.0	0.000 000	0.000
100 %		-30	1880 000 004	2.4	0.000 000	0.001
100 %		-20	1880 000 004	2.2	0.000 000	0.001
100 %		-10	1880 000 003	1.9	0.000 000	0.001
100 %		0	1880 000 004	2.0	0.000 000	0.001
100 %		+10	1880 000 005	3.0	0.000 000	0.002
100 %		+30	1880 000 005	3.4	0.000 000	0.002
100 %		+40	1879 999 999	-2.6	0.000 000	-0.001
100 %		+50	1880 000 000	-1.8	0.000 000	-0.001
Batt. Endpoint		3.300	+20	1880 000 004	2.8	0.000 000



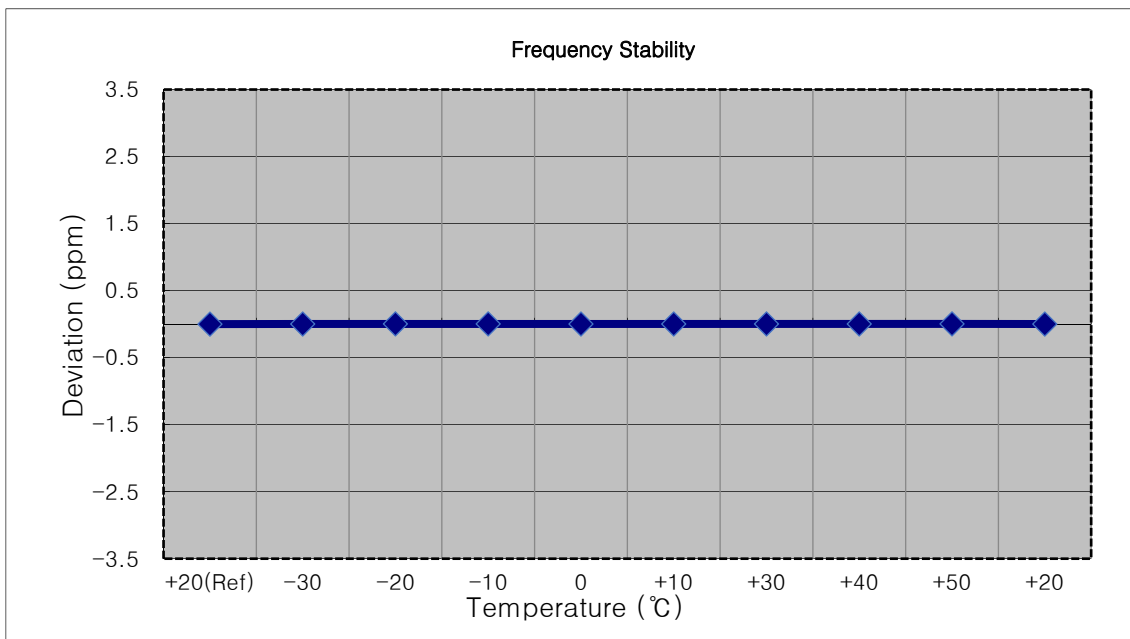
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (15 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1880 000 005	0.0	0.000 000	0.000
100 %		-30	1880 000 007	2.0	0.000 000	0.001
100 %		-20	1880 000 010	5.4	0.000 000	0.003
100 %		-10	1880 000 009	3.9	0.000 000	0.002
100 %		0	1880 000 007	1.6	0.000 000	0.001
100 %		+10	1880 000 008	2.9	0.000 000	0.002
100 %		+30	1880 000 006	1.4	0.000 000	0.001
100 %		+40	1880 000 007	1.6	0.000 000	0.001
100 %		+50	1880 000 010	4.8	0.000 000	0.003
Batt. Endpoint		3.300	+20	1880 000 010	4.7	0.000 000



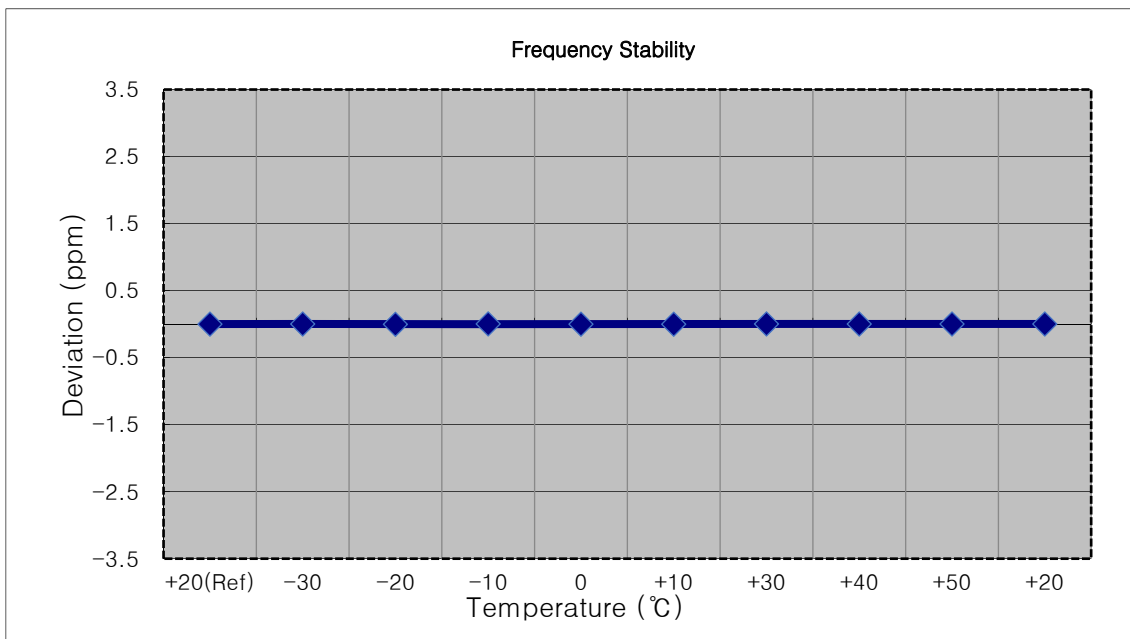
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1880,000,000 Hz
- ▣ CHANNEL: 18900 (20 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1880 000 005	0.0	0.000 000	0.000
100 %		-30	1880 000 008	3.0	0.000 000	0.002
100 %		-20	1880 000 010	5.7	0.000 000	0.003
100 %		-10	1880 000 010	5.3	0.000 000	0.003
100 %		0	1880 000 008	2.8	0.000 000	0.001
100 %		+10	1880 000 007	2.4	0.000 000	0.001
100 %		+30	1880 000 008	3.2	0.000 000	0.002
100 %		+40	1880 000 008	3.6	0.000 000	0.002
100 %		+50	1880 000 010	5.2	0.000 000	0.003
Batt. Endpoint		3.300	+20	1880 000 006	1.6	0.000 000



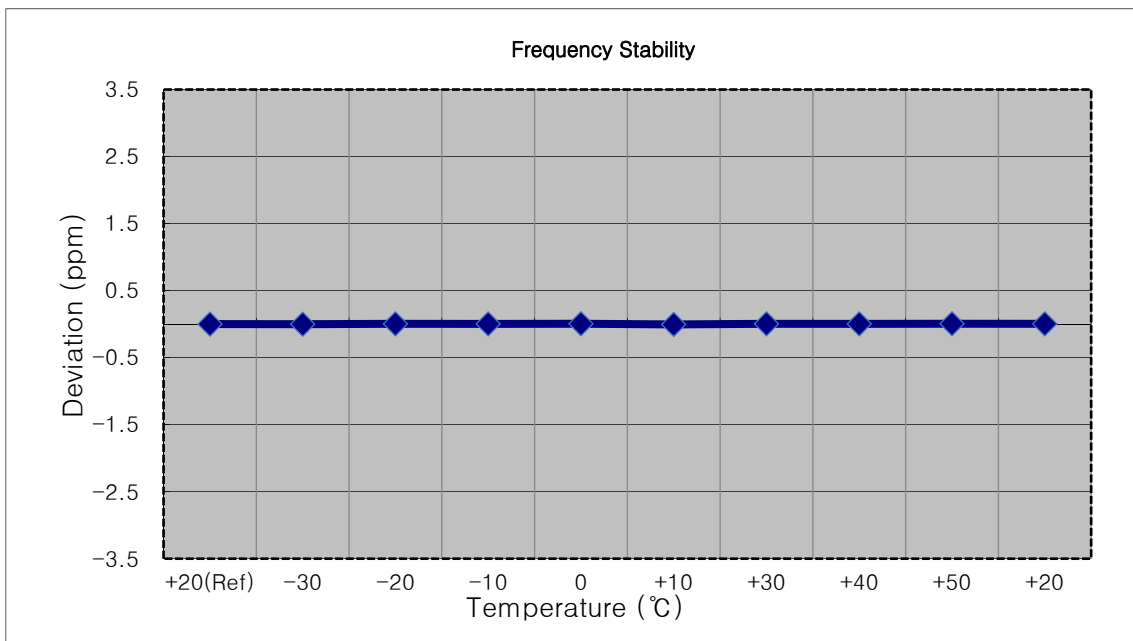
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1909,300,000 Hz
- ▣ CHANNEL: 19193 (1.4 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1909 300 004	0.0	0.000 000	0.000
100 %		-30	1909 300 007	2.9	0.000 000	0.002
100 %		-20	1909 299 998	-6.3	0.000 000	-0.003
100 %		-10	1909 300 010	5.8	0.000 000	0.003
100 %		0	1909 300 003	-1.8	0.000 000	-0.001
100 %		+10	1909 300 001	-3.3	0.000 000	-0.002
100 %		+30	1909 300 009	4.2	0.000 000	0.002
100 %		+40	1909 300 008	3.2	0.000 000	0.002
100 %		+50	1909 300 007	2.8	0.000 000	0.001
Batt. Endpoint		3.300	+20	1909 300 007	2.7	0.000 000



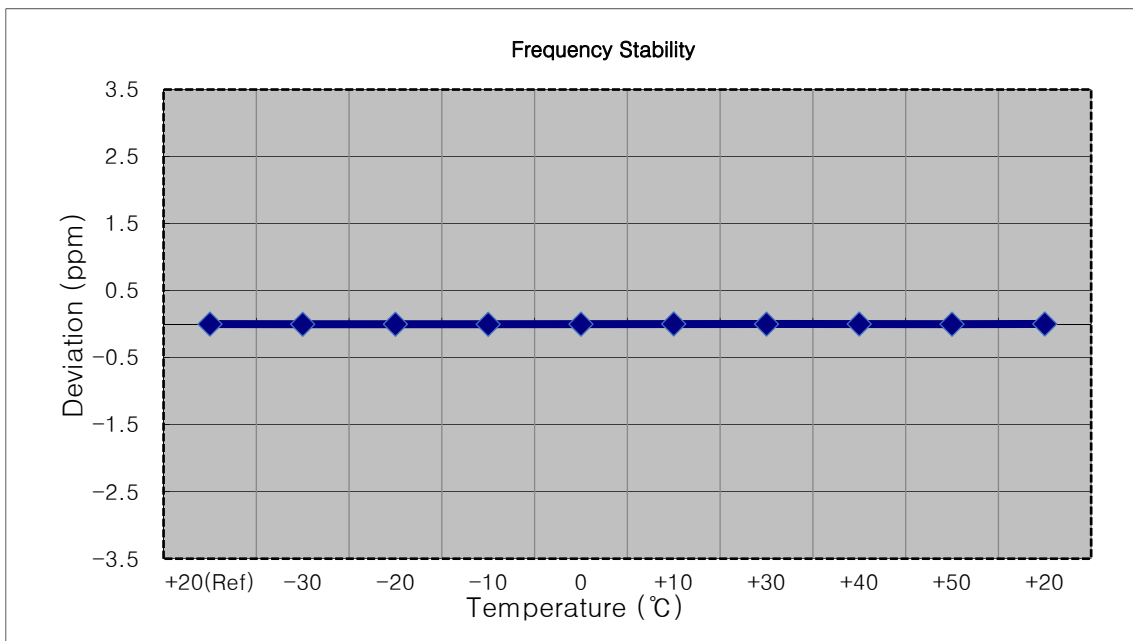
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1908,500,000 Hz
- ▣ CHANNEL: 19185 (3 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1908 500 011	0.0	0.000 000	0.000
100 %		-30	1908 500 007	-4.3	0.000 000	-0.002
100 %		-20	1908 500 019	7.6	0.000 000	0.004
100 %		-10	1908 500 016	4.8	0.000 000	0.003
100 %		0	1908 500 021	9.6	0.000 001	0.005
100 %		+10	1908 500 001	-10.3	-0.000 001	-0.005
100 %		+30	1908 500 019	7.7	0.000 000	0.004
100 %		+40	1908 500 018	6.8	0.000 000	0.004
100 %		+50	1908 500 021	9.4	0.000 000	0.005
Batt. Endpoint		3.300	+20	1908 500 019	7.8	0.000 000



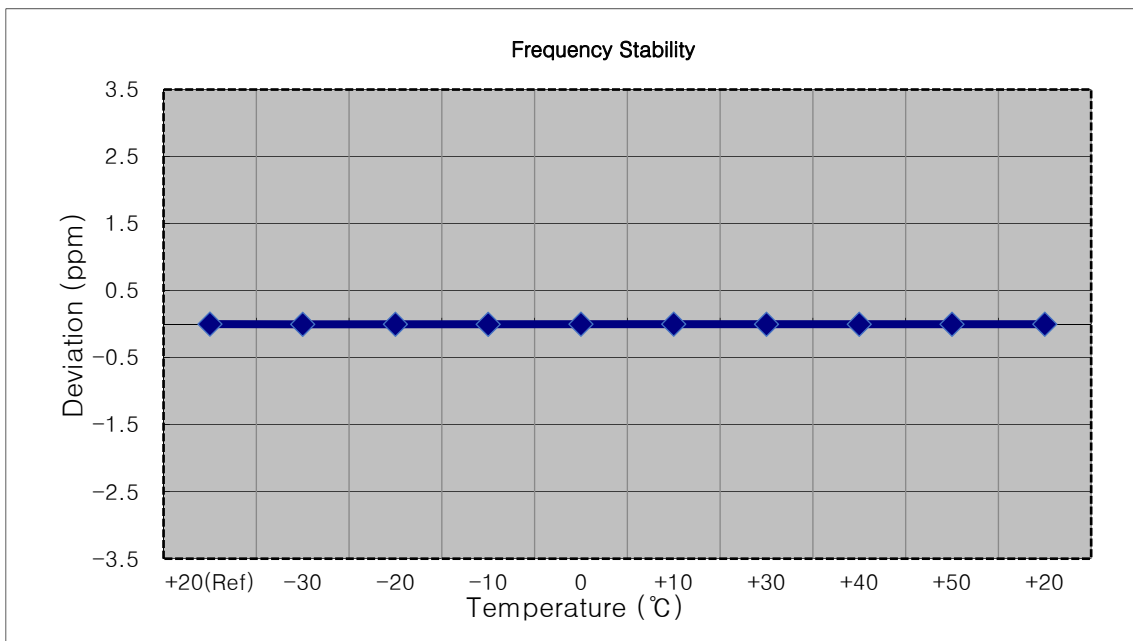
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1907,500,000 Hz
- ▣ CHANNEL: 19175 (5 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1907 499 997	0.0	0.000 000	0.000
100 %		-30	1907 499 992	-4.6	0.000 000	-0.002
100 %		-20	1907 499 994	-3.3	0.000 000	-0.002
100 %		-10	1907 499 992	-5.0	0.000 000	-0.003
100 %		0	1907 499 995	-1.9	0.000 000	-0.001
100 %		+10	1907 500 002	4.5	0.000 000	0.002
100 %		+30	1907 499 996	-1.1	0.000 000	-0.001
100 %		+40	1907 499 999	1.6	0.000 000	0.001
100 %		+50	1907 499 994	-2.9	0.000 000	-0.002
Batt. Endpoint		3.300	+20	1907 500 000	2.9	0.000 000



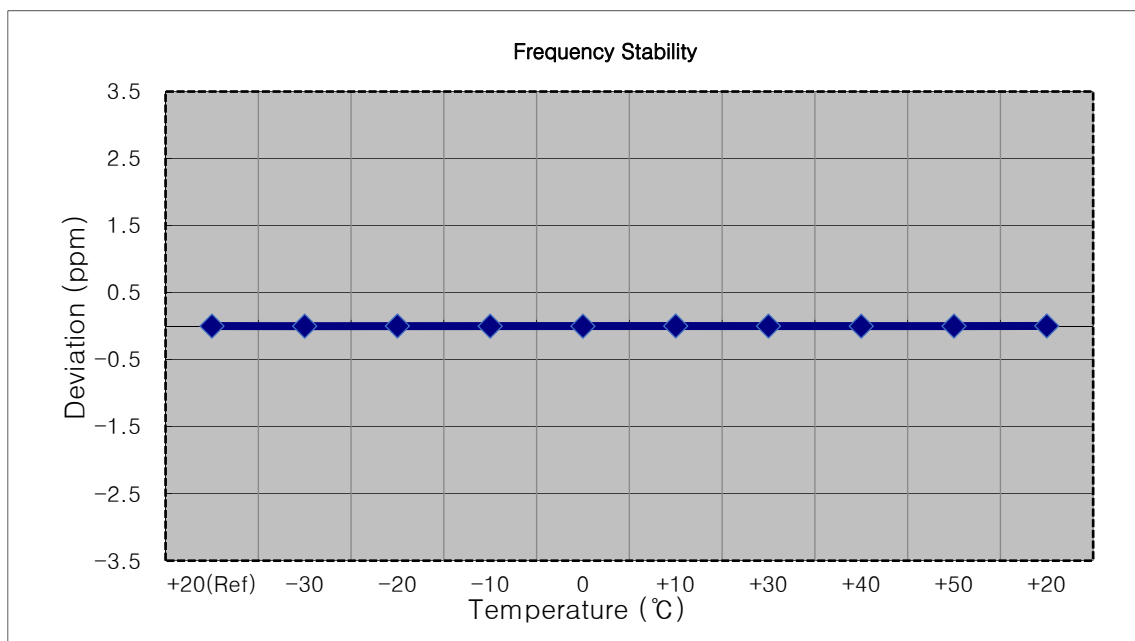
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1905,000,000 Hz
- ▣ CHANNEL: 19150 (10 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1904 999 997	0.0	0.000 000	0.000
100 %		-30	1904 999 990	-6.2	0.000 000	-0.003
100 %		-20	1904 999 992	-5.1	0.000 000	-0.003
100 %		-10	1904 999 991	-5.9	0.000 000	-0.003
100 %		0	1904 999 994	-2.7	0.000 000	-0.001
100 %		+10	1904 999 994	-2.4	0.000 000	-0.001
100 %		+30	1904 999 991	-5.3	0.000 000	-0.003
100 %		+40	1904 999 992	-4.6	0.000 000	-0.002
100 %		+50	1904 999 992	-4.6	0.000 000	-0.002
Batt. Endpoint		3.300	+20	1904 999 993	-3.6	0.000 000



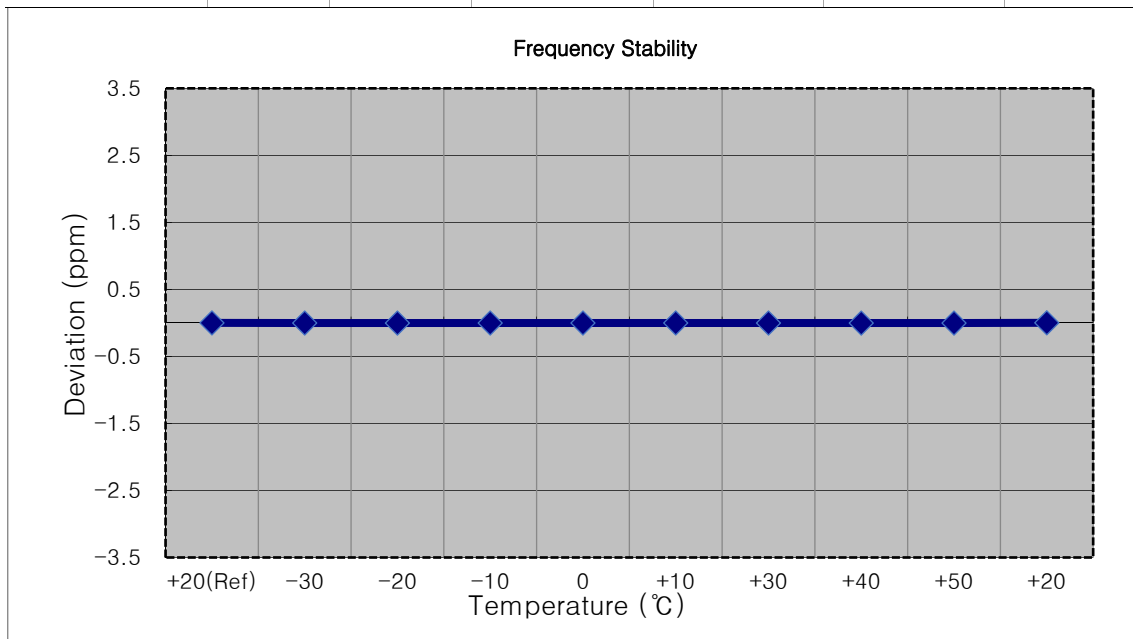
- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1902,500,000 Hz
- ▣ CHANNEL: 19125 (15 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1902 500 002	0.0	0.000 000	0.000
100 %		-30	1902 500 000	-2.2	0.000 000	-0.001
100 %		-20	1902 500 005	2.8	0.000 000	0.001
100 %		-10	1902 500 000	-2.3	0.000 000	-0.001
100 %		0	1902 499 998	-4.3	0.000 000	-0.002
100 %		+10	1902 500 004	2.5	0.000 000	0.001
100 %		+30	1902 500 004	1.7	0.000 000	0.001
100 %		+40	1902 500 000	-1.6	0.000 000	-0.001
100 %		+50	1902 500 001	-1.2	0.000 000	-0.001
Batt. Endpoint		3.300	+20	1902 500 005	3.4	0.000 000



- ▣ MODE: LTE B2
- ▣ OPERATING FREQUENCY: 1900,000,000 Hz
- ▣ CHANNEL: 19100 (20 MHz)
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1899 999 998	0.0	0.000 000	0.000
100 %		-30	1899 999 995	-3.4	0.000 000	-0.002
100 %		-20	1899 999 993	-4.8	0.000 000	-0.003
100 %		-10	1899 999 995	-3.2	0.000 000	-0.002
100 %		0	1899 999 995	-3.3	0.000 000	-0.002
100 %		+10	1899 999 996	-1.8	0.000 000	-0.001
100 %		+30	1899 999 995	-2.7	0.000 000	-0.001
100 %		+40	1899 999 993	-5.2	0.000 000	-0.003
100 %		+50	1899 999 994	-4.4	0.000 000	-0.002
Batt. Endpoint		3.300	+20	1900 000 001	2.8	0.000 000



10. TEST DATA

10.1. UPLINK CARRIER AGGREGATION

Test Note

1. All tests were evaluated for the two bands using various combinations of RB size, RB offset, modulation, and channel bandwidth.
2. All modes of operation were investigated and the worst case configuration results are reported in this section.

Please refer to the table below.

3. The worst case is reported with the modulations, RB sizes and offsets.

- 2A(ANT A)-4A(ANT I)

(PCC - Modulation: QPSK, RB: 1, RB Offset: 49, SCC - Modulation: QPSK, RB: 1, RB Offset: 0)

- 4A(ANT A)-2A(ANT I)

(PCC - Modulation: QPSK, RB: 1, RB Offset: 74, SCC - Modulation: QPSK, RB: 1, RB Offset: 0)

Radiated Spurious Emissions

PCC	SCC	PCC		SCC	
		BW(MHz)	Channel	BW(MHz)	Channel
2A(ANT A)	4A(ANT I)	10	18900	15	20325
4A(ANT A)	2A(ANT I)	15	20325	10	18900

10.1.1. RADIATED SPURIOUS EMISSIONS

2A(ANT A)(PCC)- 4A(ANT I)(SCC)

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)	Limit (dBm)
3 760.00	-55.54	12.22	-60.17	3.27	V	-51.22	-13.00
5 640.00	-56.81	13.12	-54.54	4.07	V	-45.49	-13.00
7 520.00	-56.77	10.82	-45.96	4.71	V	-39.85	-13.00

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)	Limit (dBm)
3 495.00	-55.12	12.34	-61.19	3.09	V	-51.94	-13.00
5 242.50	-57.43	12.87	-56.58	3.95	V	-47.66	-13.00
6 990.00	-56.41	11.36	-48.20	4.58	V	-41.42	-13.00

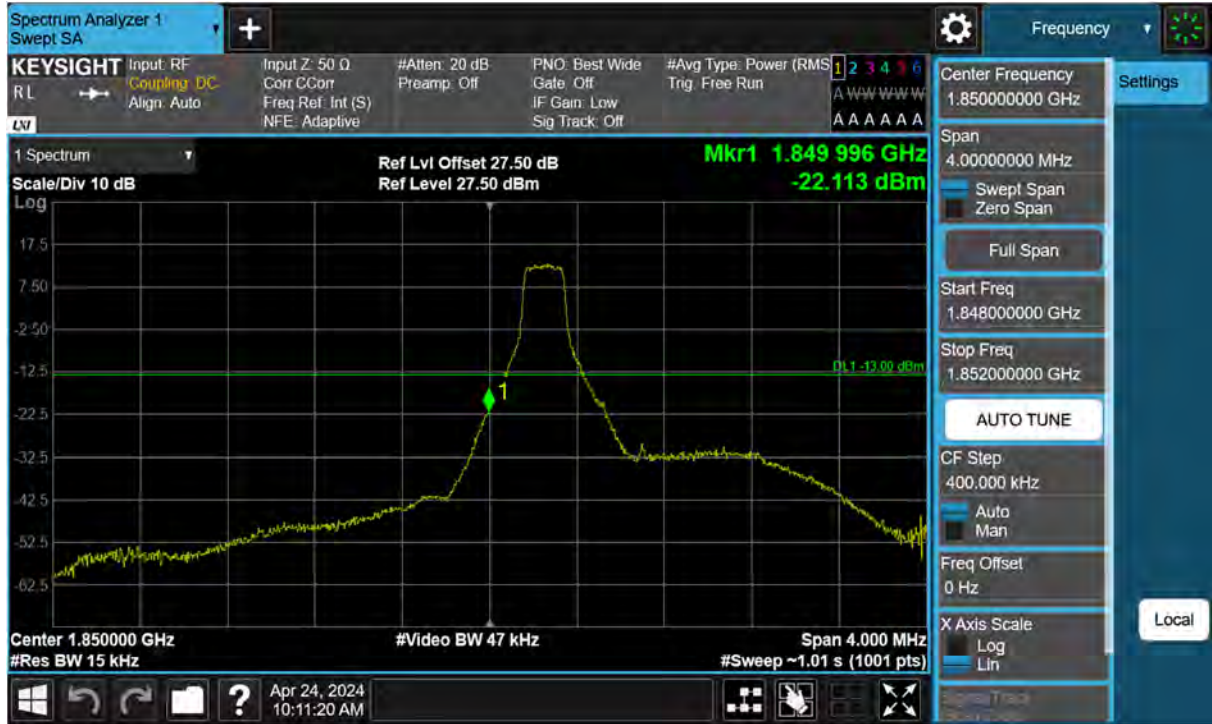
4A(ANT A)(PCC)- 2A(ANT I)(SCC)

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)	Limit (dBm)
3 495.00	-55.72	12.34	-61.79	3.09	V	-52.54	-13.00
5 242.50	-57.50	12.87	-56.65	3.95	V	-47.73	-13.00
6 990.00	-59.09	11.36	-50.88	4.58	V	-44.10	-13.00

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)	Limit (dBm)
3 760.00	-56.95	12.22	-61.58	3.27	V	-52.63	-13.00
5 640.00	-58.45	13.12	-56.18	4.07	V	-47.13	-13.00
7 520.00	-59.74	10.82	-48.93	4.71	V	-42.82	-13.00

11. TEST PLOTS(Main 1 Ant)

SM-F741B_LTE2_1.4 M_BandEdge_Low_QPSK_1RB



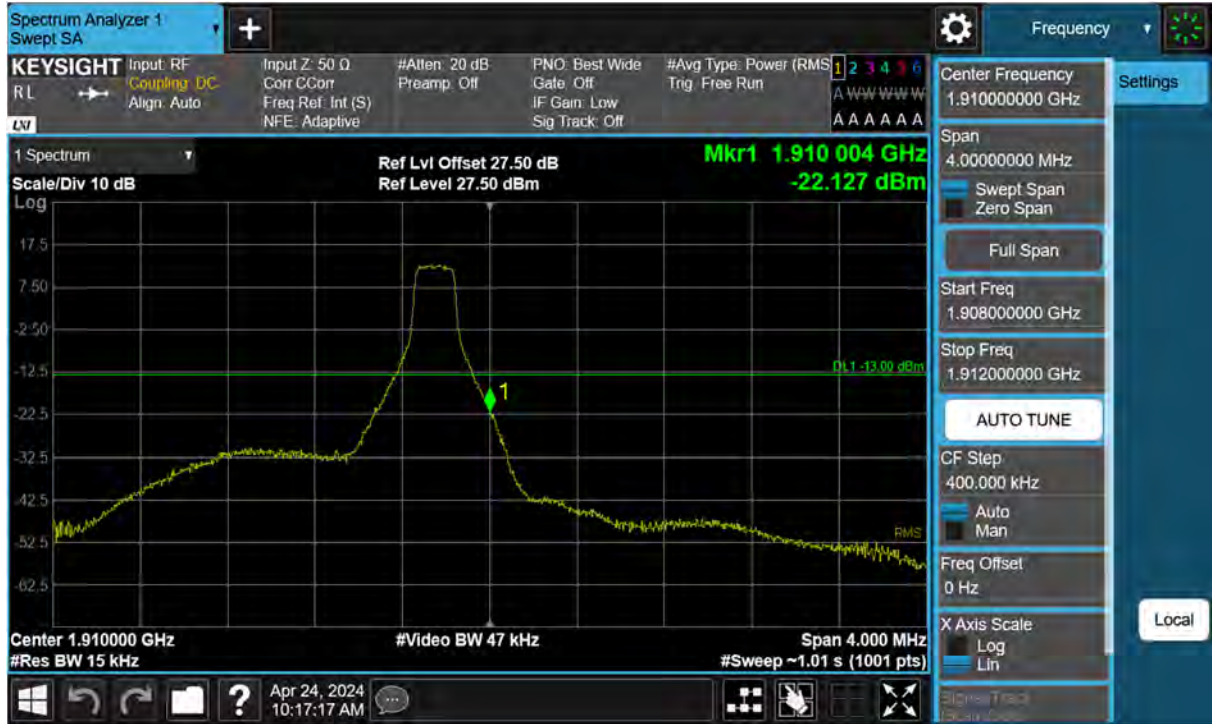
SM-F741B_LTE2_1.4 M_BandEdge_Low_QPSK_FullRB



SM-F741B_LTE2_1.4 M_Extended Band Edge_Low_QPSK_FullRB



SM-F741B_LTE2_1.4 M_BandEdge_High_QPSK_1RB



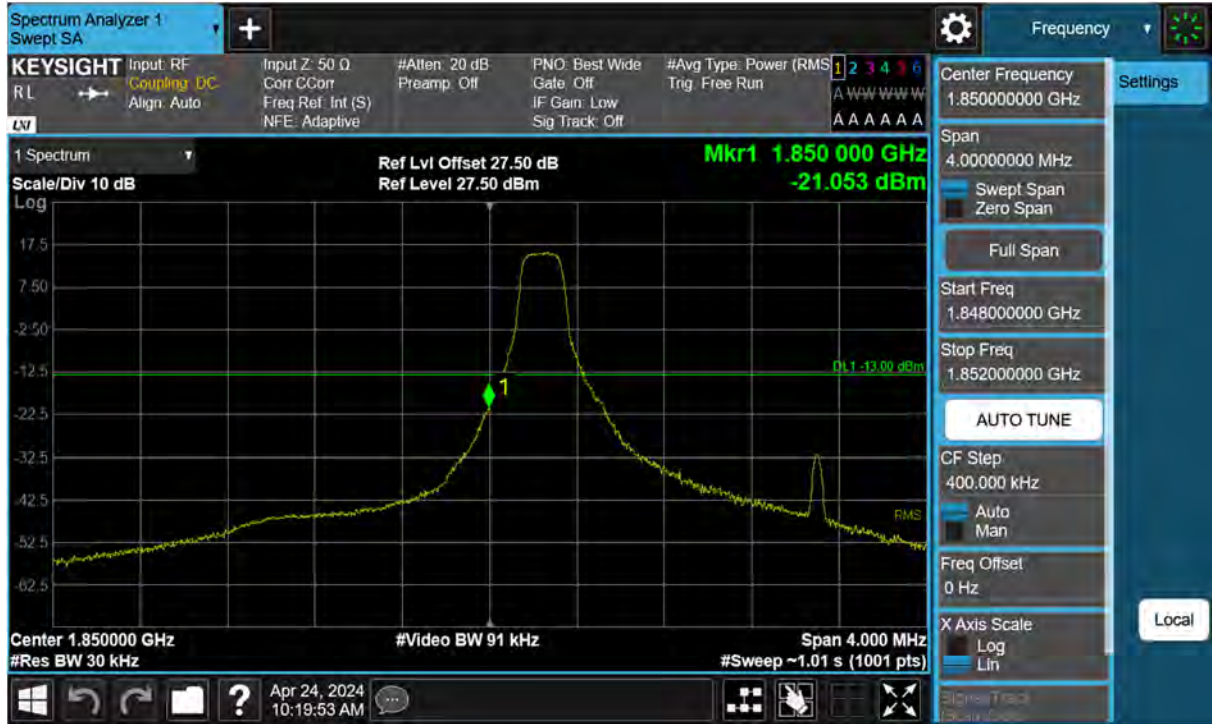
SM-F741B_LTE2_1.4 M_BandEdge_High_QPSK_FullRB



SM-F741B_LTE2_1.4 M_Extended Band Edge_High_QPSK_FullRB



SM-F741B_LTE2_3 M_BandEdge_Low_QPSK_1RB



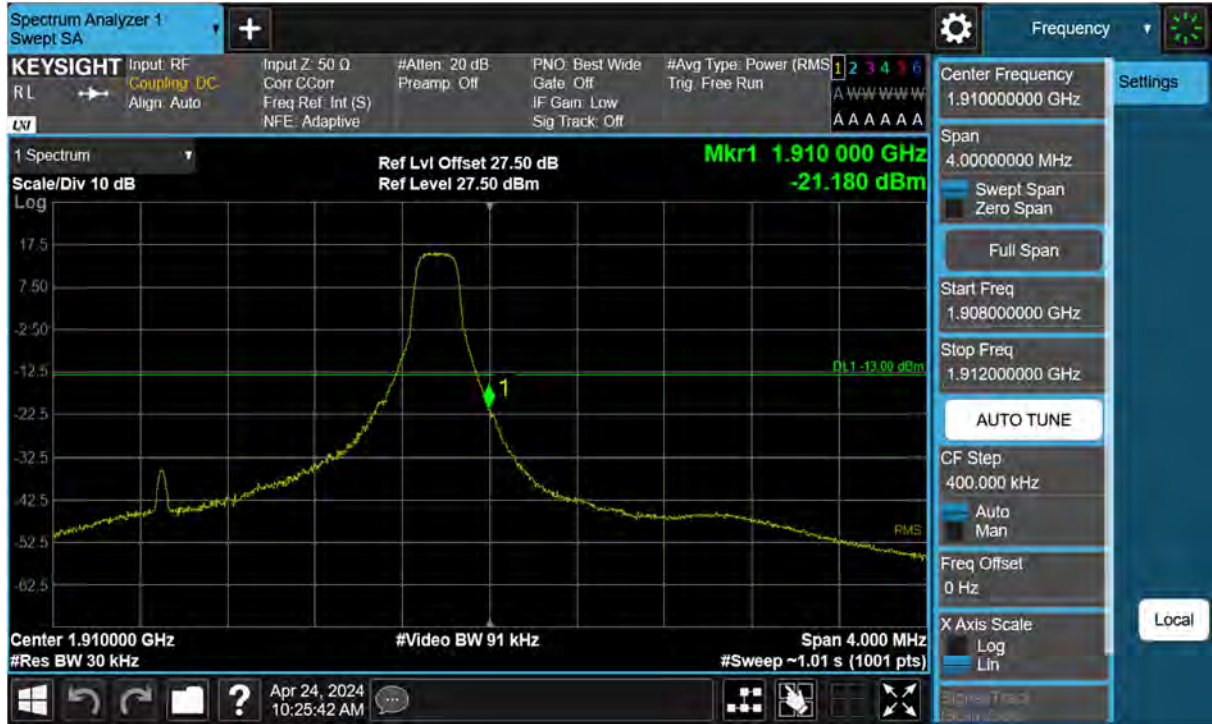
SM-F741B_LTE2_3 M_BandEdge_Low_QPSK_FullRB



SM-F741B_LTE2_3 M_Extended Band Edge_Low_QPSK_FullRB



SM-F741B_LTE2_3 M_BandEdge_High_QPSK_1RB



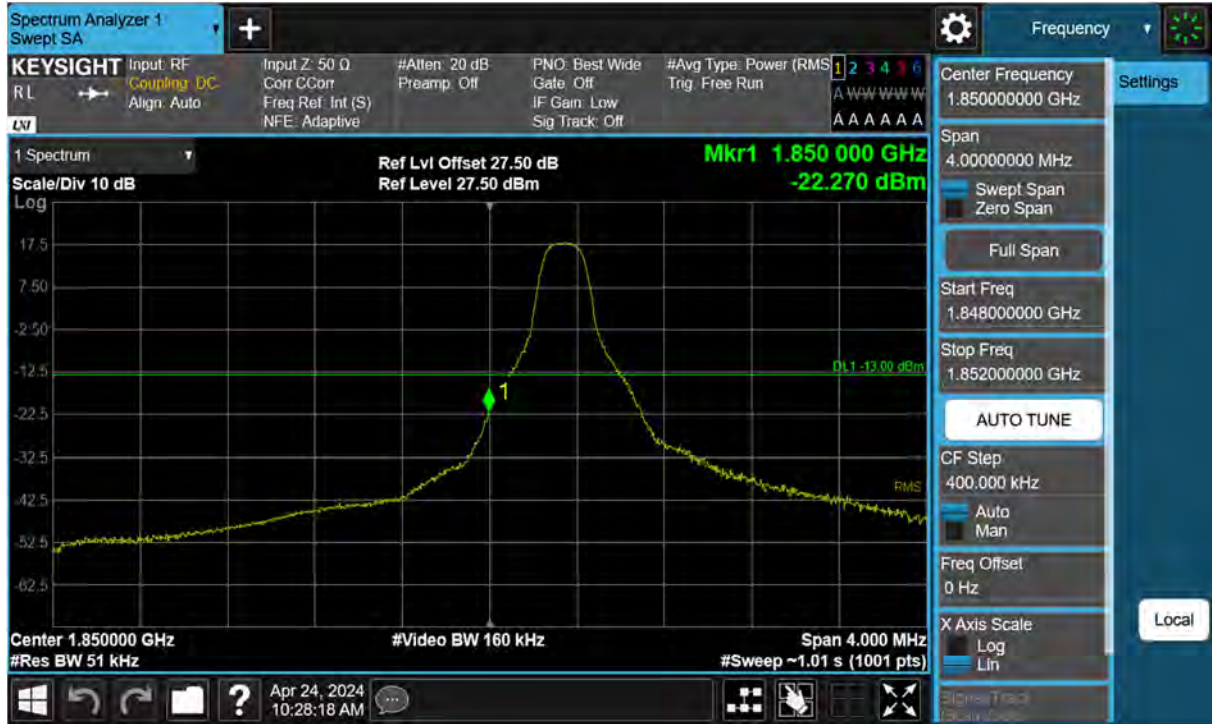
SM-F741B_LTE2_3 M_BandEdge_High_QPSK_FullRB



SM-F741B_LTE2_3 M_Extended Band Edge_High_QPSK_FullRB



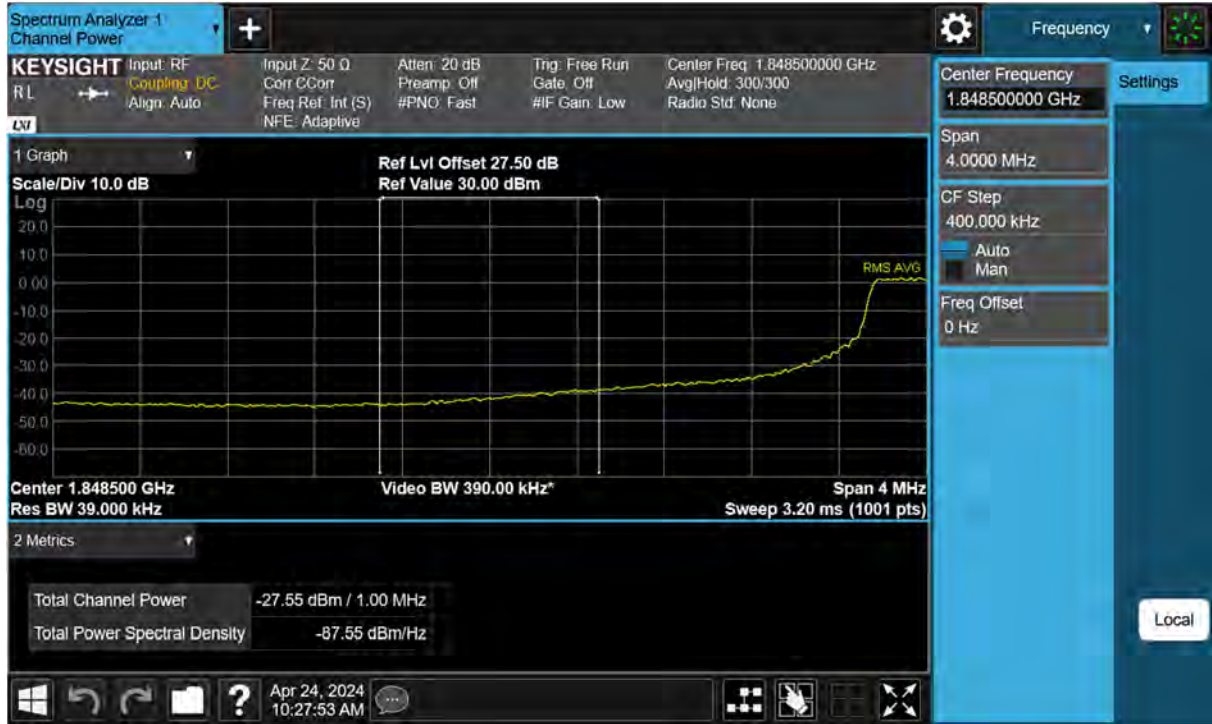
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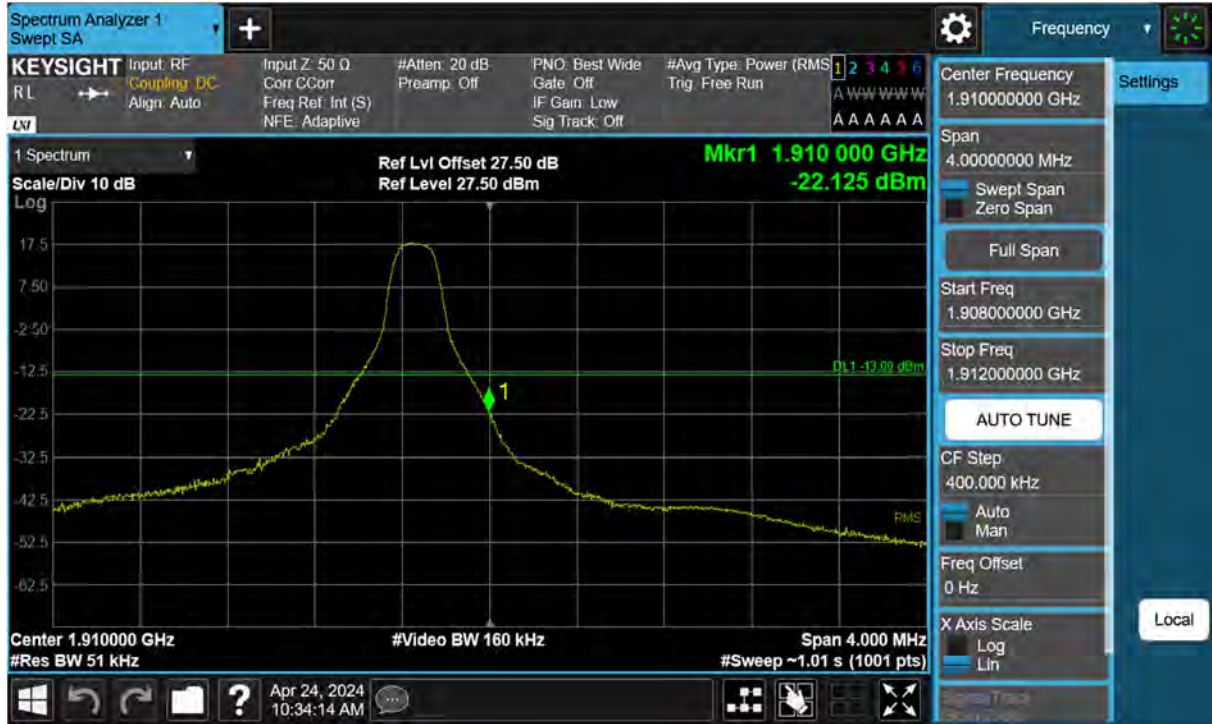
SM-F741B_LTE2_5 M_BandEdge_Low_QPSK_FullRB



SM-F741B_LTE2_5 M_BandEdge_Low_QPSK_FullRB



SM-F741B_LTE2_5 M_BandEdge_High_QPSK_1RB



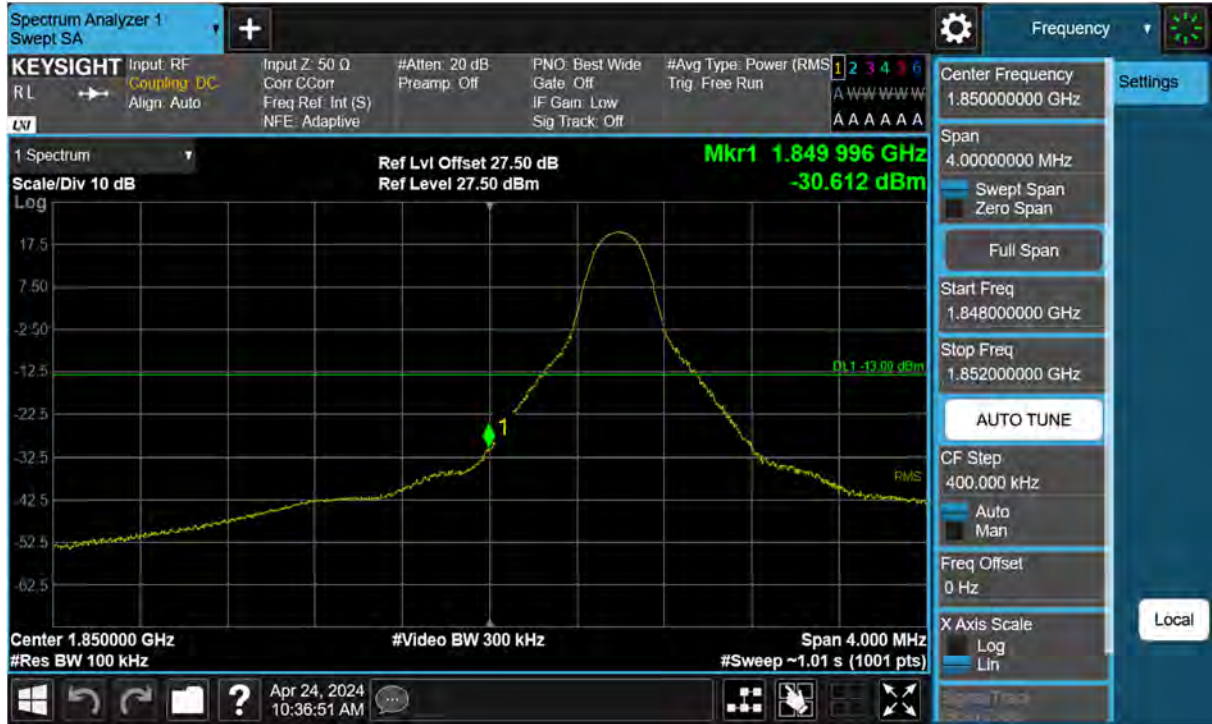
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SM-F741B_LTE2_5 M_Extended Band Edge_High_QPSK_FullRB



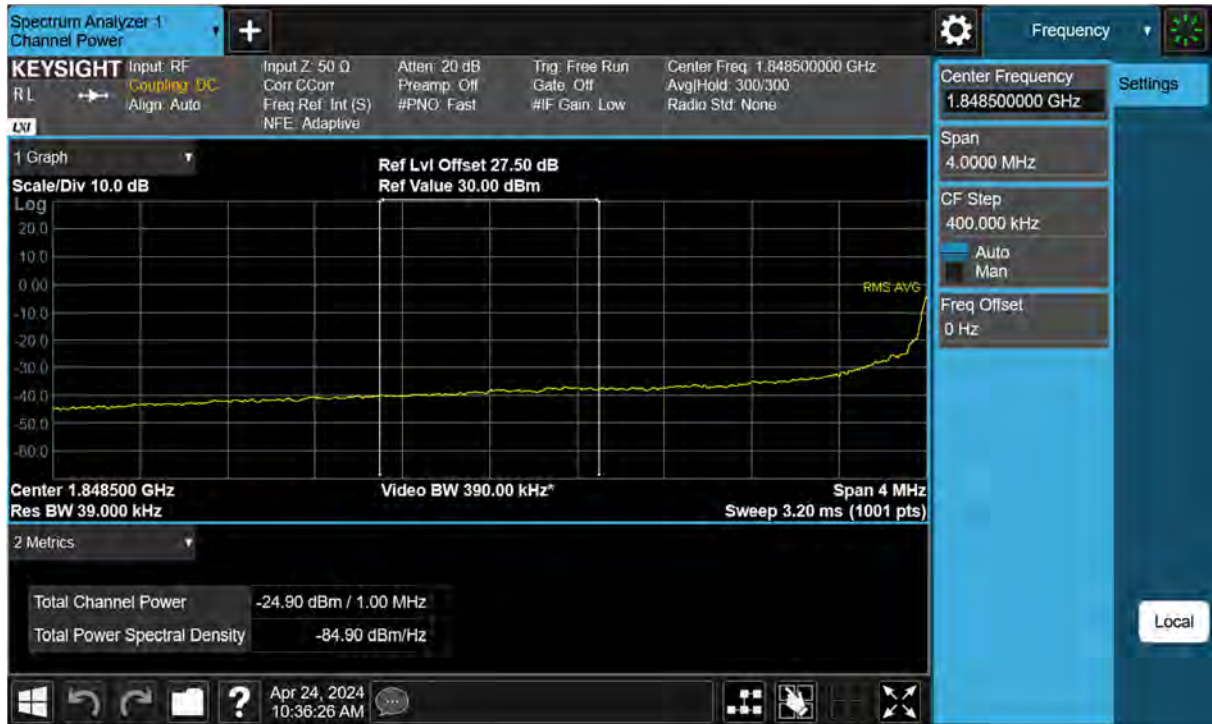
SM-F741B_LTE2_10 M_BandEdge_Low_QPSK_1RB



SM-F741B_LTE2_10 M_BandEdge_Low_QPSK_FullRB



SM-F741B_LTE2_10 M_Extended Band Edge_Low_QPSK_FullRB



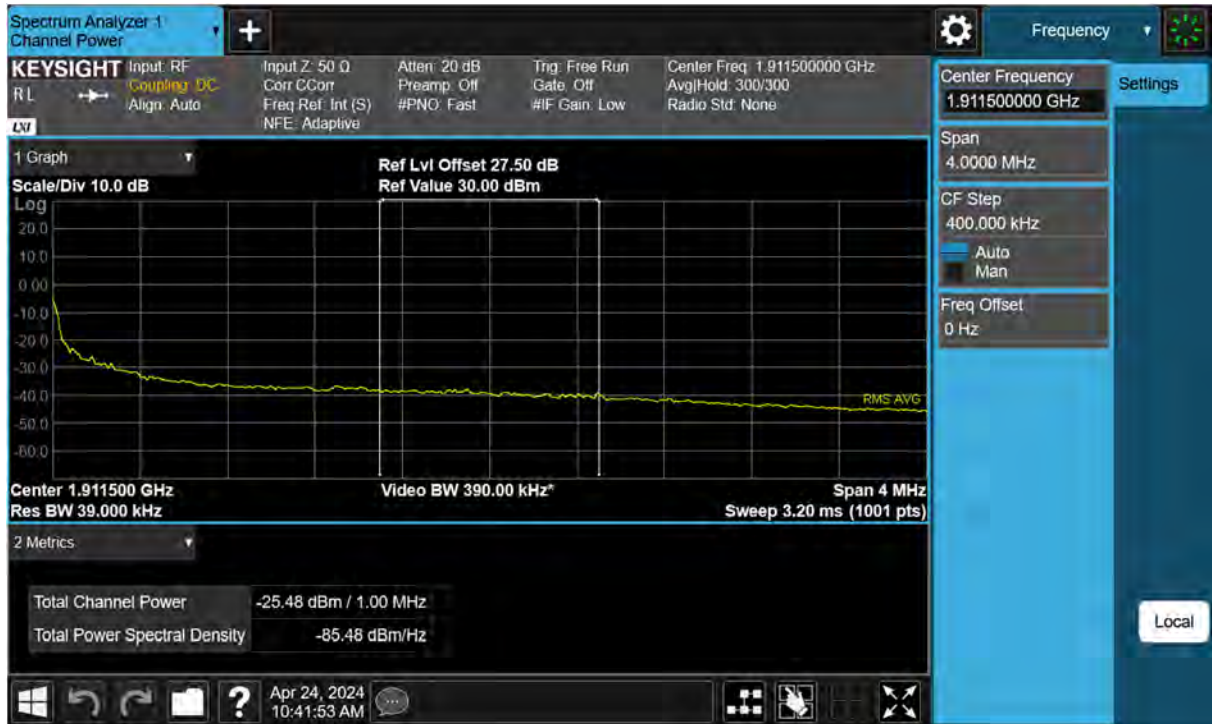
SM-F741B_LTE2_10 M_BandEdge_High_QPSK_1RB



SM-F741B_LTE2_10 M_BandEdge_High_QPSK_FullRB



SM-F741B_LTE2_10 M_Extended Band Edge_High_QPSK_FullRB



SM-F741B_LTE2_15 M_BandEdge_Low__QPSK_1RB



SM-F741B_LTE2_15 M_BandEdge_Low_QPSK_FullRB



SM-F741B_LTE2_15 M_Extended Band Edge_Low_QPSK_FullRB



SM-F741B_LTE2_15 M_BandEdge_High_QPSK_1RB



SM-F741B_LTE2_15 M_BandEdge_High_QPSK_FullRB



SM-F741B_LTE2_15 M_Extended Band Edge_High_QPSK_FullRB



SM-F741B_LTE2_20 M_BandEdge_Low_QPSK_1RB



SM-F741B_LTE2_20 M_BandEdge_Low_QPSK_FullRB



SM-F741B_LTE2_20 M_Extended Band Edge_Low_QPSK_FullRB



SM-F741B_LTE2_20 M_BandEdge_High_QPSK_1RB



SM-F741B_LTE2_20 M_BandEdge_High_QPSK_FullRB



SM-F741B_LTE2_20 M_Extended Band Edge_High_QPSK_FullRB



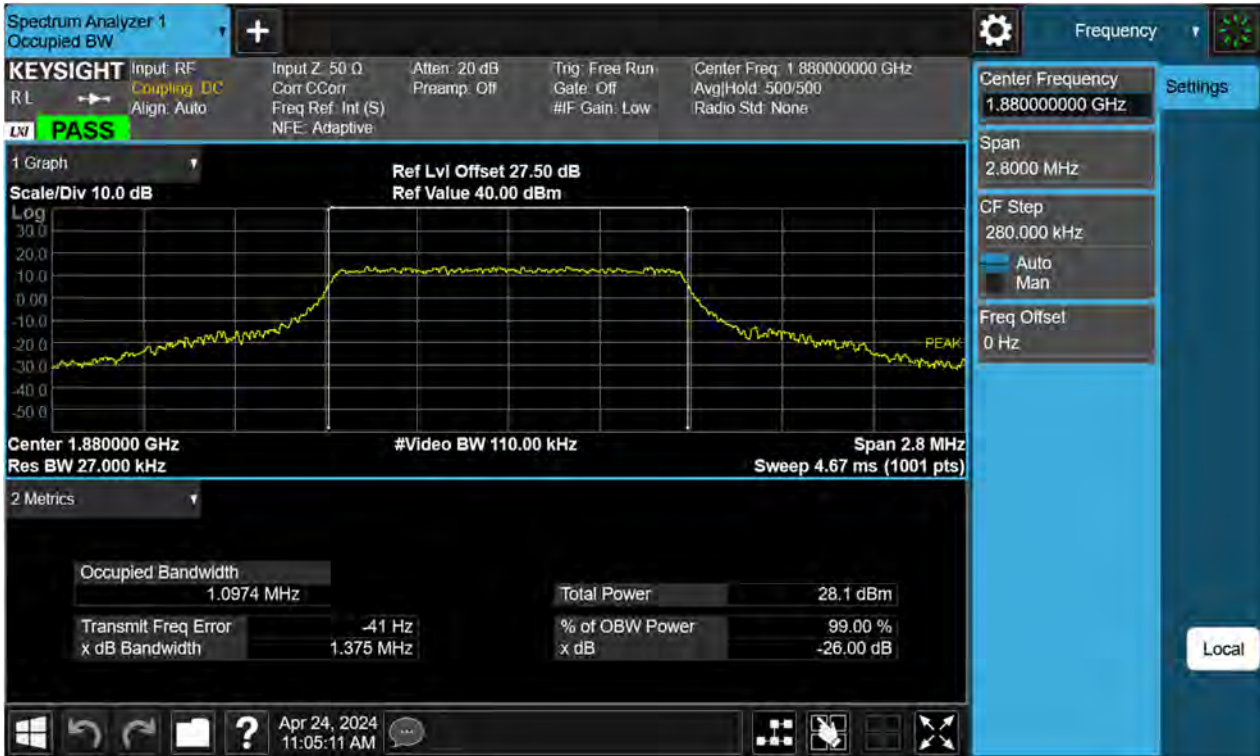
SM-F741B_LTE2_1.4 M_OBW_Middle Channel_QPSK_FullRB



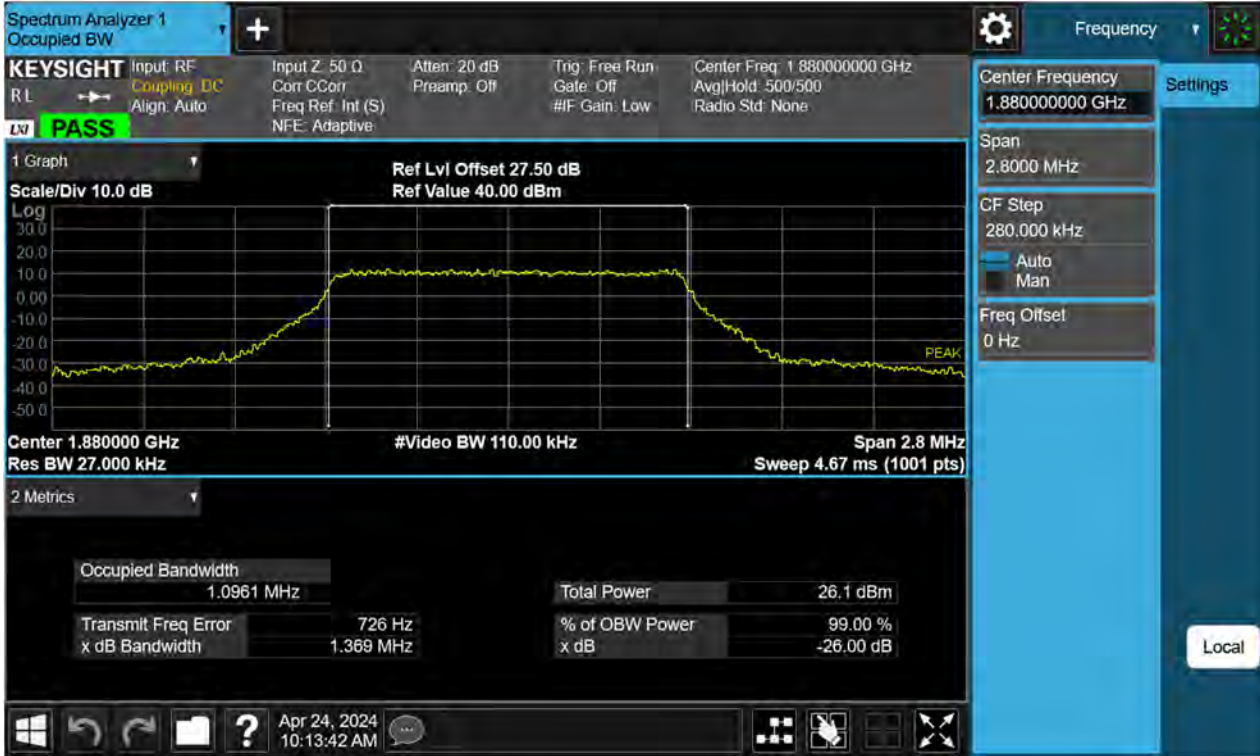
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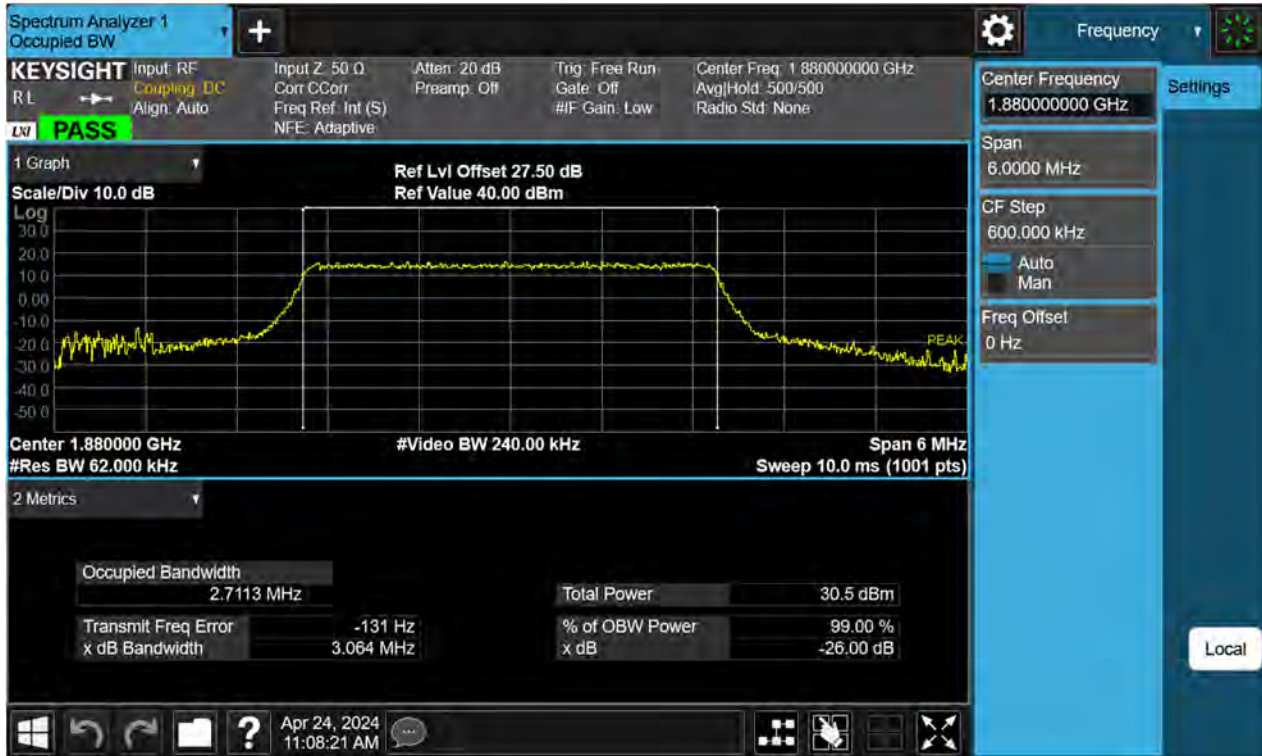
SM-F741B_LTE2_1.4 M_OBW_Middle Channel_64QAM_FullRB



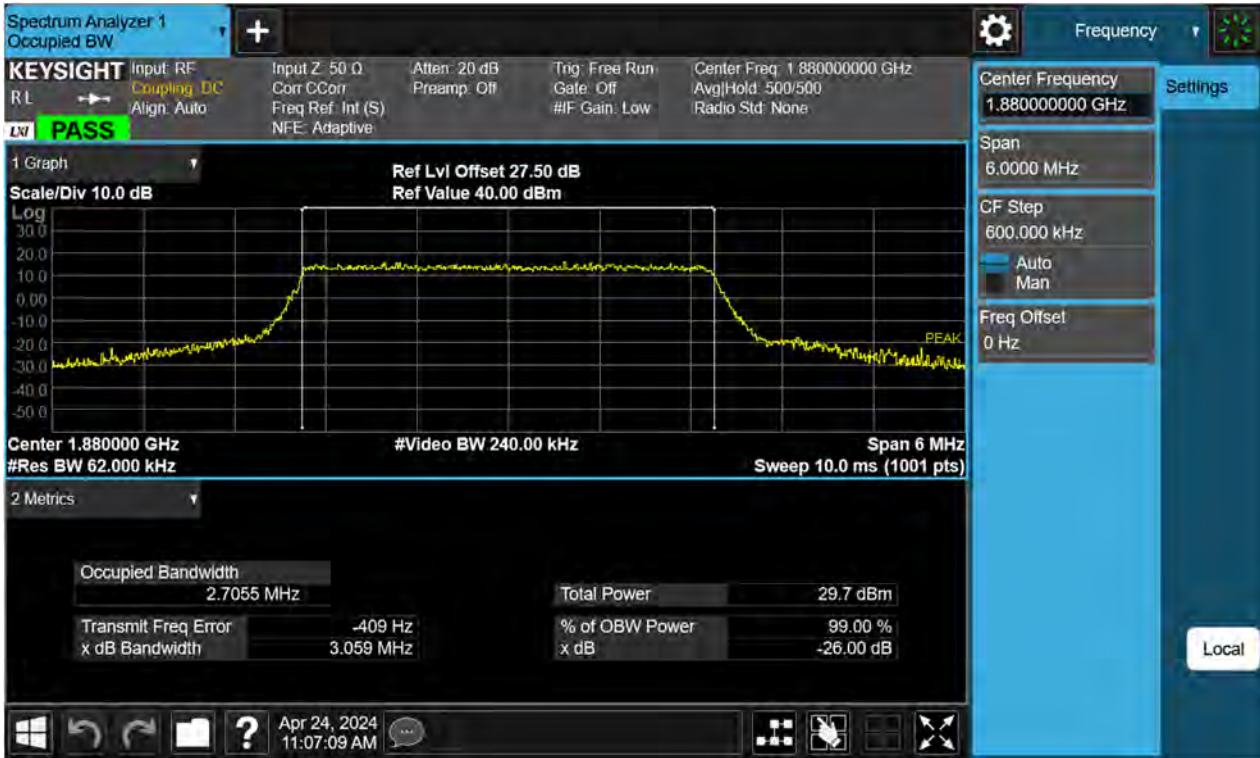
SM-F741B_LTE2_1.4 M_OBW_Middle Channel_256QAM_FullRB



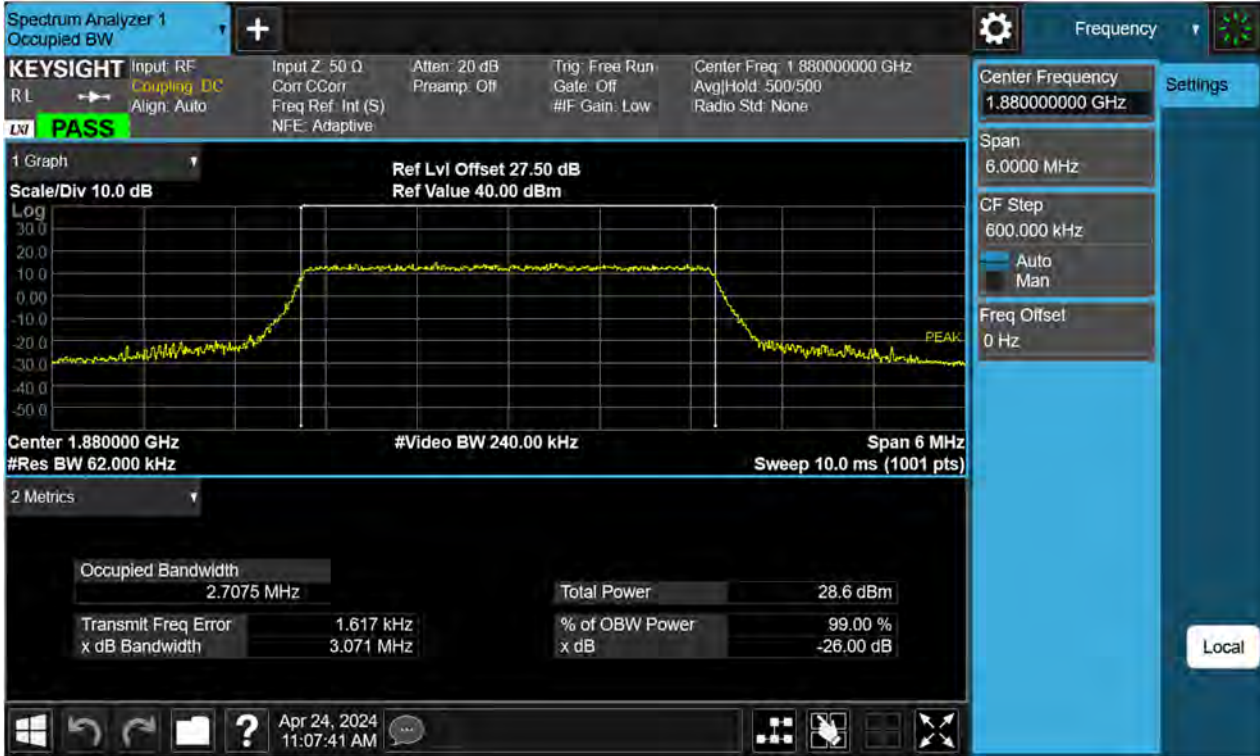
SM-F741B_LTE2_3 M_OBW_Middle Channel_QPSK_FullRB



SM-F741B_LTE2_3 M_OBW_Middle Channel_16QAM_FullRB



SM-F741B_LTE2_3 M_OBW_Middle Channel_64QAM_FullRB



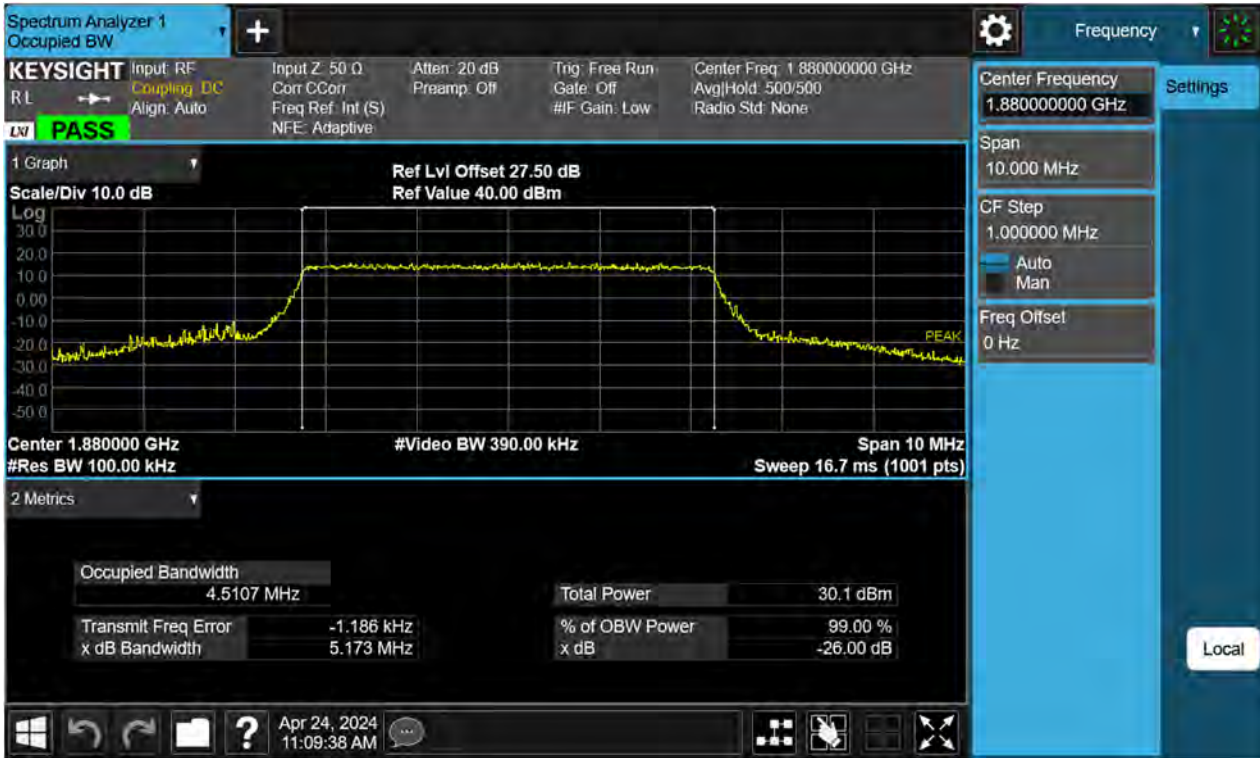
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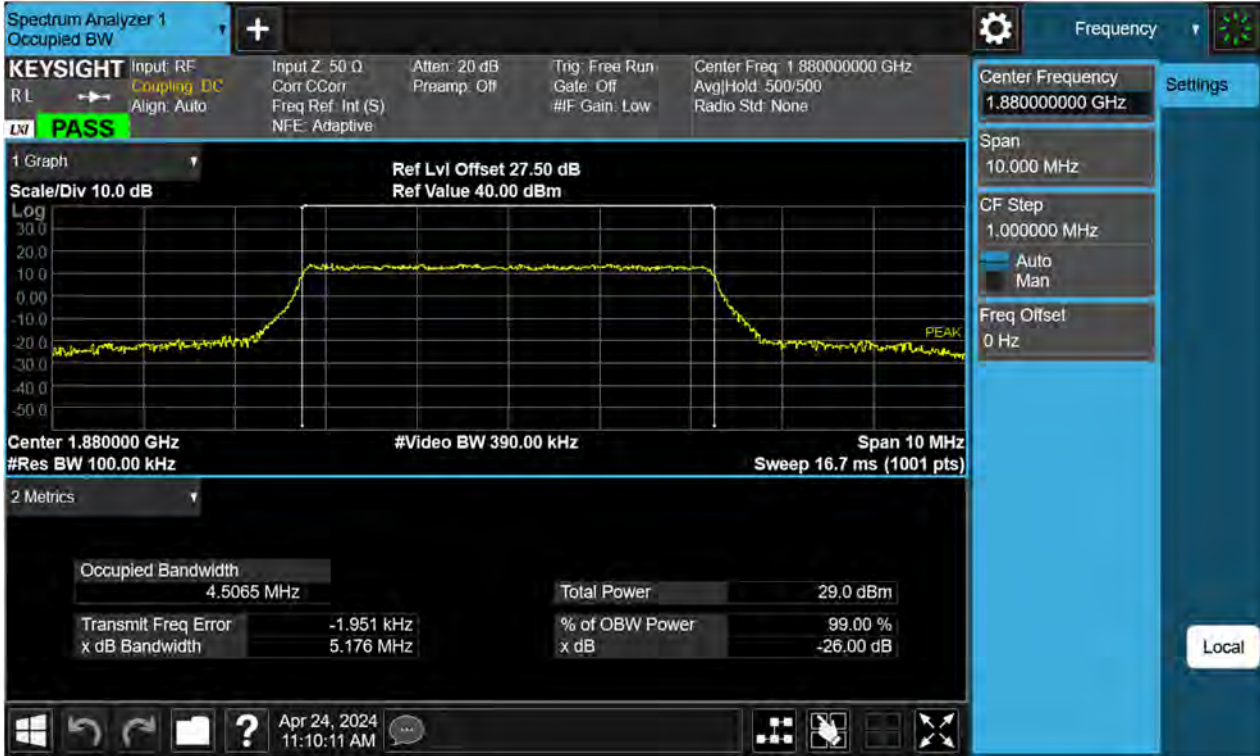
SM-F741B_LTE2_5 M_OBW_Middle Channel_QPSK_FullRB



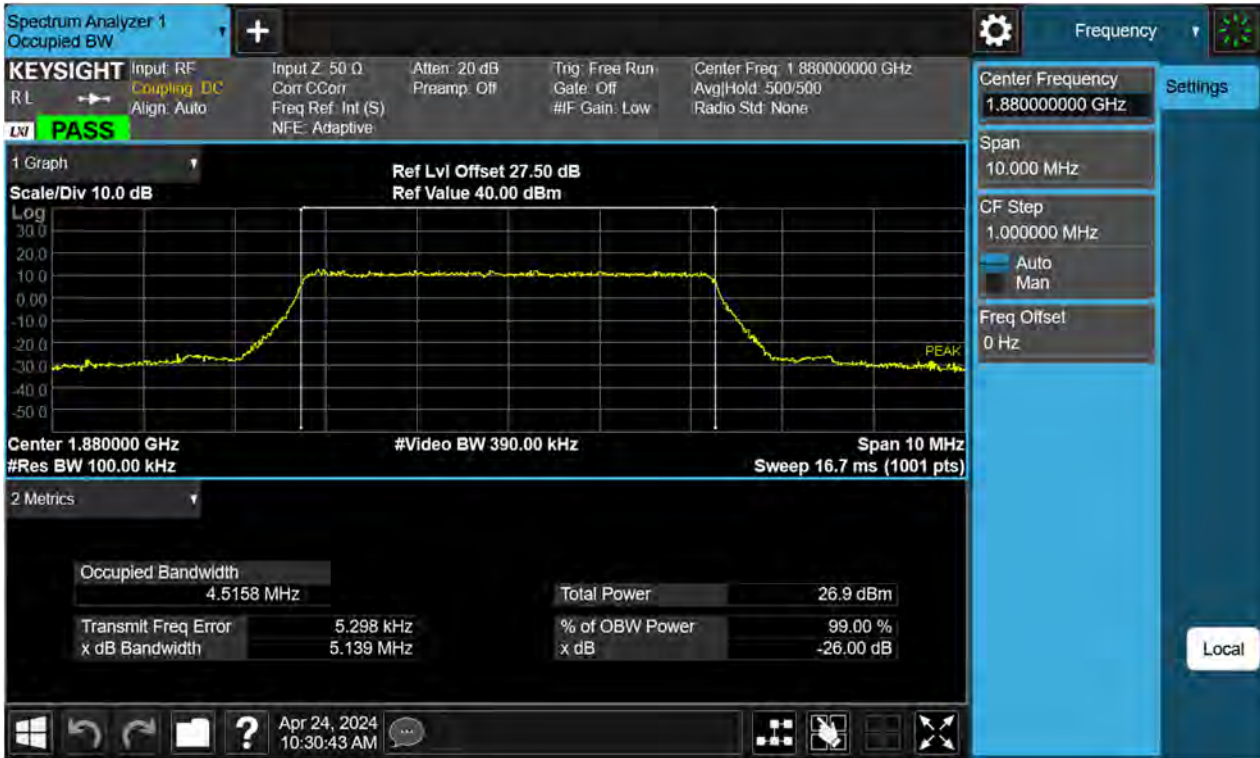
SM-F741B_LTE2_5 M_OBW_Middle Channel_16QAM_FullRB



SM-F741B_LTE2_5 M_OBW_Middle Channel_64QAM_FullRB



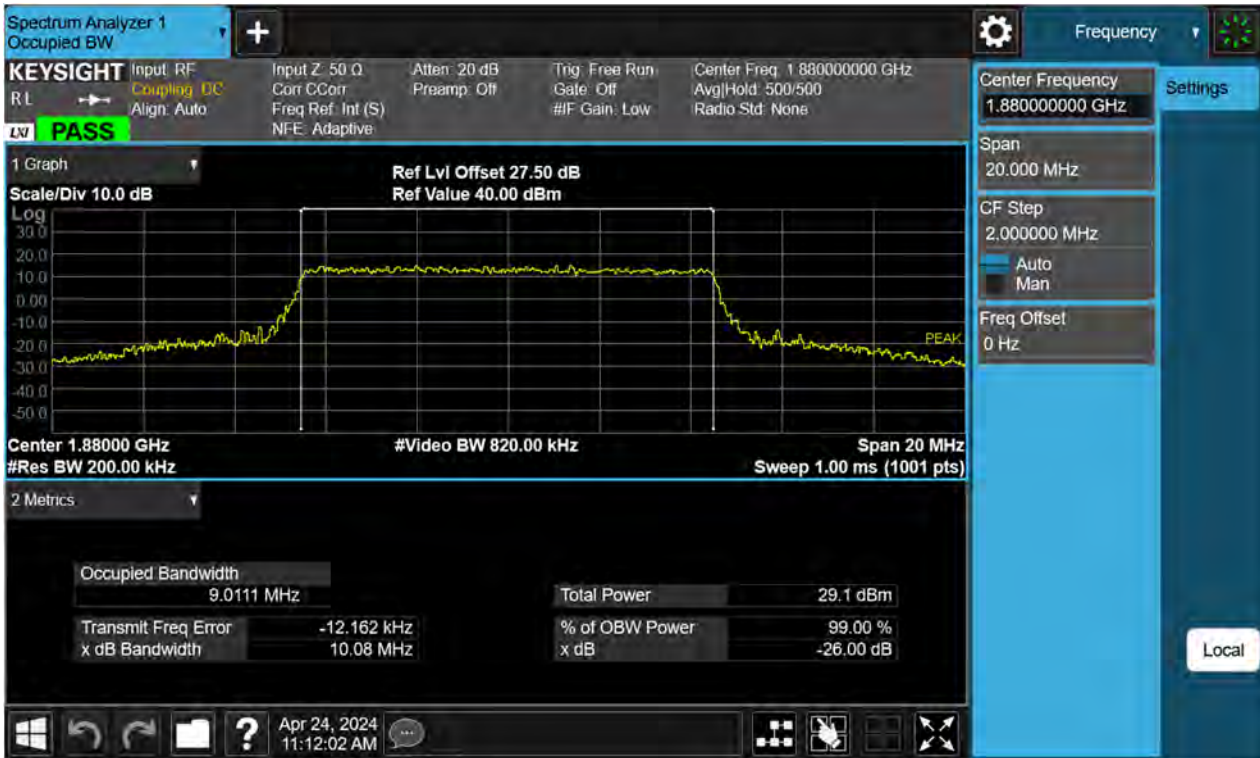
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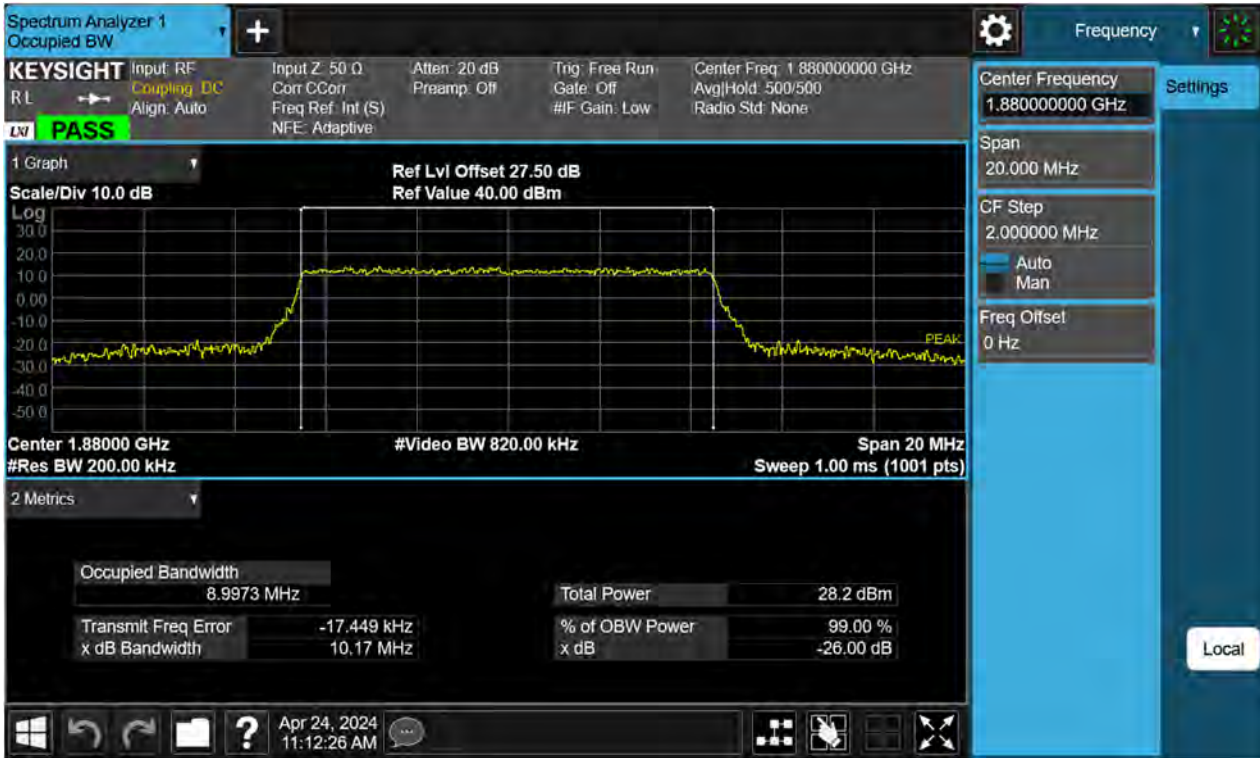
SM-F741B_LTE2_10 M_OBW_Middle Channel_QPSK_FullRB



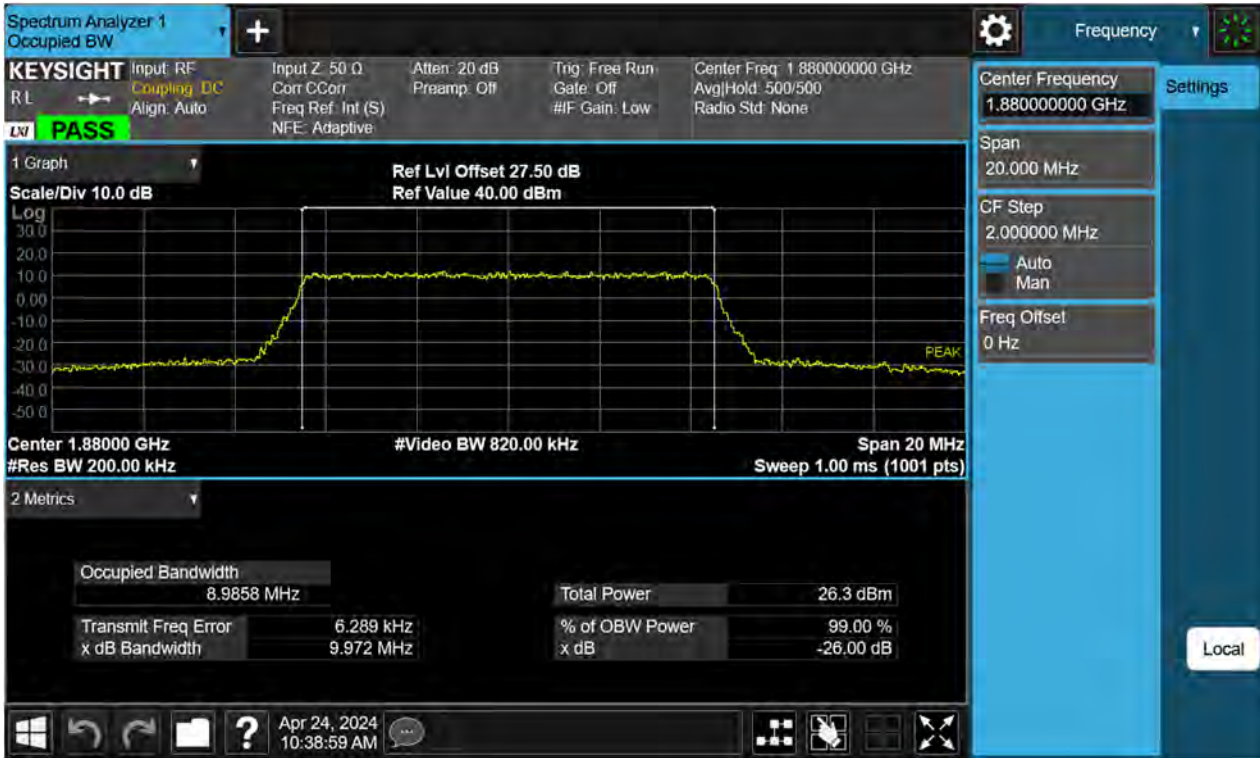
SM-F741B_LTE2_10 M_OBW_Middle Channel_16QAM_FullRB



SM-F741B_LTE2_10 M_OBW_Middle Channel_64QAM_FullRB



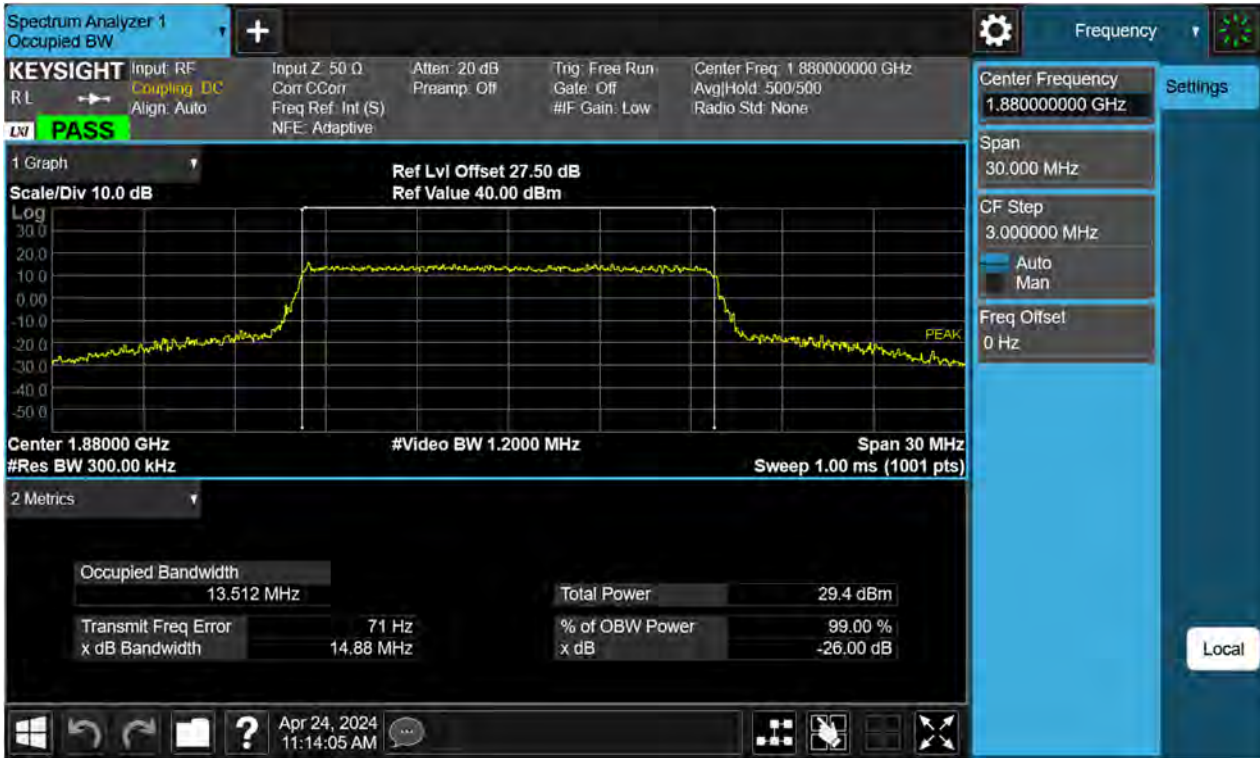
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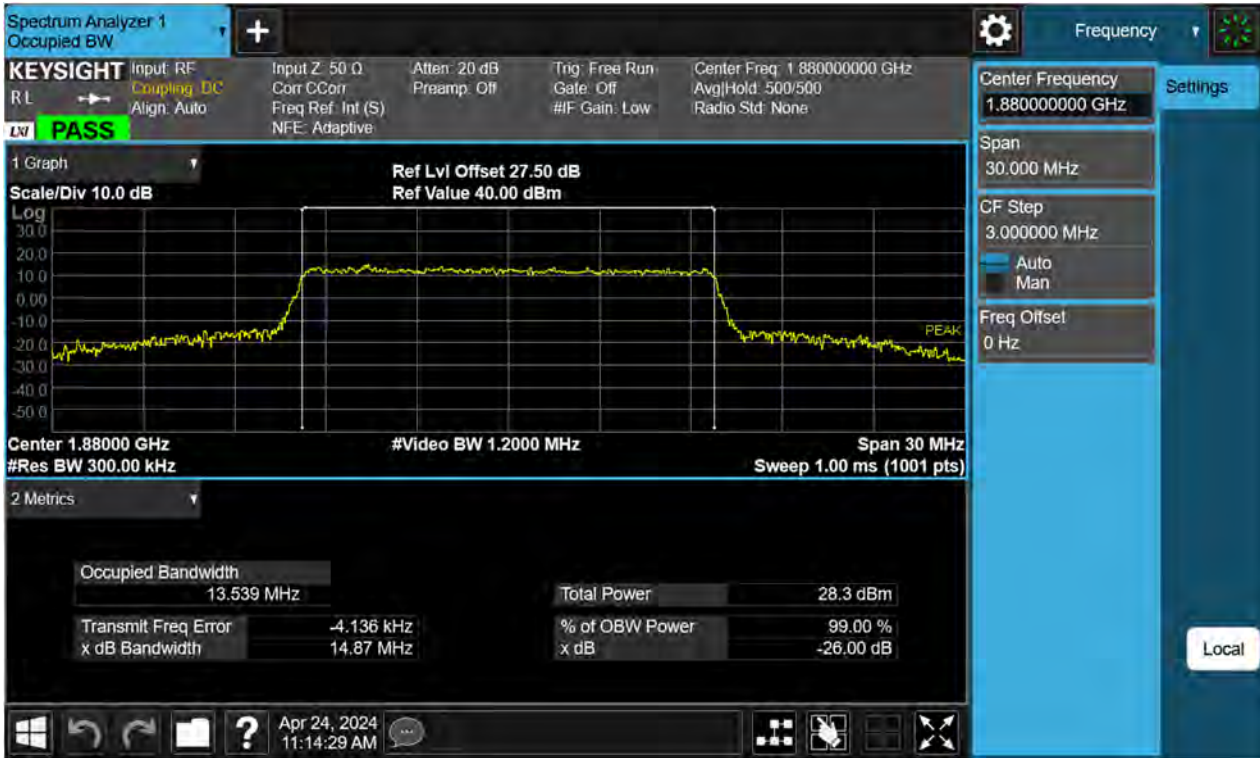
SM-F741B_LTE2_15 M_OBW_Middle Channel_QPSK_FullRB



SM-F741B_LTE2_15 M_OBW_Middle Channel_16QAM_FullRB



SM-F741B_LTE2_15 M_OBW_Middle Channel_64QAM_FullRB



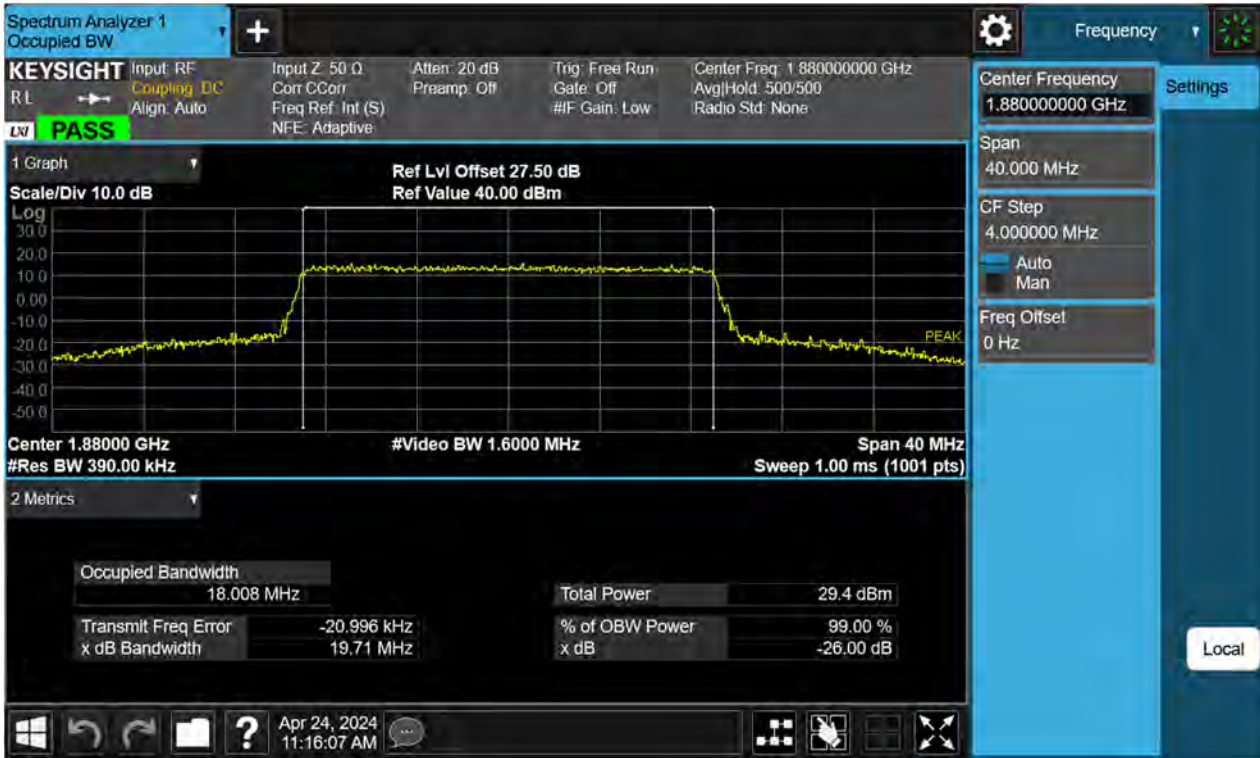
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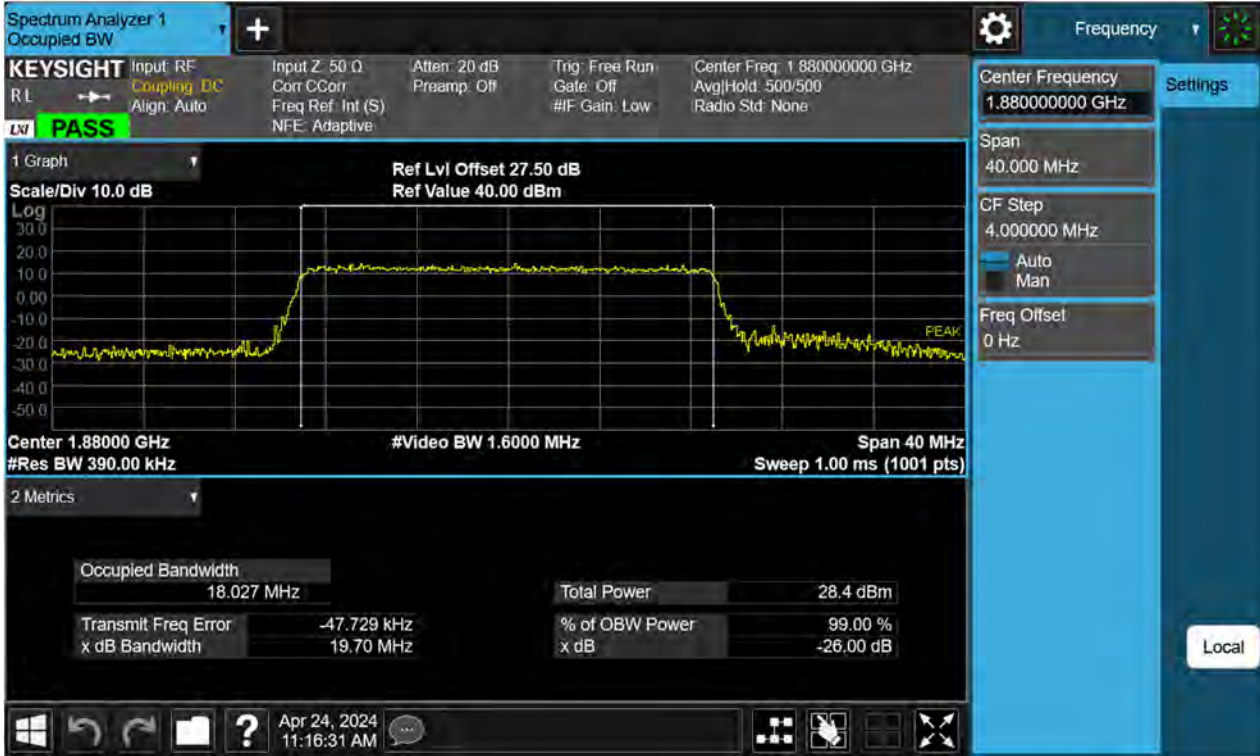
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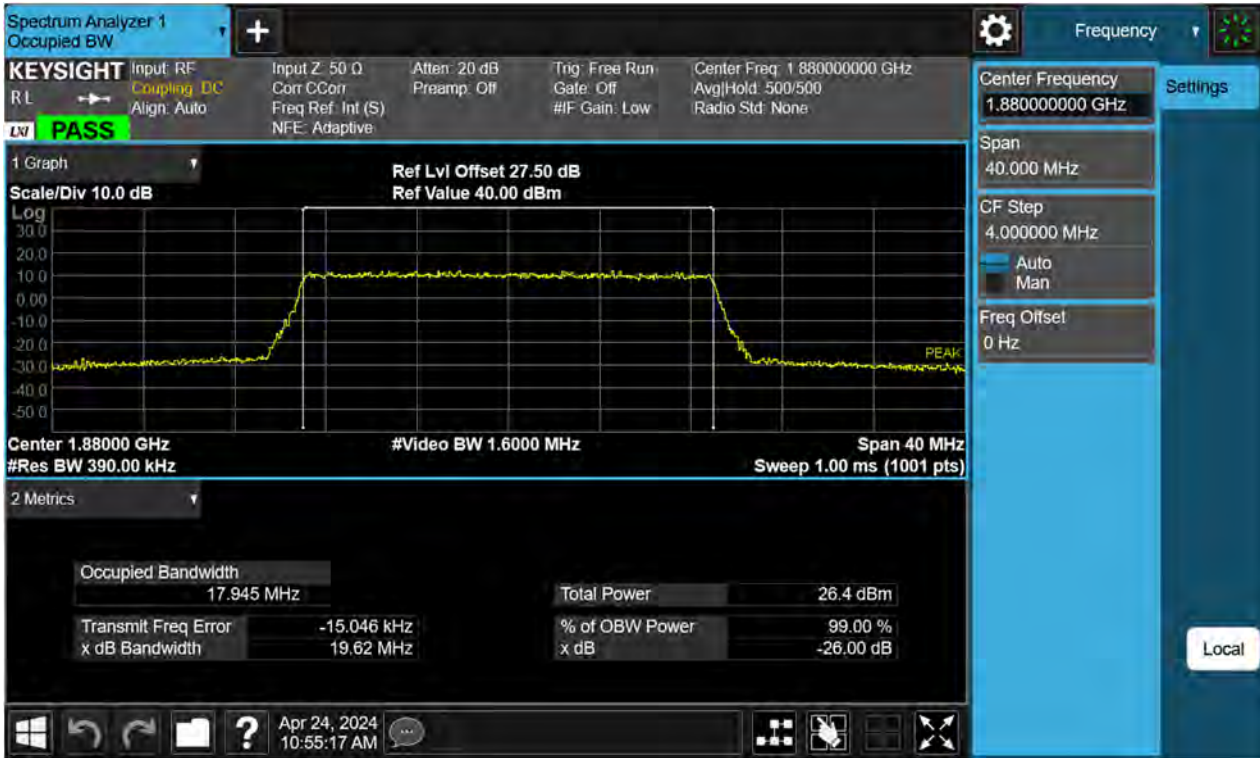
SM-F741B_LTE2_20 M_OBW_Middle Channel_16QAM_FullRB



SM-F741B_LTE2_0 M_OBW_Middle Channel_64QAM_FullRB



SM-F741B_LTE2_20 M_OBW_Middle Channel_256QAM_FullRB



SM-F741B_LTE2_1.4 M_PAR_Middle Channel_QPSK_FullRB



SM-F741B_LTE2_1.4 M_PAR_Middle Channel_16QAM_FullRB



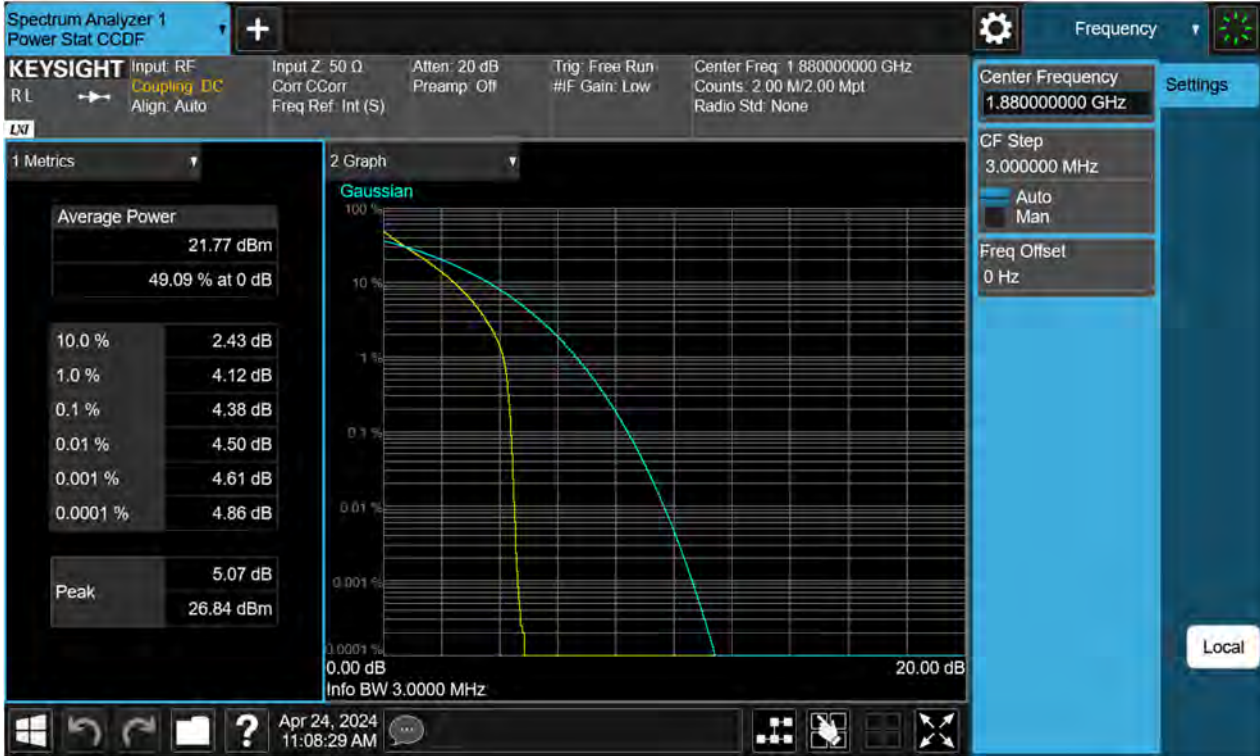
SM-F741B_LTE2_1.4 M_PAR_Middle Channel_64QAM_FullRB



SM-F741B_LTE2_1.4 M_PAR_Middle Channel_256QAM_FullRB



SM-F741B_LTE2_3 M_PAR_Middle Channel_QPSK_FullRB



SM-F741B_LTE2_3 M_PAR_Middle Channel_16QAM_FullRB



SM-F741B_LTE2_3 M_PAR_Middle Channel_64QAM_FullRB



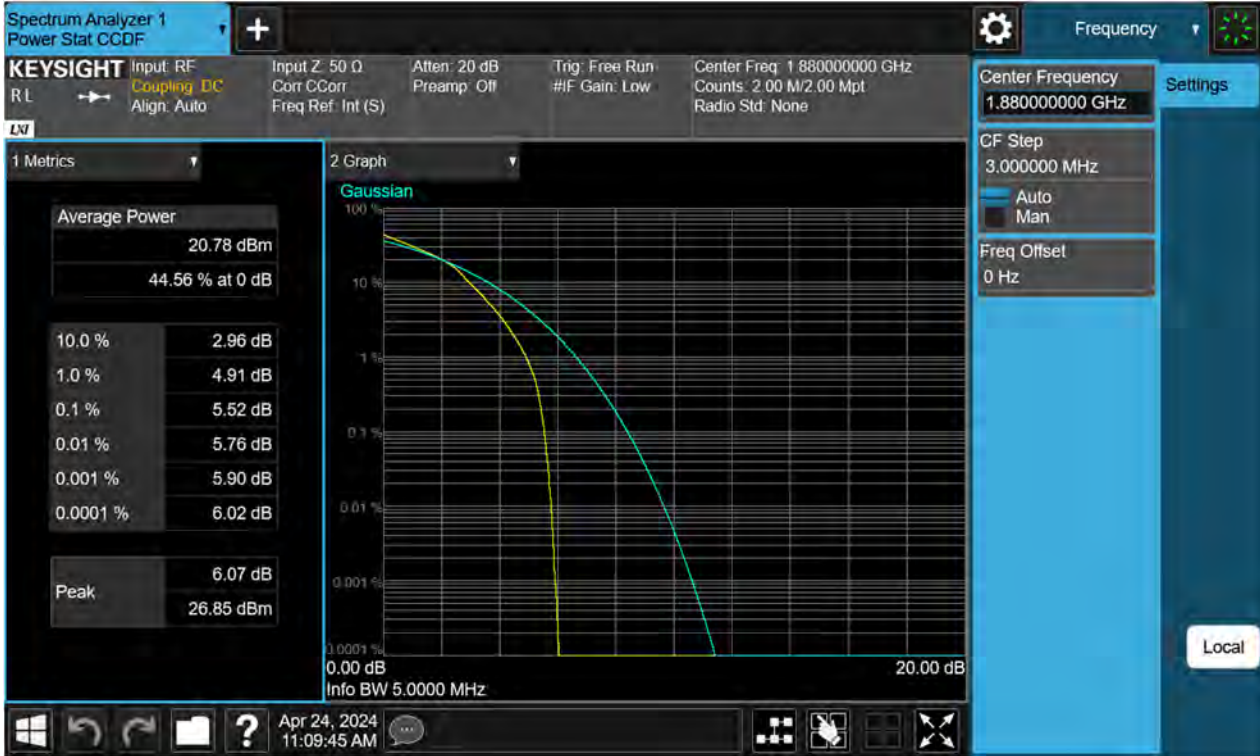
SM-F741B_LTE2_3 M_PAR_Middle Channel_256QAM_FullRB



SM-F741B_LTE2_5 M_PAR_Middle Channel_QPSK_FullRB



SM-F741B_LTE2_5 M_PAR_Middle Channel_16QAM_FullRB



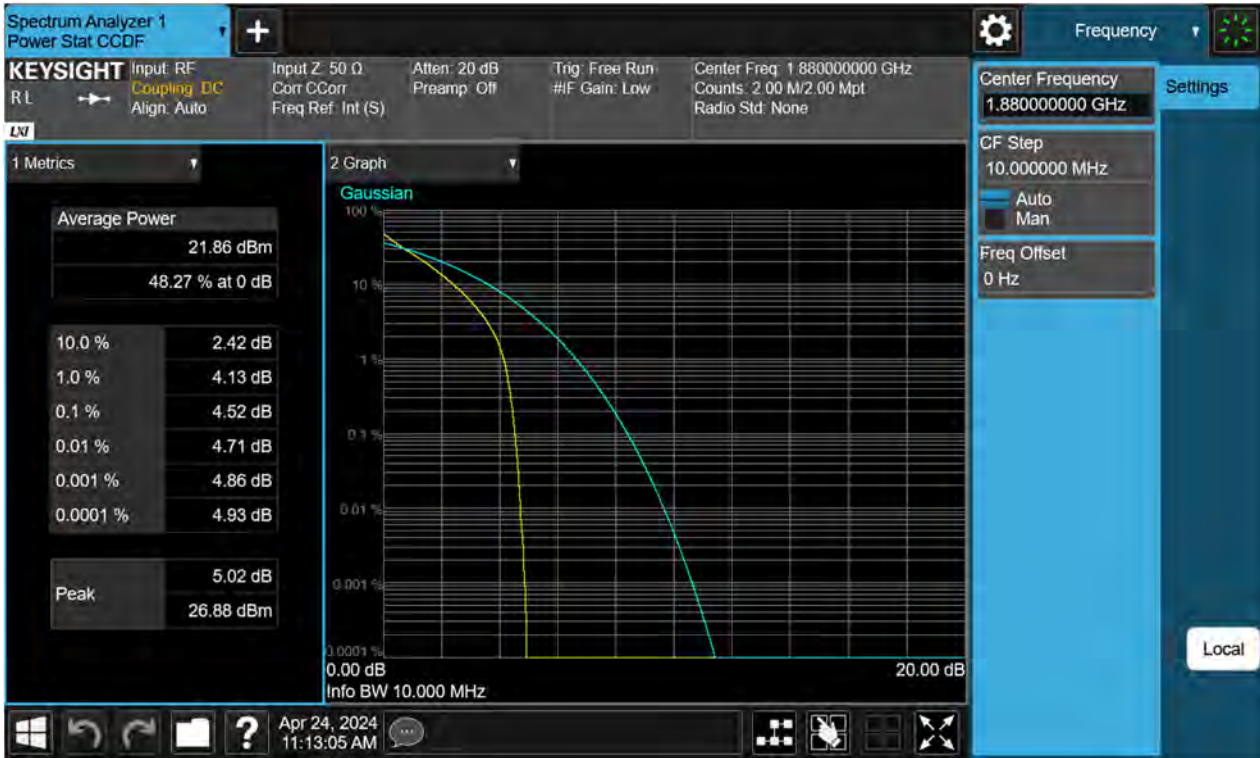
SM-F741B_LTE2_5 M_PAR_Middle Channel_64QAM_FullRB



SM-F741B_LTE2_5 M_PAR_Middle Channel_256QAM_FullRB



SM-F741B_LTE2_10 M_PAR_Middle Channelz_QPSK_FullRB



SM-F741B_LTE2_10 M_PAR_Middle Channel_16QAM_FullRB



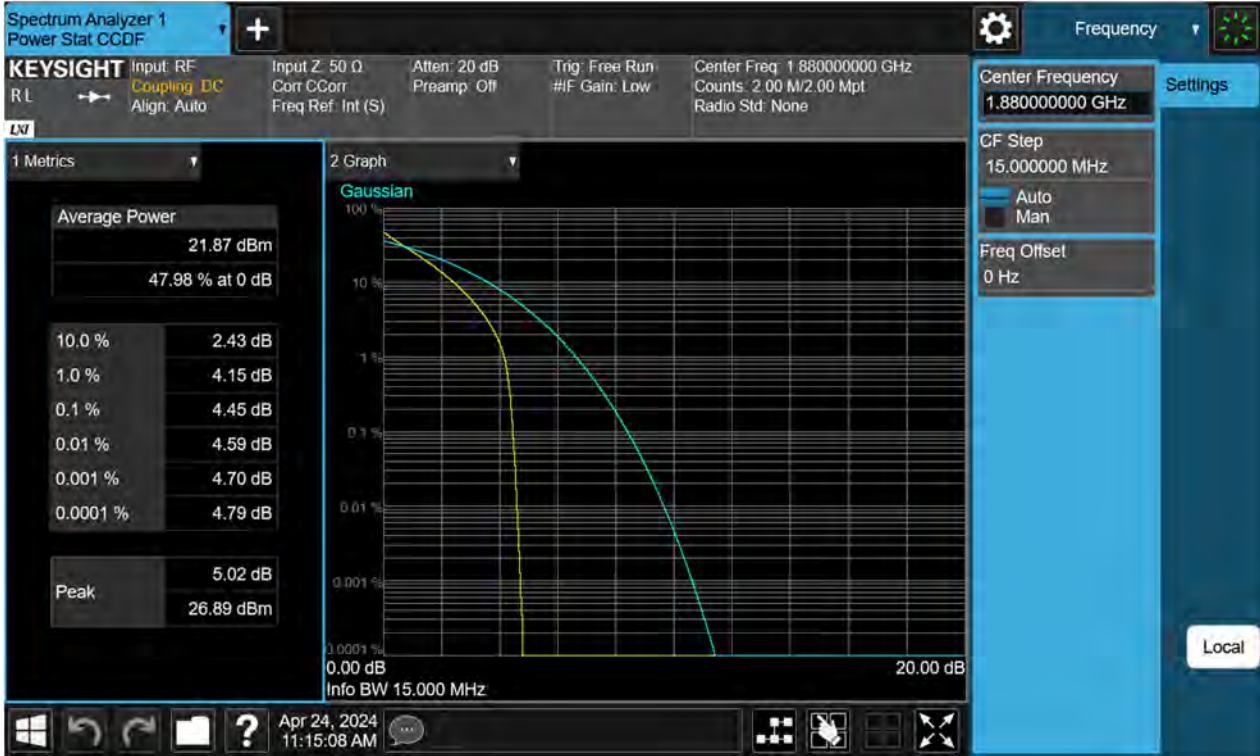
SM-F741B_LTE2_10 M_PAR_Middle Channel_64QAM_FullRB



SM-F741B_LTE2_10 M_PAR_Middle Channel_256QAM_FullRB



SM-F741B_LTE2_15 M_PAR_Middle Channel_QPSK_FullRB



SM-F741B_LTE2_15 M_PAR_Middle Channel_16QAM_FullRB



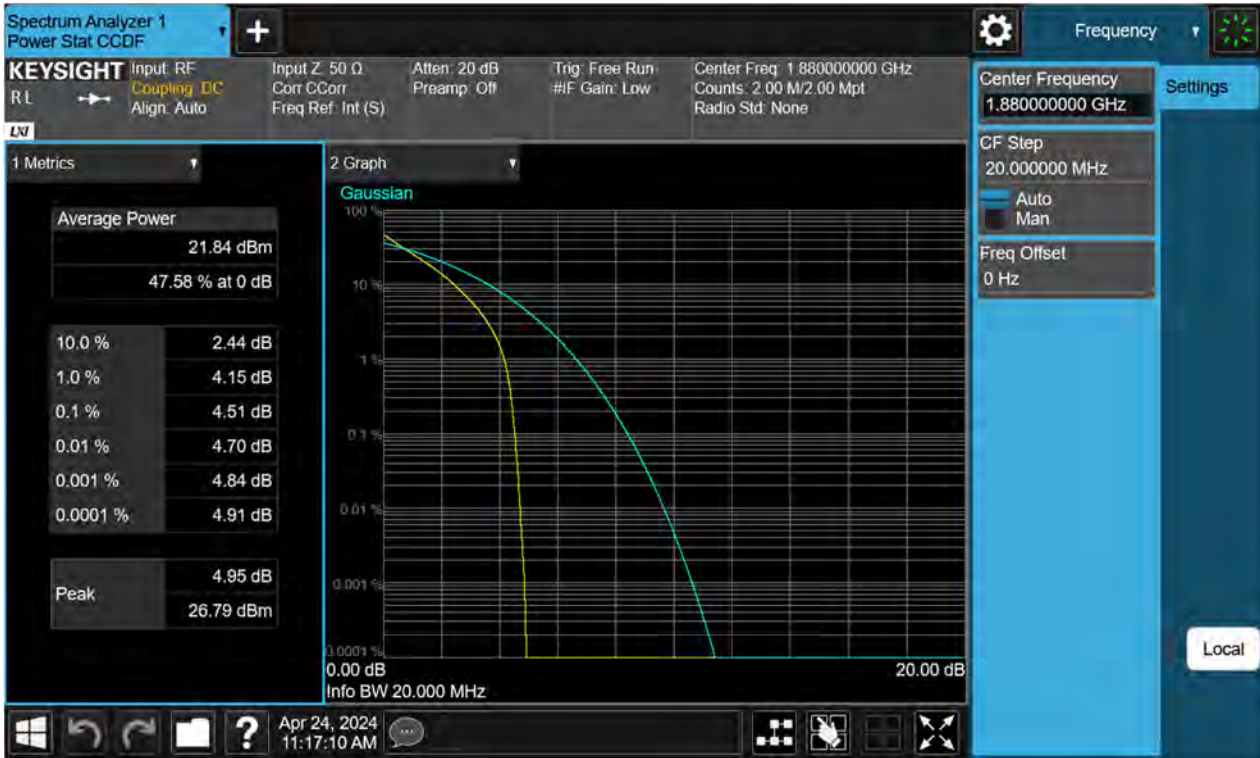
SM-F741B_LTE2_15 M_PAR_Middle Channel_64QAM_FullRB



SM-F741B_LTE2_15 M_PAR_Middle Channel_256QAM_FullRB



SM-F741B_LTE2_20 M_PAR_Middle Channel_QPSK_FullRB



SM-F741B_LTE2_20 M_PAR_Middle Channel_16QAM_FullRB



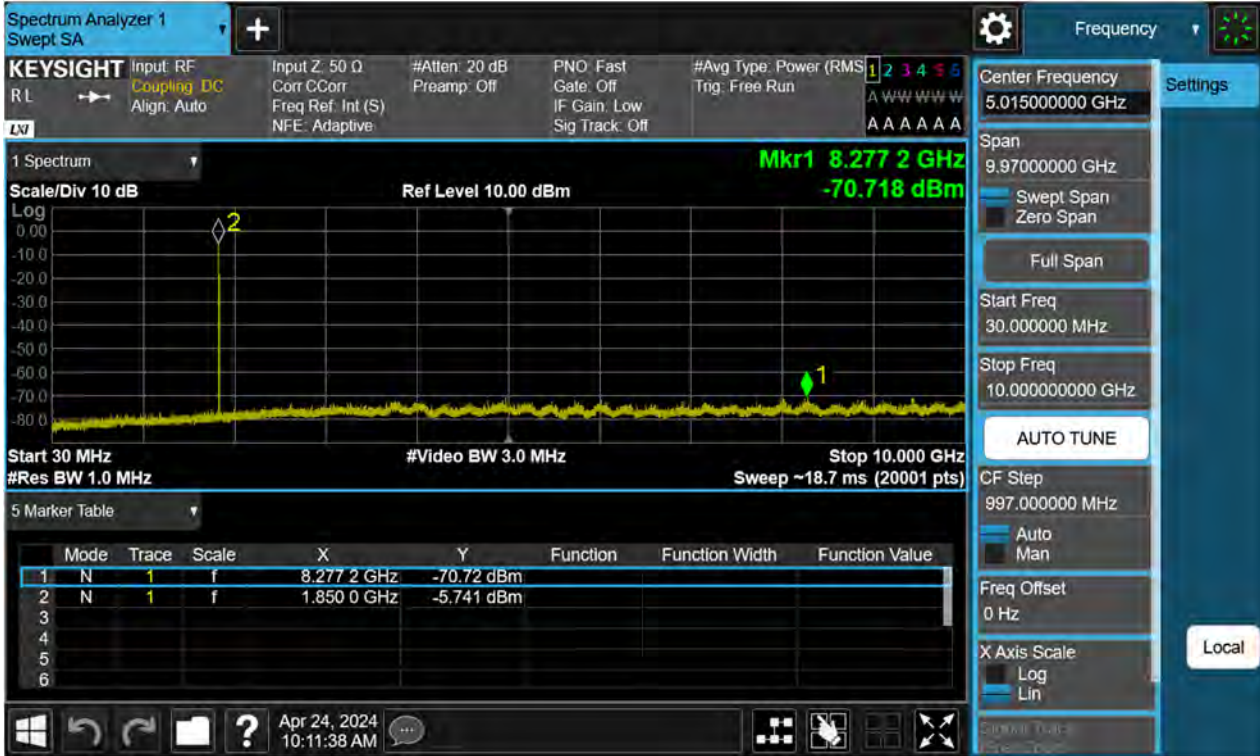
SM-F741B_LTE2_20 M_PAR_Middle Channel_64QAM_FullRB



SM-F741B_LTE2_20 M_PAR_Middle Channel_256QAM_FullRB



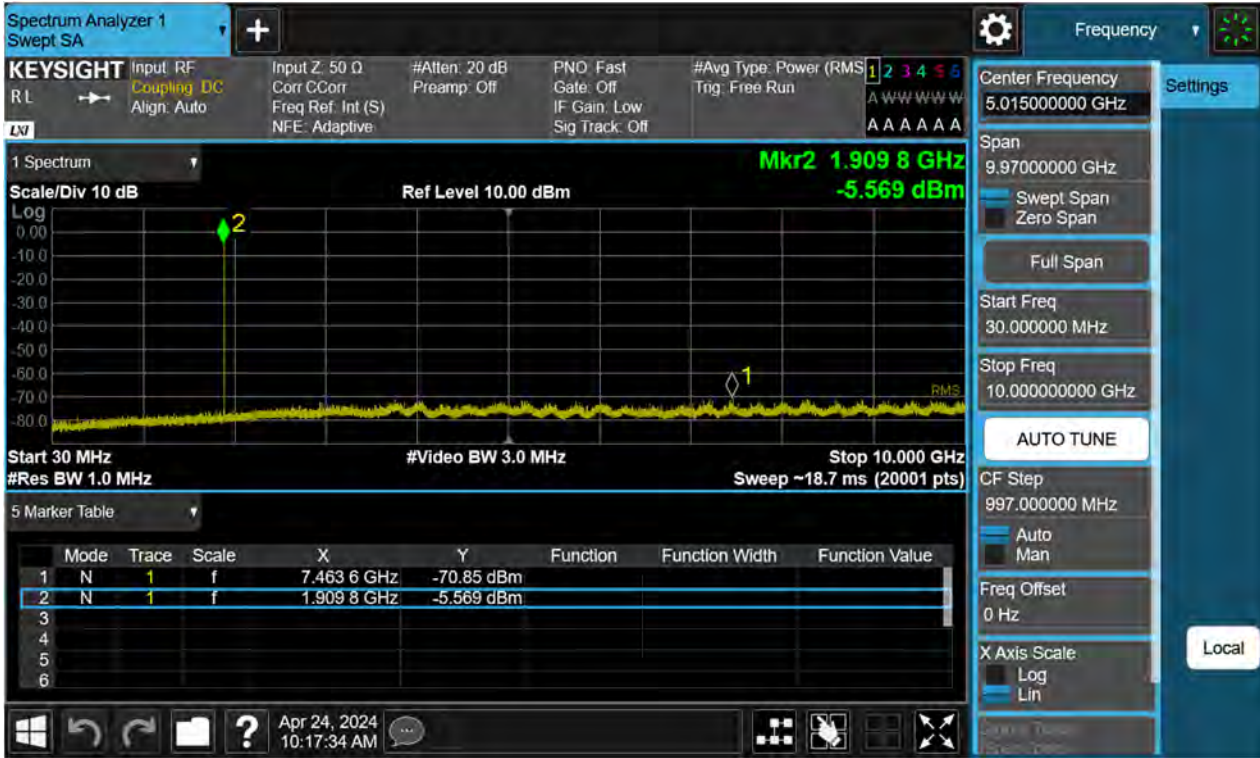
SM-F741B_LTE2_1.4 M_CSE(30 M-10 G)_Lowest Channel_QPSK_1RB



SM-F741B_LTE2_1.4 M_CSE(30 M-10 G)_Middle Channel_QPSK_1RB



SM-F741B_LTE2_1.4 M_CSE(30 M-10 G)_Highest Channel_QPSK_1RB



SM-F741B_LTE2_3 M_CSE(30 M-10 G)_Lowest Channel_QPSK_1RB



SM-F741B_LTE2_3 M_CSE(30 M-10 G)_Middle Channel_QPSK_1RB



SM-F741B_LTE2_3 M_CSE(30 M-10 G)_Highest Channel_QPSK_1RB



SM-F741B_LTE2_5 M_CSE(30 M-10 G)_Lowest Channel_QPSK_1RB



SM-F741B_LTE2_5 M_CSE(30 M-10 G)_Middle Channel_QPSK_1RB



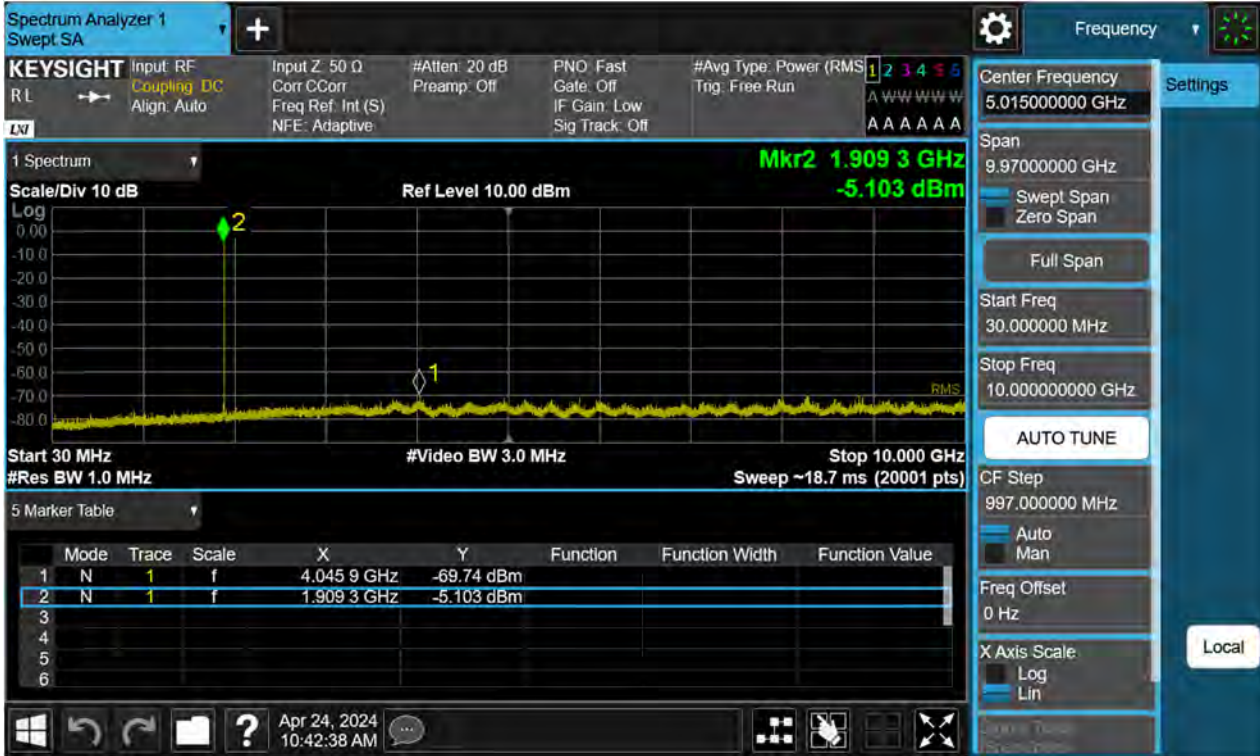
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SM-F741B_LTE2_10 M_CSE(30 M-10 G)_Middle Channel_QPSK_1RB



SM-F741B_LTE2_10 M_CSE(30 M-10 G)_Highest Channel_QPSK_1RB



SM-F741B_LTE2_15 M_CSE(30 M-10 G)_Lowest Channel_QPSK_1RB



SM-F741B_LTE2_15 M_CSE(30 M-10 G)_Middle Channel_QPSK_1RB



SM-F741B_LTE2_15 M_CSE(30 M-10 G)_Highest Channel_QPSK_1RB



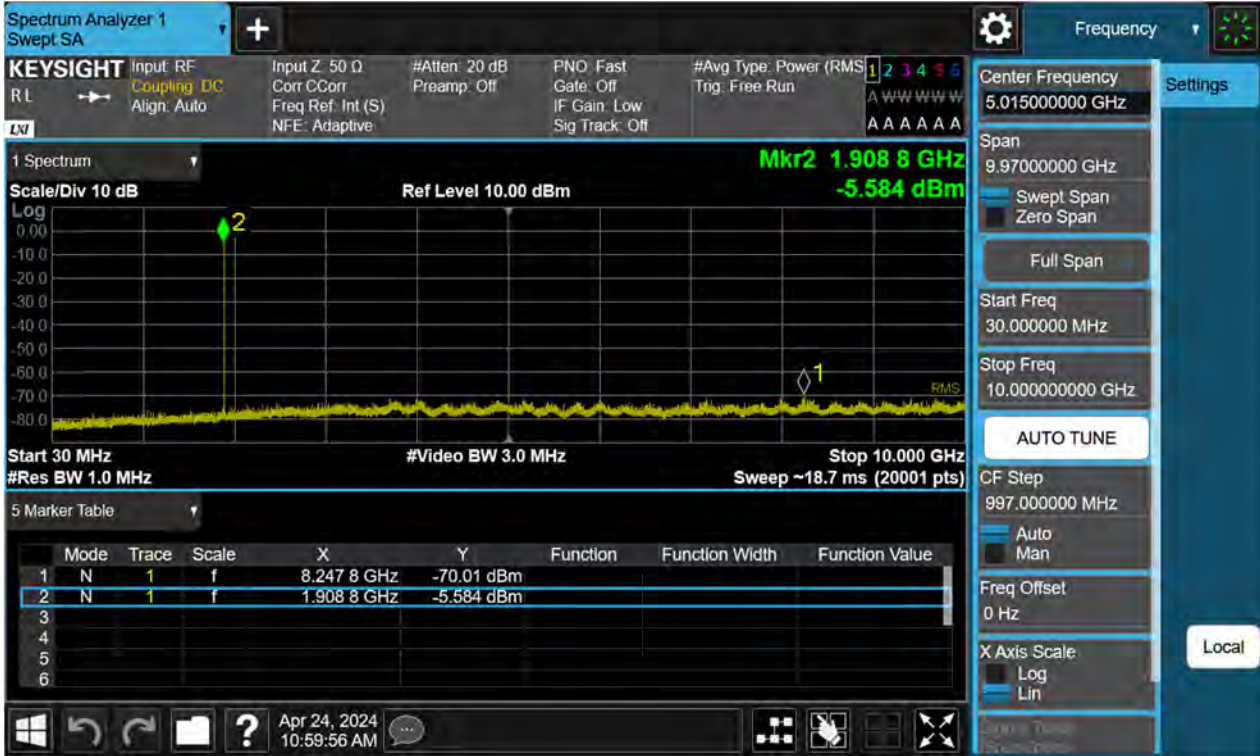
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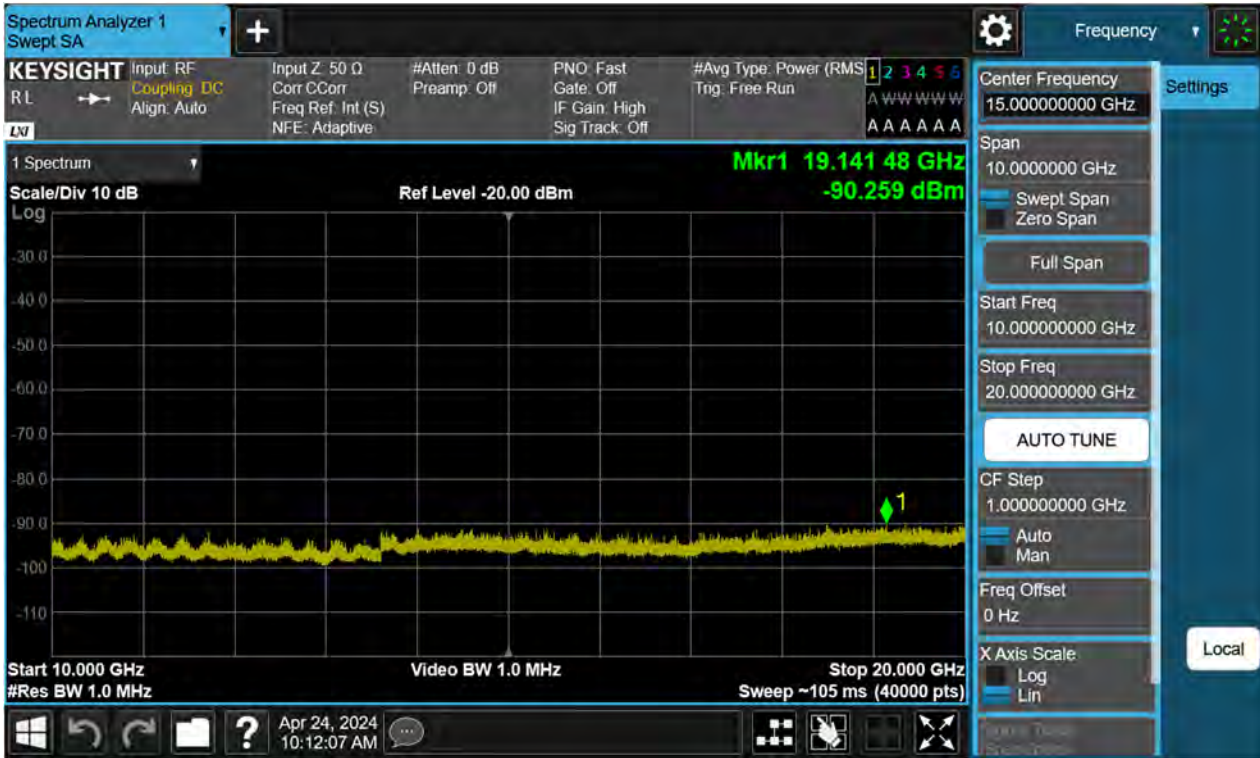
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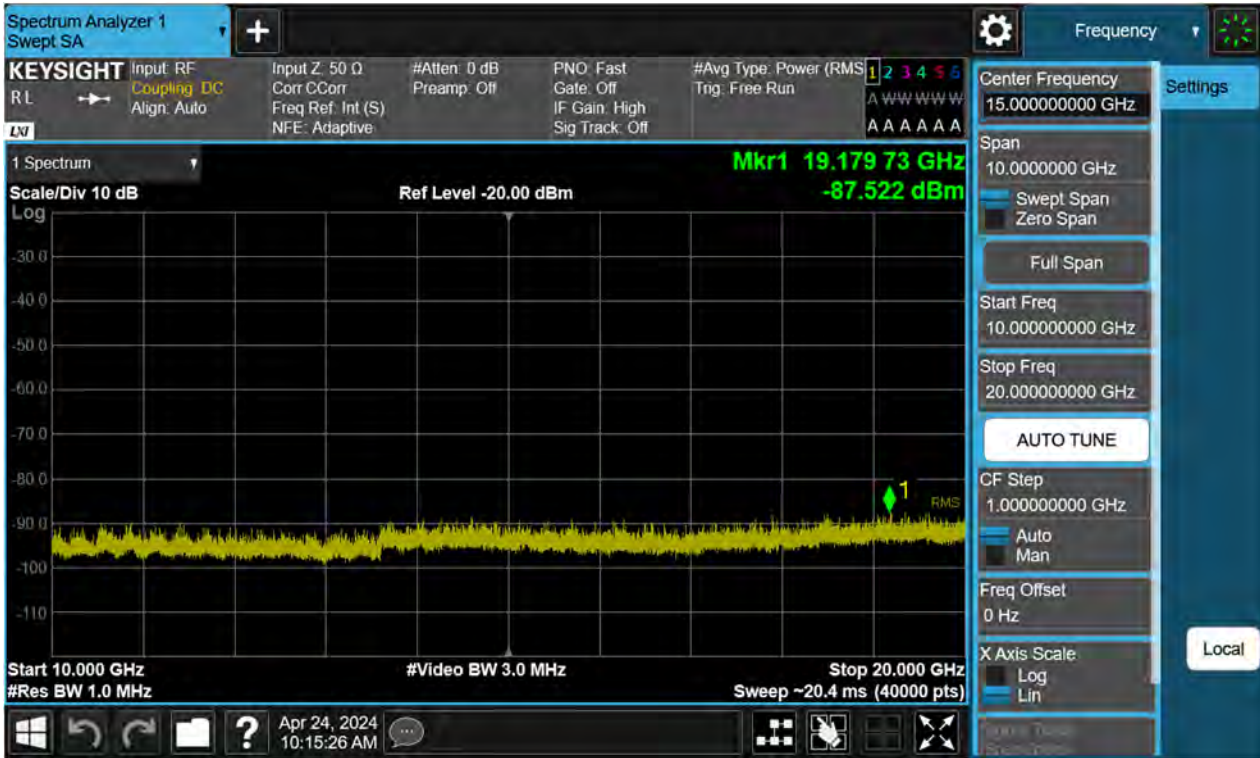
SM-F741B_LTE2_20 M_CSE(30 M-10 G)_Highest Channel_QPSK_1RB



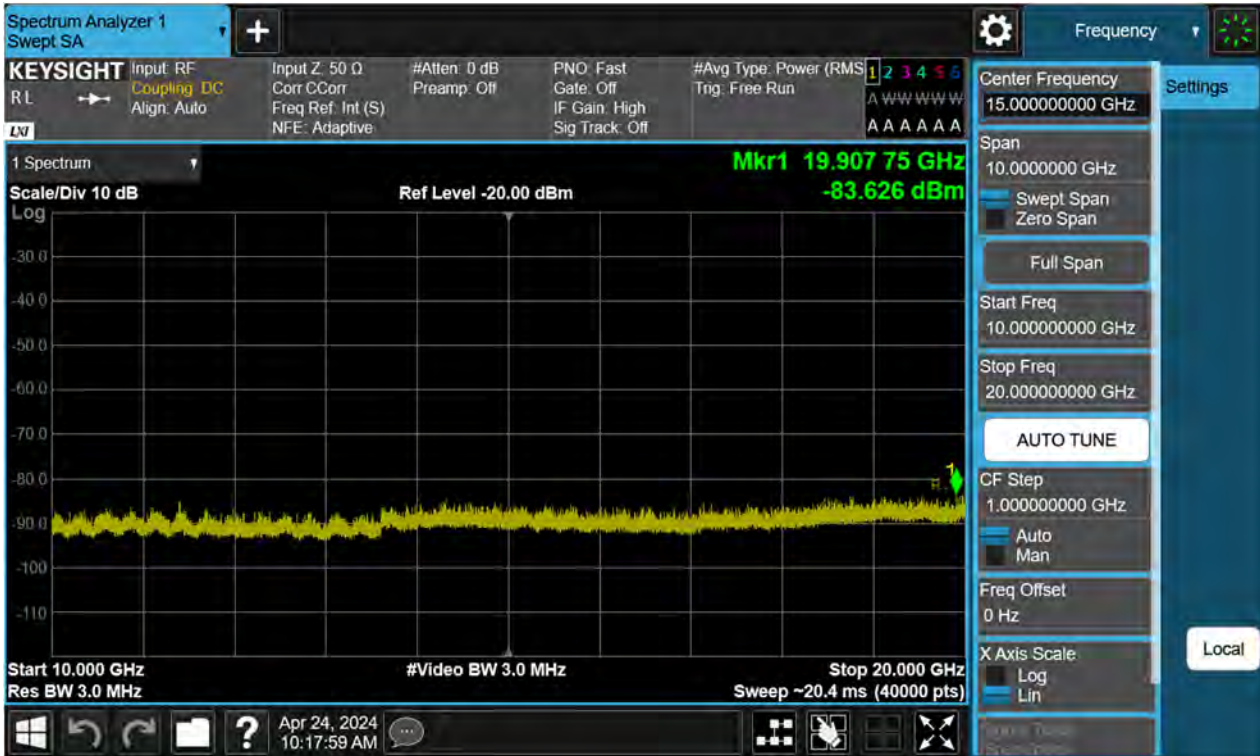
SM-F741B_LTE2_1.4 M_CSE(10 G-20 G)_Lowest Channel_QPSK_1RB



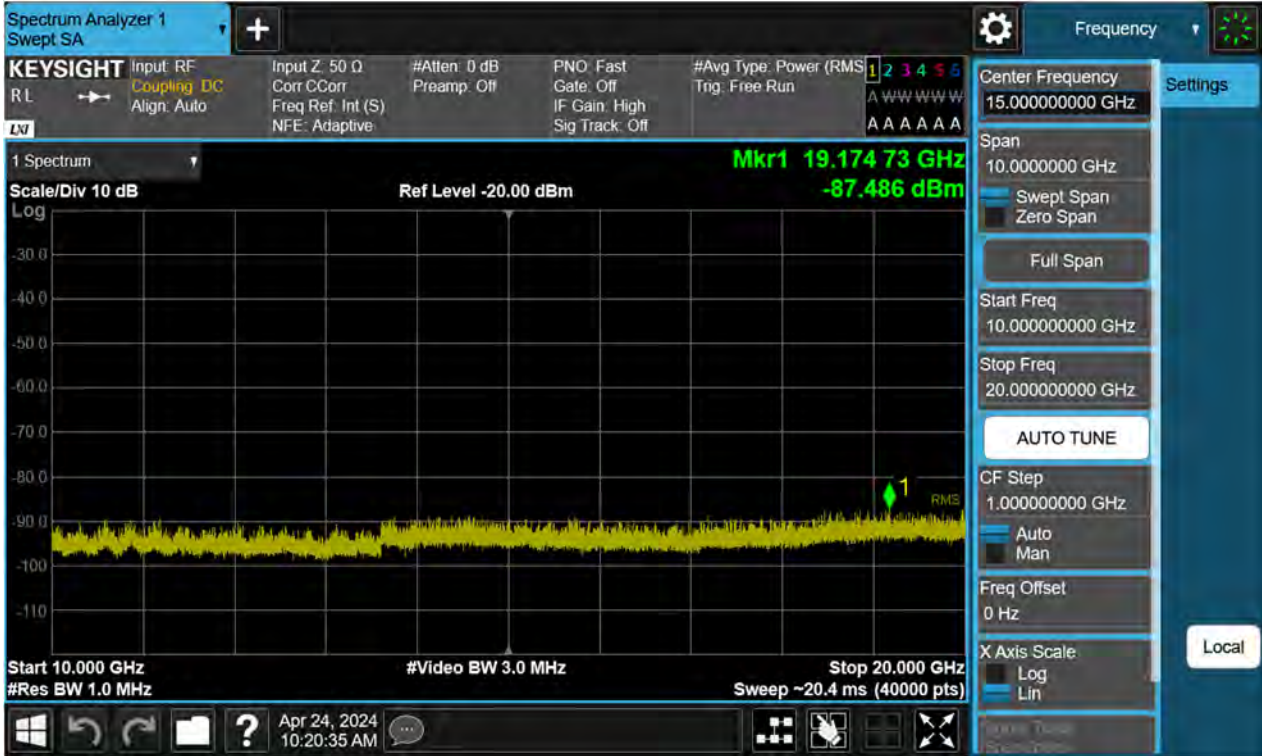
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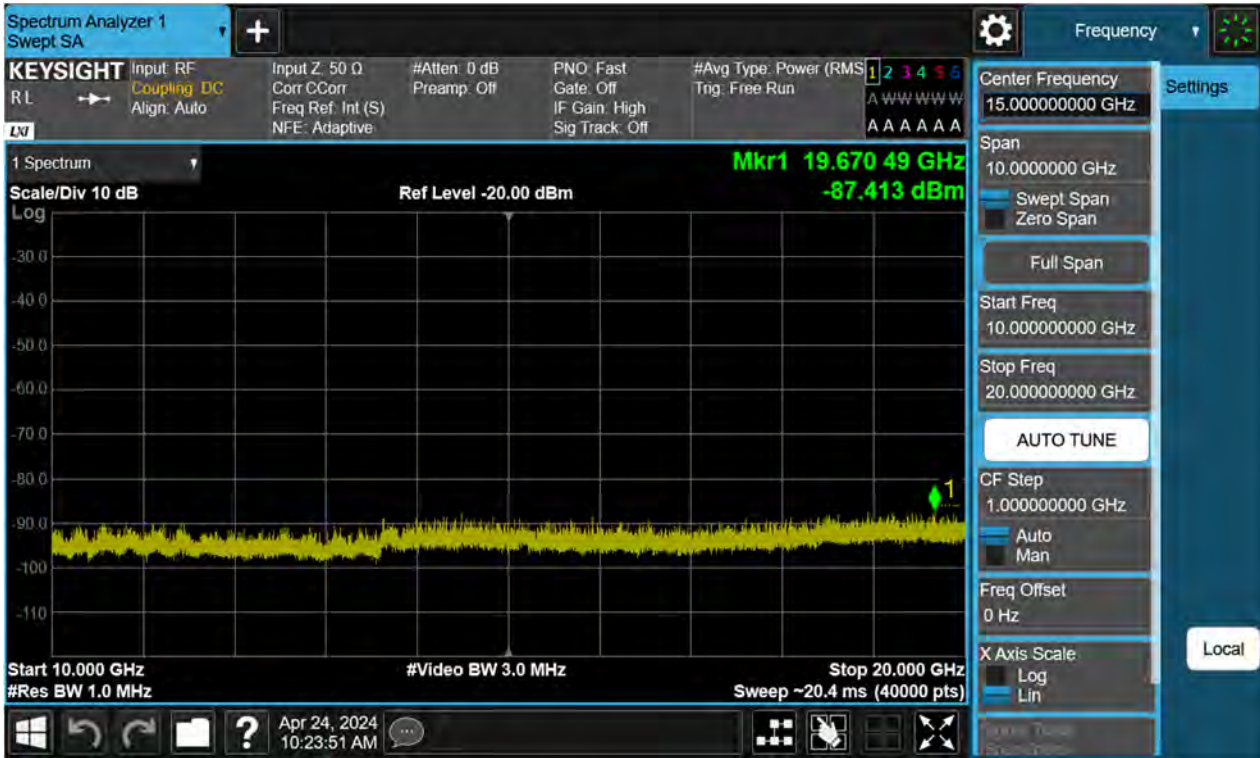
SM-F741B_LTE2_1.4 M_CSE(10 G-20 G)_Highest Channel_QPSK_1RB



SM-F741B_LTE2_3 M_CSE(10 G-20 G)_Lowest Channel_QPSK_1RB



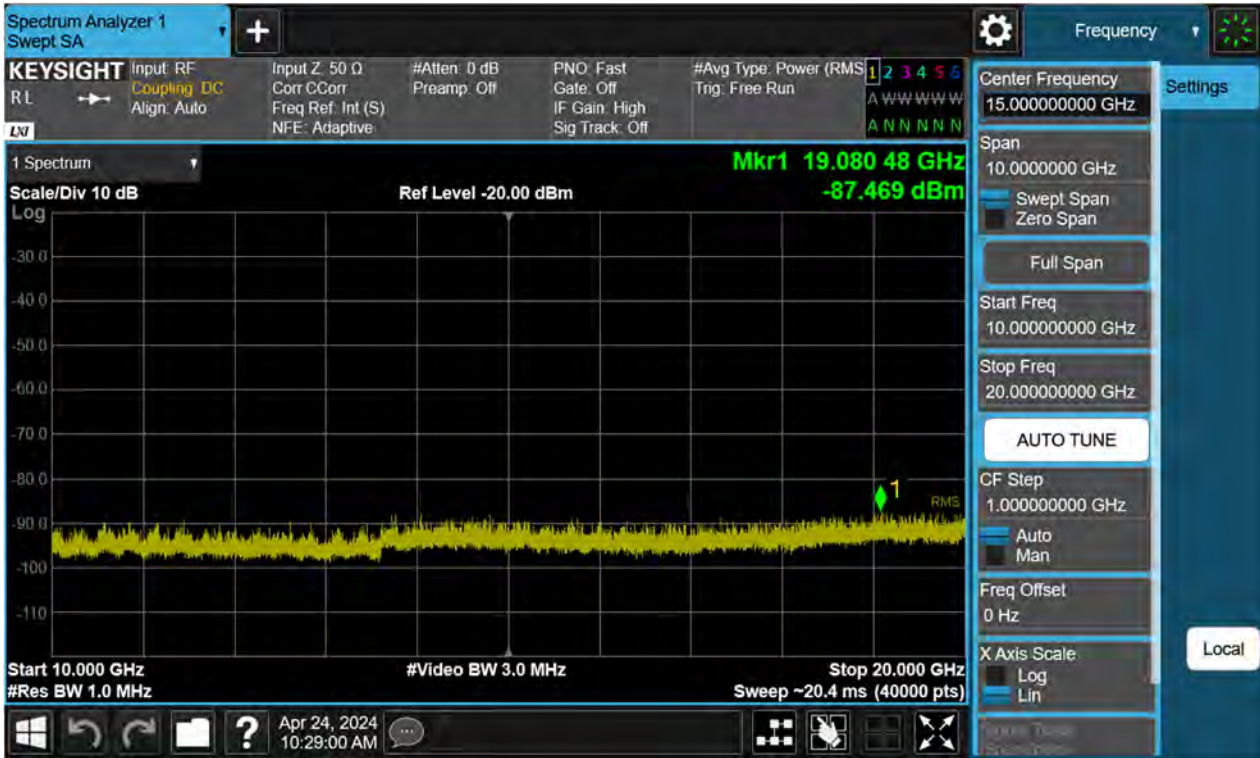
SM-F741B_LTE2_3 M_CSE(10 G-20 G)_Middle Channel_QPSK_1RB



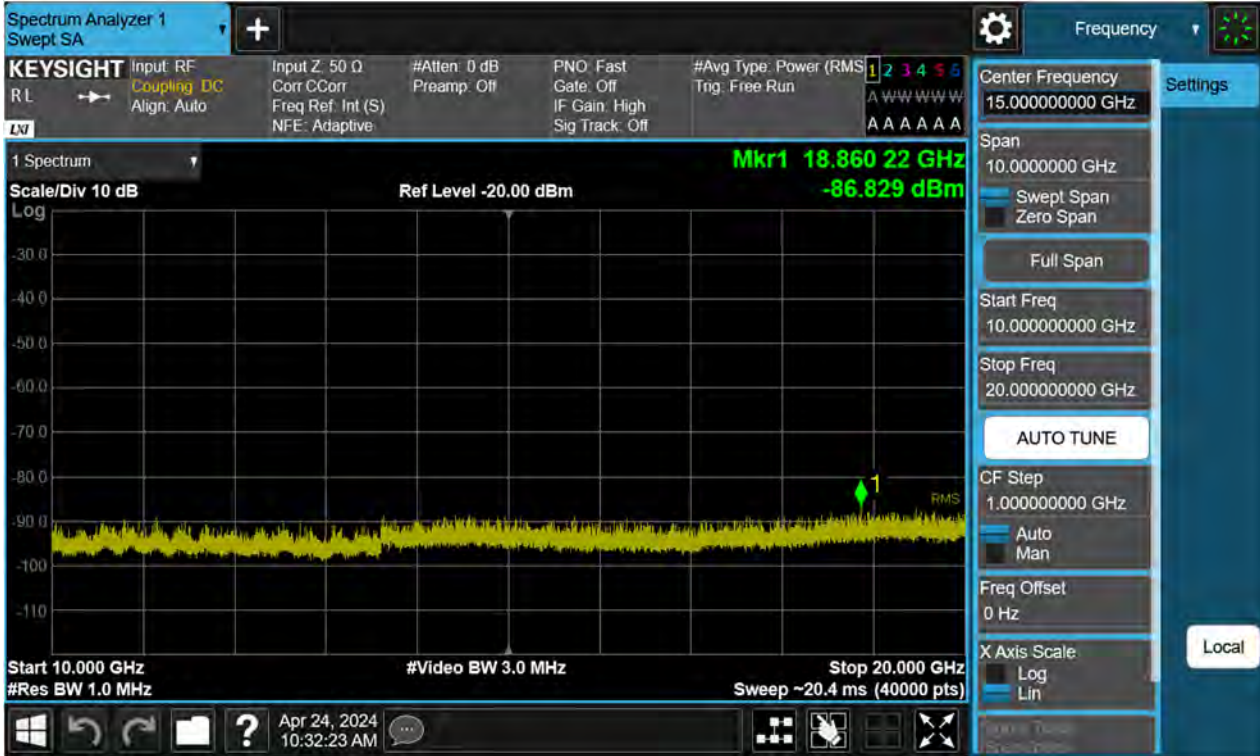
SM-F741B_LTE2_3 M_CSE(10 G-20 G)_Highest Channel_QPSK_1RB



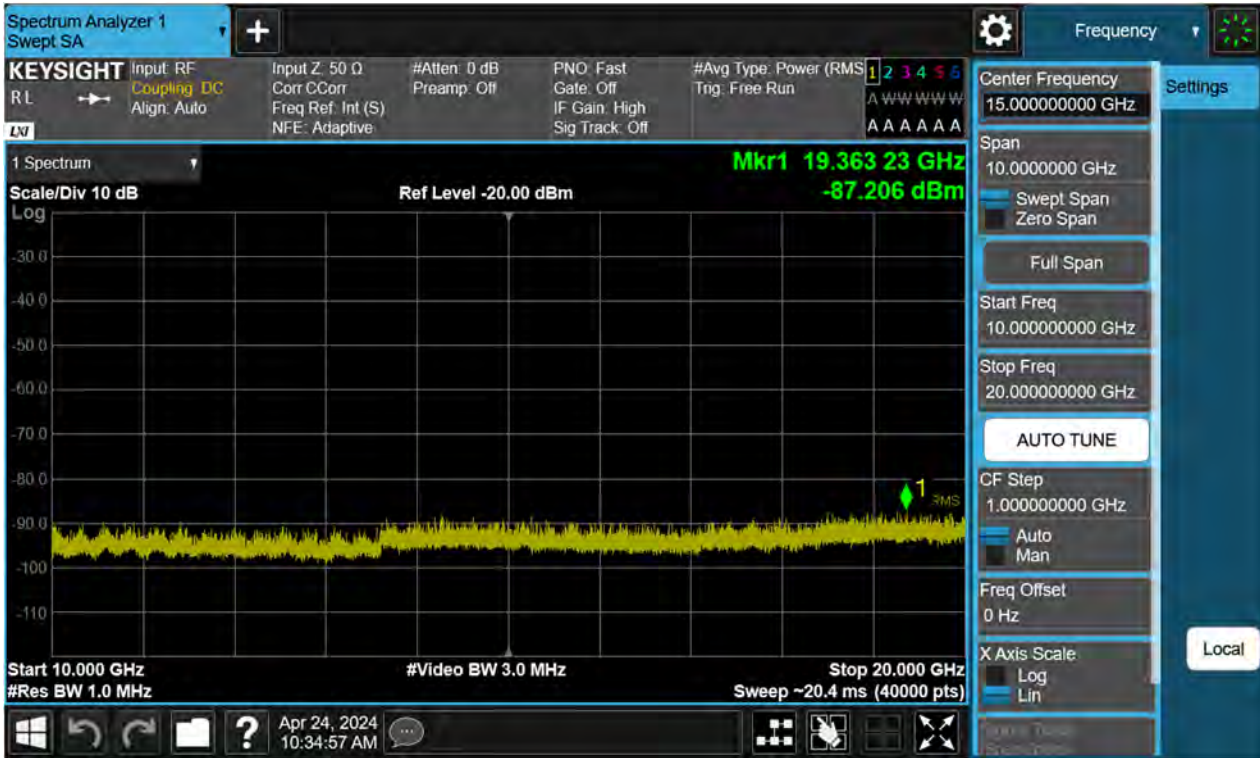
SM-F741B_LTE2_5 M_CSE(10 G-20 G)_Lowest Channel_QPSK_1RB



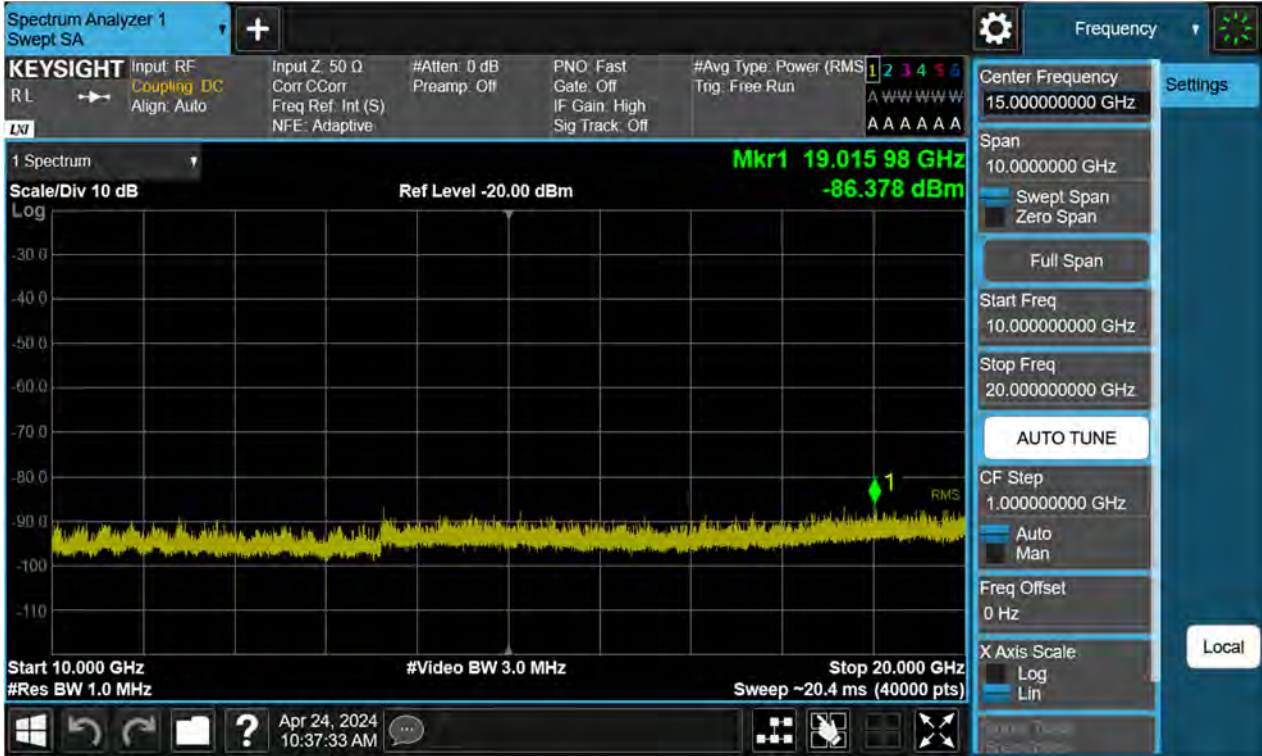
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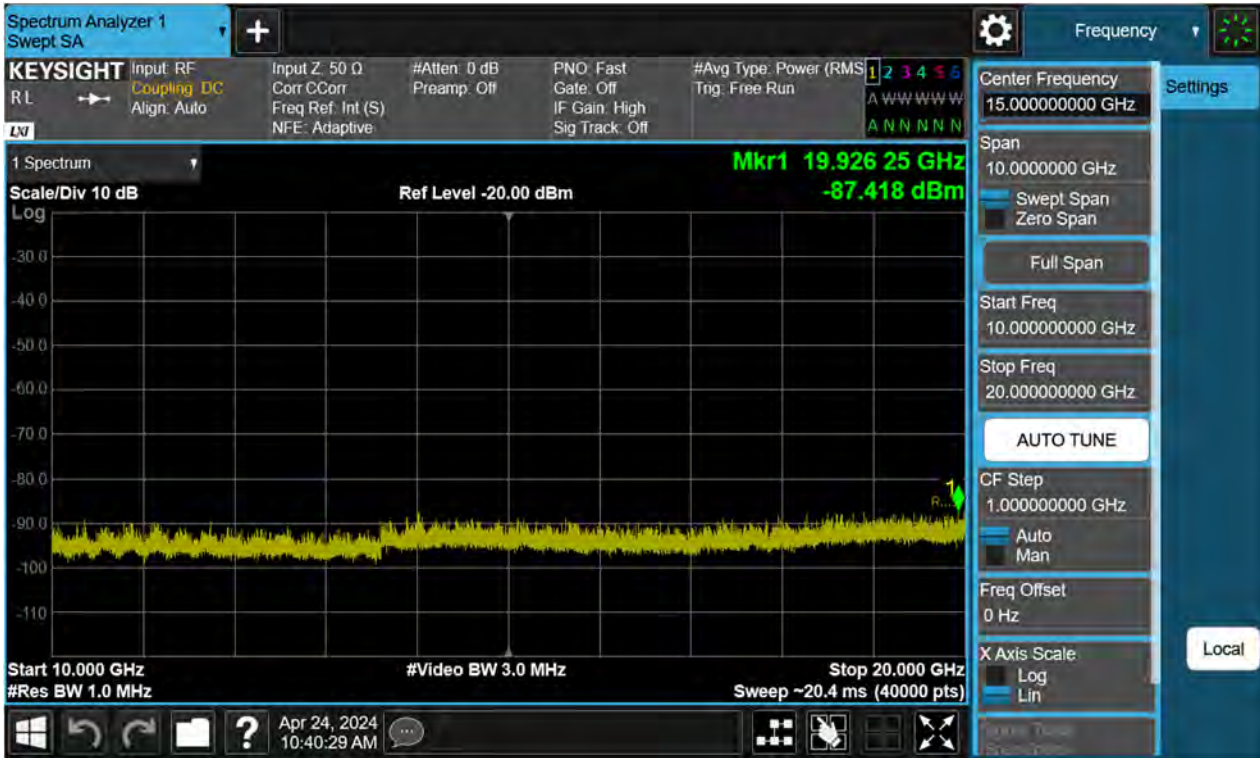
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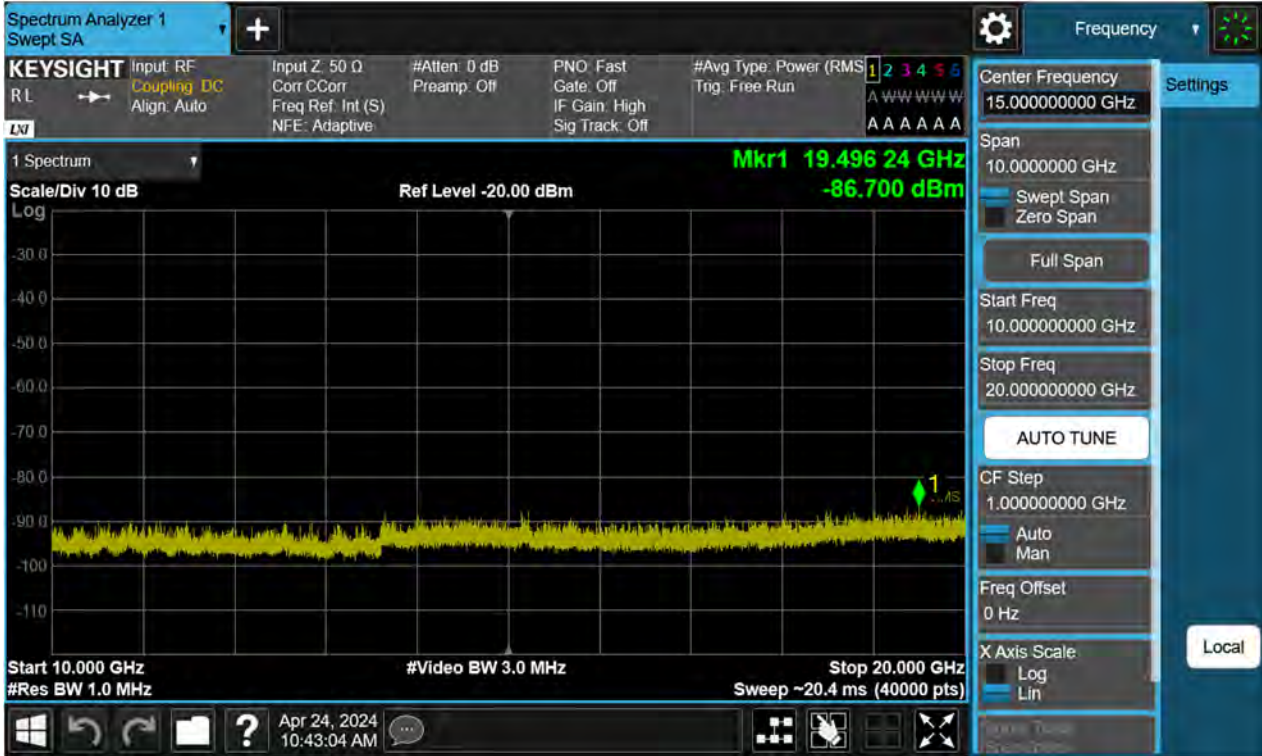
SM-F741B_LTE2_10 M_CSE(10 G-20 G)_Lowest Channel_QPSK_1RB



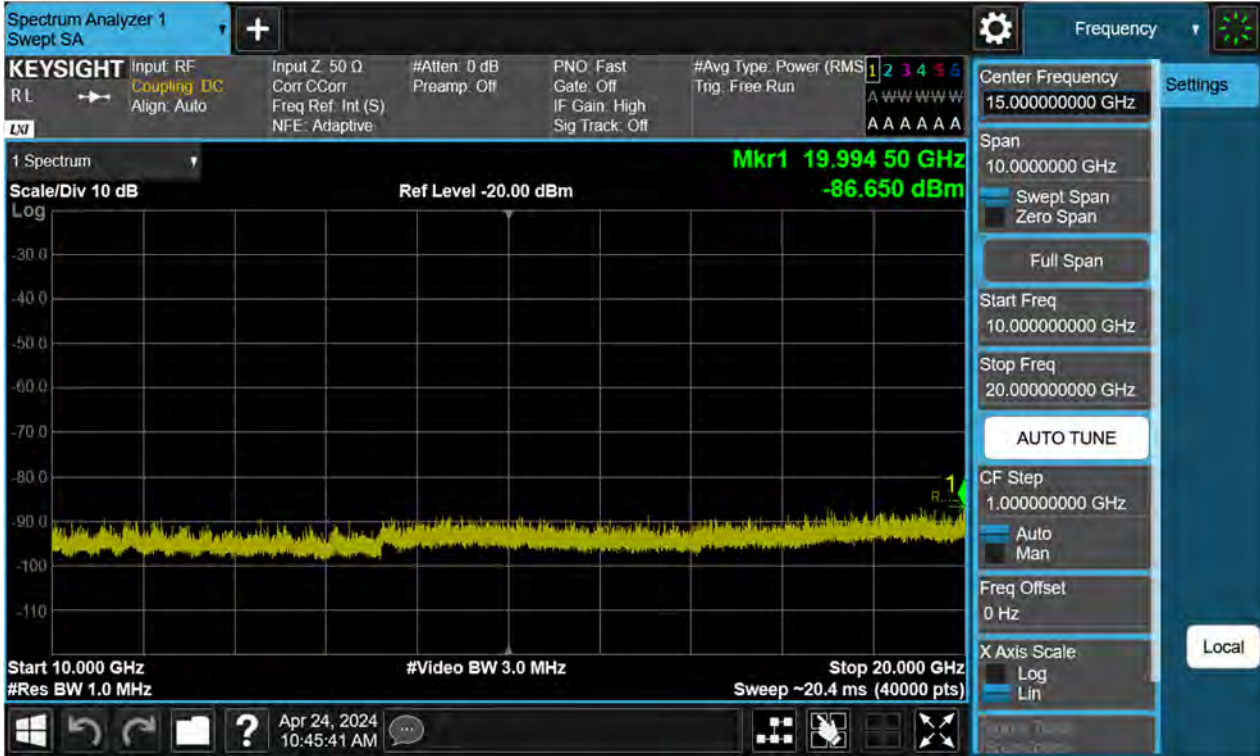
SM-F741B_LTE2_10 M_CSE(10 G-20 G)_Middle Channel_QPSK_1RB



SM-F741B_LTE2_10 M_CSE(10 G-20 G)_Highest Channel_QPSK_1RB



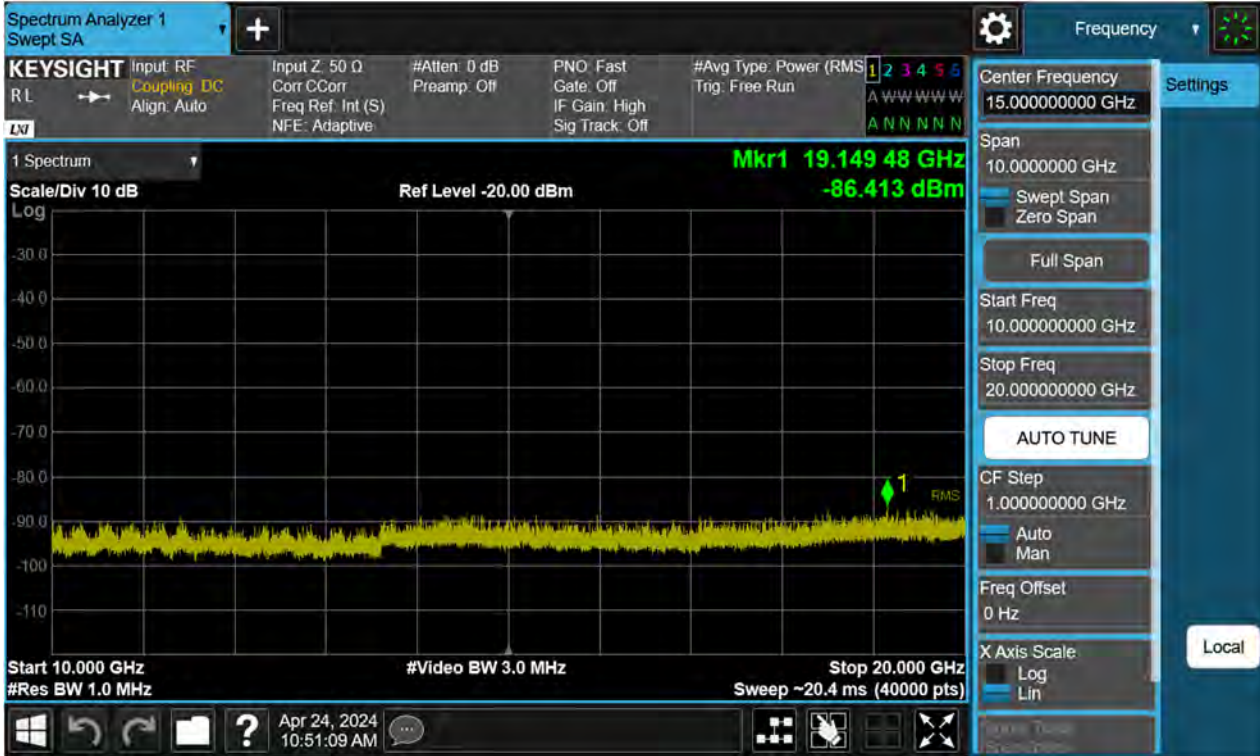
SM-F741B_LTE2_15 M_CSE(10 G-20 G)_Lowest Channel_QPSK_1RB



SM-F741B_LTE2_15 M_CSE(10 G-20 G)_Middle Channel_QPSK_1RB



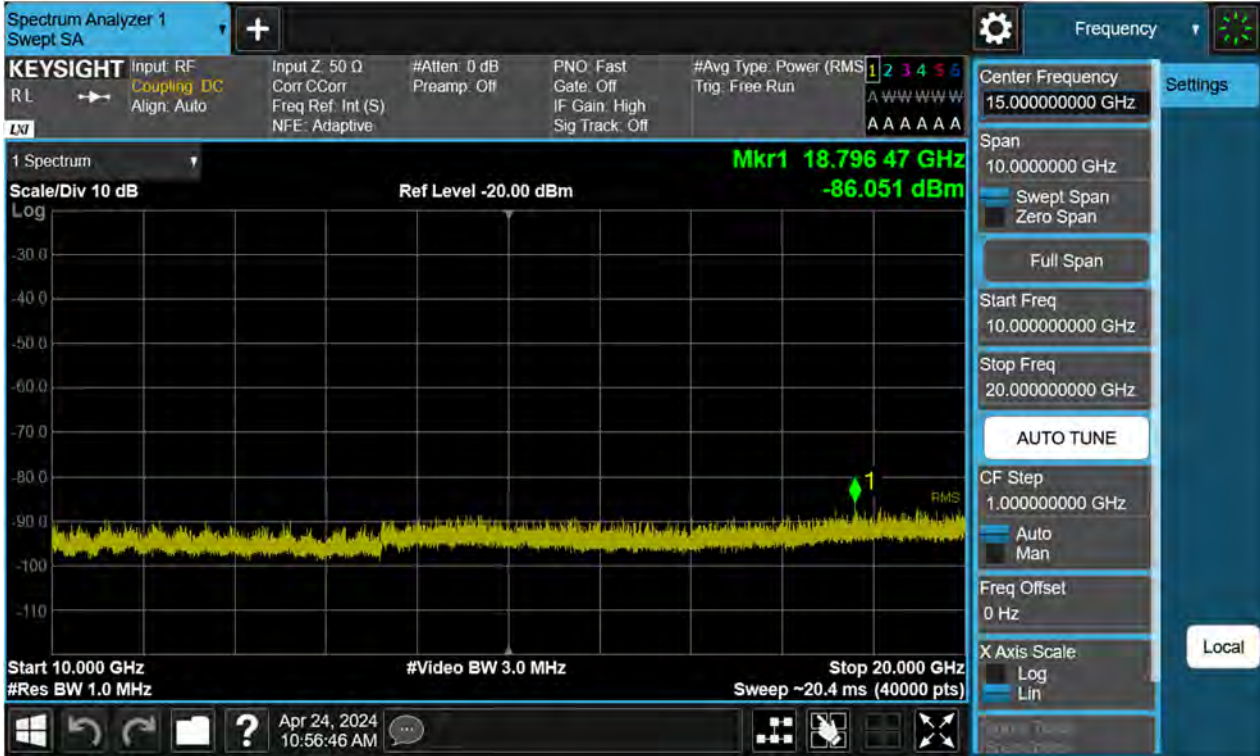
SM-F741B_LTE2_15 M_CSE(10 G-20 G)_Highest Channel_QPSK_1RB



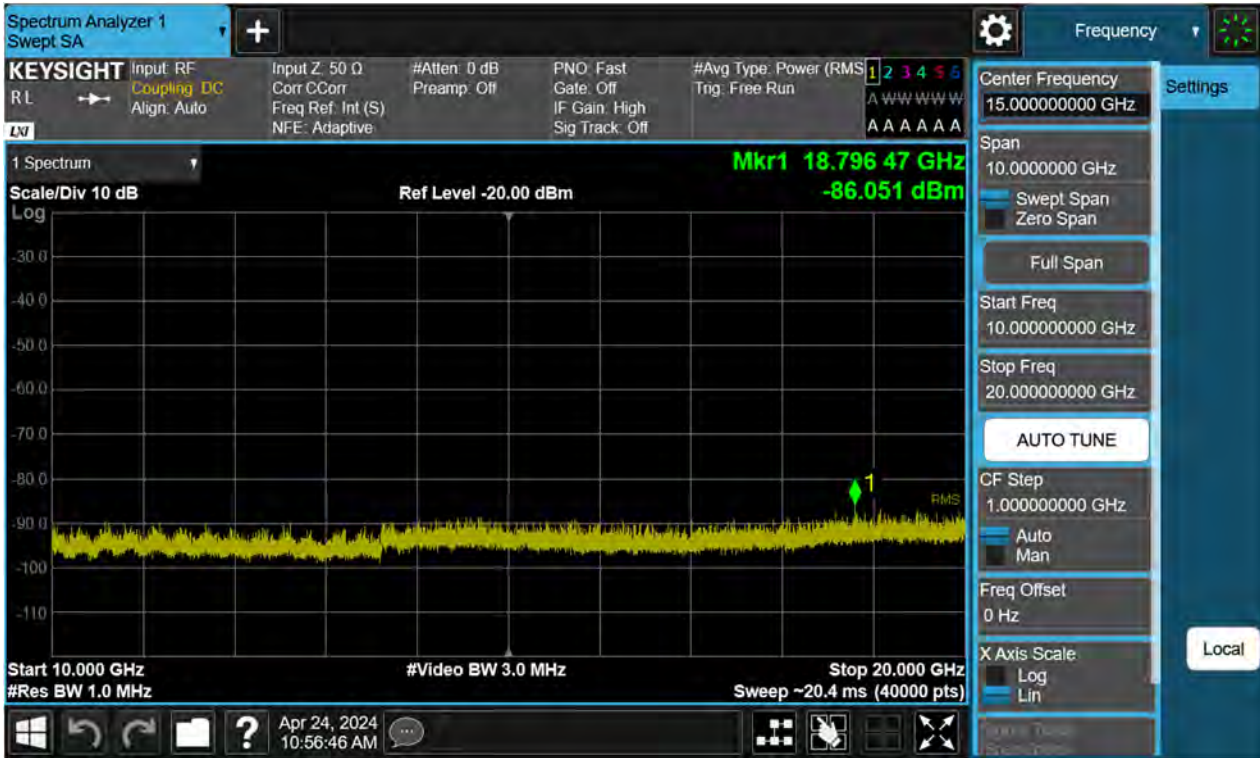
SM-F741B_LTE2_20 M_CSE(10 G-20 G)_Lowest Channel_QPSK_1RB



SM-F741B_LTE2_20 M_CSE(10 G-20 G)_Middle Channel_QPSK_1RB

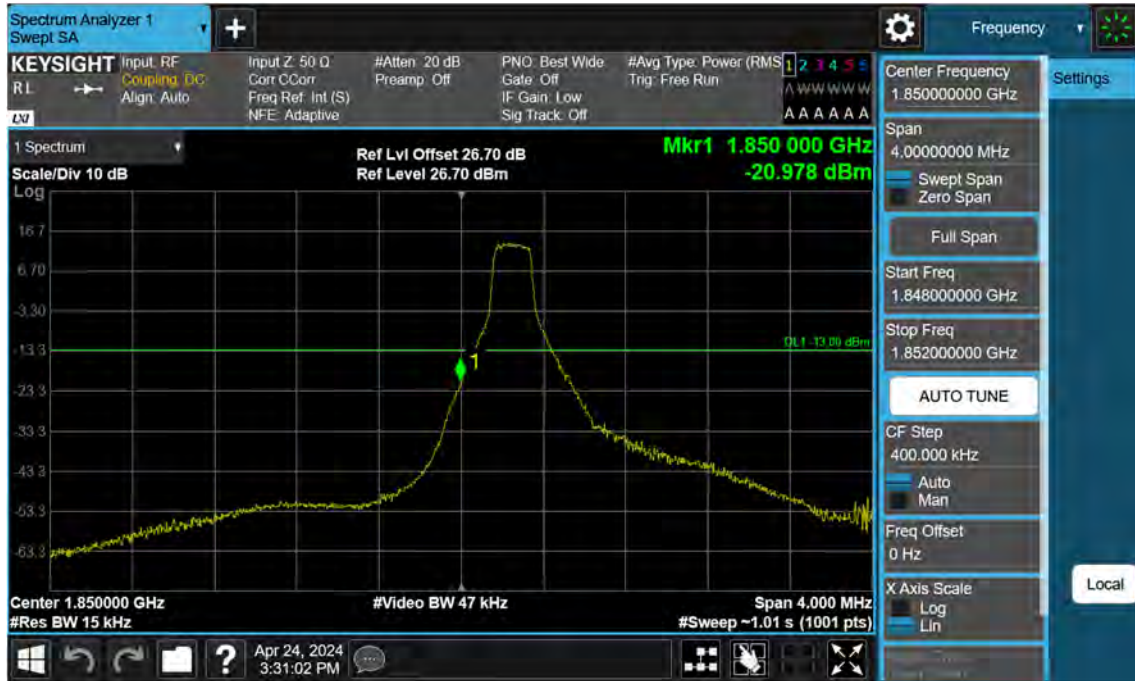


SM-F741B_LTE2_20 M_CSE(10 G-20 G)_Highest Channel_QPSK_1RB



12. TEST PLOTS(Sub 5 Ant)

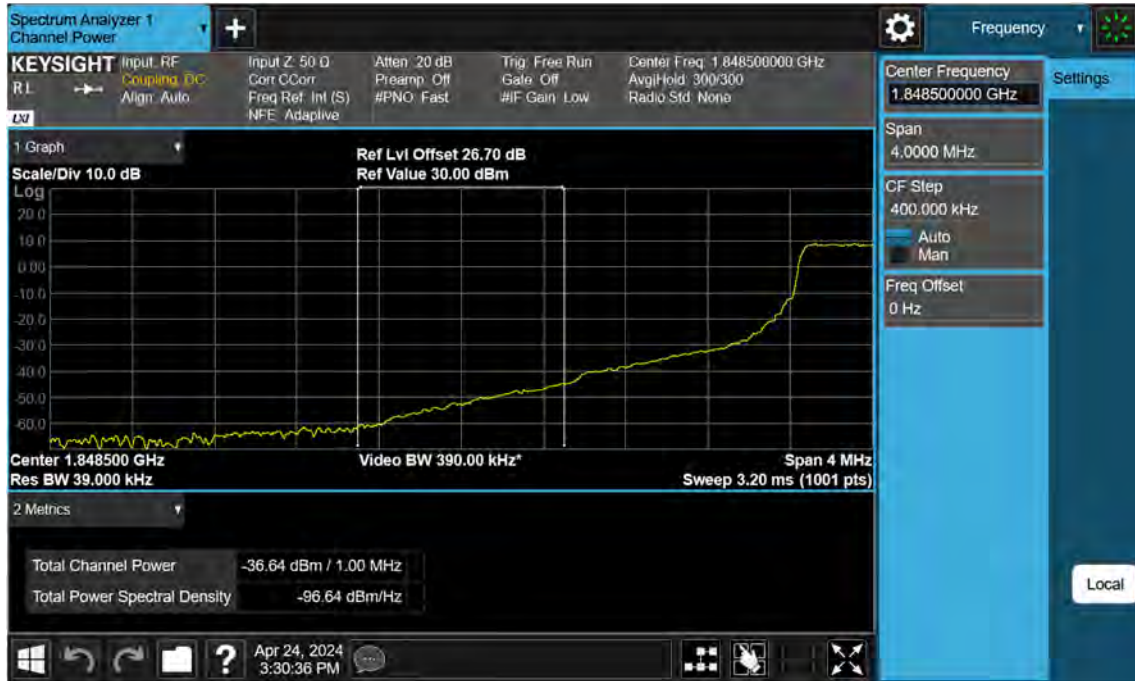
SM-F741B_LTE2_1.4 M_BandEdge_Low_QPSK_1RB



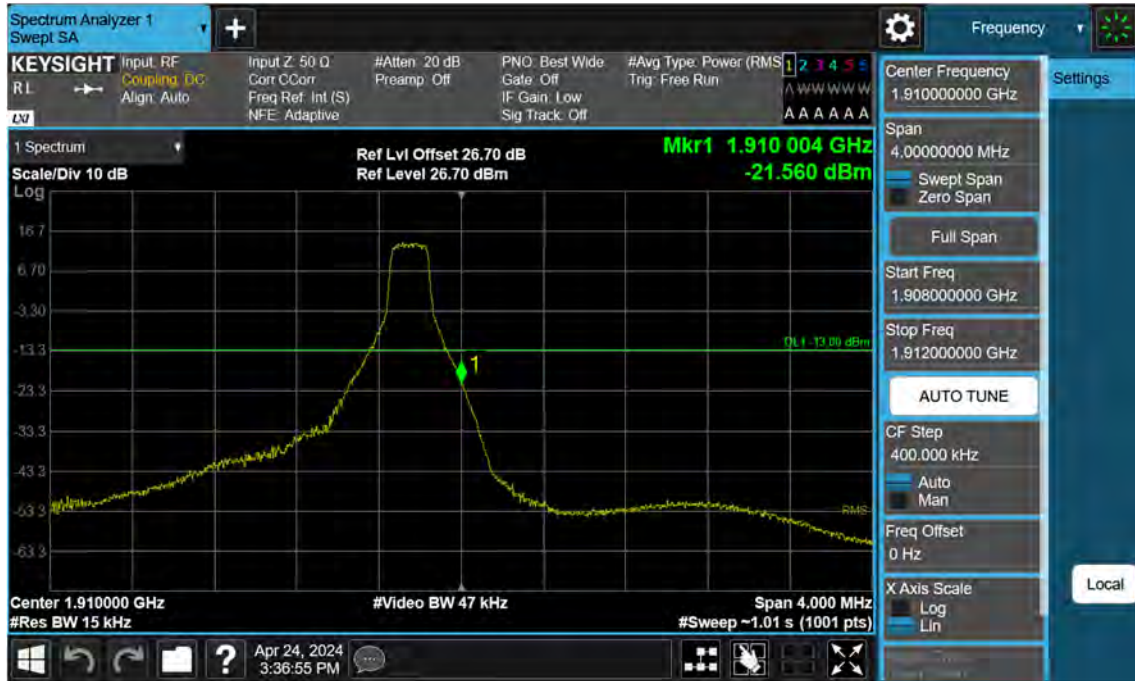
SM-F741B_LTE2_1.4 M_BandEdge_Low_QPSK_FullRB



SM-F741B_LTE2_1.4 M_Extended Band Edge_Low_QPSK_FullRB



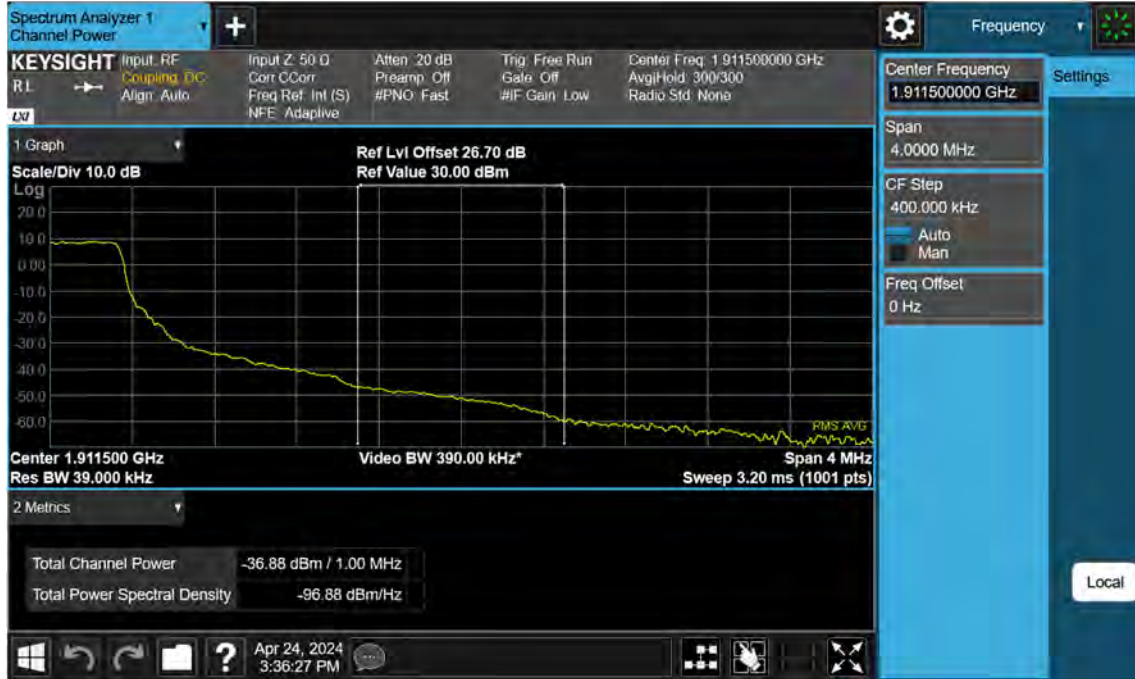
SM-F741B_LTE2_1.4 M_BandEdge_High_QPSK_1RB



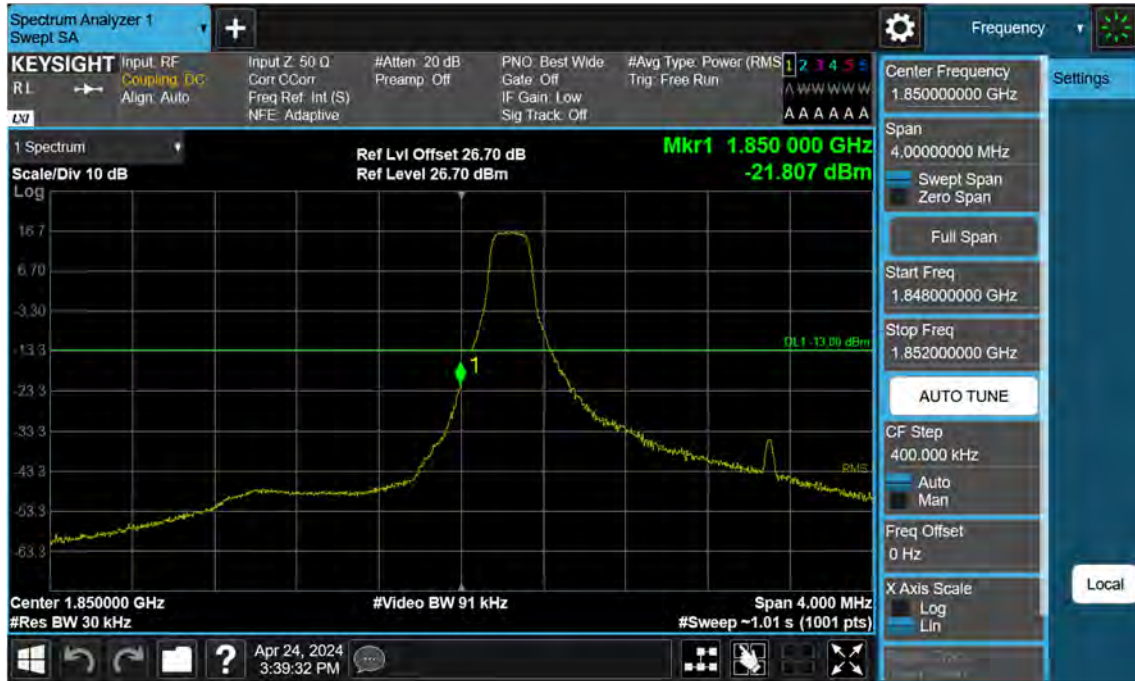
SM-F741B_LTE2_1.4 M_BandEdge_High_QPSK_FullRB



SM-F741B_LTE2_1.4 M_Extended Band Edge_High_QPSK_FullRB



SM-F741B_LTE2_3 M_BandEdge_Low_QPSK_1RB



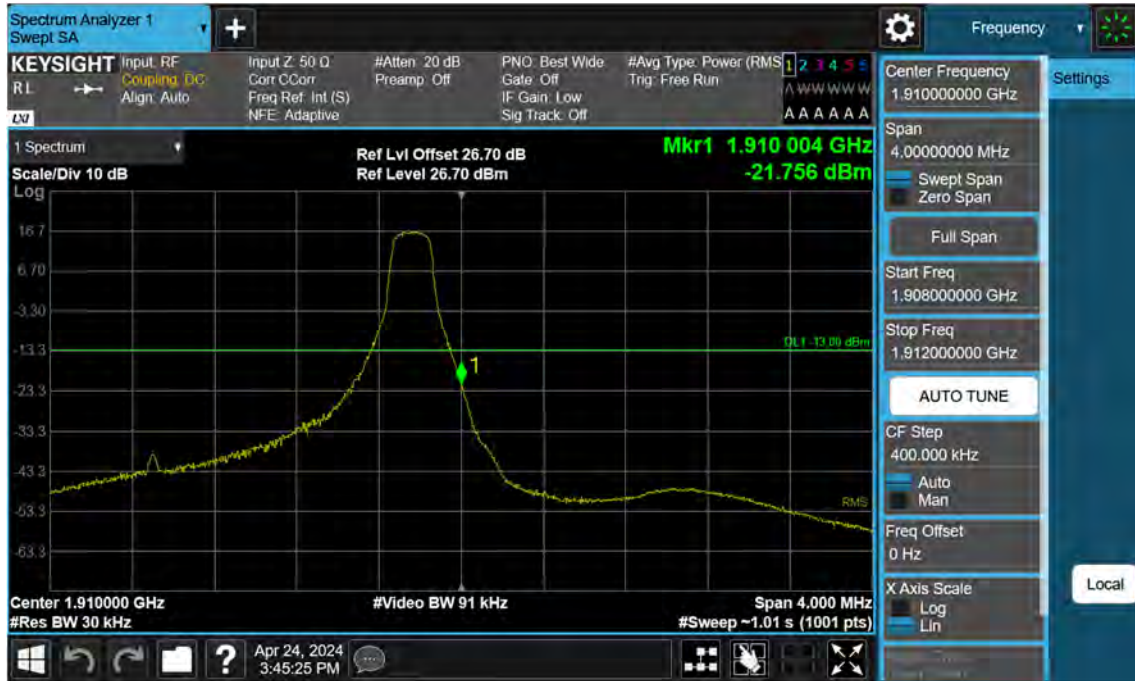
SM-F741B_LTE2_3 M_BandEdge_Low_QPSK_FullRB



SM-F741B_LTE2_3 M_Extended Band Edge_Low_QPSK_FullRB



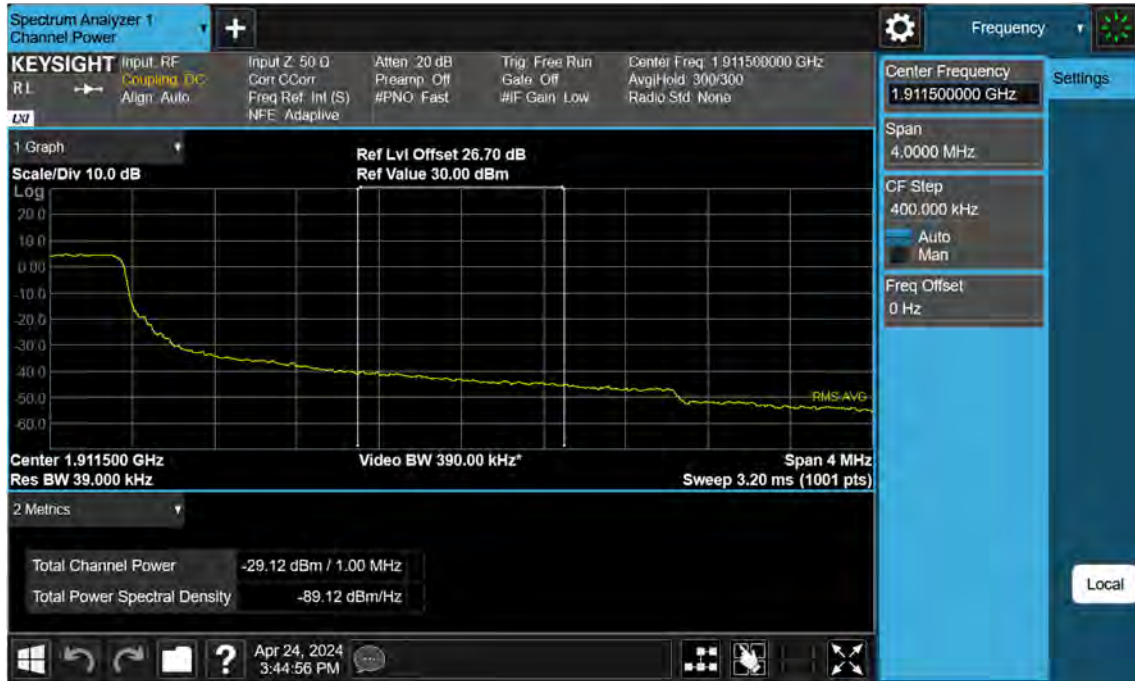
SM-F741B_LTE2_3 M_BandEdge_High_QPSK_1RB



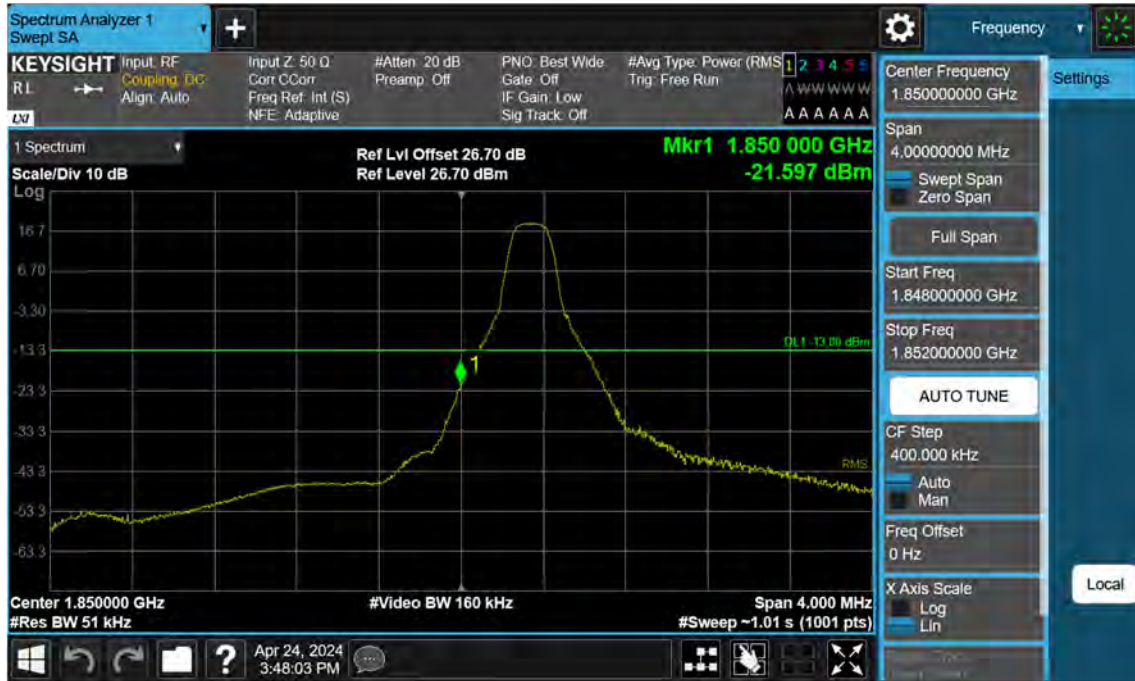
SM-F741B_LTE2_3 M_BandEdge_High_QPSK_FullRB



SM-F741B_LTE2_3 M_Extended Band Edge_High_QPSK_FullRB



SM-F741B_LTE2_5 M_BandEdge_Low_QPSK_1RB



SM-F741B_LTE2_5 M_BandEdge_Low_QPSK_FullRB



SM-F741B_LTE2_5 M_BandEdge_Low_QPSK_FullRB

