

TEST REPORT

FCC LTE B48 Test for SM-A276U
Certification

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2604-FC023-R1

DATE OF ISSUE
May 15, 2026

Tested by
Jae Ryang Do



Technical Manager
Jong Seok Lee



HCT CO., LTD.
BongJai Huh
BongJai Huh / CEO



HCT CO.,LTD.

2-6, 73, 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea
Tel. +82 31 645 6300 Fax. +82 31 645 6401

TEST REPORT

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May 15, 2026

Additional Model

SM-A276U1, SM-S276V

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-A276U

Date of Test

March 11, 2026 ~ April 22, 2026

FCC ID

A3LSMA276U

Location of Test

☒ Permanent Testing Lab ☐ On Site Testing

(Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea)

FCC Classification:

Citizens Band End User Devices (CBE)

Test Standard Used

FCC Rule Part: § 96

Test Results

PASS

REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	April 23, 2026	Initial Release
1	May 15, 2026	Revised the KDB version on page 8.

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

Model(s):	SM-A276U
Additional Model(s)	SM-A276U1, SM-S276V
Tx Frequency:	3552.5 – 3697.5 : 5 MHz 3555.0 – 3695.0 : 10 MHz 3557.5 – 3692.5 : 15 MHz 3560.0 – 3690.0 : 20 MHz
Serial number:	Radiated : R3GL30N9KDA Conducted : 9aece1647e127ece
Antenna Information	Please refer to the Antenna Specification document.

1.1 MAXIMUM OUTPUT POWER

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	EIRP	
				Max. Power (W)	Max. Power (dBm/ 10 MHz)
LTE – LTE B48 (5)	3552.5 – 3697.5	4M48G7D	QPSK	0.097	19.85
		4M47W7D	16QAM	0.077	18.87
		4M49W7D	64QAM	0.058	17.66
		4M51W7D	256QAM	0.028	14.45
LTE – LTE B48 (10)	3555.0 – 3695.0	8M92G7D	QPSK	0.091	19.58
		8M99W7D	16QAM	0.074	18.69
		9M00W7D	64QAM	0.060	17.75
		9M03W7D	256QAM	0.029	14.57
LTE – LTE B48 (15)	3557.5 – 3692.5	13M4G7D	QPSK	0.084	19.24
		13M5W7D	16QAM	0.074	18.67
		13M5W7D	64QAM	0.055	17.42
		13M5W7D	256QAM	0.027	14.32
LTE – LTE B48 (20)	3560.0 – 3690.0	18M0G7D	QPSK	0.084	19.25
		18M0W7D	16QAM	0.069	18.40
		18M0W7D	64QAM	0.058	17.62
		17M8W7D	256QAM	0.028	14.43

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

Please refer to the [2G3G] Test Report.

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, Republic of Korea.

Detailed description of test facility was submitted to the Commission and accepted dated February 26, 2026 (Registration Number: KR0032).

2.4. EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to ANSI/USEMCSC C63.2-2023, "American National Standard for Specifications of Electromagnetic Interference and Field Strength Measuring Instrumentation in the Frequency Range 9 kHz to 40 GHz".

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 - KDB 940660 D01 v03r01
Channel Edge/ ACLR	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7 - KDB 940660 D01 v03r01
Spurious and Harmonic Emissions at Antenna Terminal	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7 - KDB 940660 D01 v03r01
Conducted Output Power	- KDB 971168 D01 v03r01 - Section 5.2.4 - ANSI C63.26-2015 - Section 5.2.1 & 5.2.4.2
Peak- to- Average Ratio	- KDB 971168 D01 v03r01 – Section 5.7 - ANSI C63.26-2015 – Section 5.2.3.4 - KDB 940660 D01 v03r01
Frequency stability	- ANSI C63.26-2015 – Section 5.6
Radiated Power	- ANSI C63.26-2015 – Section 5.2.4.4 - KDB 971168 D01 v03r01 – Section 5.8 - KDB 940660 D01 v03r01
Radiated Spurious and Harmonic Emissions	- ANSI C63.26-2015 – Section 5.5.3 - KDB 971168 D01 v03r01 – Section 5.8 - KDB 940660 D01 v03r01
End User Device Additional Requirement (CBSD Protocol)	- KDB 940660 D01 v03r01 - WINNF-TS-0122 V1.0.2

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.

Test Settings

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

Test Note

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

The power is calculated by the following formula;

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

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

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

3.3 RADIATED SPURIOUS EMISSIONS

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

Radiated Spurious Emission Measurements at 3 meters by Substitution Method.

Test Settings (1)

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

Test Note

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

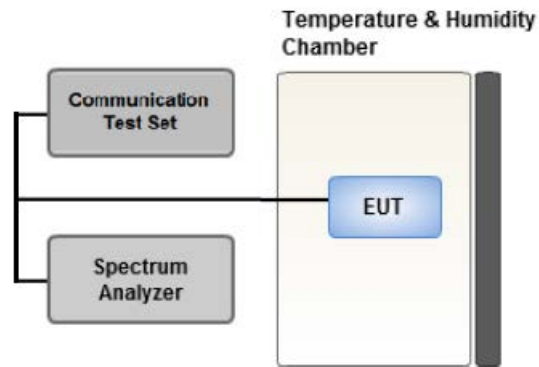
$$\text{Result}_{(\text{dBm})} = P_g_{(\text{dBm})} - \text{cable loss}_{(\text{dB})} + \text{antenna gain}_{(\text{dBi})}$$

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

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

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

3.4 PEAK- TO- AVERAGE RATIO



Test setup

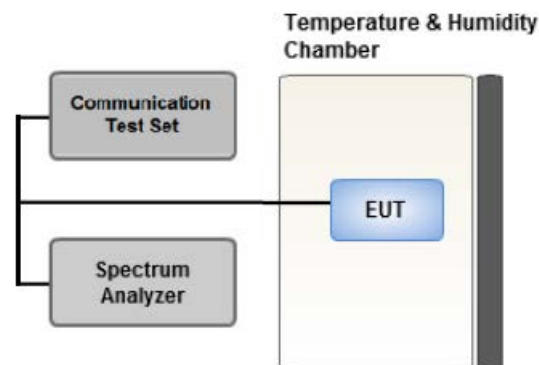
Test Settings

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 %.

Test Notes

1. This test was performed using the spectrum analyzer's CCDF function.

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.

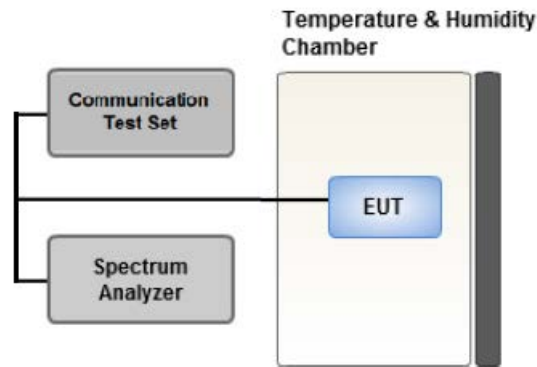
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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 $\geq 3 \times$ RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5 % of the 99 % occupied bandwidth observed in Step 7

3.6 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.

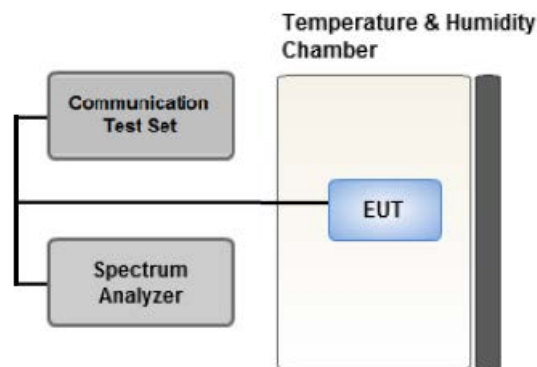
All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

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 = trace average
5. Sweep time > (Number of points in sweep $\times$ Transmitter period)
6. Number of points in sweep $\geq 2 \times \text{Span} / \text{RBW}$

3.7 CHANNEL EDGE



Test setup

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. Within 1 MHz of the channel edge the RBW should be 2 % of EBW, then 1 MHz after that.
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points $\geq 2 \times \text{Span/RBW}$
7. Trace mode = trace average
8. Sweep Time > (Number of Points) $\times$ (Symbol Period)
9. The trace was allowed to stabilize

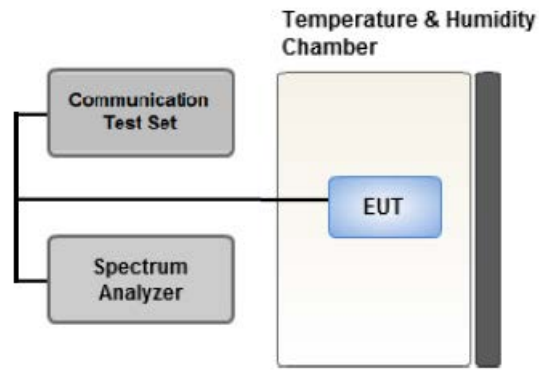
Test Notes

The conducted power of any emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any emission shall not exceed -25 dBm/MHz .

The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/MHz

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

3.8 Adjacent Channel Leakage Ratio



Test setup

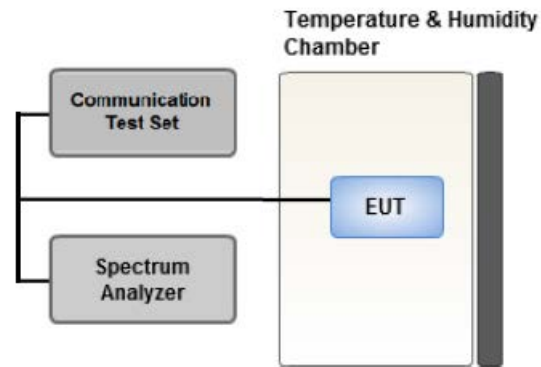
Test Settings

1. Use ACP measurement function of Spectrum analyzer to measure adjacent channel leakage ratio
2. Integ BW = Assigned channel bandwidth
5. Detector = RMS
6. Number of sweep points $\geq 2 \times \text{Span/RBW}$
7. Trace mode = trace average
8. Sweep time = Sweep time $>$ Number of points in sweep $\times$ Transmitter period
9. The trace was allowed to stabilize

Test Notes

the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.

3.9 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE



Test setup

Test Overview

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

The frequency stability of the transmitter is measured by:

1. Temperature:

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

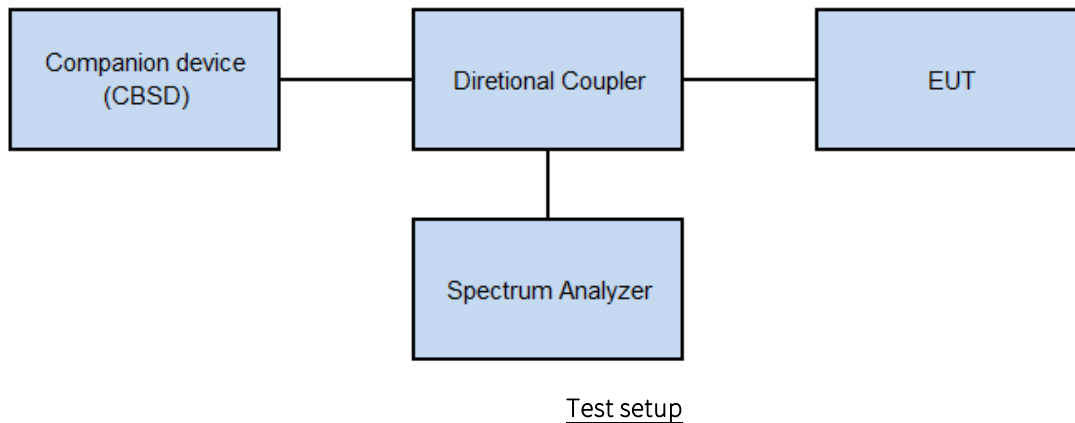
2. Primary Supply Voltage:

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

Test Settings

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

3.10 End User Device Additional Requirement (CBSD Protocol)



Test Overview

End user device additional requirements (CBSD Protocol) are tested per the test procedures listed below. During testing, the EUT is connected to a certified CBSD (FCC ID: 2AS48SC-220) as a companion device to show compliance with Part 96.47.

End User Devices may operate only if they can positively receive and decode an authorization signal transmitted by a CBSD, including the frequencies and power limits for their operation.

Test Settings

- Setup companion device with 3690 MHz(BW 20MHz).
- Enable AP service from companion device.
- EUT is connected to a companion device.
- Check EUT Tx frequency and power.
- Disable AP service from companion device and check EUT stop transmission within 10 s.

3.11 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
- All simultaneous transmission scenarios of operation were investigated, and the test results showed no additional significant emissions relative to the least restrictive limit were observed.
Therefore, only the worst case(stand-alone) results were reported.
- The worst case is reported with the EUT positioning, modulations, and paging service configurations shown in the test data
- Please refer to the table below.
- SM-A276U & additional models were tested and the worst case results are reported.
(Worst case : SM-A276U)

[Worst case]

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

3.12 WORST CASE(CONDUCTED TEST)

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

- SM-A276U & additional models were tested and the worst case results are reported.

(Worst case : SM-A276U)

[Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset
Occupied Bandwidth	QPSK, 16QAM, 64QAM, 256QAM	5, 10, 15, 20	Mid	Full RB	0
Peak-To-Average Ratio	QPSK, 16QAM, 64QAM, 256QAM	5, 10, 15, 20	Mid	Full RB	0
Channel Edge	QPSK	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
Spurious and Harmonic Emissions at Antenna Terminal	QPSK	5, 10, 15, 20	Low, Mid, High	Full RB	0
			Low, Mid, High	1	0
Adjacent Channel Leakage Ratio(ACLR)	QPSK	5, 10, 15, 20	Mid	Full RB	0

4. LIST OF TEST EQUIPMENT

Equipment	Model	Manufacture	Serial No.	Due to Calibration	Calibration Interval
RF Switching System	input 1 + 1.2G HPF+LNA	HCT CO., LTD.	F1L1	12/17/2026	Annual
RF Switching System	input 1 + 3.3 G HPF+LNA	HCT CO., LTD.	F1L2	12/17/2026	Annual
RF Switching System	input 1 + LNA	HCT CO., LTD.	F1L4	12/17/2026	Annual
RF Switching System	Input 2 + 6G HPF + LNA	HCT CO., LTD.	F1L7	12/17/2026	Annual
Broadband LNA	CBL18265035	CERNEX	22966	10/21/2026	Annual
Broadband LNA	CBL26405040	CERNEX	25956	02/09/2027	Annual
Power Splitter	11667B	Hewlett Packard	5001	04/01/2027	Annual
DC Power Supply	E3632A	Agilent	MY40010147	07/29/2026	Annual
Dipole Antenna	UHAP	Schwarzbeck	01274	03/05/2028	Biennial
Dipole Antenna	UHAP	Schwarzbeck	01288	08/07/2026	Biennial
Chamber	SU-642	ESPEC	93008124	02/04/2027	Annual
Horn Antenna	BBHA 9120D	Schwarzbeck	147	08/07/2027	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1298	08/27/2027	Biennial
Horn Antenna	BBHA 9170	Schwarzbeck	BBHA9170342	09/20/2026	Biennial
Horn Antenna	BBHA 9170	Schwarzbeck	BBHA9170124	03/23/2027	Biennial
MXA SIGNAL ANALYZER	N9020A	Agilent	MY52090906	04/08/2027	Annual
20dB ATTENUATOR	8493C	HP	15233	12/10/2026	Annual
Spectrum Analyzer	FSV40	ROHDE & SCHWARZ	100931	07/28/2026	Annual
Wireless Communications Set	E5515C	Agilent	MY48360800	07/29/2026	Annual
Loop Antenna	FMZB1513	Schwarzbeck	1513-333	06/23/2027	Biennial
Trilog Broadband Antenna	VULB9168	Schwarzbeck	00895	08/28/2026	Biennial
Trilog Broadband Antenna	VULB9168	SCHWARZBECK MESS- ELEKTRONIK	01135	08/19/2026	Biennial
Radio Communication Analyzer	MT8821C	Anritsu.	6262094331	11/24/2026	Annual
Radio Communication Test Station	MT8000A	Anritsu.	6272613402	08/18/2026	Annual
SIGNAL GENERATOR	SMB100A	ROHDE & SCHWARZ	177633	07/22/2026	Annual
Signal Analyzer	N9030B	KEYSIGHT	MY55480167	05/14/2026	Annual
SIGNAL ANALYZER	FSW67	ROHDE & SCHWARZ	101736	05/27/2026	Annual
CBRS Small Cell, SC-220 (Incl. Embedded EPC)	SC-220	Qucell Networks Co., Ltd	-	-	-
Automation Software	FCC 2G/3G/4G Conducted	HCT CO., LTD	-	-	-
Automation Software	FCC NR Conducted	HCT CO., LTD	-	-	-
Automation Software	FCC LTE Radiated	HCT CO., LTD	-	-	-
Automation Software	FCC NR Radiated	HCT CO., LTD	-	-	-

Note:

- Equipment whose calibration due date was updated during the test period was not used between the previous due date and the update. All reported measurements were performed using equipment within valid calibration.
- Especially, all antenna for measurement is calibrated in accordance with the requirements of ANSI C63.5-2017.

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 ($\pm$ kHz)
Occupied Bandwidth	95 (Confidence level about 95 %, $k=2$)
Frequency stability	28 (Confidence level about 95 %, $k=2$)

Parameter	Expanded Uncertainty ($\pm$ kHz)
Block Edge	0.70 (Confidence level about 95 %, $k=2$)
Conducted Spurious Emissions	1.11 (Confidence level about 95 %, $k=2$)
Peak- to- Average Ratio	0.73 (Confidence level about 95 %, $k=2$)
Radiated Power	4.74 (Confidence level about 95 %, $k=2$)
Adjacent Channel Leakage Ratio(ACLR)	0.68 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.54 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.74 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.80 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.86 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (Above 40 GHz)	5.44 (Confidence level about 95 %, $k=2$)

6. SUMMARY OF TEST RESULTS

-. The decision rule applies 'simple acceptance'

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, § 96.41(e)	■ -13 dBm/MHz at frequencies within 0-10 MHz of channel edge ■ -25 dBm/MHz at frequencies greater than 10 MHz above and below channel edge ■ -40 dBm/MHz at frequencies below 3530 MHz and above 3720 MHz	PASS
Adjacent Channel Leakage Ratio	§ 96.41(e)	At least 30 dB.	PASS
Conducted Output Power	§ 2.1046	N/A	PASS <u>Note1</u>
Frequency stability / variation of ambient temperature	§ 2.1055,	Emission must remain in band	PASS
Peak- to- Average Ratio	§ 96.41	< 13 dB	PASS
End User Device Additional Requirements (CBSD Protocol)	§ 96.47	End User Devices may operate only if they can positively receive and decode an authorization signal transmitted by a CBSD, including the frequencies and power limits for their operation. An End User Device must discontinue operations, change frequencies, or change its operational power level within 10 seconds of receiving instructions from its associated CBSD.	PASS

Note:

1. Refer to the SAR report.
2. The EUT is an End User Device

6.2 Test Condition: Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Equivalent Isotropic Radiated Power	§ 96.41(b)	23 dBm/10 MHz	PASS
Radiated Spurious and Harmonic Emissions	§ 2.1053, § 96.41(e)	-40 dBm/MHz	PASS

7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

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

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

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

7.2 EIRP Sample Calculation

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

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

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

7.3. Emission Designator

GSM Emission Designator

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

EDGE Emission Designator

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

WCDMA Emission Designator

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

QPSK Modulation

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

QAM Modulation

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

8. TEST DATA

8.1 EQUIVALENT ISOTROPIC RADIATED POWER

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	EIRP	Limit	RB	
								dBm/10 MHz		Size	Offset
3552.5	LTE B48/ 5 MHz	QPSK	-28.79	10.06	12.39	3.09	H	19.36	23.0	1	0
		16-QAM	-30.04	8.81	12.39	3.09	H	18.11			
		64-QAM	-30.70	8.15	12.39	3.09	H	17.45			
		256-QAM	-34.21	4.64	12.39	3.09	H	13.94			
3625.0		QPSK	-28.96	10.22	12.25	3.13	H	19.34		1	24
		16-QAM	-29.85	9.33	12.25	3.13	H	18.45			
		64-QAM	-30.71	8.47	12.25	3.13	H	17.59			
		256-QAM	-33.89	5.29	12.25	3.13	H	14.41			
3697.5		QPSK	-28.73	10.62	12.30	3.07	H	19.85		1	24
		16-QAM	-29.71	9.64	12.30	3.07	H	18.87			
		64-QAM	-30.92	8.43	12.30	3.07	H	17.66			
		256-QAM	-34.13	5.22	12.30	3.07	H	14.45			

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	EIRP	Limit	RB	
								dBm/10 MHz		Size	Offset
3555.0	LTE B48/ 10 MHz	QPSK	-28.87	9.98	12.39	3.09	H	19.28	23.0	1	0
		16-QAM	-29.82	9.03	12.39	3.09	H	18.33			
		64-QAM	-30.94	7.91	12.39	3.09	H	17.21			
		256-QAM	-33.79	5.06	12.39	3.09	H	14.36			
3625.0		QPSK	-29.14	10.04	12.25	3.13	H	19.16		1	49
		16-QAM	-29.87	9.31	12.25	3.13	H	18.43			
		64-QAM	-30.87	8.31	12.25	3.13	H	17.43			
		256-QAM	-33.96	5.22	12.25	3.13	H	14.34			
3695.0		QPSK	-28.94	10.37	12.29	3.08	H	19.58		1	25
		16-QAM	-29.83	9.48	12.29	3.08	H	18.69			
		64-QAM	-30.77	8.54	12.29	3.08	H	17.75			
		256-QAM	-33.95	5.36	12.29	3.08	H	14.57			

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	EIRP	Limit	RB	
								dBm/10 MHz		Size	Offset
3557.5	LTE B48/ 15 MHz	QPSK	-28.91	9.86	12.38	3.09	H	19.15	23.0	1	0
		16-QAM	-30.12	8.65	12.38	3.09	H	17.94			
		64-QAM	-30.91	7.86	12.38	3.09	H	17.15			
		256-QAM	-34.12	4.65	12.38	3.09	H	13.94			
3625.0		QPSK	-29.25	9.93	12.25	3.13	H	19.05		1	74
		16-QAM	-29.98	9.20	12.25	3.13	H	18.32			
		64-QAM	-30.98	8.20	12.25	3.13	H	17.32			
		256-QAM	-34.02	5.16	12.25	3.13	H	14.28			
3692.5		QPSK	-29.28	10.03	12.29	3.08	H	19.24		1	0
		16-QAM	-29.85	9.46	12.29	3.08	H	18.67			
		64-QAM	-31.10	8.21	12.29	3.08	H	17.42			
		256-QAM	-34.20	5.11	12.29	3.08	H	14.32			

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	EIRP	Limit	RB	
								dBm/10 MHz		Size	Offset
3560.0	LTE B48/ 20 MHz	QPSK	-29.50	9.27	12.38	3.09	H	18.56	23.0	1	0
		16-QAM	-29.98	8.79	12.38	3.09	H	18.08			
		64-QAM	-31.25	7.52	12.38	3.09	H	16.81			
		256-QAM	-33.92	4.85	12.38	3.09	H	14.14			
3625.0		QPSK	-29.14	10.04	12.25	3.13	H	19.16		1	0
		16-QAM	-29.90	9.28	12.25	3.13	H	18.40			
		64-QAM	-30.98	8.20	12.25	3.13	H	17.32			
		256-QAM	-33.87	5.31	12.25	3.13	H	14.43			
3690.0		QPSK	-29.21	10.05	12.28	3.08	H	19.25		1	50
		16-QAM	-30.12	9.14	12.28	3.08	H	18.34			
		64-QAM	-30.84	8.42	12.28	3.08	H	17.62			
		256-QAM	-34.14	5.12	12.28	3.08	H	14.32			

8.2 RADIATED SPURIOUS EMISSIONS

☐ MODE: LTE B48
☐ MODULATION SIGNAL: 5 MHz QPSK
☐ DISTANCE: 1 meters
☐ LIMIT: -40 dBm

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	RB	
								Size	Offset
55265 (3552.5)	7 105.00	-43.19	11.34	-58.07	4.48	V	-51.21	1	0
		-43.81		-58.69		H	-51.83		
	10 657.50	-46.79	10.90	-57.49	5.67	V	-52.26		
		-46.80		-57.50		H	-52.27		
	14 210.00	-48.18	11.83	-52.08	6.66	V	-46.91		
		-46.84		-50.74		H	-45.57		
55990 (3625.0)	7 250.00	-44.33	11.18	-59.26	4.53	V	-52.61	1	24
		-44.46		-59.39		H	-52.74		
	10 875.00	-46.68	10.61	-56.07	5.82	V	-51.28		
		-46.02		-55.41		H	-50.62		
	14 500.00	-47.11	11.61	-52.78	6.69	V	-47.86		
		-47.28		-52.95		H	-48.03		
56715 (3697.5)	7 395.00	-43.96	11.12	-59.69	4.59	V	-53.16	1	24
		-45.36		-61.09		H	-54.56		
	11 092.50	-44.02	11.13	-53.65	5.88	V	-48.40		
		-46.60		-56.23		H	-50.98		
	14 790.00	-47.73	11.85	-54.24	6.73	V	-49.12		
		-47.43		-53.94		H	-48.82		

MODE: LTE B48
 MODULATION SIGNAL: 10 MHz QPSK
 DISTANCE: 1 meters
 LIMIT: -40 dBm

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	RB	
								Size	Offset
55290 (3555.0)	7 110.00	-43.89	11.33	-57.99	4.48	V	-51.14	1	0
		-44.31		-58.41		H	-51.56		
	10 665.00	-47.59	10.91	-58.14	5.68	V	-52.91		
		-46.37		-56.92		H	-51.69		
	14 220.00	-47.17	11.83	-50.79	6.63	V	-45.59		
		-47.25		-50.87		H	-45.67		
55990 (3625.0)	7 250.00	-44.22	11.18	-59.15	4.53	V	-52.50	1	49
		-44.15		-59.08		H	-52.43		
	10 875.00	-47.45	10.61	-56.84	5.82	V	-52.05		
		-46.64		-56.03		H	-51.24		
	14 500.00	-47.59	11.61	-53.26	6.69	V	-48.34		
		-48.01		-53.68		H	-48.76		
56690 (3695.0)	7 390.00	-44.29	11.13	-60.32	4.60	V	-53.79	1	25
		-44.65		-60.68		H	-54.15		
	11 085.00	-48.00	11.09	-57.67	5.85	V	-52.43		
		-45.17		-54.84		H	-49.60		
	14 780.00	-47.98	11.81	-54.39	6.73	V	-49.31		
		-47.75		-54.16		H	-49.08		

MODE: LTE B48
 MODULATION SIGNAL: 15 MHz QPSK
 DISTANCE: 1 meters
 LIMIT: -40 dBm

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	RB	
								Size	Offset
55315 (3557.5)	7 115.00	-44.08	11.32	-58.01	4.47	V	-51.16	1	0
		-44.49		-58.42		H	-51.57		
	10 672.50	-46.68	10.92	-56.97	5.70	V	-51.75		
		-47.85		-58.14		H	-52.92		
	14 230.00	-48.06	11.82	-51.14	6.58	V	-45.90		
		-48.86		-51.94		H	-46.70		
55990 (3625.0)	7 250.00	-44.73	11.18	-59.66	4.53	V	-53.01	1	74
		-45.74		-60.67		H	-54.02		
	10 875.00	-47.65	10.61	-57.04	5.82	V	-52.25		
		-48.40		-57.79		H	-53.00		
	14 500.00	-48.40	11.61	-54.07	6.69	V	-49.15		
		-47.25		-52.92		H	-48.00		
56665 (3692.5)	7 385.00	-45.70	11.13	-61.94	4.61	V	-55.42	1	0
		-46.11		-62.35		H	-55.83		
	11 077.50	-47.47	11.08	-57.09	5.84	V	-51.85		
		-46.14		-55.76		H	-50.52		
	14 770.00	-48.15	11.78	-54.72	6.72	V	-49.66		
		-47.37		-53.94		H	-48.88		

MODE: LTE B48
 MODULATION SIGNAL: 20 MHz QPSK
 DISTANCE: 1 meters
 LIMIT: -40 dBm

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	RB	
								Size	Offset
55340 (3560.0)	7 120.00	-44.36	11.31	-58.11	4.46	V	-51.26	1	0
		-43.11		-56.86		H	-50.01		
	10 680.00	-47.88	10.92	-58.07	5.71	V	-52.86		
		-45.96		-56.15		H	-50.94		
	14 240.00	-47.35	11.82	-51.28	6.54	V	-46.00		
		-47.57		-51.50		H	-46.22		
55990 (3625.0)	7 250.00	-44.21	11.18	-59.14	4.53	V	-52.49	1	0
		-45.21		-60.14		H	-53.49		
	10 875.00	-46.41	10.61	-55.80	5.82	V	-51.01		
		-46.17		-55.56		H	-50.77		
	14 500.00	-47.05	11.61	-52.72	6.69	V	-47.80		
		-47.79		-53.46		H	-48.54		
56640 (3690.0)	7 380.00	-45.59	11.14	-62.06	4.61	V	-55.53	1	50
		-45.54		-62.01		H	-55.48		
	11 070.00	-47.41	11.04	-56.84	5.79	V	-51.59		
		-46.78		-56.21		H	-50.96		
	14 760.00	-48.02	11.75	-54.78	6.71	V	-49.74		
		-47.29		-54.05		H	-49.01		

8.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)	Limit (dB)
LTE B48	5 MHz	3625.0	QPSK	25	0	5.63	13.00
			16-QAM			6.70	
			64-QAM			6.92	
			256-QAM			7.11	
	10 MHz		QPSK	50		5.49	
			16-QAM			6.38	
			64-QAM			6.89	
			256-QAM			6.99	
	15 MHz		QPSK	75		5.31	
			16-QAM			6.21	
			64-QAM			6.72	
			256-QAM			6.93	
	20 MHz		QPSK	100		5.24	
			16-QAM			6.14	
			64-QAM			6.54	
			256-QAM			7.05	

8.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
LTE B48	5 MHz	3625.0	QPSK	25	0	4.4750
			16-QAM			4.4700
			64-QAM			4.4901
			256-QAM			4.5061
	10 MHz		QPSK	50		8.9238
			16-QAM			8.9933
			64-QAM			8.9946
			256-QAM			9.0247
	15 MHz		QPSK	75		13.443
			16-QAM			13.498
			64-QAM			13.445
			256-QAM			13.481
	20 MHz		QPSK	100		17.979
			16-QAM			17.976
			64-QAM			17.955
			256-QAM			17.832

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)
LTE B48	5	3552.5	3.7809	31.955	-77.974	-46.019	-40.00
		3625.0	3.9305	31.955	-79.738	-47.783	
		3697.5	4.0022	31.955	-77.354	-45.399	
	10	3555.0	3.7809	31.955	-78.168	-46.213	
		3625.0	3.9280	31.955	-79.180	-47.225	
		3695.0	3.9210	31.955	-79.663	-47.708	
	15	3557.5	3.7814	31.955	-78.794	-46.839	
		3625.0	3.3881	31.955	-80.590	-48.635	
		3692.5	3.9928	31.955	-79.640	-47.685	
	20	3560.0	3.7814	31.955	-79.014	-47.059	
		3625.0	3.3856	31.955	-79.862	-47.907	
		3690.0	3.9883	31.955	-80.006	-48.051	

Note:

- Conducted Spurious Emissions was Tested QPSK Modulation, Resource Block Size 1 and Resource Block Offset 0
- Duty Cycle factor already applied on the factor.
- Duty Cycle factor(dB) = 3.979
- Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
- Factor (dB) = Cable Loss + Attenuator + Power Splitter + Duty Cycle factor(dB)

Frequency Range (GHz)	Factor [dB]
0.03 – 1	29.249
1 – 5	31.955
5 – 10	32.570
10 – 15	33.095
15 – 20	33.468
Above 20(26.5)	34.110

8.6 CHANNEL EDGE

BW (MHz)	RB (Size/ Offset)	Freq. (MHz)	Outside of the authorized band (dBm)							
			Lower Side(MHz)				Upper Side(MHz)			
			Below 3530 MHz	-[B]MHz ~ 3530 MHz	-1 MHz ~ -[B]MHz	0 MHz ~ -1 MHz	0 MHz ~ +1 MHz	1 MHz ~ +[B]MHz	+ [B]MHz ~ 3720 MHz	Above 3720 MHz
5	25/0	3552.5	-49.60	-39.68	-28.27	-28.81	-28.92	-28.81	-39.39	-
		3625.0	-	-38.91	-28.73	-28.82	-29.03	-29.62	-38.88	-
		3697.5	-	-38.02	-27.93	-28.84	-28.43	-28.88	-37.77	-43.95
10	50/0	3555.0	-49.28	-40.68	-30.27	-33.41	-33.00	-30.10	-39.93	-
		3625.0	-	-39.99	-30.38	-33.46	-33.39	-31.10	-39.41	-
		3695.0	-	-38.99	-29.75	-33.09	-32.99	-30.81	-38.66	-43.83
15	75/0	3557.5	-47.32	-40.53	-32.69	-35.65	-35.31	-31.87	-43.38	-
		3625.0	-	-42.25	-32.54	-35.53	-35.77	-32.61	-41.69	-
		3692.5	-	-41.39	-32.19	-35.31	-35.50	-32.11	-38.14	-42.92
20	100/0	3560.0	-45.72	-40.46	-33.96	-37.36	-36.44	-32.51	-42.61	-
		3625.0	-	-46.05	-33.83	-37.43	-37.22	-33.37	-42.42	-
		3690.0	-	-42.47	-33.63	-37.08	-36.83	-33.23	-37.48	-42.12
Limit (dBm)			-40.00	-25.00	-13.00	-13.00	-13.00	-13.00	-25.00	-40.00

Note:

1. C.E = Channel Edge
2. Duty Cycle factor already applied on the factor.
 - Duty Cycle factor(dB) = 3.979
 - Factor(dB) = Duty Cycle factor + Cable Loss + Ext. Attenuator + Power Splitter

BW (MHz)	RB (Size/ Offset)	Freq. (MHz)	Outside of the authorized band (dBm)							
			Lower Side(MHz)				Upper Side(MHz)			
			Below 3530 MHz	-[B]MHz ~ 3530 MHz	-1 MHz ~ -[B]MHz	0 MHz ~ -1 MHz	0 MHz ~ +1 MHz	1 MHz ~ +[B]MHz	+ [B]MHz ~ 3720 MHz	Above 3720 MHz
5	Lower Side: 1/0	3552.5	-49.07	-44.65	-31.24	-23.54	-23.26	-31.80	-44.77	-
	Upper Side:	3625.0	-	-42.69	-31.74	-23.38	-24.09	-31.79	-42.51	-
	1/24	3697.5	-	-41.67	-31.14	-22.94	-23.03	-30.76	-41.60	-43.82
10	Lower Side: 1/0	3555.0	-49.08	-47.41	-33.75	-30.69	-29.70	-33.83	-47.20	-
	Upper Side:	3625.0	-	-44.04	-33.53	-30.54	-30.03	-33.54	-43.63	-
	1/49	3695.0	-	-42.93	-33.18	-30.05	-29.44	-32.95	-42.96	-43.75
15	Lower Side: 1/0	3557.5	-49.06	-47.35	-34.49	-27.96	-28.35	-34.29	-48.20	-
	Upper Side:	3625.0	-	-44.40	-34.35	-28.49	-28.43	-34.46	-43.84	-
	1/74	3692.5	-	-43.33	-33.83	-27.97	-28.18	-33.57	-42.97	-43.78
20	Lower Side: 1/0	3560.0	-49.05	-47.24	-35.16	-29.08	-28.76	-35.04	-44.65	-
	Upper Side:	3625.0	-	-48.82	-35.18	-29.30	-29.09	-35.15	-43.81	-
	1/99	3690.0	-	-43.75	-34.85	-29.10	-28.34	-34.01	-42.70	-43.79
Limit (dBm)			-40.00	-25.00	-13.00	-13.00	-13.00	-13.00	-25.00	-40.00

Note:

1. C.E = Channel Edge
2. Duty Cycle factor already applied on the factor.
 - Duty Cycle factor(dB) = 3.979
 - Factor(dB) = Duty Cycle factor + Cable Loss + Ext. Attenuator + Power Splitter

8.7 Adjacent Channel Leakage Ratio(ACLR)

Band Width	RB (Size/ Offset)	Frequency (MHz)	Adjacent Channel Leakage Ratio(dB)	
			Lower Side	Upper Side
5 MHz	25/0	3552.5	42.19	42.22
		3625.0	41.70	41.94
		3697.5	41.51	41.82
10 MHz	50/0	3555.0	43.59	43.01
		3625.0	42.03	41.87
		3695.0	41.70	41.76
15 MHz	75/0	3557.5	44.14	43.15
		3625.0	41.70	41.23
		3692.5	41.26	41.10
20 MHz	100/0	3560.0	44.38	42.92
		3625.0	41.19	40.45
		3690.0	40.75	40.42
Limit (dB)			ACLR > 30 dB	ACLR > 30 dB

Note:

1. Duty Cycle factor already applied on the factor.

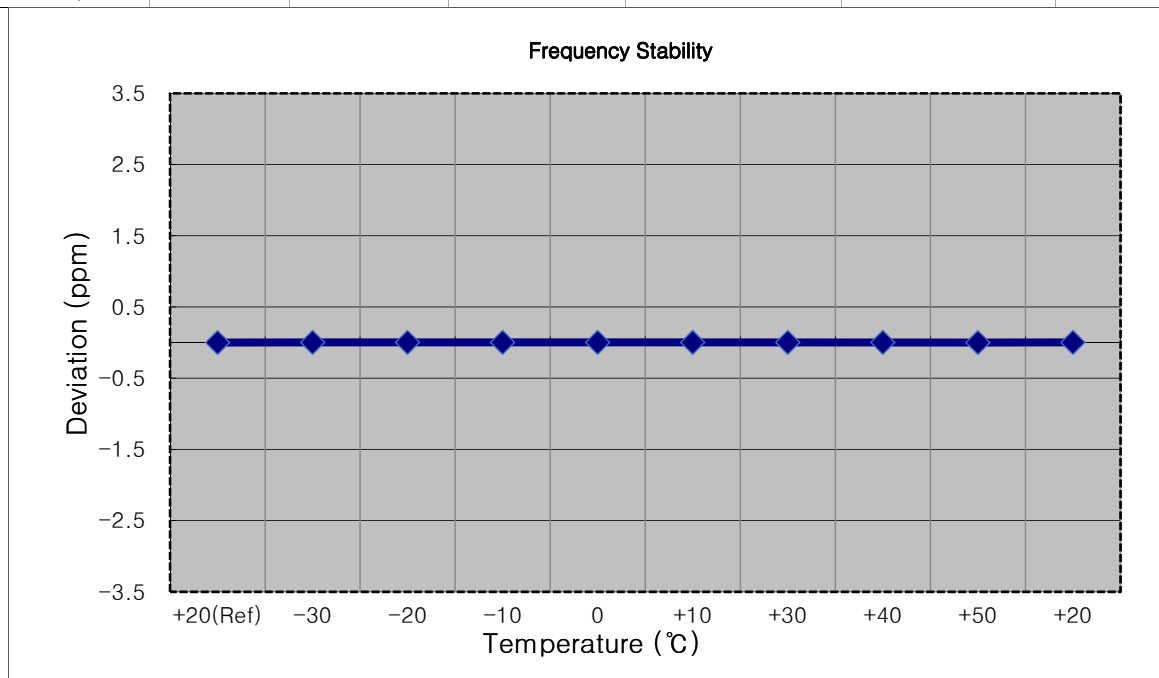
- Duty Cycle factor(dB) = 3.979

- Factor(dB) = Duty Cycle factor + Cable Loss + Ext. Attenuator + Power Splitter

8.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

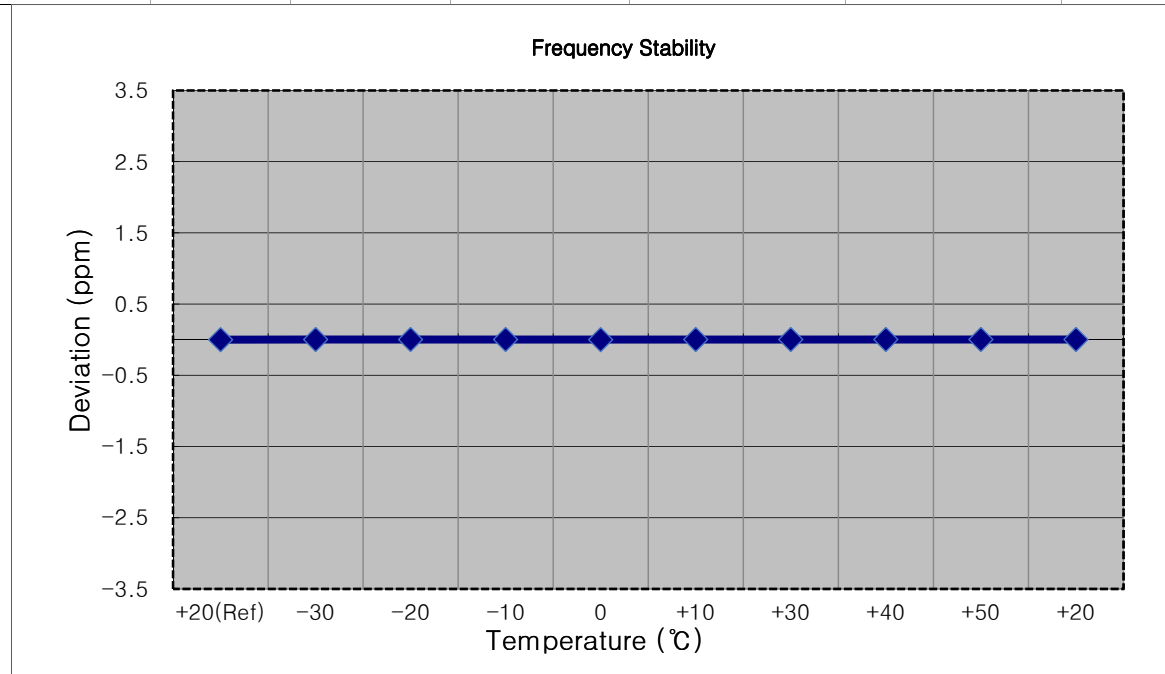
- ▣ OPERATING FREQUENCY: 3,552,500,000 Hz
- ▣ BANDWIDTH: 5 MHz
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	3552 500 003	0.0	0.000 000	0.000
100 %		-30	3552 500 007	3.7	0.000 000	0.001
100 %		-20	3552 500 007	4.1	0.000 000	0.001
100 %		-10	3552 500 006	2.4	0.000 000	0.001
100 %		0	3552 500 006	3.2	0.000 000	0.001
100 %		+10	3552 500 007	3.4	0.000 000	0.001
100 %		+30	3552 500 008	5.0	0.000 000	0.001
100 %		+40	3552 500 006	2.5	0.000 000	0.001
100 %		+50	3552 500 002	-1.6	0.000 000	0.000
Batt. Endpoint	3.300	+20	3552 500 009	6.2	0.000 000	0.002



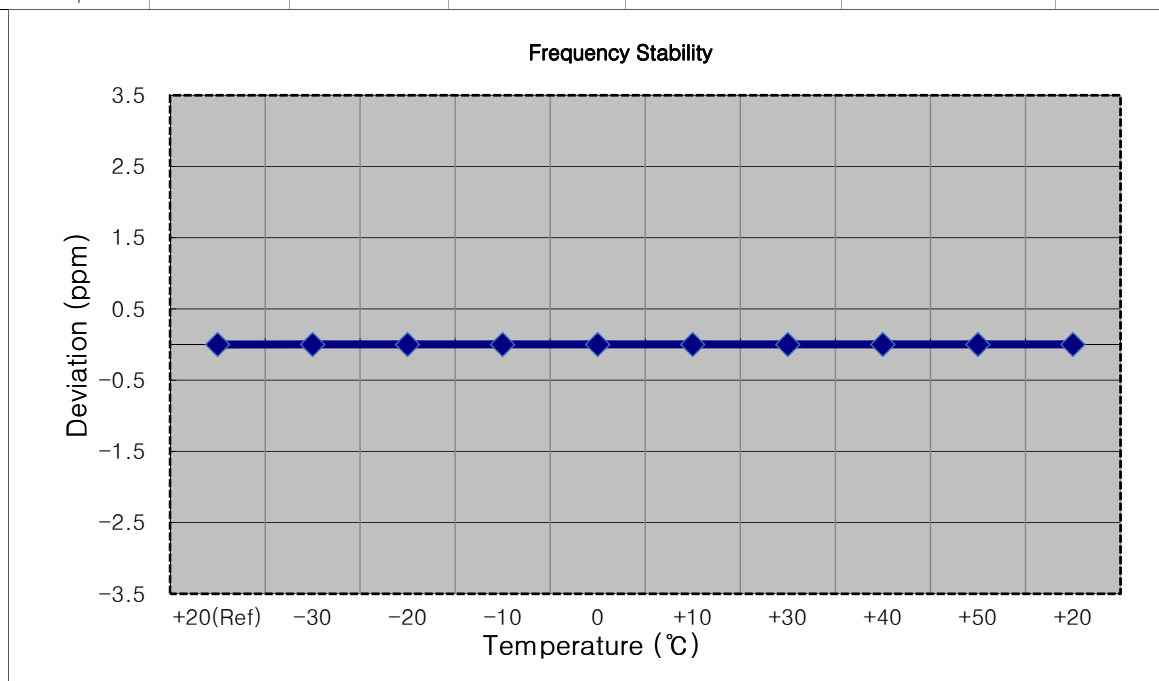
- ▣ OPERATING FREQUENCY: 3,555,000,000 Hz
- ▣ BANDWIDTH: 10 MHz
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	3555 000 005	0.0	0.000 000	0.000
100 %		-30	3555 000 013	8.0	0.000 000	0.002
100 %		-20	3555 000 009	4.9	0.000 000	0.001
100 %		-10	3555 000 011	6.6	0.000 000	0.002
100 %		0	3555 000 006	1.9	0.000 000	0.001
100 %		+10	3555 000 010	5.7	0.000 000	0.002
100 %		+30	3555 000 011	6.6	0.000 000	0.002
100 %		+40	3555 000 009	4.8	0.000 000	0.001
100 %		+50	3555 000 009	4.0	0.000 000	0.001
Batt. Endpoint	3.300	+20	3555 000 012	7.1	0.000 000	0.002



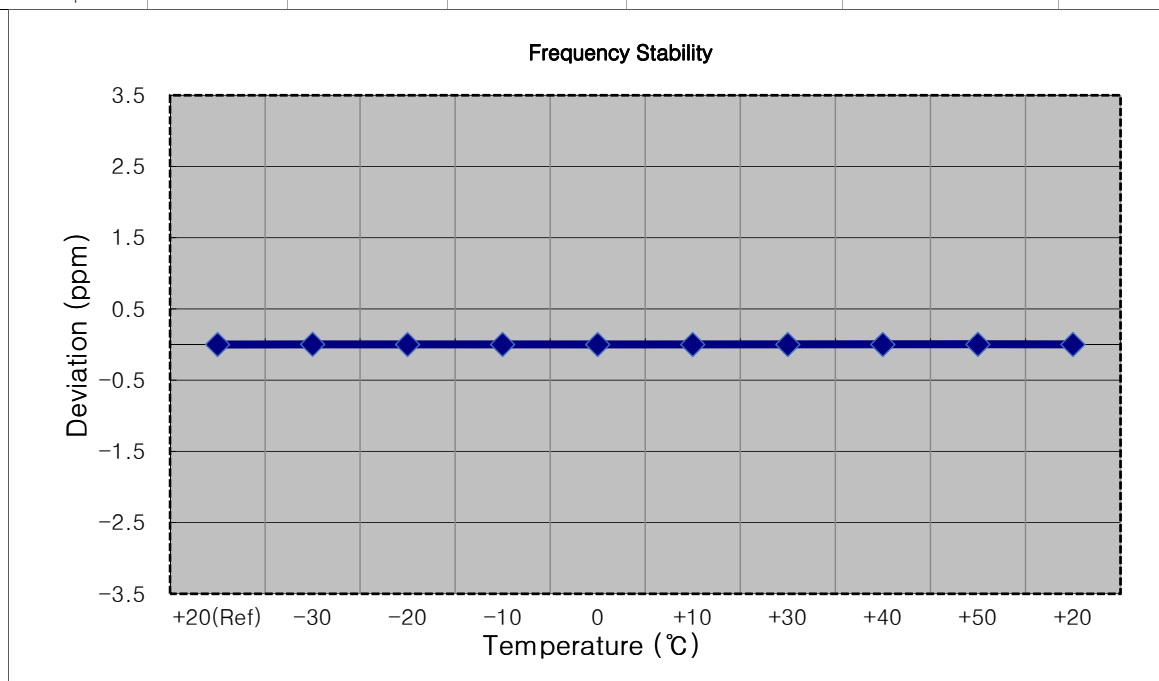
- ▣ OPERATING FREQUENCY: 3,557,500,000 Hz
- ▣ BANDWIDTH: 15 MHz
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	3557 500 006	0.0	0.000 000	0.000
100 %		-30	3557 500 011	4.9	0.000 000	0.001
100 %		-20	3557 500 011	4.8	0.000 000	0.001
100 %		-10	3557 500 012	6.0	0.000 000	0.002
100 %		0	3557 500 012	6.0	0.000 000	0.002
100 %		+10	3557 500 010	3.7	0.000 000	0.001
100 %		+30	3557 500 013	6.8	0.000 000	0.002
100 %		+40	3557 500 009	3.1	0.000 000	0.001
100 %		+50	3557 500 012	5.5	0.000 000	0.002
Batt. Endpoint	3.300	+20	3557 500 011	4.6	0.000 000	0.001



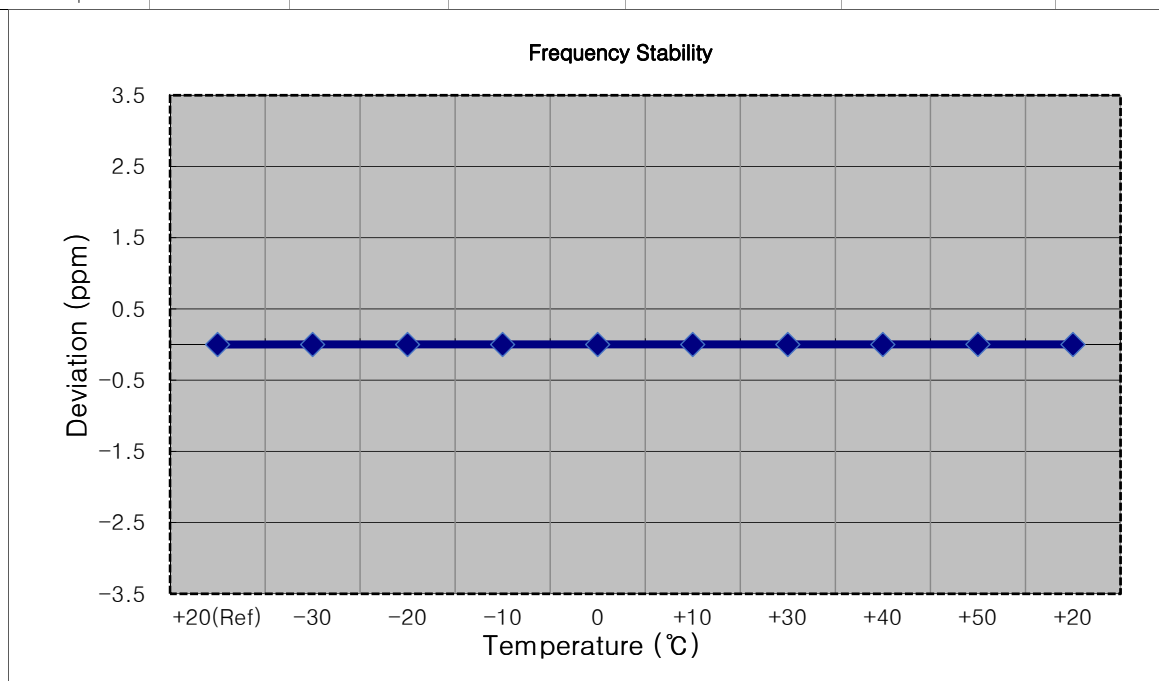
- ▣ OPERATING FREQUENCY: 3,560,000,000 Hz
- ▣ BANDWIDTH: 20 MHz
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	3560 000 005	0.0	0.000 000	0.000
100 %		-30	3560 000 014	8.7	0.000 000	0.002
100 %		-20	3560 000 009	3.7	0.000 000	0.001
100 %		-10	3560 000 011	5.4	0.000 000	0.002
100 %		0	3560 000 009	3.5	0.000 000	0.001
100 %		+10	3560 000 012	6.4	0.000 000	0.002
100 %		+30	3560 000 009	3.1	0.000 000	0.001
100 %		+40	3560 000 008	2.1	0.000 000	0.001
100 %		+50	3560 000 013	7.7	0.000 000	0.002
Batt. Endpoint	3.300	+20	3560 000 009	3.8	0.000 000	0.001



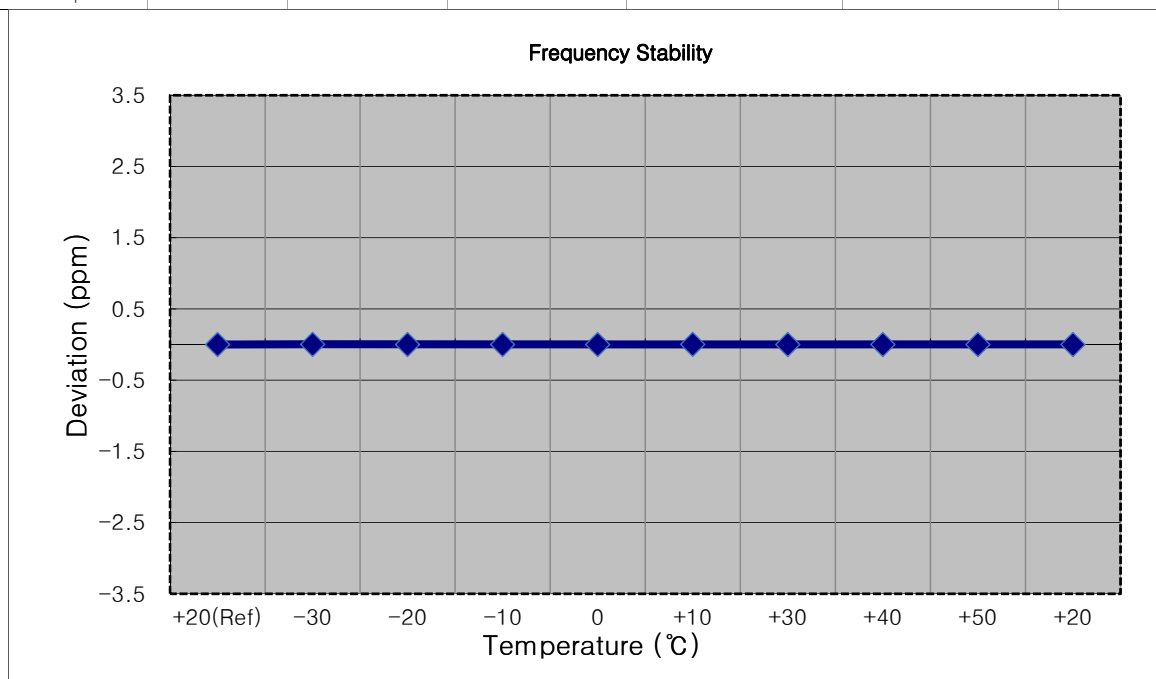
- ▣ OPERATING FREQUENCY: 3,625,000,000 Hz
- ▣ BANDWIDTH: 5 MHz
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	3625 000 005	0.0	0.000 000	0.000
100 %		-30	3625 000 010	4.9	0.000 000	0.001
100 %		-20	3625 000 008	3.5	0.000 000	0.001
100 %		-10	3625 000 008	3.5	0.000 000	0.001
100 %		0	3625 000 008	3.3	0.000 000	0.001
100 %		+10	3625 000 008	3.6	0.000 000	0.001
100 %		+30	3625 000 008	3.1	0.000 000	0.001
100 %		+40	3625 000 009	4.5	0.000 000	0.001
100 %		+50	3625 000 013	8.1	0.000 000	0.002
Batt. Endpoint	3.300	+20	3625 000 008	3.1	0.000 000	0.001



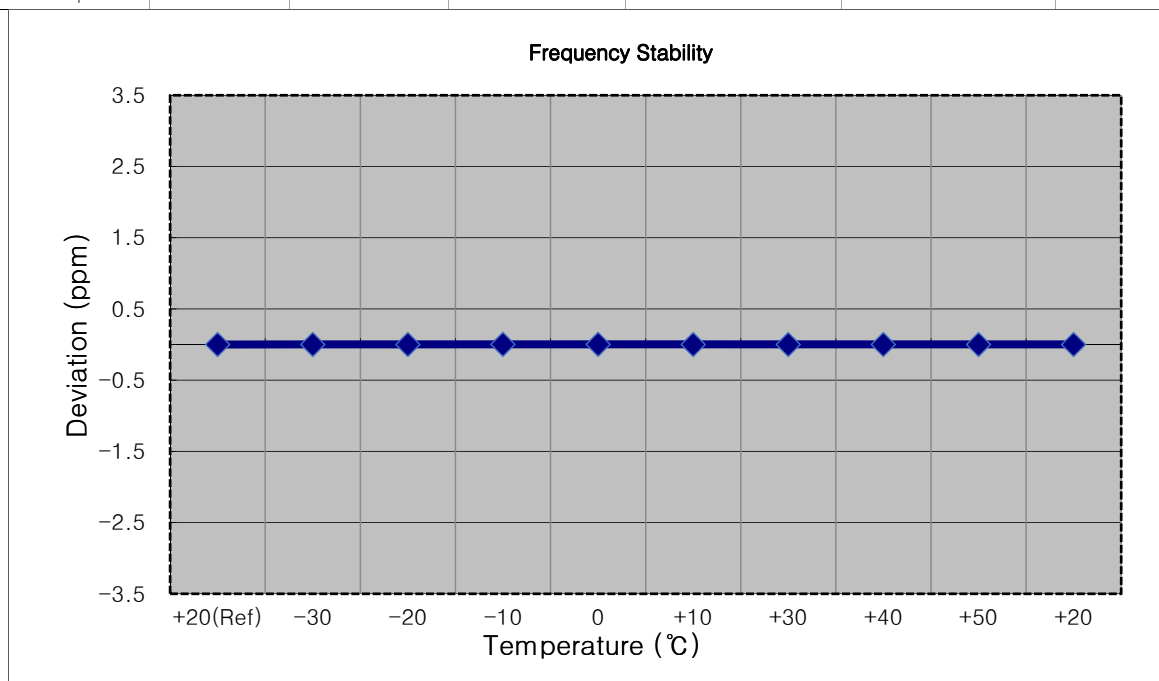
- ▣ OPERATING FREQUENCY: 3,625,000,000 Hz
- ▣ BANDWIDTH: 10 MHz
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	3625 000 007	0.0	0.000 000	0.000
100 %		-30	3625 000 015	7.9	0.000 000	0.002
100 %		-20	3625 000 009	2.0	0.000 000	0.001
100 %		-10	3625 000 010	3.5	0.000 000	0.001
100 %		0	3625 000 012	5.1	0.000 000	0.001
100 %		+10	3625 000 017	9.8	0.000 000	0.003
100 %		+30	3625 000 014	7.3	0.000 000	0.002
100 %		+40	3625 000 013	6.3	0.000 000	0.002
100 %		+50	3625 000 012	5.7	0.000 000	0.002
Batt. Endpoint	3.300	+20	3625 000 013	6.1	0.000 000	0.002



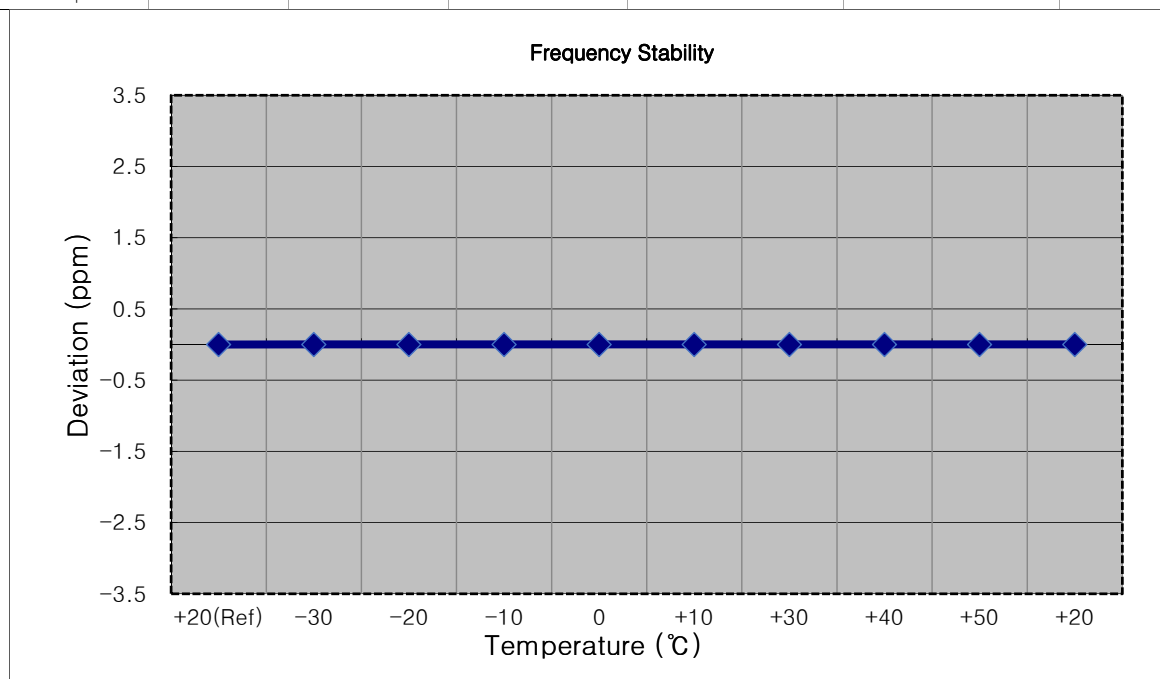
- ▣ OPERATING FREQUENCY: 3,625,000,000 Hz
- ▣ BANDWIDTH: 15 MHz
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	3625 000 004	0.0	0.000 000	0.000
100 %		-30	3625 000 010	6.5	0.000 000	0.002
100 %		-20	3625 000 009	4.8	0.000 000	0.001
100 %		-10	3625 000 012	8.3	0.000 000	0.002
100 %		0	3625 000 013	8.6	0.000 000	0.002
100 %		+10	3625 000 011	7.2	0.000 000	0.002
100 %		+30	3625 000 010	5.9	0.000 000	0.002
100 %		+40	3625 000 011	6.6	0.000 000	0.002
100 %		+50	3625 000 010	6.2	0.000 000	0.002
Batt. Endpoint	3.300	+20	3625 000 008	4.5	0.000 000	0.001



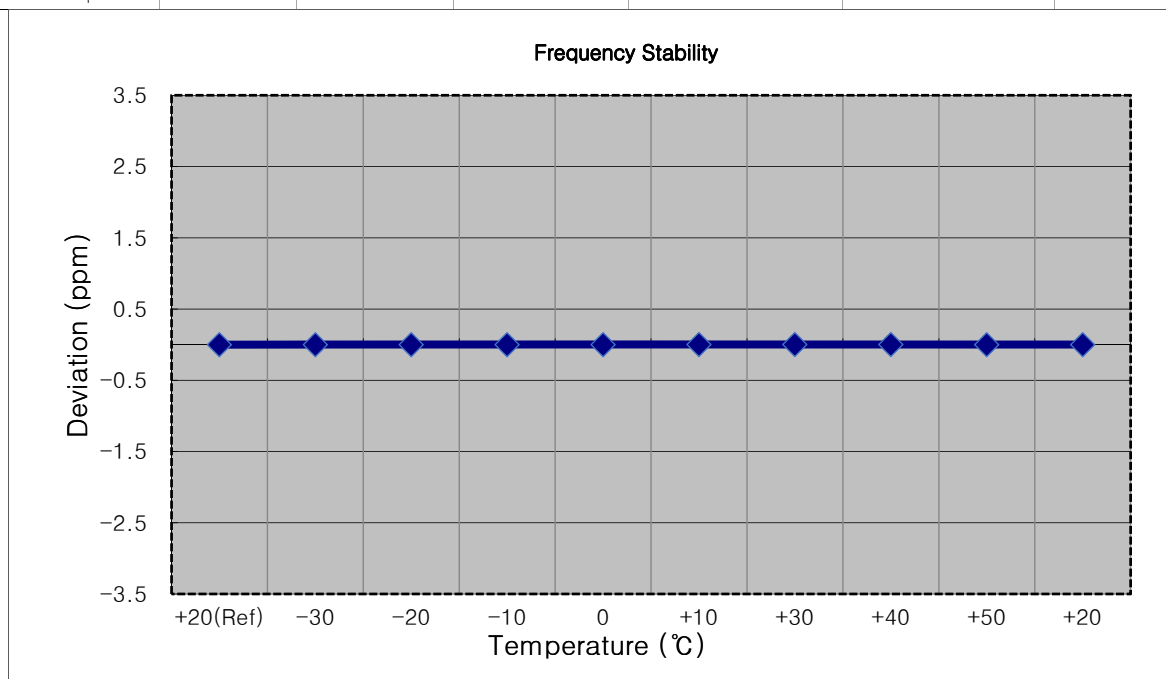
- ▣ OPERATING FREQUENCY: 3,625,000,000 Hz
- ▣ BANDWIDTH: 20 MHz
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	3625 000 008	0.0	0.000 000	0.000
100 %		-30	3625 000 014	5.5	0.000 000	0.002
100 %		-20	3625 000 014	6.0	0.000 000	0.002
100 %		-10	3625 000 011	2.3	0.000 000	0.001
100 %		0	3625 000 015	6.7	0.000 000	0.002
100 %		+10	3625 000 016	7.4	0.000 000	0.002
100 %		+30	3625 000 014	6.0	0.000 000	0.002
100 %		+40	3625 000 015	7.0	0.000 000	0.002
100 %		+50	3625 000 013	4.3	0.000 000	0.001
Batt. Endpoint	3.300	+20	3625 000 013	4.7	0.000 000	0.001



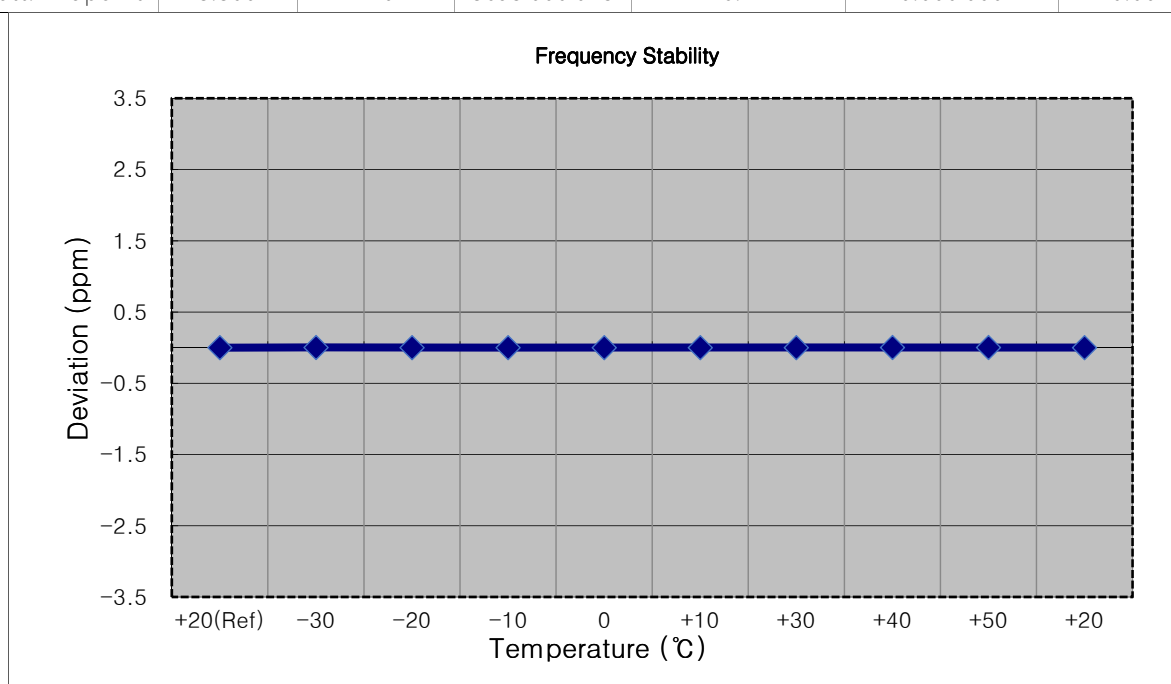
- ▣ OPERATING FREQUENCY: 3,697,500,000 Hz
- ▣ BANDWIDTH: 5 MHz
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	3697 500 006	0.0	0.000 000	0.000
100 %		-30	3697 500 012	6.4	0.000 000	0.002
100 %		-20	3697 500 010	4.5	0.000 000	0.001
100 %		-10	3697 500 012	6.3	0.000 000	0.002
100 %		0	3697 500 011	5.3	0.000 000	0.001
100 %		+10	3697 500 012	6.9	0.000 000	0.002
100 %		+30	3697 500 015	9.0	0.000 000	0.002
100 %		+40	3697 500 012	6.5	0.000 000	0.002
100 %		+50	3697 500 009	3.3	0.000 000	0.001
Batt. Endpoint	3.300	+20	3697 500 012	6.4	0.000 000	0.002



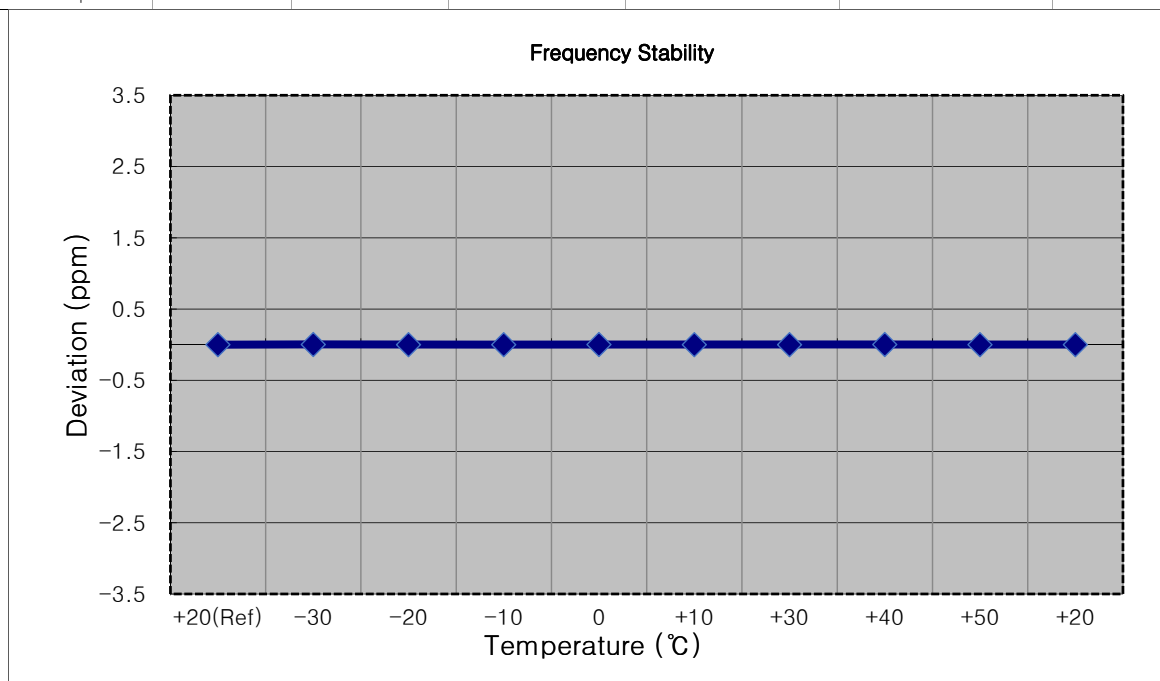
- ▣ OPERATING FREQUENCY: 3,695,000,000 Hz
- ▣ BANDWIDTH: 10 MHz
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	3695 000 011	0.0	0.000 000	0.000
100 %		-30	3695 000 020	8.4	0.000 000	0.002
100 %		-20	3695 000 016	5.0	0.000 000	0.001
100 %		-10	3695 000 015	3.5	0.000 000	0.001
100 %		0	3695 000 015	3.7	0.000 000	0.001
100 %		+10	3695 000 015	3.6	0.000 000	0.001
100 %		+30	3695 000 015	4.1	0.000 000	0.001
100 %		+40	3695 000 018	7.1	0.000 000	0.002
100 %		+50	3695 000 020	9.0	0.000 000	0.002
Batt. Endpoint	3.300	+20	3695 000 018	6.2	0.000 000	0.002



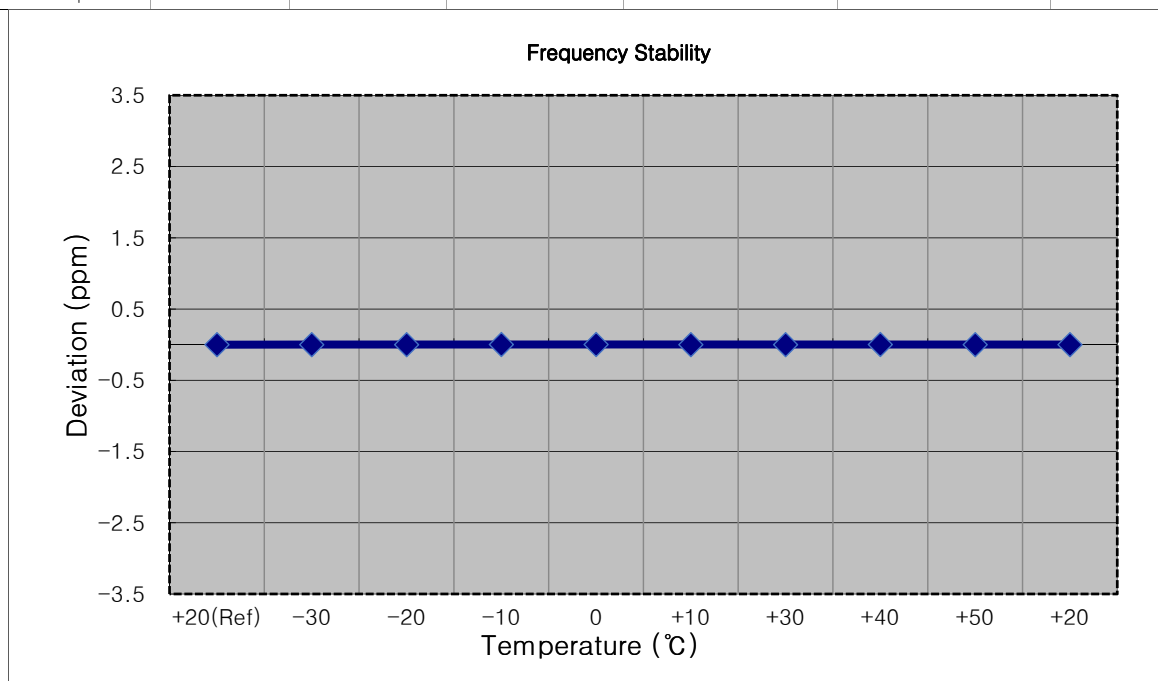
- ▣ OPERATING FREQUENCY: 3,692,500,000 Hz
- ▣ BANDWIDTH: 15 MHz
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	3692 500 005	0.0	0.000 000	0.000
100 %		-30	3692 500 012	6.6	0.000 000	0.002
100 %		-20	3692 500 010	4.9	0.000 000	0.001
100 %		-10	3692 500 008	2.7	0.000 000	0.001
100 %		0	3692 500 014	8.1	0.000 000	0.002
100 %		+10	3692 500 009	3.6	0.000 000	0.001
100 %		+30	3692 500 011	5.5	0.000 000	0.001
100 %		+40	3692 500 012	6.9	0.000 000	0.002
100 %		+50	3692 500 011	5.4	0.000 000	0.001
Batt. Endpoint	3.300	+20	3692 500 008	2.7	0.000 000	0.001



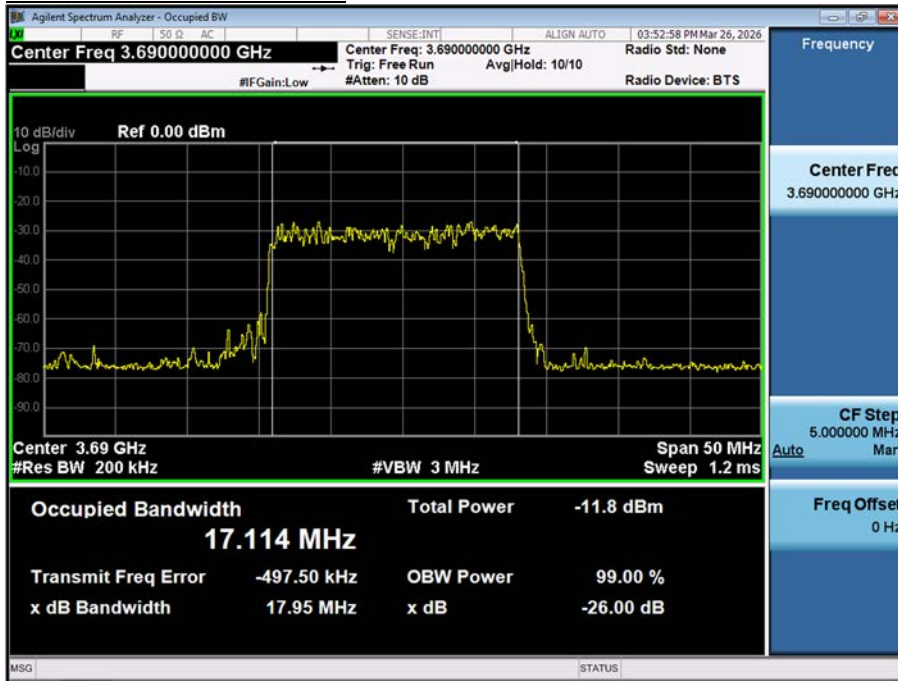
- ▣ OPERATING FREQUENCY: 3,690,000,000 Hz
- ▣ BANDWIDTH: 20 MHz
- ▣ REFERENCE VOLTAGE: 3.880 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	3690 000 006	0.0	0.000 000	0.000
100 %		-30	3690 000 010	4.0	0.000 000	0.001
100 %		-20	3690 000 012	6.0	0.000 000	0.002
100 %		-10	3690 000 013	7.2	0.000 000	0.002
100 %		0	3690 000 014	7.5	0.000 000	0.002
100 %		+10	3690 000 011	5.2	0.000 000	0.001
100 %		+30	3690 000 011	4.6	0.000 000	0.001
100 %		+40	3690 000 013	6.9	0.000 000	0.002
100 %		+50	3690 000 010	4.0	0.000 000	0.001
Batt. Endpoint	3.300	+20	3690 000 010	3.7	0.000 000	0.001



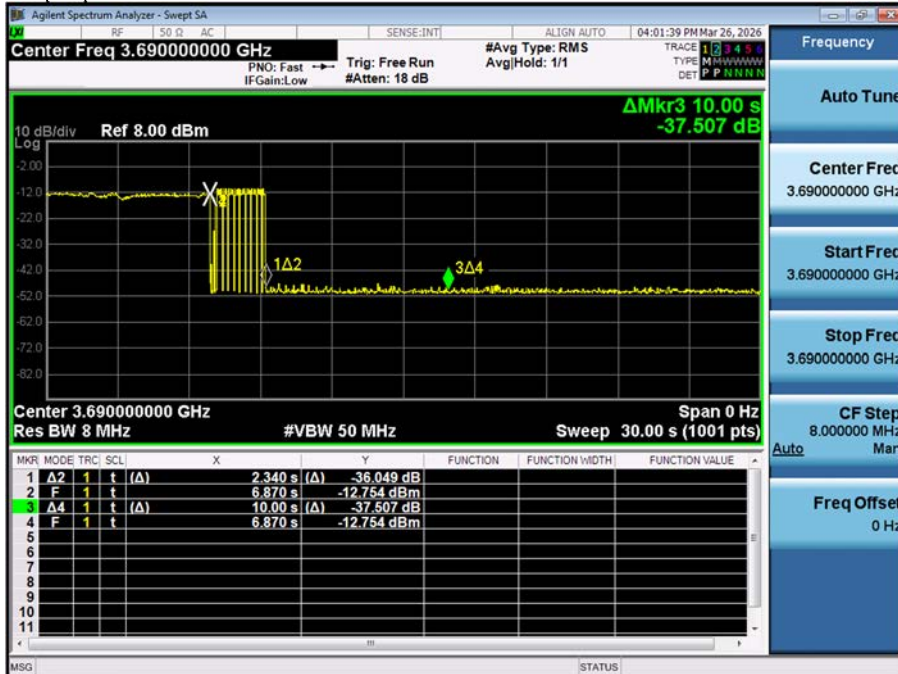
8.9 End User Device Additional Requirements (CBSD Protocol)

Test#1: 3690 MHz(BW: 20 MHz)



Operation Mode

Stop Operation Within 10 s



Note:

Marker 2: CBSD sends instructions to discontinue LTE operations.

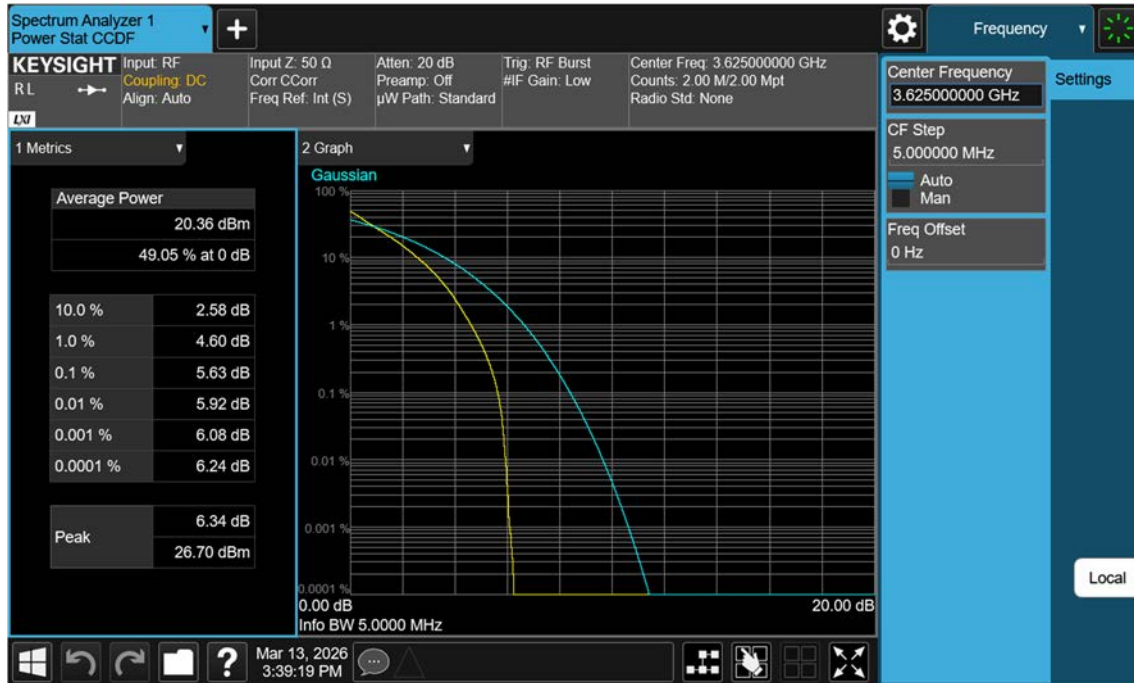
Marker 1Δ2: EUT discontinues operation. (2.340 s)

Marker 3Δ4: 10 seconds elapsed time from CBSD sending instructions to EUT.(10.0 s)

9. TEST PLOTS

9.1 PEAK-TO-AVERAGE RATIO

LTE B48_5 M_PAR_Mid_QPSK_FullRB



LTE B48_5 M_PAR_Mid_16QAM_FullRB



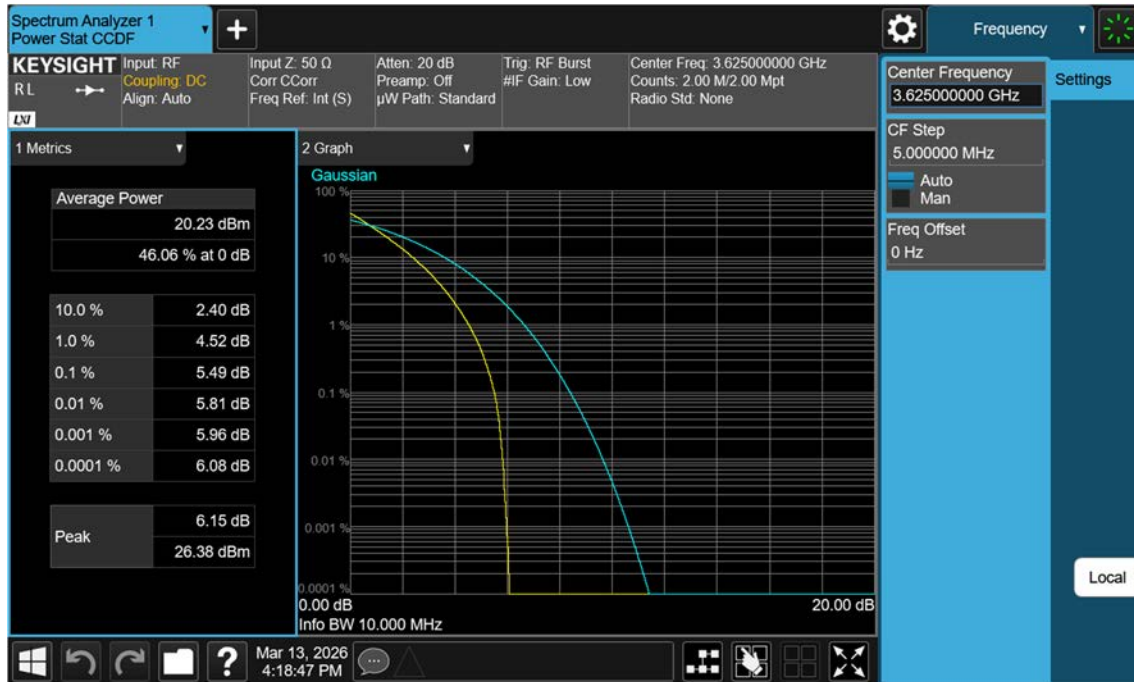
LTE B48_5 M_PAR_Mid_64QAM_FullRB



LTE B48_5 M_PAR_Mid_256QAM_FullRB



LTE B48_10 M_PAR_Mid_QPSK_FullRB



LTE B48_10 M_PAR_Mid_16QAM_FullRB



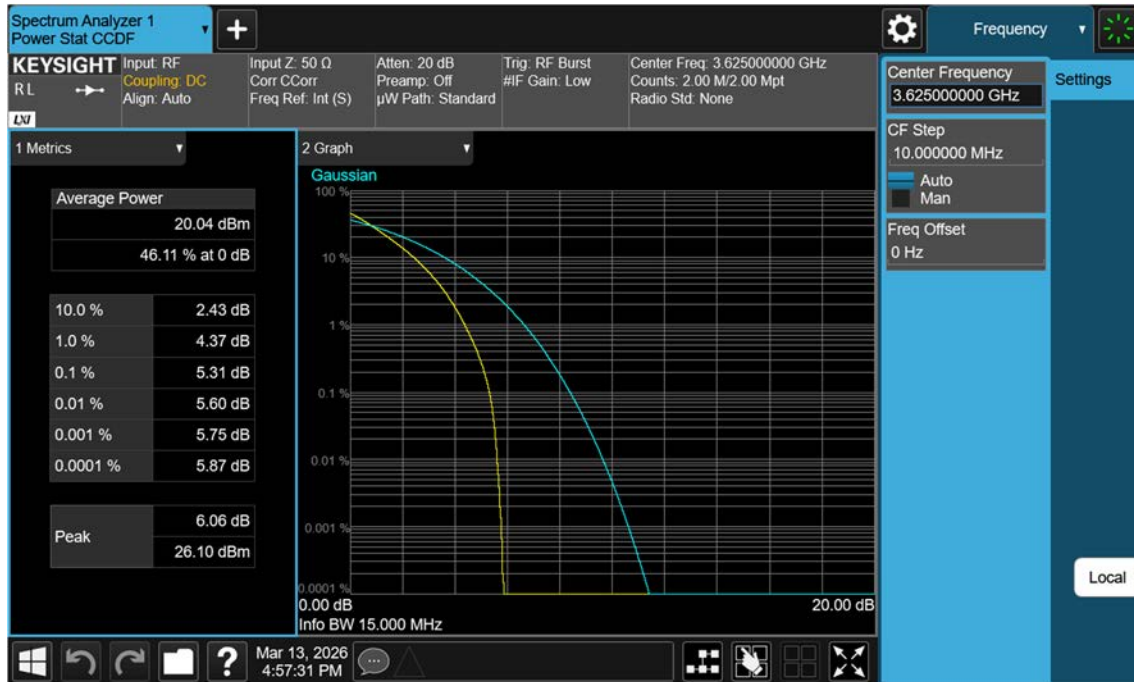
LTE B48_10 M_PAR_Mid_64QAM_FullRB



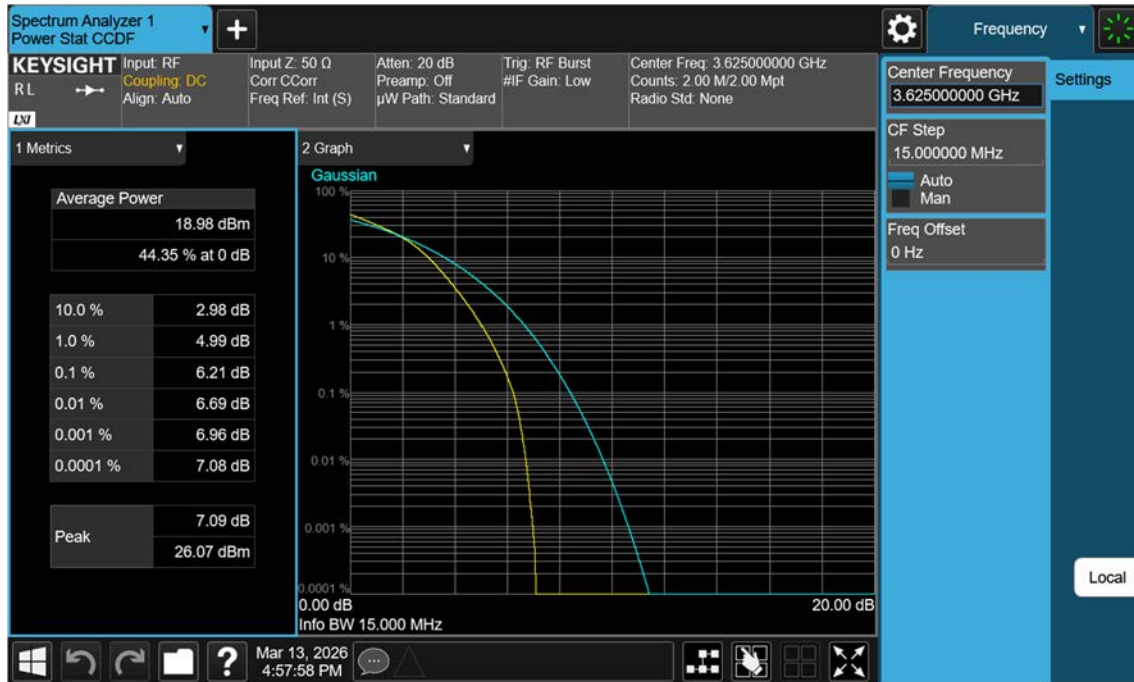
LTE B48_10 M_PAR_Mid_256QAM_FullRB



LTE B48_15 M_PAR_Mid_QPSK_FullRB



LTE B48_15 M_PAR_Mid_16QAM_FullRB



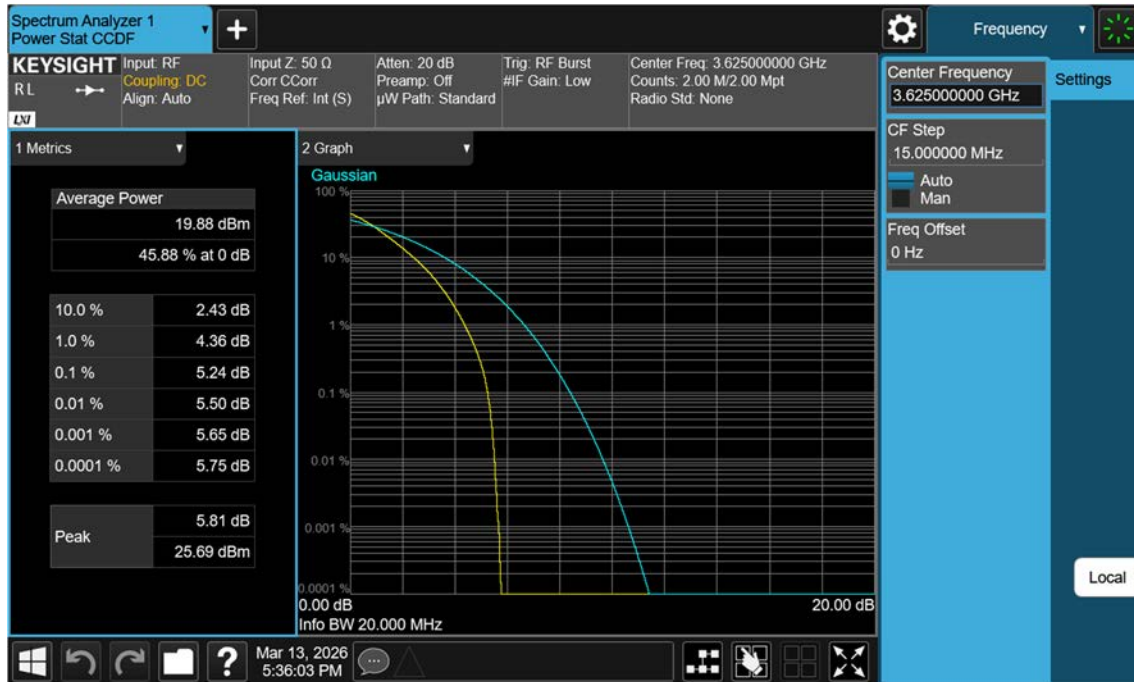
LTE B48_15 M_PAR_Mid_64QAM_FullRB



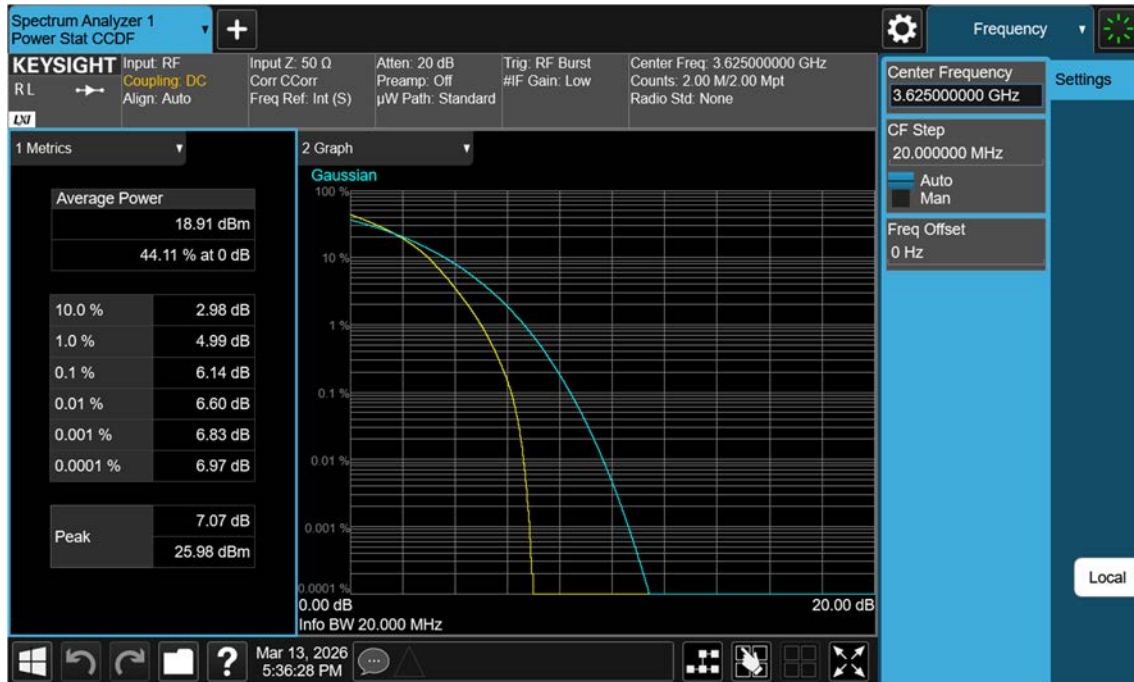
LTE B48_15 M_PAR_Mid_256QAM_FullRB



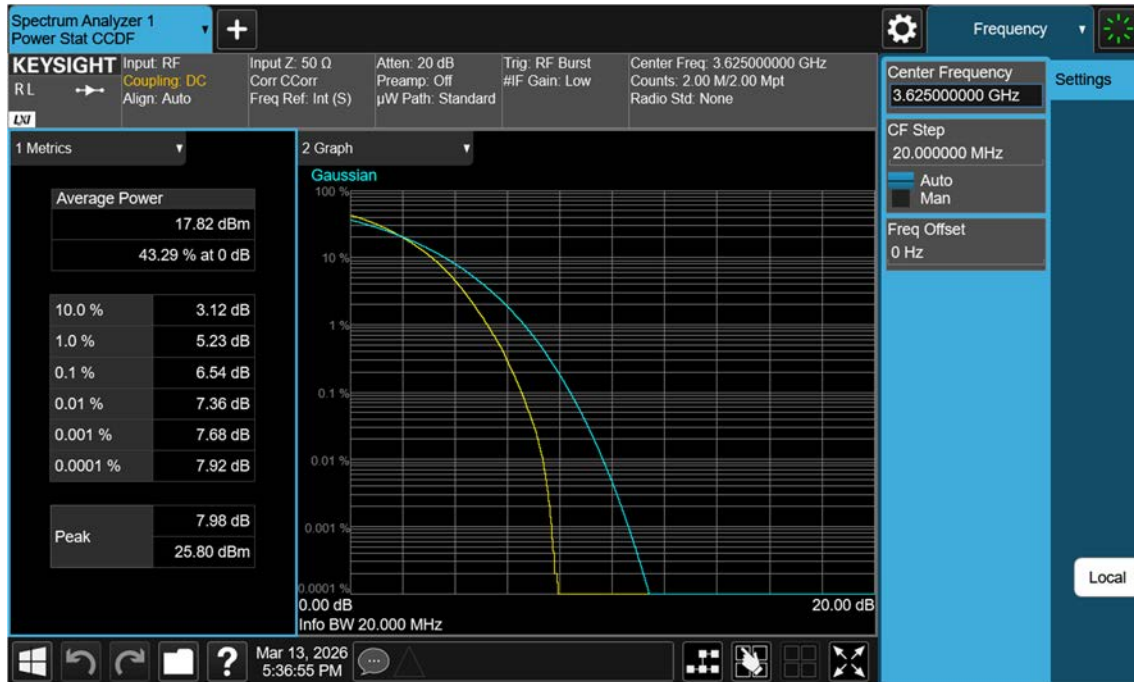
LTE B48_20 M_PAR_Mid_QPSK_FullRB



LTE B48_20 M_PAR_Mid_16QAM_FullRB



LTE B48_20 M_PAR_Mid_64QAM_FullRB

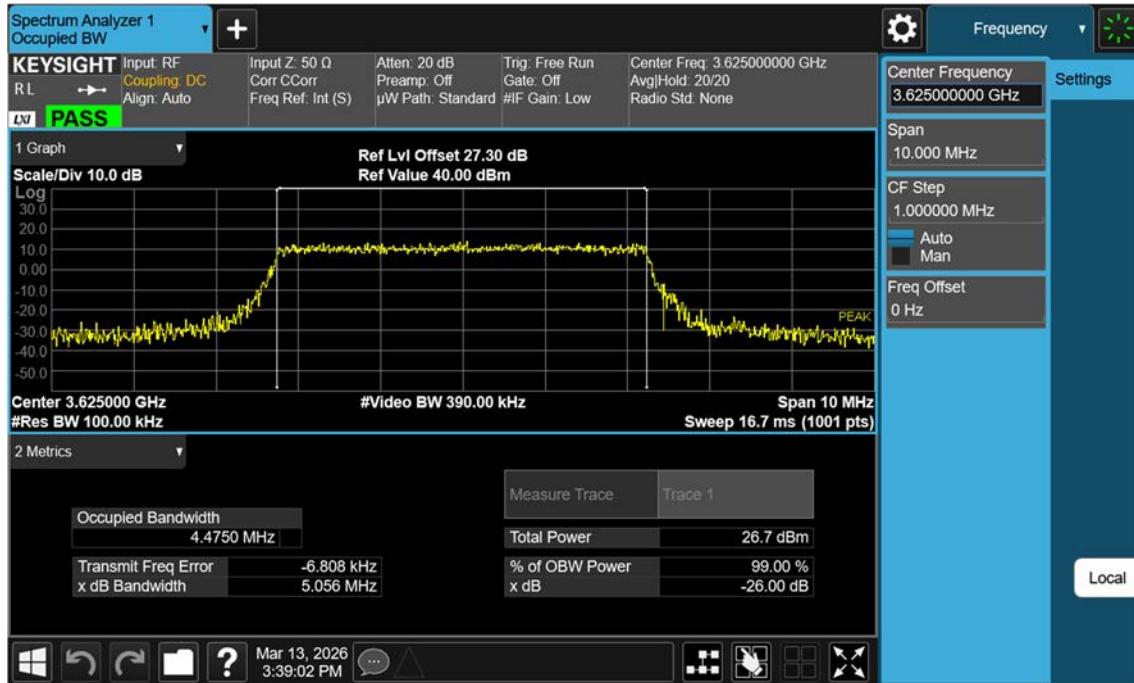


LTE B48_20 M_PAR_Mid_256QAM_FullRB

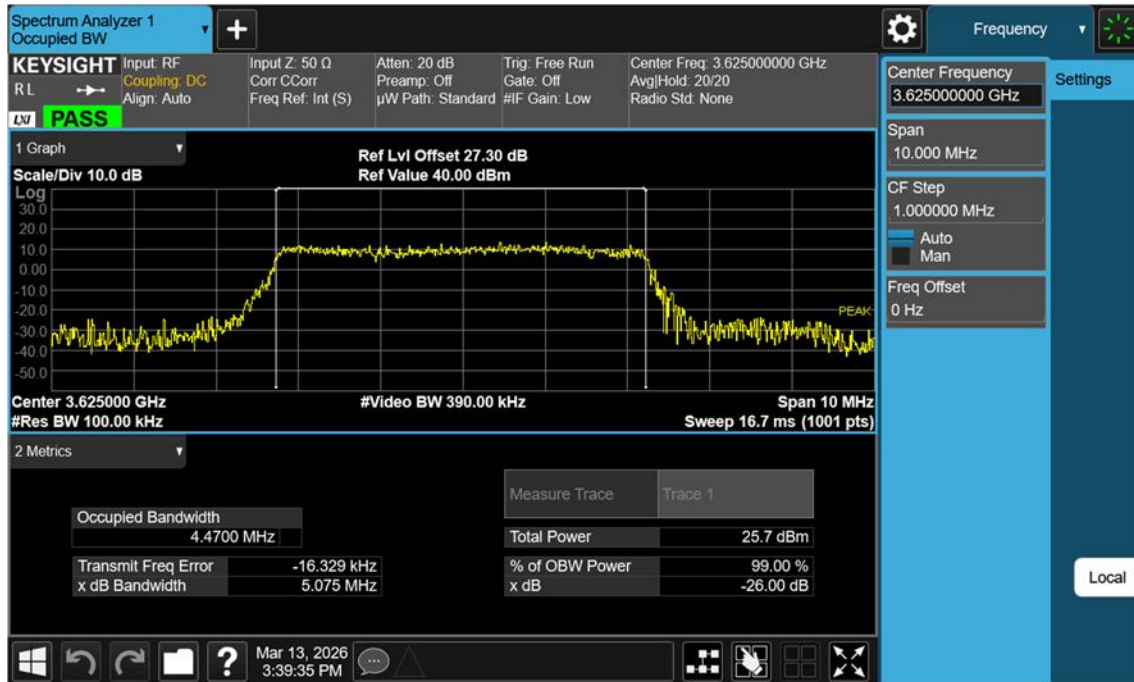


9.2 OCCUPIED BANDWIDTH

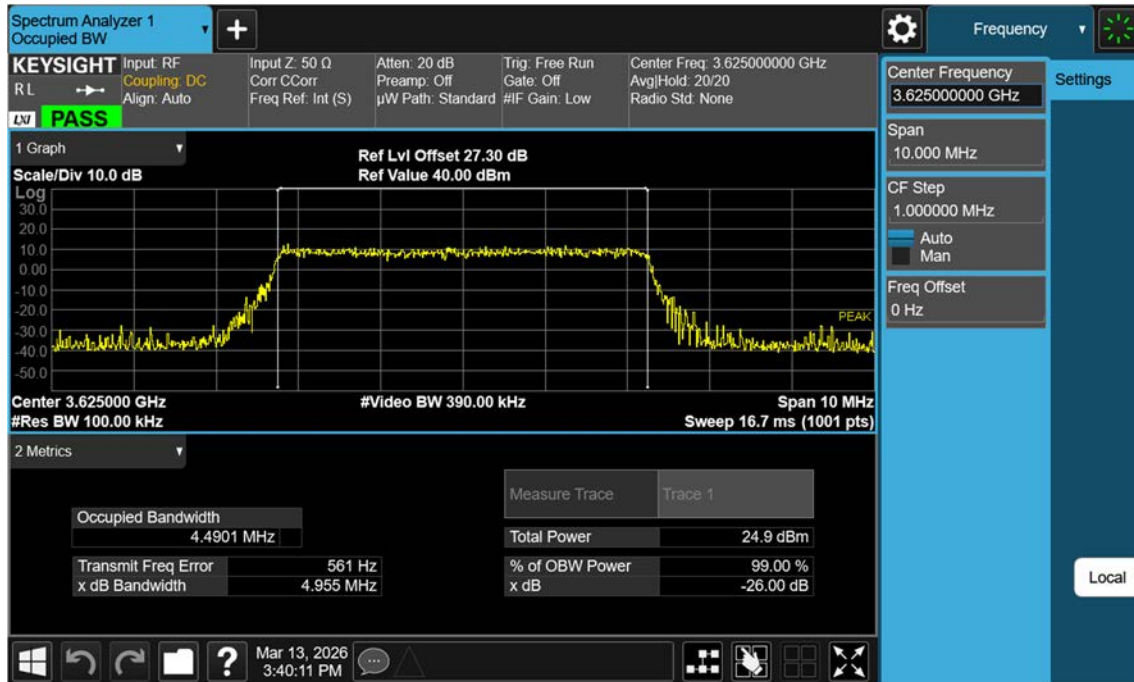
LTE B48_5 M_OBW_Mid_QPSK_FullRB



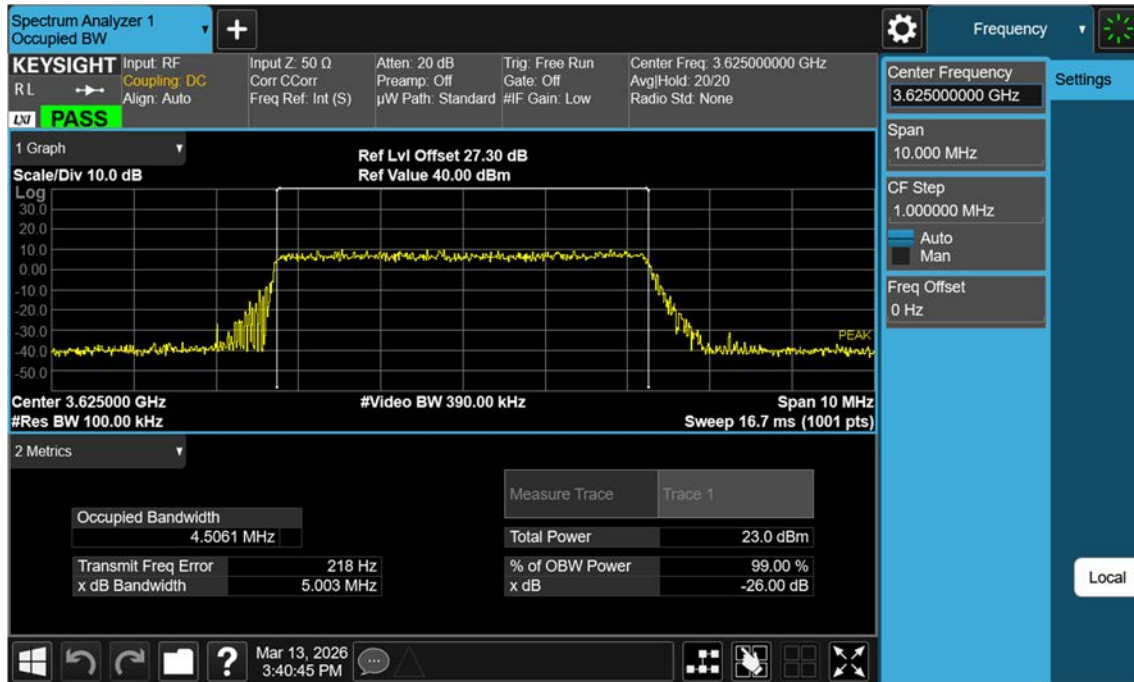
LTE B48_5 M_OBW_Mid_16QAM_FullRB



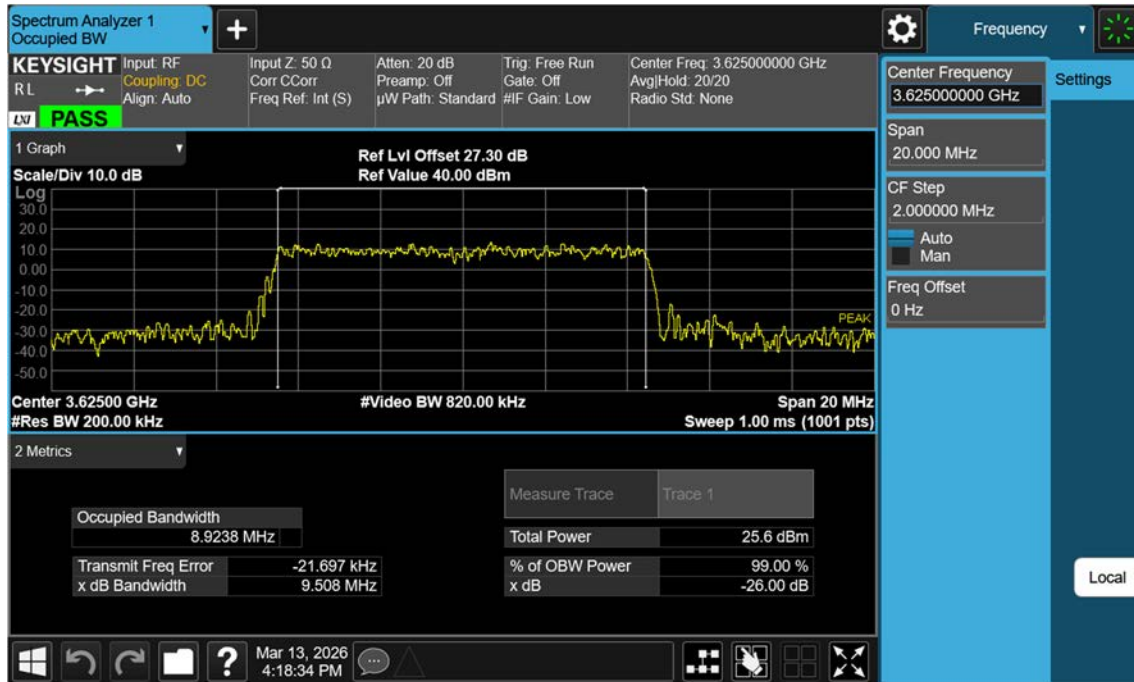
LTE B48_5 M_OBW_Mid_64QAM_FullRB



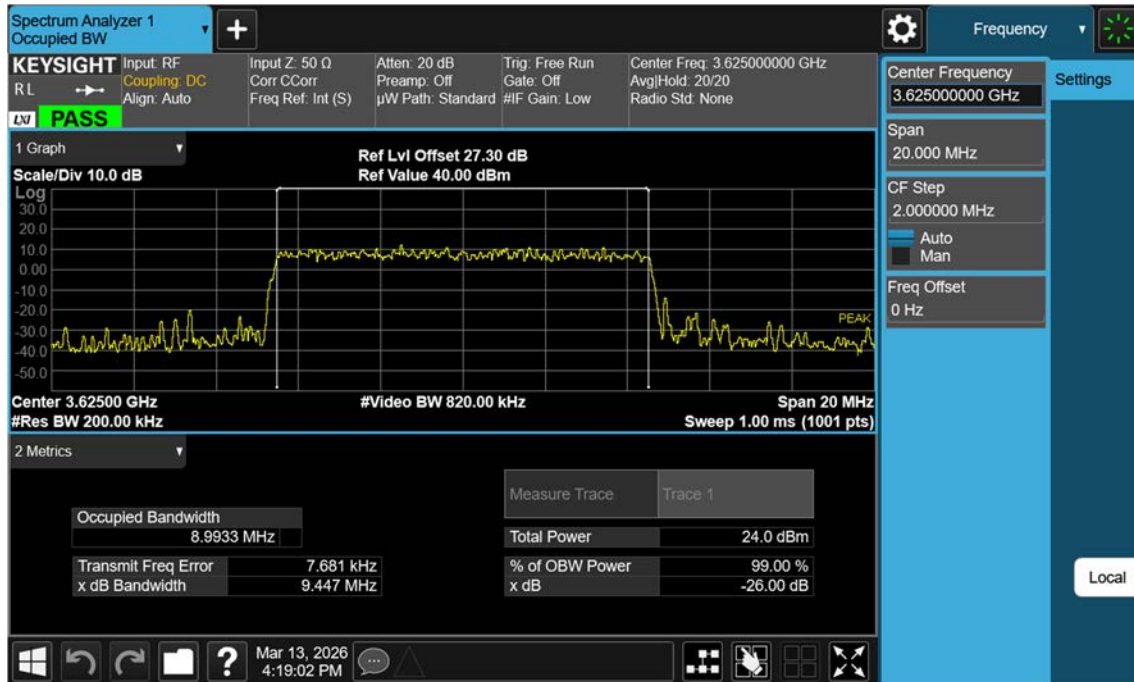
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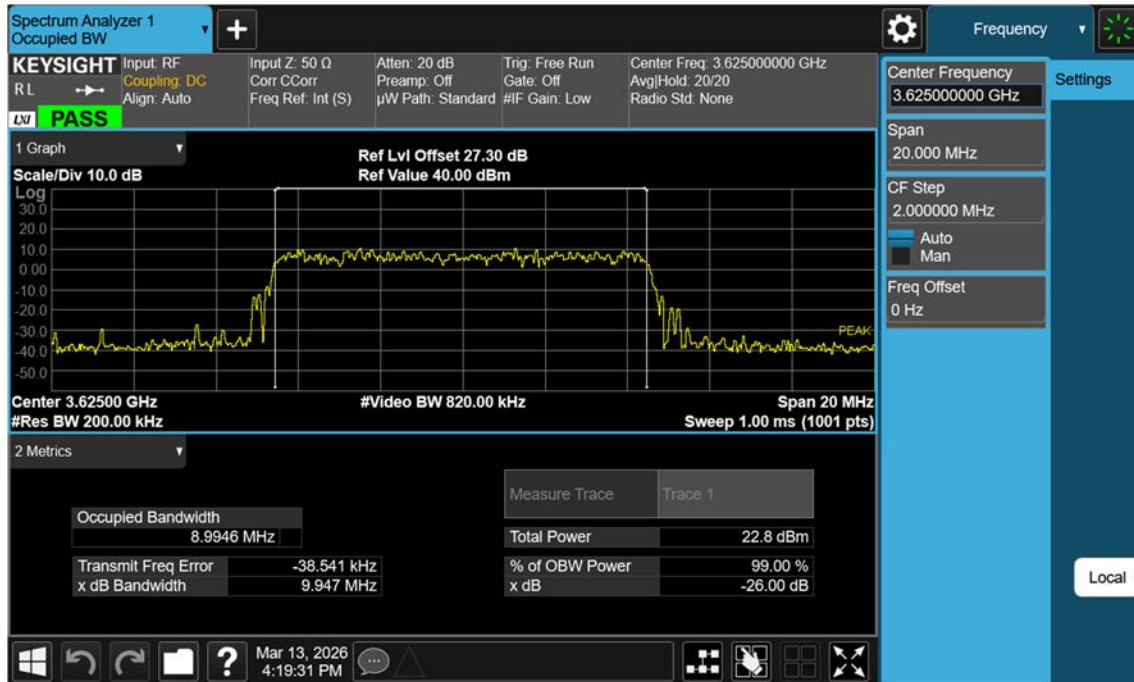
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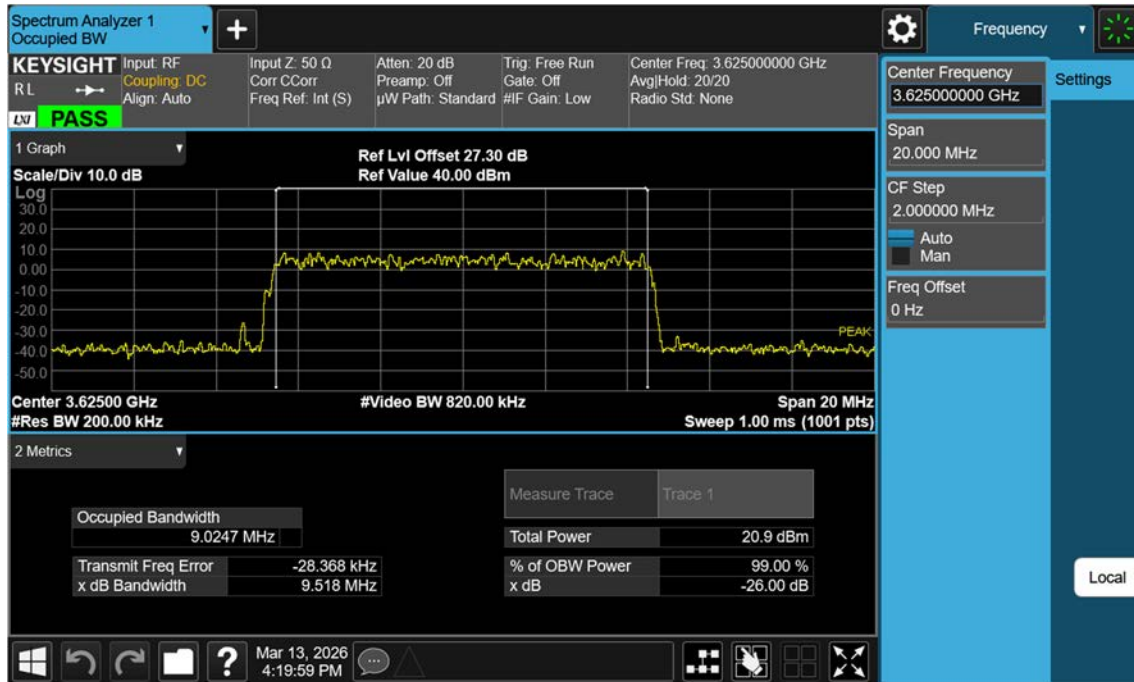
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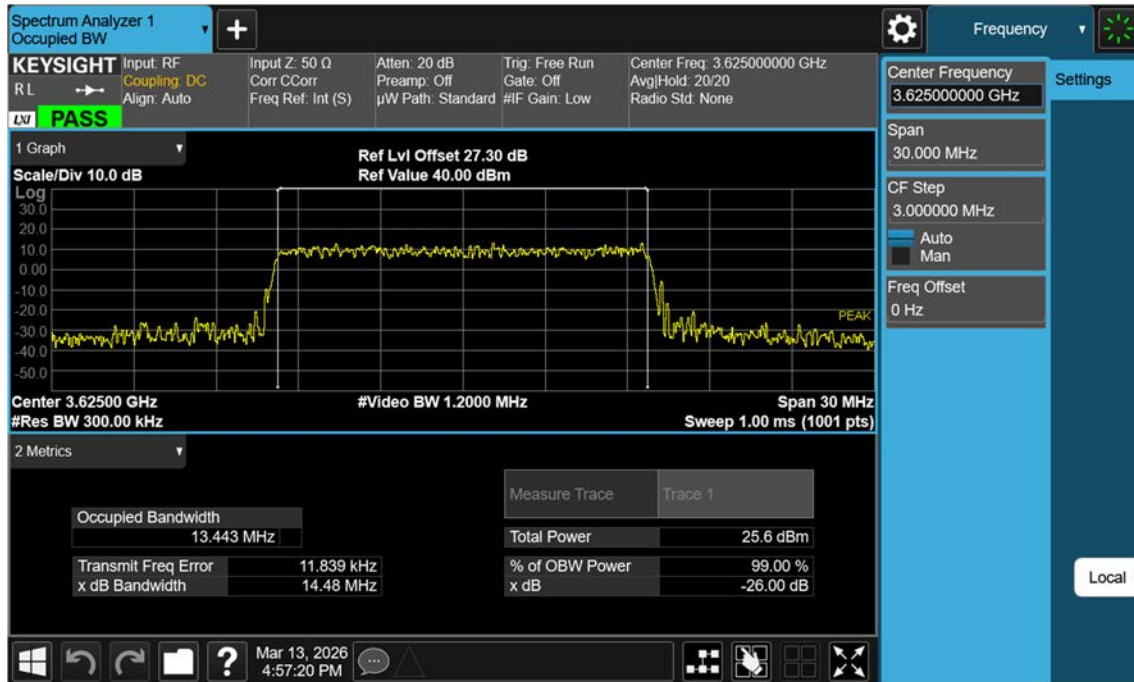
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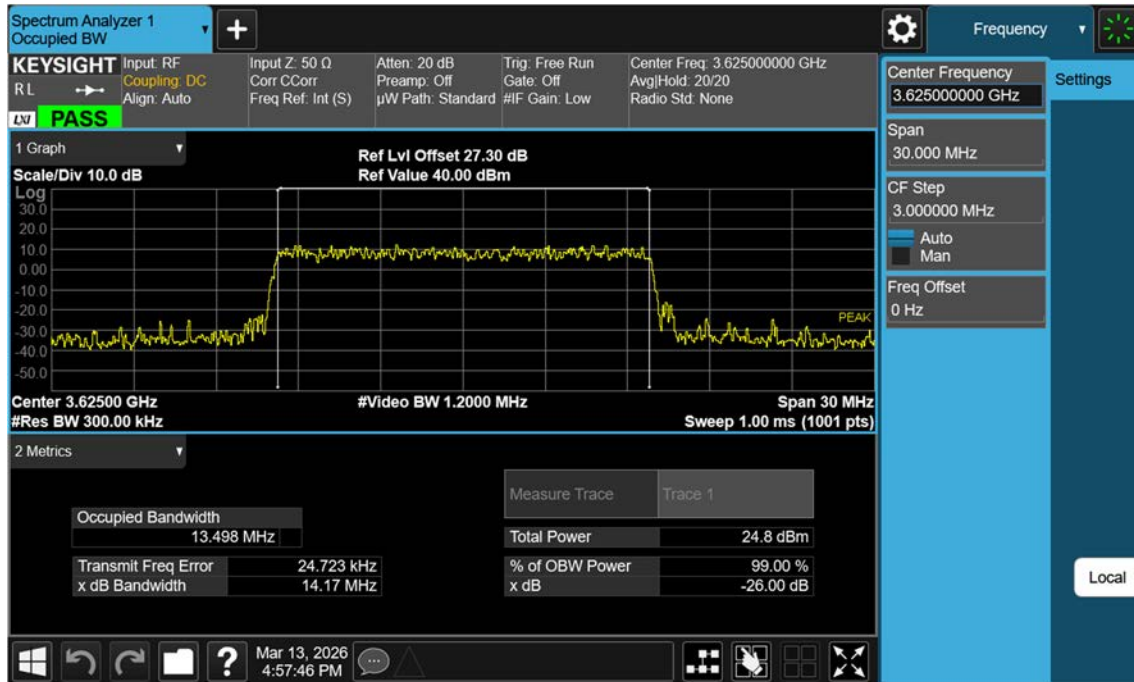
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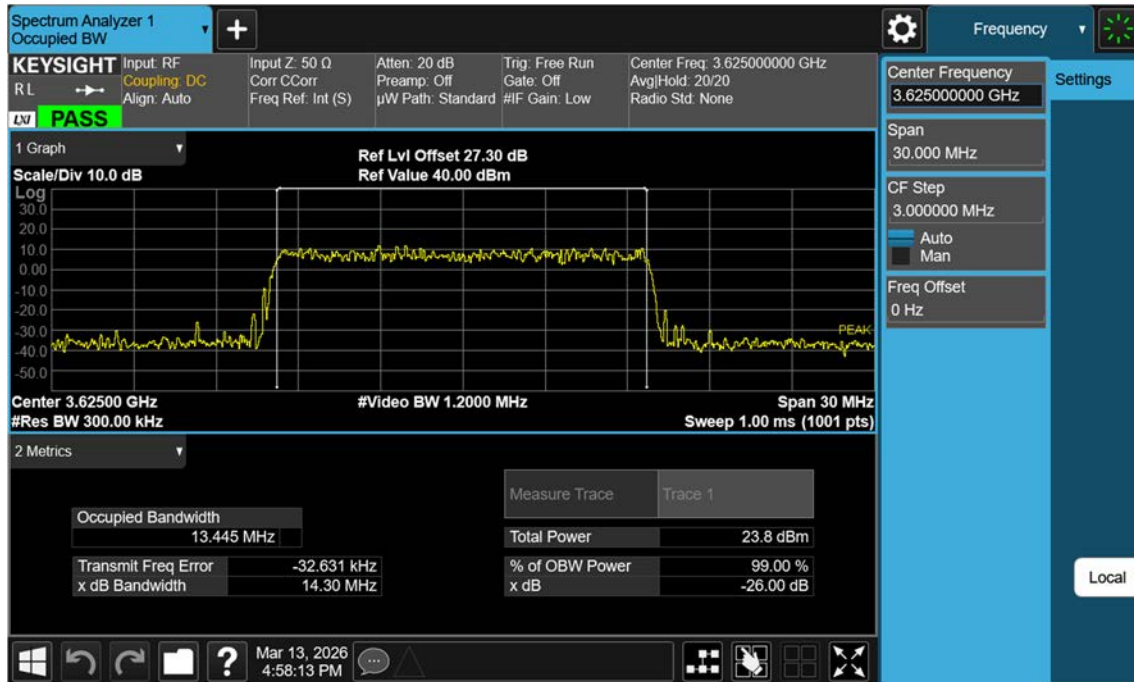
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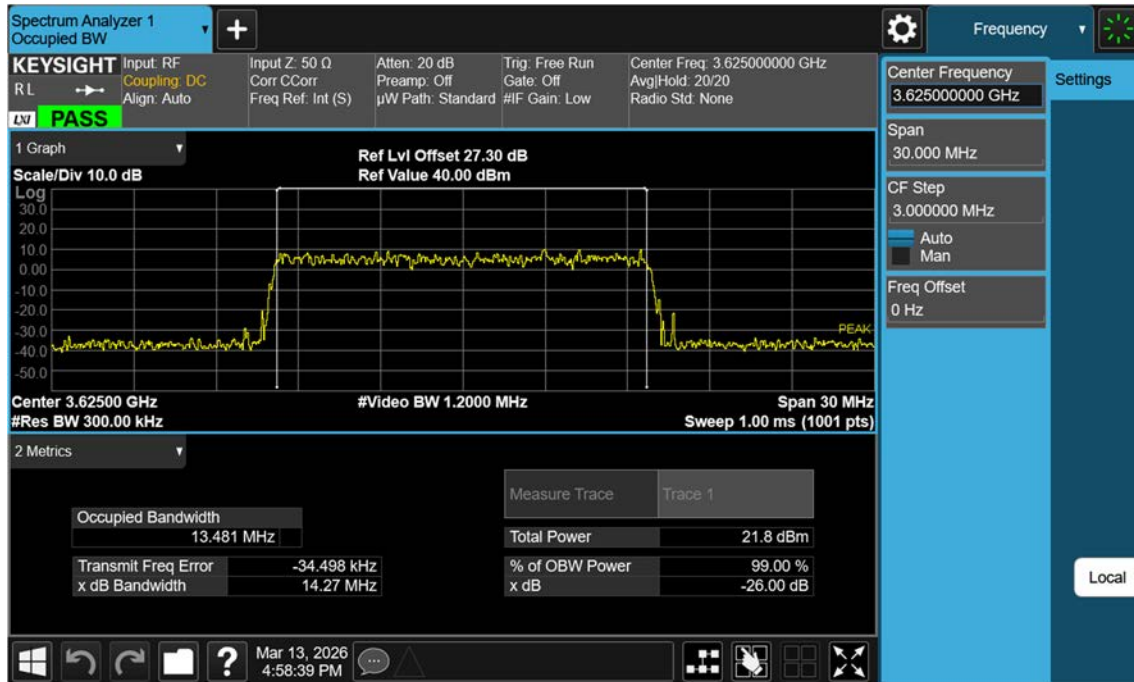
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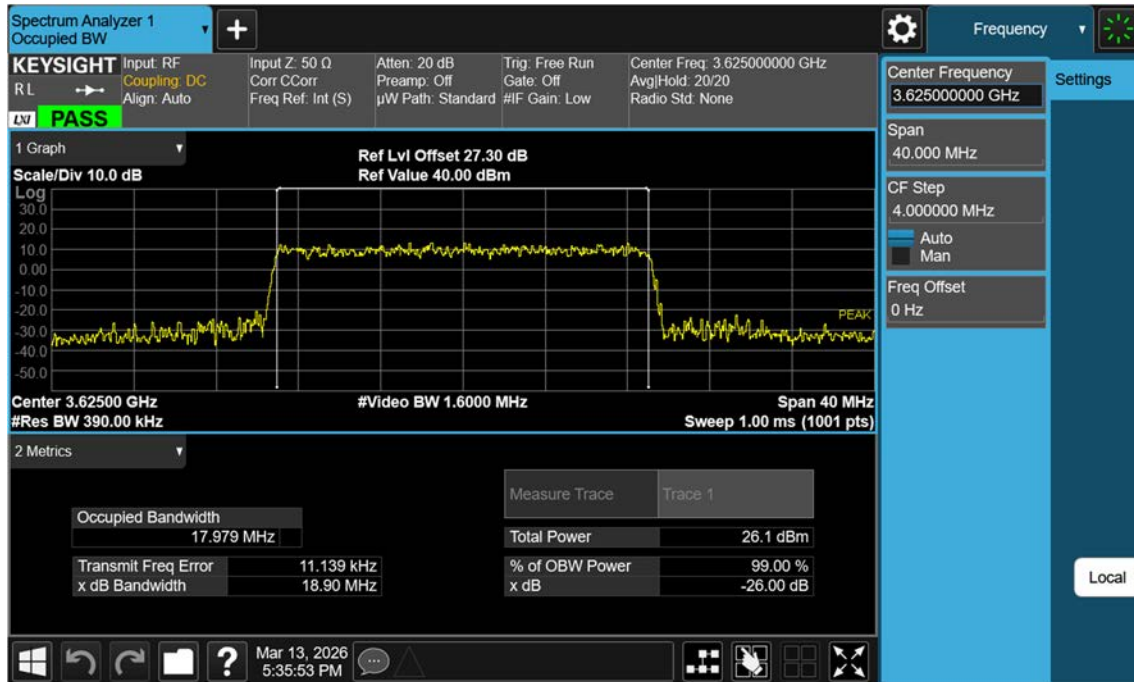
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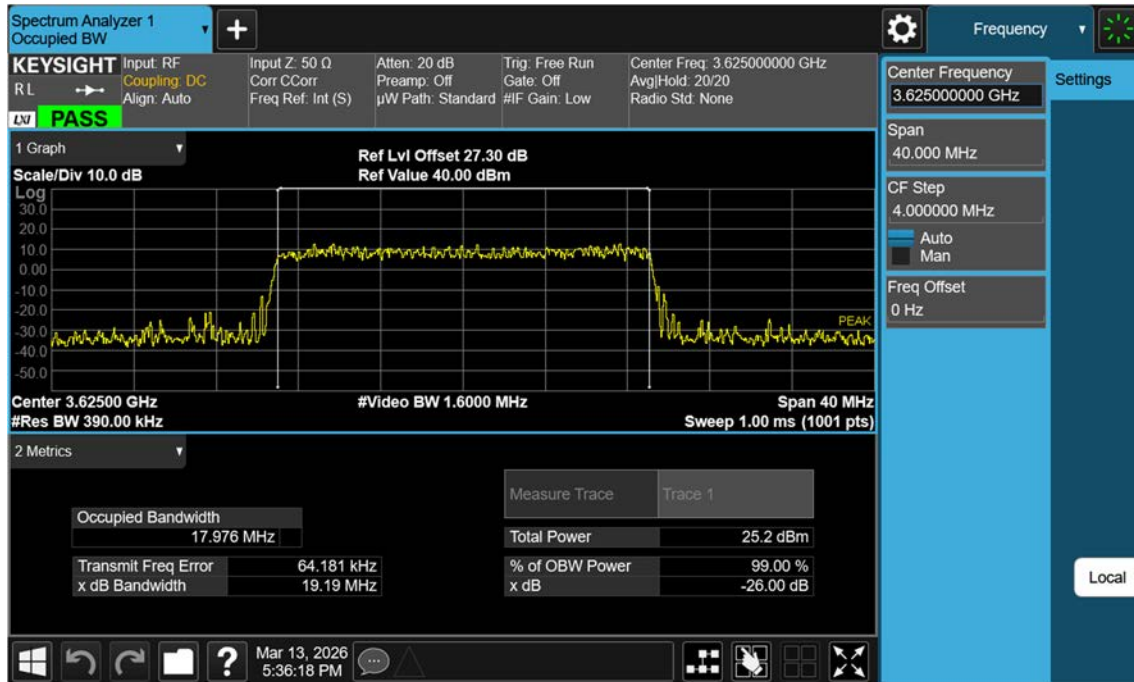
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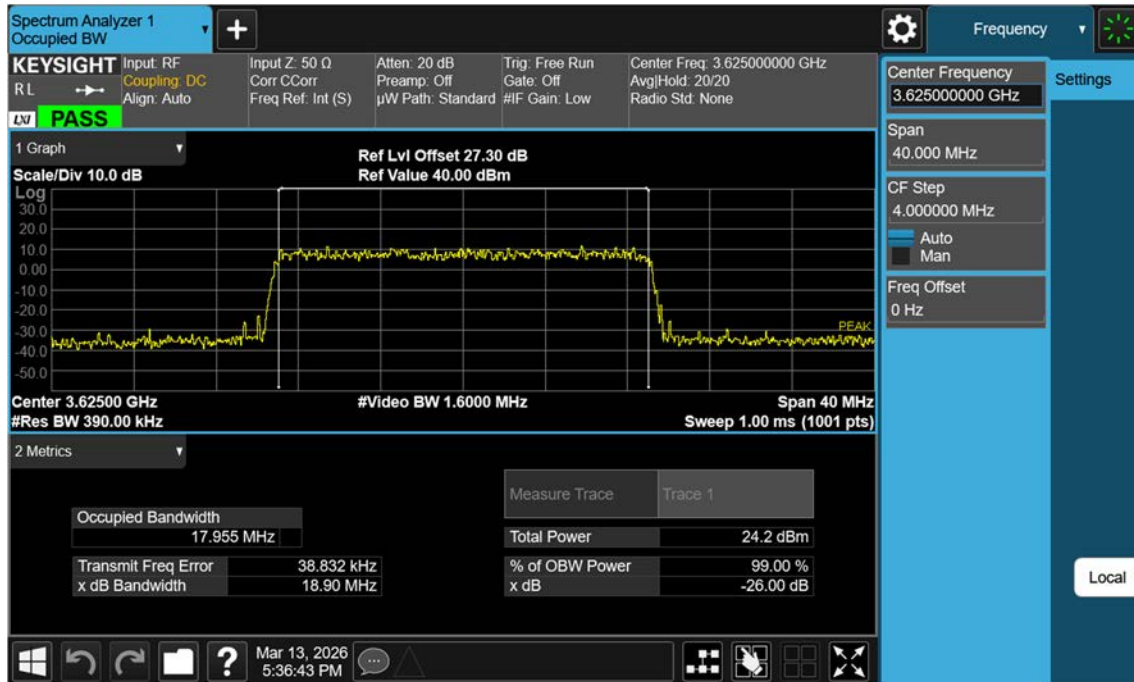
LTE B48_20 M_OBW_Mid_QPSK_FullRB



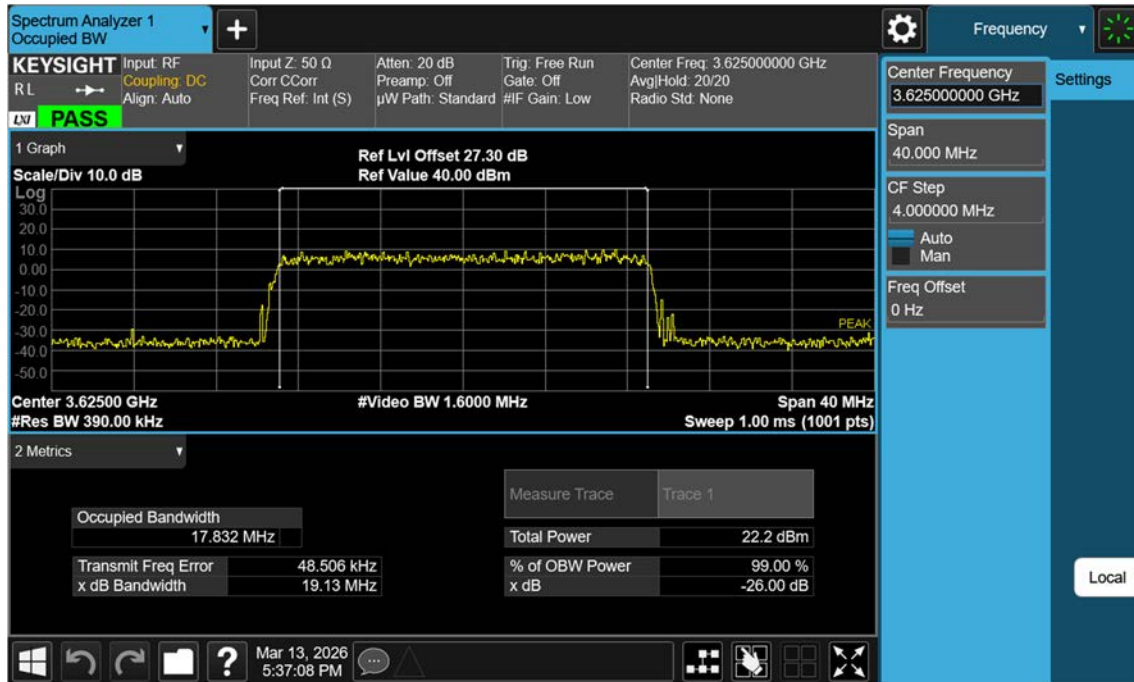
LTE B48_20 M_OBW_Mid_16QAM_FullRB



LTE B48_20 M_OBW_Mid_64QAM_FullRB



LTE B48_20 M_OBW_Mid_256QAM_FullRB



9.3 CONDUCTED SPURIOUS EMISSIONS

LTE B48_5 M_Conducted Spurious Emissions(30 M-10 G)_Low_QPSK_1RB



LTE B48_5 M_Conducted Spurious Emissions(30 M-10 G)_Mid_QPSK_1RB



LTE B48_5 M_Conducted Spurious Emissions(30 M-10 G)_High_QPSK_1RB



LTE B48_10 M_Conducted Spurious Emissions(30 M-10 G)_Low_QPSK_1RB



LTE B48_10 M_Conducted Spurious Emissions(30 M-10 G)_Mid_QPSK_1RB



LTE B48_10 M_Conducted Spurious Emissions(30 M-10 G)_High_QPSK_1RB



LTE B48_15 M_Conducted Spurious Emissions(30 M-10 G)_Low_QPSK_1RB



LTE B48_15 M_Conducted Spurious Emissions(30 M-10 G)_Mid_QPSK_1RB



LTE B48_15 M_Conducted Spurious Emissions(30 M-10 G)_High_QPSK_1RB



LTE B48_20 M_Conducted Spurious Emissions(30 M-10 G)_Low_QPSK_1RB



LTE B48_20 M_Conducted Spurious Emissions(30 M-10 G)_Mid_QPSK_1RB



LTE B48_20 M_Conducted Spurious Emissions(30 M-10 G)_High_QPSK_1RB



LTE B48_5 M_Conducted Spurious Emissions(Above10 G)_Low_QPSK_1RB



LTE B48_5 M_Conducted Spurious Emissions(Above10 G)_Mid_QPSK_1RB



LTE B48_5 M_Conducted Spurious Emissions(Above10 G)_High_QPSK_1RB



LTE B48_10 M_Conducted Spurious Emissions(Above10 G)_Low_QPSK_1RB



LTE B48_10 M_Conducted Spurious Emissions(Above10 G)_Mid_QPSK_1RB



LTE B48_10 M_Conducted Spurious Emissions(Above10 G)_High_QPSK_1RB



LTE B48_15 M_Conducted Spurious Emissions(Above10 G)_Low_QPSK_1RB



LTE B48_15 M_Conducted Spurious Emissions(Above10 G)_Mid_QPSK_1RB



LTE B48_15 M_Conducted Spurious Emissions(Above10 G)_High_QPSK_1RB



LTE B48_20 M_Conducted Spurious Emissions(Above10 G)_Low_QPSK_1RB



LTE B48_20 M_Conducted Spurious Emissions(Above10 G)_Mid_QPSK_1RB

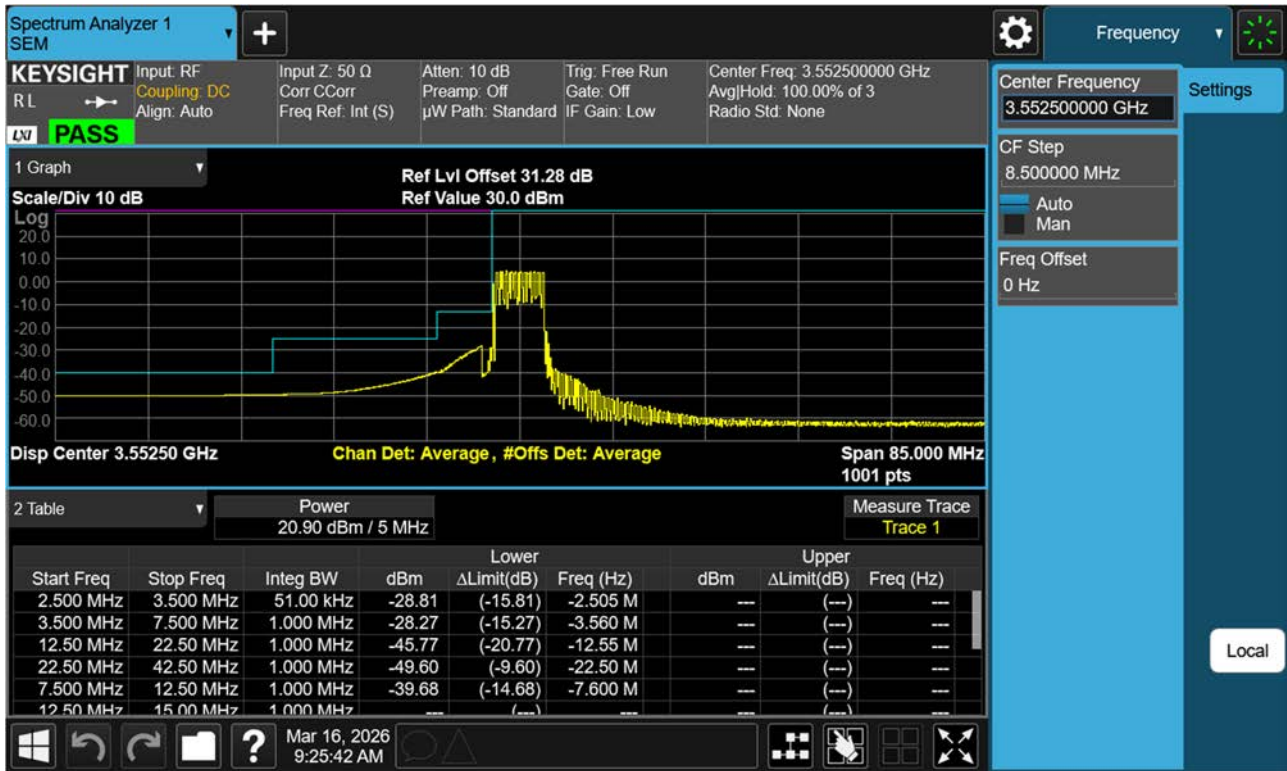


LTE B48_20 M_Conducted Spurious Emissions(Above10 G)_High_QPSK_1RB

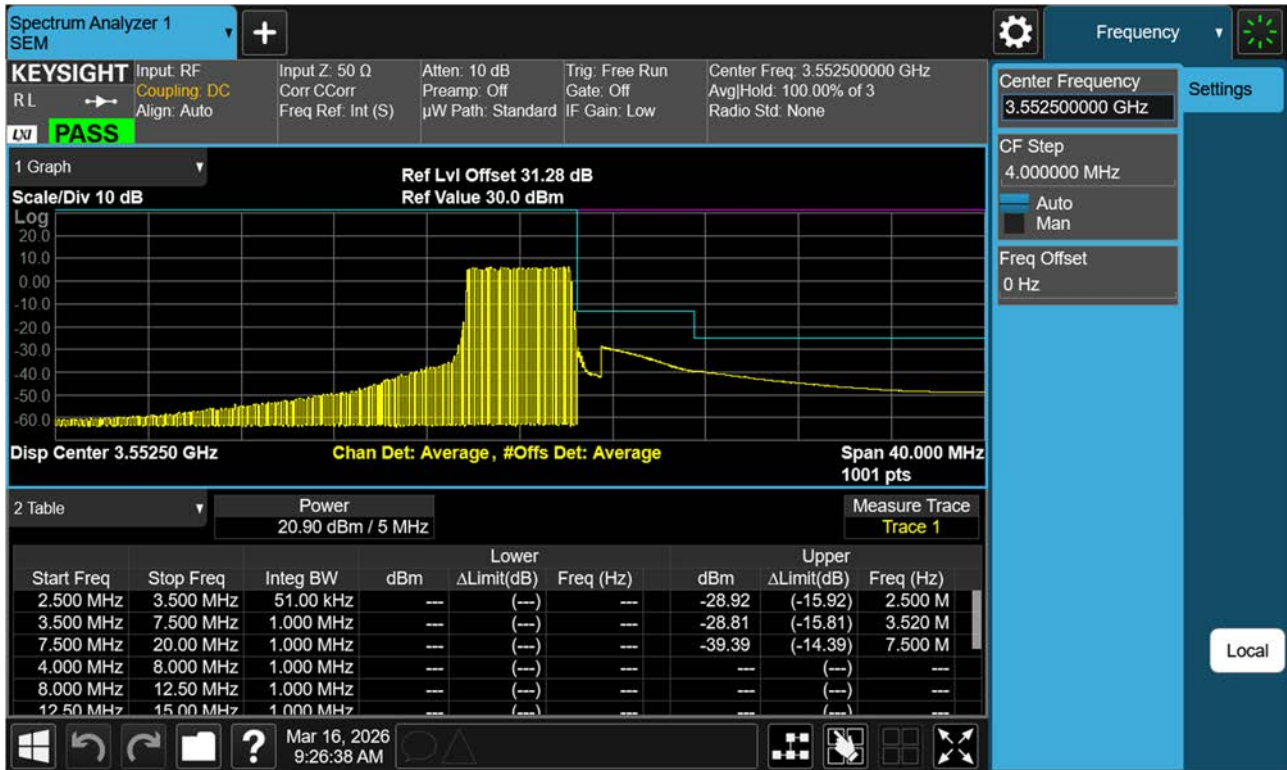


9.4 CHANNEL EDGE

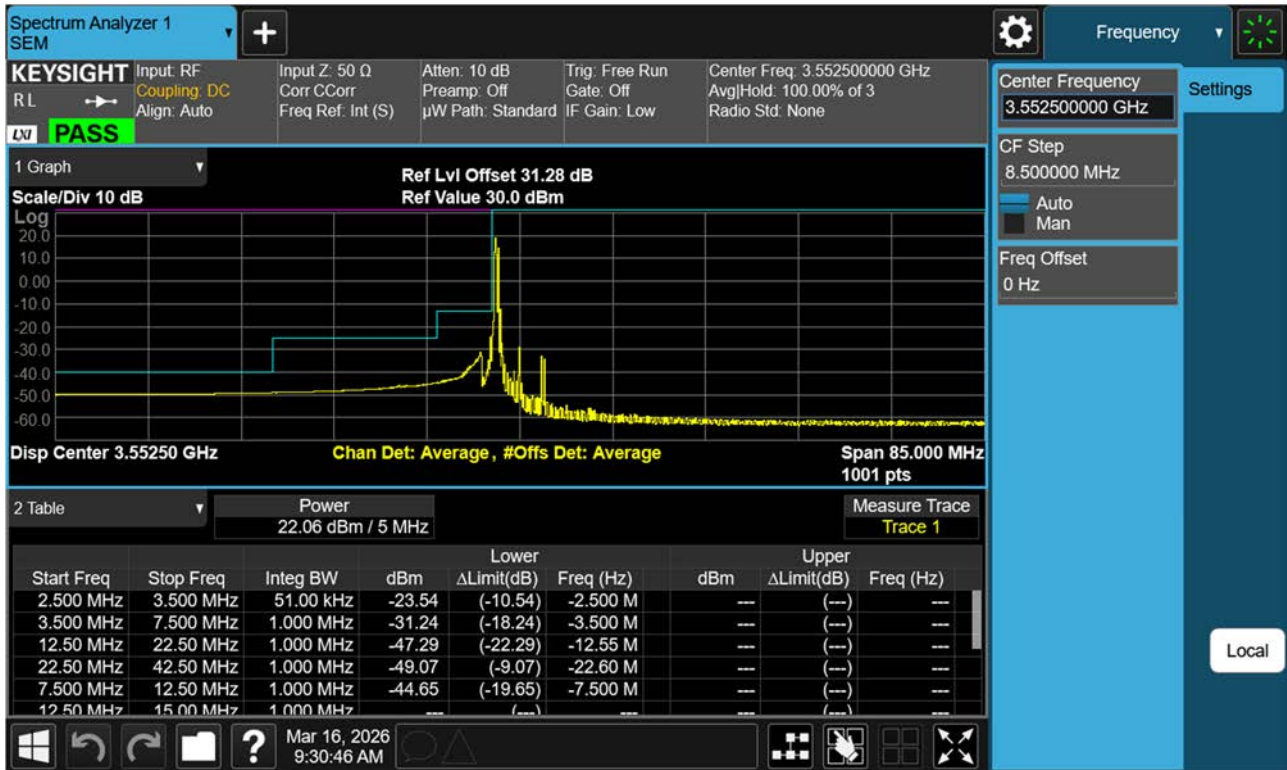
LTE B48_5 M Channel Edge(Lower)_Low_3552.5 MHz_QPSK_Full RB



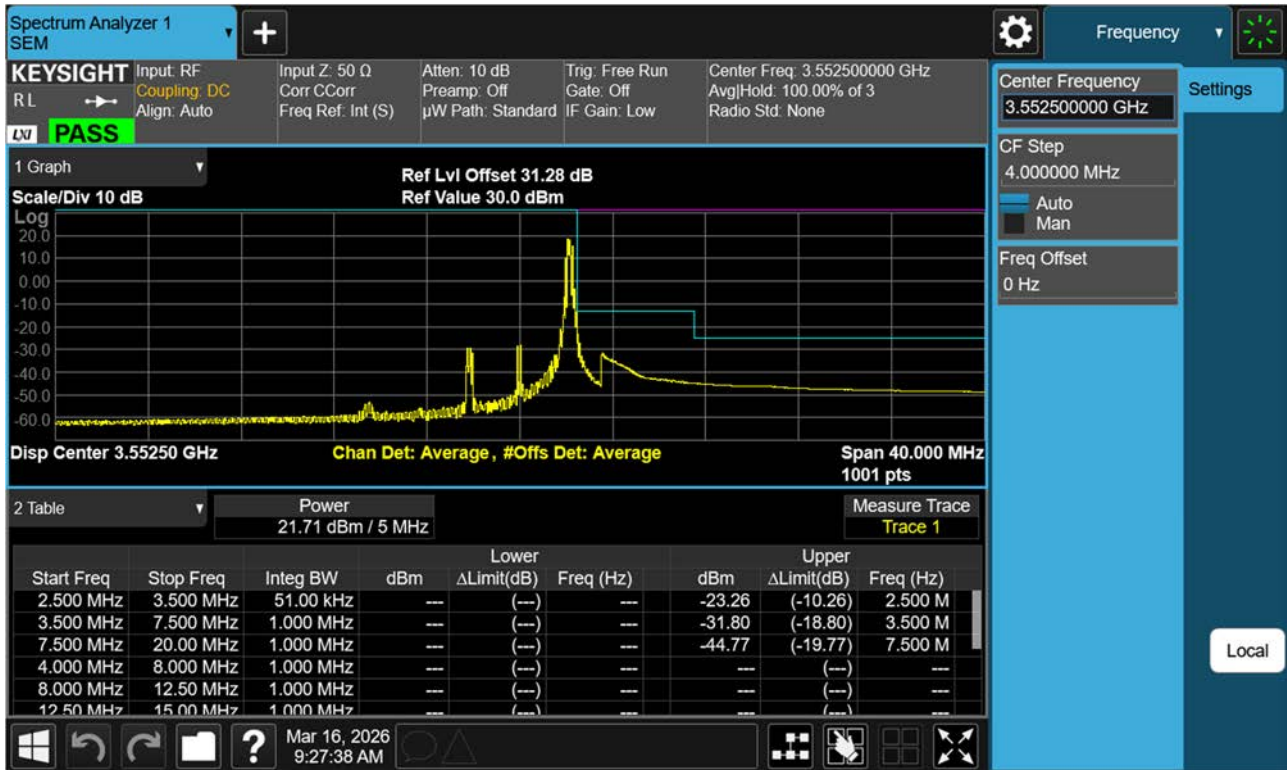
LTE B48_5 M_Channel Edge(Upper)_Low_3552.5 MHz_QPSK_Full RB



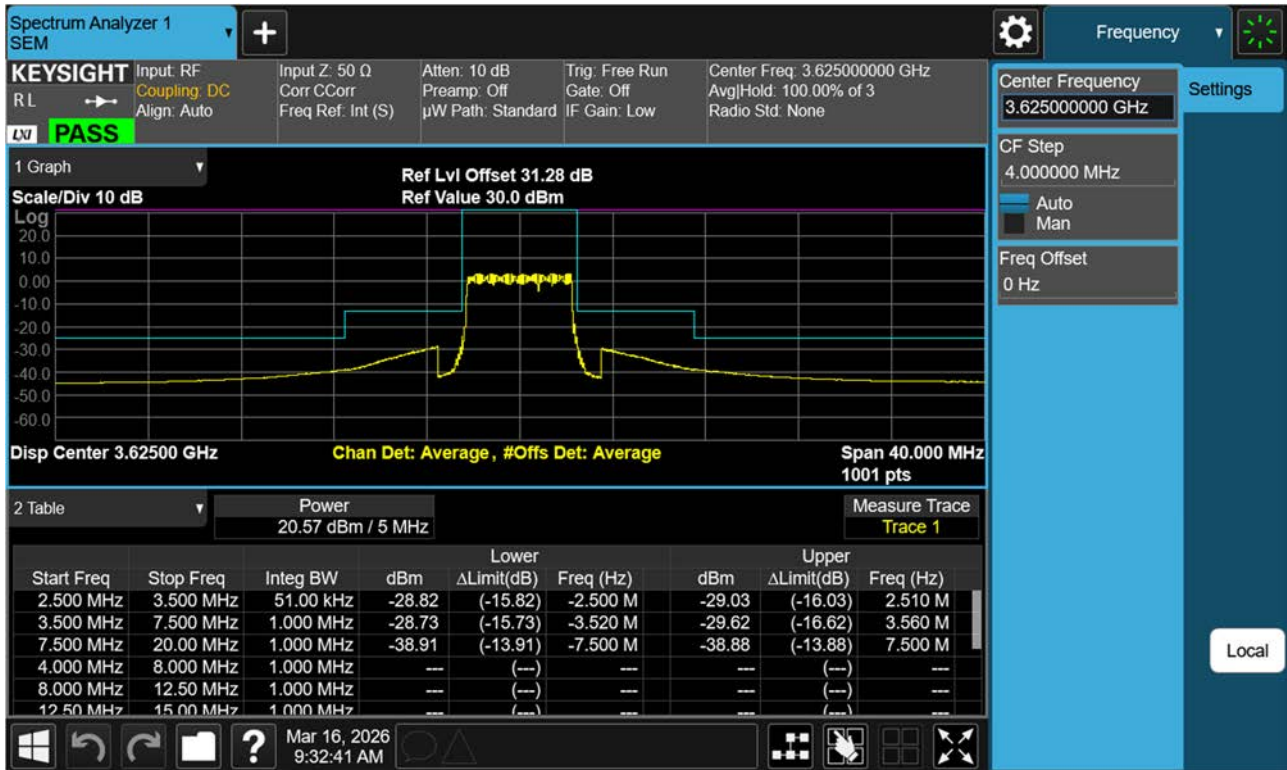
LTE B48_5 M_Channel Edge(Lower)_Low_3552.5 MHz_QPSK_1RB



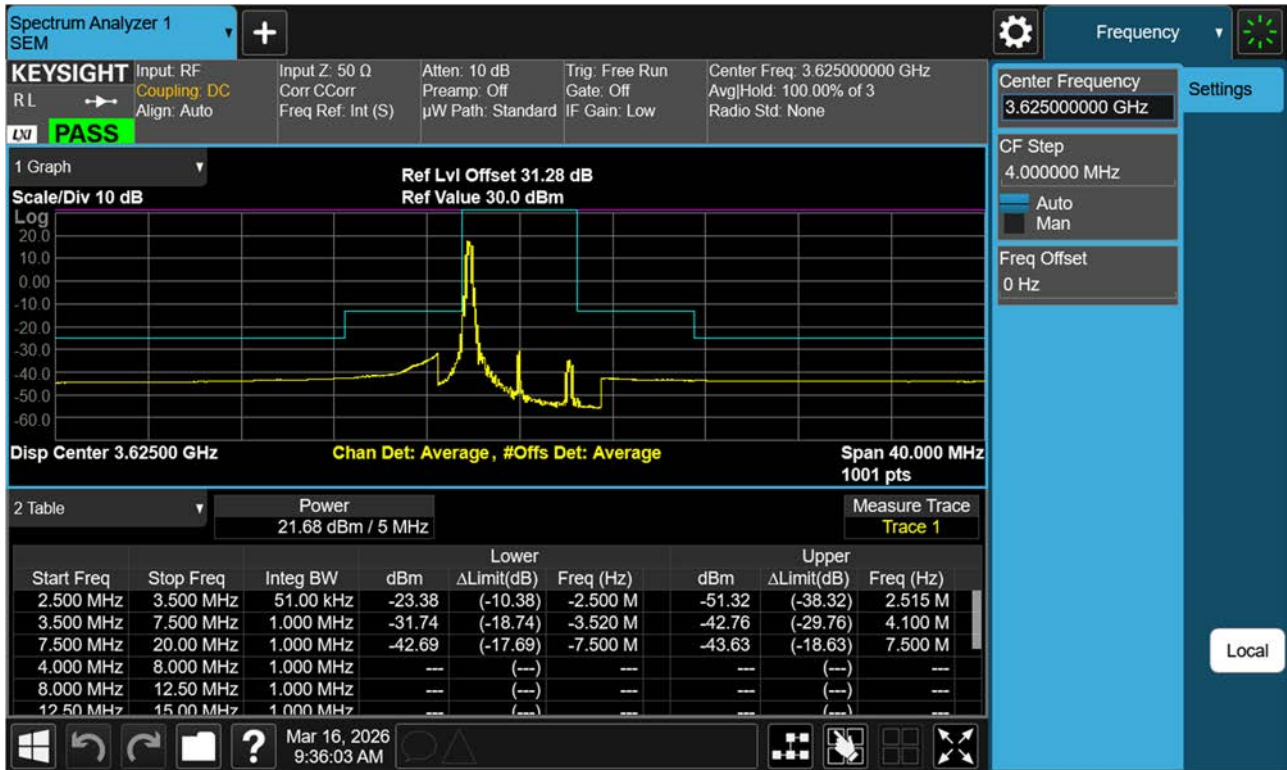
LTE B48_5 M_Channel Edge(Upper)_Low_3552.5 MHz_QPSK_1RB



LTE B48_5 M_Channel Edge(Center)_Mid_3625 MHz_QPSK_Full RB



LTE B48_5 M_Channel Edge(Lower)_Mid_3625 MHz_QPSK_1RB



LTE B48_5 M_Channel Edge(Upper)_Mid_3625 MHz_QPSK_1RB

