

TEST REPORT

FCC LTE B12 Test for SM-S931U
Certification

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2410-FC008

DATE OF ISSUE
October 29, 2024

Tested by
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TEST REPORT

REPORT NO.

HCT-RF-2410-FC008

DATE OF ISSUE

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Additional Model

SM-S931U1

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-S931U

Date of Test

August 21, 2024 ~ October 28, 2024

FCC ID

A3LSMS931U

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:

PCS Licensed Transmitter Held to Ear (PCE)

Test Standard Used

FCC Rule Part: § 27

Test Results

PASS

REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	October 29, 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:	A3LSMS931U
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§ 27
EUT Type:	Mobile phone
Model(s):	SM-S931U
Additional Model(s)	SM-S931U1
Tx Frequency:	699.7 MHz – 715.3 MHz (LTE – Band 12 (1.4 MHz)) 700.5 MHz – 714.5 MHz (LTE – Band 12 (3 MHz)) 701.5 MHz – 713.5 MHz (LTE – Band 12 (5 MHz)) 704.0 MHz – 711.0 MHz (LTE – Band 12 (10 MHz))
Date(s) of Tests:	August 21, 2024 ~ October 28, 2024
Serial number:	Radiated : R3CXA0930NH Conducted : R3CX70H9H0B

1.1. MAXIMUM OUTPUT POWER

Main 1 ANT

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	ERP	
				Max. Power (W)	Max. Power (dBm)
LTE – Band 12 (1.4)	699.7 – 715.3	1M10G7D	QPSK	0.053	17.27
		1M10W7D	16QAM	0.045	16.55
		1M10W7D	64QAM	0.036	15.55
		1M10W7D	256QAM	0.017	12.34
LTE – Band 12 (3)	700.5 – 714.5	2M71G7D	QPSK	0.054	17.29
		2M72W7D	16QAM	0.045	16.58
		2M72W7D	64QAM	0.035	15.49
		2M72W7D	256QAM	0.017	12.27
LTE – Band 12 (5)	701.5 – 713.5	4M51G7D	QPSK	0.053	17.23
		4M51W7D	16QAM	0.045	16.52
		4M51W7D	64QAM	0.035	15.41
		4M50W7D	256QAM	0.016	12.16
LTE – Band 12 (10)	704.0 – 711.0	8M97G7D	QPSK	0.051	17.11
		9M00W7D	16QAM	0.043	16.36
		8M99W7D	64QAM	0.033	15.23
		8M98W7D	256QAM	0.016	12.13

Sub 1 ANT

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	ERP	
				Max. Power (W)	Max. Power (dBm)
LTE – Band 12 (1.4)	699.7 – 715.3	1M10G7D	QPSK	0.088	19.44
		1M10W7D	16QAM	0.076	18.83
		1M10W7D	64QAM	0.060	17.77
		1M10W7D	256QAM	0.029	14.56
LTE – Band 12 (3)	700.5 – 714.5	2M71G7D	QPSK	0.088	19.45
		2M72W7D	16QAM	0.075	18.74
		2M72W7D	64QAM	0.059	17.71
		2M72W7D	256QAM	0.028	14.51
LTE – Band 12 (5)	701.5 – 713.5	4M51G7D	QPSK	0.086	19.37
		4M52W7D	16QAM	0.075	18.74
		4M51W7D	64QAM	0.058	17.61
		4M52W7D	256QAM	0.028	14.42
LTE – Band 12 (10)	704.0 – 711.0	9M02G7D	QPSK	0.087	19.40
		9M02W7D	16QAM	0.072	18.60
		9M03W7D	64QAM	0.056	17.52
		9M02W7D	256QAM	0.028	14.42

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a Mobile Phone with GSM/GPRS/EGPRS/UMTS and LTE, Sub 6, mmWave. It also supports IEEE 802.11 a/b/g/n/ac/ax/be (20/40/80/160/320 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, Republic 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
Peak- to- Average Ratio	- KDB 971168 D01 v03r01 – Section 5.7 - ANSI C63.26-2015 – Section 5.2.3.4
Conducted Output Power	- N/A (See SAR Report)
Frequency stability	- ANSI C63.26-2015 – Section 5.6
Effective Radiated Power/ Effective Isotropic Radiated Power	- KDB 971168 D01 v03r01 – Section 5.2 & 5.8 - ANSI/TIA-603-E-2016 – Section 2.2.17
Radiated Spurious and Harmonic Emissions	- KDB 971168 D01 v03r01 – Section 6.2 - ANSI/TIA-603-E-2016 – Section 2.2.12

3.2 RADIATED POWER

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

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

Test Settings

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

Test Note

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

The power is calculated by the following formula;

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

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

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

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

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

3.3 RADIATED SPURIOUS EMISSIONS

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

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

Test Settings

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

Test Note

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

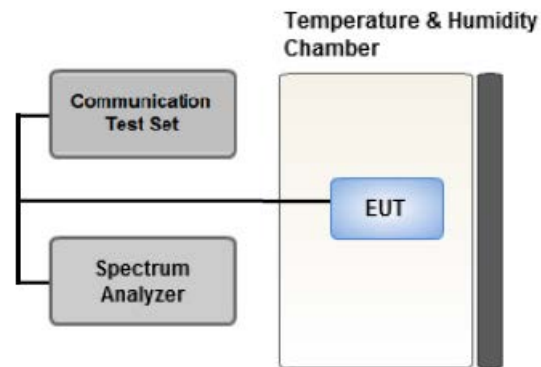
$$\text{Result}_{(\text{dBm})} = P_g_{(\text{dBm})} - \text{cable loss}_{(\text{dB})} + \text{antenna gain}_{(\text{dBi})}$$

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

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

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

3.4 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.

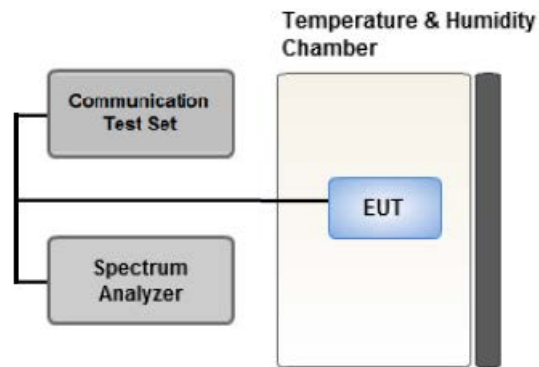
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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

3.5 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



Test setup

Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic.

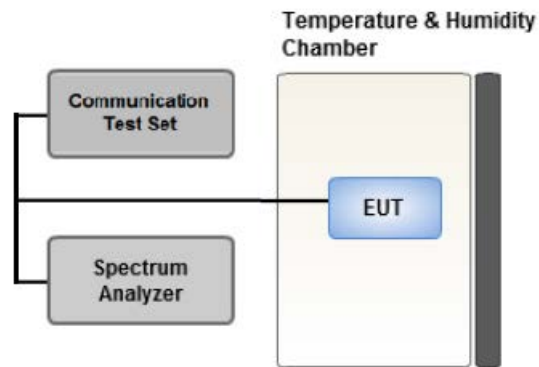
All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Settings

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

3.6 BAND EDGE



Test setup

Test Overview

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

Test Settings

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

Test Notes

According to FCC 22.917, 24.238, 27.53 specified that power of any emission outside of The authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

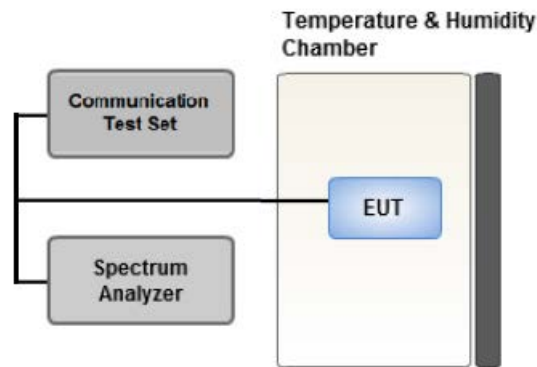
In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

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 $\text{Margin} < 1$ 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.

3.7 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.

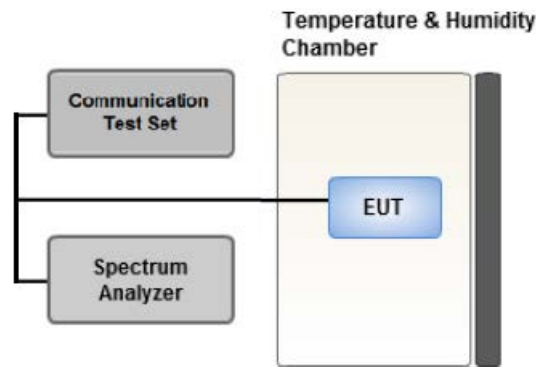
2. Primary Supply Voltage:

- .- 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.

3.8 PEAK- TO- AVERAGE RATIO



Test setup

① CCDF Procedure for PAPR

Test Settings

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

② Alternate Procedure for PAPR

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

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

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

Test Settings(Peak Power)

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

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

Test Settings(Average Power)

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

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
- 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.
- In the case of radiated spurious emissions, all bandwidth of operation were investigated and the worst case bandwidth results are reported. (Worst case : 3 MHz)
- The worst case is reported with the EUT positioning, modulations, and paging service configurations shown in the test data
- Please refer to the table below.
- SM-S931U & additional models were tested and the worst case results are reported.
(Worst case : SM-S931U)

[Main 1 ANT Worst case]

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

[Sub 1 ANT Worst case]

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

3.10 WORST CASE(CONDUCTED TEST)

- All modes of operation were investigated and the worst case configuration results are reported.
 - SM-S931U & additional models were tested and the worst case results are reported.
- (Worst case : SM-S931U)

[Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset
Occupied Bandwidth	QPSK, 16QAM, 64QAM, 256QAM	1.4, 3, 5, 10	Mid	Full RB	0
PEAK- TO- AVERAGE RATIO	QPSK, 16QAM, 64QAM, 256QAM	1.4, 3, 5, 10	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
Band Edge	QPSK	1.4, 3, 5, 10	Low, High	Full RB	0
			Low, Mid, High	1	0
Spurious and Harmonic Emissions at Antenna Terminal	QPSK	1.4, 3, 5, 10	Low, Mid, High	1	0

4. LIST OF TEST EQUIPMENT

Equipment	Model	Manufacture	Serial No.	Due to Calibration	Calibration Interval
RF Switching System	Switch box(1.2 G HPF+LNA)	HCT CO., LTD.,	F1L1	08/21/2025	Annual
RF Switching System	Switch box(3.3 G HPF+LNA)	HCT CO., LTD.,	F1L2	08/21/2025	Annual
RF Switching System	Switch box(LNA)	HCT CO., LTD.,	F1L4	08/21/2025	Annual
RF Switching System	Switch box(6 G HPF+LNA)	HCT CO., LTD.,	F1L7	08/21/2025	Annual
Power Splitter(DC ~ 26.5 GHz)	11667B	Hewlett Packard	5001	04/17/2025	Annual
DC Power Supply	E3632A	Agilent	MY40010147	08/06/2025	Annual
Dipole Antenna	UHAP	Schwarzbeck	01274	03/10/2026	Biennial
Dipole Antenna	UHAP	Schwarzbeck	01288	08/07/2026	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	09/20/2026	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	08/06/2025	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/05/2025	Annual
Loop Antenna(9 kHz ~ 30 MHz)	FMZB1513	Schwarzbeck	1513-333	03/07/2026	Biennial
Trilog Broadband Antenna	VULB9168	Schwarzbeck	895	08/28/2026	Biennial
Trilog Broadband Antenna	VULB9168	Schwarzbeck	1135	08/19/2026	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	07/26/2025	Annual
Signal Analyzer(5 Hz ~ 40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/17/2025	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	HCT CO., LTD.,	-	-	-

Note:

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

5. MEASUREMENT UNCERTAINTY

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

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

Parameter	Expanded Uncertainty ($\pm$ dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.98 (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, § 27.53(g)	$< 43 + 10\log_{10} (P[\text{Watts}])$ at Band Edge and for all out-of-band emissions	PASS
Conducted Output Power	§ 2.1046	N/A	<u>See Note1</u>
Frequency stability / variation of ambient temperature	§ 2.1055, § 27.54	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
Effective Radiated Power	§ 27.50(c)(10)	< 3 Watts max. ERP	PASS
Radiated Spurious and Harmonic Emissions	§ 2.1053, § 27.53(g)	$< 43 + 10\log_{10} (P[\text{Watts}])$ 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 EFFECTIVE RADIATED POWER

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
699.7	LTE B12 (1.4 MHz)	QPSK	-31.55	28.45	-9.89	1.29	V	< 3.00	0.053	17.27	1	0
		16-QAM	-32.27	27.73	-9.89	1.29	V		0.045	16.55		
		64-QAM	-33.27	26.73	-9.89	1.29	V		0.036	15.55		
		256-QAM	-36.48	23.52	-9.89	1.29	V		0.017	12.34		
707.5		QPSK	-31.83	27.84	-9.90	1.30	V		0.046	16.64	1	0
		16-QAM	-32.54	27.13	-9.90	1.30	V		0.039	15.93		
		64-QAM	-33.62	26.05	-9.90	1.30	V		0.031	14.85		
		256-QAM	-36.74	22.93	-9.90	1.30	V		0.015	11.73		
715.3		QPSK	-31.84	27.46	-9.91	1.32	V		0.042	16.23	1	0
		16-QAM	-32.52	26.78	-9.91	1.32	V		0.036	15.55		
		64-QAM	-33.55	25.75	-9.91	1.32	V		0.028	14.52		
		256-QAM	-36.72	22.58	-9.91	1.32	V		0.014	11.35		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
700.5	LTE B12 (3 MHz)	QPSK	-31.53	28.47	-9.89	1.29	V	< 3.00	0.054	17.29	1	0
		16-QAM	-32.24	27.76	-9.89	1.29	V		0.045	16.58		
		64-QAM	-33.33	26.67	-9.89	1.29	V		0.035	15.49		
		256-QAM	-36.55	23.45	-9.89	1.29	V		0.017	12.27		
707.5		QPSK	-31.78	27.89	-9.90	1.30	V		0.047	16.69	1	0
		16-QAM	-32.53	27.14	-9.90	1.30	V		0.039	15.94		
		64-QAM	-33.62	26.05	-9.90	1.30	V		0.031	14.85		
		256-QAM	-36.78	22.89	-9.90	1.30	V		0.015	11.69		
714.5		QPSK	-31.76	27.50	-9.90	1.31	V		0.043	16.29	1	0
		16-QAM	-32.58	26.68	-9.90	1.31	V		0.035	15.47		
		64-QAM	-33.63	25.63	-9.90	1.31	V		0.028	14.42		
		256-QAM	-36.78	22.48	-9.90	1.31	V		0.013	11.27		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
701.5	LTE B12 (5 MHz)	QPSK	-31.50	28.41	-9.89	1.29	V	< 3.00	0.053	17.23	1	0
		16-QAM	-32.21	27.70	-9.89	1.29	V		0.045	16.52		
		64-QAM	-33.32	26.59	-9.89	1.29	V		0.035	15.41		
		256-QAM	-36.57	23.34	-9.89	1.29	V		0.016	12.16		
707.5		QPSK	-31.78	27.89	-9.90	1.30	V		0.047	16.69	1	0
		16-QAM	-32.52	27.15	-9.90	1.30	V		0.039	15.95		
		64-QAM	-33.60	26.07	-9.90	1.30	V		0.031	14.87		
		256-QAM	-36.74	22.93	-9.90	1.30	V		0.015	11.73		
713.5		QPSK	-31.71	27.55	-9.90	1.31	V		0.043	16.34	1	0
		16-QAM	-32.52	26.74	-9.90	1.31	V		0.036	15.53		
		64-QAM	-33.58	25.68	-9.90	1.31	V		0.028	14.47		
		256-QAM	-36.74	22.52	-9.90	1.31	V		0.014	11.31		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
704.0	LTE B12 (10 MHz)	QPSK	-31.66	28.29	-9.89	1.29	V	< 3.00	0.051	17.11	1	0
		16-QAM	-32.41	27.54	-9.89	1.29	V		0.043	16.36		
		64-QAM	-33.54	26.41	-9.89	1.29	V		0.033	15.23		
		256-QAM	-36.64	23.31	-9.89	1.29	V		0.016	12.13		
707.5		QPSK	-31.76	27.91	-9.90	1.30	V		0.047	16.71	1	0
		16-QAM	-32.61	27.06	-9.90	1.30	V		0.039	15.86		
		64-QAM	-33.65	26.02	-9.90	1.30	V		0.030	14.82		
		256-QAM	-36.75	22.92	-9.90	1.30	V		0.015	11.72		
711.0		QPSK	-31.86	27.53	-9.90	1.30	V		0.043	16.33	1	0
		16-QAM	-32.64	26.75	-9.90	1.30	V		0.036	15.55		
		64-QAM	-33.72	25.67	-9.90	1.30	V		0.028	14.47		
		256-QAM	-36.82	22.57	-9.90	1.30	V		0.014	11.37		

8.2 RADIATED SPURIOUS EMISSIONS

■ MODE: LTE B12
 ■ MODULATION SIGNAL: 3 MHz QPSK
 ■ DISTANCE: 3 meters

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)	RB	
									Size	Offset
23025 (700.5)	1 401.00	-47.12	7.60	-62.25	1.85	V	-56.50	-13.00	1	0
	2 101.50	-39.40	9.60	-55.32	2.34	H	-48.06	-13.00		
	2 802.00	-47.54	10.80	-62.24	2.66	H	-54.10	-13.00		
23095 (707.5)	1 415.00	-48.39	7.72	-63.74	1.87	V	-57.89	-13.00	1	0
	2 122.50	-40.16	9.40	-55.43	2.28	V	-48.31	-13.00		
	2 830.00	-48.10	10.80	-62.62	2.70	H	-54.52	-13.00		
23165 (714.5)	1 429.00	-48.92	7.84	-64.58	1.87	H	-58.61	-13.00	1	0
	2 143.50	-39.30	9.24	-53.93	2.27	V	-46.96	-13.00		
	2 858.00	-47.83	10.84	-62.53	2.76	H	-54.45	-13.00		

8.3 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
12	1.4 MHz	707.5	QPSK	6	0	1.0957
			16-QAM			1.1017
			64-QAM			1.1027
			256-QAM			1.0990
	3 MHz		QPSK	15		2.7097
			16-QAM			2.7151
			64-QAM			2.7158
			256-QAM			2.7168
	5 MHz		QPSK	25		4.5123
			16-QAM			4.5131
			64-QAM			4.5135
			256-QAM			4.5043
	10 MHz		QPSK	50		8.9683
			16-QAM			8.9992
			64-QAM			8.9914
			256-QAM			8.9787

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 79 ~ 94.

8.4 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
12	1.4 MHz	707.5	QPSK	Full RB		4.56
			16-QAM			5.71
			64-QAM			6.22
			256-QAM			6.62
	3 MHz		QPSK			4.55
			16-QAM			5.79
			64-QAM			6.28
			256-QAM			6.63
	5 MHz		QPSK			4.59
			16-QAM			5.59
			64-QAM			6.22
			256-QAM			6.58
	10 MHz		QPSK			4.59
			16-QAM			5.57
			64-QAM			6.15
			256-QAM			6.56

Note:

1. Plots of the EUT's P.A.P.R are shown Page 63 ~ 78.
2. P.A.P.R is not required. These values are reported for information only.

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)
12	1.4	699.7	3.6830	27.976	-67.213	-39.237	-13.00
		707.5	3.1770	27.976	-67.462	-39.486	
		715.3	3.6795	27.976	-67.286	-39.310	
	3	700.5	3.6780	27.976	-67.252	-39.276	
		707.5	3.6925	27.976	-67.005	-39.029	
		714.5	3.6880	27.976	-67.082	-39.106	
	5	701.5	3.6980	27.976	-67.104	-39.128	
		707.5	3.6815	27.976	-67.470	-39.494	
		713.5	3.6940	27.976	-67.121	-39.145	
	10	704.0	3.6885	27.976	-67.160	-39.184	
		707.5	3.7079	27.976	-67.201	-39.225	
		711.0	3.6995	27.976	-67.161	-39.185	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 95 ~ 106.
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

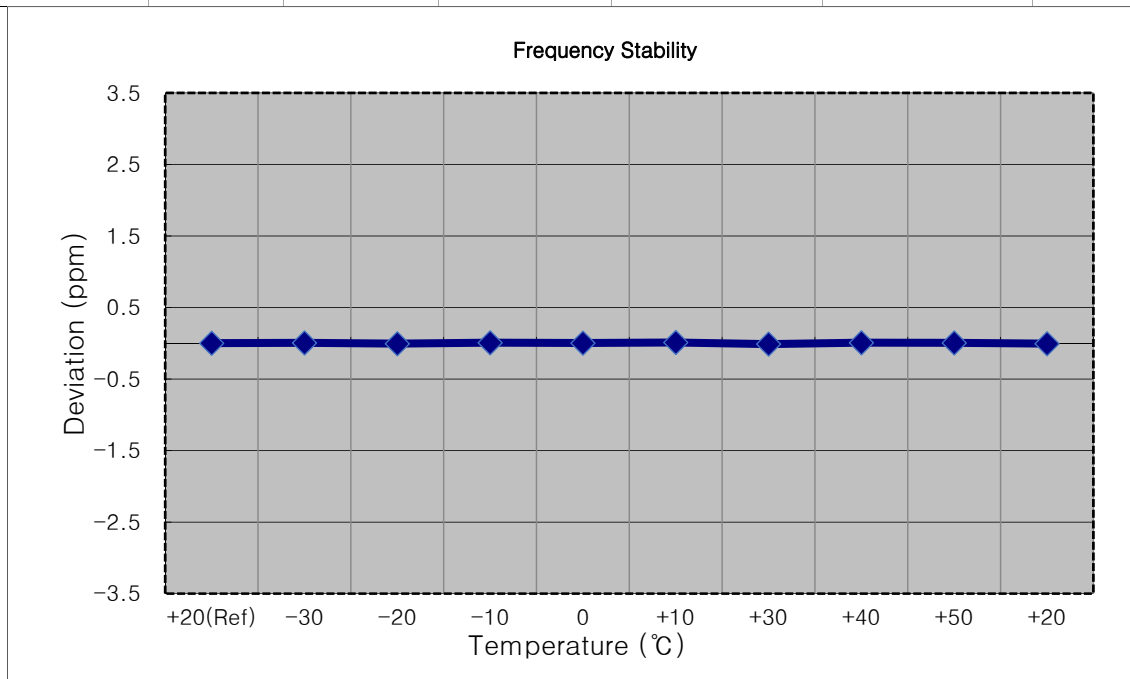
8.6 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 107 ~ 134.

8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

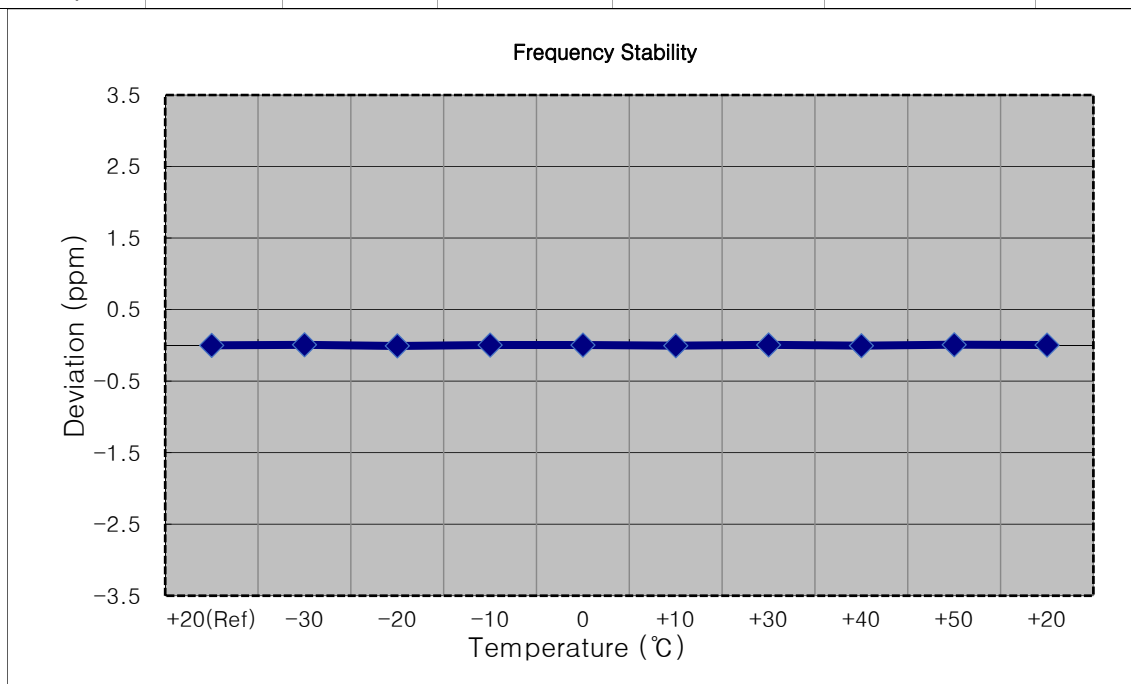
MODE:	<u>LTE B12</u>
OPERATING FREQUENCY:	<u>699,700,000 Hz</u>
CHANNEL:	<u>23017 (1.4 MHz)</u>
REFERENCE VOLTAGE:	<u>3.880 VDC</u>
DEVIATION LIMIT:	<u>Emission must remain in band</u>

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	699 699 997	0.0	0.000 000	0.000
100 %		-30	699 700 000	3.0	0.000 000	0.004
100 %		-20	699 699 992	-4.2	-0.000 001	-0.006
100 %		-10	699 700 001	4.8	0.000 001	0.007
100 %		0	699 699 998	1.8	0.000 000	0.003
100 %		+10	699 700 005	8.0	0.000 001	0.011
100 %		+30	699 699 989	-8.0	-0.000 001	-0.011
100 %		+40	699 700 001	4.6	0.000 001	0.007
100 %		+50	699 700 000	3.9	0.000 001	0.006
Batt. Endpoint	3.300	+20	699 699 991	-5.2	-0.000 001	-0.007



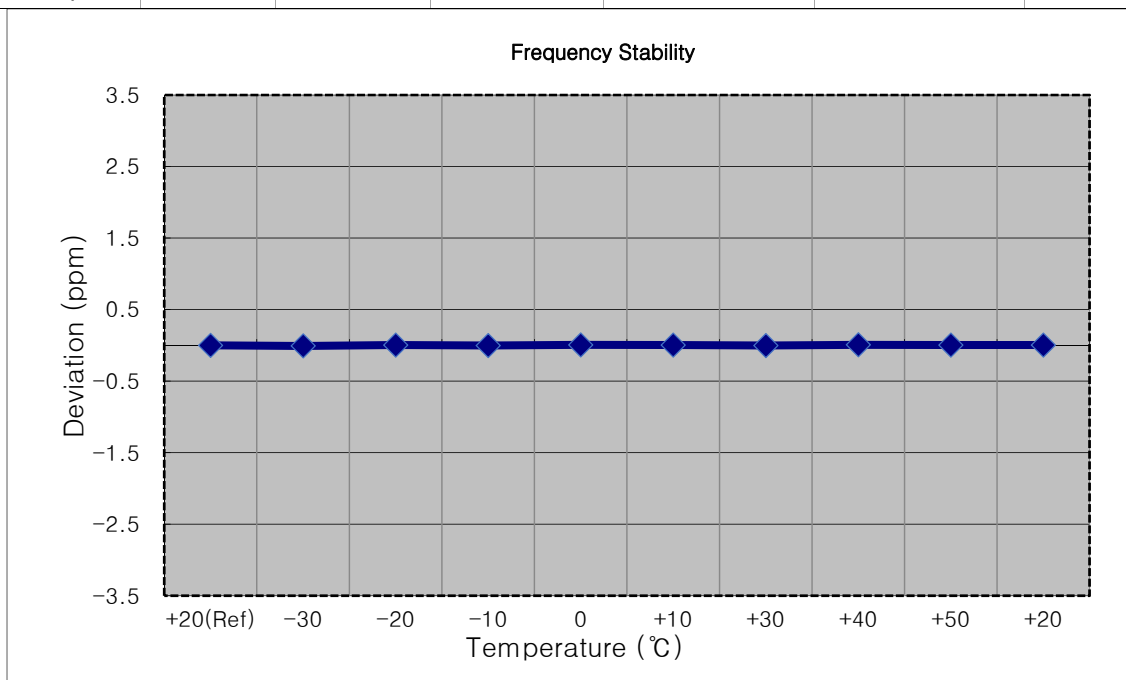
MODE: LTE B12
 OPERATING FREQUENCY: 700,500,000 Hz
 CHANNEL: 23025 (3 MHz)
 REFERENCE VOLTAGE: 3.880 VDC
 DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	700 499 995	0.0	0.000 000	0.000
100 %		-30	700 500 001	5.9	0.000 001	0.008
100 %		-20	700 499 989	-5.7	-0.000 001	-0.008
100 %		-10	700 499 998	3.1	0.000 000	0.004
100 %		0	700 499 998	2.6	0.000 000	0.004
100 %		+10	700 499 992	-3.6	-0.000 001	-0.005
100 %		+30	700 499 999	3.8	0.000 001	0.005
100 %		+40	700 499 992	-2.7	0.000 000	-0.004
100 %		+50	700 500 001	5.7	0.000 001	0.008
Batt. Endpoint	3.300	+20	700 499 997	2.3	0.000 000	0.003



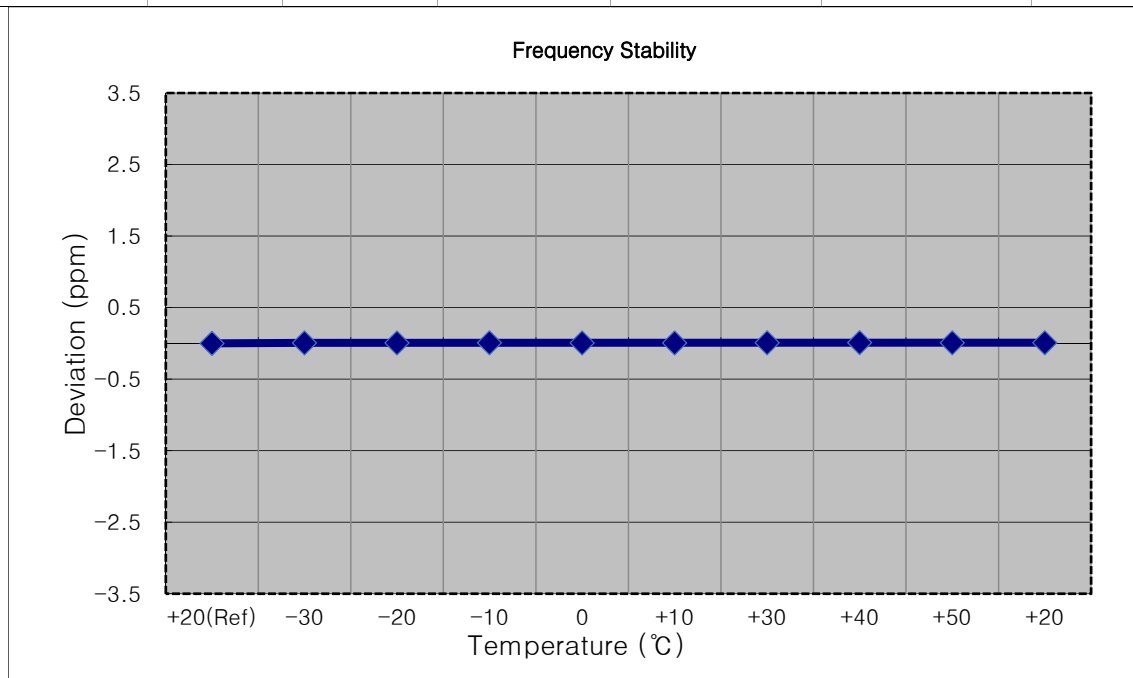
MODE:	<u>LTE B12</u>
OPERATING FREQUENCY:	<u>701,500,000 Hz</u>
CHANNEL:	<u>23035 (5 MHz)</u>
REFERENCE VOLTAGE:	<u>3.880 VDC</u>
DEVIATION LIMIT:	<u>Emission must remain in band</u>

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	701 500 004	0.0	0.000 000	0.000
100 %		-30	701 499 999	-5.1	-0.000 001	-0.007
100 %		-20	701 500 007	3.4	0.000 000	0.005
100 %		-10	701 500 002	-1.9	0.000 000	-0.003
100 %		0	701 500 008	3.9	0.000 001	0.006
100 %		+10	701 500 007	3.1	0.000 000	0.004
100 %		+30	701 500 002	-1.4	0.000 000	-0.002
100 %		+40	701 500 009	5.3	0.000 001	0.008
100 %		+50	701 500 007	3.6	0.000 001	0.005
Batt. Endpoint	3.300	+20	701 500 007	3.5	0.000 000	0.005



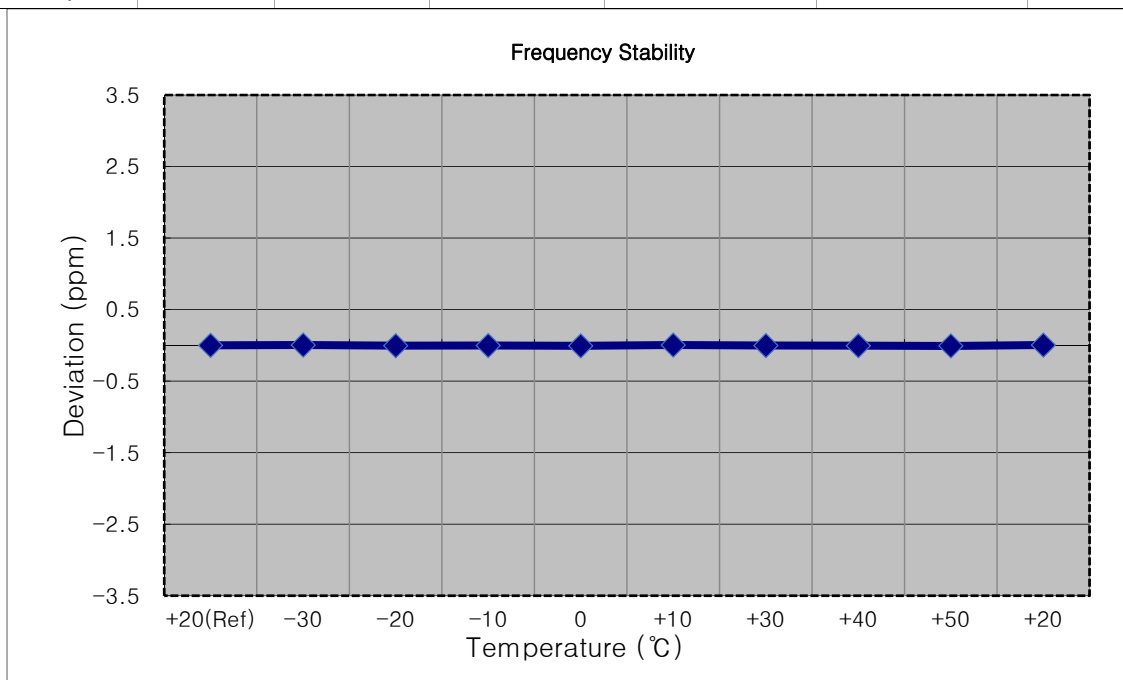
MODE: LTE B12
 OPERATING FREQUENCY: 704,000,000 Hz
 CHANNEL: 23060 (10 MHz)
 REFERENCE VOLTAGE: 3.880 VDC
 DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	704 000 004	0.0	0.000 000	0.000
100 %		-30	704 000 008	4.4	0.000 001	0.006
100 %		-20	704 000 009	5.0	0.000 001	0.007
100 %		-10	704 000 010	6.8	0.000 001	0.010
100 %		0	704 000 008	4.9	0.000 001	0.007
100 %		+10	704 000 009	5.0	0.000 001	0.007
100 %		+30	704 000 010	6.3	0.000 001	0.009
100 %		+40	704 000 012	8.1	0.000 001	0.012
100 %		+50	704 000 010	6.1	0.000 001	0.009
Batt. Endpoint	3.300	+20	704 000 010	6.1	0.000 001	0.009



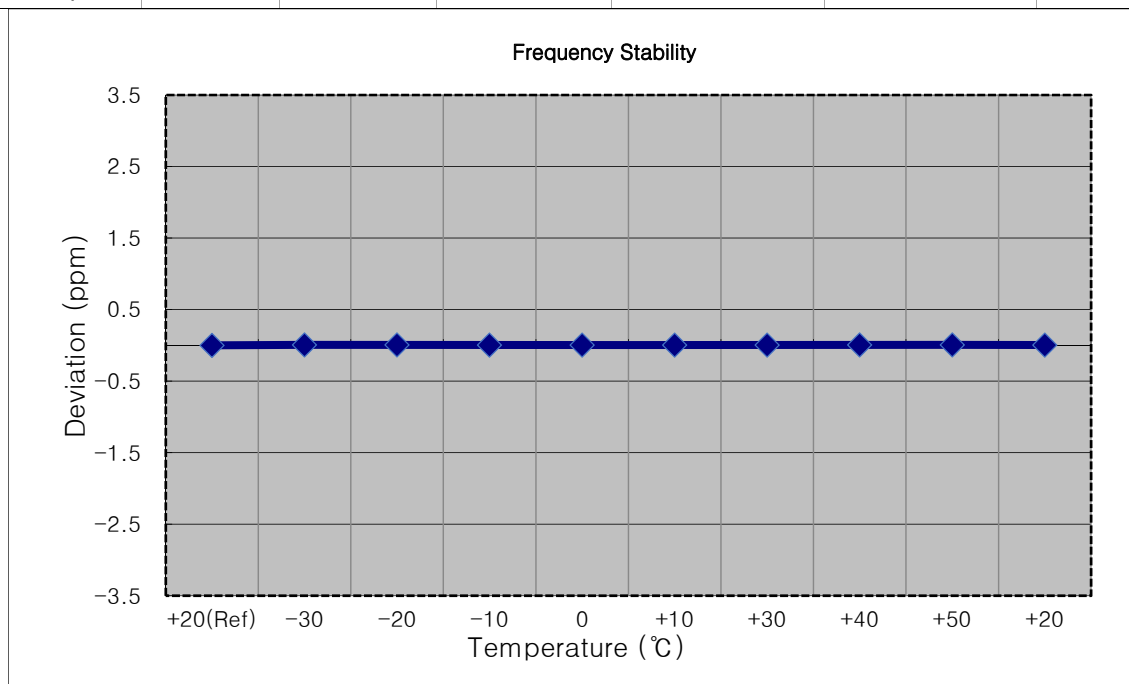
■ MODE: LTE B12
 ■ OPERATING FREQUENCY: 707,500,000 Hz
 ■ CHANNEL: 23095 (1.4 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	707 499 995	0.0	0.000 000	0.000
100 %		-30	707 499 998	3.4	0.000 000	0.005
100 %		-20	707 499 990	-4.1	-0.000 001	-0.006
100 %		-10	707 499 992	-2.2	0.000 000	-0.003
100 %		0	707 499 990	-5.0	-0.000 001	-0.007
100 %		+10	707 499 998	3.4	0.000 000	0.005
100 %		+30	707 499 992	-2.2	0.000 000	-0.003
100 %		+40	707 499 990	-4.2	-0.000 001	-0.006
100 %		+50	707 499 989	-5.6	-0.000 001	-0.008
Batt. Endpoint		+20	707 499 997	2.3	0.000 000	0.003



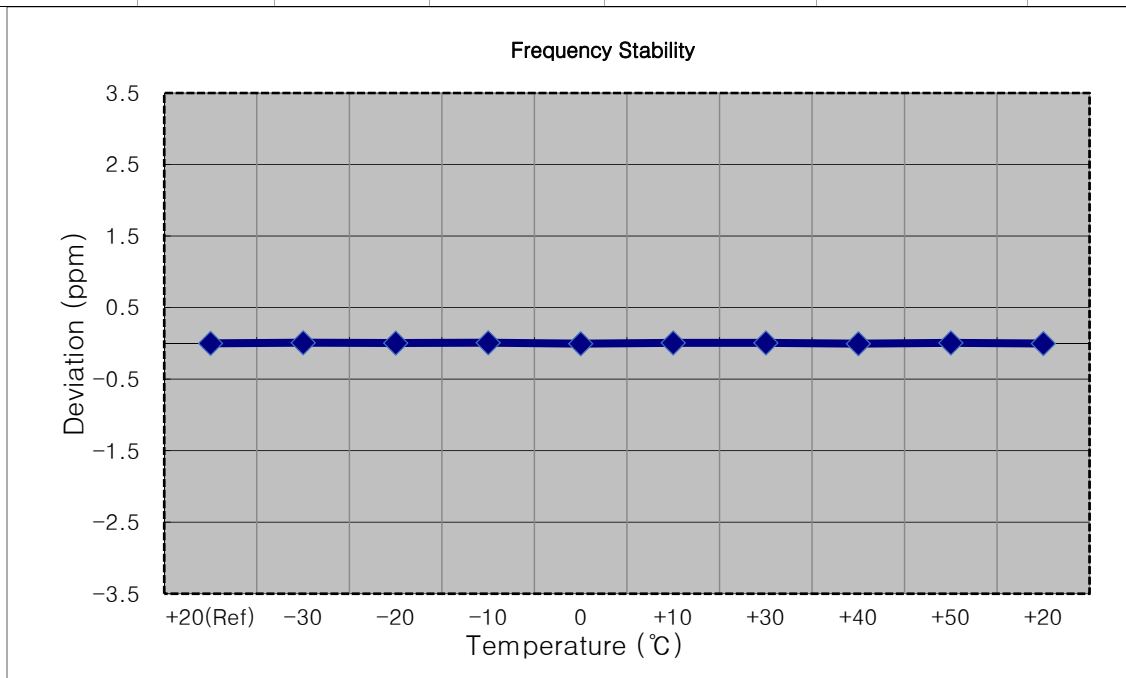
MODE:	<u>LTE B12</u>
OPERATING FREQUENCY:	<u>707,500,000 Hz</u>
CHANNEL:	<u>23095 (3 MHz)</u>
REFERENCE VOLTAGE:	<u>3.880 VDC</u>
DEVIATION LIMIT:	<u>Emission must remain in band</u>

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	707 500 003	0.0	0.000 000	0.000
100 %		-30	707 500 008	4.6	0.000 001	0.007
100 %		-20	707 500 008	5.2	0.000 001	0.007
100 %		-10	707 500 006	3.2	0.000 000	0.005
100 %		0	707 500 006	2.8	0.000 000	0.004
100 %		+10	707 500 006	3.1	0.000 000	0.004
100 %		+30	707 500 006	2.7	0.000 000	0.004
100 %		+40	707 500 008	5.1	0.000 001	0.007
100 %		+50	707 500 008	4.5	0.000 001	0.006
Batt. Endpoint	3.300	+20	707 500 006	2.7	0.000 000	0.004



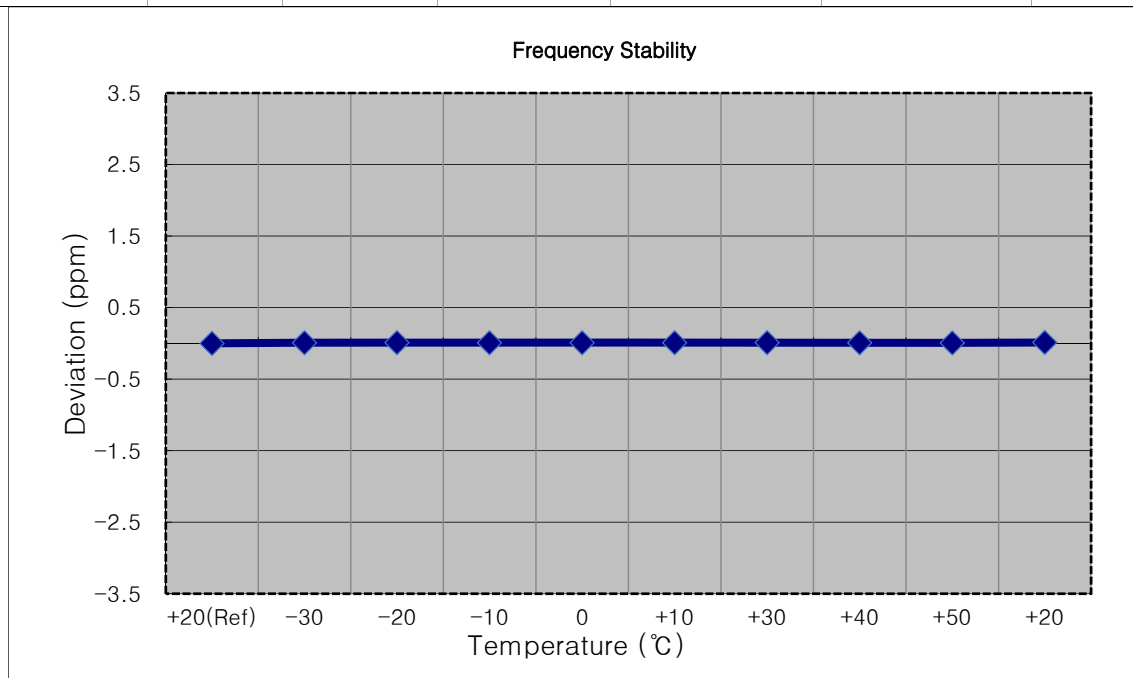
MODE: LTE B12
 OPERATING FREQUENCY: 707,500,000 Hz
 CHANNEL: 23095 (5 MHz)
 REFERENCE VOLTAGE: 3.880 VDC
 DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	707 500 005	0.0	0.000 000	0.000
100 %		-30	707 500 011	6.1	0.000 001	0.009
100 %		-20	707 500 008	3.2	0.000 000	0.005
100 %		-10	707 500 011	5.5	0.000 001	0.008
100 %		0	707 500 002	-2.9	0.000 000	-0.004
100 %		+10	707 500 009	4.3	0.000 001	0.006
100 %		+30	707 500 009	3.9	0.000 001	0.006
100 %		+40	707 500 002	-2.8	0.000 000	-0.004
100 %		+50	707 500 009	4.4	0.000 001	0.006
Batt. Endpoint	3.300	+20	707 500 003	-2.0	0.000 000	-0.003



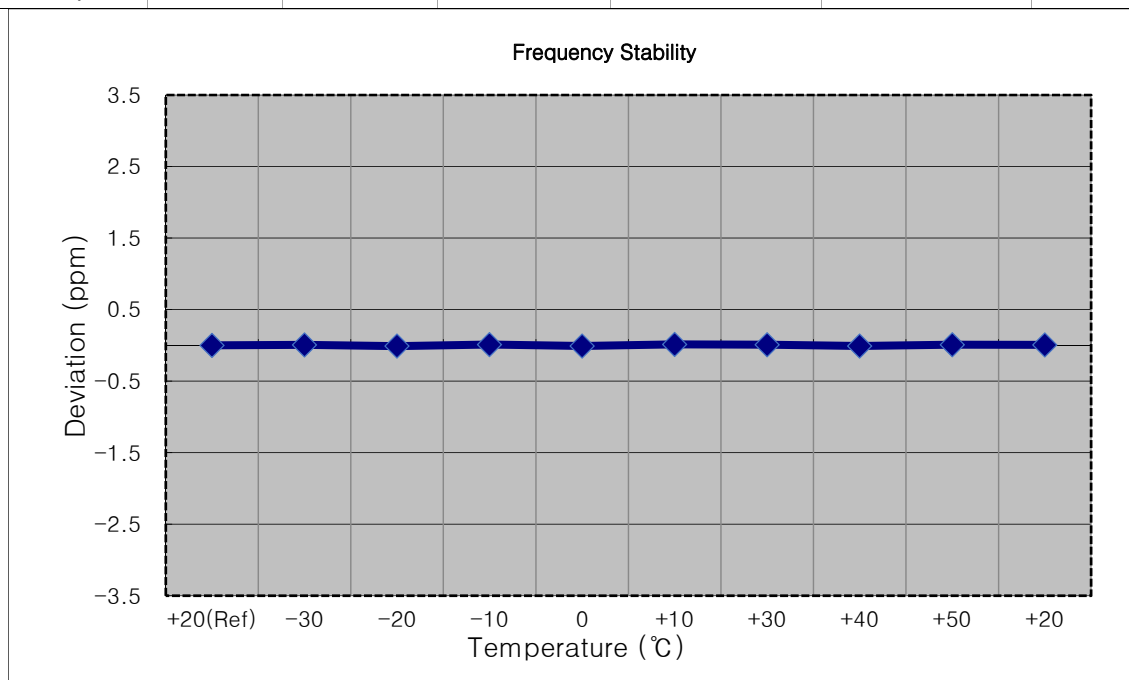
MODE: LTE B12
 OPERATING FREQUENCY: 707,500,000 Hz
 CHANNEL: 23095 (10 MHz)
 REFERENCE VOLTAGE: 3.880 VDC
 DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	707 500 005	0.0	0.000 000	0.000
100 %		-30	707 500 011	6.7	0.000 001	0.009
100 %		-20	707 500 012	7.8	0.000 001	0.011
100 %		-10	707 500 011	6.2	0.000 001	0.009
100 %		0	707 500 011	6.3	0.000 001	0.009
100 %		+10	707 500 010	5.5	0.000 001	0.008
100 %		+30	707 500 013	8.3	0.000 001	0.012
100 %		+40	707 500 010	5.8	0.000 001	0.008
100 %		+50	707 500 010	5.2	0.000 001	0.007
Batt. Endpoint	3.300	+20	707 500 013	8.5	0.000 001	0.012



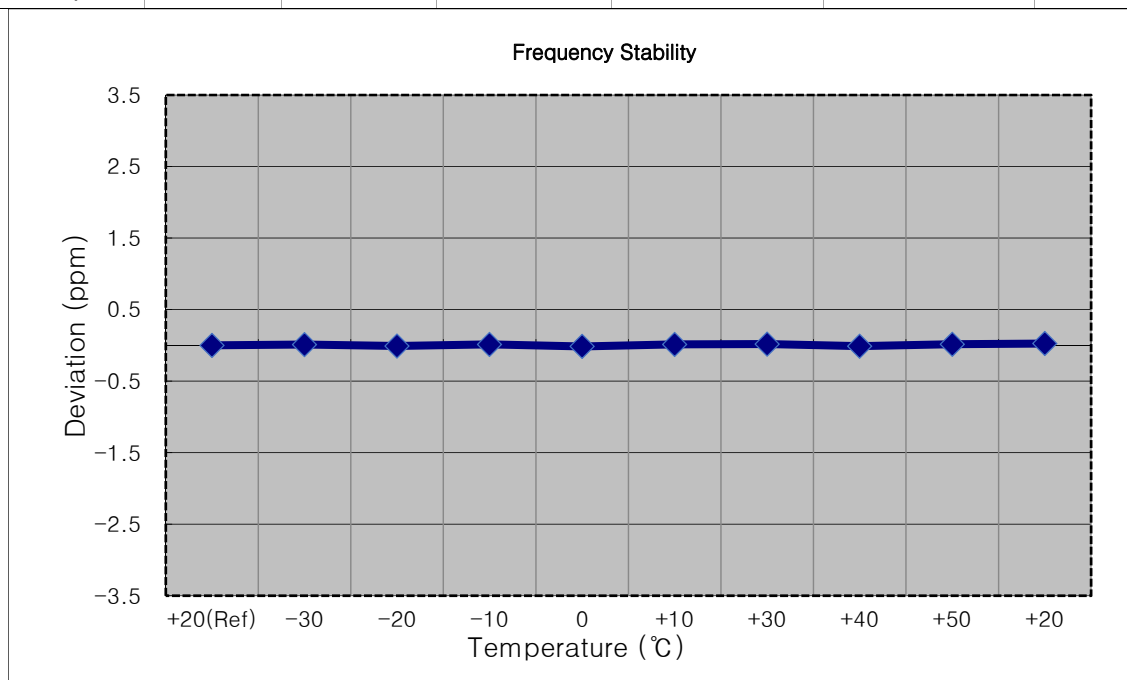
MODE:	<u>LTE B12</u>
OPERATING FREQUENCY:	<u>715,300,000 Hz</u>
CHANNEL:	<u>23173 (1.4 MHz)</u>
REFERENCE VOLTAGE:	<u>3.880 VDC</u>
DEVIATION LIMIT:	<u>Emission must remain in band</u>

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	715 299 996	0.0	0.000 000	0.000
100 %		-30	715 300 001	4.9	0.000 001	0.007
100 %		-20	715 299 989	-7.3	-0.000 001	-0.010
100 %		-10	715 300 004	7.5	0.000 001	0.010
100 %		0	715 299 990	-6.3	-0.000 001	-0.009
100 %		+10	715 300 006	9.9	0.000 001	0.014
100 %		+30	715 300 002	5.6	0.000 001	0.008
100 %		+40	715 299 990	-6.3	-0.000 001	-0.009
100 %		+50	715 300 002	5.8	0.000 001	0.008
Batt. Endpoint		+20	715 300 001	4.5	0.000 001	0.006



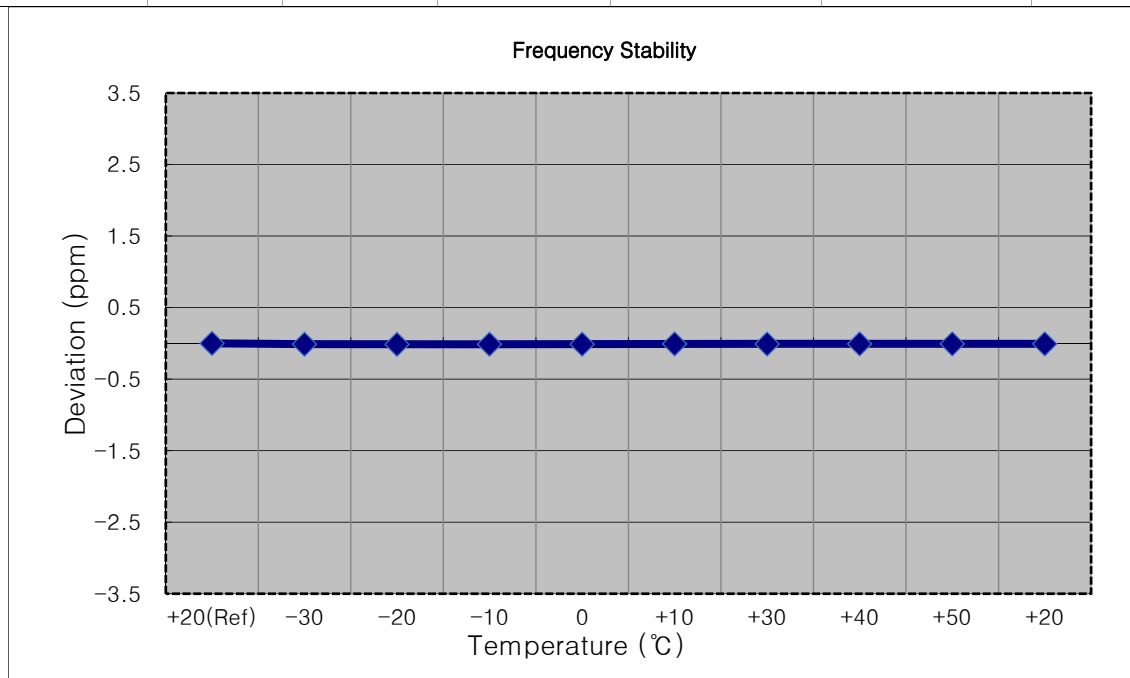
■ MODE: LTE B12
 ■ OPERATING FREQUENCY: 714,500,000 Hz
 ■ CHANNEL: 23165 (3 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	714 499 991	0.0	0.000 000	0.000
100 %		-30	714 499 998	7.5	0.000 001	0.010
100 %		-20	714 499 985	-6.1	-0.000 001	-0.009
100 %		-10	714 499 999	8.6	0.000 001	0.012
100 %		0	714 499 981	-10.0	-0.000 001	-0.014
100 %		+10	714 500 000	9.0	0.000 001	0.013
100 %		+30	714 500 004	13.0	0.000 002	0.018
100 %		+40	714 499 982	-8.6	-0.000 001	-0.012
100 %		+50	714 500 001	10.4	0.000 001	0.015
Batt. Endpoint	3.300	+20	714 500 009	18.4	0.000 003	0.026



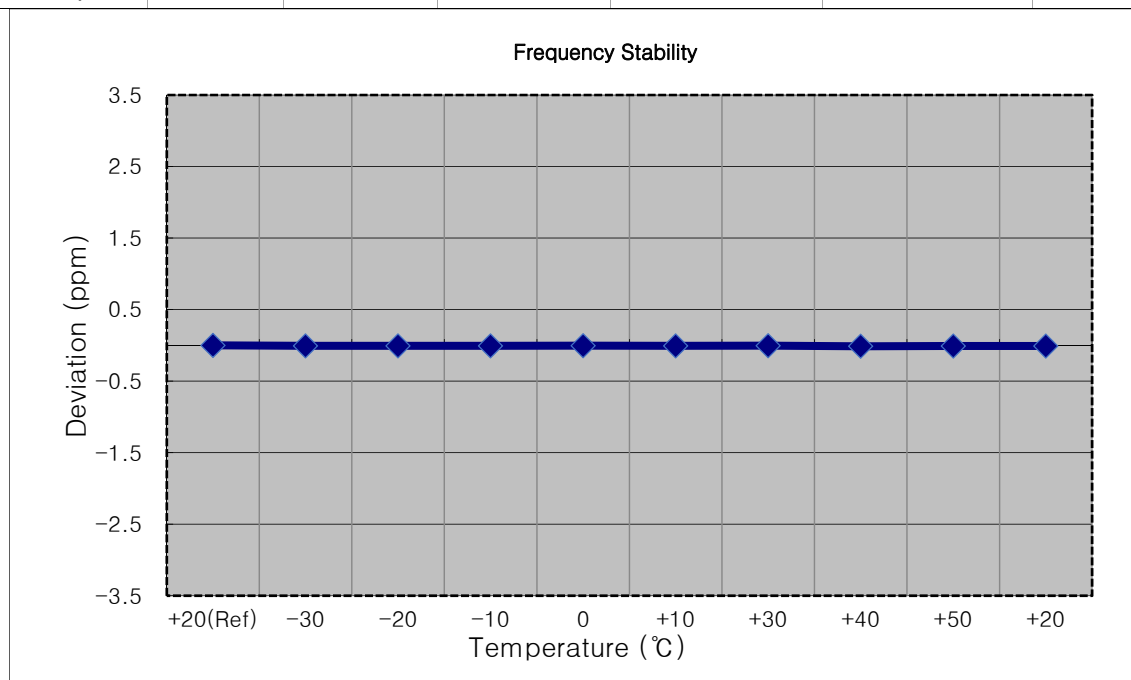
MODE: LTE B12
 OPERATING FREQUENCY: 713,500,000 Hz
 CHANNEL: 23155 (5 MHz)
 REFERENCE VOLTAGE: 3.880 VDC
 DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	713 499 992	0.0	0.000 000	0.000
100 %		-30	713 499 984	-7.8	-0.000 001	-0.011
100 %		-20	713 499 982	-10.1	-0.000 001	-0.014
100 %		-10	713 499 984	-8.0	-0.000 001	-0.011
100 %		0	713 499 984	-7.7	-0.000 001	-0.011
100 %		+10	713 499 987	-4.4	-0.000 001	-0.006
100 %		+30	713 499 985	-7.0	-0.000 001	-0.010
100 %		+40	713 499 986	-5.7	-0.000 001	-0.008
100 %		+50	713 499 987	-4.9	-0.000 001	-0.007
Batt. Endpoint	3.300	+20	713 499 986	-5.8	-0.000 001	-0.008



MODE: LTE B12
 OPERATING FREQUENCY: 711,000,000 Hz
 CHANNEL: 23130 (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)	710 999 990	0.0	0.000 000	0.000
100 %		-30	710 999 985	-5.7	-0.000 001	-0.008
100 %		-20	710 999 985	-5.5	-0.000 001	-0.008
100 %		-10	710 999 985	-5.6	-0.000 001	-0.008
100 %		0	710 999 986	-4.1	-0.000 001	-0.006
100 %		+10	710 999 985	-5.7	-0.000 001	-0.008
100 %		+30	710 999 986	-4.2	-0.000 001	-0.006
100 %		+40	710 999 982	-8.8	-0.000 001	-0.012
100 %		+50	710 999 984	-6.4	-0.000 001	-0.009
Batt. Endpoint	3.300	+20	710 999 983	-7.0	-0.000 001	-0.010



9. TEST DATA(Sub 1 ANT)

9.1 EFFECTIVE RADIATED POWER

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
699.7	LTE B12 (1.4 MHz)	QPSK	-29.38	30.62	-9.89	1.29	H	< 3.00	0.088	19.44	1	0
		16-QAM	-29.99	30.01	-9.89	1.29	H		0.076	18.83		
		64-QAM	-31.05	28.95	-9.89	1.29	H		0.060	17.77		
		256-QAM	-34.26	25.74	-9.89	1.29	H		0.029	14.56		
707.5		QPSK	-29.67	30.00	-9.90	1.30	H		0.076	18.80	1	0
		16-QAM	-30.37	29.30	-9.90	1.30	H		0.065	18.10		
		64-QAM	-31.40	28.27	-9.90	1.30	H		0.051	17.07		
		256-QAM	-34.56	25.11	-9.90	1.30	H		0.025	13.91		
715.3		QPSK	-29.81	29.49	-9.91	1.32	H		0.067	18.26	1	0
		16-QAM	-30.52	28.78	-9.91	1.32	H		0.057	17.55		
		64-QAM	-31.58	27.72	-9.91	1.32	H		0.045	16.49		
		256-QAM	-34.79	24.51	-9.91	1.32	H		0.021	13.28		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
700.5	LTE B12 (3 MHz)	QPSK	-29.37	30.63	-9.89	1.29	H	< 3.00	0.088	19.45	1	0
		16-QAM	-30.08	29.92	-9.89	1.29	H		0.075	18.74		
		64-QAM	-31.11	28.89	-9.89	1.29	H		0.059	17.71		
		256-QAM	-34.31	25.69	-9.89	1.29	H		0.028	14.51		
707.5		QPSK	-29.68	29.99	-9.90	1.30	H		0.076	18.79	1	0
		16-QAM	-30.42	29.25	-9.90	1.30	H		0.064	18.05		
		64-QAM	-31.48	28.19	-9.90	1.30	H		0.050	16.99		
		256-QAM	-34.61	25.06	-9.90	1.30	H		0.024	13.86		
714.5		QPSK	-29.89	29.37	-9.90	1.31	H		0.066	18.16	1	0
		16-QAM	-30.66	28.60	-9.90	1.31	H		0.055	17.39		
		64-QAM	-31.71	27.55	-9.90	1.31	H		0.043	16.34		
		256-QAM	-34.83	24.43	-9.90	1.31	H		0.021	13.22		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
701.5	LTE B12 (5 MHz)	QPSK	-29.36	30.55	-9.89	1.29	H	< 3.00	0.086	19.37	1	0
		16-QAM	-29.99	29.92	-9.89	1.29	H		0.075	18.74		
		64-QAM	-31.12	28.79	-9.89	1.29	H		0.058	17.61		
		256-QAM	-34.31	25.60	-9.89	1.29	H		0.028	14.42		
707.5		QPSK	-29.60	30.07	-9.90	1.30	H		0.077	18.87	1	0
		16-QAM	-30.33	29.34	-9.90	1.30	H		0.065	18.14		
		64-QAM	-31.39	28.28	-9.90	1.30	H		0.051	17.08		
		256-QAM	-34.56	25.11	-9.90	1.30	H		0.025	13.91		
713.5		QPSK	-29.77	29.49	-9.90	1.31	H		0.067	18.28	1	0
		16-QAM	-30.56	28.70	-9.90	1.31	H		0.056	17.49		
		64-QAM	-31.61	27.65	-9.90	1.31	H		0.044	16.44		
		256-QAM	-34.74	24.52	-9.90	1.31	H		0.021	13.31		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
704.0	LTE B12 (10 MHz)	QPSK	-29.37	30.58	-9.89	1.29	H	< 3.00	0.087	19.40	1	0
		16-QAM	-30.17	29.78	-9.89	1.29	H		0.072	18.60		
		64-QAM	-31.25	28.70	-9.89	1.29	H		0.057	17.52		
		256-QAM	-34.35	25.60	-9.89	1.29	H		0.028	14.42		
707.5		QPSK	-29.55	30.12	-9.90	1.30	H		0.078	18.92	1	0
		16-QAM	-30.29	29.38	-9.90	1.30	H		0.066	18.18		
		64-QAM	-31.43	28.24	-9.90	1.30	H		0.051	17.04		
		256-QAM	-34.53	25.14	-9.90	1.30	H		0.025	13.94		
711.0		QPSK	-29.70	29.69	-9.90	1.30	H		0.071	18.49	1	0
		16-QAM	-30.47	28.92	-9.90	1.30	H		0.059	17.72		
		64-QAM	-31.59	27.80	-9.90	1.30	H		0.046	16.60		
		256-QAM	-34.71	24.68	-9.90	1.30	H		0.022	13.48		

9.2 RADIATED SPURIOUS EMISSIONS

MODE: LTE B12
 MODULATION SIGNAL: 3 MHz QPSK
 DISTANCE: 3 meters

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)	RB	
									Size	Offset
23025 (700.5)	1 401.00	-48.60	7.60	-63.73	1.85	H	-57.98	-13.00	1	0
	2 101.50	-40.10	9.60	-56.02	2.34	H	-48.76	-13.00		
	2 802.00	-48.45	10.80	-63.15	2.66	H	-55.01	-13.00		
23095 (707.5)	1 415.00	-49.82	7.72	-65.17	1.87	H	-59.32	-13.00	1	0
	2 122.50	-39.54	9.40	-54.81	2.28	H	-47.69	-13.00		
	2 830.00	-48.94	10.80	-63.46	2.70	H	-55.36	-13.00		
23165 (714.5)	1 429.00	-48.04	7.84	-63.70	1.87	H	-57.73	-13.00	1	0
	2 143.50	-37.96	9.24	-52.59	2.27	V	-45.62	-13.00		
	2 858.00	-47.03	10.84	-61.73	2.76	H	-53.65	-13.00		

9.3 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
12	1.4 MHz	707.5	QPSK	6	0	1.0960
			16-QAM			1.1004
			64-QAM			1.1025
			256-QAM			1.1019
	3 MHz		QPSK	15		2.7120
			16-QAM			2.7169
			64-QAM			2.7200
			256-QAM			2.7166
	5 MHz		QPSK	25		4.5050
			16-QAM			4.5189
			64-QAM			4.5069
			256-QAM			4.5202
	10 MHz		QPSK	50		9.0215
			16-QAM			9.0204
			64-QAM			9.0274
			256-QAM			9.0173

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 152 ~167.

9.4 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
12	1.4 MHz	707.5	QPSK	Full RB		4.69
			16-QAM			5.84
			64-QAM			6.36
			256-QAM			6.64
	3 MHz		QPSK			4.67
			16-QAM			5.94
			64-QAM			6.41
			256-QAM			6.65
	5 MHz		QPSK			4.74
			16-QAM			5.71
			64-QAM			6.33
			256-QAM			6.60
	10 MHz		QPSK			4.75
			16-QAM			5.70
			64-QAM			6.26
			256-QAM			6.61

Note:

1. Plots of the EUT's P.A.P.R are shown Page 136 ~ 151.
2. P.A.P.R is not required. These values are reported for information only.

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)
12	1.4	699.7	3.7099	27.976	-67.239	-39.263	-13.00
		707.5	3.1980	27.976	-67.300	-39.324	
		715.3	3.6656	27.976	-67.457	-39.481	
	3	700.5	3.6775	27.976	-67.306	-39.330	
		707.5	3.6775	27.976	-67.176	-39.200	
		714.5	3.6840	27.976	-67.229	-39.253	
	5	701.5	3.6860	27.976	-67.251	-39.275	
		707.5	3.1800	27.976	-67.245	-39.269	
		713.5	3.6830	27.976	-67.111	-39.135	
	10	704.0	3.6955	27.976	-67.318	-39.342	
		707.5	3.7099	27.976	-67.327	-39.351	
		711.0	3.7044	27.976	-67.282	-39.306	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 168 ~ 179.
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

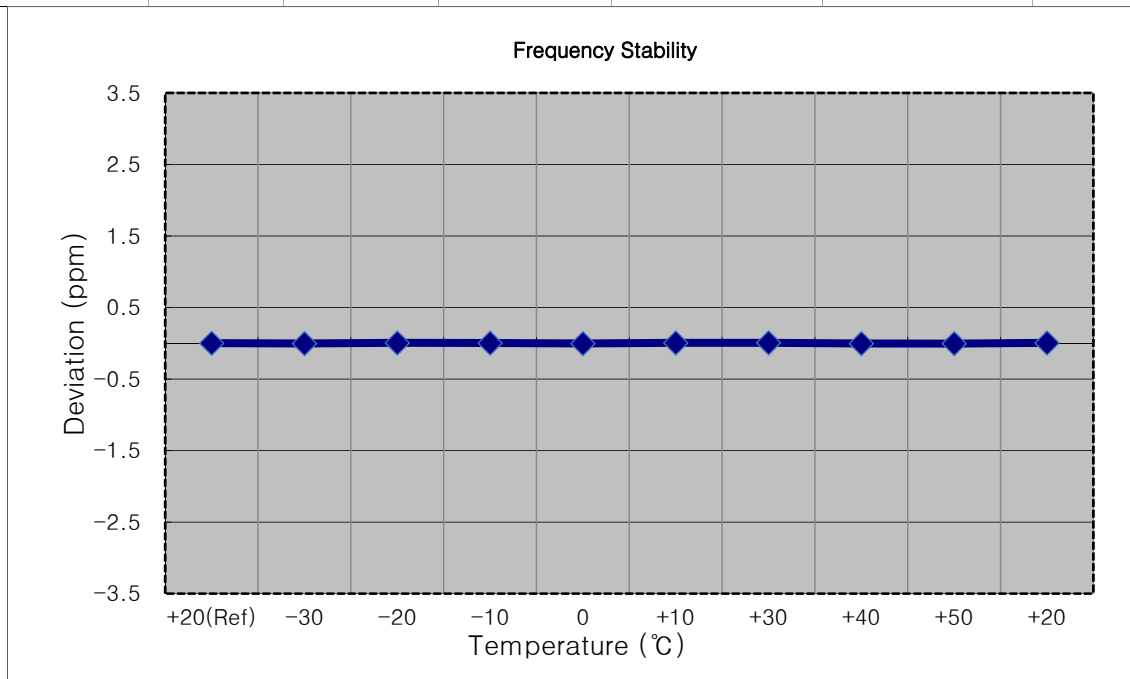
9.6 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 180 ~ 207.

9.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

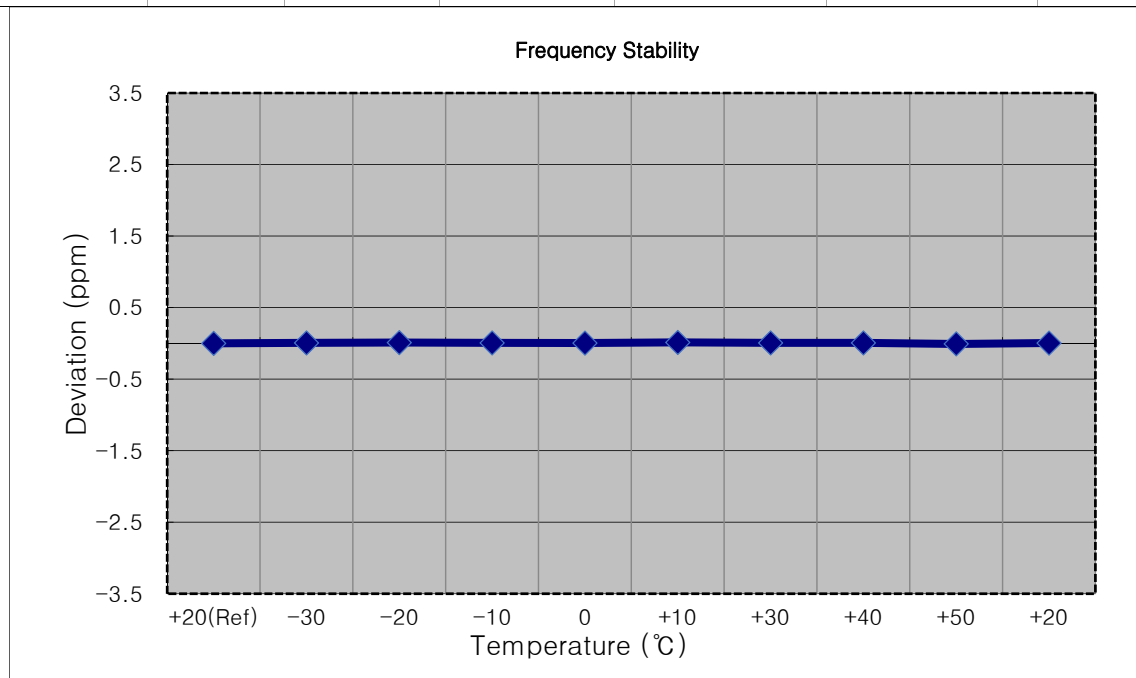
MODE:	<u>LTE B12</u>
OPERATING FREQUENCY:	<u>699,700,000 Hz</u>
CHANNEL:	<u>23017 (1.4 MHz)</u>
REFERENCE VOLTAGE:	<u>3.880 VDC</u>
DEVIATION LIMIT:	<u>Emission must remain in band</u>

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	699 699 995	0.0	0.000 000	0.000
100 %		-30	699 699 992	-3.3	0.000 000	-0.005
100 %		-20	699 699 999	3.6	0.000 001	0.005
100 %		-10	699 699 997	2.1	0.000 000	0.003
100 %		0	699 699 992	-2.9	0.000 000	-0.004
100 %		+10	699 699 998	2.6	0.000 000	0.004
100 %		+30	699 700 000	4.8	0.000 001	0.007
100 %		+40	699 699 992	-3.2	0.000 000	-0.005
100 %		+50	699 699 992	-3.4	0.000 000	-0.005
Batt. Endpoint	3.300	+20	699 699 998	3.2	0.000 000	0.005



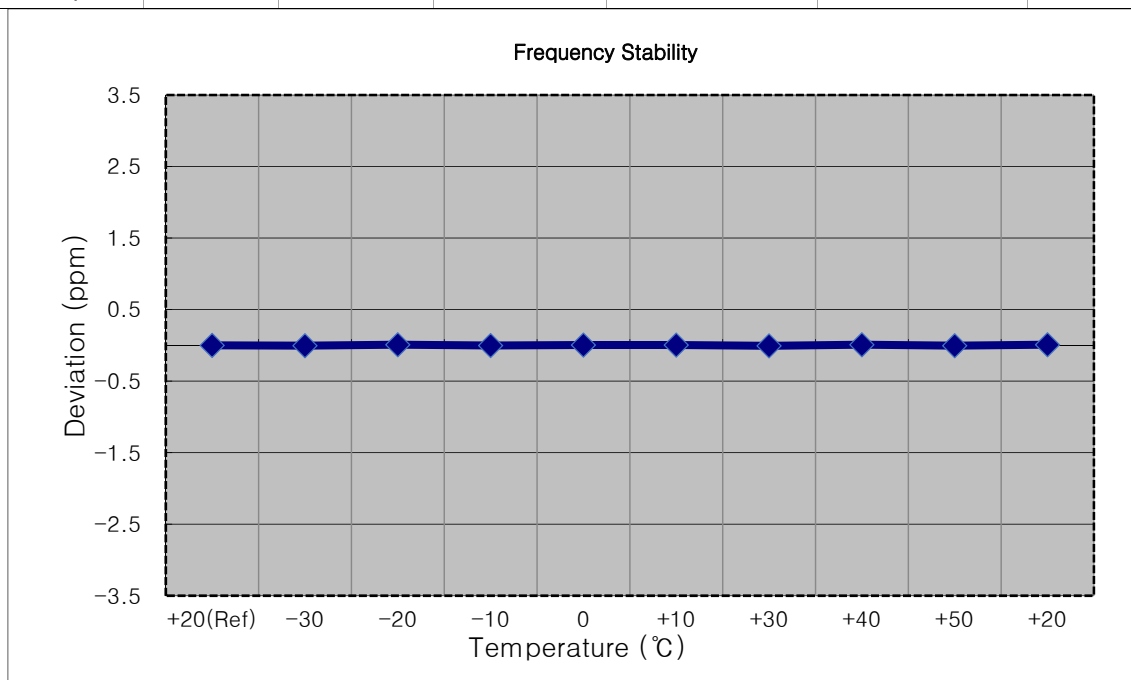
MODE: LTE B12
 OPERATING FREQUENCY: 700,500,000 Hz
 CHANNEL: 23025 (3 MHz)
 REFERENCE VOLTAGE: 3.880 VDC
 DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	700 500 005	0.0	0.000 000	0.000
100 %		-30	700 500 009	4.4	0.000 001	0.006
100 %		-20	700 500 012	7.6	0.000 001	0.011
100 %		-10	700 500 010	5.0	0.000 001	0.007
100 %		0	700 500 008	3.0	0.000 000	0.004
100 %		+10	700 500 014	9.1	0.000 001	0.013
100 %		+30	700 500 009	4.4	0.000 001	0.006
100 %		+40	700 500 010	4.9	0.000 001	0.007
100 %		+50	700 500 000	-5.1	-0.000 001	-0.007
Batt. Endpoint	3.300	+20	700 500 008	2.8	0.000 000	0.004



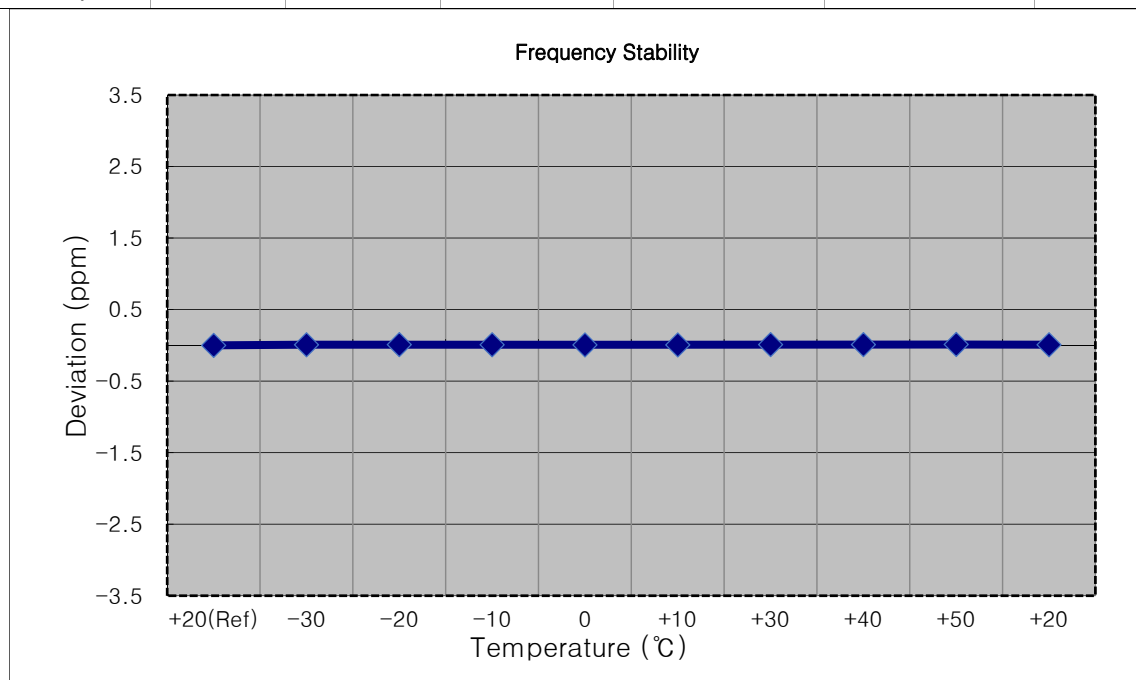
MODE: LTE B12
 OPERATING FREQUENCY: 701,500,000 Hz
 CHANNEL: 23035 (5 MHz)
 REFERENCE VOLTAGE: 3.880 VDC
 DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	701 500 005	0.0	0.000 000	0.000
100 %		-30	701 500 001	-3.8	-0.000 001	-0.005
100 %		-20	701 500 010	5.6	0.000 001	0.008
100 %		-10	701 500 003	-1.9	0.000 000	-0.003
100 %		0	701 500 008	3.0	0.000 000	0.004
100 %		+10	701 500 008	3.2	0.000 000	0.005
100 %		+30	701 500 001	-4.3	-0.000 001	-0.006
100 %		+40	701 500 011	5.8	0.000 001	0.008
100 %		+50	701 500 001	-3.4	0.000 000	-0.005
Batt. Endpoint	3.300	+20	701 500 011	6.2	0.000 001	0.009



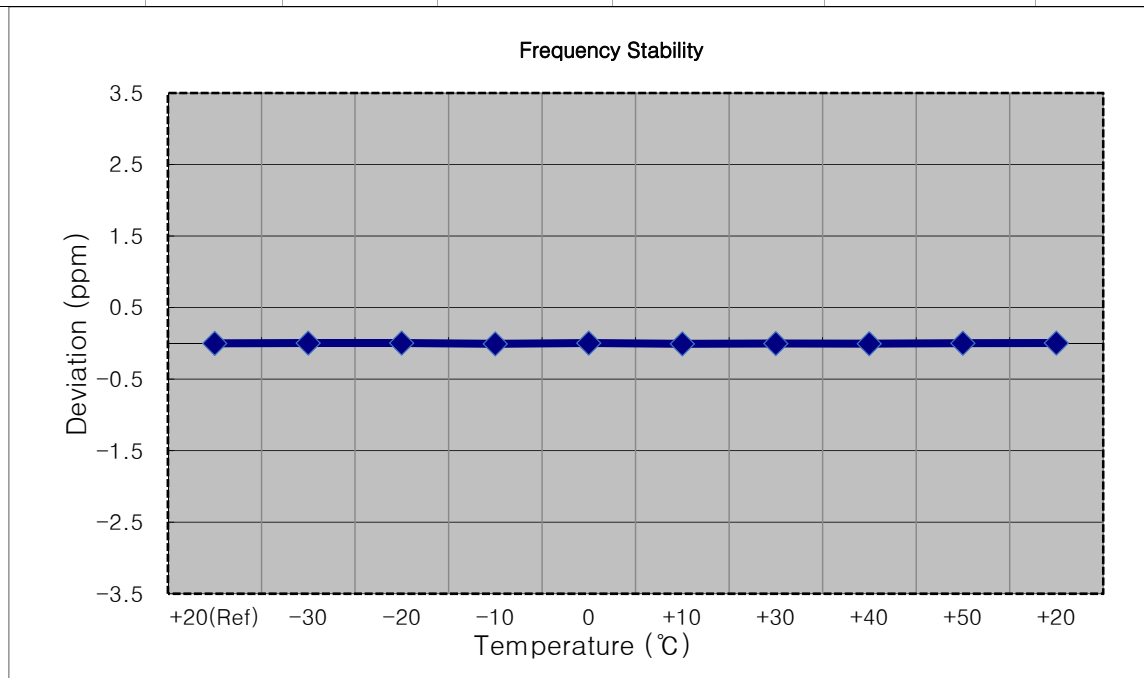
MODE: LTE B12
 OPERATING FREQUENCY: 704,000,000 Hz
 CHANNEL: 23060 (10 MHz)
 REFERENCE VOLTAGE: 3.880 VDC
 DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	704 000 009	0.0	0.000 000	0.000
100 %		-30	704 000 015	5.8	0.000 001	0.008
100 %		-20	704 000 017	8.2	0.000 001	0.012
100 %		-10	704 000 016	6.7	0.000 001	0.010
100 %		0	704 000 014	4.8	0.000 001	0.007
100 %		+10	704 000 013	4.0	0.000 001	0.006
100 %		+30	704 000 016	7.0	0.000 001	0.010
100 %		+40	704 000 016	7.5	0.000 001	0.011
100 %		+50	704 000 017	8.5	0.000 001	0.012
Batt. Endpoint	3.300	+20	704 000 016	6.7	0.000 001	0.010



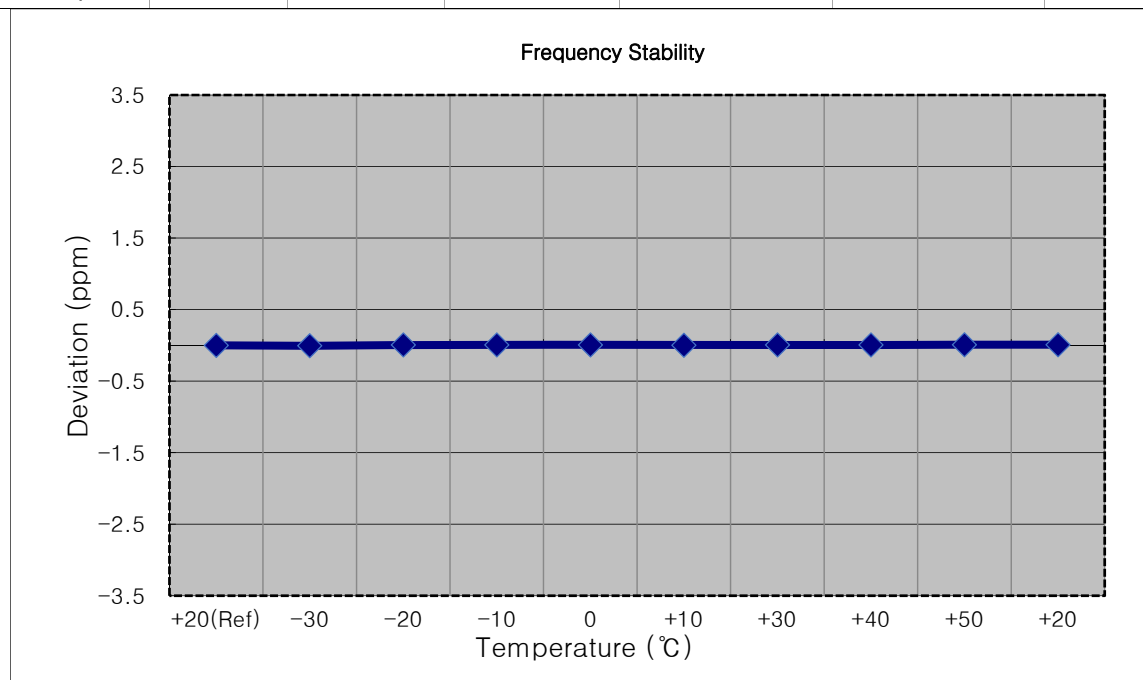
MODE: LTE B12
 OPERATING FREQUENCY: 707,500,000 Hz
 CHANNEL: 23095 (1.4 MHz)
 REFERENCE VOLTAGE: 3.880 VDC
 DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	707 499 993	0.0	0.000 000	0.000
100 %		-30	707 499 996	2.3	0.000 000	0.003
100 %		-20	707 499 997	3.5	0.000 000	0.005
100 %		-10	707 499 989	-4.6	-0.000 001	-0.007
100 %		0	707 499 996	2.6	0.000 000	0.004
100 %		+10	707 499 989	-4.5	-0.000 001	-0.006
100 %		+30	707 499 991	-2.3	0.000 000	-0.003
100 %		+40	707 499 990	-3.3	0.000 000	-0.005
100 %		+50	707 499 995	1.9	0.000 000	0.003
Batt. Endpoint		+20	707 499 997	3.1	0.000 000	0.004



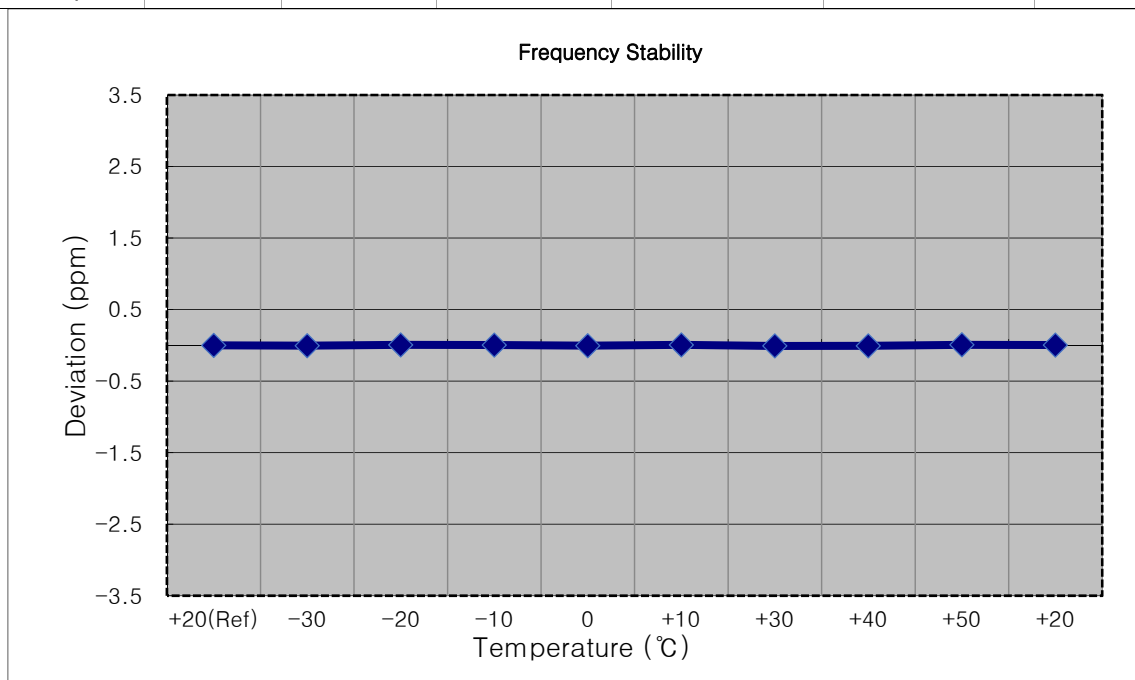
MODE: LTE B12
 OPERATING FREQUENCY: 707,500,000 Hz
 CHANNEL: 23095 (3 MHz)
 REFERENCE VOLTAGE: 3.880 VDC
 DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	707 499 997	0.0	0.000 000	0.000
100 %		-30	707 499 993	-3.8	-0.000 001	-0.005
100 %		-20	707 500 001	3.9	0.000 001	0.006
100 %		-10	707 500 001	3.9	0.000 001	0.006
100 %		0	707 500 002	5.1	0.000 001	0.007
100 %		+10	707 499 999	1.9	0.000 000	0.003
100 %		+30	707 500 002	4.7	0.000 001	0.007
100 %		+40	707 500 001	4.0	0.000 001	0.006
100 %		+50	707 500 003	5.6	0.000 001	0.008
Batt. Endpoint	3.300	+20	707 500 004	6.7	0.000 001	0.009



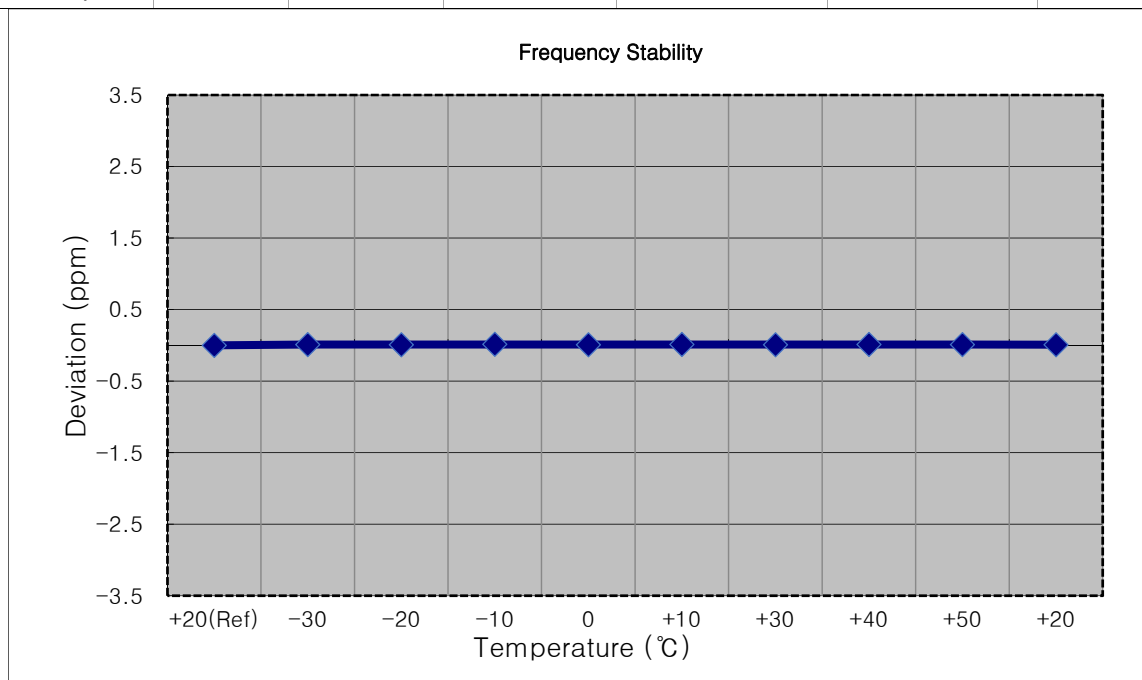
MODE:	<u>LTE B12</u>
OPERATING FREQUENCY:	<u>707,500,000 Hz</u>
CHANNEL:	<u>23095 (5 MHz)</u>
REFERENCE VOLTAGE:	<u>3.880 VDC</u>
DEVIATION LIMIT:	<u>Emission must remain in band</u>

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	707 500 005	0.0	0.000 000	0.000
100 %		-30	707 500 002	-2.9	0.000 000	-0.004
100 %		-20	707 500 009	4.2	0.000 001	0.006
100 %		-10	707 500 007	2.7	0.000 000	0.004
100 %		0	707 500 001	-3.3	0.000 000	-0.005
100 %		+10	707 500 009	3.9	0.000 001	0.006
100 %		+30	707 499 999	-5.5	-0.000 001	-0.008
100 %		+40	707 499 999	-5.3	-0.000 001	-0.007
100 %		+50	707 500 011	5.9	0.000 001	0.008
Batt. Endpoint	3.300	+20	707 500 007	2.1	0.000 000	0.003



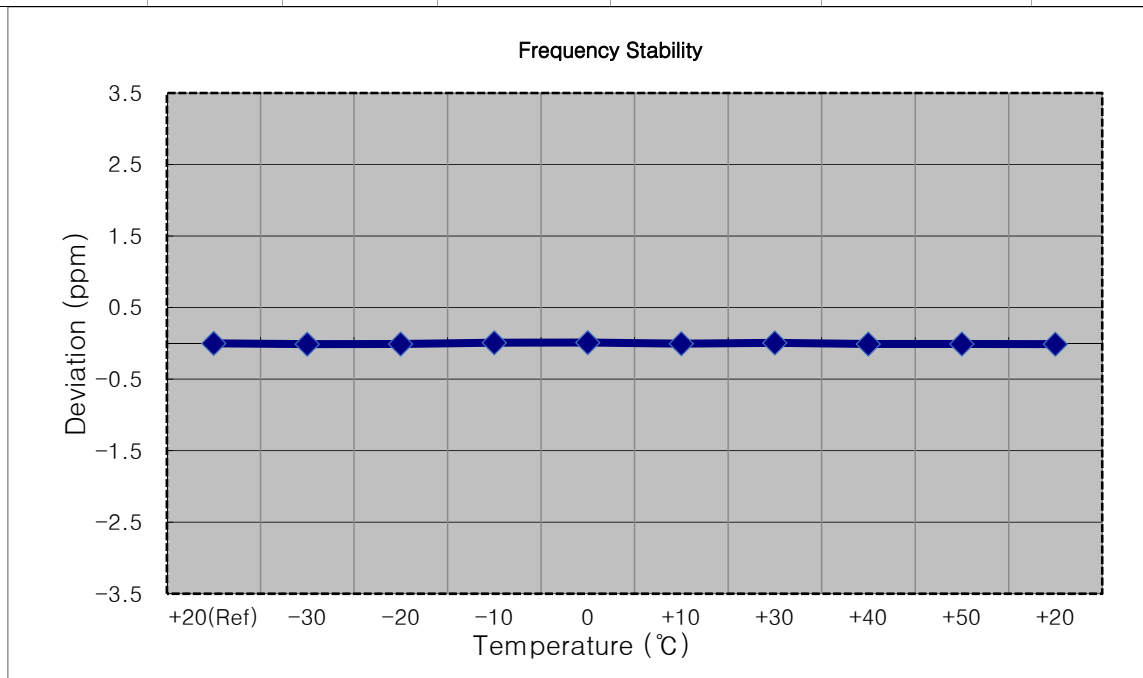
■ MODE: LTE B12
 ■ OPERATING FREQUENCY: 707,500,000 Hz
 ■ CHANNEL: 23095 (10 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	707 500 007	0.0	0.000 000	0.000
100 %		-30	707 500 014	7.8	0.000 001	0.011
100 %		-20	707 500 012	5.3	0.000 001	0.007
100 %		-10	707 500 017	10.3	0.000 001	0.015
100 %		0	707 500 013	6.1	0.000 001	0.009
100 %		+10	707 500 016	9.2	0.000 001	0.013
100 %		+30	707 500 013	6.8	0.000 001	0.010
100 %		+40	707 500 016	9.2	0.000 001	0.013
100 %		+50	707 500 014	6.9	0.000 001	0.010
Batt. Endpoint	3.300	+20	707 500 012	5.8	0.000 001	0.008



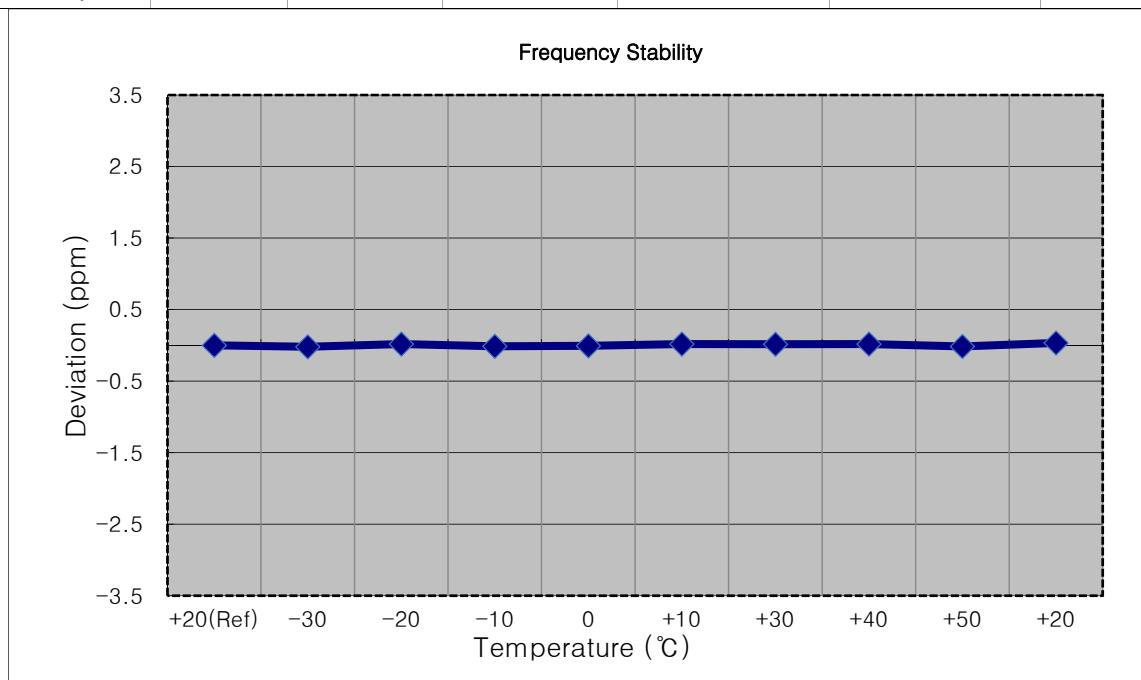
MODE: LTE B12
 OPERATING FREQUENCY: 715,300,000 Hz
 CHANNEL: 23173 (1.4 MHz)
 REFERENCE VOLTAGE: 3.880 VDC
 DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	715 300 003	0.0	0.000 000	0.000
100 %		-30	715 299 996	-7.5	-0.000 001	-0.010
100 %		-20	715 299 997	-5.9	-0.000 001	-0.008
100 %		-10	715 300 009	5.5	0.000 001	0.008
100 %		0	715 300 011	8.0	0.000 001	0.011
100 %		+10	715 300 000	-3.5	0.000 000	-0.005
100 %		+30	715 300 008	4.8	0.000 001	0.007
100 %		+40	715 299 996	-7.3	-0.000 001	-0.010
100 %		+50	715 299 997	-6.0	-0.000 001	-0.008
Batt. Endpoint		+20	715 299 995	-8.3	-0.000 001	-0.012



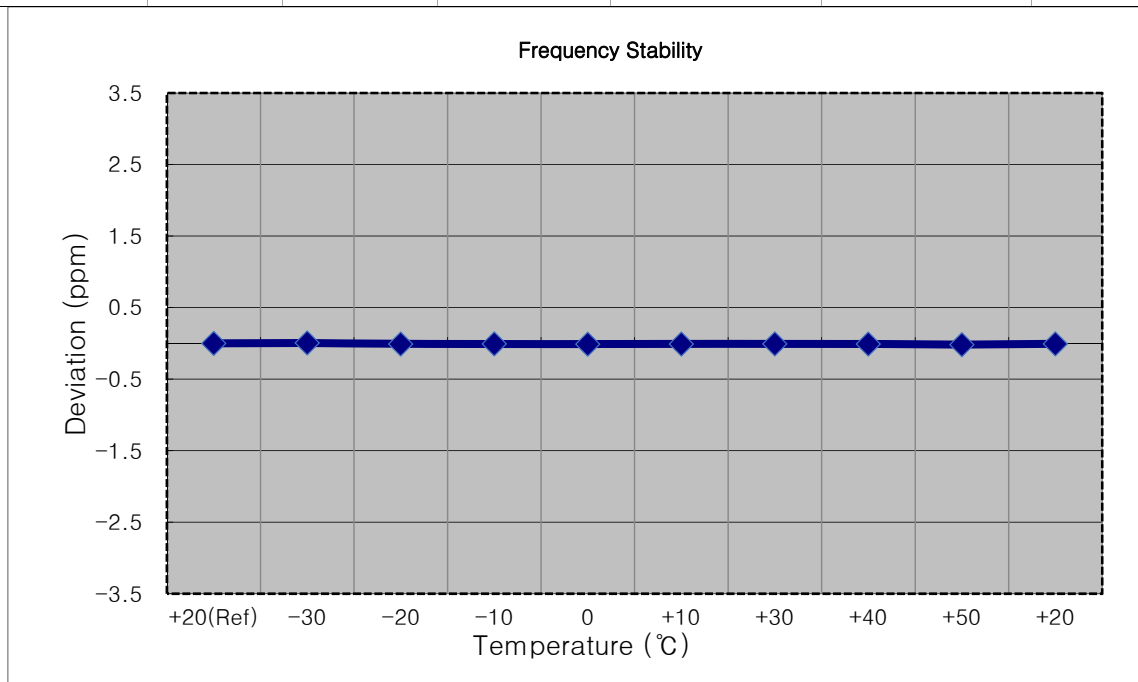
MODE: LTE B12
 OPERATING FREQUENCY: 714,500,000 Hz
 CHANNEL: 23165 (3 MHz)
 REFERENCE VOLTAGE: 3.880 VDC
 DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	714 500 008	0.0	0.000 000	0.000
100 %		-30	714 499 994	-14.4	-0.000 002	-0.020
100 %		-20	714 500 021	12.3	0.000 002	0.017
100 %		-10	714 499 999	-9.3	-0.000 001	-0.013
100 %		0	714 500 003	-5.6	-0.000 001	-0.008
100 %		+10	714 500 022	13.3	0.000 002	0.019
100 %		+30	714 500 019	11.1	0.000 002	0.016
100 %		+40	714 500 020	12.0	0.000 002	0.017
100 %		+50	714 499 997	-11.3	-0.000 002	-0.016
Batt. Endpoint	3.300	+20	714 500 032	24.0	0.000 003	0.034



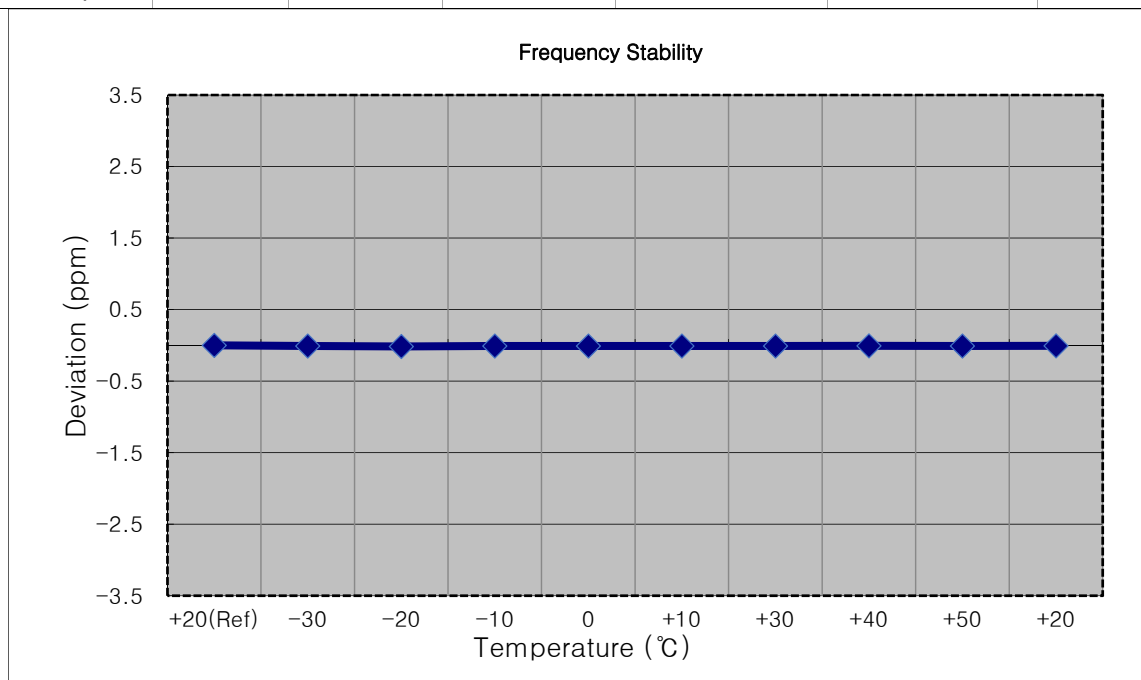
MODE: LTE B12
 OPERATING FREQUENCY: 713,500,000 Hz
 CHANNEL: 23155 (5 MHz)
 REFERENCE VOLTAGE: 3.880 VDC
 DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	3.880	+20(Ref)	713 499 995	0.0	0.000 000	0.000
100 %		-30	713 499 999	4.1	0.000 001	0.006
100 %		-20	713 499 988	-6.9	-0.000 001	-0.010
100 %		-10	713 499 990	-5.6	-0.000 001	-0.008
100 %		0	713 499 987	-8.6	-0.000 001	-0.012
100 %		+10	713 499 989	-6.3	-0.000 001	-0.009
100 %		+30	713 499 990	-5.7	-0.000 001	-0.008
100 %		+40	713 499 988	-7.0	-0.000 001	-0.010
100 %		+50	713 499 983	-12.3	-0.000 002	-0.017
Batt. Endpoint	3.300	+20	713 499 990	-5.7	-0.000 001	-0.008



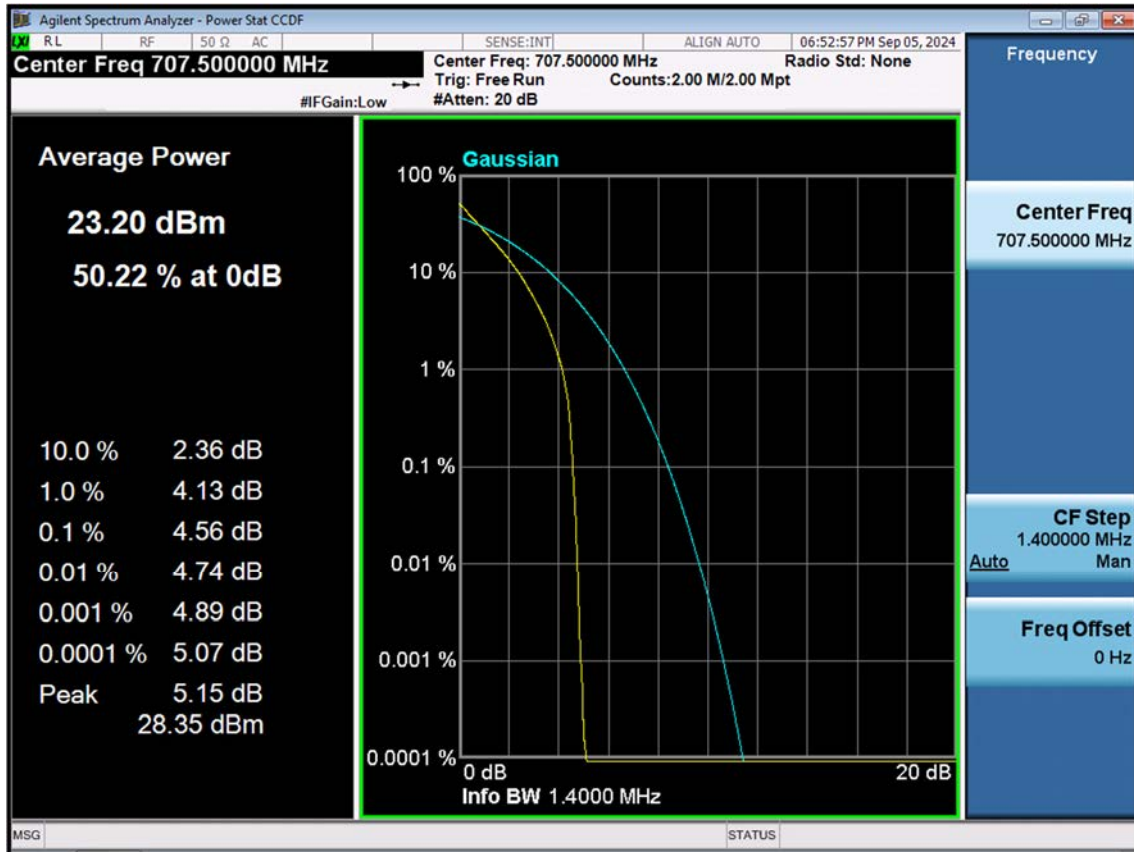
MODE: LTE B12
 OPERATING FREQUENCY: 711,000,000 Hz
 CHANNEL: 23130 (10 MHz)
 REFERENCE VOLTAGE: 3.880 VDC
 DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	710 999 992	0.0	0.000 000	0.000
100 %		-30	710 999 986	-6.5	-0.000 001	-0.009
100 %		-20	710 999 981	-10.7	-0.000 002	-0.015
100 %		-10	710 999 986	-6.3	-0.000 001	-0.009
100 %		0	710 999 986	-6.6	-0.000 001	-0.009
100 %		+10	710 999 986	-6.4	-0.000 001	-0.009
100 %		+30	710 999 986	-6.3	-0.000 001	-0.009
100 %		+40	710 999 987	-5.1	-0.000 001	-0.007
100 %		+50	710 999 986	-6.0	-0.000 001	-0.008
Batt. Endpoint	3.300	+20	710 999 986	-5.8	-0.000 001	-0.008

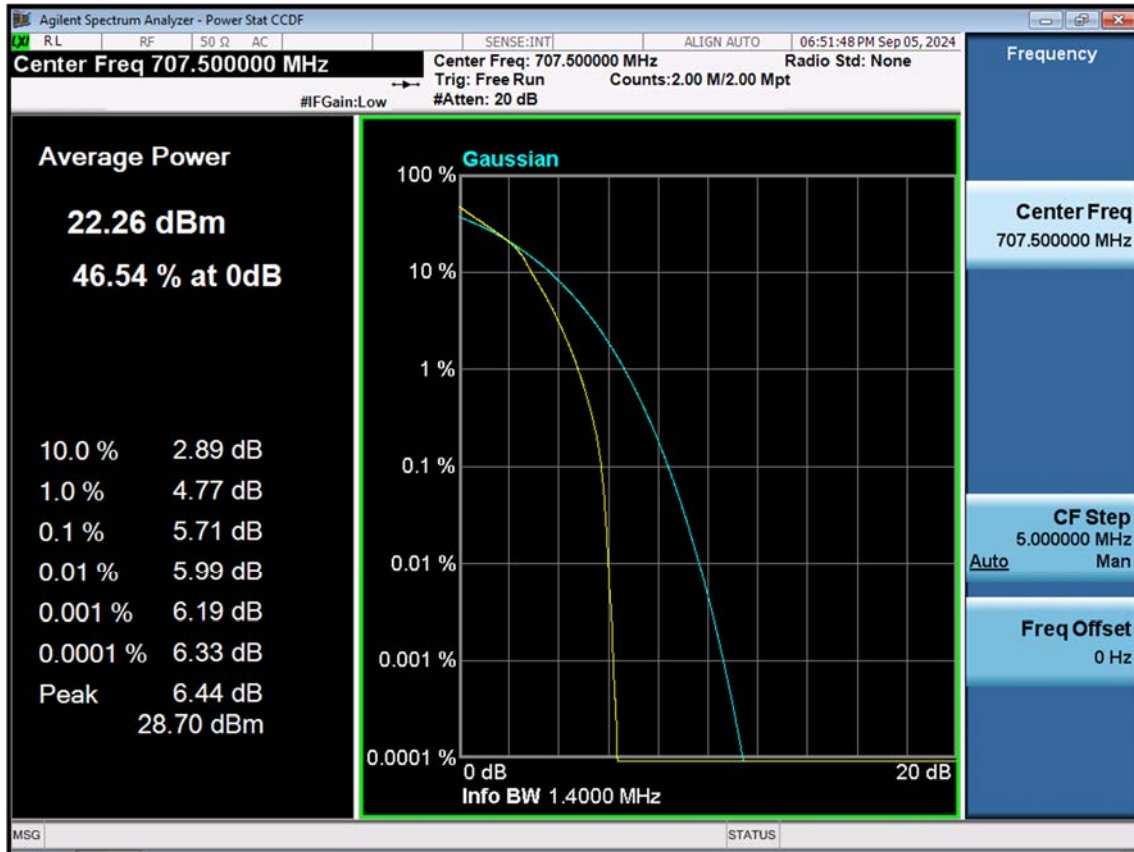


10. TEST PLOTS(Main 1 ANT)

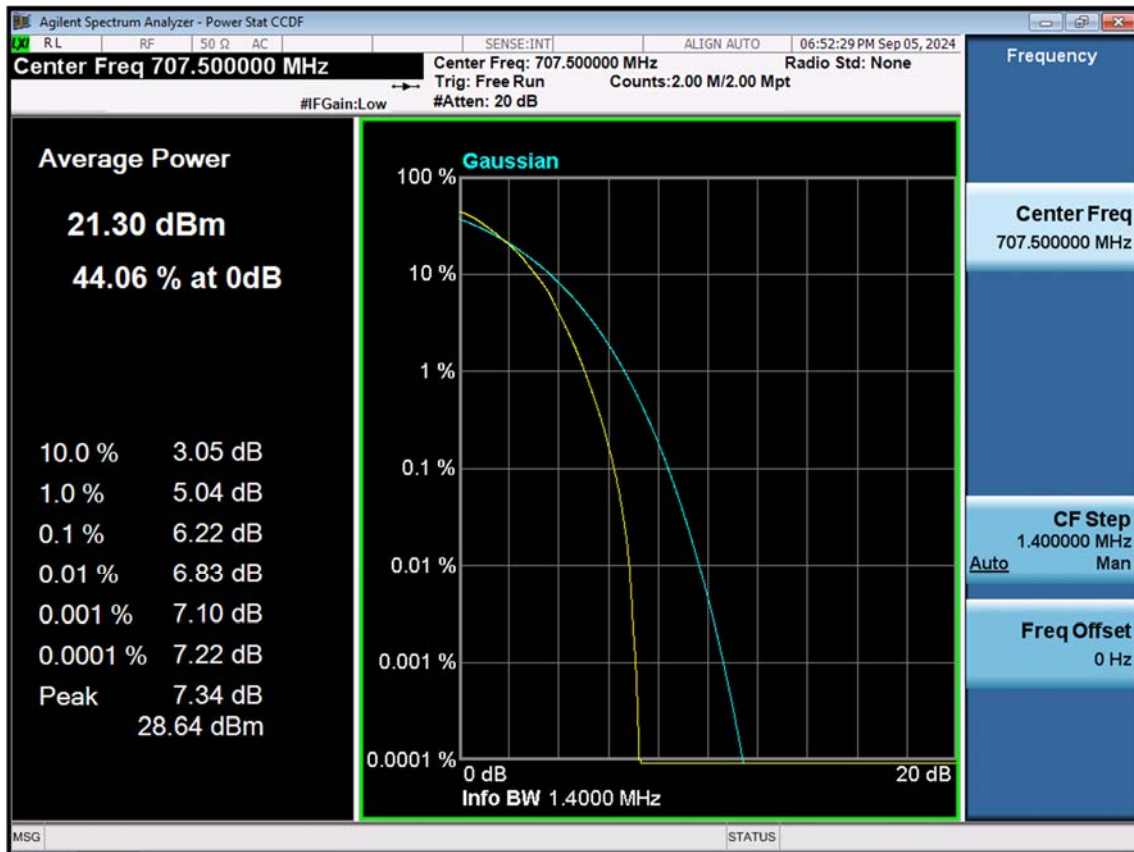
LTE B12_1.4M_PAR_Mid_QPSK_FullRB



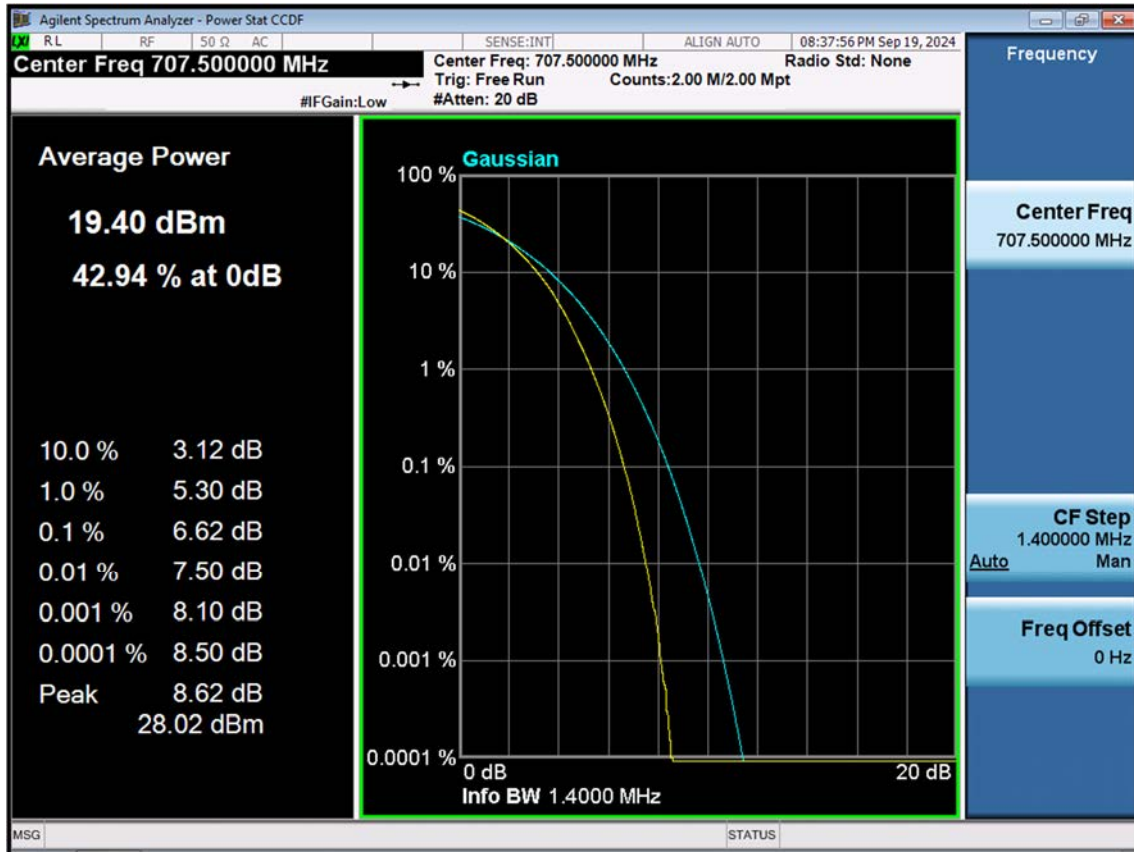
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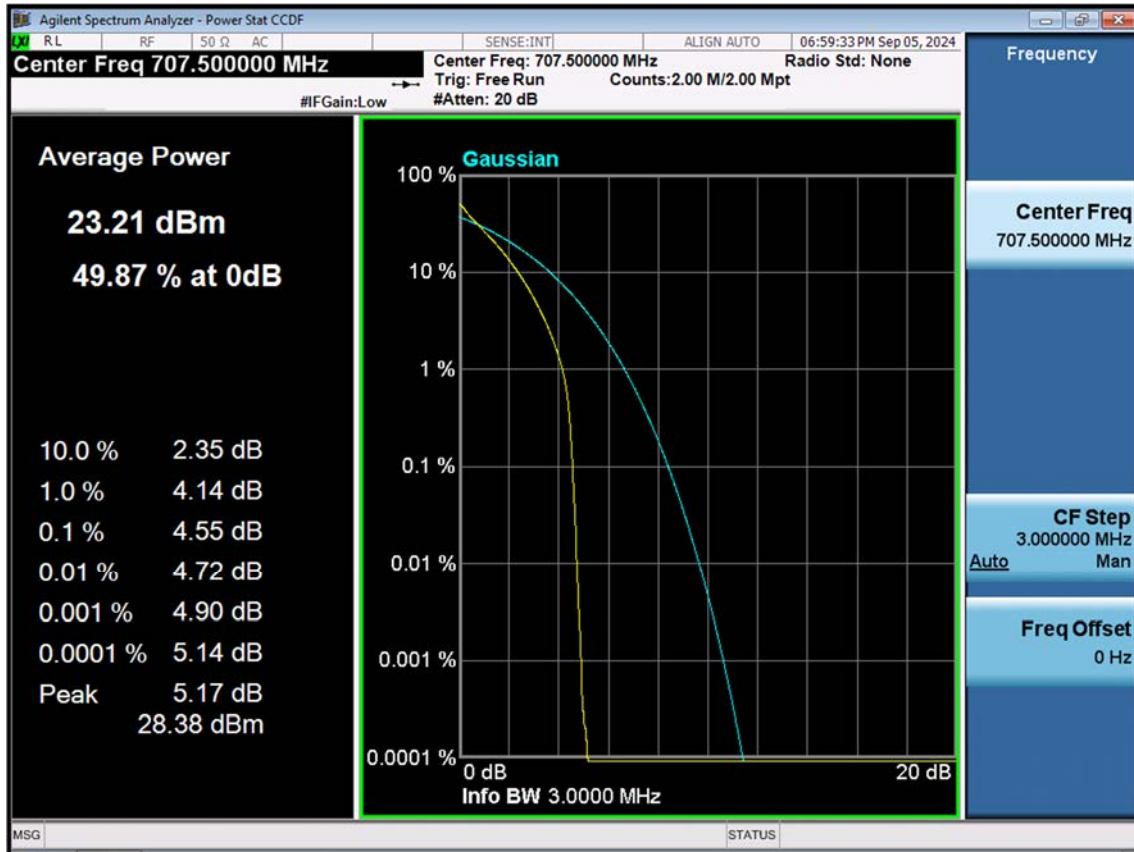
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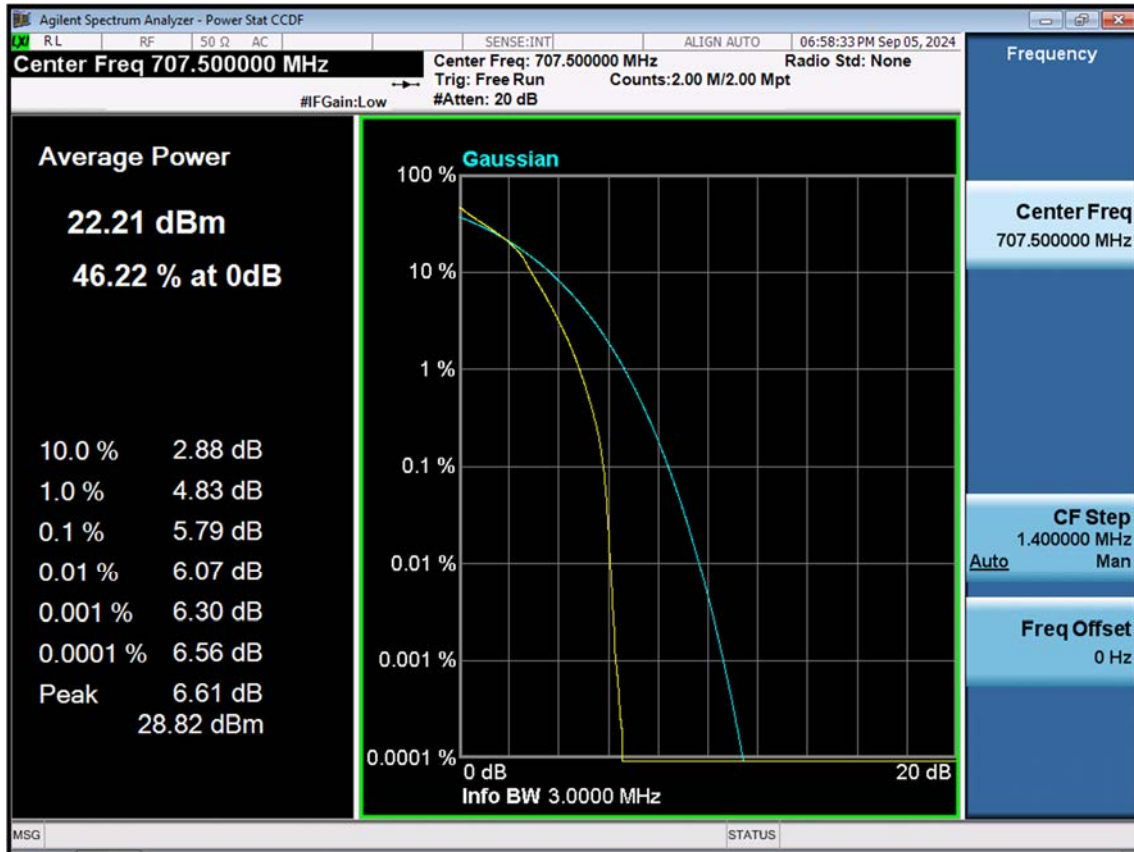
LTE B12_1.4M_PAR_Mid_256QAM_FullRB



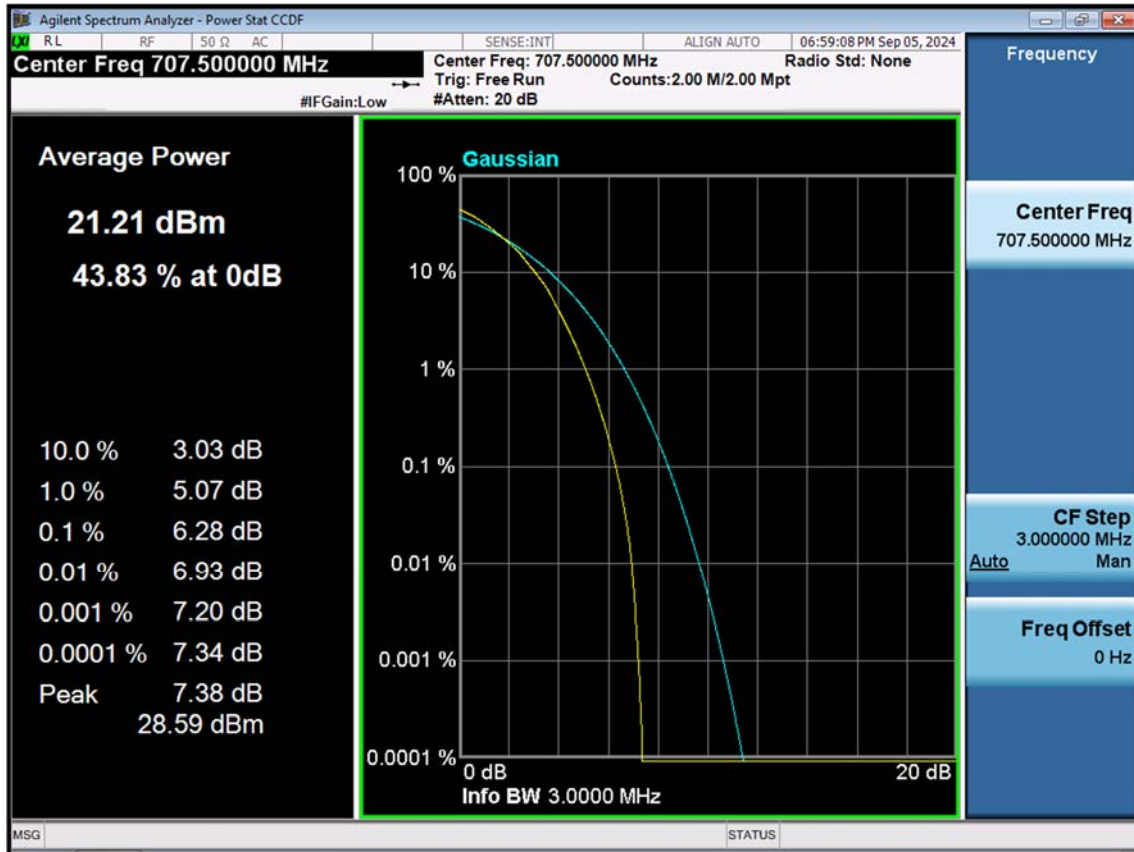
LTE B12_3 M_PAR_Mid_QPSK_FullRB



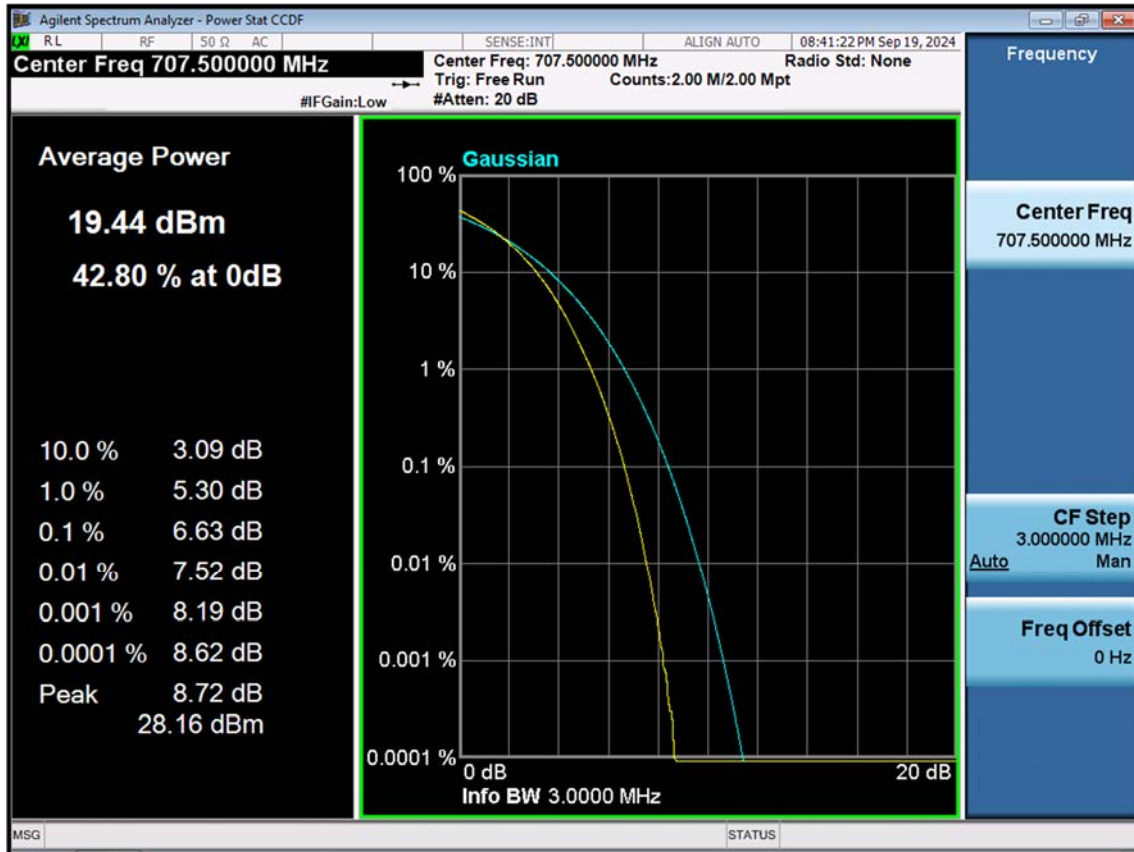
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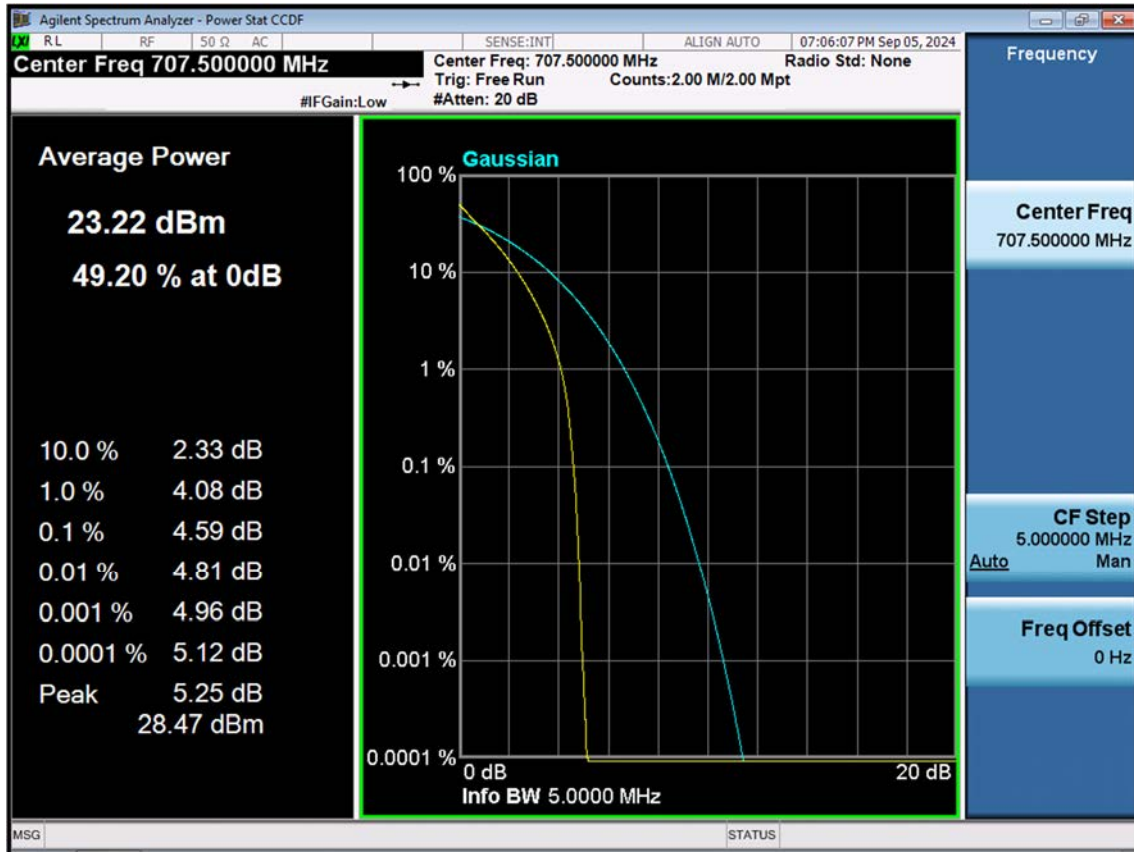
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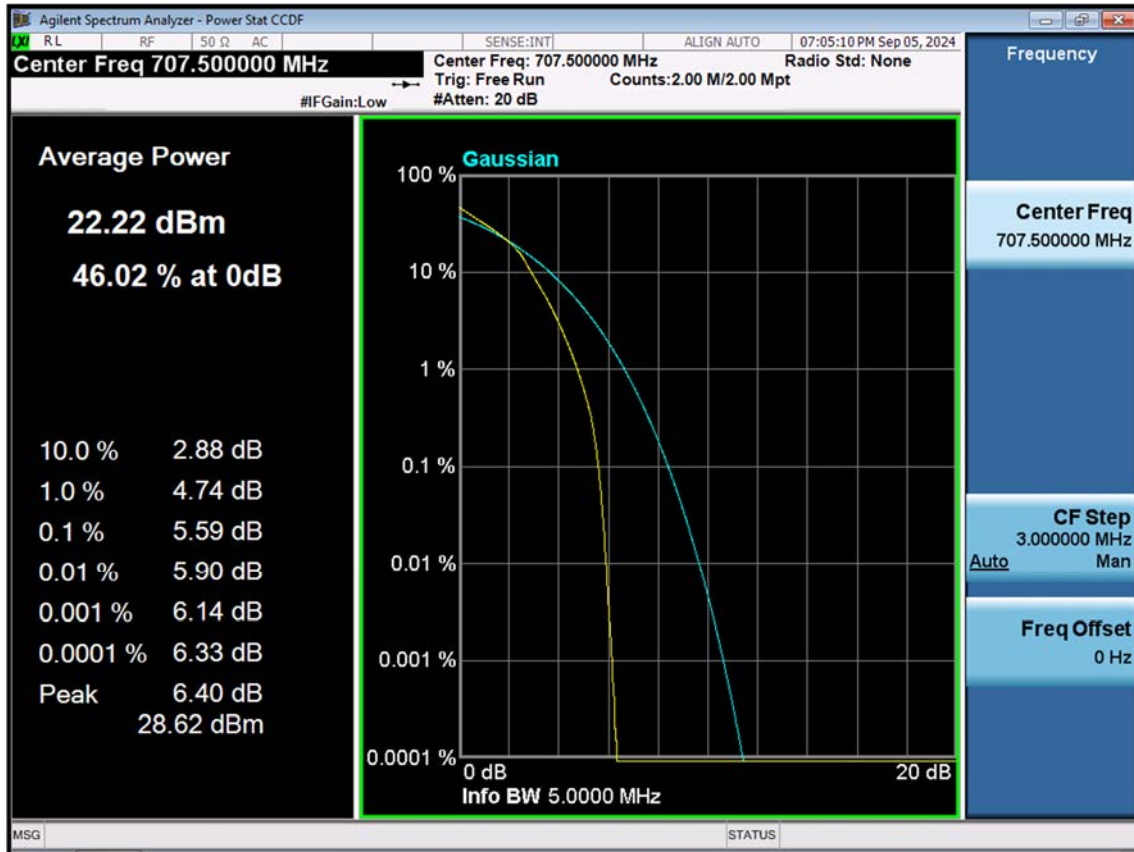
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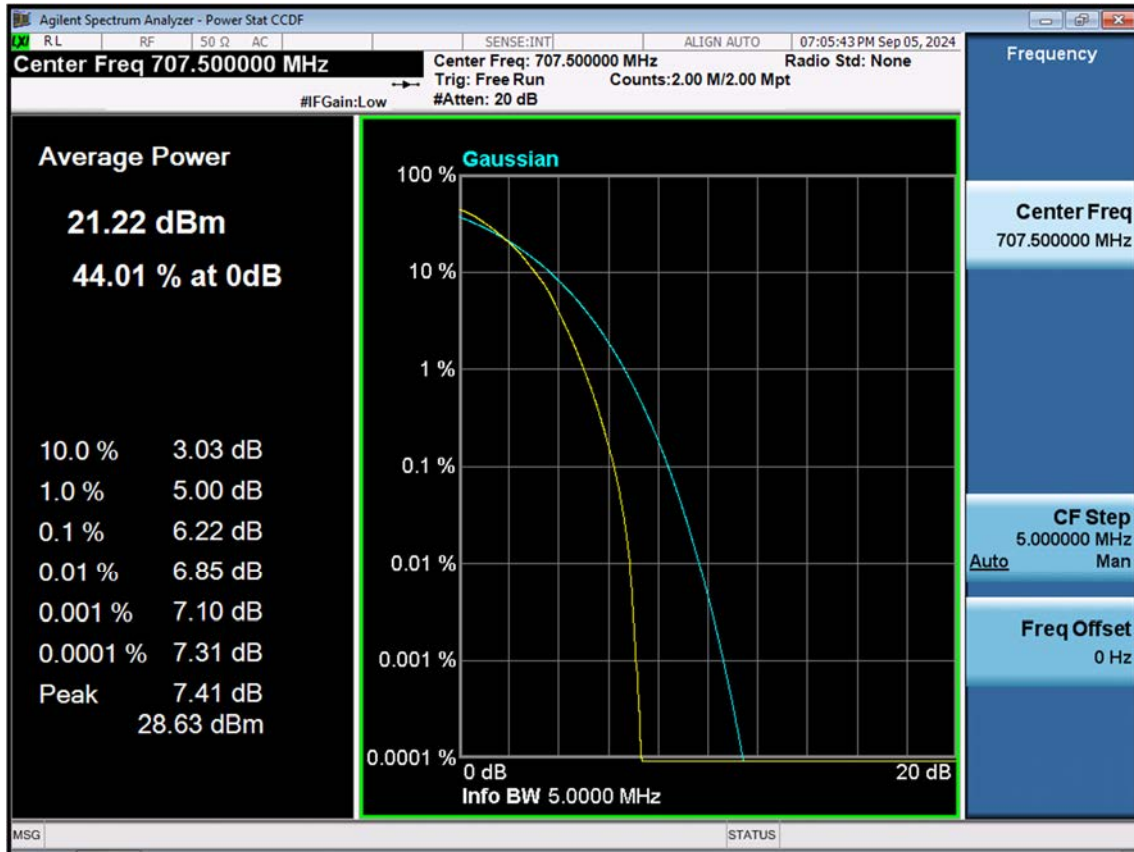
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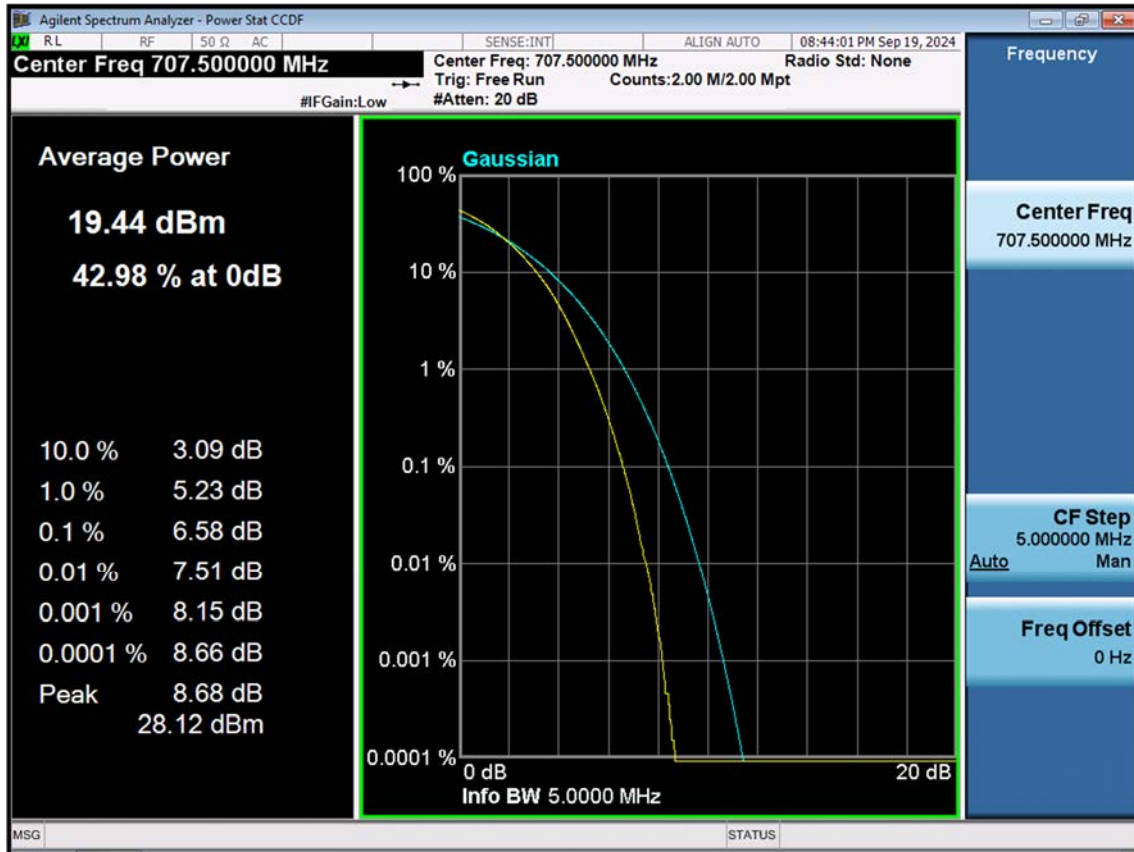
LTE B12_5 M_PAR_Mid_16QAM_FullRB



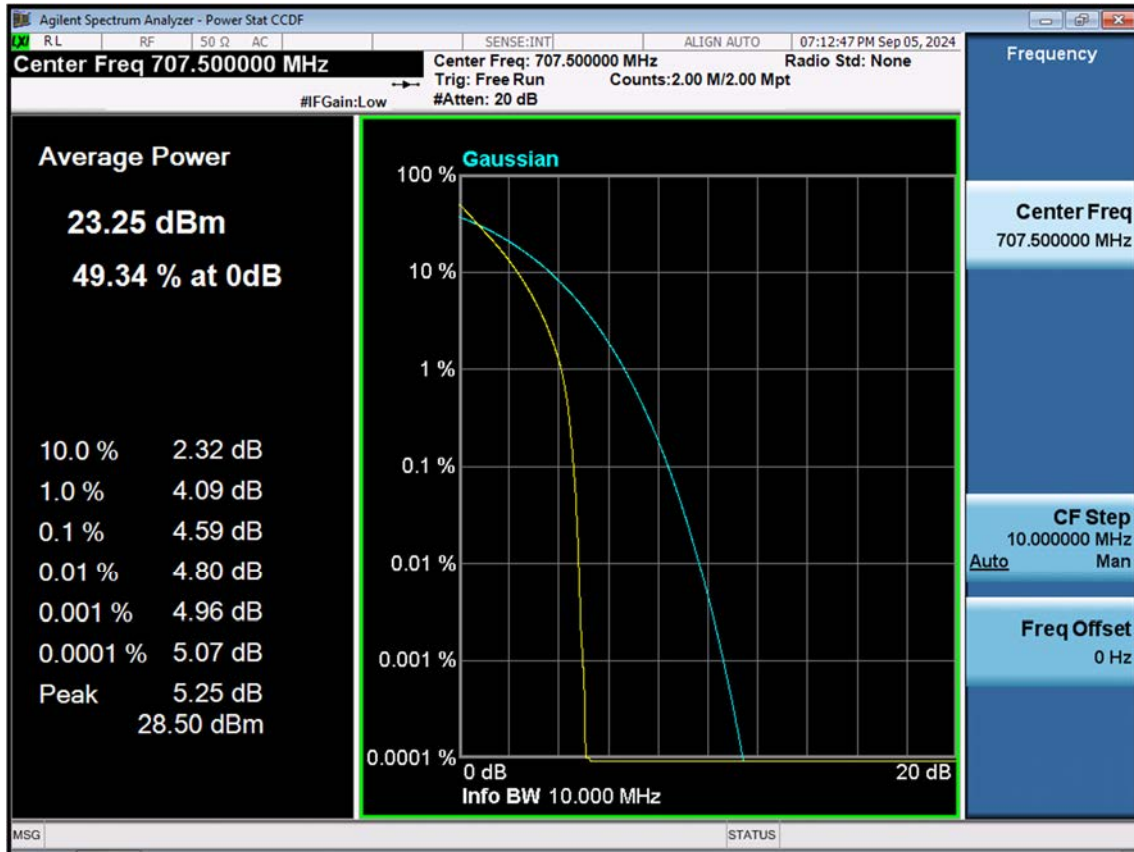
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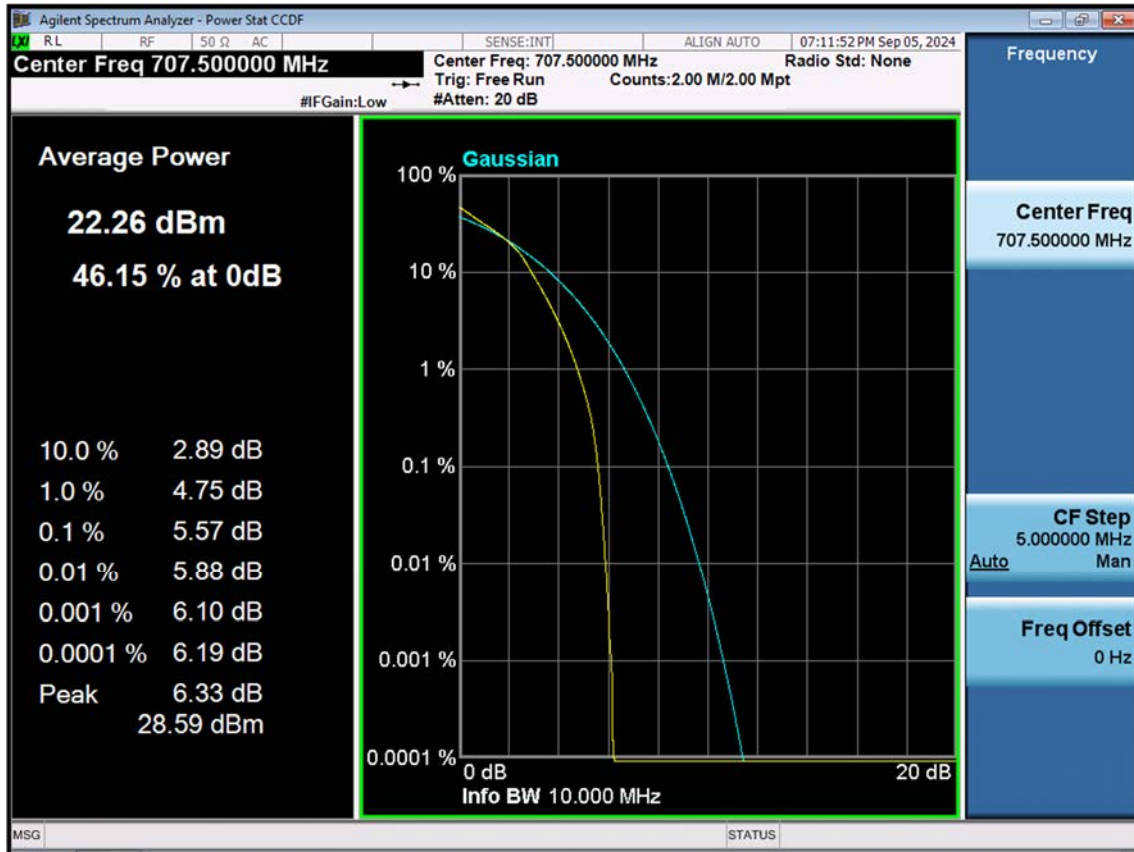
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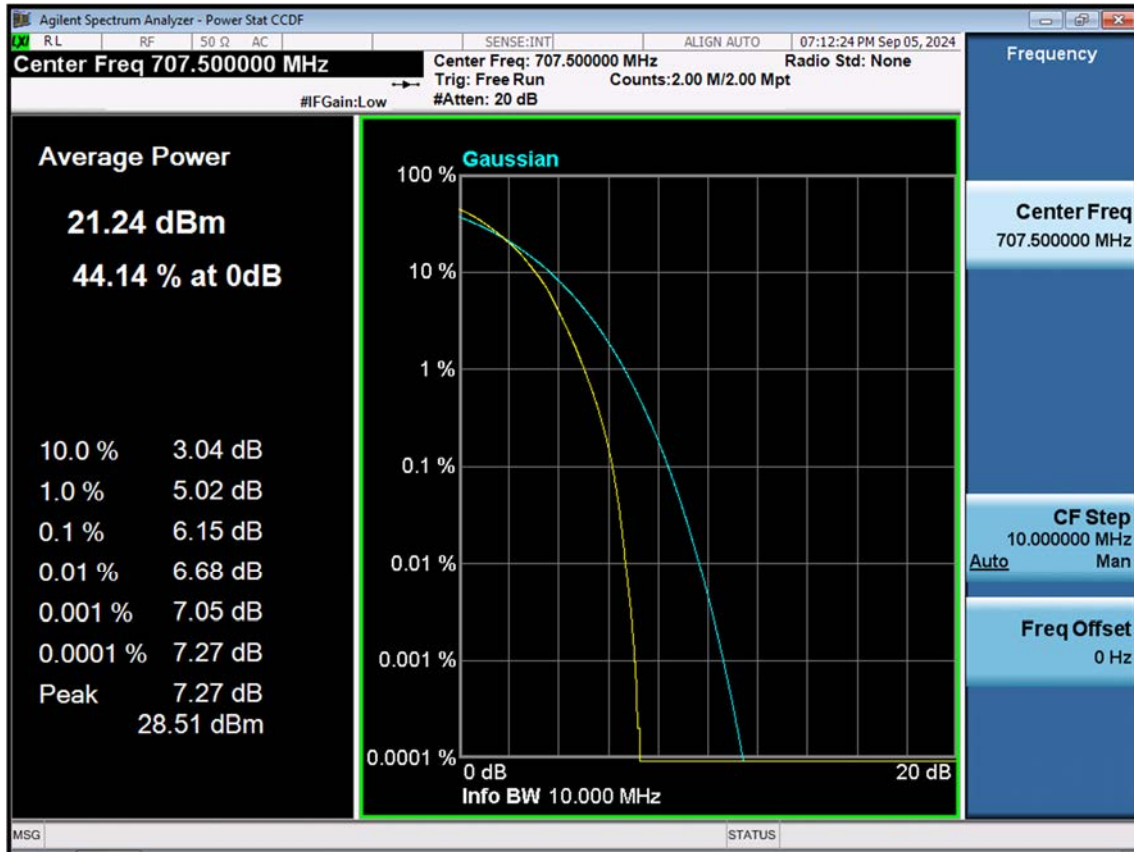
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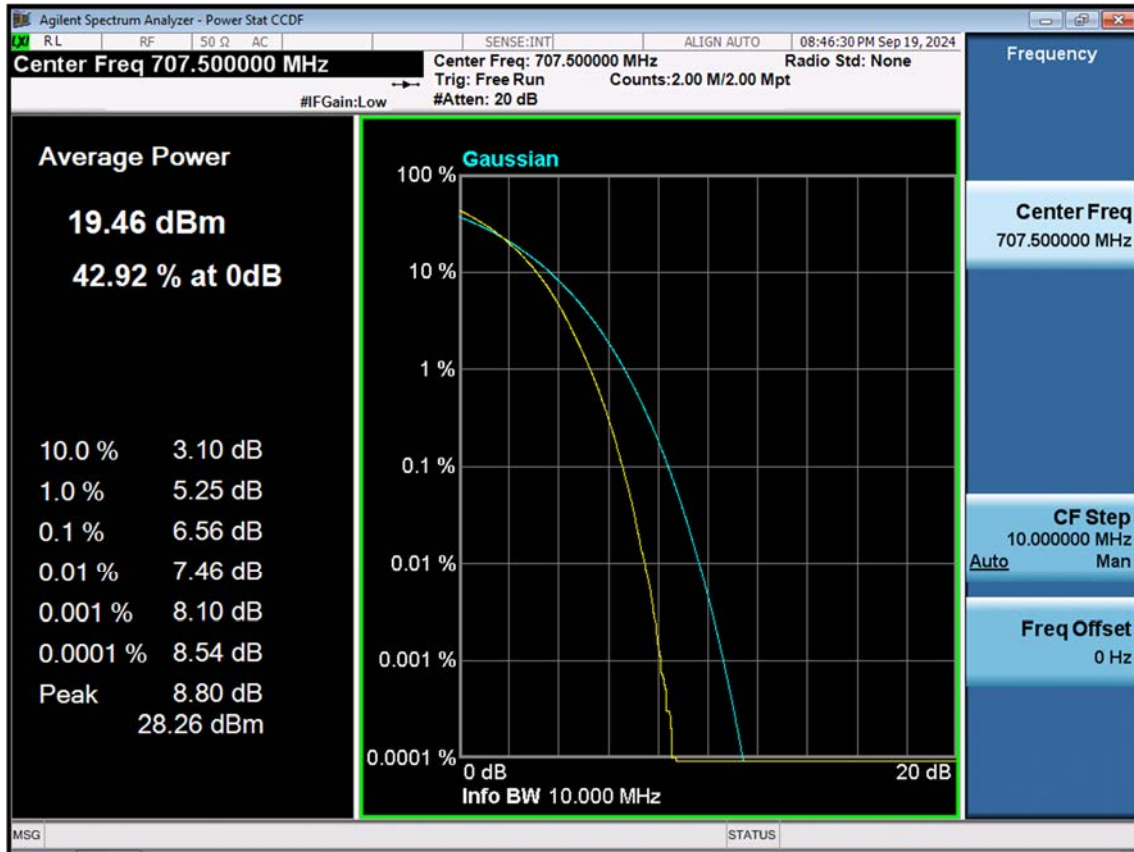
LTE B12_10 M_PAR_Mid_16QAM_FullRB



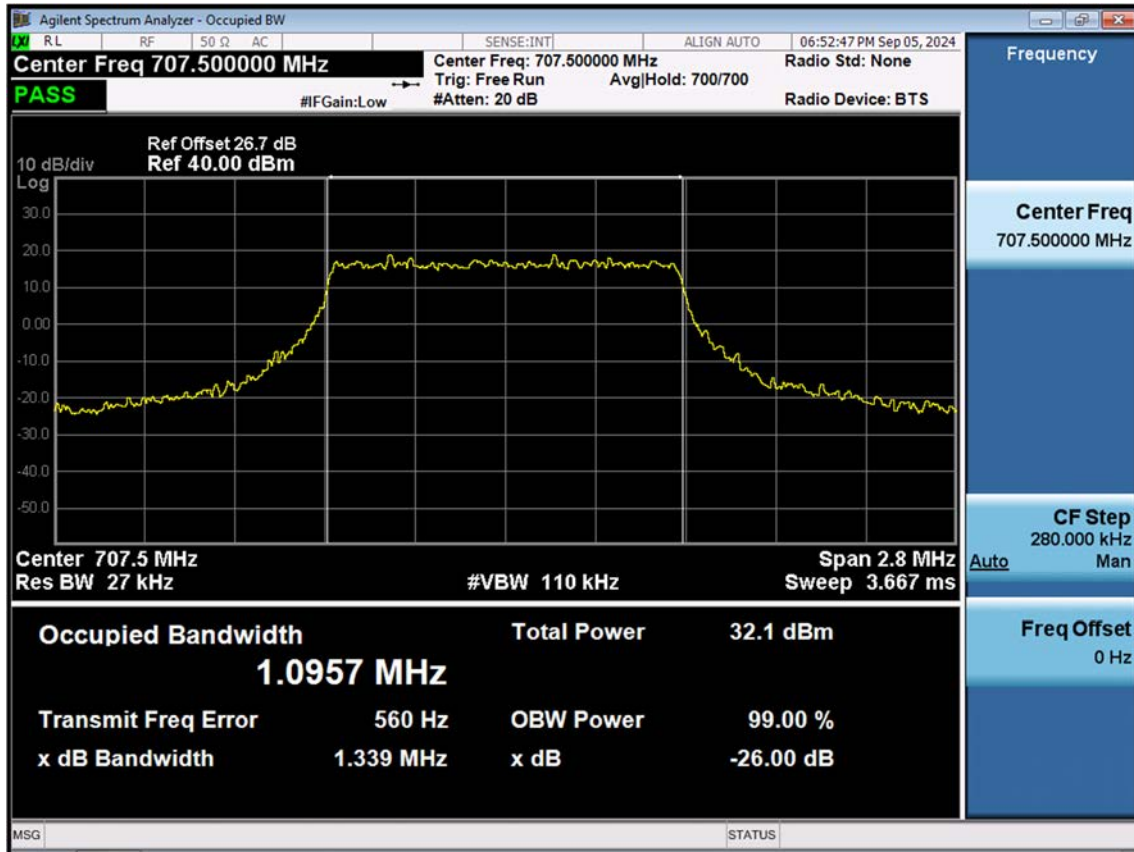
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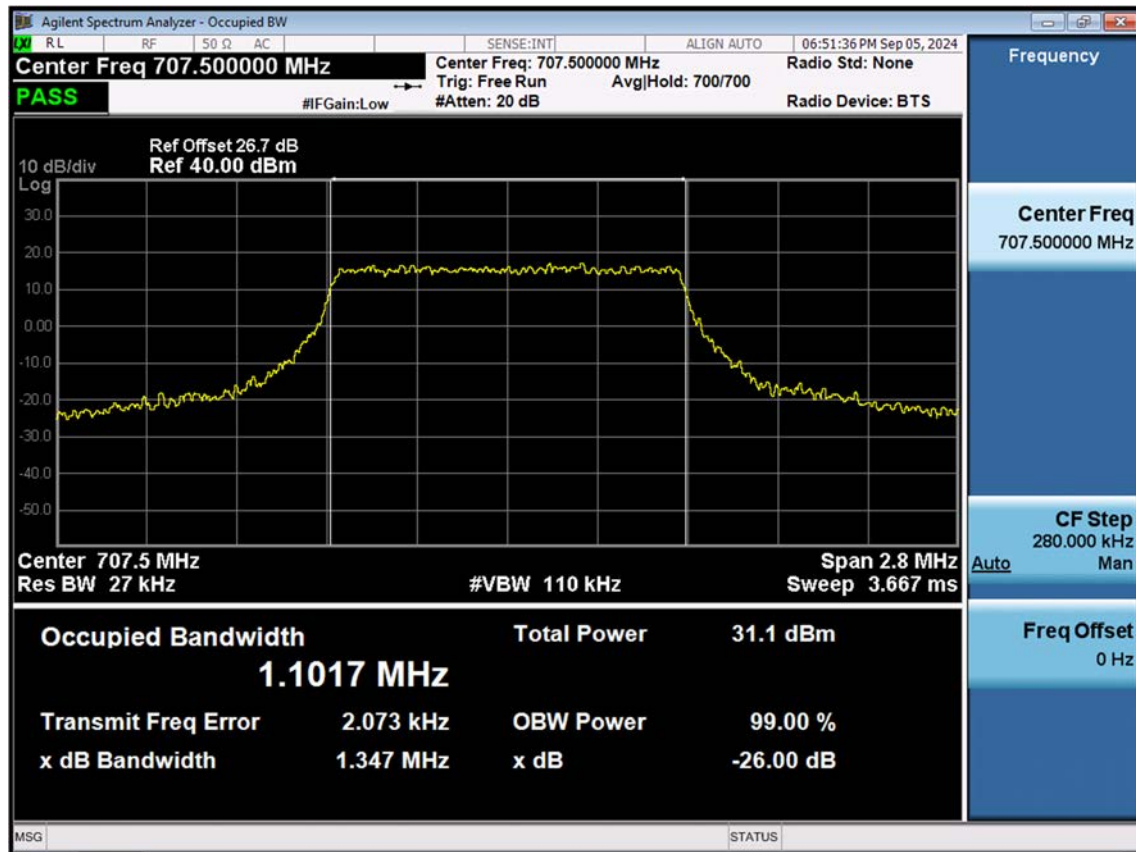
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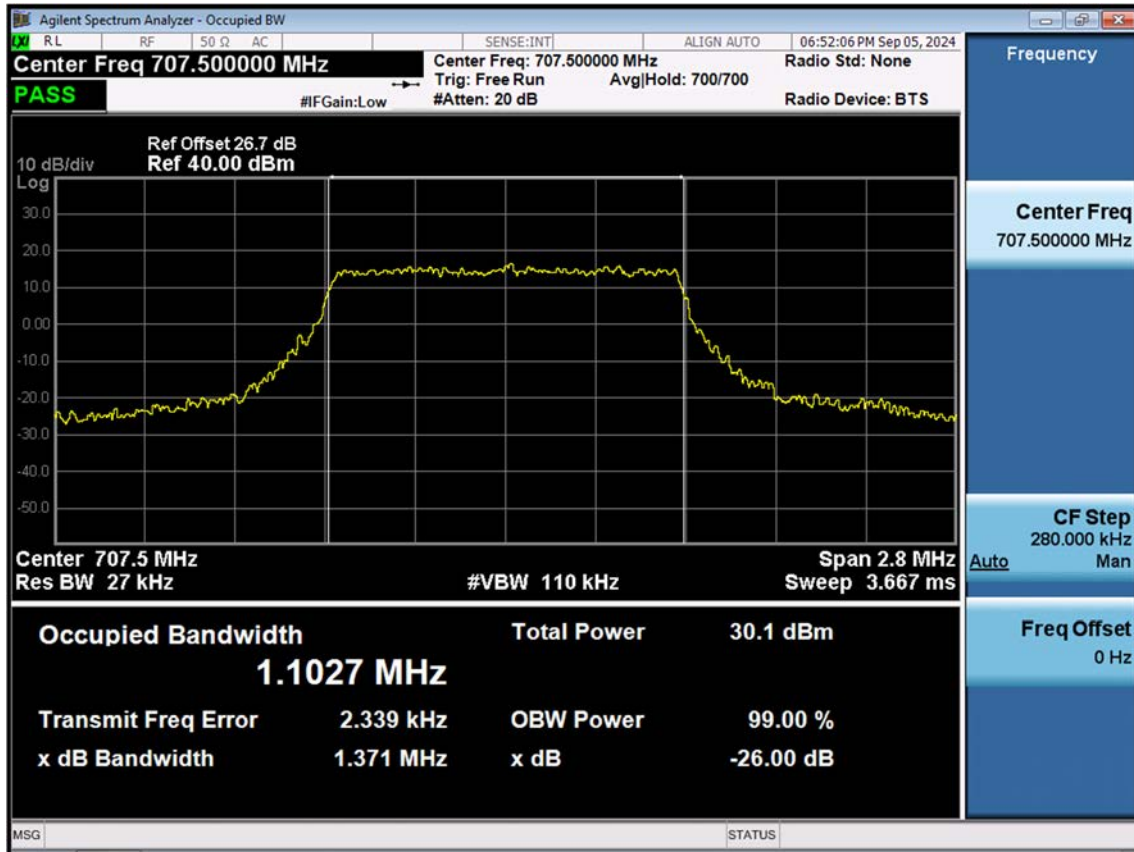
LTE B12_1.4M_OBW_Mid_QPSK_FullRB



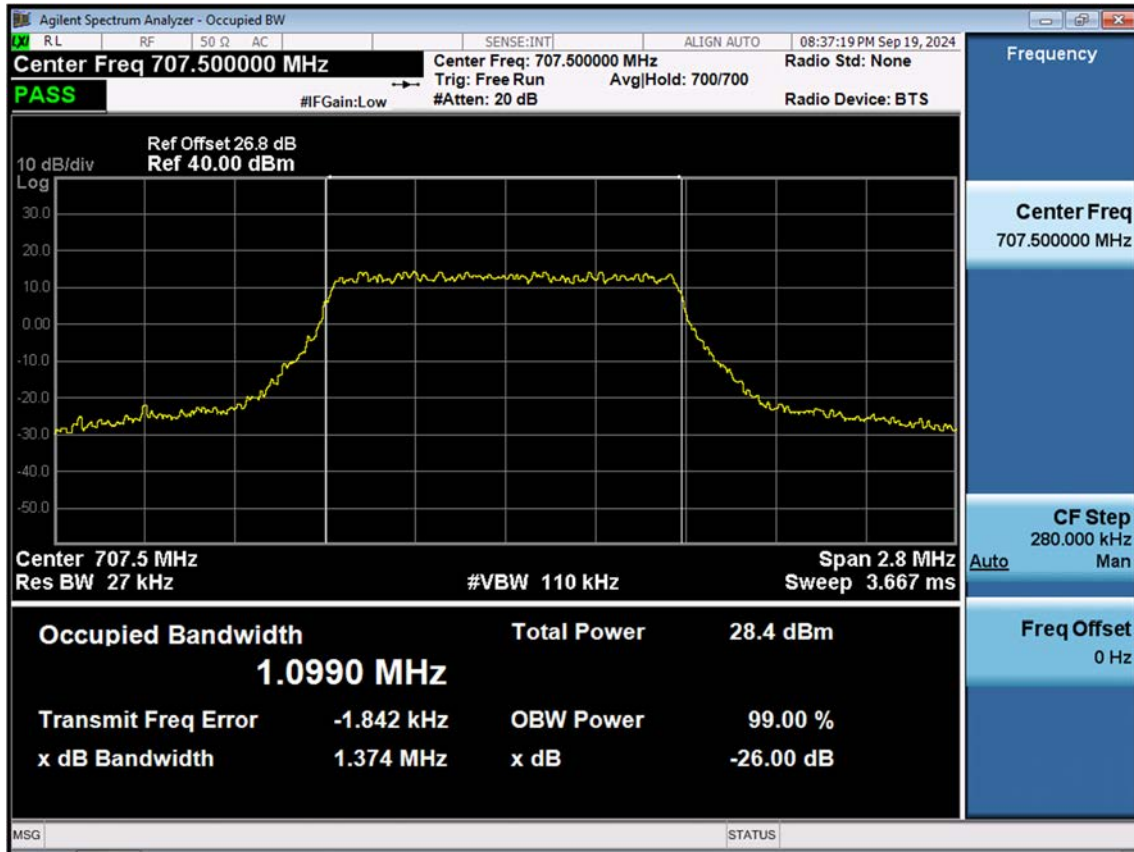
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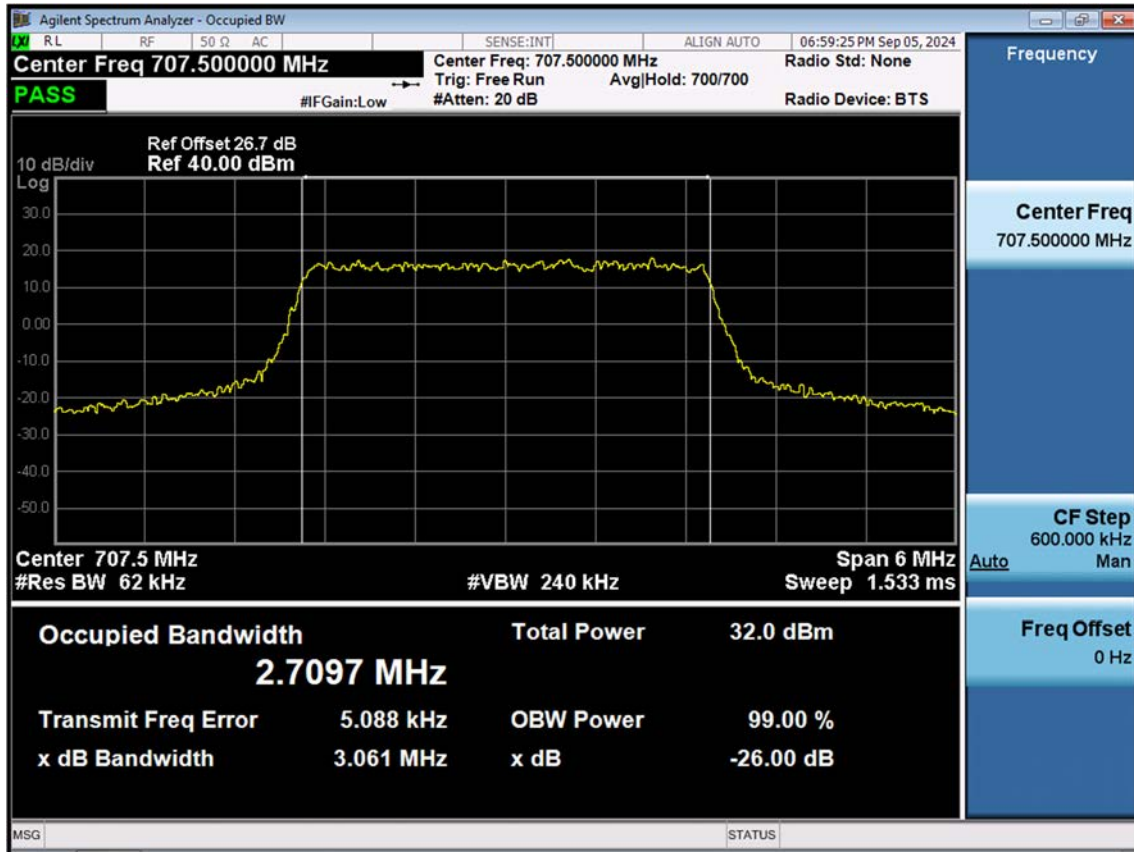
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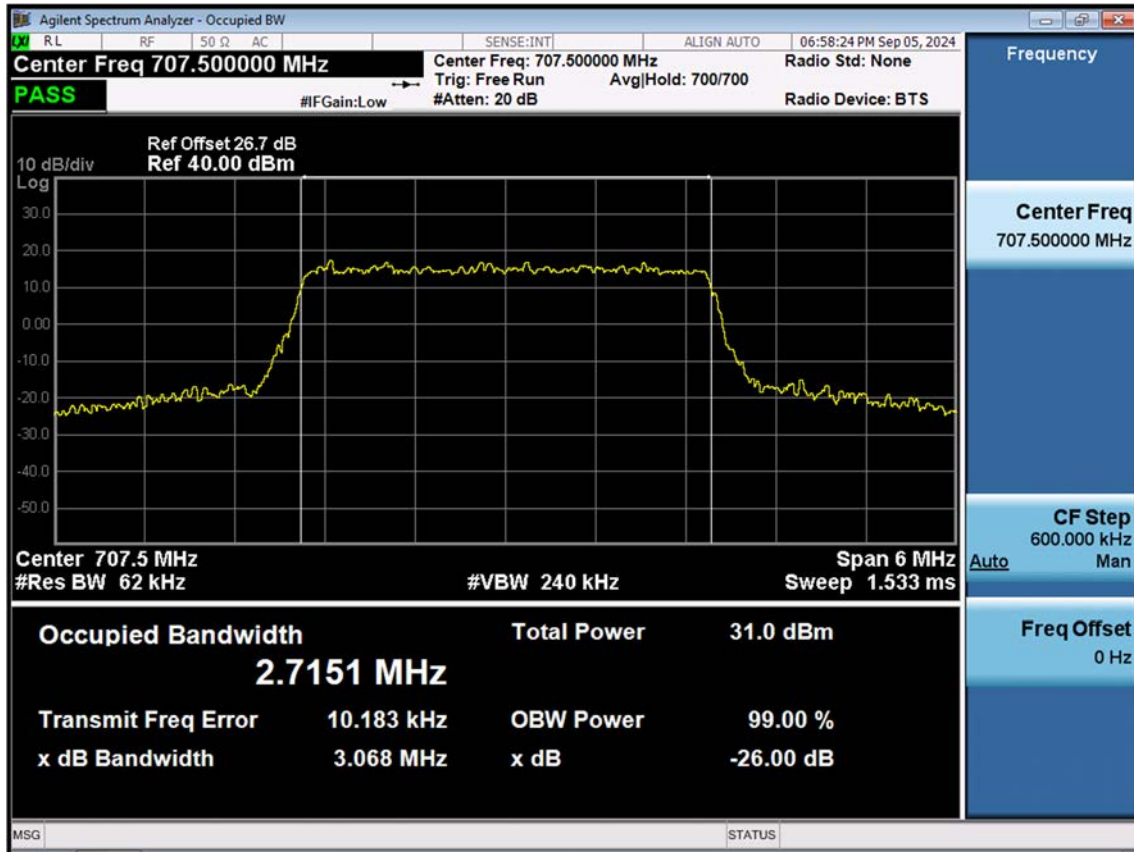
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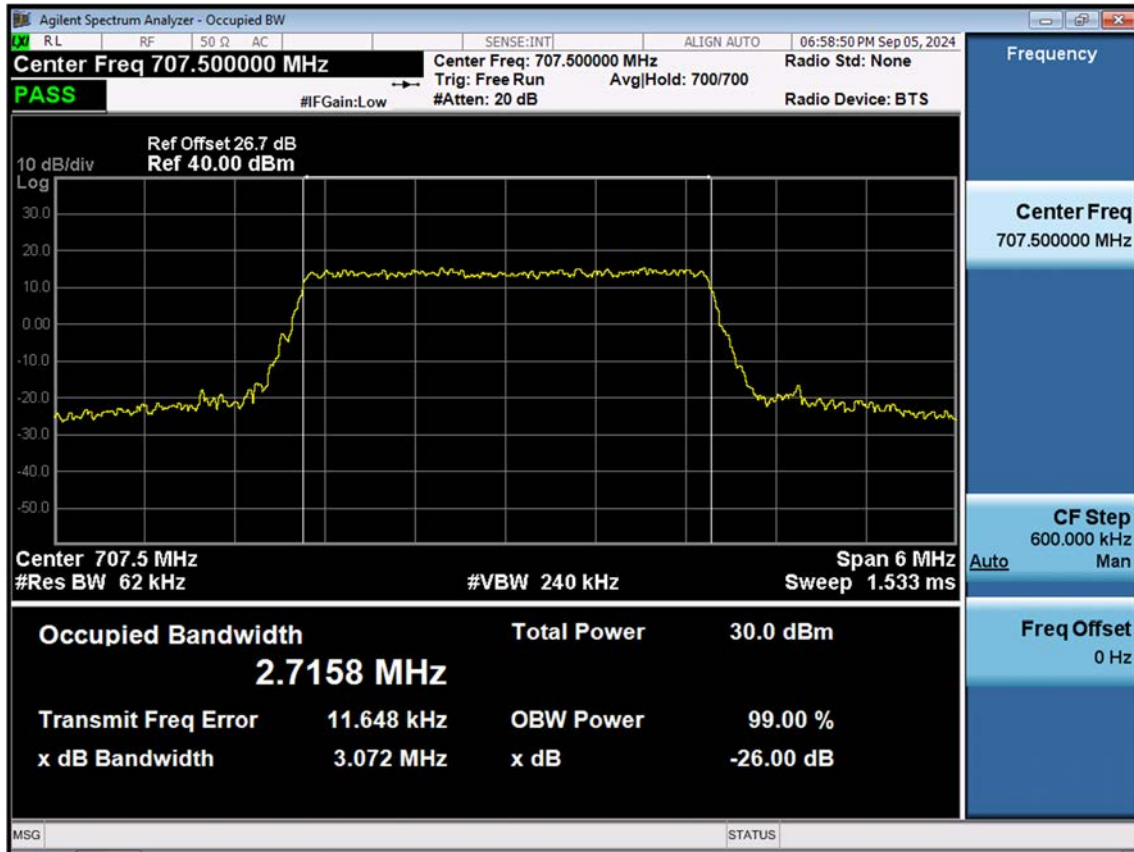
LTE B12_3 M_OBW_Mid_QPSK_FullRB



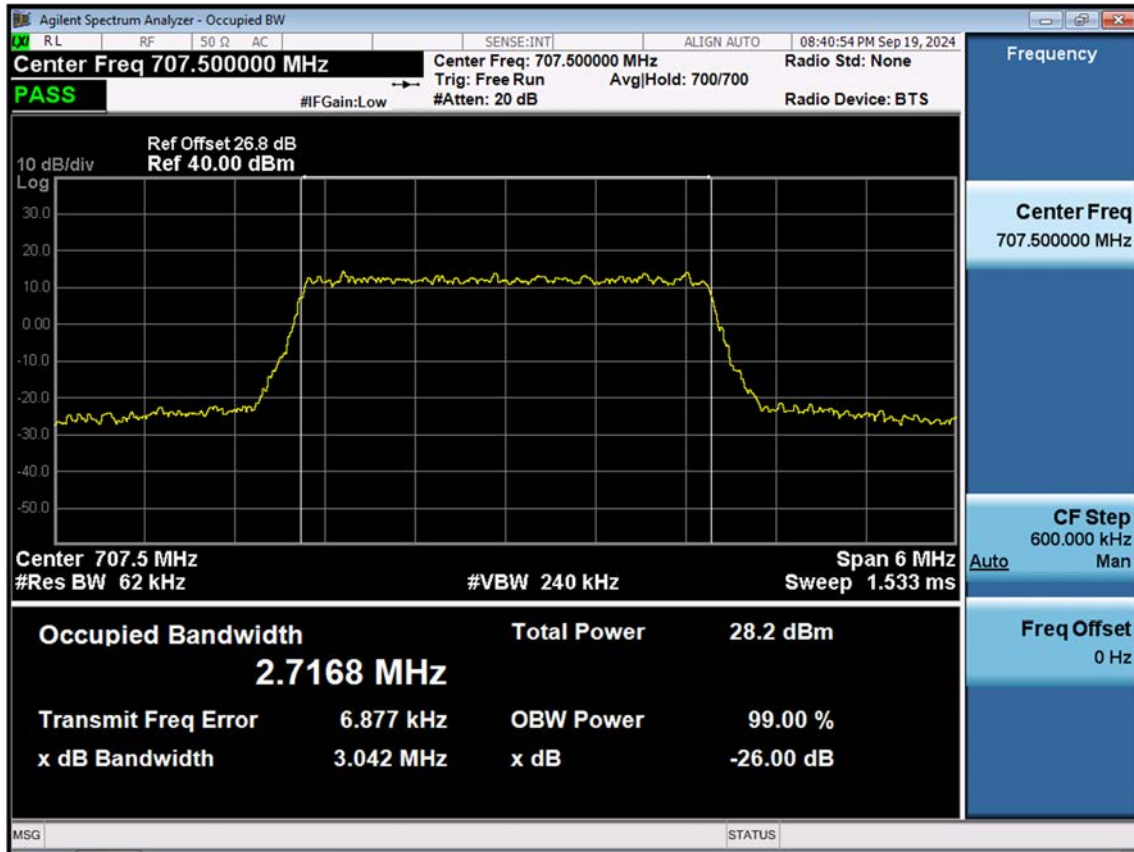
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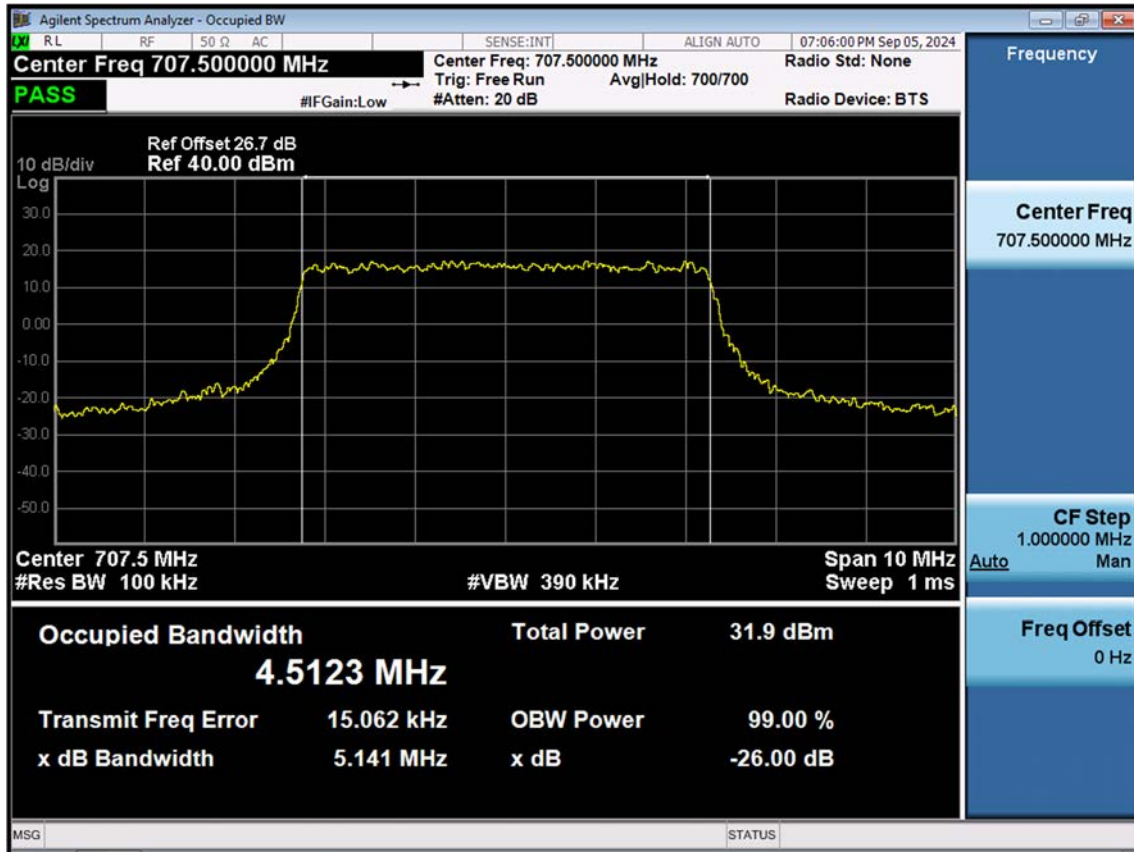
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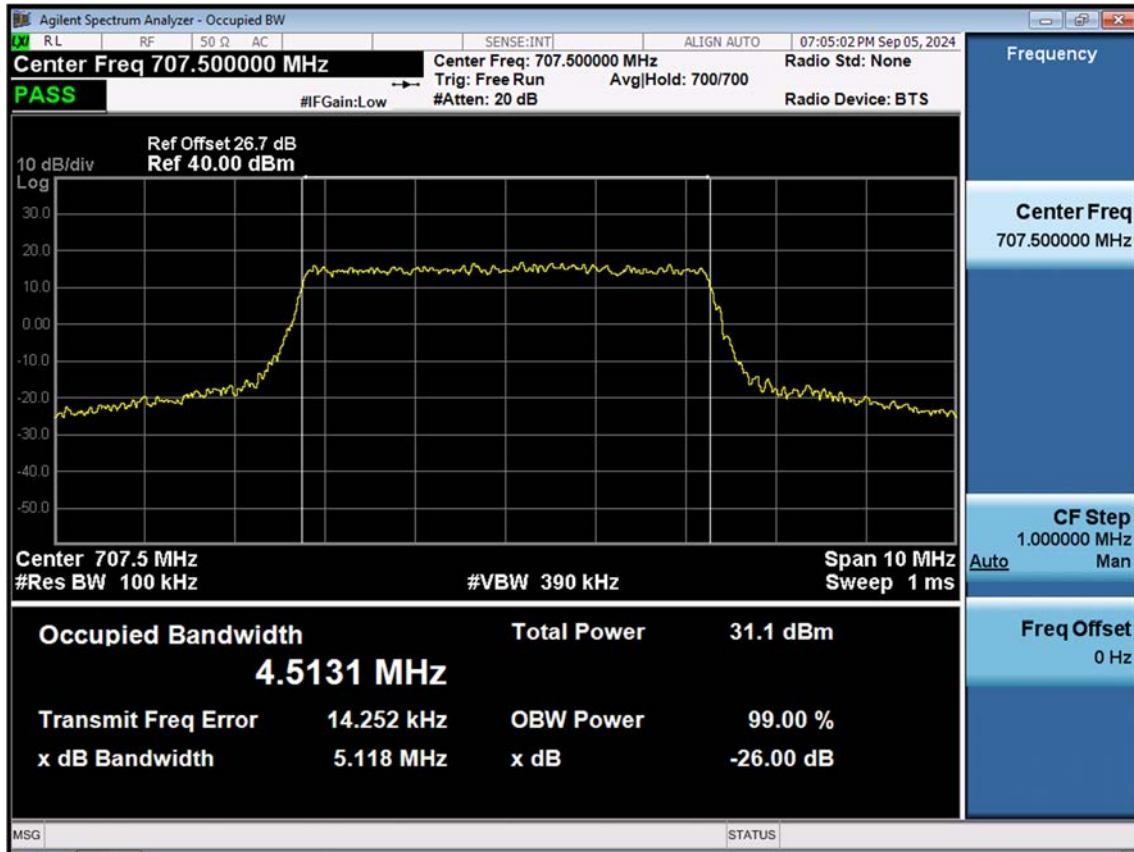
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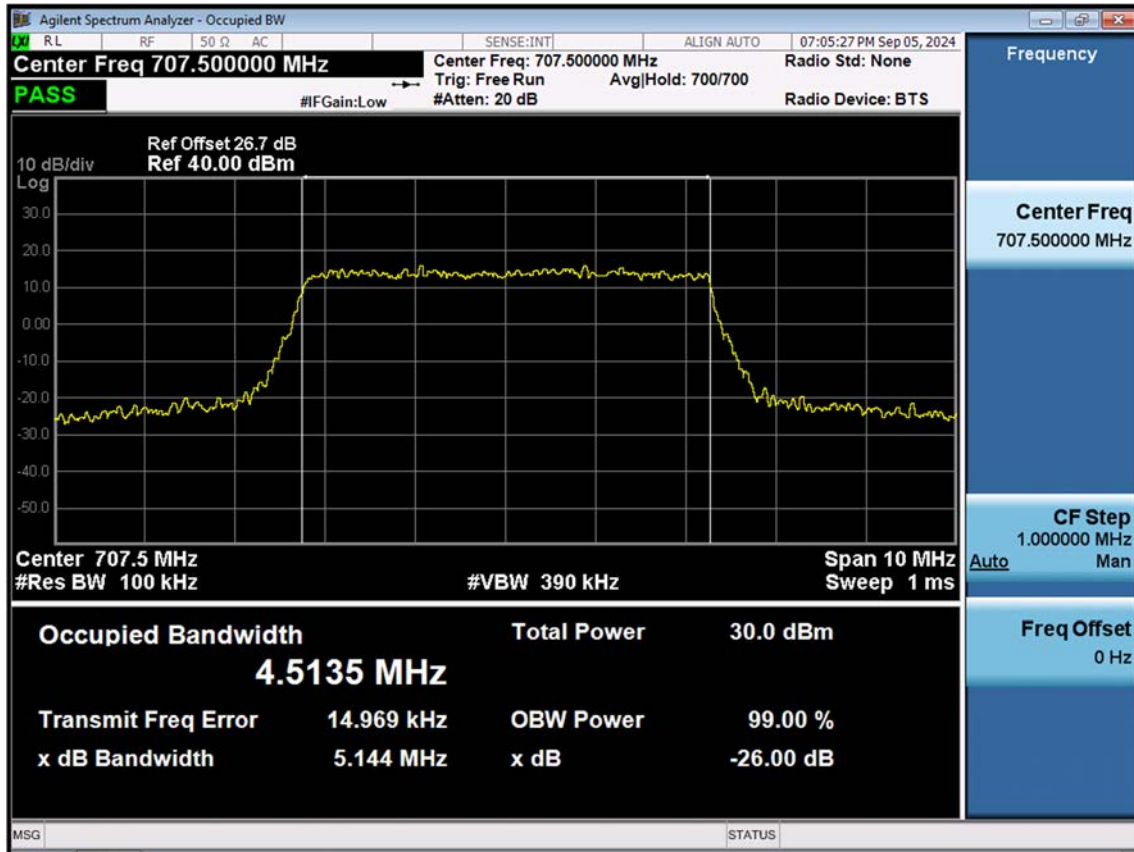
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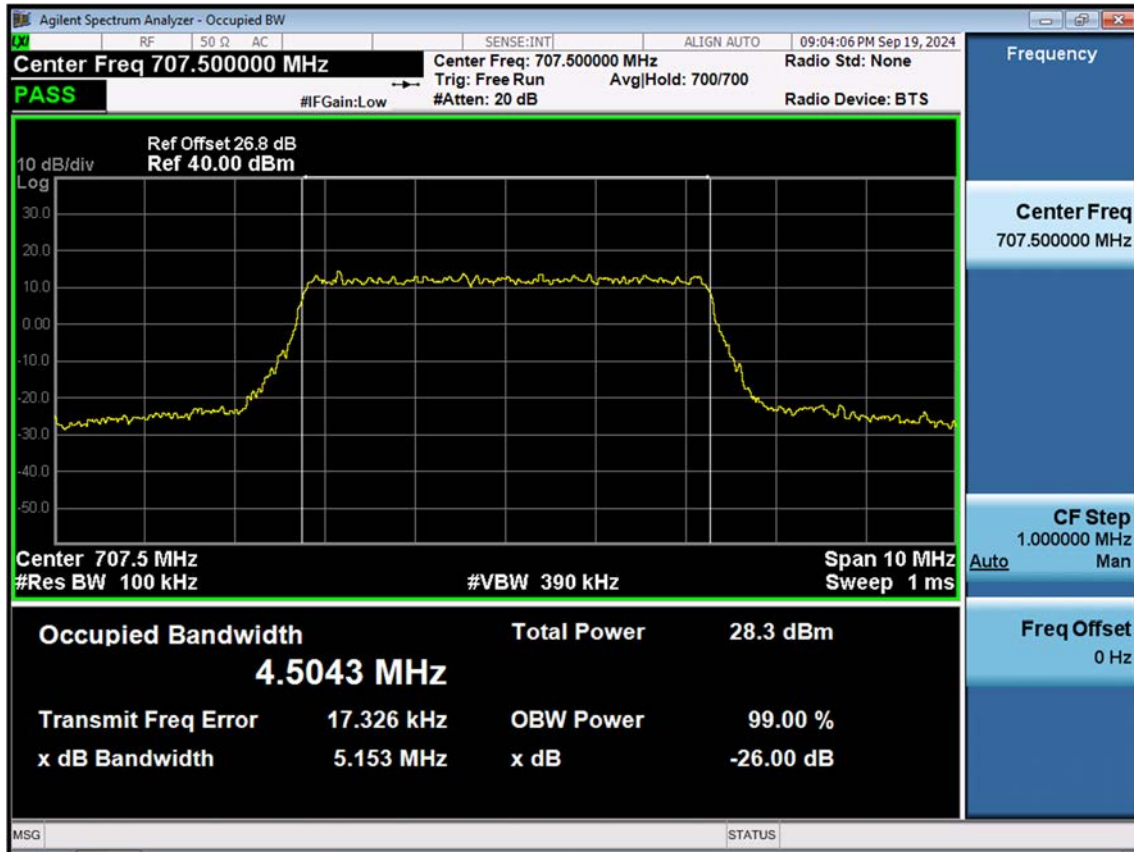
LTE B12_5 M_OBW_Mid_16QAM_FullRB



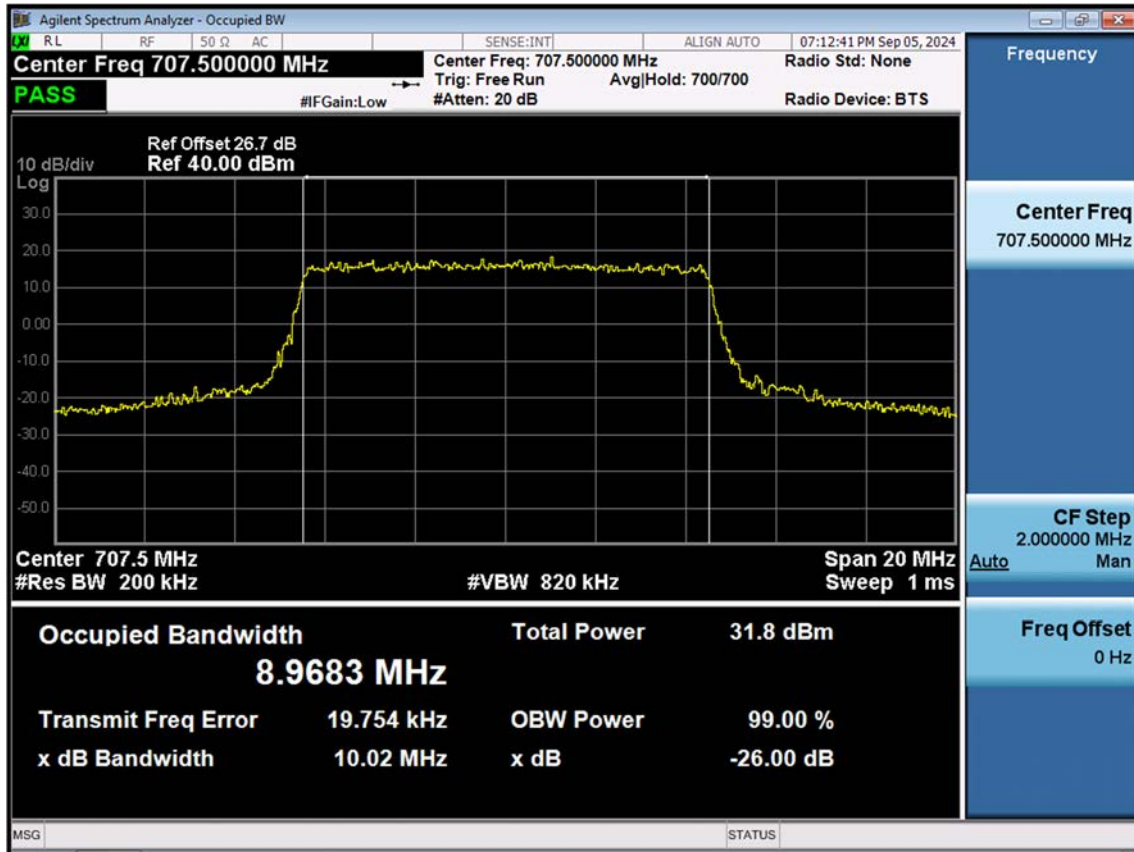
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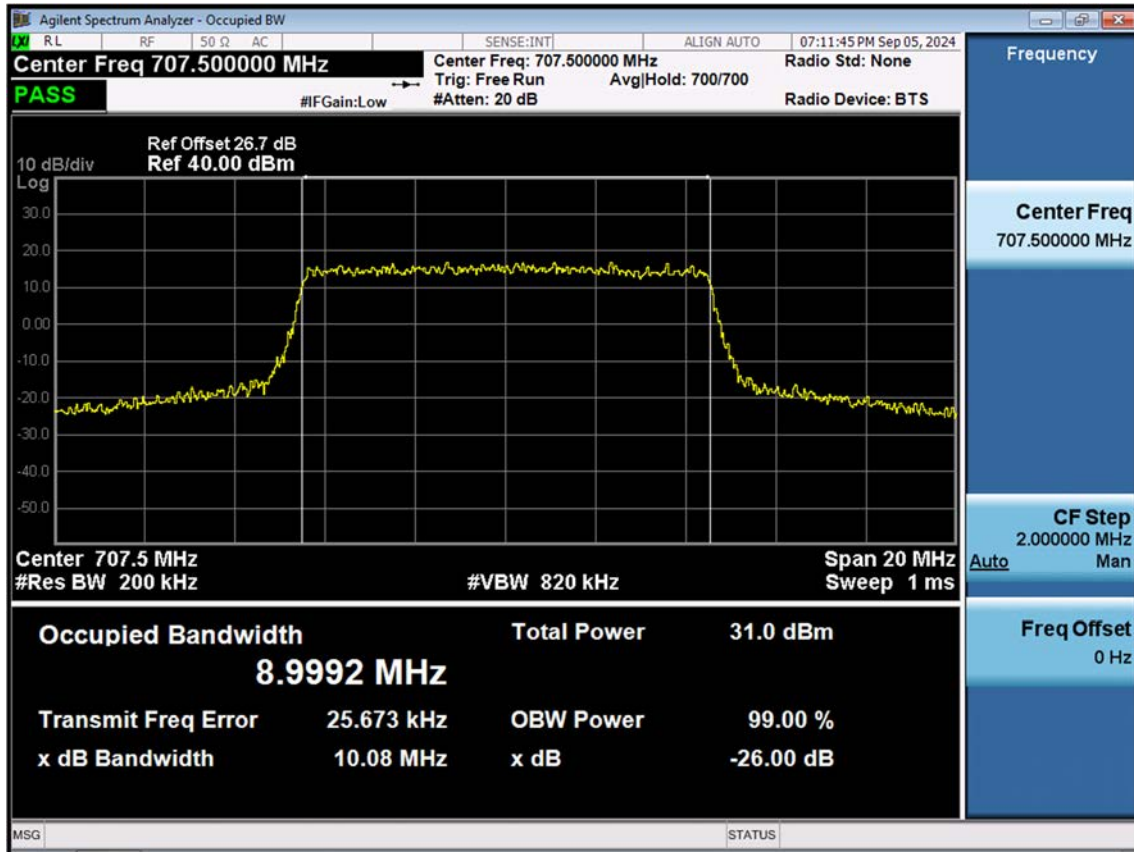
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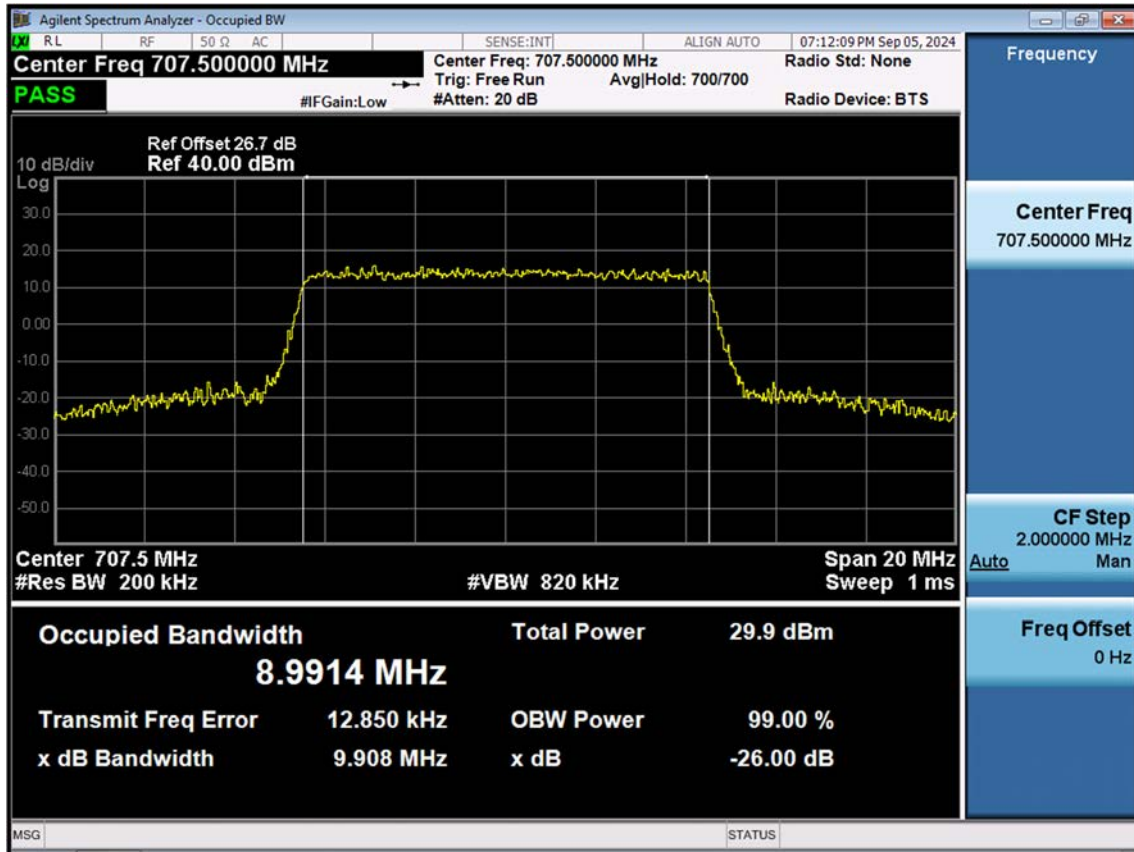
LTE B12_10 M_OBW_Mid_QPSK_FullRB



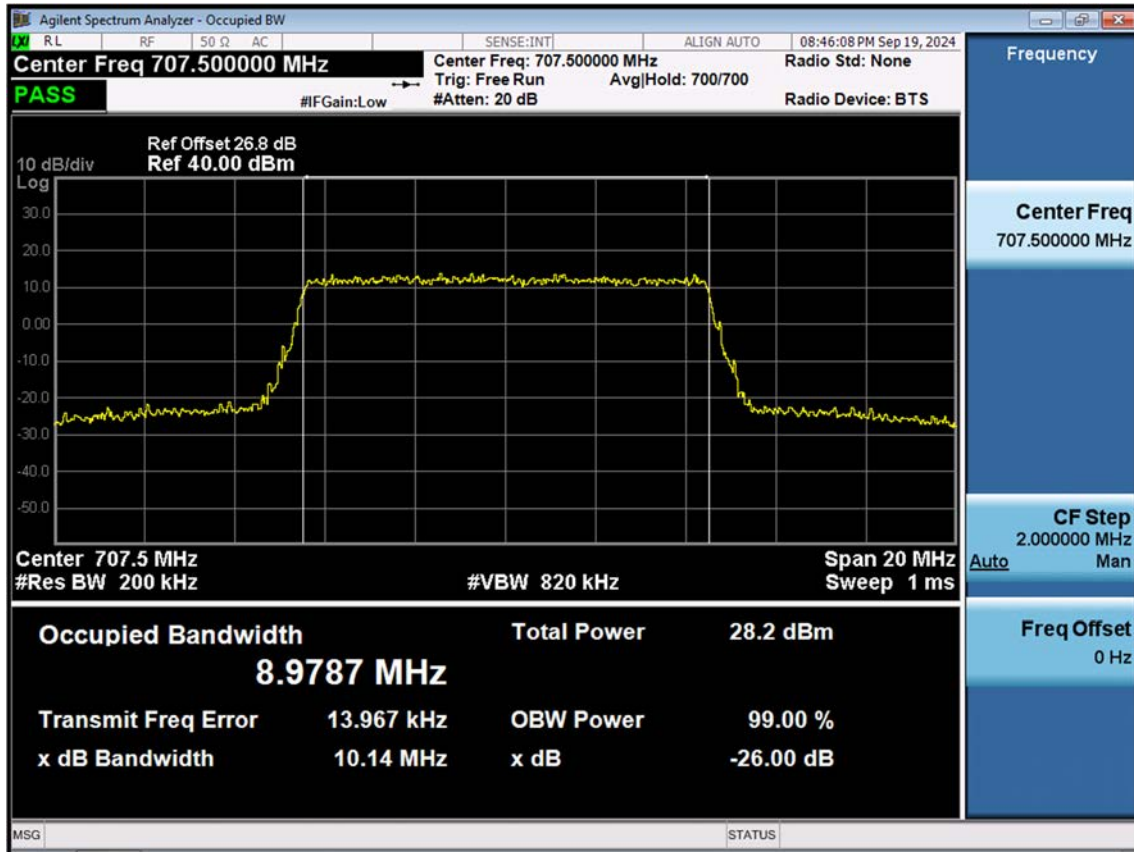
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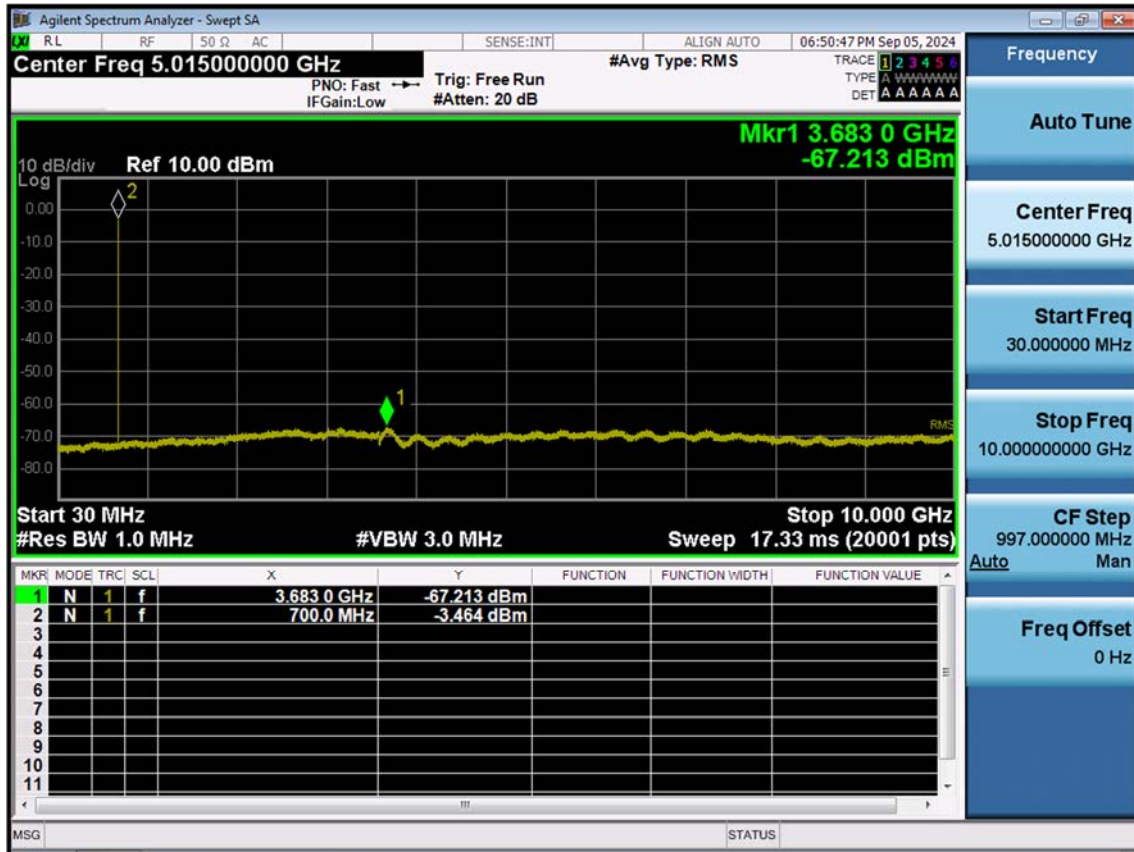
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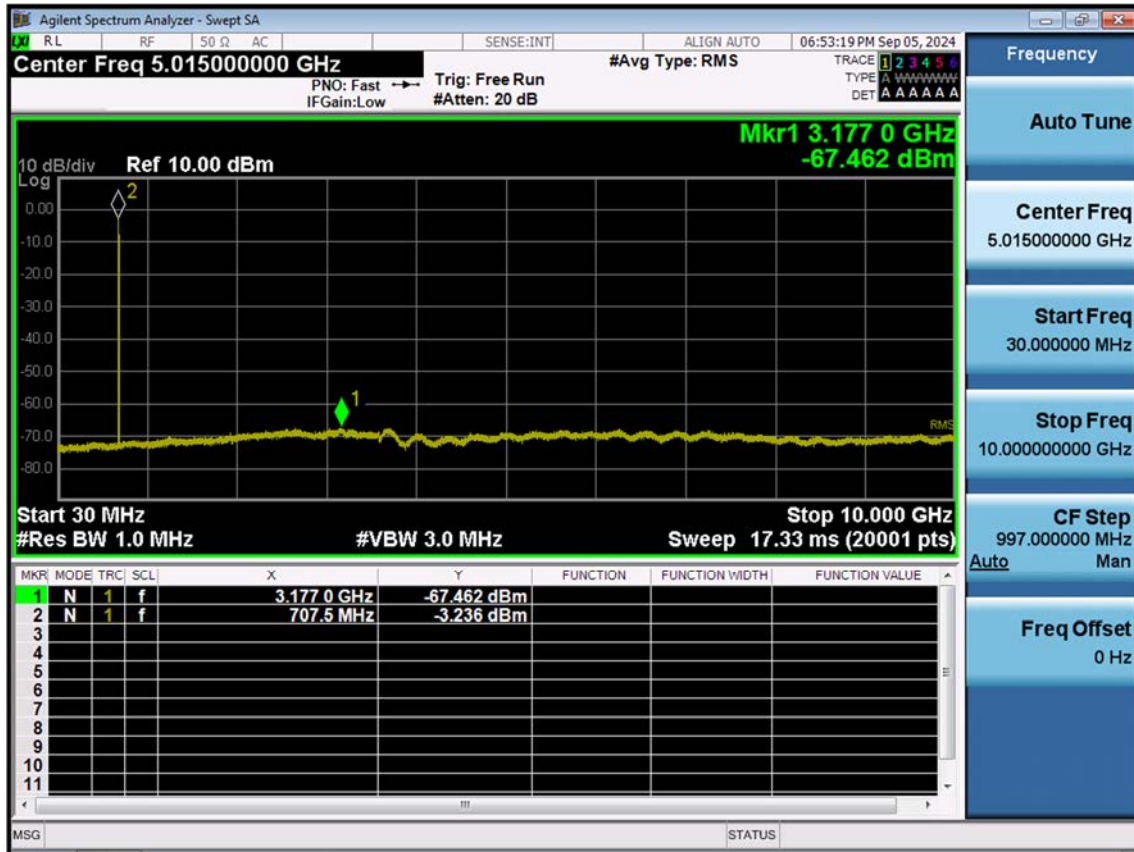
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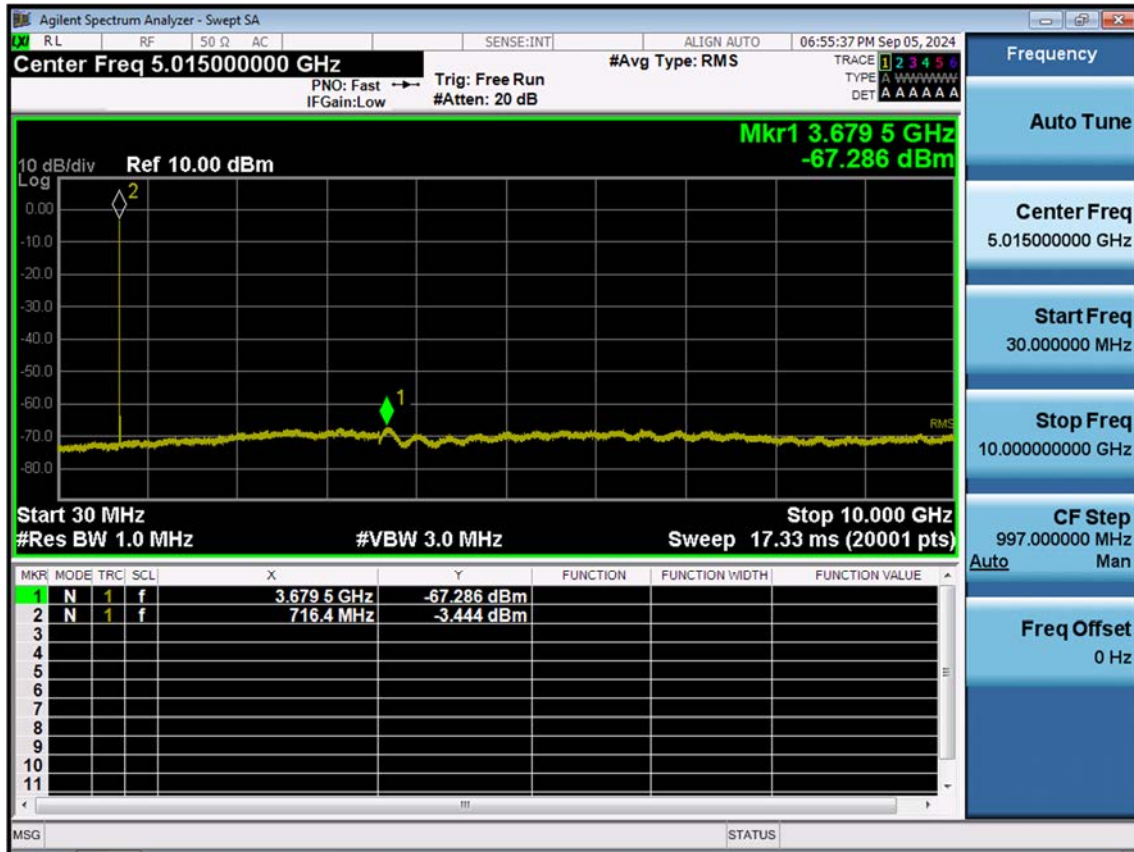
LTE B12_1.4M_Conducted Spurious(30 M-10 G)_Low_QPSK_1RB



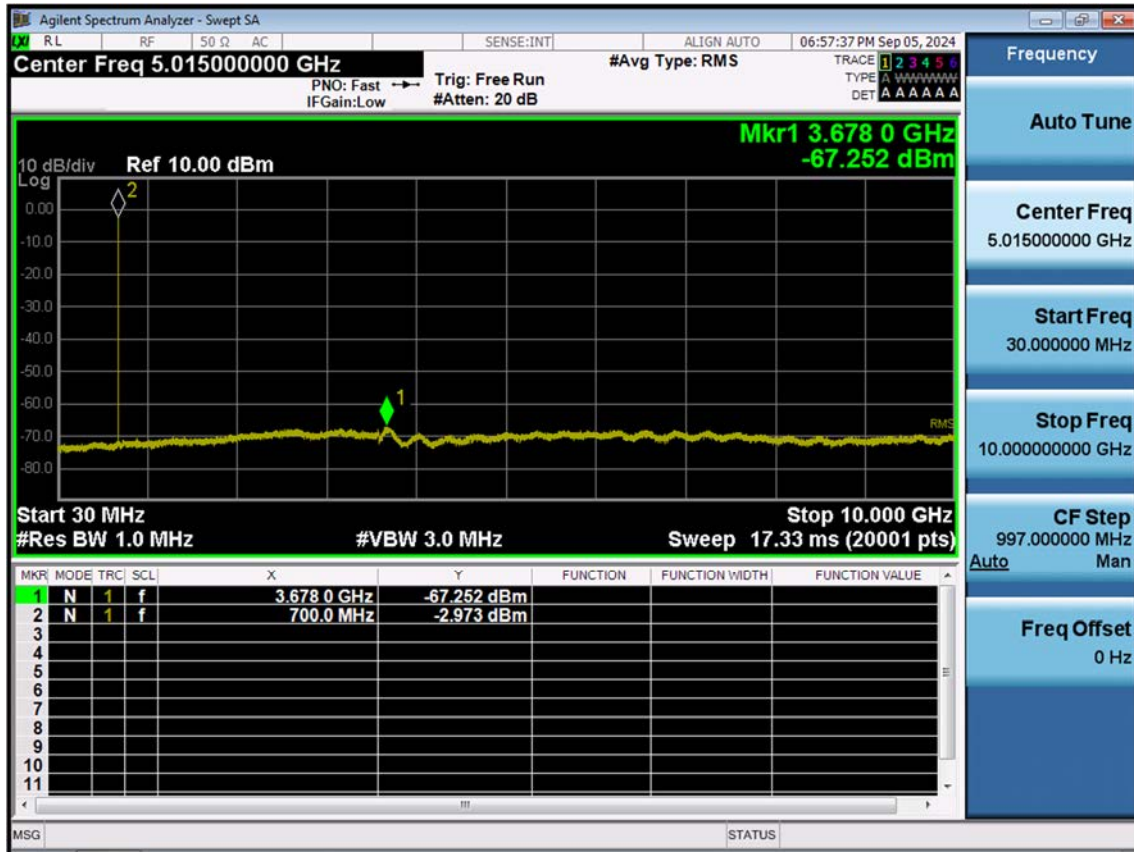
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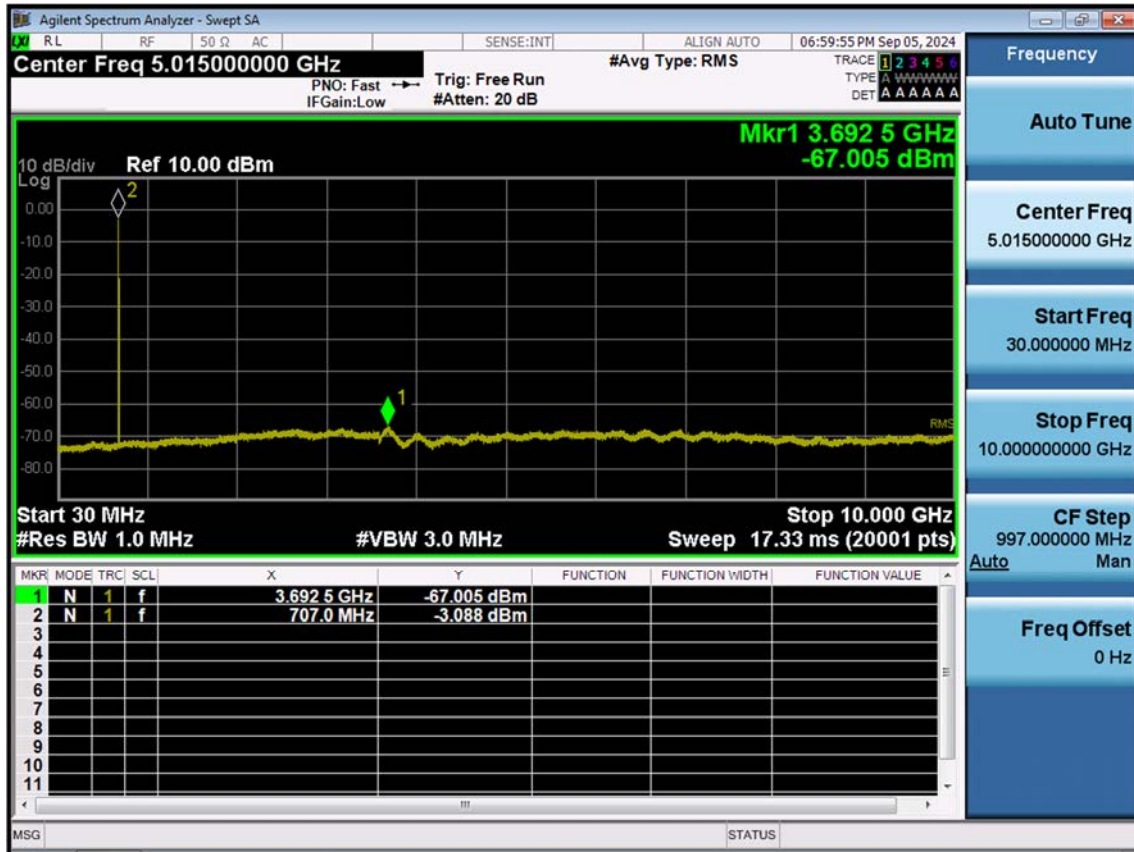
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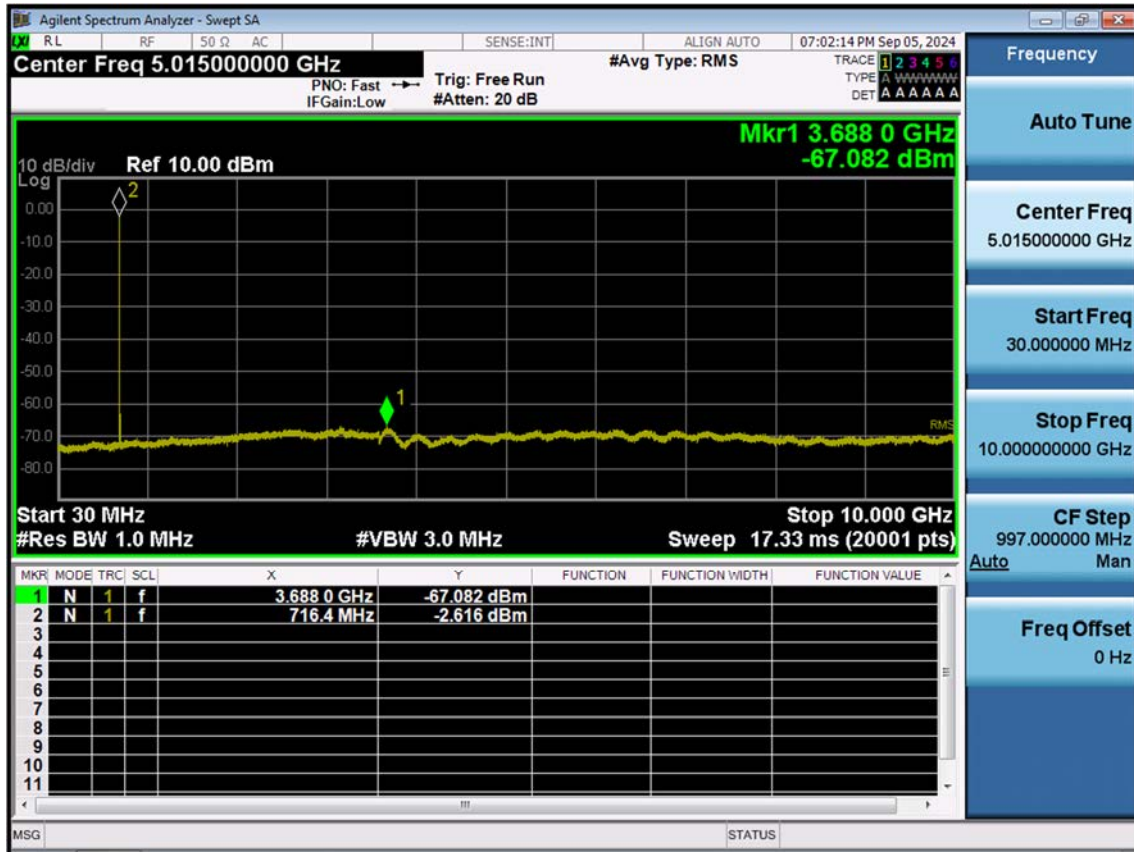
LTE B12_3 M_Conducted Spurious(30 M-10 G)_Low_QPSK_1RB



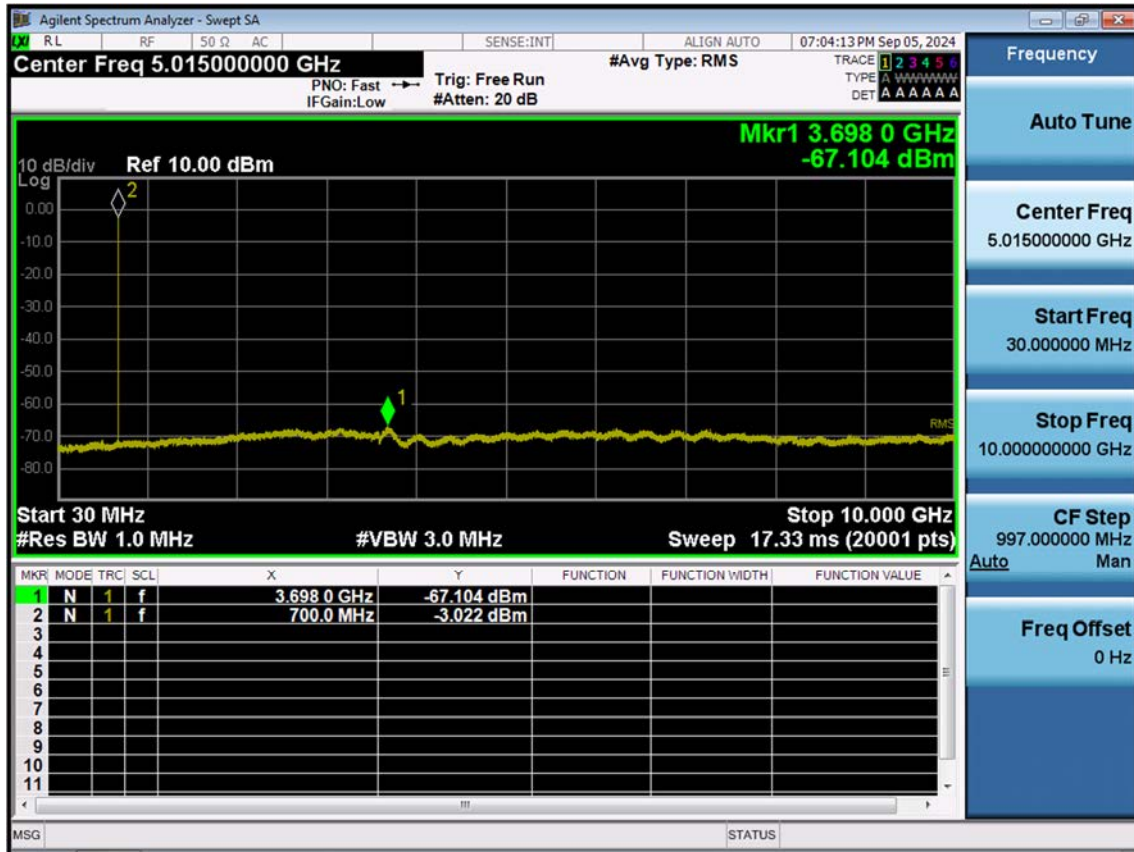
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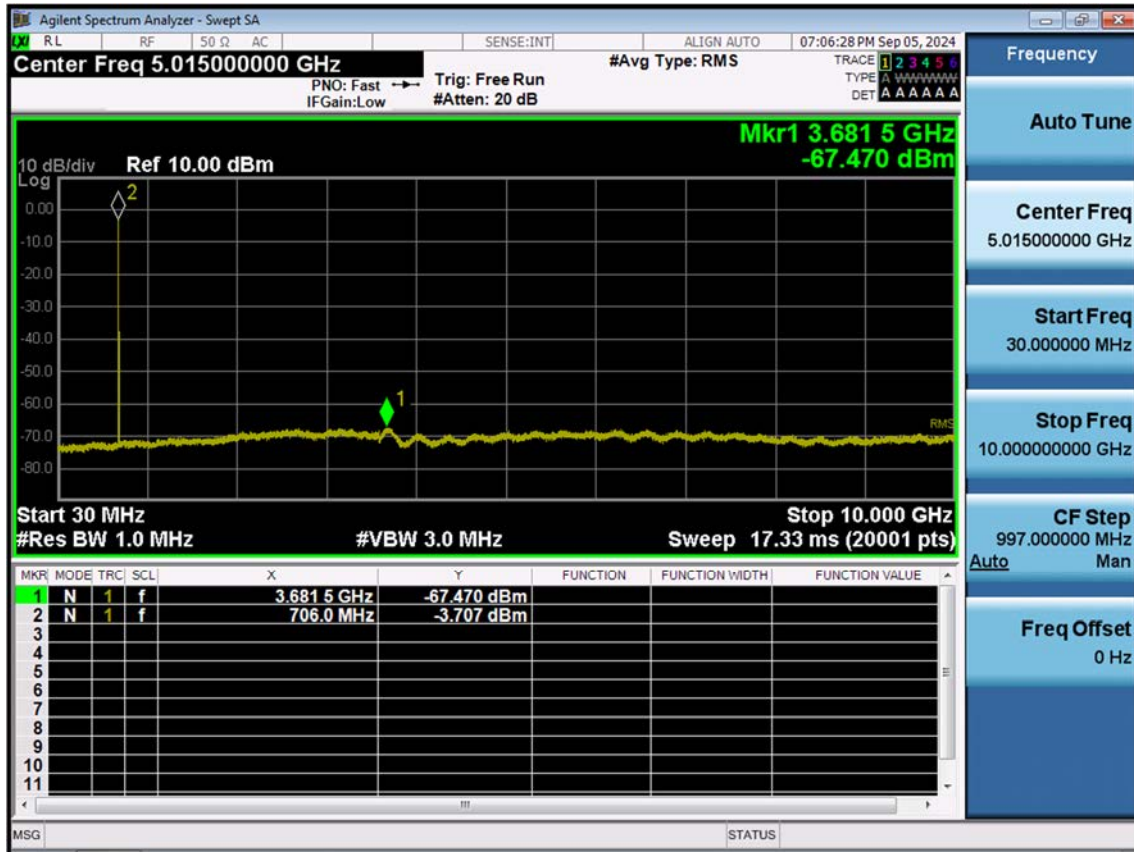
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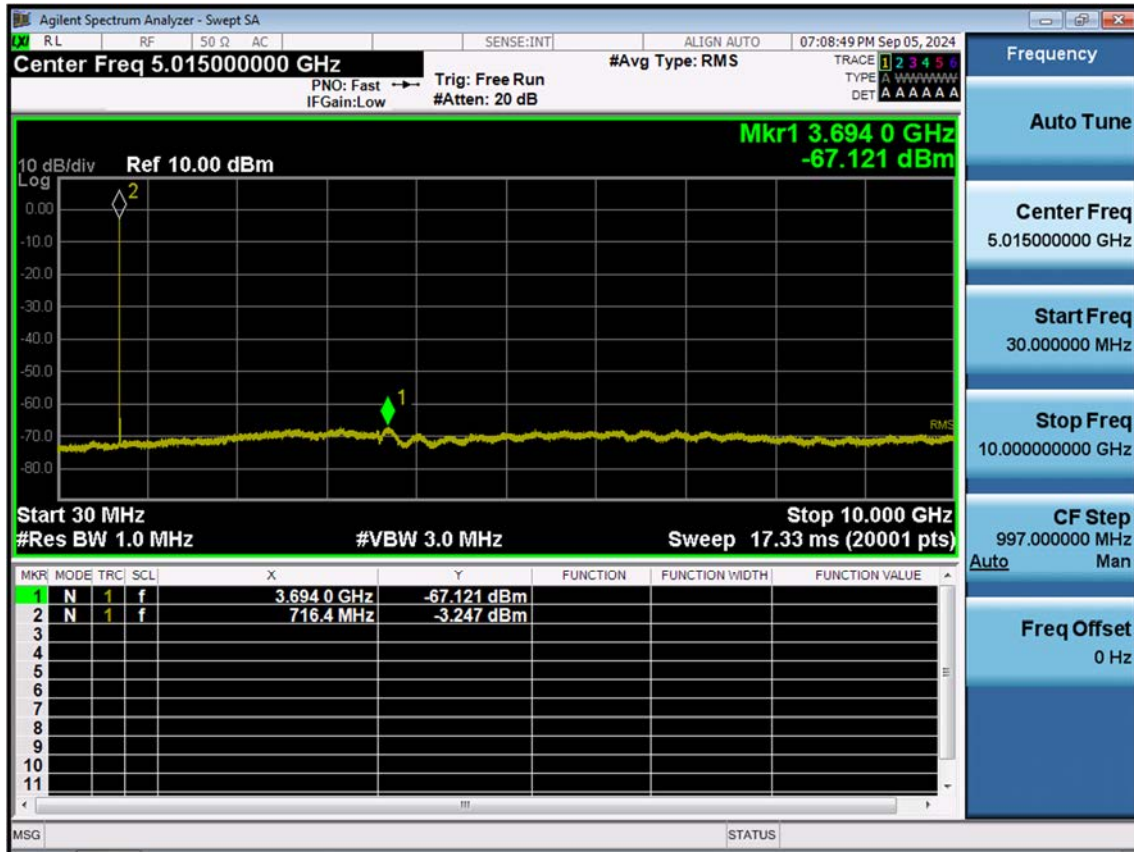
LTE B12_5 M_Conducted Spurious(30 M-10 G)_Low_QPSK_1RB



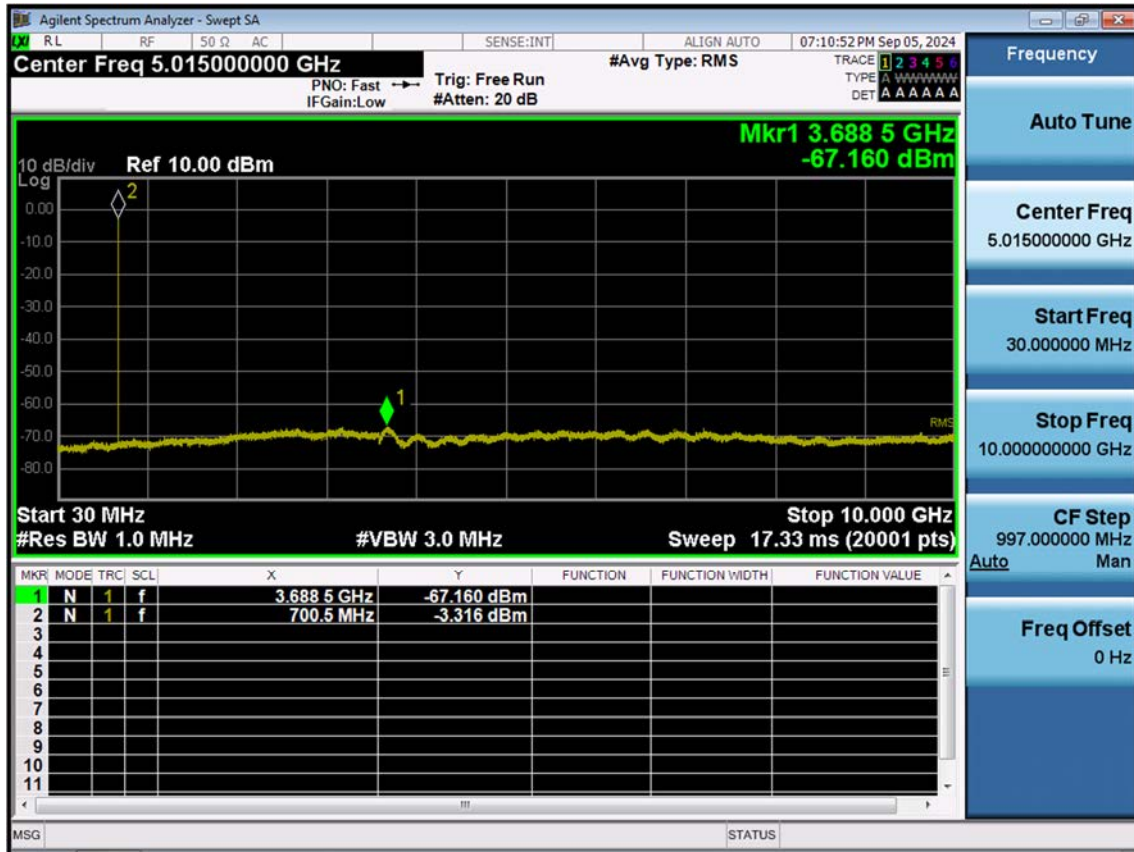
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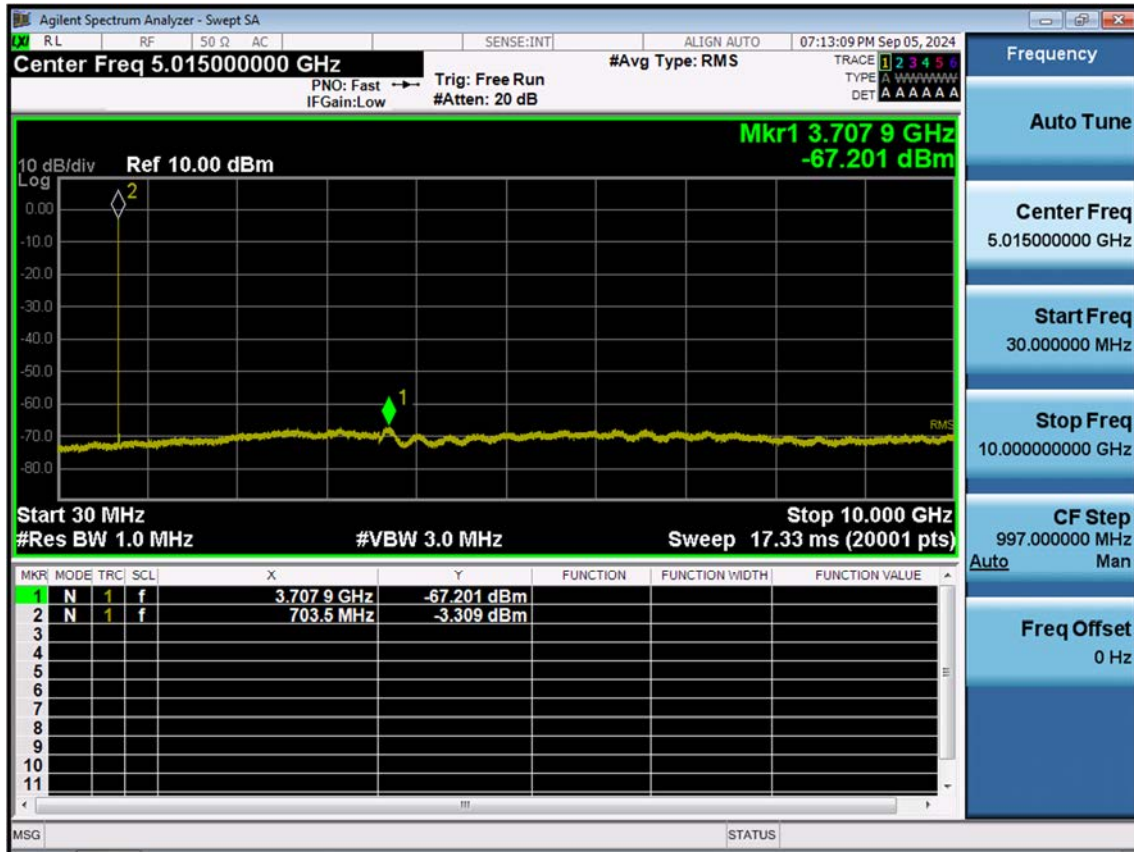
LTE B12_5 M_Conducted Spurious(30 M-10 G)_High_QPSK_1RB



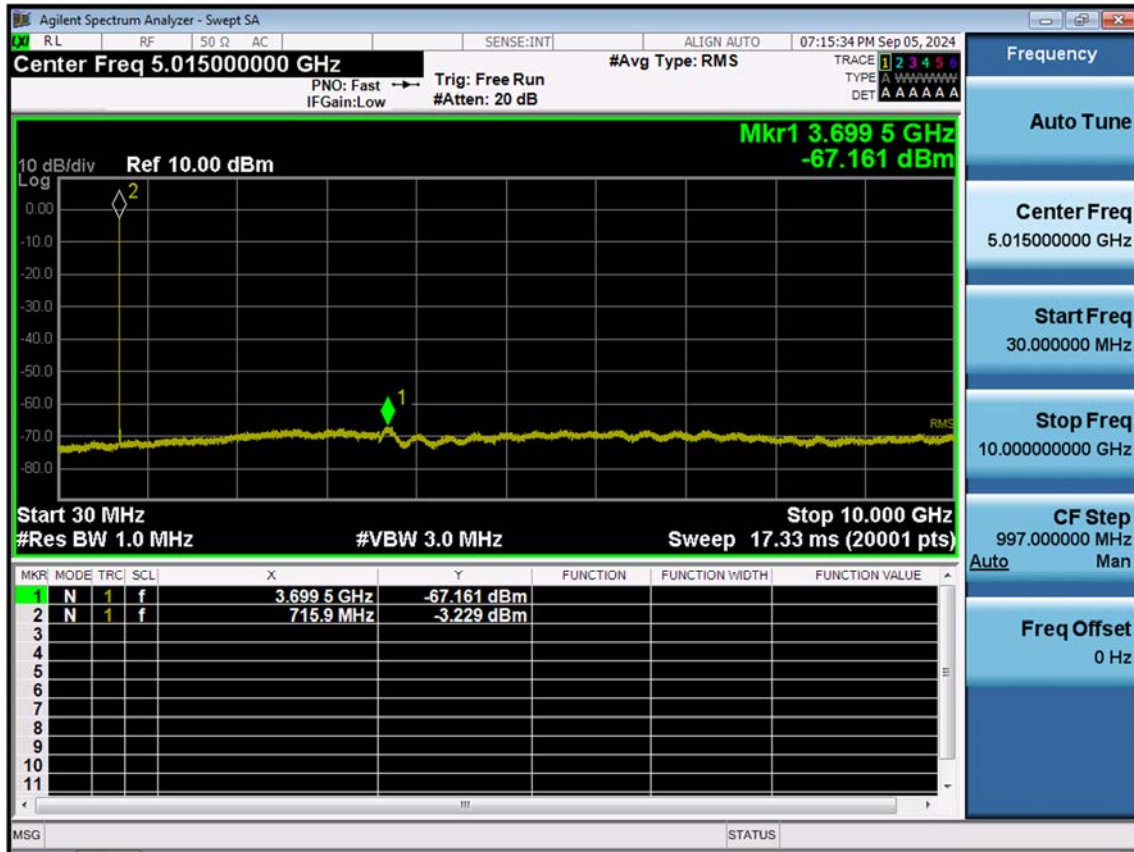
LTE B12_10 M_Conducted Spurious(30 M-10 G)_Low_QPSK_1RB



LTE B12_10 M_Conducted Spurious(30 M-10 G)_Mid_QPSK_1RB



LTE B12_10 M_Conducted Spurious(30 M-10 G)_High_QPSK_1RB



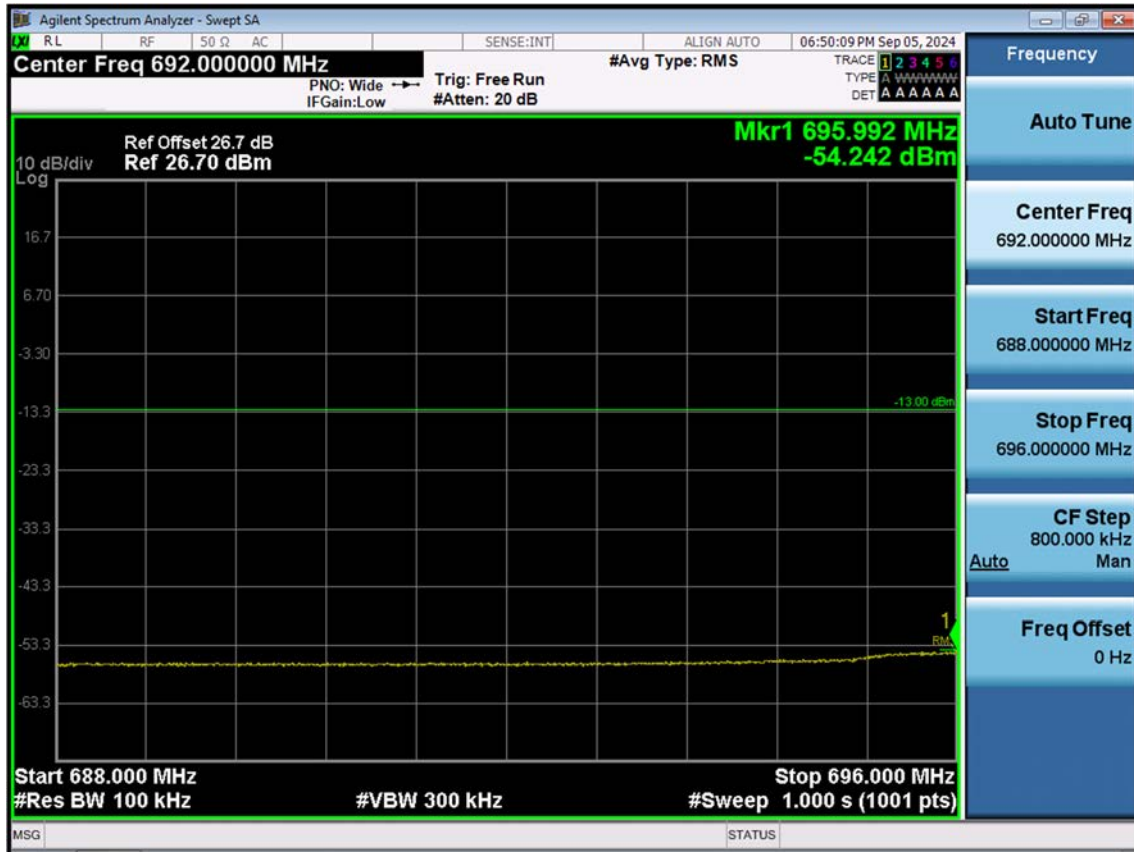
LTE B12_1.4M_Band Edge_Low_QPSK_1RB



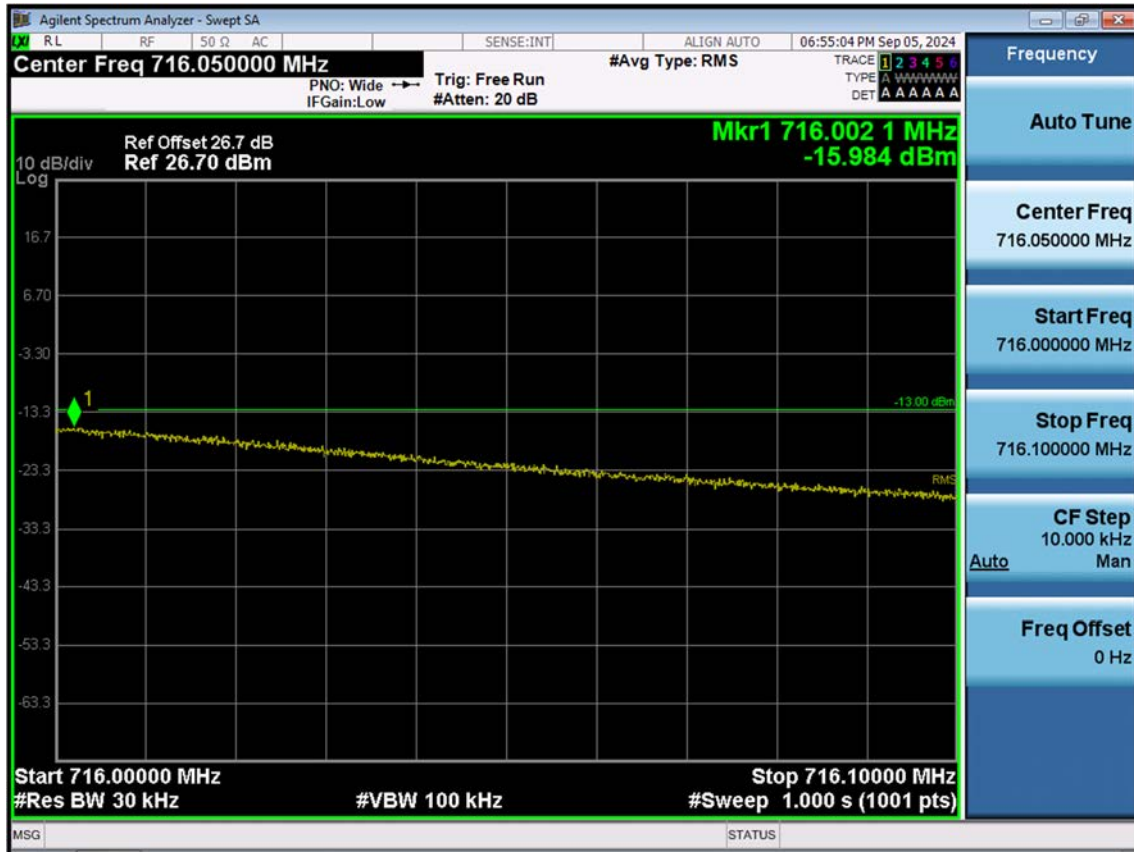
LTE B12_1.4M_Band Edge_Low_QPSK_FullRB



LTE B12_1.4M_Extended Band Edge_Low_QPSK_FullRB



LTE B12_1.4M_Band Edge_High_QPSK_1RB(1)



LTE B12_1.4M_Band Edge_High_QPSK_1RB(2)



LTE B12_1.4M_Band Edge_High_QPSK_FullRB



LTE B12_1.4M_Extended Band Edge_High_QPSK_FullRB



LTE B12_3 M_Band Edge_Low_QPSK_1RB



LTE B12_3 M_Band Edge_Low_QPSK_FullRB

