

TEST REPORT

FCC LTE B5 Test for SM-F766B
Certification

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2505-FC025-R1

DATE OF ISSUE
May 27, 2025

Tested by
Jae Mun 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

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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-F766B

Date of Test

February 24, 2025 ~ May 07, 2025

FCC ID

A3LSMF766B

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: § 22

Test Results

PASS

REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	May 07, 2025	Initial Release
1	May 27, 2025	Revised the Power Supply Voltage. (DC 3.88 V → DC 3.90 V)

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:	A3LSMF766B
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§ 22
EUT Type:	Mobile Phone
Model(s):	SM-F766B
Additional Model(s)	-
Tx Frequency:	824.7 MHz – 848.3 MHz (LTE – Band 5 (1.4 MHz)) 825.5 MHz – 847.5 MHz (LTE – Band 5 (3 MHz)) 826.5 MHz – 846.5 MHz (LTE – Band 5 (5 MHz)) 829.0 MHz – 844.0 MHz (LTE – Band 5 (10 MHz))
Date(s) of Tests:	February 24, 2025 ~ May 07, 2025
Serial number:	Radiated R3CY2080L3Y (Main 1 ANT), R3CY30RSYRA (Sub 1 ANT) Conducted : R3CY2080JGY
Antenna Information	Please refer to the Antenna Specification document.

1.1 MAXIMUM OUTPUT POWER

Main 1 ANT

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	ERP	
				Max. Power (W)	Max. Power (dBm)
LTE – Band5 (1.4)	824.7 – 848.3	1M10G7D	QPSK	0.132	21.19
		1M09W7D	16QAM	0.086	19.35
		1M09W7D	64QAM	0.067	18.26
		1M09W7D	256QAM	0.041	16.12
LTE – Band5 (3)	825.5 – 847.5	2M70G7D	QPSK	0.130	21.14
		2M75W7D	16QAM	0.086	19.36
		2M71W7D	64QAM	0.067	18.24
		2M74W7D	256QAM	0.041	16.10
LTE – Band5 (5)	826.5 – 846.5	4M54G7D	QPSK	0.129	21.10
		4M52W7D	16QAM	0.084	19.26
		4M54W7D	64QAM	0.066	18.18
		4M56W7D	256QAM	0.040	16.05
LTE – Band5 (10)	829.0 – 844.0	8M99G7D	QPSK	0.133	21.23
		8M98W7D	16QAM	0.085	19.30
		9M03W7D	64QAM	0.066	18.22
		9M01W7D	256QAM	0.041	16.11

Sub 1 ANT

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	ERP	
				Max. Power (W)	Max. Power (dBm)
LTE – Band5 (1.4)	824.7 – 848.3	1M10G7D	QPSK	0.053	17.28
		1M10W7D	16QAM	0.035	15.46
		1M10W7D	64QAM	0.027	14.32
		1M09W7D	256QAM	0.017	12.27
LTE – Band5 (3)	825.5 – 847.5	2M72G7D	QPSK	0.054	17.32
		2M71W7D	16QAM	0.036	15.57
		2M71W7D	64QAM	0.028	14.43
		2M71W7D	256QAM	0.017	12.25
LTE – Band5 (5)	826.5 – 846.5	4M54G7D	QPSK	0.052	17.19
		4M52W7D	16QAM	0.034	15.37
		4M54W7D	64QAM	0.027	14.39
		4M56W7D	256QAM	0.017	12.22
LTE – Band5 (10)	829.0 – 844.0	9M01G7D	QPSK	0.052	17.18
		9M00W7D	16QAM	0.034	15.34
		9M01W7D	64QAM	0.026	14.22
		9M00W7D	256QAM	0.016	12.12

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**

3. DESCRIPTION OF TESTS

3.1 TEST PROCEDURE

Test Description	Test Procedure Used
Occupied Bandwidth	- KDB 971168 D01 v03r01 – Section 4.3 - ANSI C63.26-2015 – Section 5.4.4
Band Edge	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Spurious and Harmonic Emissions at Antenna Terminal	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Conducted Output Power	- N/A (See SAR Report)
Peak- to- Average Ratio	- KDB 971168 D01 v03r01 – Section 5.7 - ANSI C63.26-2015 – Section 5.2.3.4
Frequency stability	- ANSI C63.26-2015 – Section 5.6
Radiated Power	- ANSI C63.26-2015 – Section 5.2.4.4 - KDB 971168 D01 v03r01 – Section 5.8
Radiated Spurious and Harmonic Emissions	- ANSI C63.26-2015 – Section 5.5.3 - KDB 971168 D01 v03r01 – Section 5.8

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

Test Note

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

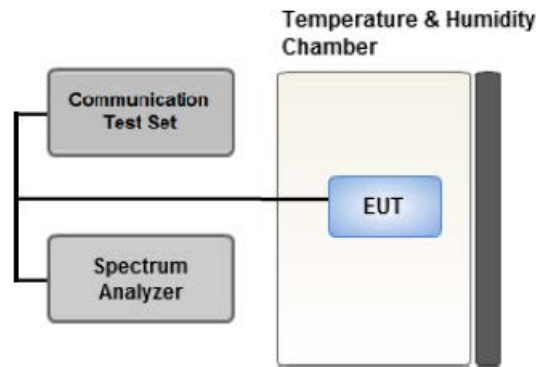
$$\text{Result}_{(\text{dBm})} = P_g_{(\text{dBm})} - \text{cable loss}_{(\text{dB})} + \text{antenna gain}_{(\text{dBi})}$$

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

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

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

3.4 PEAK- TO- AVERAGE RATIO



Test setup

① CCDF Procedure for PAPR

Test Settings

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

② Alternate Procedure for PAPR

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

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

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

Test Settings(Peak Power)

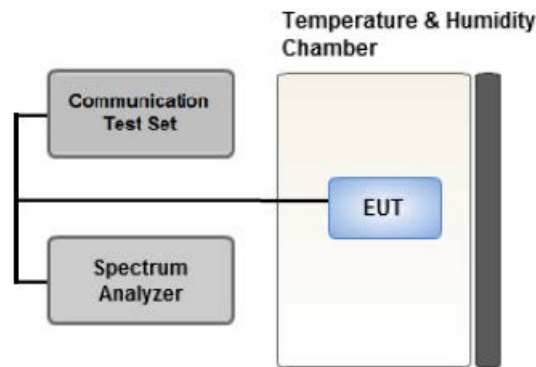
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW $\geq 3 \times$ RBW.

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

Test Settings(Average Power)

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

3.5 OCCUPIED BANDWIDTH.



Test setup

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

The EUT makes a call to the communication simulator.

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

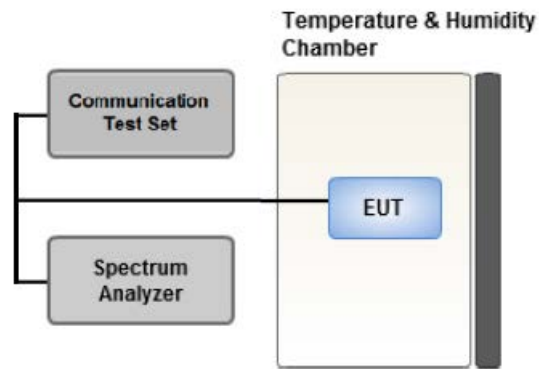
The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth

Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99 % occupied bandwidth and the 26 dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. $RBW = 1 - 5 \%$ of the expected OBW
3. $VBW \geq 3 \times RBW$
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

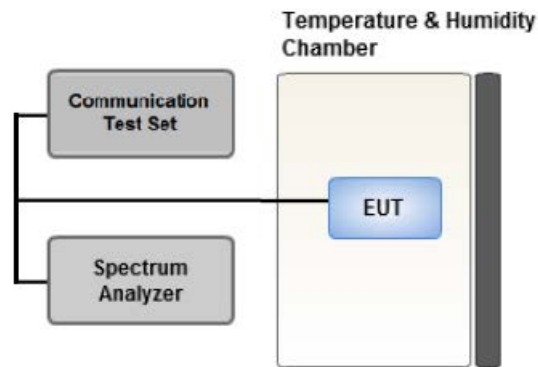
Test Overview

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 = Peak
4. Trace Mode = Max Hold
5. Sweep time = auto
6. Number of points in sweep $\geq$ 2 x Span / RBW

3.7 BAND EDGE



Test setup

Test Overview

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

Test Settings

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

Test Notes

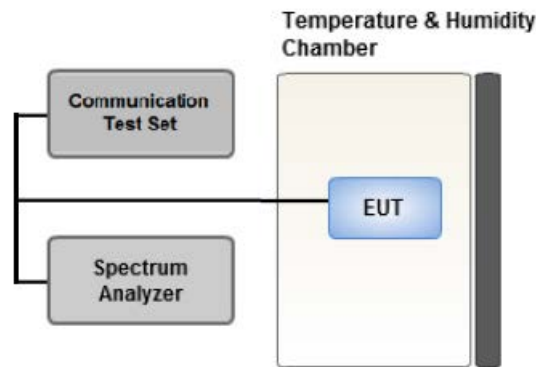
According to FCC 22.917, 24.238, 27.53 specified that power of any emission outside of The authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. In the 1 MHz bands immediately outside and adjacent to the frequency block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

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

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

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

3.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE



Test setup

Test Overview

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

The frequency stability of the transmitter is measured by:

1. Temperature:

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

2. Primary Supply Voltage:

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

Test Settings

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

3.9 WORST CASE(RADIATED TEST)

- The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
- All modes of operation were investigated and the worst case configuration results are reported.
Mode : Stand alone, Stand alone + External accessories (Earphone, AC adapter, etc)
Worst case : Stand alone
- 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 : 10 MHz(Main 1 ANT), 3 MHz(Sub 1 ANT))
- The EUT was tested in three modes(Open, Half-open, Closed), the worst case configuration results are reported. (Worst case: Open mode)
- The worst case is reported with the EUT positioning, modulations, and paging service configurations shown in the test data.

[Main 1 ANT Worst case]

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

[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.

[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
		1.4, 3, 5, 10	Low, High	Full RB	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 G HPF+LNA)	HCT CO., LTD.,	F2L2	12/12/2025	Annual
RF Switching System	Switch box(3 G HPF+LNA)	HCT CO., LTD.,	F2L3	12/12/2025	Annual
RF Switching System	Switch box(LNA)	HCT CO., LTD.,	F2L5	12/12/2025	Annual
RF Switching System	Switch box(6 G HPF+LNA)	HCT CO., LTD.,	F2L14	12/12/2025	Annual
Power Amplifier	CBL18265035	CERNEX	22966	11/07/2025	Annual
Power Amplifier	CBL26405040	CERNEX	25956	02/19/2026	Annual
Power Splitter(DC ~ 26.5 GHz)	11667B	Hewlett Packard	5001	04/10/2026	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	02/11/2026	Annual
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	03197	11/28/2025	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	03201	11/28/2025	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/20/2026	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170124	03/23/2027	Biennial
Signal Analyzer(10 Hz ~ 26.5 GHz)	N9020A	Agilent	MY52090906	04/14/2026	Annual
ATTENUATOR(20 dB)	8493C	Hewlett Packard	17280	04/10/2026	Annual
Spectrum Analyzer(10 Hz ~ 40 GHz)	FSV40	ROHDE & SCHWARZ	101733	09/19/2025	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
Radio Communication Test Station	MT8000A	Anritsu Corp.	6272613402	08/28/2025	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
Signal Analyzer(2 Hz ~ 50.0 GHz)	N9040B	KEYSIGHT	US55230216	12/09/2025	Annual
Signal & Spectrum Analyzer (2 Hz~67 GHz)	FSW67	REOHDE & SCHWARZ	101736	05/23/2025	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 ($\pm$ 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	1.18 (Confidence level about 95 %, $k=2$)
Peak- to- Average Ratio	0.68 (Confidence level about 95 %, $k=2$)
Radiated Power	4.74 (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)	5.68 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.75 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.82 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (Above 40 GHz)	5.58 (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, § 22.917(a)	< 43 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions	PASS
Conducted Output Power	§ 2.1046	N/A	<u>See Note1</u>
Peak- to- Average Ratio	§ 22.913(d)	< 13 dB	PASS
Frequency stability / variation of ambient temperature	§ 2.1055, § 22.355	< 2.5 ppm	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	§ 22.913(a)(5)	< 7 Watts max. ERP	PASS
Radiated Spurious and Harmonic Emissions	§ 2.1053, § 22.917(a)	< 43 + 10log10 (P[Watts]) for all out-of band emissions	PASS

7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

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

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

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

7.2 EIRP Sample Calculation

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

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

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

7.3. Emission Designator

GSM Emission Designator

Emission Designator = 249KGXW

GSM BW = 249 kHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

EDGE Emission Designator

Emission Designator = 249KG7W

GSM BW = 249 kHz

G = Phase Modulation

7 = Quantized/Digital Info

W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M17F9W

WCDMA BW = 4.17 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

QPSK Modulation

Emission Designator = 4M48G7D

LTE BW = 4.48 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

QAM Modulation

Emission Designator = 4M48W7D

LTE BW = 4.48 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

8. TEST DATA(Main 1 ANT)

8.1 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
824.7	LTE B5/ 1.4 MHz	QPSK	-30.41	32.58	-9.95	1.44	H	< 7.00	0.132	21.19	1	0
		16-QAM	-32.25	30.74	-9.95	1.44	H		0.086	19.35		
		64-QAM	-33.34	29.65	-9.95	1.44	H		0.067	18.26		
		256-QAM	-35.48	27.51	-9.95	1.44	H		0.041	16.12		
836.5		QPSK	-30.63	32.23	-9.90	1.45	H		0.122	20.88	1	0
		16-QAM	-32.43	30.43	-9.90	1.45	H		0.081	19.08		
		64-QAM	-33.55	29.31	-9.90	1.45	H		0.063	17.96		
		256-QAM	-35.73	27.13	-9.90	1.45	H		0.038	15.78		
848.3		QPSK	-31.21	31.88	-9.85	1.45	H		0.114	20.58	1	0
		16-QAM	-32.98	30.11	-9.85	1.45	H		0.076	18.81		
		64-QAM	-34.12	28.97	-9.85	1.45	H		0.058	17.67		
		256-QAM	-36.25	26.84	-9.85	1.45	H		0.036	15.54		

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
825.5	LTE B5/ 3 MHz	QPSK	-30.43	32.53	-9.95	1.44	H	< 7.00	0.130	21.14	1	0
		16-QAM	-32.21	30.75	-9.95	1.44	H		0.086	19.36		
		64-QAM	-33.33	29.63	-9.95	1.44	H		0.067	18.24		
		256-QAM	-35.47	27.49	-9.95	1.44	H		0.041	16.10		
836.5		QPSK	-30.65	32.21	-9.90	1.45	H		0.122	20.86	1	0
		16-QAM	-32.43	30.43	-9.90	1.45	H		0.081	19.08		
		64-QAM	-33.55	29.31	-9.90	1.45	H		0.063	17.96		
		256-QAM	-35.71	27.15	-9.90	1.45	H		0.038	15.80		
847.5		QPSK	-31.12	32.10	-9.85	1.45	H		0.120	20.80	1	0
		16-QAM	-32.87	30.35	-9.85	1.45	H		0.080	19.05		
		64-QAM	-34.00	29.22	-9.85	1.45	H		0.062	17.92		
		256-QAM	-36.12	27.10	-9.85	1.45	H		0.038	15.80		

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
826.5	LTE B5/ 5 MHz	QPSK	-30.42	32.49	-9.95	1.44	H	< 7.00	0.129	21.10	1	0
		16-QAM	-32.26	30.65	-9.95	1.44	H		0.084	19.26		
		64-QAM	-33.34	29.57	-9.95	1.44	H		0.066	18.18		
		256-QAM	-35.47	27.44	-9.95	1.44	H		0.040	16.05		
836.5		QPSK	-30.66	32.20	-9.90	1.45	H		0.122	20.85	1	0
		16-QAM	-32.47	30.39	-9.90	1.45	H		0.080	19.04		
		64-QAM	-33.58	29.28	-9.90	1.45	H		0.062	17.93		
		256-QAM	-35.74	27.12	-9.90	1.45	H		0.038	15.77		
846.5		QPSK	-30.98	32.31	-9.85	1.45	H		0.126	21.01	1	0
		16-QAM	-32.78	30.51	-9.85	1.45	H		0.083	19.21		
		64-QAM	-33.89	29.40	-9.85	1.45	H		0.065	18.10		
		256-QAM	-36.02	27.27	-9.85	1.45	H		0.040	15.97		

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
829.0	LTE B5/ 10 MHz	QPSK	-30.45	32.40	-9.95	1.44	H	< 7.00	0.126	21.01	1	0
		16-QAM	-32.27	30.58	-9.95	1.44	H		0.083	19.19		
		64-QAM	-33.37	29.48	-9.95	1.44	H		0.064	18.09		
		256-QAM	-35.45	27.40	-9.95	1.44	H		0.040	16.01		
836.5		QPSK	-30.56	32.30	-9.90	1.45	H		0.124	20.95	1	0
		16-QAM	-32.44	30.42	-9.90	1.45	H		0.081	19.07		
		64-QAM	-33.55	29.31	-9.90	1.45	H		0.063	17.96		
		256-QAM	-35.59	27.27	-9.90	1.45	H		0.039	15.92		
844.0		QPSK	-30.71	32.53	-9.85	1.45	H		0.133	21.23	1	0
		16-QAM	-32.64	30.60	-9.85	1.45	H		0.085	19.30		
		64-QAM	-33.72	29.52	-9.85	1.45	H		0.066	18.22		
		256-QAM	-35.83	27.41	-9.85	1.45	H		0.041	16.11		

8.2 RADIATED SPURIOUS EMISSIONS

MODE: LTE B5
 MODULATION SIGNAL: 10 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
20450 (829.0)	1 658.00	-52.33	9.51	-67.45	2.03	V	-59.97	-13.00	1	0
	2 487.00	-53.15	10.31	-64.33	2.53	V	-56.55	-13.00		
	3 316.00	-54.38	11.09	-62.75	2.99	V	-54.65	-13.00		
20525 (836.5)	1 673.00	-52.63	9.60	-67.90	2.05	V	-60.35	-13.00	1	0
	2 509.50	-52.36	10.26	-63.64	2.51	V	-55.89	-13.00		
	3 346.00	-54.36	11.10	-63.02	2.96	V	-54.88	-13.00		
20600 (844.0)	1 688.00	-50.11	9.70	-65.39	2.06	V	-57.75	-13.00	1	0
	2 532.00	-51.71	10.25	-62.98	2.54	V	-55.27	-13.00		
	3 376.00	-54.14	11.15	-63.11	2.98	V	-54.94	-13.00		

8.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
5	1.4 MHz	836.5	QPSK	6	0	5.83
			16-QAM			6.48
			64-QAM			6.70
			256-QAM			6.54
	3 MHz		QPSK	15		5.81
			16-QAM			6.62
			64-QAM			6.88
			256-QAM			7.05
	5 MHz		QPSK	25		5.96
			16-QAM			6.71
			64-QAM			6.89
			256-QAM			6.70
	10 MHz		QPSK	50		5.98
			16-QAM			6.63
			64-QAM			6.70
			256-QAM			6.60

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 47 ~ 62.

8.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
5	1.4 MHz	836.5	QPSK	6	0	1.0990
			16-QAM			1.0867
			64-QAM			1.0932
			256-QAM			1.0927
	3 MHz		QPSK	15		2.7022
			16-QAM			2.7504
			64-QAM			2.7055
			256-QAM			2.7424
	5 MHz		QPSK	25		4.5381
			16-QAM			4.5161
			64-QAM			4.5346
			256-QAM			4.5618
	10 MHz		QPSK	50		8.9920
			16-QAM			8.9803
			64-QAM			9.0276
			256-QAM			9.0051

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 63 ~ 78.

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)
5	1.4	824.7	9.9701	28.591	-56.763	-28.172	-13.00
		836.5	6.2613	28.591	-57.824	-29.233	
		848.3	3.9183	27.976	-57.880	-29.904	
	3	826.5	9.9801	28.591	-56.804	-28.213	
		836.5	6.2513	28.591	-57.957	-29.366	
		846.5	5.0748	28.591	-58.731	-30.140	
	5	826.5	9.1127	28.591	-57.058	-28.467	
		836.5	4.0878	27.976	-57.634	-29.658	
		846.5	8.9133	28.591	-58.180	-29.589	
	10	829.0	5.1346	28.591	-58.284	-29.693	
		836.5	3.7787	27.976	-57.609	-29.633	
		844.0	9.1127	28.591	-57.575	-28.984	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 79 ~ 90.
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

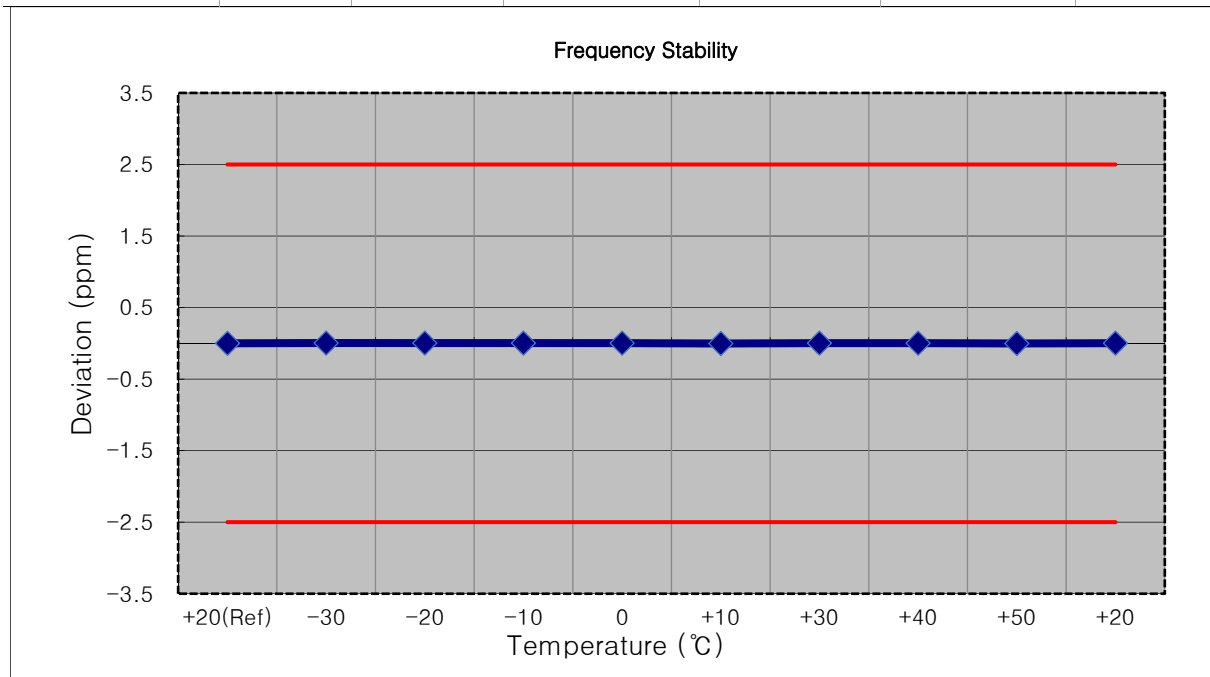
8.6 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 91 ~ 114.

8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

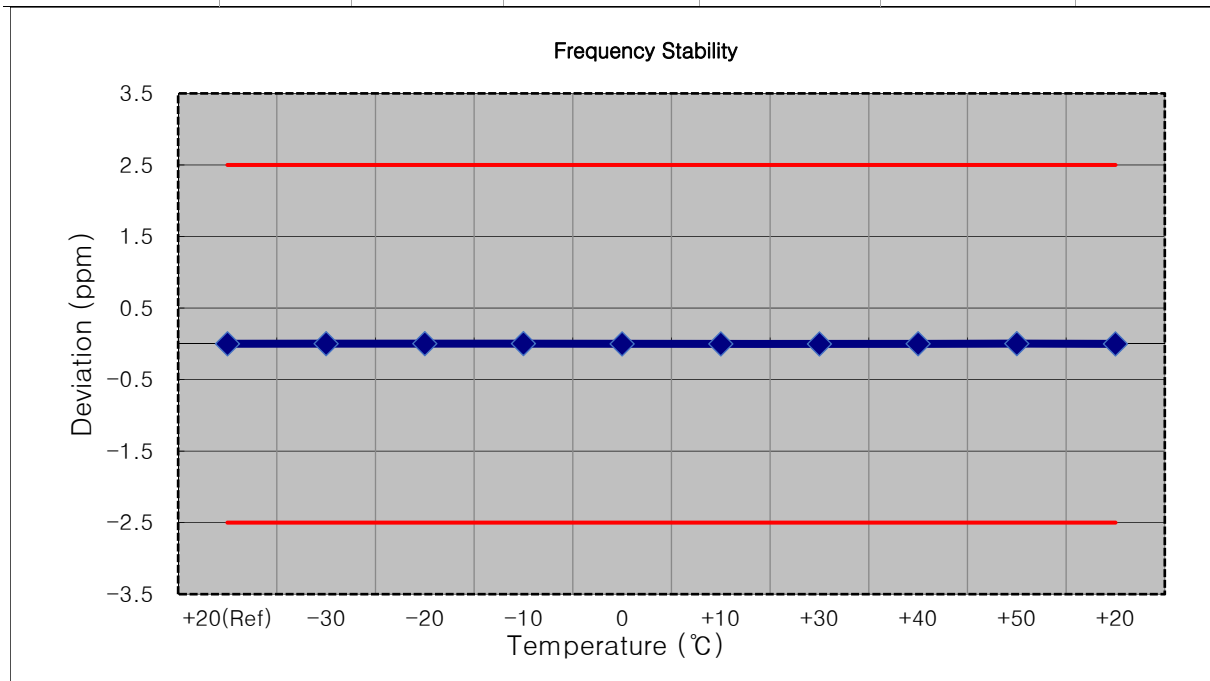
MODE:	<u>LTE B5</u>
OPERATING FREQUENCY:	<u>836,500,000 Hz</u>
CHANNEL:	<u>20525 (1.4 MHz)</u>
REFERENCE VOLTAGE:	<u>3.900 VDC</u>
DEVIATION LIMIT:	<u>± 0.000 25 % or 2.5 ppm</u>

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.900	+20(Ref)	836 499 998	0.0	0.000 000	0.000
100 %		-30	836 500 001	3.0	0.000 000	0.004
100 %		-20	836 500 001	3.1	0.000 000	0.004
100 %		-10	836 500 000	2.4	0.000 000	0.003
100 %		0	836 500 000	2.1	0.000 000	0.003
100 %		+10	836 499 996	-2.3	0.000 000	-0.003
100 %		+30	836 500 000	2.0	0.000 000	0.002
100 %		+40	836 500 000	1.9	0.000 000	0.002
100 %		+50	836 499 996	-1.8	0.000 000	-0.002
Batt. Endpoint	3.300	+20	836 499 999	1.4	0.000 000	0.002



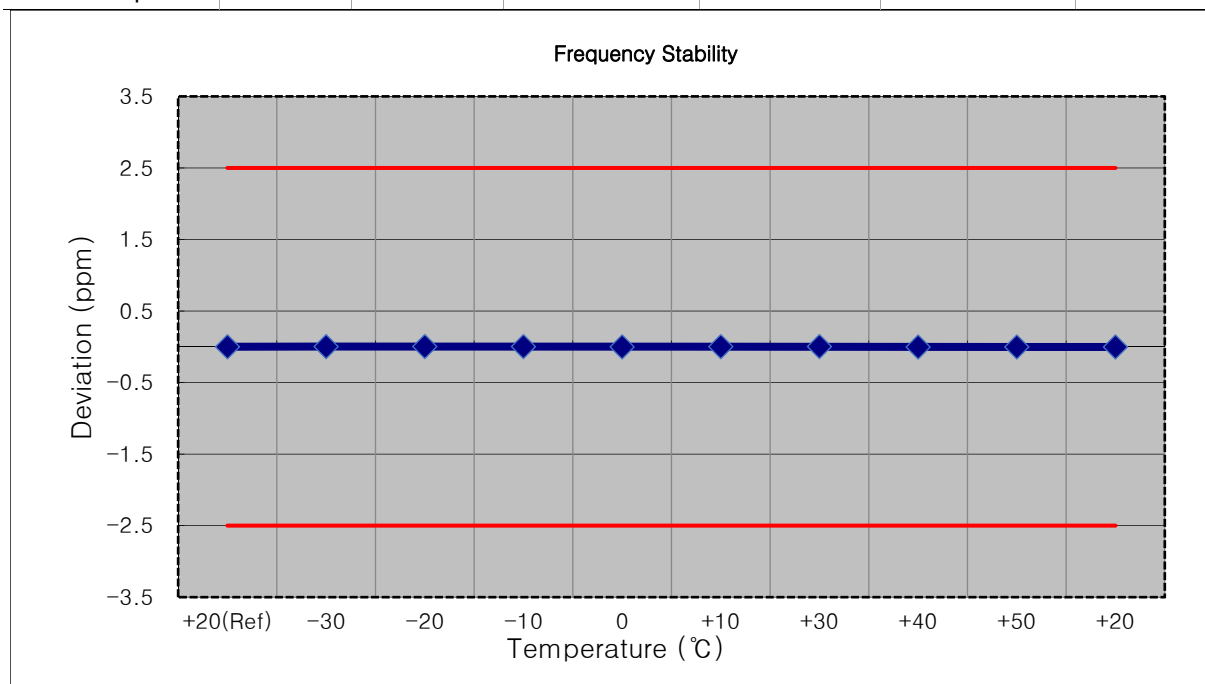
MODE:	<u>LTE B5</u>
OPERATING FREQUENCY:	<u>836,500,000 Hz</u>
CHANNEL:	<u>20525(3 MHz)</u>
REFERENCE VOLTAGE:	<u>3.900 VDC</u>
DEVIATION LIMIT:	<u>± 0.000 25 % or 2.5 ppm</u>

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100 %	3.900	+20(Ref)	836 499 998	0.0	0.000 000	0.000
100 %		-30	836 499 999	1.3	0.000 000	0.002
100 %		-20	836 499 999	1.5	0.000 000	0.002
100 %		-10	836 500 000	2.1	0.000 000	0.003
100 %		0	836 499 996	-1.4	0.000 000	-0.002
100 %		+10	836 499 996	-1.7	0.000 000	-0.002
100 %		+30	836 499 996	-1.8	0.000 000	-0.002
100 %		+40	836 499 998	0.4	0.000 000	0.000
100 %		+50	836 500 000	1.9	0.000 000	0.002
Batt. Endpoint	3.300	+20	836 499 996	-1.3	0.000 000	-0.002



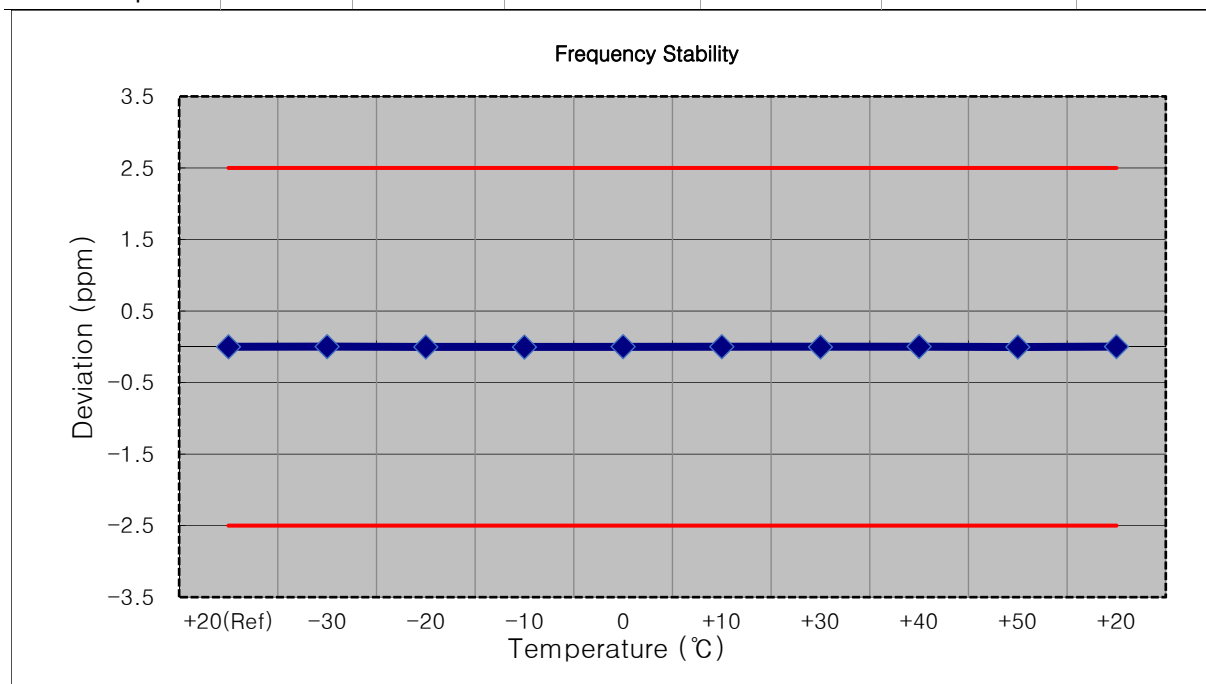
MODE:	<u>LTE B5</u>
OPERATING FREQUENCY:	<u>836,500,000 Hz</u>
CHANNEL:	<u>20525(5 MHz)</u>
REFERENCE VOLTAGE:	<u>3.900 VDC</u>
DEVIATION LIMIT:	<u>± 0.000 25 % or 2.5 ppm</u>

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100 %	3.900	+20(Ref)	836 500 002	0.0	0.000 000	0.000
100 %		-30	836 500 004	2.4	0.000 000	0.003
100 %		-20	836 500 005	2.9	0.000 000	0.003
100 %		-10	836 500 004	2.2	0.000 000	0.003
100 %		0	836 500 000	-1.7	0.000 000	-0.002
100 %		+10	836 500 004	1.7	0.000 000	0.002
100 %		+30	836 500 005	2.6	0.000 000	0.003
100 %		+40	836 499 999	-2.7	0.000 000	-0.003
100 %		+50	836 500 000	-2.1	0.000 000	-0.003
Batt. Endpoint	3.300	+20	836 500 000	-2.2	0.000 000	-0.003



MODE:	<u>LTE B5</u>
OPERATING FREQUENCY:	<u>836,500,000 Hz</u>
CHANNEL:	<u>20525(10 MHz)</u>
REFERENCE VOLTAGE:	<u>3.900 VDC</u>
DEVIATION LIMIT:	<u>± 0.000 25 % or 2.5 ppm</u>

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100 %	3.900	+20(Ref)	836 499 998	0.0	0.000 000	0.000
100 %		-30	836 500 000	1.7	0.000 000	0.002
100 %		-20	836 499 996	-2.0	0.000 000	-0.002
100 %		-10	836 499 995	-3.3	0.000 000	-0.004
100 %		0	836 500 000	1.6	0.000 000	0.002
100 %		+10	836 500 000	1.2	0.000 000	0.001
100 %		+30	836 499 996	-2.0	0.000 000	-0.002
100 %		+40	836 500 001	2.4	0.000 000	0.003
100 %		+50	836 499 995	-3.0	0.000 000	-0.004
Batt. Endpoint	3.300	+20	836 500 000	2.1	0.000 000	0.003



9. TEST DATA(Sub 1 ANT)

9.1 EFFECTIVE RADIATED POWER

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured	Substitute	Ant.	C.L	Pol	Limit	ERP		RB	
			Level (dBm)	Level (dBm)	Gain (dBd)			W	W	dBm	Size	Offset
824.7	LTE B5/ 1.4 MHz	QPSK	-34.32	28.67	-9.95	1.44	H	< 7.00	0.053	17.28	1	0
		16-QAM	-36.14	26.85	-9.95	1.44	H		0.035	15.46		
		64-QAM	-37.28	25.71	-9.95	1.44	H		0.027	14.32		
		256-QAM	-39.33	23.66	-9.95	1.44	H		0.017	12.27		
836.5		QPSK	-35.05	27.81	-9.90	1.45	H		0.044	16.46	1	0
		16-QAM	-36.87	25.99	-9.90	1.45	H		0.029	14.64		
		64-QAM	-38.02	24.84	-9.90	1.45	H		0.022	13.49		
		256-QAM	-40.14	22.72	-9.90	1.45	H		0.014	11.37		
848.3		QPSK	-35.97	27.12	-9.85	1.45	H		0.038	15.82	1	0
		16-QAM	-37.88	25.21	-9.85	1.45	H		0.025	13.91		
		64-QAM	-38.99	24.10	-9.85	1.45	H		0.019	12.80		
		256-QAM	-41.13	21.96	-9.85	1.45	H		0.012	10.66		

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
825.5	LTE B5/ 3 MHz	QPSK	-34.25	28.71	-9.95	1.44	H	< 7.00	0.054	17.32	1	0
		16-QAM	-36.00	26.96	-9.95	1.44	H		0.036	15.57		
		64-QAM	-37.14	25.82	-9.95	1.44	H		0.028	14.43		
		256-QAM	-39.32	23.64	-9.95	1.44	H		0.017	12.25		
836.5		QPSK	-34.88	27.98	-9.90	1.45	H		0.046	16.63	1	0
		16-QAM	-36.65	26.21	-9.90	1.45	H		0.031	14.86		
		64-QAM	-37.80	25.06	-9.90	1.45	H		0.023	13.71		
		256-QAM	-39.93	22.93	-9.90	1.45	H		0.014	11.58		
847.5		QPSK	-35.88	27.34	-9.85	1.45	H		0.040	16.04	1	0
		16-QAM	-36.76	26.46	-9.85	1.45	H		0.033	15.16		
		64-QAM	-37.86	25.36	-9.85	1.45	H		0.025	14.06		
		256-QAM	-40.92	22.30	-9.85	1.45	H		0.013	11.00		

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
826.5	LTE B5/ 5 MHz	QPSK	-34.33	28.58	-9.95	1.44	H	< 7.00	0.052	17.19	1	0
		16-QAM	-36.15	26.76	-9.95	1.44	H		0.034	15.37		
		64-QAM	-37.13	25.78	-9.95	1.44	H		0.027	14.39		
		256-QAM	-39.30	23.61	-9.95	1.44	H		0.017	12.22		
836.5		QPSK	-34.85	28.01	-9.90	1.45	H		0.046	16.66	1	0
		16-QAM	-36.66	26.20	-9.90	1.45	H		0.031	14.85		
		64-QAM	-37.79	25.07	-9.90	1.45	H		0.024	13.72		
		256-QAM	-39.85	23.01	-9.90	1.45	H		0.015	11.66		
846.5		QPSK	-35.84	27.45	-9.85	1.45	H		0.041	16.15	1	0
		16-QAM	-37.65	25.64	-9.85	1.45	H		0.027	14.34		
		64-QAM	-38.80	24.49	-9.85	1.45	H		0.021	13.19		
		256-QAM	-40.88	22.41	-9.85	1.45	H		0.013	11.11		

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
829.0	LTE B5/ 10 MHz	QPSK	-34.28	28.57	-9.95	1.44	H	< 7.00	0.052	17.18	1	0
		16-QAM	-36.12	26.73	-9.95	1.44	H		0.034	15.34		
		64-QAM	-37.24	25.61	-9.95	1.44	H		0.026	14.22		
		256-QAM	-39.34	23.51	-9.95	1.44	H		0.016	12.12		
836.5		QPSK	-34.74	28.12	-9.90	1.45	H		0.048	16.77	1	0
		16-QAM	-36.60	26.26	-9.90	1.45	H		0.031	14.91		
		64-QAM	-37.73	25.13	-9.90	1.45	H		0.024	13.78		
		256-QAM	-39.72	23.14	-9.90	1.45	H		0.015	11.79		
844.0		QPSK	-35.29	27.95	-9.85	1.45	H		0.046	16.65	1	0
		16-QAM	-37.15	26.09	-9.85	1.45	H		0.030	14.79		
		64-QAM	-38.23	25.01	-9.85	1.45	H		0.023	13.71		
		256-QAM	-40.41	22.83	-9.85	1.45	H		0.014	11.53		

9.2 RADIATED SPURIOUS EMISSIONS

MODE: LTE B5
 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
20415 (825.5)	1 651.00	-47.40	9.44	-62.34	2.02	V	-54.92	-13.00	1	0
	2 476.50	-42.59	10.34	-53.76	2.57	V	-45.99	-13.00		
	3 302.00	-54.66	11.09	-62.87	2.96	V	-54.74	-13.00		
20525 (836.5)	1 673.00	-49.55	9.60	-64.82	2.05	V	-57.27	-13.00	1	0
	2 509.50	-42.20	10.26	-53.48	2.51	V	-45.73	-13.00		
	3 346.00	-53.67	11.10	-62.33	2.96	V	-54.19	-13.00		
20635 (847.5)	1 695.00	-50.63	9.73	-65.85	2.07	V	-58.19	-13.00	1	0
	2 542.50	-40.14	10.25	-51.18	2.53	V	-43.46	-13.00		
	3 390.00	-53.80	11.19	-62.72	2.98	V	-54.51	-13.00		

9.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
5	1.4 MHz	836.5	QPSK	6	0	6.33
			16-QAM			7.22
			64-QAM			7.25
			256-QAM			6.71
	3 MHz		QPSK	15		6.26
			16-QAM			7.03
			64-QAM			7.04
			256-QAM			6.81
	5 MHz		QPSK	25		6.38
			16-QAM			7.05
			64-QAM			7.23
			256-QAM			6.84
	10 MHz		QPSK	50		6.19
			16-QAM			6.83
			64-QAM			6.94
			256-QAM			6.70

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 116 ~ 131.

9.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
5	1.4 MHz	836.5	QPSK	6	0	1.0989
			16-QAM			1.0973
			64-QAM			1.0955
			256-QAM			1.0934
	3 MHz		QPSK	15		2.7243
			16-QAM			2.7072
			64-QAM			2.7058
			256-QAM			2.7070
	5 MHz		QPSK	25		4.5382
			16-QAM			4.5192
			64-QAM			4.5349
			256-QAM			4.5561
	10 MHz		QPSK	50		9.0084
			16-QAM			8.9971
			64-QAM			9.0126
			256-QAM			9.0012

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 132 ~ 147.

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)
5	1.4	824.7	5.2742	28.591	-57.851	-29.260	-13.00
		836.5	5.7727	28.591	-58.080	-29.489	
		848.3	8.3450	28.591	-57.161	-28.570	
	3	826.5	3.7787	27.976	-57.919	-29.943	
		836.5	9.6909	28.591	-58.372	-29.781	
		846.5	3.7688	27.976	-57.657	-29.681	
	5	826.5	8.0758	28.591	-57.682	-29.091	
		836.5	7.8066	28.591	-57.550	-28.959	
		846.5	4.9851	27.976	-58.499	-30.523	
	10	829.0	9.7208	28.591	-57.794	-29.203	
		836.5	3.8086	27.976	-57.452	-29.476	
		844.0	8.9232	28.591	-57.848	-29.257	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 148 ~ 159.
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

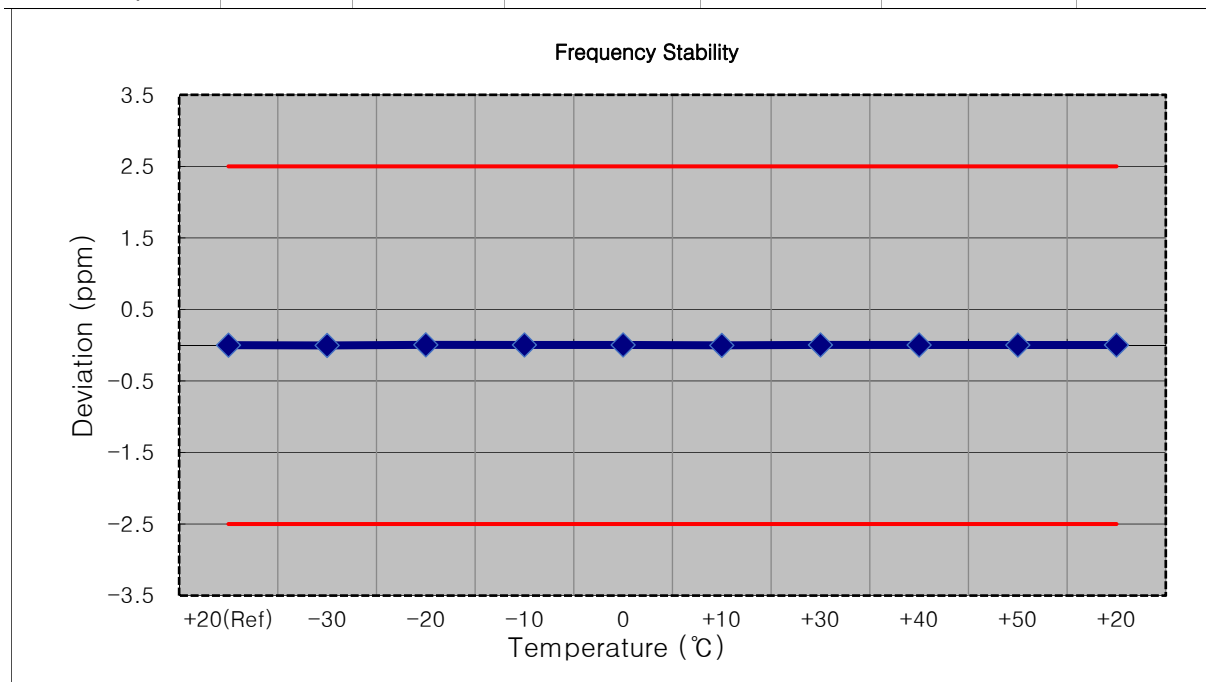
9.6 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 160 ~ 183.

9.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

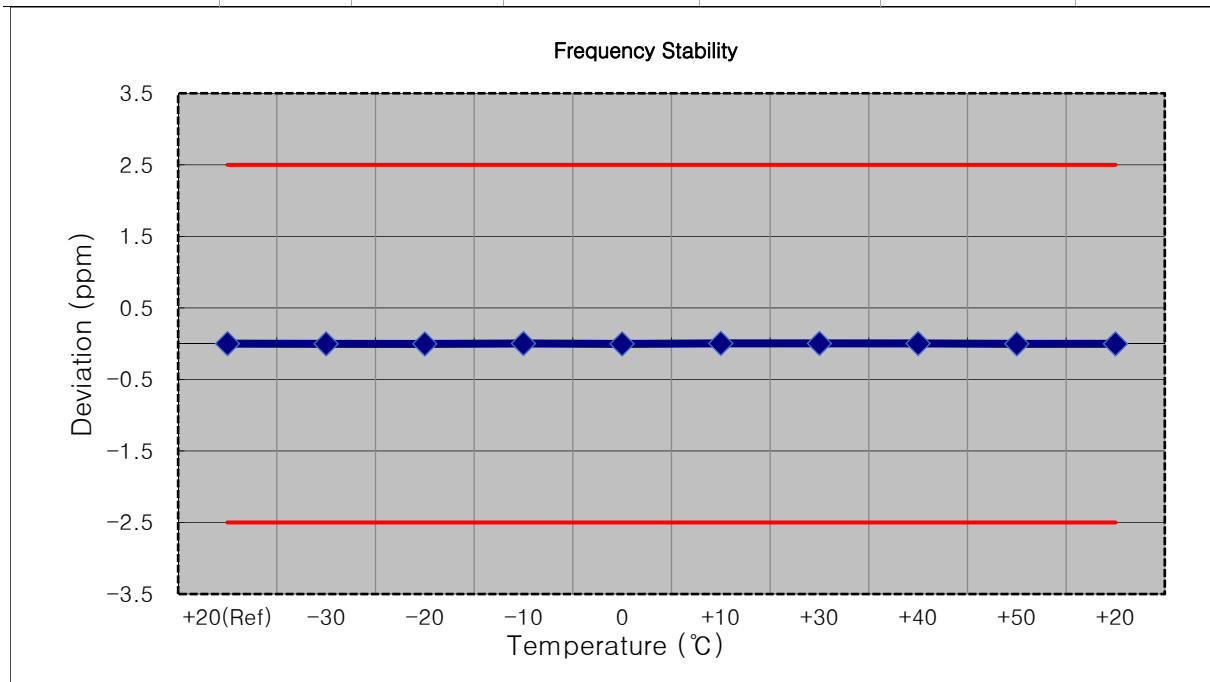
MODE:	<u>LTE B5</u>
OPERATING FREQUENCY:	<u>836,500,000 Hz</u>
CHANNEL:	<u>20525 (1.4 MHz)</u>
REFERENCE VOLTAGE:	<u>3.900 VDC</u>
DEVIATION LIMIT:	<u>± 0.000 25 % or 2.5 ppm</u>

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.900	+20(Ref)	836 499 997	0.0	0.000 000	0.000
100 %		-30	836 499 995	-2.6	0.000 000	-0.003
100 %		-20	836 500 001	4.1	0.000 000	0.005
100 %		-10	836 500 000	2.7	0.000 000	0.003
100 %		0	836 500 000	2.7	0.000 000	0.003
100 %		+10	836 499 995	-2.0	0.000 000	-0.002
100 %		+30	836 500 000	2.8	0.000 000	0.003
100 %		+40	836 499 999	2.2	0.000 000	0.003
100 %		+50	836 499 999	1.6	0.000 000	0.002
Batt. Endpoint	3.300	+20	836 499 999	1.9	0.000 000	0.002



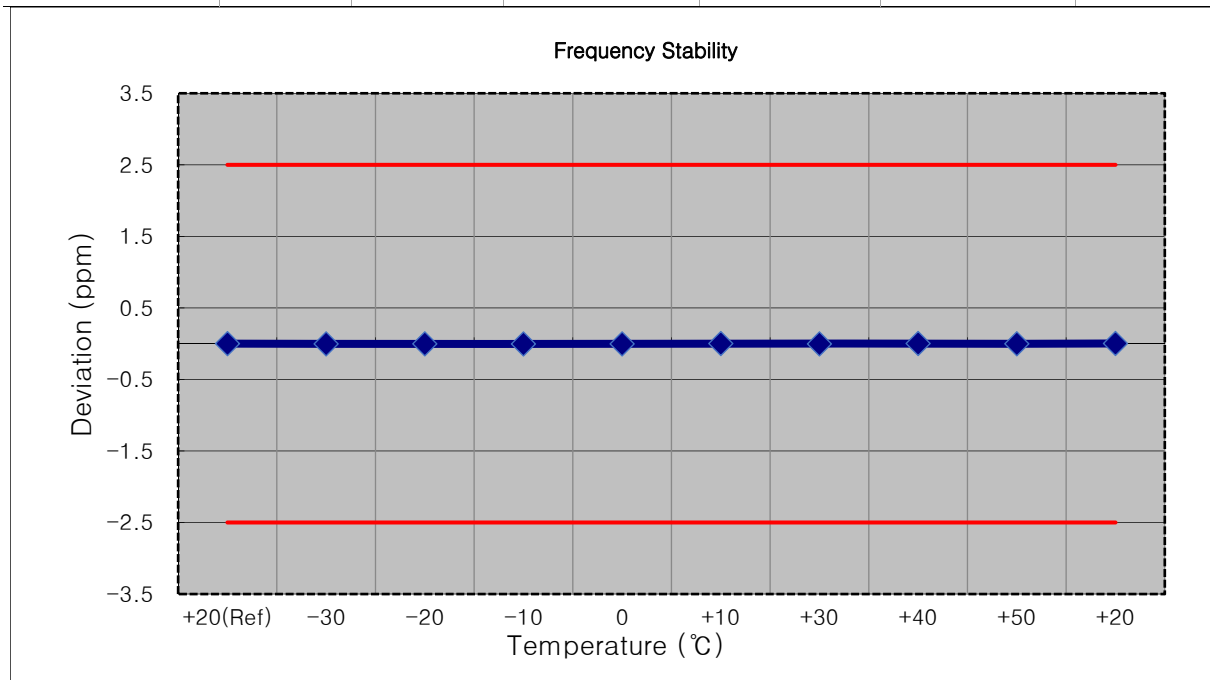
MODE:	<u>LTE B5</u>
OPERATING FREQUENCY:	<u>836,500,000 Hz</u>
CHANNEL:	<u>20525(3 MHz)</u>
REFERENCE VOLTAGE:	<u>3.900 VDC</u>
DEVIATION LIMIT:	<u>± 0.000 25 % or 2.5 ppm</u>

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100 %	3.900	+20(Ref)	836 499 998	0.0	0.000 000	0.000
100 %		-30	836 499 995	-2.5	0.000 000	-0.003
100 %		-20	836 499 995	-2.6	0.000 000	-0.003
100 %		-10	836 499 999	1.8	0.000 000	0.002
100 %		0	836 499 995	-2.6	0.000 000	-0.003
100 %		+10	836 500 001	3.1	0.000 000	0.004
100 %		+30	836 500 000	2.9	0.000 000	0.003
100 %		+40	836 500 000	2.3	0.000 000	0.003
100 %		+50	836 499 995	-2.5	0.000 000	-0.003
Batt. Endpoint	3.300	+20	836 499 995	-2.1	0.000 000	-0.003



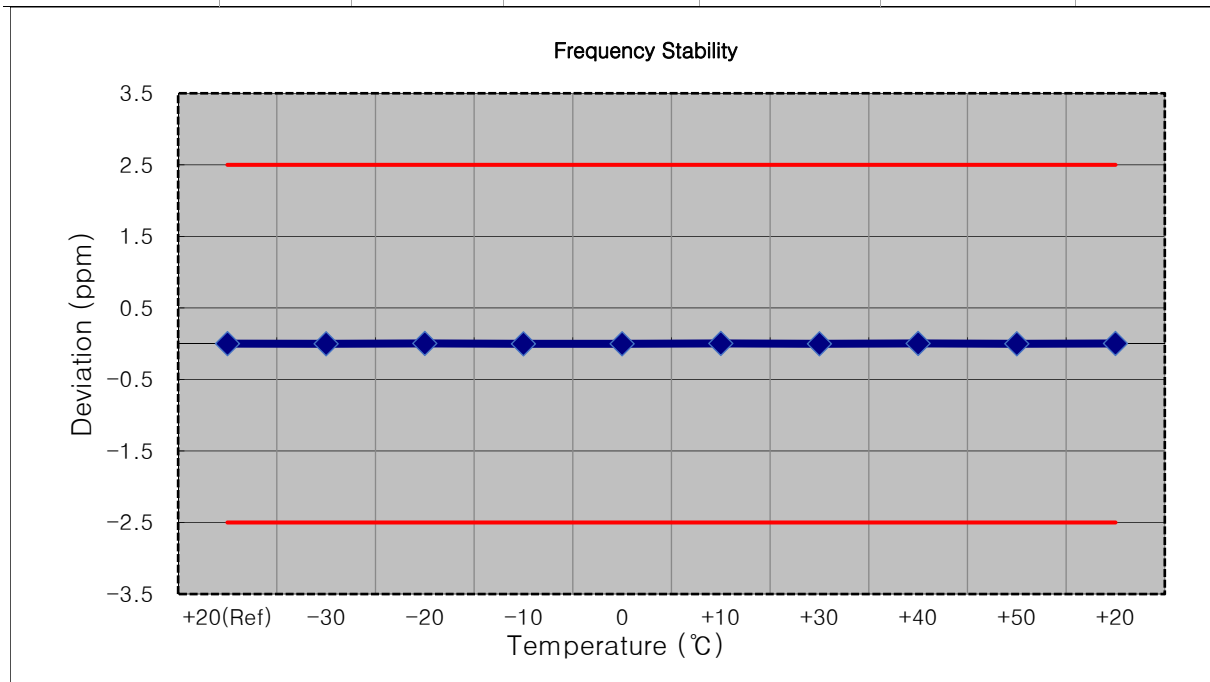
MODE:	<u>LTE B5</u>
OPERATING FREQUENCY:	<u>836,500,000 Hz</u>
CHANNEL:	<u>20525(5 MHz)</u>
REFERENCE VOLTAGE:	<u>3.900 VDC</u>
DEVIATION LIMIT:	<u>± 0.000 25 % or 2.5 ppm</u>

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100 %	3.900	+20(Ref)	836 499 997	0.0	0.000 000	0.000
100 %		-30	836 499 995	-2.6	0.000 000	-0.003
100 %		-20	836 499 995	-2.0	0.000 000	-0.002
100 %		-10	836 499 994	-3.2	0.000 000	-0.004
100 %		0	836 499 994	-3.0	0.000 000	-0.004
100 %		+10	836 499 999	1.7	0.000 000	0.002
100 %		+30	836 499 995	-2.8	0.000 000	-0.003
100 %		+40	836 500 000	2.3	0.000 000	0.003
100 %		+50	836 499 996	-1.8	0.000 000	-0.002
Batt. Endpoint	3.300	+20	836 500 000	2.4	0.000 000	0.003



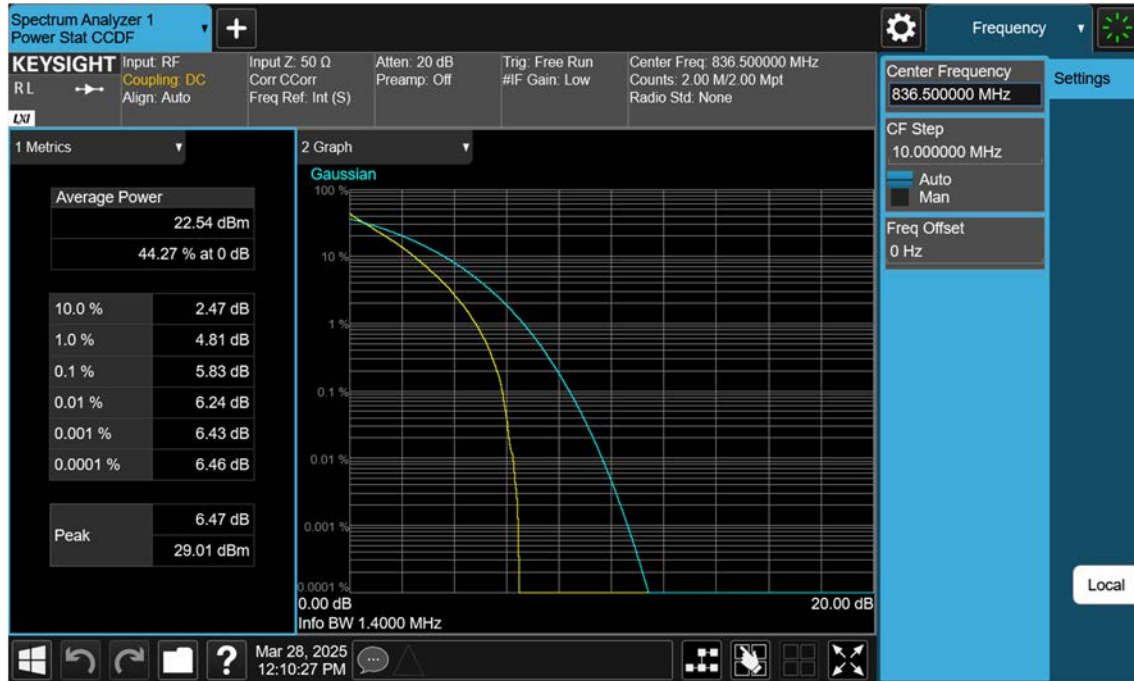
MODE:	<u>LTE B5</u>
OPERATING FREQUENCY:	<u>836,500,000 Hz</u>
CHANNEL:	<u>20525(10 MHz)</u>
REFERENCE VOLTAGE:	<u>3.900 VDC</u>
DEVIATION LIMIT:	<u>± 0.000 25 % or 2.5 ppm</u>

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100 %	3.900	+20(Ref)	836 499 998	0.0	0.000 000	0.000
100 %		-30	836 499 996	-1.8	0.000 000	-0.002
100 %		-20	836 500 001	2.9	0.000 000	0.003
100 %		-10	836 499 996	-1.9	0.000 000	-0.002
100 %		0	836 499 997	-1.6	0.000 000	-0.002
100 %		+10	836 500 001	2.7	0.000 000	0.003
100 %		+30	836 499 996	-1.8	0.000 000	-0.002
100 %		+40	836 500 001	2.5	0.000 000	0.003
100 %		+50	836 499 997	-1.7	0.000 000	-0.002
Batt. Endpoint	3.300	+20	836 500 000	2.1	0.000 000	0.003

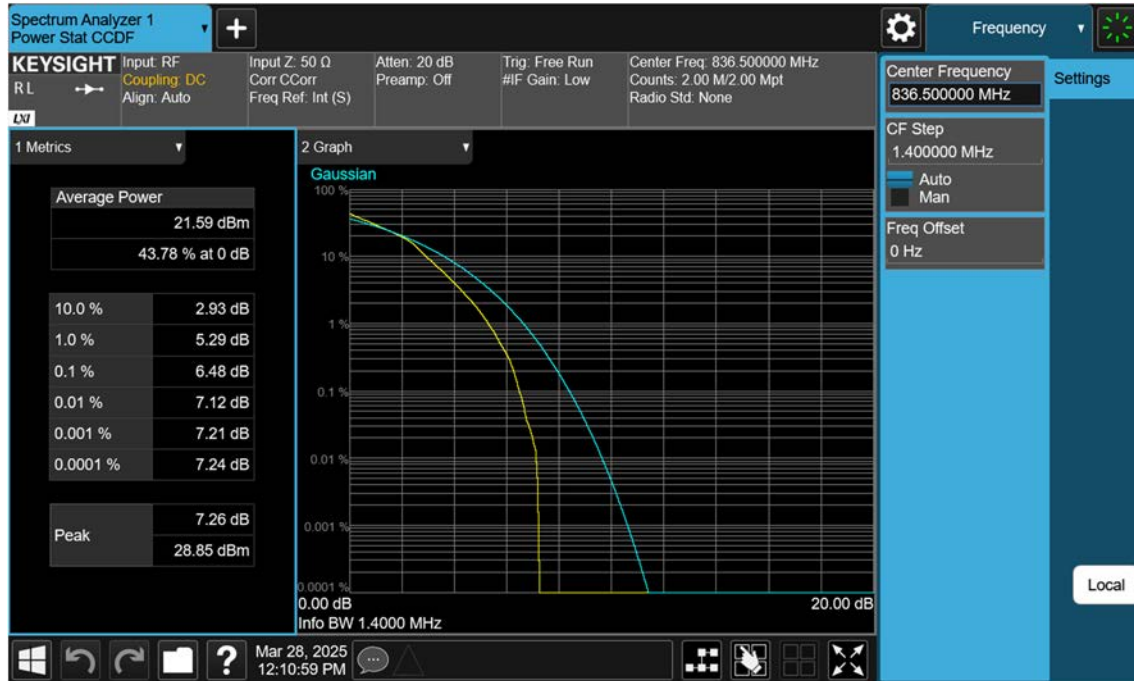


10. TEST PLOTS(Main 1 ANT)

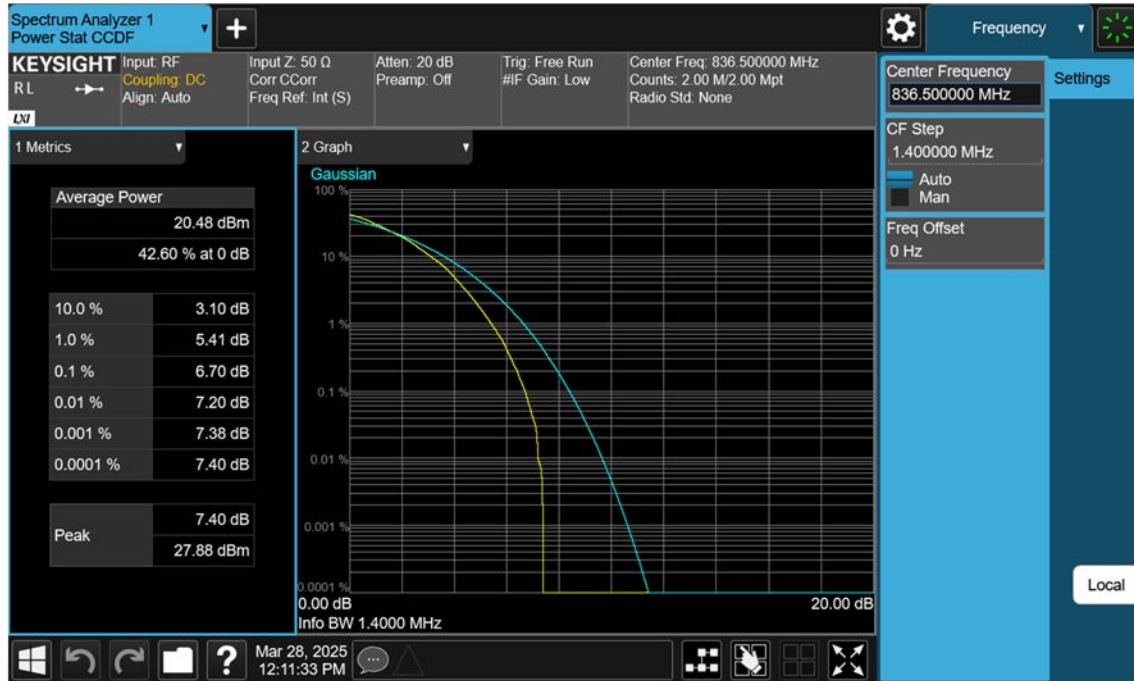
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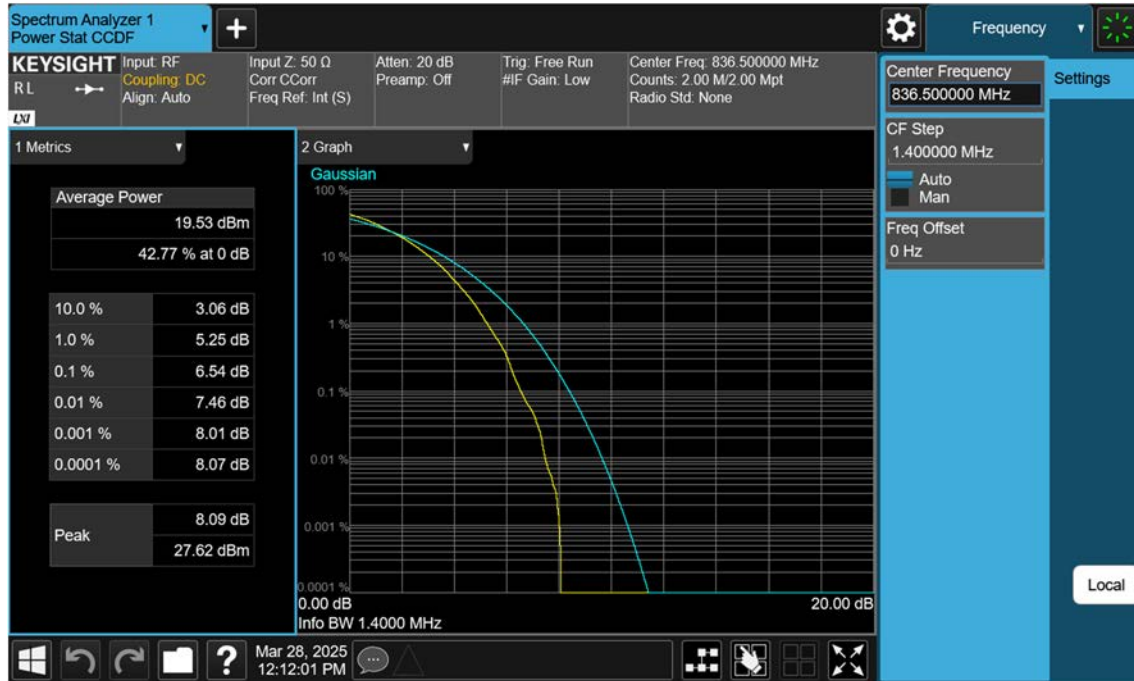
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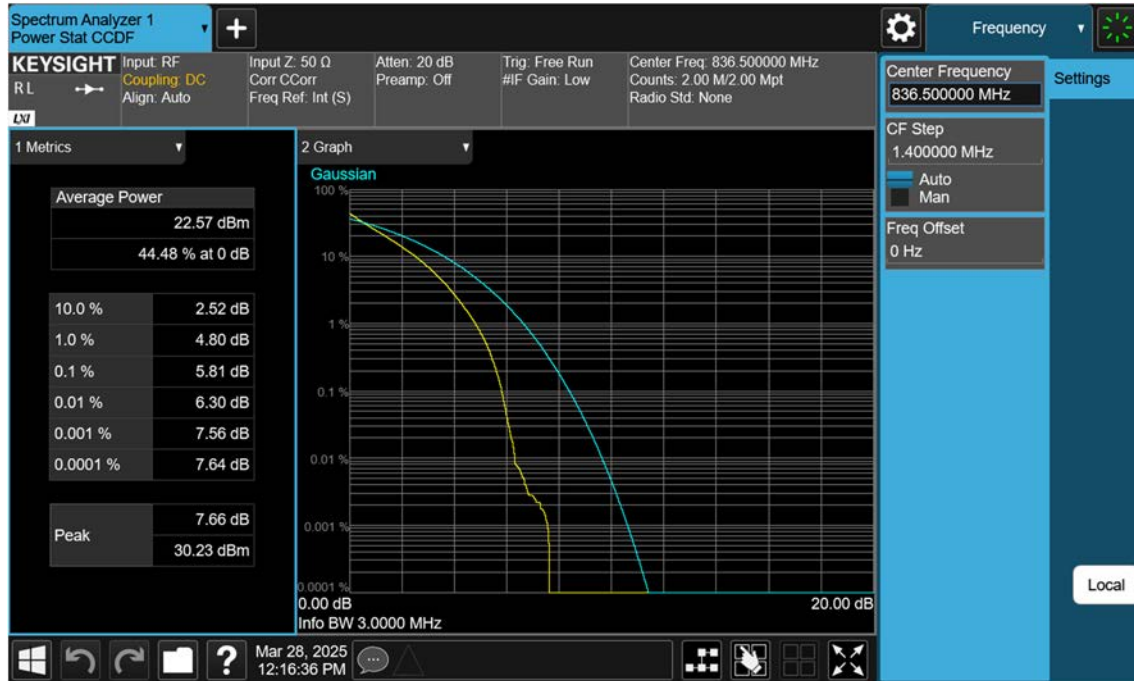
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LTE B5_1.4M_PAR_Mid_256QAM_FullRB



LTE B5_3 M_PAR_Mid_QPSK_FullRB



LTE B5_3 M_PAR_Mid_16QAM_FullRB



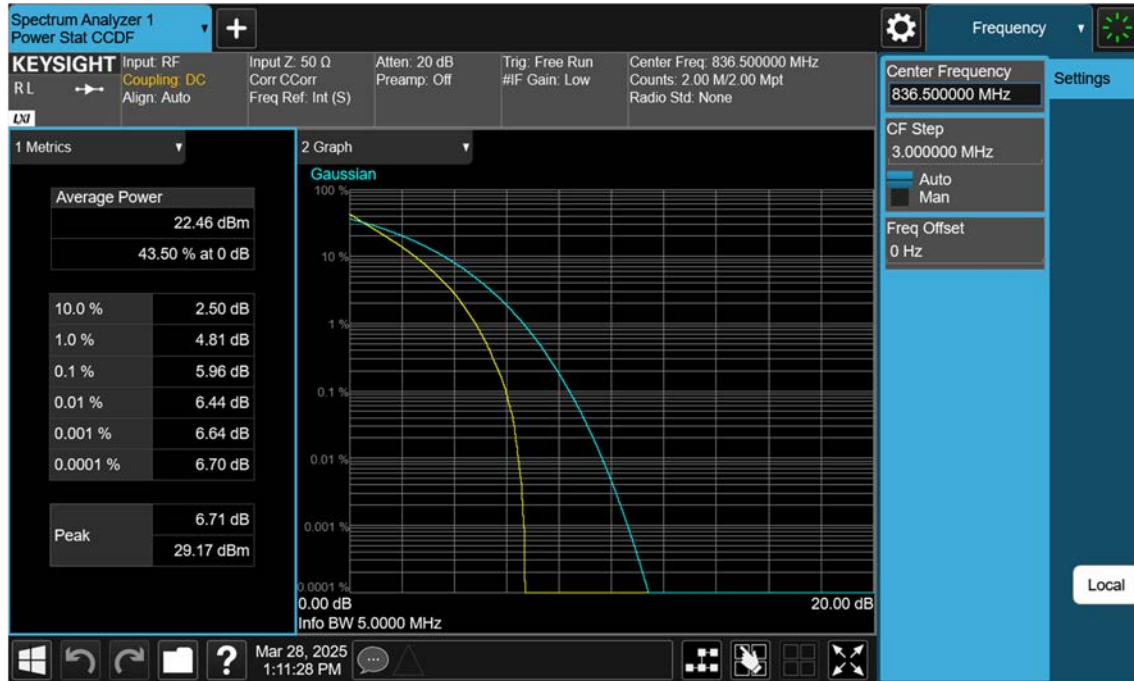
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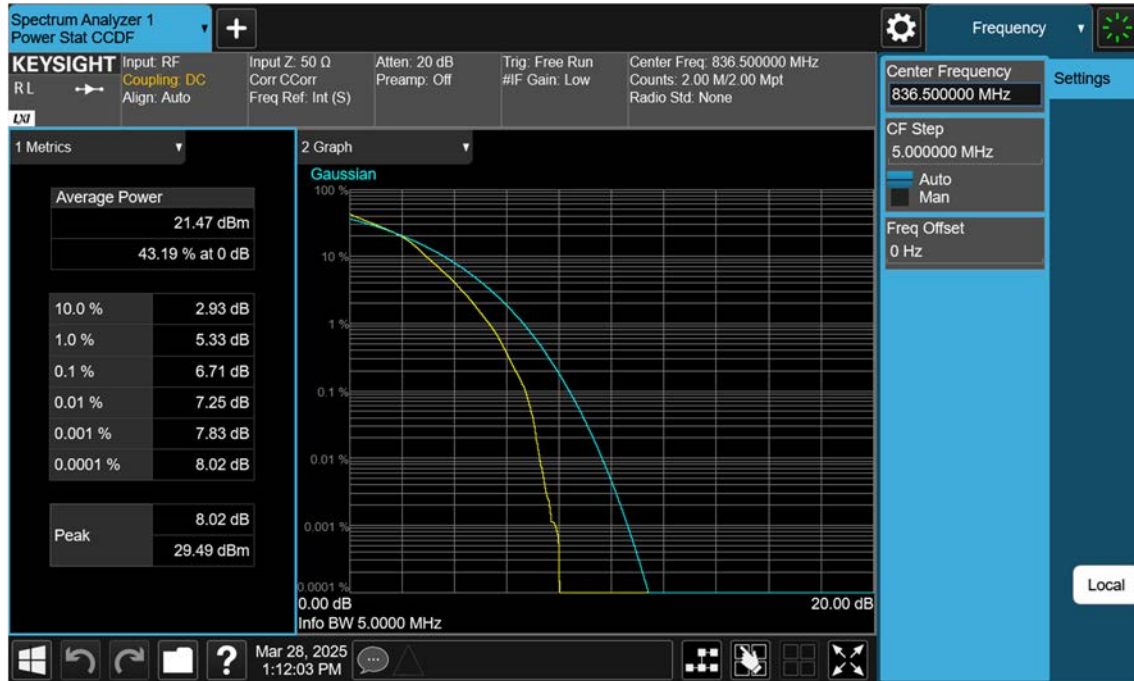
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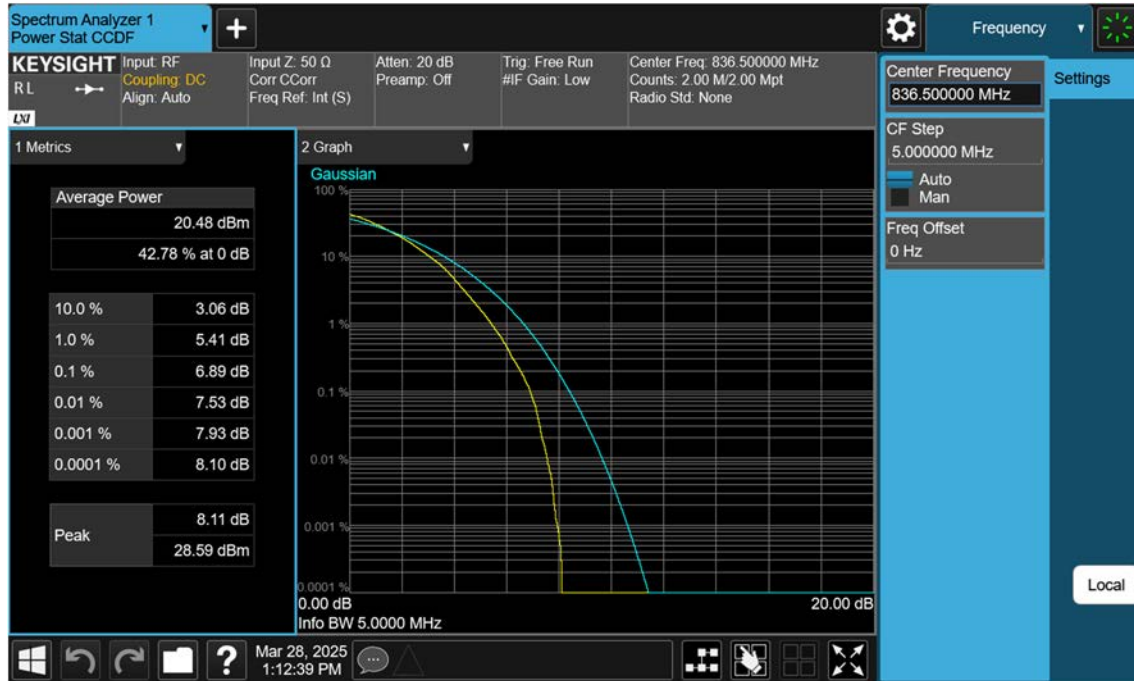
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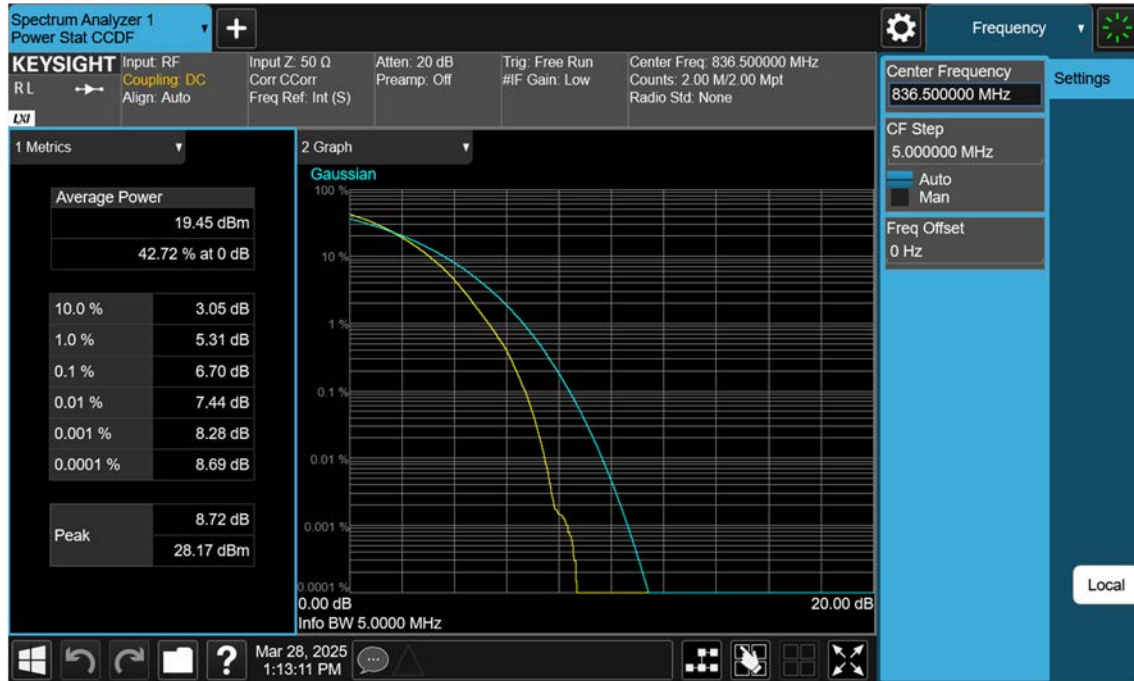
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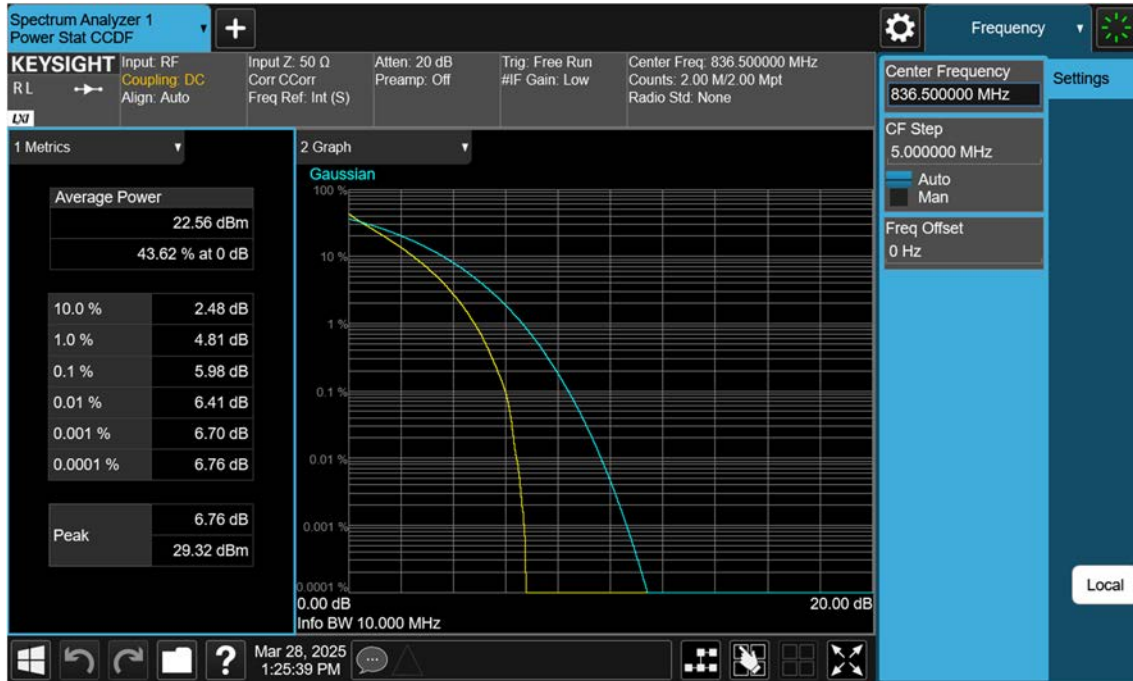
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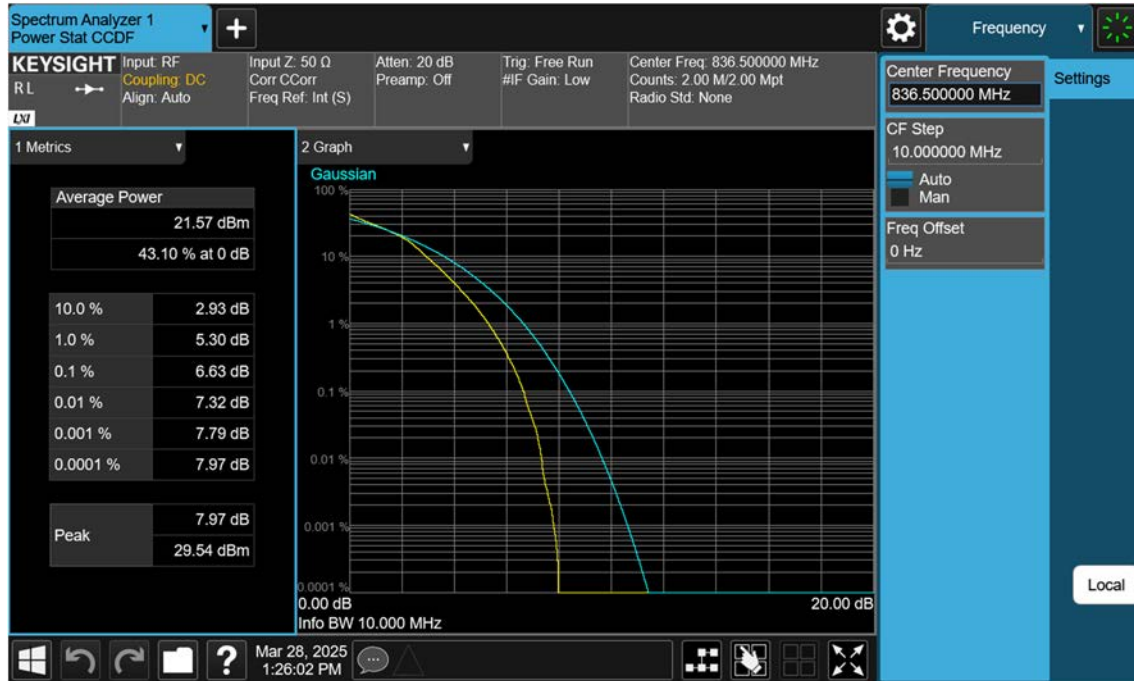
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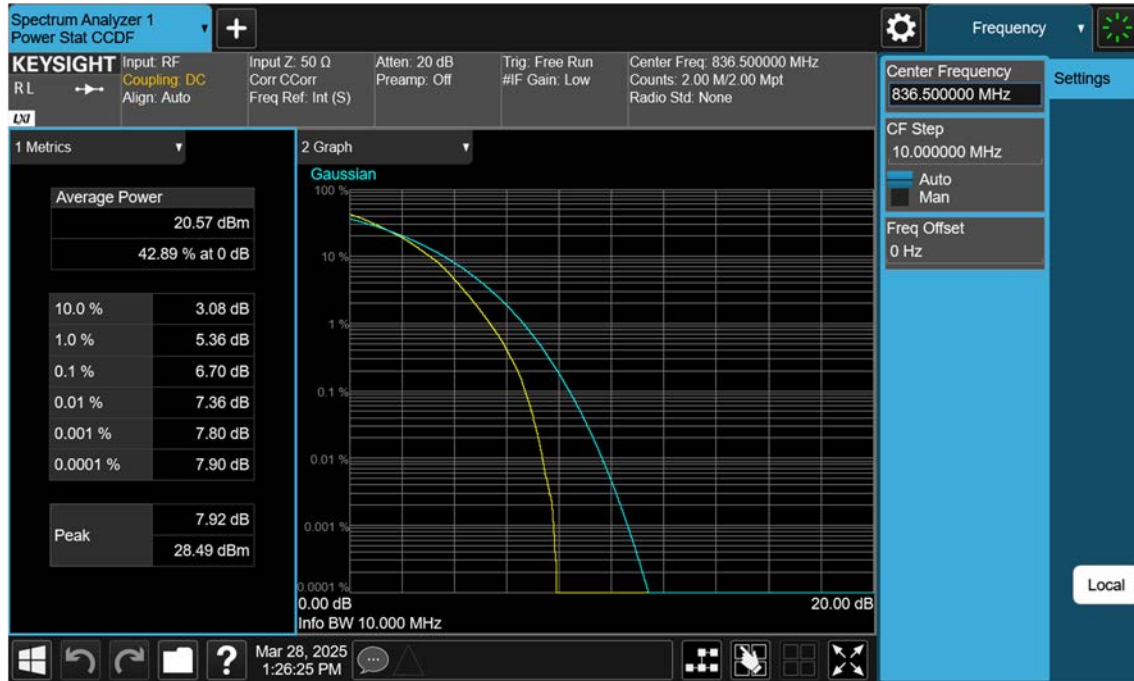
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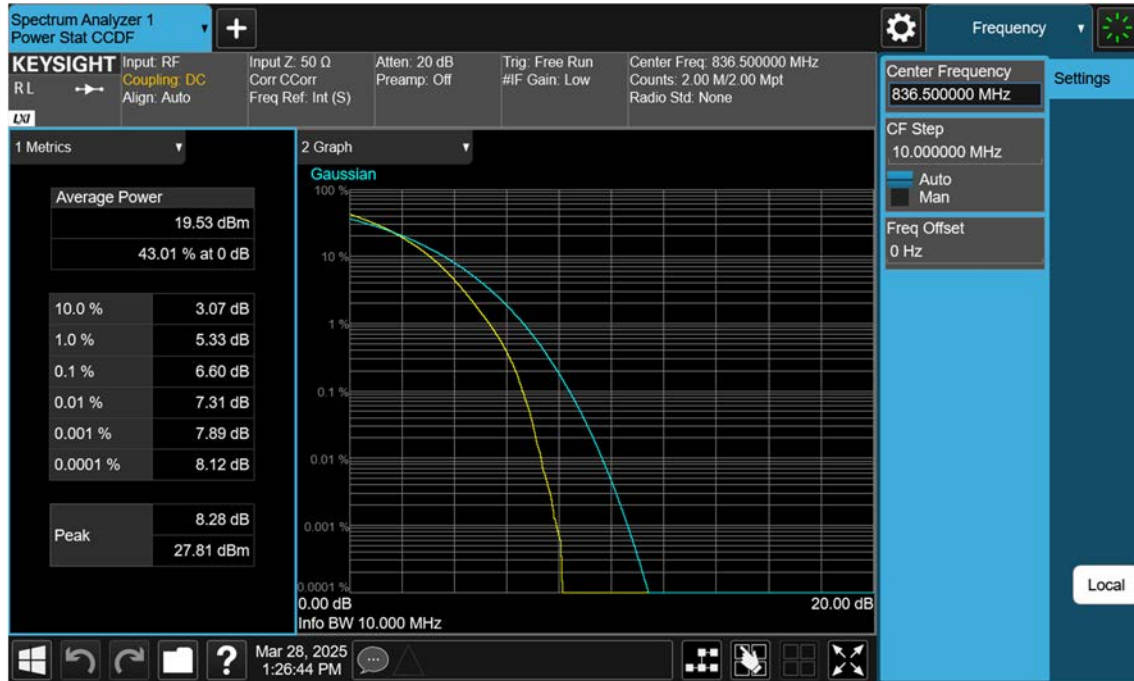
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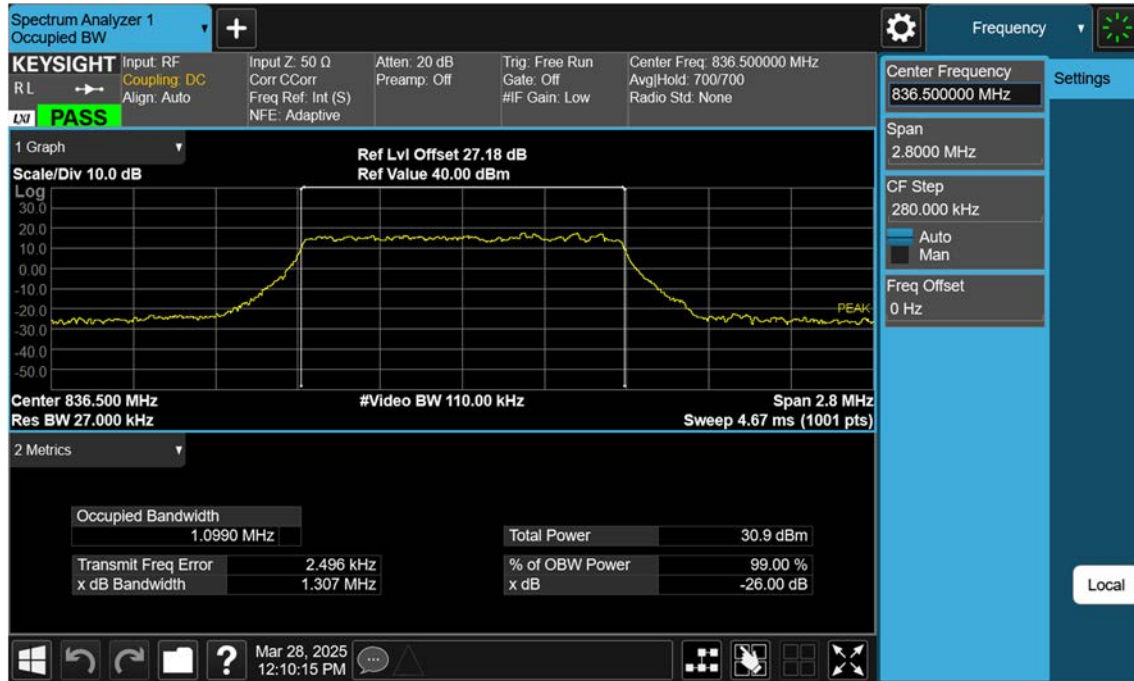
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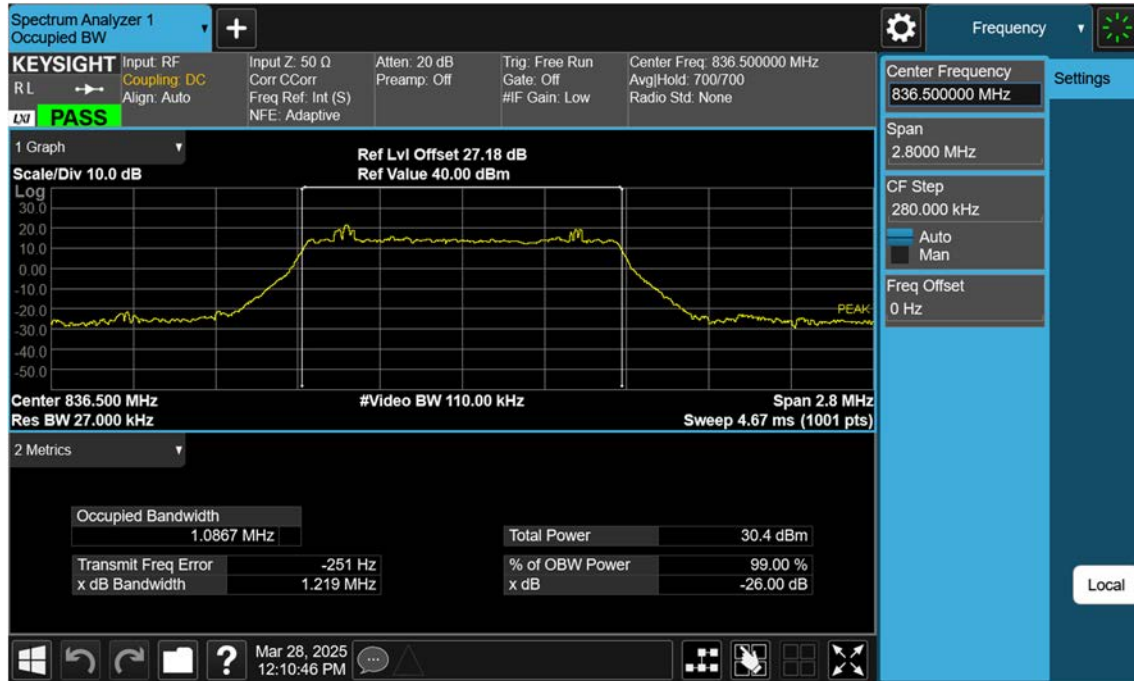
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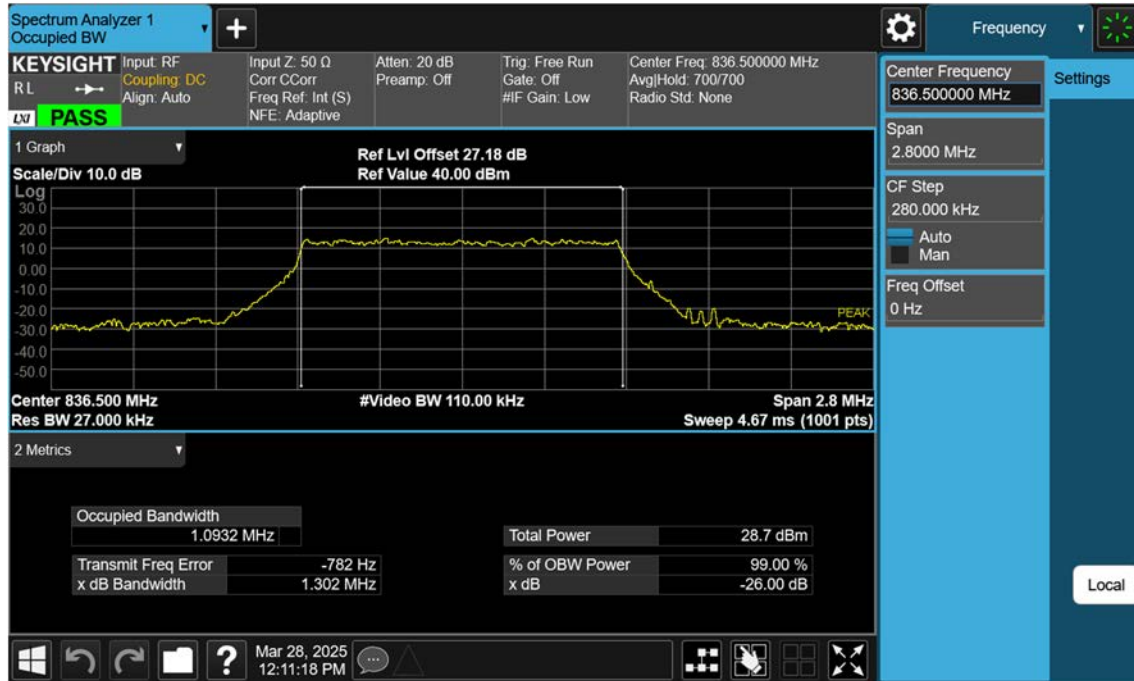
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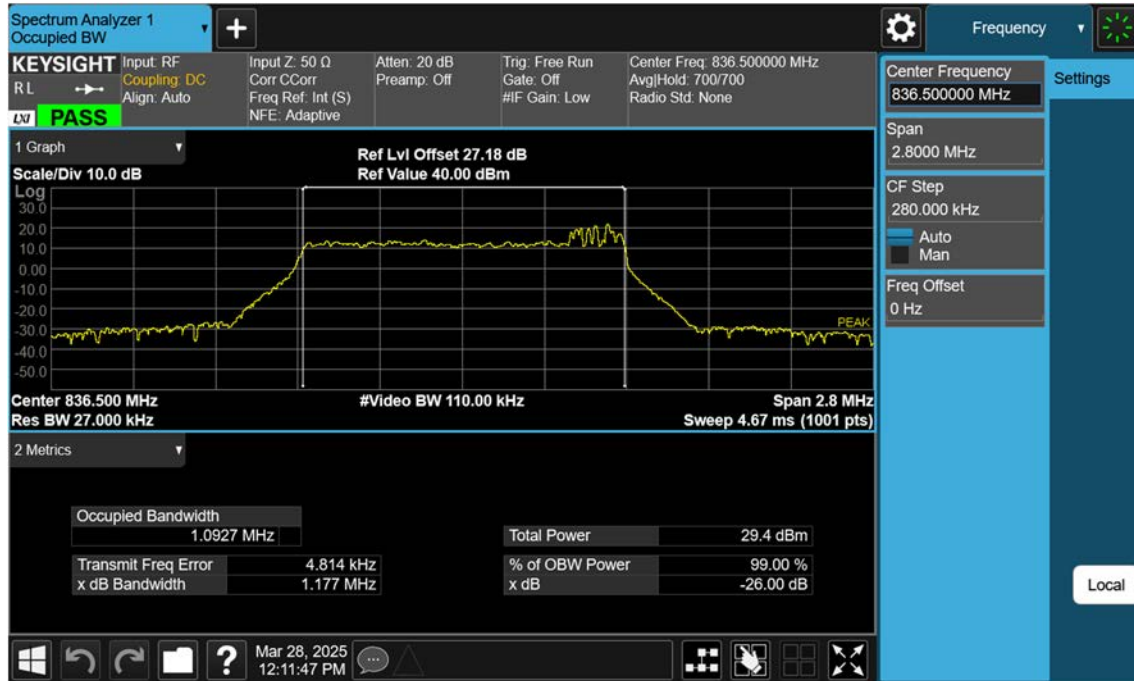
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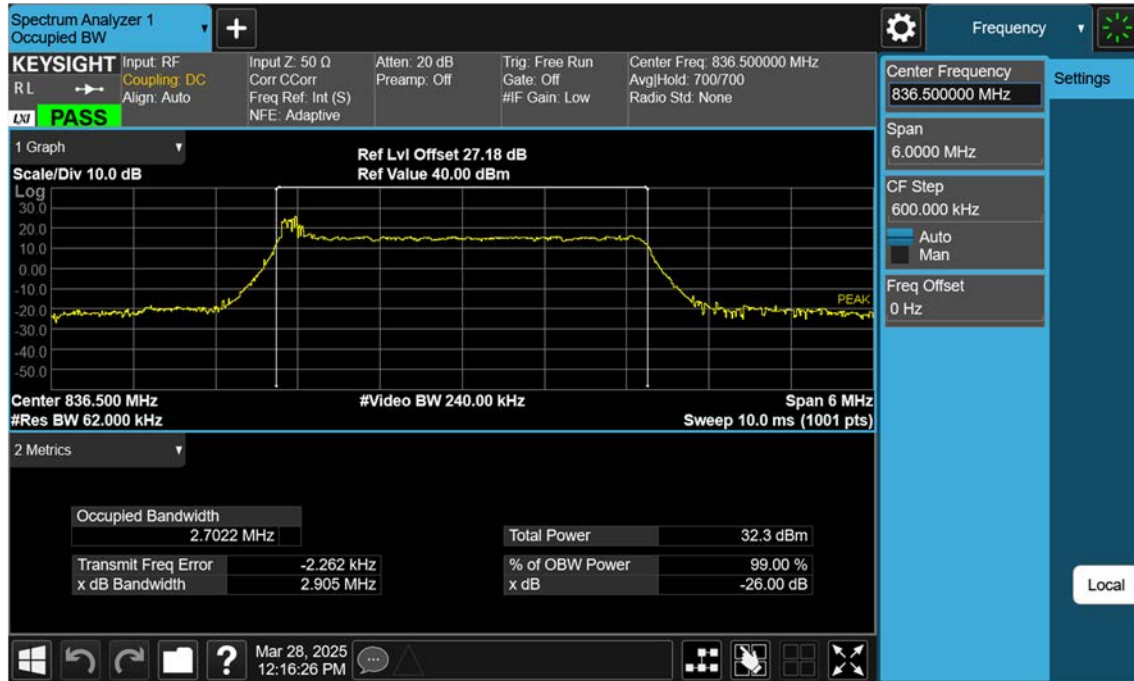
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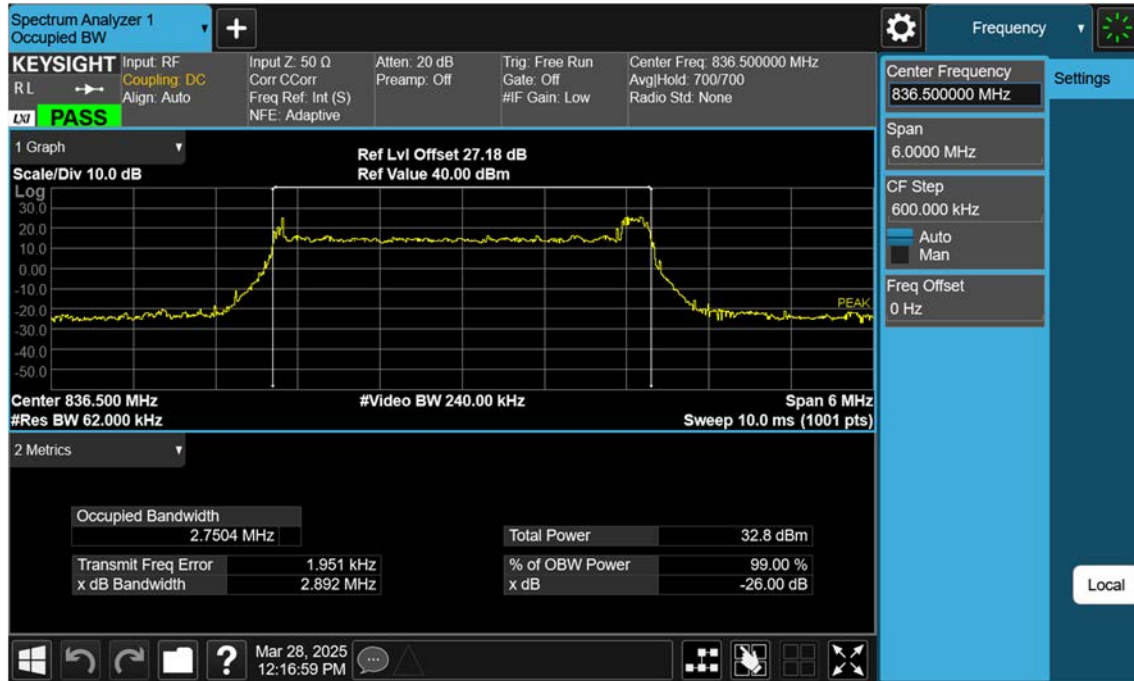
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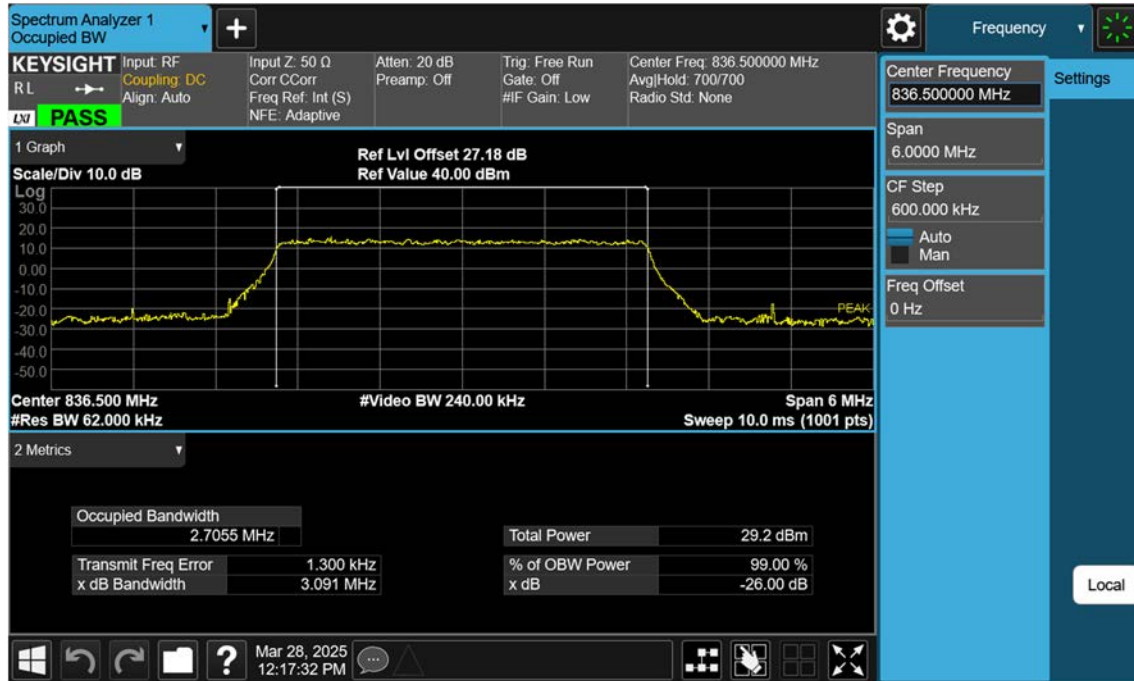
LTE B5_3 M_OBW_Mid_QPSK_FullRB



LTE B5_3 M_OBW_Mid_16QAM_FullRB



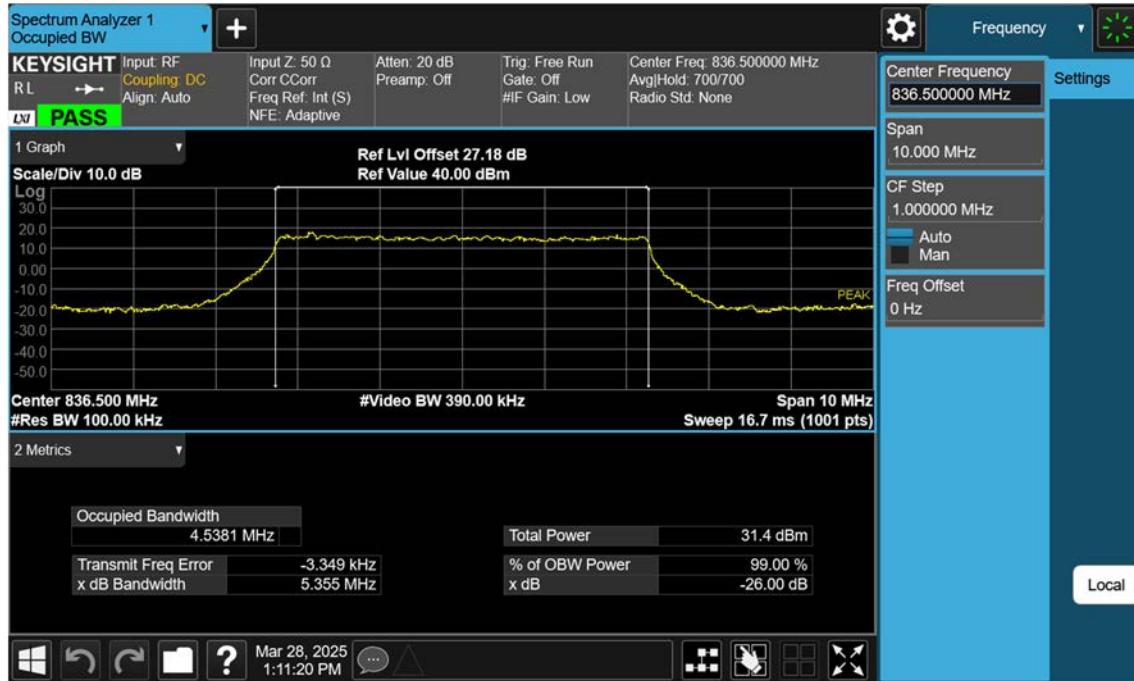
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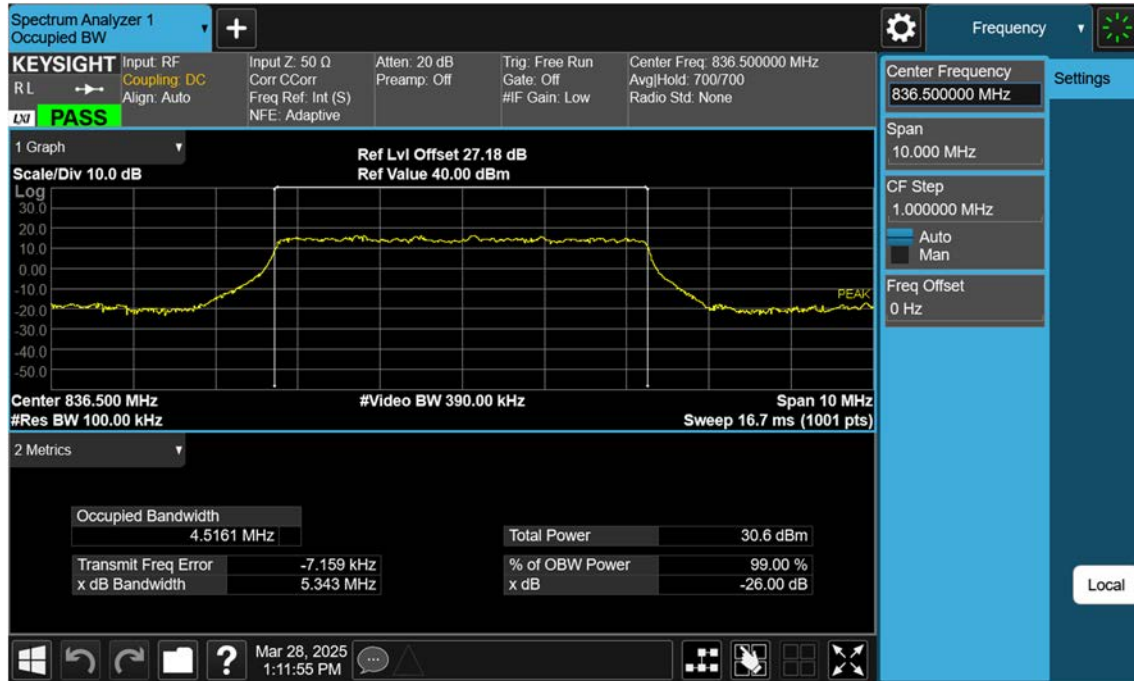
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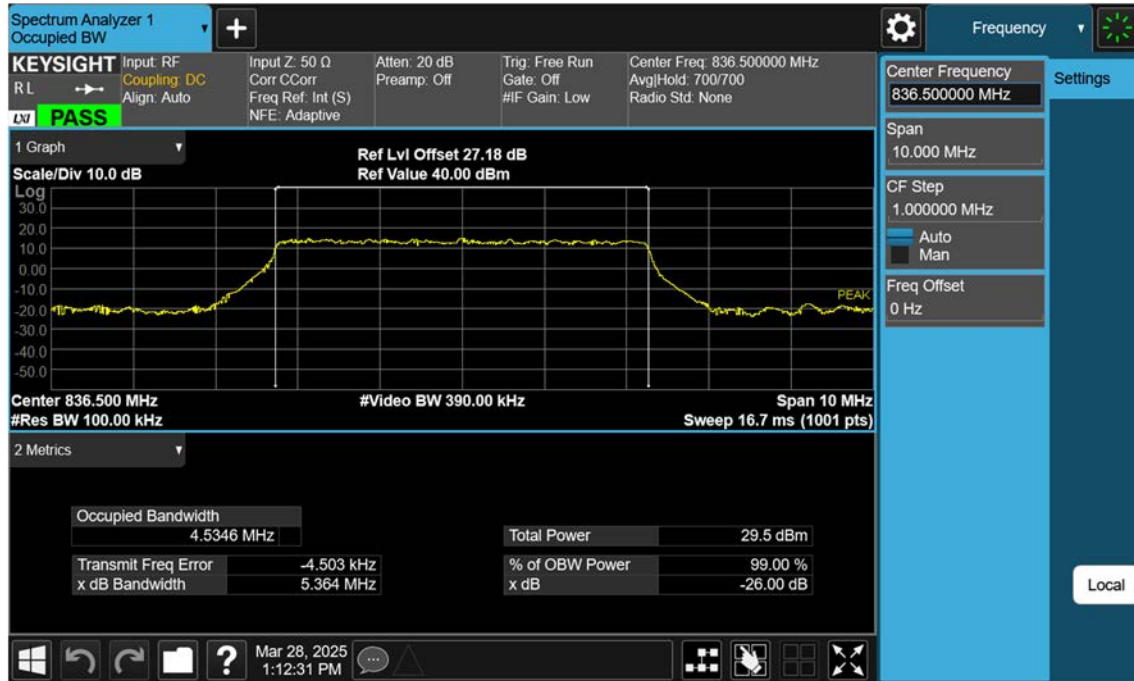
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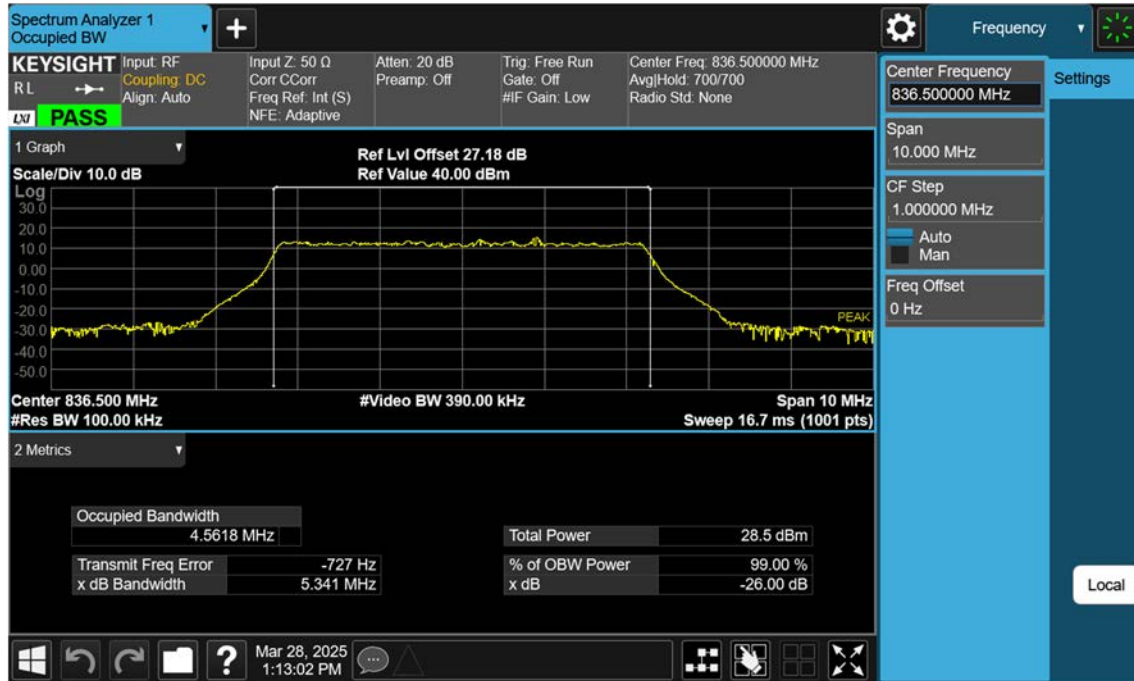
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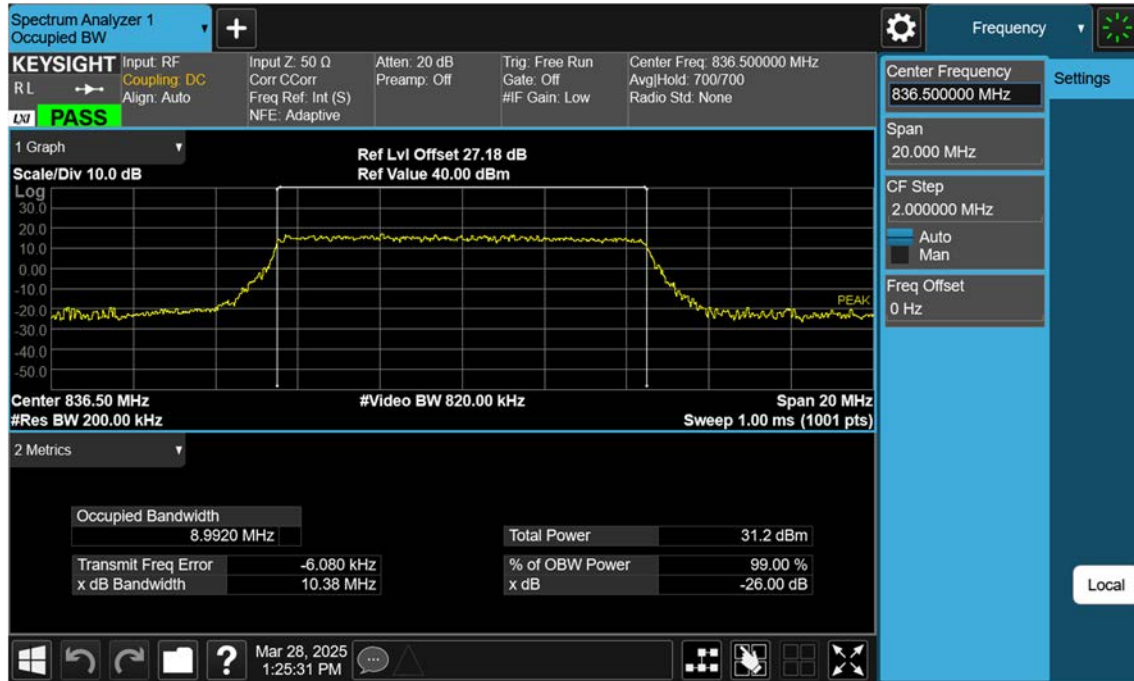
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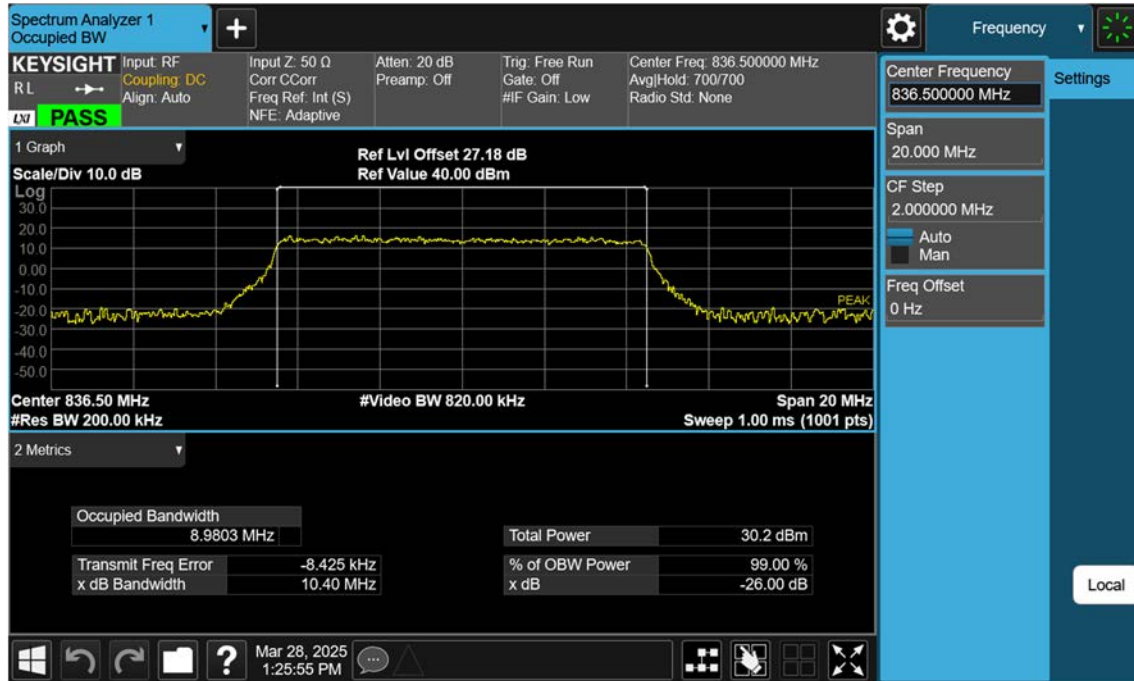
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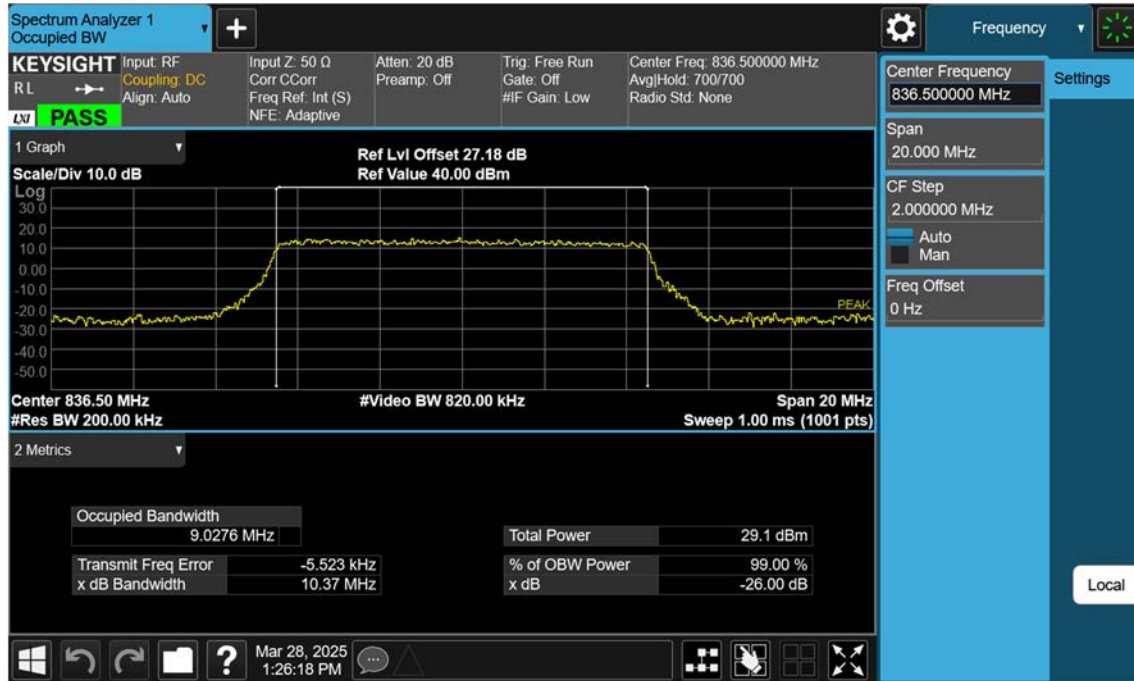
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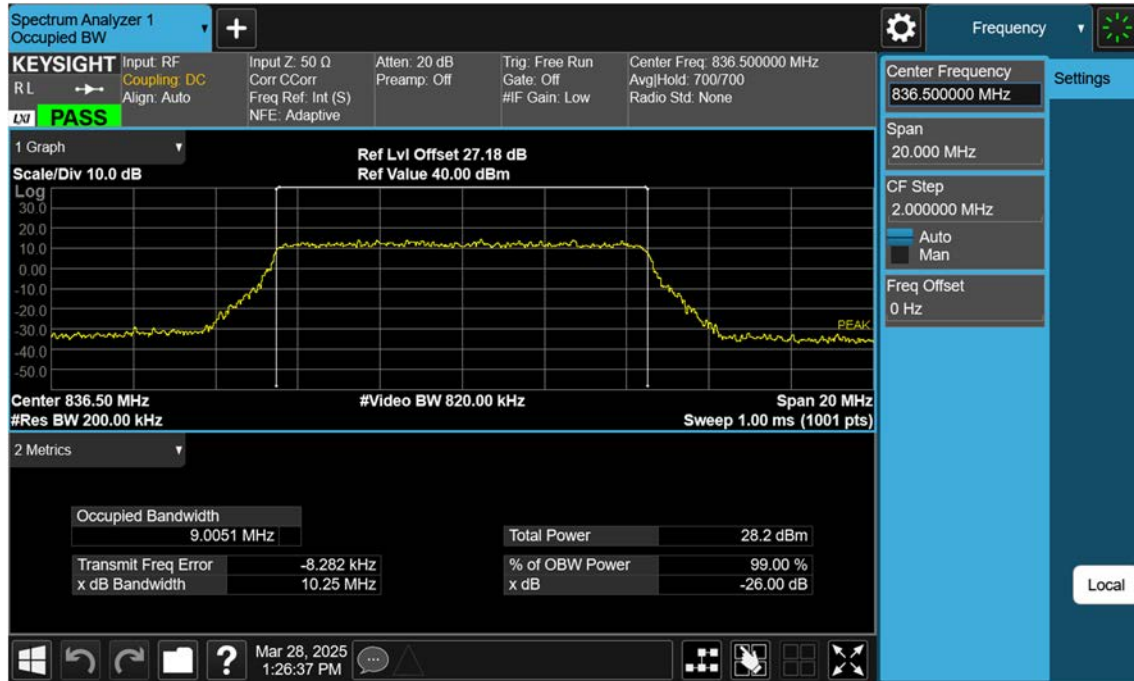
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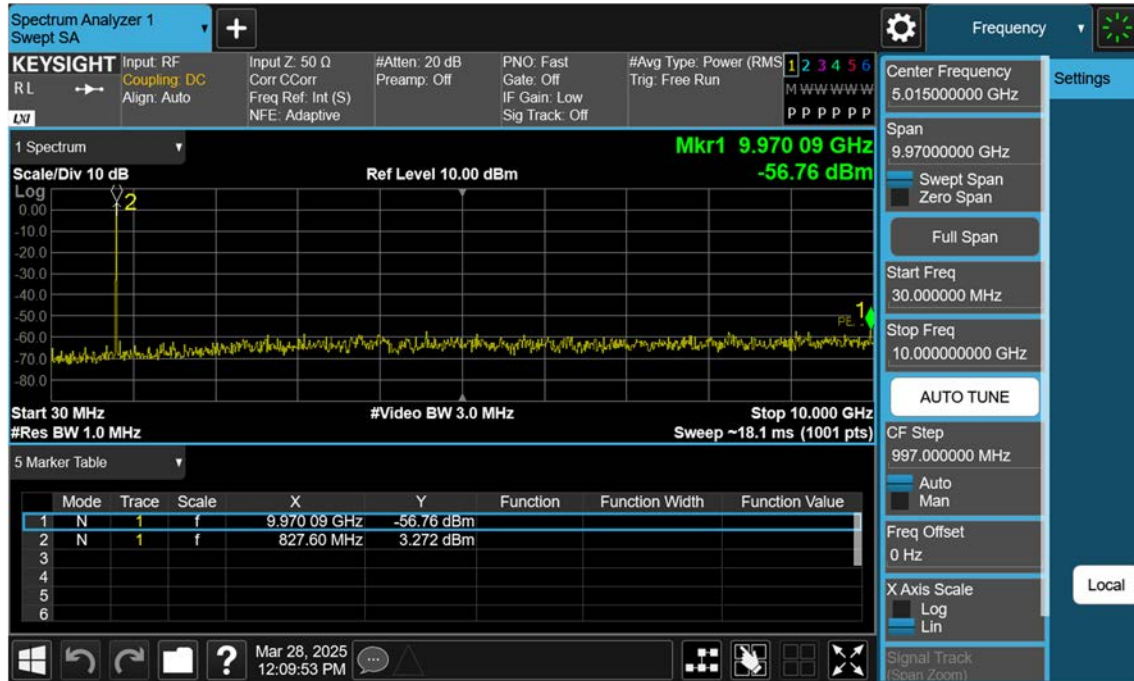
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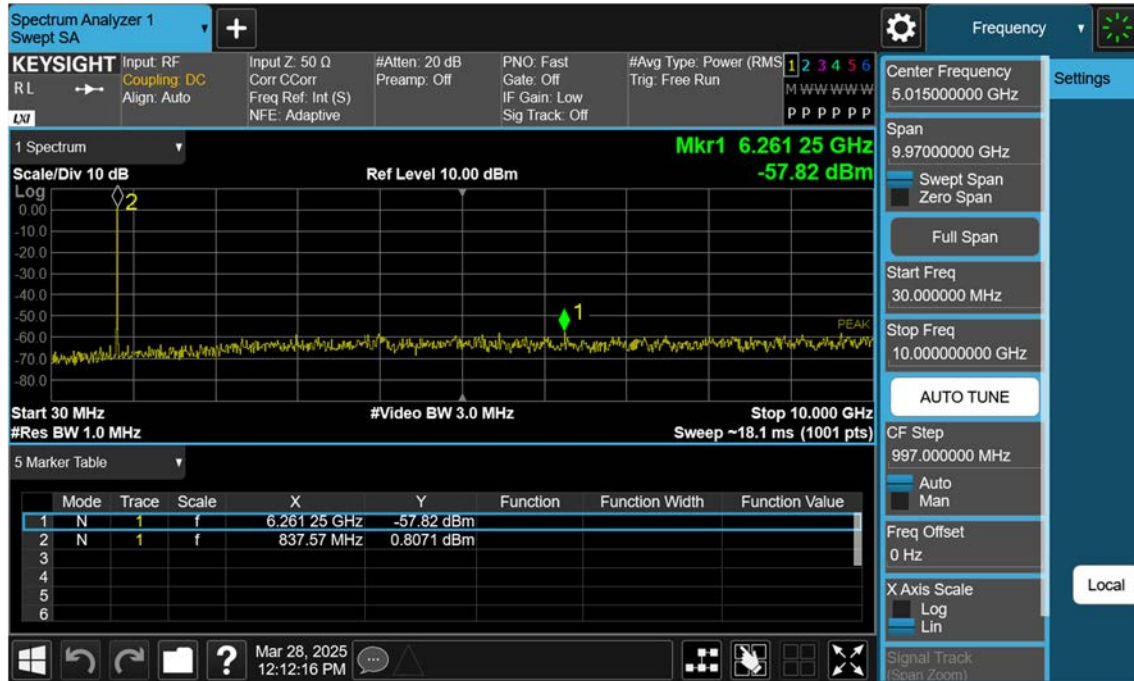
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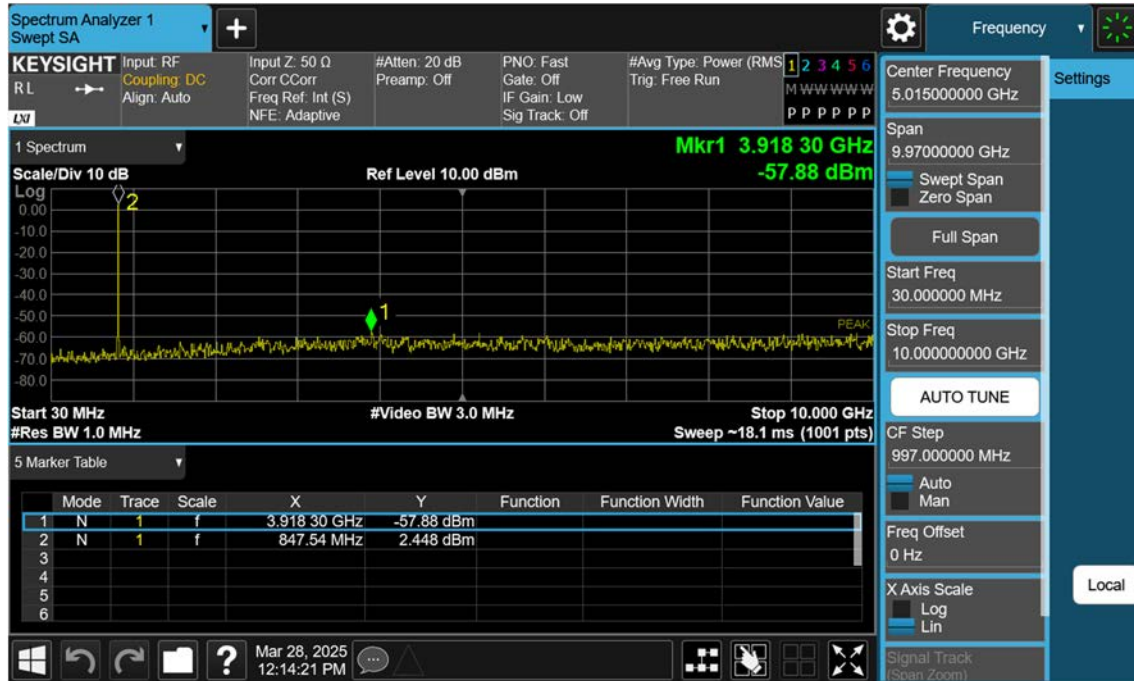
LTE B5_1.4M_Conducted Spurious(30 M-10 G)_Low_QPSK_1RB



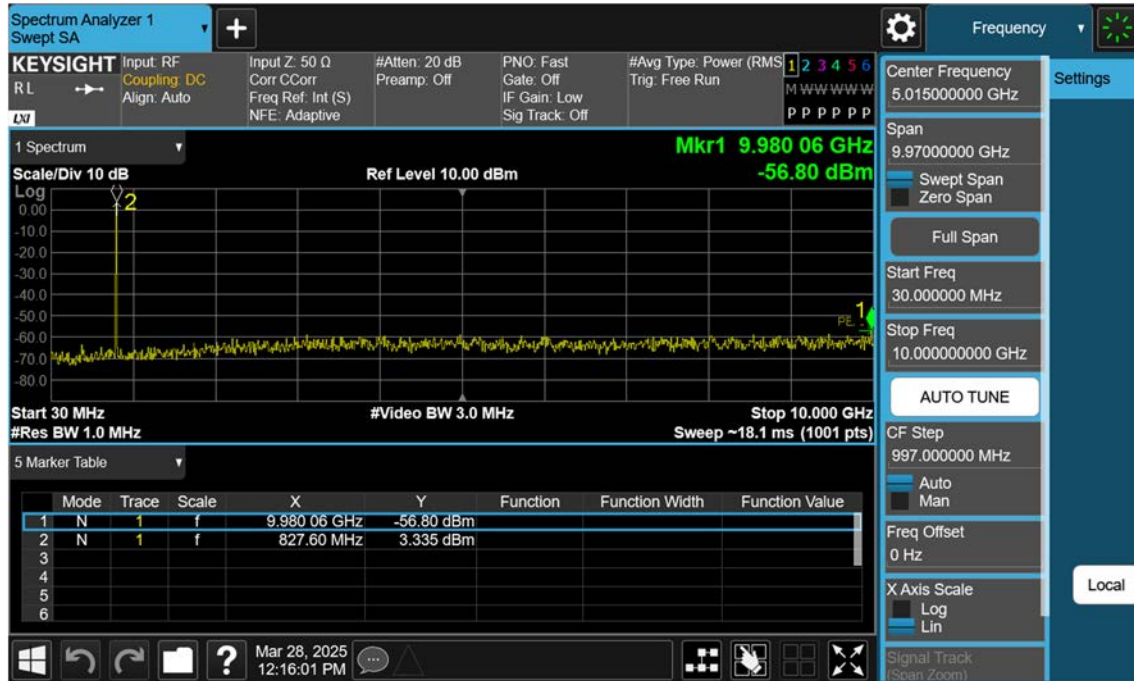
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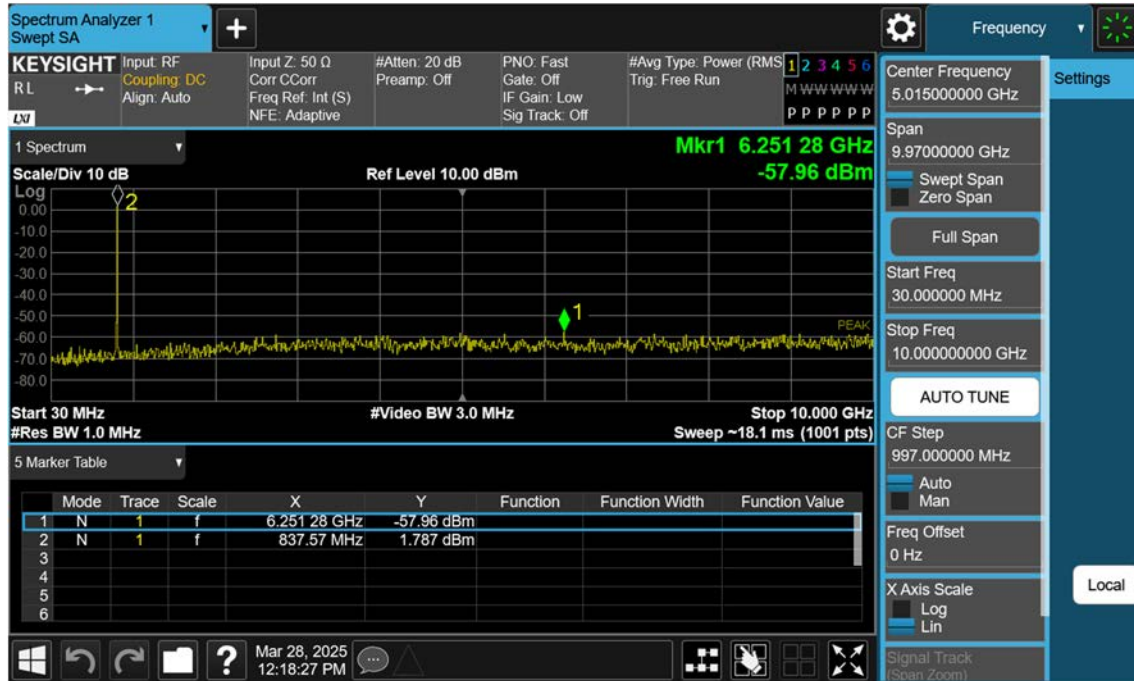
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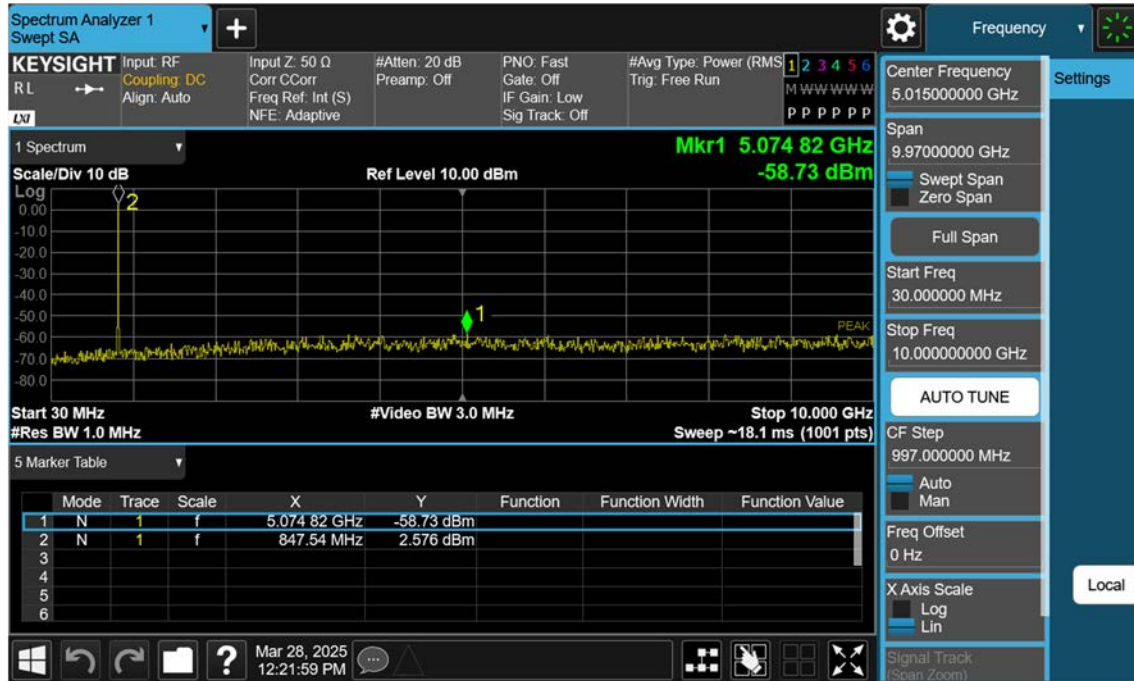
LTE B5_3 M_Conducted Spurious(30 M-10 G)_Low_QPSK_1RB



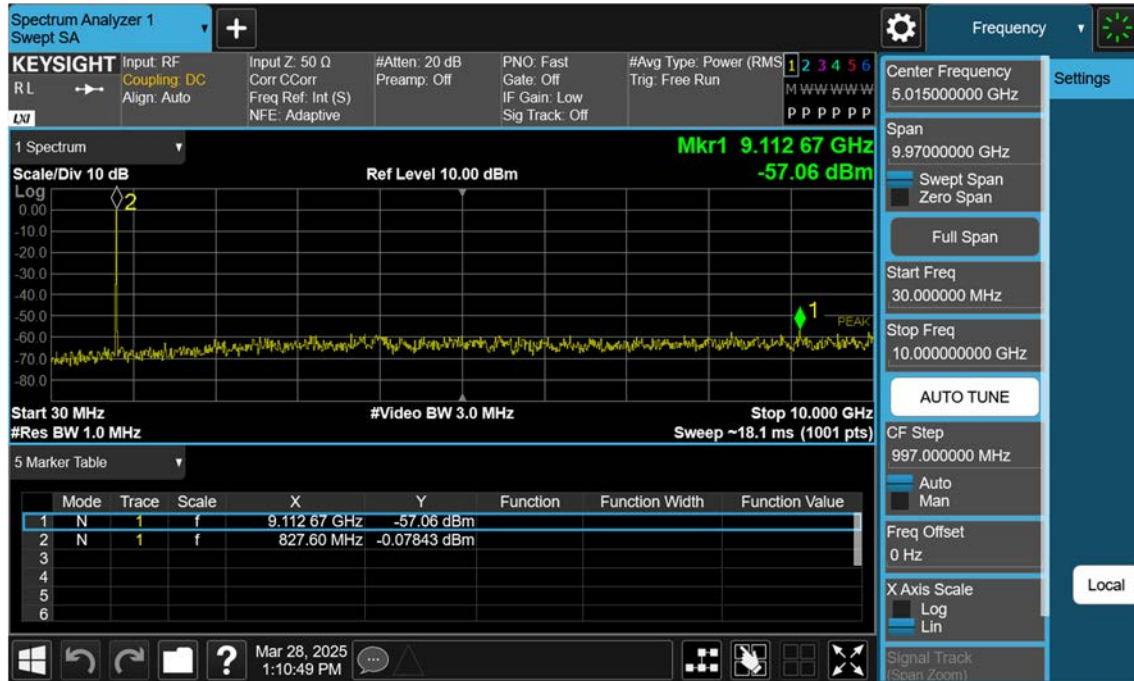
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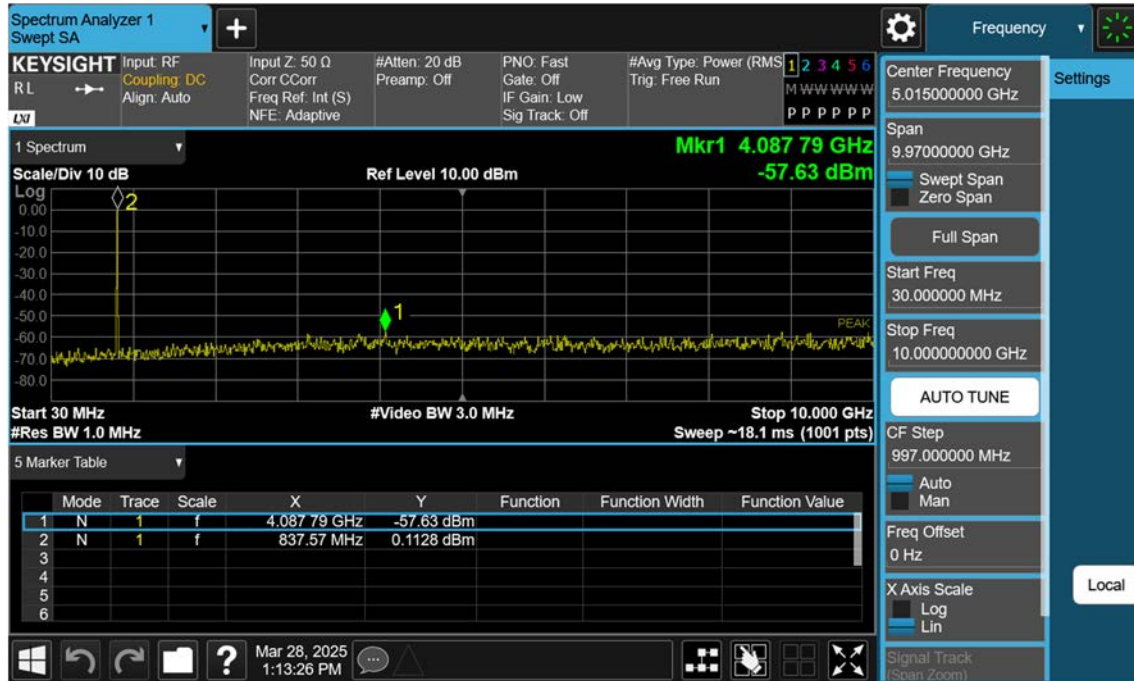
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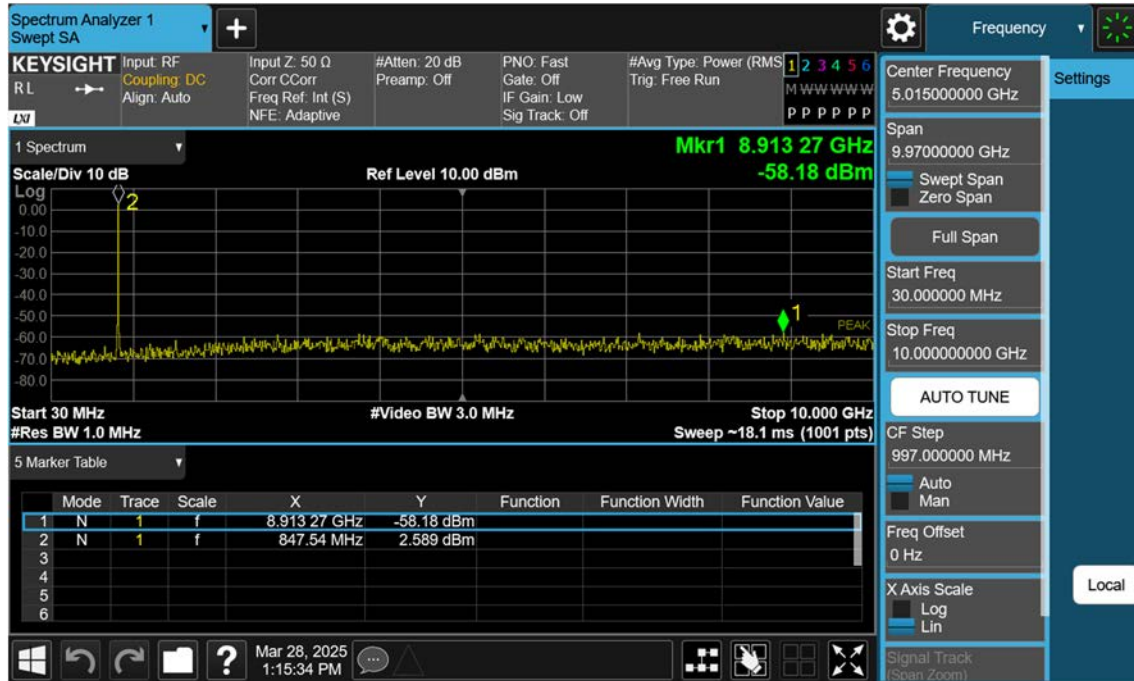
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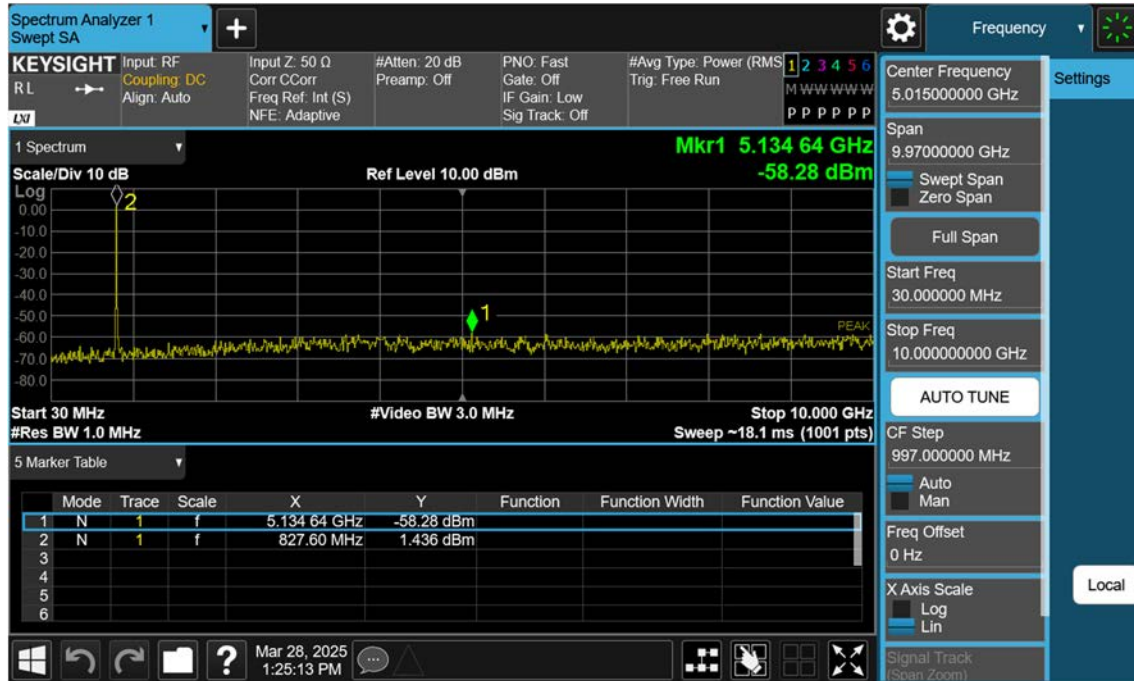
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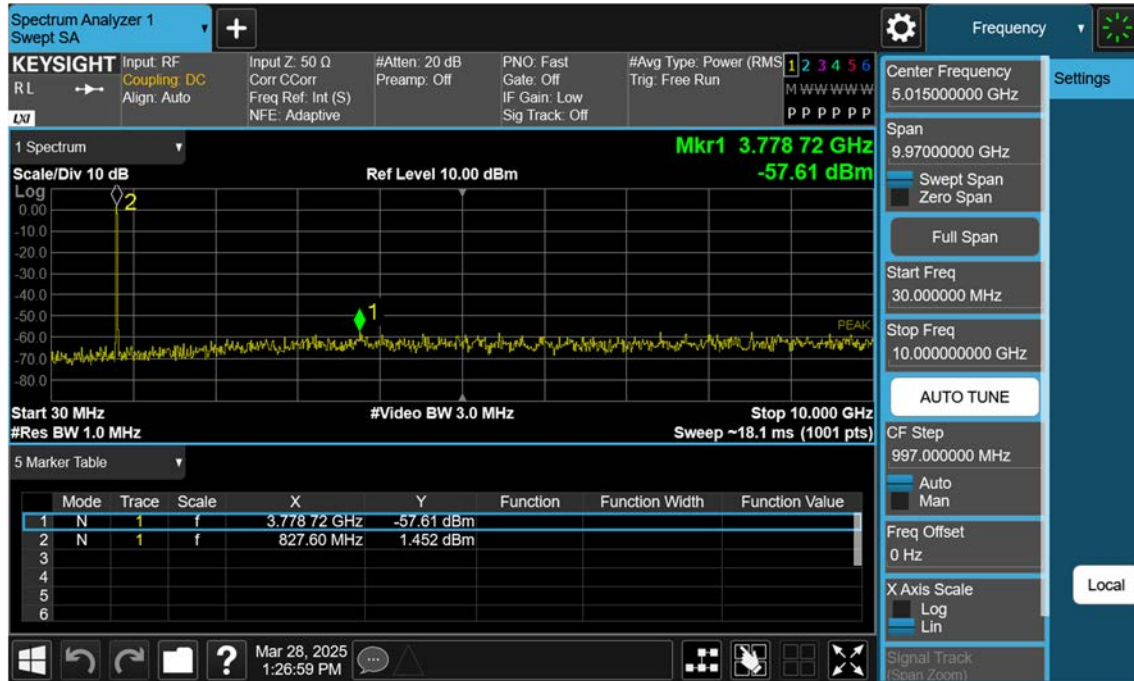
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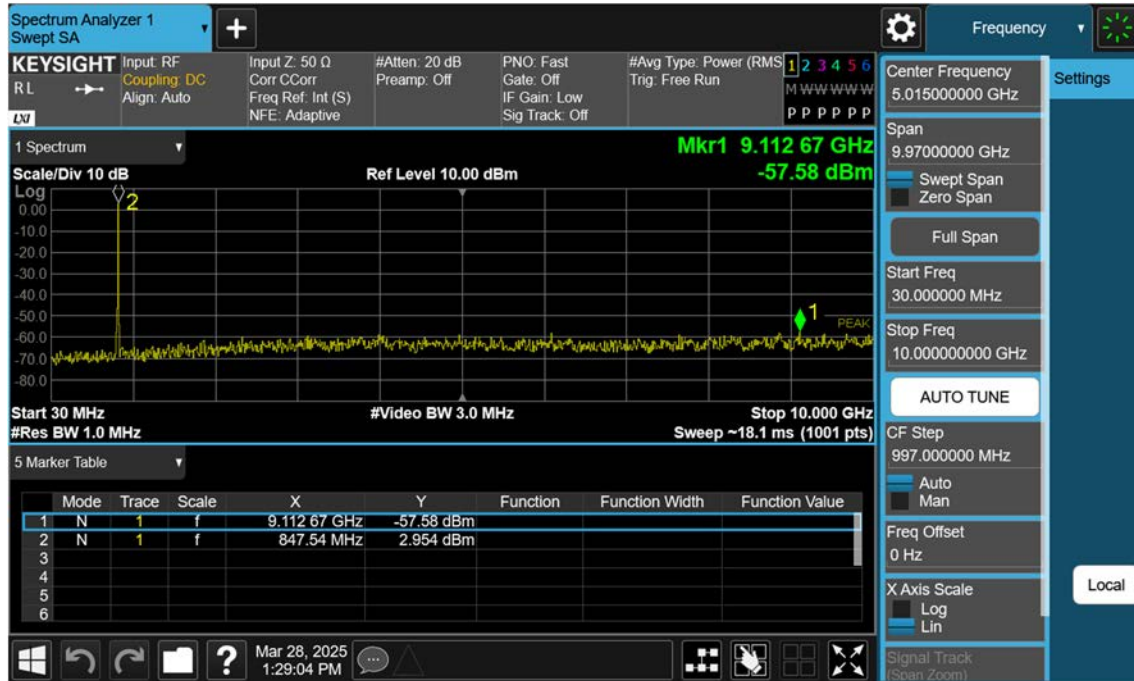
LTE B5_10 M_Conducted Spurious(30 M-10 G)_Low_QPSK_1RB



LTE B5_10 M_Conducted Spurious(30 M-10 G)_Mid_QPSK_1RB



LTE B5_10 M_Conducted Spurious(30 M-10 G)_High_QPSK_1RB



LTE B5_1.4M_Band Edge_Low_QPSK_1RB



LTE B5_1.4M_Band Edge_Low_QPSK_FullRB



LTE B5_1.4M_Extended Band Edge_Low_QPSK_FullRB



LTE B5_1.4M_Band Edge_High_QPSK_1RB



LTE B5_1.4M_Band Edge_High_QPSK_FullRB



LTE B5_1.4M_Extended Band Edge_High_QPSK_FullRB



LTE B5_3 M_Band Edge_Low_QPSK_1RB



LTE B5_3 M_Band Edge_Low_QPSK_FullRB



LTE B5_3 M_Extended Band Edge_Low_QPSK_FullRB



LTE B5_3 M_Band Edge_High_QPSK_1RB



LTE B5_3 M_Band Edge_High_QPSK_FullRB



LTE B5_3 M_Extended Band Edge_High_QPSK_FullRB



LTE B5_5 M_Band Edge_Low_QPSK_1RB



LTE B5_5 M_Band Edge_Low_QPSK_FullRB



LTE B5_5 M_Extended Band Edge_Low_QPSK_FullRB



LTE B5_5 M_Band Edge_High_QPSK_1RB



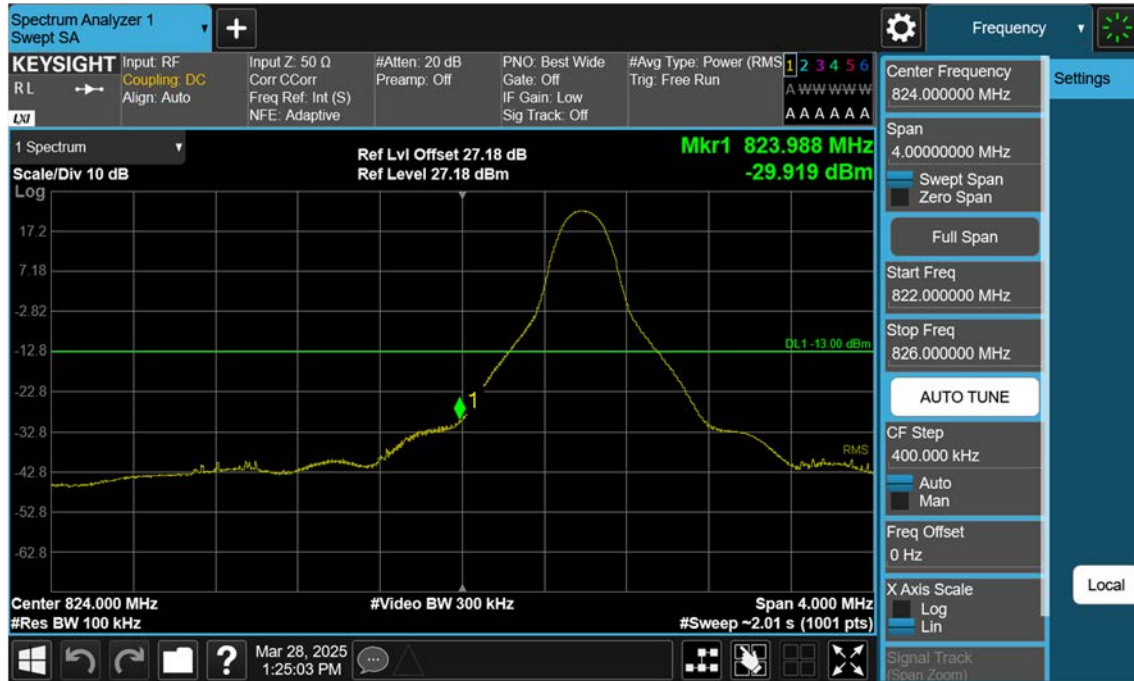
LTE B5_5 M_Band Edge_High_QPSK_FullRB



LTE B5_5 M_Extended Band Edge_High_QPSK_FullRB



LTE B5_10 M_Band Edge_Low_QPSK_1RB



LTE B5_10 M_Band Edge_Low_QPSK_FullRB



LTE B5_10 M_Extended Band Edge_Low_QPSK_FullRB



LTE B5_10 M_Band Edge_High_QPSK_1RB



LTE B5_10 M_Band Edge_High_QPSK_FullRB

