

TEST REPORT

FCC Sub6 Test for SM-S731U
Certification

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2507-FC032

DATE OF ISSUE
July 14, 2025

Tested by
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TEST REPORT

REPORT NO.

HCT-RF-2507-FC032

DATE OF ISSUE

July 14, 2025

Additional Model

SM-S731U1

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-S731U

Date of Test

May 13, 2025 ~ July 10, 2025

FCC ID

A3LSMS731U

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	July 14, 2025	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**

Model(s):	SM-S731U
Additional Model(s)	SM-S731U1
SCS(kHz):	15
Bandwidth(MHz):	5, 10, 15, 20
Waveform:	CP-OFDM, DFT-S-OFDM
Modulation:	DFT-S-OFDM: PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM CP-OFDM: QPSK, 16QAM, 64QAM, 256QAM
Tx Frequency:	826.5 MHz – 846.5 MHz (Sub6 n26 (5 MHz)) 829.0 MHz – 844.0 MHz (Sub6 n26 (10 MHz)) 831.5 MHz – 841.5 MHz (Sub6 n26 (15 MHz)) 834.0 MHz – 839.0 MHz (Sub6 n26 (20 MHz))
Serial number:	Radiated : R3CY40DEGXL Conducted : R3CY40XC6MR
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)
Sub6 n26 (5)	826.5 – 846.5	4M53G7D	PI/2 BPSK	0.110	20.42
		4M53G7D	QPSK	0.108	20.32
		4M52W7D	16QAM	0.087	19.40
		4M52W7D	64QAM	0.061	17.82
		4M55W7D	256QAM	0.040	16.01
Sub6 n26 (10)	829.0 – 844.0	9M02G7D	PI/2 BPSK	0.108	20.35
		8M98G7D	QPSK	0.108	20.32
		8M98W7D	16QAM	0.090	19.52
		9M01W7D	64QAM	0.061	17.83
		9M02W7D	256QAM	0.039	15.87
Sub6 n26 (15)	831.5 – 841.5	13M5G7D	PI/2 BPSK	0.108	20.32
		13M5G7D	QPSK	0.107	20.30
		13M5W7D	16QAM	0.087	19.39
		13M5W7D	64QAM	0.062	17.92
		13M5W7D	256QAM	0.039	15.87
Sub6 n26 (20)	834.0 – 839.0	18M0G7D	PI/2 BPSK	0.107	20.31
		18M0G7D	QPSK	0.107	20.30
		17M9W7D	16QAM	0.086	19.37
		17M9W7D	64QAM	0.059	17.71
		18M0W7D	256QAM	0.038	15.75

Sub 1 ANT

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	ERP	
				Max. Power (W)	Max. Power (dBm)
Sub6 n26 (5)	826.5 – 846.5	4M51G7D	PI/2 BPSK	0.102	20.08
		4M54G7D	QPSK	0.101	20.05
		4M52W7D	16QAM	0.081	19.08
		4M51W7D	64QAM	0.057	17.59
		4M55W7D	256QAM	0.038	15.77
Sub6 n26 (10)	829.0 – 844.0	9M01G7D	PI/2 BPSK	0.099	19.95
		9M02G7D	QPSK	0.099	19.94
		8M99W7D	16QAM	0.082	19.13
		8M99W7D	64QAM	0.059	17.72
		9M03W7D	256QAM	0.036	15.57
Sub6 n26 (15)	831.5 – 841.5	13M5G7D	PI/2 BPSK	0.102	20.08
		13M5G7D	QPSK	0.101	20.05
		13M5W7D	16QAM	0.082	19.16
		13M5W7D	64QAM	0.060	17.80
		13M5W7D	256QAM	0.037	15.74
Sub6 n26 (20)	834.0 – 839.0	18M0G7D	PI/2 BPSK	0.102	20.10
		17M9G7D	QPSK	0.102	20.09
		17M9W7D	16QAM	0.085	19.29
		17M9W7D	64QAM	0.060	17.79
		17M9W7D	256QAM	0.038	15.83

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

Test Note

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

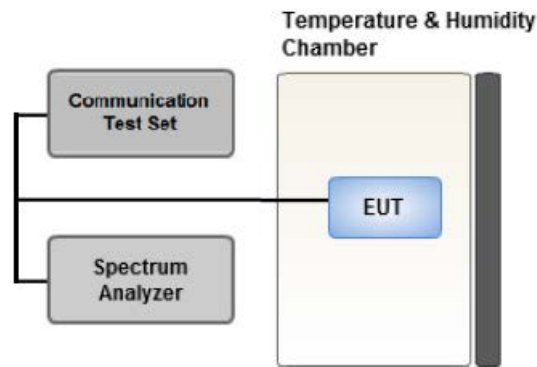
$$\text{Result}_{(\text{dBm})} = P_g_{(\text{dBm})} - \text{cable loss}_{(\text{dB})} + \text{antenna gain}_{(\text{dBi})}$$

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



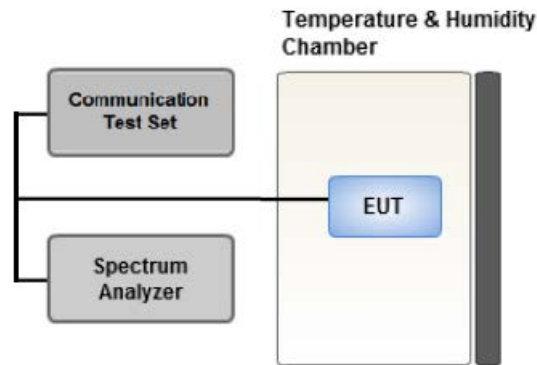
Test setup

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 %.

3.5 OCCUPIED BANDWIDTH.



Test setup

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

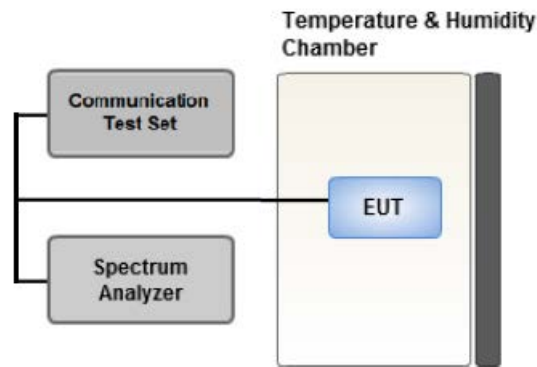
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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

Test Settings

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

3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



Test setup

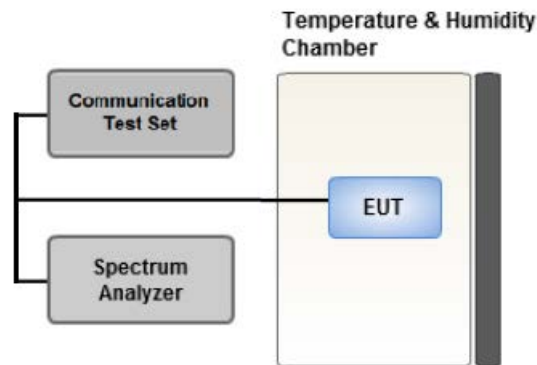
Test Overview

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

Test Settings

1. RBW = 1 MHz
2. VBW $\geq$ 3 MHz
3. Detector = Peak
4. Trace Mode = Max Hold
5. Sweep time = auto
6. Number of points in sweep $\geq 2 \times \text{Span} / \text{RBW}$

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 > (Number of Points) (Symbol Period)
9. The trace was allowed to stabilize

Test Notes

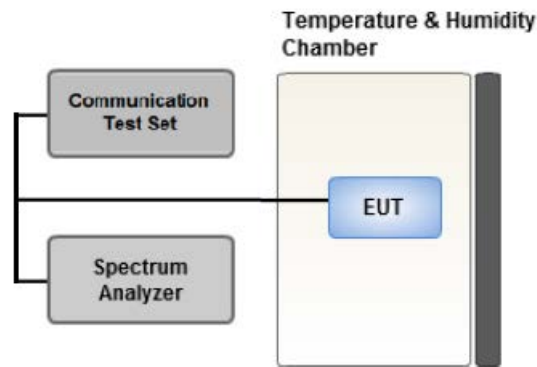
According to FCC 22.917, 24.238, 27.53 specified that power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. In the 1 MHz bands immediately outside and adjacent to the frequency block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

3.8 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)

- Waveform : All Waveform of operation were investigated and the worst case configuration results are reported.
(Worst case: DFT-S-OFDM)
- 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: SA Only
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.
- All RB sizes, offsets of operation were investigated and the worst case configuration results are reported.
Please refer to the table below.
- In the case of radiated spurious emissions, all bandwidth of operation was investigated and the worst case bandwidth results are reported. (Worst case : 5 MHz(Main 1 ANT), 20 MHz(Sub 1 ANT))
- SM-S731U & additional models were tested and the worst case results are reported.
(Worst case : SM-S731U)

[Main 1 ANT Worst case]

Test Description	Modulation	RB size	RB offset	Axis
Effective Radiated Power	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	See Section 8.1		X
Radiated Spurious and Harmonic Emissions	PI/2 BPSK	See Section 8.2		Z

[Sub 1 ANT Worst case]

Test Description	Modulation	RB size	RB offset	Axis
Effective Radiated Power	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	See Section 9.1		X
Radiated Spurious and Harmonic Emissions	PI/2 BPSK	See Section 9.2		X

3.10 WORST CASE(CONDUCTED TEST)

- Waveform : All Waveform of operation were investigated and the worst case configuration results are reported.
(Worst case: DFT-S-OFDM)
- Modulation : All Modulation of operation were investigated and the worst case configuration results are reported.
(Worst case: PI/2 BPSK)
- All modes of operation were investigated and the worst case configuration results are reported.
Mode: SA Only
- All RB sizes, offsets of operation were investigated and the worst case configuration results are reported.
Please refer to the table below..
- SM-S731U & additional models were tested and the worst case results are reported.
(Worst case : SM-S731U)

[Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset
Occupied Bandwidth	Pi2/BPSK QPSK, 16QAM, 64QAM, 256QAM	5, 10, 15, 20	Mid	Full RB	0
Peak-To-Average Ratio	Pi2/BPSK QPSK, 16QAM, 64QAM, 256QAM	5, 10, 15, 20	Mid	Full RB	0
Band-edge	Pi2/BPSK	5	Low	1	0
			High	1	24
		10	Low	1	0
			High	1	49
		15	Low	1	0
			High	1	74
		20	Low	1	0
			High	1	99
Band-edge	Pi2/BPSK	5, 10, 15, 20	Low, High	Full RB	0
		5, 10, 15, 20	Low, Mid, High	1	1
Spurious and Harmonic Emissions at Antenna Terminal	Pi2/BPSK	5, 10, 15, 20	Low, Mid, High	1	1

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	05/14/2026	Annual
Signal Analyzer(2 Hz ~ 50.0 GHz)	N9040B	KEYSIGHT	US55230216	12/09/2025	Annual
UXM 5G Wireless Test Platform	E7515B	KEYSIGHT	MY60101126	02/10/2026	Annual
Automation Software	FCC 2G/3G/4G Conducted	HCT CO., LTD	-	-	-
Automation Software	FCC NR Conducted	HCT CO., LTD	-	-	-
Automation Software	FCC LTE Radiated	HCT CO., LTD	-	-	-
Automation Software	FCC NR Radiated	HCT CO., LTD	-	-	-

Note:

- Equipment 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 ($\pm$ dB)
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>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. Refer to the SAR report.
2. Conducted test were tested using 5G Wireless Tester.

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

Note:

1. Radiated tests were tested using 5G Wireless Tester.

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 [SCS (kHz)]	Modulation	Measured	Substitute	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
			Level (dBm)	Level (dBm)				W	W	dBm	Size	Offset
826.5		PI/2 BPSK	-31.10	31.81	-9.95	1.44	H	< 7.00	0.110	20.42	1	12
		QPSK	-31.20	31.71	-9.95	1.44	H		0.108	20.32		
		16-QAM	-32.12	30.79	-9.95	1.44	H		0.087	19.40		
		64-QAM	-33.70	29.21	-9.95	1.44	H		0.061	17.82		
		256-QAM	-35.51	27.40	-9.95	1.44	H		0.040	16.01		
836.5	Sub6 n26 5 MHz [15 kHz]	PI/2 BPSK	-31.49	31.37	-9.90	1.45	H	< 7.00	0.100	20.02	1	1
		QPSK	-31.51	31.35	-9.90	1.45	H		0.100	20.00		
		16-QAM	-32.39	30.47	-9.90	1.45	H		0.082	19.12		
		64-QAM	-33.91	28.95	-9.90	1.45	H		0.058	17.60		
		256-QAM	-35.84	27.02	-9.90	1.45	H		0.037	15.67		
1846.5		PI/2 BPSK	-32.73	30.56	-9.85	1.45	H	< 7.00	0.084	19.26	1	1
		QPSK	-32.74	30.55	-9.85	1.45	H		0.084	19.25		
		16-QAM	-33.77	29.52	-9.85	1.45	H		0.066	18.22		
		64-QAM	-35.34	27.95	-9.85	1.45	H		0.046	16.65		
		256-QAM	-37.32	25.97	-9.85	1.45	H		0.029	14.67		

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured	Substitute	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
			Level (dBm)	Level (dBm)				W	W	dBm	Size	Offset
829.0		PI/2 BPSK	-31.11	31.74	-9.95	1.44	H	< 7.00	0.108	20.35	1	26
		QPSK	-31.14	31.71	-9.95	1.44	H		0.108	20.32		
		16-QAM	-31.94	30.91	-9.95	1.44	H		0.090	19.52		
		64-QAM	-33.63	29.22	-9.95	1.44	H		0.061	17.83		
		256-QAM	-35.59	27.26	-9.95	1.44	H		0.039	15.87		
836.5	Sub6 n26 10 MHz [15 kHz]	PI/2 BPSK	-31.39	31.47	-9.90	1.45	H		0.103	20.12	1	1
		QPSK	-31.42	31.44	-9.90	1.45	H		0.102	20.09		
		16-QAM	-32.02	30.84	-9.90	1.45	H		0.089	19.49		
		64-QAM	-33.71	29.15	-9.90	1.45	H		0.060	17.80		
		256-QAM	-35.64	27.22	-9.90	1.45	H		0.039	15.87		
844.0		PI/2 BPSK	-32.70	30.54	-9.85	1.45	H		0.084	19.24	1	26
		QPSK	-32.73	30.51	-9.85	1.45	H		0.083	19.21		
		16-QAM	-33.73	29.51	-9.85	1.45	H		0.066	18.21		
		64-QAM	-35.23	28.01	-9.85	1.45	H		0.047	16.71		
		256-QAM	-37.16	26.08	-9.85	1.45	H		0.030	14.78		

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured	Substitute	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
			Level (dBm)	Level (dBm)				W	W	dBm	Size	Offset
831.5	Sub6 n26 15 MHz [15 kHz]	PI/2 BPSK	-31.18	31.58	-9.95	1.45	H	< 7.00	0.104	20.18	1	39
		QPSK	-31.20	31.56	-9.95	1.45	H		0.104	20.16		
		16-QAM	-31.99	30.77	-9.95	1.45	H		0.086	19.37		
		64-QAM	-33.44	29.32	-9.95	1.45	H		0.062	17.92		
		256-QAM	-35.49	27.27	-9.95	1.45	H		0.039	15.87		
836.5		PI/2 BPSK	-31.19	31.67	-9.90	1.45	H		0.108	20.32	1	1
		QPSK	-31.21	31.65	-9.90	1.45	H		0.107	20.30		
		16-QAM	-32.12	30.74	-9.90	1.45	H		0.087	19.39		
		64-QAM	-33.62	29.24	-9.90	1.45	H		0.061	17.89		
		256-QAM	-35.74	27.12	-9.90	1.45	H		0.038	15.77		
841.5		PI/2 BPSK	-32.93	30.15	-9.85	1.45	H	0.077	18.85	1	39	
		QPSK	-32.95	30.13	-9.85	1.45	H	0.076	18.83			
		16-QAM	-33.88	29.20	-9.85	1.45	H	0.062	17.90			
		64-QAM	-35.51	27.57	-9.85	1.45	H	0.042	16.27			
		256-QAM	-37.42	25.66	-9.85	1.45	H	0.027	14.36			

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured	Substitute	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
			Level (dBm)	Level (dBm)				W	W	dBm	Size	Offset
834.0	Sub6 n26 20 MHz [15 kHz]	PI/2 BPSK	-31.22	31.52	-9.95	1.45	H	< 7.00	0.103	20.12	1	1
		QPSK	-31.33	31.41	-9.95	1.45	H		0.100	20.01		
		16-QAM	-32.27	30.47	-9.95	1.45	H		0.081	19.07		
		64-QAM	-33.68	29.06	-9.95	1.45	H		0.058	17.66		
		256-QAM	-35.78	26.96	-9.95	1.45	H		0.036	15.56		
836.5		PI/2 BPSK	-31.20	31.66	-9.90	1.45	H		0.107	20.31	1	1
		QPSK	-31.21	31.65	-9.90	1.45	H		0.107	20.30		
		16-QAM	-32.14	30.72	-9.90	1.45	H		0.086	19.37		
		64-QAM	-33.80	29.06	-9.90	1.45	H		0.059	17.71		
		256-QAM	-35.76	27.10	-9.90	1.45	H		0.038	15.75		
839.0		PI/2 BPSK	-33.43	29.59	-9.85	1.45	H	0.067	18.29	1	53	
		QPSK	-33.45	29.57	-9.85	1.45	H	0.067	18.27			
		16-QAM	-34.06	28.96	-9.85	1.45	H	0.058	17.66			
		64-QAM	-35.50	27.52	-9.85	1.45	H	0.042	16.22			
		256-QAM	-37.51	25.51	-9.85	1.45	H	0.026	14.21			

8.2 RADIATED SPURIOUS EMISSIONS

NR Band:	<u>N26</u>
Bandwidth:	<u>5 MHz</u>
Modulation:	<u>PI/2 BPSK</u>
Distance:	<u>3 meters</u>
SCS:	<u>15 kHz</u>

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)	RB	
									Size	Offset
165300 (826.5)	1 653.00	-49.91	9.47	-64.94	2.02	H	-57.49	-13.00	1	12
	2 479.50	-43.85	10.32	-54.99	2.55	V	-47.22	-13.00		
	3 306.00	-54.28	11.09	-62.54	2.97	V	-54.42	-13.00		
167300 (836.5)	1 673.00	-49.13	9.60	-64.40	2.05	V	-56.85	-13.00	1	1
	2 509.50	-42.19	10.26	-53.47	2.51	H	-45.72	-13.00		
	3 346.00	-54.00	11.10	-62.66	2.96	H	-54.52	-13.00		
169300 (846.5)	1 693.00	-47.37	9.73	-62.59	2.07	V	-54.93	-13.00	1	1
	2 539.50	-44.95	10.25	-56.05	2.53	H	-48.33	-13.00		
	3 386.00	-54.23	11.18	-63.18	2.99	V	-54.99	-13.00		

8.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)	Limit (dB)
Sub6 n26	5 MHz	836.5	BPSK	25	0	4.49	13.00
			QPSK			5.53	
			16-QAM			6.30	
			64-QAM			6.03	
			256-QAM			6.24	
	10 MHz		BPSK	50		4.39	
			QPSK			5.46	
			16-QAM			6.28	
			64-QAM			6.10	
			256-QAM			6.24	
	15 MHz		BPSK	75		4.22	
			QPSK			5.32	
			16-QAM			6.15	
			64-QAM			5.95	
			256-QAM			6.16	
	20 MHz		BPSK	100		5.34	
			QPSK			5.66	
			16-QAM			6.23	
			64-QAM			6.00	
			256-QAM			6.12	

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 49~ 68.

8.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
Sub6 n26	5 MHz	836.5	BPSK	25	0	4.5343
			QPSK			4.5257
			16-QAM			4.5164
			64-QAM			4.5229
			256-QAM			4.5475
	10 MHz		BPSK	50		9.0191
			QPSK			8.9808
			16-QAM			8.9771
			64-QAM			9.0132
			256-QAM			9.0213
	15 MHz		BPSK	75		13.468
			QPSK			13.479
			16-QAM			13.468
			64-QAM			13.494
			256-QAM			13.477
	20 MHz		BPSK	100		17.946
			QPSK			18.044
			16-QAM			17.943
			64-QAM			17.888
			256-QAM			17.986

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 69 ~ 88.

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)
Sub6 n26	5	826.5	7.9661	30.815	-63.401	-32.586	-13.00
		836.5	9.5613	30.815	-62.766	-31.951	
		846.5	8.8834	30.815	-63.183	-32.368	
	10	829.0	4.0579	30.200	-62.916	-32.716	
		836.5	3.7688	30.200	-63.024	-32.824	
		844.0	9.1027	30.815	-62.469	-31.654	
	15	831.5	5.1845	30.815	-61.861	-31.046	
		836.5	5.7528	30.815	-63.561	-32.746	
		841.5	4.0280	30.200	-63.640	-33.440	
	20	834.0	9.4217	30.815	-63.214	-32.399	
		836.5	8.5344	30.815	-62.704	-31.889	
		839.0	4.0579	30.200	-62.785	-32.585	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 89 ~ 100.
2. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
3. Factor(dB) = Cable Loss + Ext. Attenuator + Power Splitter

Frequency Range (GHz)	Factor [dB]
0.03 – 1	27.012
1 – 5	29.722
5 – 10	30.315
10 – 15	30.840
15 – 20	31.213
Above 20	31.855

8.6 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 101 ~ 124.

8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

BandWidth:	<u>5 MHz</u>
Voltage(100 %):	<u>3.880 VDC</u>
Batt. Endpoint:	<u>3.300 VDC</u>
Deviation Limit:	<u>± 0.000 25 % or 2.5 ppm</u>

Test. Frequency	Voltage	Temp.	Frequency	Frequency Error	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	(Hz)	(%)	
836.5	100 %	+20(Ref)	836 499 998	0.0	0.000 000	0.000
	100 %	-30	836 499 997	-1.2	0.000 000	-0.001
	100 %	-20	836 499 996	-2.6	0.000 000	-0.003
	100 %	-10	836 499 998	0.2	0.000 000	0.000
	100 %	0	836 499 999	0.7	0.000 000	0.001
	100 %	+10	836 499 997	-1.7	0.000 000	-0.002
	100 %	+30	836 500 000	1.5	0.000 000	0.002
	100 %	+40	836 499 997	-1.5	0.000 000	-0.002
	100 %	+50	836 499 999	0.7	0.000 000	0.001
	Batt. Endpoint	+20	836 499 997	-1.3	0.000 000	-0.002

▣ BandWidth:	<u>10 MHz</u>
▣ Voltage(100 %):	<u>3.880 VDC</u>
▣ Batt. Endpoint:	<u>3.300 VDC</u>
▣ Deviation Limit:	<u>± 0.000 25 % or 2.5 ppm</u>

Test. Frequency	Voltage	Temp.	Frequency	Frequency Error	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	(Hz)	(%)	
836.5	100 %	+20(Ref)	836 500 000	0.0	0.000 000	0.000
	100 %	-30	836 500 000	-0.3	0.000 000	0.000
	100 %	-20	836 499 999	-0.7	0.000 000	-0.001
	100 %	-10	836 499 999	-1.1	0.000 000	-0.001
	100 %	0	836 499 999	-0.4	0.000 000	-0.001
	100 %	+10	836 499 999	-0.7	0.000 000	-0.001
	100 %	+30	836 499 999	-0.8	0.000 000	-0.001
	100 %	+40	836 500 000	0.0	0.000 000	0.000
	100 %	+50	836 500 000	-0.2	0.000 000	0.000
	Batt. Endpoint	+20	836 499 998	-1.5	0.000 000	-0.002

▣ BandWidth:	<u>15 MHz</u>
▣ Voltage(100 %):	<u>3.880 VDC</u>
▣ Batt. Endpoint:	<u>3.300 VDC</u>
▣ Deviation Limit:	<u>± 0.000 25 % or 2.5 ppm</u>

Test. Frequency	Voltage	Temp.	Frequency	Frequency Error	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	(Hz)	(%)	
836.5	100 %	+20(Ref)	836 499 999	0.0	0.000 000	0.000
	100 %	-30	836 499 998	-1.1	0.000 000	-0.001
	100 %	-20	836 499 999	-0.3	0.000 000	0.000
	100 %	-10	836 499 998	-0.8	0.000 000	-0.001
	100 %	0	836 499 998	-1.1	0.000 000	-0.001
	100 %	+10	836 500 000	0.6	0.000 000	0.001
	100 %	+30	836 500 000	0.4	0.000 000	0.001
	100 %	+40	836 499 998	-1.1	0.000 000	-0.001
	100 %	+50	836 499 998	-0.7	0.000 000	-0.001
	Batt. Endpoint	+20	836 499 998	-1.0	0.000 000	-0.001

▣ BandWidth:	<u>20 MHz</u>
▣ Voltage(100 %):	<u>3.880 VDC</u>
▣ Batt. Endpoint:	<u>3.300 VDC</u>
▣ Deviation Limit:	<u>± 0.000 25 % or 2.5 ppm</u>

Test. Frequency	Voltage	Temp.	Frequency	Frequency Error	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	(Hz)	(%)	
836.5	100 %	+20(Ref)	836 500 000	0.0	0.000 000	0.000
	100 %	-30	836 500 000	-0.1	0.000 000	0.000
	100 %	-20	836 500 001	0.3	0.000 000	0.000
	100 %	-10	836 500 000	-0.1	0.000 000	0.000
	100 %	0	836 500 000	-0.2	0.000 000	0.000
	100 %	+10	836 500 000	-0.1	0.000 000	0.000
	100 %	+30	836 500 001	0.3	0.000 000	0.000
	100 %	+40	836 500 001	0.1	0.000 000	0.000
	100 %	+50	836 500 001	0.5	0.000 000	0.001
	Batt. Endpoint	+20	836 500 001	0.5	0.000 000	0.001

9. TEST DATA (Sub 1 ANT)

9.1 EFFECTIVE RADIATED POWER

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
826.5		PI/2 BPSK	-31.46	31.45	-9.95	1.44	H	< 7.00	0.102	20.06	1	23
		QPSK	-31.47	31.44	-9.95	1.44	H		0.101	20.05		
		16-QAM	-32.44	30.47	-9.95	1.44	H		0.081	19.08		
		64-QAM	-33.93	28.98	-9.95	1.44	H		0.057	17.59		
		256-QAM	-35.75	27.16	-9.95	1.44	H		0.038	15.77		
836.5	Sub6 n26 5 MHz [15 kHz]	PI/2 BPSK	-31.43	31.43	-9.90	1.45	H	< 7.00	0.102	20.08	1	12
		QPSK	-31.52	31.34	-9.90	1.45	H		0.100	19.99		
		16-QAM	-32.48	30.38	-9.90	1.45	H		0.080	19.03		
		64-QAM	-34.00	28.86	-9.90	1.45	H		0.056	17.51		
		256-QAM	-36.00	26.86	-9.90	1.45	H		0.036	15.51		
1846.5		PI/2 BPSK	-32.82	30.47	-9.85	1.45	H	< 7.00	0.083	19.17	1	1
		QPSK	-32.86	30.43	-9.85	1.45	H		0.082	19.13		
		16-QAM	-33.34	29.95	-9.85	1.45	H		0.073	18.65		
		64-QAM	-34.74	28.55	-9.85	1.45	H		0.053	17.25		
		256-QAM	-36.65	26.64	-9.85	1.45	H		0.034	15.34		

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured	Substitute	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
			Level (dBm)	Level (dBm)				W	W	dBm	Size	Offset
829.0		PI/2 BPSK	-31.51	31.34	-9.95	1.44	H	< 7.00	0.099	19.95	1	50
		QPSK	-31.52	31.33	-9.95	1.44	H		0.099	19.94		
		16-QAM	-32.40	30.45	-9.95	1.44	H		0.081	19.06		
		64-QAM	-33.91	28.94	-9.95	1.44	H		0.057	17.55		
		256-QAM	-36.03	26.82	-9.95	1.44	H		0.035	15.43		
836.5	Sub6 n26 10 MHz [15 kHz]	PI/2 BPSK	-31.58	31.28	-9.90	1.45	H	< 7.00	0.098	19.93	1	26
		QPSK	-31.60	31.26	-9.90	1.45	H		0.098	19.91		
		16-QAM	-32.56	30.30	-9.90	1.45	H		0.079	18.95		
		64-QAM	-33.79	29.07	-9.90	1.45	H		0.059	17.72		
		256-QAM	-36.05	26.81	-9.90	1.45	H		0.035	15.46		
844.0		PI/2 BPSK	-32.11	31.13	-9.85	1.45	H	< 7.00	0.096	19.83	1	1
		QPSK	-32.12	31.12	-9.85	1.45	H		0.096	19.82		
		16-QAM	-32.81	30.43	-9.85	1.45	H		0.082	19.13		
		64-QAM	-34.37	28.87	-9.85	1.45	H		0.057	17.57		
		256-QAM	-36.37	26.87	-9.85	1.45	H		0.036	15.57		

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured	Substitute	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
			Level (dBm)	Level (dBm)				W	W	dBm	Size	Offset
831.5	Sub6 n26 15 MHz [15 kHz]	PI/2 BPSK	-31.51	31.25	-9.95	1.45	H	< 7.00	0.097	19.85	1	1
		QPSK	-31.53	31.23	-9.95	1.45	H		0.096	19.83		
		16-QAM	-32.40	30.36	-9.95	1.45	H		0.079	18.96		
		64-QAM	-33.82	28.94	-9.95	1.45	H		0.057	17.54		
		256-QAM	-35.73	27.03	-9.95	1.45	H		0.037	15.63		
836.5		PI/2 BPSK	-31.48	31.38	-9.90	1.45	H		0.101	20.03	1	39
		QPSK	-31.50	31.36	-9.90	1.45	H		0.100	20.01		
		16-QAM	-32.35	30.51	-9.90	1.45	H		0.082	19.16		
		64-QAM	-33.79	29.07	-9.90	1.45	H		0.059	17.72		
		256-QAM	-35.94	26.92	-9.90	1.45	H		0.036	15.57		
841.5		PI/2 BPSK	-31.70	31.38	-9.85	1.45	H		0.102	20.08	1	1
		QPSK	-31.73	31.35	-9.85	1.45	H		0.101	20.05		
		16-QAM	-32.66	30.42	-9.85	1.45	H		0.082	19.12		
		64-QAM	-33.98	29.10	-9.85	1.45	H		0.060	17.80		
		256-QAM	-36.04	27.04	-9.85	1.45	H		0.037	15.74		

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured	Substitute	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
			Level (dBm)	Level (dBm)				W	W	dBm	Size	Offset
834.0		PI/2 BPSK	-31.29	31.45	-9.95	1.45	H	< 7.00	0.101	20.05	1	53
		QPSK	-31.36	31.38	-9.95	1.45	H		0.100	19.98		
		16-QAM	-32.27	30.47	-9.95	1.45	H		0.081	19.07		
		64-QAM	-33.84	28.90	-9.95	1.45	H		0.056	17.50		
		256-QAM	-35.85	26.89	-9.95	1.45	H		0.035	15.49		
836.5	Sub6 n26 20 MHz [15 kHz]	PI/2 BPSK	-31.41	31.45	-9.90	1.45	H		0.102	20.10	1	1
		QPSK	-31.42	31.44	-9.90	1.45	H		0.102	20.09		
		16-QAM	-32.22	30.64	-9.90	1.45	H		0.085	19.29		
		64-QAM	-33.72	29.14	-9.90	1.45	H		0.060	17.79		
		256-QAM	-35.68	27.18	-9.90	1.45	H		0.038	15.83		
839.0		PI/2 BPSK	-31.69	31.33	-9.85	1.45	H		0.101	20.03	1	1
		QPSK	-31.73	31.29	-9.85	1.45	H		0.100	19.99		
		16-QAM	-32.57	30.45	-9.85	1.45	H		0.082	19.15		
		64-QAM	-34.05	28.97	-9.85	1.45	H		0.059	17.67		
		256-QAM	-36.02	27.00	-9.85	1.45	H		0.037	15.70		

9.2 RADIATED SPURIOUS EMISSIONS

NR Band:	<u>N26</u>
Bandwidth:	<u>20 MHz</u>
Modulation:	<u>PI/2 BPSK</u>
Distance:	<u>3 meters</u>
SCS:	<u>15 kHz</u>

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)	RB	
									Size	Offset
166800 (834.0)	1 668.00	-49.37	9.57	-64.61	2.05	H	-57.09	-13.00	1	53
	2 502.00	-34.06	10.27	-45.32	2.50	H	-37.55	-13.00		
	3 336.00	-54.38	11.10	-63.00	2.98	H	-54.88	-13.00		
167300 (836.5)	1 673.00	-50.31	9.60	-65.58	2.05	H	-58.03	-13.00	1	1
	2 509.50	-32.26	10.26	-43.54	2.51	H	-35.79	-13.00		
	3 346.00	-54.01	11.10	-62.67	2.96	H	-54.53	-13.00		
167800 (839.0)	1 678.00	-49.16	9.63	-64.45	2.06	H	-56.88	-13.00	1	1
	2 517.00	-33.69	10.26	-44.98	2.53	H	-37.25	-13.00		
	3 356.00	-54.22	11.11	-62.98	2.95	V	-54.82	-13.00		

9.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)	Limit (dB)
Sub6 n26	5 MHz	836.5	BPSK	25	0	4.25	13.00
			QPSK			5.17	
			16-QAM			5.93	
			64-QAM			5.68	
			256-QAM			5.90	
	10 MHz		BPSK	50		4.21	
			QPSK			5.22	
			16-QAM			5.98	
			64-QAM			5.84	
			256-QAM			5.95	
	15 MHz		BPSK	75		4.17	
			QPSK			5.21	
			16-QAM			5.98	
			64-QAM			5.83	
			256-QAM			5.95	
	20 MHz		BPSK	100		4.28	
			QPSK			5.29	
			16-QAM			6.06	
			64-QAM			5.86	
			256-QAM			5.97	

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 126~ 145.

9.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
Sub6 n26	5 MHz	836.5	BPSK	25	0	4.5088
			QPSK			4.5370
			16-QAM			4.5195
			64-QAM			4.5052
			256-QAM			4.5454
	10 MHz		BPSK	50		9.0144
			QPSK			9.0185
			16-QAM			8.9900
			64-QAM			8.9909
			256-QAM			9.0263
	15 MHz		BPSK	75		13.451
			QPSK			13.458
			16-QAM			13.471
			64-QAM			13.503
			256-QAM			13.466
	20 MHz		BPSK	100		17.964
			QPSK			17.931
			16-QAM			17.900
			64-QAM			17.927
			256-QAM			17.919

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 146 ~ 165.

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)
Sub6 n26	5	826.5	3.9582	29.722	-63.188	-33.466	-13.00
		836.5	7.2283	30.315	-63.886	-33.571	
		846.5	3.9781	29.722	-63.464	-33.742	
	10	829.0	4.0180	29.722	-63.831	-34.109	
		836.5	9.0429	30.315	-63.467	-33.152	
		844.0	4.0280	29.722	-62.699	-32.977	
	15	831.5	9.9601	30.315	-63.952	-33.637	
		836.5	9.1326	30.315	-62.966	-32.651	
		841.5	9.6810	30.315	-62.727	-32.412	
	20	834.0	4.0479	29.722	-63.097	-33.375	
		836.5	9.4317	30.315	-62.335	-32.020	
		839.0	5.0150	30.315	-62.842	-32.527	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 166 ~ 177.
2. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
3. Factor(dB) = Cable Loss + Ext. Attenuator + Power Splitter

Frequency Range (GHz)	Factor [dB]
0.03 – 1	27.012
1 – 5	29.722
5 – 10	30.315
10 – 15	30.840
15 – 20	31.213
Above 20	31.855

9.6 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 178 ~ 201.

9.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

BandWidth:	<u>5 MHz</u>
Voltage(100 %):	<u>3.880 VDC</u>
Batt. Endpoint:	<u>3.300 VDC</u>
Deviation Limit:	<u>± 0.000 25 % or 2.5 ppm</u>

Test. Frequency	Voltage	Temp.	Frequency	Frequency Error	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	(Hz)	(%)	
836.5	100 %	+20(Ref)	836 500 000	0.0	0.000 000	0.000
	100 %	-30	836 500 001	1.8	0.000 000	0.002
	100 %	-20	836 499 999	-0.3	0.000 000	0.000
	100 %	-10	836 499 999	-1.0	0.000 000	-0.001
	100 %	0	836 499 999	-1.0	0.000 000	-0.001
	100 %	+10	836 500 000	0.7	0.000 000	0.001
	100 %	+30	836 500 000	0.4	0.000 000	0.000
	100 %	+40	836 499 998	-1.7	0.000 000	-0.002
	100 %	+50	836 499 999	-0.6	0.000 000	-0.001
	Batt. Endpoint	+20	836 499 998	-1.1	0.000 000	-0.001

▣ BandWidth:	<u>10 MHz</u>
▣ Voltage(100 %):	<u>3.880 VDC</u>
▣ Batt. Endpoint:	<u>3.300 VDC</u>
▣ Deviation Limit:	<u>± 0.000 25 % or 2.5 ppm</u>

Test. Frequency	Voltage	Temp.	Frequency	Frequency Error	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	(Hz)	(%)	
836.5	100 %	+20(Ref)	836 499 999	0.0	0.000 000	0.000
	100 %	-30	836 499 998	-1.2	0.000 000	-0.001
	100 %	-20	836 499 998	-1.2	0.000 000	-0.001
	100 %	-10	836 499 997	-1.8	0.000 000	-0.002
	100 %	0	836 499 999	0.3	0.000 000	0.000
	100 %	+10	836 499 999	0.5	0.000 000	0.001
	100 %	+30	836 499 997	-1.7	0.000 000	-0.002
	100 %	+40	836 499 997	-1.6	0.000 000	-0.002
	100 %	+50	836 499 998	-0.6	0.000 000	-0.001
	Batt. Endpoint	+20	836 500 000	0.9	0.000 000	0.001

■ BandWidth: 15 MHz
 ■ Voltage(100 %): 3.880 VDC
 ■ Batt. Endpoint: 3.300 VDC
 ■ Deviation Limit: ± 0.000 25 % or 2.5 ppm

Test. Frequency	Voltage	Temp.	Frequency	Frequency Error	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	(Hz)	(%)	
836.5	100 %	+20(Ref)	836 499 999	0.0	0.000 000	0.000
	100 %	-30	836 499 999	-0.2	0.000 000	0.000
	100 %	-20	836 499 999	-0.6	0.000 000	-0.001
	100 %	-10	836 499 999	-0.6	0.000 000	-0.001
	100 %	0	836 499 998	-1.3	0.000 000	-0.002
	100 %	+10	836 499 997	-1.8	0.000 000	-0.002
	100 %	+30	836 500 000	0.6	0.000 000	0.001
	100 %	+40	836 500 000	0.3	0.000 000	0.000
	100 %	+50	836 499 999	-0.7	0.000 000	-0.001
	Batt. Endpoint	+20	836 499 999	-0.1	0.000 000	0.000

☐ BandWidth: 20 MHz
☐ Voltage(100 %): 3.880 VDC
☐ Batt. Endpoint: 3.300 VDC
☐ Deviation Limit: ± 0.000 25 % or 2.5 ppm

Test. Frequency	Voltage	Temp.	Frequency	Frequency Error	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	(Hz)	(%)	
836.5	100 %	+20(Ref)	836 500 000	0.0	0.000 000	0.000
	100 %	-30	836 500 000	0.0	0.000 000	0.000
	100 %	-20	836 499 998	-1.8	0.000 000	-0.002
	100 %	-10	836 500 000	-0.4	0.000 000	0.000
	100 %	0	836 500 000	-0.5	0.000 000	-0.001
	100 %	+10	836 499 999	-1.3	0.000 000	-0.002
	100 %	+30	836 499 998	-2.1	0.000 000	-0.002
	100 %	+40	836 499 999	-1.1	0.000 000	-0.001
	100 %	+50	836 500 000	0.0	0.000 000	0.000
	Batt. Endpoint	+20	836 499 999	-0.9	0.000 000	-0.001

10. TEST PLOTS(Main 1 ANT)

5 M_PAR_Mid_BPSK_FullRB



5 M_PAR_Mid_QPSK_FullRB



5 M_PAR_Mid_16QAM_FullRB



5 M_PAR_Mid_64QAM_FullIRB



5 M_PAR_Mid_256QAM_FullRB



10 M_PAR_Mid_BPSK_FullRB



10 M_PAR_Mid_QPSK_FullRB



10 M_PAR_Mid_16QAM_FullRB



10 M_PAR_Mid_64QAM_FullRB



10 M_PAR_Mid_256QAM_FullRB



15 M_PAR_Mid_BPSK_FullRB



15 M_PAR_Mid_QPSK_FullRB



15 M_PAR_Mid_16QAM_FullRB



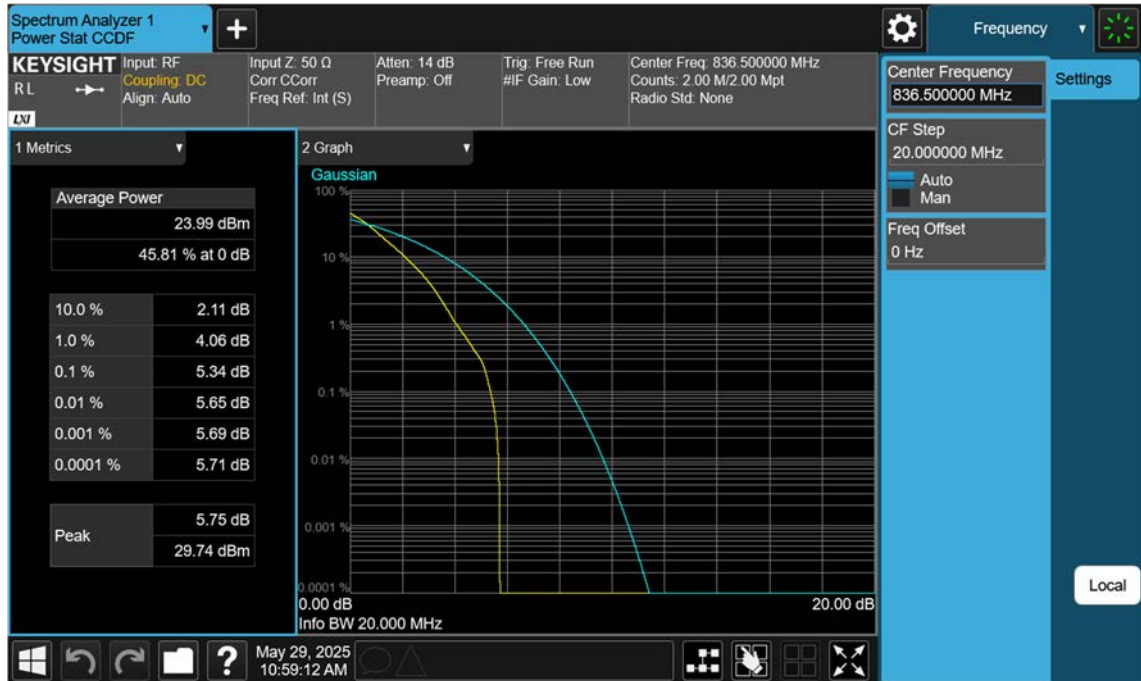
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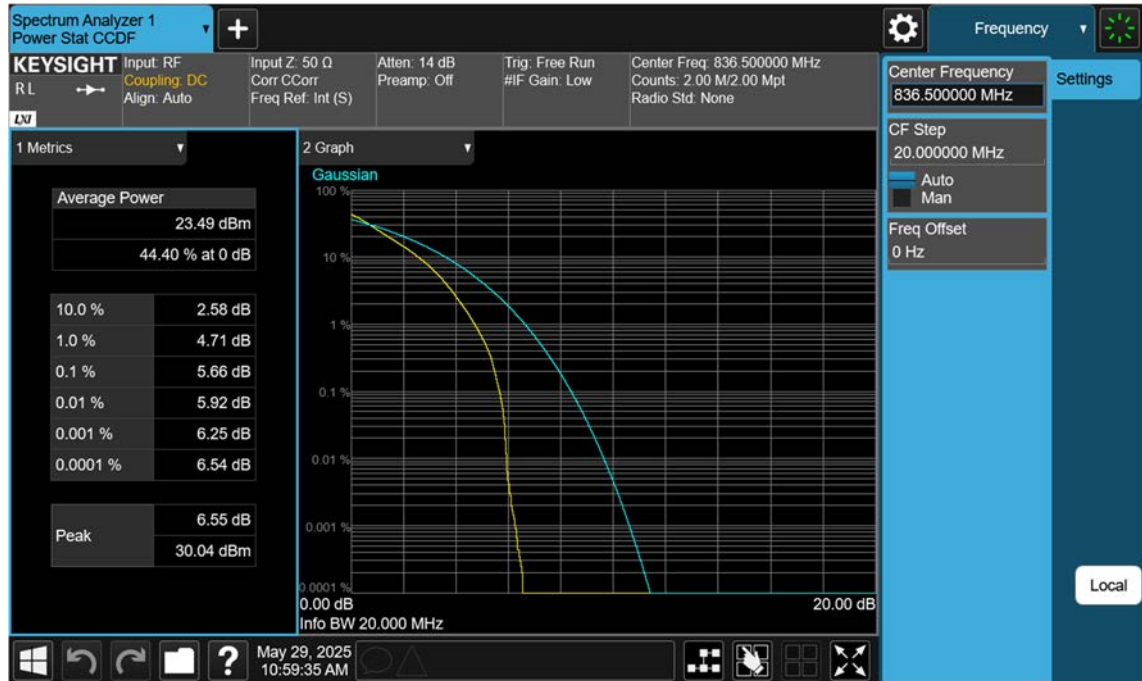
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20 M_PAR_Mid_BPSK_FullRB



20 M_PAR_Mid_QPSK_FullRB



20 M_PAR_Mid_16QAM_FullRB



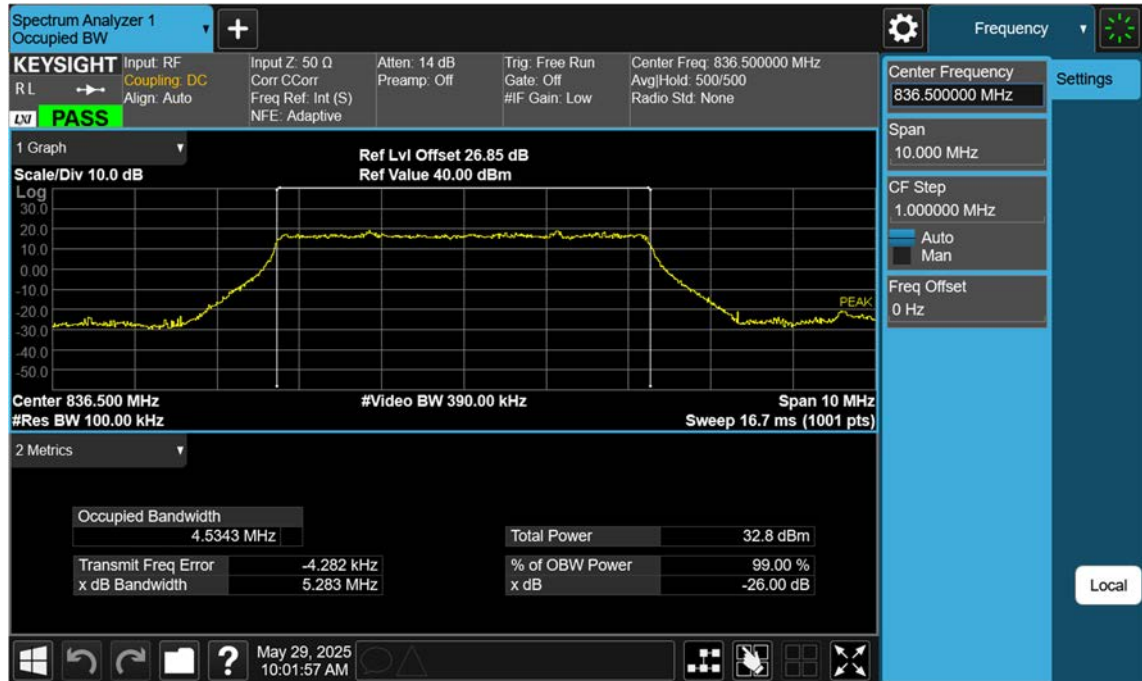
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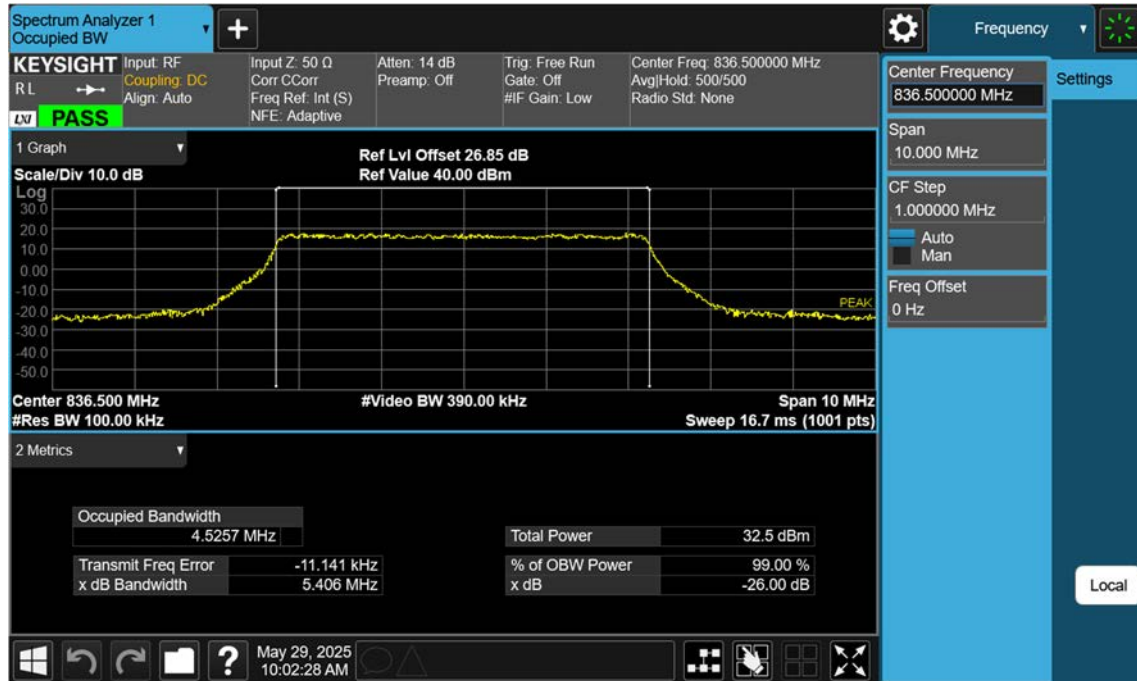
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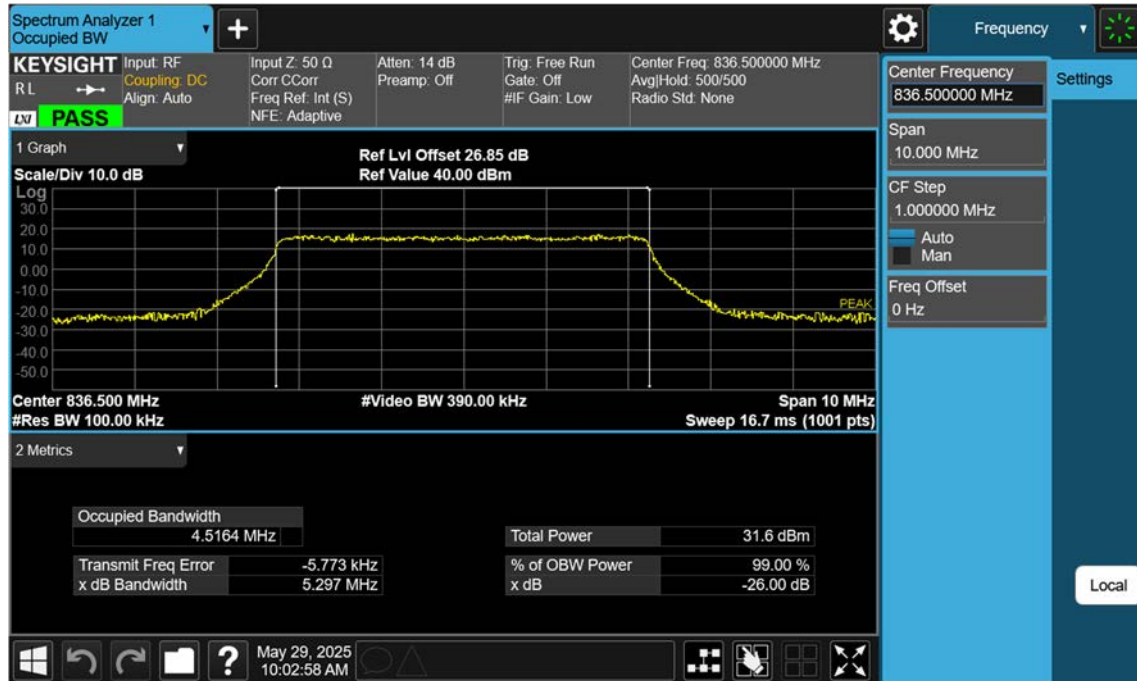
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5 M_OBW_Mid_QPSK_FullRB



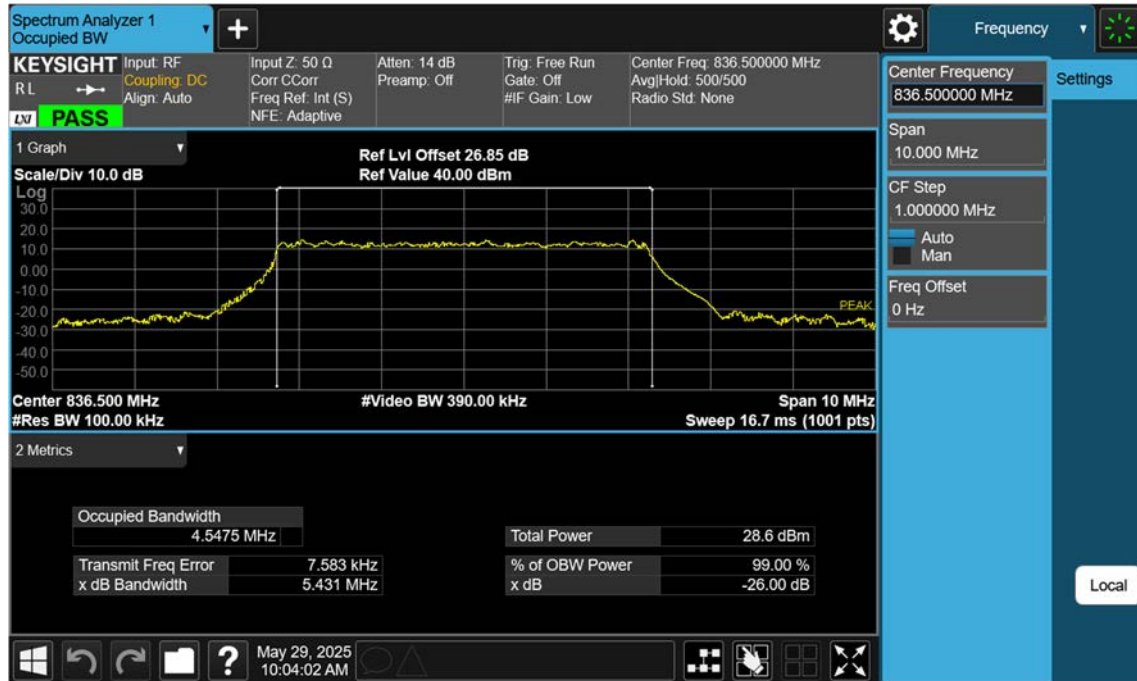
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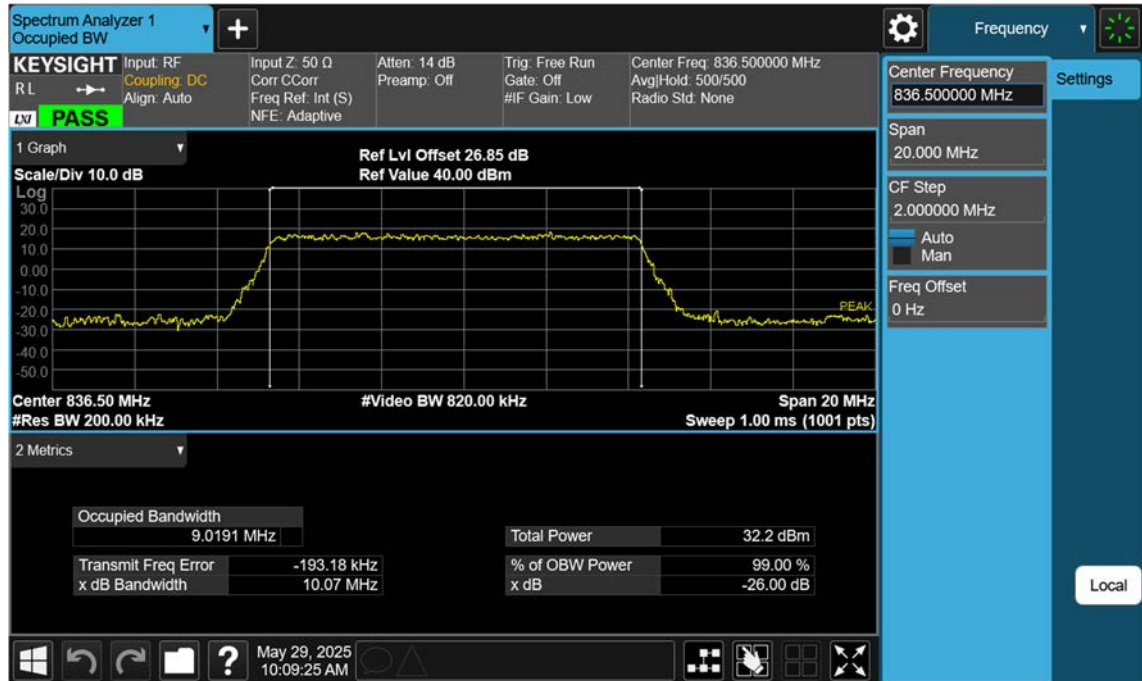
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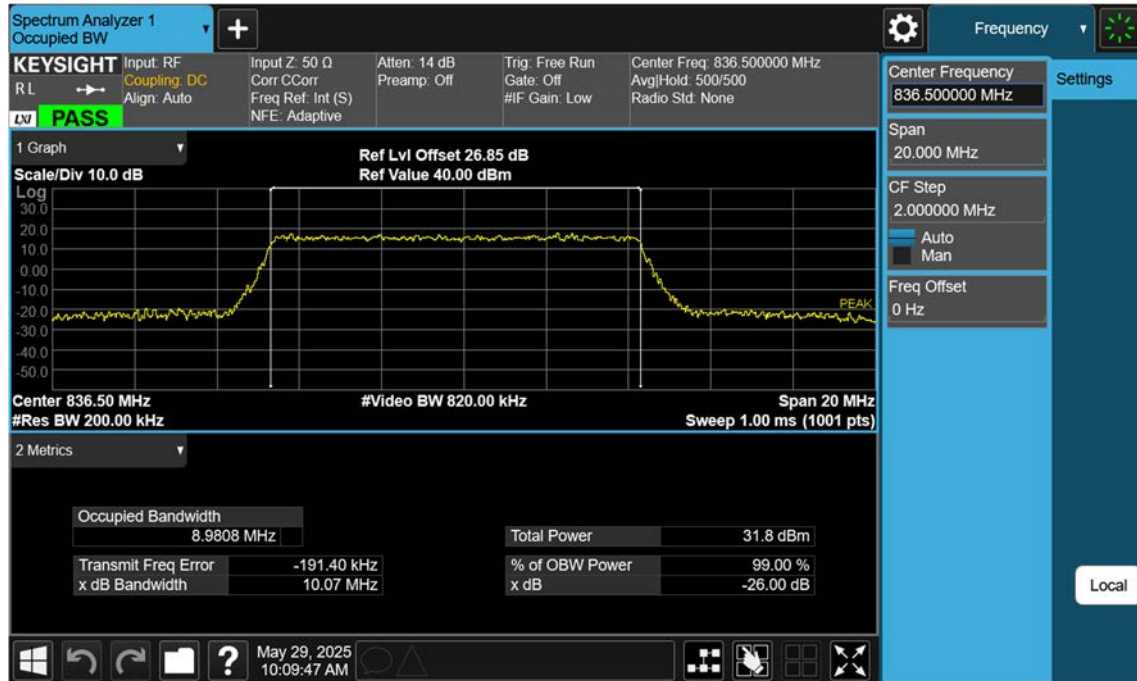
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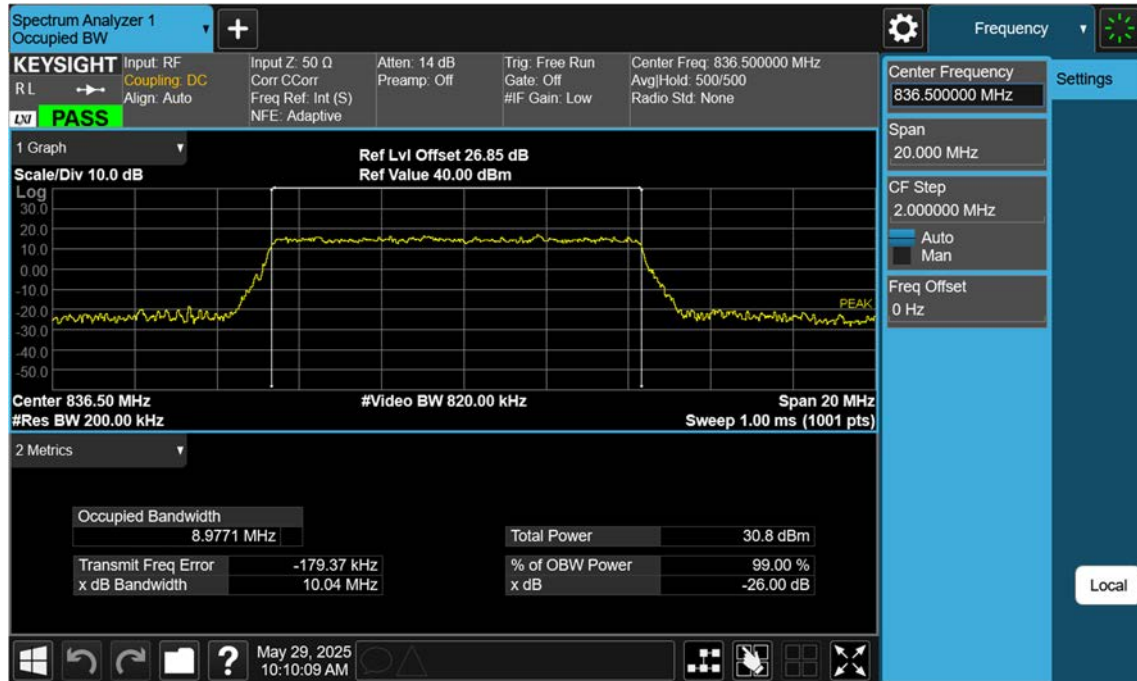
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10 M_OBW_Mid_QPSK_FullRB



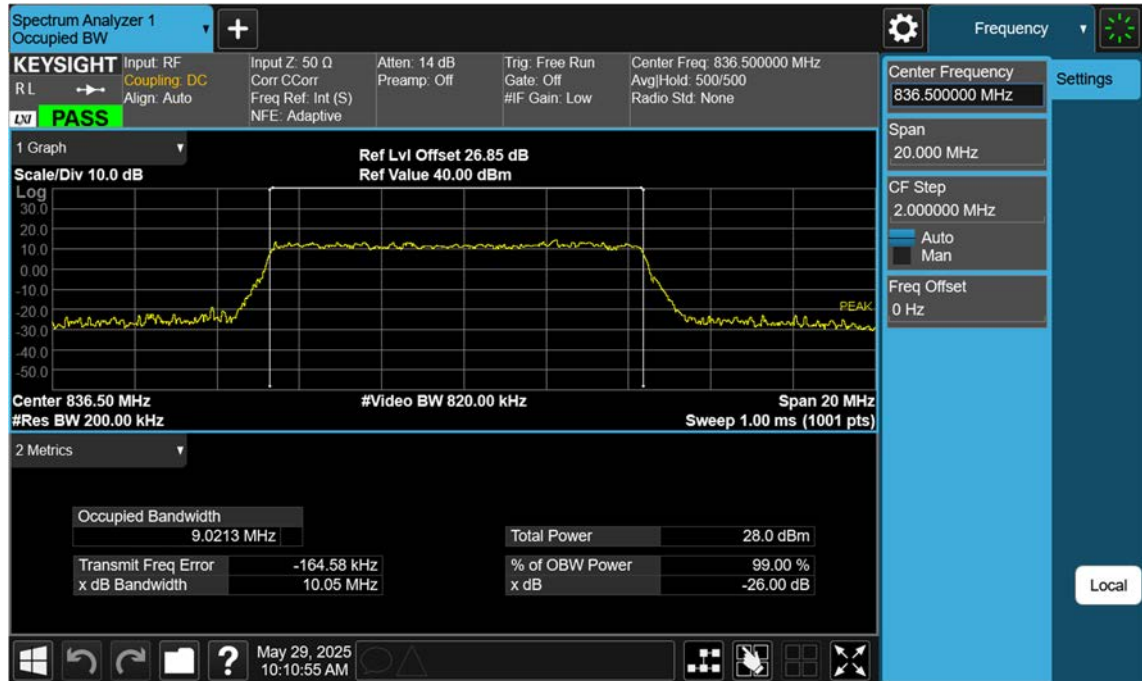
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10 M_OBW_Mid_64QAM_FullRB



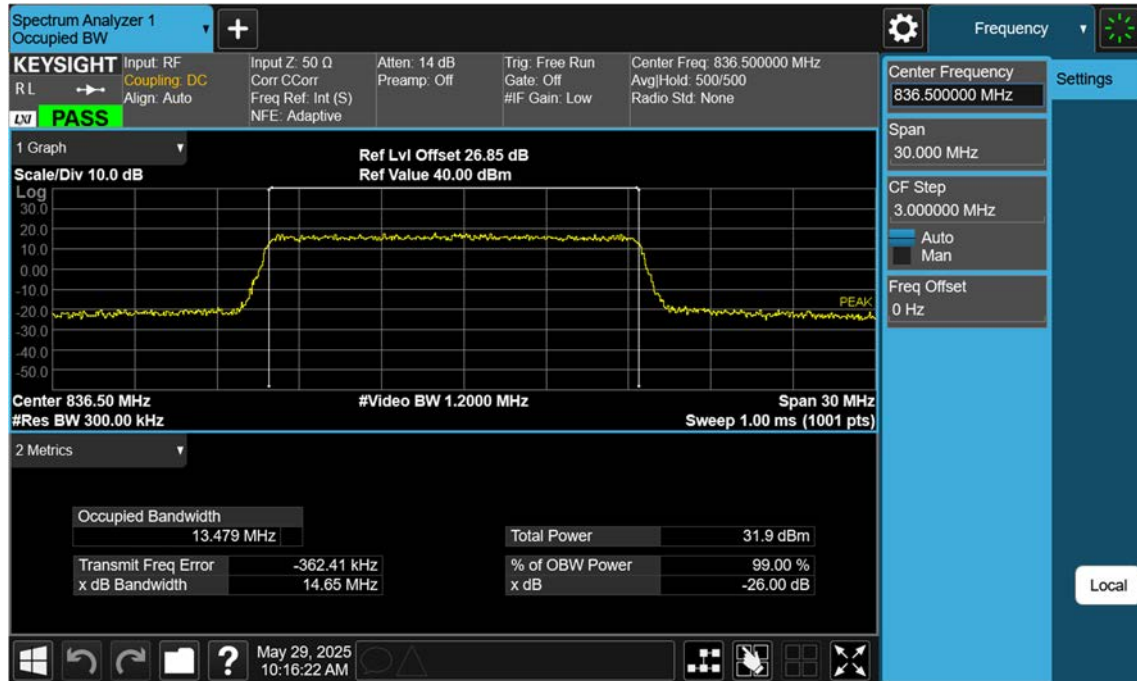
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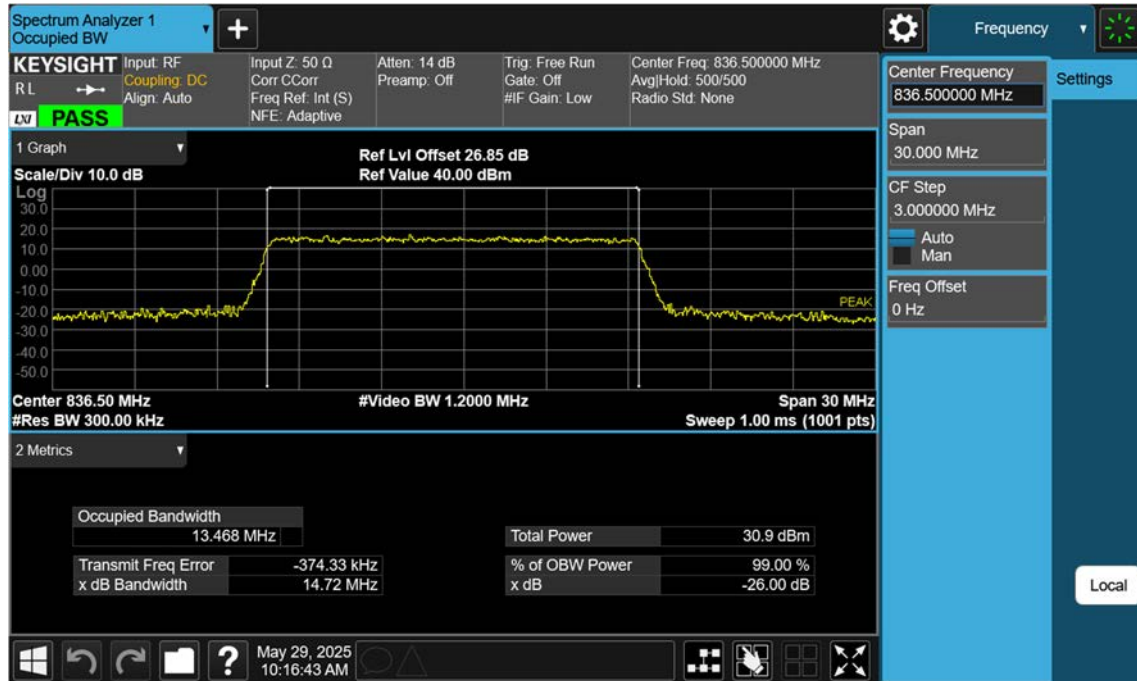
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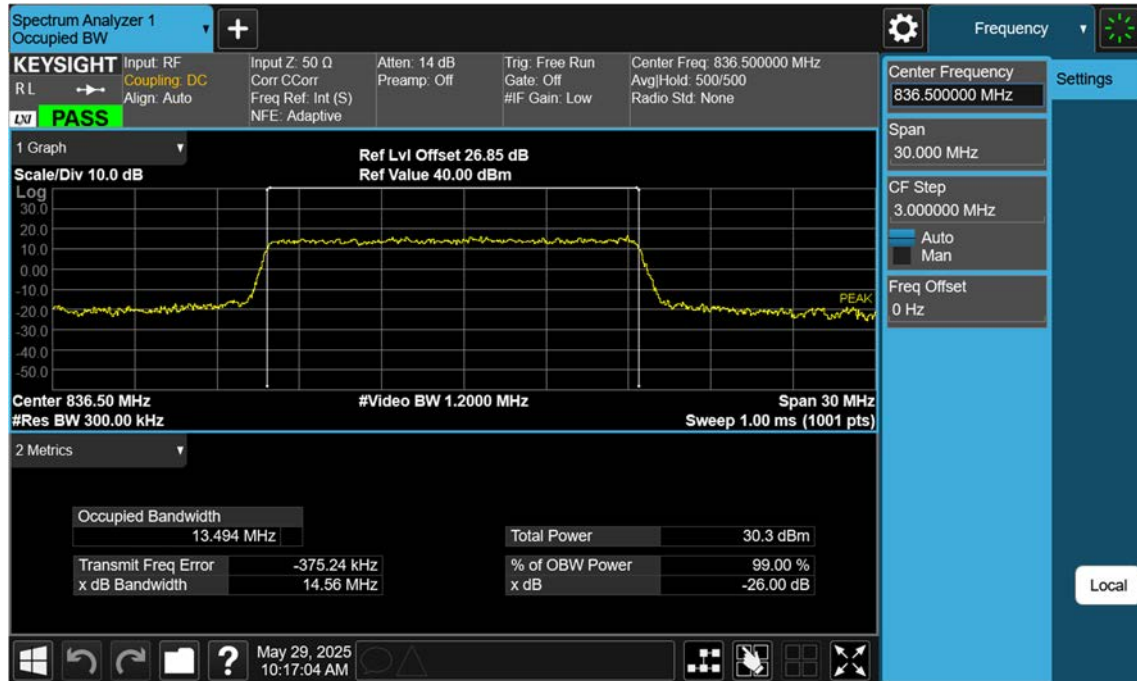
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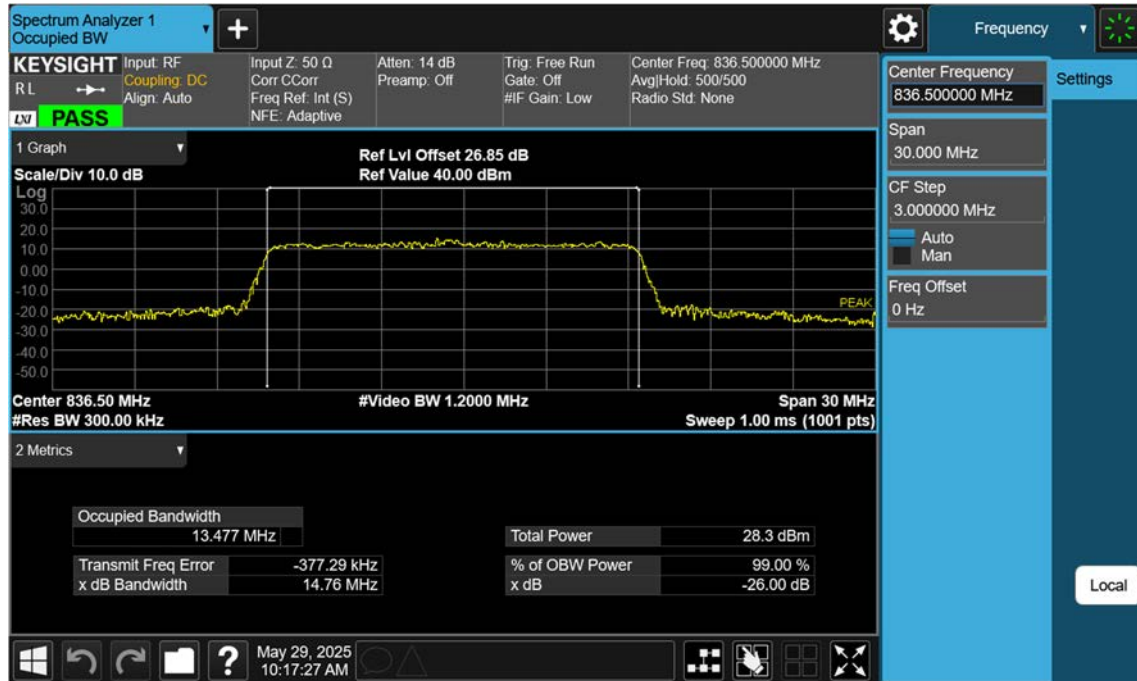
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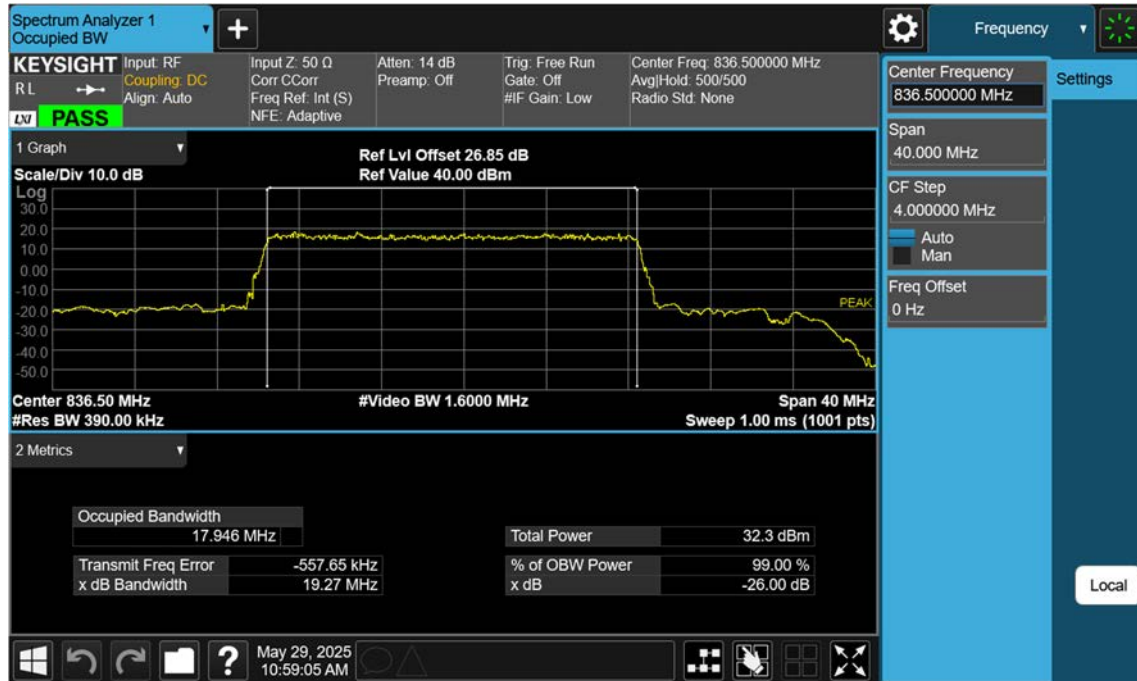
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15 M_OBW_Mid_256QAM_FullRB



20 M_OBW_Mid_BPSK_FullRB



20 M_OBW_Mid_QPSK_FullRB



20 M_OBW_Mid_16QAM_FullRB



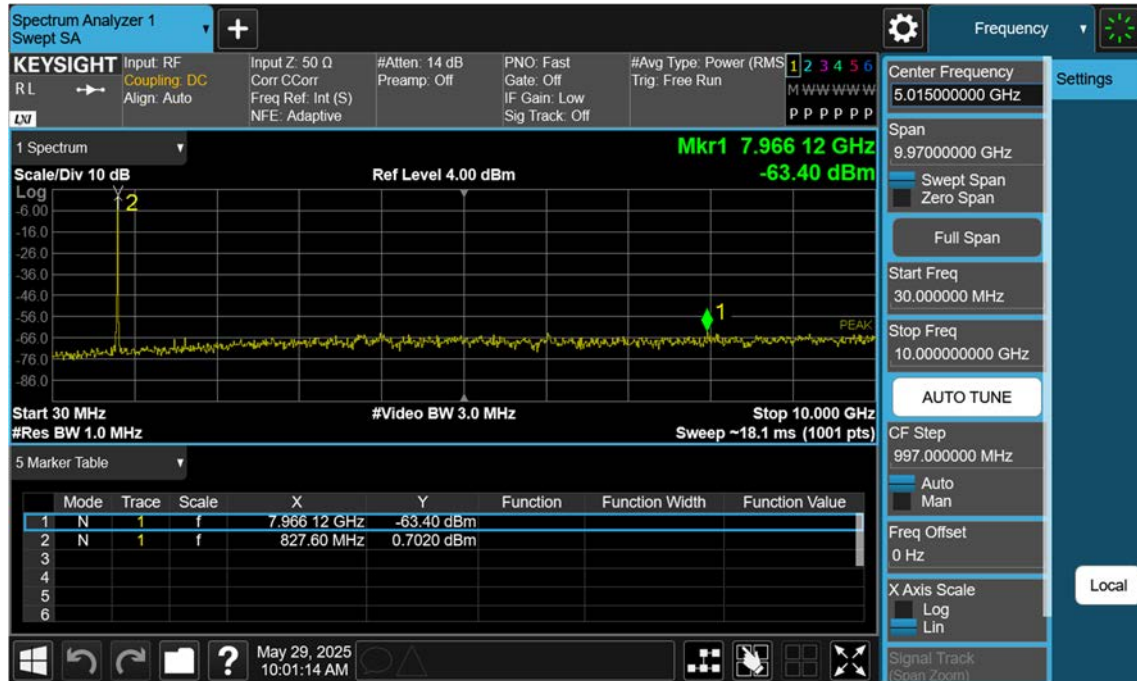
20 M_OBW_Mid_64QAM_FullRB



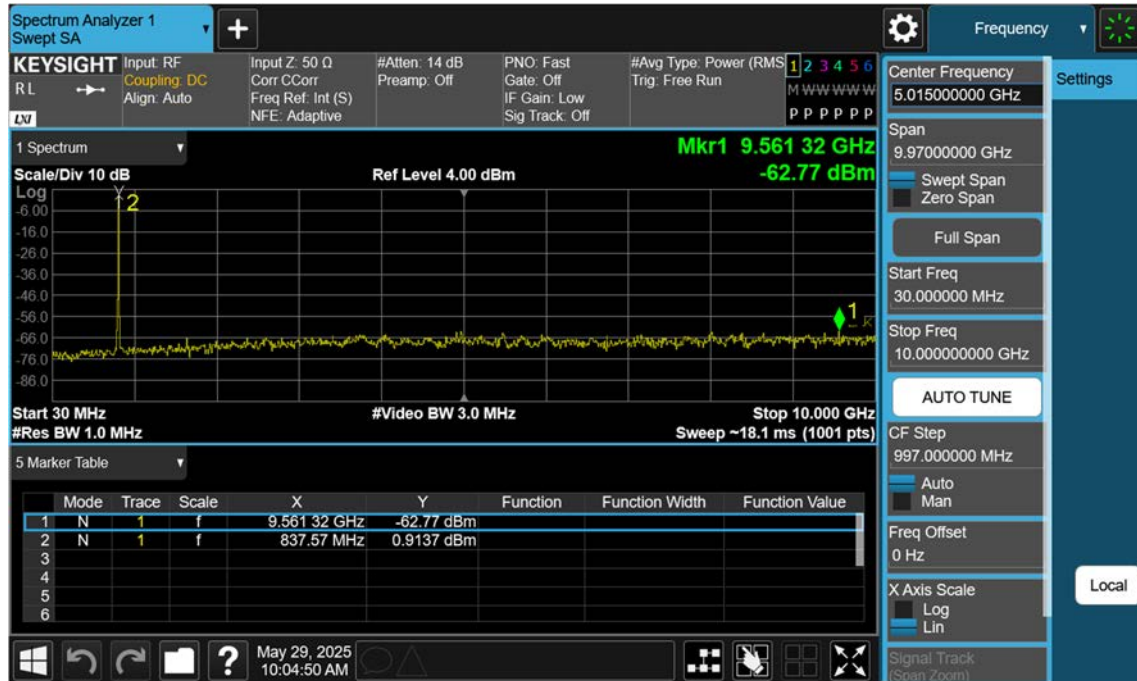
20 M_OBW_Mid_256QAM_FullRB



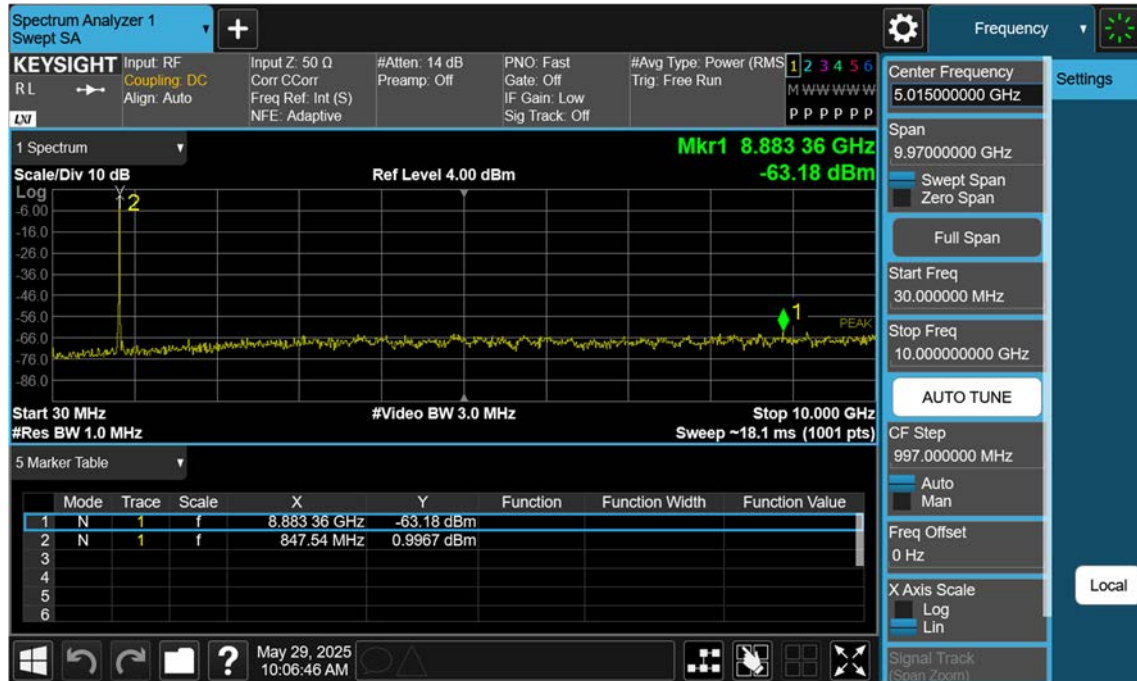
5 M_Conducted Spurious(30 M-10 G)_Low_BPSK_1RB



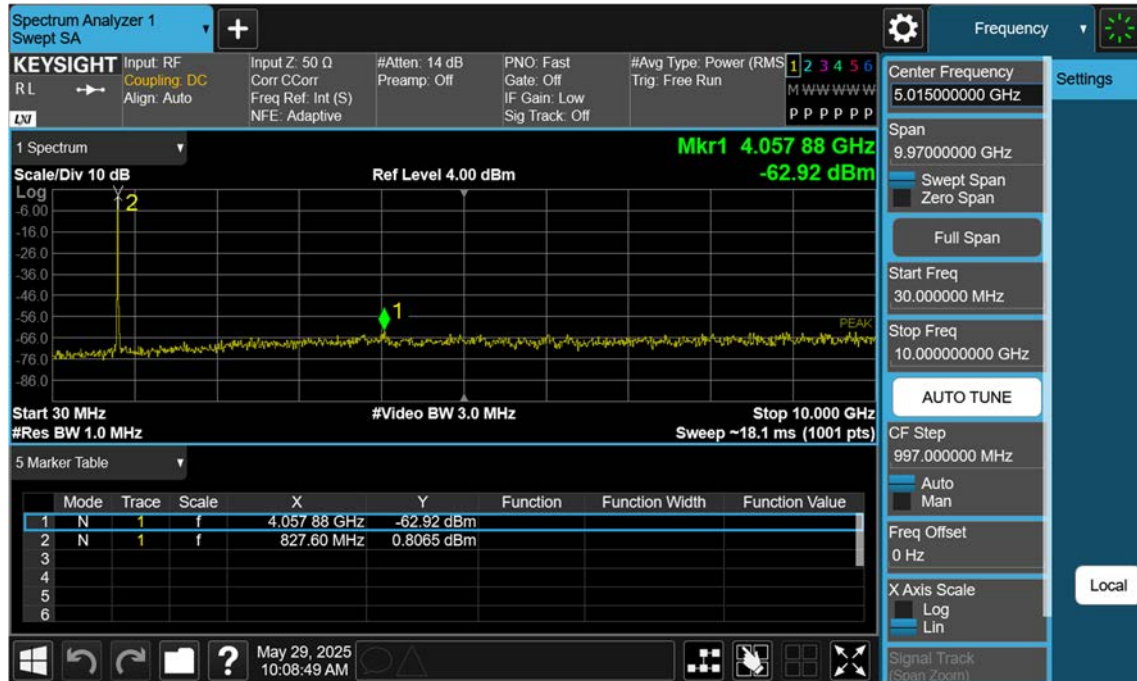
5 M_Conducted Spurious(30 M-10 G)_Mid_BPSK_1RB



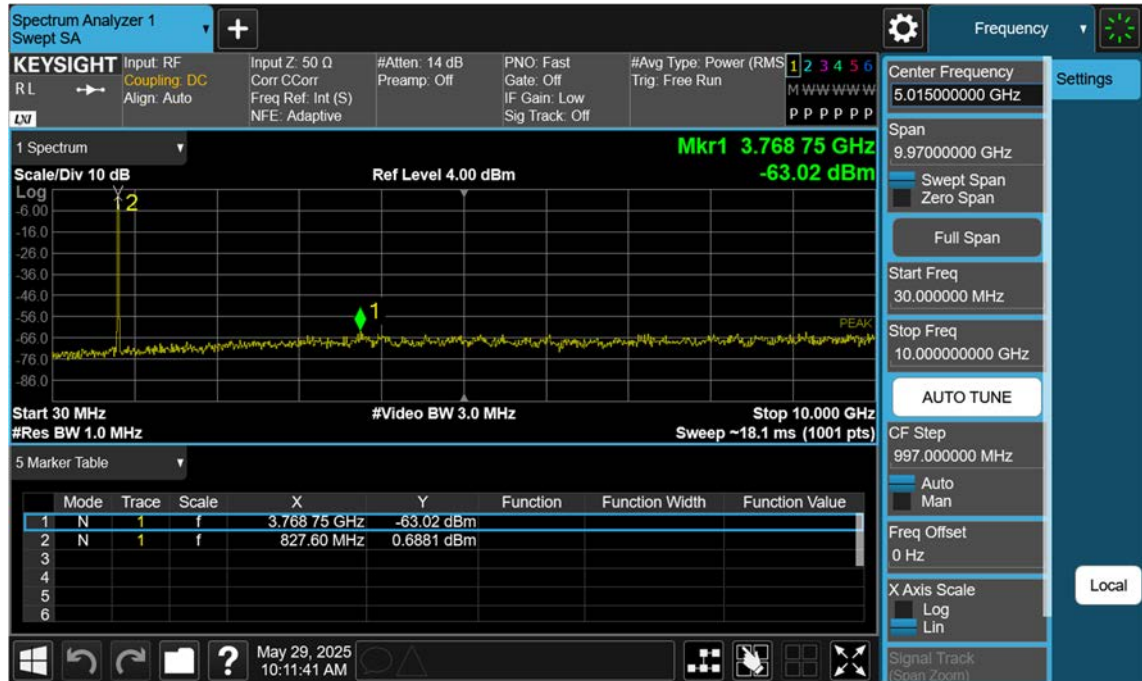
5 M_Conducted Spurious(30 M-10 G)_High_BPSK_1RB



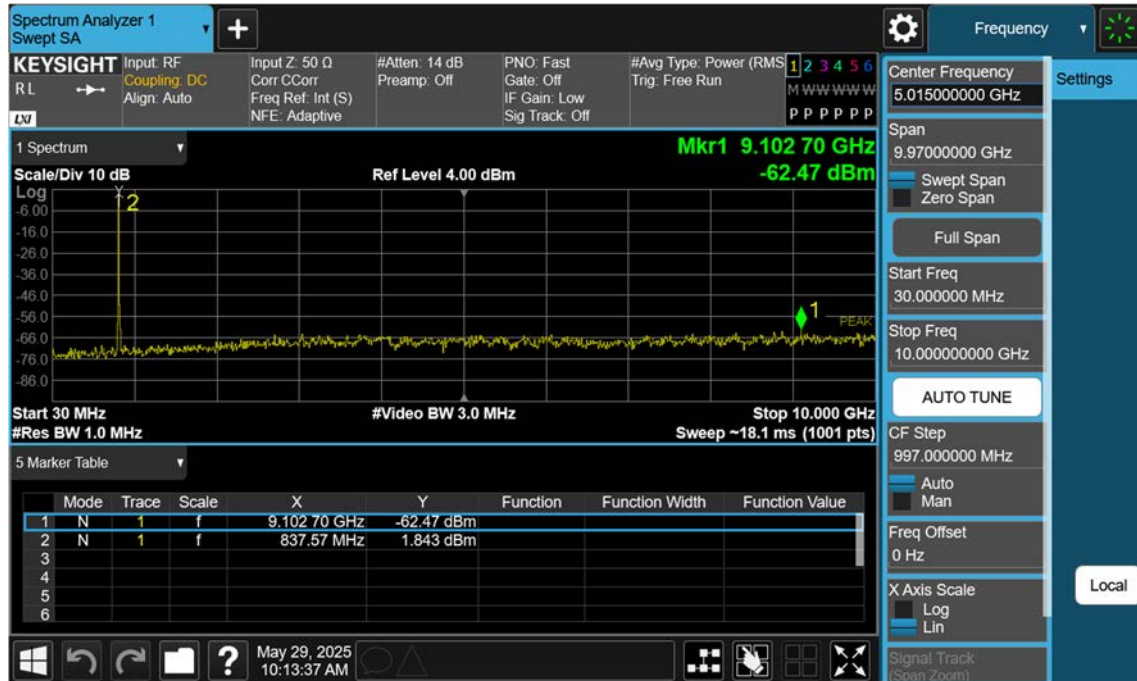
10 M_Conducted Spurious(30 M-10 G)_Low_BPSK_1RB



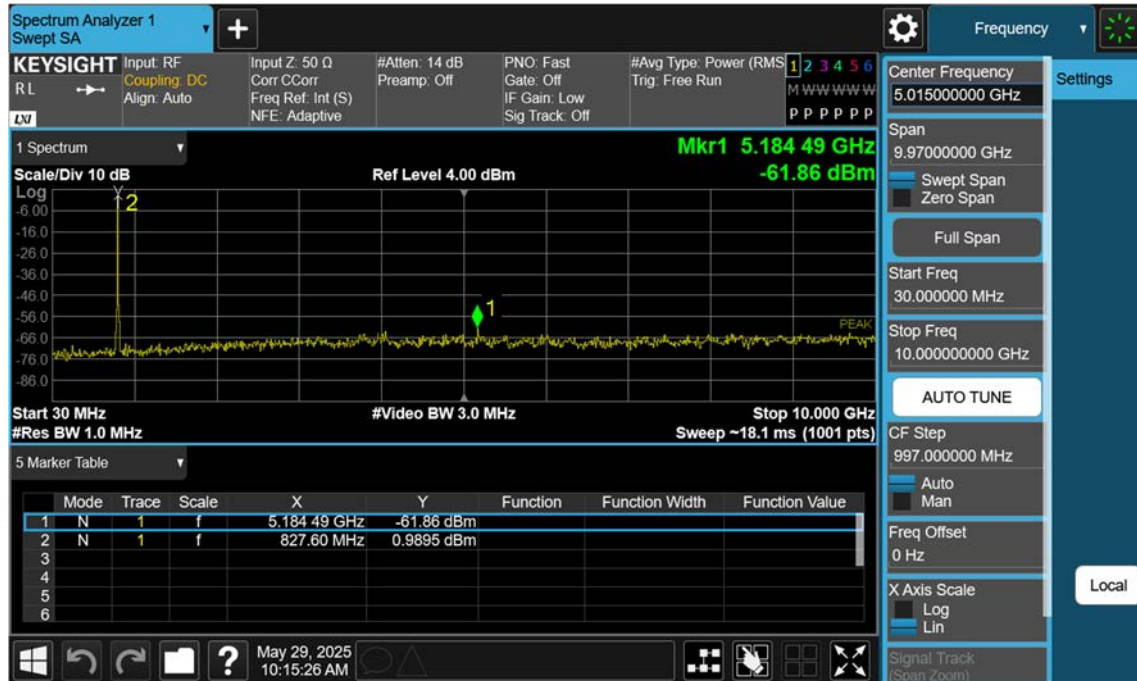
10 M_Conducted Spurious(30 M-10 G)_Mid_BPSK_1RB



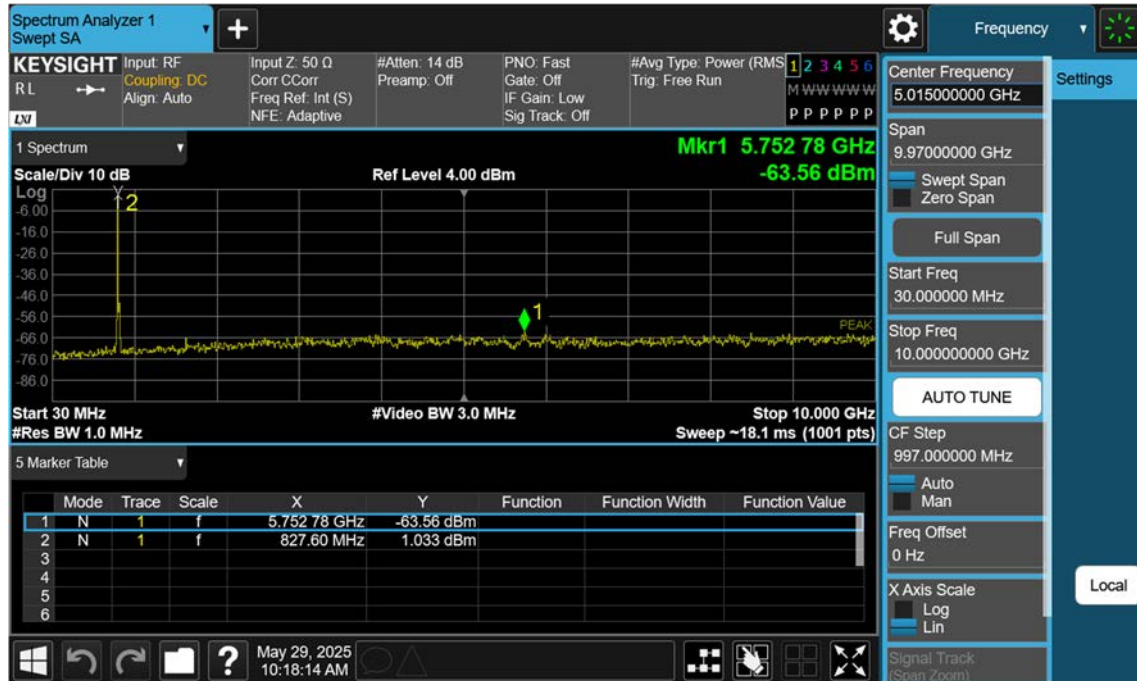
10 M_Conducted Spurious(30 M-10 G)_High_BPSK_1RB



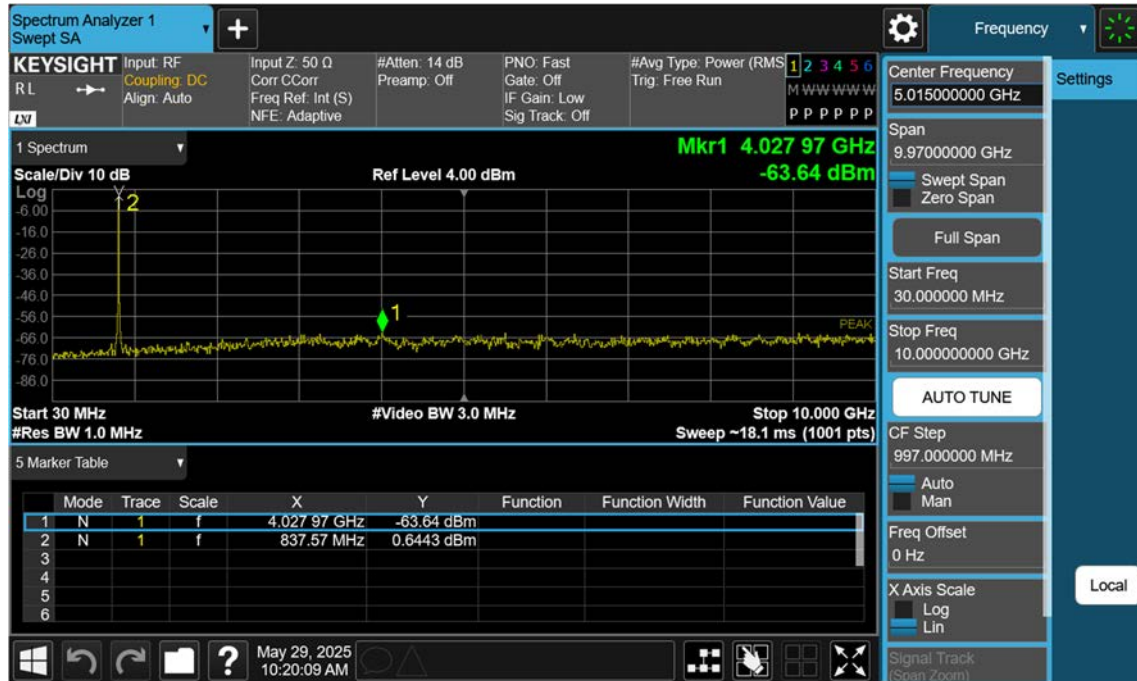
15 M_Conducted Spurious(30 M-10 G)_Low_BPSK_1RB



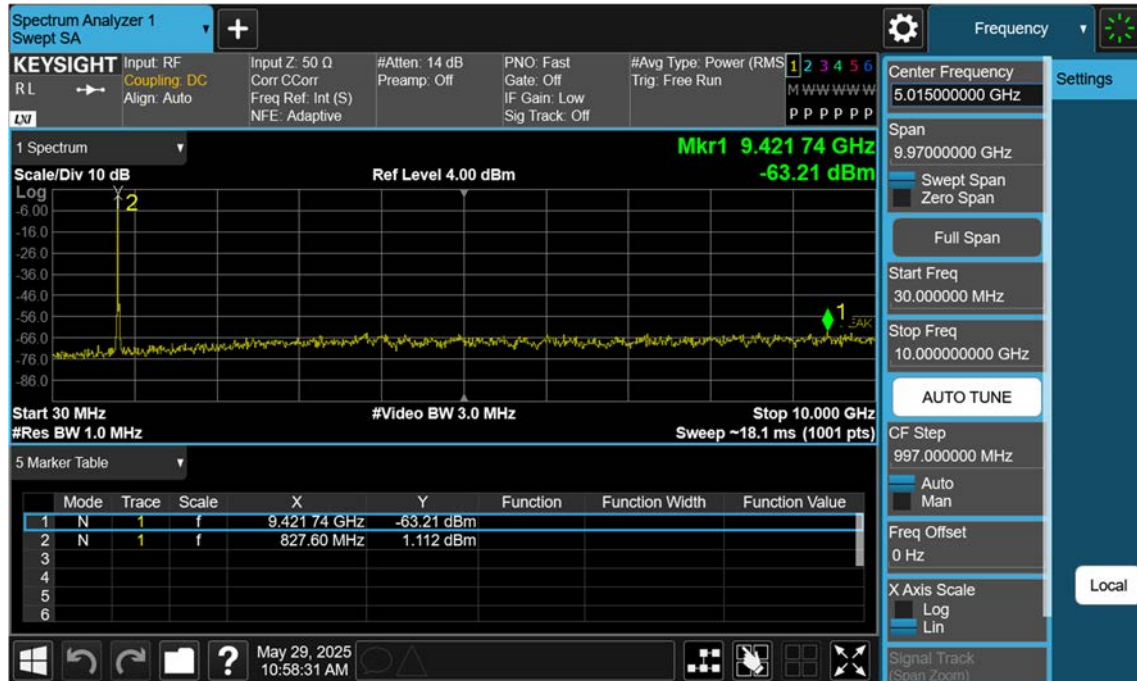
15 M_Conducted Spurious(30 M-10 G)_Mid_BPSK_1RB



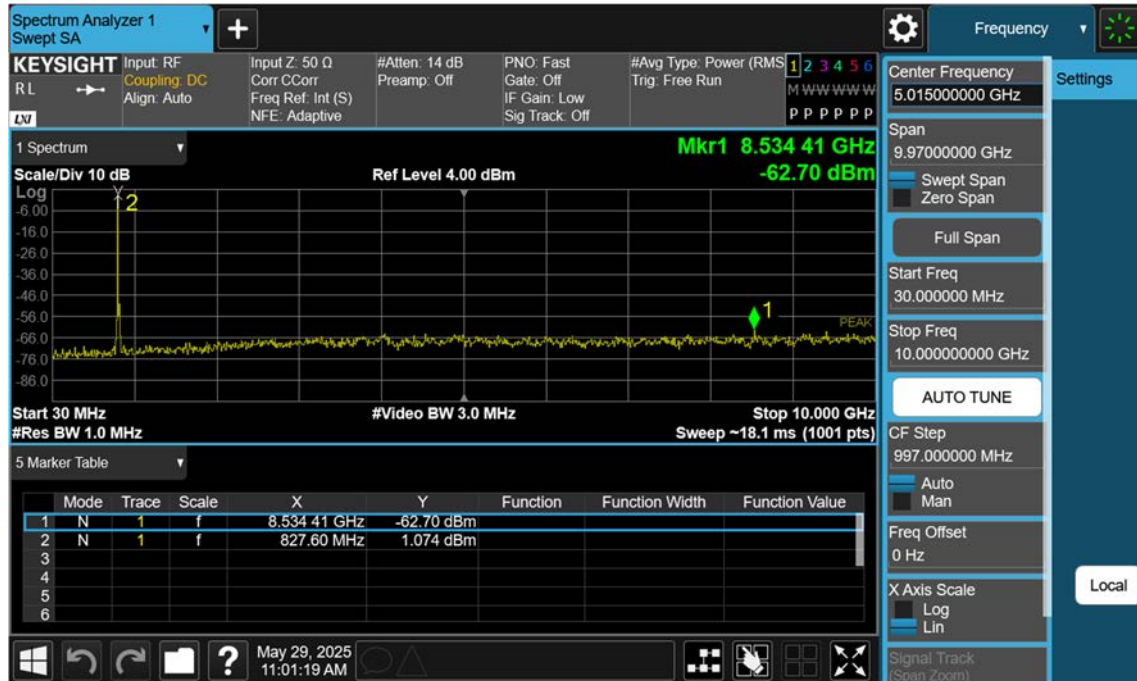
15 M_Conducted Spurious(30 M-10 G)_High_BPSK_1RB



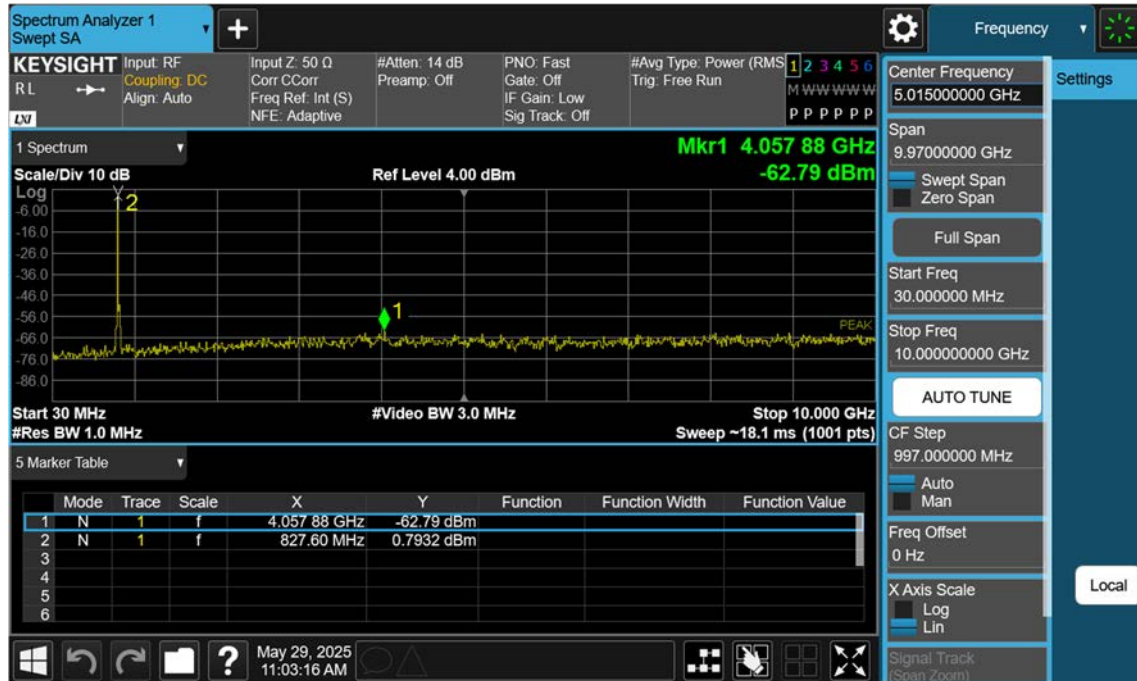
20 M_Conducted Spurious(30 M-10 G)_Low_BPSK_1RB



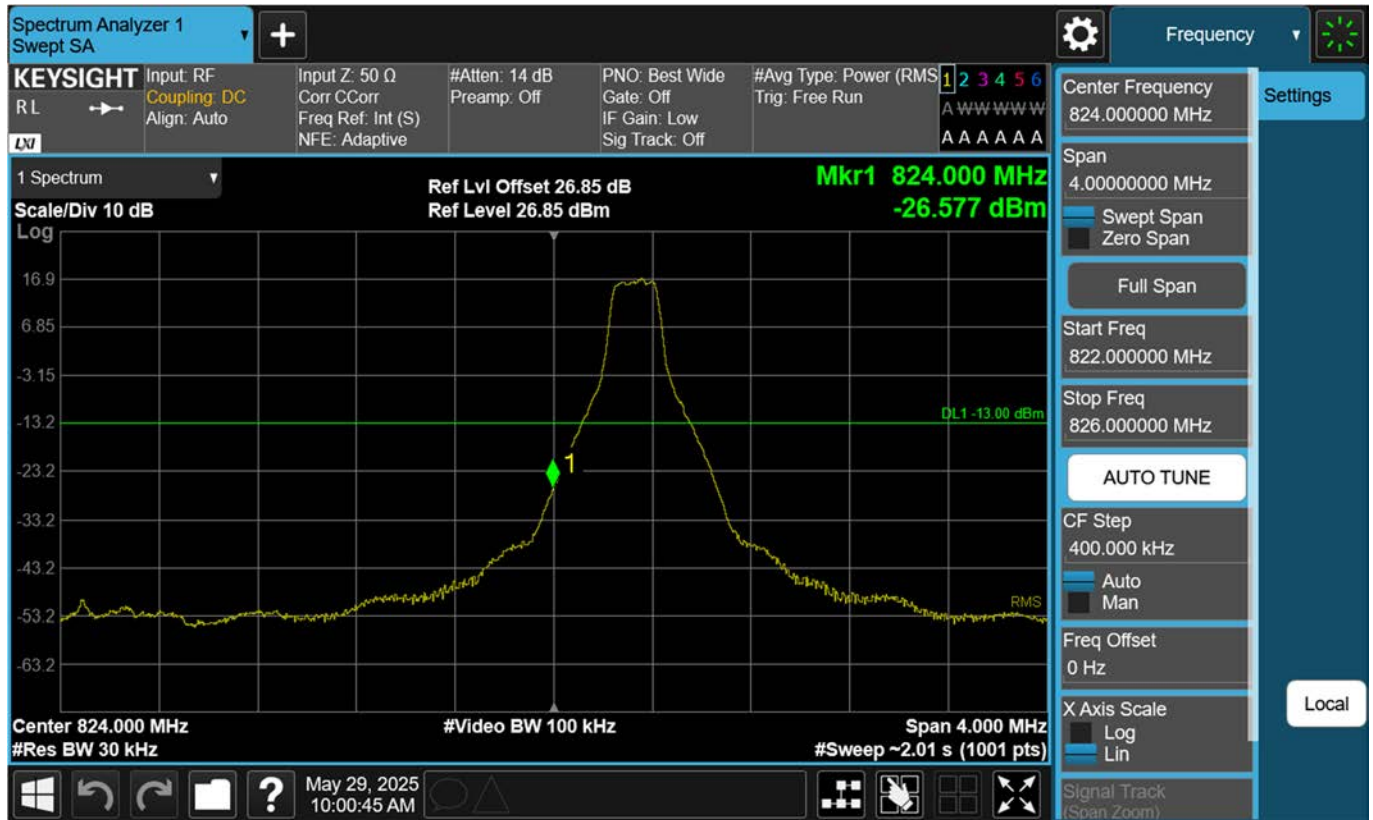
20 M_Conducted Spurious(30 M-10 G)_Mid_BPSK_1RB



20 M_Conducted Spurious(30 M-10 G)_High_BPSK_1RB



Lower Band Edge Plot (5 M BW Ch.165300 BPSK_RB 1_Offset 0)



Lower Band Edge Plot (5 M BW Ch.165300 BPSK_RB 25_Offset 0)



Lower Extended Band Edge Plot (5 M BW Ch.165300 BPSK_RB 25_0)



Spectrum Analyzer 1
Swept SA

KEYSIGHT Input: RF
RL $\rightarrow$ Coupling: DC
Align: Auto

Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
NFE: Adaptive

#Atten: 14 dB
Preamp: Off

PNO: Best Wide
Gate: Off
IF Gain: Low
Sig Track: Off

#Avg Type: Power (RMS)
Trig: Free Run

1 2 3 4 5 6
A W W W W W
A A A A A A

Center Frequency
824.000000 MHz

Span
4.00000000 MHz

☒ Swept Span
☐ Zero Span

Full Span

Start Freq
822.000000 MHz

Stop Freq
826.000000 MHz

AUTO TUNE

CF Step
400.000 kHz

☒ Auto
☐ Man

Freq Offset
0 Hz

X Axis Scale
☐ Log
☒ Lin

Signal Track
(Scan Zoom)

1 Spectrum

Scale/Div 10 dB
Log

Ref Lvl Offset 26.85 dB
Ref Level 26.85 dBm

Mkr1 824.000 MHz
-34.246 dBm

DL1 -13.00 dBm

Center 824.000 MHz
#Res BW 30 kHz

#Video BW 100 kHz

Span 4.000 MHz
#Sweep ~2.01 s (1001 pts)

May 29, 2025
10:08:19 AM

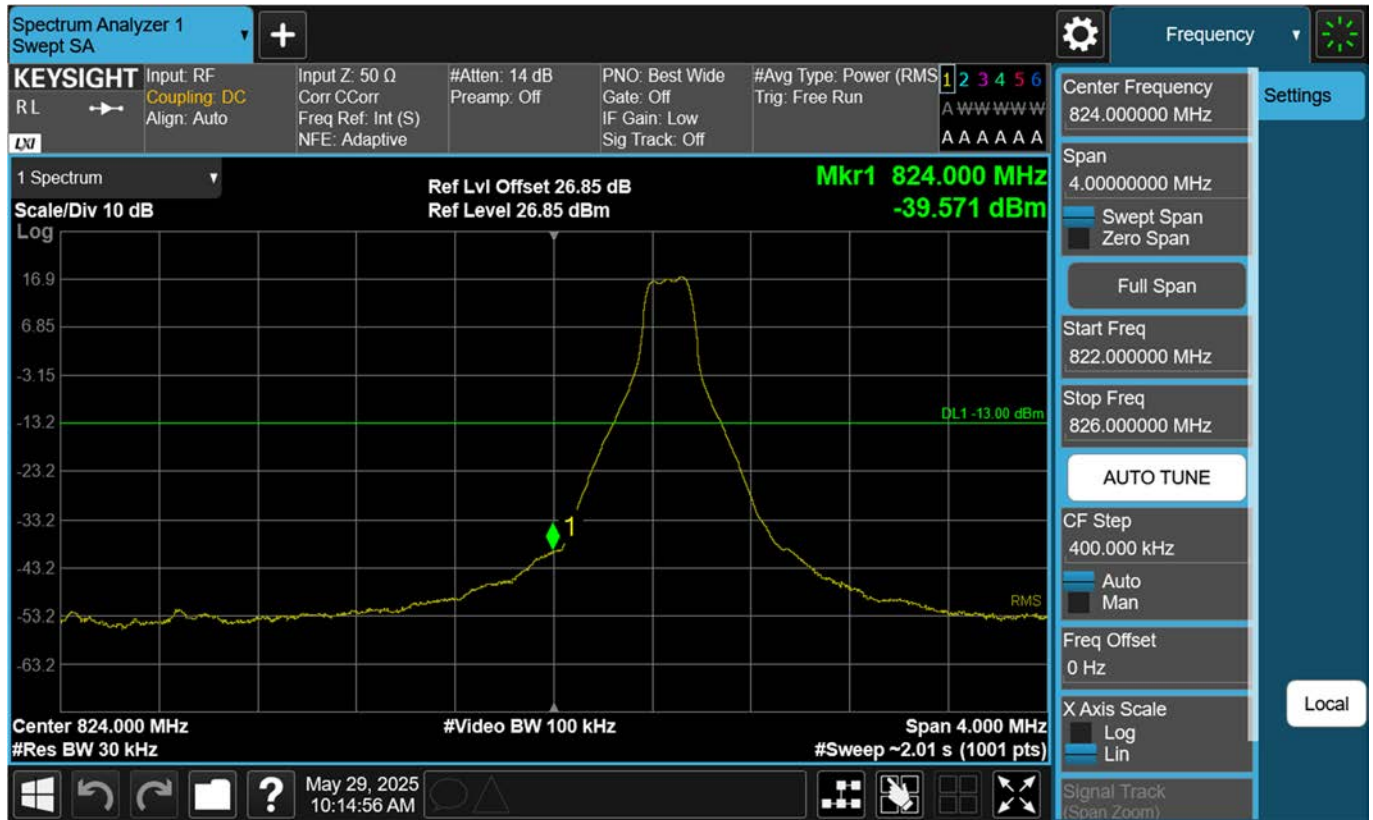
Lower Band Edge Plot (10 M BW Ch.165800 BPSK_RB 50_Offset 0)



Lower Extended Band Edge Plot (10 M BW Ch.165800 BPSK_RB 50_0)



Lower Band Edge Plot (15 M BW Ch.166300 BPSK_RB 1_Offset 0)



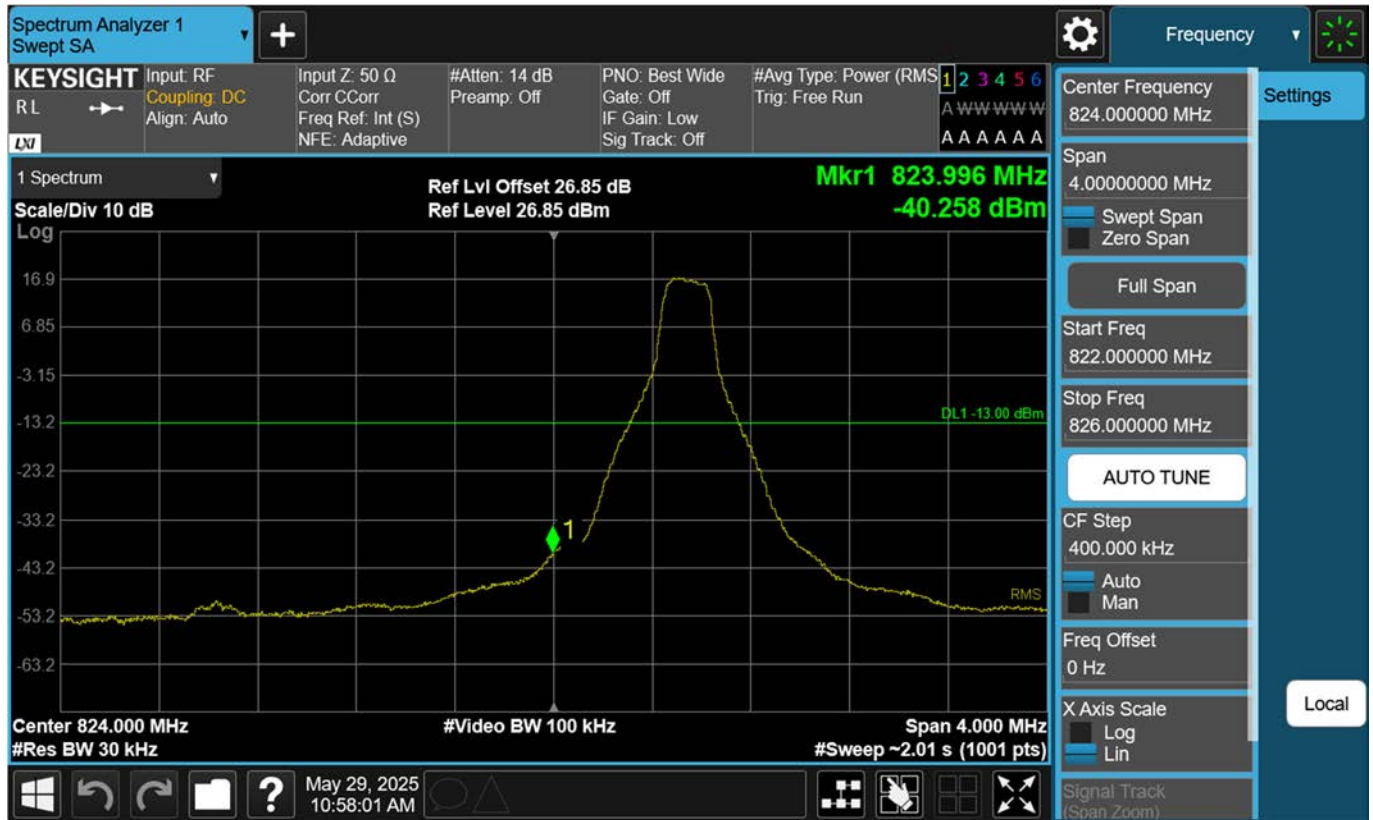
Lower Band Edge Plot (15 M BW Ch.166300 BPSK_RB 75_Offset 0)



Lower Extended Band Edge Plot (15 M BW Ch.166300 BPSK_RB 75_0)



Lower Band Edge Plot (20 M BW Ch.166800 BPSK_RB 1_Offset 0)



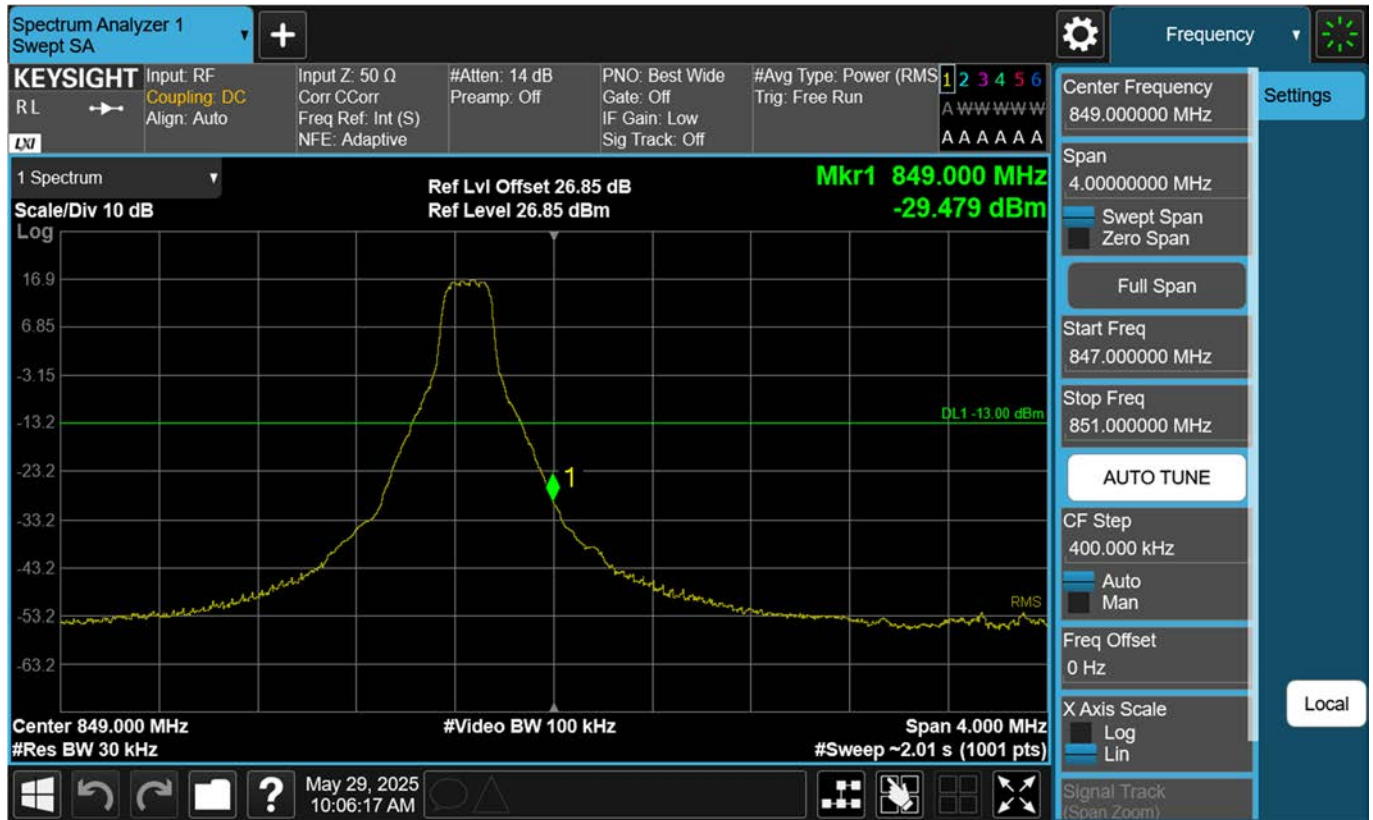
Lower Band Edge Plot (20 M BW Ch.166800 BPSK_RB 100_Offset 0)



Lower Extended Band Edge Plot (20 M BW Ch.166800 BPSK_RB 100_0)



Upper Band Edge Plot (5 M BW Ch.169300 BPSK_RB 1_Offset 24)



Upper Band Edge Plot (5 M BW Ch.169300 BPSK_RB 25_Offset 0)



Upper Extended Band Edge Plot (5 M BW Ch.169300 BPSK_RB 25_0)



Upper Band Edge Plot (10 M BW Ch.168800 BPSK_RB 1_Offset 49)



Upper Band Edge Plot (10 M BW Ch.168800 BPSK_RB 50_Offset 0)

