TEST REPORT

FCC Sub6 n5 Test for SM-F741U
Certification

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2404-FC024-R1

DATE OF ISSUE
May 3, 2024

Tested by
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TEST REPORT

REPORT NO.
HCT-RF-2404-FC024-R1

DATE OF ISSUE
May 03, 2024

Additional Model
SM-F741U1

Applicant	**SAMSUNG Electronics Co., Ltd.** 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Product Name Model Name	Mobile Phone SM-F741U
Date of Test	February 27, 2024 ~ April 19, 2024
FCC ID	A3LSMF741U
Location of Test	■ Permanent Testing Lab ☐ On Site Testing (Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 Republic of Korea)
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§ 22

REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	April 26, 2024	Initial Release
1	May 03, 2024	Revised the date of test (Page 2.)

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).
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).

CONTENTS

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:	A3LSMF741U
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§ 22
EUT Type:	Mobile phone
Model(s):	SM-F741U
Additional Model(s)	SM-F741U1
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 n5(5 MHz)) 829.0 MHz – 844.0 MHz (Sub6 n5(10 MHz)) 831.5 MHz – 841.5 MHz (Sub6 n5(15 MHz)) 834.0 MHz – 839.0 MHz (Sub6 n5(20 MHz))
Date(s) of Tests:	February 27, 2024 ~ April 19, 2024
Serial number:	Radiated : R3CX20KJSJW Conducted : 7B5599BDA3507ECE

1.1. MAXIMUM OUTPUT POWER

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	ERP	
				Max. Power (W)	Max. Power (dBm)
Sub6 n5 (5)	826.5 – 846.5	4M50G7D	PI/2 BPSK	0.112	20.49
		4M52G7D	QPSK	0.110	20.43
		4M52W7D	16QAM	0.086	19.33
		4M52W7D	64QAM	0.063	17.97
		4M51W7D	256QAM	0.034	15.34
Sub6 n5 (10)	829.0 – 844.0	8M98G7D	PI/2 BPSK	0.108	20.33
		9M00G7D	QPSK	0.107	20.28
		8M98W7D	16QAM	0.085	19.28
		8M96W7D	64QAM	0.061	17.83
		8M99W7D	256QAM	0.033	15.16
Sub6 n5 (15)	831.5 – 841.5	13M5G7D	PI/2 BPSK	0.108	20.32
		13M5G7D	QPSK	0.105	20.20
		13M5W7D	16QAM	0.082	19.13
		13M4W7D	64QAM	0.060	17.77
		13M5W7D	256QAM	0.033	15.18
Sub6 n5 (20)	834.0 – 839.0	18M0G7D	PI/2 BPSK	0.107	20.30
		18M0G7D	QPSK	0.105	20.20
		17M9W7D	16QAM	0.081	19.08
		18M0W7D	64QAM	0.059	17.73
		18M0W7D	256QAM	0.033	15.15

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

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

2.2. MEASURING INSTRUMENT CALIBRATION

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

2.3. TEST FACILITY

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

3. DESCRIPTION OF TESTS

3.1 TEST PROCEDURE

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

3.2 RADIATED POWER

Test Overview

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

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5 % of the expected OBW, not to exceed 1 MHz
3. VBW ≥ 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;

$$P_{d\ (dBm)} = Pg_{\ (dBm)} - \text{cable loss}_{\ (dB)} + \text{antenna gain}_{\ (dB)}$$

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

3.3 RADIATED SPURIOUS EMISSIONS

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

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

Test Settings

1. RBW = 100 kHz for emissions below 1 GHz and 1 MHz for emissions above 1 GHz
2. VBW ≥ 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 10^{th} harmonics from 9 kHz.

Test Note

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

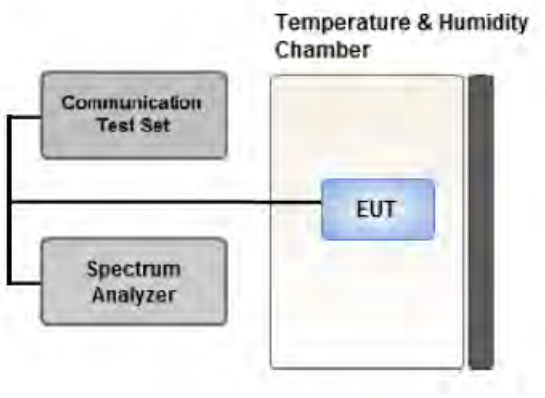
$$\text{Result}_{(dBm)} = Pg_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dBi)}$$

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

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

$$EIRP_{(dBm)} = ERP_{(dBm)} + 2.15$$

3.4 PEAK- TO- AVERAGE RATIO



Test setup

① CCDF Procedure for PAPR

Test Settings

1. Set resolution/measurement bandwidth ≥ 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:

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

Test Settings(Peak Power)

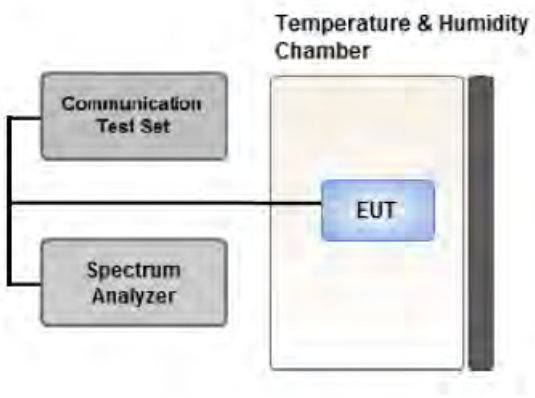
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW ≥ 3 × RBW.

1. Set the RBW ≥ OBW.
2. Set VBW ≥ 3 × RBW.
3. Set span ≥ 2 × OBW.
4. Sweep time ≥ 10 × (number of points in sweep) × (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 × to 3 × the OBW.
2. Set RBW ≥ OBW.
3. Set VBW ≥ 3 × RBW.
4. Set number of measurement points in sweep ≥ 2 × span / RBW.
5. Sweep time:
   Set ≥ [10 × (number of points in sweep) × (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/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 dB if the duty cycle is a constant 25 %.

3.5 OCCUPIED BANDWIDTH.



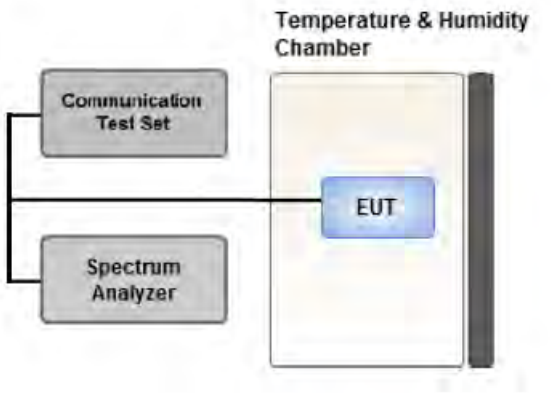
Test setup

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 ≥ 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

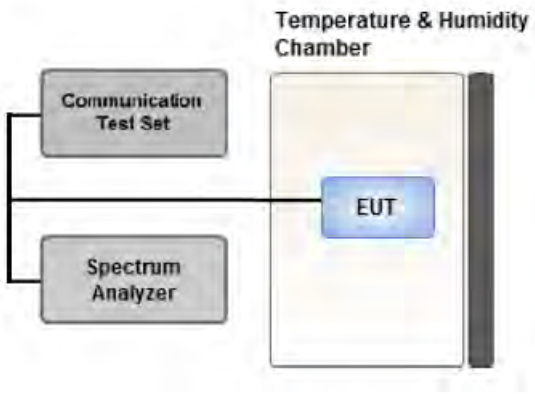
Test Overview

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 ≥ 3 MHz
3. Detector = RMS
4. Trace Mode = trace average
5. Sweep time = auto
6. Number of points in sweep ≥ 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

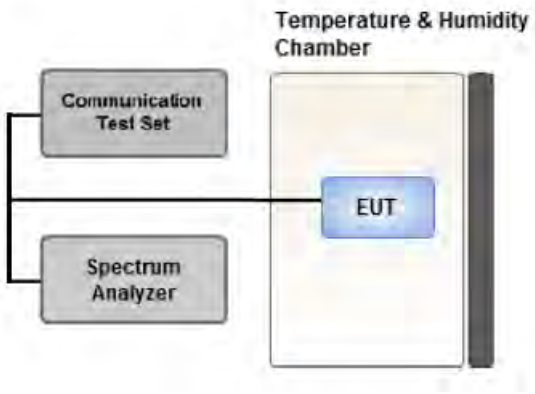
1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW > 1 % of the emission bandwidth
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW
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 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)

- 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.
- The EUT was tested in three modes(Open, Half-open, Closed), the worst case configuration results are reported. (Worst case: Open mode)
- All modes of operation were investigated and the worst case configuration results are reported.
  Mode: NSA, SA
  Worst case: SA
  Mode : Stand alone, Stand alone + External accessories (Earphone, AC adapter, etc)
  Worst case : Stand alone
- We were performed the RSE test in condition of co-location.
  Mode : Stand alone, Simultaneous transmission scenarios
  Worst case : Stand alone
- Radiated Spurious emissions are measured while operating in EN-DC mode with Sub 6 NR carrier as well as an LTE carrier (anchor).
  All EN-DC mode of operation (=anchor) were investigated and the test results were measured No Peak Found.
  The test results which are attenuated more than 20 dB below the permissible value, so it was not 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)
- SM-F741U & additional models were tested and the worst case results are reported.
  (Worst case : SM-F741U)

[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 8.1		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: NSA, SA
  Worst case: SA
- All RB sizes, offsets of operation were investigated and the worst case configuration results are reported.
  Please refer to the table below.
- SM-F741U & additional models were tested and the worst case results are reported.
  (Worst case : SM-F741U)

[Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset
Occupied Bandwidth Peak- to- Average Ratio	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	5, 10, 15, 20	Mid	Full RB	0
Band Edge	PI/2 BPSK	5	Low	1	0
			High	1	24
		10	Low	1	0
			High	1	51
		15	Low	1	0
			High	1	78
		20	Low	1	0
			High	1	105
		5, 10, 15, 20	Low, High	Full RB	0
Spurious and Harmonic Emissions at Antenna Terminal	PI/2 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
Precision Dipole Antenna	UHAP	Schwarzbeck	01273	03/10/2026	Biennial
Precision Dipole Antenna	UHAP	Schwarzbeck	01274	03/10/2026	Biennial
Horn Antenna(1~18 GHz)	BBHA 9120D	Schwarzbeck	02289	02/14/2026	Biennial
Horn Antenna(1~18 GHz)	BBHA 9120D	Schwarzbeck	9120D-1299	04/27/2025	Biennial
Horn Antenna(15~40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/29/2024	Biennial
Horn Antenna(15~40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170124	03/28/2025	Biennial
Loop Antenna(9 kHz~30 MHz)	FMZB1513	Rohde & Schwarz	1513-175	01/16/2025	Biennial
Bilog Antenna	VULB9160	Schwarzbeck	3150	03/09/2025	Biennial
Hybrid Antenna	VULB9160	Schwarzbeck	760	02/24/2025	Biennial
RF Switching System	FBSR-06B (1G HPF + LNA)	T&M SYSTEM	F3L1	05/22/2024	Annual
RF Switching System	FBSR-06B (3G HPF + LNA)	T&M SYSTEM	F3L2	05/22/2024	Annual
RF Switching System	FBSR-06B (6G HPF + LNA)	T&M SYSTEM	F3L3	05/22/2024	Annual
RF Switching System	FBSR-06B (LNA)	T&M SYSTEM	F3L4	05/22/2024	Annual
Power Amplifier	CBL18265035	CERNEX	22966	11/17/2024	Annual
Power Amplifier	CBL26405040	CERNEX	25956	02/26/2025	Annual
DC Power Supply	E3632A	Hewlett Packard	MY40004427	08/25/2024	Annual
Power Splitter(DC~26.5 GHz)	11667B	Hewlett Packard	11275	02/29/2025	Annual
Chamber	SU-642	ESPEC	93008124	02/19/2025	Annual
Signal Analyzer(10 Hz~26.5 GHz)	N9020A	Agilent	MY51110063	04/04/2025	Annual
ATTENUATOR(20 dB)	8493C	Hewlett Packard	17280	04/17/2025	Annual
Spectrum Analyzer(10 Hz~40 GHz)	FSV40	REOHDE & SCHWARZ	101436	02/13/2025	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/10/2024	Annual
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262287701	05/22/2024	Annual
Wideband Radio Communication Tester	MT8000A	Anritsu Corp.	6262302511	05/23/2024	Annual
SIGNAL GENERATOR (100 kHz~40 GHz)	SMB100A	REOHDE & SCHWARZ	177633	06/22/2024	Annual
Signal Analyzer(5 Hz~40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/24/2024	Annual
4-Way Divider	ZC4PD-K1844+	Mini-Circuits	942907	09/19/2024	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	HCT CO., LTD.,	-	-	-

Note:

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

5. MEASUREMENT UNCERTAINTY

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

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

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

6. SUMMARY OF TEST RESULTS

6.1 Test Condition: Conducted Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Occupied Bandwidth	§ 2.1049	N/A	PASS
Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	§ 2.1051, § 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	See Note1
Frequency stability / variation of ambient temperature	§ 2.1055, § 22.355	< 2.5 ppm	PASS

Note:

1. See SAR Report
2. Conducted tests 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

ERP = Substitute LEVEL(dBm) + Ant. Gain – 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

EIRP = Substitute LEVEL(dBm) + Ant. Gain – CL(Cable Loss)

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

7.3. Emission Designator

GSM Emission Designator

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

EDGE Emission Designator

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

WCDMA Emission Designator

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

QPSK Modulation

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

QAM Modulation

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

8. TEST DATA

8.1 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	Sub6 n5/ 5 MHz [15 kHz]	PI/2 BPSK	-30.06	30.84	-10.05	1.39	V	< 7.00	0.087	19.40	1	12
		QPSK	-30.13	30.77	-10.05	1.39	V		0.086	19.33		
		16-QAM	-31.28	29.62	-10.05	1.39	V		0.066	18.18		
		64-QAM	-32.49	28.41	-10.05	1.39	V		0.050	16.97		
		256-QAM	-35.25	25.65	-10.05	1.39	V		0.026	14.21		
836.5		PI/2 BPSK	-29.93	31.36	-10.05	1.40	V		0.098	19.91	1	23
		QPSK	-29.97	31.32	-10.05	1.40	V		0.097	19.87		
		16-QAM	-31.02	30.27	-10.05	1.40	V		0.076	18.82		
		64-QAM	-32.38	28.91	-10.05	1.40	V		0.056	17.46		
		256-QAM	-35.00	26.29	-10.05	1.40	V		0.031	14.84		
846.5		PI/2 BPSK	-29.73	31.95	-10.05	1.41	V		0.112	20.49	1	12
		QPSK	-29.79	31.89	-10.05	1.41	V		0.110	20.43		
		16-QAM	-30.89	30.79	-10.05	1.41	V		0.086	19.33		
		64-QAM	-32.25	29.43	-10.05	1.41	V		0.063	17.97		
		256-QAM	-34.88	26.80	-10.05	1.41	V		0.034	15.34		

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
829.0	Sub6 n5/ 10 MHz [15 kHz]	PI/2 BPSK	-29.89	31.13	-10.05	1.39	V	< 7.00	0.093	19.69	1	50
		QPSK	-30.12	30.90	-10.05	1.39	V		0.088	19.46		
		16-QAM	-31.18	29.84	-10.05	1.39	V		0.069	18.40		
		64-QAM	-32.32	28.70	-10.05	1.39	V		0.053	17.26		
		256-QAM	-35.04	25.98	-10.05	1.39	V		0.029	14.54		
836.5		PI/2 BPSK	-29.76	31.53	-10.05	1.40	V		0.102	20.08	1	50
		QPSK	-29.82	31.47	-10.05	1.40	V		0.101	20.02		
		16-QAM	-31.00	30.29	-10.05	1.40	V		0.077	18.84		
		64-QAM	-32.14	29.15	-10.05	1.40	V		0.059	17.70		
		256-QAM	-34.89	26.40	-10.05	1.40	V		0.031	14.95		
844.0		PI/2 BPSK	-29.69	31.79	-10.05	1.41	V		0.108	20.33	1	50
		QPSK	-29.74	31.74	-10.05	1.41	V		0.107	20.28		
		16-QAM	-30.74	30.74	-10.05	1.41	V		0.085	19.28		
		64-QAM	-32.19	29.29	-10.05	1.41	V		0.061	17.83		
		256-QAM	-34.86	26.62	-10.05	1.41	V		0.033	15.16		

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
831.5	Sub6 n5/ 15 MHz [15 kHz]	PI/2 BPSK	-29.80	31.33	-10.05	1.39	V	< 7.00	0.098	19.89	1	77
		QPSK	-29.85	31.28	-10.05	1.39	V		0.096	19.84		
		16-QAM	-31.06	30.07	-10.05	1.39	V		0.073	18.63		
		64-QAM	-32.36	28.77	-10.05	1.39	V		0.054	17.33		
		256-QAM	-35.03	26.10	-10.05	1.39	V		0.029	14.66		
836.5		PI/2 BPSK	-29.62	31.67	-10.05	1.40	V		0.105	20.22	1	77
		QPSK	-29.64	31.65	-10.05	1.40	V		0.105	20.20		
		16-QAM	-30.85	30.44	-10.05	1.40	V		0.079	18.99		
		64-QAM	-32.15	29.14	-10.05	1.40	V		0.059	17.69		
		256-QAM	-34.79	26.50	-10.05	1.40	V		0.032	15.05		
841.5		PI/2 BPSK	-29.64	31.78	-10.05	1.41	V		0.108	20.32	1	77
		QPSK	-29.85	31.57	-10.05	1.41	V		0.103	20.11		
		16-QAM	-30.83	30.59	-10.05	1.41	V		0.082	19.13		
		64-QAM	-32.19	29.23	-10.05	1.41	V		0.060	17.77		
		256-QAM	-34.78	26.64	-10.05	1.41	V		0.033	15.18		

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
834.0	Sub6 n5/ 20 MHz [15 kHz]	PI/2 BPSK	-29.62	31.59	-10.05	1.39	V	< 7.00	0.104	20.15	1	104
		QPSK	-29.67	31.54	-10.05	1.39	V		0.102	20.10		
		16-QAM	-30.84	30.37	-10.05	1.39	V		0.078	18.93		
		64-QAM	-32.17	29.04	-10.05	1.39	V		0.058	17.60		
		256-QAM	-34.80	26.41	-10.05	1.39	V		0.031	14.97		
836.5		PI/2 BPSK	-29.65	31.64	-10.05	1.40	V		0.105	20.19	1	104
		QPSK	-29.71	31.58	-10.05	1.40	V		0.103	20.13		
		16-QAM	-30.87	30.42	-10.05	1.40	V		0.079	18.97		
		64-QAM	-32.13	29.16	-10.05	1.40	V		0.059	17.71		
		256-QAM	-34.85	26.44	-10.05	1.40	V		0.032	14.99		
839.0		PI/2 BPSK	-29.70	31.75	-10.05	1.40	V		0.107	20.30	1	104
		QPSK	-29.80	31.65	-10.05	1.40	V		0.105	20.20		
		16-QAM	-30.92	30.53	-10.05	1.40	V		0.081	19.08		
		64-QAM	-32.27	29.18	-10.05	1.40	V		0.059	17.73		
		256-QAM	-34.85	26.60	-10.05	1.40	V		0.033	15.15		

8.2 RADIATED SPURIOUS EMISSIONS

▣ NR Band: N5

▣ Bandwidth: 5 MHz

▣ Modulation: PI/2 BPSK

▣ Distance: 3 meters

▣ SCS: 15 kHz

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	-59.06	9.20	-67.97	2.03	V	-60.80	-13.00	1	12
	2 479.50	-59.87	10.20	-63.12	2.45	V	-55.37	-13.00		
	3 306.00	-61.26	10.90	-63.30	2.92	V	-55.32	-13.00		
	4 132.50	-61.19	11.30	-61.04	3.25	V	-52.99	-13.00		
	4 959.00	-62.25	10.90	-57.96	3.58	V	-50.64	-13.00		
167300 (836.5)	1 673.00	-58.61	9.20	-67.79	2.03	V	-60.62	-13.00	1	23
	2 509.50	-59.42	10.30	-63.95	2.50	V	-56.15	-13.00		
	3 346.00	-61.24	10.95	-64.13	2.89	V	-56.07	-13.00		
	4 182.50	-60.96	11.30	-60.81	3.30	V	-52.81	-13.00		
	5 019.00	-61.30	10.70	-56.24	3.55	V	-49.09	-13.00		
169300 (846.5)	1 693.00	-59.14	9.40	-67.76	2.00	V	-60.36	-13.00	1	12
	2 539.50	-60.58	10.30	-65.41	2.52	V	-57.63	-13.00		
	3 386.00	-60.91	11.00	-63.39	2.94	V	-55.33	-13.00		
	4 232.50	-62.75	11.20	-61.83	3.28	V	-53.91	-13.00		
	5 079.00	-62.98	10.70	-57.82	3.61	V	-50.73	-13.00		

8.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
Sub6 n5	5 MHz	836.5	BPSK	25	0	4.43
			QPSK			5.28
			16-QAM			5.84
			64-QAM			6.17
			256-QAM			6.41
	10 MHz		BPSK	50		4.19
			QPSK			5.09
			16-QAM			5.61
			64-QAM			5.92
			256-QAM			6.43
	15 MHz		BPSK	75		4.18
			QPSK			5.03
			16-QAM			5.73
			64-QAM			5.89
			256-QAM			6.28
	20 MHz		BPSK	100		4.48
			QPSK			5.41
			16-QAM			5.90
			64-QAM			6.22
			256-QAM			6.53

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 60 ~ 79.

8.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
Sub6 n5	5 MHz	836.5	BPSK	25	0	4.5036
			QPSK			4.5173
			16-QAM			4.5168
			64-QAM			4.5152
			256-QAM			4.5067
	10 MHz		BPSK	50		8.9816
			QPSK			9.0012
			16-QAM			8.9758
			64-QAM			8.9558
			256-QAM			8.9944
	15 MHz		BPSK	75		13.468
			QPSK			13.453
			16-QAM			13.484
			64-QAM			13.443
			256-QAM			13.478
	20 MHz		BPSK	100		17.977
			QPSK			17.947
			16-QAM			17.917
			64-QAM			17.946
			256-QAM			17.975

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 40 ~ 59.

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 n5	5	826.5	8.0429	30.815	-74.793	-43.978	-13.00
		836.5	9.1595	30.815	-74.151	-43.336	
		846.5	9.6999	30.815	-74.470	-43.655	
	10	829.0	8.0195	30.815	-74.861	-44.046	
		836.5	5.2468	30.815	-75.041	-44.226	
		844.0	6.0065	30.815	-74.626	-43.811	
	15	831.5	9.0952	30.815	-74.317	-43.502	
		836.5	4.0190	30.200	-74.799	-44.599	
		841.5	3.7807	30.200	-74.674	-44.474	
	20	834.0	9.0798	30.815	-73.925	-43.110	
		836.5	3.7503	30.200	-73.480	-43.280	
		839.0	8.0249	30.815	-74.596	-43.781	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 104 ~ 115.
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	27.494
1 – 5	30.200
5 – 10	30.815
10 – 15	31.340
15 – 20	31.713
Above 20	32.355

8.6 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 80 ~ 103.

8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

▣ BandWidth: 5 MHz

▣ Voltage(100 %): 3.880 VDC

▣ Batt. Endpoint: 3.300 VDC

▣Deviation Limit: ± 0.000 25 % or 2.5 ppm

Test. Frequncy	Voltage	Temp.	Frequency	Frequency	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	Error (Hz)	(%)	
836.5	100 %	+20(Ref)	836 500 006	0.0	0.000 000	0.000
	100 %	-30	836 500 011	4.5	0.000 001	0.005
	100 %	-20	836 500 012	6.1	0.000 001	0.007
	100 %	-10	836 500 012	5.9	0.000 001	0.007
	100 %	0	836 500 011	4.4	0.000 001	0.005
	100 %	+10	836 500 014	8.2	0.000 001	0.010
	100 %	+30	836 500 013	7.1	0.000 001	0.008
	100 %	+40	836 500 011	5.2	0.000 001	0.006
	100 %	+50	836 500 013	6.6	0.000 001	0.008
	Batt. Endpoint	+20	836 500 011	4.9	0.000 001	0.006

▣ BandWidth: 10 MHz

▣ Voltage(100 %): 3.880 VDC

▣ Batt. Endpoint: 3.300 VDC

▣ Deviation Limit: ± 0.000 25 % or 2.5 ppm

Test. Frequncy	Voltage	Temp.	Frequency	Frequency	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	Error (Hz)	(%)	
836.5	100 %	+20(Ref)	836 500 002	0.0	0.000 000	0.000
	100 %	-30	836 500 010	8.1	0.000 001	0.010
	100 %	-20	836 500 009	6.4	0.000 001	0.008
	100 %	-10	836 500 010	8.0	0.000 001	0.010
	100 %	0	836 500 009	7.2	0.000 001	0.009
	100 %	+10	836 500 009	6.9	0.000 001	0.008
	100 %	+30	836 500 007	4.8	0.000 001	0.006
	100 %	+40	836 500 007	4.5	0.000 001	0.005
	100 %	+50	836 500 010	8.2	0.000 001	0.010
	Batt. Endpoint	+20	836 500 008	6.2	0.000 001	0.007

▣ BandWidth: 15 MHz

▣ Voltage(100 %): 3.880 VDC

▣ Batt. Endpoint: 3.300 VDC

▣ Deviation Limit: ± 0.000 25 % or 2.5 ppm

Test. Frequncy	Voltage	Temp.	Frequency	Frequency	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	Error (Hz)	(%)	
836.5	100 %	+20(Ref)	836 500 005	0.0	0.000 000	0.000
	100 %	-30	836 500 010	5.3	0.000 001	0.006
	100 %	-20	836 500 014	9.2	0.000 001	0.011
	100 %	-10	836 500 014	8.6	0.000 001	0.010
	100 %	0	836 500 012	7.2	0.000 001	0.009
	100 %	+10	836 500 009	3.5	0.000 000	0.004
	100 %	+30	836 500 010	4.8	0.000 001	0.006
	100 %	+40	836 500 010	4.4	0.000 001	0.005
	100 %	+50	836 500 010	5.1	0.000 001	0.006
	Batt. Endpoint	+20	836 500 011	5.9	0.000 001	0.007

▣ BandWidth: 20 MHz

▣ Voltage(100 %): 3.880 VDC

▣ Batt. Endpoint: 3.300 VDC

▣ Deviation Limit: ± 0.000 25 % or 2.5 ppm

Test. Frequncy	Voltage	Temp.	Frequency	Frequency	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	Error (Hz)	(%)	
836.5	100 %	+20(Ref)	836 500 003	0.0	0.000 000	0.000
	100 %	-30	836 500 010	7.2	0.000 001	0.009
	100 %	-20	836 500 012	8.4	0.000 001	0.010
	100 %	-10	836 500 010	6.9	0.000 001	0.008
	100 %	0	836 500 009	5.5	0.000 001	0.007
	100 %	+10	836 500 011	7.4	0.000 001	0.009
	100 %	+30	836 500 011	8.1	0.000 001	0.010
	100 %	+40	836 500 013	9.4	0.000 001	0.011
	100 %	+50	836 500 009	6.2	0.000 001	0.007
	Batt. Endpoint	+20	836 500 008	5.1	0.000 001	0.006

8.8 UPLINK CARRIER AGGREGATION

Test Note

1. All tests were evaluated for the two bands using various combinations of RB size, RB offset, modulation, and channel bandwidth.
2. All modes of operation were investigated and the worst case configuration results are reported in this section.
   Please refer to the table below.
3. The worst case is reported with the modulations, RB sizes and offsets.
   - N5A(ANT A)-N41A(ANT I)
     (PCC - Modulation: BPSK, RB: 1, RB Offset: 23, SCC - Modulation: BPSK, RB: 1, RB Offset: 19)

Radiated Spurious Emissions

PCC	SCC	PCC		SCC	
		BW(MHz)	Channel	BW(MHz)	Channel
N5A(ANT A)	N41A(ANT I)	5	167300	15	518598

8.8.1 RADIATED SPURIOUS EMISSIONS

N5A(ANT A)(PCC)- N41A(ANT I)(SCC)

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)	Limit (dBm)
1 673.00	-59.60	9.20	-68.78	2.03	V	-61.61	-13.00
2 509.50	-61.19	10.30	-65.72	2.50	V	-57.92	-13.00
3 346.00	-62.26	10.95	-65.15	2.89	V	-57.09	-13.00

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)	Limit (dBm)
5 185.98	-62.72	11.00	-64.22	3.70	V	-56.92	-25.00
7 778.97	-64.67	10.90	-57.29	4.61	V	-51.00	-25.00
10 371.96	-64.99	11.20	-54.29	5.41	V	-48.50	-25.00

9. TEST PLOTS

Sub6 n5. Occupied Bandwidth Plot (5 M BW Ch.167300 BPSK_Full RB_0)

Sub6 n5. Occupied Bandwidth Plot (5 M BW Ch.167300 QPSK_ Full RB _0)

Sub6 n5. Occupied Bandwidth Plot (5 M BW Ch.167300 16QAM_ Full RB _0)

Sub6 n5. Occupied Bandwidth Plot (5 M BW Ch.167300 64QAM_ Full RB _0)

Sub6 n5. Occupied Bandwidth Plot (5 M BW Ch.167300 256QAM_ Full RB _0)

Sub6 n5. Occupied Bandwidth Plot (10 M BW Ch.167300 BPSK_ Full RB _0)

Sub6 n5. Occupied Bandwidth Plot (10 M BW Ch.167300 QPSK_ Full RB _0)

Sub6 n5. Occupied Bandwidth Plot (10 M BW Ch.167300 16QAM_ Full RB _0)

Sub6 n5. Occupied Bandwidth Plot (10 M BW Ch.167300 64QAM_ Full RB _0)

Sub6 n5. Occupied Bandwidth Plot (10 M BW Ch.167300 256QAM_ Full RB _0)

Sub6 n5. Occupied Bandwidth Plot (15 M BW Ch.167300 BPSK_ Full RB _0)

Sub6 n5. Occupied Bandwidth Plot (15 M BW Ch.167300 QPSK_ Full RB _0)

Sub6 n5. Occupied Bandwidth Plot (15 M BW Ch.167300 16QAM_ Full RB _0)

Sub6 n5. Occupied Bandwidth Plot (15 M BW Ch.167300 64QAM_ Full RB _0)

Sub6 n5. Occupied Bandwidth Plot (15 M BW Ch.167300 256QAM_ Full RB _0)

Sub6 n5. Occupied Bandwidth Plot (20 M BW Ch.167300 BPSK_ Full RB _0)

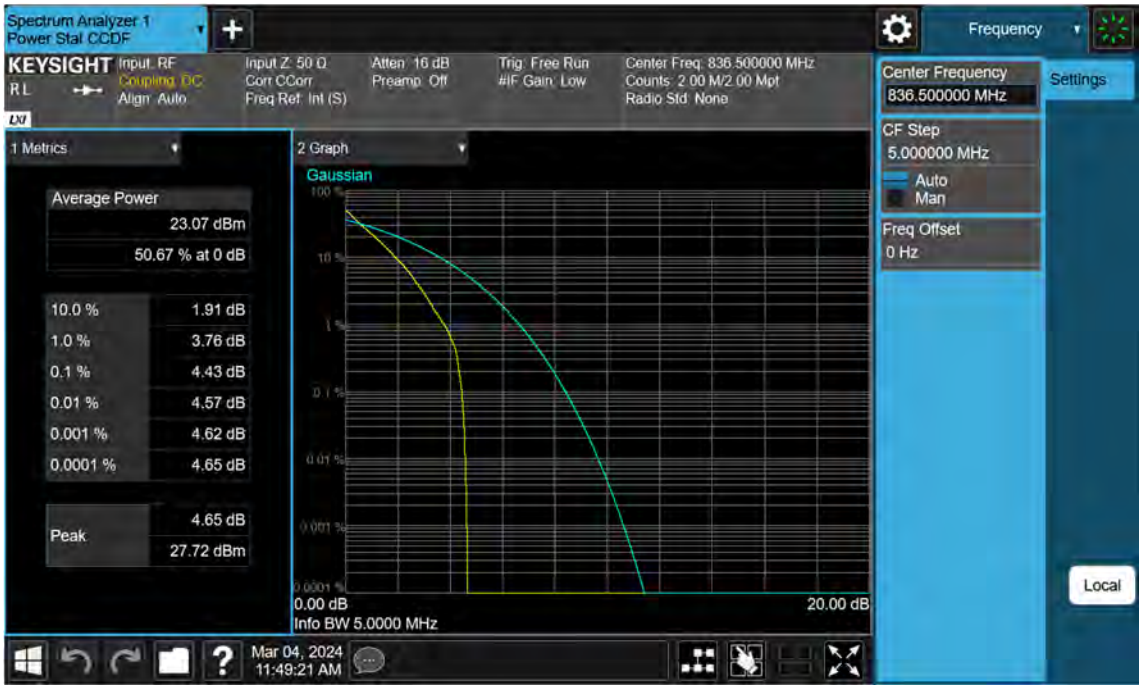
Sub6 n5. Occupied Bandwidth Plot (20 M BW Ch.167300 QPSK_ Full RB _0)

Sub6 n5. Occupied Bandwidth Plot (20 M BW Ch.167300 16QAM_ Full RB _0)

Sub6 n5. Occupied Bandwidth Plot (20 M BW Ch.167300 64QAM_ Full RB _0)

Sub6 n5. Occupied Bandwidth Plot (20 M BW Ch.167300 256QAM_ Full RB _0)

Sub6 n5. PAR Plot (5 M BW_Ch.167300_ BPSK_ Full RB _0)



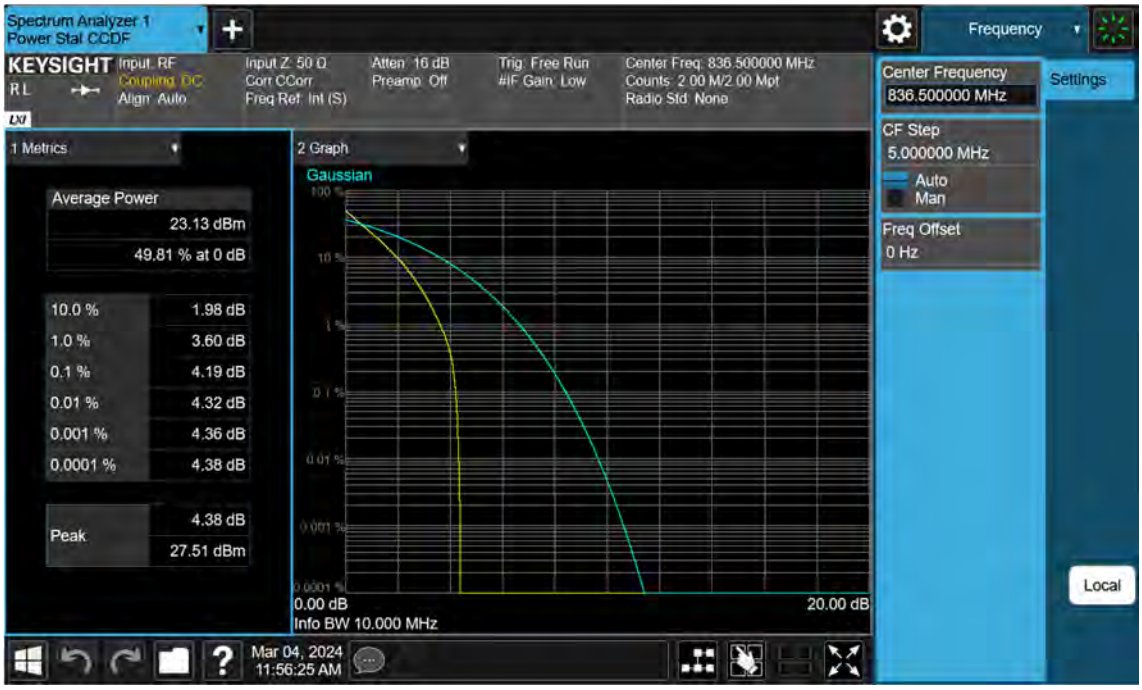
Sub6 n5. PAR Plot (5 M BW_Ch. 167300_QPSK_ Full RB _0)

Sub6 n5. PAR Plot (5 M BW_Ch. 167300_16QAM_ Full RB _0)

Sub6 n5. PAR Plot (5 M BW_Ch. 167300_64QAM_ Full RB _0)

Sub6 n5. PAR Plot (5 M BW_Ch. 167300_256QAM_ Full RB _0)

Sub6 n5. PAR Plot (10 M BW_Ch. 167300_ BPSK_ Full RB _0)



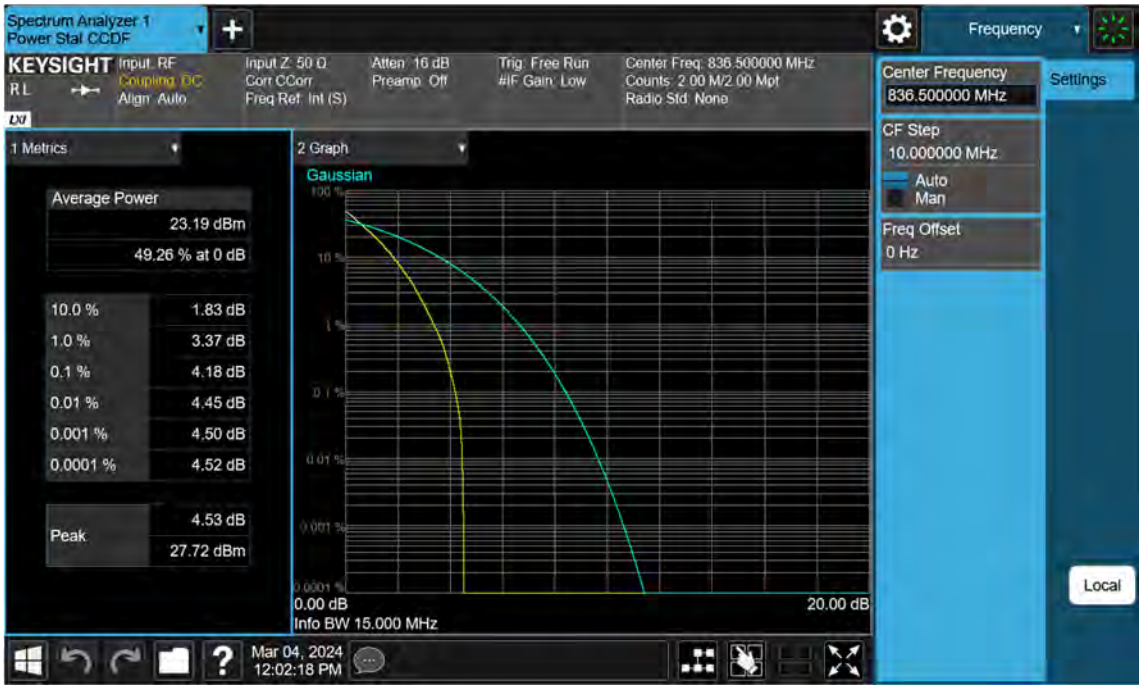
Sub6 n5. PAR Plot (10 M BW_Ch. 167300_QPSK_ Full RB _0)

Sub6 n5. PAR Plot (10 M BW_Ch. 167300_16QAM_ Full RB _0)

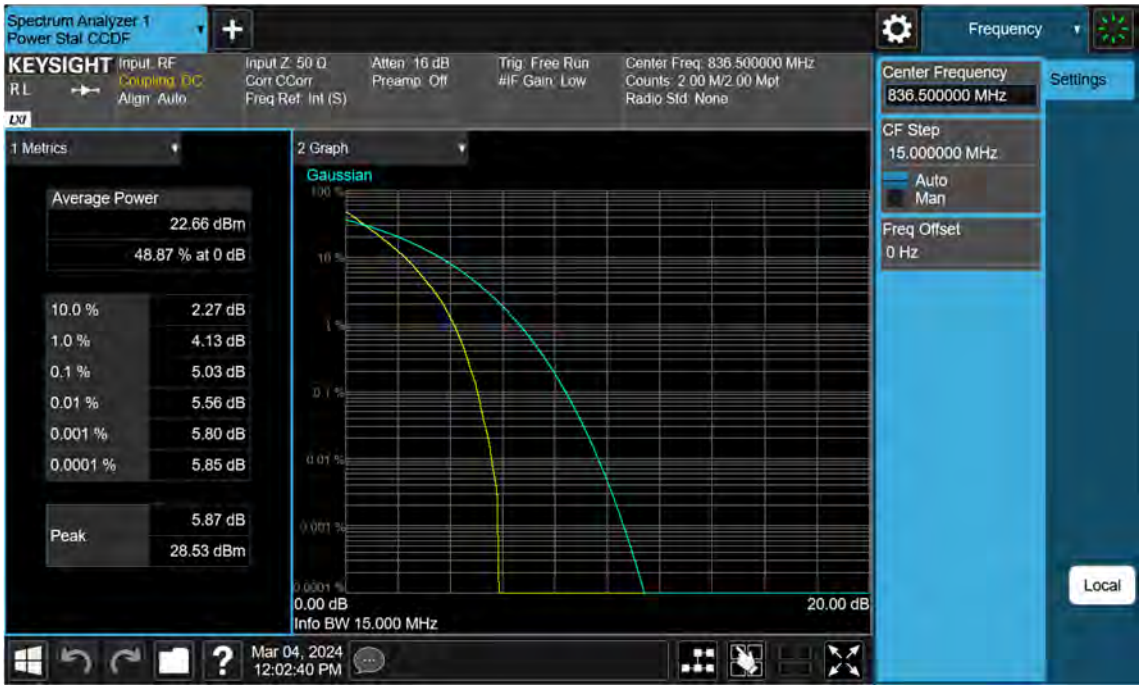
Sub6 n5. PAR Plot (10 M BW_Ch. 167300_64QAM_ Full RB _0)

Sub6 n5. PAR Plot (10 M BW_Ch. 167300_256QAM_ Full RB _0)

Sub6 n5. PAR Plot (15 M BW_Ch. 167300_ BPSK_ Full RB _0)



Sub6 n5. PAR Plot (15 M BW_Ch. 167300_QPSK_ Full RB _0)



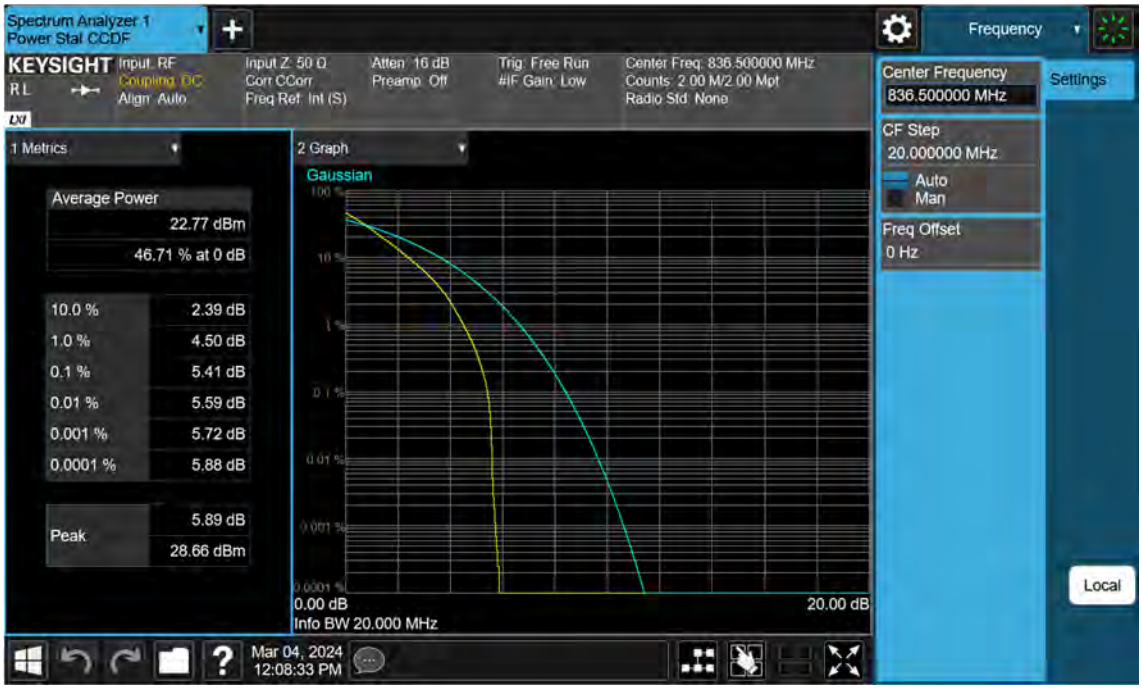
Sub6 n5. PAR Plot (15 M BW_Ch. 167300_16QAM_ Full RB _0)

Sub6 n5. PAR Plot (15 M BW_Ch. 167300_64QAM_ Full RB _0)

Sub6 n5. PAR Plot (15 M BW_Ch. 167300_256QAM_ Full RB _0)

Sub6 n5. PAR Plot (20 M BW_Ch. 167300_ BPSK_ Full RB _0)

Sub6 n5. PAR Plot (20 M BW_Ch. 167300_QPSK_ Full RB _0)



Sub6 n5. PAR Plot (20 M BW_Ch. 167300_16QAM_ Full RB _0)

Sub6 n5. PAR Plot (20 M BW_Ch. 167300_64QAM_ Full RB _0)

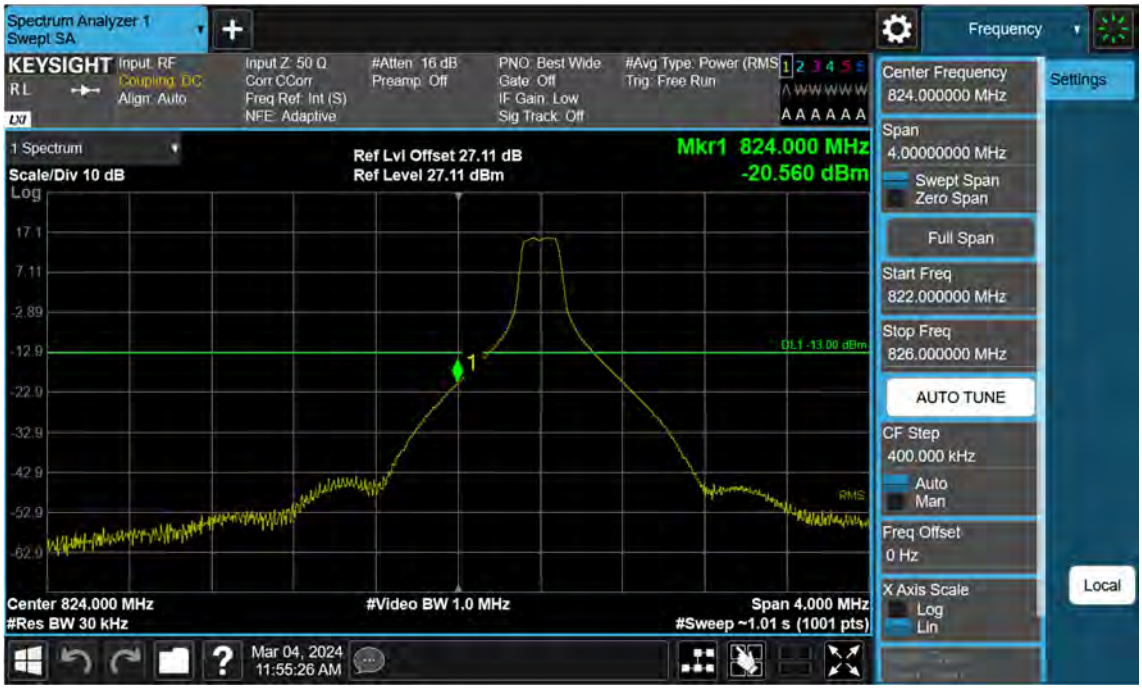
Sub6 n5. PAR Plot (20 M BW_Ch. 167300_256QAM_ Full RB _0)

Sub6 n5. Lower Band Edge Plot (5 M BW Ch.165300 BPSK_RB1_Offset 0)

Sub6 n5. Lower Band Edge Plot (5 M BW Ch.165300 BPSK_RB25_Offset 0)

Sub6 n5. Lower Extended Band Edge Plot (5 M BW Ch.165300 BPSK_RB25_0)

Sub6 n5. Lower Band Edge Plot (10 M BW Ch.165800 BPSK_RB1_Offset 0)



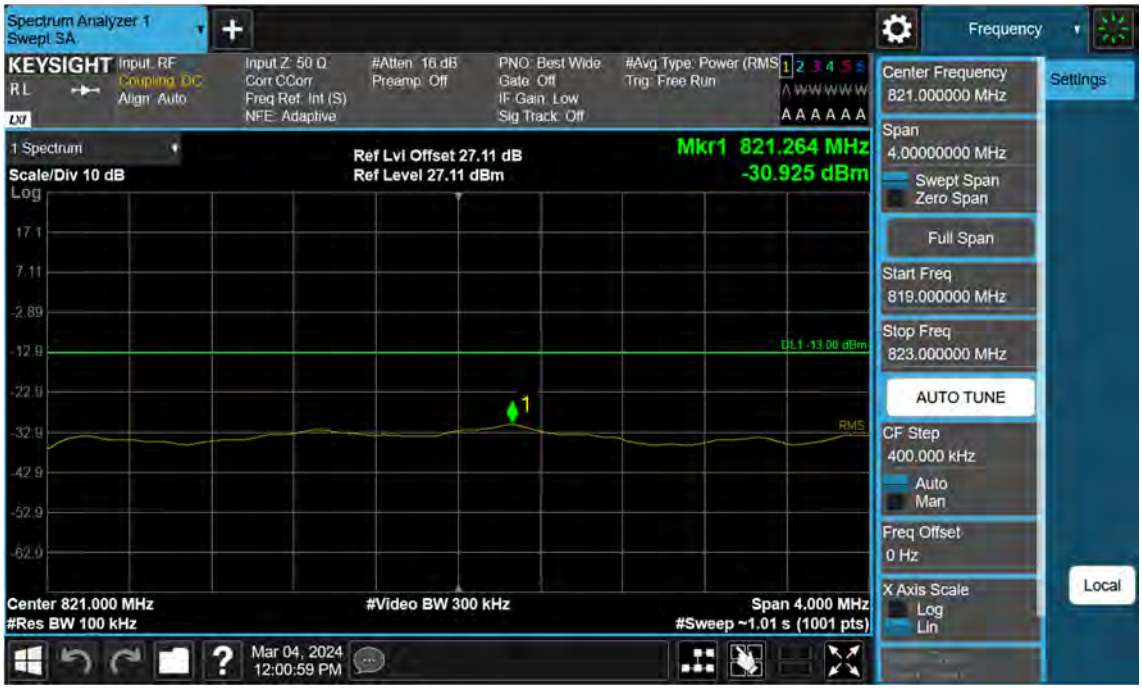
Sub6 n5. Lower Band Edge Plot (10 M BW Ch.165800 BPSK_RB50_Offset 0)

Sub6 n5. Lower Extended Band Edge Plot (10 M BW Ch.165800 BPSK_RB50_0)

Sub6 n5. Lower Band Edge Plot (15 M BW Ch.166300 BPSK_RB1_Offset 0)

Sub6 n5. Lower Band Edge Plot (15 M BW Ch.166300 BPSK_RB75_Offset 0)

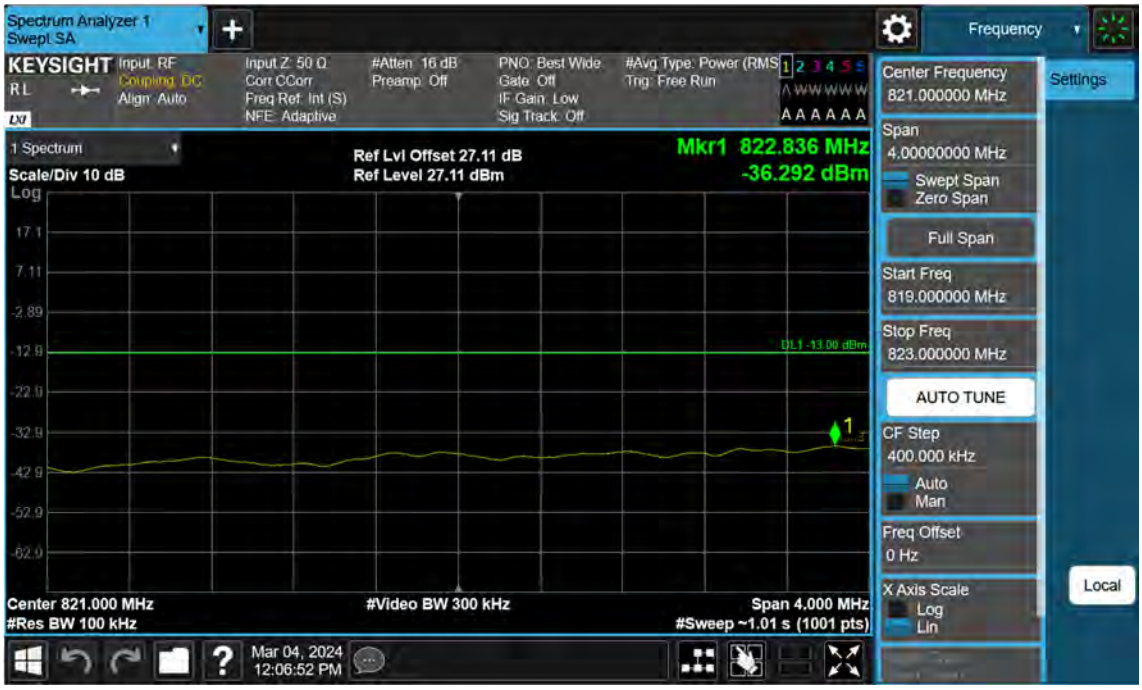
Sub6 n5. Lower Extended Band Edge Plot (15 M BW Ch.166300 BPSK_RB75_0)



Sub6 n5. Lower Band Edge Plot (20 M BW Ch.166800 BPSK_RB1_Offset 0)

Sub6 n5. Lower Band Edge Plot (20 M BW Ch.166800 BPSK_RB100_Offset 0)

Sub6 n5. Lower Extended Band Edge Plot (20 M BW Ch.166800 BPSK_RB100_0)

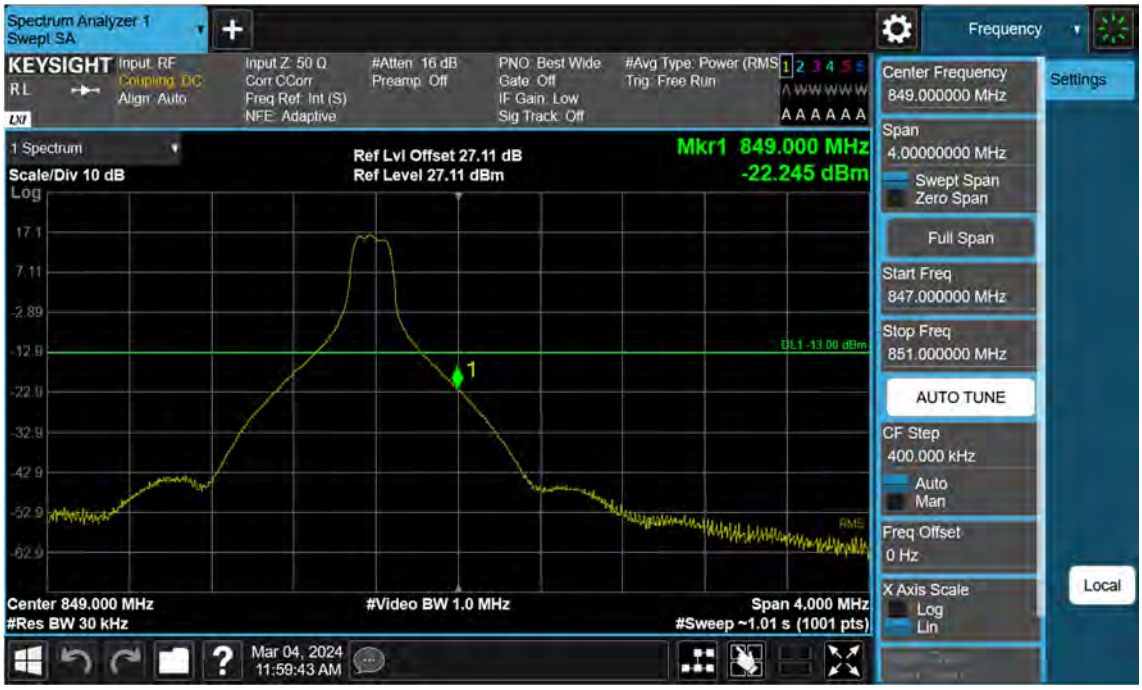


Sub6 n5. Upper Band Edge Plot (5 M BW Ch.169300 BPSK_RB1_Offset 24)

Sub6 n5. Upper Band Edge Plot (5 M BW Ch.169300 BPSK_RB25_Offset 0)

Sub6 n5. Upper Extended Band Edge Plot (5 M BW Ch.169300 BPSK_RB25_0)

Sub6 n5. Upper Band Edge Plot (10 M BW Ch.168800 BPSK_RB1_Offset 51)



Sub6 n5. Upper Band Edge Plot (10 M BW Ch.168800 BPSK_RB50_Offset 0)

Sub6 n5. Upper Extended Band Edge Plot (10 M BW Ch.168800 BPSK_RB50_0)

Sub6 n5. Upper Band Edge Plot (15 M BW Ch.168300 BPSK_RB1_Offset 78)

Sub6 n5. Upper Band Edge Plot (15 M BW Ch.168300 BPSK_RB75_Offset 0)

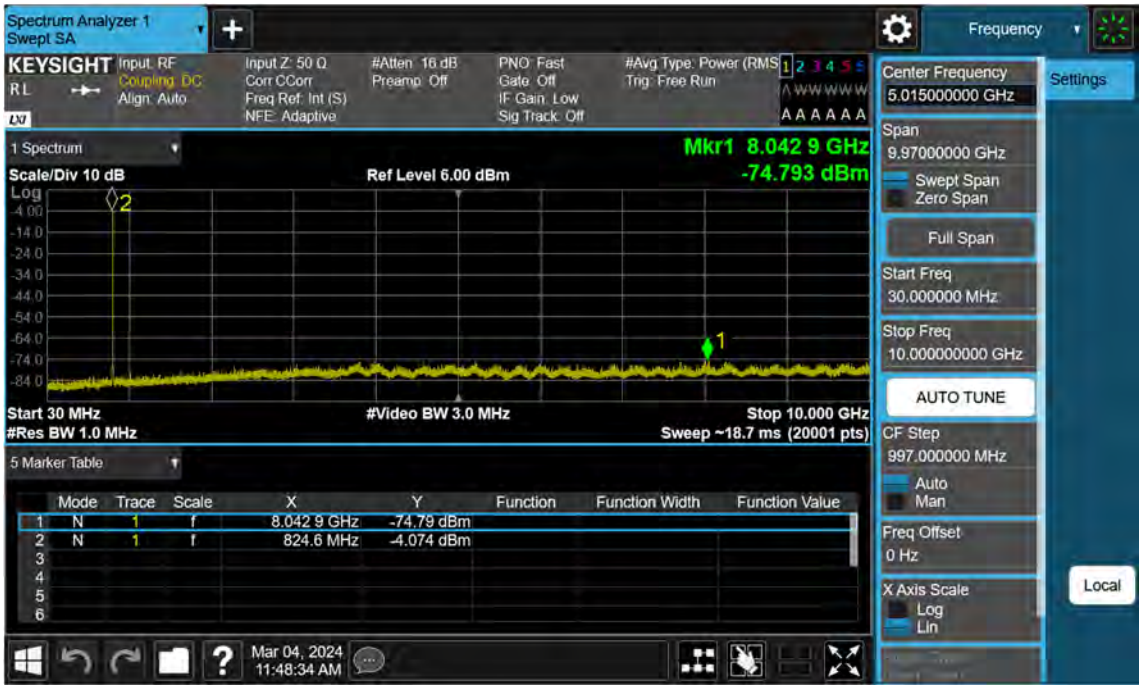
Sub6 n5. Upper Extended Band Edge Plot (15 M BW Ch.168300 BPSK_RB75_0)

Sub6 n5. Upper Band Edge Plot (20 M BW Ch.167800 BPSK_RB1_Offset 105)

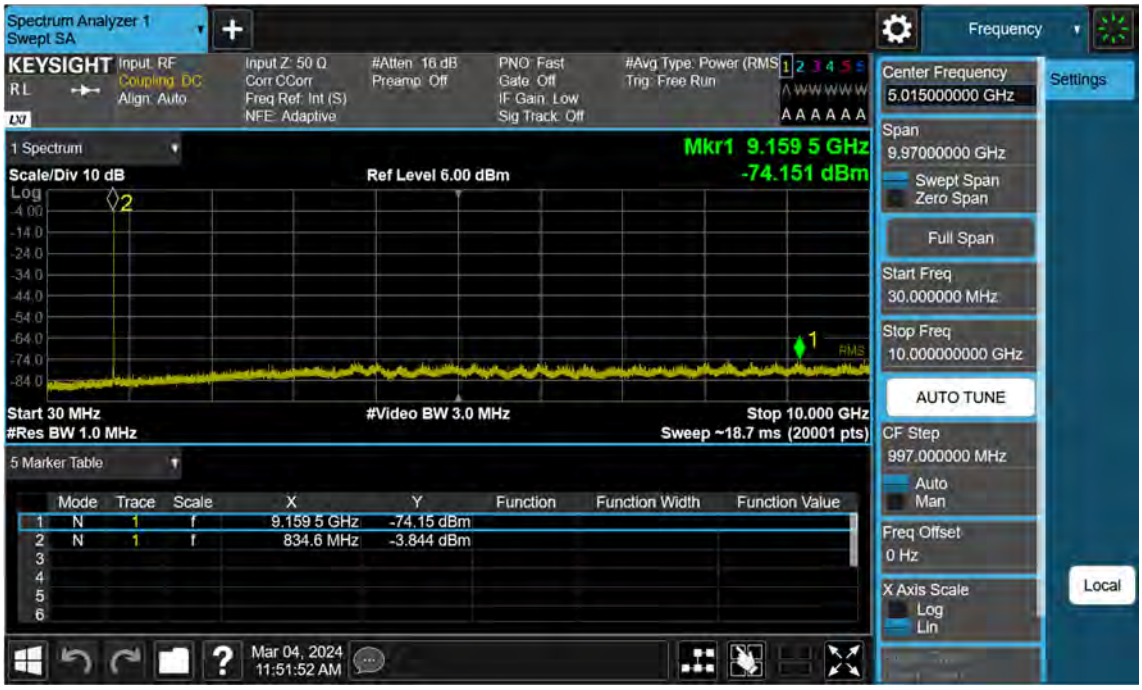
Sub6 n5. Upper Band Edge Plot (20 M BW Ch.167800 BPSK_RB100_Offset 0)

Sub6 n5. Upper Extended Band Edge Plot (20 M BW Ch.167800 BPSK_RB100_0)

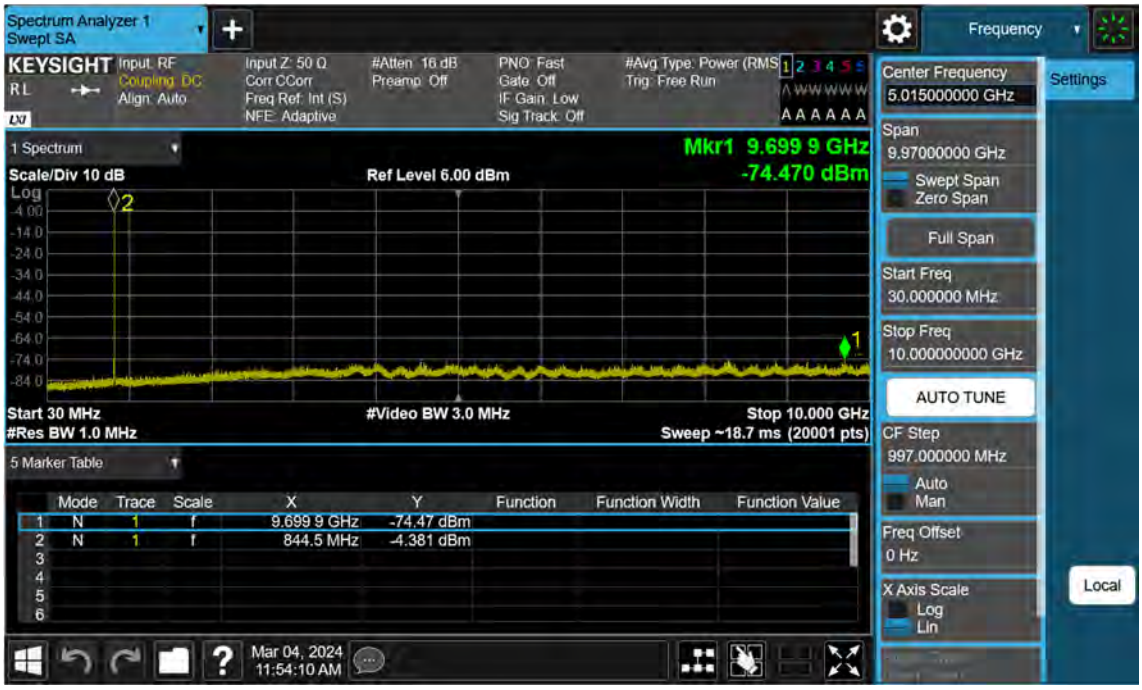
Sub6 n5. Conducted Spurious Plot (165300ch_5 MHz_BPSK_RB 1_1)



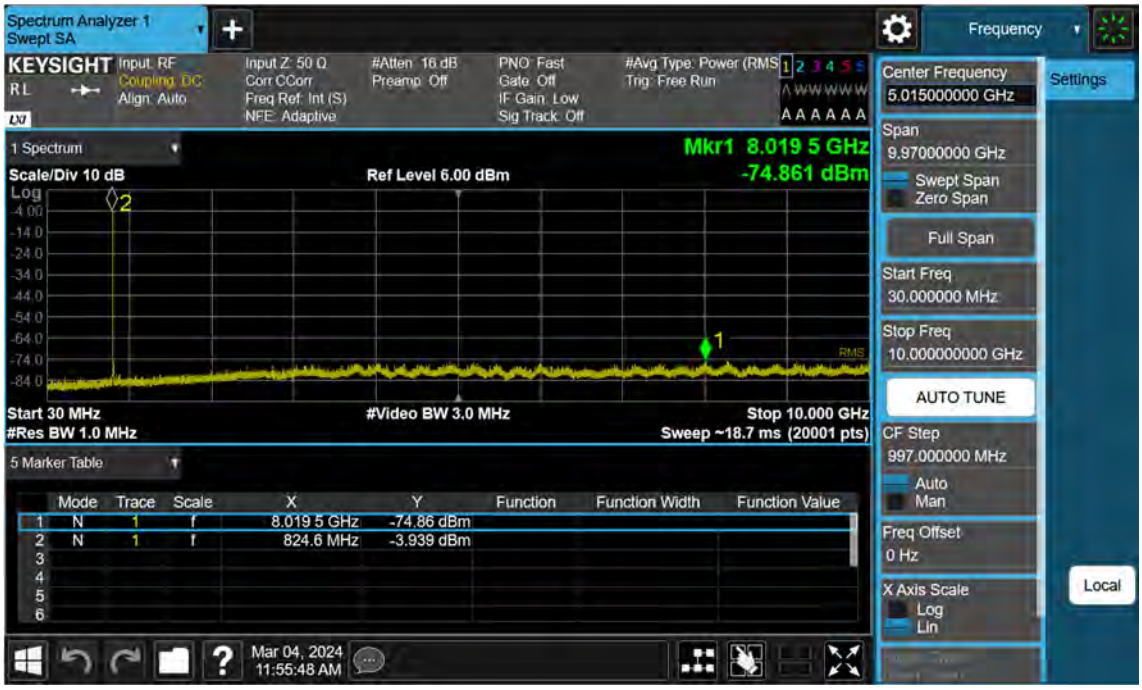
Sub6 n5. Conducted Spurious Plot (167300ch_5 MHz_BPSK_RB 1_1)



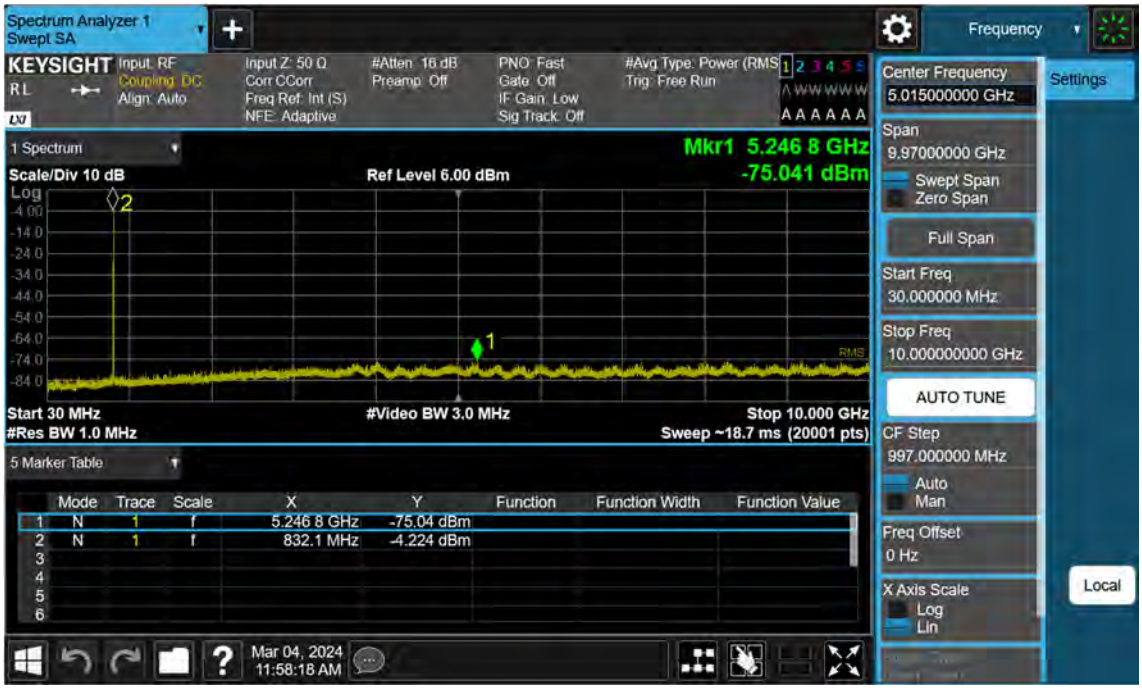
Sub6 n5. Conducted Spurious Plot (169300ch_5 MHz_BPSK_RB 1_1)



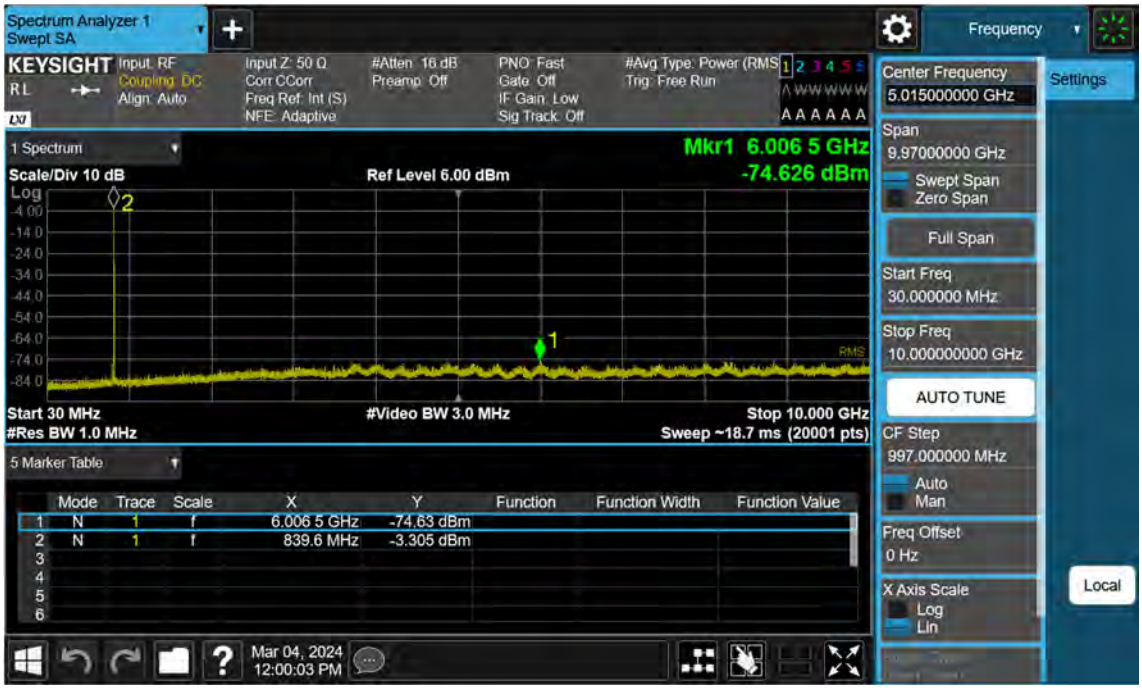
Sub6 n5. Conducted Spurious Plot (165800ch_10 MHz_BPSK_RB 1_1)



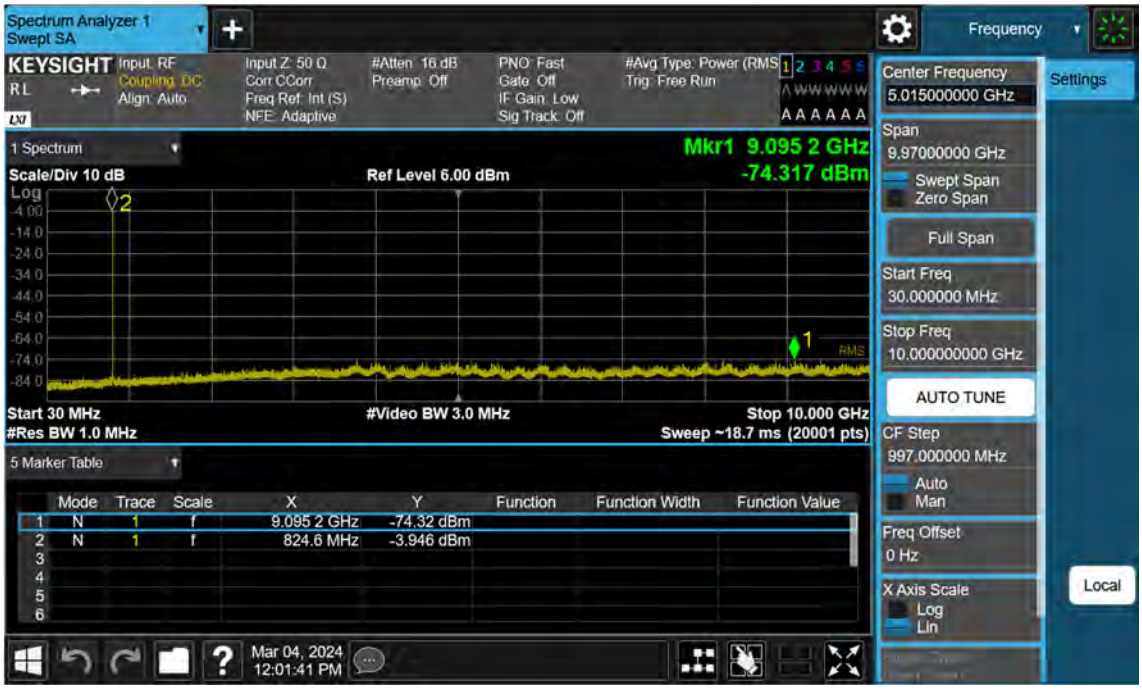
Sub6 n5. Conducted Spurious Plot (167300ch_10 MHz_BPSK_RB 1_1)



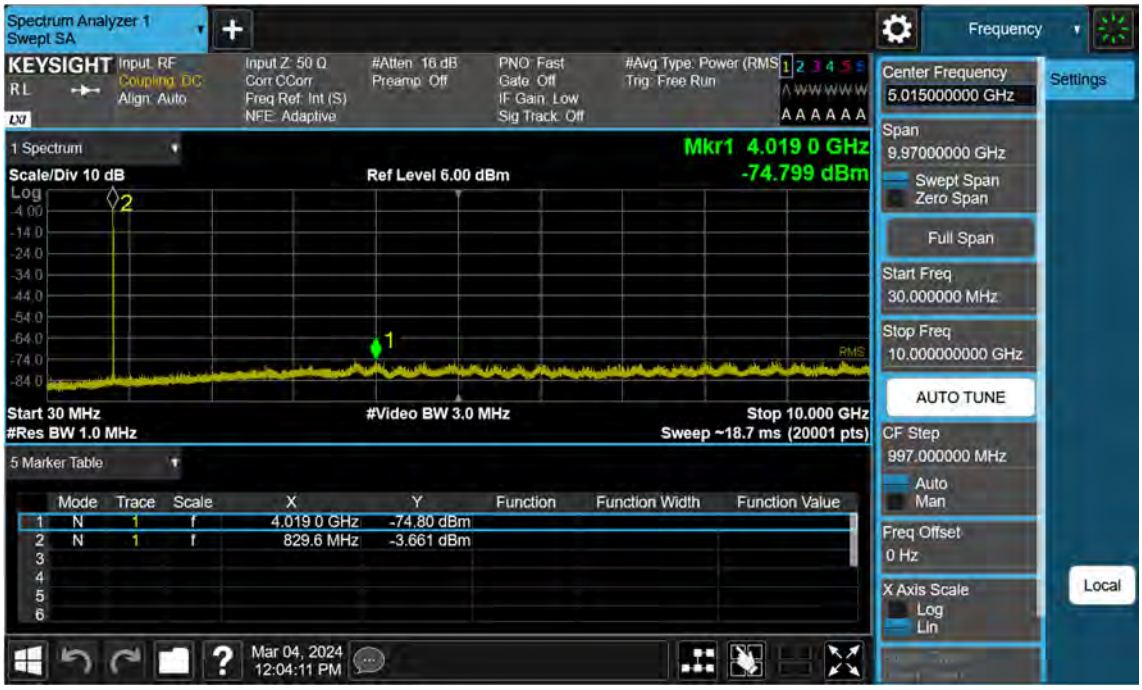
Sub6 n5. Conducted Spurious Plot (168800ch_10 MHz_BPSK_RB 1_1)



Sub6 n5. Conducted Spurious Plot (166300ch_15 MHz_BPSK_RB 1_1)

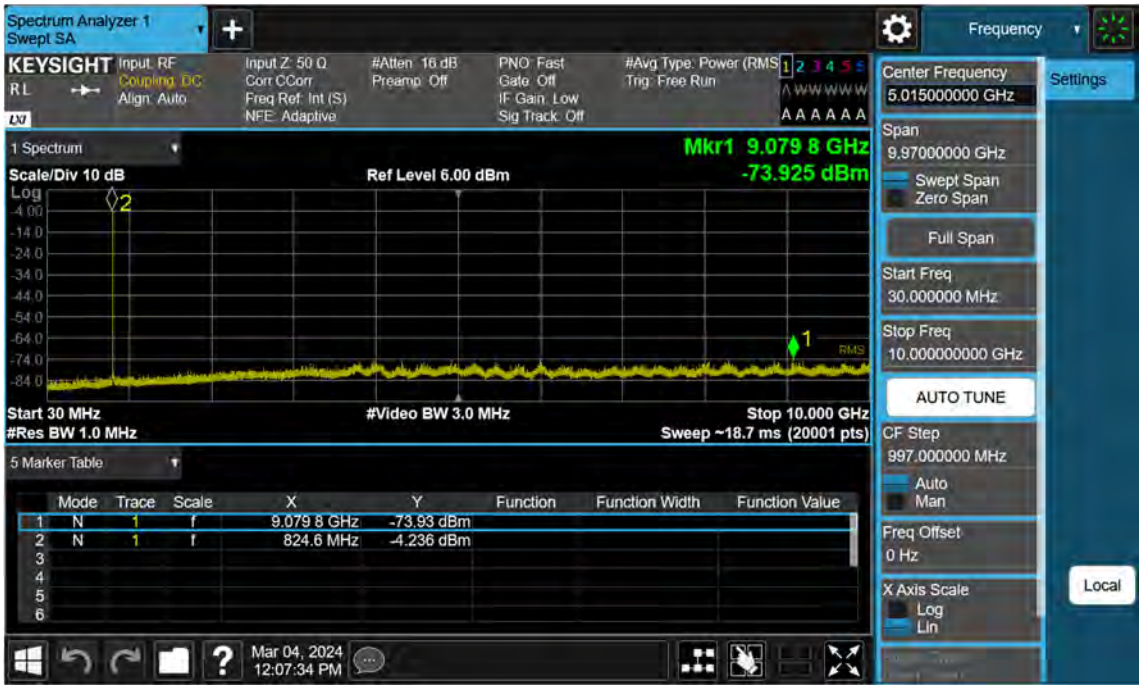


Sub6 n5. Conducted Spurious Plot (167300ch_15 MHz_BPSK_RB 1_1)

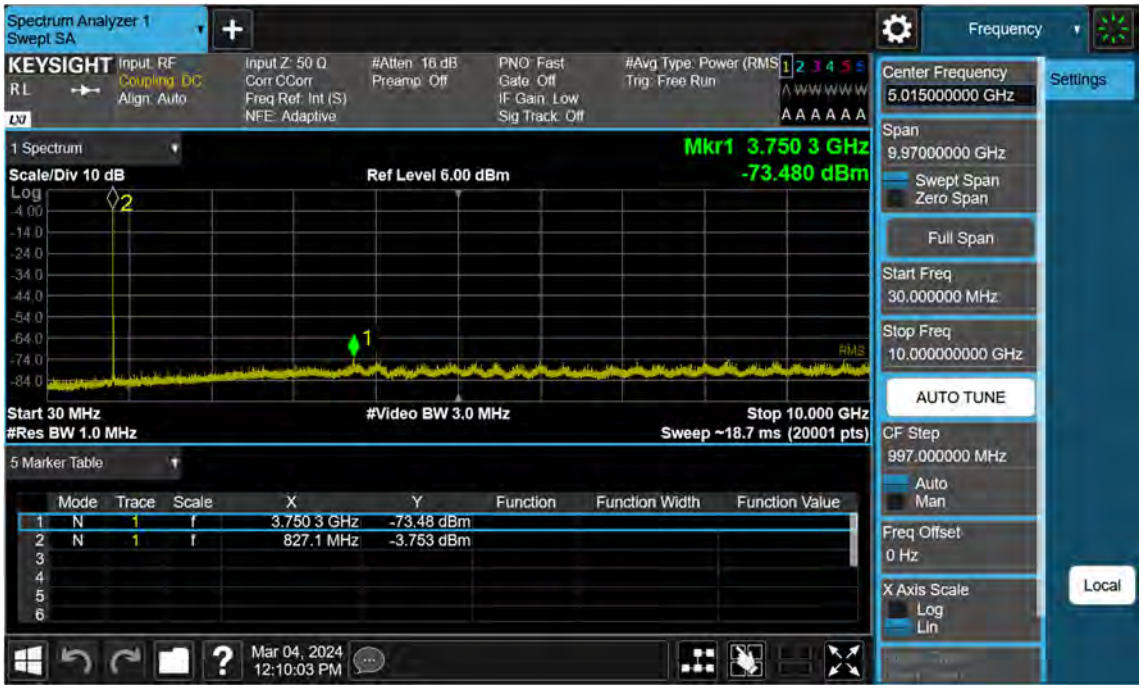


Sub6 n5. Conducted Spurious Plot (168300ch_15 MHz_BPSK_RB 1_1)

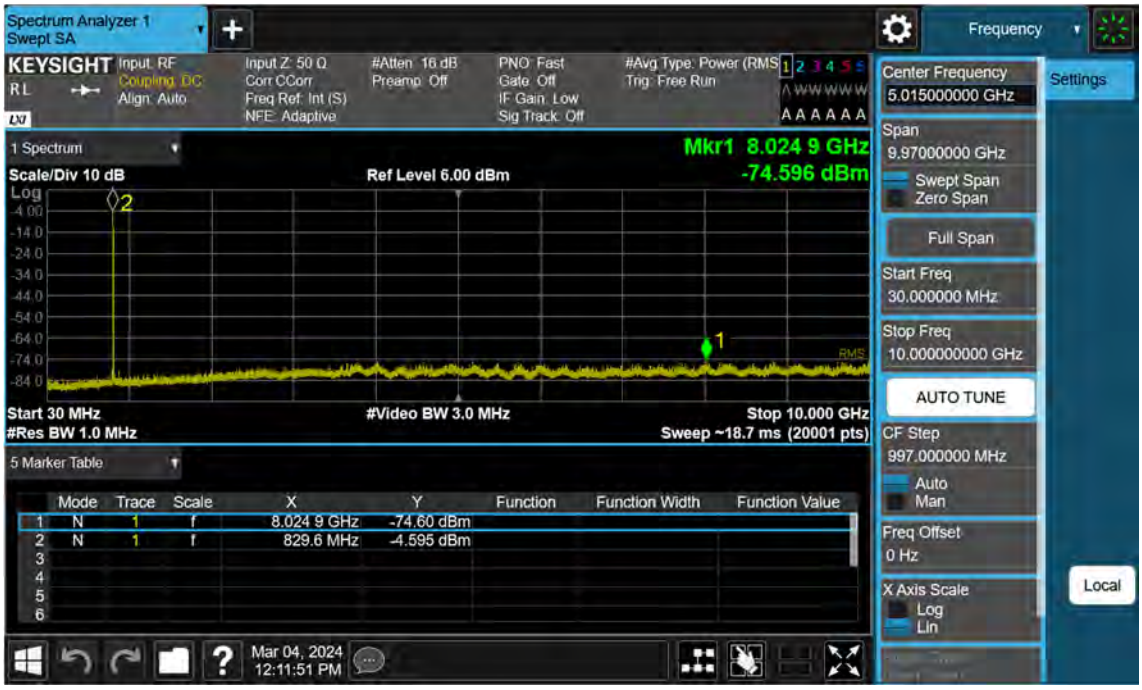
Sub6 n5. Conducted Spurious Plot (166800ch_20 MHz_BPSK_RB 1_1)



Sub6 n5. Conducted Spurious Plot (167300ch_20 MHz_BPSK_RB 1_1)



Sub6 n5. Conducted Spurious Plot (167800ch_20 MHz_BPSK_RB 1_1)



10. ANNEX A_ TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-2404-FC024-P