TEST REPORT

FCC CA_66C Test for SM-S721U
Certification

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2407-FC041

DATE OF ISSUE
July 23, 2024

Tested by
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TEST REPORT

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HCT-RF-2407-FC041

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Additional Model
SM-S721U1

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-S721U
Date of Test	May 21, 2024 ~ July 23, 2024
FCC ID	A3LSMS721U
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)
Test Standard Used	FCC Rule Part: § 27
Test Results	PASS

REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	July 23, 2024	Initial Release

Notice

Content
The measurements shown in this report were made in accordance with the procedures specified in CFR47 section § 2.947. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)
The results shown in this test report only apply to the sample(s), as received, provided by the applicant, unless otherwise stated. The test results have only been applied with the test methods required by the standard(s).
The laboratory is not accredited for the test results marked *. Information provided by the applicant is marked **. Test results provided by external providers are marked ***.
When confirmation of authenticity of this test report is required, please contact www.hct.co.kr
The test results in this test report are not associated with the ((KS Q) ISO/IEC 17025) accreditation by KOLAS (Korea Laboratory Accreditation Scheme) / A2LA (American Association for Laboratory Accreditation) that are under the ILAC (International Laboratory Accreditation Cooperation) Mutual Recognition Agreement (MRA).

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MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name:	SAMSUNG Electronics Co., Ltd.
Address:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
FCC ID:	A3LSMS721U
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§ 27
EUT Type:	Mobile phone
Model(s):	SM-S721U
Additional Model(s)	SM-S721U1
Tx Frequency:	1715.3 - 1772.5: 10 MHz+15 MHz 1717.5 - 1774.7: 15 MHz+10 MHz 1715.5 - 1770.0: 10 MHz+20 MHz 1720.0 - 1774.5: 20 MHz+10 MHz 1717.5 - 1772.5: 15 MHz+15 MHz 1717.8 - 1770.0: 15 MHz+20 MHz 1720.0 - 1772.2: 20 MHz+15 MHz 1720.0 - 1776.7: 20 MHz+5 MHz 1713.3 - 1770.0: 5 MHz+20 MHz 1720.0 - 1770.0: 20 MHz+20 MHz
Date(s) of Tests:	May 21, 2024 ~ July 23, 2024
Serial number:	Radiated : 67d50971e8197ece Conducted : R3CX506LPYM
LTE CA :	CA 66C (Uplink)

1.1. MAXIMUM OUTPUT POWER

Main 1 Ant (Antenna A)

Mode (PCC+SCC)	Tx Frequency (MHz)	Modulation	Emission Designator	EIRP	
				Max. Power (dBm)	Max. Power (W)
10 MHz+15 MHz	1715.3 - 1772.5	QPSK	23M1G7D	23.31	0.214
		16QAM	23M0W7D	22.51	0.178
		64QAM	23M1W7D	20.38	0.109
		256QAM	23M1W7D	18.42	0.070
15 MHz+10 MHz	1717.5 - 1774.7	QPSK	23M2G7D	23.27	0.212
		16QAM	23M1W7D	22.35	0.172
		64QAM	23M1W7D	20.39	0.109
		256QAM	23M2W7D	18.31	0.068
10 MHz+20 MHz	1715.5 - 1770.0	QPSK	27M7G7D	23.40	0.219
		16QAM	27M7W7D	22.48	0.177
		64QAM	27M8W7D	20.47	0.111
		256QAM	27M7W7D	18.61	0.073
20 MHz+10 MHz	1720.0 - 1774.5	QPSK	27M8G7D	23.23	0.210
		16QAM	27M8W7D	22.27	0.169
		64QAM	27M8W7D	20.46	0.111
		256QAM	27M8W7D	18.41	0.069
15 MHz+15 MHz	1717.5 - 1772.5	QPSK	28M4G7D	23.22	0.210
		16QAM	28M4W7D	22.39	0.173
		64QAM	28M3W7D	20.43	0.110
		256QAM	28M3W7D	18.23	0.067
15 MHz+20 MHz	1717.8 - 1770.0	QPSK	32M6G7D	23.43	0.220
		16QAM	32M5W7D	22.60	0.182
		64QAM	32M7W7D	20.41	0.110
		256QAM	32M6W7D	18.46	0.070
20 MHz+15 MHz	1720.0 - 1772.2	QPSK	32M7G7D	23.21	0.209
		16QAM	32M7W7D	22.57	0.181
		64QAM	32M7W7D	20.45	0.111
		256QAM	32M6W7D	18.38	0.069
20 MHz+5 MHz	1720.0 - 1776.7	QPSK	23M0G7D	23.13	0.206
		16QAM	22M9W7D	22.23	0.167
		64QAM	22M9W7D	20.24	0.106
		256QAM	23M0W7D	18.29	0.067
5 MHz+20 MHz	1713.3 - 1770.0	QPSK	22M9G7D	23.22	0.210
		16QAM	22M8W7D	22.42	0.175
		64QAM	22M9W7D	20.44	0.111
		256QAM	22M8W7D	18.21	0.066
20 MHz+20 MHz	1720.0 - 1770.0	QPSK	37M6G7D	23.35	0.216
		16QAM	37M6W7D	22.39	0.173
		64QAM	37M6W7D	20.40	0.110
		256QAM	37M6W7D	18.36	0.069

Sub 5 Ant (Antenna F)

Mode (PCC+SCC)	Tx Frequency (MHz)	Modulation	Emission Designator	EIRP	
				Max. Power (dBm)	Max. Power (W)
10 MHz+15 MHz	1715.3 - 1772.5	QPSK	23M2G7D	22.01	0.159
		16QAM	23M3W7D	21.28	0.134
		64QAM	23M2W7D	19.24	0.084
		256QAM	23M1W7D	17.15	0.052
15 MHz+10 MHz	1717.5 - 1774.7	QPSK	23M2G7D	22.06	0.161
		16QAM	23M1W7D	21.26	0.134
		64QAM	23M2W7D	19.28	0.085
		256QAM	23M1W7D	17.10	0.051
10 MHz+20 MHz	1715.5 - 1770.0	QPSK	27M8G7D	21.81	0.152
		16QAM	27M8W7D	20.99	0.126
		64QAM	27M7W7D	18.90	0.078
		256QAM	27M8W7D	16.94	0.049
20 MHz+10 MHz	1720.0 - 1774.5	QPSK	27M8G7D	22.08	0.161
		16QAM	27M8W7D	21.31	0.135
		64QAM	27M8W7D	19.23	0.084
		256QAM	27M8W7D	17.15	0.052
15 MHz+15 MHz	1717.5 - 1772.5	QPSK	28M4G7D	21.97	0.157
		16QAM	28M4W7D	21.26	0.134
		64QAM	28M4W7D	19.23	0.084
		256QAM	28M4W7D	17.04	0.051
15 MHz+20 MHz	1717.8 - 1770.0	QPSK	32M6G7D	21.99	0.158
		16QAM	32M6W7D	21.22	0.132
		64QAM	32M5W7D	19.29	0.085
		256QAM	32M6W7D	17.18	0.052
20 MHz+15 MHz	1720.0 - 1772.2	QPSK	32M6G7D	22.10	0.162
		16QAM	32M8W7D	21.12	0.129
		64QAM	32M6W7D	19.17	0.083
		256QAM	32M6W7D	17.15	0.052
20 MHz+5 MHz	1720.0 - 1776.7	QPSK	22M9G7D	21.90	0.155
		16QAM	22M9W7D	21.16	0.131
		64QAM	22M9W7D	19.03	0.080
		256QAM	22M9W7D	17.00	0.050
5 MHz+20 MHz	1713.3 - 1770.0	QPSK	22M9G7D	21.69	0.148
		16QAM	23M0W7D	21.08	0.128
		64QAM	22M9W7D	19.02	0.080
		256QAM	22M9W7D	16.90	0.049
20 MHz+20 MHz	1720.0 - 1770.0	QPSK	37M6G7D	22.14	0.164
		16QAM	37M6W7D	21.33	0.136
		64QAM	37M5W7D	19.27	0.085
		256QAM	37M6W7D	17.14	0.052

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	- KDB 971168 D01 v03r01 - Section 5.2.4 - ANSI C63.26-2015 - Section 5.2.1 & 5.2.4.2
Peak- to- Average Ratio	- KDB 971168 D01 v03r01 – Section 5.7 - ANSI C63.26-2015 – Section 5.2.3.4
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;

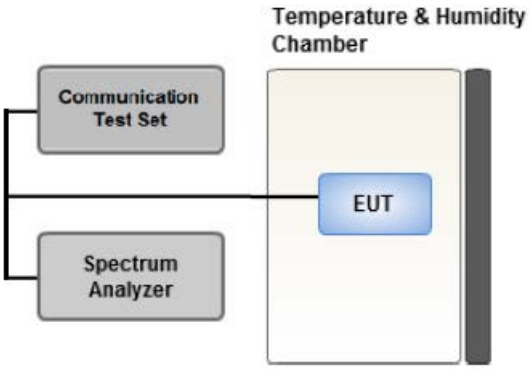
$$\text{Result}_{(dBm)} = \text{Pg}_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dBi)}$$

   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.

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

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 as P_{Pk}.

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

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

Test Settings(Peak Power)

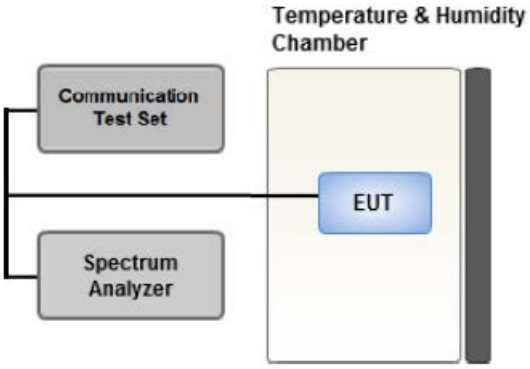
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW ≥ 3 × RBW.

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.



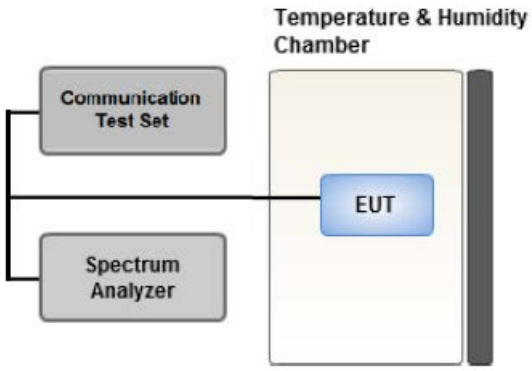
Test setup

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.

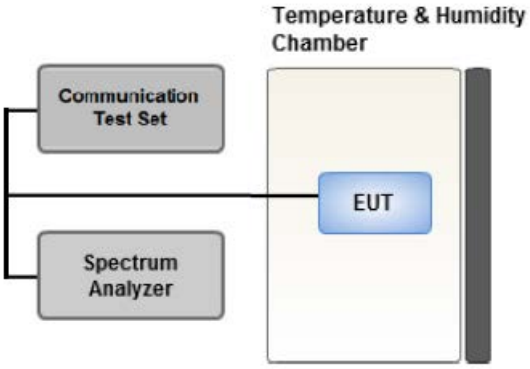
All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

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

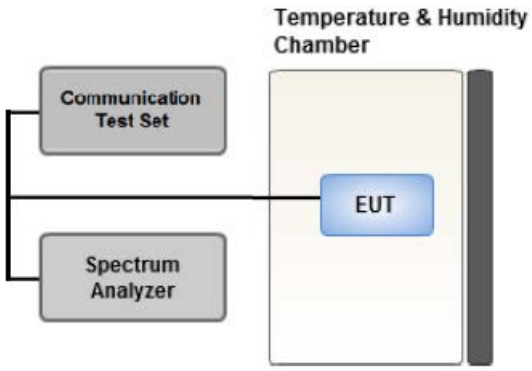
1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW > 1 % of the emission bandwidth
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW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

4. LIST OF TEST EQUIPMENT

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
RF Switching System	FBSR-02B(1.2G HPF+LNA)	T&M SYSTEM	F1L1	12/11/2024	Annual
RF Switching System	FBSR-02B(3.3G HPF+LNA)	T&M SYSTEM	F1L2	12/11/2024	Annual
Power Splitter(DC ~ 26.5 GHz)	11667B	Hewlett Packard	5001	04/17/2025	Annual
DC Power Supply	E3632A	Agilent	KR01009150	04/18/2025	Annual
Dipole Antenna	UHAP	Schwarzbeck	557	03/09/2025	Biennial
Dipole Antenna	UHAP	Schwarzbeck	558	03/09/2025	Biennial
Chamber	SU-642	ESPEC	93008124	02/19/2025	Annual
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	147	08/17/2025	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	9120D-1298	09/11/2025	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/29/2024	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170124	03/28/2025	Biennial
Signal Analyzer(10 Hz ~ 26.5 GHz)	N9020A	Agilent	MY52090906	04/19/2025	Annual
ATTENUATOR(20 dB)	8493C	Hewlett Packard	17280	04/17/2025	Annual
Spectrum Analyzer(10 Hz ~ 40 GHz)	FSV40	REOHDE & SCHWARZ	100931	08/17/2024	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/10/2024	Annual
Loop Antenna(9 kHz ~ 30 MHz)	FMZB1513	Schwarzbeck	1513-333	03/07/2026	Biennial
Trilog Broadband Antenna	VULB9168	Schwarzbeck	895	09/16/2024	Biennial
Trilog Broadband Antenna	VULB9168	Schwarzbeck	1135	09/16/2024	Biennial
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262094331	11/17/2024	Annual
Wideband Radio Communication Tester	MT8820C	Anritsu Corp.	6201026545	12/11/2024	Annual
SIGNAL GENERATOR (100 kHz ~ 40 GHz)	SMW200A	REOHDE & SCHWARZ	100988	02/26/2025	Annual
Signal Analyzer(5 Hz ~ 40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/17/2025	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	HCT CO., LTD.,	-	-	-

Note:

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, § 27.53(h)	< 43 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions	PASS
Conducted Output Power	§ 2.1046	N/A	PASS
Peak- to- Average Ratio	§ 27.50(d)(5)	< 13 dB	PASS
Frequency stability / variation of ambient temperature	§ 2.1055, § 27.54	Emission must remain in band	PASS

6.2 Test Condition: Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Equivalent Isotropic Radiated Power	§ 27.50(d)(4)	< 1 Watts max. EIRP	PASS
Radiated Spurious and Harmonic Emissions	§ 2.1053, § 27.53(h)	< 43 + 10log10 (P[Watts]) for all out-of band emissions	PASS

7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

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

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(Main 1 Ant) (ANT A)

Test Overview

The EUT is set up to transmit two contiguous LTE channels. The power level of both carriers 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 Note

1. All tests were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth.
2. Channel bandwidth is shown in the tables below based only on the channel bandwidths that were supported in this device.

Channel Bandwidth (PCC)	Channel Bandwidth (SCC)	Maximum aggregated bandwidth (MHz)
10	15	25
15	10	25
10	20	30
20	10	30
15	15	30
15	20	35
20	15	35
20	5	25
5	20	25
20	20	40

3. All modes of operation were investigated and the worst case configuration results are reported in this section.
   Please refer to the table below.
 - Worst case(Conducted Spurious Emissions, Band Edge)
   : We have selected higher of the Conduction Output Power.
 - Worst case(Radiated Spurious Emissions) : We have selected higher of the EIRP.
 - Worst case(OBW, PAR, Frequency stability)
   : All modes of operation were investigated and the worst case configuration results are reported.
4. All modes of operation were investigated and the worst case configuration results are reported.
   Mode : Stand alone, Stand alone + External accessories (Earphone, AC adapter, etc)
   Worst case : Stand alone
5. 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
6. All 3 channels(low/mid/high) of conducted power and radiated power were investigated and the worst case channel results are reported.

[Worst case]

Test Description	Mod	Operating frequency	PCC					SCC				
			BW (MHz)	Freq. (MHz)	Ch.	RB	RB Offset	BW (MHz)	Freq. (MHz)	Ch.	RB	RB Offset
Conducted Spurious Emissions/ Band Edge	QPSK	Low	10	1715.3	132025	1	49	15	1727.3	132145	1	0
		Mid	20	1750.1	132373	1	99	10	1764.5	132517	1	0
		High	20	1765.0	132522	1	99	5	1776.7	132639	1	0
		Low	10	1715.3	132025	1	0	15	1727.3	132145	1	74
		Mid	20	1750.1	132373	1	0	10	1764.5	132517	1	49
		High	20	1765.0	132522	1	0	5	1776.7	132639	1	24
		Low	5	1713.3	132005	25	0	20	1725.0	132122	100	0
		Mid	20	1747.6	132348	100	0	15	1764.7	132519	75	0
		High	20	1760.1	132473	100	0	10	1774.5	132617	50	0
		Low	20	1720.0	132072	100	0	20	1739.8	132270	100	0
		Mid	20	1745.1	132323	100	0	20	1764.9	132521	100	0
		High	20	1750.2	132374	100	0	20	1770.0	132572	100	0
Radiated Spurious Emissions	QPSK	Low	10	1715.3	132025	1	49	15	1721.3	132145	1	0
		Mid	15	1745.3	132325	1	74	20	1762.4	132496	1	0
		High	20	1750.2	132374	1	99	20	1770.0	132572	1	0

[Worst case]

Test Description	Mod	Operating frequency	PCC					SCC				
			BW (MHz)	Freq. (MHz)	Ch.	RB	RB Offset	BW (MHz)	Freq. (MHz)	Ch.	RB	RB Offset
OBW, PAR	QPSK, 16QAM, 64QAM 256QAM	Mid	10	1747.9	132351	50	0	15	1759.9	132471	75	0
			15	1750.1	132373	75	0	10	1762.1	132493	50	0
			10	1745.6	132328	50	0	20	1760.0	132472	100	0
			20	1750.1	132373	100	0	10	1764.5	132517	50	0
			15	1747.5	132347	75	0	15	1762.5	132497	75	0
			15	1745.3	132325	75	0	20	1762.4	132496	100	0
			20	1747.6	132348	100	0	15	1764.7	132519	75	0
			20	1752.5	132397	100	0	5	1764.2	132514	25	0
			5	1745.8	132330	25	0	20	1757.5	132447	100	0
			20	1745.1	132323	100	0	20	1764.9	132521	100	0
Frequency stability	QPSK	Low	5	1713.3	132005	25	0	20	1725.0	132122	100	0
			10	1715.3	132025	50	0	15	1727.3	132145	75	0
			15	1717.5	132047	75	0	10	1729.5	132167	50	0
			20	1720.0	132072	100	0	20	1739.8	132270	100	0
		High	5	1758.3	132455	25	0	20	1770.0	132572	100	0
			10	1772.5	132597	50	0	15	1784.5	132717	75	0
			15	1762.7	132499	75	0	10	1774.7	132619	50	0
			20	1750.2	132374	100	0	20	1770.0	132572	100	0

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8.1 Conducted Power

Operating frequency	PCC					SCC					Conducted. Power [dBm]
	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	
Low	***10***	***1715.3***	***132025***	***1***	***49***	***15***	***1727.3***	***132145***	***1***	***0***	***24.51***
	15	1717.5	132047	1	74	10	1729.5	132167	1	0	24.46
	10	1715.5	132027	1	49	20	1729.9	132171	1	0	24.47
	20	1720.0	132072	1	99	10	1734.4	132216	1	0	23.51
	15	1717.5	132047	1	74	15	1732.5	132197	1	0	24.40
	15	1717.8	132050	1	74	20	1734.9	132221	1	0	24.44
	20	1720.0	132072	1	99	15	1737.1	132243	1	0	24.43
	20	1720.0	132072	1	99	5	1731.7	132189	1	0	24.48
	5	1713.3	132005	1	24	20	1725.0	132122	1	0	24.46
	20	1720.0	132072	1	99	20	1739.8	132270	1	0	24.44
Mid	10	1747.9	132351	1	49	15	1759.9	132471	1	0	24.31
	15	1750.1	132373	1	74	10	1762.1	132493	1	0	24.43
	10	1745.6	132328	1	49	20	1760.0	132472	1	0	24.27
	20	***1750.1***	***132373***	***1***	***99***	***10***	***1764.5***	***132517***	***1***	***0***	***24.45***
	15	1747.5	132347	1	74	15	1762.5	132497	1	0	24.35
	15	1745.3	132325	1	74	20	1762.4	132496	1	0	24.34
	20	1747.6	132348	1	99	15	1764.7	132519	1	0	24.37
	20	1752.5	132397	1	99	5	1764.2	132514	1	0	24.40
	5	1745.8	132330	1	24	20	1757.5	132447	1	0	24.14
	20	1745.1	132323	1	99	20	1764.9	132521	1	0	23.36
High	10	1760.5	132477	1	49	15	1772.5	132597	1	0	23.55
	15	1762.7	132499	1	74	10	1774.7	132619	1	0	24.46
	10	1755.6	132428	1	49	20	1770.0	132572	1	0	24.40
	20	1760.1	132473	1	99	10	1774.5	132617	1	0	24.58
	15	1757.5	132447	1	74	15	1772.5	132597	1	0	24.54
	15	1752.9	132401	1	74	20	1770.0	132572	1	0	24.40
	20	1755.1	132423	1	99	15	1772.2	132594	1	0	24.50
	20	***1765.0***	***132522***	***1***	***99***	***5***	***1776.7***	***132639***	***1***	***0***	***24.65***
	5	1758.3	132455	1	24	20	1770.0	132572	1	0	24.34
	20	1750.2	132374	1	99	20	1770.0	132572	1	0	24.40

Note:

Modulation : QPSK(1RB)

Operating frequency	PCC					SCC					Conducted. Power [dBm]
	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	
Low	10	1715.3	132025	50	0	15	1727.3	132145	75	0	22.54
	15	1717.5	132047	75	0	10	1729.5	132167	50	0	22.50
	10	1715.5	132027	50	0	20	1729.9	132171	100	0	22.43
	20	1720.0	132072	100	0	10	1734.4	132216	50	0	22.47
	15	1717.5	132047	75	0	15	1732.5	132197	75	0	22.45
	15	1717.8	132050	75	0	20	1734.9	132221	100	0	22.40
	20	1720.0	132072	100	0	15	1737.1	132243	75	0	22.50
	20	1720.0	132072	100	0	5	1731.7	132189	25	0	22.47
	5	***1713.3***	***132005***	***25***	***0***	***20***	***1725.0***	***132122***	***100***	***0***	***22.59***
	20	1720.0	132072	100	0	20	1739.8	132270	100	0	22.52
Mid	10	1747.9	132351	50	0	15	1759.9	132471	75	0	22.40
	15	1750.1	132373	75	0	10	1762.1	132493	50	0	22.43
	10	1745.6	132328	50	0	20	1760.0	132472	100	0	22.37
	20	1750.1	132373	100	0	10	1764.5	132517	50	0	22.48
	15	1747.5	132347	75	0	15	1762.5	132497	75	0	22.39
	15	1745.3	132325	75	0	20	1762.4	132496	100	0	22.28
	20	***1747.6***	***132348***	***100***	***0***	***15***	***1764.7***	***132519***	***75***	***0***	***22.48***
	20	1752.5	132397	100	0	5	1764.2	132514	25	0	22.47
	5	1745.8	132330	25	0	20	1757.5	132447	100	0	22.21
	20	1745.1	132323	100	0	20	1764.9	132521	100	0	22.47
High	10	1760.5	132477	50	0	15	1772.5	132597	75	0	22.48
	15	1762.7	132499	75	0	10	1774.7	132619	50	0	22.50
	10	1755.6	132428	50	0	20	1770.0	132572	100	0	22.47
	20	***1760.1***	***132473***	***100***	***0***	***10***	***1774.5***	***132617***	***50***	***0***	***22.61***
	15	1757.5	132447	75	0	15	1772.5	132597	75	0	22.02
	15	1752.9	132401	75	0	20	1770.0	132572	100	0	22.47
	20	1755.1	132423	100	0	15	1772.2	132594	75	0	22.45
	20	1765.0	132522	100	0	5	1776.7	132639	25	0	22.40
	5	1758.3	132455	25	0	20	1770.0	132572	100	0	22.46
	20	1750.2	132374	100	0	20	1770.0	132572	100	0	22.46

Note:

Modulation : QPSK(Full RB)

Operating frequency	PCC					SCC					Conducted. Power [dBm]
	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	
Low	10	1715.3	132025	1	49	15	1727.3	132145	1	0	23.65
Mid	20	1750.1	132373	1	99	10	1764.5	132517	1	0	23.76
High	20	1765.0	132522	1	99	5	1776.7	132639	1	0	23.88
Low	5	1713.3	132005	25	0	20	1725.0	132122	100	0	21.63
Mid	20	1747.6	132348	100	0	15	1764.7	132519	75	0	21.53
High	20	1760.1	132473	100	0	10	1774.5	132617	50	0	21.67

Note:

Modulation : 16QAM

Operating frequency	PCC					SCC					Conducted. Power [dBm]
	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	
Low	10	1715.3	132025	1	49	15	1727.3	132145	1	0	21.69
Mid	20	1750.1	132373	1	99	10	1764.5	132517	1	0	21.66
High	20	1765.0	132522	1	99	5	1776.7	132639	1	0	21.96
Low	5	1713.3	132005	25	0	20	1725.0	132122	100	0	21.60
Mid	20	1747.6	132348	100	0	15	1764.7	132519	75	0	21.49
High	20	1760.1	132473	100	0	10	1774.5	132617	50	0	21.67

Note:

Modulation : 64QAM

Operating frequency	PCC					SCC					Conducted. Power [dBm]
	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	
Low	10	1715.3	132025	1	49	15	1727.3	132145	1	0	19.87
Mid	20	1750.1	132373	1	99	10	1764.5	132517	1	0	19.66
High	20	1765.0	132522	1	99	5	1776.7	132639	1	0	19.91
Low	5	1713.3	132005	25	0	20	1725.0	132122	100	0	19.65
Mid	20	1747.6	132348	100	0	15	1764.7	132519	75	0	19.49
High	20	1760.1	132473	100	0	10	1774.5	132617	50	0	19.70

Note:

Modulation : 256QAM

8.2 Equivalent Isotropic Radiated Power

	PCC			SCC			Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol.	E.I.R.P	
	BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset						W	dBm
Low	***10***	***132025***	***1/49***	***15***	***132145***	***1/0***	***-18.39***	***15.12***	***10.01***	***2.22***	***H***	***0.195***	***22.91***
	15	132047	1/74	10	132167	1/0	-18.66	14.94	10.04	2.20	H	0.190	22.78
	10	132027	1/49	20	132171	1/0	-18.64	14.87	10.01	2.22	H	0.184	22.66
	20	132072	1/99	10	132216	1/0	-18.66	15.00	10.07	2.17	H	0.195	22.90
	15	132047	1/74	15	132197	1/0	-18.57	15.03	10.04	2.20	H	0.194	22.87
	15	132050	1/74	20	132221	1/0	-18.62	14.98	10.04	2.20	H	0.192	22.82
	20	132072	1/99	15	132243	1/0	-18.67	14.99	10.07	2.17	H	0.194	22.89
	20	132072	1/99	5	132189	1/0	-18.77	14.83	10.04	2.20	H	0.185	22.67
	5	132005	1/24	20	132122	1/0	-18.91	14.60	10.01	2.22	H	0.173	22.39
	20	132072	1/99	20	132270	1/0	-18.75	14.91	10.07	2.17	H	0.191	22.81
Mid	10	132025	1/49	15	132471	1/0	-18.38	15.30	10.18	2.17	H	0.214	23.31
	15	132047	1/74	10	132493	1/0	-18.42	15.26	10.18	2.17	H	0.212	23.27
	10	132027	1/49	20	132472	1/0	-18.33	15.38	10.17	2.15	H	0.219	23.40
	20	132072	1/99	10	132517	1/0	-18.43	15.22	10.19	2.18	H	0.210	23.23
	15	132047	1/74	15	132497	1/0	-18.47	15.21	10.18	2.17	H	0.210	23.22
	15	***132050***	***1/74***	***20***	***132496***	***1/0***	***-18.26***	***15.42***	***10.18***	***2.17***	***H***	***0.220***	***23.43***
	20	132072	1/99	15	132519	1/0	-18.48	15.20	10.18	2.17	H	0.209	23.21
	20	132072	1/99	5	132514	1/0	-18.53	15.12	10.19	2.18	H	0.206	23.13
	5	132005	1/24	20	132447	1/0	-18.51	15.20	10.17	2.15	H	0.210	23.22
	20	132072	1/99	20	132521	1/0	-18.34	15.34	10.18	2.17	H	0.216	23.35
High	10	132025	1/49	15	132597	1/0	-18.72	14.91	10.19	2.21	H	0.195	22.90
	15	132047	1/74	10	132619	1/0	-18.78	14.83	10.20	2.23	H	0.190	22.80
	10	132027	1/49	20	132572	1/0	-18.62	15.03	10.19	2.18	H	0.201	23.04
	20	132072	1/99	10	132617	1/0	-18.77	14.84	10.20	2.23	H	0.191	22.81
	15	132047	1/74	15	132597	1/0	-18.63	15.00	10.19	2.21	H	0.199	22.99
	15	132050	1/74	20	132572	1/0	-18.56	15.09	10.19	2.18	H	0.204	23.10
	20	132072	1/99	15	132594	1/0	-18.58	15.05	10.19	2.21	H	0.201	23.04
	20	132072	1/99	5	132639	1/0	-18.72	14.89	10.20	2.23	H	0.193	22.86
	5	132005	1/24	20	132572	1/0	-18.61	15.02	10.19	2.21	H	0.200	23.01
	20	***132072***	***1/99***	***20***	***132572***	***1/0***	***-18.46***	***15.19***	***10.19***	***2.18***	***H***	***0.209***	***23.20***

Note:

1. Modulation : QPSK

2. Limit : < 1 Watts

PCC			SCC			Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol.	E.I.R.P	
BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset						W	dBm
10	***132025***	***1/49***	***15***	***132145***	***1/0***	***-19.25***	***14.26***	***10.01***	***2.22***	***H***	***0.160***	***22.05***
10	132025	1/49	15	132471	1/0	-19.18	14.50	10.18	2.17	H	0.178	22.51
15	132047	1/74	10	132493	1/0	-19.34	14.34	10.18	2.17	H	0.172	22.35
10	132027	1/49	20	132472	1/0	-19.25	14.46	10.17	2.15	H	0.177	22.48
20	132072	1/99	10	132517	1/0	-19.39	14.26	10.19	2.18	H	0.169	22.27
15	132047	1/74	15	132497	1/0	-19.30	14.38	10.18	2.17	H	0.173	22.39
15	***132050***	***1/74***	***20***	***132496***	***1/0***	***-19.09***	***14.59***	***10.18***	***2.17***	***H***	***0.182***	***22.60***
20	132072	1/99	15	132519	1/0	-19.12	14.56	10.18	2.17	H	0.181	22.57
20	132072	1/99	5	132514	1/0	-19.43	14.22	10.19	2.18	H	0.167	22.23
5	132005	1/24	20	132447	1/0	-19.31	14.40	10.17	2.15	H	0.175	22.42
20	132072	1/99	20	132521	1/0	-19.33	14.35	10.18	2.17	H	0.172	22.36
20	***132072***	***1/99***	***20***	***132572***	***1/0***	***-19.27***	***14.38***	***10.19***	***2.18***	***H***	***0.173***	***22.39***

Note:

1. Modulation : 16QAM

2. Limit : < 1 Watts

PCC			SCC			Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol.	E.I.R.P	
BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset						W	dBm
10	***132025***	***1/49***	***15***	***132145***	***1/0***	***-21.39***	***12.12***	***10.01***	***2.22***	***H***	***0.098***	***19.91***
10	132025	1/49	15	132471	1/0	-21.31	12.37	10.18	2.17	H	0.109	20.38
15	132047	1/74	10	132493	1/0	-21.30	12.38	10.18	2.17	H	0.109	20.39
10	132027	1/49	20	132472	1/0	-21.26	12.45	10.17	2.15	H	0.111	20.47
20	132072	1/99	10	132517	1/0	-21.20	12.45	10.19	2.18	H	0.111	20.46
15	132047	1/74	15	132497	1/0	-21.26	12.42	10.18	2.17	H	0.110	20.43
15	***132050***	***1/74***	***20***	***132496***	***1/0***	***-21.28***	***12.40***	***10.18***	***2.17***	***H***	***0.110***	***20.41***
20	132072	1/99	15	132519	1/0	-21.24	12.44	10.18	2.17	H	0.111	20.45
20	132072	1/99	5	132514	1/0	-21.42	12.23	10.19	2.18	H	0.106	20.24
5	132005	1/24	20	132447	1/0	-21.29	12.42	10.17	2.15	H	0.111	20.44
20	132072	1/99	20	132521	1/0	-21.34	12.34	10.18	2.17	H	0.108	20.35
20	***132072***	***1/99***	***20***	***132572***	***1/0***	***-21.26***	***12.39***	***10.19***	***2.18***	***H***	***0.110***	***20.40***

Note:

1. Modulation : 64QAM

2. Limit : < 1 Watts

PCC			SCC			Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol.	E.I.R.P	
BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset						W	dBm
10	***132025***	***1/49***	***15***	***132145***	***1/0***	***-23.30***	***10.21***	***10.01***	***2.22***	***H***	***0.063***	***18.00***
10	132025	1/49	15	132471	1/0	-23.27	10.41	10.18	2.17	H	0.070	18.42
15	132047	1/74	10	132493	1/0	-23.38	10.30	10.18	2.17	H	0.068	18.31
10	132027	1/49	20	132472	1/0	-23.12	10.59	10.17	2.15	H	0.073	18.61
20	132072	1/99	10	132517	1/0	-23.25	10.40	10.19	2.18	H	0.069	18.41
15	132047	1/74	15	132497	1/0	-23.46	10.22	10.18	2.17	H	0.067	18.23
15	***132050***	***1/74***	***20***	***132496***	***1/0***	***-23.23***	***10.45***	***10.18***	***2.17***	***H***	***0.070***	***18.46***
20	132072	1/99	15	132519	1/0	-23.31	10.37	10.18	2.17	H	0.069	18.38
20	132072	1/99	5	132514	1/0	-23.37	10.28	10.19	2.18	H	0.067	18.29
5	132005	1/24	20	132447	1/0	-23.52	10.19	10.17	2.15	H	0.066	18.21
20	132072	1/99	20	132521	1/0	-23.33	10.35	10.18	2.17	H	0.069	18.36
20	***132072***	***1/99***	***20***	***132572***	***1/0***	***-23.38***	***10.27***	***10.19***	***2.18***	***H***	***0.067***	***18.28***

Note:

1. Modulation : 256QAM
2. Limit : < 1 Watts

8.3 Conducted Spurious Emissions

Operating frequency	PCC				SCC				Measurement Maximum Frequency (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)
	BW [MHz]	Ch.	Freq. (MHz)	RB/ Offset	BW [MHz]	Ch.	Freq. (MHz)	RB/ Offset				
Low	10	132025	1715.3	1/49	15	132145	1727.3	1/0	9.9711	28.591	-76.61	-48.02
Mid	20	132373	1750.1	1/99	10	132517	1764.5	1/0	8.2523	28.591	-75.93	-47.34
High	20	132522	1765.0	1/99	5	132639	1776.7	1/0	8.8709	28.591	-75.55	-46.96
Low	10	132025	1715.3	1/0	15	132145	1727.3	1/74	3.7782	27.976	-74.89	-46.91
Mid	20	132373	1750.1	1/0	10	132517	1764.5	1/49	8.8724	28.591	-75.91	-47.32
High	20	132522	1765.0	1/0	5	132639	1776.7	1/24	9.7009	28.591	-75.82	-47.23
Low	5	132005	1713.3	25/0	20	132122	1725.0	100/0	4.0564	27.976	-75.49	-47.51
Mid	20	132348	1747.6	100/0	15	132519	1764.7	75/0	8.2891	28.591	-74.25	-45.65
High	20	132473	1760.1	100/0	10	132617	1774.5	50/0	8.2857	28.591	-76.33	-47.74
Low	20	132072	1720.0	100/0	20	132270	1739.8	100/0	9.3390	28.591	-75.79	-47.19
Mid	20	132323	1745.1	100/0	20	132521	1764.9	100/0	9.6899	28.591	-75.59	-47.00
High	20	132374	1750.2	100/0	20	132572	1770.0	100/0	9.1411	28.591	-76.08	-47.49

Note:

1. Modulation : QPSK
2. Factor(dB) = Cable Loss + Ext. Attenuator + Power Splitter
3. Factors for frequency :

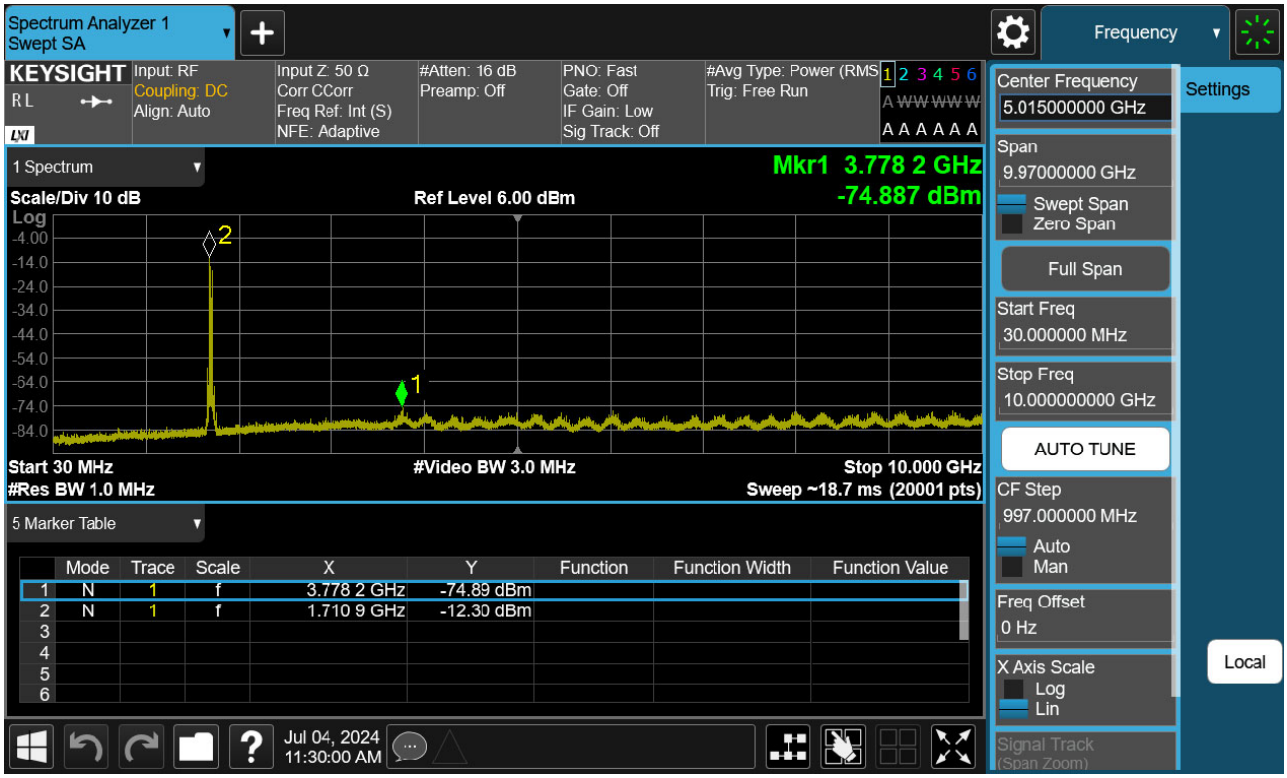
Frequency Range (GHz)	Factor [dB]
0.03 – 1	25.270
1 – 5	27.976
5 – 10	28.591
10 – 15	29.116
15 – 20	29.489
Above 20(26.5)	30.131

4. Limit : -13.0 dBm

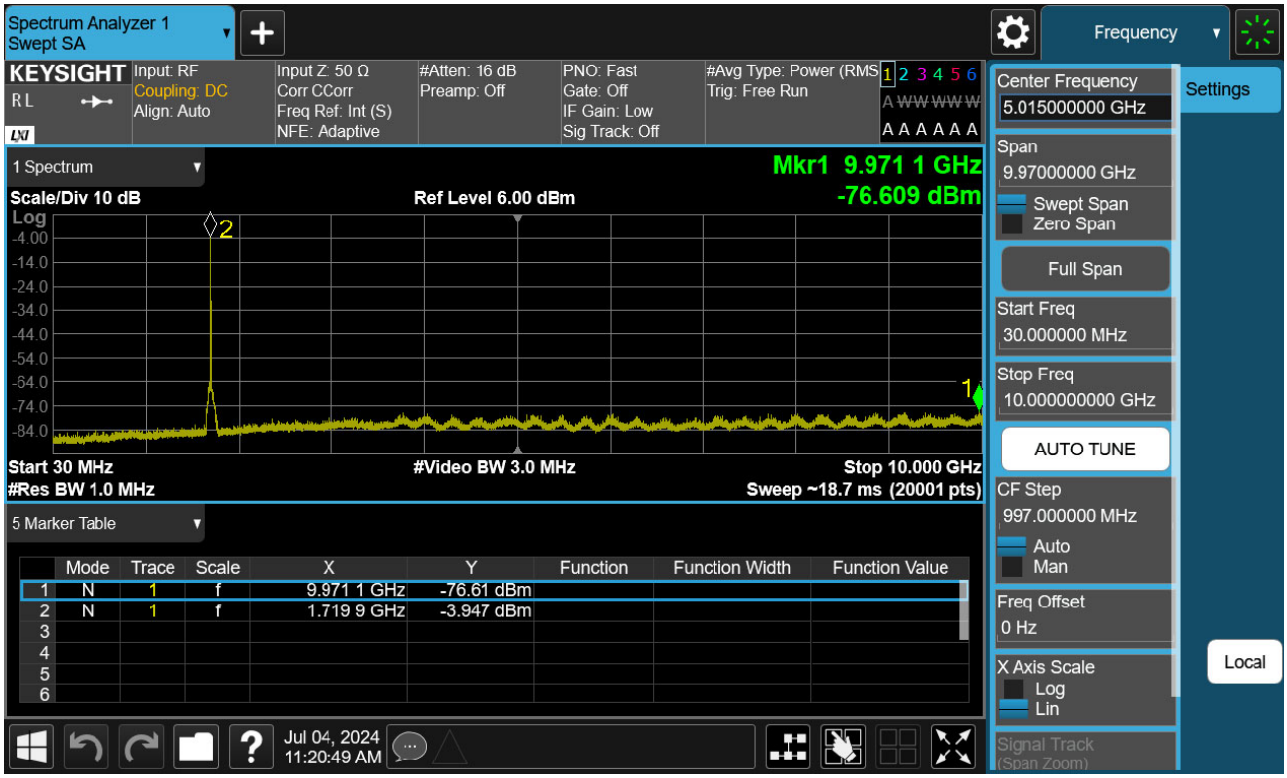
Frequency Range : 30 MHz ~ 10 GHz

PCC 5MHz Ch132005 RB25 Offset0 SCC 20MHz Ch132122 RB100 Offset0

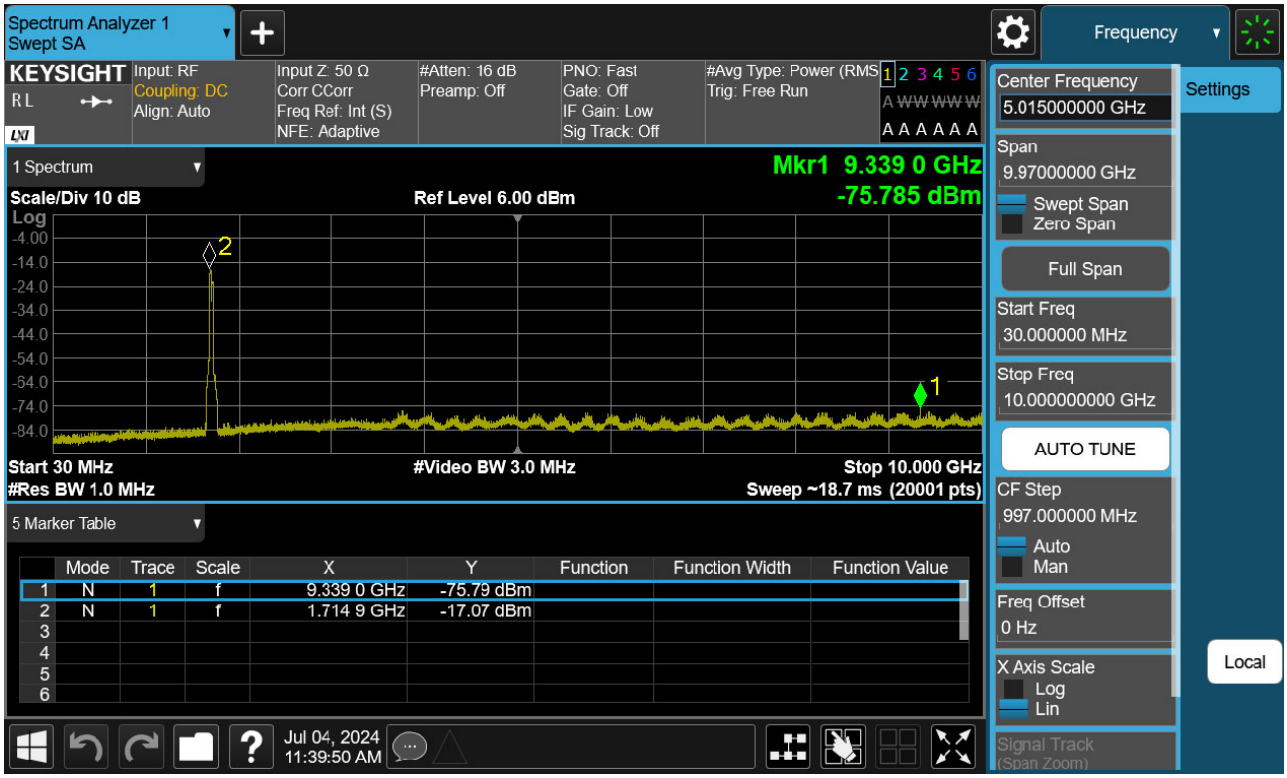
PCC 10MHz Ch132025 RB1 Offset0 SCC 15MHz Ch132145 RB1 Offset74



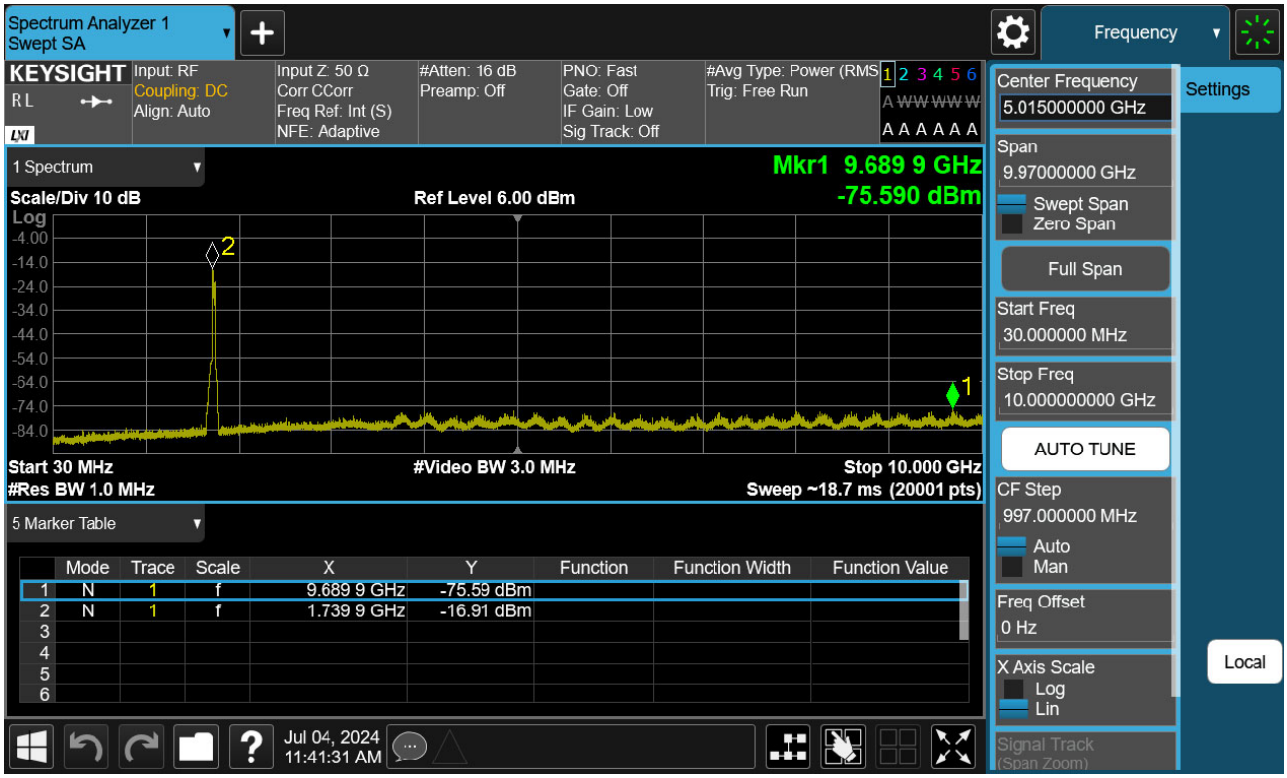
PCC 10MHz Ch132025 RB1 Offset49 SCC 15MHz Ch132145 RB1 Offset0



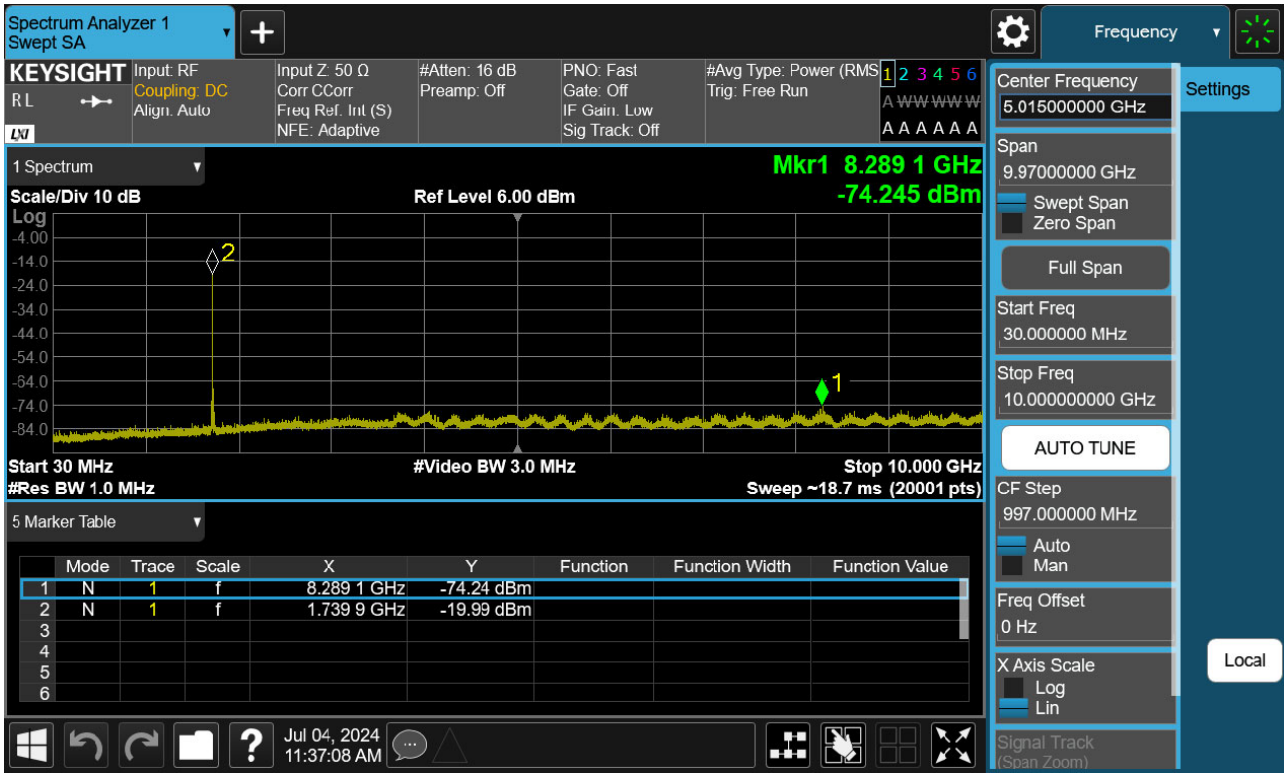
PCC 20MHz Ch132072 RB100 Offset0 SCC 20MHz Ch132270 RB100 Offset0



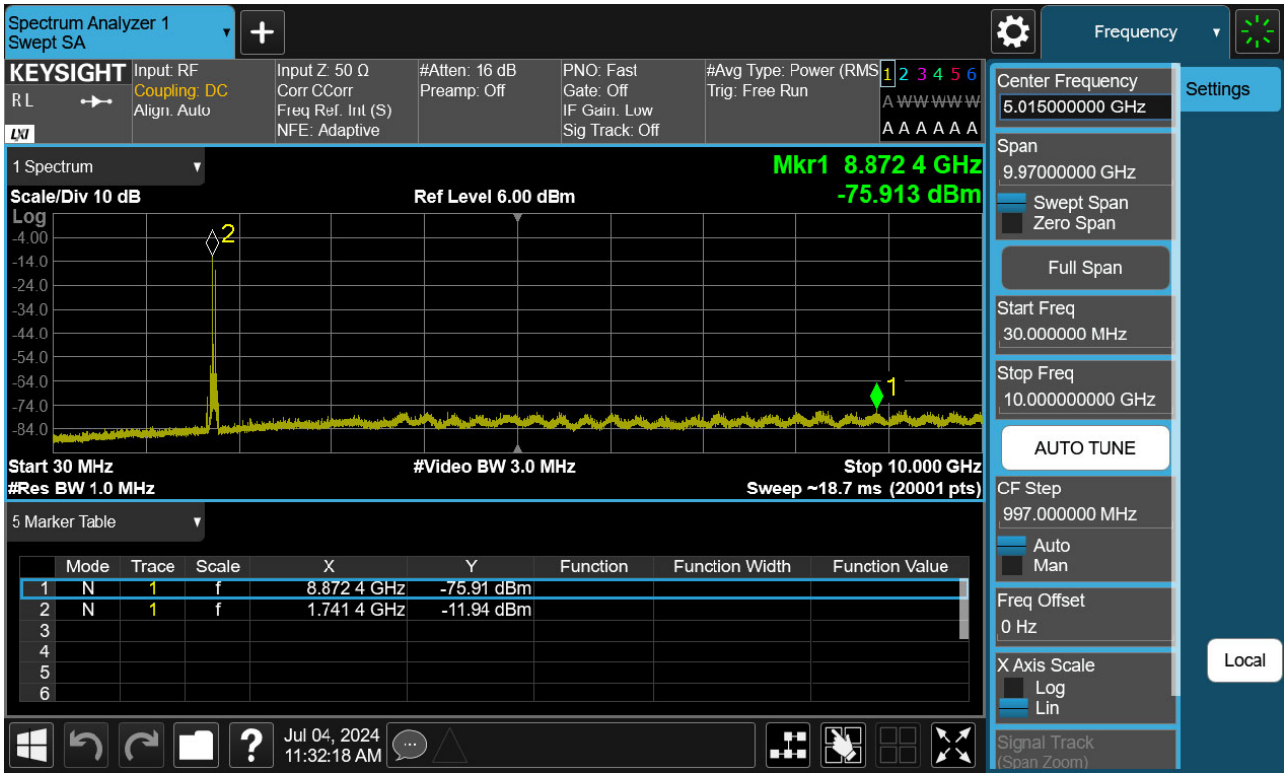
PCC 20MHz Ch132323 RB100 Offset0 SCC 20MHz Ch132521 RB100 Offset0



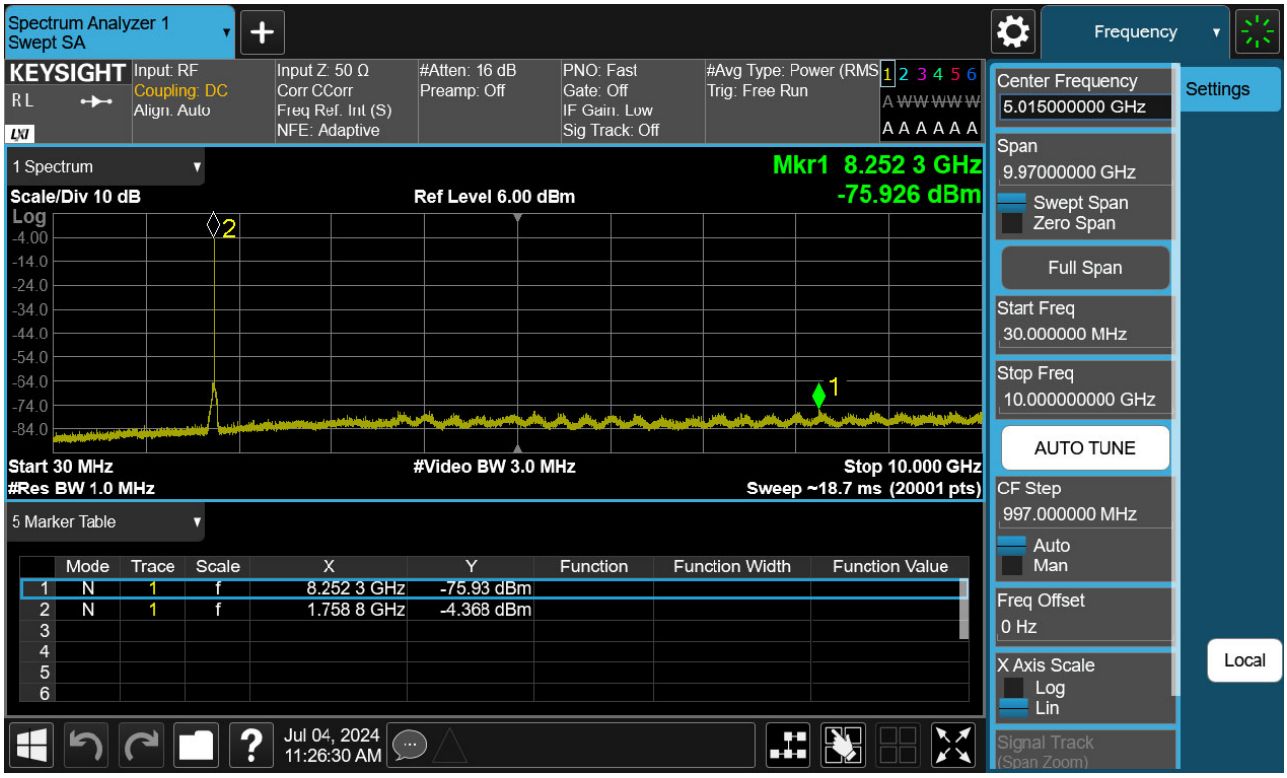
PCC 20MHz Ch132348 RB100 Offset0 SCC 15MHz Ch132519 RB75 Offset0



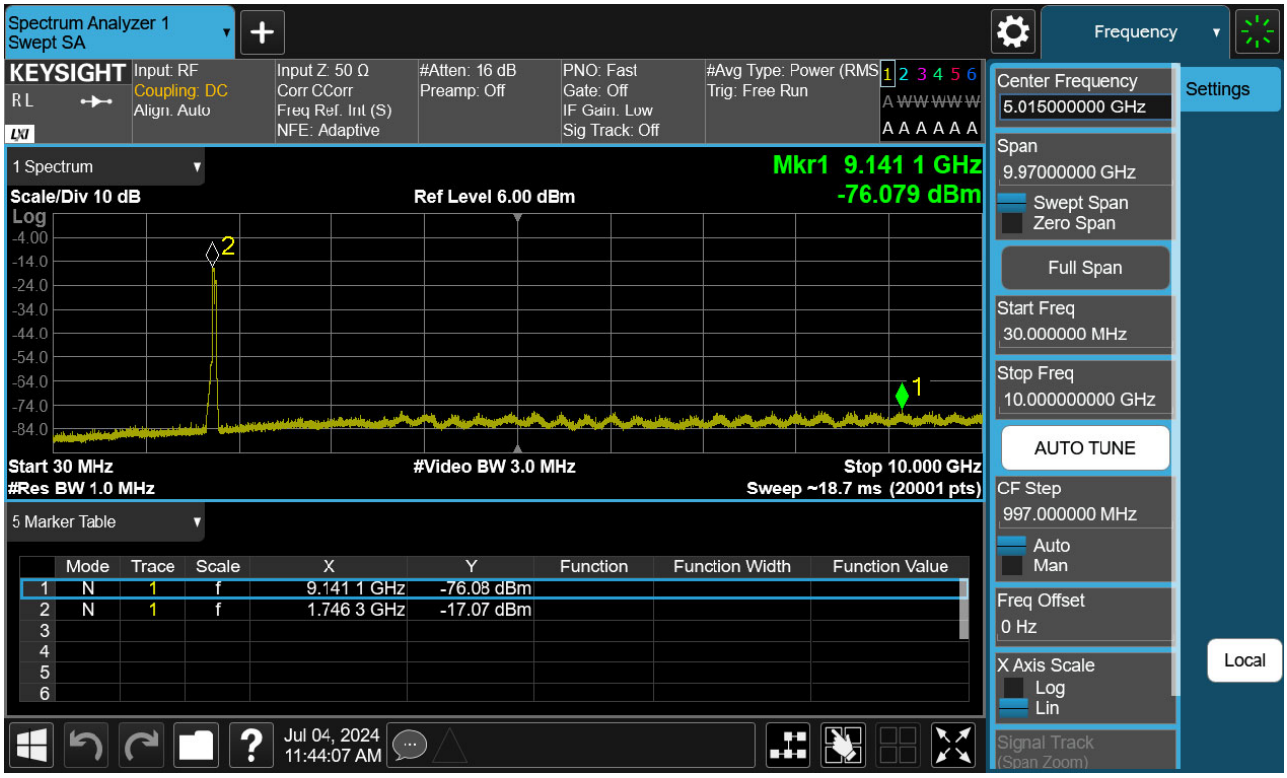
PCC 20MHz Ch132373 RB1 Offset0 SCC 10MHz Ch132517 RB1 Offset49



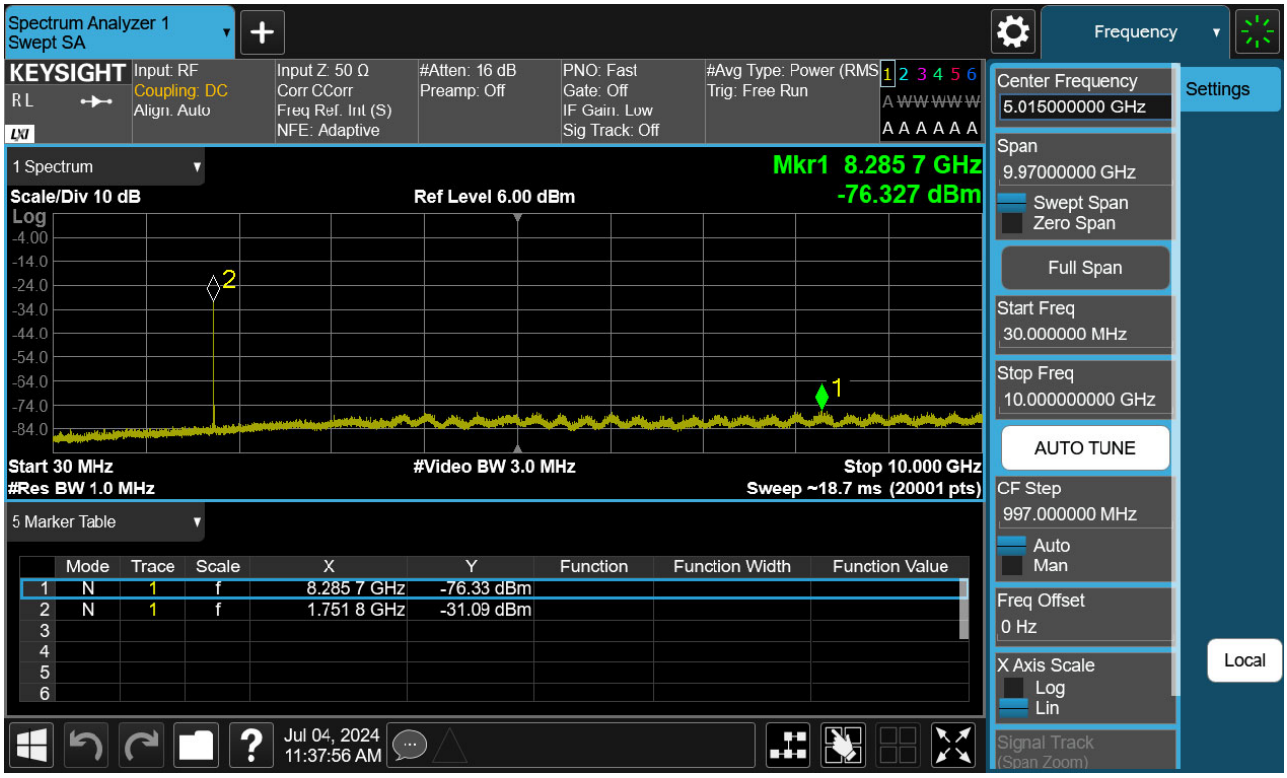
PCC 10 MHz Ch132328 RB50 Offset0 SCC 20 MHz Ch132472 RB100 Offset0



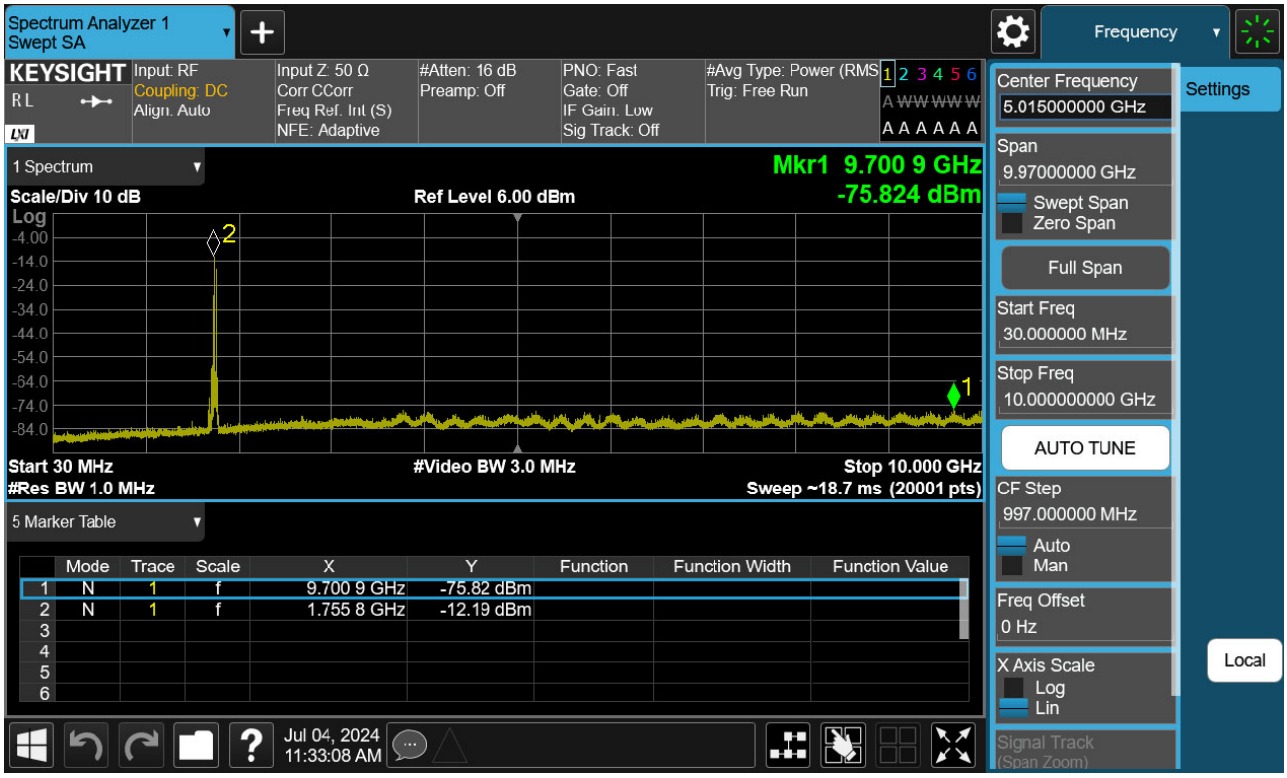
PCC 5 MHz Ch132455 RB25 Offset0 SCC 20 MHz Ch132572 RB100 Offset0



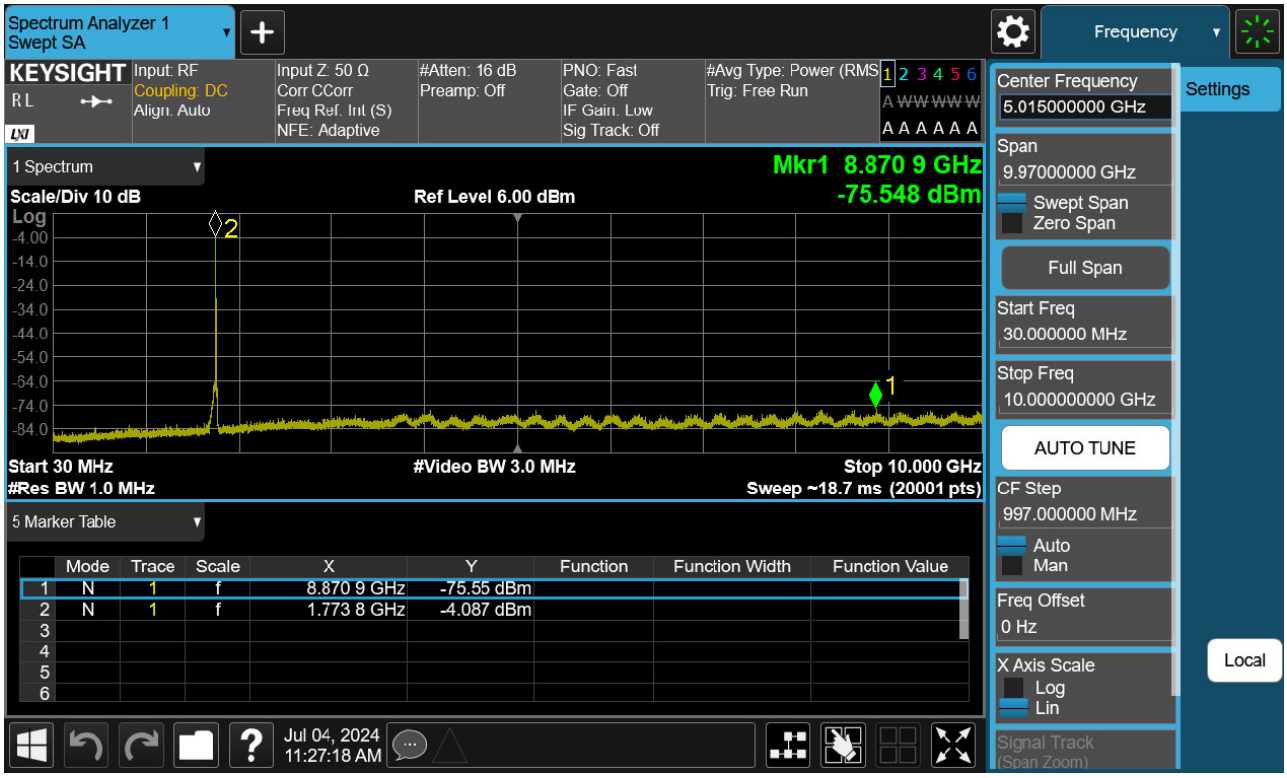
PCC 20 MHz Ch132323 RB100 Offset0 SCC 20 MHz Ch132521 RB100 Offset0



PCC 20 MHz Ch132374 RB100 Offset0 SCC 20 MHz Ch132572 RB100 Offset0

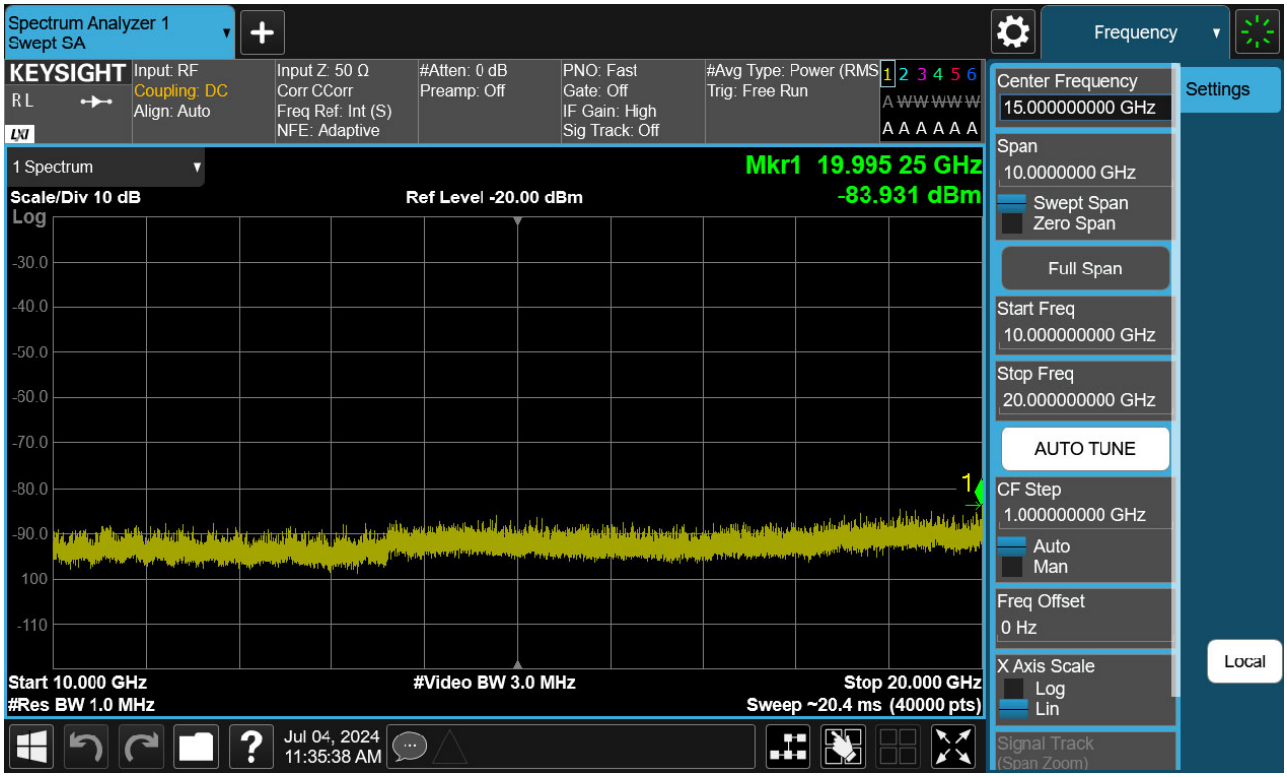


PCC 20 MHz Ch132374 RB100 Offset0 SCC 20 MHz Ch132572 RB100 Offset0

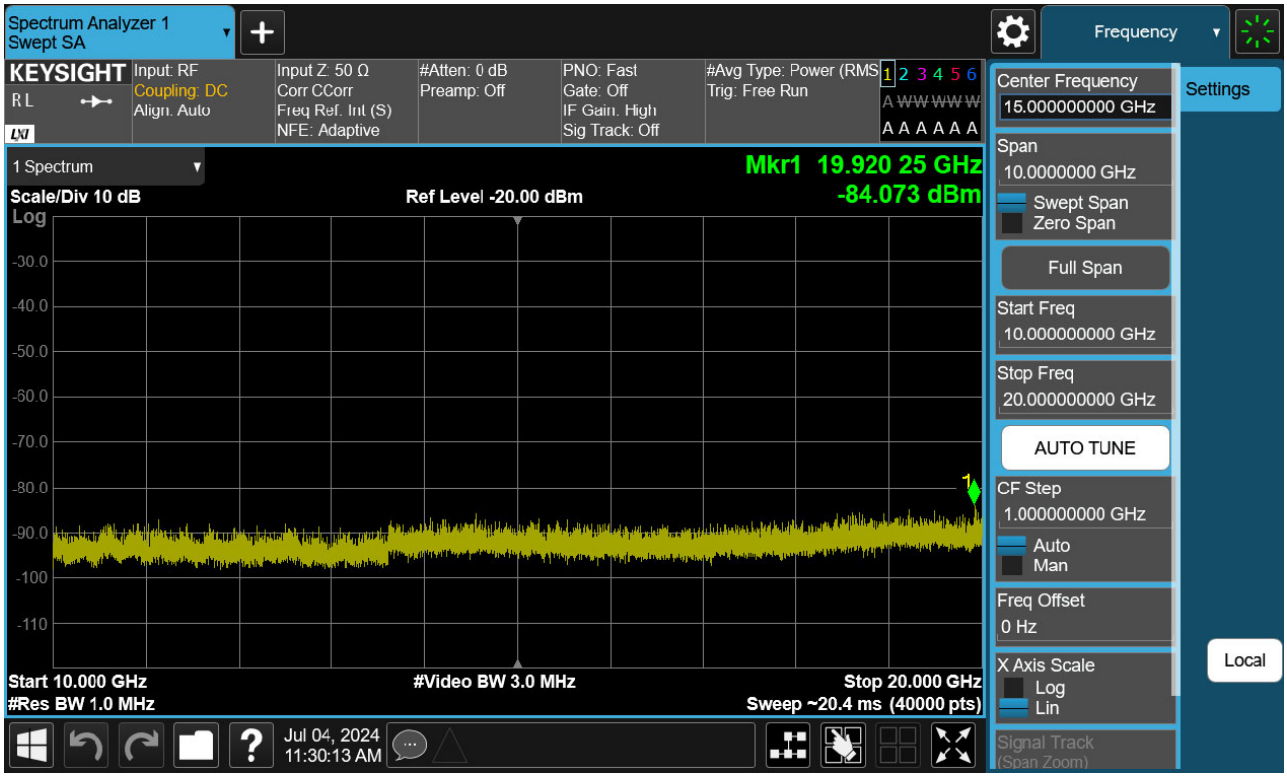


Frequency Range : 10 GHz ~ 26.5GHz

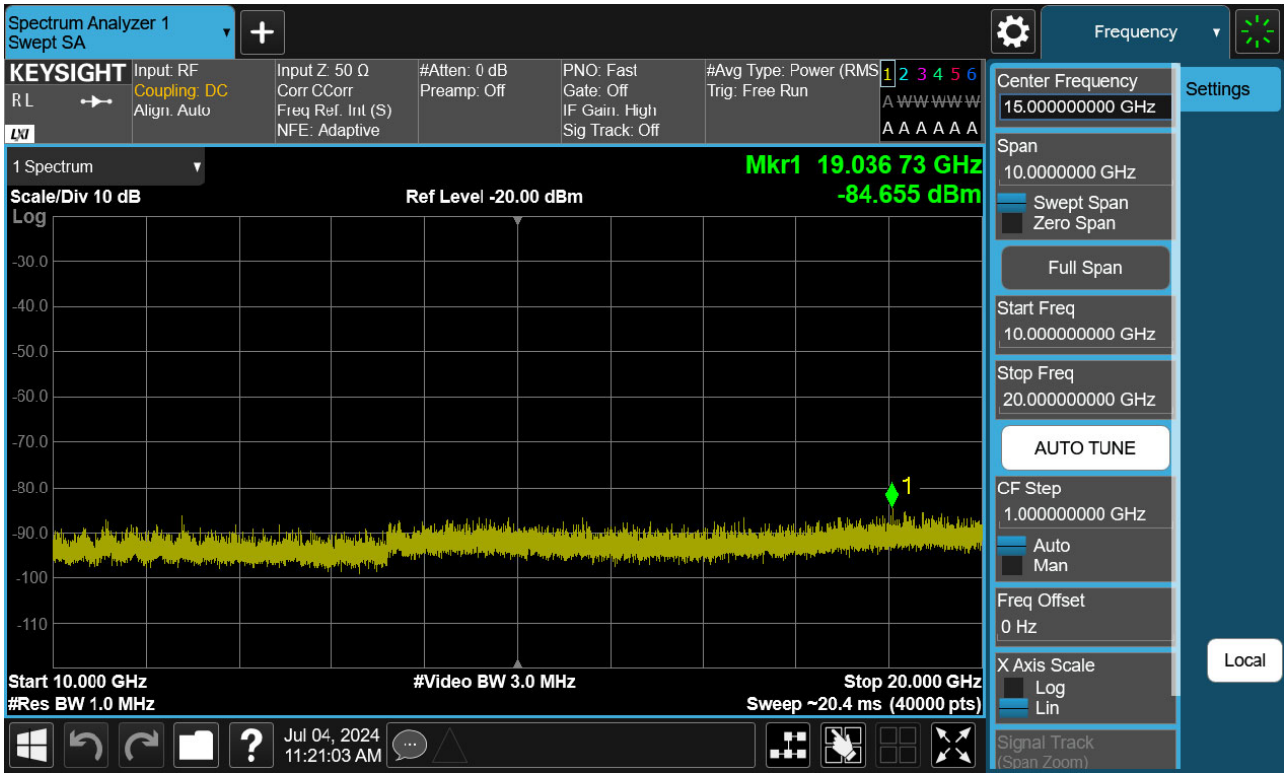
PCC 20 MHz Ch132072 RB1 Offset99, SCC 15 MHz Ch132243 RB1 Offset0



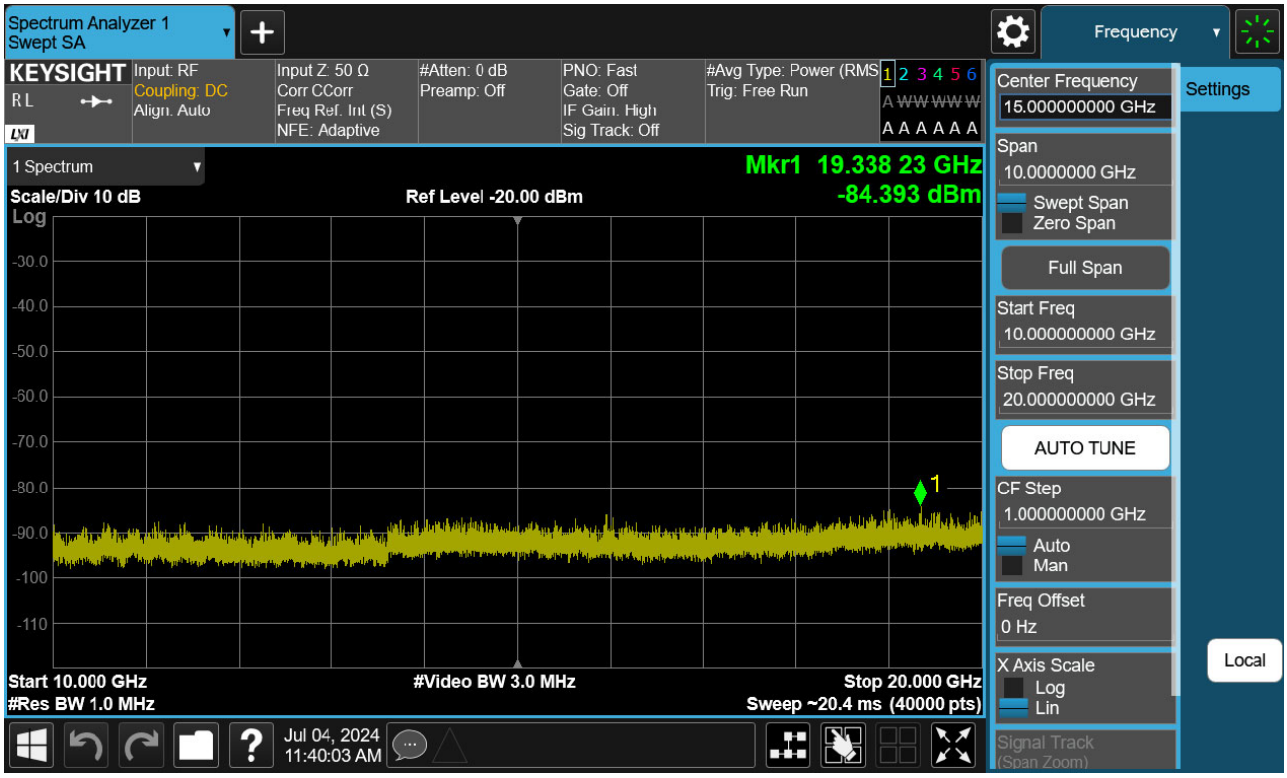
PCC 5 MHz Ch132330 RB1 Offset24, SCC 20 MHz Ch132447 RB1 Offset0



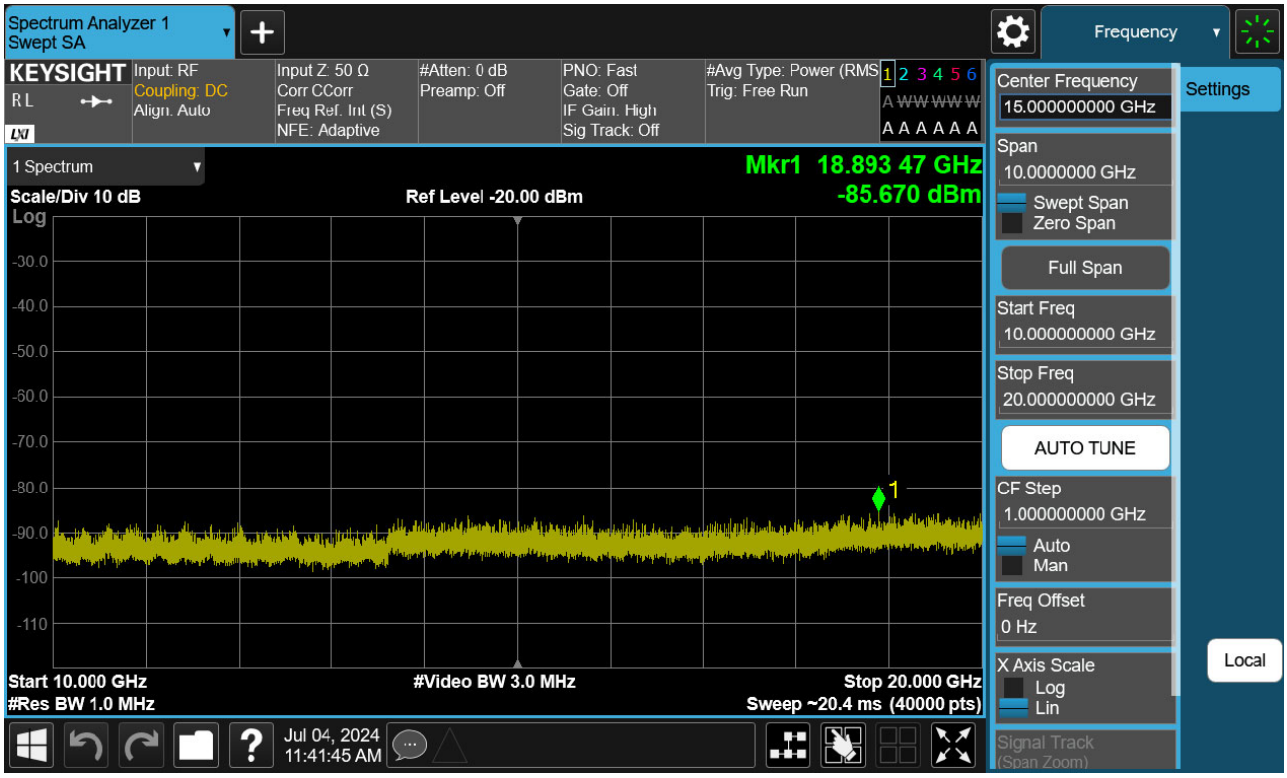
PCC 5 MHz Ch132455 RB1 Offset24, SCC 20 MHz Ch132572 RB1 Offset0



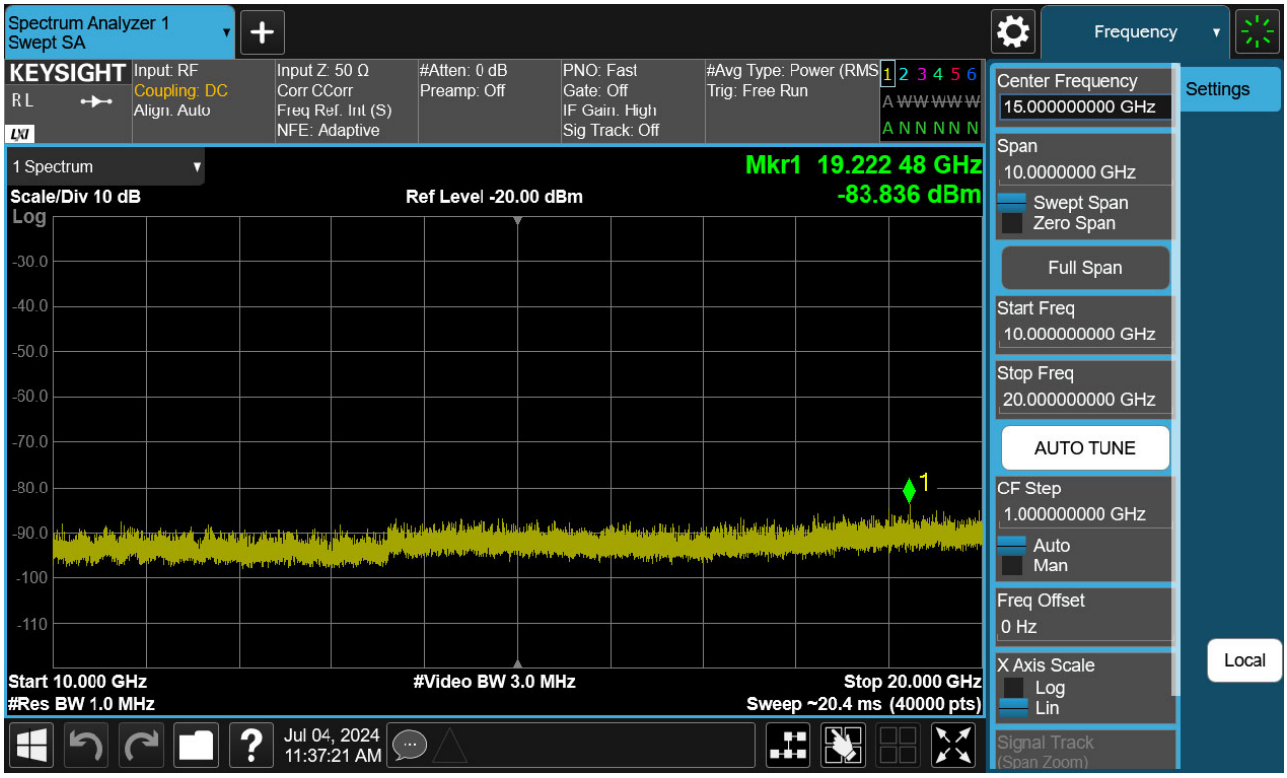
PCC 20 MHz Ch132072 RB1 Offset0, SCC 15 MHz Ch132243 RB1 Offset74



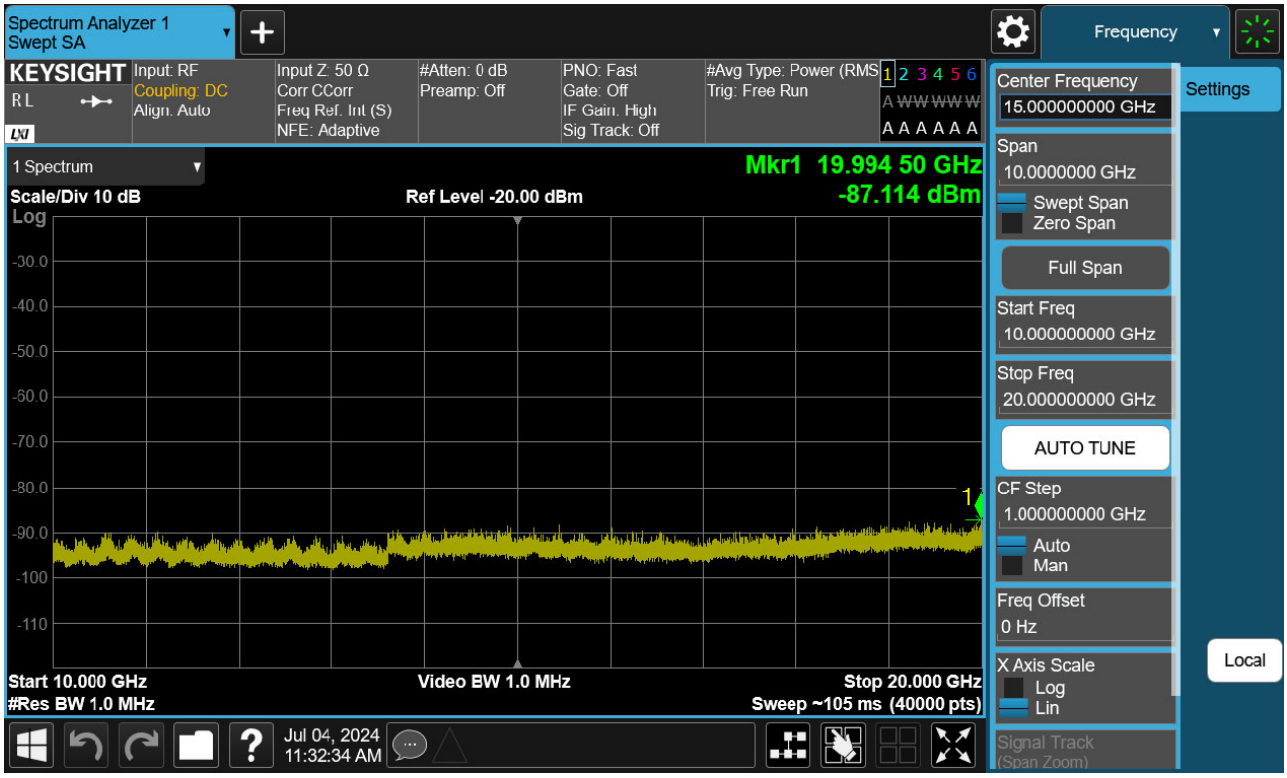
PCC 5 MHz Ch132330 RB1 Offset0, SCC 20 MHz Ch132447 RB1 Offset99



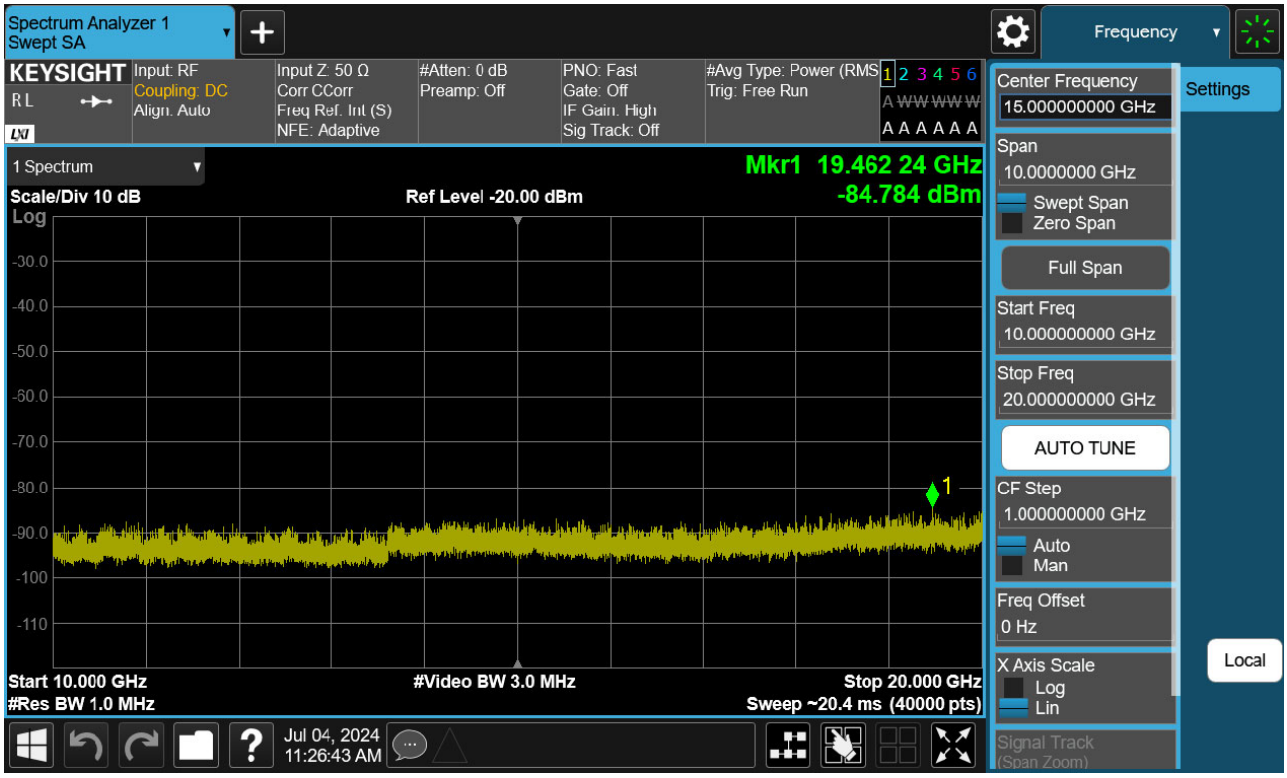
PCC 5 MHz Ch132455 RB1 Offset0, SCC 20 MHz Ch132572 RB1 Offset99



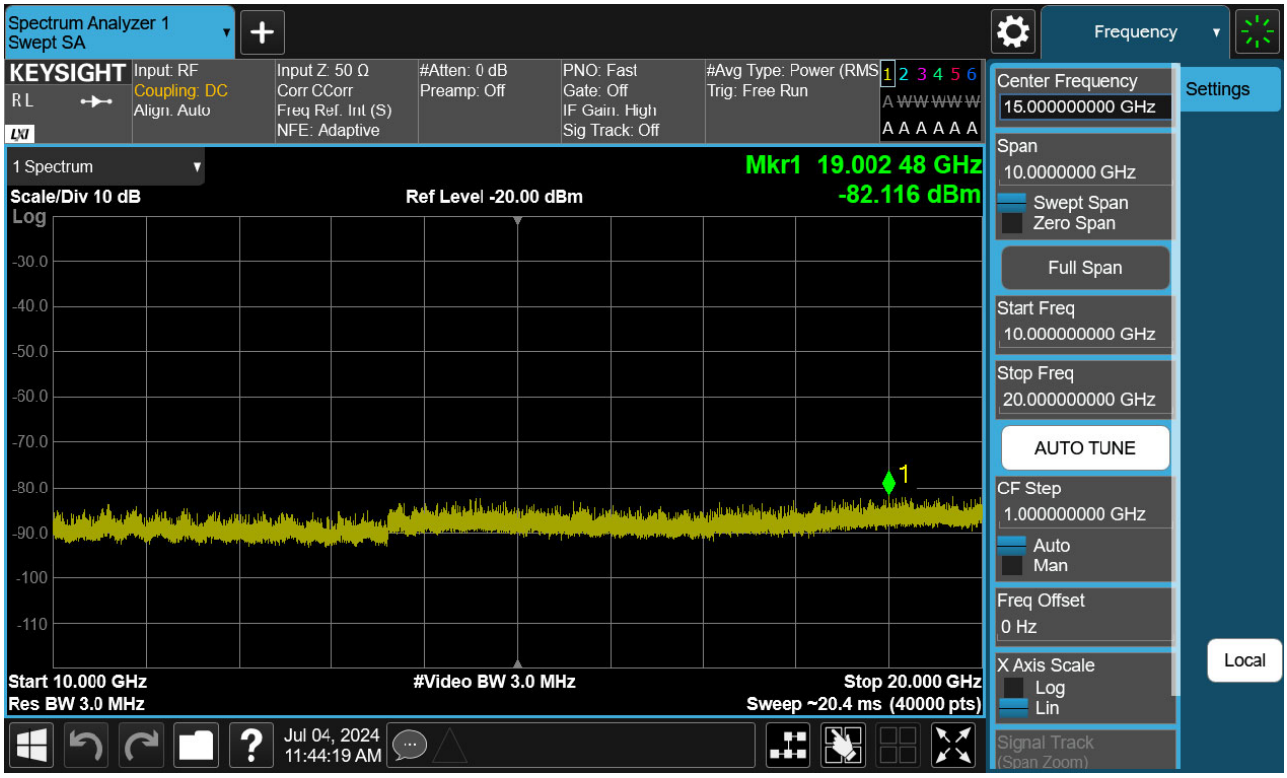
PCC 20 MHz Ch132072 RB100 Offset0, SCC 20 MHz Ch132270 RB100 Offset0



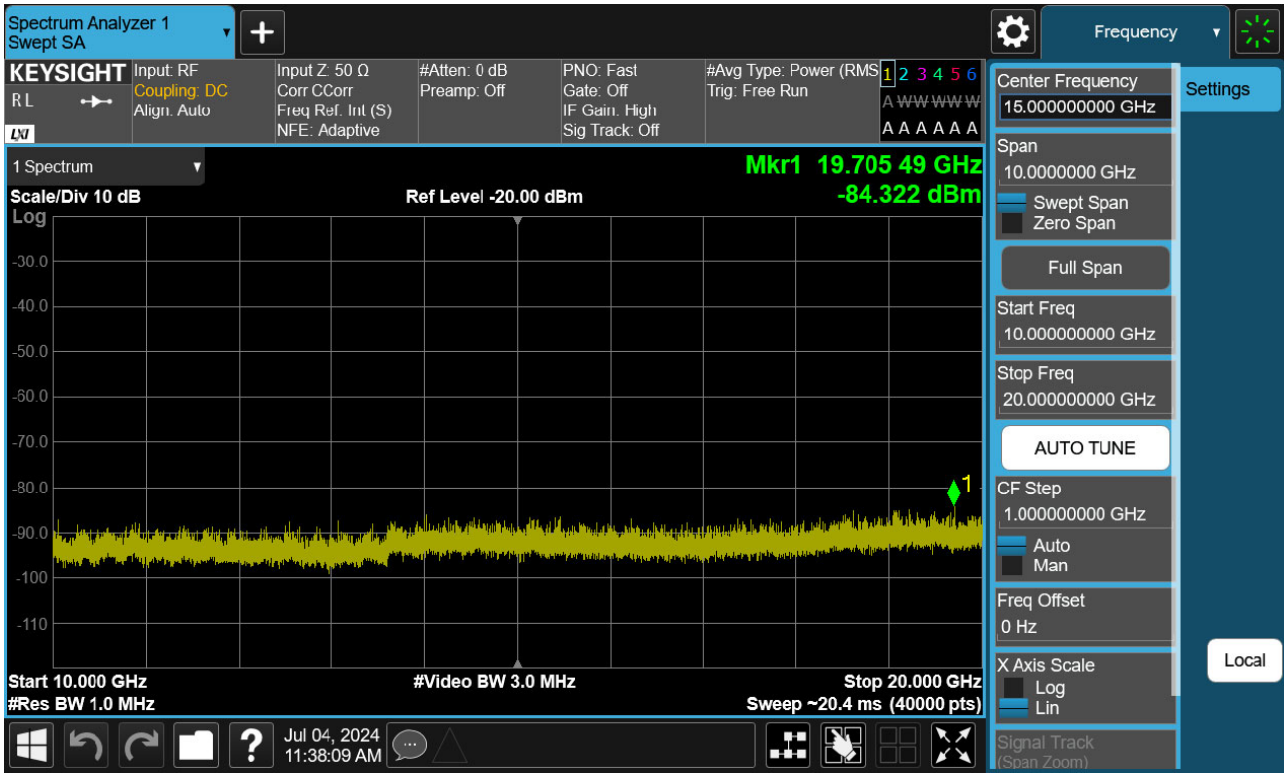
PCC 10 MHz Ch132328 RB50 Offset0, SCC 20 MHz Ch132472 RB100 Offset0



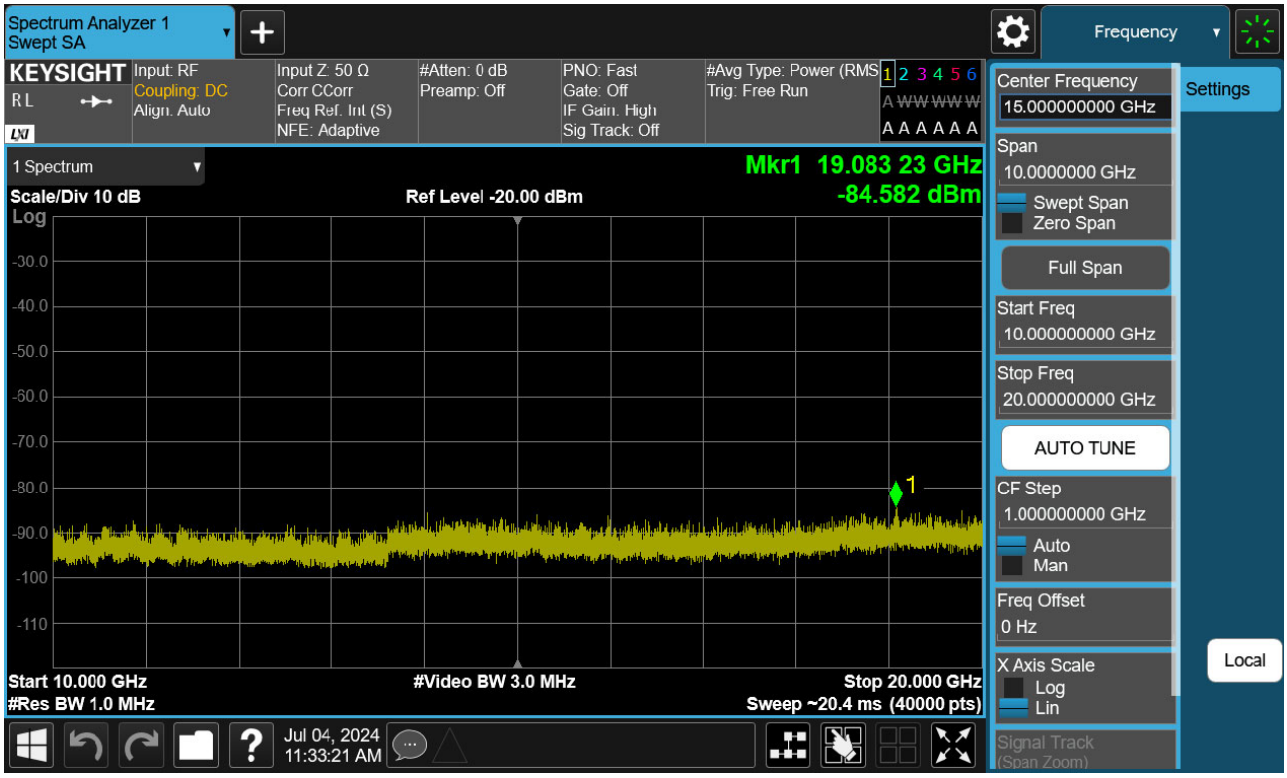
PCC 5 MHz Ch132455 RB25 Offset0, SCC 20 MHz Ch132572 RB100 Offset0



PCC 20 MHz Ch132323 RB100 Offset0, SCC 20 MHz Ch132521 RB100 Offset0



PCC 20 MHz Ch132374 RB100 Offset0, SCC 20 MHz Ch132572 RB100 Offset0



PCC 20 MHz Ch132374 RB100 Offset0, SCC 20 MHz Ch132572 RB100 Offset0