TEST REPORT

FCC CA_41C Test for SM-S721U
Certification

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2407-FC043

DATE OF ISSUE
July 23, 2024

Tested by
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TEST REPORT

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HCT-RF-2407-FC043

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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 16, 2024 ~ July 19, 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).

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:	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:	2499.3 - 2680.0: 5 MHz+20 MHz 2501.3 - 2682.5: 10 MHz+15 MHz 2501.5 - 2680.0: 10 MHz+20 MHz 2503.5 - 2684.7: 15 MHz+10 MHz 2503.5 - 2682.5: 15 MHz+15 MHz 2503.8 - 2680.0: 15 MHz+20 MHz 2506.0 - 2686.7: 20 MHz+5 MHz 2506.0 - 2684.5: 20 MHz+10 MHz 2506.0 - 2682.2: 20 MHz+15 MHz 2506.0 - 2680.0: 20 MHz+20 MHz
Date(s) of Tests:	May 16, 2024 ~ July 19, 2024
Serial number:	Radiated : 67d50971e8197ece (ANT B, F) Conducted : R3CX506LPYM (ANT B, F)
LTE CA :	CA 41C (Uplink)

1.1. MAXIMUM OUTPUT POWER

Main 2 Ant (Antenna B)

Mode (PCC+SCC)	Tx Frequency (MHz)	Modulation	Emission Designator	EIRP	
				Max. Power (dBm)	Max. Power (W)
5 MHz + 20 MHz (PC2)	2499.3 - 2680.0	QPSK	22M9G7D	21.31	0.135
		16QAM	22M7W7D	21.36	0.137
		64QAM	22M9W7D	21.20	0.132
		256QAM	22M9W7D	21.07	0.128
10 MHz + 15 MHz (PC2)	2501.3 - 2682.5	QPSK	23M2G7D	24.84	0.305
		16QAM	23M2W7D	24.95	0.313
		64QAM	23M1W7D	24.77	0.300
		256QAM	23M1W7D	24.67	0.293
10 MHz + 20 MHz (PC2)	2501.5 - 2680.0	QPSK	27M8G7D	24.95	0.313
		16QAM	27M8W7D	25.01	0.317
		64QAM	27M8W7D	24.86	0.306
		256QAM	27M7W7D	24.77	0.300
15 MHz + 10 MHz (PC2)	2503.5 - 2684.7	QPSK	23M2G7D	24.54	0.285
		16QAM	23M2W7D	24.72	0.297
		64QAM	23M2W7D	24.51	0.283
		256QAM	23M2W7D	24.43	0.278
15 MHz + 15 MHz (PC2)	2503.5 - 2682.5	QPSK	28M4G7D	24.52	0.283
		16QAM	28M4W7D	24.70	0.295
		64QAM	28M4W7D	24.59	0.288
		256QAM	28M3W7D	24.41	0.276
15 MHz + 20 MHz (PC2)	2503.8 - 2680.0	QPSK	32M7G7D	24.57	0.287
		16QAM	32M7W7D	24.70	0.295
		64QAM	32M6W7D	24.54	0.285
		256QAM	32M7W7D	24.44	0.278
20 MHz + 5 MHz (PC2)	2506.0 - 2686.7	QPSK	23M1G7D	21.56	0.143
		16QAM	23M0W7D	21.59	0.144
		64QAM	22M9W7D	21.45	0.140
		256QAM	22M9W7D	21.32	0.136
20 MHz + 10 MHz (PC2)	2506.0 - 2684.5	QPSK	27M9G7D	24.84	0.305
		16QAM	27M9W7D	25.04	0.319
		64QAM	27M8W7D	24.87	0.307
		256QAM	27M8W7D	24.81	0.303
20 MHz + 15 MHz (PC2)	2506.0 - 2682.2	QPSK	32M7G7D	24.88	0.307
		16QAM	32M7W7D	25.05	0.320
		64QAM	32M6W7D	24.95	0.312
		256QAM	32M7W7D	24.80	0.302
20 MHz + 20 MHz (PC2)	2506.0 - 2680.0	QPSK	37M7G7D	24.96	0.313
		16QAM	37M7W7D	25.07	0.321
		64QAM	37M6W7D	24.93	0.311
		256QAM	37M7W7D	24.80	0.302

Sub 5 Ant (Antenna F)

Mode (PCC+SCC)	Tx Frequency (MHz)	Modulation	Emission Designator	EIRP	
				Max. Power (dBm)	Max. Power (W)
5 MHz + 20 MHz (PC2)	2499.3 - 2680.0	QPSK	23M0G7D	18.40	0.069
		16QAM	23M0W7D	17.95	0.062
		64QAM	22M9W7D	17.92	0.062
		256QAM	23M0W7D	17.81	0.060
10 MHz + 15 MHz (PC2)	2501.3 - 2682.5	QPSK	23M3G7D	21.20	0.132
		16QAM	23M2W7D	21.27	0.134
		64QAM	23M2W7D	21.14	0.130
		256QAM	23M2W7D	21.07	0.128
10 MHz + 20 MHz (PC2)	2501.5 - 2680.0	QPSK	27M9G7D	21.28	0.134
		16QAM	27M9W7D	21.27	0.134
		64QAM	27M8W7D	21.10	0.129
		256QAM	27M8W7D	21.04	0.127
15 MHz + 10 MHz (PC2)	2503.5 - 2684.7	QPSK	23M2G7D	21.37	0.137
		16QAM	23M2W7D	21.40	0.138
		64QAM	23M2W7D	21.32	0.135
		256QAM	23M2W7D	21.17	0.131
15 MHz + 15 MHz (PC2)	2503.5 - 2682.5	QPSK	28M5G7D	21.55	0.143
		16QAM	28M4W7D	21.61	0.145
		64QAM	28M5W7D	21.50	0.141
		256QAM	28M4W7D	21.42	0.139
15 MHz + 20 MHz (PC2)	2503.8 - 2680.0	QPSK	69M4G7D	21.12	0.129
		16QAM	32M7W7D	21.13	0.130
		64QAM	32M7W7D	21.02	0.126
		256QAM	32M7W7D	21.00	0.126
20 MHz + 5 MHz (PC2)	2506.0 - 2686.7	QPSK	23M0G7D	18.32	0.068
		16QAM	22M9W7D	17.95	0.062
		64QAM	23M0W7D	17.90	0.062
		256QAM	23M0W7D	17.81	0.060
20 MHz + 10 MHz (PC2)	2506.0 - 2684.5	QPSK	27M8G7D	21.46	0.140
		16QAM	27M8W7D	21.53	0.142
		64QAM	27M8W7D	21.42	0.139
		256QAM	27M8W7D	21.40	0.138
20 MHz + 15 MHz (PC2)	2506.0 - 2682.2	QPSK	32M8G7D	21.38	0.137
		16QAM	32M7W7D	21.49	0.141
		64QAM	32M7W7D	21.36	0.137
		256QAM	32M7W7D	21.23	0.133
20 MHz + 20 MHz (PC2)	2506.0 - 2680.0	QPSK	37M7G7D	21.67	0.147
		16QAM	37M6W7D	21.76	0.150
		64QAM	37M6W7D	21.49	0.141
		256QAM	37M6W7D	21.42	0.139

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
Channel 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;

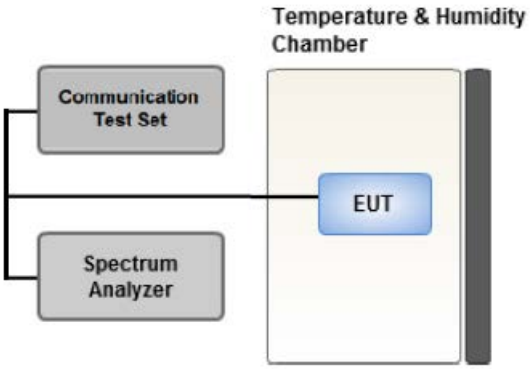
$$\text{Result}_{(dBm)} = \text{Pg}_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dBi)}$$

   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)

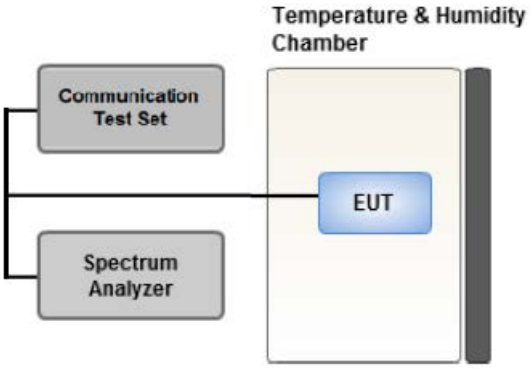
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW ≥ 3 × RBW.

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.



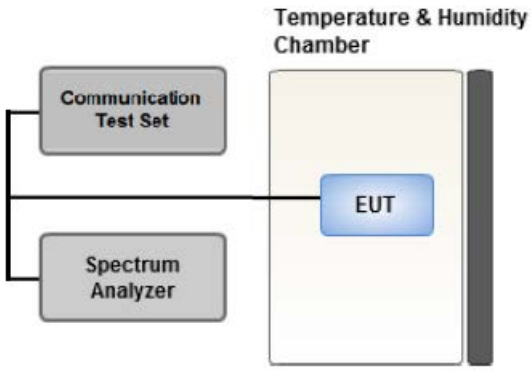
Test setup

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.

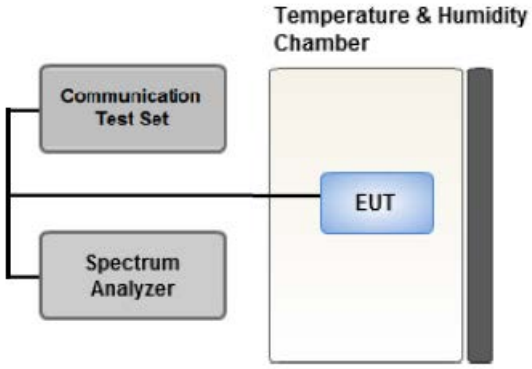
All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

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

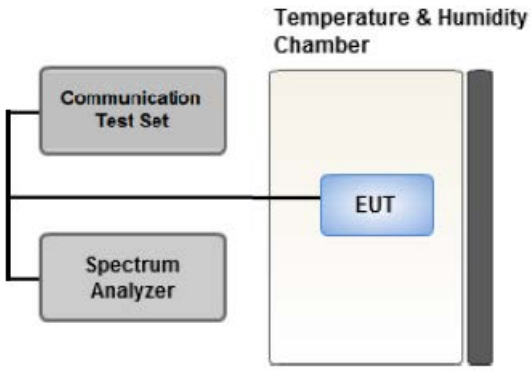
1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW > 1 % of the emission bandwidth
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW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

Test Notes

1. The attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge,
2. 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge.
3. 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge.
4. The attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz.
5. 55 + 10 log (P) dB at or below 2490.5 MHz.
6. X is the greater of 6 MHz or the actual emission bandwidth
7. 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(m)(4)	■ < 40 + 10log10 (P[Watts]) at Channel edges ■ < 43 + 10log10 (P[Watts]) between 5 and X MHz from Channel edges ■ < 55 + 10log10 (P[Watts]) beyond X MHz beyond from Channel edges ■ < 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz	PASS
Conducted Output Power	§ 2.1046	N/A	See Note1
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(h)(2)	< 2 Watts max. EIRP	PASS
Radiated Spurious and Harmonic Emissions	§ 2.1053, § 27.53(m)(4)	< 55 + 10log10 (P[Watts])	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 2 Ant) (ANT B)

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)
5	20	25
10	15	25
10	20	30
15	10	25
15	15	30
15	20	35
20	5	25
20	10	30
20	15	35
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, Channel 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_PC2]

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/ Channel Edge	QPSK	Low	20	2506.0	39750	1	99	20	2525.8	39948	1	0
	QPSK	Mid	20	2585.6	40546	1	99	15	2602.7	40717	1	0
	QPSK	High	5	2668.3	41373	1	24	20	2680.0	41490	1	0
	QPSK	Low	20	2506.0	39750	1	0	20	2525.8	39948	1	99
	QPSK	Mid	20	2585.6	40546	1	0	15	2602.7	40717	1	74
	QPSK	High	5	2668.3	41373	1	0	20	2680.0	41490	1	99
	16QAM	Low	20	2506.0	39750	100	0	20	2525.8	39948	100	0
	QPSK	Mid	20	2583.1	40521	100	0	20	2602.9	40719	100	0
	QPSK	High	20	2660.2	41292	100	0	20	2680.0	41490	100	0
Radiated Spurious Emissions	QPSK	Low	20	2506.0	39750	1	99	20	2525.8	39948	1	0
	QPSK	Mid	20	2583.1	40521	1	99	20	2602.9	40719	1	0
	QPSK	High	10	2670.5	41395	1	49	15	2682.5	41515	1	0

[Worst case_PC2]

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	5	2583.8	40528	25	0	20	2595.5	40645	100	0
			10	2585.9	40549	50	0	15	2597.9	40669	75	0
			10	2583.6	40526	50	0	20	2598.0	40670	100	0
			15	2588.1	40571	75	0	10	2600.1	40691	50	0
			15	2585.5	40545	75	0	15	2600.5	40695	75	0
			15	2583.3	40523	75	0	20	2600.4	40694	100	0
			20	2590.5	40595	100	0	5	2602.2	40712	25	0
			20	2588.1	40571	100	0	10	2602.5	40715	50	0
			20	2585.6	40546	100	0	15	2602.7	40717	75	0
			20	2583.1	40521	100	0	20	2602.9	40719	100	0
Frequency stability	QPSK	Low	5	2499.3	39683	25	0	20	2511.0	39800	100	0
			10	2501.5	39705	50	0	20	2515.9	39849	100	0
			15	2503.8	39728	75	0	20	2520.9	39899	100	0
			20	2506.0	39750	100	0	20	2525.8	39948	100	0
		High	5	2668.3	41373	25	0	20	2680.0	41490	100	0
			10	2665.6	41346	50	0	20	2680.0	41490	100	0
			15	2662.9	41319	75	0	20	2680.0	41490	100	0
			20	2660.2	41292	100	0	20	2680.0	41490	100	0

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	5	2499.3	39683	1	24	20	2511.0	39800	1	0	25.83
	10	2501.3	39703	1	49	15	2513.3	39823	1	0	25.89
	10	2501.5	39705	1	49	20	2515.9	39849	1	0	25.86
	15	2503.5	39725	1	74	10	2515.5	39845	1	0	25.90
	15	2503.5	39725	1	74	15	2518.5	39875	1	0	25.95
	15	2503.8	39728	1	74	20	2520.9	39899	1	0	26.01
	20	2506.0	39750	1	99	5	2517.7	39867	1	0	25.98
	20	2506.0	39750	1	99	10	2520.4	39894	1	0	26.02
	20	2506.0	39750	1	99	15	2523.1	39921	1	0	25.98
	20	***2506.0***	***39750***	***1***	***99***	***20***	***2525.8***	***39948***	***1***	***0***	***26.03***
Mid	5	2583.8	40528	1	24	20	2595.5	40645	1	0	25.62
	10	2585.9	40549	1	49	15	2597.9	40669	1	0	25.63
	10	2583.6	40526	1	49	20	2598.0	40670	1	0	25.67
	15	2588.1	40571	1	74	10	2600.1	40691	1	0	25.67
	15	2585.5	40545	1	74	15	2600.5	40695	1	0	25.69
	15	2583.3	40523	1	74	20	2600.4	40694	1	0	25.62
	20	2590.5	40595	1	99	5	2602.2	40712	1	0	25.61
	20	2588.1	40571	1	99	10	2602.5	40715	1	0	25.65
	20	***2585.6***	***40546***	***1***	***99***	***15***	***2602.7***	***40717***	***1***	***0***	***25.71***
	20	2583.1	40521	1	99	20	2602.9	40719	1	0	25.65
High	***5***	***2668.3***	***41373***	***1***	***24***	***20***	***2680.0***	***41490***	***1***	***0***	***26.01***
	10	2670.5	41395	1	49	15	2682.5	41515	1	0	25.92
	10	2665.6	41346	1	49	20	2680.0	41490	1	0	25.89
	15	2672.7	41417	1	74	10	2684.7	41537	1	0	25.91
	15	2667.5	41365	1	74	15	2682.5	41515	1	0	25.97
	15	2662.9	41319	1	74	20	2680.0	41490	1	0	25.91
	20	2675.0	41440	1	99	5	2686.7	41557	1	0	25.86
	20	2670.1	41391	1	99	10	2684.5	41535	1	0	25.92
	20	2665.1	41341	1	99	15	2682.2	41512	1	0	25.90
	20	2660.2	41292	1	99	20	2680.0	41490	1	0	25.89

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	5	2499.3	39683	25	0	20	2511.0	39800	100	0	23.98
	10	2501.3	39703	50	0	15	2513.3	39823	75	0	24.05
	10	2501.5	39705	50	0	20	2515.9	39849	100	0	23.84
	15	2503.5	39725	75	0	10	2515.5	39845	50	0	24.02
	15	2503.5	39725	75	0	15	2518.5	39875	75	0	24.06
	15	2503.8	39728	75	0	20	2520.9	39899	100	0	24.02
	20	2506.0	39750	100	0	5	2517.7	39867	25	0	23.98
	20	2506.0	39750	100	0	10	2520.4	39894	50	0	23.98
	20	2506.0	39750	100	0	15	2523.1	39921	75	0	23.95
	20	***2506.0***	***39750***	***100***	***0***	***20***	***2525.8***	***39948***	***100***	***0***	***24.07***
Mid	5	2583.8	40528	25	0	20	2595.5	40645	100	0	23.70
	10	2585.9	40549	50	0	15	2597.9	40669	75	0	23.66
	10	2583.6	40526	50	0	20	2598.0	40670	100	0	23.66
	15	2588.1	40571	75	0	10	2600.1	40691	50	0	23.69
	15	2585.5	40545	75	0	15	2600.5	40695	75	0	23.70
	15	2583.3	40523	75	0	20	2600.4	40694	100	0	23.68
	20	2590.5	40595	100	0	5	2602.2	40712	25	0	23.66
	20	2588.1	40571	100	0	10	2602.5	40715	50	0	23.60
	20	2585.6	40546	100	0	15	2602.7	40717	75	0	23.68
	20	***2583.1***	***40521***	***100***	***0***	***20***	***2602.9***	***40719***	***100***	***0***	***23.71***
High	5	2668.3	41373	25	0	20	2680.0	41490	100	0	23.94
	10	2670.5	41395	50	0	15	2682.5	41515	75	0	23.95
	10	2665.6	41346	50	0	20	2680.0	41490	100	0	23.91
	15	2672.7	41417	75	0	10	2684.7	41537	50	0	23.91
	15	2667.5	41365	75	0	15	2682.5	41515	75	0	24.05
	15	2662.9	41319	75	0	20	2680.0	41490	100	0	23.92
	20	2675.0	41440	100	0	5	2686.7	41557	25	0	23.96
	20	2670.1	41391	100	0	10	2684.5	41535	50	0	24.05
	20	2665.1	41341	100	0	15	2682.2	41512	75	0	23.94
	20	***2660.2***	***41292***	***100***	***0***	***20***	***2680.0***	***41490***	***100***	***0***	***24.06***

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	20	2506.0	39750	1	99	20	2525.8	39948	1	0	24.44
Mid	20	2585.6	40546	1	99	15	2602.7	40717	1	0	24.11
High	5	2668.3	41373	1	24	20	2680.0	41490	1	0	24.31
Low	20	2506.0	39750	100	0	20	2525.8	39948	100	0	23.00
Mid	20	2583.1	40521	100	0	20	2602.9	40719	100	0	22.67
High	20	2660.2	41292	100	0	20	2680.0	41490	100	0	22.99

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	20	2506.0	39750	1	99	20	2525.8	39948	1	0	23.03
Mid	20	2585.6	40546	1	99	15	2602.7	40717	1	0	22.74
High	5	2668.3	41373	1	24	20	2680.0	41490	1	0	22.95
Low	20	2506.0	39750	100	0	20	2525.8	39948	100	0	23.02
Mid	20	2583.1	40521	100	0	20	2602.9	40719	100	0	22.71
High	20	2660.2	41292	100	0	20	2680.0	41490	100	0	22.94

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	20	2506.0	39750	1	99	20	2525.8	39948	1	0	21.70
Mid	20	2585.6	40546	1	99	15	2602.7	40717	1	0	21.53
High	5	2668.3	41373	1	24	20	2680.0	41490	1	0	21.65
Low	20	2506.0	39750	100	0	20	2525.8	39948	100	0	21.06
Mid	20	2583.1	40521	100	0	20	2602.9	40719	100	0	20.82
High	20	2660.2	41292	100	0	20	2680.0	41490	100	0	20.99

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	5	39683	1/24	20	39800	1/0	-23.53	13.33	10.55	2.57	H	0.135	21.31
	10	39703	1/49	15	39823	1/0	-20.07	16.82	10.59	2.57	H	0.305	24.84
	10	39705	1/49	20	39849	1/0	-19.96	16.93	10.59	2.57	H	0.313	24.95
	15	39725	1/74	10	39845	1/0	-20.37	16.52	10.59	2.57	H	0.285	24.54
	15	39725	1/74	15	39875	1/0	-20.45	16.44	10.59	2.57	H	0.279	24.46
	15	39728	1/74	20	39899	1/0	-20.34	16.55	10.59	2.57	H	0.287	24.57
	20	39750	1/99	5	39867	1/0	-23.35	13.54	10.59	2.57	H	0.143	21.56
	20	39750	1/99	10	39894	1/0	-20.07	16.82	10.59	2.57	H	0.305	24.84
	20	39750	1/99	15	39921	1/0	-20.05	16.83	10.64	2.59	H	0.307	24.88
	20	***39750***	***1/99***	***20***	***39948***	***1/0***	***-19.97***	***16.91***	***10.64***	***2.59***	***H***	***0.313***	***24.96***
Mid	5	40528	1/24	20	40645	1/0	-24.35	12.87	10.64	2.71	H	0.120	20.80
	10	40549	1/49	15	40669	1/0	-21.61	15.61	10.64	2.71	H	0.226	23.54
	10	40526	1/49	20	40670	1/0	-21.50	15.72	10.64	2.71	H	0.232	23.65
	15	40571	1/74	10	40691	1/0	-21.25	15.86	10.64	2.68	H	0.241	23.82
	15	40545	1/74	15	40695	1/0	-21.16	16.06	10.64	2.71	H	0.251	23.99
	15	40523	1/74	20	40694	1/0	-21.56	15.66	10.64	2.71	H	0.229	23.59
	20	40595	1/99	5	40712	1/0	-24.24	12.87	10.64	2.68	H	0.121	20.83
	20	40571	1/99	10	40715	1/0	-21.15	15.96	10.64	2.68	H	0.246	23.92
	20	40546	1/99	15	40717	1/0	-21.24	15.87	10.64	2.68	H	0.241	23.83
	20	***40521***	***1/99***	***20***	***40719***	***1/0***	***-21.00***	***16.22***	***10.64***	***2.71***	***H***	***0.260***	***24.15***
High	5	41373	1/24	20	41490	1/0	-24.46	12.96	10.72	2.74	H	0.124	20.94
	10	***41395***	***1/49***	***15***	***41515***	***1/0***	***-20.74***	***16.68***	***10.72***	***2.74***	***H***	***0.292***	***24.66***
	10	41346	1/49	20	41490	1/0	-21.07	16.35	10.72	2.74	H	0.271	24.33
	15	41417	1/74	10	41537	1/0	-20.91	16.52	10.72	2.75	H	0.281	24.49
	15	41365	1/74	15	41515	1/0	-20.88	16.54	10.72	2.74	H	0.283	24.52
	15	41319	1/74	20	41490	1/0	-21.00	16.42	10.71	2.73	H	0.275	24.40
	20	41440	1/99	5	41557	1/0	-24.13	13.30	10.72	2.75	H	0.134	21.27
	20	41391	1/99	10	41535	1/0	-21.07	16.35	10.72	2.74	H	0.271	24.33
	20	41341	1/99	15	41512	1/0	-20.90	16.52	10.72	2.74	H	0.282	24.50
	20	41292	1/99	20	41490	1/0	-20.98	16.44	10.71	2.73	H	0.277	24.42

Note:

1. Modulation : QPSK

2. Limit : < 2 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
5	39683	1/24	20	39800	1/0	-23.48	13.38	10.55	2.57	H	0.137	21.36
10	39703	1/49	15	39823	1/0	-19.96	16.93	10.59	2.57	H	0.313	24.95
10	39705	1/49	20	39849	1/0	-19.90	16.99	10.59	2.57	H	0.317	25.01
15	39725	1/74	10	39845	1/0	-20.19	16.70	10.59	2.57	H	0.297	24.72
15	39725	1/74	15	39875	1/0	-20.21	16.68	10.59	2.57	H	0.295	24.70
15	39728	1/74	20	39899	1/0	-20.21	16.68	10.59	2.57	H	0.295	24.70
20	39750	1/99	5	39867	1/0	-23.32	13.57	10.59	2.57	H	0.144	21.59
20	39750	1/99	10	39894	1/0	-19.87	17.02	10.59	2.57	H	0.319	25.04
20	39750	1/99	15	39921	1/0	-19.88	17.00	10.64	2.59	H	0.320	25.05
20	39750	1/99	20	39948	1/0	-19.86	17.02	10.64	2.59	H	0.321	25.07
20	40521	1/99	20	40719	1/0	-20.94	16.28	10.64	2.71	H	0.264	24.21
10	41395	1/49	15	41515	1/0	-20.68	16.74	10.72	2.74	H	0.296	24.72

Note:

1. Modulation : 16QAM

2. Limit : < 2 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
5	39683	1/24	20	39800	1/0	-23.64	13.22	10.55	2.57	H	0.132	21.20
10	39703	1/49	15	39823	1/0	-20.14	16.75	10.59	2.57	H	0.300	24.77
10	39705	1/49	20	39849	1/0	-20.05	16.84	10.59	2.57	H	0.306	24.86
15	39725	1/74	10	39845	1/0	-20.40	16.49	10.59	2.57	H	0.283	24.51
15	39725	1/74	15	39875	1/0	-20.32	16.57	10.59	2.57	H	0.288	24.59
15	39728	1/74	20	39899	1/0	-20.37	16.52	10.59	2.57	H	0.285	24.54
20	39750	1/99	5	39867	1/0	-23.46	13.43	10.59	2.57	H	0.140	21.45
20	39750	1/99	10	39894	1/0	-20.04	16.85	10.59	2.57	H	0.307	24.87
20	39750	1/99	15	39921	1/0	-19.98	16.90	10.64	2.59	H	0.312	24.95
20	39750	1/99	20	39948	1/0	-20.00	16.88	10.64	2.59	H	0.311	24.93
20	40521	1/99	20	40719	1/0	-21.08	16.14	10.64	2.71	H	0.255	24.07
10	41395	1/49	15	41515	1/0	-20.80	16.62	10.72	2.74	H	0.288	24.60

Note:

1. Modulation : 64QAM

2. Limit : < 2 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
5	39683	1/24	20	39800	1/0	-23.77	13.09	10.55	2.57	H	0.128	21.07
10	39703	1/49	15	39823	1/0	-20.24	16.65	10.59	2.57	H	0.293	24.67
10	39705	1/49	20	39849	1/0	-20.14	16.75	10.59	2.57	H	0.300	24.77
15	39725	1/74	10	39845	1/0	-20.48	16.41	10.59	2.57	H	0.278	24.43
15	39725	1/74	15	39875	1/0	-20.50	16.39	10.59	2.57	H	0.276	24.41
15	39728	1/74	20	39899	1/0	-20.47	16.42	10.59	2.57	H	0.278	24.44
20	39750	1/99	5	39867	1/0	-23.59	13.30	10.59	2.57	H	0.136	21.32
20	39750	1/99	10	39894	1/0	-20.10	16.79	10.59	2.57	H	0.303	24.81
20	39750	1/99	15	39921	1/0	-20.13	16.75	10.64	2.59	H	0.302	24.80
20	39750	1/99	20	39948	1/0	-20.13	16.75	10.64	2.59	H	0.302	24.80
20	40521	1/99	20	40719	1/0	-21.14	16.08	10.64	2.71	H	0.252	24.01
10	41395	1/49	15	41515	1/0	-20.88	16.54	10.72	2.74	H	0.283	24.52

Note:

1. Modulation : 256QAM
2. Limit : < 2 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	20	39750	2506.0	1/99	20	39948	2525.8	1/0	3.7697	31.955	-69.75	-37.79
Mid	20	40546	2585.6	1/99	15	40717	2602.7	1/0	3.8281	31.955	-69.78	-37.83
High	5	41373	2668.3	1/24	20	41490	2680.0	1/0	9.0802	32.570	-68.40	-35.83
Low	20	39750	2506.0	1/0	20	39948	2525.8	1/99	3.7757	31.955	-69.84	-37.89
Mid	20	40546	2585.6	1/0	15	40717	2602.7	1/74	4.0414	31.955	-69.68	-37.72
High	5	41373	2668.3	1/0	20	41490	2680.0	1/99	3.7762	31.955	-69.38	-37.42
Low	20	39750	2506.0	100/0	20	39948	2525.8	100/0	3.7588	31.955	-69.78	-37.82
Mid	20	40521	2583.1	100/0	20	40719	2602.9	100/0	3.7847	31.955	-69.65	-37.70
High	20	41292	2660.2	100/0	20	41490	2680.0	100/0	4.0469	31.955	-69.84	-37.88

Note:

1. Modulation : See Section 8.

2. Duty Cycle factor already applied on the factor.

   - Duty Cycle factor(dB) = 3.979

   - Factor(dB) = Duty Cycle factor + Cable Loss + Ext. Attenuator + Power Splitter

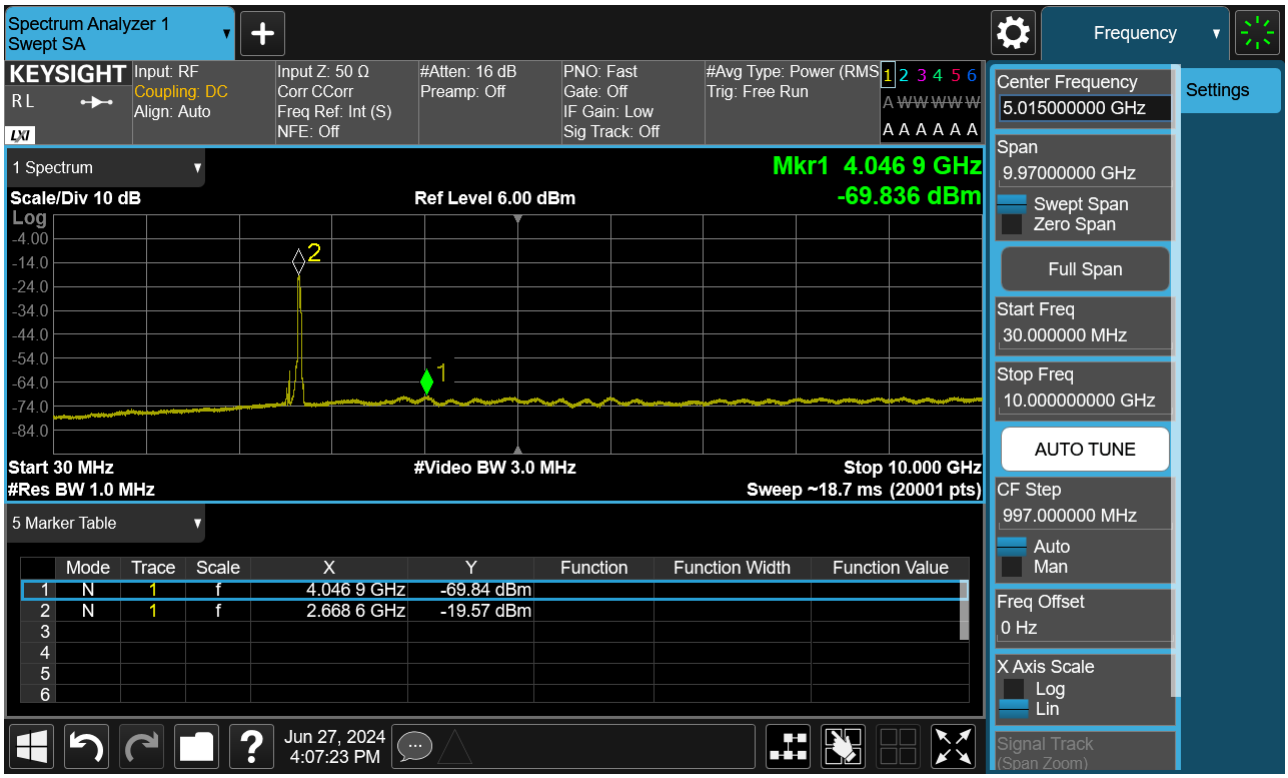
   - Result(dBm) = Measurement Maximum Data (dBm) + Factor

Frequency Range (GHz)	Factor [dB]
0.03 – 1	29.249
1 – 5	31.955
5 – 10	32.570
10 – 15	33.095
15 – 20	33.468
Above 20	34.110

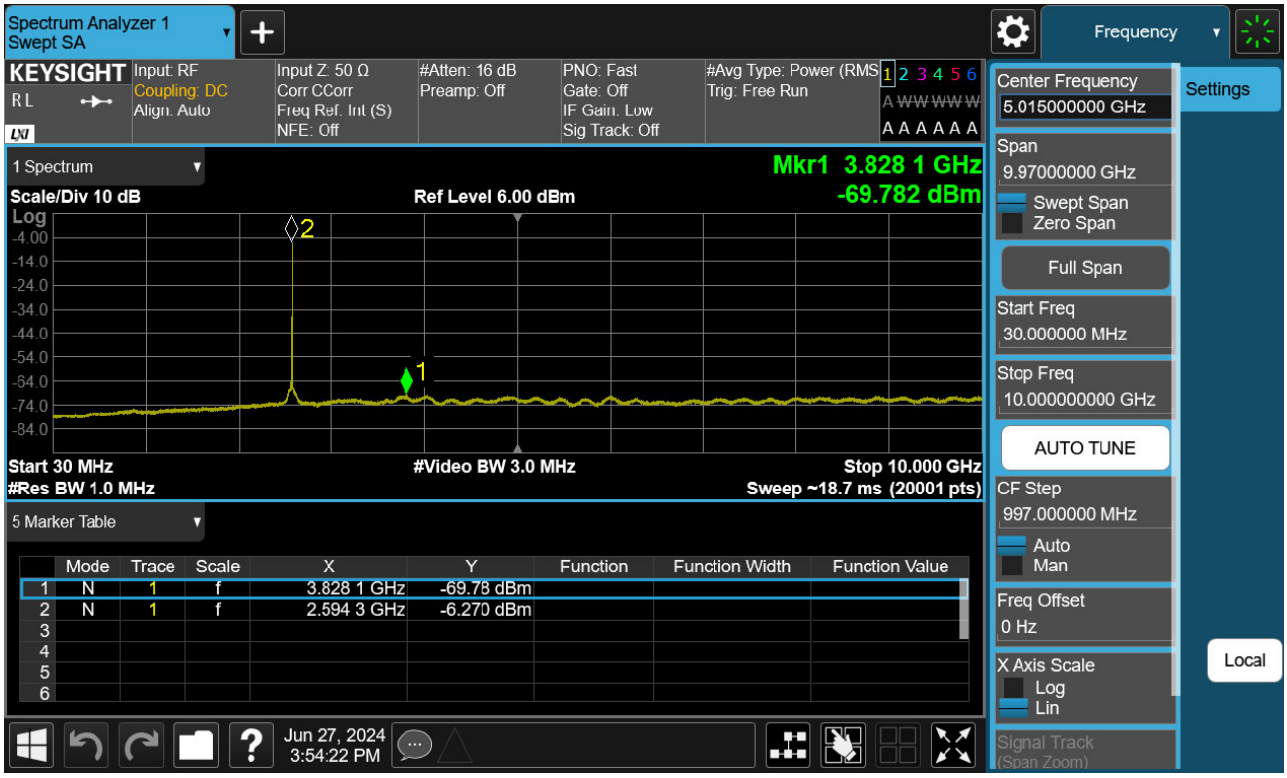
3. Limit : -25.0 dBm

Frequency Range : 30 MHz ~ 10 GHz

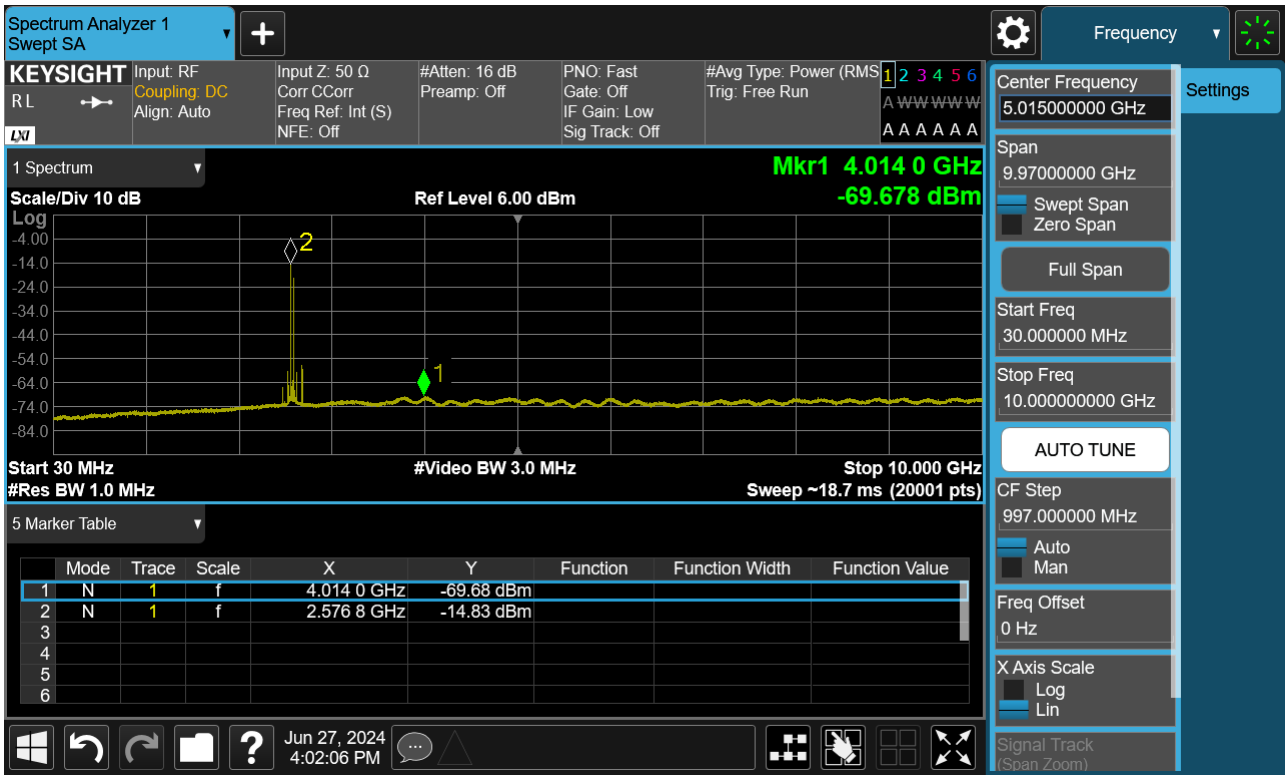
PCC 20MHz Ch40521 RB100 Offset0 SCC 20MHz Ch40719 RB100 Offset0



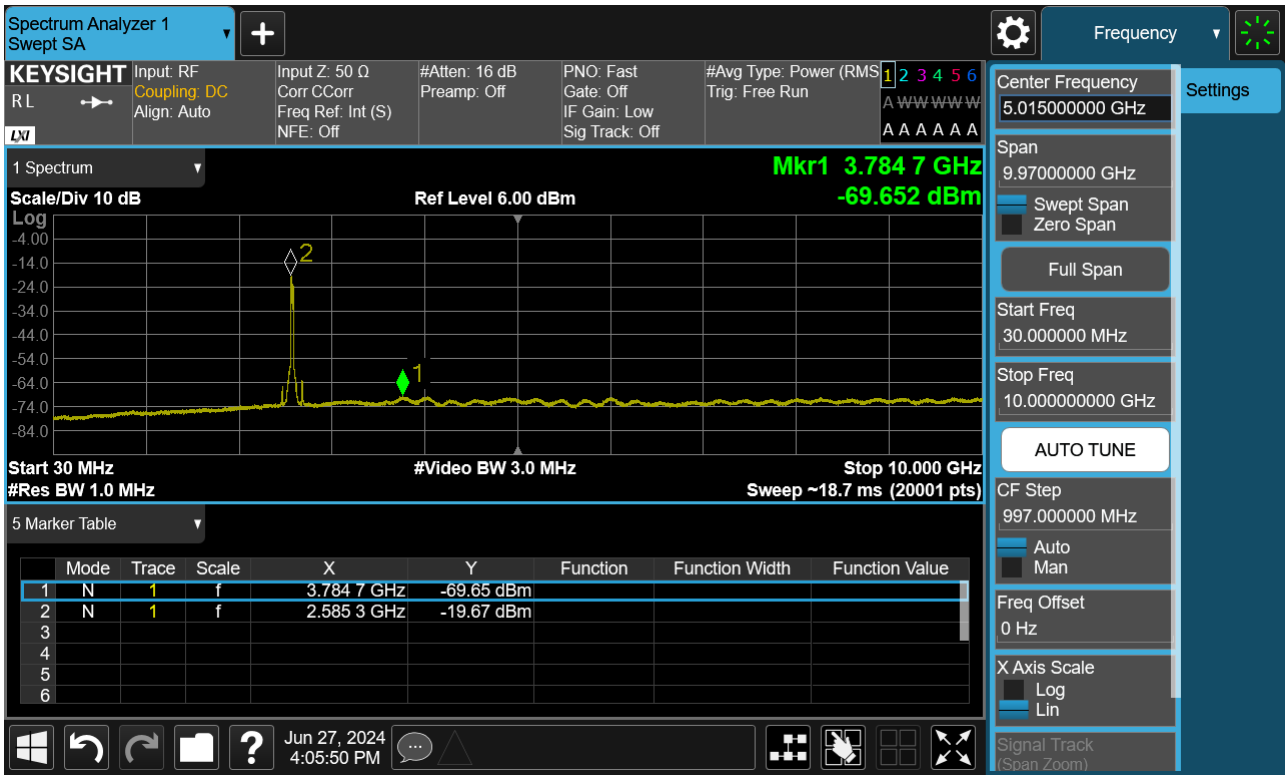
PCC 20MHz Ch40546 RB1 Offset99 SCC 15MHz Ch40717 RB1 Offset0



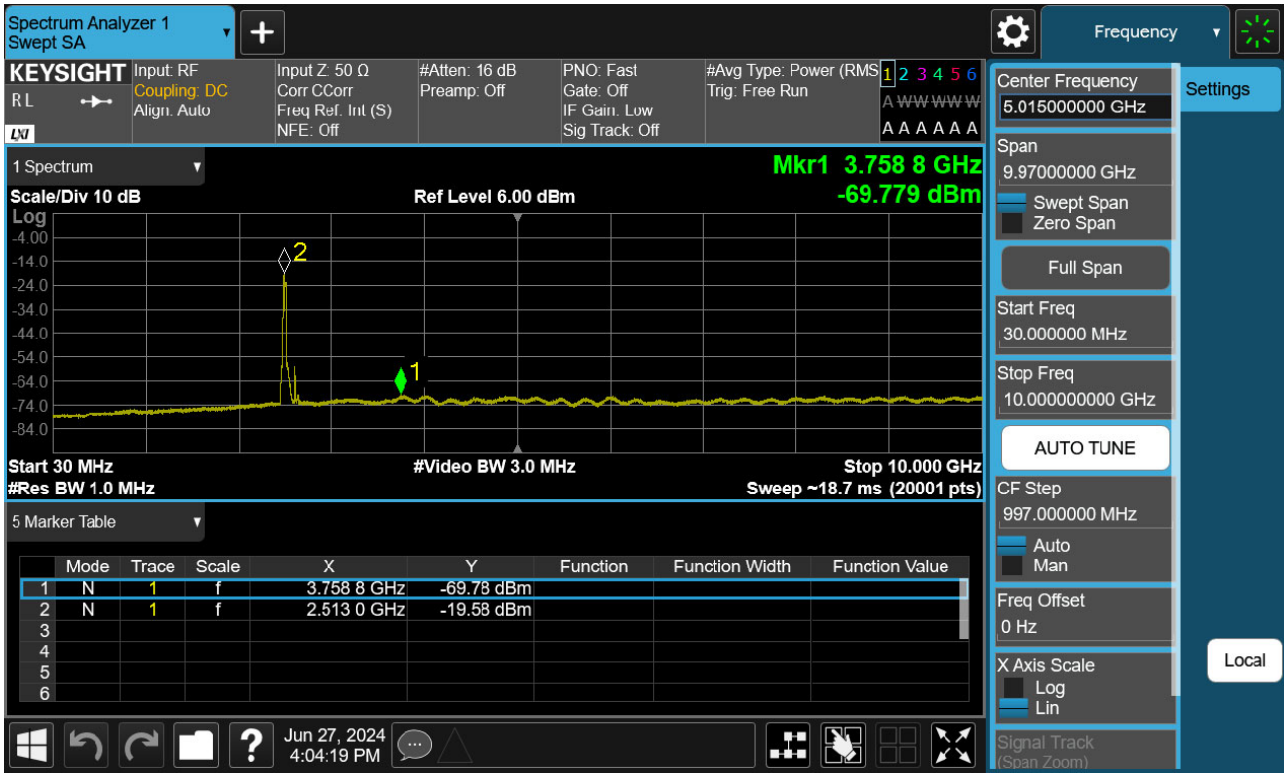
PCC 20MHz Ch40546 RB1 Offset0 SCC 15MHz Ch40717 RB1 Offset74



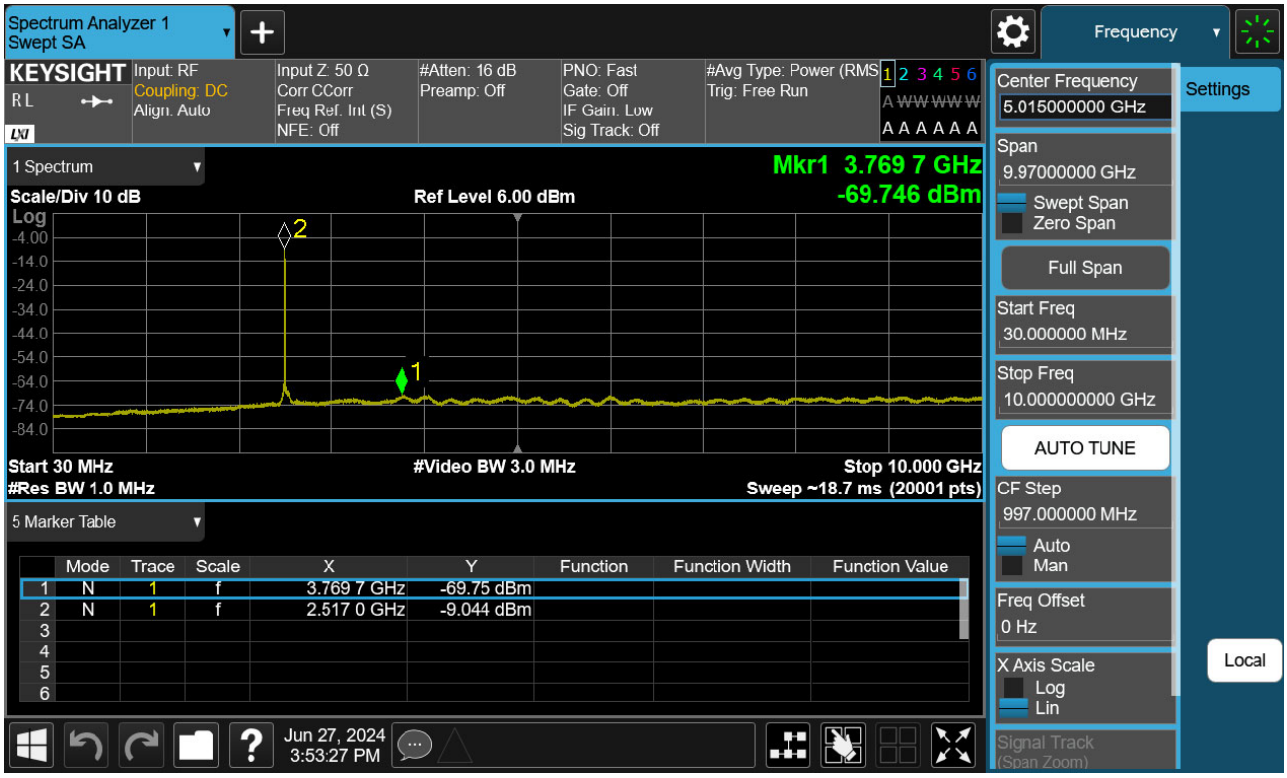
PCC 20MHz Ch40521 RB100 Offset0 SCC 20MHz Ch40719 RB100 Offset0



PCC 20MHz Ch39750 RB100 Offset0 SCC 20MHz Ch39948 RB100 Offset0



PCC 20MHz Ch39750 RB1 Offset99 SCC 20MHz Ch39948 RB1 Offset0



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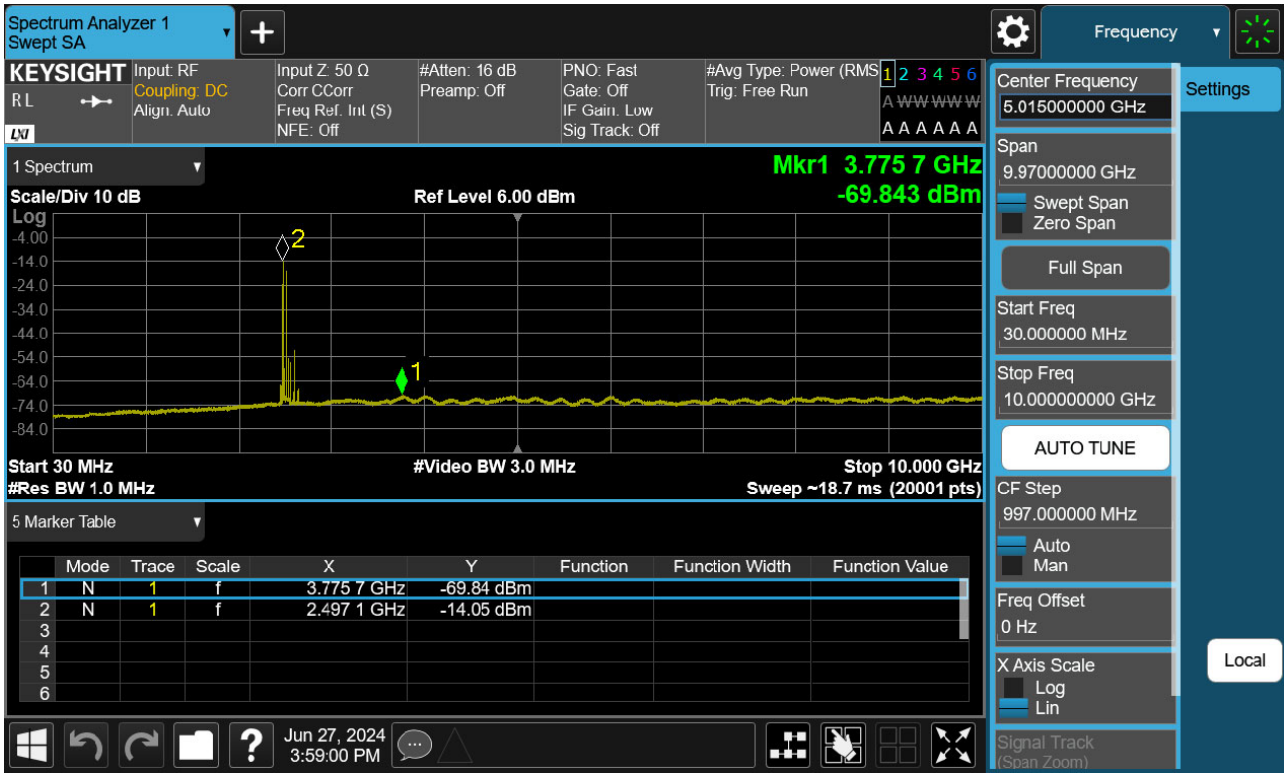
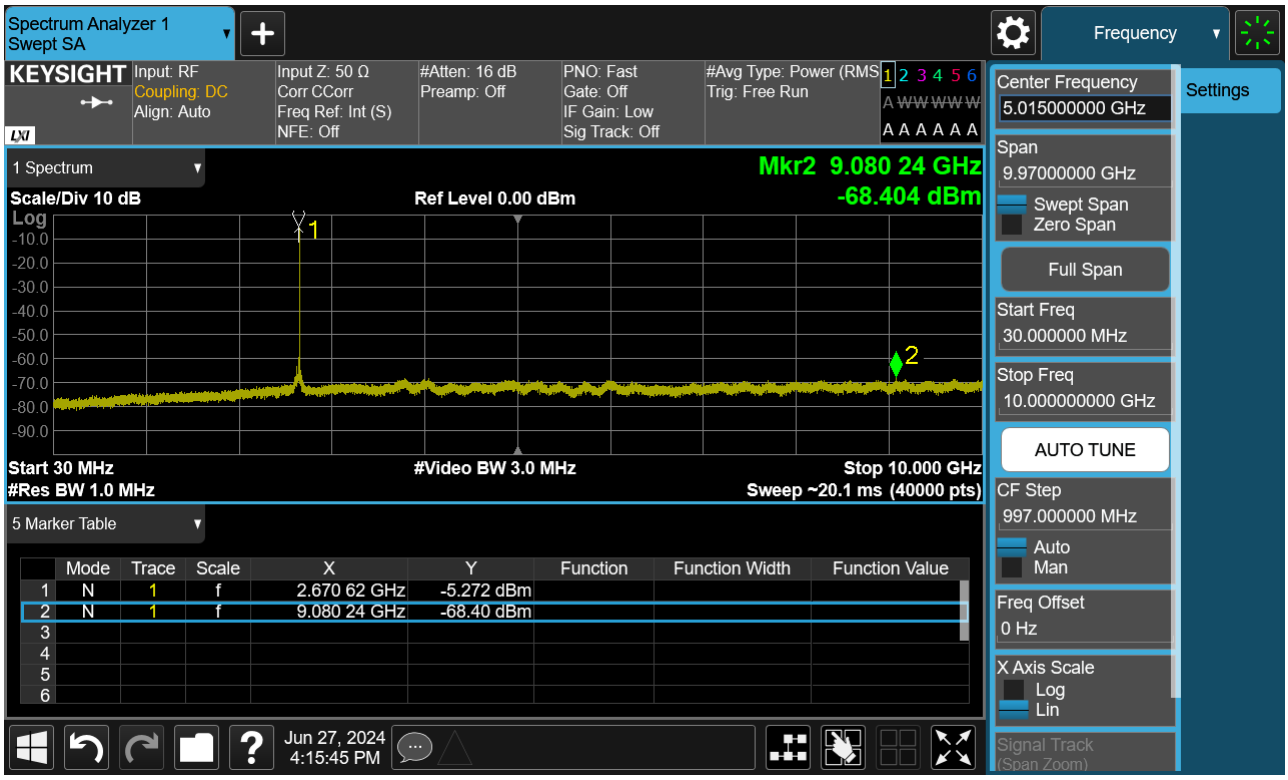
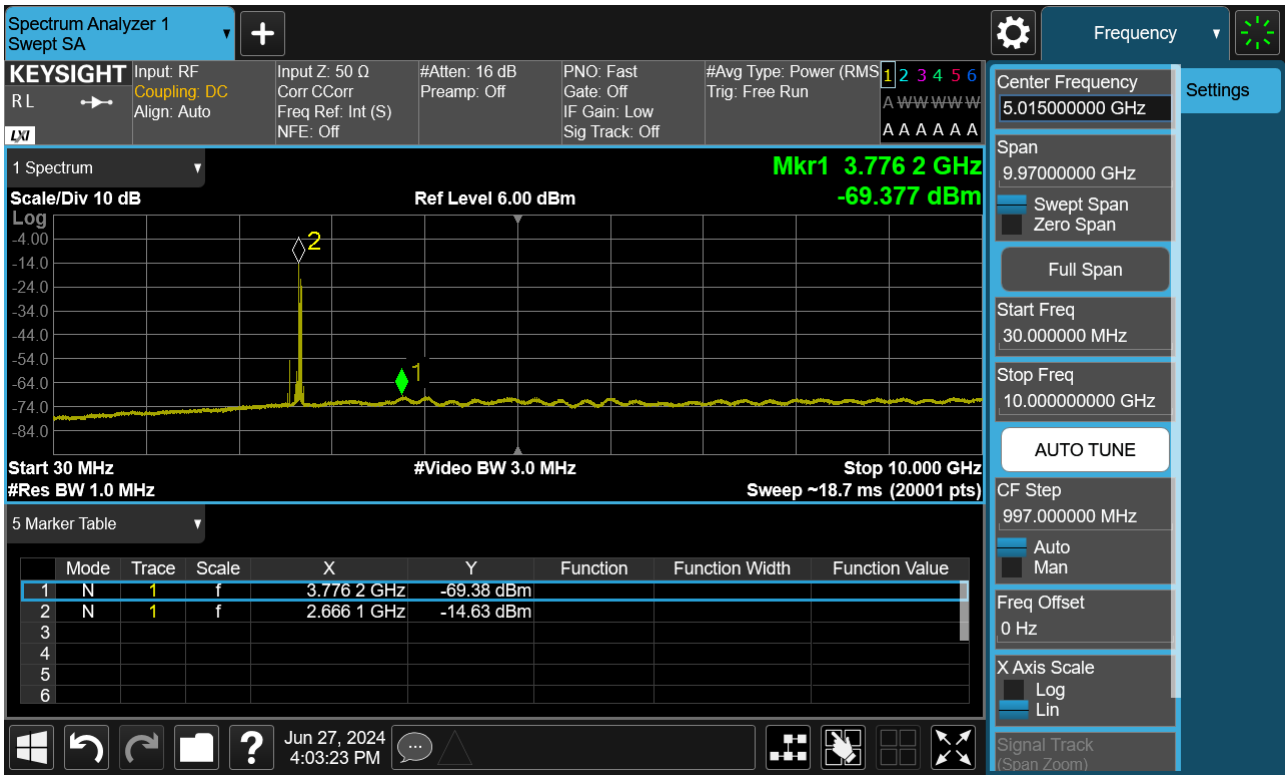


PCC 5MHz Ch41373 RB1 Offset24 SCC 20MHz Ch41490 RB1 Offset0

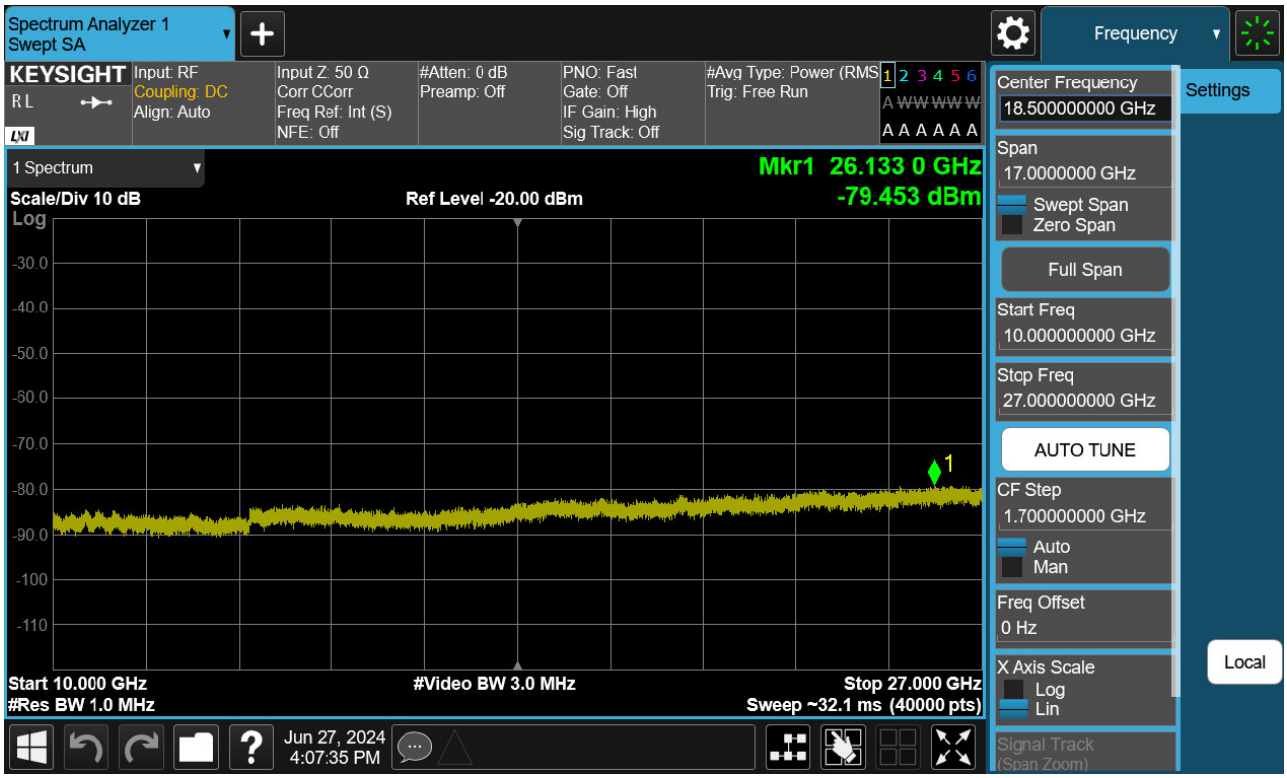


PCC 5MHz Ch41373 RB1 Offset0 SCC 20MHz Ch41490 RB1 Offset99

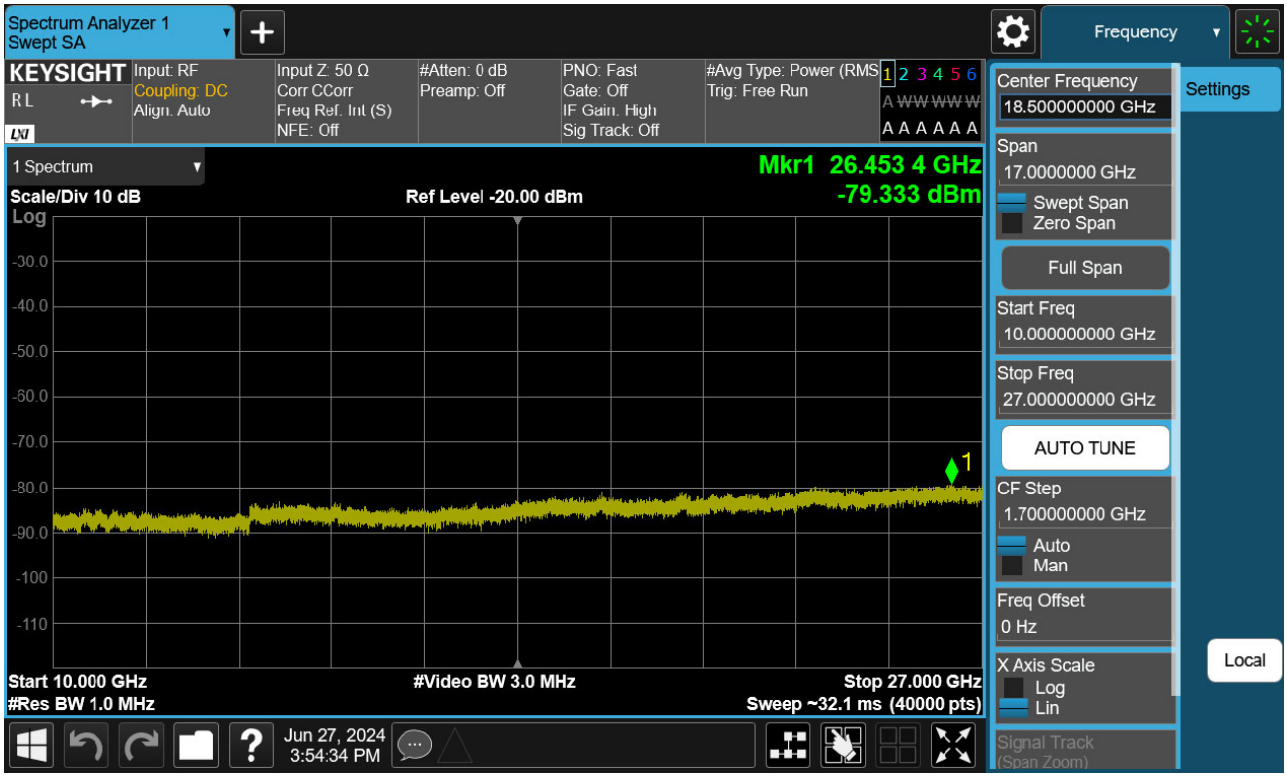


Frequency Range : above 10 GHz

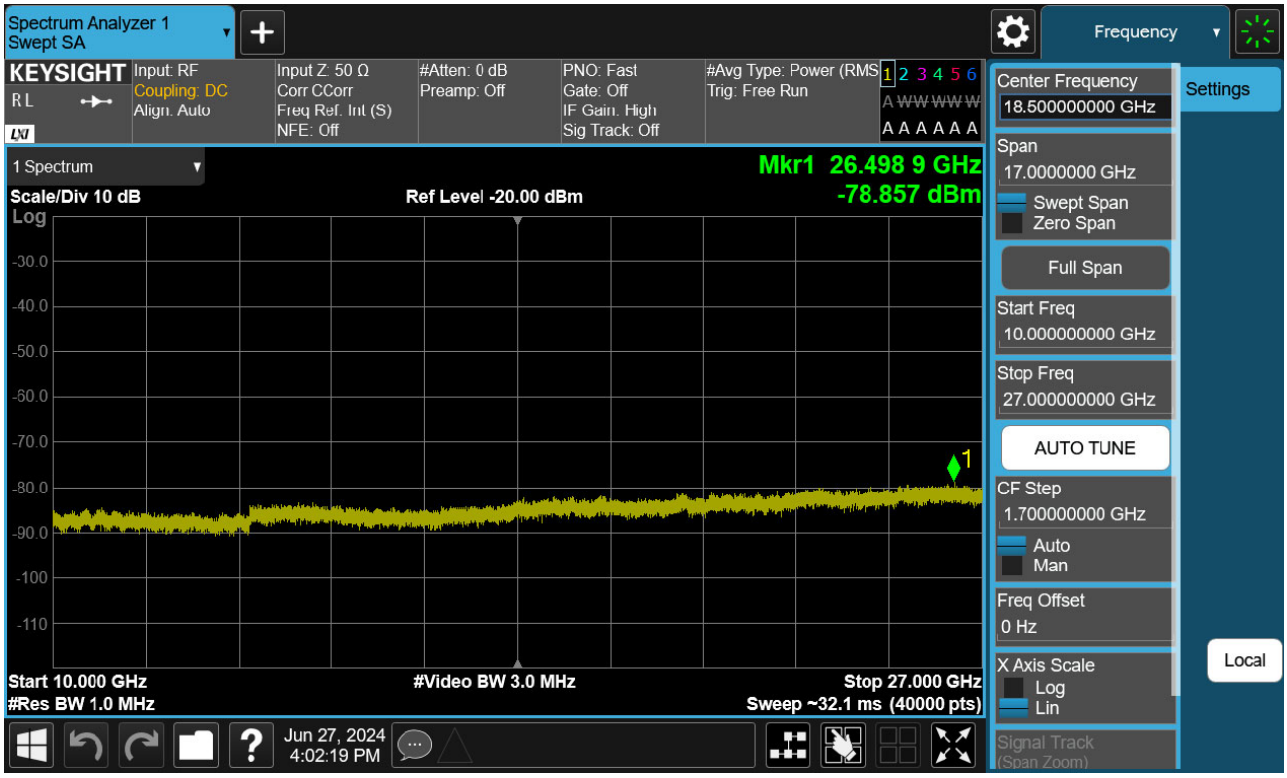
PCC 20MHz Ch41292 RB100 Offset0, SCC 20MHz Ch41490 RB100 Offset0



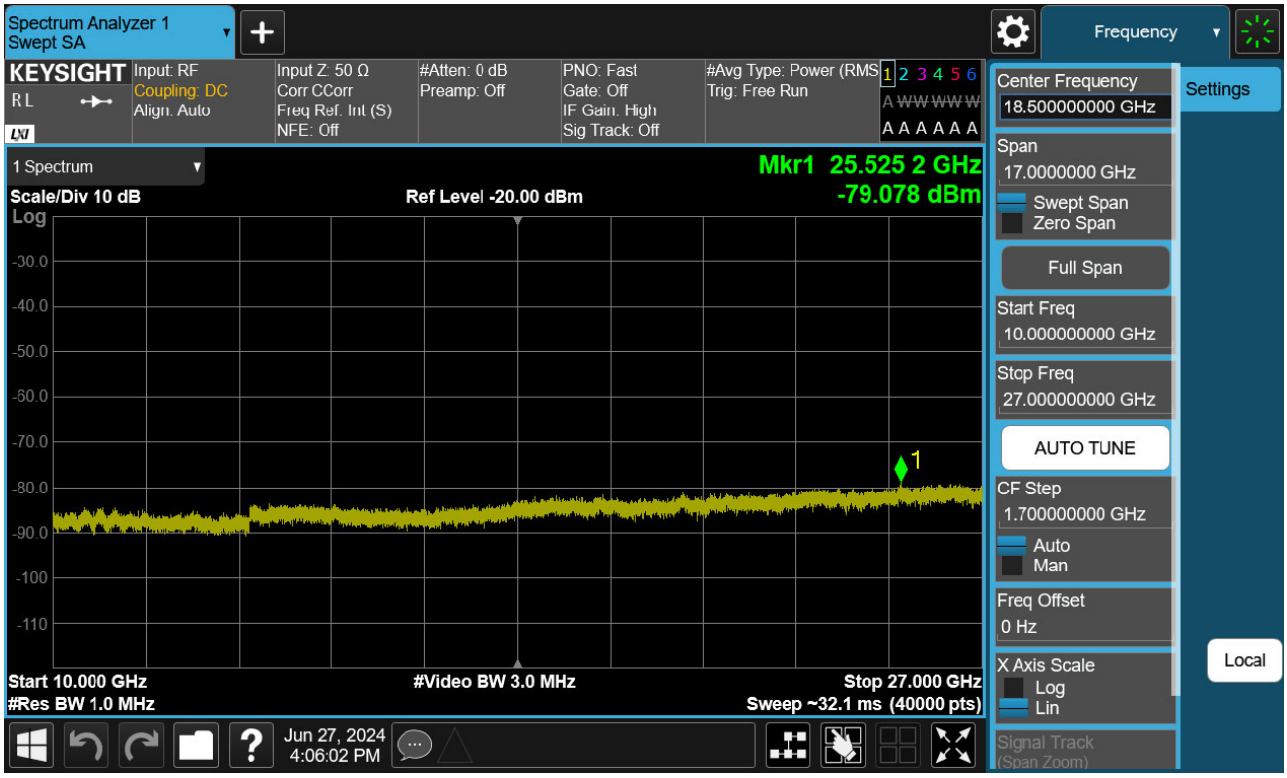
PCC 20MHz Ch40546 RB1 Offset99, SCC 15MHz Ch40717 RB1 Offset0



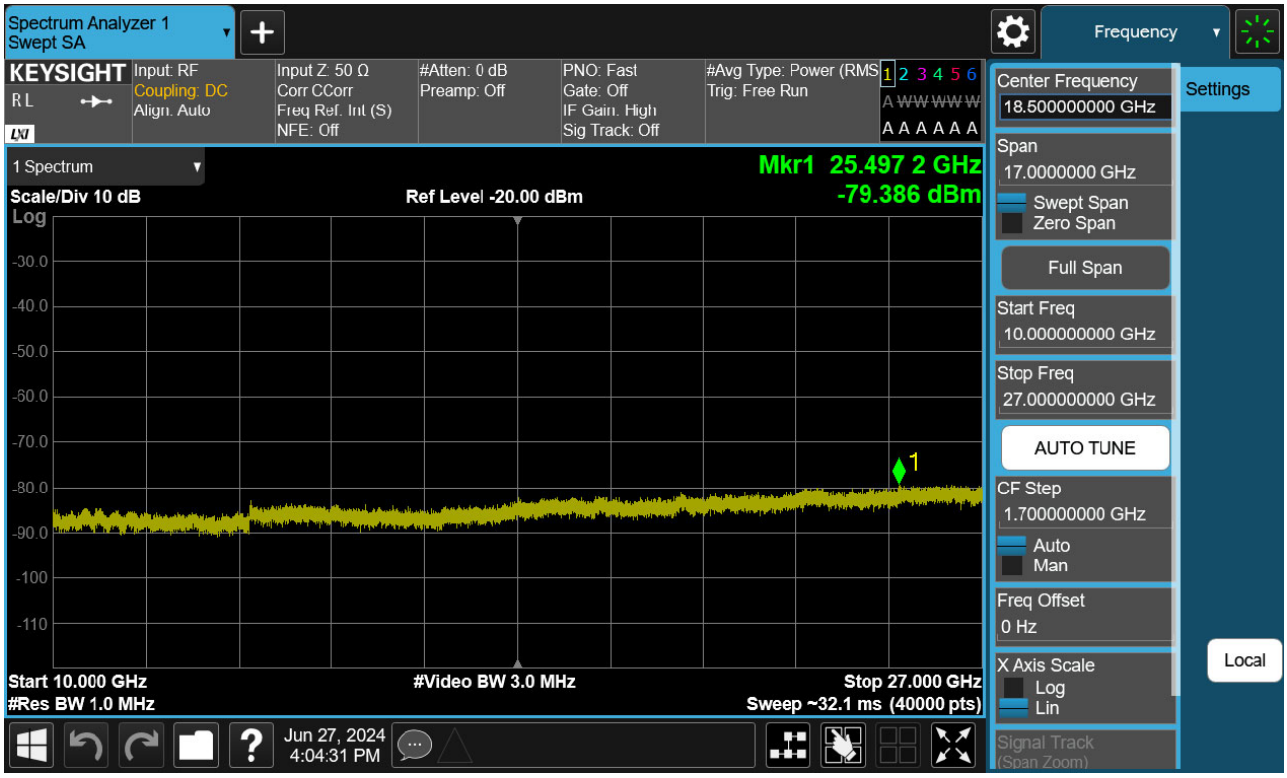
PCC 20MHz Ch40546 RB1 Offset0, SCC 15MHz Ch40717 RB1 Offset74



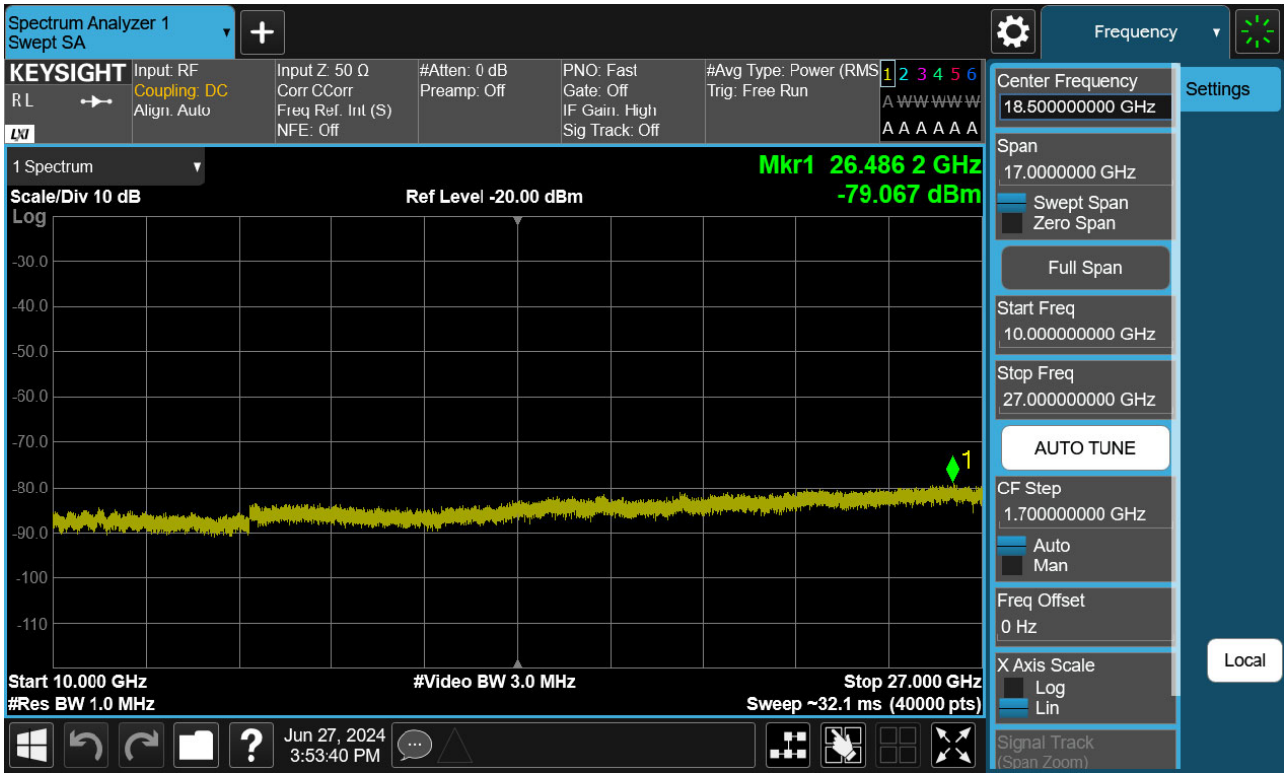
PCC 20MHz Ch40521 RB100 Offset0, SCC 20MHz Ch40719 RB100 Offset0



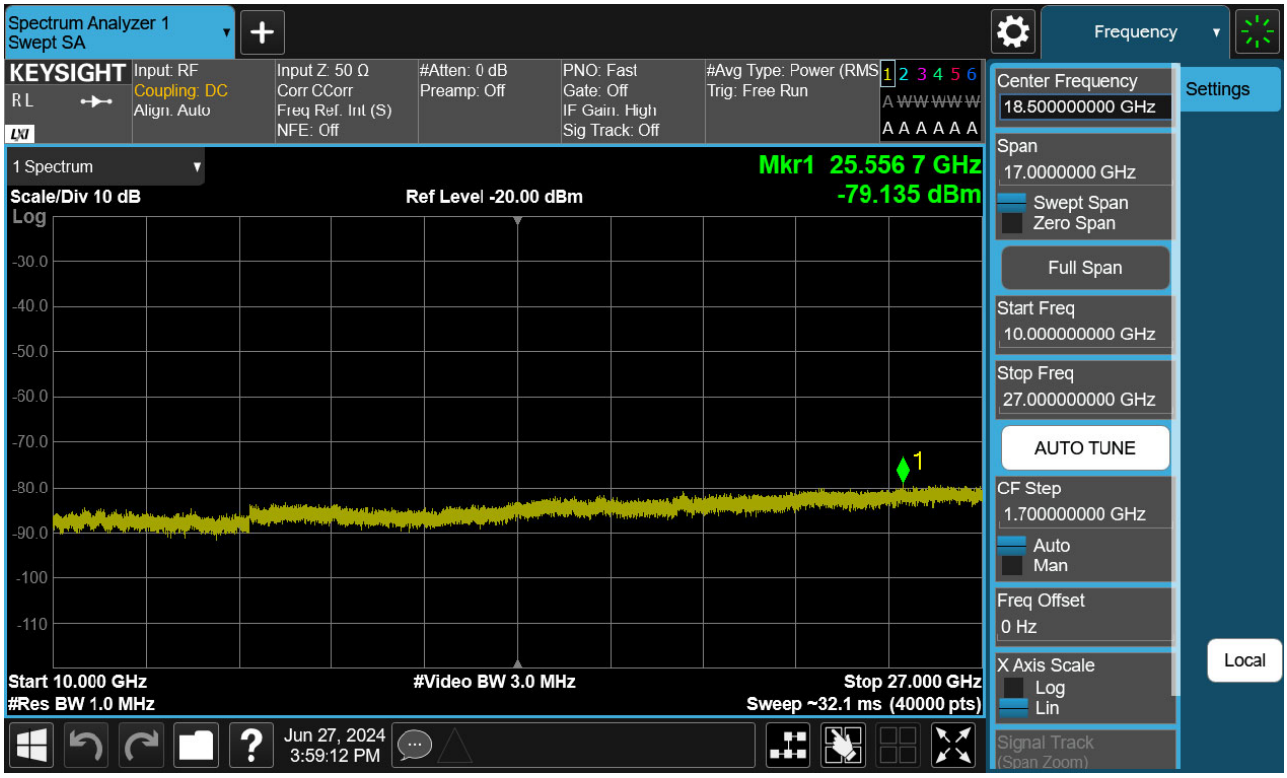
PCC 20MHz Ch39750 RB100 Offset0, SCC 20MHz Ch39948 RB100 Offset0



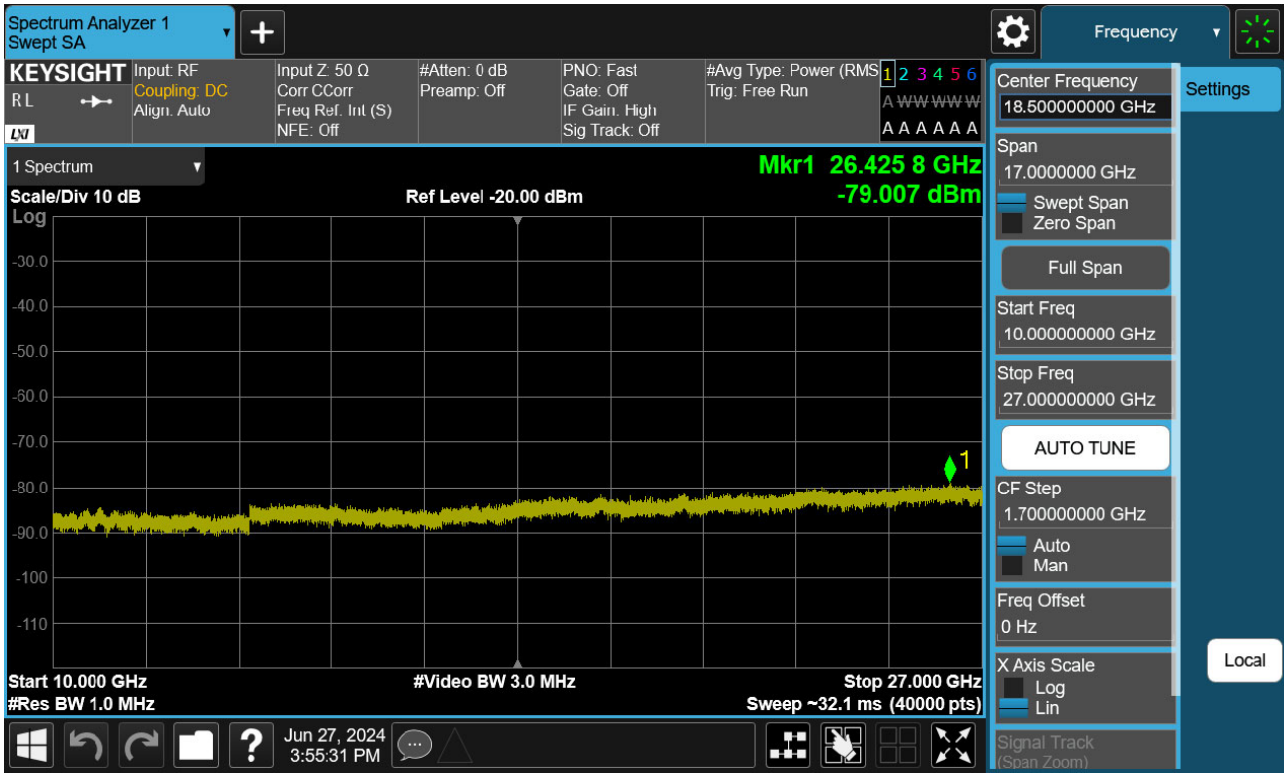
PCC 20MHz Ch39750 RB1 Offset99, SCC 20MHz Ch39948 RB1 Offset0



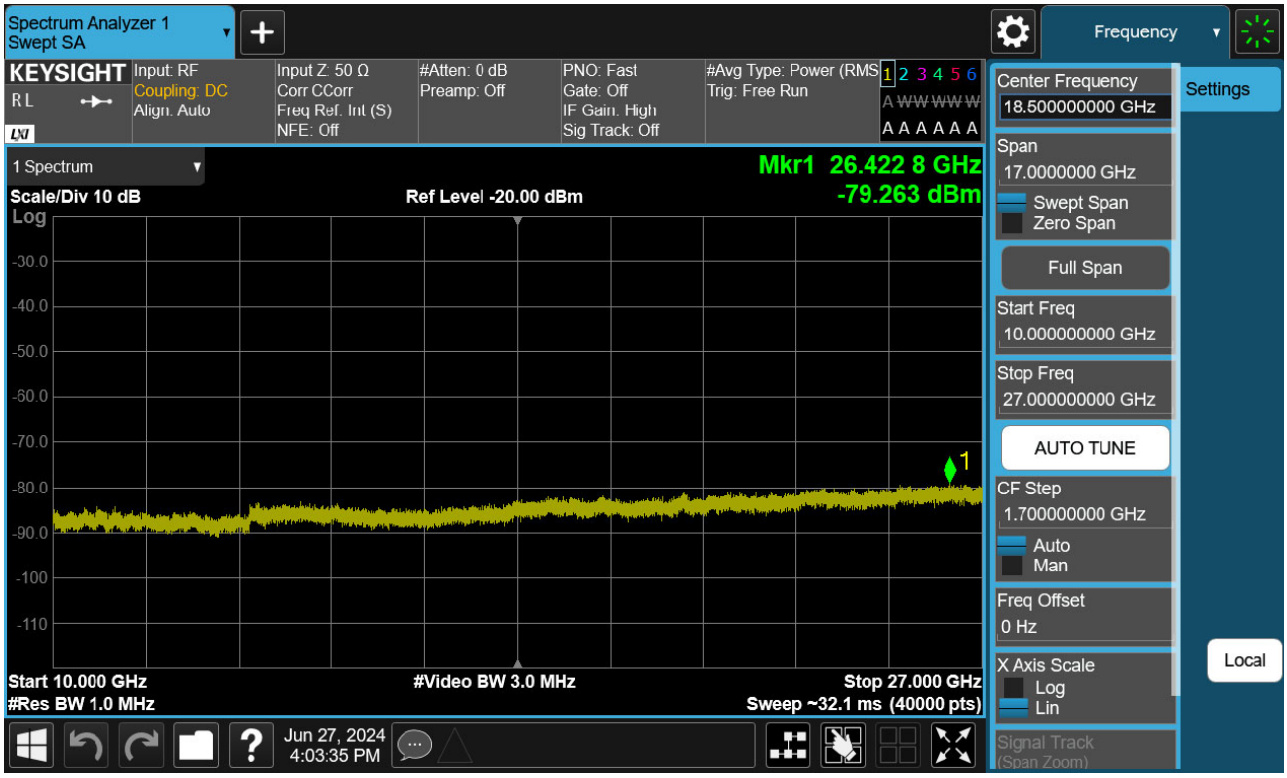
PCC 20MHz Ch39750 RB1 Offset0, SCC 20MHz Ch39948 RB1 Offset99



PCC 5MHz Ch41373 RB1 Offset24, SCC 20MHz Ch41490 RB1 Offset0

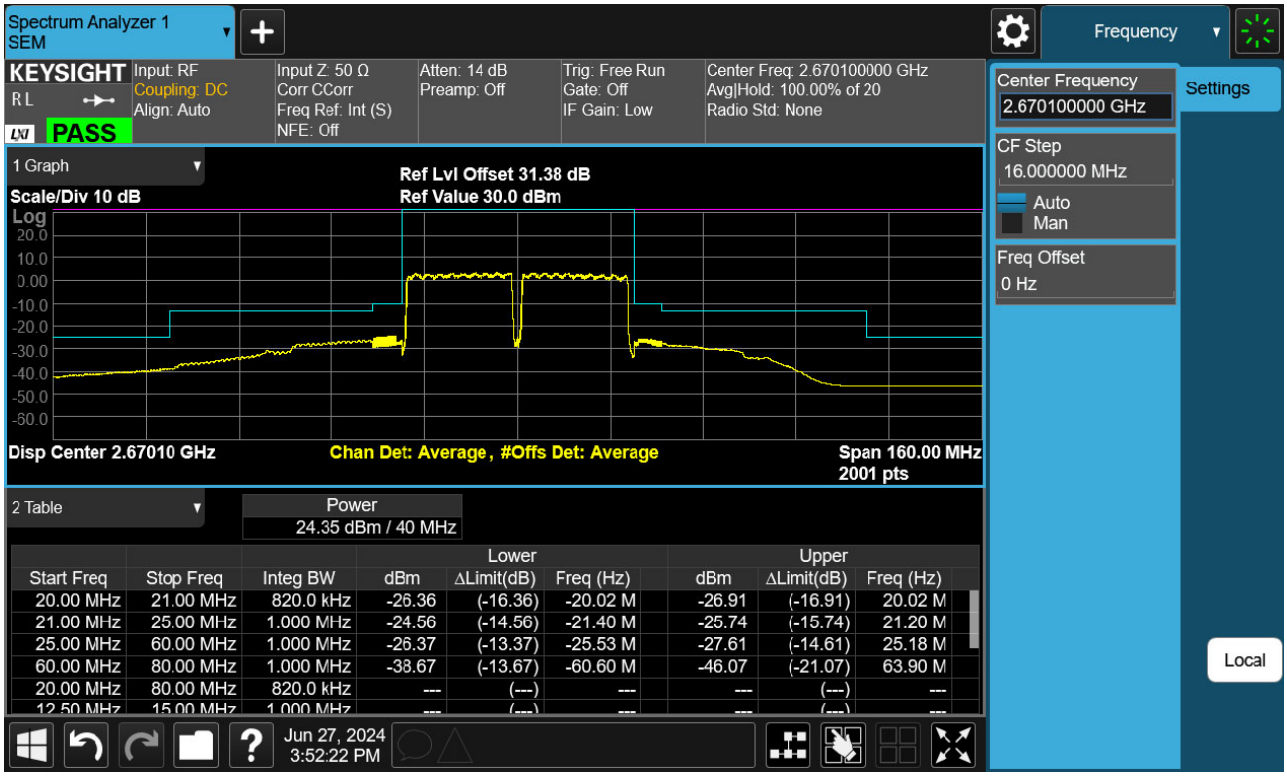


PCC 5MHz Ch41373 RB1 Offset0, SCC 20MHz Ch41490 RB1 Offset99

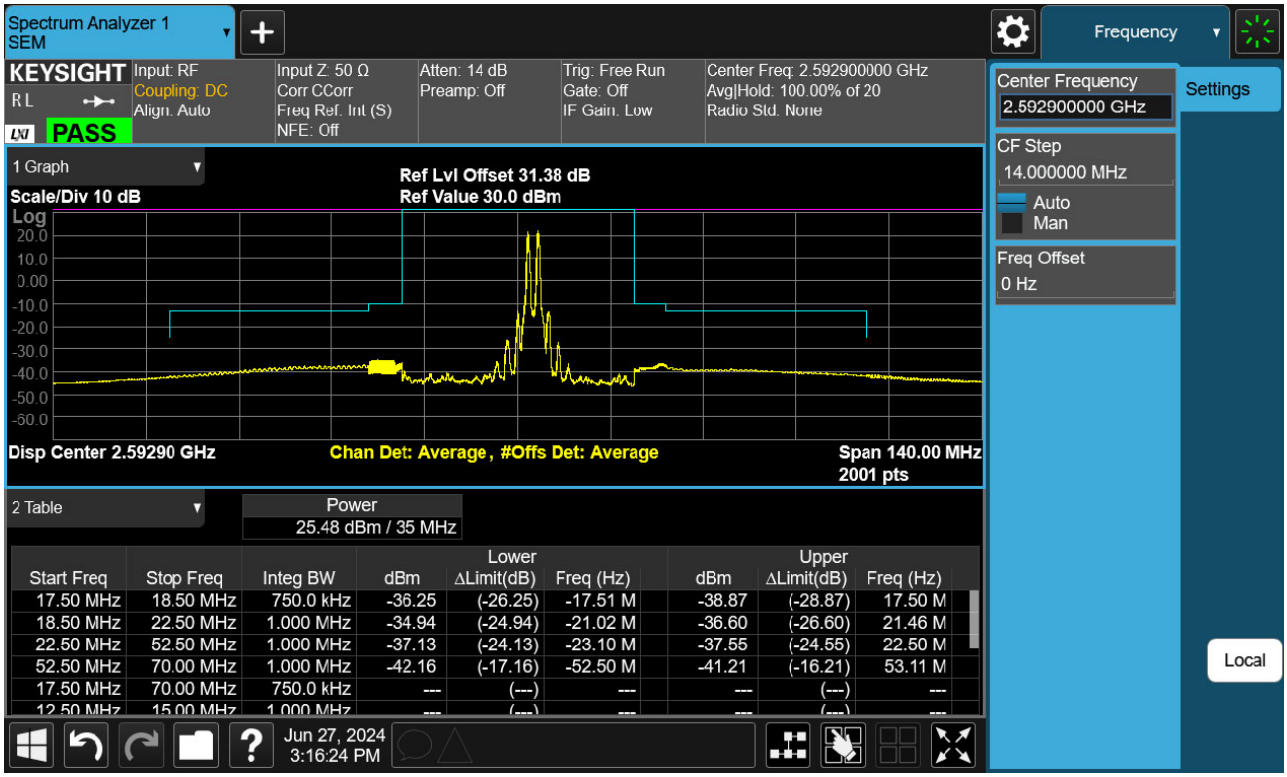


8.4 Channel Edge

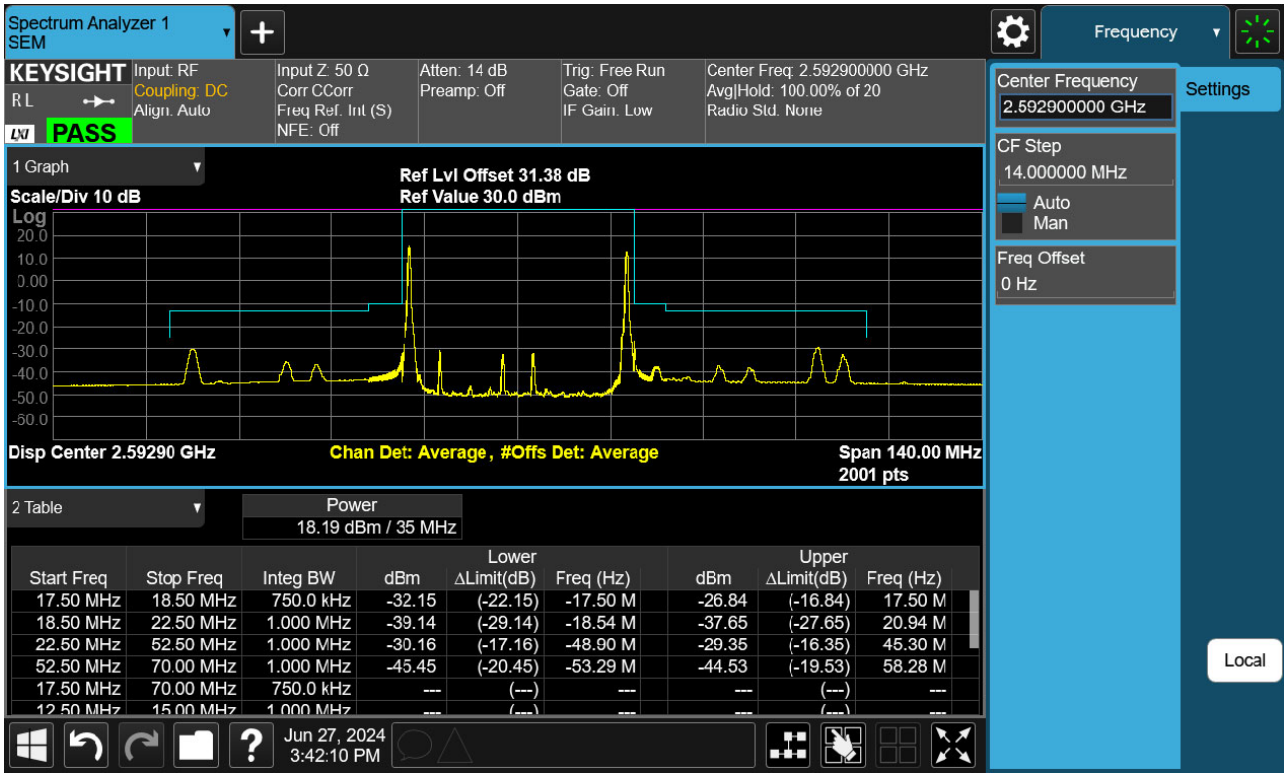
PCC 20MHz Ch41292 RB100 Offset0, SCC 20MHz Ch41490 RB100 Offset0



PCC 20MHz Ch40546 RB1 Offset99, SCC 15MHz Ch40717 RB1 Offset0



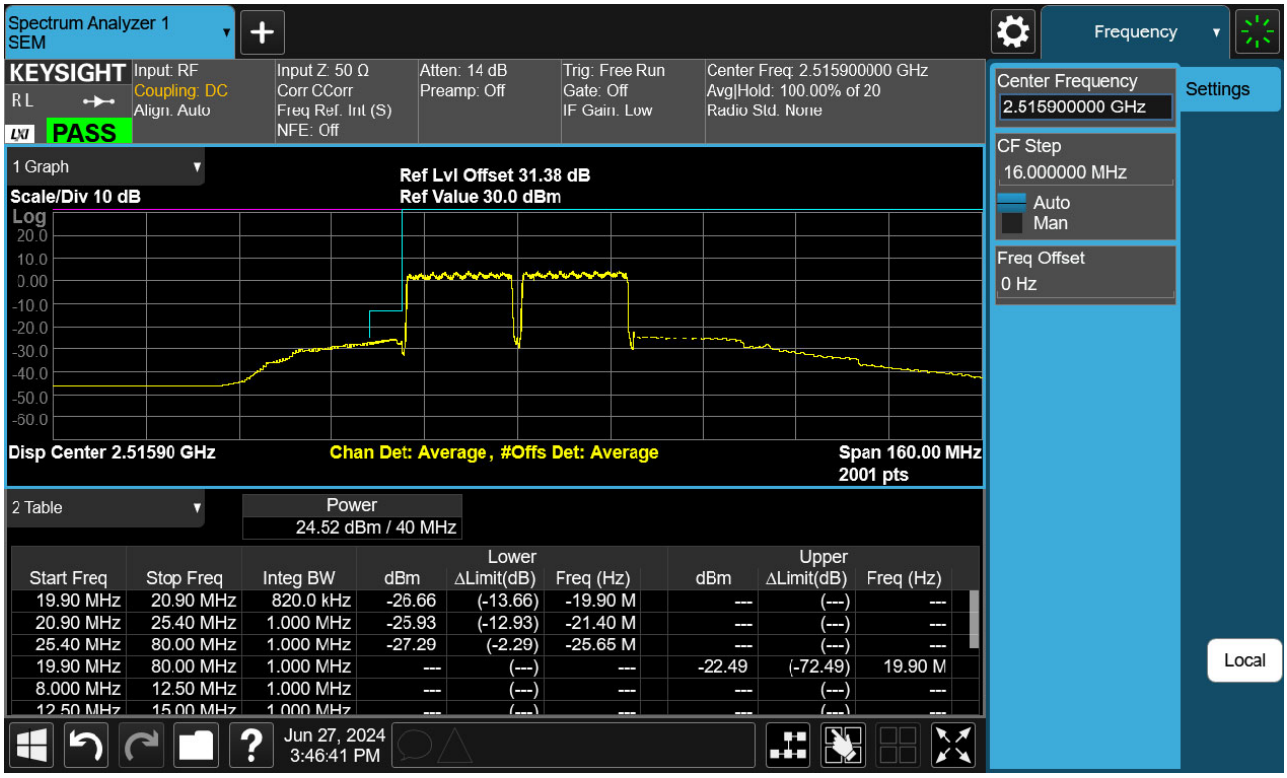
PCC 20MHz Ch40546 RB1 Offset0, SCC 15MHz Ch40717 RB1 Offset74



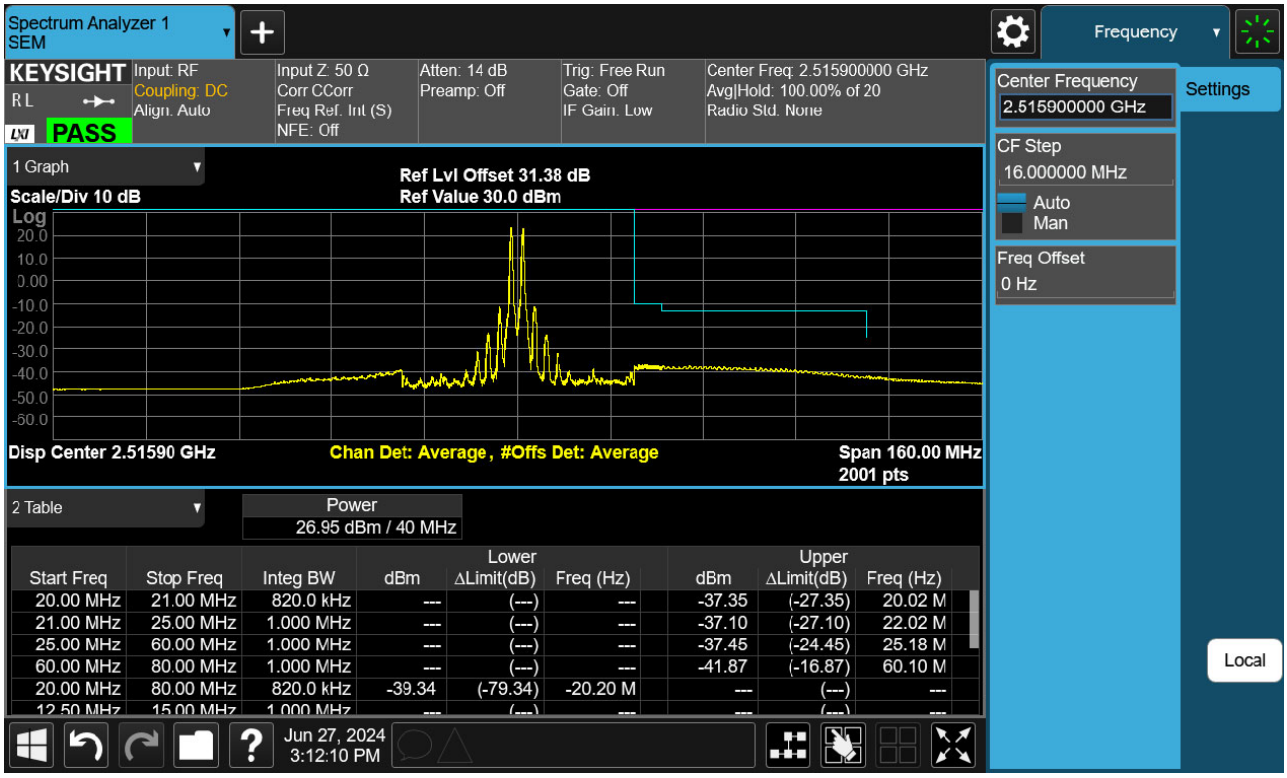
PCC 20MHz Ch40521 RB100 Offset0, SCC 20MHz Ch40719 RB100 Offset0

PCC 20MHz Ch39750 RB100 Offset0, SCC 20MHz Ch39948 RB100 Offset0-2

PCC 20MHz Ch39750 RB100 Offset0, SCC 20MHz Ch39948 RB100 Offset0-1



PCC 20MHz Ch39750 RB1 Offset99, SCC 20MHz Ch39948 RB1 Offset0-2



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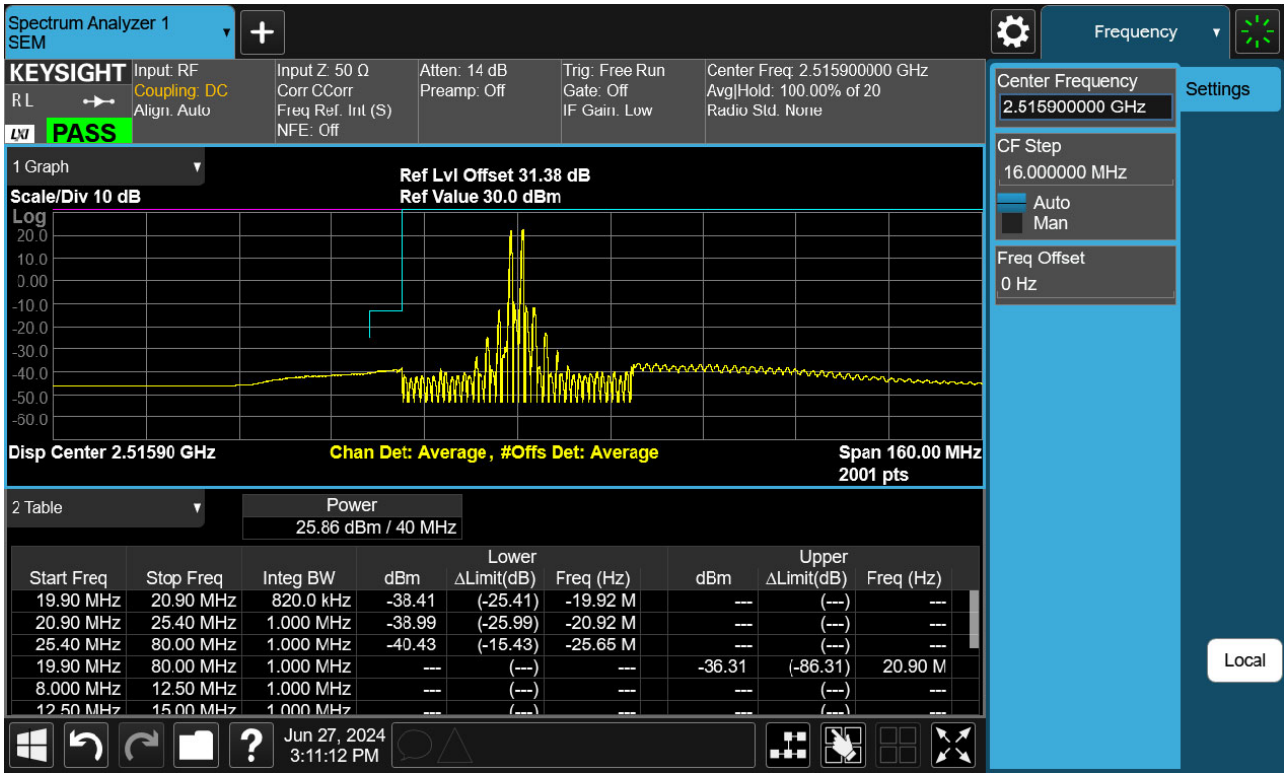

PCC 20MHz Ch39750 RB1 Offset0, SCC 20MHz Ch39948 RB1 Offset99-2