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FCC Carrier Aggregation REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Address:
129, Samsung-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Date of Issue:
June 15, 2021

Location:
HCT CO., LTD.,
74, Seoicheon-ro 578beon-gil, Majang-myeon,
Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Report No.: HCT-RF-2105-FC031-R1

FCC ID:	**A3LSMG990U**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**

Model(s):	SM-G990U
Additional Model(s):	SM-G990U1/DS, SM-G990U1
EUT Type:	Mobile Phone
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§27, §2

Mode (PCC+SCC)	Tx Frequency (MHz)	Modulation	Emission Designator	EIRP	
				Max. Power (dBm)	Max. Power (W)
5MHz + 20MHz (PC2)	2499.3 - 2680.0	QPSK	22M9G7D	25.19	0.330
		16QAM	22M8W7D	24.53	0.283
		64QAM	22M8W7D	23.73	0.236
		256QAM	22M8W7D	20.70	0.118
10MHz + 15MHz (PC2)	2501.3 - 2682.5	QPSK	23M1G7D	25.14	0.326
		16QAM	23M0W7D	24.61	0.289
		64QAM	23M0W7D	23.85	0.242
		256QAM	23M1W7D	20.48	0.112
10MHz + 20MHz (PC2)	2501.5 - 2680.0	QPSK	27M7G7D	25.30	0.338
		16QAM	27M8W7D	24.55	0.285
		64QAM	27M6W7D	23.98	0.250
		256QAM	27M6W7D	20.63	0.116
15MHz + 10MHz (PC2)	2503.5 - 2684.7	QPSK	23M1G7D	25.44	0.350
		16QAM	23M1W7D	24.73	0.297
		64QAM	23M1W7D	23.98	0.250
		256QAM	23M0W7D	20.81	0.121
15MHz + 15MHz (PC2)	2503.5 - 2682.5	QPSK	28M4G7D	25.35	0.342
		16QAM	28M4W7D	24.48	0.280
		64QAM	28M3W7D	23.84	0.242
		256QAM	28M4W7D	20.53	0.113
15MHz + 20MHz (PC2)	2503.8 - 2680.0	QPSK	32M5G7D	25.30	0.338
		16QAM	32M6W7D	24.56	0.285
		64QAM	32M5W7D	23.94	0.247
		256QAM	32M6W7D	20.56	0.114
20MHz + 5MHz (PC2)	2506.0 - 2686.7	QPSK	22M9G7D	25.32	0.340
		16QAM	23M0W7D	24.50	0.282
		64QAM	22M9W7D	23.74	0.236
		256QAM	22M9W7D	20.41	0.110
20MHz + 10MHz (PC2)	2506.0 - 2684.5	QPSK	27M8G7D	25.42	0.348
		16QAM	27M7W7D	24.57	0.286
		64QAM	27M8W7D	23.95	0.248
		256QAM	27M8W7D	20.73	0.118
20MHz + 15MHz (PC2)	2506.0 - 2682.2	QPSK	32M7G7D	25.60	0.363
		16QAM	32M5W7D	25.28	0.337
		64QAM	32M6W7D	24.84	0.304
		256QAM	32M5W7D	23.85	0.243
20MHz + 20MHz (PC2)	2506.0 - 2680.0	QPSK	37M6G7D	25.44	0.350
		16QAM	37M5W7D	24.54	0.284
		64QAM	37M5W7D	23.72	0.235
		256QAM	37M5W7D	20.54	0.113

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)

REVIEWED BY

Report prepared by : Jae Mun Do **Engineer of Telecommunication Testing Center**	**Report approved by : Jong Seok Lee** **Manager of Telecommunication Testing Center**

This test results were applied only to the test methods required by the standard.

This laboratory is not accredited for the test results marked *.
The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2105-FC031	May 26, 2021	- First Approval Report
HCT-RF-2105-FC031-R1	June 15, 2021	- Revised the Additional model(s). (SM-G990U1 added)

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.

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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:	A3LSMG990U
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§27, §2
EUT Type:	Mobile Phone
Model(s):	SM-G990U
Additional Model(s):	SM-G990U1/DS, SM-G990U1
Tx Frequency:	2499.3 - 2680.0: 5MHz+20MHz 2501.3 - 2682.5: 10MHz+15MHz 2501.5 - 2680.0: 10MHz+20MHz 2503.5 - 2684.7: 15MHz+10MHz 2503.5 - 2682.5: 15MHz+15MHz 2503.8 - 2680.0: 15MHz+20MHz 2506.0 - 2686.7: 20MHz+5MHz 2506.0 - 2684.5: 20MHz+10MHz 2506.0 - 2682.2: 20MHz+15MHz 2506.0 - 2680.0: 20MHz+20MHz
Date(s) of Tests:	April 19, 2021 ~ May 18, 2021
Serial number:	Radiated: 54136fe8da1e7ece Conducted: R3CR3117FBH
LTE CA :	CA 41C(Uplink)

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a Mobile Phone with GSM/GPRS/EGPRS/UMTS, CDMA(BC0, 1, 10) and LTE, Sub6.

It also supports IEEE 802.11 a/b/g/n/ac/ax (HT20/40/80), Bluetooth, BT LE, NFC, WPT, mmWave(n260/261).

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
Peak- to- Average Ratio	- KDB 971168 D01 v03r01 – Section 5.7 - ANSI C63.26-2015 – Section 5.2.3.4 - ANSI C63.26-2015 – Section 5.2.6(only GSM)
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 NormalHz
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 1GHz, 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 = 100kHz for emissions below 1GHz and NormalHz for emissions above 1GHz
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 1GHz, 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;

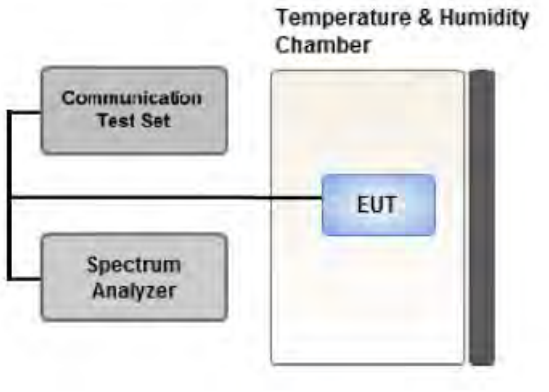
$$Result_{(dBm)} = Pg_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dBi)}$$

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

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

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

3.4 PEAK- TO- AVERAGE RATIO



Test setup

① CCDF Procedure for PAPR

Test Settings

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

② Alternate Procedure for PAPR

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

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

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

Test Settings(Peak Power)

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

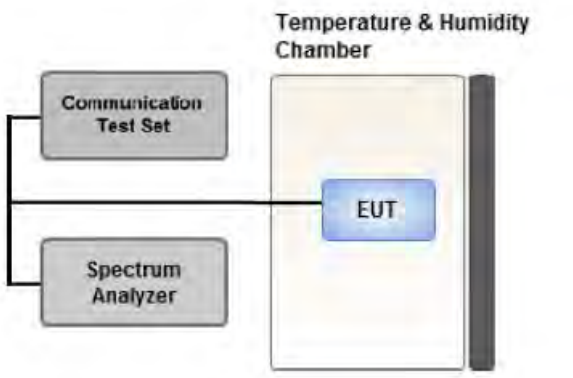
1. Set the RBW ≥ OBW.
2. Set VBW ≥ 3 × RBW.
3. Set span ≥ 2 × OBW.
4. Sweep time ≥ 10 × (number of points in sweep) × (transmission symbol period).
5. Detector = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the peak amplitude level.

Test Settings(Average Power)

1. Set span to 2 × to 3 × the OBW.
2. Set RBW ≥ OBW.
3. Set VBW ≥ 3 × RBW.
4. Set number of measurement points in sweep ≥ 2 × span / RBW.
5. Sweep time:

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

3.5 OCCUPIED BANDWIDTH.



Test setup

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

The EUT makes a call to the communication simulator.

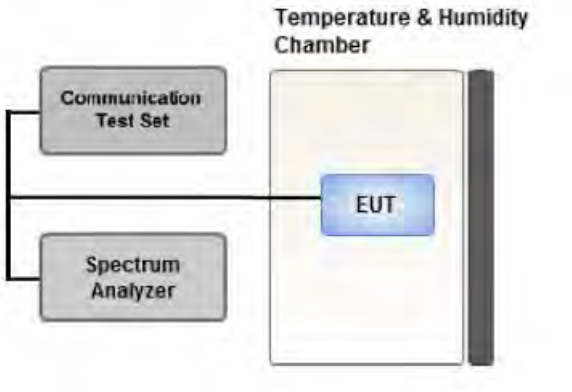
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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

Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB 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

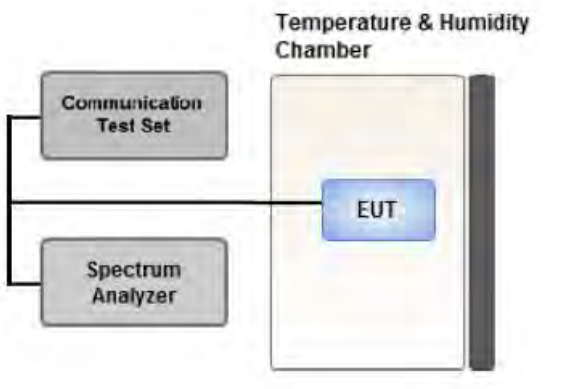
Test Overview

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 = Peak
4. Trace Mode = max hold
5. Sweep time = auto
6. Number of points in sweep ≥ 2 x Span / RBW

3.7 CHANNEL 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.

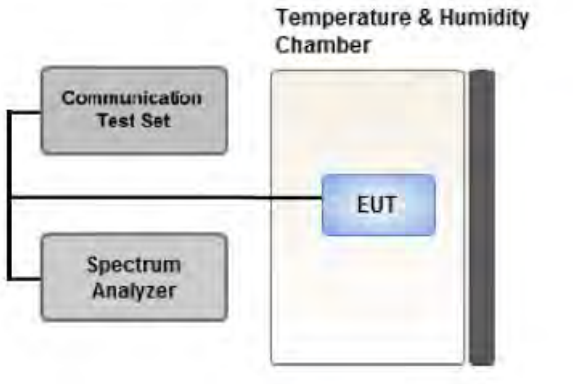
Test Settings

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. Within 1MHz of the channel edge the RBW should be 2% of EBW, then 1 MHz after that.
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 6MHz 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

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

Manufacture	Model/ Equipment	Serial Number	Calibration Date	Calibration Interval	Calibration Due
T&M SYSTEM	FBSR-02B(WHK1.2/15G-10EF)/H.P.F	-	03/02/2021	Annual	03/02/2022
T&M SYSTEM	FBSR-02B(WHK3.3/18G-10EF)/H.P.F	-	03/02/2021	Annual	03/02/2022
Hewlett Packard	11667B / Power Splitter(DC~26.5 GHz)	11275	04/07/2021	Annual	04/07/2022
Hewlett Packard	E3632A/DC Power Supply	MY40004427	09/16/2020	Annual	09/16/2021
Schwarzbeck	UHAP/ Dipole Antenna	557	04/05/2021	Biennial	04/05/2023
Schwarzbeck	UHAP/ Dipole Antenna	558	04/05/2021	Biennial	04/05/2023
ESPEC	SU-642 / Chamber	93008124	03/15/2021	Annual	03/15/2022
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	147	08/29/2019	Biennial	08/29/2021
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	9120D-1298	09/25/2019	Biennial	09/25/2021
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170342	10/13/2020	Biennial	10/13/2022
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170124	02/11/2020	Biennial	02/11/2022
Agilent	N9020A/Signal Analyzer(10Hz~26.5GHz)	MY50200093	11/17/2020	Annual	11/17/2021
Hewlett Packard	8493C/ATTENUATOR(20dB)	17280	06/04/2020	Annual	06/04/2021
REOHDE & SCHWARZ	FSV40/Spectrum Analyzer(10Hz~40GHz)	100931	10/14/2020	Annual	10/14/2021
Agilent	8960 (E5515C)/ Base Station	MY48360800	08/26/2020	Annual	08/26/2021
Schwarzbeck	FMZB1513/ Loop Antenna(9kHz~30MHz)	1513-333	03/19/2020	Biennial	03/19/2022
Schwarzbeck	VULB9160/ Bilog Antenna	3150	03/03/2021	Biennial	03/03/2023
Schwarzbeck	VULB9168/ Hybrid Antenna	760	02/22/2021	Biennial	02/22/2023
Anritsu Corp.	MT8821C/Wideband Radio Communication Tester	6262116770	07/22/2020	Annual	07/22/2021
Anritsu Corp.	MT8820C/Wideband Radio Communication Tester	6201026545	01/07/2021	Annual	01/07/2022
REOHDE & SCHWARZ	SMB100A/ SIGNAL GENERATOR (100kHz~40GHz)	177633	07/13/2020	Annual	07/13/2021
KEYSIGHT	N9030B / Signal Analyzer(5Hz~40.0GHz)	MY55480167	06/04/2020	Annual	06/04/2021
HCT CO., LTD.,	FCC LTE Mobile Conducted RF Automation Test Software	-	-	-	-

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)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70
Radiated Disturbance (18 GHz ~ 40 GHz)	5.05

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
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

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 power classes were tested, and the results were reported for the worst case PC2.

[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	15	2523.1	39921	1	0
	QPSK	Mid	20	2585.6	40546	1	99	15	2602.7	40717	1	0
	QPSK	High	20	2665.1	41341	1	99	15	2682.2	41512	1	0
	QPSK	Low	20	2506.0	39750	1	0	15	2523.1	39921	1	74
	QPSK	Mid	20	2585.6	40546	1	0	15	2602.7	40717	1	74
	QPSK	High	20	2665.1	41341	1	0	15	2682.2	41512	1	74
	QPSK	Low	20	2506.0	39750	100	0	5	2517.7	39867	25	0
	QPSK	Mid	20	2590.5	40595	100	0	5	2602.2	40712	25	0
	QPSK	High	20	2675.0	41440	100	0	5	2686.7	41557	25	0
	QPSK	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	2585.6	40546	1	99	15	2602.7	40717	1	0
	QPSK	High	20	2660.2	41292	1	99	20	2680.0	41490	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

8.1.1 PC2

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	24.51
	10	2501.3	39703	1	49	15	2513.3	39823	1	0	25.57
	10	2501.5	39705	1	49	20	2515.9	39849	1	0	23.82
	15	2503.5	39725	1	74	10	2515.5	39845	1	0	25.54
	15	2503.5	39725	1	74	15	2518.5	39875	1	0	25.56
	15	2503.8	39728	1	74	20	2520.9	39899	1	0	25.53
	20	2506.0	39750	1	99	5	2517.7	39867	1	0	25.15
	20	2506.0	39750	1	99	10	2520.4	39894	1	0	25.56
	20	***2506.0***	***39750***	***1***	***99***	***15***	***2523.1***	***39921***	***1***	***0***	***25.63***
	20	2506.0	39750	1	99	20	2525.8	39948	1	0	25.59
Mid	5	2583.8	40528	1	24	20	2595.5	40645	1	0	26.72
	10	2585.9	40549	1	49	15	2597.9	40669	1	0	26.75
	10	2583.6	40526	1	49	20	2598.0	40670	1	0	26.85
	15	2588.1	40571	1	74	10	2600.1	40691	1	0	26.78
	15	2585.5	40545	1	74	15	2600.5	40695	1	0	26.82
	15	2583.3	40523	1	74	20	2600.4	40694	1	0	26.87
	20	2590.5	40595	1	99	5	2602.2	40712	1	0	25.98
	20	2588.1	40571	1	99	10	2602.5	40715	1	0	26.68
	20	***2585.6***	***40546***	***1***	***99***	***15***	***2602.7***	***40717***	***1***	***0***	***26.88***
	20	2583.1	40521	1	99	20	2602.9	40719	1	0	26.82
High	5	2668.3	41373	1	24	20	2680.0	41490	1	0	26.06
	10	2670.5	41395	1	49	15	2682.5	41515	1	0	26.21
	10	2665.6	41346	1	49	20	2680.0	41490	1	0	26.11
	15	2672.7	41417	1	74	10	2684.7	41537	1	0	26.29
	15	2667.5	41365	1	74	15	2682.5	41515	1	0	26.15
	15	2662.9	41319	1	74	20	2680.0	41490	1	0	26.06
	20	2675.0	41440	1	99	5	2686.7	41557	1	0	25.79
	20	2670.1	41391	1	99	10	2684.5	41535	1	0	26.25
	20	***2665.1***	***41341***	***1***	***99***	***15***	***2682.2***	***41512***	***1***	***0***	***26.30***
	20	2660.2	41292	1	99	20	2680.0	41490	1	0	26.16

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	24.18
	10	2501.3	39703	50	0	15	2513.3	39823	75	0	24.19
	10	2501.5	39705	50	0	20	2515.9	39849	100	0	24.09
	15	2503.5	39725	75	0	10	2515.5	39845	50	0	24.15
	15	2503.5	39725	75	0	15	2518.5	39875	75	0	23.95
	15	2503.8	39728	75	0	20	2520.9	39899	100	0	23.86
	20	***2506.0***	***39750***	***100***	***0***	***5***	***2517.7***	***39867***	***25***	***0***	***24.21***
	20	2506.0	39750	100	0	10	2520.4	39894	50	0	23.90
	20	2506.0	39750	100	0	15	2523.1	39921	75	0	24.06
	20	2506.0	39750	100	0	20	2525.8	39948	100	0	23.94
Mid	5	2583.8	40528	25	0	20	2595.5	40645	100	0	25.11
	10	2585.9	40549	50	0	15	2597.9	40669	75	0	25.10
	10	2583.6	40526	50	0	20	2598.0	40670	100	0	25.01
	15	2588.1	40571	75	0	10	2600.1	40691	50	0	25.12
	15	2585.5	40545	75	0	15	2600.5	40695	75	0	25.03
	15	2583.3	40523	75	0	20	2600.4	40694	100	0	25.04
	20	***2590.5***	***40595***	***100***	***0***	***5***	***2602.2***	***40712***	***25***	***0***	***25.13***
	20	2588.1	40571	100	0	10	2602.5	40715	50	0	25.10
	20	2585.6	40546	100	0	15	2602.7	40717	75	0	24.93
	20	2583.1	40521	100	0	20	2602.9	40719	100	0	24.88
High	5	2668.3	41373	25	0	20	2680.0	41490	100	0	24.41
	10	2670.5	41395	50	0	15	2682.5	41515	75	0	24.27
	10	2665.6	41346	50	0	20	2680.0	41490	100	0	24.38
	15	2672.7	41417	75	0	10	2684.7	41537	50	0	24.46
	15	2667.5	41365	75	0	15	2682.5	41515	75	0	24.12
	15	2662.9	41319	75	0	20	2680.0	41490	100	0	24.43
	20	***2675.0***	***41440***	***100***	***0***	***5***	***2686.7***	***41557***	***25***	***0***	***24.49***
	20	2670.1	41391	100	0	10	2684.5	41535	50	0	24.01
	20	2665.1	41341	100	0	15	2682.2	41512	75	0	24.38
	20	2660.2	41292	100	0	20	2680.0	41490	100	0	24.27

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	15	2523.1	39921	1	0	24.60
Mid	20	2585.6	40546	1	99	15	2602.7	40717	1	0	25.87
High	20	2665.1	41341	1	99	15	2682.2	41512	1	0	25.30
Low	20	2506.0	39750	100	0	5	2517.7	39867	25	0	22.64
Mid	20	2590.5	40595	100	0	5	2602.2	40712	25	0	23.91
High	20	2675.0	41440	100	0	5	2686.7	41557	25	0	23.23

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	15	2523.1	39921	1	0	21.81
Mid	20	2585.6	40546	1	99	15	2602.7	40717	1	0	22.88
High	20	2665.1	41341	1	99	15	2682.2	41512	1	0	22.34
Low	20	2506.0	39750	100	0	5	2517.7	39867	25	0	21.71
Mid	20	2590.5	40595	100	0	5	2602.2	40712	25	0	22.94
High	20	2675.0	41440	100	0	5	2686.7	41557	25	0	22.28

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	15	2523.1	39921	1	0	20.94
Mid	20	2585.6	40546	1	99	15	2602.7	40717	1	0	21.97
High	20	2665.1	41341	1	99	15	2682.2	41512	1	0	21.43
Low	20	2506.0	39750	100	0	5	2517.7	39867	25	0	20.70
Mid	20	2590.5	40595	100	0	5	2602.2	40712	25	0	21.92
High	20	2675.0	41440	100	0	5	2686.7	41557	25	0	21.29

Note:

Modulation : 256QAM

8.2 Equivalent Isotropic Radiated Power

8.2.1 PC2

	PCC			SCC			Measured	Substitute	Ant.			E.I.R.P	
	BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset	Level (dBm)	Level (dBm)	Gain (dBi)	C.L	Pol.	W	dBm
Low	5	39683	25/0	20	39800	100/0	-24.60	12.53	10.75	2.32	H	0.125	20.96
	10	39703	50/0	15	39823	75/0	-21.17	15.96	10.75	2.32	H	0.275	24.39
	10	39705	50/0	20	39849	100/0	-24.93	12.20	10.75	2.32	H	0.116	20.63
	15	39725	75/0	10	39845	50/0	-21.39	15.74	10.75	2.32	H	0.261	24.17
	15	39725	75/0	15	39875	75/0	-21.17	15.96	10.75	2.32	H	0.275	24.39
	15	39728	75/0	20	39899	100/0	-21.17	15.96	10.75	2.32	H	0.275	24.39
	20	39750	100/0	5	39867	25/0	-21.87	15.26	10.75	2.32	H	0.234	23.69
	20	39750	100/0	10	39894	50/0	-21.81	15.32	10.75	2.32	H	0.237	23.75
	20	39750	100/0	15	39921	75/0	-20.98	16.15	10.75	2.32	H	0.287	24.58
	20	***39750***	***100/0***	***20***	***39948***	***100/0***	***-20.81***	***16.32***	***10.75***	***2.32***	***H***	***0.298***	***24.75***
Mid	5	40528	25/0	20	40645	100/0	-20.59	16.56	10.98	2.35	H	0.330	25.19
	10	40549	50/0	15	40669	75/0	-20.64	16.51	10.98	2.35	H	0.326	25.14
	10	40526	50/0	20	40670	100/0	-20.48	16.67	10.98	2.35	H	0.338	25.30
	15	40571	75/0	10	40691	50/0	-20.34	16.81	10.98	2.35	H	0.350	25.44
	15	40545	75/0	15	40695	75/0	-20.43	16.72	10.98	2.35	H	0.342	25.35
	15	40523	75/0	20	40694	100/0	-20.48	16.67	10.98	2.35	H	0.338	25.30
	20	40595	100/0	5	40712	25/0	-20.46	16.69	10.98	2.35	H	0.340	25.32
	20	40571	100/0	10	40715	50/0	-20.36	16.79	10.98	2.35	H	0.348	25.42
	20	***40546***	***100/0***	***15***	***40717***	***75/0***	***-20.18***	***16.97***	***10.98***	***2.35***	***H***	***0.363***	***25.60***
	20	40521	100/0	20	40719	100/0	-20.34	16.81	10.98	2.35	H	0.350	25.44
High	5	41373	25/0	20	41490	100/0	-21.69	15.75	11.10	2.39	H	0.280	24.47
	10	41395	50/0	15	41515	75/0	-21.55	15.89	11.10	2.39	H	0.289	24.61
	10	41346	50/0	20	41490	100/0	-21.68	15.76	11.10	2.39	H	0.280	24.48
	15	41417	75/0	10	41537	50/0	-22.01	15.43	11.10	2.39	H	0.260	24.15
	15	41365	75/0	15	41515	75/0	-21.64	15.80	11.10	2.39	H	0.283	24.52
	15	41319	75/0	20	41490	100/0	-21.61	15.83	11.10	2.39	H	0.285	24.55
	20	41440	100/0	5	41557	25/0	-21.69	15.75	11.10	2.39	H	0.280	24.47
	20	41391	100/0	10	41535	50/0	-22.03	15.41	11.10	2.39	H	0.259	24.13
	20	41341	100/0	15	41512	75/0	-21.57	15.87	11.10	2.39	H	0.288	24.59
	20	***41292***	***100/0***	***20***	***41490***	***100/0***	***-21.49***	***15.95***	***11.10***	***2.39***	***H***	***0.293***	***24.67***

Note:

1. Modulation : QPSK
2. Limit : < 2 Watts

PCC			SCC			Measured	Substitute	Ant.	C.L	Pol.	E.I.R.P	
BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset	Level (dBm)	Level (dBm)	Gain (dBi)			W	dBm
20	39750	100/0	20	39948	100/0	-21.82	15.31	10.75	2.32	H	0.236	23.74
5	40528	25/0	20	40645	100/0	-21.25	15.90	10.98	2.35	H	0.283	24.53
10	40549	50/0	15	40669	75/0	-21.17	15.98	10.98	2.35	H	0.289	24.61
10	40526	50/0	20	40670	100/0	-21.23	15.92	10.98	2.35	H	0.285	24.55
15	40571	75/0	10	40691	50/0	-21.05	16.10	10.98	2.35	H	0.297	24.73
15	40545	75/0	15	40695	75/0	-21.30	15.85	10.98	2.35	H	0.280	24.48
15	40523	75/0	20	40694	100/0	-21.22	15.93	10.98	2.35	H	0.285	24.56
20	40595	100/0	5	40712	25/0	-21.28	15.87	10.98	2.35	H	0.282	24.50
20	40571	100/0	10	40715	50/0	-21.21	15.94	10.98	2.35	H	0.286	24.57
20	40546	100/0	15	40717	75/0	-20.50	16.65	10.98	2.35	H	0.337	25.28
20	40521	100/0	20	40719	100/0	-21.24	15.91	10.98	2.35	H	0.284	24.54
20	41292	100/0	20	41490	100/0	-22.49	14.95	11.10	2.39	H	0.233	23.67

Note:

1. Modulation : 16QAM

2. Limit : < 2 Watts

PCC			SCC			Measured	Substitute	Ant.	C.L	Pol.	E.I.R.P	
BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset	Level (dBm)	Level (dBm)	Gain (dBi)			W	dBm
20	39750	100/0	20	39948	100/0	-22.56	14.57	10.75	2.32	H	0.199	23.00
5	40528	25/0	20	40645	100/0	-22.05	15.10	10.98	2.35	H	0.236	23.73
10	40549	50/0	15	40669	75/0	-21.93	15.22	10.98	2.35	H	0.242	23.85
10	40526	50/0	20	40670	100/0	-21.80	15.35	10.98	2.35	H	0.250	23.98
15	40571	75/0	10	40691	50/0	-21.80	15.35	10.98	2.35	H	0.250	23.98
15	40545	75/0	15	40695	75/0	-21.94	15.21	10.98	2.35	H	0.242	23.84
15	40523	75/0	20	40694	100/0	-21.84	15.31	10.98	2.35	H	0.247	23.94
20	40595	100/0	5	40712	25/0	-22.04	15.11	10.98	2.35	H	0.236	23.74
20	40571	100/0	10	40715	50/0	-21.83	15.32	10.98	2.35	H	0.248	23.95
20	40546	100/0	15	40717	75/0	-20.94	16.21	10.98	2.35	H	0.304	24.84
20	40521	100/0	20	40719	100/0	-22.06	15.09	10.98	2.35	H	0.235	23.72
20	41292	100/0	20	41490	100/0	-23.24	14.20	11.10	2.39	H	0.196	22.92

Note:

1. Modulation : 64QAM

2. Limit : < 2 Watts

PCC			SCC			Measured	Substitute	Ant.			E.I.R.P	
BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset	Level (dBm)	Level (dBm)	Gain (dBi)	C.L	Pol.	W	dBm
20	39750	100/0	20	39948	100/0	-25.64	11.07	10.75	2.32	H	0.089	19.50
5	40528	25/0	20	40645	100/0	-24.72	12.07	10.98	2.35	H	0.118	20.70
10	40549	50/0	15	40669	75/0	-24.94	11.85	10.98	2.35	H	0.112	20.48
10	40526	50/0	20	40670	100/0	-24.79	12.00	10.98	2.35	H	0.116	20.63
15	40571	75/0	10	40691	50/0	-24.61	12.18	10.98	2.35	H	0.121	20.81
15	40545	75/0	15	40695	75/0	-24.89	11.90	10.98	2.35	H	0.113	20.53
15	40523	75/0	20	40694	100/0	-24.86	11.93	10.98	2.35	H	0.114	20.56
20	40595	100/0	5	40712	25/0	-25.01	11.78	10.98	2.35	H	0.110	20.41
20	40571	100/0	10	40715	50/0	-24.69	12.10	10.98	2.35	H	0.118	20.73
20	40546	100/0	15	40717	75/0	-21.57	15.22	10.98	2.35	H	0.243	23.85
20	40521	100/0	20	40719	100/0	-24.88	11.91	10.98	2.35	H	0.113	20.54
20	41292	100/0	20	41490	100/0	-26.24	10.74	11.10	2.39	H	0.088	19.46

Note:

1. Modulation : 256QAM

2. Limit : < 2 Watts

8.3 Conducted Spurious Emissions

8.3.1 PC2

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	15	39921	2523.1	1/0	8.0529	28.591	-60.92	-32.32
Mid	20	40546	2585.6	1/99	15	40717	2602.7	1/0	3.7707	27.976	-61.35	-33.38
High	20	41341	2665.1	1/99	15	41512	2682.2	1/0	4.8869	27.976	-60.09	-32.12
Low	20	39750	2506.0	1/0	15	39921	2523.1	1/74	4.9881	27.976	-61.01	-33.04
Mid	20	40546	2585.6	1/0	15	40717	2602.7	1/74	3.1556	27.976	-60.43	-32.46
High	20	41341	2665.1	1/0	15	41512	2682.2	1/74	4.0160	27.976	-60.99	-33.01
Low	20	39750	2506.0	100/0	5	39867	2517.7	25/0	8.0828	28.591	-60.96	-32.37
Mid	20	40595	2590.5	100/0	5	40712	2602.2	25/0	9.6376	28.591	-60.38	-31.79
High	20	41440	2675.0	100/0	5	41557	2686.7	25/0	9.9392	28.591	-61.22	-32.63
Low	20	39750	2506.0	100/0	20	39948	2525.8	100/0	3.9916	27.976	-60.63	-32.65
Mid	20	40521	2583.1	100/0	20	40719	2602.9	100/0	3.7932	27.976	-60.62	-32.65
High	20	41292	2660.2	100/0	20	41490	2680.0	100/0	5.0145	28.591	-59.99	-31.40

Note:

1. Modulation : QPSK

2. Factor(dB) = Cable Loss + Ext. Attenuator + Power Splitter

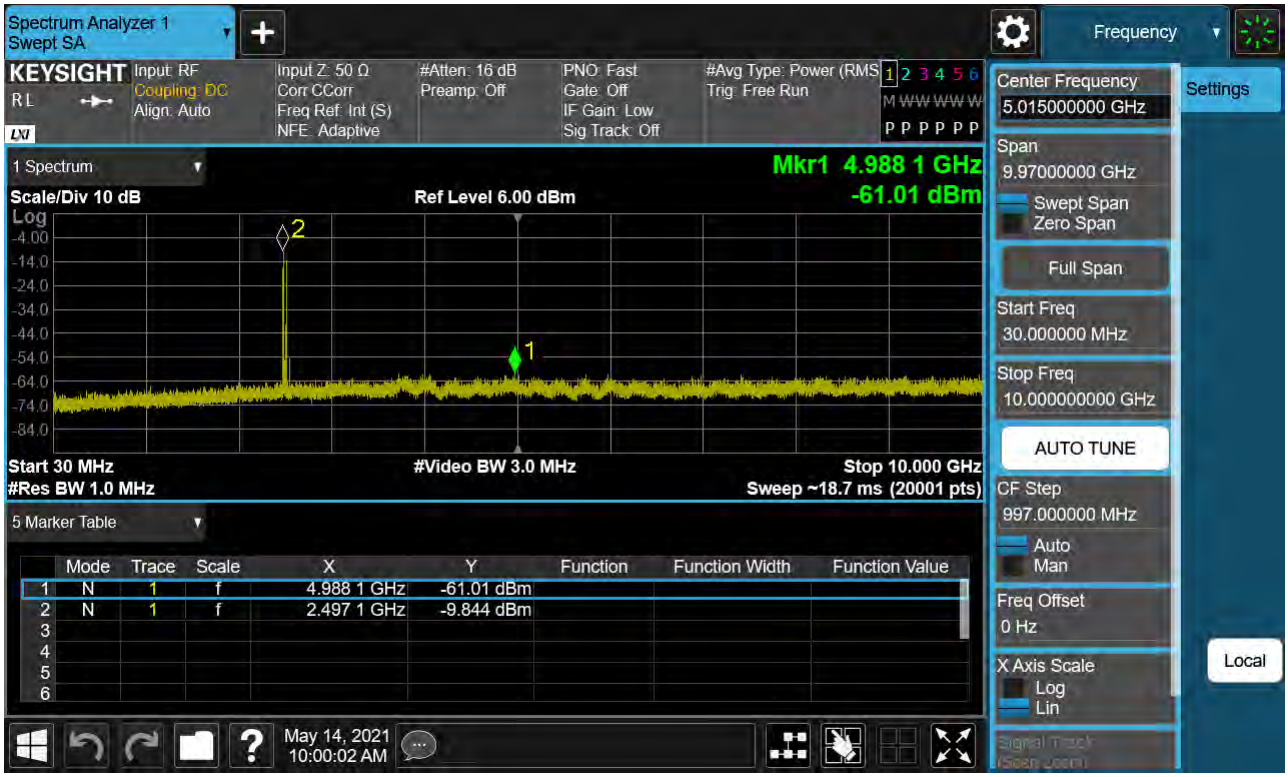
3. Factors for frequency :

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

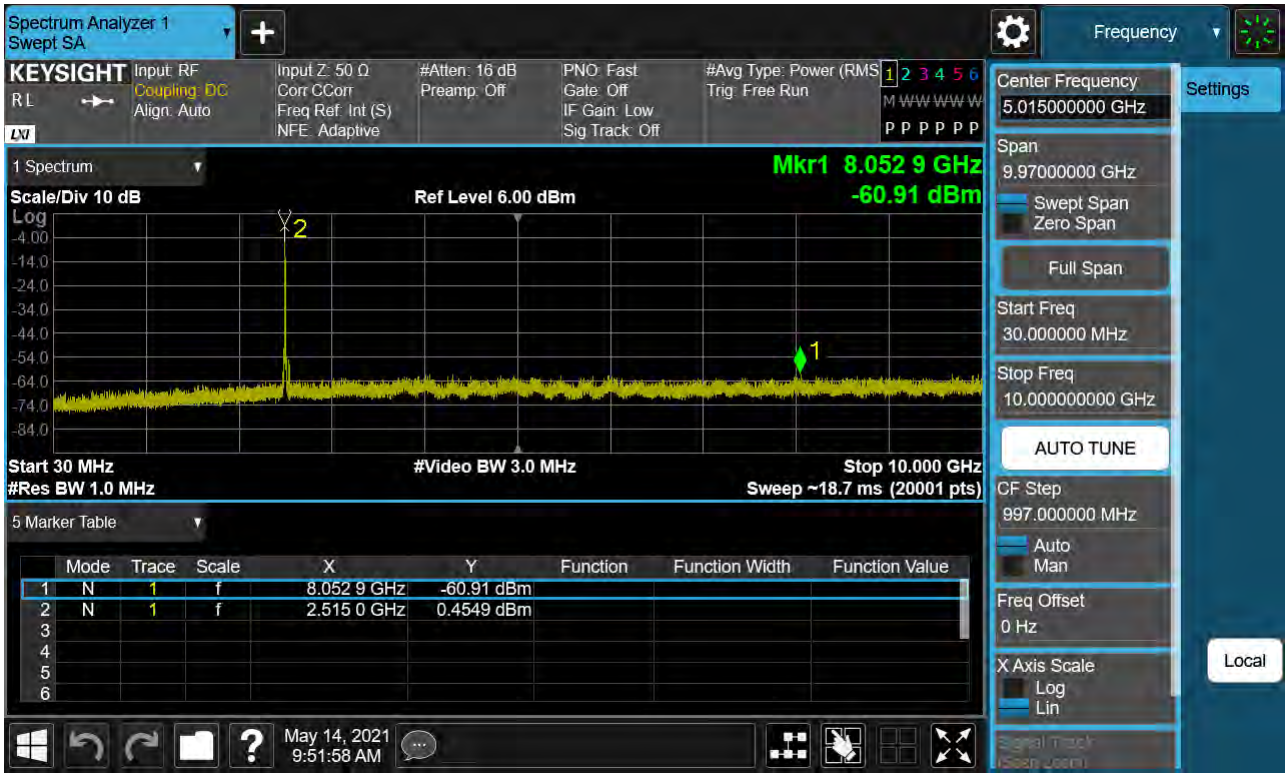
4. Limit : -25.0 dBm

Frequency Range : 30MHz ~ 10GHz

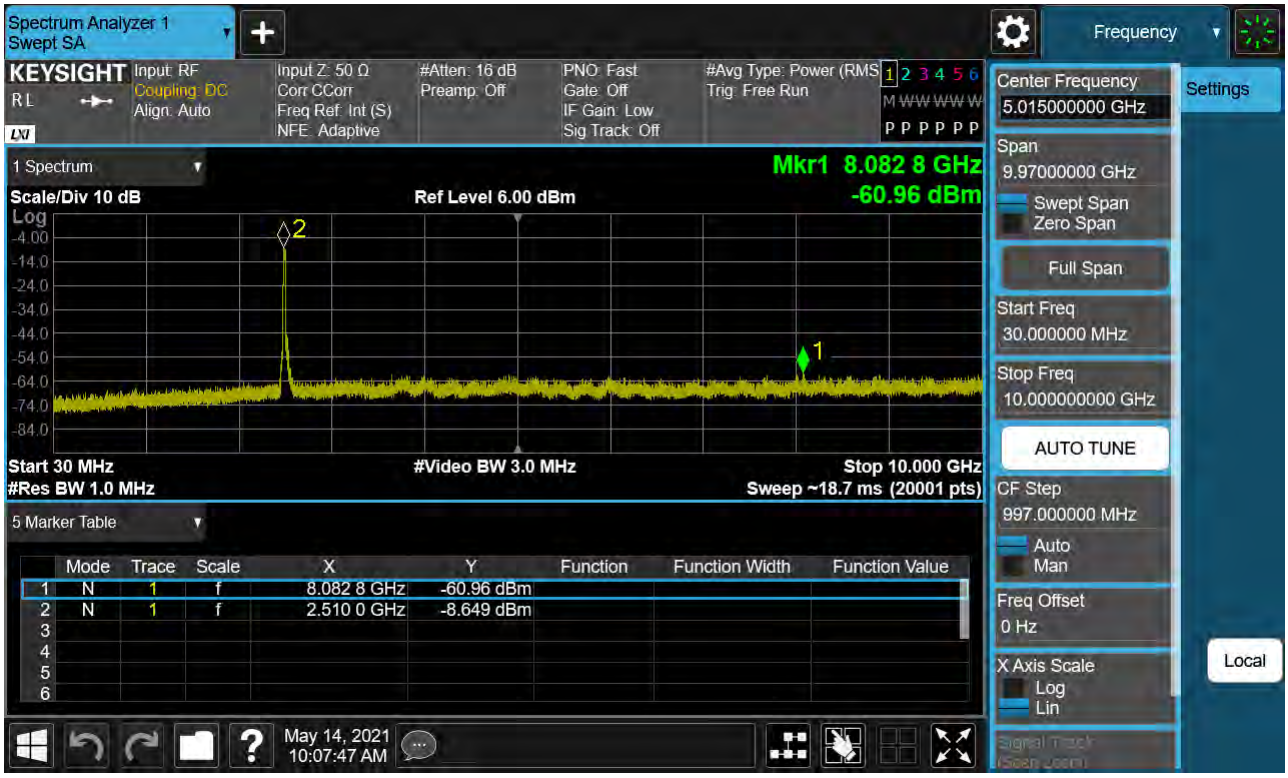
PCC 20MHz Ch39750 RB1 Offset0 SCC 15MHz Ch39921 RB1 Offset74



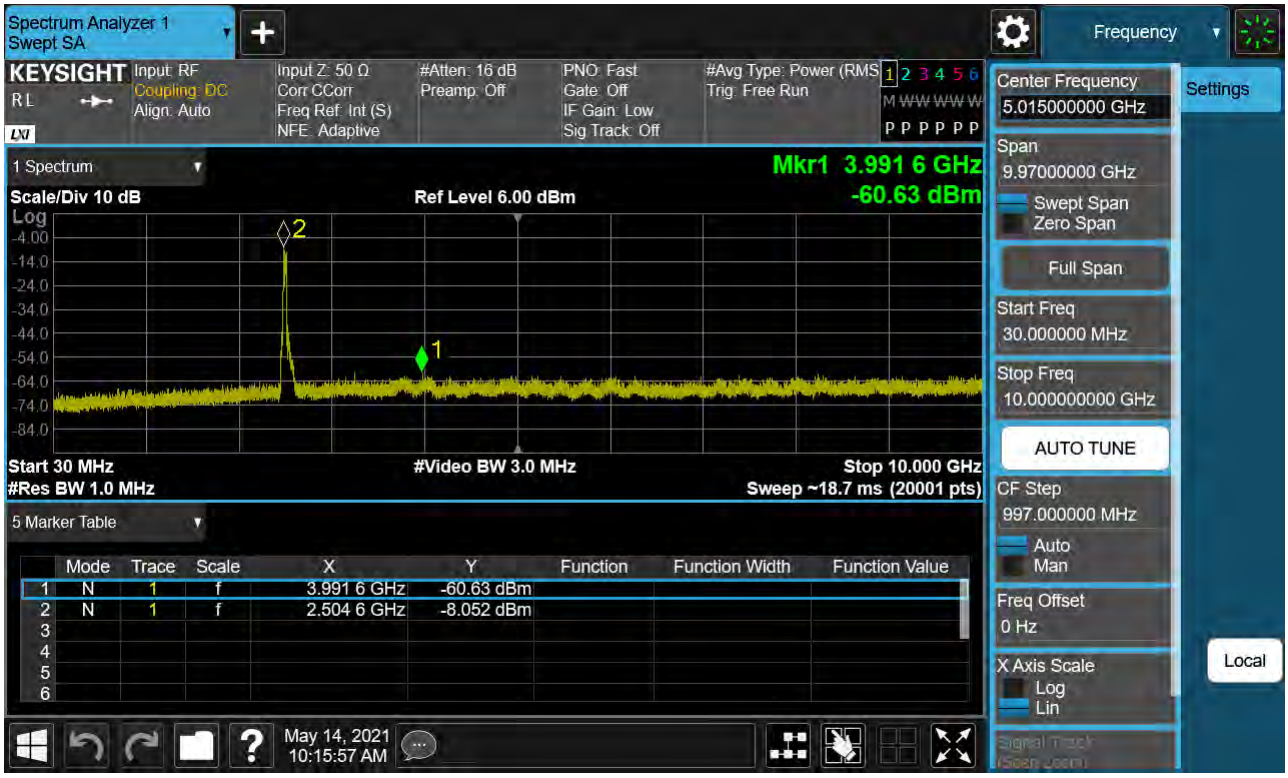
PCC 20MHz Ch39750 RB1 Offset99 SCC 15MHz Ch39921 RB1 Offset0



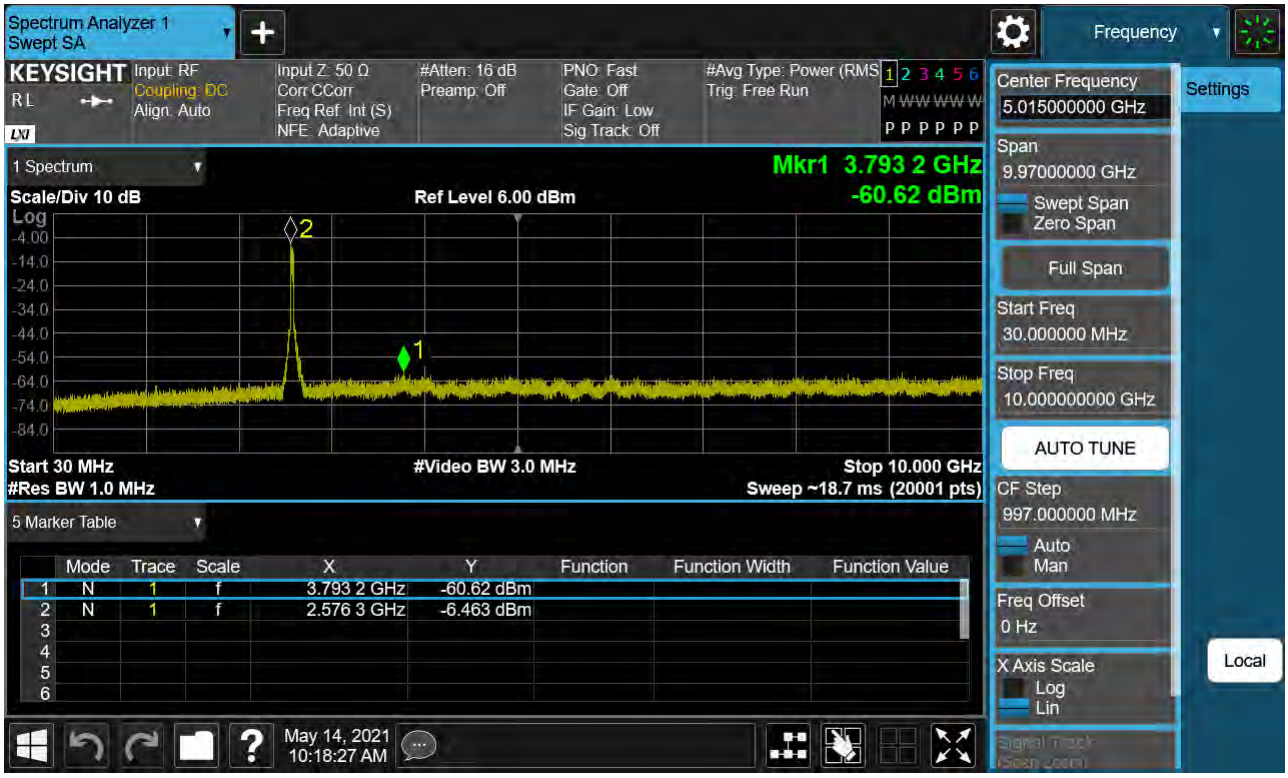
PCC 20MHz Ch39750 RB100 Offset0 SCC 5MHz Ch39867 RB25 Offset0



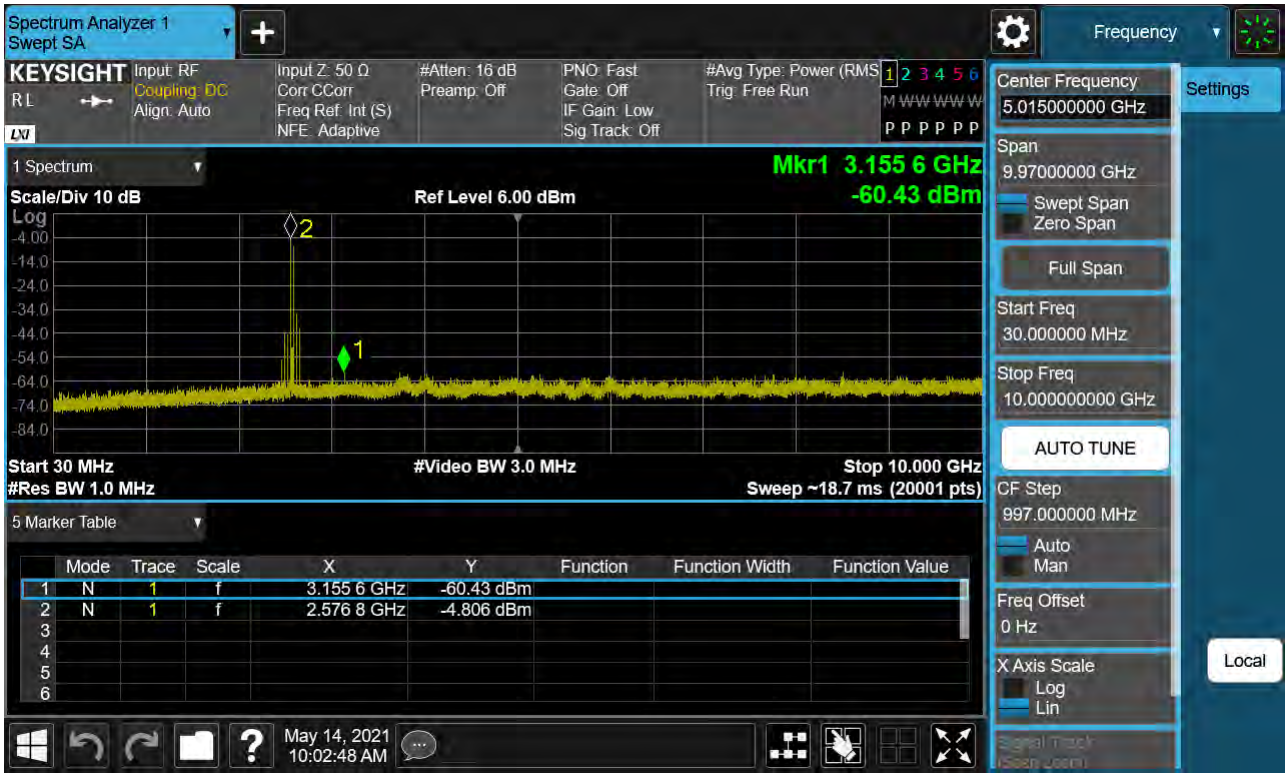
PCC 20MHz Ch39750 RB100 Offset0 SCC 20MHz Ch39948 RB100 Offset0



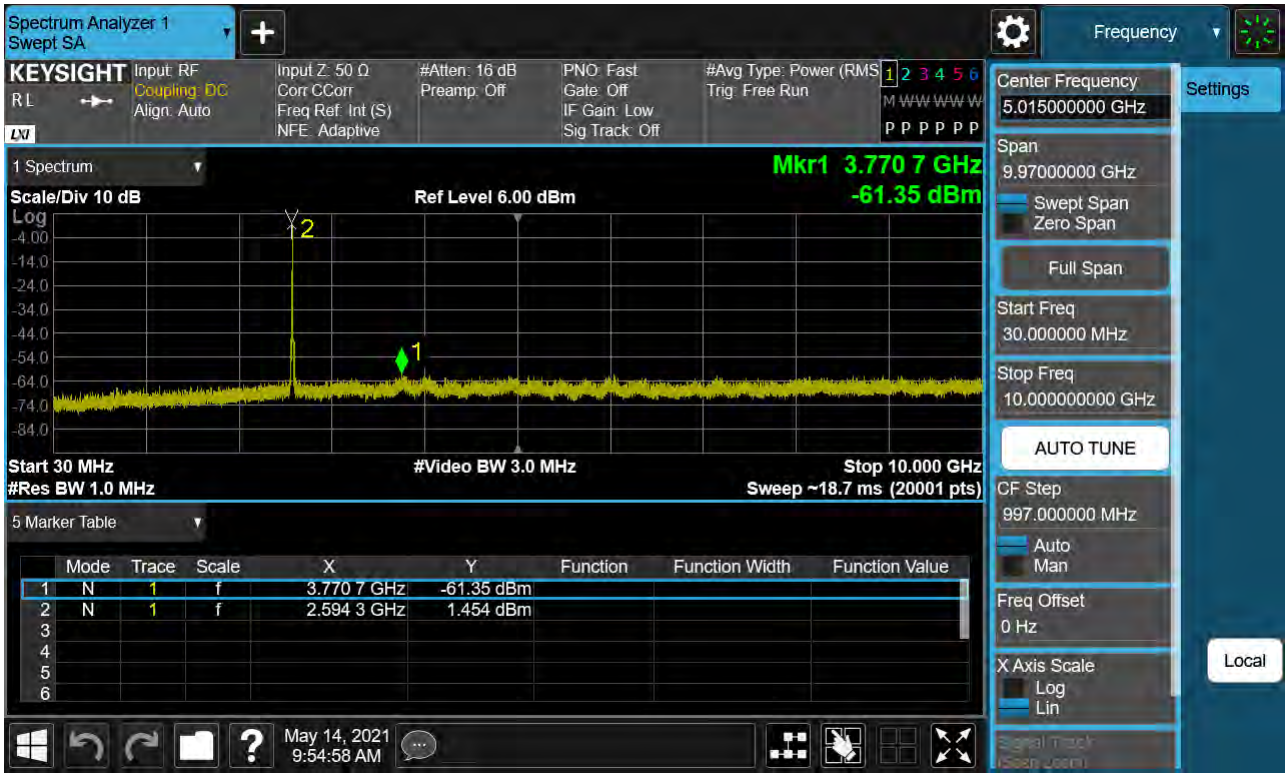
PCC 20MHz Ch40521 RB100 Offset0 SCC 20MHz Ch40719 RB100 Offset0



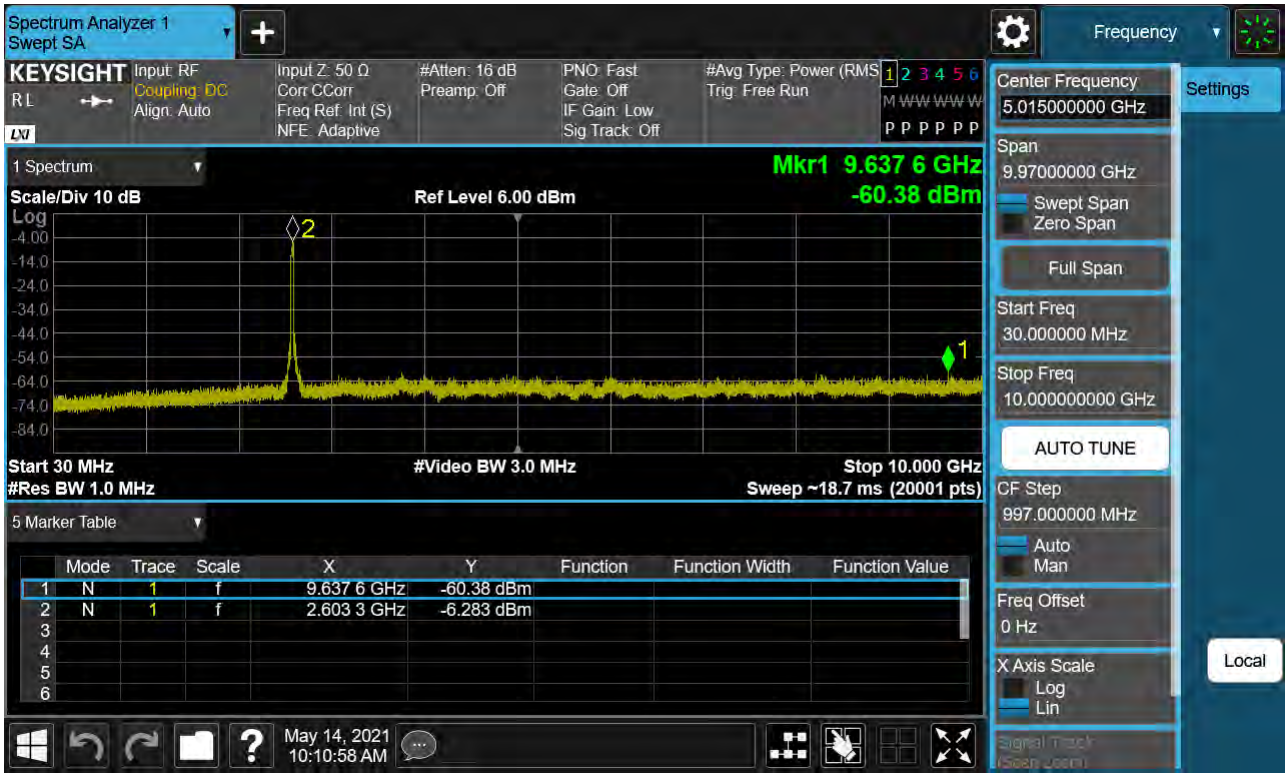
PCC 20MHz Ch40546 RB1 Offset0 SCC 15MHz Ch40717 RB1 Offset74



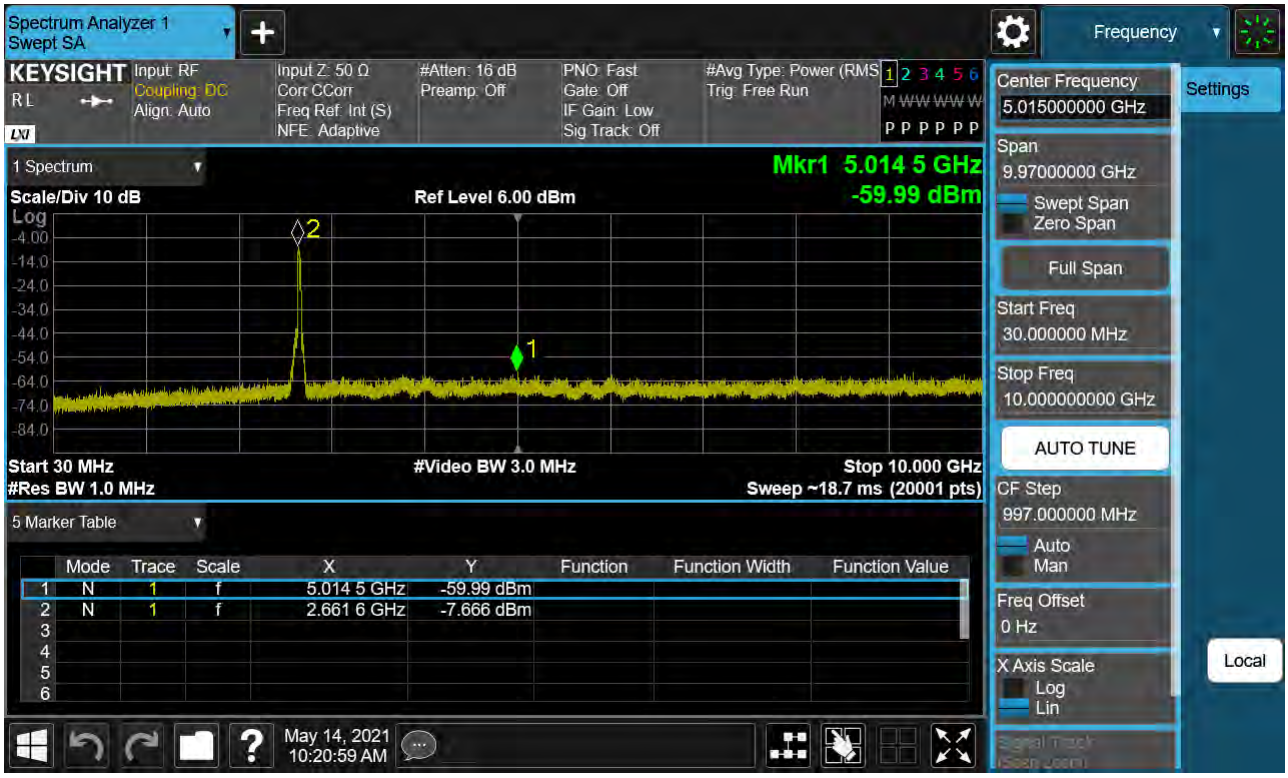
PCC 20MHz Ch40546 RB1 Offset99 SCC 15MHz Ch40717 RB1 Offset0



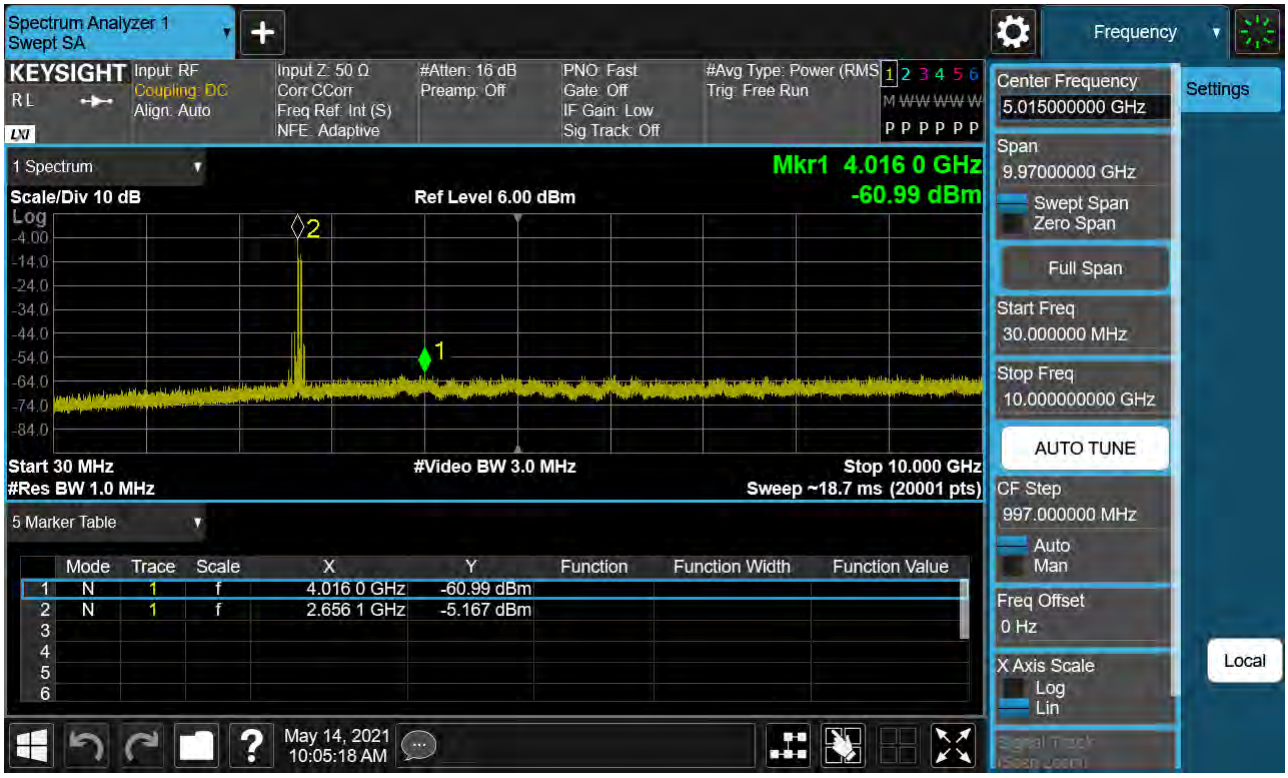
PCC 20MHz Ch40595 RB100 Offset0 SCC 5MHz Ch40712 RB25 Offset0



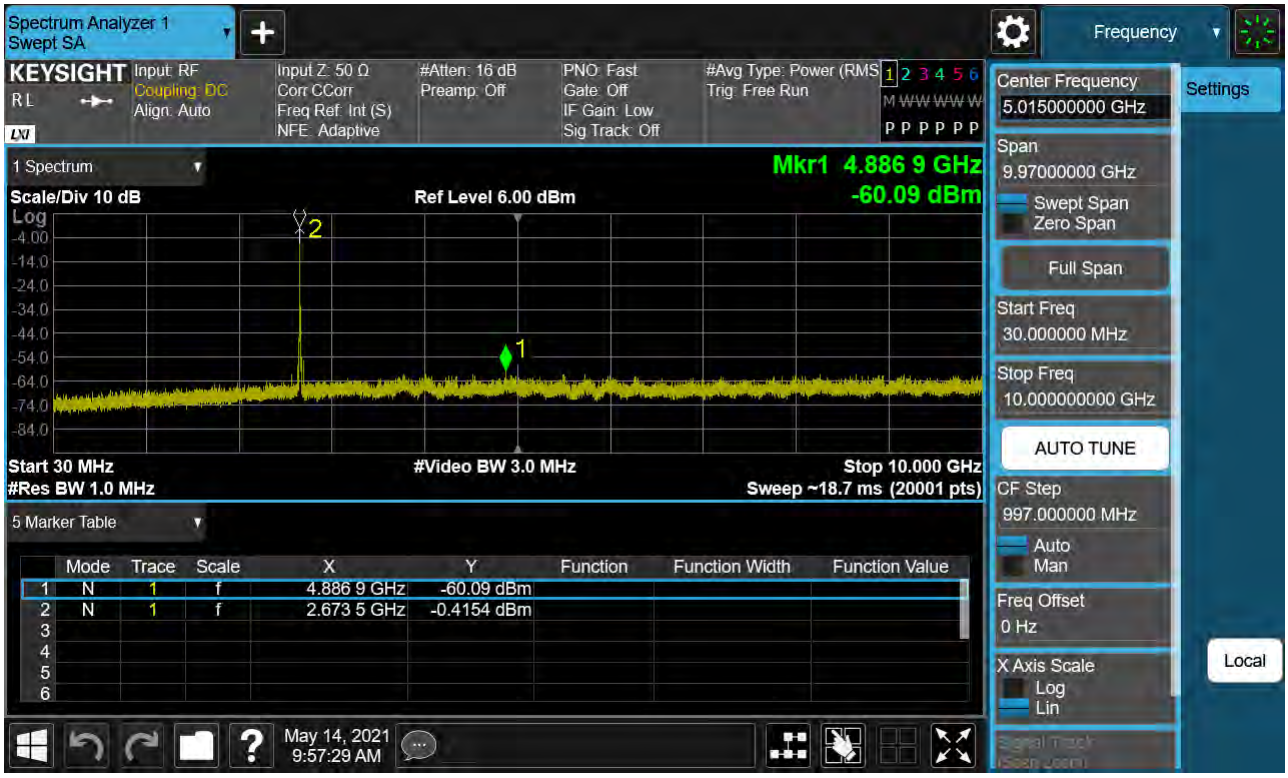
PCC 20MHz Ch41292 RB100 Offset0 SCC 20MHz Ch41490 RB100 Offset0



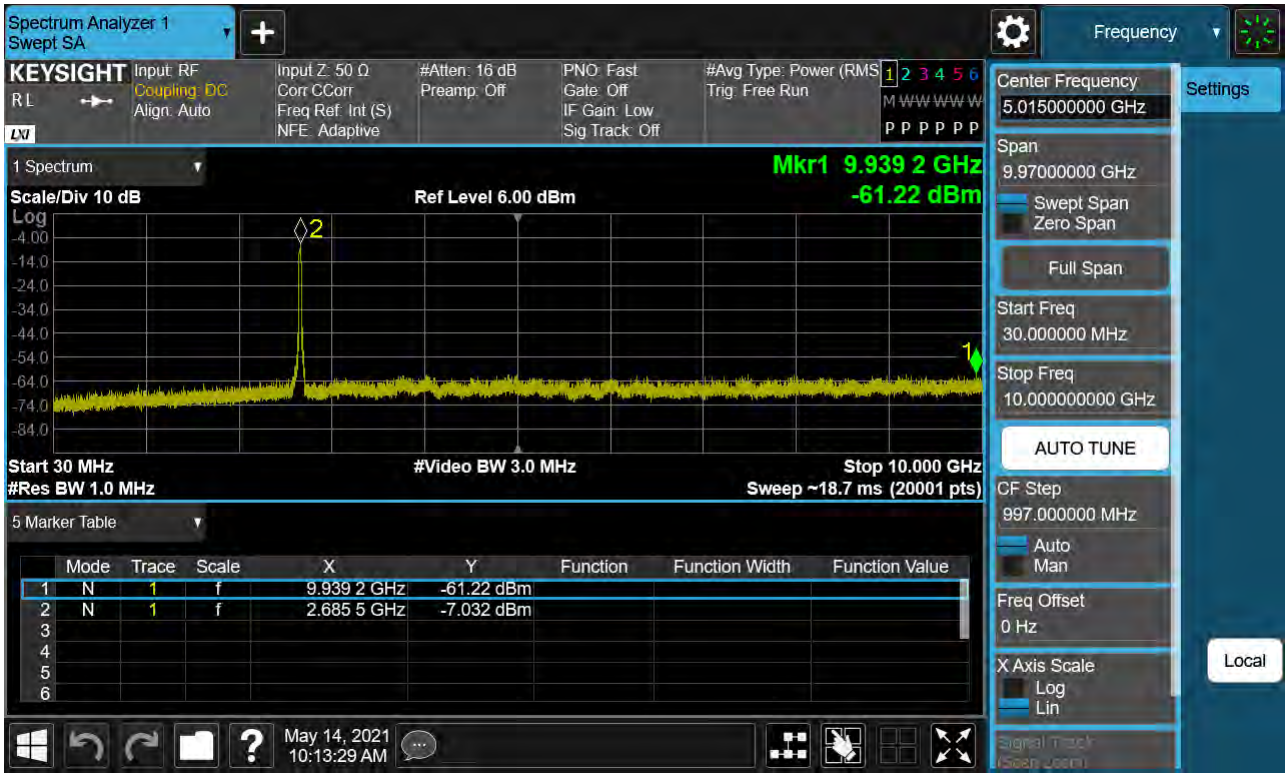
PCC 20MHz Ch41341 RB1 Offset0 SCC 15MHz Ch41512 RB1 Offset74



PCC 20MHz Ch41341 RB1 Offset99 SCC 15MHz Ch41512 RB1 Offset0

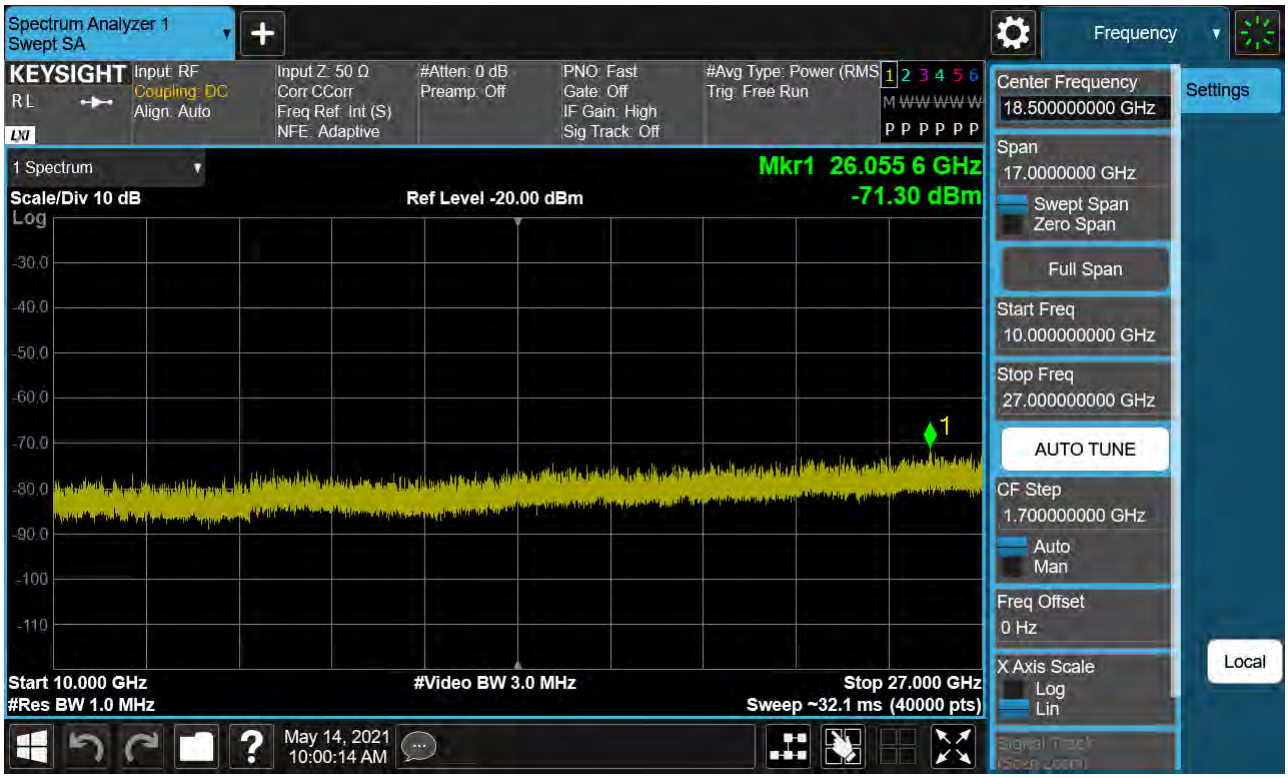


PCC 20MHz Ch41440 RB100 Offset0 SCC 5MHz Ch41557 RB25 Offset0

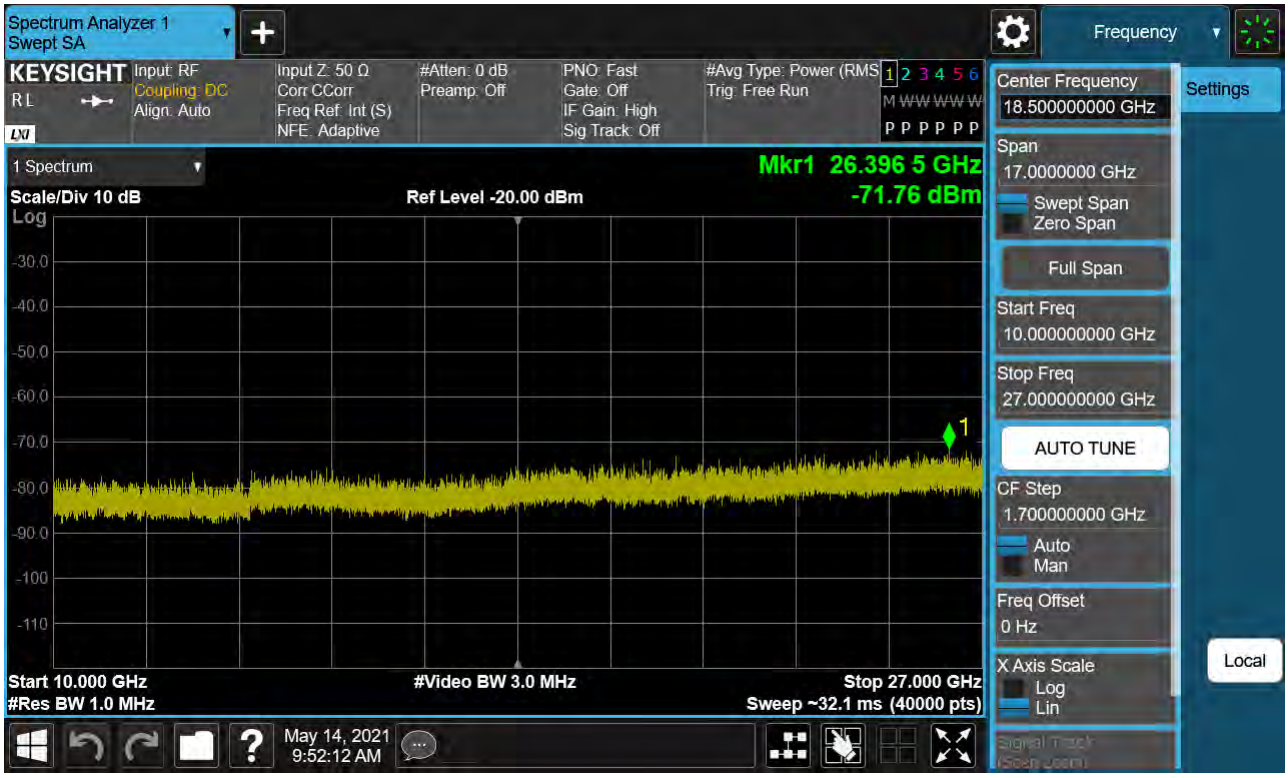


Frequency Range : 10GHz ~ 27.0GHz

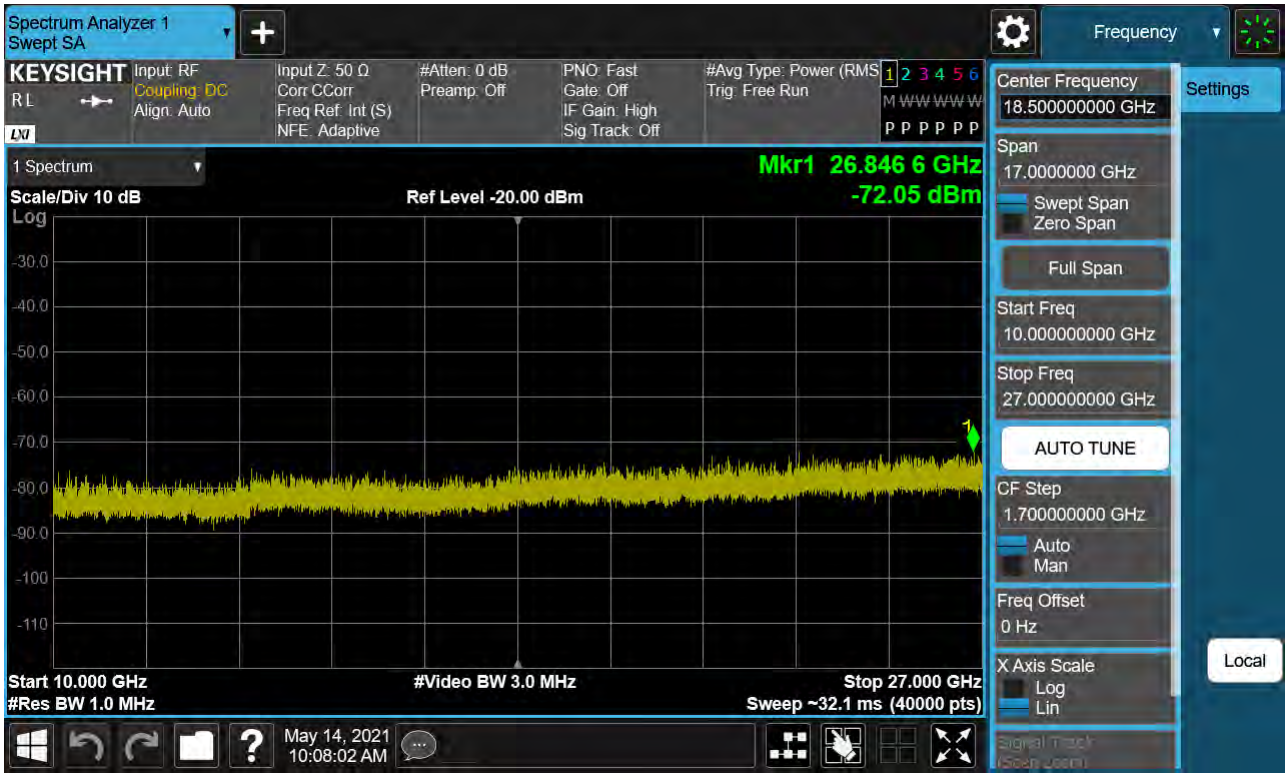
PCC 20MHz Ch39750 RB1 Offset0, SCC 15MHz Ch39921 RB1 Offset74



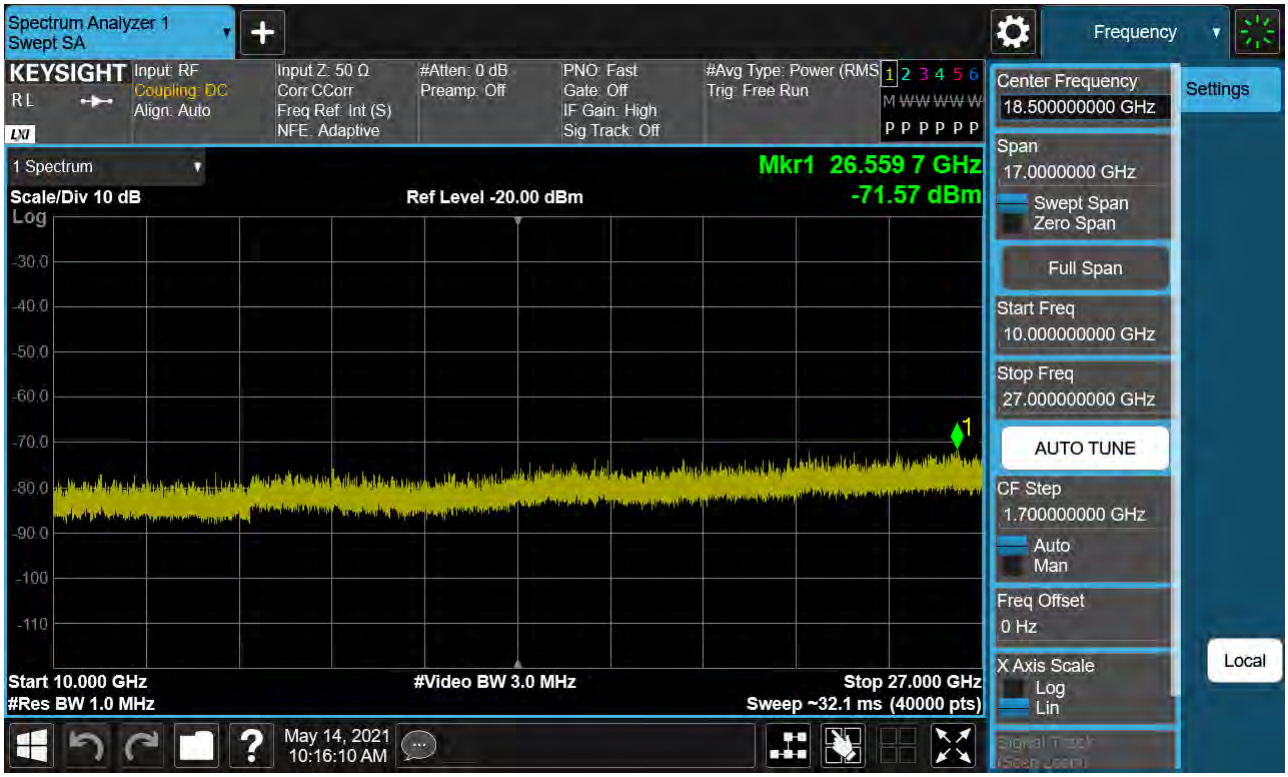
PCC 20MHz Ch39750 RB1 Offset99, SCC 15MHz Ch39921 RB1 Offset0



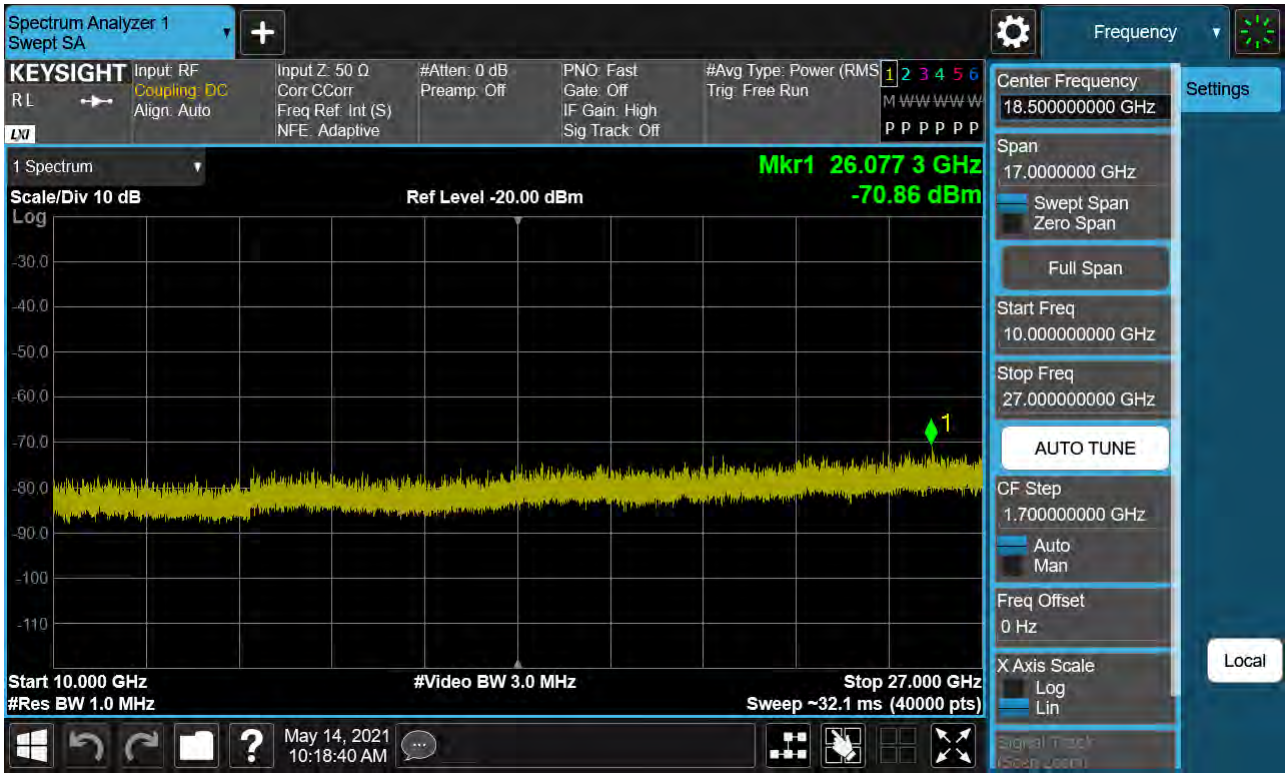
PCC 20MHz Ch39750 RB100 Offset0, SCC 5MHz Ch39867 RB25 Offset0



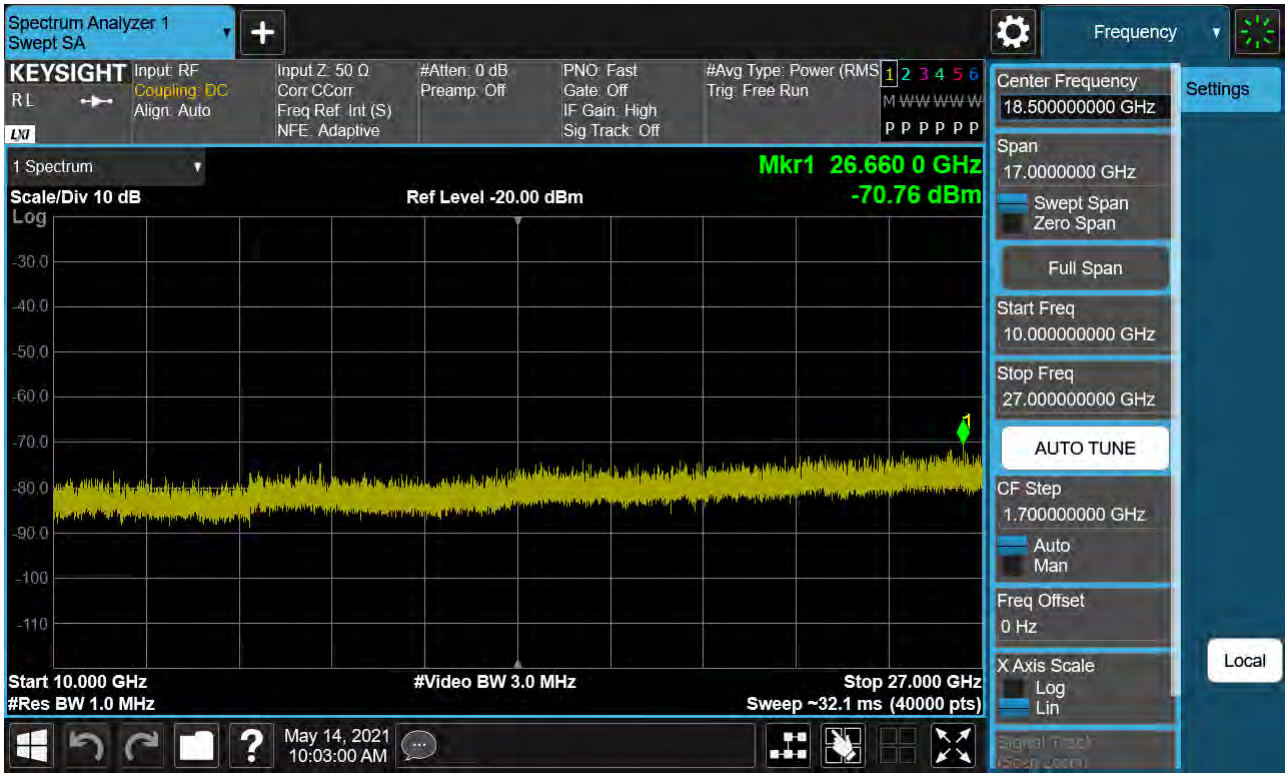
PCC 20MHz Ch39750 RB100 Offset0, SCC 20MHz Ch39948 RB100 Offset0



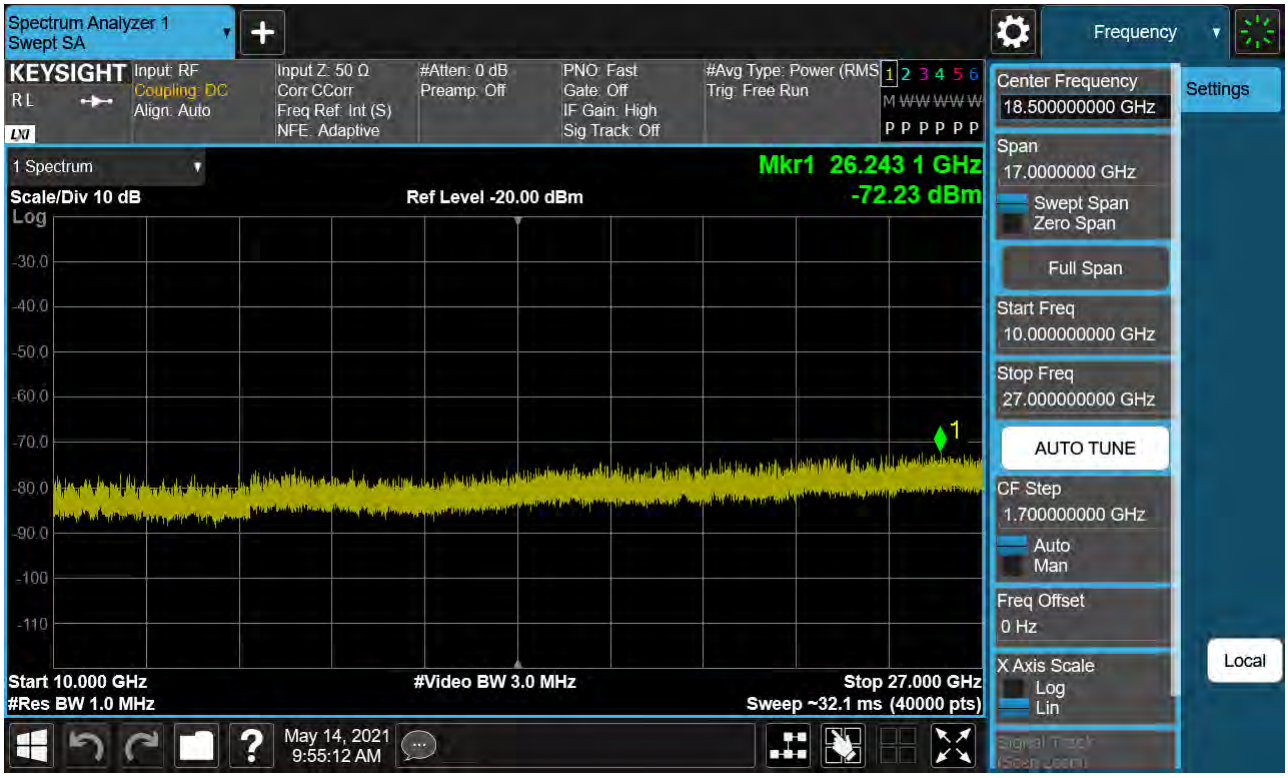
PCC 20MHz Ch40521 RB100 Offset0, SCC 20MHz Ch40719 RB100 Offset0



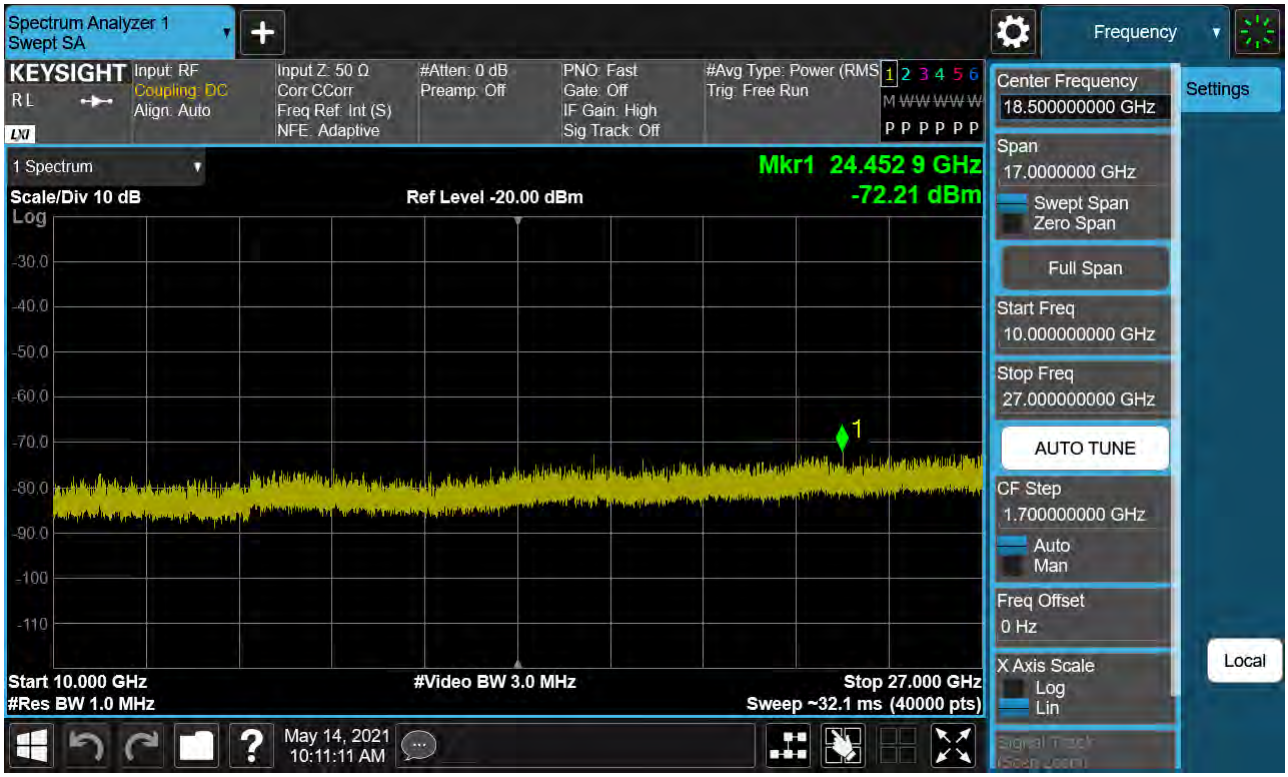
PCC 20MHz Ch40546 RB1 Offset0, SCC 15MHz Ch40717 RB1 Offset74



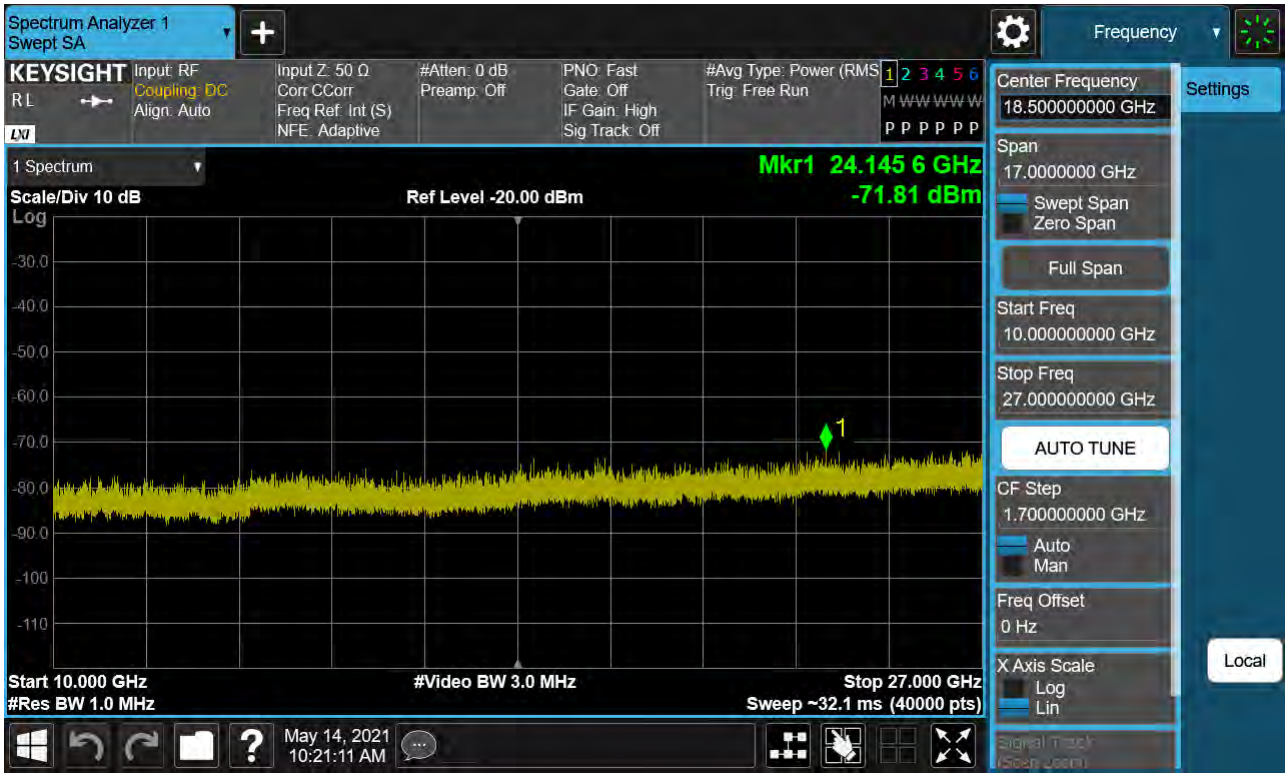
PCC 20MHz Ch40546 RB1 Offset99, SCC 15MHz Ch40717 RB1 Offset0



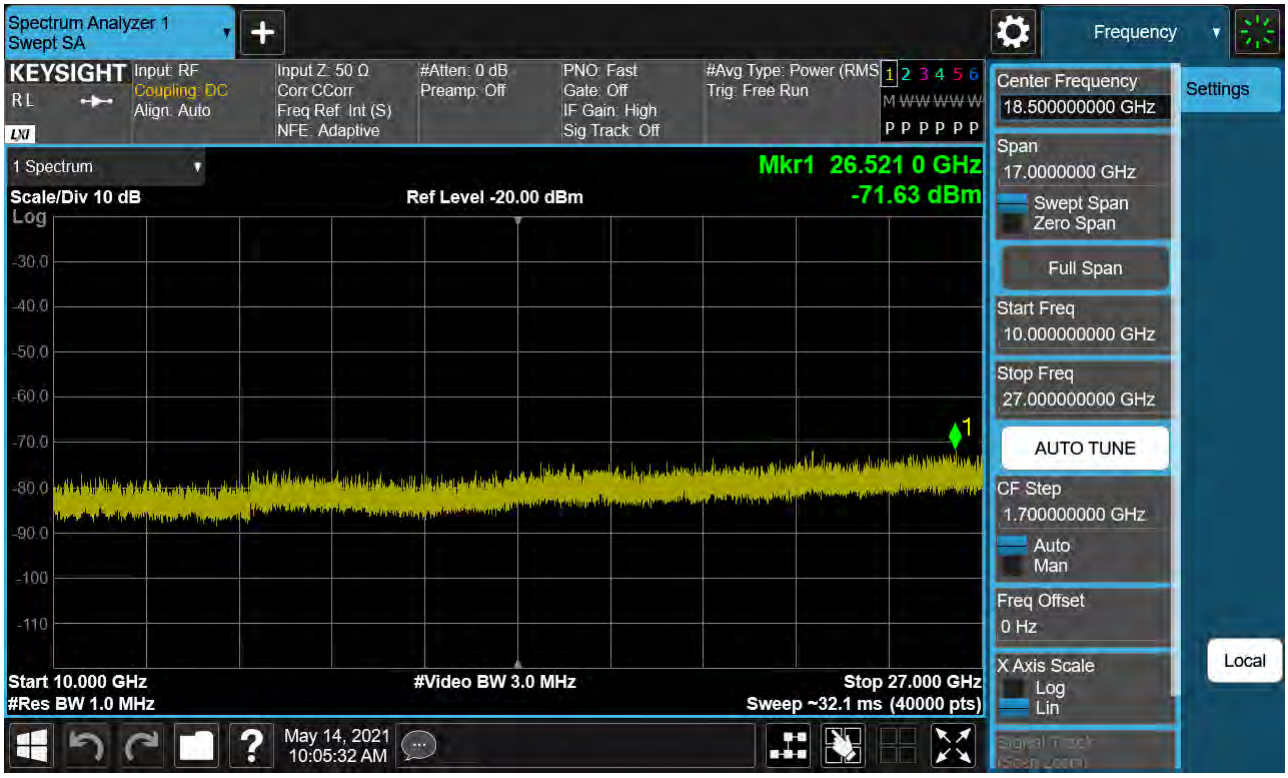
PCC 20MHz Ch40595 RB100 Offset0, SCC 5MHz Ch40712 RB25 Offset0



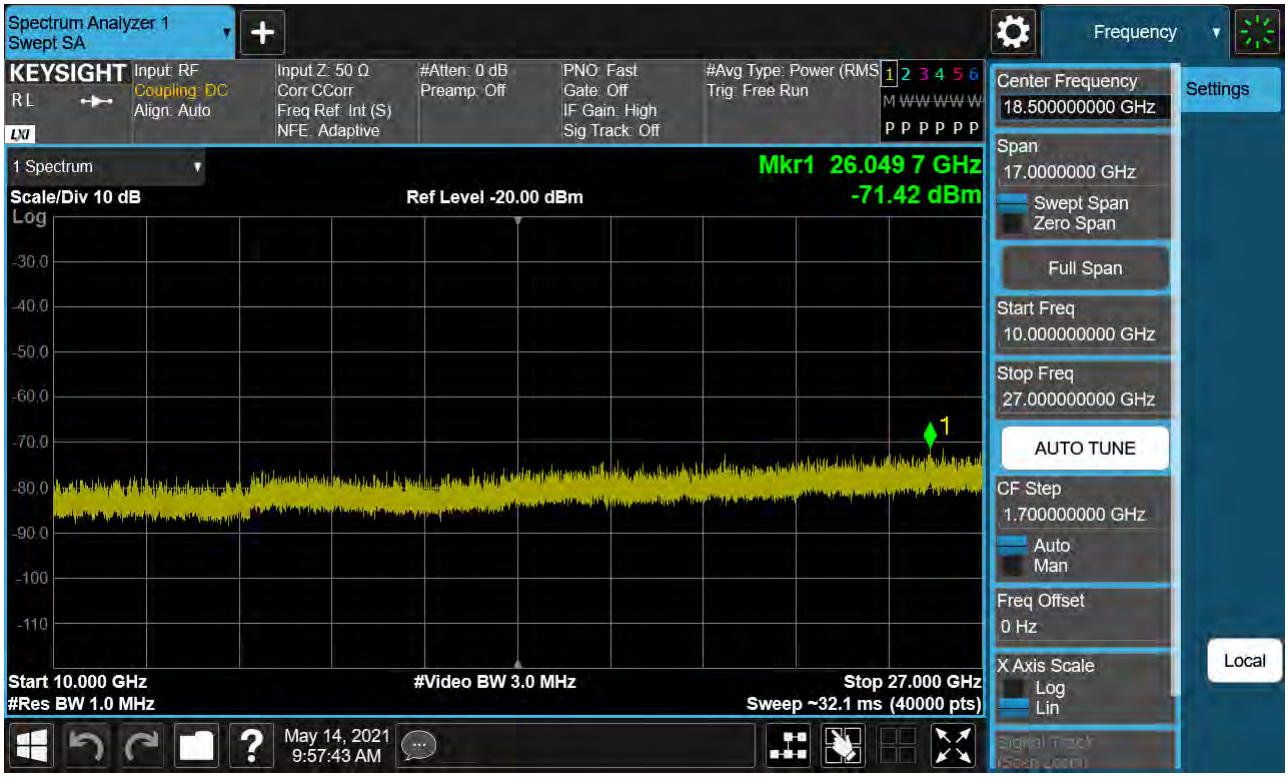
PCC 20MHz Ch41292 RB100 Offset0, SCC 20MHz Ch41490 RB100 Offset0



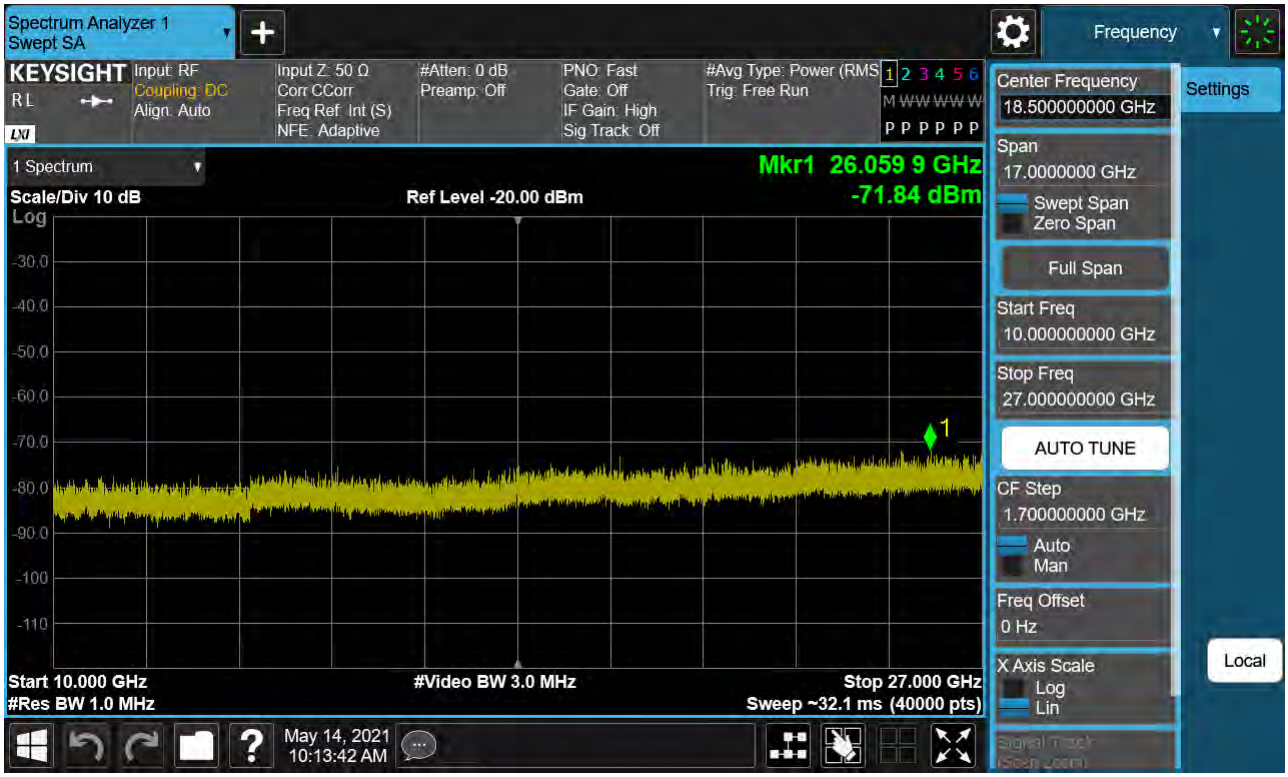
PCC 20MHz Ch41341 RB1 Offset0, SCC 15MHz Ch41512 RB1 Offset74



PCC 20MHz Ch41341 RB1 Offset99, SCC 15MHz Ch41512 RB1 Offset0



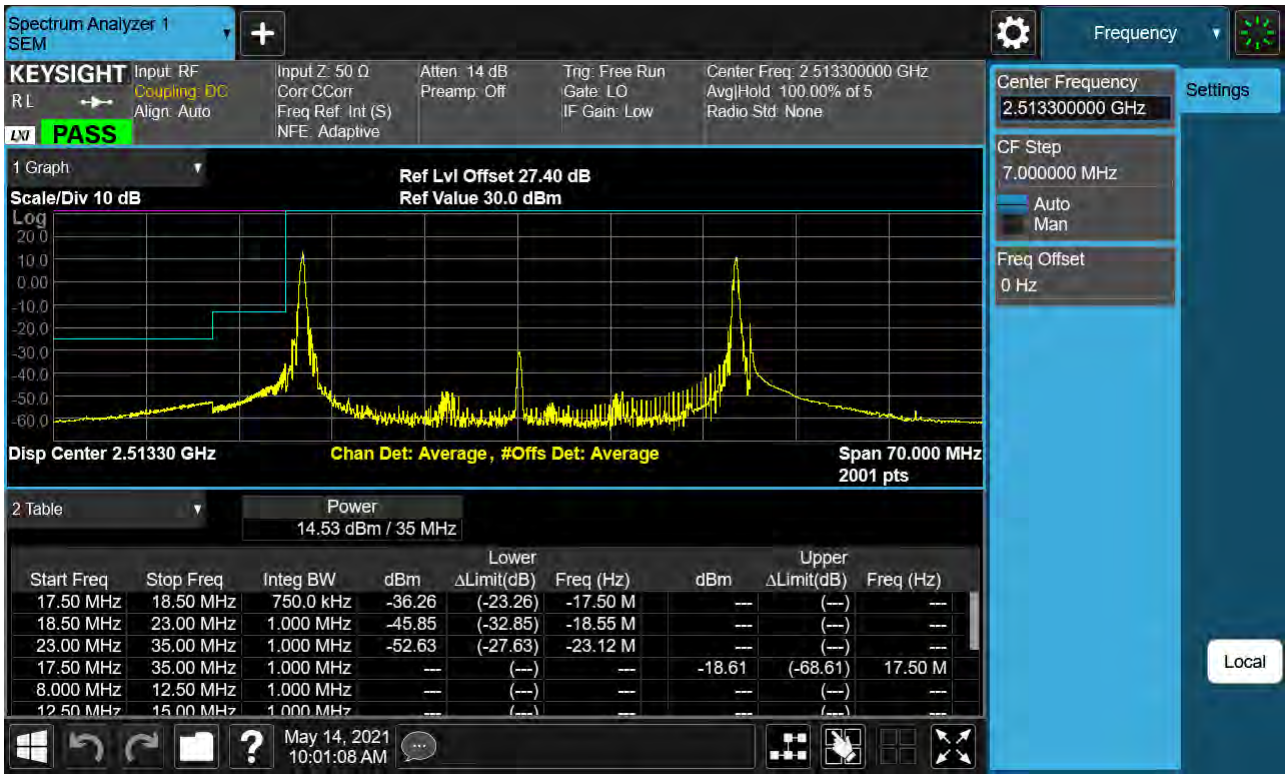
PCC 20MHz Ch41440 RB100 Offset0, SCC 5MHz Ch41557 RB25 Offset0



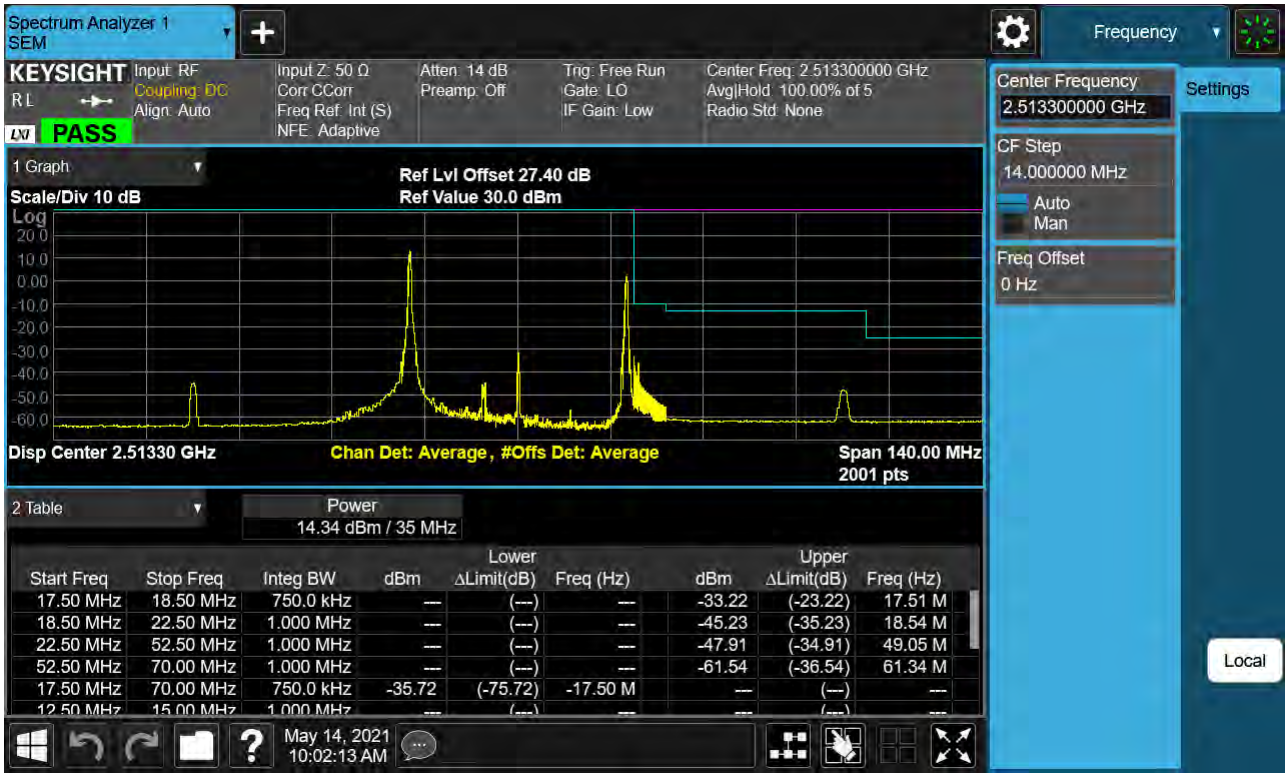
8.4 Channel Edge

8.4.1 PC2

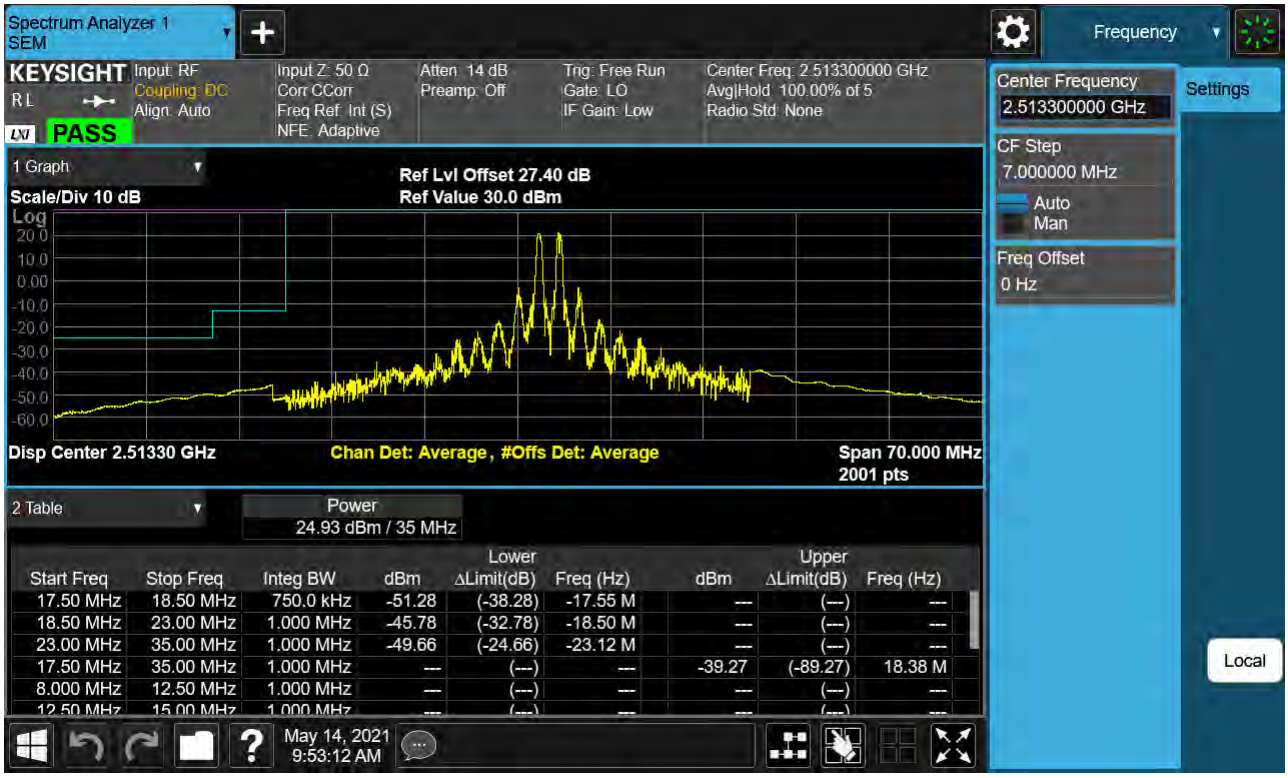
PCC 20MHz Ch39750 RB1 Offset0, SCC 15MHz Ch39921 RB1 Offset74-1



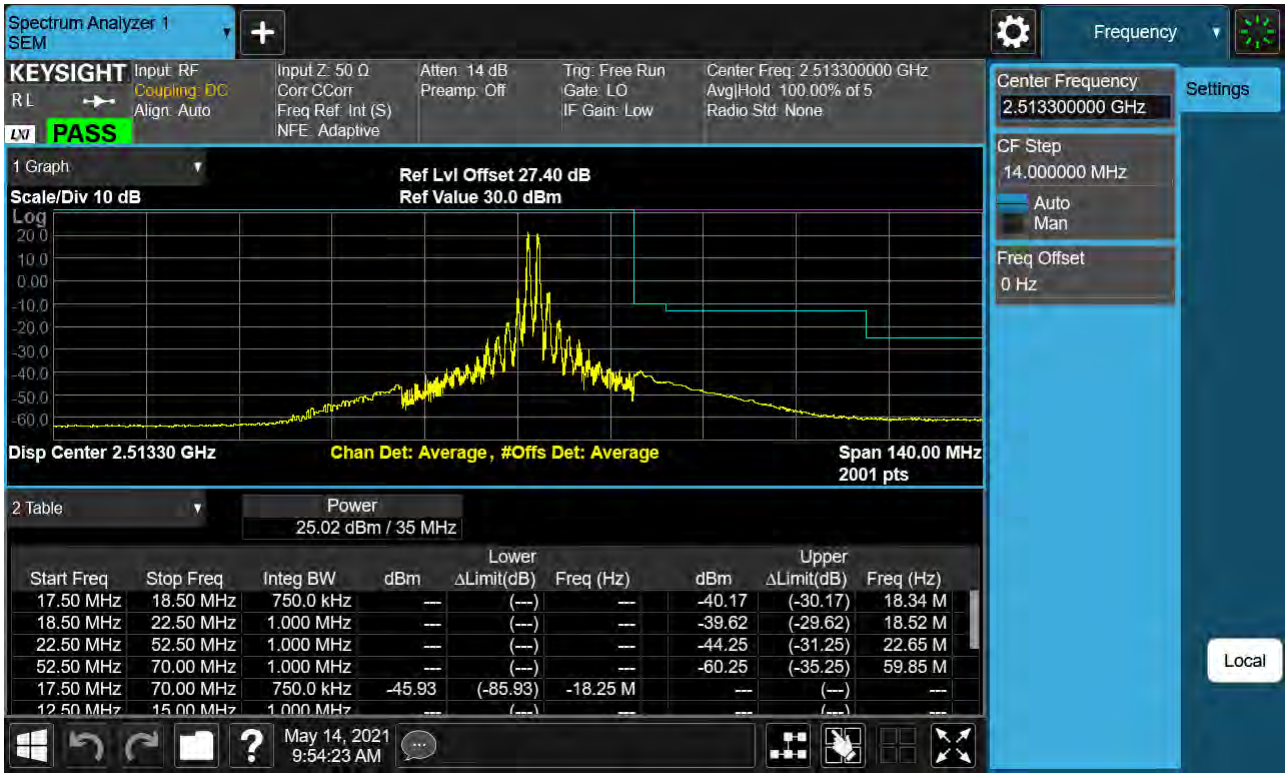
PCC 20MHz Ch39750 RB1 Offset0, SCC 15MHz Ch39921 RB1 Offset74-2



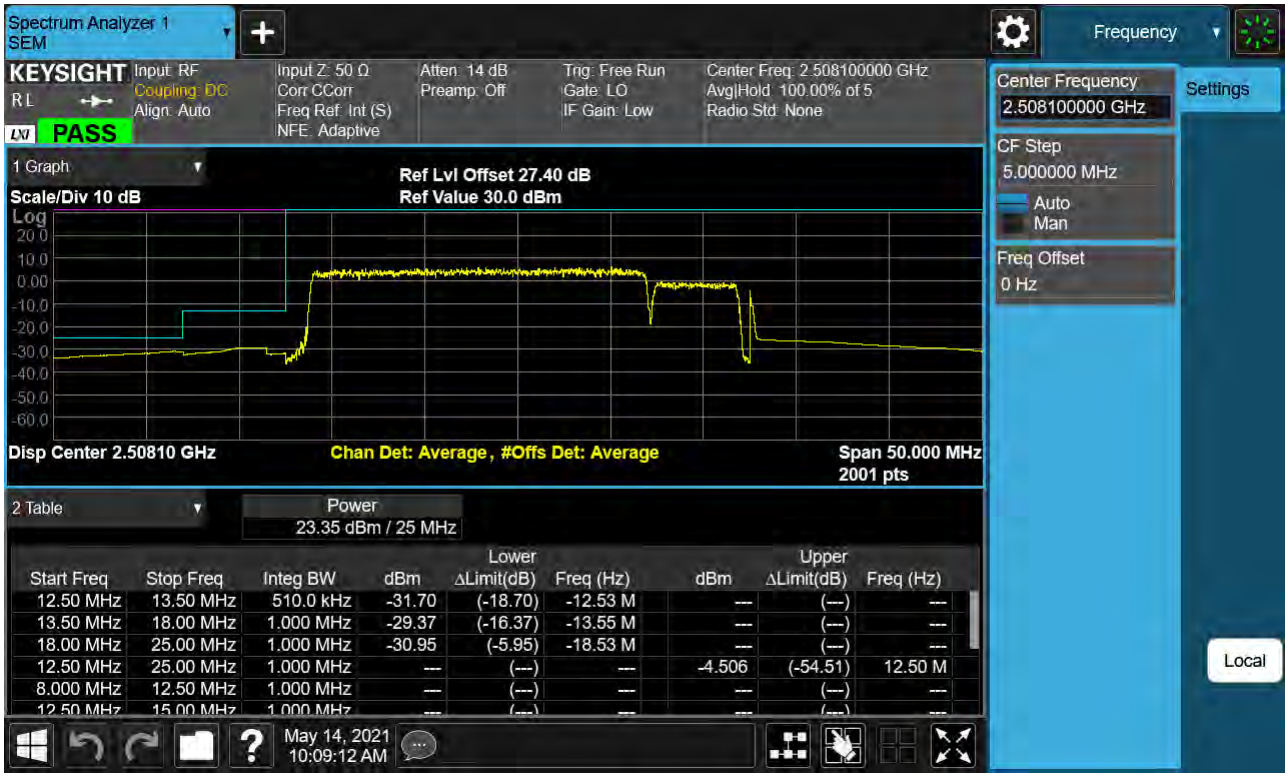
PCC 20MHz Ch39750 RB1 Offset99, SCC 15MHz Ch39921 RB1 Offset0-1



PCC 20MHz Ch39750 RB1 Offset99, SCC 15MHz Ch39921 RB1 Offset0-2

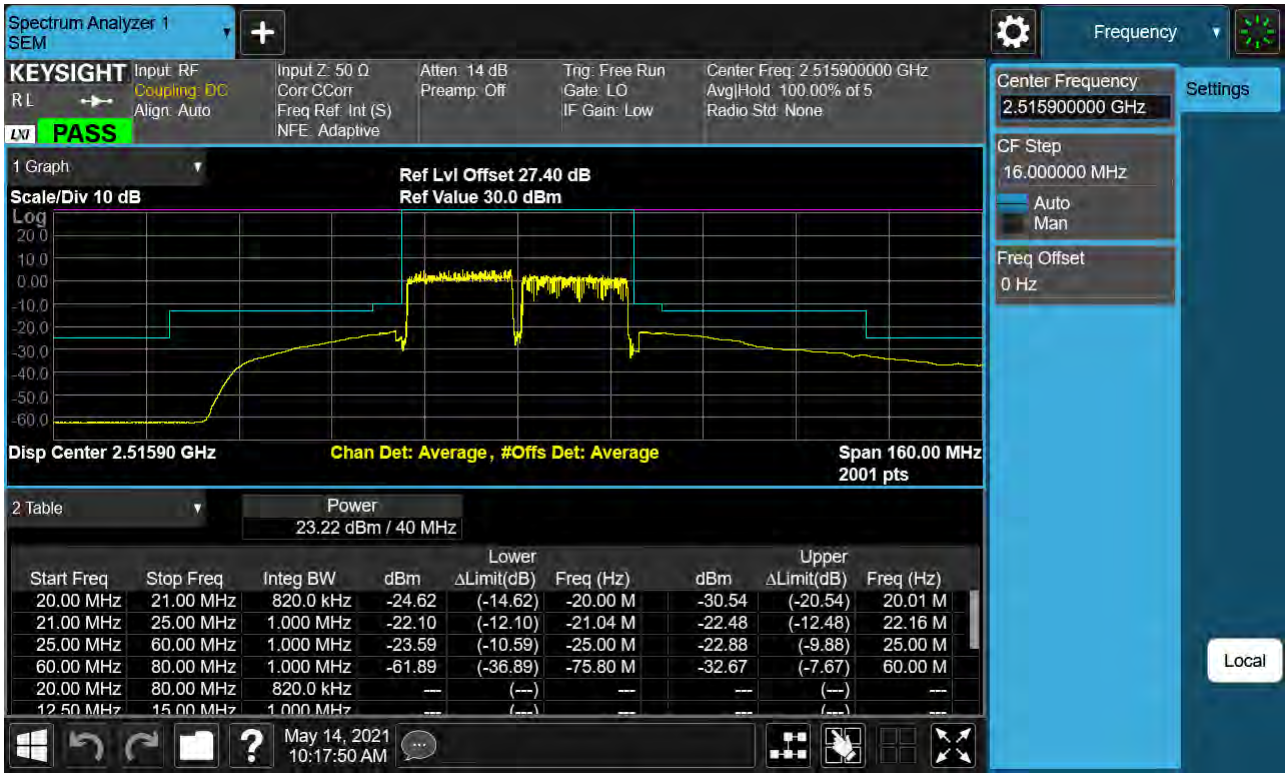


PCC 20MHz Ch39750 RB100 Offset0, SCC 5MHz Ch39867 RB25 Offset0-1



PCC 20MHz Ch39750 RB100 Offset0, SCC 5MHz Ch39867 RB25 Offset0-2

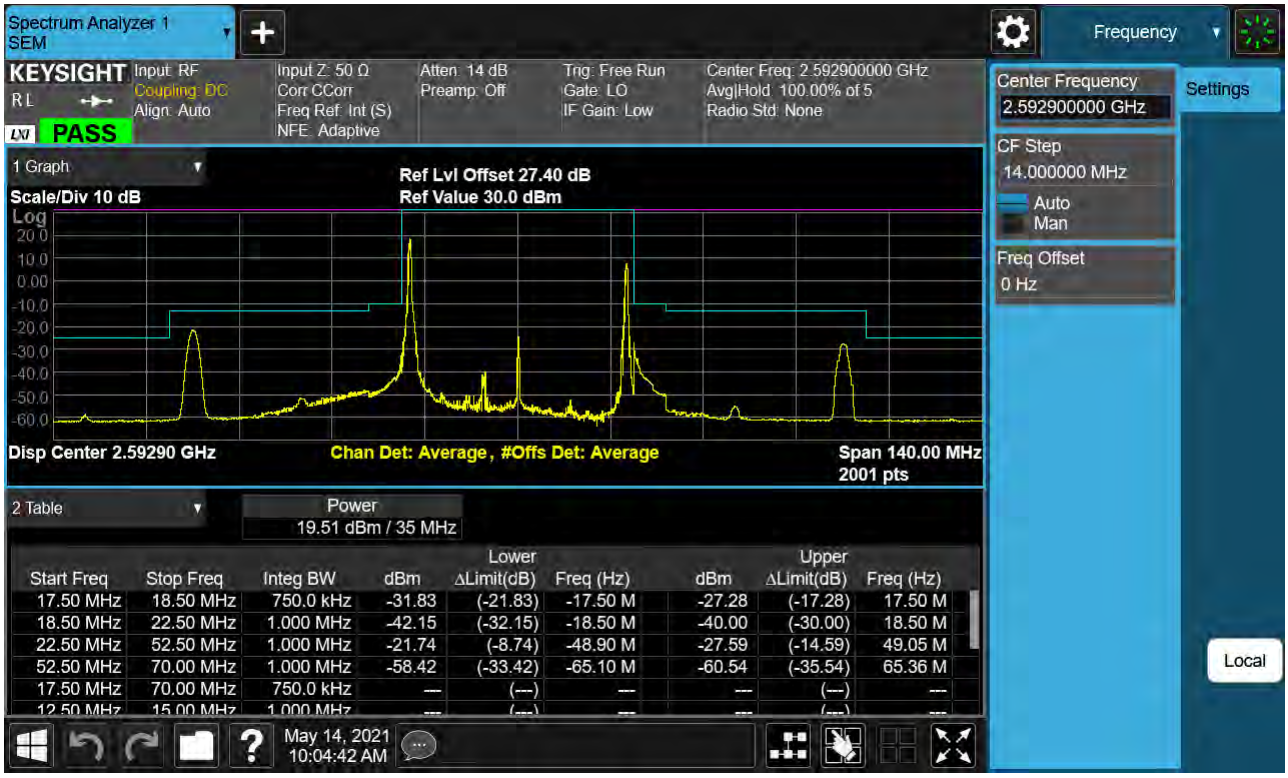
PCC 20MHz Ch39750 RB100 Offset0, SCC 20MHz Ch39948 RB100 Offset0



			Lower			Upper		
Start Freq	Stop Freq	Integ BW	dBm	ΔLimit(dB)	Freq (Hz)	dBm	ΔLimit(dB)	Freq (Hz)
20.00 MHz	21.00 MHz	820.0 kHz	-24.62	(-14.62)	-20.00 M	-30.54	(-20.54)	20.01 M
21.00 MHz	25.00 MHz	1.000 MHz	-22.10	(-12.10)	-21.04 M	-22.48	(-12.48)	22.16 M
25.00 MHz	60.00 MHz	1.000 MHz	-23.59	(-10.59)	-25.00 M	-22.88	(-9.88)	25.00 M
60.00 MHz	80.00 MHz	1.000 MHz	-61.89	(-36.89)	-75.80 M	-32.67	(-7.67)	60.00 M
20.00 MHz	80.00 MHz	820.0 kHz	---	(---)	---	---	(---)	---
12.50 MHz	15.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---

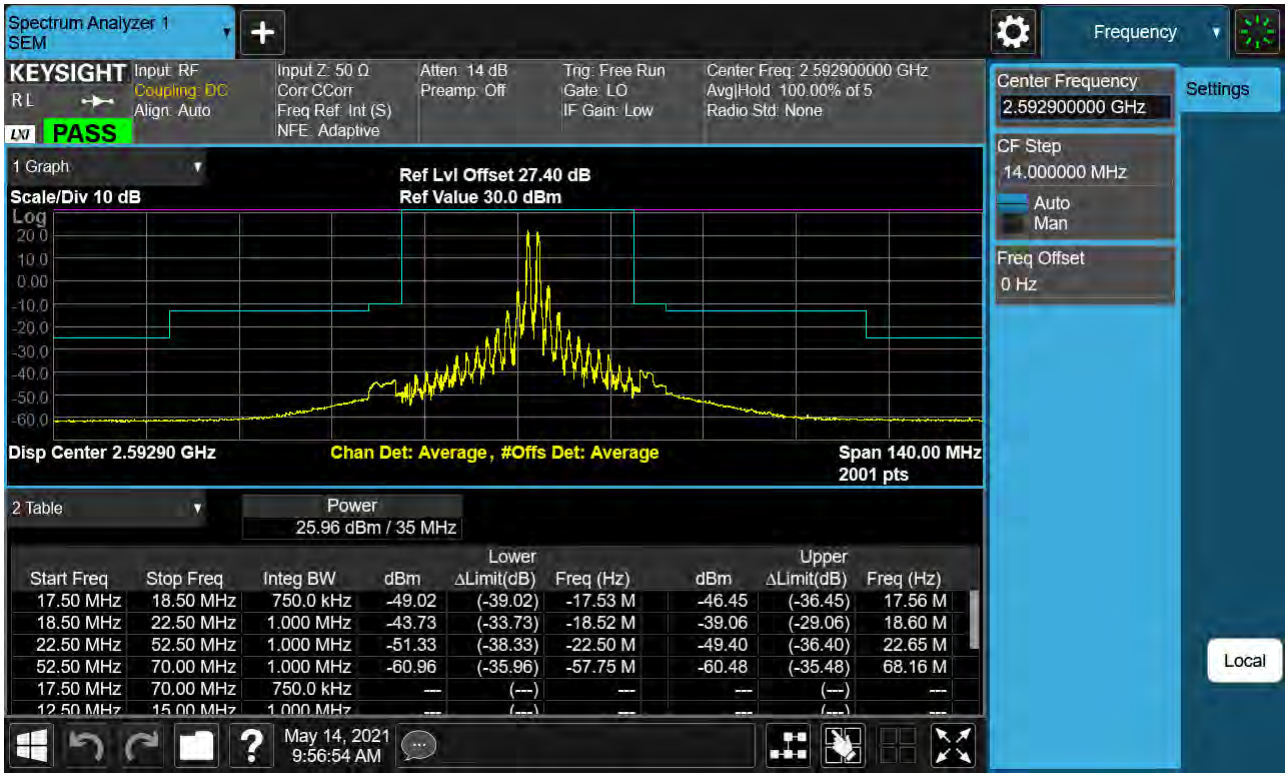
PCC 20MHz Ch40521 RB100 Offset0, SCC 20MHz Ch40719 RB100 Offset0

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

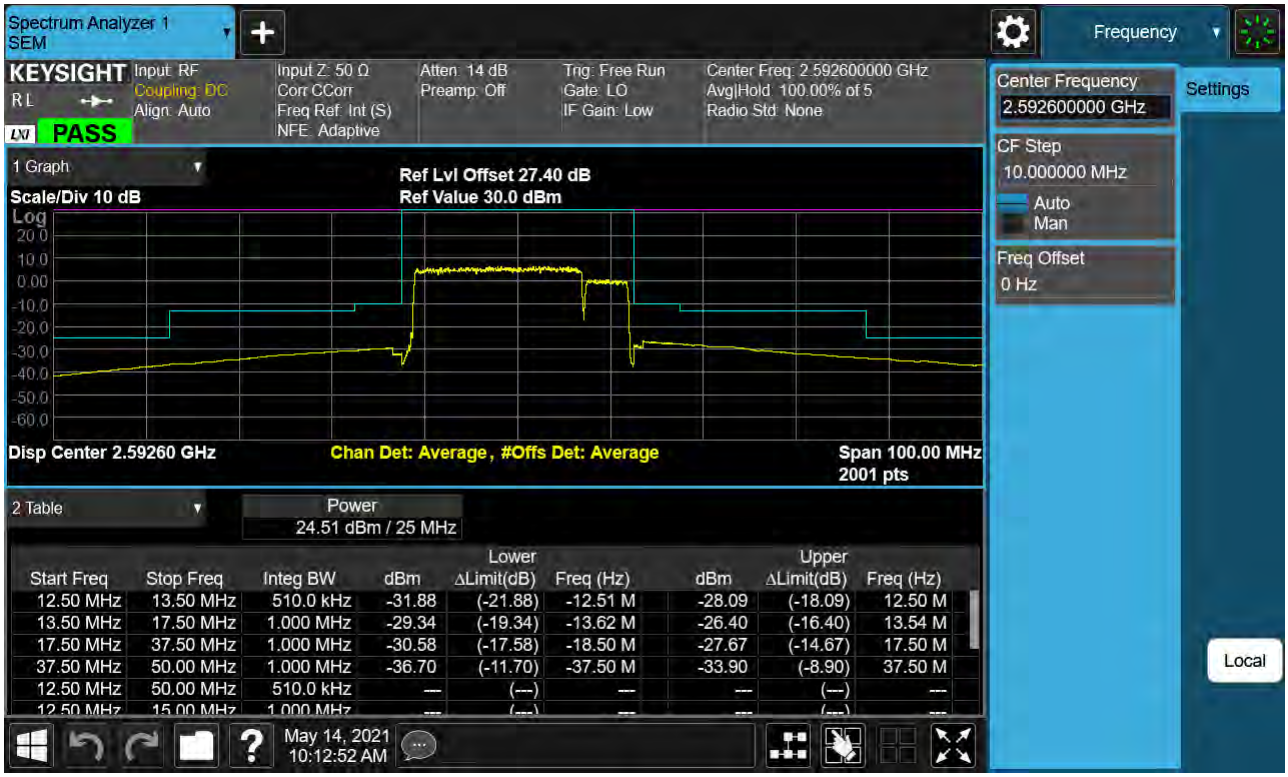


			Lower			Upper		
Start Freq	Stop Freq	Integ BW	dBm	ΔLimit(dB)	Freq (Hz)	dBm	ΔLimit(dB)	Freq (Hz)
17.50 MHz	18.50 MHz	750.0 kHz	-31.83	(-21.83)	-17.50 M	-27.28	(-17.28)	17.50 M
18.50 MHz	22.50 MHz	1.000 MHz	-42.15	(-32.15)	-18.50 M	-40.00	(-30.00)	18.50 M
22.50 MHz	52.50 MHz	1.000 MHz	-21.74	(-8.74)	-48.90 M	-27.59	(-14.59)	49.05 M
52.50 MHz	70.00 MHz	1.000 MHz	-58.42	(-33.42)	-65.10 M	-60.54	(-35.54)	65.36 M
17.50 MHz	70.00 MHz	750.0 kHz	---	(---)	---	---	(---)	---
12.50 MHz	15.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---

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



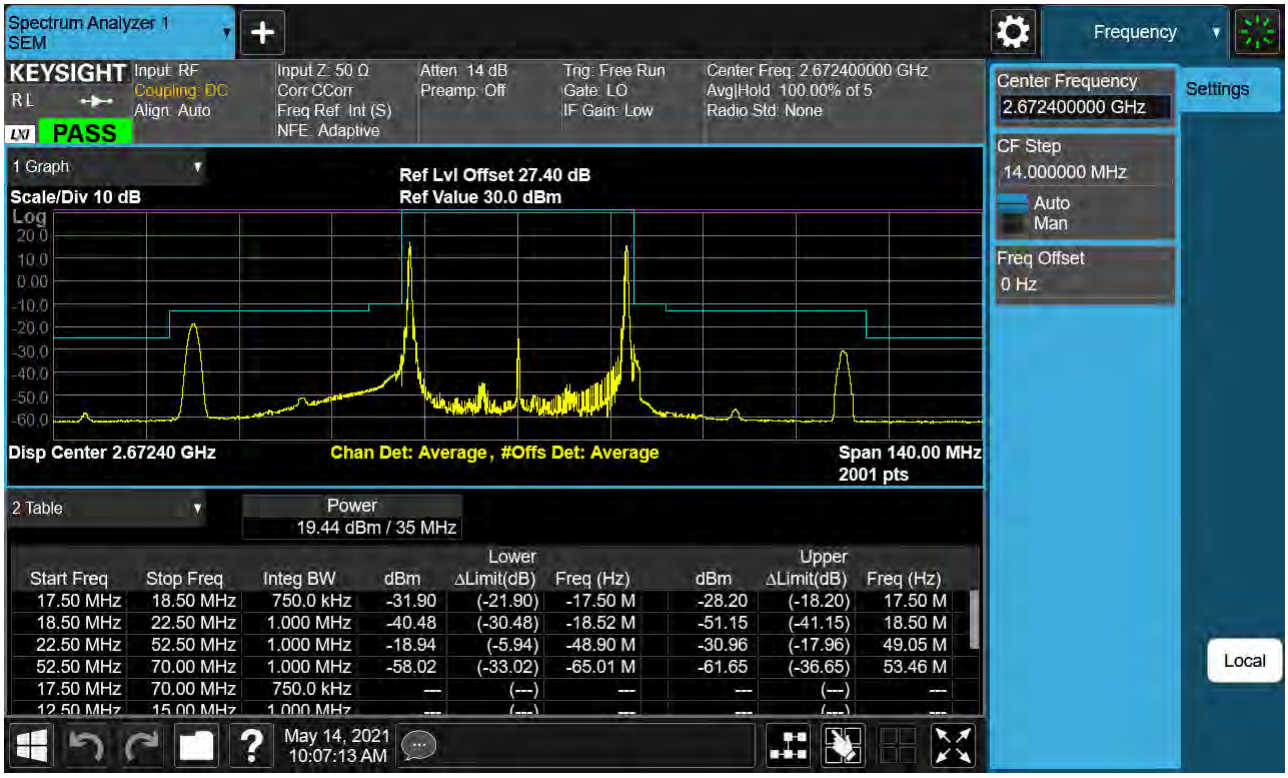
PCC 20MHz Ch40595 RB100 Offset0, SCC 5MHz Ch40712 RB25 Offset0



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

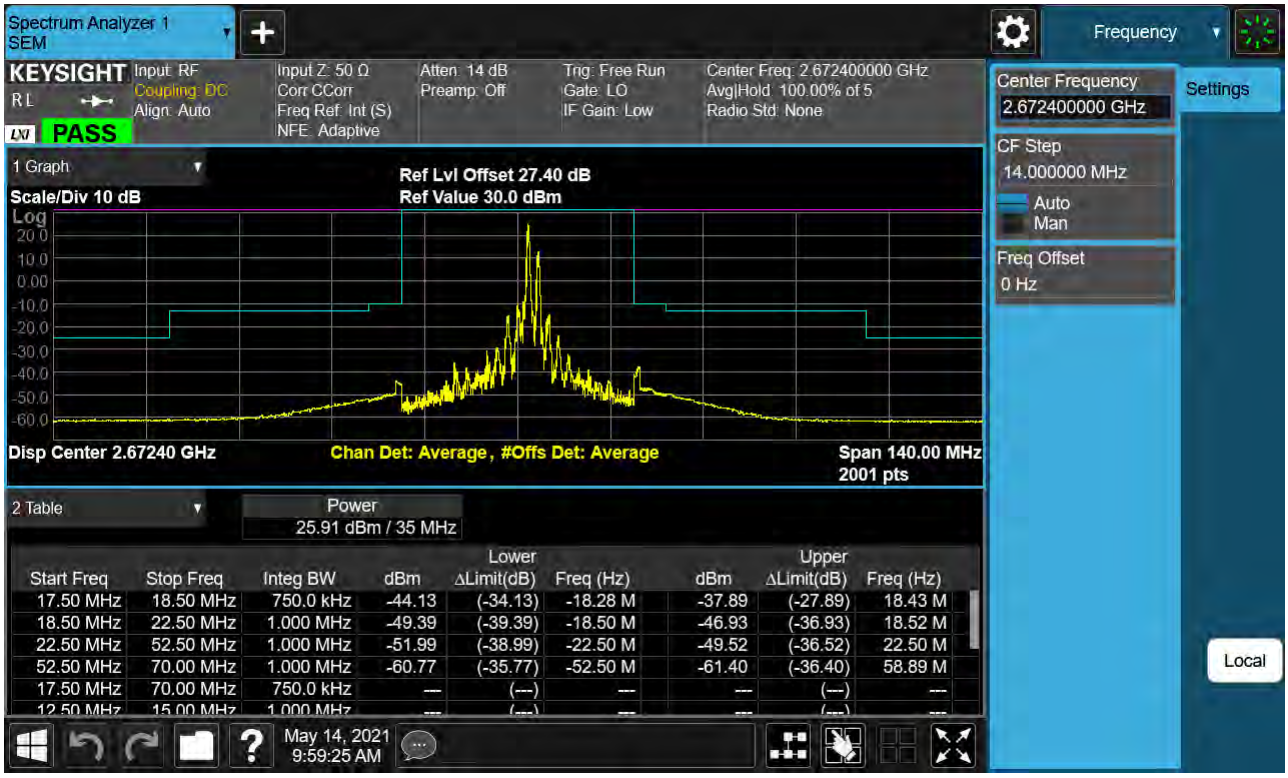
			Lower			Upper		
Start Freq	Stop Freq	Integ BW	dBm	ΔLimit(dB)	Freq (Hz)	dBm	ΔLimit(dB)	Freq (Hz)
20.00 MHz	21.00 MHz	820.0 kHz	-22.38	(-12.38)	-20.01 M	-23.75	(-13.75)	20.02 M
21.00 MHz	25.00 MHz	1.000 MHz	-25.73	(-15.73)	-22.20 M	-31.01	(-21.01)	21.18 M
25.00 MHz	60.00 MHz	1.000 MHz	-27.37	(-14.37)	-25.18 M	-31.66	(-18.66)	25.70 M
60.00 MHz	80.00 MHz	1.000 MHz	-37.17	(-12.17)	-60.00 M	-47.44	(-22.44)	60.00 M
20.00 MHz	80.00 MHz	820.0 kHz	---	(---)	---	---	(---)	---
12.50 MHz	15.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---

PCC 20MHz Ch41341 RB1 Offset0, SCC 15MHz Ch41512 RB1 Offset74



			Lower			Upper		
Start Freq	Stop Freq	Integ BW	dBm	ΔLimit(dB)	Freq (Hz)	dBm	ΔLimit(dB)	Freq (Hz)
17.50 MHz	18.50 MHz	750.0 kHz	-31.90	(-21.90)	-17.50 M	-28.20	(-18.20)	17.50 M
18.50 MHz	22.50 MHz	1.000 MHz	-40.48	(-30.48)	-18.52 M	-51.15	(-41.15)	18.50 M
22.50 MHz	52.50 MHz	1.000 MHz	-18.94	(-5.94)	-48.90 M	-30.96	(-17.96)	49.05 M
52.50 MHz	70.00 MHz	1.000 MHz	-58.02	(-33.02)	-65.01 M	-61.65	(-36.65)	53.46 M
17.50 MHz	70.00 MHz	750.0 kHz	---	(---)	---	---	(---)	---
17.50 MHz	15.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---

PCC 20MHz Ch41341 RB1 Offset99, SCC 15MHz Ch41512 RB1 Offset0



PCC 20MHz Ch41440 RB100 Offset0, SCC 5MHz Ch41557 RB25 Offset0

8.5 Frequency Stability / Variation Of Ambient Temperature

8.5.1 PC2

▣ PCC Channel:	39683	
▣ PCC Frequency:	2499.3	MHz
▣ PCC BandWidth:	5	MHz
▣ SCC Channel:	39800	
▣ SCC Frequency:	2511.0	MHz
▣ SCC BandWidth:	20	MHz
▣ Voltage :	3.880	VDC
▣ LIMIT:	Emission must remain in band	

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.880	+20(Ref)	-0.003	-0.014	2499.29999	2510.99997
100%		-30	-0.005	0.001	2499.29999	2511.00000
100%		-20	0.008	0.002	2499.30002	2511.00001
100%		-10	-0.012	-0.003	2499.29997	2510.99999
100%		0	0.001	0.000	2499.30000	2511.00000
100%		10	-0.005	0.009	2499.29999	2511.00002
100%		30	0.004	0.007	2499.30001	2511.00002
100%		40	-0.004	0.006	2499.29999	2511.00001
100%		50	0.002	0.002	2499.30001	2511.00001
Batt. Endpoint	3.650	20	0.001	0.013	2499.30000	2511.00003

▣ PCC Channel: 39705
▣ PCC Frequency: 2501.5 MHz
▣ PCC BandWidth: 10 MHz
▣ SCC Channel: 39849
▣ SCC Frequency: 2515.9 MHz
▣ SCC BandWidth: 20 MHz
▣ Voltage : 3.880 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.880	+20(Ref)	-0.005	-0.006	2501.49999	2515.89998
100%		-30	0.003	0.005	2501.50001	2515.90001
100%		-20	0.004	-0.009	2501.50001	2515.89998
100%		-10	-0.003	0.005	2501.49999	2515.90001
100%		0	0.014	0.002	2501.50003	2515.90000
100%		10	-0.013	0.005	2501.49997	2515.90001
100%		30	-0.007	-0.001	2501.49998	2515.90000
100%		40	0.008	0.002	2501.50002	2515.90000
100%		50	0.000	0.016	2501.50000	2515.90003
Batt. Endpoint	3.650	20	-0.002	-0.007	2501.50000	2515.89998

▣ PCC Channel: 39728
▣ PCC Frequency: 2503.8 MHz
▣ PCC BandWidth: 15 MHz
▣ SCC Channel: 39899
▣ SCC Frequency: 2520.9 MHz
▣ SCC BandWidth: 20 MHz
▣ Voltage : 3.880 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.880	+20(Ref)	0.005	0.005	2503.80001	2520.90001
100%		-30	0.017	0.008	2503.80003	2520.90002
100%		-20	0.007	-0.006	2503.80002	2520.89998
100%		-10	0.001	0.013	2503.80000	2520.90003
100%		0	0.014	0.007	2503.80003	2520.90001
100%		10	-0.004	0.018	2503.79999	2520.90003
100%		30	0.009	-0.003	2503.80002	2520.90000
100%		40	0.013	0.018	2503.80003	2520.90003
100%		50	0.007	0.016	2503.80001	2520.90003
Batt. Endpoint	3.650	20	-0.005	0.009	2503.79999	2520.90002

▣ PCC Channel: 39750
▣ PCC Frequency: 2506.0 MHz
▣ PCC BandWidth: 20 MHz
▣ SCC Channel: 39948
▣ SCC Frequency: 2525.8 MHz
▣ SCC BandWidth: 20 MHz
▣ Voltage : 3.880 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.880	+20(Ref)	-0.076	-0.066	2506.00001	2525.80002
100%		-30	-0.076	-0.055	2506.00002	2525.79998
100%		-20	-0.042	-0.029	2505.99998	2525.79999
100%		-10	-0.028	0.002	2506.00000	2525.80002
100%		0	-0.078	-0.045	2506.00000	2525.80000
100%		10	-0.006	-0.032	2506.00001	2525.80000
100%		30	-0.051	-0.095	2505.99997	2525.79999
100%		40	0.009	-0.071	2506.00003	2525.79999
100%		50	-0.056	-0.019	2505.99999	2525.79998
Batt. Endpoint	3.650	20	-0.035	-0.045	2506.00000	2525.79999

▣ PCC Channel: 41373
▣ PCC Frequency: 2668.3 MHz
▣ PCC BandWidth: 5 MHz
▣ SCC Channel: 41490
▣ SCC Frequency: 2680.0 MHz
▣ SCC BandWidth: 20 MHz
▣ Voltage : 3.880 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.880	+20(Ref)	-0.070	-0.053	2668.29996	2680.00000
100%		-30	-0.039	-0.089	2668.29999	2680.00001
100%		-20	-0.093	-0.086	2668.30000	2680.00003
100%		-10	0.000	-0.030	2668.30003	2680.00000
100%		0	-0.090	-0.028	2668.30000	2679.99997
100%		10	-0.069	-0.090	2668.29999	2680.00002
100%		30	-0.027	-0.032	2668.30002	2680.00001
100%		40	-0.075	-0.092	2668.30002	2679.99997
100%		50	-0.026	-0.093	2668.30002	2680.00001
Batt. Endpoint	3.650	20	-0.035	-0.066	2668.29999	2680.00002

▣ PCC Channel: 41346
▣ PCC Frequency: 2665.6 MHz
▣ PCC BandWidth: 10 MHz
▣ SCC Channel: 41490
▣ SCC Frequency: 2680.0 MHz
▣ SCC BandWidth: 20 MHz
▣ Voltage : 3.880 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.880	+20(Ref)	-0.018	-0.058	2665.60003	2679.99996
100%		-30	-0.057	-0.063	2665.59999	2680.00002
100%		-20	-0.021	-0.010	2665.60000	2680.00001
100%		-10	-0.059	-0.005	2665.59999	2680.00003
100%		0	-0.085	-0.076	2665.60000	2679.99997
100%		10	-0.080	-0.060	2665.59998	2680.00002
100%		30	-0.084	-0.077	2665.59997	2679.99998
100%		40	-0.078	-0.027	2665.60004	2680.00003
100%		50	-0.108	-0.045	2665.59997	2679.99996
Batt. Endpoint	3.650	20	-0.051	-0.091	2665.60002	2679.99999

▣ PCC Channel: 41319
▣ PCC Frequency: 2662.9 MHz
▣ PCC BandWidth: 15 MHz
▣ SCC Channel: 41490
▣ SCC Frequency: 2680.0 MHz
▣ SCC BandWidth: 20 MHz
▣ Voltage : 3.880 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.880	+20(Ref)	-0.088	0.066	2662.89999	2680.00000
100%		-30	0.051	0.030	2662.89998	2680.00001
100%		-20	-0.094	-0.073	2662.90000	2680.00001
100%		-10	-0.067	-0.013	2662.90003	2680.00000
100%		0	0.039	0.002	2662.90001	2680.00003
100%		10	-0.070	-0.028	2662.90003	2679.99999
100%		30	-0.002	-0.064	2662.90000	2680.00003
100%		40	0.029	-0.077	2662.90000	2679.99997
100%		50	0.035	-0.052	2662.90001	2680.00000
Batt. Endpoint	3.650	20	-0.057	0.044	2662.89999	2679.99997

▣ PCC Channel: 41292

▣ PCC Frequency: 2660.2 MHz

▣ PCC BandWidth: 20 MHz

▣ SCC Channel: 41490

▣ SCC Frequency: 2680.0 MHz

▣ SCC BandWidth: 20 MHz

▣ Voltage : 3.880 MHz

▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.880	+20(Ref)	0.015	0.063	2660.20002	2680.00001
100%		-30	0.056	0.085	2660.20003	2680.00000
100%		-20	0.000	0.078	2660.20000	2679.99999
100%		-10	-0.033	-0.004	2660.20002	2680.00001
100%		0	0.079	-0.079	2660.19999	2680.00001
100%		10	-0.048	-0.076	2660.20001	2680.00002
100%		30	-0.068	-0.013	2660.20001	2679.99997
100%		40	0.067	-0.086	2660.20003	2680.00001
100%		50	0.041	-0.066	2660.20002	2680.00003
Batt. Endpoint	3.650	20	-0.009	0.018	2660.20002	2680.00001

8.6 Radiated Spurious Emissions

8.6.1 PC2

▣ PCC Channel : 39750 (2506.0MHz)

▣ PCC BW(MHz) : 20

▣ PCC RB/ RB Offset : 1/ 99

▣ SCC Channel : 39948 (2525.8MHz)

▣ SCC BW(MHz) : 20

▣ SCC RB/ RB Offset : 1/ 0

▣ DISTANCE: 1 meters

▣ LIMIT: -25.0 dBm

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)
5 031.80	-50.22	12.60	-59.82	3.62	H	-50.84
7 547.70	-48.20	11.40	-48.89	4.45	H	-41.94
10 063.60	-44.18	11.18	-40.40	5.32	V	-34.54
12 579.50	-57.17	13.85	-52.69	6.06	V	-44.90
15 095.40	-53.42	13.37	-44.09	6.41	V	-37.13

▣ PCC Channel : 40546 (2585.6MHz)

▣ PCC BW(MHz) : 20

▣ PCC RB/ RB Offset : 1/ 99

▣ SCC Channel : 40717 (2602.7MHz)

▣ SCC BW(MHz) : 15

▣ SCC RB/ RB Offset : 1/ 0

▣ DISTANCE: 1 meters

▣ LIMIT: -25.0 dBm

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)
5 188.30	-46.62	12.80	-55.37	3.70	H	-46.27
7 782.45	-43.21	11.65	-44.36	4.54	H	-37.25
10 376.60	-39.32	10.75	-34.68	5.45	H	-29.38
12 970.75	-57.66	13.40	-50.78	6.14	V	-43.52
15 564.90	-51.67	16.12	-44.24	6.81	V	-34.93

▣ PCC Channel : 41292 (2660.2MHz)

▣ PCC BW(MHz) : 20

▣ PCC RB/ RB Offset : 1/ 99

▣ SCC Channel : 41490 (2682.5MHz)

▣ SCC BW(MHz) : 20

▣ SCC RB/ RB Offset : 1/ 0

▣ DISTANCE: 1 meters

▣ LIMIT: -25.0 dBm

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)
5 340.20	-40.42	13.33	-50.37	3.74	V	-40.78
8 010.30	-42.54	10.98	-41.35	4.61	V	-34.98
10 680.40	-39.17	10.90	-35.40	5.53	V	-30.03
13 350.50	-56.76	12.90	-49.16	6.13	V	-42.39
16 020.60	-54.16	17.35	-45.97	6.91	H	-35.53

8.7 Occupied Bandwidth

8.7.1 PC2

PCC					SCC					Data (MHz)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
5	40528	2583.8	QPSK	25/ 0	20	40645	2595.5	QPSK	100/ 0	22.897
10	40549	2585.9	QPSK	50/ 0	15	40669	2597.9	QPSK	75/ 0	23.048
10	40526	2583.6	QPSK	50/ 0	20	40670	2598.0	QPSK	100/ 0	27.682
15	40571	2588.1	QPSK	75/ 0	10	40691	2600.1	QPSK	50/ 0	23.103
15	40545	2585.5	QPSK	75/ 0	15	40695	2600.5	QPSK	75/ 0	28.355
15	40523	2583.3	QPSK	75/ 0	20	40694	2600.4	QPSK	100/ 0	32.508
20	40595	2590.5	QPSK	100/ 0	5	40712	2602.2	QPSK	25/ 0	22.919
20	40571	2588.1	QPSK	100/ 0	10	40715	2602.5	QPSK	50/ 0	27.820
20	40546	2585.6	QPSK	100/ 0	15	40717	2602.7	QPSK	75/ 0	32.659
20	40521	2583.1	QPSK	100/ 0	20	40719	2602.9	QPSK	100/ 0	37.608

PCC					SCC					Data (MHz)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
5	40528	2583.8	16QAM	25/ 0	20	40645	2595.5	16QAM	100/ 0	22.752
10	40549	2585.9	16QAM	50/ 0	15	40669	2597.9	16QAM	75/ 0	23.022
10	40526	2583.6	16QAM	50/ 0	20	40670	2598.0	16QAM	100/ 0	27.761
15	40571	2588.1	16QAM	75/ 0	10	40691	2600.1	16QAM	50/ 0	23.134
15	40545	2585.5	16QAM	75/ 0	15	40695	2600.5	16QAM	75/ 0	28.350
15	40523	2583.3	16QAM	75/ 0	20	40694	2600.4	16QAM	100/ 0	32.617
20	40595	2590.5	16QAM	100/ 0	5	40712	2602.2	16QAM	25/ 0	22.965
20	40571	2588.1	16QAM	100/ 0	10	40715	2602.5	16QAM	50/ 0	27.737
20	40546	2585.6	16QAM	100/ 0	15	40717	2602.7	16QAM	75/ 0	32.513
20	40521	2583.1	16QAM	100/ 0	20	40719	2602.9	16QAM	100/ 0	37.527

PCC					SCC					Data (MHz)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
5	40528	2583.8	64QAM	25/ 0	20	40645	2595.5	64QAM	100/ 0	22.816
10	40549	2585.9	64QAM	50/ 0	15	40669	2597.9	64QAM	75/ 0	23.037
10	40526	2583.6	64QAM	50/ 0	20	40670	2598.0	64QAM	100/ 0	27.628
15	40571	2588.1	64QAM	75/ 0	10	40691	2600.1	64QAM	50/ 0	23.125
15	40545	2585.5	64QAM	75/ 0	15	40695	2600.5	64QAM	75/ 0	28.268
15	40523	2583.3	64QAM	75/ 0	20	40694	2600.4	64QAM	100/ 0	32.538
20	40595	2590.5	64QAM	100/ 0	5	40712	2602.2	64QAM	25/ 0	22.882
20	40571	2588.1	64QAM	100/ 0	10	40715	2602.5	64QAM	50/ 0	27.787
20	40546	2585.6	64QAM	100/ 0	15	40717	2602.7	64QAM	75/ 0	32.588
20	40521	2583.1	64QAM	100/ 0	20	40719	2602.9	64QAM	100/ 0	37.487

PCC					SCC					Data (MHz)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
5	40528	2583.8	256QAM	25/ 0	20	40645	2595.5	256QAM	100/ 0	22.778
10	40549	2585.9	256QAM	50/ 0	15	40669	2597.9	256QAM	75/ 0	23.110
10	40526	2583.6	256QAM	50/ 0	20	40670	2598.0	256QAM	100/ 0	27.618
15	40571	2588.1	256QAM	75/ 0	10	40691	2600.1	256QAM	50/ 0	23.039
15	40545	2585.5	256QAM	75/ 0	15	40695	2600.5	256QAM	75/ 0	28.423
15	40523	2583.3	256QAM	75/ 0	20	40694	2600.4	256QAM	100/ 0	32.601
20	40595	2590.5	256QAM	100/ 0	5	40712	2602.2	256QAM	25/ 0	22.885
20	40571	2588.1	256QAM	100/ 0	10	40715	2602.5	256QAM	50/ 0	27.772
20	40546	2585.6	256QAM	100/ 0	15	40717	2602.7	256QAM	75/ 0	32.512
20	40521	2583.1	256QAM	100/ 0	20	40719	2602.9	256QAM	100/ 0	37.505

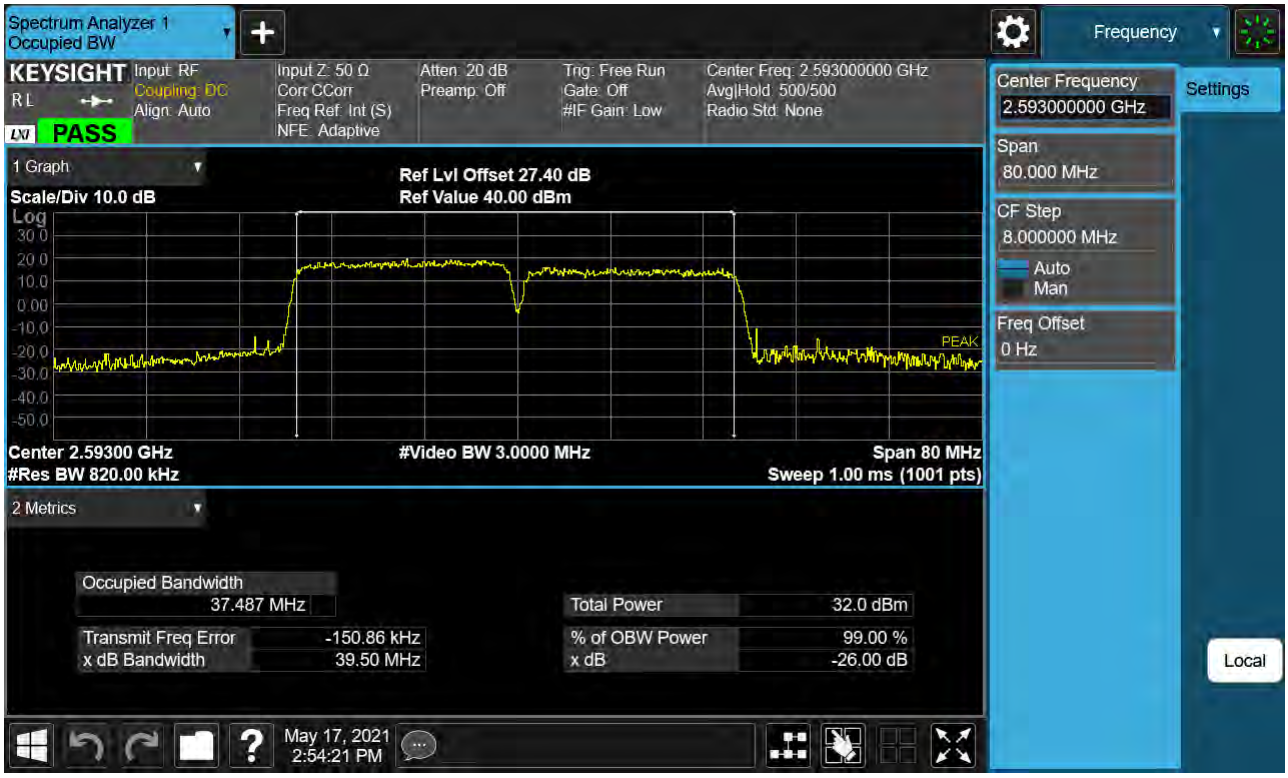
Note:

In order to simplify the report, attached plots were only Max.Bandwidth(20+20)

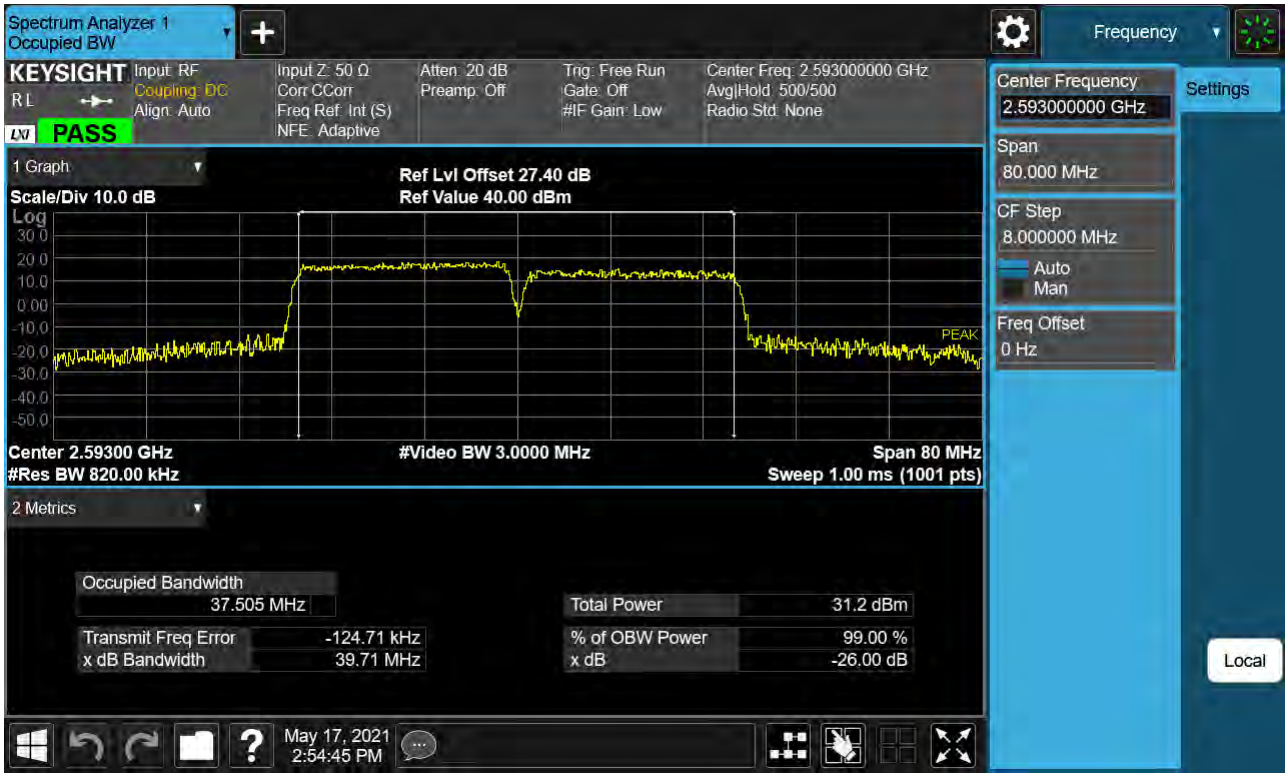
PCC 20MHz Ch40521 RB100 Offset0, SCC 20MHz Ch40719 RB100 Offset0_(QPSK)

PCC 20MHz Ch40521 RB100 Offset0, SCC 20MHz Ch40719 RB100 Offset0_(16QAM)

PCC 20MHz Ch40521 RB100 Offset0, SCC 20MHz Ch40719 RB100 Offset0_(64QAM)



PCC 20MHz Ch40521 RB100 Offset0, SCC 20MHz Ch40719 RB100 Offset0_(256QAM)



8.8 Peak- to- Average Ratio

8.8.1 PC2

PCC					SCC					Data (dBm)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
5	40528	2583.8	QPSK	25/ 0	20	40645	2595.5	QPSK	100/ 0	5.77
10	40549	2585.9	QPSK	50/ 0	15	40669	2597.9	QPSK	75/ 0	5.71
10	40526	2583.6	QPSK	50/ 0	20	40670	2598.0	QPSK	100/ 0	5.66
15	40571	2588.1	QPSK	75/ 0	10	40691	2600.1	QPSK	50/ 0	5.61
15	40545	2585.5	QPSK	75/ 0	15	40695	2600.5	QPSK	75/ 0	6.05
15	40523	2583.3	QPSK	75/ 0	20	40694	2600.4	QPSK	100/ 0	5.65
20	40595	2590.5	QPSK	100/ 0	5	40712	2602.2	QPSK	25/ 0	5.55
20	40571	2588.1	QPSK	100/ 0	10	40715	2602.5	QPSK	50/ 0	5.65
20	40546	2585.6	QPSK	100/ 0	15	40717	2602.7	QPSK	75/ 0	5.60
20	40521	2583.1	QPSK	100/ 0	20	40719	2602.9	QPSK	100/ 0	6.00

PCC					SCC					Data (dBm)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
5	40528	2583.8	16QAM	25/ 0	20	40645	2595.5	16QAM	100/ 0	6.49
10	40549	2585.9	16QAM	50/ 0	15	40669	2597.9	16QAM	75/ 0	6.41
10	40526	2583.6	16QAM	50/ 0	20	40670	2598.0	16QAM	100/ 0	6.42
15	40571	2588.1	16QAM	75/ 0	10	40691	2600.1	16QAM	50/ 0	6.37
15	40545	2585.5	16QAM	75/ 0	15	40695	2600.5	16QAM	75/ 0	6.83
15	40523	2583.3	16QAM	75/ 0	20	40694	2600.4	16QAM	100/ 0	6.46
20	40595	2590.5	16QAM	100/ 0	5	40712	2602.2	16QAM	25/ 0	6.47
20	40571	2588.1	16QAM	100/ 0	10	40715	2602.5	16QAM	50/ 0	6.46
20	40546	2585.6	16QAM	100/ 0	15	40717	2602.7	16QAM	75/ 0	6.44
20	40521	2583.1	16QAM	100/ 0	20	40719	2602.9	16QAM	100/ 0	6.85

PCC					SCC					Data (dBm)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
5	40528	2583.8	64QAM	25/ 0	20	40645	2595.5	64QAM	100/ 0	6.98
10	40549	2585.9	64QAM	50/ 0	15	40669	2597.9	64QAM	75/ 0	6.66
10	40526	2583.6	64QAM	50/ 0	20	40670	2598.0	64QAM	100/ 0	6.84
15	40571	2588.1	64QAM	75/ 0	10	40691	2600.1	64QAM	50/ 0	6.95
15	40545	2585.5	64QAM	75/ 0	15	40695	2600.5	64QAM	75/ 0	6.88
15	40523	2583.3	64QAM	75/ 0	20	40694	2600.4	64QAM	100/ 0	6.79
20	40595	2590.5	64QAM	100/ 0	5	40712	2602.2	64QAM	25/ 0	6.90
20	40571	2588.1	64QAM	100/ 0	10	40715	2602.5	64QAM	50/ 0	6.90
20	40546	2585.6	64QAM	100/ 0	15	40717	2602.7	64QAM	75/ 0	6.91
20	40521	2583.1	64QAM	100/ 0	20	40719	2602.9	64QAM	100/ 0	6.98

PCC					SCC					Data (dBm)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
5	40528	2583.8	256QAM	25/ 0	20	40645	2595.5	256QAM	100/ 0	7.11
10	40549	2585.9	256QAM	50/ 0	15	40669	2597.9	256QAM	75/ 0	7.02
10	40526	2583.6	256QAM	50/ 0	20	40670	2598.0	256QAM	100/ 0	7.14
15	40571	2588.1	256QAM	75/ 0	10	40691	2600.1	256QAM	50/ 0	7.13
15	40545	2585.5	256QAM	75/ 0	15	40695	2600.5	256QAM	75/ 0	8.10
15	40523	2583.3	256QAM	75/ 0	20	40694	2600.4	256QAM	100/ 0	7.03
20	40595	2590.5	256QAM	100/ 0	5	40712	2602.2	256QAM	25/ 0	7.08
20	40571	2588.1	256QAM	100/ 0	10	40715	2602.5	256QAM	50/ 0	7.04
20	40546	2585.6	256QAM	100/ 0	15	40717	2602.7	256QAM	75/ 0	7.06
20	40521	2583.1	256QAM	100/ 0	20	40719	2602.9	256QAM	100/ 0	8.11

Note:

In order to simplify the report, attached plots were only Max.Bandwidth(20+20)

PCC 20MHz Ch40521 RB100 Offset0, SCC 20MHz Ch40719 RB100 Offset0_(QPSK)

PCC 20MHz Ch40521 RB100 Offset0, SCC 20MHz Ch40719 RB100 Offset0_(16QAM)

PCC 20MHz Ch40521 RB100 Offset0, SCC 20MHz Ch40719 RB100 Offset0_(64QAM)

PCC 20MHz Ch40521 RB100 Offset0, SCC 20MHz Ch40719 RB100 Offset0_(256QAM)

9. ANNEX A_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2105-FC031-P