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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:
November 12, 2020

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

Report No.: HCT-RF-2011-FC014-R1

FCC ID:	**A3LSMG991U**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**

Model(s):	SM-G991U
Additional Model(s):	SM-G991U1
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)
10MHz+15MHz	1715.3 - 1772.5	QPSK	23M2G7D	23.27	0.212
		16QAM	23M2W7D	23.02	0.200
		64QAM	23M2W7D	20.39	0.109
		256QAM	23M2W7D	19.43	0.088
15MHz+10MHz	1717.5 - 1774.7	QPSK	23M1G7D	23.27	0.212
		16QAM	23M1W7D	22.89	0.195
		64QAM	23M2W7D	20.89	0.123
		256QAM	23M2W7D	19.94	0.099
10MHz+20MHz	1715.5 - 1770.0	QPSK	27M8G7D	23.23	0.210
		16QAM	27M8W7D	22.72	0.187
		64QAM	27M8W7D	20.02	0.100
		256QAM	27M8W7D	19.00	0.079
20MHz+10MHz	1720.0 - 1774.5	QPSK	27M9G7D	23.31	0.214
		16QAM	27M9W7D	22.98	0.199
		64QAM	27M8W7D	20.69	0.117
		256QAM	27M8W7D	19.57	0.090
15MHz+15MHz	1717.5 - 1772.5	QPSK	28M4G7D	23.16	0.207
		16QAM	28M4W7D	22.81	0.191
		64QAM	28M4W7D	20.22	0.105
		256QAM	28M4W7D	19.19	0.083

Mode (PCC+SCC)	Tx Frequency (MHz)	Modulation	Emission Designator	EIRP	
				Max. Power (dBm)	Max. Power (W)
15MHz+20MHz	1717.8 - 1770.0	QPSK	32M7G7D	23.32	0.215
		16QAM	32M6W7D	22.84	0.192
		64QAM	32M7W7D	20.06	0.101
		256QAM	32M7W7D	19.01	0.080
20MHz+15MHz	1720.0 - 1772.2	QPSK	32M7G7D	23.43	0.220
		16QAM	32M7W7D	22.92	0.196
		64QAM	32M5W7D	21.87	0.154
		256QAM	32M6W7D	21.12	0.129
20MHz+5MHz	1720.0 - 1776.7	QPSK	23M0G7D	23.48	0.223
		16QAM	22M9W7D	22.50	0.178
		64QAM	22M9W7D	19.49	0.089
		256QAM	22M9W7D	18.31	0.068
5MHz+20MHz	1713.3 - 1770.0	QPSK	23M0G7D	23.35	0.216
		16QAM	22M9W7D	22.60	0.182
		64QAM	22M9W7D	19.79	0.095
		256QAM	22M9W7D	18.69	0.074
20MHz+20MHz	1720.0 - 1770.0	QPSK	37M6G7D	23.47	0.222
		16QAM	37M7W7D	23.14	0.206
		64QAM	37M6W7D	20.70	0.117
		256QAM	37M6W7D	19.60	0.091

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 Ryang Do
Engineer of Telecommunication Testing Center

Report approved by : Kwon Jeong
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 KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2011-FC014	November 03, 2020	- First Approval Report
HCT-RF-2011-FC014-R1	November 12, 2020	- Revised the Max power table on 1 page.

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

Table of 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:	A3LSMG991U
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-G991U
Additional Model(s):	SM-G991U1
Tx Frequency:	1715.3 - 1772.5: 10MHz+15MHz 1717.5 - 1774.7: 15MHz+10MHz 1715.5 - 1770.0: 10MHz+20MHz 1720.0 - 1774.5: 20MHz+10MHz 1717.5 - 1772.5: 15MHz+15MHz 1717.8 - 1770.0: 15MHz+20MHz 1720.0 - 1772.2: 20MHz+15MHz 1720.0 - 1776.7: 20MHz+5MHz 1713.3 - 1770.0: 5MHz+20MHz 1720.0 - 1770.0: 20MHz+20MHz
Date(s) of Tests:	September 23, 2020 ~ October 31, 2020
LTE CA :	CA 66C (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
Band Edge	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Spurious and Harmonic Emissions at Antenna Terminal	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
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 1MHz
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 1MHz 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;

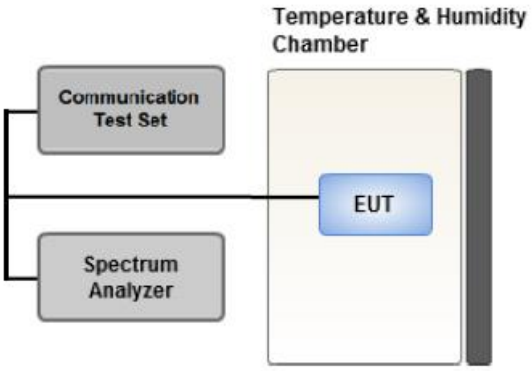
$$Result_{(dBm)} = Pg_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dBi)}$$

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

   If the fundalmatal 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)

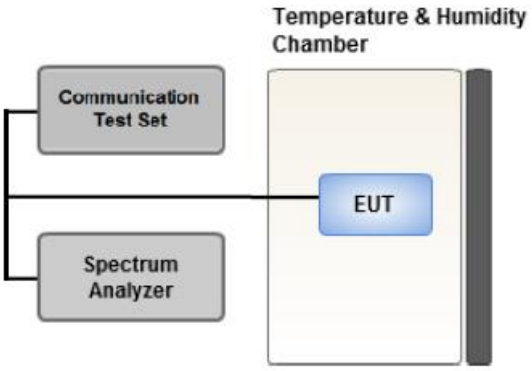
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW ≥ 3 × RBW.

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.

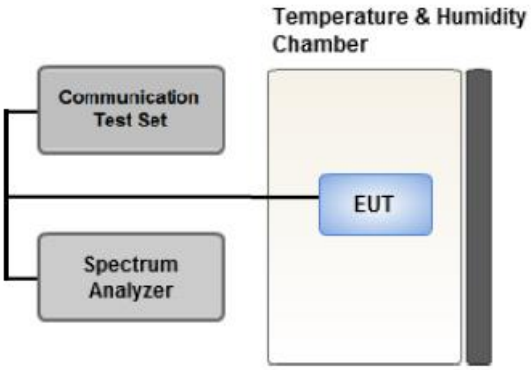
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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.

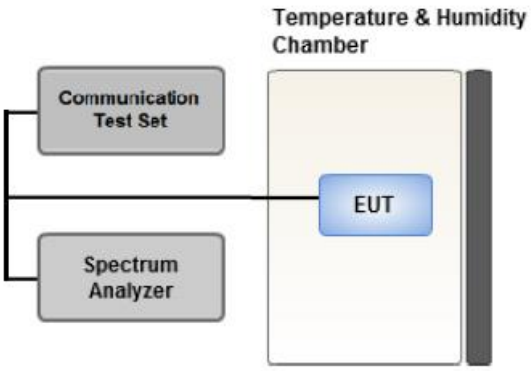
All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

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 = RMS
4. Trace Mode = trace average
5. Sweep time = auto
6. Number of points in sweep ≥ 2 x Span / RBW

3.7 BAND EDGE



Test setup

Test Overview

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Settings

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

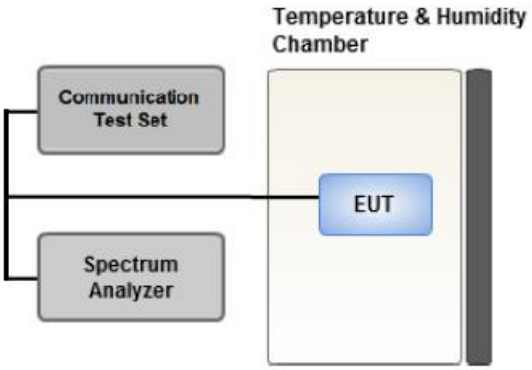
Test Notes

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

All measurements were done at 2 channels(low and high operational frequency range.)

The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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	-	03/09/2020	Annual	03/09/2021
T&M SYSTEM	FBSR-02B(WHK3.3/18G-10EF)/H.P.F	-	03/09/2020	Annual	03/09/2021
Hewlett Packard	11667B / Power Splitter(DC~26.5 GHz)	11275	04/27/2020	Annual	04/27/2021
Hewlett Packard	E3632A/DC Power Supply	MY40004427	09/16/2020	Annual	09/16/2021
Schwarzbeck	UHAP/ Dipole Antenna	557	03/29/2019	Biennial	03/29/2021
Schwarzbeck	UHAP/ Dipole Antenna	558	03/29/2019	Biennial	03/29/2021
ESPEC	SU-642 / Chamber	93008124	03/18/2020	Annual	03/18/2021
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	04/29/2019	Biennial	04/29/2021
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170124	02/11/2020	Biennial	02/11/2022
Agilent	N9020A/Signal Analyzer(10Hz~26.5GHz)	MY51110063	04/27/2020	Annual	04/27/2021
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)	1513-175	04/26/2019	Biennial	04/26/2021
Schwarzbeck	VULB9160/ Bilog Antenna	3150	03/12/2019	Biennial	03/12/2021
Schwarzbeck	VULB9160/ Hybrid Antenna	760	03/22/2019	Biennial	03/22/2021
Anritsu Corp.	MT8821C/Wideband Radio Communication Tester	6262116770	07/22/2020	Annual	07/22/2021
Anritsu Corp.	MT8820C/Wideband Radio Communication Tester	6201026545	01/22/2020	Annual	01/22/2021
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).
3. Model : FSV40/Spectrum
   - Use date of equipment: September 23, 2020 ~ October 12, 2020, October 14, 2020 ~

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

Note:

1. The same samples were used for SAR and EMC

6.2 Test Condition : Radiated Test

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

7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

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

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

1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.

2) During the test , the turn table is rotated until the maximum signal is found.

3) Record the field strength meter's level.

4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.

5) Increase the signal generator output till the field strength meter's level is equal to the item (3).

6) The signal generator output level with Ant. Gain and cable loss are the rating of effective radiated power.

7.2 EIRP Sample Calculation

Ch./ Freq.		Measured Level(dBm)	Substitute Level(dBm)	Ant. Gain (dBi)	C.L	Pol.	EIRP	
channel	Freq.(MHz)						W	dBm
20175	1,732.50	-15.75	18.45	9.90	1.76	H	0.456	26.59

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

1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.

2) During the test , the turn table is rotated until the maximum signal is found.

3) Record the field strength meter's level.

4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.

5) Increase the signal generator output till the field strength meter's level is equal to the item (3).

6) The signal generator output level with Ant. Gain and cable loss are the rating of equivalent isotropic radiated power.

7.3. Emission Designator

GSM Emission Designator

Emission Designator = 249KGXW

GSM BW = 249 kHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

EDGE Emission Designator

Emission Designator = 249KG7W

GSM BW = 249 kHz

G = Phase Modulation

7 = Quantized/Digital Info

W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M17F9W

WCDMA BW = 4.17 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

QPSK Modulation

Emission Designator = 4M48G7D

LTE BW = 4.48 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

QAM Modulation

Emission Designator = 4M48W7D

LTE BW = 4.48 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

8. TEST DATA

Test Overview

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

Test Note

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

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

3. All modes of operation were investigated and the worst case configuration results are reported in this section.

Please refer to the table below.

- Worst case(Conducted Spurious Emissions, BandEdge)

: 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.

[Worst case]

Test Description	Mod	Operating frequency	PCC					SCC				
			BW (MHz)	Freq. (MHz)	Ch.	RB	RB Offset	BW (MHz)	Freq. (MHz)	Ch.	RB	RB Offset
Conducted Spurious Emissions/ Band Edge	QPSK	Low	20	1720	132072	1	99	5	1731.7	132189	1	0
	QPSK	Mid	20	1747.6	132348	1	99	15	1764.7	132519	1	0
	QPSK	High	20	1760.1	132473	1	99	10	1774.5	132617	1	0
	QPSK	Low	20	1720	132072	1	0	5	1731.7	132189	1	24
	QPSK	Mid	20	1747.6	132348	1	0	15	1764.7	132519	1	74
	QPSK	High	20	1760.1	132473	1	0	10	1774.5	132617	1	49
	QPSK	Low	20	1720	132072	100	0	15	1737.1	132243	75	0
	QPSK	Mid	20	1747.6	132348	100	0	15	1764.7	132519	75	0
	QPSK	High	20	1755.1	132423	100	0	15	1772.2	132594	75	0
	QPSK	Low	20	1720	132072	100	0	20	1739.8	132270	100	0
	QPSK	Mid	20	1745.1	132323	100	0	20	1764.9	132521	100	0
	QPSK	High	20	1750.2	132374	100	0	20	1770	132572	100	0
Radiated Spurious Emissions	QPSK	Low	20	1720.0	132072	1	99	20	1739.8	132270	1	0
	QPSK	Mid	20	1752.5	132397	1	99	5	1764.2	132514	1	0
	QPSK	High	20	1755.1	132423	1	99	15	1772.2	132594	1	0

[Worst case]

Test Description	Mod	Operating frequency	PCC					SCC				
			BW (MHz)	Freq. (MHz)	Ch.	RB	RB Offset	BW (MHz)	Freq. (MHz)	Ch.	RB	RB Offset
OBW, PAR	QPSK, 16QAM, 64QAM 256QAM	Mid	10	1747.9	132351	50	0	15	1759.9	132471	75	0
			15	1750.1	132373	75	0	10	1762.1	132493	50	0
			10	1745.6	132328	50	0	20	1760.0	132472	100	0
			20	1750.1	132373	100	0	10	1764.5	132517	50	0
			15	1747.5	132347	75	0	15	1762.5	132497	75	0
			15	1745.3	132325	75	0	20	1762.4	132496	100	0
			20	1747.6	132348	100	0	15	1764.7	132519	75	0
			20	1752.5	132397	100	0	5	1764.2	132514	25	0
			5	1745.8	132330	25	0	20	1757.5	132447	100	0
			20	1745.1	132323	100	0	20	1764.9	132521	100	0
Frequency stability	QPSK	Low	5	1713.3	132005	25	0	20	1725.0	132122	100	0
			10	1715.3	132025	50	0	15	1727.3	132145	75	0
			15	1717.5	132047	75	0	10	1729.5	132167	50	0
			20	1720.0	132072	100	0	20	1739.8	132270	100	0
		High	5	2668.3	132455	25	0	20	1770.0	132572	100	0
			10	2665.6	132597	50	0	15	1784.5	132717	75	0
			15	2662.9	132499	75	0	10	1774.7	132619	50	0
			20	2660.2	132374	100	0	20	1770.0	132572	100	0

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8.1 Conducted Power

Operating frequency	PCC					SCC					Conducted. Power [dBm]
	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	
Low	10	1715.3	132025	1	49	15	1727.3	132145	1	0	24.02
	15	1717.5	132047	1	74	10	1729.5	132167	1	0	24.02
	10	1715.5	132027	1	49	20	1729.9	132171	1	0	23.95
	20	1720.0	132072	1	99	10	1734.4	132216	1	0	24.14
	15	1717.5	132047	1	74	15	1732.5	132197	1	0	24.03
	15	1717.8	132050	1	74	20	1734.9	132221	1	0	24.01
	20	1720.0	132072	1	99	15	1737.1	132243	1	0	24.25
	20	***1720.0***	***132072***	***1***	***99***	***5***	***1731.7***	***132189***	***1***	***0***	***24.33***
	5	1713.3	132005	1	24	20	1725.0	132122	1	0	24.13
	20	1720.0	132072	1	99	20	1739.8	132270	1	0	24.04
Mid	10	1747.9	132351	1	49	15	1759.9	132471	1	0	24.10
	15	1750.1	132373	1	74	10	1762.1	132493	1	0	24.08
	10	1745.6	132328	1	49	20	1760.0	132472	1	0	24.23
	20	1750.1	132373	1	99	10	1764.5	132517	1	0	24.07
	15	1747.5	132347	1	74	15	1762.5	132497	1	0	24.10
	15	1745.3	132325	1	74	20	1762.4	132496	1	0	24.06
	20	***1747.6***	***132348***	***1***	***99***	***15***	***1764.7***	***132519***	***1***	***0***	***24.36***
	20	1752.5	132397	1	99	5	1764.2	132514	1	0	24.10
	5	1745.8	132330	1	24	20	1757.5	132447	1	0	24.04
	20	1745.1	132323	1	99	20	1764.9	132521	1	0	24.16
High	10	1760.5	132477	1	49	15	1772.5	132597	1	0	24.10
	15	1762.7	132499	1	74	10	1774.7	132619	1	0	24.08
	10	1755.6	132428	1	49	20	1770.0	132572	1	0	24.00
	20	***1760.1***	***132473***	***1***	***99***	***10***	***1774.5***	***132617***	***1***	***0***	***24.12***
	15	1757.5	132447	1	74	15	1772.5	132597	1	0	23.91
	15	1752.9	132401	1	74	20	1770.0	132572	1	0	23.99
	20	1755.1	132423	1	99	15	1772.2	132594	1	0	23.79
	20	1765.0	132522	1	99	5	1776.7	132639	1	0	23.71
	5	1758.3	132455	1	24	20	1770.0	132572	1	0	23.55
	20	1750.2	132374	1	99	20	1770.0	132572	1	0	24.01

Note:

Modulation : QPSK(1RB)

Operating frequency	PCC					SCC					Conducted. Power [dBm]
	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	
Low	10	1715.3	132025	50	0	15	1727.3	132145	75	0	23.51
	15	1717.5	132047	75	0	10	1729.5	132167	50	0	23.51
	10	1715.5	132027	50	0	20	1729.9	132171	100	0	23.50
	20	1720.0	132072	100	0	10	1734.4	132216	50	0	23.58
	15	1717.5	132047	75	0	15	1732.5	132197	75	0	23.53
	15	1717.8	132050	75	0	20	1734.9	132221	100	0	23.51
	20	***1720.0***	***132072***	***100***	***0***	***15***	***1737.1***	***132243***	***75***	***0***	***24.08***
	20	1720.0	132072	100	0	5	1731.7	132189	25	0	23.59
	5	1713.3	132005	25	0	20	1725.0	132122	100	0	23.54
	20	1720.0	132072	100	0	20	1739.8	132270	100	0	23.53
Mid	10	1747.9	132351	50	0	15	1759.9	132471	75	0	23.65
	15	1750.1	132373	75	0	10	1762.1	132493	50	0	23.65
	10	1745.6	132328	50	0	20	1760.0	132472	100	0	23.66
	20	1750.1	132373	100	0	10	1764.5	132517	50	0	23.67
	15	1747.5	132347	75	0	15	1762.5	132497	75	0	23.64
	15	1745.3	132325	75	0	20	1762.4	132496	100	0	23.63
	20	***1747.6***	***132348***	***100***	***0***	***15***	***1764.7***	***132519***	***75***	***0***	***24.11***
	20	1752.5	132397	100	0	5	1764.2	132514	25	0	23.56
	5	1745.8	132330	25	0	20	1757.5	132447	100	0	23.63
	20	1745.1	132323	100	0	20	1764.9	132521	100	0	23.55
High	10	1760.5	132477	50	0	15	1772.5	132597	75	0	23.57
	15	1762.7	132499	75	0	10	1774.7	132619	50	0	23.55
	10	1755.6	132428	50	0	20	1770.0	132572	100	0	23.54
	20	1760.1	132473	100	0	10	1774.5	132617	50	0	23.53
	15	1757.5	132447	75	0	15	1772.5	132597	75	0	23.57
	15	1752.9	132401	75	0	20	1770.0	132572	100	0	23.64
	20	***1755.1***	***132423***	***100***	***0***	***15***	***1772.2***	***132594***	***75***	***0***	***24.07***
	20	1765.0	132522	100	0	5	1776.7	132639	25	0	23.49
	5	1758.3	132455	25	0	20	1770.0	132572	100	0	23.47
	20	1750.2	132374	100	0	20	1770.0	132572	100	0	23.58

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	1720.0	132072	1	99	5	1731.7	132189	1	0	24.18
Mid	20	1745.1	132323	1	99	15	1764.7	132519	1	0	23.89
High	20	1750.2	132374	1	99	10	1774.5	132617	1	0	24.22
Low	20	1720.0	132072	100	0	15	1737.1	132243	75	0	23.33
Mid	20	1747.6	132348	100	0	15	1764.7	132519	75	0	23.46
High	20	1755.1	132423	100	0	15	1772.2	132594	75	0	23.65

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	1720.0	132072	1	99	5	1731.7	132189	1	0	23.09
Mid	20	1745.1	132323	1	99	15	1764.7	132519	1	0	24.08
High	20	1750.2	132374	1	99	10	1774.5	132617	1	0	23.53
Low	20	1720.0	132072	100	0	15	1737.1	132243	75	0	22.49
Mid	20	1747.6	132348	100	0	15	1764.7	132519	75	0	22.55
High	20	1755.1	132423	100	0	15	1772.2	132594	75	0	22.59

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	1720.0	132072	1	99	5	1731.7	132189	1	0	20.52
Mid	20	1745.1	132323	1	99	15	1764.7	132519	1	0	23.94
High	20	1750.2	132374	1	99	10	1774.5	132617	1	0	20.87
Low	20	1720.0	132072	100	0	15	1737.1	132243	75	0	21.53
Mid	20	1747.6	132348	100	0	15	1764.7	132519	75	0	21.61
High	20	1755.1	132423	100	0	15	1772.2	132594	75	0	21.65

Note:

Modulation : 256QAM

8.2 Equivalent Isotropic Radiated Power

	PCC			SCC			Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol.	E.I.R.P	
	BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset						W	dBm
Low	10	132025	1/49	15	132145	1/0	-19.25	14.10	9.90	1.89	H	0.16	22.11
	15	132047	1/74	10	132167	1/0	-18.77	14.58	9.90	1.89	H	0.18	22.59
	10	132027	1/49	20	132171	1/0	-19.07	14.28	9.90	1.89	H	0.17	22.29
	20	132072	1/99	10	132216	1/0	-18.15	15.20	9.90	1.89	H	0.21	23.21
	15	132047	1/74	15	132197	1/0	-18.33	15.02	9.90	1.89	H	0.20	23.03
	15	132050	1/74	20	132221	1/0	-18.24	15.11	9.90	1.89	H	0.20	23.12
	20	132072	1/99	15	132243	1/0	-17.93	15.42	9.90	1.89	H	0.22	23.43
	20	132072	1/99	5	132189	1/0	-19.25	14.10	9.90	1.89	H	0.16	22.11
	5	132005	1/24	20	132122	1/0	-18.50	14.85	9.90	1.89	H	0.19	22.86
	20	***132072***	***1/99***	***20***	***132270***	***1/0***	***-17.89***	***15.46***	***9.90***	***1.89***	***H***	***0.22***	***23.47***
Mid	10	132351	1/49	15	132471	1/0	-18.14	15.16	10.02	1.91	H	0.21	23.27
	15	132373	1/74	10	132493	1/0	-18.14	15.16	10.02	1.91	H	0.21	23.27
	10	132328	1/49	20	132472	1/0	-18.18	15.12	10.02	1.91	H	0.21	23.23
	20	132373	1/99	10	132517	1/0	-18.10	15.20	10.02	1.91	H	0.21	23.31
	15	132347	1/74	15	132497	1/0	-18.25	15.05	10.02	1.91	H	0.21	23.16
	15	132325	1/74	20	132496	1/0	-18.09	15.21	10.02	1.91	H	0.21	23.32
	20	132348	1/99	15	132519	1/0	-18.10	15.20	10.02	1.91	H	0.21	23.31
	20	***132397***	***1/99***	***5***	***132514***	***1/0***	***-17.93***	***15.37***	***10.02***	***1.91***	***H***	***0.22***	***23.48***
	5	132330	1/24	20	132447	1/0	-18.06	15.24	10.02	1.91	H	0.22	23.35
	20	132323	1/99	20	132521	1/0	-18.35	14.95	10.02	1.91	H	0.20	23.06
High	10	132477	1/49	15	132597	1/0	-18.22	15.11	10.02	1.92	H	0.21	23.21
	15	132499	1/74	10	132619	1/0	-18.37	14.96	10.02	1.92	H	0.20	23.06
	10	132428	1/49	20	132572	1/0	-18.22	15.11	10.02	1.92	H	0.21	23.21
	20	132473	1/99	10	132617	1/0	-18.30	15.03	10.02	1.92	H	0.21	23.13
	15	132447	1/74	15	132597	1/0	-18.29	15.04	10.02	1.92	H	0.21	23.14
	15	132401	1/74	20	132572	1/0	-18.22	15.11	10.02	1.92	H	0.21	23.21
	20	***132423***	***1/99***	***15***	***132594***	***1/0***	***-18.20***	***15.13***	***10.02***	***1.92***	***H***	***0.21***	***23.23***
	20	132522	1/99	5	132639	1/0	-19.34	13.99	10.02	1.92	H	0.16	22.09
	5	132455	1/24	20	132572	1/0	-18.23	15.10	10.02	1.92	H	0.21	23.20
	20	132374	1/99	20	132572	1/0	-18.22	15.11	10.02	1.92	H	0.21	23.21

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
10	132351	1/49	15	132471	1/0	-18.39	14.39	10.98	2.35	H	0.20	23.02
15	132373	1/74	10	132493	1/0	-18.52	14.26	10.98	2.35	H	0.19	22.89
10	132328	1/49	20	132472	1/0	-18.69	14.09	10.98	2.35	H	0.19	22.72
20	132373	1/99	10	132517	1/0	-18.43	14.35	10.98	2.35	H	0.20	22.98
15	132347	1/74	15	132497	1/0	-18.60	14.18	10.98	2.35	H	0.19	22.81
15	132325	1/74	20	132496	1/0	-18.57	14.21	10.98	2.35	H	0.19	22.84
20	132348	1/99	15	132519	1/0	-18.49	14.29	10.98	2.35	H	0.20	22.92
20	132397	1/99	5	132514	1/0	-18.91	13.87	10.98	2.35	H	0.18	22.50
5	132330	1/24	20	132447	1/0	-18.81	13.97	10.98	2.35	H	0.18	22.60
20	132323	1/99	20	132521	1/0	-18.44	14.34	10.98	2.35	H	0.20	22.97
20	132072	1/99	20	132270	1/0	-18.22	14.71	10.75	2.32	H	0.21	23.14
20	132423	1/99	15	132594	1/0	-18.64	14.08	11.10	2.39	H	0.19	22.79

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
10	132351	1/49	15	132471	1/0	-21.02	11.76	10.98	2.35	H	0.11	20.39
15	132373	1/74	10	132493	1/0	-20.52	12.26	10.98	2.35	H	0.12	20.89
10	132328	1/49	20	132472	1/0	-21.39	11.39	10.98	2.35	H	0.10	20.02
20	132373	1/99	10	132517	1/0	-20.72	12.06	10.98	2.35	H	0.12	20.69
15	132347	1/74	15	132497	1/0	-21.19	11.59	10.98	2.35	H	0.11	20.22
15	132325	1/74	20	132496	1/0	-21.35	11.43	10.98	2.35	H	0.10	20.06
20	132348	1/99	15	132519	1/0	-19.54	13.24	10.98	2.35	H	0.15	21.87
20	132397	1/99	5	132514	1/0	-21.92	10.86	10.98	2.35	H	0.09	19.49
5	132330	1/24	20	132447	1/0	-21.62	11.16	10.98	2.35	H	0.10	19.79
20	132323	1/99	20	132521	1/0	-21.16	11.62	10.98	2.35	H	0.11	20.25
20	132072	1/99	20	132270	1/0	-20.66	12.27	10.75	2.32	H	0.12	20.70
20	132423	1/99	15	132594	1/0	-19.70	13.02	11.10	2.39	H	0.15	21.73

Note:

1. Modulation : 64QAM

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
10	132025	1/49	15	132471	1/0	-21.98	10.80	10.98	2.35	H	0.09	19.43
15	132047	1/74	10	132493	1/0	-21.47	11.31	10.98	2.35	H	0.10	19.94
10	132027	1/49	20	132472	1/0	-22.41	10.37	10.98	2.35	H	0.08	19.00
20	132072	1/99	10	132517	1/0	-21.84	10.94	10.98	2.35	H	0.09	19.57
15	132047	1/74	15	132497	1/0	-22.22	10.56	10.98	2.35	H	0.08	19.19
15	132050	1/74	20	132496	1/0	-22.40	10.38	10.98	2.35	H	0.08	19.01
20	132072	1/99	15	132519	1/0	-20.29	12.49	10.98	2.35	H	0.13	21.12
20	132072	1/99	5	132514	1/0	-23.10	9.68	10.98	2.35	H	0.07	18.31
5	132005	1/24	20	132447	1/0	-22.72	10.06	10.98	2.35	H	0.07	18.69
20	132072	1/99	20	132521	1/0	-22.17	10.61	10.98	2.35	H	0.08	19.24
20	132072	1/99	20	132270	1/0	-21.76	11.17	10.75	2.32	H	0.09	19.60
20	132072	1/99	15	132594	1/0	-20.50	12.22	11.10	2.39	H	0.12	20.93

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	132072	1720	1/99	5	132189	1731.7	1/0	7.9910	28.59	-75.89	-47.30
Mid	20	132348	1747.6	1/99	15	132519	1764.7	1/0	9.9791	28.59	-76.24	-47.65
High	20	132473	1760.1	1/99	10	132617	1774.5	1/0	3.7982	27.98	-76.06	-48.08
Low	20	132072	1720	1/0	5	132189	1731.7	1/24	8.3106	28.59	-75.36	-46.77
Mid	20	132348	1747.6	1/0	15	132519	1764.7	1/74	6.2966	28.59	-75.78	-47.19
High	20	132473	1760.1	1/0	10	132617	1774.5	1/49	9.4282	28.59	-75.66	-47.07
Low	20	132072	1720	100/0	15	132243	1737.1	75/0	8.0344	28.59	-75.12	-46.53
Mid	20	132348	1747.6	100/0	15	132519	1764.7	75/0	3.5001	27.98	-75.87	-47.90
High	20	132423	1755.1	100/0	15	132594	1772.2	75/0	8.0359	28.59	-75.42	-46.83
Low	20	132072	1720	100/0	20	132270	1739.8	100/0	3.1257	27.98	-76.38	-48.40
Mid	20	132323	1745.1	100/0	20	132521	1764.9	100/0	4.0280	27.98	-76.07	-48.10
High	20	132374	1750.2	100/0	20	132572	1770	100/0	3.7613	27.98	-75.26	-47.29

Note:

1. Modulation : QPSK

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

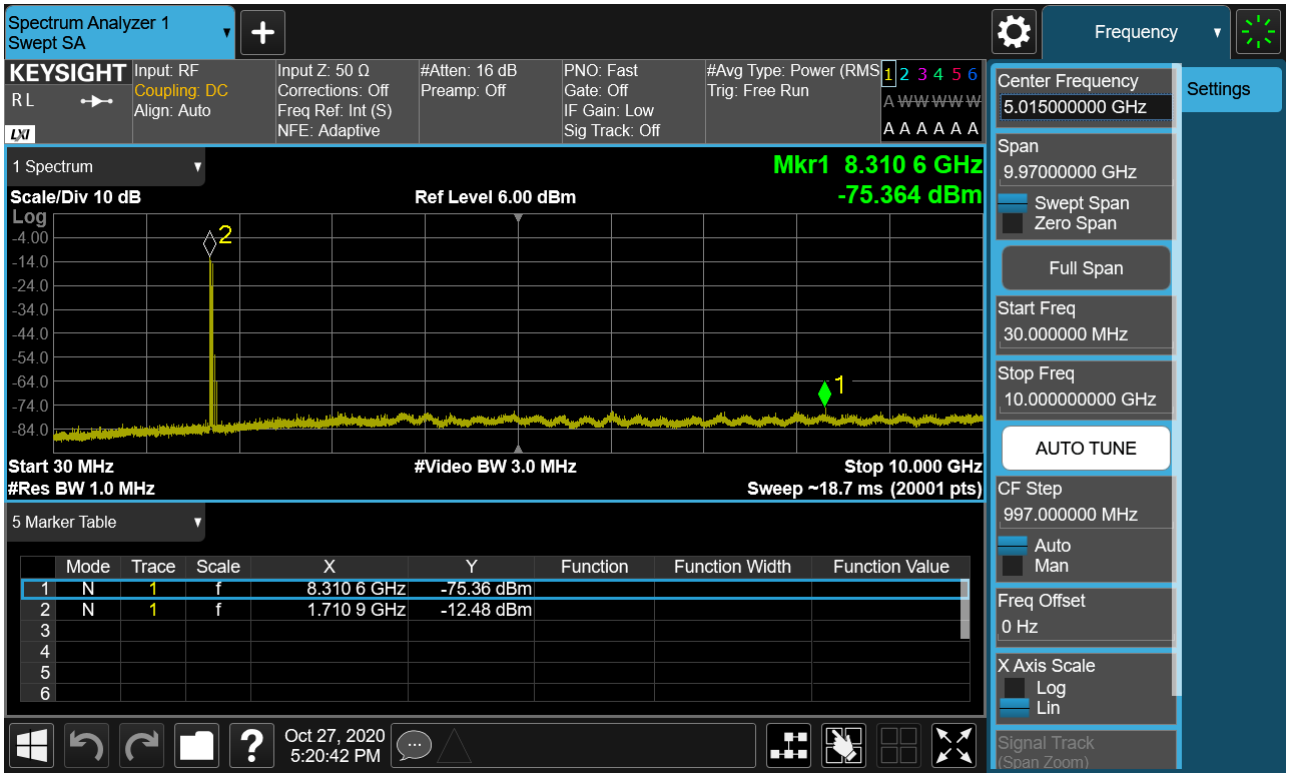
3. Factors for frequency :

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

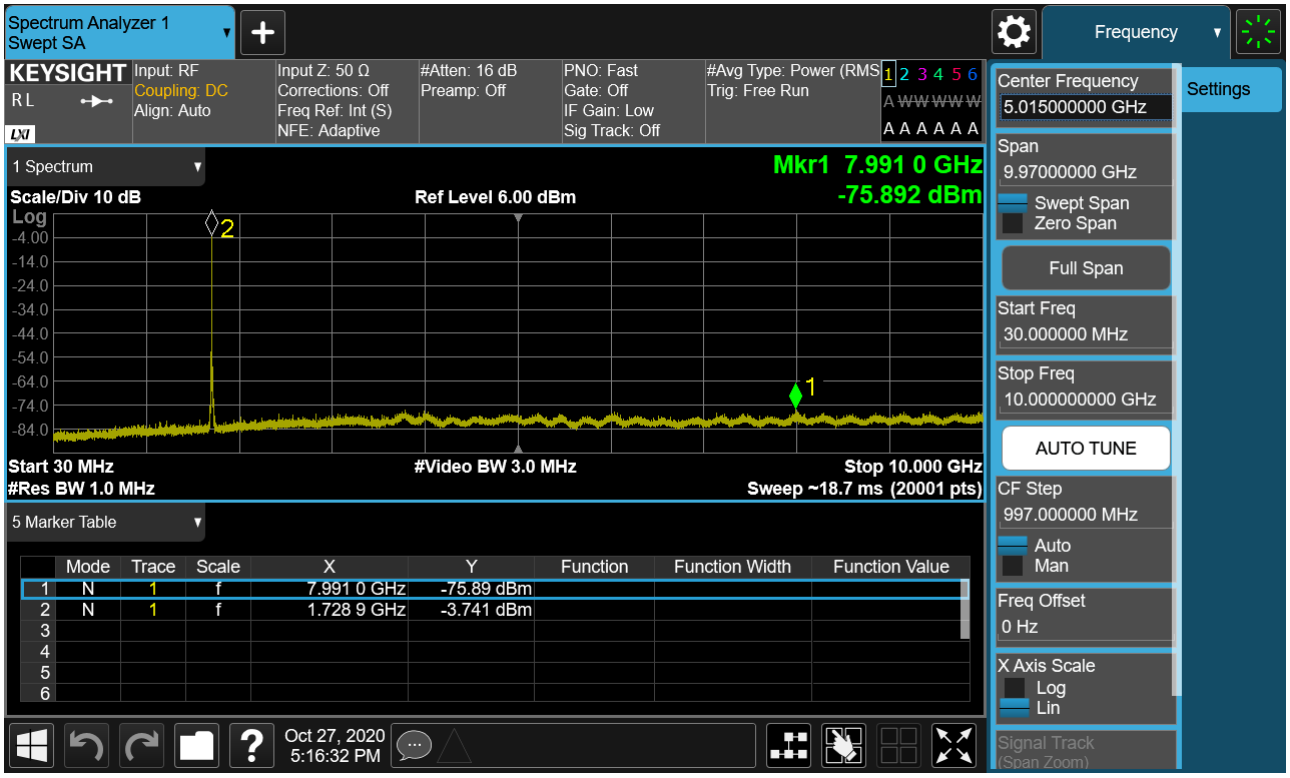
4. Limit : -13.0 dBm

Frequency Range : 30MHz ~ 10GHz

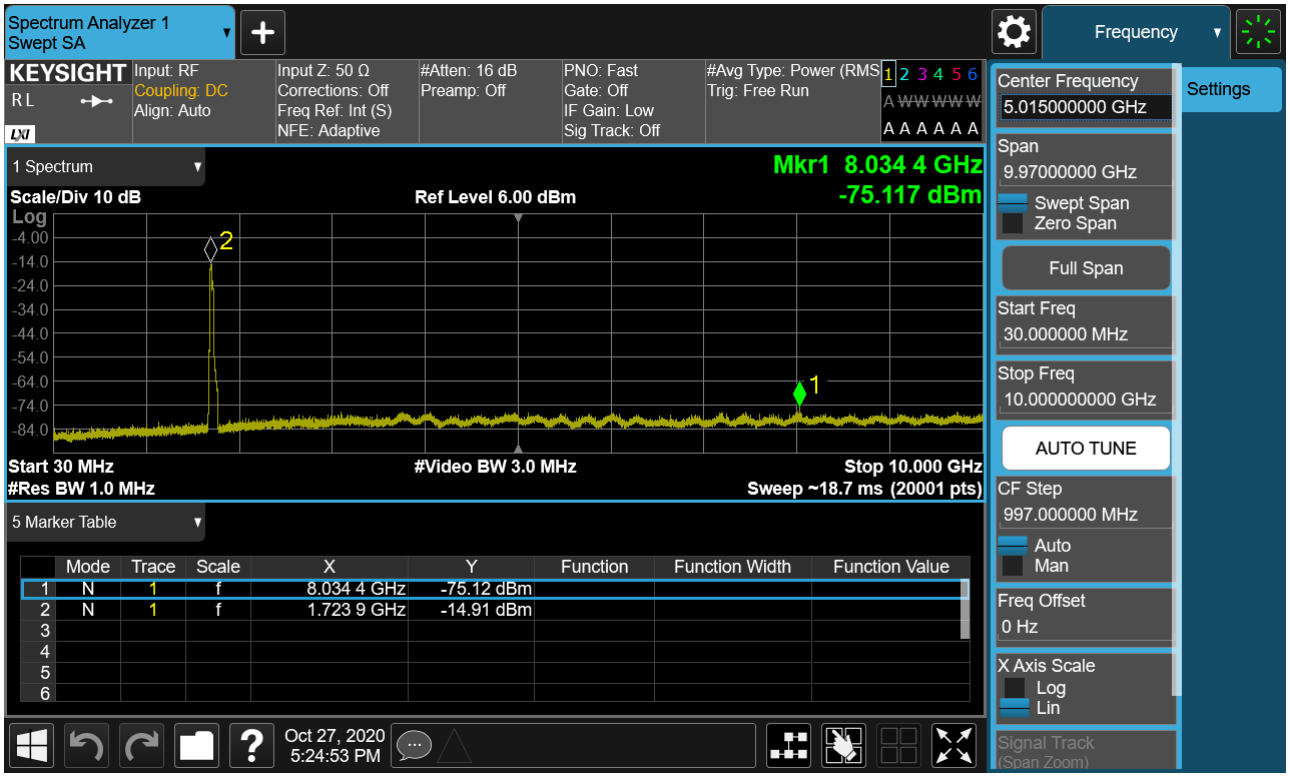
PCC 20MHz Ch132072 RB1 Offset0 SCC 5MHz Ch132189 RB1 Offset24



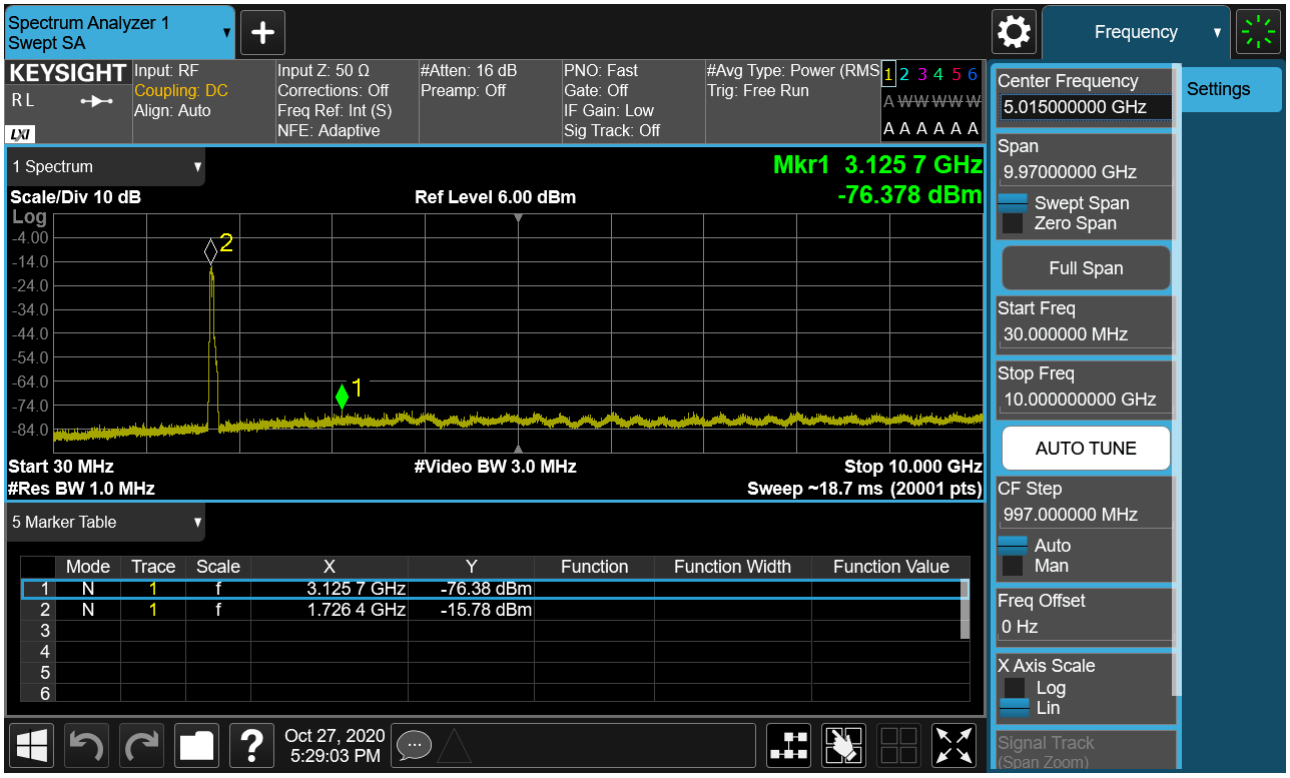
PCC 20MHz Ch132072 RB1 Offset99 SCC 5MHz Ch132189 RB1 Offset0



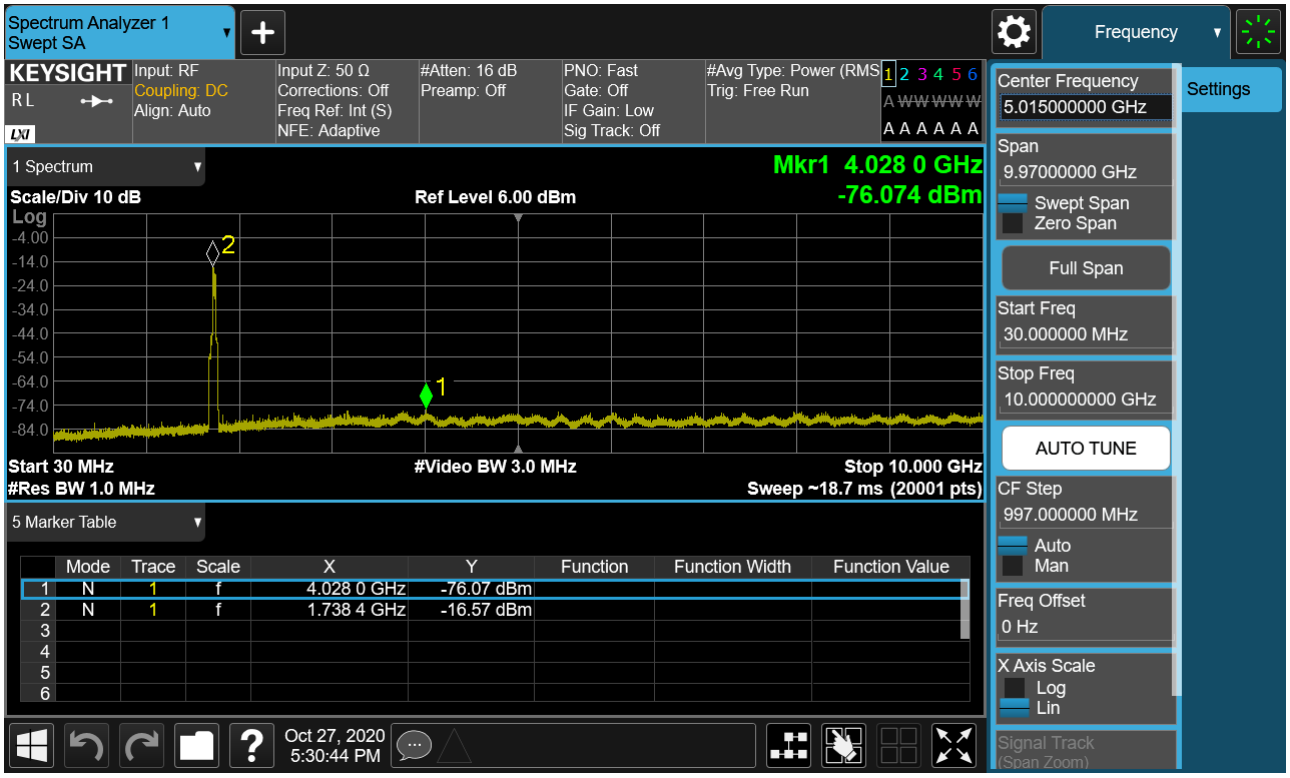
PCC 20MHz Ch132072 RB100 Offset0 SCC 15MHz Ch132243 RB75 Offset0



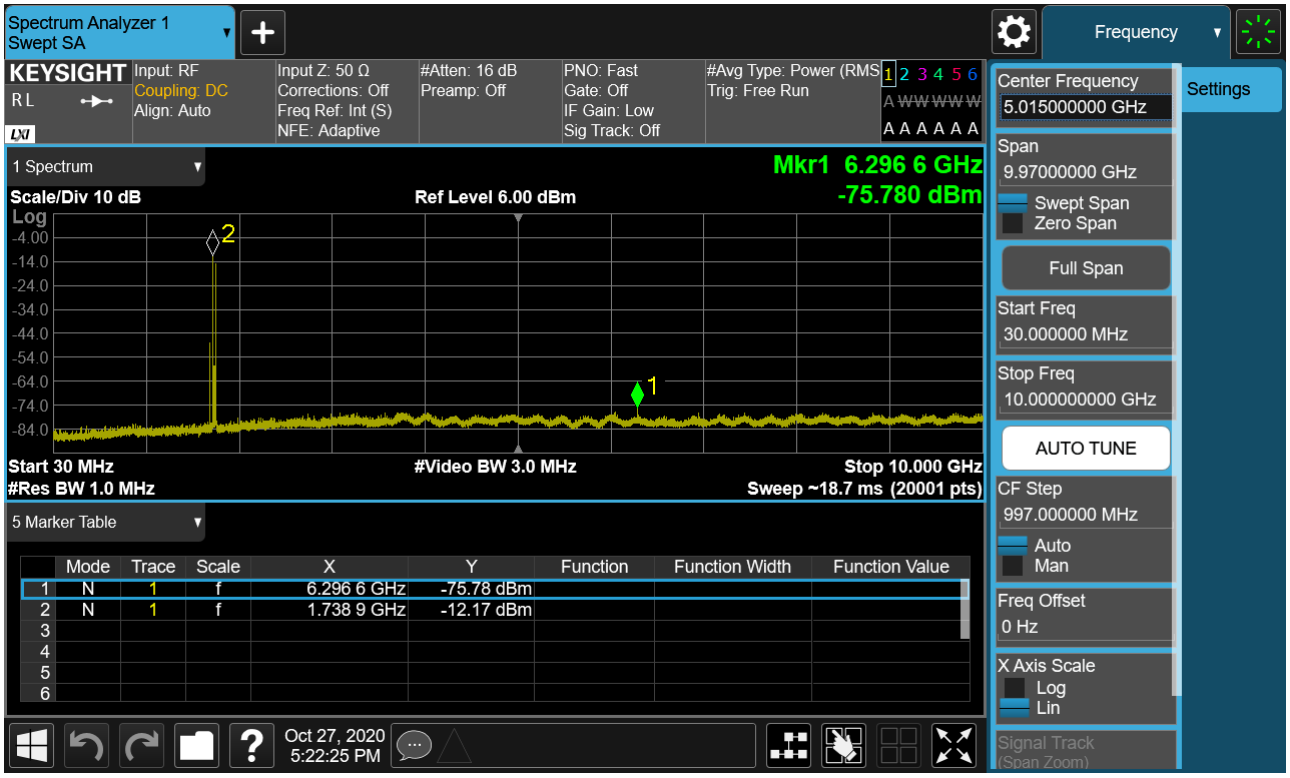
PCC 20MHz Ch132072 RB100 Offset0 SCC 20MHz Ch132270 RB100 Offset0



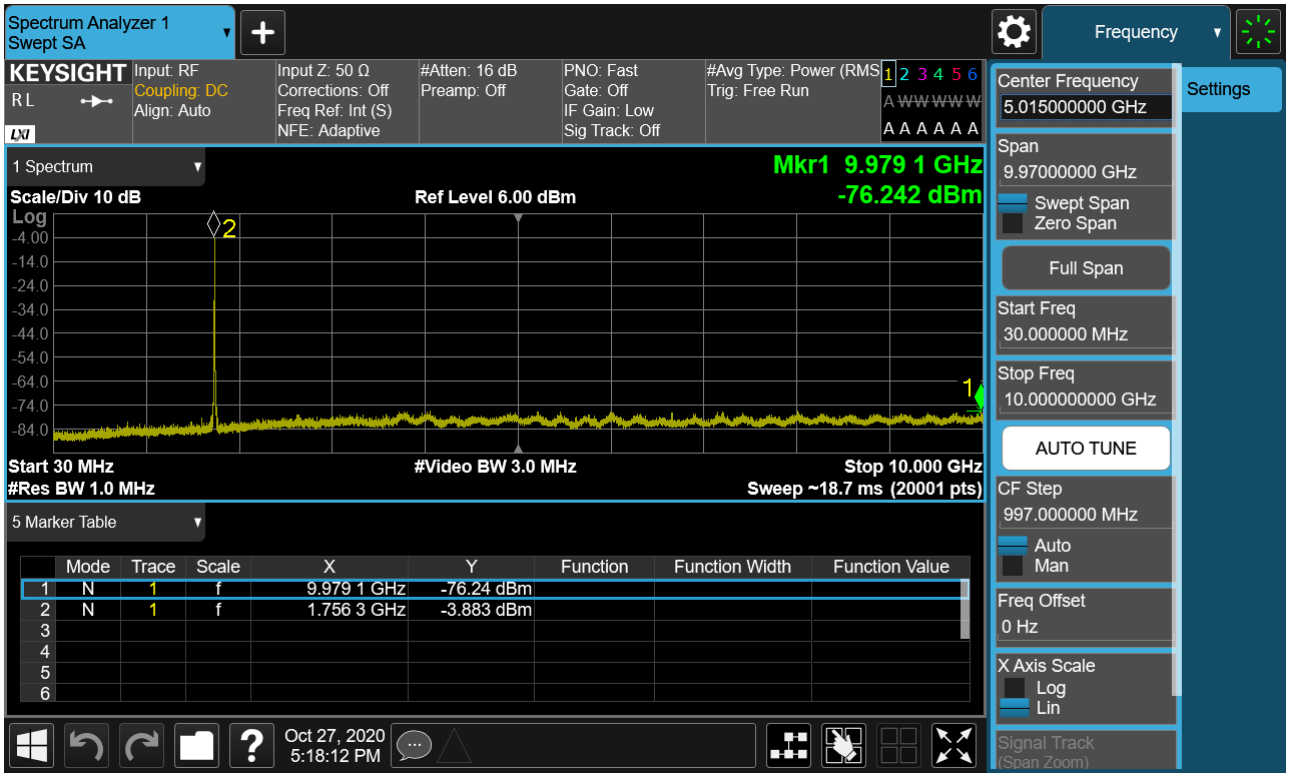
PCC 20MHz Ch132323 RB100 Offset0 SCC 20MHz Ch132521 RB100 Offset0



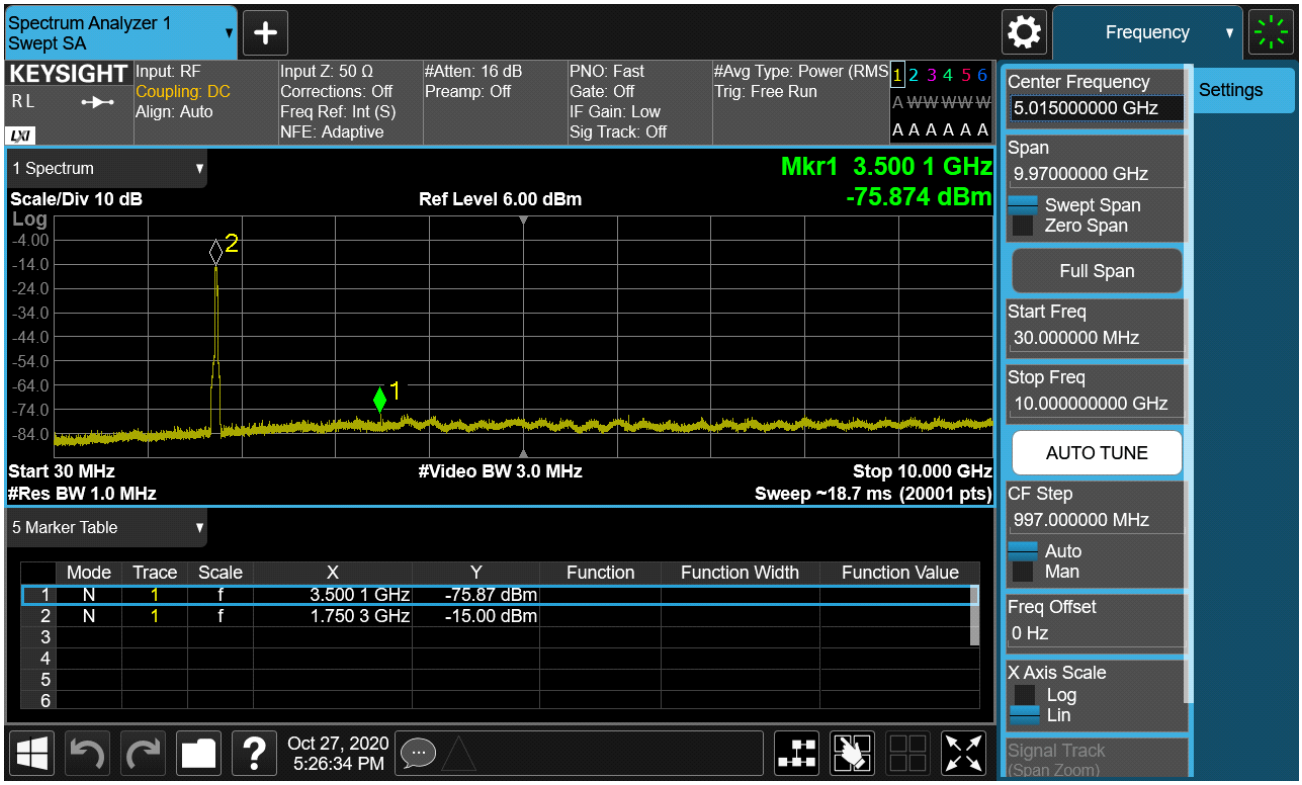
PCC 20MHz Ch132348 RB1 Offset0 SCC 15MHz Ch132519 RB1 Offset74



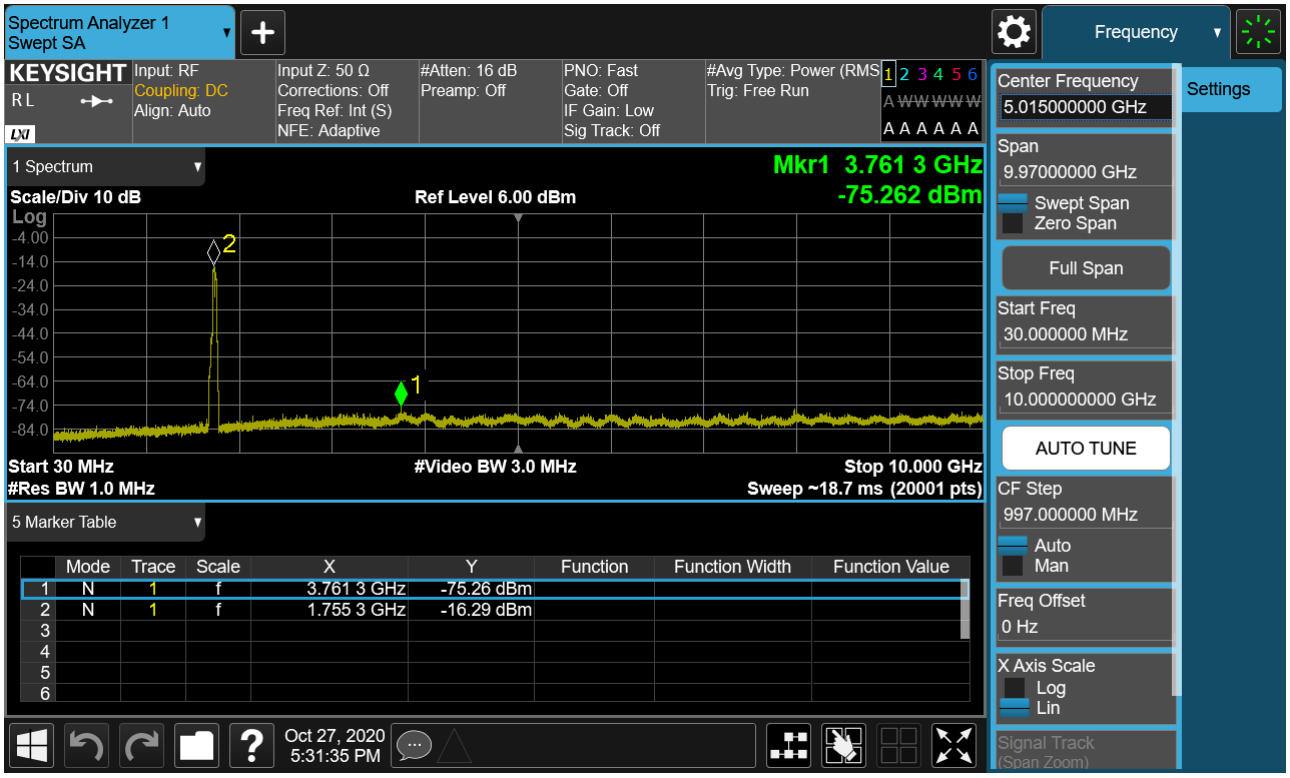
PCC 20MHz Ch132348 RB1 Offset99 SCC 15MHz Ch132519 RB1 Offset0



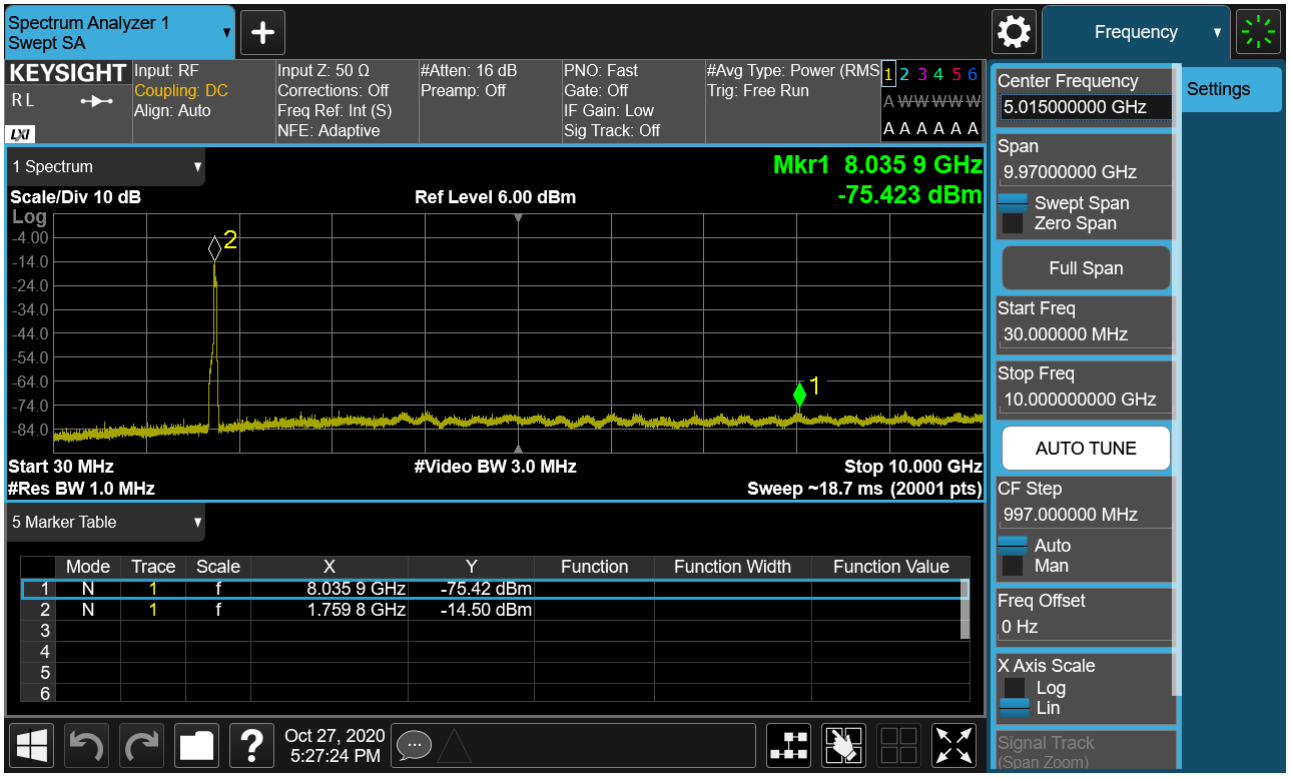
PCC 20MHz Ch132348 RB100 Offset0 SCC 15MHz Ch132519 RB75 Offset0



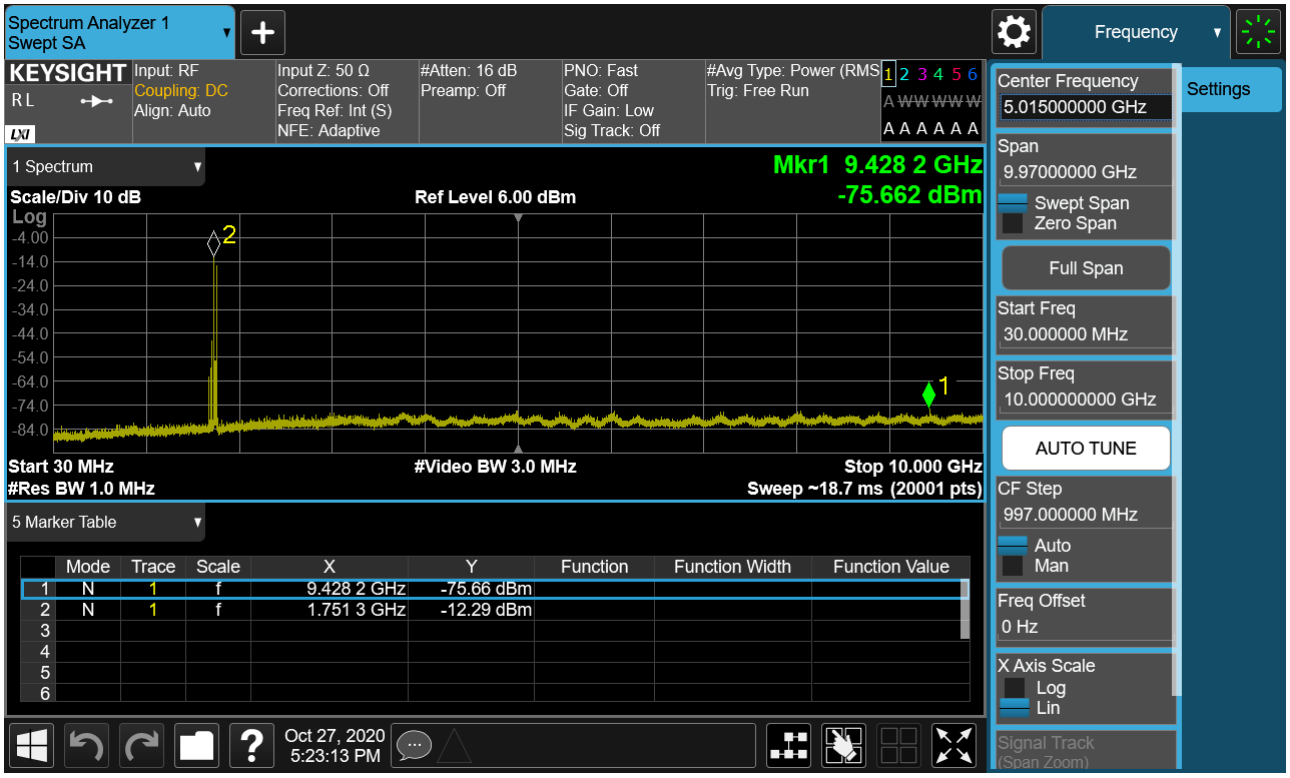
PCC 20MHz Ch132374 RB100 Offset0 SCC 20MHz Ch132572 RB100 Offset0



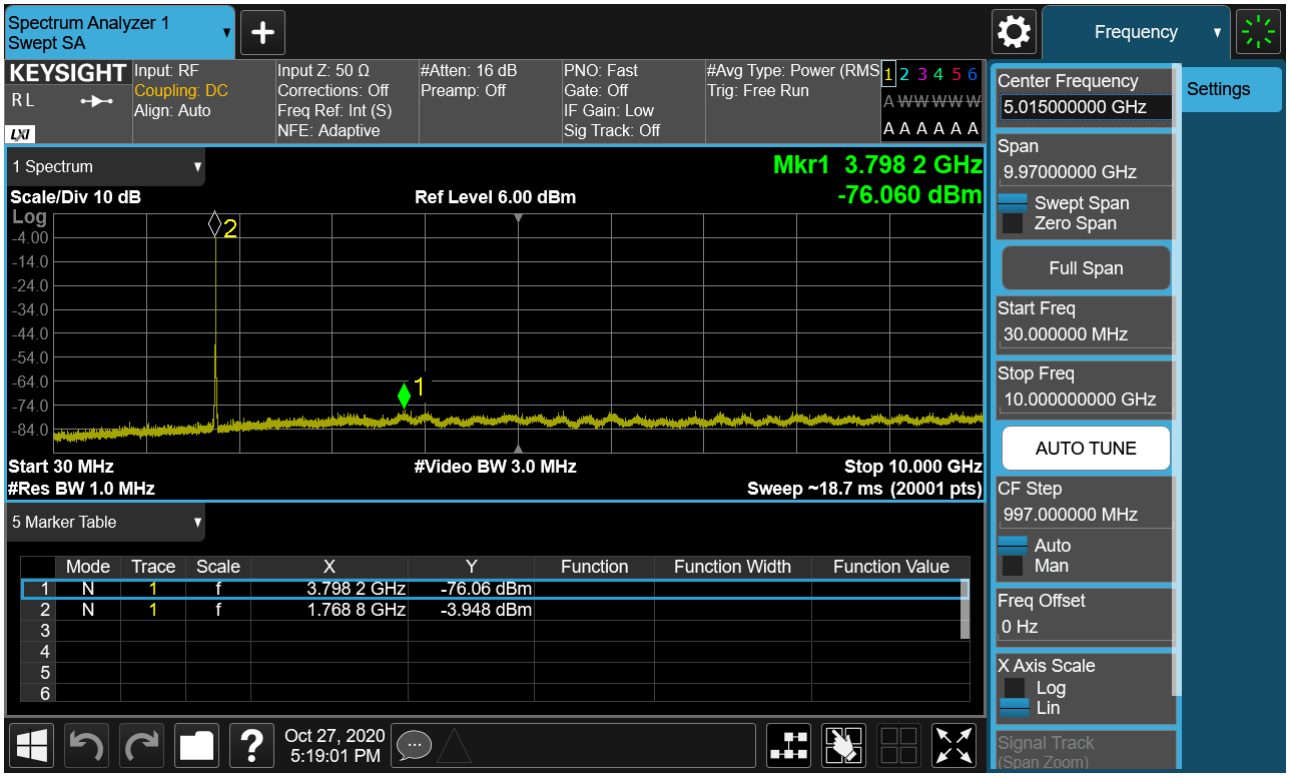
PCC 20MHz Ch132423 RB100 Offset0 SCC 15MHz Ch132594 RB75 Offset0



PCC 20MHz Ch132473 RB1 Offset0 SCC 10MHz Ch132617 RB1 Offset49

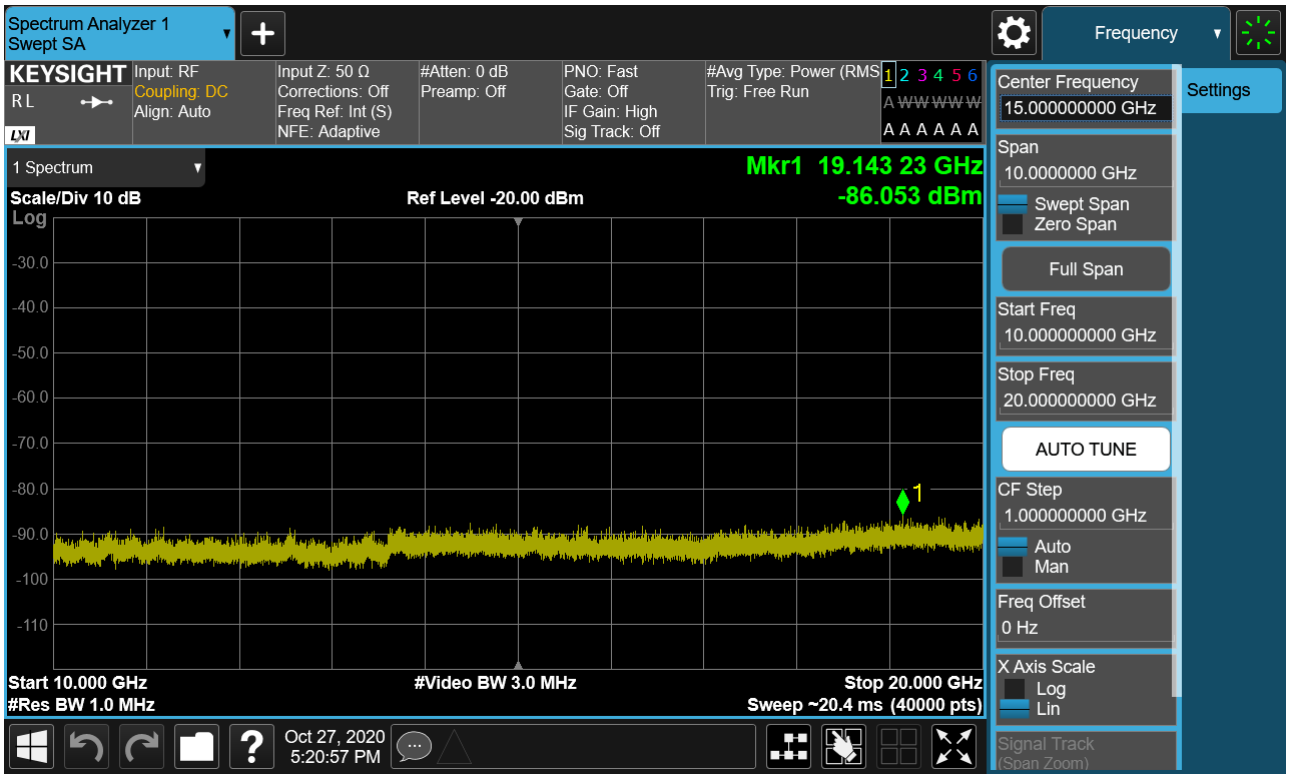


PCC 20MHz Ch132473 RB1 Offset99 SCC 10MHz Ch132617 RB1 Offset0

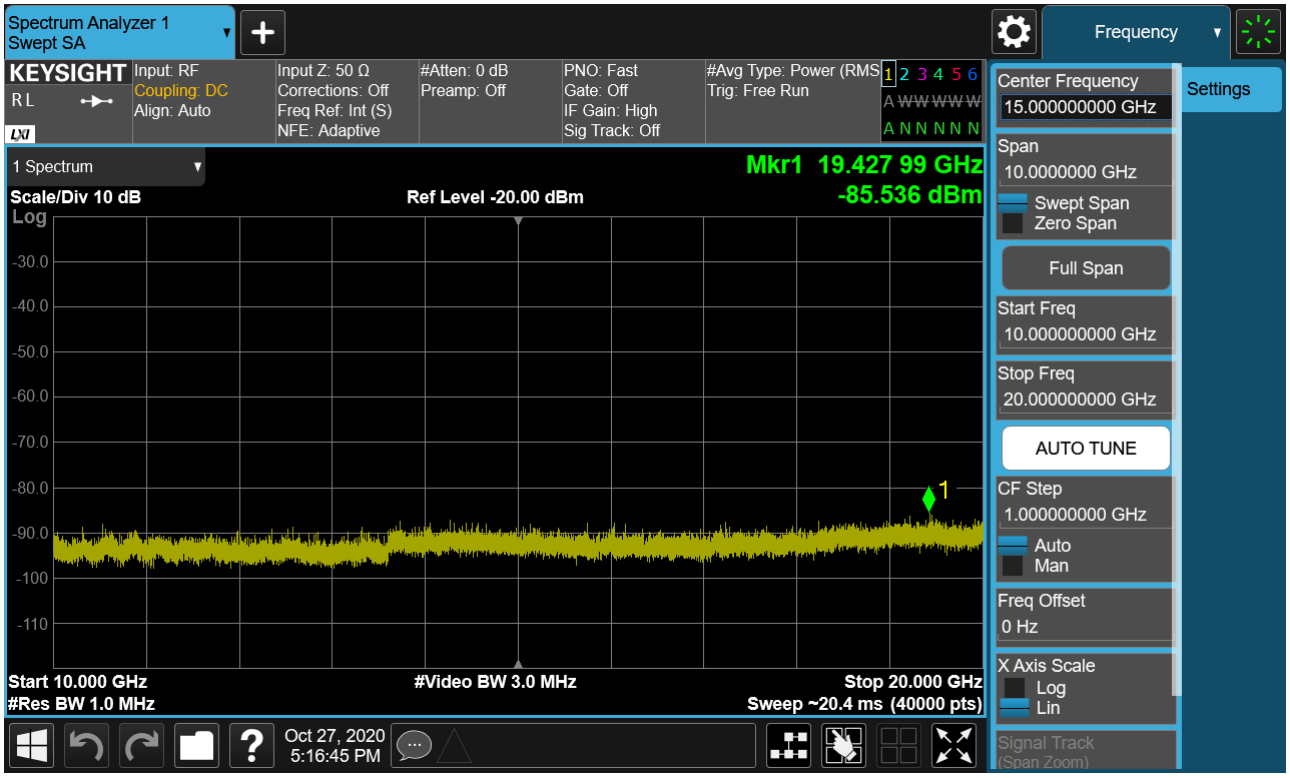


Frequency Range : 10GHz ~ 20.0GHz

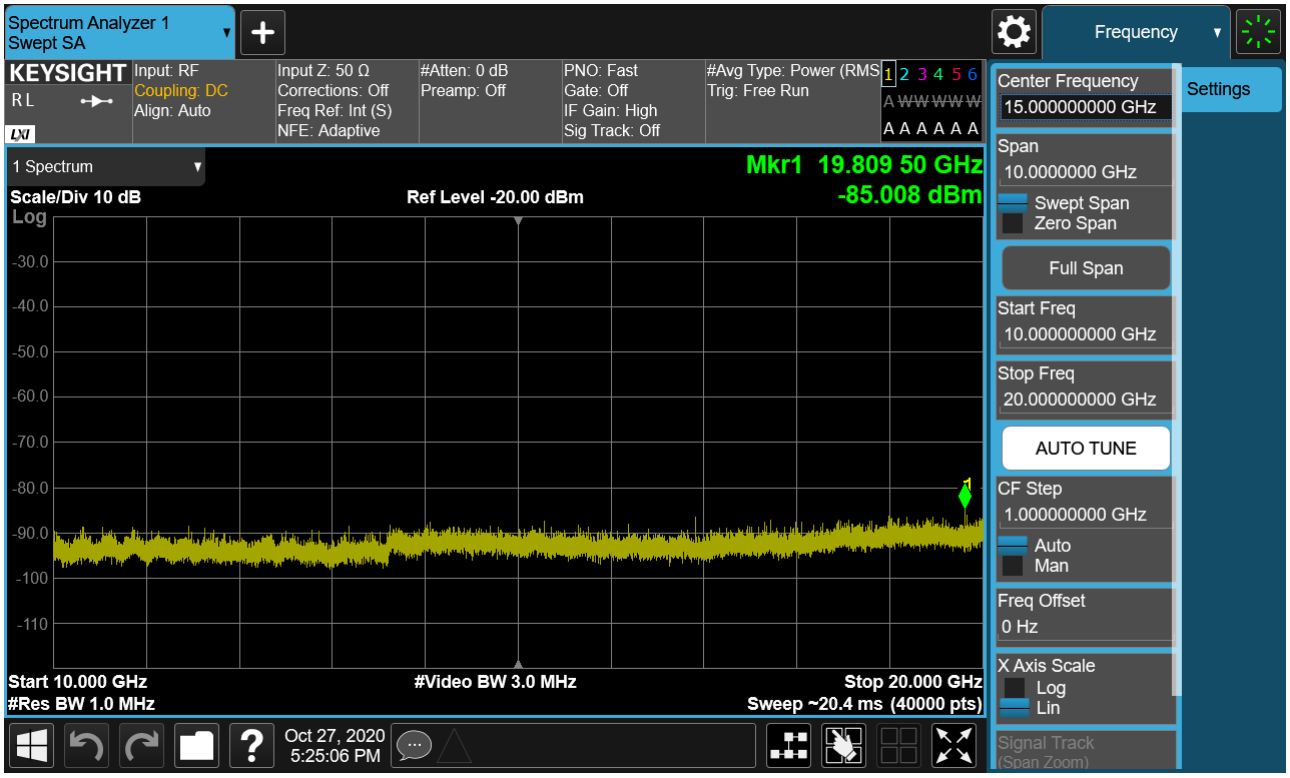
PCC 20MHz Ch132072 RB1 Offset0, SCC 5MHz Ch132189 RB1 Offset24



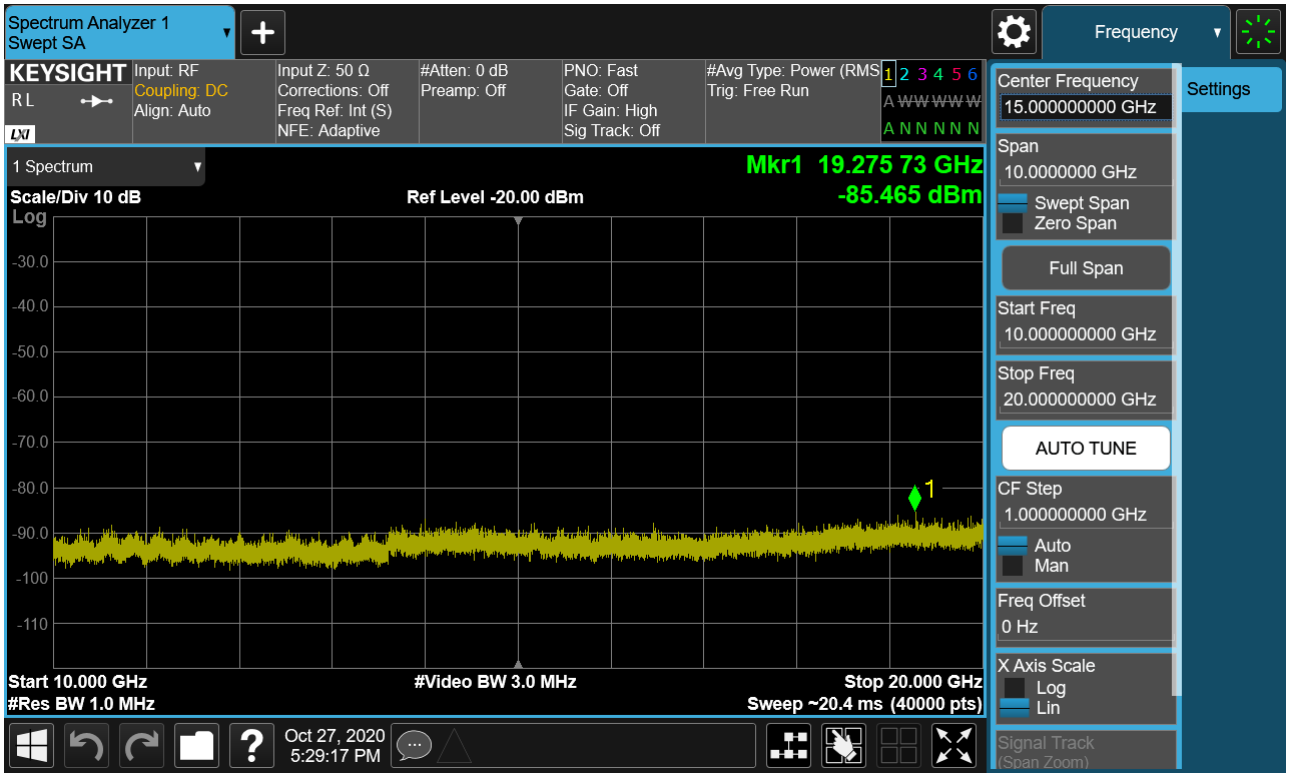
PCC 20MHz Ch132072 RB1 Offset99, SCC 5MHz Ch132189 RB1 Offset0



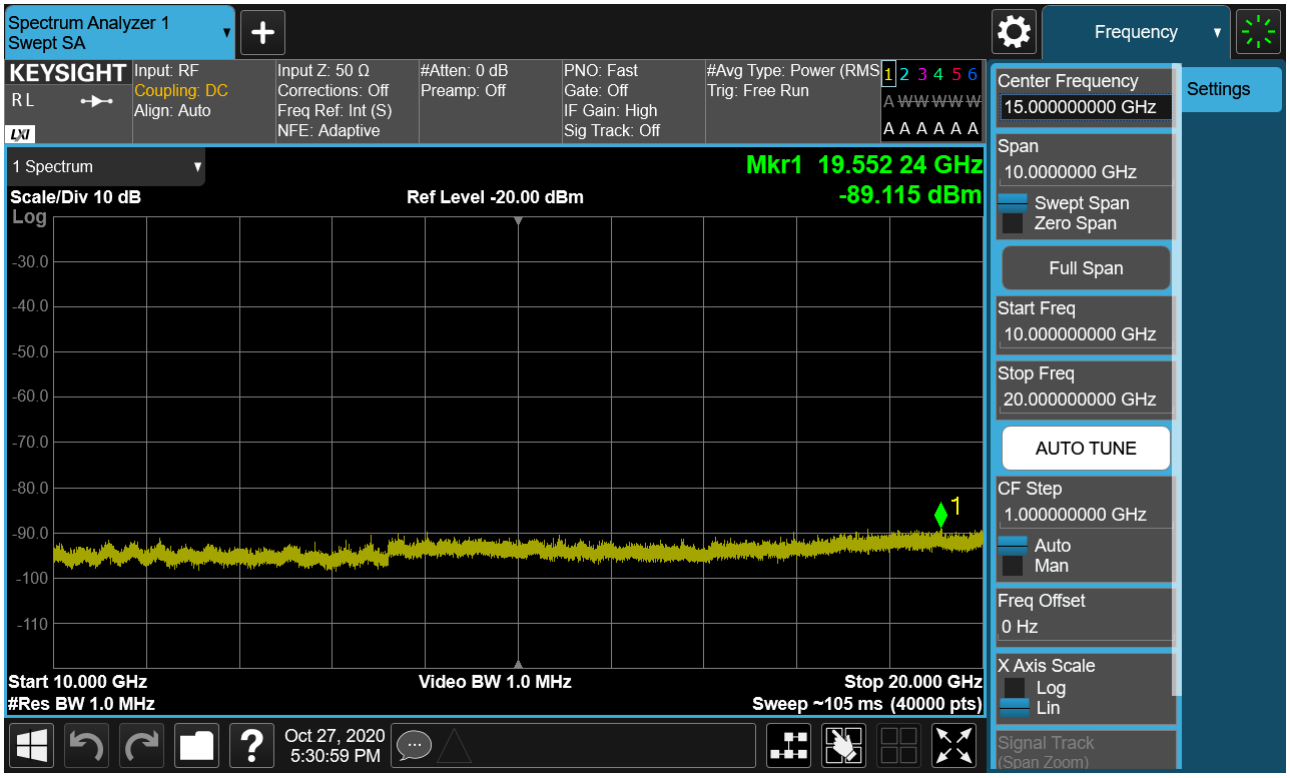
PCC 20MHz Ch132072 RB100 Offset0, SCC 15MHz Ch132243 RB75 Offset0



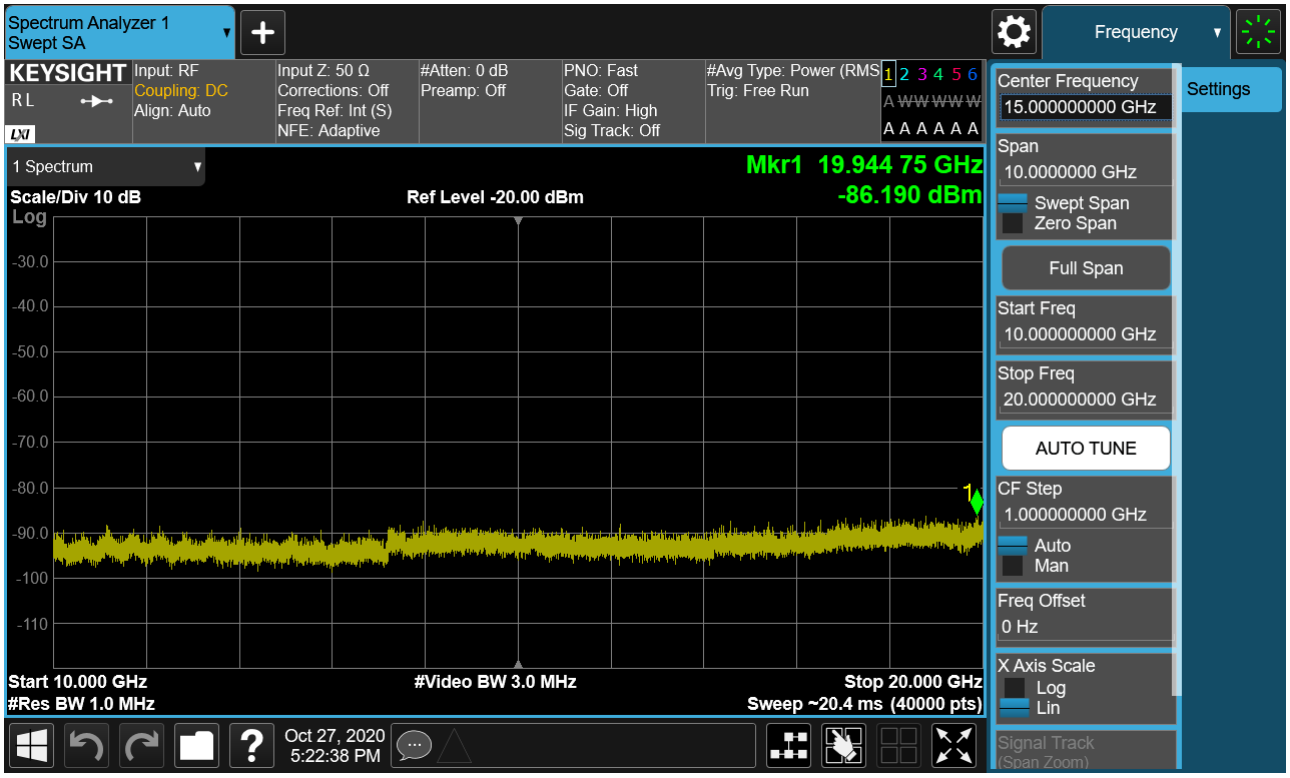
PCC 20MHz Ch132072 RB100 Offset0, SCC 20MHz Ch132270 RB100 Offset0



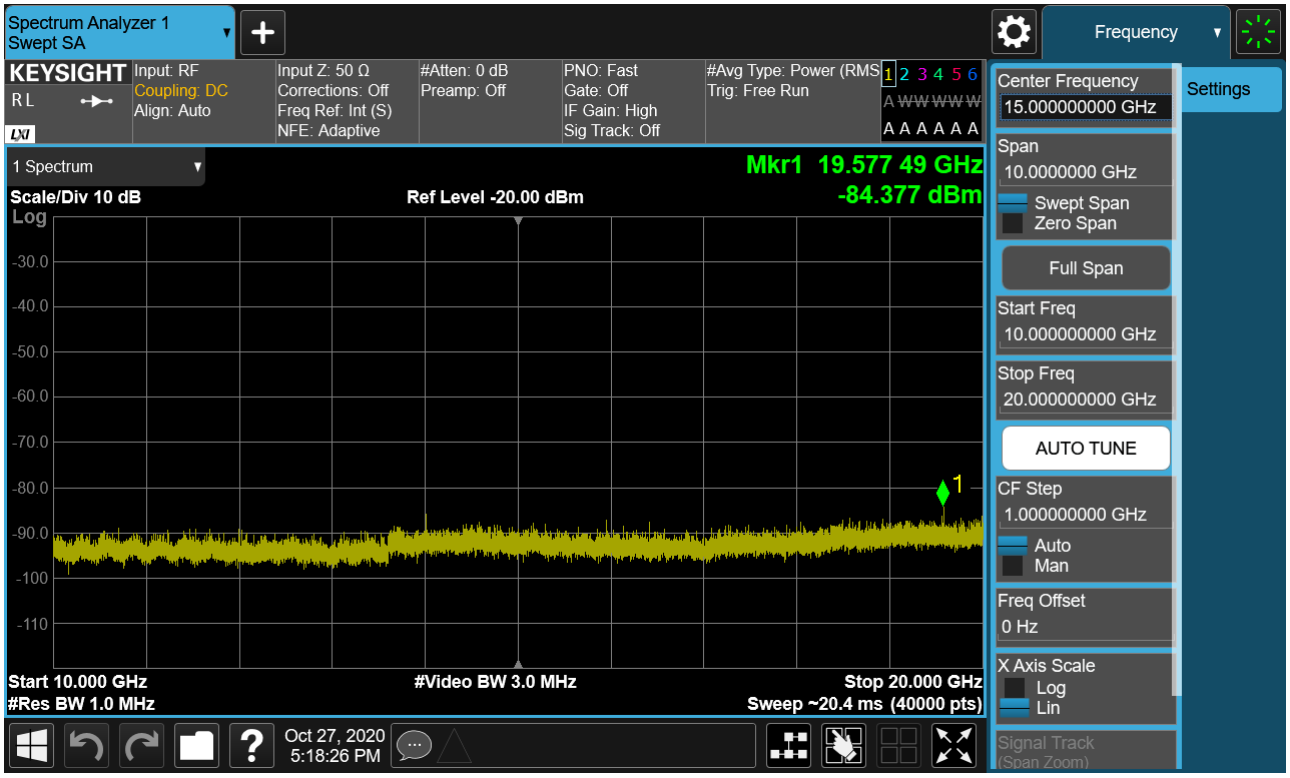
PCC 20MHz Ch132323 RB100 Offset0, SCC 20MHz Ch132521 RB100 Offset0



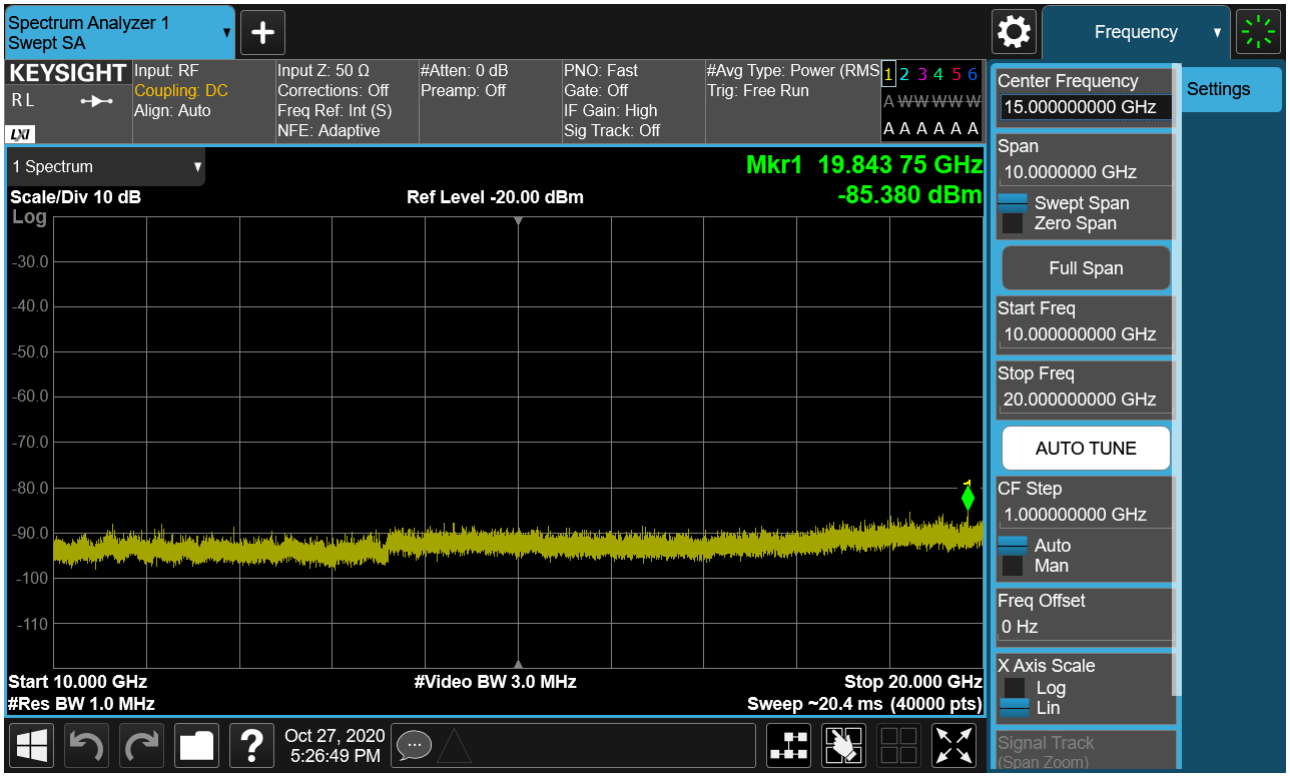
PCC 20MHz Ch132348 RB1 Offset0, SCC 15MHz Ch132519 RB1 Offset74



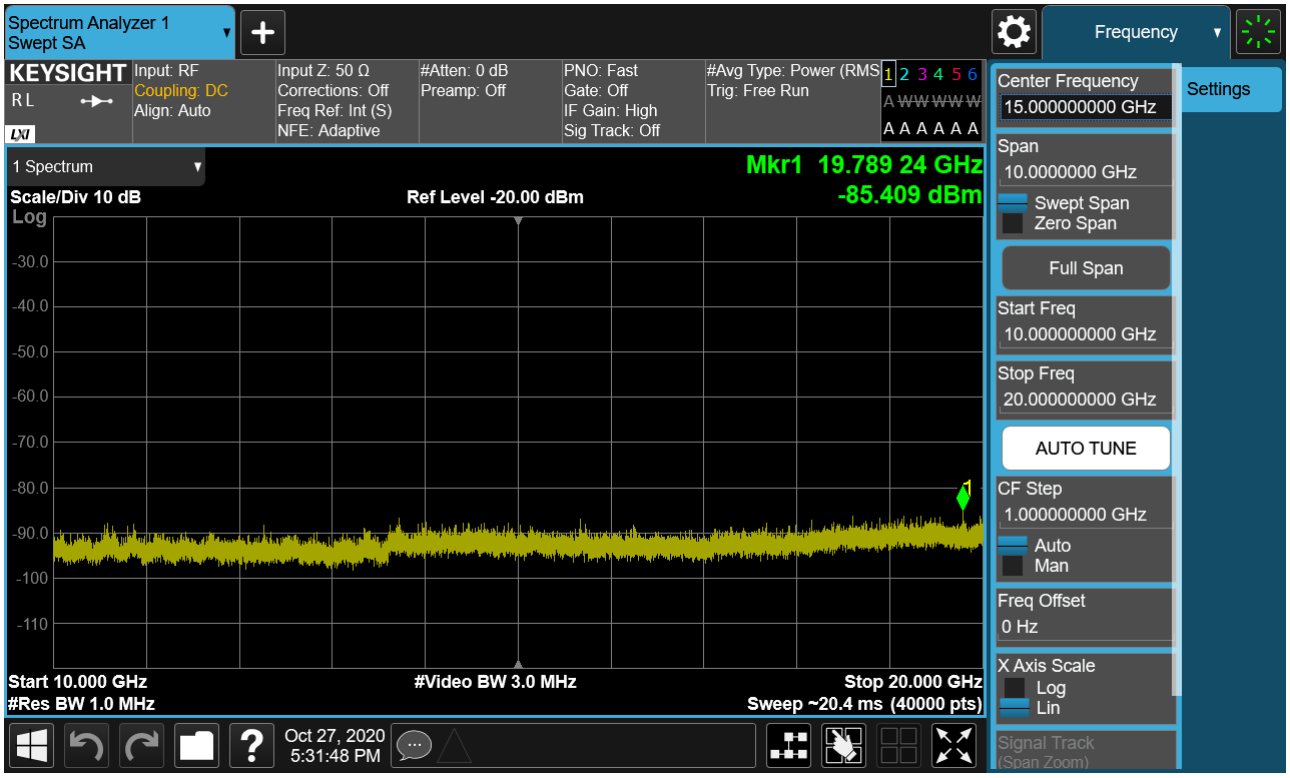
PCC 20MHz Ch132348 RB1 Offset99, SCC 15MHz Ch132519 RB1 Offset0



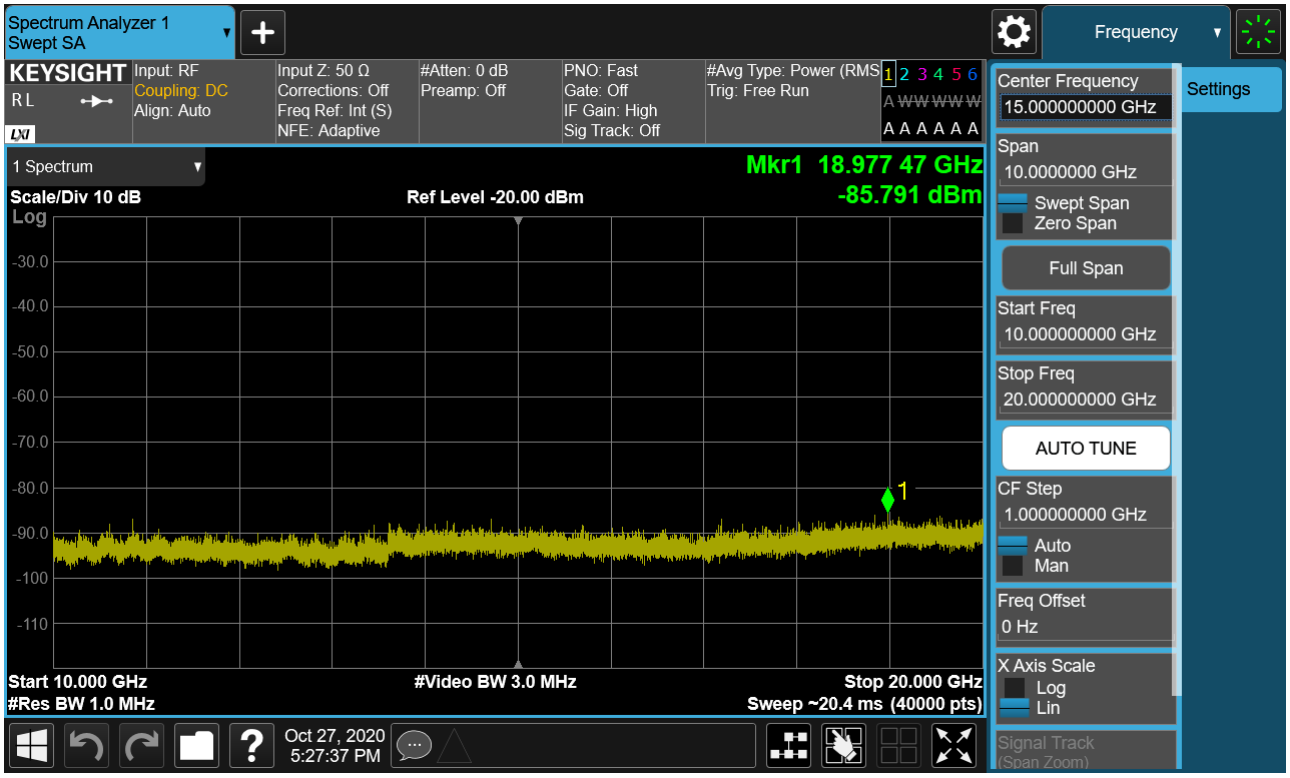
PCC 20MHz Ch132348 RB100 Offset0, SCC 15MHz Ch132519 RB75 Offset0



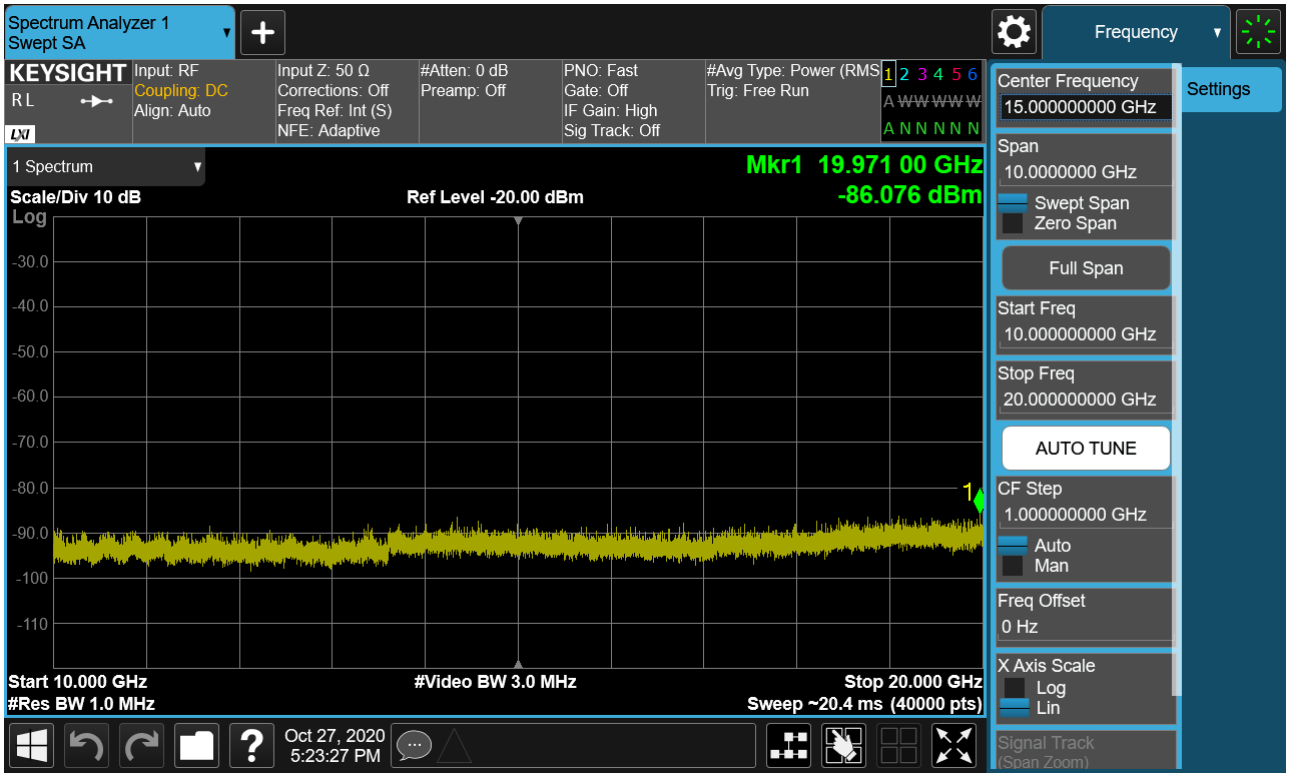
PCC 20MHz Ch132374 RB100 Offset0, SCC 20MHz Ch132572 RB100 Offset0



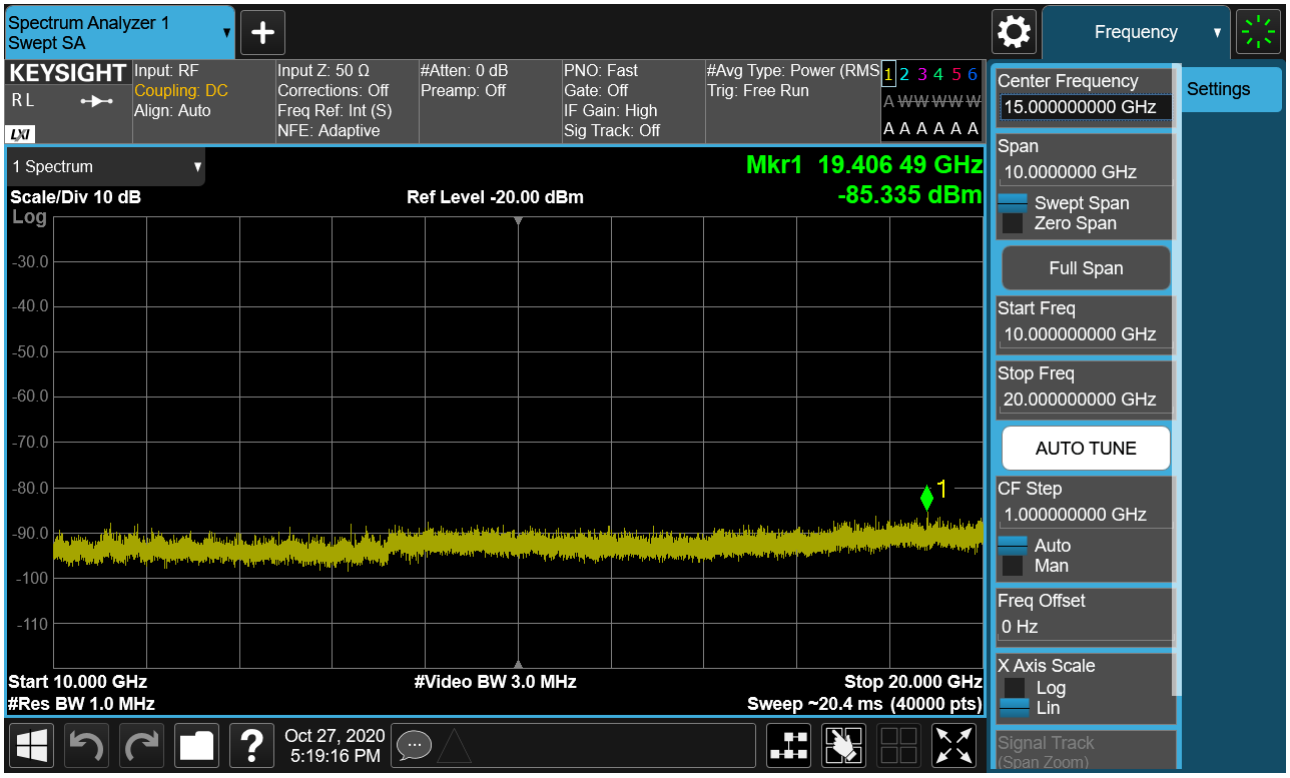
PCC 20MHz Ch132423 RB100 Offset0, SCC 15MHz Ch132594 RB75 Offset0



PCC 20MHz Ch132473 RB1 Offset0, SCC 10MHz Ch132617 RB1 Offset49

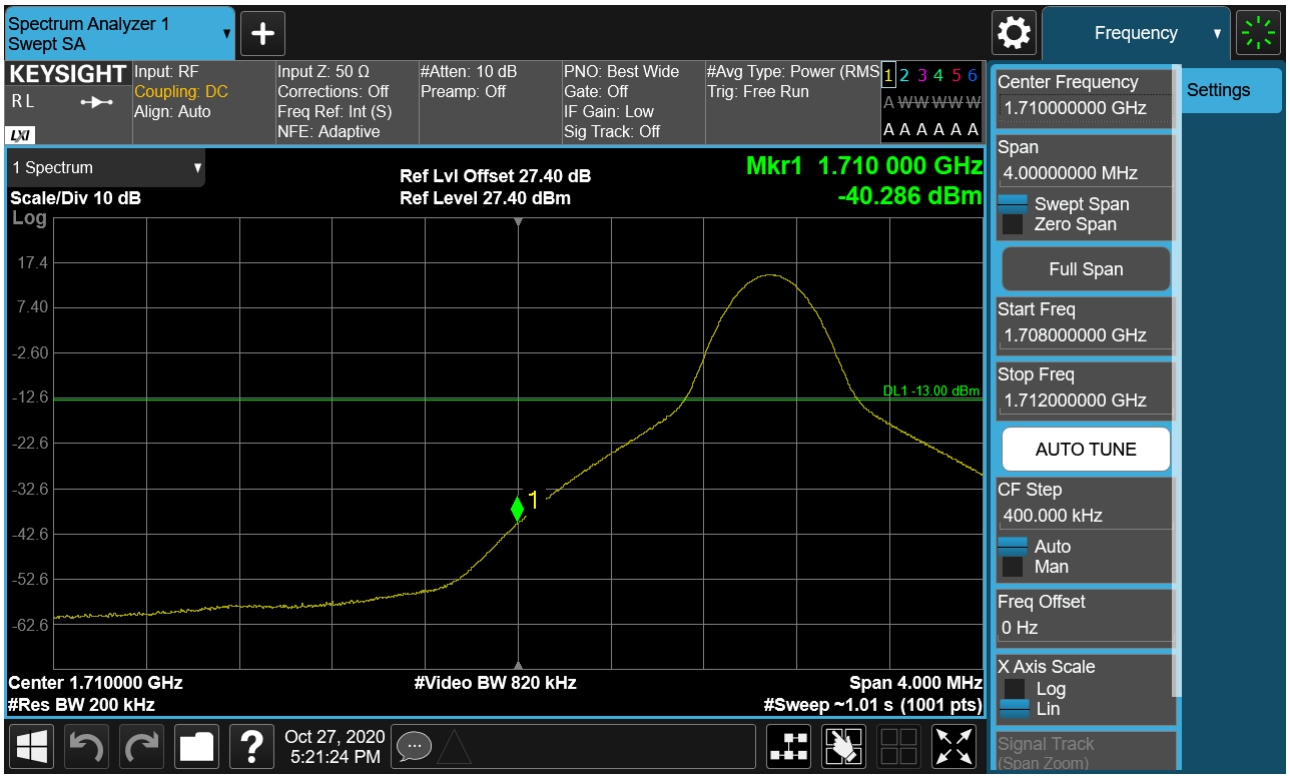


PCC 20MHz Ch132473 RB1 Offset99, SCC 10MHz Ch132617 RB1 Offset0

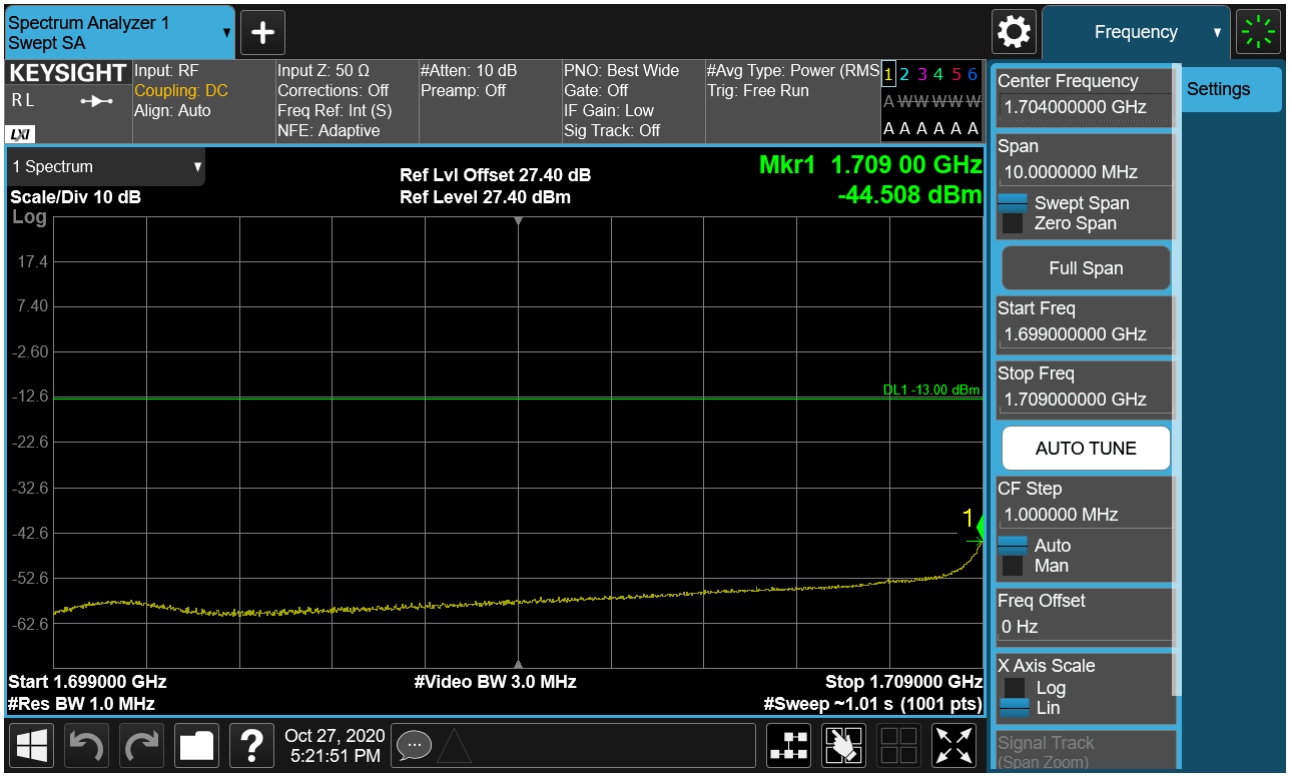


8.4 Channel Edge

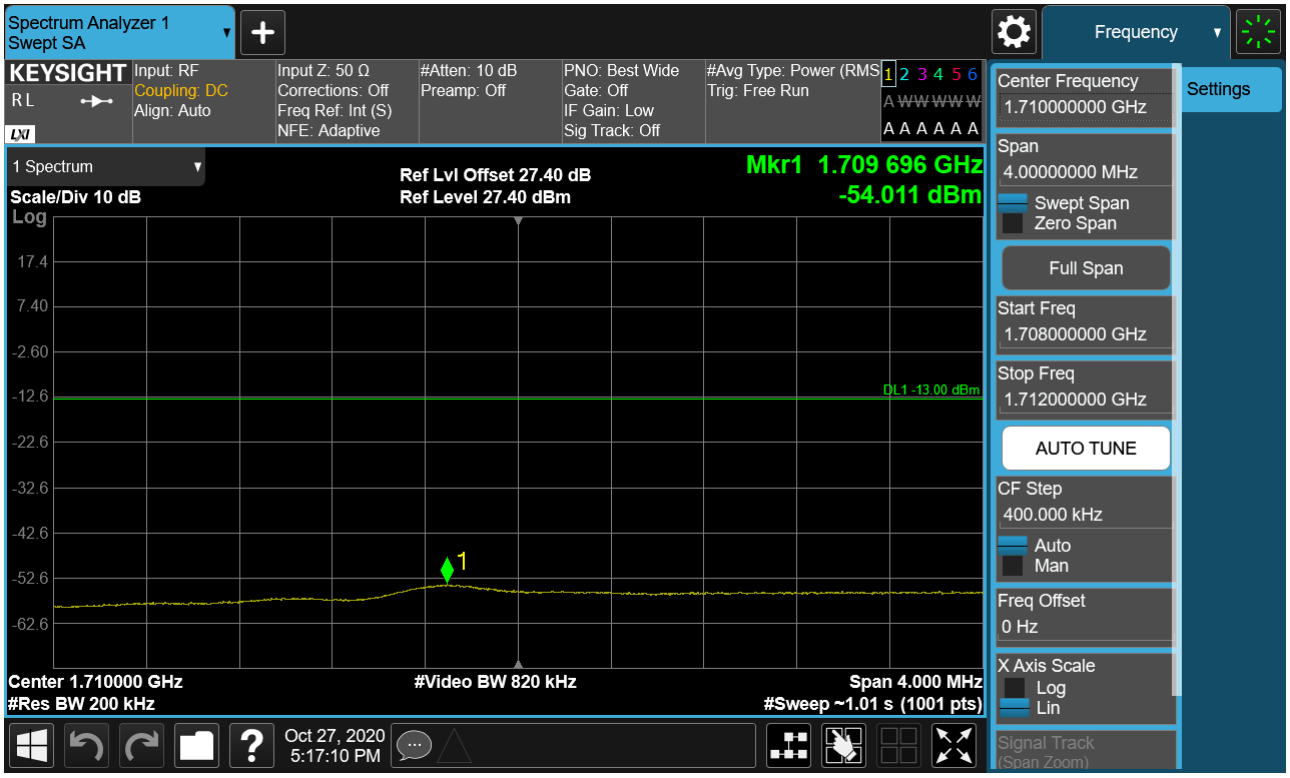
Lowest Channel_PCC 20MHz Ch132072 RB1 Offset0 SCC 5MHz Ch132189 RB1 Offset24(1)



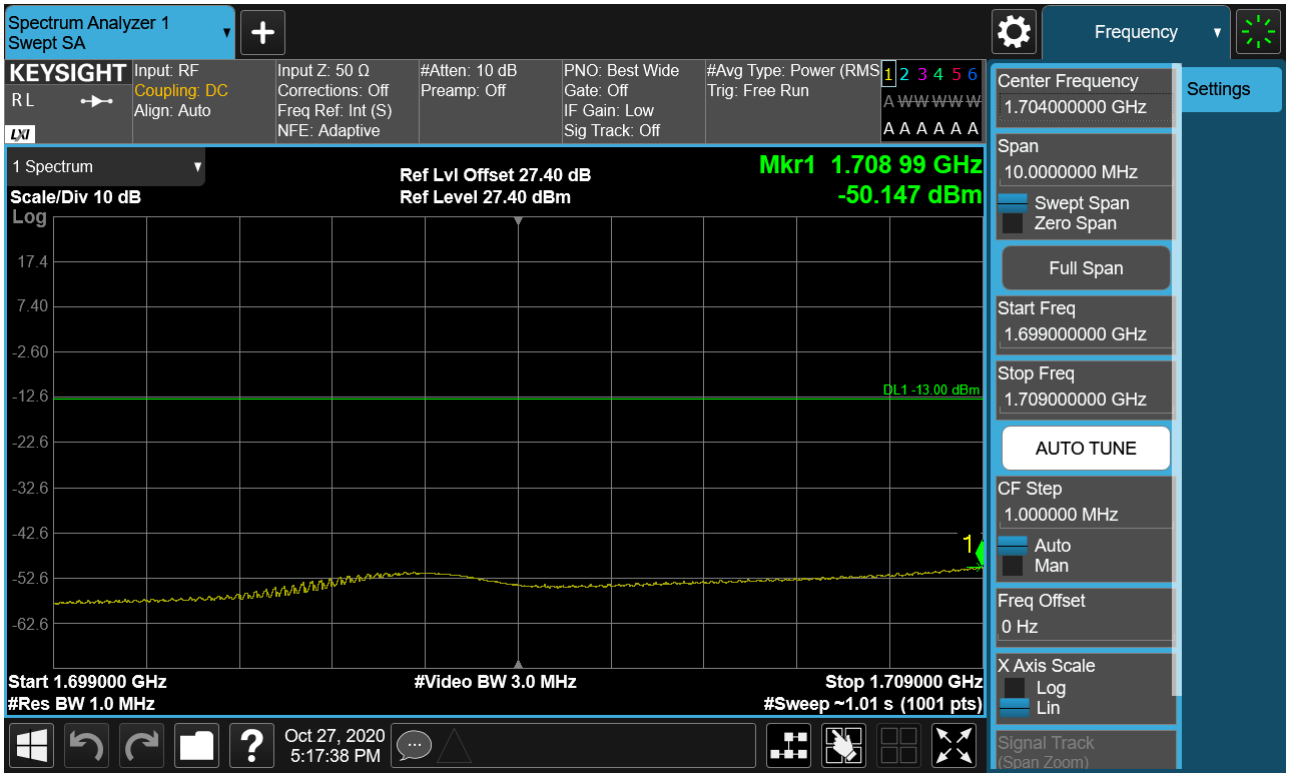
Lowest Channel_PCC 20MHz Ch132072 RB1 Offset0 SCC 5MHz Ch132189 RB1 Offset24(2)



Lowest Channel_PCC 20MHz Ch132072 RB1 Offset99 SCC 5MHz Ch132189 RB1 Offset0(1)

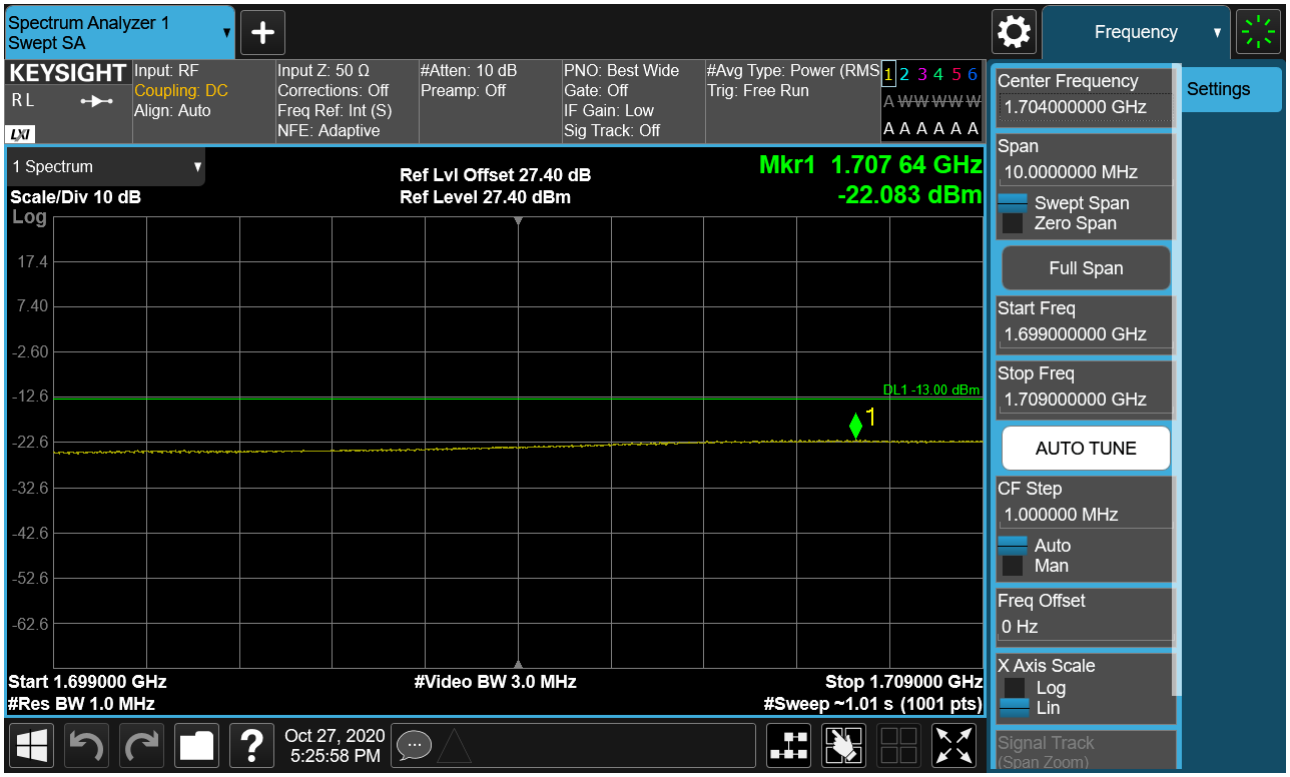


Lowest Channel_PCC 20MHz Ch132072 RB1 Offset99 SCC 5MHz Ch132189 RB1 Offset0(2)



Lowest Channel_PCC 20MHz Ch132072 RB100 Offset0 SCC 15MHz Ch132243 RB75 Offset0(1)

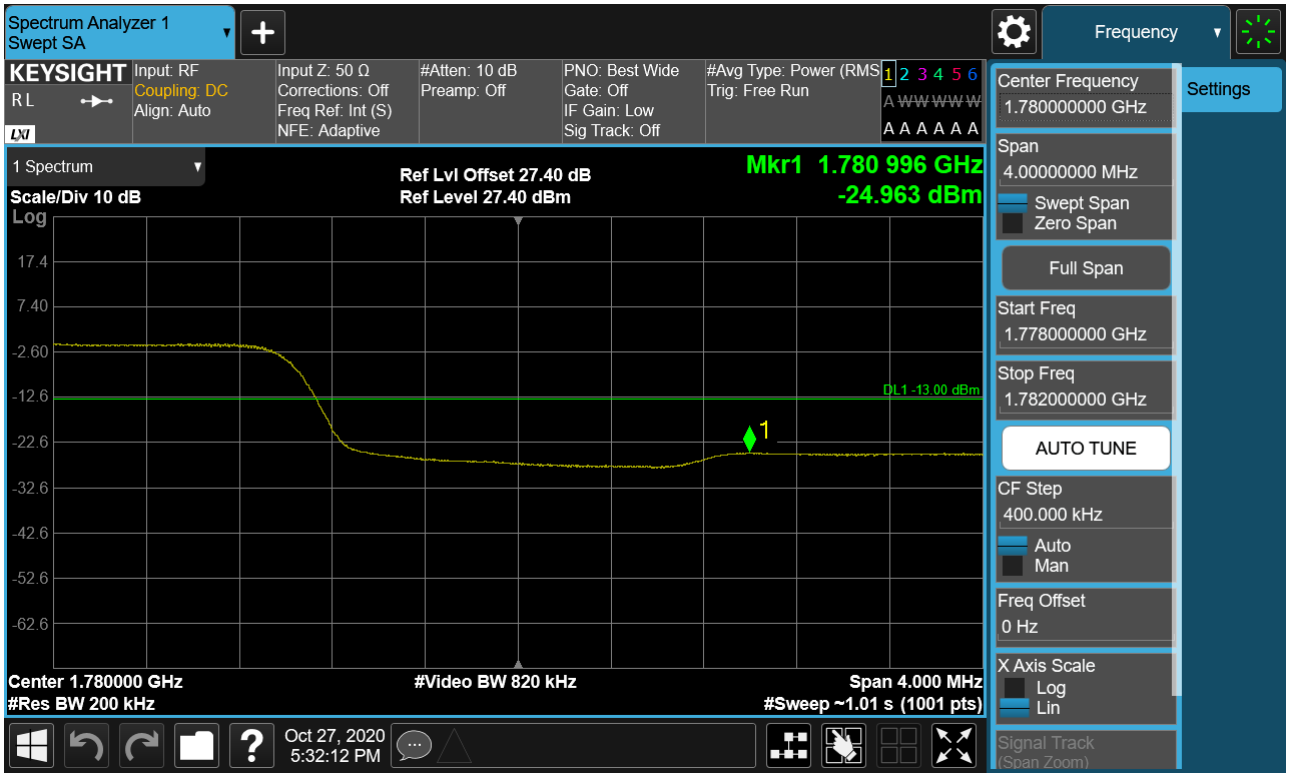
Lowest Channel_PCC 20MHz Ch132072 RB100 Offset0 SCC 15MHz Ch132243 RB75 Offset0(2)



Lowest Channel_PCC 20MHz Ch132072 RB100 Offset0 SCC 20MHz Ch132270 RB100 Offset0(1)

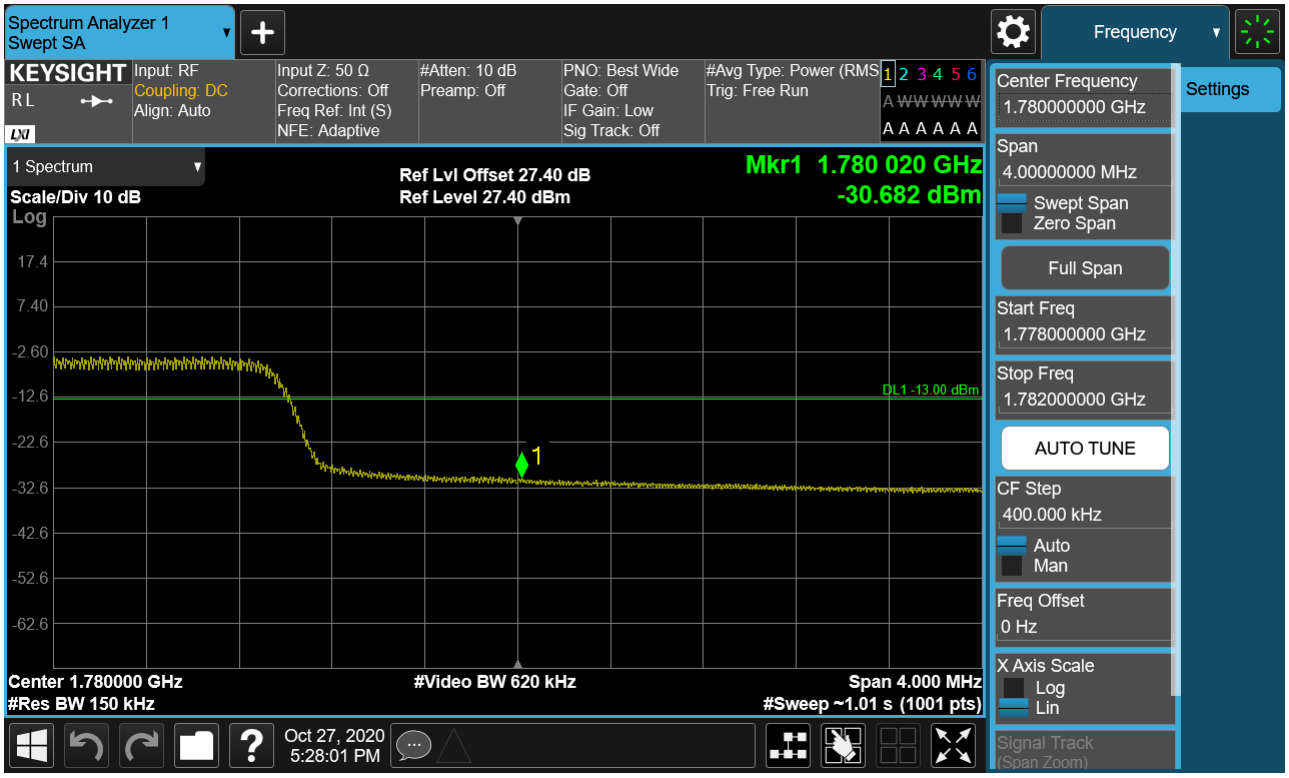
Lowest Channel_PCC 20MHz Ch132072 RB100 Offset0 SCC 20MHz Ch132270 RB100 Offset0(2)

Highest Channel_PCC 20MHz Ch132374 RB100 Offset0 SCC 20MHz Ch132572 RB100 Offset0(1)

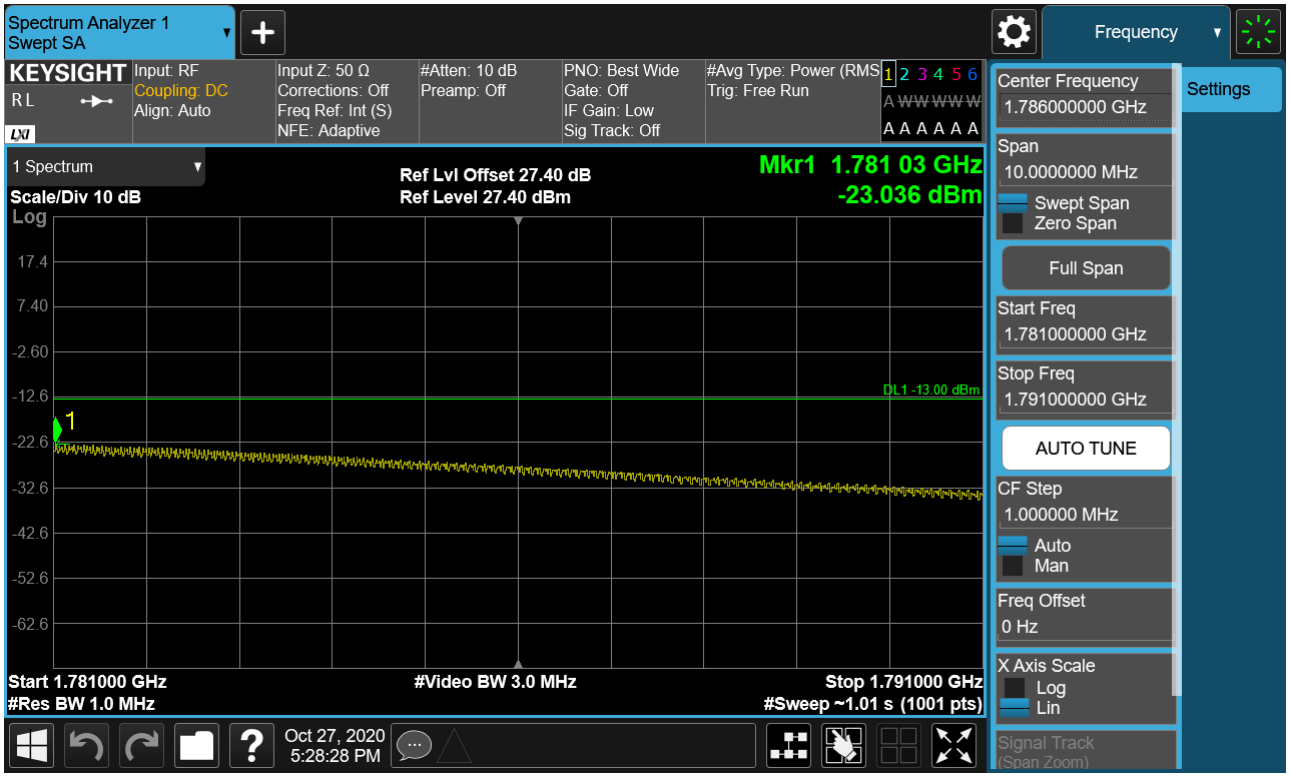


Highest Channel_PCC 20MHz Ch132374 RB100 Offset0 SCC 20MHz Ch132572 RB100 Offset0(2)

Highest Channel_PCC 20MHz Ch132423 RB100 Offset0 SCC 15MHz Ch132594 RB75 Offset0(1)



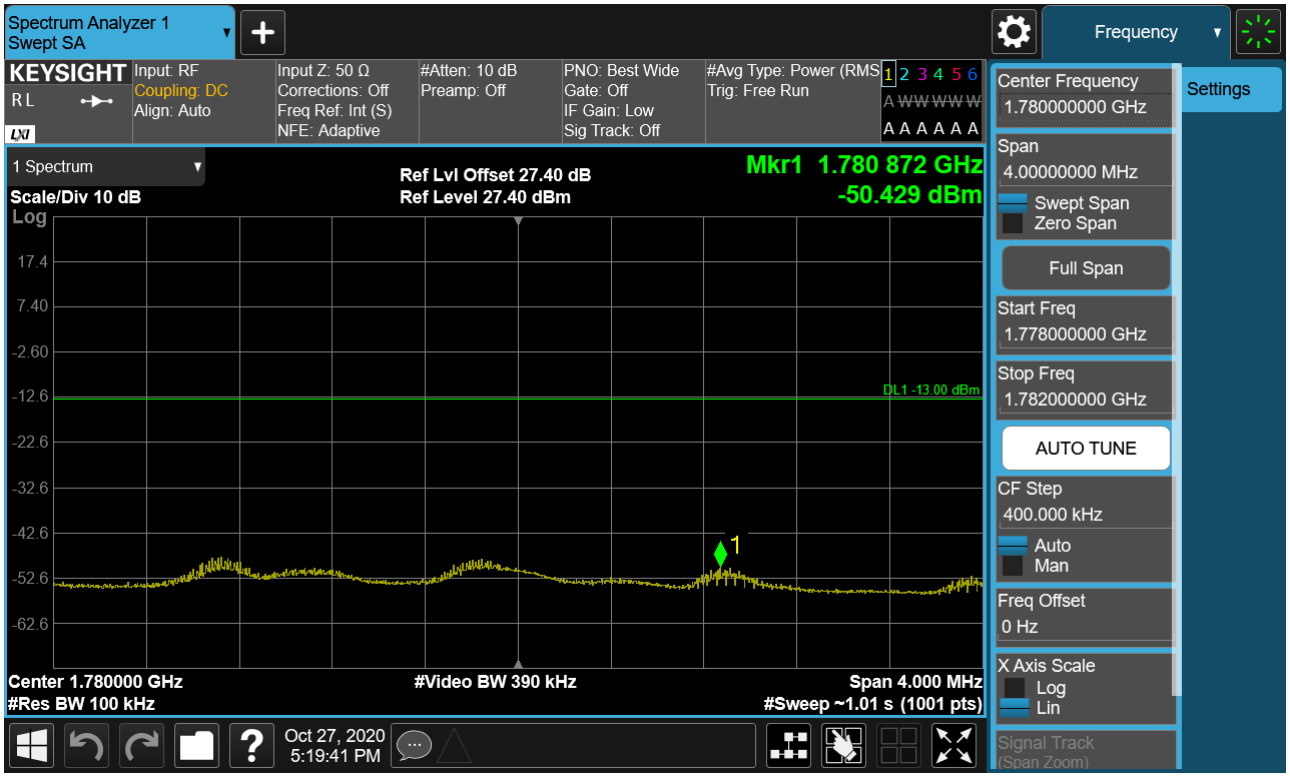
Highest Channel_PCC 20MHz Ch132423 RB100 Offset0 SCC 15MHz Ch132594 RB75 Offset0(2)



Highest Channel_PCC 20MHz Ch132473 RB1 Offset0 SCC 10MHz Ch132617 RB1 Offset49(1)

Highest Channel_PCC 20MHz Ch132473 RB1 Offset0 SCC 10MHz Ch132617 RB1 Offset49(2)

Highest Channel_PCC 20MHz Ch132473 RB1 Offset99 SCC 10MHz Ch132617 RB1 Offset0(1)



Highest Channel_PCC 20MHz Ch132473 RB1 Offset99 SCC 10MHz Ch132617 RB1 Offset0(2)

8.5 Frequency Stability / Variation Of Ambient Temperature

▣ PCC Channel:	132005	
▣ PCC Frequency:	1713.3	MHz
▣ PCC BandWidth:	5	MHz
▣ SCC Channel:	132122	
▣ SCC Frequency:	1725.0	MHz
▣ SCC BandWidth:	20	MHz
▣ Voltage :	3.800	VDC
▣ LIMIT:	Emission must remain in band	

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.880	+20(Ref)	-0.033	0.039	1713.29994	1725.00007
100%		-30	0.043	-0.042	1713.30007	1724.99993
100%		-20	0.024	-0.026	1713.30004	1724.99996
100%		-10	-0.026	0.041	1713.29996	1725.00007
100%		0	0.031	0.026	1713.30005	1725.00004
100%		10	0.024	0.038	1713.30004	1725.00007
100%		30	0.023	0.034	1713.30004	1725.00006
100%		40	0.035	-0.036	1713.30006	1724.99994
100%		50	-0.027	-0.042	1713.29995	1724.99993
Batt. Endpoint	3.650	20	0.032	0.027	1713.30005	1725.00005

▣ PCC Channel: 132025
▣ PCC Frequency: 1715.3 MHz
▣ PCC BandWidth: 10 MHz
▣ SCC Channel: 132145
▣ SCC Frequency: 1727.3 MHz
▣ SCC BandWidth: 15 MHz
▣ Voltage : 3.800 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.880	+20(Ref)	0.028	0.041	1715.30005	1727.30007
100%		-30	0.027	0.029	1715.30005	1727.30005
100%		-20	0.030	-0.027	1715.30005	1727.29995
100%		-10	0.031	-0.025	1715.30005	1727.29996
100%		0	0.027	0.034	1715.30005	1727.30006
100%		10	0.043	0.039	1715.30007	1727.30007
100%		30	-0.034	-0.029	1715.29994	1727.29995
100%		40	-0.031	0.033	1715.29995	1727.30006
100%		50	0.038	0.027	1715.30007	1727.30005
Batt. Endpoint	3.650	20	0.025	0.031	1715.30004	1727.30005

▣ PCC Channel: 132047
▣ PCC Frequency: 1717.5 MHz
▣ PCC BandWidth: 15 MHz
▣ SCC Channel: 132167
▣ SCC Frequency: 1729.5 MHz
▣ SCC BandWidth: 10 MHz
▣ Voltage : 3.800 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.880	+20(Ref)	0.036	-0.039	1717.50006	1729.49993
100%		-30	0.026	0.033	1717.50004	1729.50006
100%		-20	-0.035	-0.036	1717.49994	1729.49994
100%		-10	-0.024	0.030	1717.49996	1729.50005
100%		0	0.028	-0.024	1717.50005	1729.49996
100%		10	-0.026	-0.033	1717.49996	1729.49994
100%		30	0.031	0.033	1717.50005	1729.50006
100%		40	-0.034	0.035	1717.49994	1729.50006
100%		50	-0.036	0.034	1717.49994	1729.50006
Batt. Endpoint	3.650	20	0.037	0.036	1717.50006	1729.50006

▣ PCC Channel: 132072
▣ PCC Frequency: 1720.0 MHz
▣ PCC BandWidth: 20 MHz
▣ SCC Channel: 132270
▣ SCC Frequency: 1739.8 MHz
▣ SCC BandWidth: 20 MHz
▣ Voltage : 3.800 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.880	+20(Ref)	0.042	-0.030	1720.00007	1739.79995
100%		-30	0.026	-0.034	1720.00004	1739.79994
100%		-20	0.030	-0.027	1720.00005	1739.79995
100%		-10	0.036	0.024	1720.00006	1739.80004
100%		0	0.036	0.026	1720.00006	1739.80005
100%		10	0.040	0.026	1720.00007	1739.80004
100%		30	0.035	0.029	1720.00006	1739.80005
100%		40	0.023	-0.030	1720.00004	1739.79995
100%		50	0.042	0.036	1720.00007	1739.80006
Batt. Endpoint	3.650	20	-0.038	0.028	1719.99993	1739.80005

▣ PCC Channel: 132455
▣ PCC Frequency: 1758.3 MHz
▣ PCC BandWidth: 5 MHz
▣ SCC Channel: 132572
▣ SCC Frequency: 1770.0 MHz
▣ SCC BandWidth: 20 MHz
▣ Voltage : 3.800 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.880	+20(Ref)	0.028	0.038	1758.30005	1770.00007
100%		-30	0.033	0.041	1758.30006	1770.00007
100%		-20	0.035	0.027	1758.30006	1770.00005
100%		-10	0.029	0.029	1758.30005	1770.00005
100%		0	0.032	-0.040	1758.30006	1769.99993
100%		10	0.038	-0.032	1758.30007	1769.99994
100%		30	0.038	0.033	1758.30007	1770.00006
100%		40	0.039	-0.026	1758.30007	1769.99995
100%		50	0.024	0.040	1758.30004	1770.00007
Batt. Endpoint	3.650	20	0.025	-0.026	1758.30004	1769.99995

▣ PCC Channel: 132597

▣ PCC Frequency: 1772.5 MHz

▣ PCC BandWidth: 10 MHz

▣ SCC Channel: 132717

▣ SCC Frequency: 1784.5 MHz

▣ SCC BandWidth: 15 MHz

▣ Voltage : 3.800 VDC

▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.880	+20(Ref)	-0.037	0.027	1772.49993	1784.50005
100%		-30	0.036	0.032	1772.50006	1784.50006
100%		-20	0.033	-0.036	1772.50006	1784.49994
100%		-10	0.039	0.034	1772.50007	1784.50006
100%		0	0.038	0.030	1772.50007	1784.50005
100%		10	0.030	0.038	1772.50005	1784.50007
100%		30	0.026	0.024	1772.50005	1784.50004
100%		40	0.036	0.038	1772.50006	1784.50007
100%		50	0.033	0.042	1772.50006	1784.50007
Batt. Endpoint	3.650	20	0.032	-0.043	1772.50006	1784.49992

▣ PCC Channel: 132499
▣ PCC Frequency: 1762.7 MHz
▣ PCC BandWidth: 15 MHz
▣ SCC Channel: 132619
▣ SCC Frequency: 1774.7 MHz
▣ SCC BandWidth: 10 MHz
▣ Voltage : 3.800 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.880	+20(Ref)	-0.040	0.031	1762.69993	1774.70006
100%		-30	0.029	0.035	1762.70005	1774.70006
100%		-20	0.040	0.030	1762.70007	1774.70005
100%		-10	0.026	0.038	1762.70005	1774.70007
100%		0	-0.036	0.036	1762.69994	1774.70006
100%		10	0.025	0.035	1762.70004	1774.70006
100%		30	0.036	0.036	1762.70006	1774.70006
100%		40	-0.040	0.028	1762.69993	1774.70005
100%		50	0.041	0.042	1762.70007	1774.70007
Batt. Endpoint	3.650	20	0.029	0.024	1762.70005	1774.70004

▣ PCC Channel:	132374	
▣ PCC Frequency:	1750.2	MHz
▣ PCC BandWidth:	20	MHz
▣ SCC Channel:	132572	
▣ SCC Frequency:	1770.0	MHz
▣ SCC BandWidth:	20	MHz
▣ Voltage :	3.800	MHz
▣ LIMIT:	Emission must remain in band	

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100%	3.880	+20(Ref)	0.033	0.039	1750.20006	1770.00007
100%		-30	-0.026	0.036	1750.19995	1770.00006
100%		-20	-0.043	0.029	1750.19993	1770.00005
100%		-10	-0.024	0.037	1750.19996	1770.00007
100%		0	0.037	0.024	1750.20007	1770.00004
100%		10	0.039	0.032	1750.20007	1770.00006
100%		30	0.032	0.032	1750.20006	1770.00006
100%		40	-0.042	0.042	1750.19993	1770.00007
100%		50	-0.041	-0.036	1750.19993	1769.99994
Batt. Endpoint	3.650	20	-0.025	0.025	1750.19996	1770.00004

8.6 Radiated Spurious Emissions

▣ PCC Channel : 132072 (1720.0MHz)

▣ PCC BW(MHz) : 20

▣ PCC RB/ RB Offset : 1/ 99

▣ SCC Channel : 132270 (1739.8MHz)

▣ SCC BW(MHz) : 20

▣ SCC RB/ RB Offset : 1/ 0

▣ DISTANCE: 3 meters

▣ LIMIT: -13.0 dBm

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)
3,459.80	-55.18	12.45	-60.91	2.97	V	-51.43
5,189.70	-51.49	12.80	-49.79	3.70	H	-40.69
6,919.60	-56.31	12.05	-49.36	4.29	H	-41.60

▣ PCC Channel : 132397 (1752.5MHz)

▣ PCC BW(MHz) : 20

▣ PCC RB/ RB Offset : 1/ 99

▣ SCC Channel : 132514 (1764.2MHz)

▣ SCC BW(MHz) : 25

▣ SCC RB/ RB Offset : 1/ 0

▣ DISTANCE: 3 meters

▣ LIMIT: -13.0 dBm

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)
3,516.70	-52.56	12.28	-58.34	2.98	H	-49.04
5,275.05	-50.76	13.30	-49.93	3.73	H	-40.36
7,033.40	-56.07	11.60	-47.09	4.32	H	-39.81

▣ PCC Channel : 132423 (1755.1MHz)

▣ PCC BW(MHz) : 20

▣ PCC RB/ RB Offset : 1/ 99

▣ SCC Channel : 132594 (1772.2MHz)

▣ SCC BW(MHz) : 15

▣ SCC RB/ RB Offset : 3/ 0

▣ DISTANCE: 1 meters

▣ LIMIT: -13.0 dBm

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)
3,527.30	-54.68	12.20	-60.11	3.00	V	-50.91
5,290.95	-51.51	13.35	-50.67	3.73	V	-41.05
7,054.60	-56.45	11.48	-47.78	4.30	H	-40.60

8.7 Occupied Bandwidth

PCC					SCC					Data (MHz)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
10	132351	1747.9	QPSK	50/ 0	15	132471	1759.9	QPSK	75/ 0	23.216
15	132373	1750.1	QPSK	75/ 0	10	132493	1762.1	QPSK	50/ 0	23.138
10	132328	1745.6	QPSK	50/ 0	20	132472	1760.0	QPSK	100/ 0	27.790
20	132373	1750.1	QPSK	100/ 0	10	132517	1764.5	QPSK	50/ 0	27.861
15	132347	1747.5	QPSK	75/ 0	15	132497	1762.5	QPSK	75/ 0	28.366
15	132325	1745.3	QPSK	75/ 0	20	132496	1762.4	QPSK	100/ 0	32.656
20	132348	1747.6	QPSK	100/ 0	15	132519	1764.7	QPSK	75/ 0	32.656
20	132397	1752.5	QPSK	100/ 0	5	132514	1764.2	QPSK	25/ 0	22.951
5	132330	1745.8	QPSK	25/ 0	20	132447	1757.5	QPSK	100/ 0	22.952
20	132323	1745.1	QPSK	100/ 0	20	132521	1764.9	QPSK	100/ 0	37.588

PCC					SCC					Data (MHz)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
10	132351	1747.9	16QAM	50/ 0	15	132471	1759.9	16QAM	75/ 0	23.224
15	132373	1750.1	16QAM	75/ 0	10	132493	1762.1	16QAM	50/ 0	23.131
10	132328	1745.6	16QAM	50/ 0	20	132472	1760.0	16QAM	100/ 0	27.838
20	132373	1750.1	16QAM	100/ 0	10	132517	1764.5	16QAM	50/ 0	27.864
15	132347	1747.5	16QAM	75/ 0	15	132497	1762.5	16QAM	75/ 0	28.414
15	132325	1745.3	16QAM	75/ 0	20	132496	1762.4	16QAM	100/ 0	32.618
20	132348	1747.6	16QAM	100/ 0	15	132519	1764.7	16QAM	75/ 0	32.676
20	132397	1752.5	16QAM	100/ 0	5	132514	1764.2	16QAM	25/ 0	22.916
5	132330	1745.8	16QAM	25/ 0	20	132447	1757.5	16QAM	100/ 0	22.908
20	132323	1745.1	16QAM	100/ 0	20	132521	1764.9	16QAM	100/ 0	37.661

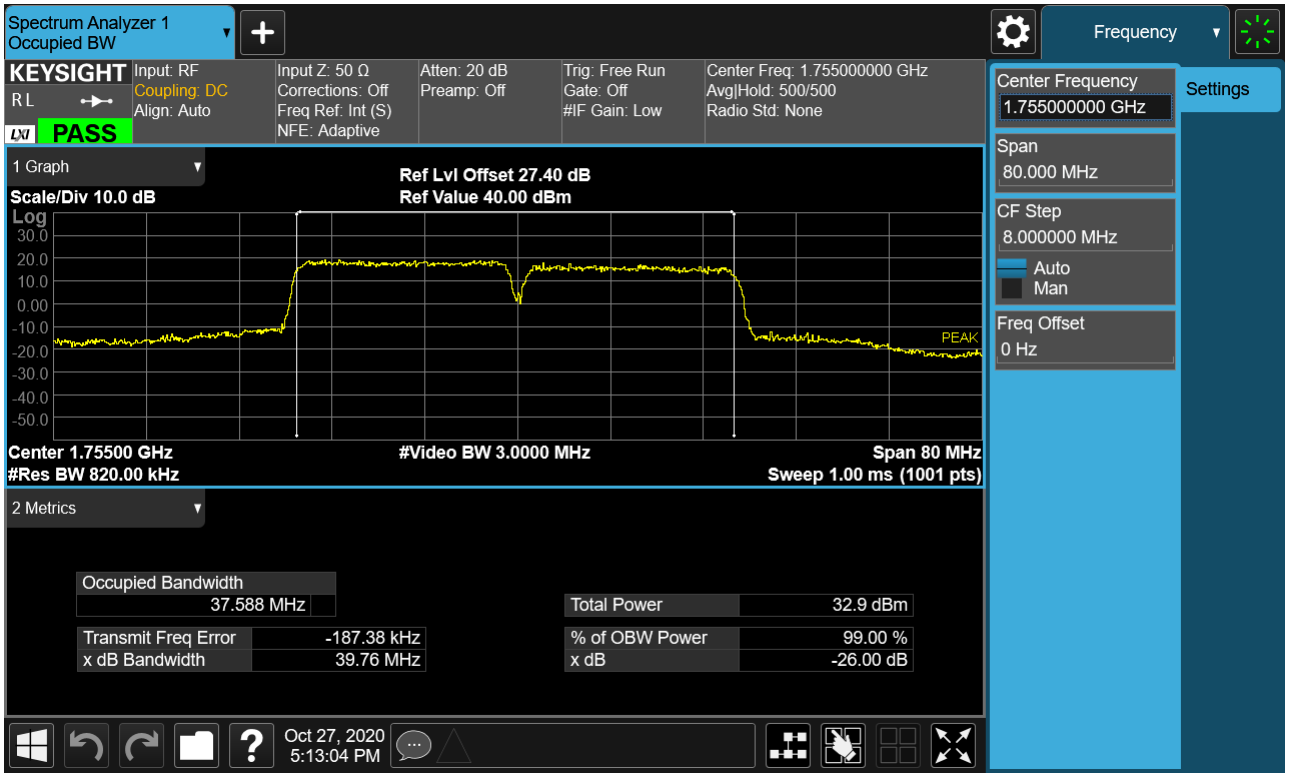
PCC					SCC					Data (MHz)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
10	132351	1747.9	64QAM	50/ 0	15	132471	1759.9	64QAM	75/ 0	23.195
15	132373	1750.1	64QAM	75/ 0	10	132493	1762.1	64QAM	50/ 0	23.149
10	132328	1745.6	64QAM	50/ 0	20	132472	1760.0	64QAM	100/ 0	27.754
20	132373	1750.1	64QAM	100/ 0	10	132517	1764.5	64QAM	50/ 0	27.750
15	132347	1747.5	64QAM	75/ 0	15	132497	1762.5	64QAM	75/ 0	28.440
15	132325	1745.3	64QAM	75/ 0	20	132496	1762.4	64QAM	100/ 0	32.645
20	132348	1747.6	64QAM	100/ 0	15	132519	1764.7	64QAM	75/ 0	32.524
20	132397	1752.5	64QAM	100/ 0	5	132514	1764.2	64QAM	25/ 0	22.874
5	132330	1745.8	64QAM	25/ 0	20	132447	1757.5	64QAM	100/ 0	22.912
20	132323	1745.1	64QAM	100/ 0	20	132521	1764.9	64QAM	100/ 0	37.591

PCC					SCC					Data (MHz)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
10	132351	1747.9	256QAM	50/ 0	15	132471	1759.9	256QAM	75/ 0	23.174
15	132373	1750.1	256QAM	75/ 0	10	132493	1762.1	256QAM	50/ 0	23.152
10	132328	1745.6	256QAM	50/ 0	20	132472	1760.0	256QAM	100/ 0	27.746
20	132373	1750.1	256QAM	100/ 0	10	132517	1764.5	256QAM	50/ 0	27.806
15	132347	1747.5	256QAM	75/ 0	15	132497	1762.5	256QAM	75/ 0	28.364
15	132325	1745.3	256QAM	75/ 0	20	132496	1762.4	256QAM	100/ 0	32.657
20	132348	1747.6	256QAM	100/ 0	15	132519	1764.7	256QAM	75/ 0	32.567
20	132397	1752.5	256QAM	100/ 0	5	132514	1764.2	256QAM	25/ 0	22.938
5	132330	1745.8	256QAM	25/ 0	20	132447	1757.5	256QAM	100/ 0	22.876
20	132323	1745.1	256QAM	100/ 0	20	132521	1764.9	256QAM	100/ 0	37.556

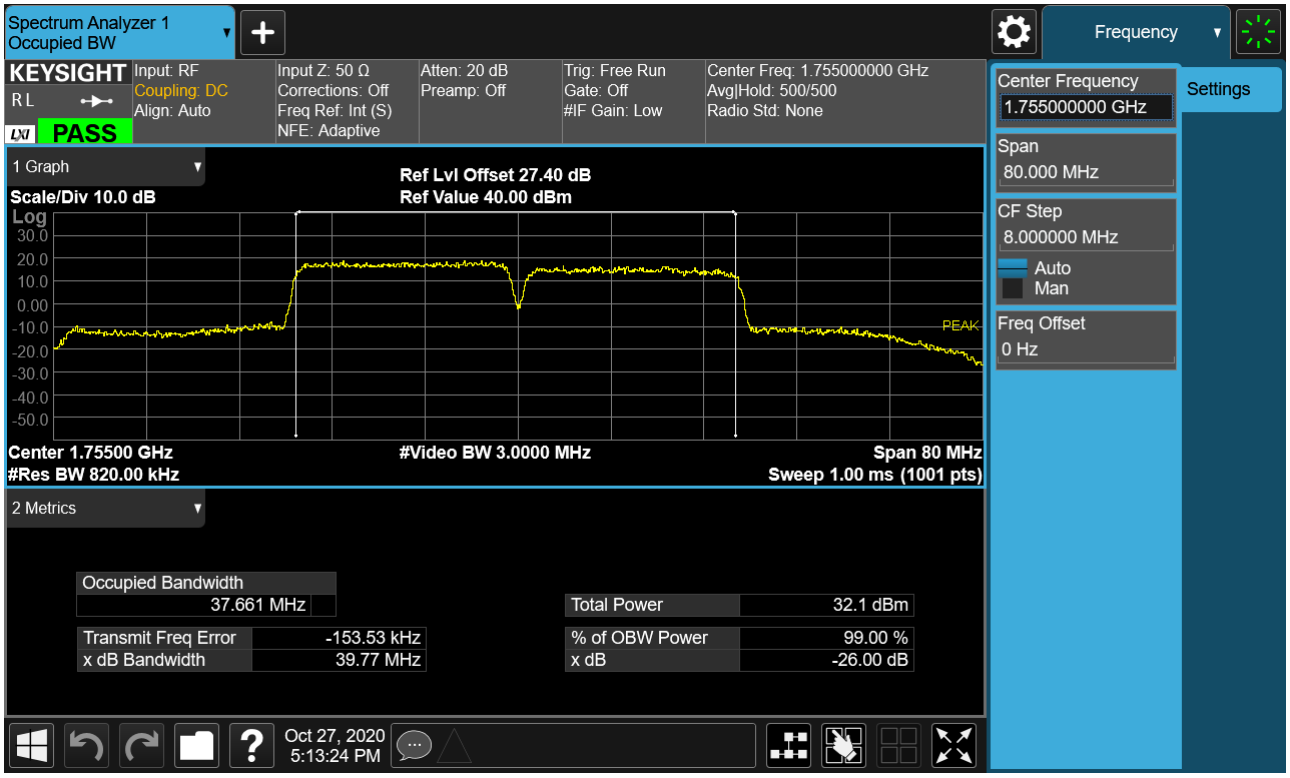
Note:

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

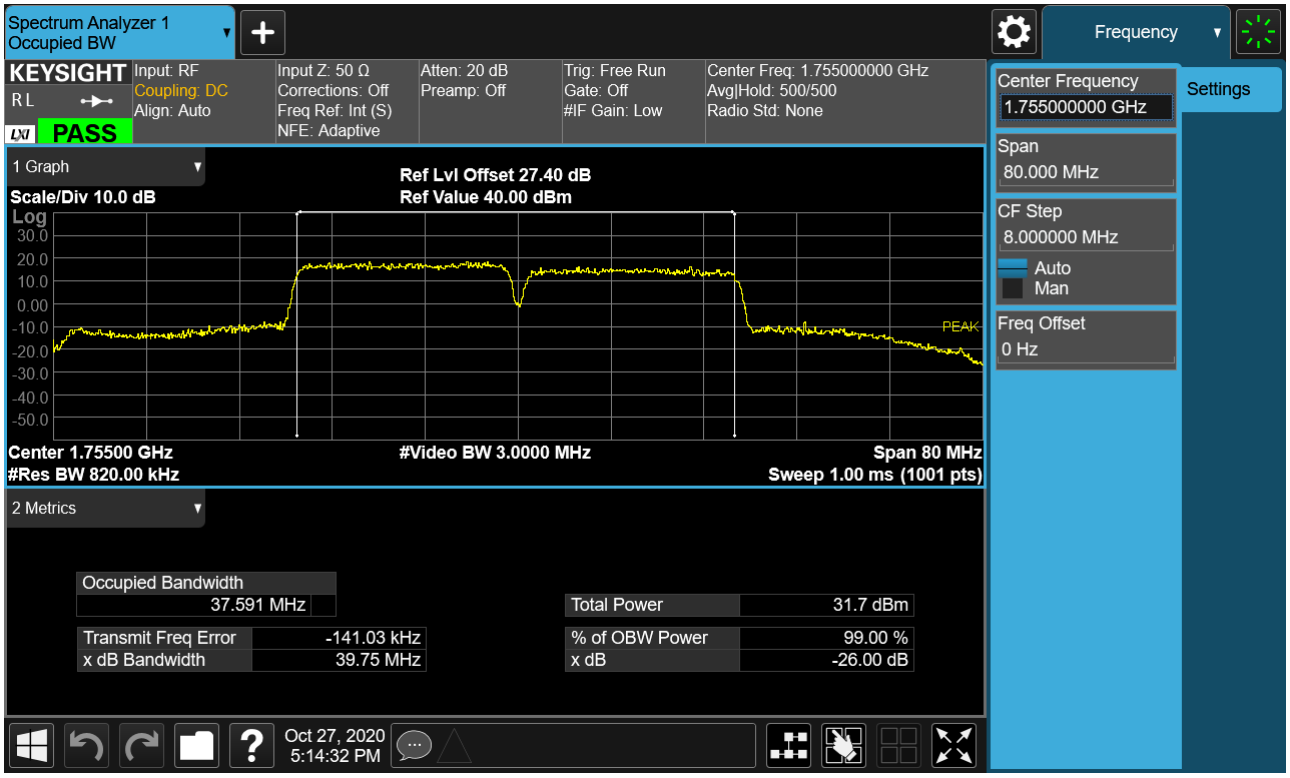
PCC 20MHz Ch132323 RB100 Offset0, SCC 20MHz Ch132521 RB100 Offset0_(QPSK)



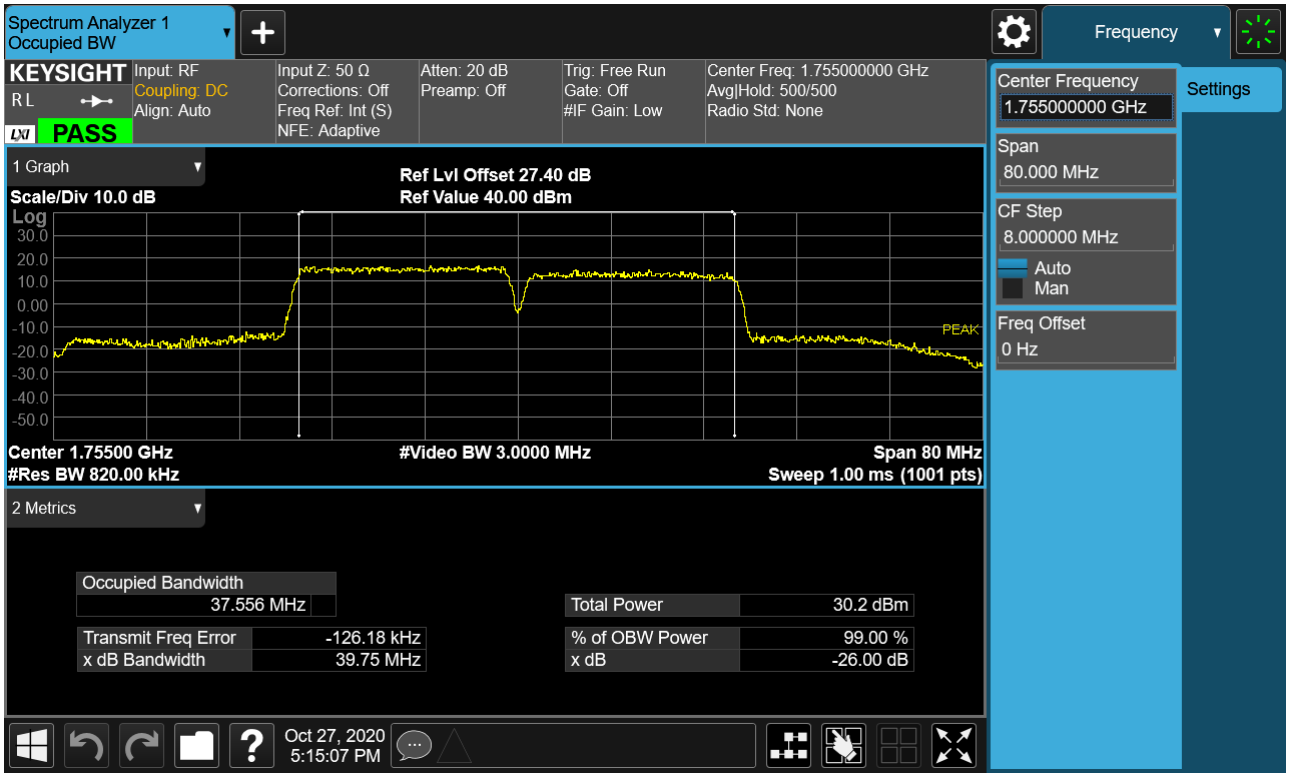
PCC 20MHz Ch132323 RB100 Offset0, SCC 20MHz Ch132521 RB100 Offset0_(16QAM)



PCC 20MHz Ch132323 RB100 Offset0, SCC 20MHz Ch132521 RB100 Offset0_(64QAM)



PCC 20MHz Ch132323 RB100 Offset0, SCC 20MHz Ch132521 RB100 Offset0_(256QAM)



8.8 Peak- to- Average Ratio

PCC					SCC					Data (dBm)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
10	132351	1747.9	QPSK	50/ 0	15	132471	1759.9	QPSK	75/ 0	6.02
15	132373	1750.1	QPSK	75/ 0	10	132493	1762.1	QPSK	50/ 0	6.01
10	132328	1745.6	QPSK	50/ 0	20	132472	1760.0	QPSK	100/ 0	5.85
20	132373	1750.1	QPSK	100/ 0	10	132517	1764.5	QPSK	50/ 0	5.87
15	132347	1747.5	QPSK	75/ 0	15	132497	1762.5	QPSK	75/ 0	5.93
15	132325	1745.3	QPSK	75/ 0	20	132496	1762.4	QPSK	100/ 0	5.88
20	132348	1747.6	QPSK	100/ 0	15	132519	1764.7	QPSK	75/ 0	5.50
20	132397	1752.5	QPSK	100/ 0	5	132514	1764.2	QPSK	25/ 0	5.91
5	132330	1745.8	QPSK	25/ 0	20	132447	1757.5	QPSK	100/ 0	5.88
20	132323	1745.1	QPSK	100/ 0	20	132521	1764.9	QPSK	100/ 0	5.78

PCC					SCC					Data (dBm)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
10	132351	1747.9	16QAM	50/ 0	15	132471	1759.9	16QAM	75/ 0	6.73
15	132373	1750.1	16QAM	75/ 0	10	132493	1762.1	16QAM	50/ 0	6.64
10	132328	1745.6	16QAM	50/ 0	20	132472	1760.0	16QAM	100/ 0	6.56
20	132373	1750.1	16QAM	100/ 0	10	132517	1764.5	16QAM	50/ 0	6.58
15	132347	1747.5	16QAM	75/ 0	15	132497	1762.5	16QAM	75/ 0	6.57
15	132325	1745.3	16QAM	75/ 0	20	132496	1762.4	16QAM	100/ 0	6.56
20	132348	1747.6	16QAM	100/ 0	15	132519	1764.7	16QAM	75/ 0	6.10
20	132397	1752.5	16QAM	100/ 0	5	132514	1764.2	16QAM	25/ 0	6.63
5	132330	1745.8	16QAM	25/ 0	20	132447	1757.5	16QAM	100/ 0	6.55
20	132323	1745.1	16QAM	100/ 0	20	132521	1764.9	16QAM	100/ 0	7.07

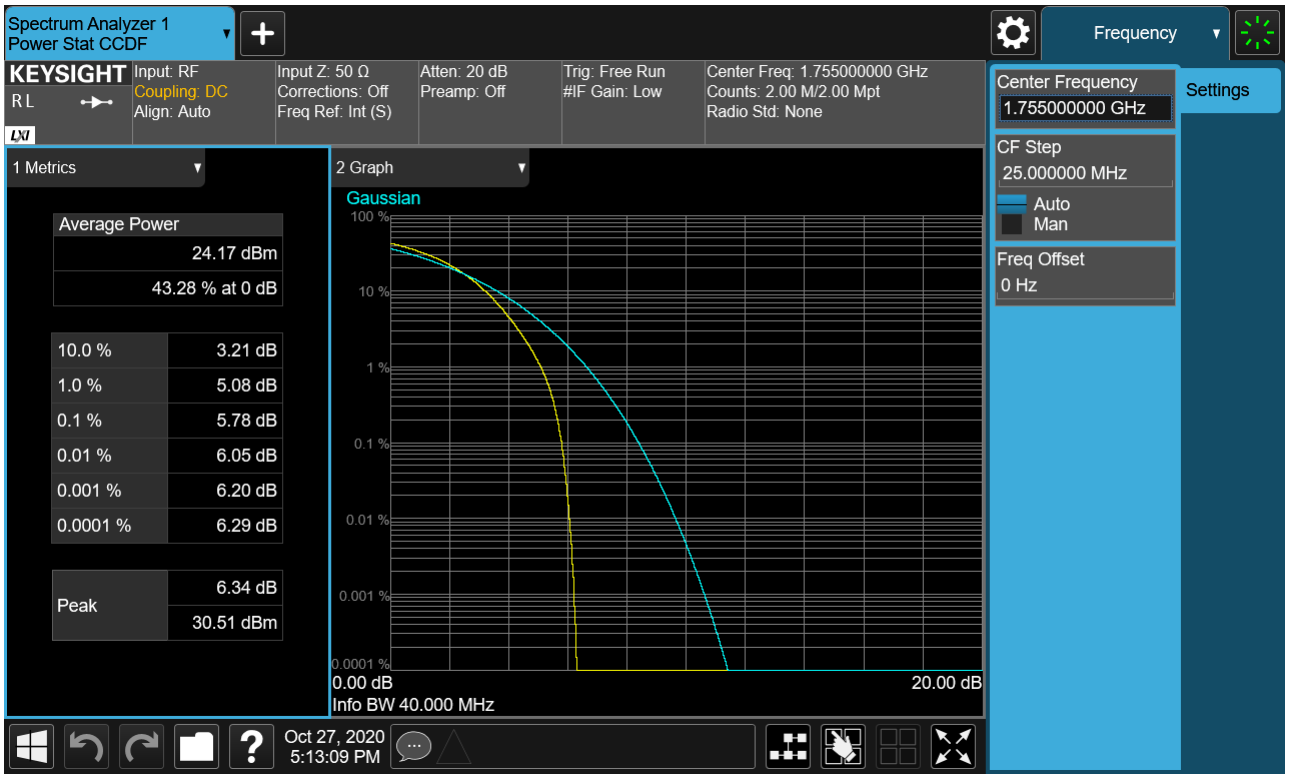
PCC					SCC					Data (dBm)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
10	132351	1747.9	64QAM	50/ 0	15	132471	1759.9	64QAM	75/ 0	6.97
15	132373	1750.1	64QAM	75/ 0	10	132493	1762.1	64QAM	50/ 0	6.89
10	132328	1745.6	64QAM	50/ 0	20	132472	1760.0	64QAM	100/ 0	6.90
20	132373	1750.1	64QAM	100/ 0	10	132517	1764.5	64QAM	50/ 0	6.87
15	132347	1747.5	64QAM	75/ 0	15	132497	1762.5	64QAM	75/ 0	7.41
15	132325	1745.3	64QAM	75/ 0	20	132496	1762.4	64QAM	100/ 0	6.89
20	132348	1747.6	64QAM	100/ 0	15	132519	1764.7	64QAM	75/ 0	6.60
20	132397	1752.5	64QAM	100/ 0	5	132514	1764.2	64QAM	25/ 0	6.91
5	132330	1745.8	64QAM	25/ 0	20	132447	1757.5	64QAM	100/ 0	6.89
20	132323	1745.1	64QAM	100/ 0	20	132521	1764.9	64QAM	100/ 0	7.44

PCC					SCC					Data (dBm)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
10	132351	1747.9	256QAM	50/ 0	15	132471	1759.9	256QAM	75/ 0	7.06
15	132373	1750.1	256QAM	75/ 0	10	132493	1762.1	256QAM	50/ 0	6.98
10	132328	1745.6	256QAM	50/ 0	20	132472	1760.0	256QAM	100/ 0	7.00
20	132373	1750.1	256QAM	100/ 0	10	132517	1764.5	256QAM	50/ 0	6.96
15	132347	1747.5	256QAM	75/ 0	15	132497	1762.5	256QAM	75/ 0	8.10
15	132325	1745.3	256QAM	75/ 0	20	132496	1762.4	256QAM	100/ 0	6.96
20	132348	1747.6	256QAM	100/ 0	15	132519	1764.7	256QAM	75/ 0	6.71
20	132397	1752.5	256QAM	100/ 0	5	132514	1764.2	256QAM	25/ 0	7.02
5	132330	1745.8	256QAM	25/ 0	20	132447	1757.5	256QAM	100/ 0	6.98
20	132323	1745.1	256QAM	100/ 0	20	132521	1764.9	256QAM	100/ 0	8.14

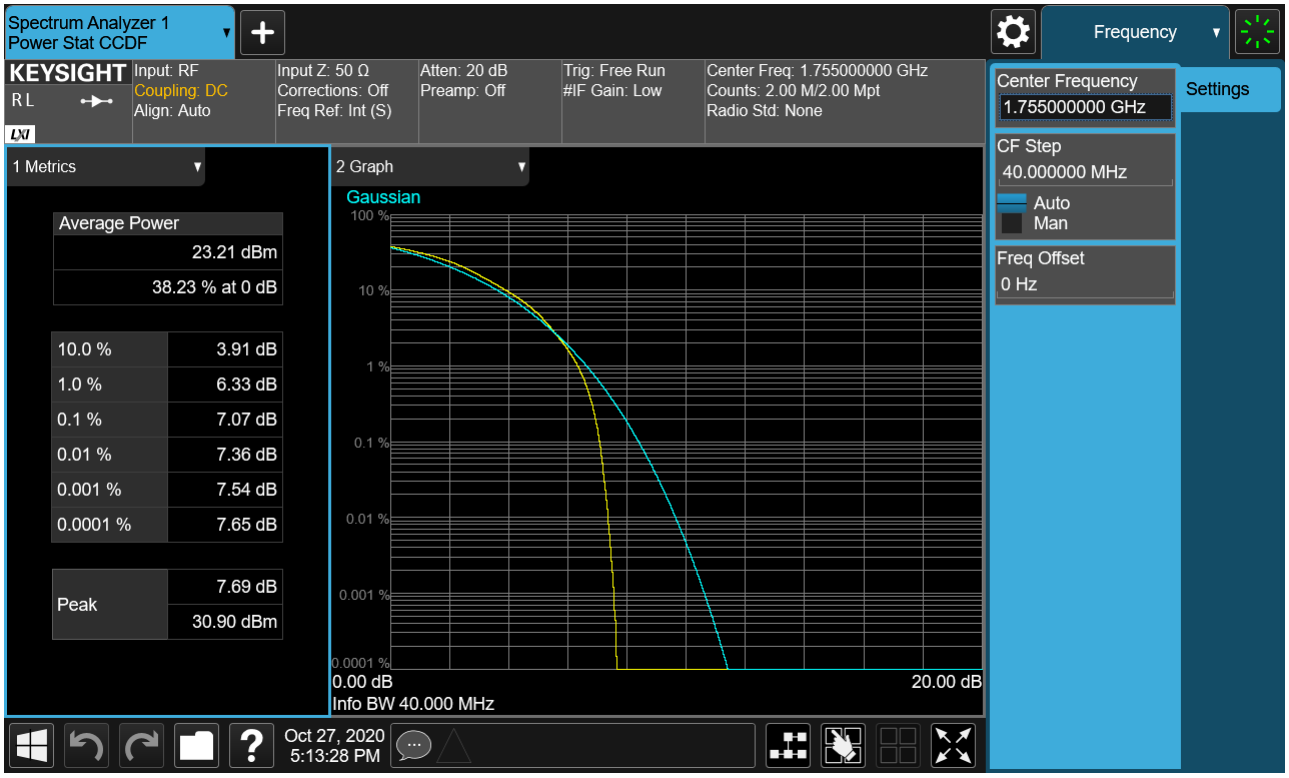
Note:

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

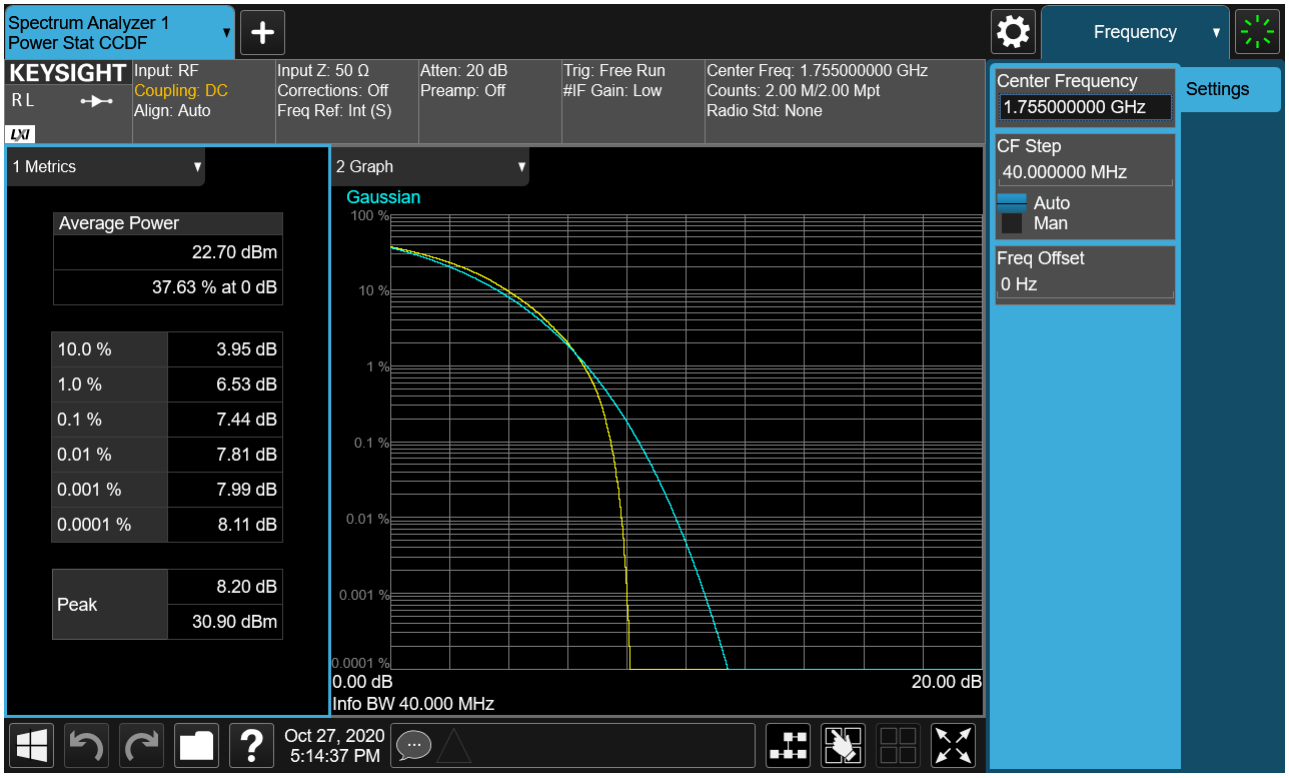
PCC 20MHz Ch132323 RB100 Offset0, SCC 20MHz Ch132521 RB100 Offset0_(QPSK)



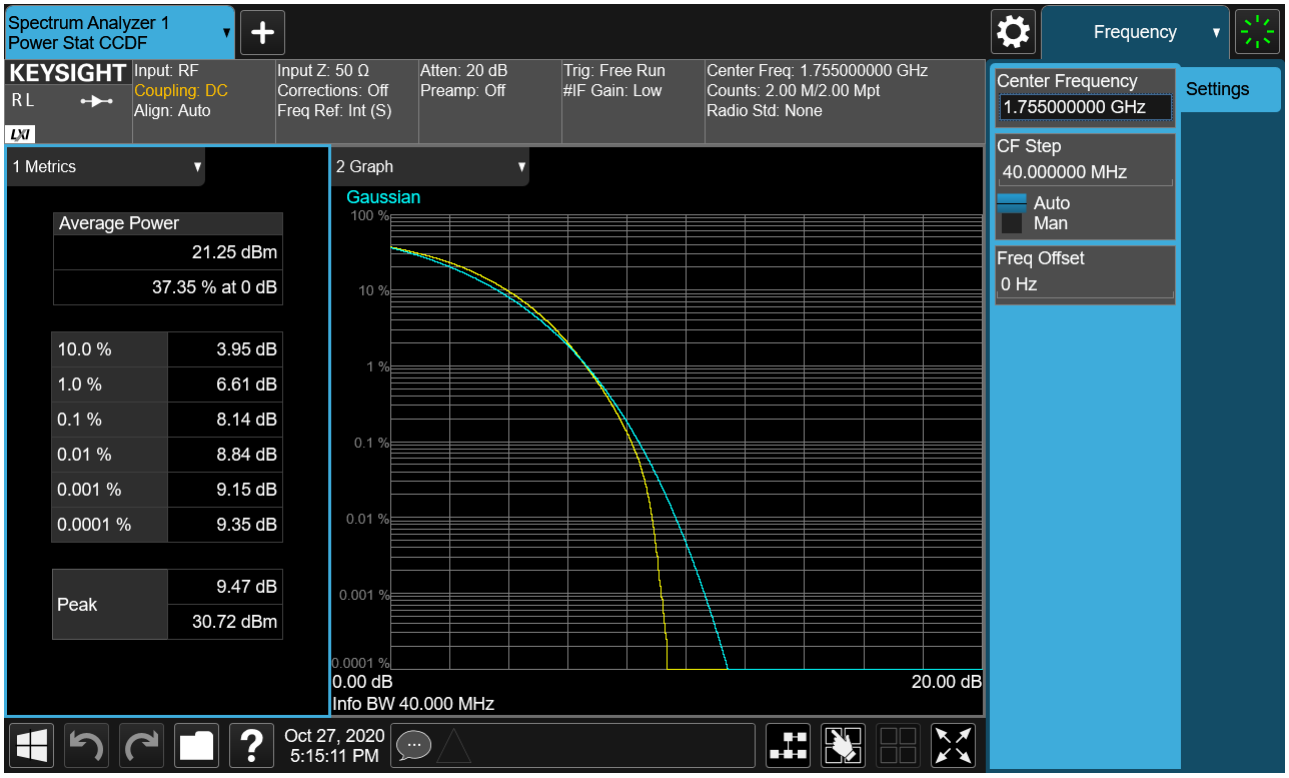
PCC 20MHz Ch132323 RB100 Offset0, SCC 20MHz Ch132521 RB100 Offset0_(16QAM)



PCC 20MHz Ch132323 RB100 Offset0, SCC 20MHz Ch132521 RB100 Offset0_(64QAM)



PCC 20MHz Ch132323 RB100 Offset0, SCC 20MHz Ch132521 RB100 Offset0_(256QAM)



9. ANNEX A_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2011-FC014-P