TEST REPORT

FCC CA_66B Test for SM-X528U
Certification

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2502-FC026

DATE OF ISSUE
February 10, 2025

Tested by
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Applicant	**SAMSUNG Electronics Co., Ltd.** 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Product Name Model Name	Tablet SM-X528U
Date of Test	January 02, 2025 ~ February 07, 2025
FCC ID	A3LSMX528U
Location of Test	■ Permanent Testing Lab ☐ On Site Testing (Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea)
FCC Classification:	PCS Licensed Transmitter (PCB)
Test Standard Used	FCC Rule Part: § 27
Test Results	PASS

REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	February 10, 2025	Initial Release

Notice

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

CONTENTS

MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name:	SAMSUNG Electronics Co., Ltd.
Address:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
FCC ID:	A3LSMX528U
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	§ 27
EUT Type:	Tablet
Model(s):	SM-X528U
Tx Frequency:	1712.5 - 1777.5: 5 MHz+5 MHz 1712.8 - 1775.0: 5 MHz+10 MHz 1715.0 - 1777.2: 10 MHz+5 MHz 1713.0 - 1772.5: 5 MHz+15 MHz 1717.5 - 1777.0: 15 MHz+5 MHz 1715.0 - 1775.0: 10 MHz+10 MHz
Date(s) of Tests:	January 02, 2025 ~ February 07, 2025
Serial number:	Radiated : R32XC00A68K Conducted : R32XC00A9JV
LTE CA :	CA 66B (Uplink)

1.1. MAXIMUM OUTPUT POWER

Mode (PCC+SCC)	Tx Frequency (MHz)	Modulation	Emission Designator	EIRP	
				Max. Power (dBm)	Max. Power (W)
5 MHz+5 MHz	1712.5 - 1777.5	QPSK	9M28G7D	25.74	0.375
		16QAM	9M26W7D	25.06	0.321
		64QAM	9M28W7D	23.02	0.200
		256QAM	9M30W7D	20.74	0.119
5 MHz+10 MHz	1712.8 - 1775.0	QPSK	13M9G7D	25.90	0.389
		16QAM	13M9W7D	25.28	0.337
		64QAM	13M9W7D	23.25	0.211
		256QAM	13M9W7D	20.97	0.125
10 MHz+5 MHz	1715.0 - 1777.2	QPSK	14M0G7D	25.69	0.371
		16QAM	13M9W7D	25.04	0.319
		64QAM	13M9W7D	22.96	0.198
		256QAM	13M9W7D	20.78	0.120
5 MHz+15 MHz	1713.0 - 1772.5	QPSK	18M3G7D	25.79	0.379
		16QAM	18M3W7D	25.25	0.335
		64QAM	18M2W7D	23.18	0.208
		256QAM	18M2W7D	20.90	0.123
15 MHz+5 MHz	1717.5 - 1777.0	QPSK	18M4G7D	25.67	0.369
		16QAM	18M3W7D	25.06	0.321
		64QAM	18M3W7D	22.98	0.199
		256QAM	18M3W7D	20.72	0.118
10 MHz+10 MHz	1715.0 - 1775.0	QPSK	18M8G7D	25.85	0.385
		16QAM	18M8W7D	25.05	0.320
		64QAM	18M9W7D	23.11	0.205
		256QAM	18M7W7D	20.87	0.122

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

Please refer to the [3G] Test Report.

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, Republic of Korea**

3. DESCRIPTION OF TESTS

3.1 TEST PROCEDURE

Test Description	Test Procedure Used
Occupied Bandwidth	- KDB 971168 D01 v03r01 – Section 4.3 - ANSI C63.26-2015 – Section 5.4.4
Band Edge	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Spurious and Harmonic Emissions at Antenna Terminal	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Conducted Output Power	- KDB 971168 D01 v03r01 - Section 5.2.4 - ANSI C63.26-2015 - Section 5.2.1 & 5.2.4.2
Peak- to- Average Ratio	- KDB 971168 D01 v03r01 – Section 5.7 - ANSI C63.26-2015 – Section 5.2.3.4
Frequency stability	- ANSI C63.26-2015 – Section 5.6
Radiated Power	- ANSI C63.26-2015 – Section 5.2.4.4 - KDB 971168 D01 v03r01 – Section 5.8
Radiated Spurious and Harmonic Emissions	- ANSI C63.26-2015 – Section 5.5.3 - KDB 971168 D01 v03r01 – Section 5.8

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.

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5 % of the expected OBW, not to exceed 1 MHz
3. VBW ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points > 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

Test Note

1. The turntable is rotated through 360 degrees, and the receiving antenna scans in order to determine the level of the maximized emission.
2. A half wave dipole is then substituted in place of the EUT. For emissions above 1 GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator and the previously recorded signal was duplicated.
   The power is calculated by the following formula;

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

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

3.3 RADIATED SPURIOUS EMISSIONS

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

Radiated Spurious Emission Measurements at 3 meters by Substitution Method.

Test Settings

1. RBW = 100 kHz for emissions below 1 GHz and 1 MHz for emissions above 1 GHz
2. VBW ≥ 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points > 2 x span / RBW
5. Detector = Peak
6. Trace mode = Max Hold
7. The trace was allowed to stabilize
8. Test channel : Low/ Middle/ High
9. Frequency range : We are performed all frequency to 10^{th} harmonics from 9 kHz.

Test Note

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

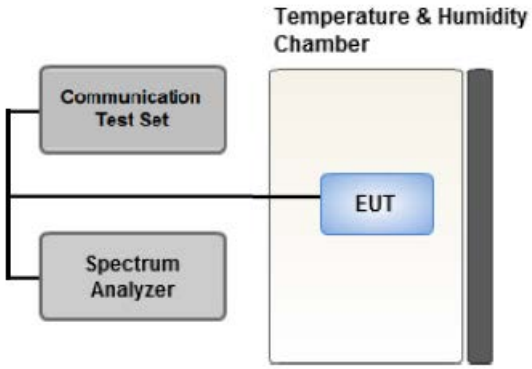
$$\text{Result}_{(dBm)} = \text{Pg}_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dBi)}$$

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

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

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

3.4 PEAK- TO- AVERAGE RATIO



Test setup

① CCDF Procedure for PAPR

Test Settings

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

② Alternate Procedure for PAPR

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

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

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

Test Settings(Peak Power)

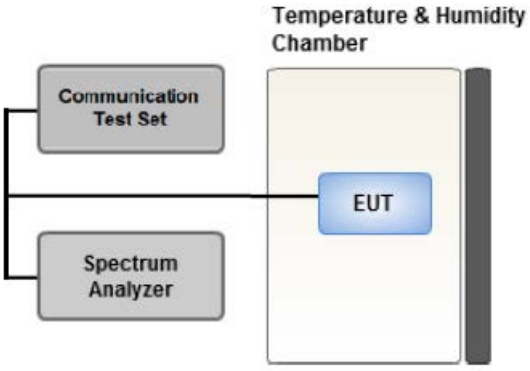
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW ≥ 3 × RBW.

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

Test Settings(Average Power)

1. Set span to 2 × to 3 × the OBW.
2. Set RBW ≥ OBW.
3. Set VBW ≥ 3 × RBW.
4. Set number of measurement points in sweep ≥ 2 × span / RBW.
5. Sweep time:
   Set ≥ [10 × (number of points in sweep) × (transmission period)] for single sweep (automation-compatible) measurement. The transmission period is the (on + off) time.
6. Detector = power averaging (rms).
7. Set sweep trigger to “free run.”
8. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. (To accurately determine the average power over the on and off period of the transmitter, it can be necessary to increase the number of traces to be averaged above 100 or, if using a manually configured sweep time, increase the sweep time.)
9. Use the peak marker function to determine the maximum amplitude level.
10. Add [10 log (1/duty cycle)] to the measured maximum power level to compute the average power during continuous transmission. For example, add [10 log (1/0.25)] = 6 dB if the duty cycle is a constant 25 %.

3.5 OCCUPIED BANDWIDTH.



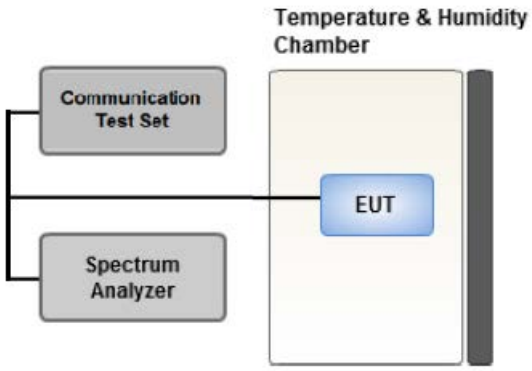
Test setup

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.
The EUT makes a call to the communication simulator.
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth

Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99 % occupied bandwidth and the 26 dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5 % of the expected OBW
3. VBW ≥ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5 % of the 99 % occupied bandwidth observed in Step 7

3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



Test setup

Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic.

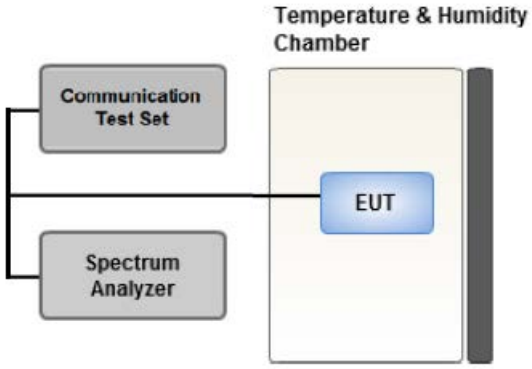
All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Settings

1. RBW = 1 MHz
2. VBW ≥ 3 MHz
3. Detector = Peak
4. Trace Mode = Max Hold
5. Sweep time = auto
6. Number of points in sweep ≥ 2 x Span / RBW

3.7 BAND EDGE



Test setup

Test Overview

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

Test Settings

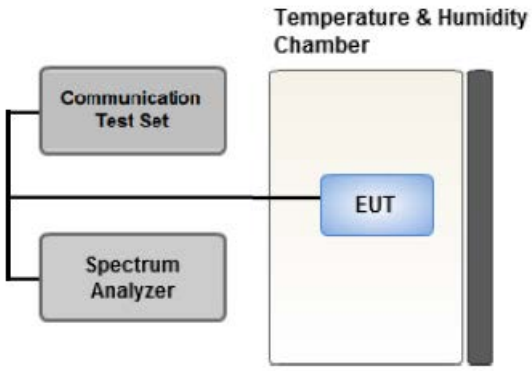
1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW > 1 % of the emission bandwidth
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW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

Test Notes

According to FCC 22.917, 24.238, 27.53 specified that power of any emission outside of The authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.
All measurements were done at 2 channels(low and high operational frequency range.)
The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

Where Margin < 1 dB the emission level is either corrected by 10 log(1 MHz/ RB) or the emission is integrated over a 1 MHz bandwidth to determine the final result. When using the integration method the integration window is either centered on the emission or, for emissions at the band edge, centered by an offset of 500 kHz from the block edge so that the integration window is the 1 MHz adjacent to the block edge.

3.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE



Test setup

Test Overview

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015.

The frequency stability of the transmitter is measured by:

1. Temperature:

   The temperature is varied from -30 °C to +50 °C in 10 °C increments using an environmental chamber.

2. Primary Supply Voltage:

   .- Unless otherwise specified, vary primary supply voltage from 85 % to 115 % of the nominal value for other than hand carried battery equipment.

   .- For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.

Test Settings

1. The carrier frequency of the transmitter is measured at room temperature (20 °C to provide a reference).
2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10 °C intervals ranging from -30 °C to +50 °C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

4. LIST OF TEST EQUIPMENT

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
RF Switching System	Switch box(1.2 G HPF+LNA)	HCT CO., LTD.,	F1L1	11/11/2025	Annual
RF Switching System	Switch box(3.3 G HPF+LNA)	HCT CO., LTD.,	F1L2	11/11/2025	Annual
RF Switching System	Switch box(LNA)	HCT CO., LTD.,	F1L4	11/11/2025	Annual
RF Switching System	Switch box(6 G HPF+LNA)	HCT CO., LTD.,	F1L7	11/11/2025	Annual
Power Amplifier	CBL18265035	CERNEX	22966	11/07/2025	Annual
Power Amplifier	CBL26405040	CERNEX	25956	02/26/2025	Annual
Power Splitter(DC ~ 26.5 GHz)	11667B	Hewlett Packard	5001	04/17/2025	Annual
DC Power Supply	E3632A	Agilent	MY40010147	08/06/2025	Annual
Dipole Antenna	UHAP	Schwarzbeck	01274	03/10/2026	Biennial
Dipole Antenna	UHAP	Schwarzbeck	01288	08/07/2026	Biennial
Chamber	SU-642	ESPEC	93008124	02/19/2025	Annual
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	147	08/17/2025	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	9120D-1298	09/11/2025	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/20/2026	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170124	03/28/2025	Biennial
Signal Analyzer(10 Hz ~ 26.5 GHz)	N9020A	Agilent	MY52090906	04/19/2025	Annual
ATTENUATOR(20 dB)	8493C	Hewlett Packard	17280	04/17/2025	Annual
Spectrum Analyzer(10 Hz ~ 40 GHz)	FSV40	REOHDE & SCHWARZ	100931	08/06/2025	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/05/2025	Annual
Loop Antenna(9 kHz ~ 30 MHz)	FMZB1513	Schwarzbeck	1513-333	03/07/2026	Biennial
Trilog Broadband Antenna	VULB9168	Schwarzbeck	895	08/28/2026	Biennial
Trilog Broadband Antenna	VULB9168	Schwarzbeck	1135	08/19/2026	Biennial
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262094331	11/13/2025	Annual
Radio Communication Test Station	MT8000A	Anritsu Corp.	6272613402	08/28/2025	Annual
SIGNAL GENERATOR (100 kHz ~ 40 GHz)	SMB100A	REOHDE & SCHWARZ	177633	07/26/2025	Annual
Signal Analyzer(5 Hz ~ 40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/17/2025	Annual
Signal & Spectrum Analyzer (2 Hz~67 GHz)	FSW67	REOHDE & SCHWARZ	101736	05/23/2025	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	HCT CO., LTD.,	-	-	-

Note:

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

5. MEASUREMENT UNCERTAINTY

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

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

Parameter	Expanded Uncertainty (±kHz)
Occupied Bandwidth	95 (Confidence level about 95 %, k=2)
Frequency stability	28 (Confidence level about 95 %, k=2)

Parameter	Expanded Uncertainty (±dB)
Block Edge	0.70 (Confidence level about 95 %, k=2)
Conducted Spurious Emissions	1.18 (Confidence level about 95 %, k=2)
Peak- to- Average Ratio	0.68 (Confidence level about 95 %, k=2)
Radiated Power	4.74 (Confidence level about 95 %, k=2)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.36 (Confidence level about 95 %, k=2)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.70 (Confidence level about 95 %, k=2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.52 (Confidence level about 95 %, k=2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.66 (Confidence level about 95 %, k=2)
Radiated Disturbance (Above 40 GHz)	5.58 (Confidence level about 95 %, k=2)

6. SUMMARY OF TEST RESULTS

6.1 Test Condition: Conducted Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Occupied Bandwidth	§ 2.1049	N/A	PASS
Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	§ 2.1051, § 27.53(h)	< 43 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions	PASS
Conducted Output Power	§ 2.1046	N/A	PASS
Peak- to- Average Ratio	§ 27.50(d)(5)	< 13 dB	PASS
Frequency stability / variation of ambient temperature	§ 2.1055, § 27.54	Emission must remain in band	PASS

6.2 Test Condition: Radiated Test

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

7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

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

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

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

7.2 EIRP Sample Calculation

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

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

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

7.3. Emission Designator

GSM Emission Designator

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

EDGE Emission Designator

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

WCDMA Emission Designator

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

QPSK Modulation

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

QAM Modulation

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

8. TEST DATA

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	5	10
5	10	15
10	5	15
5	15	20
15	5	20
10	10	20

3. All modes of operation were investigated and the worst case configuration results are reported in this section.
   Please refer to the table below.
   - Worst case(Conducted Spurious Emissions, Band Edge)
     : We have selected higher of the Conduction Output Power.
   - Worst case(Radiated Spurious Emissions) : We have selected higher of the EIRP.
   - Worst case(OBW, PAR, Frequency stability)
     : All modes of operation were investigated and the worst case configuration results are reported.
4. All modes of operation were investigated and the worst case configuration results are reported.
   Mode : Stand alone, Stand alone + External accessories (Earphone, Keyboard, AC adapter, etc)
   Worst case : Stand alone
5. All simultaneous transmission scenarios of operation were investigated, and the test results showed no additional significant emissions relative to the least restrictive limit were observed.
   Therefore, only the worst case(stand-alone) results were reported
6. All 3 channels(low/mid/high) of conducted power and radiated power were investigated and the worst case channel results are reported.

[Worst case]

Test Description	Mod	Operating frequency	PCC					SCC				
			BW (MHz)	Freq. (MHz)	Ch.	RB	RB Offset	BW (MHz)	Freq. (MHz)	Ch.	RB	RB Offset
Conducted Spurious Emissions/ Band Edge	QPSK	Low	5	1712.8	132000	1	24	10	1720.0	132072	1	0
		Mid	5	1748.1	132353	1	24	15	1757.4	132446	1	0
		High	10	1765.1	132523	1	49	10	1775.0	132622	1	0
		Low	5	1712.8	132000	1	0	10	1720.0	132072	1	49
		Mid	5	1748.1	132353	1	0	15	1757.4	132446	1	74
		High	10	1765.1	132523	1	0	10	1775.0	132622	1	49
		Low	5	1712.8	132000	25	0	10	1720.0	132072	50	0
		Mid	5	1750.3	132375	25	0	10	1757.5	132447	50	0
		High	15	1767.7	132549	75	0	5	1777.0	132642	25	0
		Low	10	1715.0	132022	50	0	10	1724.9	132121	50	0
		Mid	10	1750.1	132373	50	0	10	1760.0	132472	50	0
		High	10	1765.1	132523	50	0	10	1775.0	132622	50	0
Radiated Spurious Emissions	QPSK	Low	15	1715.5	132047	1	74	5	1726.8	132140	1	0
		Mid	5	1750.3	132375	1	24	10	1757.5	132447	1	0
		High	5	1763.2	132504	1	24	15	1772.5	132597	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	5	1752.6	132398	25	0	5	1757.4	132446	25	0
			5	1750.3	132375	25	0	10	1757.5	132447	50	0
			10	1752.5	132397	50	0	5	1759.7	132469	25	0
			5	1748.1	132353	25	0	15	1757.4	132446	75	0
			15	1752.6	132398	75	0	5	1761.9	132491	25	0
			10	1750.1	132373	50	0	10	1760.0	132472	50	0
Frequency stability	QPSK	Low	5	1712.5	131997	25	0	5	1717.3	132045	25	0
			10	1715.0	132022	50	0	5	1722.2	132094	25	0
			15	1717.5	132047	75	0	5	1726.8	132140	25	0
		High	5	1772.7	132599	25	0	5	1777.5	132647	25	0
			10	1770.0	132572	50	0	5	1777.2	132644	25	0
			15	1767.7	132549	75	0	5	1777.0	132642	25	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	5	1712.5	131997	1	24	5	1717.3	132045	1	0	24.57
	5	***1712.8***	***132000***	***1***	***24***	***10***	***1720.0***	***132072***	***1***	***0***	***24.90***
	10	1715.0	132022	1	49	5	1722.2	132094	1	0	24.58
	5	1713.0	132002	1	24	15	1722.3	132095	1	0	24.69
	15	1717.5	132047	1	74	5	1726.8	132140	1	0	24.51
	10	1715.0	132022	1	49	10	1724.9	132121	1	0	24.58
Mid	5	1752.6	132398	1	24	5	1757.4	132446	1	0	24.50
	5	1750.3	132375	1	24	10	1757.5	132447	1	0	24.71
	10	1752.5	132397	1	49	5	1759.7	132469	1	0	24.33
	5	***1748.1***	***132353***	***1***	***24***	***15***	***1757.4***	***132446***	***1***	***0***	***24.74***
	15	1752.6	132398	1	74	5	1761.9	132491	1	0	24.22
	10	1750.1	132373	1	49	10	1760.0	132472	1	0	24.45
High	5	1772.7	132599	1	24	5	1777.5	132647	1	0	24.40
	5	1767.8	132550	1	24	10	1775.0	132622	1	0	24.39
	10	1770.0	132572	1	49	5	1777.2	132644	1	0	24.41
	5	1763.2	132504	1	24	15	1772.5	132597	1	0	24.19
	15	1767.7	132549	1	74	5	1777.0	132642	1	0	24.48
	10	***1765.1***	***132523***	***1***	***49***	***10***	***1775.0***	***132622***	***1***	***0***	***24.55***

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	1712.5	131997	25	0	5	1717.3	132045	25	0	22.57
	5	***1712.8***	***132000***	***25***	***0***	***10***	***1720.0***	***132072***	***50***	***0***	***22.86***
	10	1715.0	132022	50	0	5	1722.2	132094	25	0	22.47
	5	1713.0	132002	25	0	15	1722.3	132095	75	0	22.86
	15	1717.5	132047	75	0	5	1726.8	132140	25	0	22.55
	10	1715.0	132022	50	0	10	1724.9	132121	50	0	22.28
Mid	5	1752.6	132398	25	0	5	1757.4	132446	25	0	22.50
	5	***1750.3***	***132375***	***25***	***0***	***10***	***1757.5***	***132447***	***50***	***0***	***22.98***
	10	1752.5	132397	50	0	5	1759.7	132469	25	0	22.39
	5	1748.1	132353	25	0	15	1757.4	132446	75	0	22.95
	15	1752.6	132398	75	0	5	1761.9	132491	25	0	22.30
	10	1750.1	132373	50	0	10	1760.0	132472	50	0	21.72
High	5	1772.7	132599	25	0	5	1777.5	132647	25	0	22.43
	5	1767.8	132550	25	0	10	1775.0	132622	50	0	22.36
	10	1770.0	132572	50	0	5	1777.2	132644	25	0	22.32
	5	1763.2	132504	25	0	15	1772.5	132597	75	0	22.30
	15	***1767.7***	***132549***	***75***	***0***	***5***	***1777.0***	***132642***	***25***	***0***	***22.45***
	10	1765.1	132523	50	0	10	1775.0	132622	50	0	22.17

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	5	1712.8	132000	1	24	10	1720.0	132072	1	0	23.89
Mid	5	1748.1	132353	1	24	15	1757.4	132446	1	0	23.94
High	10	1765.1	132523	1	49	10	1775.0	132622	1	0	23.78
Low	5	1712.8	132000	25	0	10	1720.0	132072	50	0	21.89
Mid	5	1750.3	132375	25	0	10	1757.5	132447	50	0	21.96
High	15	1767.7	132549	75	0	5	1777.0	132642	25	0	21.56

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	5	1712.8	132000	1	24	10	1720.0	132072	1	0	21.70
Mid	5	1748.1	132353	1	24	15	1757.4	132446	1	0	22.02
High	10	1765.1	132523	1	49	10	1775.0	132622	1	0	21.68
Low	5	1712.8	132000	25	0	10	1720.0	132072	50	0	21.84
Mid	5	1750.3	132375	25	0	10	1757.5	132447	50	0	21.77
High	15	1767.7	132549	75	0	5	1777.0	132642	25	0	21.54

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	5	1712.8	132000	1	24	10	1720.0	132072	1	0	19.59
Mid	5	1748.1	132353	1	24	15	1757.4	132446	1	0	19.96
High	10	1765.1	132523	1	49	10	1775.0	132622	1	0	18.57
Low	5	1712.8	132000	25	0	10	1720.0	132072	50	0	19.68
Mid	5	1750.3	132375	25	0	10	1757.5	132447	50	0	19.89
High	15	1767.7	132549	75	0	5	1777.0	132642	25	0	19.42

Note:

Modulation : 256QAM

8.2 Equivalent Isotropic Radiated Power

	PCC			SCC			Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol.	E.I.R.P	
	BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset						W	dBm
Low	5	131997	1/24	5	132045	1/0	-16.17	17.22	10.06	2.06	H	0.333	25.22
	5	132000	1/24	10	132072	1/0	-16.19	17.20	10.06	2.06	H	0.331	25.20
	10	132022	1/49	5	132094	1/0	-16.02	17.40	10.08	2.06	H	0.348	25.42
	5	132002	1/24	15	132095	1/0	-16.11	17.28	10.06	2.06	H	0.337	25.28
	15	***132047***	***1/74***	***5***	***132140***	***1/0***	***-15.93***	***17.49***	***10.08***	***2.06***	***H***	***0.356***	***25.51***
	10	132022	1/49	10	132121	1/0	-15.99	17.43	10.08	2.06	H	0.351	25.45
Mid	5	132398	1/24	5	132446	1/0	-15.92	17.61	10.21	2.08	H	0.375	25.74
	5	***132375***	***1/24***	***10***	***132447***	***1/0***	***-15.76***	***17.77***	***10.21***	***2.08***	***H***	***0.389***	***25.90***
	10	132397	1/49	5	132469	1/0	-15.97	17.56	10.21	2.08	H	0.371	25.69
	5	132353	1/24	15	132446	1/0	-15.87	17.66	10.21	2.08	H	0.379	25.79
	15	132398	1/74	5	132491	1/0	-15.99	17.54	10.21	2.08	H	0.369	25.67
	10	132373	1/49	10	132472	1/0	-15.81	17.72	10.21	2.08	H	0.385	25.85
High	5	132599	1/24	5	132647	1/0	-16.33	17.43	10.25	2.09	H	0.362	25.59
	5	132550	1/24	10	132622	1/0	-16.35	17.35	10.24	2.09	H	0.355	25.50
	10	132572	1/49	5	132644	1/0	-16.33	17.43	10.25	2.09	H	0.362	25.59
	5	***132504***	***1/24***	***15***	***132597***	***1/0***	***-16.06***	***17.64***	***10.24***	***2.09***	***H***	***0.379***	***25.79***
	15	132549	1/74	5	132642	1/0	-16.28	17.42	10.24	2.09	H	0.361	25.57
	10	132523	1/49	10	132622	1/0	-16.23	17.47	10.24	2.09	H	0.365	25.62

Note:

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

PCC			SCC			Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol.	E.I.R.P	
BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset						W	dBm
15	132047	1/74	5	132140	1/0	-16.58	16.84	10.08	2.06	H	0.306	24.86
5	132398	1/24	5	132446	1/0	-16.60	16.93	10.21	2.08	H	0.321	25.06
5	132375	1/24	10	132447	1/0	-16.38	17.15	10.21	2.08	H	0.337	25.28
10	132397	1/49	5	132469	1/0	-16.62	16.91	10.21	2.08	H	0.319	25.04
5	132353	1/24	15	132446	1/0	-16.41	17.12	10.21	2.08	H	0.335	25.25
15	132398	1/74	5	132491	1/0	-16.60	16.93	10.21	2.08	H	0.321	25.06
10	132373	1/49	10	132472	1/0	-16.61	16.92	10.21	2.08	H	0.320	25.05
5	132504	1/24	15	132597	1/0	-16.69	17.01	10.24	2.09	H	0.328	25.16

Note:

1. Modulation : 16QAM

2. Limit : < 1 Watts

PCC			SCC			Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol.	E.I.R.P	
BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset						W	dBm
15	132047	1/74	5	132140	1/0	-18.71	14.71	10.08	2.06	H	0.187	22.73
5	132398	1/24	5	132446	1/0	-18.64	14.89	10.21	2.08	H	0.200	23.02
5	132375	1/24	10	132447	1/0	-18.41	15.12	10.21	2.08	H	0.211	23.25
10	132397	1/49	5	132469	1/0	-18.70	14.83	10.21	2.08	H	0.198	22.96
5	132353	1/24	15	132446	1/0	-18.48	15.05	10.21	2.08	H	0.208	23.18
15	132398	1/74	5	132491	1/0	-18.68	14.85	10.21	2.08	H	0.199	22.98
10	132373	1/49	10	132472	1/0	-18.55	14.98	10.21	2.08	H	0.205	23.11
5	132504	1/24	15	132597	1/0	-18.70	15.00	10.24	2.09	H	0.207	23.15

Note:

1. Modulation : 64QAM

2. Limit : < 1 Watts

PCC			SCC			Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol.	E.I.R.P	
BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset						W	dBm
15	132047	1/74	5	132140	1/0	-20.84	12.58	10.08	2.06	H	0.115	20.60
5	132398	1/24	5	132446	1/0	-20.92	12.61	10.21	2.08	H	0.119	20.74
5	132375	1/24	10	132447	1/0	-20.69	12.84	10.21	2.08	H	0.125	20.97
10	132397	1/49	5	132469	1/0	-20.88	12.65	10.21	2.08	H	0.120	20.78
5	132353	1/24	15	132446	1/0	-20.76	12.77	10.21	2.08	H	0.123	20.90
15	132398	1/74	5	132491	1/0	-20.94	12.59	10.21	2.08	H	0.118	20.72
10	132373	1/49	10	132472	1/0	-20.79	12.74	10.21	2.08	H	0.122	20.87
5	132504	1/24	15	132597	1/0	-21.02	12.68	10.24	2.09	H	0.121	20.83

Note:

1. Modulation : 256QAM

2. Limit : < 1 Watts

8.3 Conducted Spurious Emissions

Operating frequency	PCC				SCC				Measurement Maximum Frequency (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)
	BW [MHz]	Ch.	Freq. (MHz)	RB/ Offset	BW [MHz]	Ch.	Freq. (MHz)	RB/ Offset				
Low	5	132000	1712.8	1/24	10	132072	1720.0	1/0	2.1137	27.976	-61.37	-33.39
Mid	5	132353	1748.1	124	15	132446	1757.4	1/0	7.4277	28.591	-62.68	-34.09
High	10	132523	1765.1	1/49	10	132622	1775.0	1/0	2.1636	27.976	-62.13	-34.15
Low	5	132000	1712.8	1/0	10	132072	1720.0	1/49	6.0619	28.591	-64.03	-35.44
Mid	5	132353	1748.1	1/0	15	132446	1757.4	1/74	8.0060	28.591	-63.41	-34.82
High	10	132523	1765.1	1/0	10	132622	1775.0	1/49	2.1636	27.976	-62.34	-34.36
Low	5	132000	1712.8	25/0	10	132072	1720.0	50/0	8.3250	28.591	-61.33	-32.74
Mid	5	132375	1750.3	25/0	10	132447	1757.5	50/0	8.0559	28.591	-63.53	-34.94
High	15	132549	1767.7	75/0	5	132642	1777.0	25/0	2.1736	27.976	-62.88	-34.90
Low	10	132022	1715.0	50/0	10	132121	1724.9	50/0	2.1137	27.976	-62.86	-34.88
Mid	10	132373	1750.1	50/0	10	132472	1760.0	50/0	4.0180	27.976	-63.64	-35.66
High	10	132523	1765.1	50/0	10	132622	1775.0	50/0	2.1636	27.976	-61.11	-33.13

Note:

1. Modulation : QPSK

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

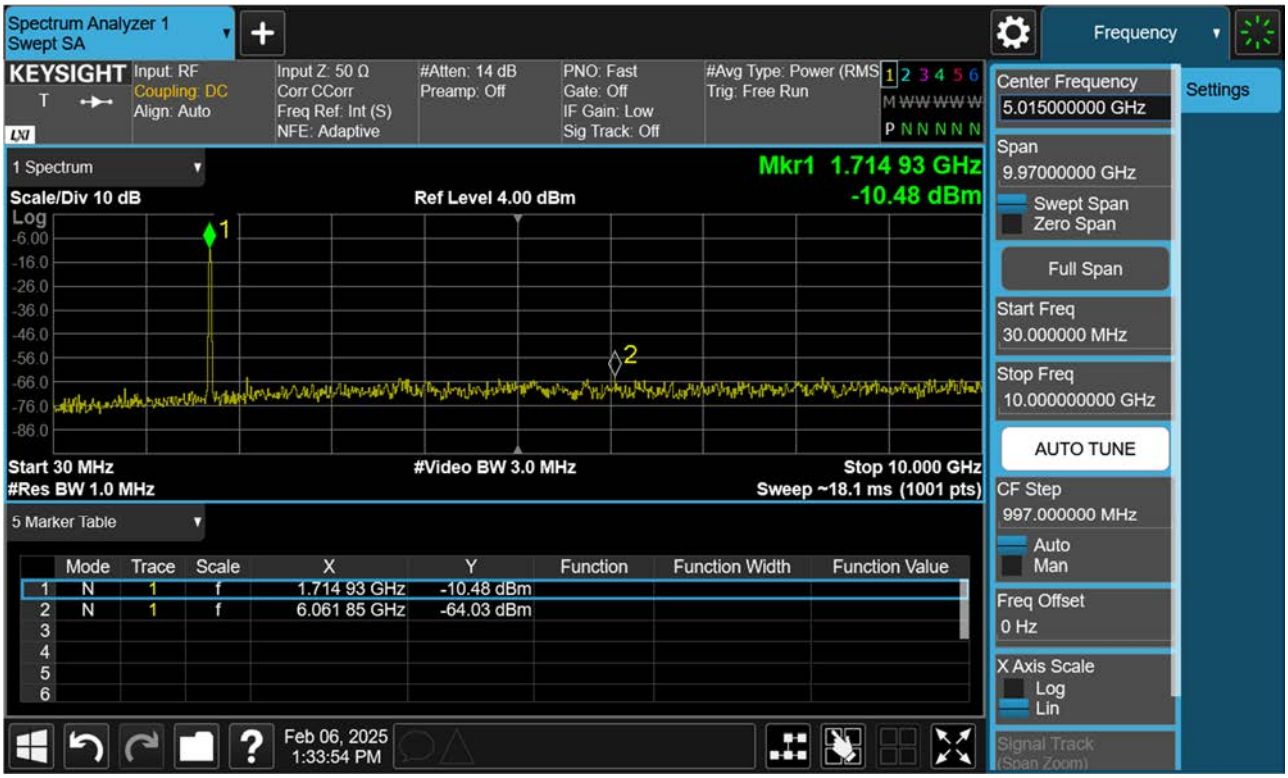
3. Factors for frequency :

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

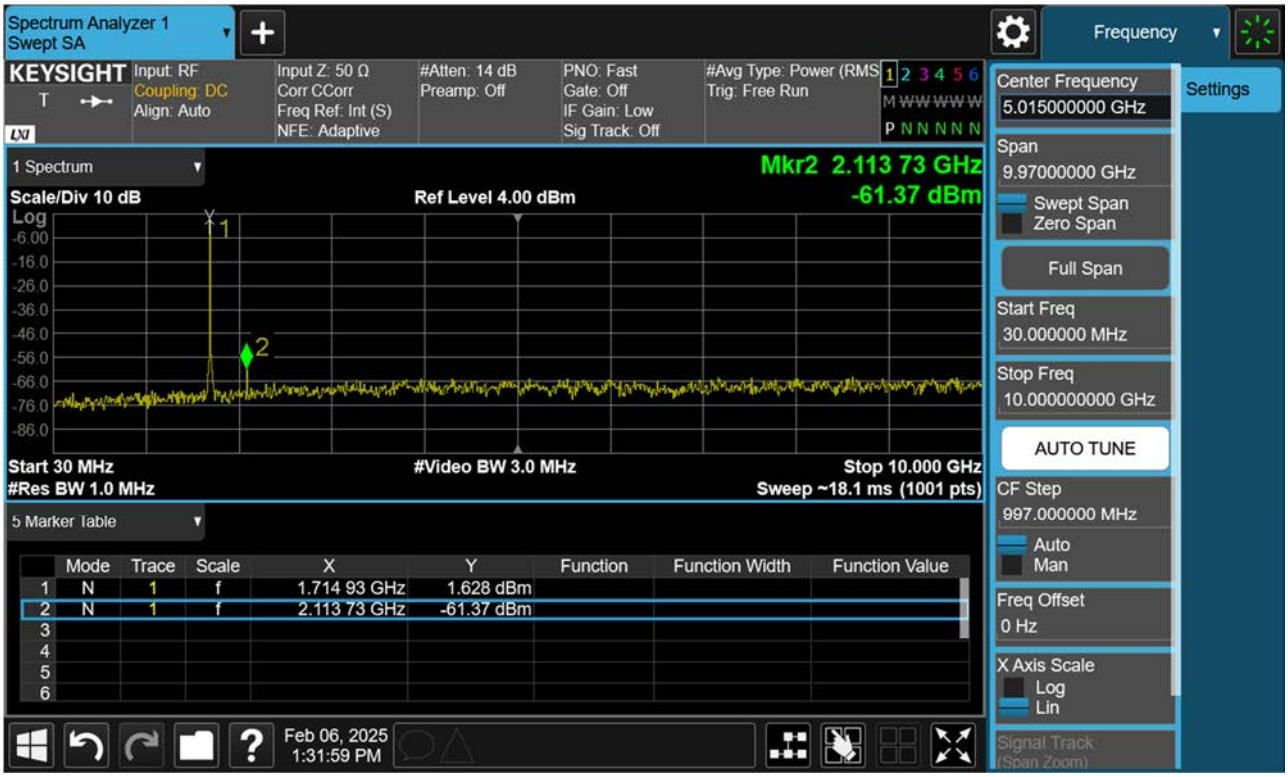
4. Limit : -13.0 dBm

Frequency Range : 30 MHz ~ 10 GHz

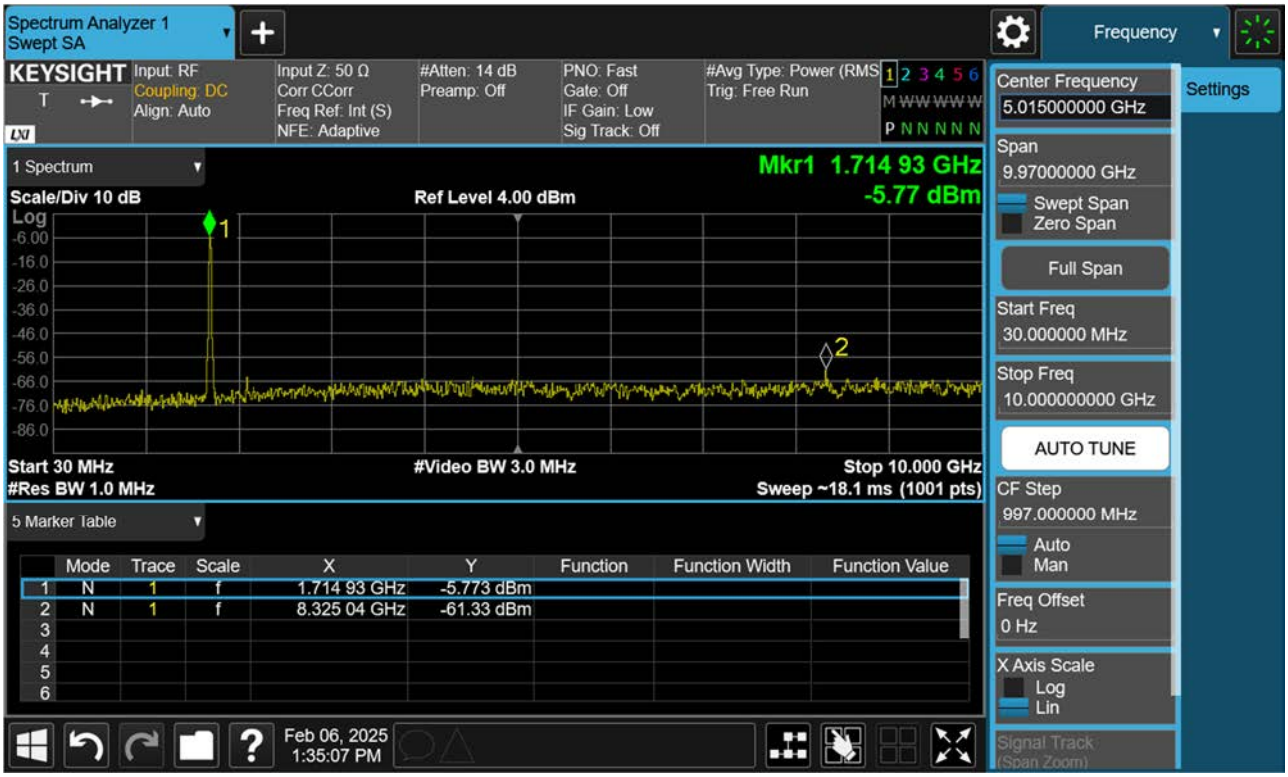
PCC 5 M 132000 RB 1,0 SCC 10 M 132072 RB 1,49



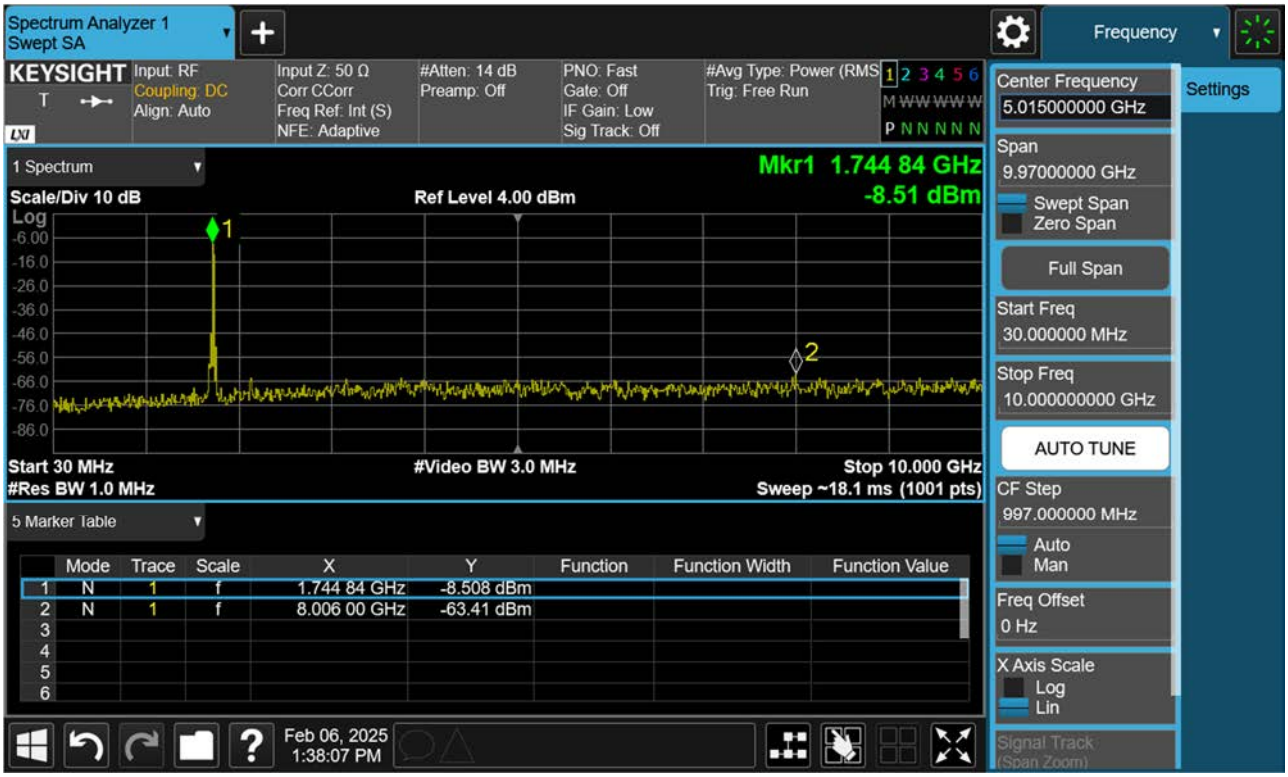
PCC 5 M 132000 RB 1,24 SCC 10 M 132072 RB 1,0



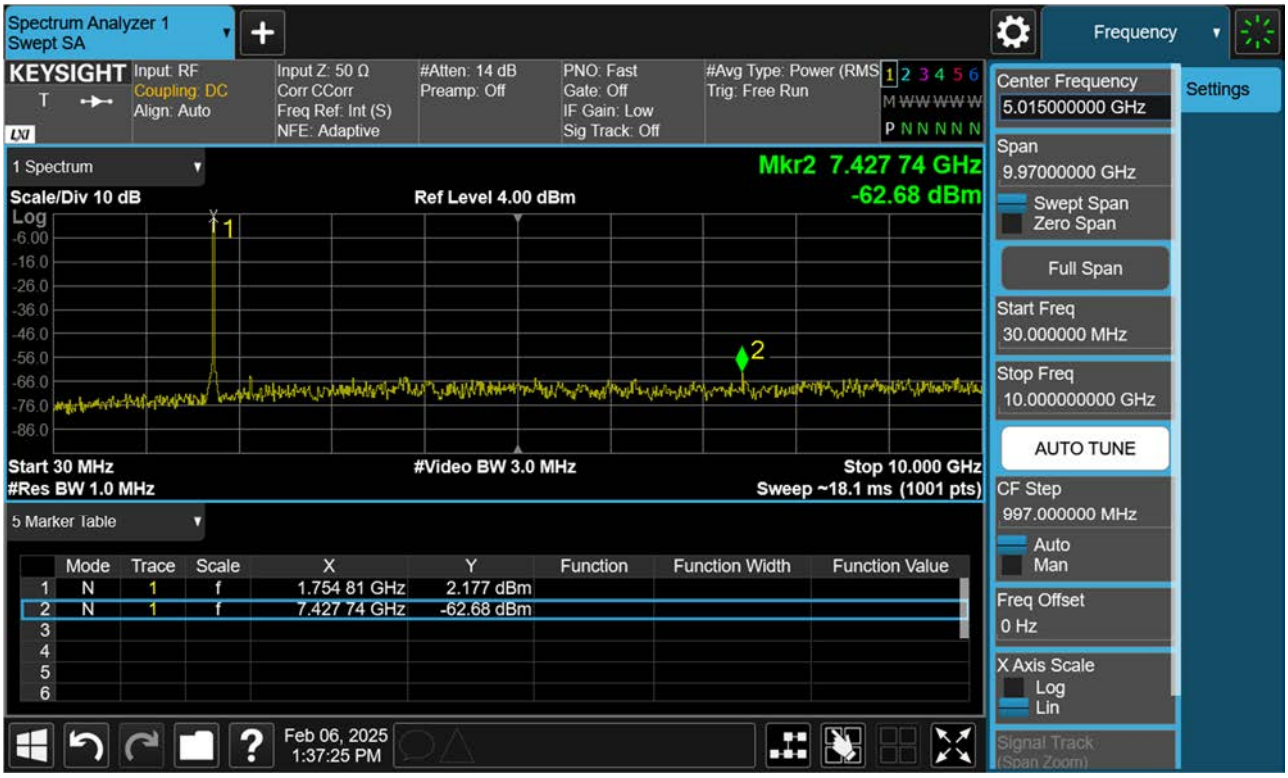
PCC 5 M 132000 RB 25,0 SCC 10 M 132072 RB 50,0



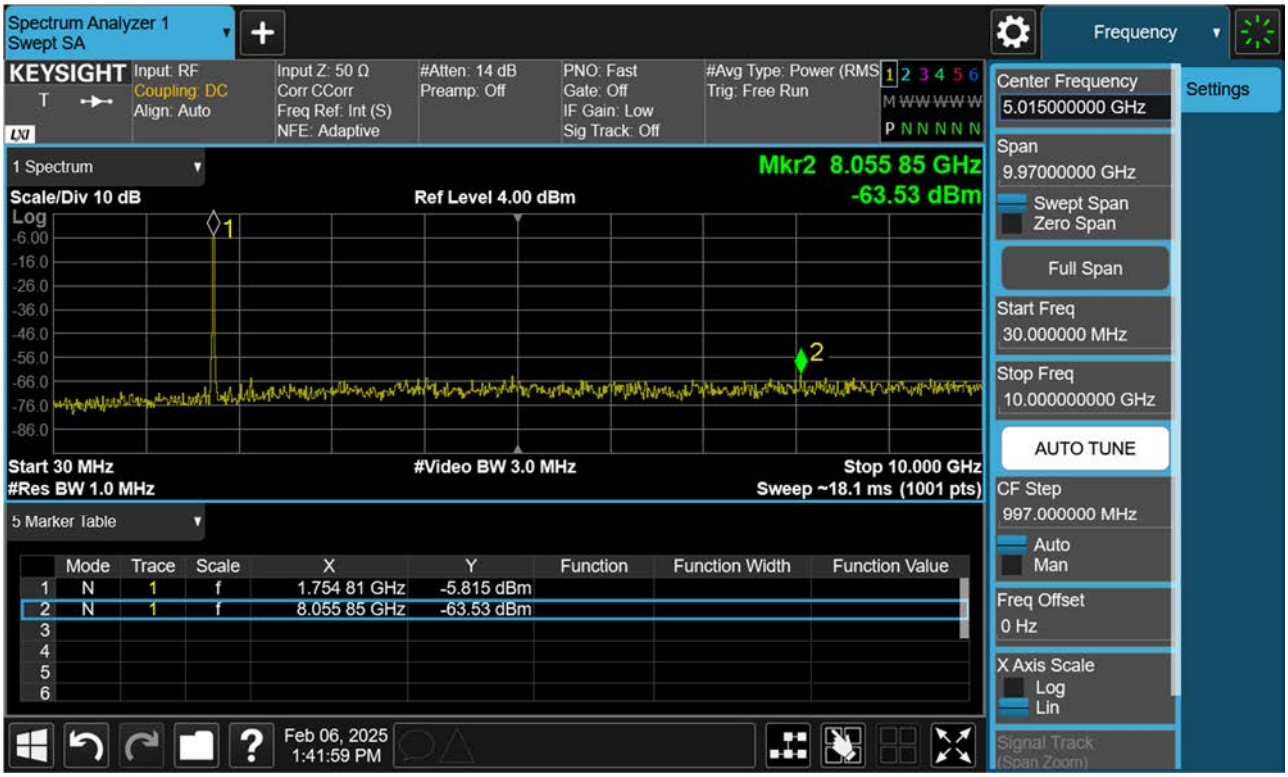
PCC 5 M 132353 RB 1,0 SCC 15 M 132446 RB 1,74



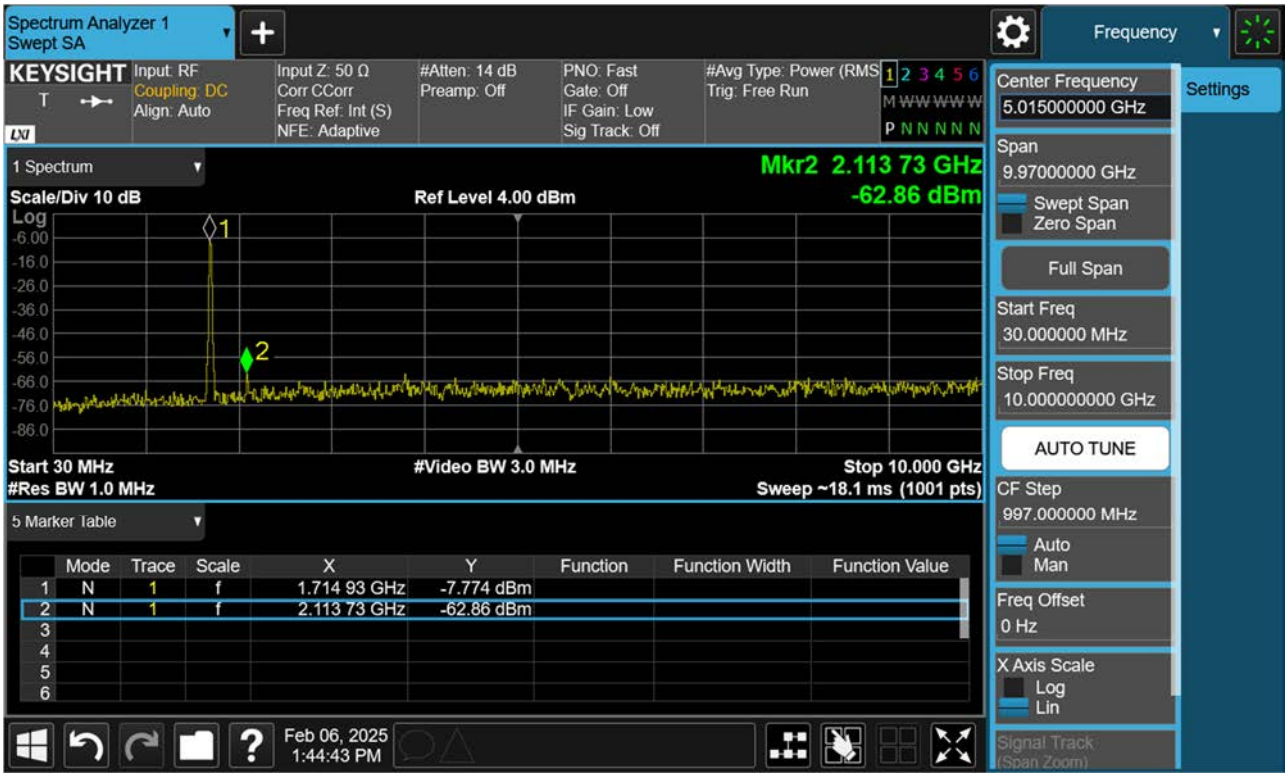
PCC 5 M 132353 RB 1,24 SCC 15 M 132446 RB 1,0



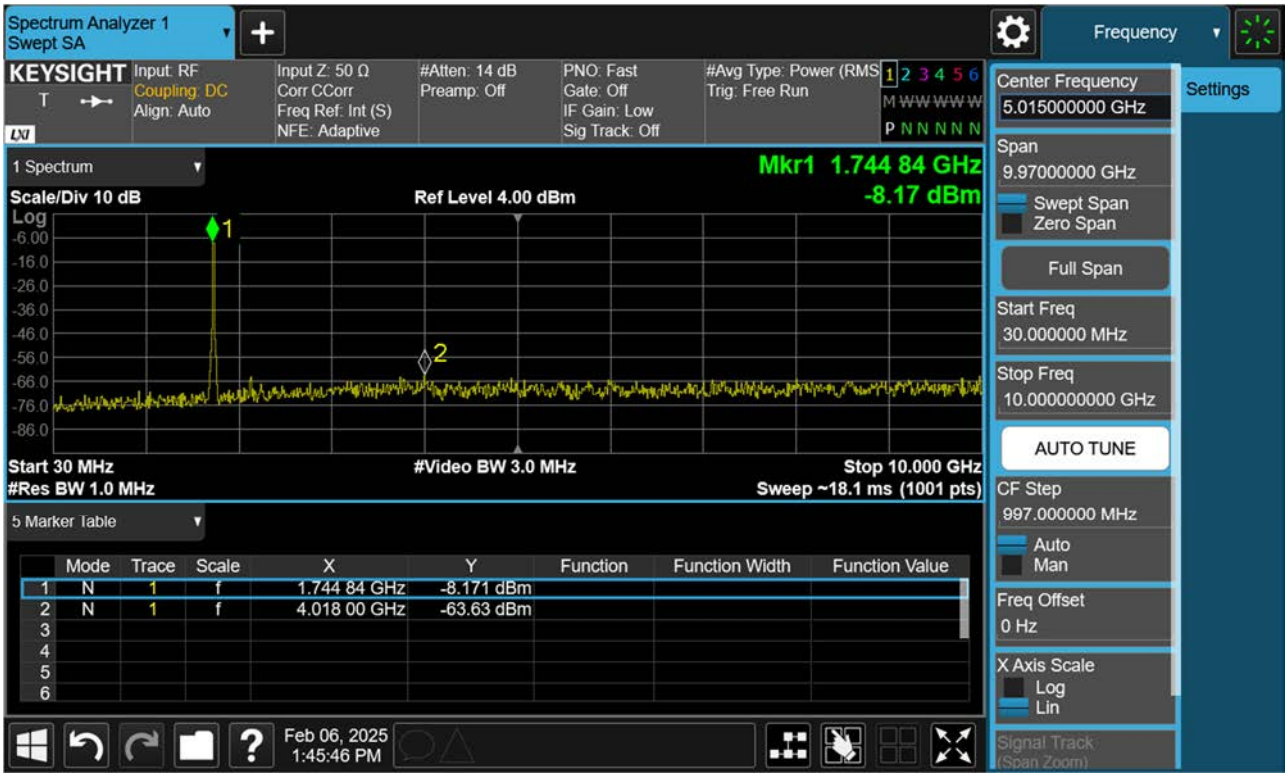
PCC 5 M 132375 RB 25,0 SCC 10 M 132447 RB 50,0



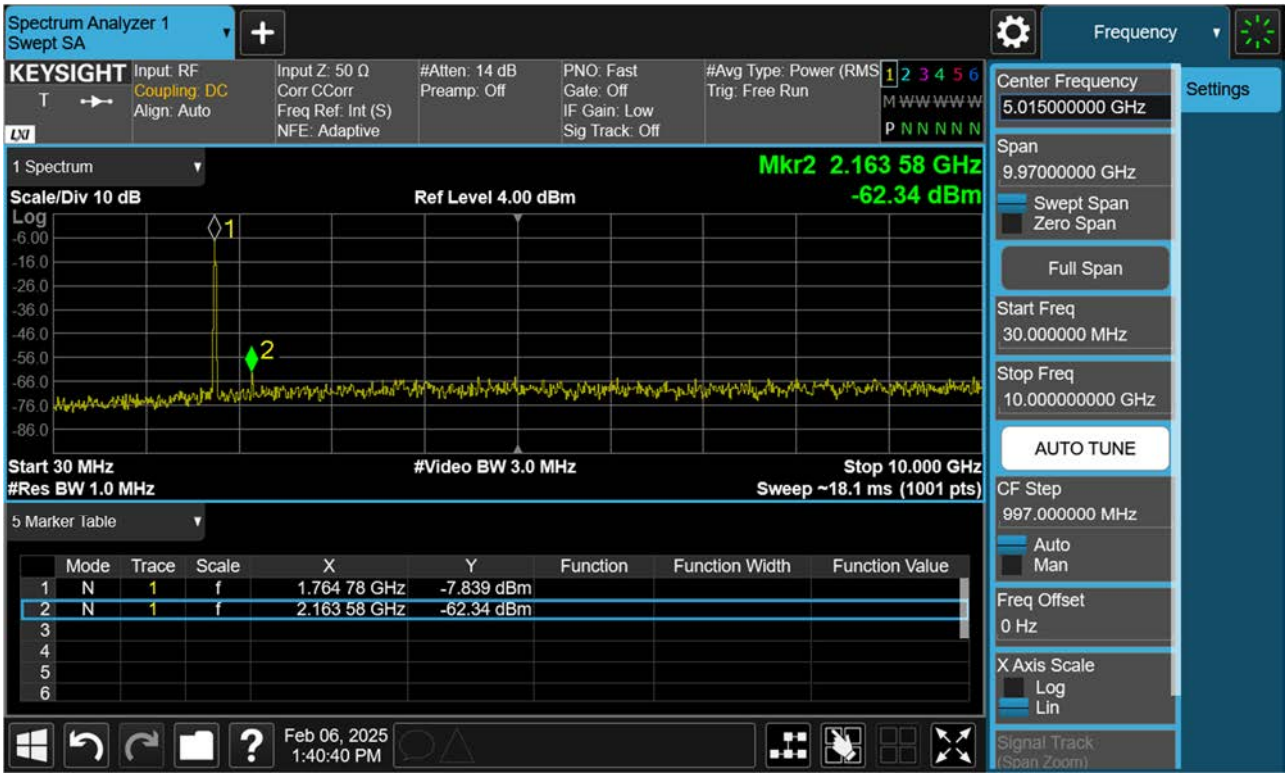
PCC 10 M 132022 RB 50,0 SCC 10 M 132121 RB 50,0



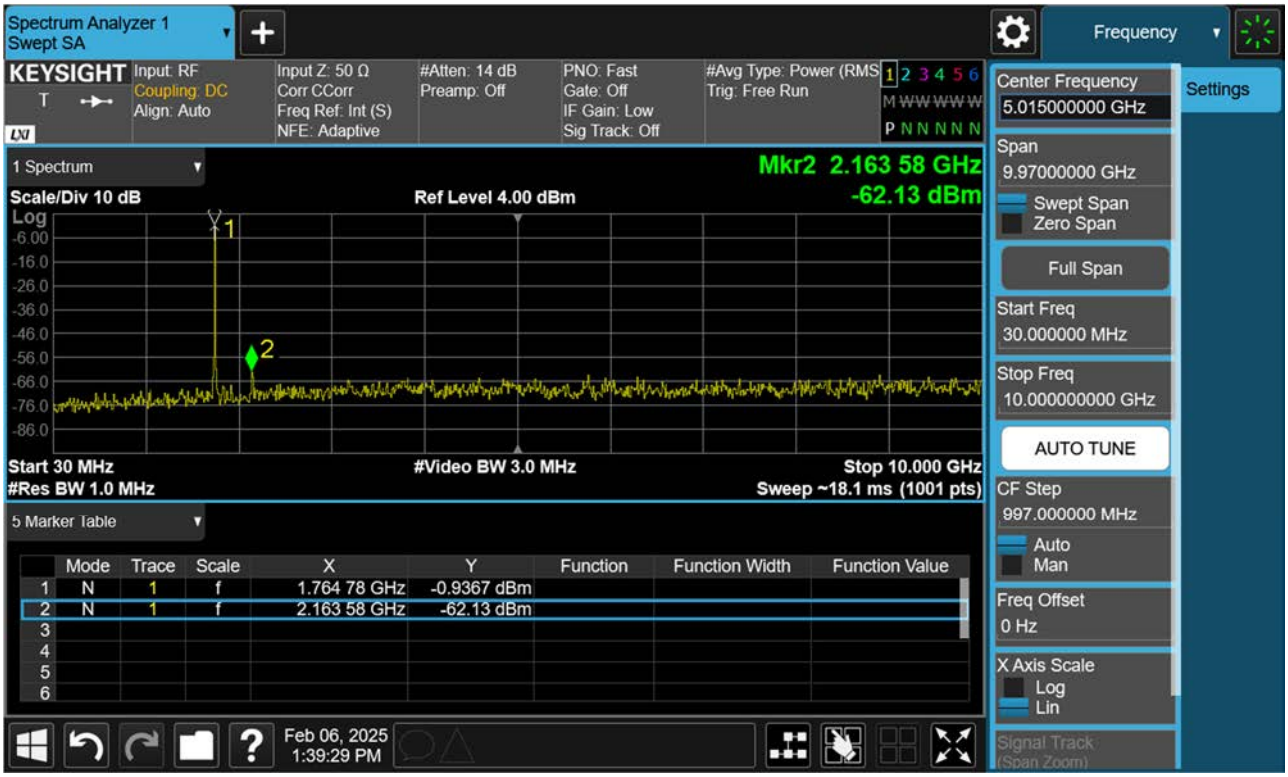
PCC 10 M 132373 RB 50,0 SCC 10 M 132472 RB 50,0



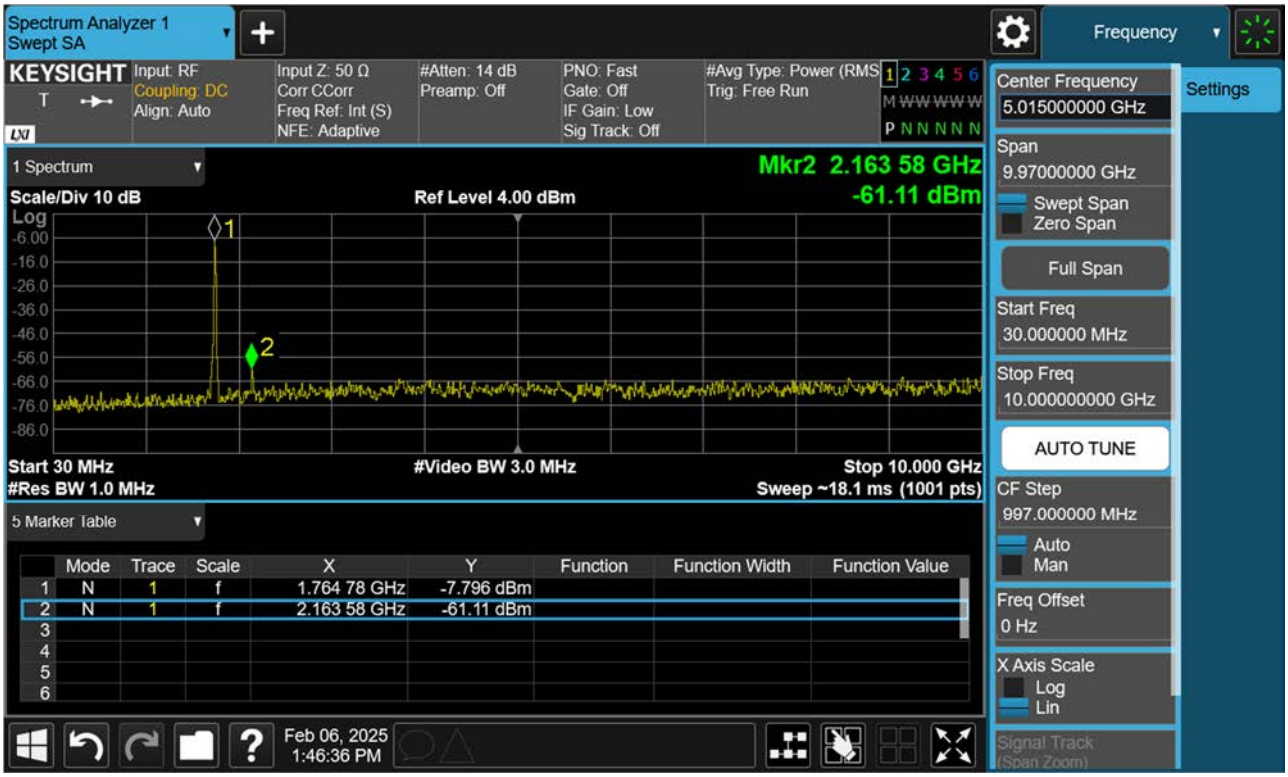
PCC 10 M 132523 RB 1,0 SCC 10 M 132622 RB 1,49



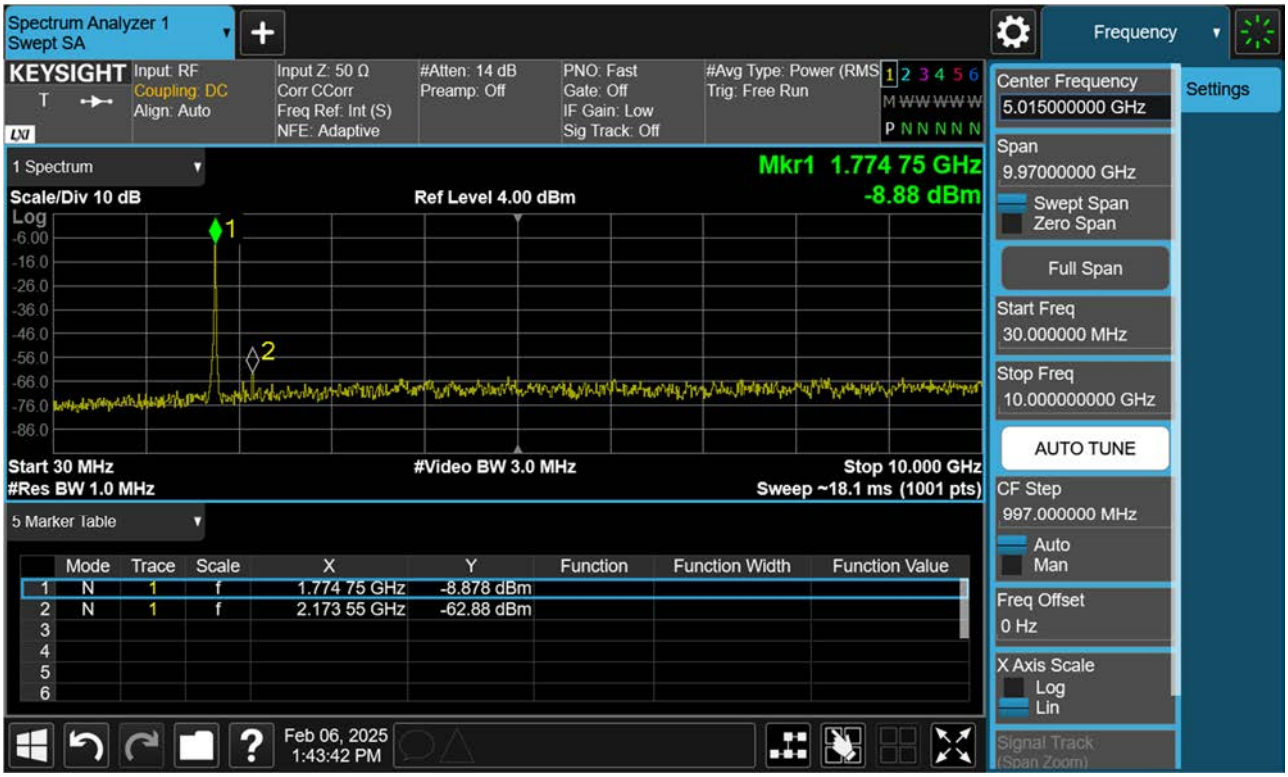
PCC 10 M 132523 RB 1,49 SCC 10 M 132622 RB 1,0



PCC 10 M 132523 RB 50,0 SCC 10 M 132622 RB 50,0

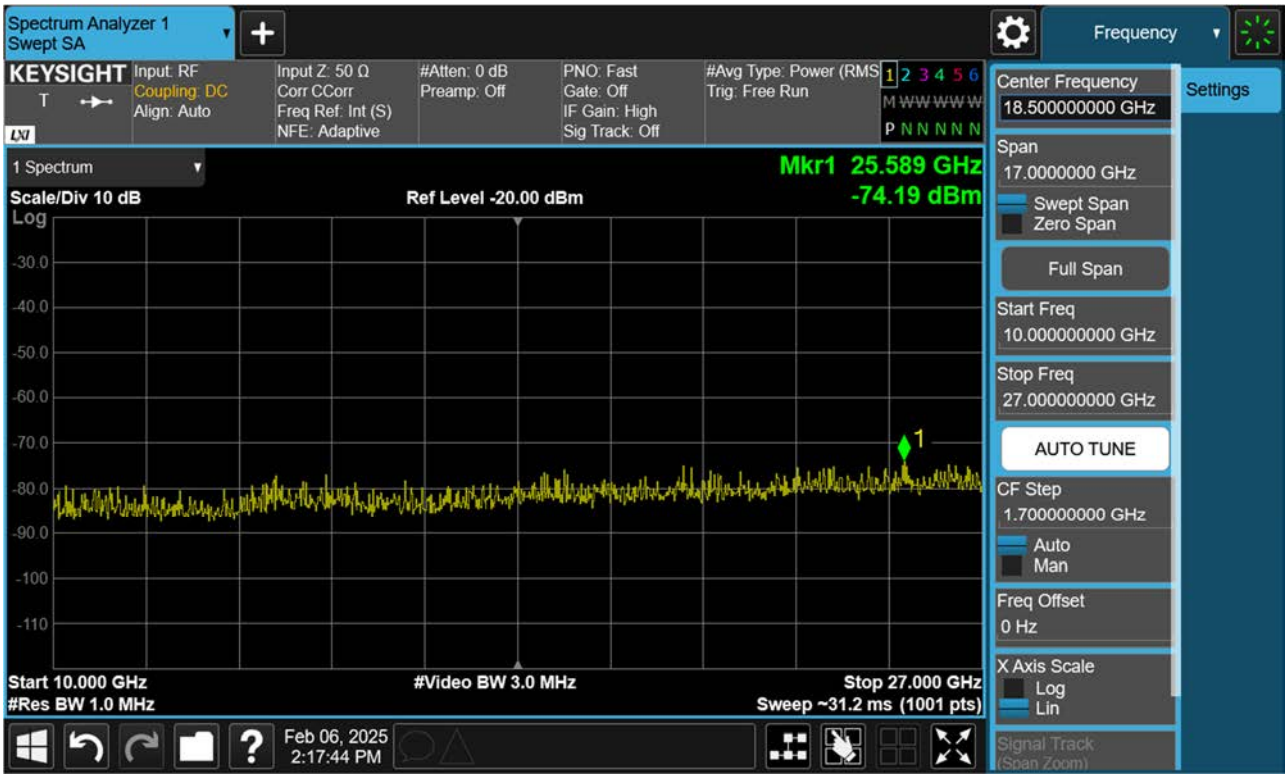


PCC 15 M 132549 RB 75,0 SCC 5 M 132642 RB 25,0

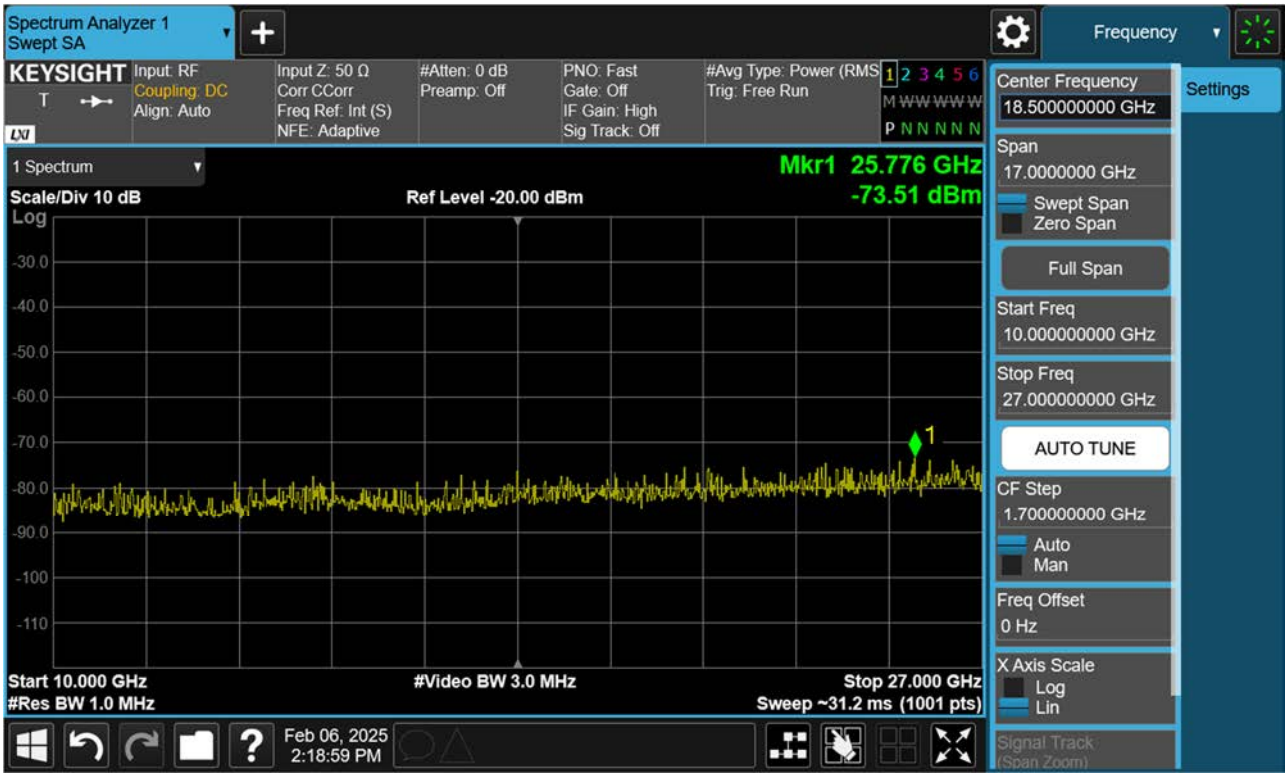


Frequency Range : 10 GHz ~ 20 GHz

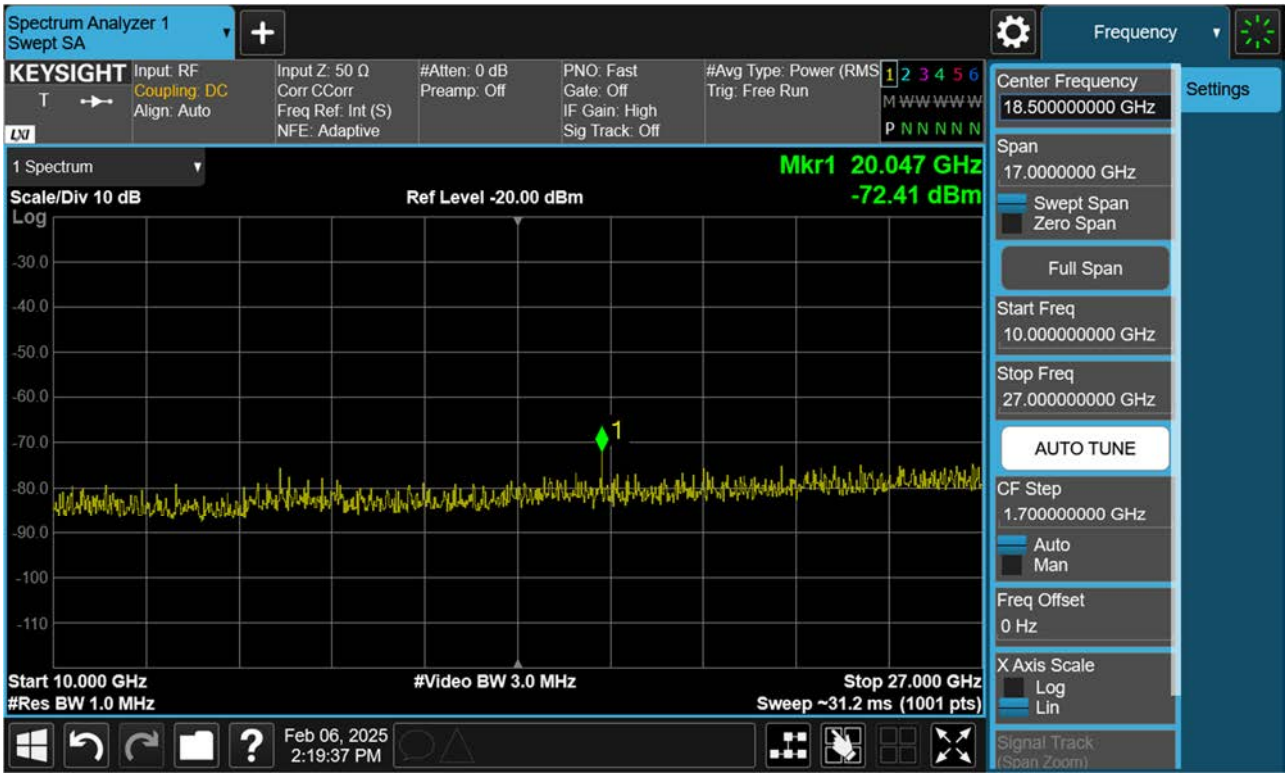
PCC 5 M 132000 RB 1,0 SCC 10 M 132072 RB 1,49



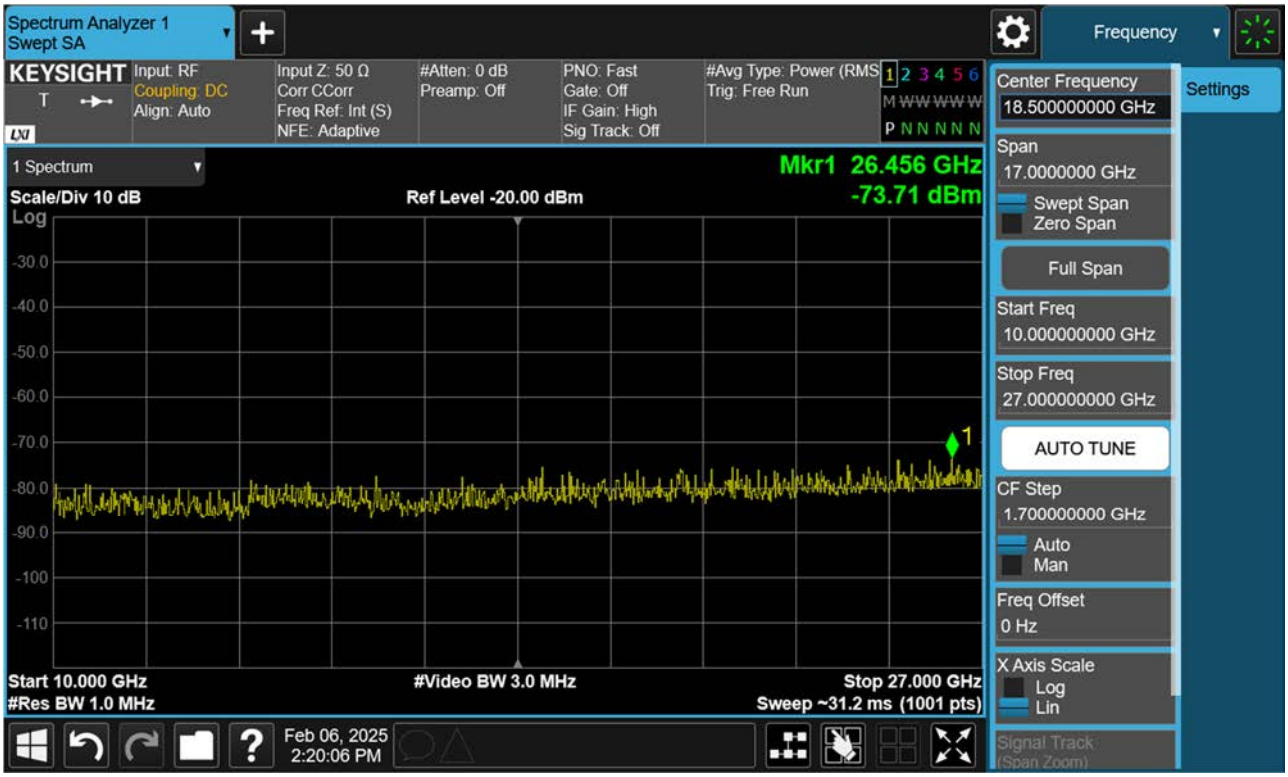
PCC 5 M 132000 RB 1,24 SCC 10 M 132072 RB 1,0



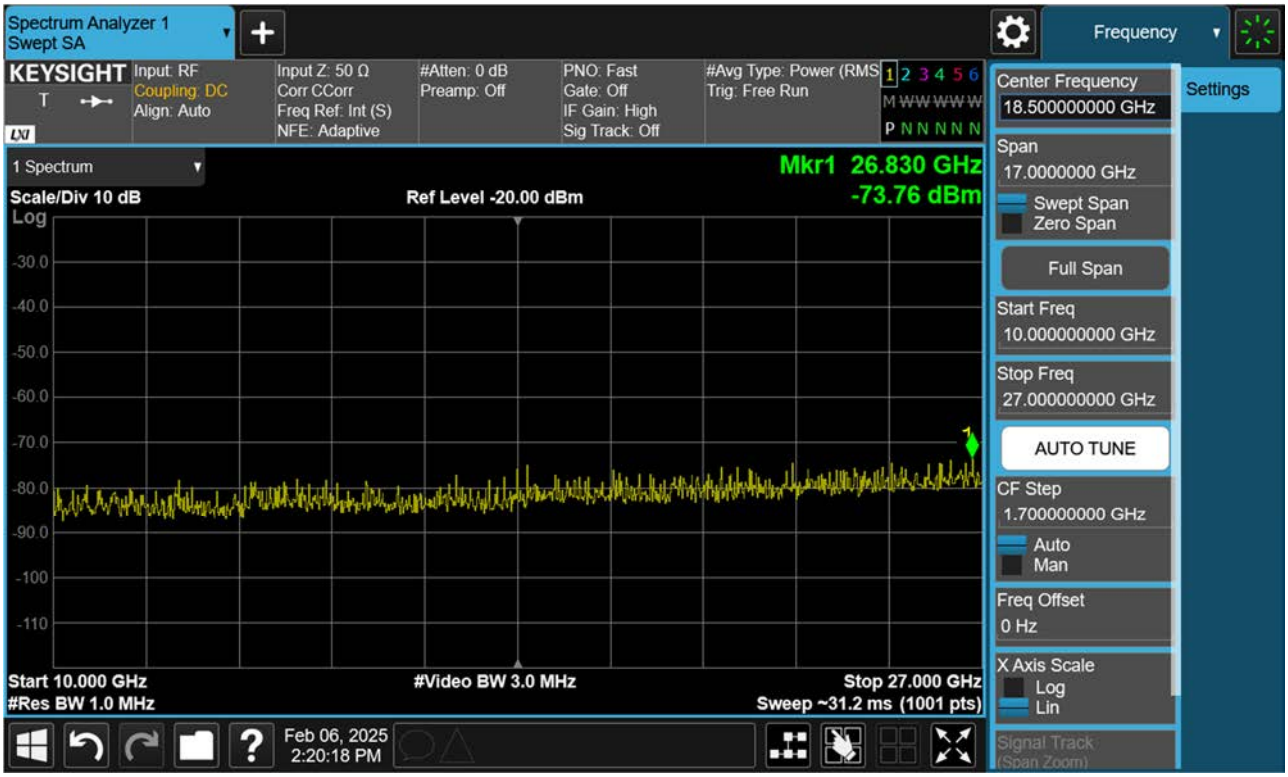
PCC 5 M 132000 RB 25,0 SCC 10 M 132072 RB 50,0



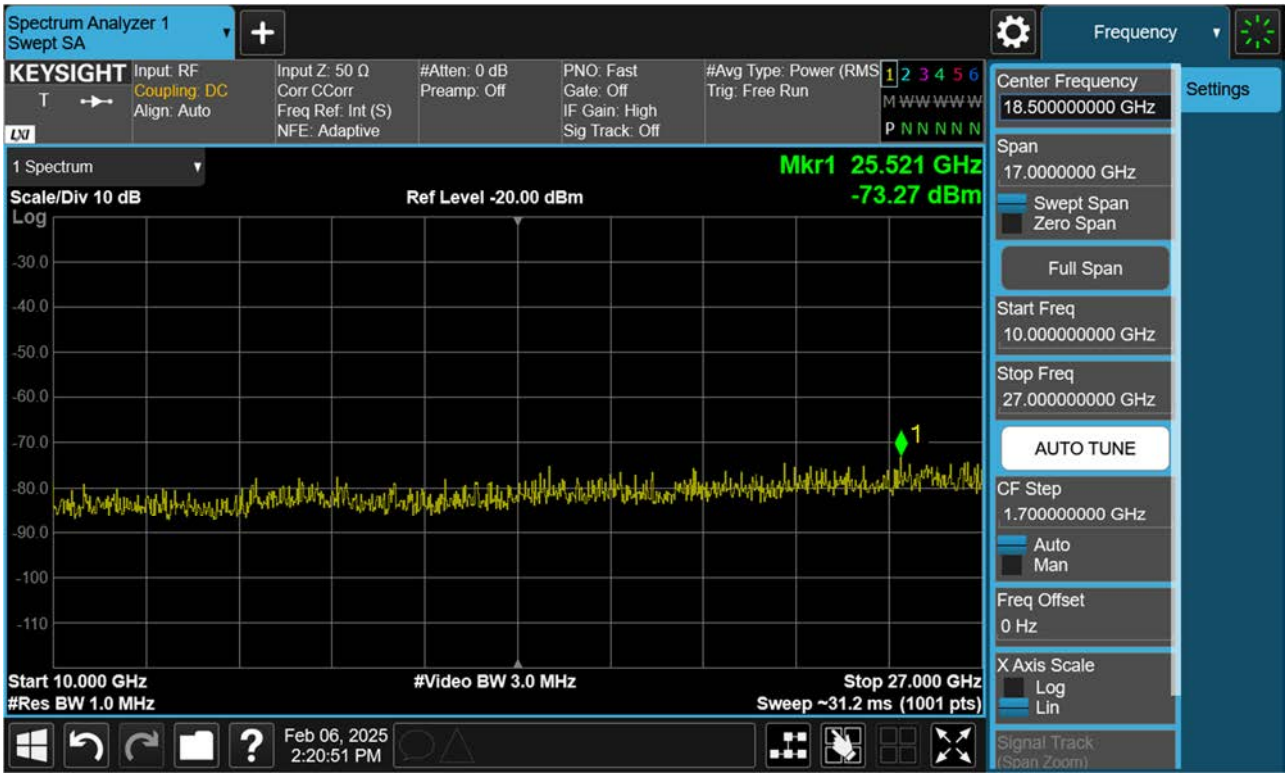
PCC 5 M 132353 RB 1,0 SCC 15 M 132446 RB 1,74



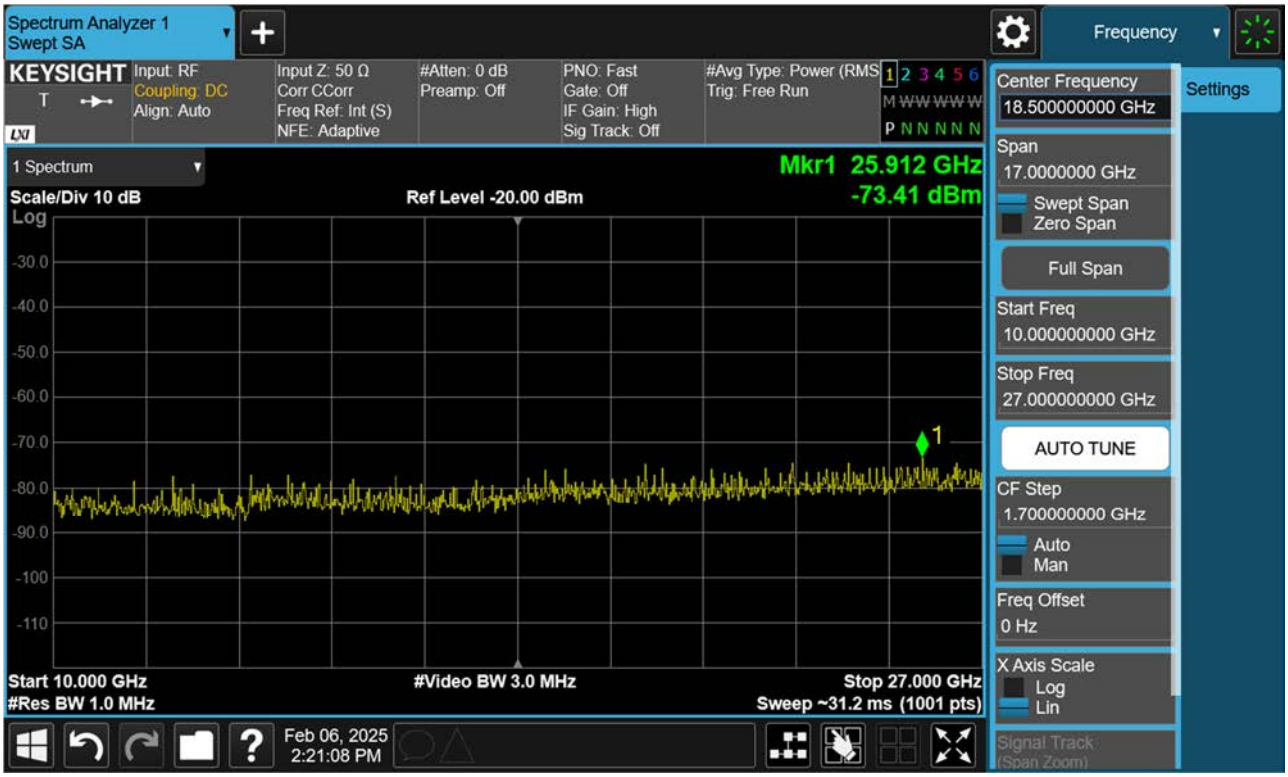
PCC 5 M 132353 RB 1,24 SCC 15 M 132446 RB 1,0



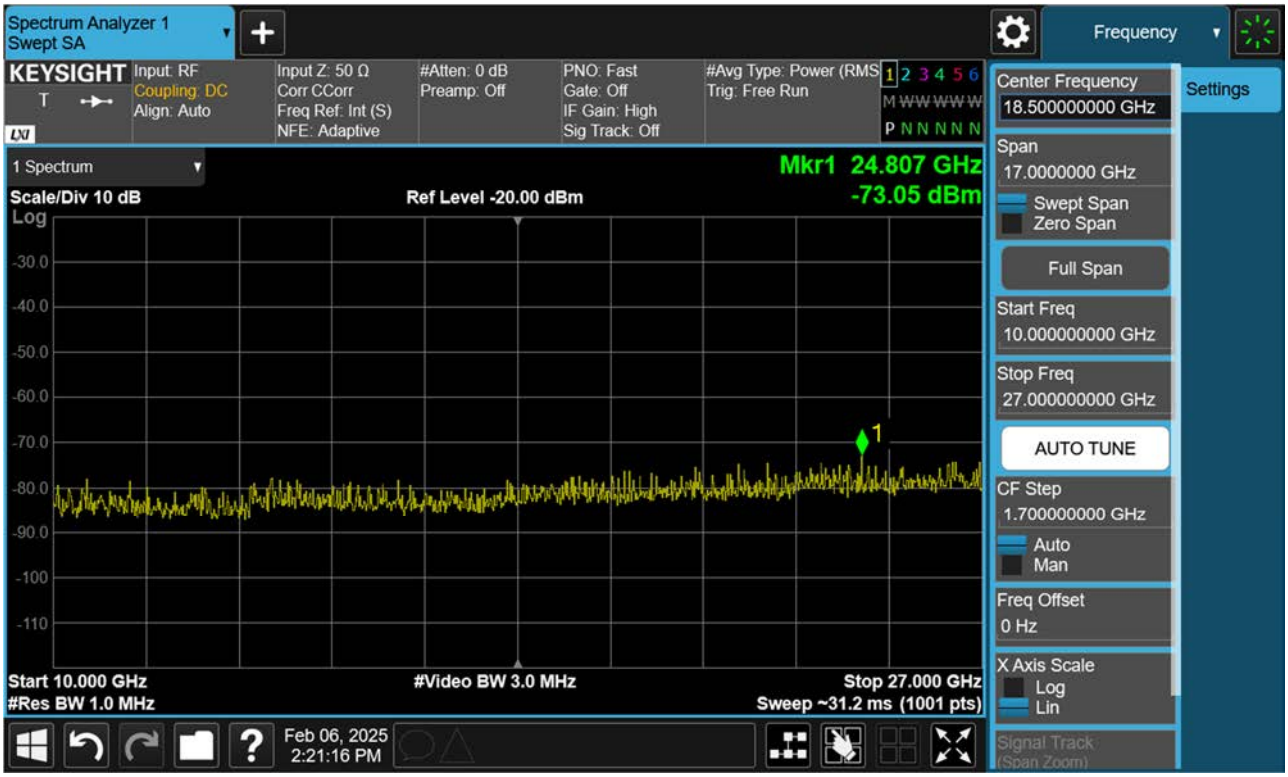
PCC 5 M 132375 RB 25,0 SCC 10 M 132447 RB 50,0



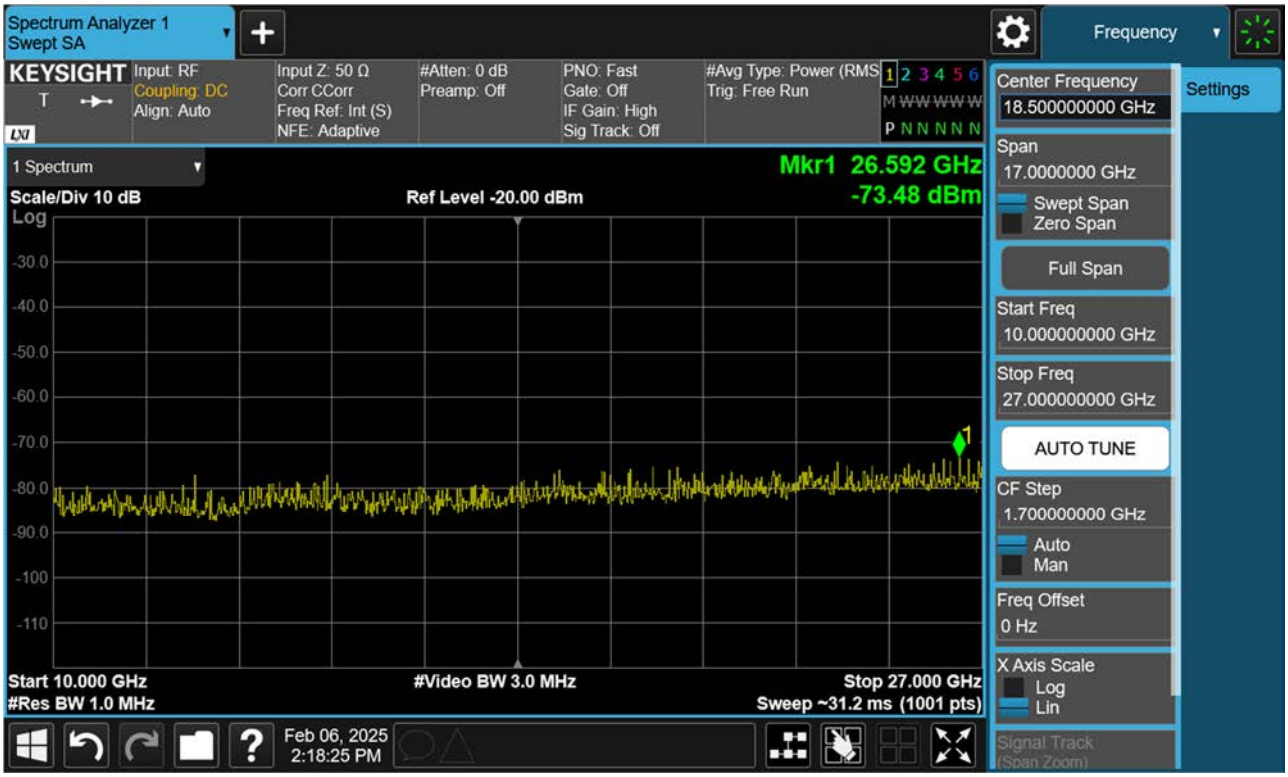
PCC 10 M 132022 RB 50,0 SCC 10 M 132121 RB 50,0



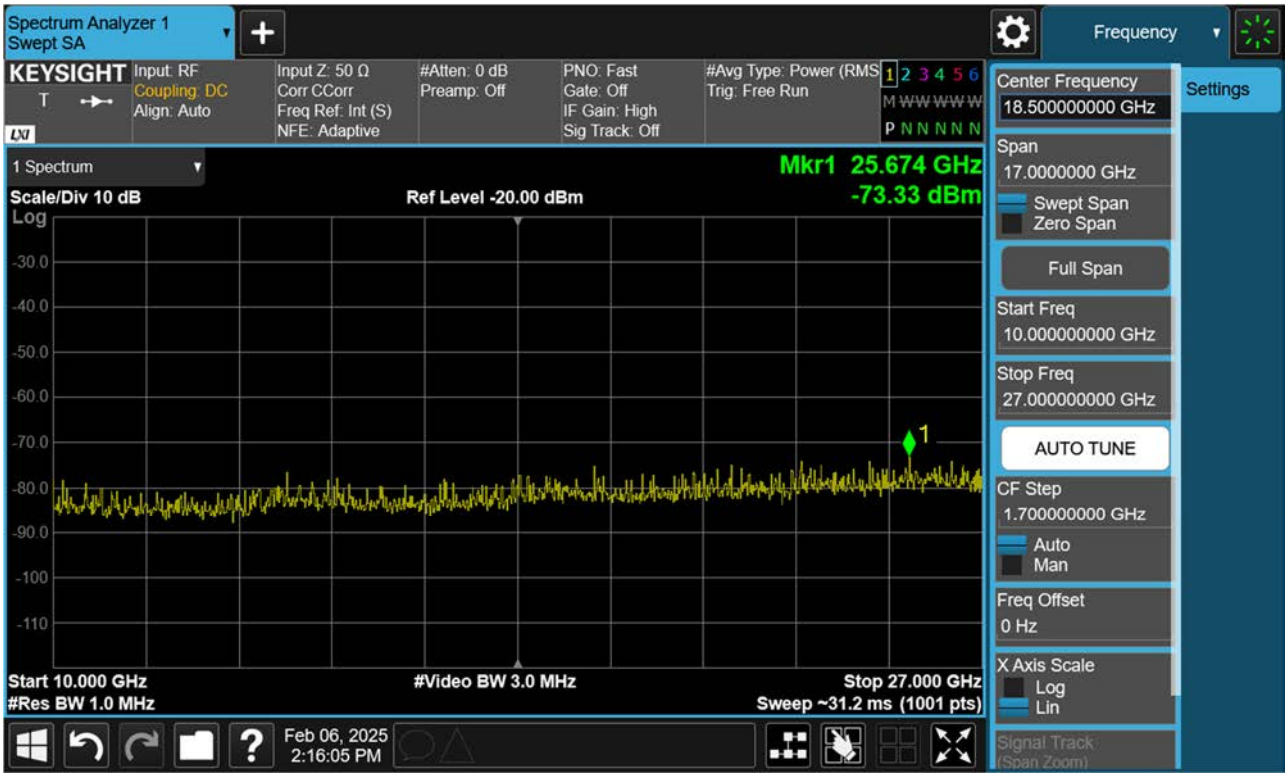
PCC 10 M 132373 RB 50,0 SCC 10 M 132472 RB 50,0



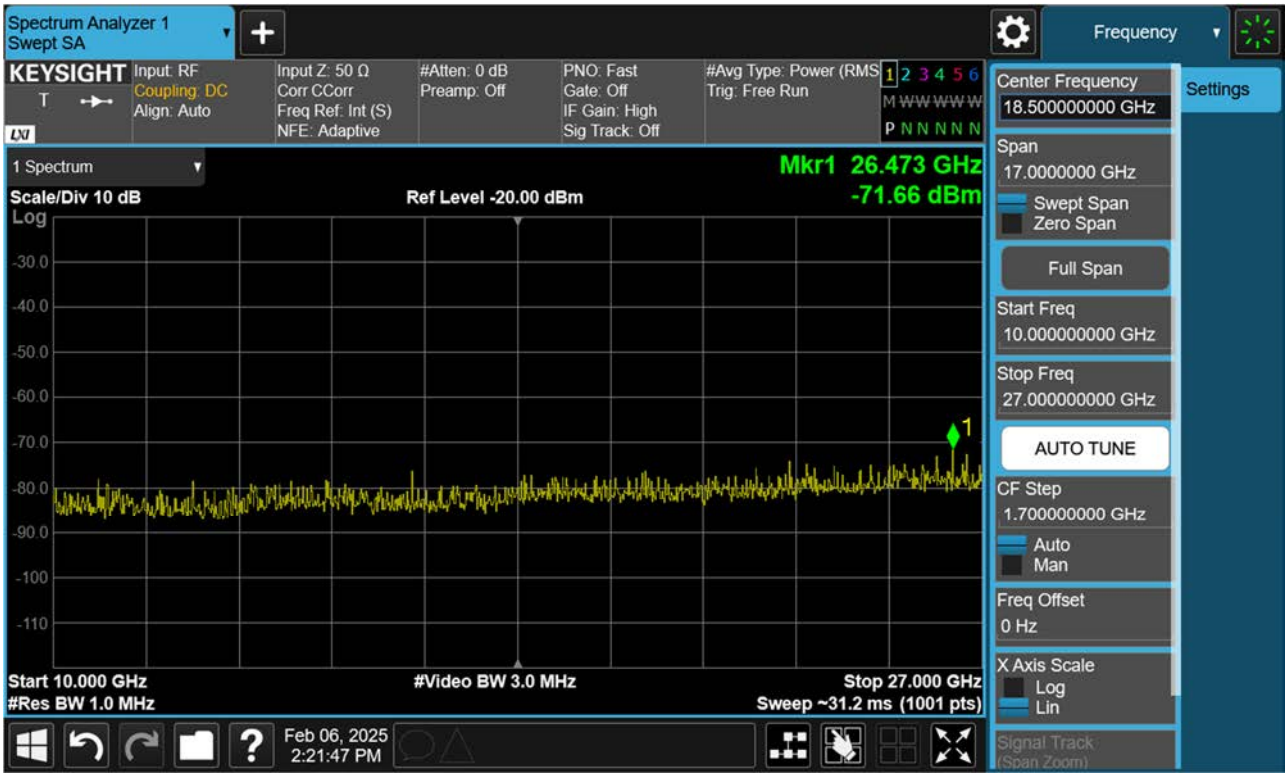
PCC 10 M 132523 RB 1,0 SCC 10 M 132622 RB 1,49



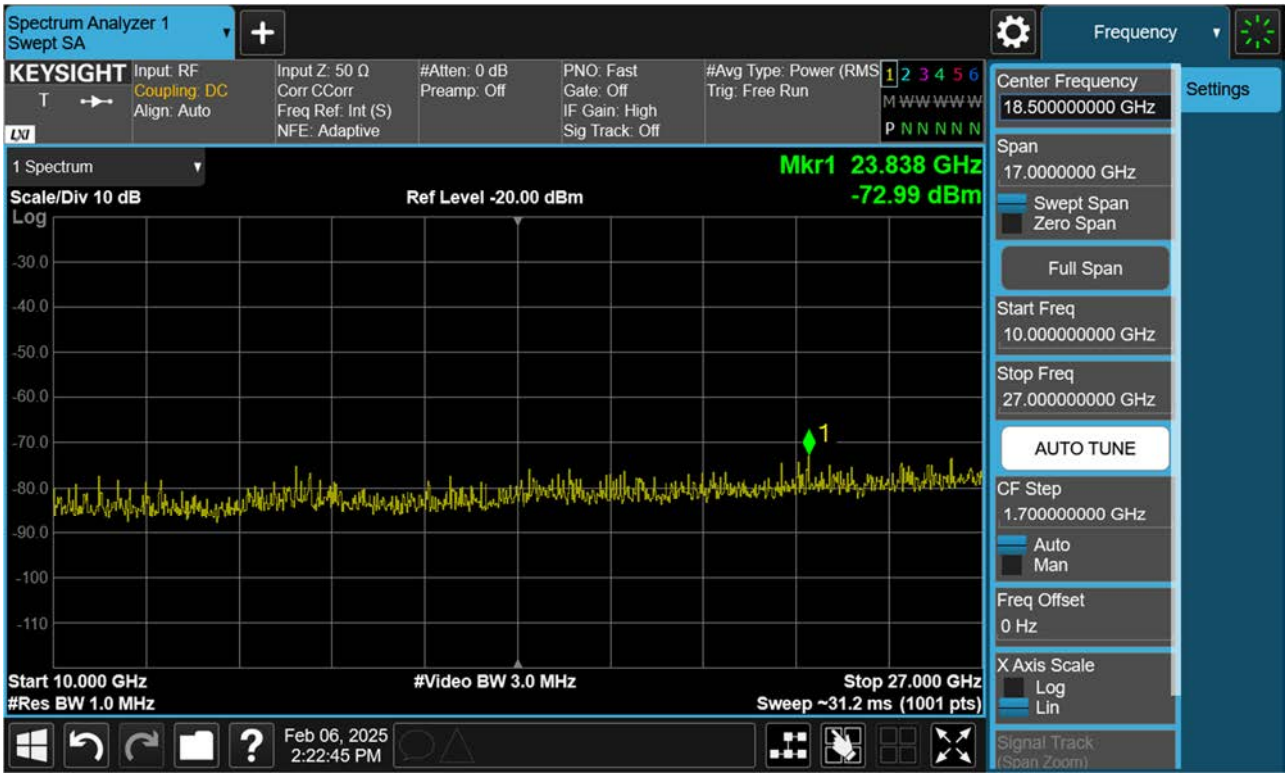
PCC 10 M 132523 RB 1,49 SCC 10 M 132622 RB 1,0



PCC 10 M 132523 RB 50,0 SCC 10 M 132622 RB 50,0



PCC 15 M 132549 RB 75,0 SCC 5 M 132642 RB 25,0



8.4 Channel Edge

Highest Channel_PCC 10 MHz Ch132523 RB1 Offset0 SCC 10 MHz Ch132622 RB1 Offset49(1)

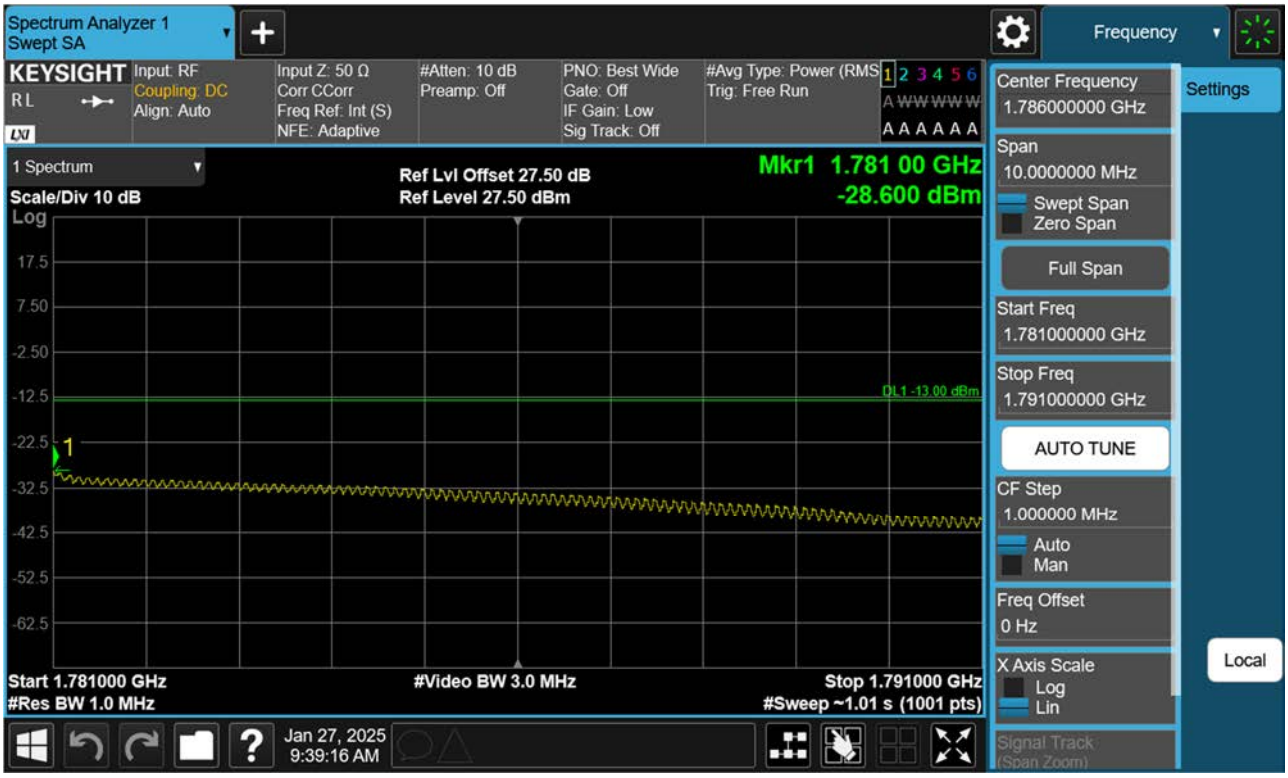
Highest Channel_PCC 10 MHz Ch132523 RB1 Offset0 SCC 10 MHz Ch132622 RB1 Offset49(2)

Highest Channel_PCC 10 MHz Ch132523 RB1 Offset49 SCC 10 MHz Ch132622 RB1 Offset0(1)

Highest Channel_PCC 10 MHz Ch132523 RB1 Offset49 SCC 10 MHz Ch132622 RB1 Offset0(2)

Highest Channel_PCC 10 MHz Ch132523 RB50 Offset0 SCC 10 MHz Ch132622 RB50 Offset0(1)

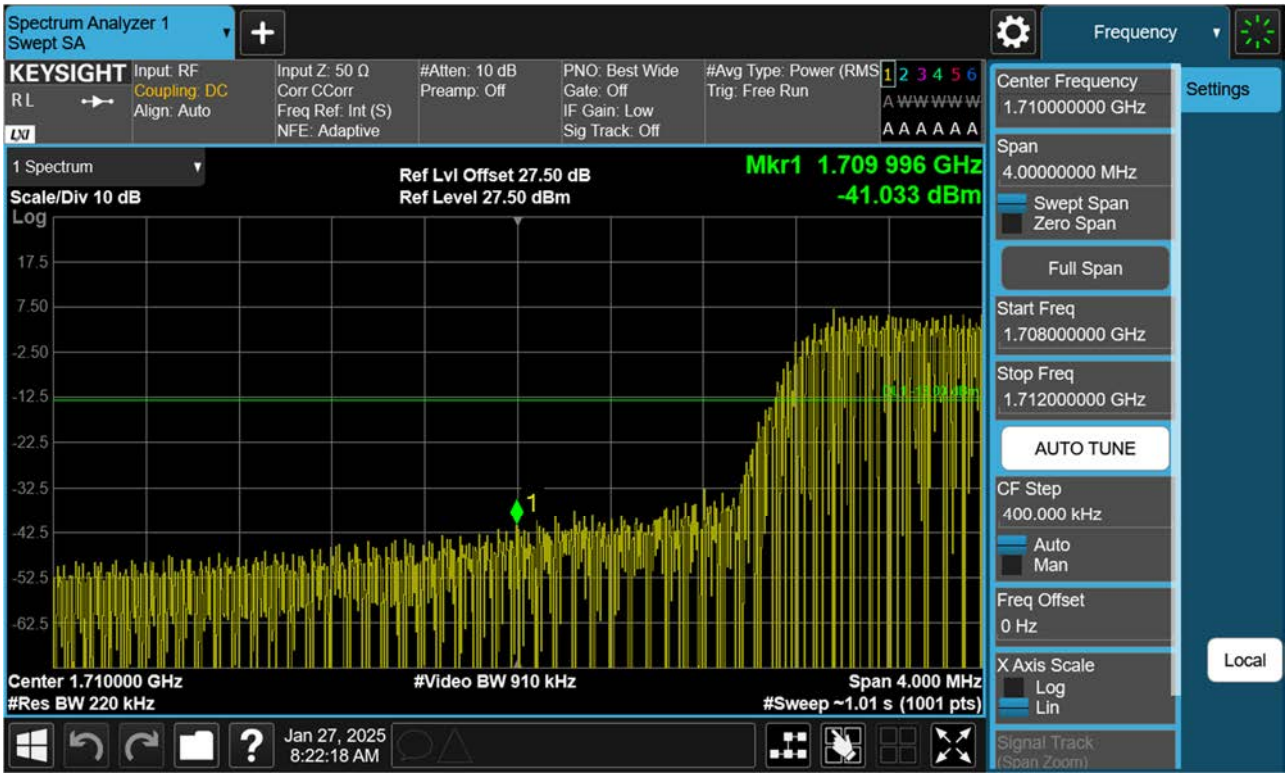
Highest Channel_PCC 10 MHz Ch132523 RB50 Offset0 SCC 10 MHz Ch132622 RB50 Offset0(2)



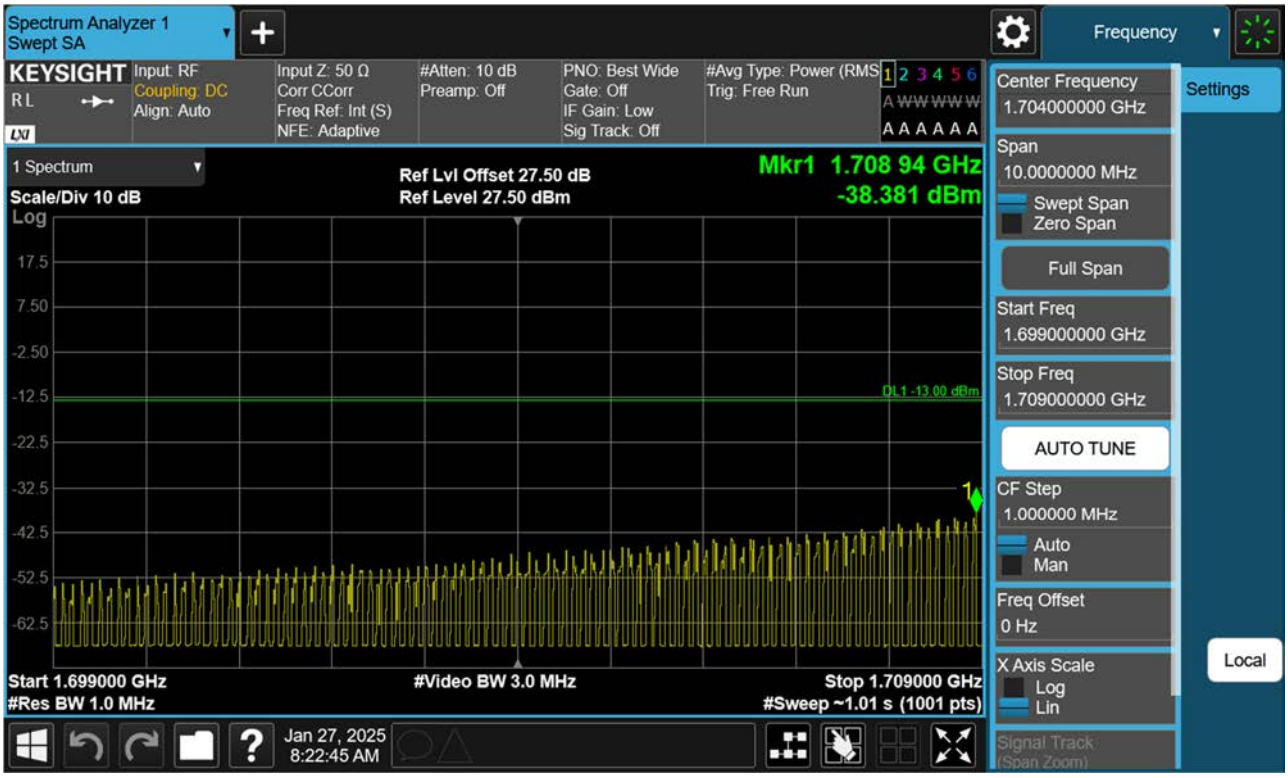
Highest Channel_PCC 15 MHz Ch132549 RB75 Offset0 SCC 5 MHz Ch132642 RB25 Offset0(1)

Highest Channel_PCC 15 MHz Ch132549 RB75 Offset0 SCC 5 MHz Ch132642 RB25 Offset0(2)

Lowest Channel_PCC 5 MHz Ch132000 RB1 Offset0 SCC 10 MHz Ch132072 RB1 Offset49(1)

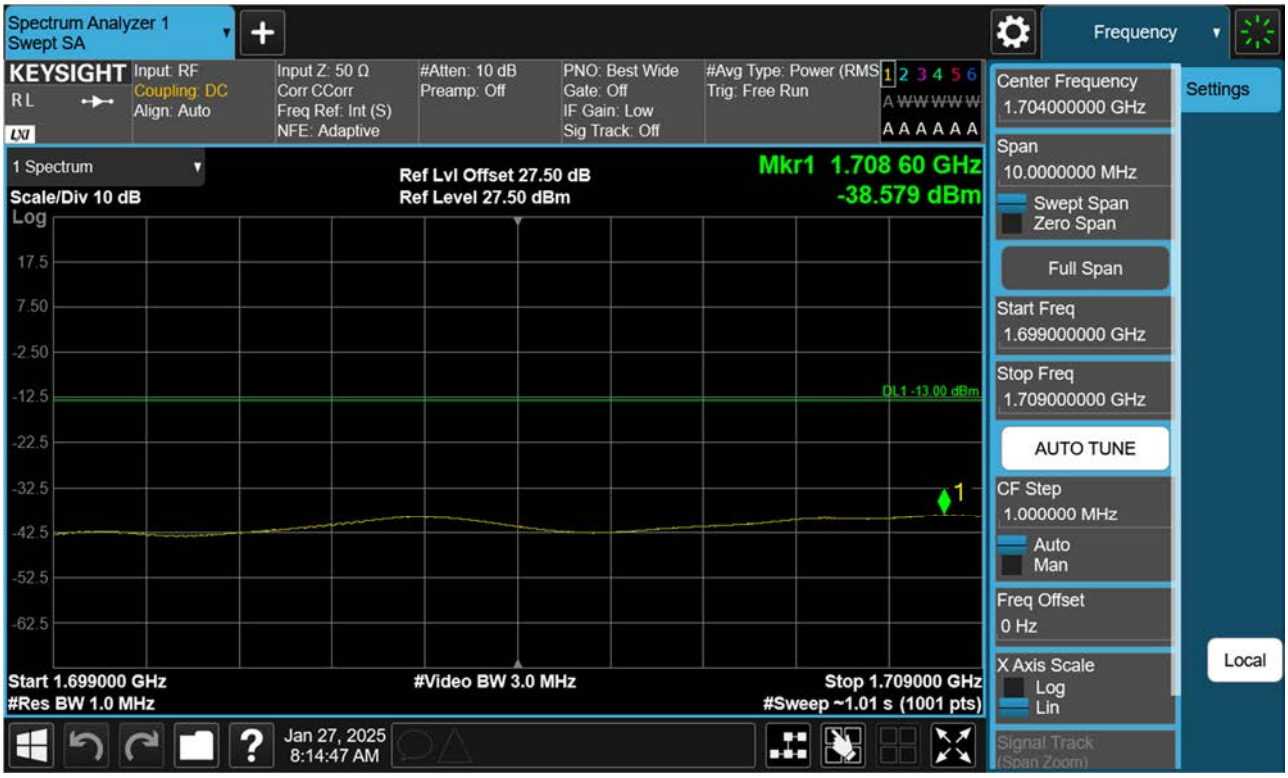


Lowest Channel_PCC 5 MHz Ch132000 RB1 Offset0 SCC 10 MHz Ch132072 RB1 Offset49(2)



Lowest Channel_PCC 5 MHz Ch132000 RB1 Offset24 SCC 10 MHz Ch132072 RB1 Offset0(1)

Lowest Channel_PCC 5 MHz Ch132000 RB1 Offset24 SCC 10 MHz Ch132072 RB1 Offset0(2)



Lowest Channel_PCC 5 MHz Ch132000 RB25 Offset0 SCC 10 MHz Ch132072 RB50 Offset0(1)

Lowest Channel_PCC 5 MHz Ch132000 RB25 Offset0 SCC 10 MHz Ch132072 RB50 Offset0(2)

Lowest Channel_PCC 10 MHz Ch132022 RB50 Offset0 SCC 10 MHz Ch132121 RB50 Offset0(1)

Lowest Channel_PCC 10 MHz Ch132022 RB50 Offset0 SCC 10 MHz Ch132121 RB50 Offset0(2)

8.5 Frequency Stability / Variation Of Ambient Temperature

▣ PCC Channel:	131997	
▣ PCC Frequency:	1712.5	MHz
▣ PCC BandWidth:	5	MHz
▣ SCC Channel:	132045	
▣ SCC Frequency:	1717.3	MHz
▣ SCC BandWidth:	5	MHz
▣ Voltage :	3.860	VDC
▣ LIMIT:	Emission must remain in band	

Voltage (%)	Power (VDC)	Temp. (°C)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	3.860	+20(Ref)	-0.0081	-0.0093	1712.50814	1717.30926
100 %		-30	0.0014	-0.0040	1712.49865	1717.30399
100 %		-20	-0.0005	-0.0106	1712.50051	1717.31065
100 %		-10	-0.0053	-0.0087	1712.50526	1717.30865
100 %		0	-0.0096	-0.0032	1712.50962	1717.30320
100 %		10	-0.0063	-0.0105	1712.50634	1717.31047
100 %		30	-0.0029	-0.0030	1712.50287	1717.30302
100 %		40	-0.0093	-0.0045	1712.50926	1717.30448
100 %		50	-0.0073	-0.0077	1712.50734	1717.30769
Batt. Endpoint	3.400	20	-0.0071	-0.0108	1712.50708	1717.31083

▣ PCC Channel: 132022
▣ PCC Frequency: 1715.0 MHz
▣ PCC BandWidth: 10 MHz
▣ SCC Channel: 132094
▣ SCC Frequency: 1722.2 MHz
▣ SCC BandWidth: 5 MHz
▣ Voltage : 3.860 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	3.860	+20(Ref)	0.0013	-0.0025	1714.99874	1722.20246
100 %		-30	0.0014	-0.0080	1714.99865	1722.20799
100 %		-20	-0.0083	-0.0016	1715.00831	1722.20165
100 %		-10	-0.0055	-0.0066	1715.00546	1722.20655
100 %		0	-0.0086	-0.0075	1715.00862	1722.20750
100 %		10	-0.0040	-0.0108	1715.00404	1722.21077
100 %		30	-0.0085	-0.0011	1715.00847	1722.20112
100 %		40	-0.0028	-0.0045	1715.00276	1722.20448
100 %		50	-0.0063	0.0005	1715.00634	1722.19949
Batt. Endpoint	3.400	20	-0.0083	-0.0073	1715.00828	1722.20733

▣ PCC Channel: 132047
▣ PCC Frequency: 1717.5 MHz
▣ PCC BandWidth: 15 MHz
▣ SCC Channel: 132140
▣ SCC Frequency: 1726.8 MHz
▣ SCC BandWidth: 5 MHz
▣ Voltage : 3.860 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	3.860	+20(Ref)	-0.0045	-0.0063	1717.50454	1726.80626
100 %		-30	0.0023	-0.0085	1717.49775	1726.80849
100 %		-20	-0.0071	-0.0063	1717.50711	1726.80635
100 %		-10	-0.0063	-0.0068	1717.50626	1726.80675
100 %		0	-0.0100	-0.0031	1717.51002	1726.80310
100 %		10	-0.0112	-0.0052	1717.51124	1726.80517
100 %		30	-0.0070	-0.0014	1717.50697	1726.80142
100 %		40	-0.0082	-0.0016	1717.50816	1726.80158
100 %		50	-0.0033	-0.0017	1717.50334	1726.80169
Batt. Endpoint	3.400	20	-0.0026	-0.0031	1717.50258	1726.80313

▣ PCC Channel: 132599
▣ PCC Frequency: 1772.7 MHz
▣ PCC BandWidth: 5 MHz
▣ SCC Channel: 132647
▣ SCC Frequency: 1777.5 MHz
▣ SCC BandWidth: 5 MHz
▣ Voltage : 3.860 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	3.860	+20(Ref)	-0.0020	-0.0076	1772.70204	1777.50756
100 %		-30	-0.0010	-0.0063	1772.70105	1777.50629
100 %		-20	-0.0090	-0.0021	1772.70901	1777.50215
100 %		-10	-0.0082	-0.0037	1772.70816	1777.50365
100 %		0	-0.0088	-0.0006	1772.70882	1777.50060
100 %		10	-0.0089	-0.0113	1772.70894	1777.51127
100 %		30	-0.0085	-0.0041	1772.70847	1777.50412
100 %		40	-0.0026	-0.0018	1772.70256	1777.50178
100 %		50	-0.0096	-0.0092	1772.70964	1777.50919
Batt. Endpoint	3.400	20	-0.0024	-0.0046	1772.70238	1777.50463

▣ PCC Channel: 132572
▣ PCC Frequency: 1770.0 MHz
▣ PCC BandWidth: 10 MHz
▣ SCC Channel: 132644
▣ SCC Frequency: 1777.2 MHz
▣ SCC BandWidth: 5 MHz
▣ Voltage : 3.860 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	3.860	+20(Ref)	-0.0071	-0.0007	1770.00714	1777.20066
100 %		-30	0.0012	-0.0062	1769.99885	1777.20619
100 %		-20	-0.0059	-0.0104	1770.00591	1777.21045
100 %		-10	-0.0041	-0.0070	1770.00406	1777.20695
100 %		0	-0.0018	-0.0063	1770.00182	1777.20630
100 %		10	-0.0046	-0.0080	1770.00464	1777.20797
100 %		30	-0.0084	-0.0046	1770.00837	1777.20462
100 %		40	-0.0048	-0.0013	1770.00476	1777.20128
100 %		50	-0.0087	-0.0037	1770.00874	1777.20369
Batt. Endpoint	3.400	20	-0.0020	-0.0064	1770.00198	1777.20643

▣ PCC Channel: 132549
▣ PCC Frequency: 1767.7 MHz
▣ PCC BandWidth: 15 MHz
▣ SCC Channel: 132642
▣ SCC Frequency: 1777.0 MHz
▣ SCC BandWidth: 5 MHz
▣ Voltage : 3.860 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	3.860	+20(Ref)	-0.0002	-0.0086	1767.70024	1777.00856
100 %		-30	-0.0044	-0.0102	1767.70445	1777.01019
100 %		-20	-0.0073	-0.0074	1767.70731	1777.00745
100 %		-10	-0.0023	-0.0097	1767.70226	1777.00965
100 %		0	-0.0034	0.0006	1767.70342	1776.99940
100 %		10	-0.0018	-0.0102	1767.70184	1777.01017
100 %		30	-0.0094	-0.0036	1767.70937	1777.00362
100 %		40	-0.0013	-0.0047	1767.70126	1777.00468
100 %		50	-0.0051	-0.0035	1767.70514	1777.00349
Batt. Endpoint	3.400	20	-0.0052	-0.0021	1767.70518	1777.00213

8.6 Radiated Spurious Emissions

▣ PCC Channel : 132047 (1715.5 MHz)

▣ PCC BW(MHz) : 15

▣ PCC RB/ RB Offset : 1/74

▣ SCC Channel : 132140 (1726.8 MHz)

▣ SCC BW(MHz) : 5

▣ 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)
3 444.30	-43.54	12.39	-62.08	3.05	H	-52.74
5 166.45	-44.09	12.44	-56.85	3.77	H	-48.18
6 888.60	-44.25	11.80	-51.36	4.42	H	-43.98

▣ PCC Channel : 132375 (1750.3 MHz)

▣ PCC BW(MHz) : 5

▣ PCC RB/ RB Offset : 1/ 24

▣ SCC Channel : 132447 (1757.5 MHz)

▣ SCC BW(MHz) : 10

▣ 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)
3 507.80	-42.14	12.34	-60.09	3.05	H	-50.80
5 261.70	-44.58	12.99	-56.95	3.79	H	-47.75
7 015.60	-43.41	11.24	-48.86	4.42	H	-42.04

▣ PCC Channel : 132504 (1763.2 MHz)

▣ PCC BW(MHz) : 5

▣ PCC RB/ RB Offset : 1/ 24

▣ SCC Channel : 132597 (1772.5 MHz)

▣ SCC BW(MHz) : 15

▣ 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)
3 535.70	-43.62	12.34	-61.37	3.06	H	-52.08
5 303.55	-43.43	13.07	-56.42	3.83	H	-47.18
7 071.40	-43.95	10.97	-48.95	4.50	H	-42.48

8.7 Occupied Bandwidth

PCC					SCC					Data (MHz)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
5	132398	1752.6	QPSK	25/0	5	132446	1757.4	QPSK	25/0	9.2793
5	132375	1750.3	QPSK	25/0	10	132447	1757.5	QPSK	50/0	13.927
10	132397	1752.5	QPSK	50/0	5	132469	1759.7	QPSK	25/0	13.951
5	132353	1748.1	QPSK	25/0	15	132446	1757.4	QPSK	75/0	18.310
15	132398	1752.6	QPSK	75/0	5	132491	1761.9	QPSK	25/0	18.368
10	132373	1750.1	QPSK	50/0	10	132472	1760.0	QPSK	50/0	18.843

PCC					SCC					Data (MHz)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
5	132398	1752.6	16QAM	25/0	5	132446	1757.4	16QAM	25/0	9.2585
5	132375	1750.3	16QAM	25/0	10	132447	1757.5	16QAM	50/0	13.877
10	132397	1752.5	16QAM	50/0	5	132469	1759.7	16QAM	25/0	13.937
5	132353	1748.1	16QAM	25/0	15	132446	1757.4	16QAM	75/0	18.261
15	132398	1752.6	16QAM	75/0	5	132491	1761.9	16QAM	25/0	18.264
10	132373	1750.1	16QAM	50/0	10	132472	1760.0	16QAM	50/0	18.805

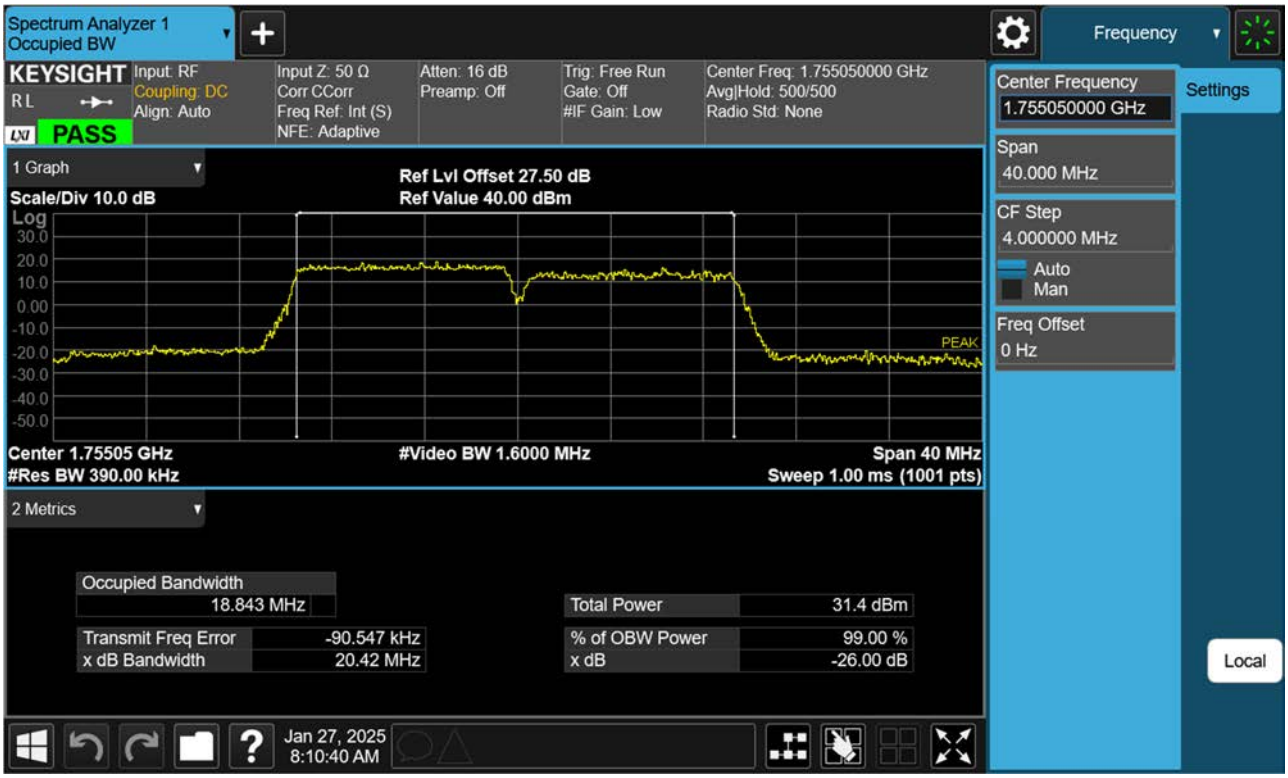
PCC					SCC					Data (MHz)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
5	132398	1752.6	64QAM	25/0	5	132446	1757.4	64QAM	25/0	9.2788
5	132375	1750.3	64QAM	25/0	10	132447	1757.5	64QAM	50/0	13.930
10	132397	1752.5	64QAM	50/0	5	132469	1759.7	64QAM	25/0	13.911
5	132353	1748.1	64QAM	25/0	15	132446	1757.4	64QAM	75/0	18.175
15	132398	1752.6	64QAM	75/0	5	132491	1761.9	64QAM	25/0	18.295
10	132373	1750.1	64QAM	50/0	10	132472	1760.0	64QAM	50/0	18.846

PCC					SCC					Data (MHz)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
5	132398	1752.6	256QAM	25/0	5	132446	1757.4	256QAM	25/0	9.3007
5	132375	1750.3	256QAM	25/0	10	132447	1757.5	256QAM	50/0	13.910
10	132397	1752.5	256QAM	50/0	5	132469	1759.7	256QAM	25/0	13.912
5	132353	1748.1	256QAM	25/0	15	132446	1757.4	256QAM	75/0	18.223
15	132398	1752.6	256QAM	75/0	5	132491	1761.9	256QAM	25/0	18.305
10	132373	1750.1	256QAM	50/0	10	132472	1760.0	256QAM	50/0	18.742

Note:

In order to simplify the report, attached plots were only widest bandwidth(10+10).

PCC 10 MHz Ch132373 RB50 Offset0, SCC 10 MHz Ch132472 RB50 Offset0_(QPSK)



PCC 10 MHz Ch132373 RB50 Offset0, SCC 10 MHz Ch132472 RB50 Offset0_(16QAM)

PCC 10 MHz Ch132373 RB50 Offset0, SCC 10 MHz Ch132472 RB50 Offset0_(64QAM)

PCC 10 MHz Ch132373 RB50 Offset0, SCC 10 MHz Ch132472 RB50 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	
5	132398	1752.6	QPSK	25/0	5	132446	1757.4	QPSK	25/0	7.00
5	132375	1750.3	QPSK	25/0	10	132447	1757.5	QPSK	50/0	6.29
10	132397	1752.5	QPSK	50/0	5	132469	1759.7	QPSK	25/0	6.37
5	132353	1748.1	QPSK	25/0	15	132446	1757.4	QPSK	75/0	6.30
15	132398	1752.6	QPSK	75/0	5	132491	1761.9	QPSK	25/0	6.34
10	132373	1750.1	QPSK	50/0	10	132472	1760.0	QPSK	50/0	7.08

PCC					SCC					Data (dBm)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
5	132398	1752.6	16QAM	25/0	5	132446	1757.4	16QAM	25/0	7.54
5	132375	1750.3	16QAM	25/0	10	132447	1757.5	16QAM	50/0	6.80
10	132397	1752.5	16QAM	50/0	5	132469	1759.7	16QAM	25/0	6.84
5	132353	1748.1	16QAM	25/0	15	132446	1757.4	16QAM	75/0	6.78
15	132398	1752.6	16QAM	75/0	5	132491	1761.9	16QAM	25/0	6.82
10	132373	1750.1	16QAM	50/0	10	132472	1760.0	16QAM	50/0	7.70

PCC					SCC					Data (dBm)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
5	132398	1752.6	64QAM	25/0	5	132446	1757.4	64QAM	25/0	6.94
5	132375	1750.3	64QAM	25/0	10	132447	1757.5	64QAM	50/0	6.76
10	132397	1752.5	64QAM	50/0	5	132469	1759.7	64QAM	25/0	6.82
5	132353	1748.1	64QAM	25/0	15	132446	1757.4	64QAM	75/0	6.75
15	132398	1752.6	64QAM	75/0	5	132491	1761.9	64QAM	25/0	6.86
10	132373	1750.1	64QAM	50/0	10	132472	1760.0	64QAM	50/0	7.09

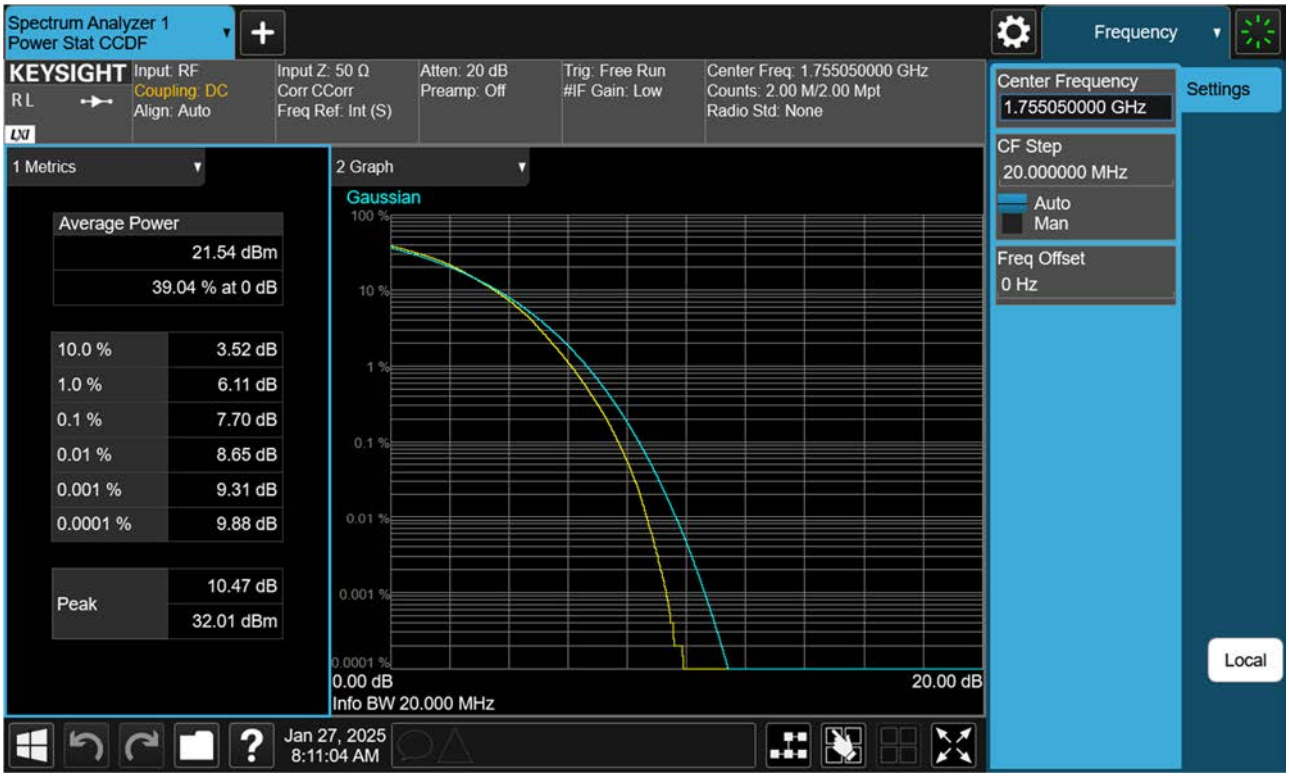
PCC					SCC					Data (dBm)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
5	132398	1752.6	256QAM	25/0	5	132446	1757.4	256QAM	25/0	7.93
5	132375	1750.3	256QAM	25/0	10	132447	1757.5	256QAM	50/0	6.80
10	132397	1752.5	256QAM	50/0	5	132469	1759.7	256QAM	25/0	6.86
5	132353	1748.1	256QAM	25/0	15	132446	1757.4	256QAM	75/0	6.75
15	132398	1752.6	256QAM	75/0	5	132491	1761.9	256QAM	25/0	6.84
10	132373	1750.1	256QAM	50/0	10	132472	1760.0	256QAM	50/0	7.96

Note:

In order to simplify the report, attached plots were only widest bandwidth(10+10).

PCC 10 MHz Ch132373 RB50 Offset0, SCC 10 MHz Ch132472 RB50 Offset0_(QPSK)

PCC 10 MHz Ch132373 RB50 Offset0, SCC 10 MHz Ch132472 RB50 Offset0_(16QAM)



PCC 10 MHz Ch132373 RB50 Offset0, SCC 10 MHz Ch132472 RB50 Offset0_(64QAM)

PCC 10 MHz Ch132373 RB50 Offset0, SCC 10 MHz Ch132472 RB50 Offset0_(256QAM)

9. ANNEX A_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2502-FC026-P