

TEST REPORT

FCC Carrier Aggregation Test for TFGMEIBBCD4
Certification

APPLICANT

LG Electronics Inc.

REPORT NO.

HCT-RF-2310-FC005-R1

DATE OF ISSUE

October 11, 2023

Tested by
Jung Ki Lim



Technical Manager
Jong Seok Lee



HCT CO., LTD.

BongJai Huh

BongJai Huh / CEO

HCT CO., LTD.

74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si,
Gyeonggi-do, 17383 KOREA
Tel. +82 31 634 6300 Fax. +82 31 645 6401



HCT Co., Ltd.

74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
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Additional Model

TFGMEIBBCD5, TFGMEIBBCD6, TFGMEIBBCD7, TFGMEIBBCD8,
TFGMEIBBCD9, TFGMEIBBCDA, TFGMEIBBCDB, TFGMEIBBCDC

Applicant

LG Electronics Inc.

10, MagokJungang-ro, Gangseo-gu, Seoul 07796, Republic of Korea

**Eut Type
Model Name**

GM Onstar Gen12 ROW
TFGMEIBBCD4

FCC ID

BEJTFGMEIBBCD4

FCC Classification:

PCS Licensed Transmitter (PCB)

FCC Rule Part(s):

§ 27, § 2

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

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

REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	October 05, 2023	Initial Release
1	October 11, 2023	Revised the 5, 6 pages. (Rule part & tx frequency)

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)

Test Report Statement:

The above Test Report is not related to the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme) / A2LA(American Association for Laboratory Accreditation), which signed the ILAC-MRA.

If this report is required to confirmation of authenticity, please contact to www.hct.co.kr

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MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name:	LG Electronics Inc.
Address:	10, Magok Jungang-ro, Gangseo-gu, Seoul 07796, Republic of Korea
FCC ID:	BEJTFGMEIBBCD4
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	§ 27, § 2
EUT Type:	GM Onstar Gen12 ROW
Model(s):	TFGMEIBBCD4
Additional Model:	TFGMEIBBCD5, TFGMEIBBCD6, TFGMEIBBCD7, TFGMEIBBCD8, TFGMEIBBCD9, TFGMEIBBCDA, TFGMEIBBCDB, TFGMEIBBCDC
Tx Frequency:	2505.5 - 2560.0 : 10 MHz+20 MHz 2507.5 - 2564.7 : 15 MHz+10 MHz 2507.5 - 2562.5 : 15 MHz+15 MHz 2507.8 - 2560.0 : 15 MHz+20 MHz 2510.0 - 2564.5 : 20 MHz+10 MHz 2510.0 - 2562.2 : 20 MHz+15 MHz 2510.0 - 2560.0 : 20 MHz+20 MHz
Date(s) of Tests:	February 27, 2023 ~ September 25, 2023
Serial number:	Radiated : EBR36018942_#30 Conducted : EBR36018829_#75
External Antenna Information	ANT5 : 86531607 ANT4 : 86575530 DUT4 : 85608774

1.1. MAXIMUM OUTPUT POWER

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	EIRP External Antenna		EIRP Internal Antenna	
				Max. Power (W)	Max. Power (W)	Max. Power (W)	Max. Power (dBm)
10 MHz+20 MHz	2505.5 - 2560.0	27M7G7D	QPSK	25.29	0.338	31.61	1.448
		27M7W7D	16QAM	24.78	0.301	30.98	1.252
		27M6W7D	64QAM	21.91	0.155	28.03	0.635
		27M7W7D	256QAM	21.01	0.126	27.11	0.514
15 MHz+10 MHz	2507.5 - 2564.7	23M1G7D	QPSK	24.41	0.276	31.03	1.268
		23M1W7D	16QAM	22.29	0.169	30.73	1.184
		23M1W7D	64QAM	18.59	0.072	27.68	0.587
		23M2W7D	256QAM	17.54	0.057	26.81	0.480
15 MHz+15 MHz	2507.5 - 2562.5	28M3G7D	QPSK	25.38	0.345	31.82	1.522
		28M3W7D	16QAM	24.69	0.294	31.37	1.372
		28M3W7D	64QAM	21.86	0.153	28.21	0.663
		28M4W7D	256QAM	21.12	0.129	27.49	0.562
15 MHz+20 MHz	2507.8 - 2560.0	32M6G7D	QPSK	25.35	0.343	31.88	1.543
		32M5W7D	16QAM	25.07	0.321	31.40	1.382
		32M6W7D	64QAM	21.92	0.156	28.23	0.666
		32M6W7D	256QAM	21.17	0.131	27.58	0.573
20 MHz+10 MHz	2510.0 - 2564.5	27M9G7D	QPSK	24.92	0.310	31.55	1.430
		27M8W7D	16QAM	24.45	0.279	31.28	1.343
		27M7W7D	64QAM	21.46	0.140	28.27	0.672
		27M7W7D	256QAM	20.44	0.111	27.45	0.556
20 MHz+15 MHz	2510.0 - 2562.2	32M5G7D	QPSK	24.05	0.254	31.14	1.301
		32M6W7D	16QAM	23.63	0.231	30.63	1.157
		32M7W7D	64QAM	20.47	0.111	27.33	0.541
		32M7W7D	256QAM	19.32	0.086	26.43	0.440
20 MHz+20 MHz	2510.0 - 2560.0	37M6G7D	QPSK	24.59	0.288	31.38	1.374
		37M5W7D	16QAM	24.08	0.256	30.88	1.226
		37M6W7D	64QAM	21.18	0.131	27.83	0.607
		37M5W7D	256QAM	20.29	0.107	27.07	0.510



2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a GM Onstar Gen12 ROW with GSM/GPRS/EGPRS/UMTS and LTE, Sub6.

2.2. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

2.3. TEST FACILITY

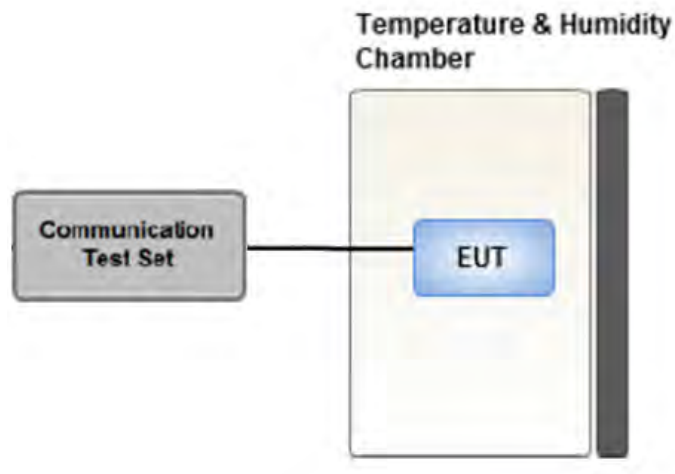
The Fully-anechoic chamber and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA.

3. DESCRIPTION OF TESTS

3.1 TEST PROCEDURE

Test Description	Test Procedure Used
Occupied Bandwidth	- KDB 971168 D01 v03r01 – Section 4.3 - ANSI C63.26-2015 – Section 5.4.4
Band Edge	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Spurious and Harmonic Emissions at Antenna Terminal	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Conducted Output Power	- KDB 971168 D01 v03r01 - Section 5.2.4 - ANSI C63.26-2015 - Section 5.2.1 & 5.2.4.2
Peak- to- Average Ratio	- KDB 971168 D01 v03r01 – Section 5.7 - ANSI C63.26-2015 – Section 5.2.3.4
Frequency stability	- ANSI C63.26-2015 – Section 5.6
Effective Radiated Power/ Effective Isotropic Radiated Power	- KDB 971168 D01 v03r01 – Section 5.2 & 5.8 - ANSI/TIA-603-E-2016 – Section 2.2.17
Radiated Spurious and Harmonic Emissions	- KDB 971168 D01 v03r01 – Section 6.2 - ANSI/TIA-603-E-2016 – Section 2.2.12

3.2 CONDUCTED OUTPUT POWER



Test setup

Test Overview

When an average power meter is used to perform RF output power measurements, the fundamental condition that measurements be performed only over durations of active transmissions at maximum output power level applies.

Conducted Output Power was tested in accordance with KDB971168 D01 Power Meas License Digital Systems v03r01, Section 5.2.

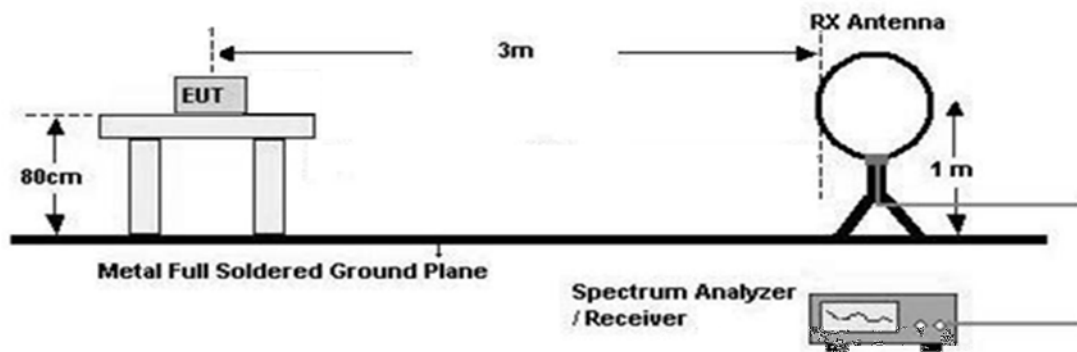
3.3 RADIATED TEST

Test Overview

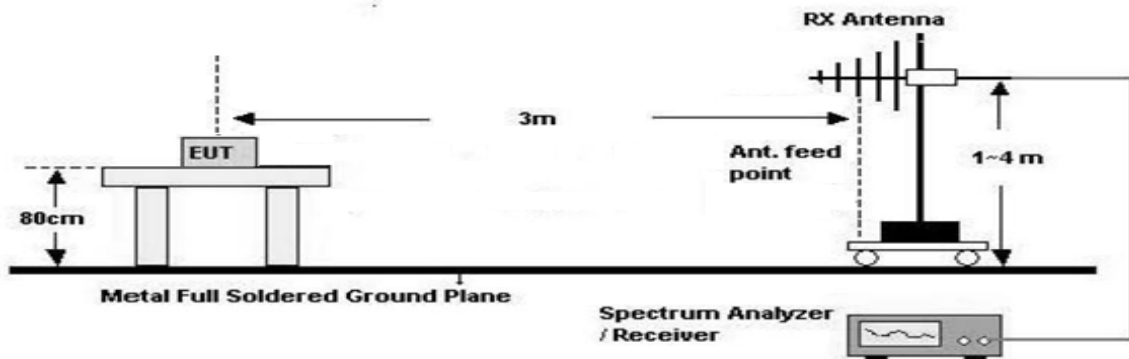
Radiated tests are performed in the semi-anechoic chamber. The equipment under test is placed on a non-conductive table on semi-anechoic chamber.

Test Configuration

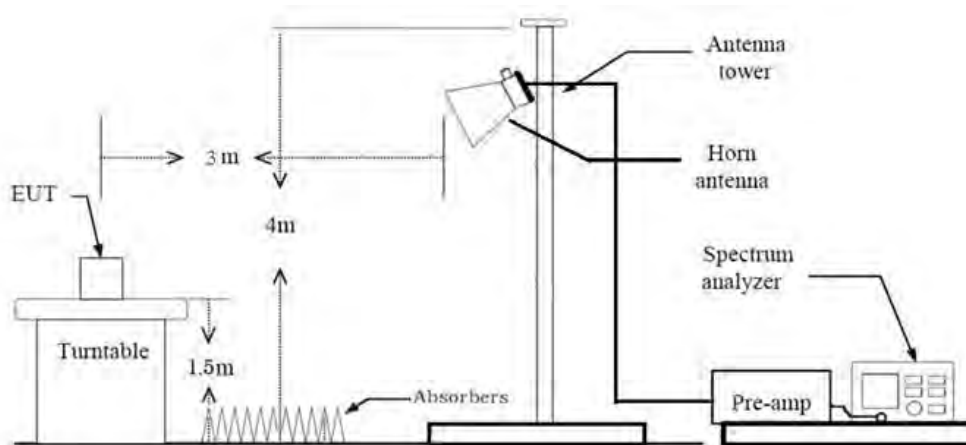
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



3.3.1 RADIATED POWER

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 $\geq 3 \times$ RBW
4. Span = 1.5 times the OBW
5. No. of sweep points $> 2 \times$ 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 EUT is placed on a turntable, which is 0.8 m above ground plane. (Below 1 GHz)
2. The EUT is placed on a turntable, which is 1.5 m above ground plane. (Above 1 GHz)
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
6. 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.
7. $\text{Total(dB}\mu\text{V/m)} = \text{Measured Value(dB}\mu\text{V)} + \text{Cable Loss(dB)} + \text{Antenna Factor(dB/m)} + \text{Distance Factor(D.F)}$
8. EIRP (dBm)
 - = Total (dB μ V/m) + 20 log D – 104.8 (where D is the measurement distance in meters. D=3)
 - = Total (dB μ V/m) - 95.2(dB)
9. ERP(dBm) = EIRP(dBm) - 2.15(dB)

3.3.2 RADIATED SPURIOUS EMISSIONS

Test Settings

1. RBW = 100 kHz for emissions below 1 GHz and 1 MHz for emissions above 1 GHz
2. VBW $\geq 3 \times$ RBW
3. Span = 1.5 times the OBW
4. No. of sweep points $> 2 \times$ 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 10th harmonics from 9 kHz.

Test Note

1. 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
2. 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.

Below 30 MHz

1. The loop antenna was placed at a location 3 m from the EUT
2. The EUT is placed on a turntable, which is 0.8 m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. Distance Correction Factor(0.009 MHz – 0.490 MHz) = $40\log(3 \text{ m}/300 \text{ m}) = - 80 \text{ dB}$
Measurement Distance : 3 m
6. Distance Correction Factor(0.490 MHz – 30 MHz) = $40\log(3 \text{ m}/30 \text{ m}) = - 40 \text{ dB}$
Measurement Distance : 3 m
7. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
8. EIRP (dBm)
= Total (dB μ V/m) + $20 \log D - 104.8$ (where D is the measurement distance in meters. D=3)
= Total (dB μ V/m) - 95.2(dB)
9. ERP(dBm) = EIRP(dBm) - 2.15(dB)

KDB 414788 OFS and Chamber Correlation Justification

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

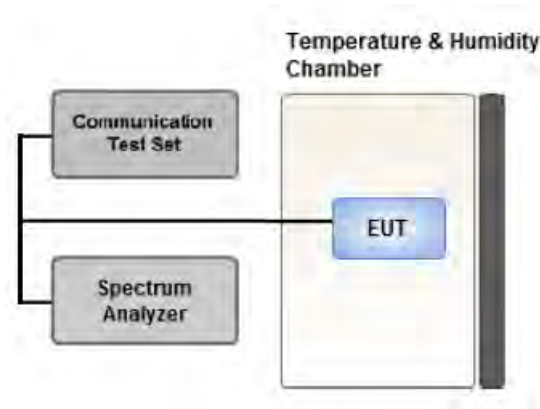
Below 1 GHz

1. The EUT is placed on a turntable, which is 0.8 m above ground plane.
2. The Hybrid antenna was placed at a location 3 m from the EUT, which is varied from 1 m to 4 m to find out the highest emissions.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L)
7. Total(dBμV/m) = Measured Value(dBμV) + Cable Loss(dB) + Antenna Factor(dB/m) + Distance Factor(D.F)
8. EIRP (dBm)
 - = Total (dBμV/m) + 20 log D – 104.8 (where D is the measurement distance in meters. D=3)
 - = Total (dBμV/m) - 95.2(dB)
9. ERP(dBm) = EIRP(dBm) - 2.15(dB)

Above 1 GHz

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Total(dBμV/m) = Measured Value(dBμV) + Cable Loss(dB) + Antenna Factor(dB/m) + Distance Factor(D.F)
 - + H.P.F(dB) - Amp Gain(dB)
8. EIRP (dBm)
 - = Total (dBμV/m) + 20 log D – 104.8 (where D is the measurement distance in meters. D=3)
 - = Total (dBμV/m) - 95.2(dB)

3.4 PEAK- TO- AVERAGE RATIO



Test setup

① CCDF Procedure for PAPR

Test Settings

1. Set resolution/measurement bandwidth $\geq$ 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:

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

Test Settings(Peak Power)

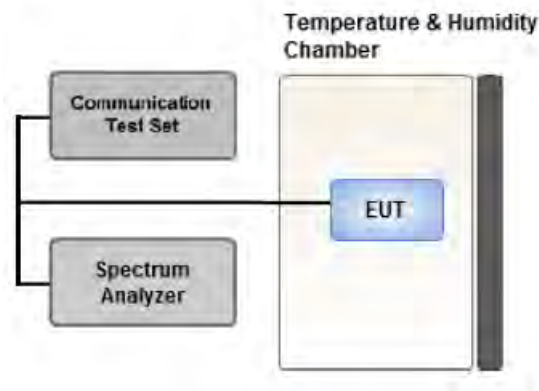
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW $\geq 3 \times RBW$.

1. Set the RBW $\geq$ OBW.
2. Set VBW $\geq 3 \times RBW$.
3. Set span $\geq 2 \times OBW$.
4. Sweep time $\geq 10 \times (\text{number of points in sweep}) \times (\text{transmission symbol period})$.
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 $2 \times$ to $3 \times$ the OBW.
2. Set RBW $\geq$ OBW.
3. Set VBW $\geq 3 \times RBW$.
4. Set number of measurement points in sweep $\geq 2 \times \text{span} / RBW$.
5. Sweep time:
Set $\geq [10 \times (\text{number of points in sweep}) \times (\text{transmission period})]$ 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 $[10 \log (1/\text{duty cycle})]$ to the measured maximum power level to compute the average power during continuous transmission. For example, add $[10 \log (1/0.25)] = 6 \text{ dB}$ 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.

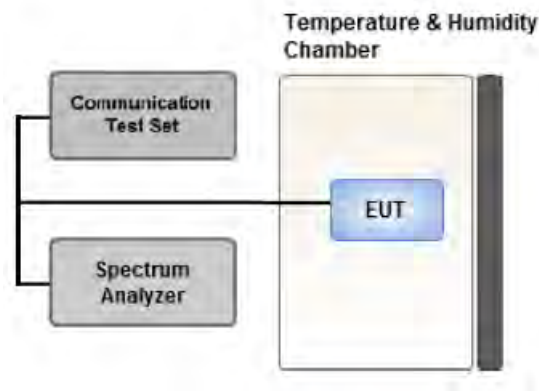
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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 $\geq$ 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

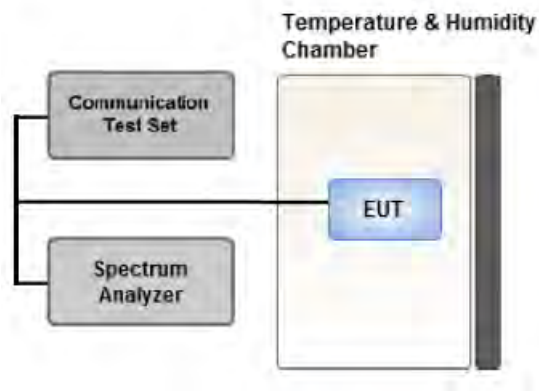
Test Overview

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 $\geq$ 3 MHz
3. Detector = RMS
4. Trace Mode = Average
5. Sweep time = auto
6. Number of points in sweep $\geq$ 2 x Span / RBW

3.7 CHANNEL EDGE



Test setup

Test Overview

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

Test Settings

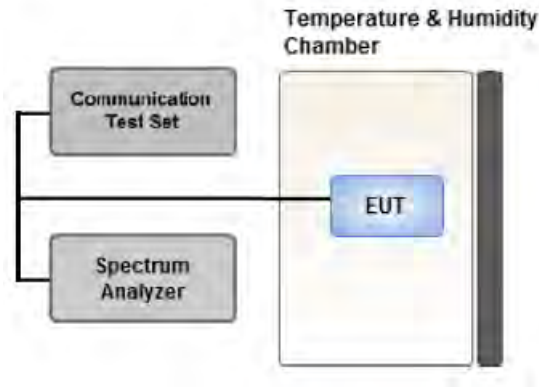
1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. Within 1 MHz of the channel edge the RBW should be 2 % of EBW, then 1 MHz after that.
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points $\geq 2 \times \text{Span/RBW}$
7. Trace mode = trace average
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Test Notes

1. The attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge,
2. $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge.
3. $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge.
4. The attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz.
5. $55 + 10 \log (P)$ dB at or below 2490.5 MHz.
6. X is the greater of 6MHz or the actual emission bandwidth
7. The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer

Where $\text{Margin} < 1$ dB the emission level is either corrected by $10 \log(1 \text{ MHz} / \text{RB})$ 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
Antenna Position Tower	MA4640/800-XP-ET	Innco systems	N/A	N/A	N/A
Turn Table	DS2000-S	Innco systems	N/A	N/A	N/A
Turn Table	Turn Table	Ets	N/A	N/A	N/A
Controller (Antenna mast & Turn Table)	CO3000	Innco systems	CO3000/1251/489 20320/P	N/A	N/A
Amp & Filter Bank Switch Controller	FBSM-01B	TNM system	TM20090002	N/A	N/A
RF Switch System	TMX0132C	TNM System	TM21100002	N/A	N/A
RF Switch System	FBSR-04C(3G HPF+LNA)	TNM System	S4L1	08/18/2024	Annual
RF Switch System	FBSR-04C(LNA)	TNM System	S4L4	08/18/2024	Annual
RF Switch System	FBSR-04C(Thru)	TNM System	S4L6	08/18/2024	Annual
HIGHPASS FILTER	WHKX10-900-1000-15000- 40SS	WAINWRIGHT INSTRUMENTS	16	08/01/2024	Annual
HIGHPASS FILTER	WHNX6.0/26.5G-6SS	WAINWRIGHT INSTRUMENTS	1	01/19/2024	Annual
Power Amplifier	CBL18265035	CERNEX	22966	12/01/2023	Annual
Power Amplifier	CBL26405040	CERNEX	25956	03/02/2024	Annual
Loop Antenna(9 kHz ~ 30 MHz)	FMZB1513	Schwarzbeck	1513-333	03/17/2024	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA 9120	Schwarzbeck	937	02/13/2025	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/29/2024	Biennial
Bilog Antenna	VULB9160	Schwarzbeck	3150	03/09/2025	Biennial
Hybrid Antenna	VULB9160	Schwarzbeck	760	02/24/2025	Biennial
Trilog Broadband Antenna	VULB 9168	Schwarzbeck	895	08/16/2024	Biennial
Chamber	SU-642	ESPEC	93008124	02/22/2024	Annual
Power Splitter(DC~26.5 GHz)	11667B	Hewlett Packard	11275	03/02/2024	Annual
DC Power Supply	E3632A	Agilent	MY40010147	06/23/2024	Annual
4-Way Divider	ZC4PD-K1844+	Mini-Circuits	942907	09/27/2023	Annual
ATTENUATOR(20 dB)	8493C	Hewlett Packard	17280	04/19/2024	Annual
Spectrum Analyzer(10 Hz ~ 40 GHz)	FSV40	REOHDE & SCHWARZ	101436	02/22/2024	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/10/2024	Annual
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262287701	05/22/2024	Annual
Wideband Radio Communication Tester	MT8000A	Anritsu Corp.	6262302511	05/23/2024	Annual
SIGNAL GENERATOR (100 kHz ~ 40 GHz)	SMB100A	REOHDE & SCHWARZ	177633	06/22/2024	Annual



Signal Analyzer(10 Hz ~ 26.5 GHz)	N9020A	Agilent	MY52090906	04/20/2024	Annual
Signal Analyzer(5 Hz ~ 40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/24/2024	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 ($\pm$ dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.90 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.14 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.82 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.74 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.76 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (Above 40 GHz)	5.52 (Confidence level about 95 %, $k=2$)

6. SUMMARY OF TEST RESULTS

6.1 Test Condition : Conducted Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Occupied Bandwidth	§ 2.1049	N/A	PASS
Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	§ 2.1051, § 27.53(m)(4)	■ $< 40 + 10\log_{10} (P[\text{Watts}])$ at Channel edges ■ $< 43 + 10\log_{10} (P[\text{Watts}])$ between 5 and X MHz from Channel edges ■ $< 55 + 10\log_{10} (P[\text{Watts}])$ beyond X MHz beyond from Channel edges ■ $< 43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz	PASS
Conducted Output Power	§ 2.1046	N/A	PASS
Frequency stability / variation of ambient temperature	§ 2.1055, § 27.54	Emission must remain in band	PASS

6.2 Test Condition : Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Equivalent Isotropic Radiated Power	§ 27.50(h)(2)	< 2 Watts max. EIRP	PASS
Radiated Spurious and Harmonic Emissions	§ 2.1053, § 27.53(m)(4)	$< 55 + 10\log_{10} (P[\text{Watts}])$	PASS



7. 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	20	30
15	10	25
15	15	30
15	20	35
20	10	30
20	15	35
20	20	40

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

Please refer to the table below.

- Worst case(Conducted Spurious Emissions, Band Edge)
: We have selected higher of the Conduction Output Power.
- Worst case(Radiated Spurious Emissions) : We have selected higher of the ERP.
- Worst case(OBW, Frequency stability)
: All modes of operation were investigated and the worst case configuration results are reported.

4. EIRP, Radiated Spurious Emissions

Mode : Internal Antenna, External Antenna (ANT 5, ANT 4, DUT 4)

Worst case : Internal Antenna, External Antenna (ANT 5)

5. All 3 channels(low/mid/high) of conducted power and radiated power were investigated

and the worst case channel results are reported.

[Worst case]

Test Description	Mod	Operating frequency	PCC					SCC				
			BW (MHz)	Freq. (MHz)	Ch.	RB	RB Offset	BW (MHz)	Freq. (MHz)	Ch.	RB	RB Offset
Conducted Spurious Emissions/ Band Edge	QPSK	Low	10	2505.5	20805	1	49	20	2519.9	20949	1	0
	QPSK	Mid	20	2530.1	21051	1	99	10	2544.5	21195	1	0
	QPSK	High	20	2545.1	21201	1	99	15	2562.2	21372	1	0
	QPSK	Low	10	2505.5	20805	1	0	20	2519.9	20949	1	99
	QPSK	Mid	20	2530.1	21051	1	0	10	2544.5	21195	1	49
	QPSK	High	20	2545.1	21201	1	0	15	2562.2	21372	1	74
	QPSK	Low	10	2505.5	20805	50	0	20	2519.9	20949	100	0
	QPSK	Mid	20	2530.1	21051	100	0	10	2544.5	21195	50	0
	QPSK	High	10	2545.6	21206	50	0	20	2560.0	21350	100	0
	QPSK	Low	20	2510.0	20850	100	0	20	2529.8	21048	100	0
	QPSK	Mid	20	2525.1	21001	100	0	20	2544.9	21199	100	0
	QPSK	High	20	2540.2	21152	100	0	20	2560.0	21350	100	0
Radiated Spurious Emissions (External Ant)	QPSK	Low	15	2507.5	20825	1	74	15	2522.5	20975	1	0
	QPSK	Mid	10	2525.6	21006	1	49	20	2540.0	21150	1	0
	QPSK	High	20	2540.2	21152	1	99	20	2560.0	21350	1	0
Radiated Spurious Emissions (Internal Ant)	QPSK	Low	20	2510.0	20850	1	99	10	2524.4	20994	1	0
	QPSK	Mid	15	2525.3	21003	1	74	20	2542.4	21174	1	0
	QPSK	High	15	2542.9	21179	1	74	20	2560.0	21350	1	0
OBW, PAR	QPSK, 16QAM, 64QAM, 256QAM	Mid	10	2525.6	21006	50	0	20	2540.0	21150	100	0
			15	2530.1	21051	75	0	10	2542.1	21171	50	0
			15	2527.5	21025	75	0	15	2542.5	21175	75	0
			15	2525.3	21003	75	0	20	2542.4	21174	100	0
			20	2530.1	21051	100	0	10	2544.5	21195	50	0
			20	2527.6	21026	100	0	15	2544.7	21197	75	0
			20	2525.1	21001	100	0	20	2544.9	21199	100	0
Frequency stability	QPSK	Low	10	2505.5	20805	50	0	20	2519.9	20949	100	0
			15	2507.8	20825	75	0	20	2524.9	20999	100	0
			20	2510.0	20850	100	0	20	2529.8	21048	100	0
		High	10	2545.6	21206	50	0	20	2560.0	21350	100	0
			15	2542.9	21179	75	0	20	2560.0	21350	100	0
			20	2540.2	21152	100	0	20	2560.0	21350	100	0



8.1 Conducted Power

Operating frequency	PCC					SCC					Conducted. Power [dBm]
	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	
Low	10	2505.5	20805	1	49	20	2519.9	20949	1	0	24.31
	15	2507.5	20825	1	74	10	2519.5	20945	1	0	24.22
	15	2507.5	20825	1	74	15	2522.5	20975	1	0	24.20
	15	2507.8	20828	1	74	20	2524.9	20999	1	0	24.18
	20	2510.0	20850	1	99	10	2524.4	20994	1	0	23.24
	20	2510.0	20850	1	99	15	2527.1	21021	1	0	23.31
	20	2510.0	20850	1	99	20	2529.8	21048	1	0	24.25
Mid	10	2525.6	21006	1	49	20	2540.0	21150	1	0	23.25
	15	2530.1	21051	1	74	10	2542.1	21171	1	0	23.08
	15	2527.5	21025	1	74	15	2542.5	21175	1	0	23.46
	15	2525.3	21003	1	74	20	2542.4	21174	1	0	23.45
	20	2530.1	21051	1	99	10	2544.5	21195	1	0	24.10
	20	2527.6	21026	1	99	15	2544.7	21197	1	0	22.85
	20	2525.1	21001	1	99	20	2544.9	21199	1	0	23.50
High	10	2545.6	21206	1	49	20	2560.0	21350	1	0	23.40
	15	2552.7	21277	1	74	10	2564.7	21397	1	0	22.85
	15	2547.5	21225	1	74	15	2562.5	21375	1	0	23.31
	15	2542.9	21179	1	74	20	2560.0	21350	1	0	23.40
	20	2550.1	21251	1	99	10	2564.5	21395	1	0	23.02
	20	2545.1	21201	1	99	15	2562.2	21372	1	0	23.66
	20	2540.2	21152	1	99	20	2560.0	21350	1	0	23.60

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	2505.5	20805	50	0	20	2519.9	20949	100	0	22.71
	15	2507.5	20825	75	0	10	2519.5	20945	50	0	22.49
	15	2507.5	20825	75	0	15	2522.5	20975	75	0	22.47
	15	2507.8	20828	75	0	20	2524.9	20999	100	0	22.30
	20	2510.0	20850	100	0	10	2524.4	20994	50	0	22.18
	20	2510.0	20850	100	0	15	2527.1	21021	75	0	21.74
	20	2510.0	20850	100	0	20	2529.8	21048	100	0	22.30
Mid	10	2525.6	21006	50	0	20	2540.0	21150	100	0	22.14
	15	2530.1	21051	75	0	10	2542.1	21171	50	0	22.18
	15	2527.5	21025	75	0	15	2542.5	21175	75	0	21.83
	15	2525.3	21003	75	0	20	2542.4	21174	100	0	21.74
	20	2530.1	21051	100	0	10	2544.5	21195	50	0	22.21
	20	2527.6	21026	100	0	15	2544.7	21197	75	0	21.85
	20	2525.1	21001	100	0	20	2544.9	21199	100	0	21.60
High	10	2545.6	21206	50	0	20	2560.0	21350	100	0	22.54
	15	2552.7	21277	75	0	10	2564.7	21397	50	0	22.29
	15	2547.5	21225	75	0	15	2562.5	21375	75	0	22.22
	15	2542.9	21179	75	0	20	2560.0	21350	100	0	22.42
	20	2550.1	21251	100	0	10	2564.5	21395	50	0	21.22
	20	2545.1	21201	100	0	15	2562.2	21372	75	0	22.05
	20	2540.2	21152	100	0	20	2560.0	21350	100	0	21.92

Note:

Modulation : QPSK(Full RB)

Operating frequency	PCC					SCC					Conducted. Power [dBm]
	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	
Low	10	2505.5	20805	1	49	20	2519.9	20949	1	0	23.45
Mid	20	2530.1	21051	1	99	10	2544.5	21195	1	0	23.40
High	20	2545.1	21201	1	99	15	2562.2	21372	1	0	23.05
Low	10	2505.5	20805	50	0	20	2519.9	20949	100	0	21.47
Mid	20	2530.1	21051	100	0	10	2544.5	21195	50	0	21.10
High	10	2545.6	21206	50	0	20	2560.0	21350	100	0	21.52

Note:

Modulation : 16QAM

Operating frequency	PCC					SCC					Conducted. Power [dBm]
	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	
Low	10	2505.5	20805	1	49	20	2519.9	20949	1	0	20.94
Mid	20	2530.1	21051	1	99	10	2544.5	21195	1	0	20.38
High	20	2545.1	21201	1	99	15	2562.2	21372	1	0	20.10
Low	10	2505.5	20805	50	0	20	2519.9	20949	100	0	20.50
Mid	20	2530.1	21051	100	0	10	2544.5	21195	50	0	19.45
High	10	2545.6	21206	50	0	20	2560.0	21350	100	0	20.22

Note:

Modulation : 64QAM

Operating frequency	PCC					SCC					Conducted. Power [dBm]
	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	
Low	10	2505.5	20805	1	49	20	2519.9	20949	1	0	18.28
Mid	20	2530.1	21051	1	99	10	2544.5	21195	1	0	17.11
High	20	2545.1	21201	1	99	15	2562.2	21372	1	0	17.40
Low	10	2505.5	20805	50	0	20	2519.9	20949	100	0	17.24
Mid	20	2530.1	21051	100	0	10	2544.5	21195	50	0	17.44
High	10	2545.6	21206	50	0	20	2560.0	21350	100	0	17.28

Note:

Modulation : 256QAM

8.2 EQUIVALENT ISOTROPIC RADIATED POWER

8.2.1 External Antenna

	PCC			SCC			Measure d Level (dBμV)	C.L+A.F+D. F (dB/m)	Total (dBμV/m)	Pol .	E.I.R.P	
	BW [MHz]	Channe l	RB/ Offse t	BW [MHz]	Channe l	RB/ Offse t					W	dBm
Low	10	20805	1/49	20	20949	1/0	84.90	35.59	120.49	H	0.338	25.29
	15	20825	1/74	10	20945	1/0	82.36	35.59	117.95	H	0.188	22.75
	15	20825	1/74	15	20975	1/0	85.11	35.47	120.58	H	0.345	25.38
	15	20828	1/74	20	20999	1/0	85.08	35.47	120.55	H	0.343	25.35
	20	20850	1/99	10	20994	1/0	84.45	35.55	120.00	H	0.302	24.80
	20	20850	1/99	15	21021	1/0	83.62	35.63	119.25	H	0.254	24.05
	20	20850	1/99	20	21048	1/0	84.12	35.63	119.75	H	0.285	24.55
Mid	10	21006	1/49	20	21150	1/0	84.65	35.62	120.27	H	0.321	25.07
	15	21051	1/74	10	21171	1/0	84.03	35.58	119.61	H	0.276	24.41
	15	21025	1/74	15	21175	1/0	84.60	35.58	120.18	H	0.315	24.98
	15	21003	1/74	20	21174	1/0	84.61	35.58	120.19	H	0.316	24.99
	20	21051	1/99	10	21195	1/0	84.52	35.60	120.12	H	0.310	24.92
	20	21026	1/99	15	21197	1/0	83.45	35.58	119.03	H	0.242	23.83
	20	21001	1/99	20	21199	1/0	84.20	35.58	119.78	H	0.287	24.58
High	10	21206	1/49	20	21350	1/0	84.09	35.51	119.60	H	0.275	24.40
	15	21277	1/74	10	21397	1/0	83.21	35.61	118.82	H	0.230	23.62
	15	21225	1/74	15	21375	1/0	84.25	35.49	119.74	H	0.284	24.54
	15	21179	1/74	20	21350	1/0	84.18	35.53	119.71	H	0.282	24.51
	20	21251	1/99	10	21395	1/0	83.48	35.55	119.03	H	0.242	23.83
	20	21201	1/99	15	21372	1/0	83.15	35.51	118.66	H	0.222	23.46
	20	21152	1/99	20	21350	1/0	84.26	35.53	119.79	H	0.288	24.59

Note:

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

PCC			SCC			Measure d Level (dBμV)	C.L+A.F+D. F (dB/m)	Total (dBμV/m)	Pol .	E.I.R.P	
BW [MHz]	Channe l	RB/ Offse t	BW [MHz]	Channe l	RB/ Offse t					W	dBm
10	20805	1/49	20	20949	1/0	84.39	35.59	119.98	H	0.301	24.78
15	20825	1/74	10	20945	1/0	81.90	35.59	117.49	H	0.169	22.29
15	20825	1/74	15	20975	1/0	84.42	35.47	119.89	H	0.294	24.69
15	20828	1/74	20	20999	1/0	84.80	35.47	120.27	H	0.321	25.07
20	20850	1/99	10	20994	1/0	84.10	35.55	119.65	H	0.279	24.45
20	20850	1/99	15	21021	1/0	83.20	35.63	118.83	H	0.231	23.63
20	20850	1/99	20	21048	1/0	83.50	35.63	119.13	H	0.247	23.93
10	21006	1/49	20	21150	1/0	84.30	35.62	119.92	H	0.296	24.72
20	21152	1/99	20	21350	1/0	83.75	35.53	119.28	H	0.256	24.08

Note:

1. Modulation : 16QAM
2. Limit : < 2 Watts

PCC			SCC			Measure d Level (dBμV)	C.L+A.F+D. F (dB/m)	Total (dBμV/m)	Pol .	E.I.R.P	
BW [MHz]	Channe l	RB/ Offse t	BW [MHz]	Channe l	RB/ Offse t					W	dBm
10	20805	1/49	20	20949	1/0	81.52	35.59	117.11	H	0.155	21.91
15	20825	1/74	10	20945	1/0	78.20	35.59	113.79	H	0.072	18.59
15	20825	1/74	15	20975	1/0	81.59	35.47	117.06	H	0.153	21.86
15	20828	1/74	20	20999	1/0	81.65	35.47	117.12	H	0.156	21.92
20	20850	1/99	10	20994	1/0	81.11	35.55	116.66	H	0.140	21.46
20	20850	1/99	15	21021	1/0	80.04	35.63	115.67	H	0.111	20.47
20	20850	1/99	20	21048	1/0	80.75	35.63	116.38	H	0.131	21.18
10	21006	1/49	20	21150	1/0	81.17	35.62	116.79	H	0.144	21.59
20	21152	1/99	20	21350	1/0	80.76	35.53	116.29	H	0.129	21.09

Note:

1. Modulation : 64QAM
2. Limit : < 2 Watts

PCC			SCC			Measure d Level (dB μ V)	C.L+A.F+D. F (dB/m)	Total (dB μ V/m)	Pol .	E.I.R.P	
BW [MHz]	Channe l	RB/ Offse t	BW [MHz]	Channe l	RB/ Offse t					W	dBm
10	20805	1/49	20	20949	1/0	80.62	35.59	116.21	H	0.126	21.01
15	20825	1/74	10	20945	1/0	77.15	35.59	112.74	H	0.057	17.54
15	20825	1/74	15	20975	1/0	80.85	35.47	116.32	H	0.129	21.12
15	20828	1/74	20	20999	1/0	80.90	35.47	116.37	H	0.131	21.17
20	20850	1/99	10	20994	1/0	80.09	35.55	115.64	H	0.111	20.44
20	20850	1/99	15	21021	1/0	78.89	35.63	114.52	H	0.086	19.32
20	20850	1/99	20	21048	1/0	79.86	35.63	115.49	H	0.107	20.29
10	21006	1/49	20	21150	1/0	80.17	35.62	115.79	H	0.115	20.59
20	21152	1/99	20	21350	1/0	79.78	35.53	115.31	H	0.103	20.11

Note:

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

8.2.2 Internal Antenna

	PCC			SCC			Measure d Level (dB μ V)	C.L+A.F+D. F (dB/m)	Total (dB μ V/m)	Pol .	E.I.R.P	
	BW [MHz]	Channe l	RB/ Offse t	BW [MHz]	Channe l	RB/ Offse t					W	dBm
Low	10	20805	1/49	20	20949	1/0	90.58	35.59	126.17	V	1.250	30.97
	15	20825	1/74	10	20945	1/0	90.29	35.59	125.88	V	1.169	30.68
	15	20825	1/74	15	20975	1/0	91.01	35.47	126.48	V	1.343	31.28
	15	20828	1/74	20	20999	1/0	91.12	35.47	126.59	V	1.377	31.39
	20	20850	1/99	10	20994	1/0	91.12	35.55	126.67	V	1.403	31.47
	20	20850	1/99	15	21021	1/0	90.23	35.63	125.86	V	1.164	30.66
	20	20850	1/99	20	21048	1/0	90.38	35.63	126.01	V	1.205	30.81
Mid	10	21006	1/49	20	21150	1/0	91.19	35.62	126.81	V	1.448	31.61
	15	21051	1/74	10	21171	1/0	90.65	35.58	126.23	V	1.268	31.03
	15	21025	1/74	15	21175	1/0	91.44	35.58	127.02	V	1.522	31.82
	15	21003	1/74	20	21174	1/0	91.50	35.58	127.08	V	1.543	31.88
	20	21051	1/99	10	21195	1/0	91.15	35.60	126.75	V	1.430	31.55
	20	21026	1/99	15	21197	1/0	90.76	35.58	126.34	V	1.301	31.14
	20	21001	1/99	20	21199	1/0	91.00	35.58	126.58	V	1.374	31.38
High	10	21206	1/49	20	21350	1/0	90.36	35.51	125.87	V	1.166	30.67
	15	21277	1/74	10	21397	1/0	90.33	35.61	125.94	V	1.186	30.74
	15	21225	1/74	15	21375	1/0	90.37	35.49	125.86	V	1.163	30.66
	15	21179	1/74	20	21350	1/0	90.56	35.53	126.09	V	1.227	30.89
	20	21251	1/99	10	21395	1/0	90.49	35.55	126.04	V	1.212	30.84
	20	21201	1/99	15	21372	1/0	89.22	35.51	124.73	V	0.897	29.53
	20	21152	1/99	20	21350	1/0	90.05	35.53	125.58	V	1.091	30.38

Note:

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

PCC			SCC			Measure d Level (dB μ V)	C.L+A.F+D. F (dB/m)	Total (dB μ V/m)	Pol .	E.I.R.P	
BW [MHz]	Channe l	RB/ Offse t	BW [MHz]	Channe l	RB/ Offse t					W	dBm
20	20850	1/99	10	20994	1/0	90.46	35.55	126.01	V	1.205	30.81
10	21006	1/49	20	21150	1/0	90.56	35.62	126.18	V	1.252	30.98
15	21051	1/74	10	21171	1/0	90.35	35.58	125.93	V	1.184	30.73
15	21025	1/74	15	21175	1/0	90.99	35.58	126.57	V	1.372	31.37
15	21003	1/74	20	21174	1/0	91.02	35.58	126.60	V	1.382	31.40
20	21051	1/99	10	21195	1/0	90.88	35.60	126.48	V	1.343	31.28
20	21026	1/99	15	21197	1/0	90.25	35.58	125.83	V	1.157	30.63
20	21001	1/99	20	21199	1/0	90.50	35.58	126.08	V	1.226	30.88
15	21179	1/74	20	21350	1/0	90.07	35.53	125.60	V	1.096	30.40

Note:

1. Modulation : 16QAM
2. Limit : < 2 Watts

PCC			SCC			Measure d Level (dB μ V)	C.L+A.F+D. F (dB/m)	Total (dB μ V/m)	Pol .	E.I.R.P	
BW [MHz]	Channe l	RB/ Offse t	BW [MHz]	Channe l	RB/ Offse t					W	dBm
20	20850	1/99	10	20994	1/0	87.29	35.55	122.84	V	0.581	27.64
10	21006	1/49	20	21150	1/0	87.61	35.62	123.23	V	0.635	28.03
15	21051	1/74	10	21171	1/0	87.30	35.58	122.88	V	0.587	27.68
15	21025	1/74	15	21175	1/0	87.83	35.58	123.41	V	0.663	28.21
15	21003	1/74	20	21174	1/0	87.85	35.58	123.43	V	0.666	28.23
20	21051	1/99	10	21195	1/0	87.87	35.60	123.47	V	0.672	28.27
20	21026	1/99	15	21197	1/0	86.95	35.58	122.53	V	0.541	27.33
20	21001	1/99	20	21199	1/0	87.45	35.58	123.03	V	0.607	27.83
15	21179	1/74	20	21350	1/0	87.11	35.53	122.64	V	0.554	27.44

Note:

1. Modulation : 64QAM
2. Limit : < 2 Watts

PCC			SCC			Measure d Level (dB μ V)	C.L+A.F+D. F (dB/m)	Total (dB μ V/m)	Pol .	E.I.R.P	
BW [MHz]	Channe l	RB/ Offse t	BW [MHz]	Channe l	RB/ Offse t					W	dBm
20	20850	1/99	10	20994	1/0	86.27	35.55	121.82	V	0.459	26.62
10	21006	1/49	20	21150	1/0	86.69	35.62	122.31	V	0.514	27.11
15	21051	1/74	10	21171	1/0	86.43	35.58	122.01	V	0.480	26.81
15	21025	1/74	15	21175	1/0	87.11	35.58	122.69	V	0.562	27.49
15	21003	1/74	20	21174	1/0	87.20	35.58	122.78	V	0.573	27.58
20	21051	1/99	10	21195	1/0	87.05	35.60	122.65	V	0.556	27.45
20	21026	1/99	15	21197	1/0	86.05	35.58	121.63	V	0.440	26.43
20	21001	1/99	20	21199	1/0	86.69	35.58	122.27	V	0.510	27.07
15	21179	1/74	20	21350	1/0	86.09	35.53	121.62	V	0.438	26.42

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	10	20805	2505.5	1/49	20	20949	2519.9	1/0	7.1396	28.591	-76.49	-47.90
Mid	20	21051	2530.1	1/99	10	21195	2544.5	1/0	3.7448	27.976	-75.77	-47.80
High	20	21201	2545.1	1/99	15	21372	2562.2	1/0	5.2219	28.591	-76.71	-48.12
Low	10	20805	2505.5	1/0	20	20949	2519.9	1/99	8.2772	28.591	-76.26	-47.67
Mid	20	21051	2530.1	1/0	10	21195	2544.5	1/49	4.0315	27.976	-76.28	-48.30
High	20	21201	2545.1	1/0	15	21372	2562.2	1/74	3.7842	27.976	-75.89	-47.92
Low	10	20805	2505.5	50/0	20	20949	2519.9	100/0	3.7982	27.976	-76.02	-48.05
Mid	20	21051	2530.1	100/0	10	21195	2544.5	50/0	8.2916	28.591	-76.34	-47.75
High	10	21206	2545.6	50/0	20	21350	2560.0	100/0	8.2986	28.591	-75.59	-47.00
Low	20	20850	2510.0	100/0	20	21048	2529.8	100/0	8.2553	28.591	-75.93	-47.34
Mid	20	21001	2525.1	100/0	20	21199	2544.9	100/0	5.2074	28.591	-75.76	-47.17
High	20	21152	2540.2	100/0	20	21350	2560.0	100/0	8.0489	28.591	-76.10	-47.51

Note:

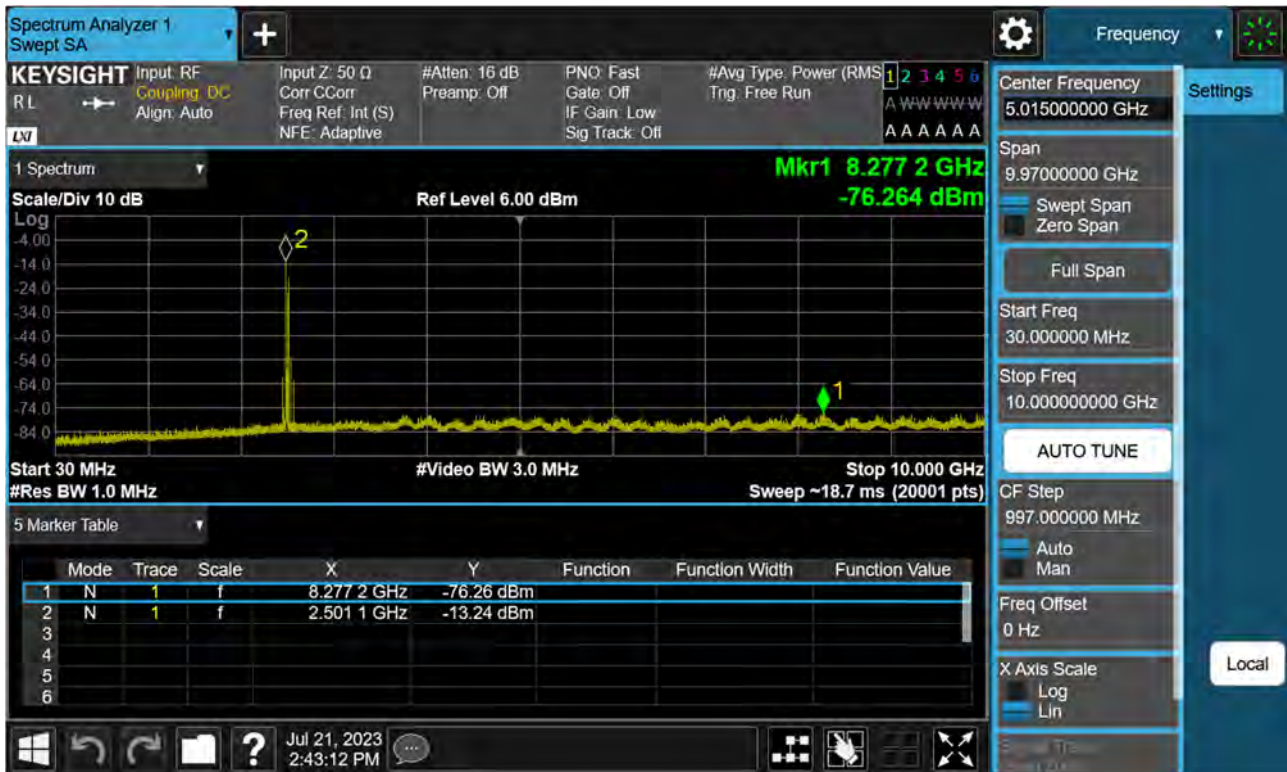
1. Modulation : QPSK
2. Factor(dB) = Cable Loss + Ext. Attenuator + Power Splitter
3. Factors for frequency :

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 10 MHz Ch20805 RB1 Offset0 SCC 20 MHz Ch20949 RB1 Offset99



PCC 10 MHz Ch20805 RB1 Offset49 SCC 20 MHz Ch20949 RB1 Offset0



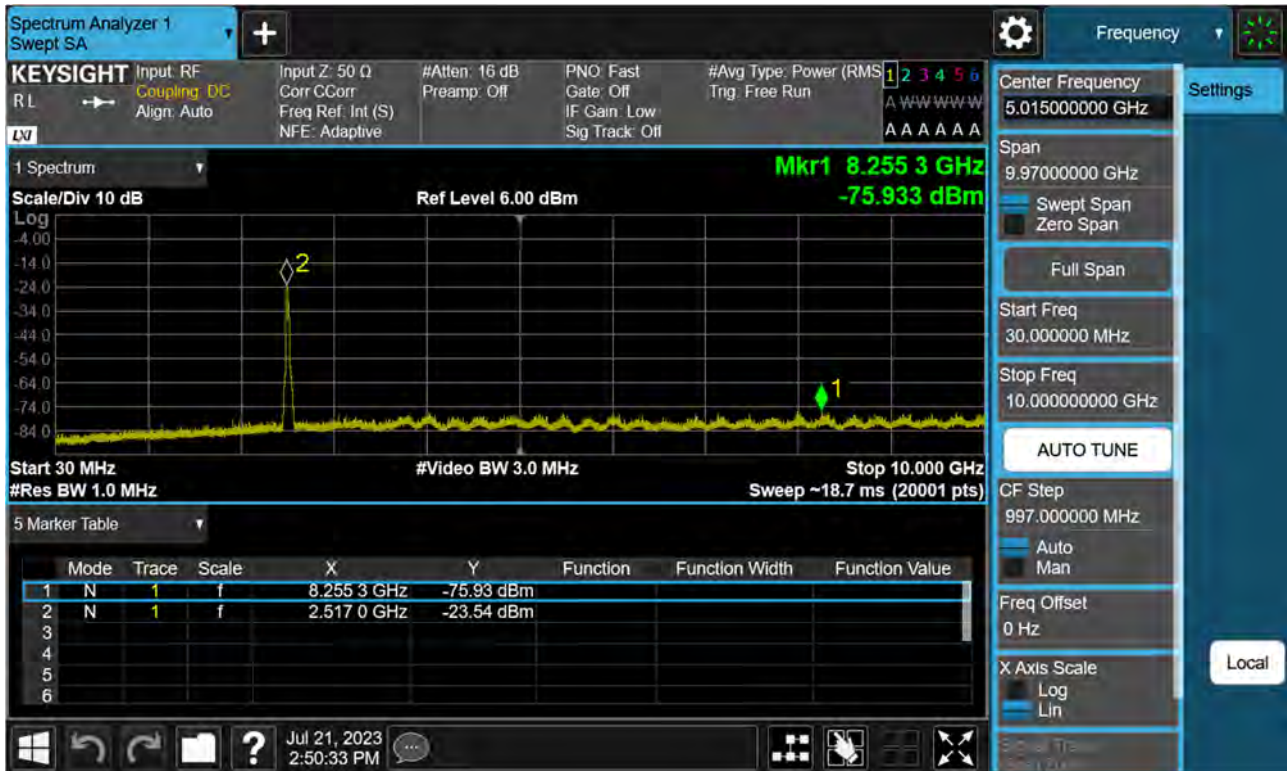
PCC 10 MHz Ch20805 RB50 Offset0 SCC 20 MHz Ch20949 RB100 Offset0



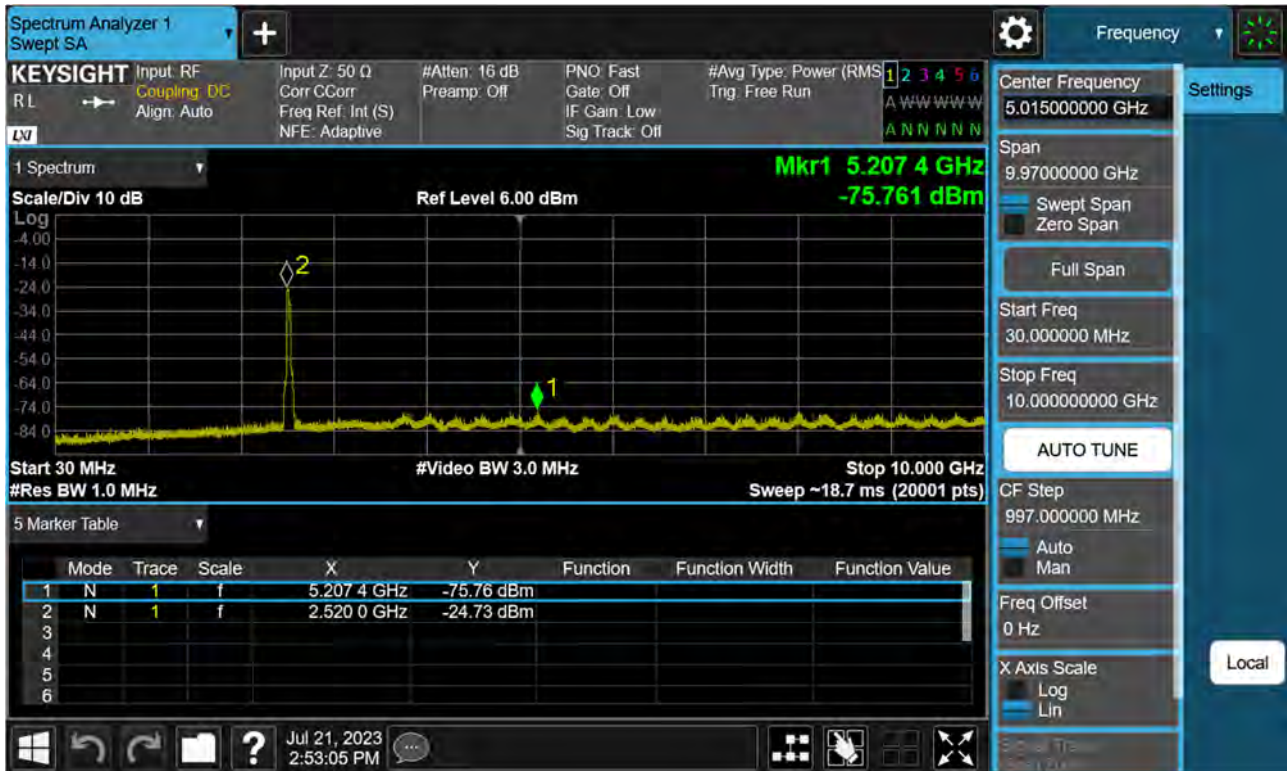
PCC 10 MHz Ch21206 RB50 Offset0 SCC 20 MHz Ch21350 RB100 Offset0



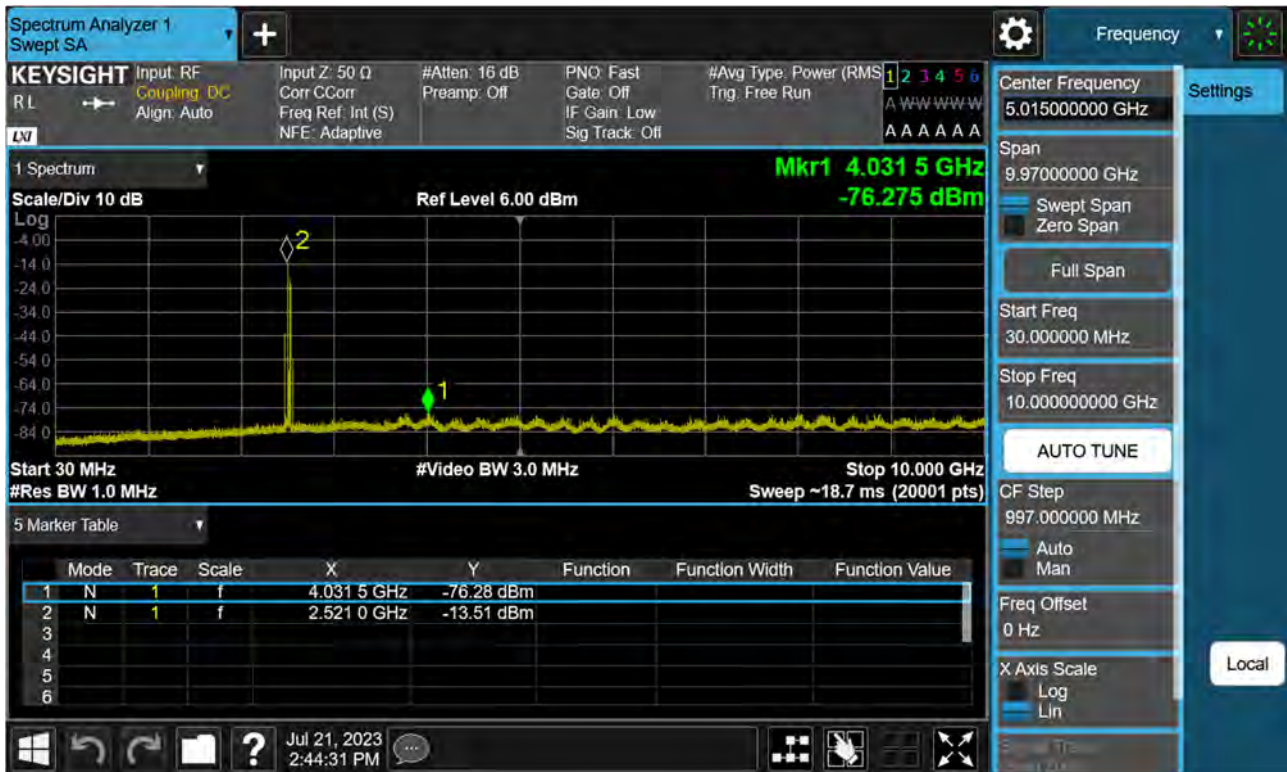
PCC 20 MHz Ch20850 RB100 Offset0 SCC 20 MHz Ch21048 RB100 Offset0



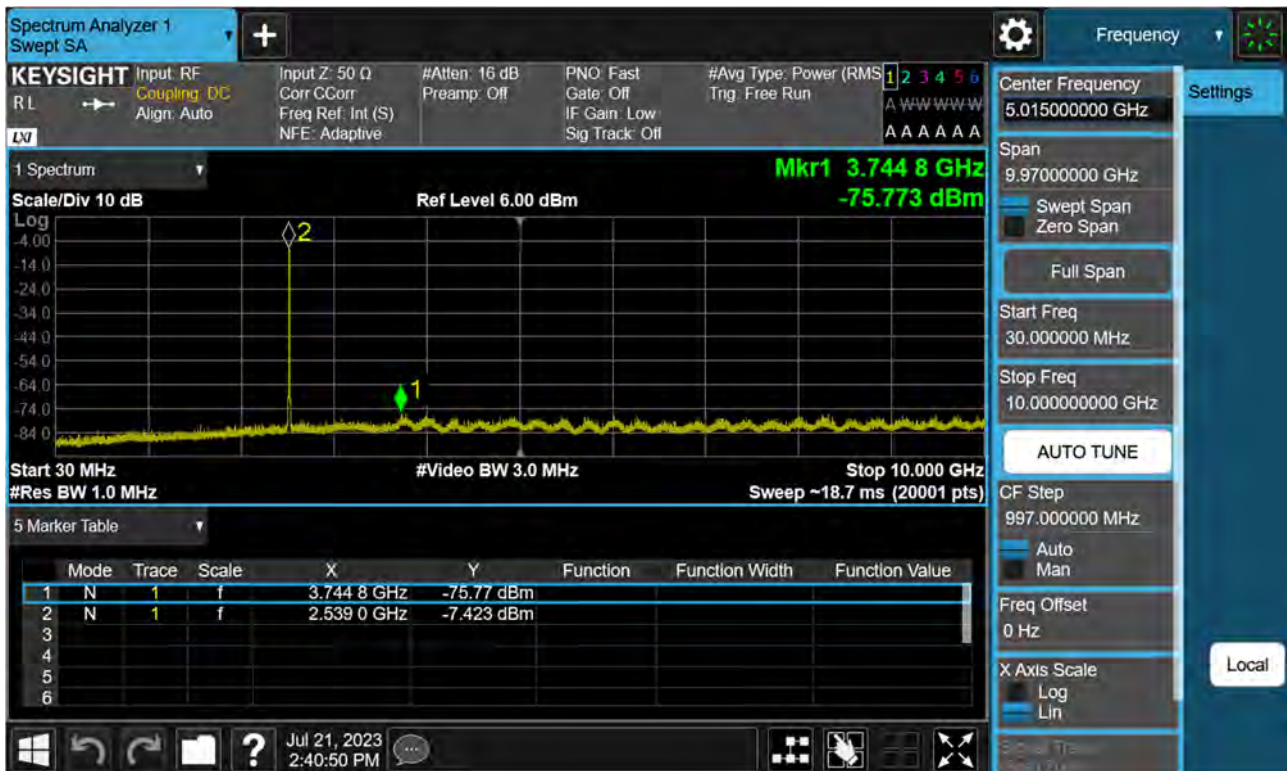
PCC 20 MHz Ch21001 RB100 Offset0 SCC 20 MHz Ch21199 RB100 Offset0



PCC 20 MHz Ch21051 RB1 Offset0 SCC 10 MHz Ch21195 RB1 Offset49



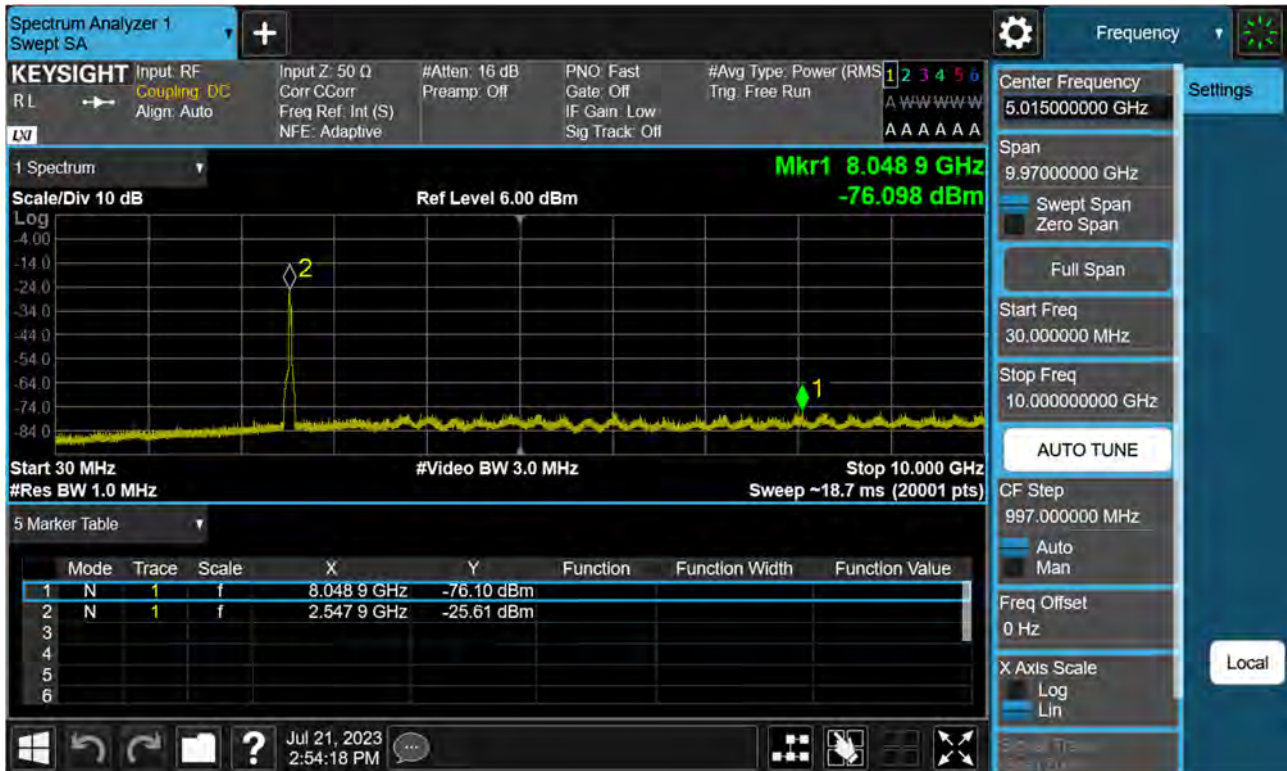
PCC 20 MHz Ch21051 RB1 Offset99 SCC 10 MHz Ch21195 RB1 Offset0



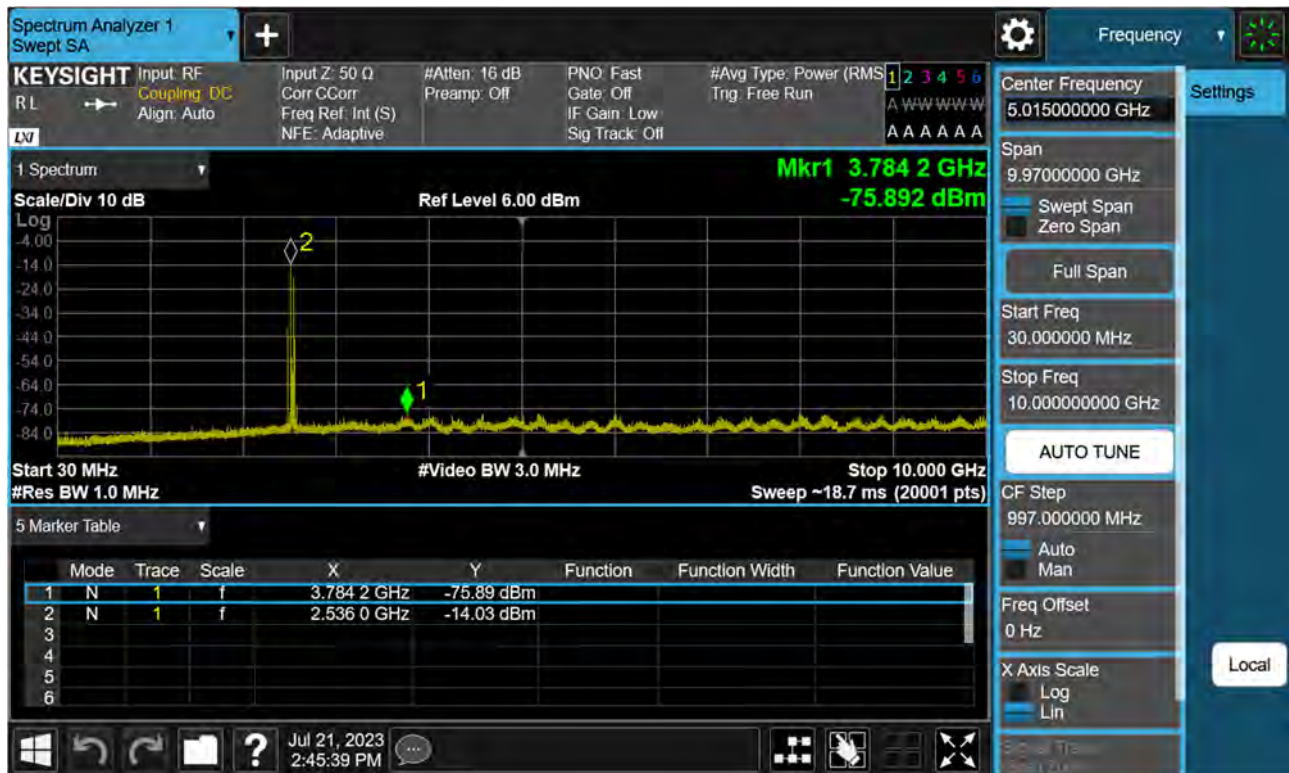
PCC 20 MHz Ch21051 RB100 Offset0 SCC 10 MHz Ch21195 RB50 Offset0



PCC 20 MHz Ch21152 RB100 Offset0 SCC 20 MHz Ch21350 RB100 Offset0



PCC 20 MHz Ch21201 RB1 Offset0 SCC 15 MHz Ch21372 RB1 Offset74



PCC 20 MHz Ch21201 RB1 Offset99 SCC 15 MHz Ch21372 RB1 Offset0

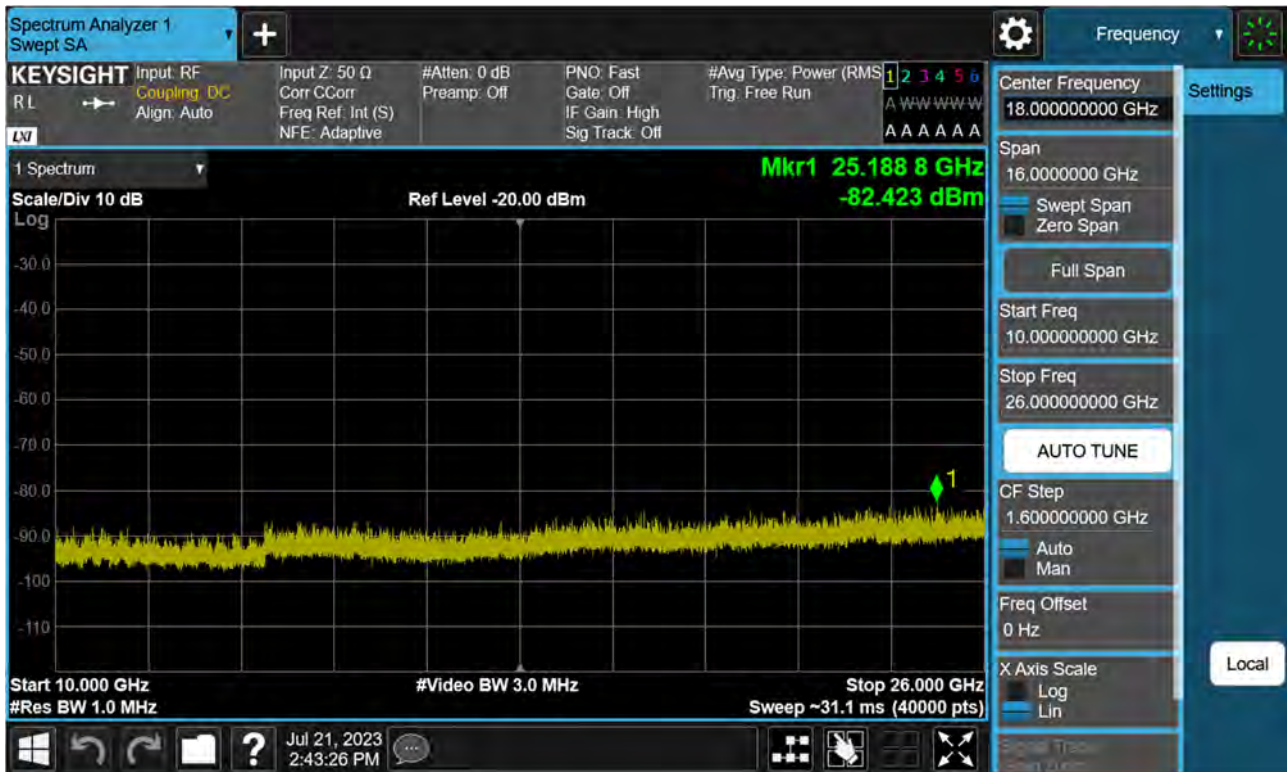




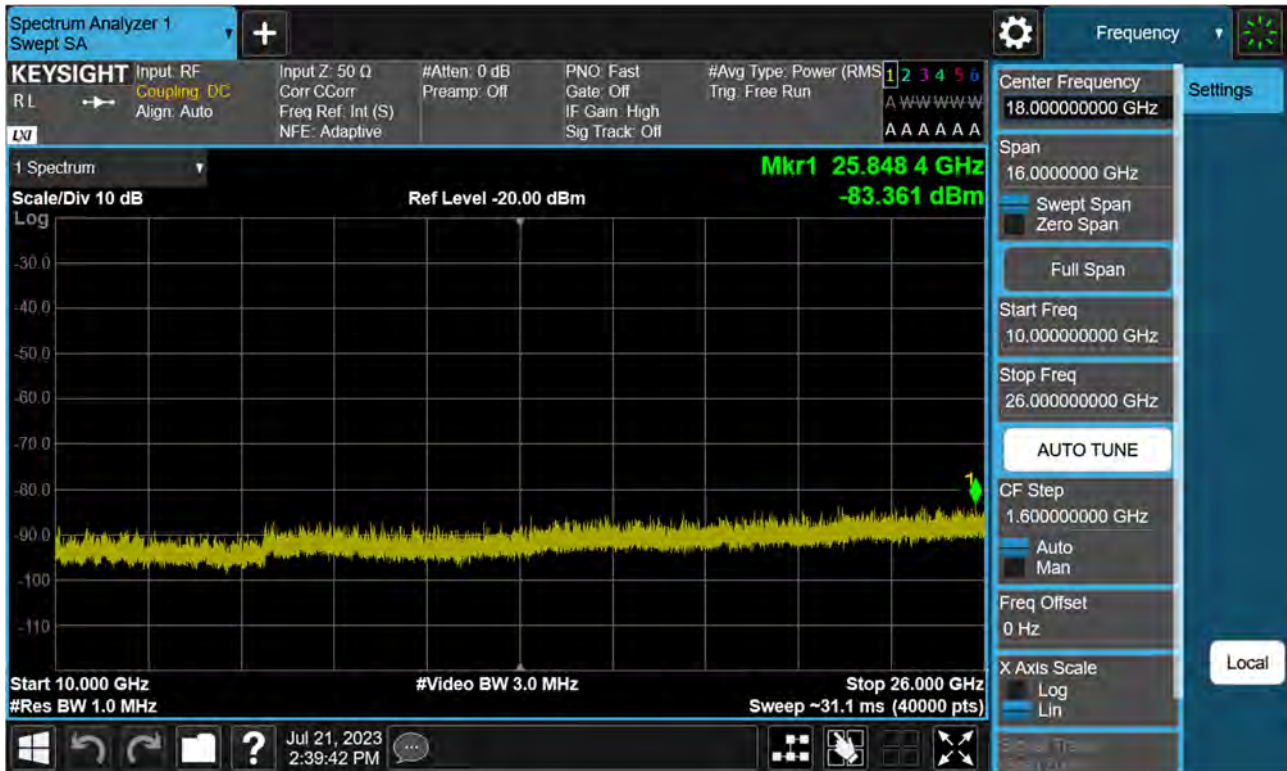
Report No. HCT-RF-2310-FC005-R1

Frequency Range : 10 GHz ~ 26.5 GHz

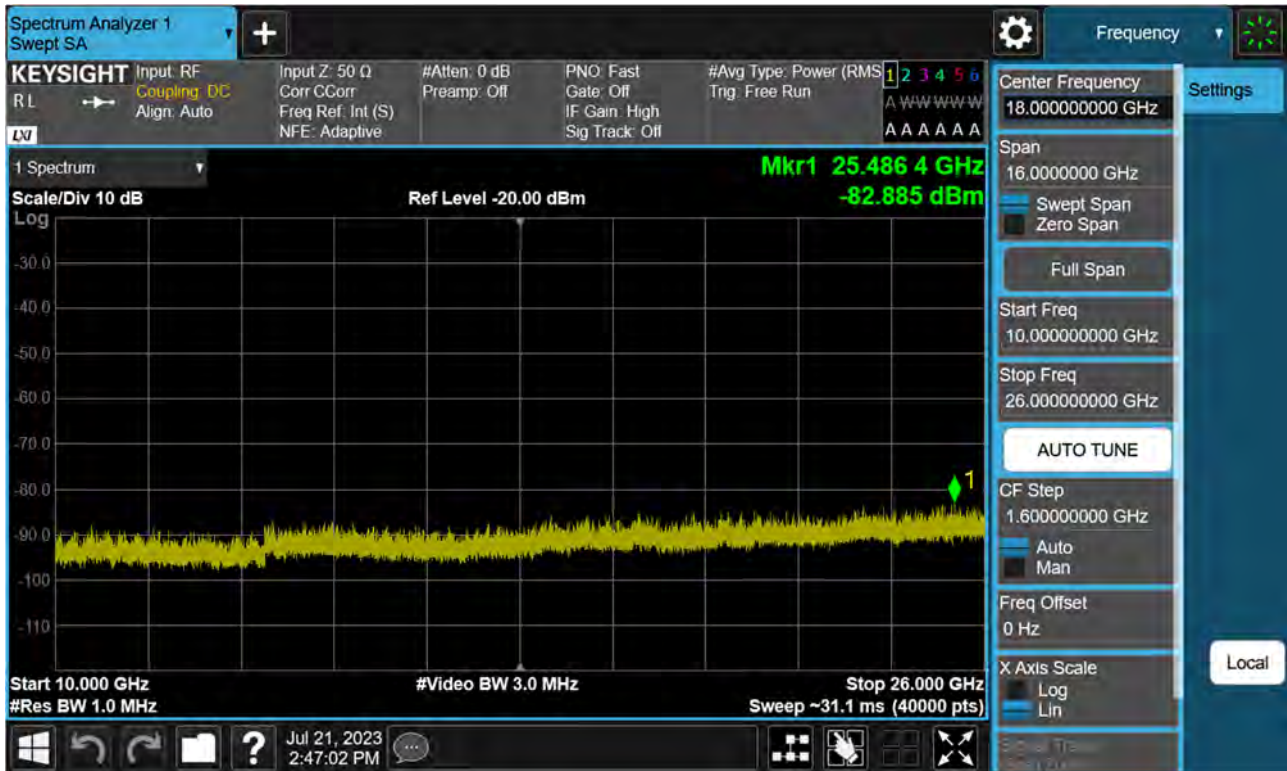
PCC 10 MHz Ch20805 RB1 Offset0, SCC 20 MHz Ch20949 RB1 Offset99



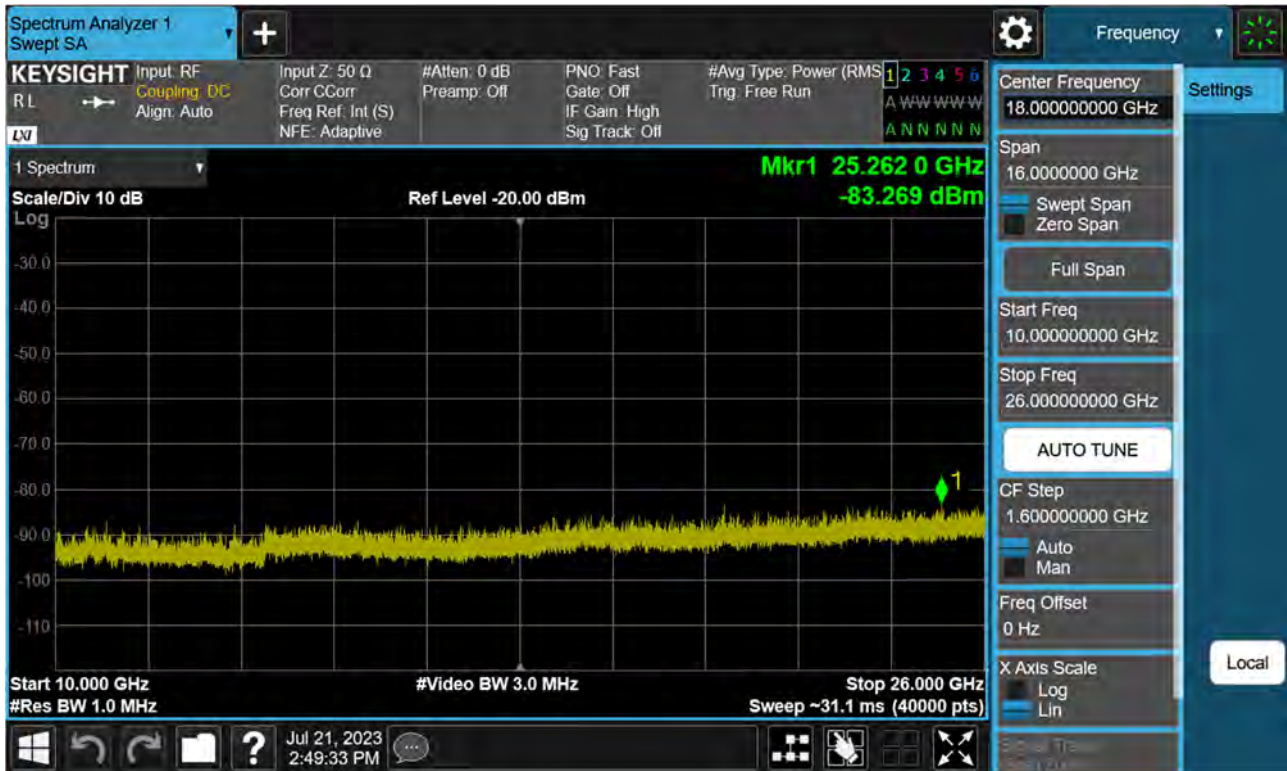
PCC 10 MHz Ch20805 RB1 Offset49, SCC 20 MHz Ch20949 RB1 Offset0



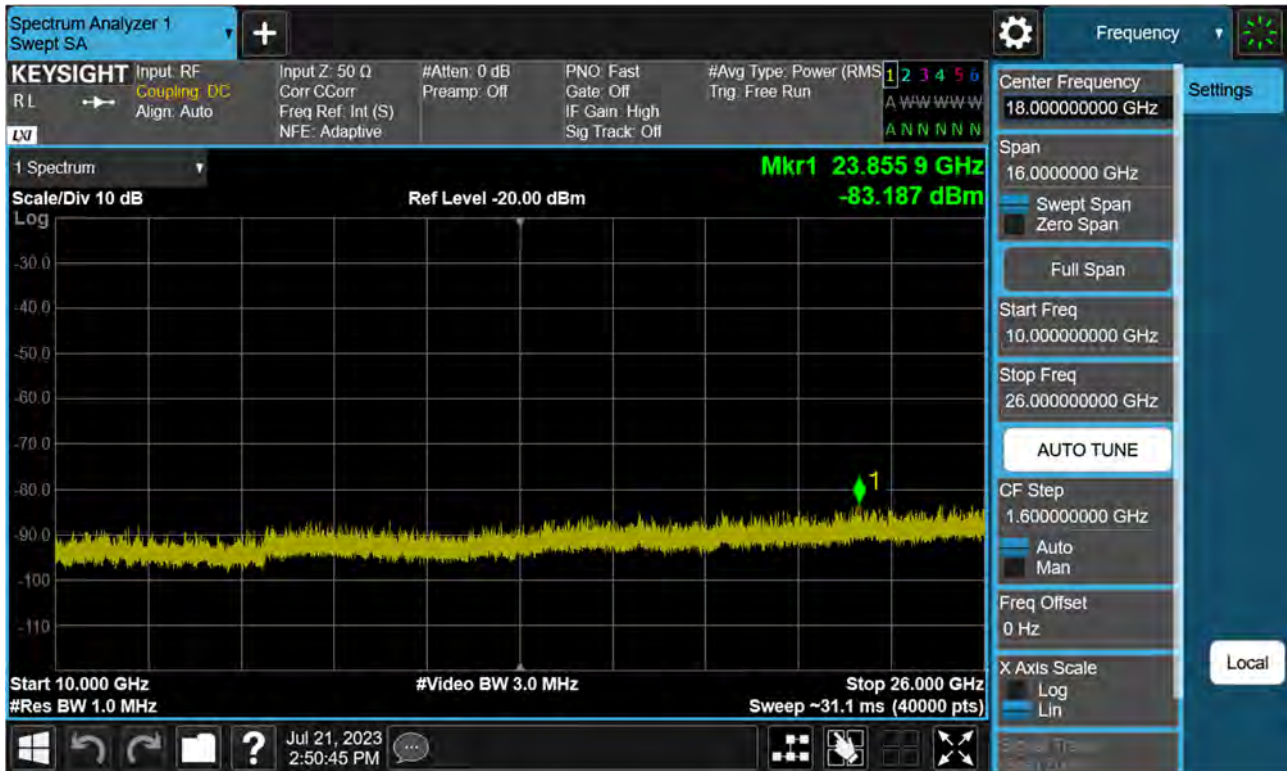
PCC 10 MHz Ch20805 RB50 Offset0, SCC 20 MHz Ch20949 RB100 Offset0



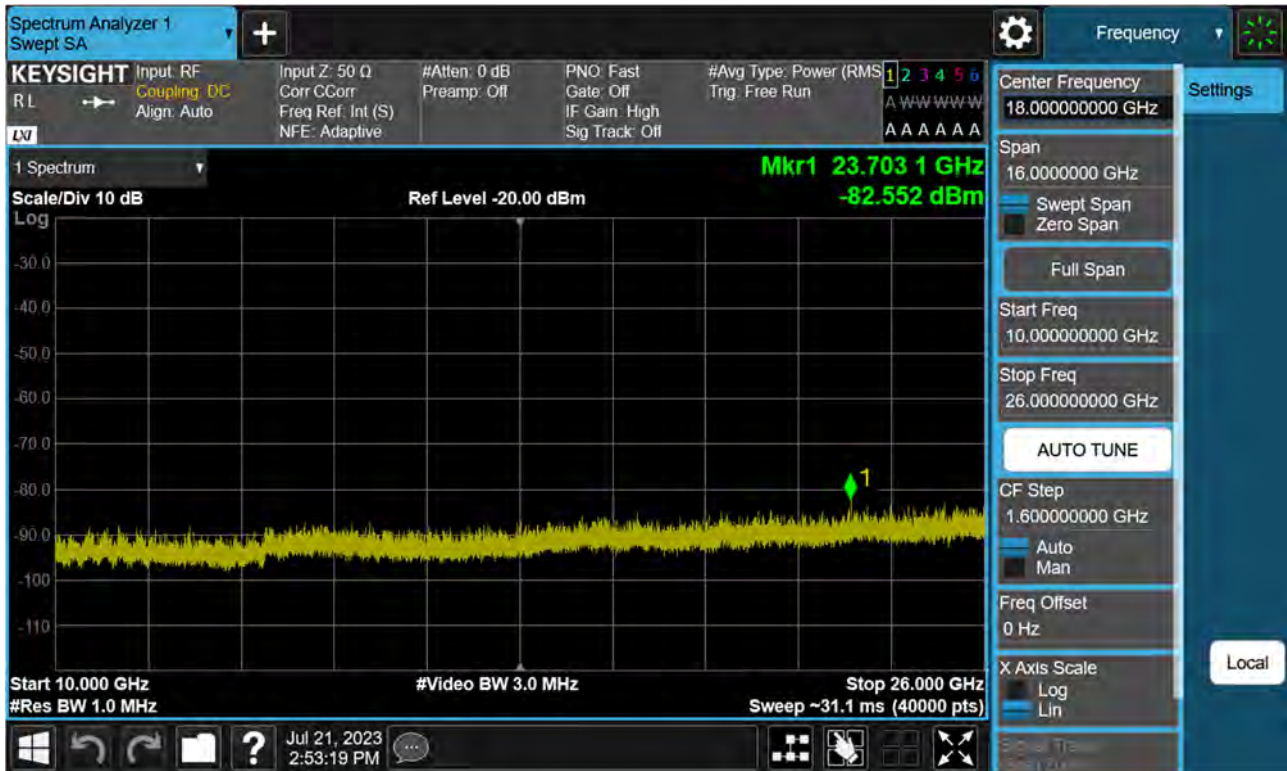
PCC 10 MHz Ch21206 RB50 Offset0, SCC 20 MHz Ch21350 RB100 Offset0



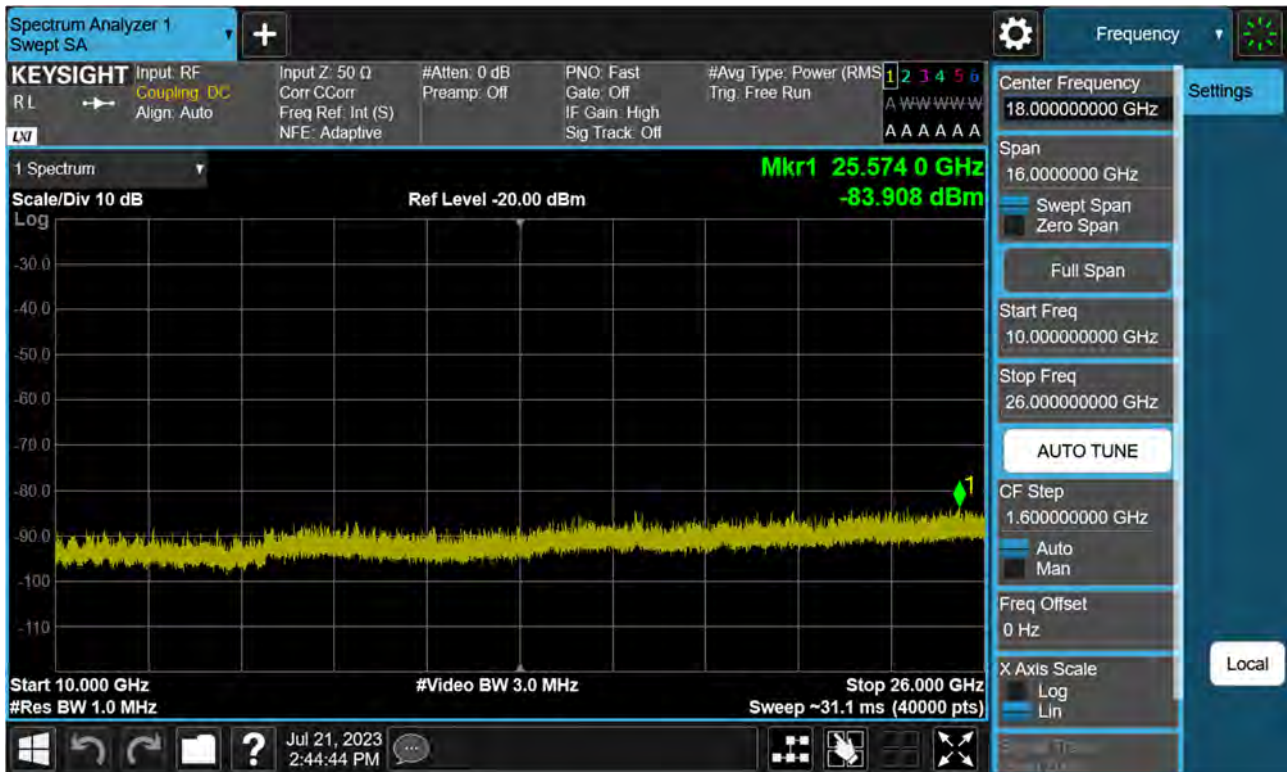
PCC 20 MHz Ch20850 RB100 Offset0, SCC 20 MHz Ch21048 RB100 Offset0



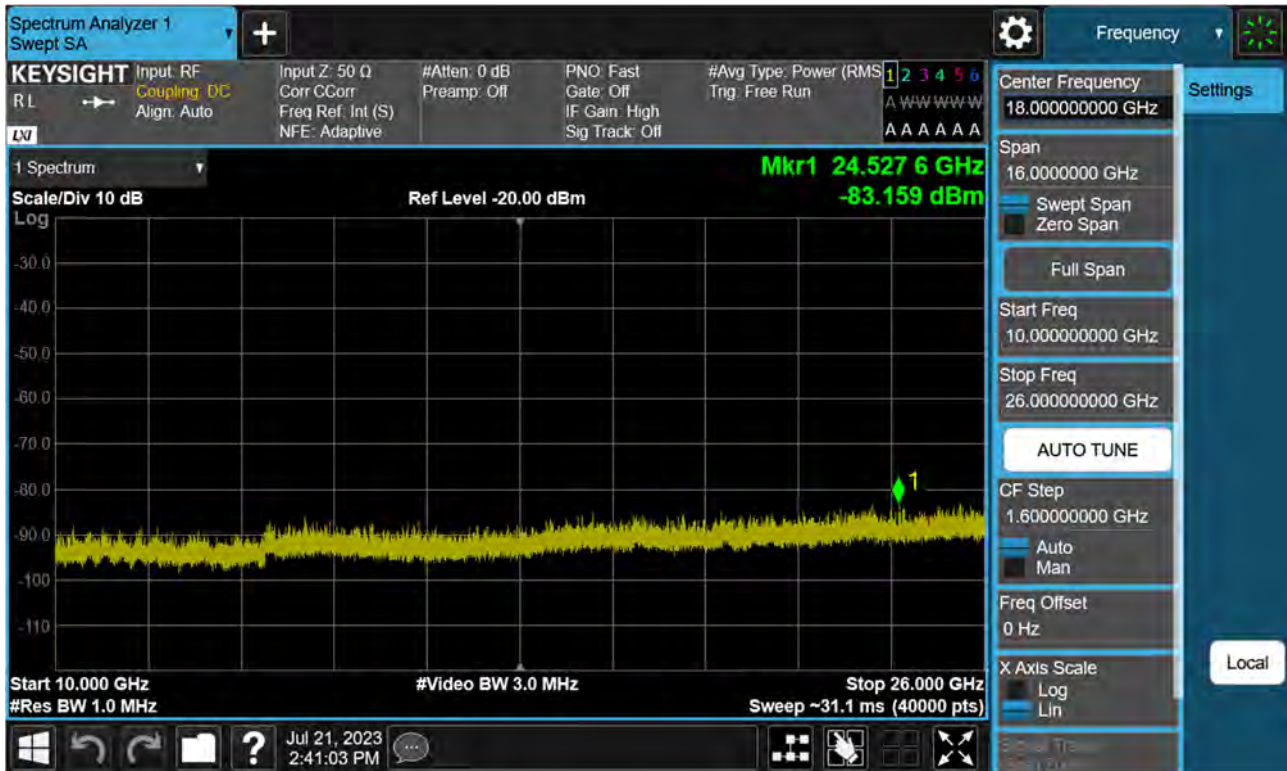
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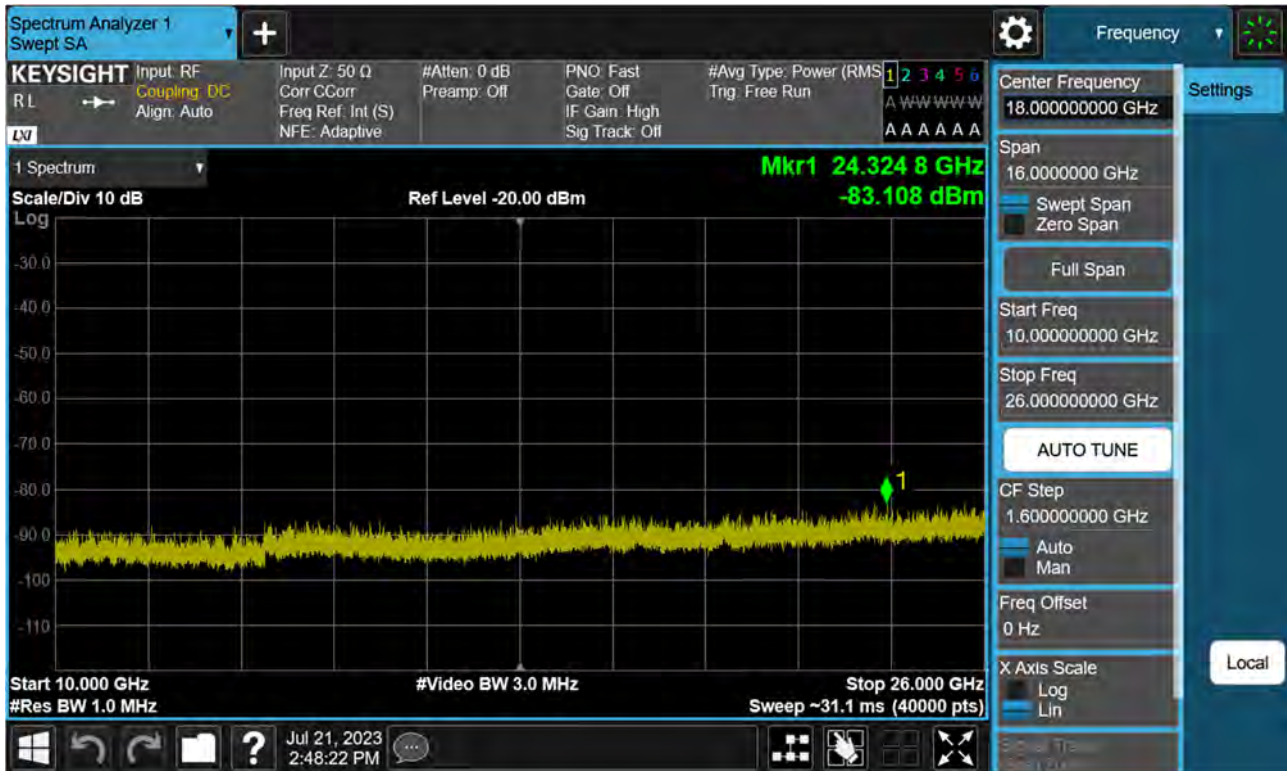
PCC 20 MHz Ch21051 RB1 Offset0, SCC 10 MHz Ch21195 RB1 Offset49



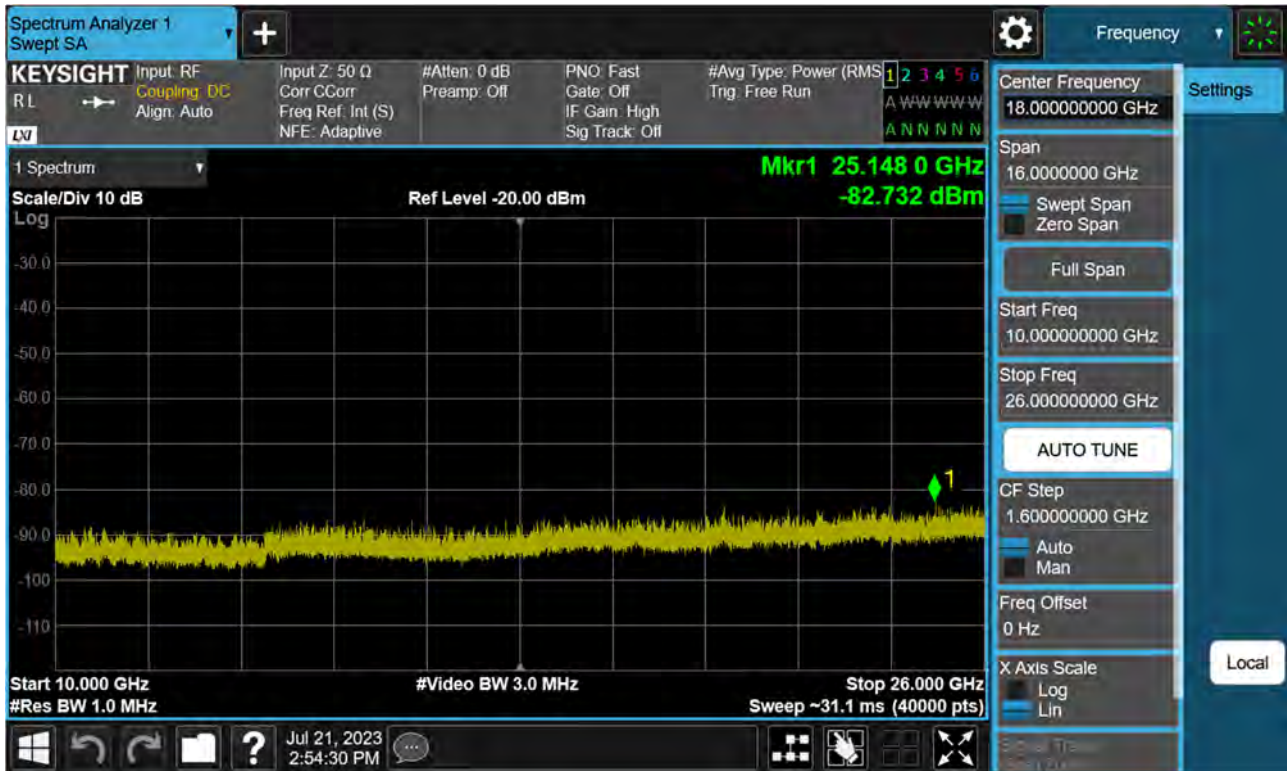
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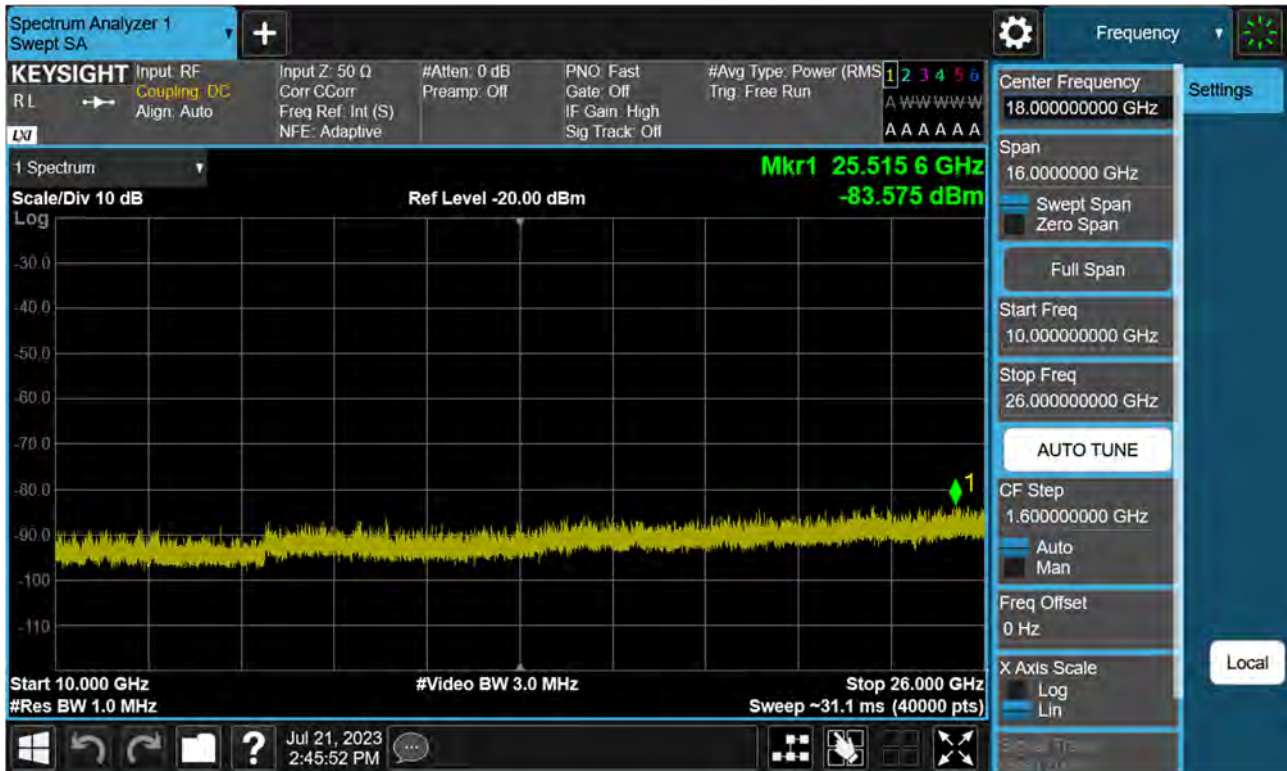
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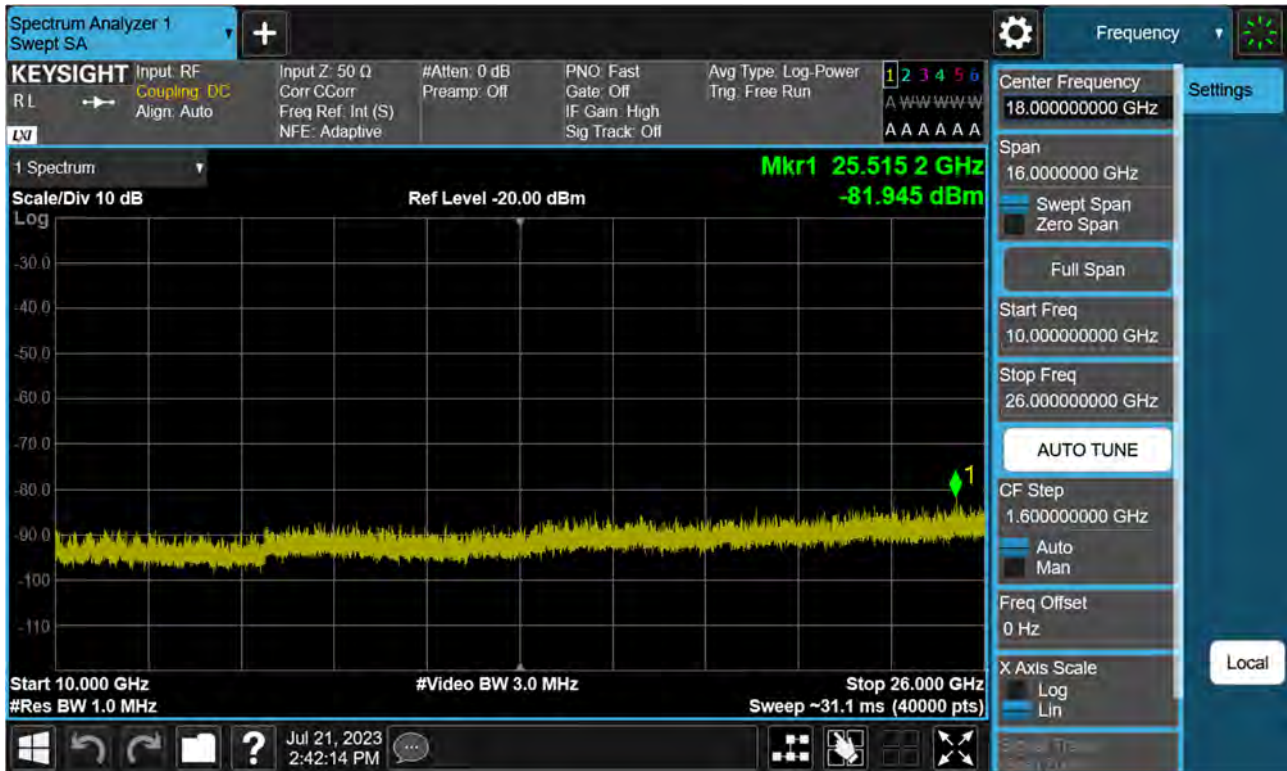
PCC 20 MHz Ch21152 RB100 Offset0, SCC 20 MHz Ch21350 RB100 Offset0



PCC 20 MHz Ch21201 RB1 Offset0, SCC 15 MHz Ch21372 RB1 Offset74



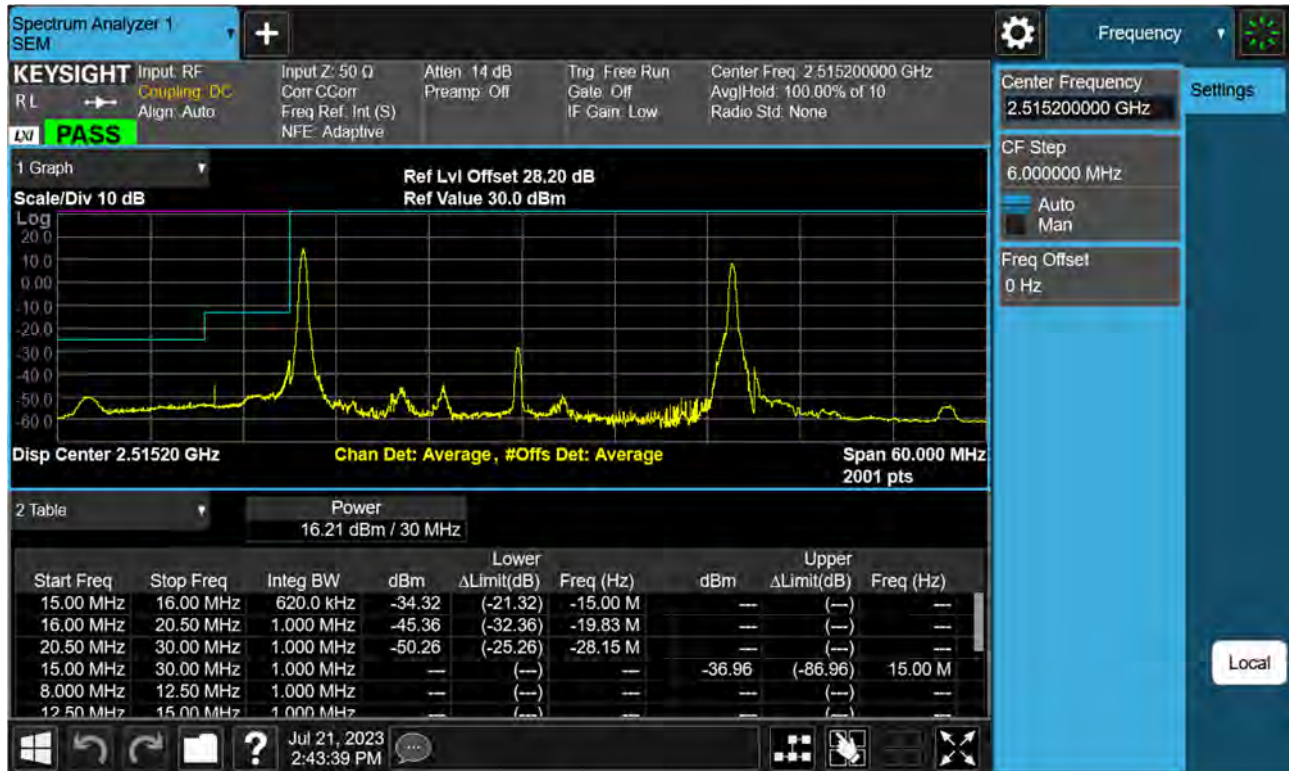
PCC 20 MHz Ch21201 RB1 Offset99, SCC 15 MHz Ch21372 RB1 Offset0



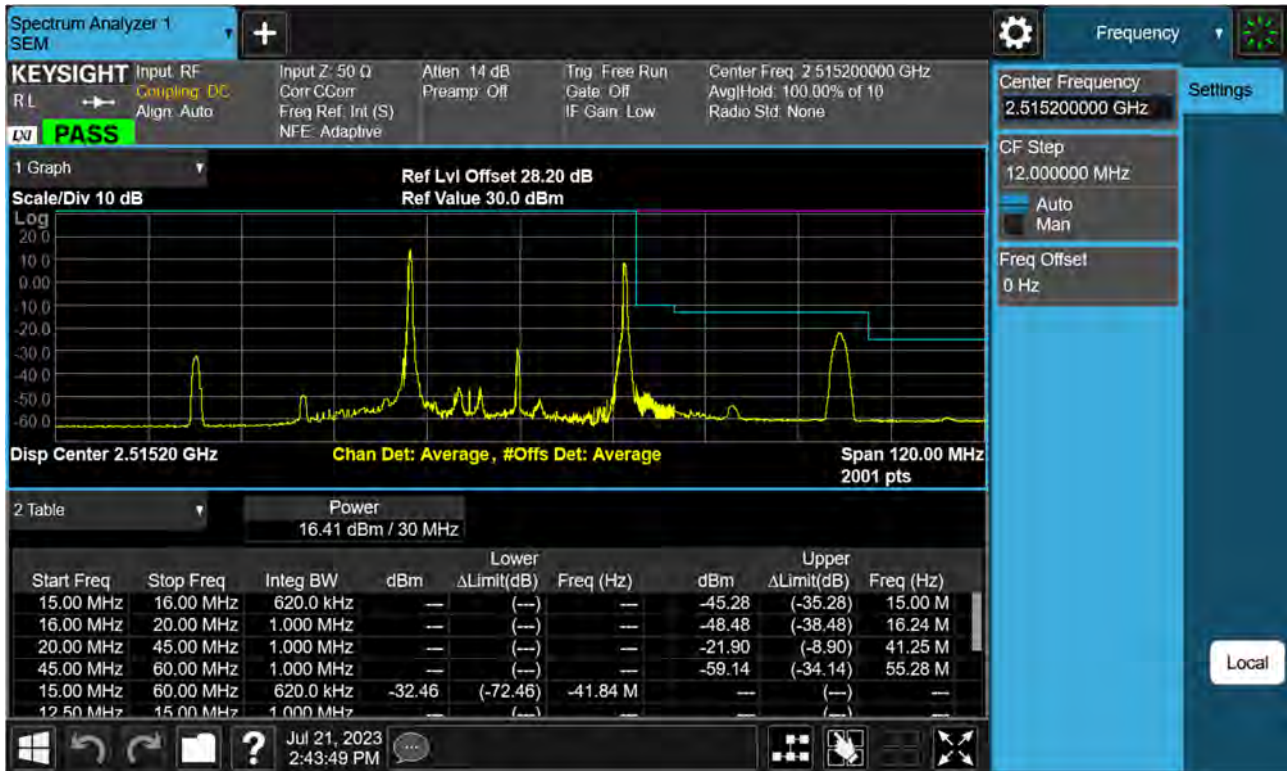


8.4 Channel Edge

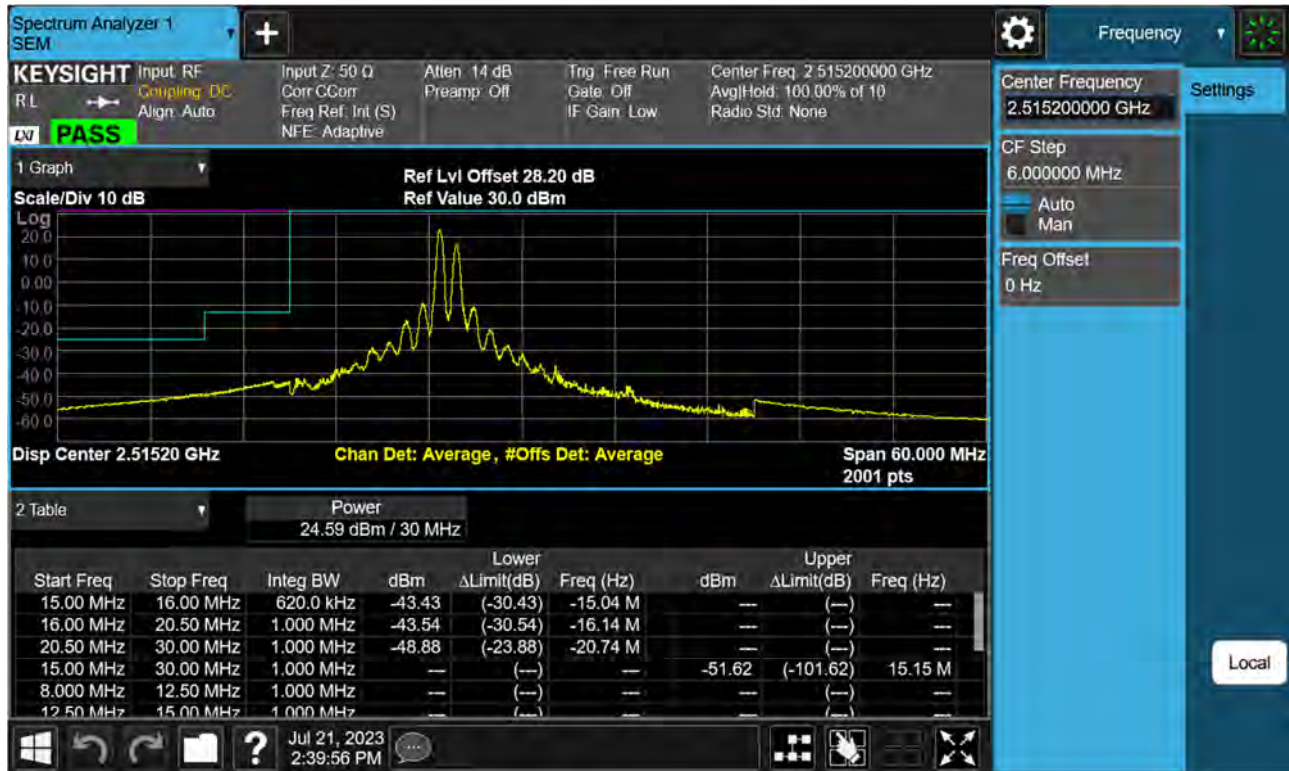
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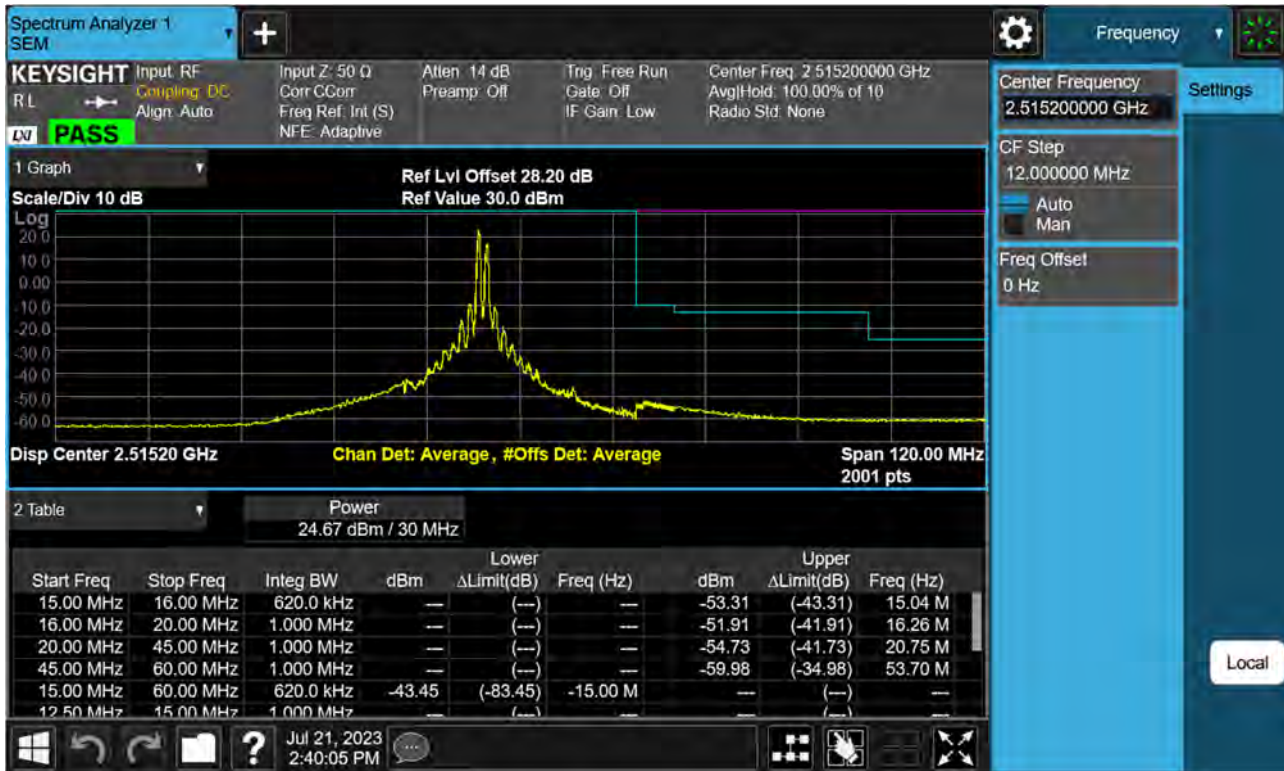
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PCC 10 MHz Ch20805 RB1 Offset49, SCC 20 MHz Ch20949 RB1 Offset0-1



PCC 10 MHz Ch20805 RB1 Offset49, SCC 20 MHz Ch20949 RB1 Offset0-2



PCC 10 MHz Ch20805 RB50 Offset0, SCC 20 MHz Ch20949 RB100 Offset0-1



PCC 10 MHz Ch20805 RB50 Offset0, SCC 20 MHz Ch20949 RB100 Offset0-2



PCC 10 MHz Ch21206 RB50 Offset0, SCC 20 MHz Ch21350 RB100 Offset0



PCC 20 MHz Ch20850 RB100 Offset0, SCC 20 MHz Ch21048 RB100 Offset0-1



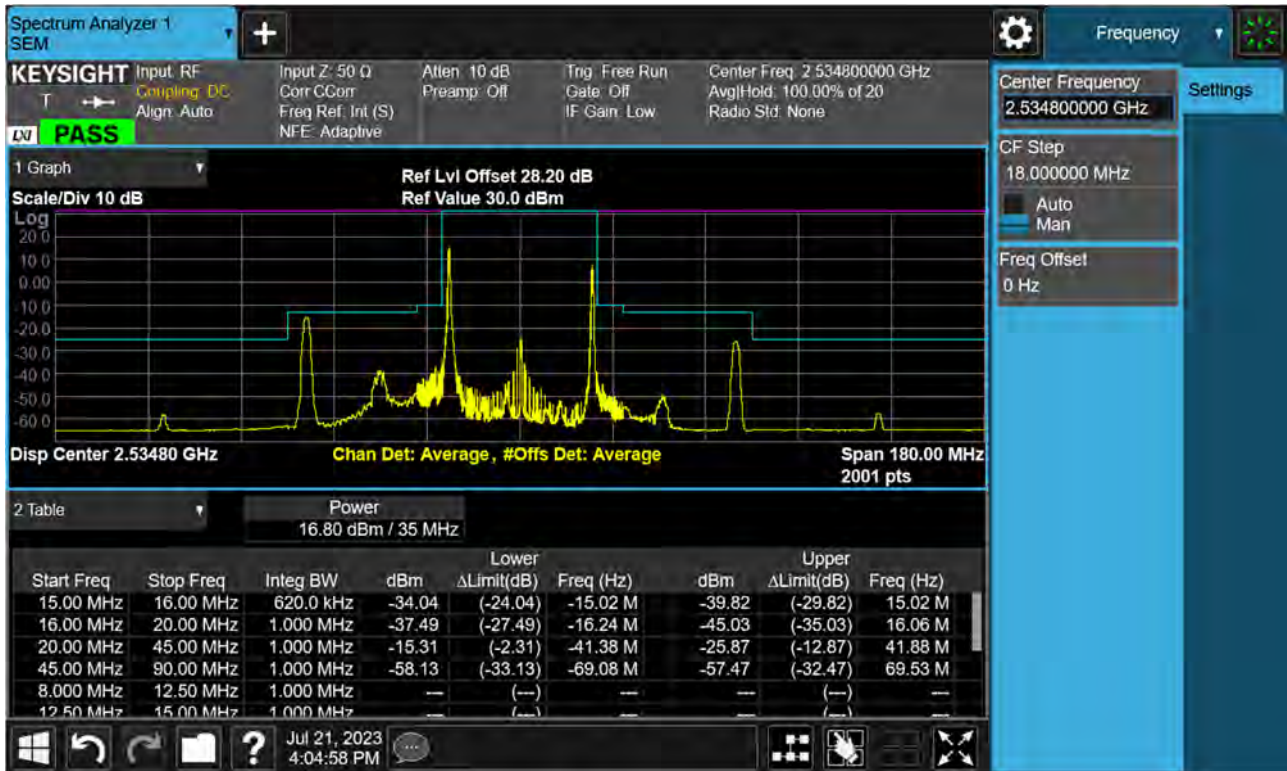
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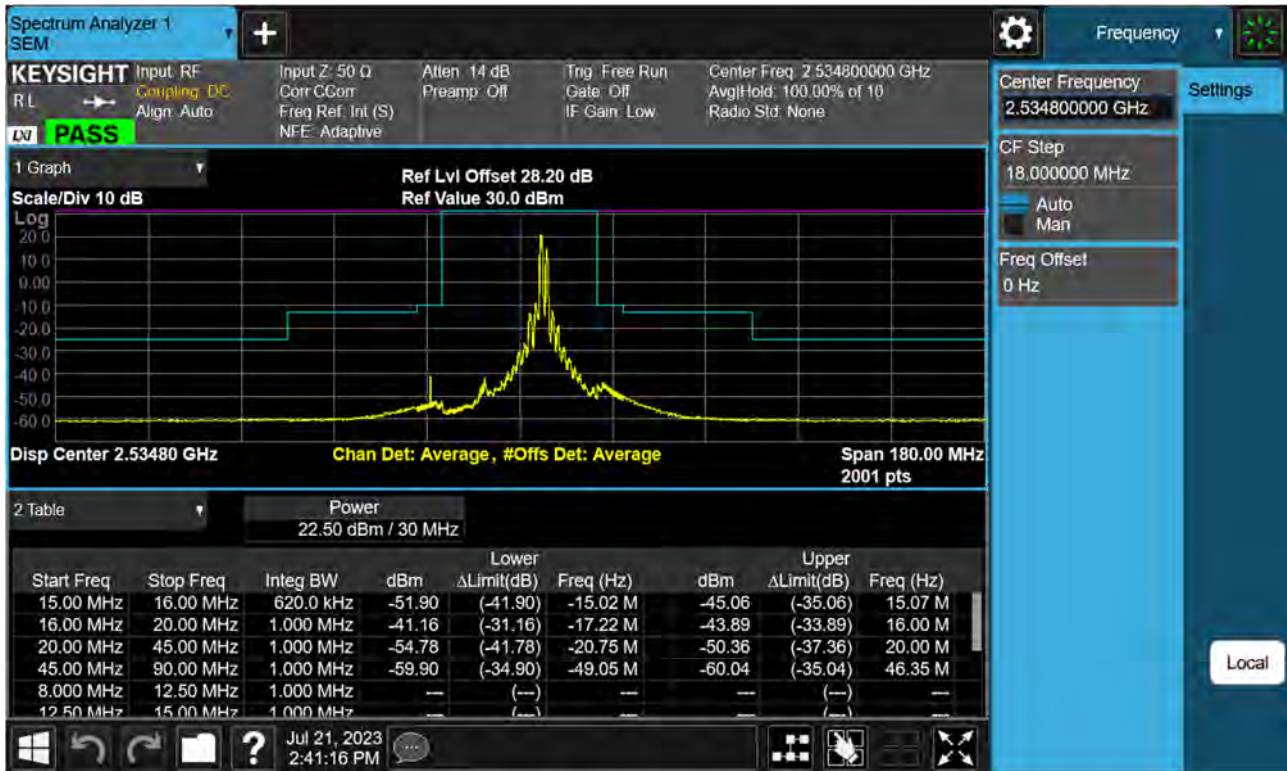
PCC 20 MHz Ch21001 RB100 Offset0, SCC 20 MHz Ch21199 RB100 Offset0



PCC 20 MHz Ch21051 RB1 Offset0, SCC 10 MHz Ch21195 RB1 Offset49



PCC 20 MHz Ch21051 RB1 Offset99, SCC 10 MHz Ch21195 RB1 Offset0



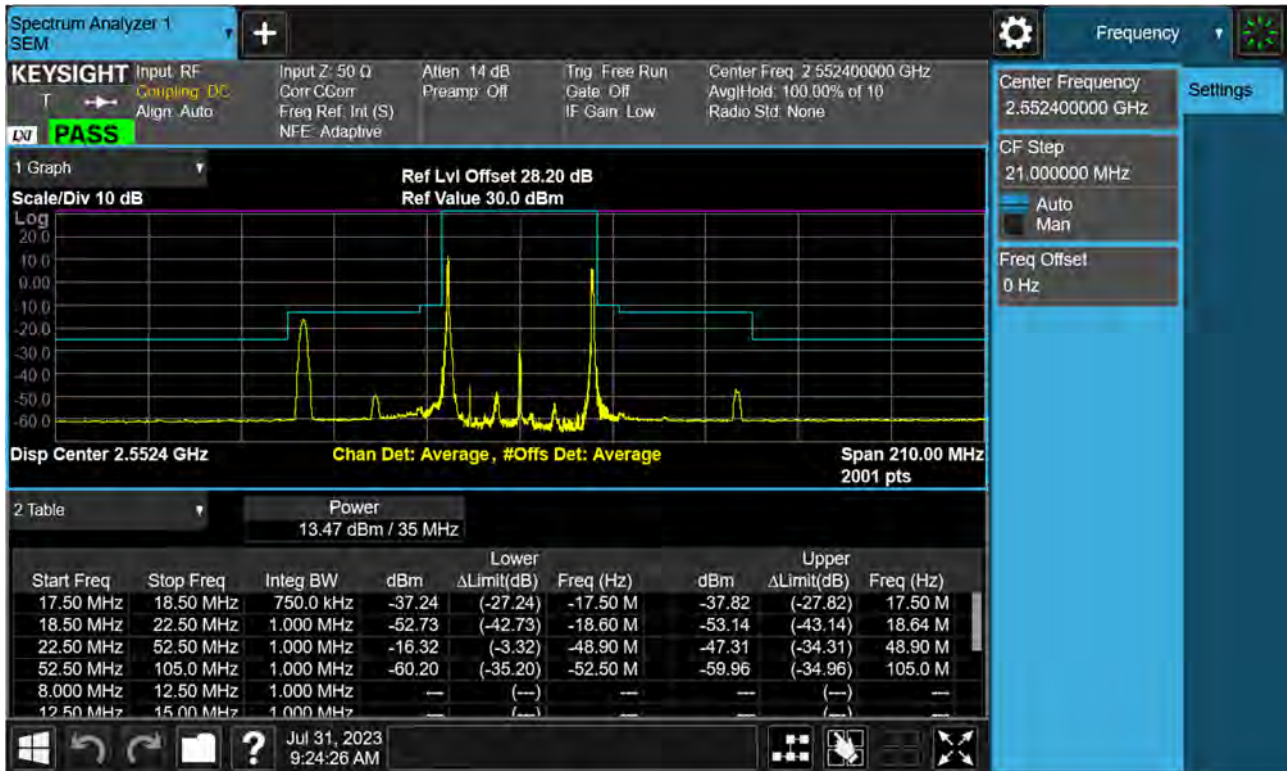
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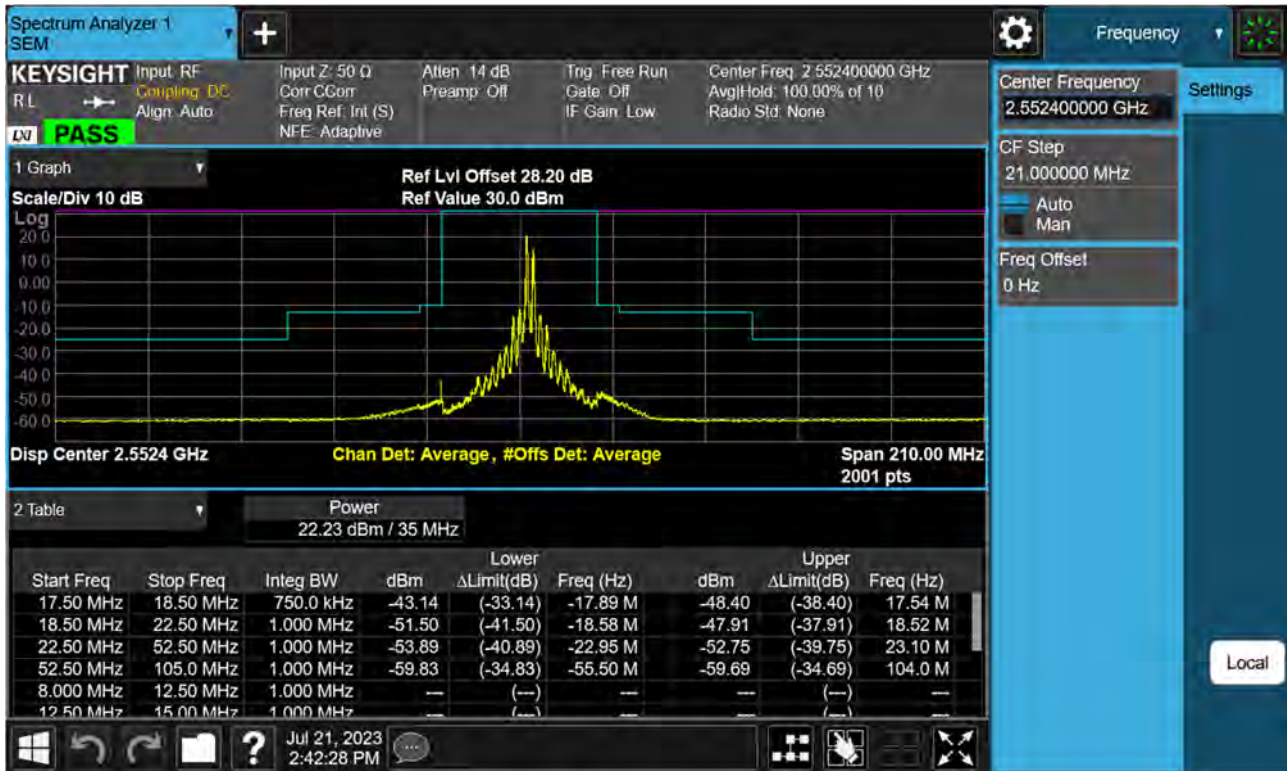
PCC 20 MHz Ch21152 RB100 Offset0, SCC 20 MHz Ch21350 RB100 Offset0



PCC 20 MHz Ch21201 RB1 Offset0, SCC 15 MHz Ch21372 RB1 Offset74



PCC 20 MHz Ch21201 RB1 Offset99, SCC 15 MHz Ch21372 RB1 Offset0





8.5 Frequency Stability / Variation Of Ambient Temperature

- ▣ PCC Channel: 20805
- ▣ PCC Frequency: 2505.5 MHz
- ▣ PCC BandWidth: 10 MHz
- ▣ SCC Channel: 20949
- ▣ SCC Frequency: 2519.9 MHz
- ▣ SCC BandWidth: 20 MHz
- ▣ Voltage : 13.500 VDC
- ▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	13.500	+20(Ref)	0.042	-0.045	2505.50000	2519.89997
100 %		-30	-0.050	-0.044	2505.49994	2519.89993
100 %		-20	0.043	0.043	2505.49993	2519.89999
100 %		-10	0.038	0.038	2505.49990	2519.89993
100 %		0	0.043	0.039	2505.49999	2519.89992
100 %		10	0.028	0.046	2505.49998	2519.89991
100 %		30	0.042	0.036	2505.49994	2519.89995
100 %		40	0.037	0.041	2505.49998	2519.89995
100 %		50	0.033	-0.044	2505.49990	2519.89995
85%	11.475	20	0.025	-0.013	2505.49995	2519.89996
115%	15.525	20	0.034	0.044	2505.49994	2519.89991



- ▣ PCC Channel: 20828
- ▣ PCC Frequency: 2507.8 MHz
- ▣ PCC BandWidth: 15 MHz
- ▣ SCC Channel: 20999
- ▣ SCC Frequency: 2524.9 MHz
- ▣ SCC BandWidth: 20 MHz
- ▣ Voltage : 13.500 VDC
- ▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	13.500	+20(Ref)	0.037	-0.050	2507.79996	2524.89997
100 %		-30	-0.057	-0.053	2507.79994	2524.89995
100 %		-20	0.035	0.040	2507.79996	2524.89991
100 %		-10	0.033	0.035	2507.79994	2524.89996
100 %		0	0.041	0.032	2507.79999	2524.89994
100 %		10	0.028	0.037	2507.79996	2524.89997
100 %		30	0.034	0.026	2507.79994	2524.89991
100 %		40	0.034	0.037	2507.79994	2524.89992
100 %		50	0.026	-0.046	2507.79991	2524.89995
85%	11.475	20	0.013	0.024	2507.79994	2524.89997
115%	15.525	20	0.031	0.042	2507.79990	2524.89993



- ▣ PCC Channel: 20850
- ▣ PCC Frequency: 2510.0 MHz
- ▣ PCC BandWidth: 20 MHz
- ▣ SCC Channel: 21048
- ▣ SCC Frequency: 2529.8 MHz
- ▣ SCC BandWidth: 20 MHz
- ▣ Voltage : 13.500 VDC
- ▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	13.500	+20(Ref)	0.033	-0.050	2509.99993	2529.79997
100 %		-30	-0.059	-0.057	2510.00000	2529.79994
100 %		-20	0.033	0.035	2509.99991	2529.79997
100 %		-10	0.024	0.028	2509.99999	2529.79993
100 %		0	0.033	0.023	2509.99999	2529.79993
100 %		10	0.025	0.027	2509.99999	2529.79995
100 %		30	0.027	0.025	2510.00000	2529.79993
100 %		40	0.025	0.035	2509.99993	2529.79990
100 %		50	0.019	-0.055	2509.99991	2529.79995
85%	11.475	20	0.021	0.011	2509.99994	2529.79997
115%	15.525	20	0.023	0.033	2509.99992	2529.79998



- ▣ PCC Channel: 21206
- ▣ PCC Frequency: 2545.6 MHz
- ▣ PCC BandWidth: 10 MHz
- ▣ SCC Channel: 21350
- ▣ SCC Frequency: 2560.0 MHz
- ▣ SCC BandWidth: 20 MHz
- ▣ Voltage : 13.500 VDC
- ▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	13.500	+20(Ref)	0.030	-0.053	2545.59998	2559.99996
100 %		-30	-0.066	-0.066	2545.59994	2559.99991
100 %		-20	0.031	0.029	2545.59991	2559.99992
100 %		-10	0.018	0.023	2545.59996	2559.99993
100 %		0	0.029	0.021	2545.59991	2559.99994
100 %		10	0.022	0.024	2545.59991	2559.99994
100 %		30	0.019	0.016	2545.59997	2559.99991
100 %		40	0.022	0.032	2545.59997	2559.99998
100 %		50	0.018	-0.065	2545.59994	2559.99991
85%	11.475	20	0.019	0.023	2545.59996	2559.99994
115%	15.525	20	0.020	0.032	2545.59993	2559.99997



- ▣ PCC Channel: 21179
- ▣ PCC Frequency: 2542.9 MHz
- ▣ PCC BandWidth: 15 MHz
- ▣ SCC Channel: 21350
- ▣ SCC Frequency: 2560.0 MHz
- ▣ SCC BandWidth: 20 MHz
- ▣ Voltage : 13.500 VDC
- ▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	13.500	+20(Ref)	0.027	-0.058	2542.89999	2559.99991
100 %		-30	-0.069	-0.070	2542.89995	2559.99990
100 %		-20	0.024	0.027	2542.89991	2559.99992
100 %		-10	0.015	0.020	2542.90000	2559.99994
100 %		0	0.020	0.021	2542.90000	2559.99992
100 %		10	0.017	0.023	2542.89994	2559.99992
100 %		30	0.015	0.011	2542.89998	2559.99990
100 %		40	0.012	0.029	2542.89995	2559.99990
100 %		50	0.010	-0.070	2542.89992	2559.99991
85%	11.475	20	0.018	-0.013	2542.89994	2559.99994
115%	15.525	20	0.020	0.023	2542.89996	2559.99994



- ▣ PCC Channel: 21152
- ▣ PCC Frequency: 2540.2 MHz
- ▣ PCC BandWidth: 20 MHz
- ▣ SCC Channel: 21350
- ▣ SCC Frequency: 2560.0 MHz
- ▣ SCC BandWidth: 20 MHz
- ▣ Voltage : 13.500 VDC
- ▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	13.500	+20(Ref)	0.026	-0.059	2540.19991	2559.99991
100 %		-30	-0.072	-0.076	2540.19991	2559.99990
100 %		-20	0.019	0.019	2540.19998	2559.99991
100 %		-10	0.008	0.017	2540.20000	2559.99995
100 %		0	0.017	0.014	2540.19992	2559.99991
100 %		10	0.015	0.014	2540.19994	2559.99996
100 %		30	0.005	0.007	2540.19994	2559.99995
100 %		40	0.007	0.022	2540.19999	2559.99997
100 %		50	0.006	-0.078	2540.19990	2559.99993
85%	11.475	20	0.013	-0.056	2540.19992	2559.99995
115%	15.525	20	0.019	0.022	2540.19999	2559.99990



8.6 Radiated Spurious Emissions

8.6.1 External Antenna

▣ PCC Channel :	<u>20825 (2507.5 MHz)</u>
▣ PCC BW(MHz) :	15
▣ PCC RB/ RB Offset :	<u>1/ 74</u>
▣ SCC Channel :	<u>20975 (2522.5 MHz)</u>
▣ SCC BW(MHz) :	15
▣ SCC RB/ RB Offset :	<u>1/ 0</u>
▣ DISTANCE:	<u>3 meters</u>
▣ LIMIT:	<u>-25.00 dBm</u>

Freq.(MHz)	Measured Level (dBμV)	A.F+C.L+D.F+H.P.F-A.G (dB/m)	Total (dBμV/m)	Pol.	Result (dBm)
5 030.00	60.76	-7.46	53.30	V	-41.90
7 545.00	56.13	-0.84	55.29	V	-39.91
10 060.00	49.12	4.53	53.65	V	-41.55
12 575.00	46.25	5.76	52.01	V	-43.19
15 090.00	48.21	8.67	56.88	V	-38.32



- ▣ PCC Channel : 21006 (2525.6 MHz)
- ▣ PCC BW(MHz) : 10
- ▣ PCC RB/ RB Offset : 1/ 49
- ▣ SCC Channel : 21350 (2560.0 MHz)
- ▣ SCC BW(MHz) : 20
- ▣ SCC RB/ RB Offset : 1/ 0
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: -25.00 dBm

Freq.(MHz)	Measured Level (dBμV)	A.F+C.L+D.F+H.P.F-A.G (dB/m)	Total (dBμV/m)	Pol.	Result (dBm)
5 065.60	59.41	-7.19	52.22	V	-42.98
7 598.40	56.54	-1.09	55.45	V	-39.75
10 131.20	48.87	3.99	52.86	V	-42.34
12 664.00	46.22	5.65	51.87	V	-43.33
15 196.80	47.68	7.18	54.86	V	-40.34



☐ PCC Channel : 21152 (2540.2 MHz)
☐ PCC BW(MHz) : 20
☐ PCC RB/ RB Offset : 1/ 99
☐ SCC Channel : 21350 (2560.0 MHz)
☐ SCC BW(MHz) : 20
☐ SCC RB/ RB Offset : 1/ 0
☐ DISTANCE: 3 meters
☐ LIMIT: -25.00 dBm

Freq.(MHz)	Measured Level (dBμV)	A.F+C.L+D.F+H.P.F-A.G (dB/m)	Total (dBμV/m)	Pol.	Result (dBm)
5 110.00	62.40	-7.02	55.38	V	-39.82
7 665.00	54.54	-1.08	53.46	V	-41.74
10 220.00	48.14	5.01	53.15	V	-42.05
12 775.00	45.99	6.25	52.24	V	-42.96
15 330.00	48.35	6.43	54.78	V	-40.42



8.6.2 Internal Antenna

- ▣ PCC Channel : 20850 (2510.0 MHz)
- ▣ PCC BW(MHz) : 20
- ▣ PCC RB/ RB Offset : 1/ 99
- ▣ SCC Channel : 20994 (2524.4 MHz)
- ▣ SCC BW(MHz) : 10
- ▣ SCC RB/ RB Offset : 1/ 0
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: -25.00 dBm

Freq.(MHz)	Measured Level (dBμV)	A.F+C.L+D.F+H.P.F-A.G (dB/m)	Total (dBμV/m)	Pol.	Result (dBm)
5 034.40	63.76	-8.63	55.13	H	-40.07
7 551.60	55.35	-1.69	53.66	H	-41.54
10 068.80	47.19	2.57	49.76	H	-45.44



- ▣ PCC Channel : 21003 (2525.3 MHz)
- ▣ PCC BW(MHz) : 15
- ▣ PCC RB/ RB Offset : 1/ 74
- ▣ SCC Channel : 21174 (2542.4 MHz)
- ▣ SCC BW(MHz) : 20
- ▣ SCC RB/ RB Offset : 1/ 0
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: -25.00 dBm

Freq.(MHz)	Measured Level (dBμV)	A.F+C.L+D.F+H.P.F-A.G (dB/m)	Total (dBμV/m)	Pol.	Result (dBm)
5 067.70	60.51	-8.67	51.84	H	-43.36
7 601.55	56.08	-2.18	53.90	H	-41.30
10 135.40	47.03	2.60	49.63	H	-45.57



- ▣ PCC Channel : 21179 (2542.9 MHz)
- ▣ PCC BW(MHz) : 15
- ▣ PCC RB/ RB Offset : 1/ 74
- ▣ SCC Channel : 21350 (2560.0 MHz)
- ▣ SCC BW(MHz) : 20
- ▣ SCC RB/ RB Offset : 1/ 0
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: -25.00 dBm

Freq.(MHz)	Measured Level (dBμV)	A.F+C.L+D.F+H.P.F-A.G (dB/m)	Total (dBμV/m)	Pol.	Result (dBm)
5 102.90	62.21	-8.33	53.88	H	-41.32
7 654.35	52.31	-2.14	50.17	V	-45.03
10 205.80	44.97	2.62	47.59	H	-47.61

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	21006	2525.6	QPSK	50/ 0	20	21150	2540.0	QPSK	100/ 0	27.701
15	21051	2530.1	QPSK	75/ 0	10	21171	2542.1	QPSK	50/ 0	23.135
15	21025	2527.5	QPSK	75/ 0	15	21175	2542.5	QPSK	75/ 0	28.265
15	21003	2525.3	QPSK	75/ 0	20	21174	2542.4	QPSK	100/ 0	32.555
20	21051	2530.1	QPSK	100/ 0	10	21195	2544.5	QPSK	50/ 0	27.891
20	21026	2527.6	QPSK	100/ 0	15	21197	2544.7	QPSK	75/ 0	32.540
20	21001	2525.1	QPSK	100/ 0	20	21199	2544.9	QPSK	100/ 0	37.639

PCC					SCC					Data (MHz)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
10	21006	2525.6	16QAM	50/ 0	20	21150	2540.0	16QAM	100/ 0	27.659
15	21051	2530.1	16QAM	75/ 0	10	21171	2542.1	16QAM	50/ 0	23.133
15	21025	2527.5	16QAM	75/ 0	15	21175	2542.5	16QAM	75/ 0	28.284
15	21003	2525.3	16QAM	75/ 0	20	21174	2542.4	16QAM	100/ 0	32.533
20	21051	2530.1	16QAM	100/ 0	10	21195	2544.5	16QAM	50/ 0	27.776
20	21026	2527.6	16QAM	100/ 0	15	21197	2544.7	16QAM	75/ 0	32.632
20	21001	2525.1	16QAM	100/ 0	20	21199	2544.9	16QAM	100/ 0	37.446

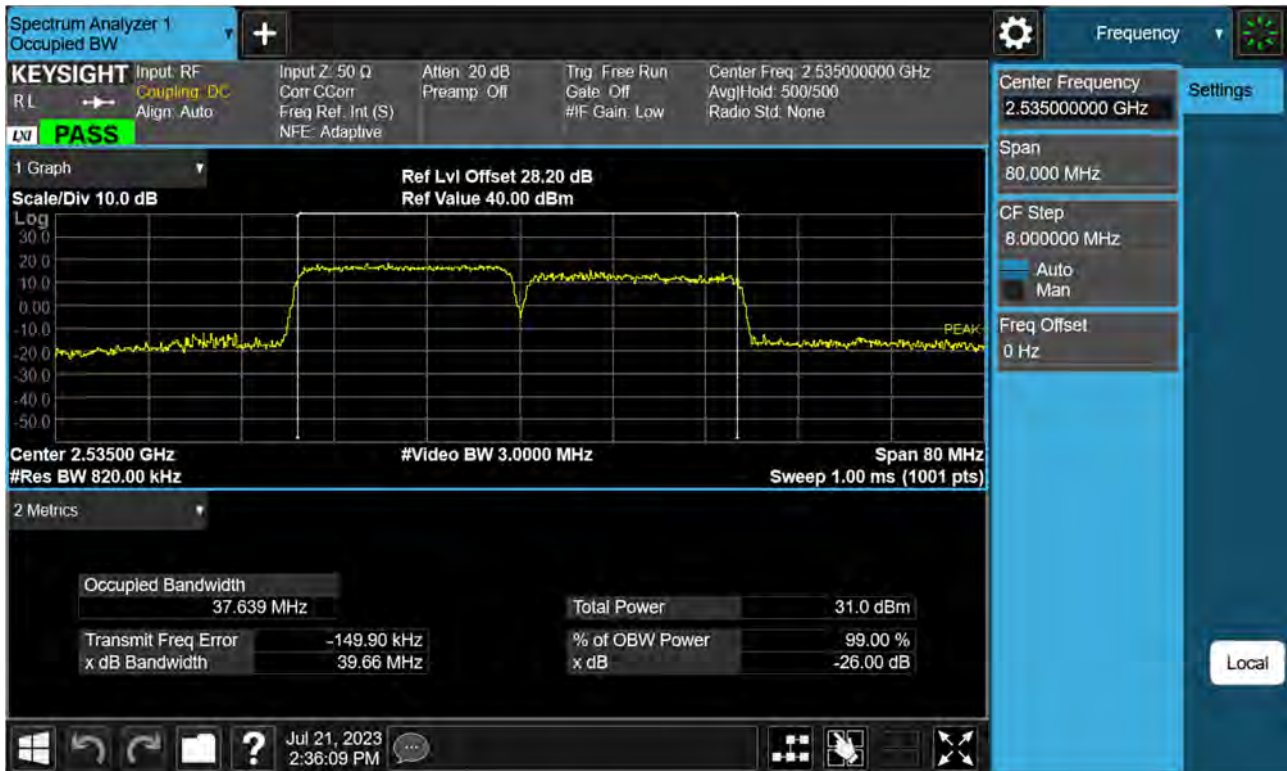
PCC					SCC					Data (MHz)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
10	21006	2525.6	64QAM	50/ 0	20	21150	2540.0	64QAM	100/ 0	27.609
15	21051	2530.1	64QAM	75/ 0	10	21171	2542.1	64QAM	50/ 0	23.127
15	21025	2527.5	64QAM	75/ 0	15	21175	2542.5	64QAM	75/ 0	28.258
15	21003	2525.3	64QAM	75/ 0	20	21174	2542.4	64QAM	100/ 0	32.580
20	21051	2530.1	64QAM	100/ 0	10	21195	2544.5	64QAM	50/ 0	27.727
20	21026	2527.6	64QAM	100/ 0	15	21197	2544.7	64QAM	75/ 0	32.679
20	21001	2525.1	64QAM	100/ 0	20	21199	2544.9	64QAM	100/ 0	37.568

PCC					SCC					Data (MHz)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
10	21006	2525.6	256QAM	50/ 0	20	21150	2540.0	256QAM	100/ 0	27.685
15	21051	2530.1	256QAM	75/ 0	10	21171	2542.1	256QAM	50/ 0	23.158
15	21025	2527.5	256QAM	75/ 0	15	21175	2542.5	256QAM	75/ 0	28.353
15	21003	2525.3	256QAM	75/ 0	20	21174	2542.4	256QAM	100/ 0	32.618
20	21051	2530.1	256QAM	100/ 0	10	21195	2544.5	256QAM	50/ 0	27.708
20	21026	2527.6	256QAM	100/ 0	15	21197	2544.7	256QAM	75/ 0	32.645
20	21001	2525.1	256QAM	100/ 0	20	21199	2544.9	256QAM	100/ 0	37.454

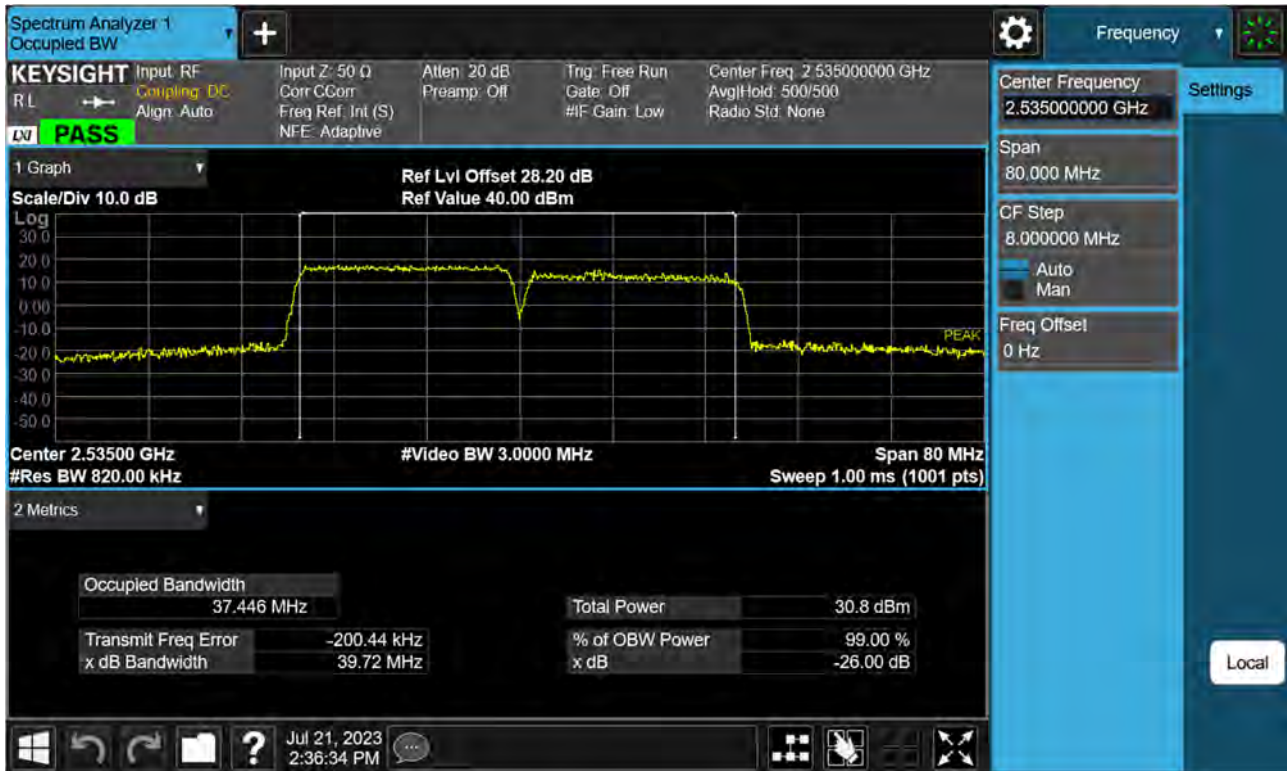
Note:

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

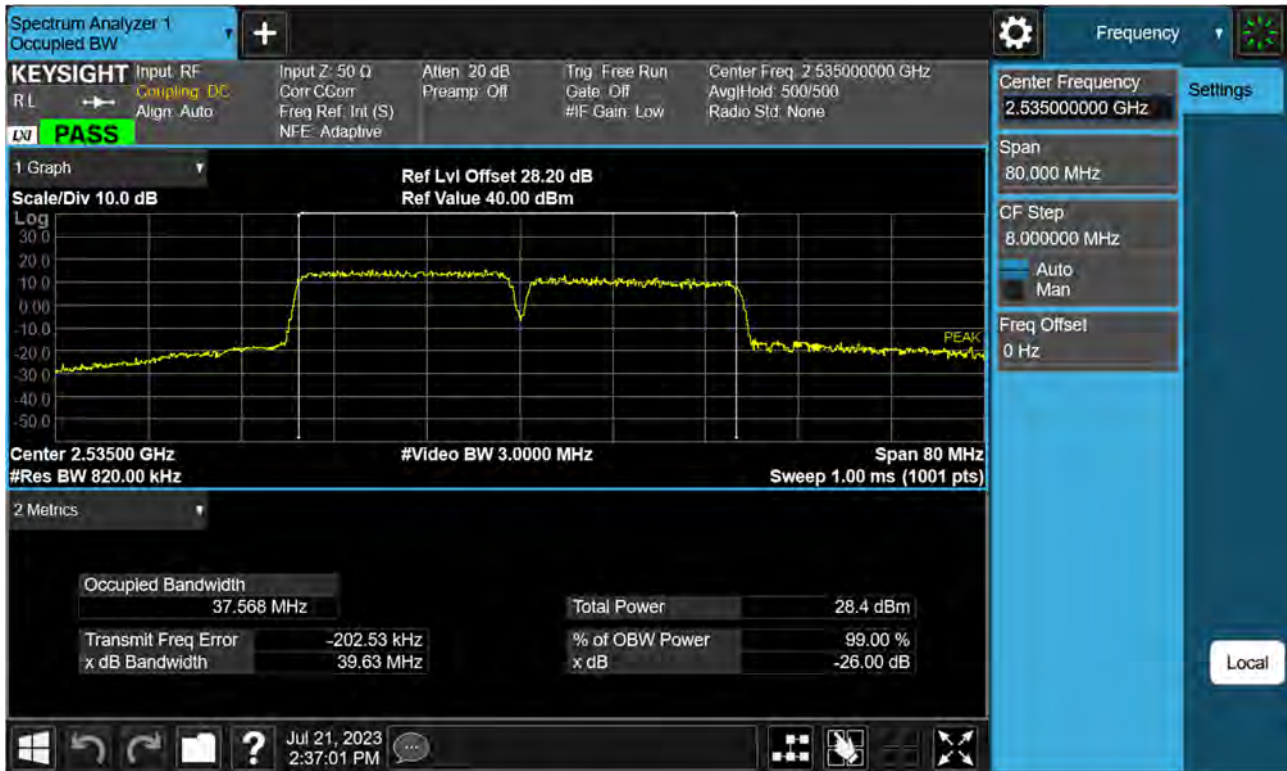
PCC 20 MHz Ch21001 RB100 Offset0, SCC 20 MHz Ch21199 RB100 Offset0_(QPSK)



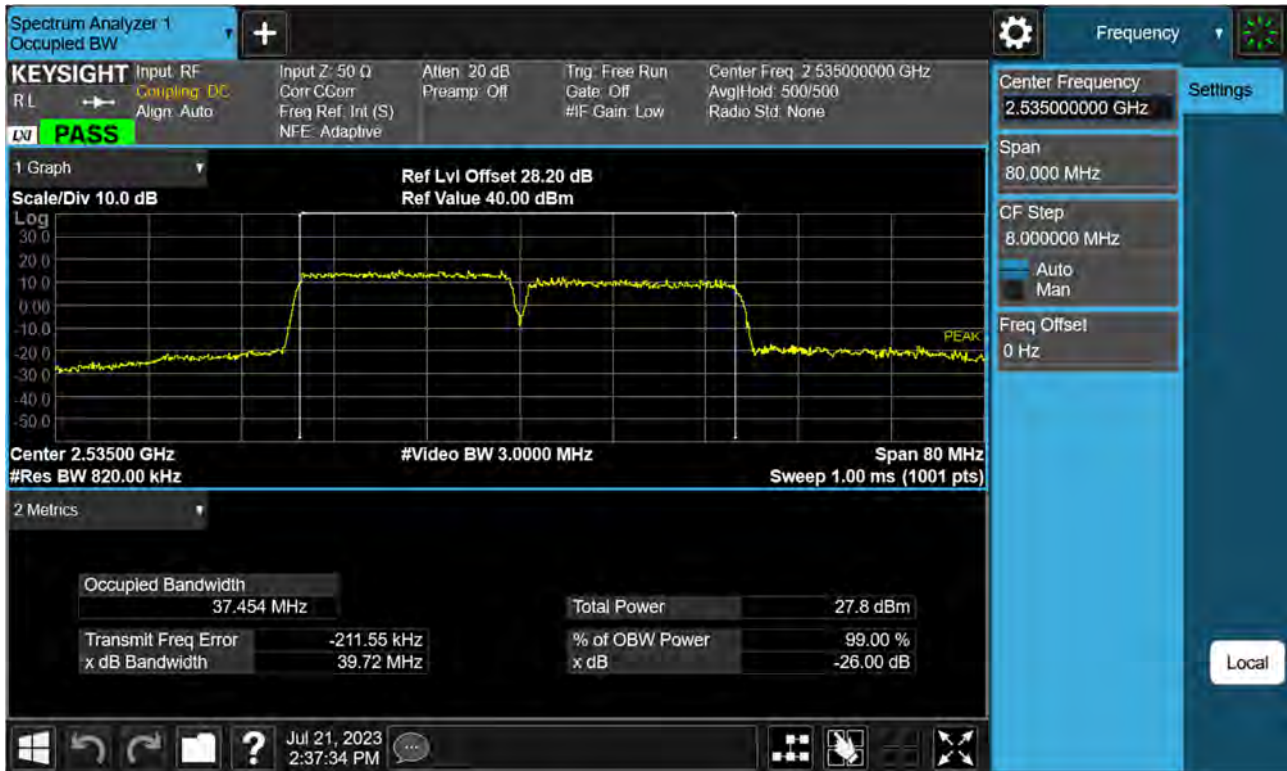
PCC 20 MHz Ch21001 RB100 Offset0, SCC 20 MHz Ch21199 RB100 Offset0_(16QAM)



PCC 20 MHz Ch21001 RB100 Offset0, SCC 20 MHz Ch21199 RB100 Offset0_(64QAM)



PCC 20 MHz Ch21001 RB100 Offset0, SCC 20 MHz Ch21199 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	21006	2525.6	QPSK	50/ 0	20	21150	2540.0	QPSK	100/ 0	5.93
15	21051	2530.1	QPSK	75/ 0	10	21171	2542.1	QPSK	50/ 0	5.79
15	21025	2527.5	QPSK	75/ 0	15	21175	2542.5	QPSK	75/ 0	6.34
15	21003	2525.3	QPSK	75/ 0	20	21174	2542.4	QPSK	100/ 0	5.81
20	21051	2530.1	QPSK	100/ 0	10	21195	2544.5	QPSK	50/ 0	5.85
20	21026	2527.6	QPSK	100/ 0	15	21197	2544.7	QPSK	75/ 0	5.95
20	21001	2525.1	QPSK	100/ 0	20	21199	2544.9	QPSK	100/ 0	6.04

PCC					SCC					Data (dBm)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
10	21006	2525.6	16QAM	50/ 0	20	21150	2540.0	16QAM	100/ 0	6.53
15	21051	2530.1	16QAM	75/ 0	10	21171	2542.1	16QAM	50/ 0	6.77
15	21025	2527.5	16QAM	75/ 0	15	21175	2542.5	16QAM	75/ 0	6.72
15	21003	2525.3	16QAM	75/ 0	20	21174	2542.4	16QAM	100/ 0	6.82
20	21051	2530.1	16QAM	100/ 0	10	21195	2544.5	16QAM	50/ 0	6.57
20	21026	2527.6	16QAM	100/ 0	15	21197	2544.7	16QAM	75/ 0	6.76
20	21001	2525.1	16QAM	100/ 0	20	21199	2544.9	16QAM	100/ 0	6.49

PCC					SCC					Data (dBm)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
10	21006	2525.6	64QAM	50/ 0	20	21150	2540.0	64QAM	100/ 0	7.02
15	21051	2530.1	64QAM	75/ 0	10	21171	2542.1	64QAM	50/ 0	7.32
15	21025	2527.5	64QAM	75/ 0	15	21175	2542.5	64QAM	75/ 0	7.41
15	21003	2525.3	64QAM	75/ 0	20	21174	2542.4	64QAM	100/ 0	7.04
20	21051	2530.1	64QAM	100/ 0	10	21195	2544.5	64QAM	50/ 0	7.22
20	21026	2527.6	64QAM	100/ 0	15	21197	2544.7	64QAM	75/ 0	7.45
20	21001	2525.1	64QAM	100/ 0	20	21199	2544.9	64QAM	100/ 0	7.30

PCC					SCC					Data (dBm)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
10	21006	2525.6	256QAM	50/ 0	20	21150	2540.0	256QAM	100/ 0	7.15
15	21051	2530.1	256QAM	75/ 0	10	21171	2542.1	256QAM	50/ 0	7.12
15	21025	2527.5	256QAM	75/ 0	15	21175	2542.5	256QAM	75/ 0	7.34
15	21003	2525.3	256QAM	75/ 0	20	21174	2542.4	256QAM	100/ 0	7.20
20	21051	2530.1	256QAM	100/ 0	10	21195	2544.5	256QAM	50/ 0	7.36
20	21026	2527.6	256QAM	100/ 0	15	21197	2544.7	256QAM	75/ 0	7.31
20	21001	2525.1	256QAM	100/ 0	20	21199	2544.9	256QAM	100/ 0	7.23

Note:

- In order to simplify the report, attached plots were only Max.Bandwidth(10+10)
- Peak- to- Average Ratio is not required. These values are reported for information only.

PCC 20 MHz Ch21001 RB100 Offset0, SCC 20 MHz Ch21199 RB100 Offset0_(QPSK)



PCC 20 MHz Ch21001 RB100 Offset0, SCC 20 MHz Ch21199 RB100 Offset0_(16QAM)



PCC 20 MHz Ch21001 RB100 Offset0, SCC 20 MHz Ch21199 RB100 Offset0_(64QAM)



PCC 20 MHz Ch21001 RB100 Offset0, SCC 20 MHz Ch21199 RB100 Offset0_(256QAM)





9. ANNEX A_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2310-FC005-P