TEST REPORT

FCC CA_41C Test for TFGMEIBBCD4
Class II Permissive Change

APPLICANT
LG Electronics Inc.

REPORT NO.
HCT-RF-2406-FC015-R1

DATE OF ISSUE
October 7, 2024

Tested by
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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
Product Name Model Name	GM Onstar Gen12 ROW TFGMEIBBCD4
Date of Test	May 07, 2024 ~ June 19, 2024
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 ID	BEJTFGMEIBBCD4
FCC Classification	PCS Licensed Transmitter (PCB)
Test Standard Used	FCC Rule Part(s) : § 27
Test Results	PASS

REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	September 26, 2024	Initial Release
1	October 07, 2024	Added the Overlap information. (Page 5,25)

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).

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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:	Class II Permissive Change
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	§ 27
EUT Type:	GM Onstar Gen12 ROW
Model(s):	TFGMEIBBCD4
Additional Model(s)	TFGMEIBBCD5,TFGMEIBBCD6,TFGMEIBBCD7,TFGMEIBBCD8, TFGMEIBBCD9, TFGMEIBBCDA, TFGMEIBBCDB, TFGMEIBBCDC
Tx Frequency:	2499.3 - 2680.0: 5 MHz+20 MHz (ULCA – 41C) 2501.3 - 2682.5: 10 MHz+15 MHz (ULCA – 41C) 2501.5 - 2680.0: 10 MHz+20 MHz (ULCA – 41C) 2503.5 - 2684.7: 15 MHz+10 MHz (ULCA – 41C) 2503.5 - 2682.5: 15 MHz+15 MHz (ULCA – 41C(38C)) 2503.8 - 2680.0: 15 MHz+20 MHz (ULCA – 41C) 2506.0 - 2686.7: 20 MHz+5 MHz (ULCA – 41C) 2506.0 - 2684.5: 20 MHz+10 MHz (ULCA – 41C) 2506.0 - 2682.2: 20 MHz+15 MHz (ULCA – 41C) 2506.0 - 2680.0: 20 MHz+20 MHz (ULCA – 41C(38C))
Date(s) of Tests:	May 07, 2024 ~ June 19, 2024
Serial number:	Radiated : EBR36018942K_#14 Conducted : EBR36018942K_#30
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 (dBm)	Max. Power (W)	Max. Power (dBm)
5 MHz+20 MHz	2499.3 - 2680.0	22M8G7D	QPSK	0.504	27.02	1.452	31.62
		22M8W7D	16QAM	0.439	26.42	1.303	31.15
		22M8W7D	64QAM	0.266	24.25	0.845	29.27
		22M8W7D	256QAM	0.161	22.07	0.519	27.15
10 MHz+15 MHz	2501.3 - 2682.5	23M1G7D	QPSK	0.409	26.12	1.581	31.99
		23M1W7D	16QAM	0.359	25.55	1.358	31.33
		23M1W7D	64QAM	0.252	24.02	0.966	29.85
		23M1W7D	256QAM	0.143	21.54	0.552	27.42
10 MHz+20 MHz	2501.5 - 2680.0	27M7G7D	QPSK	0.424	26.27	1.574	31.97
		27M7W7D	16QAM	0.370	25.68	1.355	31.32
		27M7W7D	64QAM	0.261	24.17	0.955	29.80
		27M6W7D	256QAM	0.145	21.62	0.542	27.34
15 MHz+10 MHz	2503.5 - 2684.7	23M1G7D	QPSK	0.394	25.96	1.556	31.92
		23M1W7D	16QAM	0.283	24.52	1.337	31.26
		23M1W7D	64QAM	0.196	22.93	0.933	29.70
		23M1W7D	256QAM	0.110	20.40	0.531	27.25
15 MHz+15 MHz	2503.5 - 2682.5	28M4G7D	QPSK	0.497	26.96	1.500	31.76
		28M3W7D	16QAM	0.446	26.49	1.309	31.17
		28M3W7D	64QAM	0.261	24.16	0.918	29.63
		28M4W7D	256QAM	0.177	22.49	0.520	27.16
15 MHz+20 MHz	2503.8 - 2680.0	23M0G7D	QPSK	0.414	26.17	1.570	31.96
		22M9W7D	16QAM	0.361	25.57	1.349	31.30
		23M0W7D	64QAM	0.249	23.97	0.964	29.84
		23M0W7D	256QAM	0.141	21.49	0.537	27.30
20 MHz+5 MHz	2506.0 - 2686.7	27M8G7D	QPSK	0.430	26.33	1.503	31.77
		27M8W7D	16QAM	0.380	25.80	1.303	31.15
		27M8W7D	64QAM	0.248	23.95	0.832	29.20
		27M7W7D	256QAM	0.151	21.80	0.524	27.19
20 MHz+10 MHz	2506.0 - 2684.5	27M8G7D	QPSK	0.550	27.40	1.545	31.89
		27M8W7D	16QAM	0.481	26.82	1.334	31.25
		27M8W7D	64QAM	0.321	25.07	0.881	29.45
		27M7W7D	256QAM	0.189	22.76	0.527	27.22
20 MHz+15 MHz	2506.0 - 2682.2	32M7G7D	QPSK	0.628	27.98	1.585	32.00
		32M6W7D	16QAM	0.612	27.87	1.578	31.98
		32M5W7D	64QAM	0.344	25.36	0.895	29.52
		32M5W7D	256QAM	0.275	24.39	0.721	28.58
20 MHz+20 MHz	2506.0 - 2680.0	37M6G7D	QPSK	0.601	27.79	1.387	31.42
		37M5W7D	16QAM	0.522	27.18	1.180	30.72
		37M5W7D	64QAM	0.362	25.59	0.851	29.30
		37M5W7D	256QAM	0.207	23.15	0.468	26.70

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

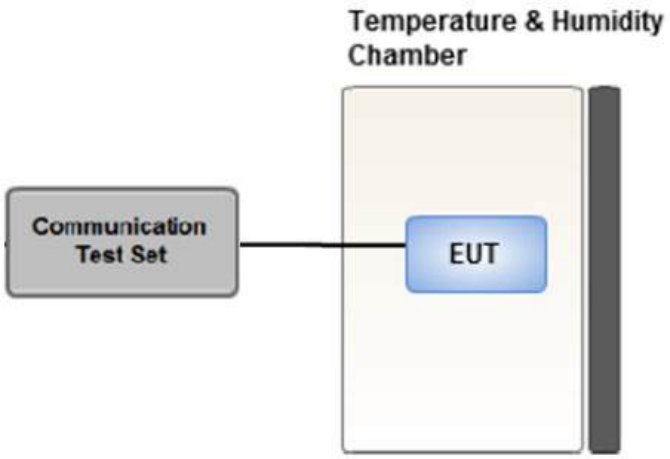
The Fully-anechoic chamber and conducted measurement facility used to collect the radiated data are located at the **74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea**

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
Channel Edge	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Spurious and Harmonic Emissions at Antenna Terminal	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Conducted Output Power	- KDB 971168 D01 v03r01 – Section 5.2
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.

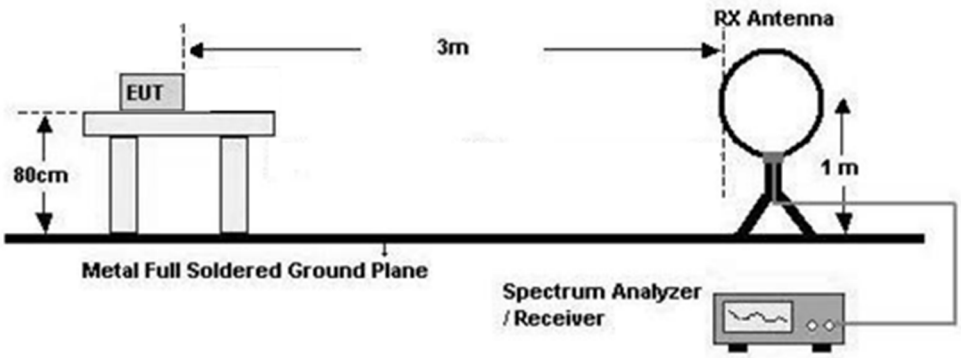
3.3 RADIATED TEST

Test Overview

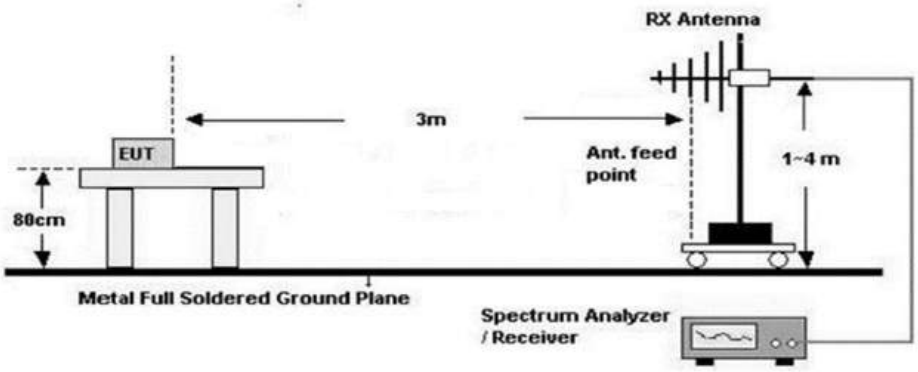
Radiated tests are performed in the semi-anechoic chamber. The equipment under test is placed on a non-conductive table on semi-anechoic chamber.

Test Configuration

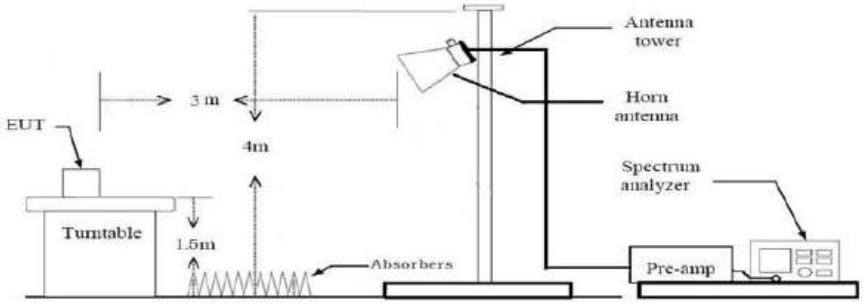
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



3.4 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 ≥ 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 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. 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)

3.5 RADIATED SPURIOUS EMISSIONS

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 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) = 40log(3 m/300 m) = - 80 dB
   Measurement Distance : 3 m
6. Distance Correction Factor(0.490 MHz – 30 MHz) = 40log(3 m/30 m) = - 40 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 (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)

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.

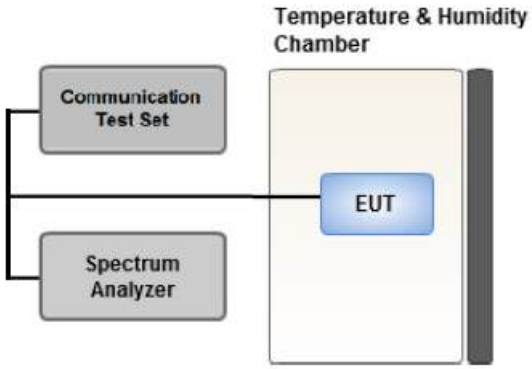
Below 1 GHz

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)

3.6 PEAK- TO- AVERAGE RATIO



Test setup

① CCDF Procedure for PAPR

Test Settings

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

② Alternate Procedure for PAPR

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

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

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

Test Settings(Peak Power)

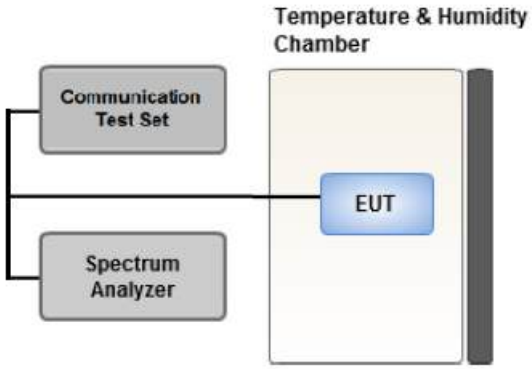
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW ≥ 3 × RBW.

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 %.

3.7 OCCUPIED BANDWIDTH.



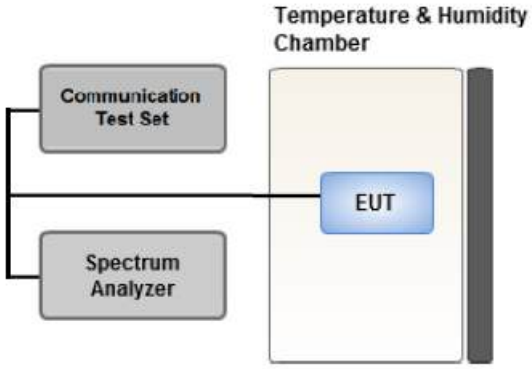
Test setup

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

3.8 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



Test setup

Test Overview

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

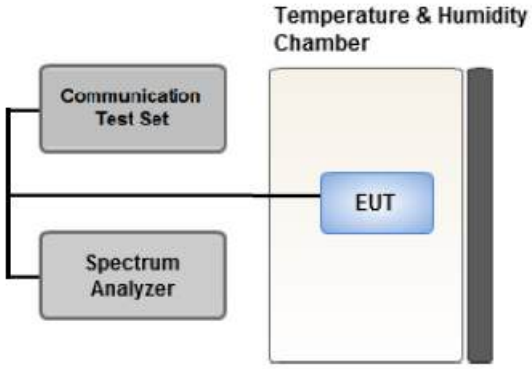
All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

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

Test Settings

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

3.9 BAND EDGE



Test setup

Test Overview

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

Test Settings

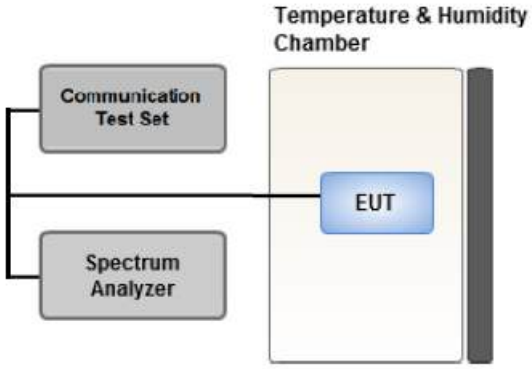
1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW > 1 % of the emission bandwidth
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW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

Test Notes

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

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

3.10 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	CO3000/1542/ 57580623/G	N/A	N/A
Amp & Filter Bank Switch Controller	FBSM-01B	TNM system	TM20090001	N/A	N/A
RF Switch System	TMX0132C	TNM System	TM21100002	N/A	N/A
RF Switch System	FBSR-04C HPF1	TNM System	S5L1	03/12/2025	Annual
RF Switch System	FBSR-04C LNA1	TNM System	S5L4	03/12/2025	Annual
RF Switch System	FBSR-04C HPF2	TNM System	S5L5	03/12/2025	Annual
HIGHPASS FILTER	WHKX10-900-1000-15000-40SS	WAINWRIGHT INSTRUMENTS	16	07/24/2025	Annual
HIGHPASS FILTER	WHNX6.0/26.5G-6SS	WAINWRIGHT INSTRUMENTS	1	12/11/2024	Annual
Power Amplifier	CBL18265035	CERNEX	22966	11/17/2024	Annual
Power Amplifier	CBL26405040	CERNEX	25956	02/26/2025	Annual
Loop Antenna (9 kHz ~ 30 MHz)	FMZB1513	Schwarzbeck	1513-333	03/07/2026	Biennial
Horn Antenna(1 ~ 18 GHz)	HF907	ROHDE & SCHWARZ	103224	05/07/2026	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/20/2026	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	1135	08/19/2026	Biennial
Chamber	SU-642	ESPEC	93008124	02/19/2025	Annual
Power Splitter(DC~26.5 GHz)	11667B	Hewlett Packard	11275	02/19/2025	Annual
DC Power Supply	E3632A	Hewlett Packard	KR01009150	04/18/2025	Annual
4-Way Divider	ZC4PD-K1844+	Mini-Circuits	942907	09/10/2025	Annual
ATTENUATOR(20 dB)	8493C	Hewlett Packard	17280	04/17/2025	Annual
Spectrum Analyzer(10 Hz ~ 40 GHz)	FSV40	ROHDE & SCHWARZ	101510	03/28/2025	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/05/2025	Annual
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262287701	05/16/2025	Annual
Wideband Radio Communication Tester	MT8000A	Anritsu Corp.	6262302511	05/14/2025	Annual
Signal Analyzer (10 Hz ~ 26.5 GHz)	N9020A	Agilent	MY52090906	04/19/2025	Annual
Signal Analyzer (5 Hz ~ 40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/17/2025	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	HCT CO., LTD.,	-	-	-

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

5. MEASUREMENT UNCERTAINTY

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

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

Parameter	Expanded Uncertainty (±dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.98 (Confidence level about 95 %, *k*=2)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.36 (Confidence level about 95 %, *k*=2)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.70 (Confidence level about 95 %, *k*=2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.52 (Confidence level about 95 %, *k*=2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.66 (Confidence level about 95 %, *k*=2)
Radiated Disturbance (Above 40 GHz)	5.58 (Confidence level about 95 %, *k*=2)

6. SUMMARY OF TEST RESULTS

6.1 Test Condition : Conducted Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Occupied Bandwidth	§2.1049	N/A	PASS
Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	§2.1051, §27.53(m)(4)	■ < 40 + 10log10 (P[Watts]) at Channel edges ■ < 43 + 10log10 (P[Watts]) between 5 and X MHz from Channel edges ■ < 55 + 10log10 (P[Watts]) beyond X MHz beyond from Channel edges ■ < 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz	PASS
Conducted Output Power	§2.1046	N/A	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(h)(2)	< 2 Watts max. EIRP	PASS
Radiated Spurious and Harmonic Emissions	§2.1053, §27.53(m)(4)	< 55 + 10log10 (P[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.

- ULCA_41C (2496 – 2690 MHz) overlaps the entire frequency range of ULCA_38C (2570 - 2620 MHz) and they have the same Tune-up power.

Therefore, test data provided in this report covers 38C as well as BAND 41C.

Test Note

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

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

3. All modes of operation were investigated and the worst case configuration results are reported in this section.
Please refer to the table below.
- Worst case(Conducted Spurious Emissions, Channel Edge)
: We have selected higher of the Conduction Output Power.
- Worst case(Radiated Spurious Emissions) : We have selected higher of the EIRP.
- Worst case(OBW, PAR, Frequency stability)
: All modes of operation were investigated and the worst case configuration results are reported.

4. All 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/ Channel Edge	QPSK	Low	5	2499.3	39683	1	24	20	2511.0	39800	1	0
	QPSK	Mid	20	2590.5	40595	1	99	5	2602.2	40712	1	0
	QPSK	High	20	2675.0	41440	1	99	5	2686.7	41557	1	0
	QPSK	Low	5	2499.3	39683	1	0	20	2511.0	39800	1	99
	QPSK	Mid	20	2590.5	40595	1	0	5	2602.2	40712	1	24
	QPSK	High	20	2675.0	41440	1	0	5	2686.7	41557	1	24
	QPSK	Low	20	2506.0	39750	100	0	15	2523.1	39921	75	0
	QPSK	Mid	20	2585.6	40546	100	0	15	2602.7	40717	75	0
	QPSK	High	20	2665.1	41341	100	0	15	2682.2	41512	75	0
	QPSK	Low	20	2506.0	39750	100	0	20	2525.8	39948	100	0
	QPSK	Mid	20	2583.1	40521	100	0	20	2602.9	40719	100	0
	QPSK	High	20	2660.2	41292	100	0	20	2680.0	41490	100	0
Radiated Spurious Emissions (External Ant)	QPSK	Low	15	2503.5	39725	1	74	15	2518.5	39875	1	0
	QPSK	Mid	20	2585.6	40546	1	99	15	2602.7	40717	1	0
	QPSK	High	15	2667.5	41365	1	74	15	2682.5	41515	1	0
Radiated Spurious Emissions (Internal Ant)	QPSK	Low	20	2506.0	39750	1	99	10	2520.4	39894	1	0
	QPSK	Mid	20	2585.6	40546	1	99	15	2602.7	40717	1	0
	QPSK	High	15	2662.9	41319	1	74	20	2680.0	41490	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	2583.8	40528	25	0	20	2595.5	40645	100	0
			10	2585.9	40549	50	0	15	2597.9	40669	75	0
			10	2583.6	40526	50	0	20	2598.0	40670	100	0
			15	2588.1	40571	75	0	10	2600.1	40691	50	0
			15	2585.5	40545	75	0	15	2600.5	40695	75	0
			15	2583.3	40523	75	0	20	2600.4	40694	100	0
			20	2590.5	40595	100	0	5	2602.2	40712	25	0
			20	2588.1	40571	100	0	10	2602.5	40715	50	0
			20	2585.6	40546	100	0	15	2602.7	40717	75	0
			20	2583.1	40521	100	0	20	2602.9	40719	100	0
Frequency stability	QPSK	Low	5	2499.3	39683	25	0	20	2511.0	39800	100	0
			10	2501.5	39705	50	0	20	2515.9	39849	100	0
			15	2503.8	39728	75	0	20	2520.9	39899	100	0
			20	2506.0	39750	100	0	20	2525.8	39948	100	0
		High	5	2668.3	41373	25	0	20	2680.0	41490	100	0
			10	2665.6	41346	50	0	20	2680.0	41490	100	0
			15	2662.9	41319	75	0	20	2680.0	41490	100	0
			20	2660.2	41292	100	0	20	2680.0	41490	100	0

8.1 Conducted Power

Operating frequency	PCC					SCC					Conducted. Power [dBm]
	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	
Low	***5***	***2499.3***	***39683***	***1***	***24***	***20***	***2511.0***	***39800***	***1***	***0***	***24.62***
	10	2501.3	39703	1	49	15	2513.3	39823	1	0	24.50
	10	2501.5	39705	1	49	20	2515.9	39849	1	0	24.50
	15	2503.5	39725	1	74	10	2515.5	39845	1	0	24.46
	15	2503.5	39725	1	74	15	2518.5	39875	1	0	24.41
	15	2503.8	39728	1	74	20	2520.9	39899	1	0	24.41
	20	2506.0	39750	1	99	5	2517.7	39867	1	0	24.48
	20	2506.0	39750	1	99	10	2520.4	39894	1	0	24.51
	20	2506.0	39750	1	99	15	2523.1	39921	1	0	24.48
	20	2506.0	39750	1	99	20	2525.8	39948	1	0	24.45
Mid	5	2583.8	40528	1	24	20	2595.5	40645	1	0	24.35
	10	2585.9	40549	1	49	15	2597.9	40669	1	0	24.25
	10	2583.6	40526	1	49	20	2598.0	40670	1	0	24.27
	15	2588.1	40571	1	74	10	2600.1	40691	1	0	24.31
	15	2585.5	40545	1	74	15	2600.5	40695	1	0	24.25
	15	2583.3	40523	1	74	20	2600.4	40694	1	0	24.18
	20	***2590.5***	***40595***	***1***	***99***	***5***	***2602.2***	***40712***	***1***	***0***	***24.44***
	20	2588.1	40571	1	99	10	2602.5	40715	1	0	24.33
	20	2585.6	40546	1	99	15	2602.7	40717	1	0	24.28
	20	2583.1	40521	1	99	20	2602.9	40719	1	0	24.19
High	5	2668.3	41373	1	24	20	2680.0	41490	1	0	24.17
	10	2670.5	41395	1	49	15	2682.5	41515	1	0	24.14
	10	2665.6	41346	1	49	20	2680.0	41490	1	0	24.13
	15	2672.7	41417	1	74	10	2684.7	41537	1	0	24.17
	15	2667.5	41365	1	74	15	2682.5	41515	1	0	24.15
	15	2662.9	41319	1	74	20	2680.0	41490	1	0	24.15
	20	***2675.0***	***41440***	***1***	***99***	***5***	***2686.7***	***41557***	***1***	***0***	***24.21***
	20	2670.1	41391	1	99	10	2684.5	41535	1	0	24.18
	20	2665.1	41341	1	99	15	2682.2	41512	1	0	24.14
	20	2660.2	41292	1	99	20	2680.0	41490	1	0	24.20

Note:

Modulation : QPSK(1RB)

Operating frequency	PCC					SCC					Conducted. Power [dBm]
	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	
Low	5	2499.3	39683	25	0	20	2511.0	39800	100	0	22.67
	10	2501.3	39703	50	0	15	2513.3	39823	75	0	22.69
	10	2501.5	39705	50	0	20	2515.9	39849	100	0	22.71
	15	2503.5	39725	75	0	10	2515.5	39845	50	0	22.63
	15	2503.5	39725	75	0	15	2518.5	39875	75	0	22.68
	15	2503.8	39728	75	0	20	2520.9	39899	100	0	22.64
	20	2506.0	39750	100	0	5	2517.7	39867	25	0	18.63
	20	2506.0	39750	100	0	10	2520.4	39894	50	0	22.63
	20	***2506.0***	***39750***	***100***	***0***	***15***	***2523.1***	***39921***	***75***	***0***	***24.26***
	20	2506.0	39750	100	0	20	2525.8	39948	100	0	22.65
Mid	5	2583.8	40528	25	0	20	2595.5	40645	100	0	22.36
	10	2585.9	40549	50	0	15	2597.9	40669	75	0	22.37
	10	2583.6	40526	50	0	20	2598.0	40670	100	0	22.36
	15	2588.1	40571	75	0	10	2600.1	40691	50	0	22.37
	15	2585.5	40545	75	0	15	2600.5	40695	75	0	22.35
	15	2583.3	40523	75	0	20	2600.4	40694	100	0	22.37
	20	2590.5	40595	100	0	5	2602.2	40712	25	0	18.40
	20	2588.1	40571	100	0	10	2602.5	40715	50	0	22.40
	20	***2585.6***	***40546***	***100***	***0***	***15***	***2602.7***	***40717***	***75***	***0***	***23.79***
	20	2583.1	40521	100	0	20	2602.9	40719	100	0	22.38
High	5	2668.3	41373	25	0	20	2680.0	41490	100	0	22.31
	10	2670.5	41395	50	0	15	2682.5	41515	75	0	22.32
	10	2665.6	41346	50	0	20	2680.0	41490	100	0	22.36
	15	2672.7	41417	75	0	10	2684.7	41537	50	0	22.38
	15	2667.5	41365	75	0	15	2682.5	41515	75	0	22.38
	15	2662.9	41319	75	0	20	2680.0	41490	100	0	22.37
	20	2675.0	41440	100	0	5	2686.7	41557	25	0	18.34
	20	2670.1	41391	100	0	10	2684.5	41535	50	0	22.35
	20	***2665.1***	***41341***	***100***	***0***	***15***	***2682.2***	***41512***	***75***	***0***	***23.25***
	20	2660.2	41292	100	0	20	2680.0	41490	100	0	22.33

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	2499.3	39683	1	24	20	2511.0	39800	1	0	24.18
Mid	20	2590.5	40595	1	99	5	2602.2	40712	1	0	23.58
High	20	2675.0	41440	1	99	5	2686.7	41557	1	0	23.55
Low	20	2506.0	39750	100	0	15	2523.1	39921	75	0	23.38
Mid	20	2585.6	40546	100	0	15	2602.7	40717	75	0	22.74
High	20	2665.1	41341	100	0	15	2682.2	41512	75	0	22.12

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	2499.3	39683	1	24	20	2511.0	39800	1	0	22.78
Mid	20	2590.5	40595	1	99	5	2602.2	40712	1	0	21.87
High	20	2675.0	41440	1	99	5	2686.7	41557	1	0	20.62
Low	20	2506.0	39750	100	0	15	2523.1	39921	75	0	21.97
Mid	20	2585.6	40546	100	0	15	2602.7	40717	75	0	21.69
High	20	2665.1	41341	100	0	15	2682.2	41512	75	0	21.03

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	2499.3	39683	1	24	20	2511.0	39800	1	0	19.81
Mid	20	2590.5	40595	1	99	5	2602.2	40712	1	0	19.26
High	20	2675.0	41440	1	99	5	2686.7	41557	1	0	19.08
Low	20	2506.0	39750	100	0	15	2523.1	39921	75	0	21.12
Mid	20	2585.6	40546	100	0	15	2602.7	40717	75	0	20.71
High	20	2665.1	41341	100	0	15	2682.2	41512	75	0	19.94

Note:

Modulation : 256QAM

8.2 Equivalent Isotropic Radiated Power

8.2.1 External Antenna

	PCC			SCC			Measured Level (dBμV)	C.L+A.F+D.F (dB/m)	Total (dBμV/m)	Pol.	E.I.R.P	
	BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset					W	dBm
Low	5	39683	1/24	20	39800	1/0	83.83	37.33	121.16	H	0.394	25.96
	10	39703	1/49	15	39823	1/0	83.88	37.33	121.21	H	0.399	26.01
	10	39705	1/49	20	39849	1/0	83.83	37.42	121.25	H	0.403	26.05
	15	39725	1/74	10	39845	1/0	83.74	37.42	121.16	H	0.394	25.96
	15	39725	1/74	15	39875	1/0	83.95	37.42	121.37	H	0.414	26.17
	15	39728	1/74	20	39899	1/0	83.70	37.42	121.12	H	0.391	25.92
	20	39750	1/99	5	39867	1/0	83.58	37.42	121.00	H	0.380	25.80
	20	39750	1/99	10	39894	1/0	83.53	37.42	120.95	H	0.376	25.75
	20	39750	1/99	15	39921	1/0	83.48	37.46	120.93	H	0.374	25.73
	20	39750	1/99	20	39948	1/0	83.43	37.46	120.88	H	0.370	25.68
Mid	5	40528	1/24	20	40645	1/0	84.28	37.94	122.22	H	0.504	27.02
	10	40549	1/49	15	40669	1/0	83.38	37.94	121.32	H	0.409	26.12
	10	40526	1/49	20	40670	1/0	83.53	37.94	121.47	H	0.424	26.27
	15	40571	1/74	10	40691	1/0	82.48	37.82	120.30	H	0.324	25.10
	15	40545	1/74	15	40695	1/0	82.96	37.82	120.78	H	0.361	25.58
	15	40523	1/74	20	40694	1/0	83.43	37.94	121.37	H	0.414	26.17
	20	40595	1/99	5	40712	1/0	83.71	37.82	121.53	H	0.430	26.33
	20	40571	1/99	10	40715	1/0	84.78	37.82	122.60	H	0.550	27.40
	20	40546	1/99	15	40717	1/0	85.36	37.82	123.18	H	0.628	27.98
	20	40521	1/99	20	40719	1/0	85.17	37.82	122.99	H	0.601	27.79
High	5	41373	1/24	20	41490	1/0	82.42	38.14	120.55	H	0.343	25.35
	10	41395	1/49	15	41515	1/0	82.63	38.14	120.76	H	0.360	25.56
	10	41346	1/49	20	41490	1/0	82.49	38.17	120.66	H	0.351	25.46
	15	41417	1/74	10	41537	1/0	82.55	38.10	120.65	H	0.351	25.45
	15	41365	1/74	15	41515	1/0	84.03	38.14	122.16	H	0.497	26.96
	15	41319	1/74	20	41490	1/0	82.39	38.17	120.56	H	0.344	25.36
	20	41440	1/99	5	41557	1/0	82.43	38.10	120.53	H	0.341	25.33
	20	41391	1/99	10	41535	1/0	82.56	38.14	120.69	H	0.354	25.49
	20	41341	1/99	15	41512	1/0	82.49	38.14	120.62	H	0.349	25.42
	20	41292	1/99	20	41490	1/0	82.29	38.17	120.46	H	0.336	25.26

Note:

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

PCC			SCC			Measured Level (dBμV))	C.L+A.F+D.F (dB/m)	Total (dBμV/m)	Pol.	E.I.R.P	
BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset					W	dBm
15	39725	1/74	15	39875	1/0	83.01	37.42	120.43	H	0.333	25.23
5	40528	1/24	20	40645	1/0	83.68	37.94	121.62	H	0.439	26.42
10	40549	1/49	15	40669	1/0	82.81	37.94	120.75	H	0.359	25.55
10	40526	1/49	20	40670	1/0	82.94	37.94	120.88	H	0.370	25.68
15	40571	1/74	10	40691	1/0	81.90	37.82	119.72	H	0.283	24.52
15	40545	1/74	15	40695	1/0	82.31	37.82	120.13	H	0.311	24.93
15	40523	1/74	20	40694	1/0	82.83	37.94	120.77	H	0.361	25.57
20	40595	1/99	5	40712	1/0	83.18	37.82	121.00	H	0.380	25.80
20	40571	1/99	10	40715	1/0	84.20	37.82	122.02	H	0.481	26.82
20	40546	1/99	15	40717	1/0	85.25	37.82	123.07	H	0.612	27.87
20	40521	1/99	20	40719	1/0	84.56	37.82	122.38	H	0.522	27.18
15	41365	1/74	15	41515	1/0	83.56	38.14	121.69	H	0.446	26.49

Note:

1. Modulation : 16QAM

2. Limit : < 2 Watts

PCC			SCC			Measured Level (dBμV)	C.L+A.F+D.F (dB/m)	Total (dBμV/m)	Pol.	E.I.R.P	
BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset					W	dBm
15	39725	1/74	15	39875	1/0	81.86	37.42	119.28	H	0.256	24.08
5	40528	1/24	20	40645	1/0	81.51	37.94	119.45	H	0.266	24.25
10	40549	1/49	15	40669	1/0	81.28	37.94	119.22	H	0.252	24.02
10	40526	1/49	20	40670	1/0	81.43	37.94	119.37	H	0.261	24.17
15	40571	1/74	10	40691	1/0	80.31	37.82	118.13	H	0.196	22.93
15	40545	1/74	15	40695	1/0	81.04	37.82	118.86	H	0.232	23.66
15	40523	1/74	20	40694	1/0	81.23	37.94	119.17	H	0.249	23.97
20	40595	1/99	5	40712	1/0	81.33	37.82	119.15	H	0.248	23.95
20	40571	1/99	10	40715	1/0	82.45	37.82	120.27	H	0.321	25.07
20	40546	1/99	15	40717	1/0	82.74	37.82	120.56	H	0.344	25.36
20	40521	1/99	20	40719	1/0	82.97	37.82	120.79	H	0.362	25.59
15	41365	1/74	15	41515	1/0	81.23	38.14	119.36	H	0.261	24.16

Note:

1. Modulation : 64QAM

2. Limit : < 2 Watts

PCC			SCC			Measured Level (dBμV)	C.L+A.F+D.F (dB/m)	Total (dBμV/m)	Pol.	E.I.R.P	
BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset					W	dBm
15	39725	1/74	15	39875	1/0	79.23	37.42	116.65	H	0.140	21.45
5	40528	1/24	20	40645	1/0	79.33	37.94	117.27	H	0.161	22.07
10	40549	1/49	15	40669	1/0	78.80	37.94	116.74	H	0.143	21.54
10	40526	1/49	20	40670	1/0	78.88	37.94	116.82	H	0.145	21.62
15	40571	1/74	10	40691	1/0	77.78	37.82	115.60	H	0.110	20.40
15	40545	1/74	15	40695	1/0	78.20	37.82	116.02	H	0.121	20.82
15	40523	1/74	20	40694	1/0	78.75	37.94	116.69	H	0.141	21.49
20	40595	1/99	5	40712	1/0	79.18	37.82	117.00	H	0.151	21.80
20	40571	1/99	10	40715	1/0	80.14	37.82	117.96	H	0.189	22.76
20	40546	1/99	15	40717	1/0	81.77	37.82	119.59	H	0.275	24.39
20	40521	1/99	20	40719	1/0	80.53	37.82	118.35	H	0.207	23.15
15	41365	1/74	15	41515	1/0	79.56	38.14	117.69	H	0.177	22.49

Note:

1. Modulation : 256QAM

2. Limit : < 2 Watts

8.2.2 Internal Antenna

	PCC			SCC			Measured Level (dBμV)	C.L+A.F+D.F (dB/m)	Total (dBμV/m)	Pol.	E.I.R.P	
	BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset					W	dBm
Low	5	39683	1/24	20	39800	1/0	86.08	37.33	123.41	H	0.662	28.21
	10	39703	1/49	15	39823	1/0	85.53	37.33	122.86	H	0.583	27.66
	10	39705	1/49	20	39849	1/0	85.50	37.42	122.92	H	0.591	27.72
	15	39725	1/74	10	39845	1/0	85.38	37.42	122.80	H	0.575	27.60
	15	39725	1/74	15	39875	1/0	85.70	37.42	123.12	H	0.619	27.92
	15	39728	1/74	20	39899	1/0	85.83	37.42	123.25	H	0.638	28.05
	20	39750	1/99	5	39867	1/0	85.76	37.42	123.18	H	0.628	27.98
	20	39750	1/99	10	39894	1/0	86.08	37.42	123.50	H	0.676	28.30
	20	39750	1/99	15	39921	1/0	85.93	37.46	123.38	H	0.658	28.18
	20	39750	1/99	20	39948	1/0	85.91	37.46	123.36	H	0.655	28.16
Mid	5	40528	1/24	20	40645	1/0	88.88	37.94	126.82	H	1.452	31.62
	10	40549	1/49	15	40669	1/0	89.25	37.94	127.19	H	1.581	31.99
	10	40526	1/49	20	40670	1/0	89.23	37.94	127.17	H	1.574	31.97
	15	40571	1/74	10	40691	1/0	89.30	37.82	127.12	H	1.556	31.92
	15	40545	1/74	15	40695	1/0	89.14	37.82	126.96	H	1.500	31.76
	15	40523	1/74	20	40694	1/0	89.22	37.94	127.16	H	1.570	31.96
	20	40595	1/99	5	40712	1/0	89.15	37.82	126.97	H	1.503	31.77
	20	40571	1/99	10	40715	1/0	89.27	37.82	127.09	H	1.545	31.89
	20	40546	1/99	15	40717	1/0	89.38	37.82	127.20	H	1.585	32.00
	20	40521	1/99	20	40719	1/0	88.80	37.82	126.62	H	1.387	31.42
High	5	41373	1/24	20	41490	1/0	87.90	38.14	126.03	H	1.212	30.83
	10	41395	1/49	15	41515	1/0	87.64	38.14	125.77	H	1.141	30.57
	10	41346	1/49	20	41490	1/0	87.88	38.17	126.05	H	1.216	30.85
	15	41417	1/74	10	41537	1/0	87.68	38.10	125.78	H	1.143	30.58
	15	41365	1/74	15	41515	1/0	87.71	38.14	125.84	H	1.160	30.64
	15	41319	1/74	20	41490	1/0	87.93	38.17	126.10	H	1.230	30.90
	20	41440	1/99	5	41557	1/0	87.06	38.10	125.16	H	0.991	29.96
	20	41391	1/99	10	41535	1/0	87.46	38.14	125.59	H	1.095	30.39
	20	41341	1/99	15	41512	1/0	87.76	38.14	125.89	H	1.173	30.69
	20	41292	1/99	20	41490	1/0	87.85	38.17	126.02	H	1.208	30.82

Note:

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

PCC			SCC			Measured Level (dBμV))	C.L+A.F+D.F (dB/m)	Total (dBμV/m)	Pol.	E.I.R.P	
BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset					W	dBm
20	39750	1/99	10	39894	1/0	85.28	37.42	122.70	H	0.562	27.50
5	40528	1/24	20	40645	1/0	88.41	37.94	126.35	H	1.303	31.15
10	40549	1/49	15	40669	1/0	88.59	37.94	126.53	H	1.358	31.33
10	40526	1/49	20	40670	1/0	88.58	37.94	126.52	H	1.355	31.32
15	40571	1/74	10	40691	1/0	88.64	37.82	126.46	H	1.337	31.26
15	40545	1/74	15	40695	1/0	88.55	37.82	126.37	H	1.309	31.17
15	40523	1/74	20	40694	1/0	88.56	37.94	126.50	H	1.349	31.30
20	40595	1/99	5	40712	1/0	88.53	37.82	126.35	H	1.303	31.15
20	40571	1/99	10	40715	1/0	88.63	37.82	126.45	H	1.334	31.25
20	40546	1/99	15	40717	1/0	89.36	37.82	127.18	H	1.578	31.98
20	40521	1/99	20	40719	1/0	88.10	37.82	125.92	H	1.180	30.72
15	41319	1/74	20	41490	1/0	87.38	38.17	125.55	H	1.084	30.35

Note:

1. Modulation : 16QAM

2. Limit : < 2 Watts

PCC			SCC			Measured Level (dBμV)	C.L+A.F+D.F (dB/m)	Total (dBμV/m)	Pol.	E.I.R.P	
BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset					W	dBm
20	39750	1/99	10	39894	1/0	83.50	37.42	120.92	H	0.373	25.72
5	40528	1/24	20	40645	1/0	86.53	37.94	124.47	H	0.845	29.27
10	40549	1/49	15	40669	1/0	87.11	37.94	125.05	H	0.966	29.85
10	40526	1/49	20	40670	1/0	87.06	37.94	125.00	H	0.955	29.80
15	40571	1/74	10	40691	1/0	87.08	37.82	124.90	H	0.933	29.70
15	40545	1/74	15	40695	1/0	87.01	37.82	124.83	H	0.918	29.63
15	40523	1/74	20	40694	1/0	87.10	37.94	125.04	H	0.964	29.84
20	40595	1/99	5	40712	1/0	86.58	37.82	124.40	H	0.832	29.20
20	40571	1/99	10	40715	1/0	86.83	37.82	124.65	H	0.881	29.45
20	40546	1/99	15	40717	1/0	86.90	37.82	124.72	H	0.895	29.52
20	40521	1/99	20	40719	1/0	86.68	37.82	124.50	H	0.851	29.30
15	41319	1/74	20	41490	1/0	85.10	38.17	123.27	H	0.641	28.07

Note:

1. Modulation : 64QAM

2. Limit : < 2 Watts

PCC			SCC			Measured Level (dBμV)	C.L+A.F+D.F (dB/m)	Total (dBμV/m)	Pol.	E.I.R.P	
BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset					W	dBm
20	39750	1/99	10	39894	1/0	81.08	37.42	118.50	H	0.214	23.30
5	40528	1/24	20	40645	1/0	84.41	37.94	122.35	H	0.519	27.15
10	40549	1/49	15	40669	1/0	84.68	37.94	122.62	H	0.552	27.42
10	40526	1/49	20	40670	1/0	84.60	37.94	122.54	H	0.542	27.34
15	40571	1/74	10	40691	1/0	84.63	37.82	122.45	H	0.531	27.25
15	40545	1/74	15	40695	1/0	84.54	37.82	122.36	H	0.520	27.16
15	40523	1/74	20	40694	1/0	84.56	37.94	122.50	H	0.537	27.30
20	40595	1/99	5	40712	1/0	84.57	37.82	122.39	H	0.524	27.19
20	40571	1/99	10	40715	1/0	84.60	37.82	122.42	H	0.527	27.22
20	40546	1/99	15	40717	1/0	85.96	37.82	123.78	H	0.721	28.58
20	40521	1/99	20	40719	1/0	84.08	37.82	121.90	H	0.468	26.70
15	41319	1/74	20	41490	1/0	83.23	38.17	121.40	H	0.417	26.20

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	5	39683	2499.3	1/24	20	39800	2511.0	1/0	6.0165	32.570	-76.510	-43.94
Mid	20	40595	2590.5	1/99	5	40712	2602.2	1/0	8.0344	32.570	-75.501	-42.93
High	20	41440	2675.0	1/99	5	41557	2686.7	1/0	9.1132	32.570	-76.229	-43.66
Low	5	39683	2499.3	1/0	20	39800	2511.0	1/99	8.0060	32.570	-76.243	-43.67
Mid	20	40595	2590.5	1/0	5	40712	2602.2	1/24	9.8958	32.570	-76.342	-43.77
High	20	41440	2675.0	1/0	5	41557	2686.7	1/24	8.0135	32.570	-76.737	-44.17
Low	20	39750	2506.0	100/0	15	39921	2523.1	75/0	4.0873	31.955	-76.710	-44.76
Mid	20	40546	2585.6	100/0	15	40717	2602.7	75/0	8.2577	32.570	-77.446	-44.88
High	20	41341	2665.1	100/0	15	41512	2682.2	75/0	9.1625	32.570	-76.372	-43.80
Low	20	39750	2506.0	100/0	20	39948	2525.8	100/0	4.0330	31.955	-76.499	-44.54
Mid	20	40521	2583.1	100/0	20	40719	2602.9	100/0	9.7114	32.570	-76.397	-43.83
High	20	41292	2660.2	100/0	20	41490	2680.0	100/0	8.0170	32.570	-76.161	-43.59

Note:

1. Modulation : QPSK

2. Duty Cycle factor already applied on the factor.

- Duty Cycle factor(dB) = 3.979
- Factor(dB) = Duty Cycle factor + Cable Loss + Ext. Attenuator + Power Splitter
- Result(dBm) = Measurement Maximum Data (dBm) + Factor

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

3. Limit : -25.0 dBm

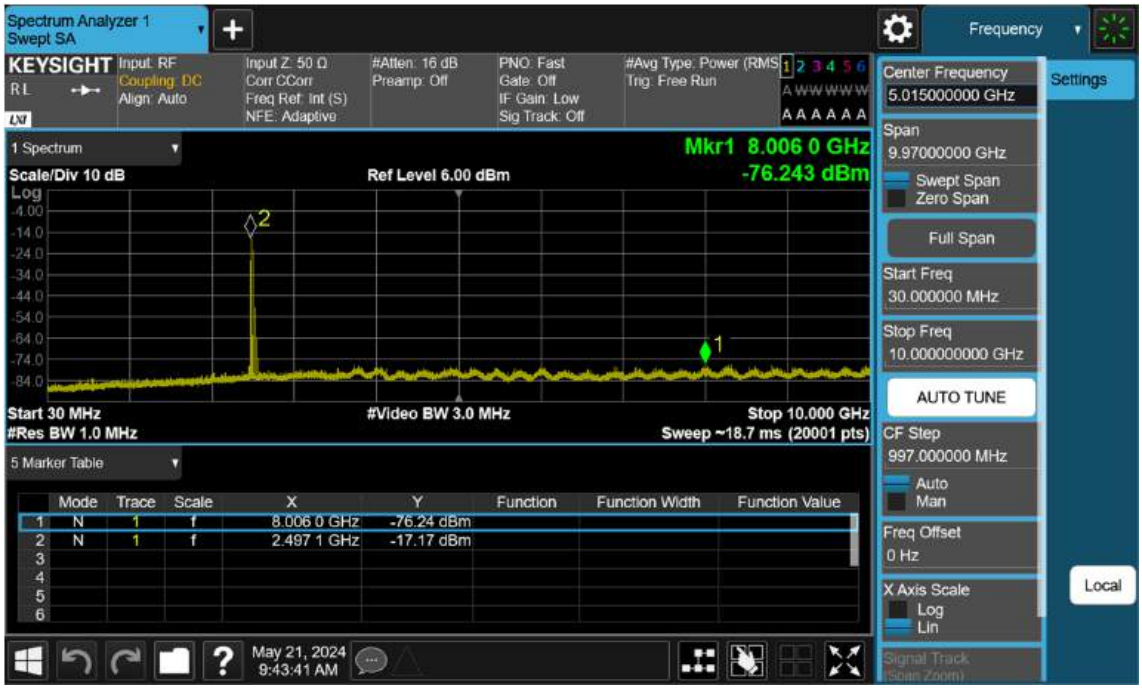
Frequency Range : 30 MHz ~ 10 GHz

PCC 5 MHz Ch39683 RB1 Offset24 SCC 20 MHz Ch39800 RB1 Offset0

PCC 20 MHz Ch40595 RB1 Offset99 SCC 5 MHz Ch40712 RB1 Offset0

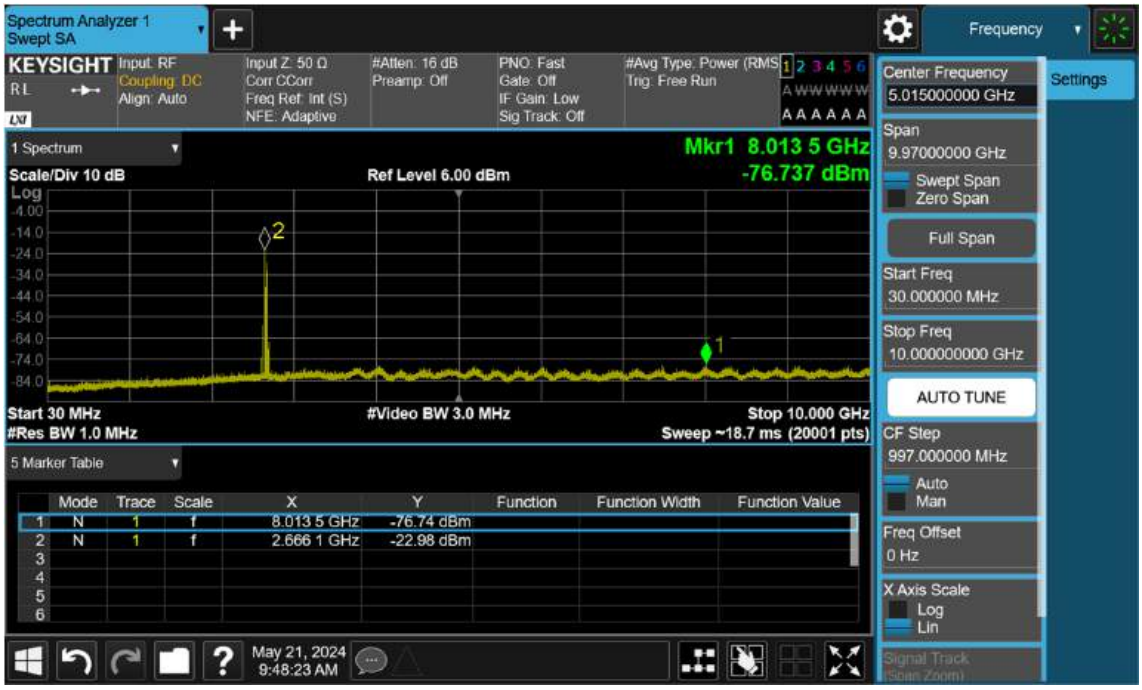
PCC 20 MHz Ch41440 RB1 Offset99 SCC 5 MHz Ch41557 RB1 Offset0

PCC 5 MHz Ch39683 RB1 Offset0 SCC 20 MHz Ch39800 RB1 Offset99



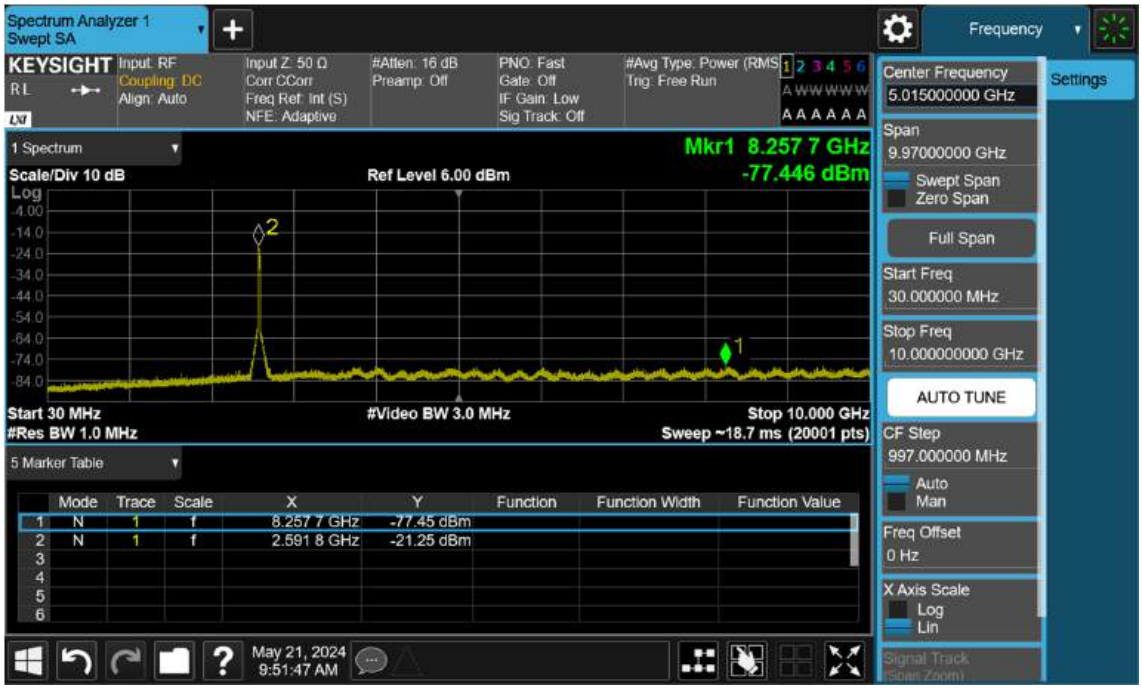
PCC 20 MHz Ch40595 RB1 Offset0 SCC 5 MHz Ch40712 RB1 Offset24

PCC 20 MHz Ch41440 RB1 Offset0 SCC 5 MHz Ch41557 RB1 Offset24



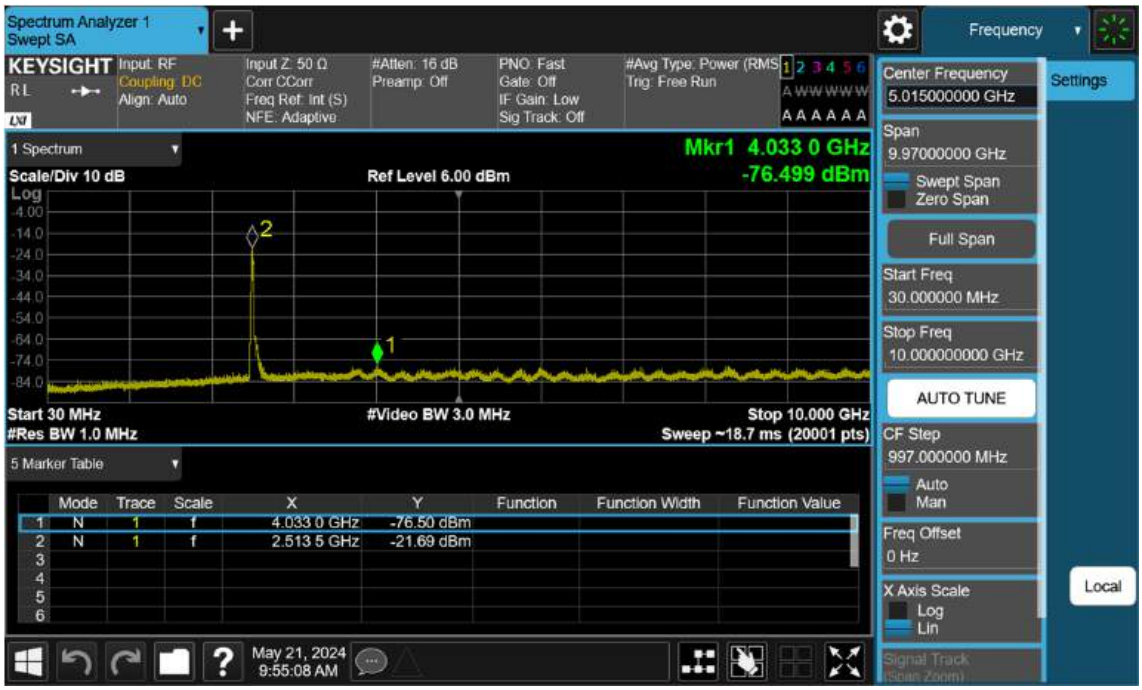
PCC 20 MHz Ch39750 RB100 Offset0 SCC 15 MHz Ch39921 RB75 Offset0

PCC 20 MHz Ch40546 RB100 Offset0 SCC 15 MHz Ch40717 RB75 Offset0

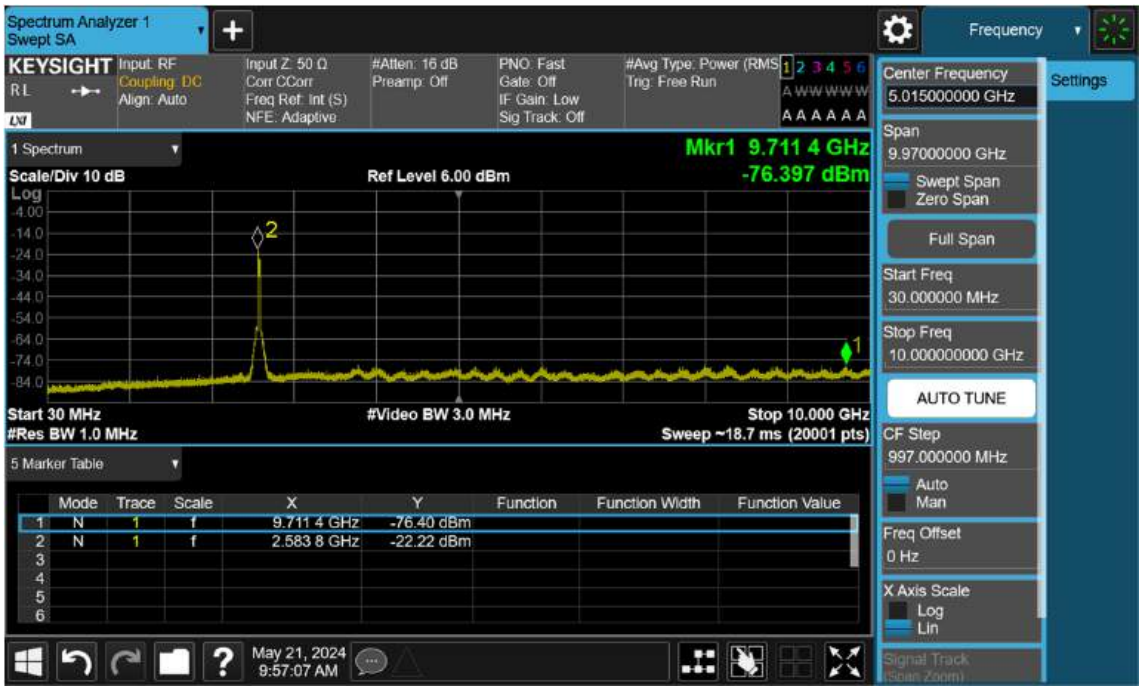


PCC 20 MHz Ch41341 RB100 Offset0 SCC 15 MHz Ch41512 RB75 Offset0

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



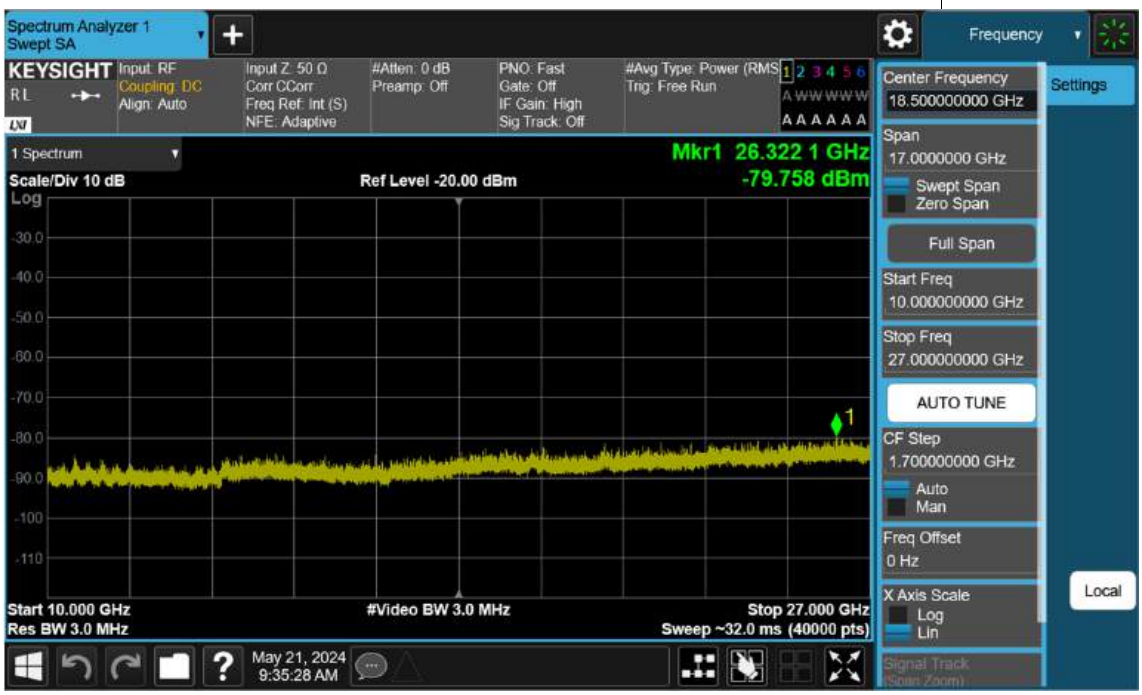
PCC 20 MHz Ch40521 RB100 Offset0 SCC 20 MHz Ch40719 RB100 Offset0



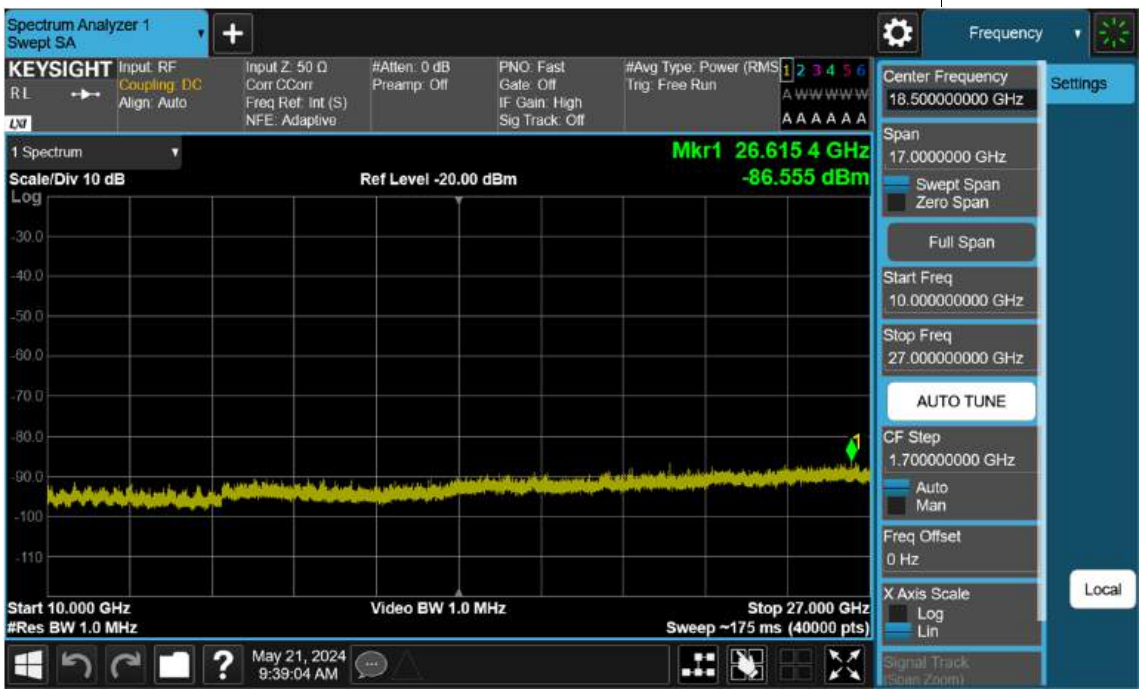
PCC 20 MHz Ch41292 RB100 Offset0 SCC 20 MHz Ch41490 RB100 Offset0

Frequency Range : 10 GHz ~ 26.5 GHz

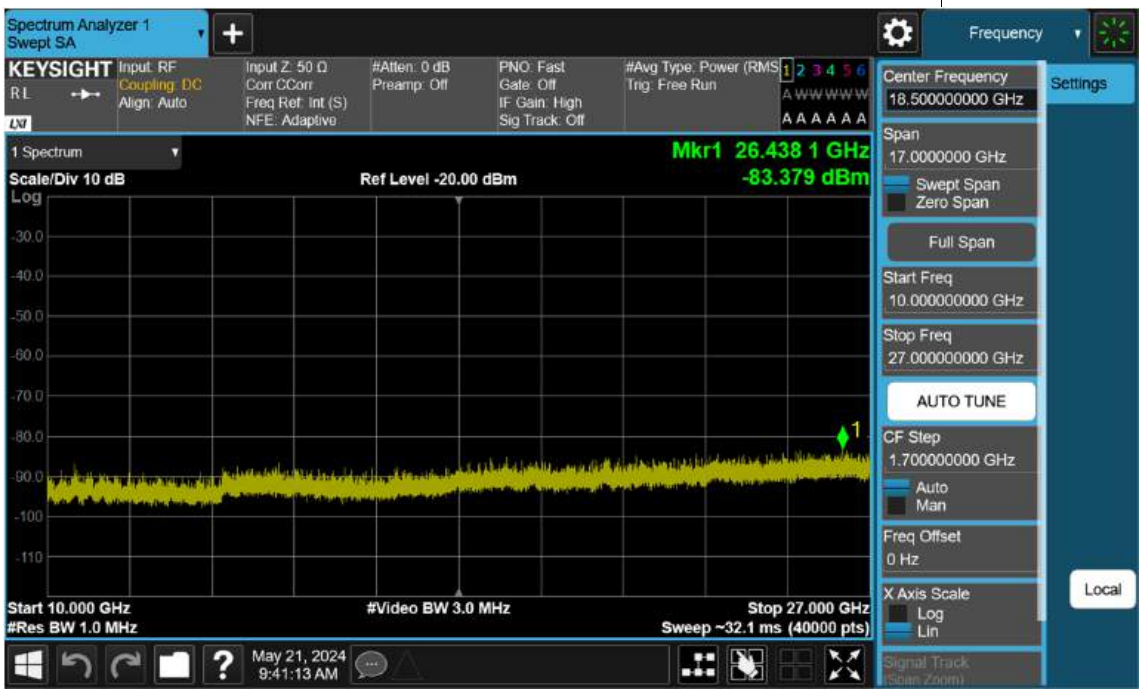
PCC 5 MHz Ch39683 RB1 Offset24 SCC 20 MHz Ch39800 RB1 Offset0



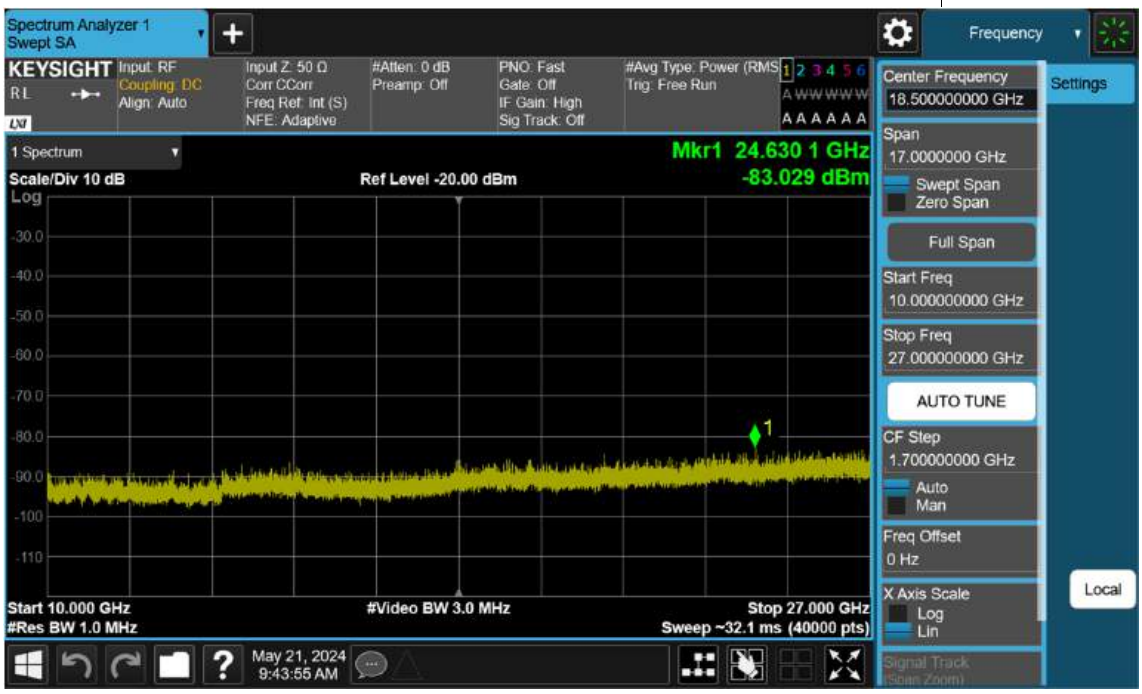
PCC 20 MHz Ch40595 RB1 Offset99 SCC 5 MHz Ch40712 RB1 Offset0



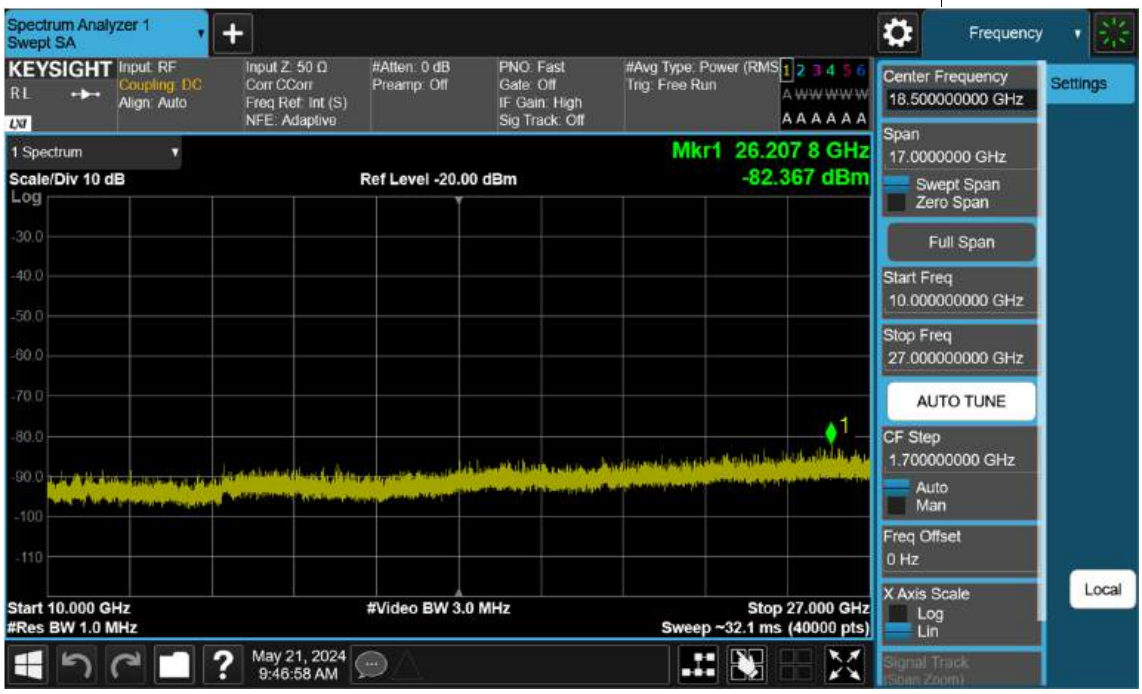
PCC 20 MHz Ch41440 RB1 Offset99 SCC 5 MHz Ch41557 RB1 Offset0



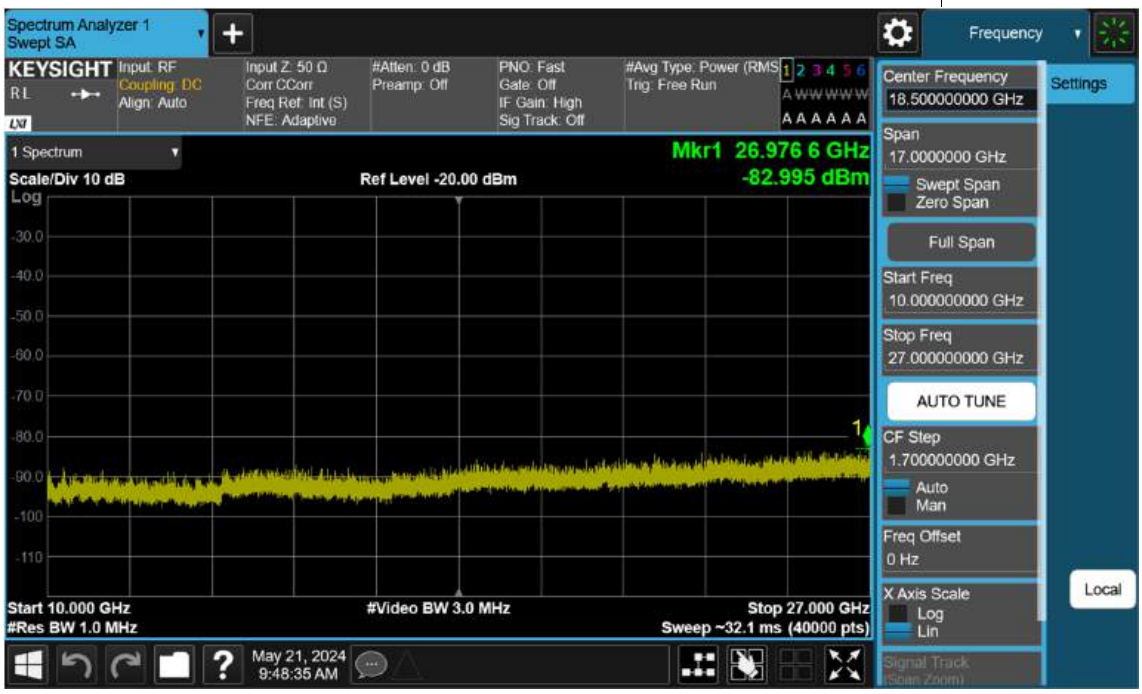
PCC 5 MHz Ch39683 RB1 Offset0 SCC 20 MHz Ch39800 RB1 Offset99



PCC 20 MHz Ch40595 RB1 Offset0 SCC 5 MHz Ch40712 RB1 Offset24

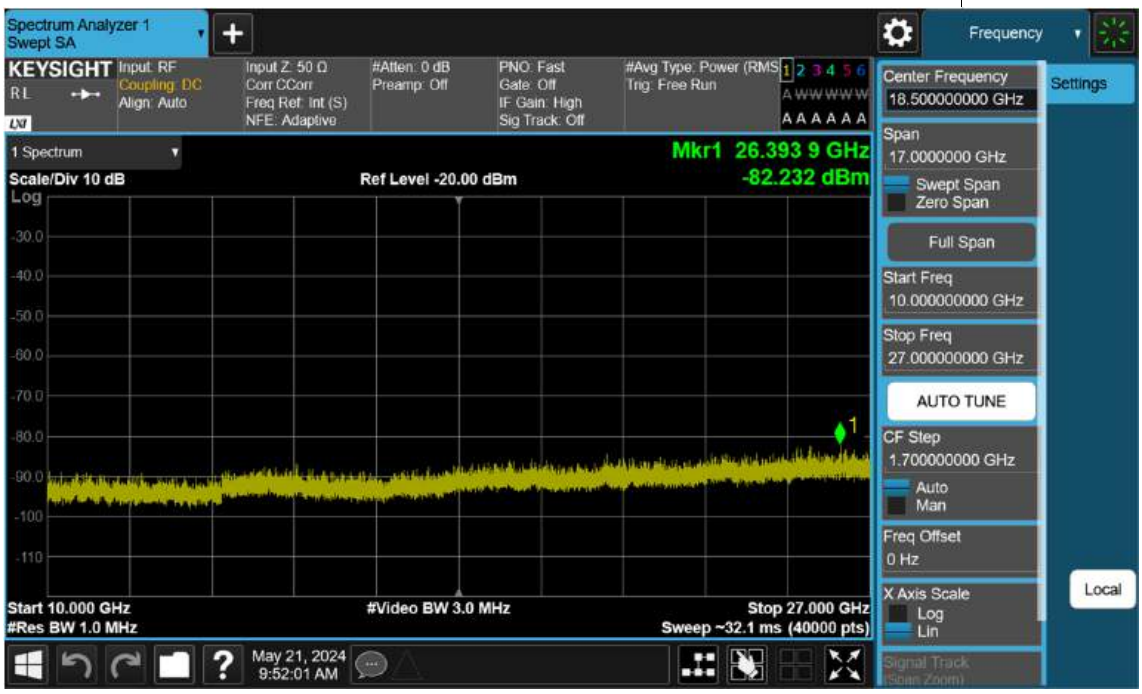


PCC 20 MHz Ch41440 RB1 Offset0 SCC 5 MHz Ch41557 RB1 Offset24

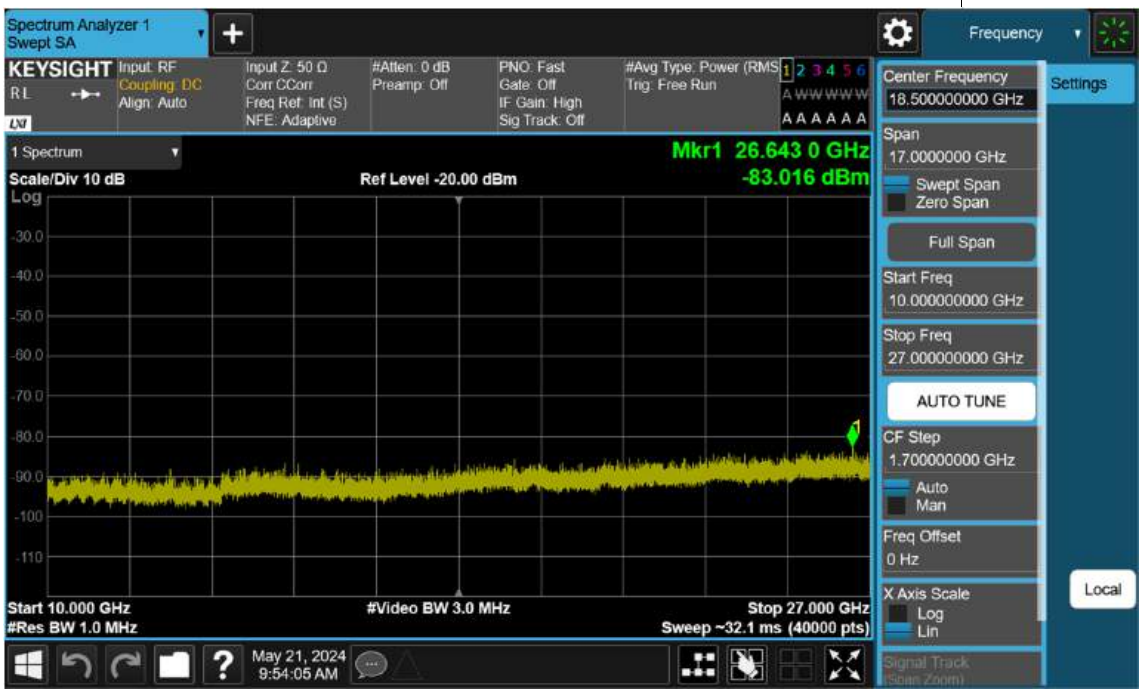


PCC 20 MHz Ch39750 RB100 Offset0 SCC 15 MHz Ch39921 RB75 Offset0

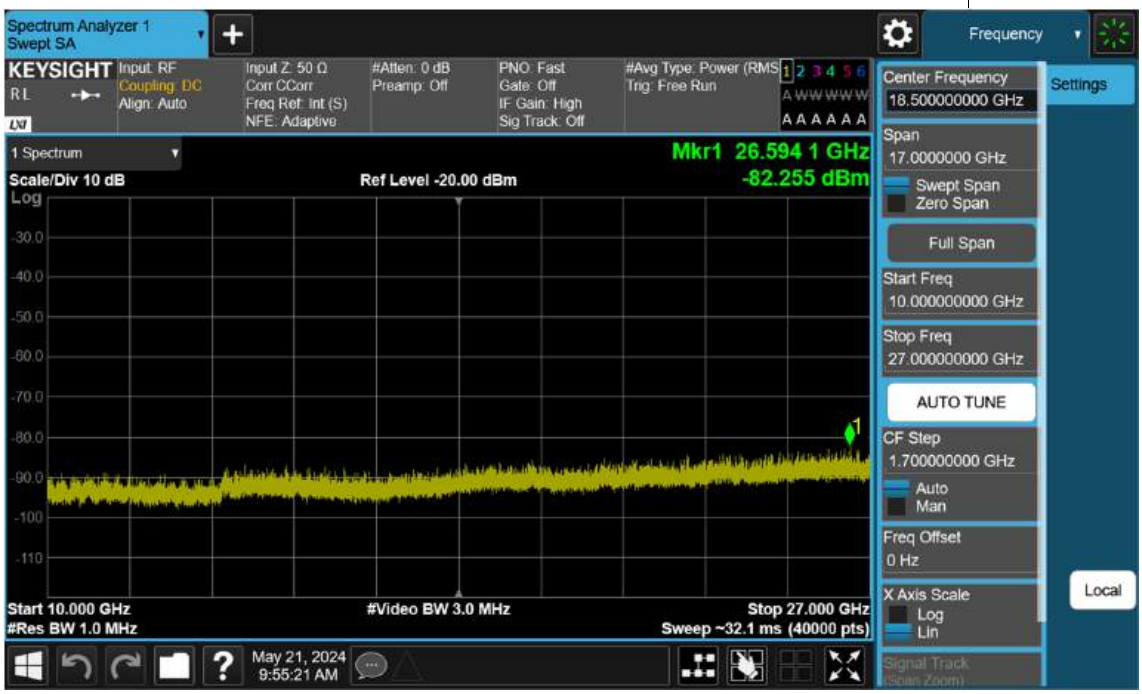
PCC 20 MHz Ch40546 RB100 Offset0 SCC 15 MHz Ch40717 RB75 Offset0



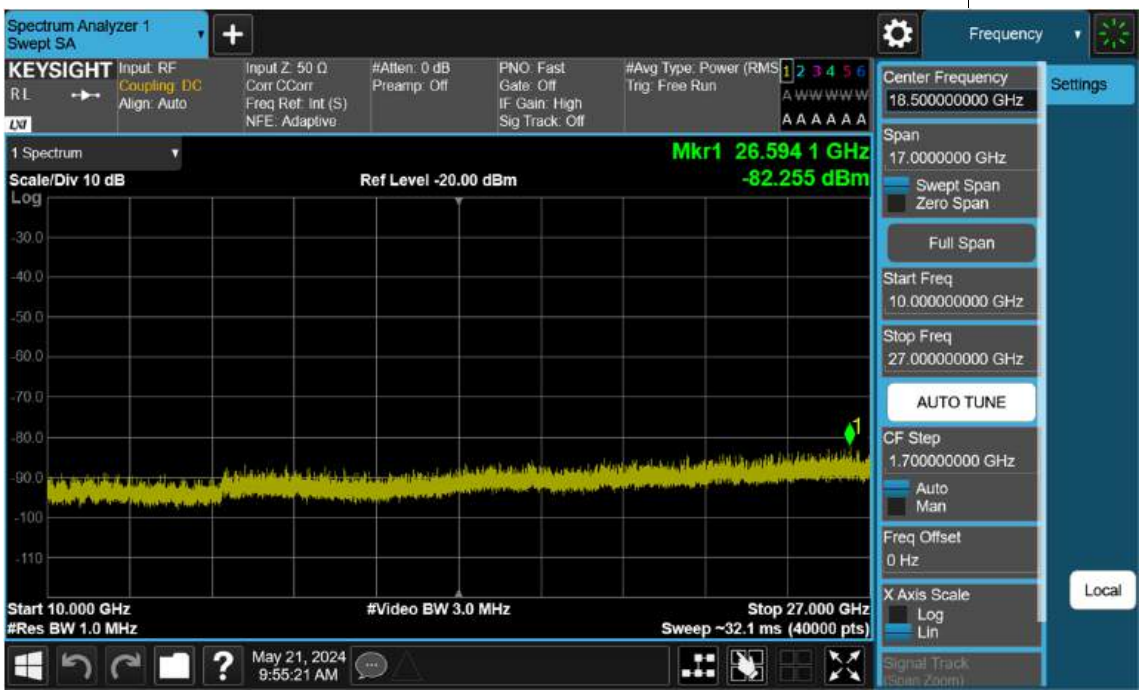
PCC 20 MHz Ch41341 RB100 Offset0 SCC 15 MHz Ch41512 RB75 Offset0



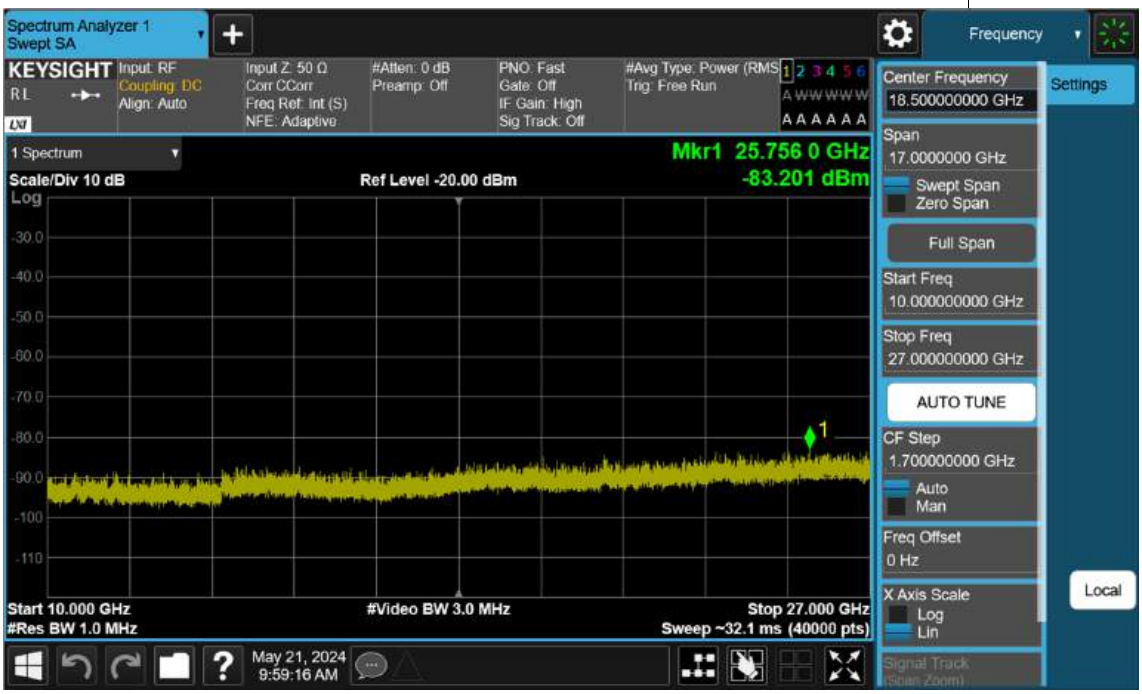
PCC 20 MHz Ch39750 RB100 Offset0 SCC 20 MHz Ch39948 RB100 Offset0



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



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

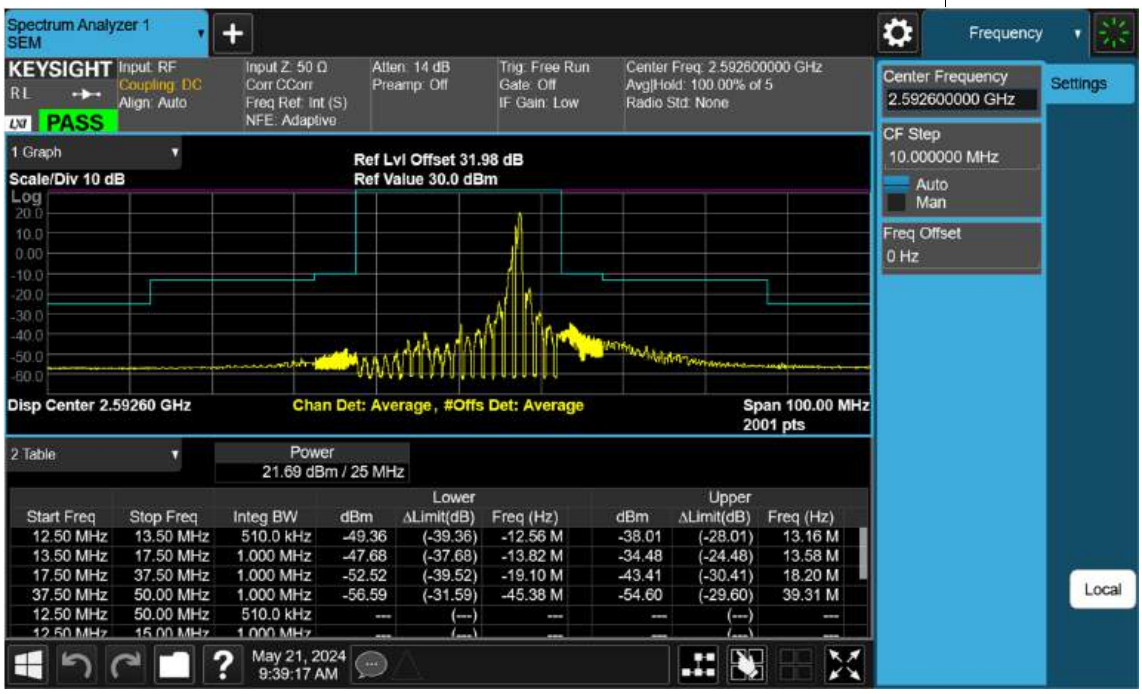


8.4 Channel Edge

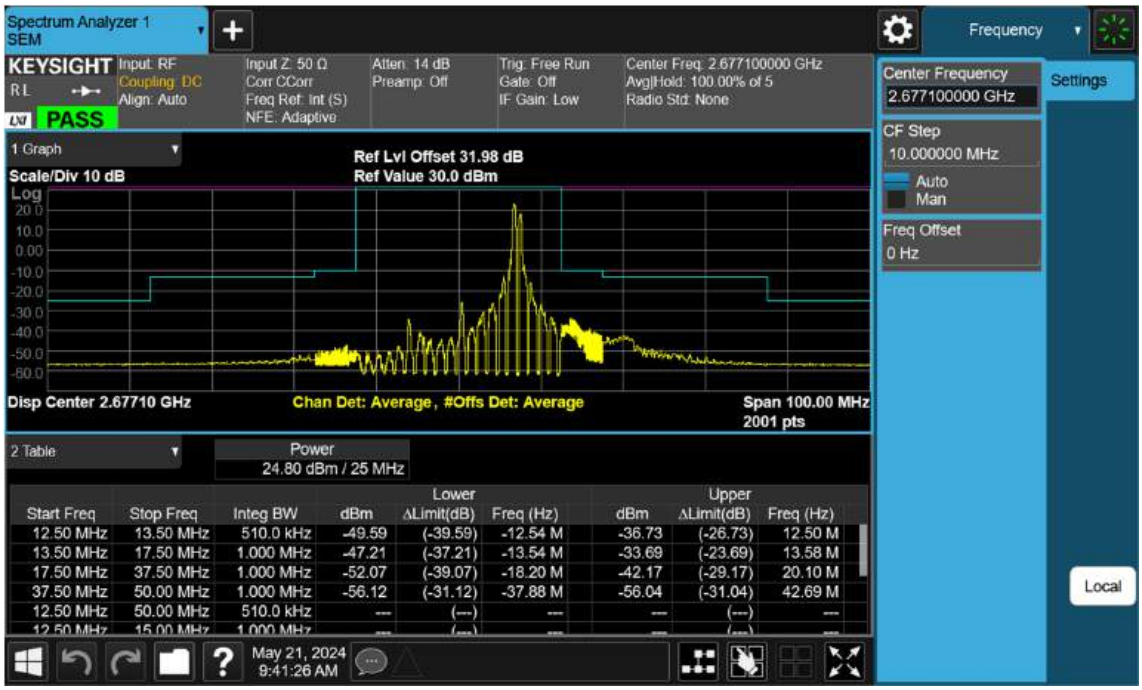
PCC 5 MHz Ch39683 RB1 Offset24, SCC 20 MHz Ch39800 RB1 Offset0-1

PCC 5 MHz Ch39683 RB1 Offset24, SCC 20 MHz Ch39800 RB1 Offset0-2

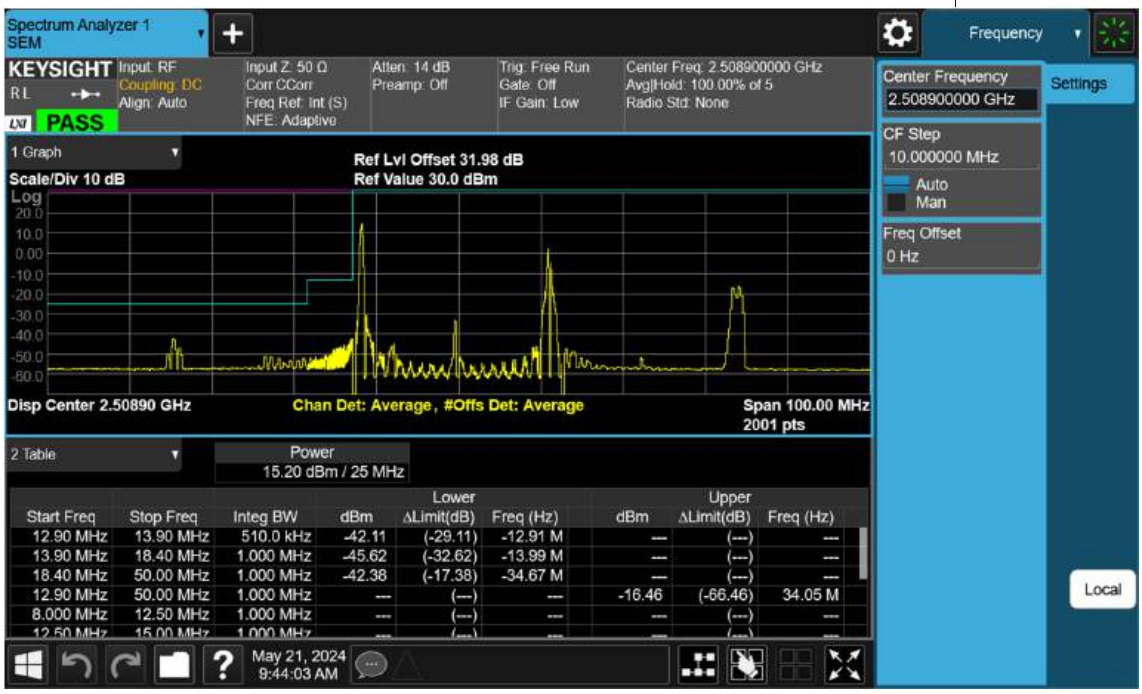
PCC 20 MHz Ch40595 RB1 Offset99, SCC 5 MHz Ch40712 RB1 Offset0



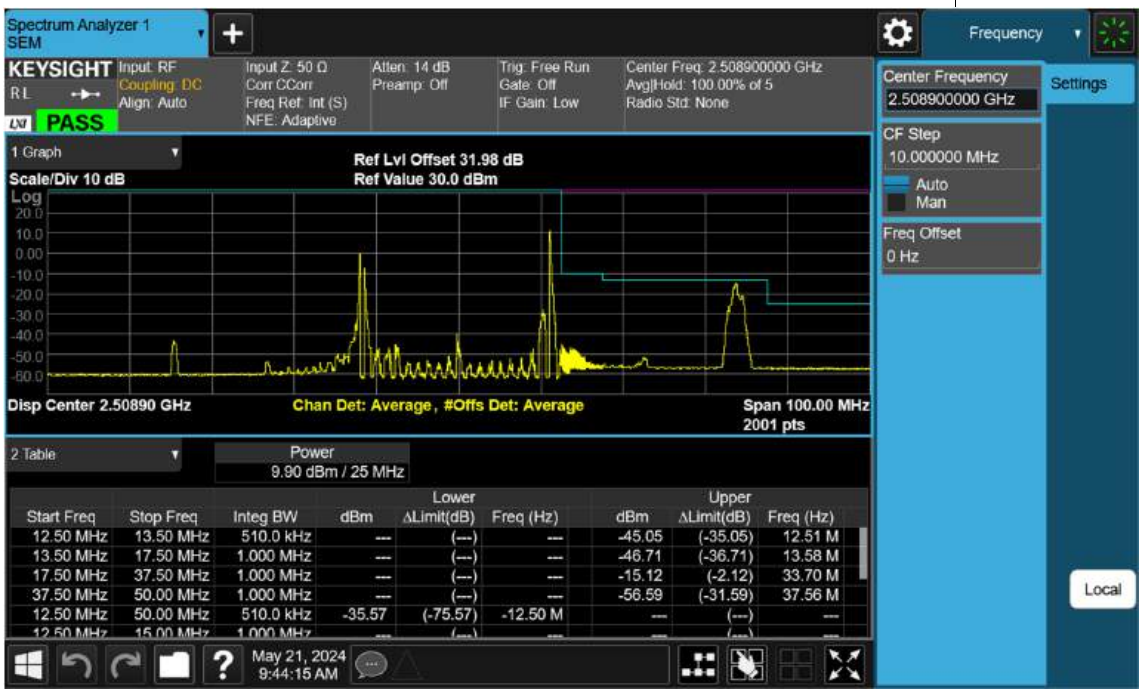
PCC 20 MHz Ch41440 RB1 Offset99, SCC 5 MHz Ch41557 RB1 Offset0



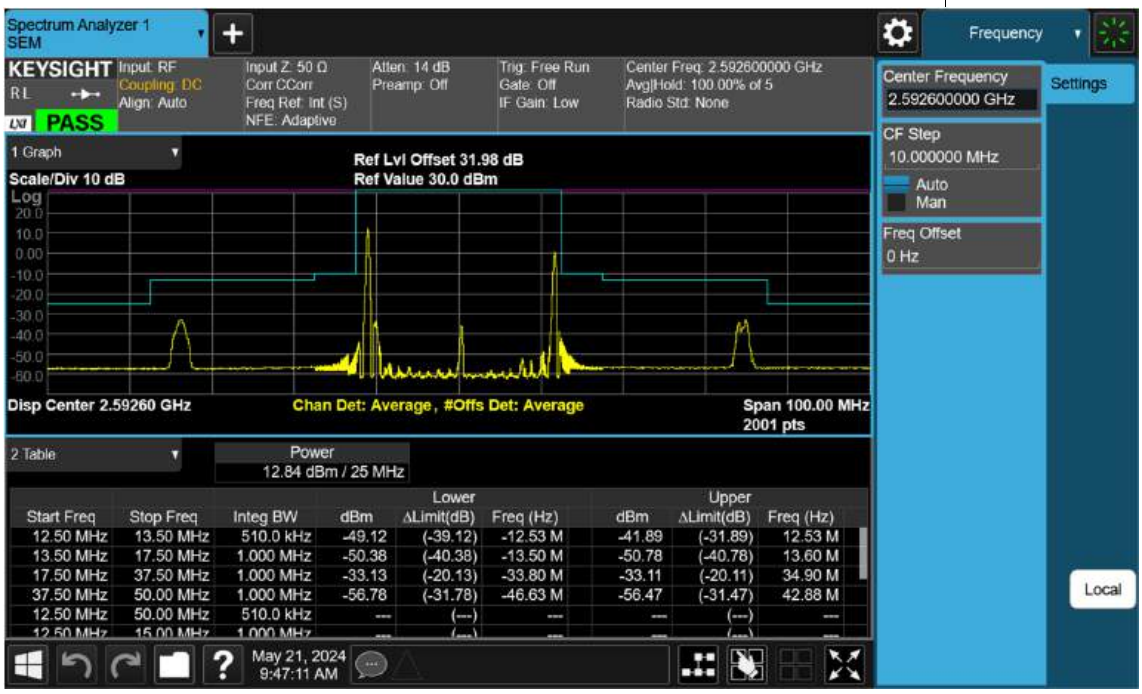
PCC 5 MHz Ch39683 RB1 Offset0, SCC 20 MHz Ch39800 RB1 Offset99-1



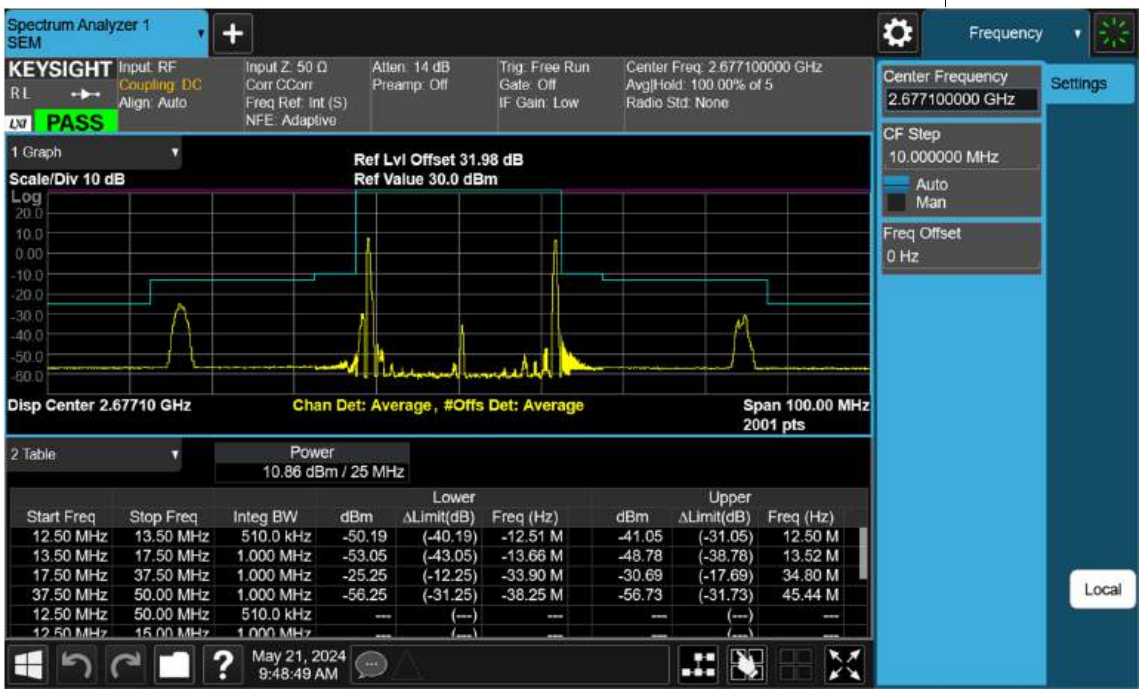
PCC 5 MHz Ch39683 RB1 Offset0, SCC 20 MHz Ch39800 RB1 Offset99-2



PCC 20 MHz Ch40595 RB1 Offset0, SCC 5 MHz Ch40712 RB1 Offset24



PCC 20 MHz Ch41440 RB1 Offset0, SCC 5 MHz Ch41557 RB1 Offset24



PCC 20 MHz Ch39750 RB100 Offset0, SCC 15 MHz Ch39921 RB75 Offset0-1

PCC 20 MHz Ch39750 RB100 Offset0, SCC 15 MHz Ch39921 RB75 Offset0-2

PCC 20 MHz Ch40546 RB100 Offset0, SCC 15 MHz Ch40717 RB75 Offset0

PCC 20 MHz Ch41341 RB100 Offset0, SCC 15 MHz Ch41512 RB75 Offset0

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

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

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

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

8.5 Frequency Stability / Variation Of Ambient Temperature

▣ PCC Channel:	39683	
▣ PCC Frequency:	2499.3	MHz
▣ PCC BandWidth:	5	MHz
▣ SCC Channel:	39800	
▣ SCC Frequency:	2511.0	MHz
▣ SCC BandWidth:	20	MHz
▣ Voltage :	13.500	VDC
▣ LIMIT:	Emission must remain in band	

Voltage	Power	Temp.	PPM		Frequency Error (MHz)	
(%)	(VDC)	(℃)	PCC	SCC	PCC	SCC
100 %	13.500	+20(Ref)	-0.006	-0.021	2499.29993	2510.99997
100 %		-30	-0.005	-0.002	2499.29994	2510.99994
100 %		-20	0.005	0.001	2499.29998	2510.99998
100 %		-10	-0.019	-0.009	2499.29988	2510.99998
100 %		0	-0.003	-0.007	2499.29997	2510.99995
100 %		10	-0.010	0.009	2499.29998	2510.99995
100 %		30	-0.003	0.005	2499.29995	2510.99999
100 %		40	-0.012	0.001	2499.29993	2510.99999
100 %		50	0.002	-0.005	2499.29995	2510.99995
85 %	11.475	20	-0.006	0.000	2499.29995	2510.99999
115 %	15.525	20	-0.002	0.004	2499.29992	2510.99994

▣ PCC Channel: 39705
▣ PCC Frequency: 2501.5 MHz
▣ PCC BandWidth: 10 MHz
▣ SCC Channel: 39849
▣ SCC Frequency: 2515.9 MHz
▣ SCC BandWidth: 20 MHz
▣ Voltage : 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)	-0.011	-0.008	2501.49990	2515.89997
100 %		-30	-0.003	-0.004	2501.49996	2515.90001
100 %		-20	0.000	-0.010	2501.49993	2515.89992
100 %		-10	-0.011	0.002	2501.49996	2515.90001
100 %		0	0.005	-0.003	2501.50003	2515.89998
100 %		10	-0.017	-0.004	2501.49997	2515.89998
100 %		30	-0.016	-0.008	2501.49990	2515.89994
100 %		40	0.004	-0.003	2501.49995	2515.89990
100 %		50	-0.009	0.006	2501.49993	2515.89993
85 %	11.475	20	-0.007	-0.003	2501.50000	2515.89991
115 %	15.525	20	-0.011	-0.016	2501.49992	2515.89993

▣ PCC Channel:	39728	
▣ PCC Frequency:	2503.8	MHz
▣ PCC BandWidth:	15	MHz
▣ SCC Channel:	39899	
▣ SCC Frequency:	2520.9	MHz
▣ SCC BandWidth:	20	MHz
▣ Voltage :	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)	-0.002	-0.003	2503.79993	2520.89997
100 %		-30	0.005	-0.001	2503.80000	2520.89999
100 %		-20	-0.001	-0.008	2503.79994	2520.89990
100 %		-10	-0.005	0.004	2503.79993	2520.89999
100 %		0	0.007	-0.007	2503.79995	2520.90000
100 %		10	-0.005	0.007	2503.79990	2520.90002
100 %		30	0.000	-0.004	2503.79997	2520.89996
100 %		40	0.008	0.008	2503.79996	2520.90002
100 %		50	0.004	0.003	2503.79998	2520.90001
85 %	11.475	20	-0.001	0.003	2503.79996	2520.89994
115 %	15.525	20	-0.009	0.007	2503.79989	2520.90000

- ▣ PCC Channel: 39750
- ▣ PCC Frequency: 2506.0 MHz
- ▣ PCC BandWidth: 20 MHz
- ▣ SCC Channel: 39948
- ▣ SCC Frequency: 2525.8 MHz
- ▣ SCC BandWidth: 20 MHz
- ▣ Voltage : 13.500 VDC
- ▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	13.500	+20(Ref)	-0.004	0.007	2505.99991	2525.79995
100 %		-30	-0.001	-0.011	2505.99997	2525.79995
100 %		-20	-0.007	-0.008	2505.99998	2525.79995
100 %		-10	-0.010	0.008	2505.99999	2525.79997
100 %		0	-0.009	-0.001	2505.99990	2525.79992
100 %		10	0.000	-0.003	2505.99994	2525.79992
100 %		30	-0.015	-0.010	2505.99996	2525.79990
100 %		40	0.011	-0.008	2505.99994	2525.79999
100 %		50	-0.014	-0.009	2505.99994	2525.79993
85 %	11.475	20	-0.003	-0.005	2505.99991	2525.79994
115 %	15.525	20	-0.005	-0.012	2505.99996	2525.79991

▣ PCC Channel: 41373
▣ PCC Frequency: 2668.3 MHz
▣ PCC BandWidth: 5 MHz
▣ SCC Channel: 41490
▣ SCC Frequency: 2680.0 MHz
▣ SCC BandWidth: 20 MHz
▣ Voltage : 13.500 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	13.500	+20(Ref)	-0.019	-0.007	2668.29993	2679.99992
100 %		-30	-0.009	0.003	2668.29997	2679.99992
100 %		-20	-0.006	0.008	2668.29992	2679.99995
100 %		-10	0.008	-0.003	2668.29998	2679.99999
100 %		0	-0.002	-0.013	2668.29991	2679.99991
100 %		10	-0.013	0.001	2668.29989	2679.99999
100 %		30	0.002	-0.004	2668.30002	2680.00000
100 %		40	0.000	-0.022	2668.29994	2679.99987
100 %		50	0.006	0.003	2668.29997	2680.00001
85 %	11.475	20	-0.006	-0.006	2668.29995	2679.99992
115 %	15.525	20	-0.010	0.003	2668.29992	2679.99997

- ▣ PCC Channel: 41346
- ▣ PCC Frequency: 2665.6 MHz
- ▣ PCC BandWidth: 10 MHz
- ▣ SCC Channel: 41490
- ▣ SCC Frequency: 2680.0 MHz
- ▣ SCC BandWidth: 20 MHz
- ▣ Voltage : 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)	0.006	-0.023	2665.59995	2679.99996
100 %		-30	-0.015	0.005	2665.59991	2679.99997
100 %		-20	-0.004	-0.007	2665.59995	2679.99991
100 %		-10	-0.006	0.003	2665.59997	2680.00001
100 %		0	-0.003	-0.020	2665.59999	2679.99993
100 %		10	-0.013	0.004	2665.59990	2679.99996
100 %		30	-0.020	-0.011	2665.59989	2679.99997
100 %		40	0.004	0.002	2665.59998	2679.99994
100 %		50	-0.016	-0.017	2665.59992	2679.99994
85 %	11.475	20	-0.002	-0.004	2665.59994	2679.99999
115 %	15.525	20	0.005	-0.010	2665.59998	2679.99996

▣ PCC Channel: 41319
▣ PCC Frequency: 2662.9 MHz
▣ PCC BandWidth: 15 MHz
▣ SCC Channel: 41490
▣ SCC Frequency: 2680.0 MHz
▣ SCC BandWidth: 20 MHz
▣ Voltage : 13.500 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	13.500	+20(Ref)	-0.012	-0.007	2662.89994	2679.99995
100 %		-30	-0.015	0.001	2662.89993	2680.00000
100 %		-20	0.000	0.000	2662.89993	2679.99991
100 %		-10	0.012	-0.006	2662.90003	2679.99994
100 %		0	-0.001	0.010	2662.89996	2680.00002
100 %		10	0.002	-0.008	2662.89996	2679.99998
100 %		30	-0.007	0.006	2662.89995	2679.99995
100 %		40	-0.007	-0.014	2662.89994	2679.99992
100 %		50	0.001	-0.009	2662.89994	2679.99991
85 %	11.475	20	-0.008	-0.004	2662.89995	2679.99998
115 %	15.525	20	-0.011	-0.014	2662.89992	2679.99988

▣ PCC Channel: 41292
▣ PCC Frequency: 2660.2 MHz
▣ PCC BandWidth: 20 MHz
▣ SCC Channel: 41490
▣ SCC Frequency: 2680.0 MHz
▣ SCC BandWidth: 20 MHz
▣ Voltage : 13.500 MHz
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	13.500	+20(Ref)	0.004	-0.006	2660.19994	2679.99998
100 %		-30	0.012	-0.009	2660.19997	2679.99994
100 %		-20	-0.002	-0.010	2660.19998	2679.99996
100 %		-10	0.006	0.004	2660.19997	2680.00000
100 %		0	-0.007	0.005	2660.19999	2679.99999
100 %		10	-0.003	0.001	2660.19992	2679.99996
100 %		30	0.004	-0.014	2660.19993	2679.99992
100 %		40	0.010	0.004	2660.19998	2679.99993
100 %		50	0.005	0.006	2660.19999	2679.99993
85 %	11.475	20	-0.006	-0.008	2660.19999	2679.99995
115 %	15.525	20	0.003	0.001	2660.19994	2680.00000

8.6 Radiated Spurious Emissions

8.6.1 External Antenna

- ▣ PCC Channel : 39725 (2503.5 MHz)
- ▣ PCC BW(MHz) : 15
- ▣ PCC RB/ RB Offset : 1/ 74
- ▣ SCC Channel : 39875 (2518.5 MHz)
- ▣ SCC BW(MHz) : 15
- ▣ SCC RB/ RB Offset : 1/ 0
- ▣ LIMIT: -25.0 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)	Detector
5 022.00	56.19	76.3	52.59	V	-42.61	peak
7 533.00	52.04	76.2	52.32	V	-42.88	peak
10 044.00	45.68	74.9	50.06	V	-45.14	peak
12 555.00	44.49	74.1	50.86	V	-44.34	peak
15 066.00	43.75	76.4	54.69	V	-40.51	peak

▣ PCC Channel : 40546 (2585.6 MHz)

▣ PCC BW(MHz) : 20

▣ PCC RB/ RB Offset : 1/ 99

▣ SCC Channel : 40717 (2602.7 MHz)

▣ SCC BW(MHz) : 15

▣ SCC RB/ RB Offset : 1/ 0

▣ LIMIT: -25.0 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)	Detector
5 190.82	69.35	75.2	66.01	V	-29.19	peak
7 786.23	50.60	75.7	51.94	V	-43.26	peak
10 381.64	46.57	74.4	51.38	V	-43.82	peak
12 977.05	43.83	74.0	51.24	V	-43.96	peak
15 572.46	44.15	75.1	56.55	V	-38.65	peak

▣ PCC Channel : 41365 (2667.5 MHz)

▣ PCC BW(MHz) : 15

▣ PCC RB/ RB Offset : 1/ 74

▣ SCC Channel : 41515 (2682.5 MHz)

▣ SCC BW(MHz) : 15

▣ SCC RB/ RB Offset : 1/ 0

▣ LIMIT: -25.0 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)	Detector
5 350.00	64.24	75.8	60.85	V	-34.35	Average
8 025.00	49.05	76.0	50.14	V	-45.06	peak
10 700.00	45.36	74.6	49.98	V	-45.22	peak
13 375.00	44.49	75.0	51.92	V	-43.28	peak
16 050.00	44.30	75.9	56.44	V	-38.76	peak

8.6.2 Internal Antenna

- ▣ PCC Channel : 39750 (2506.0 MHz)
- ▣ PCC BW(MHz) : 20
- ▣ PCC RB/ RB Offset : 1/ 99
- ▣ SCC Channel : 39894 (2520.4 MHz)
- ▣ SCC BW(MHz) : 10
- ▣ SCC RB/ RB Offset : 1/ 0
- ▣ LIMIT: -25.0 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)	Detector
5 030.80	60.89	75.7	57.85	H	-37.35	peak
7 546.20	51.91	75.5	52.96	H	-42.24	peak
10 061.60	46.42	74.2	51.52	H	-43.68	peak
12 577.00	44.15	73.7	51.02	H	-44.18	peak
15 092.40	43.90	75.8	55.48	H	-39.72	peak

▣ PCC Channel : 40546 (2585.6 MHz)

▣ PCC BW(MHz) : 20

▣ PCC RB/ RB Offset : 1/ 99

▣ SCC Channel : 40717 (2602.7 MHz)

▣ SCC BW(MHz) : 15

▣ SCC RB/ RB Offset : 1/ 0

▣ LIMIT: -25.0 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)	Detector
5 190.60	69.42	75.2	66.08	V	-29.12	peak
7 785.90	50.35	75.7	51.69	H	-43.51	peak
10 381.20	49.07	74.4	53.88	H	-41.32	peak
12 976.50	47.90	74.0	55.31	H	-39.89	peak
15 571.80	44.42	75.1	56.82	H	-38.38	peak

▣ PCC Channel : 41319 (2662.9 MHz)

▣ PCC BW(MHz) : 15

▣ PCC RB/ RB Offset : 1/ 74

▣ SCC Channel : 41490 (2680.0 MHz)

▣ SCC BW(MHz) : 20

▣ SCC RB/ RB Offset : 1/ 0

▣ LIMIT: -25.0 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)	Detector
5 340.60	64.48	75.3	61.60	H	-33.60	Average
8 010.90	50.38	75.5	51.91	H	-43.29	peak
10 681.20	46.60	73.9	51.88	H	-43.32	peak
13 351.50	43.84	74.3	51.96	H	-43.24	peak
16 021.80	43.39	74.9	56.47	H	-38.73	peak

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	40528	2583.8	QPSK	25/ 0	20	40645	2595.5	QPSK	100/ 0	22.847
10	40549	2585.9	QPSK	50/ 0	15	40669	2597.9	QPSK	75/ 0	23.116
10	40526	2583.6	QPSK	50/ 0	20	40670	2598	QPSK	100/ 0	27.670
15	40571	2588.1	QPSK	75/ 0	10	40691	2600.1	QPSK	50/ 0	23.105
15	40545	2585.5	QPSK	75/ 0	15	40695	2600.5	QPSK	75/ 0	28.353
15	40523	2583.3	QPSK	75/ 0	20	40694	2600.4	QPSK	100/ 0	32.556
20	40595	2590.5	QPSK	100/ 0	5	40712	2602.2	QPSK	25/ 0	22.978
20	40571	2588.1	QPSK	100/ 0	10	40715	2602.5	QPSK	50/ 0	27.770
20	40546	2585.6	QPSK	100/ 0	15	40717	2602.7	QPSK	75/ 0	32.690
20	40521	2583.1	QPSK	100/ 0	20	40719	2602.9	QPSK	100/ 0	37.564

PCC					SCC					Data (MHz)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
5	40528	2583.8	16QAM	25/ 0	20	40645	2595.5	16QAM	100/ 0	22.804
10	40549	2585.9	16QAM	50/ 0	15	40669	2597.9	16QAM	75/ 0	23.065
10	40526	2583.6	16QAM	50/ 0	20	40670	2598	16QAM	100/ 0	27.735
15	40571	2588.1	16QAM	75/ 0	10	40691	2600.1	16QAM	50/ 0	23.091
15	40545	2585.5	16QAM	75/ 0	15	40695	2600.5	16QAM	75/ 0	28.286
15	40523	2583.3	16QAM	75/ 0	20	40694	2600.4	16QAM	100/ 0	32.518
20	40595	2590.5	16QAM	100/ 0	5	40712	2602.2	16QAM	25/ 0	22.878
20	40571	2588.1	16QAM	100/ 0	10	40715	2602.5	16QAM	50/ 0	27.754
20	40546	2585.6	16QAM	100/ 0	15	40717	2602.7	16QAM	75/ 0	32.561
20	40521	2583.1	16QAM	100/ 0	20	40719	2602.9	16QAM	100/ 0	37.500

PCC					SCC					Data (MHz)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
5	40528	2583.8	64QAM	25/ 0	20	40645	2595.5	64QAM	100/ 0	22.782
10	40549	2585.9	64QAM	50/ 0	15	40669	2597.9	64QAM	75/ 0	23.066
10	40526	2583.6	64QAM	50/ 0	20	40670	2598	64QAM	100/ 0	27.711
15	40571	2588.1	64QAM	75/ 0	10	40691	2600.1	64QAM	50/ 0	23.124
15	40545	2585.5	64QAM	75/ 0	15	40695	2600.5	64QAM	75/ 0	28.292
15	40523	2583.3	64QAM	75/ 0	20	40694	2600.4	64QAM	100/ 0	32.611
20	40595	2590.5	64QAM	100/ 0	5	40712	2602.2	64QAM	25/ 0	22.961
20	40571	2588.1	64QAM	100/ 0	10	40715	2602.5	64QAM	50/ 0	27.776
20	40546	2585.6	64QAM	100/ 0	15	40717	2602.7	64QAM	75/ 0	32.497
20	40521	2583.1	64QAM	100/ 0	20	40719	2602.9	64QAM	100/ 0	37.495

PCC					SCC					Data (MHz)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
5	40528	2583.8	256QAM	25/ 0	20	40645	2595.5	256QAM	100/ 0	22.838
10	40549	2585.9	256QAM	50/ 0	15	40669	2597.9	256QAM	75/ 0	23.099
10	40526	2583.6	256QAM	50/ 0	20	40670	2598	256QAM	100/ 0	27.623
15	40571	2588.1	256QAM	75/ 0	10	40691	2600.1	256QAM	50/ 0	23.117
15	40545	2585.5	256QAM	75/ 0	15	40695	2600.5	256QAM	75/ 0	28.357
15	40523	2583.3	256QAM	75/ 0	20	40694	2600.4	256QAM	100/ 0	32.515
20	40595	2590.5	256QAM	100/ 0	5	40712	2602.2	256QAM	25/ 0	22.951
20	40571	2588.1	256QAM	100/ 0	10	40715	2602.5	256QAM	50/ 0	27.698
20	40546	2585.6	256QAM	100/ 0	15	40717	2602.7	256QAM	75/ 0	32.507
20	40521	2583.1	256QAM	100/ 0	20	40719	2602.9	256QAM	100/ 0	37.473

Note:

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

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

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

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

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

8.8 Peak- to- Average Ratio

PCC					SCC					Data (dB)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
5	40528	2583.8	QPSK	25/ 0	20	40645	2595.5	QPSK	100/ 0	6.22
10	40549	2585.9	QPSK	50/ 0	15	40669	2597.9	QPSK	75/ 0	6.26
10	40526	2583.6	QPSK	50/ 0	20	40670	2598	QPSK	100/ 0	6.27
15	40571	2588.1	QPSK	75/ 0	10	40691	2600.1	QPSK	50/ 0	6.27
15	40545	2585.5	QPSK	75/ 0	15	40695	2600.5	QPSK	75/ 0	7.02
15	40523	2583.3	QPSK	75/ 0	20	40694	2600.4	QPSK	100/ 0	6.36
20	40595	2590.5	QPSK	100/ 0	5	40712	2602.2	QPSK	25/ 0	6.36
20	40571	2588.1	QPSK	100/ 0	10	40715	2602.5	QPSK	50/ 0	6.31
20	40546	2585.6	QPSK	100/ 0	15	40717	2602.7	QPSK	75/ 0	5.75
20	40521	2583.1	QPSK	100/ 0	20	40719	2602.9	QPSK	100/ 0	7.01

PCC					SCC					Data (dB)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
5	40528	2583.8	16QAM	25/ 0	20	40645	2595.5	16QAM	100/ 0	6.78
10	40549	2585.9	16QAM	50/ 0	15	40669	2597.9	16QAM	75/ 0	6.75
10	40526	2583.6	16QAM	50/ 0	20	40670	2598	16QAM	100/ 0	6.81
15	40571	2588.1	16QAM	75/ 0	10	40691	2600.1	16QAM	50/ 0	6.80
15	40545	2585.5	16QAM	75/ 0	15	40695	2600.5	16QAM	75/ 0	7.90
15	40523	2583.3	16QAM	75/ 0	20	40694	2600.4	16QAM	100/ 0	6.86
20	40595	2590.5	16QAM	100/ 0	5	40712	2602.2	16QAM	25/ 0	6.84
20	40571	2588.1	16QAM	100/ 0	10	40715	2602.5	16QAM	50/ 0	6.85
20	40546	2585.6	16QAM	100/ 0	15	40717	2602.7	16QAM	75/ 0	6.48
20	40521	2583.1	16QAM	100/ 0	20	40719	2602.9	16QAM	100/ 0	7.88

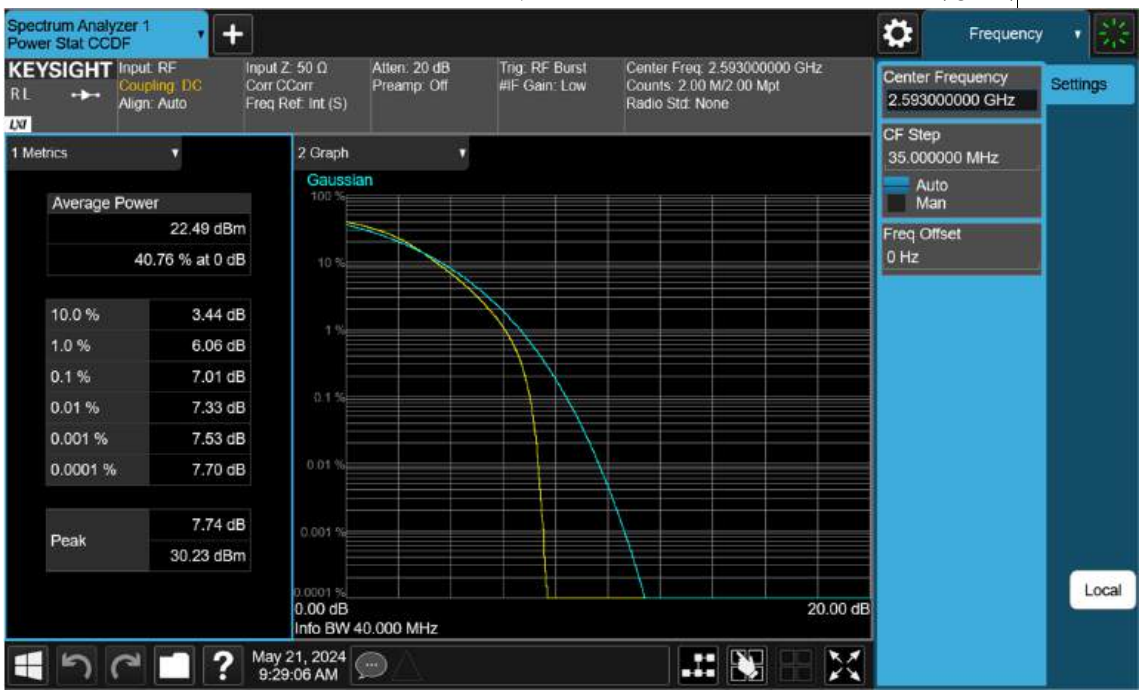
PCC					SCC					Data (dB)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
5	40528	2583.8	64QAM	25/ 0	20	40645	2595.5	64QAM	100/ 0	6.78
10	40549	2585.9	64QAM	50/ 0	15	40669	2597.9	64QAM	75/ 0	6.83
10	40526	2583.6	64QAM	50/ 0	20	40670	2598	64QAM	100/ 0	6.86
15	40571	2588.1	64QAM	75/ 0	10	40691	2600.1	64QAM	50/ 0	7.03
15	40545	2585.5	64QAM	75/ 0	15	40695	2600.5	64QAM	75/ 0	6.97
15	40523	2583.3	64QAM	75/ 0	20	40694	2600.4	64QAM	100/ 0	6.91
20	40595	2590.5	64QAM	100/ 0	5	40712	2602.2	64QAM	25/ 0	6.96
20	40571	2588.1	64QAM	100/ 0	10	40715	2602.5	64QAM	50/ 0	7.01
20	40546	2585.6	64QAM	100/ 0	15	40717	2602.7	64QAM	75/ 0	6.93
20	40521	2583.1	64QAM	100/ 0	20	40719	2602.9	64QAM	100/ 0	7.11

PCC					SCC					Data (dB)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
5	40528	2583.8	256QAM	25/ 0	20	40645	2595.5	256QAM	100/ 0	7.10
10	40549	2585.9	256QAM	50/ 0	15	40669	2597.9	256QAM	75/ 0	7.05
10	40526	2583.6	256QAM	50/ 0	20	40670	2598	256QAM	100/ 0	7.12
15	40571	2588.1	256QAM	75/ 0	10	40691	2600.1	256QAM	50/ 0	7.14
15	40545	2585.5	256QAM	75/ 0	15	40695	2600.5	256QAM	75/ 0	8.46
15	40523	2583.3	256QAM	75/ 0	20	40694	2600.4	256QAM	100/ 0	7.11
20	40595	2590.5	256QAM	100/ 0	5	40712	2602.2	256QAM	25/ 0	7.10
20	40571	2588.1	256QAM	100/ 0	10	40715	2602.5	256QAM	50/ 0	7.11
20	40546	2585.6	256QAM	100/ 0	15	40717	2602.7	256QAM	75/ 0	7.01
20	40521	2583.1	256QAM	100/ 0	20	40719	2602.9	256QAM	100/ 0	8.44

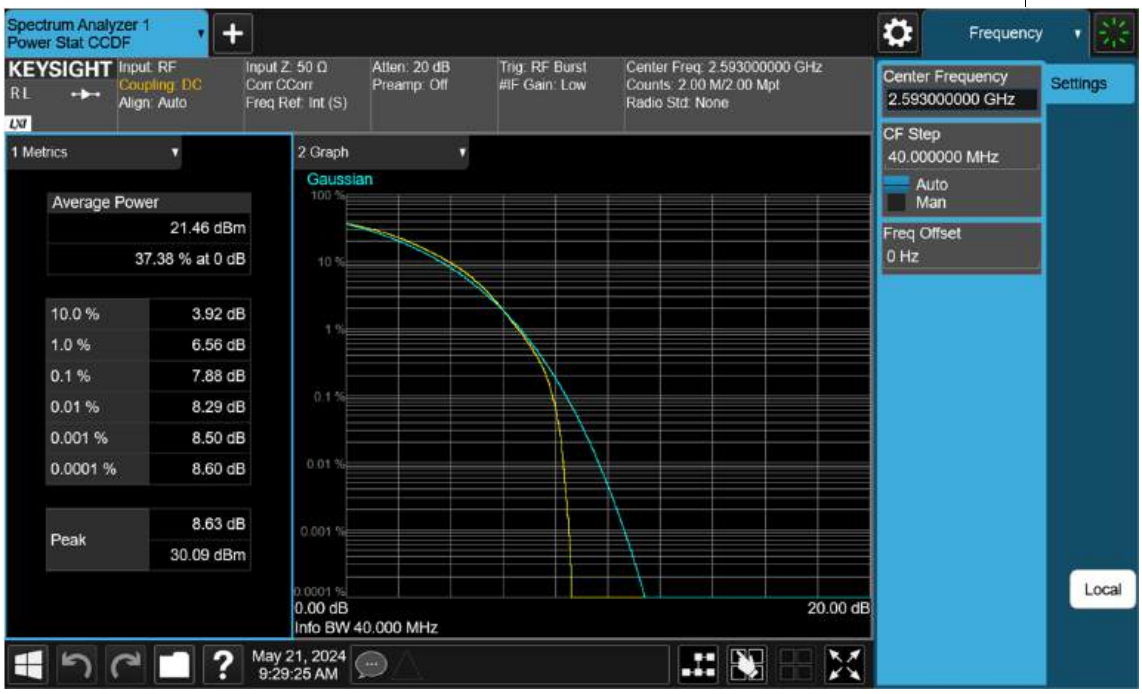
Note:

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

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



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



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

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

9. ANNEX A_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2406-FC015