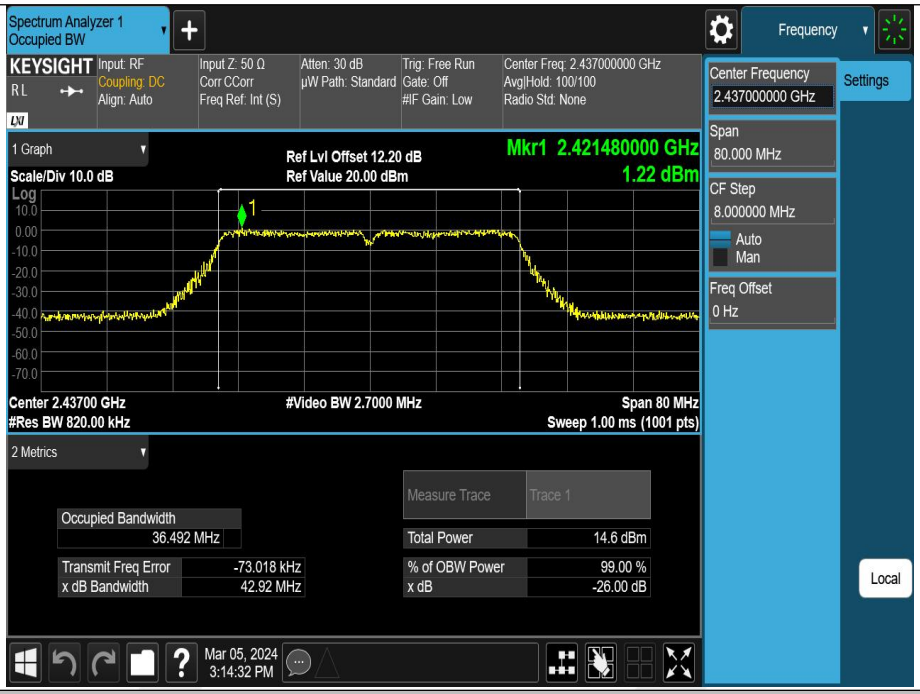
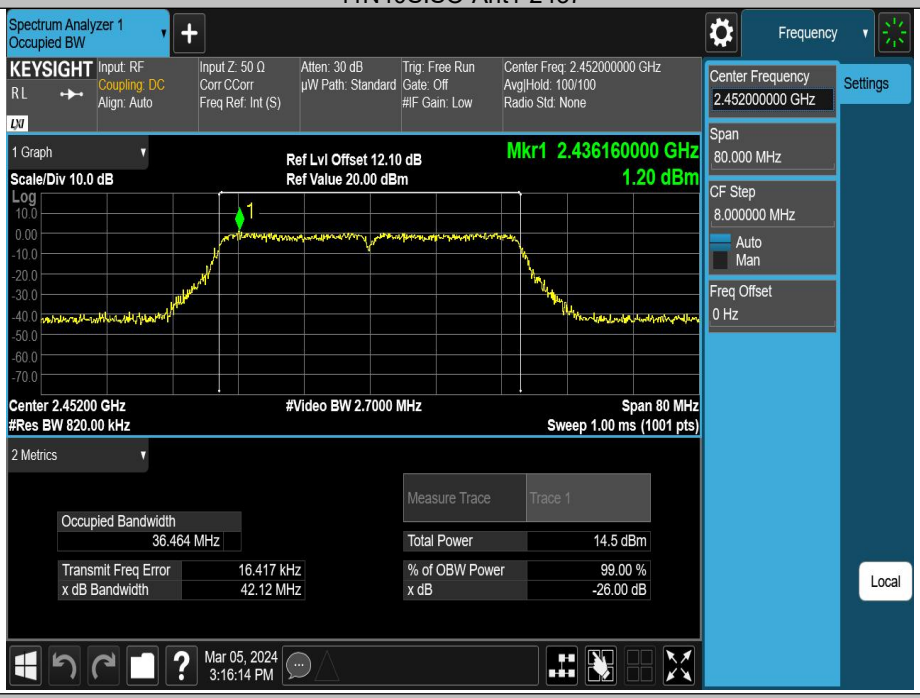


11N40SISO-Ant1-2437



11N40SISO-Ant1-2452

8.3 MAXIMUM PEAK CONDUCTED OUTPUT POWER

8.3.1 Applicable Standard

According to FCC Part15.247 (b)(3) and KDB 558074 D01 15.247 Meas Guidance v05r02
According to RSS-247 5.4(d) and RSS-Gen 6.12

8.3.2 Conformance Limit

The maximum conducted output power of the intentional radiator for systems using digital modulation in the 2400 - 2483.5 MHz bands shall not exceed: 1 Watt (30dBm).

8.3.3 Test Configuration

Test according to clause 6.1 radio frequency test setup

8.3.4 Test Procedure

a) Set span to at least 1.5 times the OBW.
b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz.
c) Set VBW ≥ 3 x RBW.
d) Number of points in sweep ≥ 2 × span / RBW. (This gives bin-to-bin spacing ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
e) Sweep time = auto.
f) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
g) If transmit duty cycle < 98 %, use a sweep trigger with the level set to enable triggering only on full power pulses. The transmitter shall operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 %, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".
h) Trace average at least 100 traces in power averaging (i.e., RMS) mode.
i) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

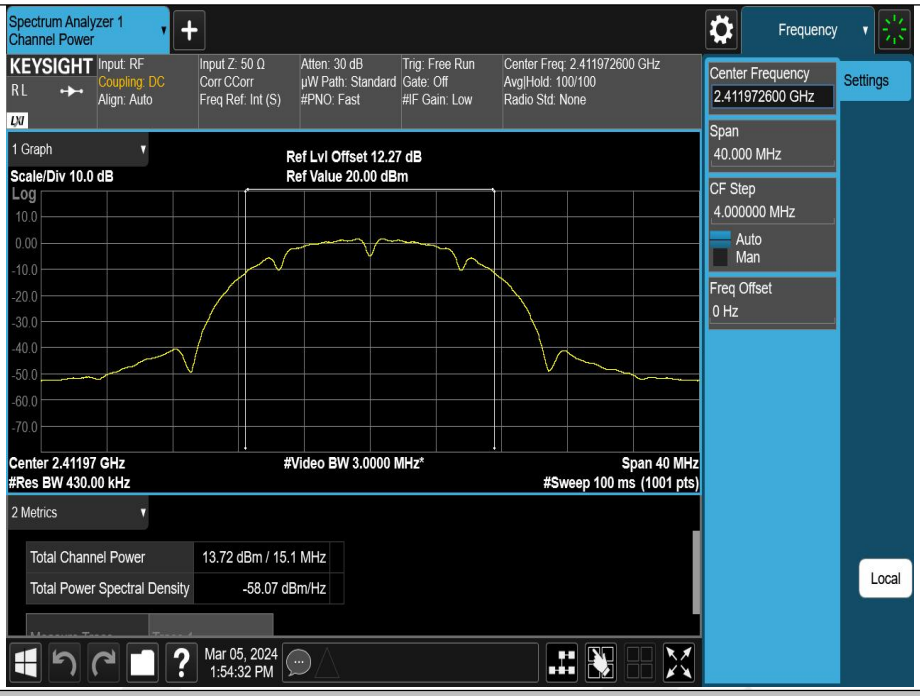
■ According to FCC Part 15.247(b)(4):
Conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
Note: If antenna Gain exceeds 6 dBi, then Output power Limit=30-(Gain- 6)

8.3.5 Test Results

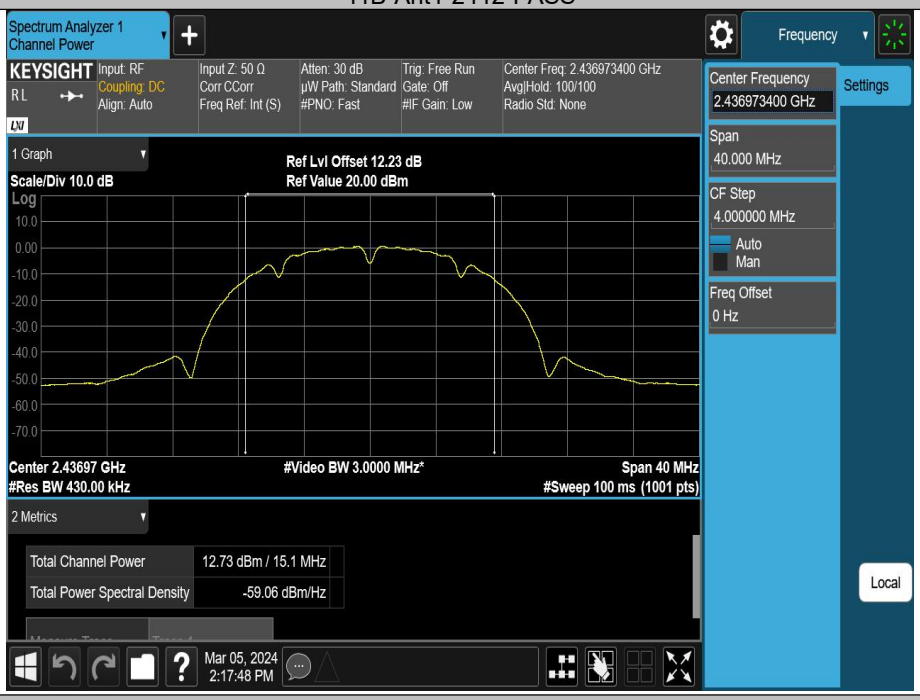
Temperature:	25 ˚C
Relative Humidity:	45%
ATM Pressure:	1011 mbar

Note: N/A

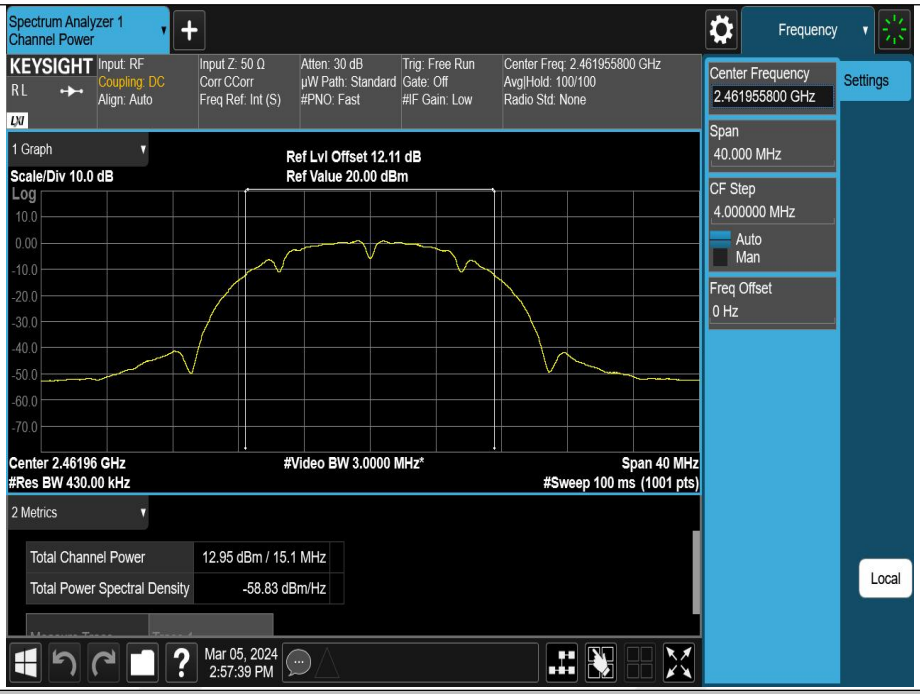
Test Mode	Antenna	Frequency[MHz]	Set Power	Average power [dBm]	Duty Cycle [%]	DC Factor [dBm]	Result [dBm]	Limit [dBm]	Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Verdict
11B	Ant1	2412	---	13.69	99.36	0.03	13.72	≤30.00	3.00	16.72	≤36.00	PASS
11B	Ant1	2437	---	12.70	99.36	0.03	12.73	≤30.00	3.00	15.73	≤36.00	PASS
11B	Ant1	2462	---	12.94	99.76	0.01	12.95	≤30.00	3.00	15.95	≤36.00	PASS
11G	Ant1	2412	---	8.30	95.37	0.21	8.51	≤30.00	3.00	11.51	≤36.00	PASS
11G	Ant1	2437	---	8.01	94.06	0.27	8.28	≤30.00	3.00	11.28	≤36.00	PASS
11G	Ant1	2462	---	7.95	96.26	0.17	8.12	≤30.00	3.00	11.12	≤36.00	PASS
11N20SISO	Ant1	2412	---	8.30	92.34	0.35	8.65	≤30.00	3.00	11.65	≤36.00	PASS
11N20SISO	Ant1	2437	---	7.94	93.66	0.28	8.22	≤30.00	3.00	11.22	≤36.00	PASS
11N20SISO	Ant1	2462	---	7.97	96.48	0.16	8.13	≤30.00	3.00	11.13	≤36.00	PASS
11N40SISO	Ant1	2422	---	8.28	50.00	3.01	11.29	≤30.00	3.00	14.29	≤36.00	PASS
11N40SISO	Ant1	2437	---	7.98	50.00	3.01	10.99	≤30.00	3.00	13.99	≤36.00	PASS
11N40SISO	Ant1	2452	---	7.96	50.00	3.01	10.97	≤30.00	3.00	13.97	≤36.00	PASS



11B-Ant1-2412-PASS



11B-Ant1-2437-PASS



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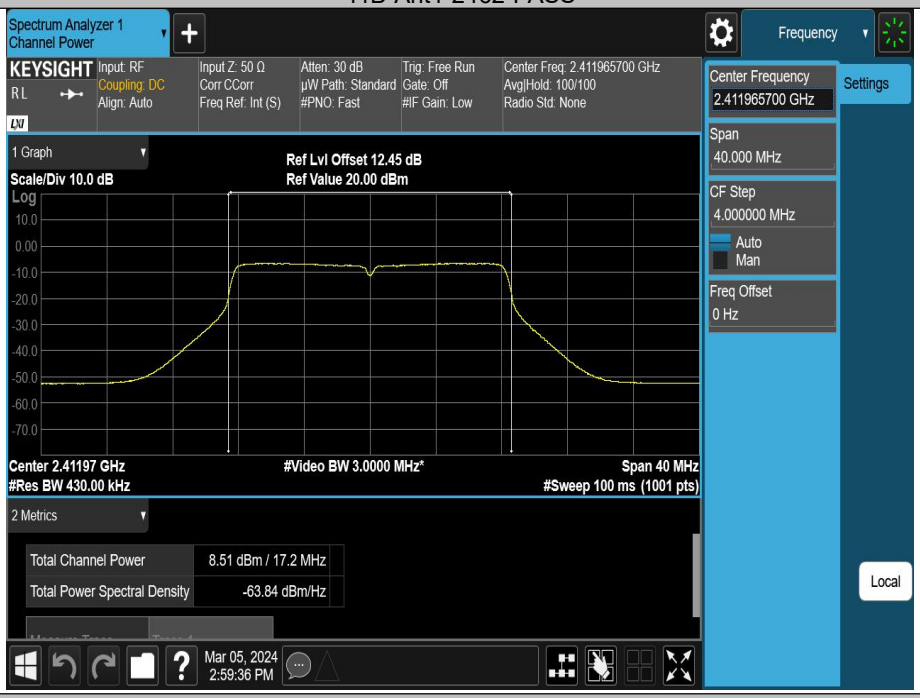

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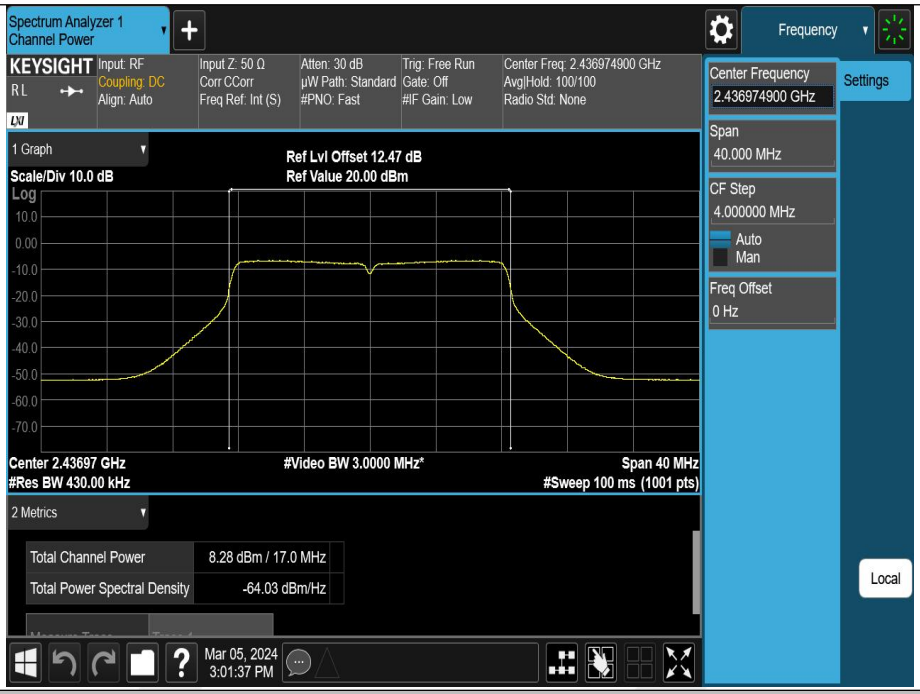

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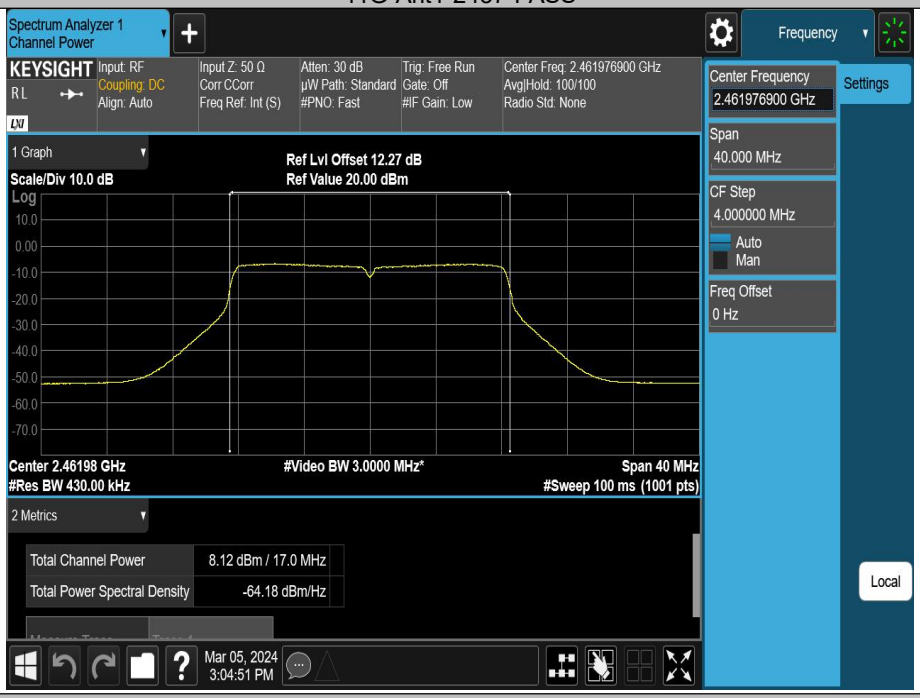

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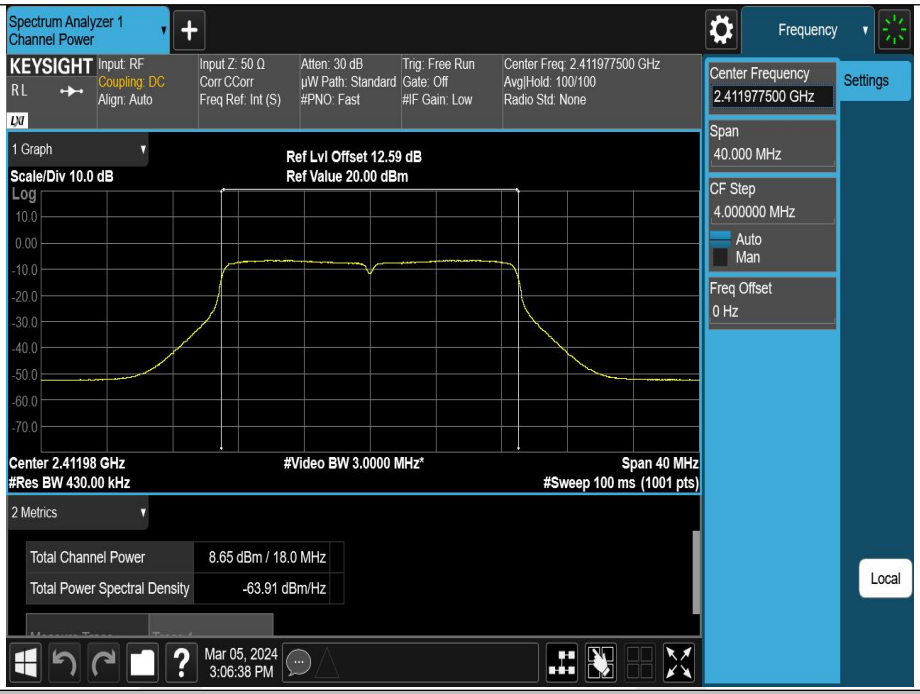

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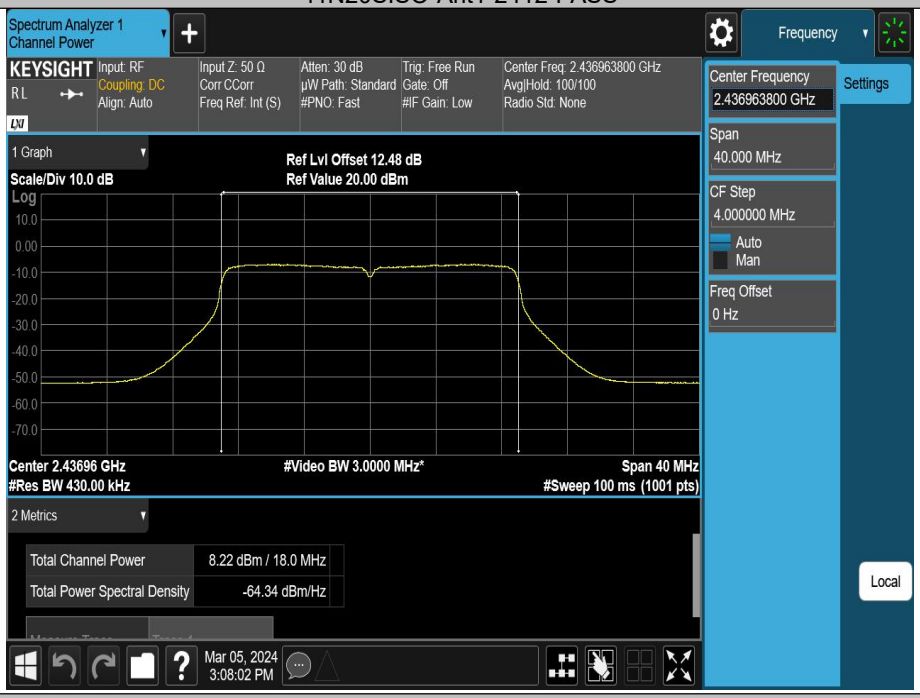

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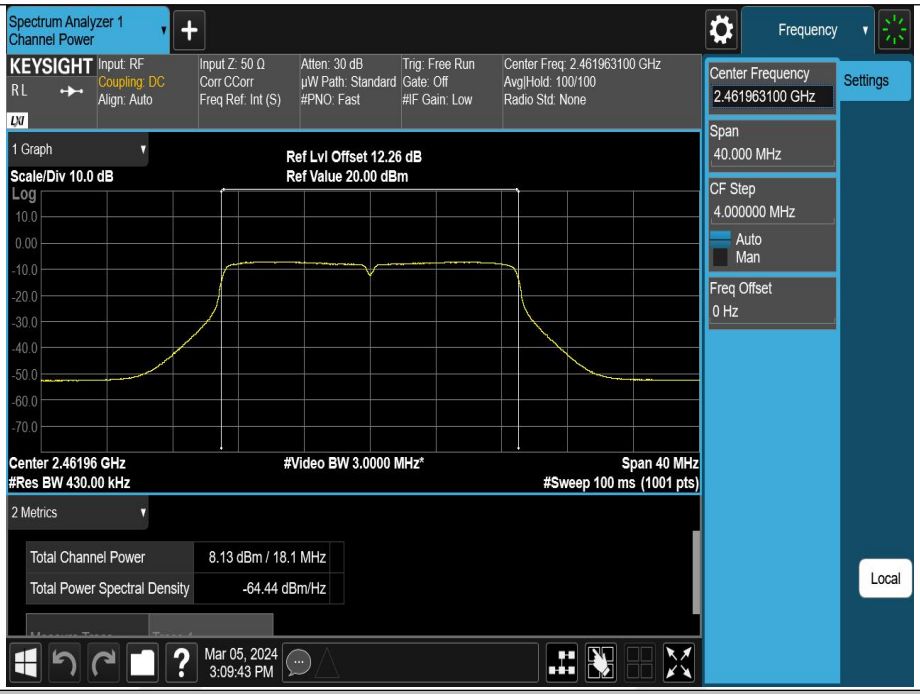

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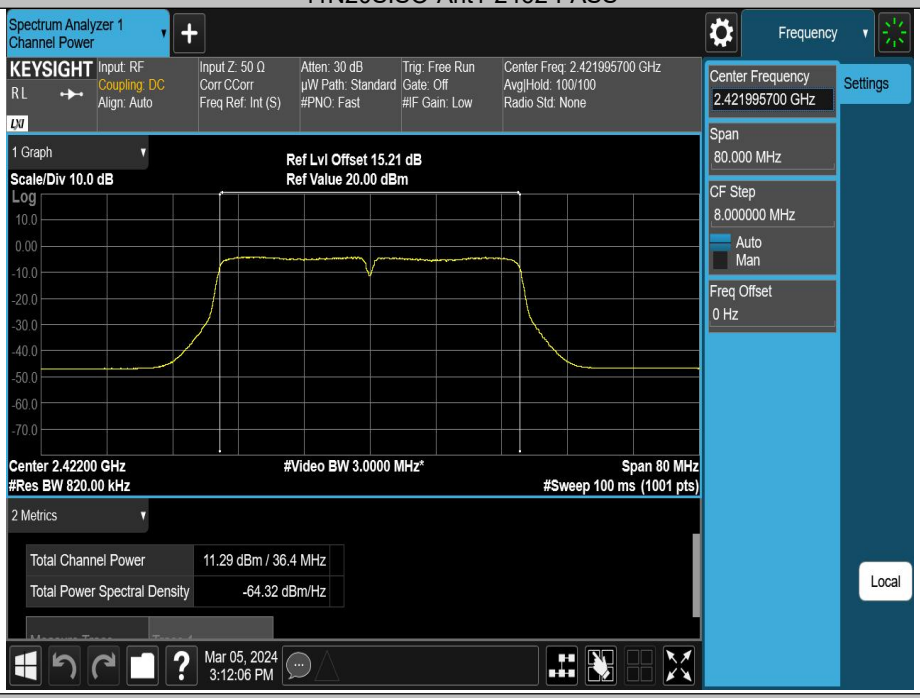
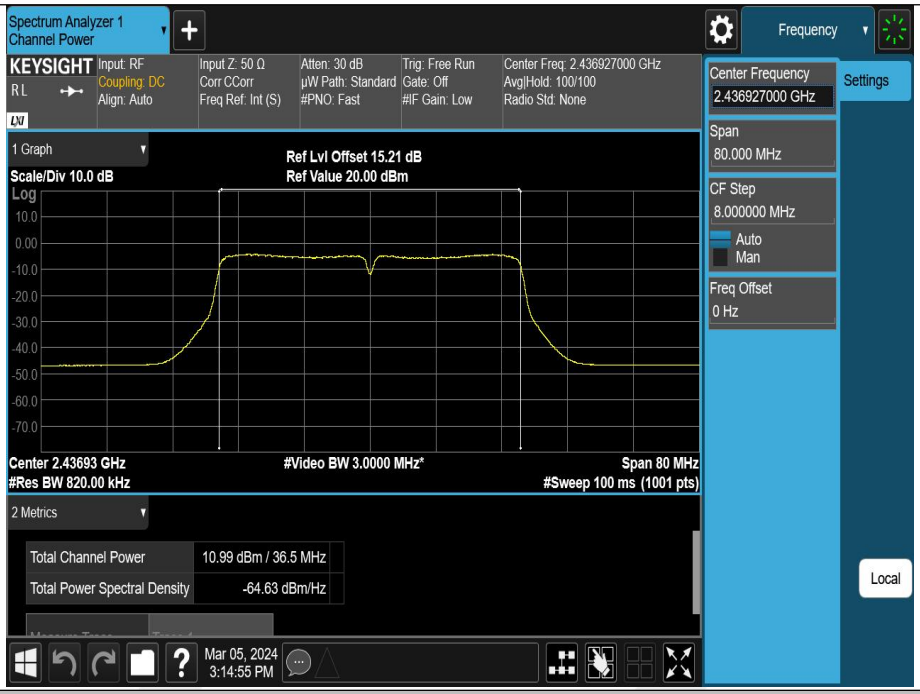


11N40SISO-Ant1-2422-PASS



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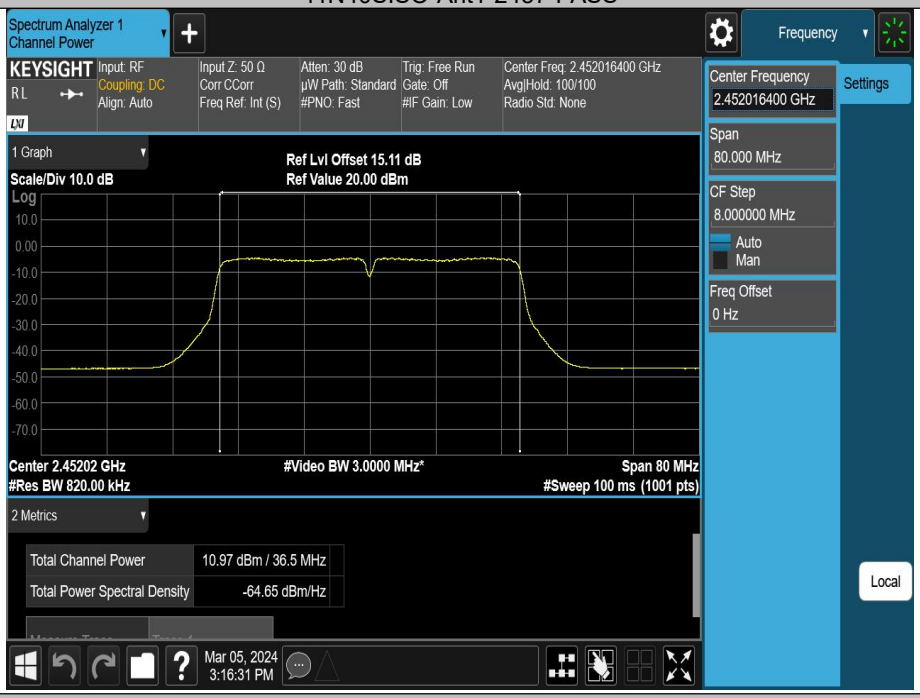


11N40SISO-Ant1-2452-PASS

8.4 MAXIMUM POWER SPECTRAL DENSITY

8.4.1 Applicable Standard

According to FCC Part15.247(e) and KDB 558074 D01 15.247 Meas Guidance v05r02
According to RSS-247 5.2(b) and RSS-Gen 6.12

8.4.2 Conformance Limit

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of section 5.4(d), (i.e. the power spectral density shall be determined using the same method as is used to determine the conducted output power).

8.4.3 Test Configuration

Test according to clause 6.1 radio frequency test setup

8.4.4 Test Procedure

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance
The transmitter output (antenna port) was connected to the spectrum analyzer
Set analyzer center frequency to DTS channel center frequency.
Set the span to 1.5 times the DTS bandwidth.
Set the RBW to: 3 kHz
Set the VBW to: 10 kHz.
Set Detector = peak.
Set Sweep time = auto couple.
Set Trace mode = max hold.
Allow trace to fully stabilize.
Use the peak marker function to determine the maximum amplitude level within the RBW.

8.4.5 Test Results

Temperature:	25 ˚C
Relative Humidity:	45%
ATM Pressure:	1011 mbar

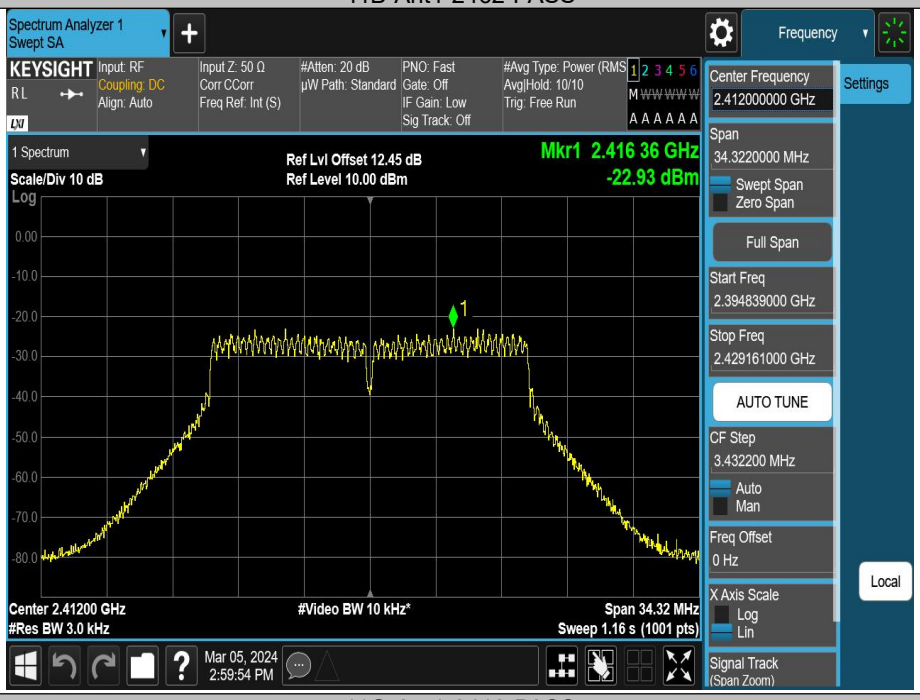
Note: N/A

TestMode	Antenna	Frequency[MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-15.76	≤8.00	PASS
11B	Ant1	2437	-17.28	≤8.00	PASS
11B	Ant1	2462	-17.12	≤8.00	PASS
11G	Ant1	2412	-22.93	≤8.00	PASS
11G	Ant1	2437	-23.61	≤8.00	PASS
11G	Ant1	2462	-23.66	≤8.00	PASS
11N20SISO	Ant1	2412	-23.49	≤8.00	PASS
11N20SISO	Ant1	2437	-23.01	≤8.00	PASS
11N20SISO	Ant1	2462	-24.30	≤8.00	PASS
11N40SISO	Ant1	2422	-24.62	≤8.00	PASS
11N40SISO	Ant1	2437	-24.36	≤8.00	PASS
11N40SISO	Ant1	2452	-25.47	≤8.00	PASS

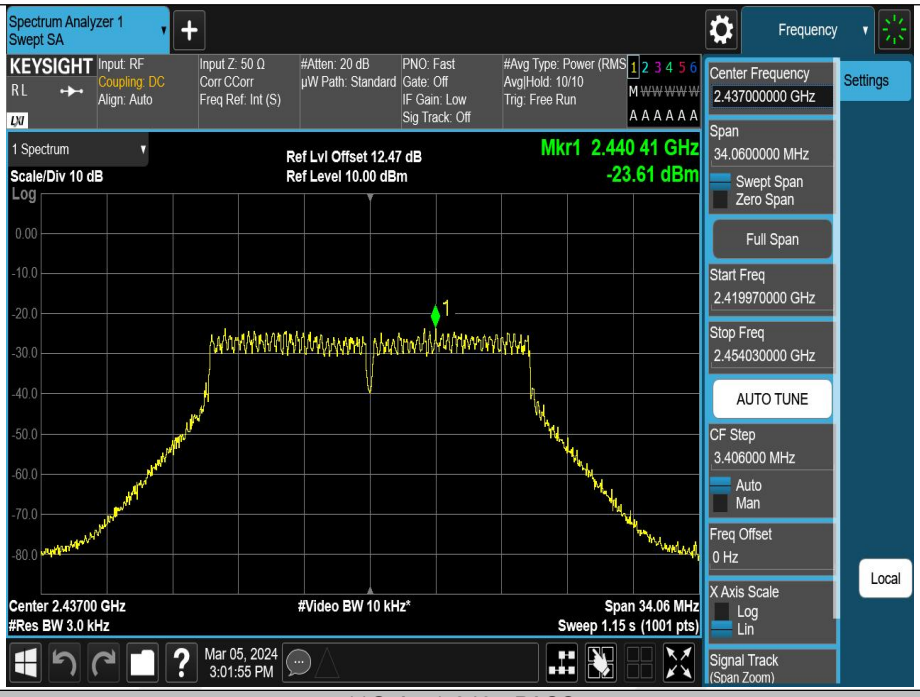
11B-Ant1-2412-PASS

11B-Ant1-2437-PASS

11B-Ant1-2462-PASS



11G-Ant1-2412-PASS



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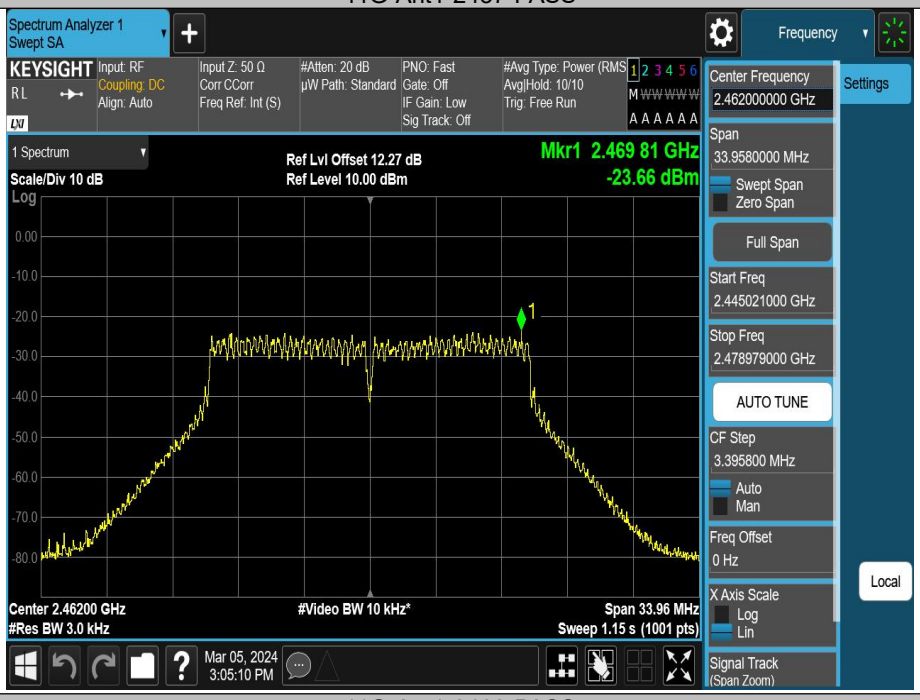

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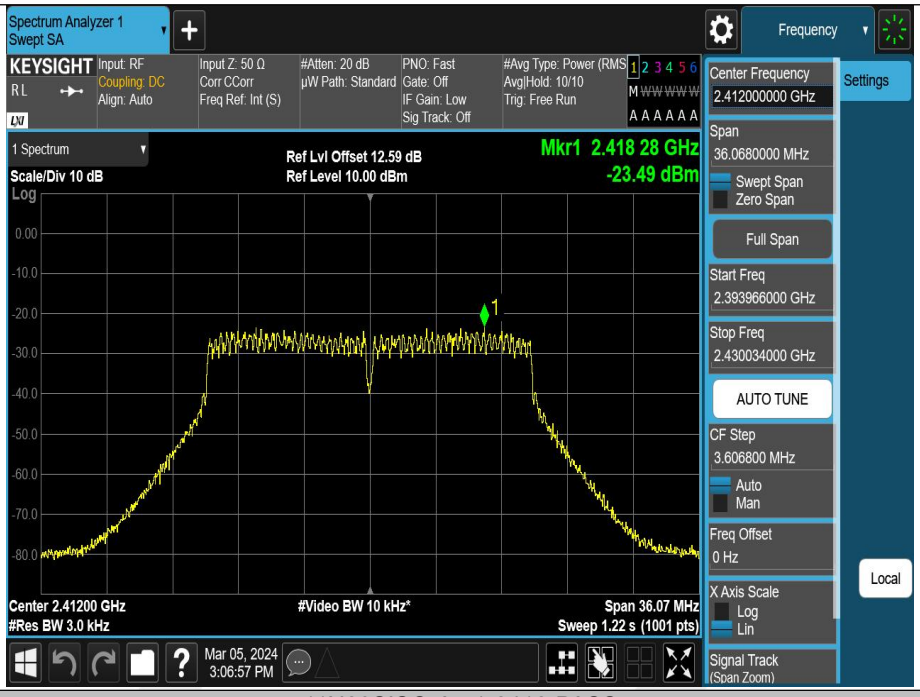

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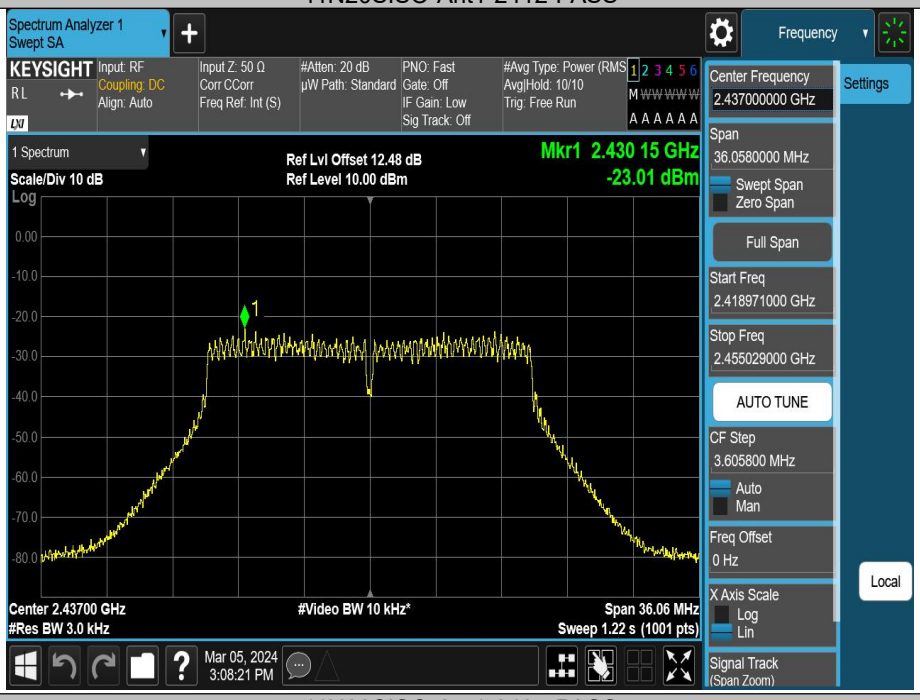

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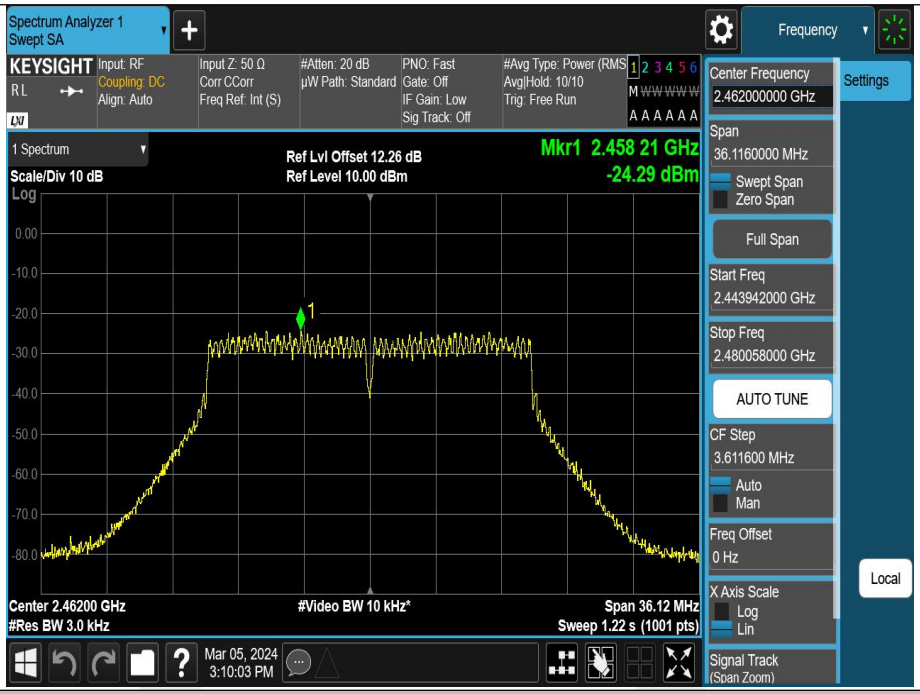

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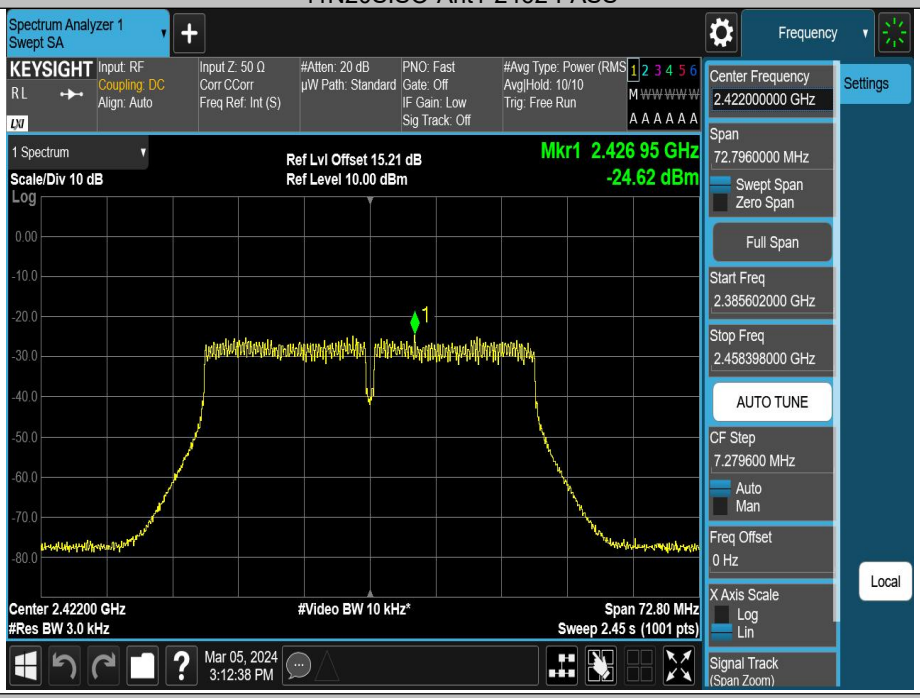

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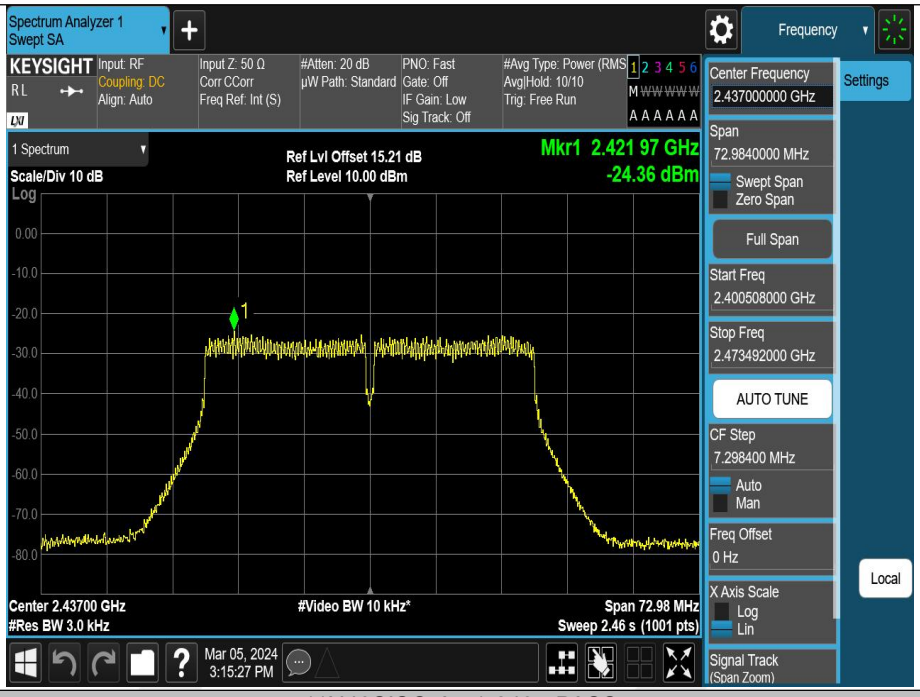

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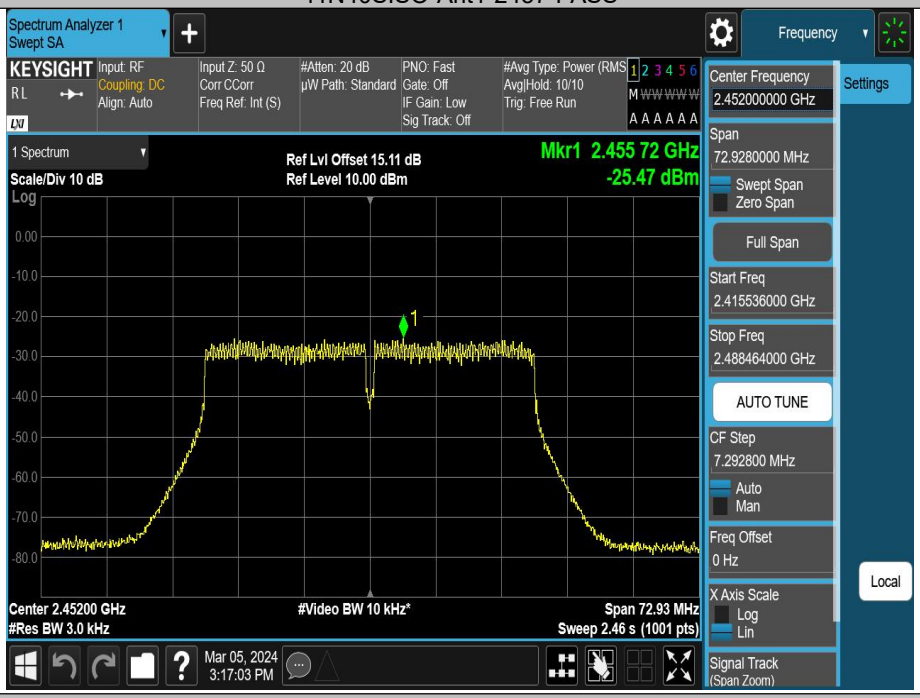


11N40SISO-Ant1-2452-PASS

8.5 UNWANTED EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS

8.5.1 Applicable Standard

According to FCC Part15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05r02
According to RSS-247 5.5

8.5.2 Conformance Limit

According to FCC Part 15.247(d):
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted undersection 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

8.5.3 Test Configuration

Test according to clause 6.1 radio frequency test setup

8.5.4 Test Procedure

The transmitter output (antenna port) was connected to the spectrum analyzer

- **Reference level measurement**

Establish a reference level by using the following procedure:
Set instrument center frequency to DTS channel center frequency.
Set the span to ≥ 1.5 times the DTS bandwidth.
Set the RBW = 100 kHz.
Set the VBW ≥ 3 x RBW.
Set Detector = peak.
Set Sweep time = auto couple.
Set Trace mode = max hold.
Allow trace to fully stabilize.
Use the peak marker function to determine the maximum PSD level.
Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

- **Band-edge measurement**

Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation
Set RBW ≥ 1% of the span=100kHz Set VBW ≥ 3 x RBW
Set Sweep = auto Set Detector function = peak Set Trace = max hold
Allow the trace to stabilize. Set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. The marker-delta value now displayed must comply with the limit specified in this Section.

- **Emission level measurement**

Set the center frequency and span to encompass frequency range to be measured.
Set the RBW = 100 kHz.
Set the VBW =300 kHz.
Set Detector = peak
Sweep time = auto couple.
Trace mode = max hold.
Allow trace to fully stabilize.
Use the peak marker function to determine the maximum amplitude level.
Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements . Report the three highest emissions relative to the limit.

8.5.5 Test Results

Temperature:	25 ˚C
Relative Humidity:	45%
ATM Pressure:	1011 mbar

Note: N/A

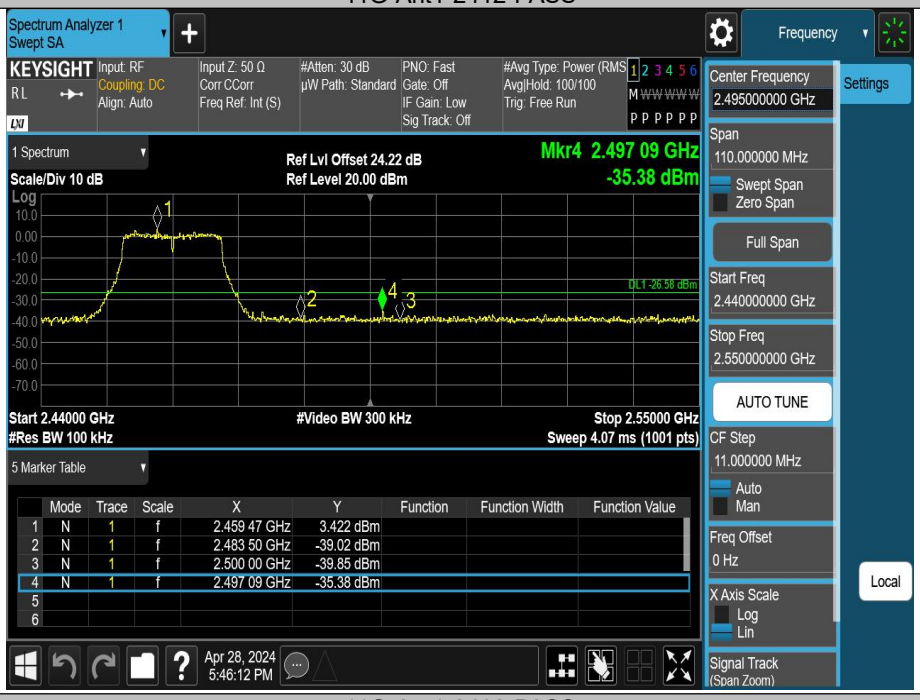
Band edge measurements

TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	12.30	-32.98	≤-17.71	PASS
11B	Ant1	High	2462	11.12	-35.71	≤-18.88	PASS
11G	Ant1	Low	2412	5.55	-32.54	≤-24.45	PASS
11G	Ant1	High	2462	3.42	-35.38	≤-26.58	PASS
11N20SISO	Ant1	Low	2412	5.26	-32.02	≤-24.74	PASS
11N20SISO	Ant1	High	2462	4.50	-35.32	≤-25.5	PASS
11N40SISO	Ant1	Low	2422	3.08	-32.82	≤-26.93	PASS
11N40SISO	Ant1	High	2452	2.30	-36.29	≤-27.7	PASS

11B-Ant1-2412-PASS

11B-Ant1-2462-PASS

11G-Ant1-2412-PASS



11G-Ant1-2462-PASS

11N20SISO-Ant1-2412-PASS

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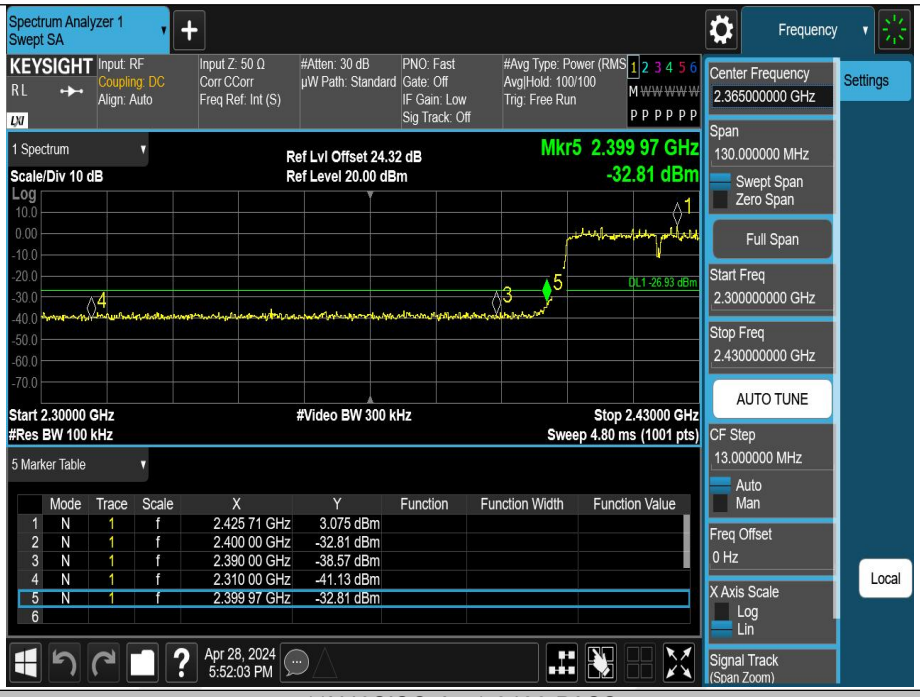

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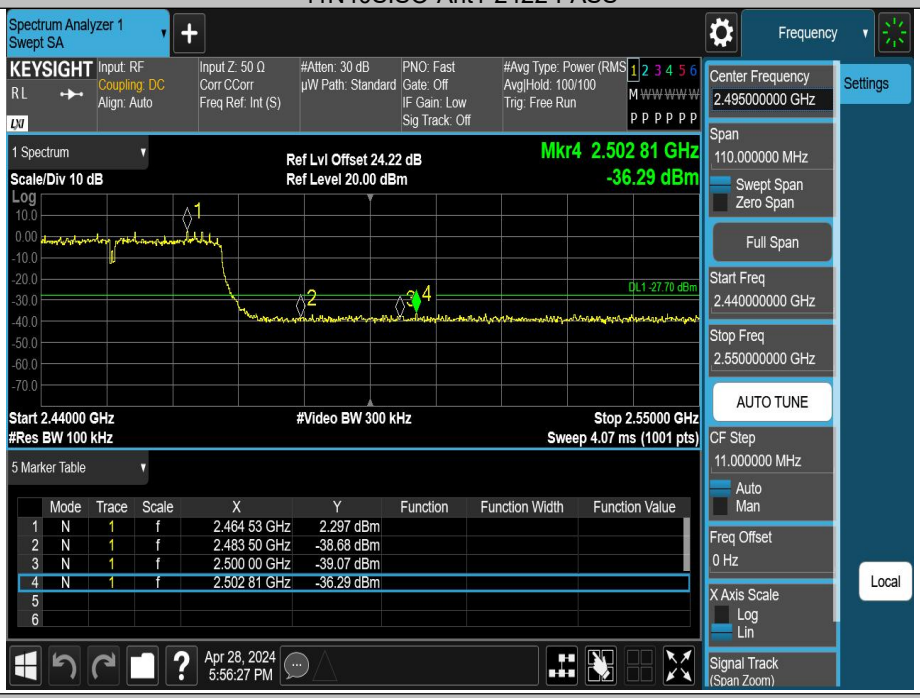
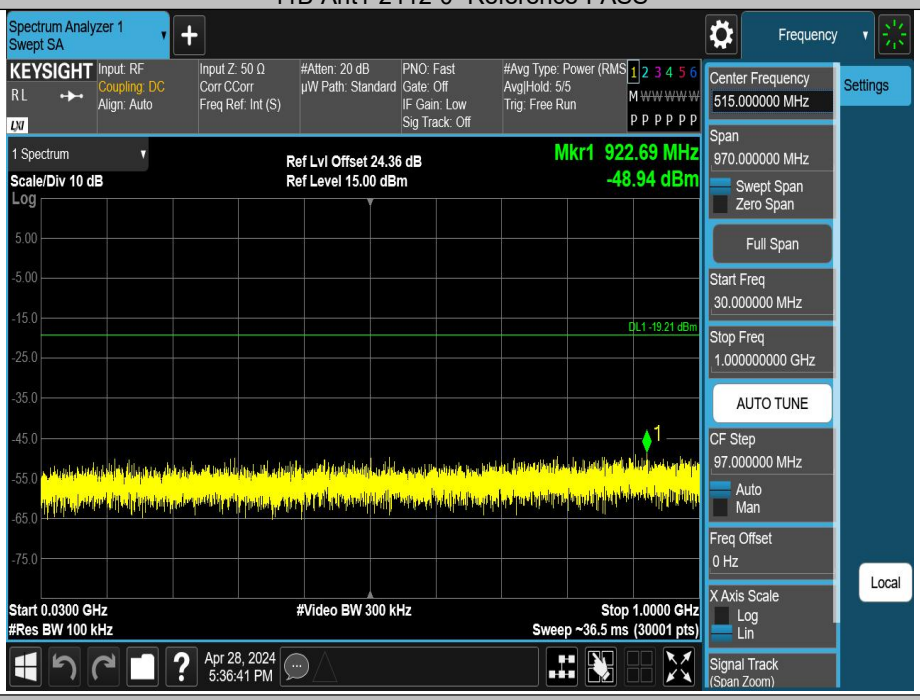


11N40SISO-Ant1-2452-PASS

Conducted Spurious Emission

TestMode	Antenna	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	0~Reference	10.79	10.79	---	PASS
11B	Ant1	2412	30~1000	10.79	-48.94	≤-19.21	PASS
11B	Ant1	2412	1000~26500	10.79	-37.37	≤-19.21	PASS
11B	Ant1	2437	0~Reference	11.05	11.05	---	PASS
11B	Ant1	2437	30~1000	11.05	-48.41	≤-18.95	PASS
11B	Ant1	2437	1000~26500	11.05	-37.87	≤-18.95	PASS
11B	Ant1	2462	0~Reference	10.97	10.97	---	PASS
11B	Ant1	2462	30~1000	10.97	-48.42	≤-19.03	PASS
11B	Ant1	2462	1000~26500	10.97	-38.07	≤-19.03	PASS
11G	Ant1	2412	0~Reference	2.35	2.35	---	PASS
11G	Ant1	2412	30~1000	2.35	-47.36	≤-27.65	PASS
11G	Ant1	2412	1000~26500	2.35	-37.85	≤-27.65	PASS
11G	Ant1	2437	0~Reference	1.67	1.67	---	PASS
11G	Ant1	2437	30~1000	1.67	-48.78	≤-28.33	PASS
11G	Ant1	2437	1000~26500	1.67	-38.28	≤-28.33	PASS
11G	Ant1	2462	0~Reference	1.63	1.63	---	PASS
11G	Ant1	2462	30~1000	1.63	-48.73	≤-28.37	PASS
11G	Ant1	2462	1000~26500	1.63	-38.2	≤-28.37	PASS
11N20SISO	Ant1	2412	0~Reference	2.71	2.71	---	PASS
11N20SISO	Ant1	2412	30~1000	2.71	-49.15	≤-27.29	PASS
11N20SISO	Ant1	2412	1000~26500	2.71	-36.47	≤-27.29	PASS
11N20SISO	Ant1	2437	0~Reference	5.55	5.55	---	PASS
11N20SISO	Ant1	2437	30~1000	5.55	-48.37	≤-24.45	PASS
11N20SISO	Ant1	2437	1000~26500	5.55	-38.07	≤-24.45	PASS
11N20SISO	Ant1	2462	0~Reference	1.26	1.26	---	PASS
11N20SISO	Ant1	2462	30~1000	1.26	-48.48	≤-28.74	PASS
11N20SISO	Ant1	2462	1000~26500	1.26	-37.99	≤-28.74	PASS
11N40SISO	Ant1	2422	0~Reference	-0.14	-0.14	---	PASS
11N40SISO	Ant1	2422	30~1000	-0.14	-48.74	≤-30.14	PASS
11N40SISO	Ant1	2422	1000~26500	-0.14	-38.4	≤-30.14	PASS
11N40SISO	Ant1	2437	0~Reference	0.54	0.54	---	PASS
11N40SISO	Ant1	2437	30~1000	0.54	-47.91	≤-29.46	PASS
11N40SISO	Ant1	2437	1000~26500	0.54	-37.69	≤-29.46	PASS
11N40SISO	Ant1	2452	0~Reference	0.97	0.97	---	PASS
11N40SISO	Ant1	2452	30~1000	0.97	-48.42	≤-29.03	PASS
11N40SISO	Ant1	2452	1000~26500	0.97	-38.87	≤-29.03	PASS

11B-Ant1-2412-0~Reference-PASS



11B-Ant1-2412-30~1000-PASS