EKTOS
Testing & Reliability Services

Hammerholmen 45A
2650 Hvidovre
Denmark
+45 7070 1499
info@ektos.net

REPORT

Accredited by DANAK under registration number 563 to testing.
TEST: Testing laboratory (DS/EN ISO/IEC 17025)
FCC reg. no.: DK0002
ISED CAB identifier: DK0001

Test Report

of

Wireless REM Probe. Part no: PN00988

FCC ID: 2BK6Q-PN00988
ISED ID: 33071-PN00988

according to

FCC 47 CFR, Part 15 Subpart C
15.247 Operation within the band 2400 to 2483.5 MHz
and
ISED RSS-247 Issue 3 Aug. 2023

Performed by

Søren Søltoft
Senior EMC Engineer

Examined by

Volodymyr Hraivoronskyi
Test Engineer, M. Sc. EE.

DANAK is the national accreditation body in Denmark in compliance with EU regulation No. 765/2008.

DANAK participates in the multilateral agreements for testing and calibration under European co-operation for Accreditation (EA) and under International Laboratory Accreditation Cooperation (ILAC) based on peer-evaluation. Accredited test reports issued by laboratories accredited by DANAK are recognized cross border by members of EA and ILAC equal to test reports issued by these members' accredited laboratories.

The use of the accreditation mark on test reports, documents that the service is provided as an accredited service under the company's DANAK accreditation.

Report no.:	P24-0097-3	**Report date:**	2025-03-26
Test started:	2024-09-17	**Test ended:**	2025-11-21
Test laboratory:	EKTOS TRS A/S Hammerholmen 45A 2650 Hvidovre Denmark	**Client:**	Auditdata A/S Wildersgade 10B 1408 Copenhagen Denmark
Contact person:	Jens Denborg	**Contact person:**	Jonas Svendsen
Facility reg. no.	FCC Designation number: DK0002 ISED CAB identifier: DK0001		
Test specimen:	Model: 2000-1 W-REM Probe. Part no: PN00988.		
Test specification:	FCC 47 CFR Part 15 Subpart C 15.247 Operation within the band 2400 to 2483.5 MHz. ISED RSS-247 Issue 3 Aug. 2023. The tests relevant for the test specimens are listed in *section 1.1*.		
Documentation:	This test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory. The complete test documentation is archived for 10 years at the testing laboratory.		
Test results:	The test specimen complies with relevant parts of the test specifications. The test results relate only to the specimen tested.		
Test personnel:	Søren Søltoft		

CONTENTS

Appendix

1 SUMMARY

See Appendix 1 for photos.

Emission measurements as specified below have been performed.

1.1 Test plan

Standard	Name of the test	Results
§ 15.247 (a)(1) RSS-247 5.1.b	Carrier frequency separation	PASSED
§ 15.247 (a)(1)(iii) RSS-247 5.1.d	Number of hopping frequencies	PASSED
§ 15.247 (a)(1)(iii) RSS-247 5.1.d	Time of occupation (Dwell time)	PASSED
§ 15.247 (b)(1) RSS-247 5.4.b	Conducted output power	PASSED
15.215 (c) RSS-Gen 6.7	Occupied bandwidth	PASSED
§ 15.247 (d) RSS-247 5.5	Conducted spurious emission	PASSED
ANSI C63.10:2013 sec. 7.8.6	Conducted band edge	PASSED
ANSI C63.10:2013 sec 6.10.5	Restricted bands adjacent to allocated band	PASSED
§ 15.247 (d) RSS 247 B.6.d	Radiated emissions in restricted bands	PASSED

PASSED	The test was performed and the test specimen complies with the essential requirements in the standard.
FAILED	The test was performed and the test specimen does not comply with the essential requirements in the standard.
REF	The test is covered by a test in another report and/or on a similar test specimen.
NR	The test is not relevant for the test specimen or has been waived by the manufacturer.

1.2 Test specimen

1.2.1 2000-1 W-REM Probe

Manufacturer	Auditdata A/S
Model (type)	2000-1 W-REM Probe
Part No.	PN00988
Revision (HW)	1.00
Firmware	1.0.0
Carrier frequency	2402 MHz to 2480MHz in 1 MHz step
Antenna	Internal chip antenna
Supply voltage	Internal rechargeable battery

The two radios setup were controlled by blue SW running on a laptop and a programmer

The test specimen was delivered for test in two versions. One with the original antennas mounted and one where the antennas were replaced by a temporary 50 ohm antenna connector.

With the normal firmware wireless connections are not active during charging of internal battery.

To ensure the maximal supply voltage during tests the ability to activate the wireless connection with external supply was enabled.

The two radios on W-REM Probe are called Red and Blue.

See photo in appendix 1.

1.2.2 AC / DC adaptor

Manufacturer	FRIWO Gerätebau GmbH
Type	FW8002.1MUSB/05
Input	100-240VAC 50-60 Hz
Output	5VDC 1400 mA

The AC / DC adaptor is used during tests to ensure the maximal supply voltage during tests.

See photo in appendix 1.

1.3 Auxiliary Equipment

1.3.1 Programmer for radio setup

Manufacturer	Qualcomm
Name	BlueTest3
Model	20-CC511-H11
Ser. No.	415218
Details	-
Supply voltage	USB

See photo in appendix 1.

Test software was used in the measurements of wireless devices to enable tests modes and specific settings. The software was provided by the manufacturer of the devices for that specific purpose.

During tests the setup “TXDATA1 and TXDATA2” were used.

TXDATA1: Modulated carrier hopping on a single selected frequency at max power.

TXDATA2 Modulated carrier hopping in the frequency range 2402 MHz to 2480 MHz at max power.

2 TESTS

2.1 Carrier frequency separation

Test specimen	2000-1 W-REM Probe
Test specification	§ 15.247 (a)(1) RSS-247 5.1 (b)
Test method	ANSI C63.10:2013 sec. 7.8.2
Comments	-
Temperature / Humidity	23°C / 48%RH, 23°C / 35%RH
Dates of measurements	2024-11-12, 2024-11-21
Test personnel	Søren Søltoft

2.1.1 Test setup

The temporary antenna connector of the test specimens channel under test was connected directly to the Test receiver.

The measurement was performed using the delta marker function on the test receiver.

See photo of test set up in appendix 1.

2.1.2 Test result

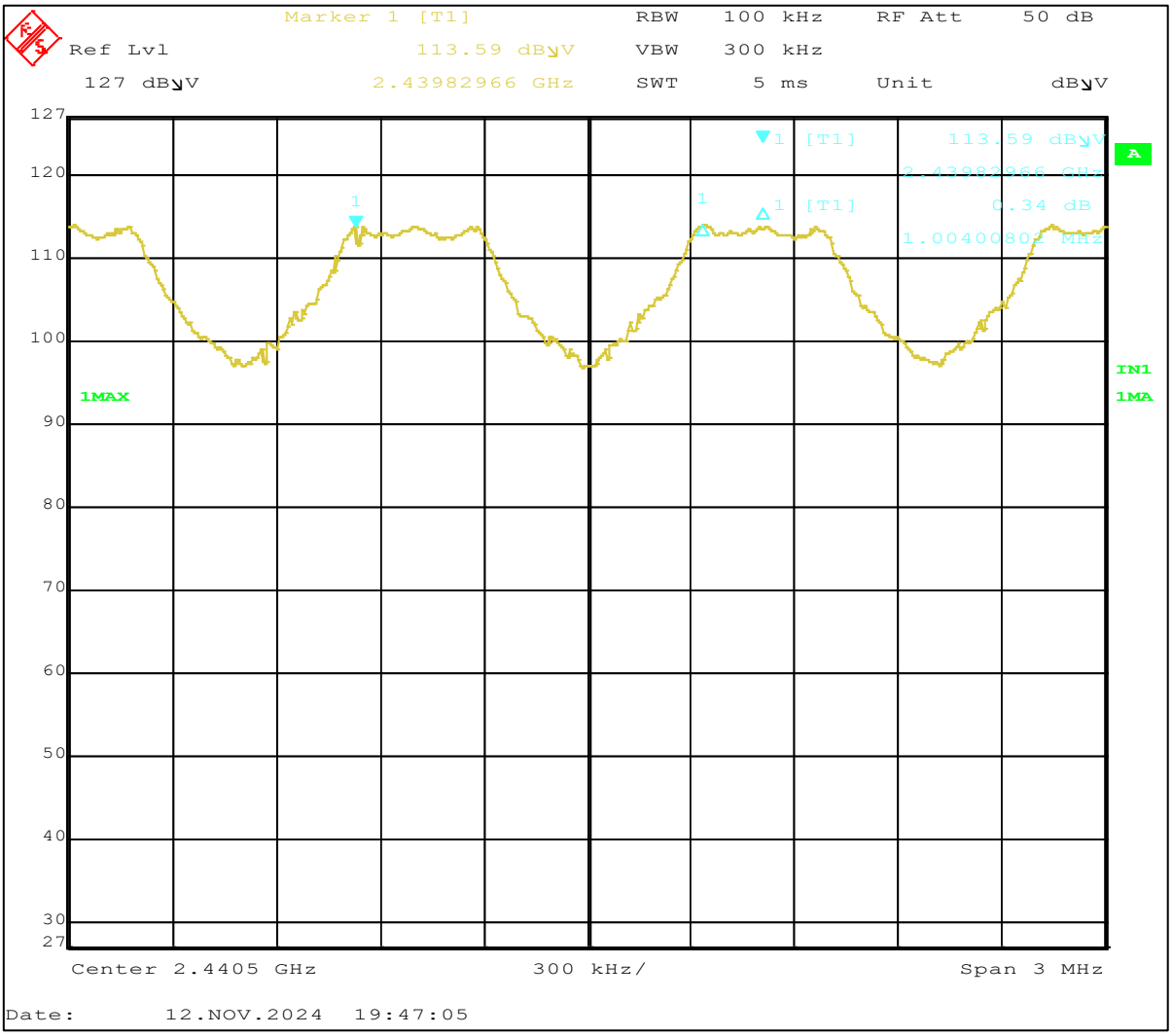

Figure 1. Carrier frequency separation test results. Red channel.

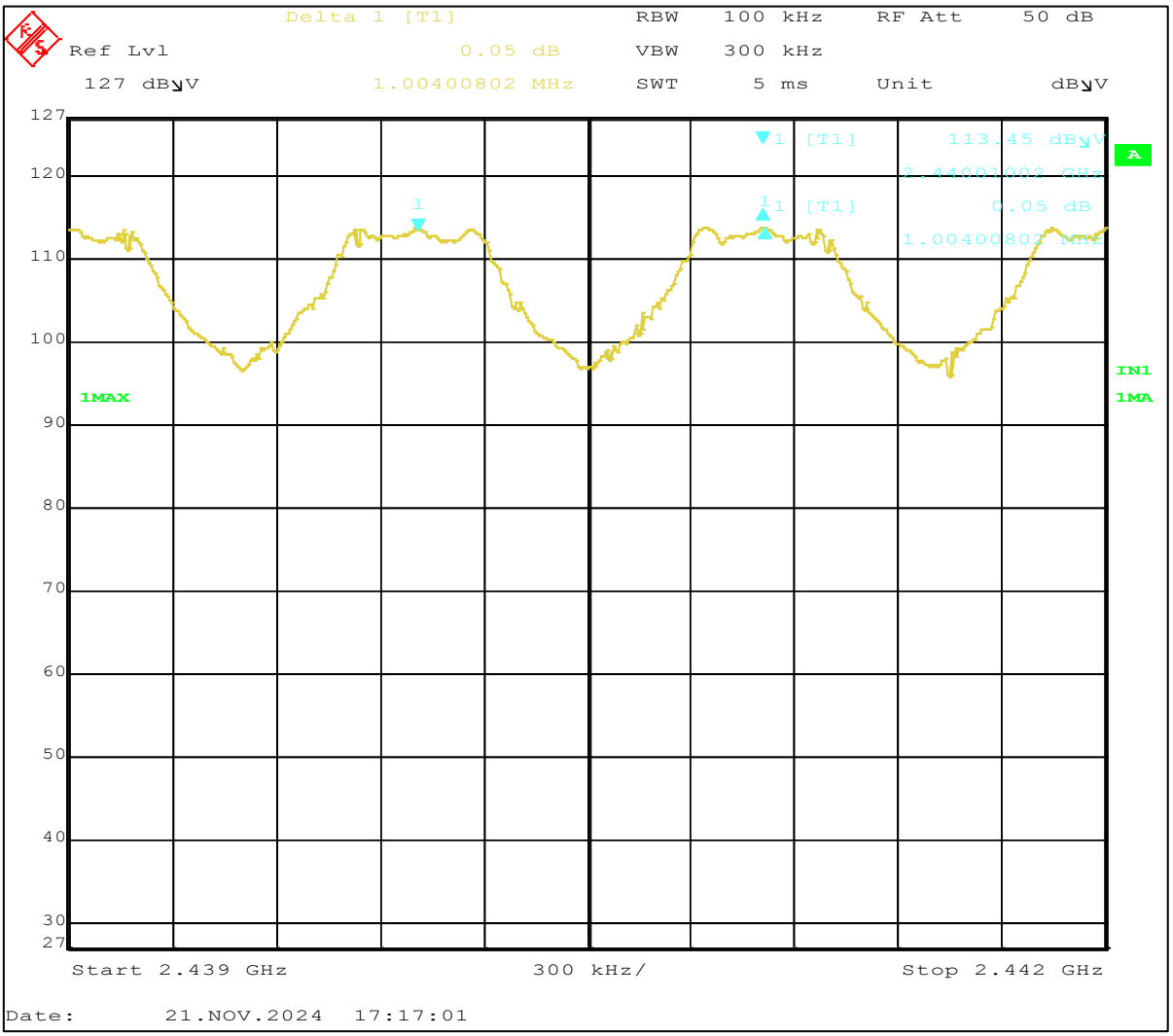

Figure 2. Carrier frequency separation test results. Blue channel.

Channel	Marker [MHz]	Delta marker [kHz]	Limit (20dB BW) [kHz]	Margin [kHz]	Result
Red	2439.8297	1004.0080	889.7796	114.23	PASSED
Blue	2440.0100	1004.0080	889.7796	114.23	PASSED

Table 1. Carrier frequency separation test results.

2.1.3 Test equipment

Description	Supplier	Model	Tag no.	Cal. due date
EMI Test Receiver 20Hz-26.5GHz	Rohde & Schwarz	ESIB26	30118880	2025-01-25

Table 2. Radiated emission test equipment.

2.2 Number of hopping frequencies

Test specimen	2000-1 W-REM Probe
Test specification	47 CFR 15.247 (a)(1)(iii) RSS 247 5.1 (d)
Test method	ANSI C63.10:2013 sec 7.8.3
Frequency range	2400 – 2483.5 MHz
Limits	47 CFR 15.247 (a)(1) RSS 247 5.1 (d)
Comments	-
Temperature / Humidity	22°C / 37%RH, 23°C / 35%RH
Dates of measurements	2024-11-12, 2024-11-21
Test personnel	Søren Søltoft

2.2.1 Test setup

The temporary antenna connector of the test specimens channel under test was connected directly to the Test receiver.

See photo of test set up in appendix 1.

2.2.2 Test results

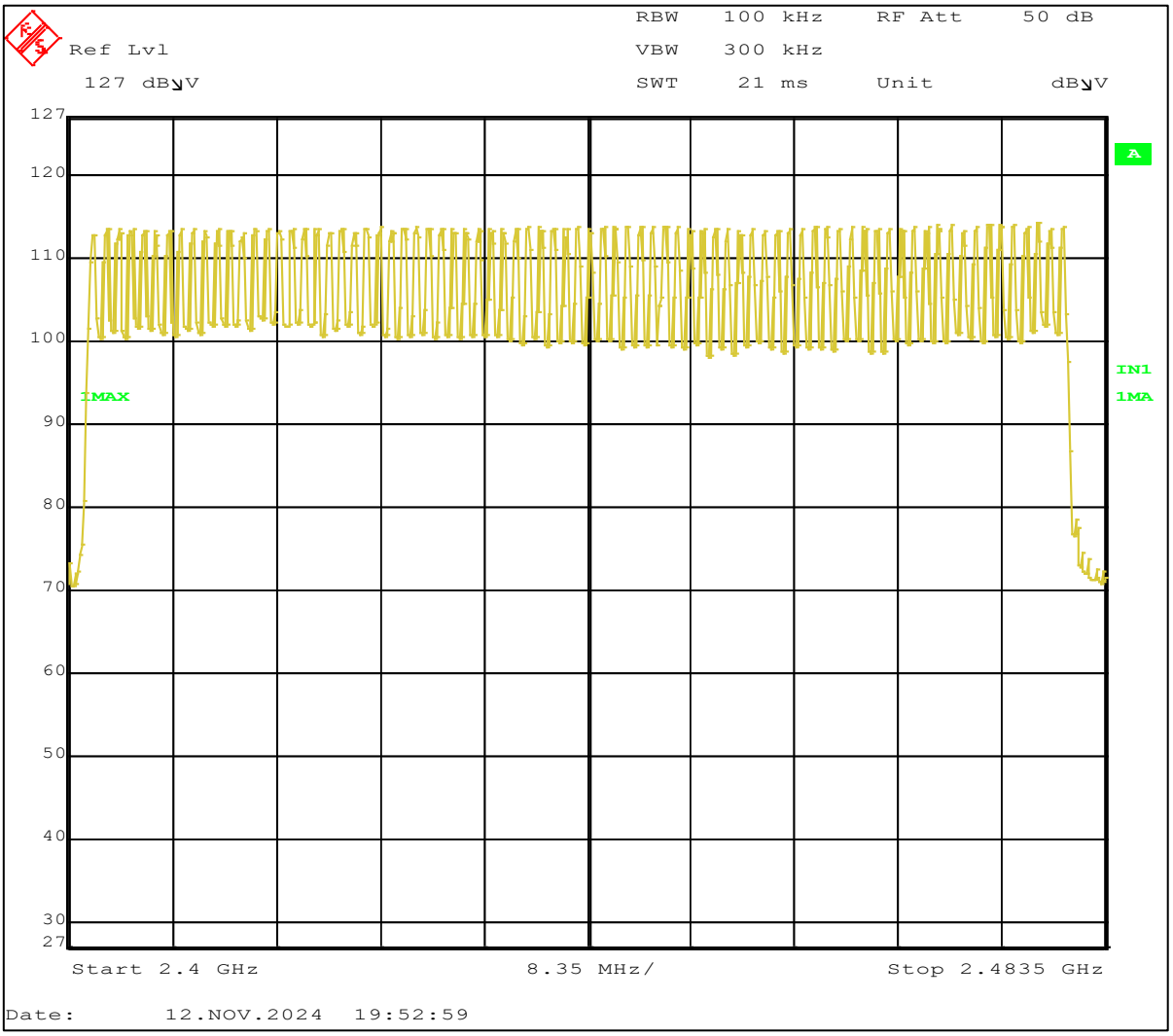

Figure 3. Number of hopping frequencies, Red channel.

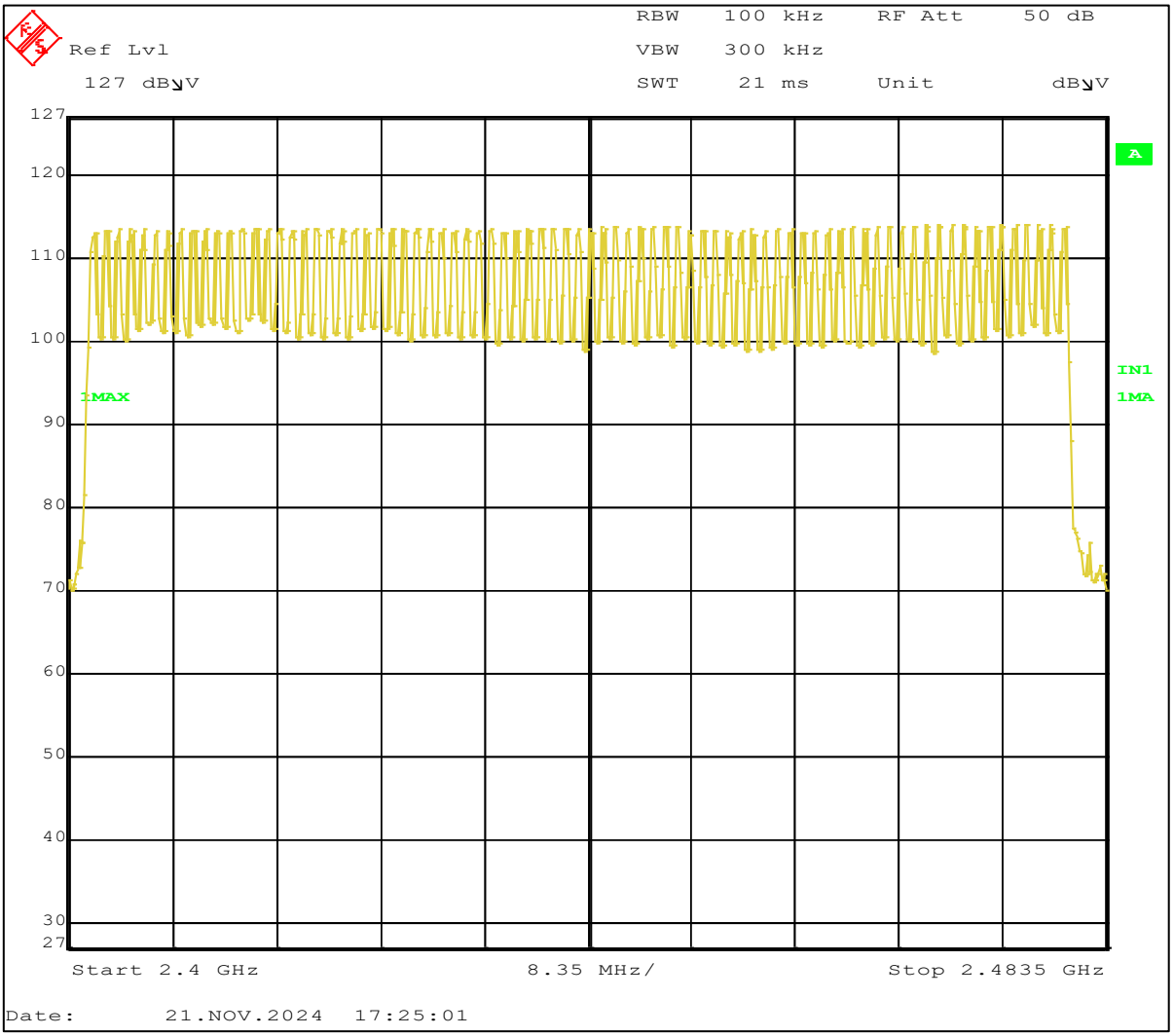

Figure 4. Number of hopping frequencies, Blue channel.

Channel	Number of hopping frequencies	Minimum number	Margin	Result
Right	79	15	64	PASSED
Left	79	15	64	PASSED

Table 3. Carrier frequency separation test results.

2.2.3 Test equipment

Description	Supplier	Model	Tag no.	Cal. due date
EMI Test Receiver 20Hz-26.5GHz	Rohde & Schwarz	ESIB26	30118880	2025-01-25

Table 4. Radiated emission test equipment.

2.3 Time of occupation

Test specimen	2000-1 W-REM Probe
Test specification	47 CFR 15.247 (a)(1)(iii) RSS 247 5.1 (d)
Test method	ANSI C63.10:2013 sec 7.8.4
Limits	47 CFR 15.247 (a)(1)(iii) RSS 247 5.1 (d)
Comments	-
Temperature / Humidity	23°C / 44%RH, 23°C / 35%RH
Dates of measurements	2024-11-12, 2024-11-21
Test personnel	Søren Søltoft

2.3.1 Test setup

The temporary antenna connector of the test specimens channel under test was connected directly to the Test receiver.

See photo of test set up in appendix 1.

2.3.2 Test results

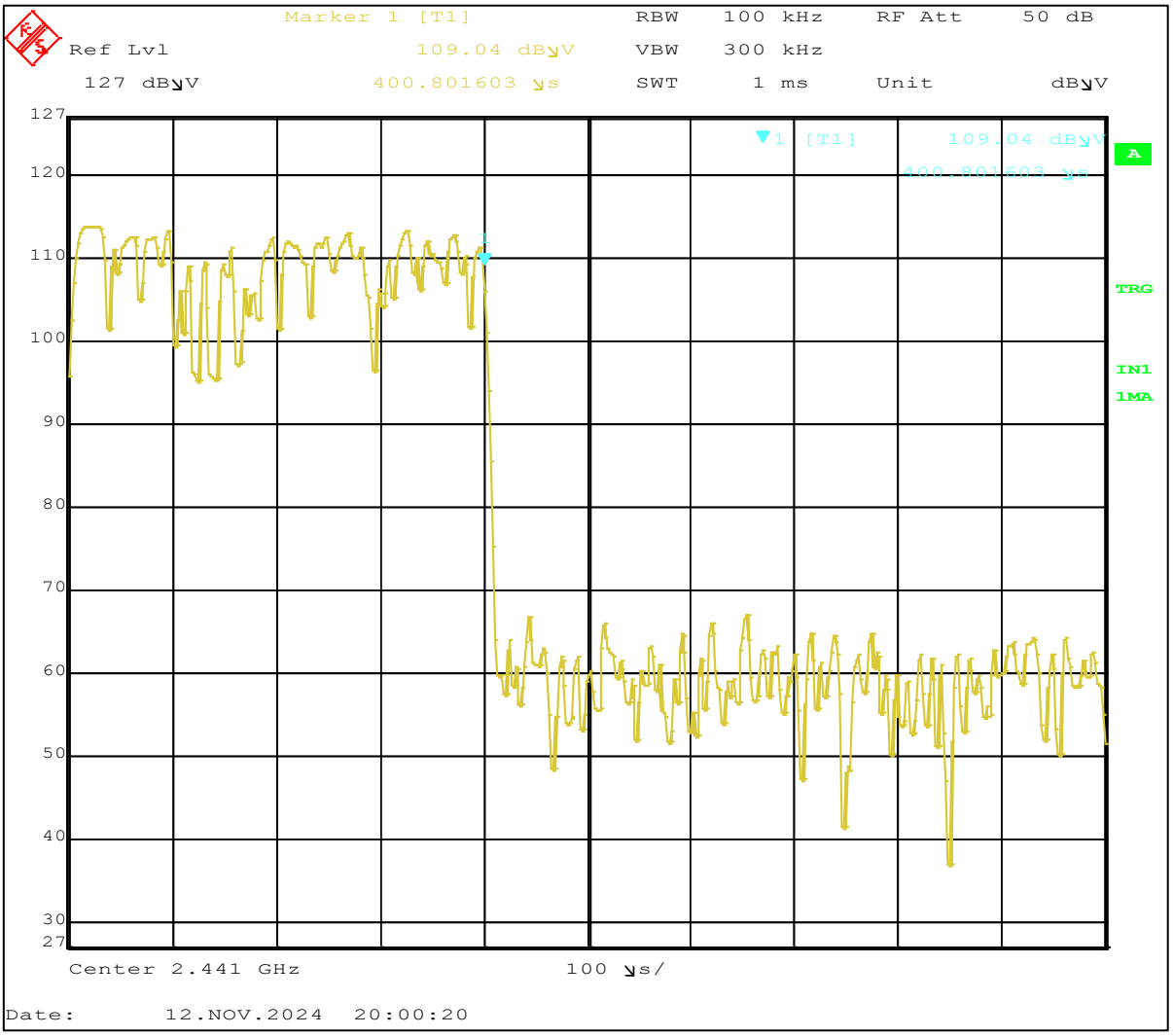

Figure 5. Singel hop. Red radio.

Dwell time on channel: 0.4000 ms

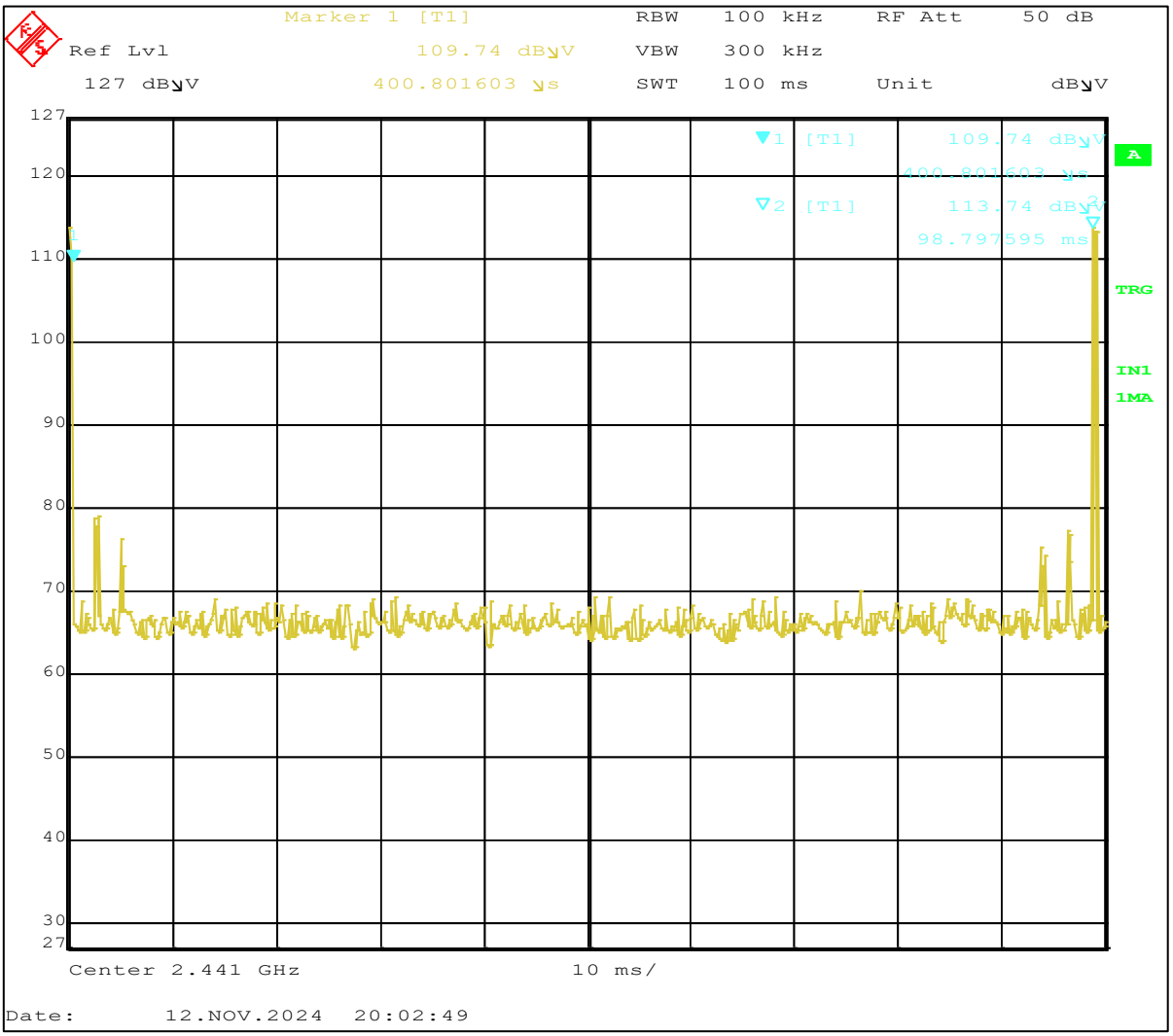

Figure 6. Dual hops. Red radio.

Time between two use of channel: 98.8 ms.

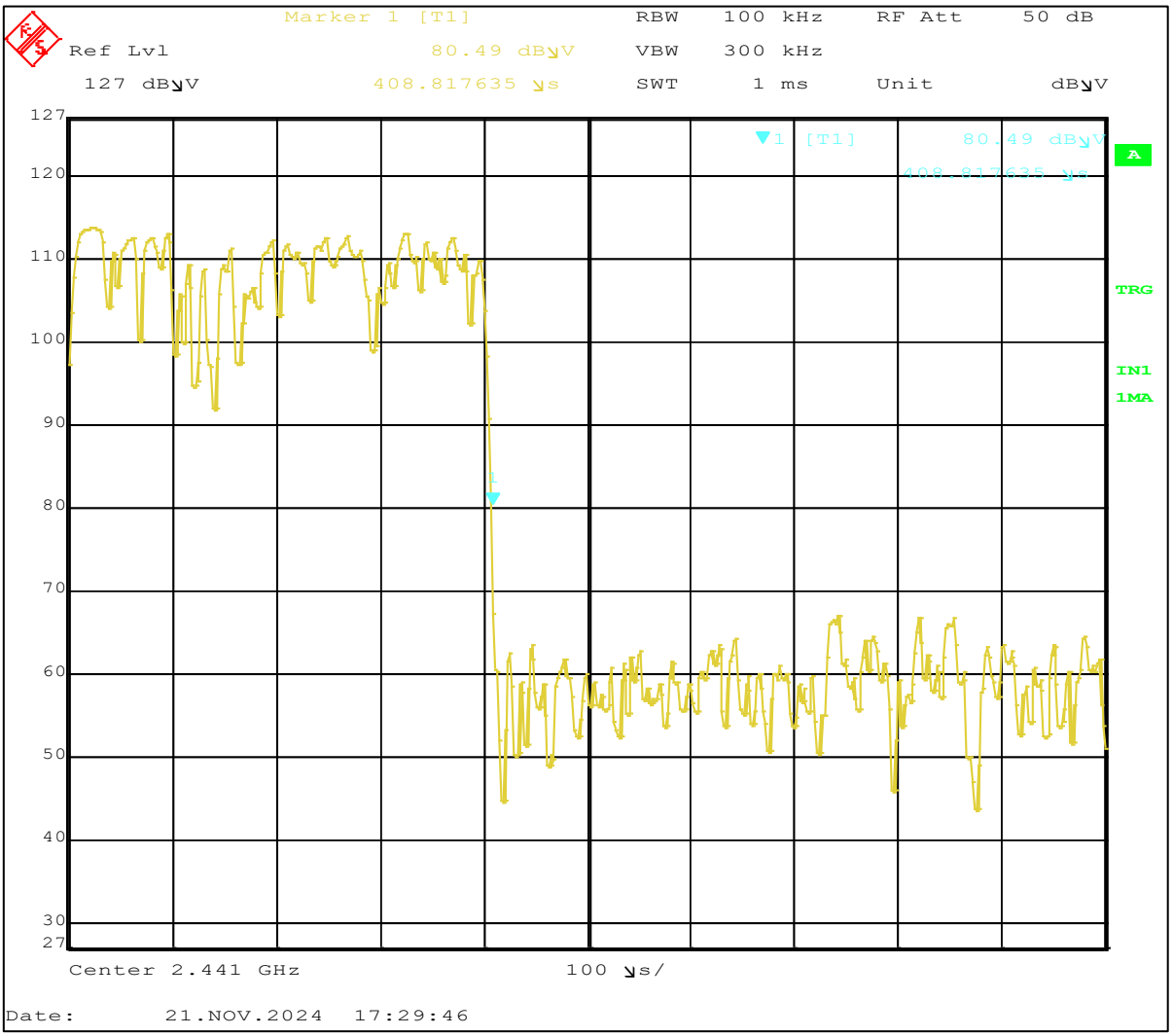

Figure 7. Singel hop. Blue radio.

Dwell time on channel: 0.4000 ms

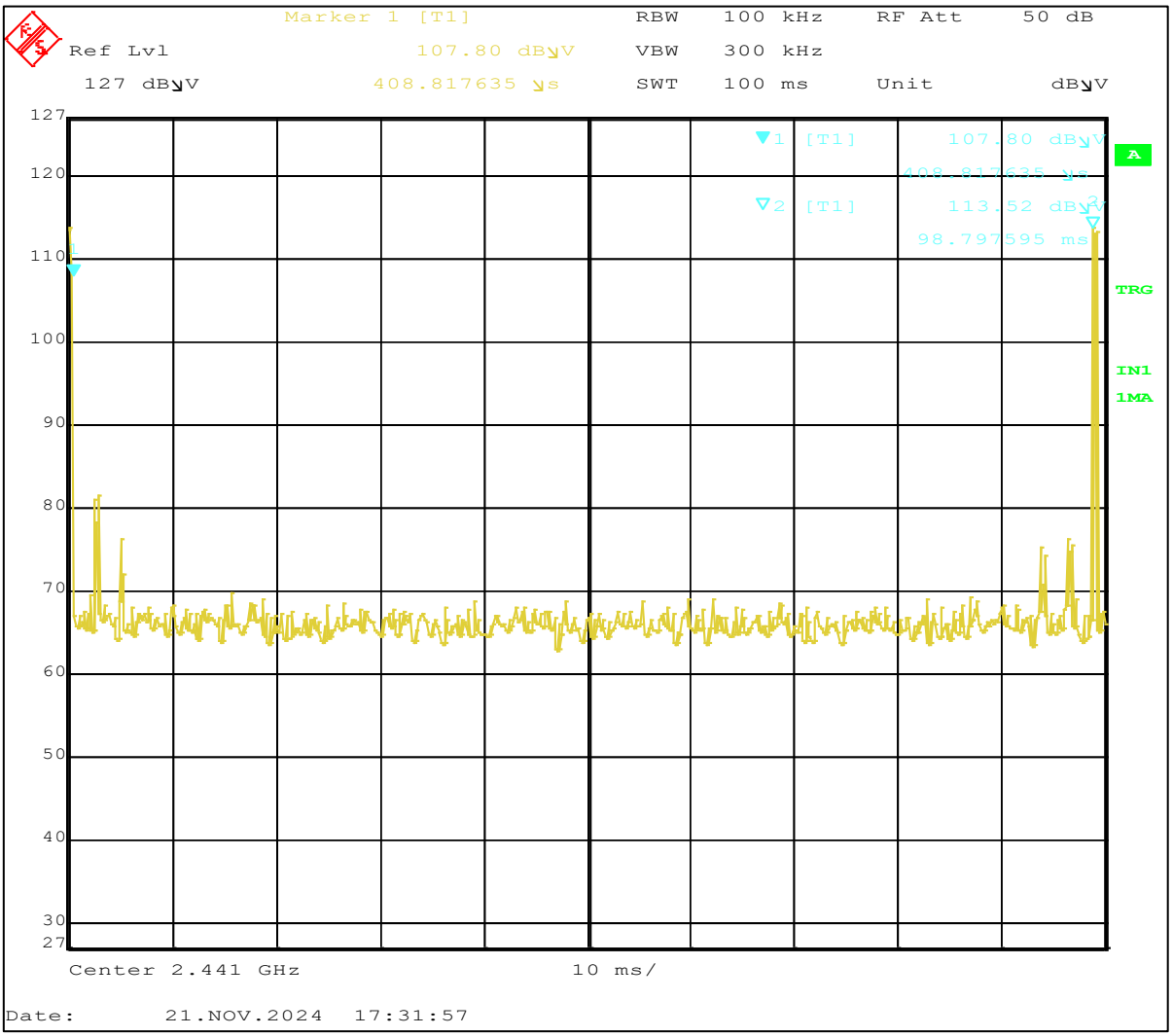

Figure 8. Dual hops. Blue radio.

Time between two use of channel: 98.8 ms.

The number of hopping channels is 79, which results in an observation time of 0.4 s x 79 = 31.6 s.

Radio	Dwell time [ms]	Time between hops [ms]	Dwell time in observation time [s]	Observation time [s]	Margin [s]	Limit [s]	Result
Red	0.4	98.4	0.129	31.6	0.27	0.4	PASSED
Blue	0.4	98.4	0.129	31.6	0.27	0.4	PASSED

2.3.3 Test equipment

Description	Supplier	Model	Tag no.	Cal. due date
EMI Test Receiver 20Hz-26.5GHz	Rohde & Schwarz	ESIB26	30118880	2025-01-25

Table 5. Radiated emission test equipment.

2.4 Output power

Test specimen	2000-1 W-REM Probe
Test specification	47 CFR 15.247 (b)(1) RSS 247 5.4 (b)
Test method	ANSI C63.10:2013 sec 7.8.5
Frequency band	2400 – 2483.5 MHz
Limits	FCC 47 CFR Part 15.247 (b)(1) RSS 247 5.4 (b)
Comments	-
Temperature / Humidity	25°C / 49%RH, 21°C / 44%RH
Dates of measurements	2024-09-27, 2024-10-02
Test personnel	Søren Søltoft

2.4.1 Test setup

The temporary antenna connector of the test specimens channel under test was connected directly to the Test receiver.

The test were performed with the test specimen radios (Red and Blue) hopping at a single frequency. The measuring RBW was greater than the 20 dB bandwidth.

The test was performed at Low, Middle and High channel on both Red and Blue radio.

Low: 2402 MHz
Middle: 2441 MHz
High: 2480 MHz

The limit stated in FCC 47 CFR Part 15.247 (b)(1) are 1 W for frequency hopping system employing at least 70 non-overlapping hopping channels or 0.125 W for all other frequency hopping system.

See photo of test set up in appendix 1.

2.4.2 Test results

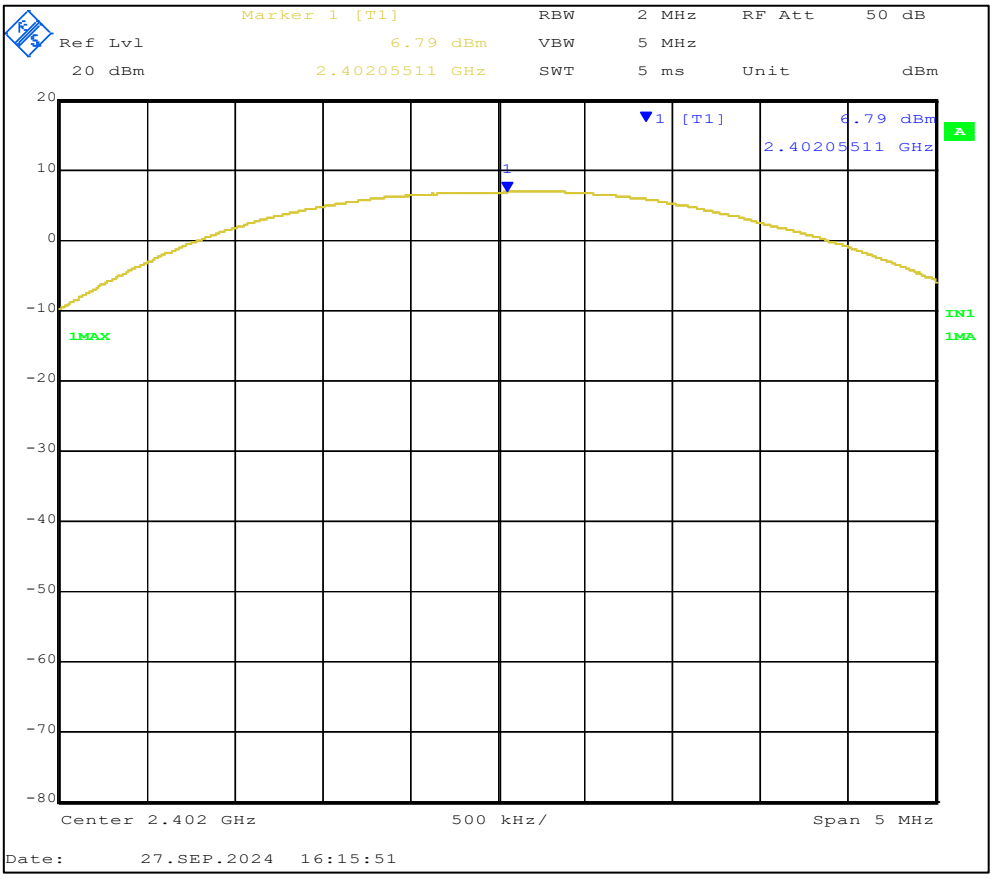

Figure 9. Output power. Red radio 2402 MHz.

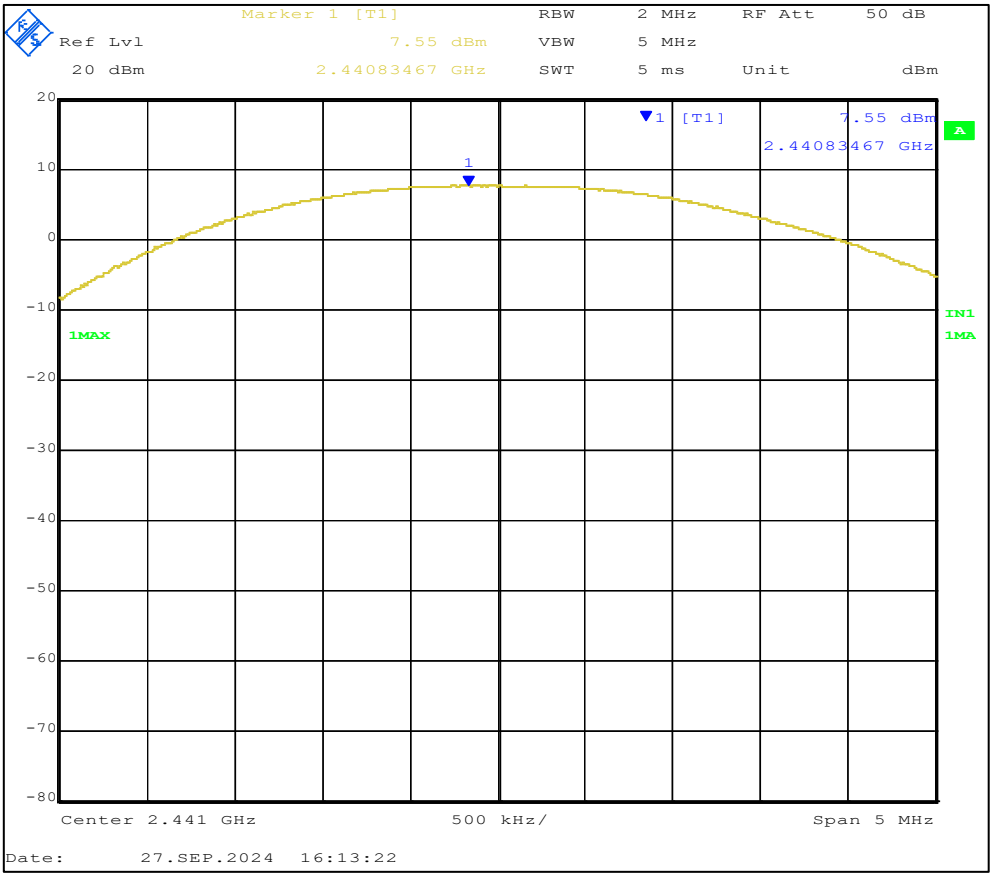

Figure 10. Output power. Red radio 2441 MHz

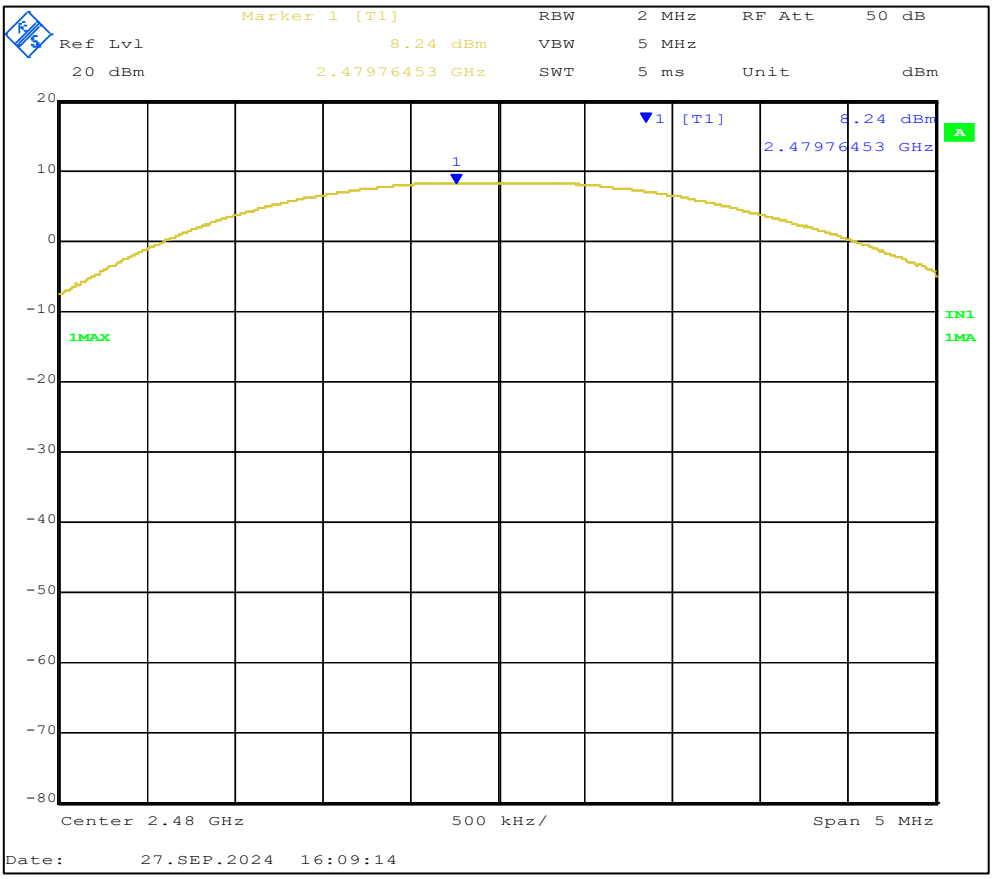

Figure 11. Output power. Red radio 2480 MHz

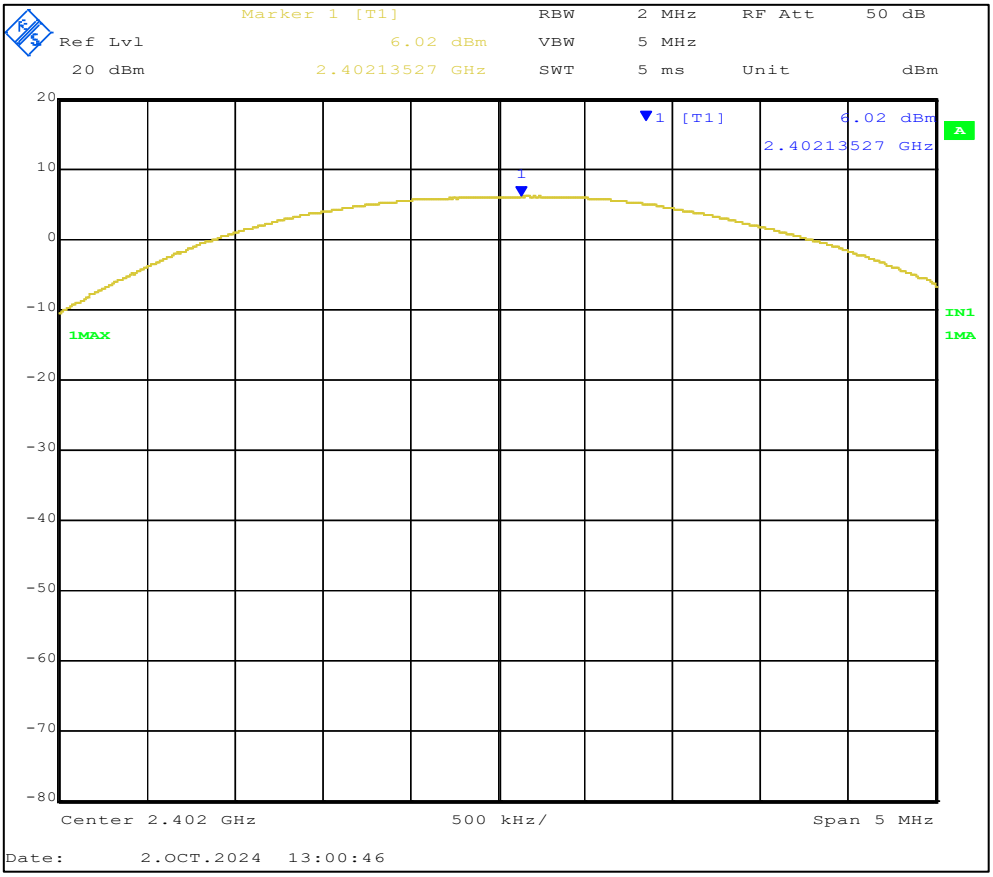

Figure 12. Output power. Blue radio 2402 MHz.

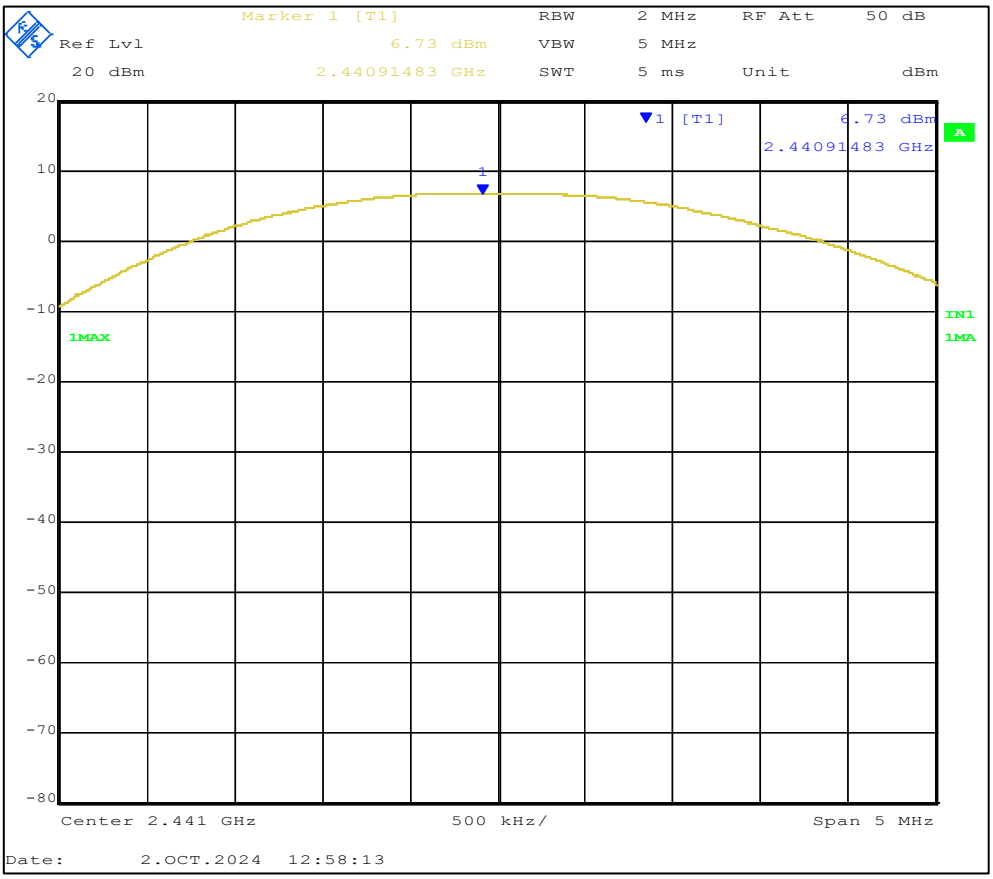

Figure 13. Output power. Blue radio 2441 MHz.

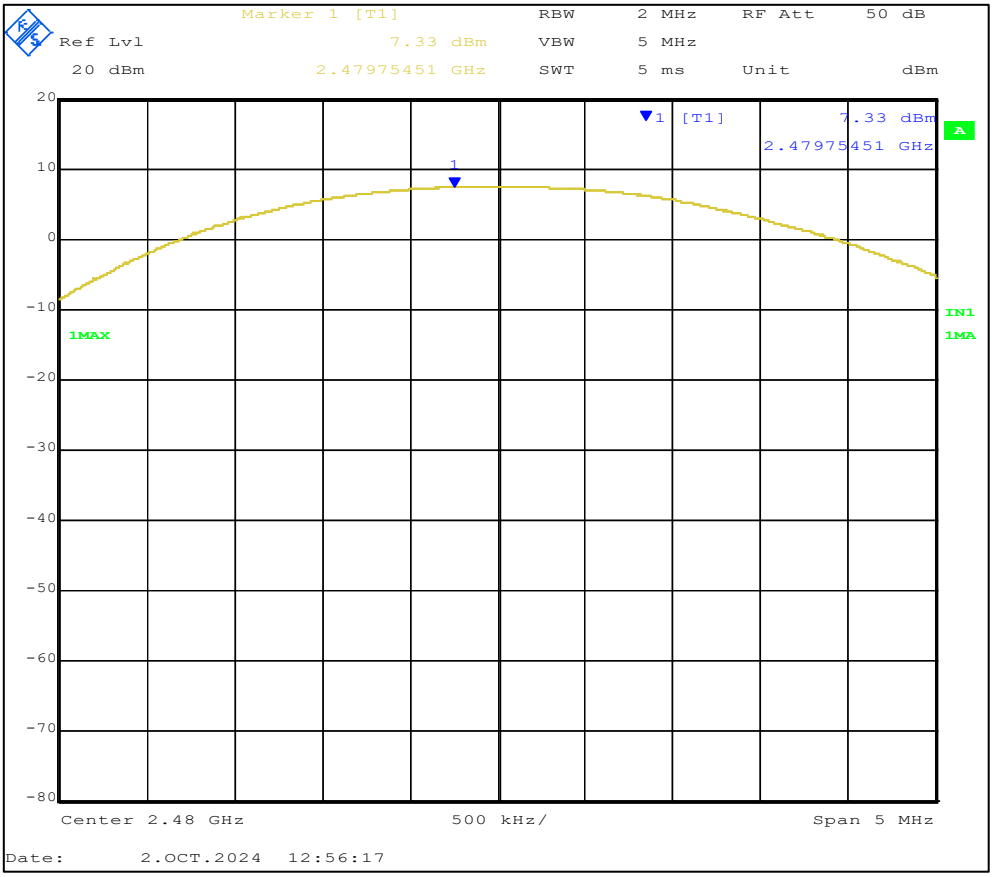

Figure 14.Output power. Left radio 2480 MHz.

Radio	Frequency [MHz]	Output power [dBm]	Output power [mW]	Limit [mW]	Margin [mW]	Result
Red	2402	6.79	4.78	1000	995.22	PASSED
Red	2441	7.55	5.69	1000	994.31	PASSED
Red	2480	8.24	6.67	1000	993.33	PASSED
Blue	2402	6.02	4.00	1000	996.00	PASSED
Blue	2441	6.73	4.71	1000	995.29	PASSED
Blue	2480	7.33	5.41	1000	994.59	PASSED

Table 6. Output power test result.

2.4.3 Test equipment

Description	Supplier	Model	Tag no.	Cal. due date
EMI Test Receiver 20Hz-26.5GHz	Rohde & Schwarz	ESI 26	30120763	2025-05-14

Table 7. Radiated emission test equipment.

2.5 Occupied bandwidth

Test specimen	2000-1 W-REM Probe
Test specification	47 CFR 15.215 (c) RSS-Gen 6.7
Test method	ANSI C63.10:2020 sec. 7.8.7
Comments	
Temperature / Humidity	25°C / 49%RH, 21°C / 44%RH
Dates of measurements	2024-09-27, 2025-10-02
Test personnel	Søren Søltoft

2.5.1 Test setup

The temporary antenna connector of the test specimen was connected directly to the Test receiver.

The test were performed with the test specimen radios at a single frequency and hopping disabled.

The test was performed at Low, Middle and High channel on both Red and Blue radio.

Low: 2402 MHz
Middle: 2441 MHz
High: 2480 MHz

See photo of test set up in appendix 1.

2.5.2 Test results

2.5.2.1 20 dB OBW

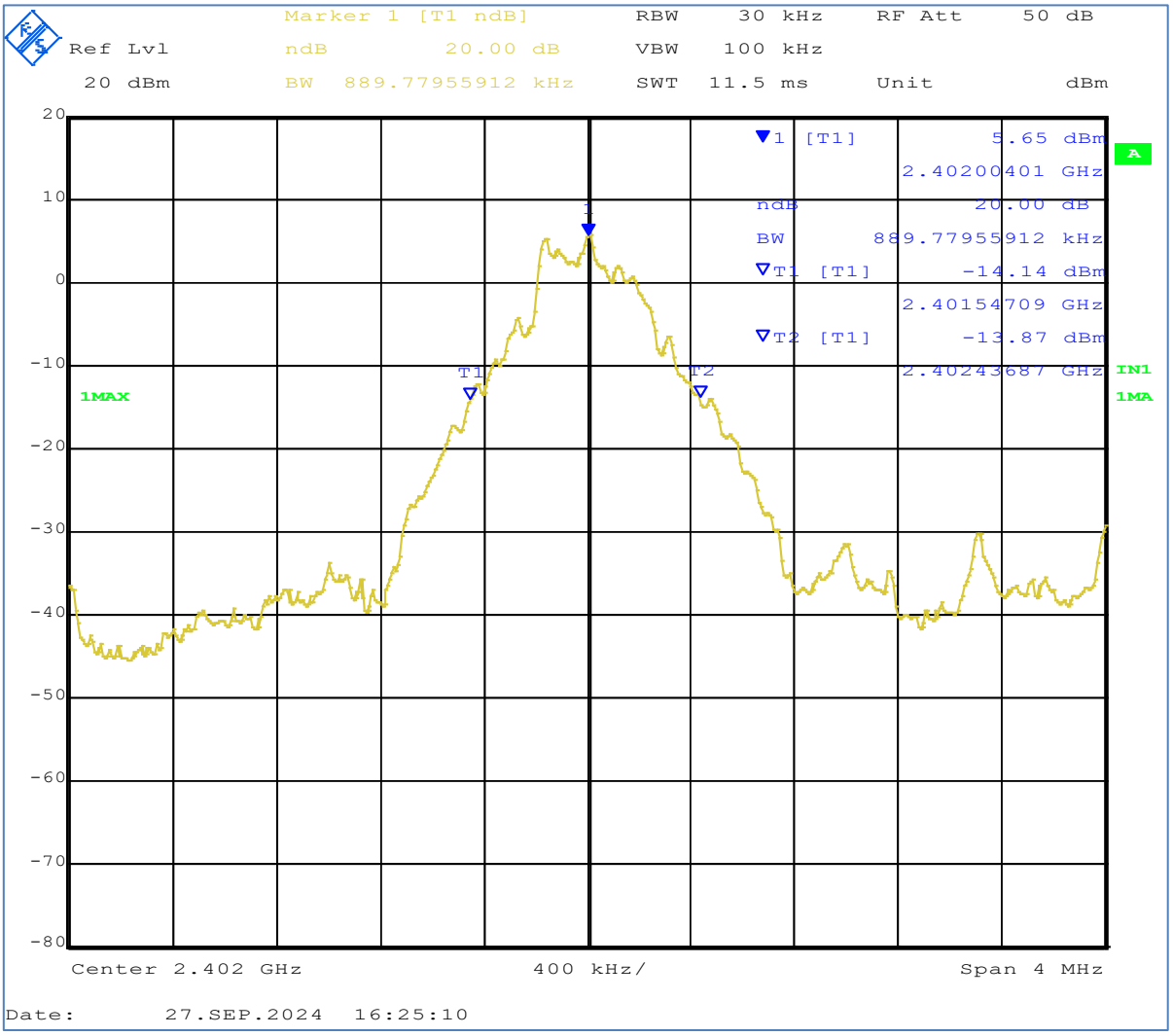

Figure 15. 20 dB Occupied bandwidth. Red radio, 2402 MHz

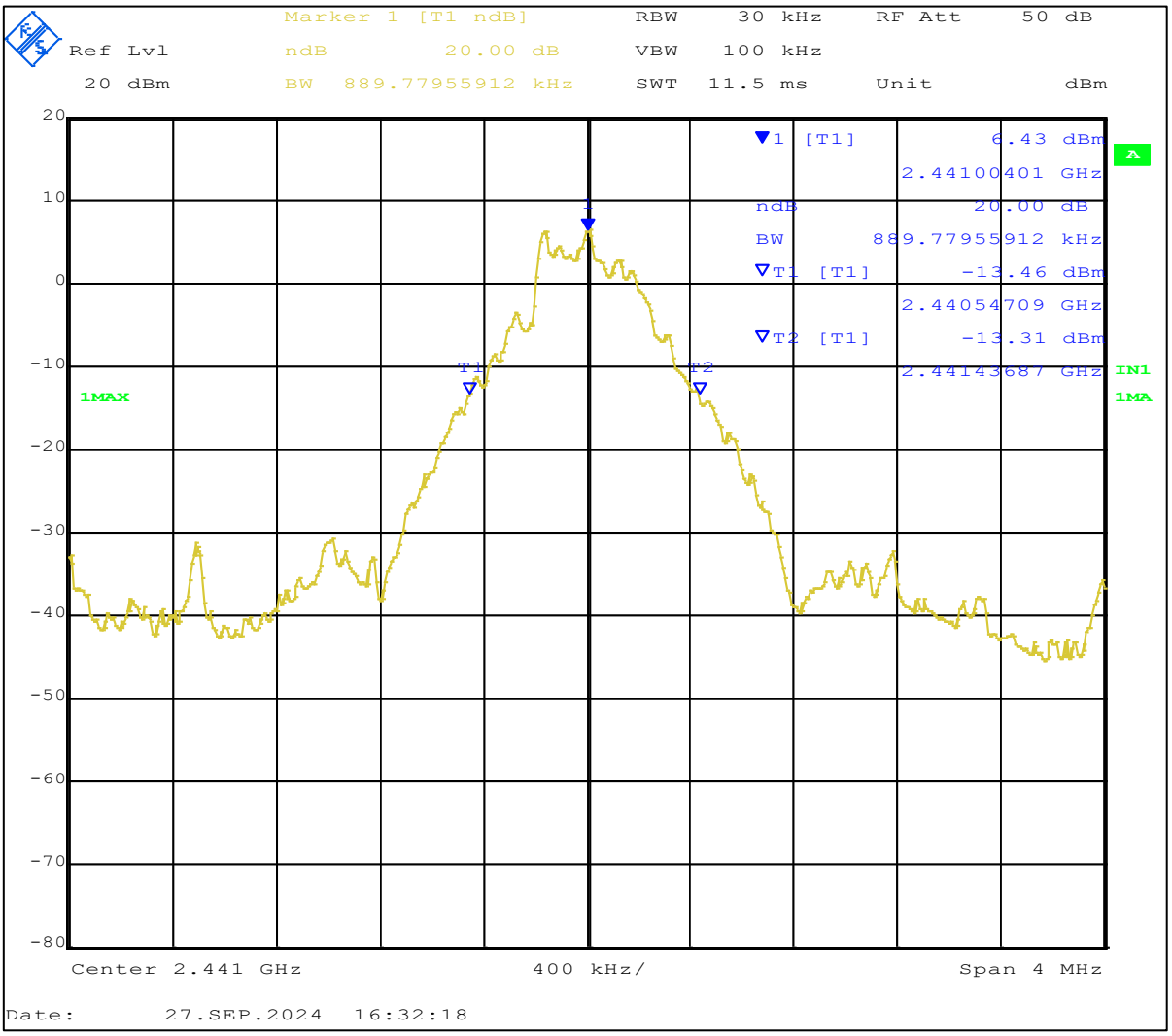

Figure 16. 20 dB Occupied bandwidth. Red radio, 2441 MHz.

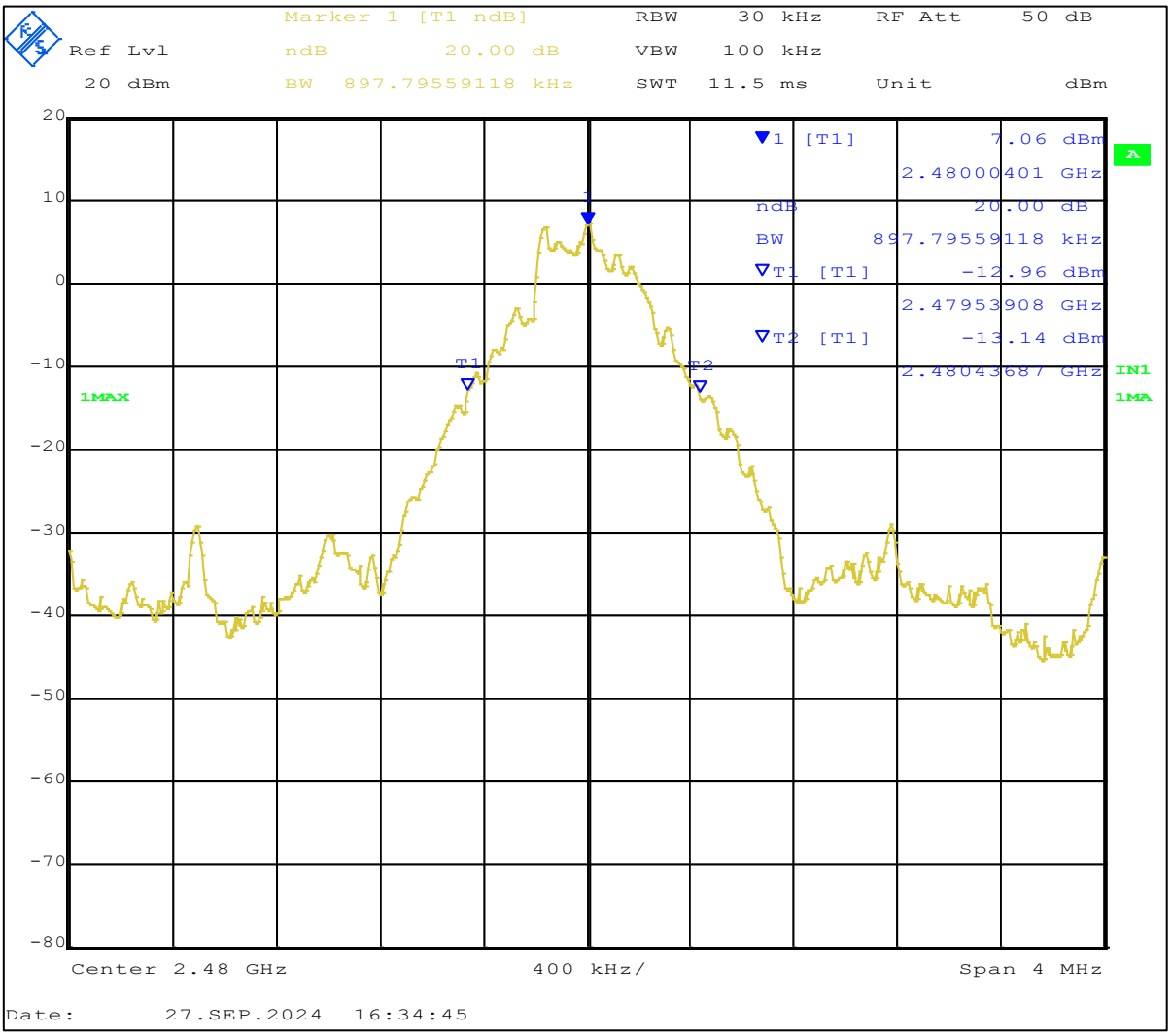

Figure 17. 20 dB Occupied bandwidth. Red radio, 2480 MHz.

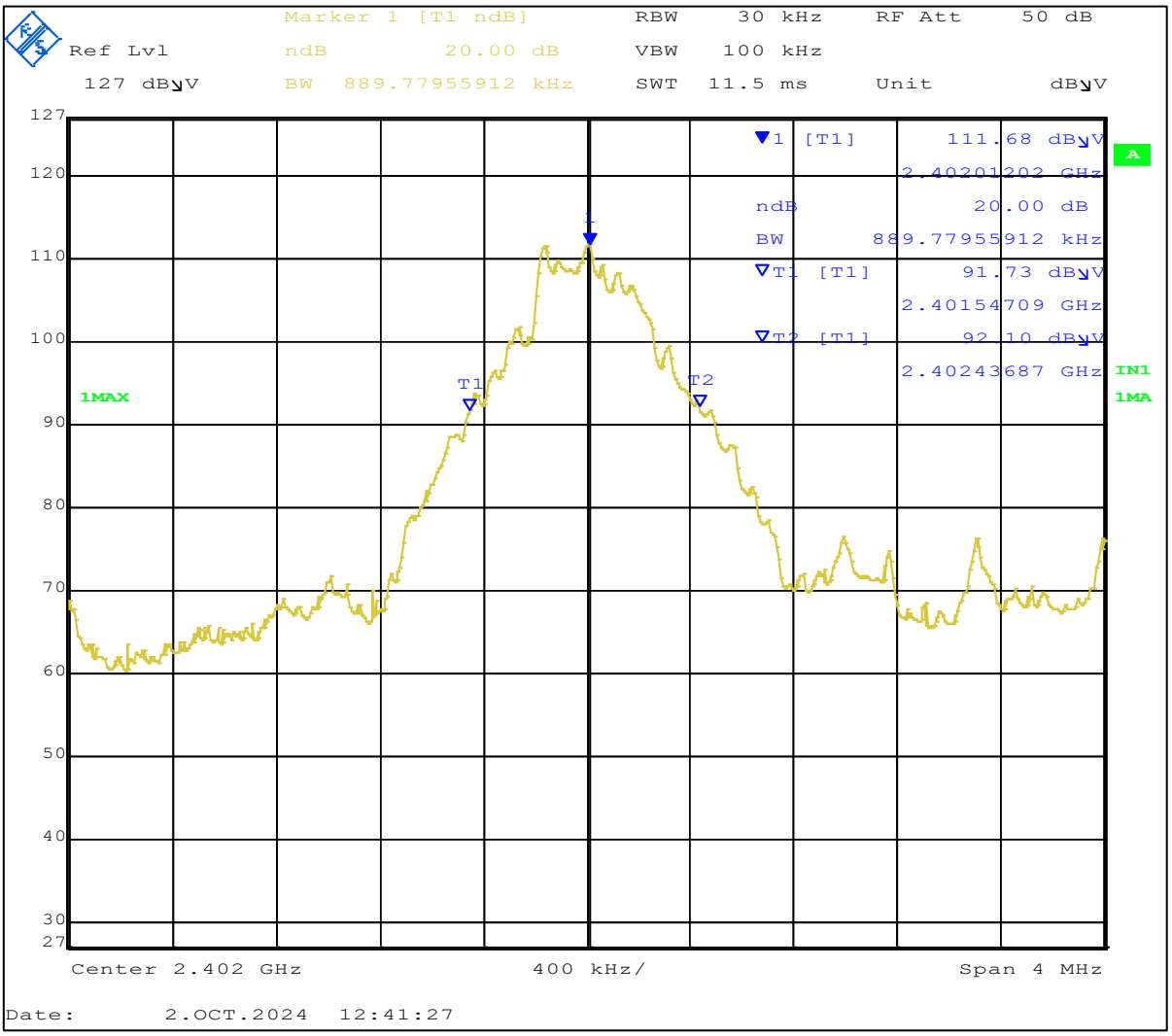

Figure 18. 20 dB Occupied bandwidth. Blue radio, 2402 MHz.

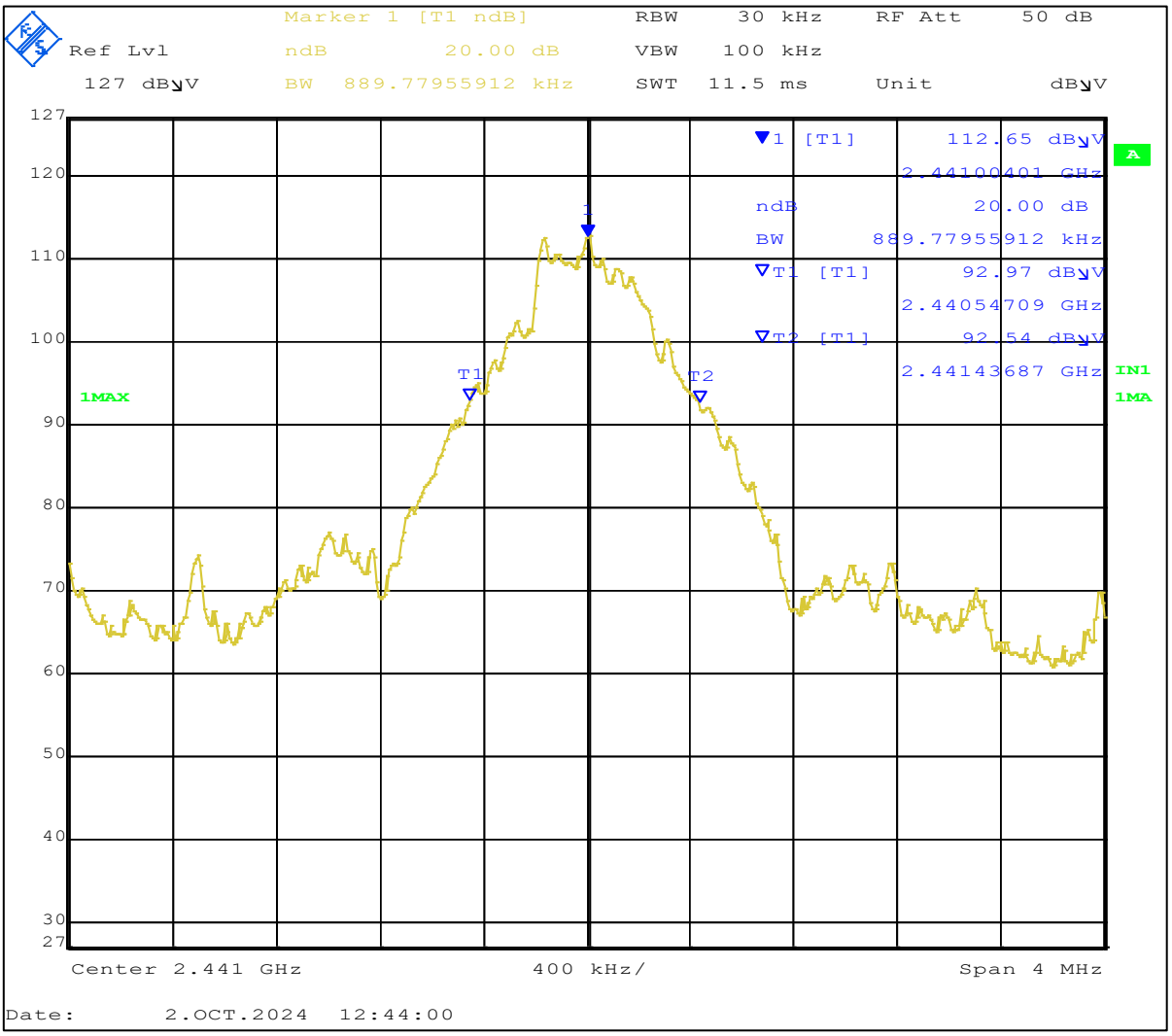

Figure 19. 20 dB Occupied bandwidth. Blue radio, 2441 MHz.

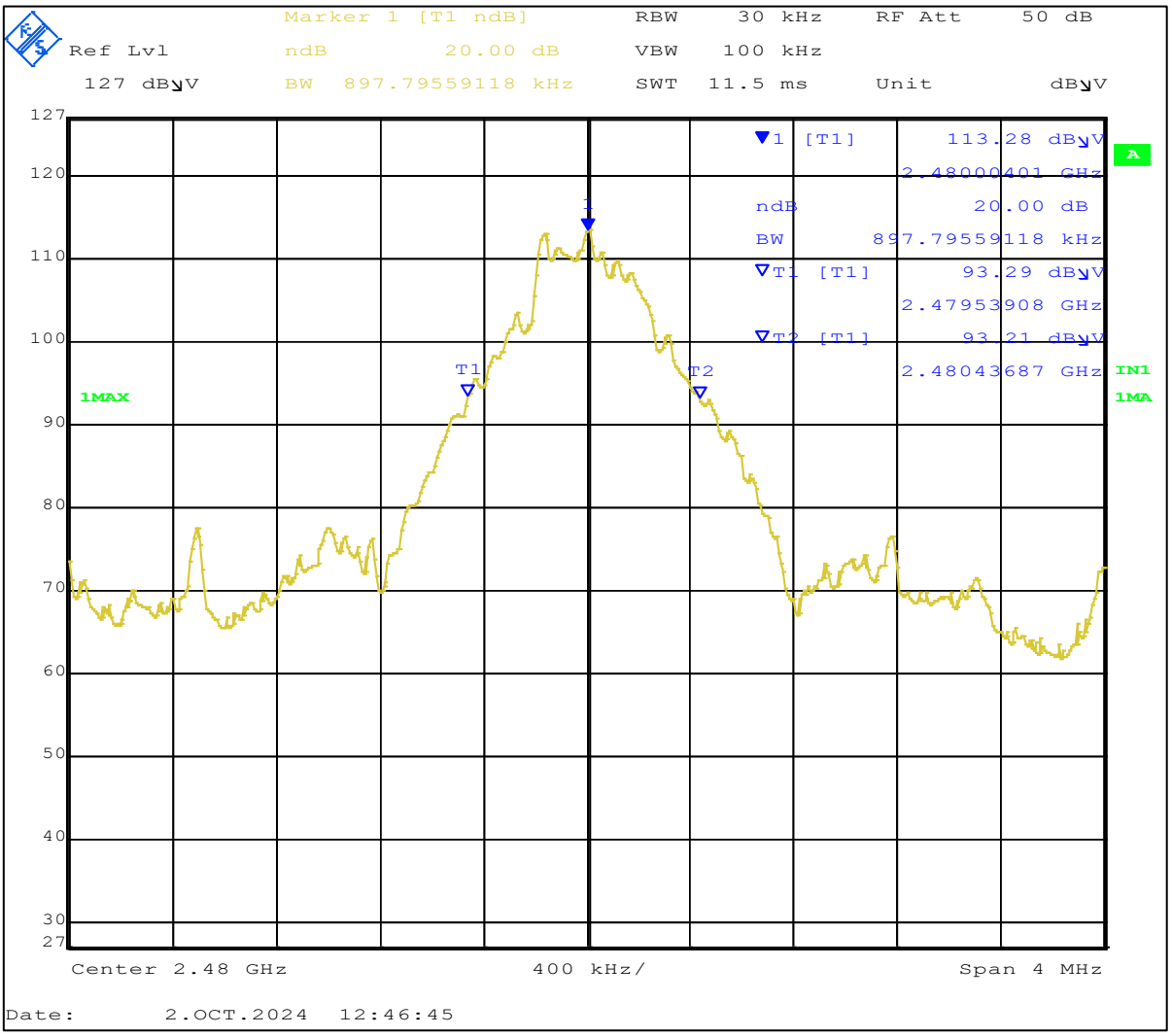

Figure 20. 20 dB Occupied bandwidth. Blue radio, 2480 MHz.

Radio	Frequency [MHz]	OBW [kHz]	Band limit [MHz]	Margin [MHz]	Result
Red	2402	889.7796	2400	1.5551	PASSED
Red	2441	889.7796	-	-	-
Red	2480	897.7956	2483.5	-3.0511	PASSED
Blue	2402	889.7796	2400	1.5551	PASSED
Blue	2441	889.7796	-	-	-
Blue	2480	897.7955	2483.5	-3.0511	PASSED

Table 8. 20 dB Occupied bandwidth results.

2.5.2.2 99% OBW

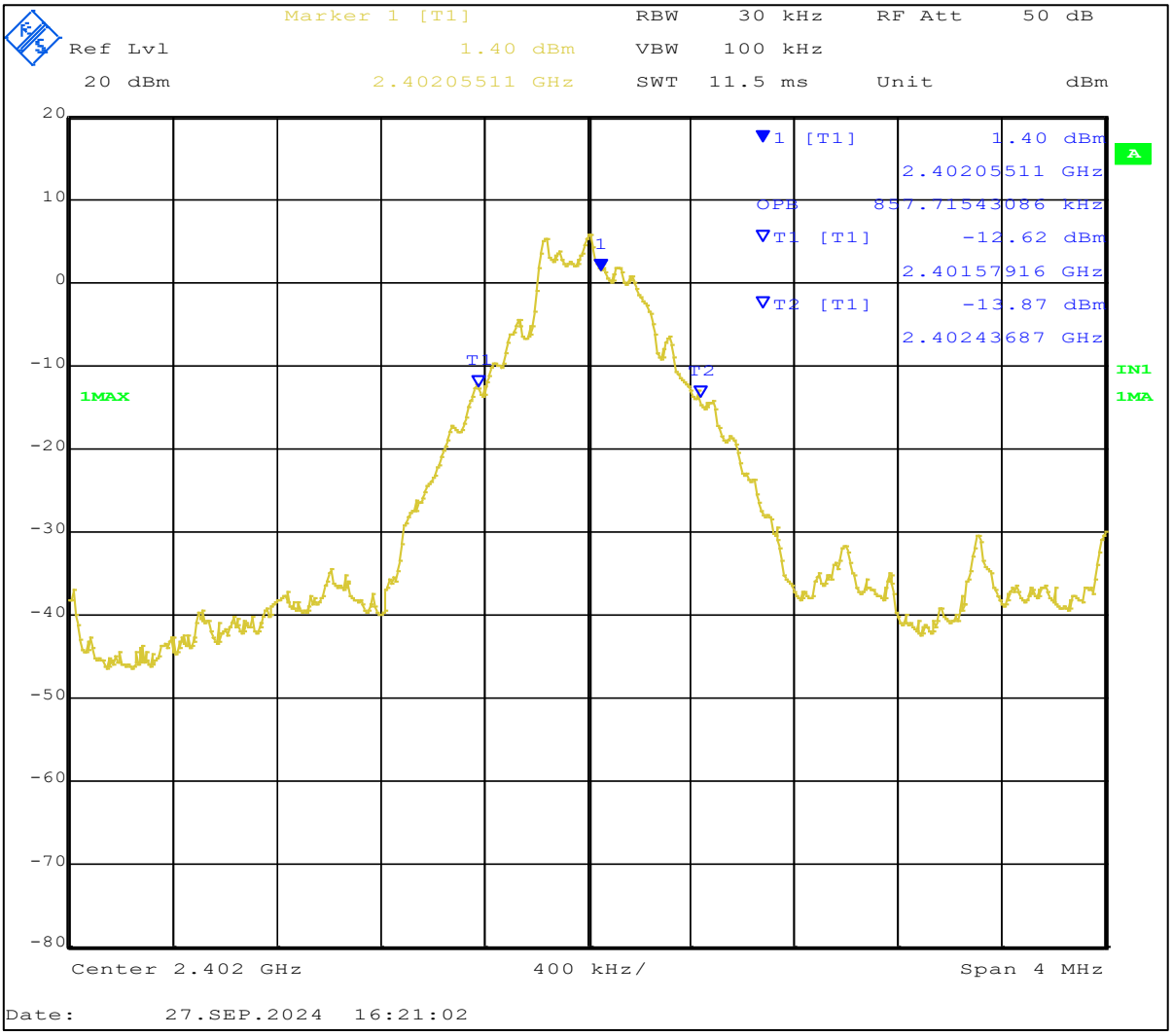

Figure 21. 99% Occupied bandwidth. Red radio, 2402 MHz.

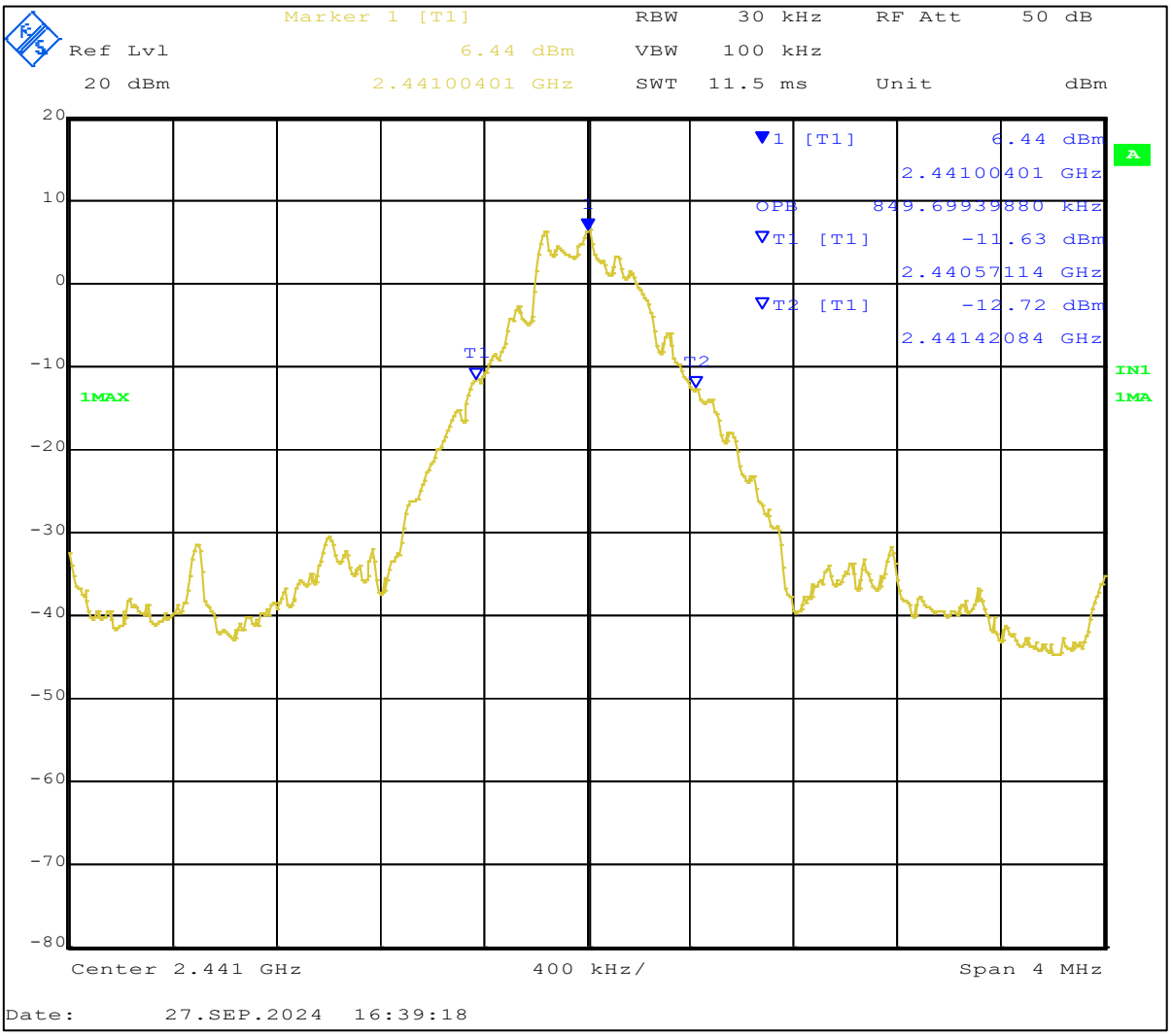

Figure 22. 99% Occupied bandwidth. Red radio, 2441 MHz

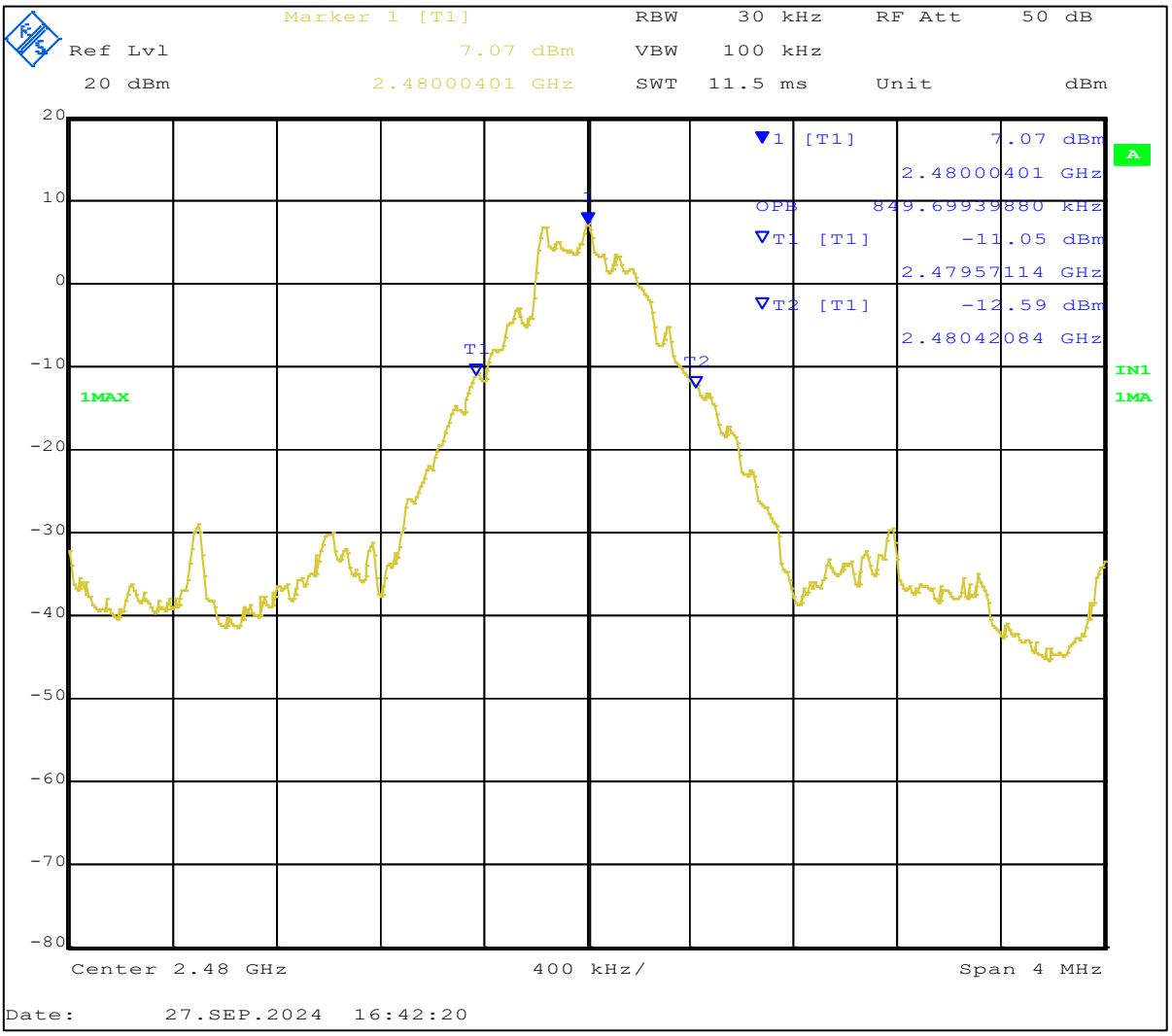

Figure 23. 99% Occupied bandwidth. Red radio, 2480 MHz.

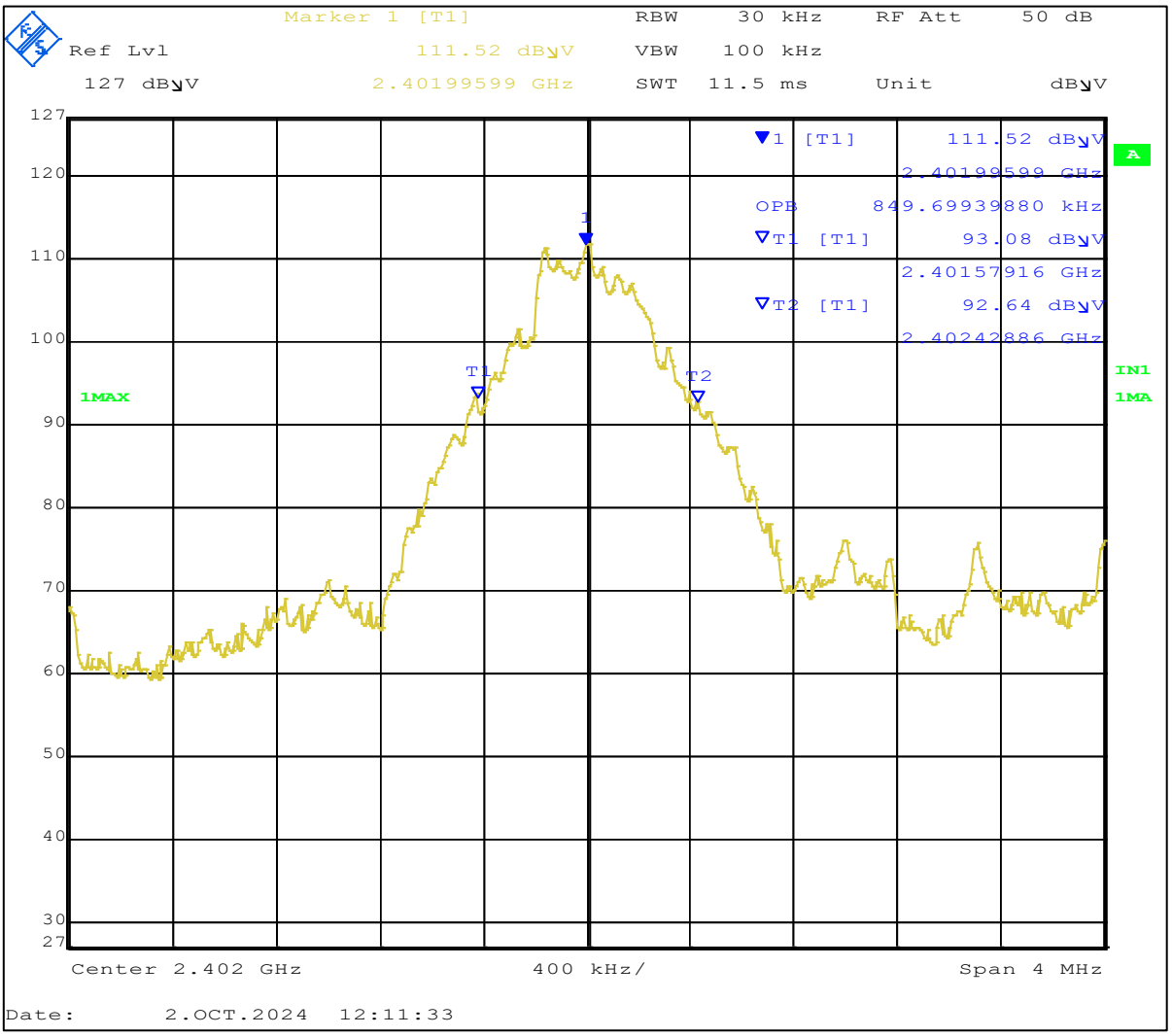

Figure 24. 99% Occupied bandwidth. Blue radio, 2402 MHz.

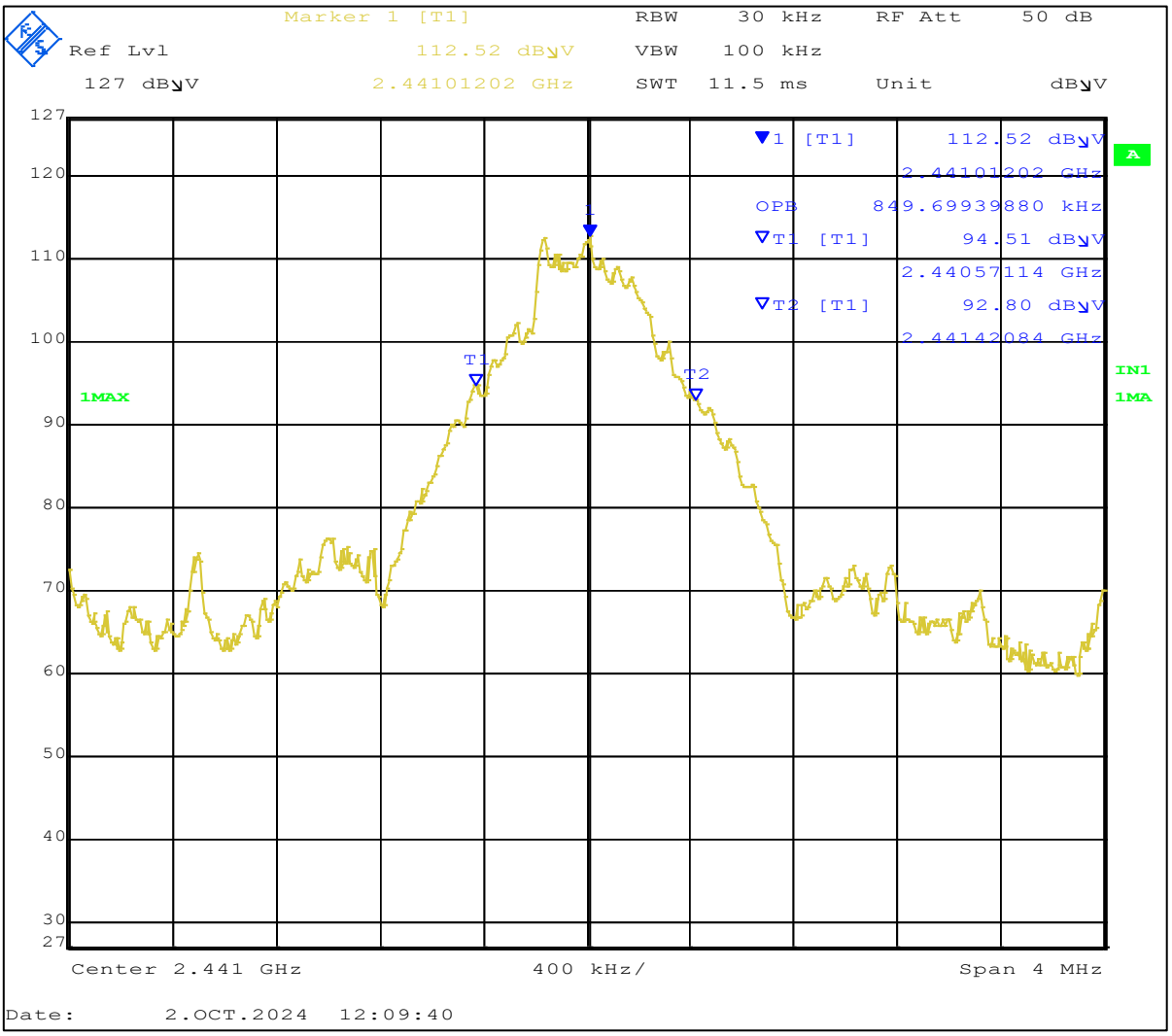

Figure 25. 99% Occupied bandwidth. Blue radio, 2441 MHz.

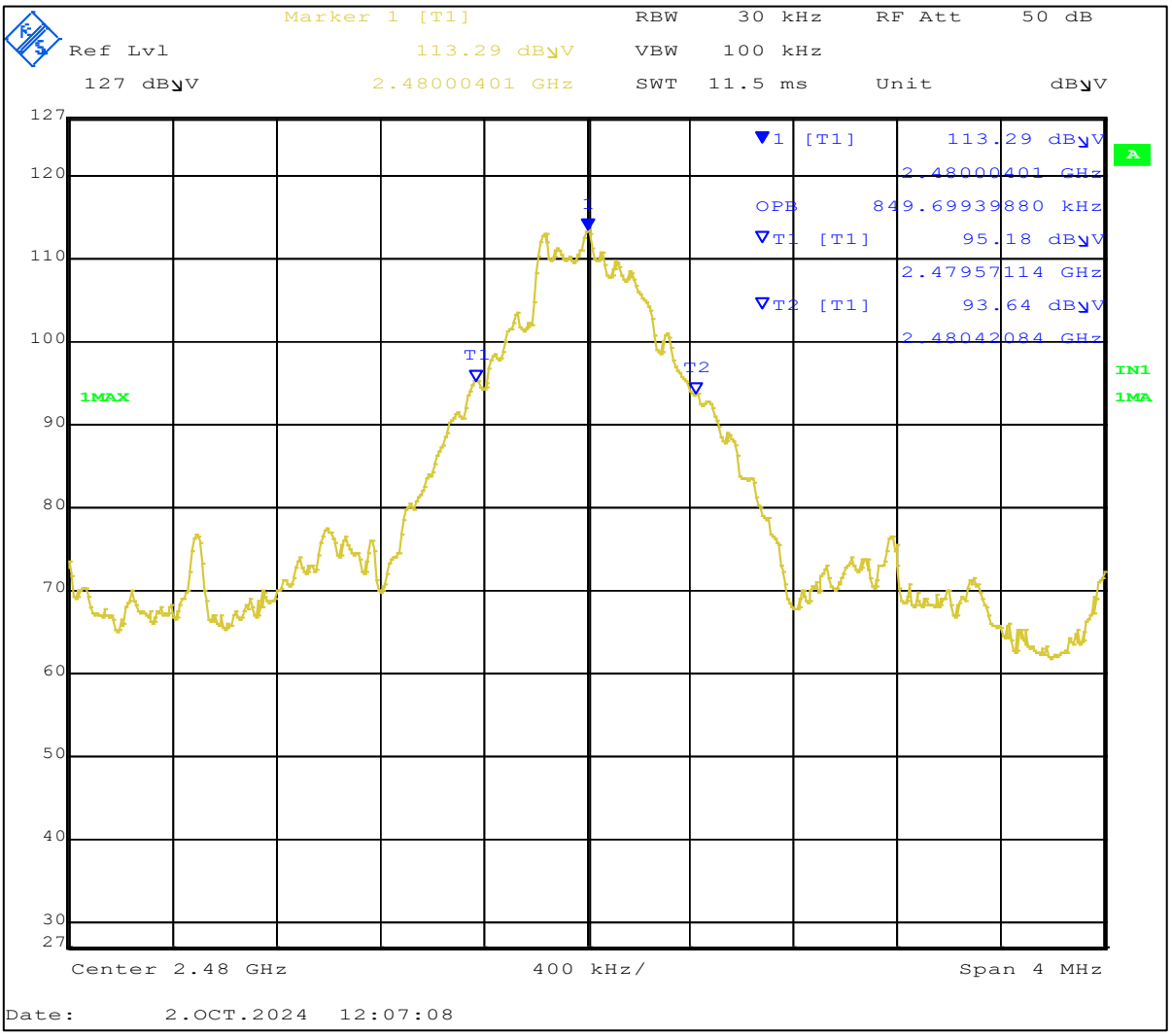

Figure 26. 99% Occupied bandwidth. Blue radio, 2480 MHz.

Radio	Frequency [MHz]	OBW [kHz]	Band limit [MHz]	Margin [MHz]	Result
Red	2402	857.7154	2400	1.5711	PASSED
Red	2441	849.6994	-		-
Red	2480	849.6994	2483.5	-3.0752	PASSED
Blue	2402	849.6994	2400	1.5752	PASSED
Blue	2441	849.6994	-		-
Blue	2480	849.6994	2483.5	-3.0752	PASSED

Table 9. 99% Occupied bandwidth results.

2.5.3 Test equipment

Description	Supplier	Model	Tag no.	Cal. due date
EMI Test Receiver 20Hz-26.5GHz	Rohde & Schwarz	ESI 26	30120763	2025-05-14

Table 10. Occupied bandwidth 20 dB and 99% test equipment.

2.6 Conducted spurious emission

Test specimen	2000-1 W-REM Probe
Test specification	47 CFR 15.247 (d) RSS 247 5.5
Test method	ANSI C63.10:2013 sec 7.8.8
Frequency range	30 MHz - 25 GHz
Limits	FCC 47 CFR Part 15.209 (a) RSS 247 5.5
Comments	
Temperature / Humidity	25°C / 49%RH, 21°C / 44%RH
Dates of measurements	2024-09-27, 2024-10-02
Test personnel	Søren Søltoft

2.6.1 Test setup

The temporary antenna connector of the test specimen was connected directly to the Test receiver.

The test were performed with the test specimen radios at a single frequency and hopping disabled.

The test was performed at Low, Middle and High channel on both Red and Blue radio.

Low: 2402 MHz
Middle: 2441 MHz
High: 2480 MHz

Limit is set to be 20 dB below the highest level of the fundamental carrier.

See photo of test set up in appendix 1.

2.6.2 Test results

2.6.2.1 Red radio. In band

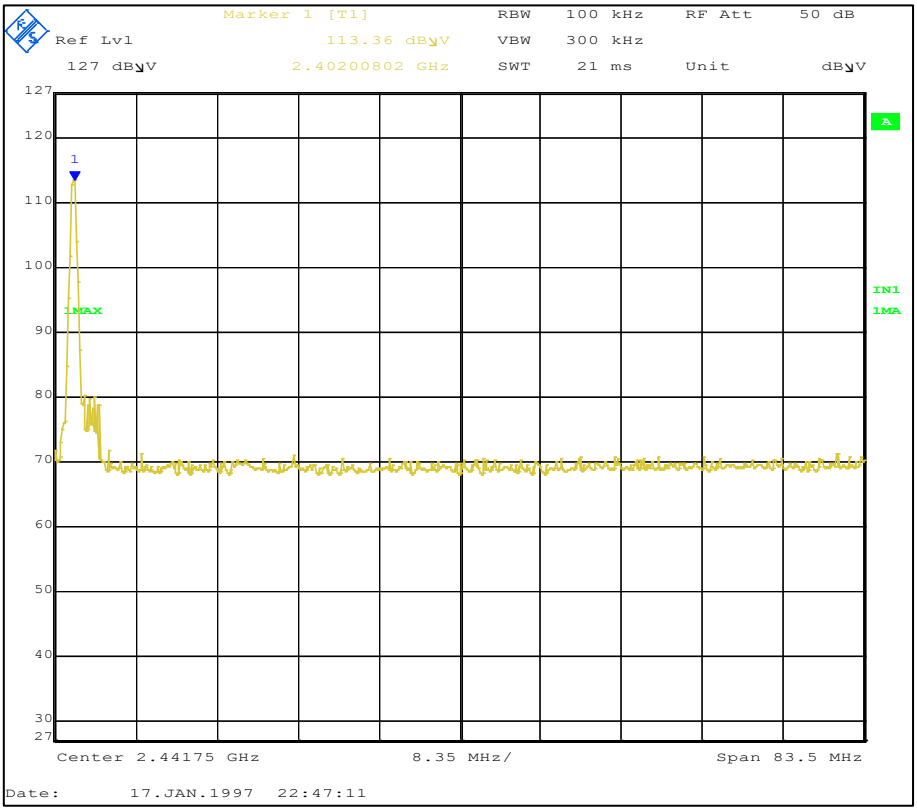

Figure 27. In band measurement of Low channel carrier.

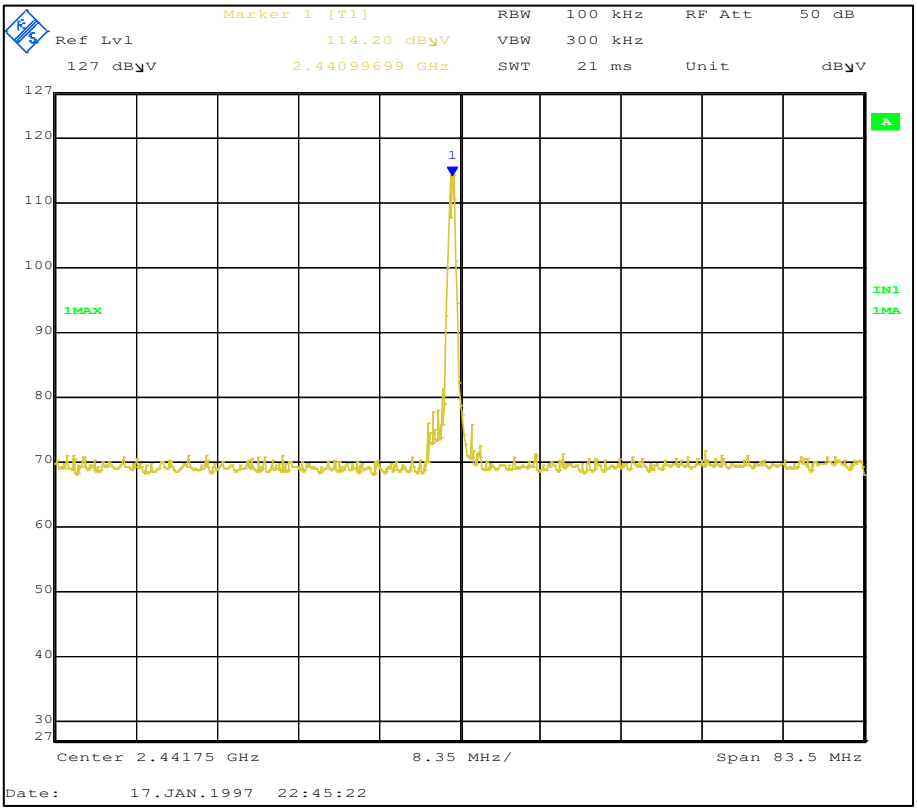

Figure 28. In band measurement of Middle channel carrier.

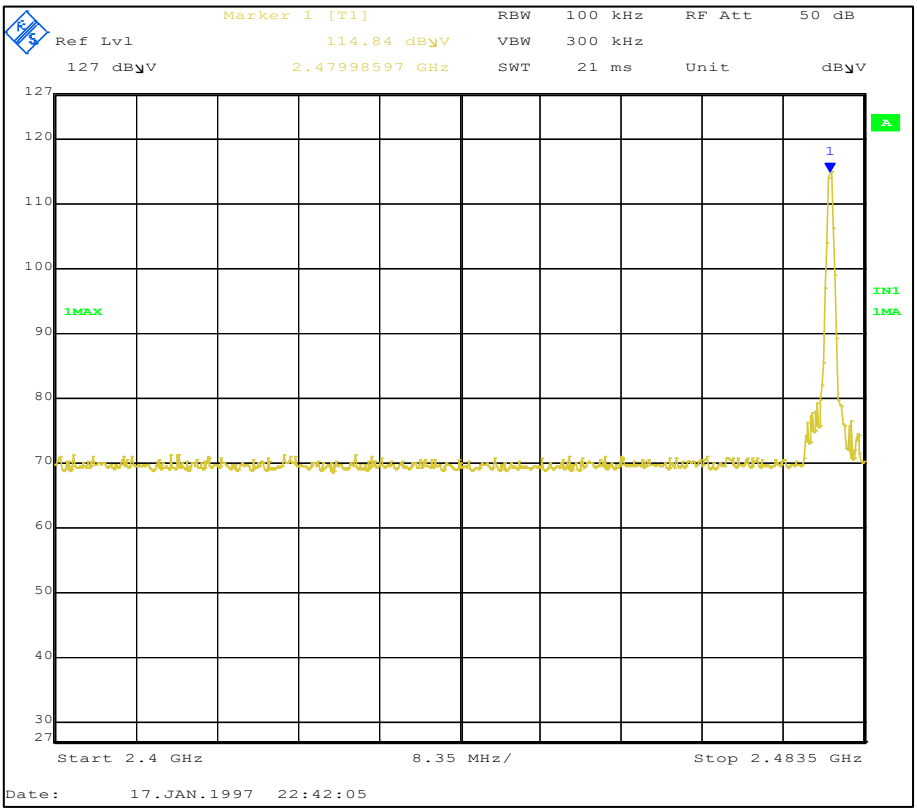

Figure 29. In band measurement of High channel carrier.

2.6.2.2 Red radio 30 MHz – 2.4 GHz

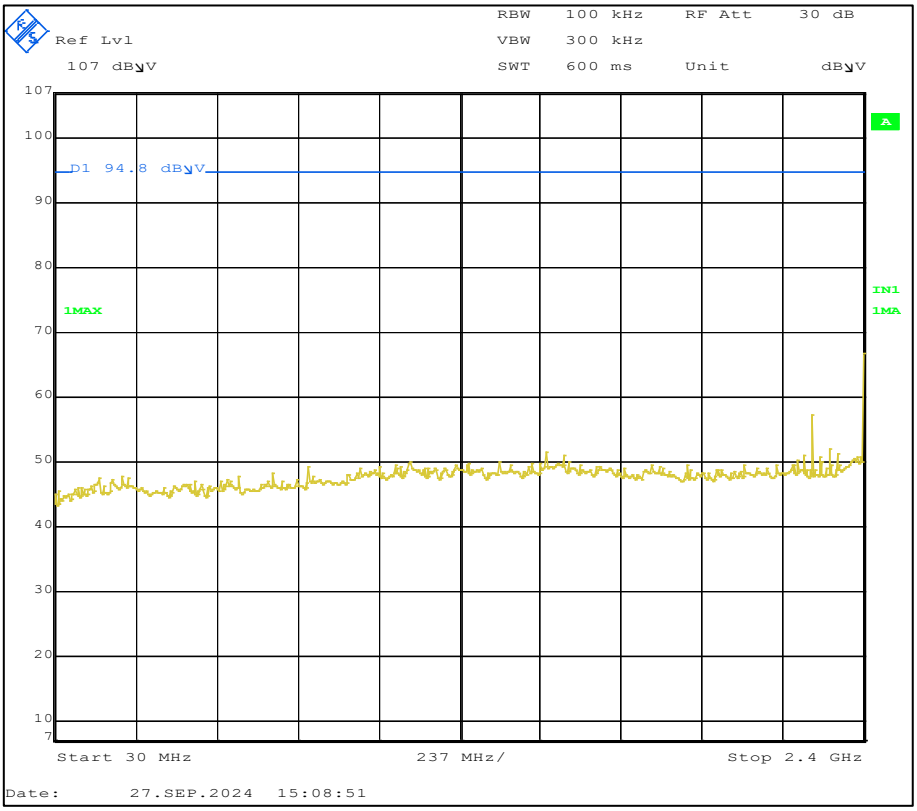

Figure 30. Conducted spurious emission, 30M – 2.4GHz. Low channel.

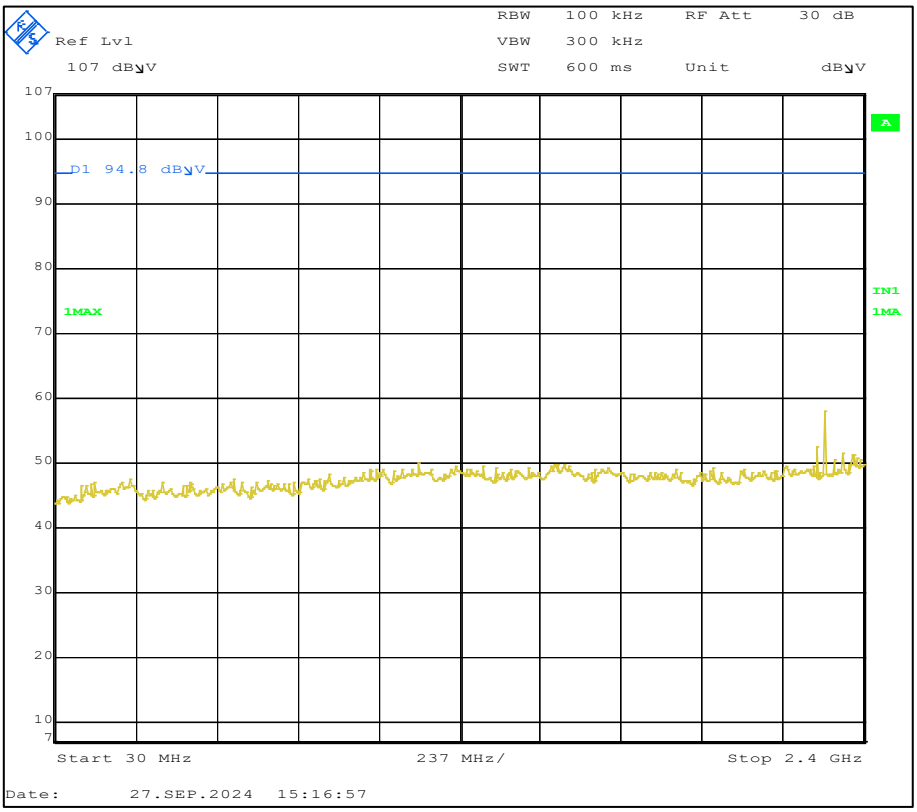

Figure 31. Conducted spurious emission, 30M – 2.4GHz. Middle channel.

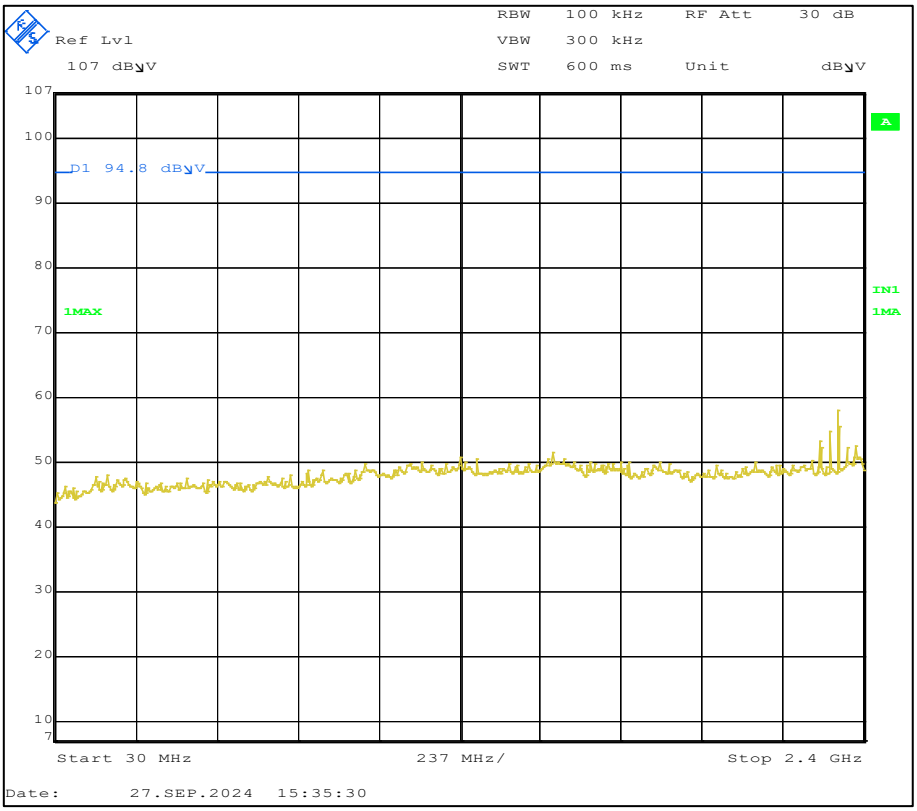

Figure 32. Conducted spurious emission, 30M – 2.4GHz. High channel.

2.6.2.3 Red radio 2.4835 GHz – 6 GHz

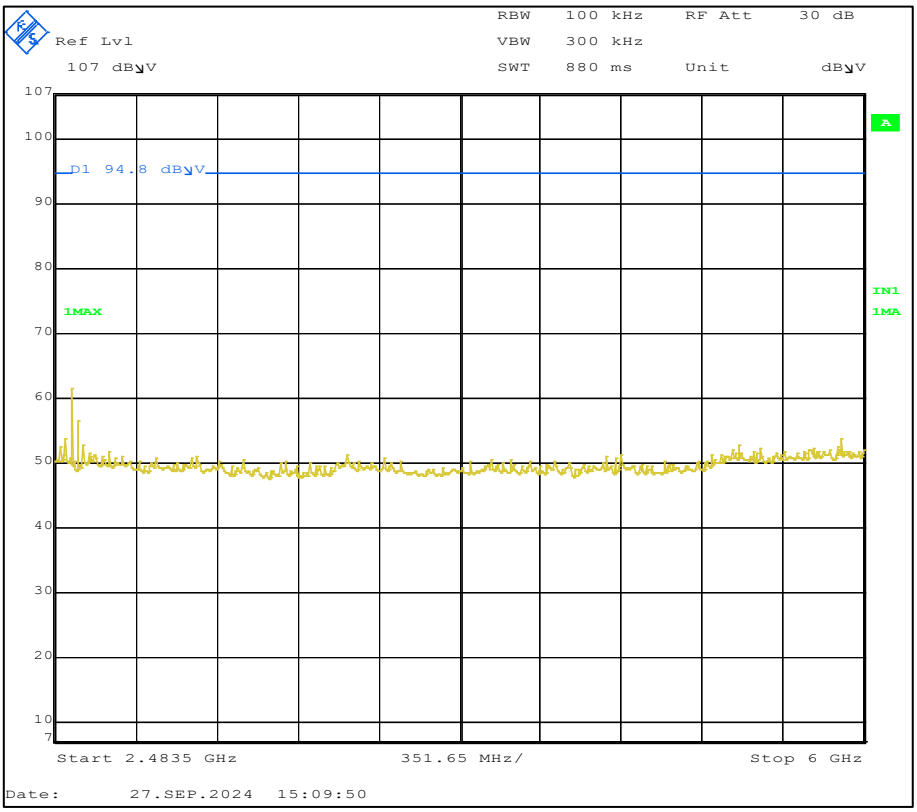

Figure 33. Conducted spurious emission, 2.4835 – 6 GHz. Low channel.

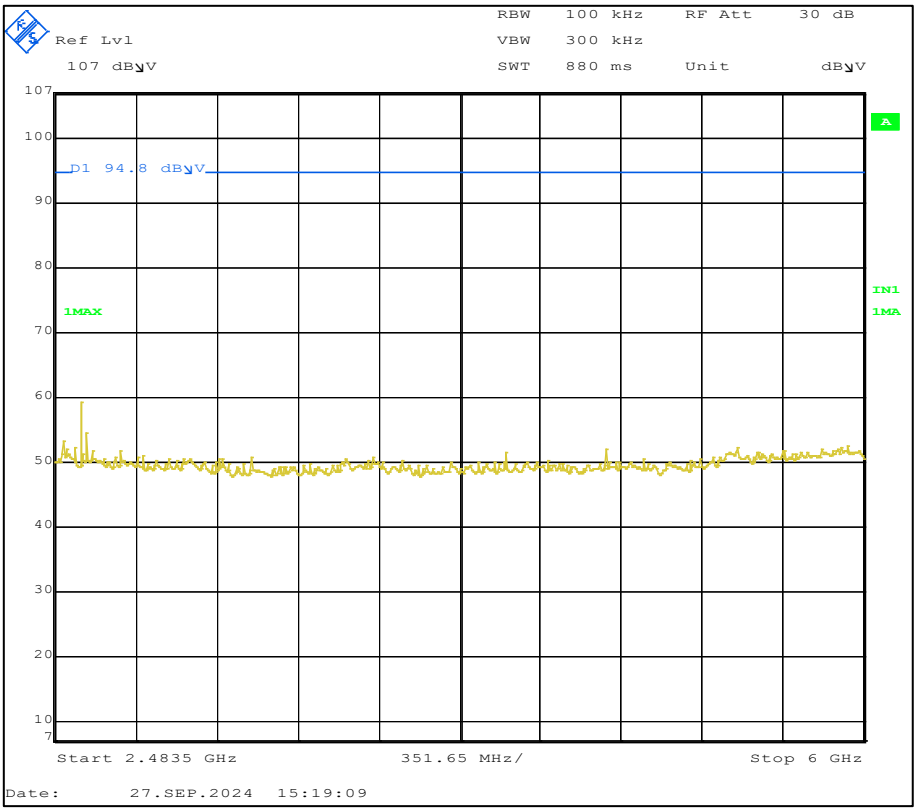

Figure 34. Conducted spurious emission, 2.4835 – 6 GHz. Middle channel.

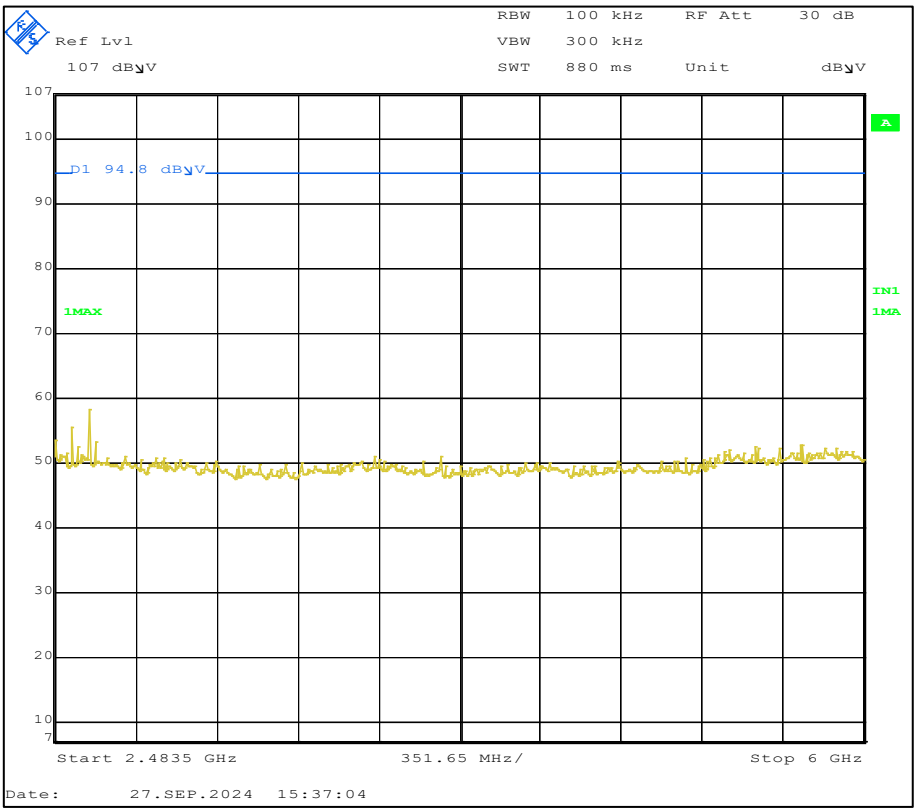

Figure 35. Conducted spurious emission, 2.4835 – 6 GHz. High channel.

2.6.2.4 Red radio 6 GHz – 9 GHz

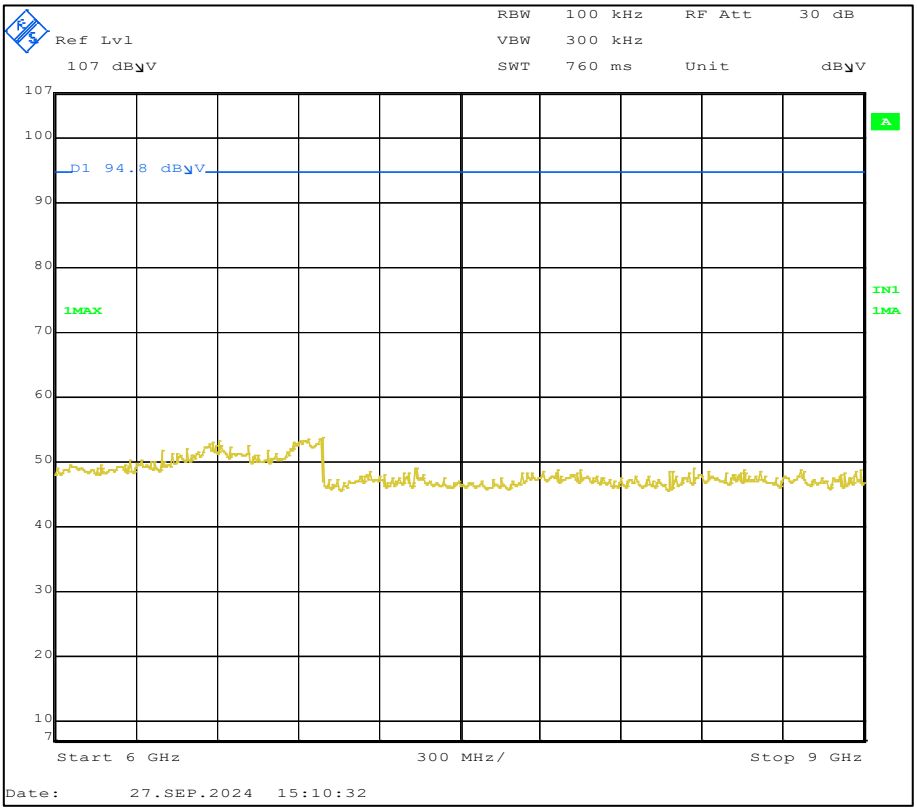

Figure 36. Conducted spurious emission, 6 - 9 GHz. Low channel.

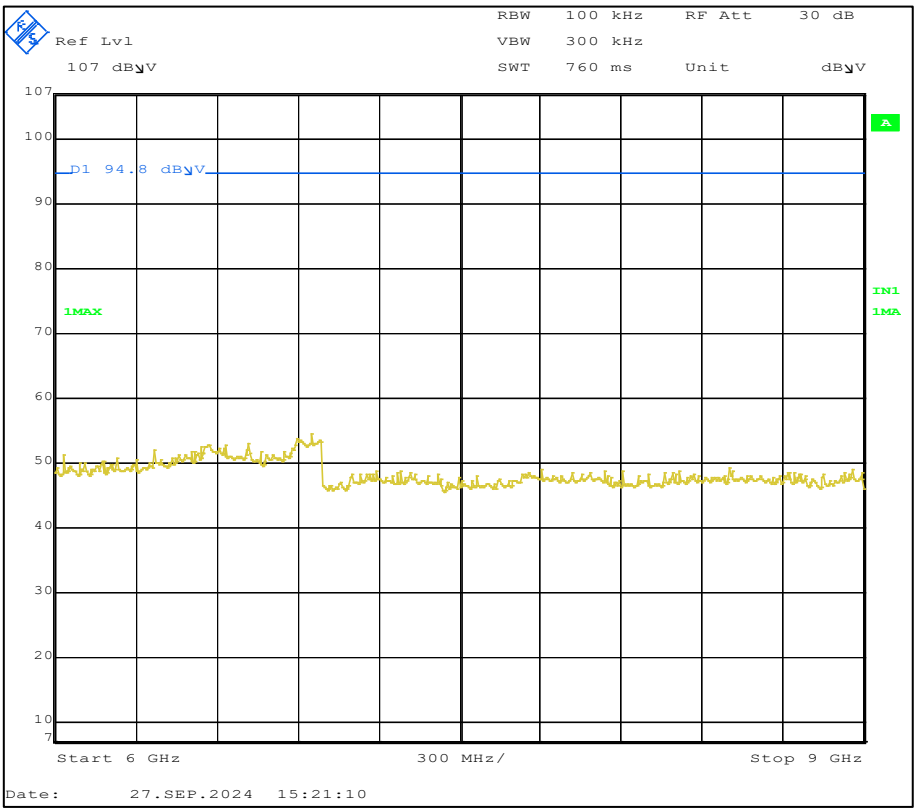

Figure 37. Conducted spurious emission, 6 - 9 GHz. Middle channel.

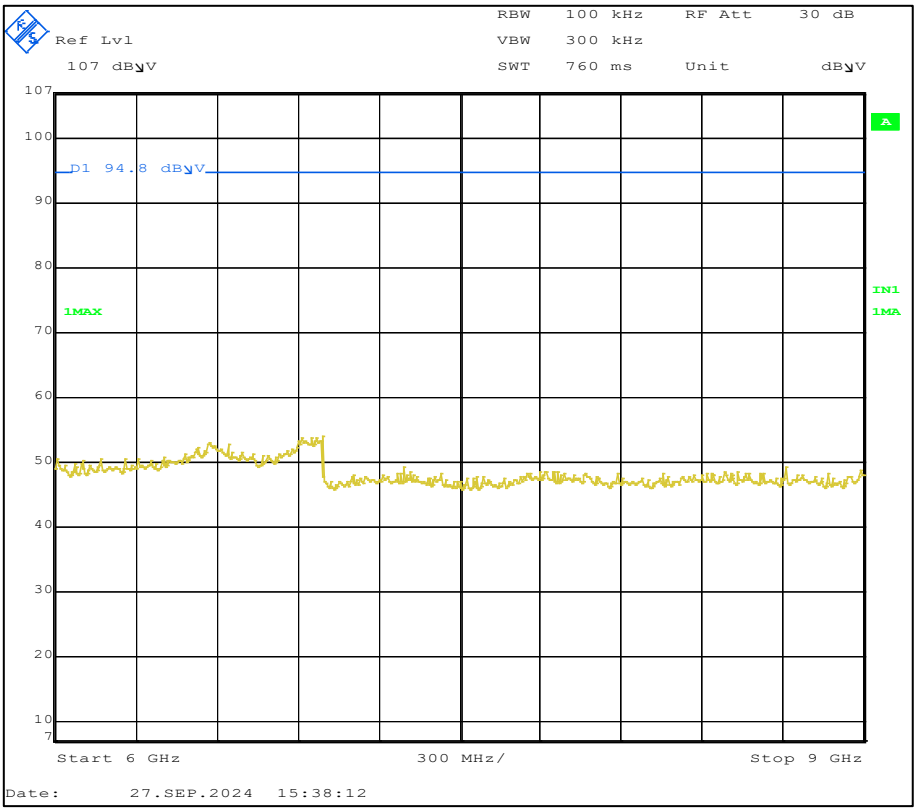

Figure 38. Conducted spurious emission, 6 - 9 GHz. High channel.

2.6.2.5 Red radio 9 GHz – 12 GHz

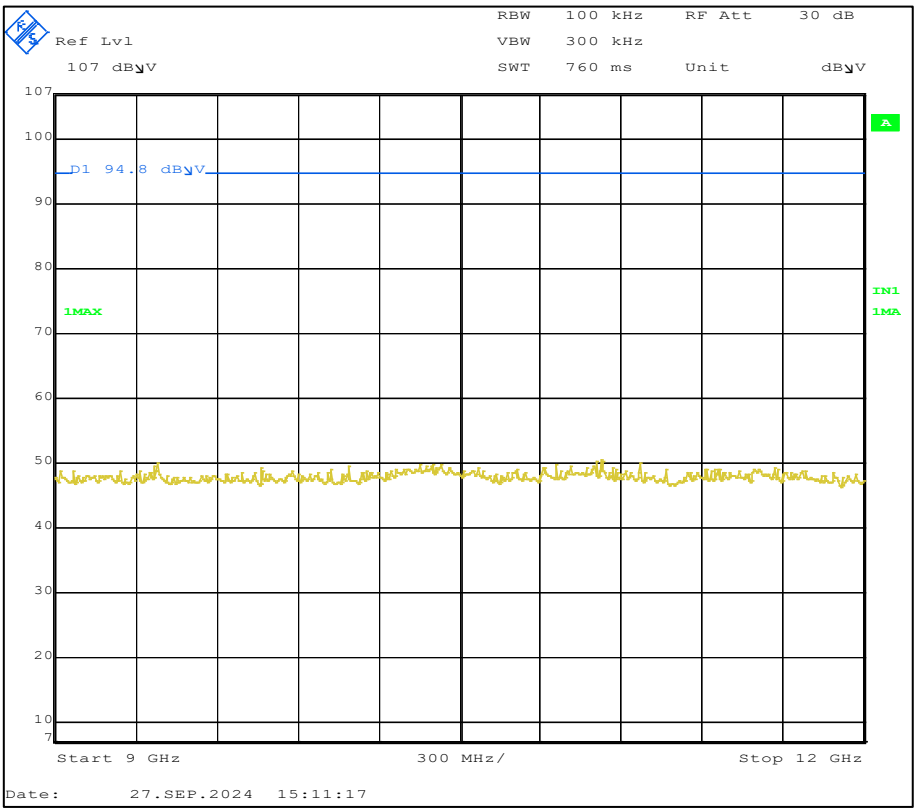

Figure 39. Conducted spurious emission, 9 - 12 GHz. Low channel.

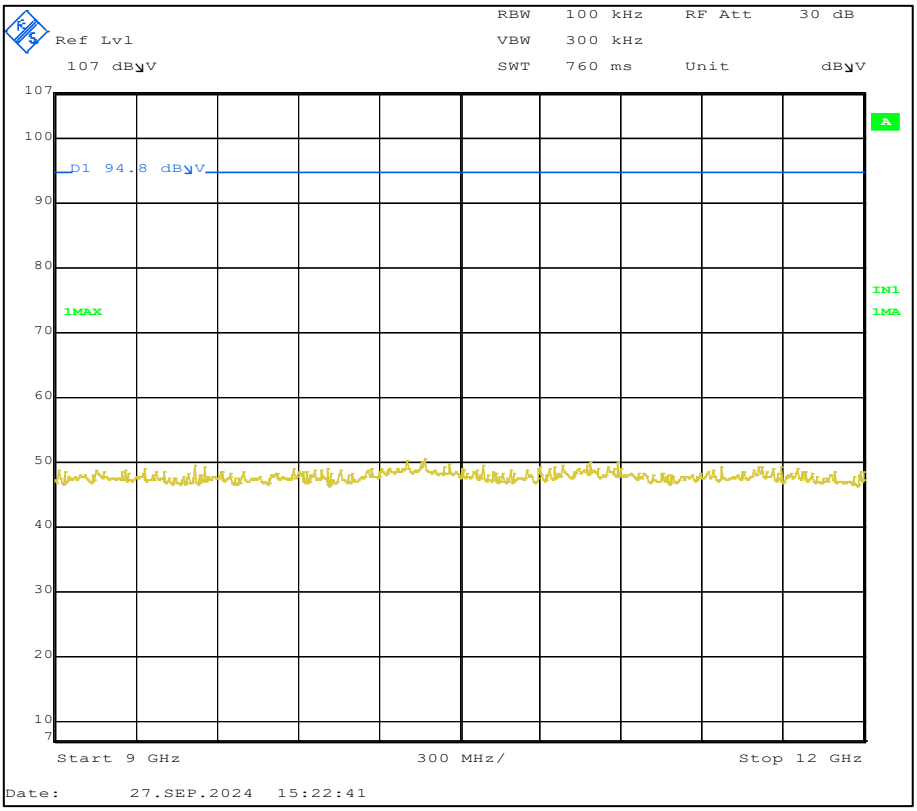

Figure 40. Conducted spurious emission, 9 - 12 GHz. Middle channel.

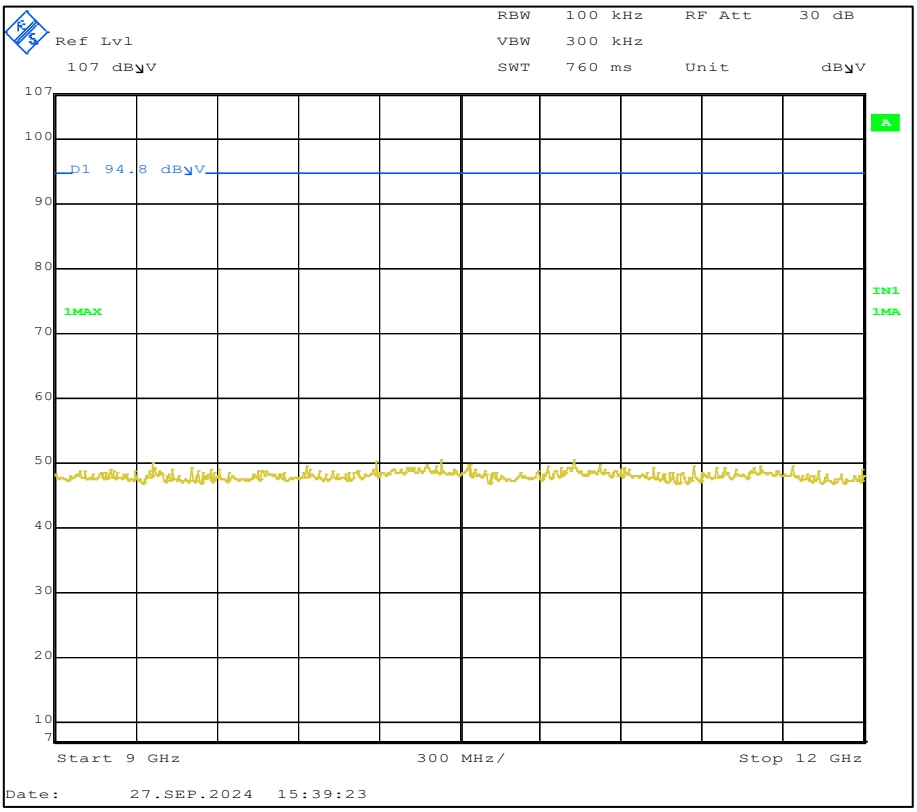

Figure 41. Conducted spurious emission, 9 - 12 GHz. High channel.

2.6.2.6 Red radio 12 GHz – 15 GHz

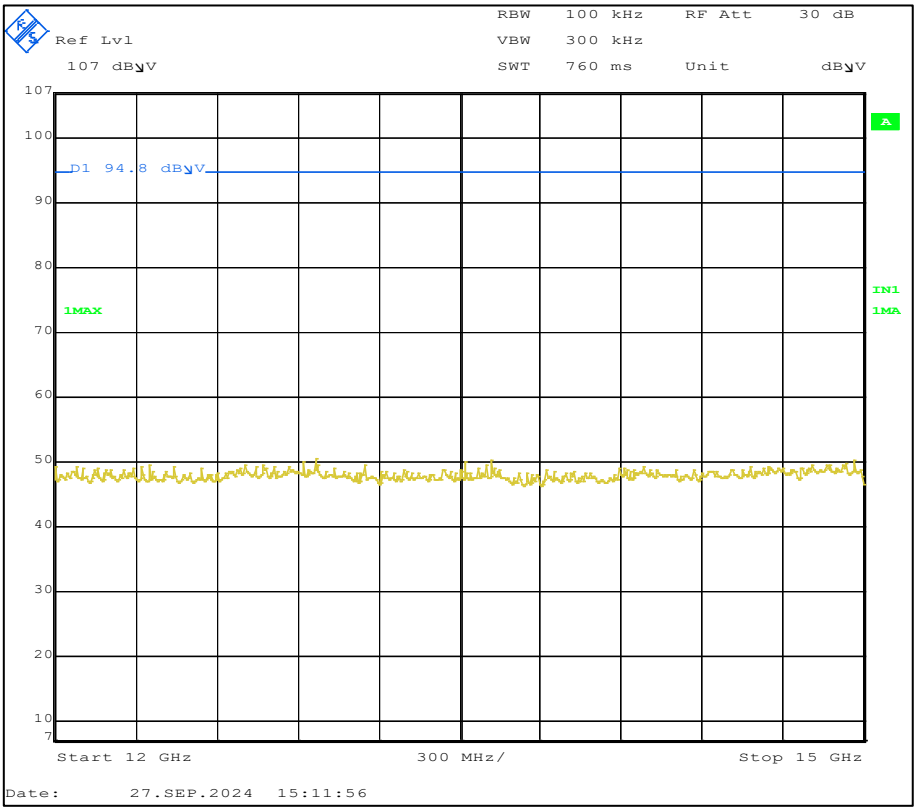

Figure 42. Conducted spurious emission, 12 – 15 GHz. Low channel.

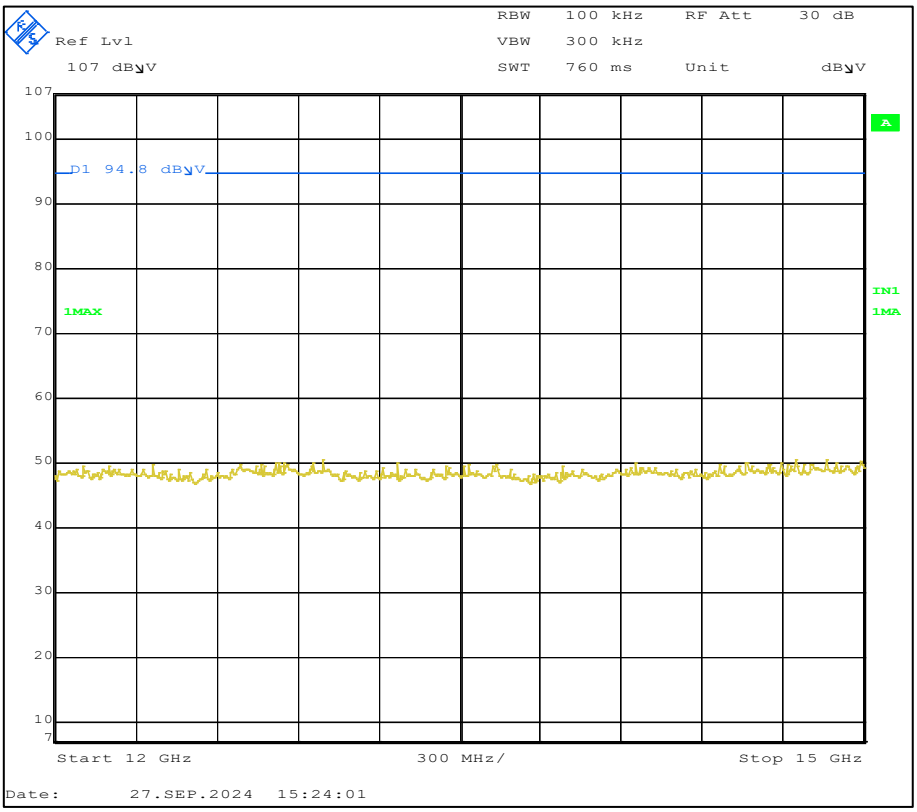

Figure 43. Conducted spurious emission, 12 – 15 GHz. Middle channel.

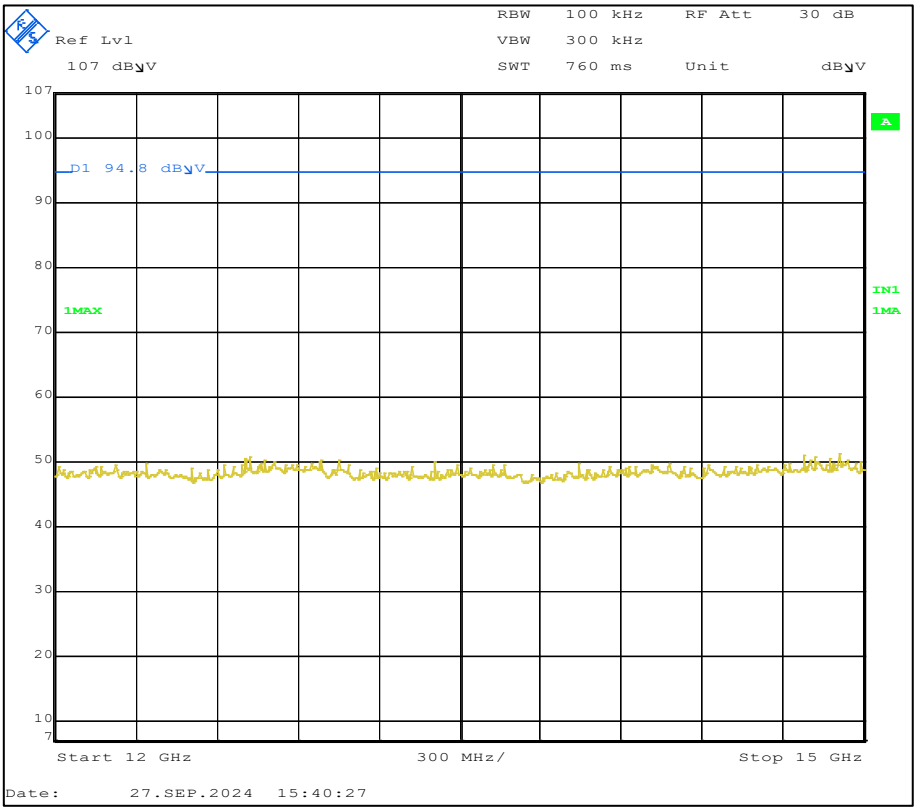

Figure 44. Conducted spurious emission, 12 – 15 GHz. High channel.

2.6.2.7 Red radio 15 GHz – 18 GHz

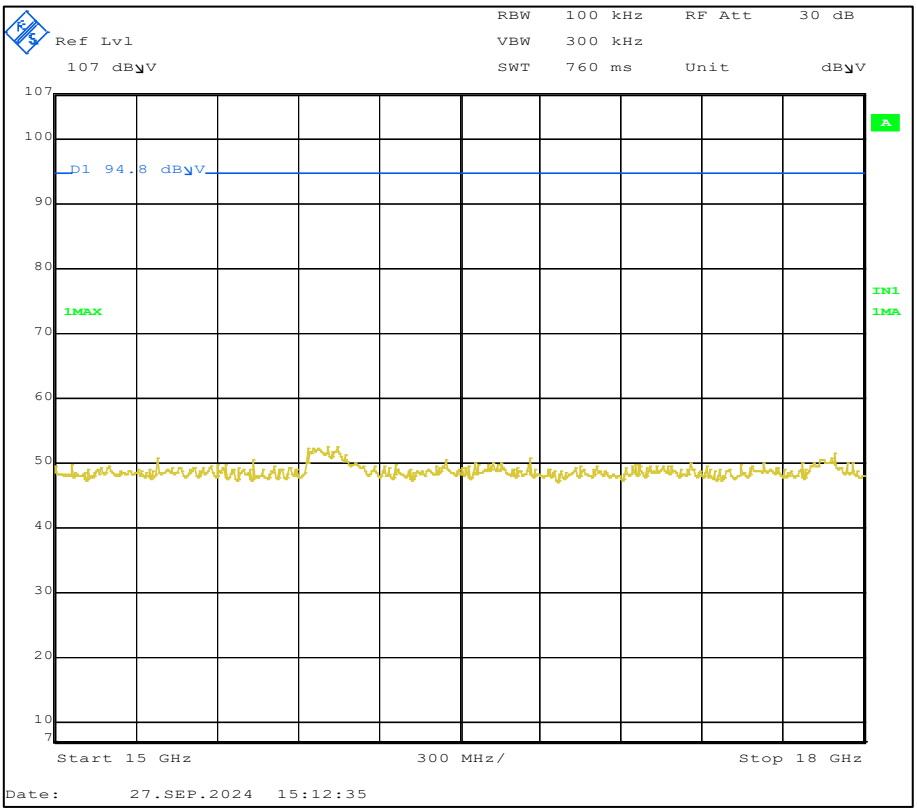

Figure 45. Conducted spurious emission, 15 – 18 GHz. Low channel.

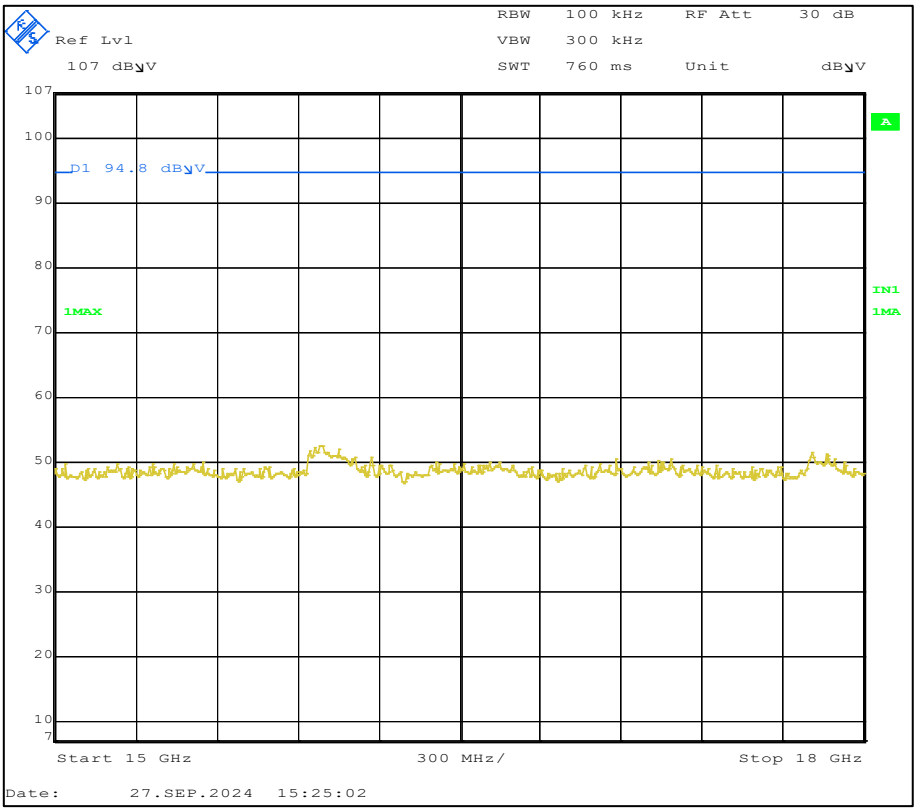

Figure 46. Conducted spurious emission, 15 – 18 GHz. Middle channel.

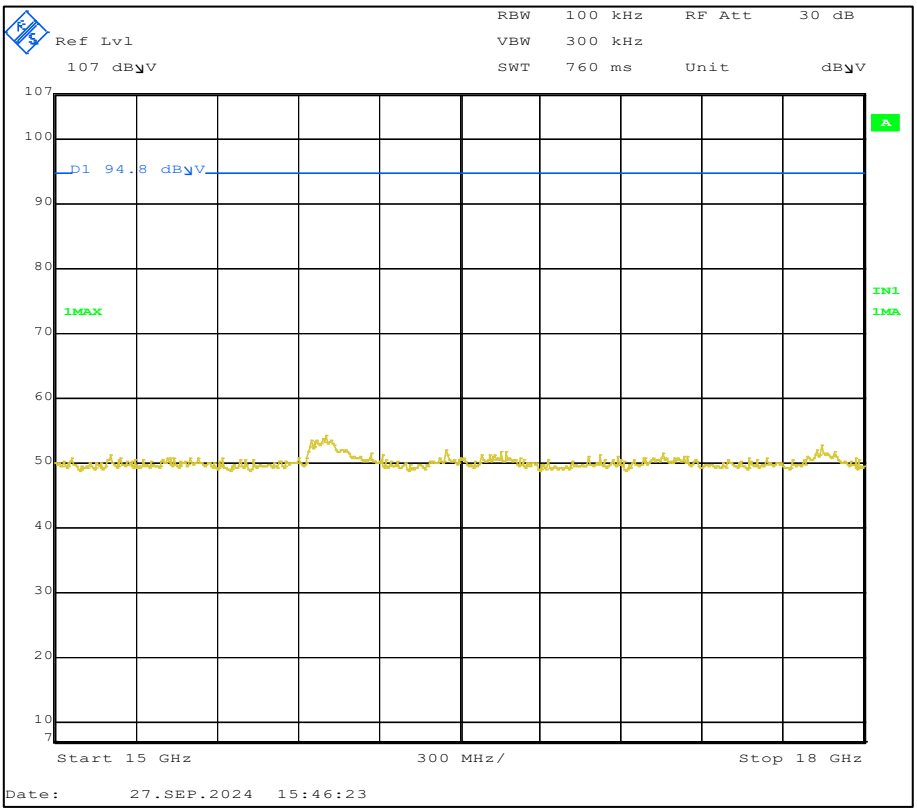

Figure 47. Conducted spurious emission, 15 – 18 GHz. High channel.

2.6.2.8 Red radio 18 GHz – 21 GHz

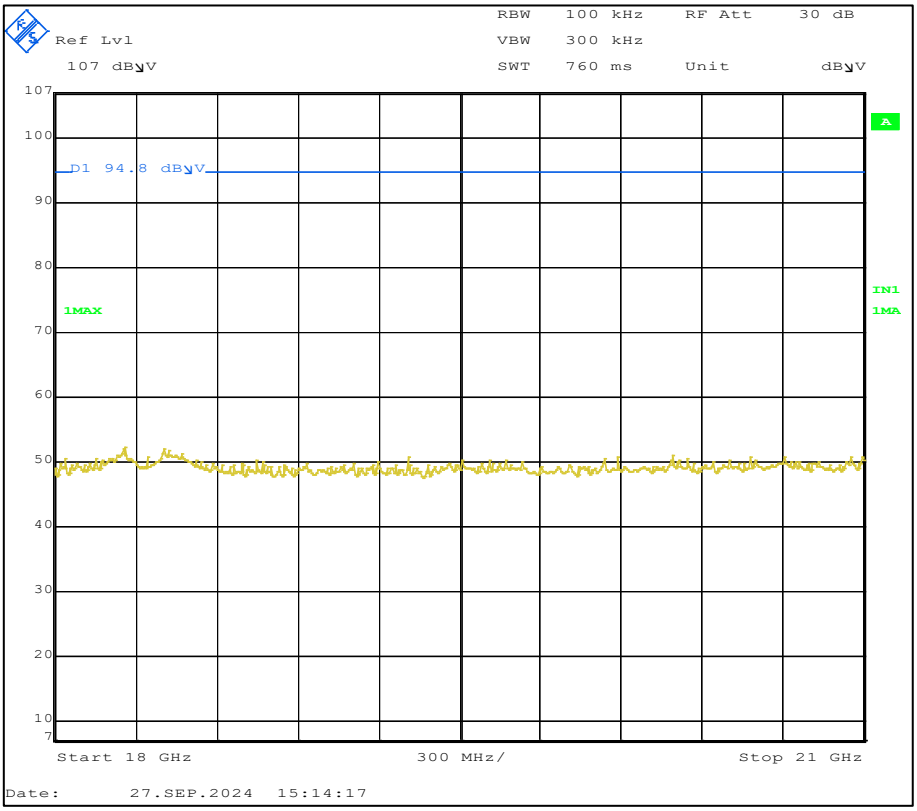

Figure 48. Conducted spurious emission, 18 – 21 GHz. Low channel.

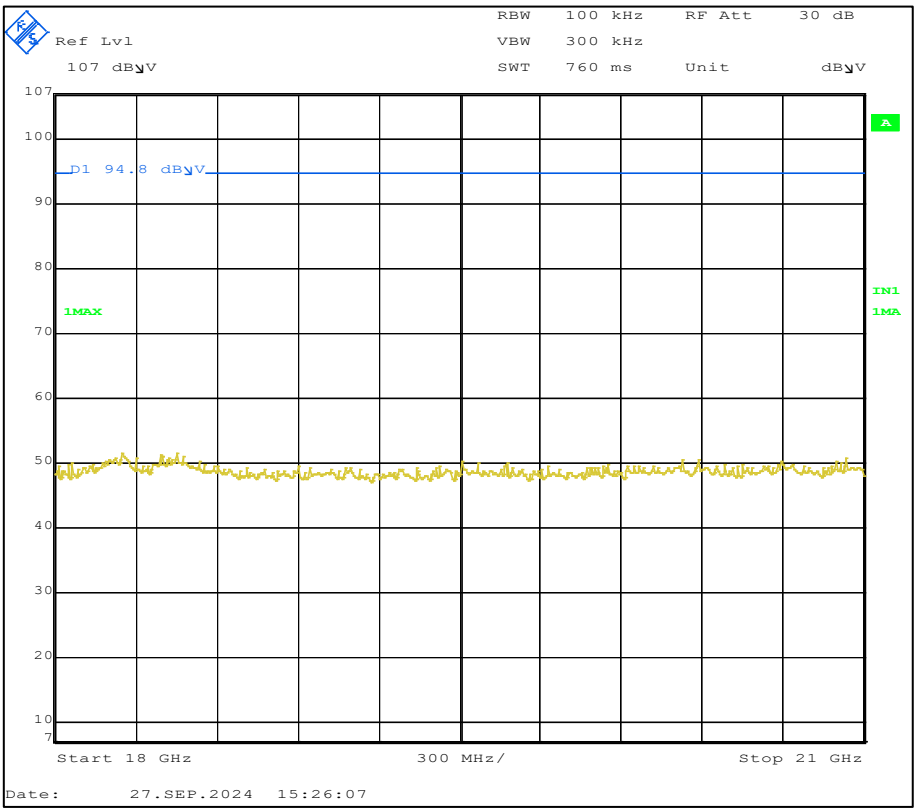

Figure 49. Conducted spurious emission, 18– 21 GHz. Middle channel.

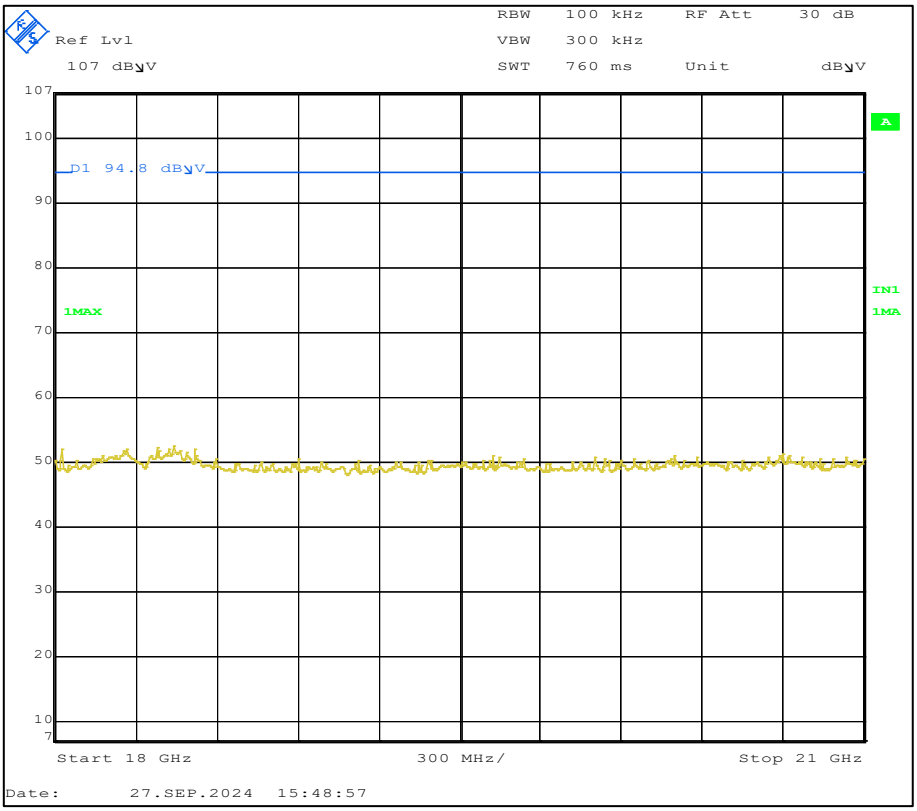

Figure 50. Conducted spurious emission, 18 – 21 GHz. High channel.

2.6.2.9 Red radio 21 GHz – 25 GHz

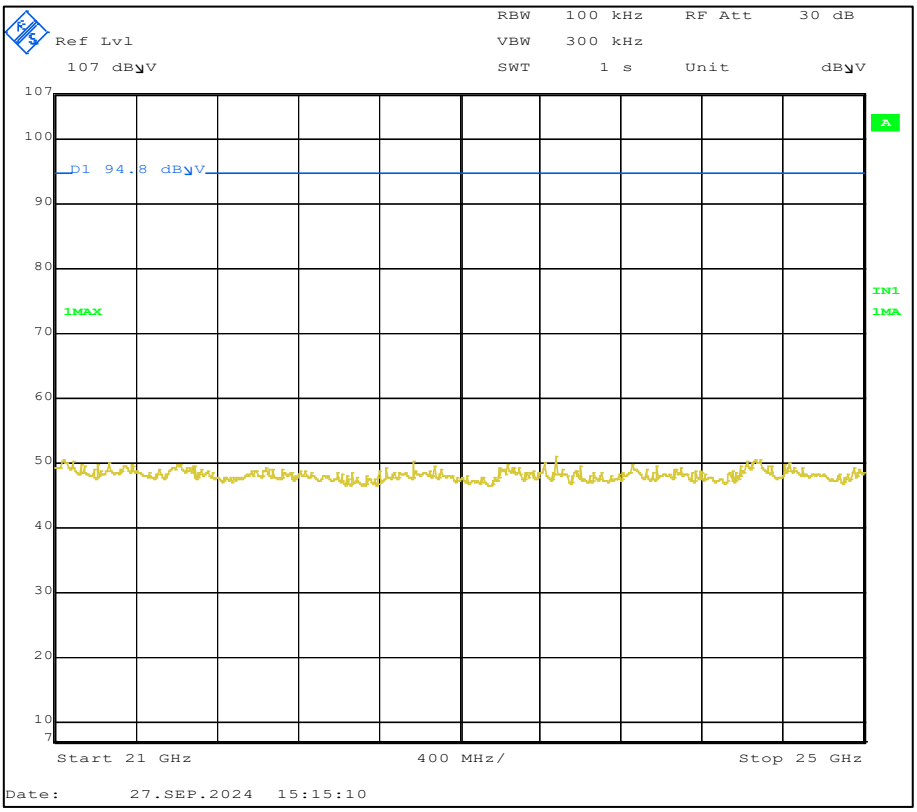

Figure 51. Conducted spurious emission, 21 – 25 GHz. Low channel.

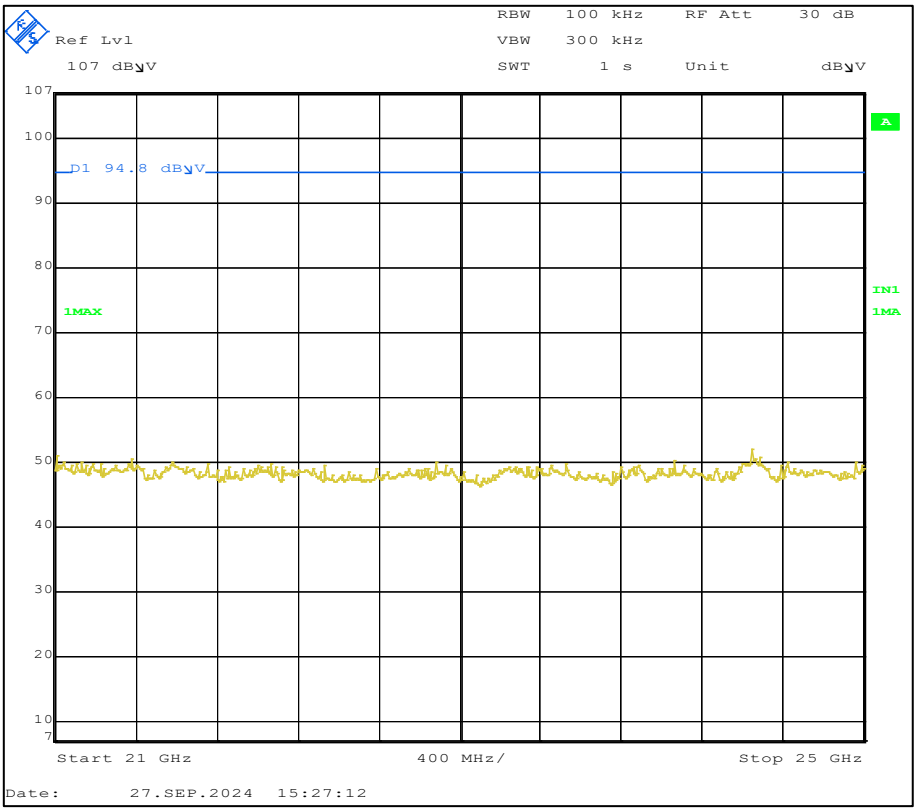

Figure 52. Conducted spurious emission, 21 – 25 GHz. Middle channel.

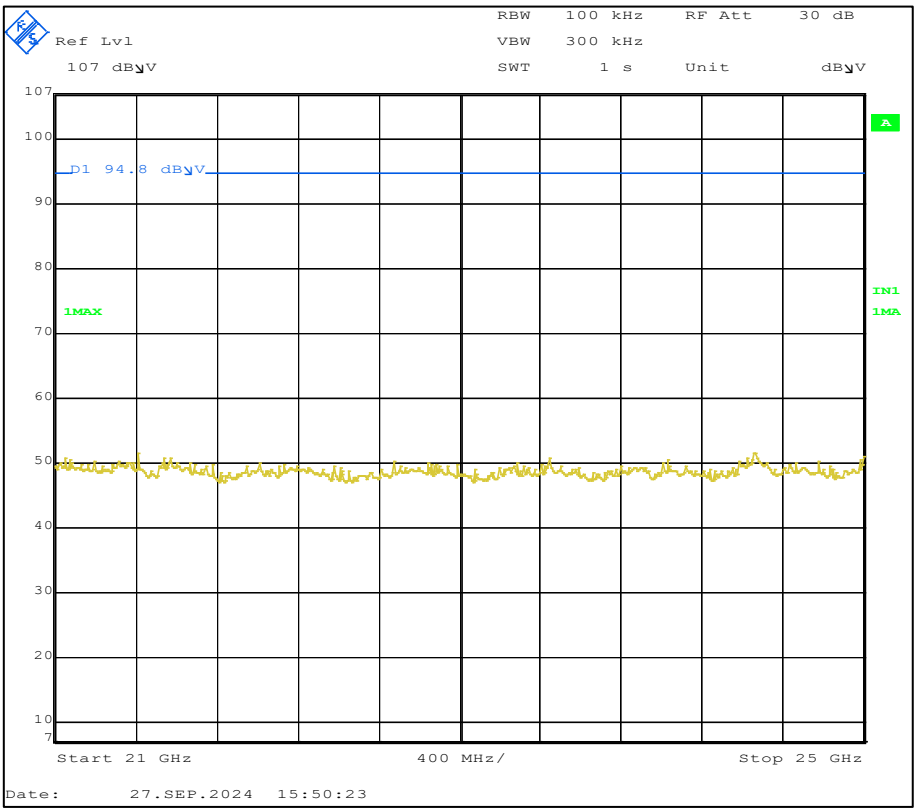

Figure 53. Conducted spurious emission, 21 – 25 GHz. High channel.

Frequency range	Low	Middle	High	Low	Middle	High	Limit	Result
[GHz]	Peak [dBµV]	Peak [dBµV]	Peak [dBµV]	Margin [dB]	Margin [dB]	Margin [dB]	[dBµV]	
0.03 – 2.4	58	59	59	36.8	35.8	35.8	94.8	PASSED
2.4835 - 6	62	60	59	32.8	34.8	35.8	94.8	PASSED
6 - 9	54	54	54	40.8	40.8	40.8	94.8	PASSED
9 - 12	50	51	51	44.8	43.8	43.8	94.8	PASSED
12 – 15	51	51	51	43.8	43.8	43.8	94.8	PASSED
15 - 18	53	53	54	41.8	41.8	40.8	94.8	PASSED
18 - 21	52	51	52	42.8	43.8	42.8	94.8	PASSED
21 - 25	51	52	51	43.8	42.8	43.8	94.8	PASSED

Table 11. Conducted spurious emission. Red radio. Final test result.

2.6.2.10 Blue radio. In band.

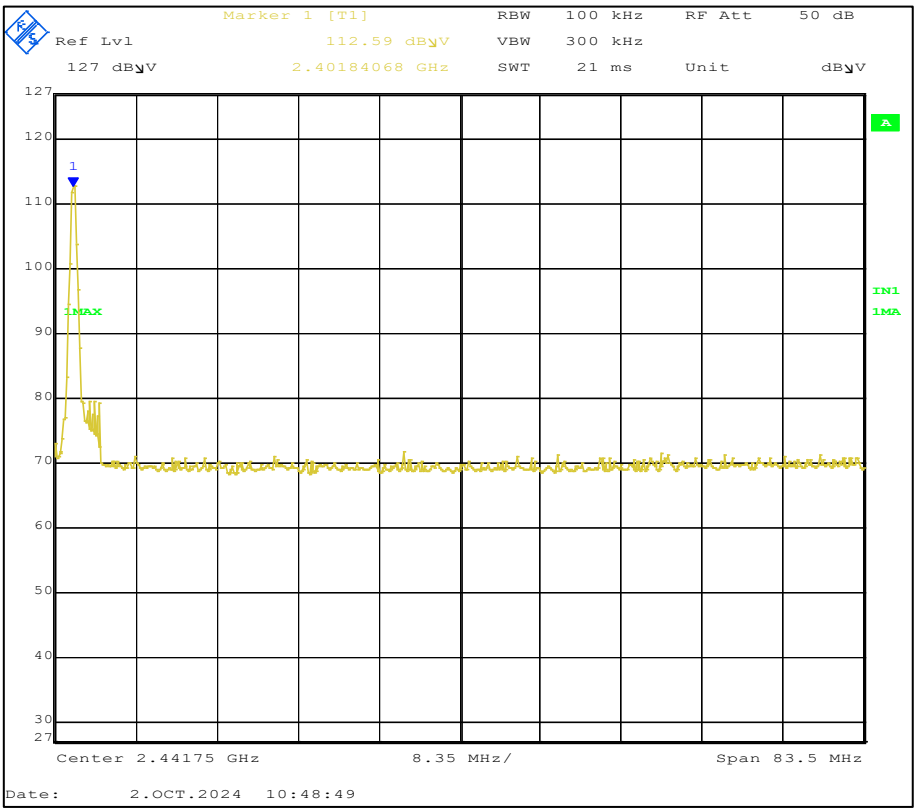

Figure 54. In band measurement of Low channel carrier.

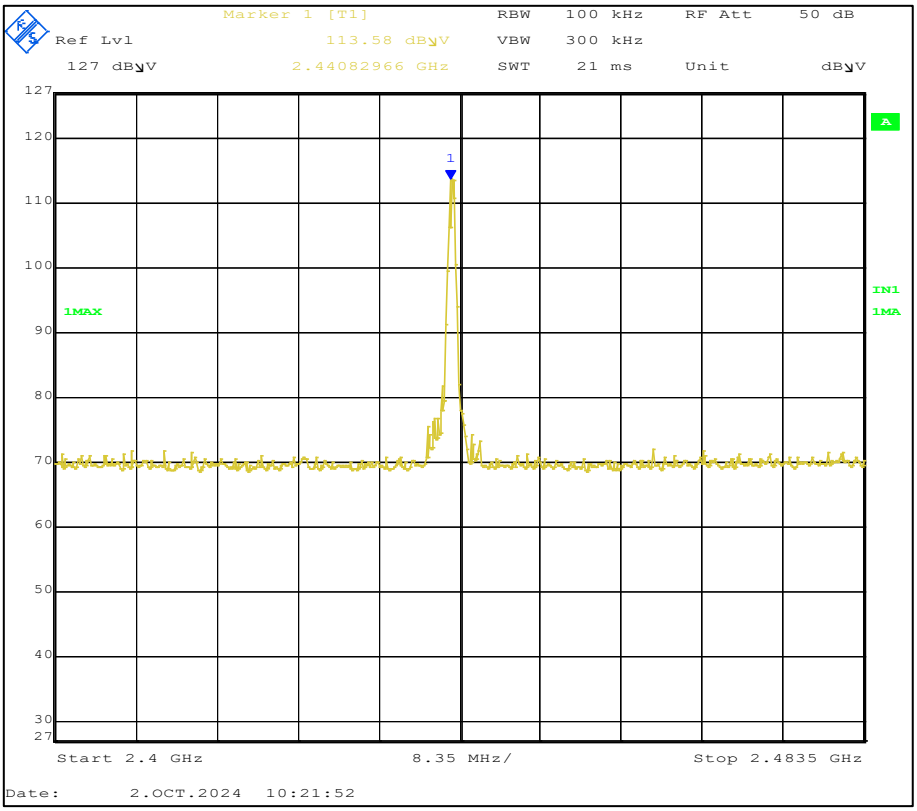

Figure 55. In band measurement of Middle channel carrier.

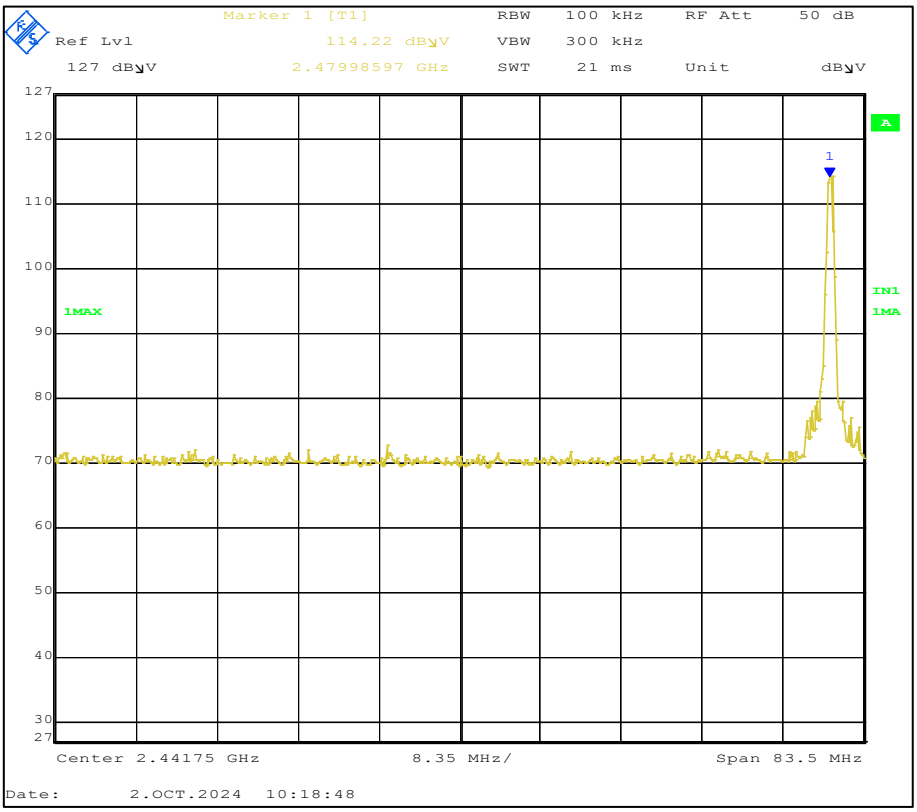

Figure 56. In band measurement of High channel carrier.

2.6.2.11 Blue radio 30 MHz – 2.4 GHz

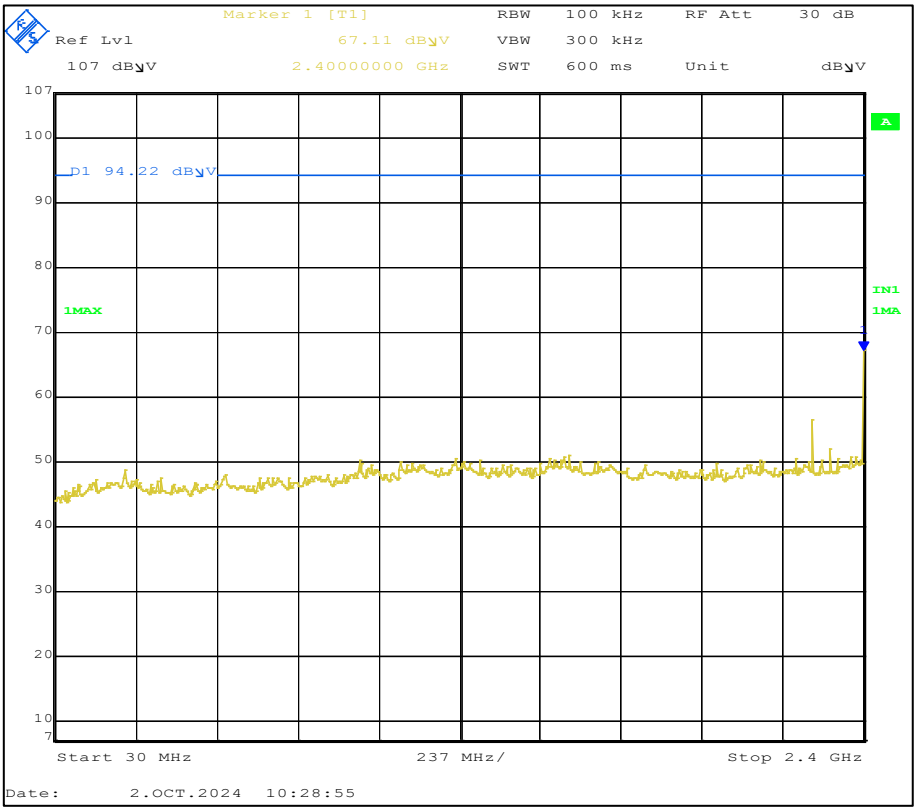

Figure 57. Conducted spurious emission, 30M – 2.4GHz. Low channel.

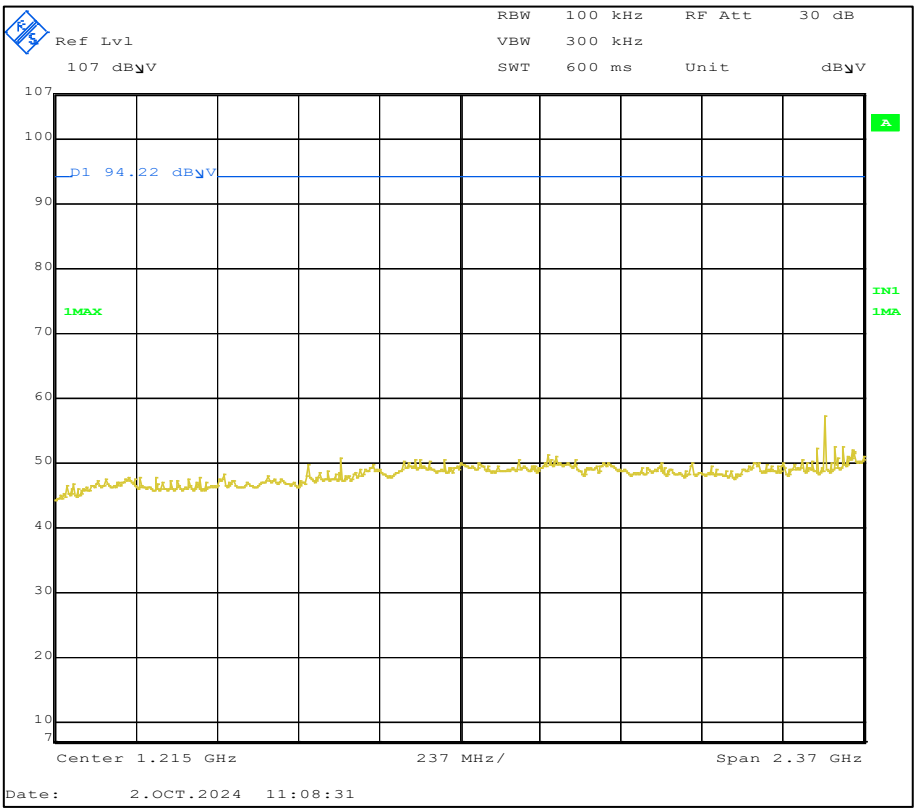

Figure 58. Conducted spurious emission, 30M – 2.4GHz. Middle channel.

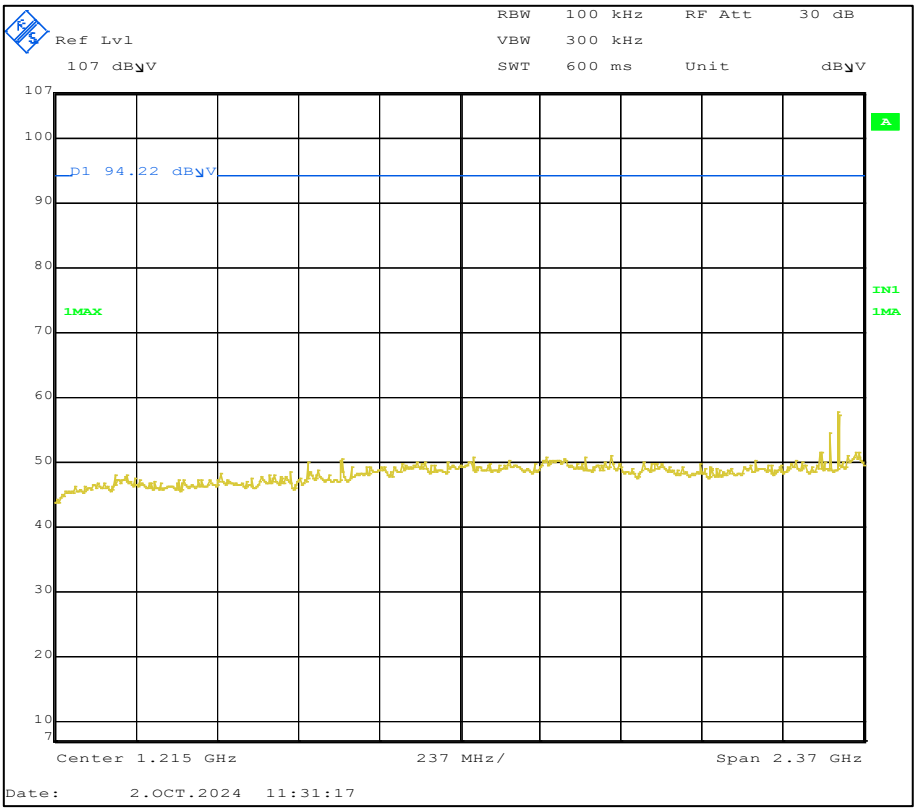

Figure 59. Conducted spurious emission, 30M – 2.4GHz. High channel.

2.6.2.12 Blue radio 2.4835 GHz- 6 GHz

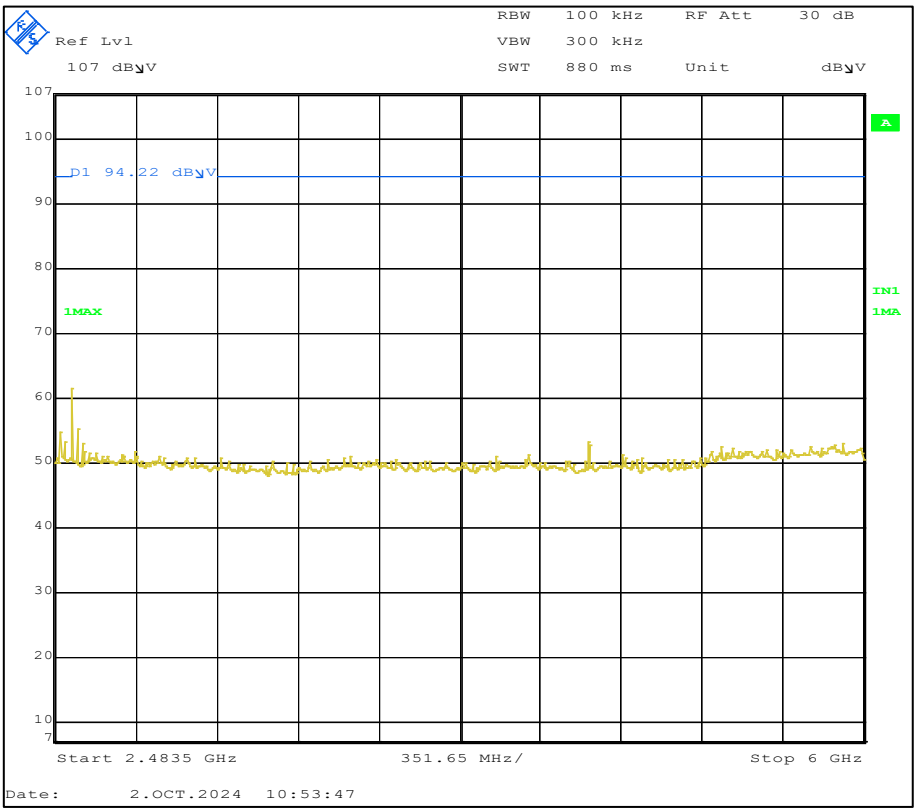

Figure 60. Conducted spurious emission, 2.4835 – 6 GHz. Low channel.

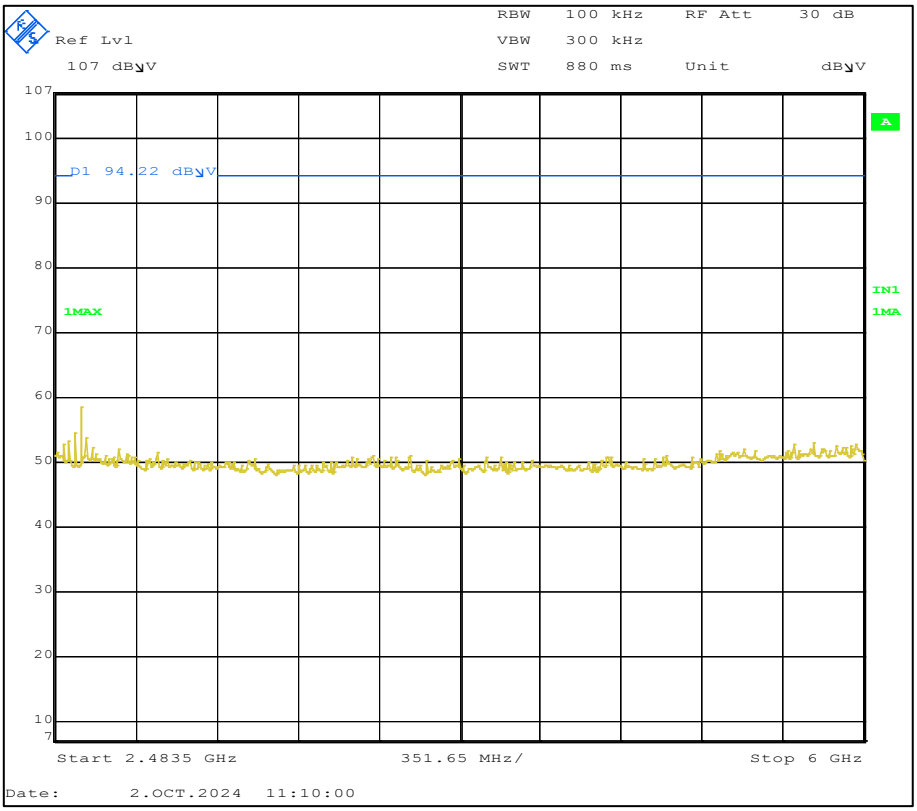

Figure 61. Conducted spurious emission, 2.4835 – 6 GHz. Middle channel.

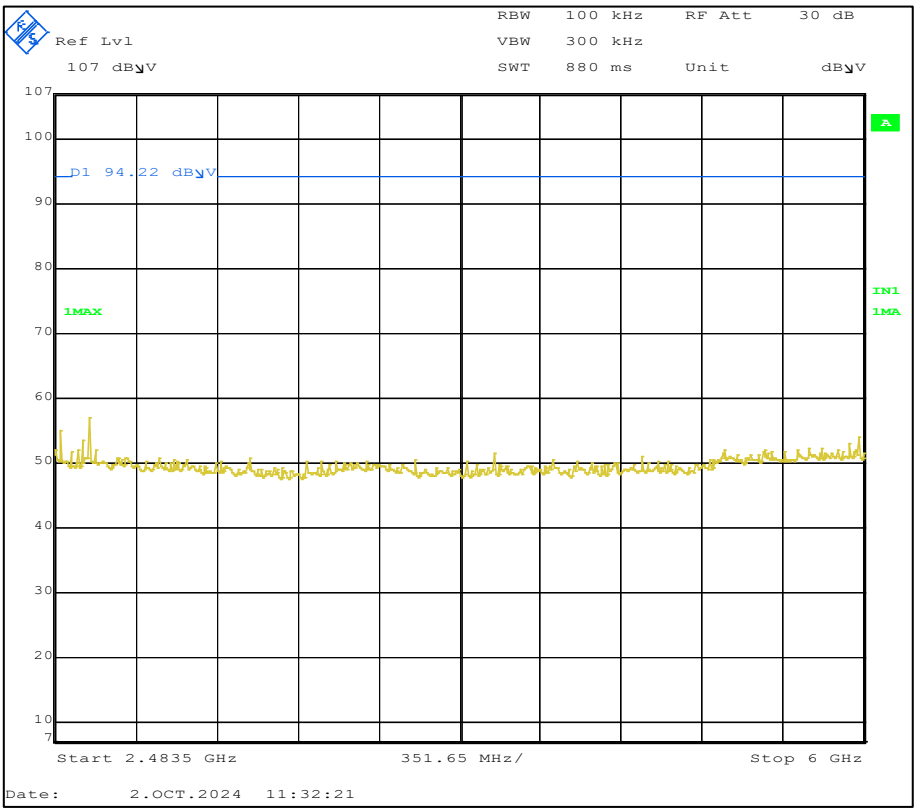

Figure 62. Conducted spurious emission, 2.4835 – 6 GHz. High channel.

2.6.2.13 Blue radio 6 GHz- 9 GHz

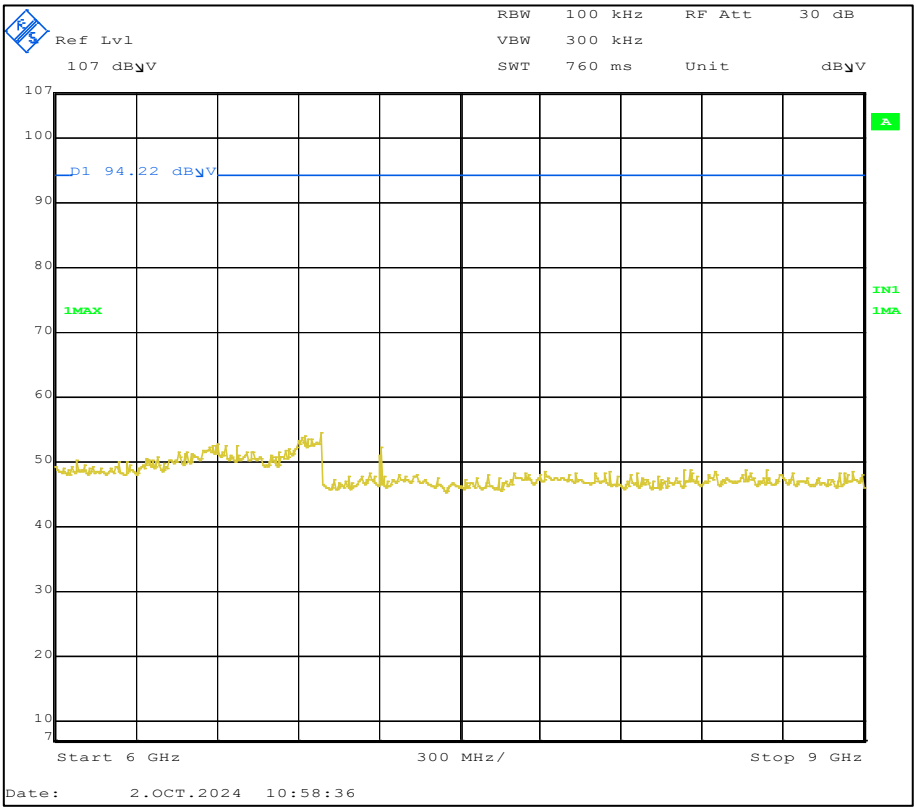

Figure 63. Conducted spurious emission, 6 - 9 GHz. Low channel.

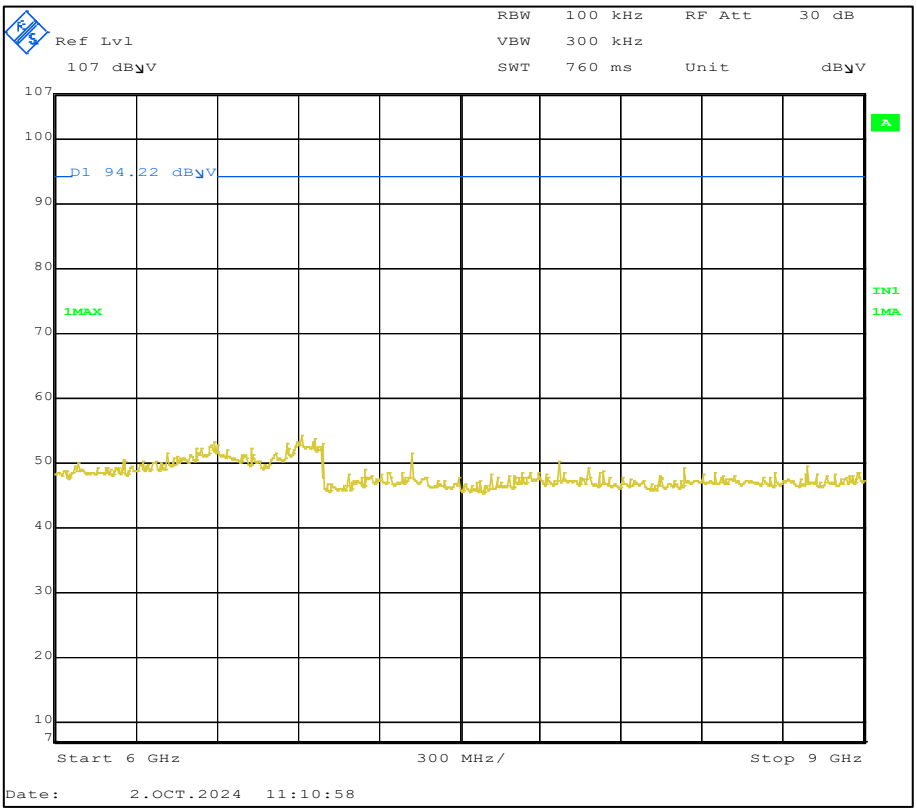

Figure 64. Conducted spurious emission, 6 - 9 GHz. Middle channel.

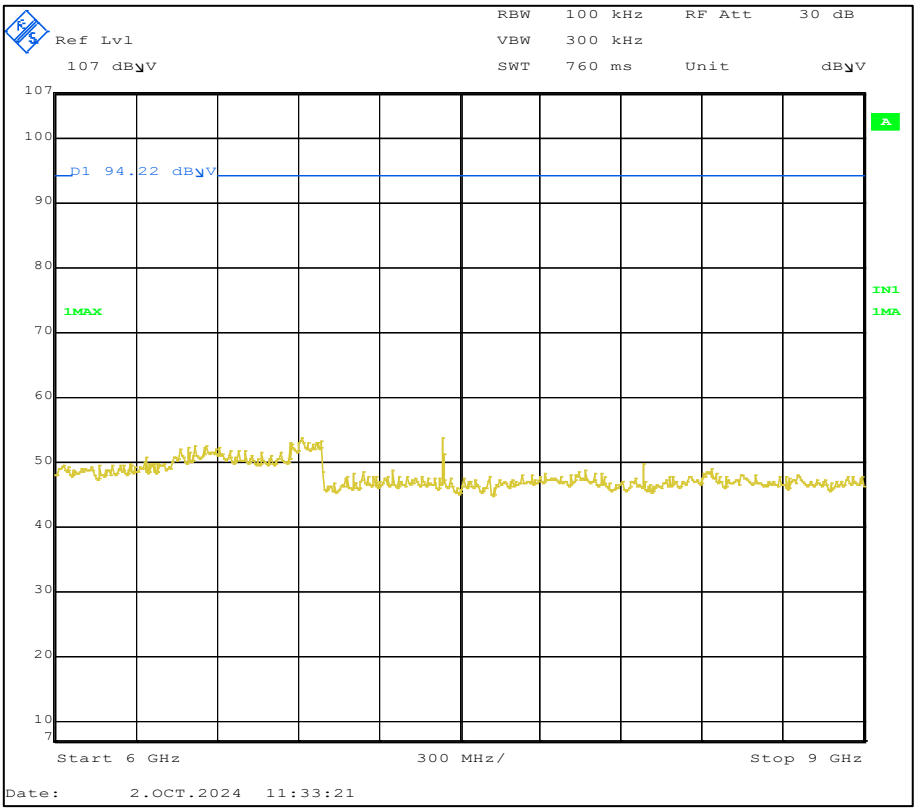

Figure 65. Conducted spurious emission, 6 - 9 GHz. High channel.

2.6.2.14 Blue radio 9 GHz- 12 GHz

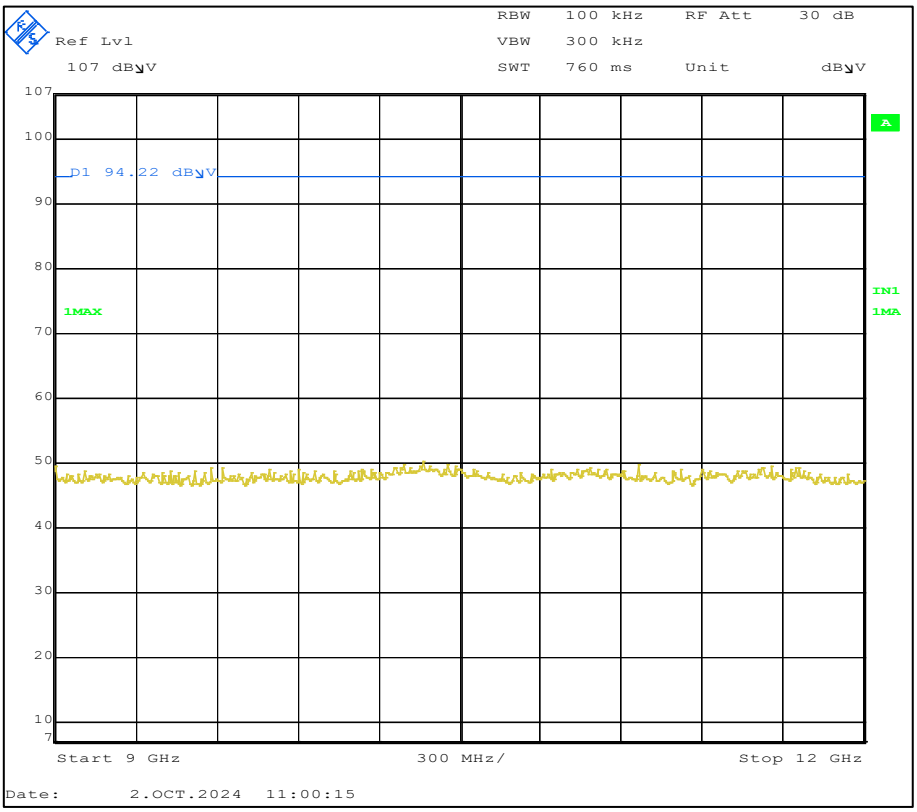

Figure 66. Conducted spurious emission, 9 - 12 GHz. Low channel.

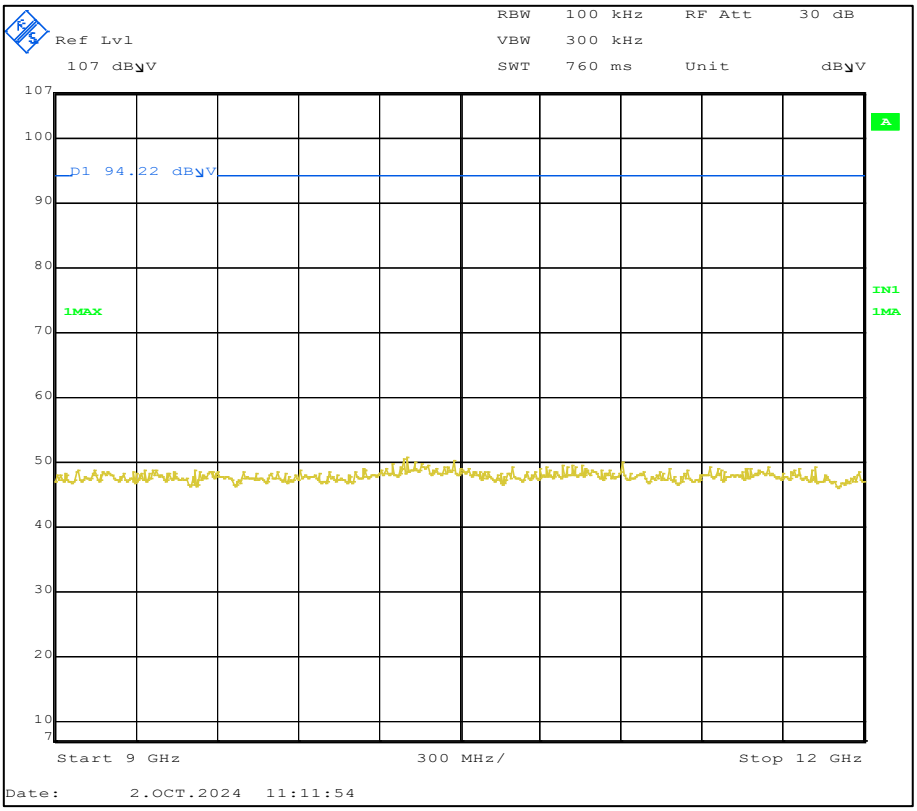

Figure 67. Conducted spurious emission, 9 - 12 GHz. Middle channel.

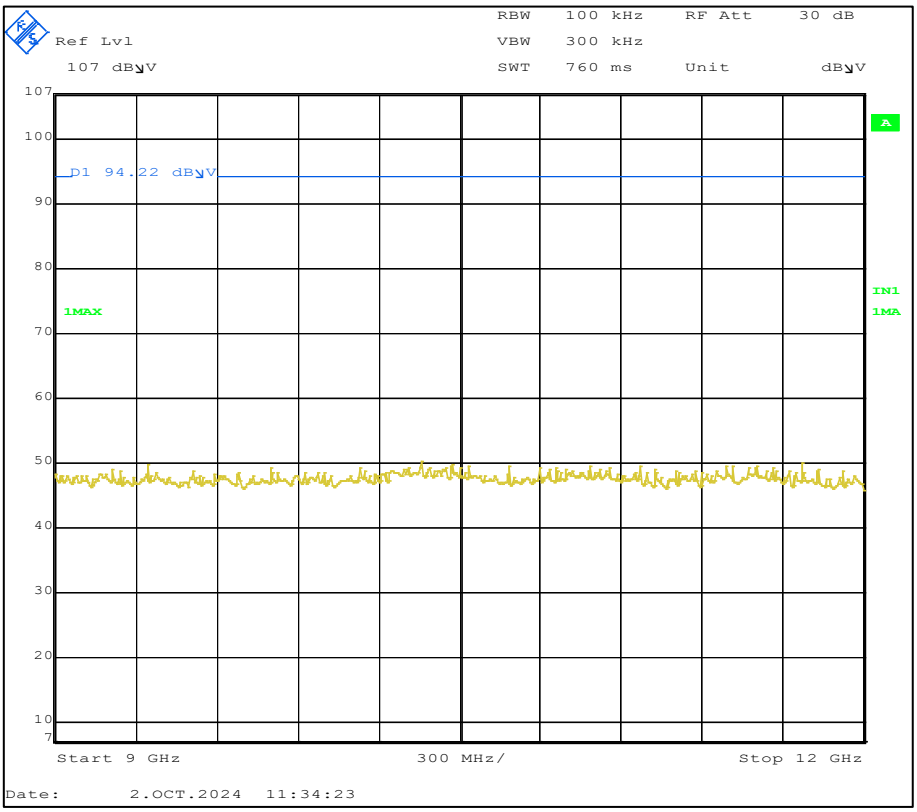

Figure 68. Conducted spurious emission, 9 - 12 GHz. High channel.

2.6.2.15 Blue radio 12 GHz- 15 GHz

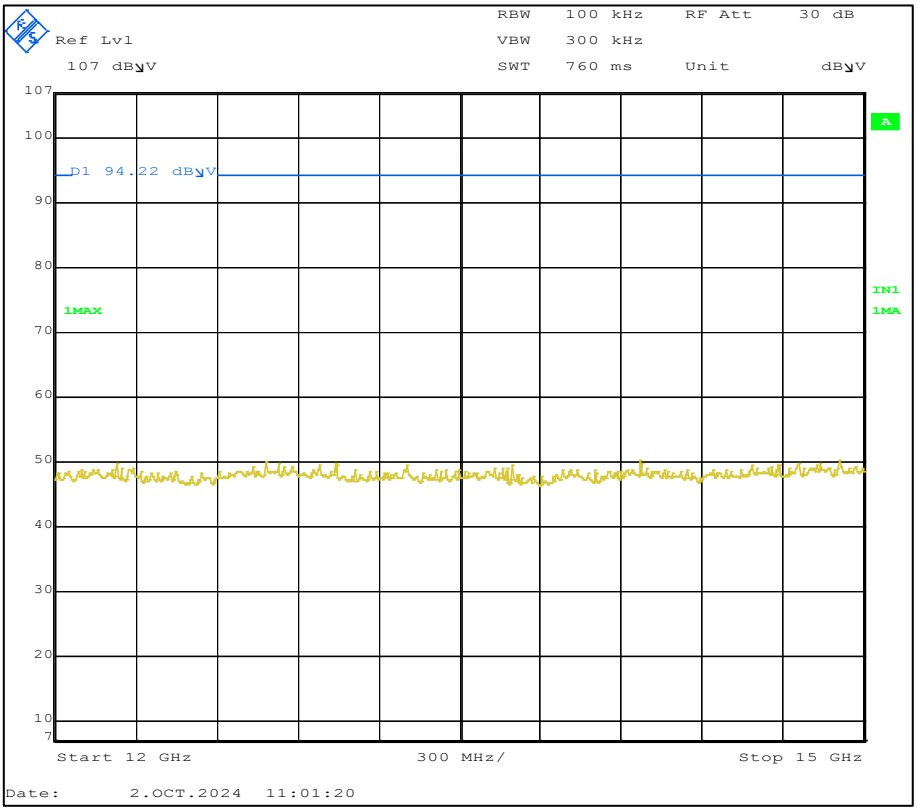

Figure 69. Conducted spurious emission, 12 – 15 GHz. Low channel.

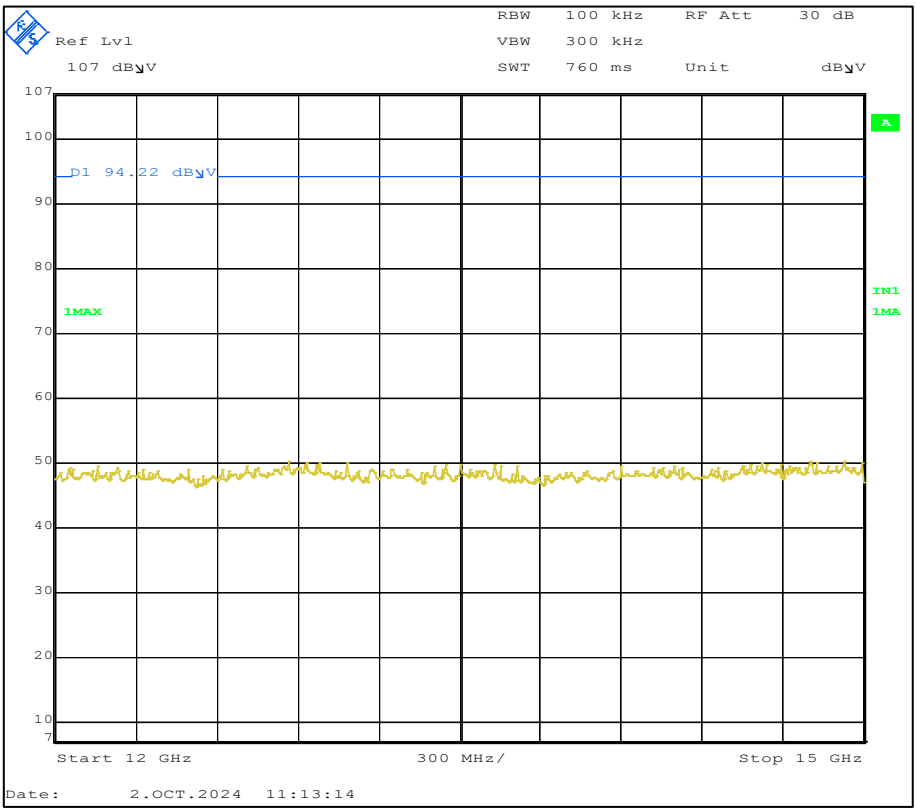

Figure 70. Conducted spurious emission, 12 – 15 GHz. Middle channel.

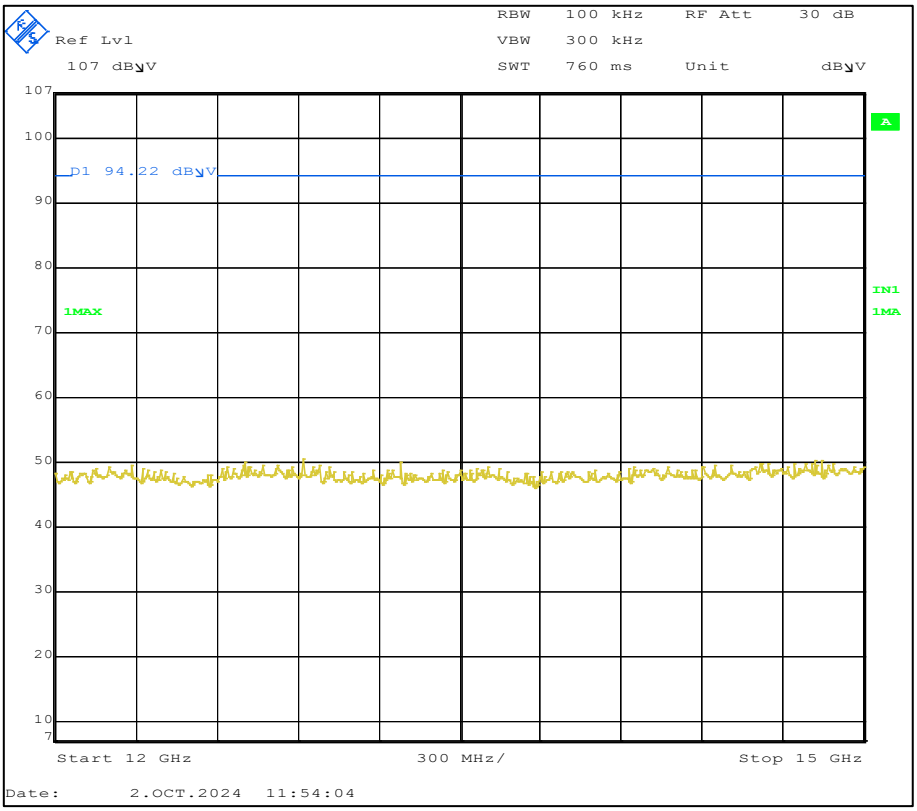

Figure 71. Conducted spurious emission, 12 – 15 GHz. High channel.

2.6.2.16 Blue radio 15 GHz - 18 GHz

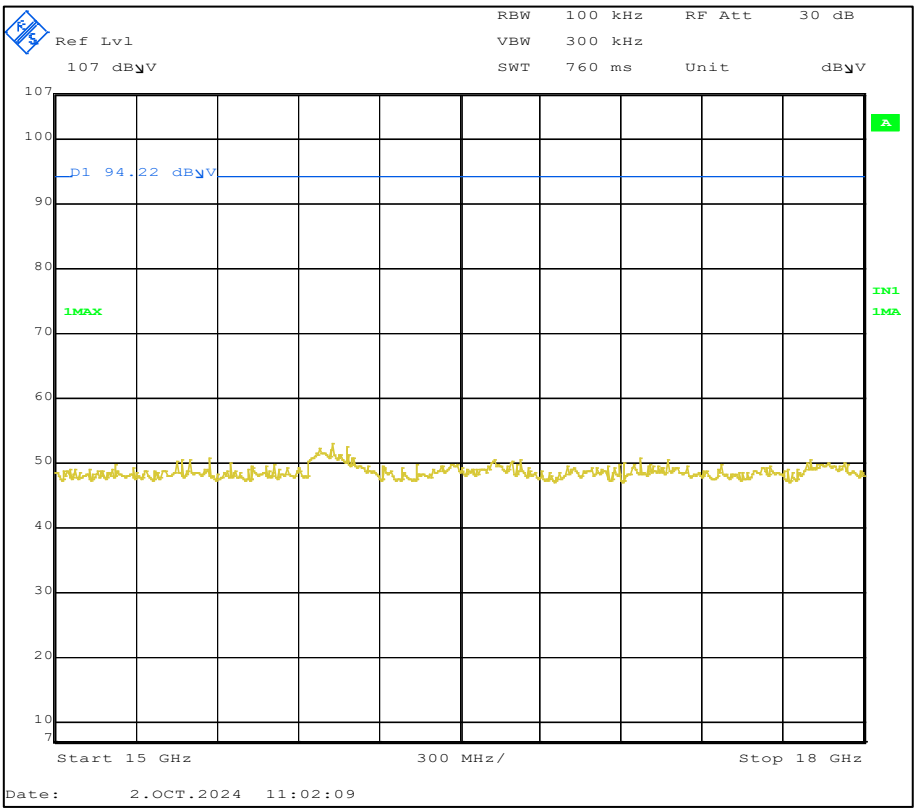

Figure 72. Conducted spurious emission, 15 – 18 GHz. Low channel.

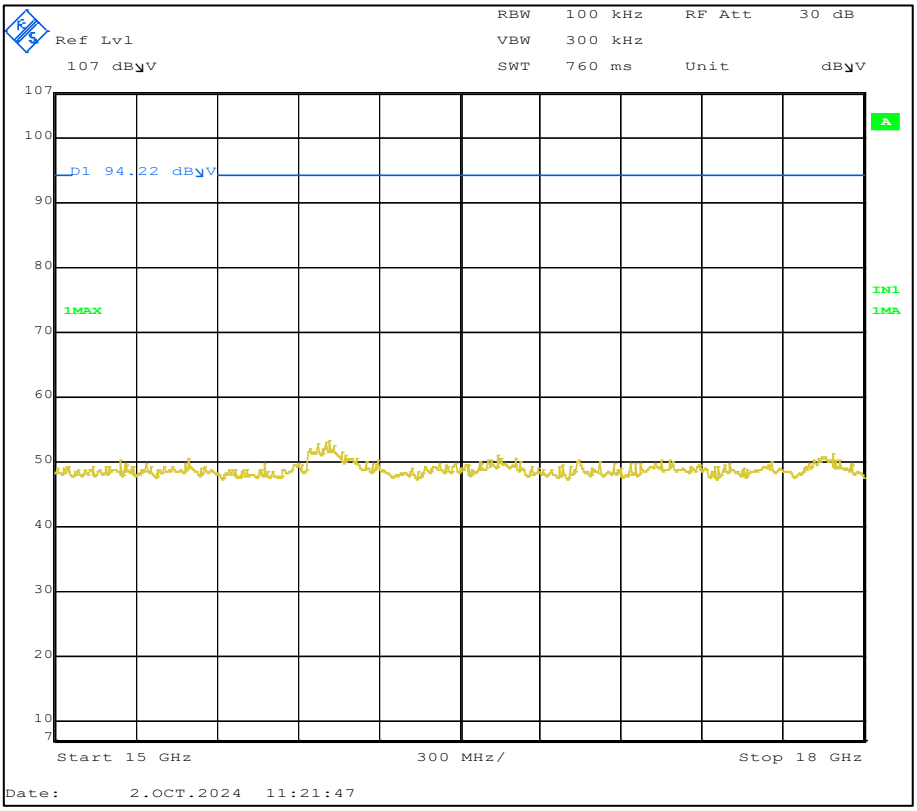

Figure 73. Conducted spurious emission, 15 – 18 GHz. Middle channel.

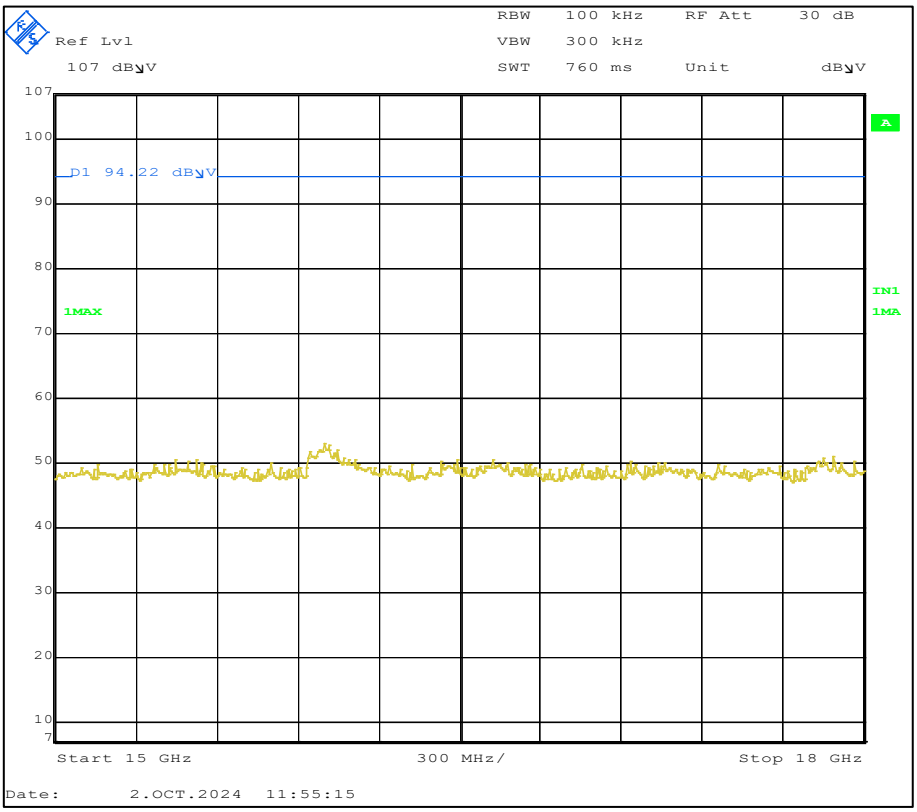

Figure 74. Conducted spurious emission, 15 – 18 GHz. High channel.

2.6.2.17 Blue radio 18 GHz - 21 GHz

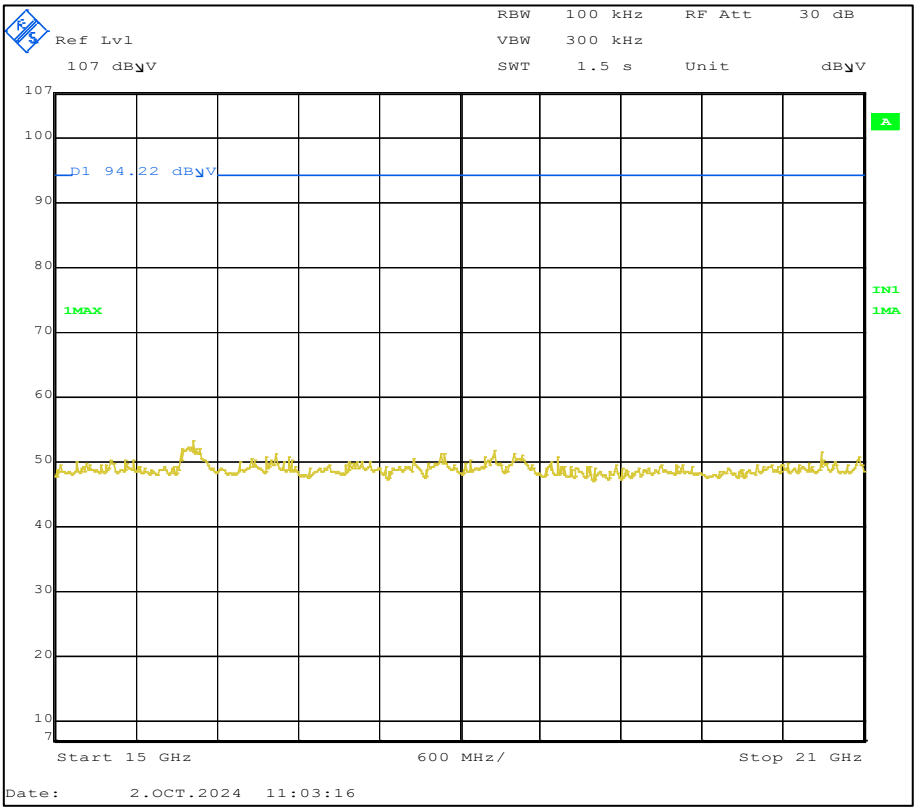

Figure 75. Conducted spurious emission, 18 – 21 GHz. Low channel.

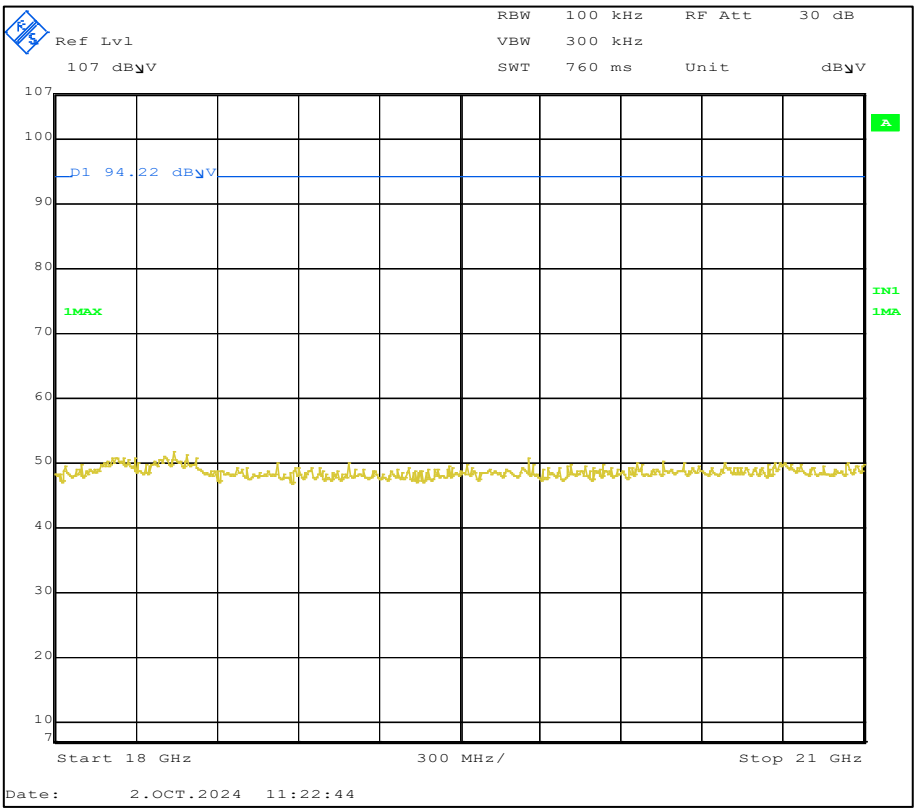

Figure 76. Conducted spurious emission, 18– 21 GHz. Middle channel.

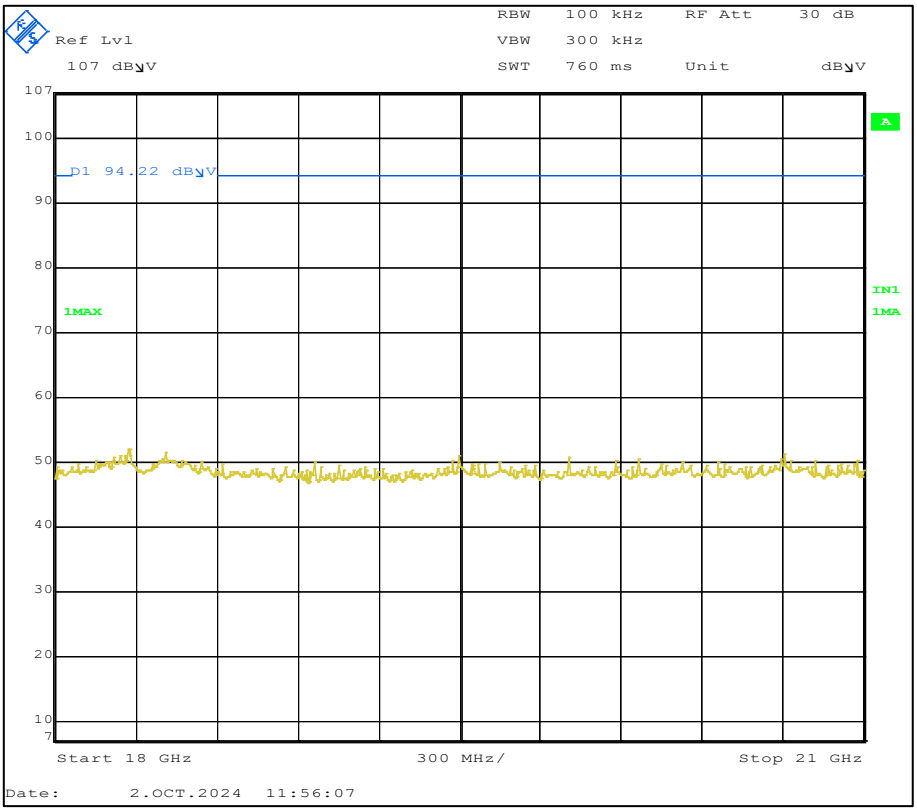

Figure 77. Conducted spurious emission, 18 – 21 GHz. High channel.

2.6.2.18 Blue radio 21 GHz- 25 GHz

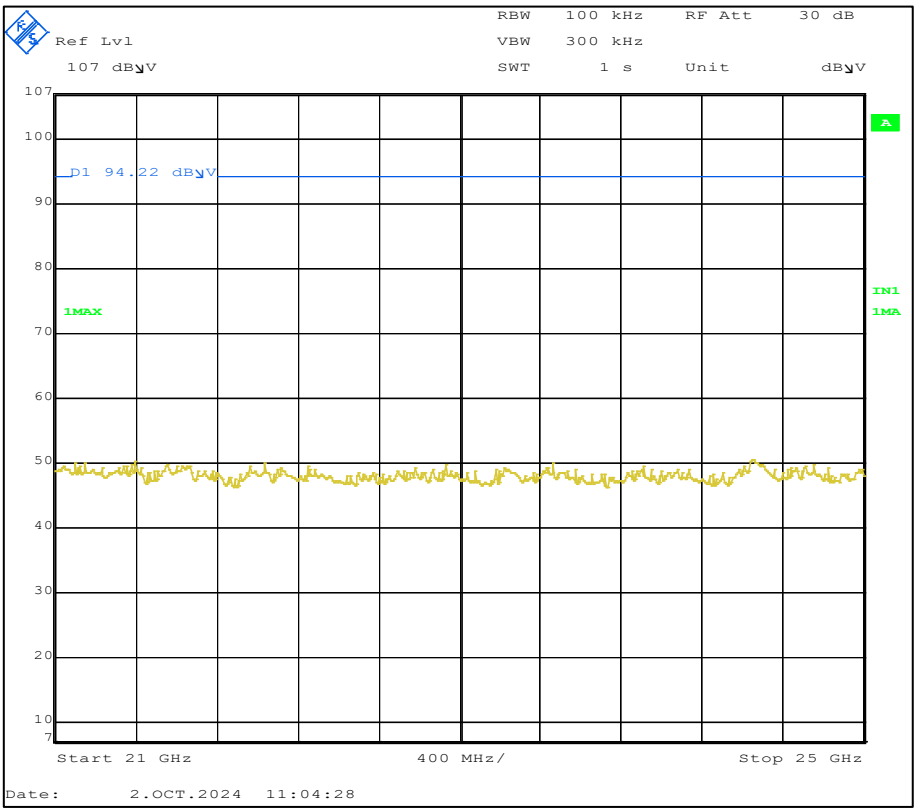

Figure 78. Conducted spurious emission, 21 – 25 GHz. Low channel.

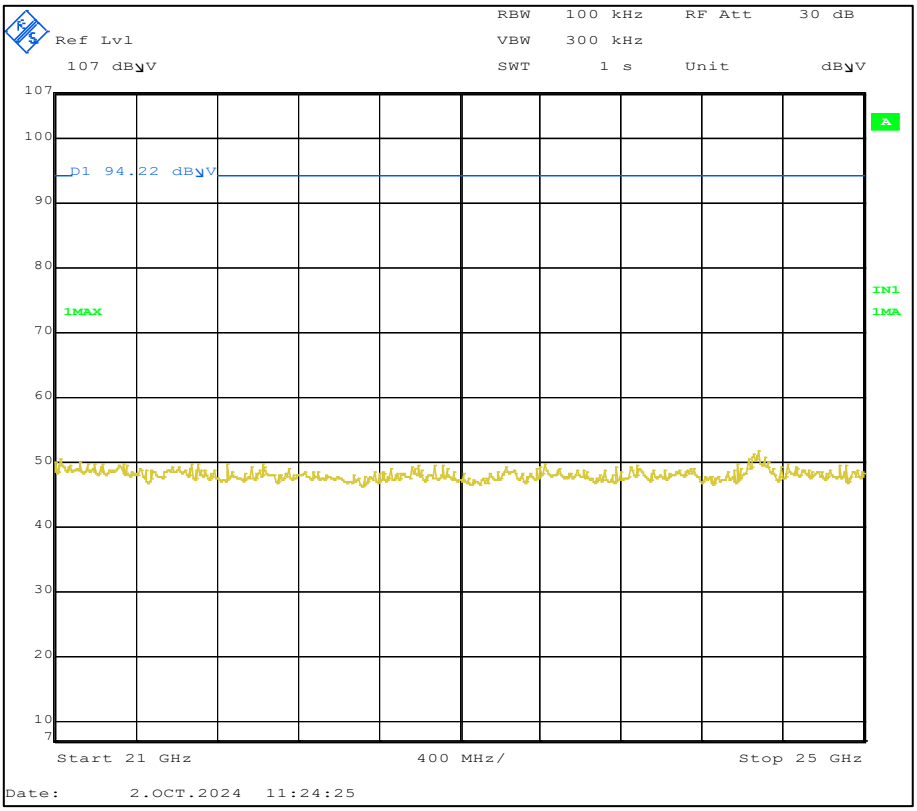

Figure 79. Conducted spurious emission, 21 – 25 GHz. Middle channel.

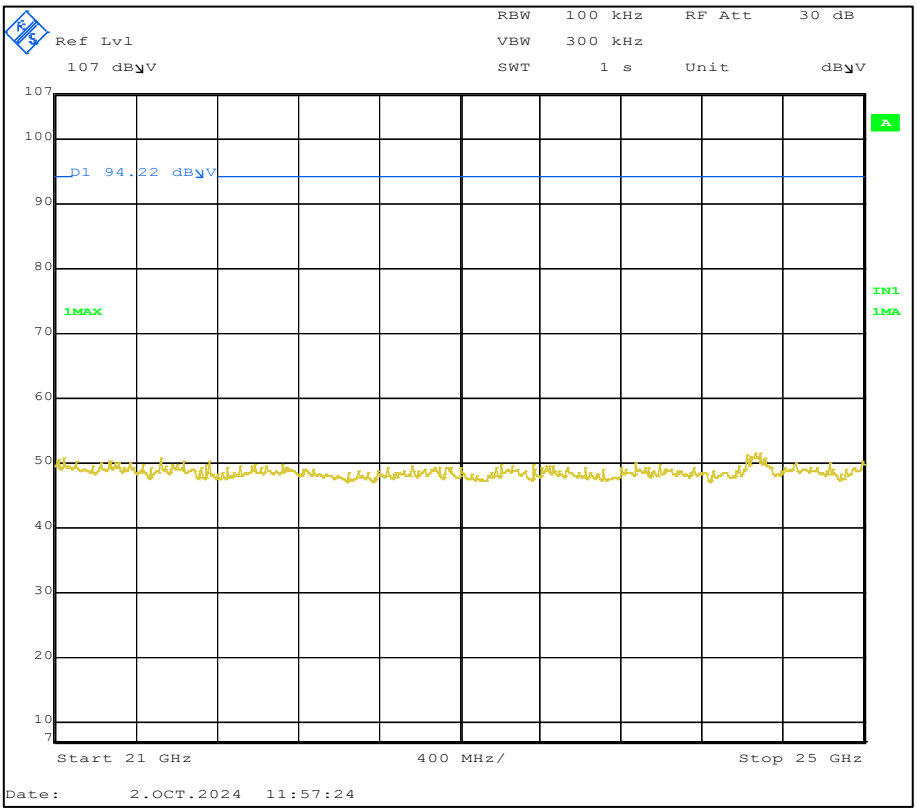

Figure 80. Conducted spurious emission, 21 – 25 GHz. High channel.

Frequency range	Low	Middle	High	Low	Middle	High	Limit	Result
[GHz]	Peak [dBµV]	Peak [dBµV]	Peak [dBµV]	Margin [dB]	Margin [dB]	Margin [dB]	[dBµV]	
0.03 – 2.4	57	58	58	37.22	36.22	36.22	94.22	PASSED
2.4835 - 6	62	59	58	32.22	35.22	36.22	94.22	PASSED
6 - 9	55	54	54	39.22	40.22	40.22	94.22	PASSED
9 - 12	51	51	50	43.22	43.22	44.22	94.22	PASSED
12 – 15	50	50	51	44.22	44.22	43.22	94.22	PASSED
15 - 18	54	54	54	40.22	40.22	40.22	94.22	PASSED
18 - 21	54	52	52	40.22	42.22	42.22	94.22	PASSED
21 - 25	51	52	52	43.22	42.22	42.22	94.22	PASSED

Table 12. Conducted spurious emission. Blue radio. Final test result.

2.6.3 Test equipment

Description	Supplier	Model	Tag no.	Cal. due date
EMI Test Receiver 20Hz-26.5GHz	Rohde & Schwarz	ESI26	30120763	2025-05-14

Table 13. Radiated emission test equipment.

2.7 Conducted band edge

Test specimen	2000-1 W-REM Probe
Test specification	KDB 558074 D01 15.247 Meas. Guidance v05.02
Test method	ANSI C63.10:2013 sec 7.8.6
Frequency band	2400 – 2483.5 MHz
Limits	FCC 47 CFR Part 15.209 (a)
Comments	-
Temperature / Humidity	23°C / 44%RH, 23°C / 35%RH
Dates of measurements	2024-11-12, 2024-11-21
Test personnel	Søren Søltoft

2.7.1 Test setup

The temporary antenna connector of the test specimen was connected directly to the Test receiver.

The test were performed with the test specimen radios at a single frequency and hopping disabled.

The test were performed at Low, and High channel on both Red and Blue radio.
The test were performed in hopping mode and on a single frequency.
Low: 2402 MHz
High: 2480 MHz

See photo of test set up in appendix 1.

2.7.2 Test results

2.7.2.1 Red radio

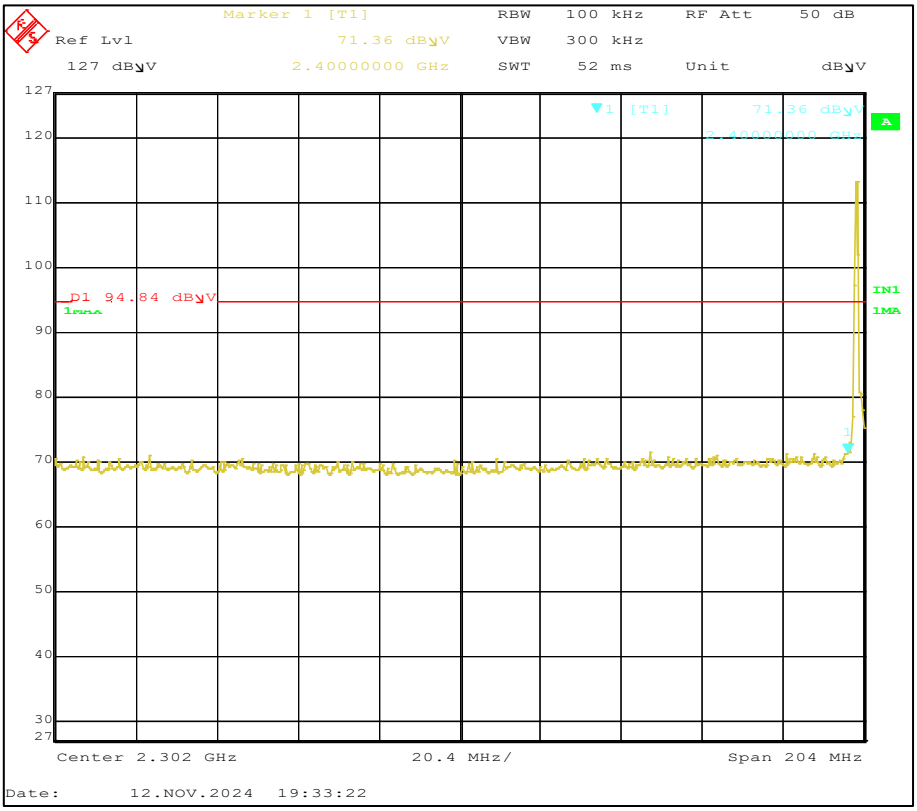

Figure 81. Conducted emission, Low Band Edge, Single frequency 2402 MHz.

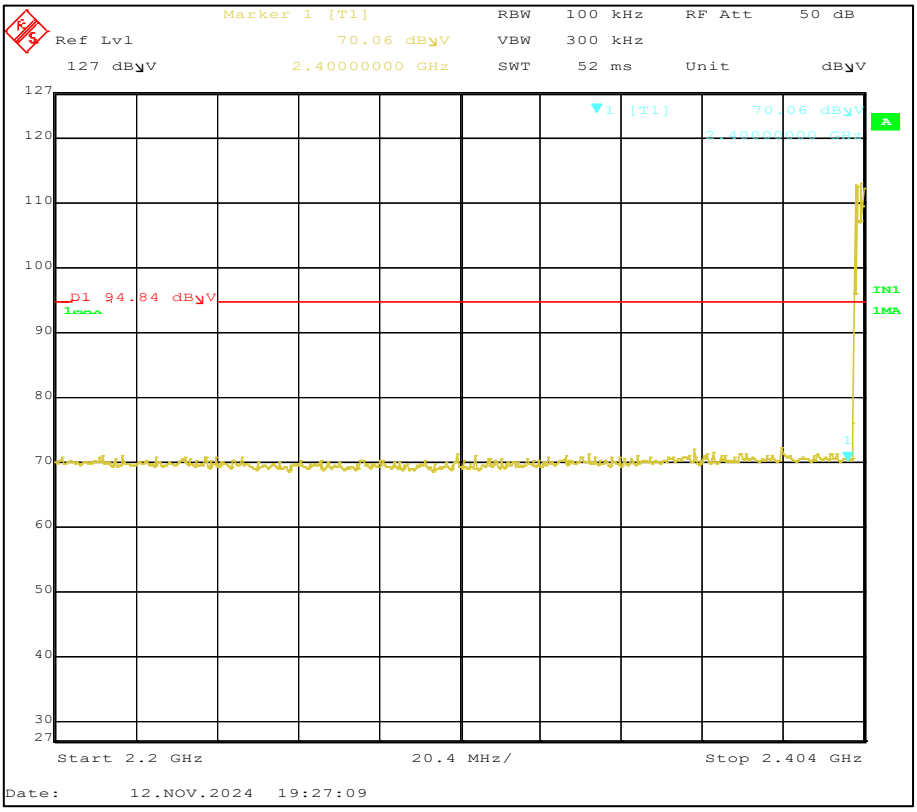

Figure 82. Conducted emission, Low Band Edge, Hopping frequencies.

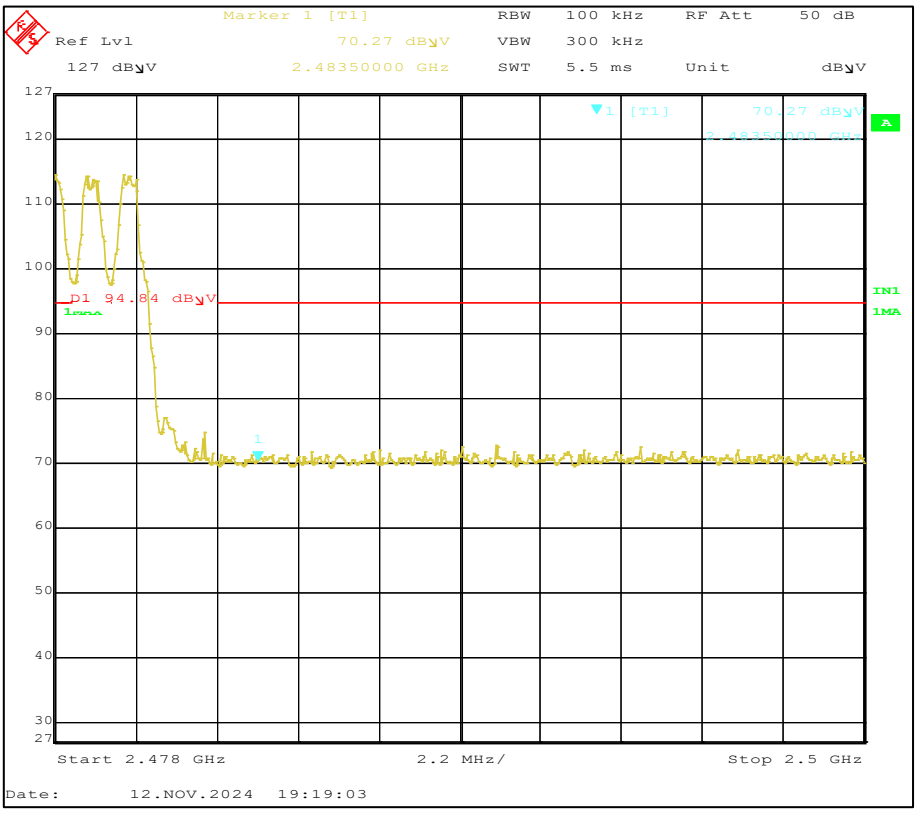

Figure 83. Conducted emission, High Band Edge, Hopping frequencies.

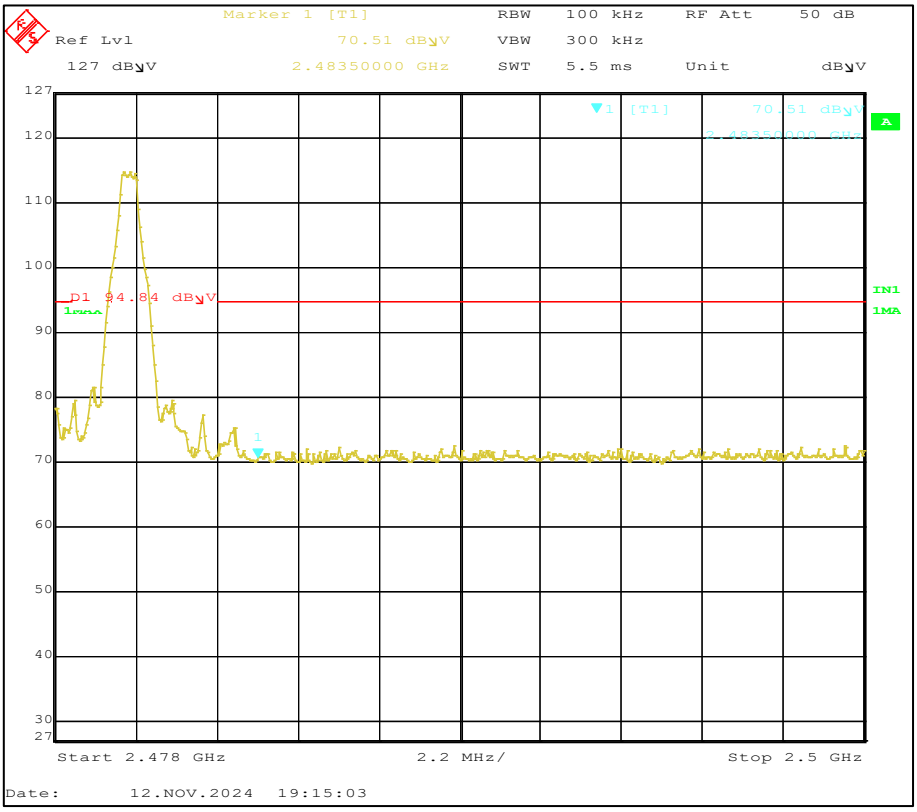

Figure 84. Conducted emission, High Band Edge, Single frequency 2480 MHz.

Frequency range	Hopping	Single	Hopping	Single	Limit	Result
[GHz]	Peak [dBµV]	Peak [dBµV]	Margin [dB]	Margin [dB]	[dBµV]	
< 2.4	72.5	71.4	22.34	23.44	94.84	PASSED
> 2.4835	72.5	73.0	22.34	21.84	94.84	PASSED

Table 14. Conducted band edge. Red radio. Final test result.

2.7.2.2 Blue radio

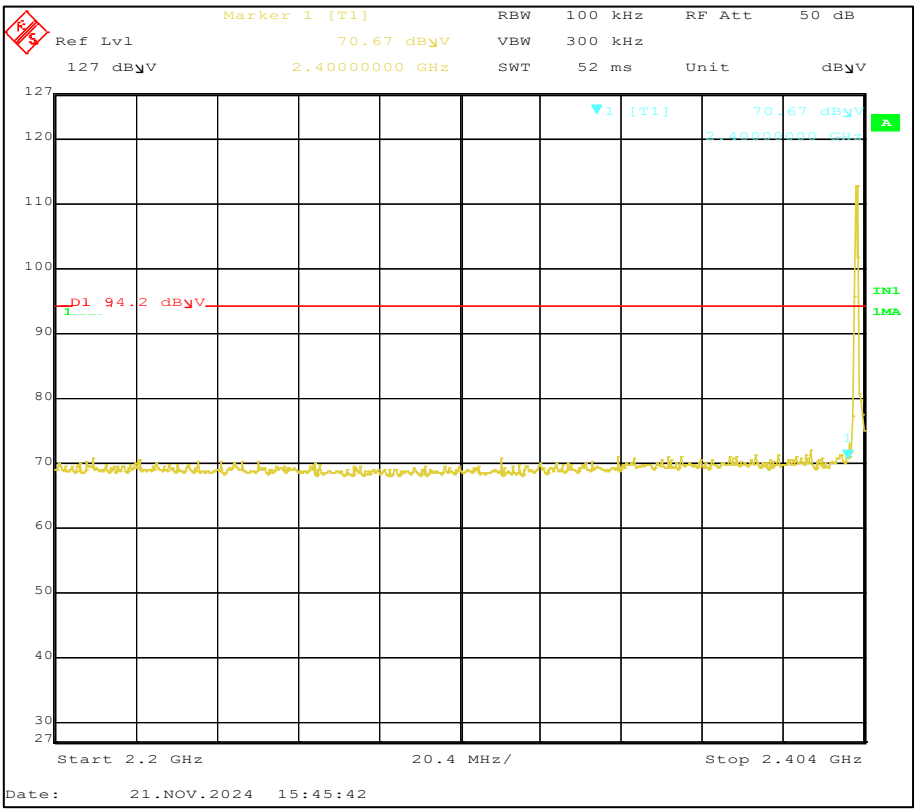

Figure 85. Conducted band edge. Low Band Edge. Single frequency 2402 MHz.

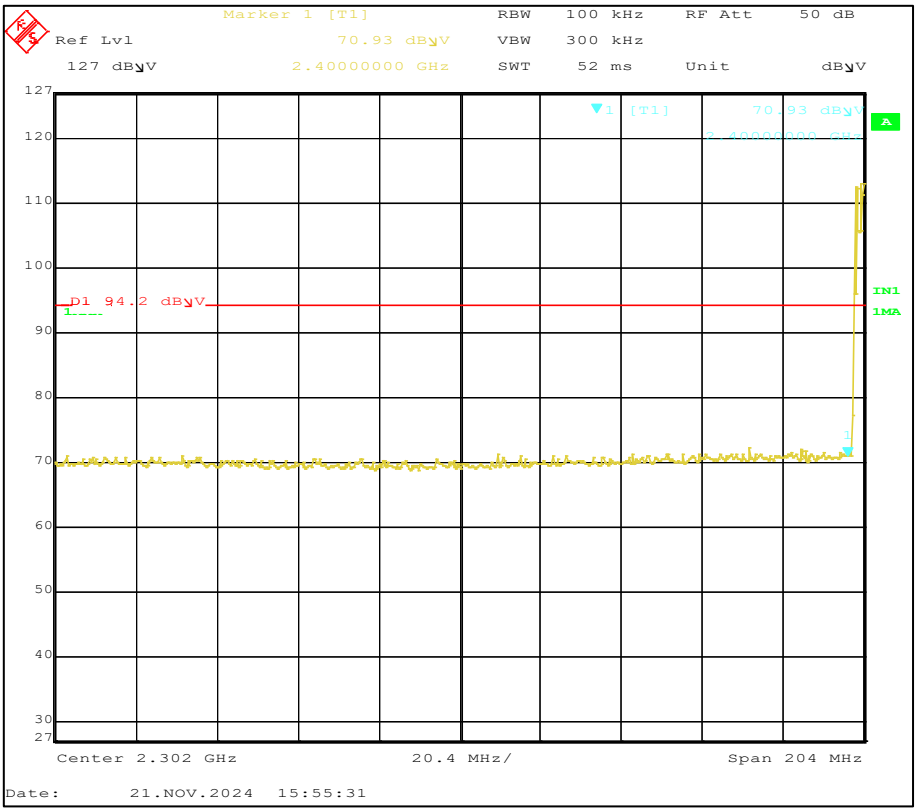

Figure 86. Conducted band edge. Low Band Edge. Hopping frequencies.

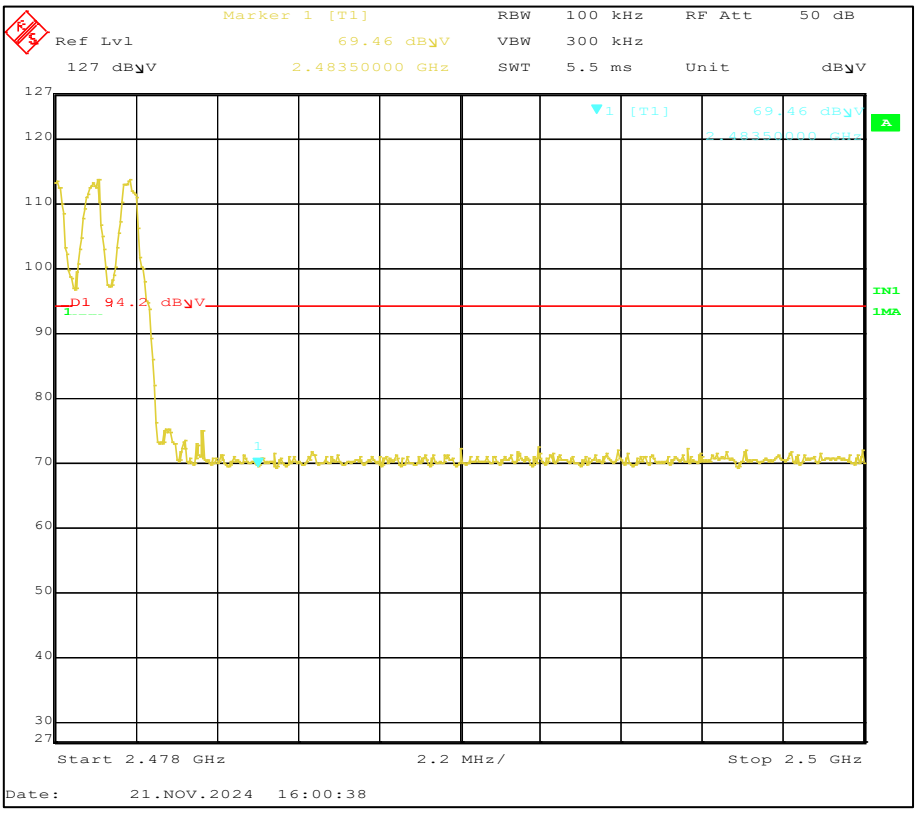

Figure 87. Conducted band edge. High Band Edge. Hopping frequencies.

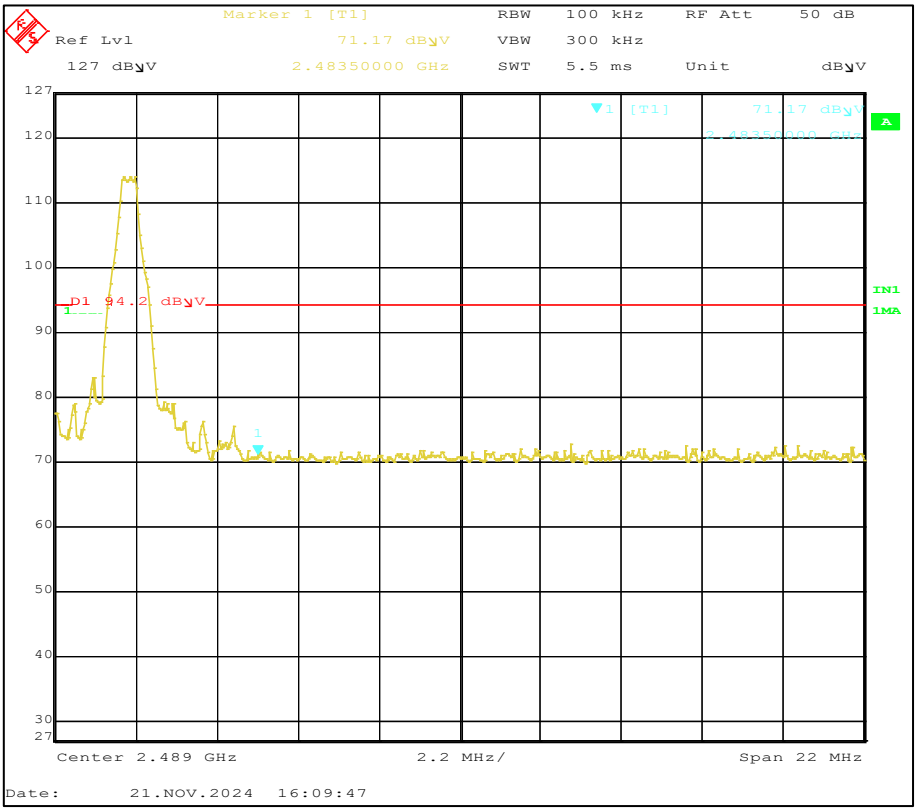

Figure 88. Conducted band edge. High Band Edge. Single frequency 2480 MHz.

Frequency range	Hopping	Single	Hopping	Single	Limit	Result
[GHz]	Peak [dBµV]	Peak [dBµV]	Margin [dB]	Margin [dB]	[dBµV]	
< 2.4	73	73	21.2	21.2	94.2	PASSED
> 2.4835	73	74	21.2	20.2	94.2	PASSED

Table 15. Conducted band edge. Blue radio. Final test result.

2.7.3 Test equipment

Description	Supplier	Model	Tag no.	Cal. due date
EMI Test Receiver 20Hz-26.5GHz	Rohde & Schwarz	ESIB26	30118880	2025-01-25

Table 16. Radiated emission test equipment.

2.8 Restricted-band band-edge.

Test specimen	2000-1 W-REM Probe
Test specification	KDB 558074 D01 15.247 Meas. Guidance v05.02
Test method	ANSI C63.10:2013 sec 6.10.5
Limits	FCC 47 CFR Part 15.209 (a) RSS Gen 8.9
Comments	-
Temperature / Humidity	23°C / 45%RH
Dates of measurements	2024-11-08
Test personnel	Søren Søltoft

2.8.1 Test setup

The test specimen will in normal use only be used I vertical orientation, thus the measurements were only performed with test specimen in vertical orientation.
The measurement was performed in a Semi Anechoic Chamber.

Above 1 GHz measurements were made with absorbers on the floor, the test specimen was placed 1.5 m above ground plane on a nonconductive table.

A measuring distance of 3 m was used in frequency range 30 MHz to 13 GHz.

In the range 1 to 3 GHz a 1 GHz high pass and a 10 dB attenuator was applied at the antenna

Exploratory radiated emission measurements in the frequency range 1-6 GHz with absorbers on the floor were made by rotating the turntable between 0-360° and an antenna height of 1.5 m, in both horizontal and vertical antenna polarization.
Based on the preliminary measurements the frequencies with the highest emissions are selected for final radiated emission measurements. Final measurements were made by rotating the turntable and changing the height of the antenna to maximize the emission level.

Above 1GHz a RBW of 1 MHz was used.

During the tests the Red and the Blue radio were set to transmit hopping at the same single frequency with modulation simultaneously.

The two selected frequencies were 2402 MHz and 2480 MHz.

See appendix 1 for photo of test setup.

2.8.2 Test results

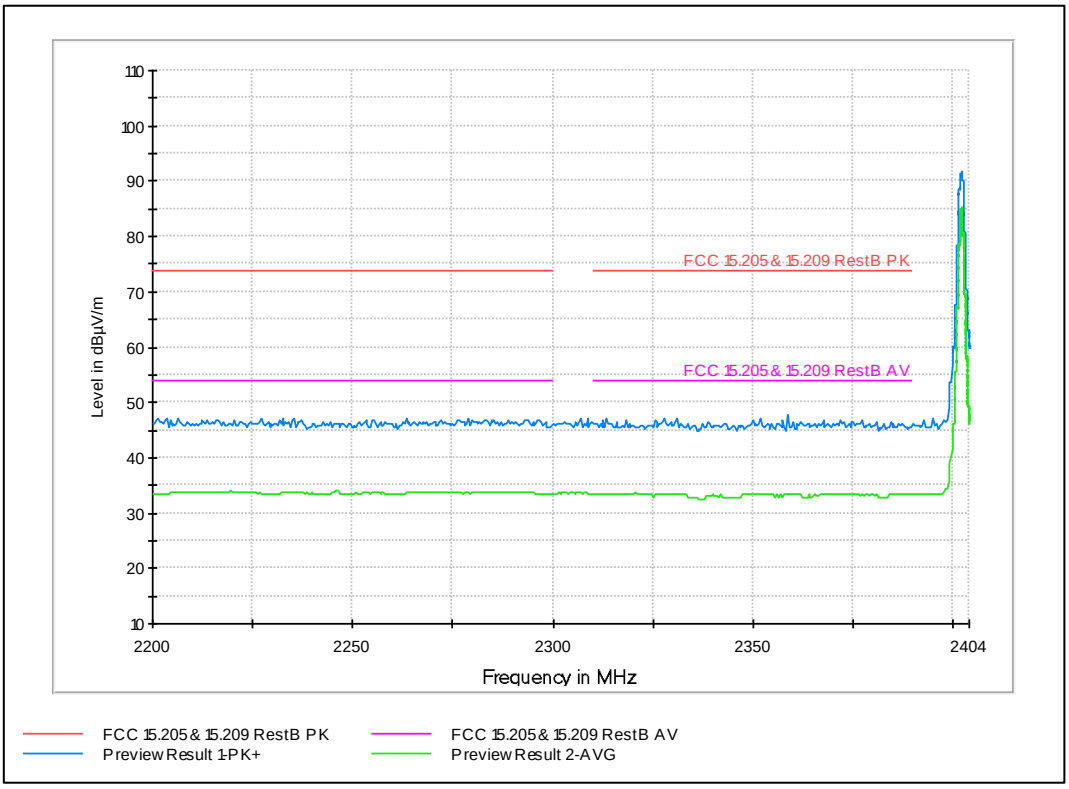

Figure 89. Low Band-edge. Test specimen Vertical -2 X 2402 MHz TX.

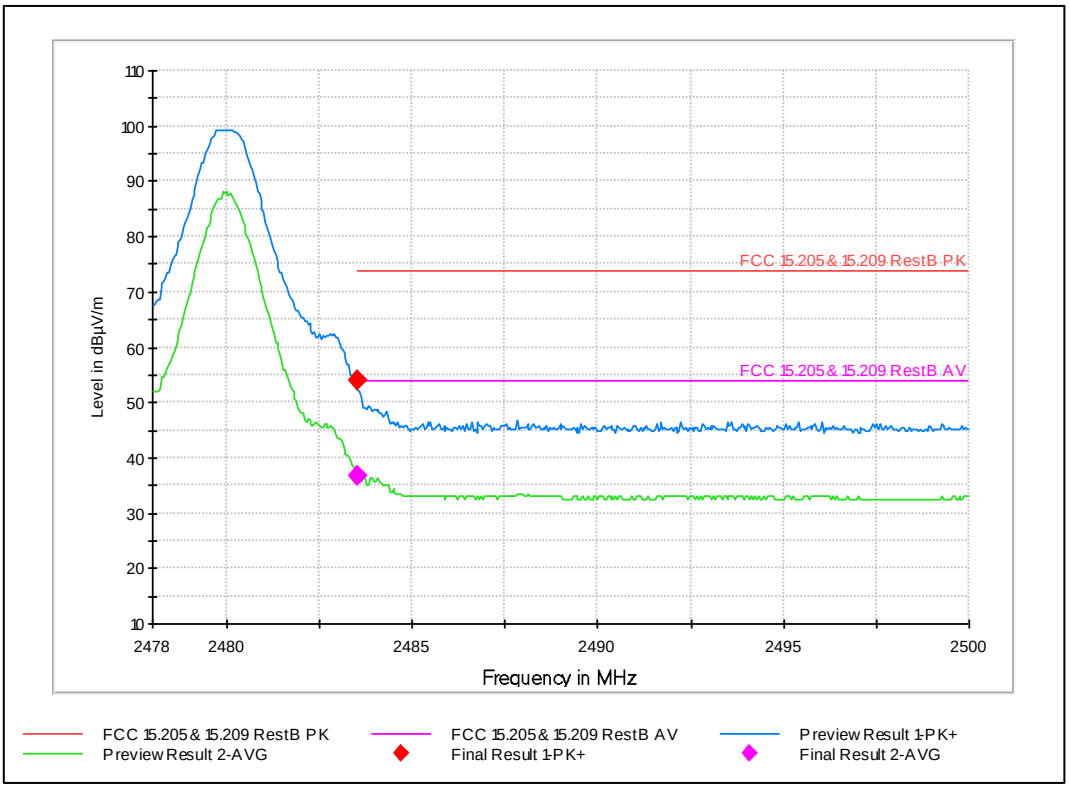

Figure 90. High Band-edge. Test specimen vertical 2 X 2480 MHz TX.

Frequency (MHz)	Peak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)	Result
2483.51102	53.9	1000.000	147.0	H	80.0	20.1	74.0	PASSED

Table 17. High Band-edge. Test specimen vertical 2 X 2480 MHz TX. Peak detector.

Frequency (MHz)	AVG (dBµV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)	Result
2483.51102	36.9	1000.000	147.0	H	80.0	17.1	54.0	PASSED

Table 18. High Band-edge. Test specimen vertical 2 X 2480 MHz TX. Average detector.

2.8.3 Test equipment

Description	Supplier	Model	Tag no.	Cal. due date
LNA amplifier 1 - 26 GHz	Miteq	JS4-01002600-36-5P	30150081	2025-11-08
Antenna Horn 1 – 18 GHz	Schwarzbeck	BBHA 1920D	30120777	2025-03-21
EMI Test Receiver 20Hz-26.5GHz	Rohde & Schwarz	ESIB26	30118880	2025-01-25

Table 19. Radiated emission test equipment.

2.9 Emission in Restricted bands

Test specimen	2000-1 W-REM Probe
Test specification	47 CFR 15.247(d) RSS 247 B.6 (d)
Test method	ANSI C63.10:2020 sec 6.5 and 6.6
Frequency range	30 MHz – 25000 MHz
Limits	FCC 47 CFR Part 15.209 (a) RSS Gen 8.9
Comments	-
Temperature / Humidity	24°C / 47%RH, 23°C / 51%RH, 22°C / 46%RH 22°C / 46%RH
Dates of measurements	2024-09-17, 2024-09-18, 2024-11-05, 2024-11-06
Test personnel	Søren Søltoft

2.9.1 Test setup

The test specimen will in normal use only be used I vertical orientation, thus the measurements were only performed with test specimen in vertical orientation.

Below 1 GHz measurements were made with reflective floor, the test specimen was placed 80 cm above ground plane on a nonconductive table.
Above 1 GHz measurements were made with absorbers on the floor, the test specimen was placed 1.5 m above ground plane on a nonconductive table.

A measuring distance of 3 m was used in frequency range 30 MHz to 13 GHz.
In the range 13 MHz to 18 MHz the distance was 1 m.
Above 18 GHz the distance was 0.5 m.

In the range 30 MHz to 1 GHz no filter was applied
In the range 1 to 3 GHz a 1 GHz high pass and a 10 dB attenuator was applied at the antenna
In the range 3 to 18 GHz a 3 GHz high pass filter was applied at the antenna
Above 18 GHz no filter was applied.

Exploratory radiated emission measurements in the frequency range 30-1000 MHz with reflective floor were made by rotating the turntable between 0-360° and variating the antenna height between 1-4 m, in both horizontal and vertical antenna polarization.
Exploratory radiated emission measurements in the frequency range 1-6 GHz with absorbers on the floor were made by rotating the turntable between 0-360° and an antenna height of 1.5 m, in both horizontal and vertical antenna polarization.
Based on the preliminary measurements the frequencies with the highest emissions are selected for final radiated emission measurements. Final measurements were made by rotating the turntable and changing the height of the antenna to maximize the emission level.

In the frequency range 30 MHz to 1 GHz a RBW of 120 kHz was used.
Above 1GHz a RBW of 1 MHz was used.

During the tests the Red and the Blue radio were set to transmit hopping at the same single frequency with modulation simultaneously.

The three selected frequencies were 2402 MHz, 2441 MHz and 2480 MHz.

See appendix 1 for photo of test setup.

2.9.2 Test result

2.9.2.1 Test specimen vertical at 2402 MHz

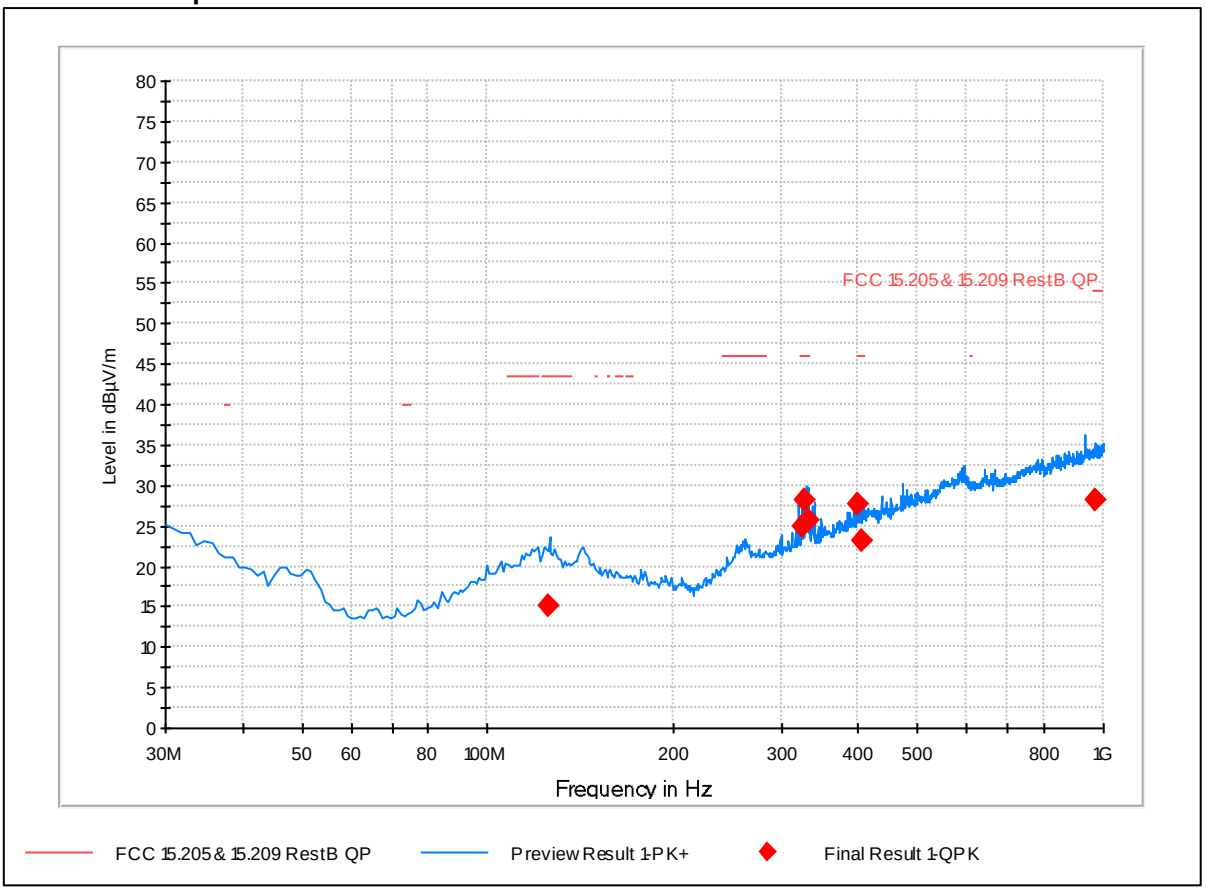

Figure 91. Emission in restricted bands, 30 -1000 MHz.

Frequency [MHz]	QP [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
125.232144	15.1	120	100	V	12.0	28.4	43.5	PASSED
323.987735	24.9	120	100	H	1.0	21.1	46.0	PASSED
328.017154	28.3	120	100	H	0.0	17.7	46.0	PASSED
332.024689	25.6	120	100	H	338.0	20.4	46.0	PASSED
400.000321	27.6	120	100	H	334.0	18.4	46.0	PASSED
404.047856	23.0	120	100	H	337.0	23.0	46.0	PASSED
971.423888	28.1	120	400	H	47.0	25.9	54.0	PASSED

Table 20. Emission in restricted bands results. 30 - 1000 MHz.

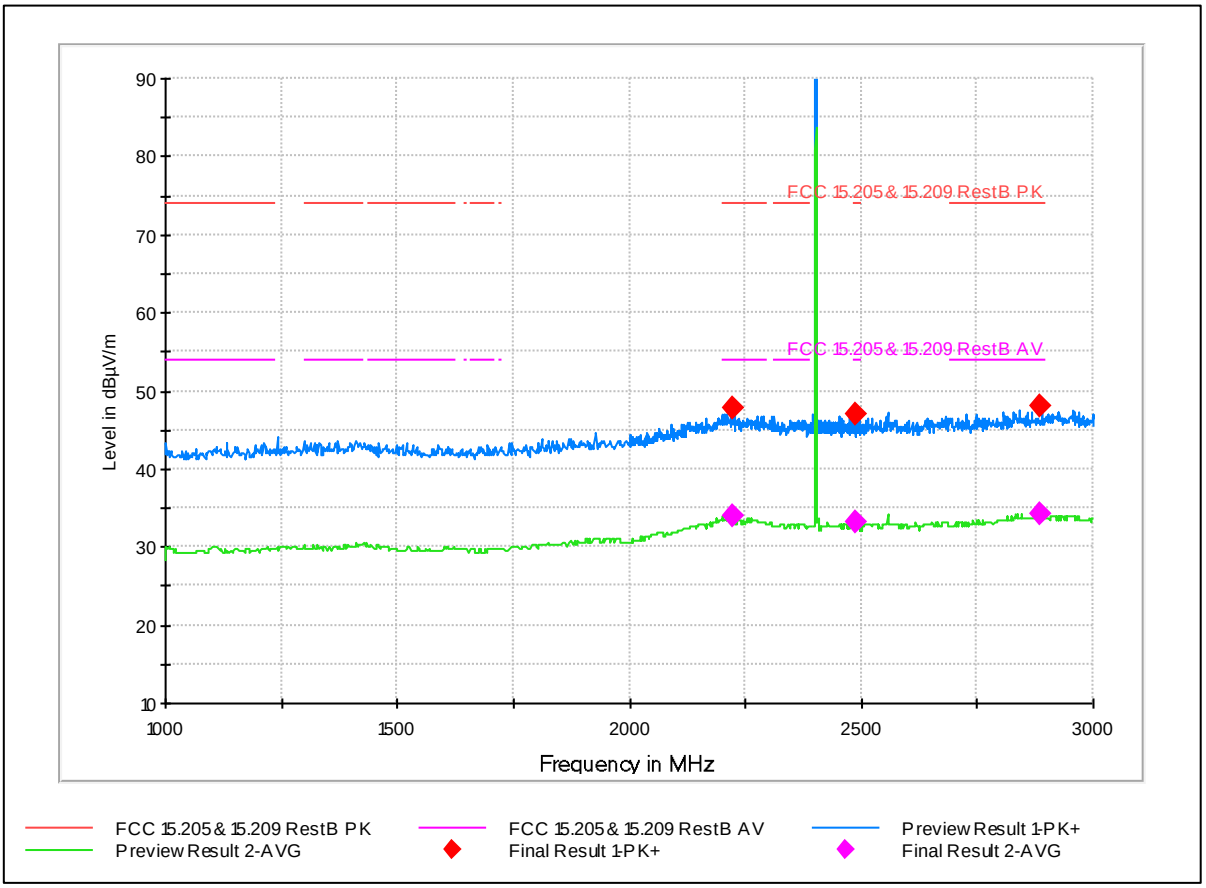

Figure 92. Emission in restricted bands results. 1 - 3 GHz.

Frequency [MHz]	Peak [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
2222.550501	47.7	1000	375.0	V	346.0	26.3	74.0	PASSED
2487.077154	46.9	1000	177.0	V	16.0	27.1	74.0	PASSED
2883.977555	48.1	1000	246.0	V	87.0	25.9	74.0	PASSED

Table 21. Emission in restricted bands Peak results. 1 - 3 GHz.

Frequency [MHz]	AVG [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
2222.550501	34.1	1000	375.0	V	346.0	19.9	54.0	PASSED
2487.077154	33.1	1000	177.0	V	16.0	20.9	54.0	PASSED
2883.977555	34.2	1000	246.0	V	87.0	19.8	54.0	PASSED

Table 22. Emission in restricted bands Average results. 1 - 3 GHz.

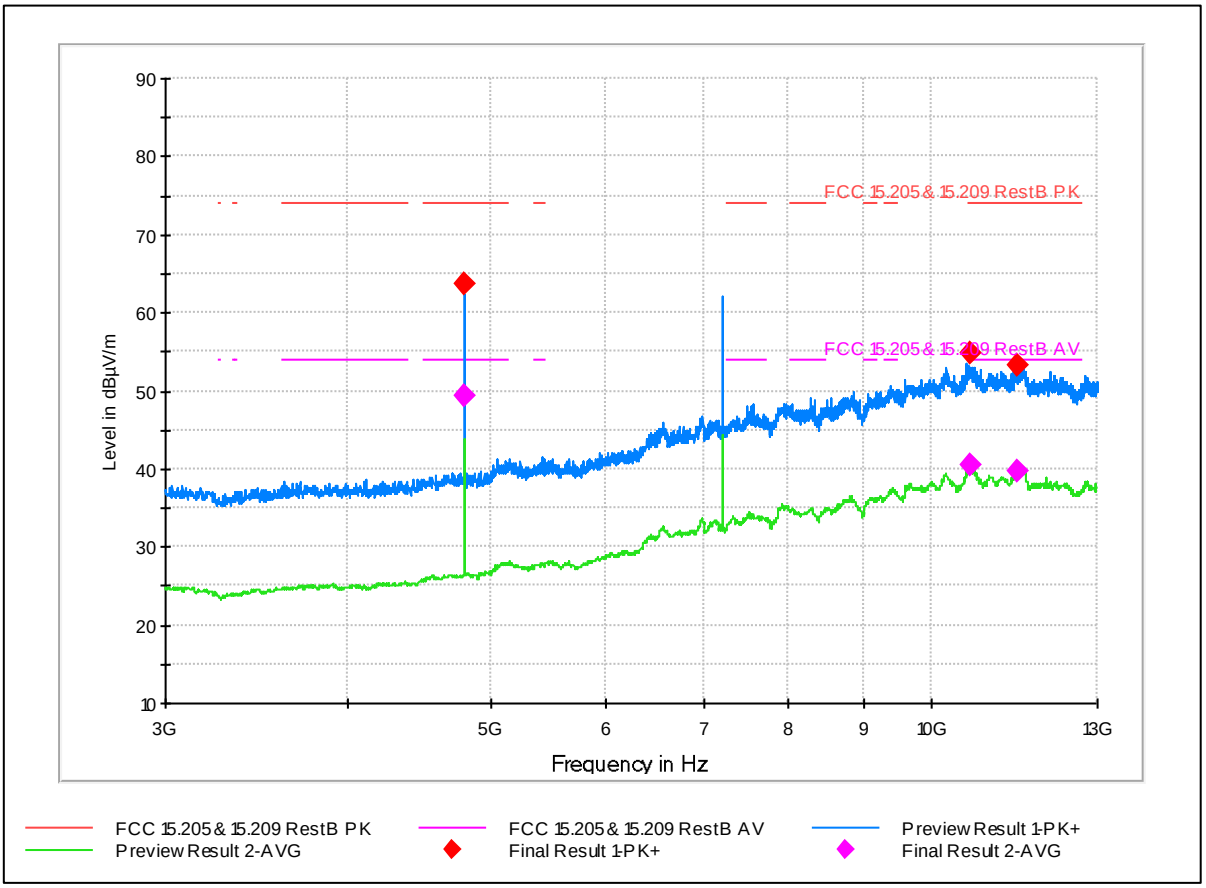

Figure 93. Emission in restricted bands results. 3 - 13 GHz.

Frequency [MHz]	Peak [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
4804.307214	63.8	1000	150.0	H	134.0	10.2	74.0	PASSED
10647.890581	54.8	1000	279.0	V	157.0	19.2	74.0	PASSED
11478.053908	53.4	1000	253.0	V	0.0	20.6	74.0	PASSED

Table 23. Emission in restricted bands Peak results. 3 - 13 GHz.

Frequency [MHz]	AVG [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
4804.307214	49.3	1000	150.0	H	134.0	4.7	54.0	PASSED
10647.890581	40.4	1000	279.0	V	157.0	13.6	54.0	PASSED
11478.053908	39.8	1000	253.0	V	0.0	14.2	54.0	PASSED

Table 24. Emission in restricted bands Average results. 3 - 13 GHz.

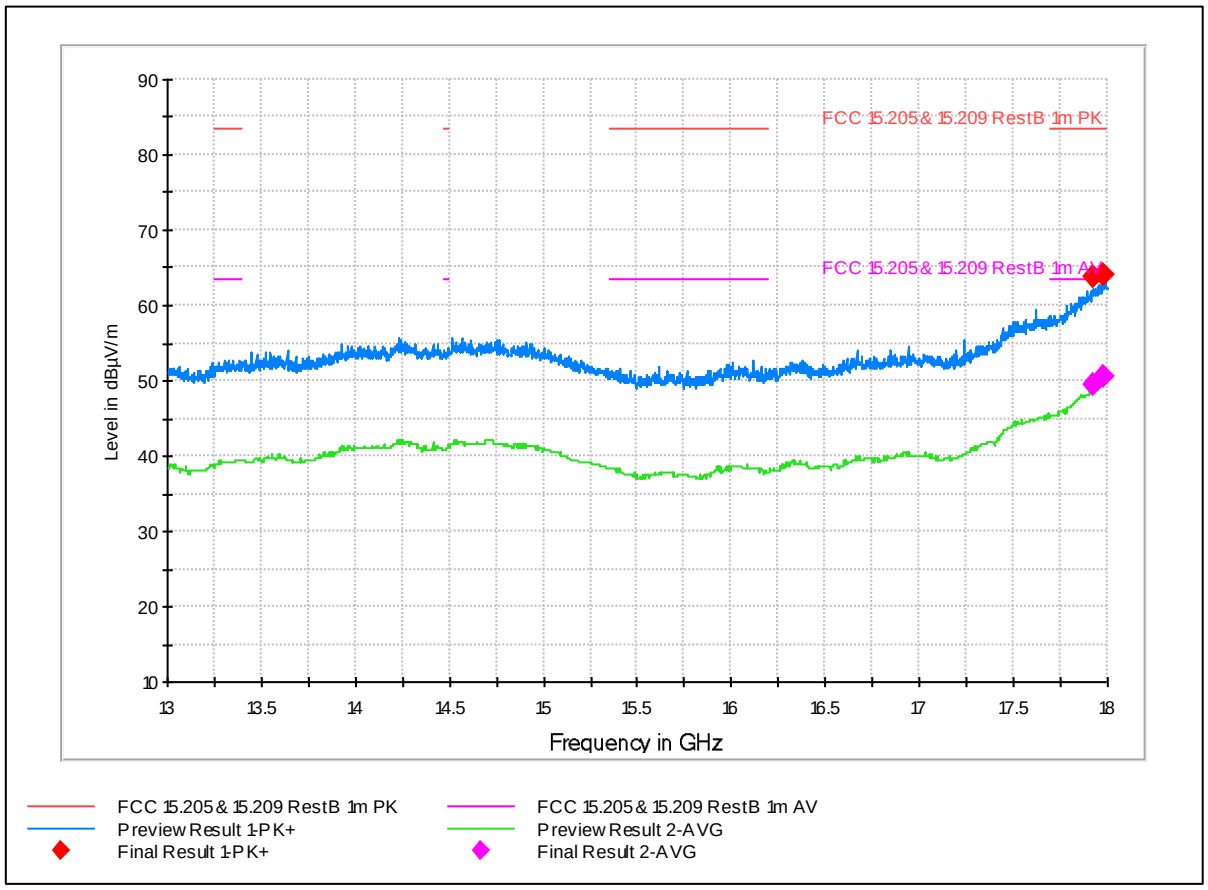

Figure 94. Emission in restricted bands results. 13 - 18 GHz.

Measured at a distance of 1m.

Average Limit at 3 m.	Peak limit At 3 m	3 m / 1 m factor	Average Limit at 1 m.	Peak limit at 1 m
[dBµV/m]	[dBµV/m]	[dB]	[dBµV/m]	[dBµV/m]
53.98	73.98	9.54	63.5	83.5

Table 25. Recalculation of limit to 1m. distance.

Frequency [MHz]	Peak [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
17921.947695	63.8	1000	230.0	V	76.0	19.7	83.5	PASSED
17975.947896	64.1	1000	206.0	H	220.0	19.4	83.5	PASSED

Table 26. Emission in restricted bands Peak results. 13 - 18 GHz.

Frequency [MHz]	AVG [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
17921.947695	49.5	1000	230.0	V	76.0	14.0	63.5	PASSED
17975.947896	50.5	1000	206.0	H	220.0	13.0	63.5	PASSED

Table 27. Emission in restricted bands Average results. 13 - 18 GHz.

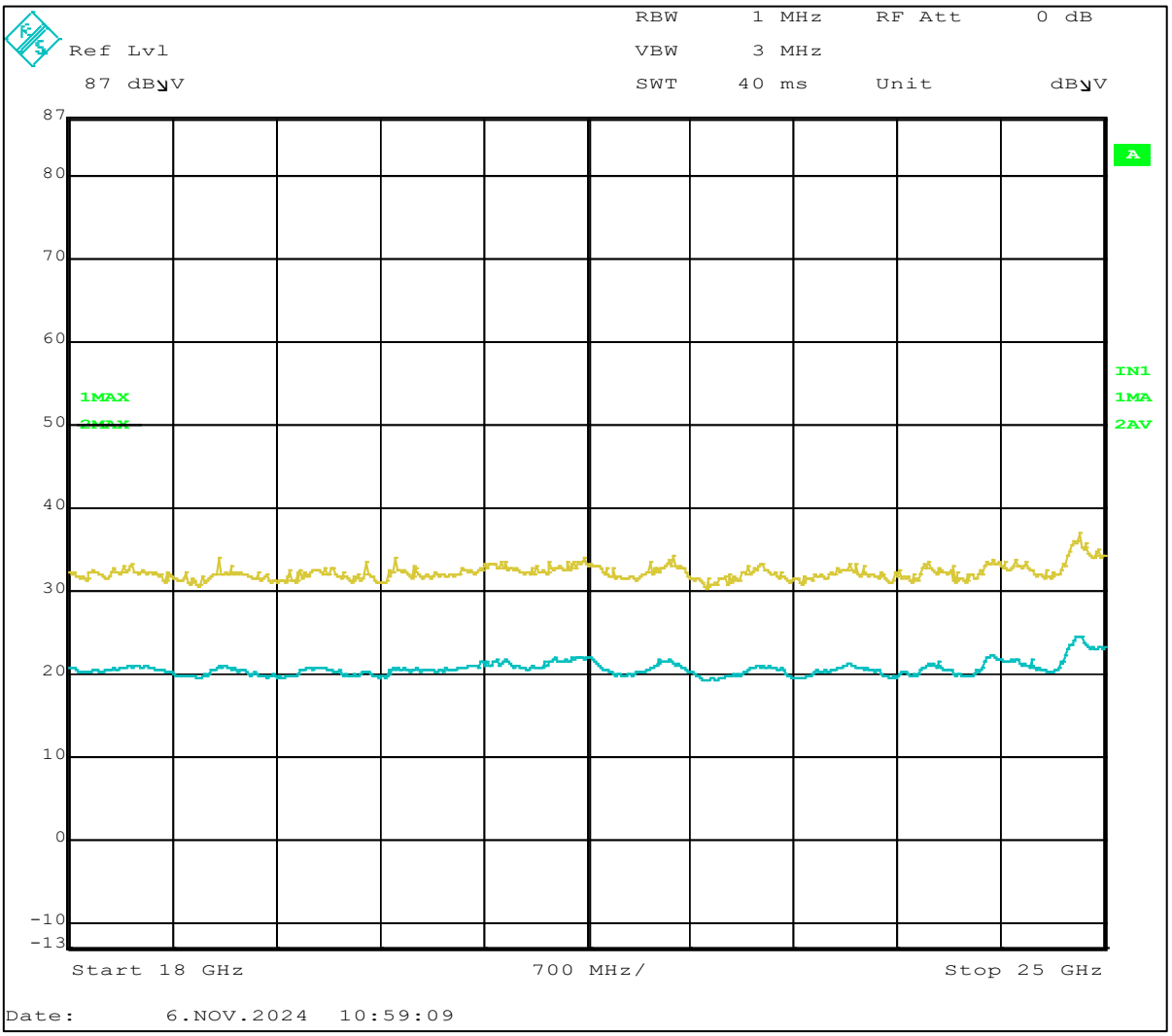

Figure 95. Emission in restricted bands. 18 – 25 GHz. Measured at a distance of 0.5m.

Average Limit at 3 m.	Peak limit At 3 m	3 m / 0.5 m factor	Average Limit at 0.5 m.	Peak limit at 0.5 m
[dBµV/m]	[dBµV/m]	[dB]	[dBµV/m]	[dBµV/m]
53.98	73.98	15.56	69.54	89.54

Table 28. Calculation of limit at 0.5 m.

Frequency	AF	Cable loss	Correction factor
GHz	dB/m	dB	dB/m
18	40.3	< 2	42.3
25	40.6	< 2	42.6

Table 29. Correction factors 18 – 25 GHz.

Frequency [MHz]	Peak [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
-	-	1000	-	-	-	-	89.54	PASSED

Table 30. Radiated emission test results 18 - 25 GHz. Peak detector.

Frequency [MHz]	AVG [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
-	-	1000	-	-	-	-	69.54	PASSED

Table 31. Radiated emission test results 18 – 25 GHz. Average detector.

2.9.2.2 Test specimen vertical at 2441 MHz

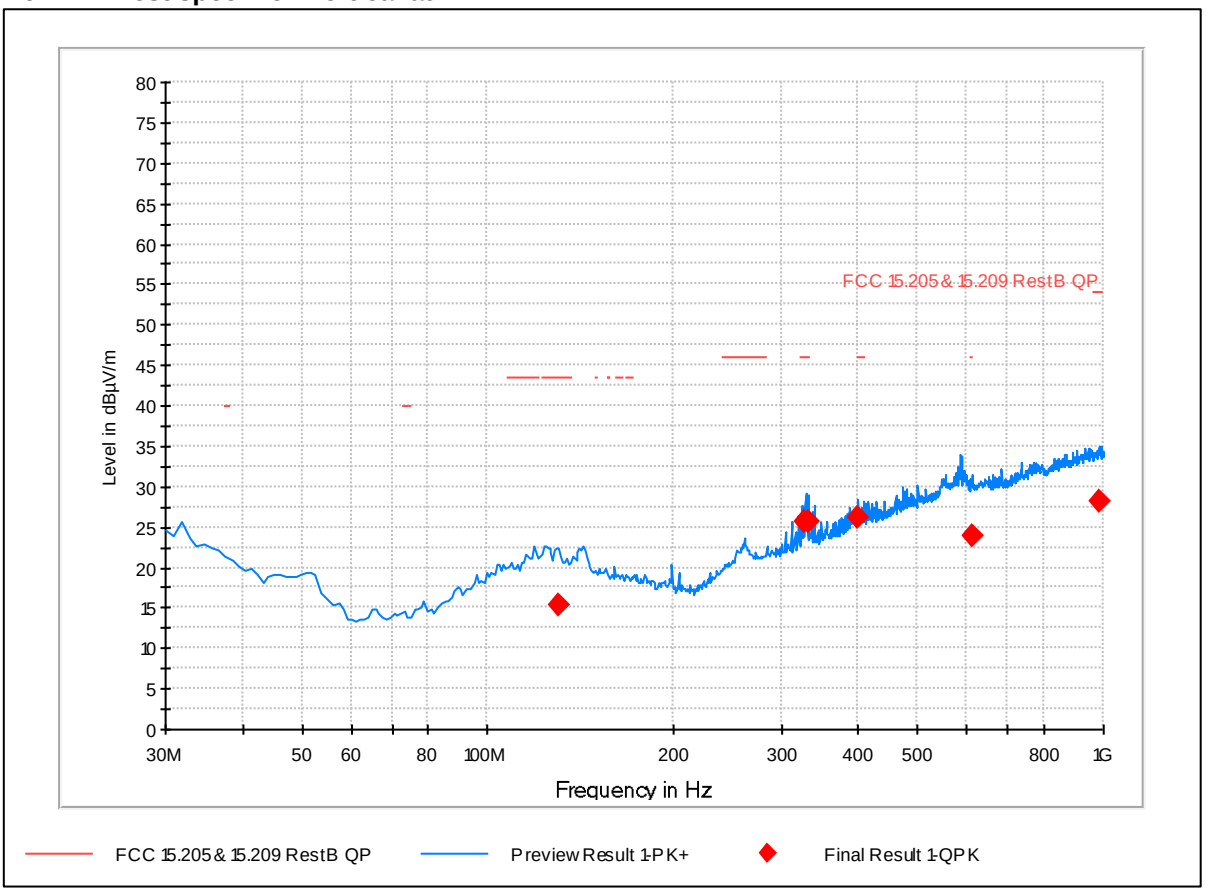

Figure 96. Emission in restricted bands, 30 - 1000 MHz.

Frequency [MHz]	QP [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
130.381563	15.2	120	100.0	V	189.0	28.3	43.5	PASSED
327.977154	25.8	120	100.0	H	1.0	20.2	46.0	PASSED
332.024689	25.7	120	100.0	H	168.0	20.3	46.0	PASSED
400.000321	26.2	120	100.0	H	322.0	19.8	46.0	PASSED
612.824449	23.9	120	268.0	V	269.0	22.1	46.0	PASSED
987.775952	28.2	120	273.0	H	12.0	25.8	54.0	PASSED

Table 32. Emission in restricted bands results. 30 - 1000 MHz.

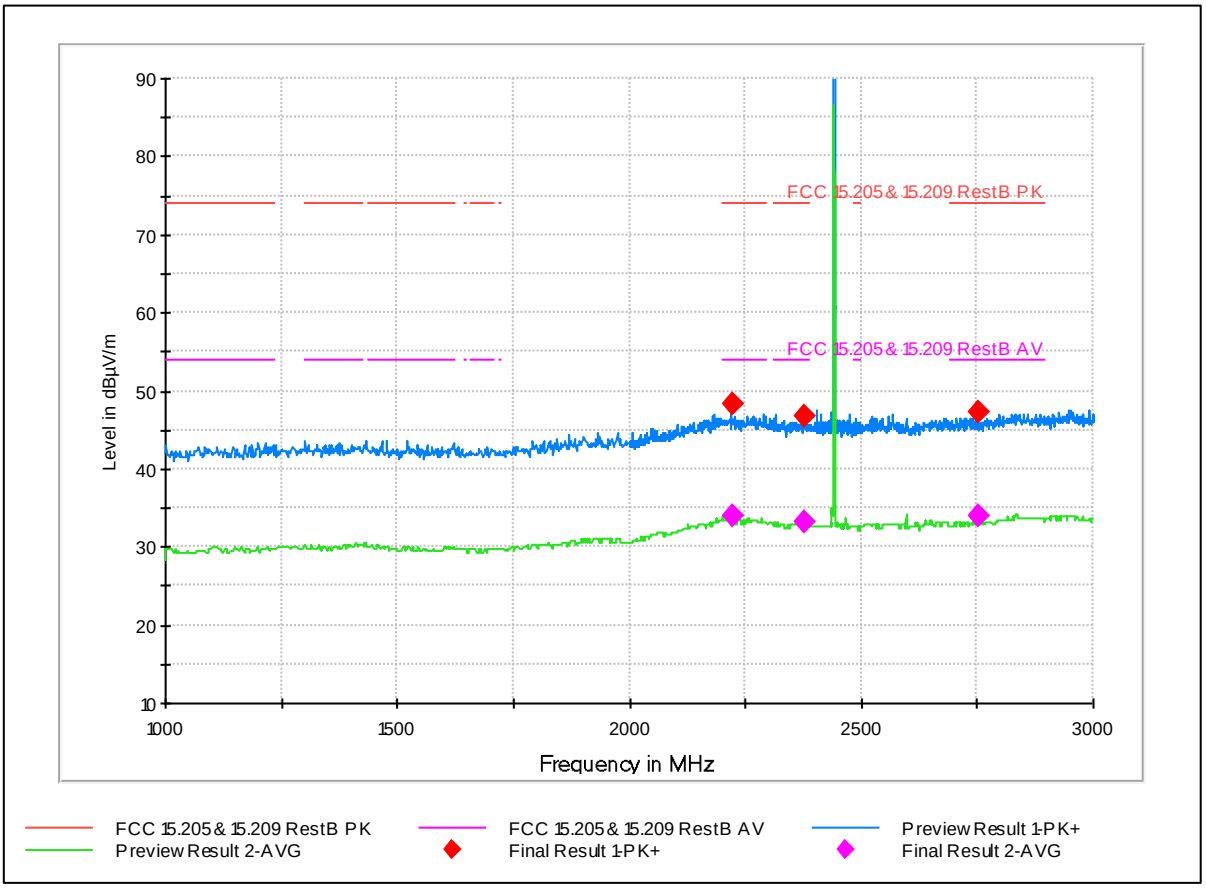

Figure 97. Emission in restricted bands results. 1 - 3 GHz.

Frequency [MHz]	Peak [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
2223.750501	48.4	1000	196.0	V	124.0	25.6	74.0	PASSED
2375.356713	46.8	1000	201.0	V	0.0	27.2	74.0	PASSED
2750.692986	47.3	1000	285.0	H	0.0	26.7	74.0	PASSED

Table 33. Emission in restricted bands Peak results. 1 - 3 GHz..

Frequency [MHz]	AVG [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
2223.750501	34.0	1000	196.0	V	124.0	20.0	54.0	PASSED
2375.356713	33.3	1000	201.0	V	0.0	20.7	54.0	PASSED
2750.692986	33.9	1000	285.0	H	0.0	20.1	54.0	PASSED

Table 34. Emission in restricted bands Average results. 1 - 3 GHz..

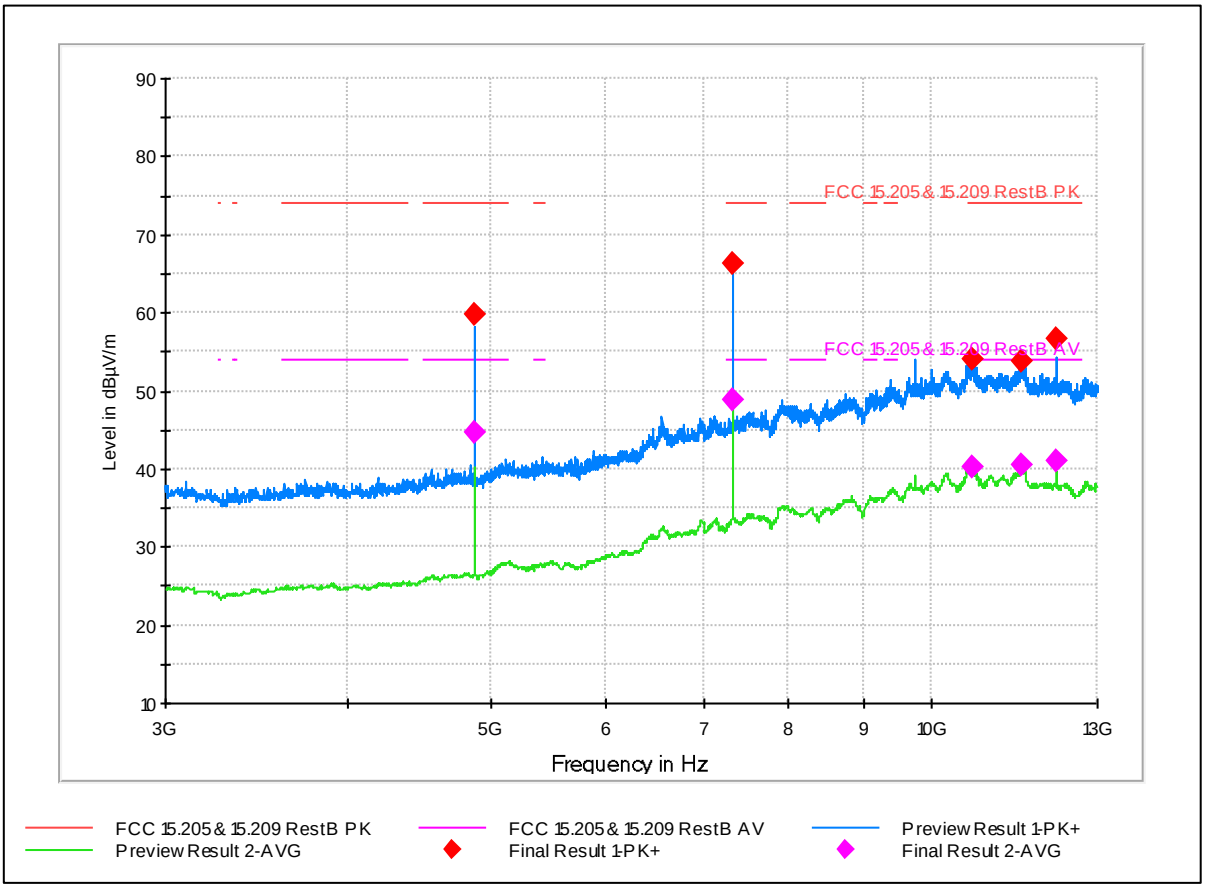

Figure 98. Emission in restricted bands results. 3 - 13 GHz.

Frequency [MHz]	Peak [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
4881.963527	59.9	1000	169.0	V	28.0	14.1	74.0	PASSED
7323.445291	66.4	1000	171.0	H	137.0	7.6	74.0	PASSED
10668.438677	53.9	1000	150.0	V	351.0	20.1	74.0	PASSED
11543.482164	53.9	1000	380.0	V	283.0	20.1	74.0	PASSED
12204.308818	56.6	1000	150.0	H	215.0	17.4	74.0	PASSED

Table 35. Emission in restricted bands Peak results. 3 - 13 GHz.

Frequency [MHz]	AVG [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
4881.963527	44.8	1000	169.0	V	28.0	9.2	54.0	PASSED
7323.445291	48.7	1000	171.0	H	137.0	5.3	54.0	PASSED
10668.438677	40.4	1000	150.0	V	351.0	13.6	54.0	PASSED
11543.482164	40.5	1000	380.0	V	283.0	13.5	54.0	PASSED
12204.308818	41.0	1000	150.0	H	215.0	13.0	54.0	PASSED

Table 36. Emission in restricted bands Average results. 3 - 13 GHz.

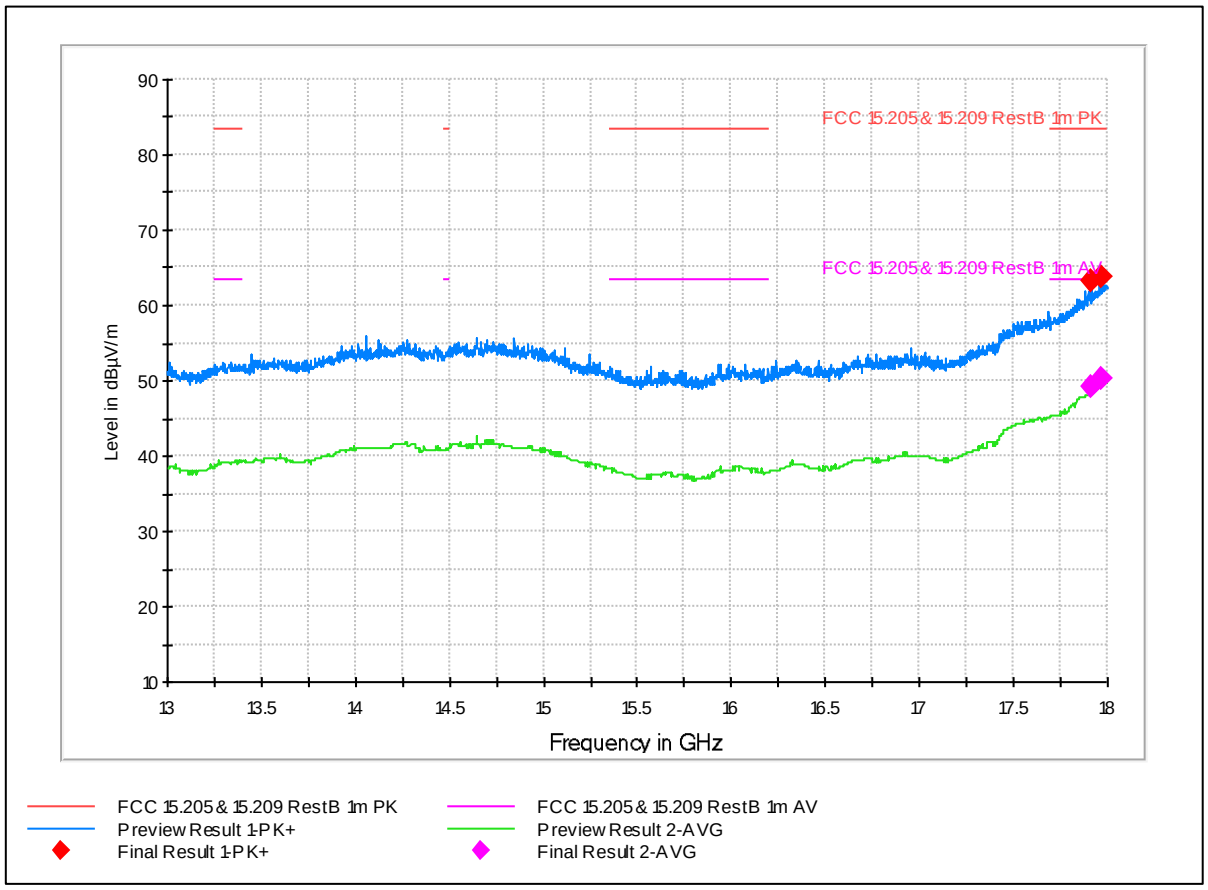

Figure 99. Emission in restricted bands results. 13 - 18 GHz.

Measured at a distance of 1m.

Average Limit at 3 m.	Peak limit At 3 m	3 m / 1 m factor	Average Limit at 1 m.	Peak limit at 1 m
[dBµV/m]	[dBµV/m]	[dB]	[dBµV/m]	[dBµV/m]
53.98	73.98	9.54	63.5	83.5

Table 37. Calculation of limit at 1 m.

Frequency [MHz]	Peak [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
17916.635671	63.2	1000	300.0	V	225.0	20.3	83.5	PASSED
17969.731864	63.9	1000	207.0	H	34.0	19.6	83.5	PASSED

Table 38. Emission in restricted bands Peak results. 13 - 18 GHz.

Frequency [MHz]	AVG [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
17916.635671	49.3	1000	300.0	V	225.0	14.2	63.5	PASSED
17969.731864	50.4	1000	207.0	H	34.0	13.1	63.5	PASSED

Table 39. Emission in restricted bands Average results. 13 - 18 GHz.

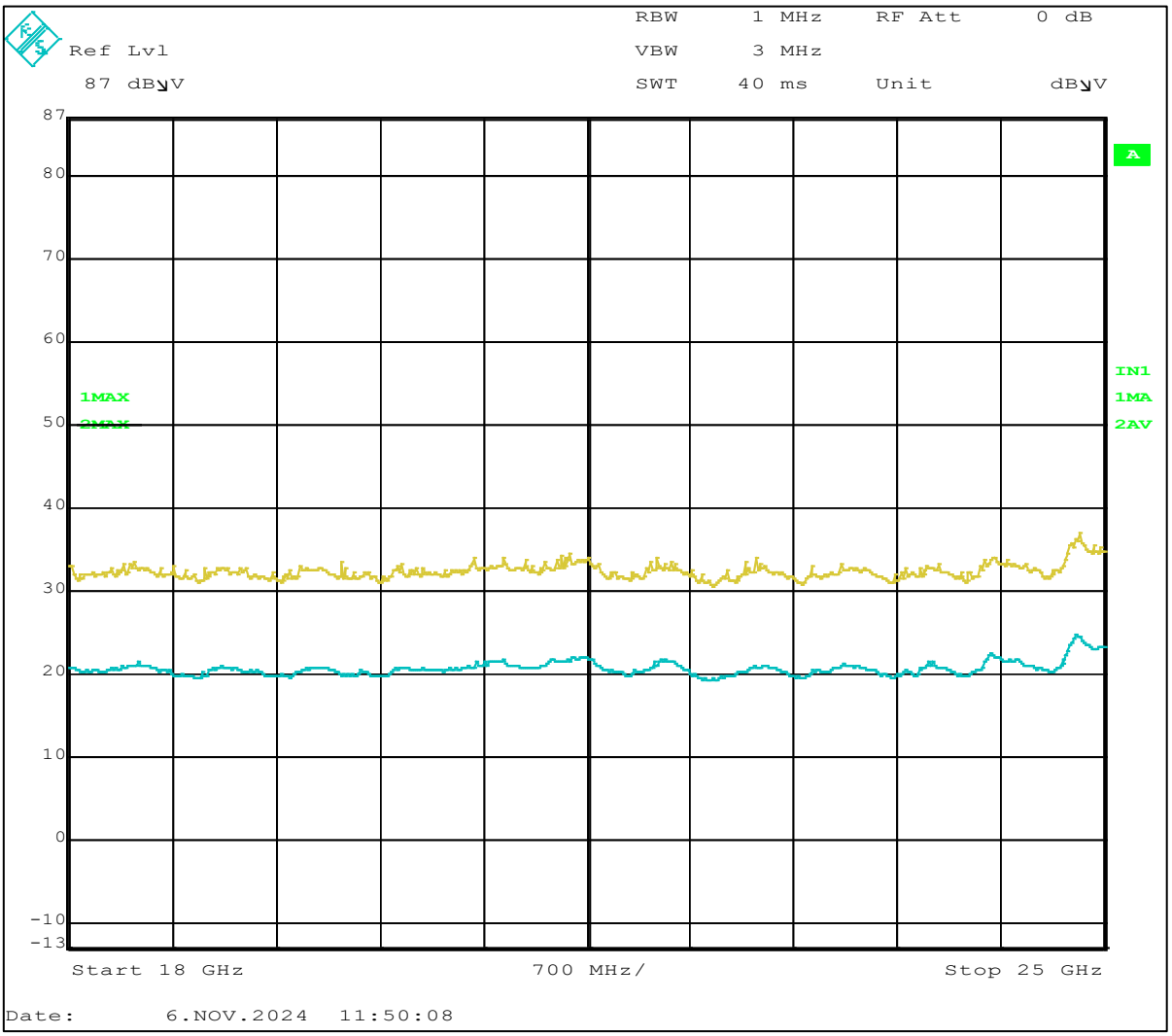

Figure 100. Emission in restricted bands. 18 – 25 GHz. Measured at a distance of 0.5m.

Average Limit at 3 m.	Peak limit At 3 m	3 m / 0.5 m factor	Average Limit at 0.5 m.	Peak limit at 0.5 m
[dBµV/m]	[dBµV/m]	[dB]	[dBµV/m]	[dBµV/m]
53.98	73.98	15.56	69.54	89.54

Table 40. Calculation of limit at 0.5 m.

Frequency	AF	Cable loss	Correction factor
GHz	dB/m	dB	dB/m
18	40.3	< 2	42.3
25	40.6	< 2	42.6

Table 41. Correction factors 18 – 25 GHz.

Frequency [MHz]	Peak [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
-	-	1000	-	-	-	-	89.54	PASSED

Table 42. Radiated emission test results 18 - 25 GHz. Peak detector.

Frequency [MHz]	AVG [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
-	-	1000	-	-	-	-	69.54	PASSED

Table 43. Radiated emission test results 18 – 25 GHz. Average detector.

2.9.2.3 Test specimen vertical at 2480 MHz

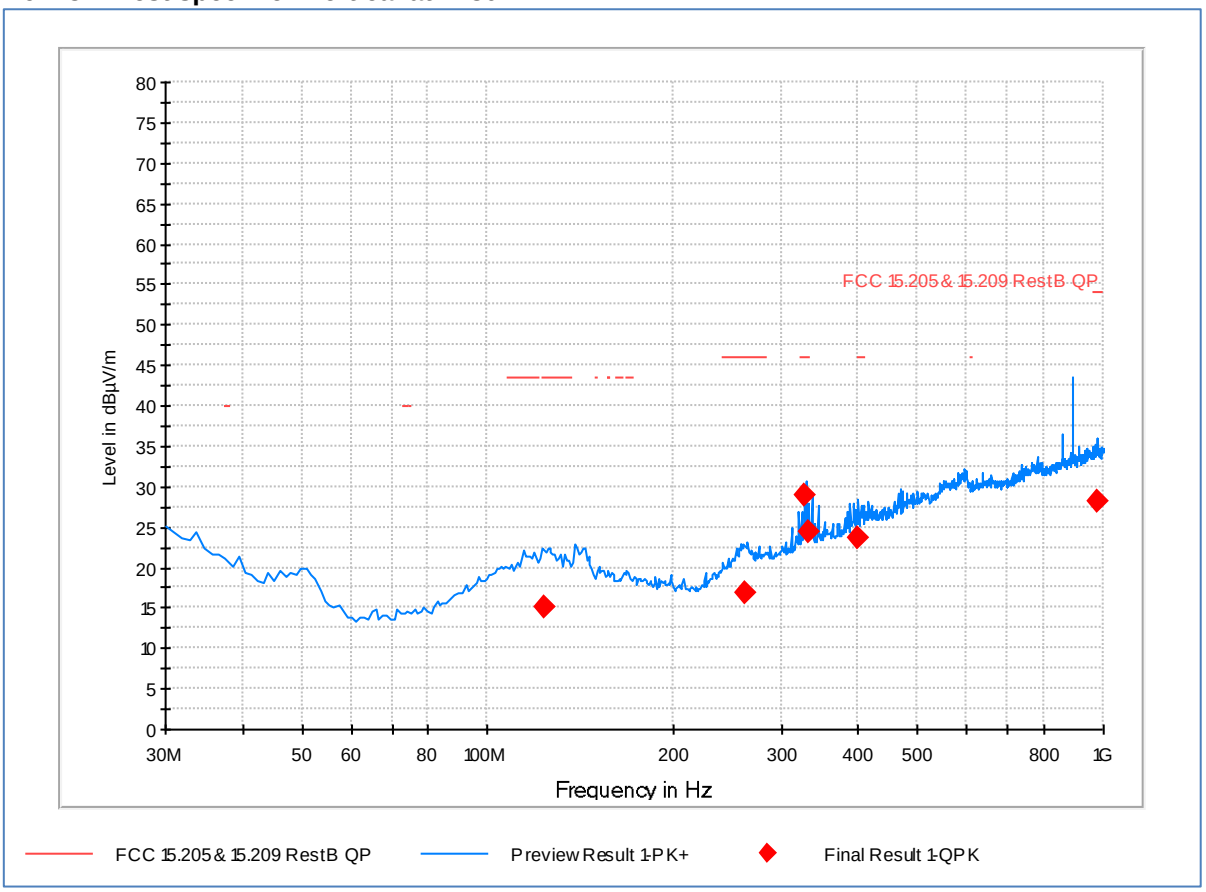

Figure 101. Emission in restricted bands, 30 -1000 MHz.

Frequency [MHz]	QP [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
124.050261	15.1	120	126.0	V	23.0	28.4	43.5	PASSED
261.361523	16.8	120	275.0	V	273.0	29.2	46.0	PASSED
328.017154	28.9	120	100.0	H	0.0	17.1	46.0	PASSED
331.984689	24.5	120	100.0	H	196.0	21.5	46.0	PASSED
400.040321	23.8	120	100.0	H	337.0	22.2	46.0	PASSED
980.039920	28.3	120	281.0	H	97.0	25.7	54.0	PASSED
124.050261	15.1	120	126.0	V	23.0	28.4	43.5	PASSED

Table 44. Emission in restricted bands results. 30 - 1000 MHz.

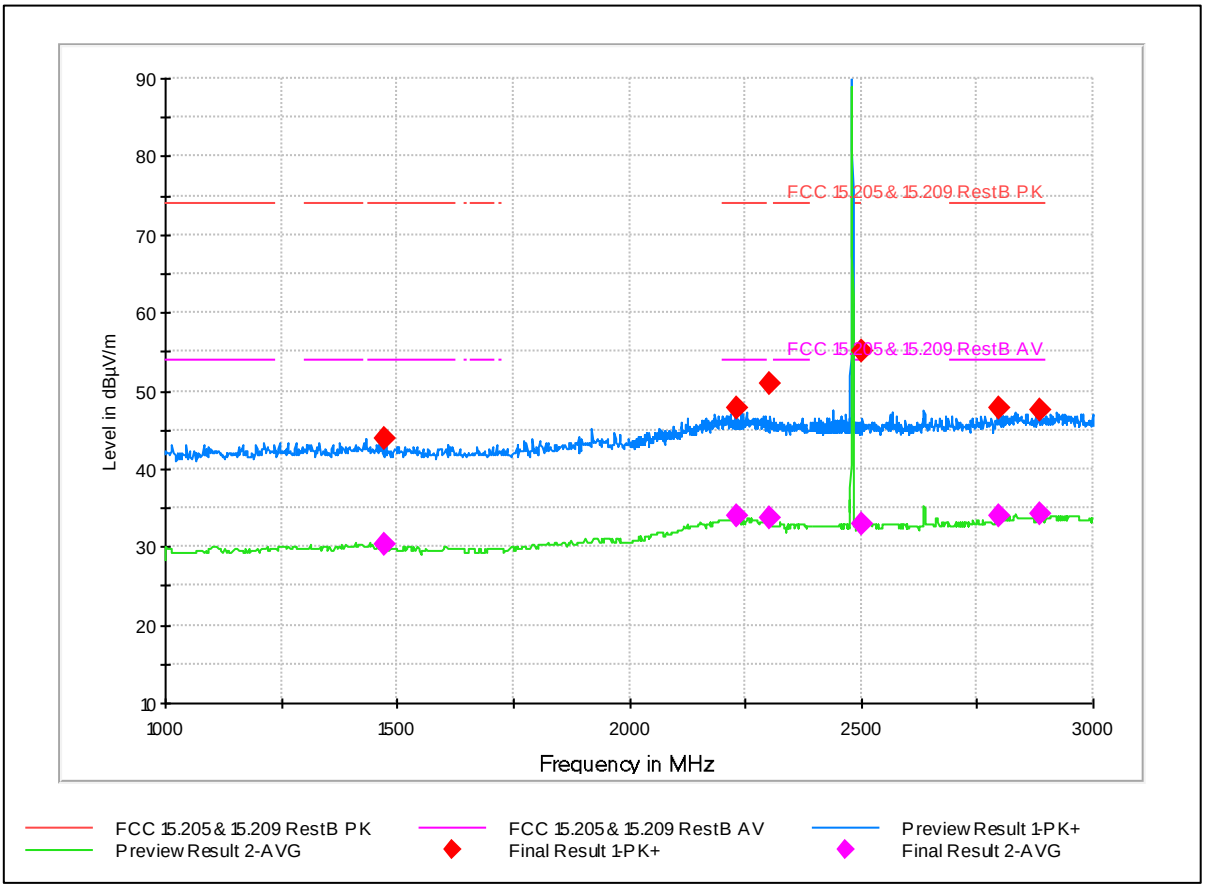

Figure 102. Emission in restricted bands results. 1 - 3 GHz.

Frequency [MHz]	Peak [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
1470.949900	43.8	1000	400.0	H	301.0	30.2	74.0	PASSED
2233.058517	47.7	1000	202.0	H	5.0	26.3	74.0	PASSED
2303.809218	50.8	1000	177.0	H	125.0	---	---	---
2499.306012	55.2	1000	150.0	H	105.0	18.8	74.0	PASSED
2798.191182	47.7	1000	202.0	H	132.0	26.3	74.0	PASSED
2885.573547	47.6	1000	271.0	H	16.0	26.4	74.0	PASSED

Table 45. Emission in restricted bands Peak results. 1 - 3 GHz.

Frequency [MHz]	AVG [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
1470.949900	30.3	1000	400.0	H	301.0	23.7	54.0	PASSED
2233.058517	33.9	1000	202.0	H	5.0	20.1	54.0	PASSED
2303.809218	33.7	1000	177.0	H	125.0	---	---	---
2499.306012	33.0	1000	150.0	H	105.0	21.0	54.0	PASSED
2798.191182	34.0	1000	202.0	H	132.0	20.0	54.0	PASSED
2885.573547	34.1	1000	271.0	H	16.0	19.9	54.0	PASSED

Table 46. Emission in restricted bands Average results. 1 - 3 GHz..

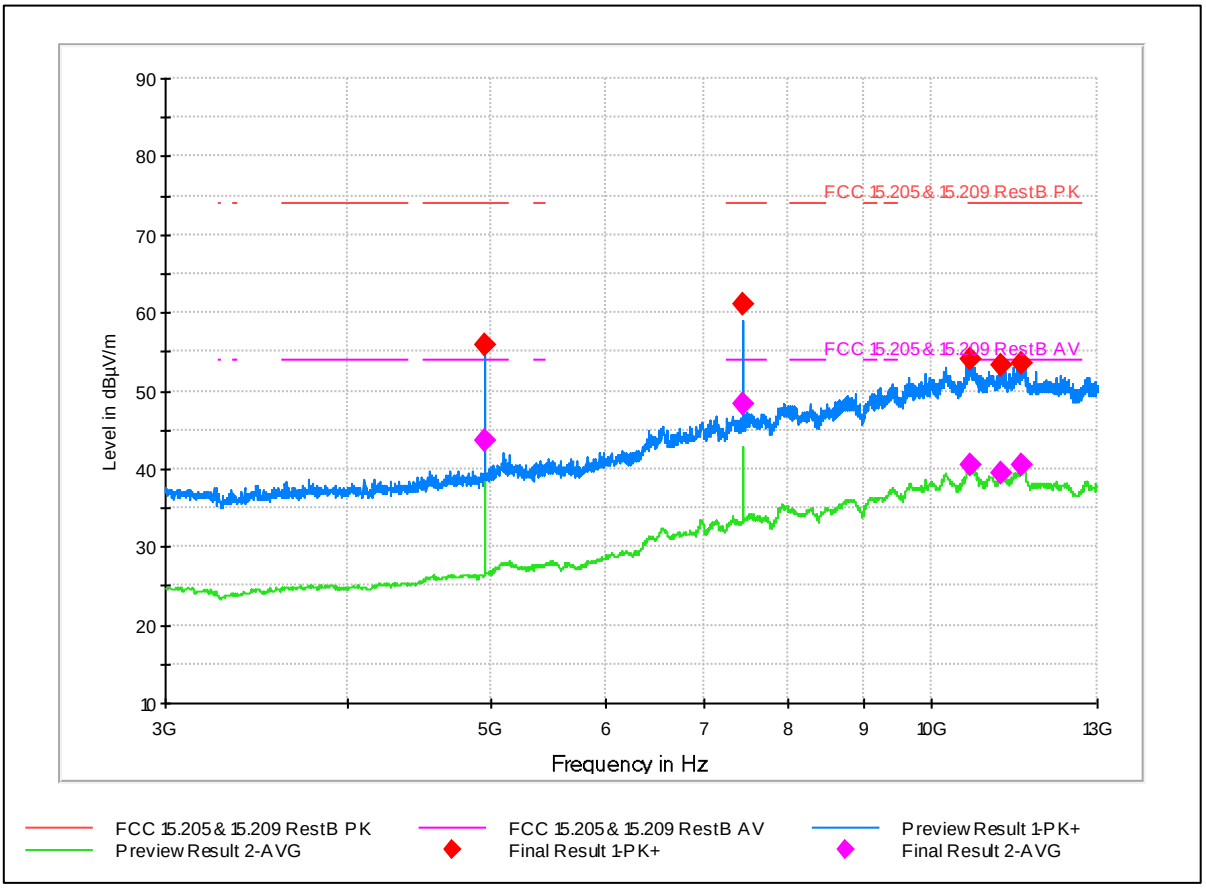

Figure 103. Emission in restricted bands results. 3 - 13 GHz.

Frequency [MHz]	Peak [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
4960.019840	55.8	1000	150.0	V	142.0	18.2	74.0	PASSED
7439.577756	61.0	1000	207.0	H	199.0	13.0	74.0	PASSED
10659.522645	54.0	1000	170.0	H	264.0	20.0	74.0	PASSED
11189.384770	53.1	1000	386.0	H	199.0	20.9	74.0	PASSED
11539.478156	53.6	1000	223.0	H	62.0	20.4	74.0	PASSED

Table 47. Emission in restricted bands Peak results. 3 - 13 GHz..

Frequency [MHz]	AVG [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
4960.019840	43.7	1000	150.0	V	142.0	10.3	54.0	PASSED
7439.577756	48.2	1000	207.0	H	199.0	5.8	54.0	PASSED
10659.522645	40.4	1000	170.0	H	264.0	13.6	54.0	PASSED
11189.384770	39.4	1000	386.0	H	199.0	14.6	54.0	PASSED
11539.478156	40.4	1000	223.0	H	62.0	13.6	54.0	PASSED

Table 48. Emission in restricted bands Average results. 3 - 13 GHz..

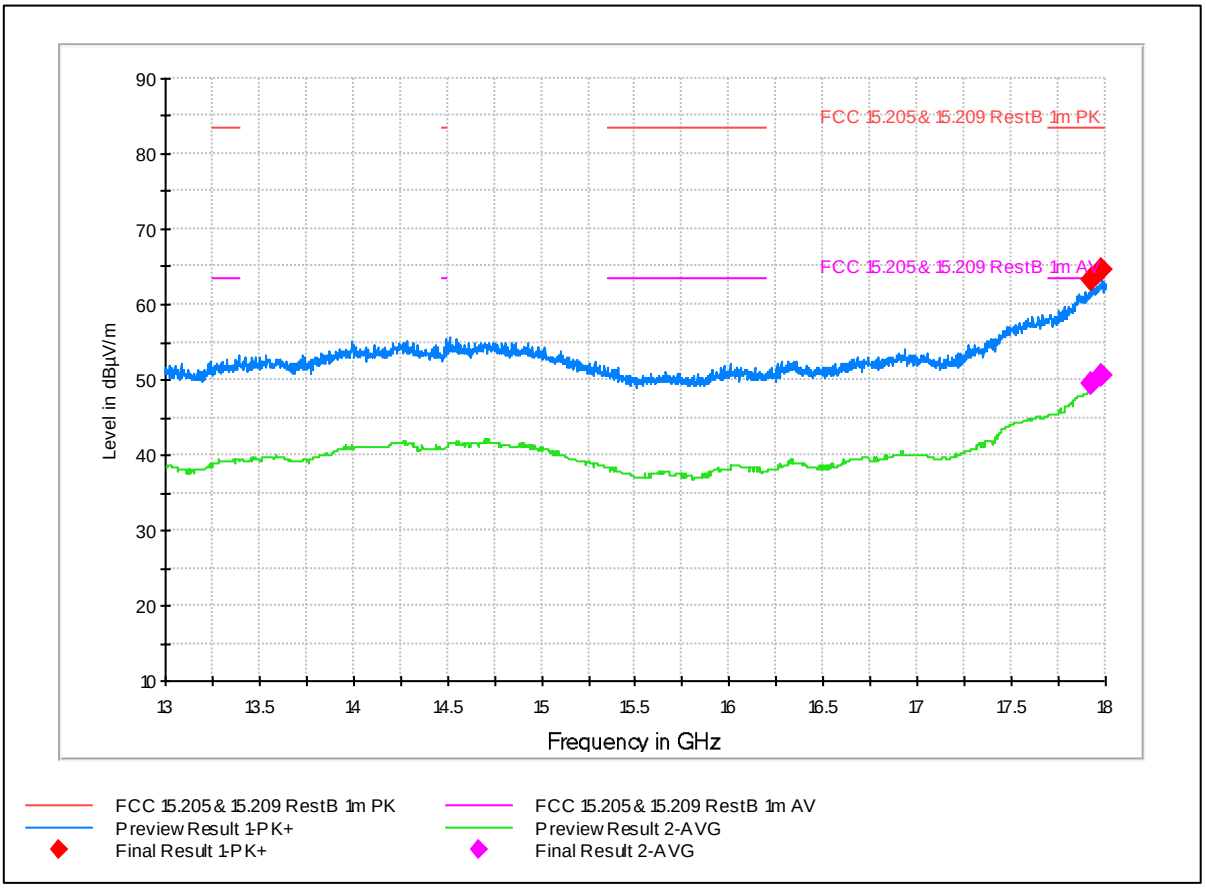

Figure 104. Emission in restricted bands results. 13 - 18 GHz.

Measured at a distance of 1m.

Average Limit at 3 m.	Peak limit At 3 m	3 m / 1 m factor	Average Limit at 1 m.	Peak limit at 1 m
[dBµV/m]	[dBµV/m]	[dB]	[dBµV/m]	[dBµV/m]
53.98	73.98	9.54	63.5	83.5

Table 49. Calculation of limit at 1 m.

Frequency [MHz]	Peak [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
17926.751703	63.4	1000	158.0	V	271.0	20.1	83.5	PASSED
17982.363928	64.5	1000	143.0	V	300.0	19.0	83.5	PASSED

Table 50. Emission in restricted bands Peak results. 13 - 18 GHz.

Frequency [MHz]	AVG [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
17926.751703	49.6	1000	158.0	V	271.0	13.9	63.5	PASSED
17982.363928	50.5	1000	143.0	V	300.0	13.0	63.5	PASSED

Table 51. Emission in restricted bands Average results. 13 - 18 GHz.

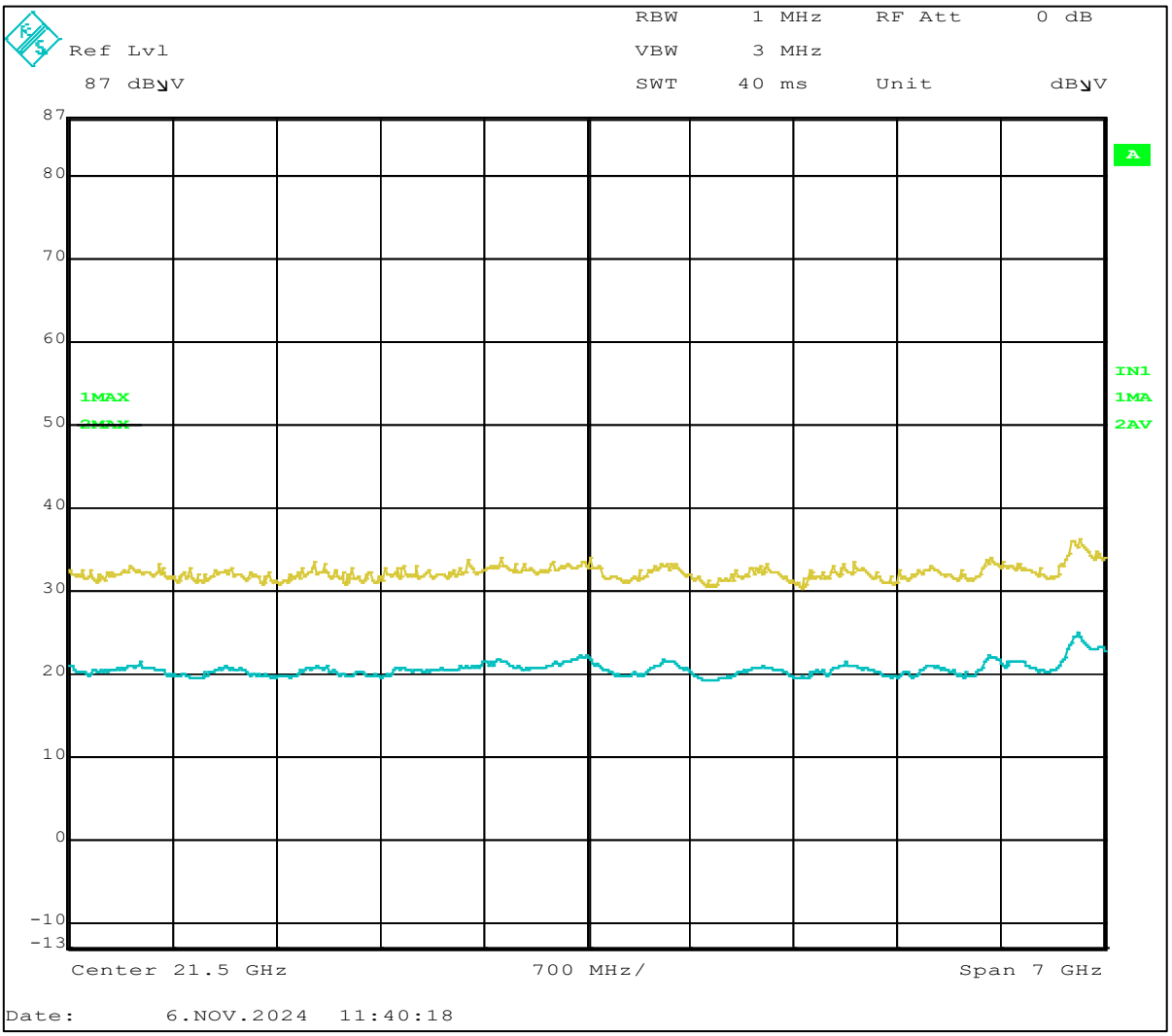

Figure 105. Emission in restricted bands. 18 – 25 GHz. Measured at a distance of 0.5m.

Average Limit at 3 m.	Peak limit At 3 m	3 m / 0.5 m factor	Average Limit at 0.5 m.	Peak limit at 0.5 m
[dBµV/m]	[dBµV/m]	[dB]	[dBµV/m]	[dBµV/m]
53.98	73.98	15.56	69.54	89.54

Table 52. Calculation of limit at 0.5 m.

Frequency	AF	Cable loss	Correction factor
GHz	dB/m	dB	dB/m
18	40.3	< 2	42.3
25	40.6	< 2	42.6

Table 53. Correction factors 18 – 25 GHz.

Frequency [MHz]	Peak [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
-	-	1000	-	-	-	-	89.54	PASSED

Table 54. Radiated emission test results 18 - 25 GHz. Peak detector.

Frequency [MHz]	AVG [dBµV/m]	BW [kHz]	Height [cm]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dBµV/m]	Result
-	-	1000	-	-	-	-	69.54	PASSED

Table 55. Radiated emission test results 18 – 25 GHz. Average detector.

2.9.3 Test equipment

Description	Supplier	Model	Tag no.	Cal. due
Antenna Bilog 30MHz - 2GHz	Chase	CBL6112B	30114397	2025-12-15
LNA amplifier 1 - 26 GHz	Miteq	JS4-01002600-36-5P	30150081	2024-11-14
Antenna Horn 1 – 18 GHz	Schwarzbeck	BBHA 1920D	30120777	2025-03-21
Standard Cain Horn 18 – 26.5 GHz	Narda	638	30117524	-
EMI Test Receiver 20Hz-26.5GHz	Rohde & Schwarz	ESIB26	30118880	2025-01-25

Table 56. Radiated emission test equipment.

3 MEASURING UNCERTAINTIES

Compliancy evaluation is based on a shared risk principle with respect to the measurement uncertainty.

	Frequency [MHz]	Polarization	Expanded Uncertainty [dB] (k=2)
Radiated emission	30 - 200	Vertical	4.73 dB
	200 - 1000	Vertical	4.97 dB
	30 - 200	Horizontal	4.72 dB
	200 - 1000	Horizontal	5.08 dB
	1000 - 18000	Vertical	3.76 dB
	1000 - 18000	Horizontal	3.77 dB
	18000 - 26500	Vertical	4.10 dB
	18000 - 26500	Horizontal	4.11 dB
Conducted emission (CISPR 16-4)	0.009 - 30	-	3.44 dB
Conducted emission (ESIB 26)	<1 GHz	-	2.58 dB
	1-7 GHz	-	2.76 dB
	7 - 18 GHz	-	3.38 dB
	18-26,5 GHz	-	3.79 dB
Frequency error ESIB	2480	-	0.102 ppm