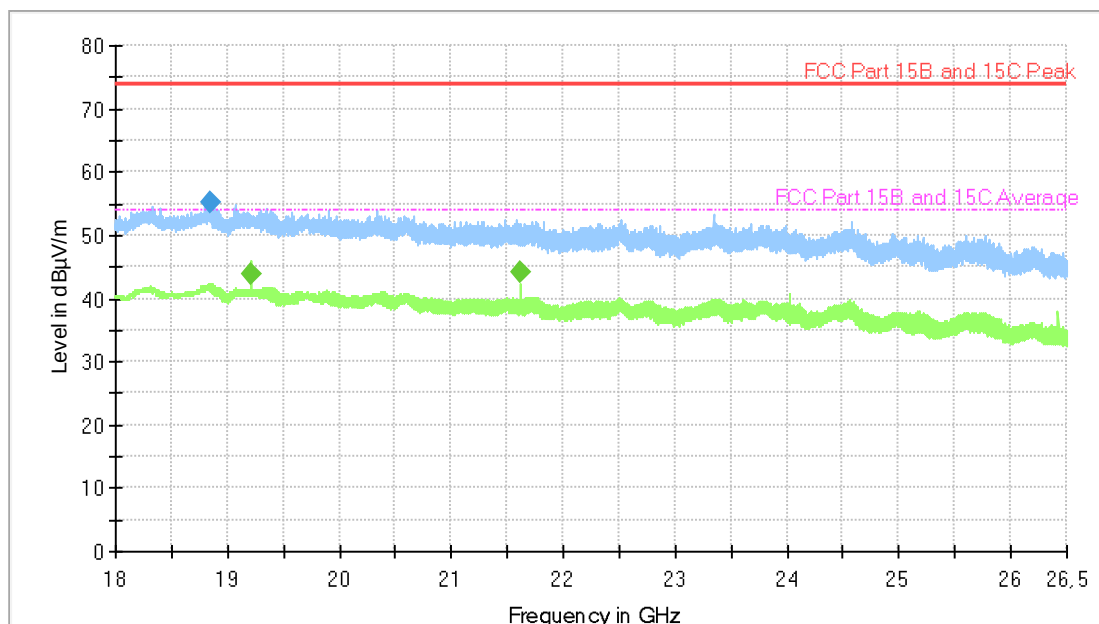
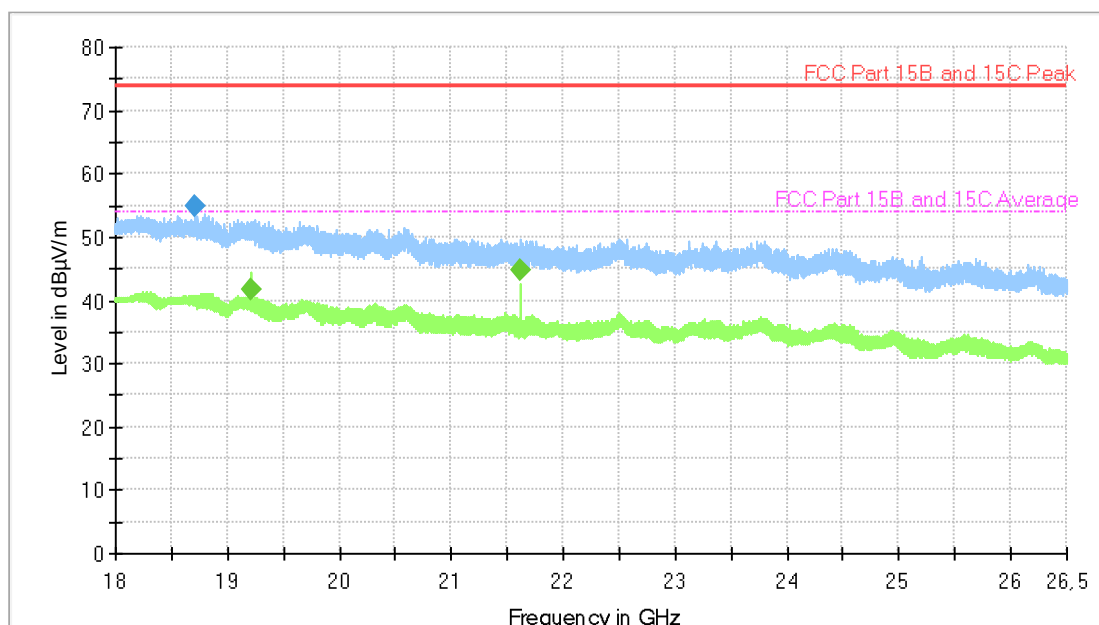
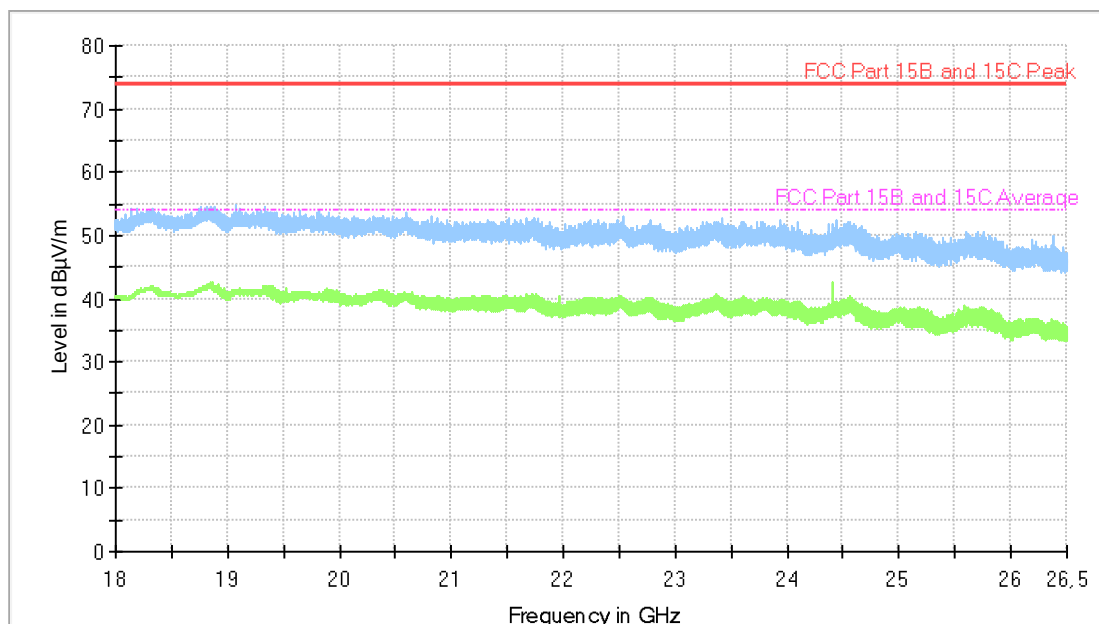




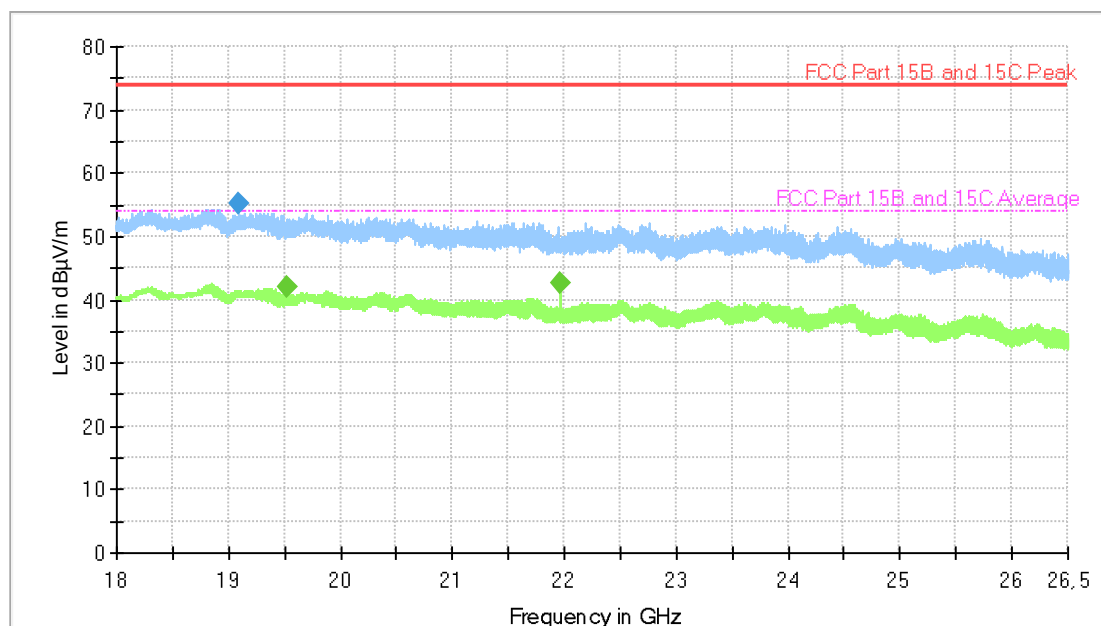
Diagram, Peak overview sweep, 18 – 26.5 GHz at 3 m distance. TX low channel, Internal antenna. Powered via PoE (AH40)



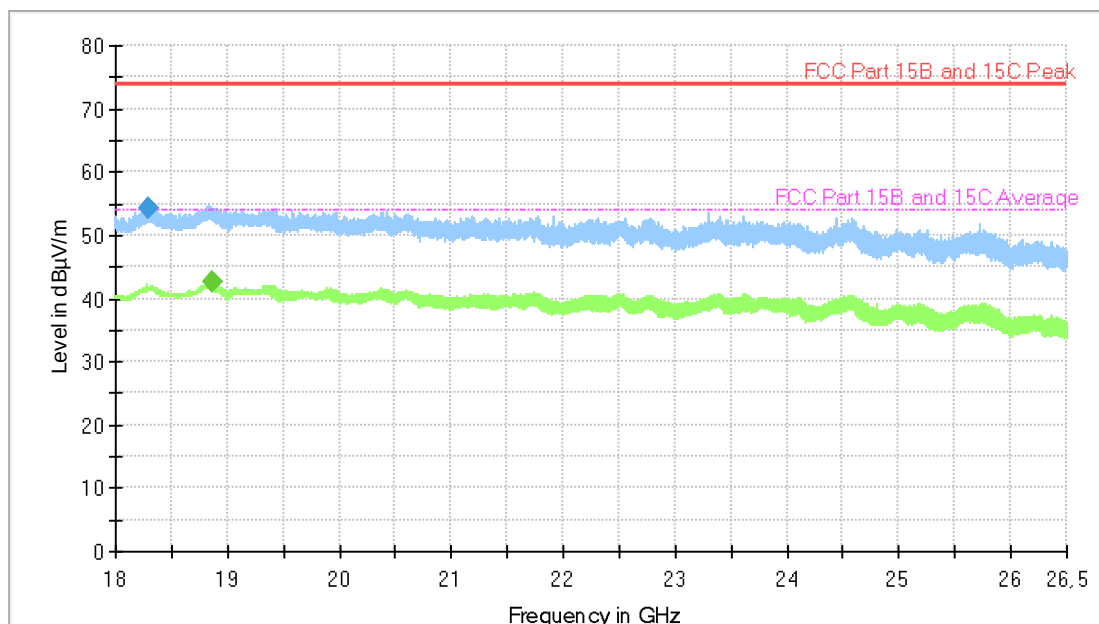
Diagram, Peak overview sweep, 18 – 26.5 GHz at 3 m distance. TX low channel, Internal antenna. Powered via AC/DC (AH20)



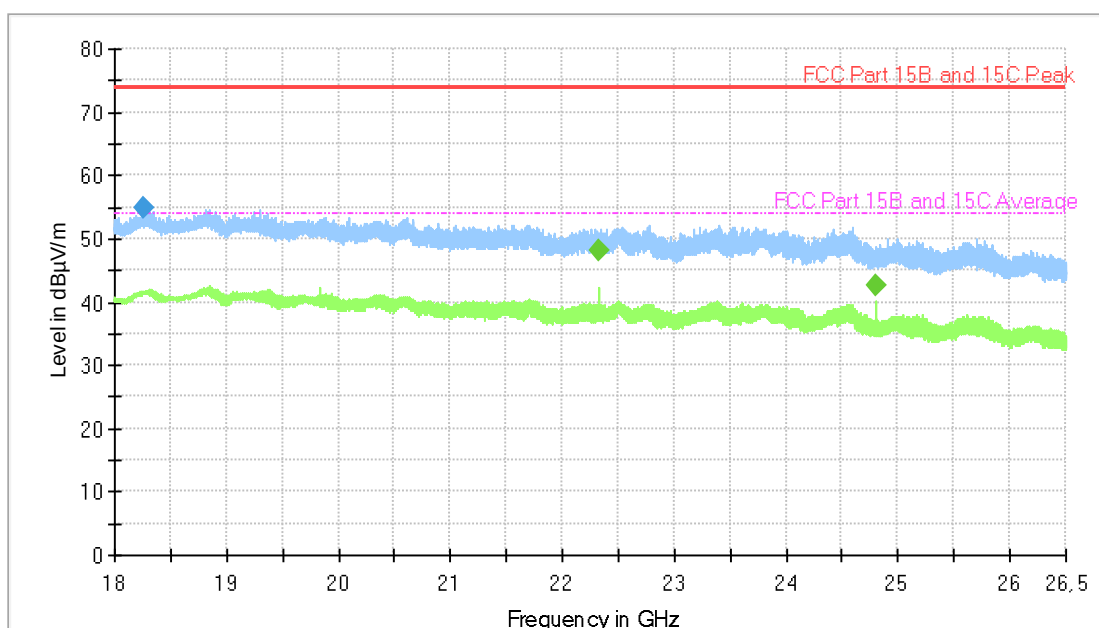
Diagram, Peak overview sweep, 18 – 26.5 GHz at 3 m distance. TX mid channel, Internal antenna. Powered via PoE (AH40)



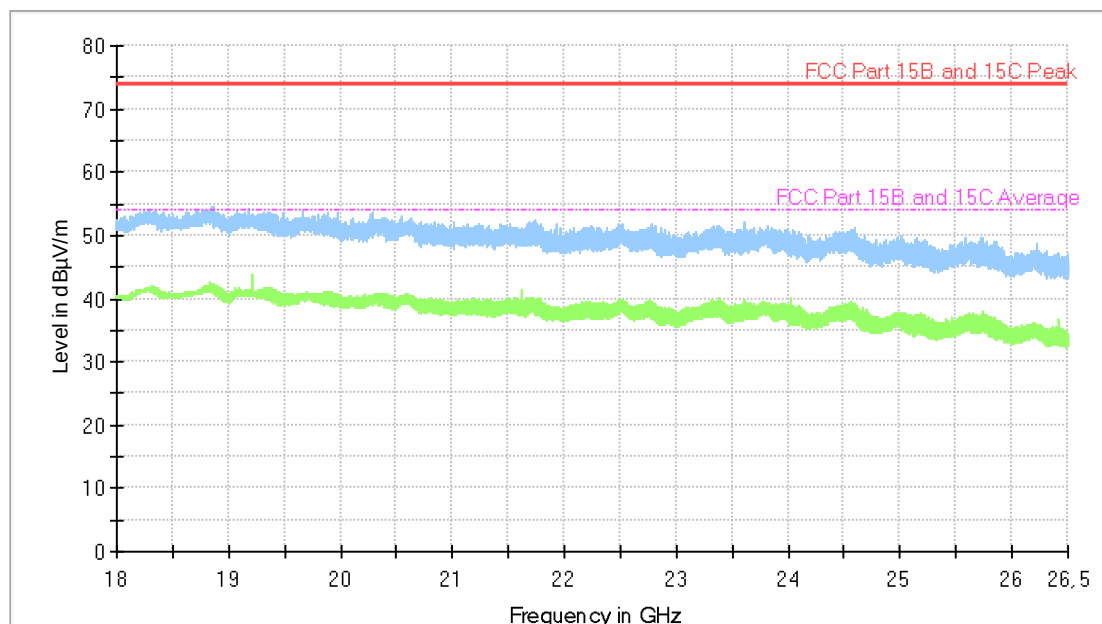
Diagram, Peak overview sweep, 18 – 26.5 GHz at 3 m distance. TX mid channel, Internal antenna. Powered via AC/DC (AH20)



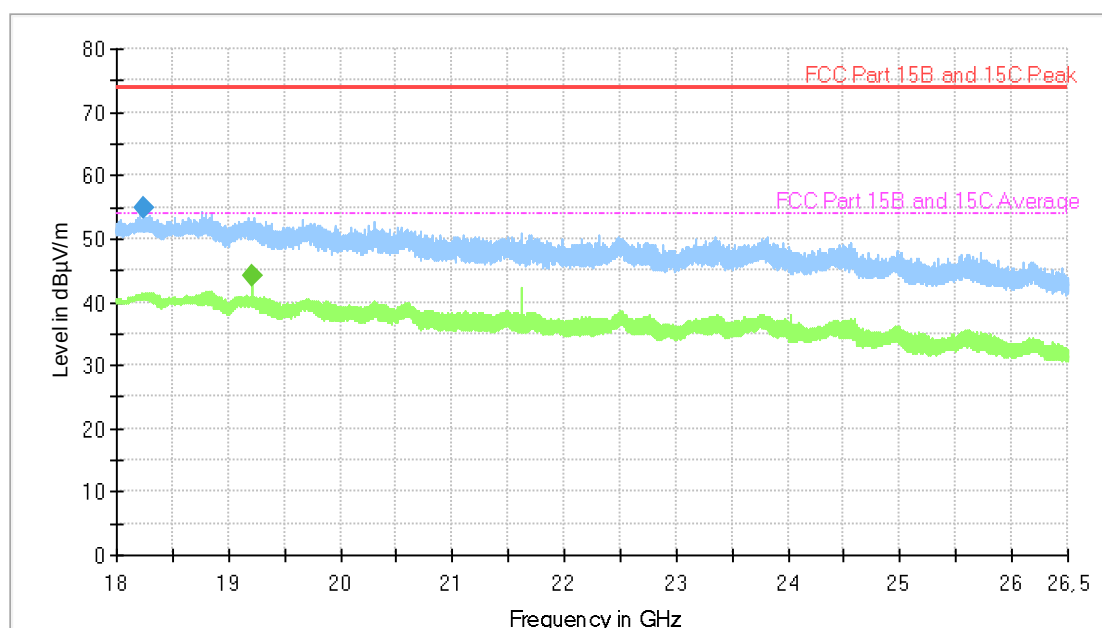
Diagram, Peak overview sweep, 18 – 26.5 GHz at 3 m distance. TX high channel, Internal antenna. Powered via PoE (AH40)



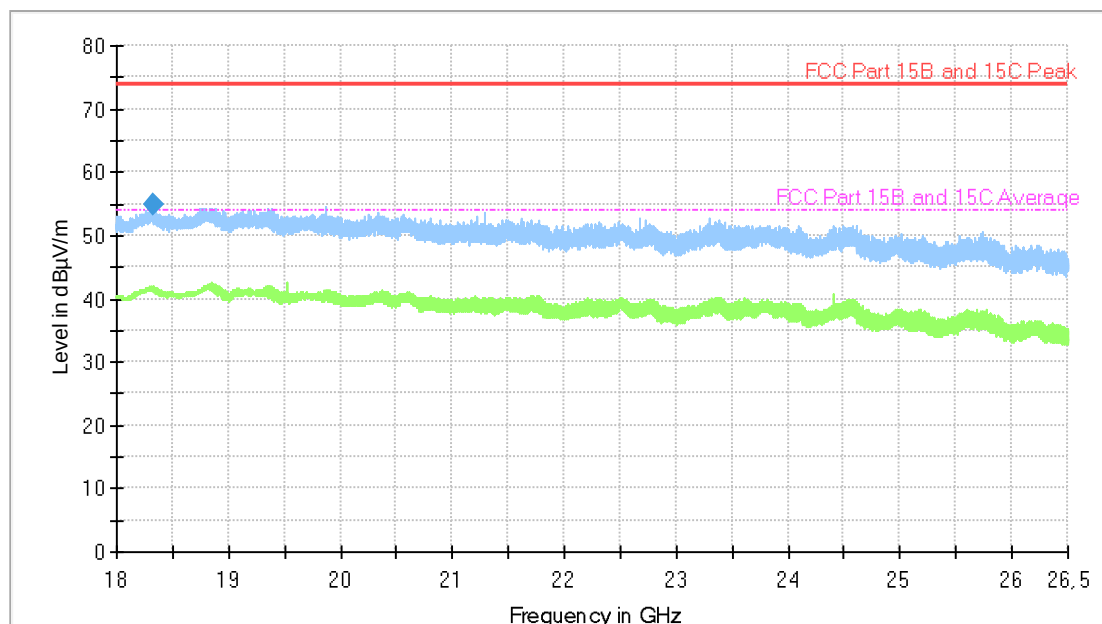
Diagram, Peak overview sweep, 18 – 26.5 GHz at 3 m distance. TX high channel, Internal antenna. Powered via AC/DC (AH20)



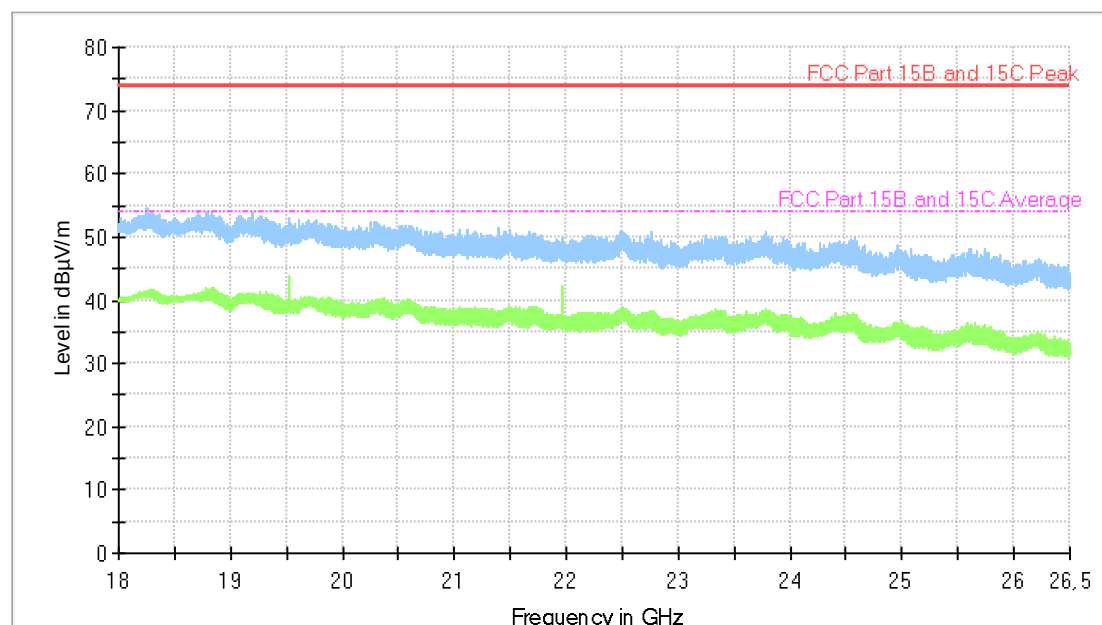
Diagram, Peak overview sweep, 18 – 26.5 GHz at 3 m distance. TX low channel, External antenna. Powered via PoE (AH40)



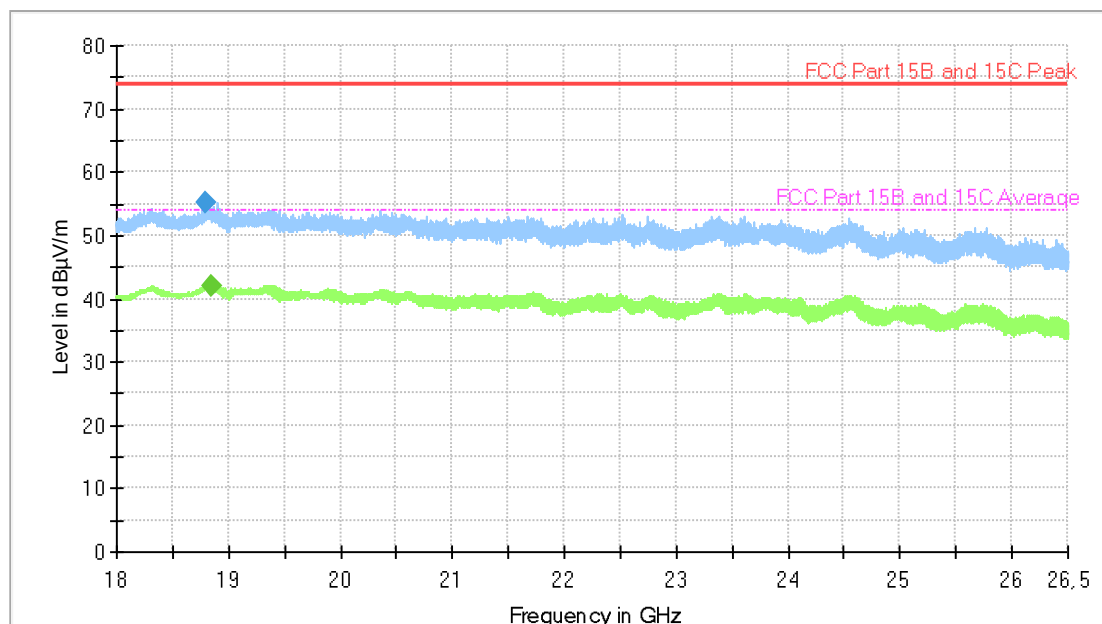
Diagram, Peak overview sweep, 18 – 26.5 GHz at 3 m distance. TX low channel, External antenna. Powered via AC/DC (AH20)



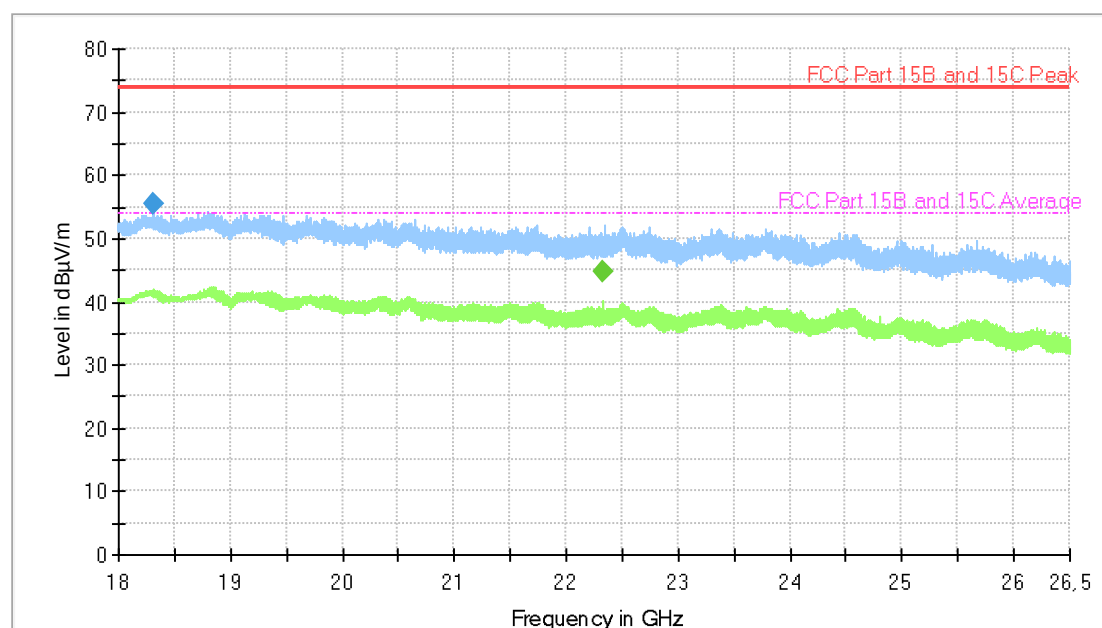
Diagram, Peak overview sweep, 18 – 26.5 GHz at 3 m distance. TX mid channel, External antenna. Powered via PoE (AH40)



Diagram, Peak overview sweep, 18 – 26.5 GHz at 3 m distance. TX mid channel, External antenna. Powered via AC/DC (AH20)



Diagram, Peak overview sweep, 18 – 26.5 GHz at 3 m distance. TX high channel, External antenna. Powered via PoE (AH40)



Diagram, Peak overview sweep, 18 – 26.5 GHz at 3 m distance. TX high channel, External antenna. Powered via AC/DC (AH20)

Measurement results, Peak, TX low channel, internal antenna, model AH40

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
7205.866111	61.02	74	V	12.98	2
9608.000000	51.5	74	V	22.5	5
12009.822778	65.49	74	V	8.51	5
14411.716000	62.43	74	V	11.57	5
18856.224375	55.28	74	H	18.72	8

Measurement results, Average, TX Low channel, internal antenna, model AH40

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
4804.000000	35.54	54	V	18.46	-4
7206.000000	38.75 ¹	54	V	15.25 ¹	2
9608.000000	40.7	54	V	13.3	5
12010.000000	44.49 ¹	54	V	9.51 ¹	5
14412.000000	40.69 ¹	54	H	13.31 ¹	5
16814.000000	45.65	54	H	8.35	5
19215.500000	43.72	54	V	10.28	8
21617.694444	44.20	54	H	9.80	9

Measurement results, Peak, TX low channel, external antenna, model AH40

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
7205.754444	61.00	74	V	13.00	2
12009.777778	61.22	74	V	12.78	5
14411.817000	62.08	74	H	11.92	5

Measurement results, Average, TX Low channel, external antenna, model AH40

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
4804.000000	34.25	54	V	19.75	-4
7206.000000	40.27 ¹	54	V	13.73 ¹	2
9608.000000	43.00	54	V	11.00	5
12010.000000	37.78 ¹	54	V	16.22 ¹	5
14412.000000	40.8 ¹	54	H	13.2 ¹	5
16814.000000	44.64	54	H	9.36	5

¹⁾ Duty Cycle Correction factor = 20 x log (0.11) = -19.17 dB (Duty cycle: 11%)

Measurement results, Peak, TX mid channel, internal antenna, model AH40

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
7319.918333	62.33	74	V	11.67	2
9759.895556	55.84	74	V	18.16	5
12200.237778	61.17	74	V	12.83	4
14639.895000	59.15	74	H	14.85	4

Measurement results, Average, mid channel, internal antenna, model AH40

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization n H/V	Margin [dB]	Correction factor [dB]
4879.500000	32.39	54	V	21.61	-3
7320.000000	41.52 ¹	54	V	12.48 ¹	2
9760.000000	48.28	54	V	5.72	5
14640.000000	35.16 ¹	54	H	18.84 ¹	4
17080.500000	35.12	54	V	18.88	5

Measurement results, Peak, TX mid channel, external antenna, model AH40

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
7319.905000	60.85	74	V	13.15	2
9762.881111	49.19	74	V	24.81	5
12199.733333	61.02	74	V	12.98	4
14639.944000	60.93	74	H	13.07	4
18336.527917	54.96	74	H	19.04	8

Measurement results, Average, mid channel, external antenna, model AH40

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
4880.000000	32.93	54	V	21.07	-3
7320.000000	38.86 ¹	54	V	15.14 ¹	2
9760.000000	36.66	54	V	17.34	5
12200.000000	38.46 ¹	54	V	15.54 ¹	4
14640.000000	37.58 ¹	54	H	16.42 ¹	4
17080.500000	40.78	54	V	13.22	5

¹⁾ Duty Cycle Correction factor = $20 \times \log(0.11) = -19.17$ dB (Duty cycle: 11%)

Measurement results, Peak, TX high channel, internal antenna, model AH40

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
7439.968889	59.86	74	V	14.14	2
9919.741667	54.24	74	V	19.76	5
12399.745000	61.31	74	V	12.69	4
14879.912000	59.95	74	H	14.05	4
17359.597000	54.82	74	V	19.18	5
18290.141111	54.13	74	V	19.87	8

Measurement results, Average, TX high channel, internal antenna, model AH40

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
4960.000000	36.58	54	H	17.42	-3
7440.000000	35.83 ¹	54	V	18.17 ¹	2
9920.500000	36.51	54	V	17.49	5
12400.000000	36.5 ¹	54	V	17.50 ¹	4
14880.000000	52.97	54	H	1.03	4
17360.000000	45.09	54	V	8.91	5
18859.444444	42.51	54	V	11.49	8

Measurement results, Peak, TX high channel, external antenna, model AH40

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
7440.000000	62.93	74	V	11.07	2
9919.830556	57.19	74	V	16.81	5
12399.652222	59.20	74	V	14.80	4
14879.939000	58.56	74	H	15.44	4
17359.812000	55.23	74	V	18.77	5
18792.852292	55.07	74	V	18.93	8

Measurement results, Average, TX high channel, external antenna, model AH40

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
4960.000000	35.51	54	H	18.49	-3
7440.000000	42.00 ¹	54	V	12.00 ¹	2
9920.000000	52.00	54	V	17.17 ¹	5
12400.000000	51.07	54	V	2.93	4
14880.000000	52.68	54	H	1.32	4
17360.000000	43.64	54	V	10.36	5
18850.472222	41.89	54	V	12.11	8

¹⁾ Duty Cycle Correction factor = $20 \times \log(0.11) = -19.17$ dB (Duty cycle: 11%)

All other measured disturbances have a margin of more than 20 dB to the limits.

Result [dBμV/m] = Analyser reading [dBμV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

Measurement results, Peak, TX low channel, internal antenna, model AH20

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
7206.001667	62.32	74	V	11.68	2
9608.151667	53.27	74	V	20.73	5
12010.149444	62.69	74	V	11.31	5
14412.094000	65.03	74	H	8.97	5
18713.544306	55.01	74	V	18.99	8

Measurement results, Average, TX Low channel, internal antenna, model AH20

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
7206.000000	38.55 ¹	54	V	13.45 ¹	2
9608.000000	46.54	54	V	7.46	5
12010.500000	46.53	54	V	7.47	5
14412.000000	40.03 ¹	54	H	13.97 ¹	5
16814.500000	42.06	54	H	11.94	5
19215.972222	41.76	54	V	12.24	8
21618.638889	44.77	54	H	9.23	9

Measurement results, Peak, TX low channel, external antenna, model AH20

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
7206.050000	63.31	74	V	10.69	2
9607.986667	56.03	74	V	17.97	5
12010.185556	64.94	74	V	9.06	5
14412.085000	65.08	74	H	8.92	5
16813.862000	54.34	74	H	19.66	5
18239.811181	54.75	74	V	19.25	8

Measurement results, Average, TX Low channel, external antenna, model AH20

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
7206.000000	42.22 ¹	54	V	10.78 ¹	2
12010.500000	44.02 ¹	54	V	9.98 ¹	5
14412.000000	43.92 ¹	54	H	10.08 ¹	5
16814.500000	41.66	54	H	12.34	5
19215.972222	44.23	54	H	9.77	8

¹⁾ Duty Cycle Correction factor = 20 x log (0.11) = -19.17 dB (Duty cycle: 11%)

Measurement results, Peak, TX mid channel, internal antenna, model AH20

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
7319.918333	62.33	74	V	11.67	2
9759.895556	58.31 ¹	74	V	15.69 ¹	5
12200.237778	66.2 ¹	74	V	7.80 ¹	4
14640.101000	62.96	74	H	11.04	4
19082.186389	55.15	74	V	18.85	8

Measurement results, Average, mid channel, internal antenna, model AH20

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
7320.000000	39.24 ¹	54	V	14.76 ¹	2
9760.000000	52.67	54	V	1.33	5
12200.000000	44.93 ¹	54	V	9.07 ¹	4
14640.000000	40.01	54	H	13.99 ¹	4
17080.500000	40.53	54	H	13.47	5
19520.083333	41.92	54	V	12.08	8
21960.527778	42.70	54	V	11.30	10

Measurement results, Peak, TX mid channel, external antenna, model AH20

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
7319.885000	63.89	74	V	10.11	2
9760.078333	56.17	74	V	17.83	5
12199.976667	68.14	74	V	5.86	4
14640.193000	62.63	74	H	11.37	4
16468.951000	52.02	74	V	21.98	4
17079.819000	53.15	74	H	20.85	5

Measurement results, Average, mid channel, external antenna, model AH20

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
7319.885000	43.91 ¹	54	V	10.09 ¹	2
9760.078333	52.08	54	V	1.92	5
12199.976667	47.51 ¹	54	V	6.49 ¹	4
14640.000000	41.54 ¹	54	H	12.44 ¹	4
17080.500000	38.87	54	V	15.13	5

¹⁾ Duty Cycle Correction factor = 20 x log (0.11) = -19.17 dB (Duty cycle: 11%)

Measurement results, Peak, TX high channel, internal antenna, model AH20

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
4960.106111	46.34	74	H	27.66	-3
7440.081667	63.40	74	V	10.60	2
9920.183889	58.26	74	H	15.74	5
12400.117778	65.43	74	H	8.57	4
14880.136000	61.59	74	H	12.41	4
18254.228472	54.75	74	V	19.25	8

Measurement results, Average, TX high channel, internal antenna, model AH20

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
7440.000000	37.35 ¹	54	V	16.65 ¹	2
12400.500000	41.55 ¹	54	H	12.45 ¹	4
14880.000000	36.88 ¹	54	H	17.12 ¹	4
17360.500000	41.55	54	H	12.45	5
22320.361111	48.14	54	H	5.86	11
24800.472222	42.74	54	H	11.26	9

Measurement results, Peak, TX high channel, external antenna, model AH20

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
7440.000000	63.05	74	V	11.07	2
9919.830556	60.12	74	V	13.88	5
12399.652222	68.00	74	V	6.00	4
14880.208000	61.27	74	H	12.73	4
18306.990278	55.34	74	V	18.66	8

Measurement results, Average, TX high channel, external antenna, model AH20

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]	Correction factor [dB]
7440.000000	43.08 ¹	54	V	10.92 ¹	2
9920.000000	38.63 ¹	54	V	15.37 ¹	5
12400.000000	46.95 ¹	54	V	7.05 ¹	4
14880.000000	35.92 ¹	54	H	18.08 ¹	4
17360.500000	42.32	54	H	11.68	5
22320.361111	44.64	54	H	9.36	11

¹⁾ Duty Cycle Correction factor = $20 \times \log(0.11) = -19.17$ dB (Duty cycle: 11%)

All other measured disturbances have a margin of more than 20 dB to the limits.

Result [dBμV/m] = Analyser reading [dBμV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

7 CONDUCTED BAND EDGE MEASUREMENT

Date of test:	4 October 2024	Test location:	TS8997
EUT Serial:	00.12.4B.00.2E.1A.11.29 00.12.4B.00.2E.18.82.9C	Ambient temp:	20°C
Tested by:	Nahome Micheal Sandipan Basu Björn Utermöhl	Relative humidity:	34%
Test result:	Pass	Margin:	> 20dB

7.1 Test set-up and test procedure.

The test method is in accordance with ANSI C63.10-2020 section 6.10.4.
The EUT was connected to spectrum analyser via rf-cable and attenuator.
The EUT was set up in order to emit maximum disturbances.

7.2 Test conditions

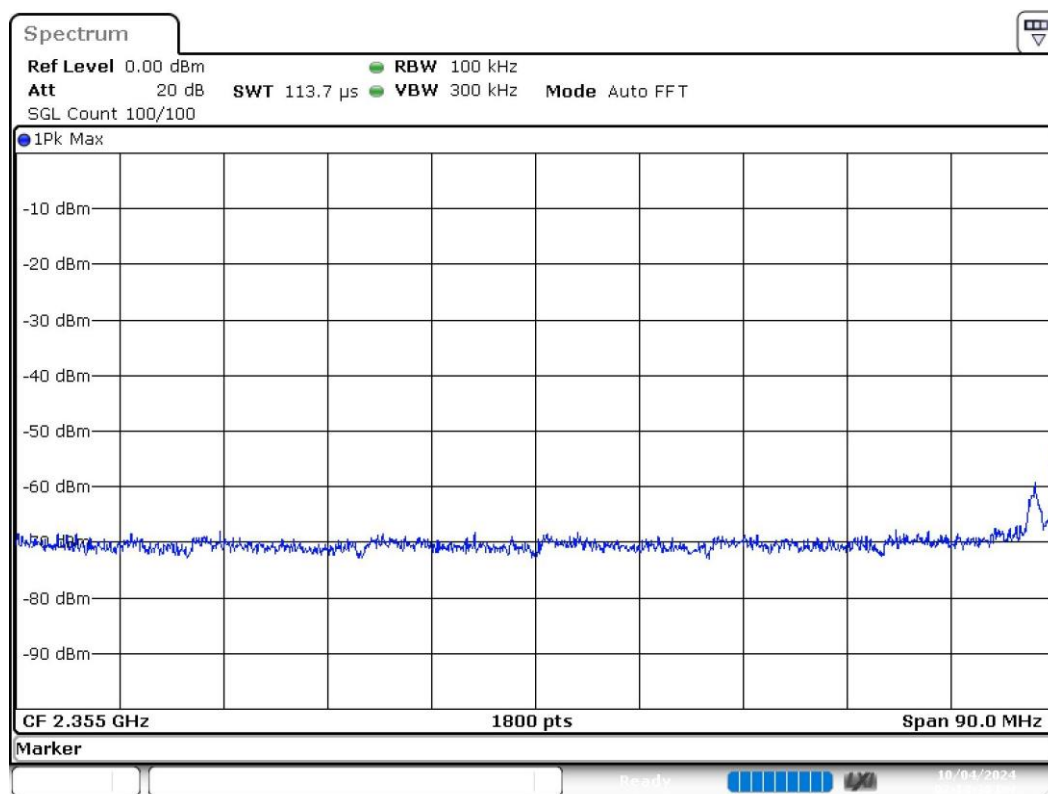
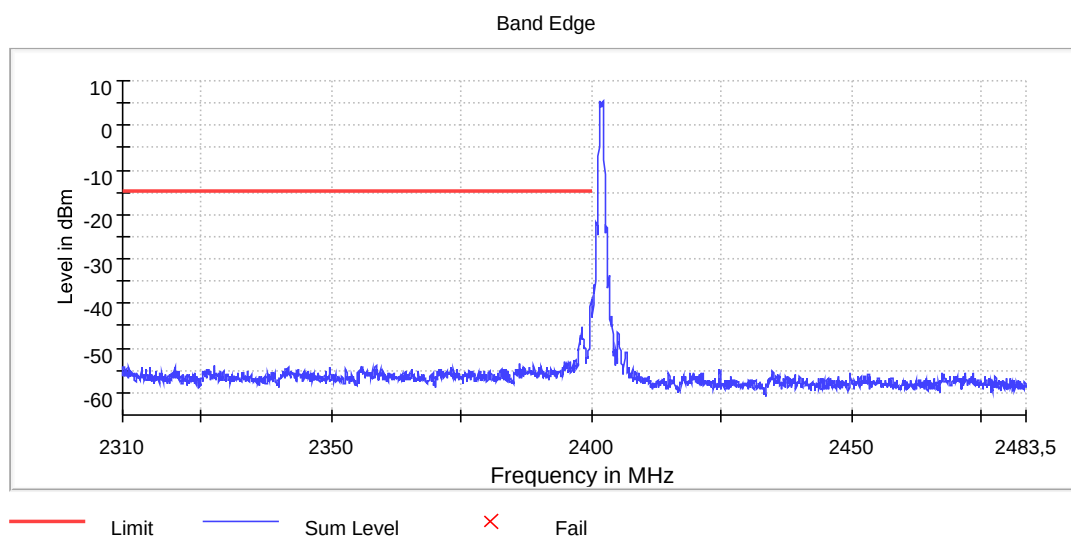
Detector: Peak,
RBW: 100 kHz
VBW: 300 kHz

7.3 Requirement

Reference: CFR 47 §15.247(d), RSS-247 5.5,

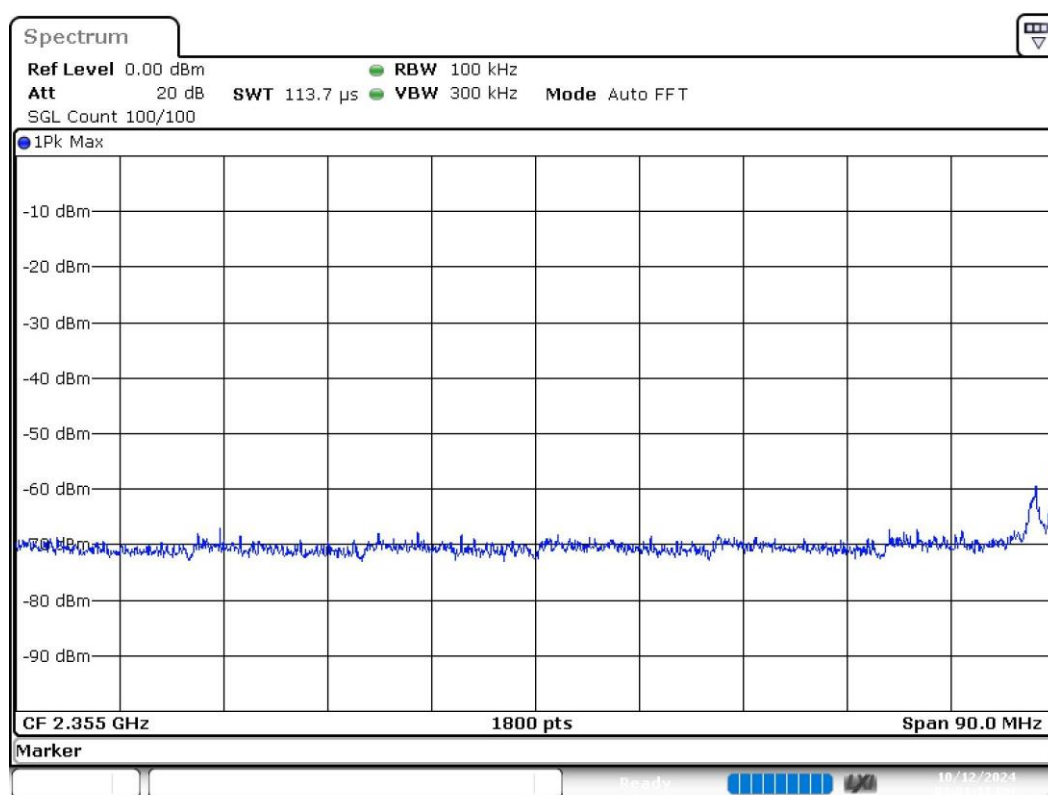
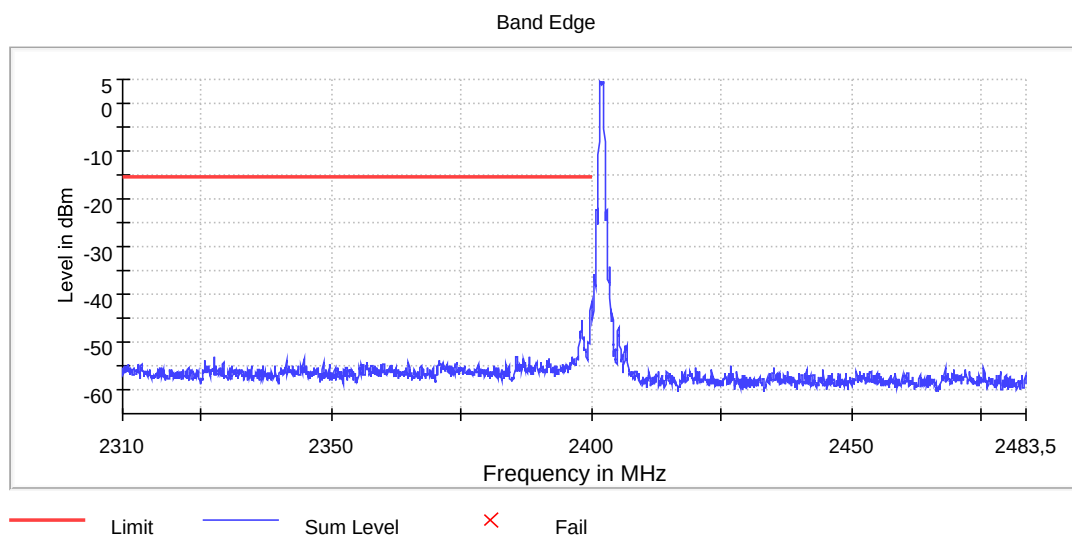
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits.

7.4 Test results



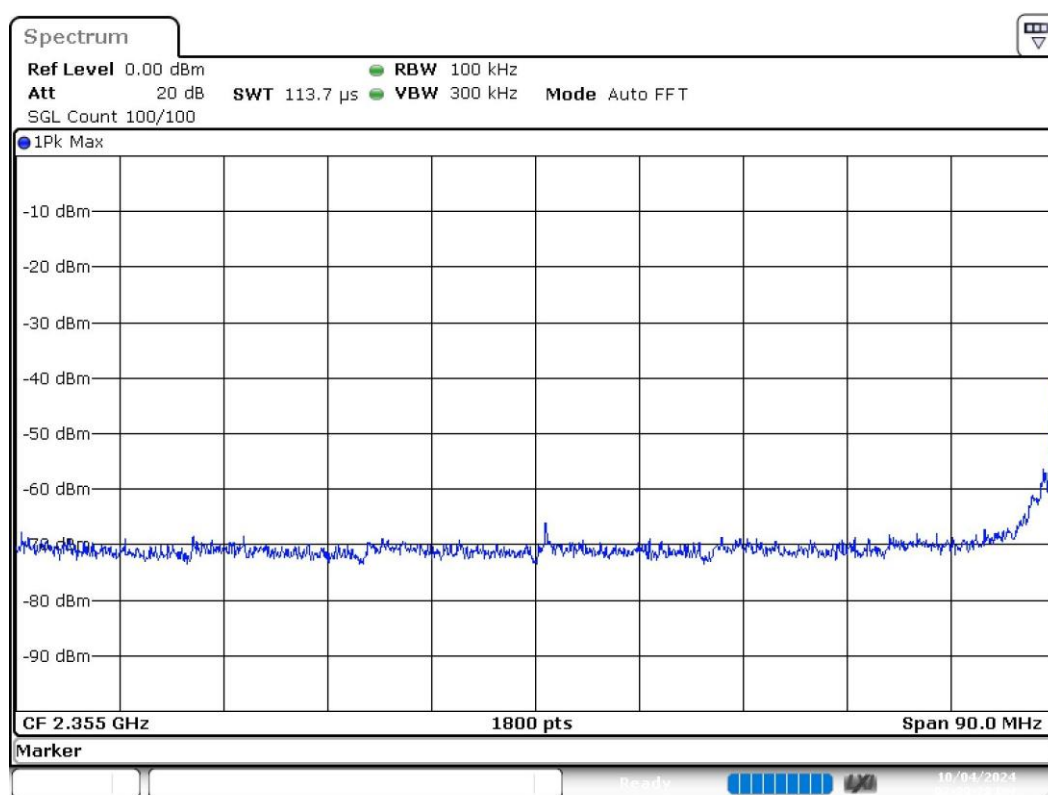
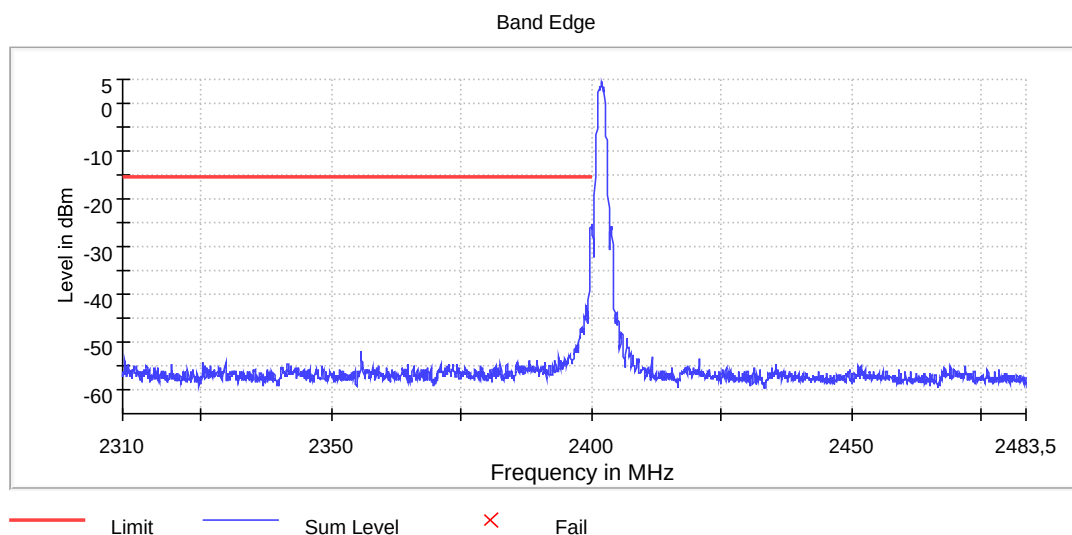
Date: 4.OCT.2024 14:14:30

Screenshot: Lower band edge sweep, 1MHz bandwidth (AH40)



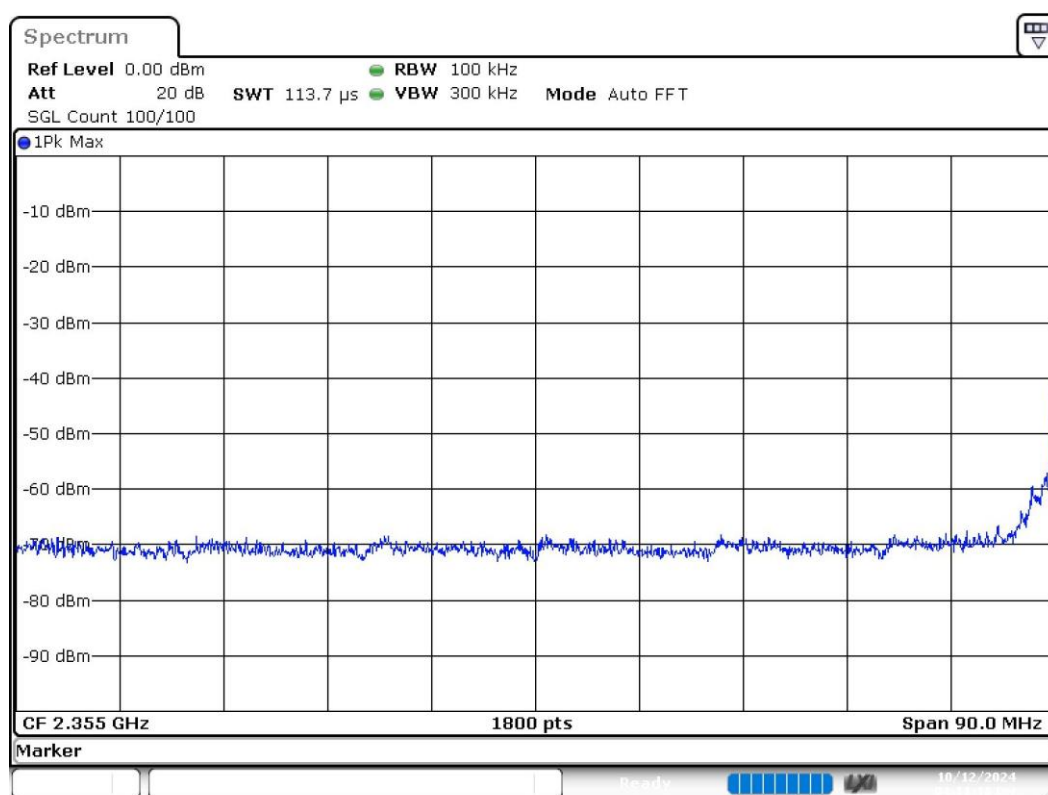
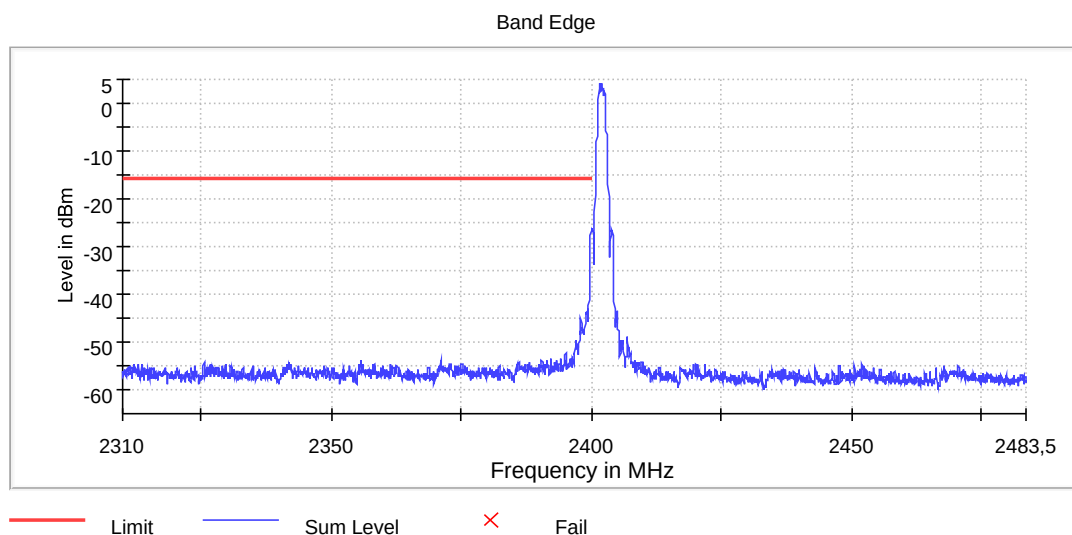
Date: 12.OCT.2024 16:01:11

Screenshot: Lower band edge sweep, 1MHz bandwidth (AH20)



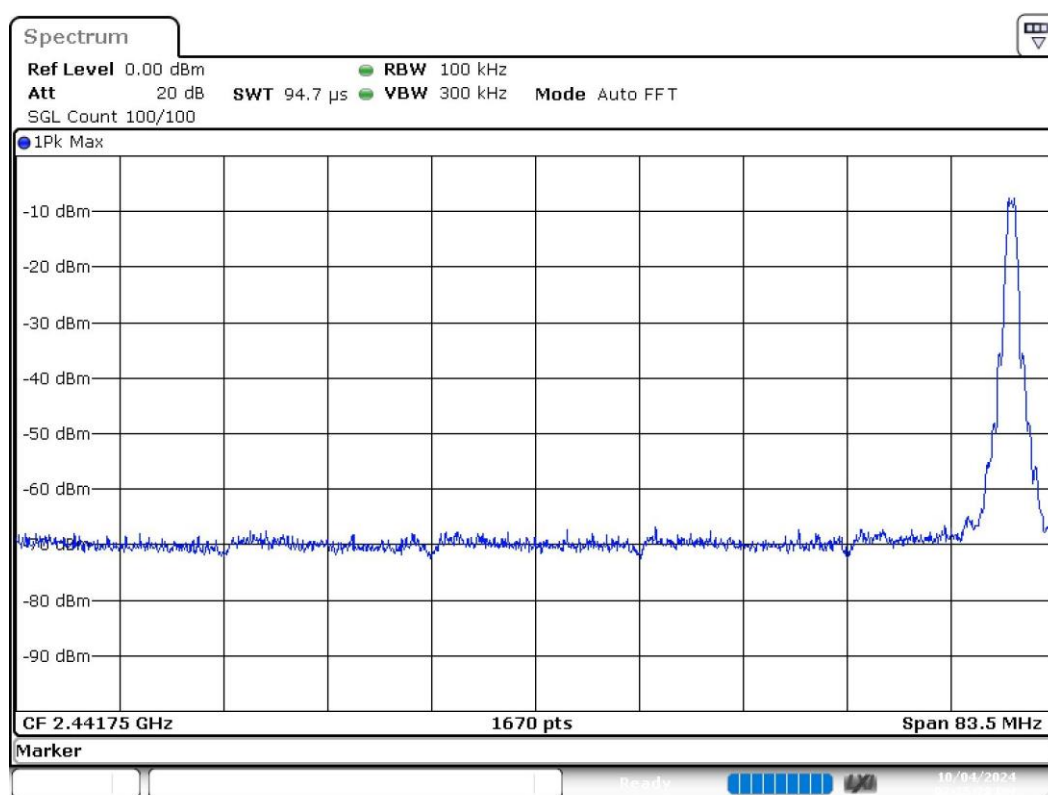
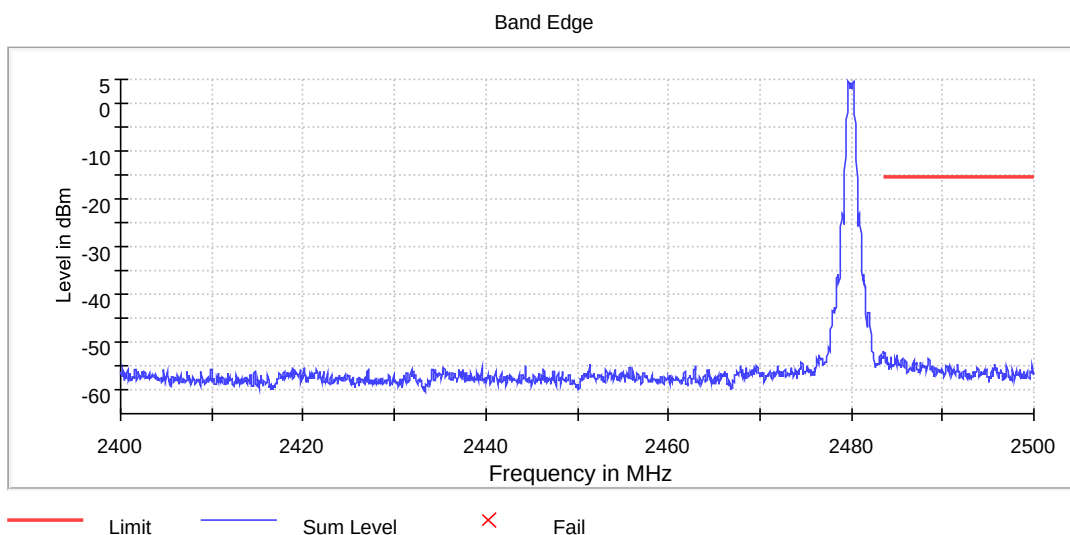
Date: 4.OCT.2024 14:29:29

Screenshot: Lower band edge sweep, 2MHz bandwidth. (AH40)



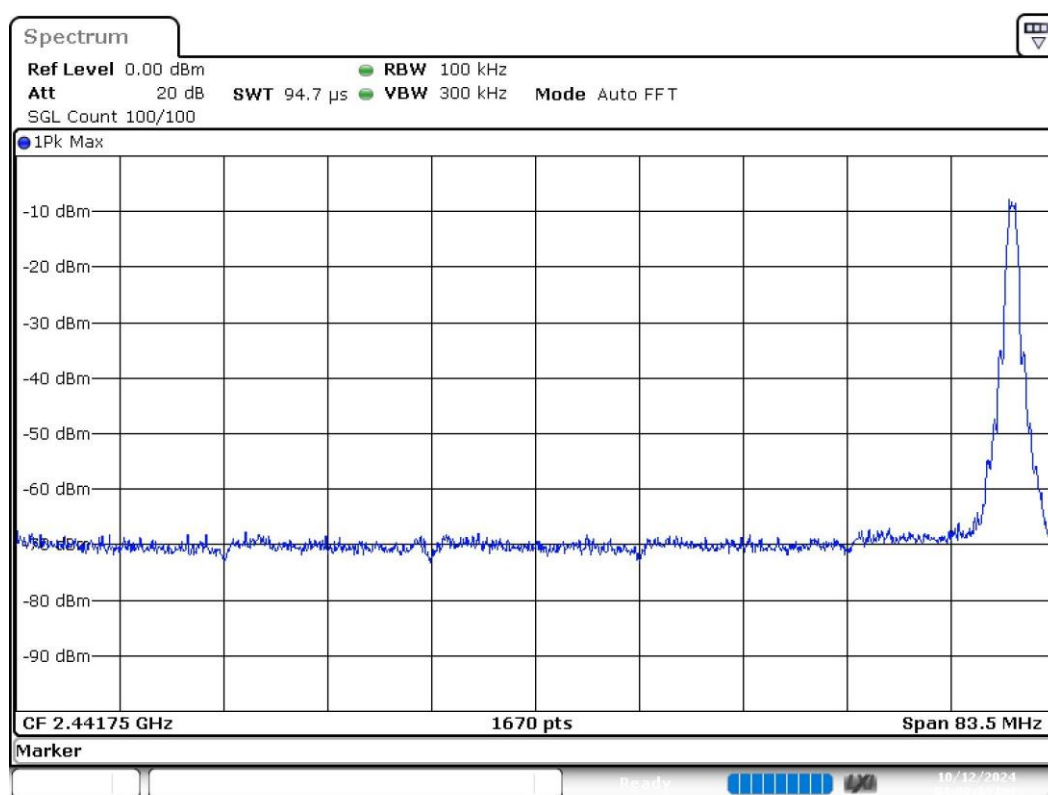
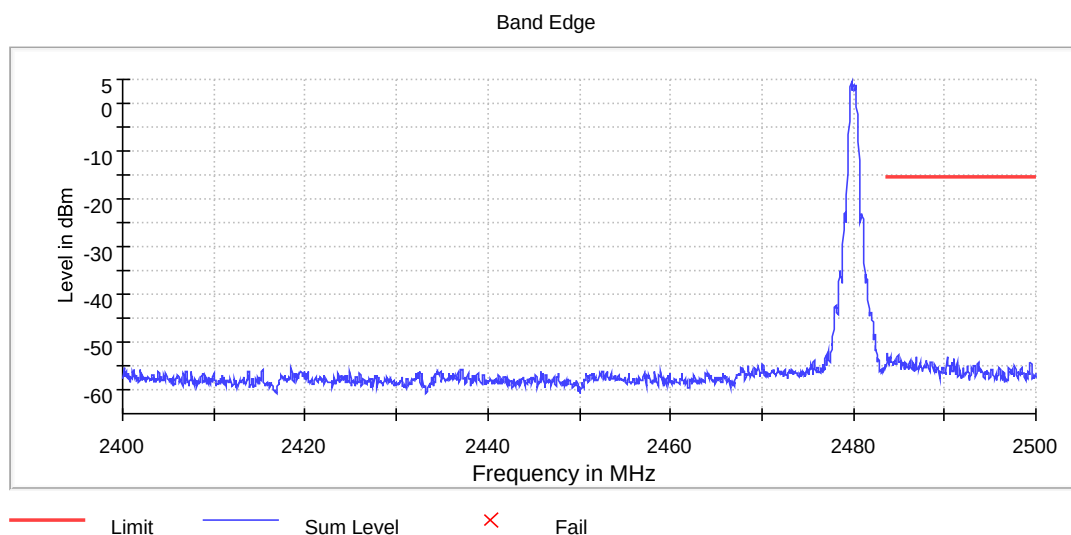
Date: 12.OCT.2024 16:11:11

Screenshot: Lower band edge sweep, 2MHz bandwidth. (AH20)



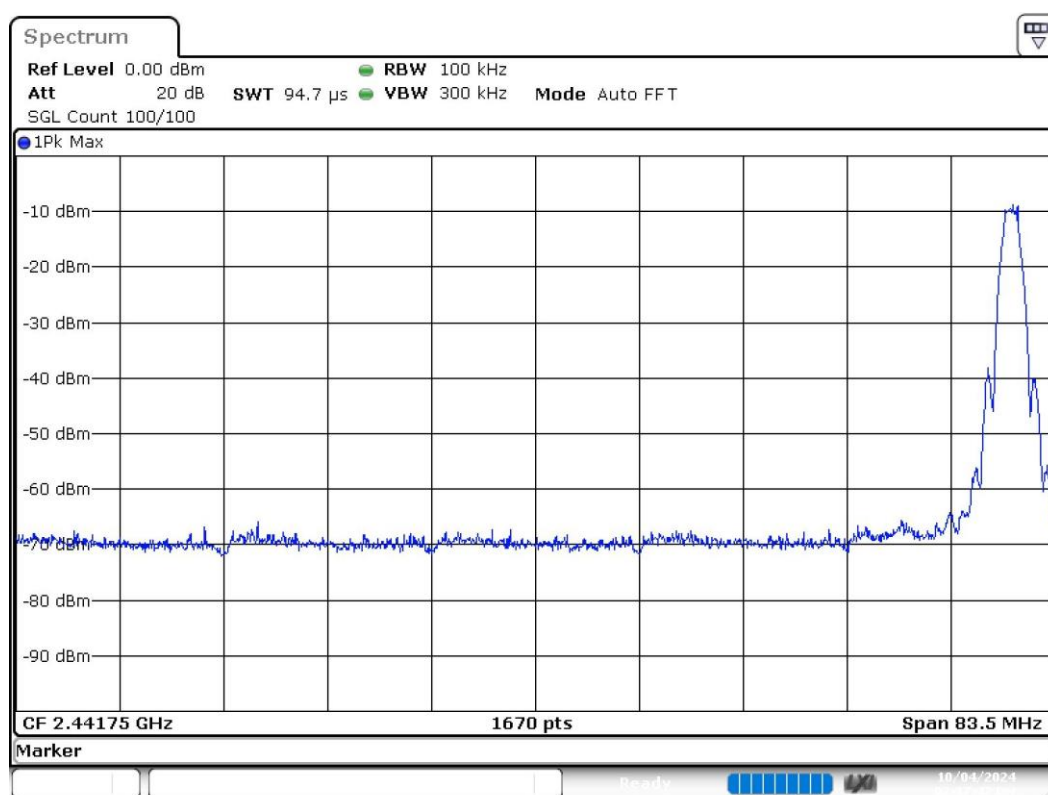
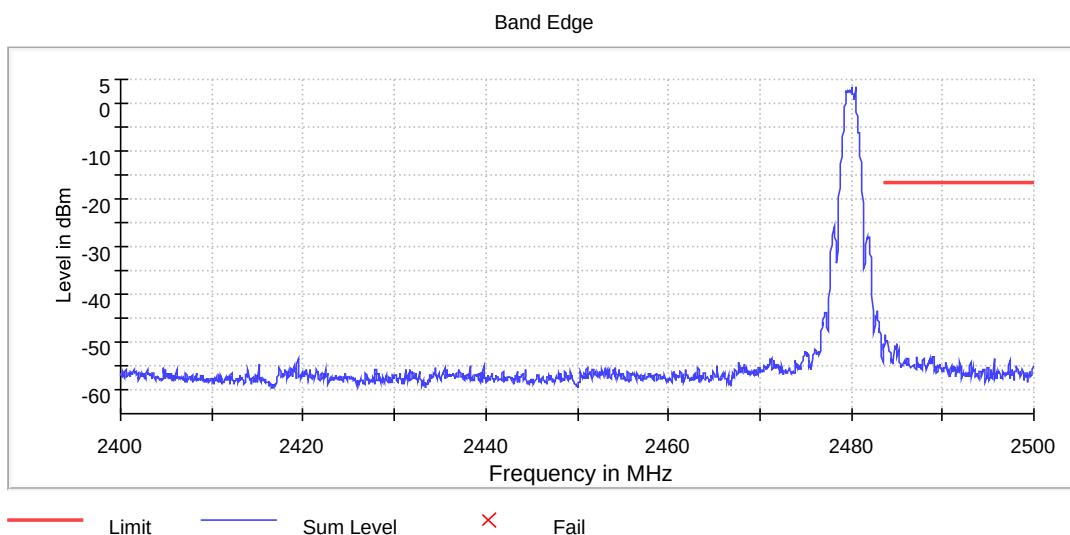
Date: 4.OCT.2024 14:25:29

Screenshot: Upper band edge sweep, 1MHz bandwidth (AH40)



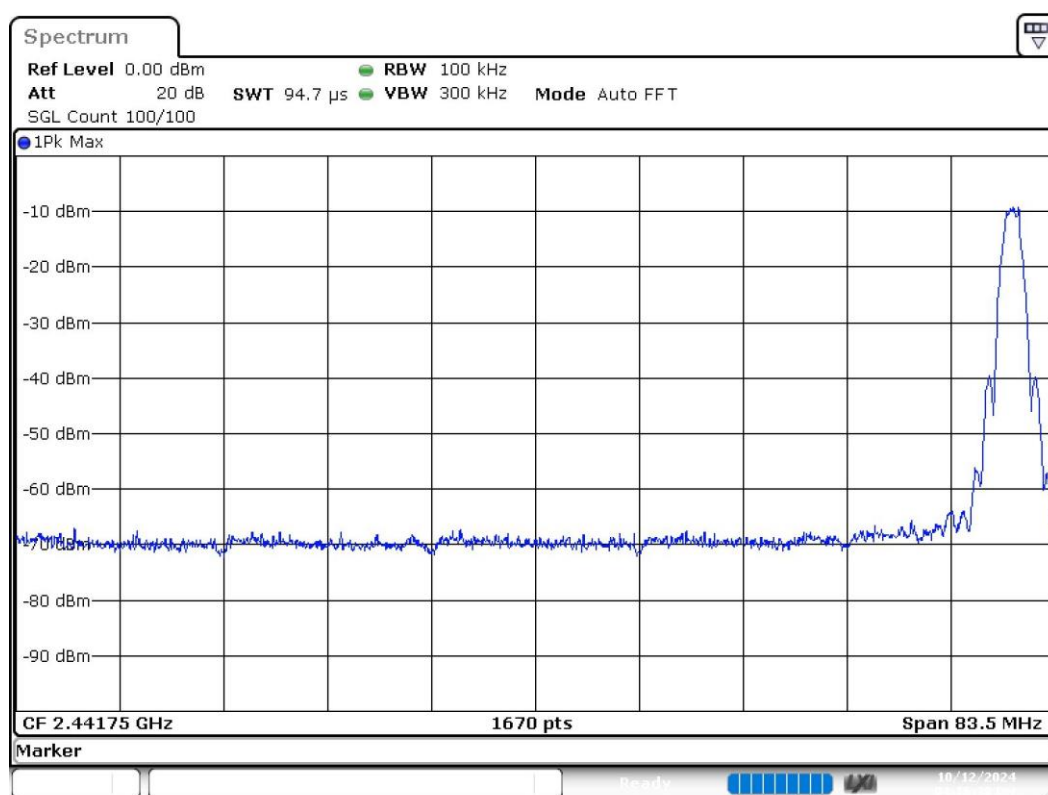
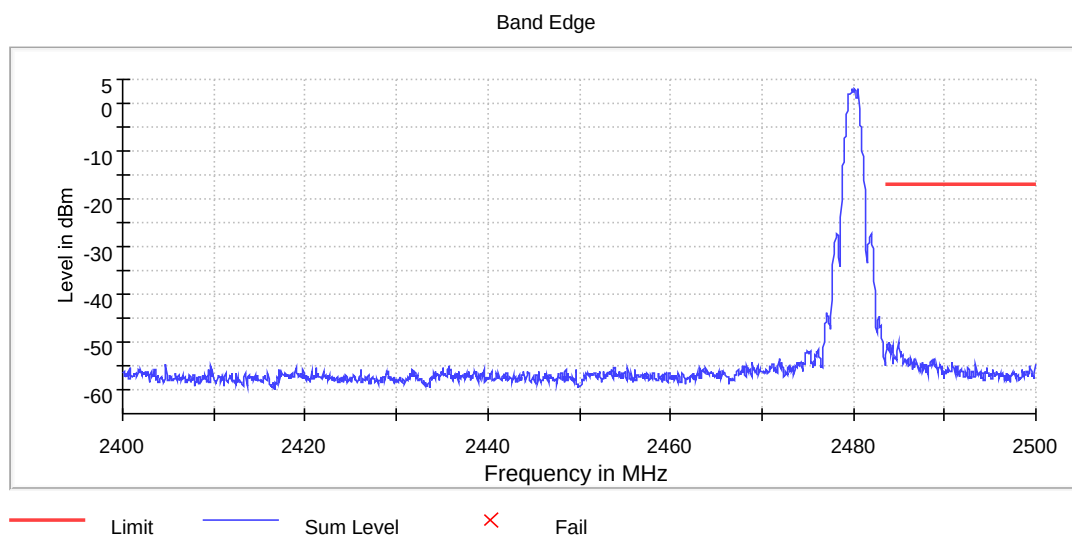
Date: 12.OCT.2024 16:08:34

Screenshot: Upper band edge sweep, 1MHz bandwidth (AH20)



Date: 4.OCT.2024 14:37:42

Screenshot: Upperband edge sweep, 2MHz bandwidth. (AH40)



Date: 12.OCT.2024 16:16:39

Screenshot: Upperband edge sweep, 2MHz bandwidth. (AH20)

Test results

Model	Band edge	Delta [dBc]	Limit [dBc]	Margin [dB]
AH40	1MHz OBW, Lower edge	44.6	20.0	24.6
AH40	2MHz OBW, Lower edge	30.2	20.0	10.2
AH20	1MHz OBW, Lower edge	46.5	20.0	26.5
AH20	2MHz OBW, Lower edge	30.7	20.0	10.7
AH40	1MHz OBW, Upper edge	56.7	20.0	36.7
AH40	2MHz OBW, Upper edge	52.0	20.0	32.0
AH20	1MHz OBW, Upper edge	56.8	20.0	36.8
AH20	2MHz OBW, Upper edge	53.0	20.0	33.0

8 RADIATED BAND EDGE MEASUREMENT

Date of test:	16 October 2024	Test location:	TS8997
EUT Serial:	00.12.4B.00.2E.1A.11.29 00.12.4B.00.2E.18.82.9C	Ambient temp:	20°C
Tested by:	Nahome Micheal Sandipan Basu Björn Utermöhl	Relative humidity:	26%
Test result:	Pass	Margin:	> 13.19dB

8.1 Test set-up and test procedure.

The test method is in accordance with KDB 558074 D01 and ANSI C63.10-2020 section 11.12.2.5.1

The EUT was set up in order to emit maximum disturbances.

The EUT was placed on an insulating support 0.8 and 1.5 m above the turntable which is part of the reference ground plane.

Overview sweeps were performed with the measurement receiver in max-hold mode and the peak detector activated.

Portable device: Pre scan was made in three orthogonal EUT orientations.

8.2 Test conditions

Detector: Peak,
RBW: 1 MHz
VBW: 3 MHz

8.3 Requirement

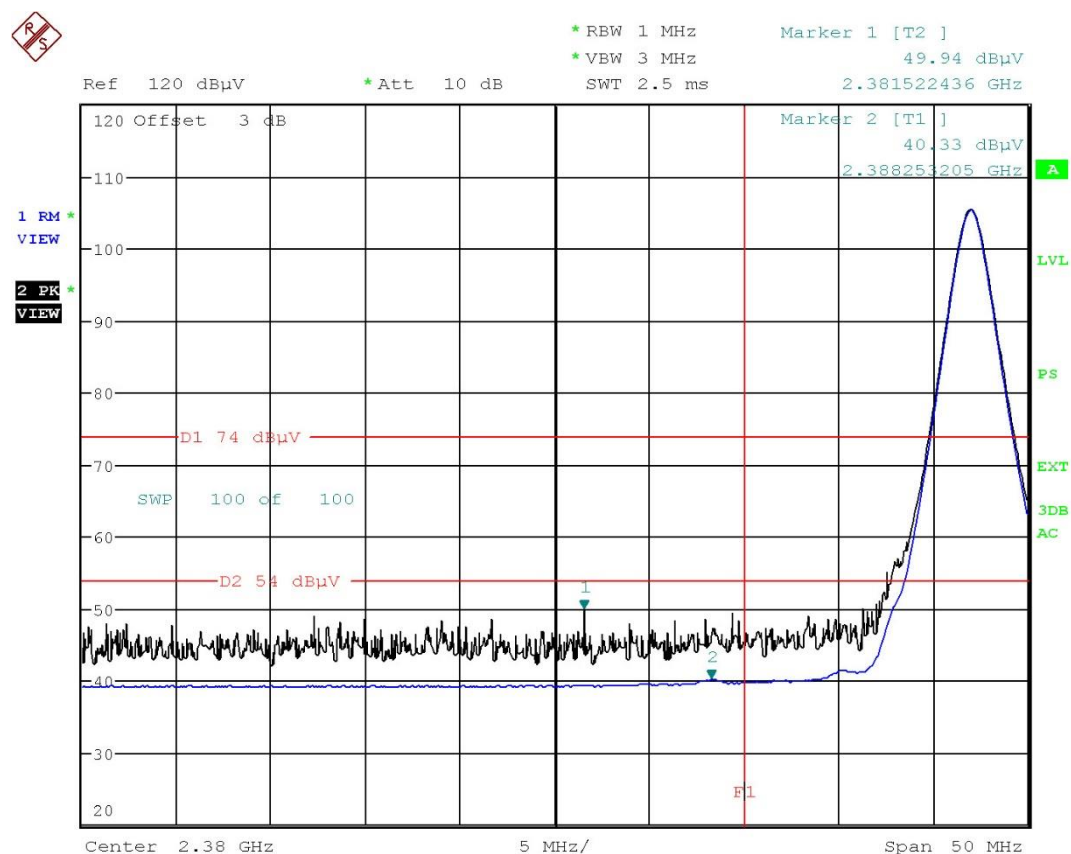
Within restricted bands:

Reference: CFR 47 §15.209, RSS-Gen section 8.9

Field strength of emissions must comply with limits shown in table below

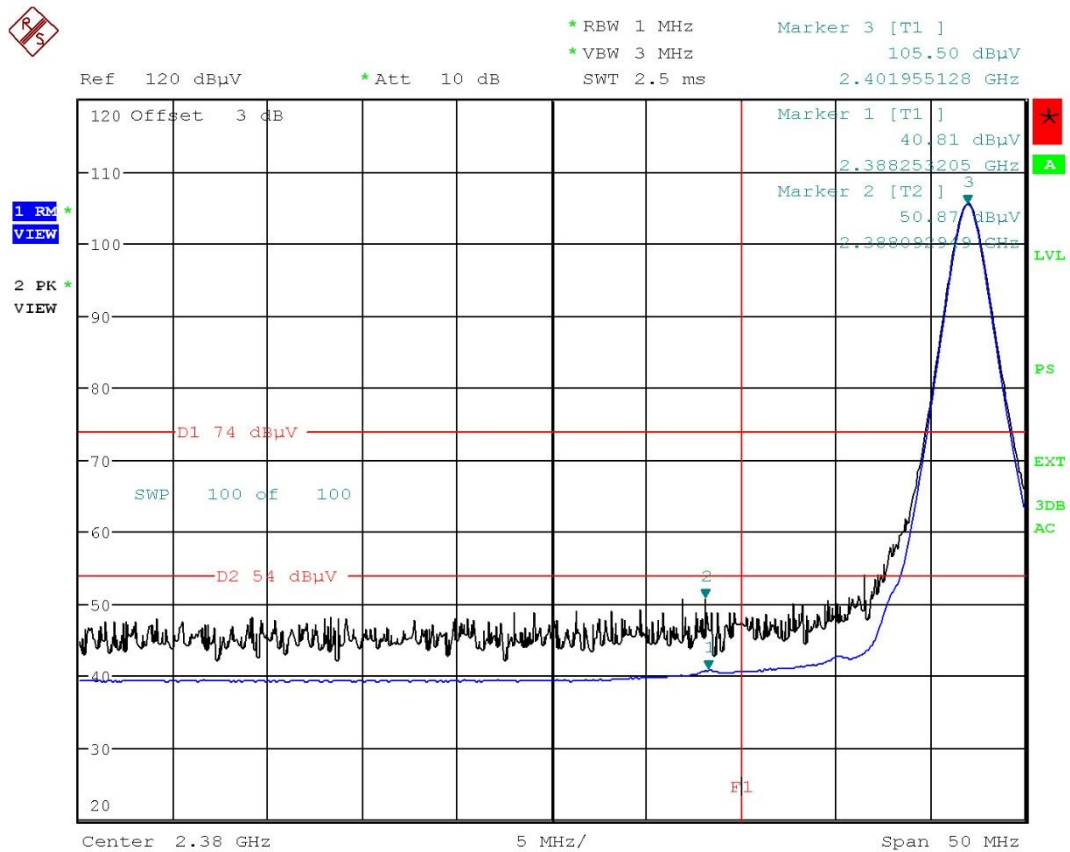
Frequency range [MHz]	Field strength at 3 m (dB μ V/m)	Field strength at 10 m (dB μ V/m)	Detector (dB μ V/m)
30 – 88	40.0	29.5	Quasi Peak
88 – 216	43.5	33.0	Quasi Peak
216 – 960	46.0	35.5	Quasi Peak
960 – 1000	54.0	43.5	Quasi Peak
Above 1000	54.0 / 74.0	43.5 / 63.5	Average / Peak

8.4 Results



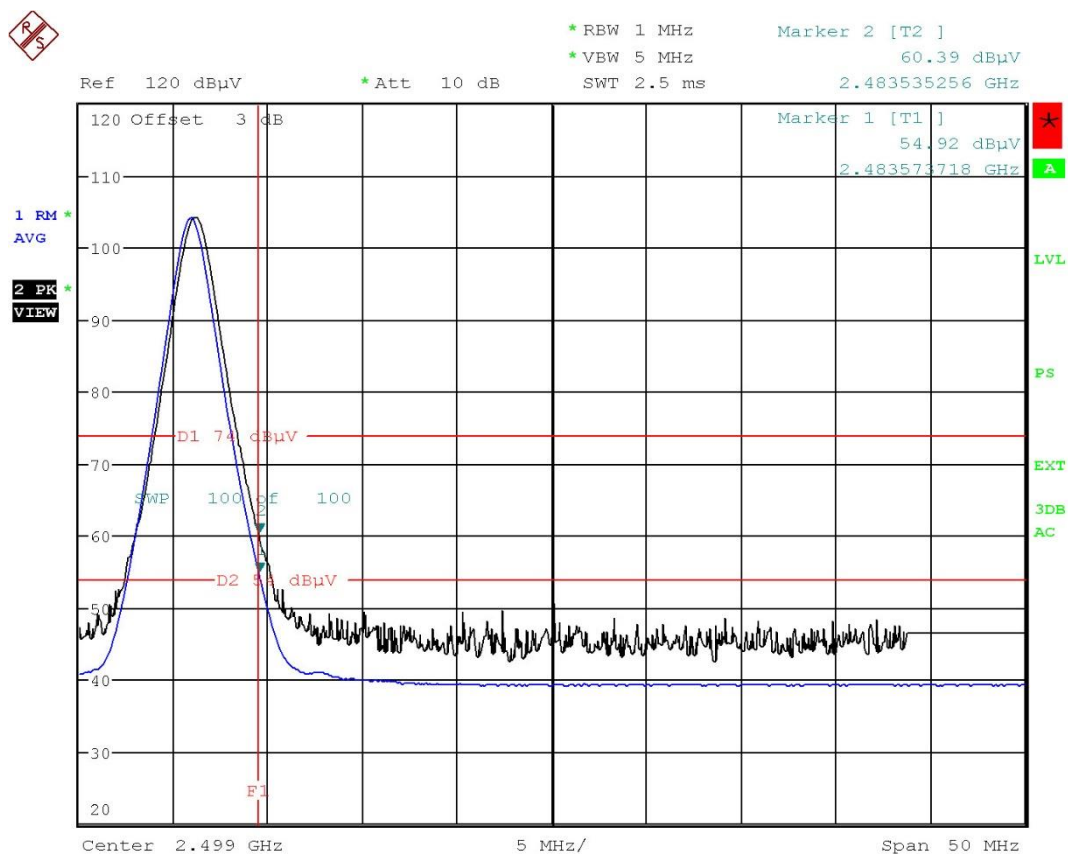
Date: 16.OCT.2024 15:49:59

Screenshot: Lower band edge sweep, single channel, external antenna. (AH40)



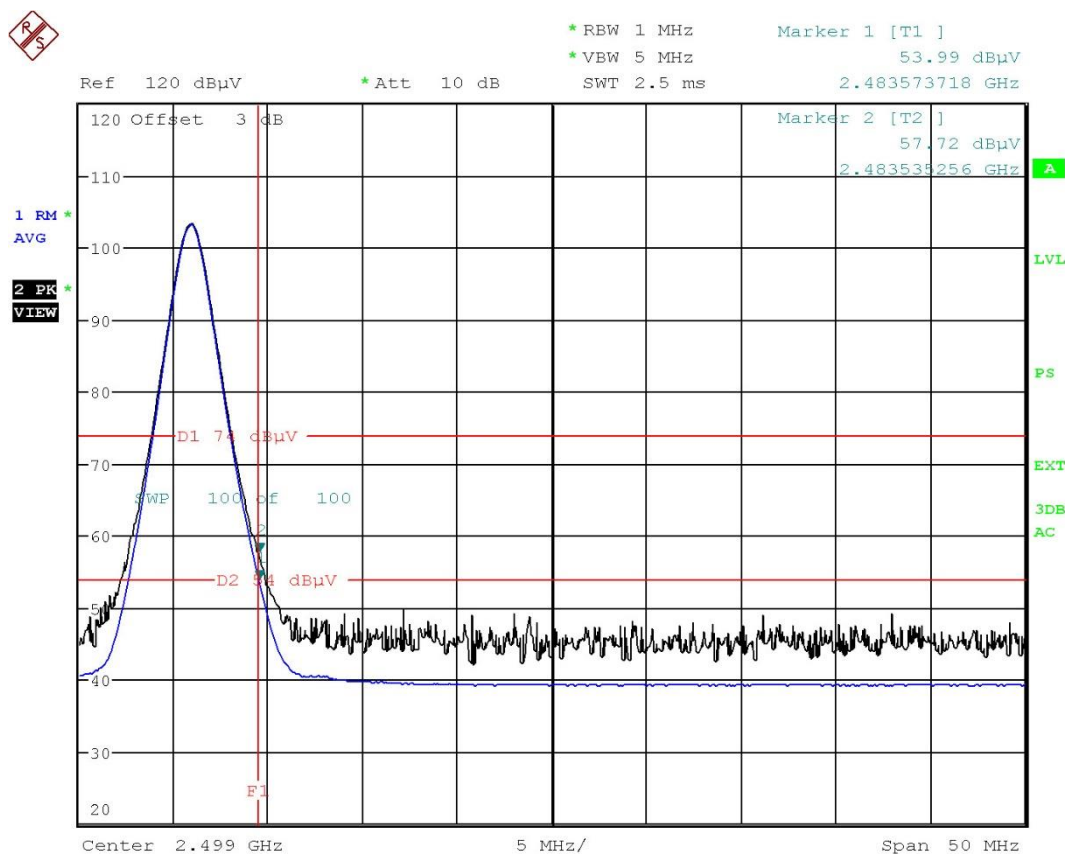
Date: 16.OCT.2024 14:28:16

Screenshot: Lower band edge sweep, single channel, internal antenna. (AH20)



Date: 16.OCT.2024 13:32:46

Screenshot: Higher band edge sweep, single channel, external antenna. (AH40)



Date: 16.OCT.2024 13:45:09

Screenshot: Higher band edge sweep, single channel, internal antenna. (AH20)

Test results

Model	Band edge	Peak [dBμV]	Limit [dBc]	Margin [dB]
AH20	Lower, internal antenna	50.87	74	23.13
AH40	Lower, external antenna	49.94	74	24.06
AH20	Upper, internal antenna	57.72	74	16.28
AH40	Upper, external antenna	60.39	74	13.61

Model	Band edge	Average [dBμV]	Limit [dBc]	Margin [dB]
AH20	Lower, internal antenna	40.81	54	13.19
AH40	Lower, external antenna	40.33	54	13.67
AH20	Upper, internal antenna	53.99	54	0.01
AH40	Upper, external antenna	35.75	54	18.25*

The maximum duty cycle calculation is given by manufacturer in the operational description is 11%

* Duty Cycle Correction factor = $20 \times \log(0.11) = -19.17 \text{ dB}$ (Duty cycle: 11%)

9 PEAK CONDUCTED OUTPUT POWER

Date of test:	4 October 2024	Test location:	TS8997
EUT Serial:	00.12.4B.00.2E.1A.11.29 00.12.4B.00.2E.18.82.9C	Ambient temp:	20°C
Tested by:	Nahome Micheal Sandipan Basu Björn Utermöhl	Relative humidity:	34%
Test result:	Pass	Margin:	> 0.8dBm

9.1 Test set-up and test procedure.

The test method is in accordance with ANSI C63.10-2020 section 11.9.1.1.

The EUT was connected to spectrum analyser via rf-cable and attenuator.

9.2 Test conditions

Detector: Peak,
RBW: >=OBW
VBW: 3 x RBW
Span: >3 x OBW

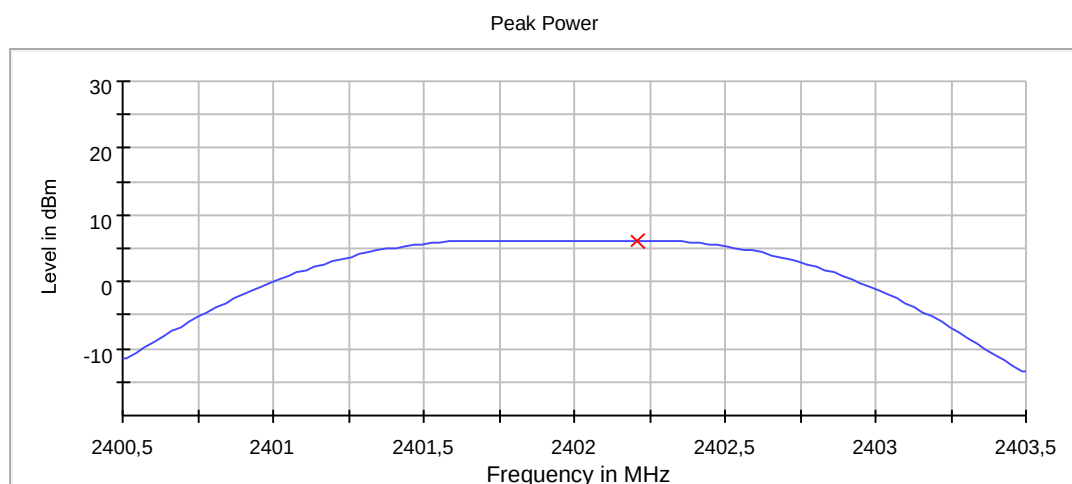
The EUT was set up according to section 2.4, in order to emit the highest emission.

9.3 Requirements

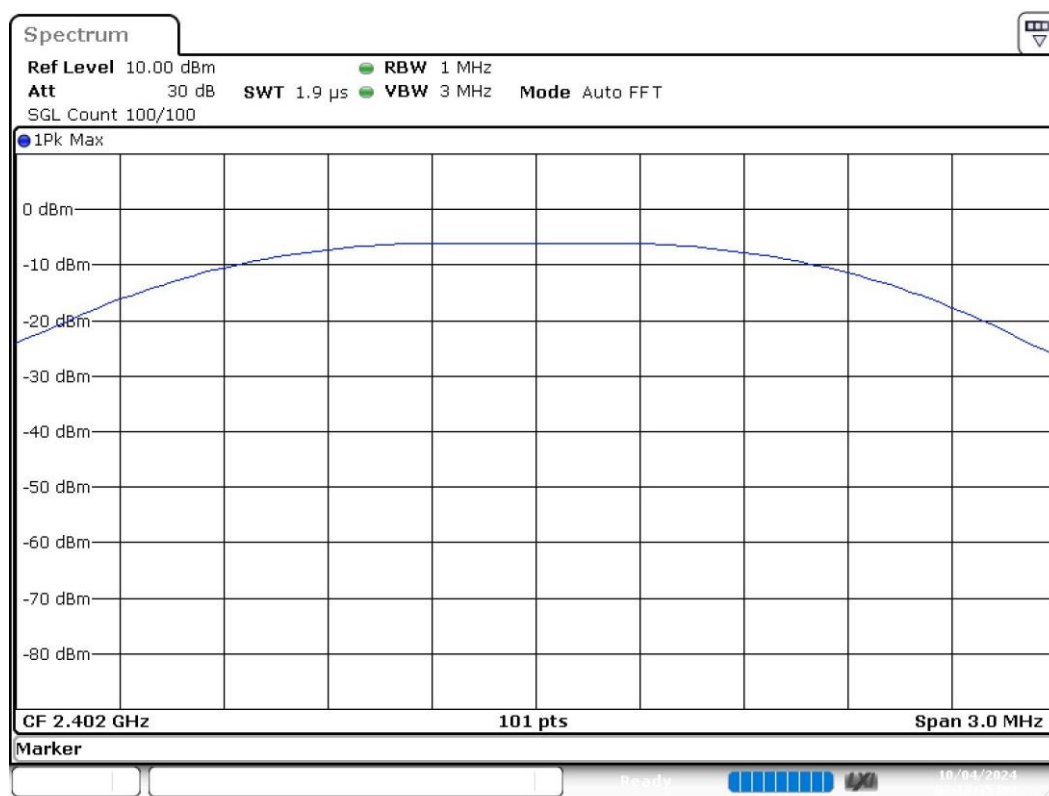
Reference: CFR 47§15.247(b)(3), RSS-247 5.4

For DTSs employing digital modulation techniques operating in the bands 902 – 128 MHz, 2400 – 2483.5 MHz and 5725 – 5850 MHz, the maximum peak conducted output power shall not exceed 1W.

9.4 Test results

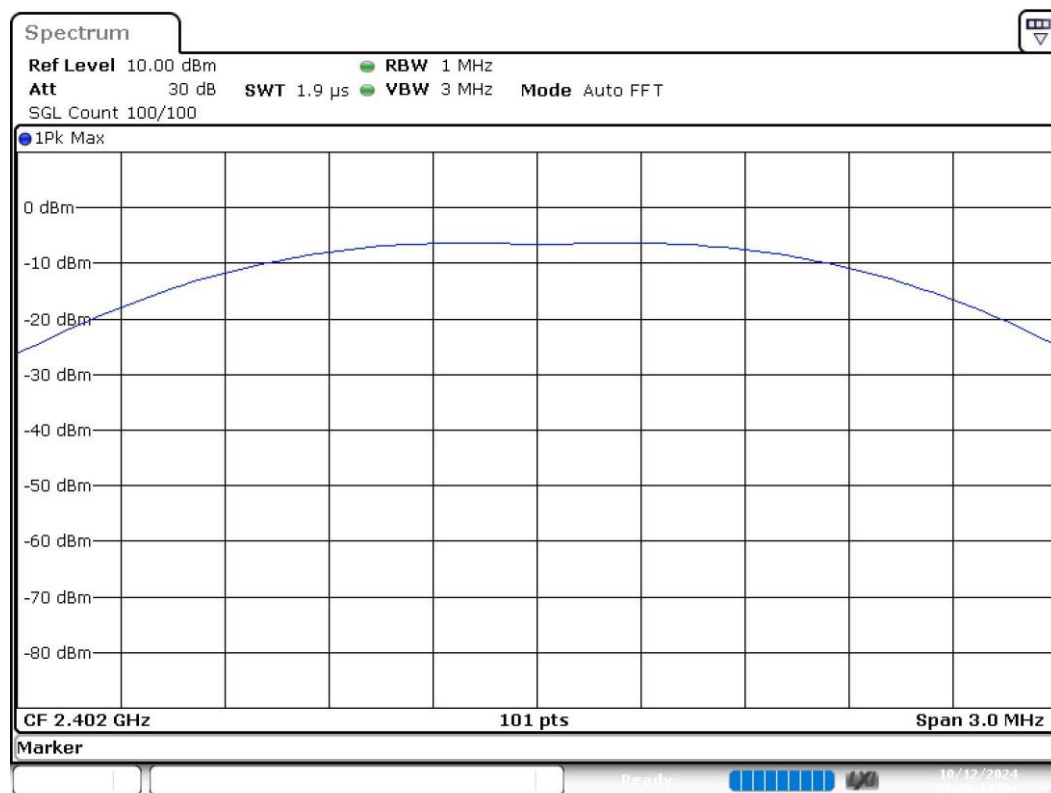
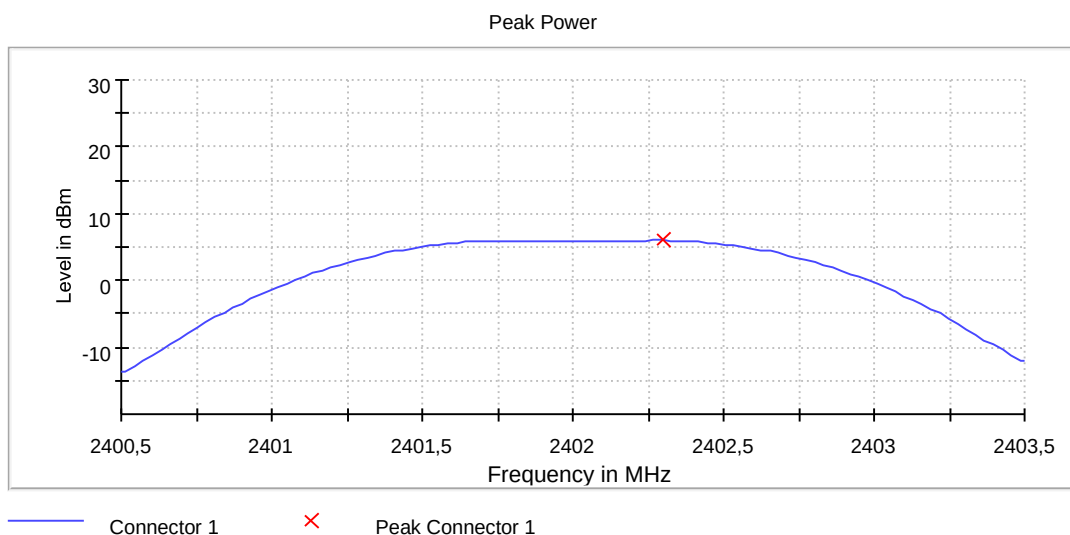


Connector 1 X Peak Connector 1



Date: 4.OCT.2024 14:13:35

Screenshot: Output power, low channel, 1M bandwidth operation (AH40)



Date: 12.OCT.2024 16:00:14

Screenshot: Output power, low channel, 1M bandwidth operation (AH20)