
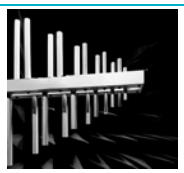
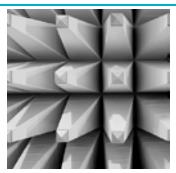

Bundesnetzagentur

BNetzA-CAB-02/21-102

TEST REPORT

Test report no.: 1-4095/22-01-05-A

Testing laboratory

CTC advanced GmbH
Untertuerkheimer Strasse 6 – 10
66117 Saarbruecken / Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
Internet: https://www.ctcadvanced.com
e-mail: mail@ctcadvanced.com

Accredited Testing Laboratory:
The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2018-03) by the Deutsche Akkreditierungsstelle GmbH (DAkkS)
The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate starting with the registration number: D-PL-12076-01.

Applicant

SAGEMCOM BROADBAND SAS
250, route de l´ Empereur
92848 Rueil-Malmaison Cedex / FRANCE
Phone:
Contact: Alain Cruchant
e-mail: alain.cruchant@sagemcom.com

Manufacturer

SAGEMCOM BROADBAND SAS
250, route de l´ Empereur
92848 Rueil-Malmaison Cedex / FRANCE

Test standard/s

FCC - Title 47 CFR Part 15	FCC - Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices

For further applied test standards please refer to section 3 of this test report.

Test Item

Kind of test item:	**Set Top Box**
Model name:	**DIW377 ALT US**
FCC ID:	**VW3DIW377**
Frequency:	UNII bands: 5150 MHz to 5250 MHz; 5250 MHz to 5350 MHz; 5470 MHz to 5725 MHz; 5725 MHz to 5850 MHz
Technology tested:	WLAN
Antenna:	Two integrated antennas
Power supply:	110 V to 127 V AC by mains
Temperature range:	-5°C to 45°C

This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test report authorized:

p.o. cn=Marco Bertolino, o=CTC advanced GmbH, ou=BTL-211209, email=marco.bertolino@ctcadvanced.com, c=DE
2022.09.02 10:28:27 +02'00'

Michael Dorongovski
Lab Manager
Radio Communications

Test performed:

cn=Andreas Kurzkurt, o=CTC advanced GmbH, ou=KZK-200114, email=Andreas.Kurzkurt@ctcadvanced.com, c=DE

Andreas Kurzkurt
Testing Manager
Radio Communications

1 Table of contents

2 General information

2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. CTC advanced GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.
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This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

2.2 Application details

Date of receipt of order:	2022-03-22
Date of receipt of test item:	2022-05-10
Start of test:*	2022-07-04
End of test:*	2022-08-25
Person(s) present during the test:	-/-

*Date of each measurement, if not shown in the plot, can be requested. Dates are stored in the measurement software.

2.3 Test laboratories sub-contracted

None

3 Test standard/s, references and accreditations

Test standard	Date	Description
FCC - Title 47 CFR Part 15		FCC - Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices

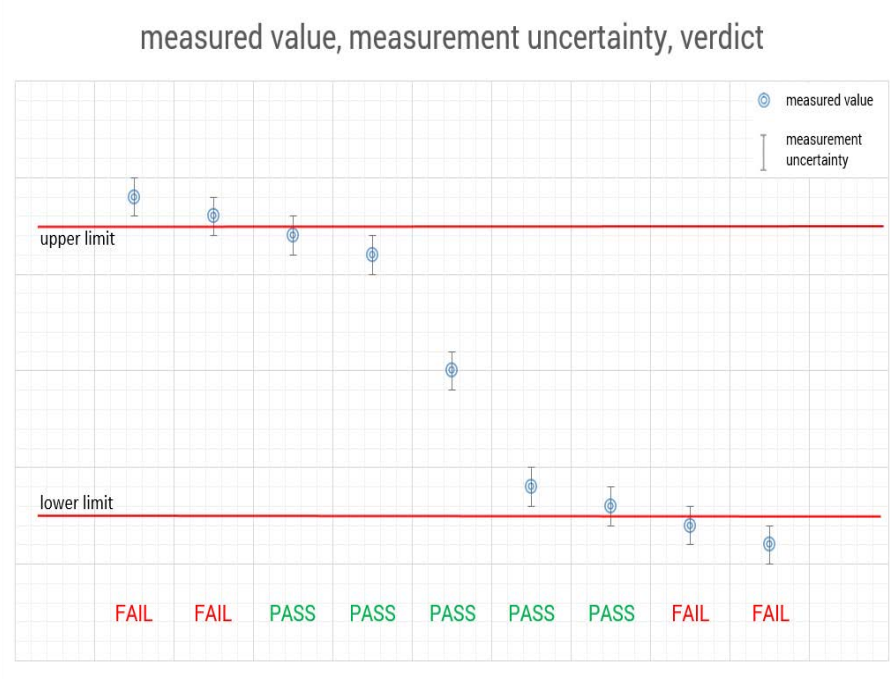
Guidance	Version	Description
KDB 789033 D02	v02r01	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E
ANSI C63.4-2014	-/-	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10-2013	-/-	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
KDB 662911 D01	v02r01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band

Accreditation	Description
D-PL-12076-01-05	Telecommunication FCC requirements https://www.dakks.de/as/ast/d/D-PL-12076-01-05e.pdf

FCC designation number: DE0002

4 Reporting statements of conformity – decision rule

Only the measured values related to their corresponding limits will be used to decide whether the equipment under test meets the requirements of the test standards listed in chapter 3.
The measurement uncertainty is mentioned in this test report, see chapter 9 but is not taken into account - neither to the limits nor to the measurement results. Measurement results with a smaller margin to the corresponding limits than the measurement uncertainty have a potential risk of more than 5% that the decision might be wrong."



5 Test environment

Temperature	:	T_{nom} T_{max} T_{min}	21 °C during room temperature tests No testing under extreme temperature conditions required No testing under extreme temperature conditions required
Relative humidity content	:		55 %
Barometric pressure	:		Not relevant for this kind of testing
Power supply	:	V_{nom} V_{max} V_{min}	115 V AC by mains No testing under extreme voltage conditions required No testing under extreme voltage conditions required

6 Test item

6.1 General description

Kind of test item	:	Set Top Box
Model name	:	DIW377 ALT US
S/N serial number	:	Rad. 622172052045 Cond. 622172052818
Hardware status	:	v1
Software status	:	3.1.8
Firmware status	:	3.1.8
Frequency band	:	UNII bands: 5150 MHz to 5250 MHz; 5250 MHz to 5350 MHz; 5470 MHz to 5725 MHz; 5725 MHz to 5850 MHz
Type of radio transmission Use of frequency spectrum	: :	OFDM
Type of modulation	:	(D)BPSK, (D)QPSK, 16 – QAM, 64 – QAM
Number of channels	:	24 with 20 MHz channel bandwidth 11 with 40 MHz channel bandwidth 5 with 80 MHz channel bandwidth
Antenna	:	Two integrated antennas
Power supply	:	110 V to 127 V AC by mains
Temperature range	:	-5°C to 45°C

6.2 Additional information

The content of the following annexes is defined in the QA. It may be that not all of the listed annexes are necessary for this report, thus some values in between may be missing.

Test setup and EUT photos are included in test report: 1-4095/22-01-01_AnnexA
1-4095/22-01-01_AnnexB
1-4095/22-01-01_AnnexD

7 Description of the test setup

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, RF generating and signaling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Lab/Item).

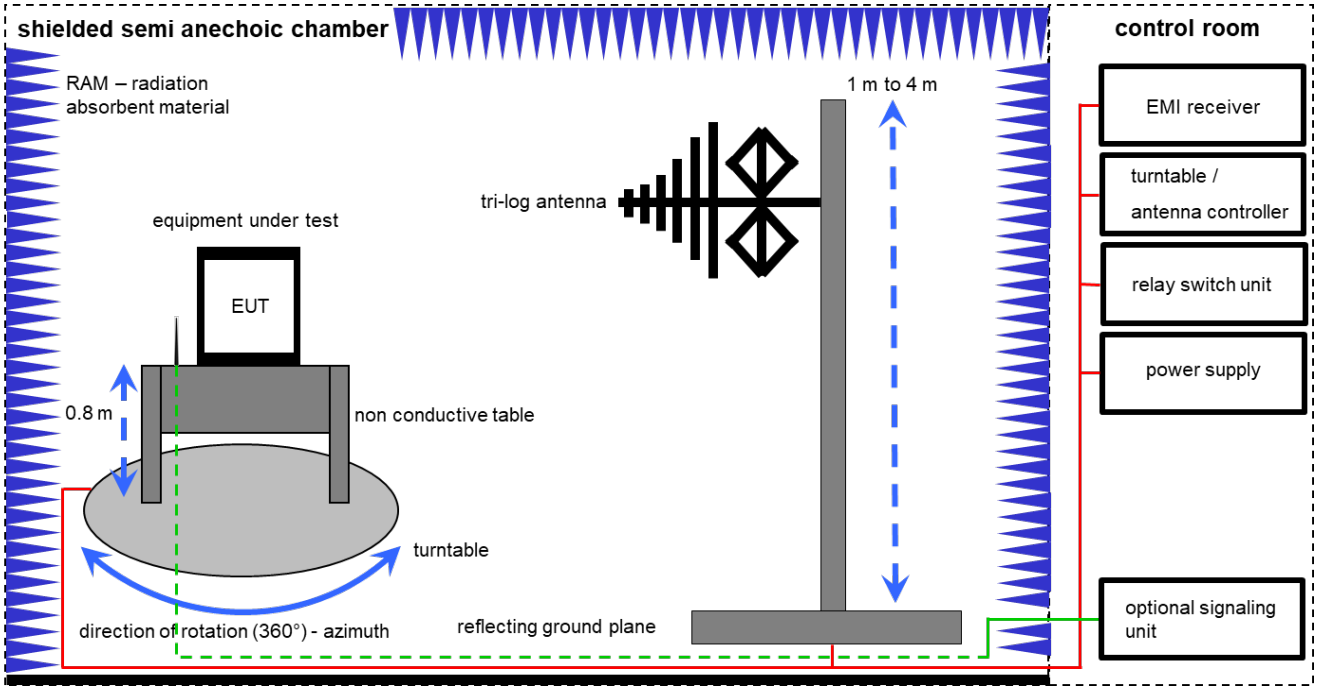
Each block diagram listed can contain several test setup configurations. All devices belonging to a test setup are identified with the same letter syntax. For example: Column Setup and all devices with an A.

Agenda: Kind of Calibration

k	calibration / calibrated	EK	limited calibration
ne	not required (k, ev, izw, zw not required)	zw	cyclical maintenance (external cyclical maintenance)
ev	periodic self verification	izw	internal cyclical maintenance
Ve	long-term stability recognized	g	blocked for accredited testing
vlkl!	Attention: extended calibration interval		
NK!	Attention: not calibrated	*)	next calibration ordered / currently in progress

7.1 Shielded semi anechoic chamber

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 30 MHz to 1 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are conform to specifications ANSI C63. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analyzers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.



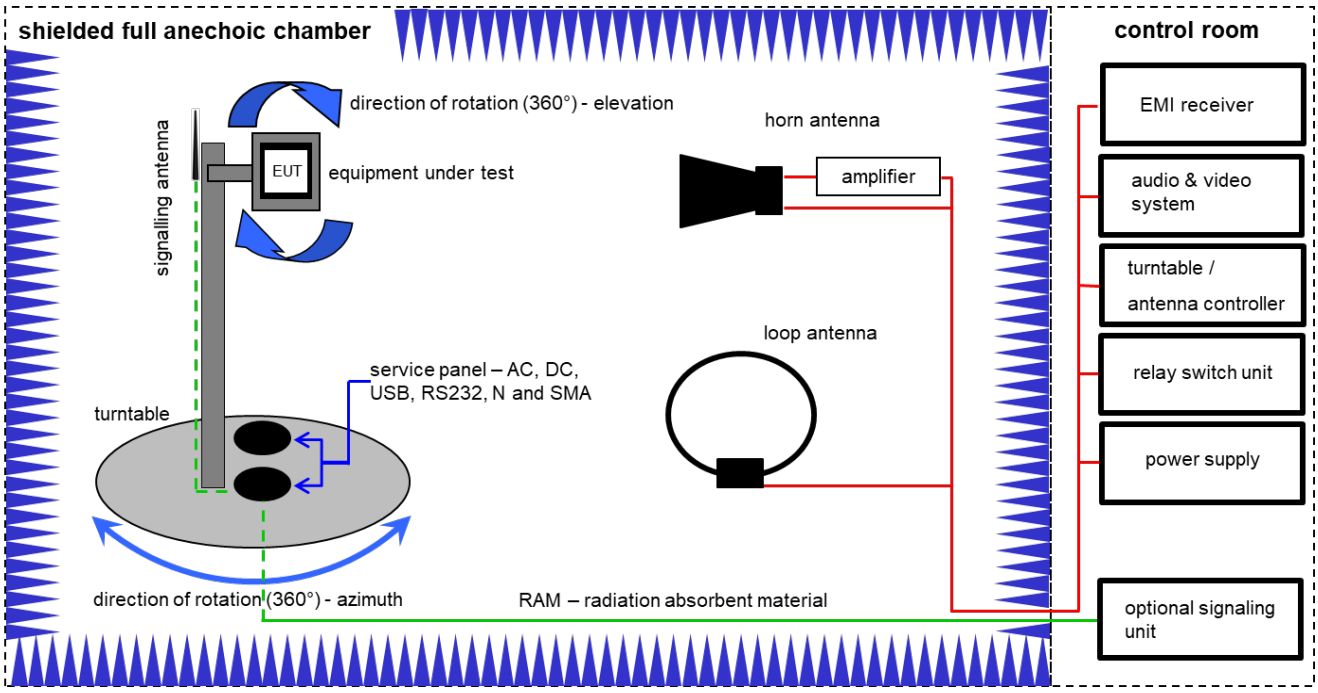
Measurement distance: tri-log antenna 10 meter
EMC32 software version: 10.59.00

FS = UR + CL + AF
(FS-field strength; UR-voltage at the receiver; CL-loss of the cable; AF-antenna factor)

Equipment table:

No.	Setup	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Switch-Unit	3488A	HP	2719A14505	300000368	ev	-/-	-/-
2	A	Meßkabine 1	HF-Absorberhalle	MWB AG 300023	Batch no. 699714	300000551	ne	-/-	-/-
3	A	Antenna Tower	Model 2175	ETS-Lindgren	64762	300003745	izw	-/-	-/-
4	A	Positioning Controller	Model 2090	ETS-Lindgren	64672	300003746	izw	-/-	-/-
5	A	Turntable Interface-Box	Model 105637	ETS-Lindgren	44583	300003747	izw	-/-	-/-
6	A	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck Mess - Elektronik	295	300003787	vlKl!	21.04.2021	20.04.2023
7	A	EMI Test Receiver	ESR3	Rohde & Schwarz	102587	300005771	k	20.05.2022	19.05.2023

7.2 Shielded fully anechoic chamber



Measurement distance: horn antenna 3 meter; loop antenna 3 meter / 1 meter

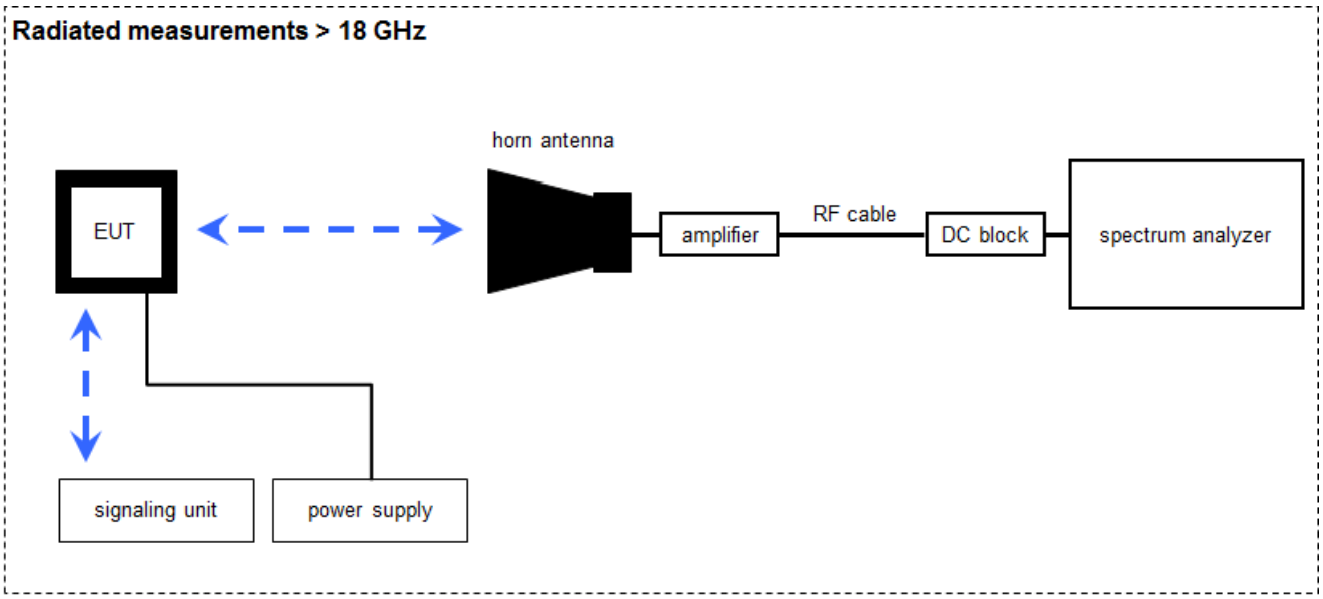
FS = UR + CA + AF
(FS-field strength; UR-voltage at the receiver; CA-loss of the signal path; AF-antenna factor)

Example calculation:
FS [dBµV/m] = 40.0 [dBµV/m] + (-35.8) [dB] + 32.9 [dB/m] = 37.1 [dBµV/m] (71.61 µV/m)

Equipment table:

No.	Setup	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev	-/-	-/-
2	A	Switch / Control Unit	3488A	HP	*	300000199	ne	-/-	-/-
3	A	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3089	300000307	vlKl!	11.02.2022	29.02.2024
4	A	EMI Test Receiver 20Hz- 26,5GHz	ESU26	R&S	100037	300003555	k	09.12.2021	31.12.2022
5	A	Highpass Filter	WHK1.1/15G-10SS	Wainwright	3	300003255	ev	-/-	-/-
6	A	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	19	300003790	ne	-/-	-/-
7	A	Broadband Amplifier 0.5-18 GHz	CBLU5184540	CERNEX	22049	300004481	ev	-/-	-/-
8	A	4U RF Switch Platform	L4491A	Agilent Technologies	MY50000037	300004509	ne	-/-	-/-
9	A	NEXIO EMV-Software	BAT EMC V3.21.0.32	EMCO		300004682	ne	-/-	-/-
10	A	PC	ExOne	F+W		300004703	ne	-/-	-/-
11	A	RF-Amplifier	AMF-6F06001800-30-10P-R	NARDA-MITEQ Inc	2011572	300005241	ev	-/-	-/-
12	A	Active Loop Antenna 9 kHz to 30 MHz	6502	EMCO	2210	300001015	vlKl!	01.07.2021	31.07.2023

7.3 Radiated measurements > 18 GHz



Measurement distance: horn antenna 50 cm

FS = UR + CA + AF
(FS-field strength; UR-voltage at the receiver; CA-loss signal path & distance correction; AF-antenna factor)

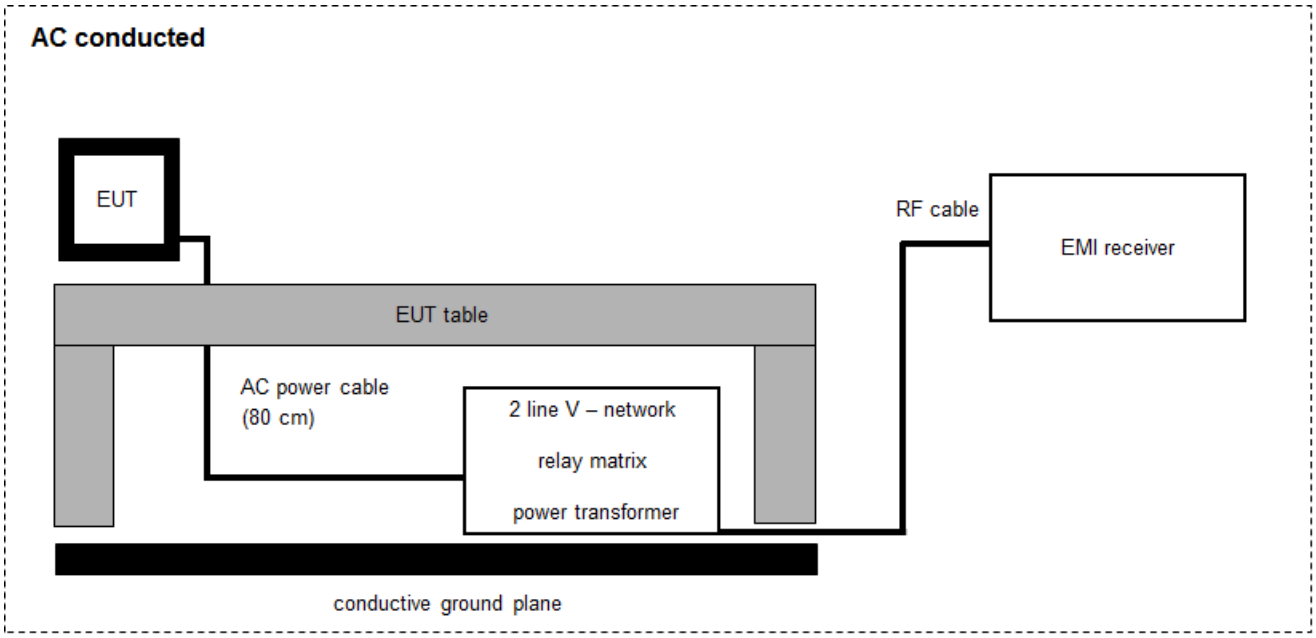
Example calculation:
FS [dBµV/m] = 40.0 [dBµV/m] + (-60.1) [dB] + 36.74 [dB/m] = 16.64 [dBµV/m] (6.79 µV/m)

Equipment table:

No.	Setup	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Signal analyzer	FSV40	Rohde&Schwarz	101353	300004819	k	10.12.2021	31.12.2022
2	A	Control-PC of OSP	exone Variety		060931P1302P 00109	300004869	ne	-/-	-/-
3	A	RF-Cable WLAN-Tester Vector Signal Generator	ST18/SMAm/SMAm /60	Huber & Suhner	Batch no. 606844	400001222	ev	-/-	-/-
4	A	DC Power Supply	HMP2020	Rohde & Schwarz	102219	300005264	k	09.12.2020	08.12.2022
5	A	Tester Software RadioStar (C.BER2 for BT Conformance)	Version 1.0.0.X	CTC advanced GmbH	0001	400001380	ne	-/-	-/-
6	A	Rack mounted PC	Precision 3930 Rack-Workstation i5-9500 CTO	Dell	J15D873	300006115	ne	-/-	-/-
7	A	Switch matrix	RSM 004 TS	CTC advanced	001	400001578	ev	-/-	-/-
8	A	HF-Vorverstärker 0.01 - 26 GHz	HP 83006	EMCO	3104A00499	300000211	g	-/-	-/-
9	A	Std. Gain Horn Antenna 18.0-26.5 GHz	638	Narda	8205	300002442	NK!	-/-	-/-
10	B	Broadband Low Noise Amplifier 18-50 GHz	CBL18503070-XX	CERNEX	19338	300004273	ev	-/-	-/-
11	B	Std. Gain Horn Antenna 26.5-40.0 GHz	V637	Narda	82-16	300000510	vlKl!	17.01.2022	31.01.2024

12	B	Signal- and Spectrum Analyzer 2 Hz - 50 GHz	FSW50	Rohde&Schwarz	101332	300005935	k	20.01.2022	31.01.2023

7.4 AC conducted



FS = UR + CF + VC
(FS-field strength; UR-voltage at the receiver; CR-loss of the cable and filter; VC-correction factor of the ISN)

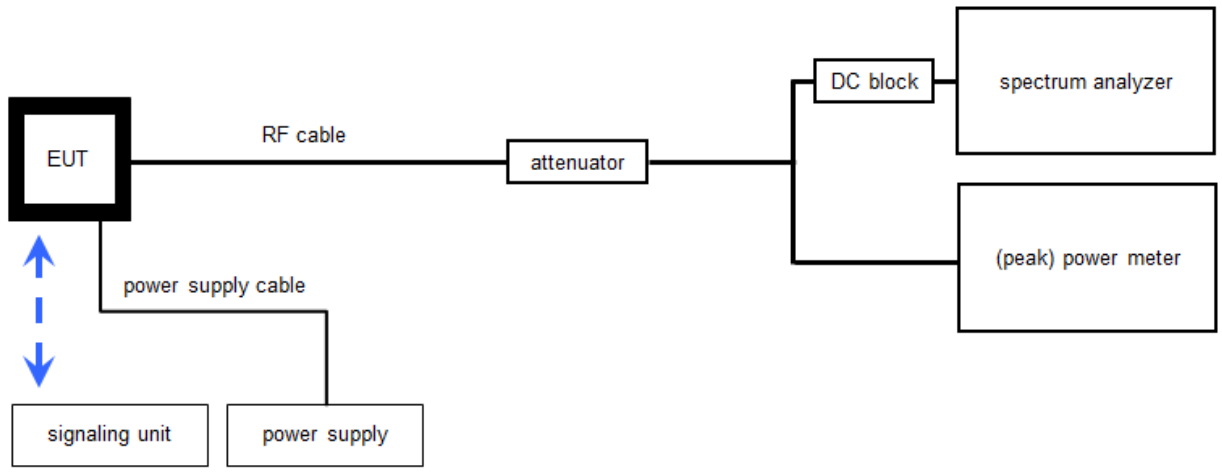
Example calculation:
FS [dBµV/m] = 37.62 [dBµV/m] + 9.90 [dB] + 0.23 [dB] = 47.75 [dBµV/m] (244.06 µV/m)

Equipment table:

No.	Setup	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Two-line V-Network (LISN) 9 kHz to 30 MHz	ESH3-Z5	Rohde & Schwarz	892475/017	300002209	vIKI!	14.12.2021	13.12.2023
2	A	RF-Filter-section	85420E	HP	3427A00162	300002214	NK!	-/-	-/-
3	A	EMI Test Receiver	ESCI 3	R&S	100083	300003312	k	09.12.2021	08.12.2022
4	A	Analyzer-Reference-System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	vIKI!	29.12.2021	28.12.2023
5	A	Hochpass 150 kHz	EZ-25	R&S	100010	300003798	ev	-/-	-/-
6	A	PC	TecLine	F+W		300003532	ne	-/-	-/-
7	A	Switch-Unit	3488A	HP	2719A14505	300000368	ev	-/-	-/-

7.5 Conducted measurements with spectrum analyzer

Conducted measurements normal conditions



OP = AV + CA
(OP-output power; AV-analyzer value; CA-loss signal path)

Example calculation:
OP [dBm] = 6.0 [dBm] + 11.7 [dB] = 17.7 [dBm] (58.88 mW)

Equipment table:

No.	Setup	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Signal analyzer	FSV40	Rohde&Schwarz	101042	300004517	k	25.01.2022	31.01.2023
2	A	PC Tester R005	Intel Core i3 3220/3,3 GHz, Prozessor		2V2403033A4523	300004589	ne	-/-	-/-
3	A	RF-Cable	ST18/SMAm/SMAm/60	Huber & Suhner	Batch no. 606844	400001181	ev	-/-	-/-
4	A	DC-Blocker 0.1-40 GHz	8141A	Inmet		400001185	ev	-/-	-/-
5	A	Coax Attenuator 10 dB 2W 0-40 GHz	MCL BW-K10-2W44+	Mini Circuits		400001186	ev	-/-	-/-
6	A	Synchron Power Meter	SPM-4	CTC	1	300005580	ev	-/-	-/-
7	A	Tester Software RadioStar (C.BER2 for BT Conformance)	Version 1.0.0.X	CTC advanced GmbH	0001	400001380	ne	-/-	-/-

8 Sequence of testing

8.1 Sequence of testing radiated spurious 9 kHz to 30 MHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, it is placed on a table with 0.8 m height.
- If the EUT is a floor standing device, it is placed directly on the turn table.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

Premeasurement*

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna height is 1 m.
- At each turntable position the analyzer sweeps with positive-peak detector to find the maximum of all emissions.

Final measurement

- Identified emissions during the pre-measurement are maximized by the software by rotating the turntable from 0° to 360°.
- Loop antenna is rotated about its vertical axis for maximum response at each azimuth about the EUT. (For certain applications, the loop antenna plane may also need to be positioned horizontally at the specified distance from the EUT)
- The final measurement is done in the position (turntable and elevation) causing the highest emissions with quasi-peak (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. A plot with the graph of the premeasurement and the limit is stored.

*)Note: The sequence will be repeated three times with different EUT orientations.

8.2 Sequence of testing radiated spurious 30 MHz to 1 GHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 10 m or 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height changes from 1 m to 3 m.
- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement

- The final measurement is performed for at least six highest peaks according to the requirements of the ANSI C63.4.
- Based on antenna and turntable positions at which the peak values are measured the software maximize the peaks by changing turntable position ± 45° and antenna height between 1 and 4 m.
- The final measurement is done with quasi-peak detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement with marked maximum final results and the limit is stored.

8.3 Sequence of testing radiated spurious 1 GHz to 18 GHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a 2-axis positioner with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed directly on the turn table.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height is 1.5 m.
- At each turntable position and antenna polarization the analyzer sweeps with positive peak detector to find the maximum of all emissions.

Final measurement

- The final measurement is performed for at least six highest peaks according to the requirements of the ANSI C63.4.
- Based on antenna and turntable positions at which the peak values are measured the software maximizes the peaks by rotating the turntable from 0° to 360°. This measurement is repeated for different EUT-table positions (0° to 150° in 30°-steps) and for both antenna polarizations.
- The final measurement is done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and RMS detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement with marked maximum final results and the limit is stored.

8.4 Sequence of testing radiated spurious above 18 GHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet.
- The measurement distance is as appropriate (e.g. 0.5 m).
- The EUT is set into operation.

Premeasurement

- The test antenna is handheld and moved carefully over the EUT to cover the EUT's whole sphere and different polarizations of the antenna.

Final measurement

- The final measurement is performed at the position and antenna orientation causing the highest emissions with Peak and RMS detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement and the limit is stored.

9 Measurement uncertainty

Measurement uncertainty		
Test case	**Uncertainty**	
Antenna gain	± 3 dB	
Power spectral density	± 1.56 dB	
DTS bandwidth	± 100 kHz (depends on the used RBW)	
Occupied bandwidth	± 100 kHz (depends on the used RBW)	
Maximum output power conducted	± 1.56 dB	
Detailed spurious emissions @ the band edge - conducted	± 1.56 dB	
Band edge compliance radiated	± 3 dB	
Spurious emissions conducted	> 3.6 GHz	± 1.56 dB
	> 7 GHz	± 1.56 dB
	> 18 GHz	± 2.31 dB
	≥ 40 GHz	± 2.97 dB
Spurious emissions radiated below 30 MHz	± 3 dB	
Spurious emissions radiated 30 MHz to 1 GHz	± 3 dB	
Spurious emissions radiated 1 GHz to 12.75 GHz	± 3.7 dB	
Spurious emissions radiated above 12.75 GHz	± 4.5 dB	
Spurious emissions conducted below 30 MHz (AC conducted)	± 2.6 dB	

10 Summary of measurement results

☒	No deviations from the technical specifications were ascertained
☐	There were deviations from the technical specifications ascertained
☐	This test report is only a partial test report. The content and verdict of the performed test cases are listed below.

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	CFR Title 47 Part 15	See table	2022-09-02	-/-

Test specification clause	Test case	C	NC	NA	NP	Remark
-/-	Output power verification (cond.)	-/-				Declared
-/-	Antenna gain	-/-				Declared
U-NII Part 15	Duty cycle	-/-				-/-
§15.407(a)	Maximum output power (conducted)	☒	☐	☐	☐	-/-
§15.407(a)	Power spectral density	☒	☐	☐	☐	-/-
§15.407(a)	Spectrum bandwidth 26dB bandwidth	☒	☐	☐	☐	-/-
§15.407(a)	Spectrum bandwidth 99% bandwidth	-/-				-/-
§15.205	Band edge compliance radiated	☒	☐	☐	☐	-/-
§15.407(b)	TX spurious emissions radiated	☒	☐	☐	☐	-/-
§15.209(a)	Spurious emissions radiated < 30 MHz	☒	☐	☐	☐	-/-
§15.107(a) §15.207	Spurious emissions conducted emissions< 30 MHz	☒	☐	☐	☐	-/-
§15.407	DFS	-/-				See report 1-4095_22-01-06

Notes:

C:	Compliant	NC:	Not compliant	NA:	Not applicable	NP:	Not performed

11 Additional comments

Reference documents:	DFS report: 1-4095_22-01-06 DIW377 UHD ALT US - WiFi test commands_V2.docx Operational Description – Antenna.pdf
Special test descriptions:	None
Configuration descriptions:	All tests were performed with both chains active. SISO modes are not supported.

Provided channels and used power settings for all modes:

a-mode:

U-NII-1 & U-NII-2A (5150 MHz to 5250 MHz & 5250 MHz to 5350 MHz) channel number & center frequency								
channel	**36**	**40**	44	**48**	**52**	**56**	60	**64**
f_c / MHz	**5180**	**5200**	5220	**5240**	**5260**	**5280**	5300	**5320**
Power setting *)	**54**	**54**	54	**54**	**55**	**55**	55	**55**

U-NII-2C (5470 MHz to 5725 MHz) channel number & center frequency											
channel	**100**	104	108	112	116	**120**	124	128	132	136	**140**
f_c / MHz	**5500**	5520	5540	5560	5580	**5600**	5620	5640	5660	5680	**5700**
Power setting *)	**63**	63	63	63	63	**63**	63	63	63	63	**63**

U-NII-3 (5725 MHz to 5850 MHz) channel number & center frequency					
channel	**149**	153	**157**	161	**165**
f_c / MHz	**5745**	5765	**5785**	5805	**5825**
Power setting *)	**86**	86	**86**	86	**86**

nHT20-mode:

U-NII-1 & U-NII-2A (5150 MHz to 5250 MHz & 5250 MHz to 5350 MHz) channel number & center frequency								
channel	**36**	**40**	44	**48**	**52**	**56**	60	**64**
f_c / MHz	**5180**	**5200**	5220	**5240**	**5260**	**5280**	5300	**5320**
Power setting *)	**54**	**54**	54	**54**	**55**	**55**	55	**55**

U-NII-2C (5470 MHz to 5725 MHz) channel number & center frequency											
channel	**100**	104	108	112	116	**120**	124	128	132	136	**140**
f_c / MHz	**5500**	5520	5540	5560	5580	**5600**	5620	5640	5660	5680	**5700**
Power setting *)	**62**	62	62	62	62	**62**	62	62	62	62	**62**

U-NII-3 (5725 MHz to 5850 MHz) channel number & center frequency					
channel	**149**	153	**157**	161	**165**
f_c / MHz	**5745**	5765	**5785**	5805	**5825**
Power setting *)	**86**	86	**86**	86	**86**

acVHT20-mode:

U-NII-1 & U-NII-2A (5150 MHz to 5250 MHz & 5250 MHz to 5350 MHz) channel number & center frequency								
channel	**36**	**40**	44	**48**	**52**	**56**	60	**64**
f_c / MHz	**5180**	**5200**	5220	**5240**	**5260**	**5280**	5300	**5320**
Power setting *)	**54**	**54**	54	**54**	**56**	**56**	56	**56**

U-NII-2C (5470 MHz to 5725 MHz) channel number & center frequency											
channel	**100**	104	108	112	116	**120**	124	128	132	136	**140**
f_c / MHz	**5500**	5520	5540	5560	5580	**5600**	5620	5640	5660	5680	**5700**
Power setting *)	**64**	64	64	64	64	**64**	64	64	64	64	**64**

U-NII-3 (5725 MHz to 5850 MHz) channel number & center frequency					
channel	**149**	153	**157**	161	**165**
f_c / MHz	**5745**	5765	**5785**	5805	**5825**
Power setting *)	**86**	86	**86**	86	**86**

axHE20-mode:

U-NII-1 & U-NII-2A (5150 MHz to 5250 MHz & 5250 MHz to 5350 MHz) channel number & center frequency								
channel	**36**	**40**	44	**48**	**52**	**56**	60	**64**
f_c / MHz	**5180**	**5200**	5220	**5240**	**5260**	**5280**	5300	**5320**
Power setting *)	**48**	**48**	48	**48**	**46**	**46**	46	**46**

U-NII-2C (5470 MHz to 5725 MHz) channel number & center frequency											
channel	**100**	104	108	112	116	**120**	124	128	132	136	**140**
f_c / MHz	**5500**	5520	5540	5560	5580	**5600**	5620	5640	5660	5680	**5700**
Power setting *)	**63**	63	63	63	63	**63**	63	63	63	63	**63**

U-NII-3 (5725 MHz to 5850 MHz) channel number & center frequency					
channel	**149**	153	**157**	161	**165**
f_c / MHz	**5745**	5765	**5785**	5805	**5825**
Power setting *)	**86**	86	**86**	86	**86**

nHT40-mode:

U-NII-1 & U-NII-2A (5150 MHz to 5250 MHz & 5250 MHz to 5350 MHz) channel number & center frequency				
channel	**38**	**46**	**54**	**62**
f_c / MHz	**5190**	**5230**	**5270**	**5310**
Power setting *)	**40**	**40**	**42**	**42**

U-NII-2C (5470 MHz to 5725 MHz) channel number & center frequency					
channel	**102**	110	**118**	126	**134**
f_c / MHz	**5510**	5550	**5590**	5630	**5670**
Power setting *)	**51**	51	**51**	51	**51**

U-NII-3 (5725 MHz to 5850 MHz) channel number & center frequency		
channel	**151**	**159**
f_c / MHz	**5755**	**5795**
Power setting *)	**86**	**86**

acVHT40-mode:

U-NII-1 & U-NII-2A (5150 MHz to 5250 MHz & 5250 MHz to 5350 MHz) channel number & center frequency				
channel	**38**	**46**	**54**	**62**
f_c / MHz	**5190**	**5230**	**5270**	**5310**
Power setting *)	**40**	**40**	**40**	**40**

U-NII-2C (5470 MHz to 5725 MHz) channel number & center frequency					
channel	**102**	110	**118**	126	**134**
f_c / MHz	**5510**	5550	**5590**	5630	**5670**
Power setting *)	**51**	51	**51**	51	**51**

U-NII-3 (5725 MHz to 5850 MHz) channel number & center frequency		
channel	**151**	**159**
f_c / MHz	**5755**	**5795**
Power setting *)	**86**	**86**

axHE40-mode:

U-NII-1 & U-NII-2A (5150 MHz to 5250 MHz & 5250 MHz to 5350 MHz) channel number & center frequency				
channel	**38**	**46**	**54**	**62**
f_c / MHz	**5190**	**5230**	**5270**	**5310**
Power setting *)	**36**	**36**	**40**	**40**

U-NII-2C (5470 MHz to 5725 MHz) channel number & center frequency					
channel	**102**	110	**118**	126	**134**
f_c / MHz	**5510**	5550	**5590**	5630	**5670**
Power setting *)	**48**	48	**48**	48	**48**

U-NII-3 (5725 MHz to 5850 MHz) channel number & center frequency		
channel	**151**	**159**
f_c / MHz	**5755**	**5795**
Power setting *)	**86**	**86**

acVHT80-mode:

U-NII-1 & U-NII-2A (5150 MHz to 5250 MHz & 5250 MHz to 5350 MHz) channel number & center frequency		
channel	**42**	**58**
f_c / MHz	**5210**	**5290**
Power setting *)	**41**	**41**

U-NII-2C (5470 MHz to 5725 MHz) channel number & center frequency		
channel	**106**	**122**
f_c / MHz	**5530**	**5610**
Power setting *)	**43**	**43**

U-NII-3 (5725 MHz to 5850 MHz) channel number & center frequency	
channel	**155**
f_c / MHz	**5775**
Power setting *)	**66**

axHE80-mode:

U-NII-1 & U-NII-2A (5150 MHz to 5250 MHz & 5250 MHz to 5350 MHz) channel number & center frequency		
channel	**42**	**58**
f_c / MHz	**5210**	**5290**
Power setting *)	**37**	**40**

U-NII-2C (5470 MHz to 5725 MHz) channel number & center frequency		
channel	**106**	**122**
f_c / MHz	**5530**	**5610**
Power setting *)	**46**	**46**

U-NII-3 (5725 MHz to 5850 MHz) channel number & center frequency	
channel	**155**
f_c / MHz	**5775**
Power setting *)	**66**

*) In U-NII-1 & U-NII-2A & U-NII-2C bands the power setting have been reduced to be compliant with the radiated band edge requirement.
In U-NII-3 band the power settings have been reduced to make sure all emissions are within the band for the 26dB bandwidth (Maximum frequency 5850 MHz).

EUT selection:

☒ Only one device available

☐ Devices selected by the customer

☐ Devices selected by the laboratory (Randomly)

Test mode:

☐ No test mode available.
Iperf is used to transmit data to a companion device

☒ Special software is used.
EUT is transmitting pseudo random data by itself

Antennas and transmit operating modes:

☐ Operating mode 1 (single antenna)
- Equipment with 1 antenna,
- Equipment with 2 diversity antennas operating in switched diversity mode by which at any moment in time only 1 antenna is used,
- Smart antenna system with 2 or more transmit/receive chains, but operating in a mode where only 1 transmit/receive chain is used)

☒ Operating mode 2 (multiple antennas, no beamforming)
- Equipment operating in this mode contains a smart antenna system using two or more transmit/receive chains simultaneously but without beamforming.

☐ Operating mode 3 (multiple antennas, with beamforming)
- Equipment operating in this mode contains a smart antenna system using two or more transmit/receive chains simultaneously with beamforming.
  In addition to the antenna assembly gain (G), the beamforming gain (Y) may have to be taken into account when performing the measurements.

12 Measurement results

12.1 Identify worst case data rate

In further tests only the identified worst case modulation scheme or bandwidth will be measured.

Results:

OFDM – mode	Modulation scheme
a – mode	6 Mbit/s
n HT20 – mode	MCS8
ac HT20 – mode	MCS0NSS2
ax HT20 – mode	HE0NSS2
n HT40 – mode	MCS8
ac HT40 – mode	MCS0NSS2
ax HT40 – mode	HE0NSS2
ac VHT80 – mode	MCS0NSS2
ax VHT80 – mode	HE0NSS2

The worst case data rates are declared by manufacturer.

12.2 Antenna gain

Description:

The antenna gain is declared by customer. Referenced information and antenna patterns can be found in "Operational Description – Antenna.pdf".

Limits:

Antenna Gain
6 dBi / > 6 dBi output power and power density reduction required

Results:

U-NII-1 (5150 MHz to 5250 MHz)	Peak Antenna Gain ANT 0	Peak Antenna Gain ANT 1
Gain / dBi (declared)	1.8	1.2

U-NII-2A (5250 MHz to 5350 MHz)	Peak Antenna Gain ANT 0	Peak Antenna Gain ANT 1
Gain / dBi (declared)	1.8	1.2

U-NII-2C (5470 MHz to 5725 MHz)	Peak Antenna Gain ANT 0	Peak Antenna Gain ANT 1
Gain / dBi (declared)	2.0	0.3

U-NII-3 (5725 MHz to 5850 MHz)	Peak Antenna Gain ANT 0	Peak Antenna Gain ANT 1
Gain / dBi (declared)	2.3	0.5

12.3 Duty cycle

Description:

The duty cycle is necessary to compute the maximum power during an actual transmission. The shown plots and values are to show an example of the measurement procedure. The real value is measured direct during the power measurement or power density measurement. The correction value is shown in each plot of these measurements.

Measurement:

Measurement parameter	
According to: KDB789033 D02, B.	
External result file(s)	1-4095_22-01-05_Annex_MR_A_1.pdf 1-4095_22-01-05_Annex_MR_A_2.pdf 1-4095_22-01-05_Annex_MR_A_3.pdf 1-4095_22-01-05_Annex_MR_A_4.pdf 1-4095_22-01-05_Annex_MR_A_5.pdf 1-4095_22-01-05_Annex_MR_A_6.pdf 1-4095_22-01-05_Annex_MR_A_7.pdf 1-4095_22-01-05_Annex_MR_A_8.pdf 1-4095_22-01-05_Annex_MR_A_9.pdf FCC Part 15.407 Max Output Power and PSD
Used test setup:	See chapter 7.5 – A
Measurement uncertainty:	See chapter 9

Results:

See external result files!

12.4 Maximum output power

12.4.1 Maximum output power according to FCC requirements

Description:

Measurement of the maximum output power conducted

Measurement:

Measurement parameter	
According to: KDB789033 D02, E.2.e.	
External result file(s)	1-4095_22-01-05_Annex_MR_A_1.pdf 1-4095_22-01-05_Annex_MR_A_2.pdf 1-4095_22-01-05_Annex_MR_A_3.pdf 1-4095_22-01-05_Annex_MR_A_4.pdf 1-4095_22-01-05_Annex_MR_A_5.pdf 1-4095_22-01-05_Annex_MR_A_6.pdf 1-4095_22-01-05_Annex_MR_A_7.pdf 1-4095_22-01-05_Annex_MR_A_8.pdf 1-4095_22-01-05_Annex_MR_A_9.pdf FCC Part 15.407 Max Output Power and PSD
Used test setup:	See chapter 7.5 – A
Measurement uncertainty:	See chapter 9
Standard parts:	FCC: § 15.407 (a)

Limits:

Limits	
Radiated output power	Conducted output power
Band 5150 MHz – 5250 MHz	
For an outdoor access point: Conducted power + 6 dBi antenna gain **For an indoor access point:** Conducted power + 6 dBi antenna gain **For fixed point-to-point access points** Conducted power + 23 dBi antenna gain **For client devices** Conducted power + 6 dBi antenna gain	**For an outdoor access point:** output power ≤ 1W/30dBm The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm) **For an indoor access point** output power ≤ 1W/30dBm **For fixed point-to-point access points** output power ≤ 1W/30dBm **For client devices**

(If the Antenna gain is greater than the Limit: 1dB reduction in the max. conducted output power for each 1 dB of antenna gain in excess of the Limit)	output power ≤ 250 mW/24dBm
Band 5250MHz – 5350 MHz	
Conducted power + 6 dBi antenna gain (Antenna gain higher than the Limit: 1dB reduction in the max. conducted output power for each 1 dB of antenna gain in excess of the Limit)	Output power ≤ lesser of 250mW or 11dBm +10logB (B is the 26 dB emission bandwidth in megahertz)
Band 5470MHz – 5725 MHz	
Conducted power + 6 dBi antenna gain (Antenna gain higher than the Limit: 1dB reduction in the max. conducted output power for each 1 dB of antenna gain in excess of the Limit)	Output power ≤ lesser of 250mW or 11dBm +10logB (B is the 26 dB emission bandwidth in megahertz)
Band 5725MHz – 5850 MHz	
Conducted power + 6 dBi antenna gain (Antenna gain higher than the Limit: 1dB reduction in the max. conducted output power for each 1 dB of antenna gain in excess of the Limit Exception: fixed point-to-point U-NII devices, no corresponding reduction in transmitter conducted power)	output power ≤ 1W/30dBm

Results: ANT1+ANT2 sum

a	Maximum output power conducted [dBm]		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	19.1	18.9	19.0
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	20.2	20.3	20.0
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	21.4	21.8	21.1
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	26.6	26.7	26.4

n-HT20	Maximum output power conducted [dBm]		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	19.8	19.5	19.5
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	20.3	20.4	19.9
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	21.3	21.6	21.0
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	26.8	26.9	26.6

ac-HT20	Maximum output power conducted [dBm]		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	19.7	19.5	19.5
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	20.5	20.6	20.2
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	21.6	22.1	21.4
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	26.7	26.8	26.4

ax-HE20	Maximum output power conducted [dBm]		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	18.1	18.2	18.3
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	19.2	19.3	18.9
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	22.1	22.4	21.7
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	27.2	27.3	27.0

Results: ANT1+ANT2 sum

n HT40	Maximum output power conducted [dBm]		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel		Highest channel
	16.3		16.3
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel		Highest channel
	17.8		17.5
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	19.0	19.1	18.7
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel		Highest channel
	27.6		27.6

ac HT40	Maximum output power conducted [dBm]		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel		Highest channel
	16.3		16.2
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel		Highest channel
	17.3		17.0
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	19.0	19.1	18.5
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel		Highest channel
	27.6		27.6

ax HE40	Maximum output power conducted [dBm]		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel		Highest channel
	15.5		15.3
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel		Highest channel
	17.2		17.0
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	18.3	18.2	17.7
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel		Highest channel
	27.3		27.2

Results: ANT1+ANT2 sum

ac VHT80	Maximum output power conducted [dBm]	
	U-NII-1 (5150 MHz to 5250 MHz)	
	Middle channel	
	16.8	
	U-NII-2A (5250 MHz to 5350 MHz)	
	Middle channel	
	18.1	
	U-NII-2C (5470 MHz to 5725 MHz)	
	Lowest channel	Highest channel
	18.2	17.8
	U-NII-3 (5725 MHz to 5850 MHz)	
	Middle channel	
	22.3	

ax HE80	Maximum output power conducted [dBm]	
	U-NII-1 (5150 MHz to 5250 MHz)	
	Middle channel	
	16.3	
	U-NII-2A (5250 MHz to 5350 MHz)	
	Middle channel	
	18.1	
	U-NII-2C (5470 MHz to 5725 MHz)	
	Lowest channel	Highest channel
	19.1	19.0
	U-NII-3 (5725 MHz to 5850 MHz)	
	Middle channel	
	23.3	

12.5 Power spectral density

12.5.1 Power spectral density according to FCC requirements

Description:

Measurement of the power spectral density of a digital modulated system. The measurement is repeated at the lowest, middle and highest channel.

Measurement:

Measurement parameter	
According to: KDB789033 D02, F.	
External result file(s)	1-4095_22-01-05_Annex_MR_A_1.pdf 1-4095_22-01-05_Annex_MR_A_2.pdf 1-4095_22-01-05_Annex_MR_A_3.pdf 1-4095_22-01-05_Annex_MR_A_4.pdf 1-4095_22-01-05_Annex_MR_A_5.pdf 1-4095_22-01-05_Annex_MR_A_6.pdf 1-4095_22-01-05_Annex_MR_A_7.pdf 1-4095_22-01-05_Annex_MR_A_8.pdf 1-4095_22-01-05_Annex_MR_A_9.pdf FCC Part 15.407 Max Output Power and PSD
Used test setup:	See chapter 7.5 – A
Measurement uncertainty:	See chapter 9
Standard parts:	FCC: § 15.407 (a)

Limits:

Power Spectral Density
Band 5150 MHz – 5250 MHz
For an outdoor access point power spectral density conducted ≤ 17 dBm in any 1 MHz band* For an indoor access point power spectral density conducted ≤ 17 dBm in any 1 MHz band* For fixed point-to-point access points power spectral density conducted ≤ 17 dBm in any 1 MHz band** For client devices point power spectral density conducted ≤ 11 dBm in any 1 MHz band* *If transmitting antennas of directional gain greater than 6 dBi are used the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi **Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi.
Band 5250MHz – 5350 MHz
power spectral density conducted ≤ 11 dBm in any 1 MHz band*

*If transmitting antennas of directional gain greater than 6 dBi are used the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi
Band 5470MHz – 5725 MHz
power spectral density conducted ≤ 11 dBm in any 1 MHz band* *If transmitting antennas of directional gain greater than 6 dBi are used the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi
Band 5725MHz – 5850 MHz
power spectral density conducted ≤ 30 dBm in any 500 kHz band If transmitting antennas of directional gain greater than 6 dBi are used the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi

Results: ANT1+ANT2 sum

a	Power spectral density (dBm/1MHz or dBm/500kHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	8.6	7.2	7.3
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	8.5	8.6	9.5
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	10.9	10.1	9.4
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	11.8	12.0	11.7

n-HT20	Power spectral density (dBm/1MHz or dBm/500kHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	9.0	7.5	7.5
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	8.3	8.4	9.2
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	10.5	9.6	8.9
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	11.7	11.9	11.6

ac-HT20	Power spectral density (dBm/1MHz or dBm/500kHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	8.9	7.5	7.5
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	8.5	8.6	9.5
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	10.9	10.0	9.4
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	11.7	11.8	11.4

ax-HE20	Power spectral density (dBm/1MHz or dBm/500kHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	7.4	6.0	5.9
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	6.8	6.9	6.6
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	9.8	10.1	9.4
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	11.8	11.9	11.6

Results: ANT1+ANT2 sum

n HT40	Power spectral density (dBm/1MHz or dBm/500kHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel		Highest channel
	2.7		1.5
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel		Highest channel
	3.0		3.9
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	5.3	4.3	3.8
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel		Highest channel
	9.6		9.8

ac HT40	Power spectral density (dBm/1MHz or dBm/500kHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel		Highest channel
	2.7		1.4
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel		Highest channel
	2.5		3.4
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	5.3	4.2	3.6
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel		Highest channel
	9.6		9.7

ax HE40	Power spectral density (dBm/1MHz or dBm/500kHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel		Highest channel
	0.5		0.3
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel		Highest channel
	2.2		2.0
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	3.2	3.2	2.7
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel		Highest channel
	9.1		9.3

Results: ANT1+ANT2 sum

ac VHT80	Power spectral density (dBm/1MHz or dBm/500kHz)	
	U-NII-1 (5150 MHz to 5250 MHz)	
	Middle channel	
	0.3	
	U-NII-2A (5250 MHz to 5350 MHz)	
	Middle channel	
	1.7	
	U-NII-2C (5470 MHz to 5725 MHz)	
	Lowest channel	Highest channel
	1.7	0.1
	U-NII-3 (5725 MHz to 5850 MHz)	
	Middle channel	
	1.6	

ax HE80	Power spectral density (dBm/1MHz or dBm/500kHz)	
	U-NII-1 (5150 MHz to 5250 MHz)	
	Middle channel	
	-1.5	
	U-NII-2A (5250 MHz to 5350 MHz)	
	Middle channel	
	0.3	
	U-NII-2C (5470 MHz to 5725 MHz)	
	Lowest channel	Highest channel
	1.3	1.2
	U-NII-3 (5725 MHz to 5850 MHz)	
	Middle channel	
	2.5	

12.6 Minimum emission bandwidth for the band 5.725-5.85 GHz

Description:

Measurement of the 6 dB bandwidth of the modulated signal.

Measurement:

Measurement parameter	
According to: KDB789033 D02, C.2.	
External result file(s)	1-4095_22-01-05_Annex_MR_A_1.pdf 1-4095_22-01-05_Annex_MR_A_2.pdf 1-4095_22-01-05_Annex_MR_A_3.pdf 1-4095_22-01-05_Annex_MR_A_4.pdf 1-4095_22-01-05_Annex_MR_A_5.pdf 1-4095_22-01-05_Annex_MR_A_6.pdf 1-4095_22-01-05_Annex_MR_A_7.pdf 1-4095_22-01-05_Annex_MR_A_8.pdf 1-4095_22-01-05_Annex_MR_A_9.pdf FCC Part 15.407 & ISED Minimum Emission BW
Used test setup:	See chapter 7.5 – A
Measurement uncertainty:	See chapter 9

Limits:

FCC
The minimum 6 dB bandwidth shall be at least 500 kHz.

Results:

a	6 dB emission bandwidth (MHz)		
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
Port 1	16.4	16.4	16.4
Port 2	16.4	16.4	16.4

n HT20	6 dB emission bandwidth (MHz)		
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
Port 1	17.6	17.6	17.6
Port 2	17.7	17.6	17.6

ac HT20	6 dB emission bandwidth (MHz)		
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
Port 1	17.6	17.6	17.6
Port 2	17.6	17.6	17.6

ax HE20	6 dB emission bandwidth (MHz)		
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
Port 1	18.9	18.8	18.9
Port 2	18.8	18.8	18.7

Results:

n HT40	6 dB emission bandwidth (MHz)	
	U-NII-3 (5725 MHz to 5850 MHz)	
	Lowest channel	Highest channel
Port 1	36.3	36.3
Port 2	36.3	36.3

ac HT40	6 dB emission bandwidth (MHz)	
	U-NII-3 (5725 MHz to 5850 MHz)	
	Lowest channel	Highest channel
Port 1	36.3	36.1
Port 2	36.3	36.3

ax HE40	6 dB emission bandwidth (MHz)	
	U-NII-3 (5725 MHz to 5850 MHz)	
	Lowest channel	Highest channel
Port 1	37.5	37.2
Port 2	37.7	37.0

ac VHT80	6 dB emission bandwidth (MHz)
	U-NII-3 (5725 MHz to 5850 MHz)
	Middle channel
Port 1	75.8
Port 2	76.4

ax HE80	6 dB emission bandwidth (MHz)
	U-NII-3 (5725 MHz to 5850 MHz)
	Middle channel
Port 1	77.0
Port 2	77.0

12.7 Spectrum bandwidth / 26 dB bandwidth

Description:

Measurement of the 26 dB bandwidth of the modulated signal.

Measurement:

Measurement parameter	
According to: KDB789033 D02, C.1.	
External result file(s)	1-4095_22-01-05_Annex_MR_A_1.pdf 1-4095_22-01-05_Annex_MR_A_2.pdf 1-4095_22-01-05_Annex_MR_A_3.pdf 1-4095_22-01-05_Annex_MR_A_4.pdf 1-4095_22-01-05_Annex_MR_A_5.pdf 1-4095_22-01-05_Annex_MR_A_6.pdf 1-4095_22-01-05_Annex_MR_A_7.pdf 1-4095_22-01-05_Annex_MR_A_8.pdf 1-4095_22-01-05_Annex_MR_A_9.pdf FCC Part 15.407 & ISED Bandwidths
Used test setup:	see chapter 7.5 – A
Measurement uncertainty:	See chapter 9

Limits:

Spectrum Bandwidth – 26 dB Bandwidth
IC: Any unwanted emissions that fall into the band 5250-5350 MHz shall be attenuated below the channel power by at least 26 dB, when measured using a resolution bandwidth between 1 and 5% of the occupied bandwidth (i.e. 99% bandwidth), above 5250 MHz. The 26 dB bandwidth may fall into the 5250-5350 MHz band; however, if the occupied bandwidth also falls within the 5250-5350 MHz band, the transmission is considered as intentional and the devices shall comply with all requirements in the band 5250-5350 MHz including implementing dynamic frequency selection (DFS) and TPC, on the portion of the emission that resides in the 5250-5350 MHz band. **FCC:** Radar Detection Function of Dynamic Frequency Selection (DFS). U-NII devices operating with any part of its 26 dB emission bandwidth in the 5.25-5.35 GHz and 5.47-5.725 GHz bands shall employ a DFS radar detection mechanism to detect the presence of radar systems and to avoid co-channel operation with radar systems.

Results:

a Port 1 Port 2	26 dB bandwidth (MHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	21.4	21.6	21.6
	21.3	21.6	21.5
	Lowest frequency		Highest frequency
	5169.3		5250.9
	5169.5		5250.9
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	21.6	21.6	21.6
	21.5	21.5	21.5
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	21.4	21.4	21.4
	21.6	21.6	21.6
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	45.0	45.0	45.0
	44.5	44.5	44.5
	Lowest frequency		Highest frequency
	5722.4		5847.5
	5722.8		5847.3

n HT20 Port 1 Port 2	26 dB bandwidth (MHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	21.7	22.0	22.0
	21.5	21.9	21.8
	Lowest frequency		Highest frequency
	5169.2		5251.0
	5169.4		5251.0
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	21.9	21.9	21.9
	21.8	21.8	21.8
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	21.8	21.8	21.8
	22.2	22.2	22.2
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	47.9	47.9	47.9
	46.8	46.8	46.8
	Lowest frequency		Highest frequency
	5720.8		5720.8
	5721.5		5721.5

ac HT20 Port 1 Port 2	26 dB bandwidth (MHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	21.8	22.0	22.0
	21.4	21.7	21.7
	Lowest frequency		Highest frequency
	5169.3		5251.0
	5169.4		5250.9
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	21.9	21.9	21.9
	22.8	22.8	22.8
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	21.7	21.7	21.7
	22.8	22.8	22.8
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	47.8	47.8	47.8
	46.3	46.3	46.3
	Lowest frequency		Highest frequency
	5721.5		5849.3
	5721.6		5848.2

ax HE20 Port 1 Port 2	26 dB bandwidth (MHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	21.7	21.7	21.8
	21.5	21.8	21.7
	Lowest frequency		Highest frequency
	5169.3		5250.9
	5169.3		5250.9
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	21.8	21.8	21.8
	21.6	21.6	21.6
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	21.7	21.7	21.7
	22.6	22.6	22.6
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	50.0	50.0	50.0
	49.1	49.1	49.1
	Lowest frequency		Highest frequency
	5720.0		5849.8
	5720.0		5849.2

Results:

n HT40 Port 1 Port 2	26 dB bandwidth (MHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Highest channel	
	39.8	39.8	
	39.3	39.3	
	Lowest frequency	Highest frequency	
	5170.1	5170.1	
	5170.4	5170.4	
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Highest channel	
	40.1	40.1	
	39.7	39.7	
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	39.9	39.9	39.9
	39.6	39.6	39.6
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Highest channel	
	99.9	99.9	
	96.8	96.8	
	Lowest frequency	Highest frequency	
	5705.0	5844.8	
	5706.6	5842.4	

ac HT40 Port 1 Port 2	26 dB bandwidth (MHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel		Highest channel
	39.8		39.8
	39.3		39.3
	Lowest frequency		Highest frequency
	5170.1		5170.1
	5170.4		5170.4
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel		Highest channel
	40.4		40.4
	39.8		39.8
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	39.8	39.8	39.8
	39.3	39.3	39.3
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel		Highest channel
	100.0		100.0
	97.2		97.2
	Lowest frequency		Highest frequency
	5705.0		5844.6
	5706.6		5843.3

ax HE40 Port 1 Port 2	26 dB bandwidth (MHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel		Highest channel
	40.4		40.4
	40.1		40.1
	Lowest frequency		Highest frequency
	5169.8		5169.8
	5170.0		5170.0
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel		Highest channel
	40.0		40.0
	40.2		40.2
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	40.2	40.2	40.2
	40.0	40.0	40.0
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel		Highest channel
	99.9		99.9
	97.6		97.6
	Lowest frequency		Highest frequency
	5705.0		5845.0
	5705.7		5842.5

Results:

ac VHT80 Port 1 Port 2	26 dB bandwidth (MHz)	
	U-NII-1 (5150 MHz to 5250 MHz)	
	Middle channel	
	81.4	
	81.2	
	Lowest frequency	Highest frequency
	5169.2	5169.2
	5169.6	5169.6
	U-NII-2A (5250 MHz to 5350 MHz)	
	Middle channel	
	81.6	
	81.2	
	U-NII-2C (5470 MHz to 5725 MHz)	
	Lowest channel	Highest channel
	81.8	81.8
	81.2	81.2
	U-NII-3 (5725 MHz to 5850 MHz)	
	Middle channel	
	104.8	
	122.0	
	Lowest frequency	Highest frequency
	5725.4	5830.2
	5720.2	5842.2

ax HE80 Port 1 Port 2	26 dB bandwidth (MHz)	
	U-NII-1 (5150 MHz to 5250 MHz)	
	Middle channel	
	81.8	
	81.6	
	Lowest frequency	Highest frequency
	5169.2	5169.2
	5169.4	5169.4
	U-NII-2A (5250 MHz to 5350 MHz)	
	Middle channel	
	81.8	
	81.6	
	U-NII-2C (5470 MHz to 5725 MHz)	
	Lowest channel	Highest channel
	81.8	81.8
	81.6	81.6
	U-NII-3 (5725 MHz to 5850 MHz)	
	Middle channel	
	102.0	
	81.8	
	Lowest frequency	Highest frequency
	5714.2	5816.2
	5734.4	5816.2

12.8 Band edge compliance radiated

Description:

Measurement of the radiated band edge compliance. The EUT is turned in the position that results in the maximum level at the band edge. Then a sweep over the corresponding restricted band is performed. The EUT is set to the lowest channel for the lower restricted band and to the highest channel for the upper restricted band. Measurement distance is 3m.

Measurement:

Measurement parameter	
Detector:	Peak / RMS
Sweep time:	Auto
Resolution bandwidth:	1 MHz
Video bandwidth:	≥ 3 x RBW
Span:	See plots!
Trace mode:	Max Hold
Test setup:	See sub clause 7.2 – A
Measurement uncertainty:	See chapter 9

Limits:

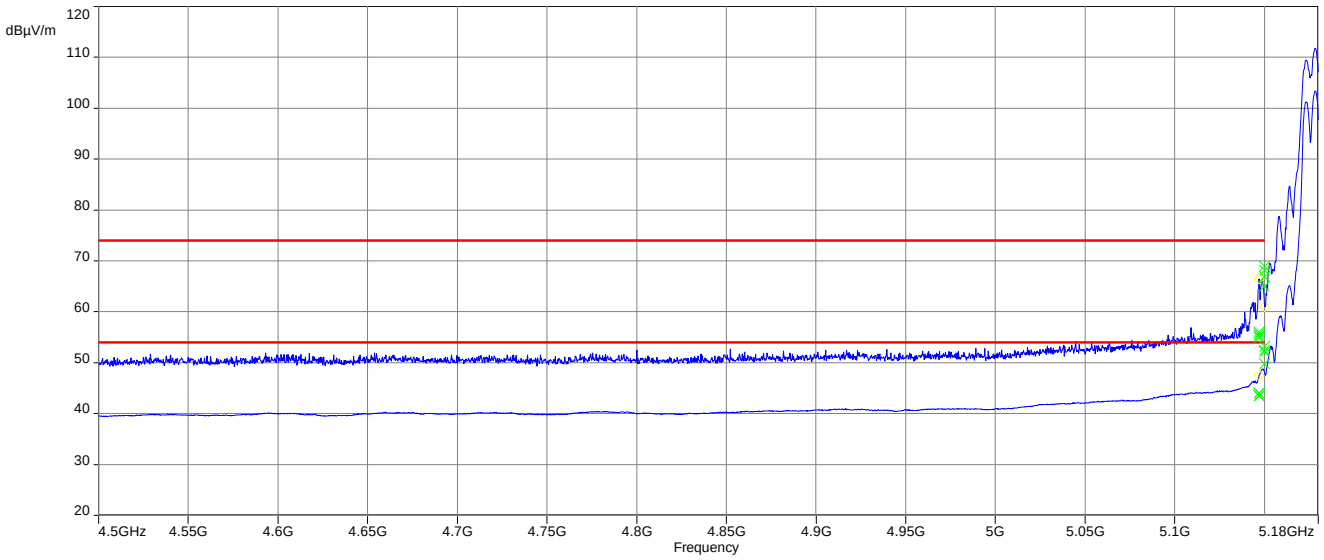
Band Edge Compliance Radiated
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 5.205(c)).
74 dBµV/m (peak) 54 dBµV/m (average)

Results:

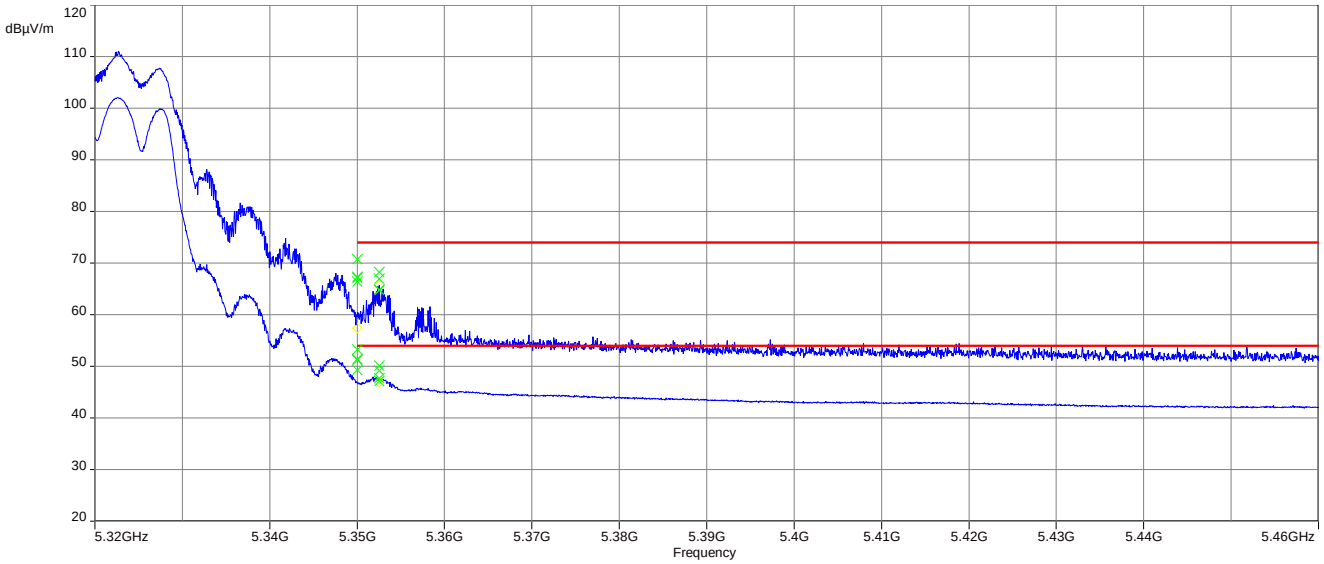
band edge compliance radiated / (dBµV / m) @ 3 m			
	lower band edge; U-NII-1; lowest channel	upper band edge; U-NII-2A; highest channel	lower band edge; U-NII-2C; lowest channel
a-mode	68.9 (Peak) 53.2 (AVG)	70.8 (Peak) 53.3 (AVG)	69.0 (Peak) 53.4 (AVG)
n20-mode	70.4 (Peak) 53.0 (AVG)	69.7 (Peak) 53.1 (AVG)	68.5 (Peak) 53.1 (AVG)
ac20-mode	69.9 (Peak) 53.2 (AVG)	70.2 (Peak) 53.5 (AVG)	69.8 (Peak) 53.1 (AVG)
ax20-mode	70.4 (Peak) 53.8 (AVG)	70.7 (Peak) 53.8 (AVG)	72.6 (Peak) 52.5 (AVG)
n40-mode	73.1 (Peak) 52.3 (AVG)	73.0 (Peak) 52.5 (AVG)	69.2 (Peak) 52.9 (AVG)
ac40-mode	69.9 (Peak) 52.0 (AVG)	71.5 (Peak) 52.2 (AVG)	70.6 (Peak) 52.3 (AVG)
ax40-mode	73.9 (Peak) 53.4 (AVG)	73.9 (Peak) 53.9 (AVG)	73.8 (Peak) 53.3 (AVG)
ac80-mode	72.0 (Peak) 53.9 (AVG)	72.0 (Peak) 52.6 (AVG)	69.7 (Peak) 53.1 (AVG)
ax80-mode	69.0 (Peak) 51.1 (AVG)	70.9 (Peak) 53.6 (AVG)	69.8 (Peak) 53.5 (AVG)

Plots: a-Mode

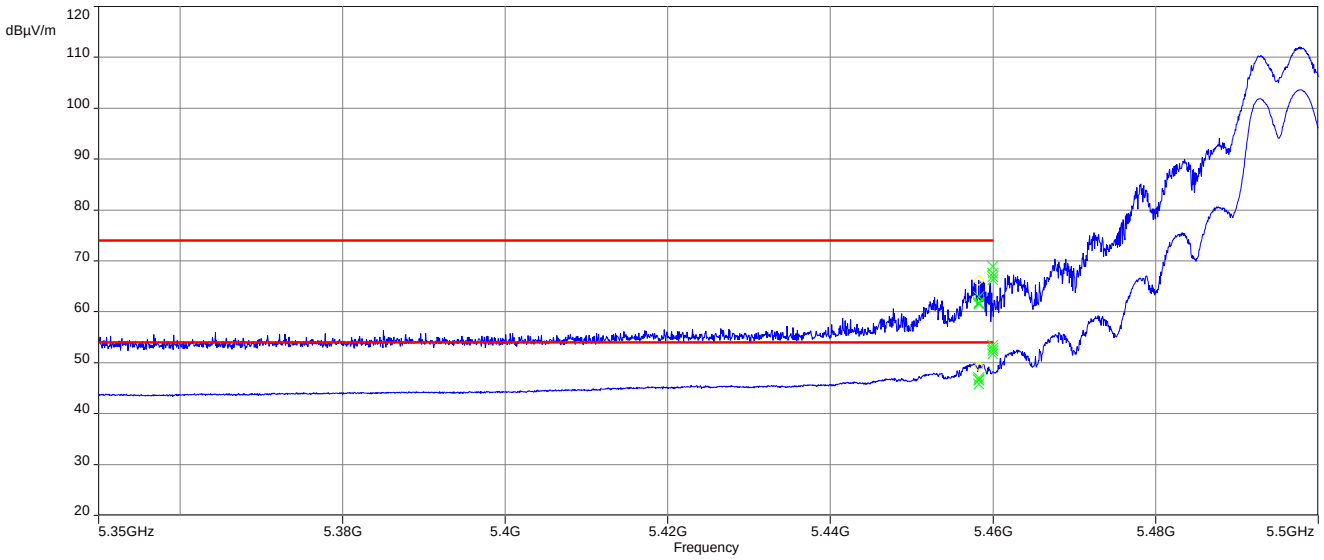
Plot 1: lower band edge; U-NII-1; lowest channel



Plot 2: upper band edge; U-NII-2A; highest channel

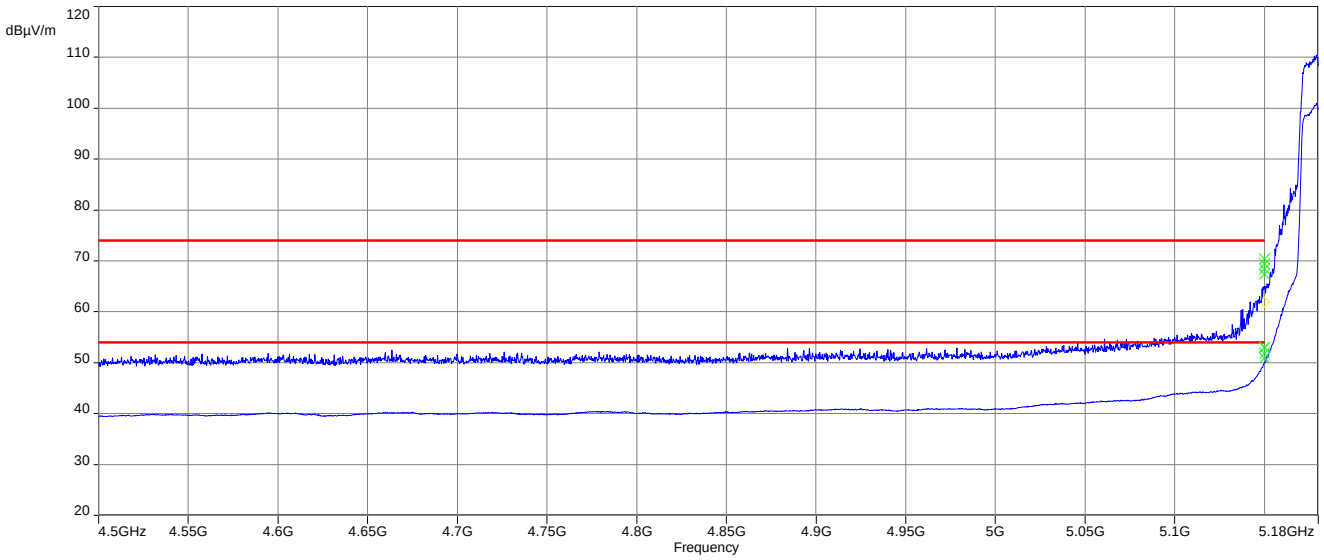


Plot 3: lower band edge; U-NII-2C; lowest channel

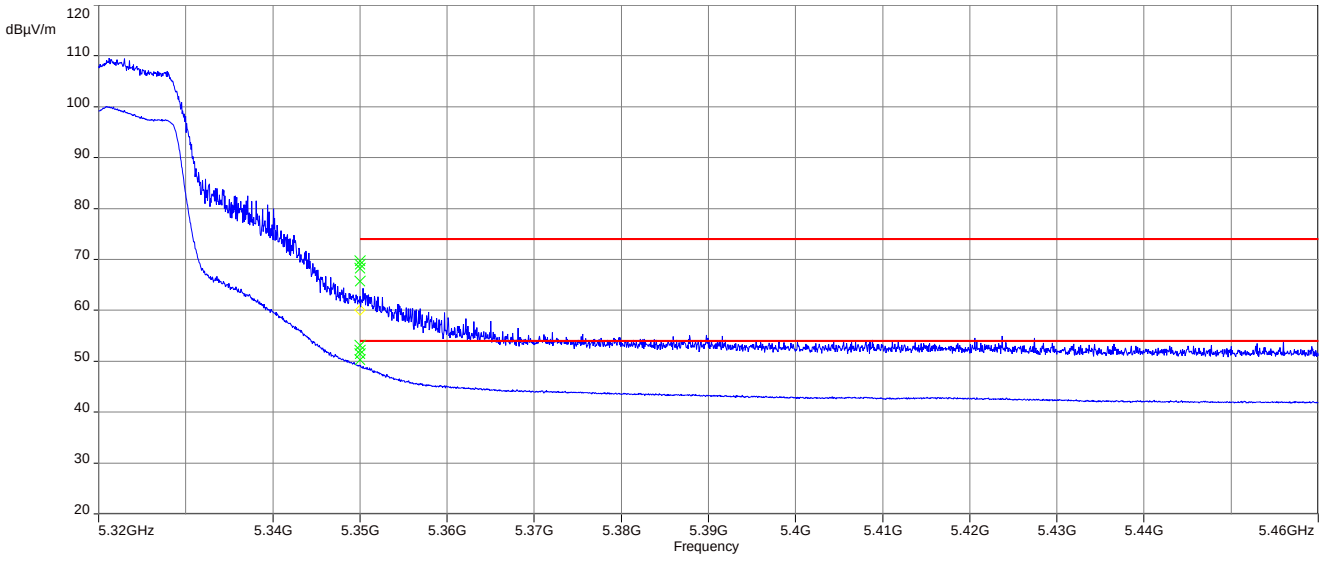


Plots: n20-Mode

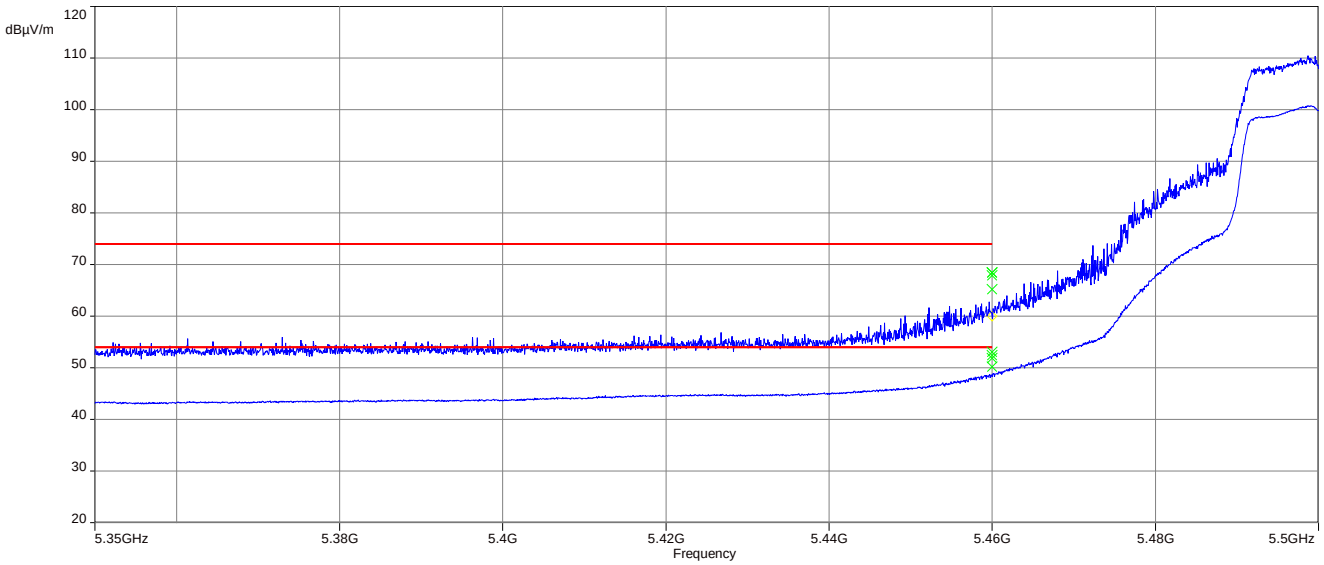
Plot 4: lower band edge; U-NII-1; lowest channel



Plot 5: upper band edge; U-NII-2A; highest channel

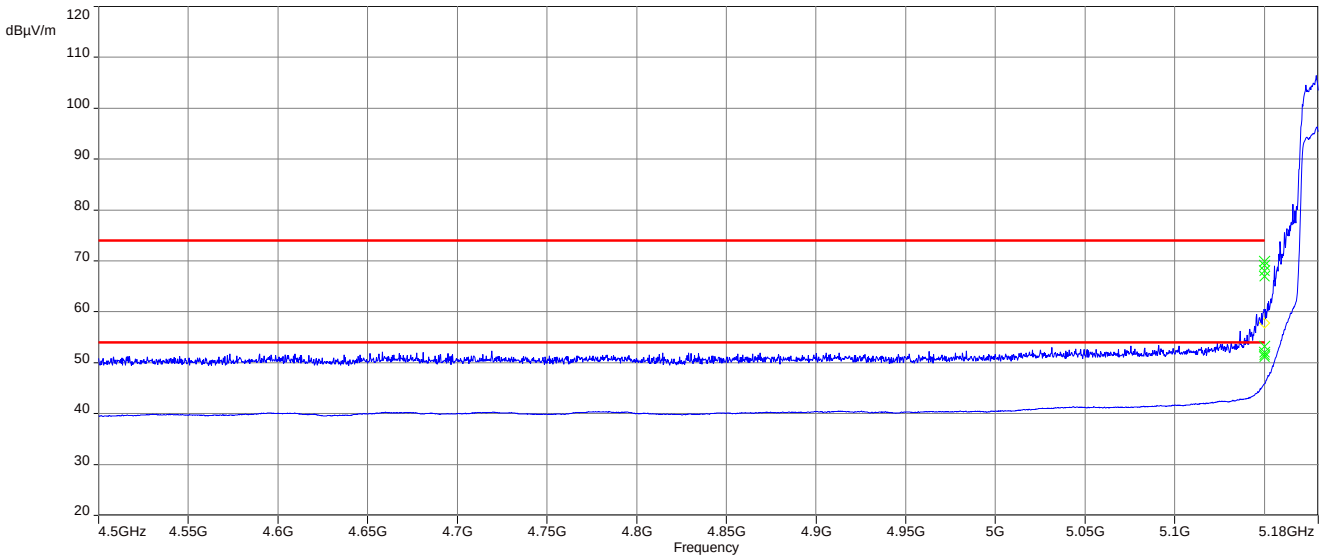


Plot 6: lower band edge; U-NII-2C; lowest channel

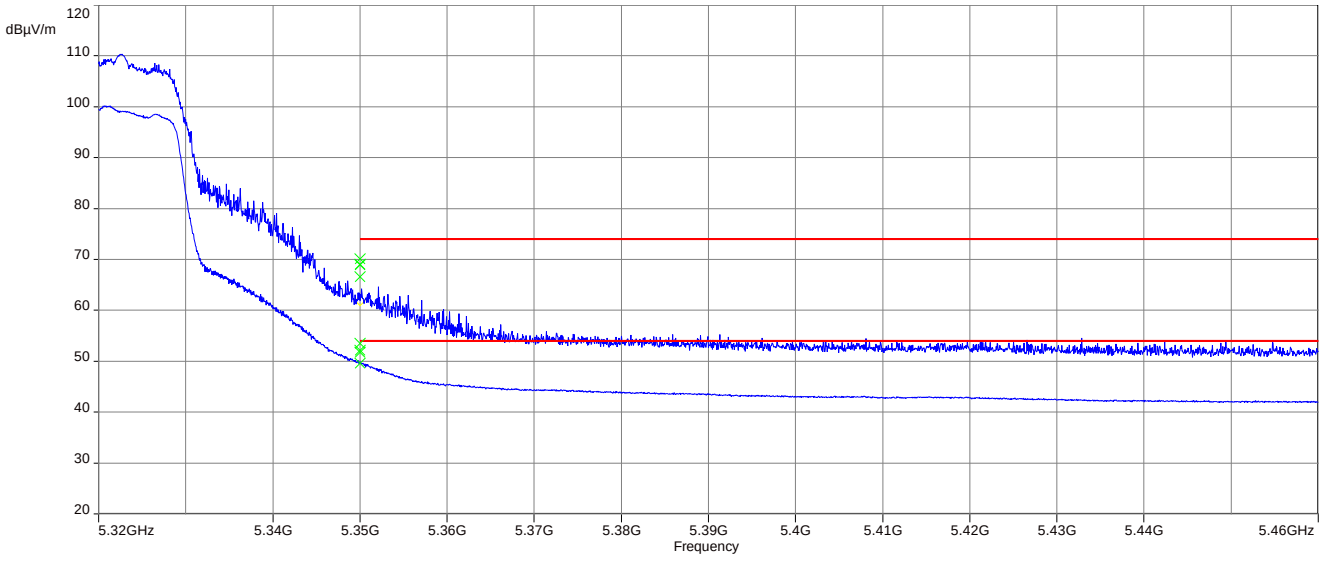


Plots: ac20-Mode

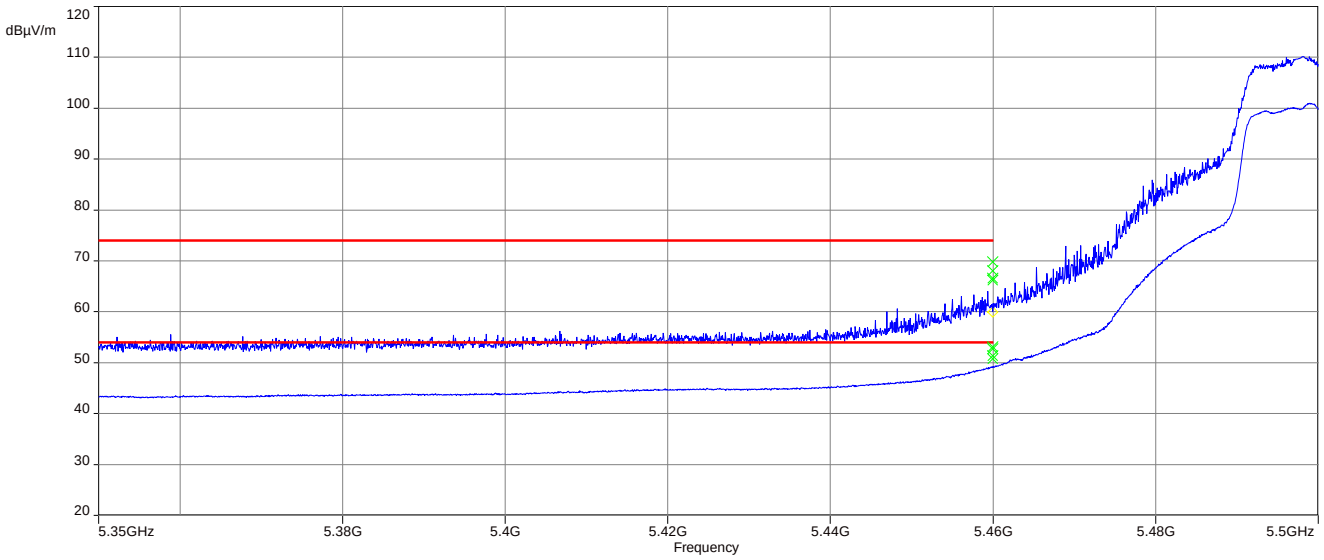
Plot 7: lower band edge; U-NII-1; lowest channel



Plot 8: upper band edge; U-NII-2A; highest channel

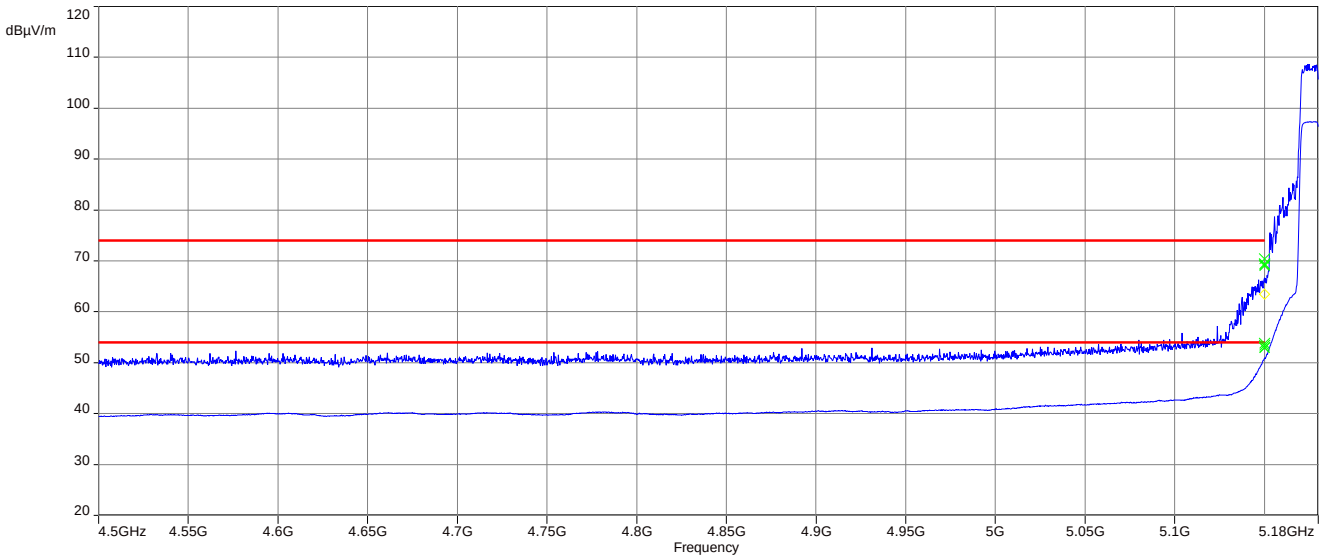


Plot 9: lower band edge; U-NII-2C; lowest channel

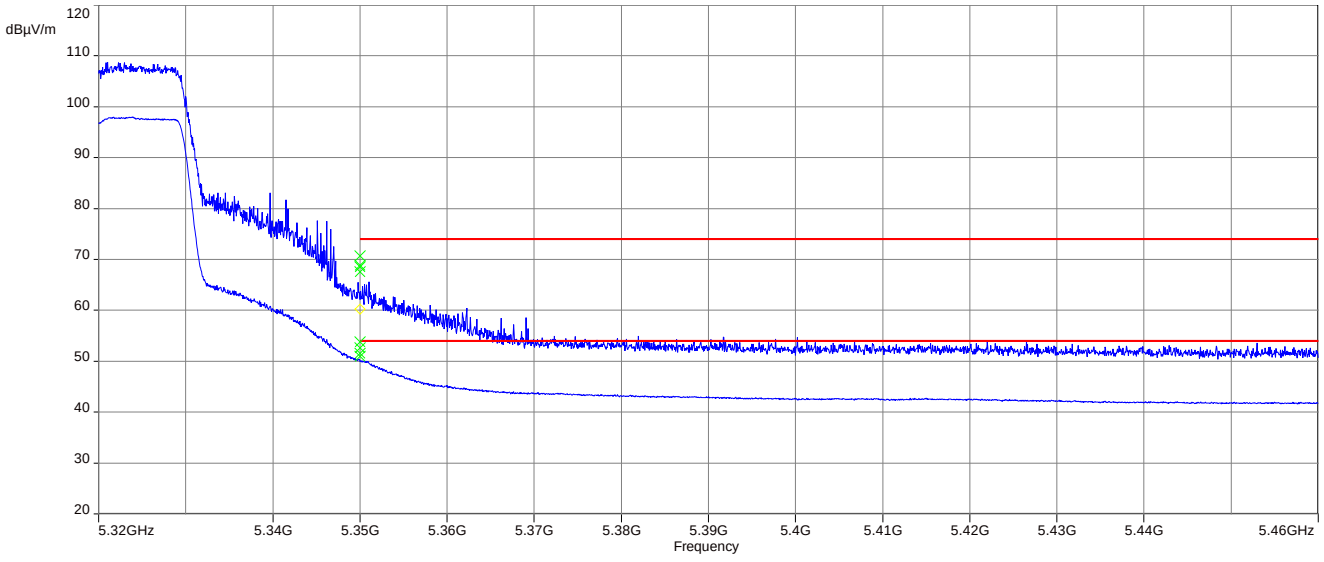


Plots: ax20-Mode

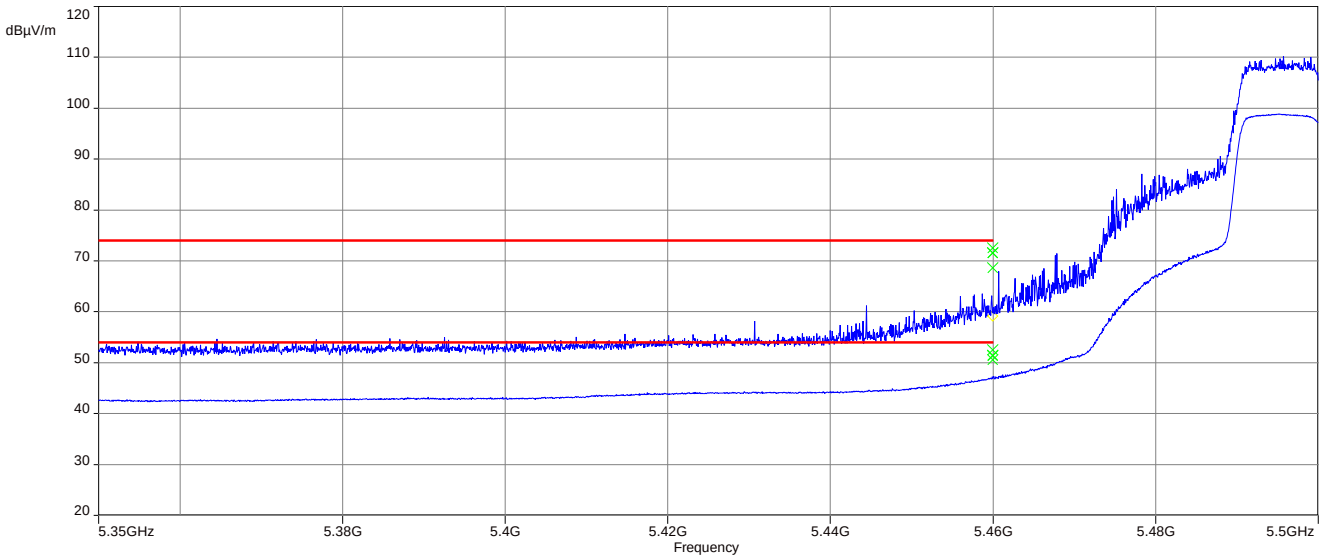
Plot 10: lower band edge; U-NII-1; lowest channel



Plot 11: upper band edge; U-NII-2A; highest channel

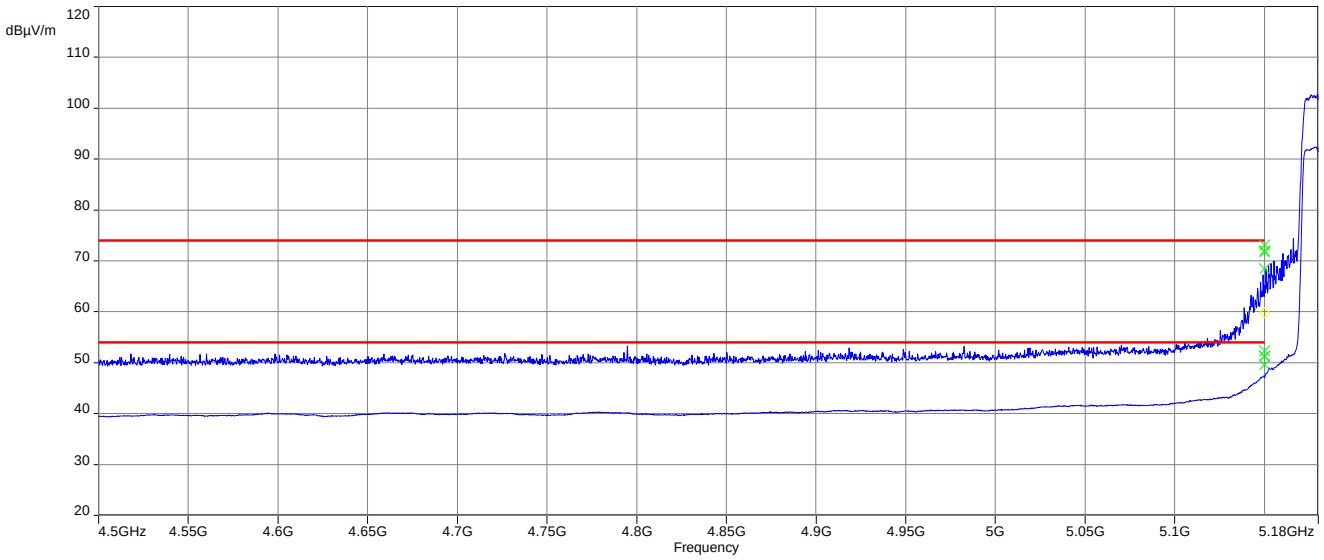


Plot 12: lower band edge; U-NII-2C; lowest channel

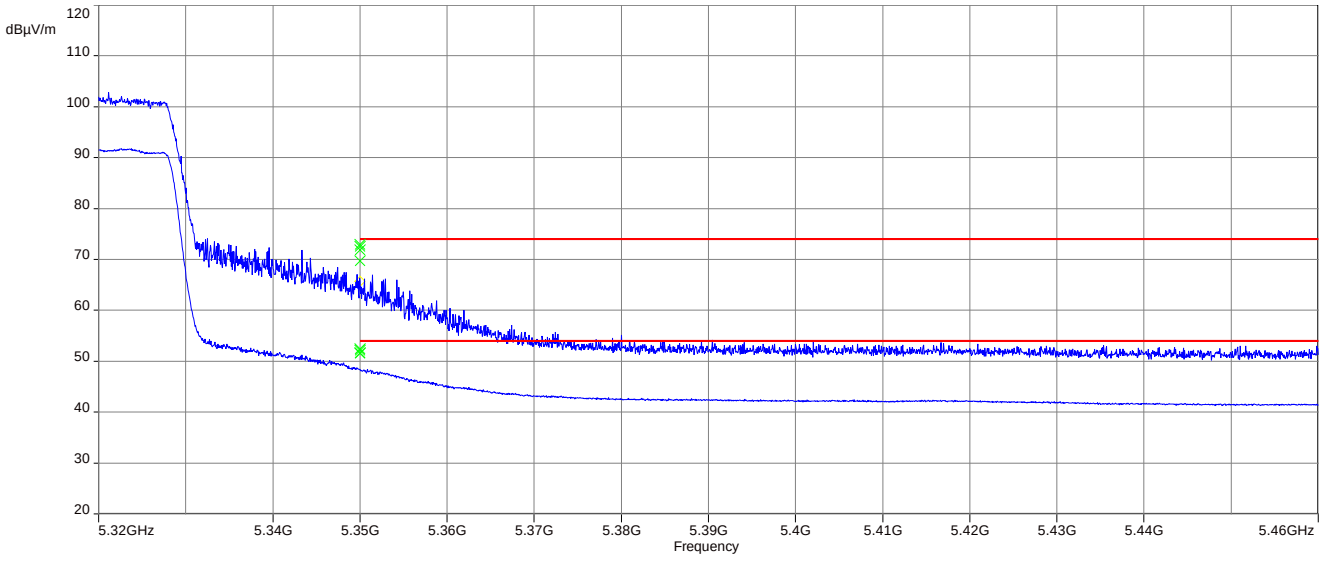


Plots: n40-Mode

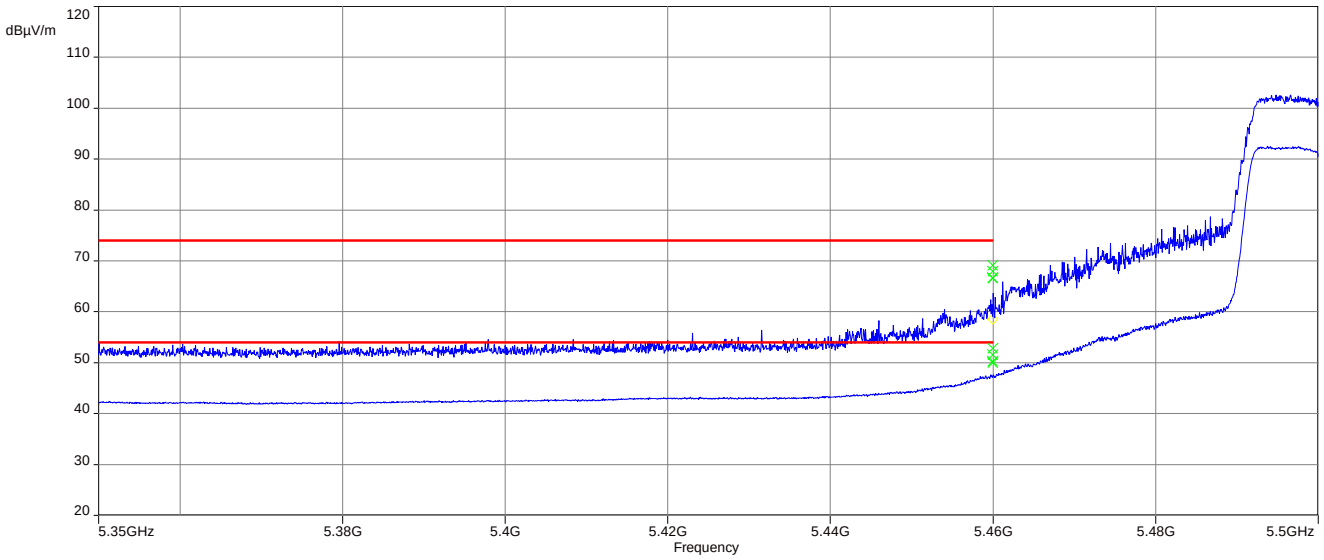
Plot 13: lower band edge; U-NII-1; lowest channel



Plot 14: upper band edge; U-NII-2A; highest channel

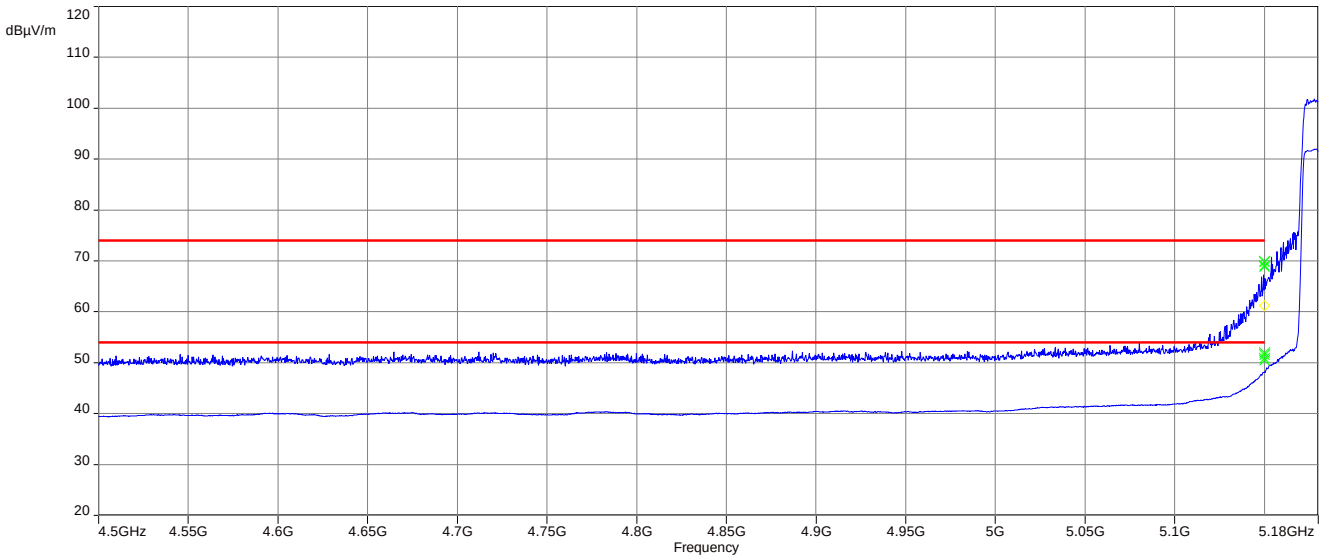


Plot 15: lower band edge; U-NII-2C; lowest channel

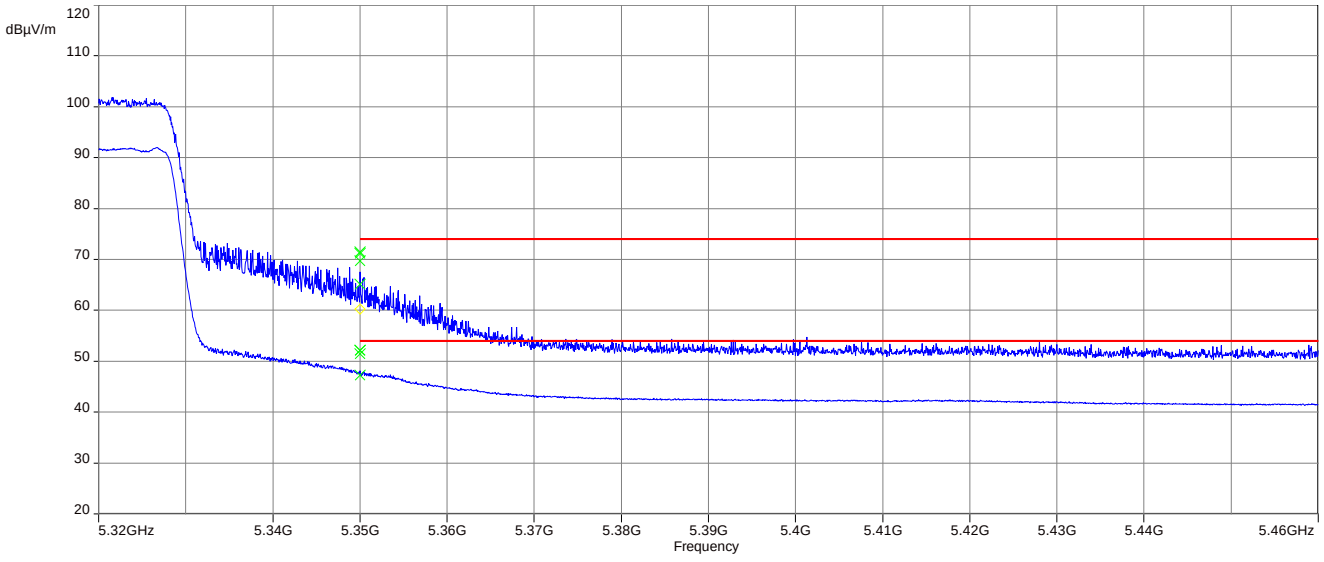


Plots: ac40-Mode

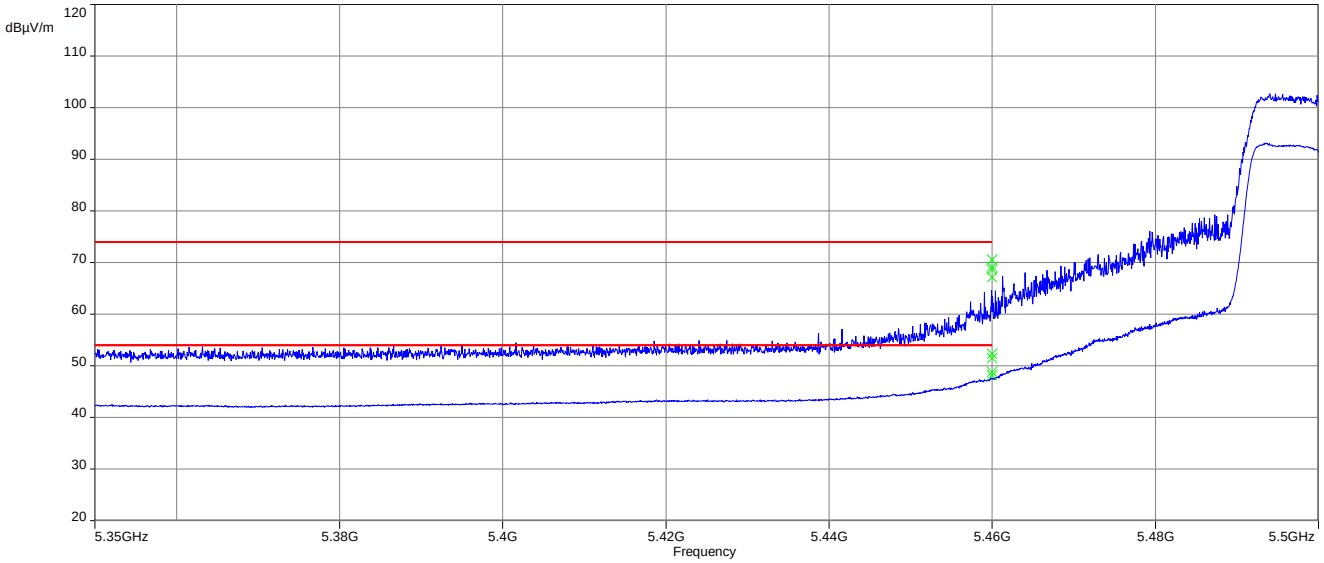
Plot 16: lower band edge; U-NII-1; lowest channel



Plot 17: upper band edge; U-NII-2A; highest channel

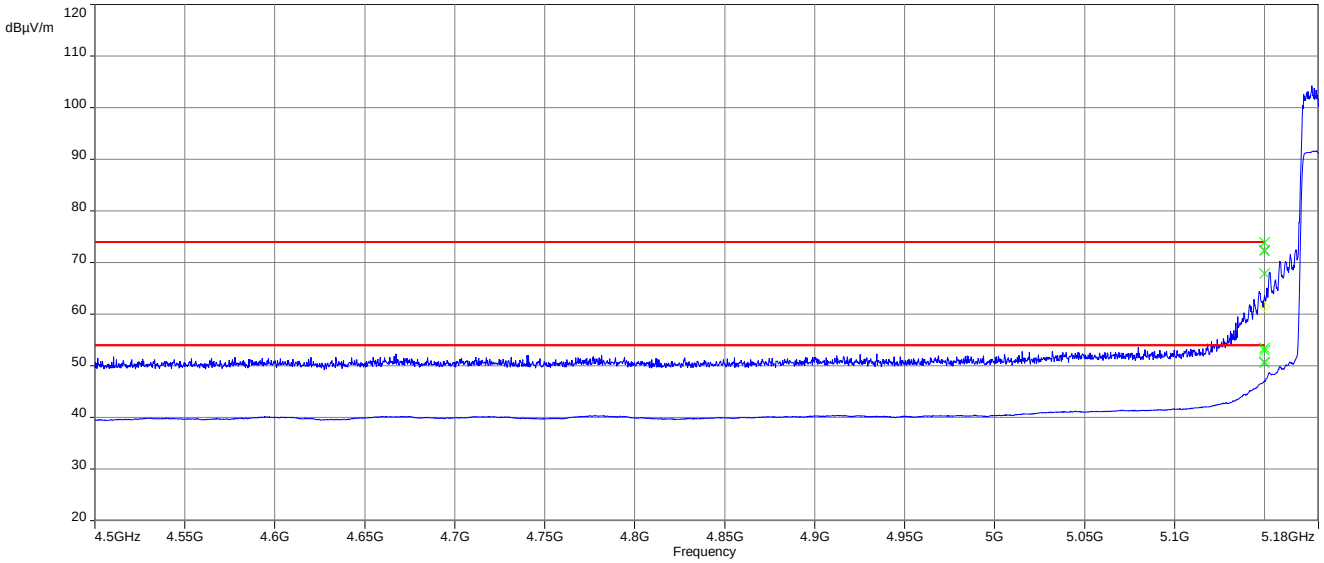


Plot 18: lower band edge; U-NII-2C; lowest channel

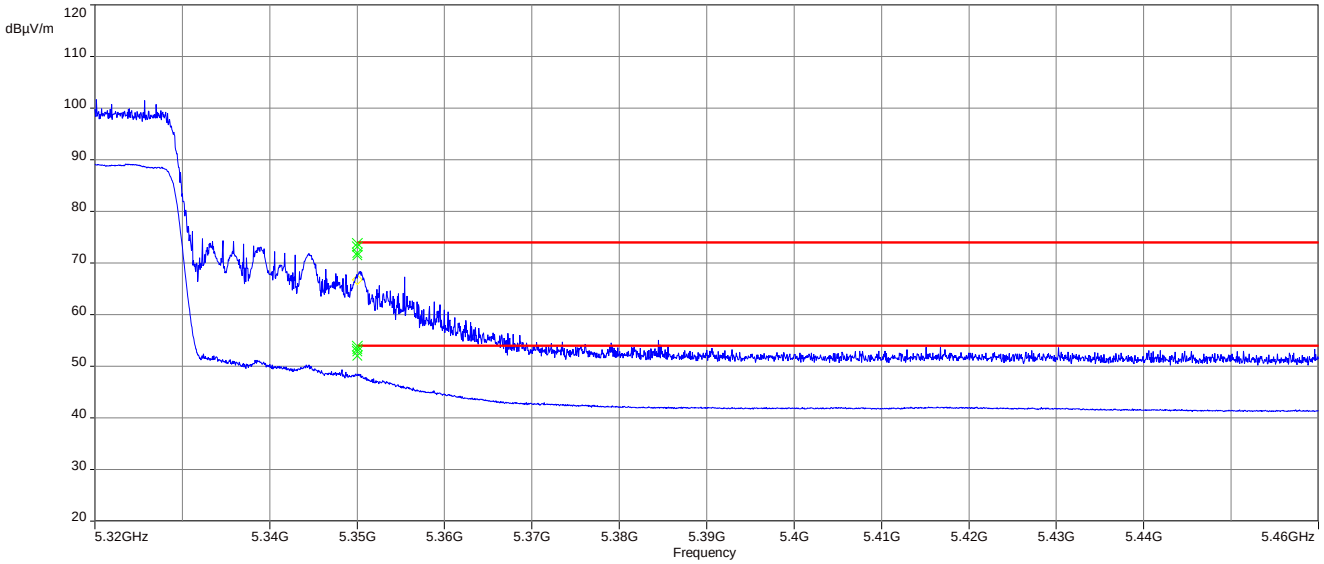


Plots: ax40-Mode

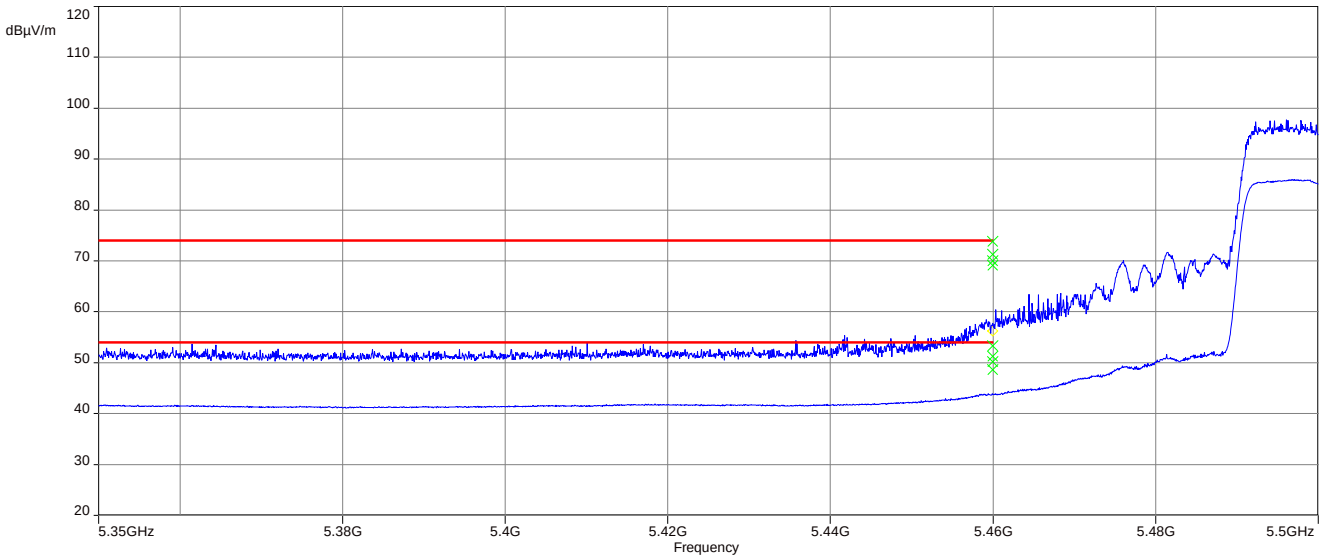
Plot 19: lower band edge; U-NII-1; lowest channel



Plot 20: upper band edge; U-NII-2A; highest channel

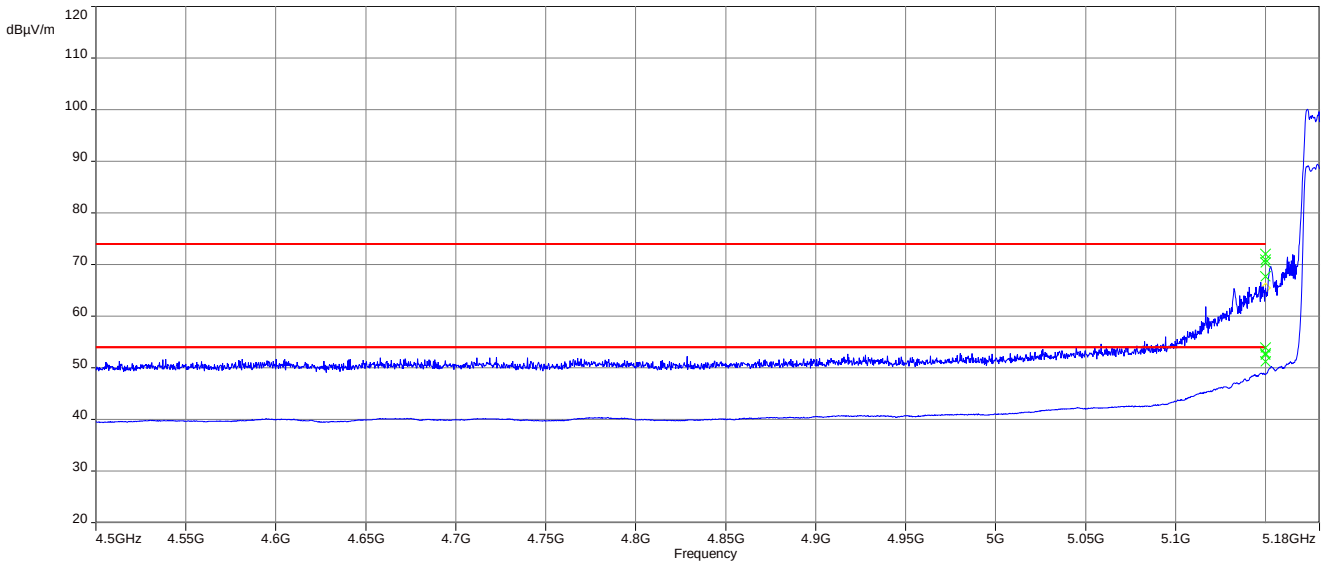


Plot 21: lower band edge; U-NII-2C; lowest channel

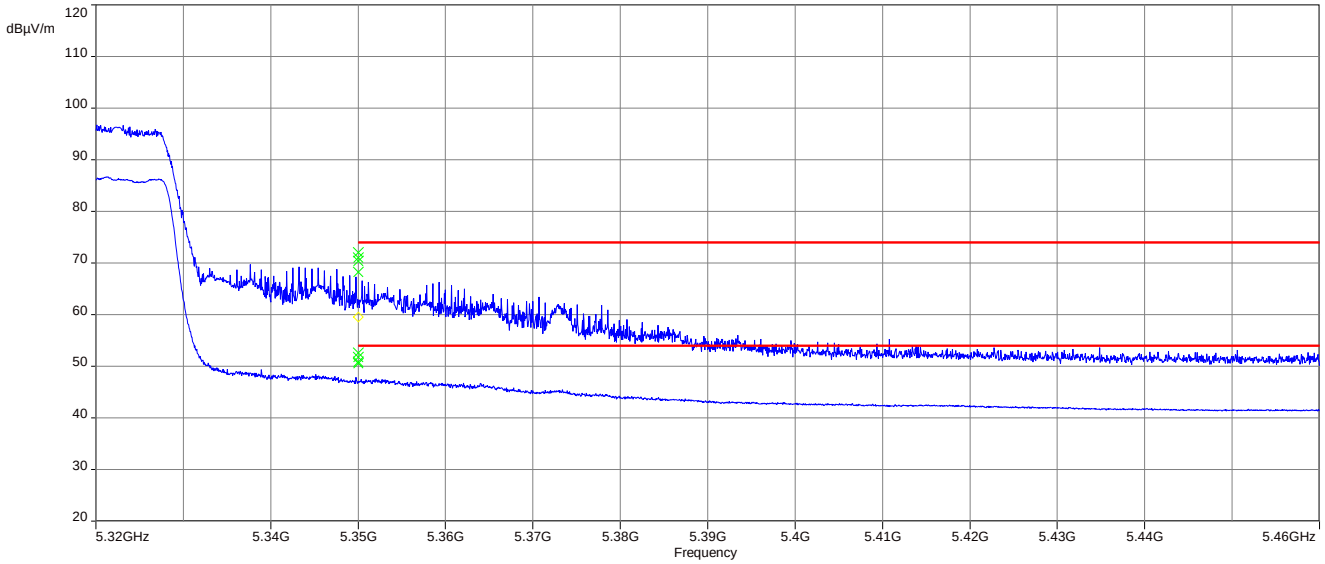


Plots: ac80-Mode

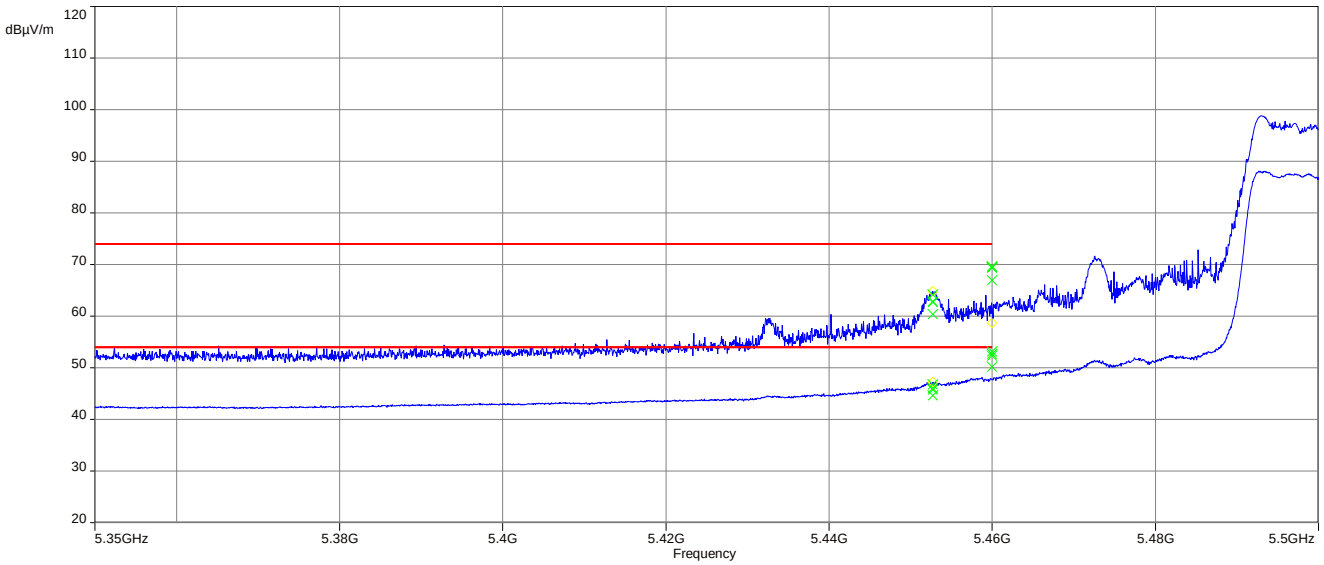
Plot 22: lower band edge; U-NII-1; lowest channel



Plot 23: upper band edge; U-NII-2A; highest channel

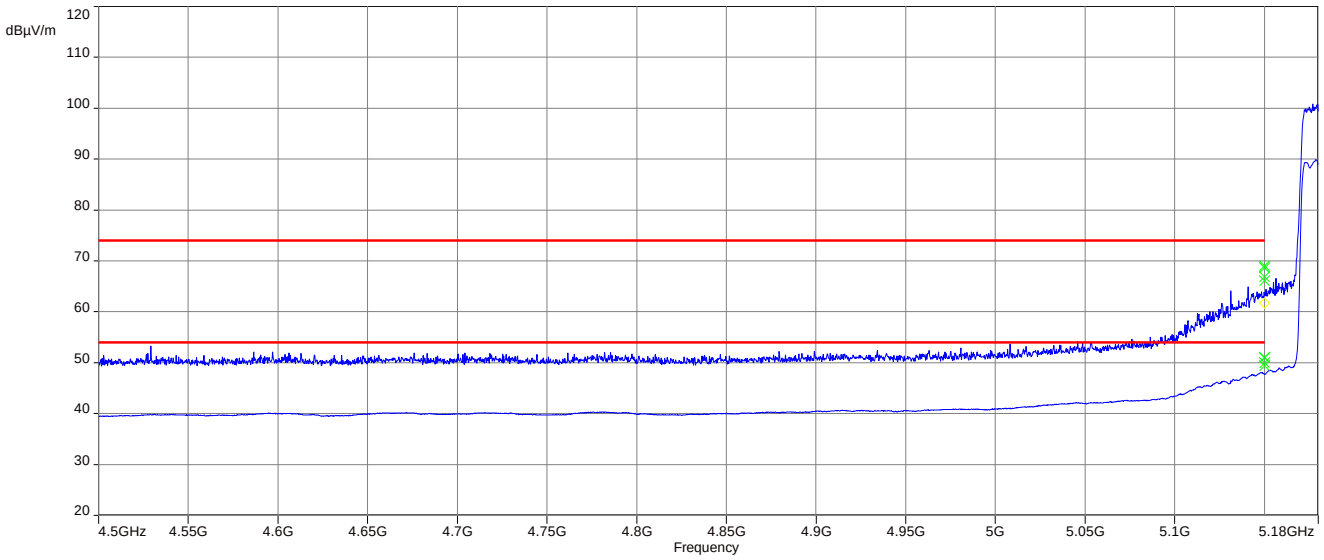


Plot 24: lower band edge; U-NII-2C; lowest channel

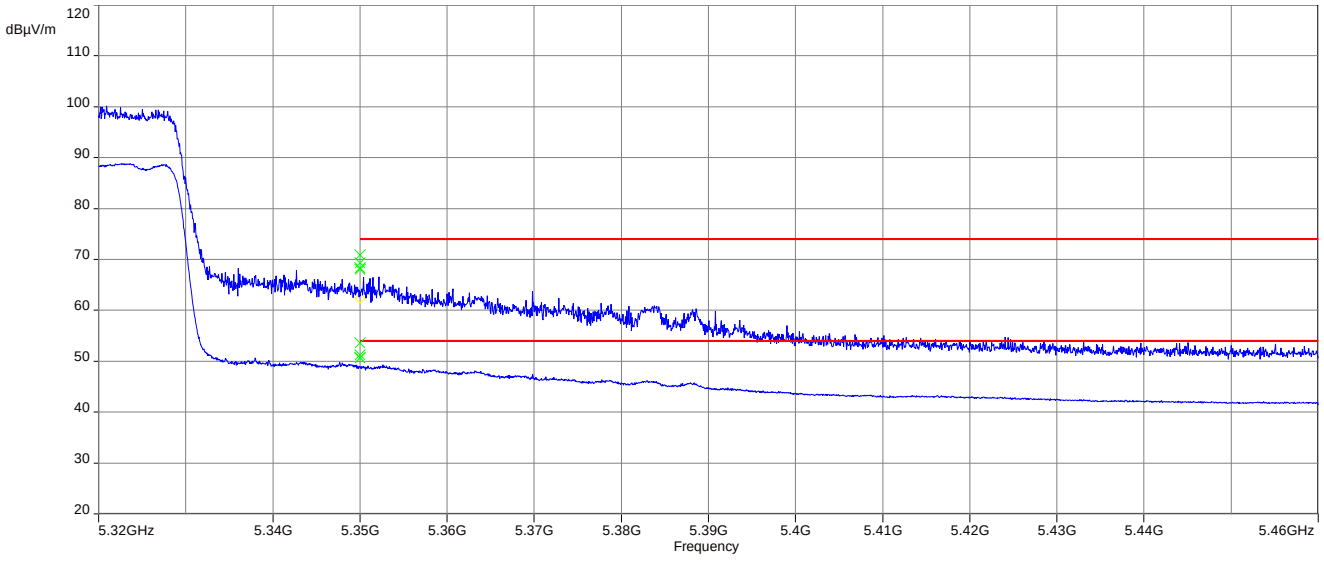


Plots: ax80-Mode

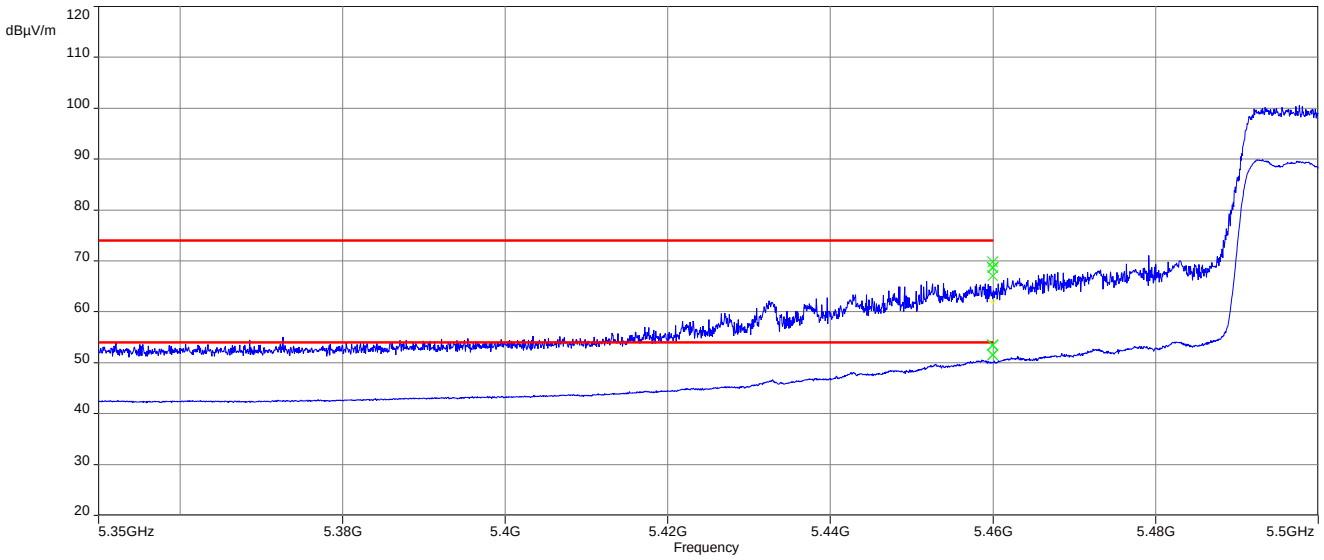
Plot 25: lower band edge; U-NII-1; lowest channel



Plot 26: upper band edge; U-NII-2A; highest channel



Plot 27: lower band edge; U-NII-2C; lowest channel



12.9 Spurious emissions radiated below 30 MHz

Description:

Measurement of the radiated spurious emissions in transmit mode below 30 MHz. The limits are re-calculated to a measurement distance of 3 m with 40 dB/decade according CFR Part 2.

Measurement:

Measurement parameter	
Detector:	Peak / Quasi Peak
Sweep time:	Auto
Video bandwidth:	F < 150 kHz: 200 Hz F > 150 kHz: 9 kHz
Resolution bandwidth:	F < 150 kHz: 1 kHz F > 150 kHz: 100 kHz
Span:	9 kHz to 30 MHz
Trace mode:	Max Hold
Test setup:	See sub clause 7.2 – A
Measurement uncertainty:	See chapter 9

Limits:

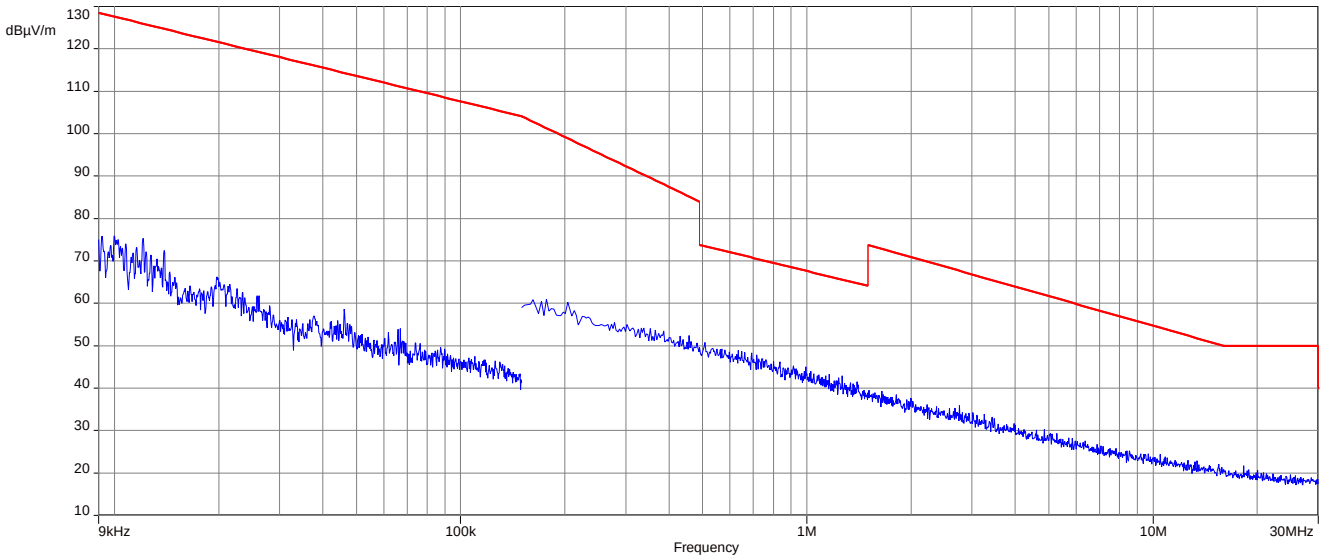
Spurious Emissions Radiated < 30 MHz		
Frequency (MHz)	Field Strength (dBµV/m)	Measurement distance
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

Results:

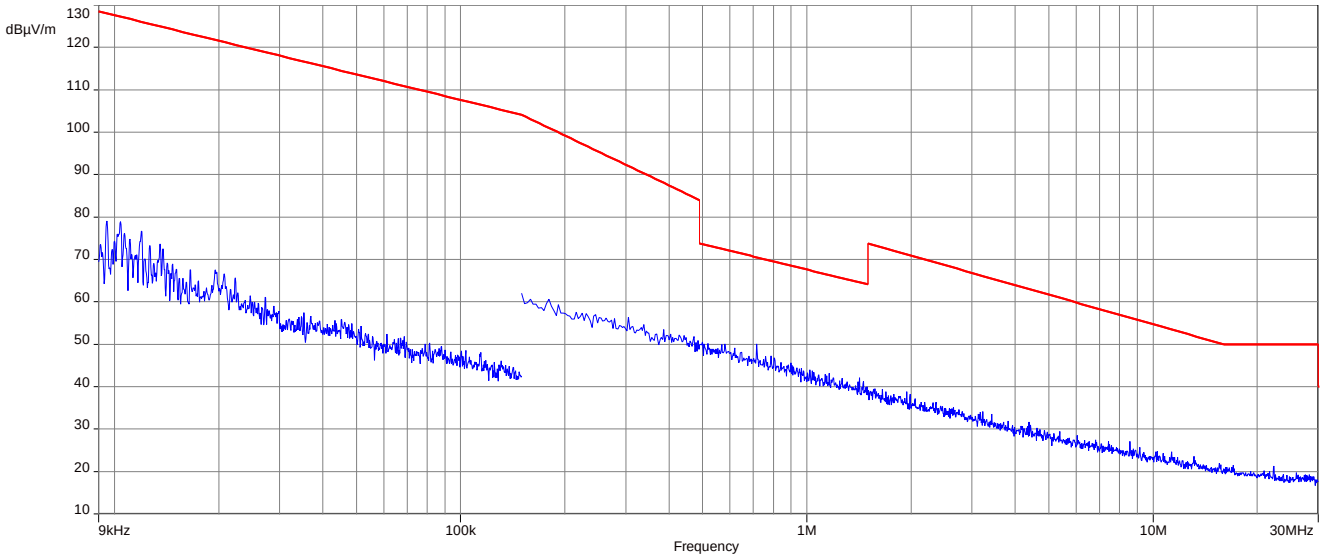
Spurious Emissions Radiated < 30 MHz [dBµV/m]		
F [MHz]	Detector	Level [dBµV/m]
All detected emissions are more than 20 dB below the limit.		

Plots: 20 MHz channel bandwidth

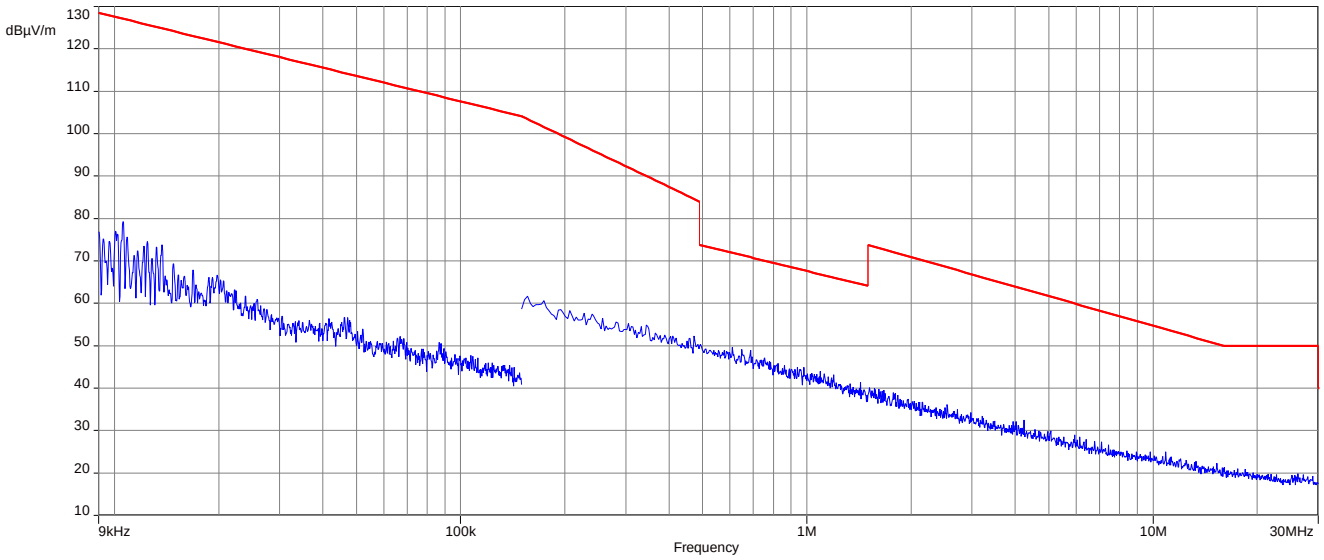
Plot 1: 9 kHz to 30 MHz, U-NII-1; lowest channel



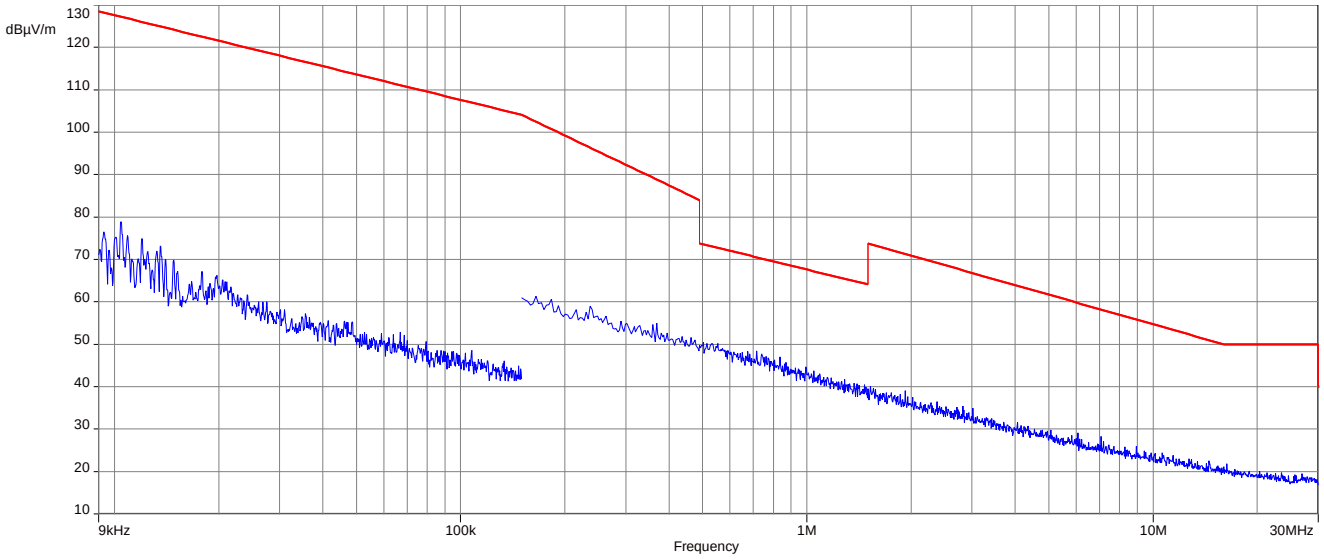
Plot 2: 9 kHz to 30 MHz, U-NII-1; middle channel



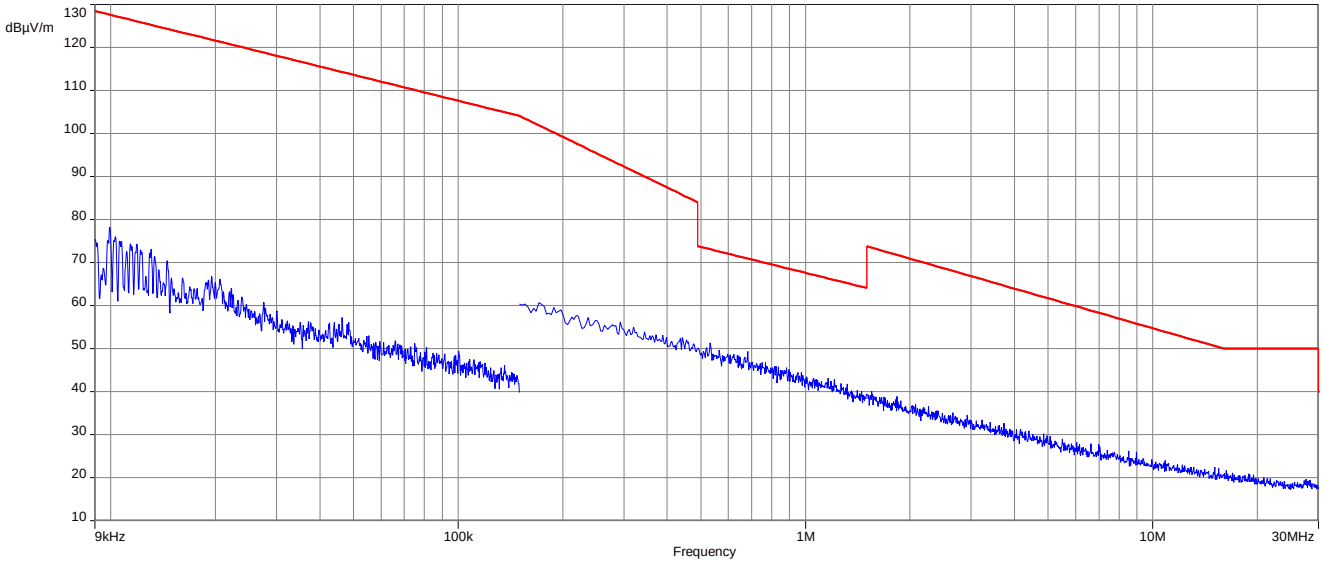
Plot 3: 9 kHz to 30 MHz, U-NII-1; highest channel



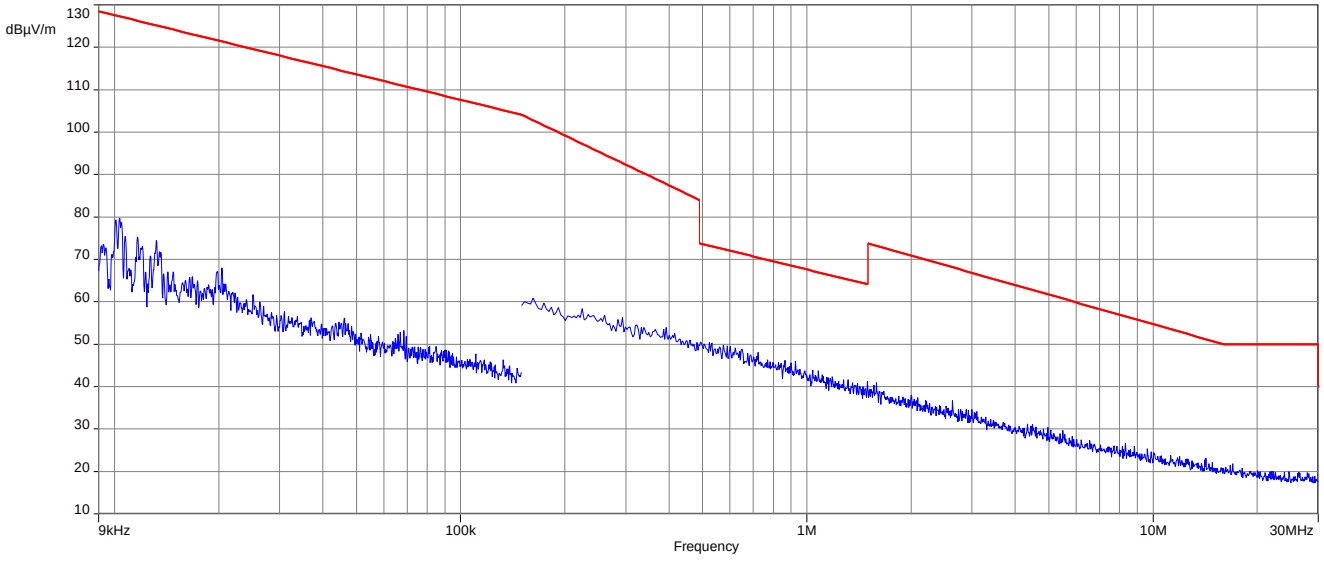
Plot 4: 9 kHz to 30 MHz, U-NII-2A; lowest channel



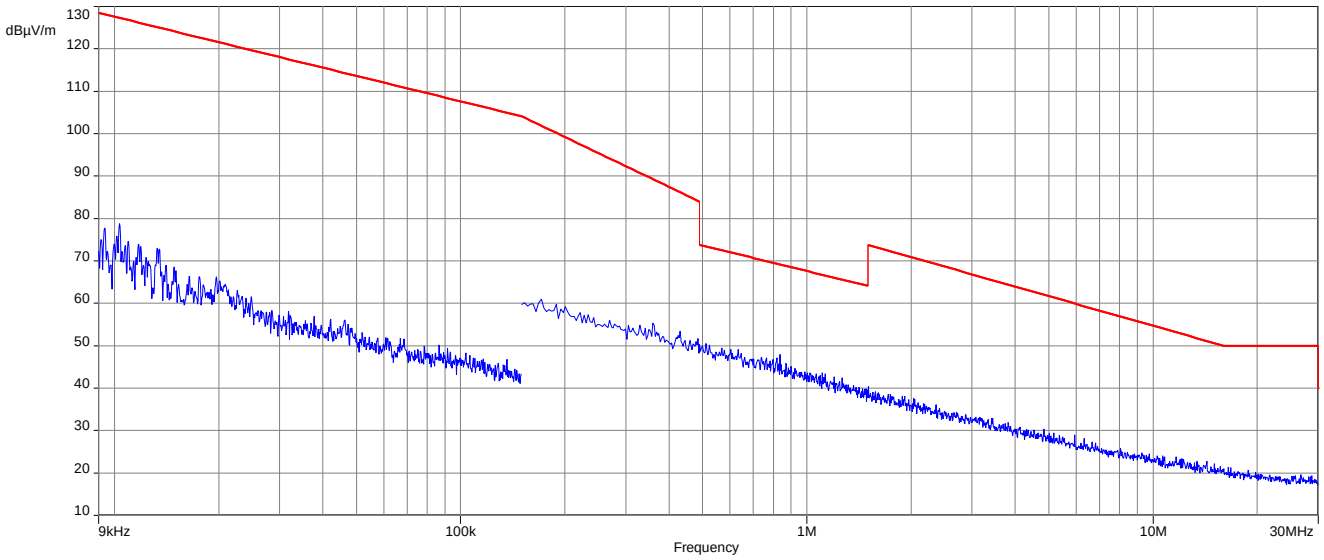
Plot 5: 9 kHz to 30 MHz, U-NII-2A; middle channel



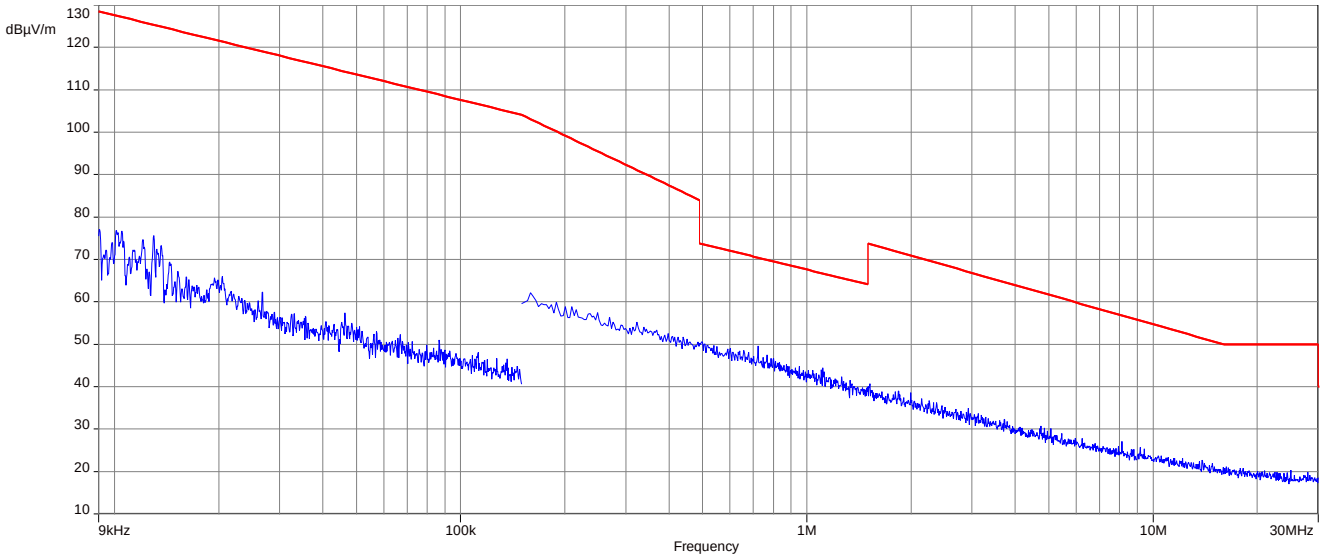
Plot 6: 9 kHz to 30 MHz, U-NII-2A; highest channel



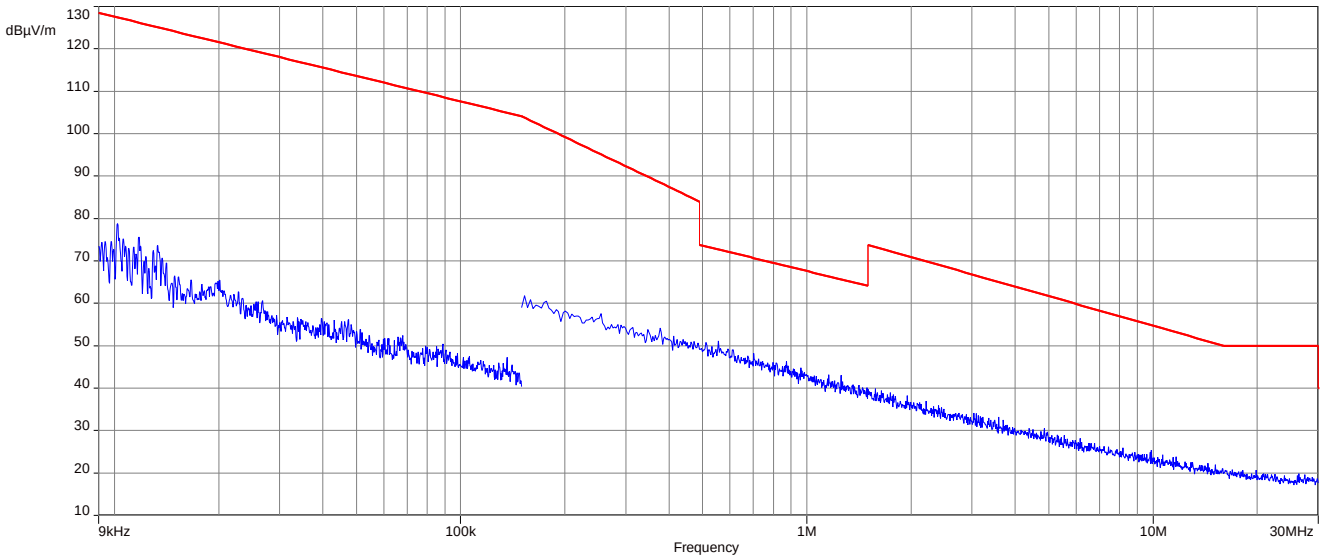
Plot 7: 9 kHz to 30 MHz, U-NII-2C; lowest channel



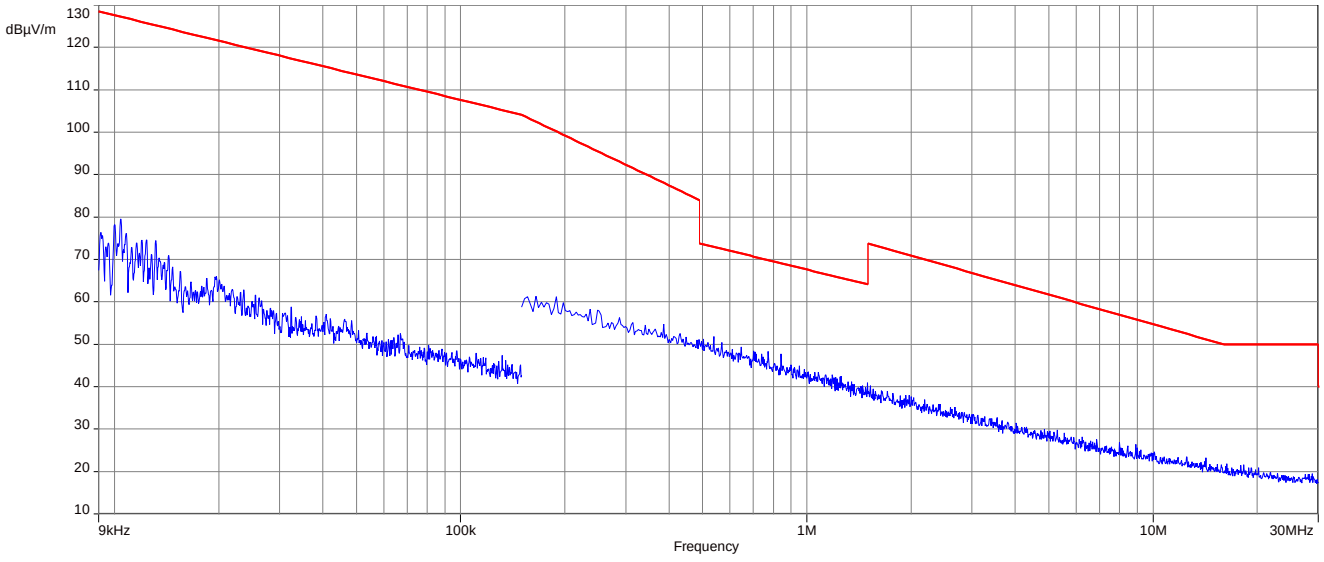
Plot 8: 9 kHz to 30 MHz, U-NII-2C; middle channel



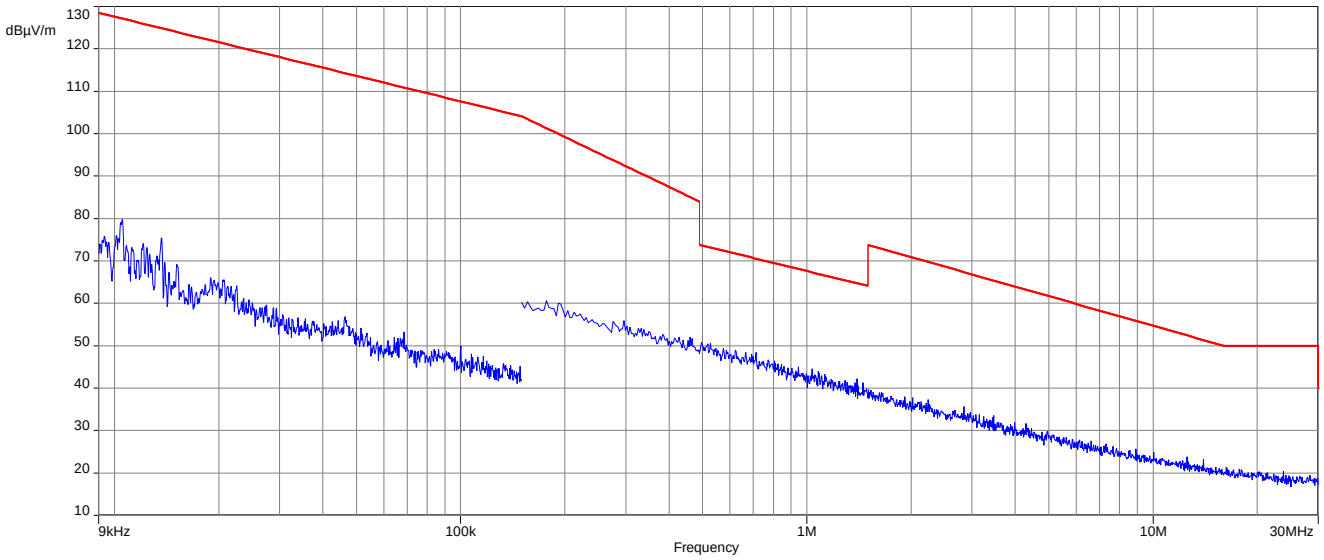
Plot 9: 9 kHz to 30 MHz, U-NII-2C; highest channel



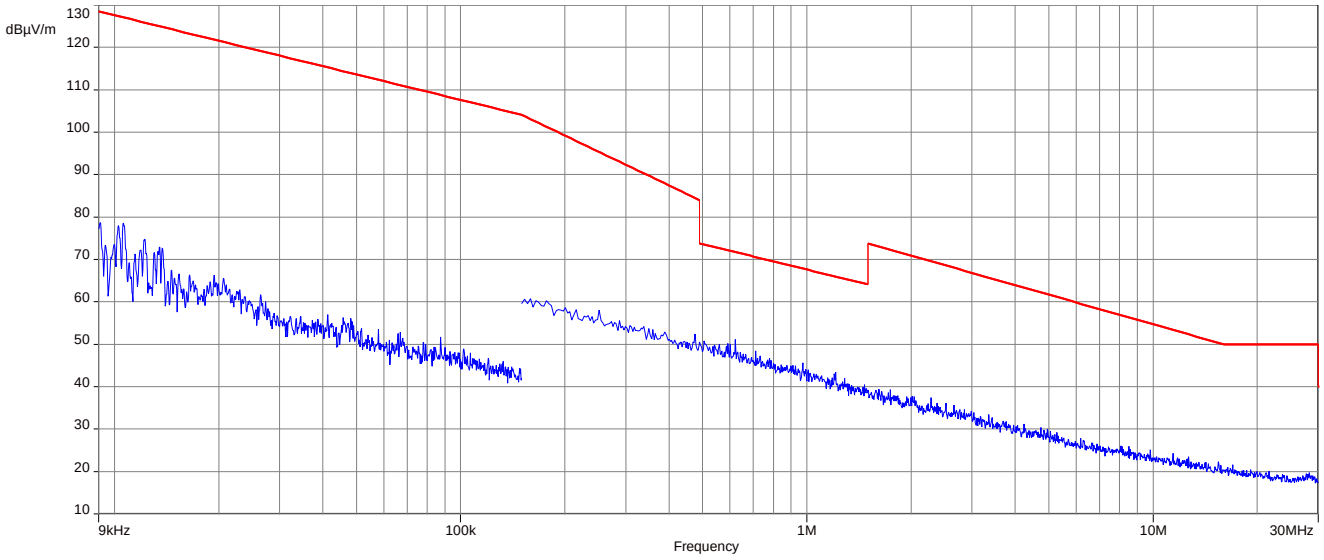
Plot 10: 9 kHz to 30 MHz, U-NII-3; lowest channel



Plot 11: 9 kHz to 30 MHz, U-NII-3; middle channel

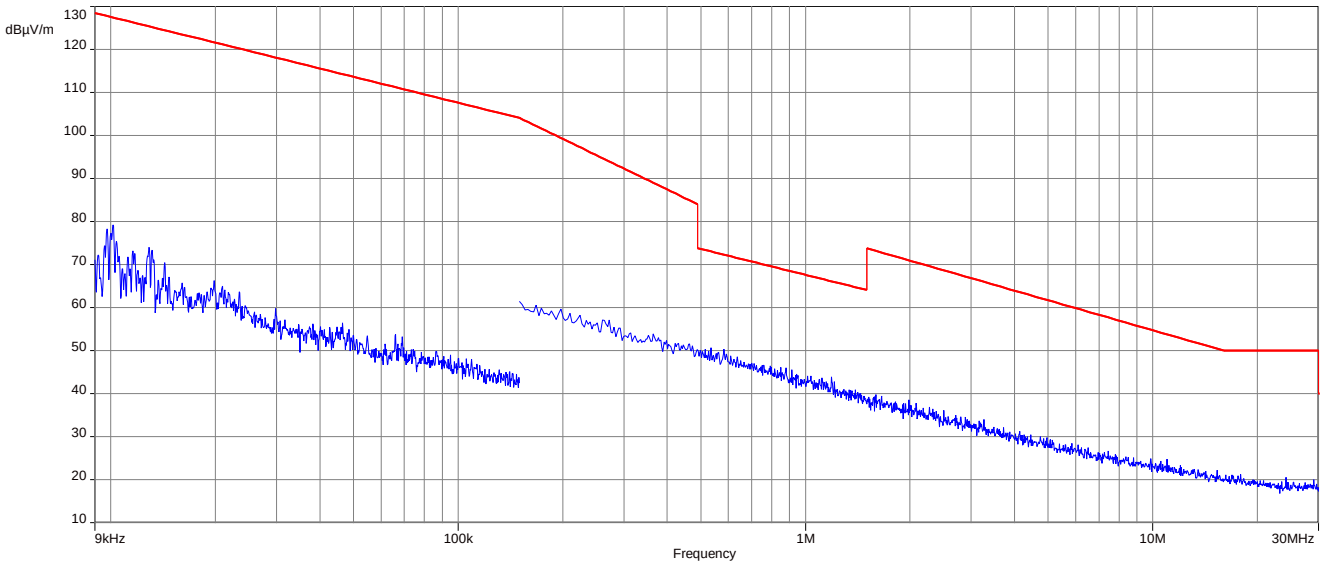


Plot 12: 9 kHz to 30 MHz, U-NII-3; highest channel

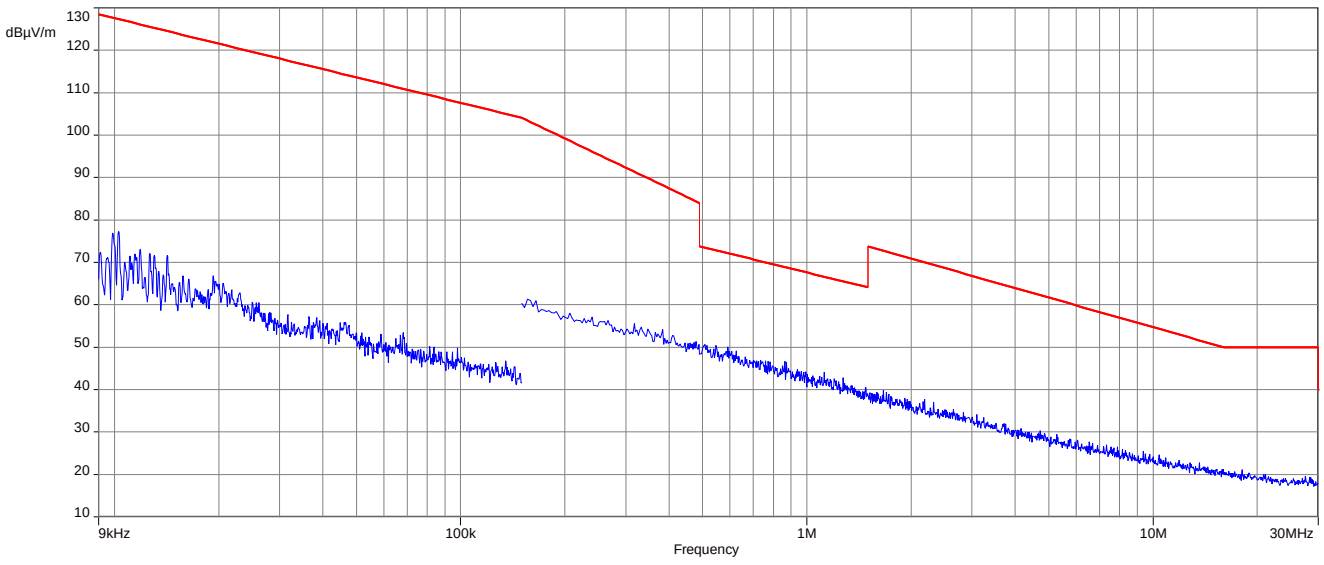


Plots: 40 MHz channel bandwidth

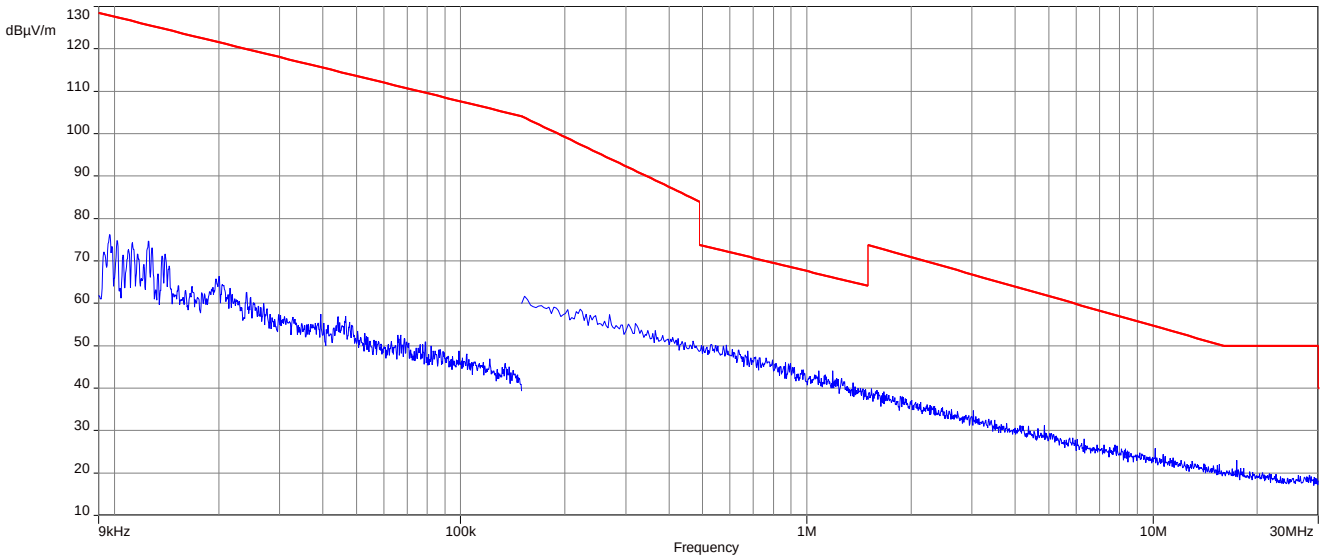
Plot 1: 9 kHz to 30 MHz, U-NII-1; lowest channel



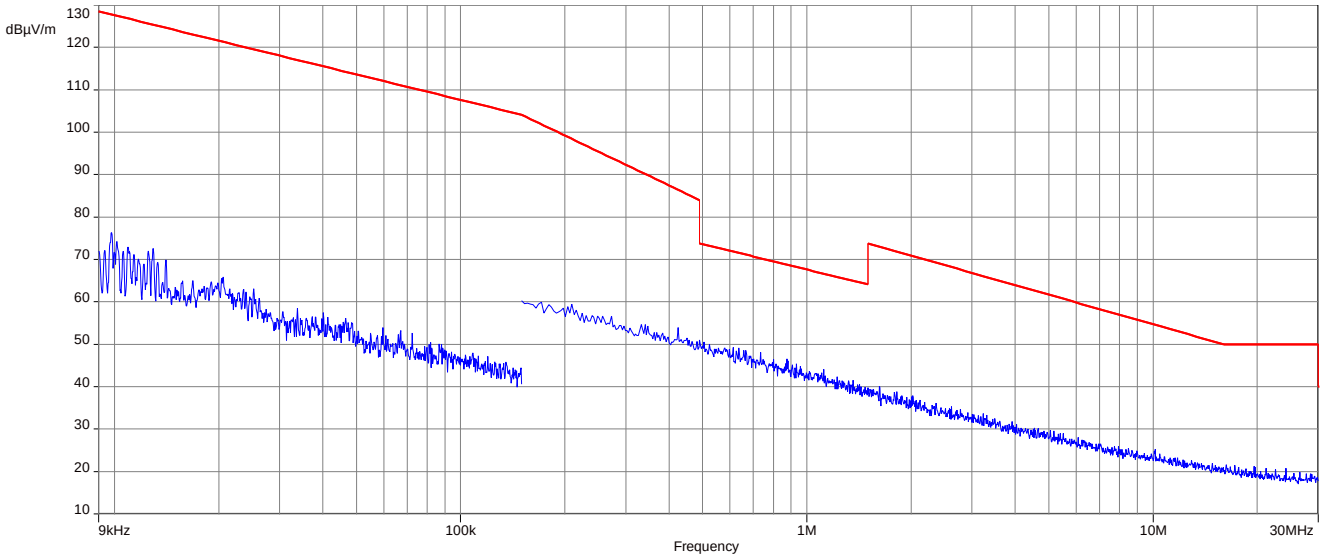
Plot 2: 9 kHz to 30 MHz, U-NII-1; highest channel



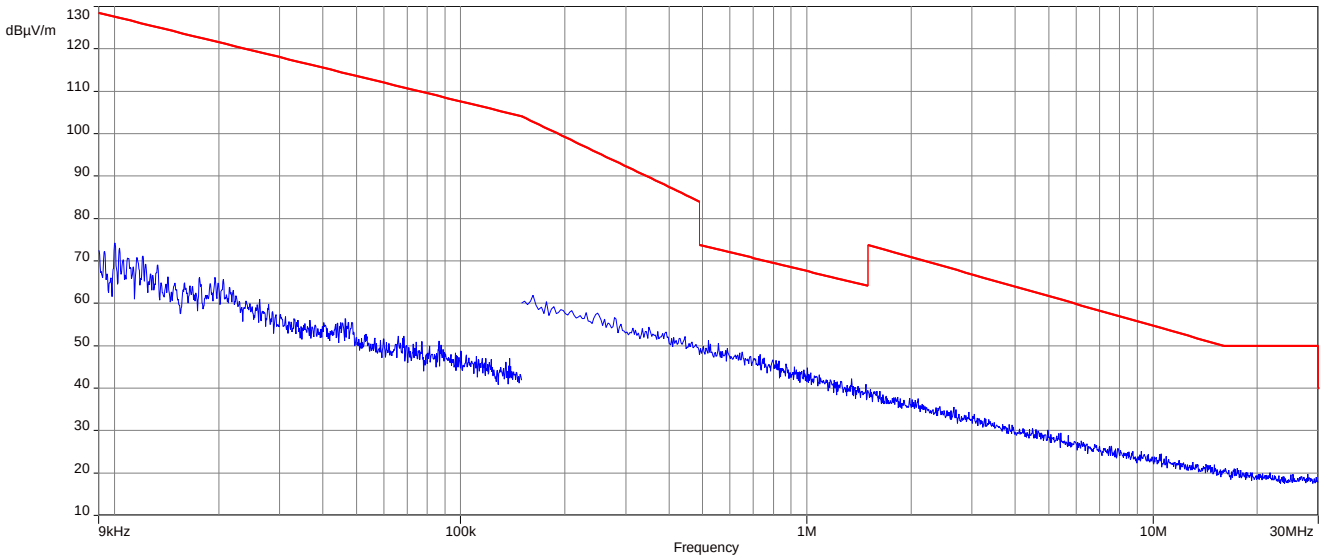
Plot 3: 9 kHz to 30 MHz, U-NII-2A; lowest channel



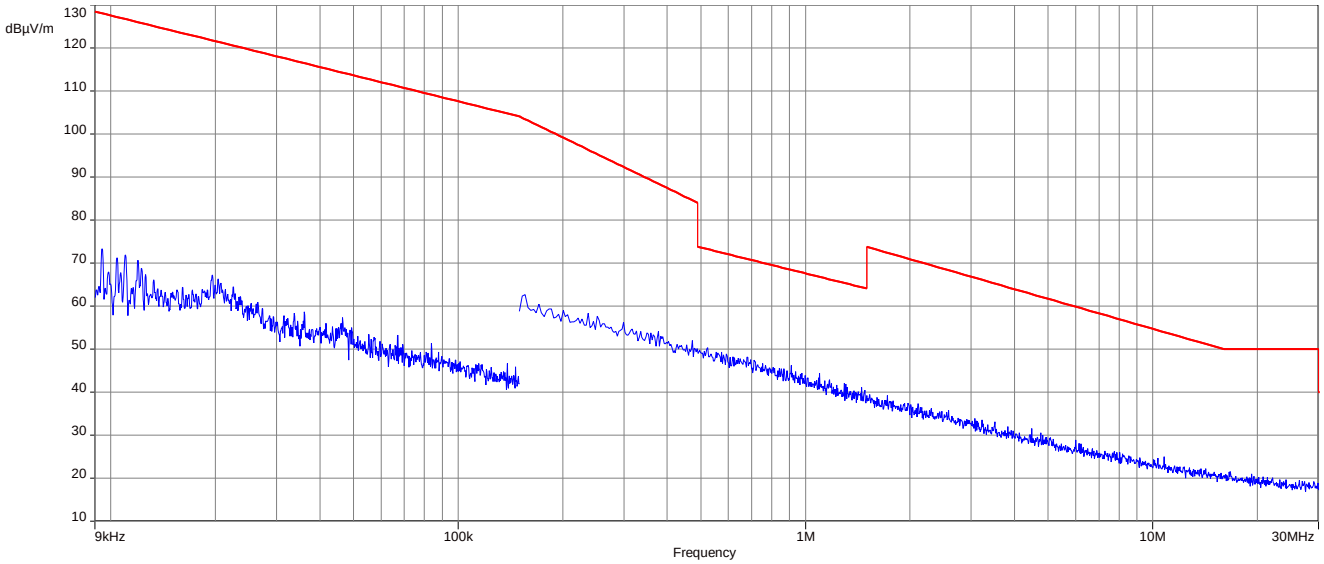
Plot 4: 9 kHz to 30 MHz, U-NII-2A; highest channel



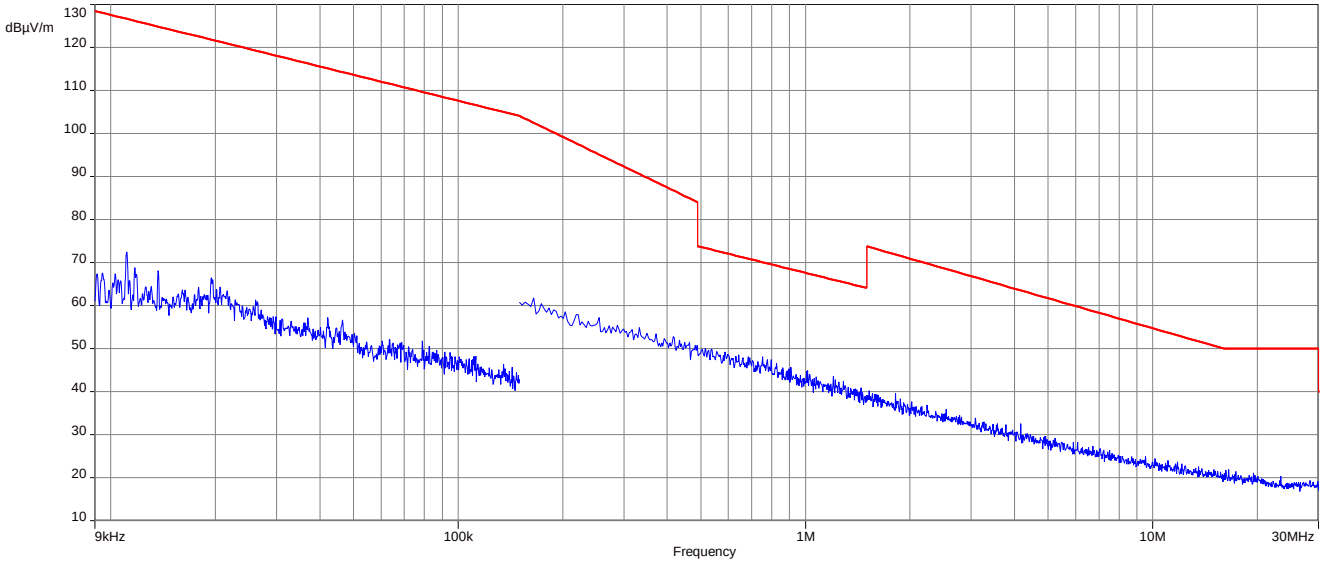
Plot 5: 9 kHz to 30 MHz, U-NII-2C; lowest channel



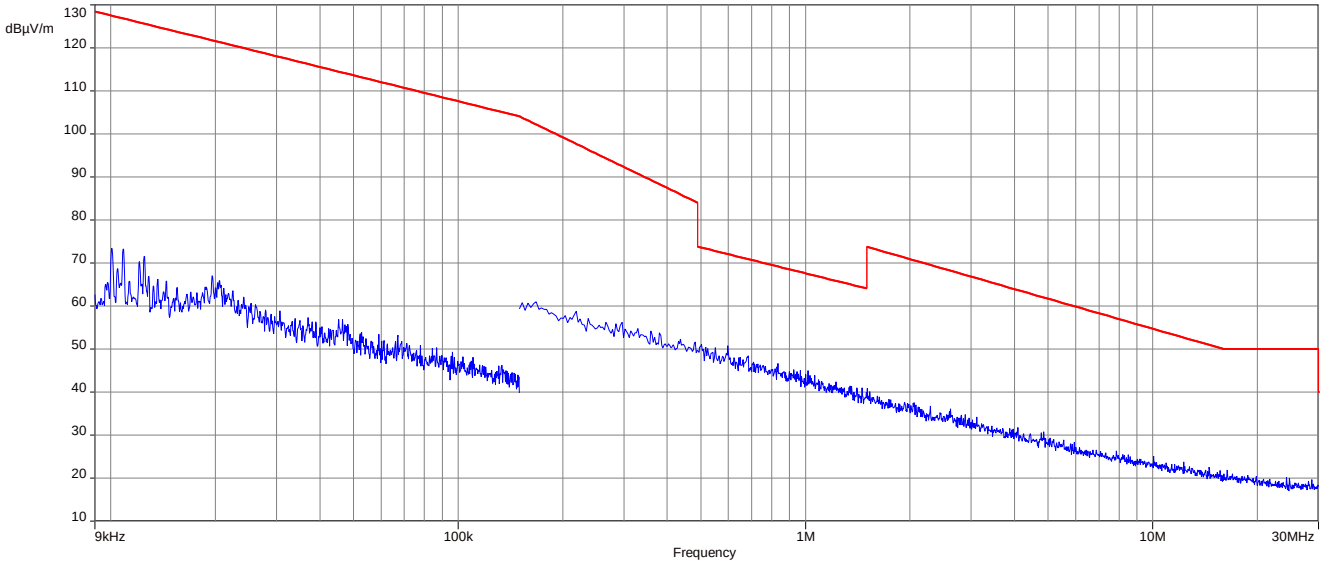
Plot 6: 9 kHz to 30 MHz, U-NII-2C; middle channel



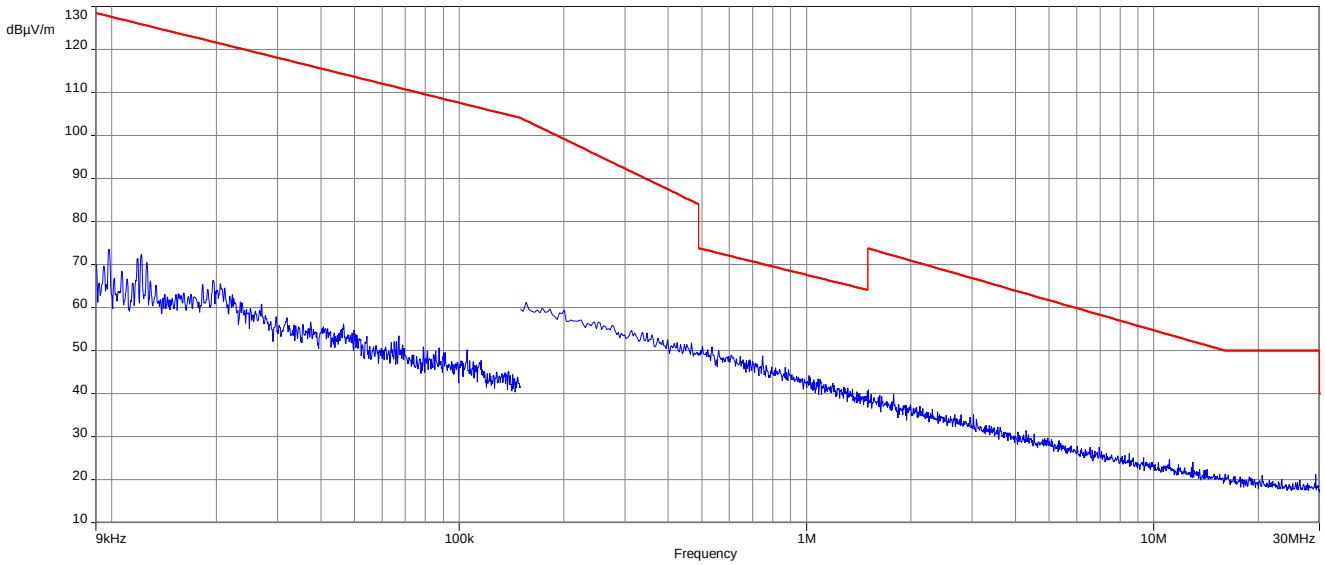
Plot 7: 9 kHz to 30 MHz, U-NII-2C; highest channel



Plot 8: 9 kHz to 30 MHz, U-NII-3; lowest channel

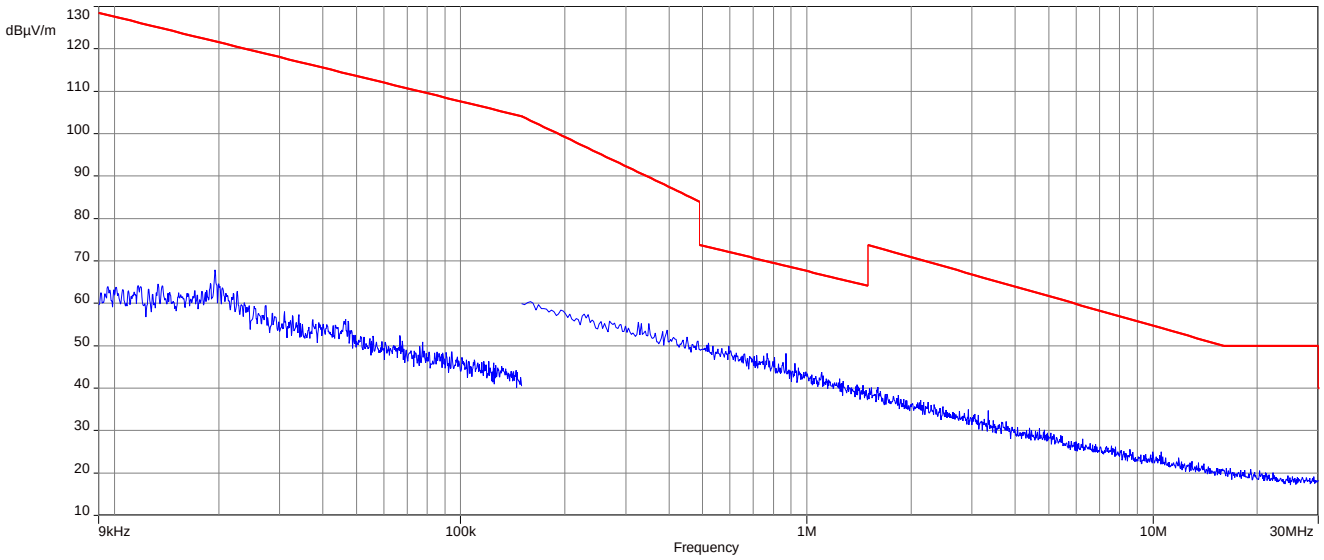


Plot 9: 9 kHz to 30 MHz, U-NII-3; highest channel

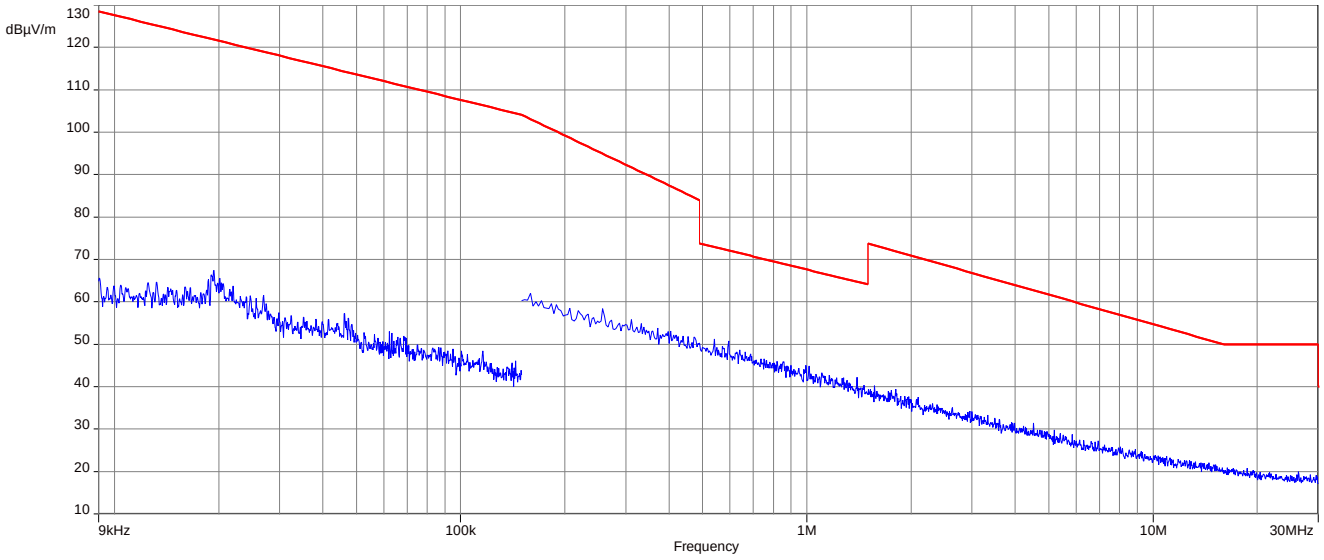


Plots: 80 MHz channel bandwidth

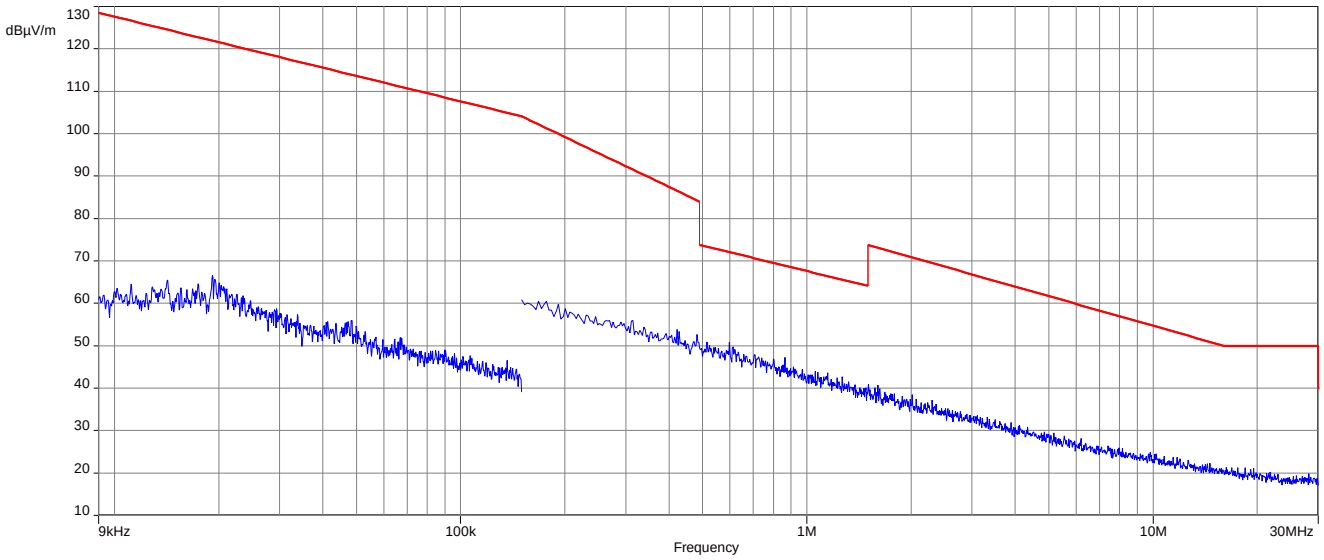
Plot 1: 9 kHz to 30 MHz, U-NII-1; middle channel



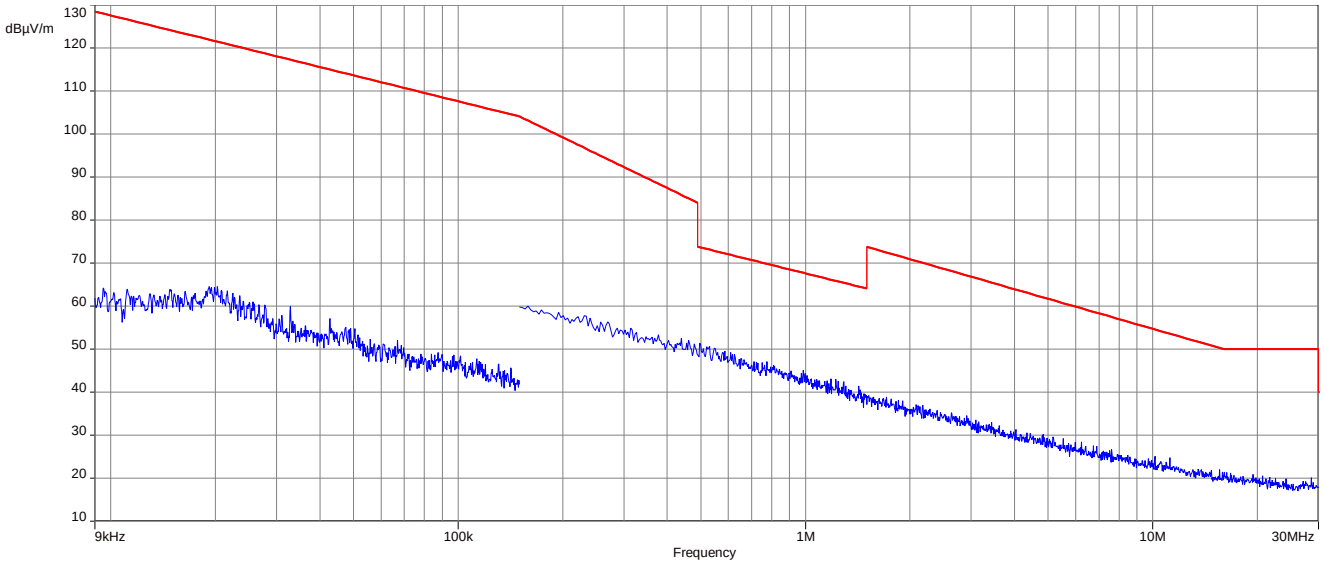
Plot 2: 9 kHz to 30 MHz, U-NII-2A; middle channel



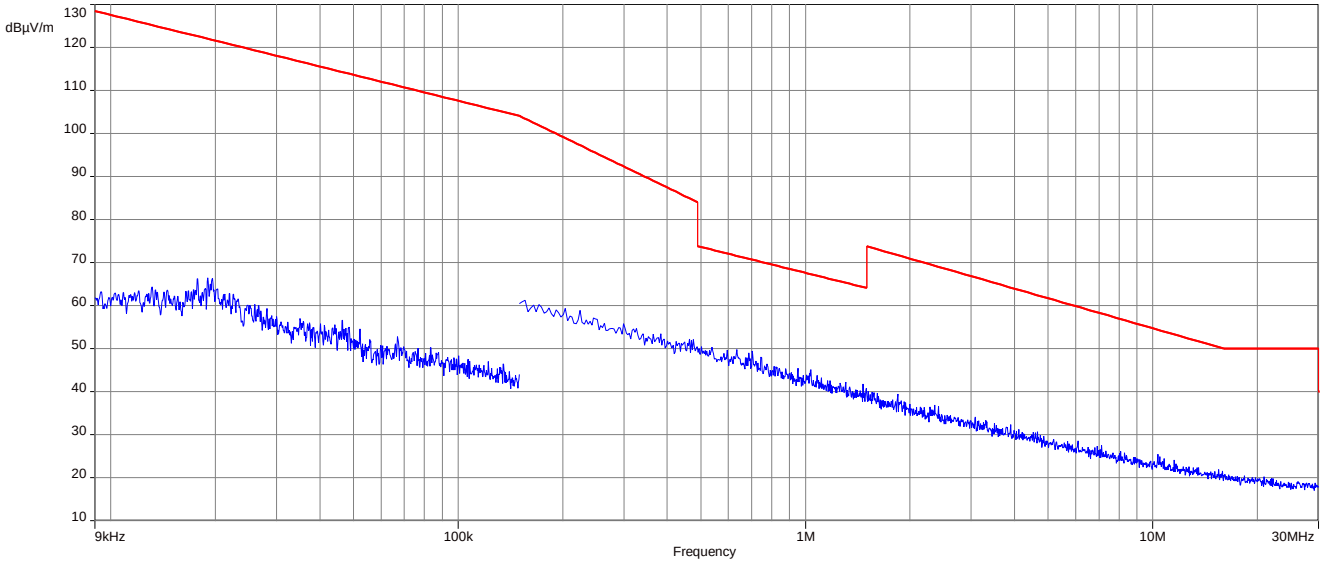
Plot 3: 9 kHz to 30 MHz, U-NII-2C; lowest channel



Plot 4: 9 kHz to 30 MHz, U-NII-2C; highest channel



Plot 5: 9 kHz to 30 MHz, U-NII-3; middle channel



12.10 Spurious emissions radiated 30 MHz to 1 GHz

Description:

Measurement of the radiated spurious emissions and cabinet radiations below 1 GHz.

Measurement:

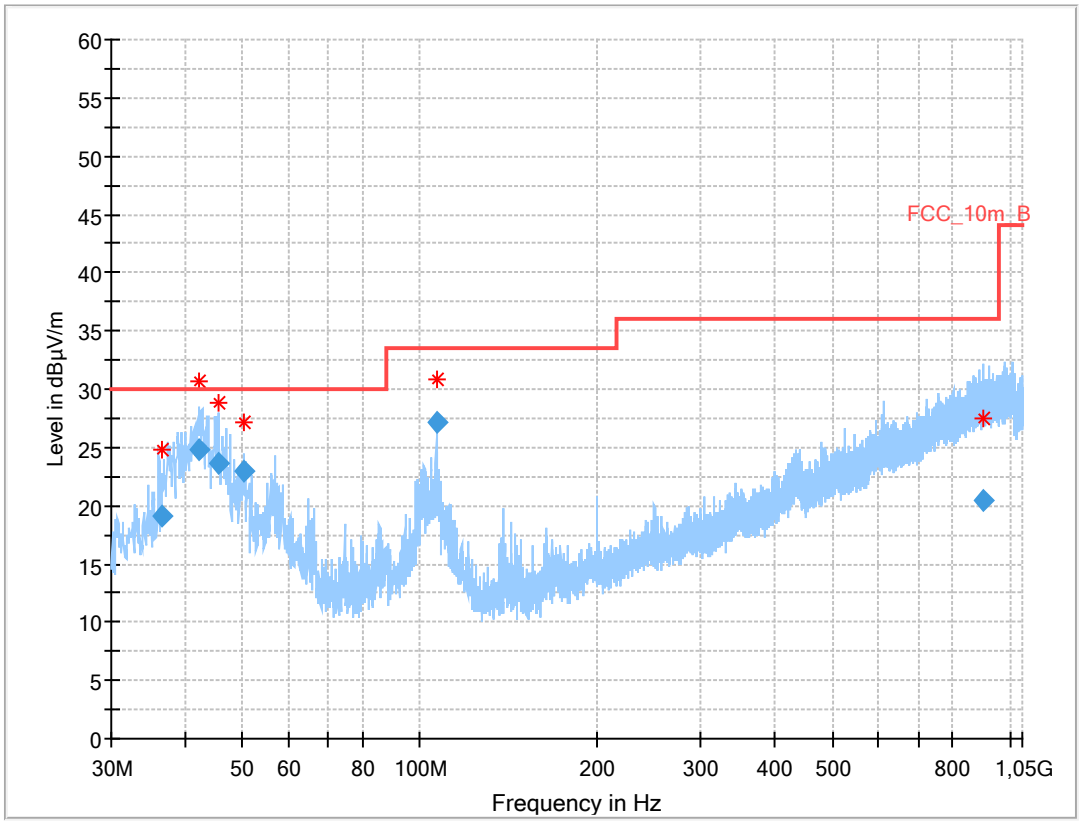
Measurement parameter	
Detector:	Quasi Peak
Sweep time:	Auto
Resolution bandwidth:	120 kHz
Video bandwidth:	500 kHz
Span:	30 MHz to 1 GHz
Test setup:	See sub clause 7.1 – A
Measurement uncertainty:	See chapter 9

Limits:

TX Spurious Emissions Radiated		
§15.209		
Frequency (MHz)	Field Strength (dBµV/m)	Measurement distance
30 - 88	30.0	10
88 – 216	33.5	10
216 – 960	36.0	10
Above 960	54.0	3
§15.407		
Outside the restricted bands!	-27 dBm / MHz	

Plots: 20 MHz channel bandwidth a-mode, valid for all bands and channels of a-mode

Plot 1: 30 MHz to 1 GHz; vertical & horizontal polarization

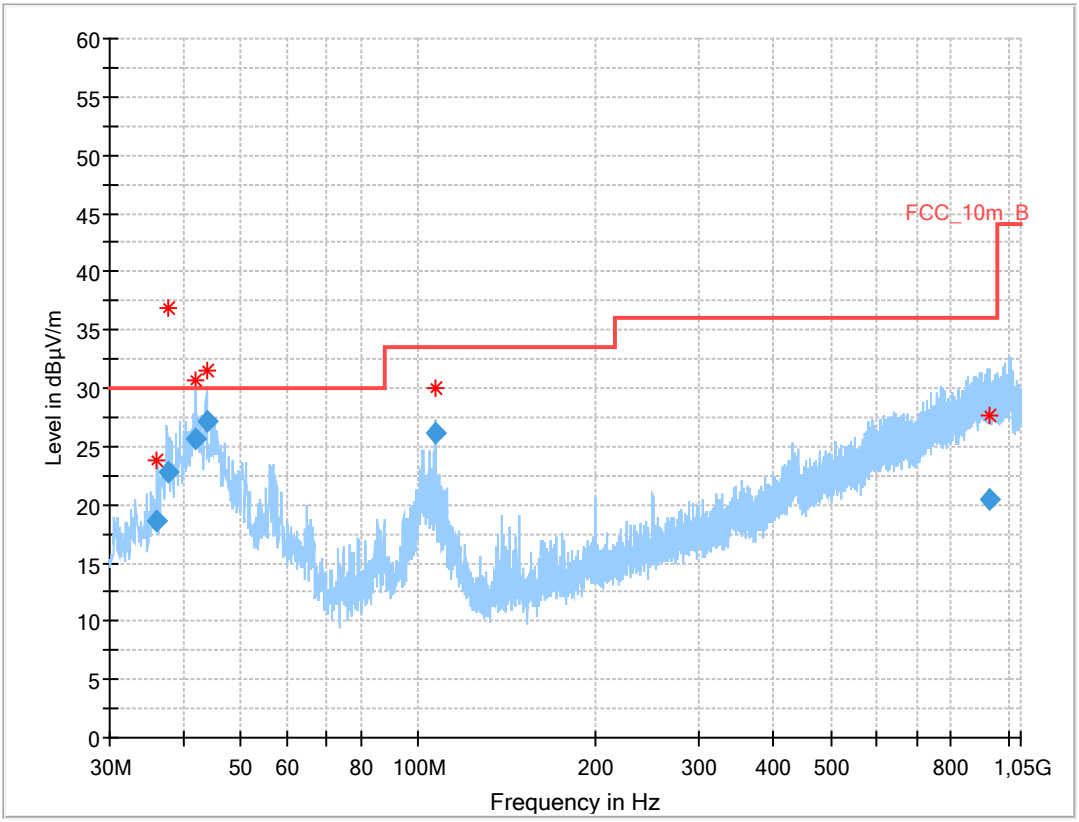


Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
36.650	19.10	30.0	10.9	1000	120.0	112.0	V	254	15
42.100	24.78	30.0	5.2	1000	120.0	151.0	V	90	16
45.761	23.60	30.0	6.4	1000	120.0	220.0	V	309	16
50.460	22.90	30.0	7.1	1000	120.0	100.0	V	67	16
106.682	27.09	33.5	6.4	1000	120.0	107.0	V	326	14
902.574	20.51	36.0	15.5	1000	120.0	248.0	V	0	26

Plots: 20 MHz channel bandwidth n20-mode, valid for all bands and channels of 20 MHz modes

Plot 2: 30 MHz to 1 GHz; vertical & horizontal polarization

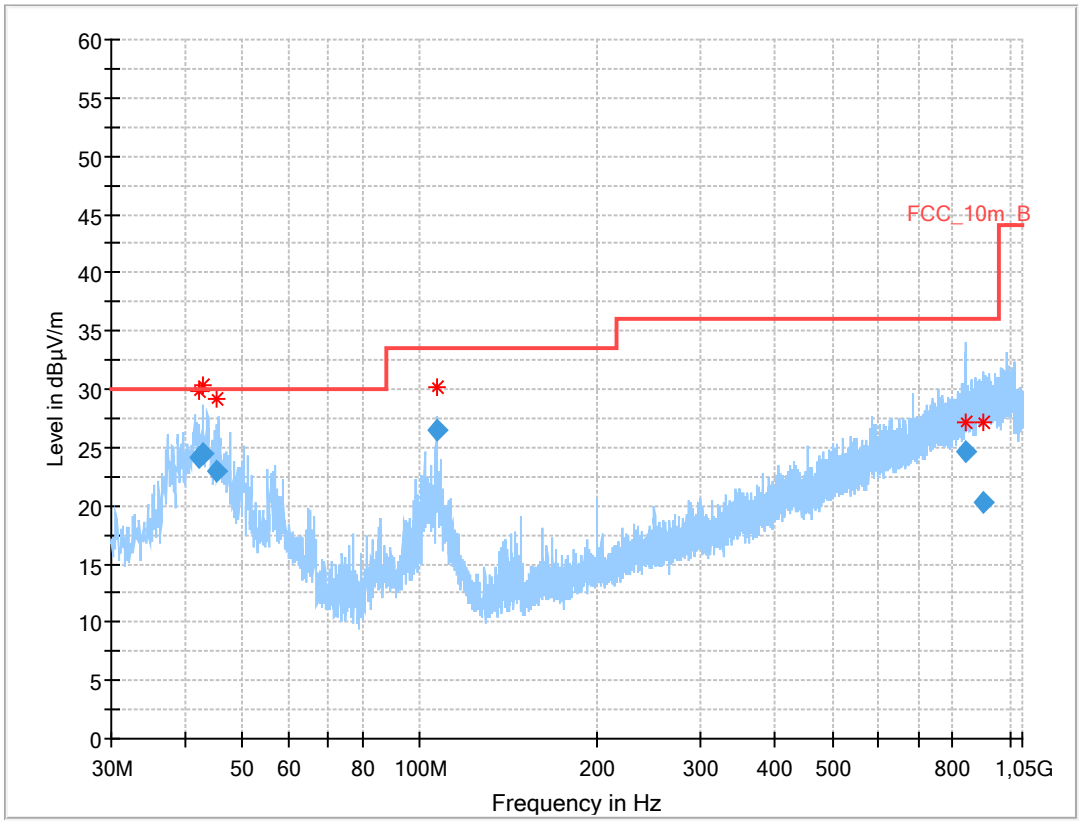


Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
36.125	18.57	30.0	11.4	1000	120.0	285.0	V	308	14
37.775	22.79	30.0	7.2	1000	120.0	173.0	V	307	15
42.063	25.66	30.0	4.3	1000	120.0	104.0	V	-39	16
43.798	27.08	30.0	2.9	1000	120.0	100.0	V	337	16
106.692	26.22	33.5	7.3	1000	120.0	106.0	V	309	14
931.589	20.53	36.0	15.5	1000	120.0	167.0	H	180	26

Plots: 40 MHz channel bandwidth n40-mode, valid for all bands and channels of 40 MHz modes

Plot 1: 30 MHz to 1 GHz; vertical & horizontal polarization

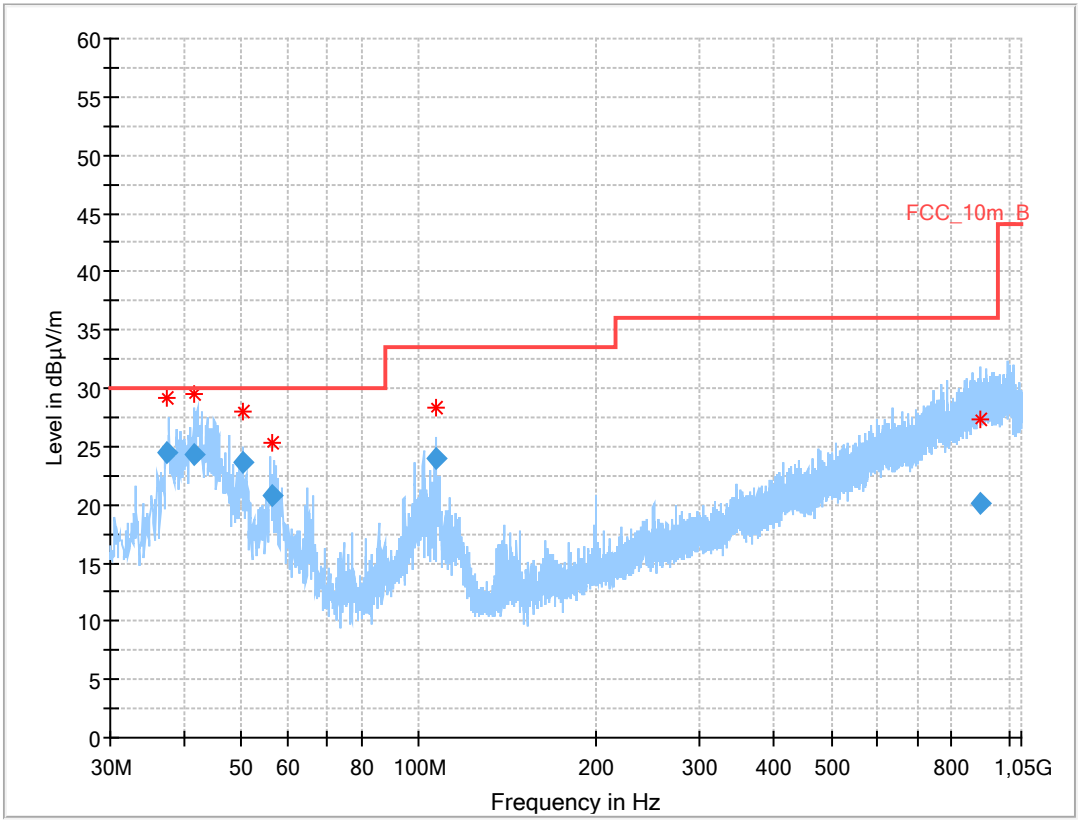


Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
42.117	24.16	30.0	5.8	1000	120.0	120.0	V	258	16
42.907	24.45	30.0	5.6	1000	120.0	200.0	V	225	16
45.246	22.94	30.0	7.1	1000	120.0	200.0	V	29	16
106.688	26.56	33.5	6.9	1000	120.0	106.0	V	278	14
839.785	24.72	36.0	11.3	1000	120.0	200.0	V	225	24
902.324	20.30	36.0	15.7	1000	120.0	297.0	V	266	26

Plots: 80 MHz channel bandwidth, valid for all bands and channels of 80 MHz modes

Plot 1: 30 MHz to 1 GHz; vertical & horizontal polarization



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
37.526	24.44	30.0	5.6	1000	120.0	112.0	V	207	15
41.600	24.29	30.0	5.7	1000	120.0	109.0	V	250	16
50.450	23.68	30.0	6.3	1000	120.0	123.0	V	309	16
56.553	20.78	30.0	9.2	1000	120.0	159.0	V	206	16
106.701	24.05	33.5	9.5	1000	120.0	282.0	V	313	14
892.023	20.18	36.0	15.8	1000	120.0	400.0	H	87	25

12.11 Spurious emissions radiated 1 GHz to 40 GHz

Description:

Measurement of the radiated spurious emissions and cabinet radiations from 1 GHz to 40 GHz.

Measurement:

Measurement parameter	
Detector:	Quasi Peak below 1 GHz (alternative Peak) Peak above 1 GHz / RMS
Sweep time:	Auto
Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz
Span:	1 GHz to 40 GHz
Trace mode:	Max Hold / Average with 100 counts + 20 log (1 / X) for duty cycle lower than 100 %
Test setup:	See sub clause 7.2 – A See sub clause 7.3 – A+B
Measurement uncertainty:	See chapter 9

Limits:

TX Spurious Emissions Radiated		
§15.209		
Frequency (MHz)	Field Strength (dBµV/m)	Measurement distance
Above 960	54.0	3
§15.407		
Outside the restricted bands!	-27 dBm / MHz	

Note: The 26GHz to 40GHz plots are valid for more than one channel and are partly identical.

Results: 20 MHz channel bandwidth

TX Spurious Emissions Radiated [dBµV/m] / dBm								
U-NII-1 (5150 MHz to 5250 MHz)								
Lowest channel			Middle channel			Highest channel		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
15540	Peak	60.0	15606	Peak	59.8	15724	Peak	60.1
	AVG	50.6		AVG	49.4		AVG	50.7
For emissions above 18 GHz please take look at the plots.			For emissions above 18 GHz please take look at the plots.			For emissions above 18 GHz please take look at the plots.		

TX Spurious Emissions Radiated [dBµV/m] / dBm								
U-NII-2A (5250 MHz to 5350 MHz)								
Lowest channel			Middle channel			Highest channel		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
15780	Peak	61.7	15846	Peak	59.9	15960	Peak	61.2
	AVG	51.7		AVG	49.5		AVG	51.9
For emissions above 18 GHz please take look at the plots.			For emissions above 18 GHz please take look at the plots.			For emissions above 18 GHz please take look at the plots.		

TX Spurious Emissions Radiated [dBµV/m] / dBm								
U-NII-2C (5470 MHz to 5725 MHz)								
Lowest channel			Middle channel			Highest channel		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
11000	Peak	52.5	11200	Peak	57.1	11400	Peak	57.9
	AVG	43.6		AVG	47.7		AVG	48.9
16500	Peak	72.0	16800	Peak	67.8	17100	Peak	56.5
	AVG	60.6		AVG	56.7		AVG	68.0
For emissions above 18 GHz please take look at the plots.			For emissions above 18 GHz please take look at the plots.			For emissions above 18 GHz please take look at the plots.		

TX Spurious Emissions Radiated [dBµV/m] / dBm								
U-NII-3 (5725 MHz to 5850 MHz)								
Lowest channel			Middle channel			Highest channel		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
11488	Peak	60.1	11572	Peak	60.8	11652	Peak	60.9
	AVG	52.2		AVG	52.3		AVG	52.4
17230	Peak	68.3	17355	Peak	68.6	17475	Peak	68.6
	AVG	57.6		AVG	57.2		AVG	57.6
For emissions above 18 GHz please take look at the plots.			For emissions above 18 GHz please take look at the plots.			For emissions above 18 GHz please take look at the plots.		

Results: 40 MHz channel bandwidth

TX Spurious Emissions Radiated [dBµV/m] / dBm					
U-NII-1 (5150 MHz to 5250 MHz)					
Lowest channel			Highest channel		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
15580	Peak	59.3	15680	Peak	56.9
	AVG	50.7		AVG	48.6
For emissions above 18 GHz please take look at the plots.			For emissions above 18 GHz please take look at the plots.		

TX Spurious Emissions Radiated [dBµV/m] / dBm					
U-NII-2A (5250 MHz to 5350 MHz)					
Lowest channel				Highest channel	
F [MHz]	Detector	Level [dBµV/m]		F [MHz]	Detector	Level [dBµV/m]
15800	Peak	57.4		15936	Peak	56.0
	AVG	49.5			AVG	47.6
For emissions above 18 GHz please take look at the plots.				For emissions above 18 GHz please take look at the plots.		

TX Spurious Emissions Radiated [dBµV/m] / dBm								
U-NII-2C (5470 MHz to 5725 MHz)								
Lowest channel			Middle channel			Highest channel		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
-/-	Peak	-/-	11172	Peak	51.9	11338	Peak	55.7
	AVG	-/-		AVG	42.3		AVG	46.5
For emissions above 18 GHz please take look at the plots.			For emissions above 18 GHz please take look at the plots.			For emissions above 18 GHz please take look at the plots.		

TX Spurious Emissions Radiated [dBµV/m] / dBm					
U-NII-3 (5725 MHz to 5850 MHz)					
Lowest channel				Highest channel	
F [MHz]	Detector	Level [dBµV/m]		F [MHz]	Detector	Level [dBµV/m]
11498	Peak	54.8		11590	Peak	52.5
	AVG	45.6			AVG	61.2
For emissions above 18 GHz please take look at the plots.				For emissions above 18 GHz please take look at the plots.		

Results: 80 MHz channel bandwidth

TX Spurious Emissions Radiated [dBµV/m] / dBm		
U-NII-1 (5150 MHz to 5250 MHz)		
Middle channel		
F [MHz]	Detector	Level [dBµV/m]
15618	Peak	54.8
	AVG	45.1
For emissions above 18 GHz please take look at the plots.		

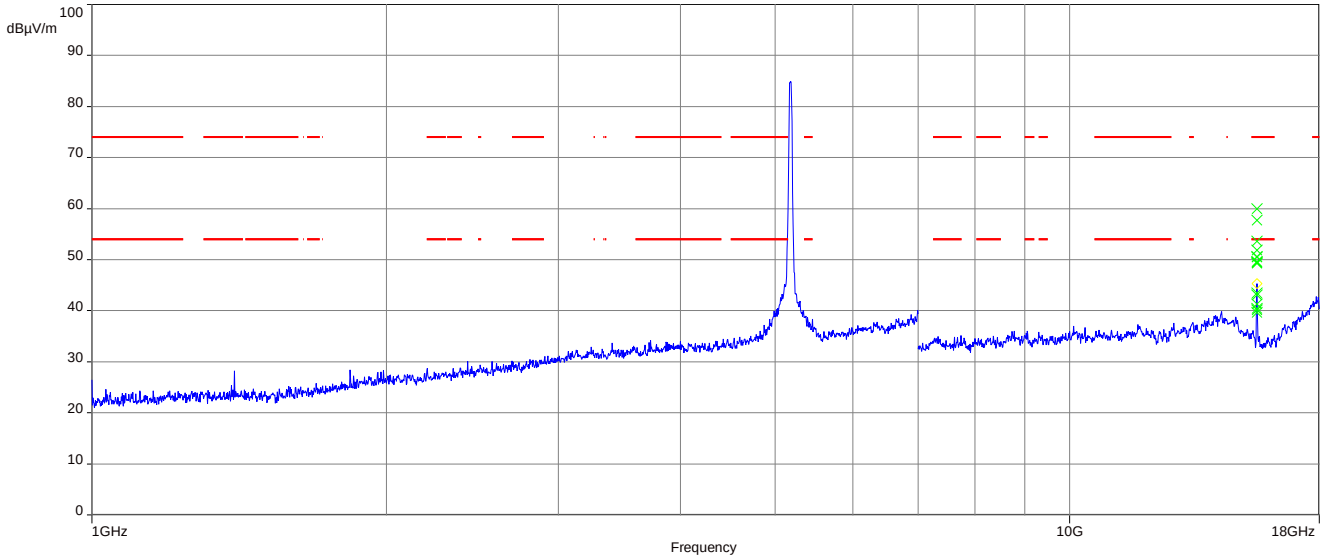
TX Spurious Emissions Radiated [dBµV/m] / dBm		
U-NII-2A (5250 MHz to 5350 MHz)		
Middle channel		
F [MHz]	Detector	Level [dBµV/m]
-/	Peak	-/-
	AVG	-/-
For emissions above 18 GHz please take look at the plots.		

TX Spurious Emissions Radiated [dBµV/m] / dBm					
U-NII-2C (5470 MHz to 5725 MHz)					
Lowest channel			Highest channel		
-/-	Peak	-/-	11238	Peak	50.4
	AVG	-/-		AVG	39.1
For emissions above 18 GHz please take look at the plots.			For emissions above 18 GHz please take look at the plots.		

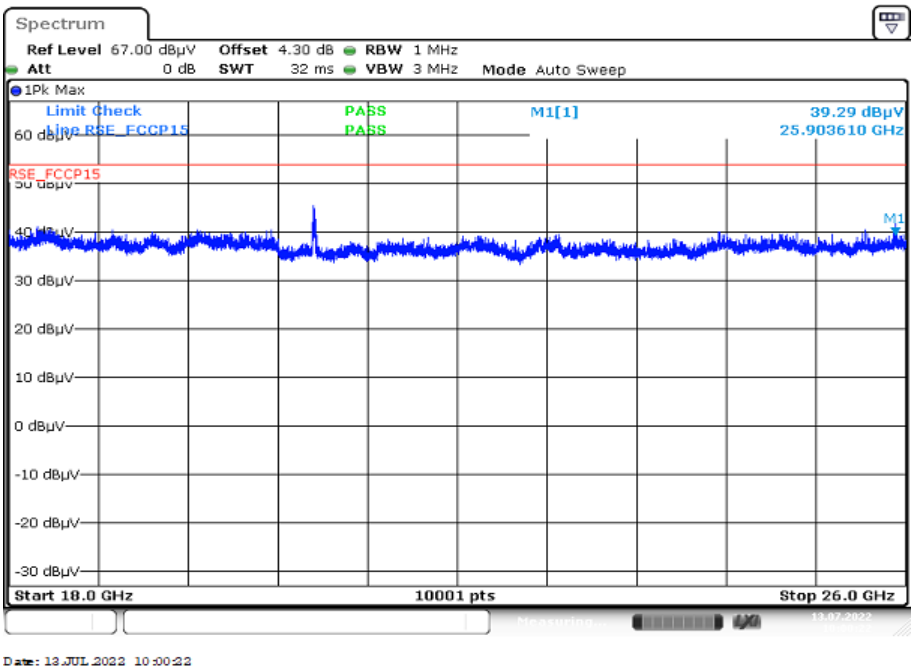
TX Spurious Emissions Radiated [dBµV/m] / dBm		
U-NII-3 (5725 MHz to 5850 MHz)		
Middle channel		
F [MHz]	Detector	Level [dBµV/m]
11570	Peak	53.1
	AVG	43.0
For emissions above 18 GHz please take look at the plots.		

Plots: 20 MHz channel bandwidth

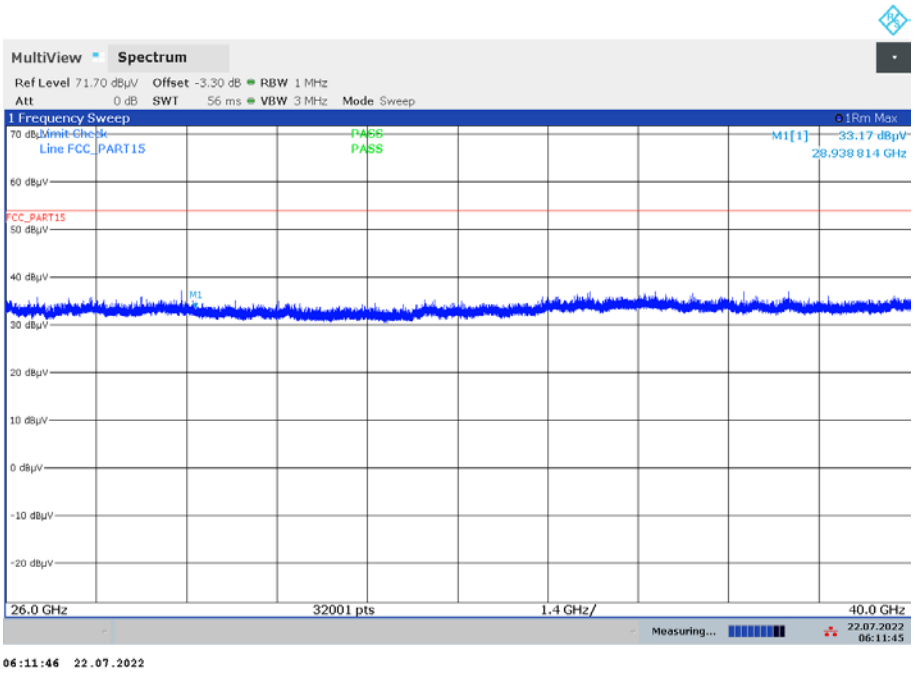
Plot 1: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-1; lowest channel



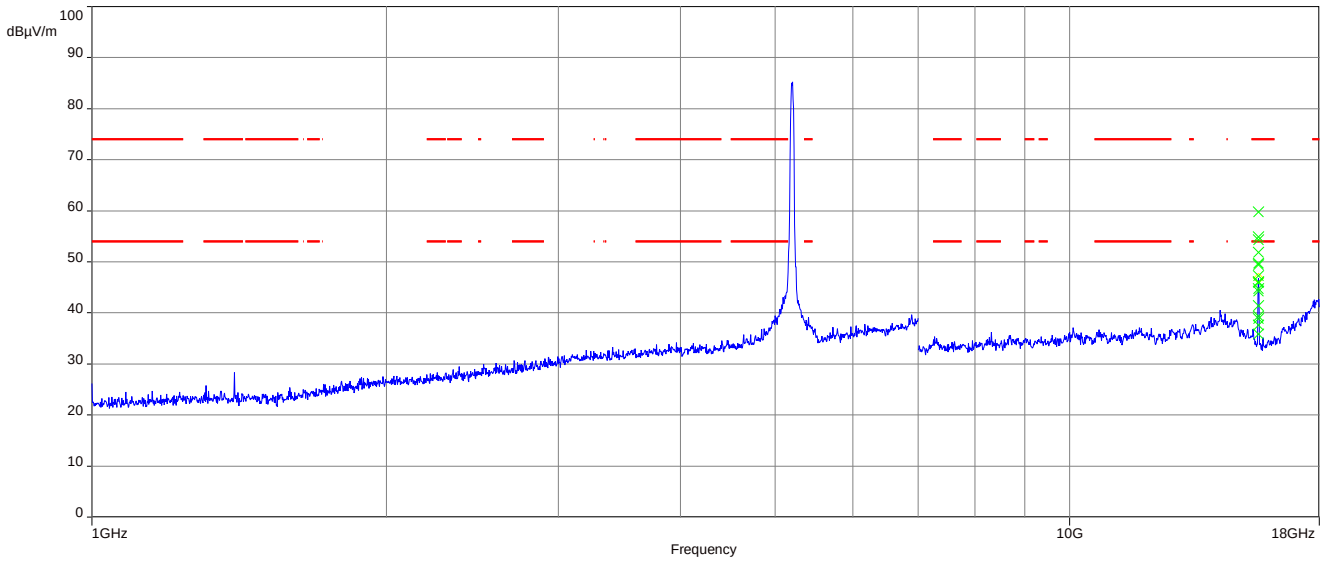
Plot 2: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-1; lowest channel



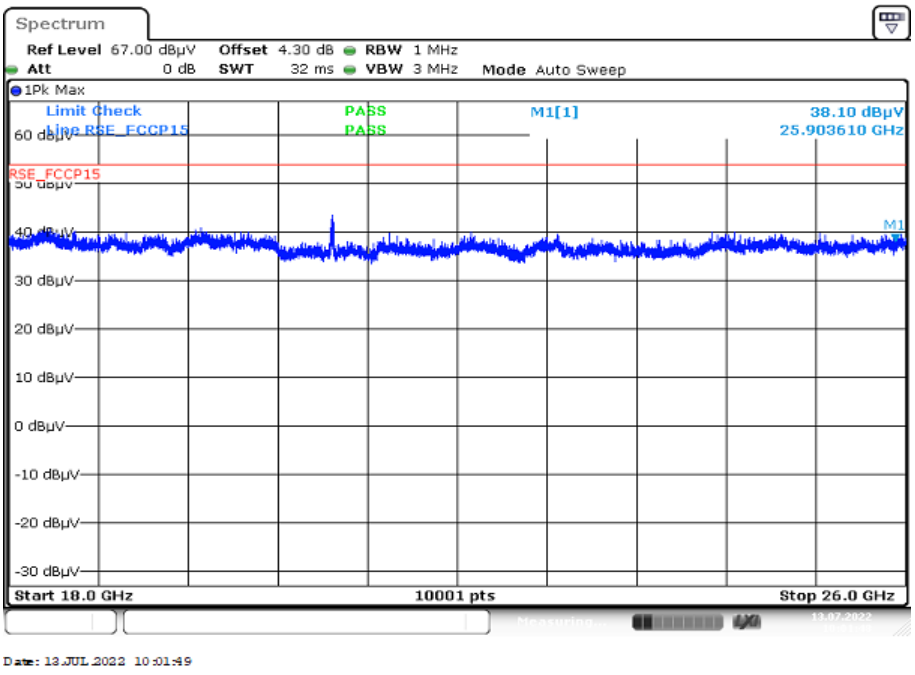
Plot 3: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-1; lowest channel



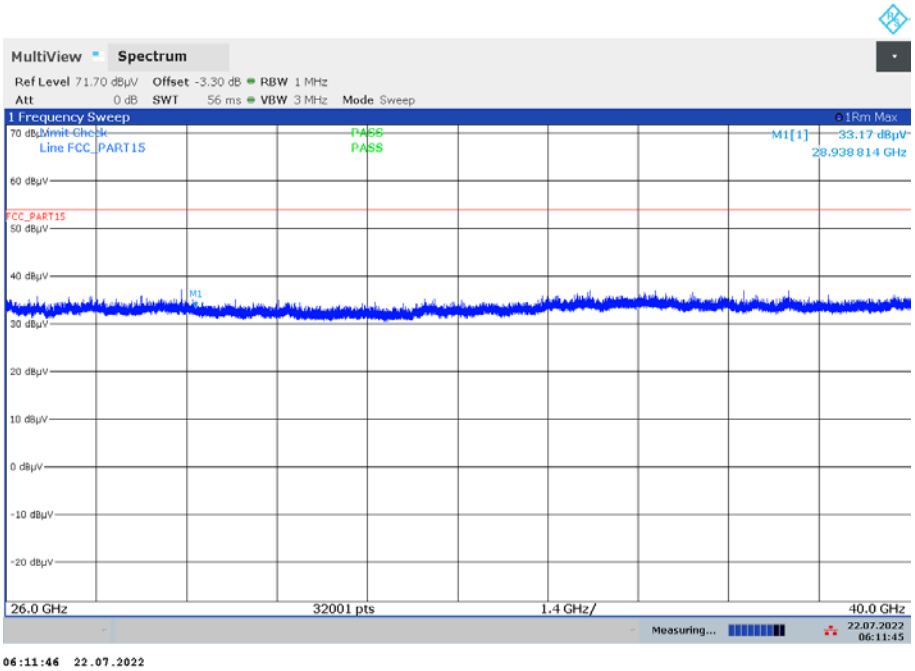
Plot 4: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-1; middle channel



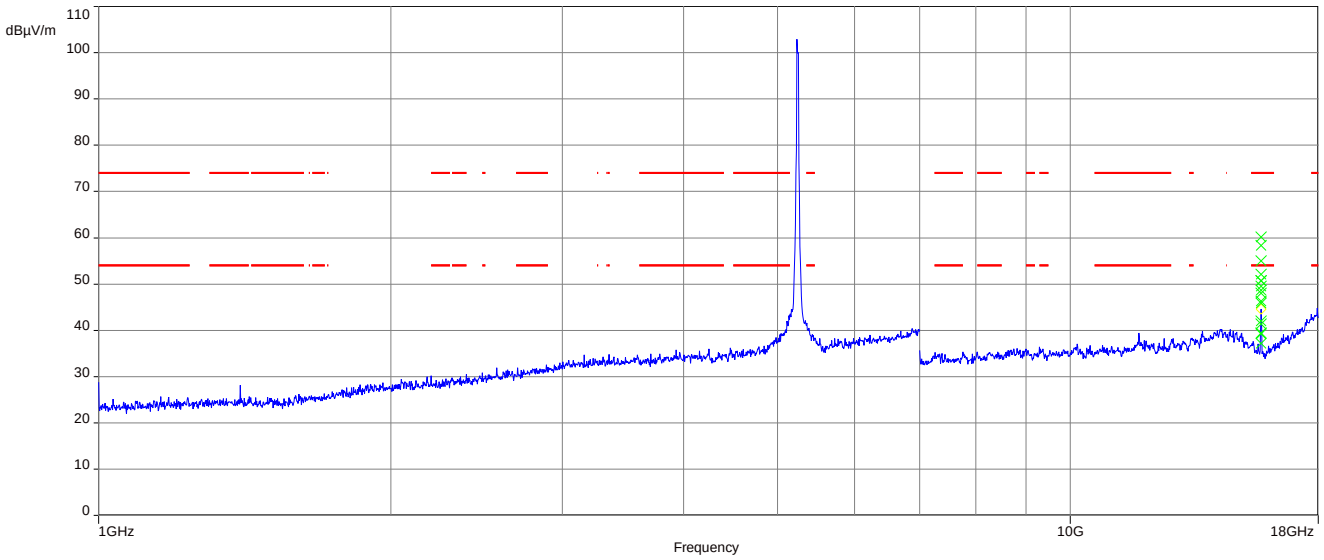
Plot 5: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-1; middle channel



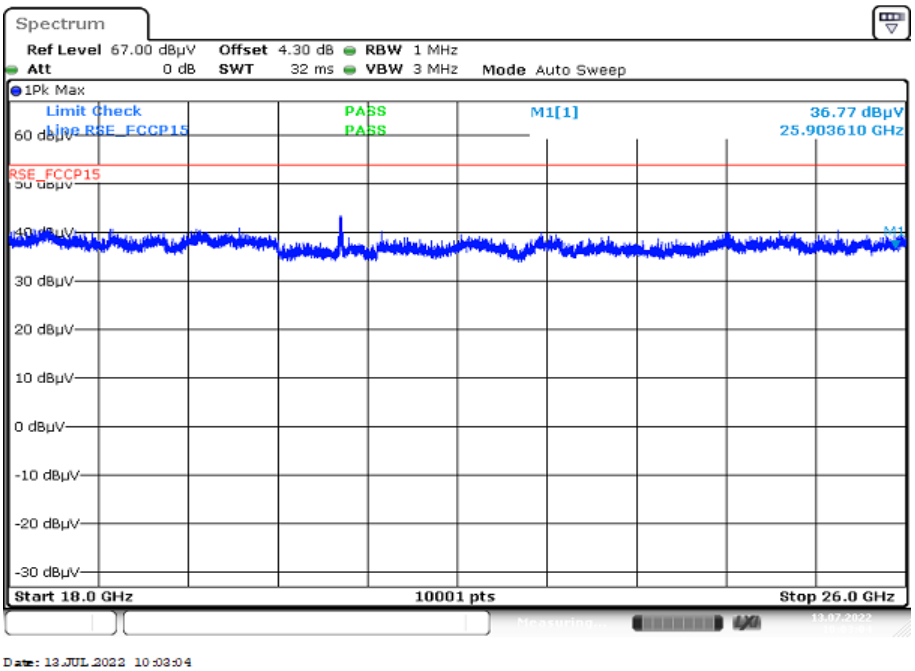
Plot 6: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-1; middle channel



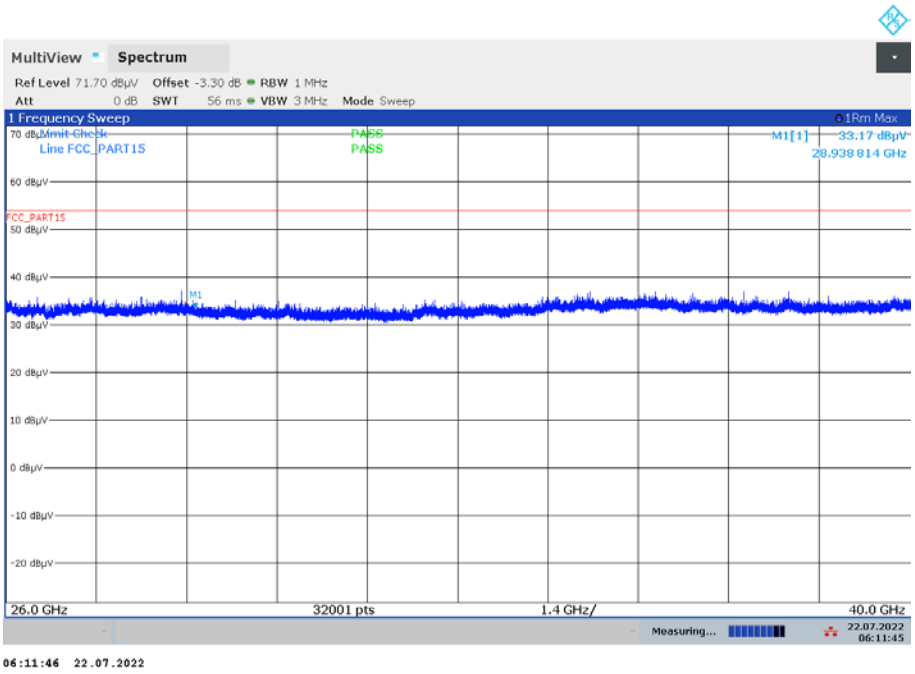
Plot 7: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-1; highest channel



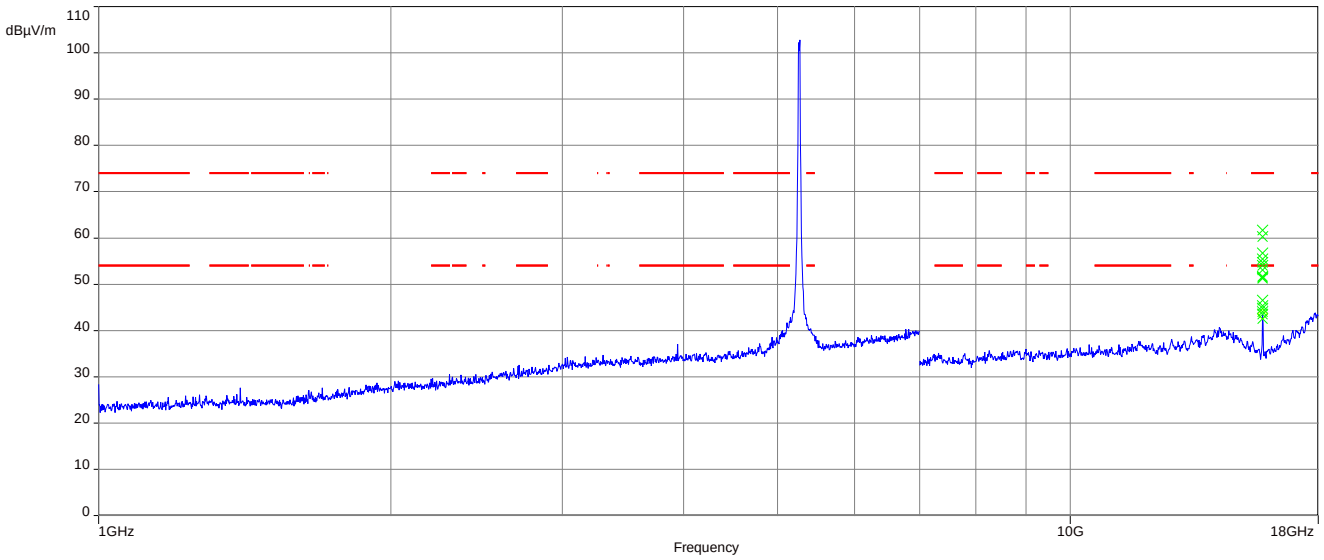
Plot 8: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-1; highest channel



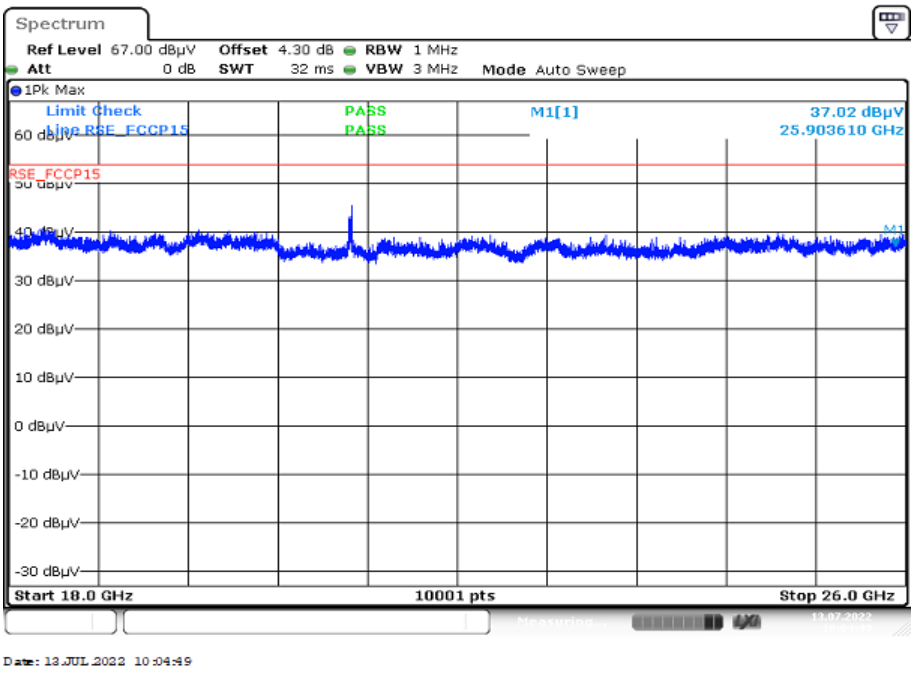
Plot 9: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-1; highest channel



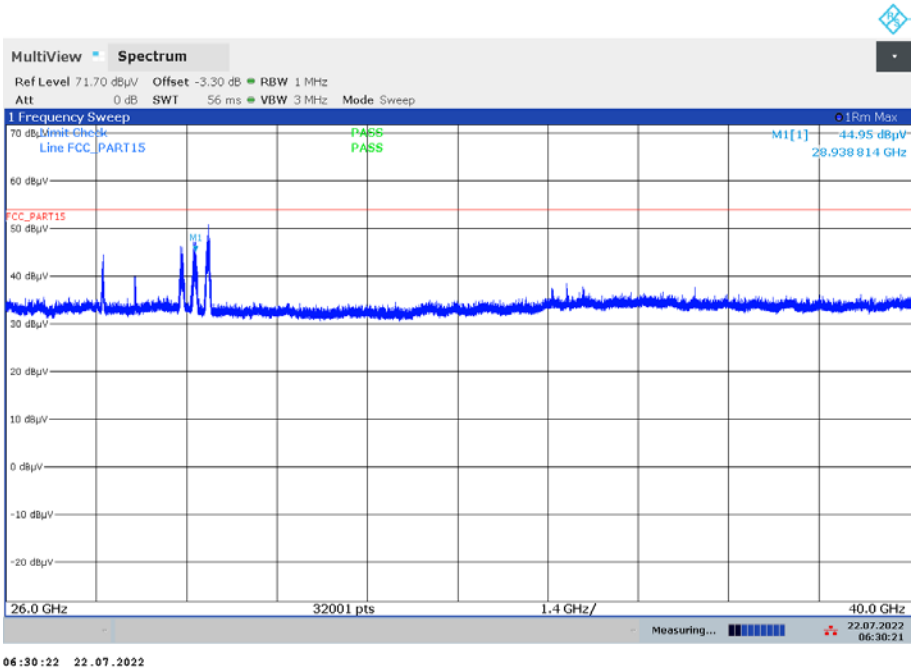
Plot 10: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-2A; lowest channel



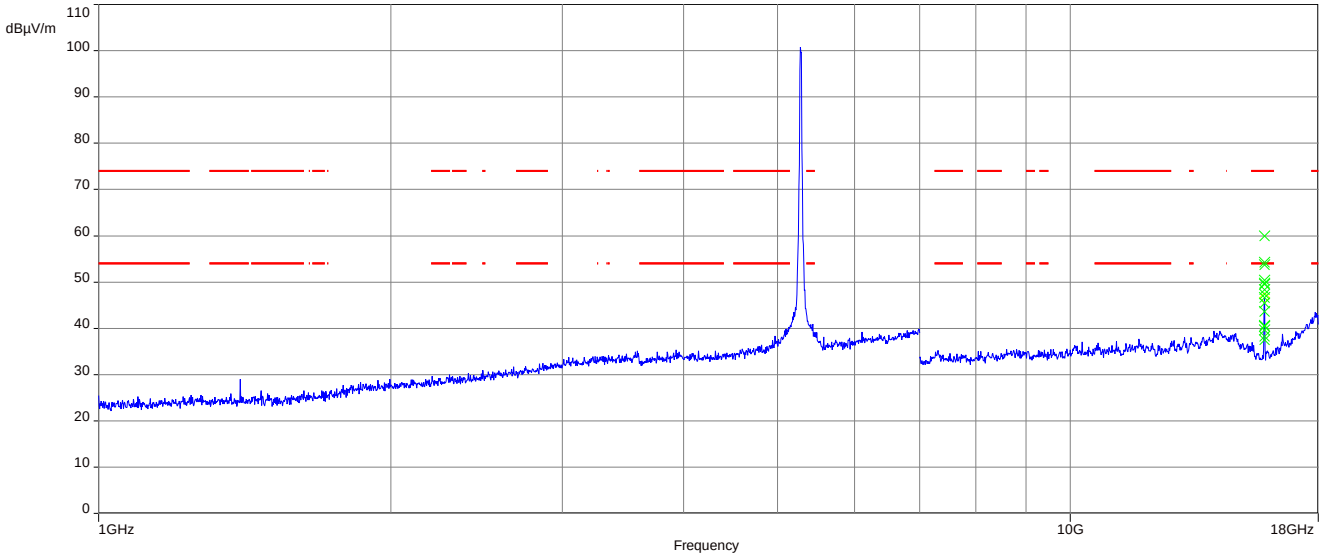
Plot 11: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-2A; lowest channel



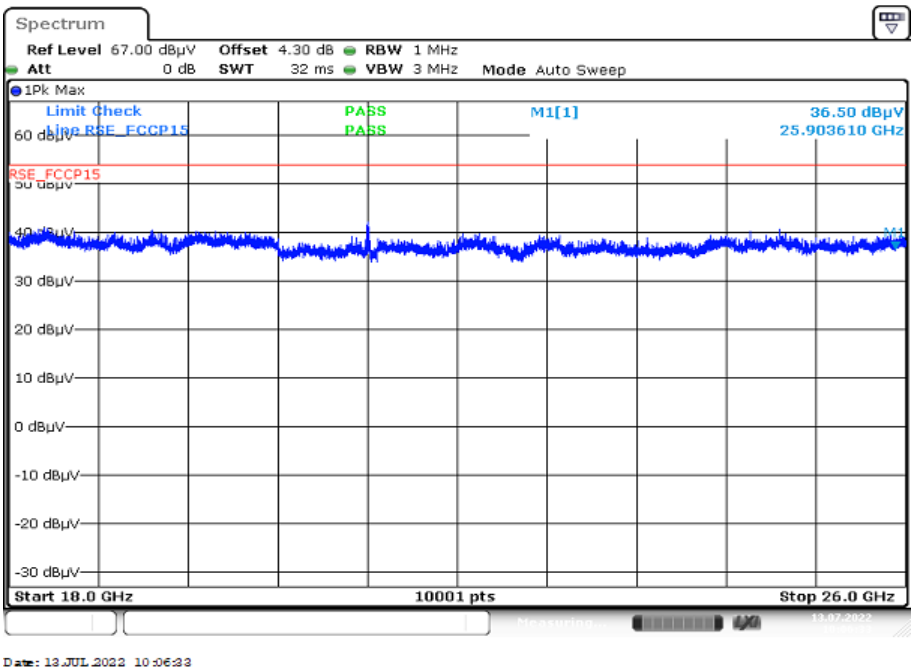
Plot 12: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-2A; lowest channel



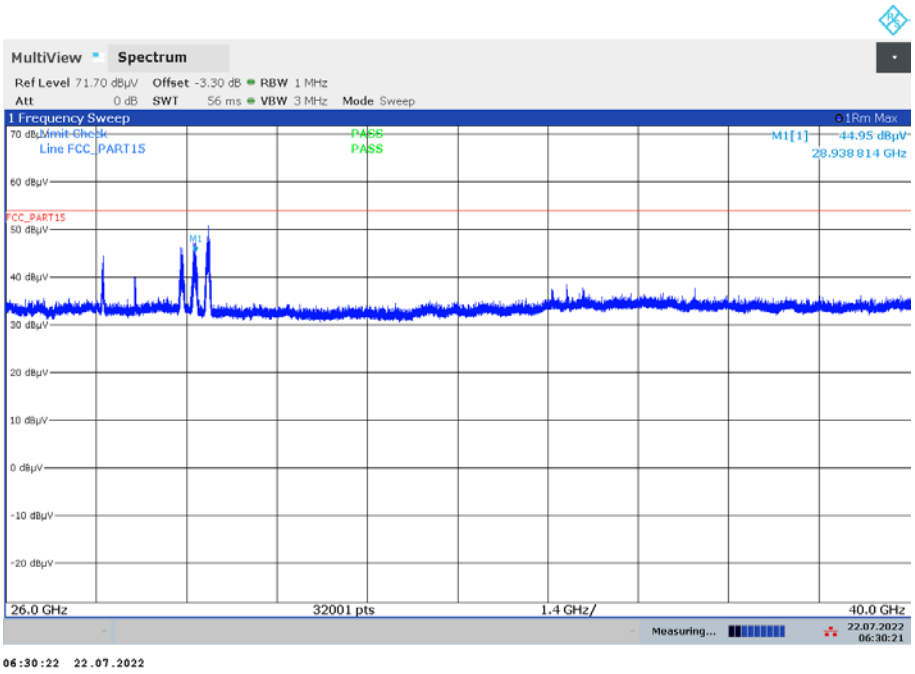
Plot 13: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-2A; middle channel



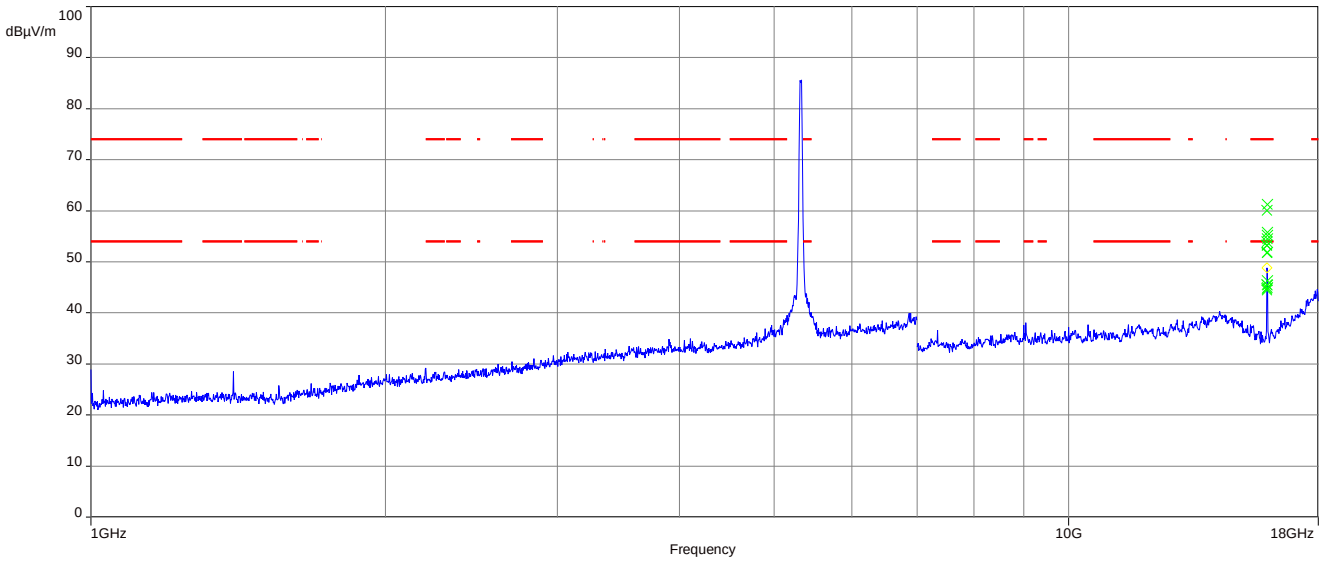
Plot 14: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-2A; middle channel



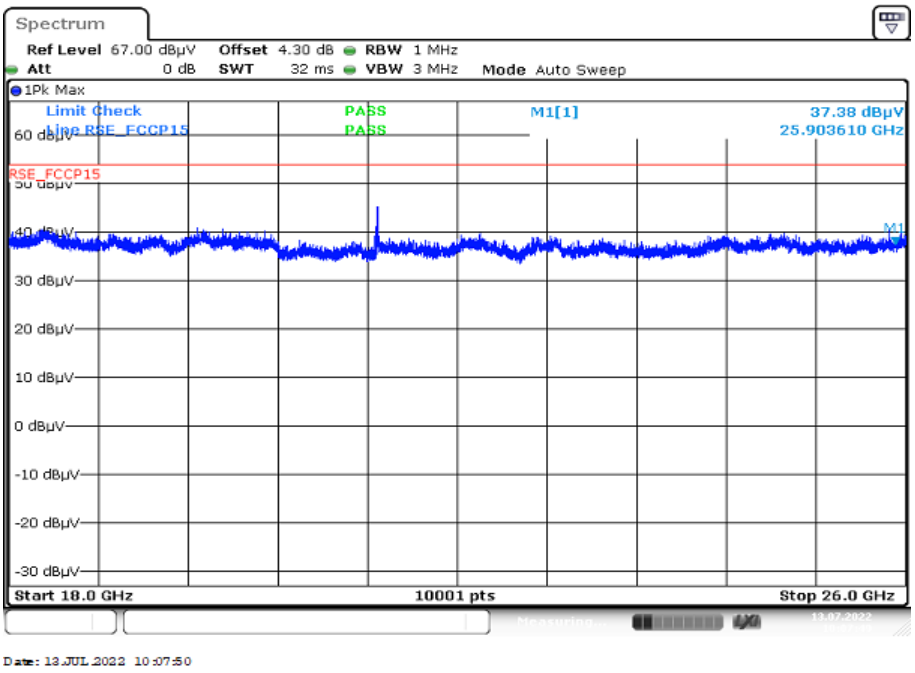
Plot 15: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-2A; middle channel



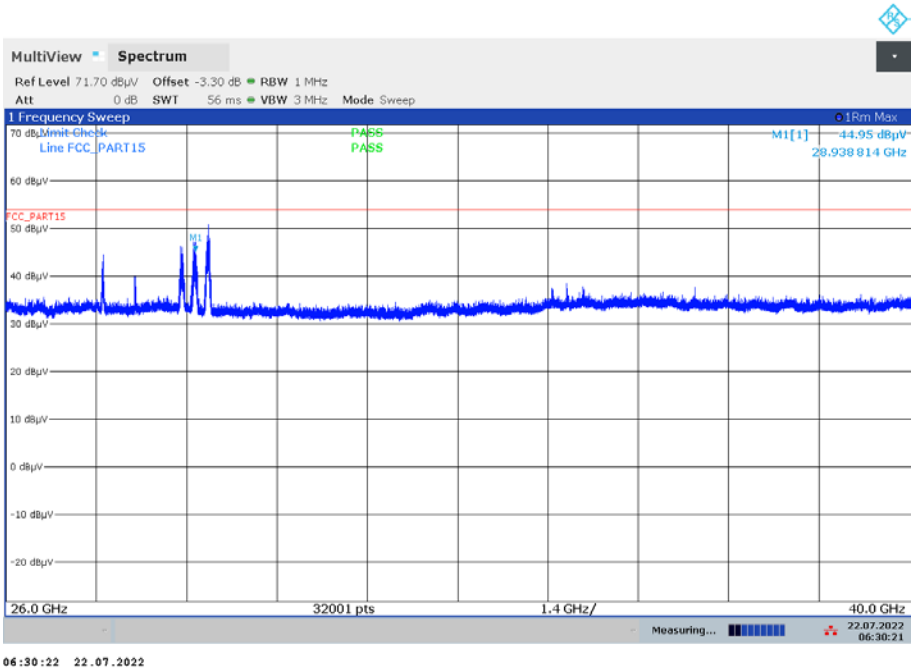
Plot 16: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-2A; highest channel



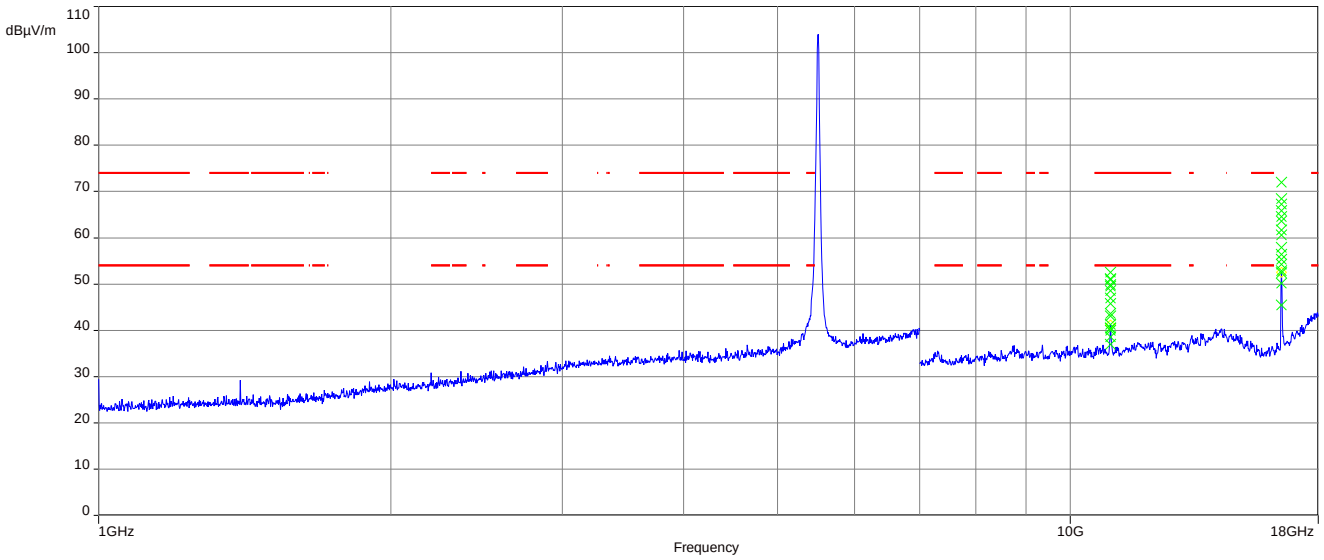
Plot 17: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-2A; highest channel



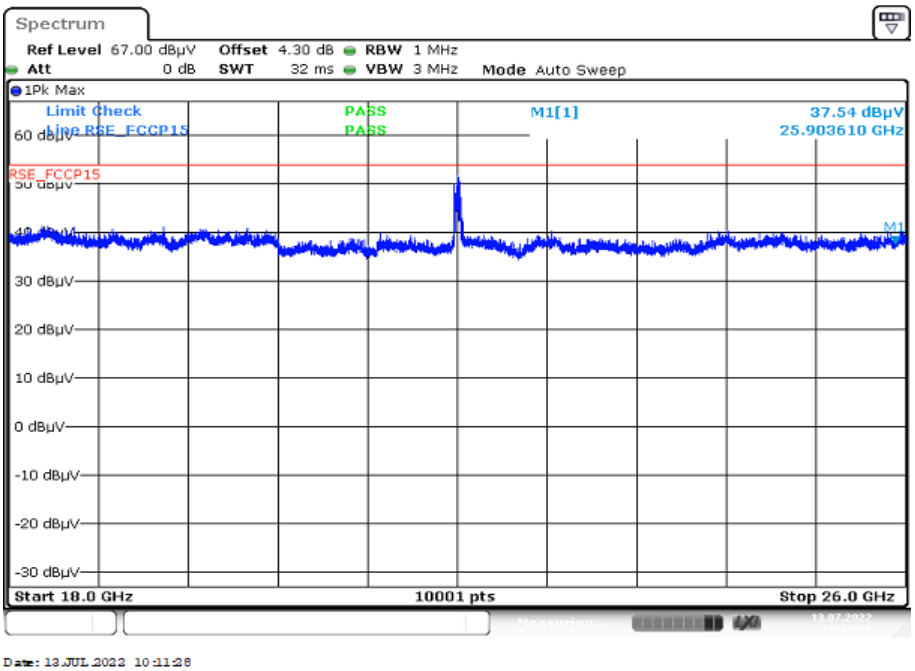
Plot 18: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-2A; highest channel



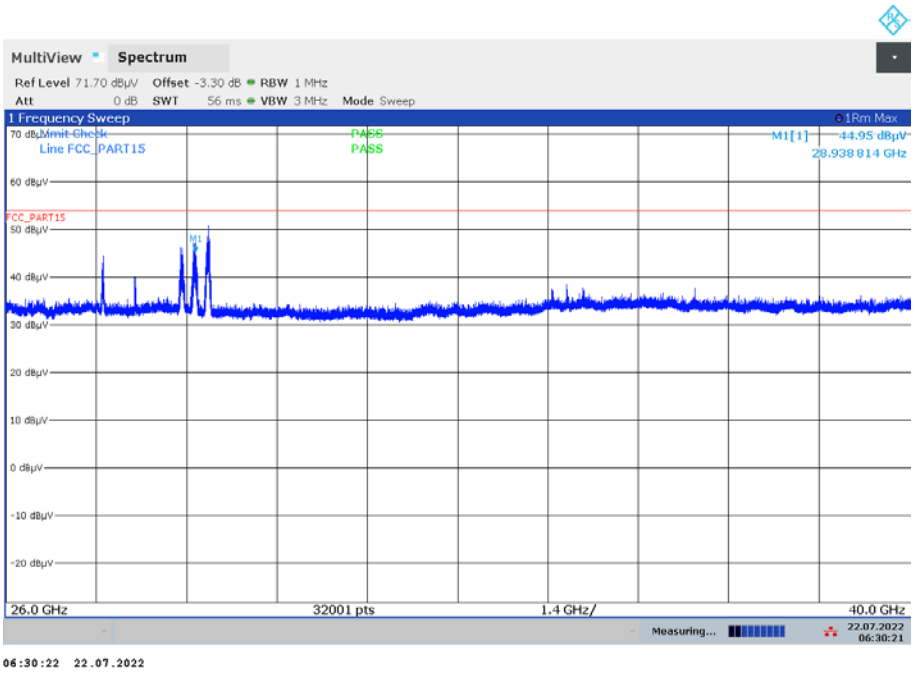
Plot 19: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-2C; lowest channel



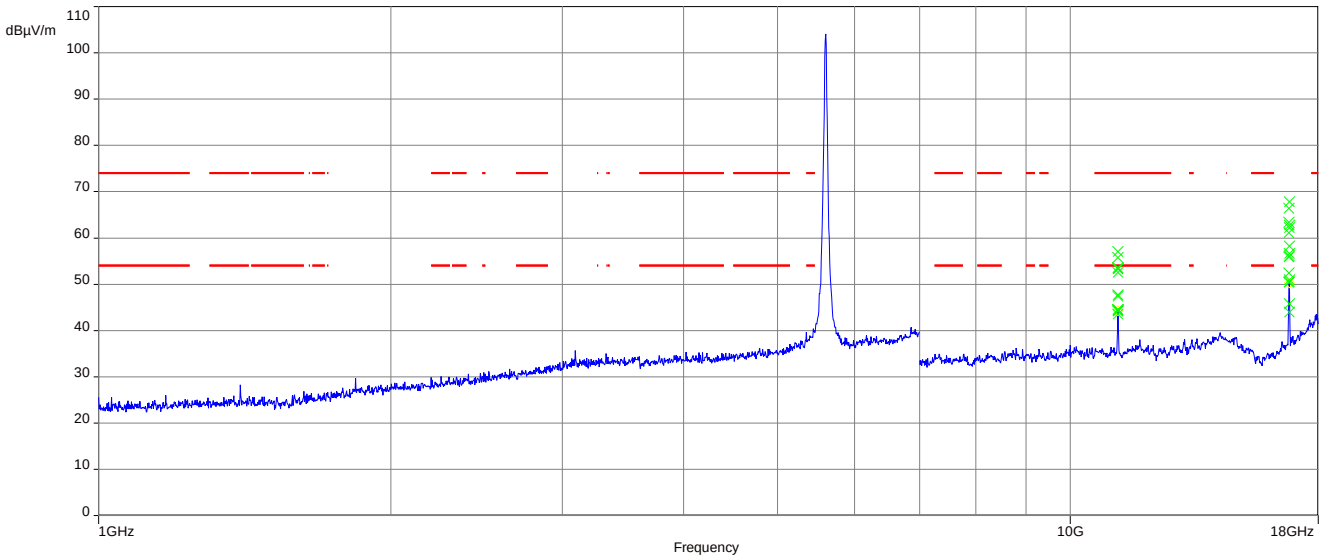
Plot 20: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-2C; lowest channel



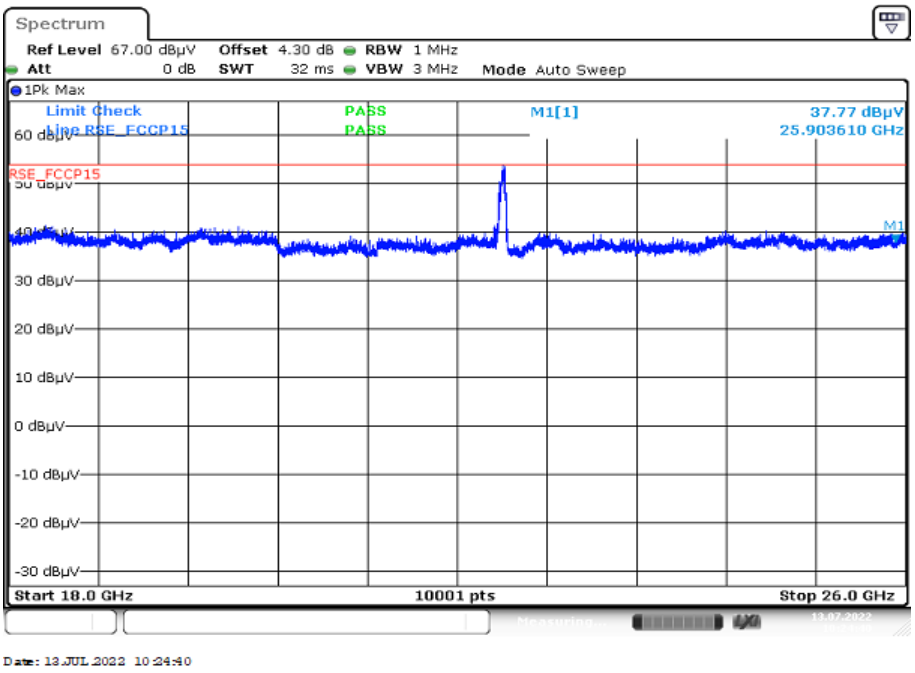
Plot 21: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-2C; lowest channel



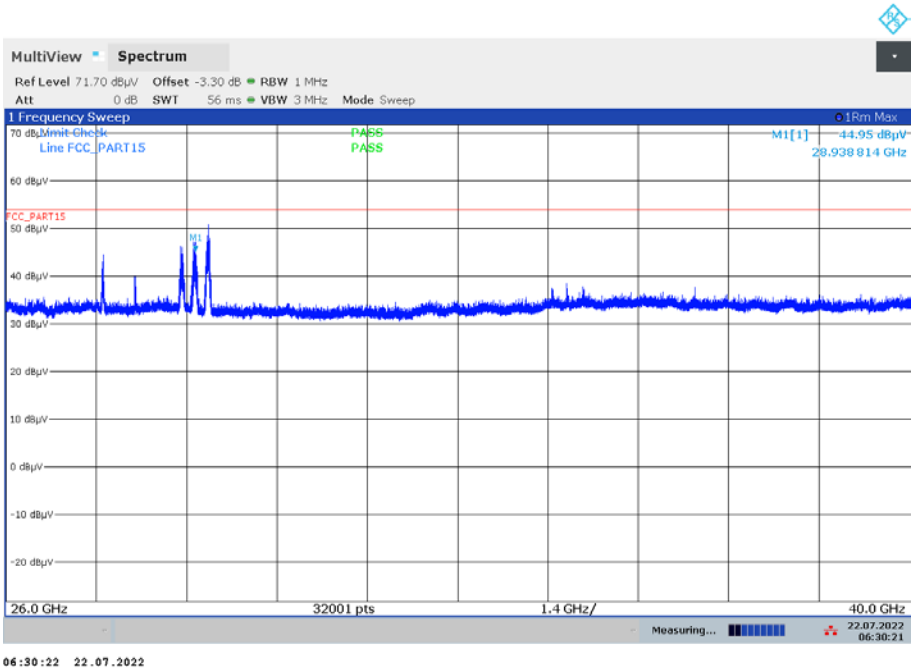
Plot 22: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-2C; middle channel



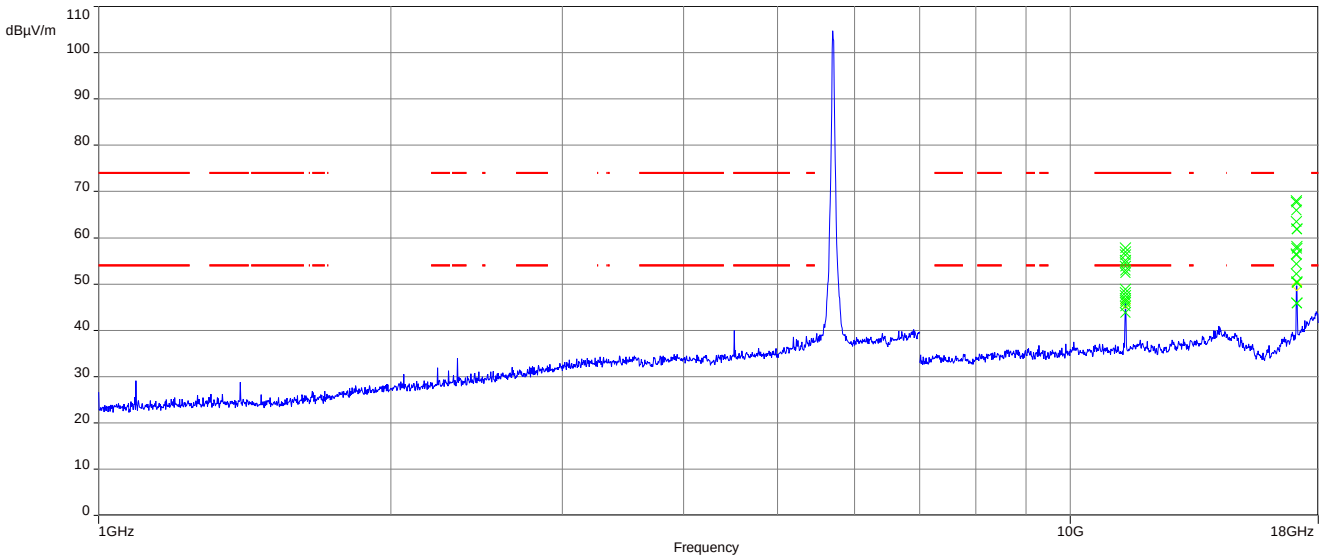
Plot 23: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-2C; middle channel



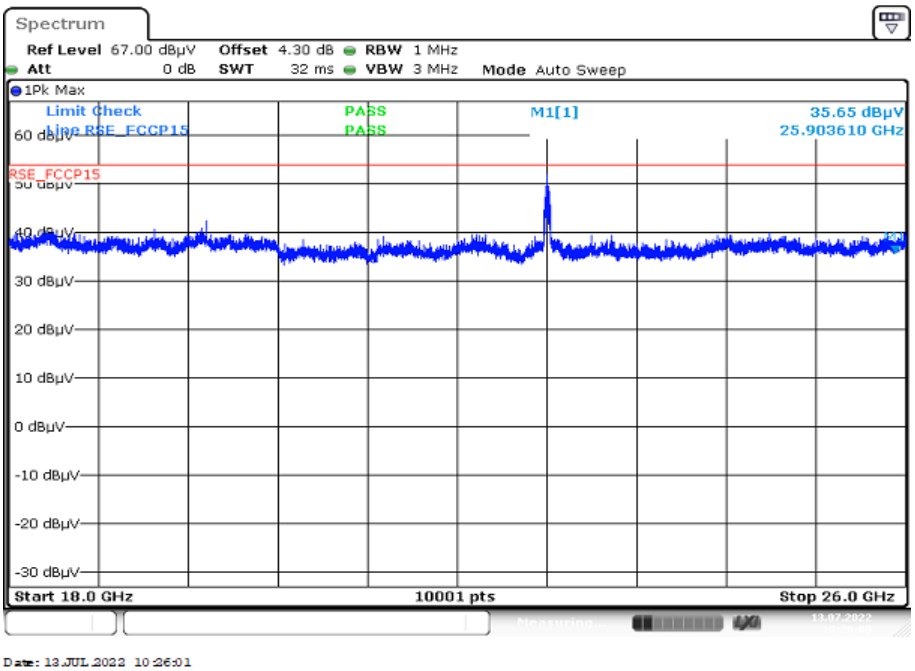
Plot 24: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-2C; middle channel



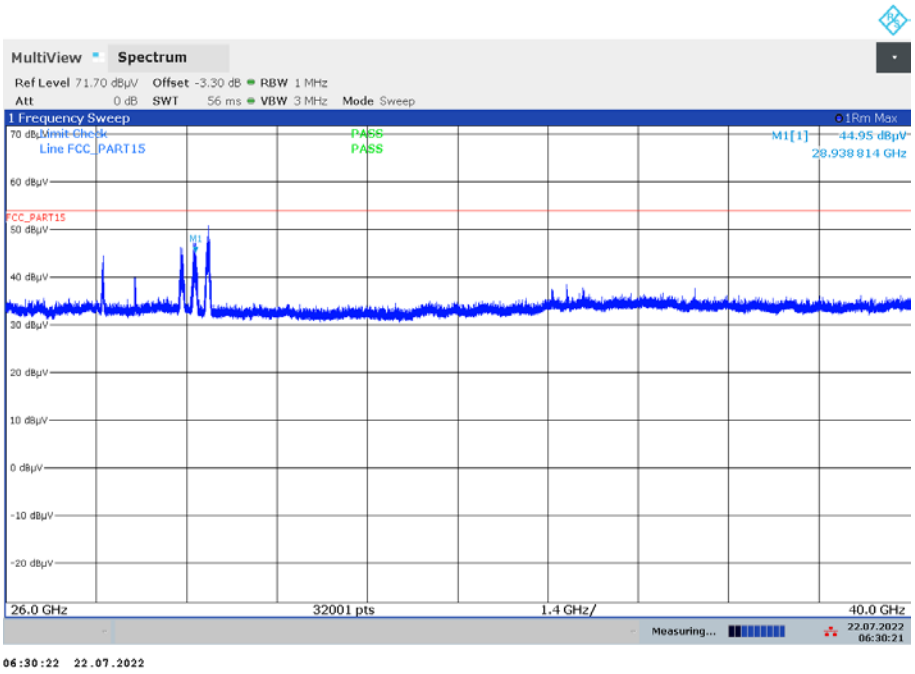
Plot 25: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-2C; highest channel



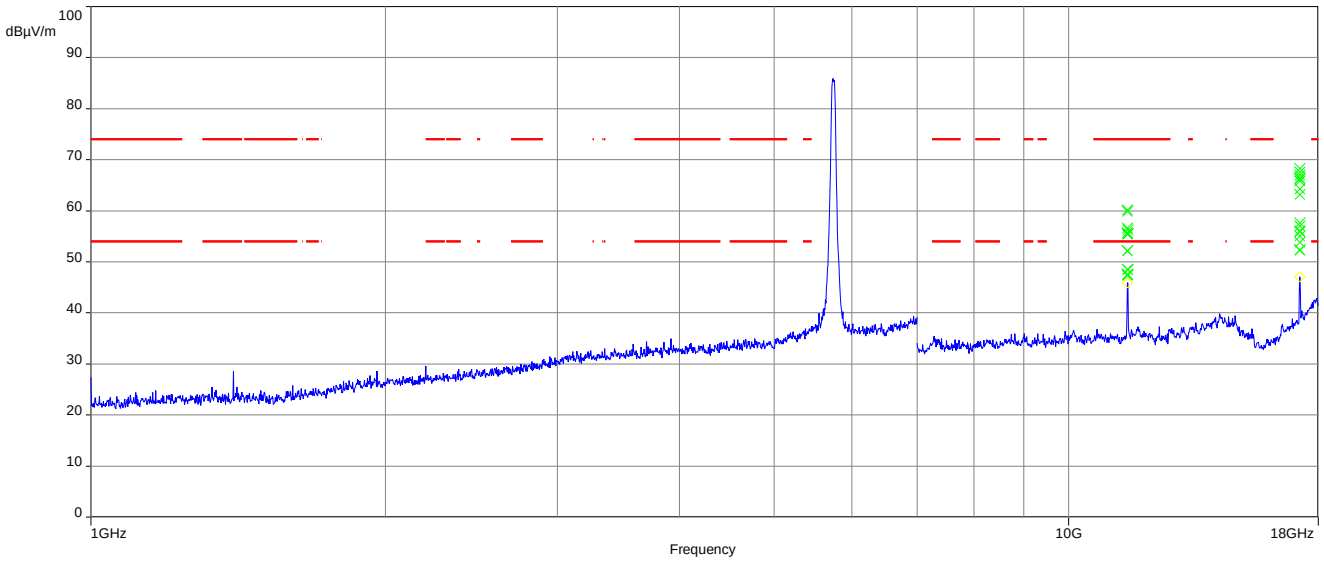
Plot 26: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-2C; highest channel



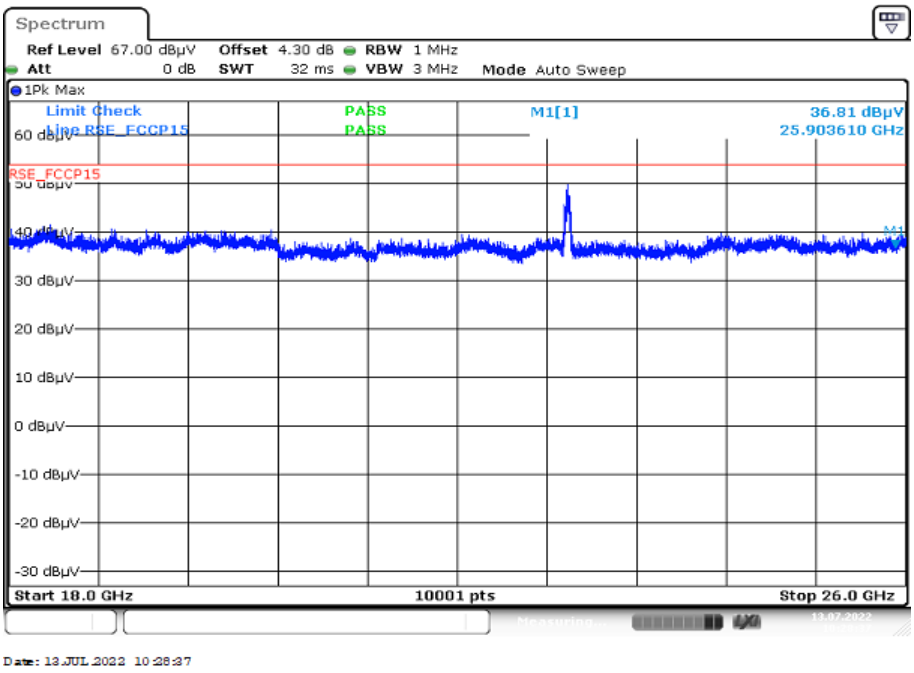
Plot 27: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-2C; highest channel



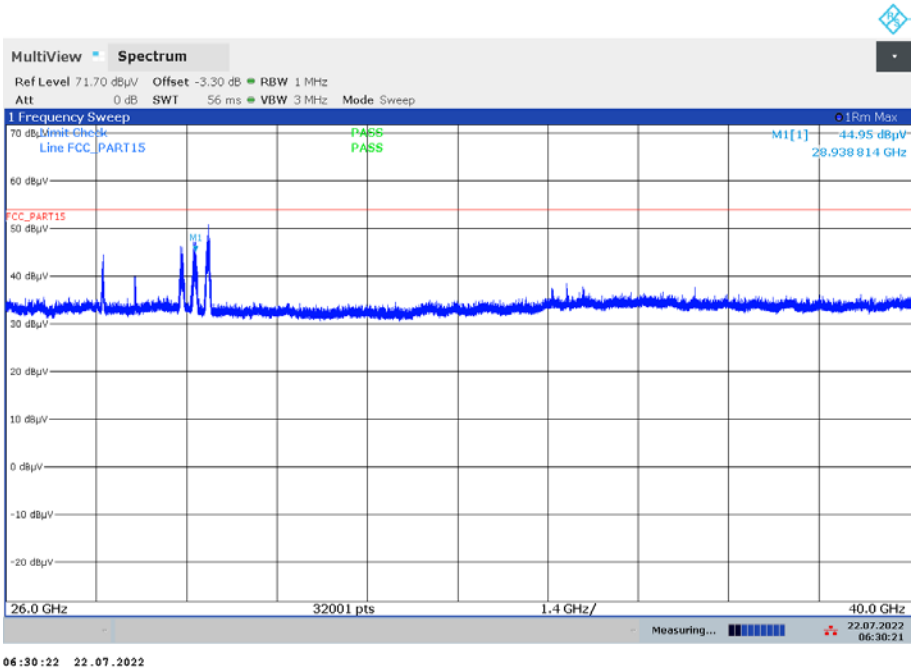
Plot 28: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-3; lowest channel



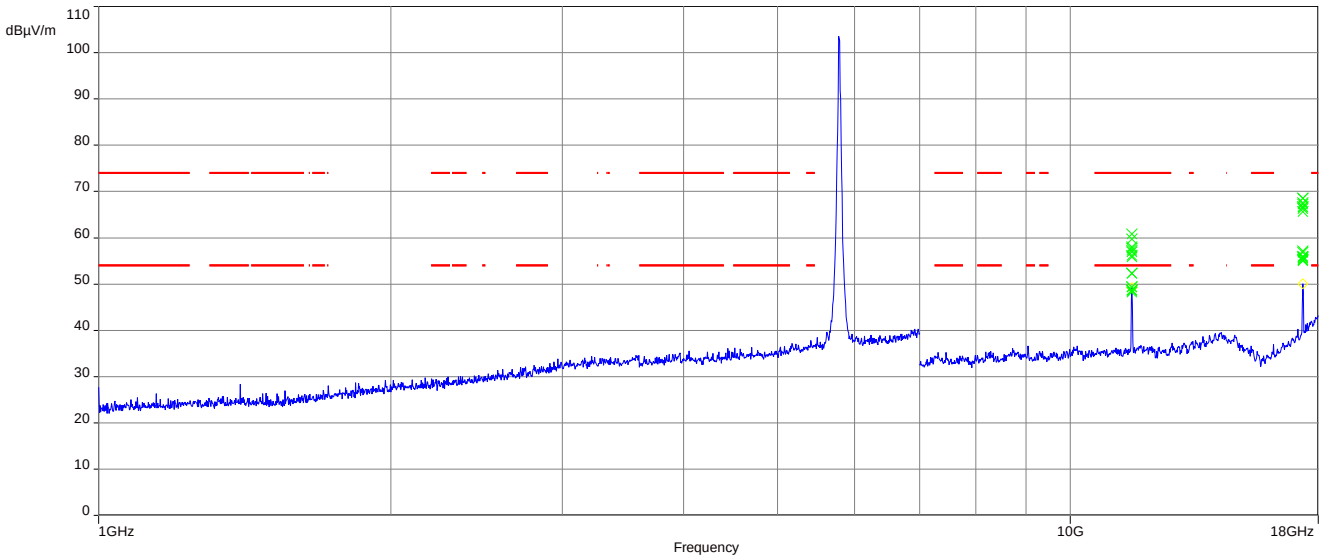
Plot 29: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-3; lowest channel



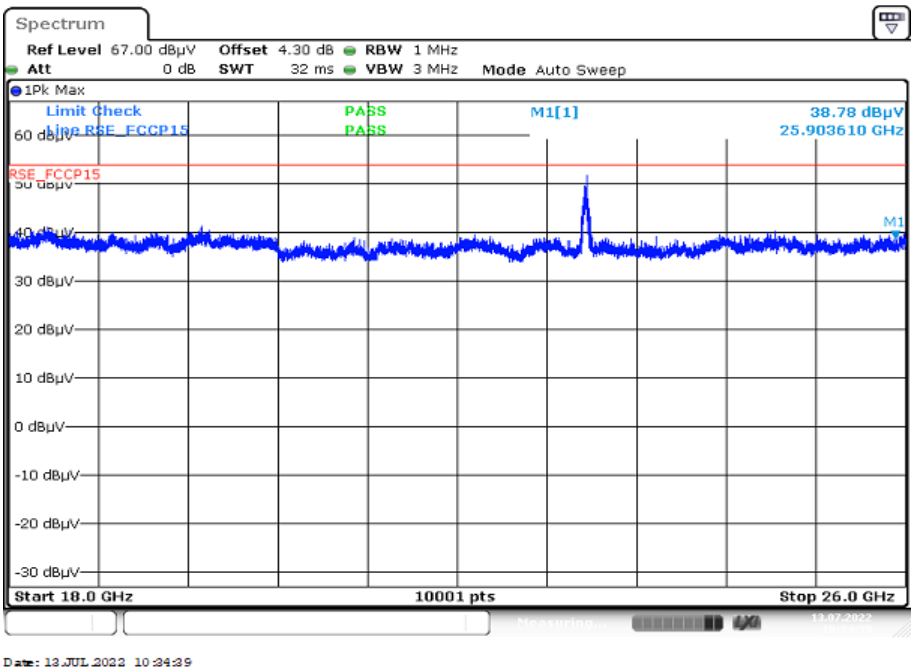
Plot 30: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-3; lowest channel



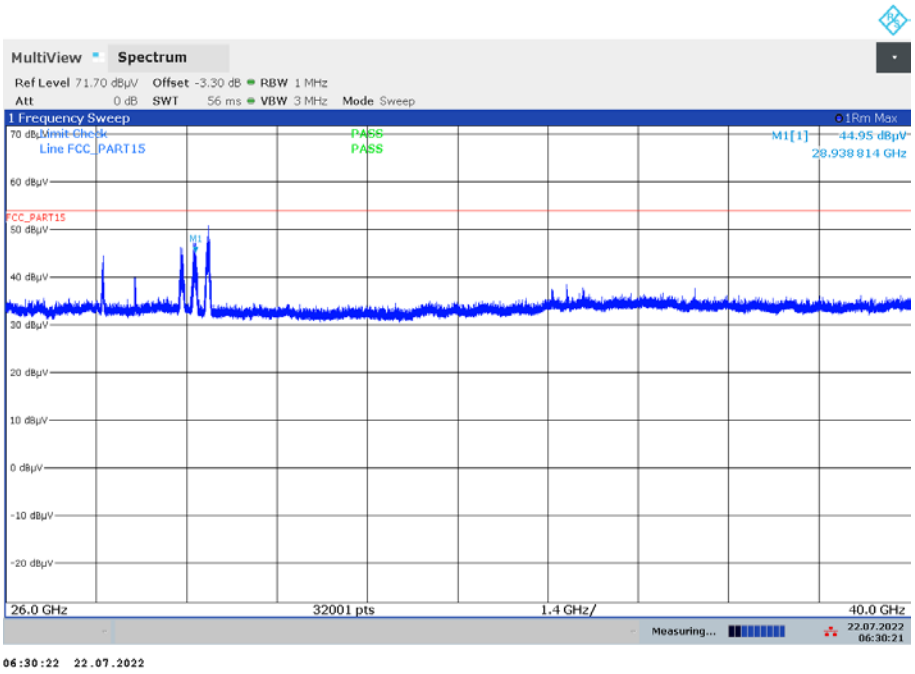
Plot 31: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-3; middle channel



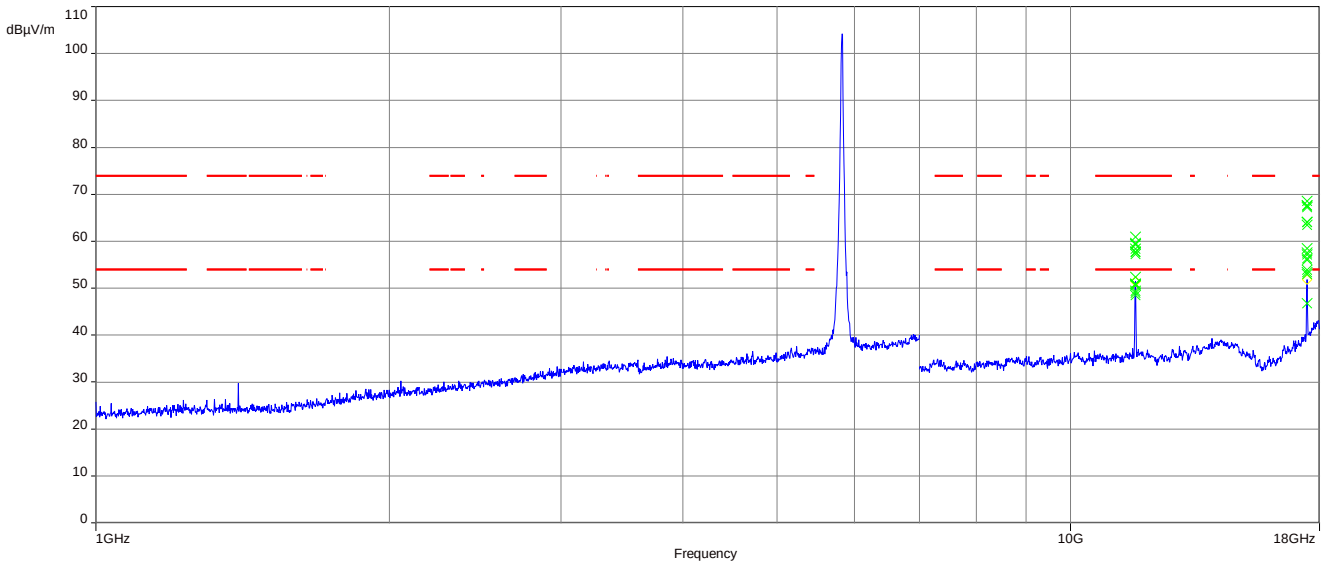
Plot 32: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-3; middle channel



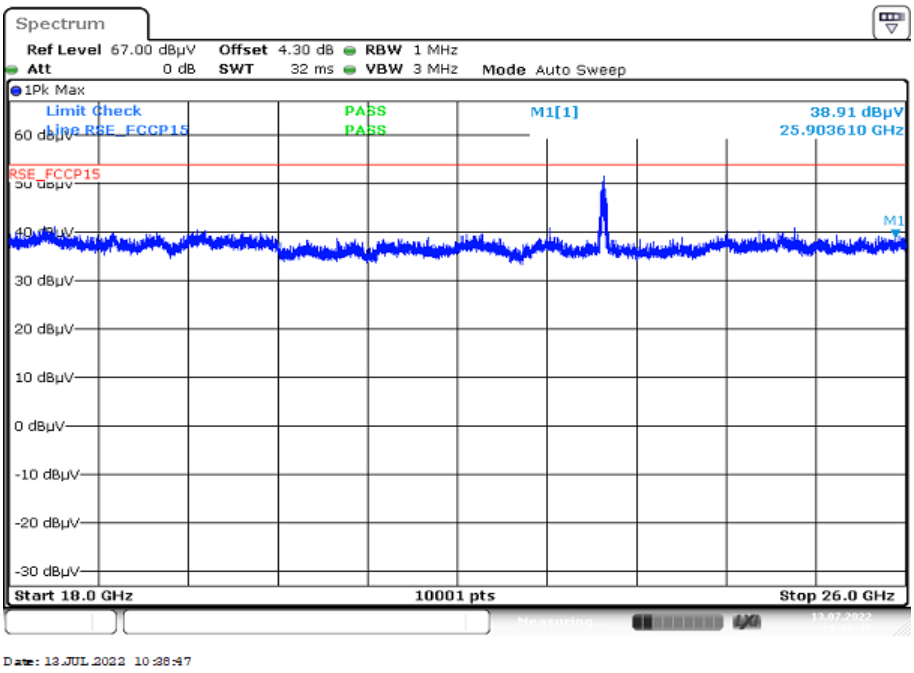
Plot 33: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-3; middle channel



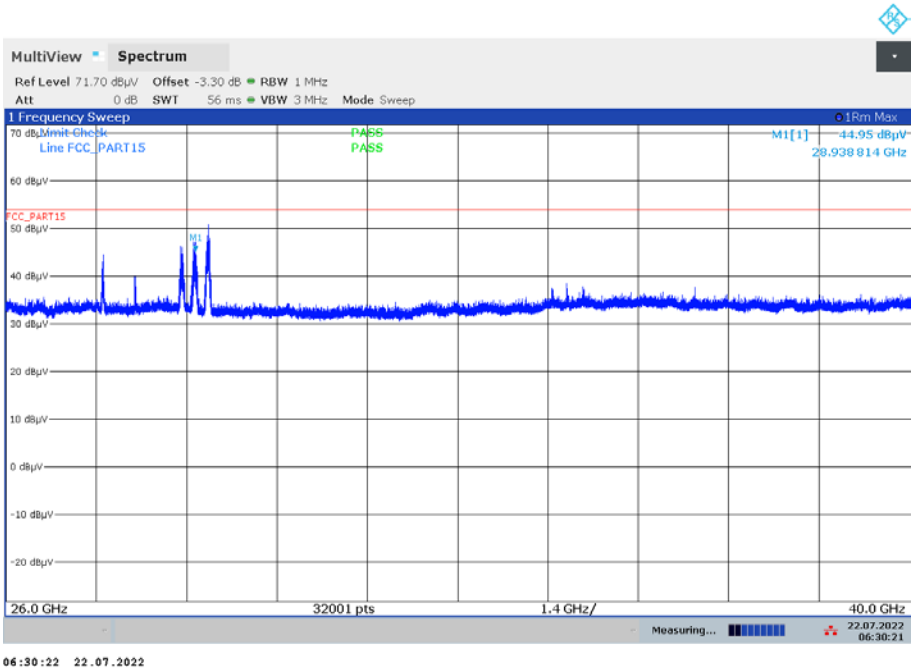
Plot 34: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-3; highest channel



Plot 35: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-3; highest channel

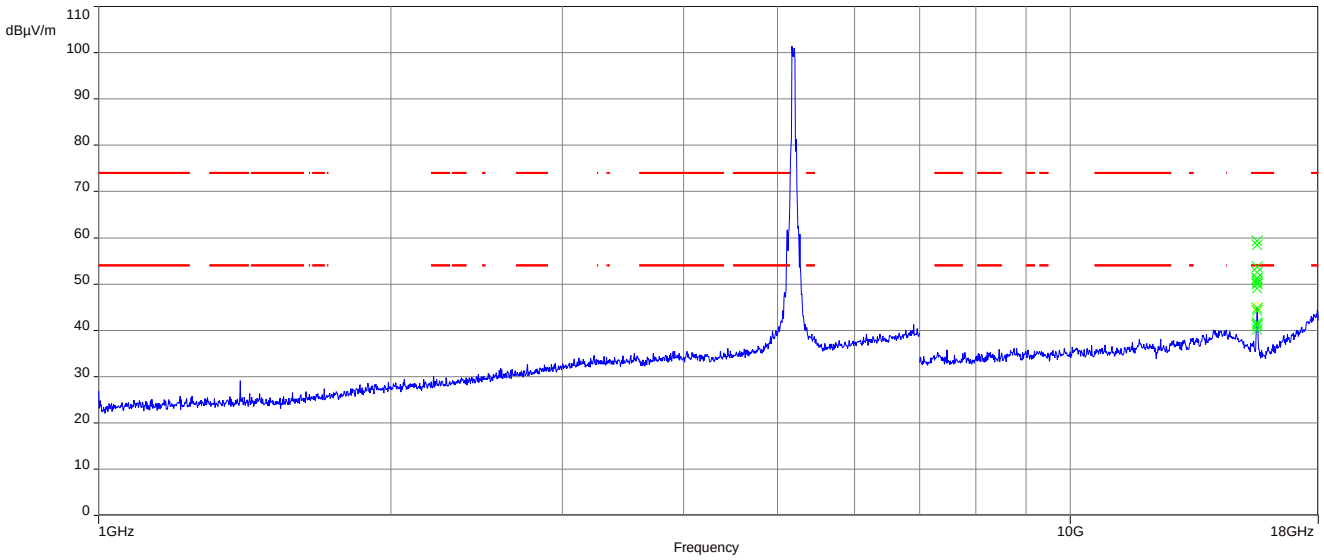


Plot 36: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-3; highest channel

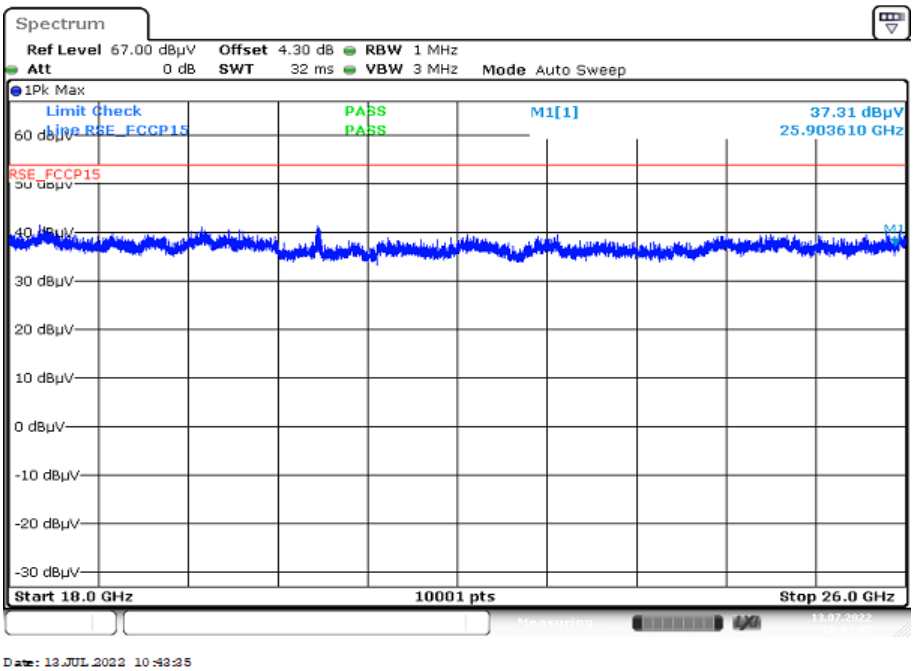


Plots: 40 MHz channel bandwidth

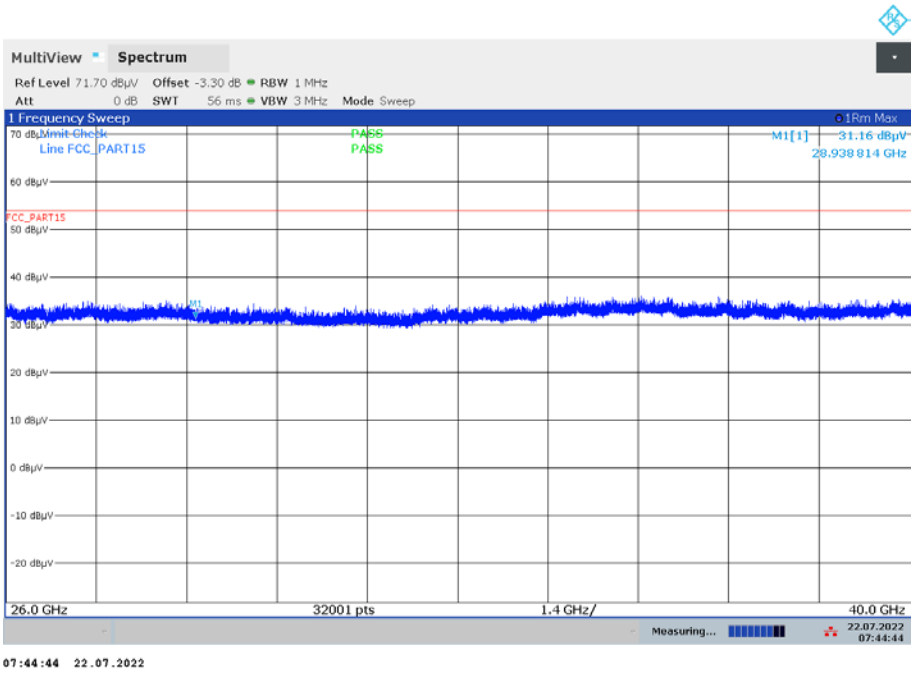
Plot 1: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-1; lowest channel



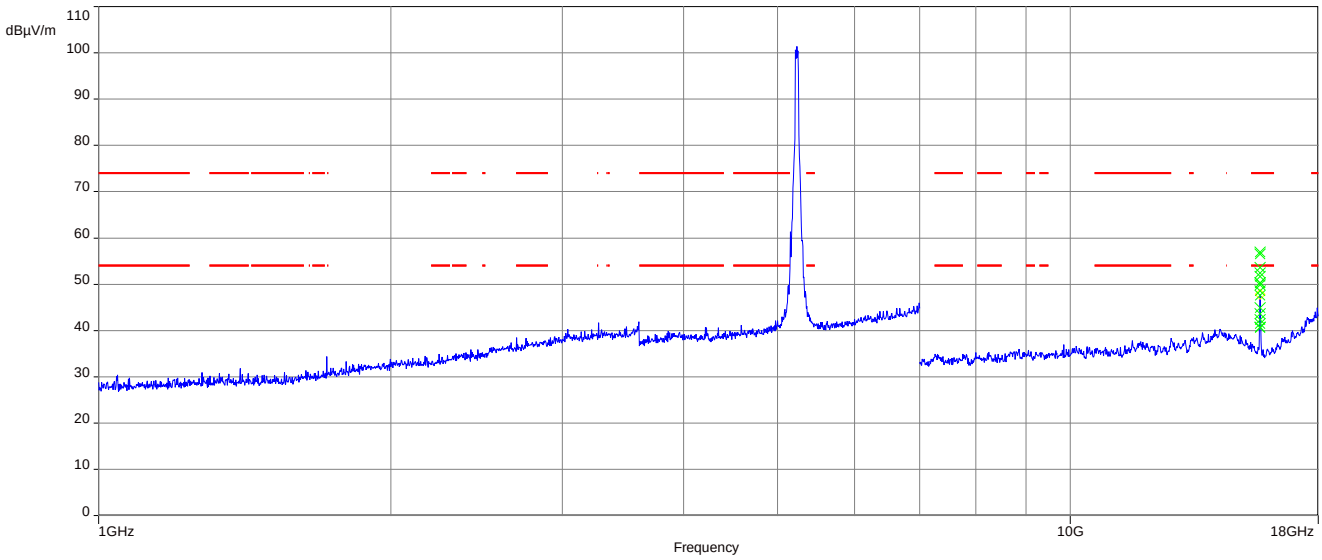
Plot 2: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-1; lowest channel



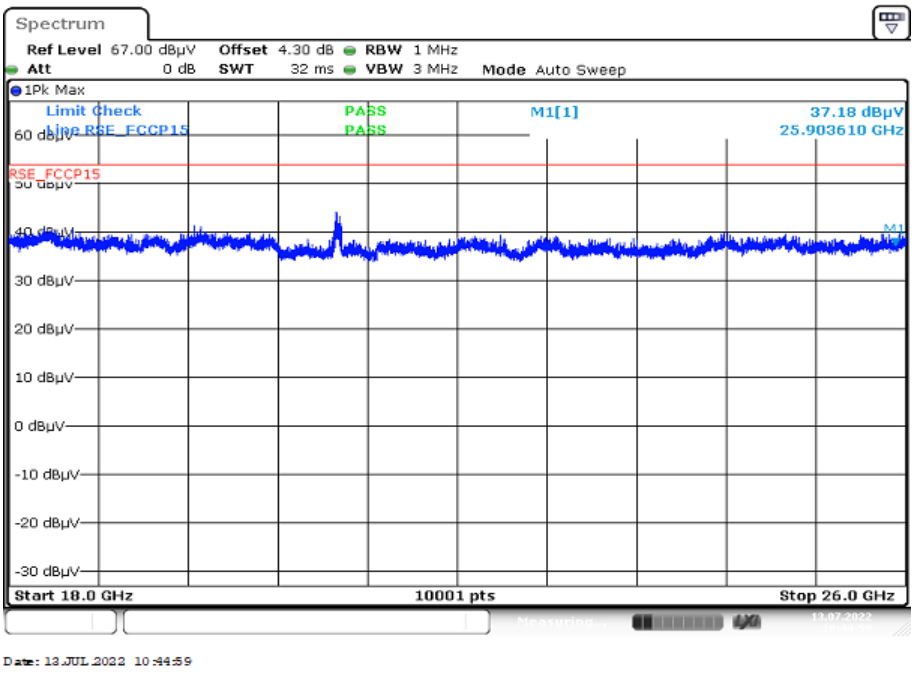
Plot 3: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-1; lowest channel



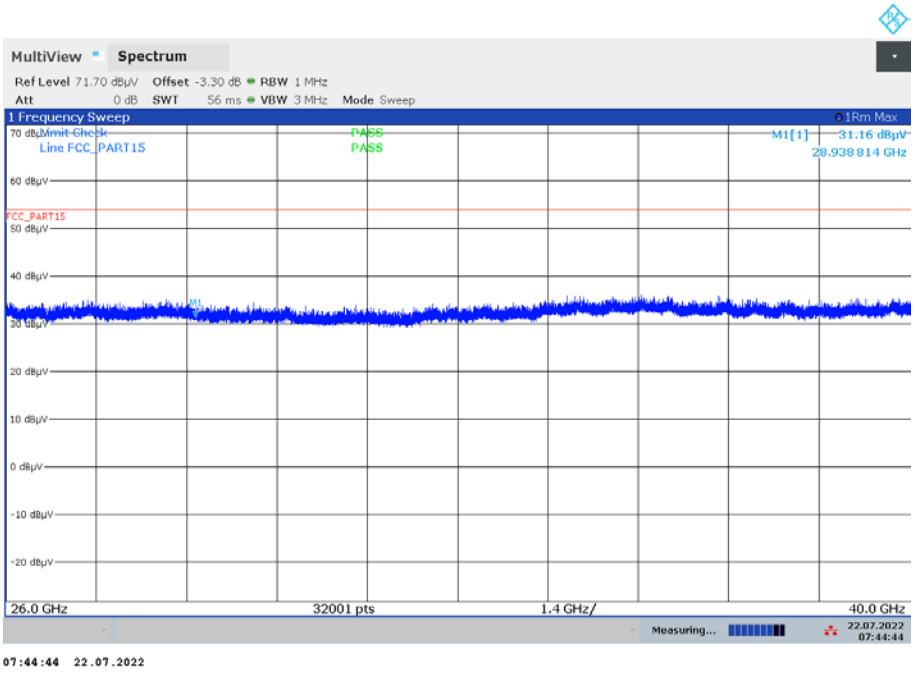
Plot 4: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-1; highest channel



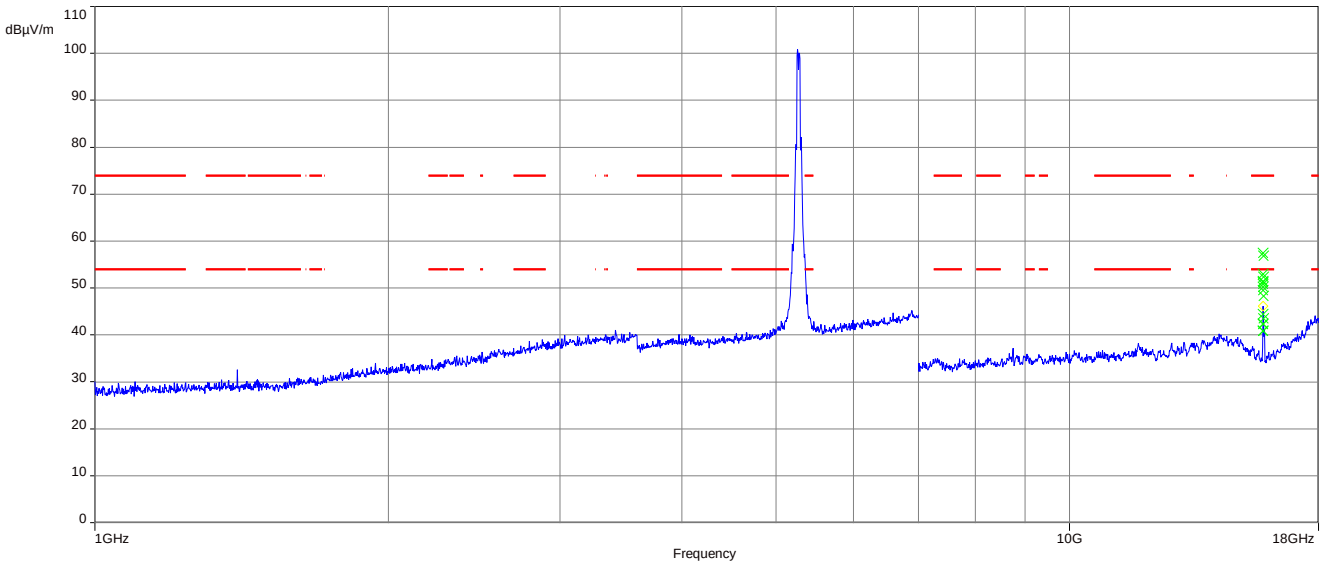
Plot 5: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-1; highest channel



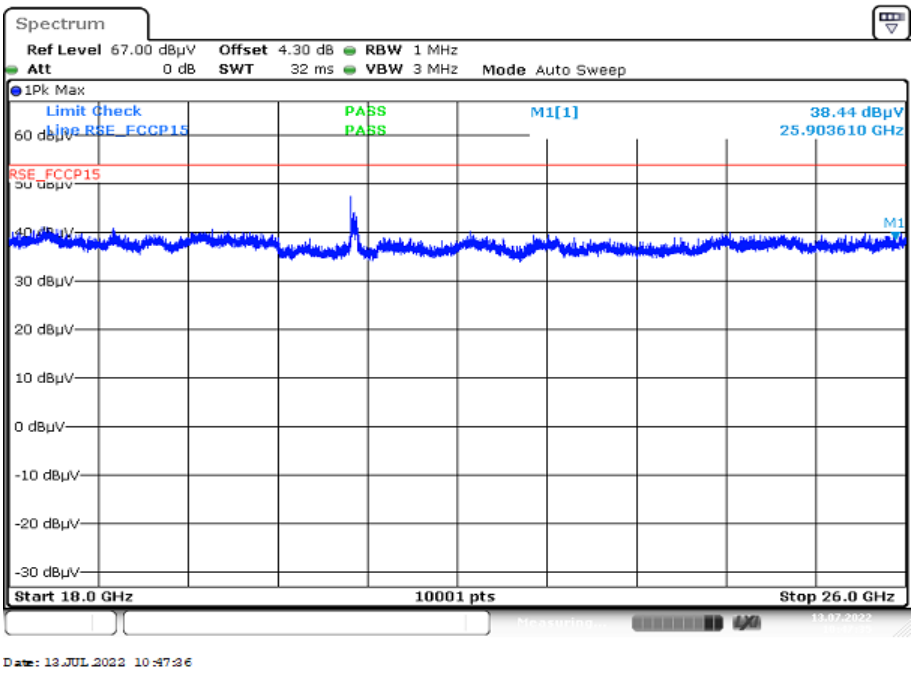
Plot 6: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-1; highest channel



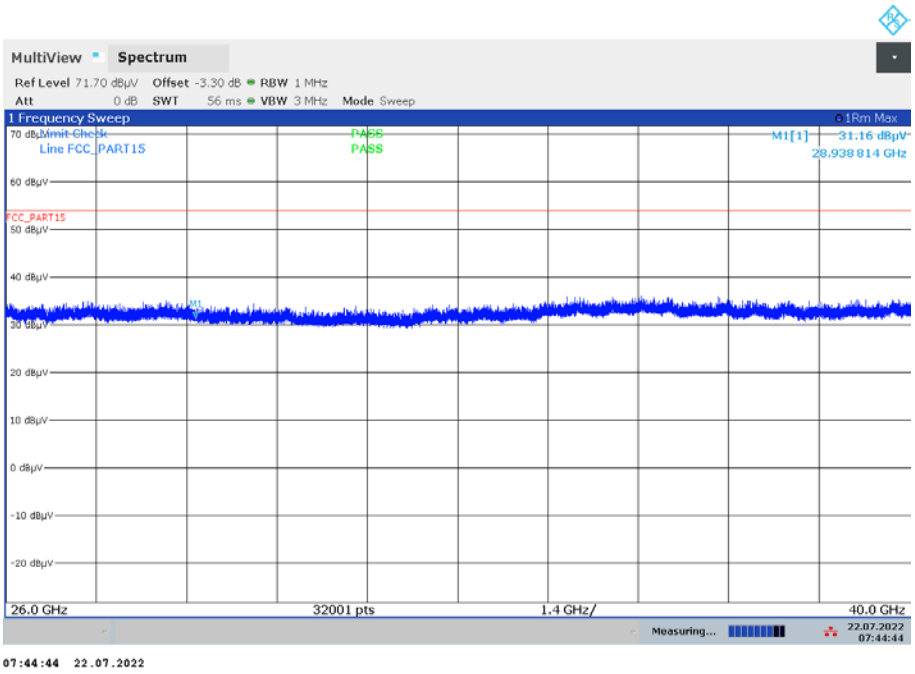
Plot 7: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-2A; lowest channel



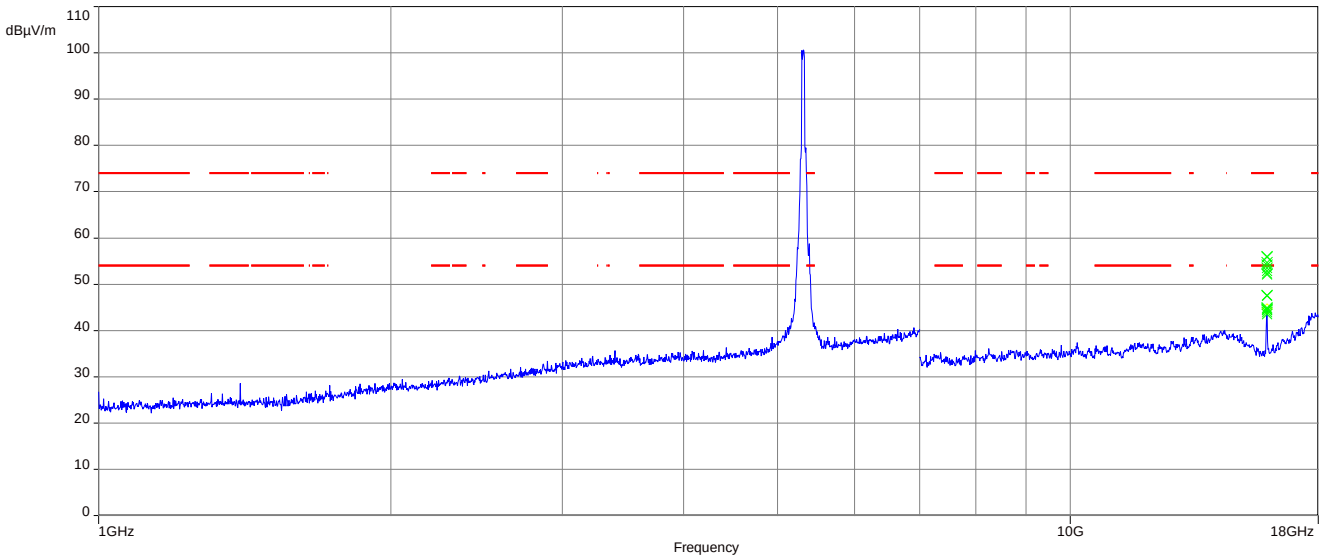
Plot 8: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-2A; lowest channel



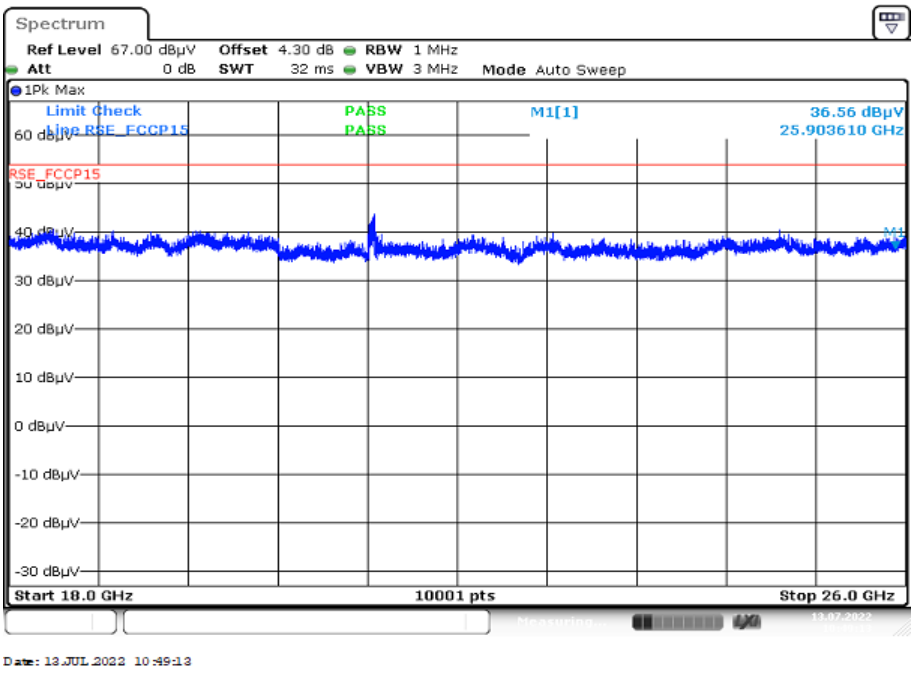
Plot 9: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-2A; lowest channel



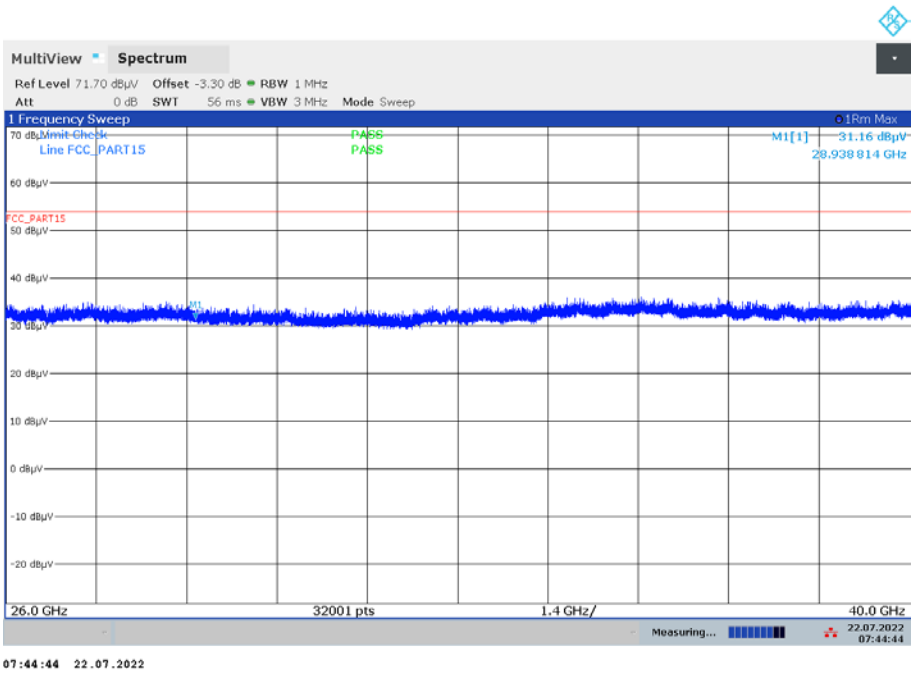
Plot 10: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-2A; highest channel



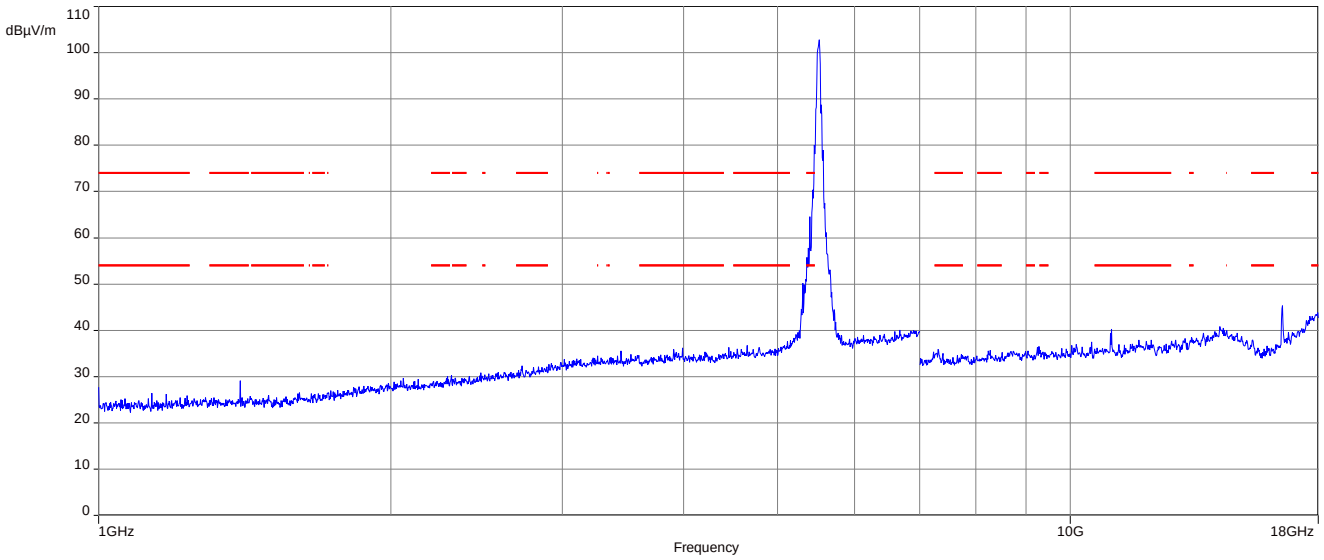
Plot 11: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-2A; highest channel



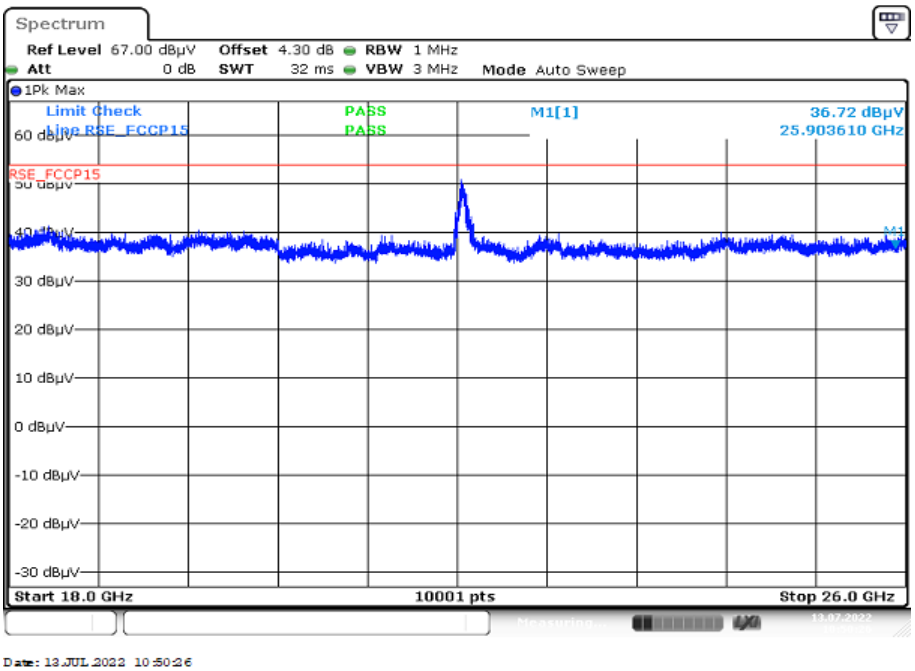
Plot 12: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-2A; highest channel



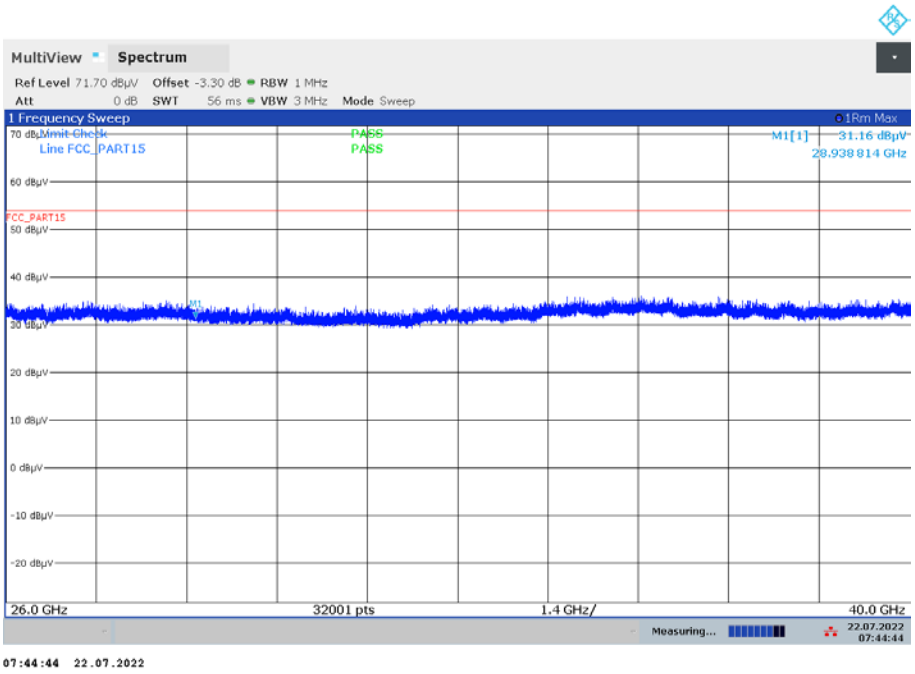
Plot 13: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-2C; lowest channel



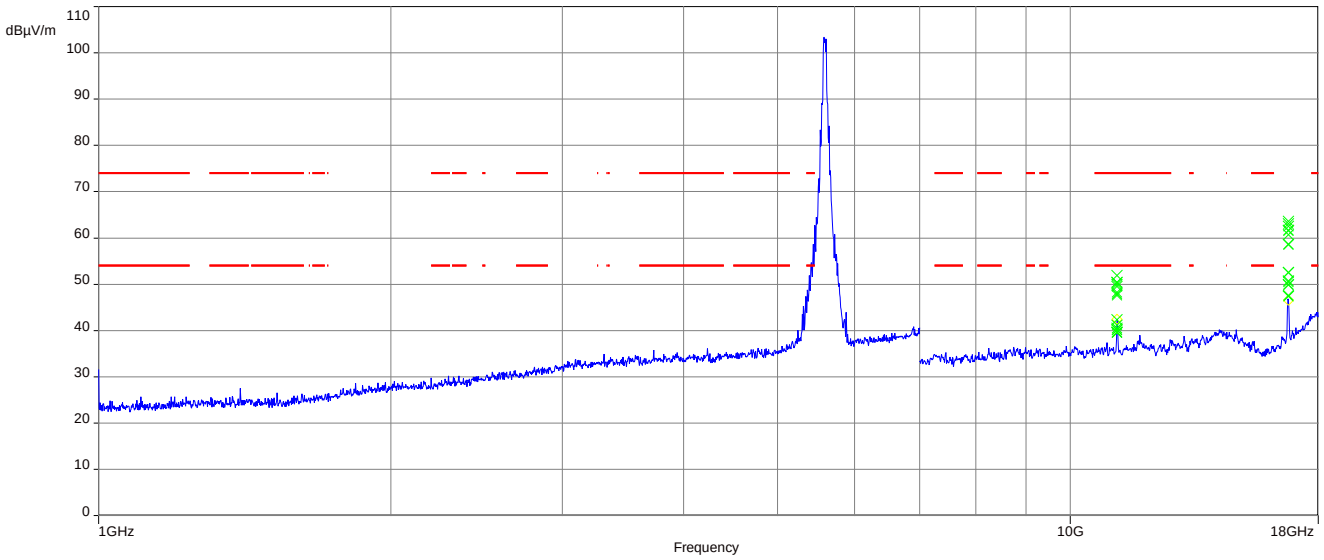
Plot 14: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-2C; lowest channel



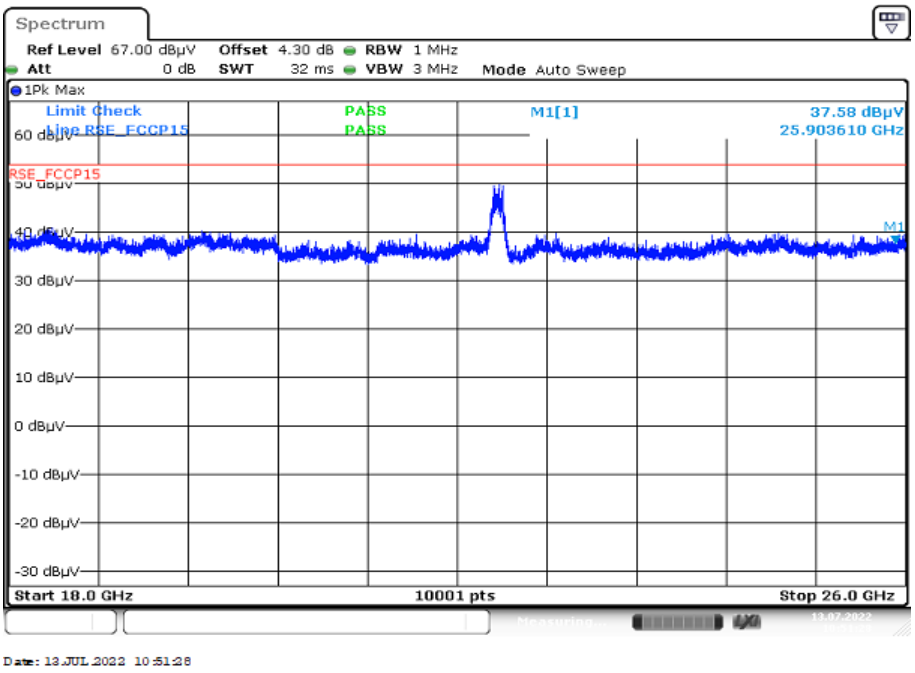
Plot 15: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-2C; lowest channel



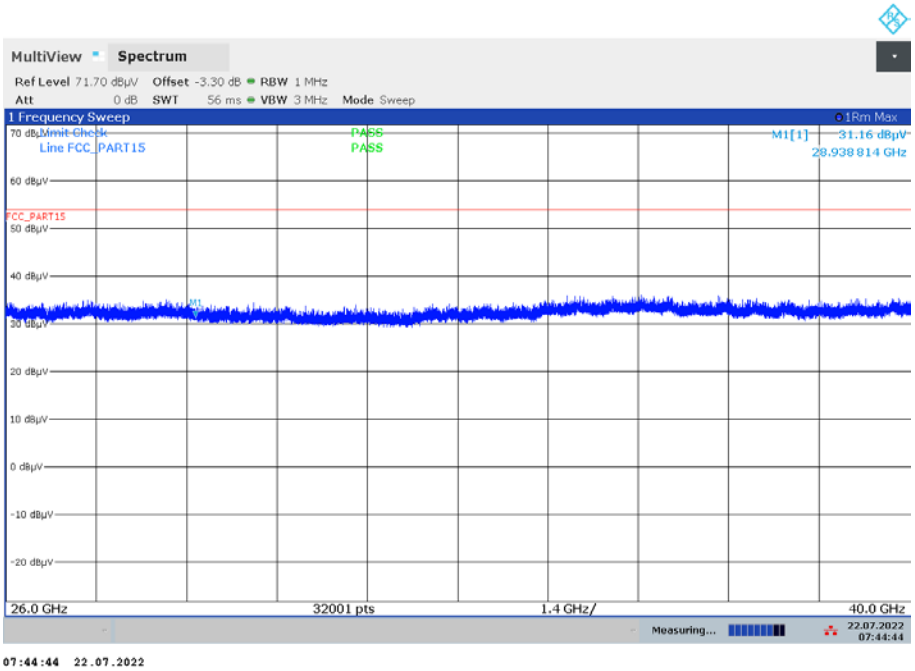
Plot 16: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-2C; middle channel



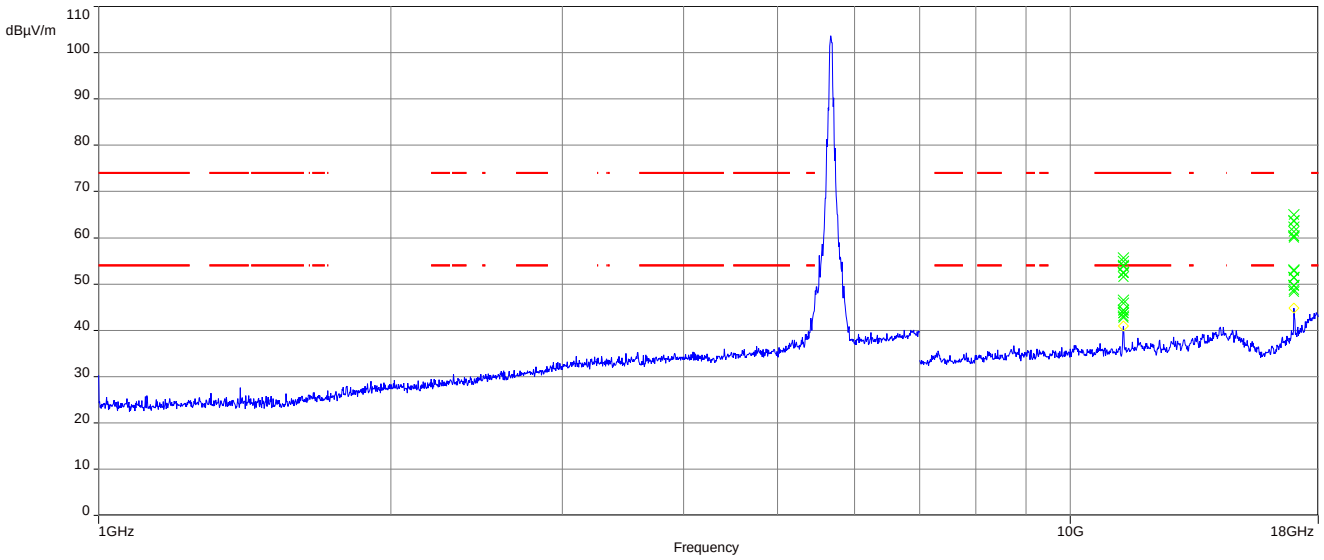
Plot 17: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-2C; middle channel



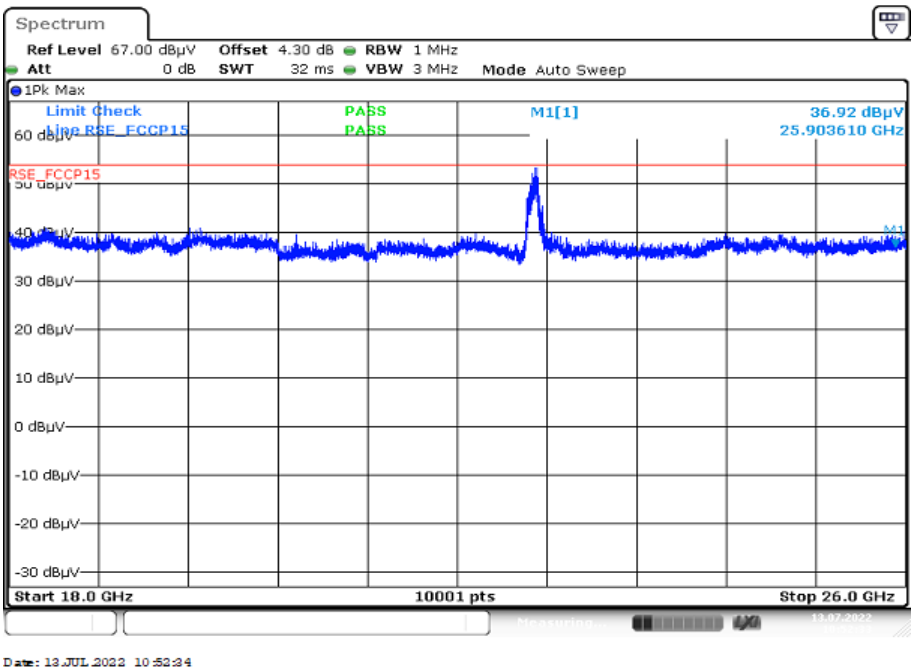
Plot 18: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-2C; middle channel



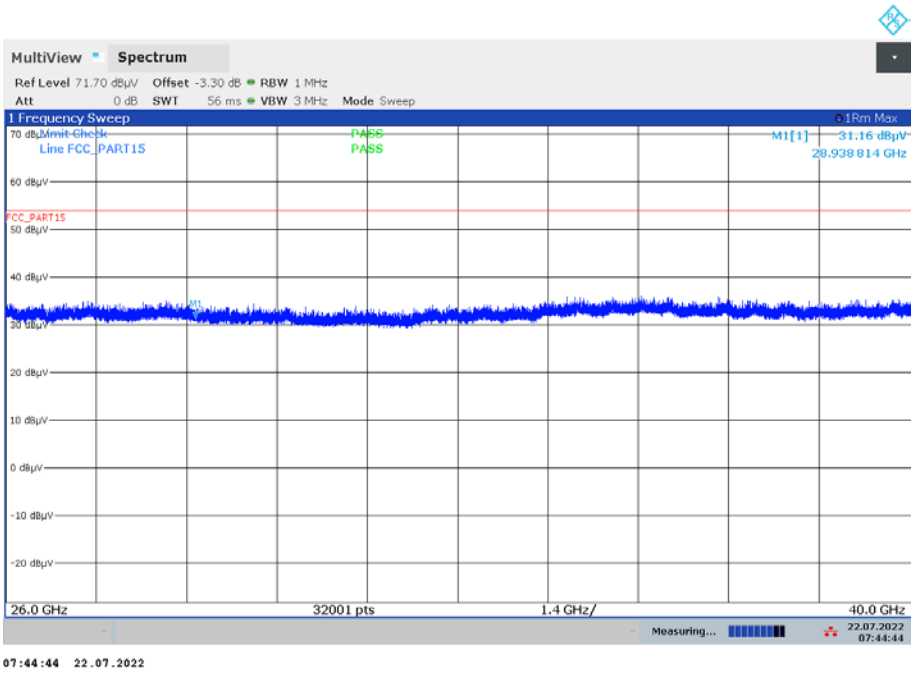
Plot 19: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-2C; highest channel



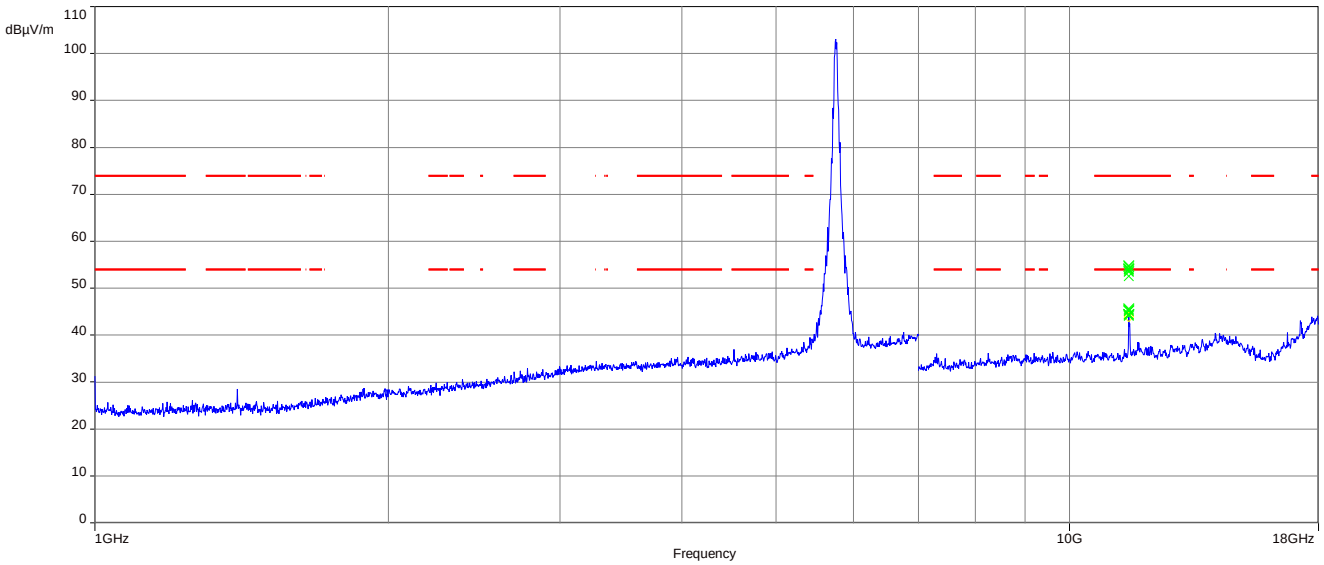
Plot 20: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-2C; highest channel



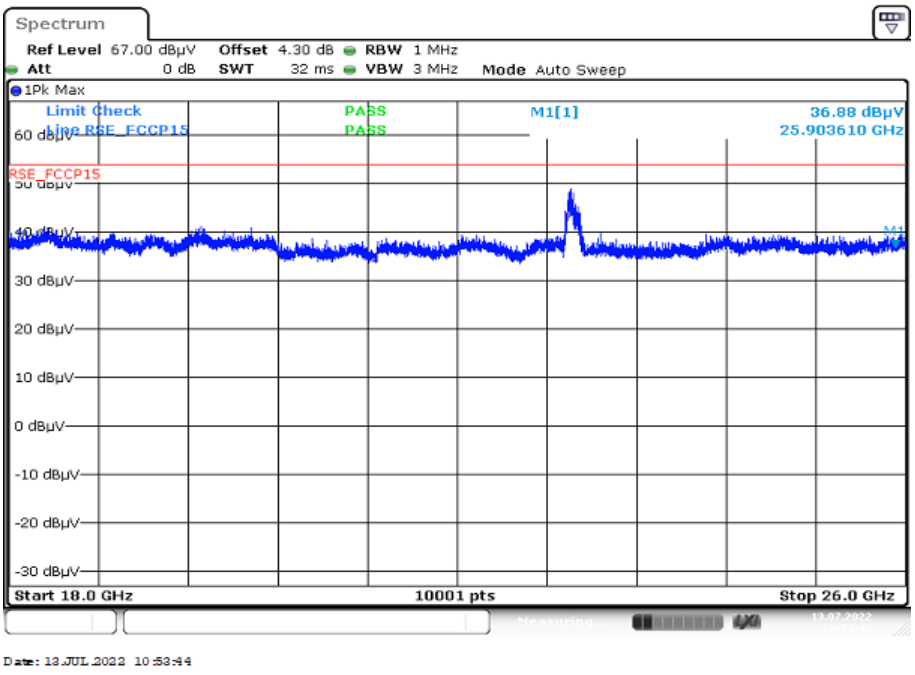
Plot 21: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-2C; highest channel



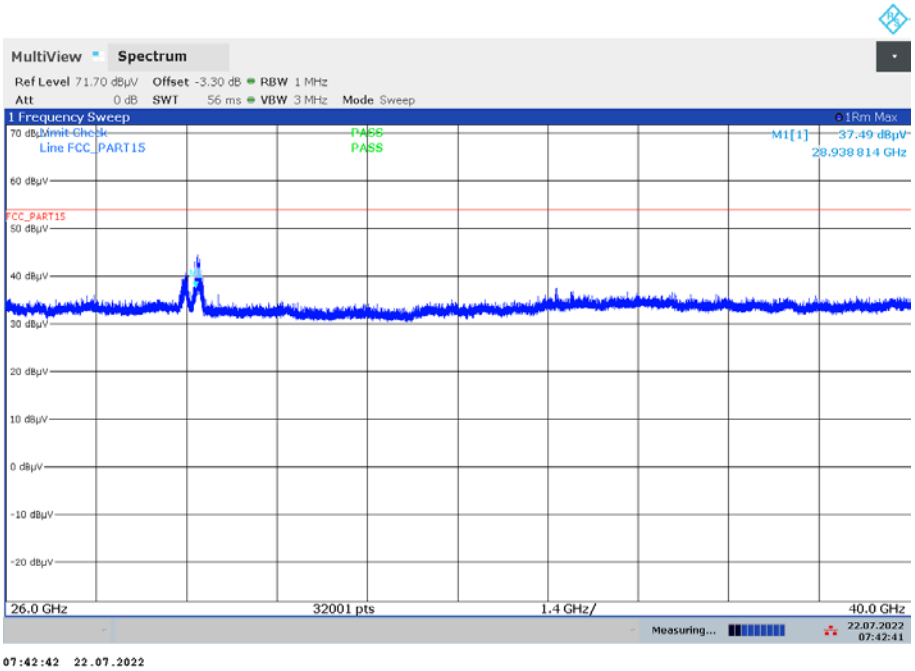
Plot 22: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-3; lowest channel



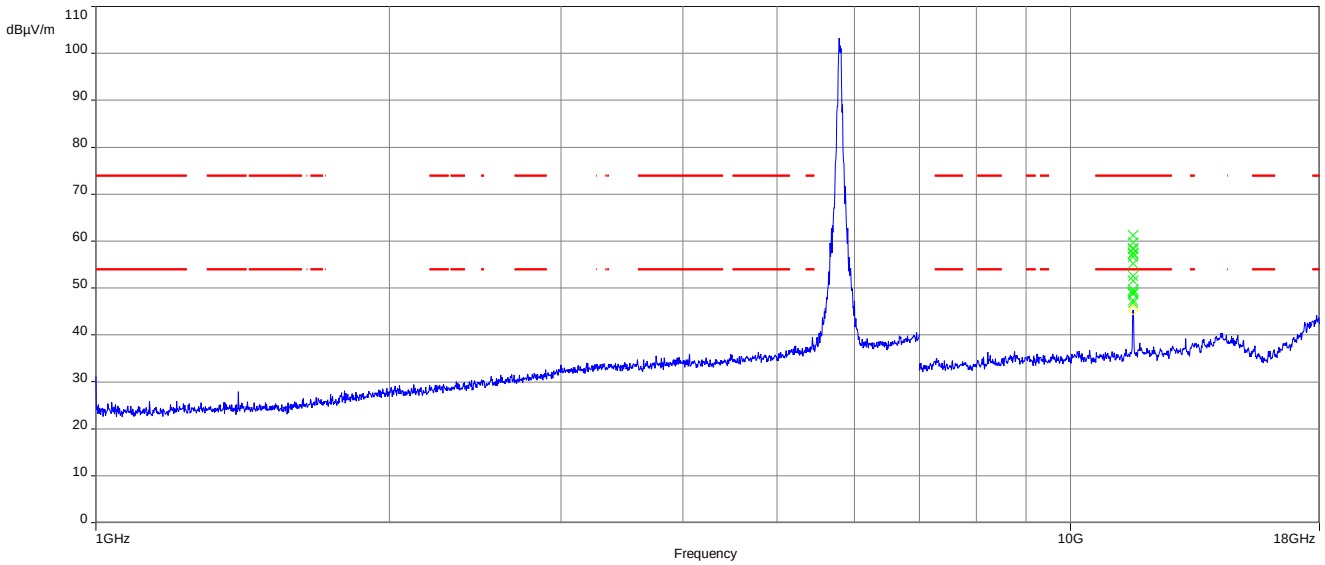
Plot 23: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-3; lowest channel



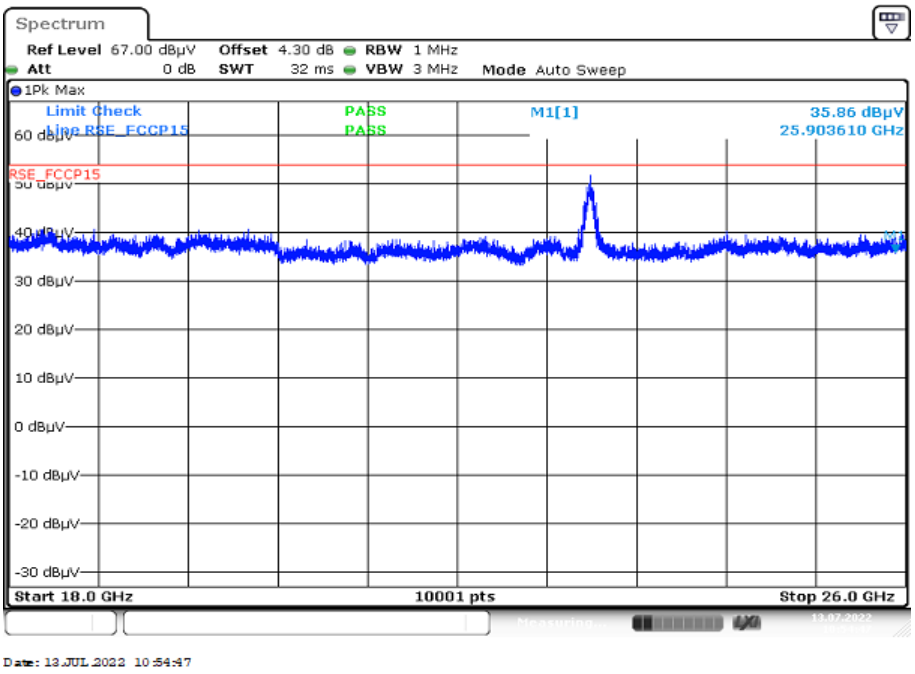
Plot 24: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-3; lowest channel



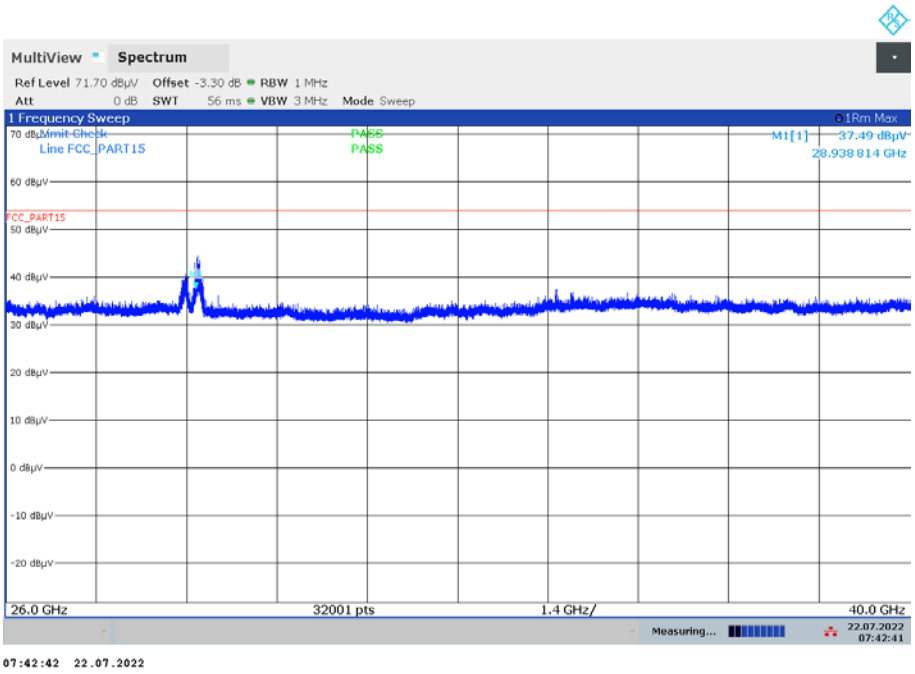
Plot 25: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-3; highest channel



Plot 26: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-3; highest channel

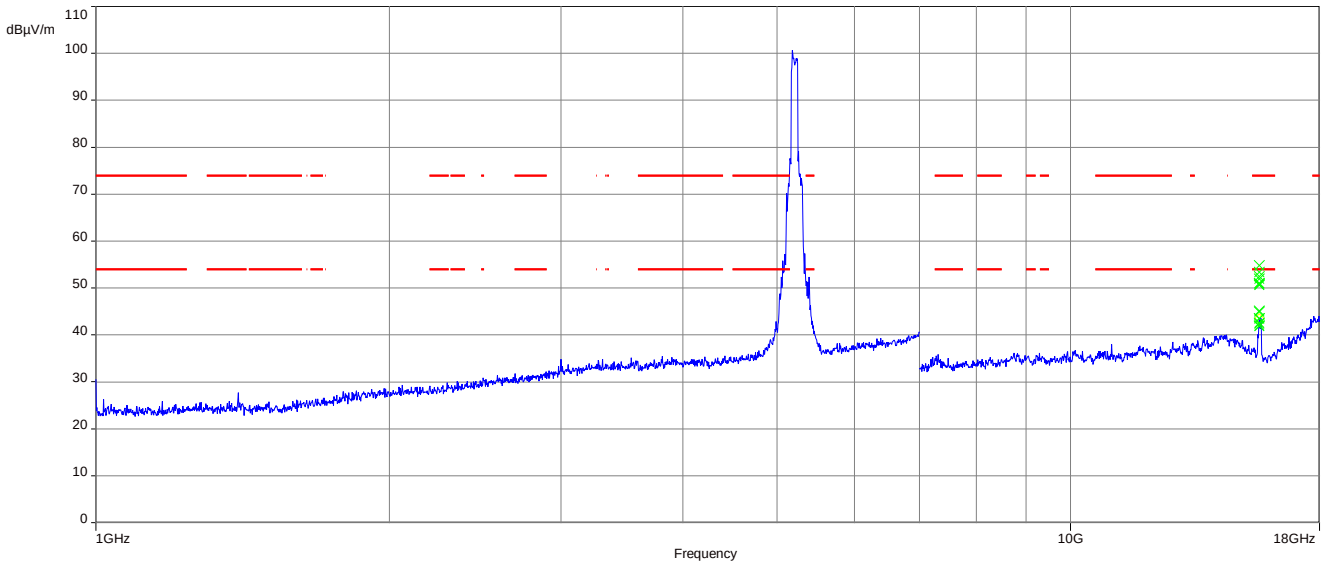


Plot 27: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-3; highest channel

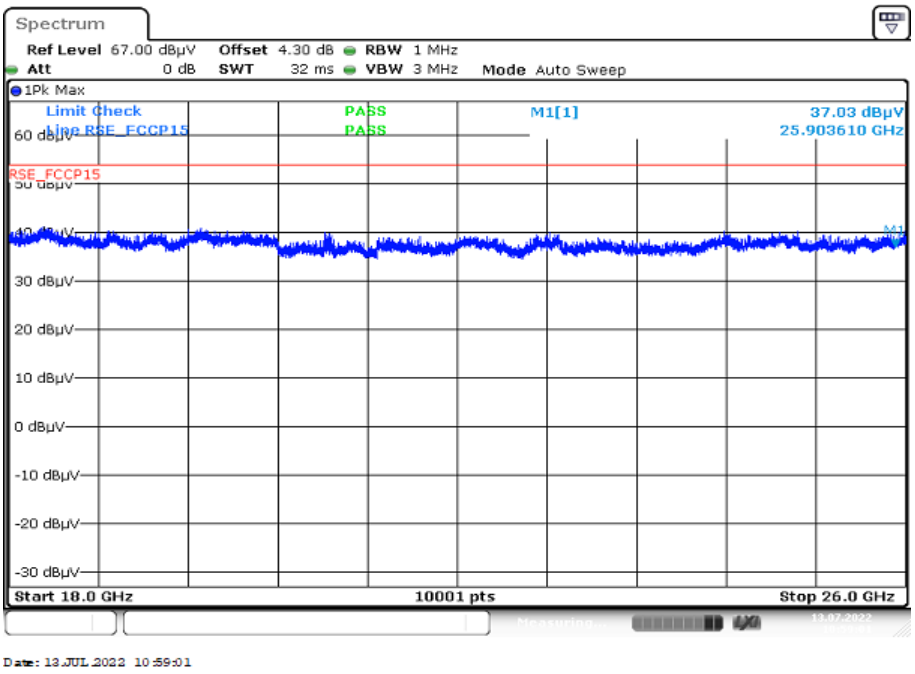


Plots: 80 MHz channel bandwidth

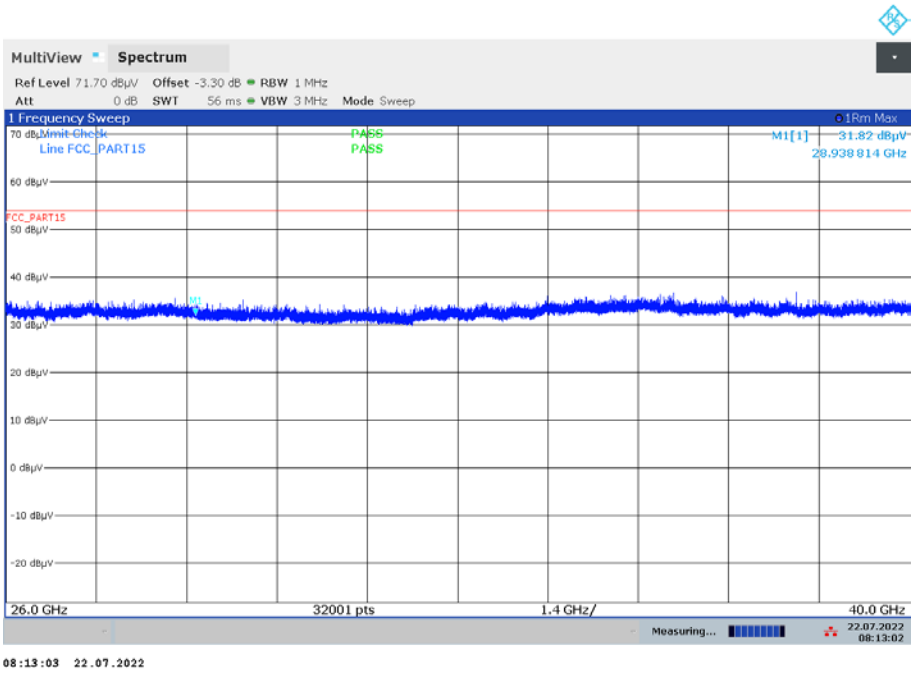
Plot 1: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-1; middle channel



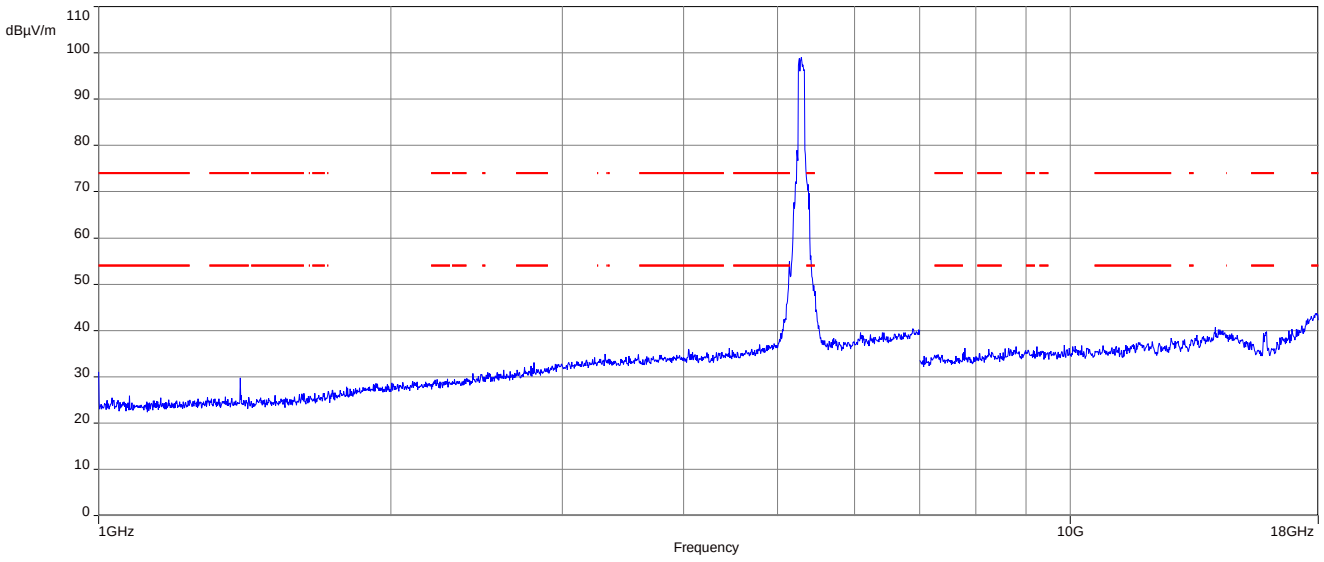
Plot 2: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-1; middle channel



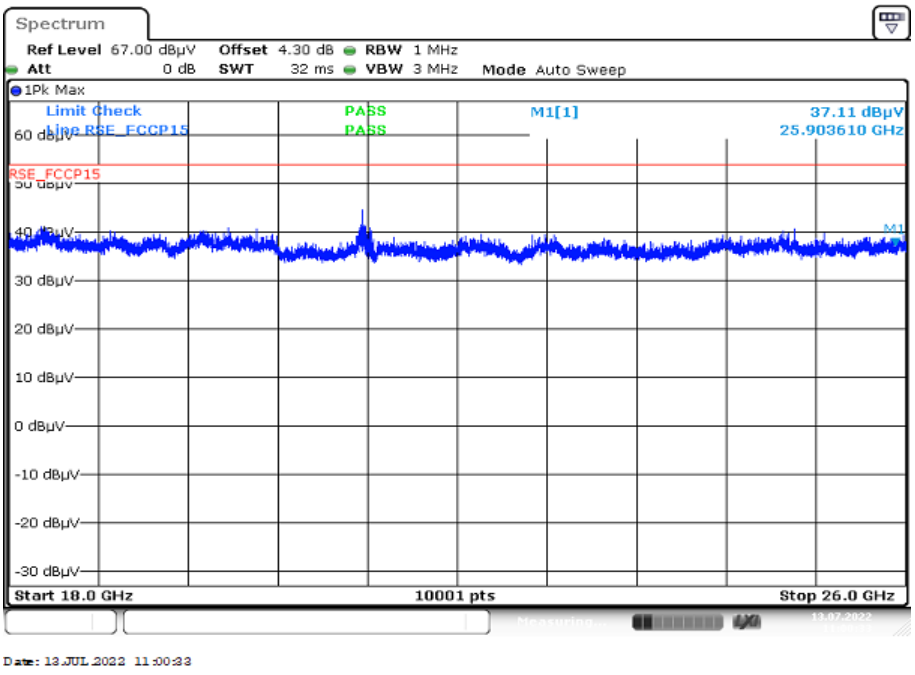
Plot 3: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-1; middle channel



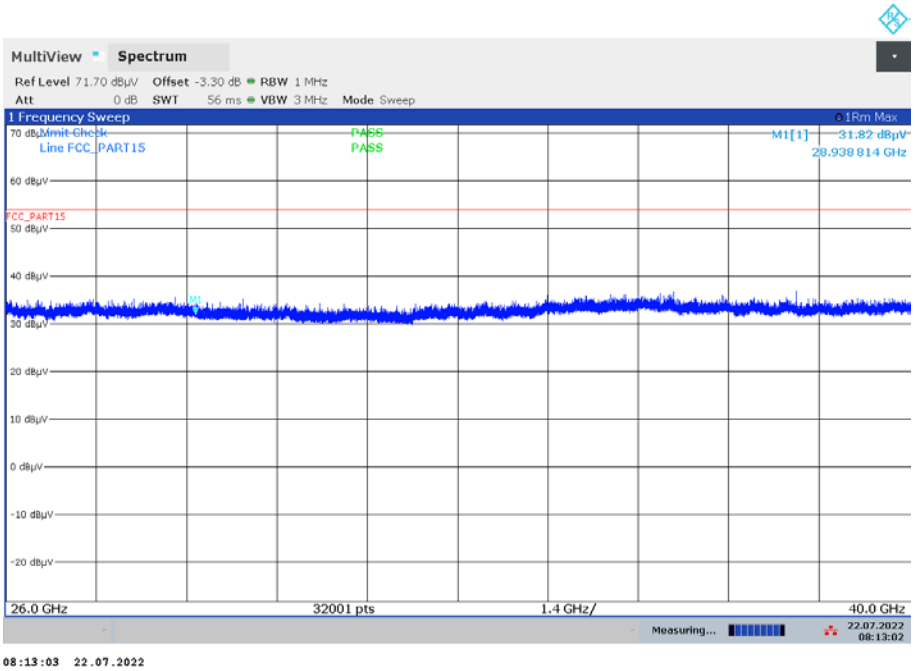
Plot 4: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-2A; middle channel



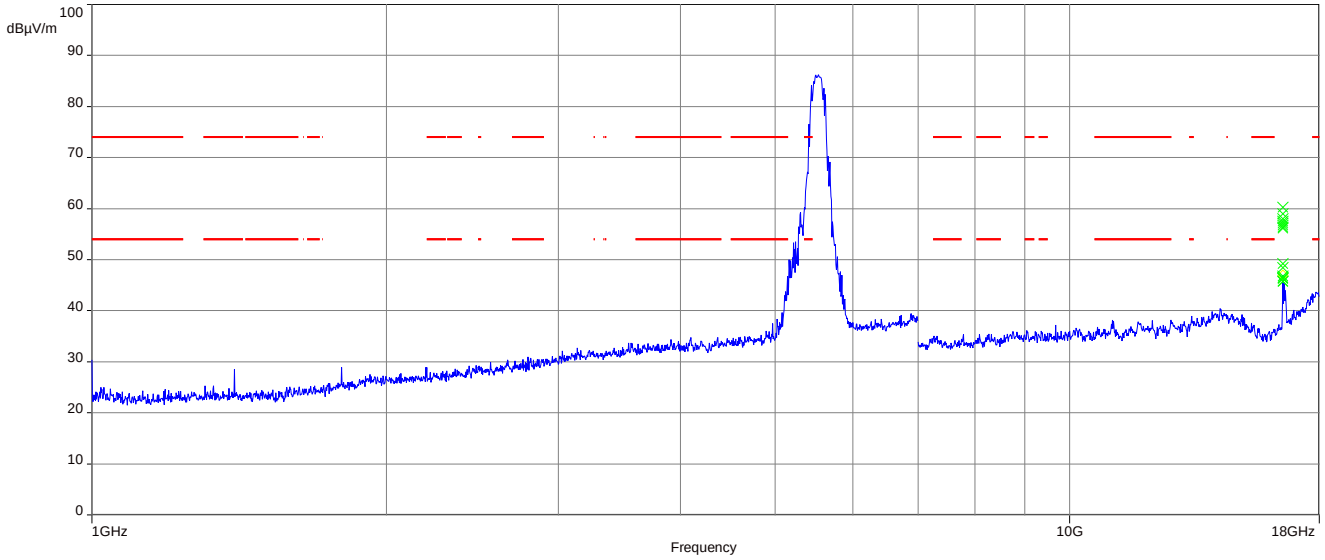
Plot 5: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-2A; middle channel



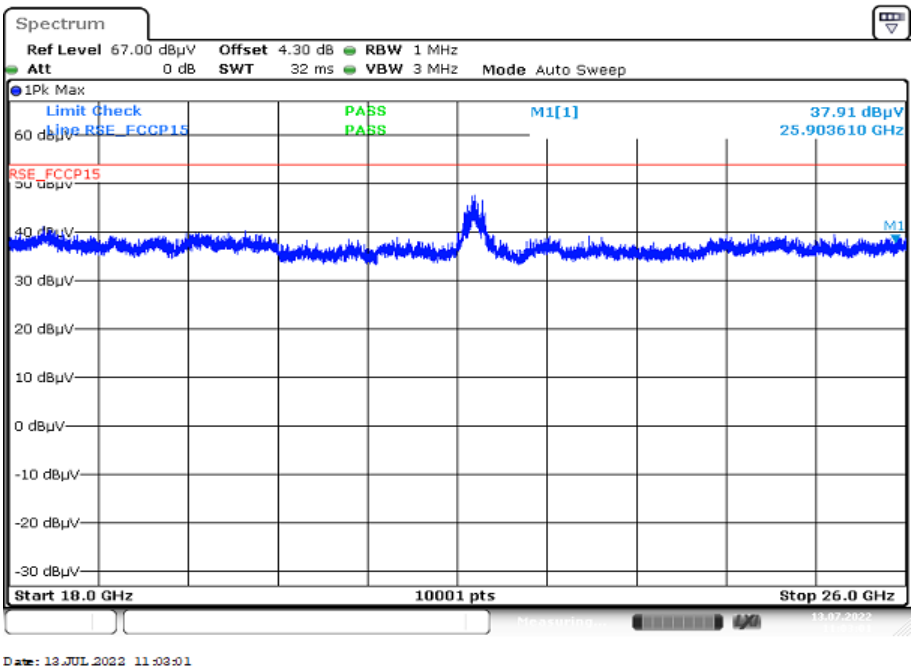
Plot 6: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-2A; middle channel



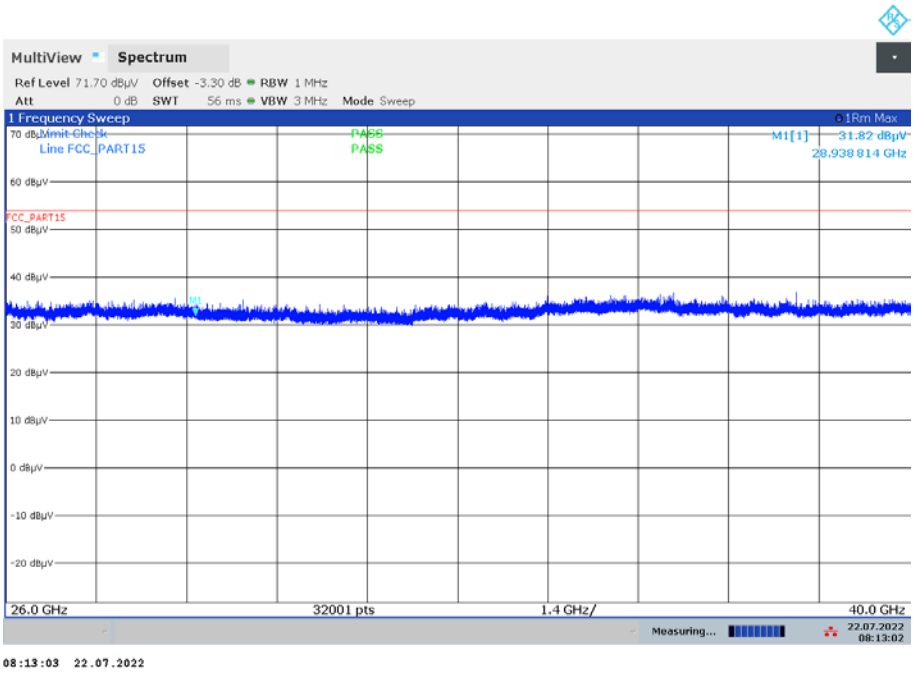
Plot 7: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-2C; lowest channel



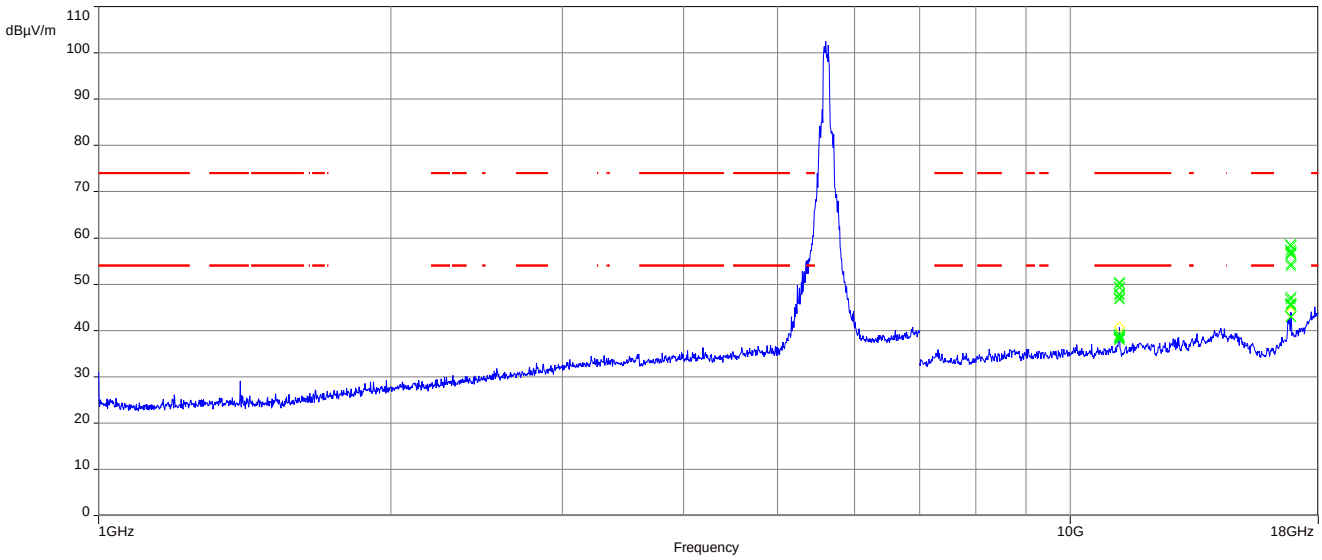
Plot 8: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-2C; lowest channel



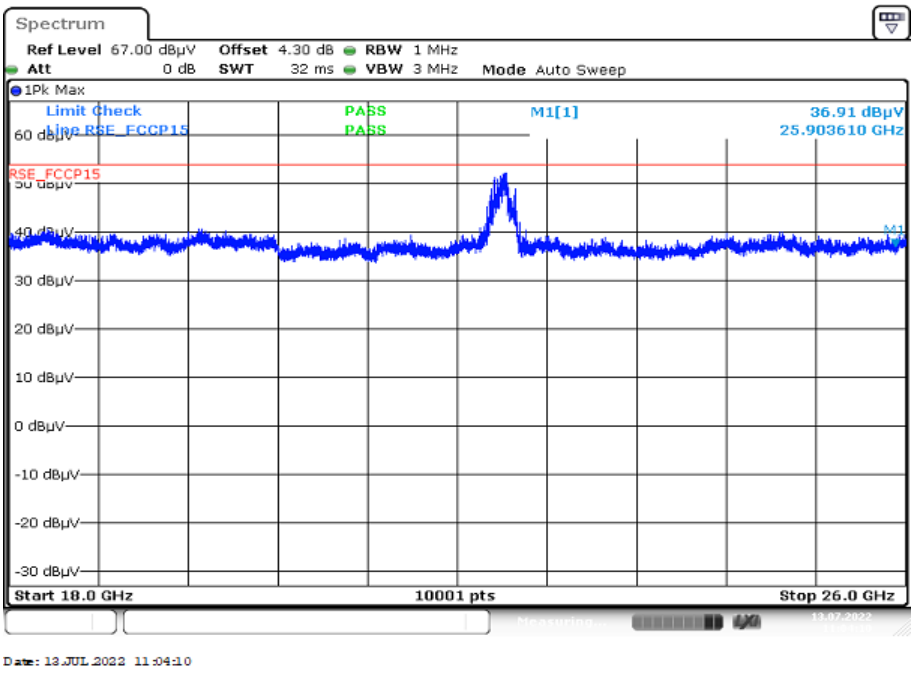
Plot 9: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-2C; lowest channel



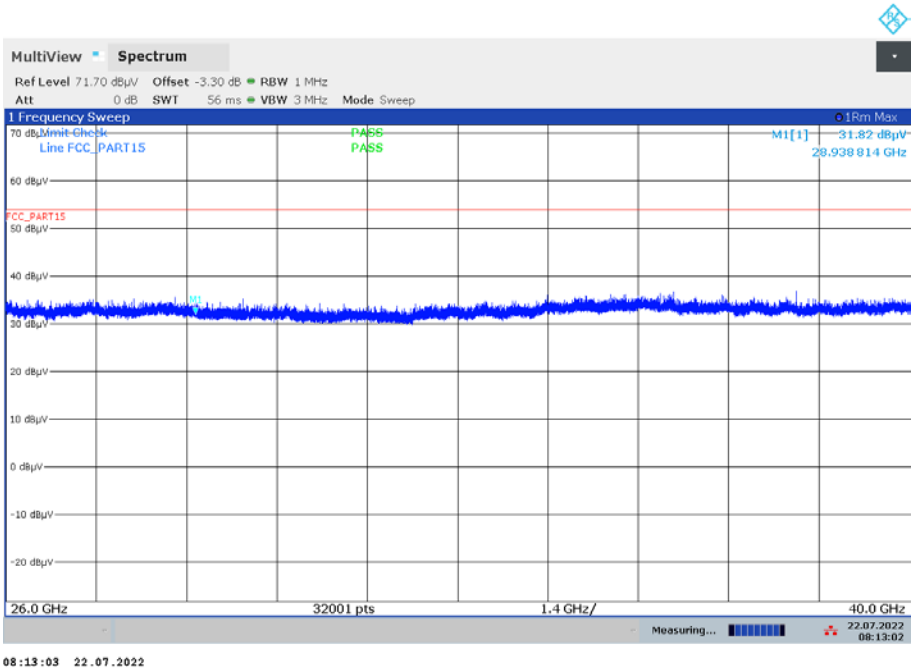
Plot 10: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-2C; highest channel



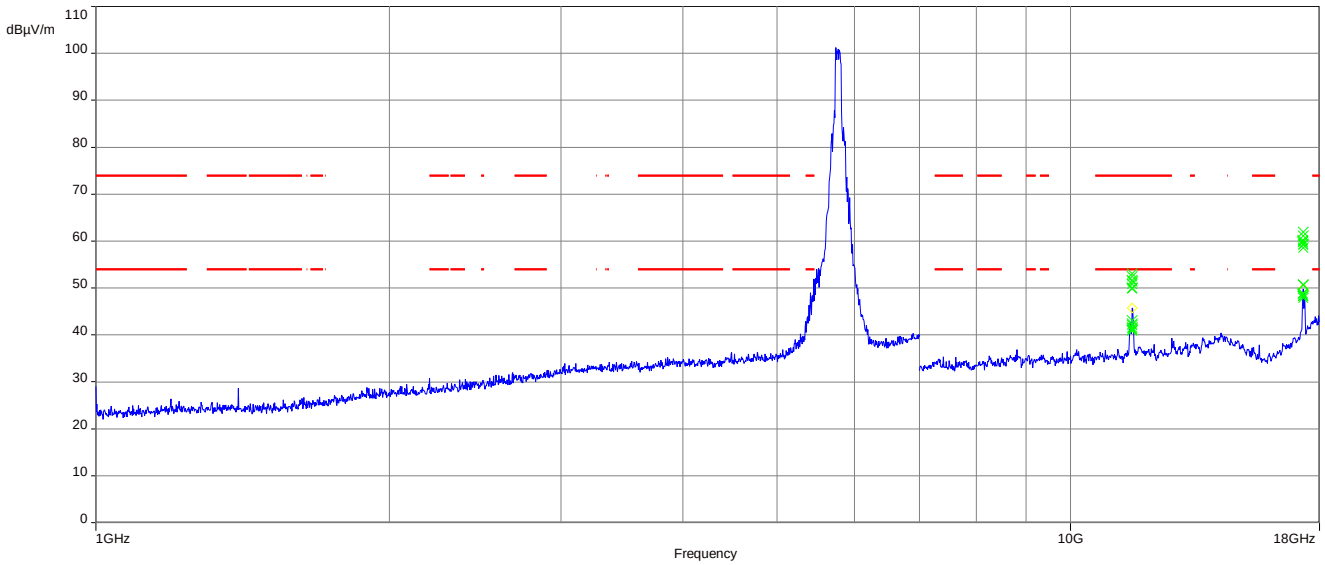
Plot 11: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-2C; highest channel



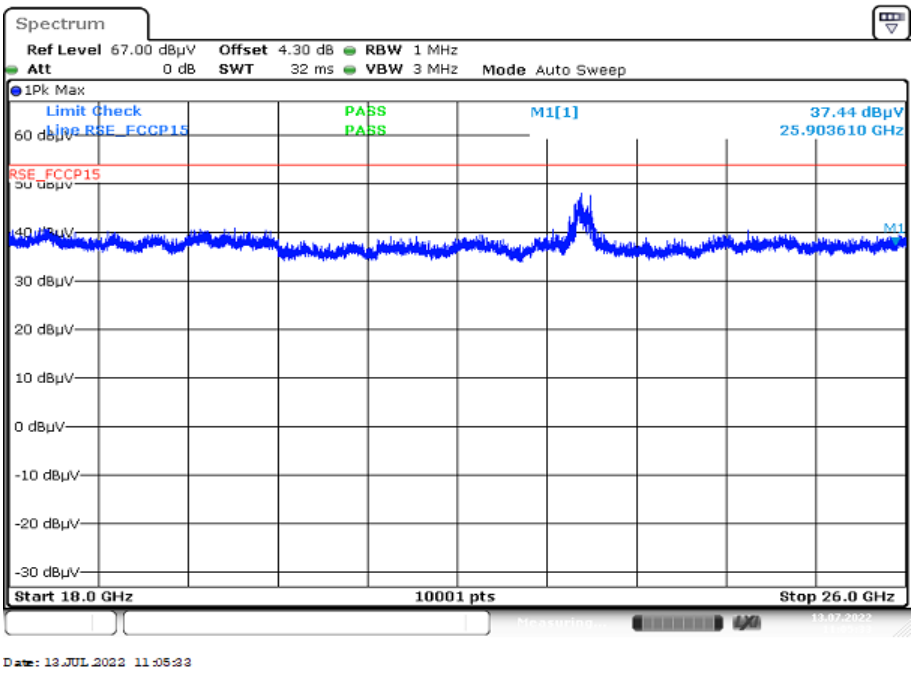
Plot 12: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-2C; highest channel



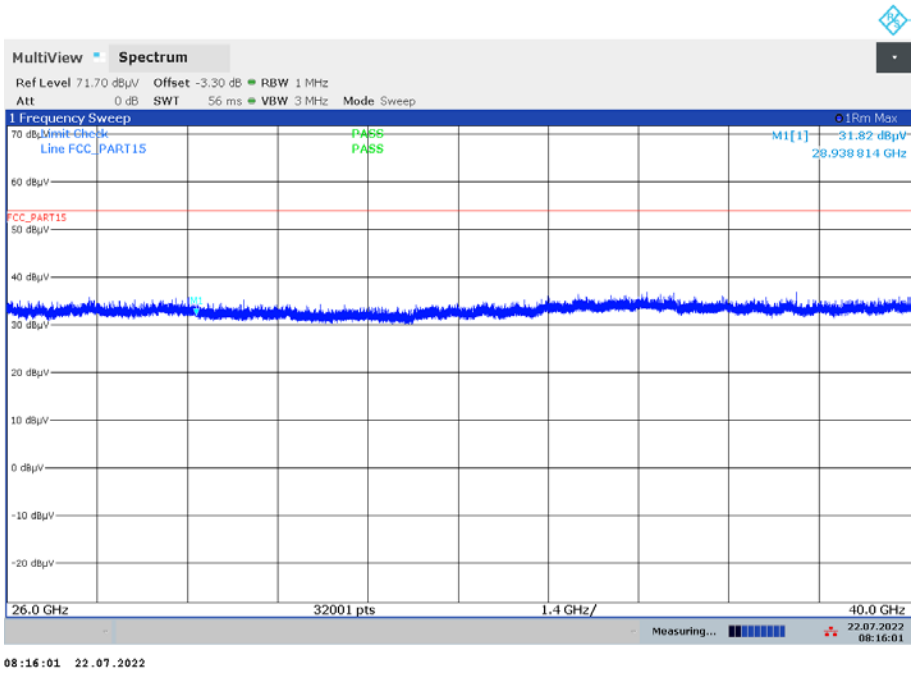
Plot 13: 1 GHz to 18 GHz; vertical & horizontal polarization; U-NII-3; middle channel



Plot 14: 18 GHz to 26 GHz; vertical & horizontal polarization; U-NII-3; middle channel



Plot 15: 26 GHz to 40 GHz; vertical & horizontal polarization; U-NII-3; middle channel



12.12 Spurious emissions conducted < 30 MHz

Description:

Measurement of the conducted spurious emissions in transmit mode below 30 MHz. The EUT is set to middle channel. If critical peaks are found the lowest channel and the highest channel will be measured too. Both power lines, phase and neutral line, are measured. Found peaks are re-measured with average and quasi peak detection to show compliance to the limits.

Measurement:

Measurement parameter	
Detector:	Peak - Quasi Peak / Average
Sweep time:	Auto
Video bandwidth:	9 kHz
Resolution bandwidth:	100 kHz
Span:	150 kHz to 30 MHz
Trace mode:	Max Hold
Test setup:	See sub clause 7.4 – A
Measurement uncertainty:	See chapter 9

Limits:

Spurious Emissions Conducted < 30 MHz		
Frequency (MHz)	Quasi-Peak (dBµV/m)	Average (dBµV/m)
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30.0	60	50

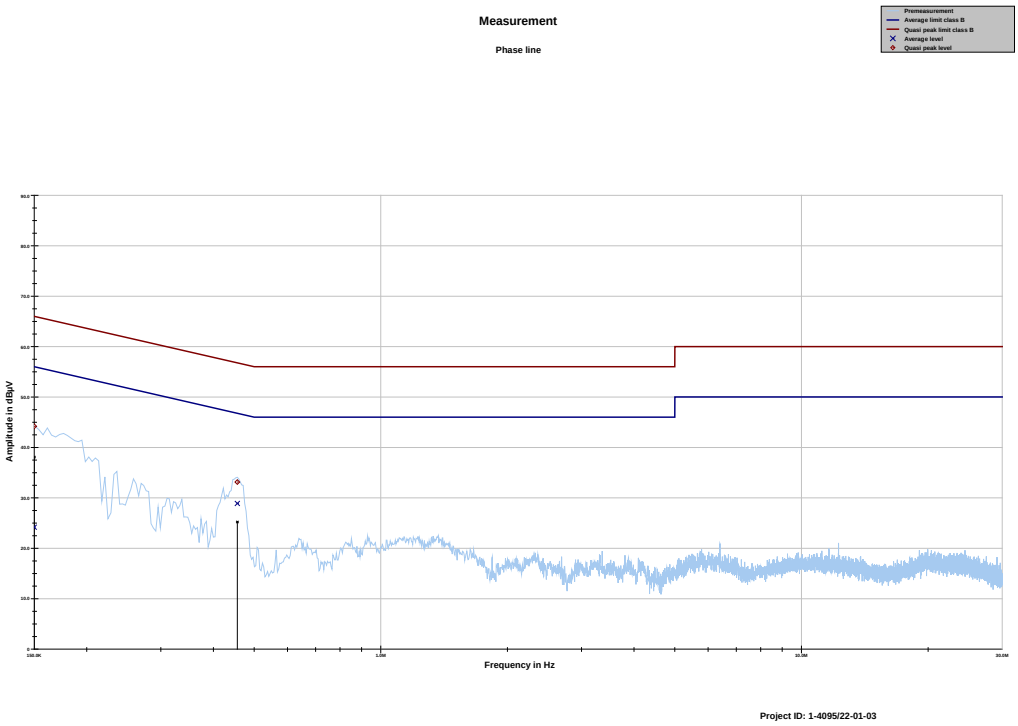
*Decreases with the logarithm of the frequency

Results:

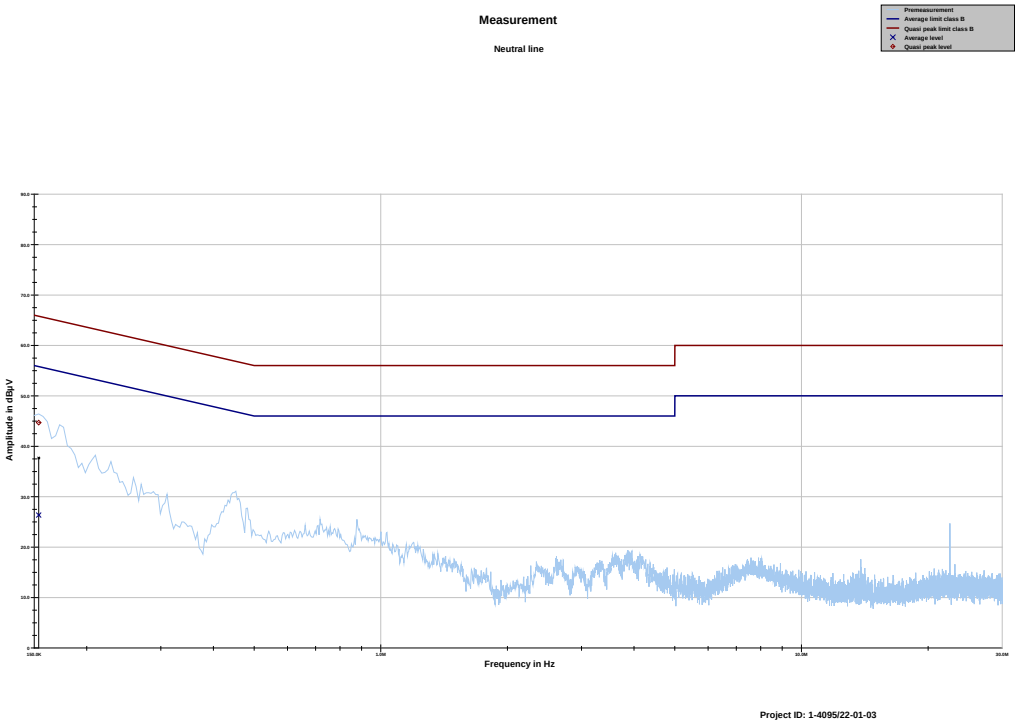
Spurious Emissions Conducted < 30 MHz [dBµV/m]		
F [MHz]	Detector	Level [dBµV/m]
All detected emissions are more than 20 dB below the limit.		

Plots:

Plot 1: 150 kHz to 30 MHz, phase line



Plot 2: 150 kHz to 30 MHz, neutral line



13 Observations

No observations except those reported with the single test cases have been made.

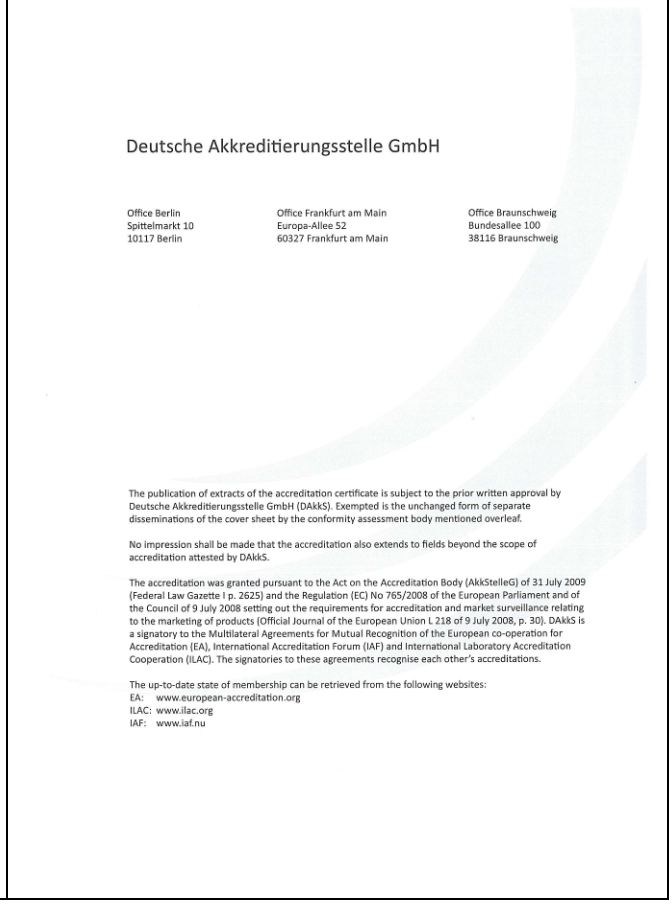
14 Glossary

EUT	Equipment under test
DUT	Device under test
UUT	Unit under test
FCC	Federal Communications Commission
FCC ID	Company Identifier at FCC
IC	Industry Canada
PMN	Product marketing name
HMN	Host marketing name
HVIN	Hardware version identification number
FVIN	Firmware version identification number
EMC	Electromagnetic Compatibility
HW	Hardware
SW	Software
Inv. No.	Inventory number
S/N or SN	Serial number
C	Compliant
NC	Not compliant
NA	Not applicable
NP	Not performed
PP	Positive peak
QP	Quasi peak
AVG	Average
OC	Operating channel
OCW	Operating channel bandwidth
OBW	Occupied bandwidth
OOB	Out of band
DFS	Dynamic frequency selection
CAC	Channel availability check
OP	Occupancy period
NOP	Non occupancy period
DC	Duty cycle
PER	Packet error rate
CW	Clean wave
MC	Modulated carrier
WLAN	Wireless local area network
RLAN	Radio local area network
DSSS	Dynamic sequence spread spectrum
OFDM	Orthogonal frequency division multiplexing

15 Document history

Version	Applied changes	Date of release
-/-	Initial release	2022-08-31
A	Added antenna gain reference	2022-09-02

16 Accreditation Certificate – D-PL-12076-01-05

first page	last page
	

DAkkS Deutsche Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV
Signatory to the Multilateral Agreements of EA, ILAC and IAF for Mutual Recognition

Accreditation

The Deutsche Akkreditierungsstelle GmbH attests that the testing laboratory

CTC advanced GmbH
Untertürkheimer Straße 6-10, 66117 Saarbrücken

is competent under the terms of DIN EN ISO/IEC 17025:2018 to carry out tests in the following fields:

Telecommunication (FCC Requirements)

The accreditation certificate shall only apply in connection with the notice of accreditation of 09.06.2020 with the accreditation number D-PL-12076-01. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 05 pages.

Registration number of the certificate: **D-PL-12076-01-05**

Frankfurt am Main, 09.06.2020

by order Dipl.-Ing. (FH) Ralf Egner
Head of Division

The certificate together with its annex reflects the status at the time of the date of issue. The current status of the scope of accreditation can be found in the database of accredited bodies of Deutsche Akkreditierungsstelle GmbH.
https://www.dakks.de/en/content/accredited-bodies-dakks

See notes overleaf.

Deutsche Akkreditierungsstelle GmbH

Office Berlin
Spittelmarkt 10
10117 Berlin

Office Frankfurt am Main
Europa-Allee 52
60327 Frankfurt am Main

Office Braunschweig
Bundesallee 100
38116 Braunschweig

The publication of extracts of the accreditation certificate is subject to the prior written approval by Deutsche Akkreditierungsstelle GmbH (DAkkS). Exempted is the unchanged form of separate disseminations of the cover sheet by the conformity assessment body mentioned overleaf.

No impression shall be made that the accreditation also extends to fields beyond the scope of accreditation attested by DAkkS.

The accreditation was granted pursuant to the Act on the Accreditation Body (AkkStelleG) of 31 July 2009 (Federal Law Gazette I p. 2625) and the Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products (Official Journal of the European Union L 218 of 9 July 2008, p. 30). DAkkS is a signatory to the Multilateral Agreements for Mutual Recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Cooperation (ILAC). The signatories to these agreements recognise each other's accreditations.

The up-to-date state of membership can be retrieved from the following websites:
EA: www.european-accreditation.org
ILAC: www.ilac.org
IAF: www.iaf.nu

Note: The current certificate annex is published on the websites (link see below).

https://www.dakks.de/files/data/as/pdf/D-PL-12076-01-05e.pdf

or

https://ctcadvanced.com/app/uploads/2020/06/D-PL-12076-01-05_TCB_USA.pdf

################################ END OF TEST REPORT ################################