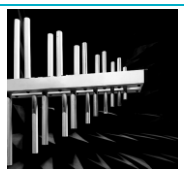
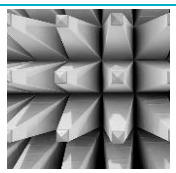




CTC advanced
member of RWTÜV group

Bundesnetzagentur

BNetzA-CAB-02/21-102

TEST REPORT

Test report no.: 1-0397/20-02-14-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

Digi International Inc.
9350 Excelsior Blvd, Suite 700
Hopkins, 55343 / UNITED STATES
Phone: -/-
Contact: Dan Kobylarz
e-mail: daniel.kobylarz@digi.com
Phone: +1 (952) 912-3029

Manufacturer

Digi International Inc.
9350 Excelsior Blvd, Suite 700
Hopkins, 55343 / UNITED STATES

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
RSS - 247 Issue 2	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence - Exempt Local Area Network (LE-LAN) Devices

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

Test Item

Kind of test item:	**Embedded ARM System on Module**
Model name:	**ConnectCore 8M Nano**
FCC ID:	**MCQ-CCMX8MN**
IC:	**1846A-CCMX8MN**
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:	One U.FL antenna port for one of the listed antennas
Power supply:	4.5 V to 5.5 V DC via external power supply
Temperature range:	-40°C to +85°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:

cn=Marco Bertolino, o=CTC advanced GmbH, ou=BTL-161128, email=Marco.Bertolino@ctcadvanced.com, c=DE
2021.03.23 06:49:33 +01'00'

Marco Bertolino
Lab Manager
Radio Communications

Test performed:

cn=David Lang, o=CTC advanced GmbH, ou=LNG-161129, email=david.lang@ctcadvanced.com, c=DE
2021.03.19 12:35:42 +01'00'

David Lang
Lab 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.
The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CTC advanced GmbH.
The testing service provided by CTC advanced GmbH has been rendered under the current "General Terms and Conditions for CTC advanced GmbH".
CTC advanced GmbH will not be liable for any loss or damage resulting from false, inaccurate, inappropriate or incomplete product information provided by the customer.
Under no circumstances does the CTC advanced GmbH test report include any endorsement or warranty regarding the functionality, quality or performance of any other product or service provided.
Under no circumstances does the CTC advanced GmbH test report include or imply any product or service warranties from CTC advanced GmbH, including, without limitation, any implied warranties of merchantability, fitness for purpose, or non-infringement, all of which are expressly disclaimed by CTC advanced GmbH.
All rights and remedies regarding vendor's products and services for which CTC advanced GmbH has prepared this test report shall be provided by the party offering such products or services and not by CTC advanced GmbH.
In no case this test report can be considered as a Letter of Approval.

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.

This test report replaces the test report with the number 1-0397/20-02-14-A and dated 2021-03-17.

2.2 Application details

RF tests:

Date of receipt of order:	2020-08-03
Date of receipt of test item:	2020-10-06
Start of test: *	2020-10-15
End of test: *	2020-11-20
Person(s) present during the test:	-/-

Additional tests for overlapping channels:

Date of receipt of order:	2020-08-03
Date of receipt of test item:	2020-10-06
Start of test: *	2021-03-09
End of test: *	2021-03-11
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

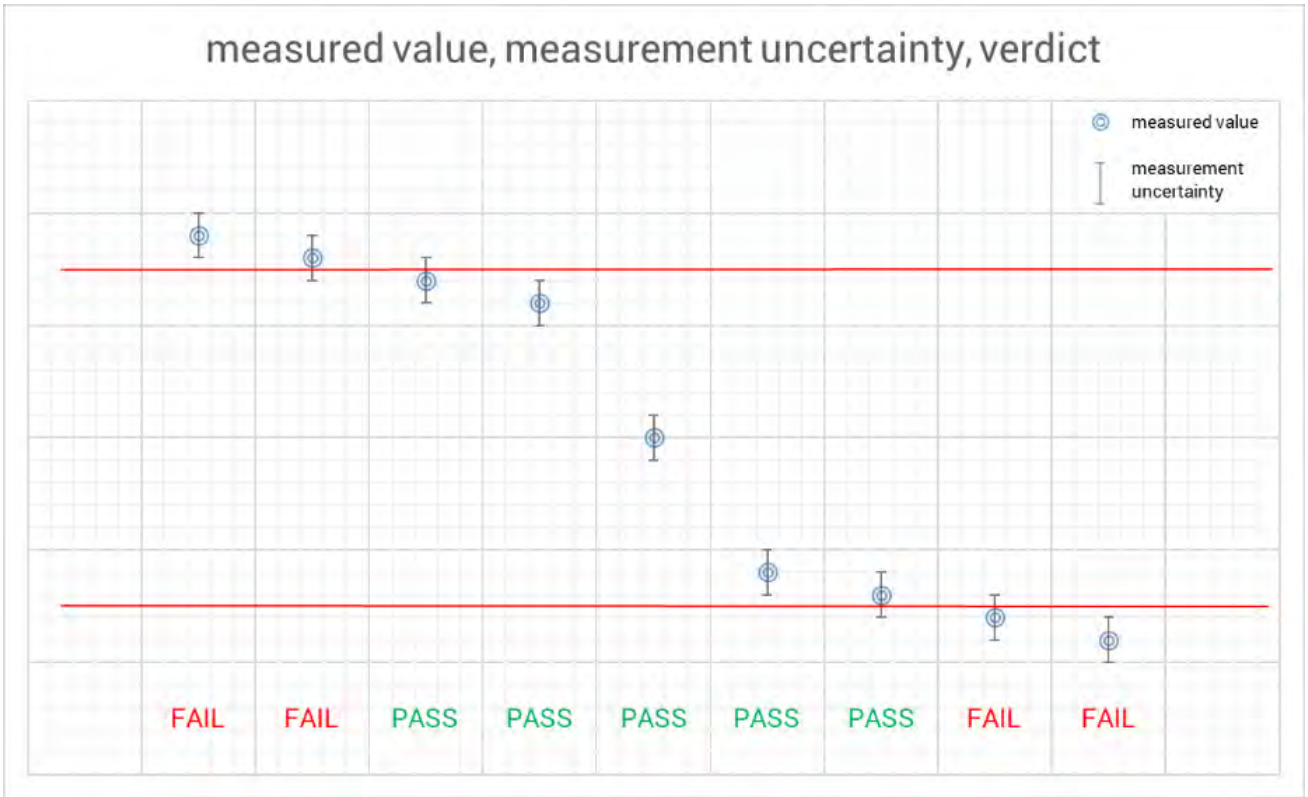
Test standard	Date	Description
FCC - Title 47 CFR Part 15		FCC - Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices
RSS - 247 Issue 2	February 2017	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence - Exempt Local Area Network (LE-LAN) Devices
RSS - Gen Issue 5 incl. Amendment 1	March 2019	Spectrum Management and Telecommunications Radio Standards Specification - General Requirements for Compliance of Radio Apparatus

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

Accreditation	Description
D-PL-12076-01-04	Telecommunication and EMC Canada https://www.dakks.de/as/ast/d/D-PL-12076-01-04e.pdf
D-PL-12076-01-05	Telecommunication FCC requirements https://www.dakks.de/as/ast/d/D-PL-12076-01-05e.pdf

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}	+22 °C during room temperature tests No tests under extreme environmental conditions required. No tests under extreme environmental conditions required.
Relative humidity content	:		55 %
Barometric pressure	:		1021 hpa
Power supply	:	V_{nom} V_{max} V_{min}	5.0 V DC via external power supply No tests under extreme environmental conditions required. No tests under extreme environmental conditions required.

6 Test item

6.1 General description

Kind of test item	:	Embedded ARM System on Module
Model name	:	ConnectCore 8M Nano
HMN	:	-/-
PMN	:	ConnectCore 8M Nano
HVIN	:	55002070-xx
FVIN	:	82004426
S/N serial number	:	Rad. Unknown (labeled CTC #1) (RSE 30MHz to 1 GHz), 8M DVK 056 (55002060-01 AS47102.0008) Cond. 8M DVK 054 (55002060-01 AS47102.0009) CC8MN R204202000400 (for measurements on overlapping channels (U-NII2C/3 only)
Hardware status	:	55002070-xx
Software status	:	82004426
Firmware status	:	82004431
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	:	CCK, (D)BPSK, (D)QPSK, 16 – QAM, 64 – QAM
Number of channels	:	25 with 20 MHz channel bandwidth 12 with 40 MHz channel bandwidth 6 with 80 MHz channel bandwidth
Antenna	:	One U.FL antenna port for one of the listed antennas; TAOGLAS GW.48.A151: **4.56 dBi*,** TAOGLAS FXP830.07.0100C: **4.7 dBi*,** TAOGLAS FXP831.07.0100C: **5.5 dBi*,** YAGEO ANTX100P001B24553: **5.1 dBi*,** Ethertronics 1001932: **5.0 dBi*,** Linx Technologies Inc. ANT-DB1-RAF-RPS: **4.6 dBi*** *peak antenna gain as per data sheet (see section 11)
Power supply	:	4.5 V to 5.5 V DC via external power supply
Temperature range	:	-40°C to +85°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: 1-0397/20-02-01_AnnexA
1-0397/20-02-01_AnnexB
1-0397/20-02-01_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).

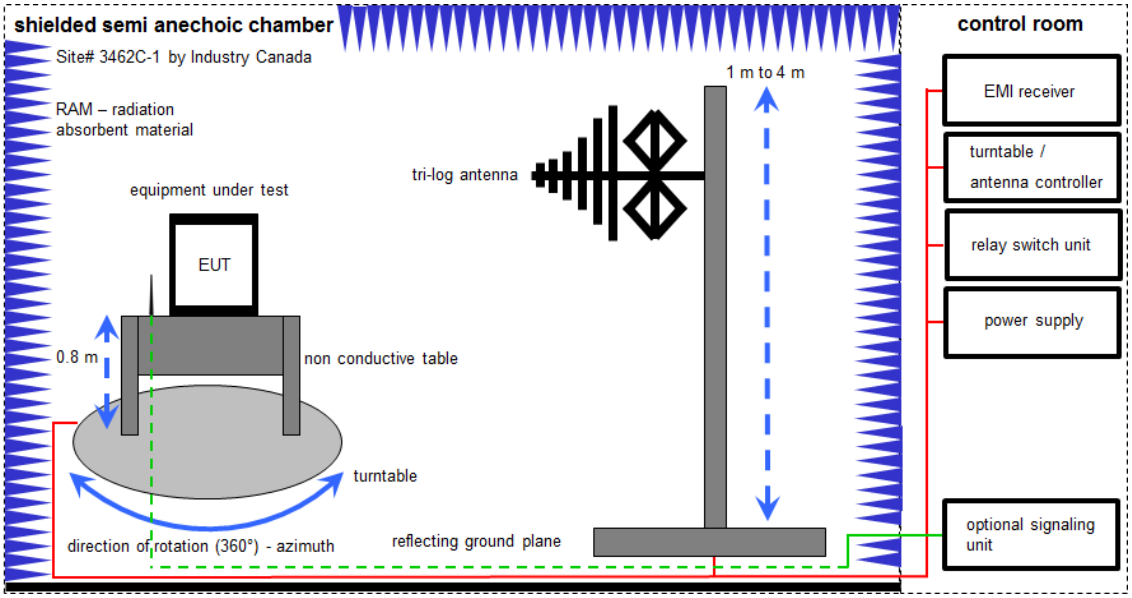
In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Lab/Item).

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

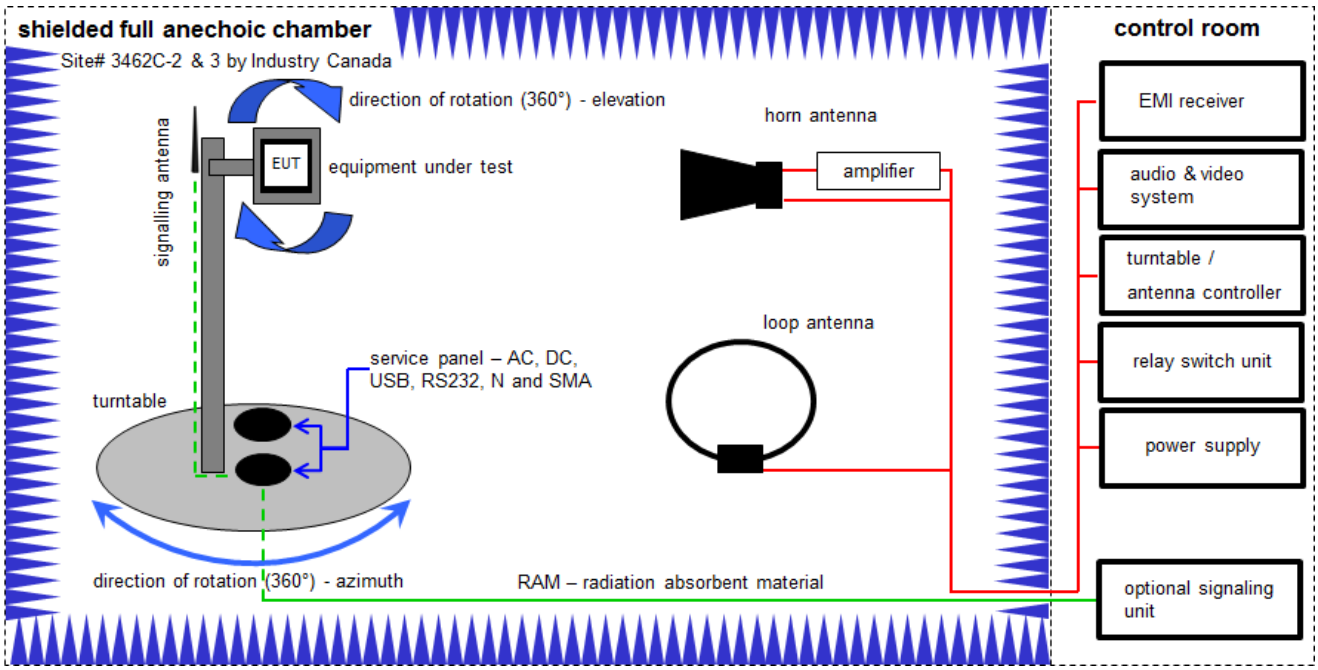
FS = UR + CL + AF
(FS-field strength; UR-voltage at the receiver; CL-loss of the cable; AF-antenna factor)

Example calculation:
FS [dBµV/m] = 12.35 [dBµV/m] + 1.90 [dB] + 16.80 [dB/m] = 31.05 [dBµV/m] (35.69 µV/m)

Equipment table:

No.	Lab / Item	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	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP	2920A04466	300000580	ne	-/-	-/-
3	A	Meßkabine 1	HF-Absorberhalle	MWB AG 300023		300000551	ne	-/-	-/-
4	A	Antenna Tower	Model 2175	ETS-Lindgren	64762	300003745	izw	-/-	-/-
5	A	Positioning Controller	Model 2090	ETS-Lindgren	64672	300003746	izw	-/-	-/-
6	A	Turntable Interface-Box	Model 105637	ETS-Lindgren	44583	300003747	izw	-/-	-/-
7	A	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck Mess - Elektronik	295	300003787	vIKI!	19.02.2019	18.02.2021
8	A	EMI Test Receiver	ESR3	Rohde & Schwarz	102587	300005771	k	21.05.2019	20.11.2020

7.2 Shielded fully anechoic chamber



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

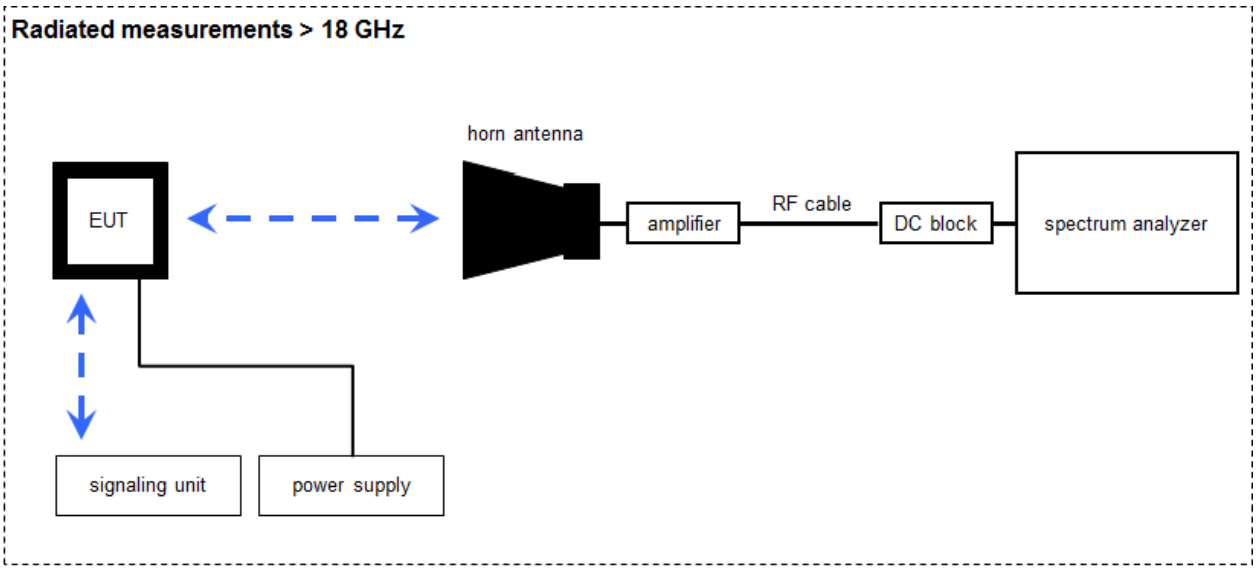
FS = UR + CA + AF
(FS-field strength; UR-voltage at the receiver; CA-loss of the signal path; AF-antenna factor)

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.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP	2818A03450	300001040	vIKI!	12.12.2017	11.12.2020
2	A	Active Loop Antenna 9 kHz to 30 MHz	6502	EMCO	2210	300001015	vIKI!	13.06.2019	12.06.2021
3	A	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev	-/-	-/-
4	A	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	9107-3697	300001605	vIKI!	27.02.2019	26.02.2021
5	A	Switch / Control Unit	3488A	HP	*	300000199	ne	-/-	-/-
6	A	Highpass Filter	WHKX2.9/18G-12SS	Wainwright	1	300003492	ev	-/-	-/-
7	A	EMI Test Receiver 20Hz- 26,5GHz	ESU26	R&S	100037	300003555	k	11.12.2019	10.12.2020
8	A	Highpass Filter	WHK1.1/15G-10SS	Wainwright	3	300003255	ev	-/-	-/-
9	A	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	19	300003790	ne	-/-	-/-
10	A	High Pass Filter	VHF-3500+	Mini Circuits	-/-	400000193	ne	-/-	-/-
11	A	Broadband Amplifier 0.5-18 GHz	CBLU5184540	CERNEX	22049	300004481	ev	-/-	-/-
12	A	4U RF Switch Platform	L4491A	Agilent Technologies	MY50000037	300004509	ne	-/-	-/-
13	A	NEXIO EMV-Software	BAT EMC V3.20.0.13	EMCO		300004682	ne	-/-	-/-
14	A	PC	ExOne	F+W		300004703	ne	-/-	-/-
15	A	RF-Amplifier	AMF-6F06001800-30-10P-R	NARDA-MITEQ Inc	2011572	300005241	ev	-/-	-/-

7.3 Radiated measurements > 18 GHz



Measurement distance: horn antenna 50 cm

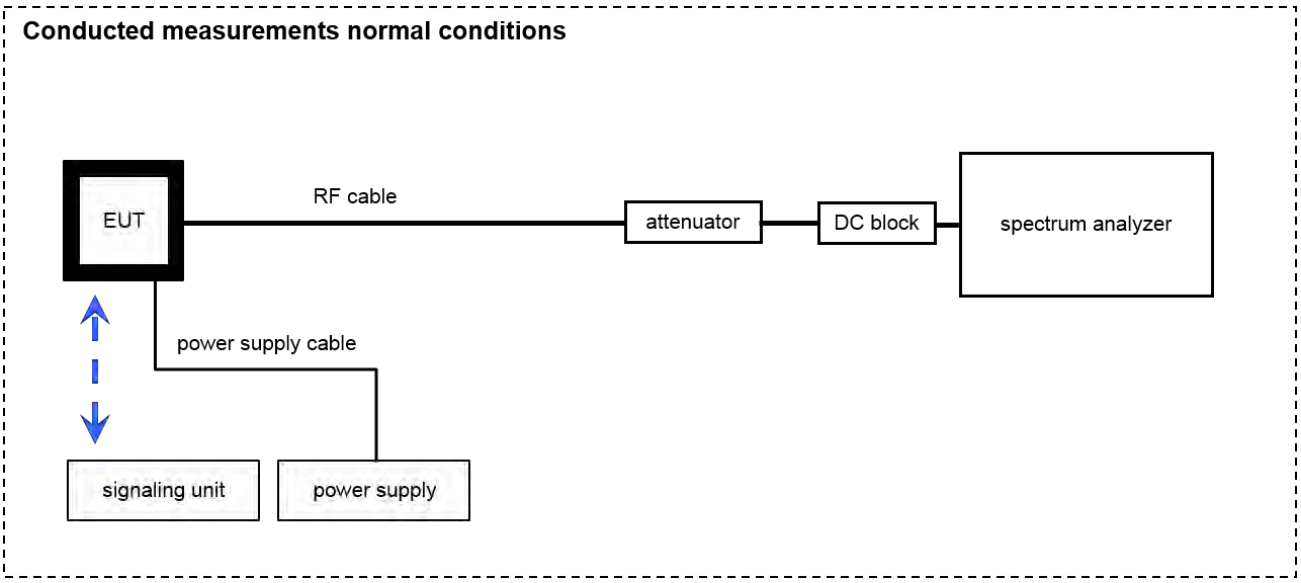
FS = UR + CA + AF
(FS-field strength; UR-voltage at the receiver; CA-loss signal path & distance correction; AF-antenna factor)

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.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Microwave System Amplifier, 0.5-26.5 GHz	83017A	HP	00419	300002268	ev	-/-	-/-
2	A	Std. Gain Horn Antenna 18.0-26.5 GHz	638	Narda	01096	300000486	vIKI!	21.01.2020	20.01.2022
3	A	Std. Gain Horn Antenna 26.5-40.0 GHz	V637	Narda	82-16	300000510	vIKI!	23.01.2020	22.01.2022
4	A	Broadband Low Noise Amplifier 18-50 GHz	CBL18503070-XX	CERNEX	19338	300004273	ev	-/-	-/-
5	A	RF-Cable	ST18/SMAm/SMAm /48	Huber & Suhner	Batch no. 600918	400001182	ev	-/-	-/-
6	A	Signal Analyzer 40 GHz	FSV40	R&S	101042	300004517	k	17.12.2019	16.12.2020

7.4 Conducted measurements



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

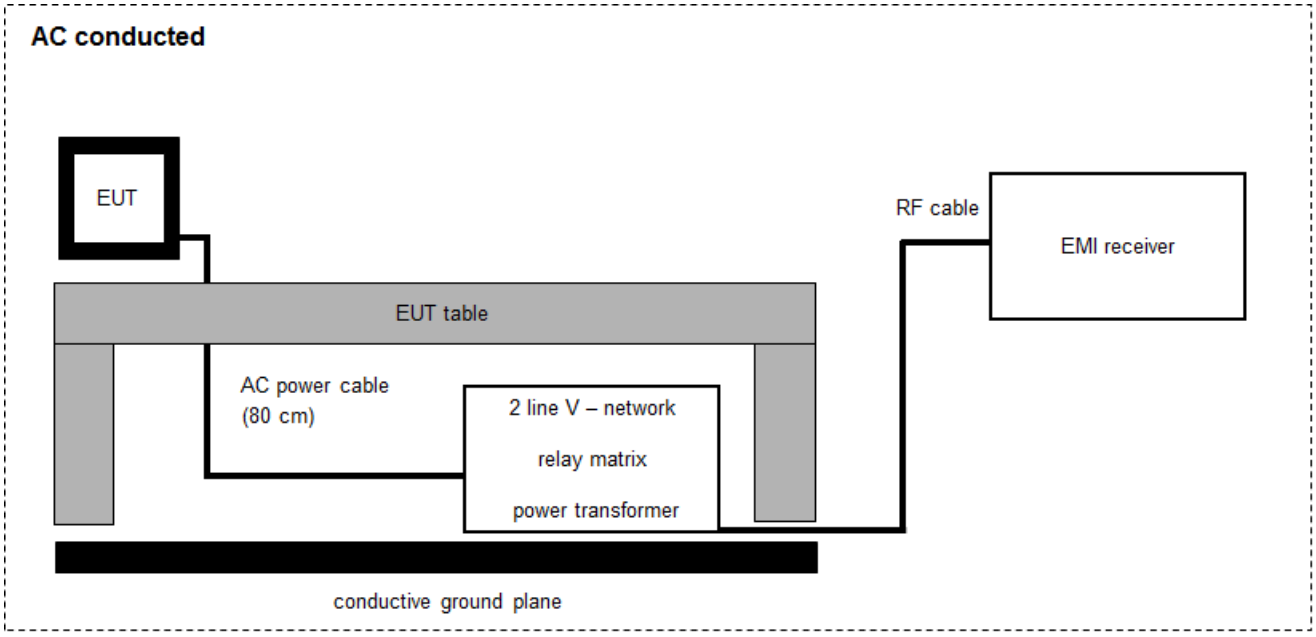
Example calculation:
OP [dBm] = 6.0 [dBm] + 11.7 [dB] = 17.7 [dBm] (58.88 mW)

Equipment table:

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Hygro-Thermometer	-/-, 5-45°C, 20-100%rF	Thies Clima	-/-	400000108	ev	13.08.2020	12.08.2022
2	A[1]	Signal Analyzer 40 GHz	FSV40	R&S	101042	300004517	k	17.12.2019	16.12.2020
3	A	PC Tester R005	Intel Core i3 3220/3,3 GHz, Prozessor		2V2403033A4523	300004589	ne	-/-	-/-
4	A	RF-Cable	ST18/SMAm/SMAm/60	Huber & Suhner	Batch no. 606844	400001181	ev	-/-	-/-
5	A	DC-Blocker 0.1-40 GHz	8141A	Inmet		400001185	ev	-/-	-/-
6	A	Coax Attenuator 10 dB 2W 0-40 GHz	MCL BW-K10-2W44+	Mini Circuits		400001186	ev	-/-	-/-
7	A	DC-Blocker	WA7046	Weinschel Associates		400001310	ev	-/-	-/-
8	A	DC Power Supply	HMP2020	Rohde & Schwarz	102850	300005517	vIKI!	12.12.2019	11.12.2021
9	A	Tester Software RadioStar (C.BER2 for BT Conformance)	Version 1.0.0.X	CTC advanced GmbH	0001	400001380	ne	-/-	-/-
10	B	Signal Analyzer 40 GHz	FSV40	Rohde & Schwarz	101353	300004819	k	12.01.2021	11.01.2022
11	B	Control-PC of OSP	exone Variety	Dell	060931P1302P00109	300004869	ne	-/-	-/-
12	B	RF-Cable WLAN-Tester Port 1	ST18/SMAm/SMAm/36	Huber & Suhner	Batch no. 601494	400001216	g	-/-	-/-
13	B	RF-Cable WLAN-Tester Analyzer	ST18/SMAm/SMAm/36	Huber & Suhner	Batch no. 54876	400001220	ev	-/-	-/-

Note [1]: Lab items (A) used for testing before 2020-11-24. Lab items (B) used for testing between 2021-03-09 to 2021-03-11.

7.5 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.	Lab / Item	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	R&S	892475/017	300002209	vIKI!	11.12.2019	10.12.2021
2	A	RF-Filter-section	85420E	HP	3427A00162	300002214	NK!	-/-	-/-
3	A	EMI Test Receiver	ESCI 3	R&S	100083	300003312	k	10.12.2019	09.12.2020
4	A	Analyzer-Reference-System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	vIKI!	17.01.2020	16.01.2022
5	A	Hochpass 150 kHz	EZ-25	R&S	100010	300003798	ev	-/-	-/-
6	A	PC	TecLine	F+W		300003532	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	± 1.15 dB	
Spectrum bandwidth	± 100 kHz (depends on the used RBW)	
Occupied bandwidth	± 100 kHz (depends on the used RBW)	
Maximum output power	± 1.15 dB conducted ± 3 dB radiated	
Minimum emissions bandwidth	± 100 kHz (depends on the used RBW)	
Band edge compliance radiated	± 3 dB	
Spurious emissions conducted	> 3.6 GHz	± 1.15 dB
	> 7 GHz	± 1.15 dB
	> 18 GHz	± 1.89 dB
	≥ 40 GHz	± 3.12 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 RSS 247, Issue 2	See table	2021-03-19	-/-

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) RSS - 247 (6.2.x.1)	Maximum output power (conducted & radiated)	☒	☐	☐	☐	-/-
§15.407(a) RSS - 247 (6.2.x.1)	Power spectral density	☒	☐	☐	☐	-/-
RSS - 247 (6.2.4.1)	Spectrum bandwidth 6dB bandwidth	☒	☐	☐	☐	-/-
§15.407(a) RSS - 247 (6.2.x.2)	Spectrum bandwidth 26dB bandwidth	☒	☐	☐	☐	-/-
RSS Gen clause 6.6	Spectrum bandwidth 99% bandwidth	-/-				-/-
§15.205 RSS - 247 (6.2.x.2)	Band edge compliance radiated	☒	☐	☐	☐	-/-
§15.407(b) RSS - 247 (6.2.x.2)	TX spurious emissions radiated	☒	☐	☐	☐	-/-
§15.109 RSS-Gen	RX spurious emissions radiated	☒	☐	☐	☐	-/-
§15.209(a) RSS-Gen	Spurious emissions radiated < 30 MHz	☒	☐	☐	☐	-/-
§15.107(a) §15.207	Spurious emissions conducted emissions< 30 MHz	☒	☐	☐	☐	-/-
§15.407 RSS - 247 (6.3)	DFS	-/-				See report 1-0397/20-02-15

Notes:

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

11 Additional comments

Reference documents:

Result files:
1-0397/20-02-14_log1_conducted.pdf (a-mode),
1-0397/20-02-14_log2_conducted.pdf (nHT20-mode),
1-0397/20-02-14_log3_conducted.pdf (nHT40-mode),
1-0397/20-02-14_log4_conducted.pdf (acVHT80-mode),
1-0397/20-02-14_log5_conducted.pdf (Overlapped channels),
DFS report: 1-0397/20-02-15

Antenna specifications:
ant-db1-raf-ccc.pdf,
AVX-E_1001932PT.pdf
FXP830.07.0100C.pdf,
FXP831.07.0100C.pdf,
GW.48.A151.pdf,
An_PCB_2400-5000_ANTX100P001B24553_v0.pdf

Customer Questionnaire,
CC8X_RF_Certification_Testing_Guide.pdf (2020-07-22)

Special test descriptions:

The antenna with the highest antenna gain (TAOGLAS FXP831.07.0100C) was considered for conducted measurements when referencing to an e.i.r.p. limit.

Conducted tests have been performed on overlapping channels (U-NII-2C/3) in addition to those channels next to the band edge at 5725MHz.

Radiated measurements:

For each type of antenna (PCB & Dipole) the
antenna with the highest gain was tested.
Dipole antenna: Linx Technologies Inc. ANT-DB1-RAF-RPS: 4.6dBi
PCB antenna: TAOGLAS FXP831.07.0100C: 5.5dBi

Configuration descriptions:

Test modes were enabled using test software qdart_conn_qrct.win from Qualcomm. Power settings and worst case modulations used for testing were defined by the manufacturer.

Settings used for measurements:

Test mode:	Data rate:	Power setting
a-mode (SISO)	6 Mbit/s	10
nHT20-mode (SISO)	MCS0	10
nHT40-mode (SISO)	MCS0	4
ac80-mode (SISO)	MCS0	2

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.

EUT selection:

☐ Only one device available

☐ Devices selected by the customer

☒ Devices selected by the laboratory (Randomly)

Provided channels:

Channels with 20 MHz channel bandwidth:

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**

U-NII-2C (5470 MHz to 5725 MHz) channel number & center frequency												
channel	**100**	104	108	112	116	**120**	124	128	132	136	**140**	**144***
f_c / MHz	**5500**	5520	5540	5560	5580	**5600**	5620	5640	5660	5680	**5700**	**5720**

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**

* Overlapped channel

Channels with 40 MHz channel bandwidth:

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**

U-NII-2C (5470 MHz to 5725 MHz) channel number & center frequency						
channel	**102**	110	**118**	126	**134**	**142***
f_c / MHz	**5510**	5550	**5590**	5630	**5670**	**5710**

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

Note: The channels used for the tests were marked in bold in the list.

* Overlapped channel

Channels with 80 MHz channel bandwidth:

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**

U-NII-2C (5470 MHz to 5725 MHz) channel number & center frequency			
channel	**106**	**122**	**138***
f_c / MHz	**5530**	**5610**	**5690**

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

Note: The channels used for the tests were marked in bold in the list.

* Overlapped channel

12 Measurement results

12.1 Identify worst case data rate

Note: Worst case data rate or modulation scheme declared by the manufacturer

OFDM – mode	Modulation scheme / bandwidth					
	U-NII-1 & U-NII-2A		U-NII-2C		U-NII-3	
	lowest channel	highest channel	lowest channel	highest channel	lowest channel	highest channel
a – mode	6Mbit/s	6Mbit/s	6Mbit/s	6Mbit/s	6Mbit/s	6Mbit/s
n/ac HT20 – mode	MCS0	MCS0	MCS0	MCS0	MCS0	MCS0
n/ac HT40 – mode	MCS0	MCS0	MCS0	MCS0	MCS0	MCS0
ac HT80 – mode	MCS0	MCS0	MCS0	MCS0	MCS0	MCS0

12.2 Antenna gain

The maximum antenna gain is declared by the manufacturer (see section 6 & 11).

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)	1-0397/20-02-14_log1_conducted.pdf, 1-0397/20-02-14_log2_conducted.pdf, 1-0397/20-02-14_log3_conducted.pdf, 1-0397/20-02-14_log4_conducted.pdf, FCC Part 15.407 Max Output Power and PSD
Used test setup:	See chapter 7.4 – A
Measurement uncertainty:	See chapter 9

Results:

Duty cycle and correction factor:

OFDM – mode	Calculation method	
	Duty cycle	Correction factor
a – mode	94.7 %	0.2 dB
n/ac HT20 – mode	91.6 %	0.3 dB
n/ac HT40 – mode	83.7 %	0.8 dB
ac HT80 – mode	70.2 %	1.5 dB

Note: The duty cycle has been measured for each tested channel separately (refer to external result files). The above stated values are results for the lowest channel tested.

12.4 Maximum output power

12.4.1 Maximum output power according to FCC requirements

Description:

Measurement of the maximum output power conducted

For the overlapped channels between U-NII-2C and U-NII-3, and according to FCC KDB 789033 D02 , the power is computed based on the portion of the emission bandwidth contained within that band. This rule is only applicable for those channels marked as overlapped.

Measurement:

Measurement parameter	
According to: KDB789033 D02, E.2.e.	
External result file(s)	1-0397/20-02-14_log1_conducted.pdf, 1-0397/20-02-14_log2_conducted.pdf, 1-0397/20-02-14_log3_conducted.pdf, 1-0397/20-02-14_log4_conducted.pdf, 1-0397/20-02-14_log5_conducted.pdf, FCC Part 15.407 Max Output Power and PSD
Used test setup:	See chapter 7.4 – B
Measurement uncertainty:	See chapter 9

Limits:

Radiated output power	Conducted output power for mobile equipment
Conducted power + 6 dBi antenna gain	250mW 5.150-5.250 GHz The lesser one of 250mW or 11 dBm + 10 log Bandwidth 5.250-5.350 GHz 250mW or 11 dBm + 10 log Bandwidth 5.470-5.725 GHz (where Bandwidth is the 26dB Bandwidth [MHz]) 1W 5.725-5.85 GHz

Results:

a	Maximum output power conducted [dBm]		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	13.9	13.8	13.1
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	12.8	13.0	12.1
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	12.3	12.2	14.0
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	13.8	13.1	13.8
	Overlapped channel/s		
	U-NII-2C (5720 MHz)	U-NII-3 (5720 MHz)	
	13.3	5.9	

Results:

n/ac HT20	Maximum output power conducted [dBm]		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	13.5	13.4	12.8
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	12.5	12.7	11.7
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	12.0	12.0	13.8
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	13.6	13.0	12.8
	Overlapped channel/s		
	U-NII-2C (5720 MHz)	U-NII-3 (5720 MHz)	
	13.0	6.0	

Results:

n/ac HT40	Maximum output power conducted [dBm]		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel		Highest channel
	8.3		8.3
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel		Highest channel
	7.3		7.3
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	7.1	7.6	8.1
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel		Highest channel
	7.9		8.1
	Overlapped channel/s		
	U-NII-2C (5710 MHz)		U-NII-3 (5710 MHz)
	7.7		-4.9

Results:

ac VHT80	Maximum output power conducted [dBm]	
	U-NII-1 (5150 MHz to 5250 MHz)	
	Middle channel	
	6.6	
	U-NII-2A (5250 MHz to 5350 MHz)	
	Middle channel	
	7.5	
	U-NII-2C (5470 MHz to 5725 MHz)	
	Lowest channel	Highest channel
	6.4	5.4
	U-NII-3 (5725 MHz to 5850 MHz)	
	Middle channel	
	5.4	
	Overlapped channel/s	
	U-NII-2C (5690 MHz)	U-NII-3 (5690 MHz)
	5.8	-11.3

12.4.2 Maximum output power according to IC requirements

Description:

Measurement of the maximum output power conduced + radiated

For the overlapped channels between U-NII-2C and U-NII-3, and according to RSS-247 Section 6, the power is computed based on the portion of the emission bandwidth contained within that band. This rule is only applicable for those channels marked as overlapped.

Measurement:

Measurement parameter	
External result file(s)	1-0397/20-02-14_log1_conducted.pdf, 1-0397/20-02-14_log2_conducted.pdf, 1-0397/20-02-14_log3_conducted.pdf, 1-0397/20-02-14_log4_conducted.pdf, 1-0397/20-02-14_log5_conducted.pdf, ISED Max Output Power and PSD
Used test setup:	See chapter 7.4 – A
Measurement uncertainty:	See chapter 9

Limits:

Radiated output power	Conducted output power for mobile equipment
The lesser one of 200 mW or 10 dBm + 10 log Bandwidth 5.150-5.250 GHz 1 W or 17 dBm + 10 log Bandwidth 5.250-5.350 GHz 1 W or 17 dBm + 10 log Bandwidth 5.470-5.725 GHz (where Bandwidth is the 99% Bandwidth [MHz]) Conducted power + 6dBi antenna gain 5.725-5.825 GHz	The lesser one of 250mW or 11 dBm + 10 log Bandwidth 5.250-5.350 GHz 250mW or 11 dBm + 10 log Bandwidth 5.470-5.725 GHz (where Bandwidth is the 99% Bandwidth [MHz]) 1W 5.725-5.825 GHz

Results:

a	Maximum output power [dBm]		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	Conducted		
	13.8	13.7	13.1
	Radiated (calculated – see chapter antenna gain)		
	19.3	19.2	18.6
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	Conducted		
	12.2	12.9	12.0
	Radiated (calculated – see chapter antenna gain)		
	17.7	18.4	17.5
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	Conducted		
	12.2	12.2	13.9
	Radiated (calculated – see chapter antenna gain)		
	17.7	17.7	19.4
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	Conducted		
	13.7	13.2	13.0
	Radiated (calculated – see chapter antenna gain)		
	19.2	18.7	18.5
	Overlapped channel/s		
	Conducted		
	U-NII-2C (5720 MHz)	U-NII-3 (5720 MHz)	
	13.25	5.7	
	Radiated (calculated – see chapter antenna gain)		
	18.75	11.2	

Results:

n/ac HT20	Maximum output power [dBm]		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	Conducted		
	13.4	13.3	12.8
	Radiated (calculated – see chapter antenna gain)		
	18.9	18.8	18.3
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	Conducted		
	12.6	12.6	11.8
	Radiated (calculated – see chapter antenna gain)		
	18.1	18.1	17.3
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	Conducted		
	11.9	11.9	13.7
	Radiated (calculated – see chapter antenna gain)		
	17.4	17.4	19.2
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	Conducted		
	13.5	12.9	12.8
	Radiated (calculated – see chapter antenna gain)		
	19.0	18.4	18.3
	Overlapped channel/s		
	Conducted		
	U-NII-2C (5720 MHz)	U-NII-3 (5720 MHz)	
	13.0	5.8	
	Radiated (calculated – see chapter antenna gain)		
	18.5	11.3	

Results:

n/ac HT40	Maximum output power [dBm]		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel		Highest channel
	Conducted		
	8.3		8.2
	Radiated (calculated – see chapter antenna gain)		
	13.8		13.7
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel		Highest channel
	Conducted		
	7.3		7.3
	Radiated (calculated – see chapter antenna gain)		
	12.8		12.8
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	Conducted		
	7.0	7.5	8.0
	Radiated (calculated – see chapter antenna gain)		
	12.5	13.0	13.5
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel		Highest channel
	Conducted		
	7.9		8.1
	Radiated (calculated – see chapter antenna gain)		
	13.4		13.6
	Overlapped channel/s		
	Conducted		
	U-NII-2C (5710 MHz)		U-NII-3 (5710 MHz)
	7.6		-5.4
	Radiated (calculated – see chapter antenna gain)		
	13.1		0.1

Results:

ac VHT80	Maximum output power [dBm]	
	U-NII-1 (5150 MHz to 5250 MHz)	
	Middle channel	
	Conducted	
	6.6	
	Radiated (calculated – see chapter antenna gain)	
	12.1	
	U-NII-2A (5250 MHz to 5350 MHz)	
	Middle channel	
	Conducted	
	5.6	
	Radiated (calculated – see chapter antenna gain)	
	11.1	
	U-NII-2C (5470 MHz to 5725 MHz)	
	Lowest channel	Highest channel
	Conducted	
	4.2	5.4
	Radiated (calculated – see chapter antenna gain)	
	9.7	10.9
	U-NII-3 (5725 MHz to 5850 MHz)	
	Middle channel	
	Conducted	
	5.3	
	Radiated (calculated – see chapter antenna gain)	
	10.8	
	Overlapped channel/s	
	Conducted	
	U-NII-2C (5690 MHz)	U-NII-3 (5690 MHz)
	5.8	-12.5
	Radiated (calculated – see chapter antenna gain)	
	11.3	-7.0

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.

For the overlapped channels between U-NII-2C and U-NII-3, and according to FCC KDB 789033 D02 , the power is computed based on the portion of the emission bandwidth contained within that band. This rule is only applicable for those channels marked as overlapped.

Measurement:

Measurement parameter	
According to: KDB789033 D02, F.	
External result file(s)	1-0397/20-02-14_log1_conducted.pdf, 1-0397/20-02-14_log2_conducted.pdf, 1-0397/20-02-14_log3_conducted.pdf, 1-0397/20-02-14_log4_conducted.pdf, 1-0397/20-02-14_log5_conducted.pdf, FCC Part 15.407 Max Output Power and PSD
Used test setup:	See chapter 7.4 – A
Measurement uncertainty:	See chapter 9

Limits:

Power Spectral Density
power spectral density conducted ≤ 11 dBm in any 1 MHz band (band 5150 – 5250 MHz) power spectral density conducted ≤ 11 dBm in any 1 MHz band (band 5250 – 5350 MHz) power spectral density conducted ≤ 11 dBm in any 1 MHz band (band 5470 – 5725 MHz) power spectral density conducted ≤ 30 dBm in any 500 kHz band (band 5725 – 5850 MHz)

Results:

a	Power spectral density (dBm/1MHz or dBm/500kHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	2.9	2.7	2.1
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	1.7	1.9	1.0
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	1.3	1.1	3.0
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	-0.3	-0.8	-1.1
	Overlapped channel/s		
	U-NII-2C (5720 MHz)	U-NII-3 (5720 MHz)	
	2.9	-1.0	

Results:

n/ac HT20	Power spectral density (dBm/1MHz or dBm/500kHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	2.3	2.1	1.6
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	1.2	1.5	0.5
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	0.8	0.8	2.5
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	-0.6	-1.2	-1.4
	Overlapped channel/s		
	U-NII-2C (5720 MHz)	U-NII-3 (5720 MHz)	
	2.6	-1.3	

Results:

n/ac HT40	Power spectral density (dBm/1MHz or dBm/500kHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel		Highest channel
	-6.2		-5.9
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel		Highest channel
	-6.9		-7.1
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	-7.3	-6.8	-6.3
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel		Highest channel
	-9.5		-9.1
	Overlapped channel/s		
	U-NII-2C (5710 MHz)		U-NII-3 (5710 MHz)
	-6.5		-11.7

Results:

ac VHT80	Power spectral density (dBm/1MHz or dBm/500kHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Middle channel		
	-10.4		
	U-NII-2A (5250 MHz to 5350 MHz)		
	Middle channel		
	-9.9		
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel		Highest channel
	-11.5		-12.0
	U-NII-3 (5725 MHz to 5850 MHz)		
	Middle channel		
	-14.9		
	Overlapped channel/s		
	U-NII-2C (5690 MHz)		U-NII-3 (5690 MHz)
	-11.6		-18.4

12.5.2 Power spectral density according to IC requirements

Description:

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

For the overlapped channels between U-NII-2C and U-NII-3, and according to RSS-247 Section 6, the power is computed based on the portion of the emission bandwidth contained within that band. This rule is only applicable for those channels marked as overlapped.

Measurement:

Measurement parameter	
External result file(s)	1-0397/20-02-14_log1_conducted.pdf, 1-0397/20-02-14_log2_conducted.pdf, 1-0397/20-02-14_log3_conducted.pdf, 1-0397/20-02-14_log4_conducted.pdf, 1-0397/20-02-14_log5_conducted.pdf, ISED Max Output Power and PSD
Used test setup:	See chapter 7.4 – A
Measurement uncertainty:	See chapter 9

Limits:

Power Spectral Density
power spectral density e.i.r.p. ≤ 10 dBm in any 1 MHz band (band 5150 – 5250 MHz) power spectral density conducted ≤ 11 dBm in any 1 MHz band (band 5250 – 5350 MHz) power spectral density conducted ≤ 11 dBm in any 1 MHz band (band 5470 – 5725 MHz) power spectral density conducted ≤ 30 dBm in any 500 kHz band (band 5725 – 5850 MHz)

Results:

a	Power spectral density (dBm/1MHz or dBm/500kHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	Conducted		
	2.9	2.6	2.1
	Radiated (calculated – see chapter antenna gain)		
	8.4	8.1	7.6
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	1.2	1.9	1.0
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	1.3	1.2	2.9
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	-0.3	-0.8	-1.0
	Overlapped channel/s		
	U-NII-2C (5720 MHz)	U-NII-3 (5720 MHz)	
	3.0	-1.0	

Results:

n/ac HT20	Power spectral density (dBm/1MHz or dBm/500kHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	Conducted		
	2.3	2.1	1.7
	Radiated (calculated – see chapter antenna gain)		
	7.8	7.6	7.2
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	1.4	1.5	0.6
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	0.8	0.8	2.5
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	-0.6	-1.2	-1.4
	Overlapped channel/s		
	U-NII-2C (5720 MHz)	U-NII-3 (5720 MHz)	
	2.6	-1.4	

Results:

n/ac HT40	Power spectral density (dBm/1MHz or dBm/500kHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Highest channel	
	Conducted		
	-6.2	-5.9	
	Radiated (calculated – see chapter antenna gain)		
	-0.7	-0.4	
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Highest channel	
	-6.9	-7.1	
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	-7.3	-6.8	-6.3
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Highest channel	
	-9.5	-9.2	
	Overlapped channel/s		
	U-NII-2C (5710 MHz)	U-NII-3 (5710 MHz)	
	-6.5	-11.7	

Results:

ac VHT80	Power spectral density (dBm/1MHz or dBm/500kHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Middle channel		
	Conducted		
	-10.5		
	Radiated (calculated – see chapter antenna gain)		
	-5.0		
	U-NII-2A (5250 MHz to 5350 MHz)		
	Middle channel		
	-11.8		
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Highest channel	
	-13.6	-12.0	
	U-NII-3 (5725 MHz to 5850 MHz)		
	Middle channel		
	-14.9		
	Overlapped channel/s		
	U-NII-2C (5690 MHz)	U-NII-3 (5690 MHz)	
	-11.6	-18.4	

12.6 Minimum emission bandwidth for the band 5.725-5.85 GHz

Description: Measurement of the 6 dB bandwidth of the modulated signal.

For the overlapped channels between U-NII-2C and U-NII-3, and according to RSS-247 Section 6, only the portion of the emission bandwidth contained within that band is considered.

Measurement:

Measurement parameter	
According to: KDB789033 D02, C.2.	
External result file(s)	1-0397/20-02-14_log1_conducted.pdf, 1-0397/20-02-14_log2_conducted.pdf, 1-0397/20-02-14_log3_conducted.pdf, 1-0397/20-02-14_log4_conducted.pdf, 1-0397/20-02-14_log5_conducted.pdf, FCC Part 15.407 & ISED Minimum Emission BW
Used test setup:	See chapter 7.5 – A
Measurement uncertainty:	See chapter 9

Limits:

FCC	IC
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
	15.4	15.4	15.1
	Overlapped channel U-NII-2C to U-NII-3 (5720 MHz)		
	2.8		

Results:

n/ac HT20	6 dB emission bandwidth (MHz)		
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	15.1	15.2	15.2
	Overlapped channel U-NII-2C to U-NII-3 (5720 MHz)		
	2.6		

Results:

n/ac HT40	6 dB emission bandwidth (MHz)	
	U-NII-3 (5725 MHz to 5850 MHz)	
	Lowest channel	Highest channel
	35.1	35.1
	Overlapped channel U-NII-2C to U-NII-3 (5710 MHz)	
	2.5	

Results:

ac VHT80	6 dB emission bandwidth (MHz)
	U-NII-3 (5725 MHz to 5850 MHz)
	Middle channel
	75.2
	Overlapped channel U-NII-2C to U-NII-3 (5690 MHz)
	2.6

12.7 Spectrum bandwidth / 26 dB bandwidth

Description:

Measurement of the 26 dB bandwidth of the modulated signal.

For the overlapped channels between U-NII-2C and U-NII-3 bands, and according to FCC KDB 789033 D02 , the boundary frequency between the bands is used as one edge for defining the portion of the 26dB bandwidth that falls within a particular U-NII band. This rule is only applicable for the 26dB bandwidth and for those channels marked as overlapped.

Measurement:

Measurement parameter	
According to: KDB789033 D02, C.1.	
External result file(s)	1-0397/20-02-14_log1_conducted.pdf, 1-0397/20-02-14_log2_conducted.pdf, 1-0397/20-02-14_log3_conducted.pdf, 1-0397/20-02-14_log4_conducted.pdf, 1-0397/20-02-14_log5_conducted.pdf, FCC Part 15.407 & ISED Bandwidths
Used test setup:	see chapter 7.4 – 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	26 dB bandwidth (MHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	20.7	20.8	20.2
	Lowest frequency		Highest frequency
	5169.65		5250.40*
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	20.0	19.7	19.7
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	19.6	20.3	20.8
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	22.1	20.3	19.4
	Lowest frequency		Highest frequency
	5733.30		5834.60
	Overlapped channel/s		
	U-NII-2C (5720 MHz)		U-NII-3 (5720 MHz)
	14.8		4.8

* As per KDB 789033 D02 v02r01 the 99% bandwidth can be used in lieu of the 26dB bandwidth. The highest frequency measured with 99% measurement function is 5248.2 MHz and falls completely within the U-NII-1 band.

Results:

n/ac HT20	26 dB bandwidth (MHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	20.8	21.5	20.8
	Lowest frequency		Highest frequency
	5169.75		5250.40*
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	20.4	20.0	20.9
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	20.4	20.9	22.1
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	25.4	20.2	20.7
	Lowest frequency		Highest frequency
	5730.50		5835.25
	Overlapped channel/s		
	U-NII-2C (5720 MHz)		U-NII-3 (5720 MHz)
	15.2		5.2

* As per KDB 789033 D02 v02r01 the 99% bandwidth can be used in lieu of the 26dB bandwidth. The highest frequency measured with 99% measurement function is 5248.7 MHz and falls completely within the U-NII-1 band.

Results:

n/ac HT40	26 dB bandwidth (MHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel		Highest channel
	45.4		41.9
	Lowest frequency		Highest frequency
	5167.20		5250.50*
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel		Highest channel
	43.0		43.3
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	44.4	45.0	41.6
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel		Highest channel
	44.1		50.7
	Lowest frequency		Highest frequency
	5734.00		5817.70
	Overlapped channel/s		
	U-NII-2C (5710 MHz)		U-NII-3 (5710 MHz)
	38.4		7.5

* As per KDB 789033 D02 v02r01 the 99% bandwidth can be used in lieu of the 26dB bandwidth. The highest frequency measured with 99% measurement function is 5247.9 MHz and falls completely within the U-NII-1 band.

Results:

ac VHT80	26 dB bandwidth (MHz)	
	U-NII-1 (5150 MHz to 5250 MHz)	
	Middle channel	
	82.6	
	Lowest frequency	Highest frequency
	5168.40	5251.00*
	U-NII-2A (5250 MHz to 5350 MHz)	
	Middle channel	
	81.6	
	U-NII-2C (5470 MHz to 5725 MHz)	
	Lowest channel	Highest channel
	84.2	81.4
	U-NII-3 (5725 MHz to 5850 MHz)	
	Middle channel	
	81.4	
	Lowest frequency	Highest frequency
	5734.20	5815.60
	Overlapped channel/s	
	U-NII-2C (5690 MHz)	U-NII-3 (5690 MHz)
	76.6	5.9

* As per KDB 789033 D02 v02r01 the 99% bandwidth can be used in lieu of the 26dB bandwidth. The highest frequency measured with 99% measurement function is 5247.4 MHz and falls completely within the U-NII-1 band.

12.8 Occupied bandwidth / 99% emission bandwidth

Description:

Measurement of the 99% bandwidth of the modulated signal acc. RSS-GEN.

For the overlapped channels between U-NII-2C and U-NII-3 bands, and according to RSS-247 Section 6, the boundary frequency between the bands is used as one edge for defining the portion of the 99% bandwidth that falls within a particular U-NII band. This rule is only applicable for the 99% bandwidth and for those channels marked as overlapped.

Measurement:

Measurement parameter	
External result file(s)	1-0397/20-02-14_log1_conducted.pdf, 1-0397/20-02-14_log2_conducted.pdf, 1-0397/20-02-14_log3_conducted.pdf, 1-0397/20-02-14_log4_conducted.pdf, 1-0397/20-02-14_log5_conducted.pdf, FCC Part 15.407 & ISED Bandwidths
Test setup:	See sub clause 7.5 – B
Measurement uncertainty:	See chapter 9

Usage:

-/-	IC
OBW is necessary for Emission Designator	

Results:

a	99% bandwidth (kHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	16434	16384	16384
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	16384	16334	16334
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	16334	16384	16384
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	16484	16384	16384
	Overlapped channel/s		
	U-NII-2C (5720 MHz)	U-NII-3 (5720 MHz)	
	13192	3152	

Results:

n/ac HT20	99% bandwidth (kHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Middle channel	Highest channel
	17483	17483	17483
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Middle channel	Highest channel
	17483	17433	17433
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	17433	17483	17483
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Middle channel	Highest channel
	17532	17433	17483
	Overlapped channel/s		
	U-NII-2C (5720 MHz)	U-NII-3 (5720 MHz)	
	13751	3671	

Results:

n/ac HT40	99% bandwidth (kHz)		
	U-NII-1 (5150 MHz to 5250 MHz)		
	Lowest channel	Highest channel	
	36124	35964	
	U-NII-2A (5250 MHz to 5350 MHz)		
	Lowest channel	Highest channel	
	35804	35964	
	U-NII-2C (5470 MHz to 5725 MHz)		
	Lowest channel	Middle channel	Highest channel
	35964	35964	35964
	U-NII-3 (5725 MHz to 5850 MHz)		
	Lowest channel	Highest channel	
	35964	35964	
	Overlapped channel/s		
	U-NII-2C (5710 MHz)	U-NII-3 (5710 MHz)	
	32982	2902	

Results:

ac VHT80	99% bandwidth (kHz)	
	U-NII-1 (5150 MHz to 5250 MHz)	
	Middle channel	
	74925	
	U-NII-2A (5250 MHz to 5350 MHz)	
	Middle channel	
	74725	
	U-NII-2C (5470 MHz to 5725 MHz)	
	Lowest channel	Highest channel
	75125	74925
	U-NII-3 (5725 MHz to 5850 MHz)	
	Middle channel	
	74925	
	Overlapped channel/s	
	U-NII-2C (5690 MHz)	U-NII-3 (5690 MHz)
	72562	2403

12.9 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:

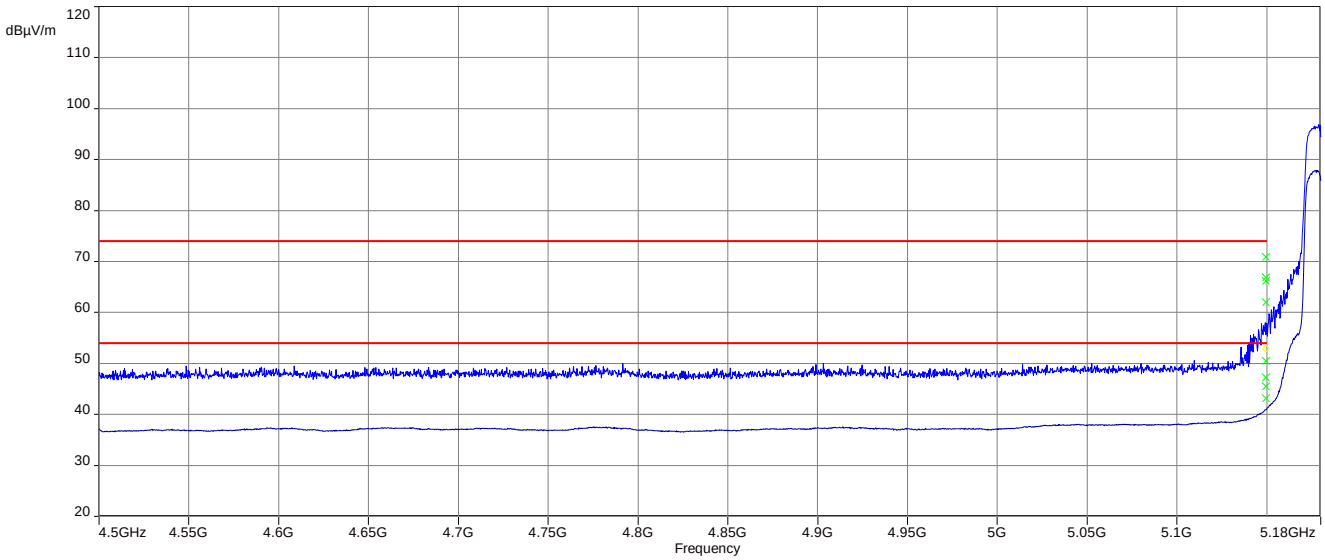
Band Edge Compliance Radiated
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within 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)

Result:

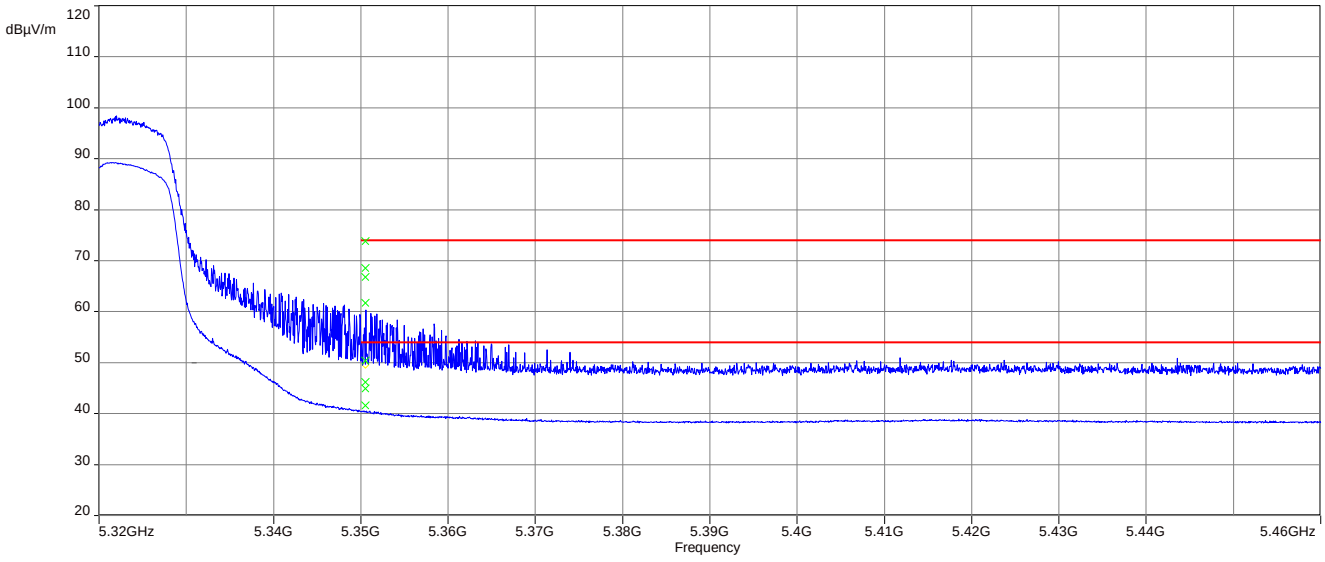
Scenario	Band Edge Compliance Radiated [dBµV/m]
band edge	< 74 dBµV/m (peak) < 54 dBµV/m (average)

Plots: (TAOGLAS FXP831.07.0100C)

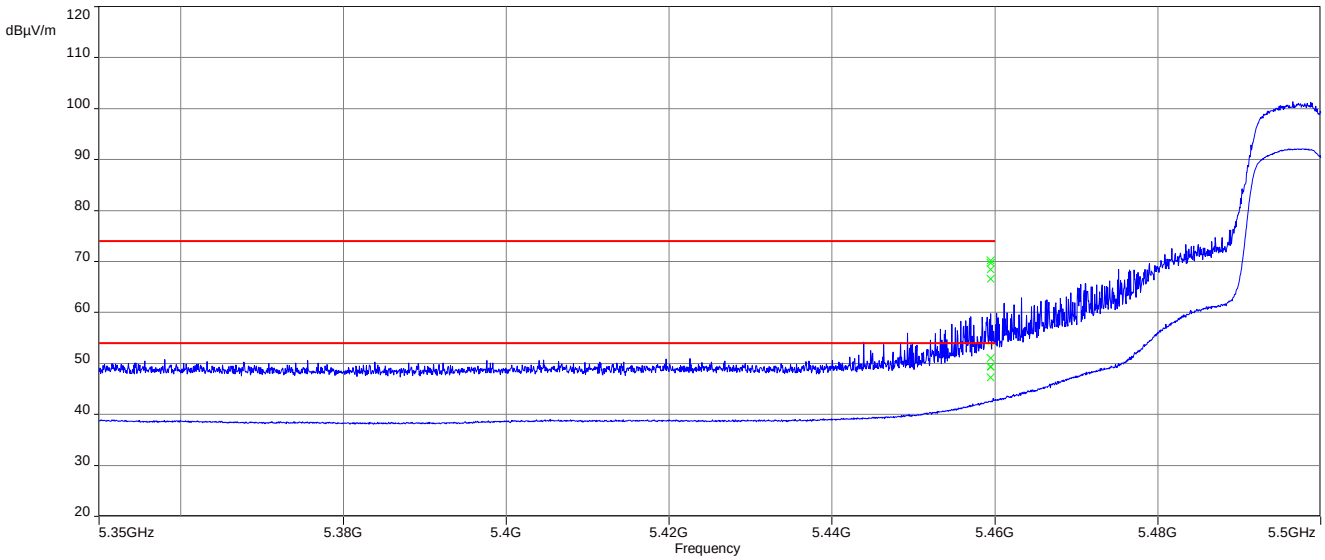
Plot 1: lower band edge; U-NII-1; lowest channel; 20 MHz channel bandwidth a-mode



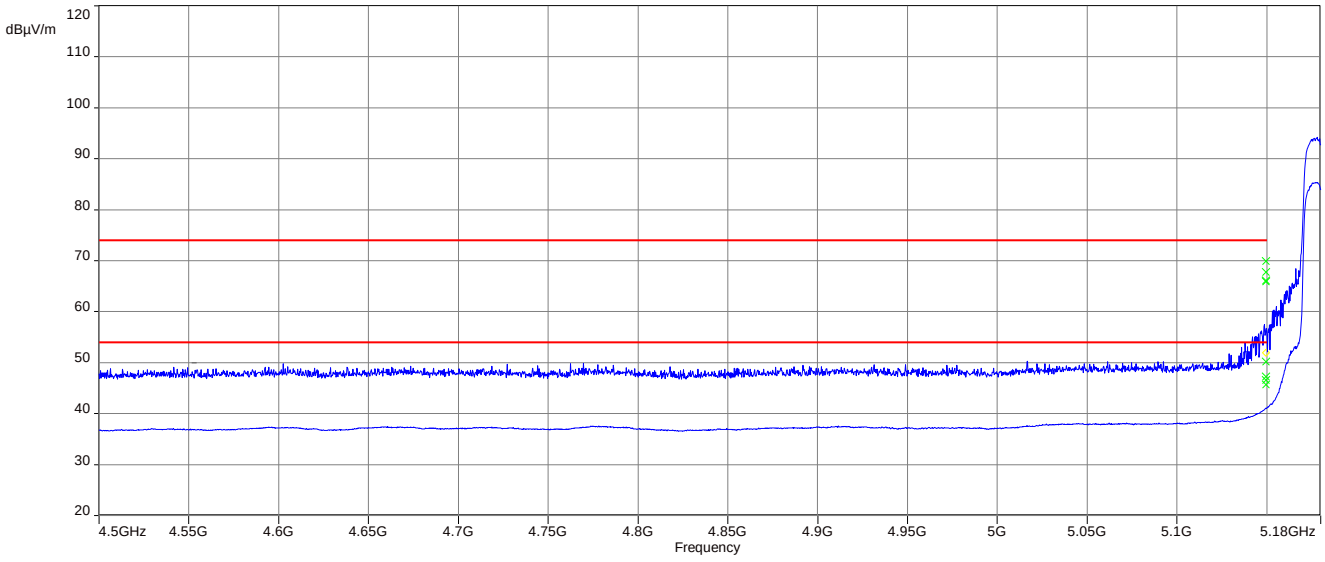
Plot 2: upper band edge; U-NII-2A; highest channel; 20 MHz channel bandwidth a-mode



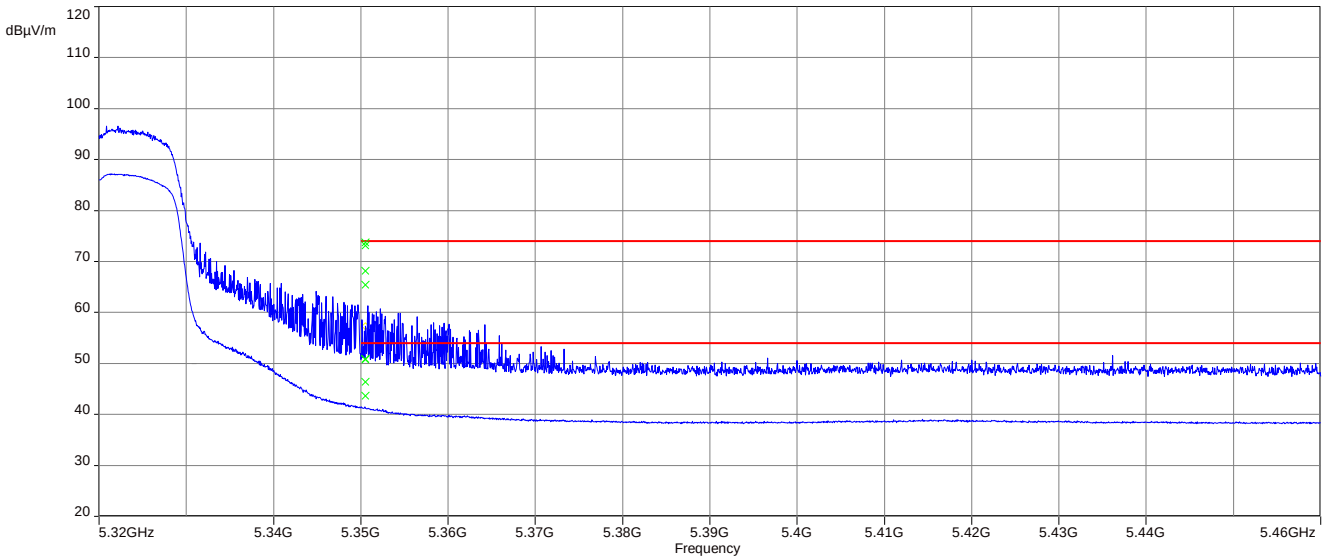
Plot 3: lower band edge; U-NII-2C; lowest channel; 20 MHz channel bandwidth a-mode



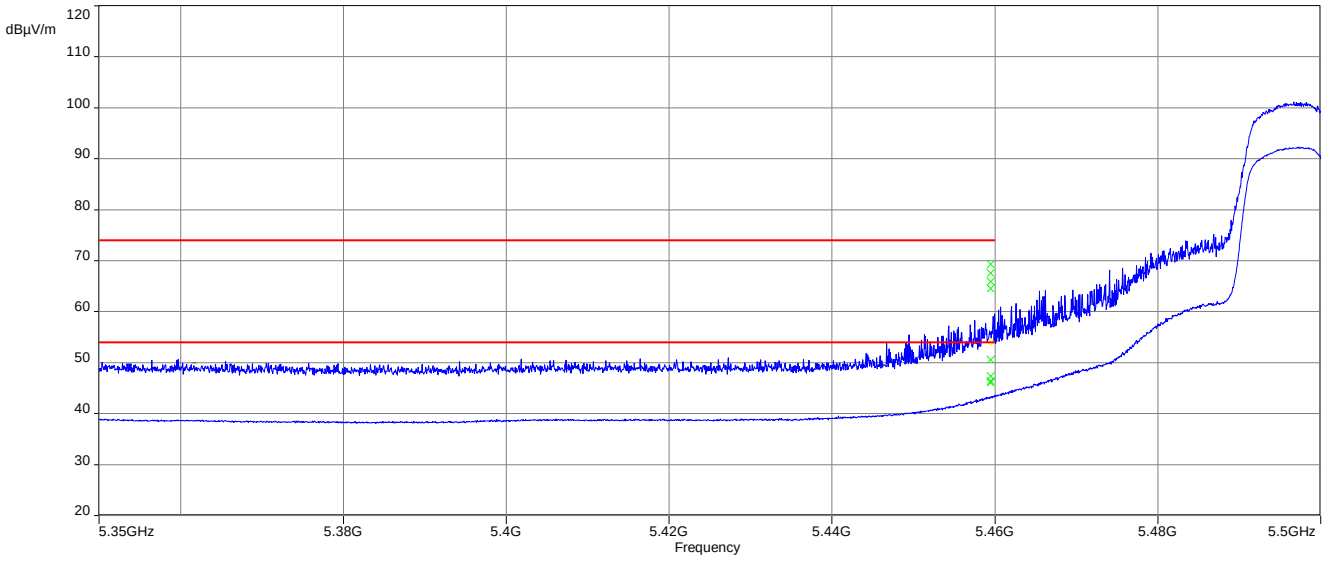
Plot 4: lower band edge; U-NII-1; lowest channel; 20 MHz channel bandwidth n20-mode



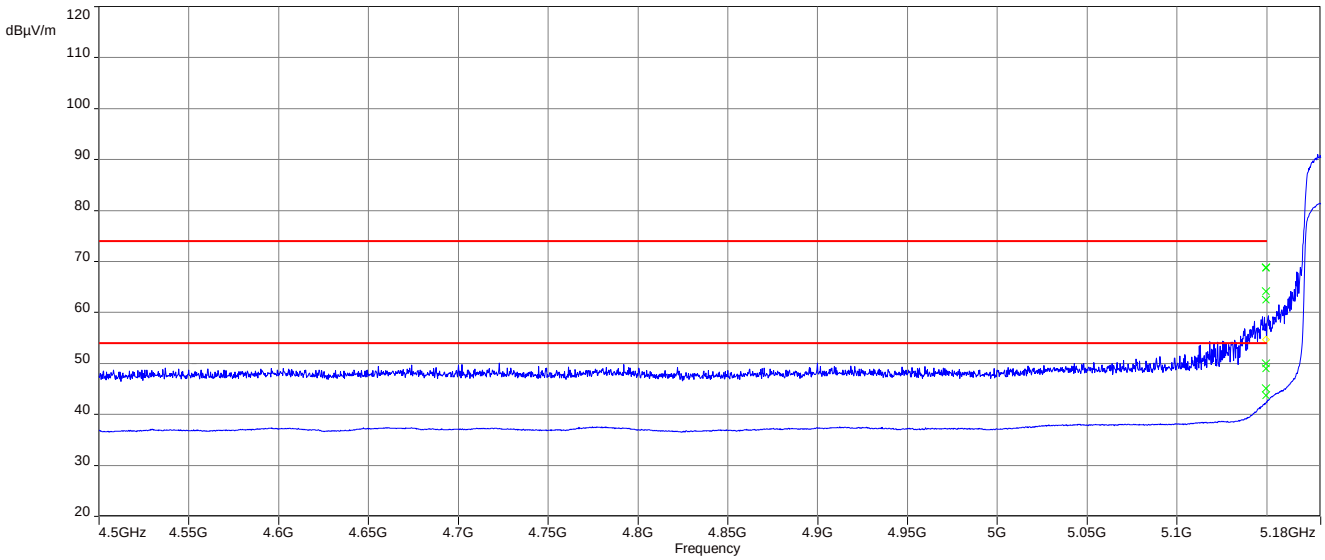
Plot 5: upper band edge; U-NII-2A; highest channel; 20 MHz channel bandwidth n20-mode



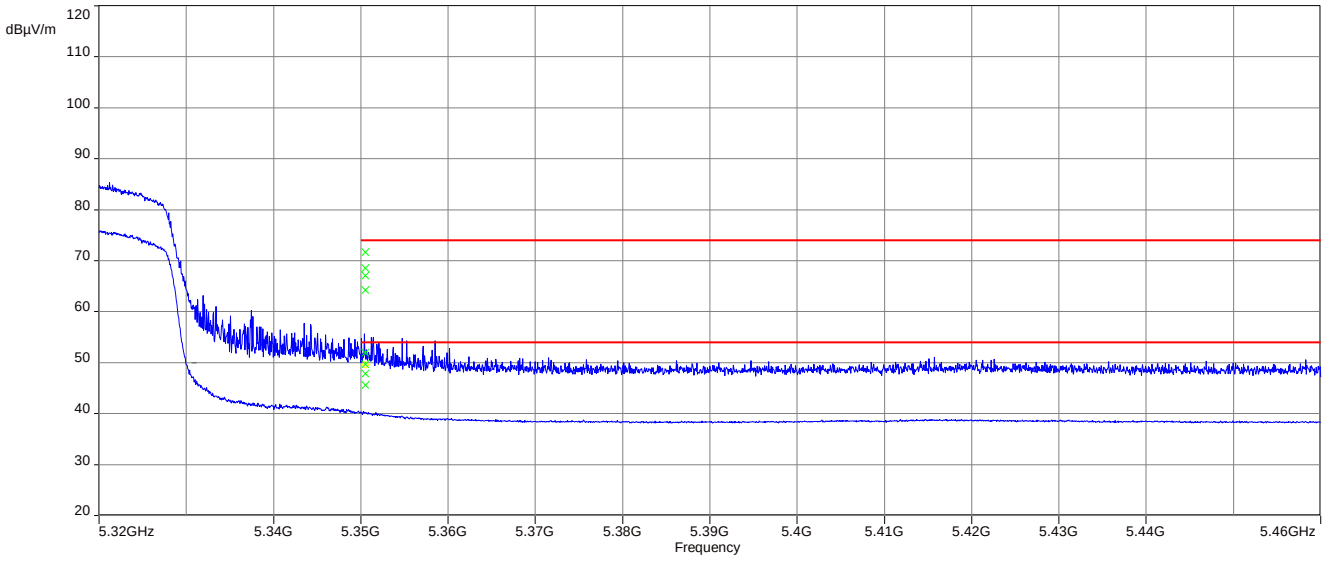
Plot 6: lower band edge; U-NII-2C; lowest channel; 20 MHz channel bandwidth n20-mode



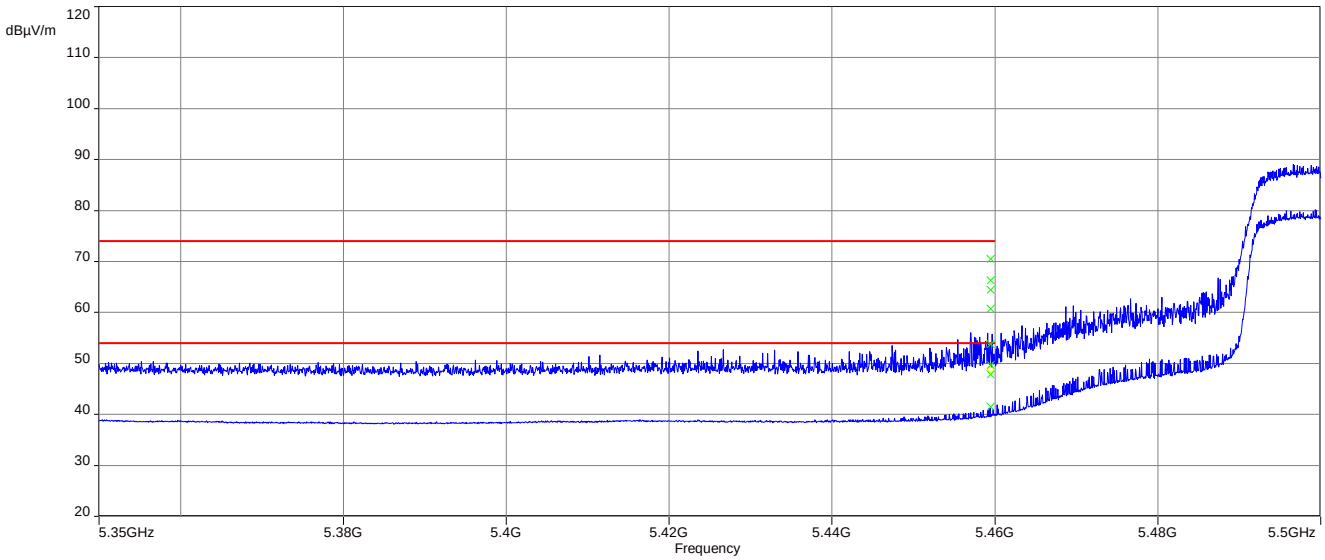
Plot 7: lower band edge; U-NII-1; middle channel; 40 MHz channel bandwidth



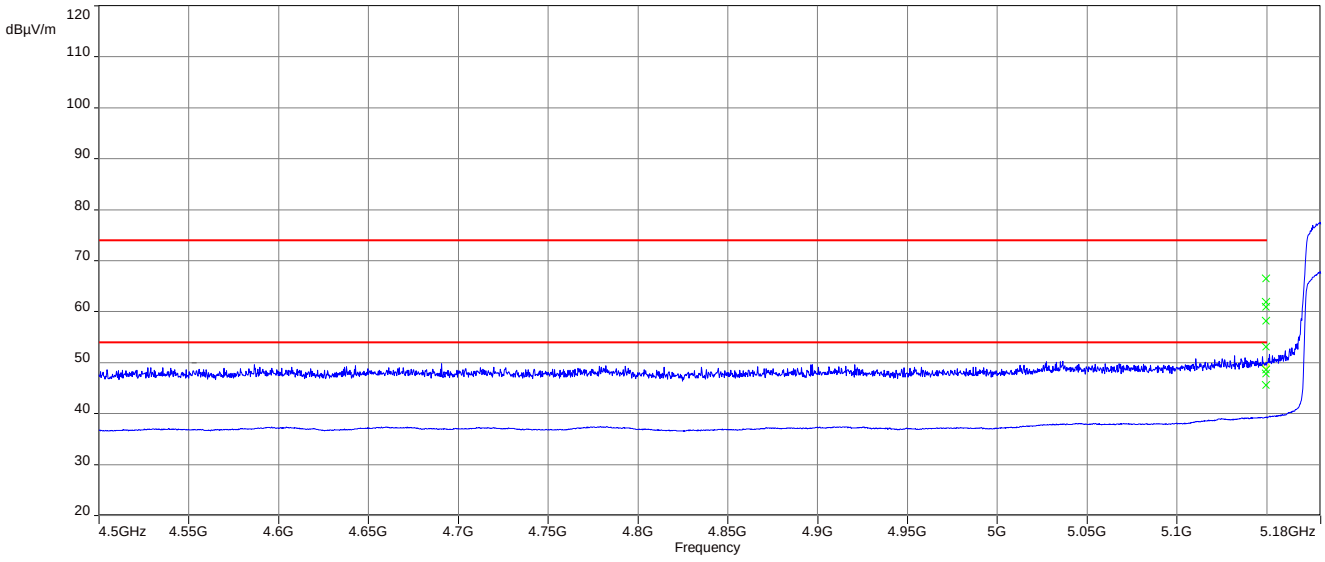
Plot 8: upper band edge; U-NII-2A; middle channel; 40 MHz channel bandwidth



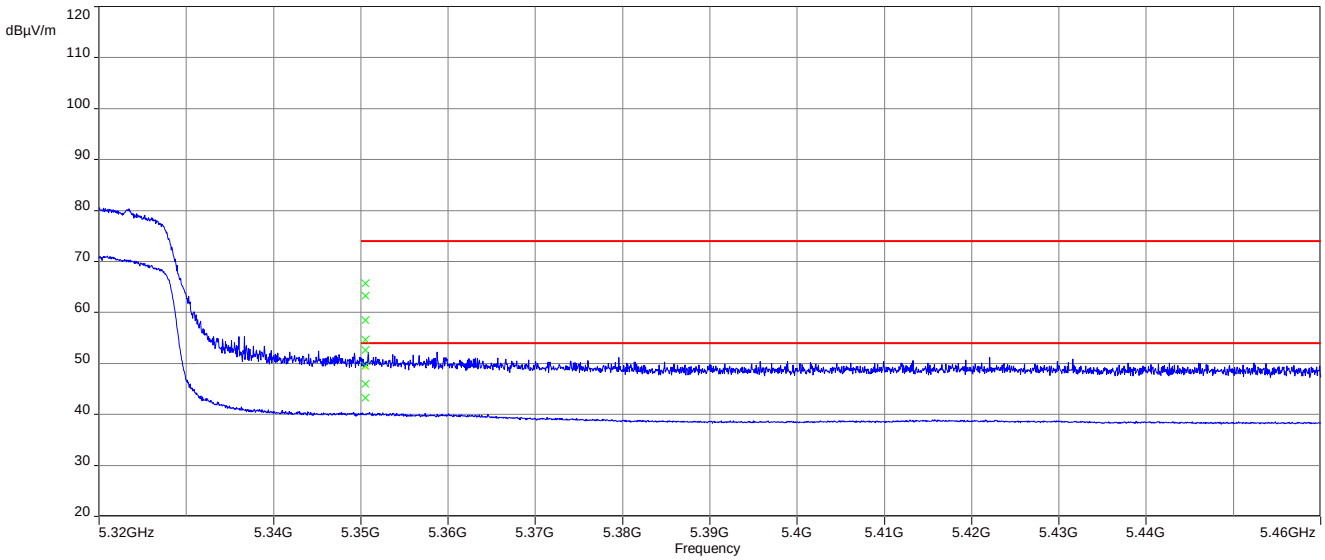
Plot 9: lower band edge; U-NII-2C; lowest channel; 40 MHz channel bandwidth



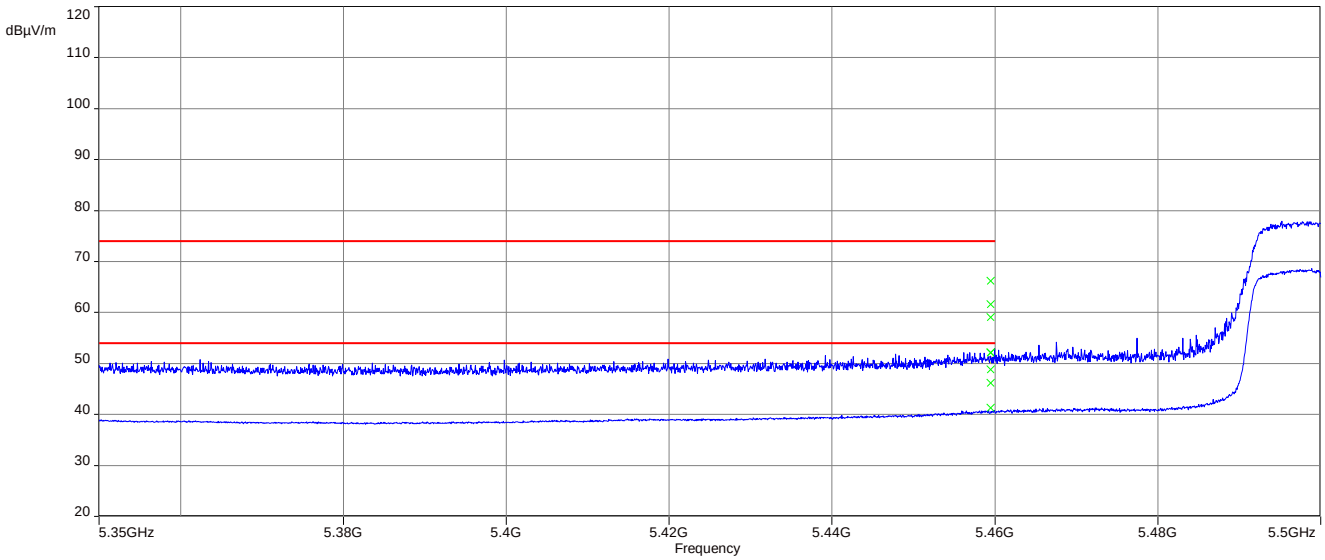
Plot 10: lower band edge; U-NII-1; middle channel; 80 MHz channel bandwidth



Plot 11: upper band edge; U-NII-2A; middle channel; 80 MHz channel bandwidth

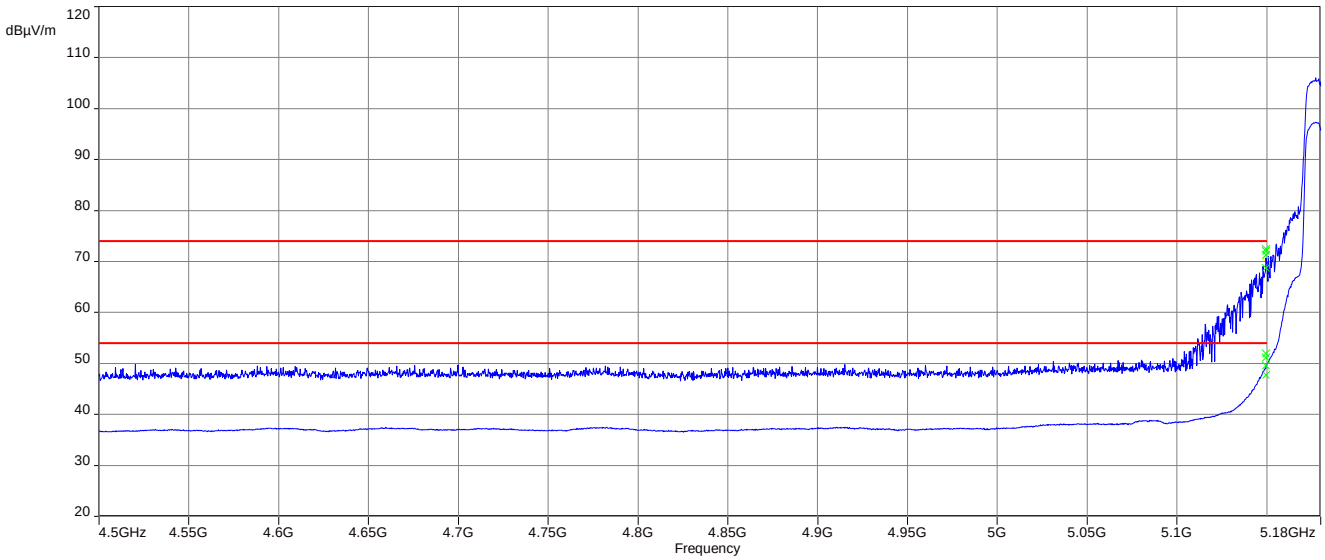


Plot 12: lower band edge; U-NII-2C; lowest channel; 80 MHz channel bandwidth

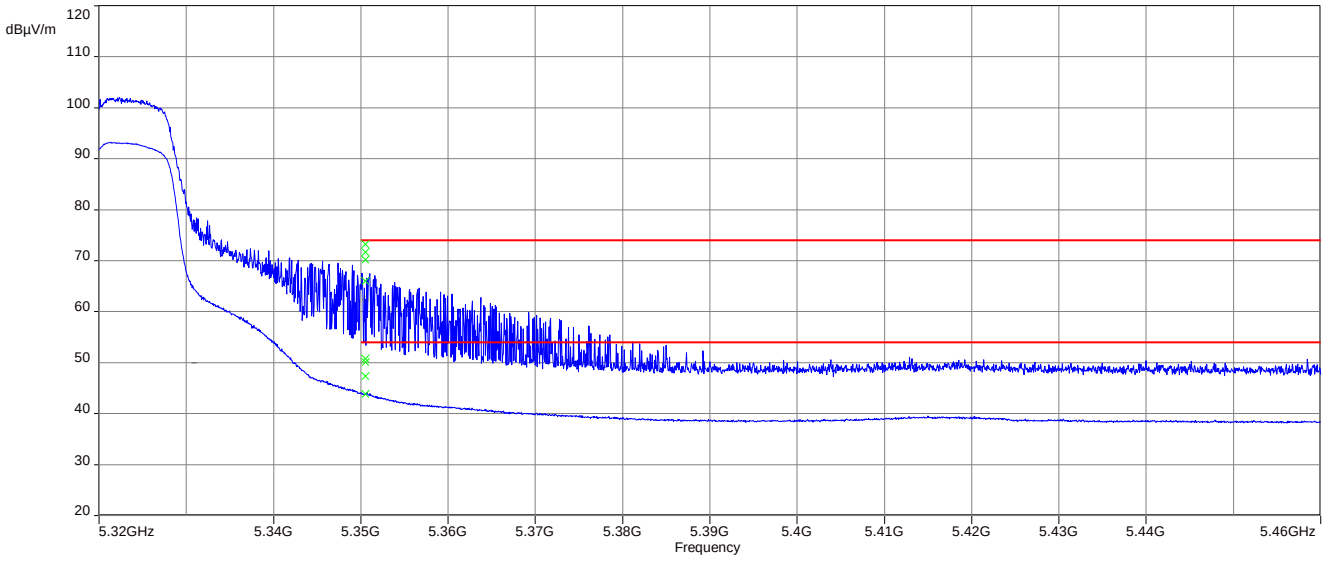


Plots: (ANT-DB1-RAF-RPS)

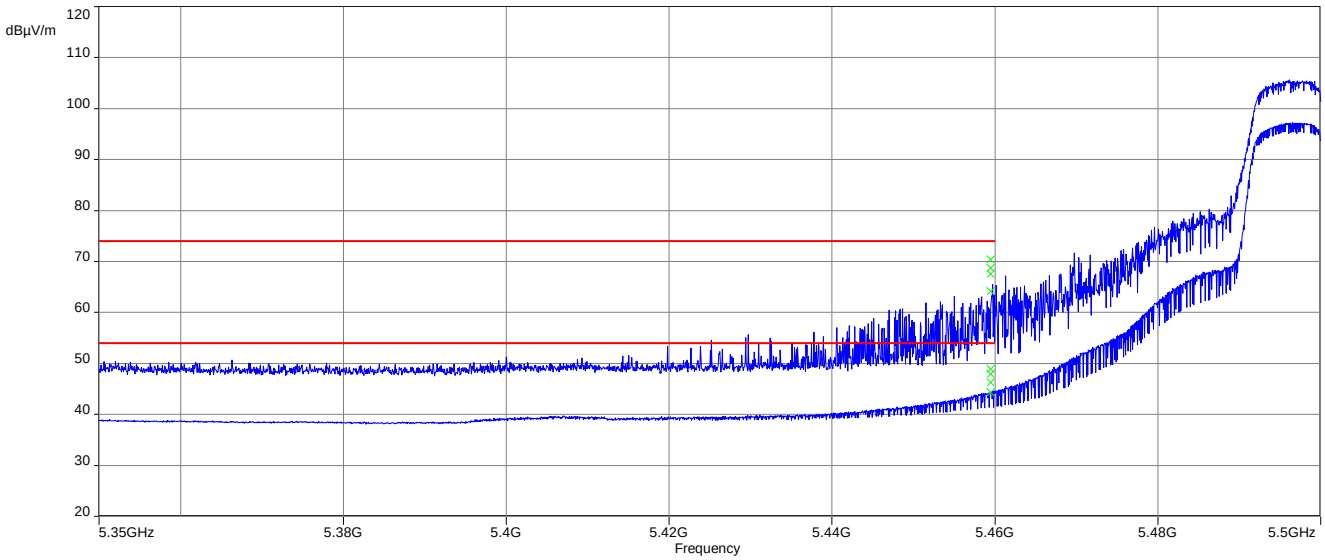
Plot 13: lower band edge; U-NII-1; lowest channel; 20 MHz channel bandwidth a-mode



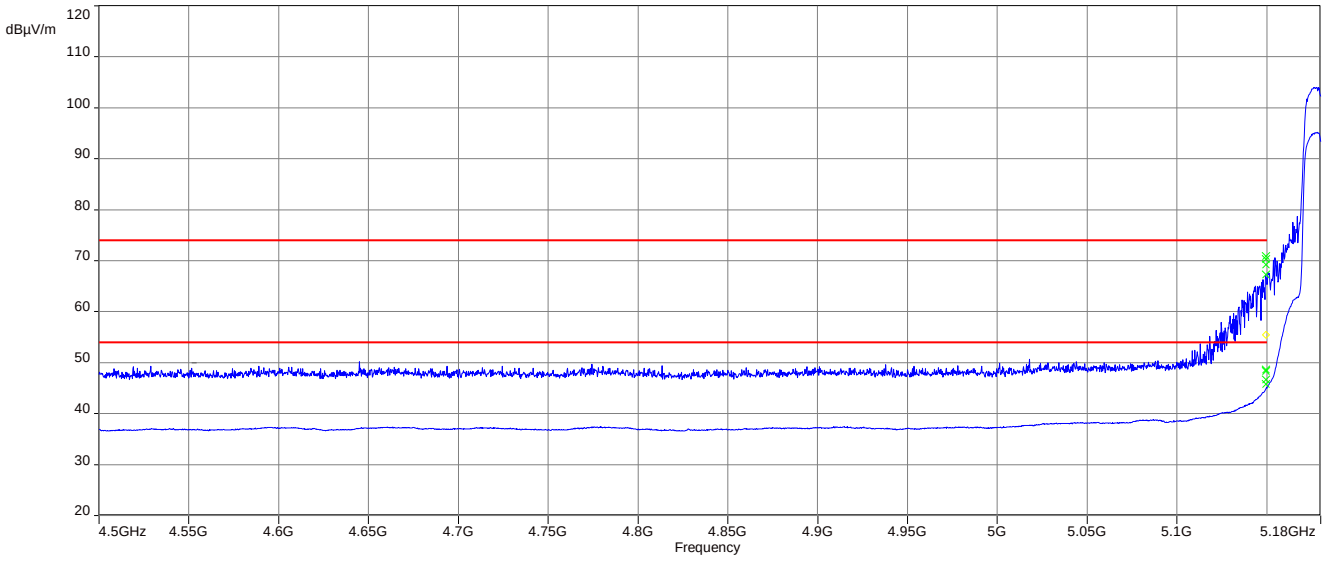
Plot 14: upper band edge; U-NII-2A; highest channel; 20 MHz channel bandwidth a-mode



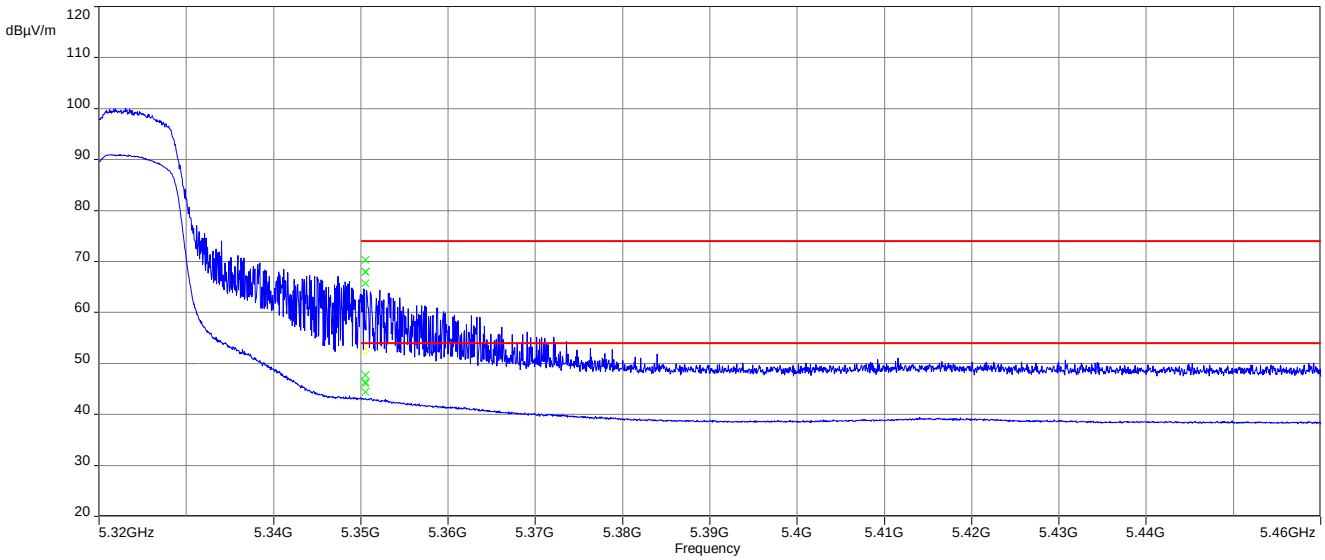
Plot 15: lower band edge; U-NII-2C; lowest channel; 20 MHz channel bandwidth a-mode



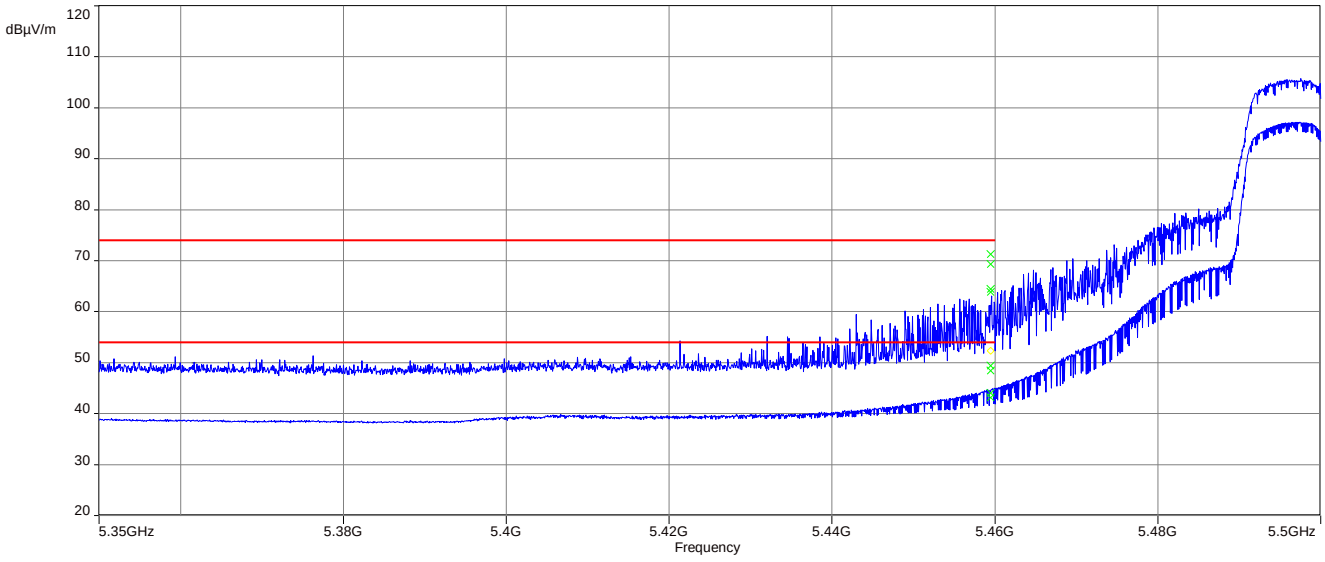
Plot 16: lower band edge; U-NII-1; lowest channel; 20 MHz channel bandwidth n20-mode



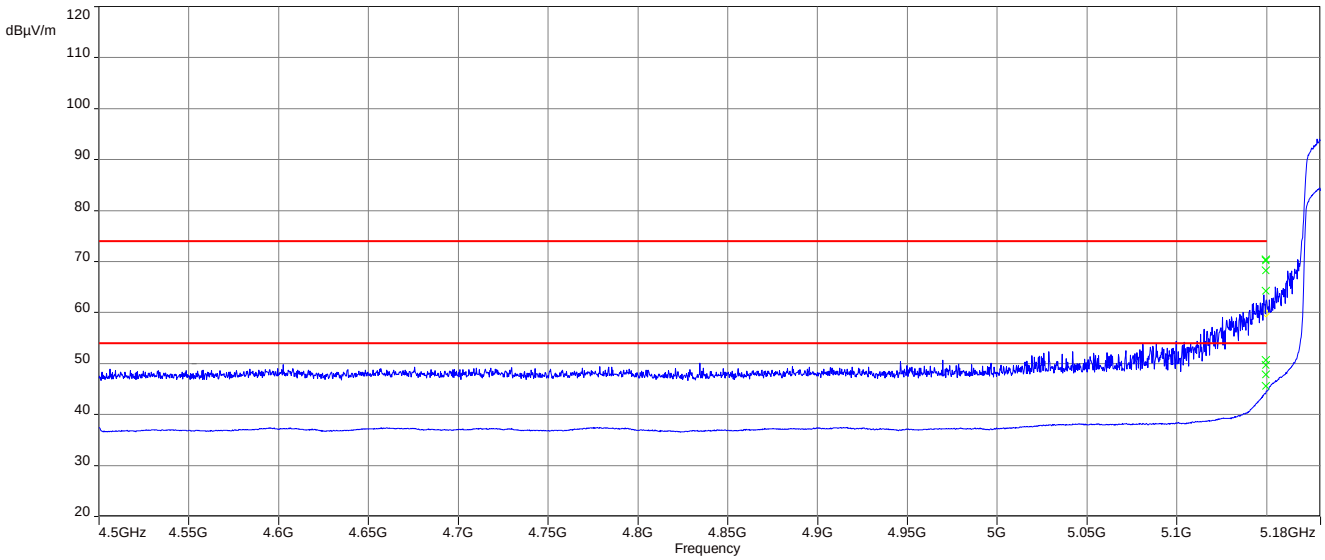
Plot 17: upper band edge; U-NII-2A; highest channel; 20 MHz channel bandwidth n20-mode



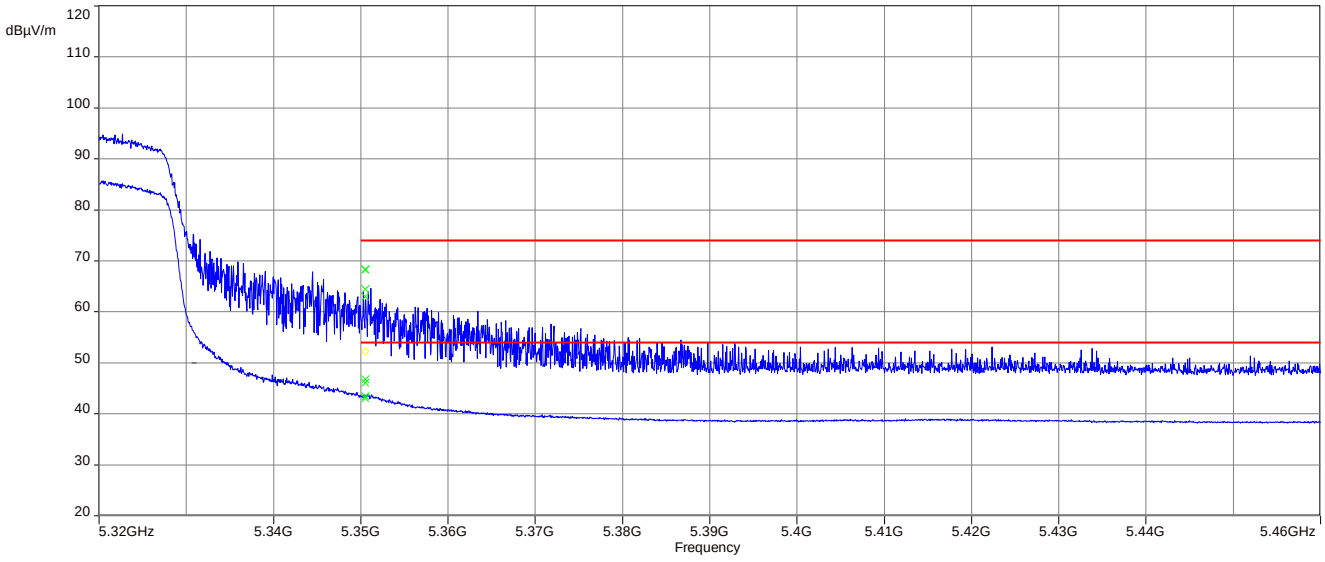
Plot 18: lower band edge; U-NII-2C; lowest channel; 20 MHz channel bandwidth n20-mode



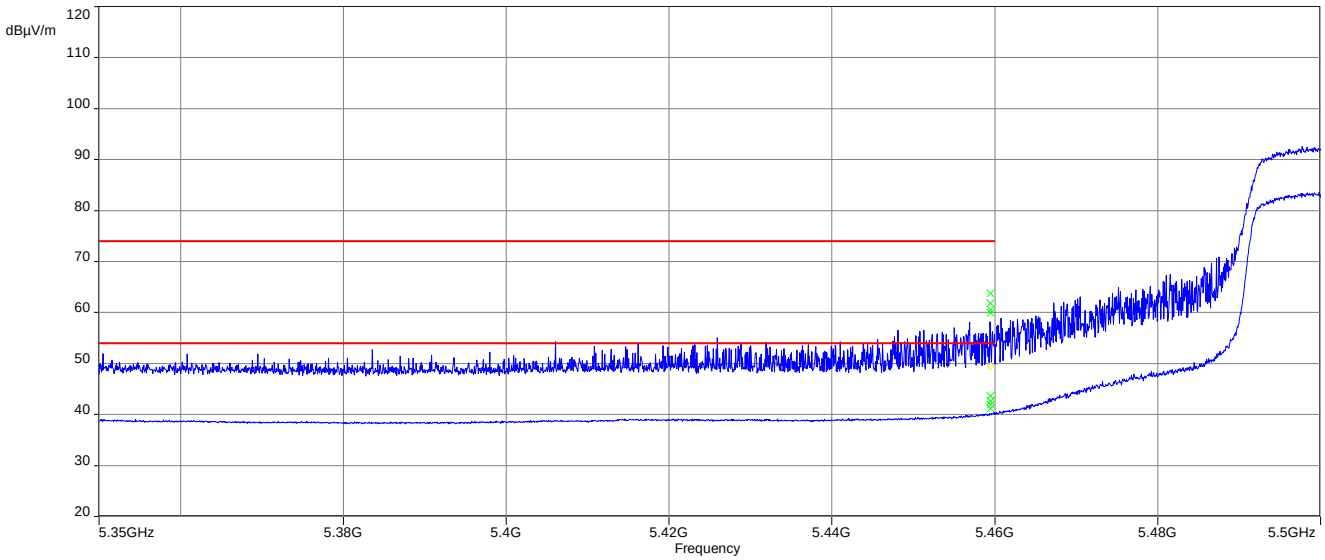
Plot 19: lower band edge; U-NII-1; middle channel; 40 MHz channel bandwidth



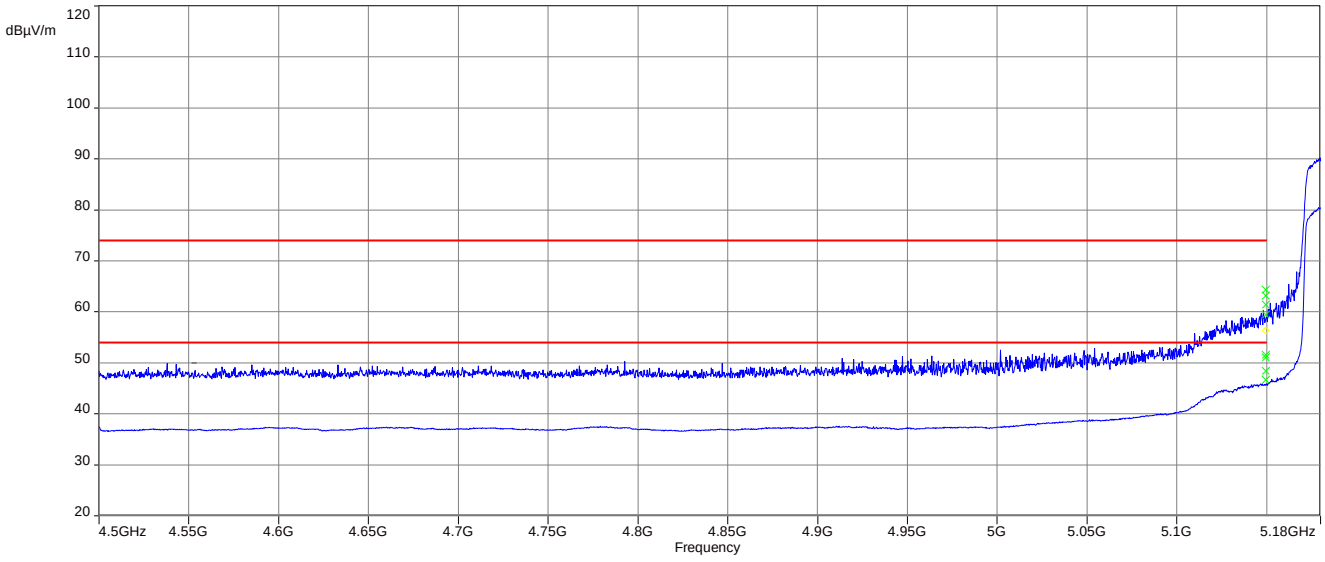
Plot 20: upper band edge; U-NII-2A; middle channel; 40 MHz channel bandwidth



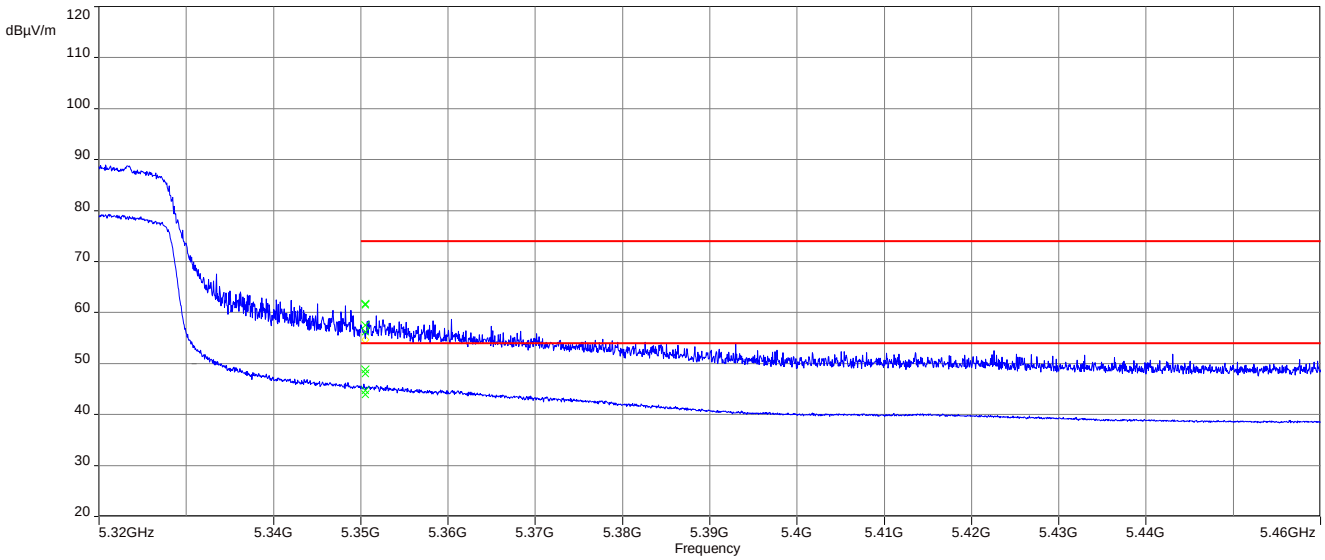
Plot 21: lower band edge; U-NII-2C; lowest channel; 40 MHz channel bandwidth



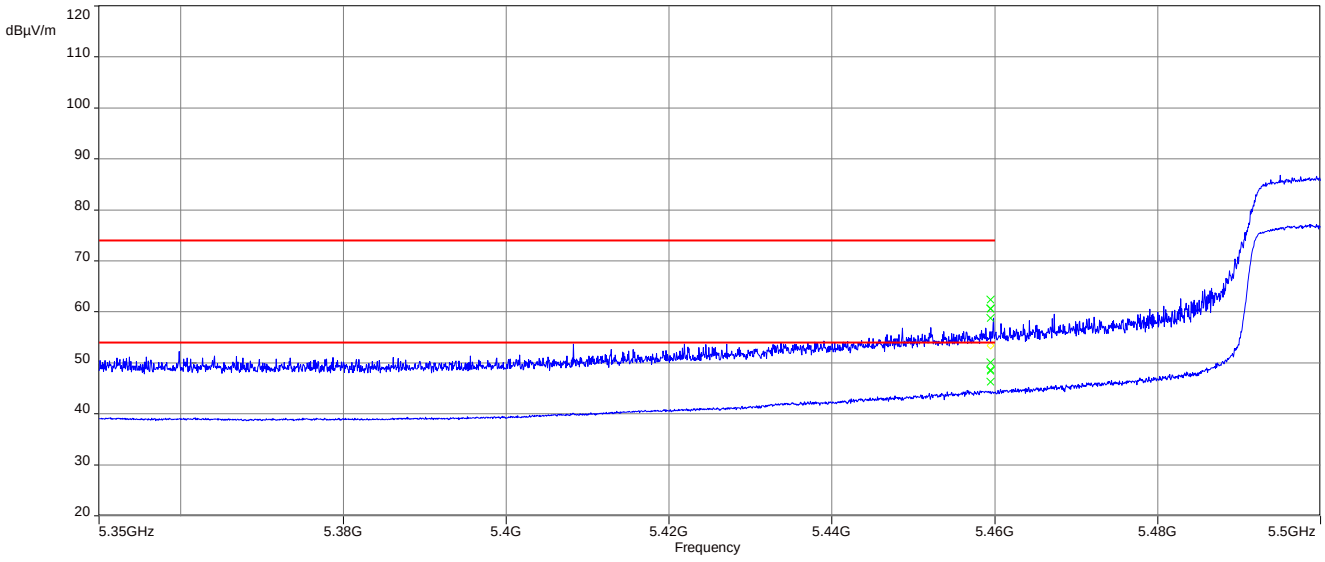
Plot 22: lower band edge; U-NII-1; middle channel; 80 MHz channel bandwidth



Plot 23: upper band edge; U-NII-2A; middle channel; 80 MHz channel bandwidth



Plot 24: lower band edge; U-NII-2C; lowest channel; 80 MHz channel bandwidth



12.10 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 – C
Measurement uncertainty:	See chapter 9

Limits:

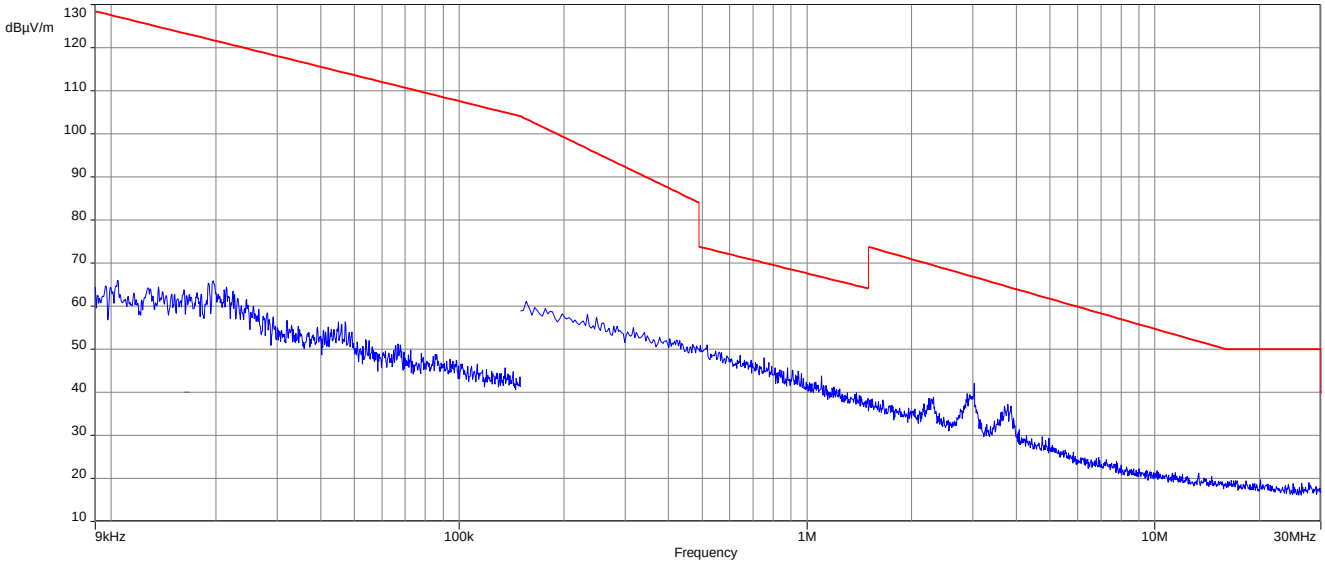
Spurious Emissions Radiated < 30 MHz		
Frequency (MHz)	Field Strength (dBµV/m)	Measurement distance
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

Results: TAOGLAS FXP831.07.0100C

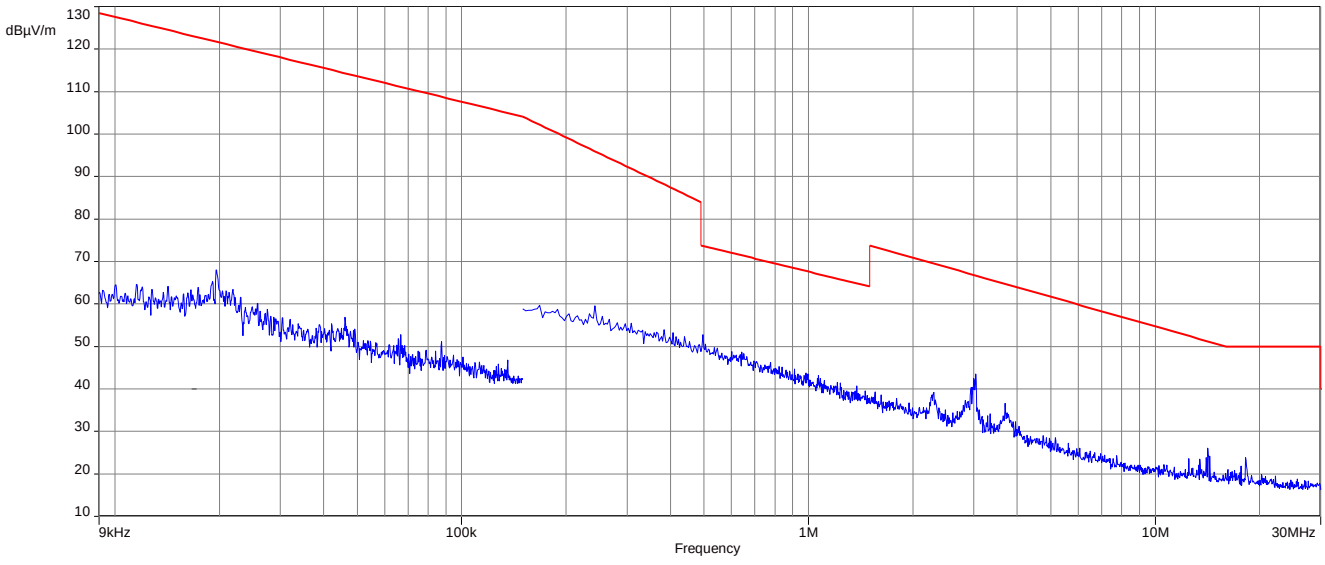
Spurious Emissions Radiated < 30 MHz [dBµV/m]		
F [MHz]	Detector	Level [dBµV/m]
All detected emissions are more than 20 dB below the limit.		

Plots: 20 MHz channel bandwidth (TAOGLAS FXP831.07.0100C)

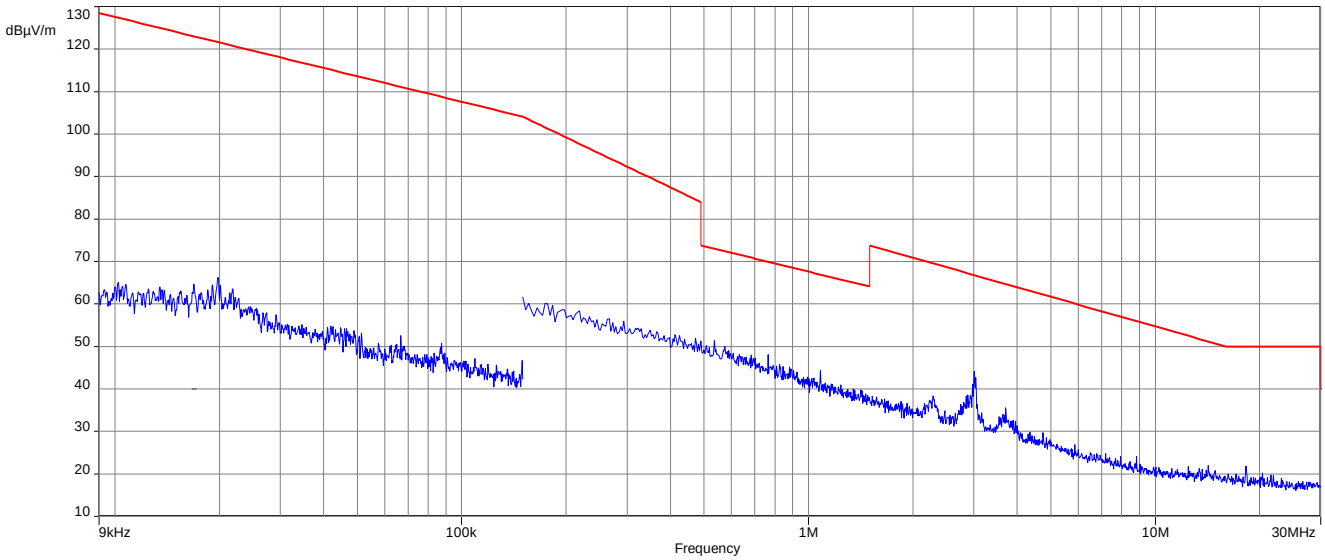
Plot 1: 9 kHz to 30 MHz, U-NII-1; lowest channel



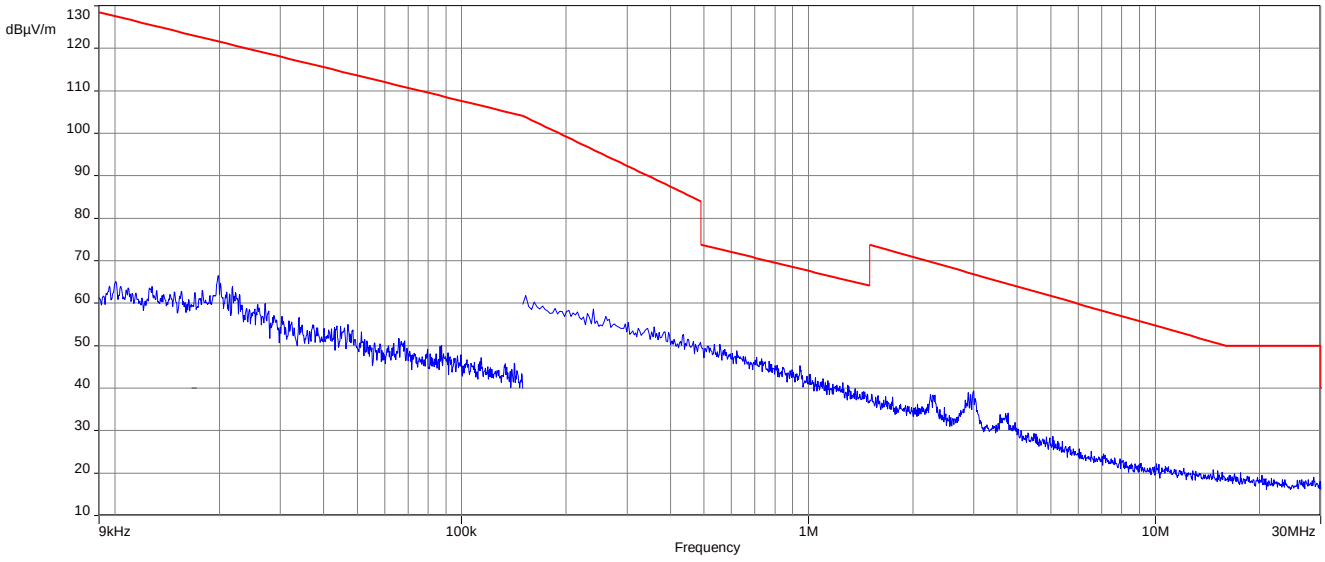
Plot 2: 9 kHz to 30 MHz, U-NII-1; highest channel



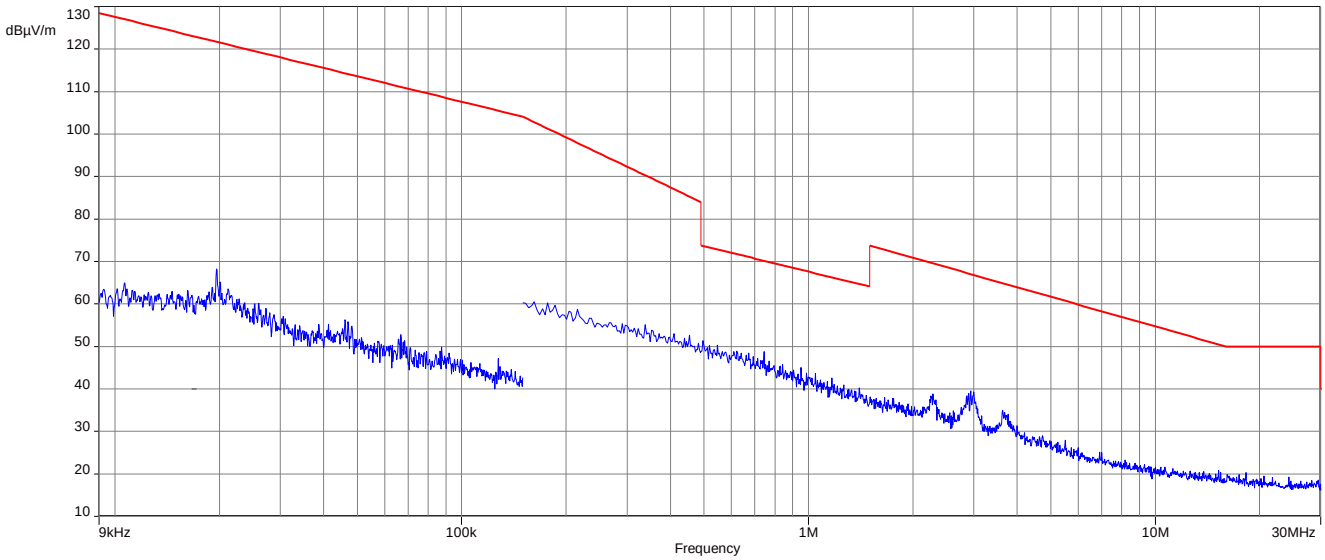
Plot 3: 9 kHz to 30 MHz, U-NII-2A; lowest channel



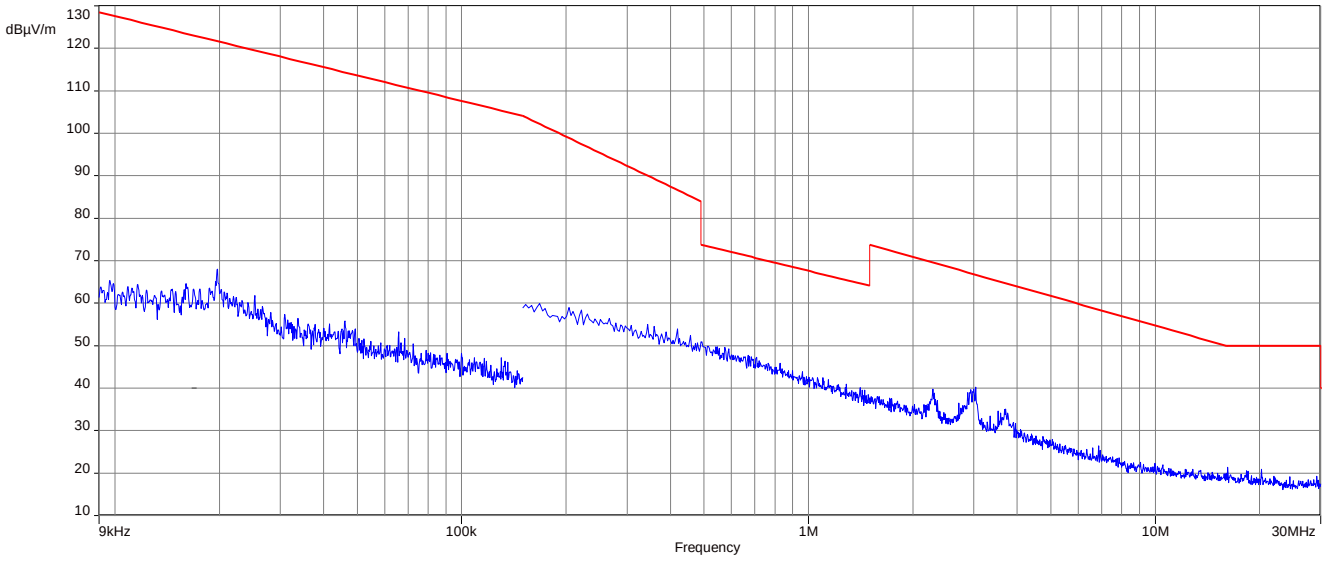
Plot 4: 9 kHz to 30 MHz, U-NII-2A; highest channel



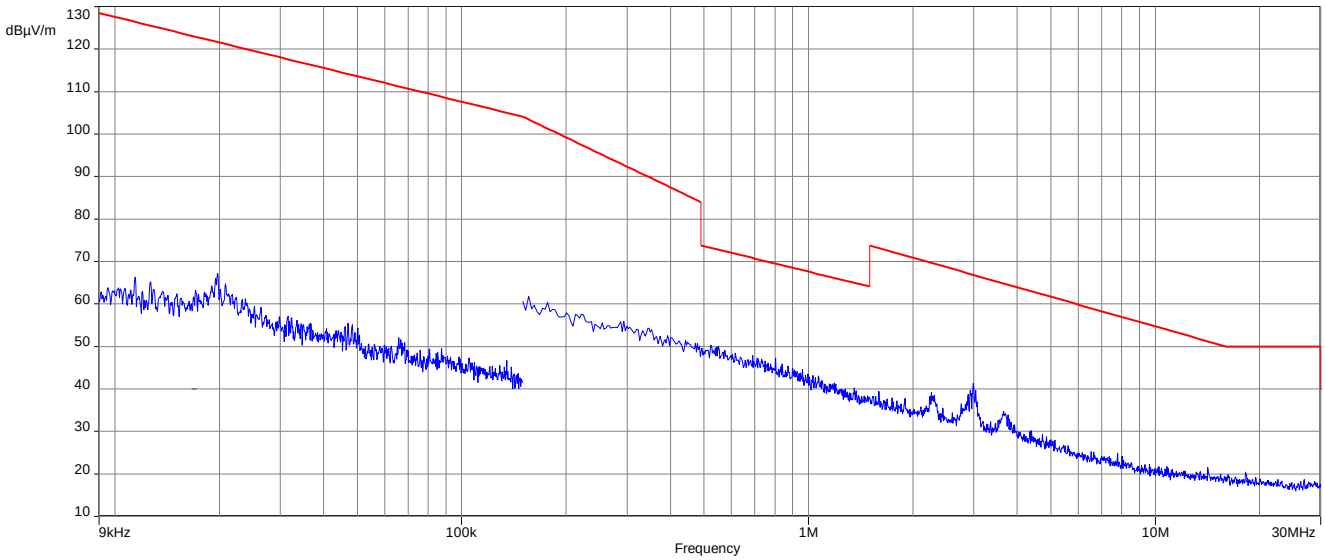
Plot 5: 9 kHz to 30 MHz, U-NII-2C; lowest channel



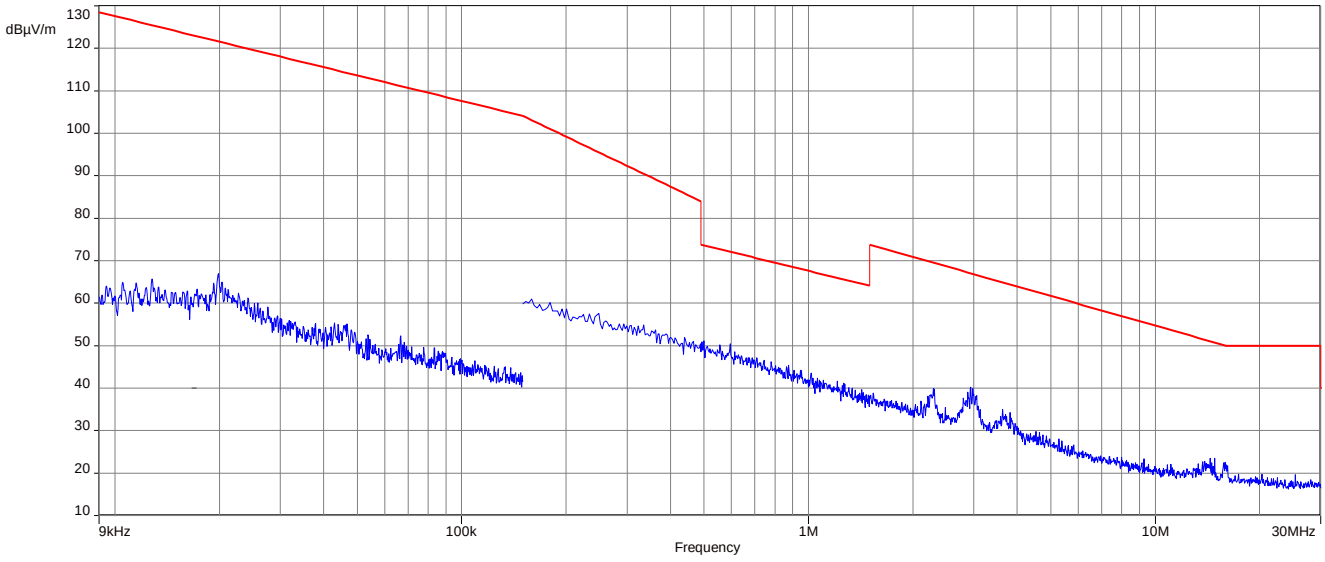
Plot 6: 9 kHz to 30 MHz, U-NII-2C; middle channel



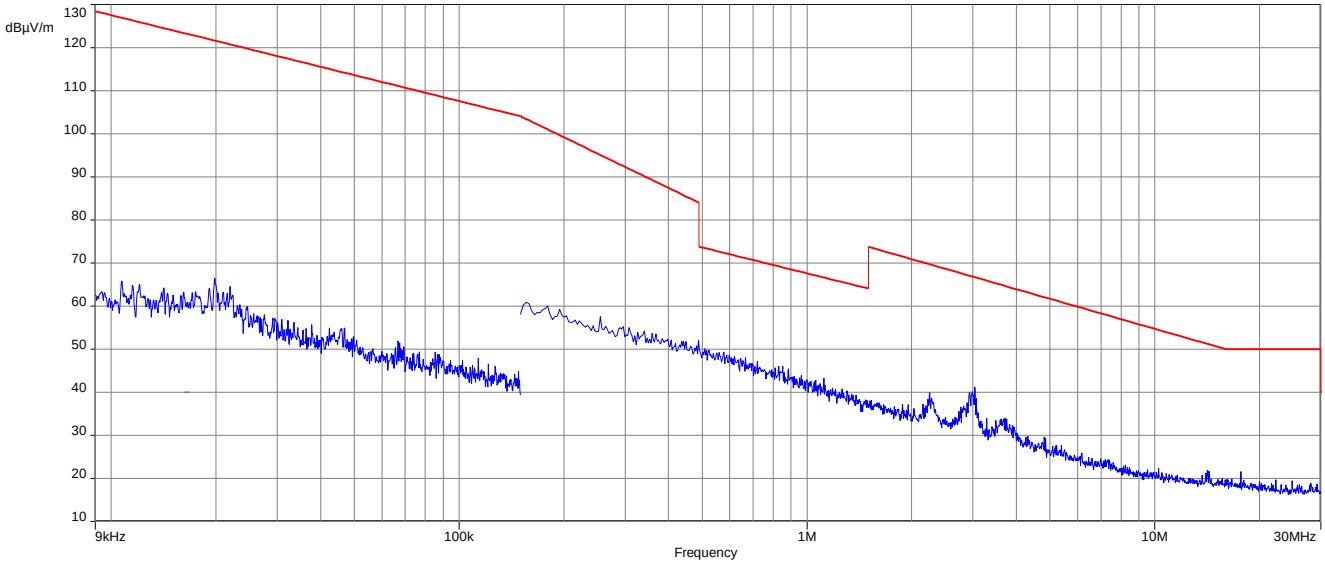
Plot 7: 9 kHz to 30 MHz, U-NII-2C; highest channel



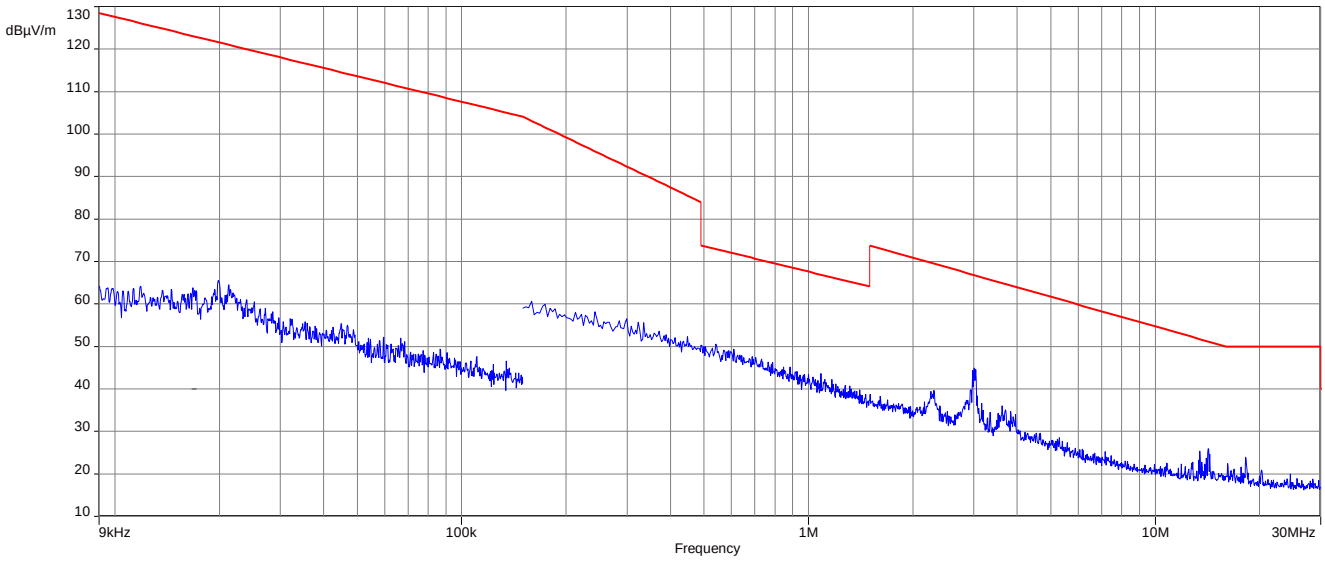
Plot 8: 9 kHz to 30 MHz, U-NII-3; lowest channel



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

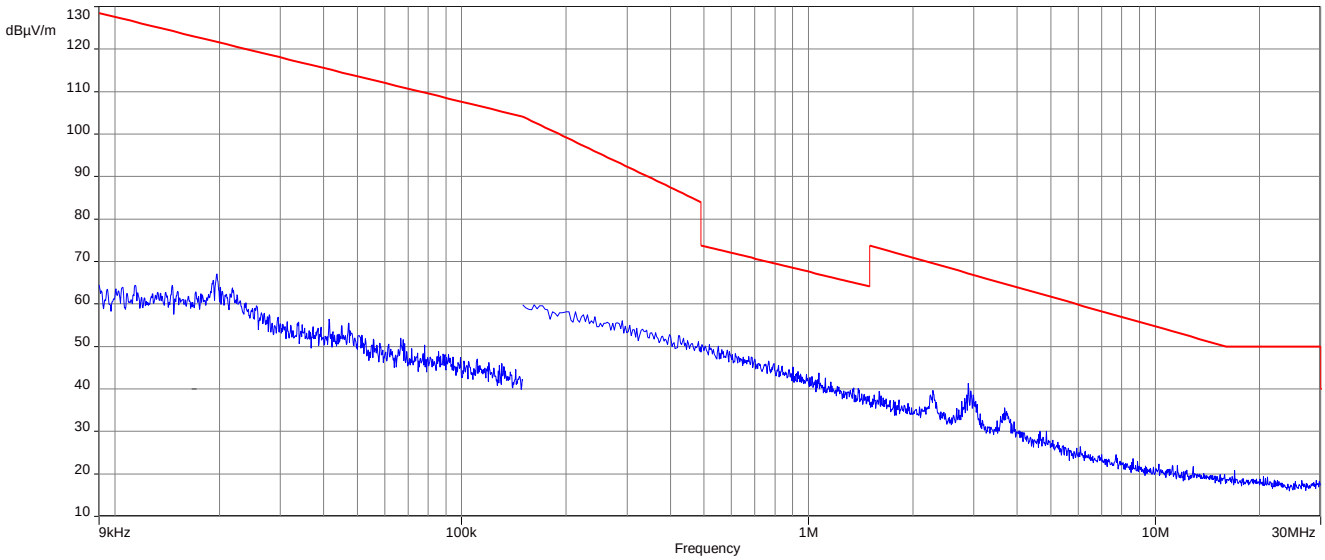


Plot 10: 9 kHz to 30 MHz, U-NII-3; highest channel

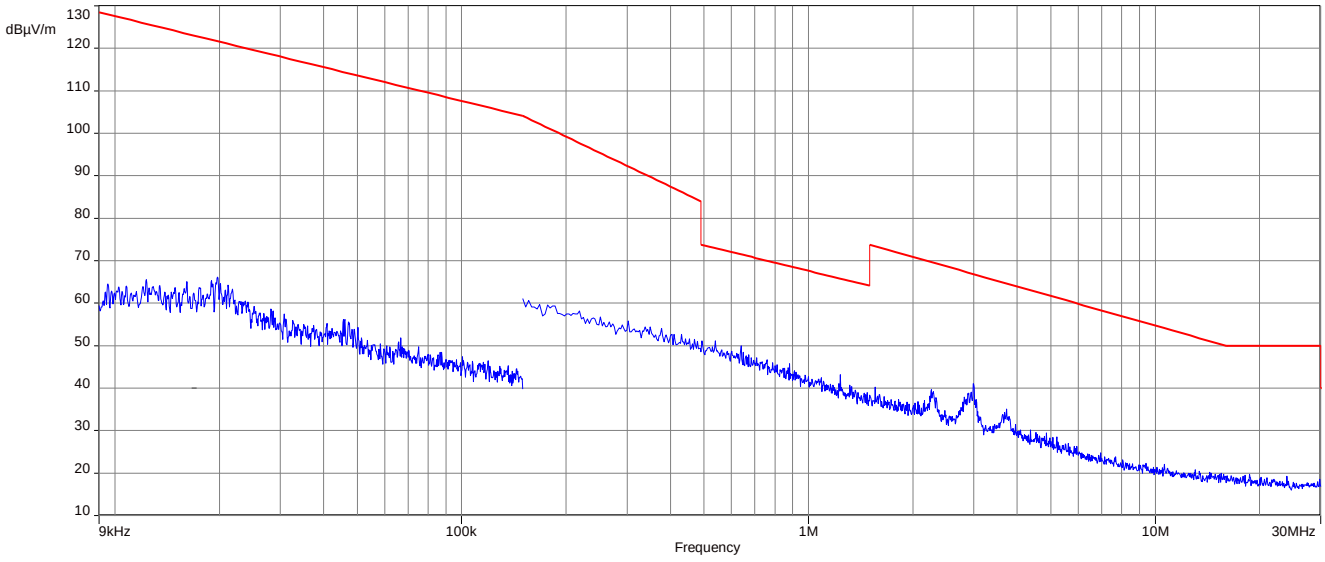


Plots: 40 MHz channel bandwidth

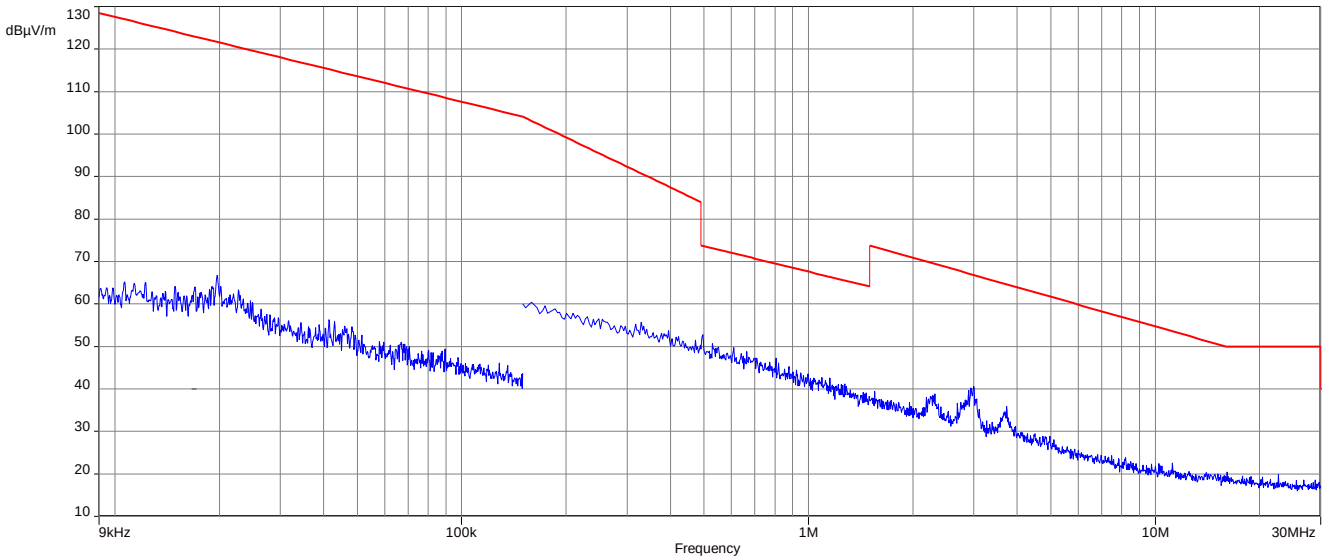
Plot 11: 9 kHz to 30 MHz, U-NII-1; lowest channel



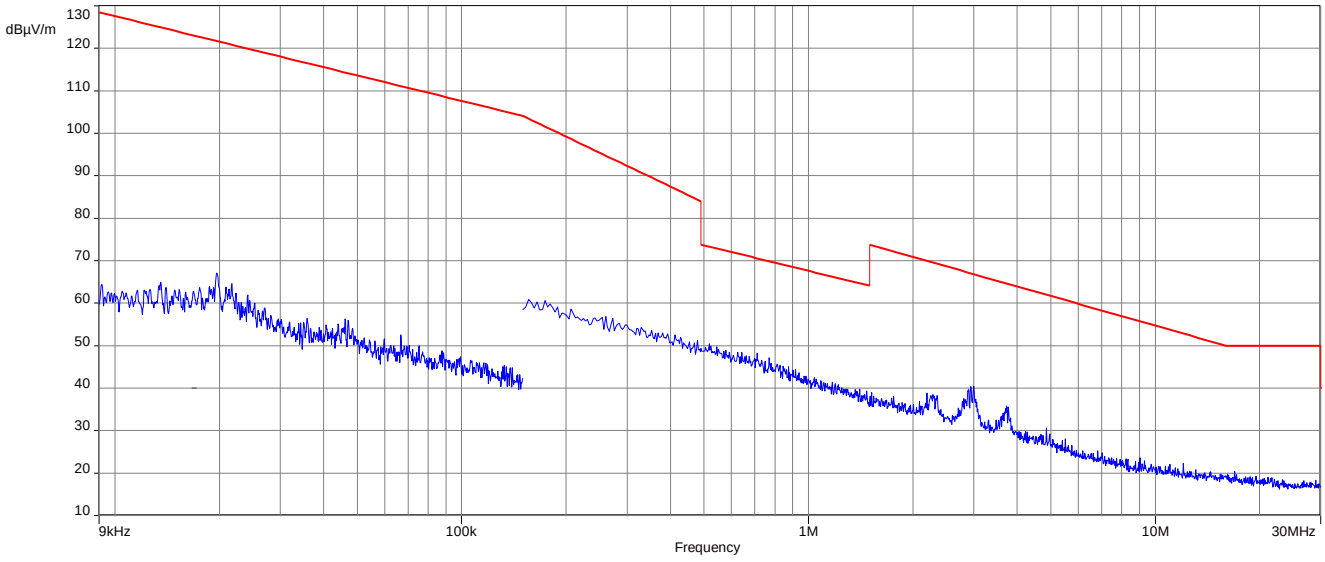
Plot 12: 9 kHz to 30 MHz, U-NII-1; highest channel



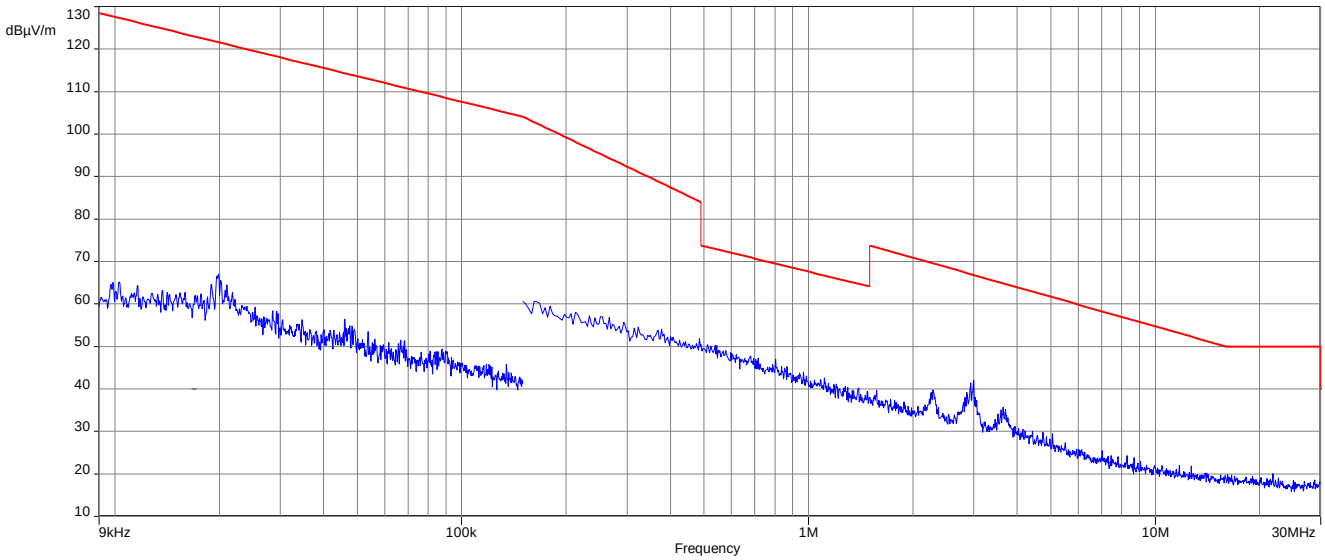
Plot 13: 9 kHz to 30 MHz, U-NII-2A; lowest channel



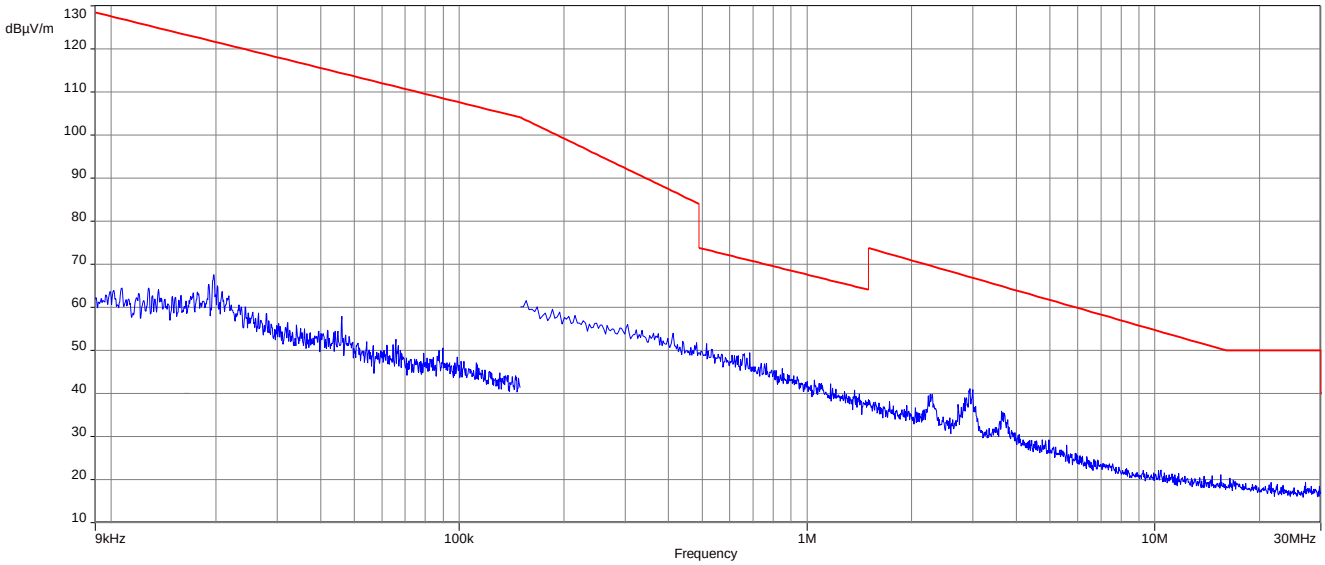
Plot 14: 9 kHz to 30 MHz, U-NII-2A; highest channel



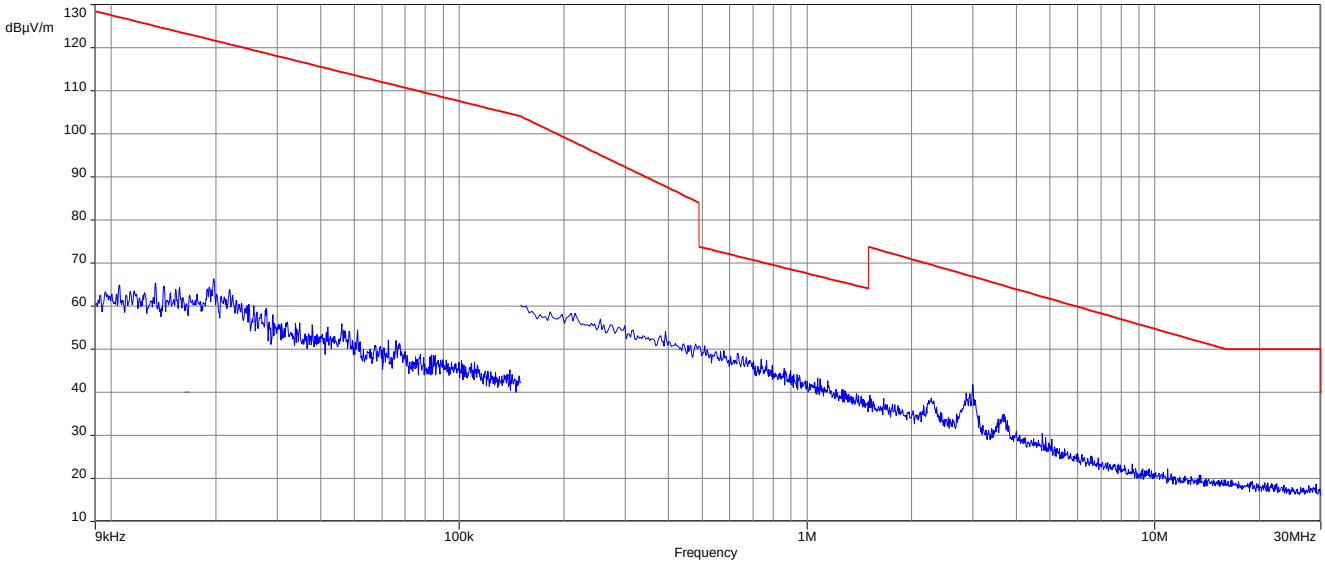
Plot 15: 9 kHz to 30 MHz, U-NII-2C; lowest channel



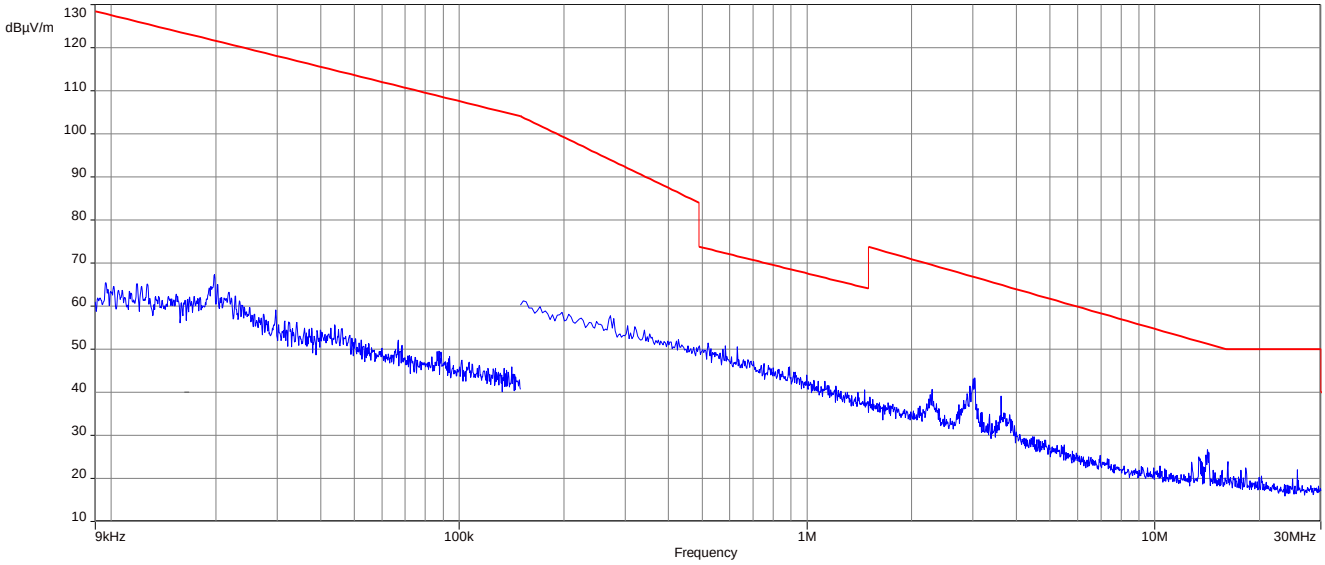
Plot 16: 9 kHz to 30 MHz, U-NII-2C; middle channel



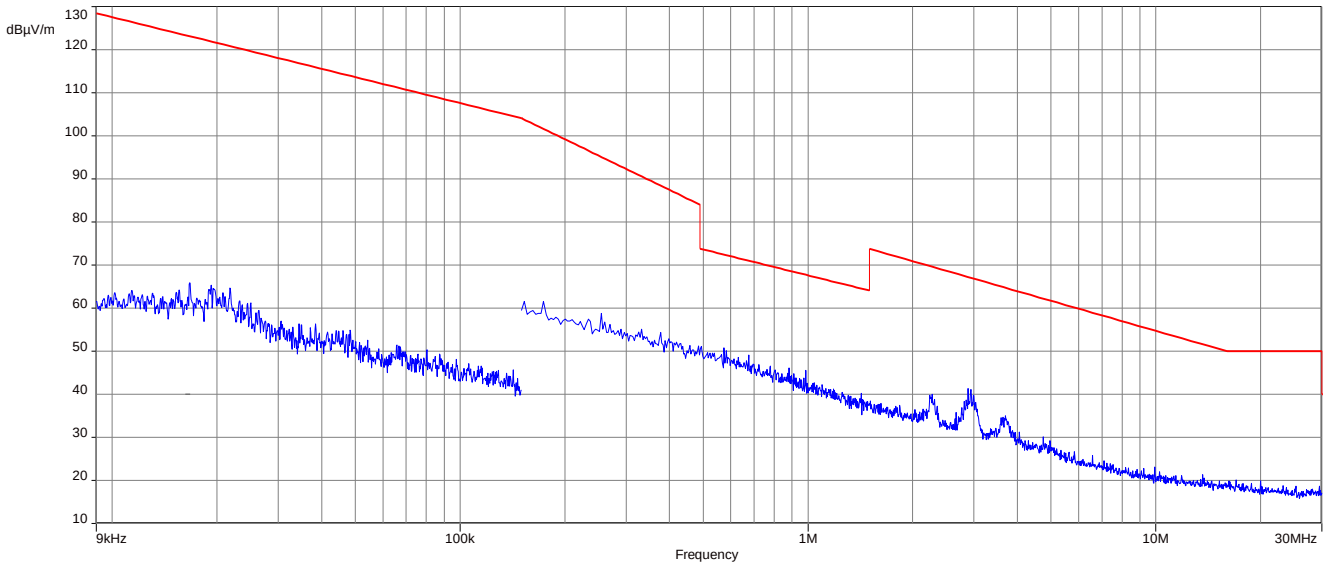
Plot 17: 9 kHz to 30 MHz, U-NII-2C; highest channel



Plot 18: 9 kHz to 30 MHz, U-NII-3; lowest channel

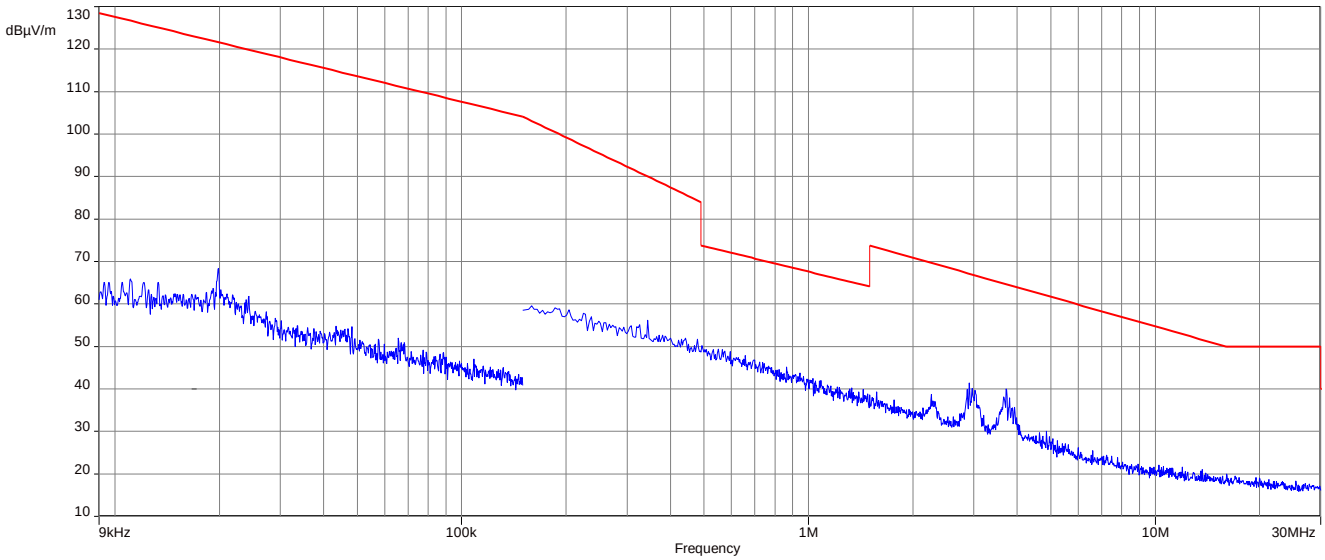


Plot 19: 9 kHz to 30 MHz, U-NII-3; highest channel

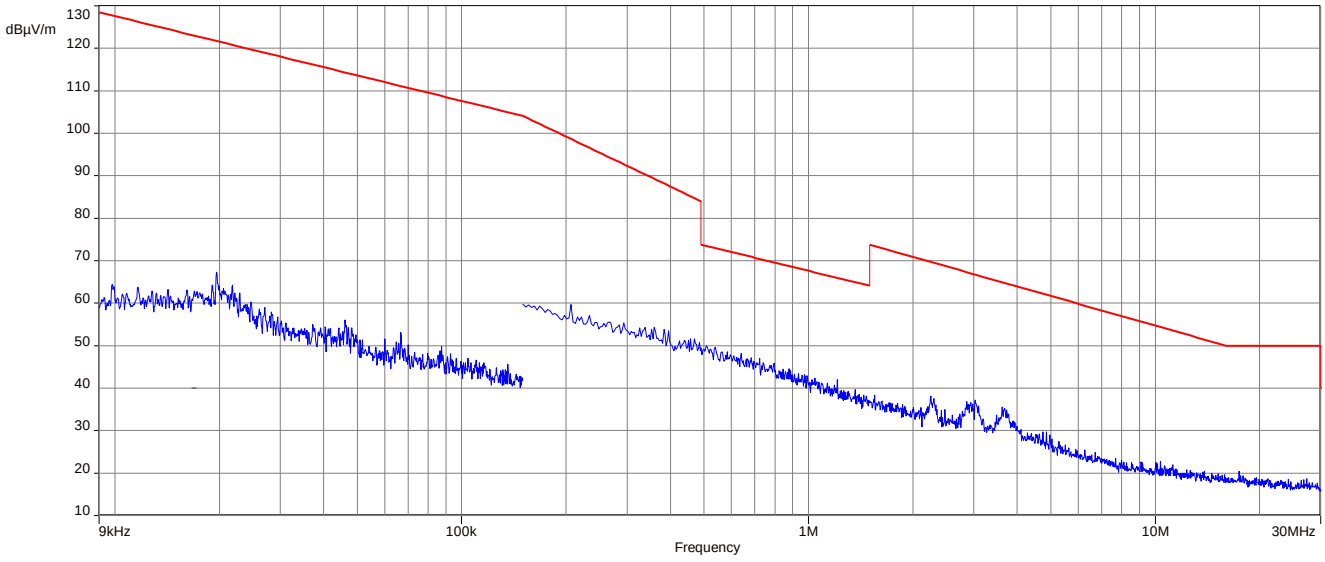


Plots: 80 MHz channel bandwidth

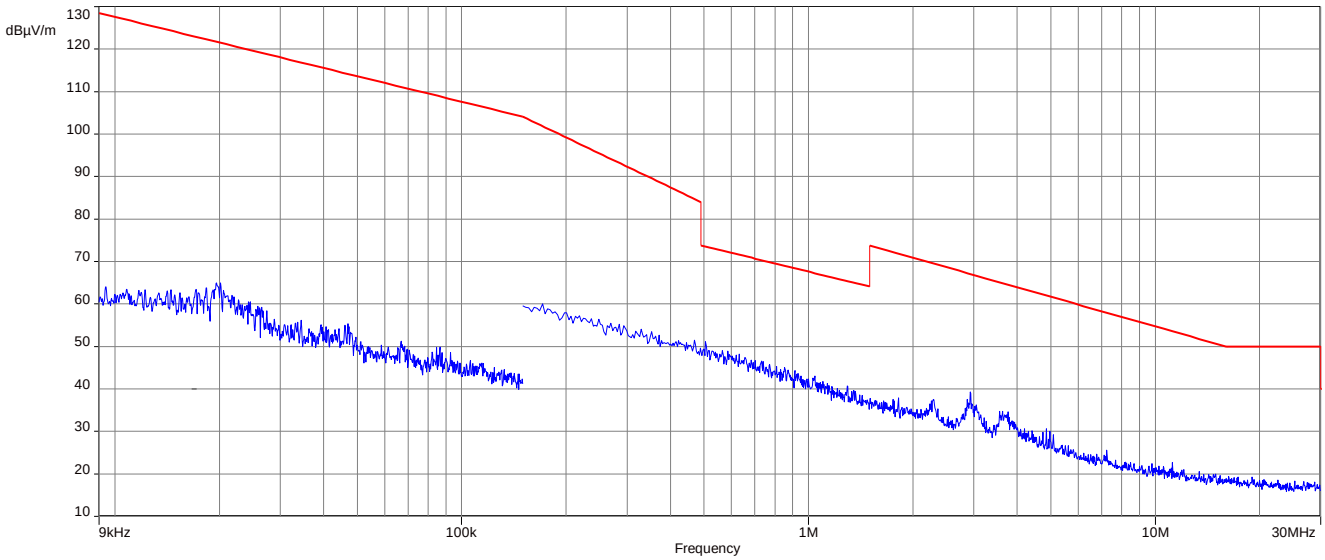
Plot 20: 9 kHz to 30 MHz, U-NII-1; middle channel



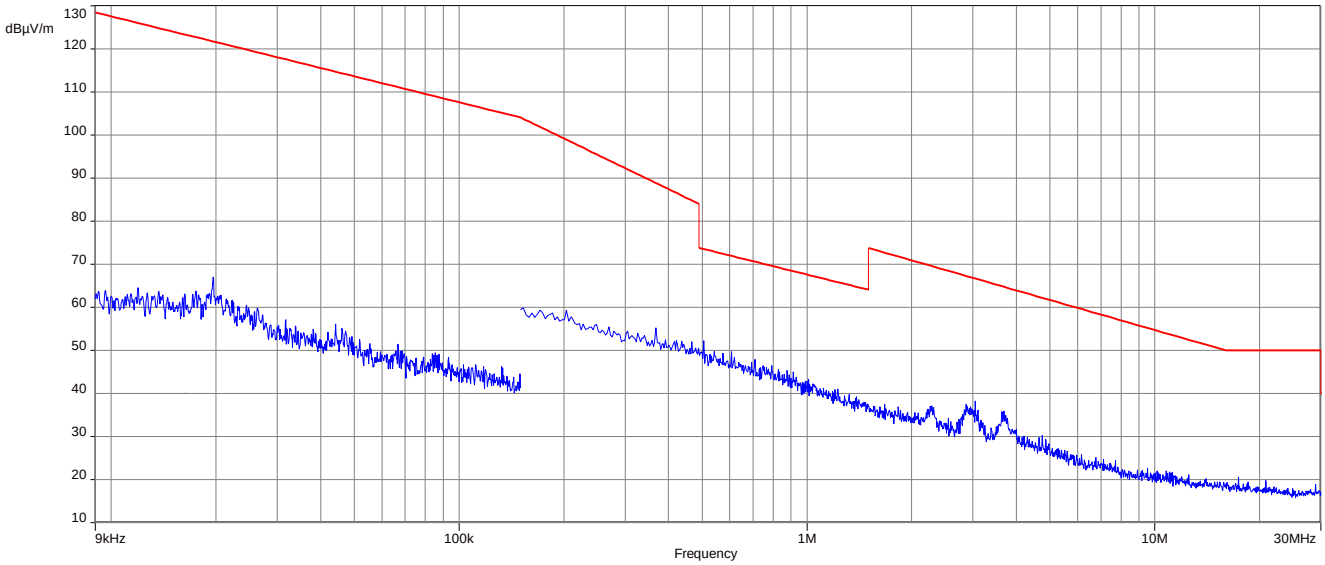
Plot 21: 9 kHz to 30 MHz, U-NII-2A; middle channel



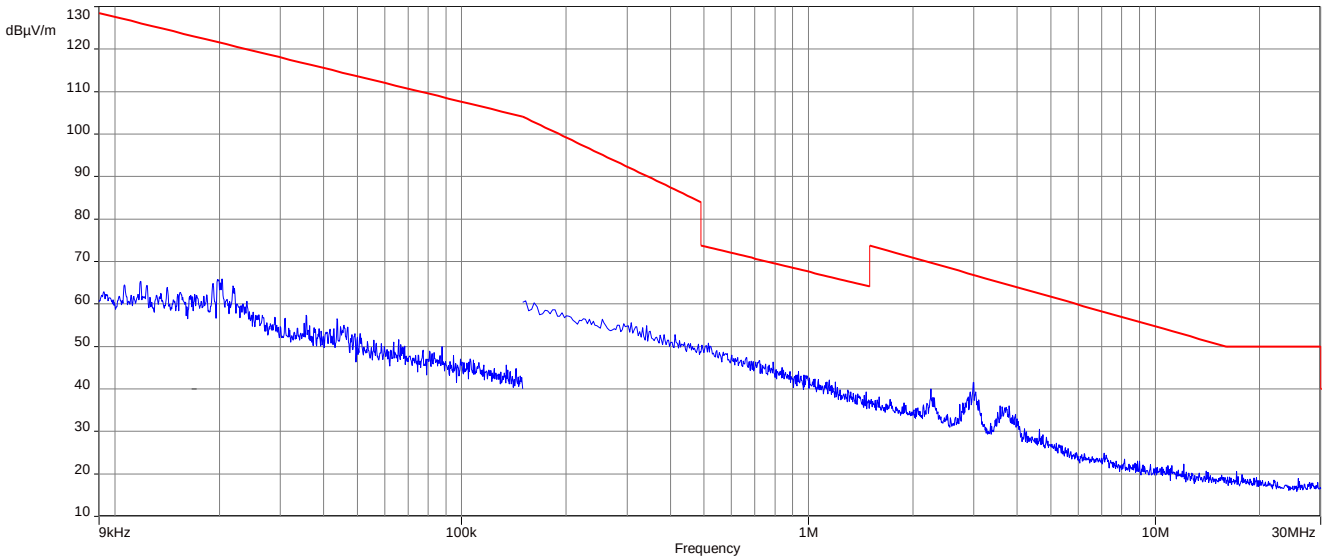
Plot 22: 9 kHz to 30 MHz, U-NII-2C; lowest channel



Plot 23: 9 kHz to 30 MHz, U-NII-2C; highest channel



Plot 24: 9 kHz to 30 MHz, U-NII-3; middle channel

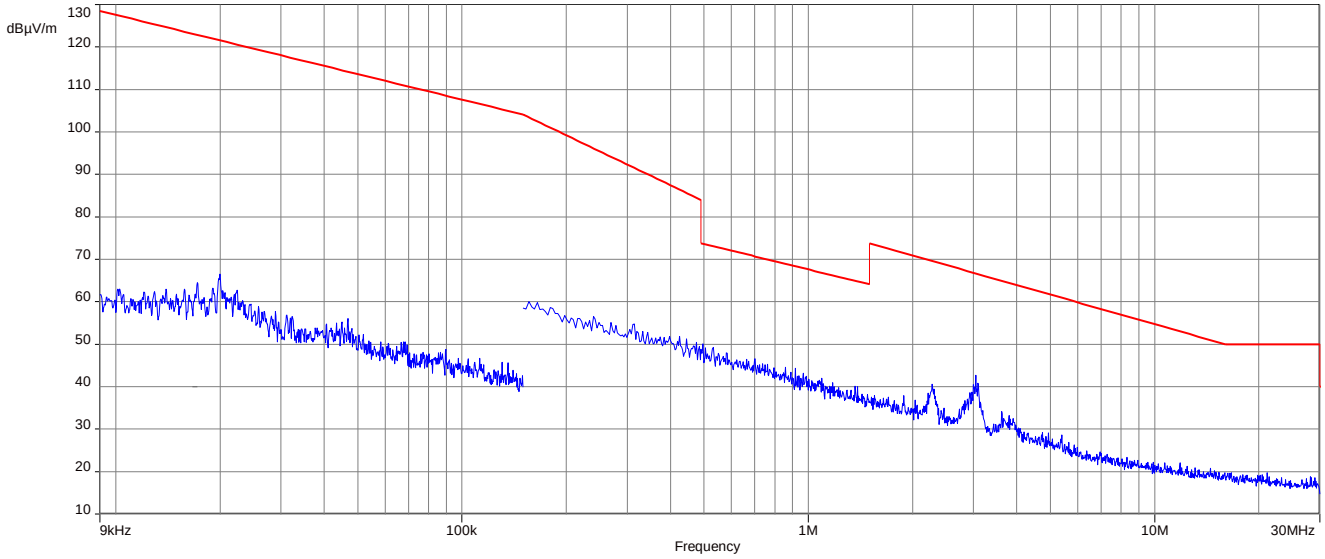


Results: ANT-DB1-RAF-RPS

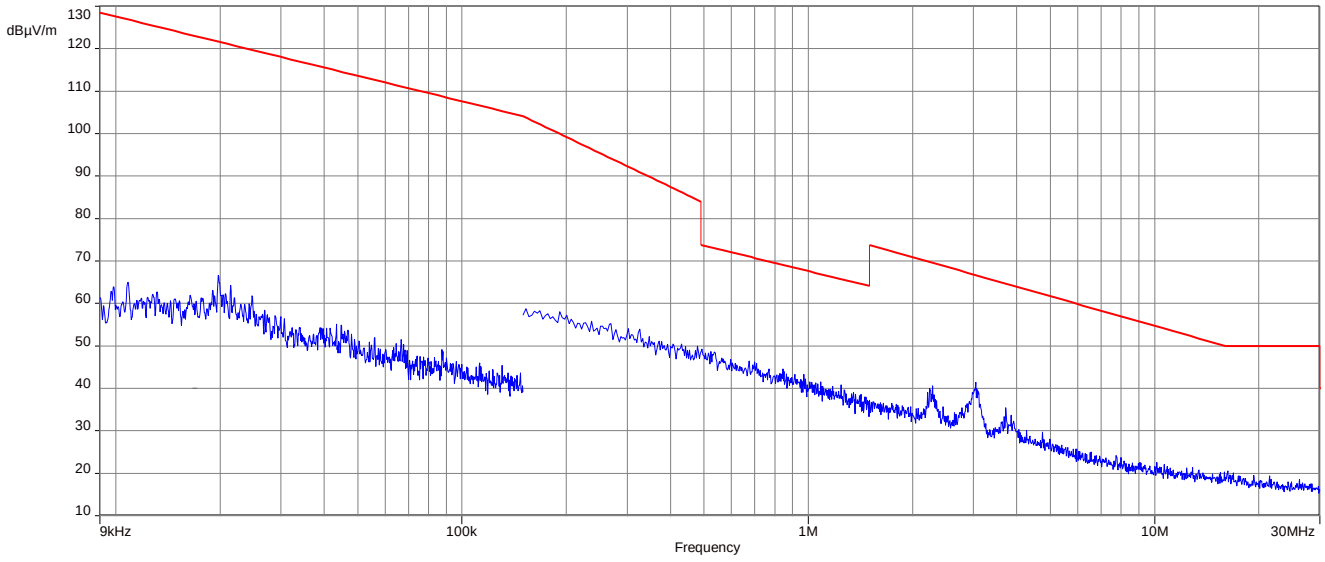
Spurious Emissions Radiated < 30 MHz [dBµV/m]		
F [MHz]	Detector	Level [dBµV/m]
All detected emissions are more than 20 dB below the limit.		

Plots: 20 MHz channel bandwidth (ANT-DB1-RAF-RPS)

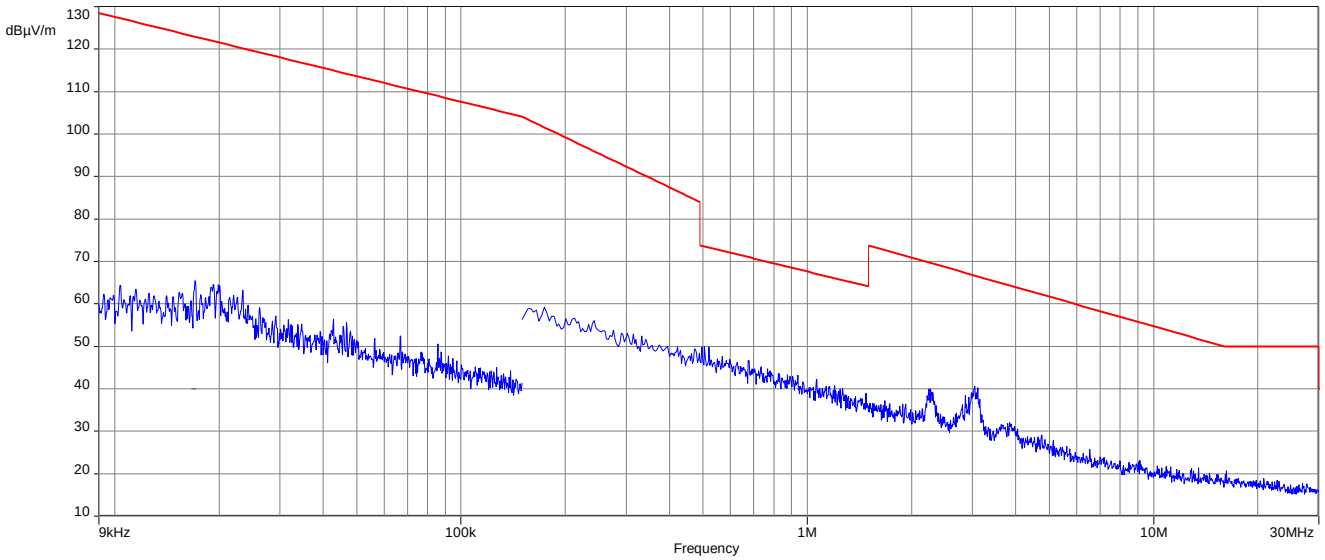
Plot 25: 9 kHz to 30 MHz, U-NII-1; lowest channel



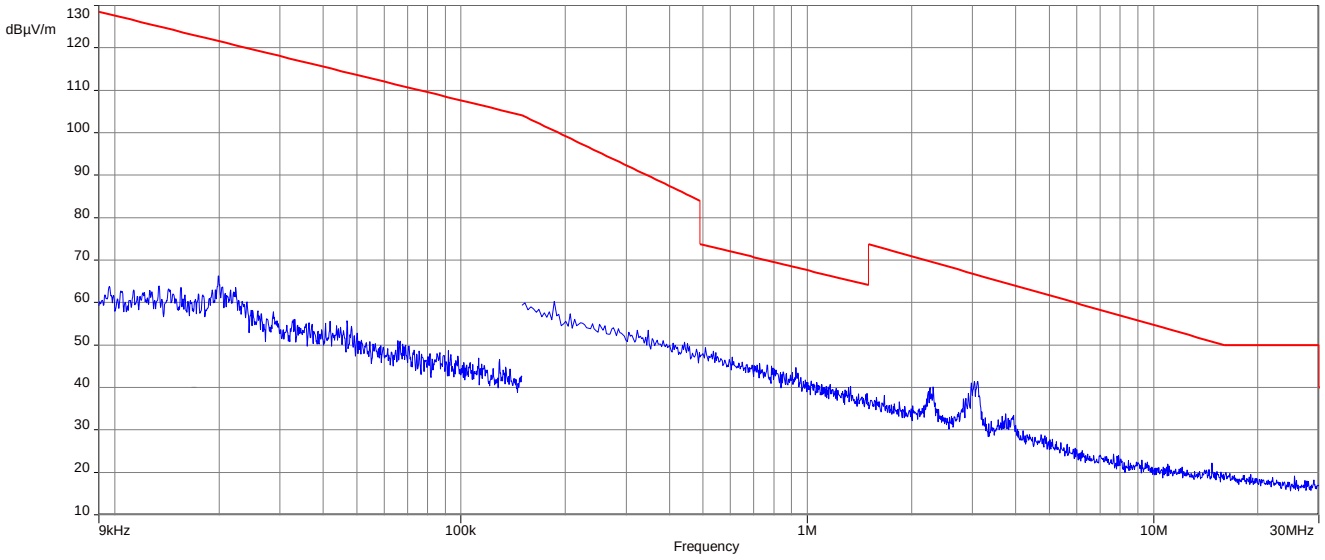
Plot 26: 9 kHz to 30 MHz, U-NII-1; highest channel



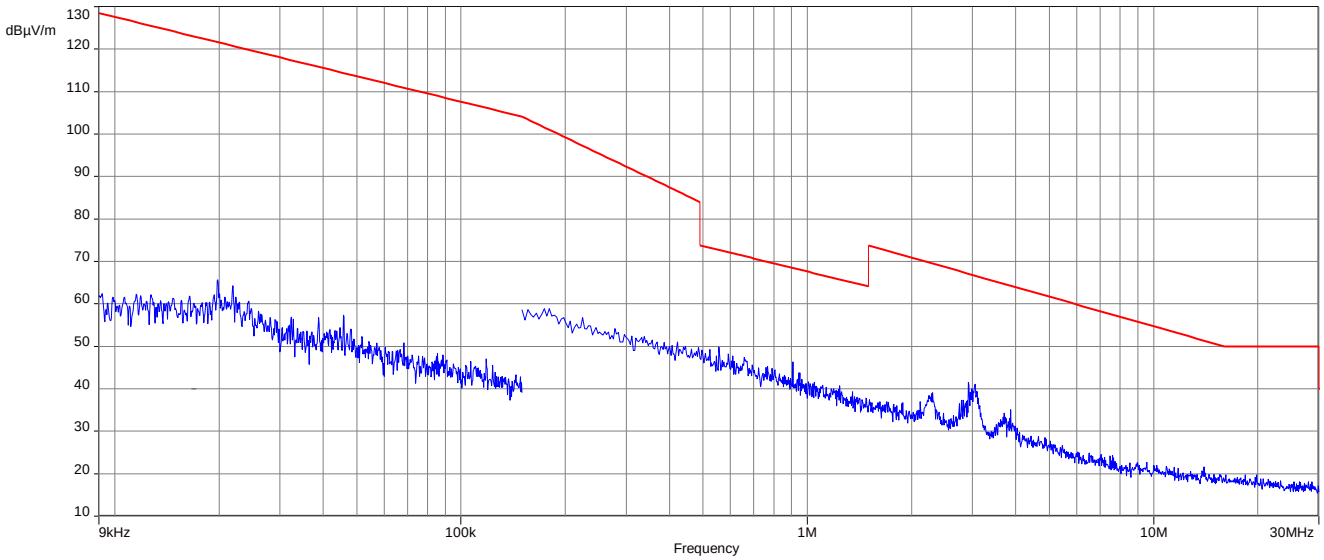
Plot 27: 9 kHz to 30 MHz, U-NII-2A; lowest channel



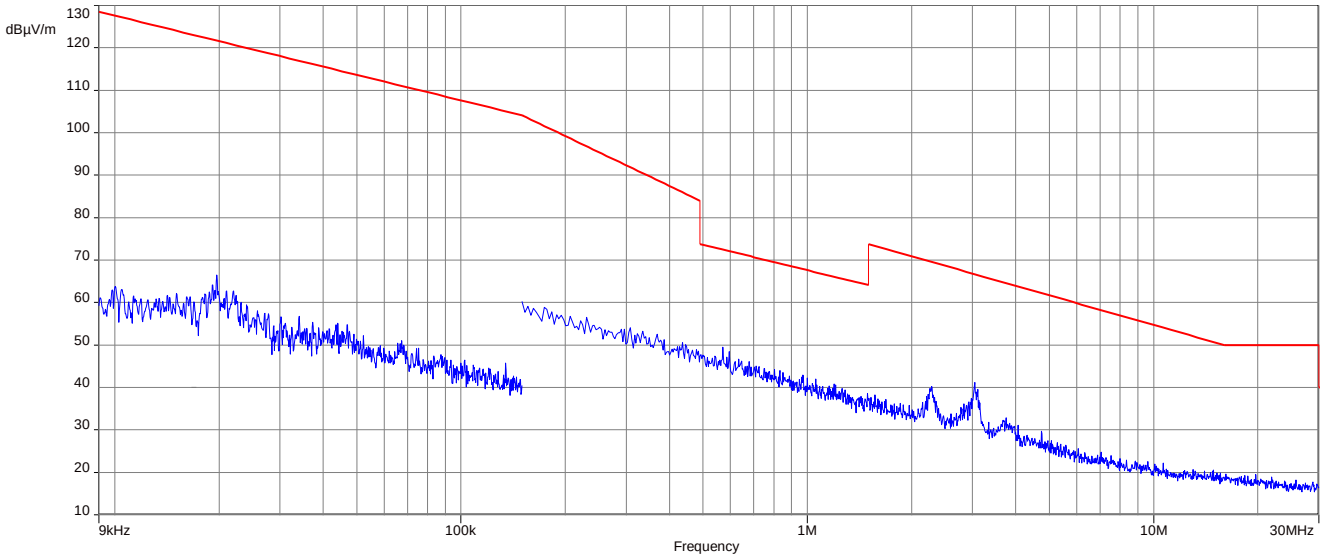
Plot 28: 9 kHz to 30 MHz, U-NII-2A; highest channel



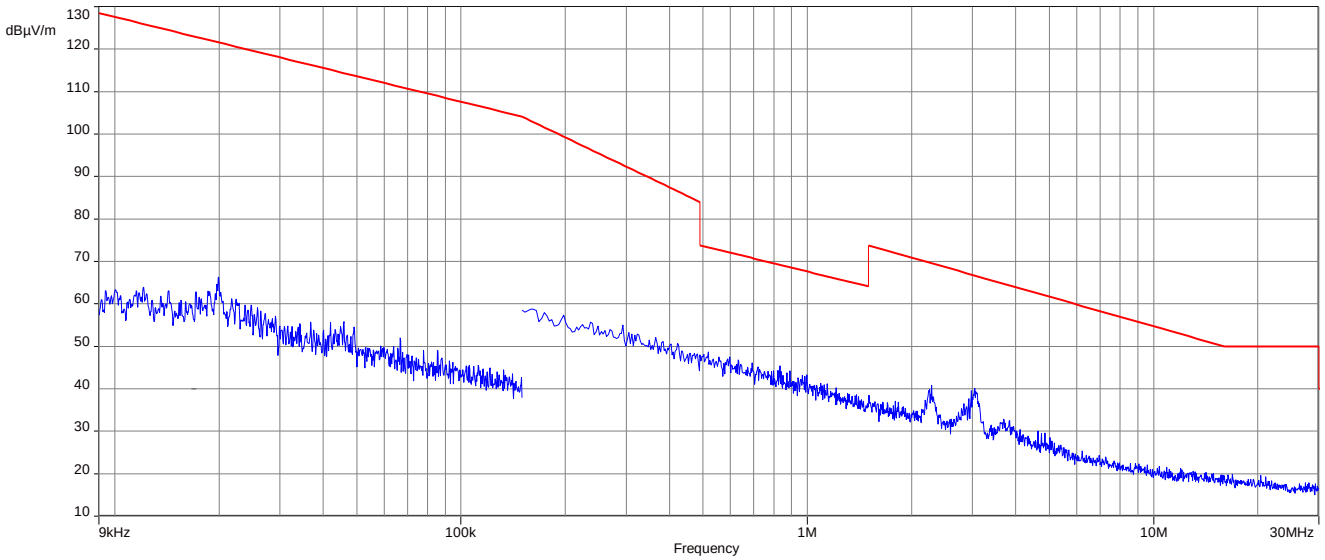
Plot 29: 9 kHz to 30 MHz, U-NII-2C; lowest channel



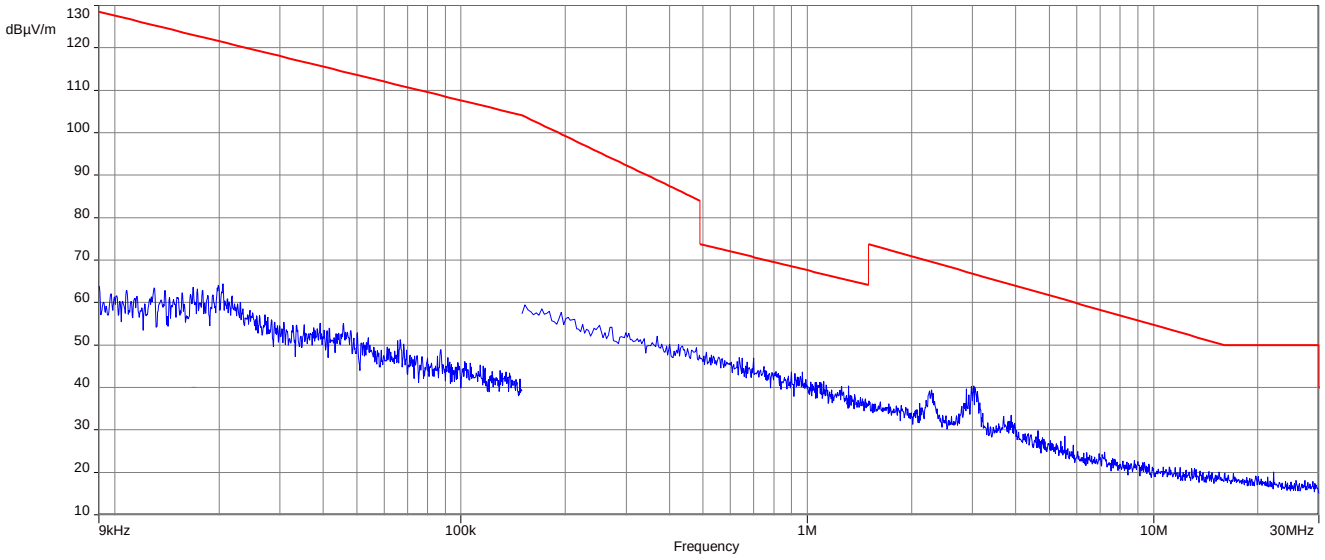
Plot 30: 9 kHz to 30 MHz, U-NII-2C; middle channel



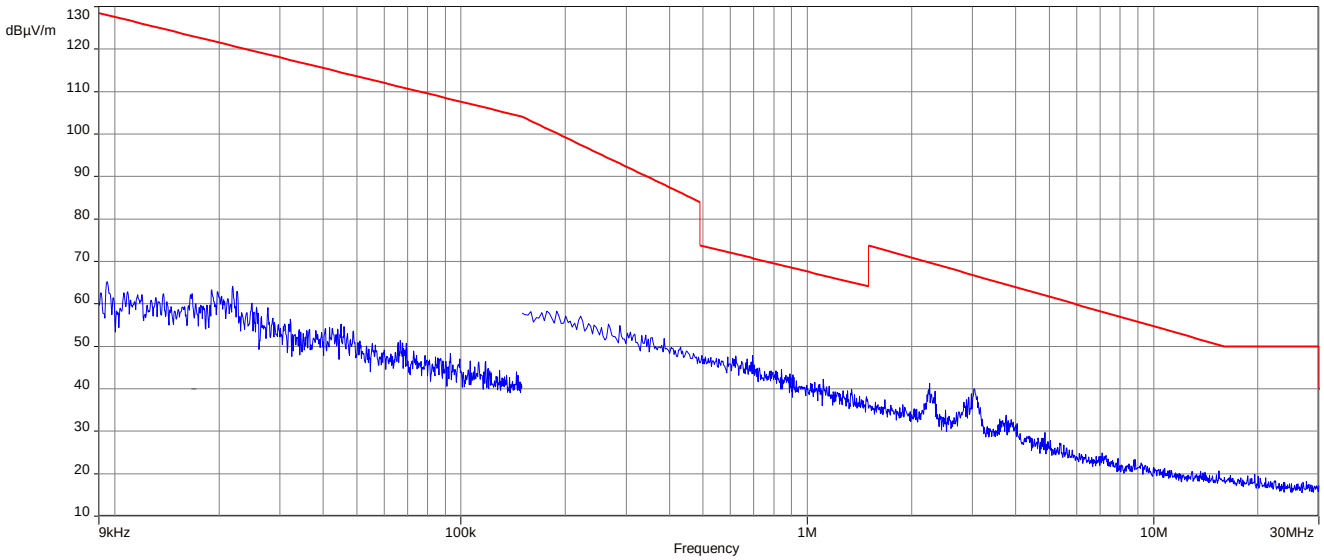
Plot 31: 9 kHz to 30 MHz, U-NII-2C; highest channel



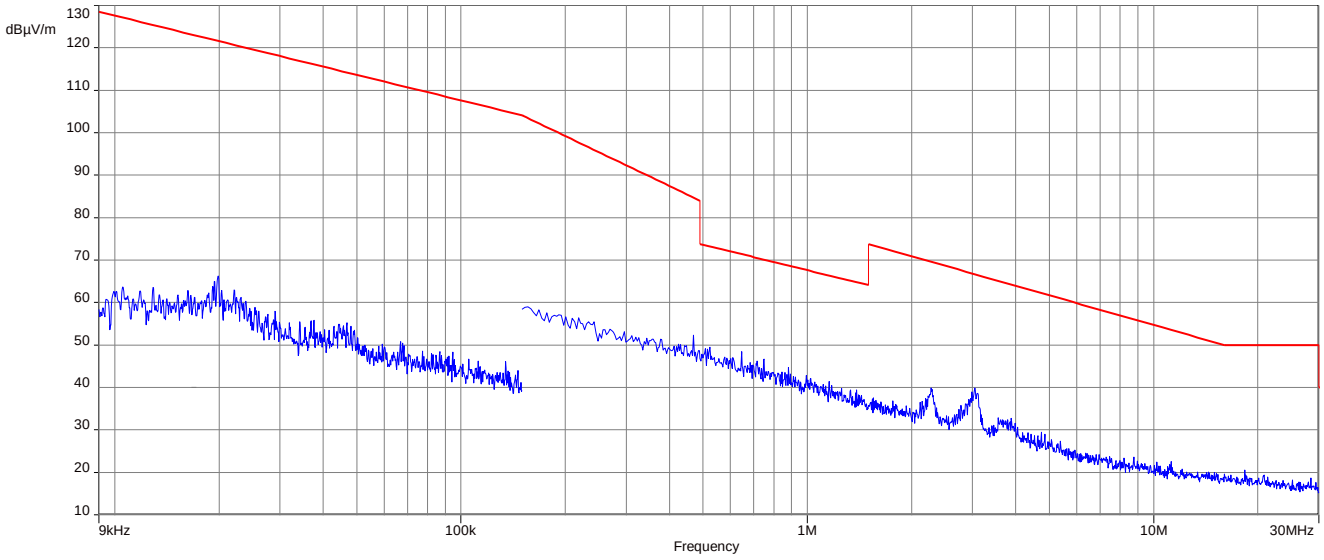
Plot 32: 9 kHz to 30 MHz, U-NII-3; lowest channel



Plot 33: 9 kHz to 30 MHz, U-NII-3; middle channel

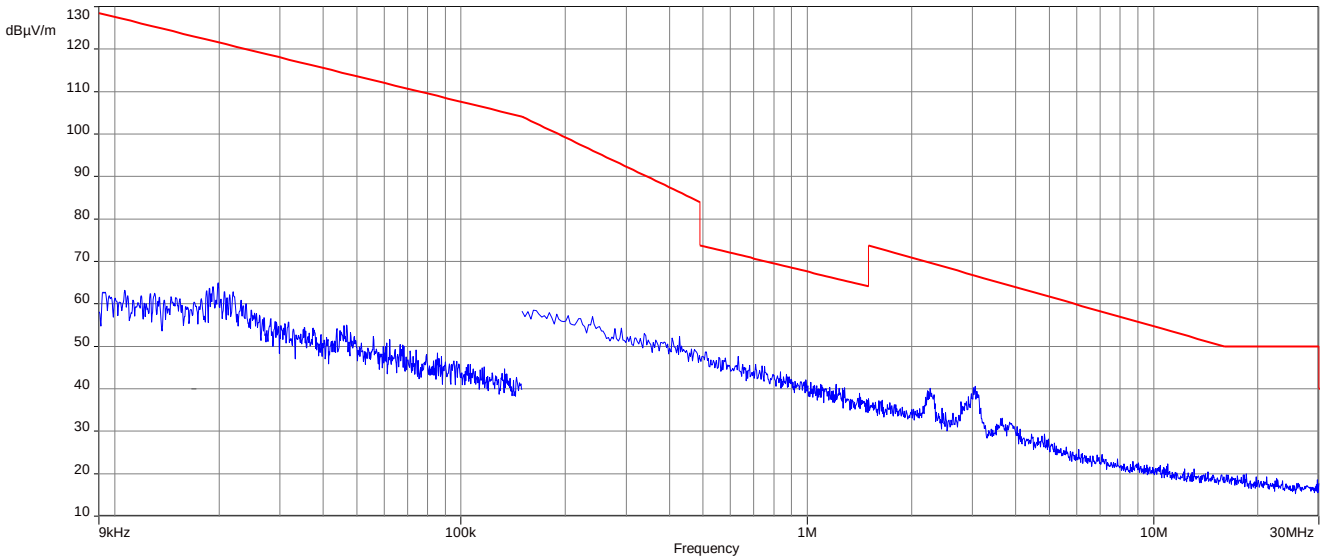


Plot 34: 9 kHz to 30 MHz, U-NII-3; highest channel

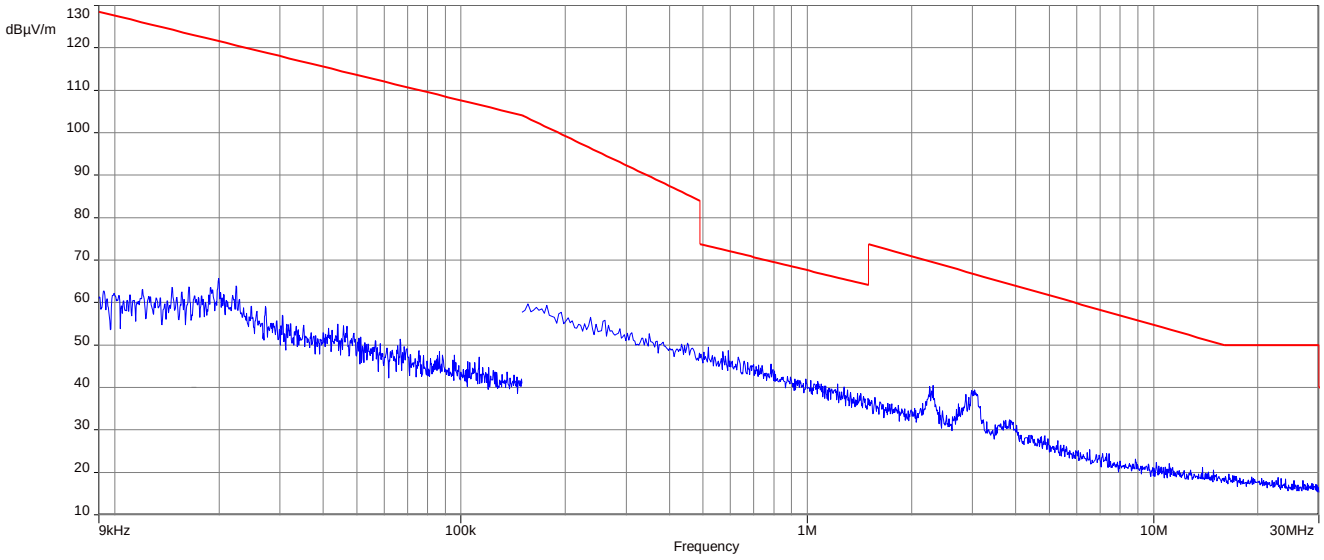


Plots: 40 MHz channel bandwidth

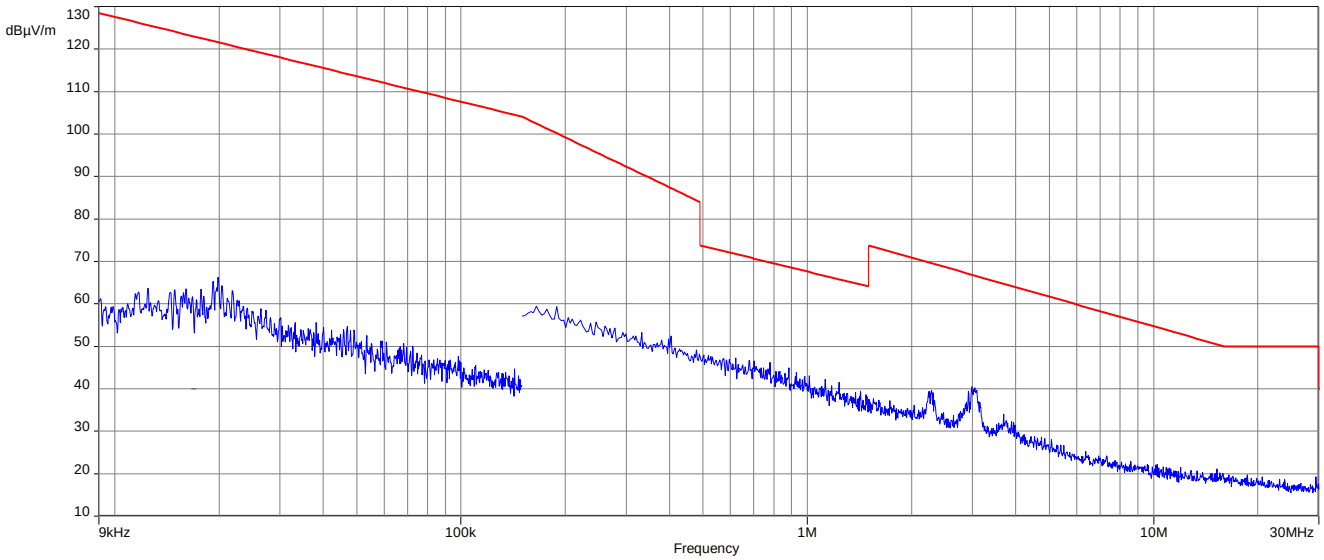
Plot 35: 9 kHz to 30 MHz, U-NII-1; lowest channel



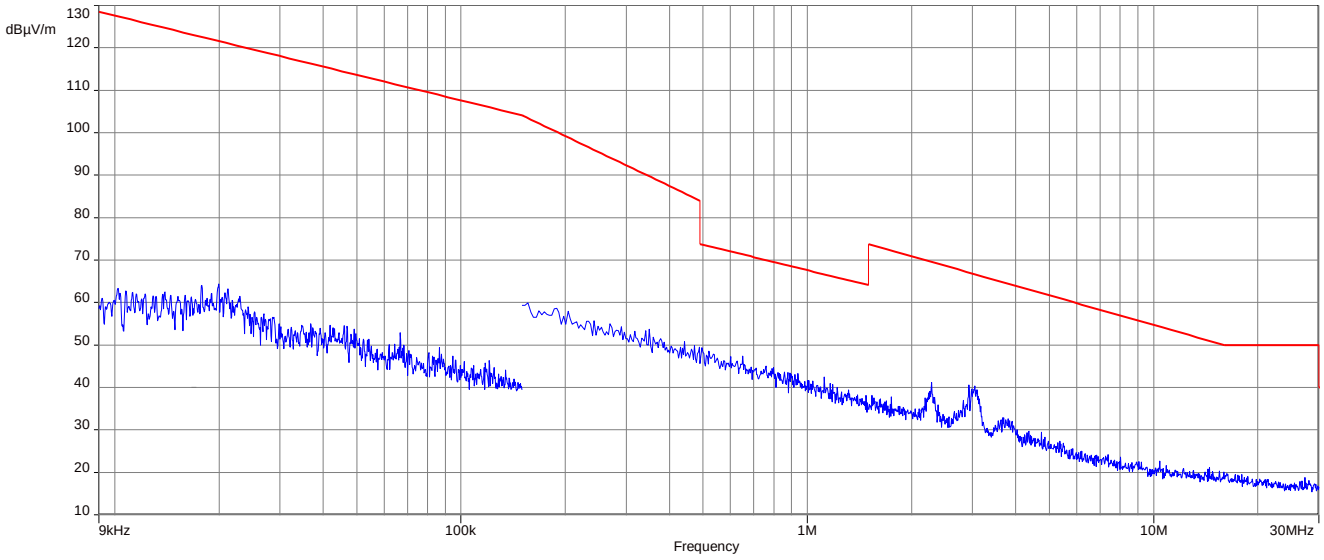
Plot 36: 9 kHz to 30 MHz, U-NII-1; highest channel



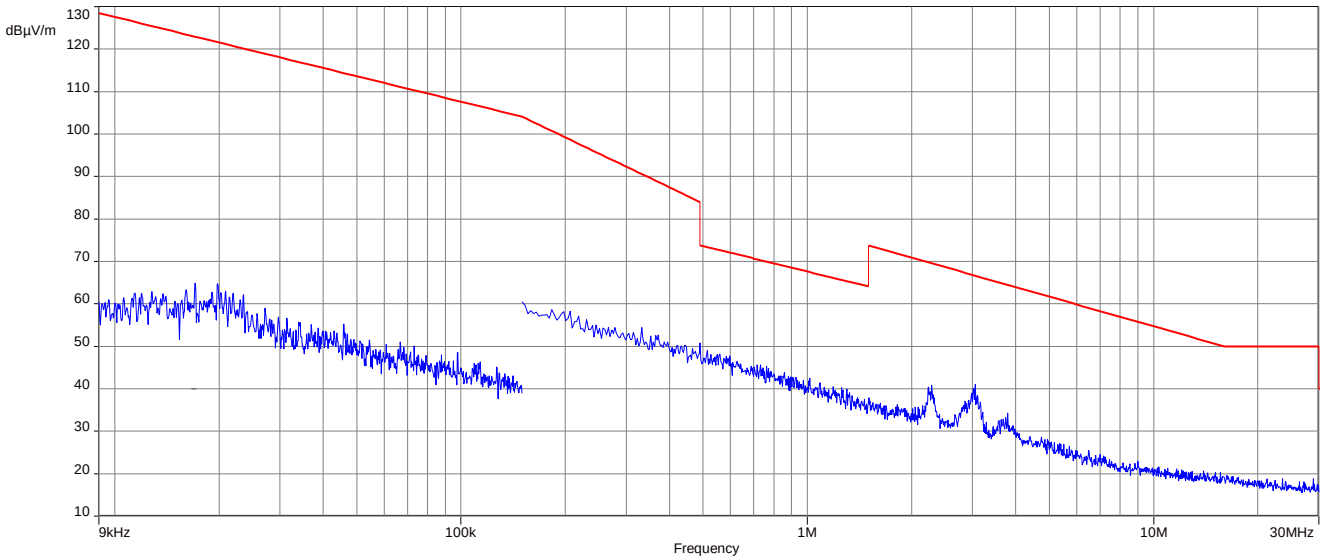
Plot 37: 9 kHz to 30 MHz, U-NII-2A; lowest channel



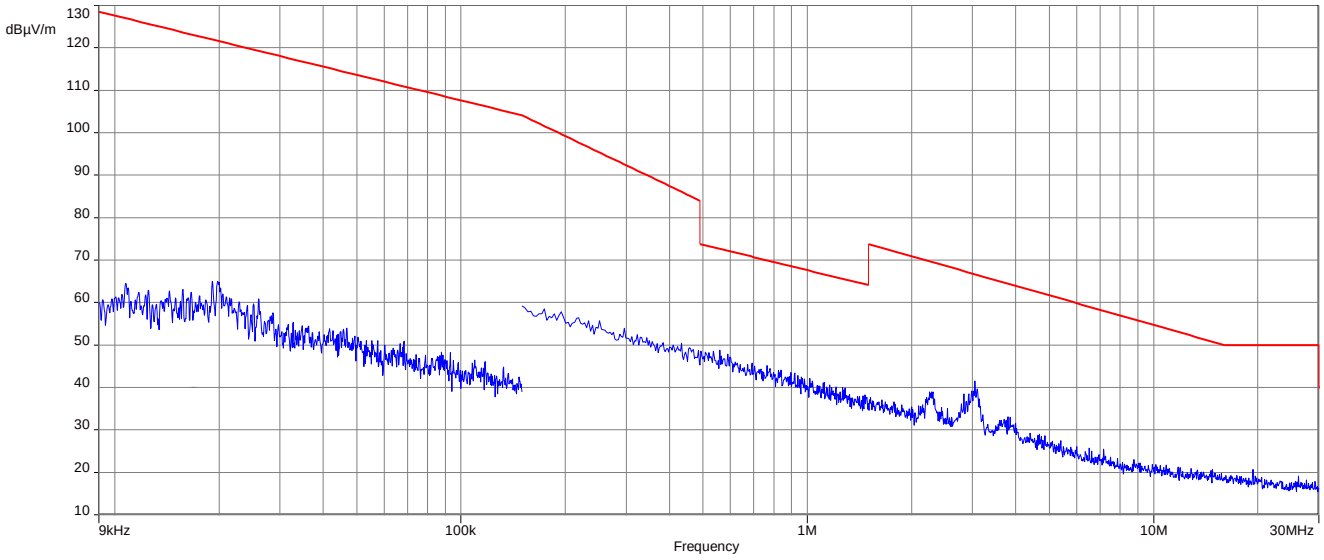
Plot 38: 9 kHz to 30 MHz, U-NII-2A; highest channel



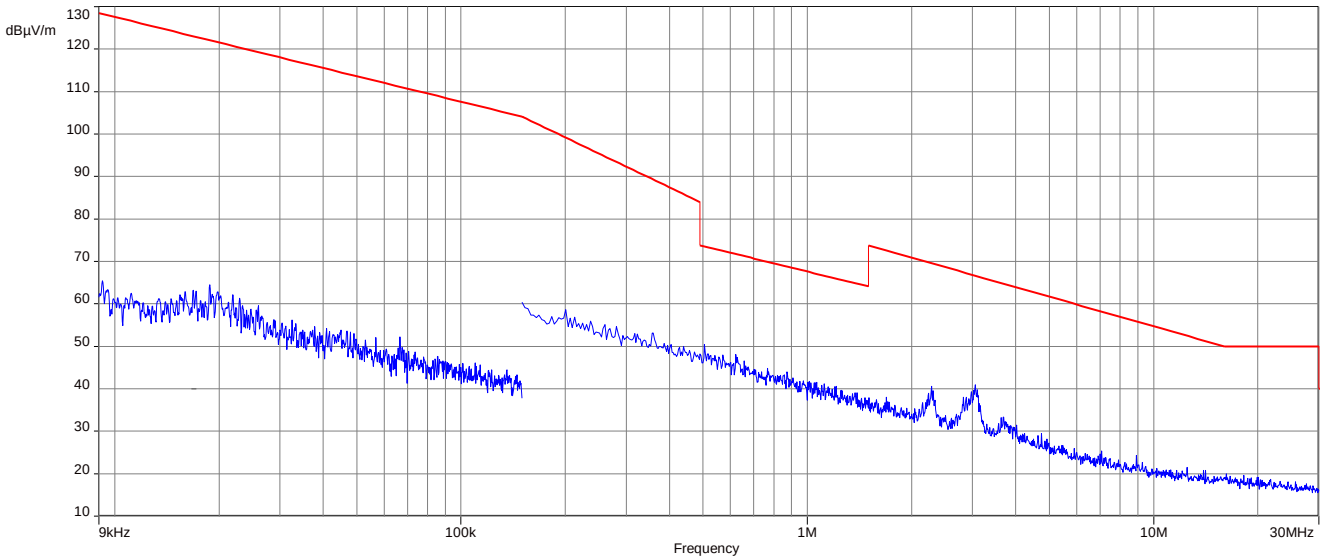
Plot 39: 9 kHz to 30 MHz, U-NII-2C; lowest channel



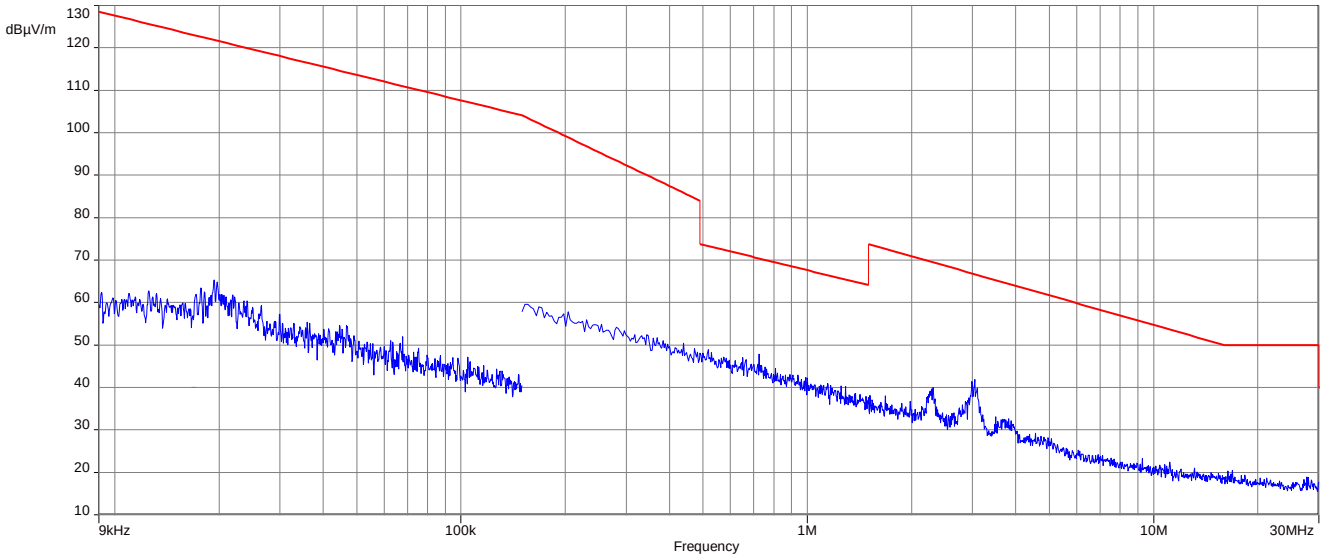
Plot 40: 9 kHz to 30 MHz, U-NII-2C; middle channel



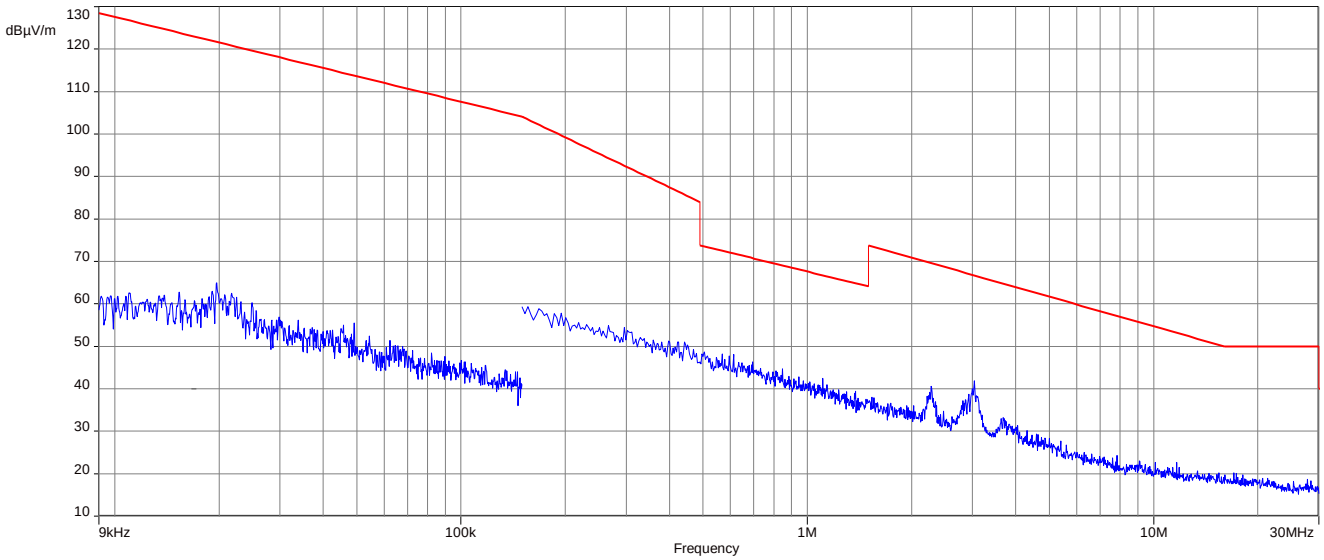
Plot 41: 9 kHz to 30 MHz, U-NII-2C; highest channel



Plot 42: 9 kHz to 30 MHz, U-NII-3; lowest channel

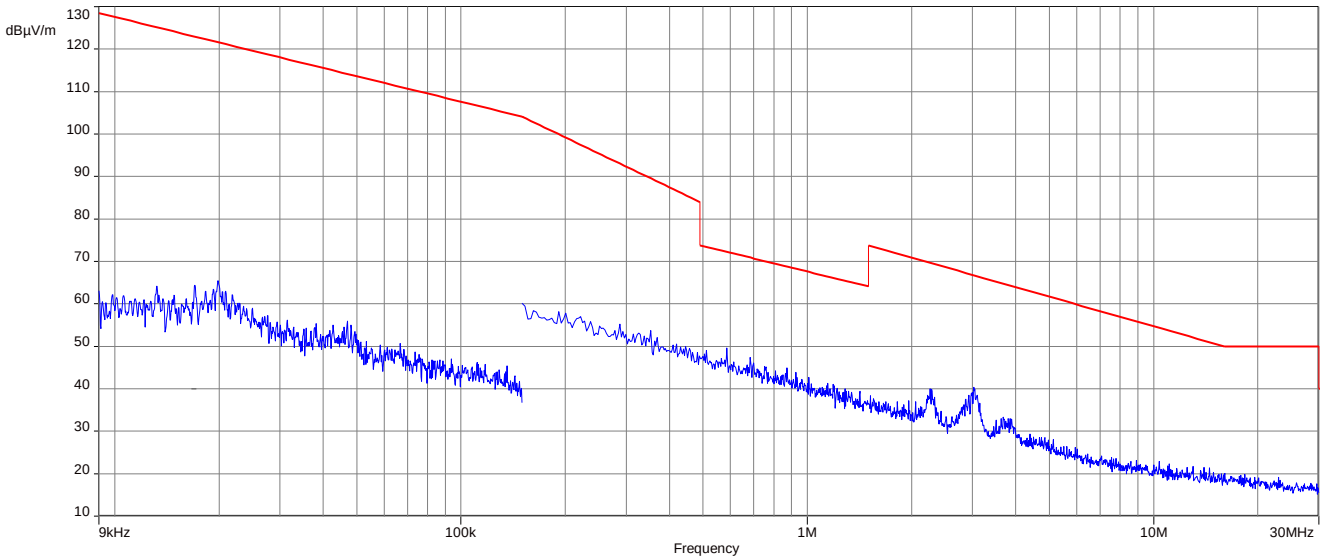


Plot 43: 9 kHz to 30 MHz, U-NII-3; highest channel

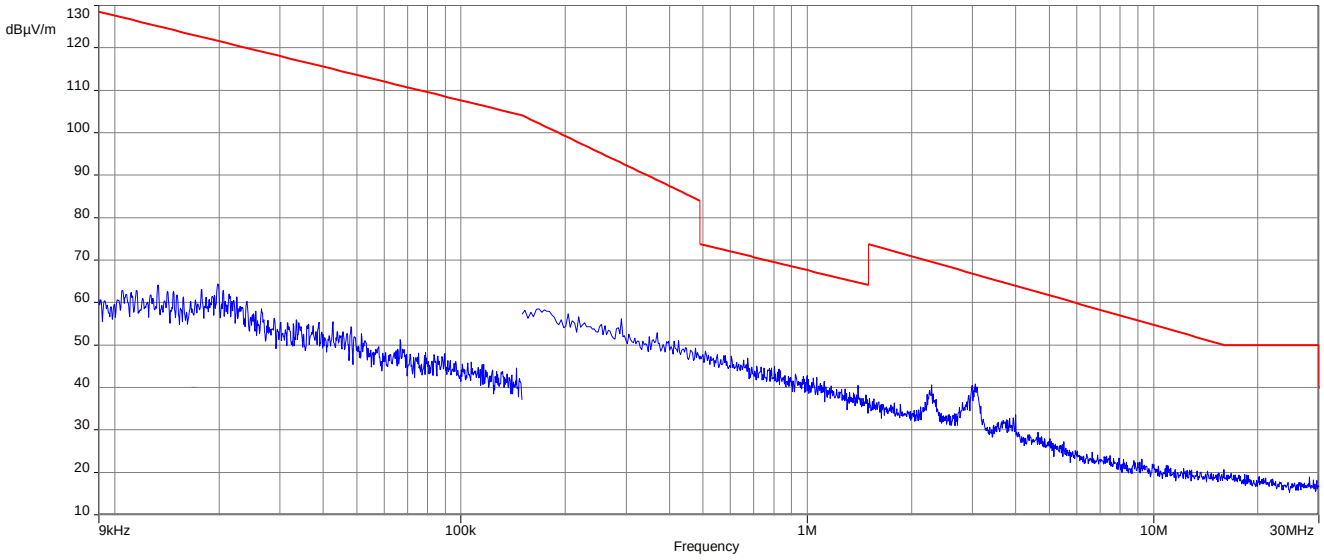


Plots: 80 MHz channel bandwidth

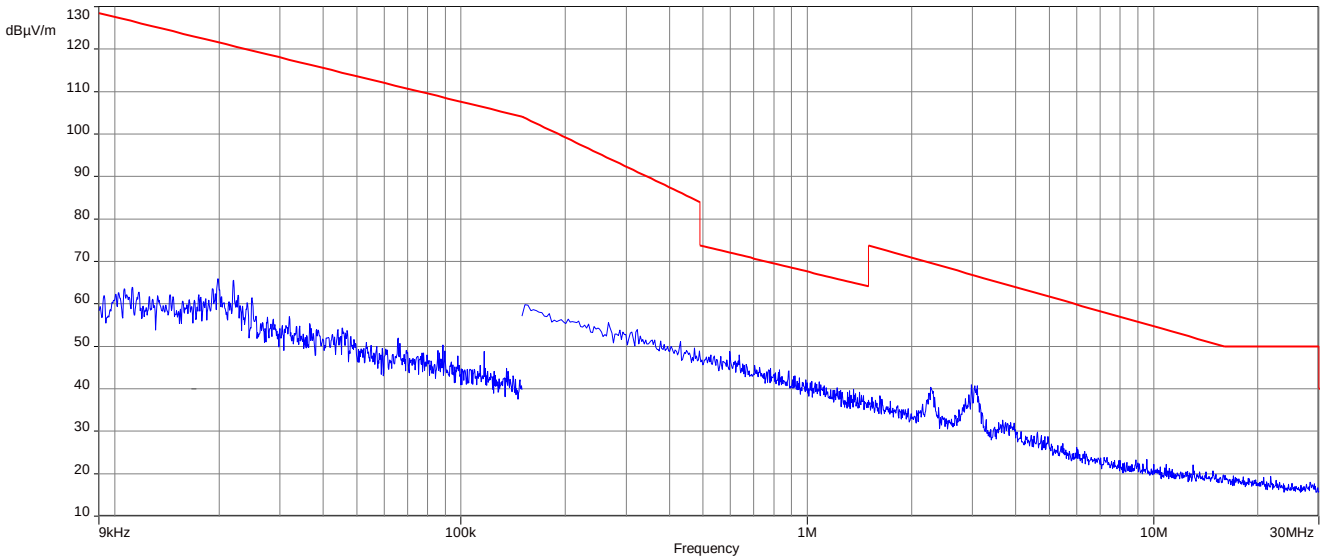
Plot 44: 9 kHz to 30 MHz, U-NII-1; middle channel



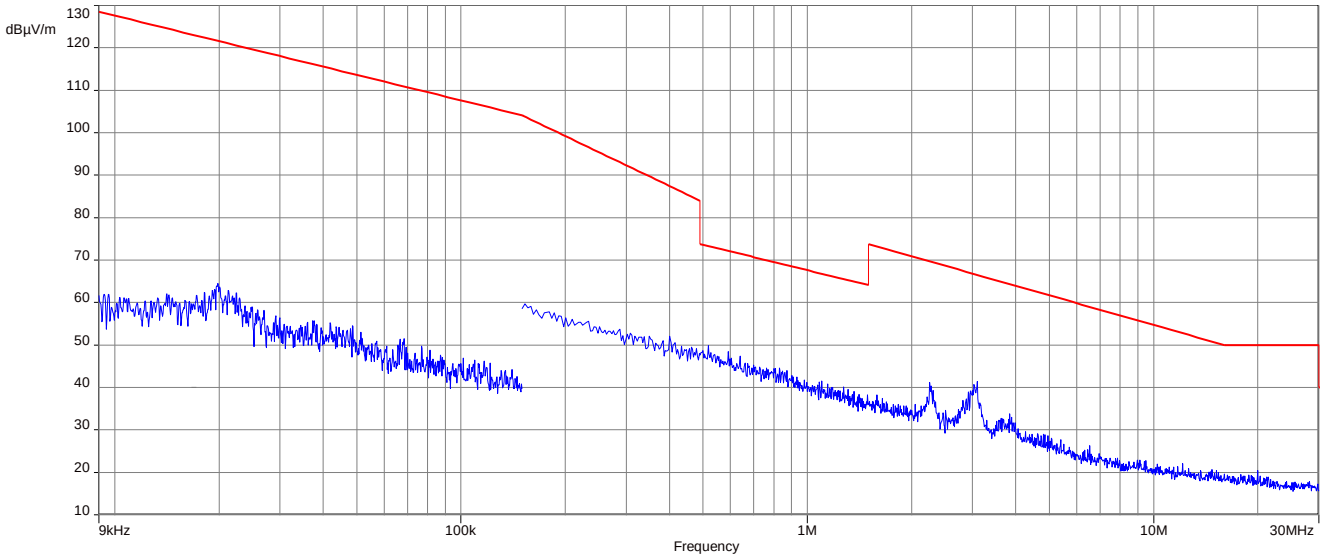
Plot 45: 9 kHz to 30 MHz, U-NII-2A; middle channel



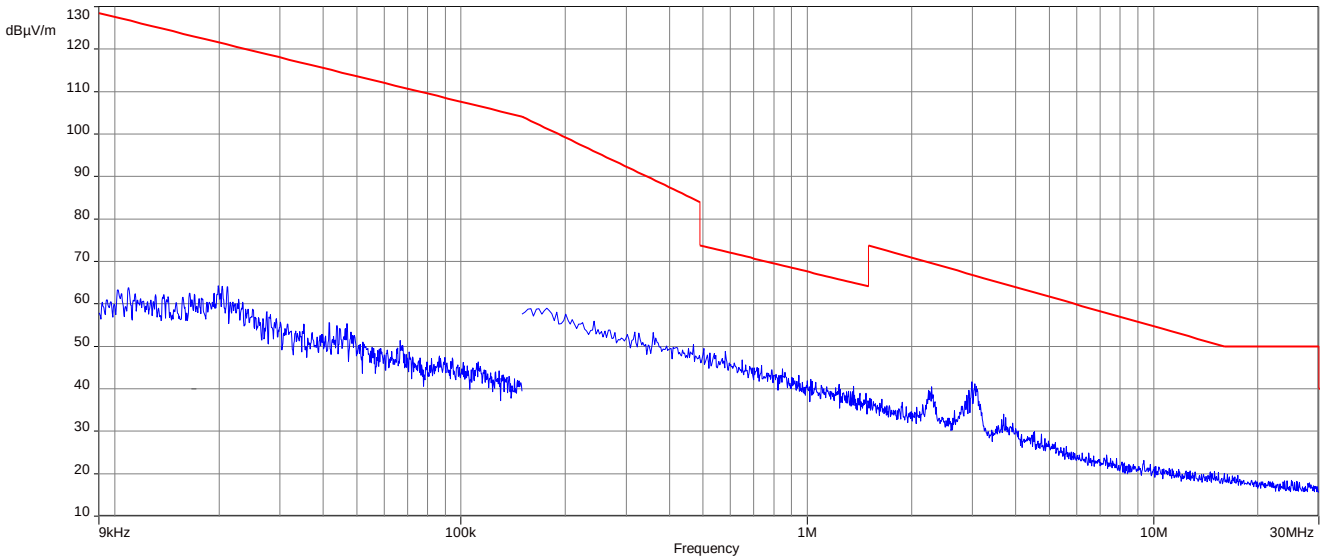
Plot 46: 9 kHz to 30 MHz, U-NII-2C; lowest channel



Plot 47: 9 kHz to 30 MHz, U-NII-2C; highest channel



Plot 48: 9 kHz to 30 MHz, U-NII-3; middle channel



12.11 Spurious emissions radiated 30 MHz to 1 GHz

Description:

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

Measurement:

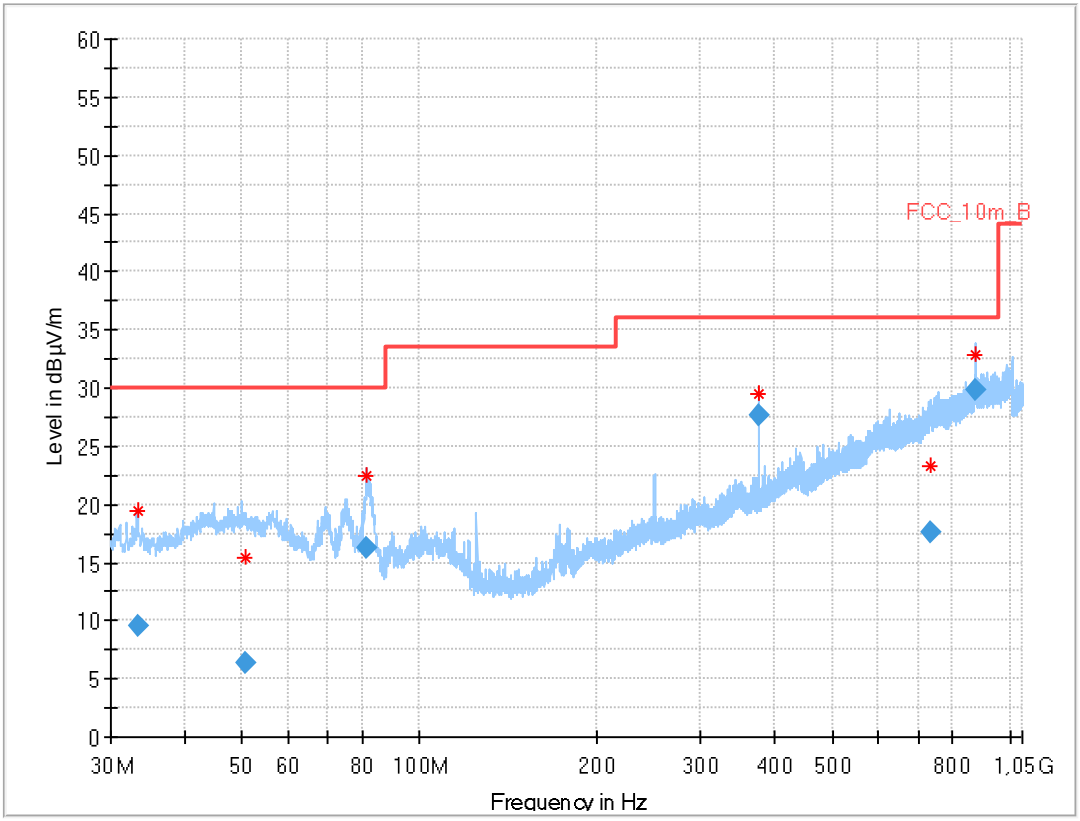
Measurement parameter	
Detector:	Quasi Peak
Sweep time:	Auto
Resolution bandwidth:	120 kHz
Video bandwidth:	500 kHz
Span:	30 MHz to 1 GHz
Test setup:	See sub clause 7.1 – A
Measurement uncertainty:	See chapter 9

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 (ANT-DB1-RAF-RPS)

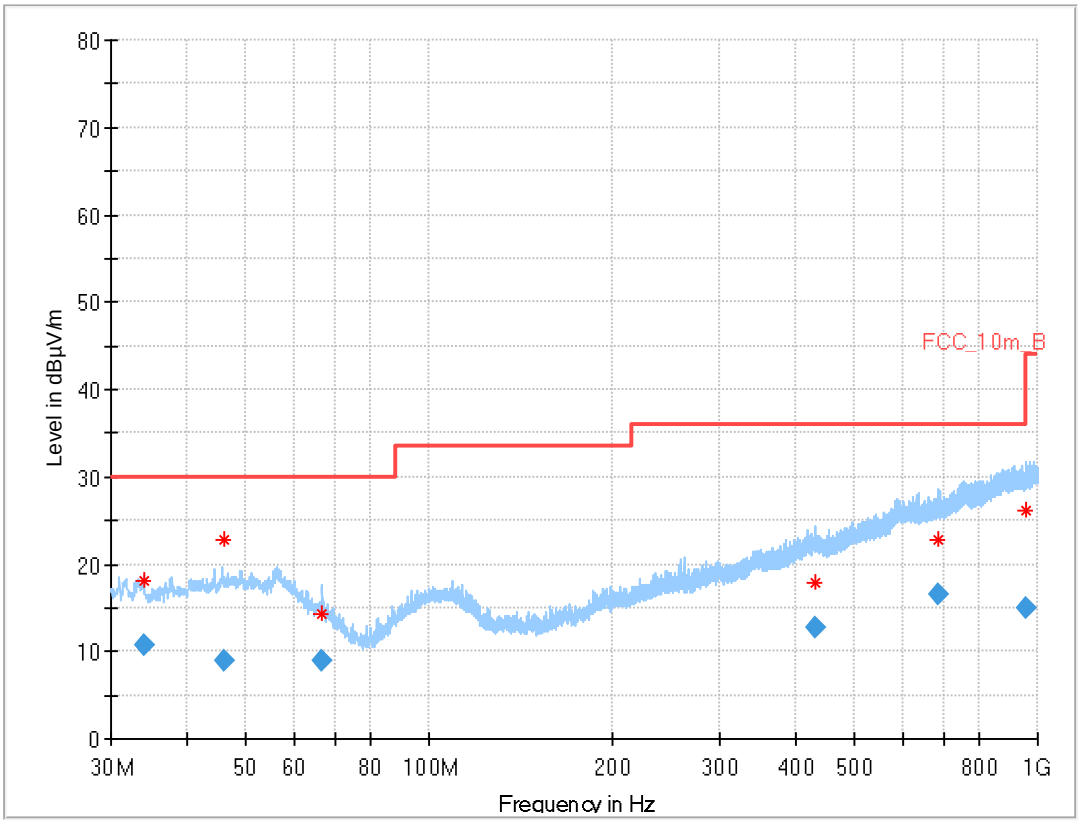
Plot 1: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-1; lowest channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.248	9.48	30.0	20.5	1000	120.0	174.0	V	303	12
50.591	6.36	30.0	23.6	1000	120.0	114.0	V	228	14
81.415	16.26	30.0	13.7	1000	120.0	204.0	V	197	8
374.993	27.63	36.0	8.4	1000	120.0	238.0	H	180	16
735.348	17.57	36.0	18.4	1000	120.0	200.0	H	180	22
874.986	29.80	36.0	6.2	1000	120.0	128.0	H	307	23

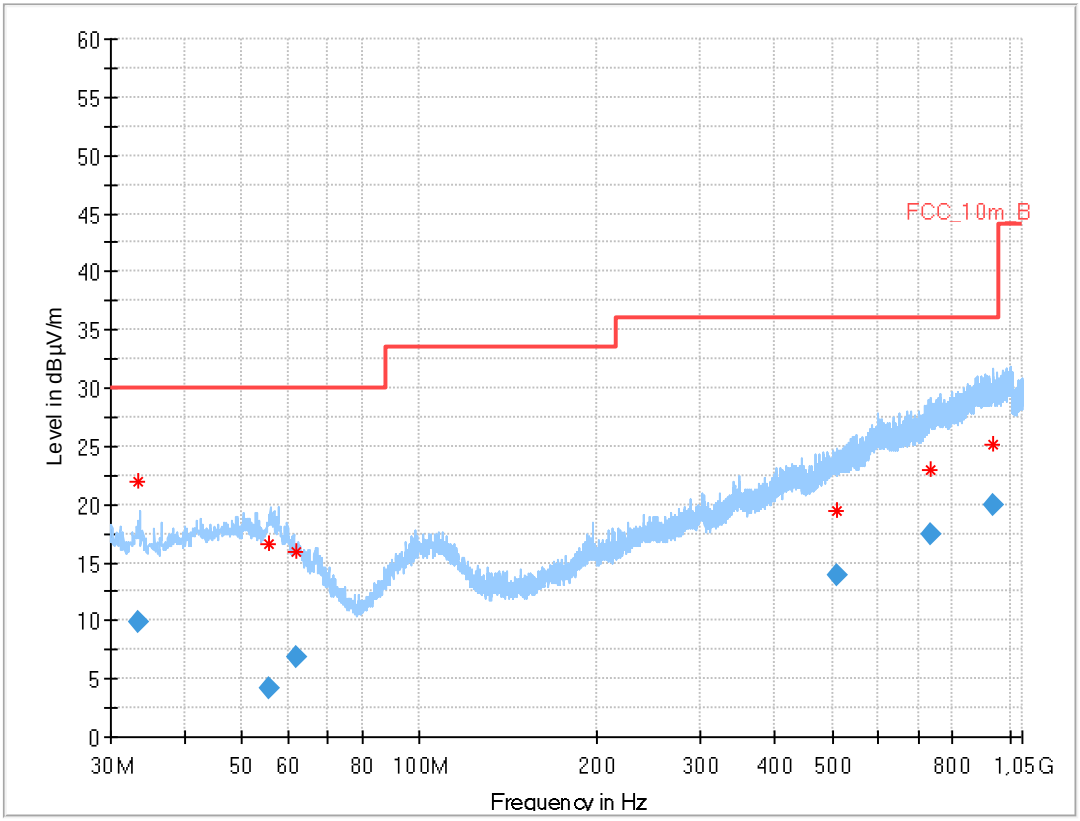
Plot 2: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-1; middle channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
34.028	10.75	30.0	19.3	1000	120.0	139.0	V	70	12
46.155	8.88	30.0	21.1	1000	120.0	170.0	V	70	14
66.533	8.83	30.0	21.2	1000	120.0	118.0	H	-10	11
431.441	12.65	36.0	23.4	1000	120.0	170.0	V	38	17
683.783	16.53	36.0	19.5	1000	120.0	102.0	V	217	21
958.153	15.02	36.0	21.0	1000	120.0	98.0	H	134	24

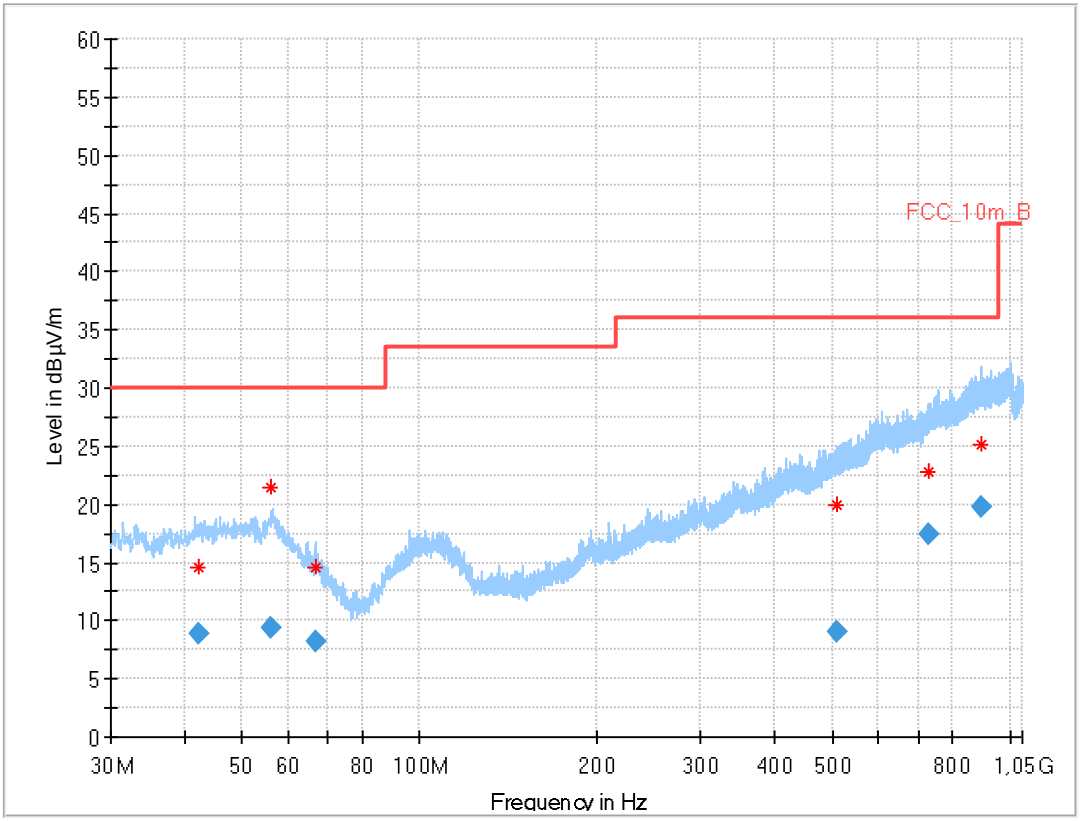
Plot 3: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-1; highest channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.398	9.96	30.0	20.0	1000	120.0	109.0	V	165	12
55.666	4.16	30.0	25.8	1000	120.0	387.0	V	322	15
61.709	6.81	30.0	23.2	1000	120.0	352.0	H	225	12
509.132	13.93	36.0	22.1	1000	120.0	106.0	V	210	18
734.251	17.51	36.0	18.5	1000	120.0	200.0	V	225	22
937.310	19.98	36.0	16.0	1000	120.0	200.0	H	180	24

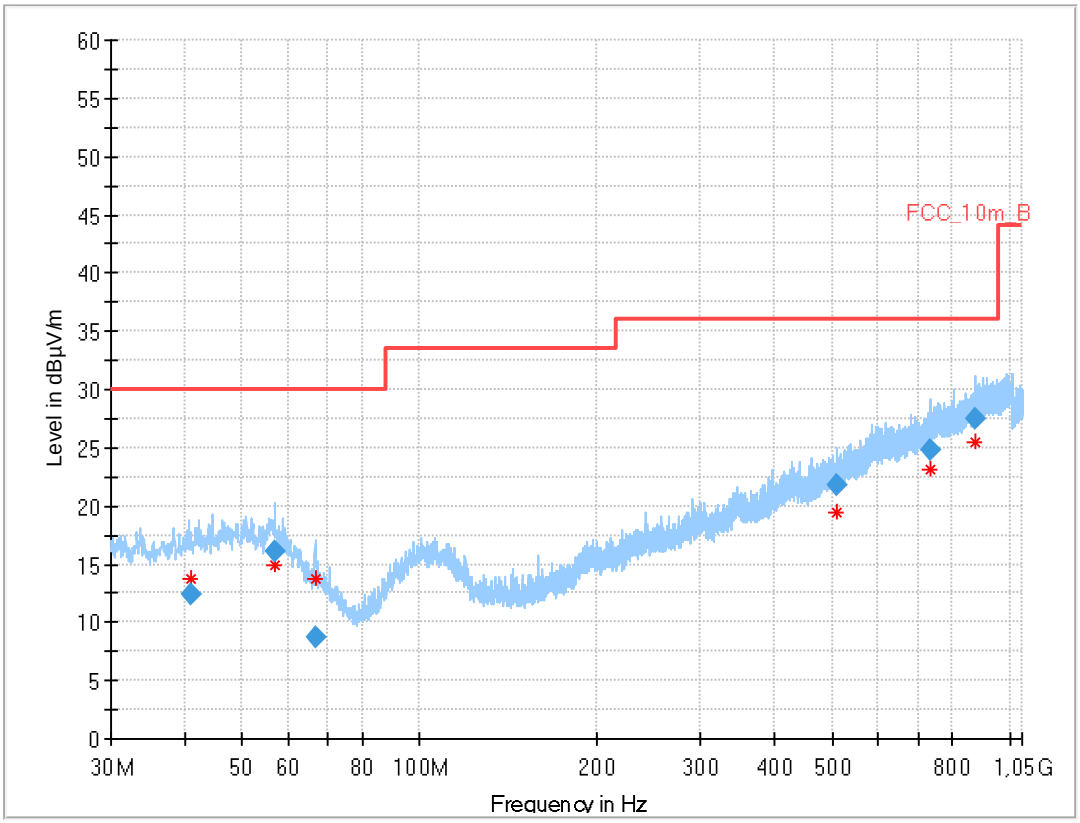
Plot 4: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-2A; lowest channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
42.208	8.92	30.0	21.1	1000	120.0	169.0	V	90	14
55.936	9.43	30.0	20.6	1000	120.0	308.0	H	135	15
66.777	8.15	30.0	21.9	1000	120.0	104.0	H	135	11
510.824	9.12	36.0	26.9	1000	120.0	400.0	H	45	19
730.306	17.37	36.0	18.6	1000	120.0	200.0	H	48	21
893.069	19.76	36.0	16.2	1000	120.0	200.0	V	270	24

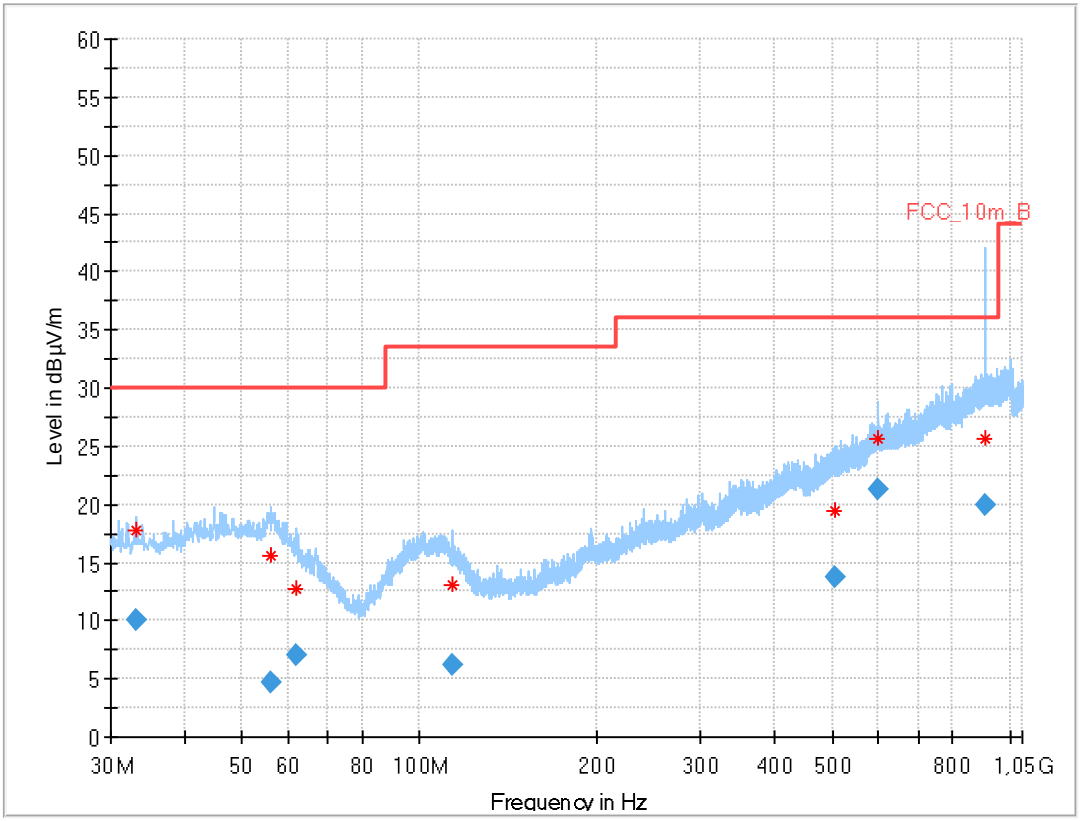
Plot 5: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-2A; middle channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
41.066	12.46	30.0	17.5	1000	120.0	170.0	H	75	14
56.750	16.09	30.0	13.9	1000	120.0	170.0	H	157	15
66.509	8.77	30.0	21.2	1000	120.0	170.0	H	292	11
510.672	21.83	36.0	14.2	1000	120.0	161.0	H	67	19
732.924	24.75	36.0	11.3	1000	120.0	170.0	H	157	22
872.169	27.44	36.0	8.6	1000	120.0	170.0	V	264	23

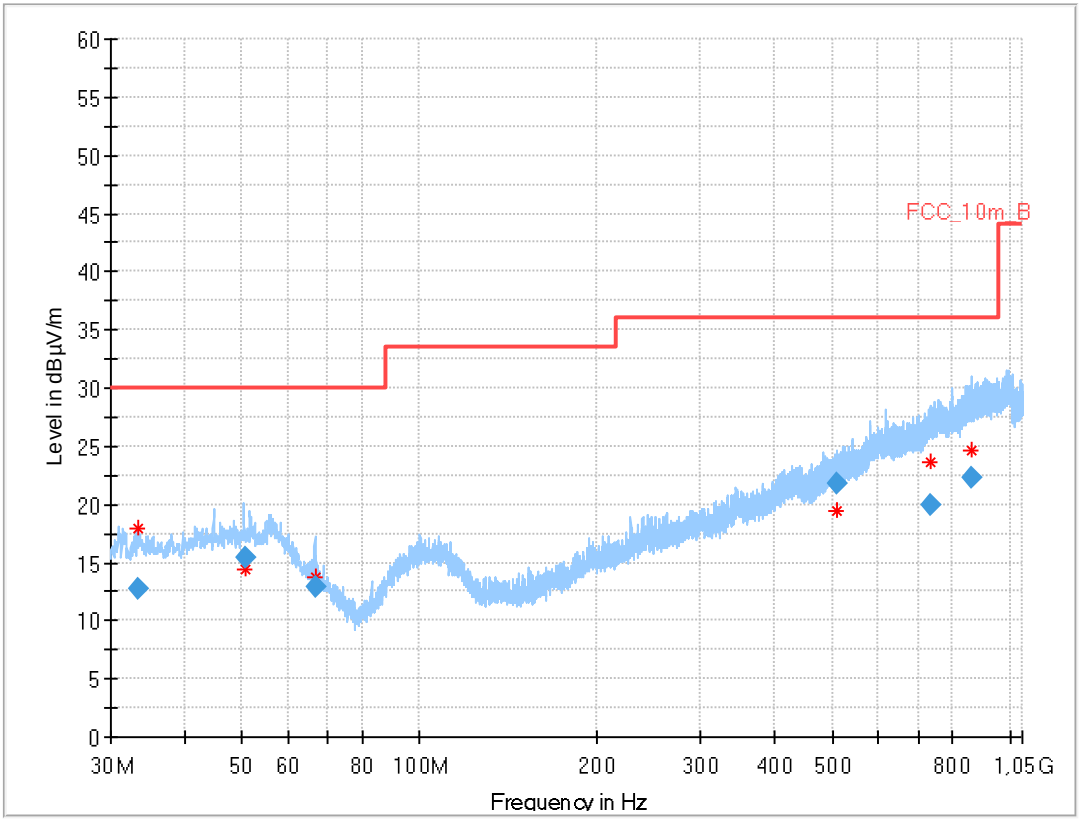
Plot 6: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-2A; highest channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.245	9.99	30.0	20.0	1000	120.0	130.0	V	330	12
55.978	4.71	30.0	25.3	1000	120.0	143.0	V	90	15
62.021	7.00	30.0	23.0	1000	120.0	200.0	H	270	12
113.326	6.12	33.5	27.4	1000	120.0	318.0	H	-45	12
504.579	13.77	36.0	22.2	1000	120.0	181.0	H	53	18
599.970	21.34	36.0	14.7	1000	120.0	167.0	H	147	20

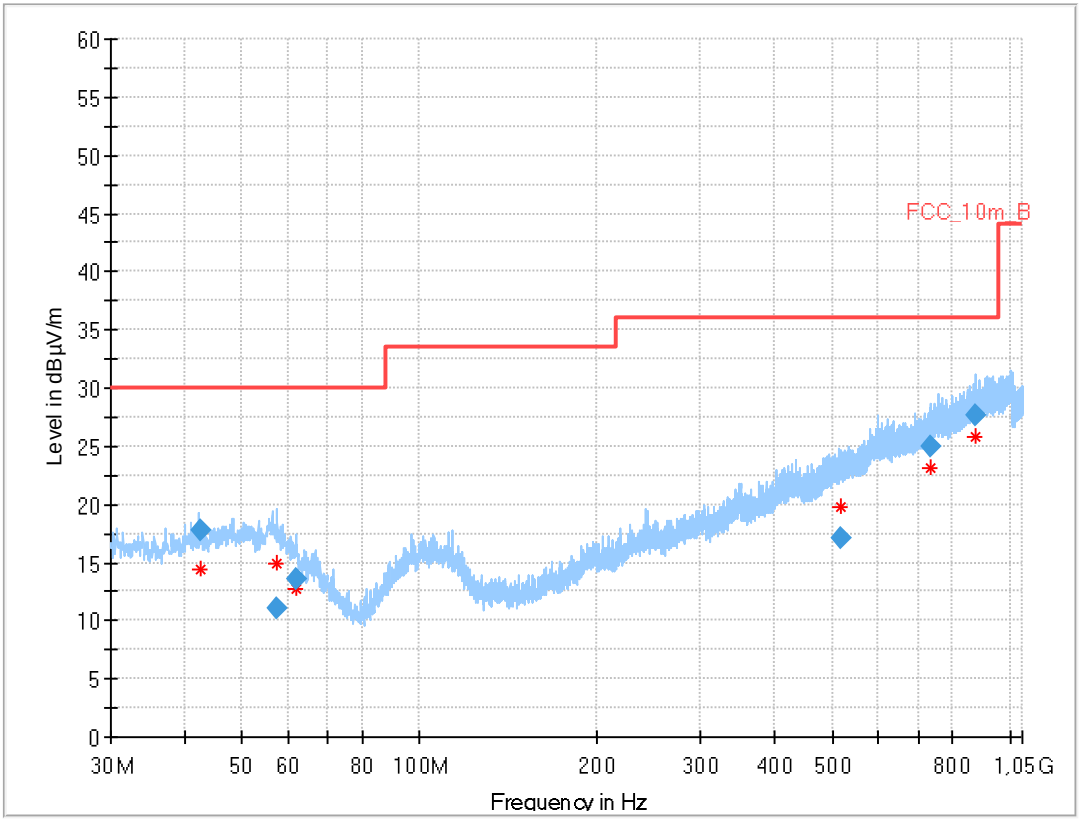
Plot 7: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-2C; lowest channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.401	12.80	30.0	17.2	1000	120.0	119.0	V	98	12
50.765	15.44	30.0	14.6	1000	120.0	170.0	H	185	14
66.645	12.98	30.0	17.0	1000	120.0	106.0	H	83	11
509.658	21.76	36.0	14.2	1000	120.0	102.0	H	67	18
734.565	19.90	36.0	16.1	1000	120.0	170.0	V	4	22
860.541	22.29	36.0	13.7	1000	120.0	102.0	H	157	23

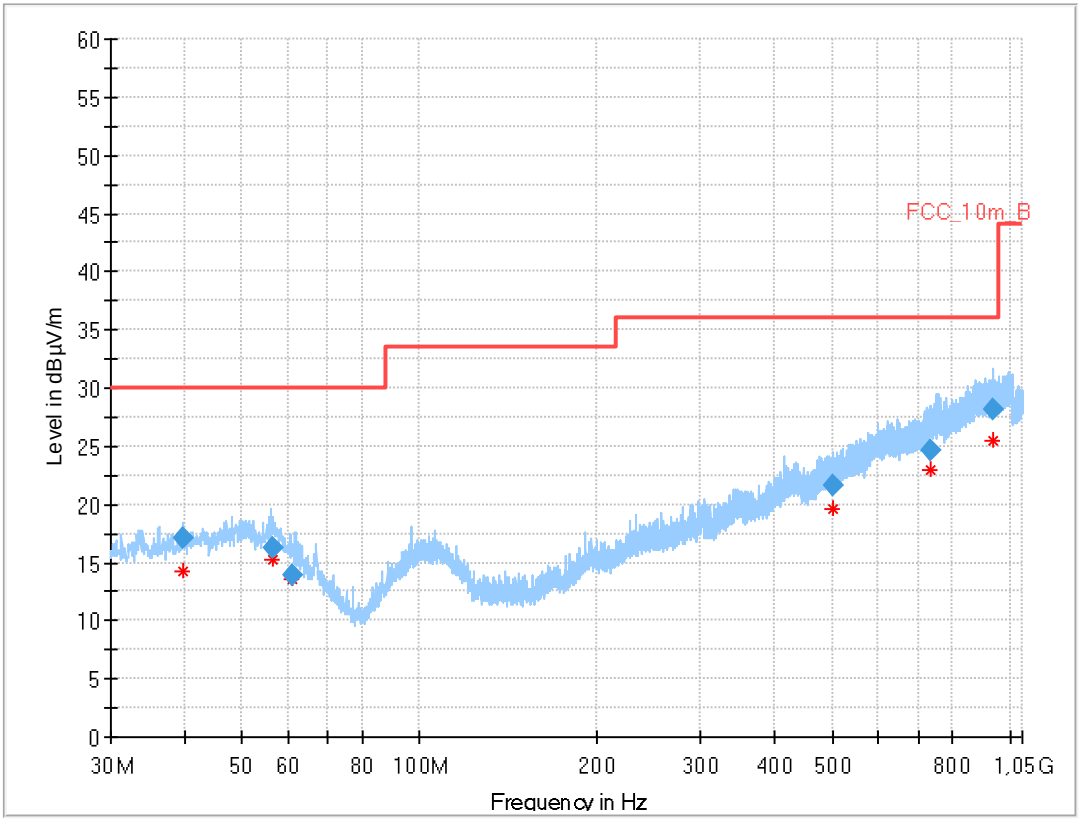
Plot 8: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-2C; middle channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
42.424	17.72	30.0	12.3	1000	120.0	120.0	V	76	14
57.151	11.04	30.0	19.0	1000	120.0	170.0	V	157	15
61.877	13.65	30.0	16.4	1000	120.0	101.0	H	-2	12
515.621	17.09	36.0	18.9	1000	120.0	170.0	H	70	19
735.177	24.91	36.0	11.1	1000	120.0	170.0	H	-22	22
876.743	27.62	36.0	8.4	1000	120.0	162.0	H	67	23

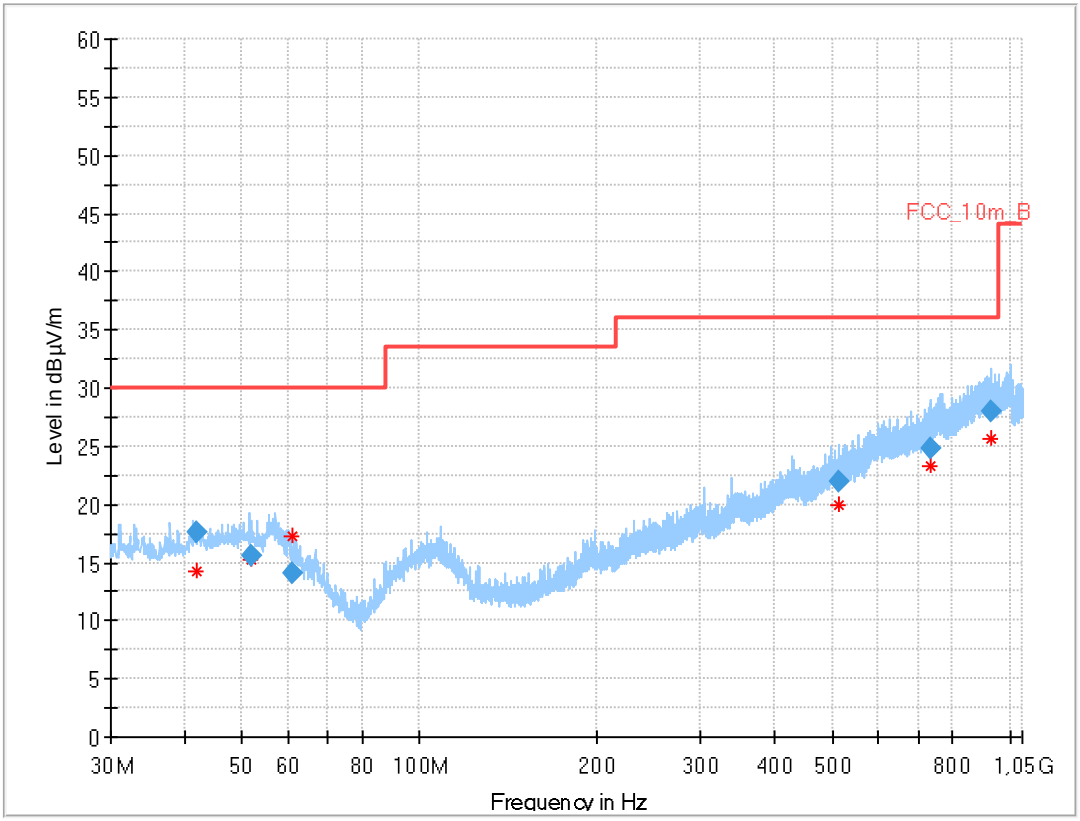
Plot 9: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-2C; highest channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
39.700	17.17	30.0	12.8	1000	120.0	113.0	V	-22	13
56.338	16.22	30.0	13.8	1000	120.0	170.0	V	67	15
61.005	13.93	30.0	16.1	1000	120.0	170.0	H	-6	13
501.111	21.65	36.0	14.4	1000	120.0	170.0	H	-22	18
732.994	24.69	36.0	11.3	1000	120.0	170.0	H	-22	22
933.657	28.11	36.0	7.9	1000	120.0	166.0	V	67	24

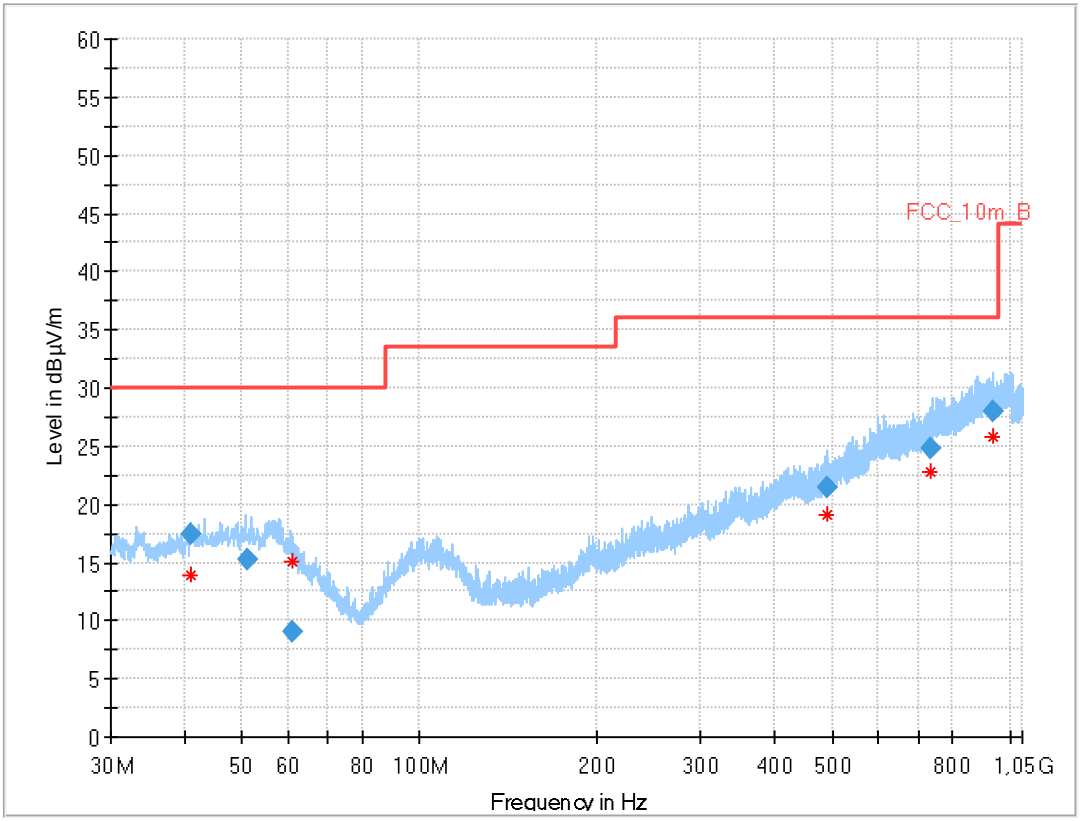
Plot 10: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-3; lowest channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
41.926	17.63	30.0	12.4	1000	120.0	101.0	V	67	14
51.966	15.53	30.0	14.5	1000	120.0	152.0	V	202	14
60.824	14.00	30.0	16.0	1000	120.0	106.0	V	157	13
515.281	21.95	36.0	14.1	1000	120.0	110.0	H	-2	19
735.617	24.84	36.0	11.2	1000	120.0	110.0	H	67	22
930.849	28.00	36.0	8.0	1000	120.0	170.0	H	181	24

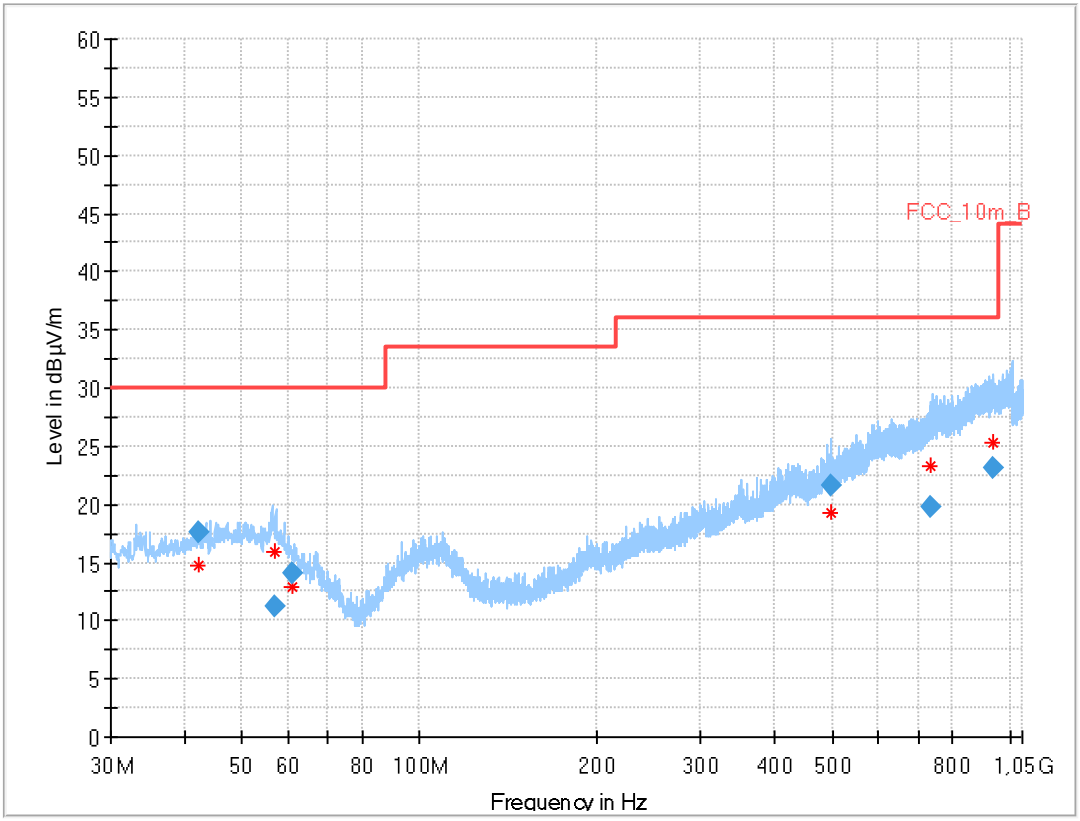
Plot 11: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-3; middle channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
40.986	17.37	30.0	12.6	1000	120.0	170.0	V	157	14
51.026	15.31	30.0	14.7	1000	120.0	170.0	H	-5	14
60.911	9.10	30.0	20.9	1000	120.0	121.0	V	181	13
491.053	21.40	36.0	14.6	1000	120.0	170.0	V	67	18
732.204	24.79	36.0	11.2	1000	120.0	153.0	H	-22	22
935.834	27.96	36.0	8.0	1000	120.0	114.0	V	-22	24

Plot 12: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-3; highest channel

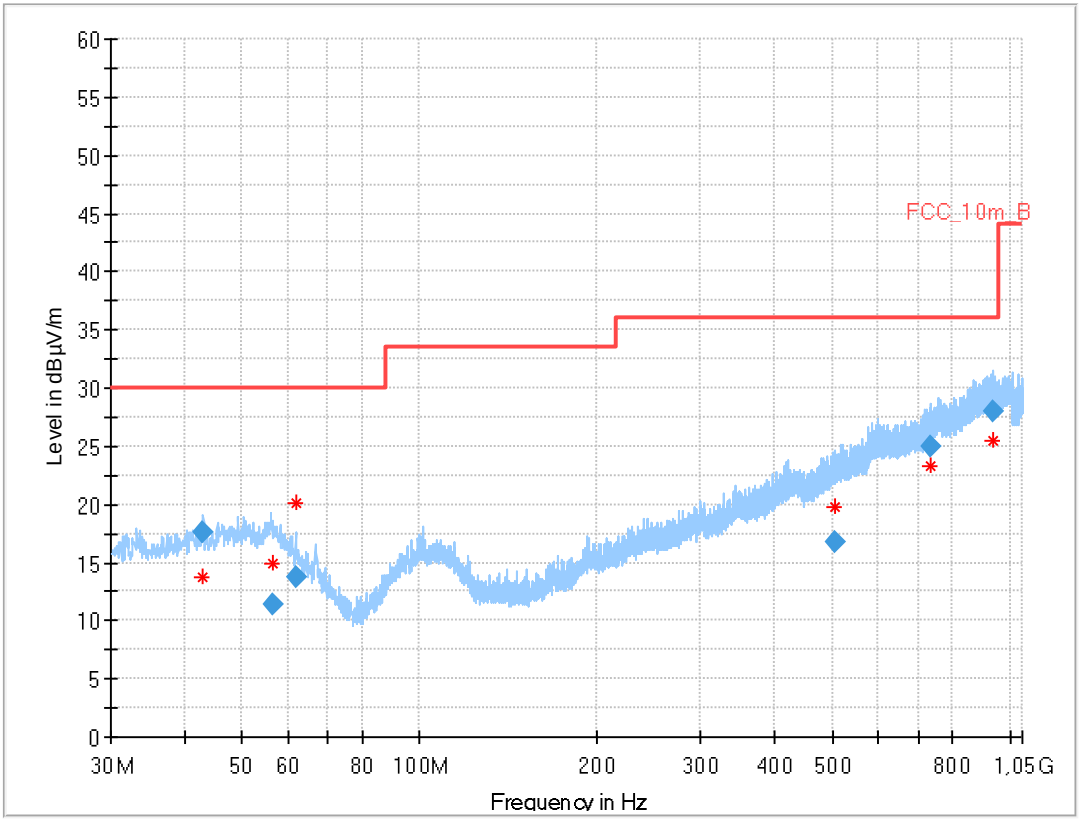


Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
42.117	17.63	30.0	12.4	1000	120.0	144.0	V	247	14
56.707	11.18	30.0	18.8	1000	120.0	154.0	V	22	15
61.000	14.05	30.0	16.0	1000	120.0	170.0	H	100	13
496.295	21.61	36.0	14.4	1000	120.0	170.0	H	157	18
734.521	19.78	36.0	16.2	1000	120.0	170.0	V	247	22
935.719	23.12	36.0	12.9	1000	120.0	163.0	V	-22	24

Plots: 40 MHz channel bandwidth

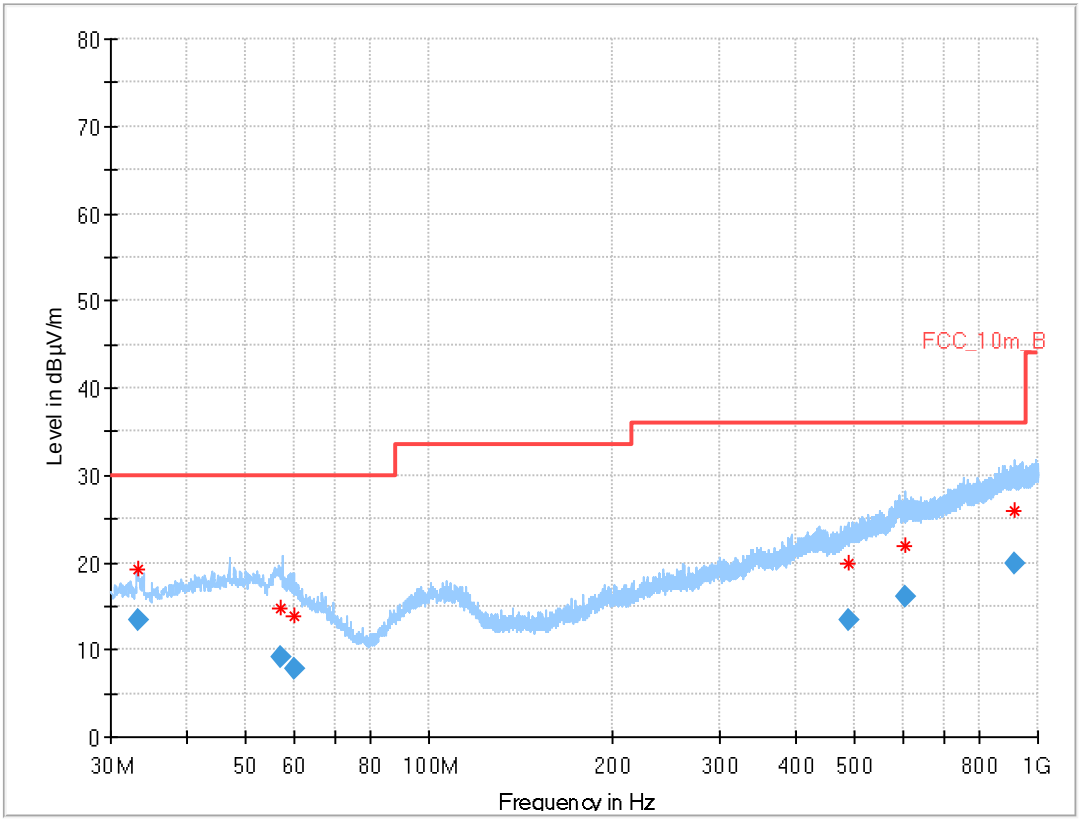
Plot 13: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-1; lowest channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
42.775	17.66	30.0	12.3	1000	120.0	170.0	V	292	14
56.463	11.35	30.0	18.7	1000	120.0	101.0	H	-20	15
61.719	13.76	30.0	16.2	1000	120.0	114.0	V	-22	12
505.646	16.82	36.0	19.2	1000	120.0	170.0	V	99	18
735.026	24.90	36.0	11.1	1000	120.0	170.0	V	247	22
934.519	27.98	36.0	8.0	1000	120.0	170.0	H	-22	24

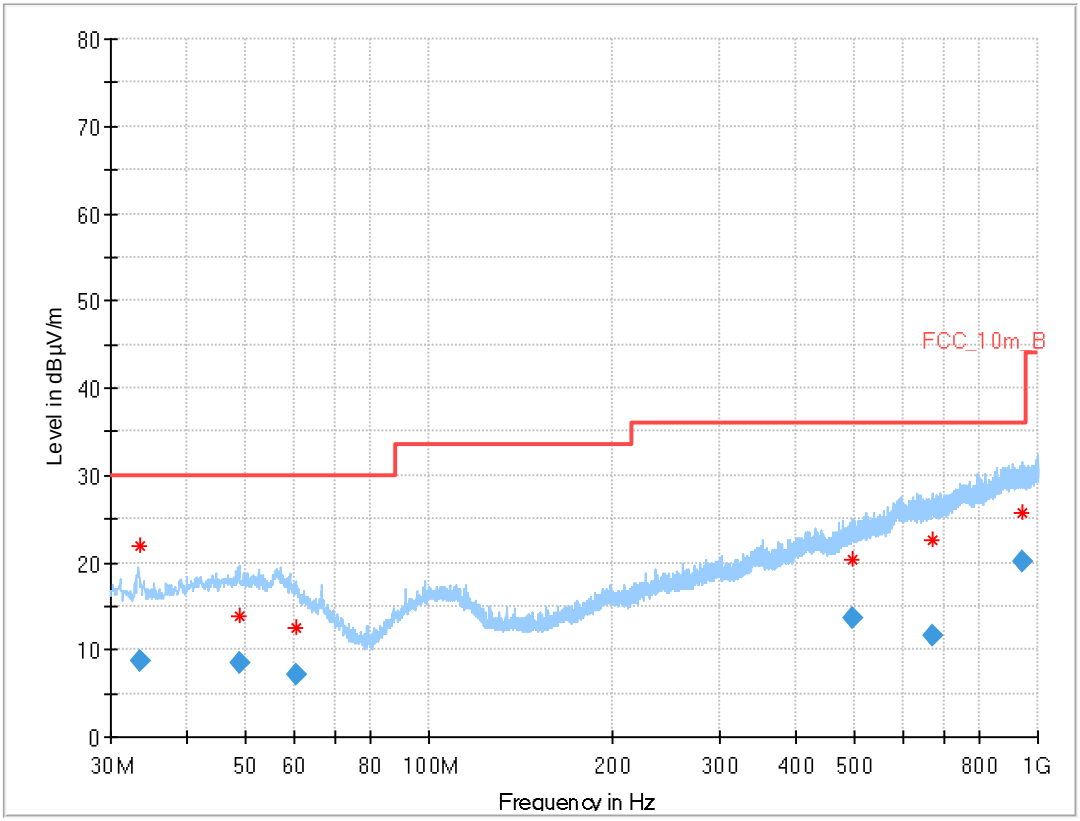
Plot 14: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-1; highest channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.189	13.41	30.0	16.6	1000	120.0	101.0	V	-4	12
56.966	9.18	30.0	20.8	1000	120.0	170.0	V	-4	15
59.973	7.83	30.0	22.2	1000	120.0	170.0	H	329	13
487.741	13.50	36.0	22.5	1000	120.0	170.0	V	281	18
605.035	16.09	36.0	19.9	1000	120.0	170.0	H	305	20
915.124	19.97	36.0	16.0	1000	120.0	170.0	H	0	24

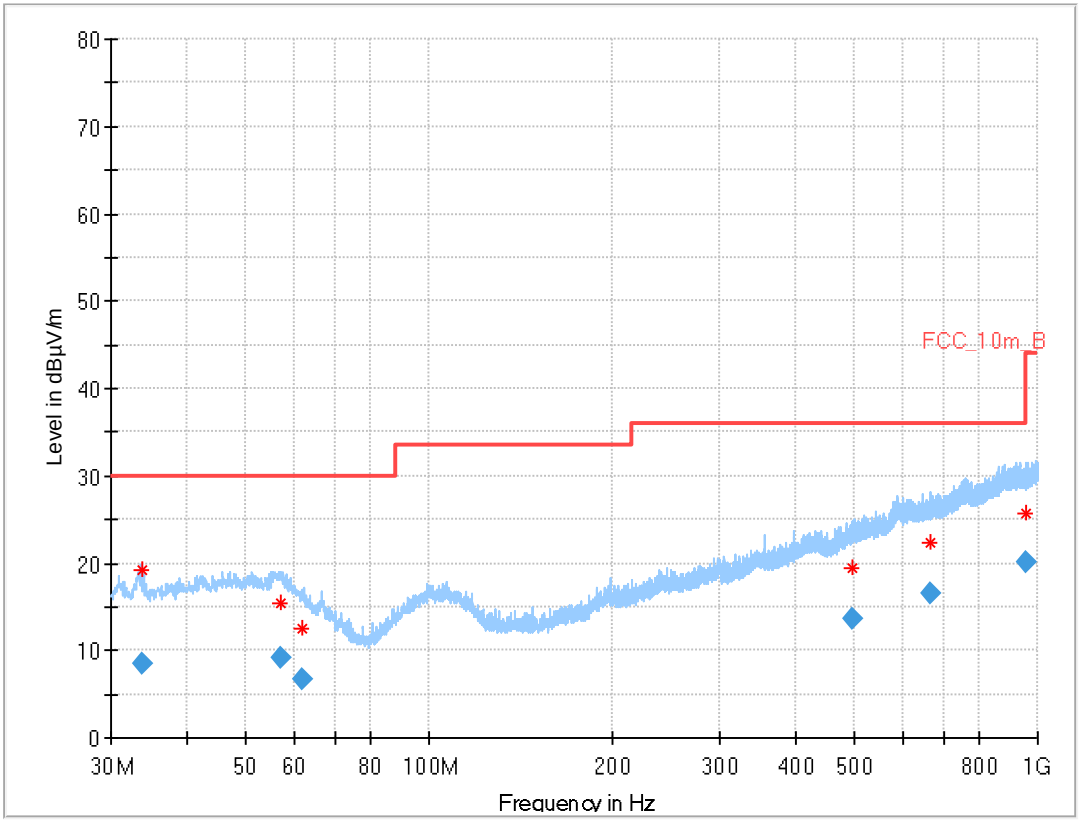
Plot 15: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-2A; lowest channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.428	8.65	30.0	21.4	1000	120.0	141.0	V	189	12
48.972	8.46	30.0	21.5	1000	120.0	120.0	V	316	14
60.668	7.17	30.0	22.8	1000	120.0	170.0	H	225	13
494.850	13.61	36.0	22.4	1000	120.0	170.0	H	100	18
670.621	11.53	36.0	24.5	1000	120.0	170.0	V	85	21
941.964	20.02	36.0	16.0	1000	120.0	170.0	H	10	24

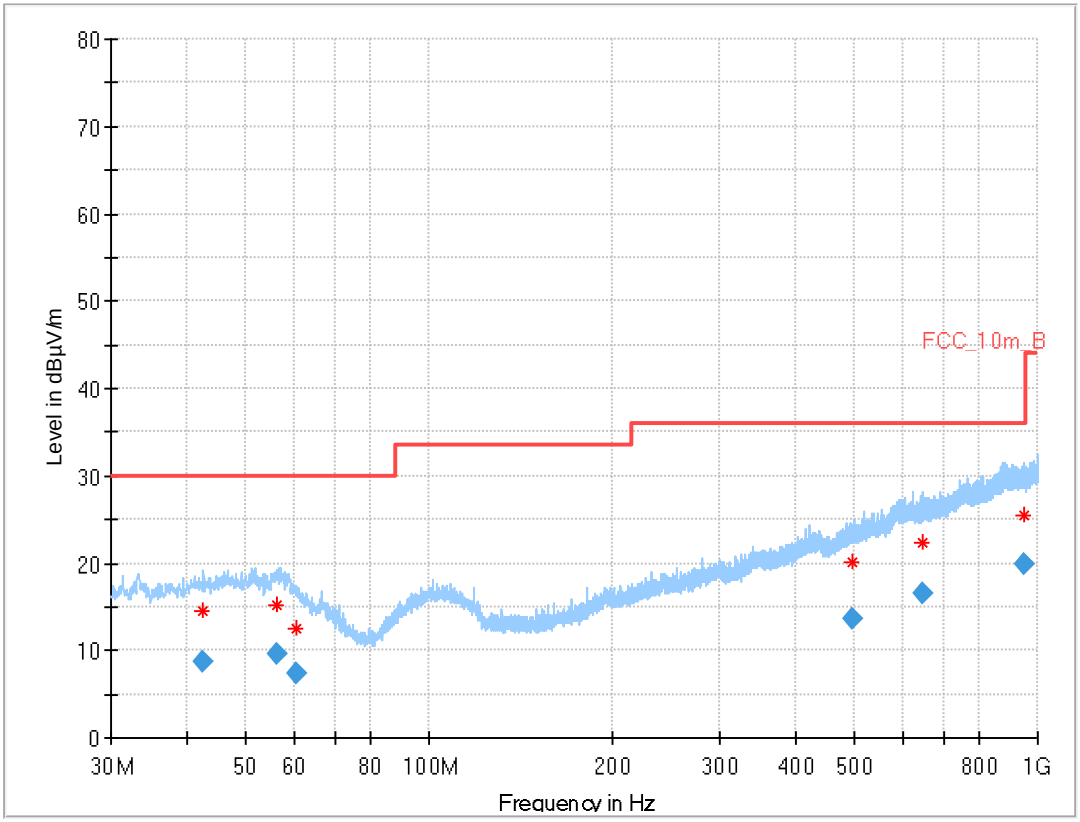
Plot 16: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-2A; highest channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.851	8.40	30.0	21.6	1000	120.0	134.0	V	214	12
56.999	9.14	30.0	20.9	1000	120.0	127.0	H	326	15
62.048	6.71	30.0	23.3	1000	120.0	116.0	V	44	12
496.160	13.73	36.0	22.3	1000	120.0	170.0	H	112	18
664.714	16.49	36.0	19.5	1000	120.0	170.0	H	293	21
958.702	20.09	36.0	15.9	1000	120.0	170.0	V	24	24

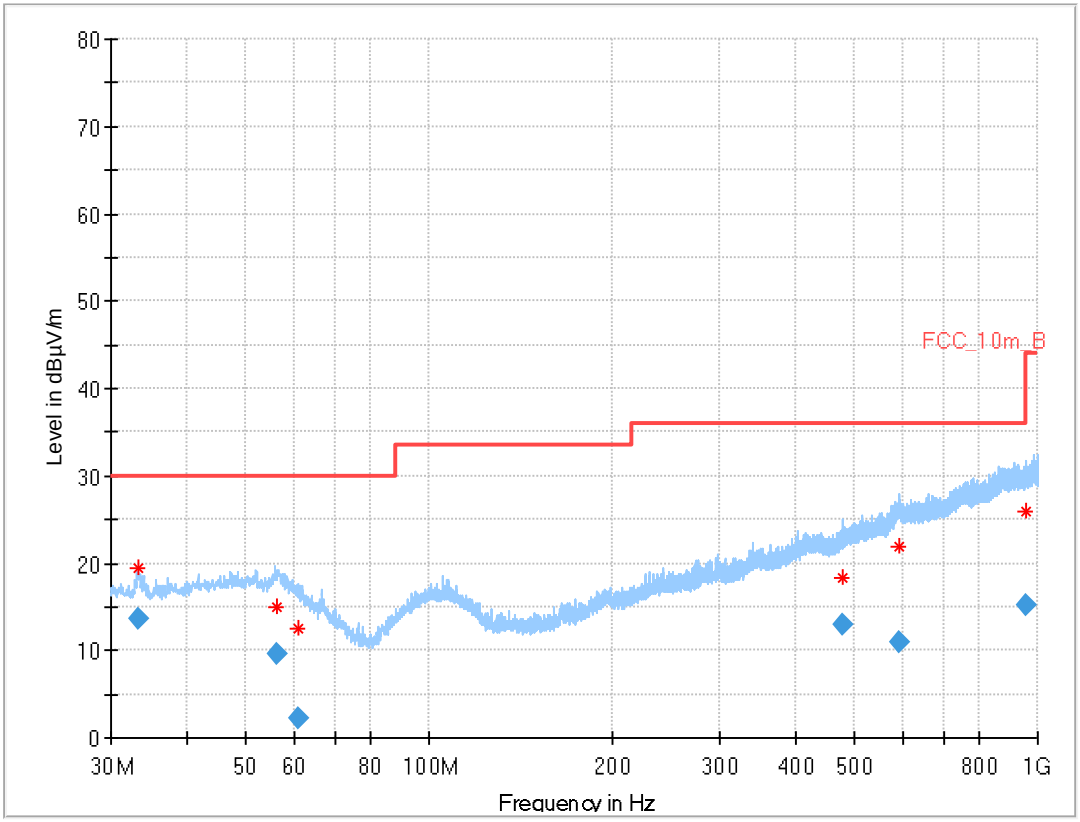
Plot 17: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-2C; lowest channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
42.512	8.77	30.0	21.2	1000	120.0	103.0	H	66	14
56.253	9.63	30.0	20.4	1000	120.0	170.0	V	-10	15
60.502	7.32	30.0	22.7	1000	120.0	170.0	H	192	13
494.588	13.64	36.0	22.4	1000	120.0	158.0	H	125	18
645.289	16.54	36.0	19.5	1000	120.0	170.0	H	2	21
949.203	19.97	36.0	16.0	1000	120.0	170.0	H	65	24

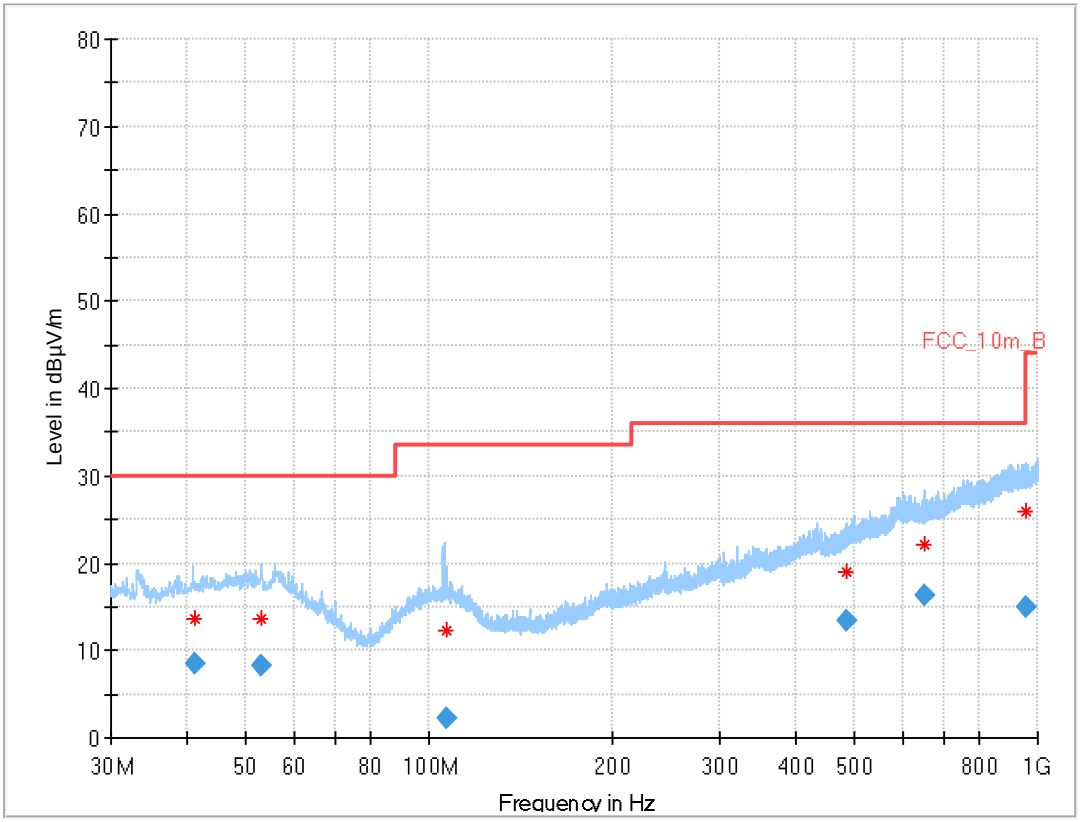
Plot 18: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-2C; middle channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.208	13.61	30.0	16.4	1000	120.0	114.0	V	-10	12
56.261	9.50	30.0	20.5	1000	120.0	147.0	H	10	15
61.117	2.25	30.0	27.8	1000	120.0	170.0	V	131	13
477.231	12.90	36.0	23.1	1000	120.0	170.0	V	142	18
592.520	11.06	36.0	24.9	1000	120.0	100.0	H	-10	20
959.570	15.15	36.0	20.9	1000	120.0	170.0	V	-2	24

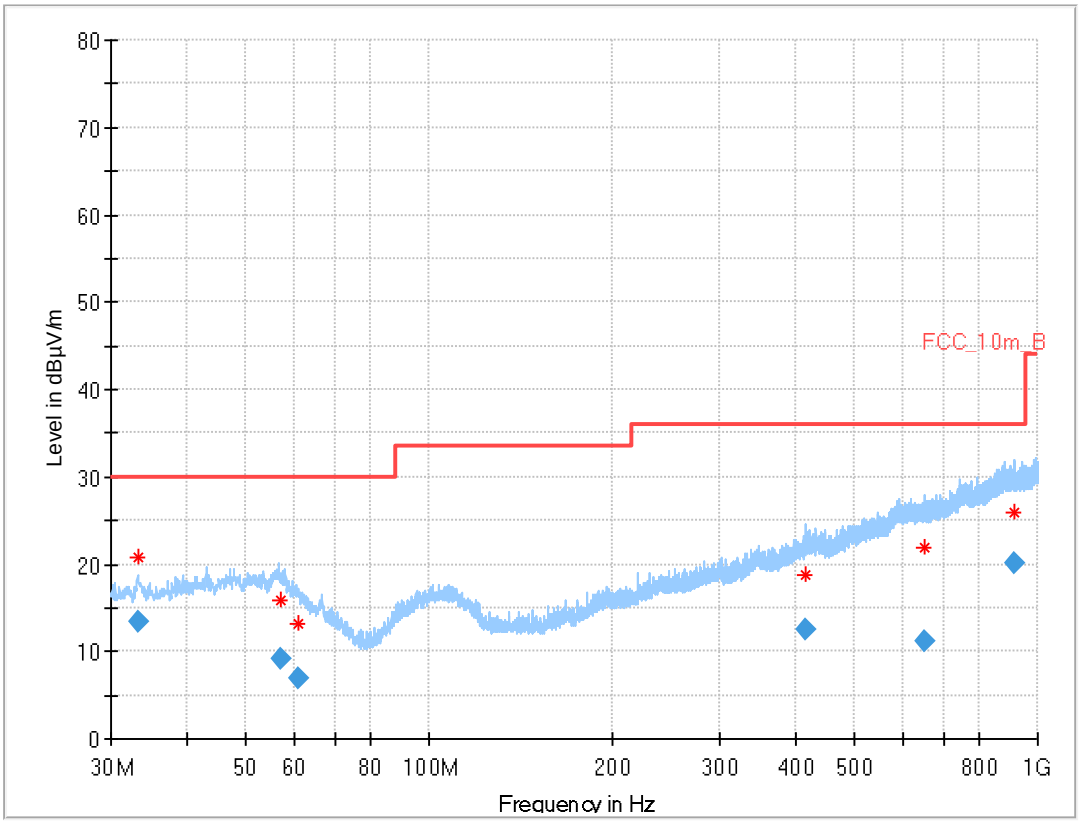
Plot 19: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-2C; highest channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
41.105	8.56	30.0	21.4	1000	120.0	170.0	H	92	14
53.107	8.24	30.0	21.8	1000	120.0	170.0	V	293	14
106.521	2.20	33.5	31.3	1000	120.0	170.0	H	274	13
485.754	13.39	36.0	22.6	1000	120.0	142.0	V	199	18
652.060	16.39	36.0	19.6	1000	120.0	110.0	H	297	21
957.724	15.08	36.0	20.9	1000	120.0	170.0	H	154	24

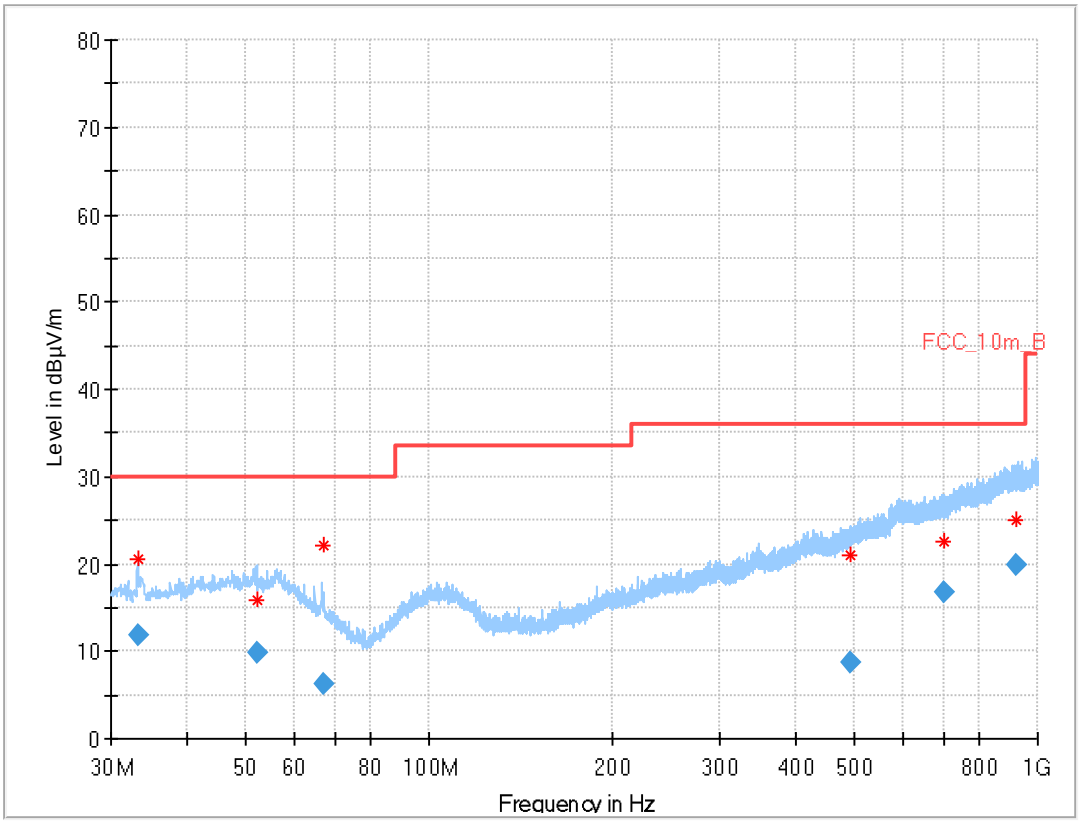
Plot 20: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-3; lowest channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.195	13.33	30.0	16.7	1000	120.0	118.0	V	336	12
56.957	9.18	30.0	20.8	1000	120.0	170.0	V	125	15
61.028	7.02	30.0	23.0	1000	120.0	170.0	H	117	13
416.060	12.46	36.0	23.5	1000	120.0	170.0	V	340	17
652.149	11.28	36.0	24.7	1000	120.0	170.0	V	153	21
918.168	20.03	36.0	16.0	1000	120.0	170.0	H	117	24

Plot 21: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-3; highest channel

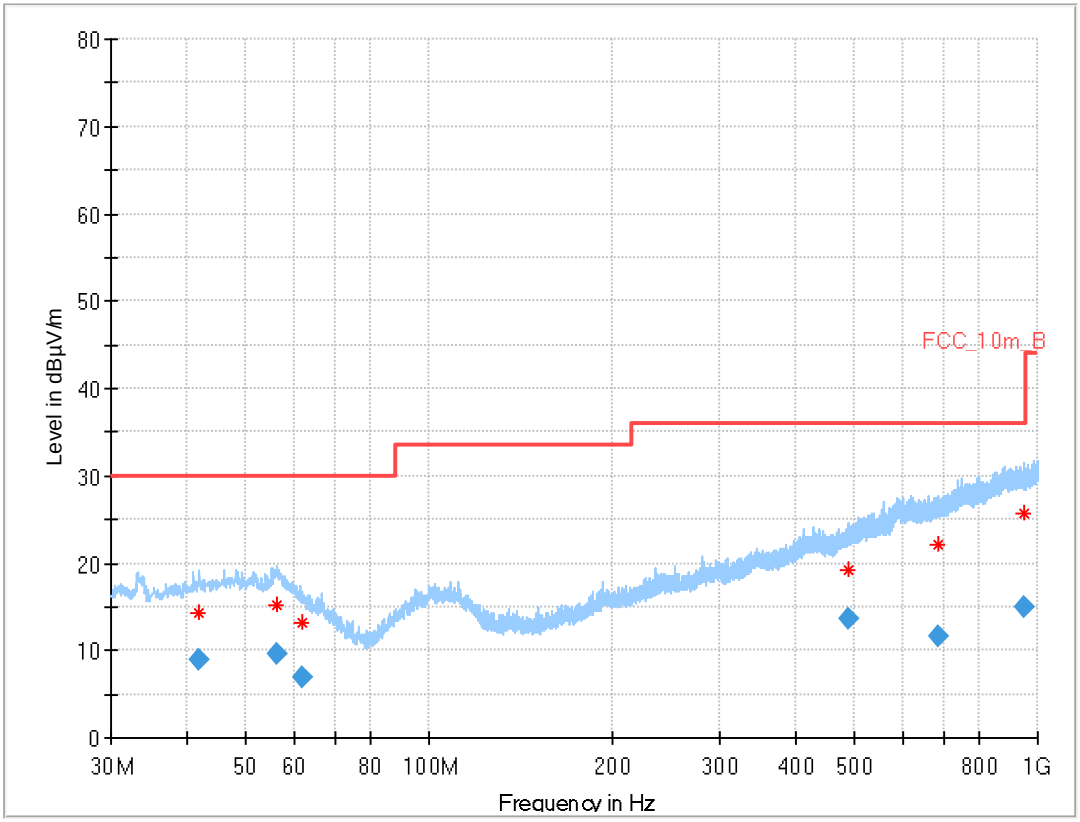


Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.232	11.83	30.0	18.2	1000	120.0	106.0	V	342	12
52.010	9.86	30.0	20.1	1000	120.0	170.0	V	340	14
67.008	6.33	30.0	23.7	1000	120.0	114.0	V	68	11
493.113	8.70	36.0	27.3	1000	120.0	170.0	H	2	18
703.053	16.79	36.0	19.2	1000	120.0	107.0	V	249	21
925.013	19.88	36.0	16.1	1000	120.0	105.0	V	99	24

Plots: 80 MHz channel bandwidth

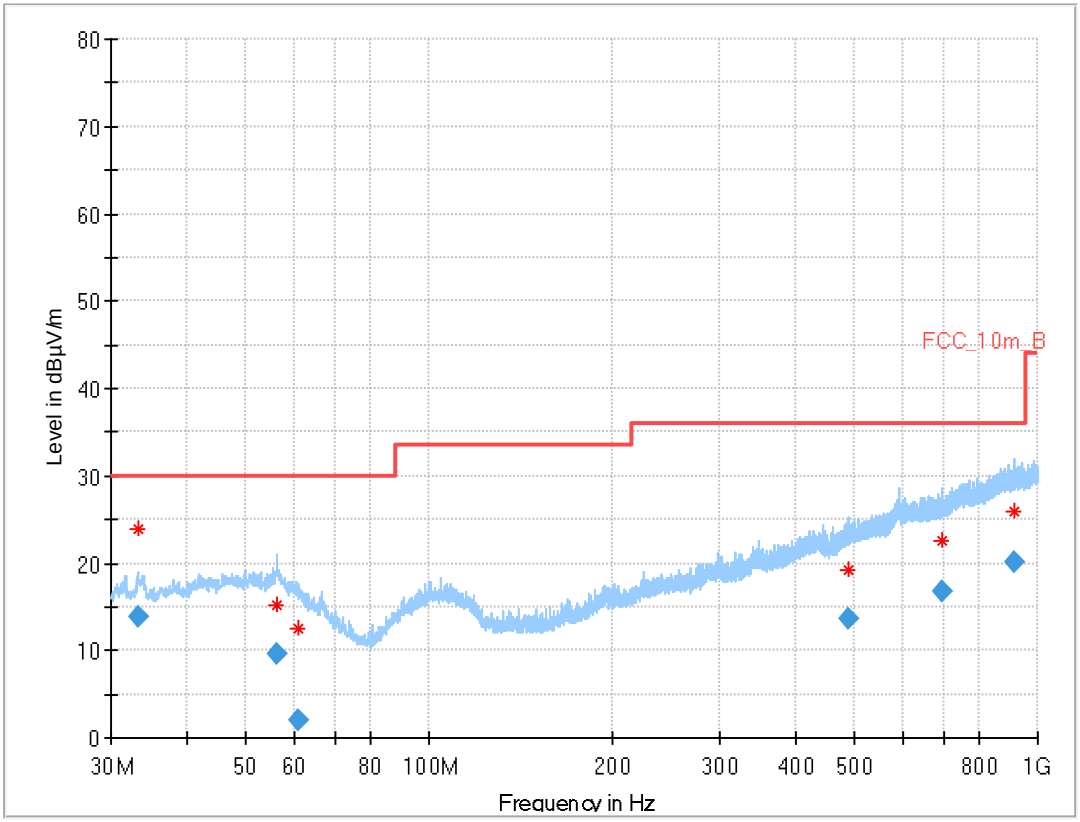
Plot 22: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-1; middle channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
41.919	8.83	30.0	21.2	1000	120.0	170.0	V	197	14
56.046	9.51	30.0	20.5	1000	120.0	101.0	V	318	15
61.641	6.85	30.0	23.2	1000	120.0	101.0	H	23	12
489.912	13.57	36.0	22.4	1000	120.0	170.0	V	-5	18
686.565	11.62	36.0	24.4	1000	120.0	147.0	H	59	21
950.221	15.00	36.0	21.0	1000	120.0	170.0	H	215	24

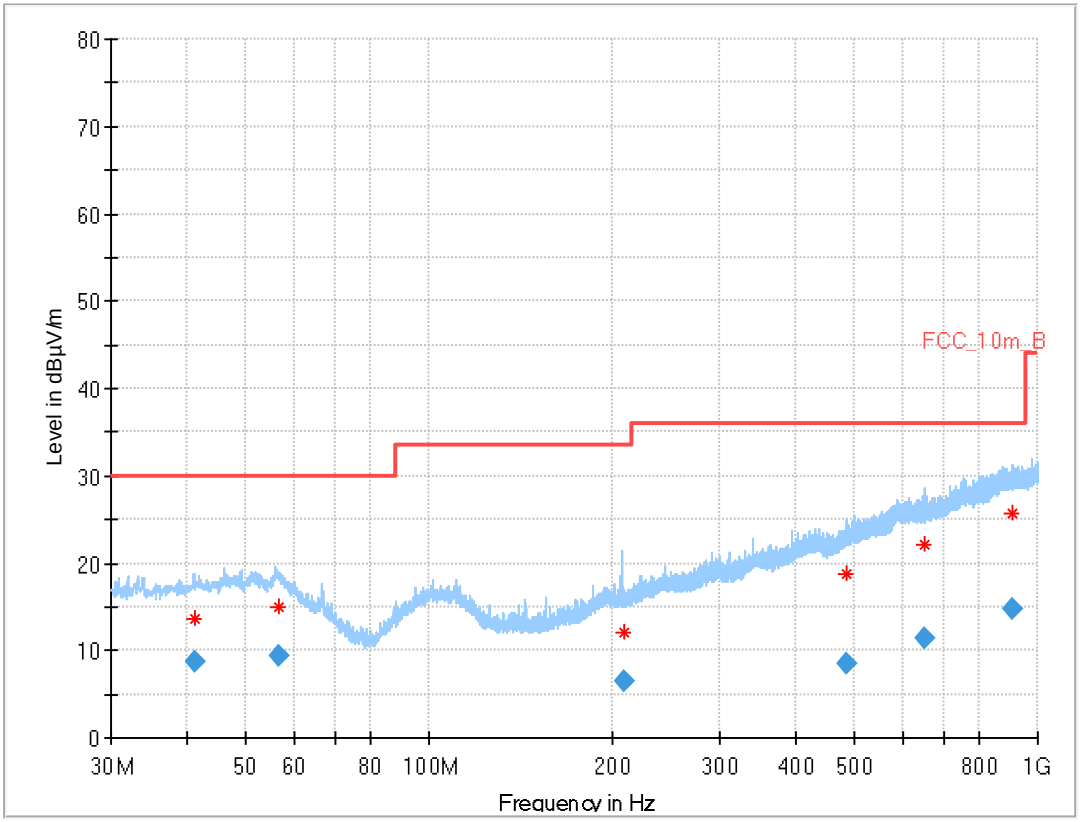
Plot 23: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-2A; middle channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.166	13.78	30.0	16.2	1000	120.0	118.0	V	312	12
56.178	9.52	30.0	20.5	1000	120.0	170.0	H	142	15
60.832	2.08	30.0	27.9	1000	120.0	157.0	H	171	13
488.005	13.59	36.0	22.4	1000	120.0	166.0	H	87	18
694.421	16.71	36.0	19.3	1000	120.0	170.0	V	155	21
914.865	20.03	36.0	16.0	1000	120.0	170.0	H	293	24

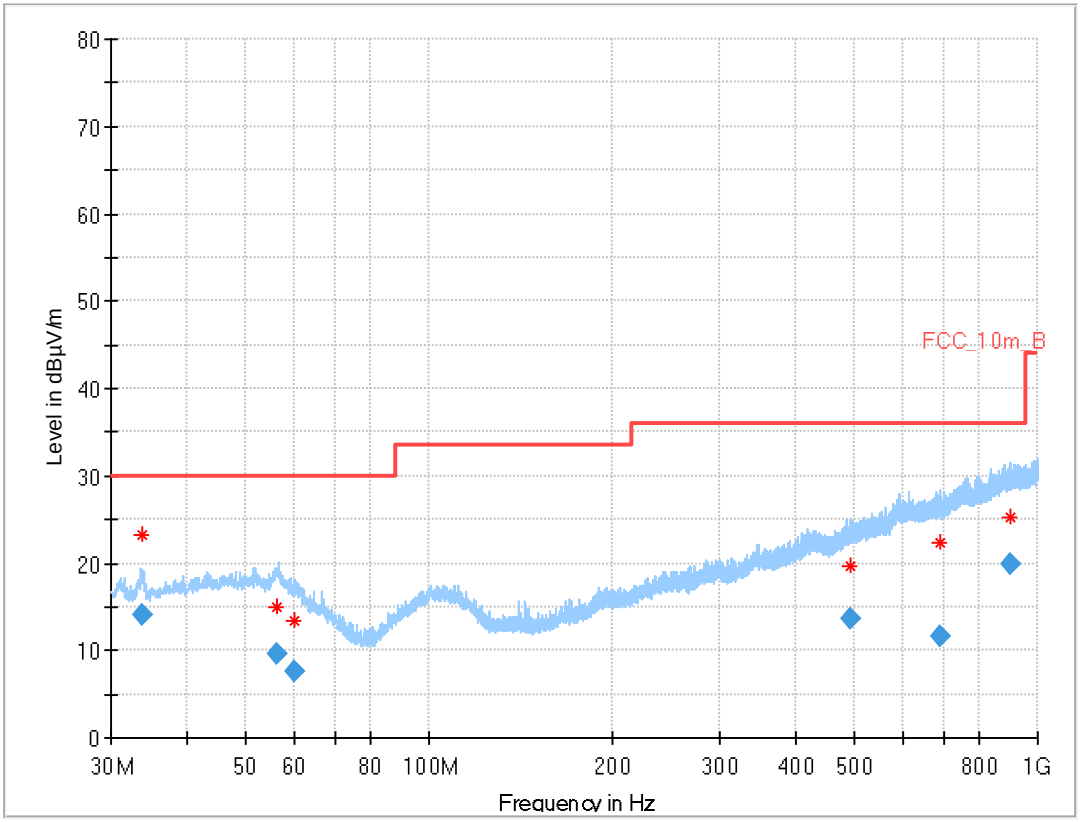
Plot 24: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-2C; lowest channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
41.307	8.76	30.0	21.2	1000	120.0	139.0	V	158	14
56.433	9.45	30.0	20.6	1000	120.0	154.0	V	242	15
208.423	6.39	33.5	27.1	1000	120.0	118.0	V	95	11
485.282	8.45	36.0	27.6	1000	120.0	170.0	V	61	18
650.192	11.40	36.0	24.6	1000	120.0	170.0	H	284	21
908.298	14.81	36.0	21.2	1000	120.0	170.0	V	91	24

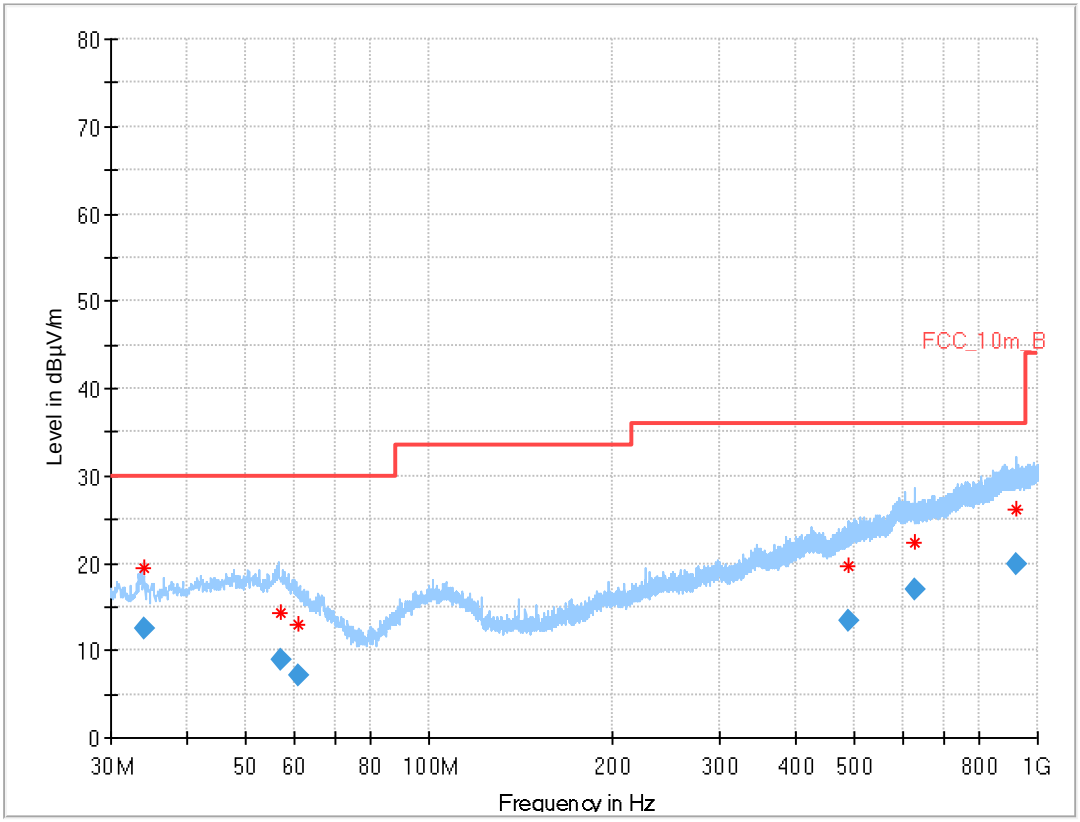
Plot 25: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-2C; highest channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.675	14.18	30.0	15.8	1000	120.0	106.0	V	328	12
56.151	9.57	30.0	20.4	1000	120.0	127.0	H	337	15
60.086	7.60	30.0	22.4	1000	120.0	170.0	V	212	13
492.949	13.61	36.0	22.4	1000	120.0	170.0	H	150	18
691.031	11.63	36.0	24.4	1000	120.0	98.0	H	131	21
904.831	19.85	36.0	16.2	1000	120.0	139.0	V	333	24

Plot 26: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-3; middle channel

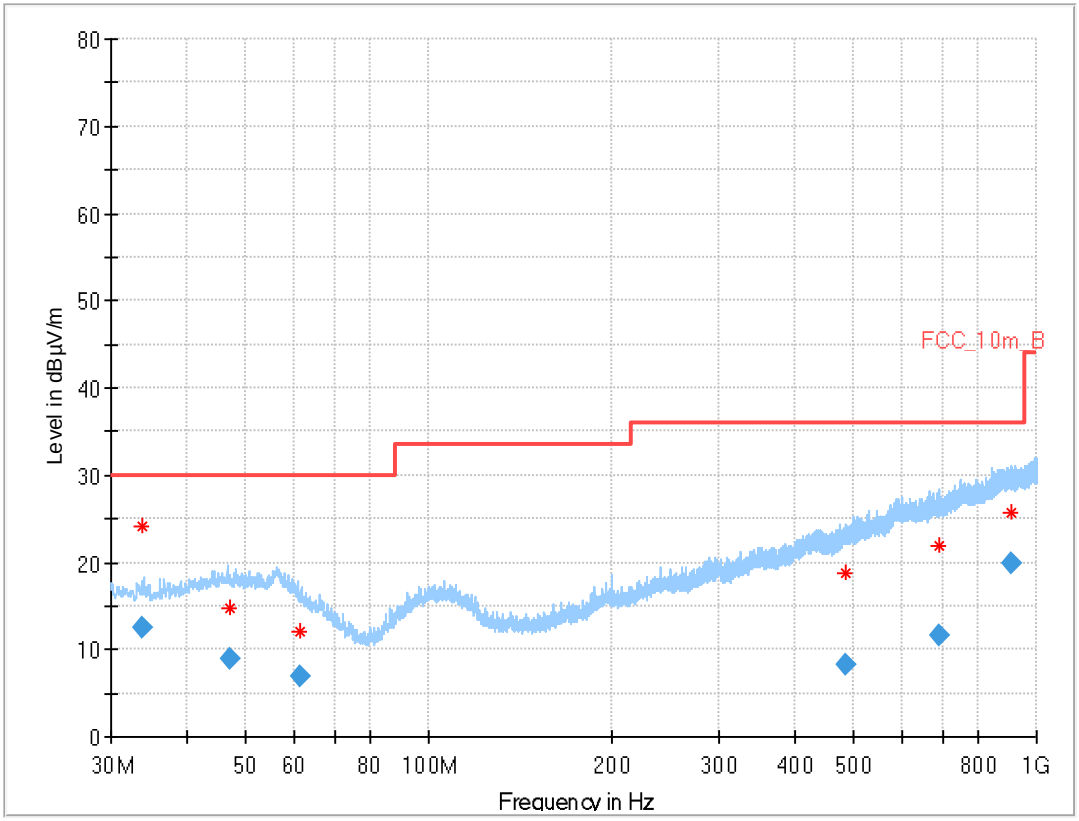


Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.977	12.62	30.0	17.4	1000	120.0	104.0	V	53	12
57.206	8.96	30.0	21.0	1000	120.0	170.0	H	-8	15
60.744	7.22	30.0	22.8	1000	120.0	170.0	H	310	13
489.616	13.45	36.0	22.6	1000	120.0	134.0	H	47	18
629.920	16.92	36.0	19.1	1000	120.0	170.0	V	264	20
923.497	19.85	36.0	16.2	1000	120.0	170.0	H	109	24

Plots: 20 MHz channel bandwidth (TAOGLAS FXP831.07.0100C)

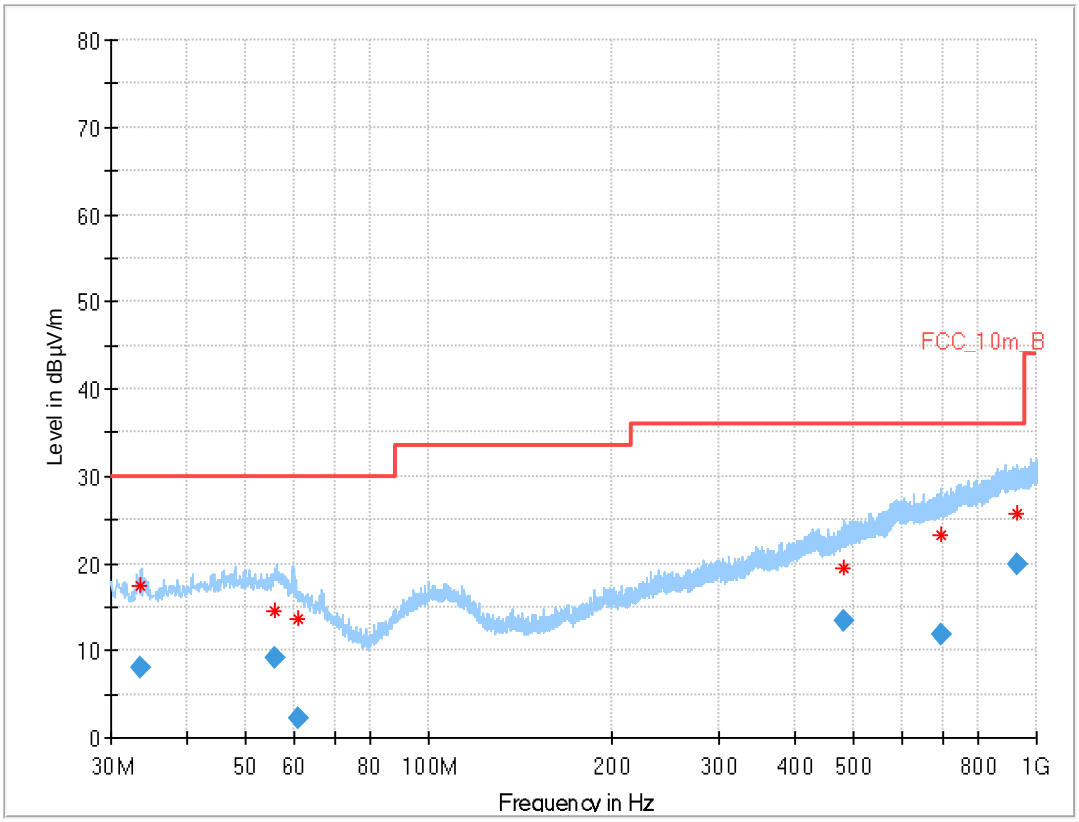
Plot 1: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-1; lowest channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.838	12.52	30.0	17.5	1000	120.0	112.0	V	72	12
47.025	9.04	30.0	21.0	1000	120.0	170.0	H	126	14
61.258	6.85	30.0	23.2	1000	120.0	160.0	H	27	13
484.966	8.35	36.0	27.7	1000	120.0	170.0	V	194	18
691.101	11.61	36.0	24.4	1000	120.0	170.0	V	242	21
911.355	19.81	36.0	16.2	1000	120.0	170.0	V	340	24

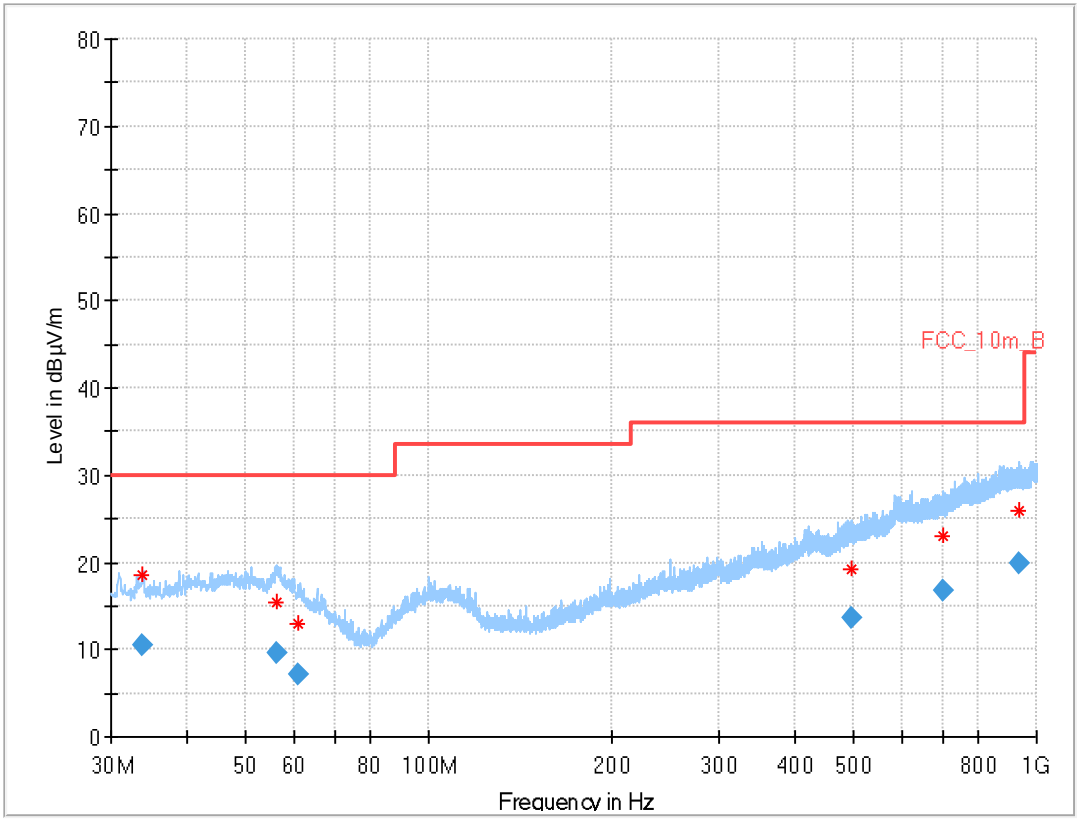
Plot 2: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-1; middle channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.551	8.06	30.0	21.9	1000	120.0	121.0	H	14	12
55.737	9.23	30.0	20.8	1000	120.0	170.0	H	191	15
60.754	2.21	30.0	27.8	1000	120.0	170.0	V	336	13
483.045	13.38	36.0	22.6	1000	120.0	170.0	H	202	18
698.610	11.74	36.0	24.3	1000	120.0	170.0	H	58	21
926.048	19.94	36.0	16.1	1000	120.0	137.0	V	11	24

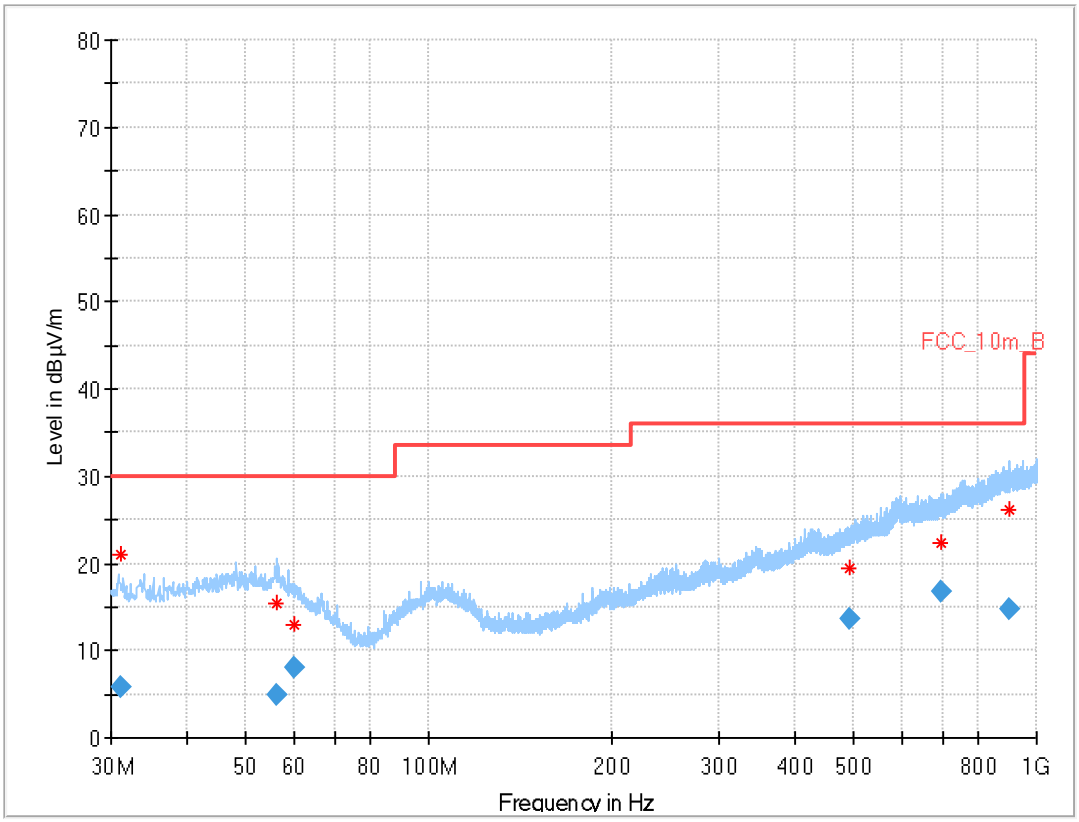
Plot 3: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-1; highest channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.809	10.57	30.0	19.4	1000	120.0	107.0	V	0	12
56.191	9.59	30.0	20.4	1000	120.0	170.0	H	197	15
60.990	7.13	30.0	22.9	1000	120.0	170.0	V	334	13
495.384	13.62	36.0	22.4	1000	120.0	170.0	H	51	18
702.447	16.73	36.0	19.3	1000	120.0	142.0	V	142	21
935.046	19.90	36.0	16.1	1000	120.0	170.0	H	8	24

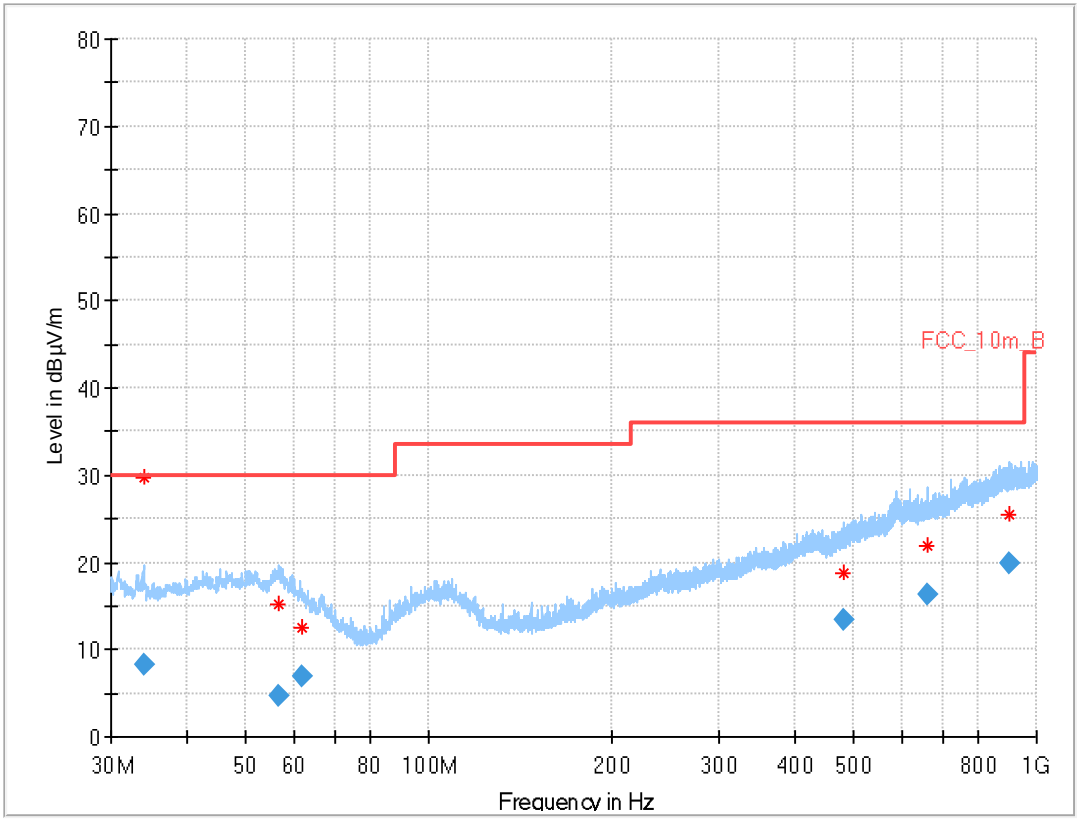
Plot 4: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-2A; lowest channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
31.161	5.74	30.0	24.3	1000	120.0	113.0	V	293	12
56.288	4.82	30.0	25.2	1000	120.0	128.0	H	115	15
60.018	8.07	30.0	21.9	1000	120.0	100.0	H	85	13
493.780	13.60	36.0	22.4	1000	120.0	170.0	V	340	18
699.013	16.80	36.0	19.2	1000	120.0	170.0	H	207	21
901.400	14.76	36.0	21.2	1000	120.0	163.0	V	158	24

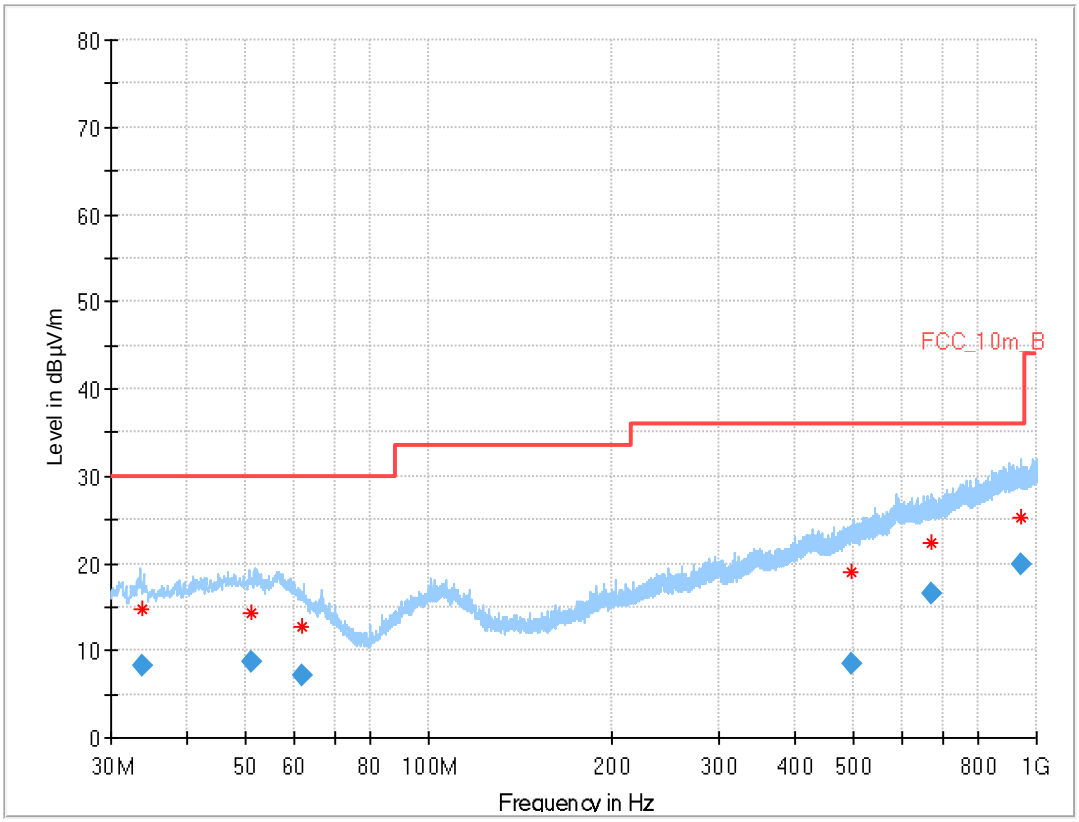
Plot 5: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-2A; middle channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.944	8.29	30.0	21.7	1000	120.0	145.0	V	50	12
56.481	4.71	30.0	25.3	1000	120.0	170.0	H	40	15
61.685	6.83	30.0	23.2	1000	120.0	147.0	H	282	12
483.080	13.37	36.0	22.6	1000	120.0	102.0	V	285	18
659.383	16.29	36.0	19.7	1000	120.0	170.0	H	10	21
904.644	19.80	36.0	16.2	1000	120.0	170.0	V	340	24

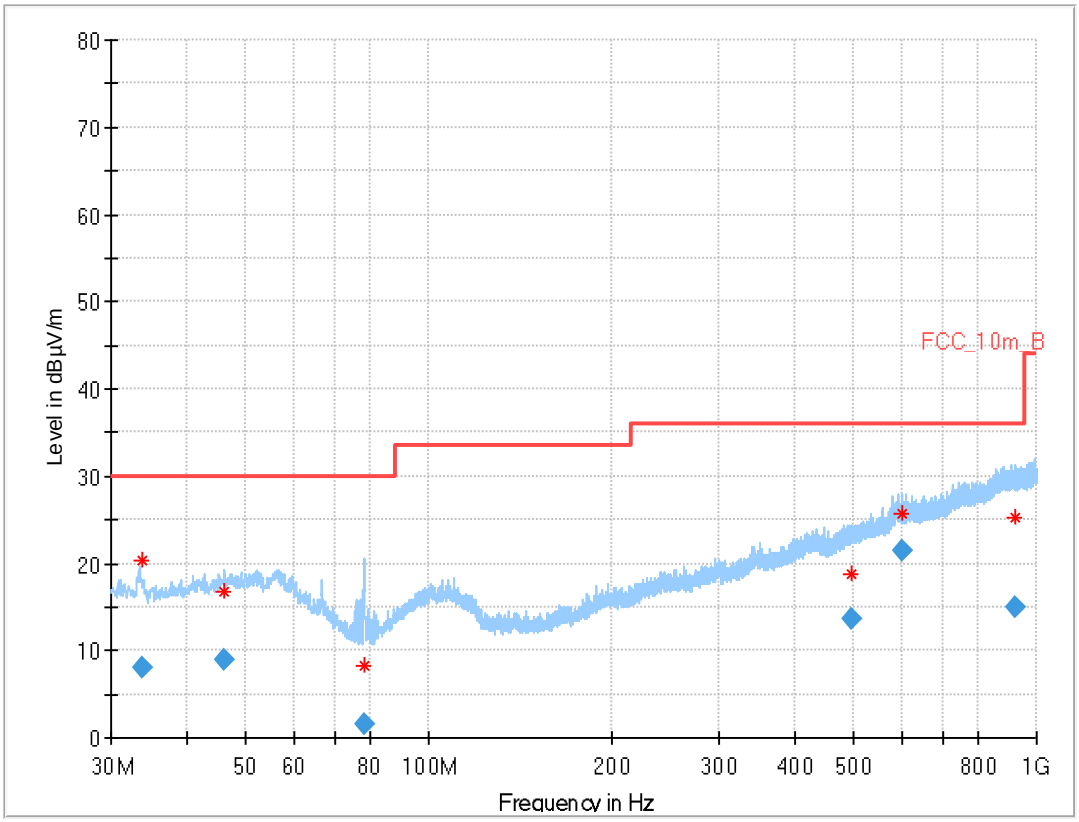
Plot 6: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-2A; highest channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.750	8.28	30.0	21.7	1000	120.0	158.0	H	69	12
51.163	8.82	30.0	21.2	1000	120.0	101.0	H	166	14
61.744	7.06	30.0	22.9	1000	120.0	101.0	V	107	12
495.440	8.51	36.0	27.5	1000	120.0	106.0	H	210	18
670.824	16.55	36.0	19.5	1000	120.0	170.0	V	76	21
944.821	19.97	36.0	16.0	1000	120.0	170.0	H	69	24

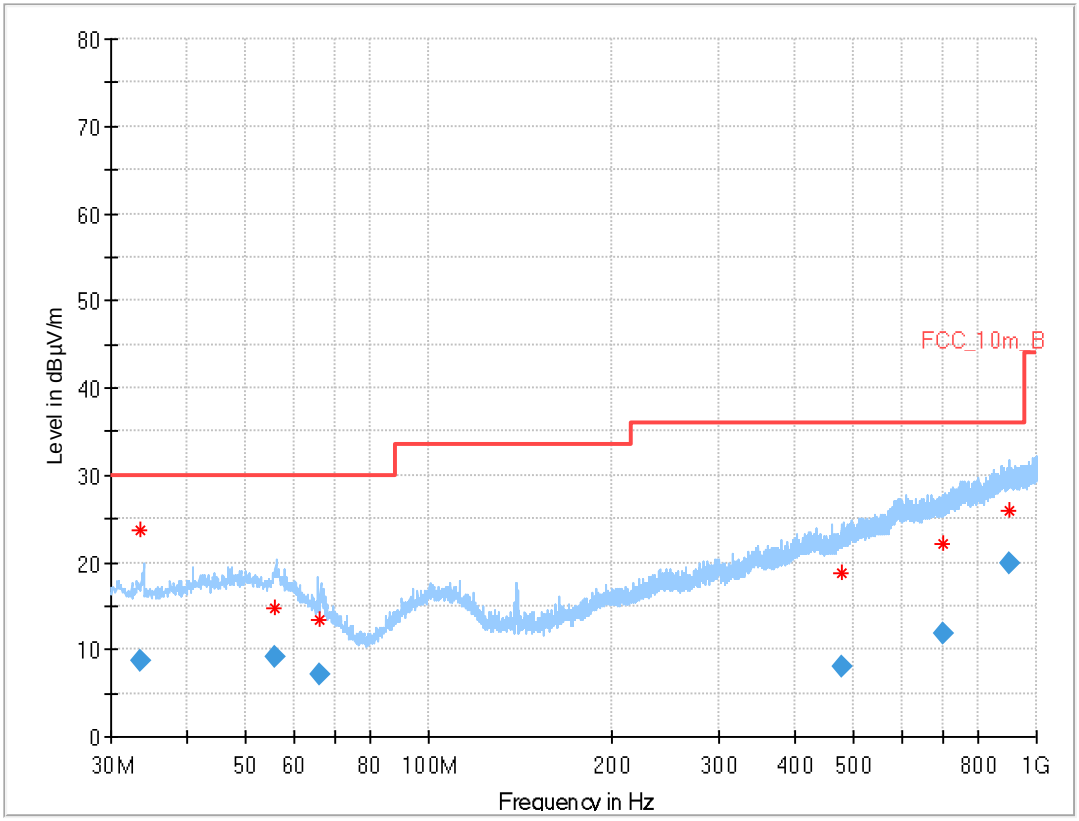
Plot 7: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-2C; lowest channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.647	8.11	30.0	21.9	1000	120.0	110.0	V	265	12
46.074	8.90	30.0	21.1	1000	120.0	142.0	V	218	14
78.397	1.66	30.0	28.3	1000	120.0	170.0	H	63	7
494.339	13.61	36.0	22.4	1000	120.0	102.0	H	217	18
599.956	21.52	36.0	14.5	1000	120.0	170.0	H	265	20
922.773	14.98	36.0	21.0	1000	120.0	132.0	H	184	24

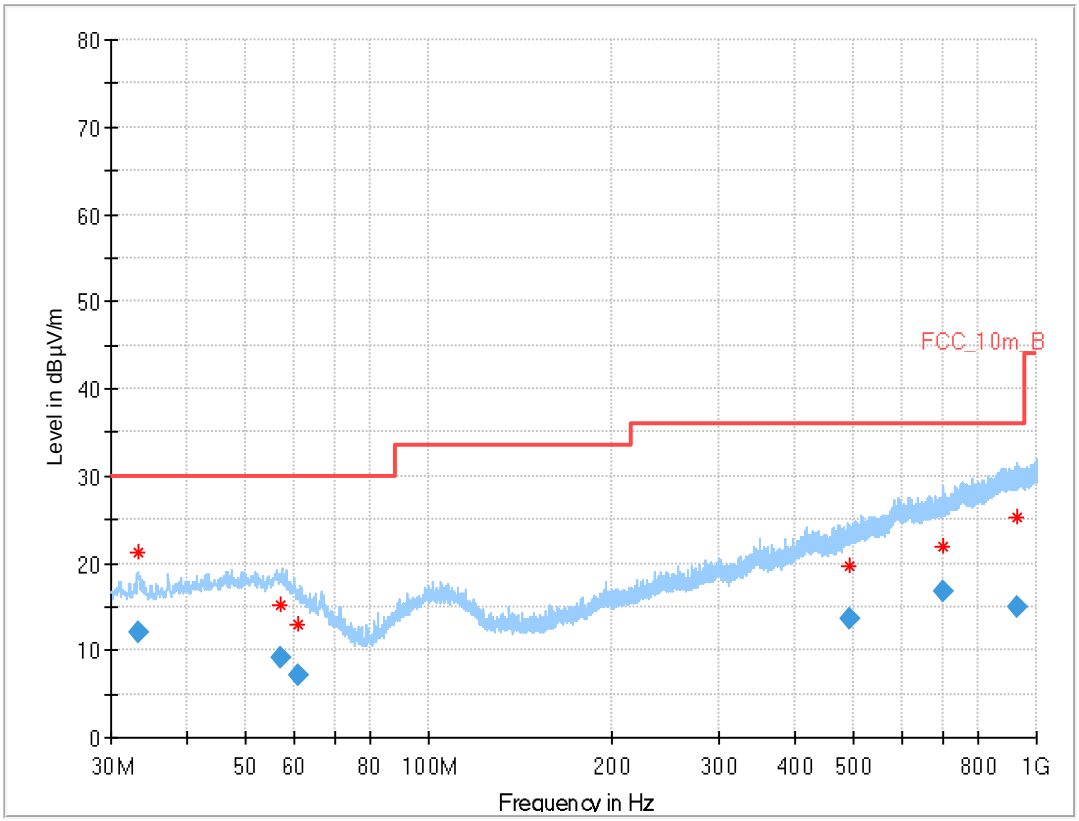
Plot 8: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-2C; middle channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.630	8.61	30.0	21.4	1000	120.0	170.0	V	117	12
55.573	9.16	30.0	20.8	1000	120.0	165.0	V	180	15
66.020	7.10	30.0	22.9	1000	120.0	98.0	H	311	11
479.709	7.96	36.0	28.0	1000	120.0	145.0	V	77	18
703.015	11.75	36.0	24.3	1000	120.0	170.0	V	256	21
904.959	19.79	36.0	16.2	1000	120.0	117.0	V	306	24

Plot 9: 30 MHz to 1 GHz; vertical & horizontal polarization; U-NII-2C; highest channel



Results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.180	12.13	30.0	17.9	1000	120.0	102.0	V	342	12
56.998	9.14	30.0	20.9	1000	120.0	98.0	H	327	15
60.917	7.07	30.0	22.9	1000	120.0	170.0	V	10	13
490.577	13.53	36.0	22.5	1000	120.0	170.0	H	239	18
699.096	16.72	36.0	19.3	1000	120.0	170.0	H	118	21
931.285	14.91	36.0	21.1	1000	120.0	170.0	V	340	24