

TEST REPORT

Test report no.: 1-9320-25-02-03_TR1-R01



Deutsche
Akkreditierungsstelle
D-PL-12047-01-00

Testing laboratory

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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 with the registration number:

D-PL-12047-01-00.

ISED Testing Laboratory Recognized Listing Number: DE0001

FCC designation number: DE0002

Applicant

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Manufacturer

Panasonic Industrial Devices Europe GmbH

Zeppelinstrasse 19

21337 Lüneburg / GERMANY

Test standard/s

FCC 47 CFR Part 15

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

RSS-247:Issue 4 (2025-07)

RSS-247 – Digital Transmission Systems, Frequency Hopping Systems and Licence-Exempt Local Area Network Devices in 902-928 MHz, 2400-2483.5 MHz, 5150-5350 MHz, and 5470-5895 MHz bands

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

Test Item

Kind of test item:	WiFi / BLE Module
Model name:	PAN W602-2B
FCC ID:	T7V-W602
ISED certification number:	216Q-W602
Frequency:	2400 MHz to 2483.5 MHz
Technology tested:	WLAN
Antenna:	Two different external antennas
Power supply:	3.3 V DC by PCB
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.

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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. cetecom advanced GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.

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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.

2.2 Application details

Date of receipt of order:	2026-05-11
Date of receipt of test item:	2026-05-28
Start of test:*	2026-05-28
End of test:*	2026-06-11
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

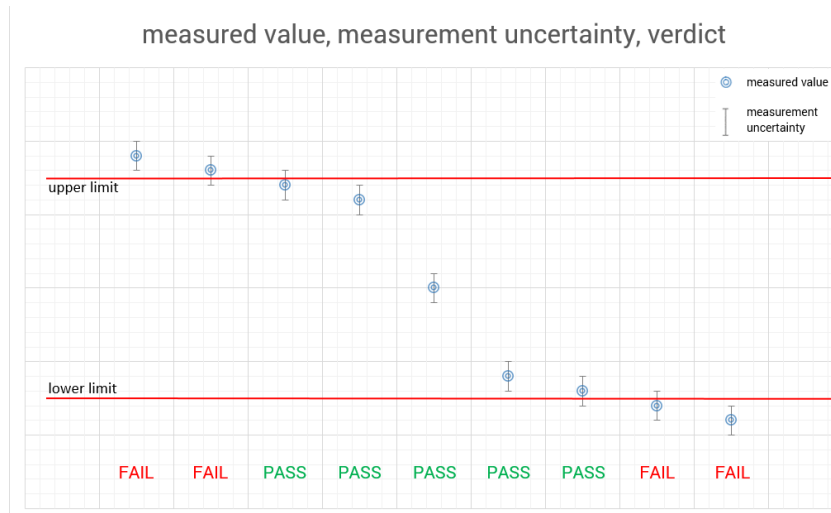
Test standard	Date	Description
FCC 47 CFR Part 15	-/-	FCC - Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices
RSS-247:Issue 4 (2025-07)	2025-07-24	RSS-247 – Digital Transmission Systems, Frequency Hopping Systems and Licence-Exempt Local Area Network Devices in 902-928 MHz, 2400-2483.5 MHz, 5150-5350 MHz, and 5470-5895 MHz bands
RSS-Gen:Issue 5 (2018-04) + Amendment 1 (2019-03) + Amendment 2 (2021-02)	2021-02-01	General Requirements for Compliance of Radio Apparatus

Guidance	Version	Description
KDB 558074 D01	v05r02	GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES
ANSI C63.10-2020	-/-	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
ANSI/USEMCSC C63.10a-2024 Amendment 1	2024-08-08	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices Amendment 1
ANSI/USEMCSC C63.10a-2024 Amendment 1 Errata	2024-11-18	Errata to American National Standard for Procedures for Compliance Testing of Unlicensed Wireless Devices Amendment 1 Correction Sheet

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 testing under extreme temperature conditions required No testing under extreme temperature conditions required
Relative humidity content	:		55 %
Barometric pressure	:		1021 hpa
Power supply	:	V_{nom} V_{max} V_{min}	3.3 V DC by PCB No testing under extreme voltage conditions required No testing under extreme voltage conditions required

6 Test item

6.1 General description

Kind of test item	:	WiFi / BLE Module
Model name	:	PAN W602-2B
HMN	:	N/A
PMN	:	PAN W602-2C; PAN W602-2B
HVIN	:	ENWF9215A; ENWF9215C
FVIN	:	N/A
S/N serial number	:	Board 2: Taoglas GW.51.5153 antenna Board 8: 2J Antennas 2JF1002P antenna
Hardware status	:	03
Software status	:	01
Firmware status	:	TBD
Frequency band	:	2400 MHz to 2483.5 MHz
Type of radio transmission	:	DSSS, OFDM(A)
Use of frequency spectrum	:	
Type of modulation	:	CCK, (D)BPSK, (D)QPSK, 16 – QAM, 64 – QAM
Number of channels	:	11
Antenna	:	Two different external antennas; Taoglas GW.51.5153 antenna: 5.2 dBi 2J Antennas 2JF1002P antenna: 4.2 dBi
Power supply	:	3.3 V DC by PCB
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:

1-9320-25-02-01_TR1-A101-R01
1-9320-25-02-01_TR1-A102-R01
1-9320-25-02-01_TR1-A104-R01

7 Description of the test setup

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

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

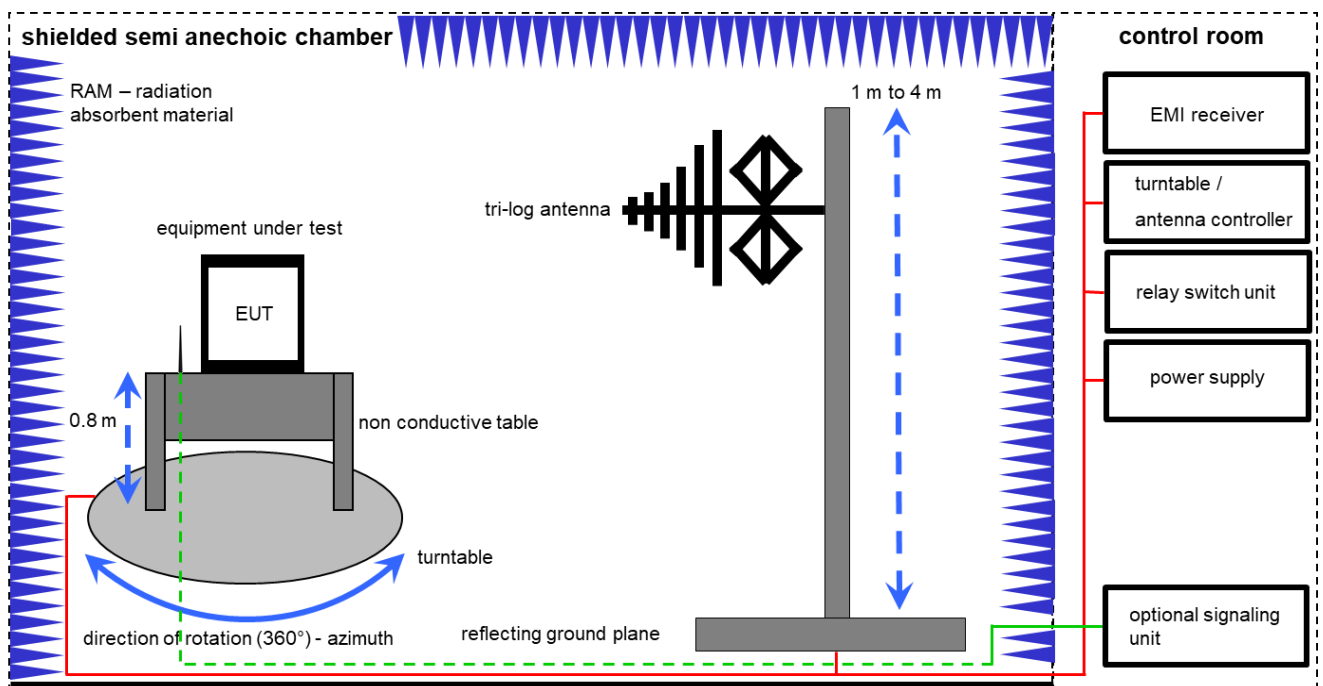
Each block diagram listed can contain several test setup configurations. All devices belonging to a test setup are identified with the same letter syntax. For example: Column Setup and all devices with an A.

Agenda: Kind of Calibration

k/cal	calibration / calibrated	EK	limited calibration
Ne/cnn	not required (k, ev, izw, zw not required)	zw	cyclical maintenance (external cyclical maintenance)
Ev/chk	periodic self verification	izw	internal cyclical maintenance
Ve	long-term stability recognized	g	blocked for accredited testing
vlk!	Attention: extended calibration interval		
NK!	Attention: not calibrated	*)	next calibration ordered / currently in progress
cpu	check prior usage		

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)

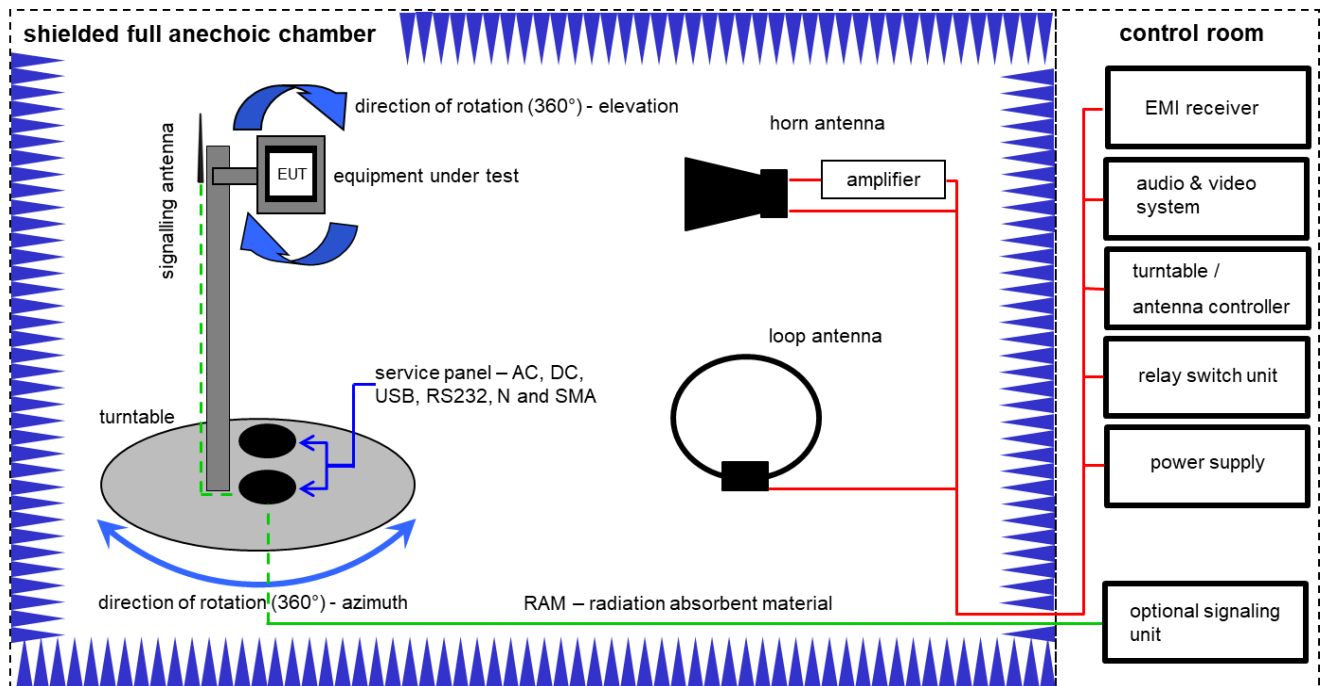
Example calculation:

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.	Setup	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Switch-Unit	Switch-Unit 3488A	Hewlett Packard	2719A14505	50160	cpu	-/-	-/-
2	A	Positioning Controller	Positioning Controller 2090	ETS-Lindgren GmbH Taufkirchen	64672	50280	cnn	-/-	-/-
3	A	TRILOG Broadband Antenna	TRILOG Broadband Antenna VULB9163	Schwarzbeck MESS-ELEKTRONIK OHG Schönaun	1029	50403	cal	07.11.2025	30.11.2027
4	A	EMI Test Receiver	EMI Test Receiver ESR3 9kHz-3.6GHz	Rohde & Schwarz Messgerätebau GmbH Memmingen	102587	50417	cal	08.12.2025	31.12.2026

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:

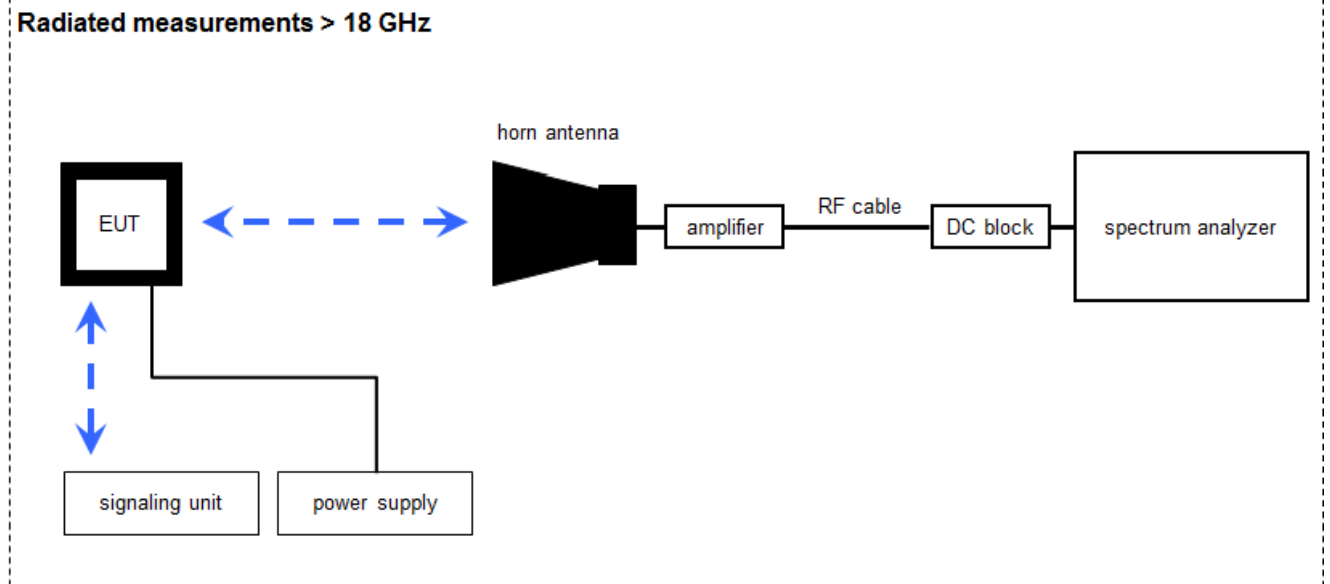
FS [dBμV/m] = 40.0 [dBμV/m] + (-35.8) [dB] + 32.9 [dB/m] = 37.1 [dBμV/m] (71.61 μV/m)

Equipment table:

No.	Setup	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A, C	Double-Ridged Waveguide Horn Antenna	Double-Ridged Waveguide Horn Antenna 3115	EMCO Elektronik GmbH Gilching	9107-3696	40342	cal	15.04.2025	30.04.2027
2	A, B, C	Anechoic chamber	Anechoic chamber FAC 3/5m	MEC Import: MWB TDK	87400/02	40349	cpu	-/-	-/-
3	A, B, C	Switch / Control Unit	Switch / Control Unit 3488A	Hewlett Packard	*	40350	cnn	-/-	-/-
4	C	Band Reject filter	Band Reject filter WRCG2400/2483-2375/2505-50/10SS	Wainwright Instruments GmbH Andechs	11	40356	cpu	-/-	-/-
5	C	Highpass Filter	Highpass Filter WHK1.1/15G-10SS	Wainwright Instruments GmbH Andechs	3	40361	cpu	-/-	-/-
6	C	Highpass Filter	Highpass Filter WHKX7.0/18G-8SS	Wainwright Instruments GmbH Andechs	19	40365	cnn	-/-	-/-
7	C	High Pass Filter	High Pass Filter VHF-3500+	Mini-Circuits Brooklyn	-/-	40369	cnn	-/-	-/-
8	A, C	Broadband Amplifier 0.5-18 GHz	Broadband Amplifier 0.5-18 GHz CBLU5184540	MEC Import: CERNEX	22049	40373	cpu	-/-	-/-
9	A, B, C	4U RF Switch Platform	4U RF Switch Platform L4491A	Agilent Technologies Deutschland GmbH Böblingen	MY50000037	40375	cnn	-/-	-/-
10	A, B, C	NEXIO EMV-Software	NEXIO EMV-Software BAT EMC V2022.0.32.0	MEC Import: Nexio	-/-	40383	cnn	-/-	-/-

11	C	RF-Amplifier	RF-Amplifier AMF-6F06001800-30-10P-R	MEC Import: NARDA-MITEQ Inc	2011572	40400	cpu	-/-	-/-
12	B	Active Loop Antenna	Active Loop Antenna 6502	EMCO Elektronik GmbH Gilching	2210	50044	cal	07.07.2025	31.07.2027
13	A, B, C	EMI Test Receiver	EMI Test Receiver ESU26	Rohde & Schwarz Messgerätebau GmbH Memmingen	100037	50254	cal	11.12.2025	31.12.2026
14	C	Low Noise Amplifier	Low Noise Amplifier LNA-40-00100800-15-10P	Miteq Inc.	2336093	50483	cnn	-/-	-/-

7.3 Radiated measurements > 18 GHz



Measurement distance: horn antenna 50 cm

FS = UR + CA + AF

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

Example calculation:

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

Equipment table:

No.	Setup	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Horn Antenna 18,0-40,0 GHz	Horn Antenna 18,0-40,0 GHz LHAF180	MEC Import: Microw.Devel	39180-103-021	40170	cal	16.01.2026	31.01.2028
2	A	Low Noise Amplifier, Broadband 18-50 GHz	Low Noise Amplifier, Broadband 18-50 GHz BZT-18005000-550835-SL2525-SL	MEC Import: B&Z Technologies	27887-27889	40789	cpu	-/-	-/-
3	A	Signal- and Spectrum Analyzer	Signal- and Spectrum Analyzer FSW50	Rohde & Schwarz Messgerätebau GmbH Memmingen	101560	40011	cal	18.12.2025	31.12.2026

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 63.10.
- 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 63.10) – 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 63.10).
- 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 63.10.
- 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 63.10) – 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 $\pm 45^\circ$ and antenna height between 1 and 4 m.
- The final measurement is done with quasi-peak detector (as described in ANSI C 63.10).
- 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 63.10.
- 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 63.10) – 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 63.10).
- 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 63.10.
- 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 63.10).
- Final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement and the limit is stored.

9 Measurement uncertainty

Measurement uncertainty		
Test case	Uncertainty	
Antenna gain	± 3 dB	
Power spectral density	± 1.56 dB	
DTS bandwidth	± 100 kHz (depends on the used RBW)	
Occupied bandwidth	± 100 kHz (depends on the used RBW)	
Maximum output power conducted	± 1.56 dB	
Detailed spurious emissions @ the band edge - conducted	± 1.56 dB	
Band edge compliance radiated	± 3 dB	
Spurious emissions conducted	> 3.6 GHz	± 1.56 dB
	> 7 GHz	± 1.56 dB
	> 18 GHz	± 2.31 dB
	≥ 40 GHz	± 2.97 dB
Spurious emissions radiated below 30 MHz	± 3 dB	
Spurious emissions radiated 30 MHz to 1 GHz	± 4.1 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 Part 15 RSS - 247, Issue 4	See table!	2026-06-30	-/-

Test specification clause	Test case	Guideline	Temperature & voltage conditions	C	NC	NA	NP	Remark
§15.247(b)(4) RSS - 247 / 5.4 (f)(ii)	Antenna gain	-/-	Nominal	-/-				-/-
§15.35	Duty cycle	-/-	Nominal	-/-				-/-
§15.247(e) RSS - 247 / 5.2 (b)	Power spectral density	KDB 558074 DTS clause: 8.4	Nominal	☐	☐	☐	☒	-/-
§15.247(a)(2) RSS - 247 / 5.2 (a)	DTS bandwidth	KDB 558074 DTS clause: 8.2	Nominal	☐	☐	☐	☒	-/-
RSS Gen clause 4.6.1	Occupied bandwidth	-/-	Nominal	☐	☐	☐	☒	-/-
§15.247(b)(3) RSS - 247 / 5.4 (d)	Maximum output power	KDB 558074 DTS clause: 8.3.1.3	Nominal	☐	☐	☐	☒	-/-
§15.247(d) RSS - 247 / 5.5	Detailed spurious emissions @ the band edge – cond.	-/-	Nominal	☐	☐	☐	☒	-/-
§15.205 RSS - 247 / 5.5 RSS - Gen	Band edge compliance rad.	KDB 558074 DTS clause: 8.7.3	Nominal	☒	☐	☐	☐	-/-
§15.247(d) RSS - 247 / 5.5	TX spurious emissions cond.	KDB 558074 DTS clause: 8.5	Nominal	☐	☐	☐	☒	-/-
§15.209(a) RSS-Gen	TX spurious emissions rad. below 30 MHz	-/-	Nominal	☒	☐	☐	☐	-/-
§15.247(d) RSS - 247 / 5.5 RSS-Gen	TX spurious emissions rad. 30 MHz to 1 GHz	-/-	Nominal	☒	☐	☐	☐	-/-
§15.247(d) RSS - 247 / 5.5 RSS-Gen	TX spurious emissions rad. above 1 GHz	-/-	Nominal	☒	☐	☐	☐	-/-
§15.107(a) §15.207	Conducted emissions < 30 MHz	-/-	Nominal	☐	☐	☐	☒	-/-

Notes:

C	Compliant	NC	Not compliant	NA	Not applicable	NP	Not performed
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11 Additional information and comments

Reference documents: Customer_Questionnaire_1-9318-25-01.docx
rf_ant_ant162442dt-2001a2_summary_en.pdf

Special test descriptions: Power settings:

Channel	1 / 6 / 11
DSSS / b – mode	Default
OFDM / g – mode	Default
OFDM / n HT20 – mode	Default
OFDM / ax HE20 SU – mode	Default
OFDM / ax HE20 ER – mode	Default
OFDM / ax HE20 TB – mode (RU0, RU8, RU37, RU40, RU53, RU54 etc.)	Default

Configuration descriptions: The DUT has been controlled using a web GUI and batch files. Only 20 MHz bandwidth is supported.

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:

channel number & center frequency													
channel	1	2	3	4	5	6	7	8	9	10	11	12	13
f _c / MHz	2412	2417	2422	2427	2432	2437	2442	2447	2452	2457	2462	2467	2472

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

12 Additional EUT parameter

- Test mode:
- ☐ No test mode available
Iperf was used to ping another device with the largest support packet size
 - ☒ Test mode available
Special software is used.
EUT is transmitting pseudo random data by itself
- Modulation types:
- ☒ Wide Band Modulation (None Hopping – e.g. DSSS, OFDM)
 - ☐ Frequency Hopping Spread Spectrum (FHSS)
- 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.*

13 Measurement results

13.1 Antenna gain

Limits:

FCC	ISED
6 dBi / > 6 dBi output power and power density reduction required	

Results: Taoglas GW.51.5153 antenna, extracted from antenna datasheet

	lowest channel	middle channel	highest channel
Gain [dBi] / Declared	5.2	5.2	5.2

Results: 2J Antennas 2JF1002P antenna, extracted from antenna datasheet

	lowest channel	middle channel	highest channel
Gain [dBi] / Declared	4.2	4.2	4.2

13.2 Identify worst case data rate

Worst case data rates declared by the manufacturer.

Modulation scheme / bandwidth	
DSSS / b – mode	1 Mbit/s
OFDM / g – mode	6 Mbit/s
OFDM / n HT20 – mode	MCS0
OFDM / ax HE20 – mode	MCS0
OFDM / ax HE20 – mode ER	MCS0

13.3 Band edge compliance radiated (Taoglas GW.51.5153 antenna)

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 3 meter.

Measurement:

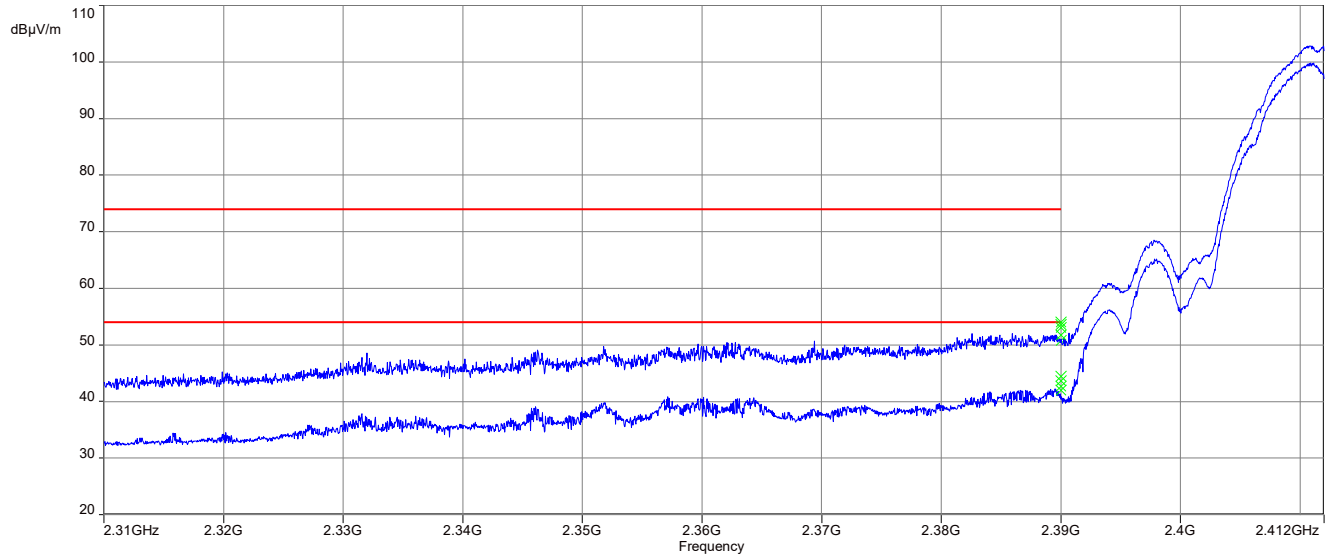
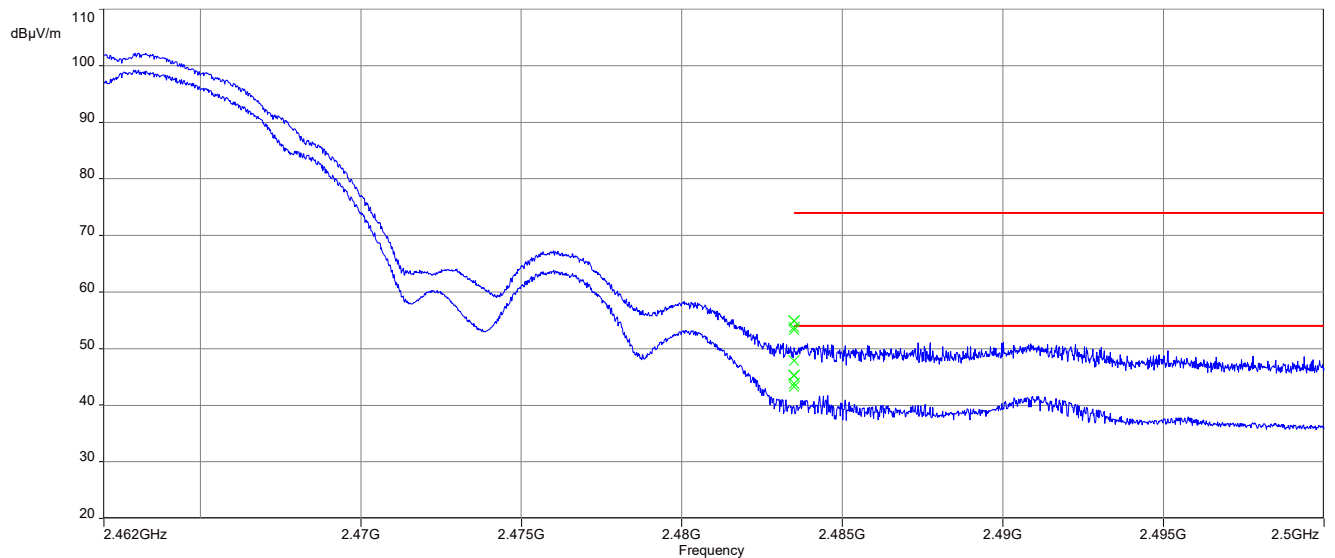
	Measurement parameter for peak measurements	Measurement parameter for average measurements
		According to DTS clause: 8.7.3
Detector	Peak	RMS
Sweep time	Auto	Auto
Resolution bandwidth	1 MHz	100 kHz
Video bandwidth	3 MHz	300 kHz
Span	See plot	2 MHz
Trace mode	Max. hold	RMS Average over 101 sweeps
Analyzer function	-/-	Band power function (Compute the power by integrating the spectrum over 1 MHz)
Test setup	See chapter 7.2 setup A	
Measurement uncertainty	See chapter 9	

Limits:

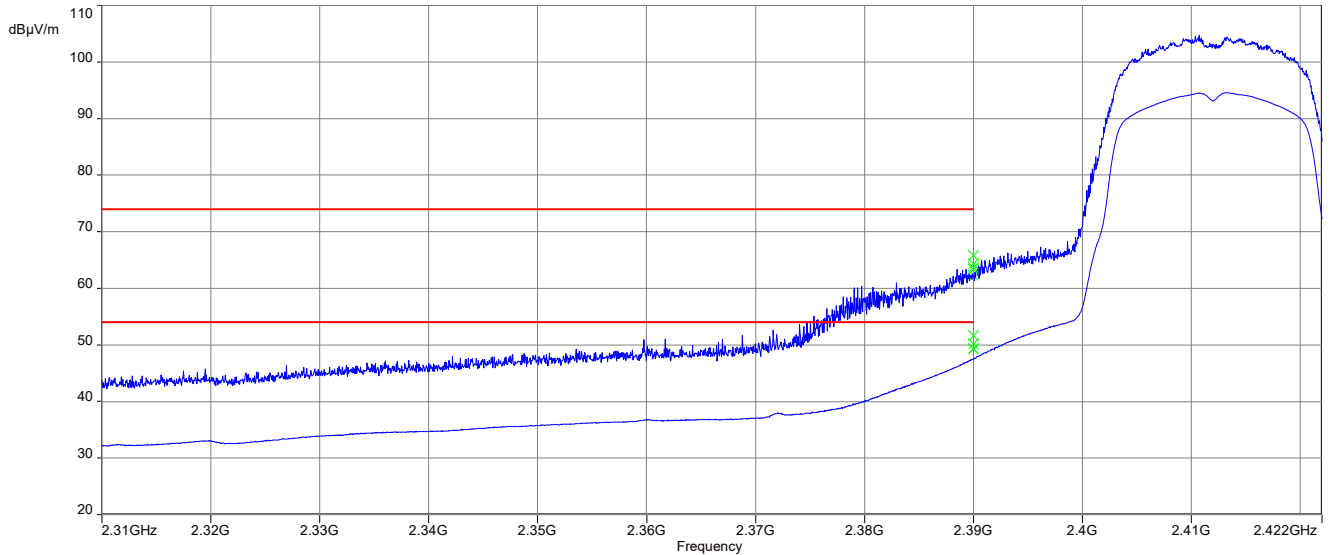
FCC	ISED
74 dB μ V/m @ 3 m (Peak) 54 dB μ V/m @ 3 m (AVG)	

Results:

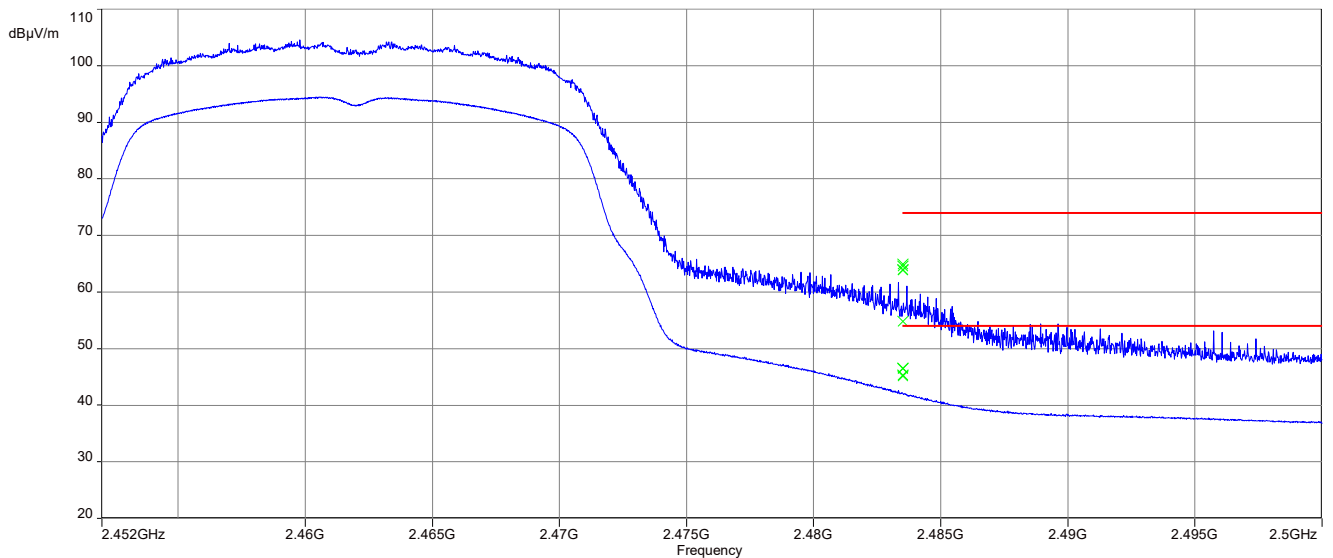
Scenario	Band Edge Compliance Radiated [dB μ V/m]
b-mode Channel 1	53.9 dB μ V/m (peak) 44.4 dB μ V/m (average)
b-mode Channel 11	54.9 dB μ V/m (peak) 45.2 dB μ V/m (average)
nHT20-mode Channel 1	65.8 dB μ V/m (peak) 51.7 dB μ V/m (average)
nHT20-mode Channel 11	64.9 dB μ V/m (peak) 46.6 dB μ V/m (average)
axHE20-mode Channel 1	68.7 dB μ V/m (peak) 51.2 dB μ V/m (average)
axHE20-mode Channel 11	72.7 dB μ V/m (peak) 48.4 dB μ V/m (average)
axHE20-mode Channel 1 ER	56.0 dB μ V/m (peak) 42.5 dB μ V/m (average)
axHE20-mode Channel 11 ER	55.8 dB μ V/m (peak) 43.3 dB μ V/m (average)
axHE20-mode Channel 1 RU0	46.7 dB μ V/m (peak) 35.1 dB μ V/m (average)
axHE20-mode Channel 11 RU8	47.6 dB μ V/m (peak) 35.6 dB μ V/m (average)
axHE20-mode Channel 1 RU37	52.5 dB μ V/m (peak) 39.8 dB μ V/m (average)
axHE20-mode Channel 11 RU40	52.1 dB μ V/m (peak) 39.3 dB μ V/m (average)
axHE20-mode Channel 1 RU53	56.4 dB μ V/m (peak) 43.6 dB μ V/m (average)
axHE20-mode Channel 11 RU54	57.3 dB μ V/m (peak) 43.9 dB μ V/m (average)

Plots:**Plot 1:** TX mode, lower band edge, vertical & horizontal polarization, b-mode**Plot 2:** TX mode, upper band edge, vertical & horizontal polarization, b-mode

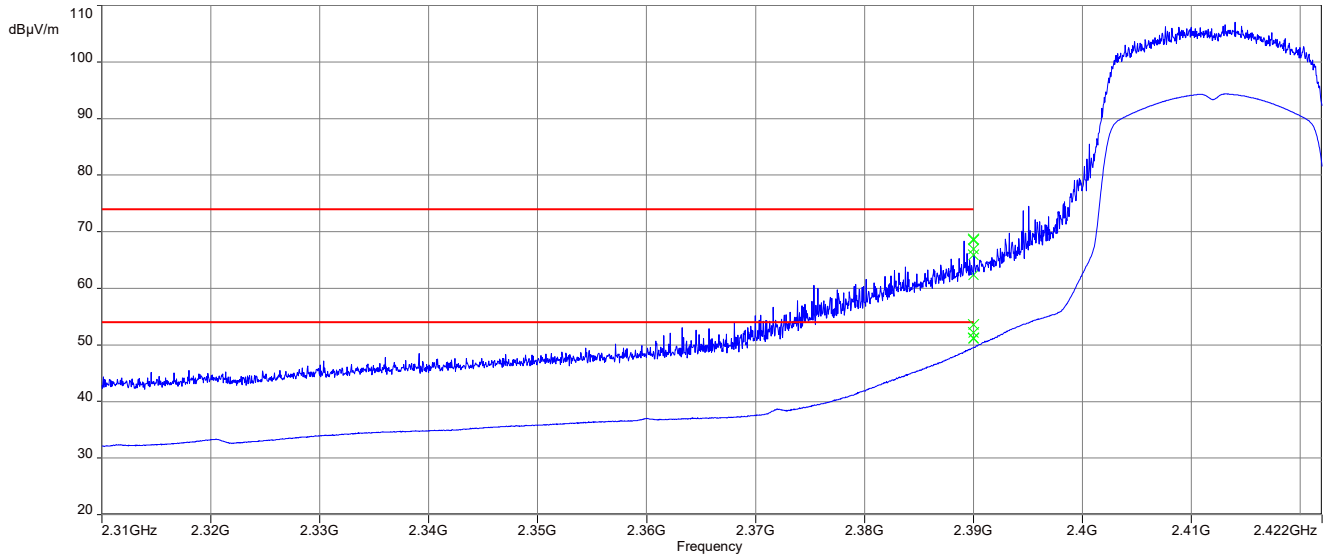
Plot 3: TX mode, lower band edge, vertical & horizontal polarization, nHT20-mode



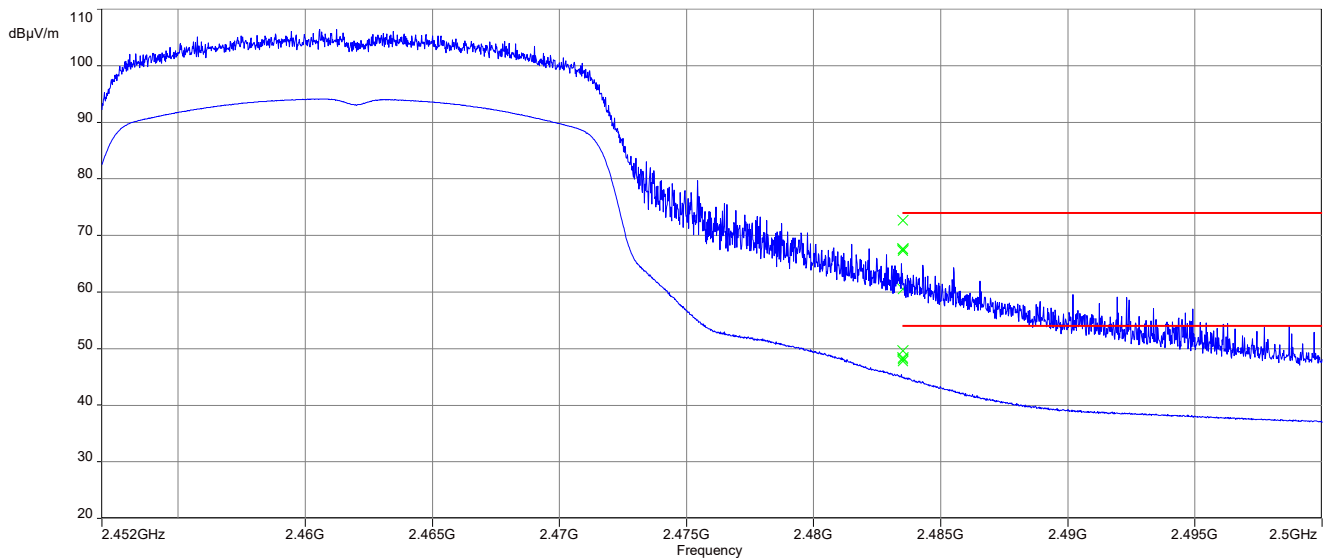
Plot 4: TX mode, upper band edge, vertical & horizontal polarization, nHT20-mode



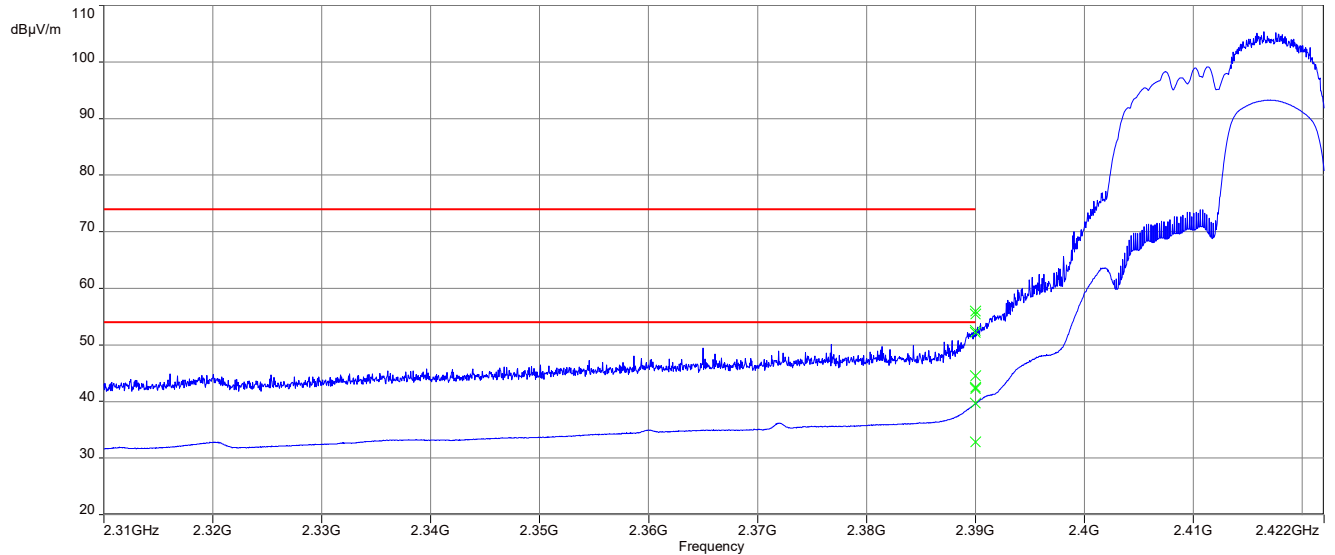
Plot 5: TX mode, lower band edge, vertical & horizontal polarization, axHE20-mode



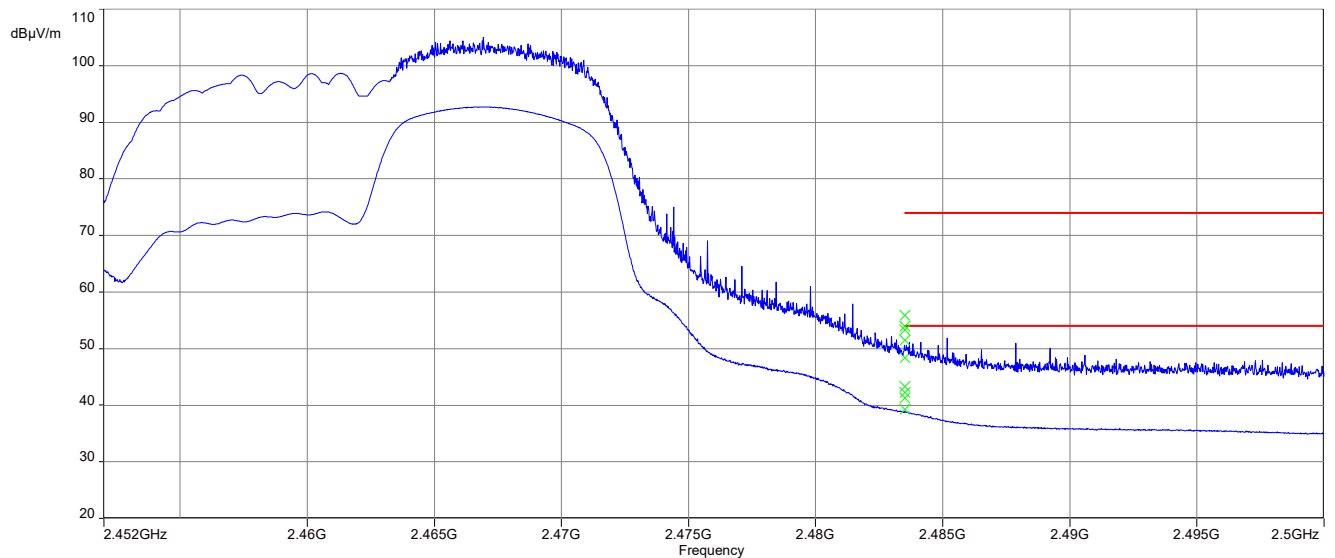
Plot 6: TX mode, upper band edge, vertical & horizontal polarization, axHE20-mode



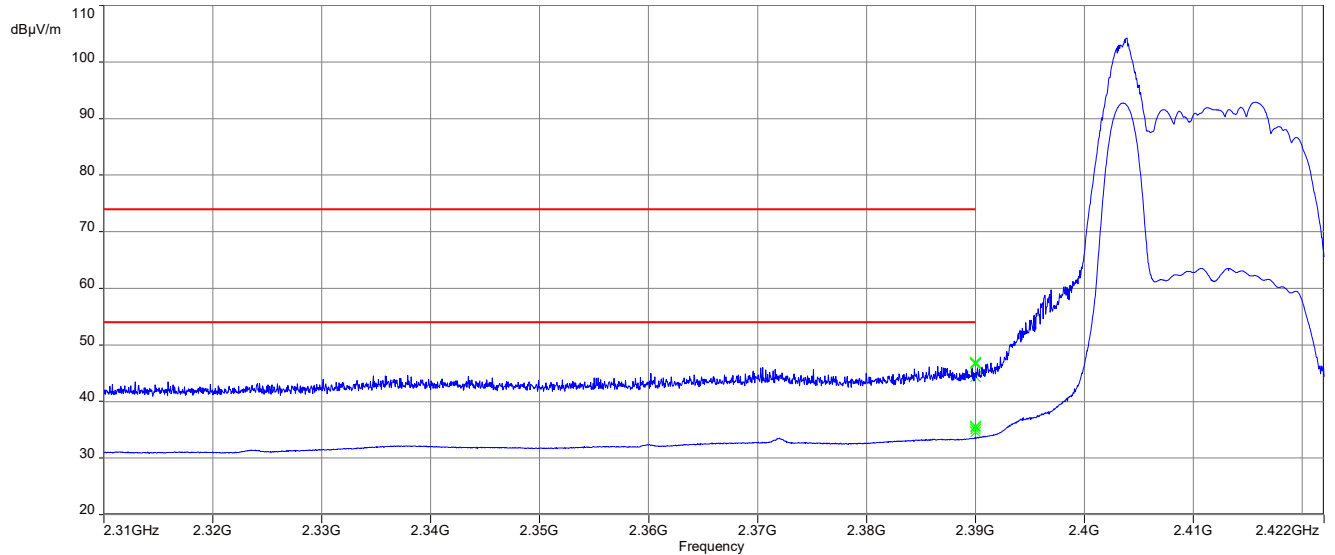
Plot 7: TX mode, lower band edge, vertical & horizontal polarization, axHE20-mode ER



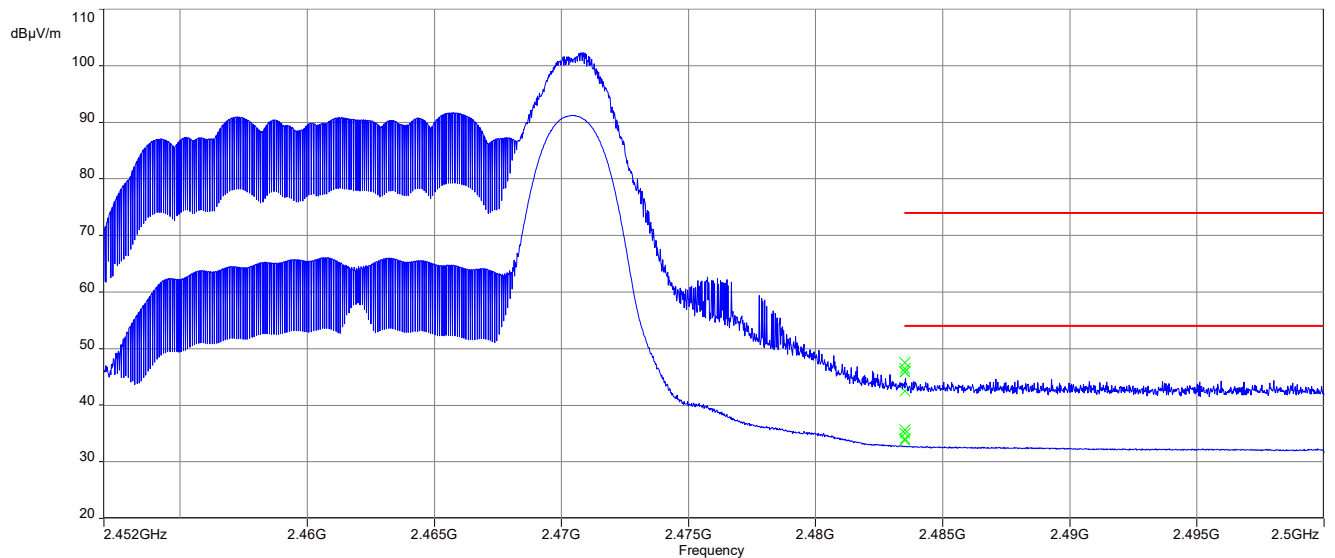
Plot 8: TX mode, upper band edge, vertical & horizontal polarization, axHE20-mode ER



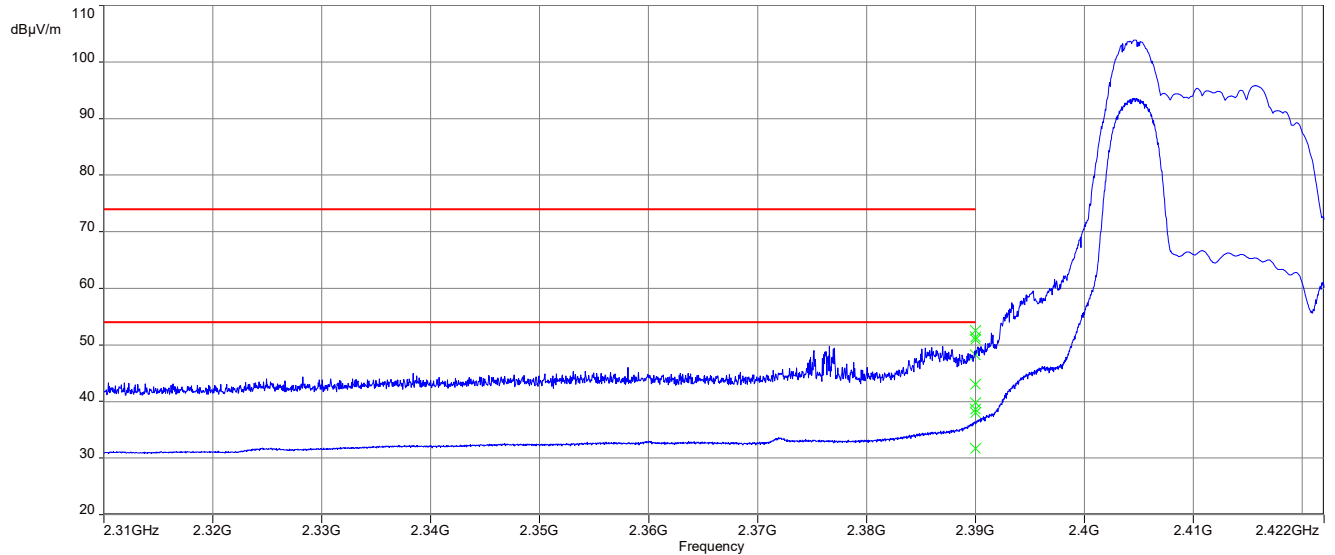
Plot 9: TX mode, lower band edge, vertical & horizontal polarization, axHE20-mode RU0



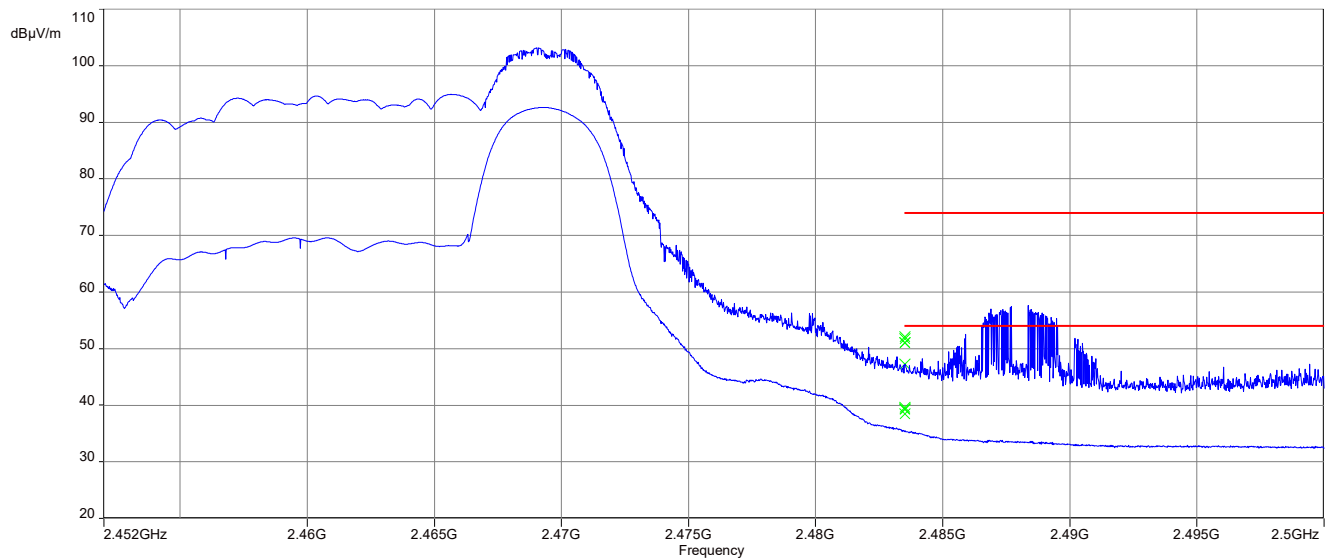
Plot 10: TX mode, upper band edge, vertical & horizontal polarization, axHE20-mode RU8



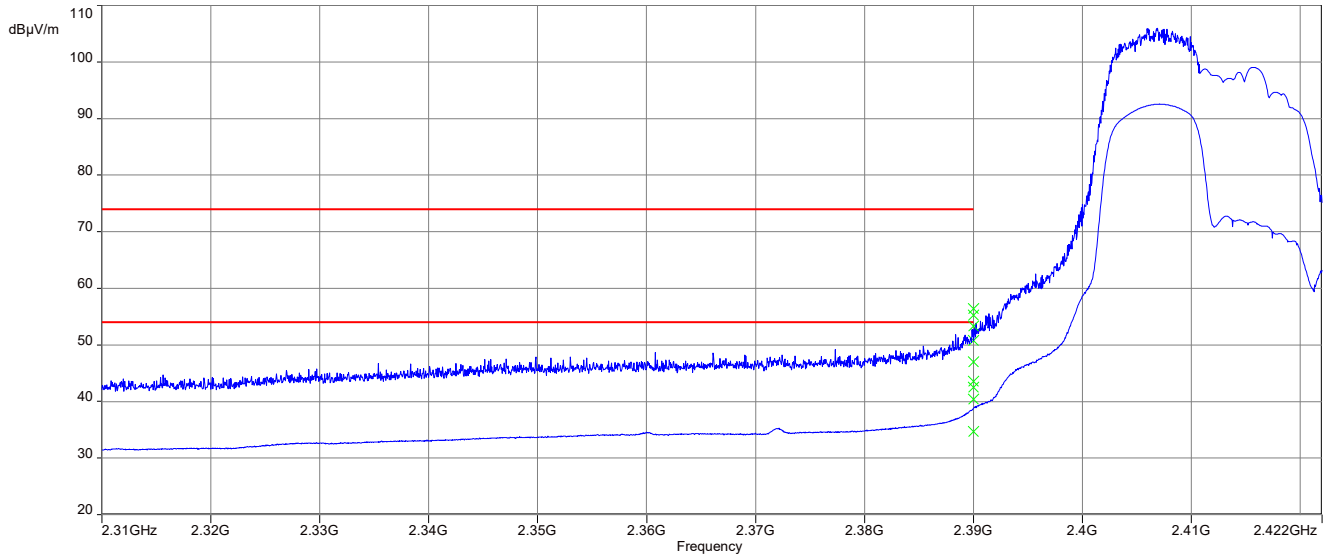
Plot 11: TX mode, lower band edge, vertical & horizontal polarization, axHE20-mode RU37



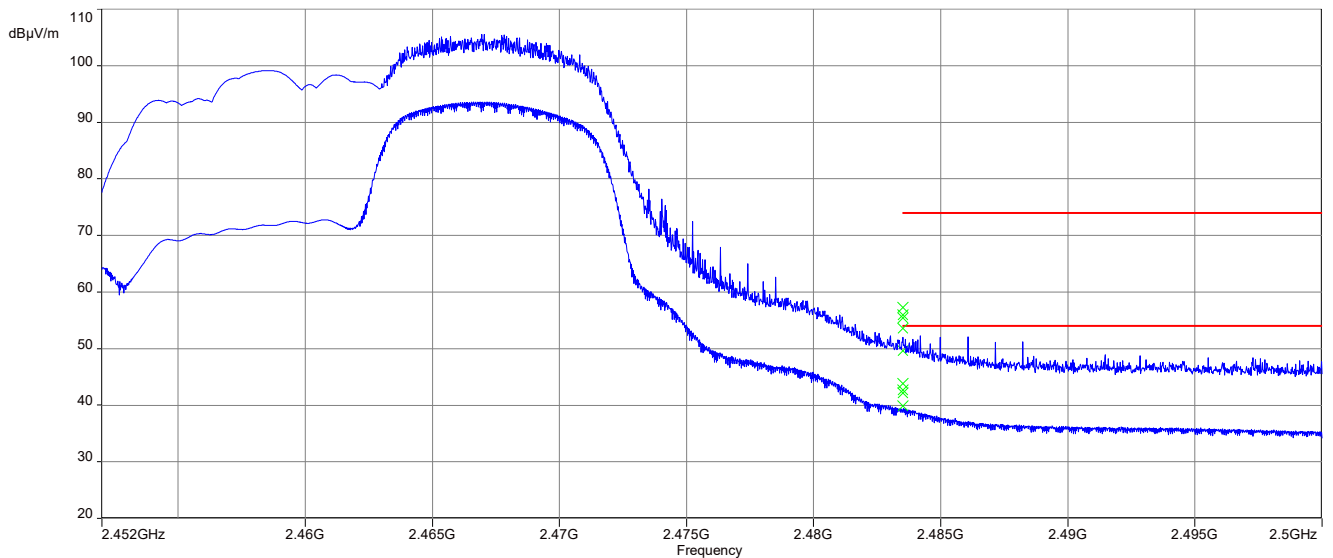
Plot 12: TX mode, upper band edge, vertical & horizontal polarization, axHE20-mode RU40



Plot 13: TX mode, lower band edge, vertical & horizontal polarization, axHE20-mode RU53



Plot 14: TX mode, upper band edge, vertical & horizontal polarization, axHE20-mode RU54



13.4 Band edge compliance radiated (2J Antennas 2JF1002P antenna)

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 3 meter.

Measurement:

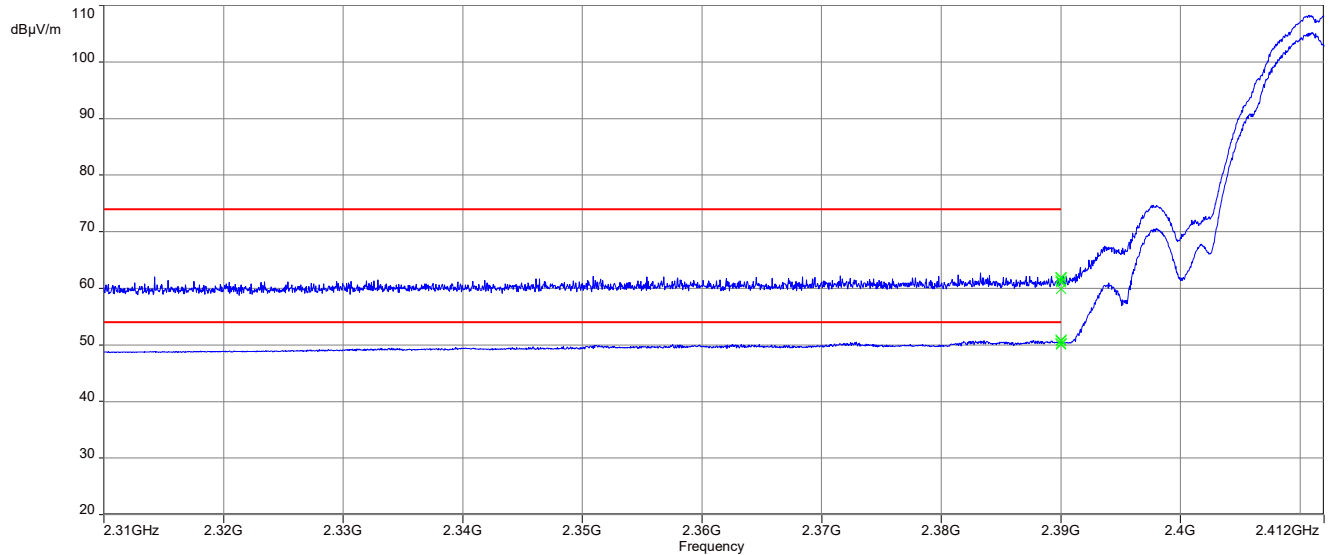
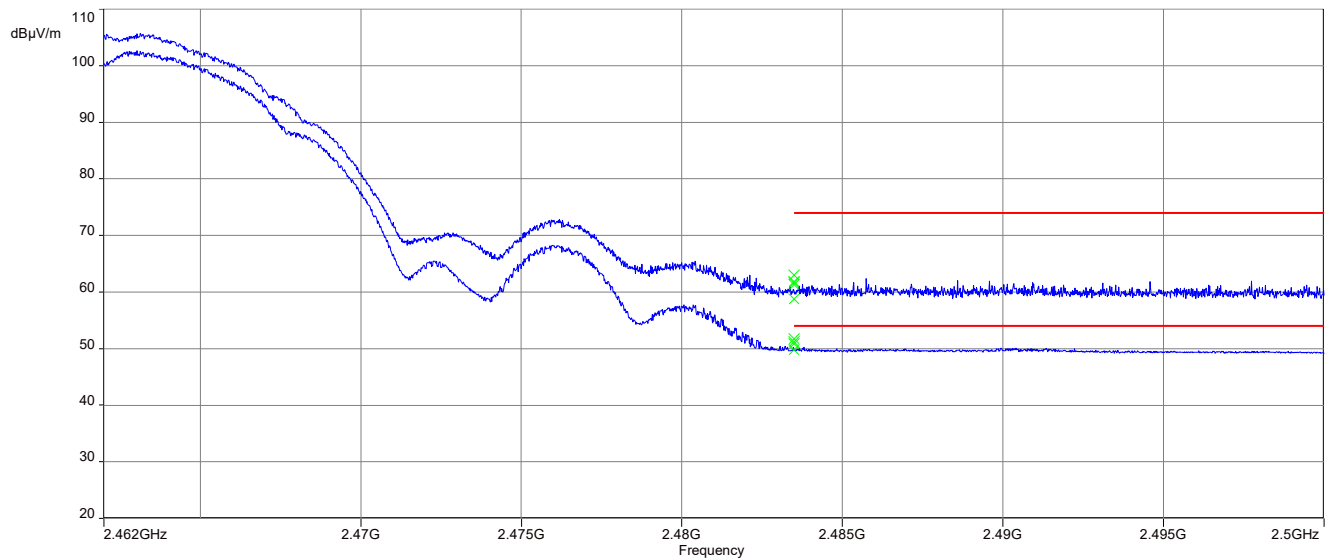
	Measurement parameter for peak measurements	Measurement parameter for average measurements
		According to DTS clause: 8.7.3
Detector	Peak	RMS
Sweep time	Auto	Auto
Resolution bandwidth	1 MHz	100 kHz
Video bandwidth	3 MHz	300 kHz
Span	See plot	2 MHz
Trace mode	Max. hold	RMS Average over 101 sweeps
Analyzer function	-/-	Band power function (Compute the power by integrating the spectrum over 1 MHz)
Test setup	See chapter 7.2 setup A	
Measurement uncertainty	See chapter 9	

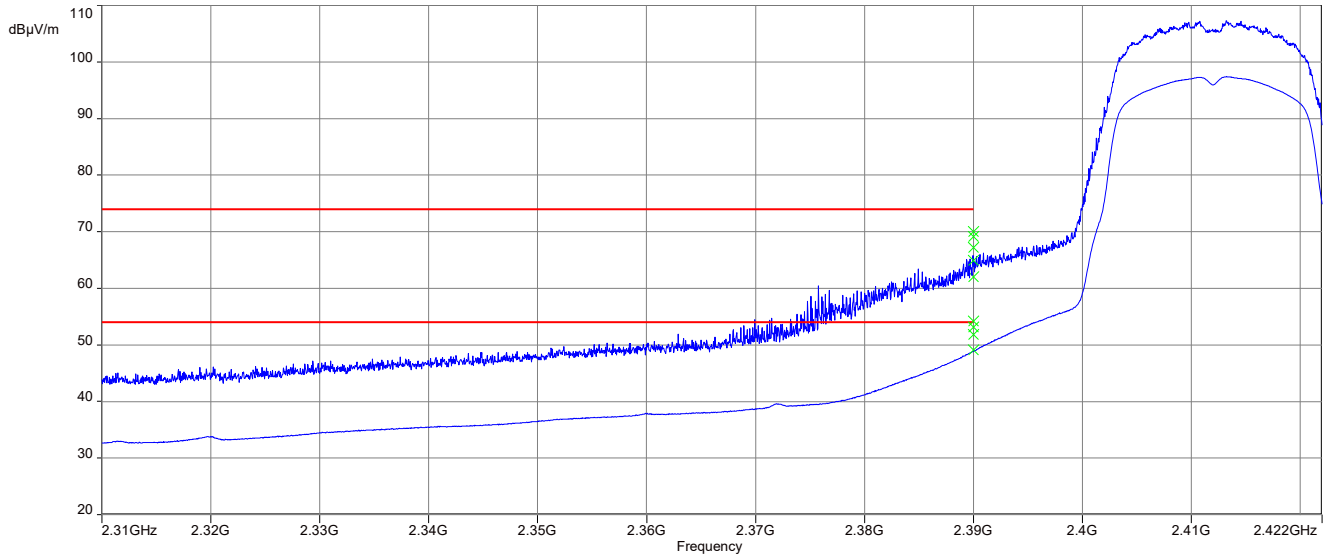
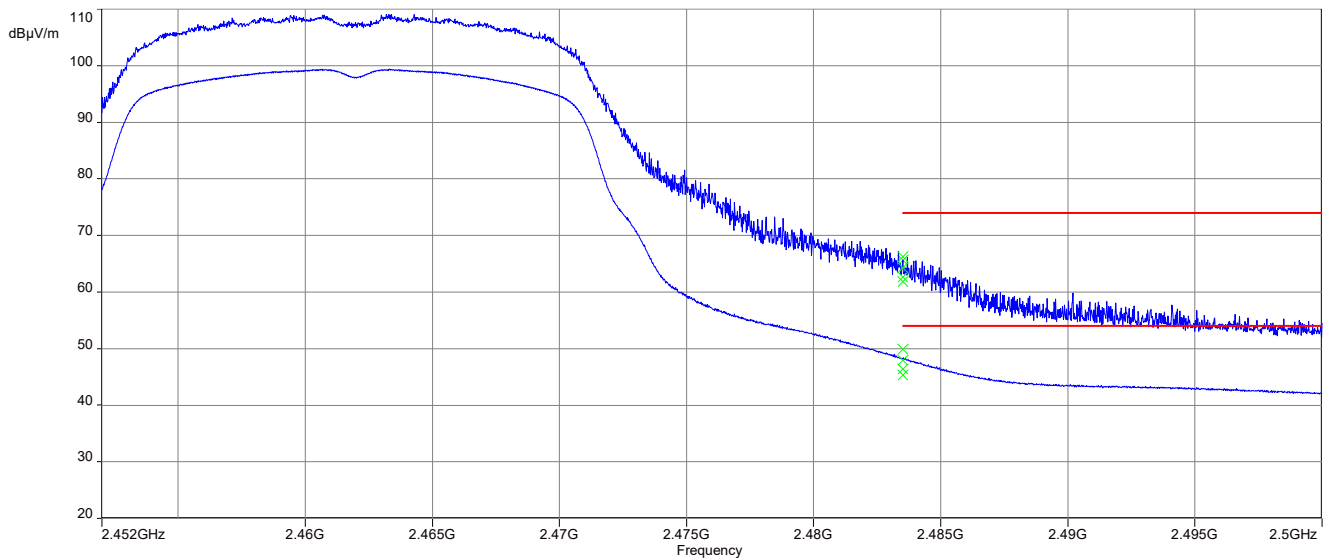
Limits:

FCC	ISED
74 dB μ V/m @ 3 m (Peak) 54 dB μ V/m @ 3 m (AVG)	

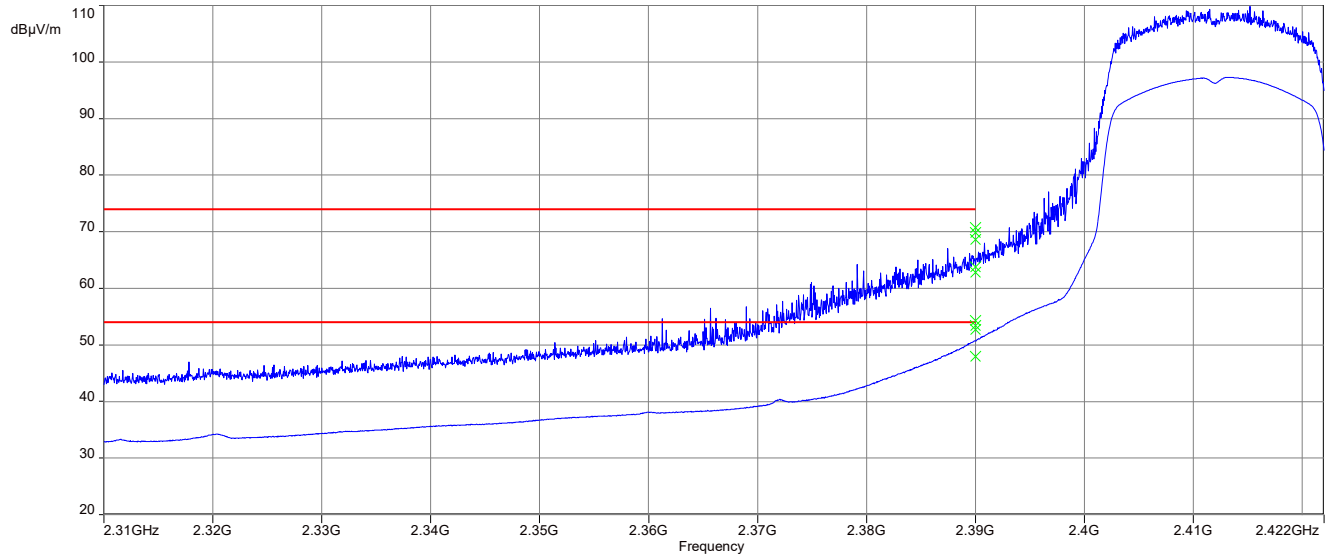
Results:

Scenario	Band Edge Compliance Radiated [dB μ V/m]
b-mode Channel 1	61.9 dB μ V/m (peak) 50.9 dB μ V/m (average)
b-mode Channel 11	63.0 dB μ V/m (peak) 51.7 dB μ V/m (average)
nHT20-mode Channel 1	70.1 dB μ V/m (peak) 50.1 dB μ V/m (average)
nHT20-mode Channel 11	66.2 dB μ V/m (peak) 49.9 dB μ V/m (average)
axHE20-mode Channel 1	70.8 dB μ V/m (peak) 53.0 dB μ V/m (average)
axHE20-mode Channel 11	72.8 dB μ V/m (peak) 52.6 dB μ V/m (average)
axHE20-mode Channel 1 ER	62.1 dB μ V/m (peak) 50.9 dB μ V/m (average)
axHE20-mode Channel 11 ER	62.9 dB μ V/m (peak) 51.3 dB μ V/m (average)
axHE20-mode Channel 1 RU0	61.8 dB μ V/m (peak) 50.0 dB μ V/m (average)
axHE20-mode Channel 11 RU8	61.6 dB μ V/m (peak) 49.7 dB μ V/m (average)
axHE20-mode Channel 1 RU37	62.0 dB μ V/m (peak) 50.2 dB μ V/m (average)
axHE20-mode Channel 11 RU40	62.5 dB μ V/m (peak) 50.4 dB μ V/m (average)
axHE20-mode Channel 1 RU53	61.4 dB μ V/m (peak) 50.6 dB μ V/m (average)
axHE20-mode Channel 11 RU54	62.9 dB μ V/m (peak) 51.0 dB μ V/m (average)

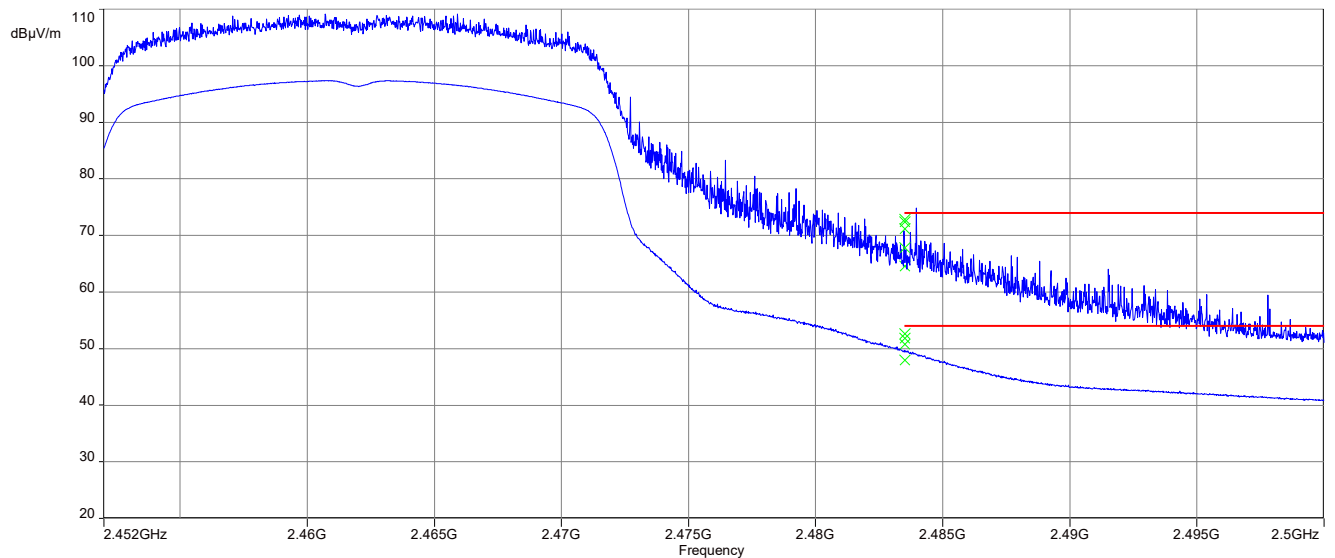
Plots:**Plot 1:** TX mode, lower band edge, vertical & horizontal polarization, b-mode**Plot 2:** TX mode, upper band edge, vertical & horizontal polarization, b-mode

Plot 3: TX mode, lower band edge, vertical & horizontal polarization, nHT20-mode**Plot 4:** TX mode, upper band edge, vertical & horizontal polarization, nHT20-mode

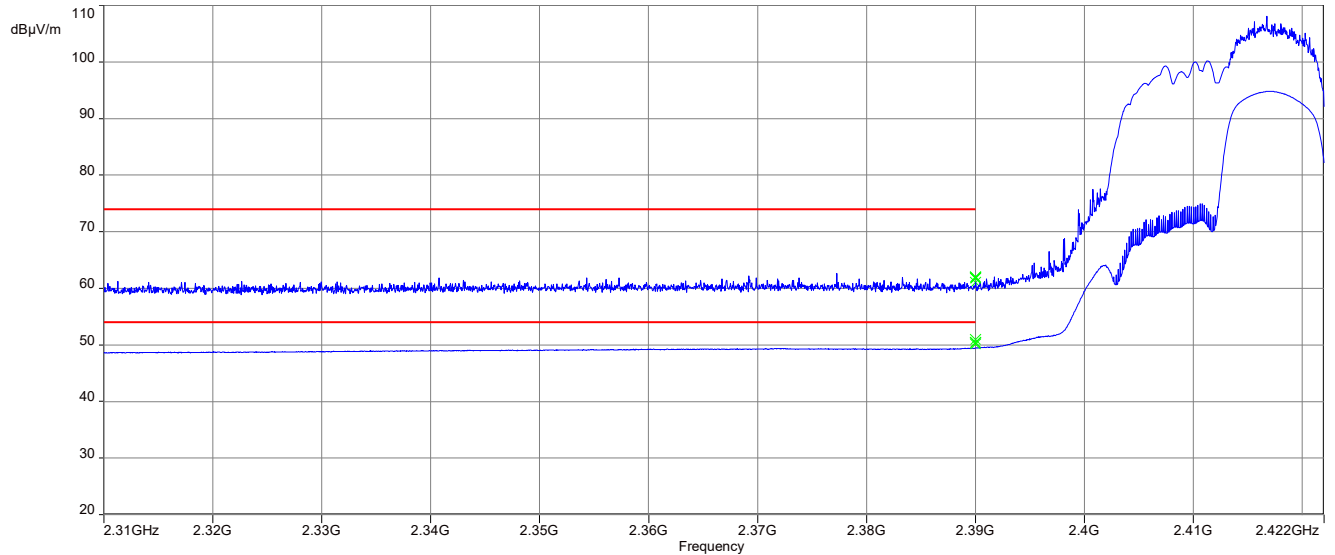
Plot 5: TX mode, lower band edge, vertical & horizontal polarization, axHE20-mode



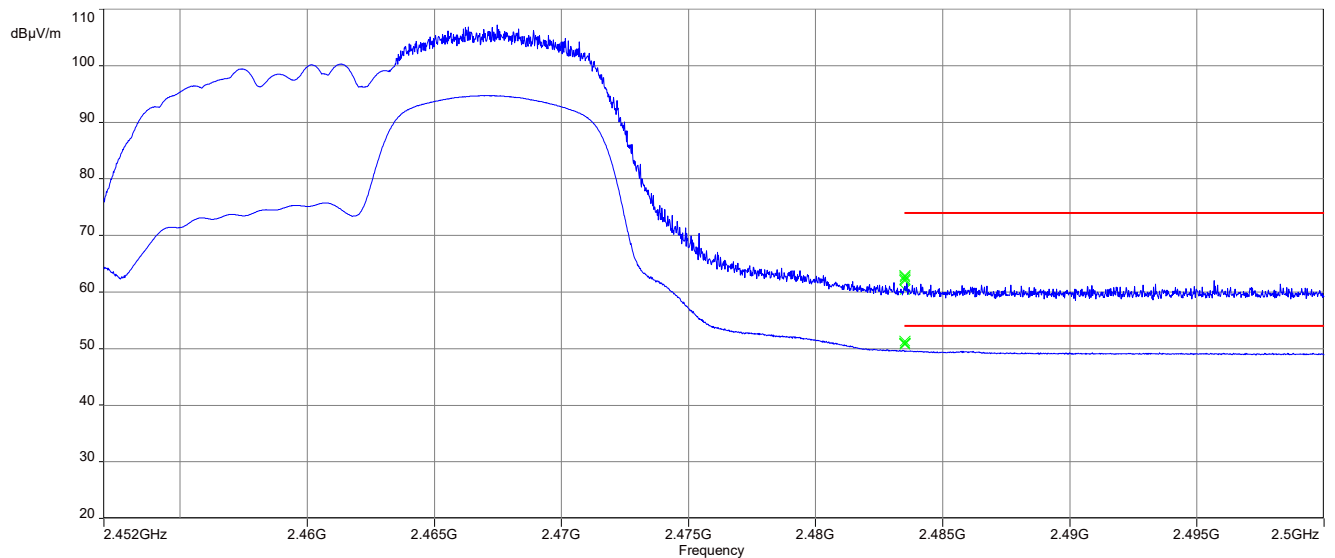
Plot 6: TX mode, upper band edge, vertical & horizontal polarization, axHE20-mode



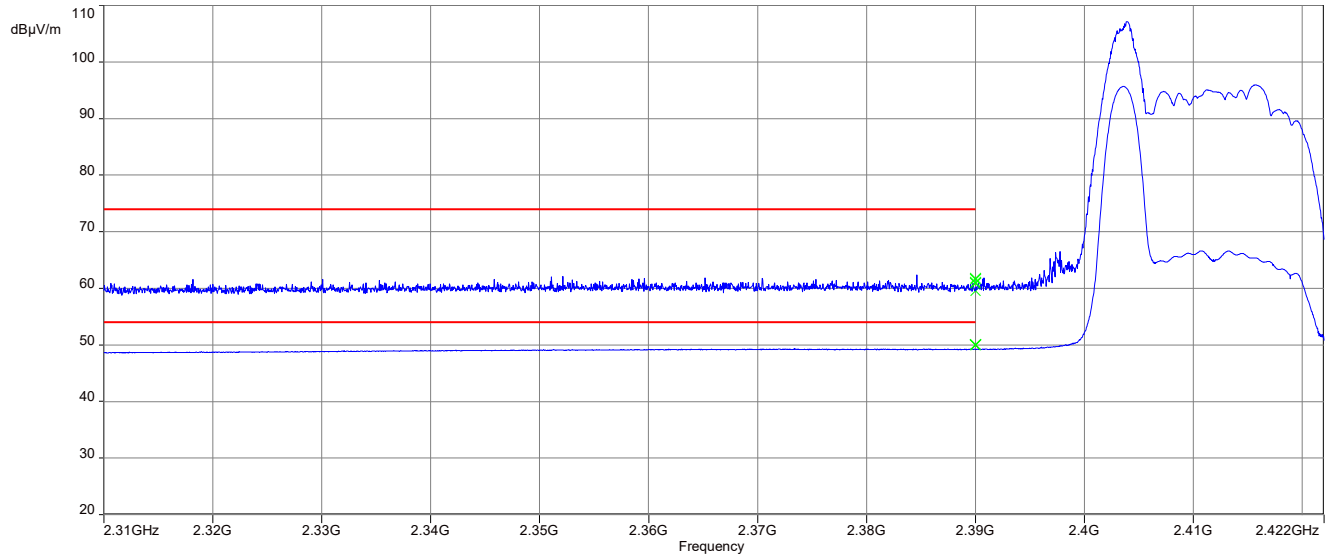
Plot 7: TX mode, lower band edge, vertical & horizontal polarization, axHE20-mode ER



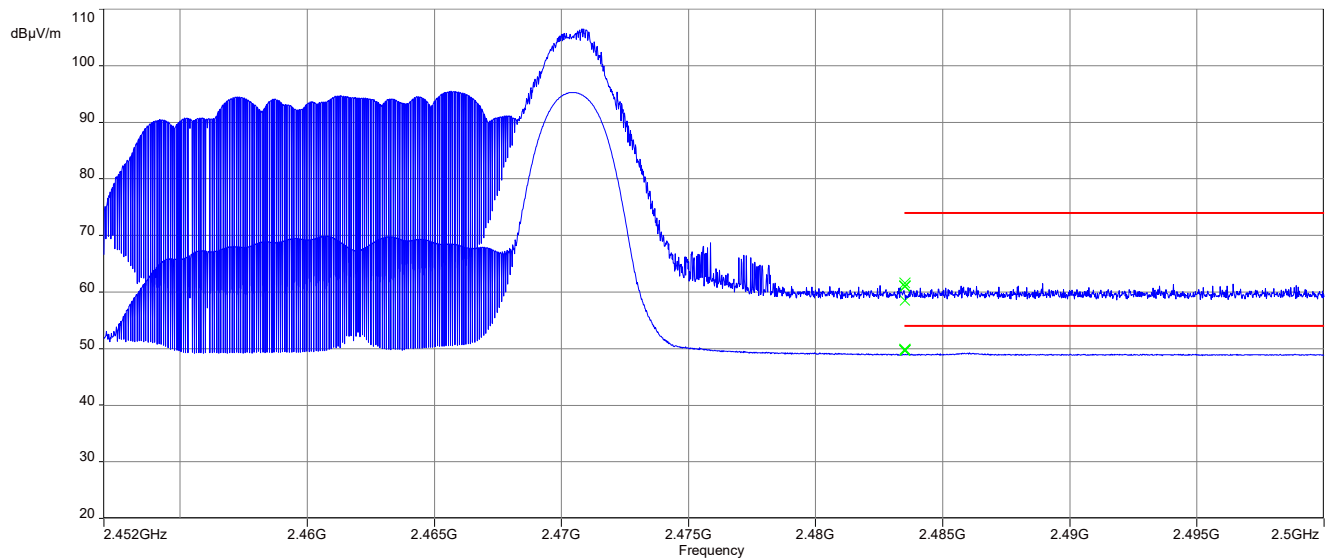
Plot 8: TX mode, upper band edge, vertical & horizontal polarization, axHE20-mode ER



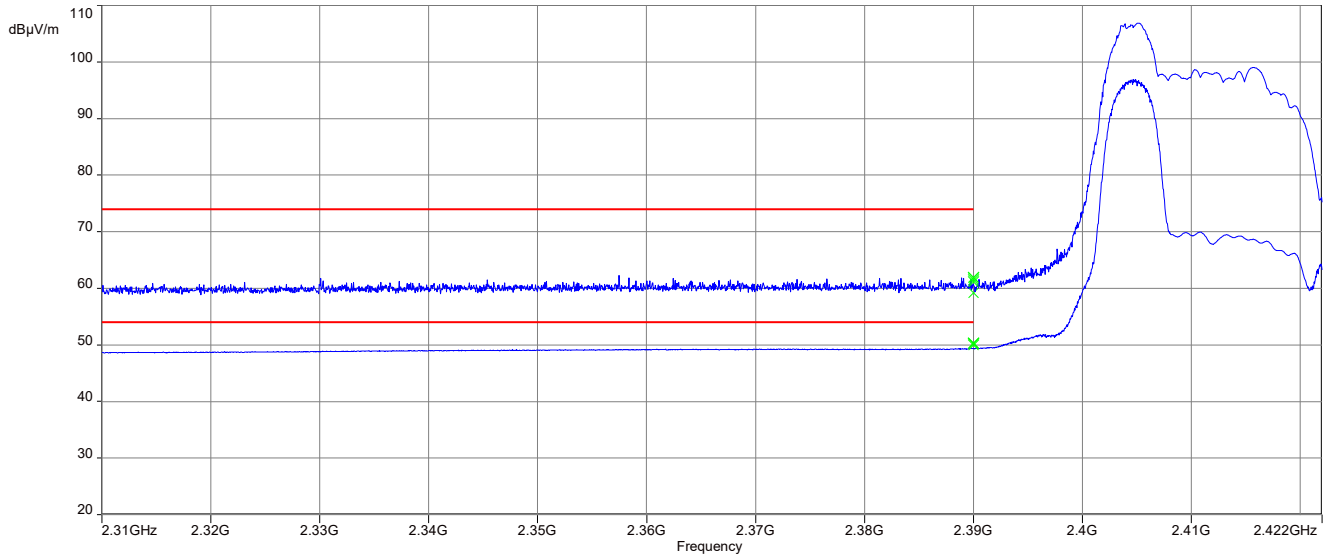
Plot 9: TX mode, lower band edge, vertical & horizontal polarization, axHE20-mode RU0



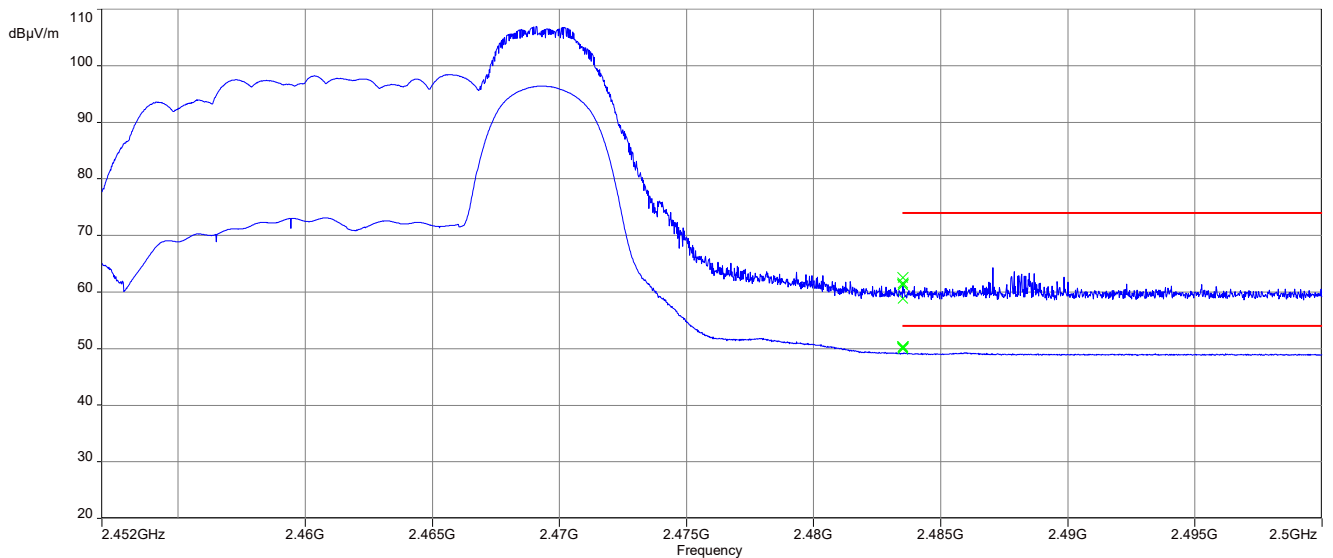
Plot 10: TX mode, upper band edge, vertical & horizontal polarization, axHE20-mode RU8



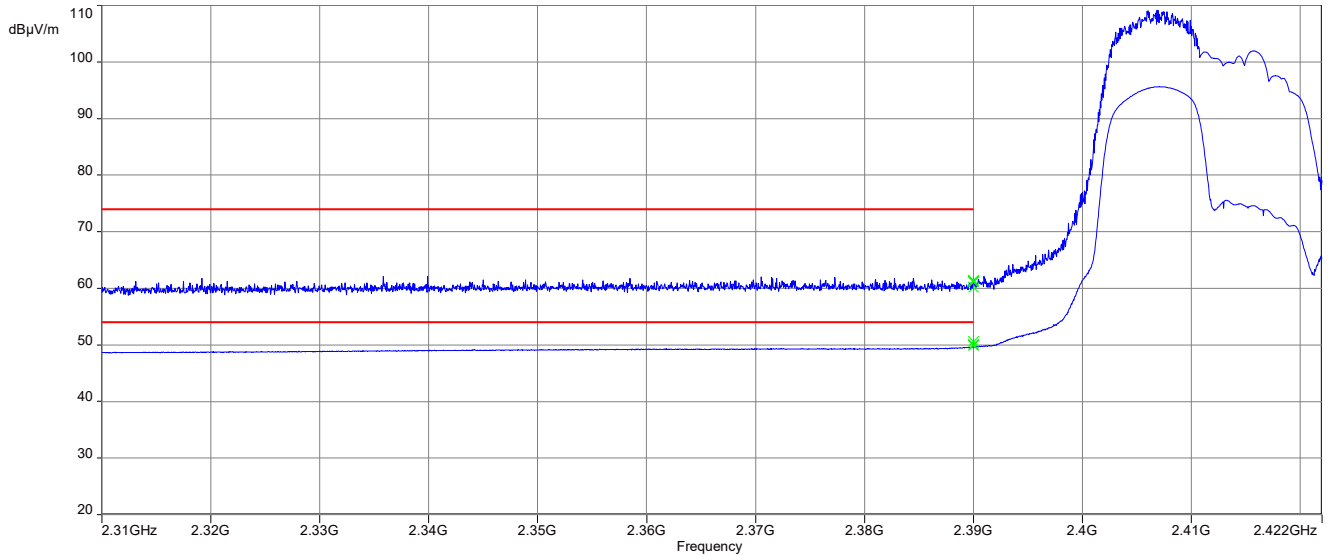
Plot 11: TX mode, lower band edge, vertical & horizontal polarization, axHE20-mode RU37



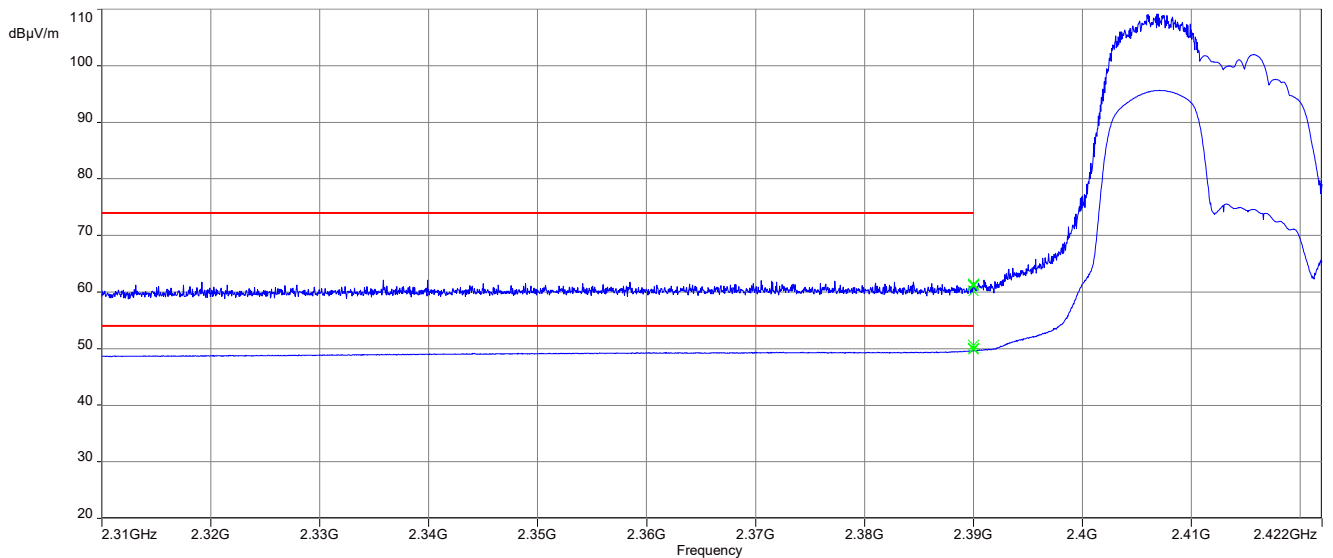
Plot 12: TX mode, upper band edge, vertical & horizontal polarization, axHE20-mode RU40



Plot 13: TX mode, lower band edge, vertical & horizontal polarization, axHE20-mode RU53



Plot 14: TX mode, upper band edge, vertical & horizontal polarization, axHE20-mode RU54



13.5 Spurious emissions radiated below 30 MHz (Taoglas GW.51.5153 antenna)

Description:

Measurement of the radiated spurious emissions in transmit mode below 30 MHz. The limits are recalculated 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
Resolution bandwidth	F < 150 kHz: 200 Hz F > 150 kHz: 9 kHz
Video bandwidth	F < 150 kHz: 1 kHz F > 150 kHz: 100 kHz
Span	9 kHz to 30 MHz
Trace mode	Max Hold
Test setup	See chapter 7.2 setup B
Measurement uncertainty	See chapter 9

Limits:

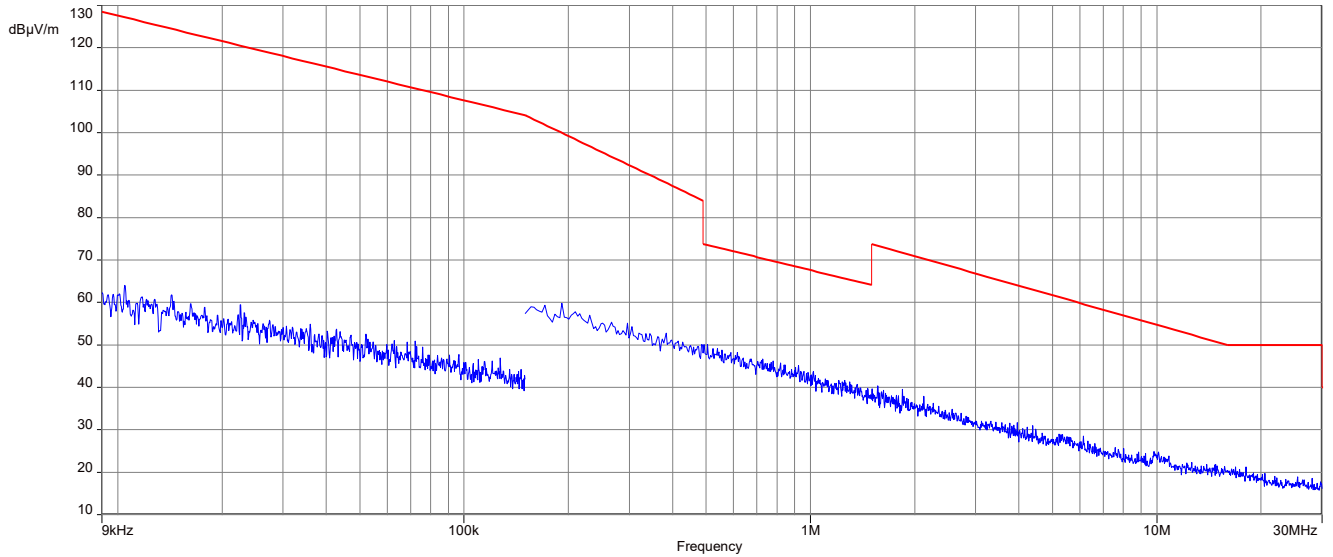
FCC		ISED
Frequency / MHz	Field Strength / ($\mu\text{V} / \text{m}$)	Measurement distance / m
0.009 – 0.490	$2400/F(\text{kHz})$	300
0.490 – 1.705	$24000/F(\text{kHz})$	30
1.705 – 30.0	30	30

Results:

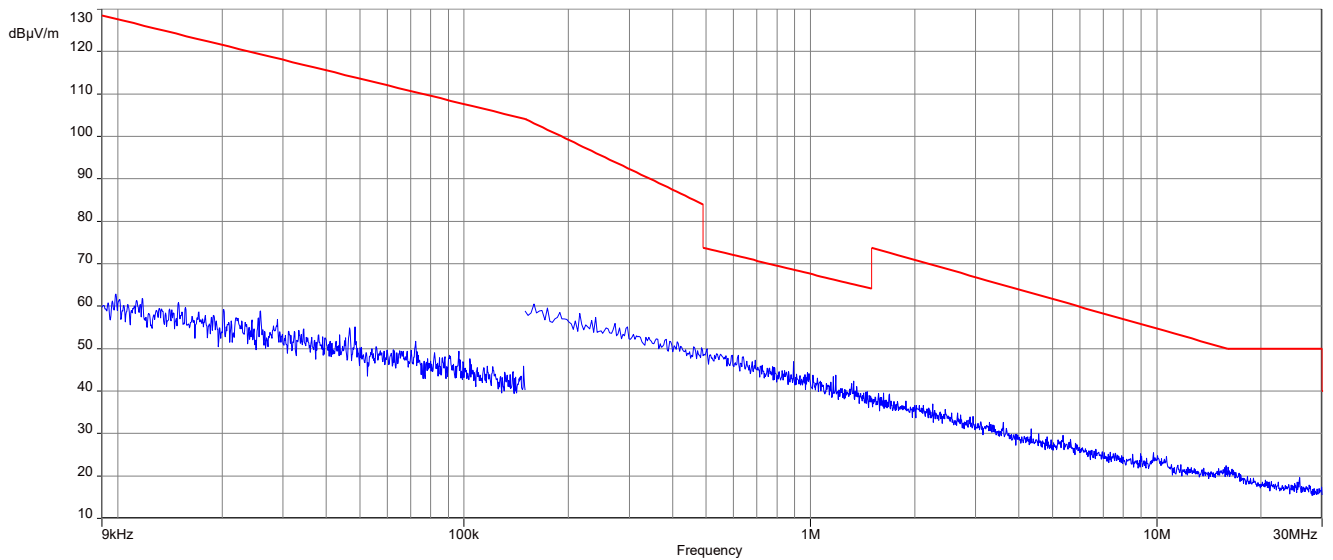
TX spurious emissions radiated < 30 MHz / (dB $\mu\text{V} / \text{m}$) @ 3 m		
Frequency / MHz	Detector	Level / (dB $\mu\text{V} / \text{m}$)
All detected peaks are more than 20 dB below the limit.		

Plots: DSSS

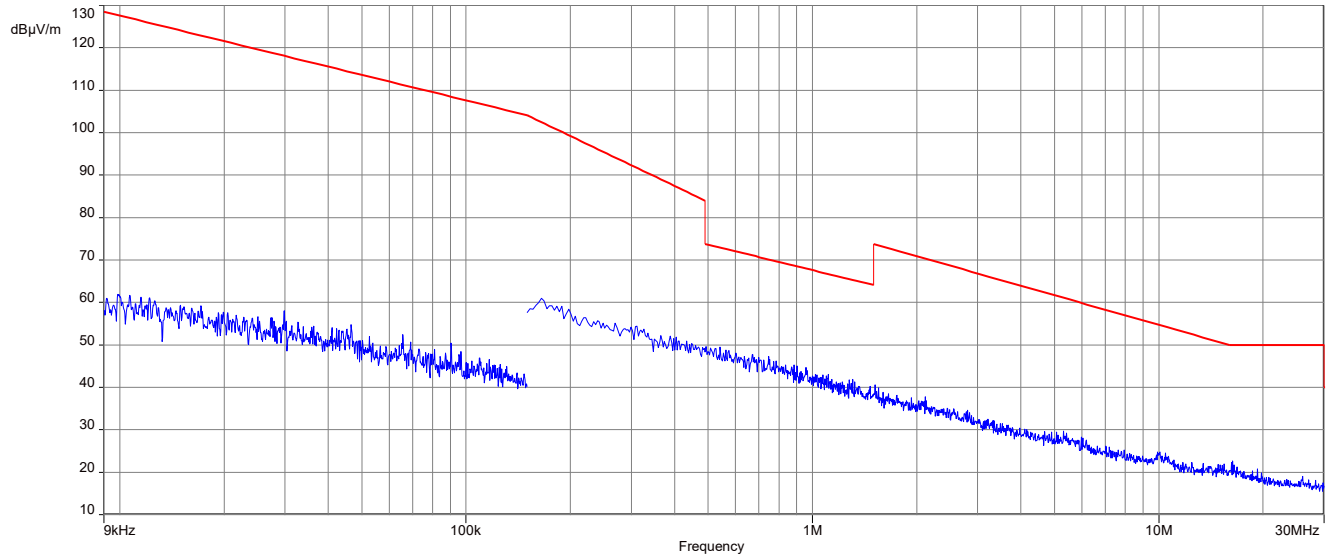
Plot 1: 9 kHz to 30 MHz, lowest channel



Plot 2: 9 kHz to 30 MHz, middle channel

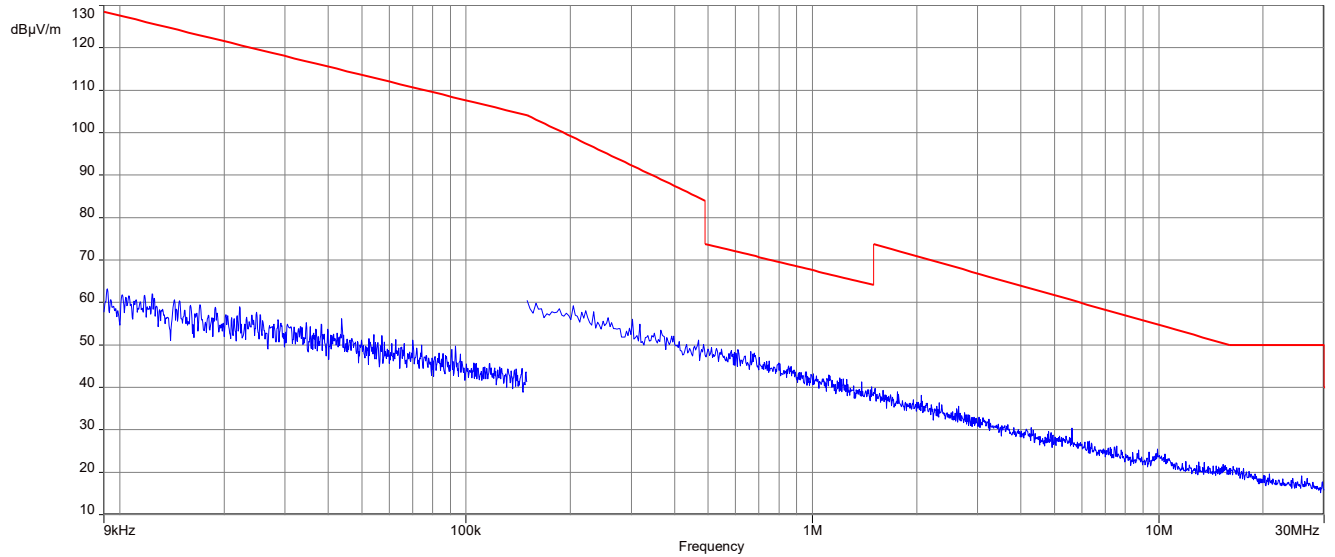


Plot 3: 9 kHz to 30 MHz, highest channel

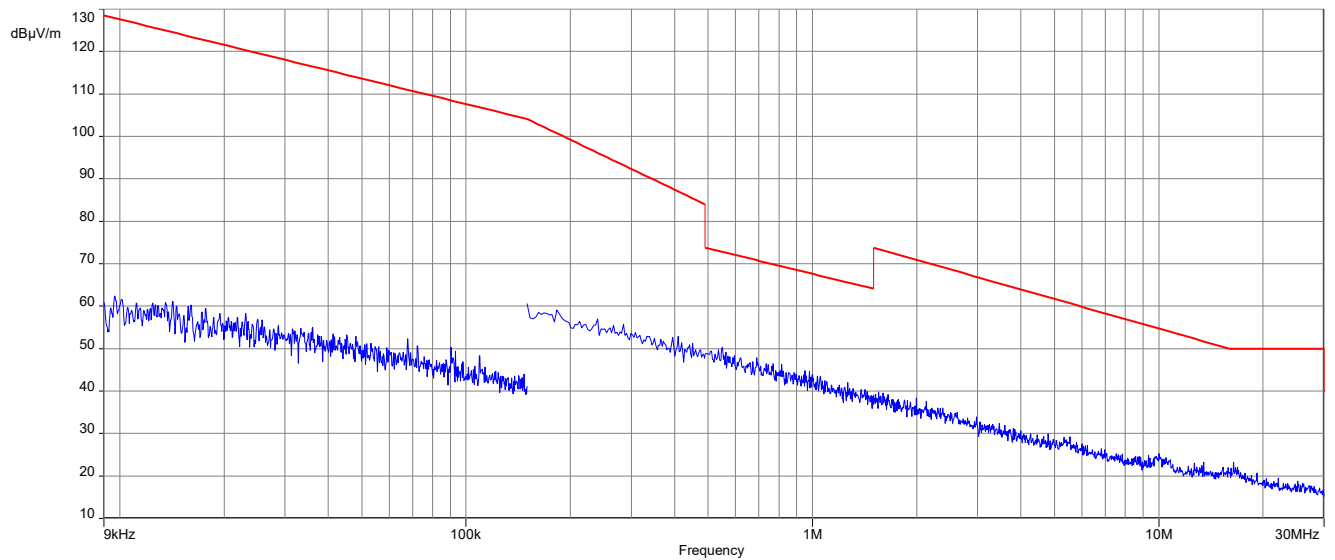


Plots: OFDM (20 MHz nominal channel bandwidth)

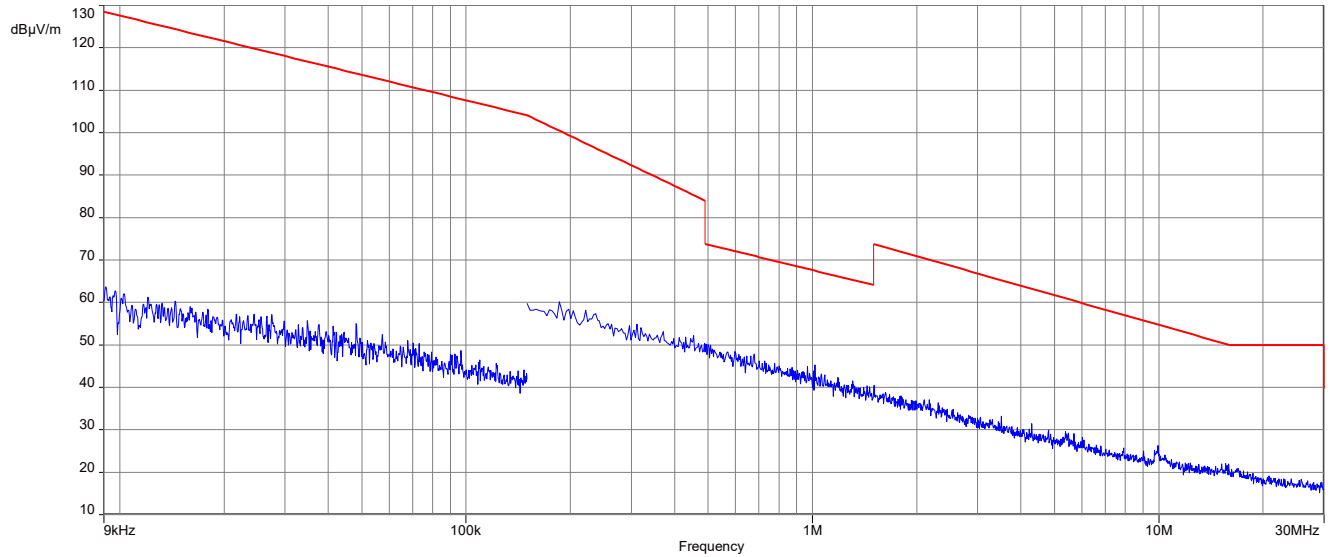
Plot 1: 9 kHz to 30 MHz, lowest channel



Plot 2: 9 kHz to 30 MHz, middle channel

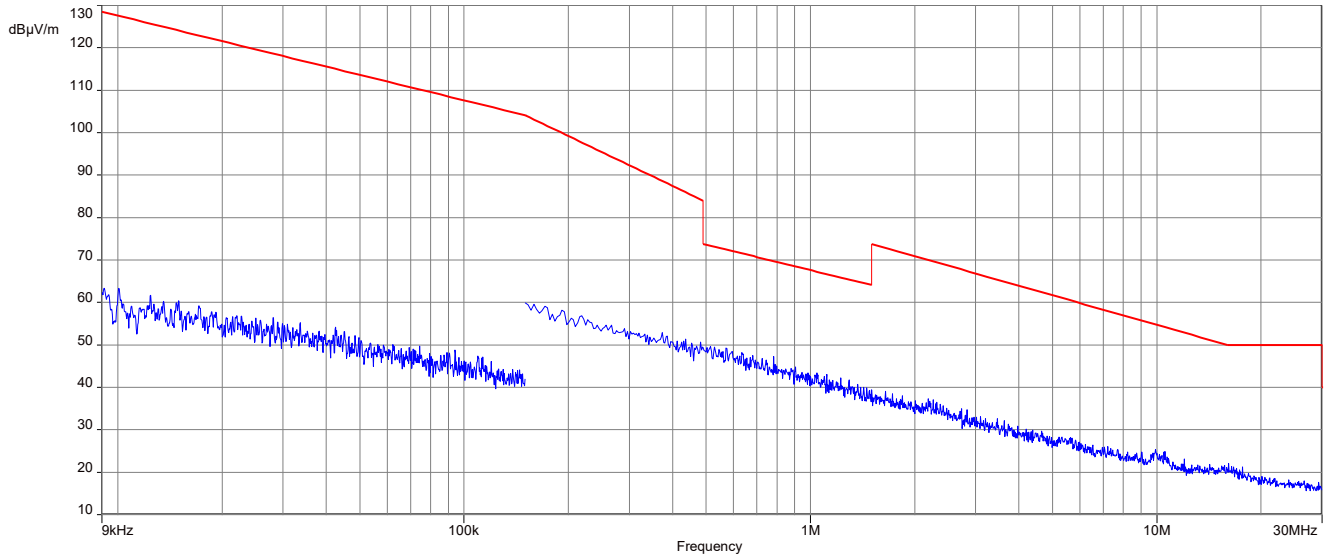


Plot 3: 9 kHz to 30 MHz, highest channel

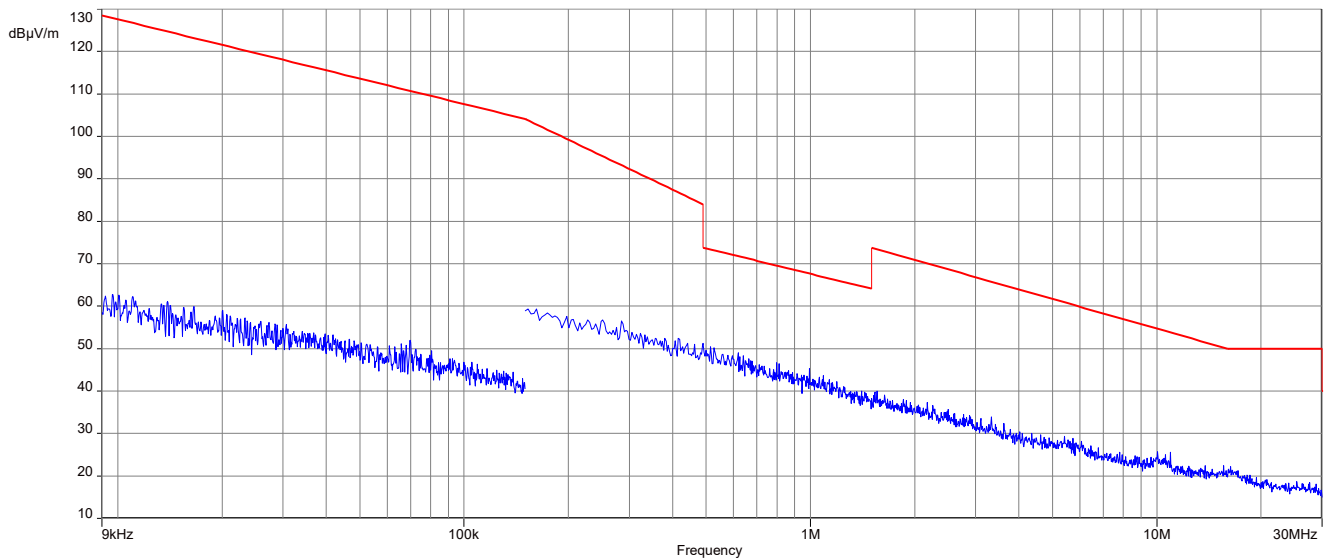


Plots: OFDMA (20 MHz bandwidth)

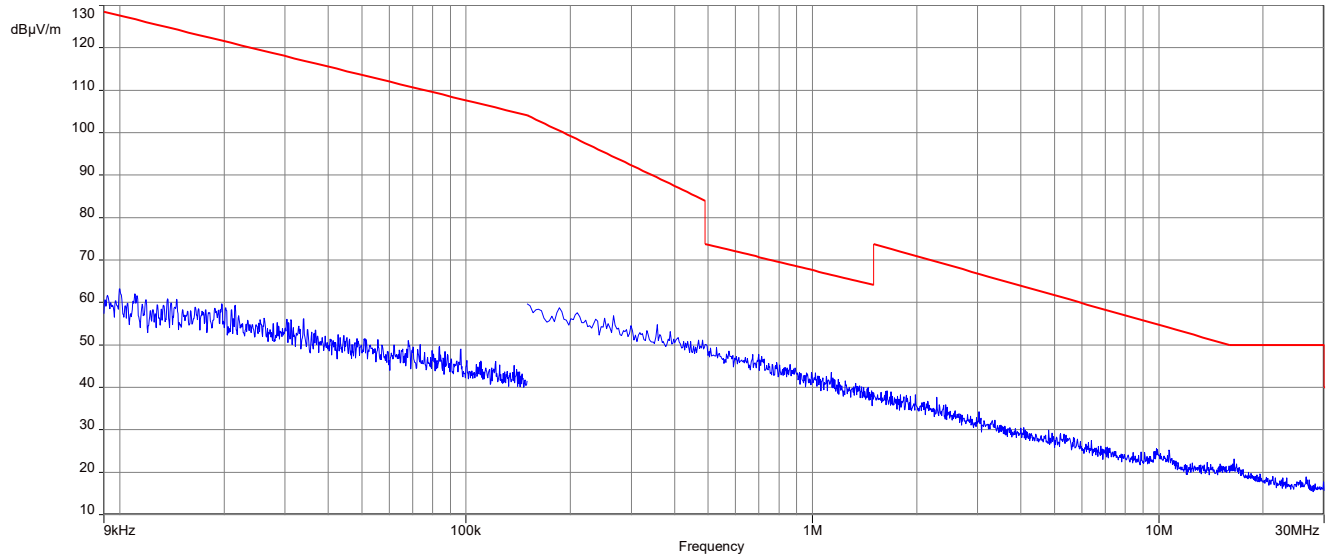
Plot 1: 9 kHz to 30 MHz, lowest channel



Plot 2: 9 kHz to 30 MHz, middle channel



Plot 3: 9 kHz to 30 MHz, highest channel



13.6 Spurious emissions radiated below 30 MHz (2J Antennas 2JF1002P antenna)

Description:

Measurement of the radiated spurious emissions in transmit mode below 30 MHz. The limits are recalculated 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
Resolution bandwidth	F < 150 kHz: 200 Hz F > 150 kHz: 9 kHz
Video bandwidth	F < 150 kHz: 1 kHz F > 150 kHz: 100 kHz
Span	9 kHz to 30 MHz
Trace mode	Max Hold
Test setup	See chapter 7.2 setup B
Measurement uncertainty	See chapter 9

Limits:

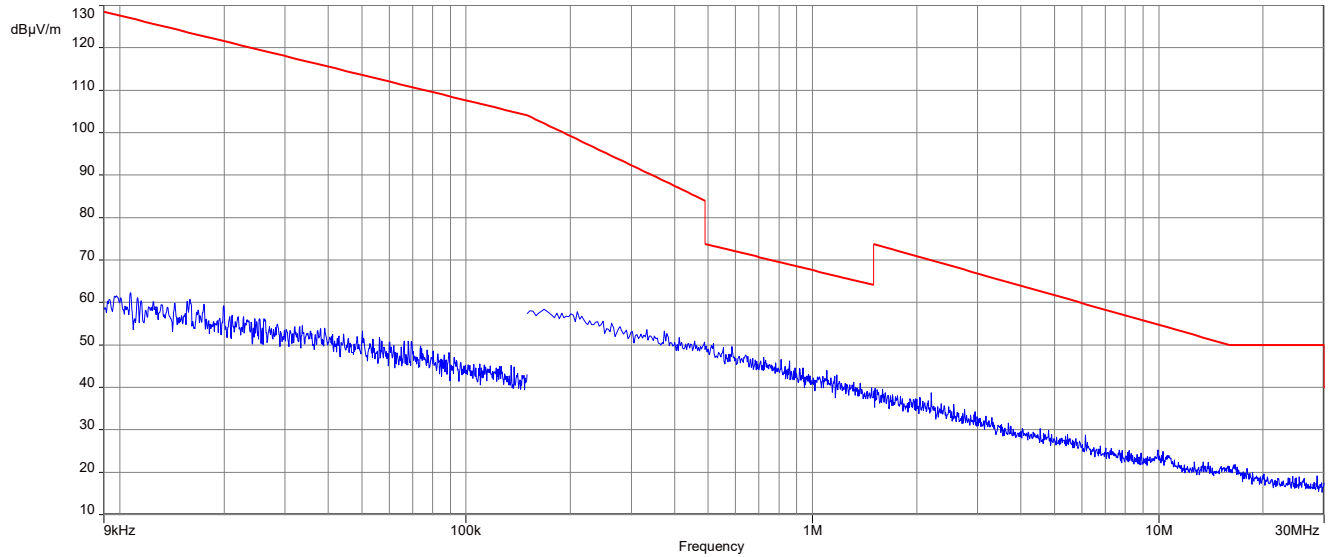
FCC		ISED
Frequency / MHz	Field Strength / ($\mu\text{V} / \text{m}$)	Measurement distance / m
0.009 – 0.490	$2400/F(\text{kHz})$	300
0.490 – 1.705	$24000/F(\text{kHz})$	30
1.705 – 30.0	30	30

Results:

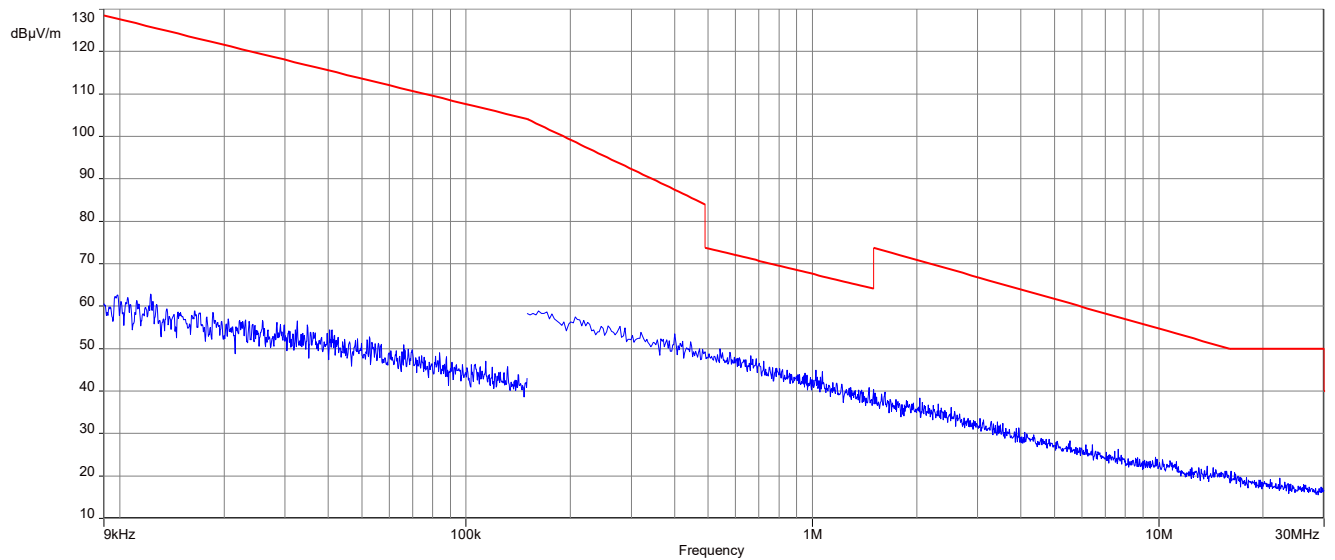
TX spurious emissions radiated < 30 MHz / (dB $\mu\text{V} / \text{m}$) @ 3 m		
Frequency / MHz	Detector	Level / (dB $\mu\text{V} / \text{m}$)
All detected peaks are more than 20 dB below the limit.		

Plots: DSSS

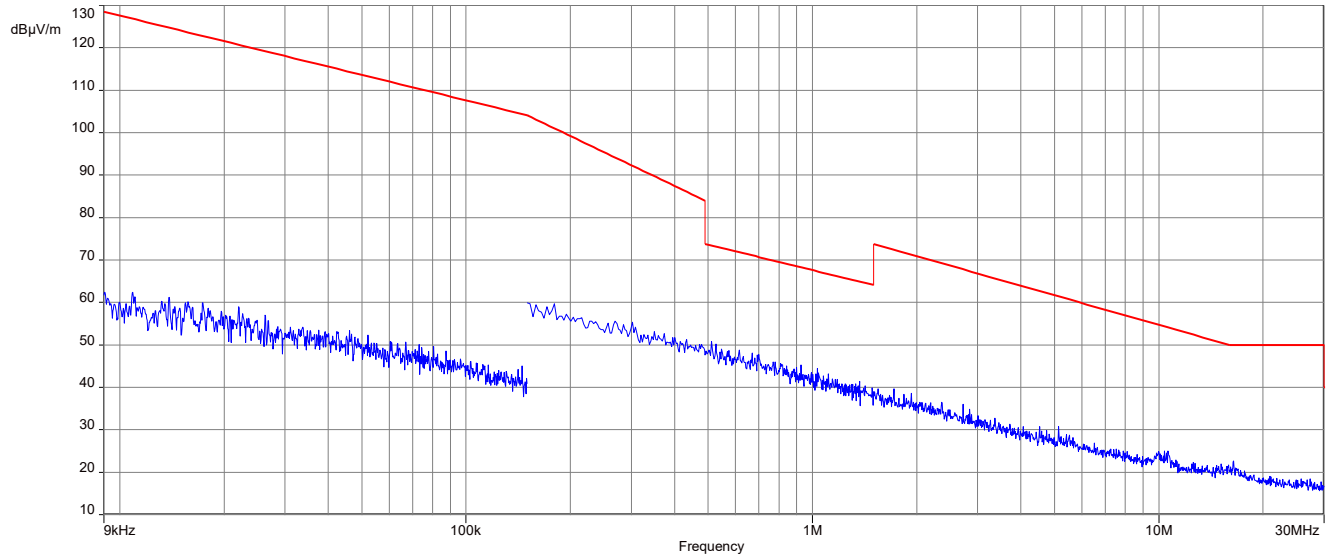
Plot 1: 9 kHz to 30 MHz, lowest channel



Plot 2: 9 kHz to 30 MHz, middle channel

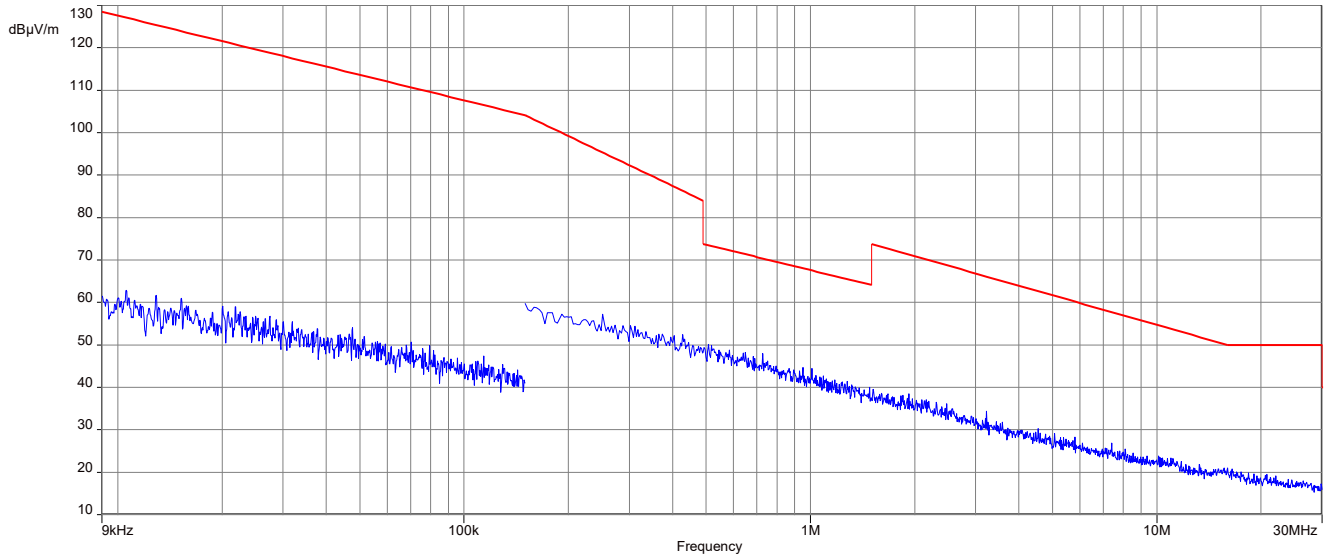


Plot 3: 9 kHz to 30 MHz, highest channel

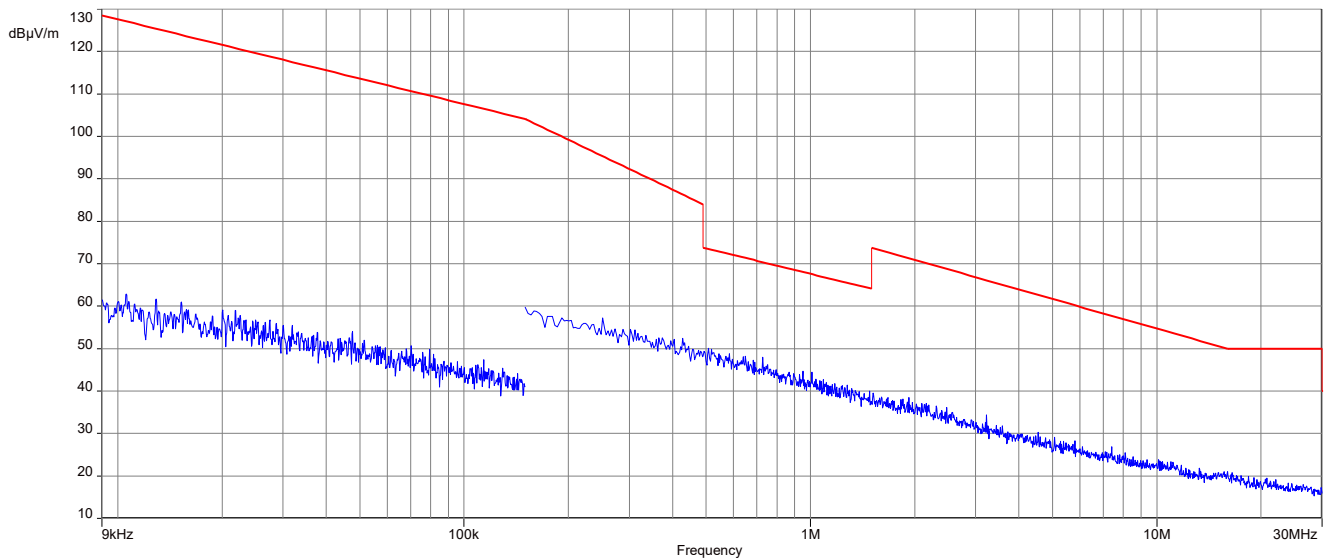


Plots: OFDM (20 MHz nominal channel bandwidth)

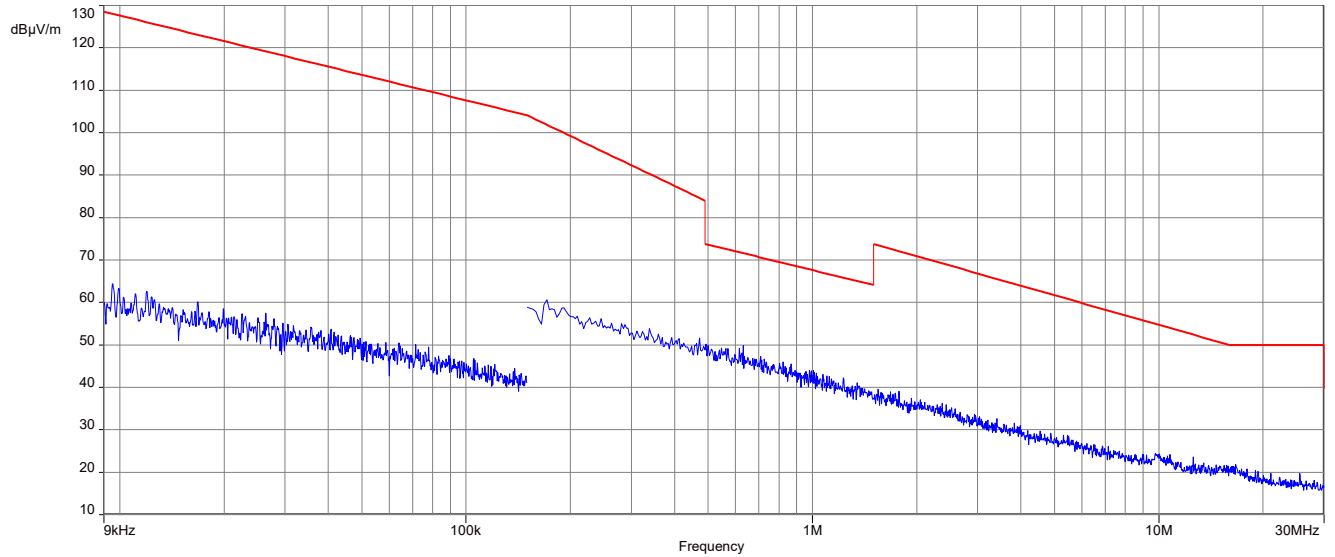
Plot 1: 9 kHz to 30 MHz, lowest channel



Plot 2: 9 kHz to 30 MHz, middle channel

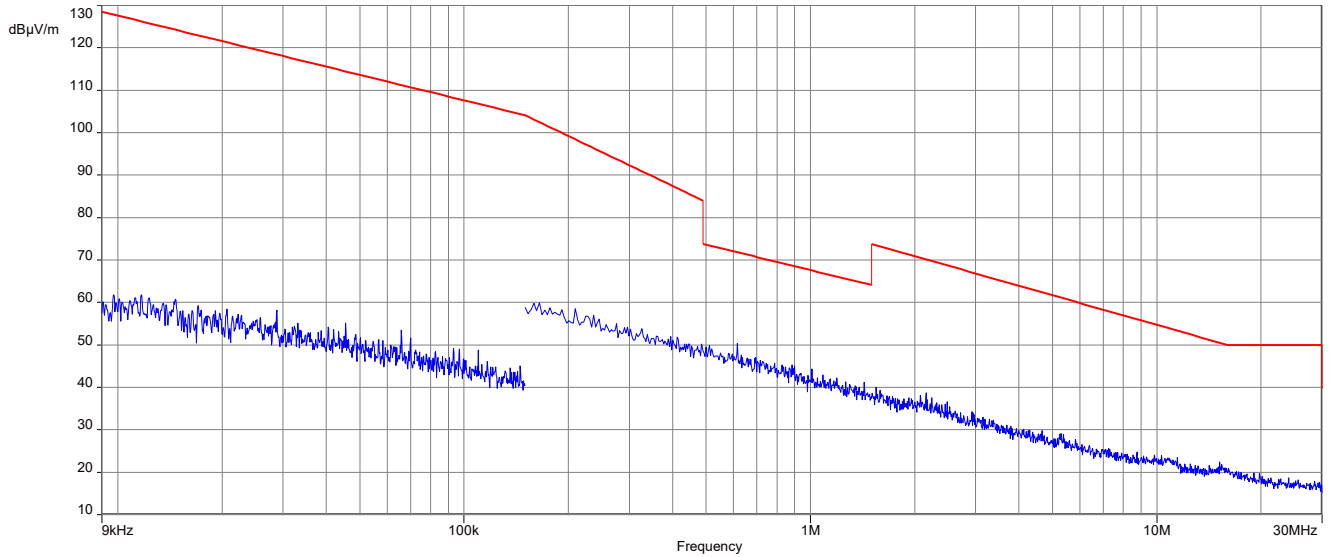


Plot 3: 9 kHz to 30 MHz, highest channel

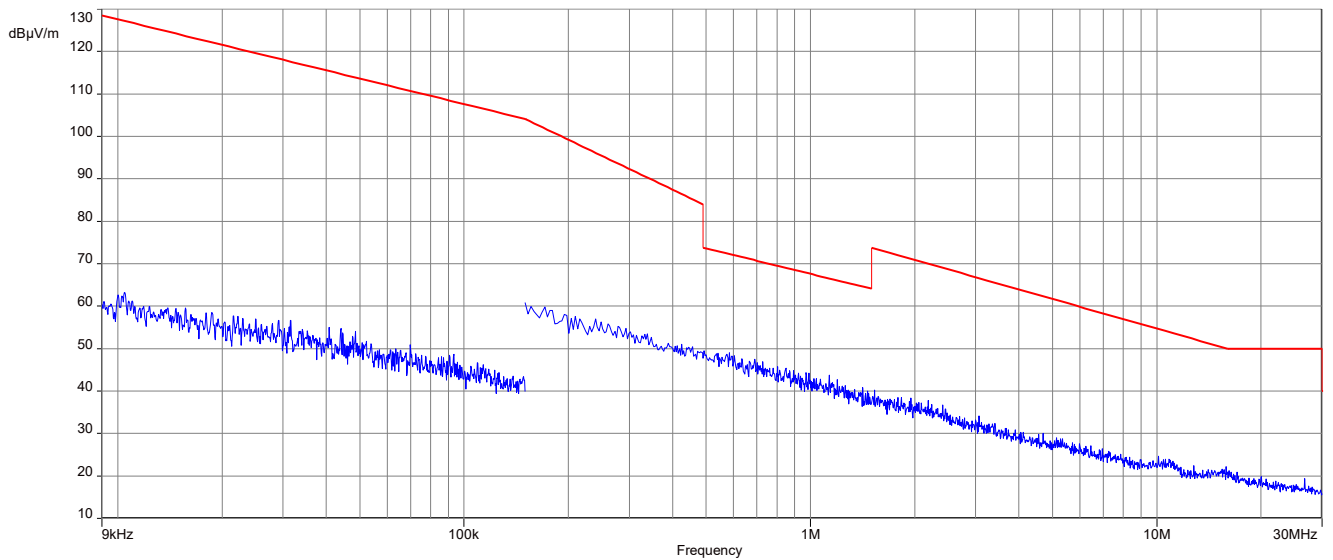


Plots: OFDMA (20 MHz bandwidth)

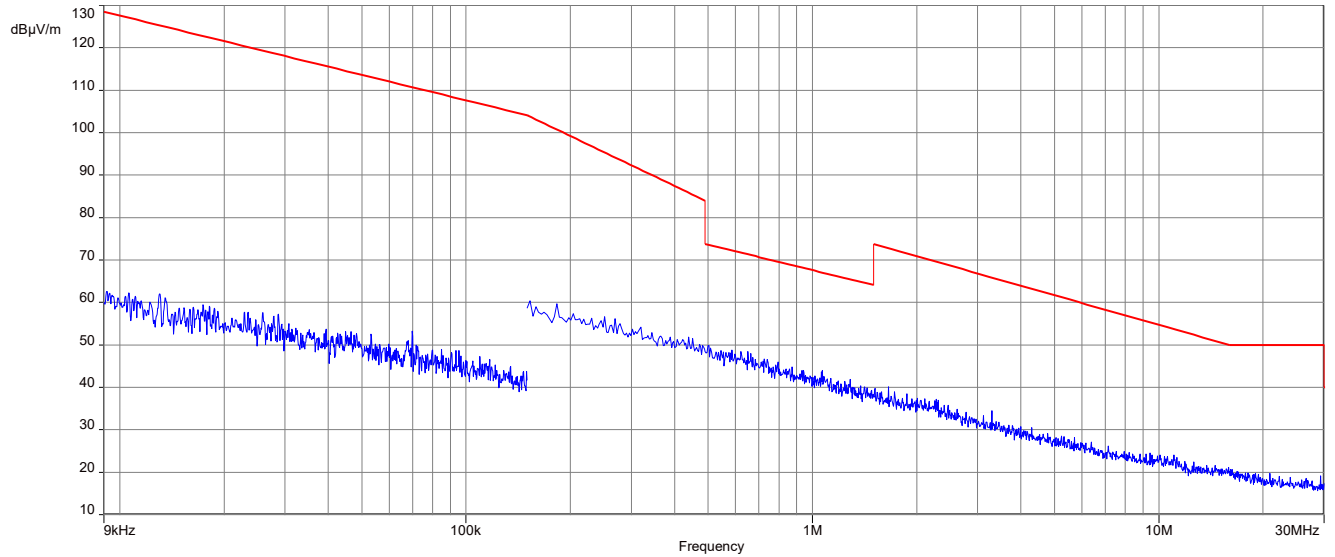
Plot 1: 9 kHz to 30 MHz, lowest channel



Plot 2: 9 kHz to 30 MHz, middle channel



Plot 3: 9 kHz to 30 MHz, highest channel



13.7 Spurious emissions radiated 30 MHz to 1 GHz (Taoglas GW.51.5153 antenna)

Measurement:

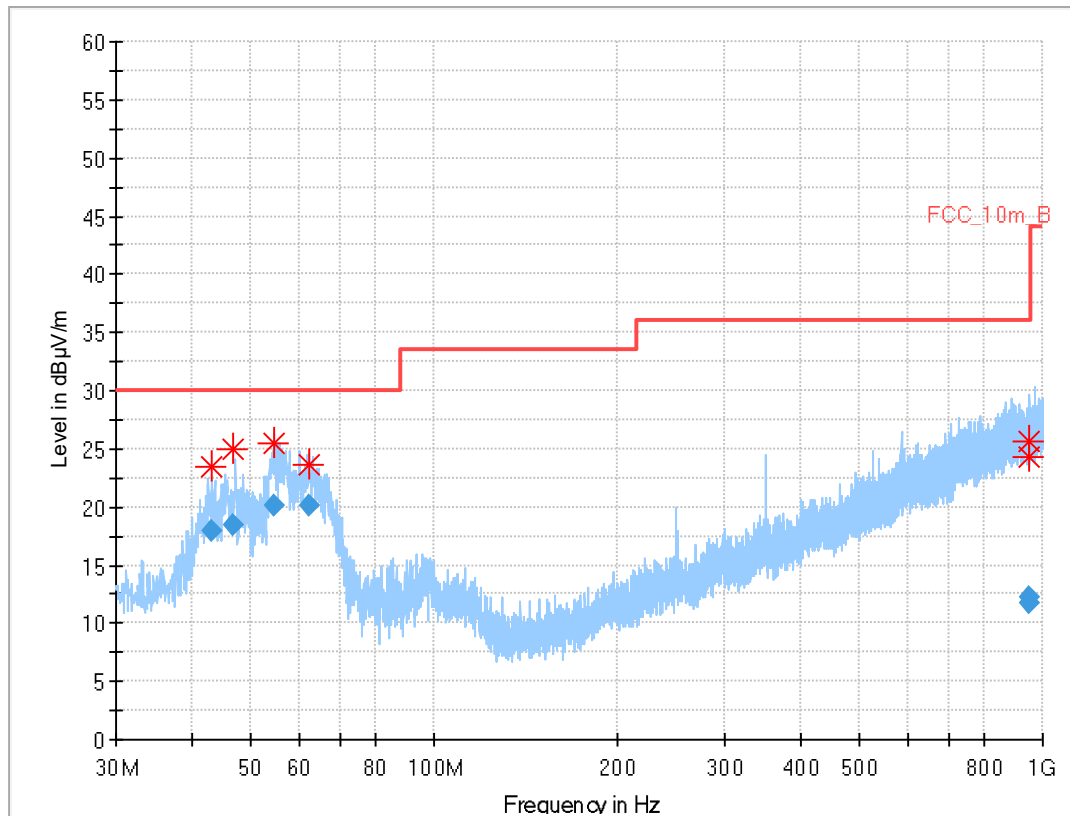
Measurement parameter	
Detector	Peak / Quasi Peak
Sweep time	Auto
Resolution bandwidth	120 kHz
Video bandwidth	3 x RBW
Span	30 MHz to 1 GHz
Trace mode	Max Hold
Test setup	See chapter 7.1 setup A
Measurement uncertainty	See chapter 9

Limits:

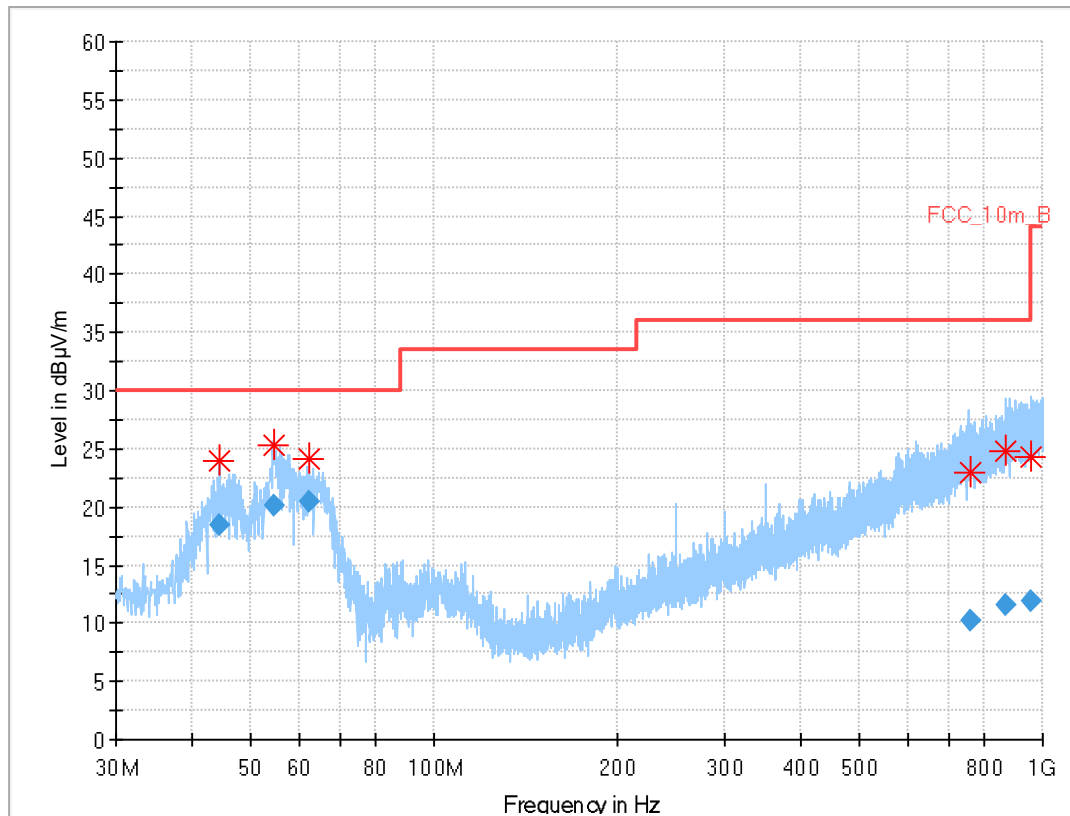
FCC		ISED
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that 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 §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).		
Frequency / MHz	Field Strength / (dB μ V / m)	Measurement distance / m
30 – 88	30.0	10
88 – 216	33.5	10
216 – 960	36.0	10

Plot:

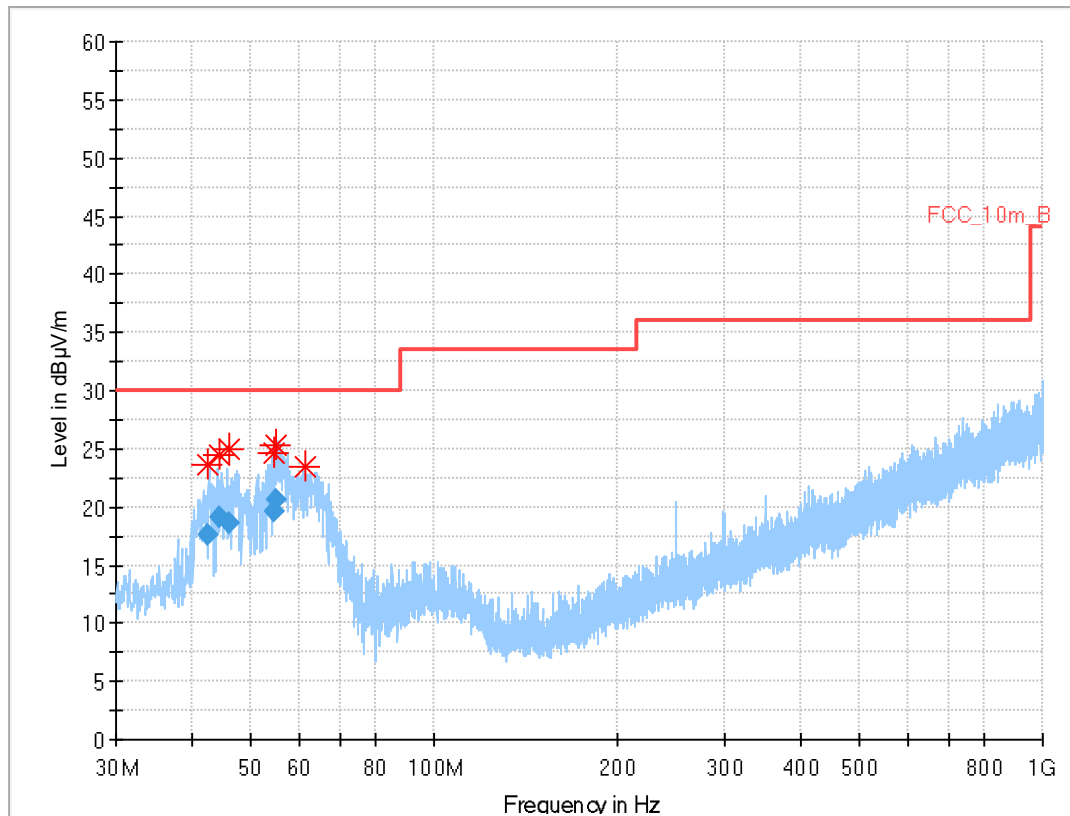
Plot 1: 30 MHz to 1 GHz, vertical & horizontal polarization, b-mode, valid for all channels

**Final results:**

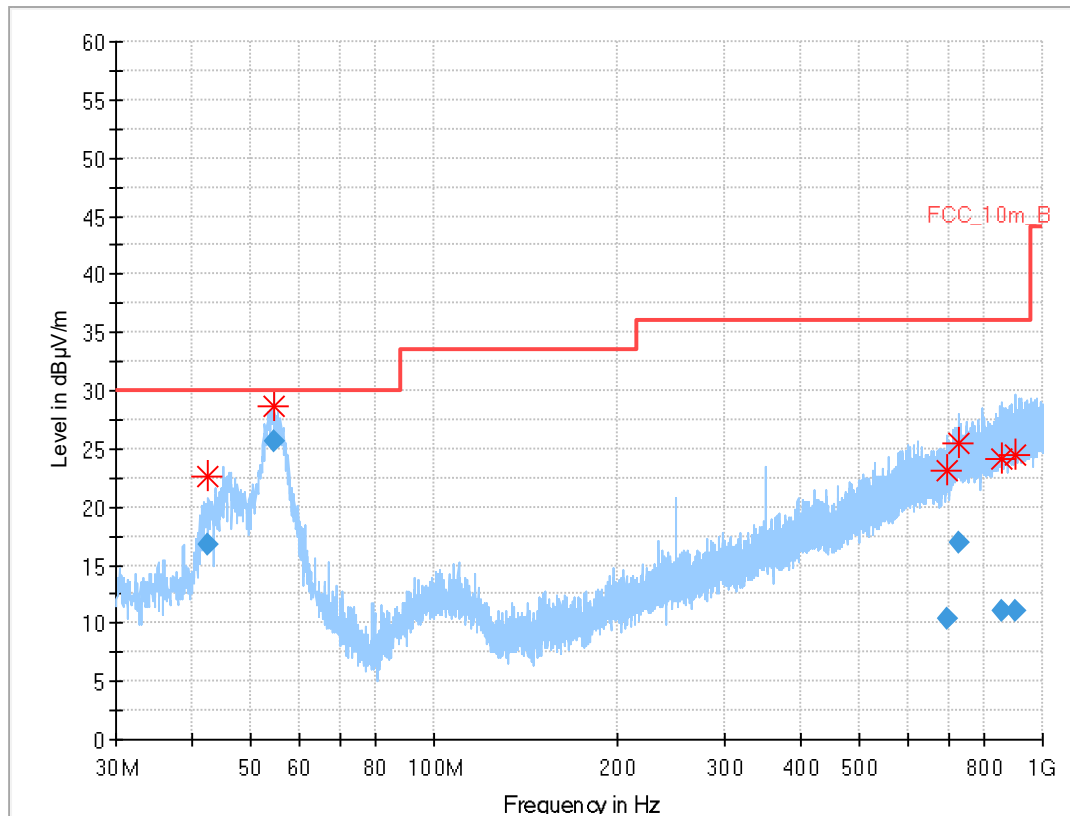
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
42.940340	17.93	30.00	12.07	1000.0	120.000	170.0	V	280.0	14.0
46.700540	18.47	30.00	11.53	1000.0	120.000	129.0	V	280.0	14.3
54.741660	20.19	30.00	9.81	1000.0	120.000	109.0	V	100.0	14.6
62.448400	20.19	30.00	9.81	1000.0	120.000	98.0	V	81.0	12.4
946.564500	12.27	36.00	23.73	1000.0	120.000	170.0	V	10.0	24.8
951.518700	11.77	36.00	24.23	1000.0	120.000	170.0	H	4.0	24.8

Plot 2: 30 MHz to 1 GHz, vertical & horizontal polarization, g-mode, valid for all channels**Final results:**

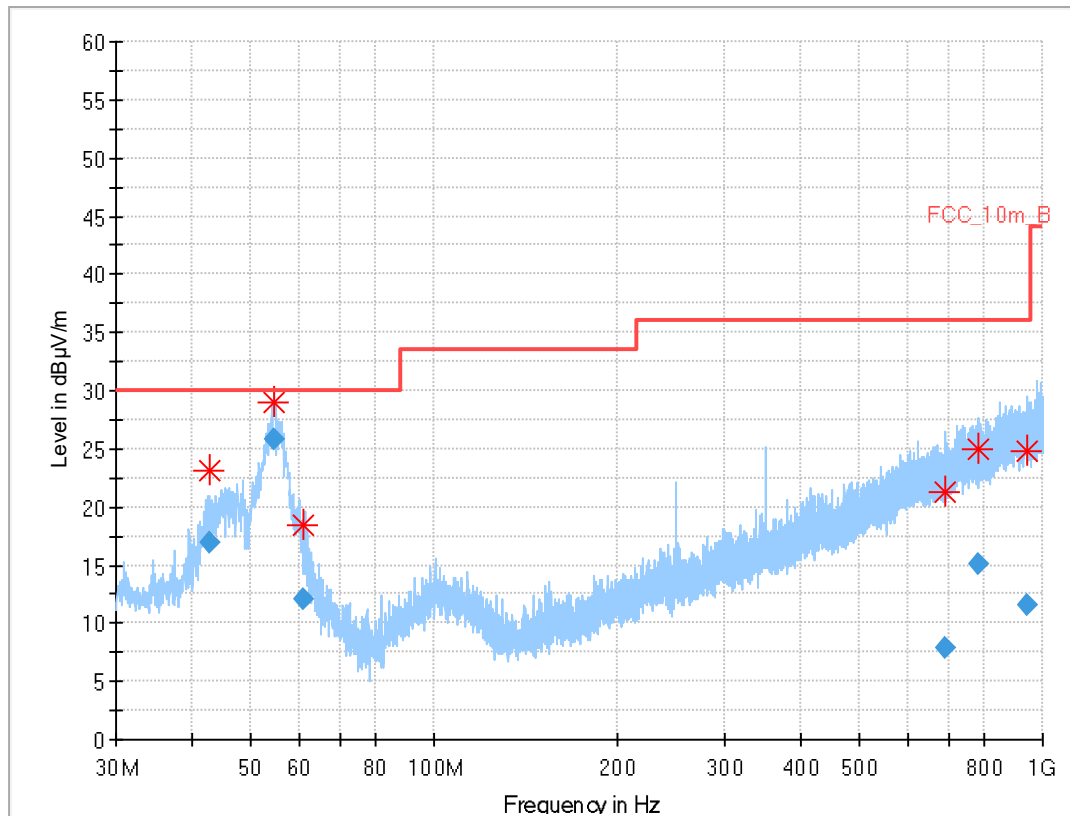
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
44.362720	18.41	30.00	11.59	1000.0	120.000	170.0	V	262.0	14.2
54.400220	20.17	30.00	9.83	1000.0	120.000	115.0	V	100.0	14.4
62.123440	20.52	30.00	9.48	1000.0	120.000	98.0	V	190.0	12.5
758.330740	10.22	36.00	25.78	1000.0	120.000	170.0	V	10.0	23.2
871.438580	11.62	36.00	24.38	1000.0	120.000	120.0	V	280.0	24.4
957.795080	11.84	36.00	24.16	1000.0	120.000	131.0	H	90.0	24.8

Plot 3: 30 MHz to 1 GHz, vertical & horizontal polarization, nHT20-mode, valid for all channels**Final results:**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
42.532260	17.66	30.00	12.34	1000.0	120.000	170.0	V	10.0	14.0
44.471900	19.10	30.00	10.90	1000.0	120.000	170.0	V	100.0	14.2
45.918220	18.63	30.00	11.37	1000.0	120.000	170.0	V	190.0	14.3
54.381240	19.54	30.00	10.46	1000.0	120.000	117.0	V	177.0	14.4
55.023660	20.65	30.00	9.35	1000.0	120.000	102.0	V	10.0	14.7
61.444900	-2.07	30.00	32.07	1000.0	120.000	98.0	V	190.0	12.7

Plot 4: 30 MHz to 1 GHz, vertical & horizontal polarization, axHE20-mode, valid for all channels**Final results:**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
42.560420	16.74	30.00	13.26	1000.0	120.000	170.0	V	100.0	14.0
54.385800	25.63	30.00	4.37	1000.0	120.000	110.0	V	0.0	14.4
698.009100	10.39	36.00	25.61	1000.0	120.000	123.0	H	81.0	21.8
727.091620	16.89	36.00	19.11	1000.0	120.000	103.0	H	0.0	22.4
856.554640	11.04	36.00	24.97	1000.0	120.000	170.0	H	268.0	24.3
900.200160	11.14	36.00	24.86	1000.0	120.000	148.0	V	100.0	24.8

Plot 5: 30 MHz to 1 GHz, vertical & horizontal polarization, axHE20-mode ER, valid for all channels**Final results:**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
42.810980	16.99	30.00	13.01	1000.0	120.000	165.0	V	81.0	14.0
54.619800	25.87	30.00	4.13	1000.0	120.000	119.0	V	-9.0	14.5
60.993660	12.00	30.00	18.00	1000.0	120.000	98.0	V	-1.0	12.9
690.323640	7.88	36.00	28.12	1000.0	120.000	170.0	V	264.0	21.7
781.447420	15.06	36.00	20.94	1000.0	120.000	110.0	H	10.0	23.2
940.071160	11.49	36.00	24.51	1000.0	120.000	101.0	V	280.0	24.8

13.8 Spurious emissions radiated 30 MHz to 1 GHz (2J Antennas 2JF1002P antenna)

Measurement:

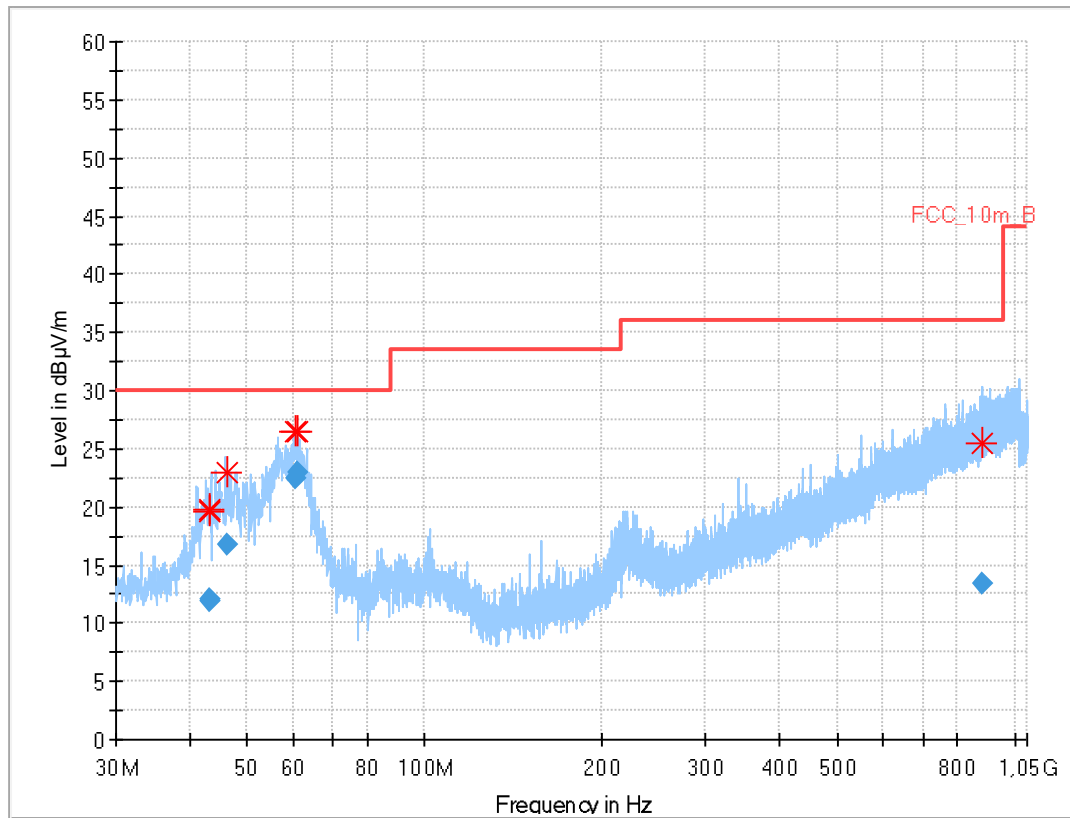
Measurement parameter	
Detector	Peak / Quasi Peak
Sweep time	Auto
Resolution bandwidth	120 kHz
Video bandwidth	3 x RBW
Span	30 MHz to 1 GHz
Trace mode	Max Hold
Test setup	See chapter 7.1 setup A
Measurement uncertainty	See chapter 9

Limits:

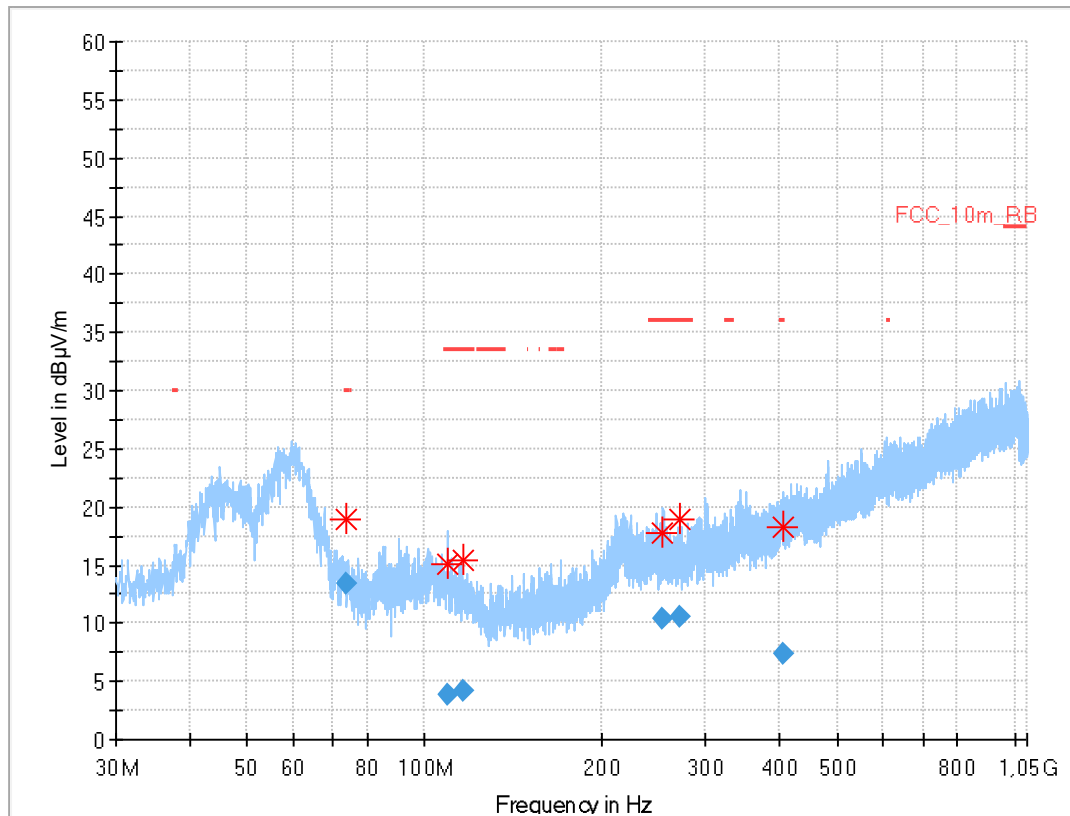
FCC		ISED
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that 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 §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).		
Frequency / MHz	Field Strength / (dB μ V / m)	Measurement distance / m
30 – 88	30.0	10
88 – 216	33.5	10
216 – 960	36.0	10

Plot:

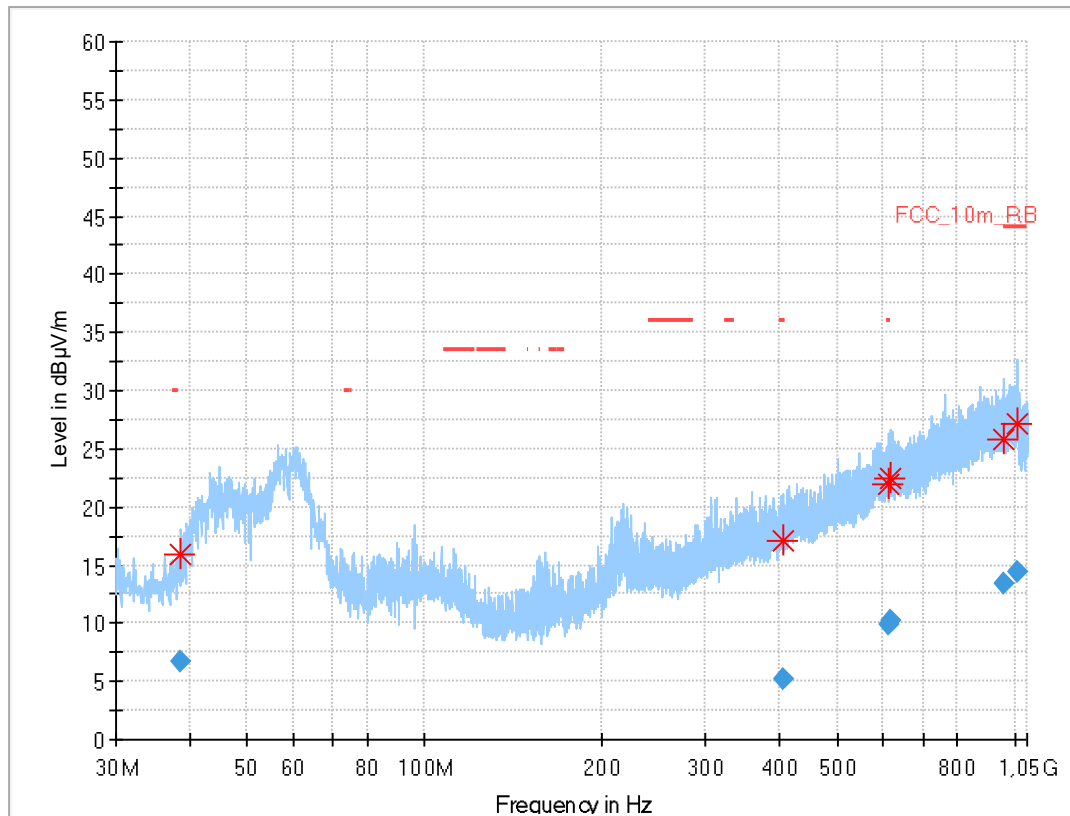
Plot 1: 30 MHz to 1 GHz, vertical & horizontal polarization, b-mode, valid for all channels

**Final results:**

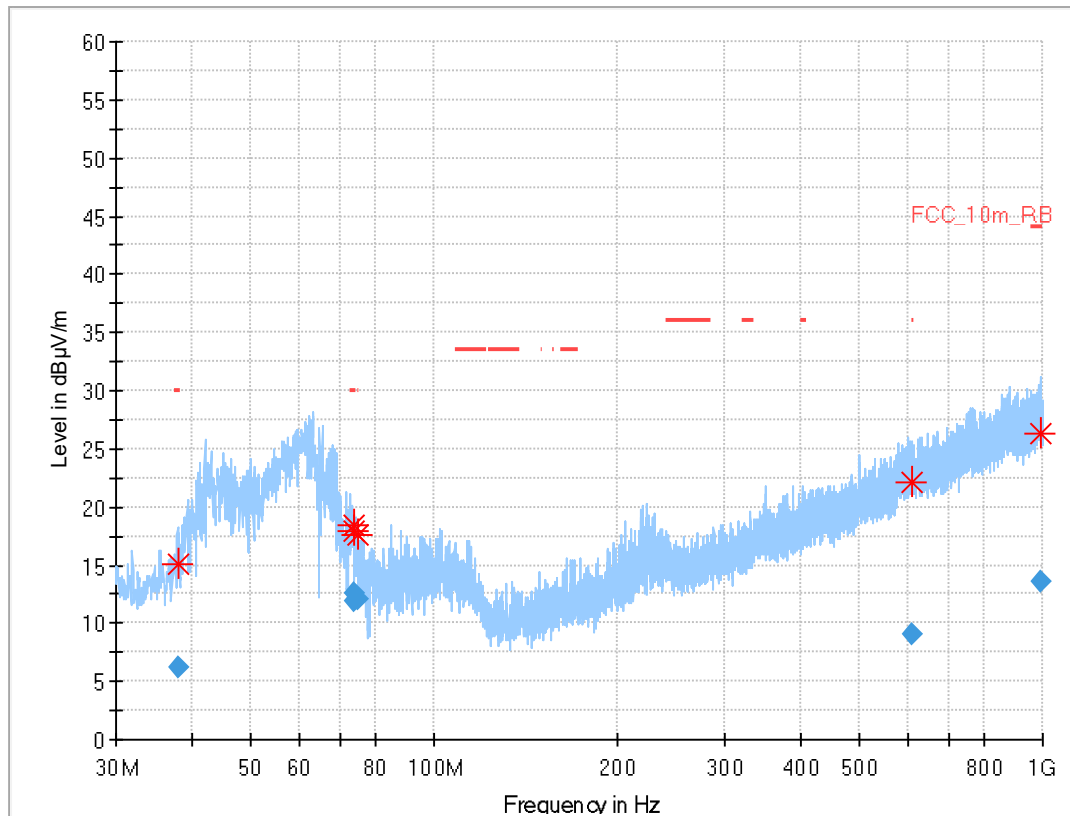
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
43.090800	11.87	30.00	18.13	1000.0	120.000	148.0	V	198.0	14.0
43.388160	12.05	30.00	17.95	1000.0	120.000	195.0	V	196.0	14.1
46.459080	16.78	30.00	13.22	1000.0	120.000	195.0	V	194.0	14.3
60.436080	22.40	30.00	7.60	1000.0	120.000	195.0	V	2.0	13.4
60.824160	23.04	30.00	6.96	1000.0	120.000	156.0	V	251.0	13.0
881.935680	13.48	36.00	22.52	1000.0	120.000	195.0	V	79.0	24.5

Plot 2: 30 MHz to 1 GHz, vertical & horizontal polarization, g-mode, valid for all channels**Final results:**

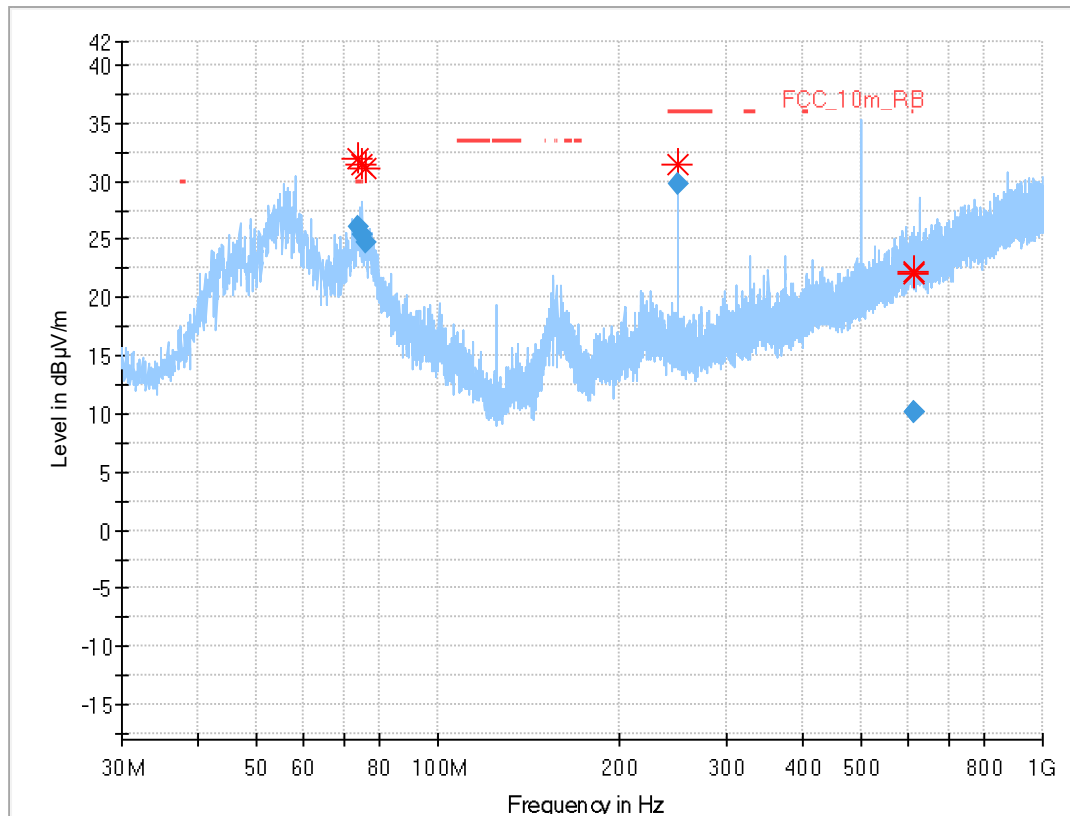
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
73.712520	13.39	30.00	16.61	1000.0	120.000	195.0	V	37.0	8.6
109.193400	3.81	33.50	29.69	1000.0	120.000	195.0	V	-13.0	12.8
116.284560	4.13	33.50	29.37	1000.0	120.000	102.0	V	69.0	11.7
253.514160	10.36	36.00	25.64	1000.0	120.000	143.0	V	119.0	13.7
270.586440	10.48	36.00	25.52	1000.0	120.000	195.0	V	187.0	13.9
405.186840	7.44	36.00	28.56	1000.0	120.000	175.0	V	-36.0	17.7

Plot 3: 30 MHz to 1 GHz, vertical & horizontal polarization, nHT20-mode, valid for all channels**Final results:**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
38.425680	6.67	---	---	1000.0	120.000	145.0	V	-6.0	13.2
405.605040	5.22	36.00	30.78	1000.0	120.000	195.0	H	163.0	17.7
612.350640	9.88	36.00	26.12	1000.0	120.000	103.0	V	37.0	21.6
614.438400	10.18	---	---	1000.0	120.000	98.0	H	257.0	21.6
961.279920	13.46	44.00	30.54	1000.0	120.000	195.0	H	236.0	24.8
1012.095840	14.45	44.00	29.55	1000.0	120.000	181.0	V	240.0	25.4

Plot 4: 30 MHz to 1 GHz, vertical & horizontal polarization, axHE20-mode, valid for all channels**Final results:**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
38.116320	6.18	30.00	23.82	1000.0	120.000	110.0	V	-3.0	13.2
73.572180	11.95	30.00	18.05	1000.0	120.000	170.0	V	184.0	8.7
73.963040	12.64	30.00	17.36	1000.0	120.000	170.0	V	-4.0	8.5
74.829480	12.08	30.00	17.92	1000.0	120.000	170.0	V	10.0	8.3
610.917600	9.13	36.00	26.87	1000.0	120.000	170.0	V	10.0	21.5
991.251440	13.51	44.00	30.49	1000.0	120.000	170.0	H	273.0	25.4

Plot 5: 30 MHz to 1 GHz, vertical & horizontal polarization, axHE20-mode ER, valid for all channels**Final results:**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
73.725240	26.04	30.00	3.96	1000.0	120.000	170.0	V	280.0	8.6
74.670100	25.39	---	---	1000.0	120.000	170.0	V	273.0	8.3
75.737540	24.79	---	---	1000.0	120.000	170.0	V	100.0	8.0
249.995640	29.69	36.00	6.31	1000.0	120.000	114.0	V	-8.0	13.8
610.637940	10.19	36.00	25.81	1000.0	120.000	170.0	V	170.0	21.5
612.050040	10.11	36.00	25.89	1000.0	120.000	165.0	V	262.0	21.6

13.9 Spurious emissions radiated above 1 GHz (Taoglas GW.51.5153 antenna)

Measurement:

Measurement parameter	
Detector	Peak / RMS
Sweep time	Auto
Resolution bandwidth	1 MHz
Video bandwidth	3 x RBW
Span	1 GHz to 26 GHz
Trace mode	Max Hold
Test setup	See chapter 7.2 setup C & 7.3 setup A
Measurement uncertainty	See chapter 9

Limits:

FCC		ISED
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 30 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 §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).		
Frequency / MHz	Field Strength / (dB μ V / m)	Measurement distance / m
Above 960	54.0 (AVG)	3
	74.0 (peak)	

Results: b-mode

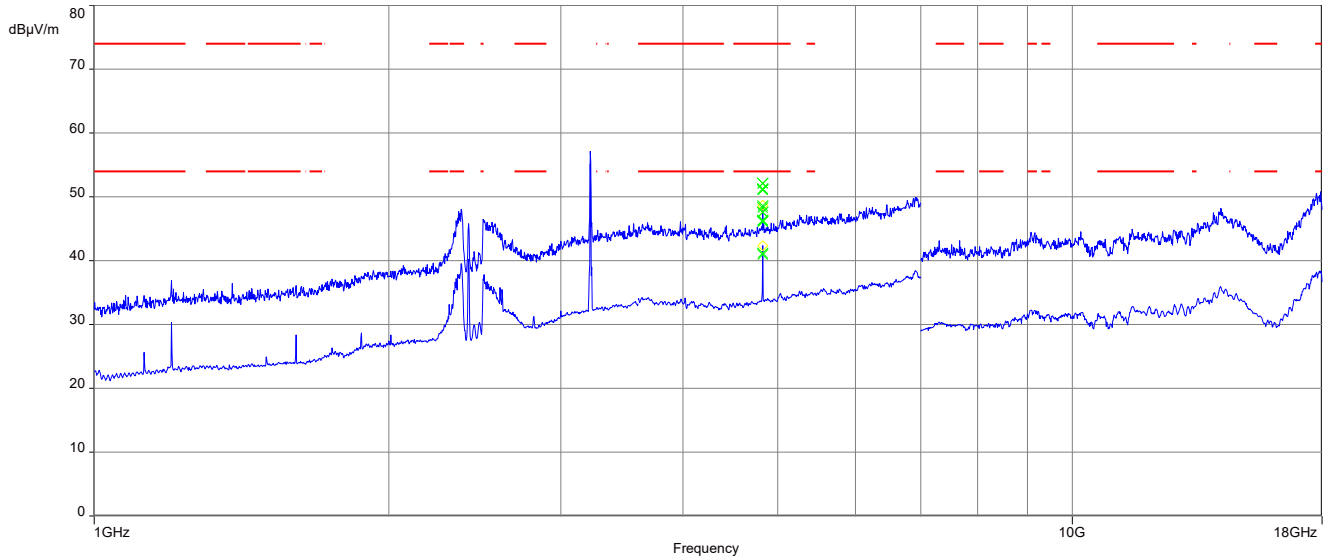
TX spurious emissions radiated / dB μ V/m @ 3 m								
lowest channel			middle channel			highest channel		
f / MHz	Detector	Level / dB μ V/m	f / MHz	Detector	Level / dB μ V/m	f / MHz	Detector	Level / dB μ V/m
4824	Peak	52.2	4874	Peak	55.0	4924	Peak	54.9
	AVG	47.6		AVG	51.0		AVG	50.5

Results: g-mode

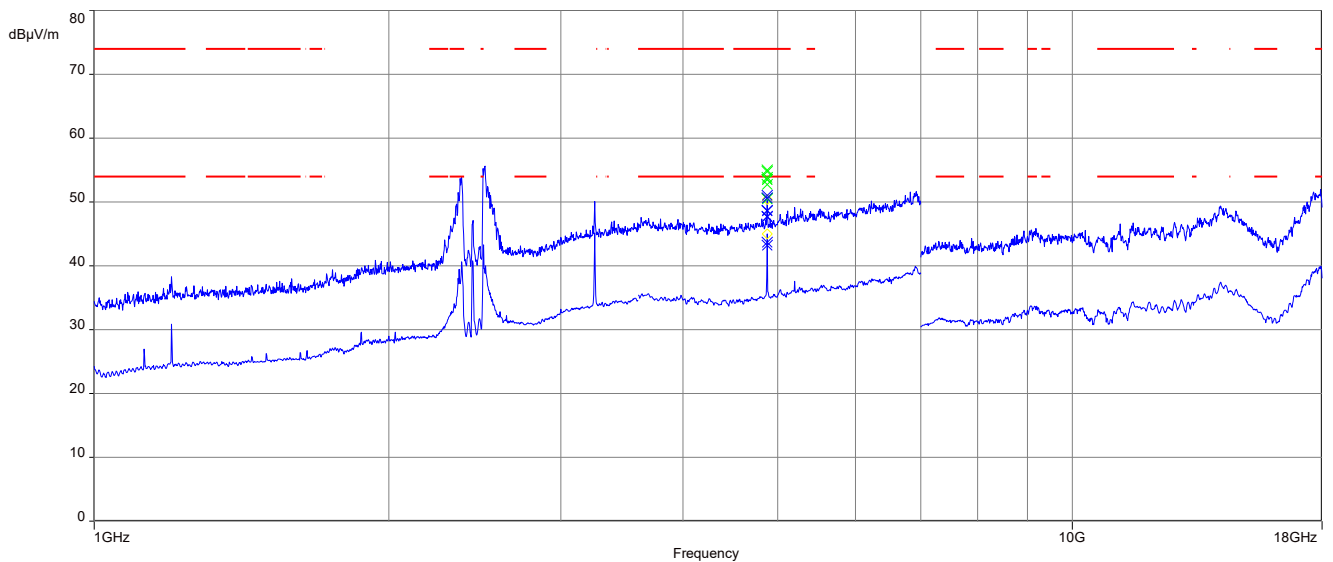
TX spurious emissions radiated / dB μ V/m @ 3 m								
lowest channel			middle channel			highest channel		
f / MHz	Detector	Level / dB μ V/m	f / MHz	Detector	Level / dB μ V/m	f / MHz	Detector	Level / dB μ V/m
All detected emissions are more than 20 dB below the limit.			All detected emissions are more than 20 dB below the limit.			All detected emissions are more than 20 dB below the limit.		

Results: axHE20-mode

TX spurious emissions radiated / dB μ V/m @ 3 m								
lowest channel			middle channel			highest channel		
f / MHz	Detector	Level / dB μ V/m	f / MHz	Detector	Level / dB μ V/m	f / MHz	Detector	Level / dB μ V/m
All detected emissions are more than 20 dB below the limit.			All detected emissions are more than 20 dB below the limit.			All detected emissions are more than 20 dB below the limit.		

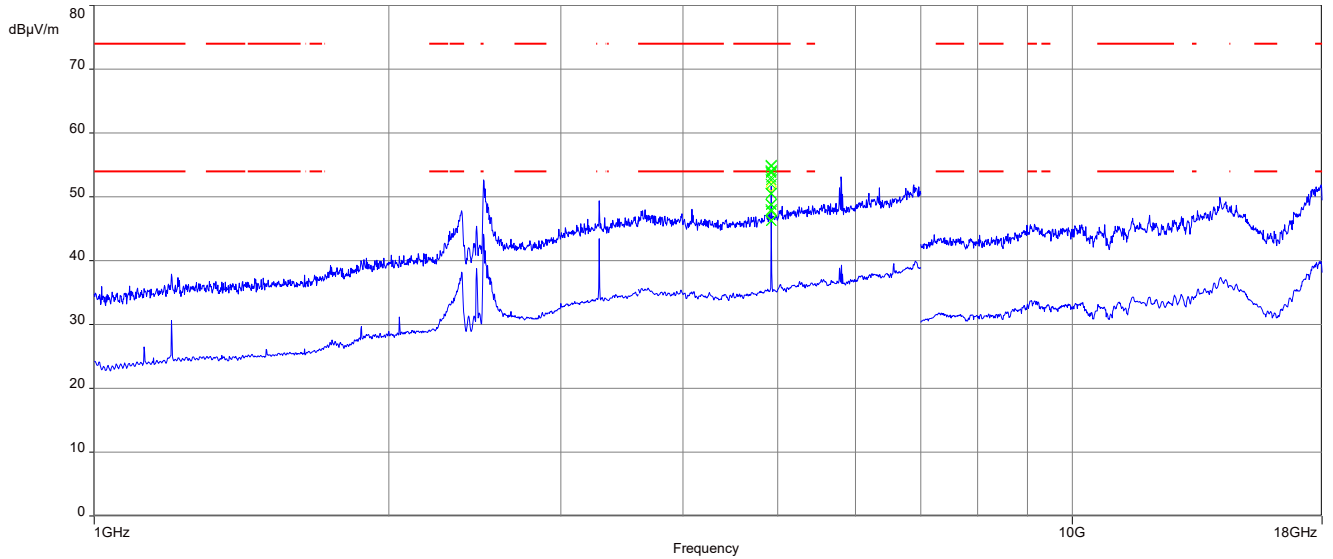
Plots: b-mode**Plot 1:** Lowest channel, 1 GHz to 18 GHz, vertical & horizontal polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

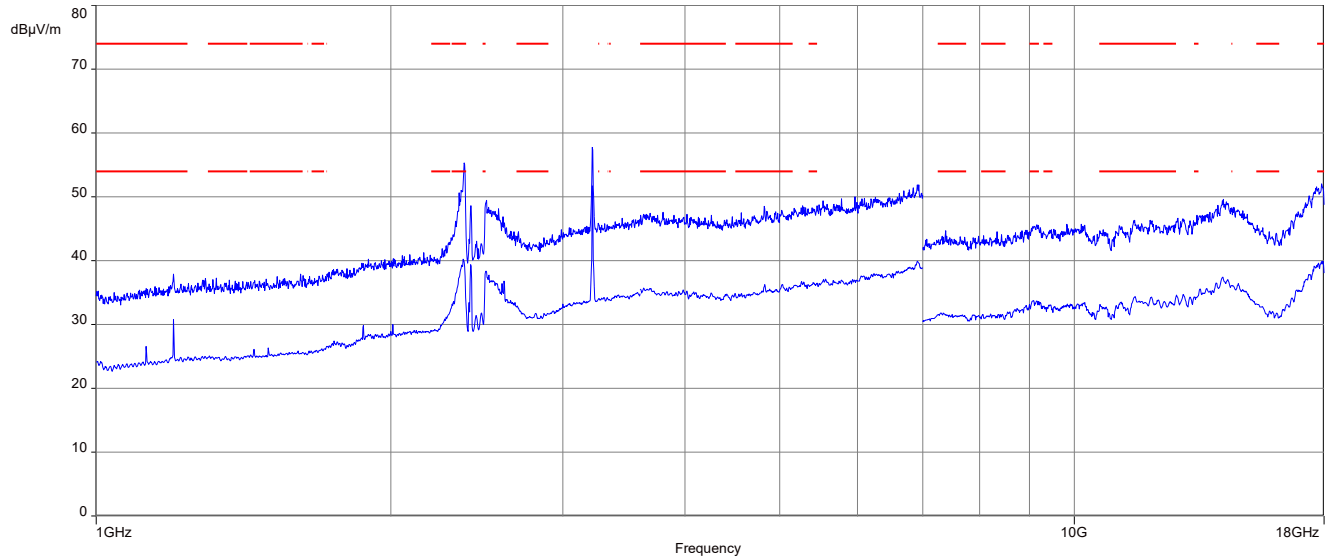
Plot 2: Middle channel, 1 GHz to 18 GHz, vertical & horizontal polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

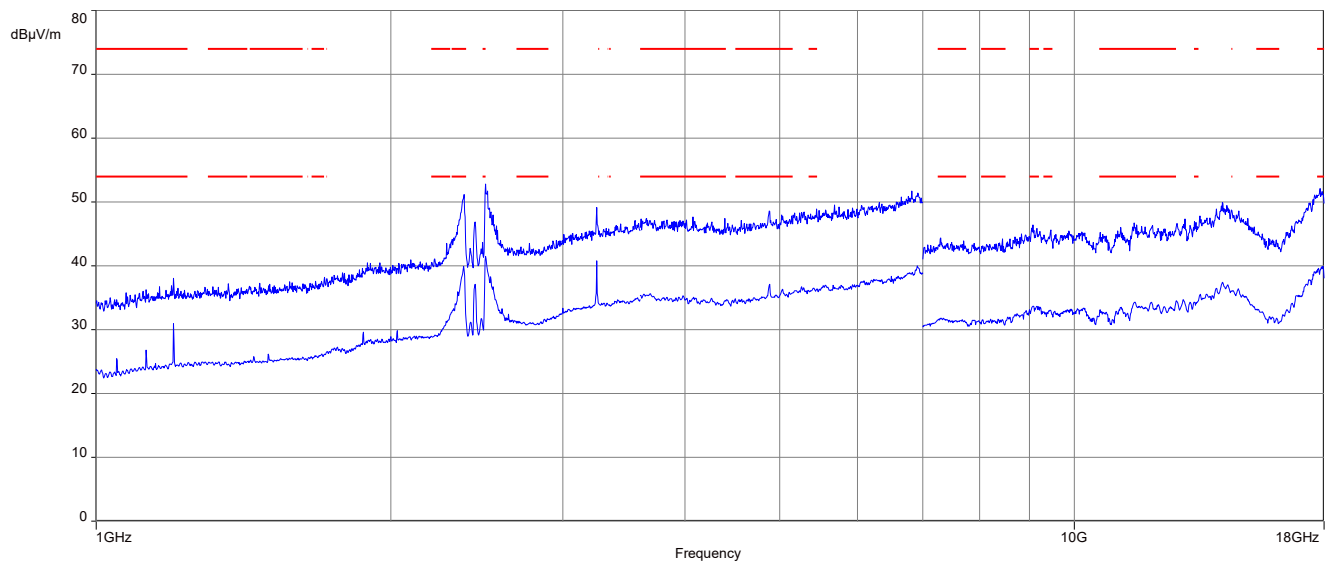
Plot 3: Highest channel, 1 GHz to 18 GHz, vertical & horizontal polarization



The carrier signal is notched with a 2.4 GHz band rejection filter.

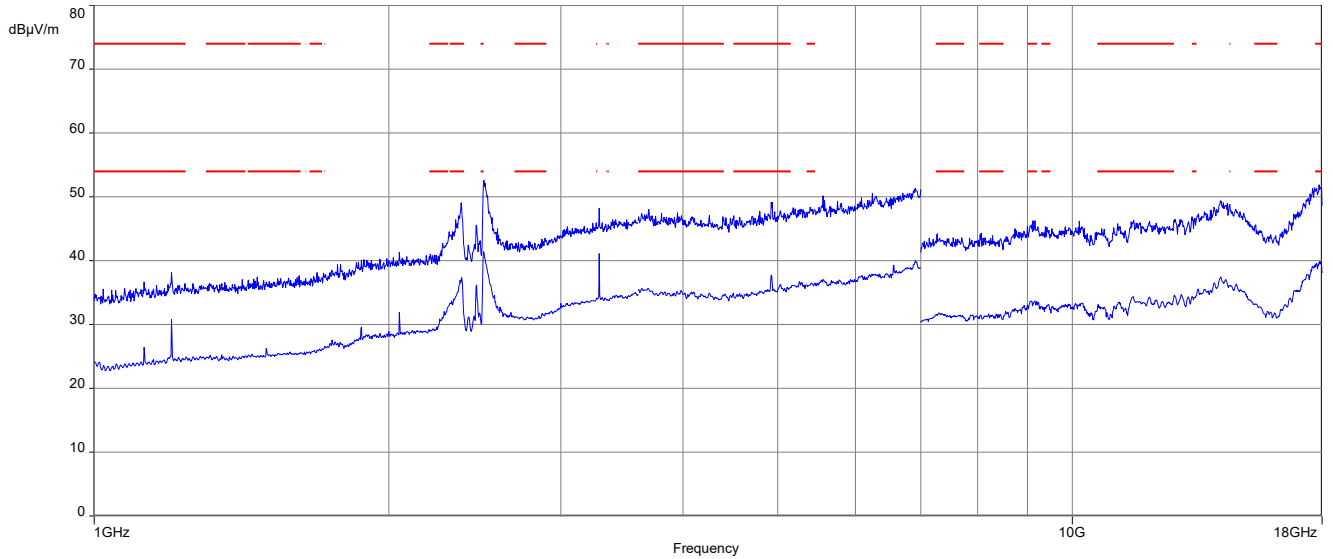
Plots: g-mode**Plot 1:** Lowest channel, 1 GHz to 18 GHz, vertical & horizontal polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

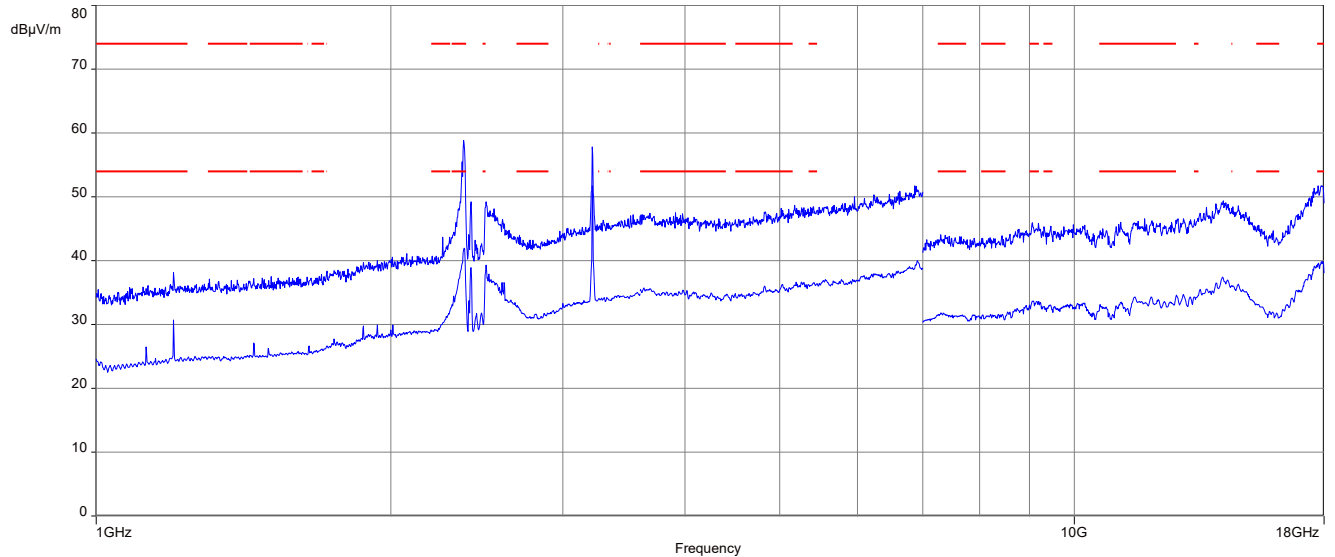
Plot 2: Middle channel, 1 GHz to 18 GHz, vertical & horizontal polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

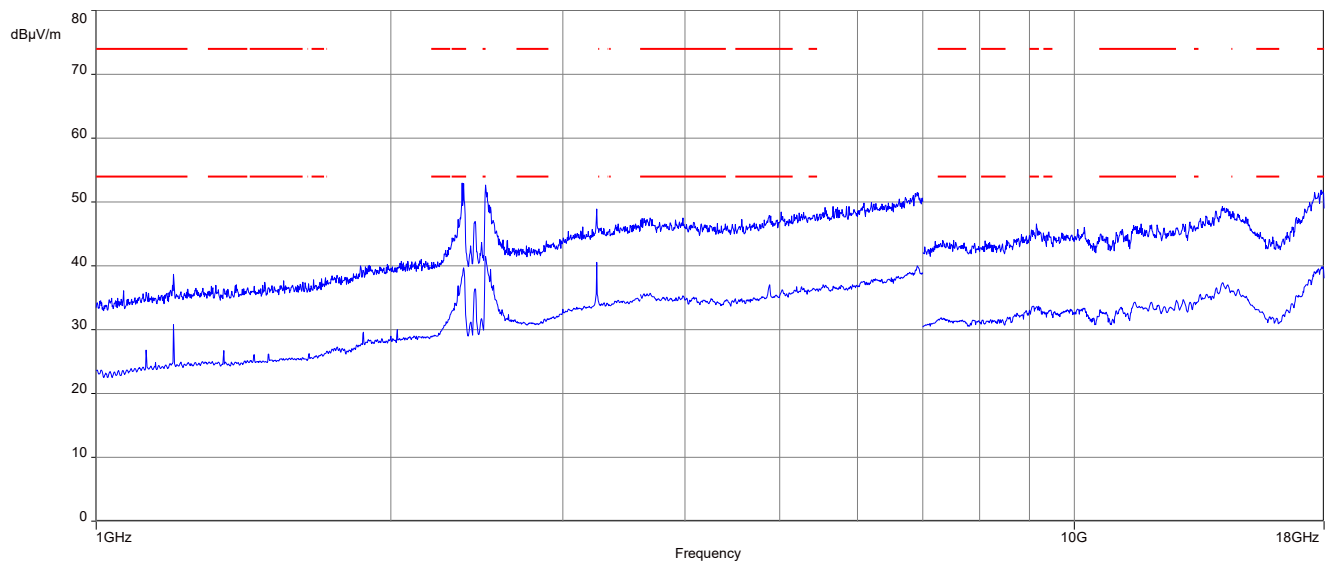
Plot 3: Highest channel, 1 GHz to 18 GHz, vertical & horizontal polarization



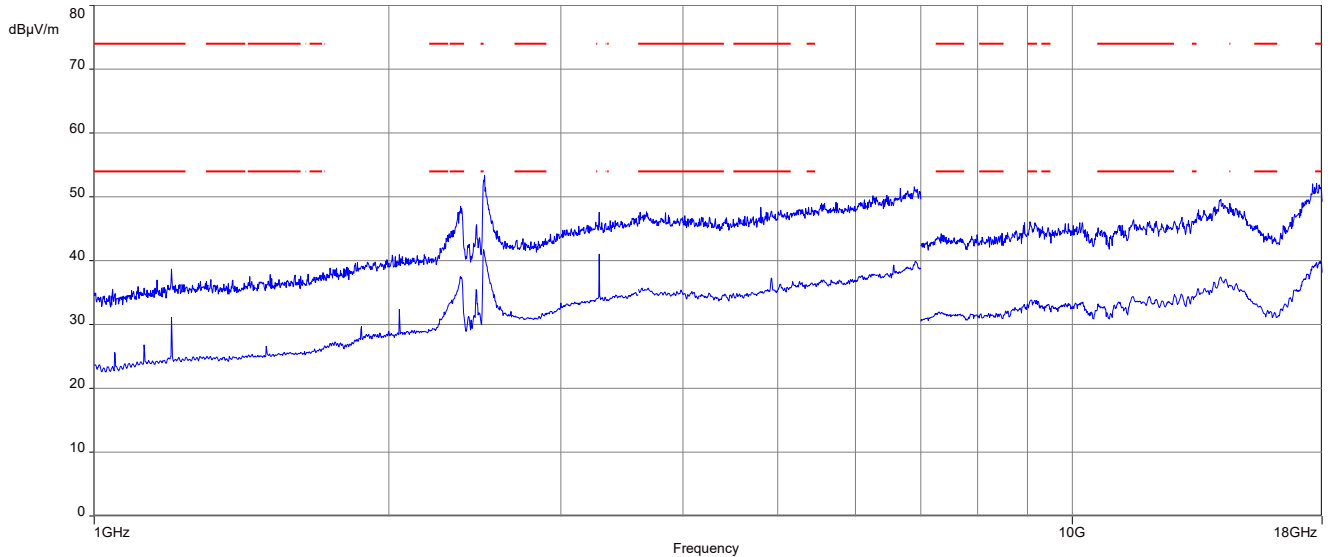
The carrier signal is notched with a 2.4 GHz band rejection filter.

Plots: axHE20-mode**Plot 1:** Lowest channel, 1 GHz to 18 GHz, vertical & horizontal polarization

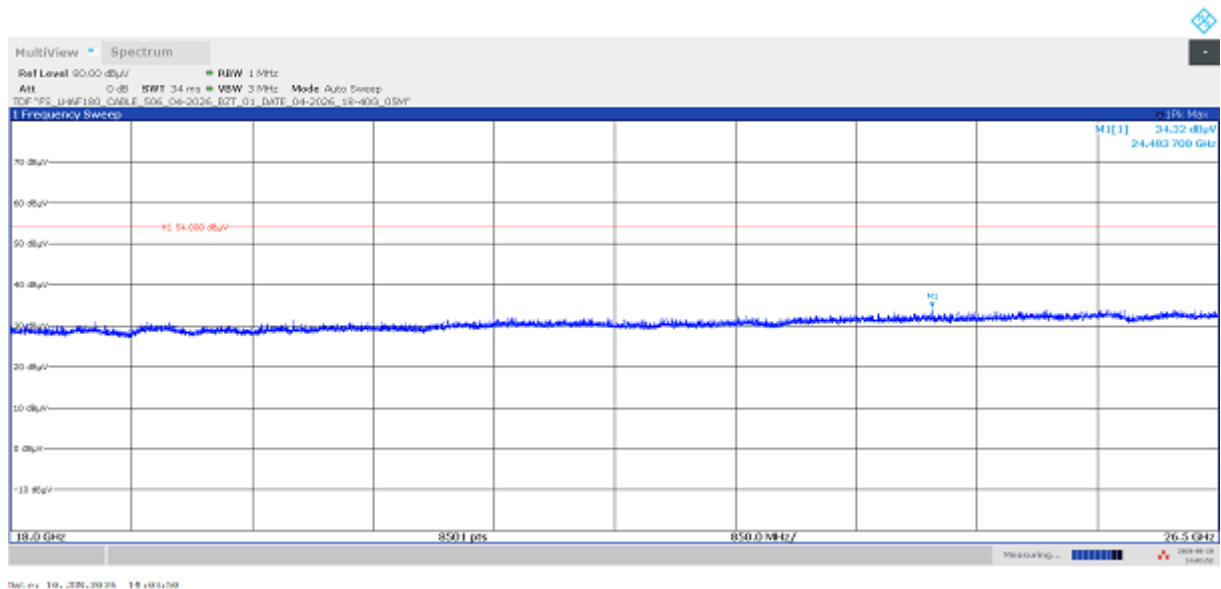
The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 2: Middle channel, 1 GHz to 18 GHz, vertical & horizontal polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 3: Highest channel, 1 GHz to 18 GHz, vertical & horizontal polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 4: 18 GHz to 26 GHz, vertical & horizontal polarization, valid for all channels and modes

13.10 Spurious emissions radiated above 1 GHz (2J Antennas 2JF1002P antenna)

Measurement:

Measurement parameter	
Detector	Peak / RMS
Sweep time	Auto
Resolution bandwidth	1 MHz
Video bandwidth	3 x RBW
Span	1 GHz to 26 GHz
Trace mode	Max Hold
Test setup	See chapter 7.2 setup C & 7.3 setup A
Measurement uncertainty	See chapter 9

Limits:

FCC		ISED
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 30 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 §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).		
Frequency / MHz	Field Strength / (dB μ V / m)	Measurement distance / m
Above 960	54.0 (AVG)	3
	74.0 (peak)	

Results: b-mode

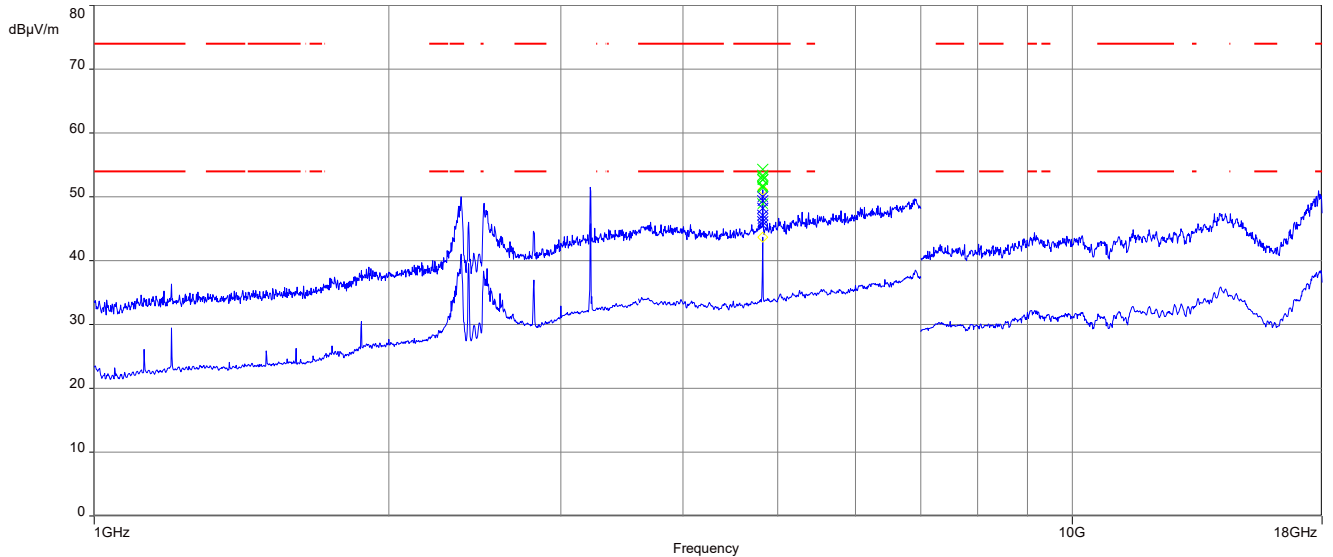
TX spurious emissions radiated / dB μ V/m @ 3 m								
lowest channel			middle channel			highest channel		
f / MHz	Detector	Level / dB μ V/m	f / MHz	Detector	Level / dB μ V/m	f / MHz	Detector	Level / dB μ V/m
4824	Peak	54.3	4874	Peak	55.5	4924	Peak	55.6
	AVG	50.0		AVG	49.8		AVG	50.1

Results: g-mode

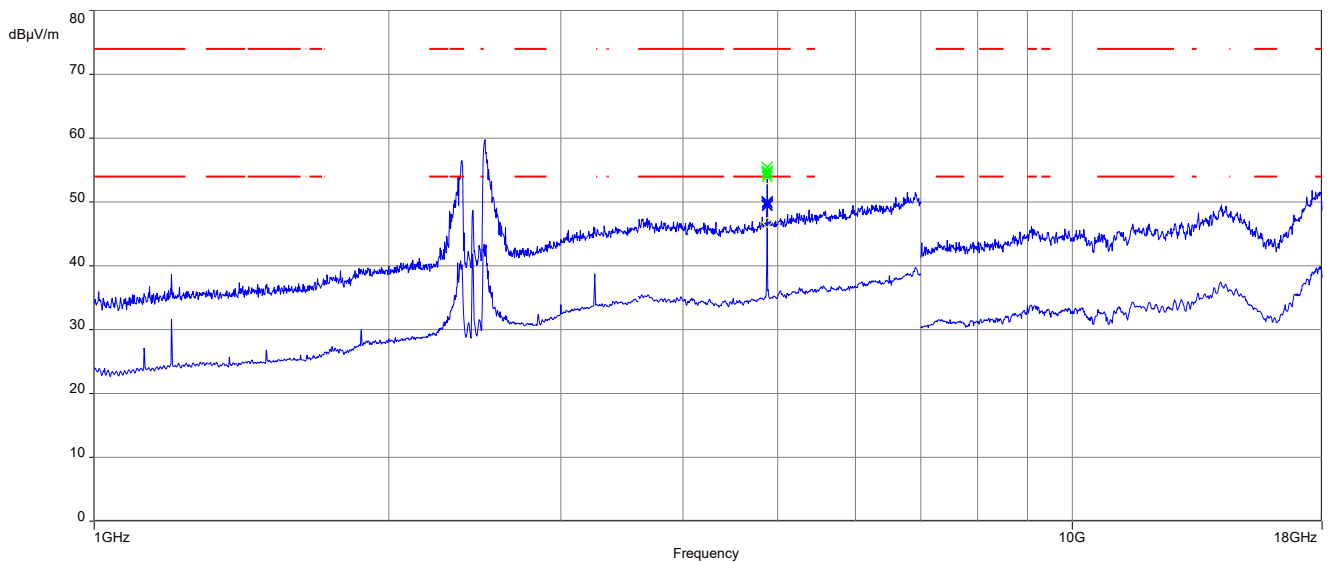
TX spurious emissions radiated / dB μ V/m @ 3 m								
lowest channel			middle channel			highest channel		
f / MHz	Detector	Level / dB μ V/m	f / MHz	Detector	Level / dB μ V/m	f / MHz	Detector	Level / dB μ V/m
All detected emissions are more than 20 dB below the limit.			All detected emissions are more than 20 dB below the limit.			All detected emissions are more than 20 dB below the limit.		

Results: axHE20-mode

TX spurious emissions radiated / dB μ V/m @ 3 m								
lowest channel			middle channel			highest channel		
f / MHz	Detector	Level / dB μ V/m	f / MHz	Detector	Level / dB μ V/m	f / MHz	Detector	Level / dB μ V/m
All detected emissions are more than 20 dB below the limit.			All detected emissions are more than 20 dB below the limit.			All detected emissions are more than 20 dB below the limit.		

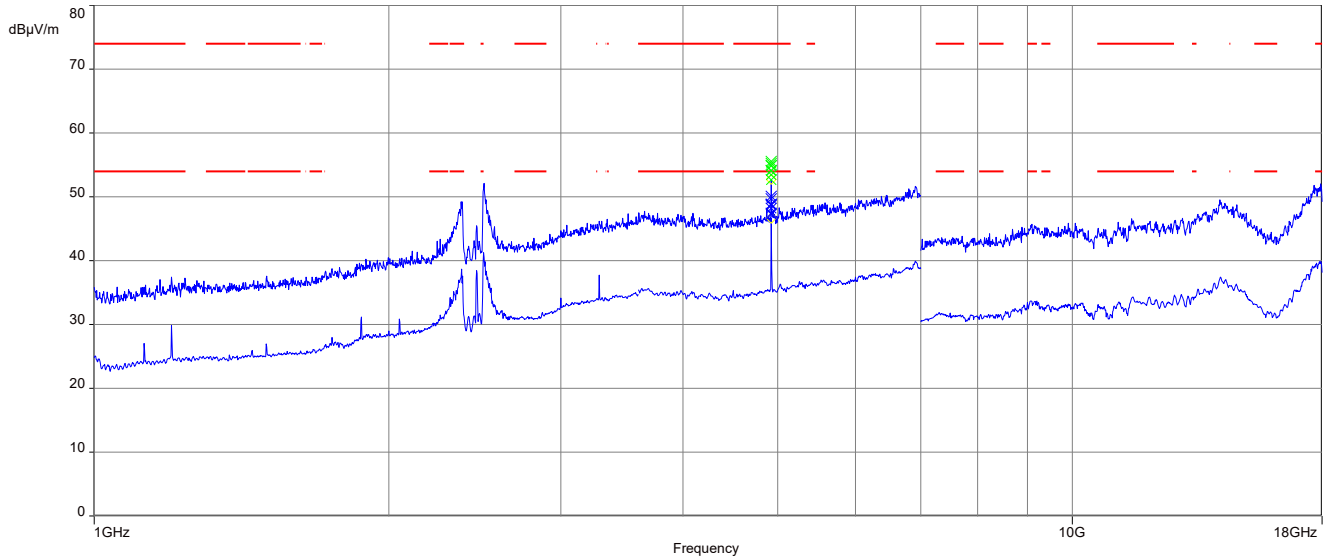
Plots: b-mode**Plot 1:** Lowest channel, 1 GHz to 18 GHz, vertical & horizontal polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

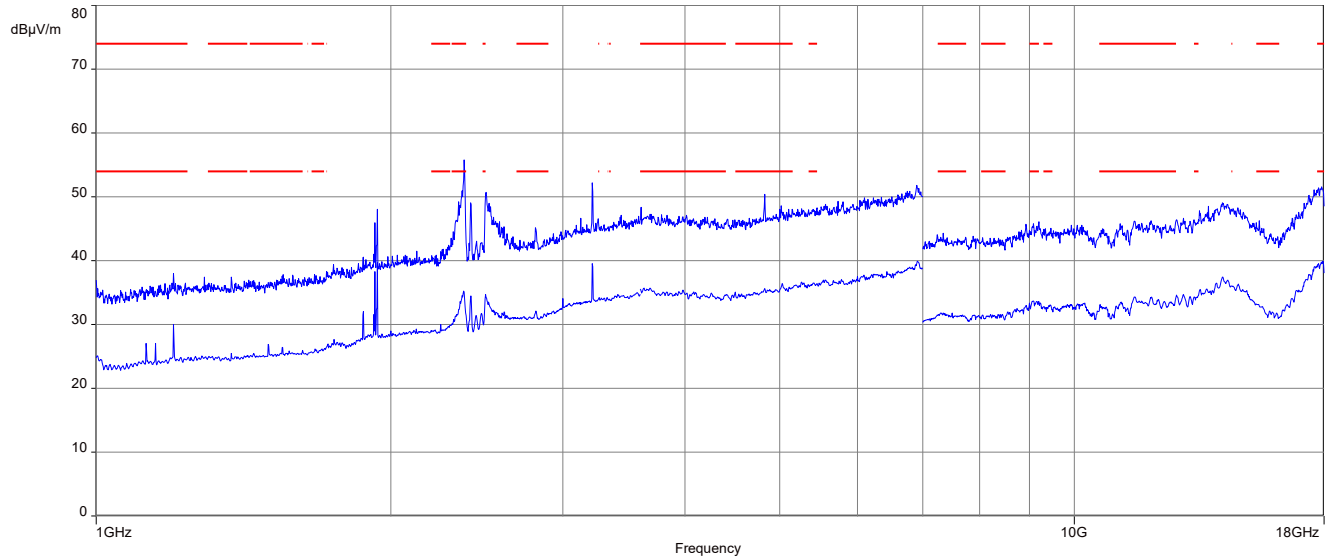
Plot 2: Middle channel, 1 GHz to 18 GHz, vertical & horizontal polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

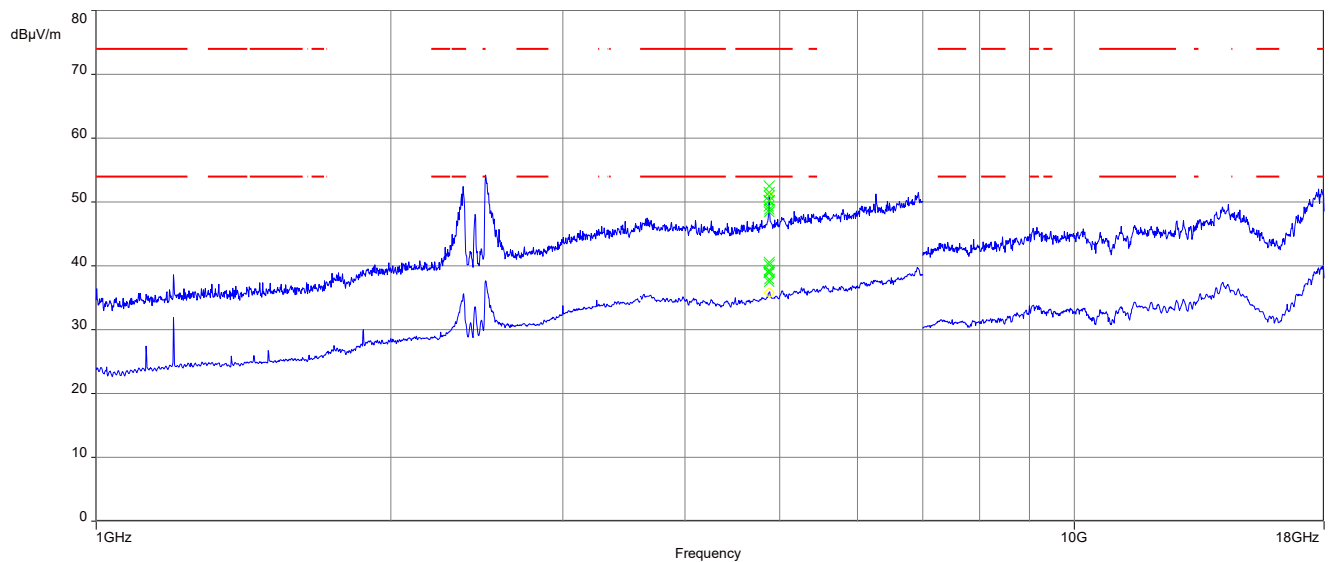
Plot 3: Highest channel, 1 GHz to 18 GHz, vertical & horizontal polarization



The carrier signal is notched with a 2.4 GHz band rejection filter.

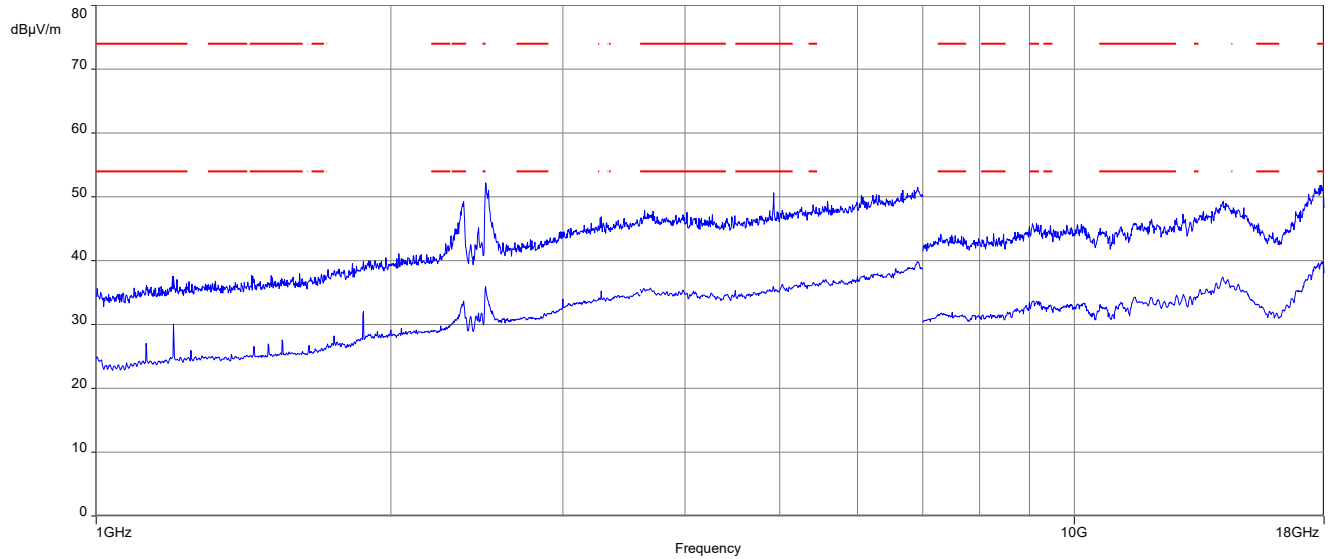
Plots: g-mode**Plot 1:** Lowest channel, 1 GHz to 18 GHz, vertical & horizontal polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

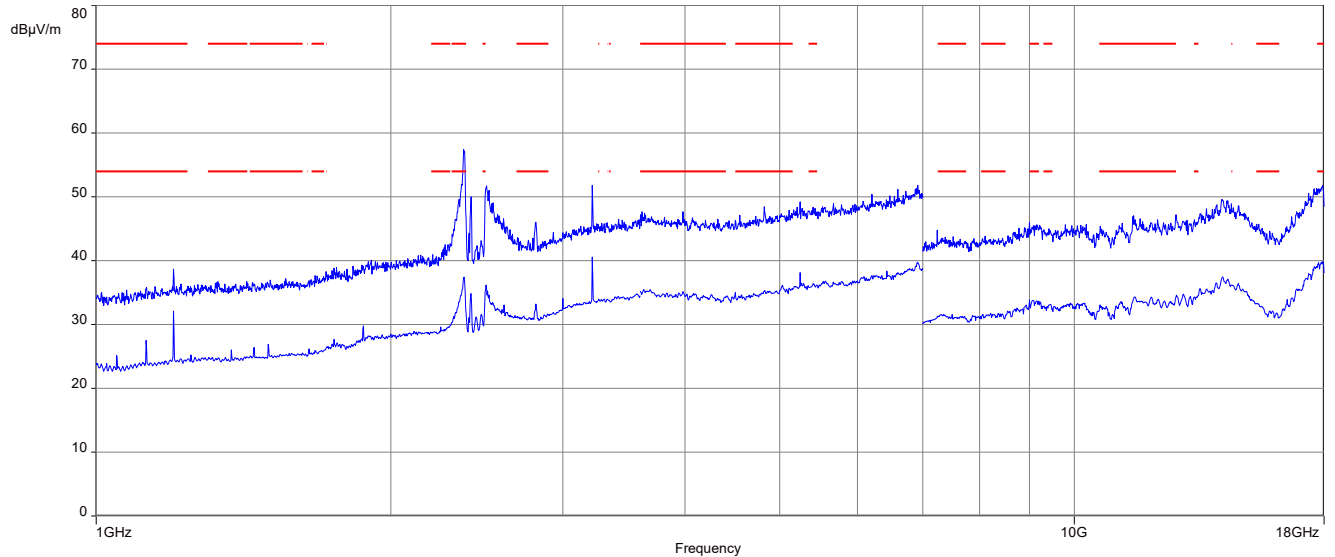
Plot 2: Middle channel, 1 GHz to 18 GHz, vertical & horizontal polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

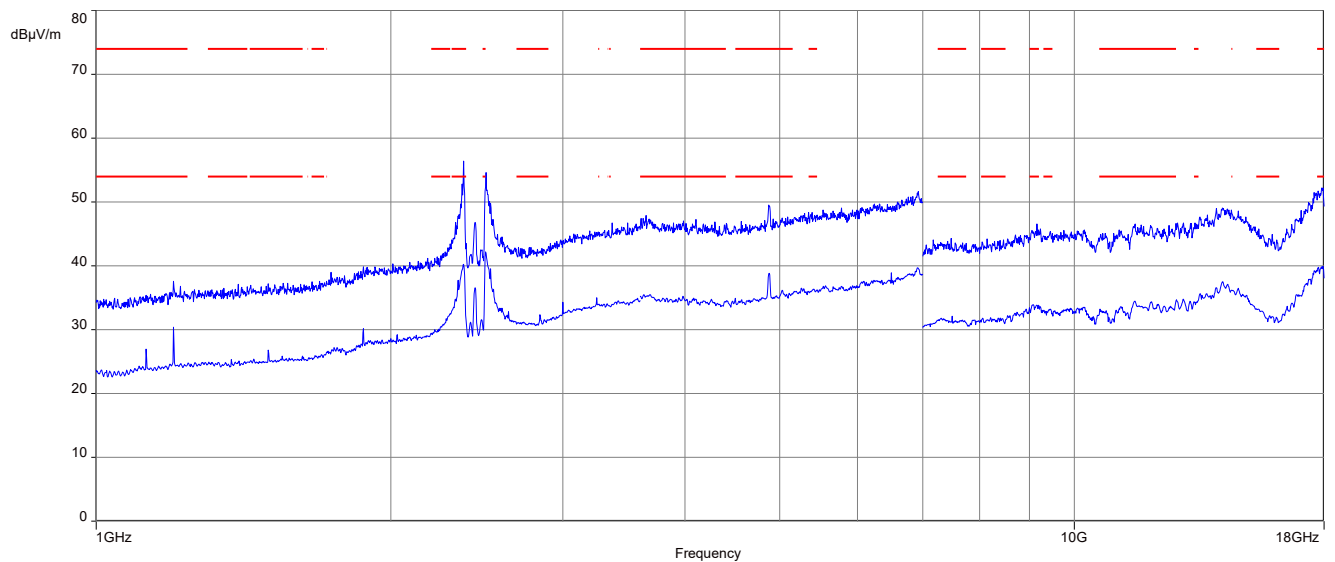
Plot 3: Highest channel, 1 GHz to 18 GHz, vertical & horizontal polarization



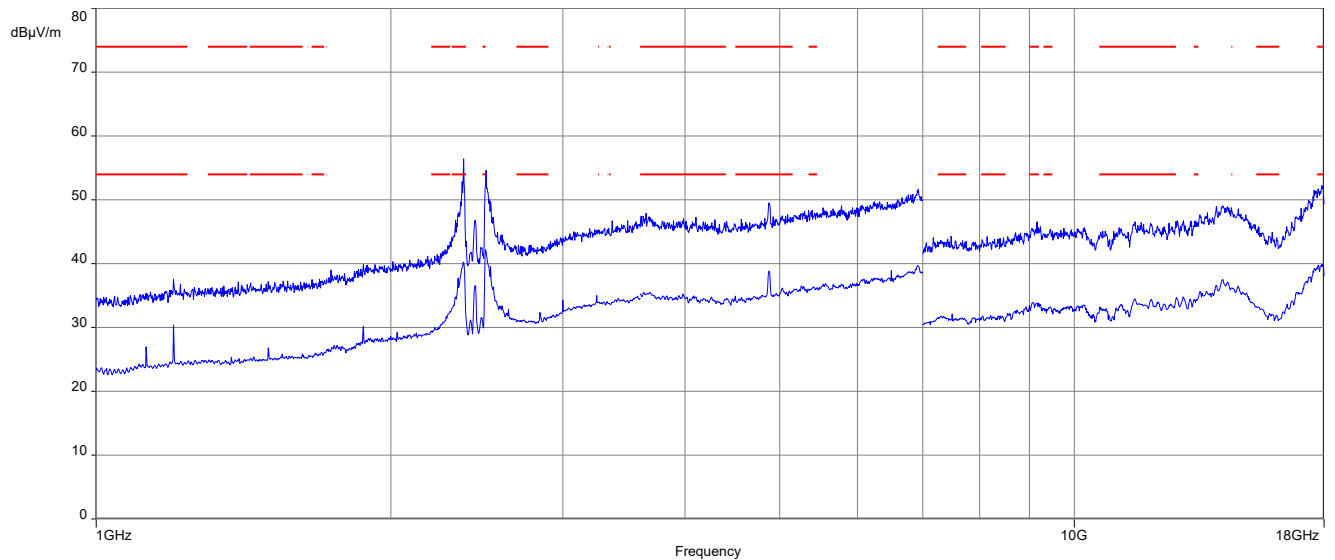
The carrier signal is notched with a 2.4 GHz band rejection filter.

Plots: axHE20-mode**Plot 1:** Lowest channel, 1 GHz to 18 GHz, vertical & horizontal polarization

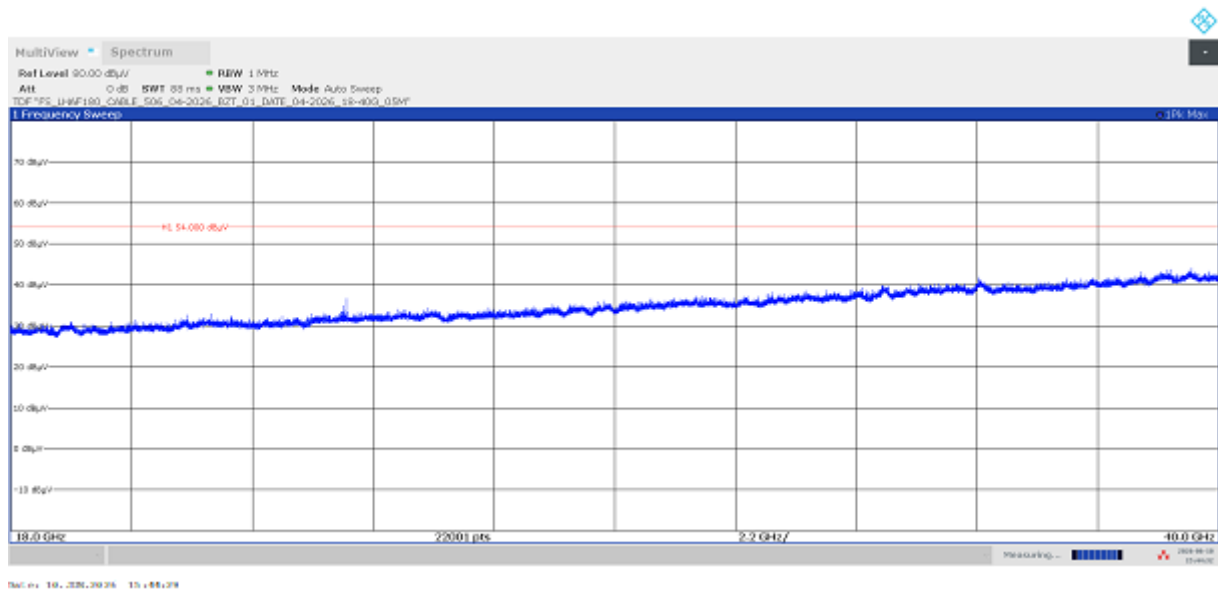
The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 2: Middle channel, 1 GHz to 18 GHz, vertical & horizontal polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 3: Highest channel, 1 GHz to 18 GHz, vertical & horizontal polarization

The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 4: 18 GHz to 26 GHz, vertical & horizontal polarization, valid for all channels and modes

14 Glossary

AVG	Average
C	Compliant
C/N₀	Carrier to noise-density ratio, expressed in dB-Hz
CAC	Channel availability check
CW	Clean wave
DC	Duty cycle
DFS	Dynamic frequency selection
DSSS	Dynamic sequence spread spectrum
DUT	Device under test
EN	European Standard
ETSI	European Telecommunications Standards Institute
EMC	Electromagnetic Compatibility
EUT	Equipment under test
FCC	Federal Communications Commission
FCC ID	Combination of Grantee Code and Equipment Product Code
FHSS	Frequency hopping spread spectrum
FVIN	Firmware version identification number
GNSS	Global Navigation Satellite System
GUE	GNSS User Equipment
HMN	Host marketing name
HVIN	Hardware version identification number
HW	Hardware
ISED	Innovation, Science and Economic Development Canada
Inv. No.	Inventory number
MC	Modulated carrier
NA	Not applicable
NC	Not compliant
NOP	Non occupancy period
NP	Not performed
OBW	Occupied bandwidth
OC	Operating channel
OCW	Operating channel bandwidth
OFDM	Orthogonal frequency division multiplexing
OOB	Out of band
OP	Occupancy period
PER	Packet error rate
PMN	Product marketing name
PP	Positive peak
QP	Quasi peak
RLAN	Radio local area network
S/N or SN	Serial number
SW	Software
UUT	Unit under test
WLAN	Wireless local area network

15 Document history

Version	Applied changes	Date of release
R01	Initial release	2026-06-30

END OF TEST REPORT