



## TEST REPORT

BNNetzA-CAB-02/21-102

Test report no.: 1-2437/21-01-08

### 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 starting with the registration number: D-PL-12076-01.

### Applicant

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### Manufacturer

**ANDREAS STIHL AG & Co. KG**

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71336 Waiblingen / GERMANY

### 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:**      Robot Lawn Mower  
**Model name:**      iMOW® 5 EVO, iMOW® 6 EVO, iMOW® 7 EVO  
**FCC ID:**      2ALP8IA01  
**ISED certification number:**      23431-IA01E  
**Frequency:**      2400 MHz to 2483.5 MHz  
**Technology tested:**      WLAN  
**Antenna:**      Integrated antenna  
**Power supply:**      36 V DC by battery  
**Temperature range:**      0°C to 40°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:



David Lang  
Lab Manager  
Radio Communications

### Test performed:



Michael Dorongovski  
Lab Manager  
Radio Communications

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

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### 2.2 Application details

Date of receipt of order: 2021-11-04

Date of receipt of test item: 2022-05-17

Start of test:\* 2022-06-21

End of test:\* 2022-08-18

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 & 2	February 2021	Spectrum Management and Telecommunications Radio Standards Specification - 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 C63.4-2014	-/-	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 <a href="https://www.dakks.de/as/ast/d/D-PL-12076-01-04e.pdf">https://www.dakks.de/as/ast/d/D-PL-12076-01-04e.pdf</a>
D-PL-12076-01-05	Telecommunication FCC requirements <a href="https://www.dakks.de/as/ast/d/D-PL-12076-01-05e.pdf">https://www.dakks.de/as/ast/d/D-PL-12076-01-05e.pdf</a>



ISED Testing Laboratory Recognized Listing Number: DE0001  
 FCC designation number: DE0002

#### 4 Reporting statements of conformity – decision rule

Only the measured values related to their corresponding limits will be used to decide whether the equipment under test meets the requirements of the test standards listed in chapter 3.

The measurement uncertainty is mentioned in this test report, see chapter 9, but is not taken into account - neither to the limits nor to the measurement results. Measurement results with a smaller margin to the corresponding limits than the measurement uncertainty have a potential risk of more than 5% that the decision might be wrong."

measured value, measurement uncertainty, verdict



## 5 Test environment

Temperature :	$T_{nom}$ $T_{max}$ $T_{min}$	+22 °C during room temperature tests No tests under extreme conditions required. No tests under extreme conditions required.
Relative humidity content :		55 %
Barometric pressure :		1021 hpa
Power supply :	$V_{nom}$ $V_{max}$ $V_{min}$	36.0 V DC by battery No tests under extreme conditions required. No tests under extreme conditions required.

## 6 Test item

### 6.1 General description

Kind of test item :	Robot Lawn Mower
Model name :	iMOW® 5 EVO, iMOW® 6 EVO, iMOW® 7 EVO
HMN :	-/-
PMN :	iMOW® 5 EVO, iMOW® 6 EVO, iMOW® 7 EVO
HVIN :	iMOW® 5 EVO, iMOW® 6 EVO, iMOW® 7 EVO
FVIN :	-/-
S/N serial number :	445131121
Hardware status :	Signal-PCB: IA01-430-1403-B R8 Power-PCB: IA01-430-1404-B R14 Cellular-PCB: IA01-430-1406-B R8 GNSS-PCB: IA01-430-1407-B R9 Docking-PCB: IA01-430-1400-B R11
Software status :	IA01-400-3800-A R7
Firmware status :	IA01-400-3800-A R7
Frequency band :	2400 MHz to 2483.5 MHz
Type of radio transmission : Use of frequency spectrum :	DSSS, OFDM
Type of modulation :	CCK, (D)BPSK, (D)QPSK, 16 – QAM, 64 – QAM
Number of channels :	11
Antenna :	Integrated antenna
Power supply :	36 V DC by battery
Temperature range :	0°C to 40°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:

1-2437/21-01-01\_AnnexA  
 1-2437/21-01-01\_AnnexB  
 1-2437/21-01-01\_AnnexD

## 7 Description of the test setup

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

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

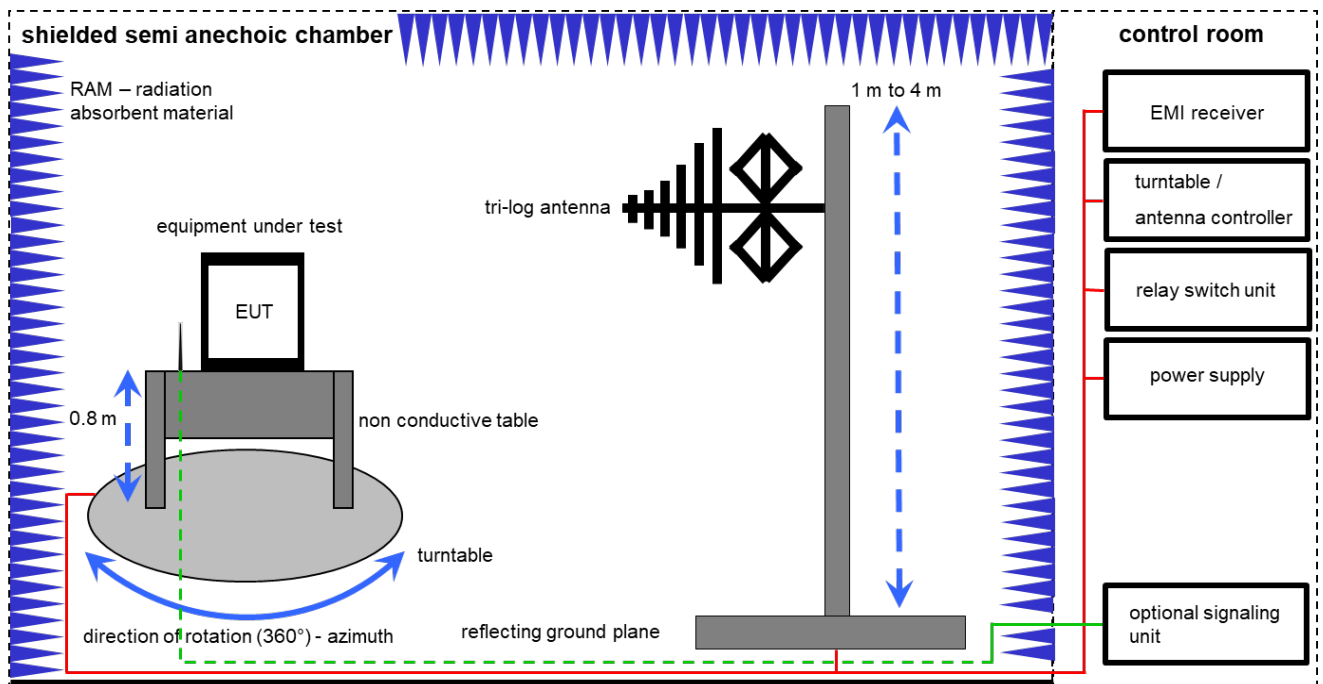
Each block diagram listed can contain several test setup configurations. All devices belonging to a test setup are identified with the same letter syntax. For example: Column Setup and all devices with an A.

### **Agenda:** Kind of Calibration

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

## 7.1 Shielded semi anechoic chamber

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



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

FS = UR + CL + AF

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

Example calculation:

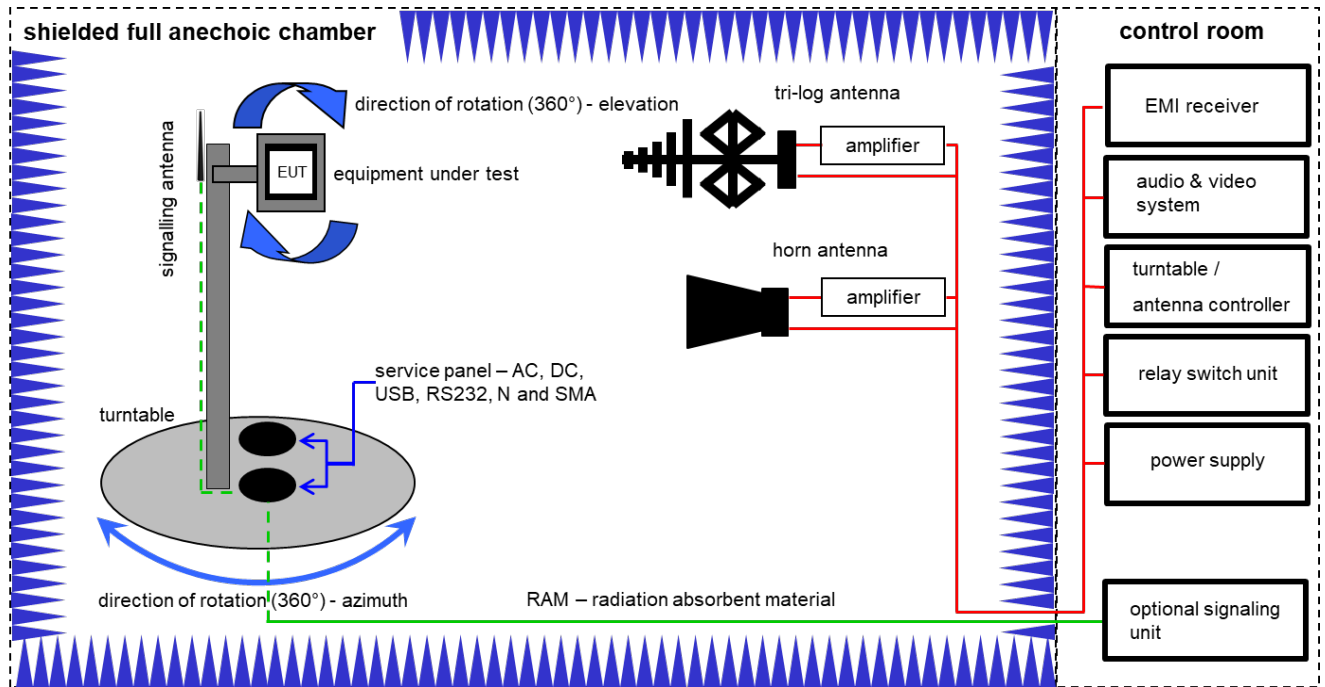
FS [dBμV/m] = 12.35 [dBμV/m] + 1.90 [dB] + 16.80 [dB/m] = 31.05 [dBμV/m] (35.69 μV/m)

### Equipment table:

No.	Setup	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Switch-Unit	3488A	HP	2719A14505	300000368	ev	-/-	-/-
2	A	Semi anechoic chamber	3000023	MWB AG	-/-	300000551	ne	-/-	-/-
3	A	Antenna Tower	Model 2175	ETS-Lindgren	64762	300003745	izw	-/-	-/-
4	A	Positioning Controller	Model 2090	ETS-Lindgren	64672	300003746	izw	-/-	-/-
5	A	Turntable Interface-Box	Model 105637	ETS-Lindgren	44583	300003747	izw	-/-	-/-
6	A	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck Mess - Elektronik	318	300003696	vIKI!	30.09.2021	29.09.2023
7	A	Turntable	2089-4.0	EMCO	-/-	300004394	ne	-/-	-/-
8	A	PC	TecLine	F+W	-/-	300004388	ne	-/-	-/-
9	A	EMI Test Receiver	ESR3	Rohde & Schwarz	102587	300005771	k	20.05.2022	19.05.2023



## 7.2 Shielded fully anechoic chamber



Measurement distance: tri-log antenna and horn antenna 3 meter

$$FS = UR + CA + AF$$

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

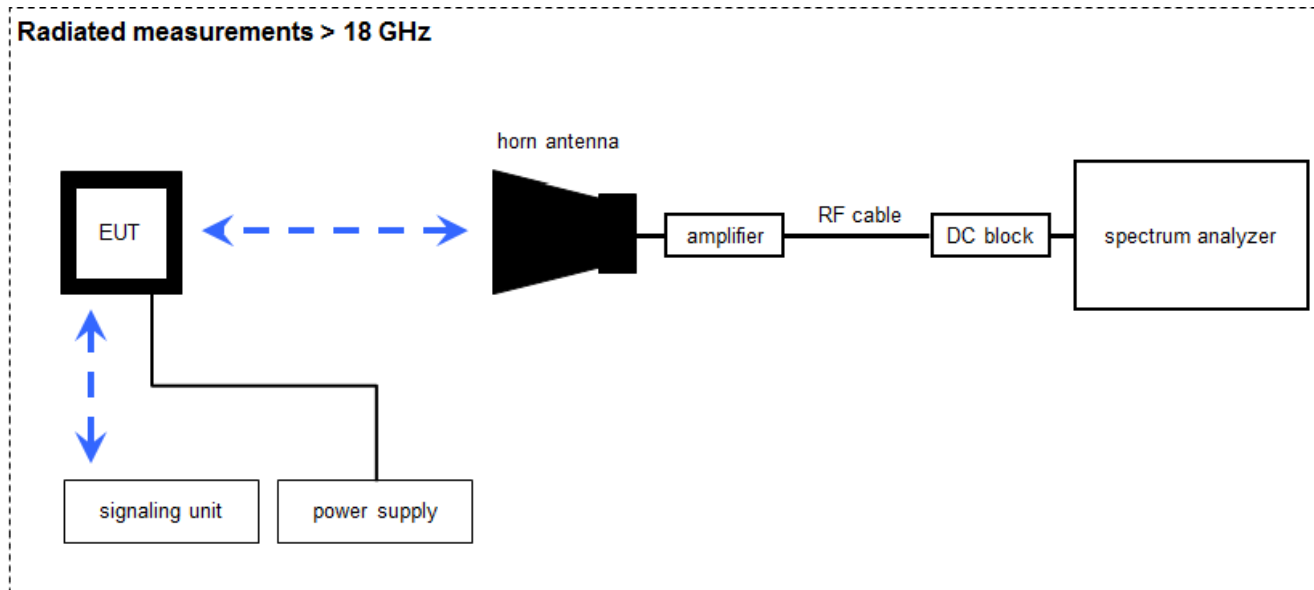
Example calculation:

$$FS \text{ [dB}\mu\text{V/m]} = 40.0 \text{ [dB}\mu\text{V/m]} + (-35.8) \text{ [dB]} + 32.9 \text{ [dB/m]} = 37.1 \text{ [dB}\mu\text{V/m]} \text{ (71.61 } \mu\text{V/m)}$$

### Equipment table:

No.	Setup	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	B	Active Loop Antenna 9 kHz to 30 MHz	6502	EMCO	2210	300001015	vKI!	01.07.2021	31.07.2023
2	C	Highpass Filter	WHK1.1/15G-10SS	Wainwright	37	400000148	ne	-/-	-/-
3	C	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne	-/-	-/-
4	C	Band Reject Filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	26	300003792	ne	-/-	-/-
5	A, C	Broadband Amplifier 0.5-18 GHz	CBLU5184540	CERNEX	22051	300004483	ev	-/-	-/-
6	A, B, C	4U RF Switch Platform	L4491A	Agilent Technologies	MY50000032	300004510	ne	-/-	-/-
7	A, B, C	Computer	Intel Core i3 3220/3,3 GHz, Prozessor	-/-	2V2403033A54 21	300004591	ne	-/-	-/-
8	A, B, C	NEXIO EMV-Software	BAT EMC V3.21.0.32	EMCO	-/-	300004682	ne	-/-	-/-
9	A, B, C	Anechoic chamber	-/-	TDK	-/-	300003726	ne	-/-	-/-
10	A, B, C	EMI Test Receiver 9kHz-26,5GHz	ESR26	Rohde & Schwarz	101376	300005063	k	15.12.2021	31.12.2022
11	C	RF-Amplifier	AMF-6F06001800-30-10P-R	NARDA-MITEQ Inc	2011571	300005240	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:

$$FS \text{ [dB}\mu\text{V/m]} = 40.0 \text{ [dB}\mu\text{V/m]} + (-60.1) \text{ [dB]} + 36.74 \text{ [dB/m]} = 16.64 \text{ [dB}\mu\text{V/m]} \text{ (6.79 } \mu\text{V/m)}$$

#### Equipment table:

No.	Setup	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	vKI!	17.01.2022	31.01.2024
3	A	Signal analyzer	FSV40	Rohde&Schwarz	101042	300004517	k	25.01.2022	31.01.2023
4	A	RF-Cable	ST18/SMAM/SMAM /48	Huber & Suhner	Batch no. 600918	400001182	ev	-/-	-/-
5	A	DC-Blocker 0.1-40 GHz	8141A	Inmet	-/-	400001185	ev	-/-	-/-

## 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  $\pm 45^\circ$  and antenna height between 1 and 4 m.
- The final measurement is done with quasi-peak detector (as described in ANSI C 63.4).
- 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	$\pm 3$ dB	
Power spectral density	$\pm 1.56$ dB	
DTS bandwidth	$\pm 100$ kHz (depends on the used RBW)	
Occupied bandwidth	$\pm 100$ kHz (depends on the used RBW)	
Maximum output power conducted	$\pm 1.56$ dB	
Detailed spurious emissions @ the band edge - conducted	$\pm 1.56$ dB	
Band edge compliance radiated	$\pm 3$ dB	
Spurious emissions conducted	> 3.6 GHz	$\pm 1.56$ dB
	> 7 GHz	$\pm 1.56$ dB
	> 18 GHz	$\pm 2.31$ dB
	$\geq 40$ GHz	$\pm 2.97$ dB
Spurious emissions radiated below 30 MHz	$\pm 3$ dB	
Spurious emissions radiated 30 MHz to 1 GHz	$\pm 3$ dB	
Spurious emissions radiated 1 GHz to 12.75 GHz	$\pm 3.7$ dB	
Spurious emissions radiated above 12.75 GHz	$\pm 4.5$ dB	
Spurious emissions conducted below 30 MHz (AC conducted)	$\pm 2.6$ dB	

## 10 Summary of measurement results

<input type="checkbox"/>	No deviations from the technical specifications were ascertained
<input type="checkbox"/>	There were deviations from the technical specifications ascertained
<input checked="" type="checkbox"/>	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 2	See table!	2022-10-19	Tests according customer demand

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	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
§15.247(a)(2) RSS - 247 / 5.2 (a)	DTS bandwidth	KDB 558074 DTS clause: 8.2	Nominal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
RSS Gen clause 4.6.1	Occupied bandwidth	-/-	Nominal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
§15.247(b)(3) RSS - 247 / 5.4 (d)	Maximum output power	KDB 558074 DTS clause: 8.3.1.3	Nominal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
§15.247(d) RSS - 247 / 5.5	Detailed spurious emissions @ the band edge – cond.	-/-	Nominal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-/-
§15.205 RSS - 247 / 5.5 RSS - Gen	Band edge compliance cond. or rad.	KDB 558074 DTS clause: 8.7.3	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-/-
§15.247(d) RSS - 247 / 5.5	TX spurious emissions cond.	KDB 558074 DTS clause: 8.5	Nominal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-/-
§15.209(a) RSS-Gen	TX spurious emissions rad. below 30 MHz	-/-	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-/-
§15.247(d) RSS - 247 / 5.5 RSS-Gen	TX spurious emissions rad. 30 MHz to 1 GHz	-/-	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-/-
§15.247(d) RSS - 247 / 5.5 RSS-Gen	TX spurious emissions rad. above 1 GHz	-/-	Nominal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Tests on both planes performed only on lowest channel
§15.107(a) §15.207	Conducted emissions < 30 MHz	-/-	Nominal	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	-/-

### Notes:

<b>C</b>	Compliant	<b>NC</b>	Not compliant	<b>NA</b>	Not applicable	<b>NP</b>	Not performed
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## 11 Additional information and comments

Reference documents: None

Co-applicable documents: Due to the size of the EUT, the tests were performed in two different planes.

Special test descriptions: None

Configuration descriptions: None

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 <sub>c</sub> / MHz	<b>2412</b>	2417	2422	2427	2432	<b>2437</b>	2442	2447	2452	2457	<b>2462</b>	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 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 3 meter.

#### Measurement:

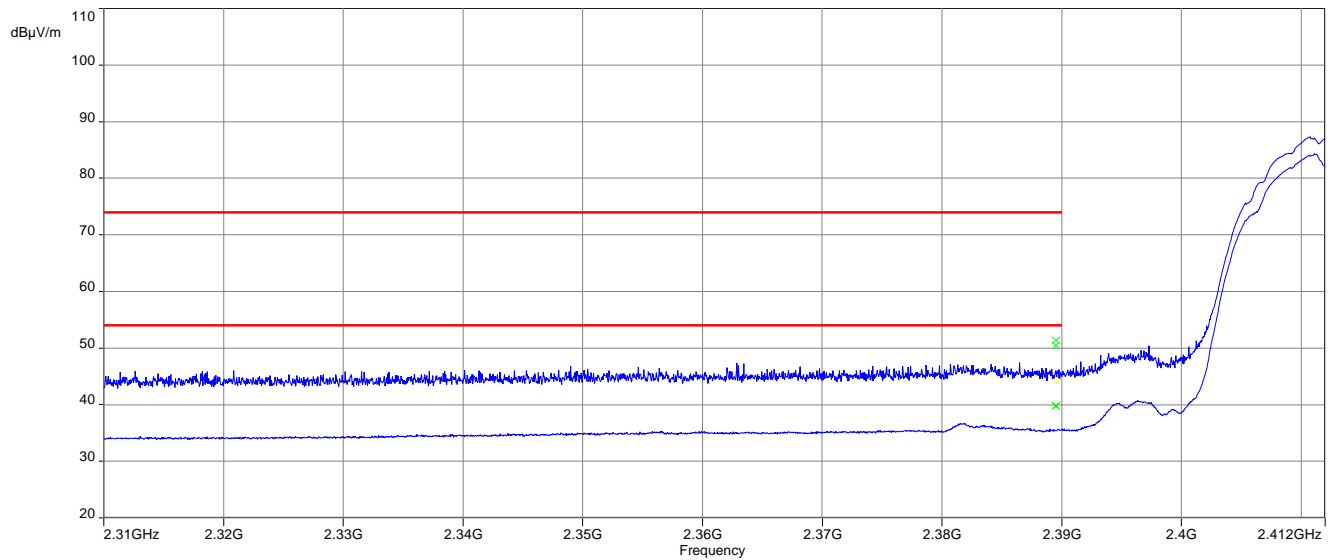
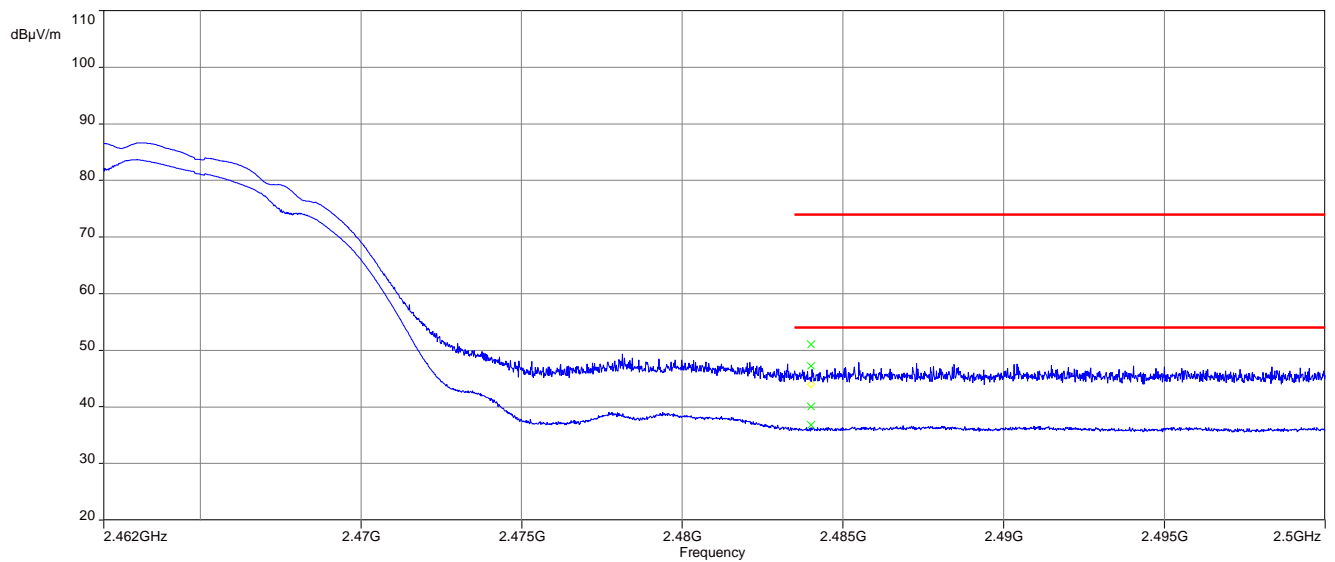
	Measurement parameter for peak measurements	Measurement parameter for average measurements
		According to DTS clause: 8.7.3
Detector	Peak	RMS
Sweep time	Auto	Auto
Resolution bandwidth	1 MHz	100 kHz
Video bandwidth	3 MHz	300 kHz
Span	See plot	2 MHz
Trace mode	Max. hold	RMS Average over 101 sweeps
Analyzer 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	

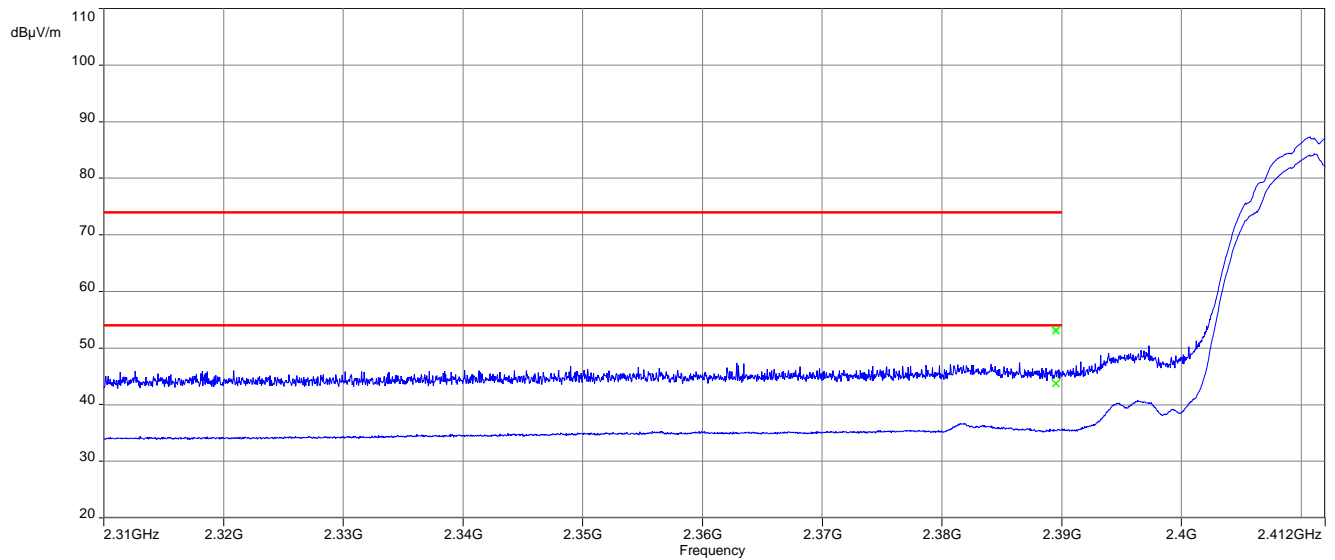
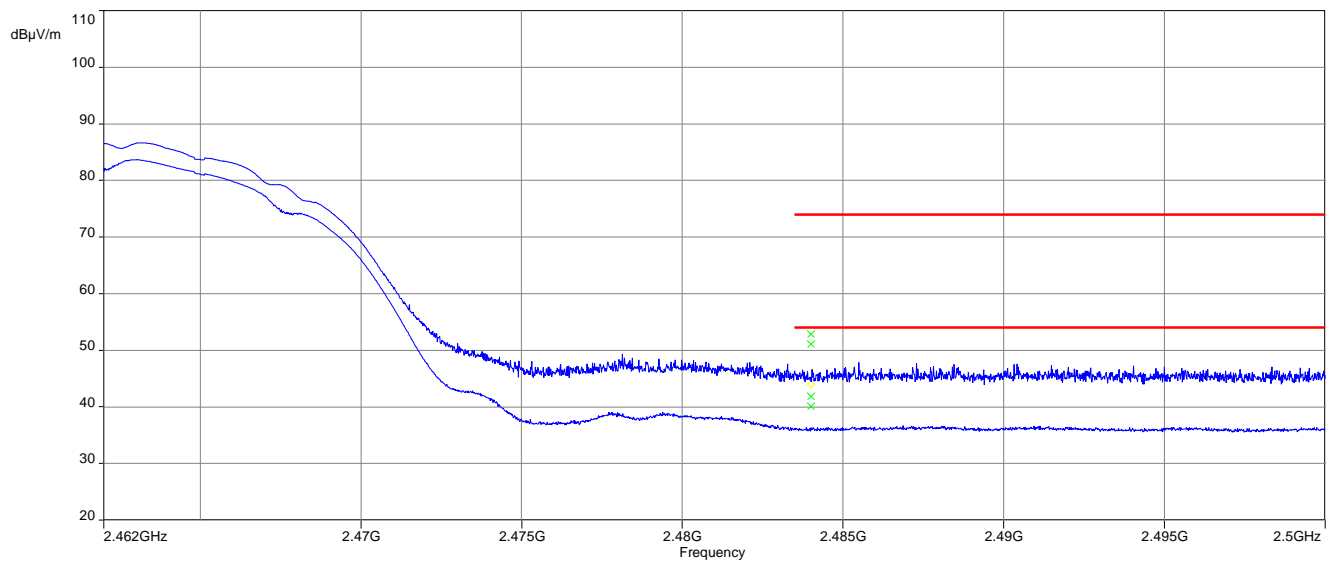
#### Limits:

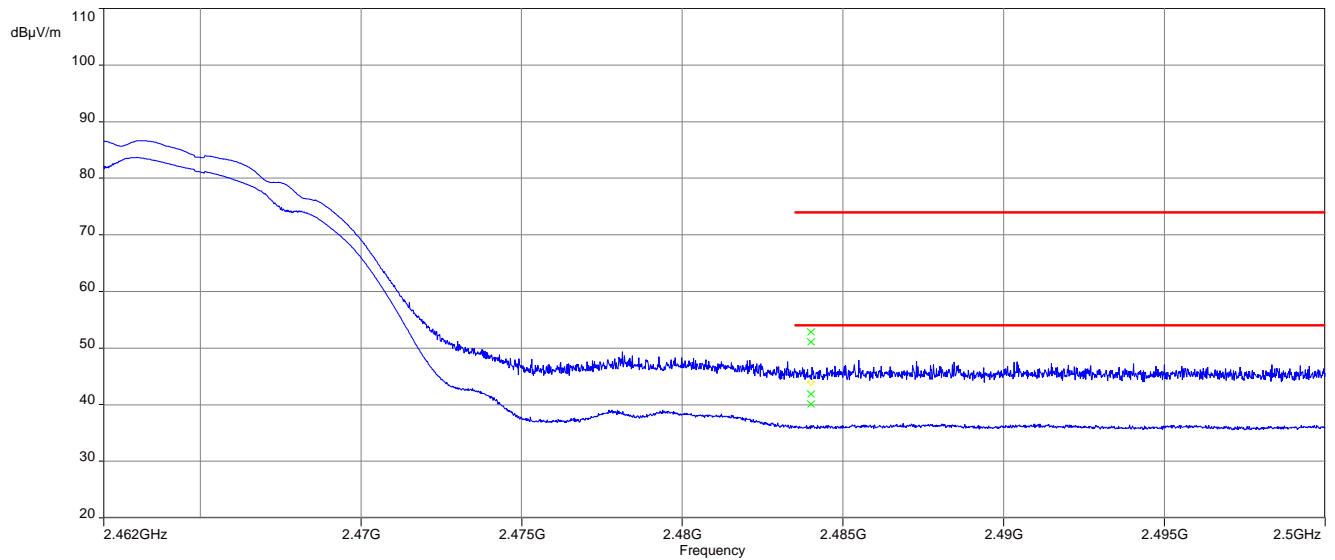
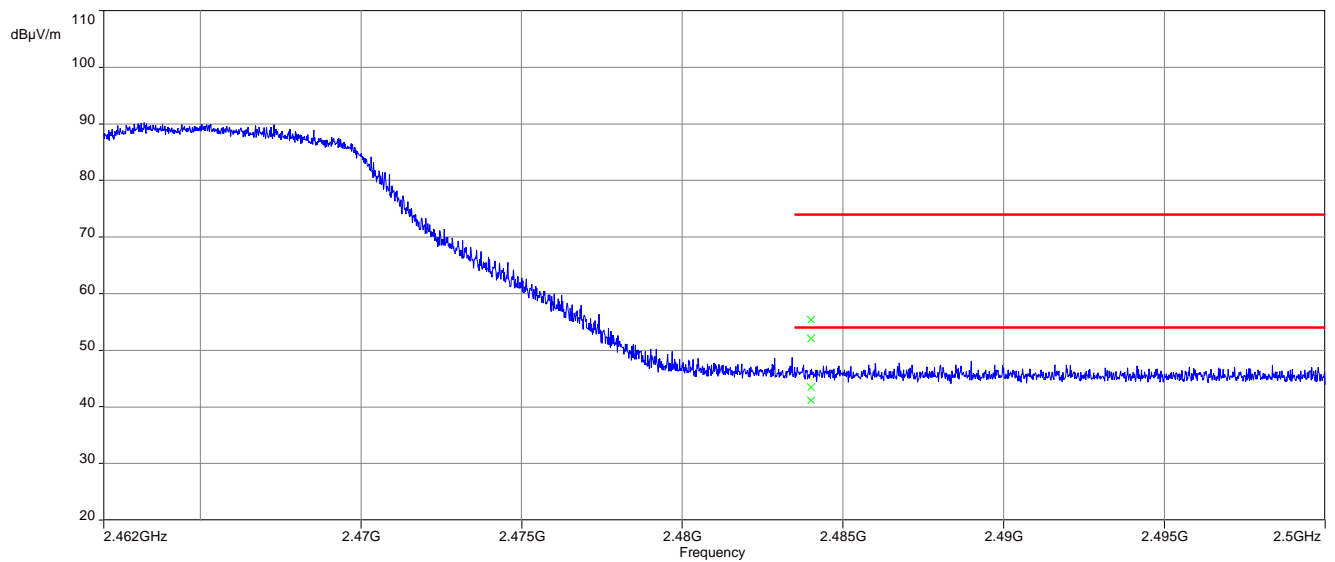
FCC	ISED
74 dBµV/m @ 3 m (Peak) 54 dBµV/m @ 3 m (AVG)	

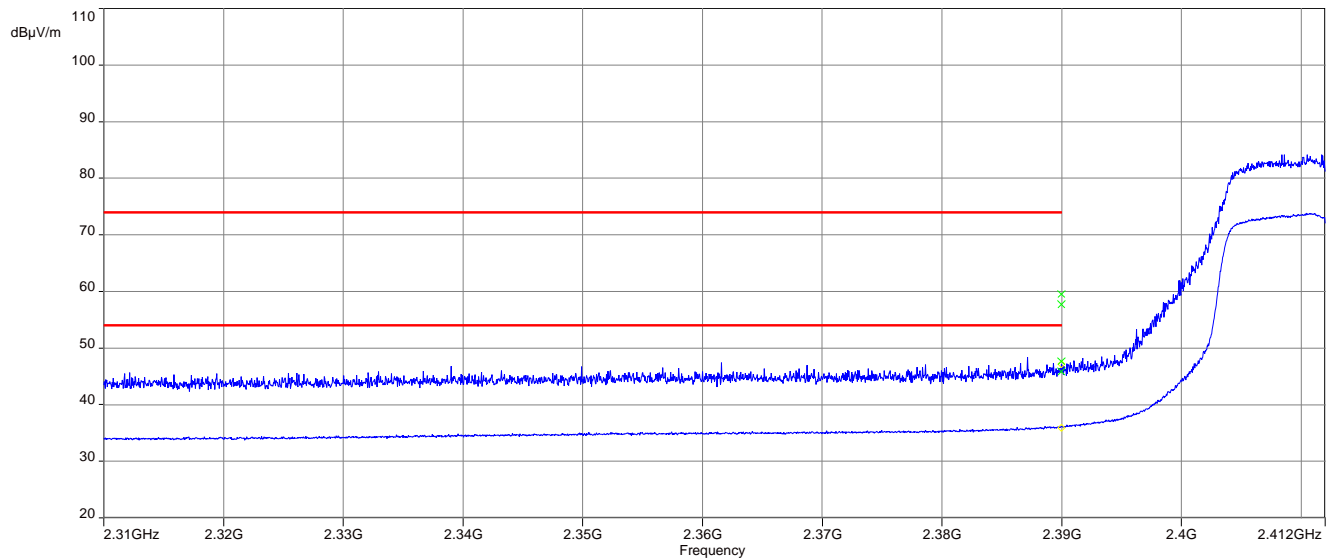
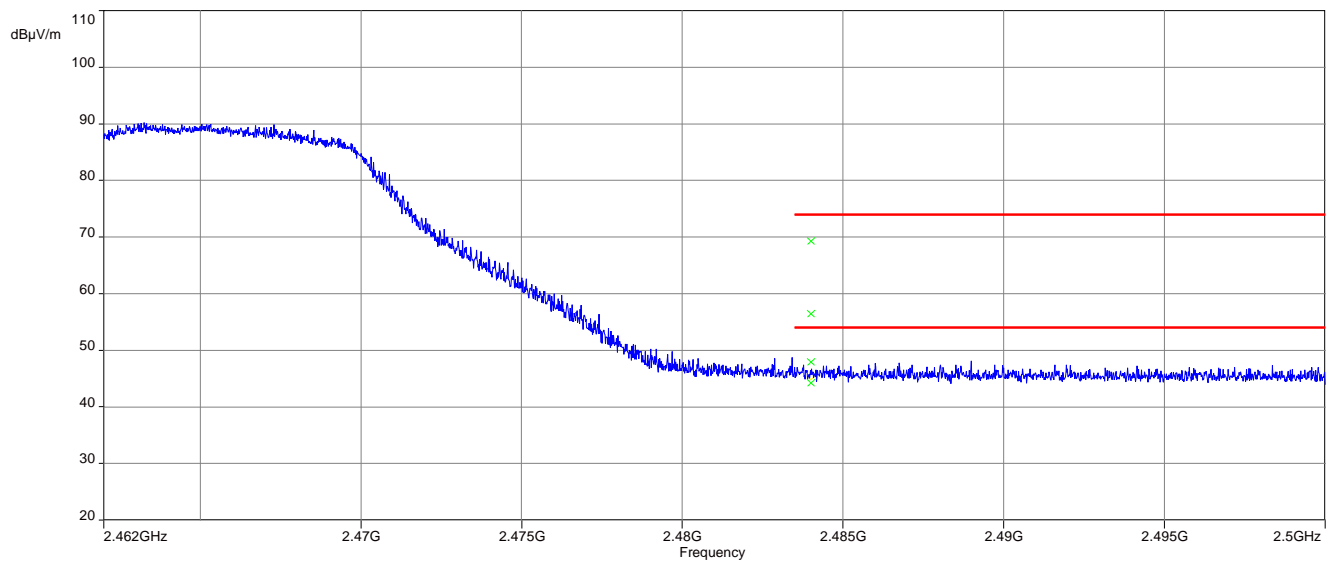
**Results:**

Scenario	Band edge compliance radiated [dBµV/m]
Mode	b-mode
Lower restricted band, EUT position 0°	39.9dBµV/m AVG 51.4 dBµV/m Peak
Lower restricted band, EUT position 90°	43.7 dBµV/m AVG 53.3 dBµV/m Peak
Upper restricted band, EUT position 0°	40.1 dBµV/m AVG 51.1 dBµV/m Peak
Upper restricted band, EUT position 90°	41.9 dBµV/m AVG 52.9 dBµV/m Peak
Mode	g-mode
Lower restricted band, EUT position 0°	46.9 dBµV/m AVG 58.7 dBµV/m Peak
Lower restricted band, EUT position 90°	47.7 dBµV/m AVG 59.6 dBµV/m Peak
Upper restricted band, EUT position 0°	43.5 dBµV/m AVG 55.5 dBµV/m Peak
Upper restricted band, EUT position 90°	48.0 dBµV/m AVG 69.4 dBµV/m Peak
Mode	nHT20-mode
Lower restricted band, EUT position 0°	44.7 dBµV/m AVG 57.2 dBµV/m Peak
Lower restricted band, EUT position 90°	46.2 dBµV/m AVG 59.0 dBµV/m Peak
Upper restricted band, EUT position 0°	43.7 dBµV/m AVG 56.7 dBµV/m Peak
Upper restricted band, EUT position 90°	46.9 dBµV/m AVG 69.3 dBµV/m Peak

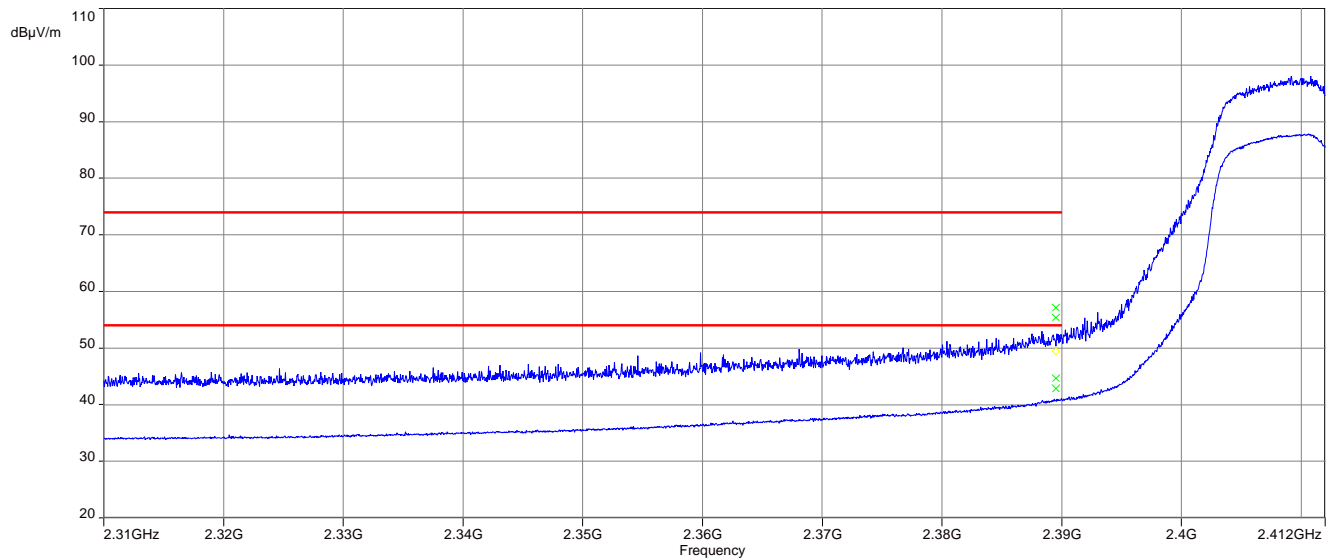
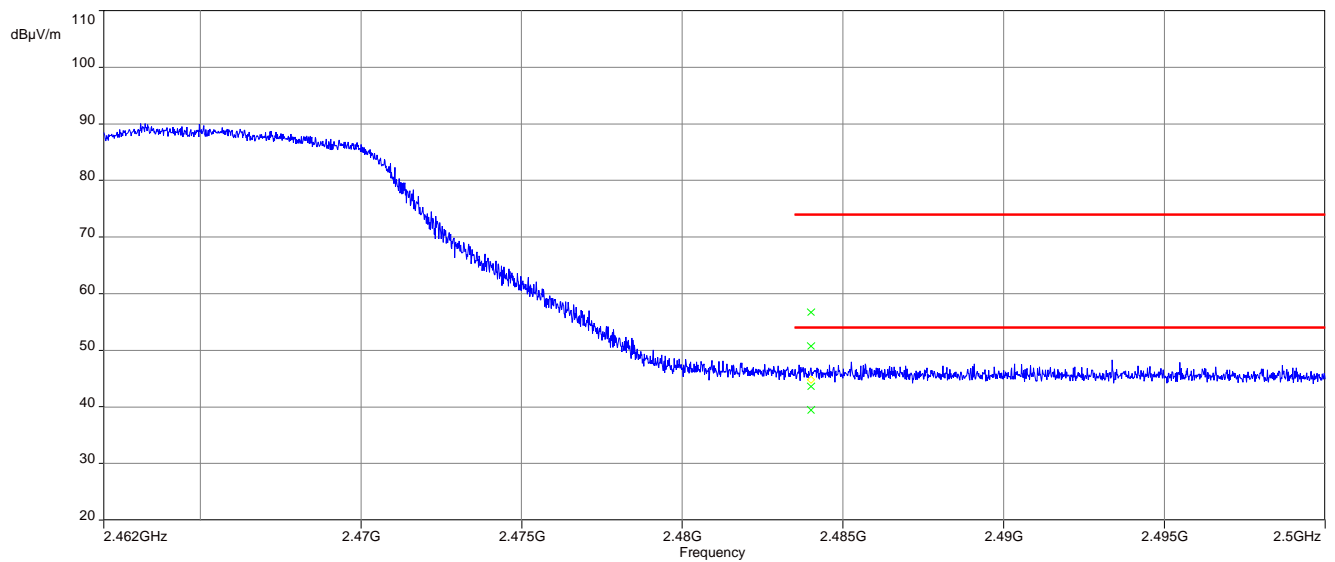
**Plots:** b-mode**Plot 1:** TX mode, lower band edge, vertical & horizontal polarization, 0°**Plot 2:** TX mode, upper band edge, vertical & horizontal polarization, 0°

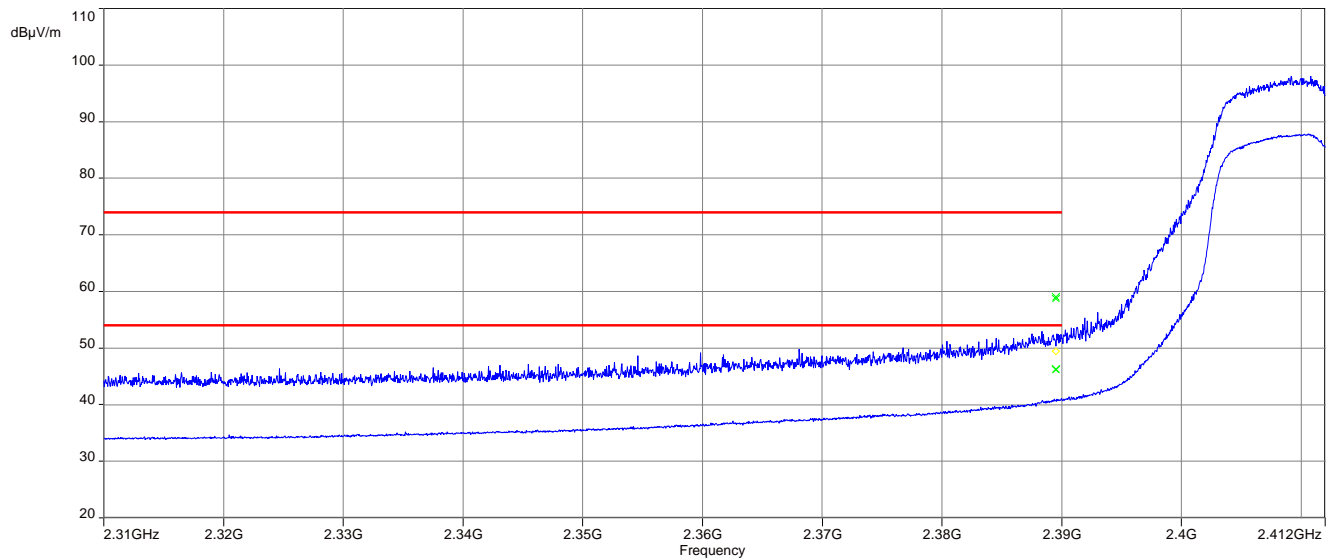
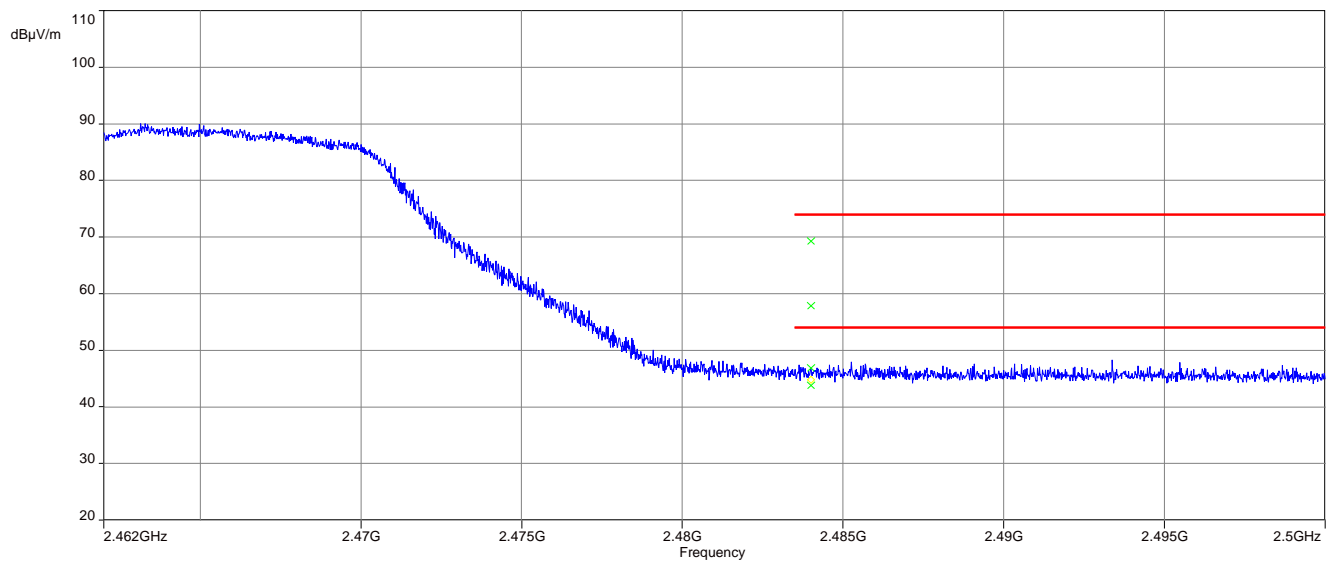
**Plot 3:** TX mode, lower band edge, vertical & horizontal polarization, 90°**Plot 4:** TX mode, upper band edge, vertical & horizontal polarization, 90°

**Plots:** g-mode**Plot 1:** TX mode, lower band edge, vertical & horizontal polarization, 0°**Plot 2:** TX mode, upper band edge, vertical & horizontal polarization, 0°

**Plot 3:** TX mode, lower band edge, vertical & horizontal polarization, 90°**Plot 4:** TX mode, upper band edge, vertical & horizontal polarization, 90°



**Plots:** nHT20-mode**Plot 1:** TX mode, lower band edge, vertical & horizontal polarization, 0°**Plot 2:** TX mode, upper band edge, vertical & horizontal polarization, 0°

**Plot 3:** TX mode, lower band edge, vertical & horizontal polarization, 90°**Plot 4:** TX mode, upper band edge, vertical & horizontal polarization, 90°

## 13.2 Spurious emissions radiated below 30 MHz

### 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
Measured modulation	<input checked="" type="checkbox"/> DSSS b – mode <input checked="" type="checkbox"/> OFDM g – mode <input type="checkbox"/> OFDM n HT20 – mode
Test setup	See chapter 7.2 setup B
Measurement uncertainty	See chapter 9

### Limits:

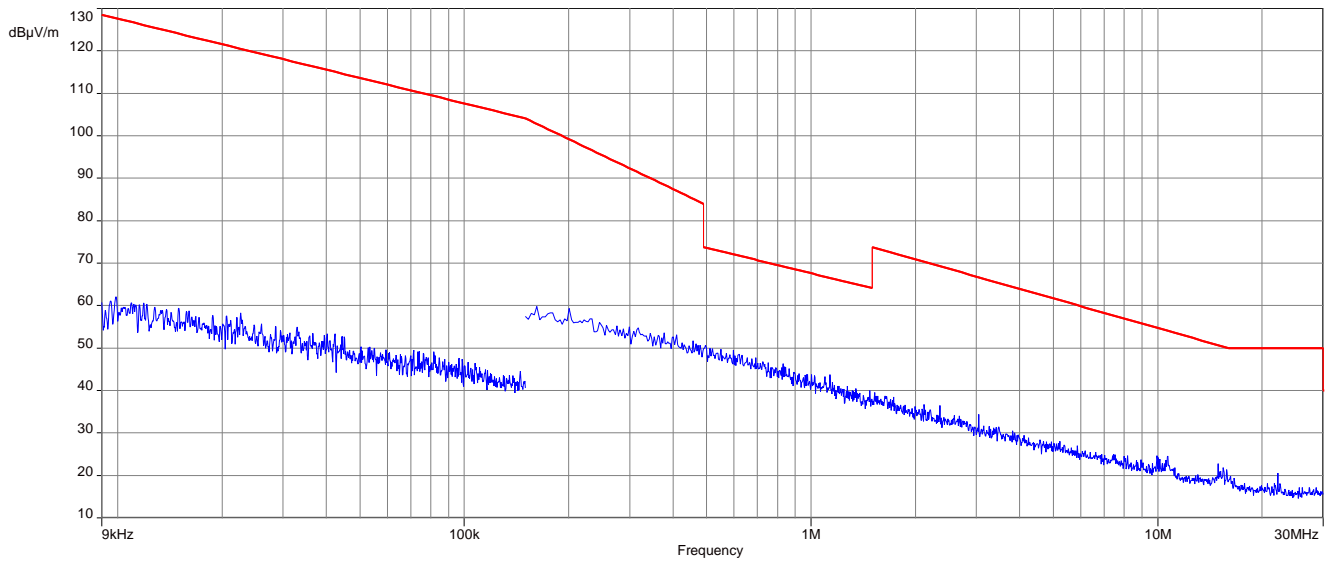
FCC		ISED
Frequency / MHz	Field Strength / (dB $\mu$ V / m)	Measurement distance / m
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

### Results:

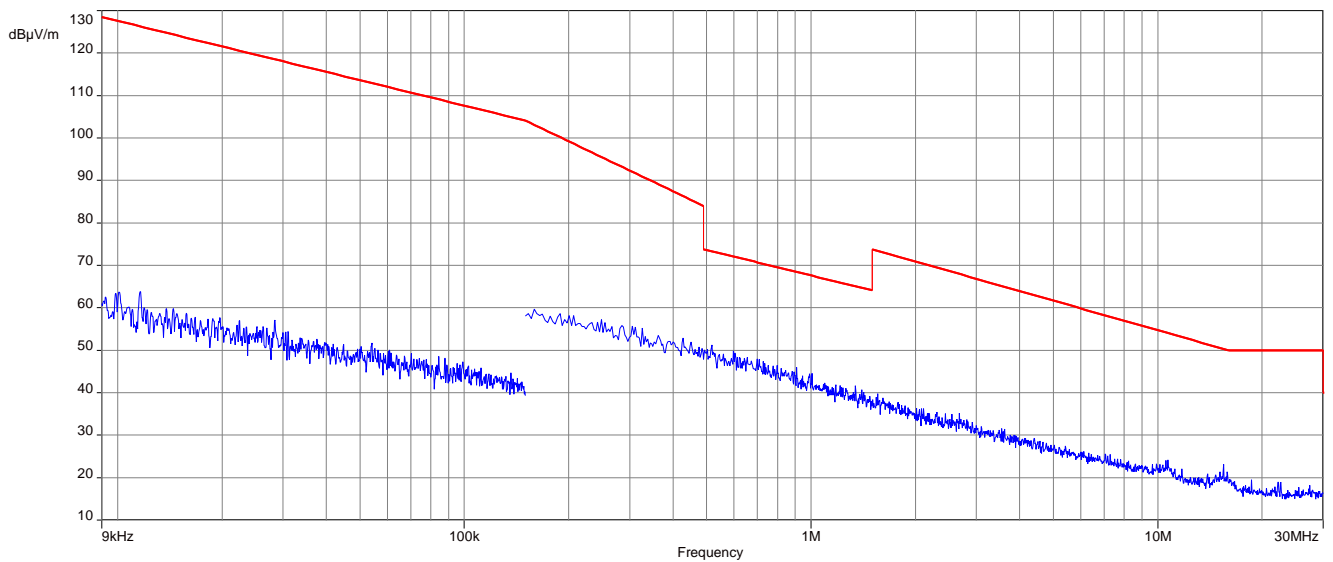
TX spurious emissions radiated < 30 MHz / (dB $\mu$ V / m) @ 3 m		
Frequency / MHz	Detector	Level / (dB $\mu$ V / m)
All detected peaks are more than 20 dB below the limit.		

**Plots:** DSSS

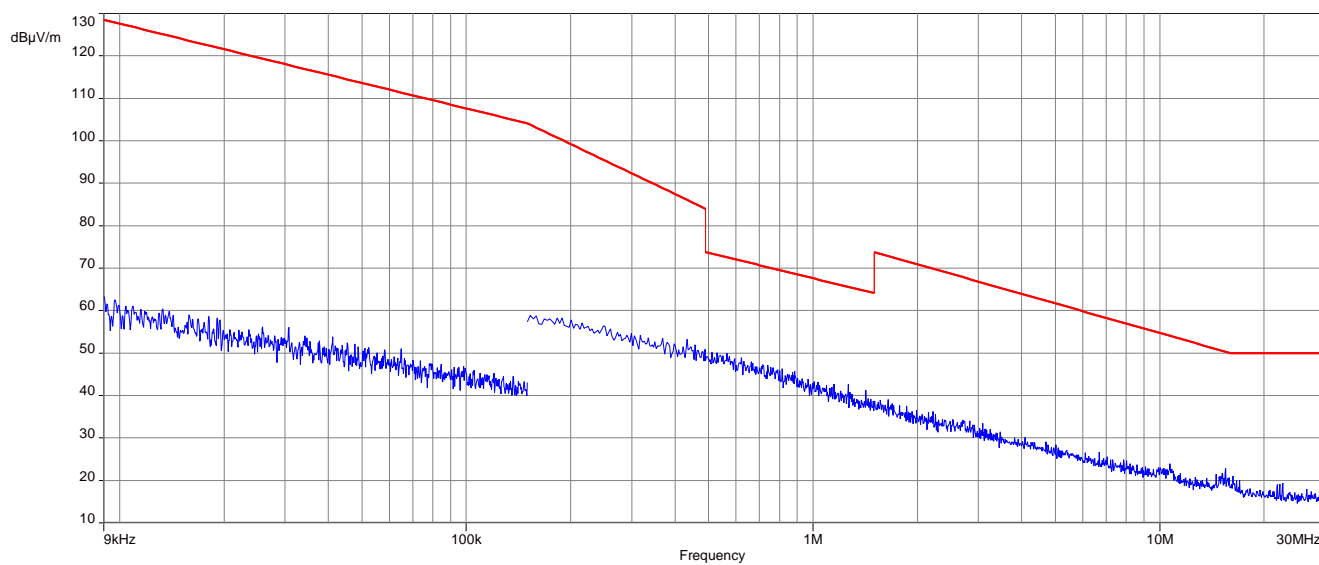
**Plot 1:** 9 kHz to 30 MHz, lowest channel



**Plot 2:** 9 kHz to 30 MHz, middle channel

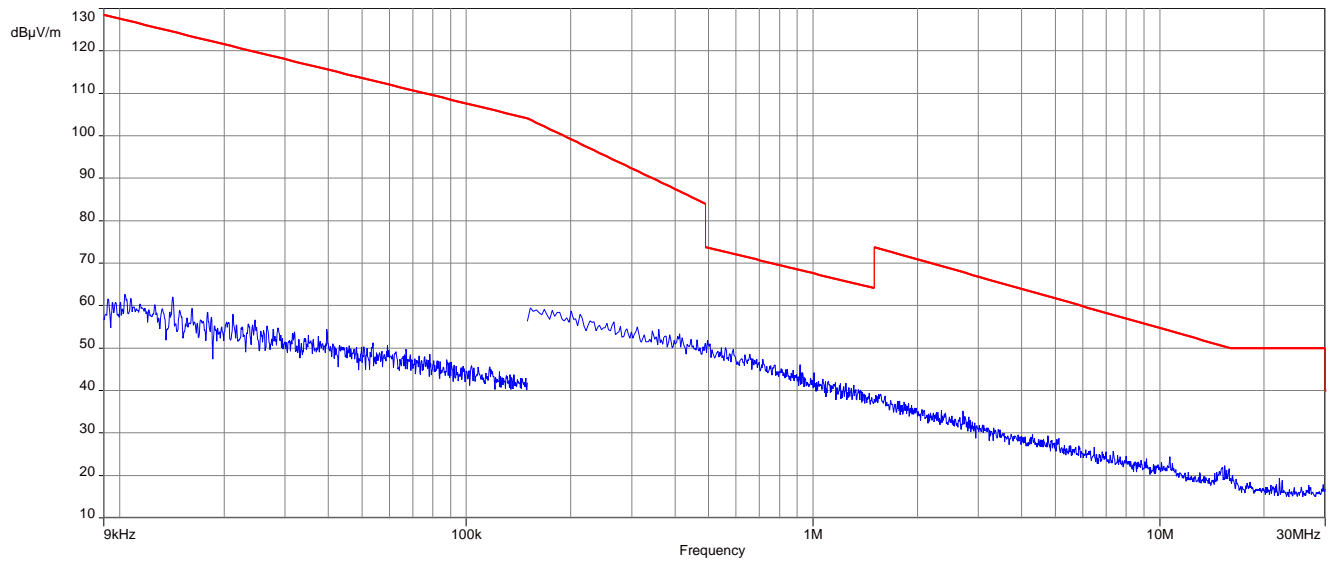


**Plot 3:** 9 kHz to 30 MHz, highest channel

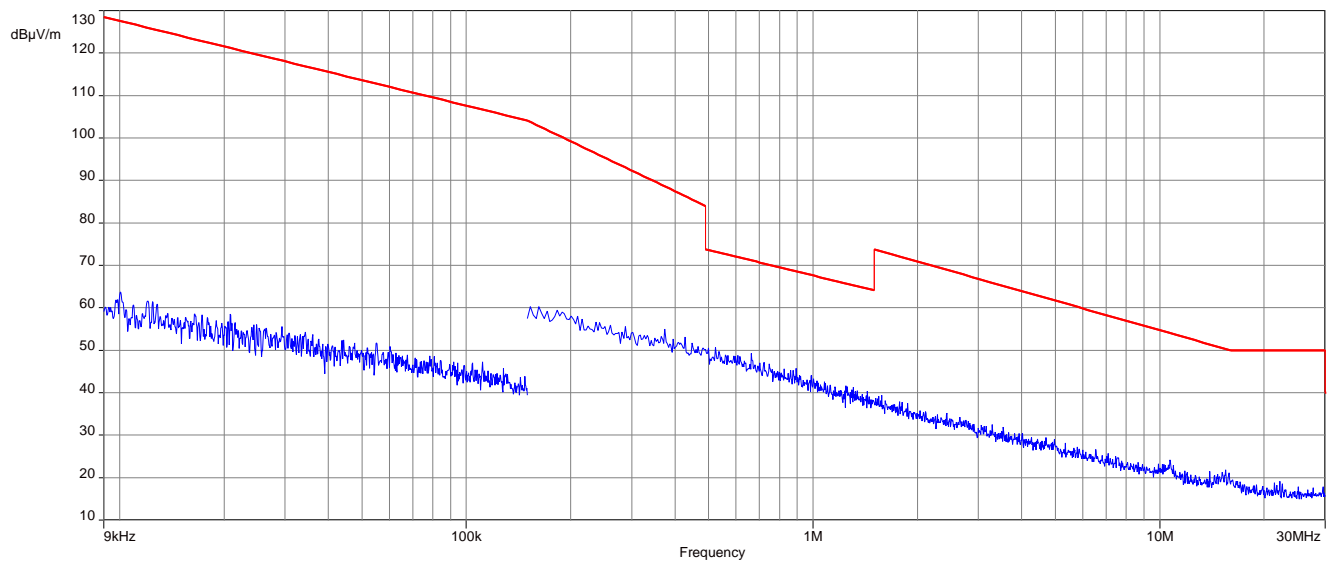


**Plots:** g-mode

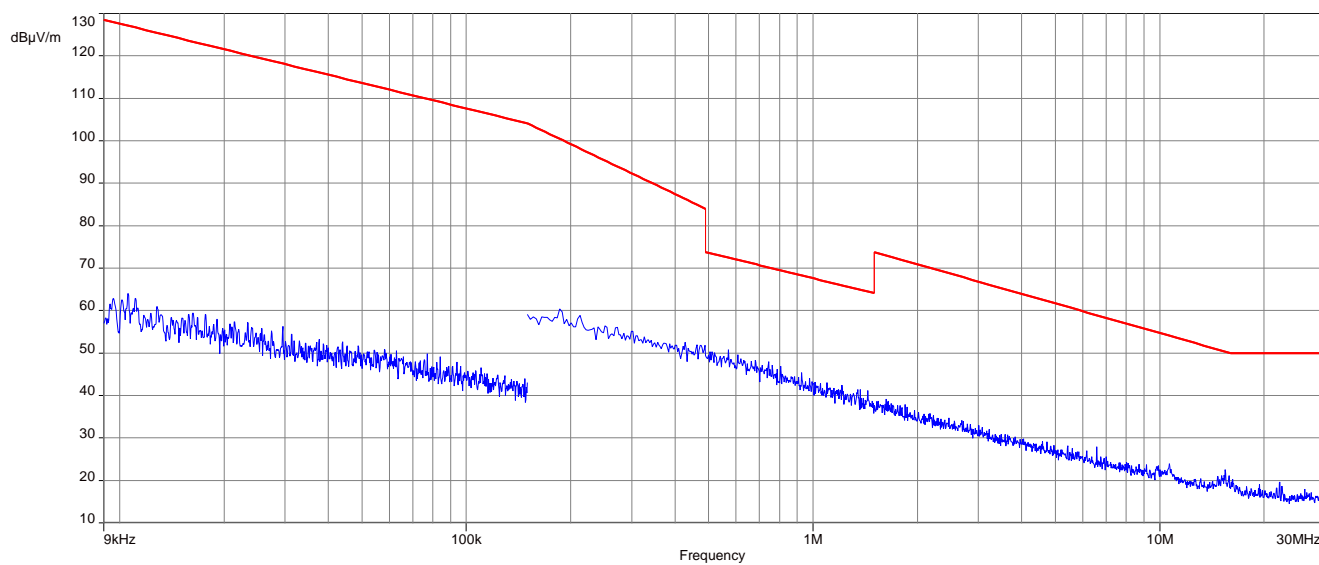
**Plot 1:** 9 kHz to 30 MHz, lowest channel



**Plot 2:** 9 kHz to 30 MHz, middle channel



**Plot 3:** 9 kHz to 30 MHz, highest channel



### 13.3 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	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
Measured modulation	<input checked="" type="checkbox"/> DSSS b – mode <input checked="" type="checkbox"/> OFDM g – mode <input checked="" type="checkbox"/> OFDM n HT20 – mode
Test setup	See chapter 7.1 setup A
Measurement uncertainty	See chapter 9

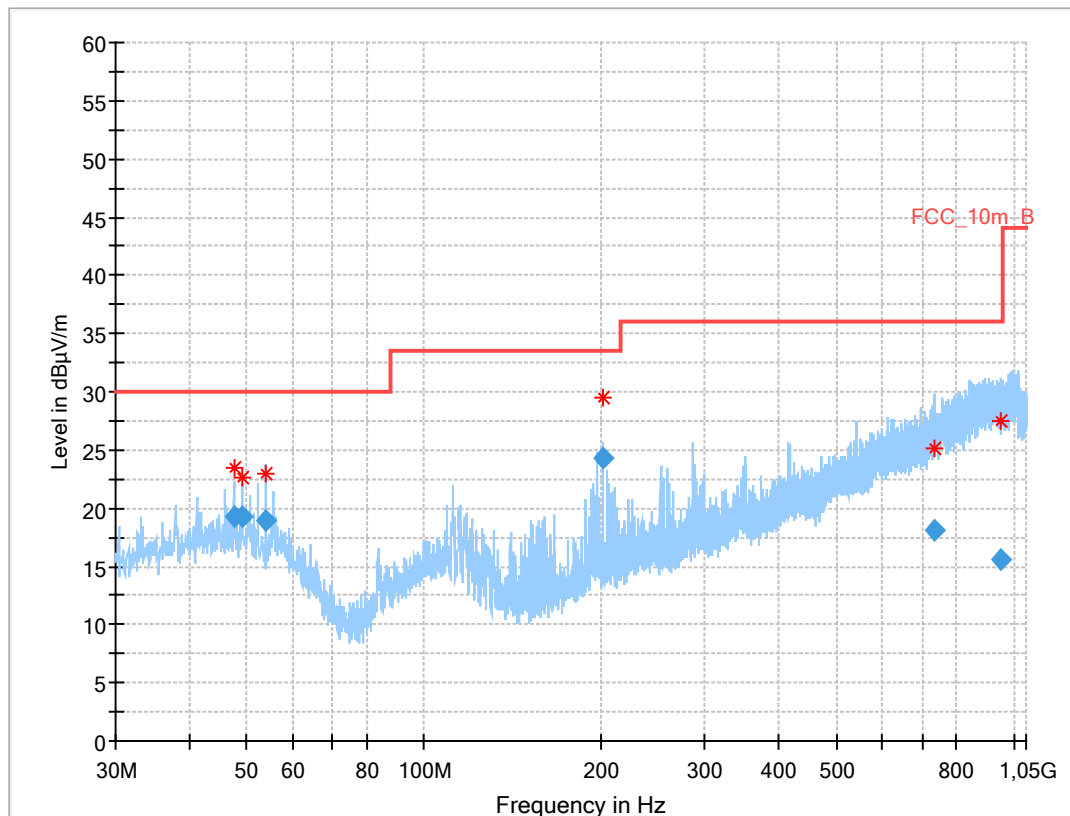
#### Limits:

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 / (dBµV / m)	Measurement distance / m
30 – 88	30.0	10
88 – 216	33.5	10
216 – 960	36.0	10



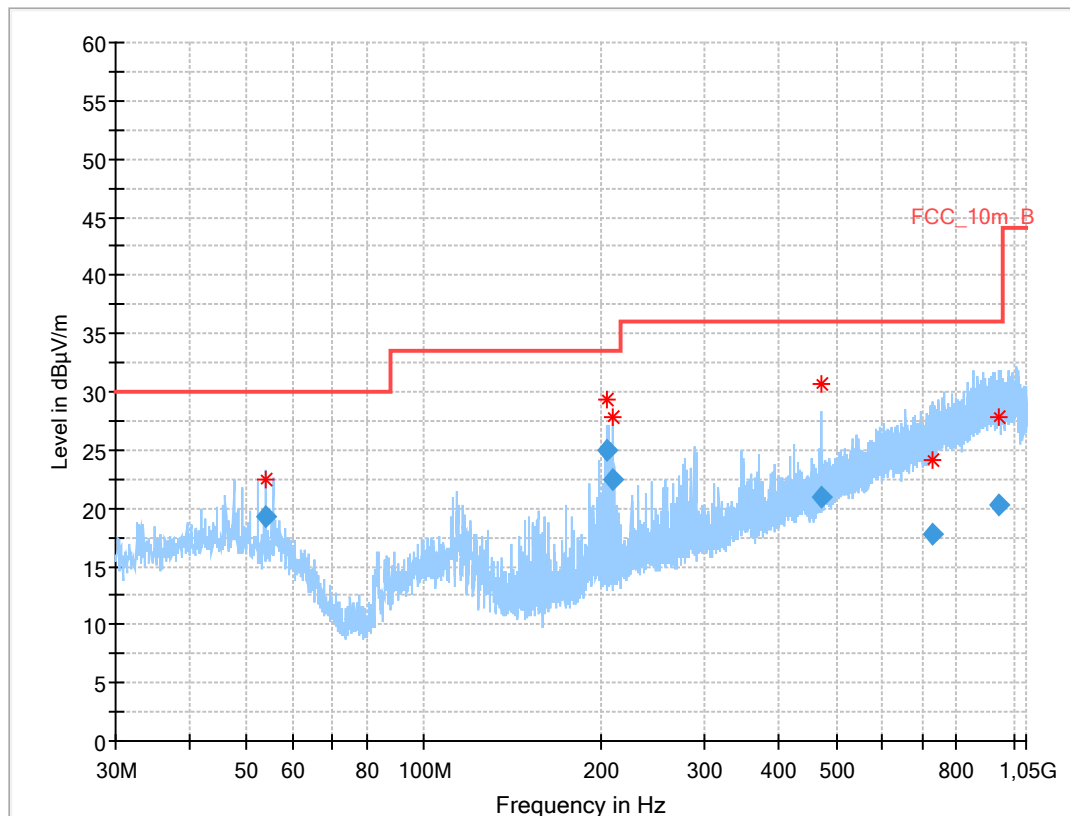
**Plot:** DSSS

**Plot 1:** 30 MHz to 1 GHz, vertical & horizontal polarization, lowest channel

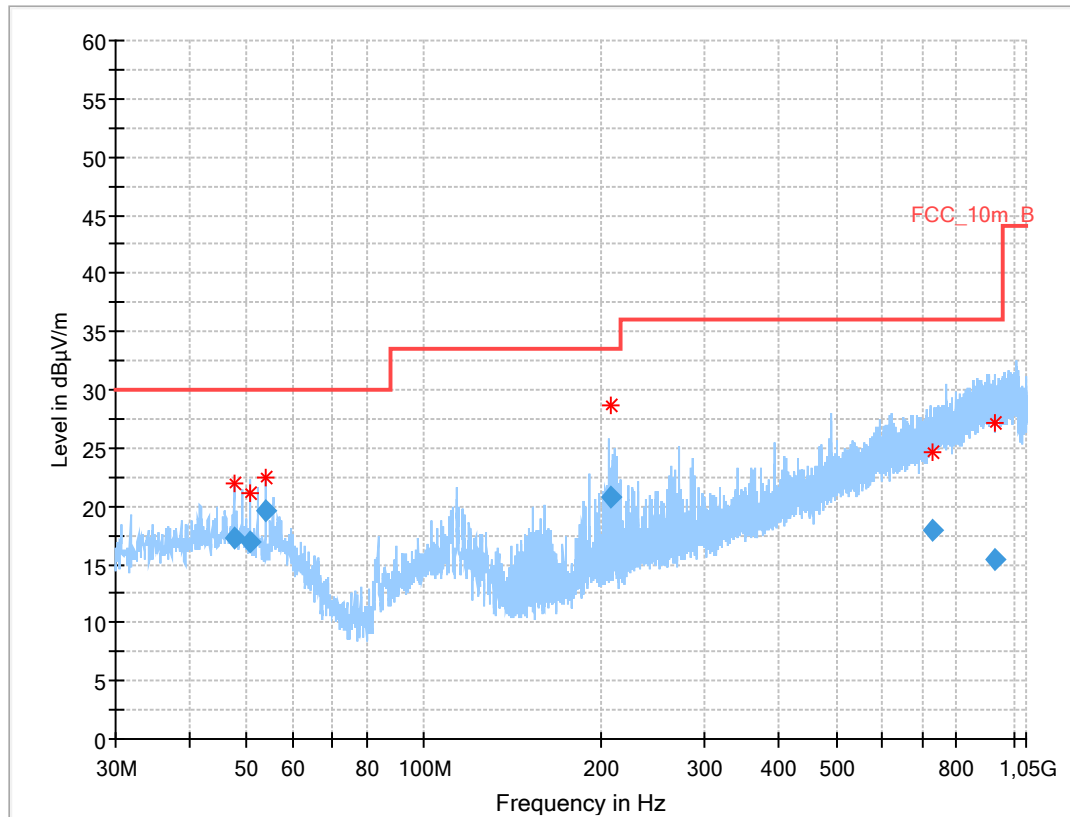


**Final results:**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
47.644	19.28	30.0	10.7	1000	120.0	111.0	V	182	16
49.212	19.23	30.0	10.8	1000	120.0	115.0	V	189	16
53.917	18.89	30.0	11.1	1000	120.0	155.0	V	190	15
201.137	24.28	33.5	9.2	1000	120.0	400.0	H	79	12
732.575	18.02	36.0	18.0	1000	120.0	382.0	V	0	23
953.355	15.52	36.0	20.5	1000	120.0	400.0	H	90	25

**Plot 2:** 30 MHz to 1 GHz, vertical & horizontal polarization, middle channel**Final results:**

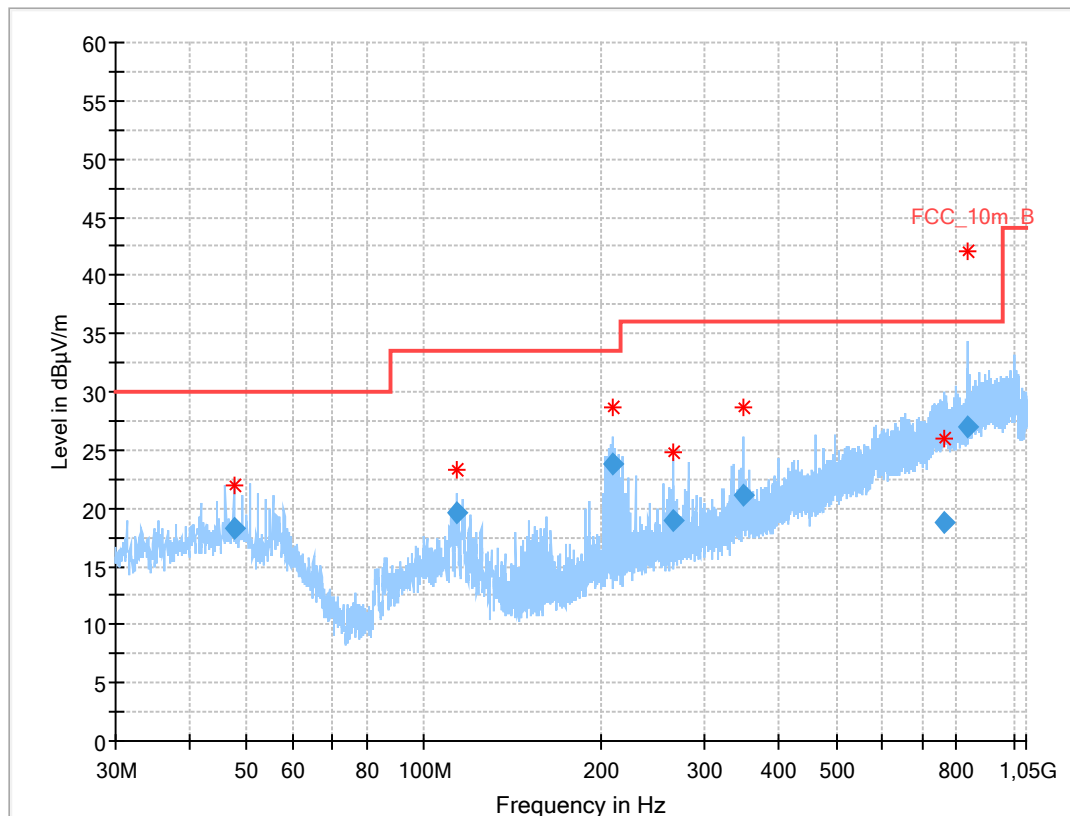
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
53.912	19.21	30.0	10.8	1000	120.0	108.0	V	189	15
204.133	24.96	33.5	8.5	1000	120.0	364.0	H	84	12
209.644	22.54	33.5	11.0	1000	120.0	355.0	H	61	13
473.332	21.00	36.0	15.0	1000	120.0	138.0	H	174	19
726.761	17.84	36.0	18.2	1000	120.0	200.0	H	135	23
942.915	20.36	36.0	15.6	1000	120.0	400.0	V	225	26

**Plot 3:** 30 MHz to 1 GHz, vertical & horizontal polarization, highest channel**Final results:**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
47.652	17.34	30.0	12.7	1000	120.0	126.0	V	105	16
50.783	16.99	30.0	13.0	1000	120.0	100.0	V	97	15
53.902	19.68	30.0	10.3	1000	120.0	147.0	V	180	15
206.762	20.71	33.5	12.8	1000	120.0	400.0	H	90	13
726.318	17.89	36.0	18.1	1000	120.0	203.0	H	270	23
932.660	15.50	36.0	20.5	1000	120.0	200.0	H	270	26

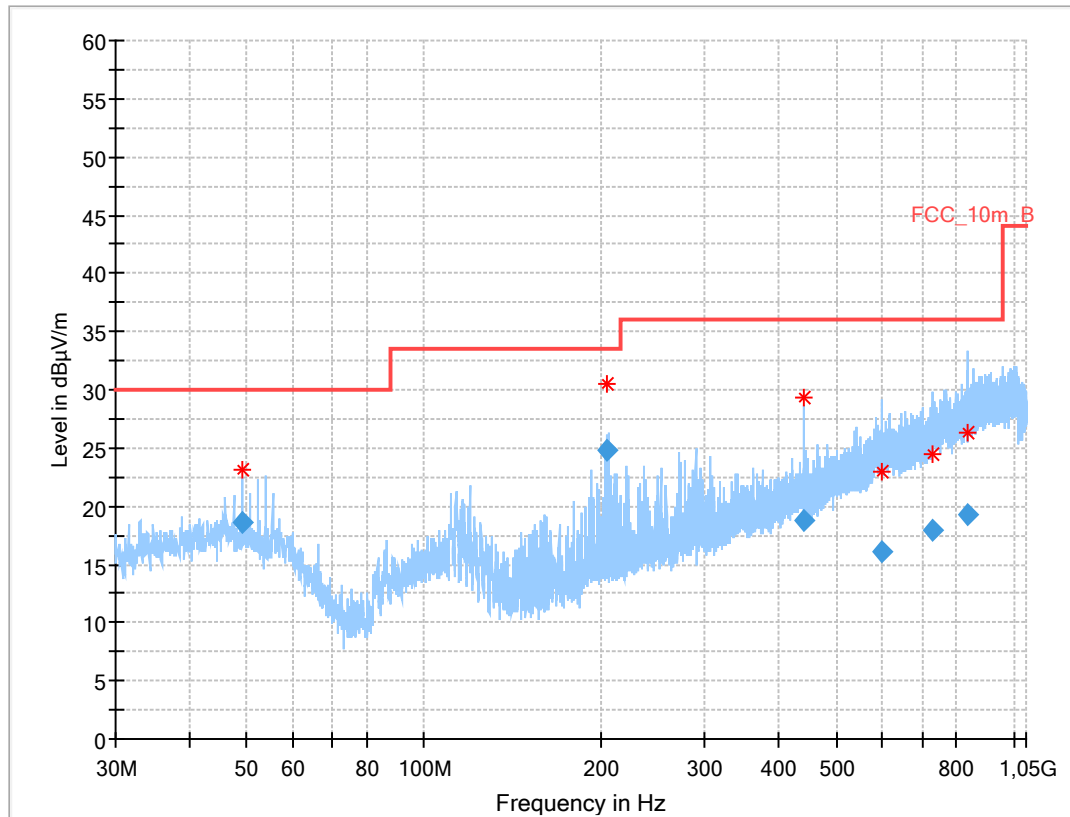
**Plot:** g-mode

**Plot 1:** 30 MHz to 1 GHz, vertical & horizontal polarization, lowest channel

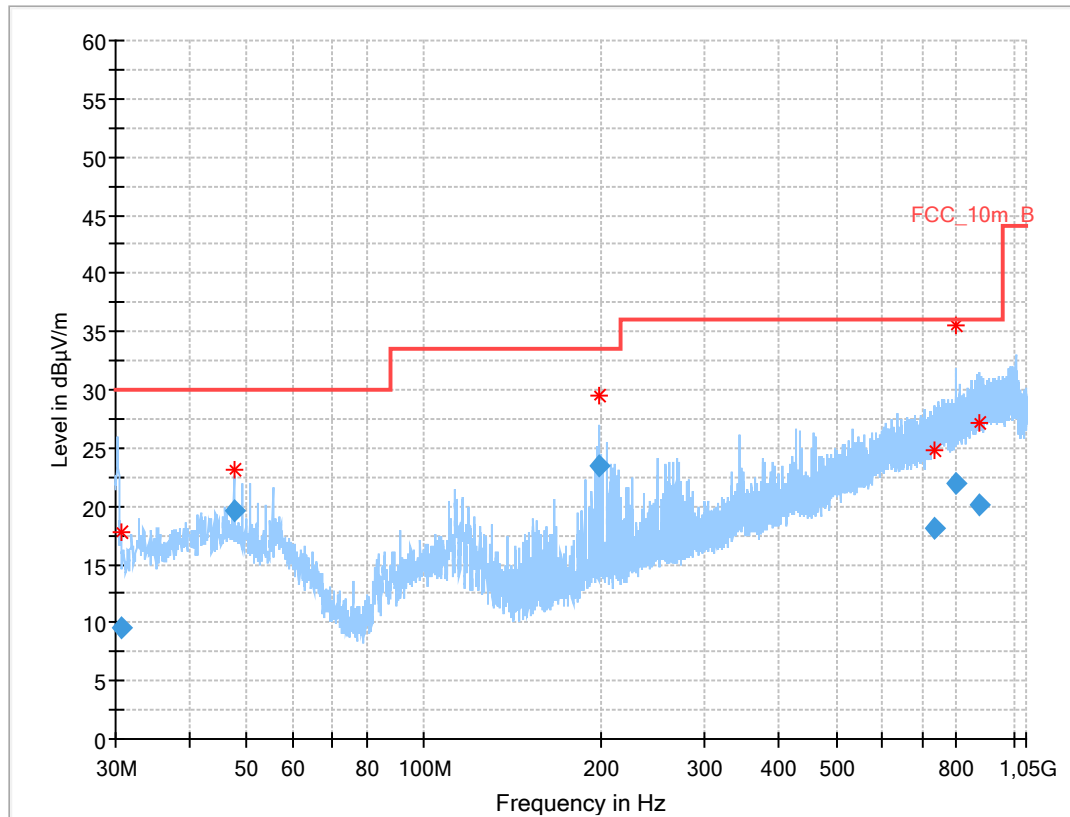


**Final results:**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
47.655	18.27	30.0	11.7	1000	120.0	112.0	V	104	16
113.652	19.63	33.5	13.9	1000	120.0	400.0	H	225	13
208.956	23.73	33.5	9.8	1000	120.0	356.0	H	90	13
265.134	18.96	36.0	17.0	1000	120.0	106.0	V	344	14
348.350	21.04	36.0	15.0	1000	120.0	203.0	H	310	17
760.055	18.82	36.0	17.2	1000	120.0	266.0	V	225	24

**Plot 2:** 30 MHz to 1 GHz, vertical & horizontal polarization, middle channel**Final results:**

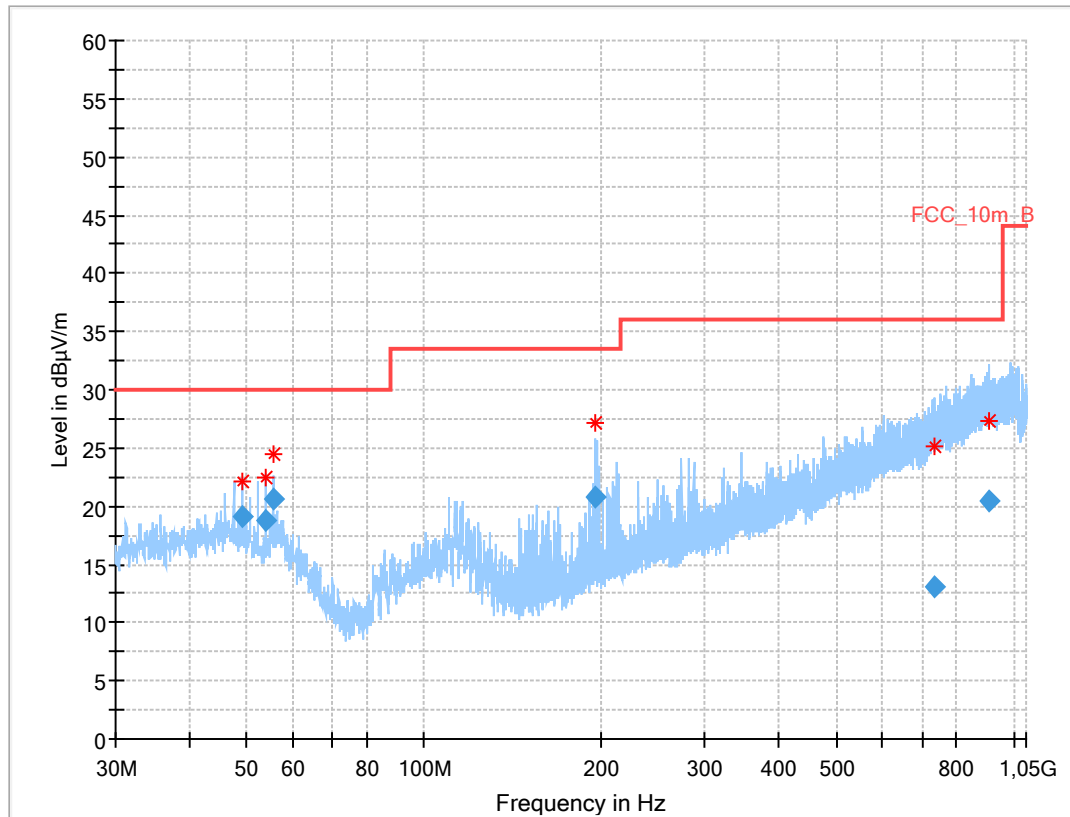
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
49.215	18.67	30.0	11.3	1000	120.0	157.0	V	182	16
203.903	24.77	33.5	8.7	1000	120.0	316.0	H	75	12
441.143	18.80	36.0	17.2	1000	120.0	155.0	H	7	19
598.041	16.08	36.0	19.9	1000	120.0	400.0	V	39	22
728.441	17.90	36.0	18.1	1000	120.0	383.0	V	270	23
836.634	19.24	36.0	16.8	1000	120.0	157.0	V	100	24

**Plot 3:** 30 MHz to 1 GHz, vertical & horizontal polarization, highest channel**Final results:**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
30.640	9.58	30.0	20.4	1000	120.0	103.0	V	25	13
47.653	19.54	30.0	10.5	1000	120.0	101.0	V	175	16
198.647	23.46	33.5	10.0	1000	120.0	374.0	H	270	13
735.450	18.17	36.0	17.8	1000	120.0	142.0	H	225	23
799.383	21.98	36.0	14.0	1000	120.0	104.0	H	335	24
872.464	20.19	36.0	15.8	1000	120.0	192.0	H	180	25

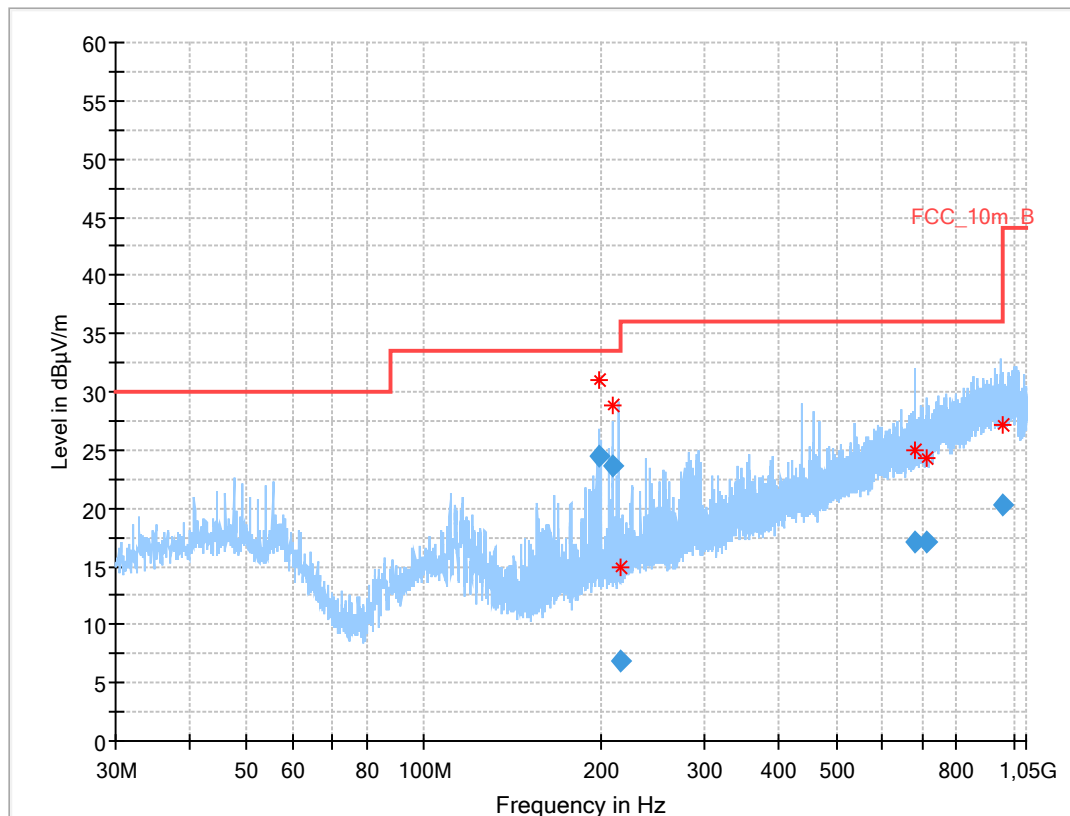
**Plot:** nHT20-mode

**Plot 1:** 30 MHz to 1 GHz, vertical & horizontal polarization, lowest channel



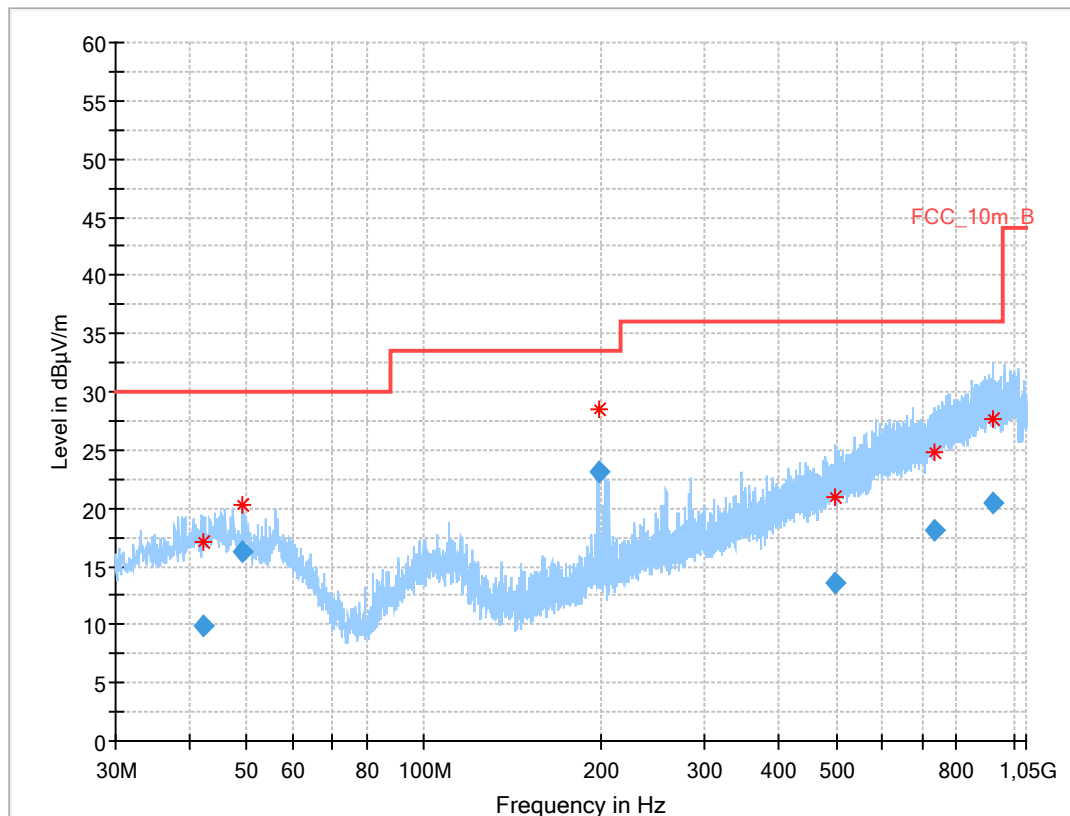
**Final results:**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
49.223	19.14	30.0	10.9	1000	120.0	104.0	V	50	16
53.891	18.84	30.0	11.2	1000	120.0	151.0	V	20	15
55.471	20.66	30.0	9.3	1000	120.0	115.0	V	193	16
195.496	20.78	33.5	12.7	1000	120.0	400.0	H	80	13
733.044	12.99	36.0	23.0	1000	120.0	200.0	H	45	23
906.282	20.40	36.0	15.6	1000	120.0	388.0	H	0	26

**Plot 2:** 30 MHz to 1 GHz, vertical & horizontal polarization, middle channel**Final results:**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
198.406	24.41	33.5	9.1	1000	120.0	400.0	H	59	13
208.830	23.56	33.5	9.9	1000	120.0	353.0	H	63	13
214.955	6.80	33.5	26.7	1000	120.0	200.0	H	135	13
679.676	17.14	36.0	18.9	1000	120.0	138.0	H	78	22
712.780	17.17	36.0	18.8	1000	120.0	312.0	H	165	22
954.894	20.31	36.0	15.7	1000	120.0	133.0	H	147	25



**Plot 3:** 30 MHz to 1 GHz, vertical & horizontal polarization, highest channel**Final results:**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
42.366	9.85	30.0	20.2	1000	120.0	216.0	H	270	16
49.224	16.21	30.0	13.8	1000	120.0	248.0	V	123	16
198.519	23.14	33.5	10.4	1000	120.0	400.0	H	267	13
499.088	13.65	36.0	22.4	1000	120.0	400.0	V	-45	20
734.463	18.09	36.0	17.9	1000	120.0	400.0	V	225	23
923.594	20.44	36.0	15.6	1000	120.0	163.0	V	67	26

### 13.4 Spurious emissions radiated above 1 GHz

#### Description:

Measurement of the radiated spurious emissions above 1 GHz in transmit mode and receiver / idle mode.

#### 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
Measured modulation	<input checked="" type="checkbox"/> DSSS b – mode <input type="checkbox"/> OFDM g – mode <input checked="" type="checkbox"/> OFDM n HT20 – mode
Test setup	See chapter 7.2 setup C & 7.3 setup A
Measurement uncertainty	See chapter 9

#### Limits:

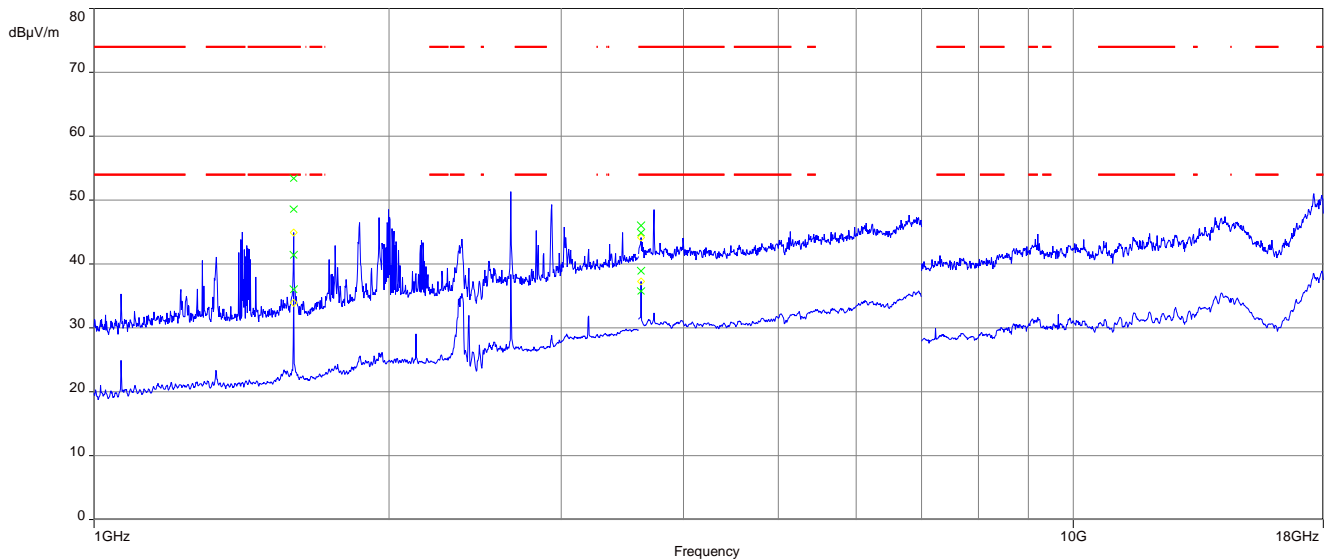
FCC		ISED
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that 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 / (dBµV / m)	Measurement distance / m
Above 960	54.0 (AVG)	3
	74.0 (peak)	

**Results:** b-mode

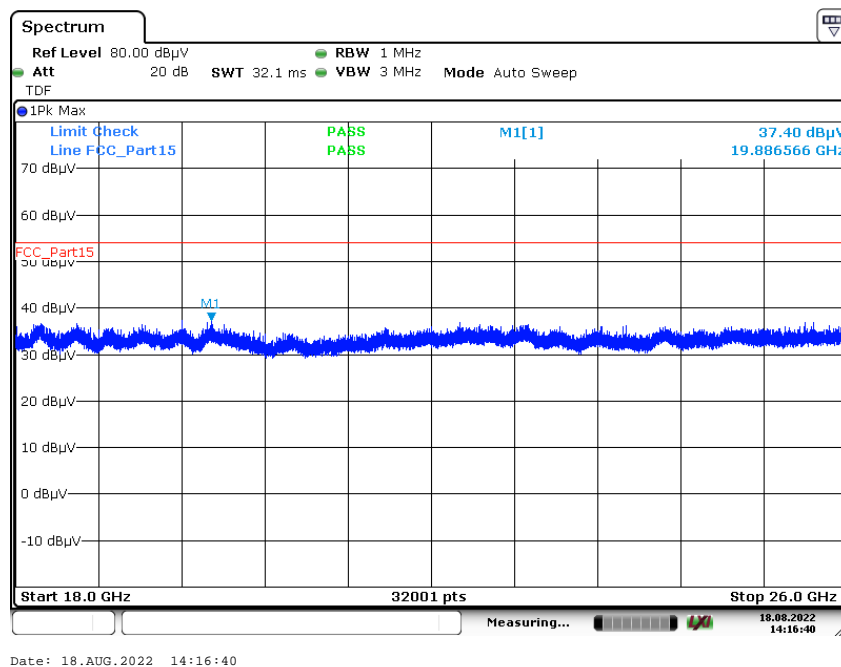
TX spurious emissions radiated / dB $\mu$ V/m @ 3 m								
lowest channel			middle channel			highest channel		
f / MHz	Detector	Level / dB $\mu$ V/m	f / MHz	Detector	Level / dB $\mu$ V/m	f / MHz	Detector	Level / dB $\mu$ V/m
1599	Peak	54.6	1599	Peak	54.6	1599	Peak	54.6
	AVG	43.3		AVG	43.3		AVG	43.3
3618	Peak	47.7	3618	Peak	47.7	3618	Peak	47.7
	AVG	40.9		AVG	40.9		AVG	40.9

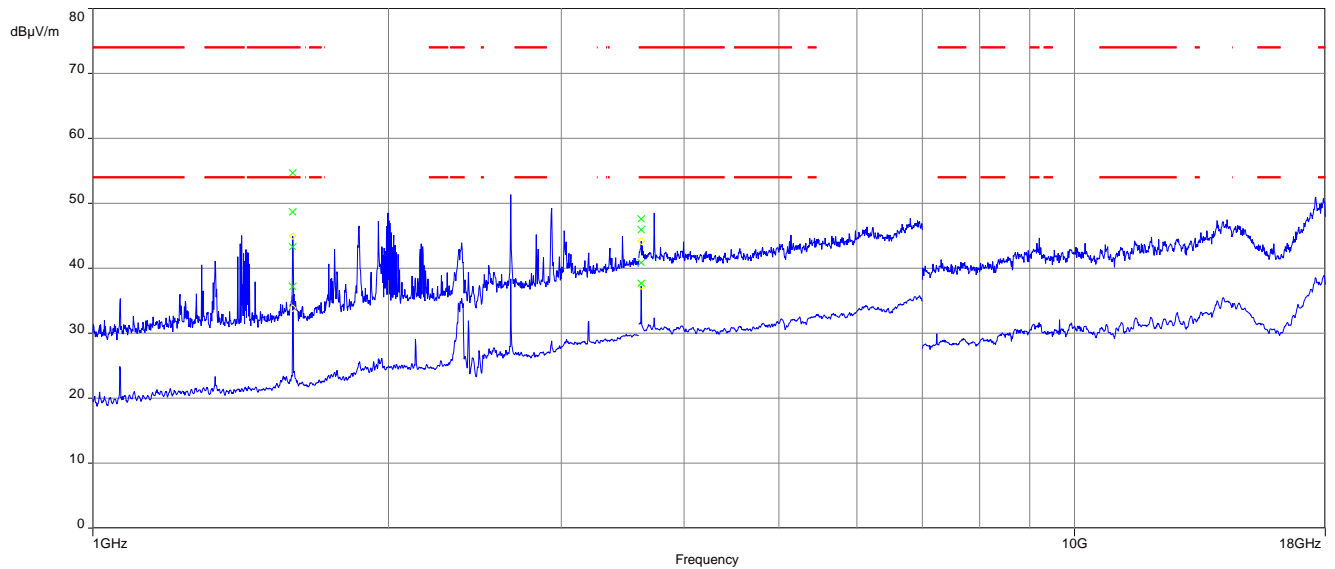
**Results:** nHT20-mode

TX spurious emissions radiated / dB $\mu$ V/m @ 3 m								
lowest channel			middle channel			highest channel		
f / MHz	Detector	Level / dB $\mu$ V/m	f / MHz	Detector	Level / dB $\mu$ V/m	f / MHz	Detector	Level / dB $\mu$ V/m
1599	Peak	54.6	1599	Peak	54.6	1599	Peak	54.6
	AVG	43.3		AVG	43.3		AVG	43.3
3618	Peak	49.2	3618	Peak	49.2	3618	Peak	49.2
	AVG	44.1		AVG	44.1		AVG	44.1

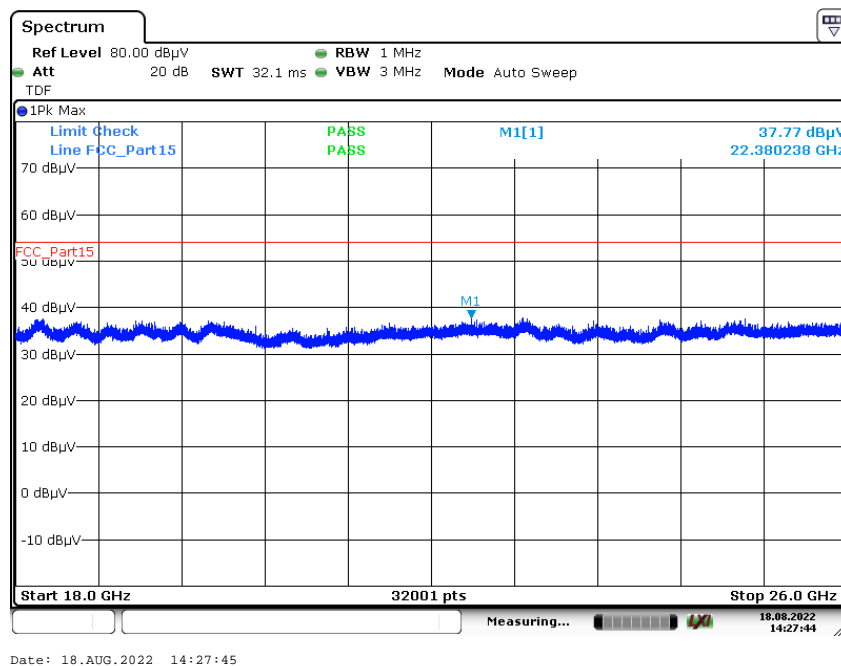
**Plots:** b-mode**Plot 1:** Lowest channel, 1 GHz to 18 GHz, vertical & horizontal polarization, 0°

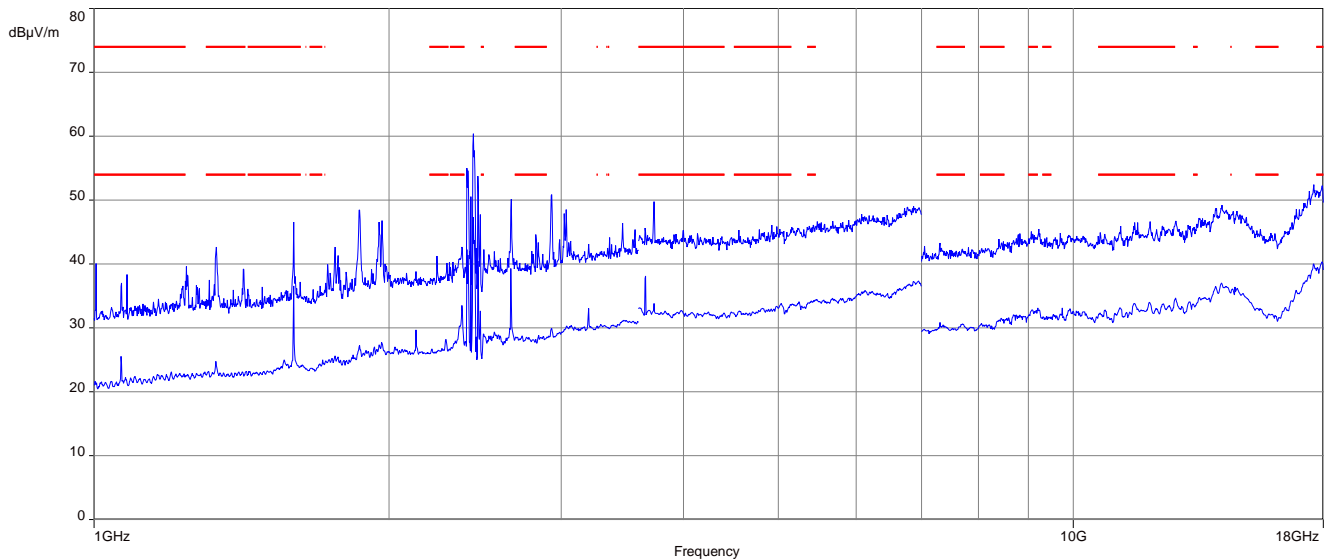
The carrier signal is notched with a 2.4 GHz band rejection filter.

**Plot 2:** Lowest channel, 18 GHz to 26 GHz, vertical & horizontal polarization

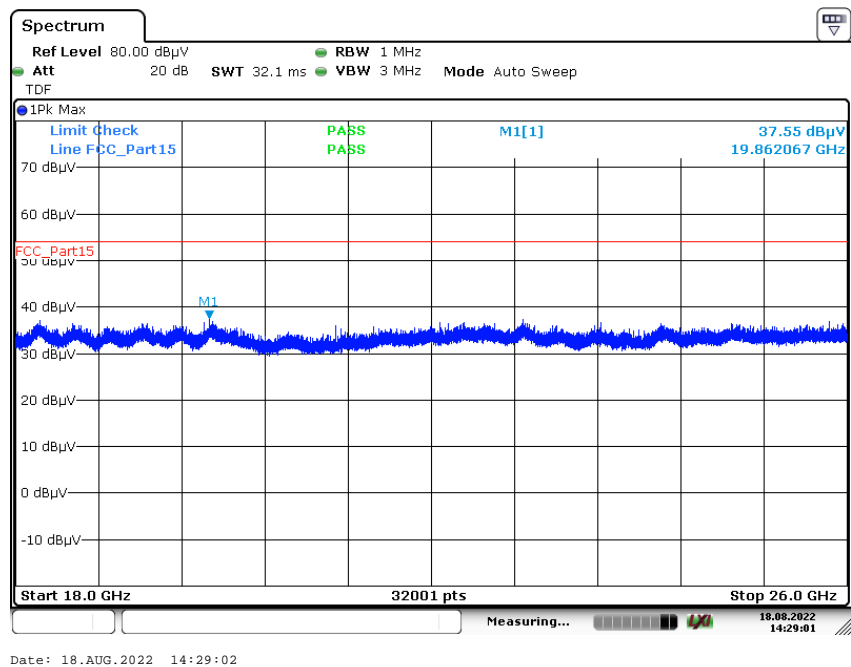
**Plot 3:** Lowest channel, 1 GHz to 18 GHz, vertical & horizontal polarization, 90°

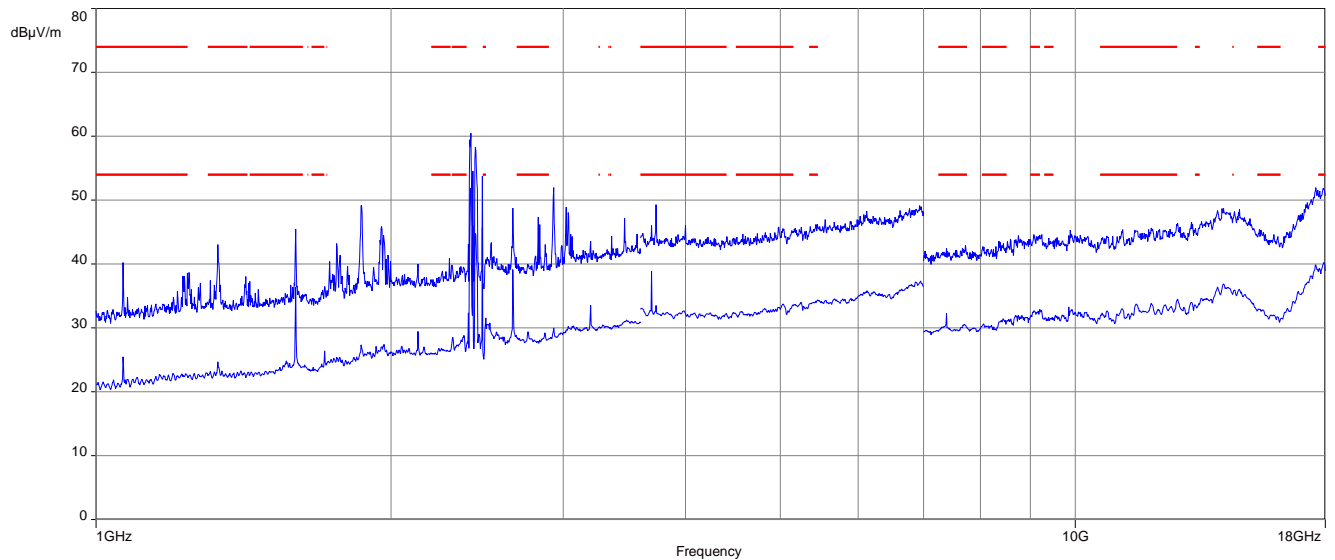
The carrier signal is notched with a 2.4 GHz band rejection filter.

**Plot 4:** Lowest channel, 18 GHz to 26 GHz, vertical & horizontal polarization

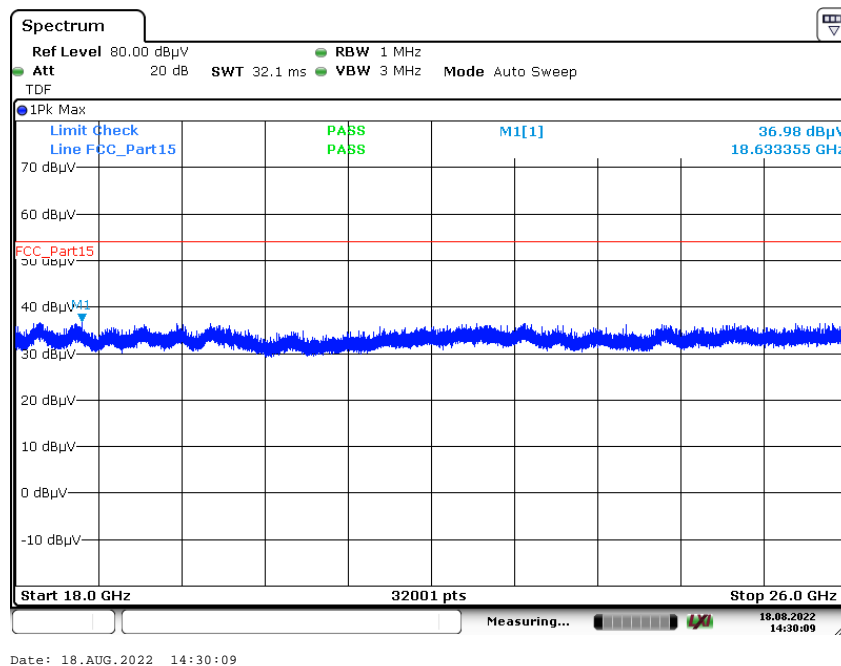
**Plot 5:** Middle channel, 1 GHz to 18 GHz, vertical & horizontal polarization, 0°

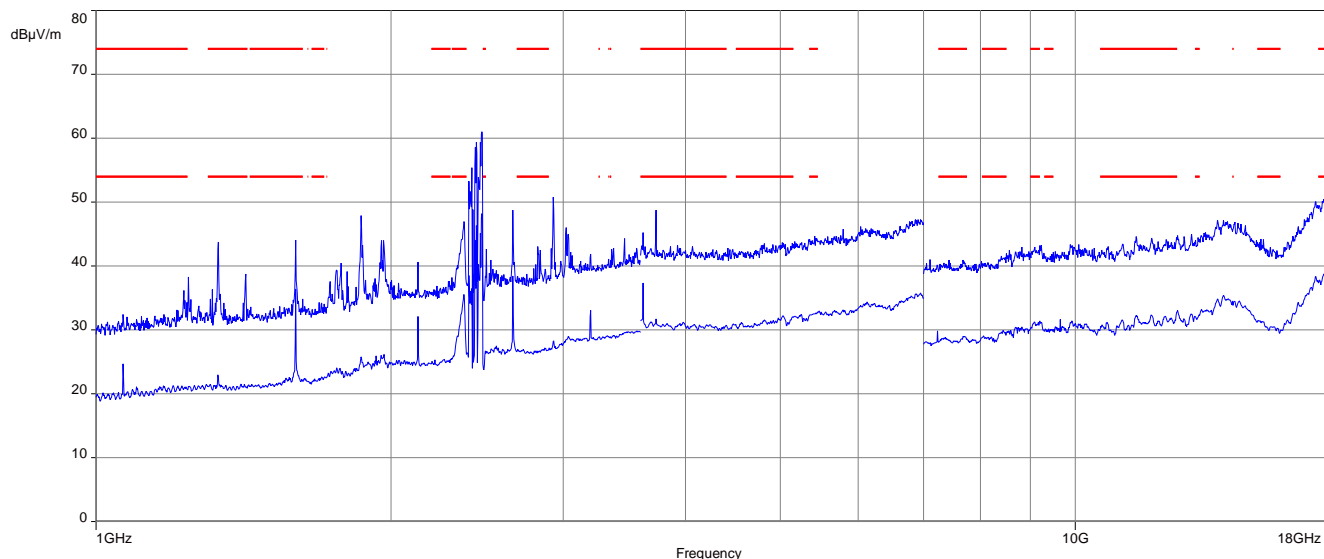
The carrier signal is notched with a 2.4 GHz band rejection filter.

**Plot 6:** Middle channel, 18 GHz to 26 GHz, vertical & horizontal polarization

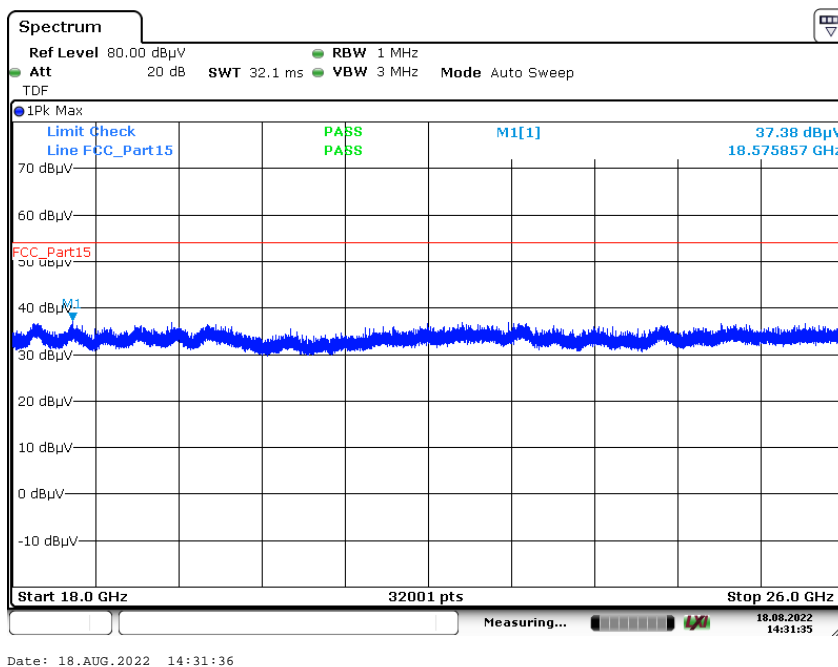
**Plot 7:** Highest channel, 1 GHz to 18 GHz, vertical & horizontal polarization, 0°

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

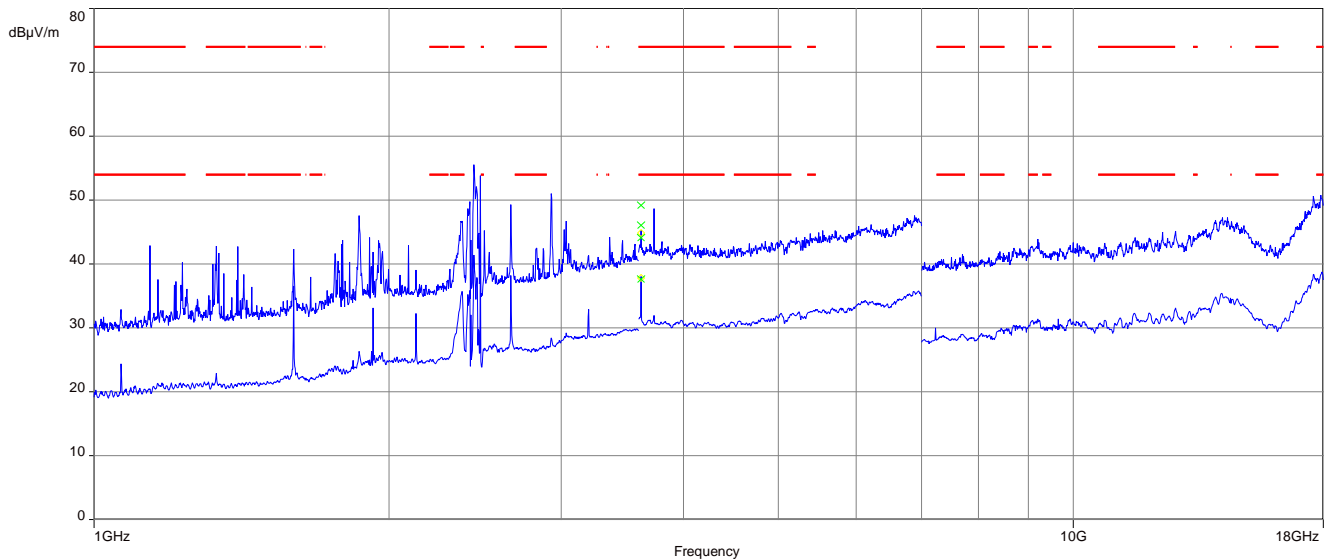
**Plot 8:** Highest channel, 18 GHz to 26 GHz, vertical & horizontal polarization

**Plots:** nHT20-mode**Plot 1:** Lowest channel, 1 GHz to 18 GHz, vertical & horizontal polarization, 0°

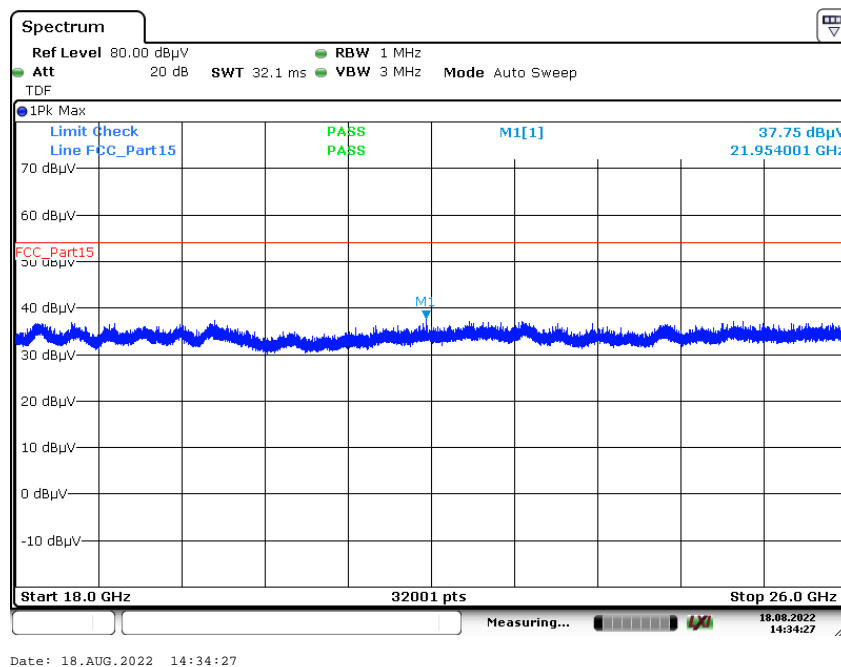
The carrier signal is notched with a 2.4 GHz band rejection filter.

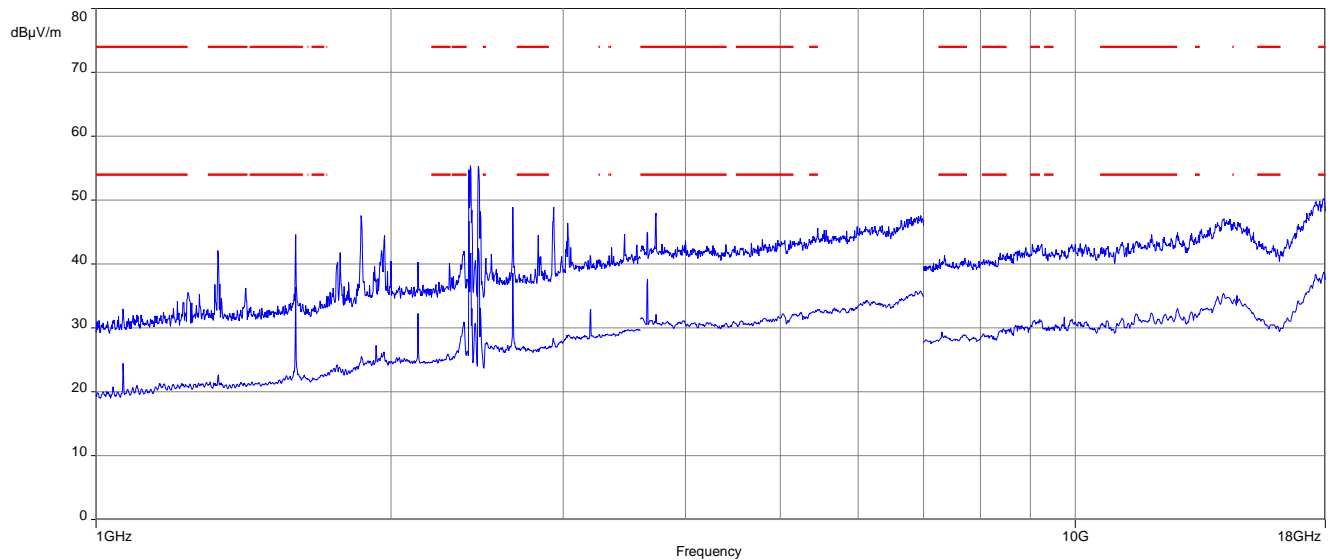
**Plot 2:** Lowest channel, 18 GHz to 26 GHz, vertical & horizontal polarization, 0°



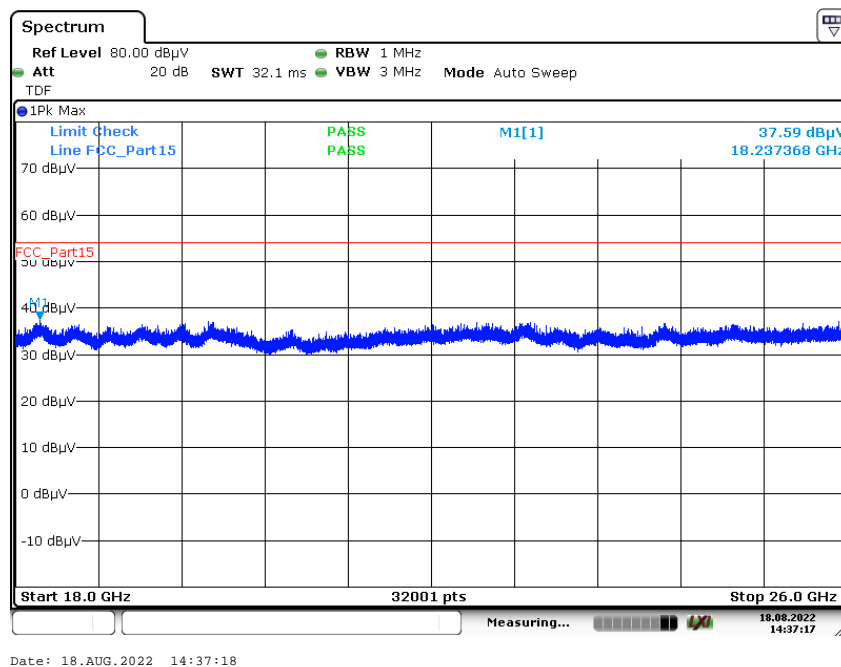
**Plot 3:** Lowest channel, 1 GHz to 18 GHz, vertical & horizontal polarization, 90°

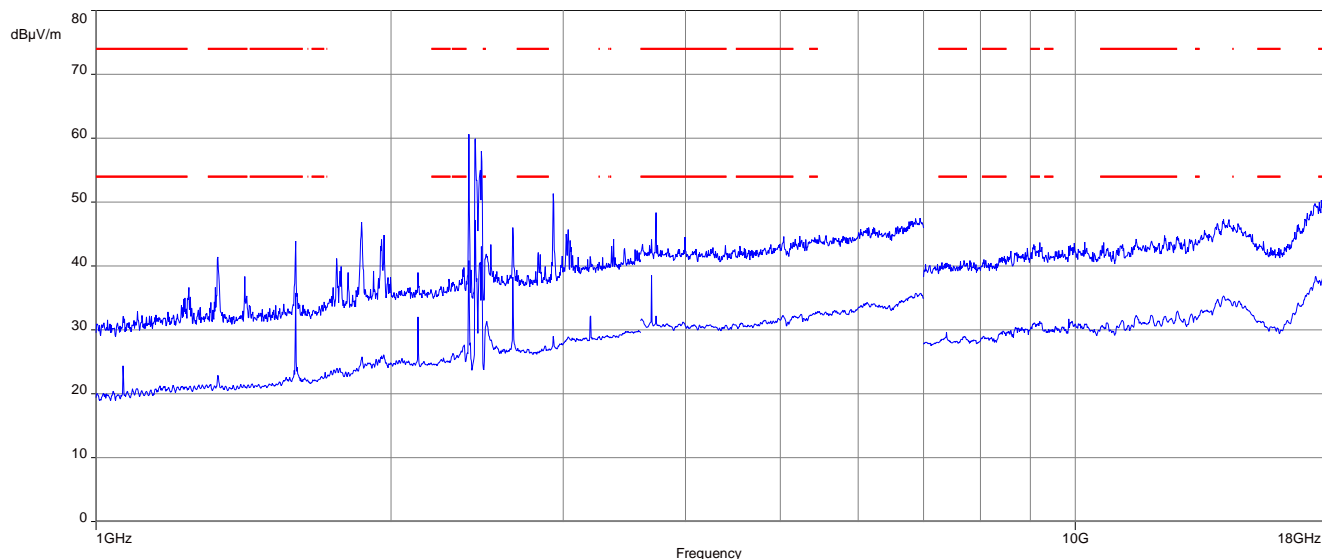
The carrier signal is notched with a 2.4 GHz band rejection filter.

**Plot 4:** Lowest channel, 18 GHz to 26 GHz, vertical & horizontal polarization, 90°

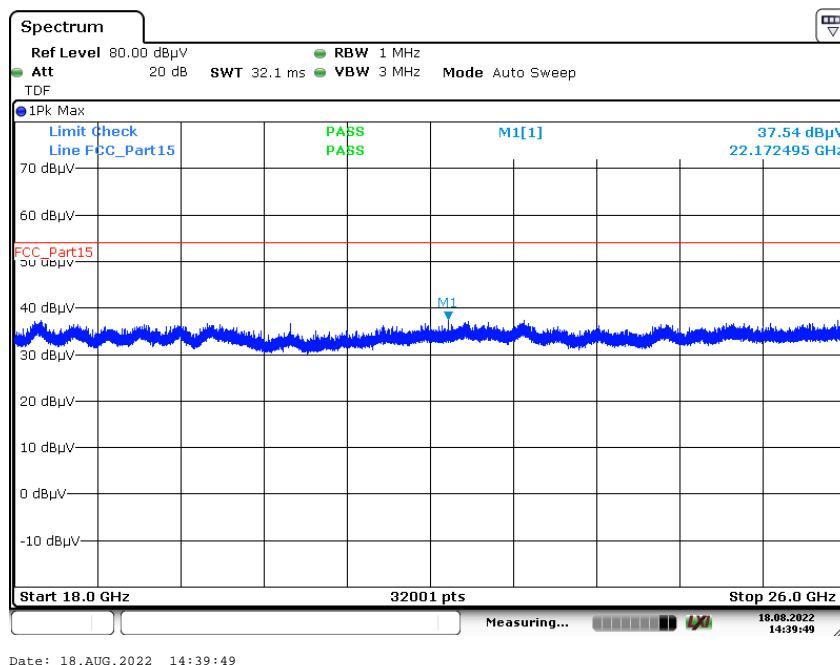
**Plot 5:** Middle channel, 1 GHz to 18 GHz, vertical & horizontal polarization, 0°

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

**Plot 6:** Middle channel, 18 GHz to 26 GHz, vertical & horizontal polarization, 0°

**Plot 7:** Highest channel, 1 GHz to 18 GHz, vertical & horizontal polarization, 0°

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

**Plot 8:** Highest channel, 18 GHz to 26 GHz, vertical & horizontal polarization, 0°

## 14 Glossary

<b>EUT</b>	Equipment under test
<b>DUT</b>	Device under test
<b>UUT</b>	Unit under test
<b>GUE</b>	GNSS User Equipment
<b>ETSI</b>	European Telecommunications Standards Institute
<b>EN</b>	European Standard
<b>FCC</b>	Federal Communications Commission
<b>FCC ID</b>	Company Identifier at FCC
<b>IC</b>	Industry Canada
<b>PMN</b>	Product marketing name
<b>HMN</b>	Host marketing name
<b>HVIN</b>	Hardware version identification number
<b>FVIN</b>	Firmware version identification number
<b>EMC</b>	Electromagnetic Compatibility
<b>HW</b>	Hardware
<b>SW</b>	Software
<b>Inv. No.</b>	Inventory number
<b>S/N or SN</b>	Serial number
<b>C</b>	Compliant
<b>NC</b>	Not compliant
<b>NA</b>	Not applicable
<b>NP</b>	Not performed
<b>PP</b>	Positive peak
<b>QP</b>	Quasi peak
<b>AVG</b>	Average
<b>OC</b>	Operating channel
<b>OCW</b>	Operating channel bandwidth
<b>OBW</b>	Occupied bandwidth
<b>OOB</b>	Out of band
<b>DFS</b>	Dynamic frequency selection
<b>CAC</b>	Channel availability check
<b>OP</b>	Occupancy period
<b>NOP</b>	Non occupancy period
<b>DC</b>	Duty cycle
<b>PER</b>	Packet error rate
<b>CW</b>	Clean wave
<b>MC</b>	Modulated carrier
<b>WLAN</b>	Wireless local area network
<b>RLAN</b>	Radio local area network
<b>DSSS</b>	Dynamic sequence spread spectrum
<b>OFDM</b>	Orthogonal frequency division multiplexing
<b>FHSS</b>	Frequency hopping spread spectrum
<b>GNSS</b>	Global Navigation Satellite System
<b>C/N<sub>0</sub></b>	Carrier to noise-density ratio, expressed in dB-Hz

## 15 Document history

Version	Applied changes	Date of release
-/-	Initial release	2022-10-19

## 16 Accreditation Certificate – D-PL-12076-01-04

first page	last page
 <p>Deutsche Akkreditierungsstelle GmbH</p> <p>Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV Signatory to the Multilateral Agreements of EA, ILAC and IAF for Mutual Recognition</p> <p><b>Accreditation</b> </p> <p>The Deutsche Akkreditierungsstelle GmbH attests that the testing laboratory <b>CTC advanced GmbH</b> Untertürkheimer Straße 6-10, 66117 Saarbrücken is competent under the terms of DIN EN ISO/IEC 17025:2018 to carry out tests in the following fields: <b>Telecommunication (TC) and Electromagnetic Compatibility (EMC) for Canadian Standards</b></p> <p>The accreditation certificate shall only apply in connection with the notice of accreditation of 09.06.2020 with the accreditation number D-PL-12076-01. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 07 pages.</p> <p>Registration number of the certificate: D-PL-12076-01-04</p> <p>Frankfurt am Main, 09.06.2020</p> <p>by order:  Frank Egner Head of Division</p> <p><small>The certificate together with its annex reflects the status at the time of the date of issue. The current status of the scope of accreditation can be found in the database of accredited bodies of Deutsche Akkreditierungsstelle GmbH. <a href="https://www.dakks.de/en/content/accredited-bodies-dakks">https://www.dakks.de/en/content/accredited-bodies-dakks</a> See notes overleaf.</small></p>	<p>Deutsche Akkreditierungsstelle GmbH</p> <p>Office Berlin Spittelmarkt 10 10117 Berlin</p> <p>Office Frankfurt am Main Europa-Allee 52 60327 Frankfurt am Main</p> <p>Office Braunschweig Bundesallee 100 38116 Braunschweig</p> <p>The publication of extracts of the accreditation certificate is subject to the prior written approval by Deutsche Akkreditierungsstelle GmbH (DAkkS). Exempted is the unchanged form of separate disseminations of the cover sheet by the conformity assessment body mentioned overleaf.</p> <p>No impression shall be made that the accreditation also extends to fields beyond the scope of accreditation attested by DAkkS.</p> <p>The accreditation was granted pursuant to the Act on the Accreditation Body (AkkStelleG) of 31 July 2009 (Federal Law Gazette I p. 2625) and the Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products (Official Journal of the European Union L 218 of 9 July 2008, p. 30). DAkkS is a signatory to the Multilateral Agreements for Mutual Recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Cooperation (ILAC). The signatories to these agreements recognise each other's accreditations.</p> <p>The up-to-date state of membership can be retrieved from the following websites: EA: <a href="http://www.european-accreditation.org">www.european-accreditation.org</a> ILAC: <a href="http://www.ilac.org">www.ilac.org</a> IAF: <a href="http://www.iaf.nu">www.iaf.nu</a></p>

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

<https://www.dakks.de/files/data/as/pdf/D-PL-12076-01-04e.pdf>

or

[https://ctcadvanced.com/app/uploads/2020/06/D-PL-12076-01-04\\_Canada\\_TCEMC.pdf](https://ctcadvanced.com/app/uploads/2020/06/D-PL-12076-01-04_Canada_TCEMC.pdf)

**17 Accreditation Certificate – D-PL-12076-01-05**

first page	last page
 <p>Deutsche Akkreditierungsstelle GmbH</p> <p>Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV Signatory to the Multilateral Agreements of EA, ILAC and IAF for Mutual Recognition</p> <p><b>Accreditation</b> </p> <p>The Deutsche Akkreditierungsstelle GmbH attests that the testing laboratory  <b>CTC advanced GmbH</b>        Untertürkheimer Straße 6-10, 66117 Saarbrücken        is competent under the terms of DIN EN ISO/IEC 17025:2018 to carry out tests in the following fields:</p> <p><b>Telecommunication (FCC Requirements)</b></p> <p>The accreditation certificate shall only apply in connection with the notice of accreditation of 09.06.2020 with the accreditation number D-PL-12076-01. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 05 pages.</p> <p>Registration number of the certificate: <b>D-PL-12076-01-05</b></p> <p>Frankfurt am Main, 09.06.2020</p> <p>by order: Dipl.-Ing. (FH) Ralf Egner Head of Division</p> <p><small>The certificate together with its annex reflects the status at the time of the date of issue. The current status of the scope of accreditation can be found in the database of accredited bodies of Deutsche Akkreditierungsstelle GmbH.  <a href="https://www.dakks.de/en/content/accredited-bodies-dakks">https://www.dakks.de/en/content/accredited-bodies-dakks</a>        last status reviewed:</small></p>	<p>Deutsche Akkreditierungsstelle GmbH</p> <p>Office Berlin Spittelmarkt 10 10117 Berlin</p> <p>Office Frankfurt am Main Europa-Allee 52 60327 Frankfurt am Main</p> <p>Office Braunschweig Bundesallee 100 38116 Braunschweig</p> <p>The publication of extracts of the accreditation certificate is subject to the prior written approval by Deutsche Akkreditierungsstelle GmbH (DAKKS). Exempted is the unchanged form of separate disseminations of the cover sheet by the conformity assessment body mentioned overleaf.</p> <p>No impression shall be made that the accreditation also extends to fields beyond the scope of accreditation attested by DAKKS.</p> <p>The accreditation was granted pursuant to the Act on the Accreditation Body (AkkStelleG) of 31 July 2009 (Federal Law Gazette I p. 2625) and the Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products (Official Journal of the European Union L 218 of 9 July 2008, p. 30). DAKKS is a signatory to the Multilateral Agreements for Mutual Recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Cooperation (ILAC). The signatories to these agreements recognise each other's accreditations.</p> <p>The up-to-date state of membership can be retrieved from the following websites:        EA: <a href="http://www.european-accreditation.org">www.european-accreditation.org</a>        ILAC: <a href="http://www.ilac.org">www.ilac.org</a>        IAF: <a href="http://www.iaf.nu">www.iaf.nu</a></p>

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or

[https://ctcadvanced.com/app/uploads/2020/06/D-PL-12076-01-05\\_TCB\\_USA.pdf](https://ctcadvanced.com/app/uploads/2020/06/D-PL-12076-01-05_TCB_USA.pdf)

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