EMI – TEST REPORT

- FCC Part 15.209 -

Type / Model Name	:	VIB 5.200
Product Description	:	Vibration meter
Applicant	:	PRÜFTECHNIK Condition Monitoring GmbH
Address	:	Oskar-Messter-Straße 19-21
		85737 ISMANING, GERMANY
Manufacturer	:	PRÜFTECHNIK Condition Monitoring GmbH
Address	:	Oskar-Messter-Straße 19-21
		85737 ISMANING, GERMANY

Test Result according to the standards listed in clause 1 test standards:	**POSITIVE**

Test Report No. : T42136-02-11GK	16. February 2018 Date of issue

Deutsche Akkreditierungsstelle
D-PL-12030-01-01
D-PL-12030-01-02

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

Contents

1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 15, Subpart A - General (April 2017)

Part 15, Subpart A, Section 15.31	Measurement standards
Part 15, Subpart A, Section 15.33	Frequency range of radiated measurements

FCC Rules and Regulations Part 15, Subpart C - Intentional Radiators (April 2017)

Part 15, Subpart C, Section 15.209	Radiated emission limits, general requirements
ANSI C63.10: 2013	Testing Unlicensed Wireless Devices
ETSI TR 100 028 V1.3.1: 2001-03	Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Uncertainties in the Measurement of Mobile Radio Equipment Characteristics—Part 1 and Part 2

2 EQUIPMENT UNDER TEST

2.1 Photo documentation of the EUT – Detailed photos see ATTACHMENT A

2.2 Equipment type

Portable device

2.3 Short description of the equipment under test (EUT)

The EUT is a vibration meter with four integrated radio technologies (NFC, Bluetooth, Bluetooth low energy and WLAN).

Number of tested samples	:	1
Serial number	:	5200 0121
Firmware version	:	0.87

EUT configuration:
(The CDF filled by the applicant can be viewed at the test laboratory.)

2.4 Operation frequency and channel plan

NFC is working at 13.56 MHz
Bluetooth and BLE are working in the 2.4 GHz range
WLAN is working in the 2.4 GHz and 5 GHz range

2.5 Peripheral devices and interface cables

The following peripheral devices and interface cables are connected during the measurements:

- None Model : _____
- _____ Model : _____

2.6 Determination of worst case conditions for final measurement

Measurements are made in all three orthogonal axes.

3 TEST RESULT SUMMARY

FCC Rule Part	Description	Result
15.209(a) partly	Radiated Emissions 1 GHz to 40 GHz	passed

3.1 Final assessment

The equipment under test fulfills the EMI requirements cited in clause 1 test standards.

Date of receipt of test sample : acc. to storage records

Testing commenced on : 03 August 2017

Testing concluded on : 03 August 2017

Checked by:

Thomas Weise
Ich bestätige die Genauigkeit und Richtigkeit des Dokuments
2018.02.16 10:42:22 +01'00'

Thomas Weise
Laboratory Manager

Tested by:

Konrad Grassl
I am the author of this document
2018.02.16 10:25:25 +01'00'

Konrad Graßl
Radio Team

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

CSA Group Bayern GmbH
Ohmstrasse 1-4
94342 STRASSKIRCHEN
GERMANY

4.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 °C
Humidity:	30-60 %
Atmospheric pressure:	86-106 kPa

4.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. It is noted that the expanded measurement uncertainty corresponds to the measurement results from the standard measurement uncertainty multiplied by the coverage factor k = 2. The true value is located in the corresponding interval with a probability of 95 % The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16-4-2 / 11.2003 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements“ and is documented in the quality system acc. to DIN EN ISO/IEC 17025. For all measurements shown in this report, the measurement uncertainty of the test laboratory, CSA Group Bayern GmbH, is below the measurement uncertainty as defined by CISPR. Therefore, no special measures must be taken into consideration with regard to the limits according to CISPR. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Measurement Type	Range	Confidence Level	Calculated Uncertainty
AC power line conducted emissions	0.15 MHz to 30 MHz	95%	± 3.29 dB
EBW and OBW	2400 MHz to 30000 MHz	95%	± 2.5 x 10^{-7}
Output power ERP, radiated	1000 MHz to 7000 MHz	95%	± 2.71 dB
Field strength of the fundamental	1000 MHz to 7000 MHz	95%	± 2.71 dB
Power spectral density	2400 MHz to 3000 MHz	95%	± 0.62 dB
Spurious Emissions, conducted	9 kHz to 10000 MHz	95%	± 2.15 dB
Spurious Emissions, conducted	10000 MHz to 40000 MHz	95%	± 3.47 dB
Spurious Emissions, radiated	9 kHz to 30 MHz	95%	± 3.53 dB
Spurious Emissions, radiated	30 MHz to 1000 MHz	95%	± 4.44 dB
Spurious Emissions, radiated	1000 MHz to 30000 MHz	95%	± 2.34 dB
Spurious Emissions, radiated	30000 MHz to 40000 MHz	95%	± 5.13 dB

4.4 Measurement protocol for FCC and ISED

4.4.1 General information

4.4.1.1 General Standard information

In compliance with 47 CFR Part 15 Subpart A, Section 15.38 testing for FCC compliance may be achieved by following the procedures set out in ANSI C63.10.

4.4.1.1.1 Radiated emission (electrical field 1 GHz - 40 GHz)

Description of measurement

Radiated emissions from the EUT are measured in the frequency range 1 GHz up to the maximum frequency as specified in 47 CFR Part 15, Subpart A, Section 15.33, using a spectrum analyser and appropriate linearly polarized antennas. Table top equipment is placed on a 1.0 X 1.5 metre non-conducting table, 1.5 metre above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. The setup of the equipment under test is following set out in ANSI C63.10. The interface cables that are closer than 40 centimetres to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimetres from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screened room located outside the test area. Measurements are made in both the horizontal and vertical polarization planes in a fully anechoic room using a spectrum analyzer set to max peak detector function and a resolution 1 MHz and video bandwidth 3 MHz for peak measurement. The conditions determined as worst case will then be used for the final measurements. When the EUT is larger than the beam width of the measuring antenna it will be moved over the surface for the four sides of the equipment. Where appropriate, the test distance may be reduced in order to detect emissions under better uncertainty and are calculated at the specified test distance.

5 TEST CONDITIONS AND RESULTS

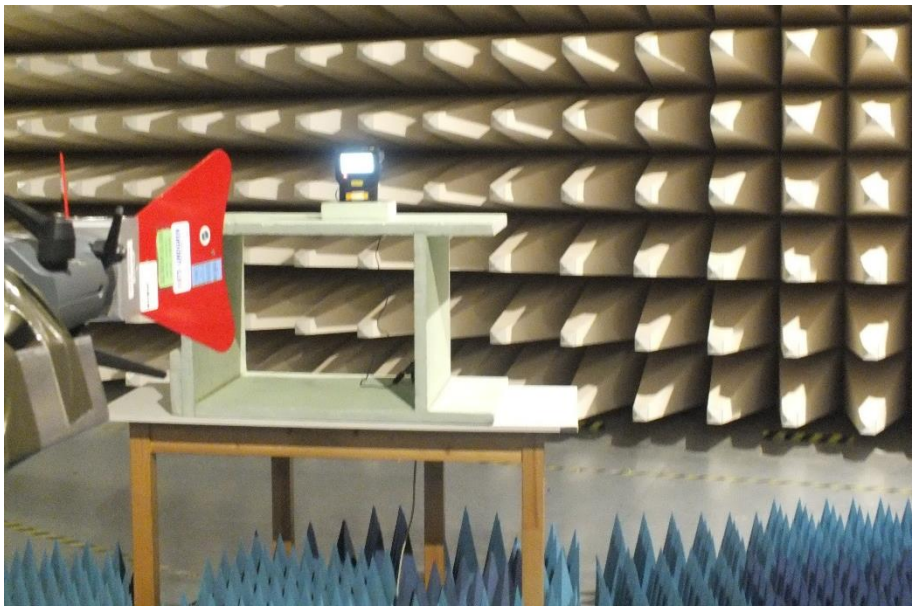
5.1 Radiated Emissions above 1 GHz

For test instruments and accessories used see section 6 Part **SER3**.

5.1.1 Description of the test location

Test location: Anechoic chamber 1

5.1.2 Photo documentation of the test set-up



5.1.3 Applicable standard

According to FCC Part 15, Section 15.209

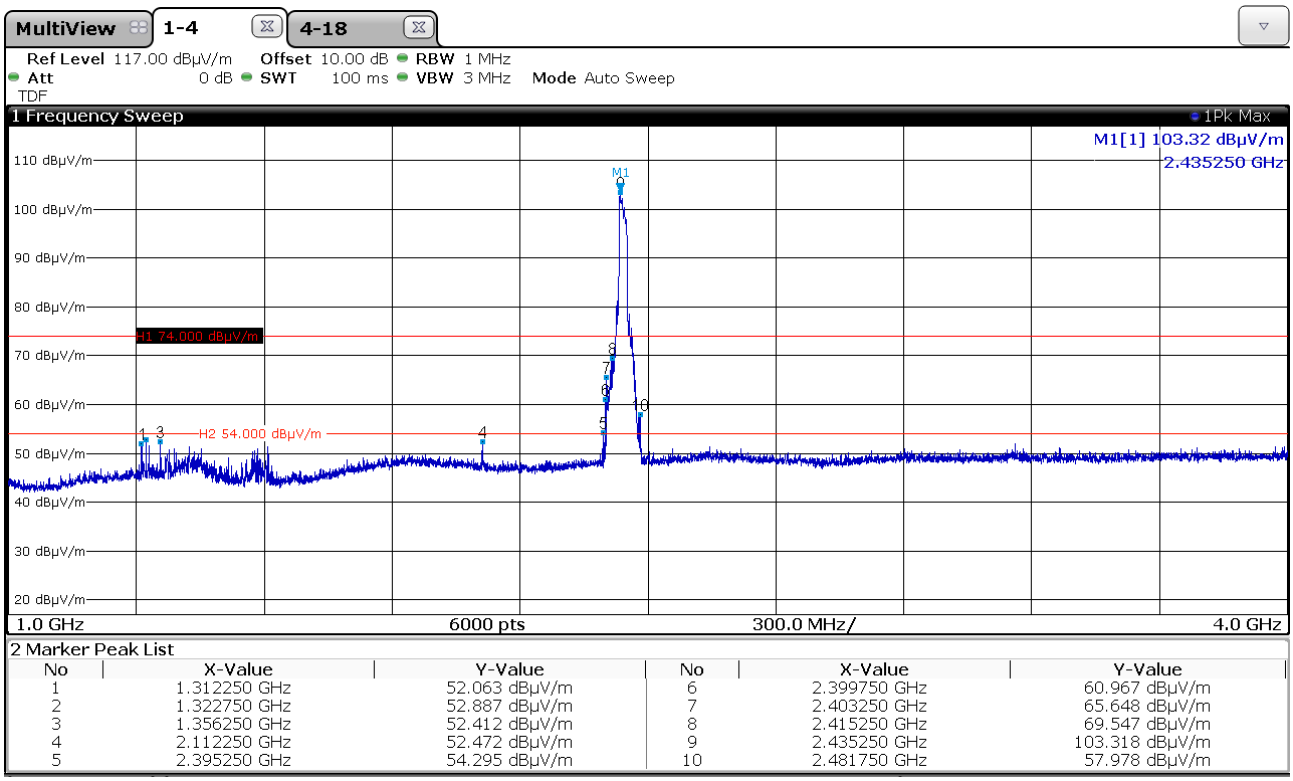
5.1.4 Analyser settings

1 GHz – 40 GHz RBW: 1 MHz VBW: 3 MHz Detector: Peak / RMS

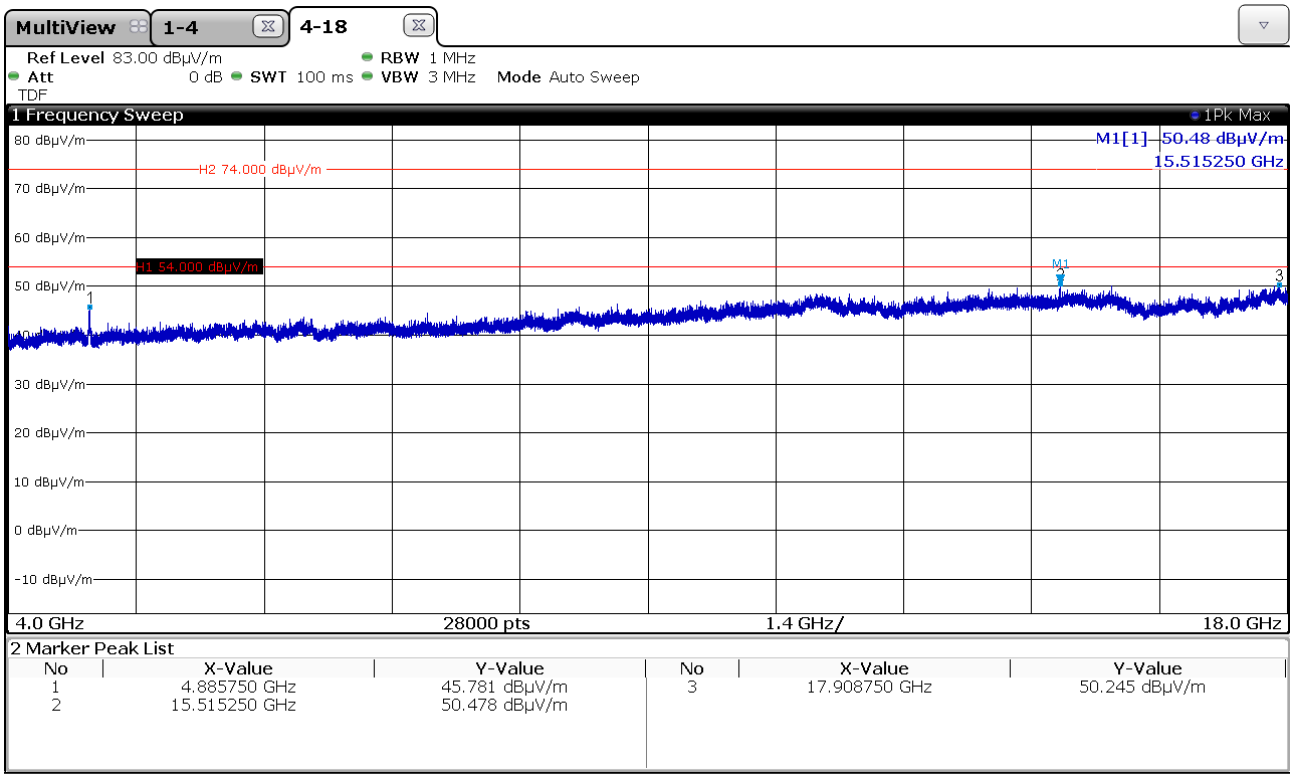
5.1.5 Test result

Channel 7 modulation n HT 20 in combination with NFC:

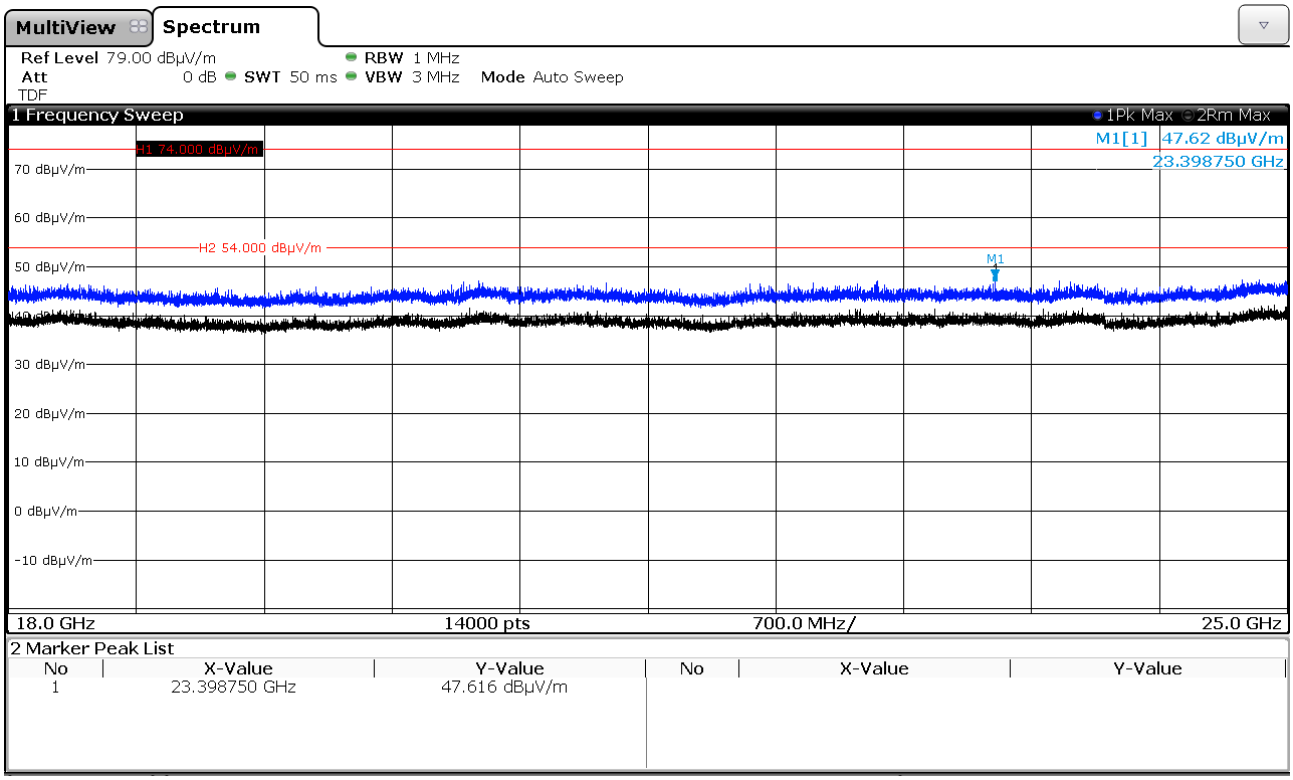
1-4 GHz peak measurement



4-18 GHz peak measurement

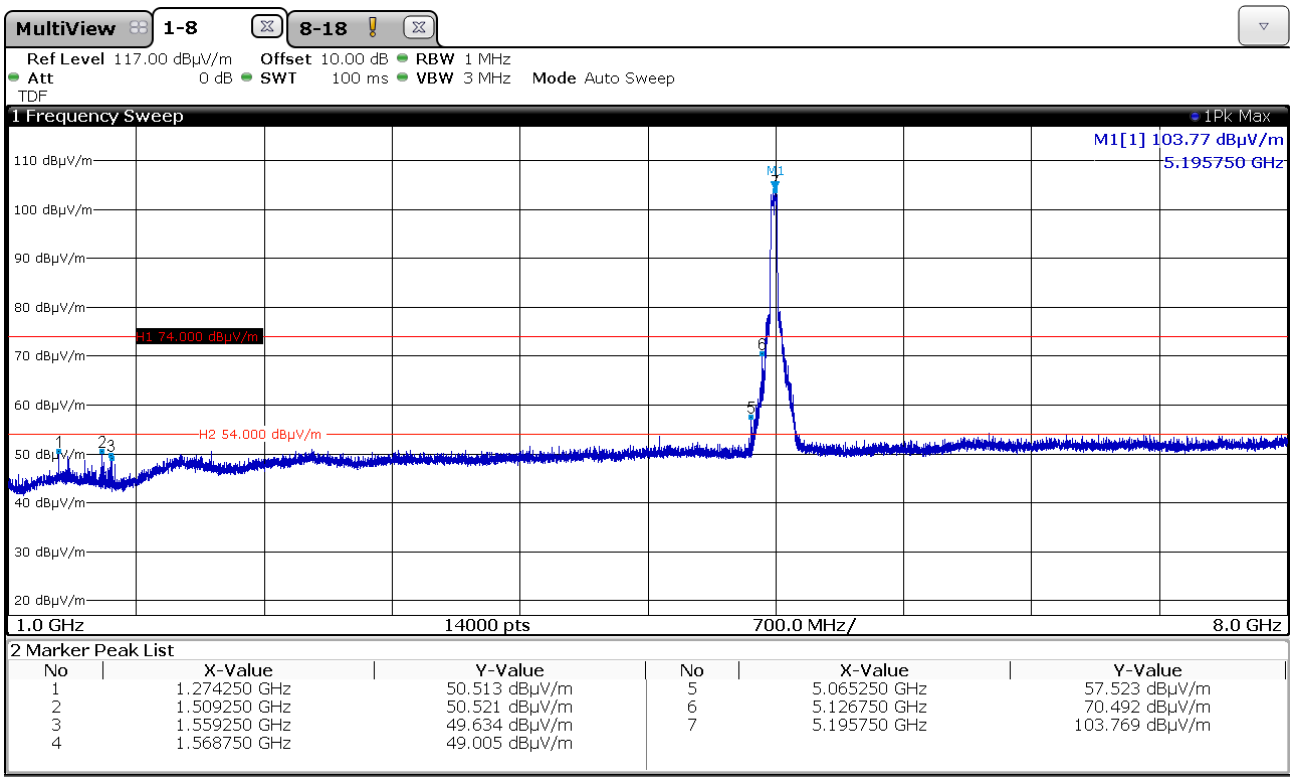


18-25 GHz peak measurement

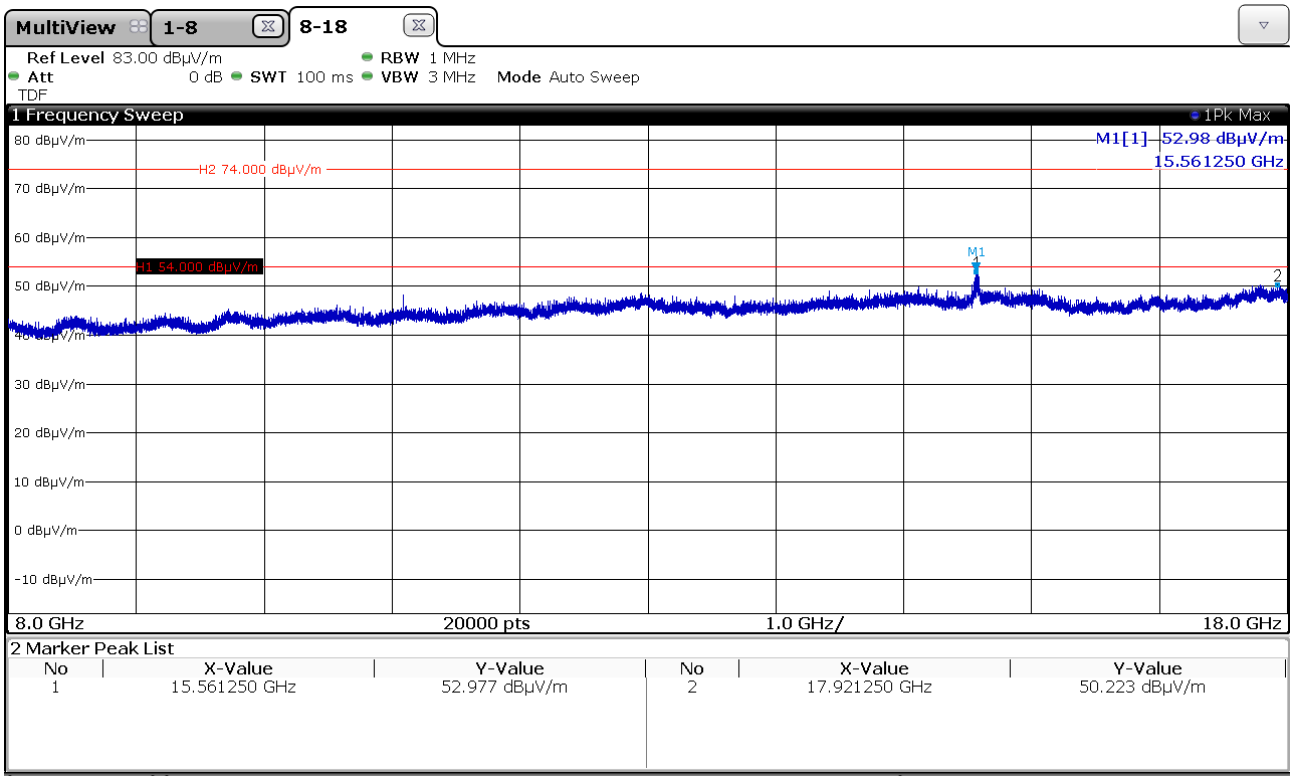


Channel 36 up modulation n HT 40 in combination with NFC:

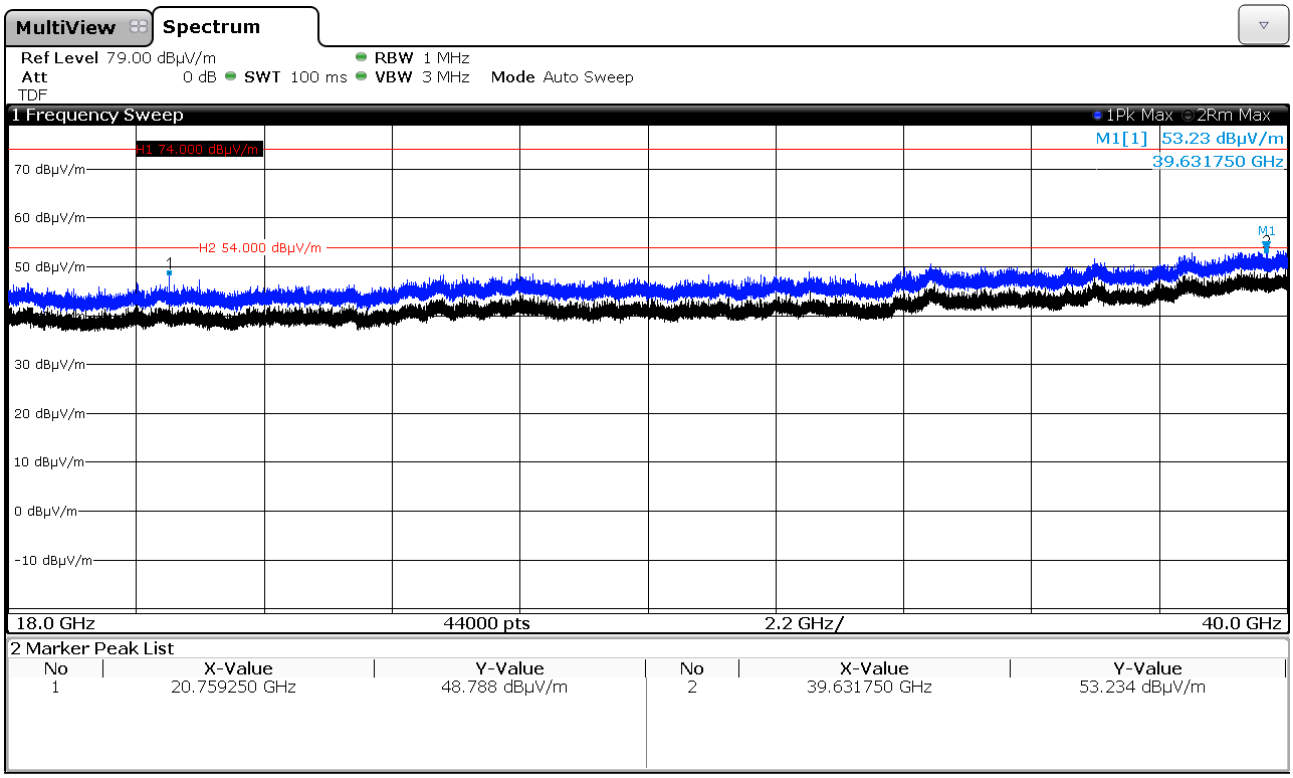
1-8 GHz peak measurement



8-18 GHz peak measurement



18-40 GHz peak and RMS measurement



Note: The peak values are below the peak limit and the RMS values are below the average limit.

Limits:

Limit according §15.209(a) in the frequency range 9 kHz 960 MHz:

Frequency (MHz)	**Field strength (microvolts/meter)**	**Measurement distance (meters)**
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

The requirements are **FULFILLED.**

Remarks: _____

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6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used are calibrated and verified regularly. The calibration history is available on request.

Test ID	Model Type	Equipment No.	Next Calib.	Last Calib.	Next Verif.	Last Verif.
SER 3	FSW43	02-02/11-15-001	07/04/2018	07/04/2017		
	JS4-18004000-30-5A	02-02/17-05-017				
	AMF-6D-01002000-22-10P	02-02/17-15-004				
	3117	02-02/24-05-009	10/05/2018	10/05/2017		
	BBHA 9170	02-02/24-05-014	02/06/2018	02/06/2015	26/10/2018	26/10/2017
	KMS102-0.2 m	02-02/50-11-020				
	SF104/11N/11N/300MM	02-02/50-13-008				
	18N-20	02-02/50-17-003				
	NMS111-GL200SC01-NMS11	02-02/50-17-012				
	Bandpass Filter	02-02/50-17-019				