



EMI – TEST REPORT

- FCC Part 15.517, RSS-220 -

Type / Model Name : KINEXON Mesh Anchor / A040001

Product Description : Anchor for UWB localization system

Applicant : KINEXON Inc.

Address : 200 S Wacker Drive, Suite 3100

CHICAGO, IL 60606, USA

Manufacturer : KINEXON GmbH

Address : Schellingstr. 35

80799 MÜNCHEN, GERMANY

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

POSITIVE

Test Report No. : **80185270-06 Rev_2**

25. April 2024

Date of issue



Deutsche
Akkreditierungsstelle
D-PL-12030-01-03
D-PL-12030-01-04

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

Contents

1	<u>TEST STANDARDS</u>	<u>3</u>
2	<u>EQUIPMENT UNDER TEST</u>	<u>4</u>
2.1	Information provided by the Client	4
2.2	Sampling	4
2.3	Photo documentation of the EUT – Detailed photos see ATTACHMENT A	4
2.4	Equipment type	4
2.5	Short description of the equipment under test (EUT)	4
2.6	Variants of the EUT	4
2.7	Operation frequency and channel plan	5
2.8	Transmit operating modes	5
2.9	Antenna	5
2.10	Power supply system utilised	5
2.11	Peripheral devices and interface cables	6
2.12	Determination of worst case conditions for final measurement	6
3	<u>TEST RESULT SUMMARY</u>	<u>7</u>
3.1	Revision history of test report	8
3.2	Final assessment	8
4	<u>TEST ENVIRONMENT</u>	<u>9</u>
4.1	Address of the test laboratory	9
4.2	Environmental conditions	9
4.3	Statement of the measurement uncertainty	9
4.4	Conformity Decision Rule	10
4.5	Measurement protocol for FCC and ISSED	10
5	<u>TEST CONDITIONS AND RESULTS</u>	<u>13</u>
5.1	AC power line conducted emissions	13
5.2	UWB Bandwidth	17
5.3	Radiated Emissions 9 kHz to 40 GHz	21
5.4	Radiated Emissions at 1164-1240 MHz and 1559-1610 MHz	30
5.5	Peak Power radiated	36
6	<u>USED TEST EQUIPMENT AND ACCESSORIES</u>	<u>38</u>

ATTACHMENT A as separate supplements

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.

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 15, Subpart C - Intentional Radiators (September 2021)

Part 15, Subpart C, Section 15.203	Antenna requirement
Part 15, Subpart C, Section 15.204	External radio frequency power amplifiers and antenna modifications
Part 15, Subpart C, Section 15.207	Conducted limits
Part 15, Subpart C, Section 15.209	Radiated emission limits, general requirements

FCC Rules and Regulations Part 15, Subpart F – Ultra Wideband Operation (October 2021)

Part 15, Subpart F, Section 15.517	Technical requirements for indoor UWB systems
Part 15, Subpart F, Section 15.521	Technical requirements applicable to all UWB devices

Industry Canada – Radio equipment standards

RSS-Gen, Issue 5 + A1 + A2, March 2019	General Requirements for Compliance of Radio Apparatus
RSS-220, Issue 1 + A1, July 2018	Devices Using Ultra-Wideband (UWB) Technology
ANSI C63.10: 2013	Testing Unlicensed Wireless Devices
KDB 393764 D01 v02r01 (April 25, 2022)	Ultra-Wideband (UWB) Devices – Frequently Asked Questions

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

2 EQUIPMENT UNDER TEST

2.1 Information provided by the Client

Please note, we do not take any responsibility for information provided by the client or his representative which may have an influence on the validity of the test results.

2.2 Sampling

The customer is responsible for the choice of sample. Sample configuration, start-up and operation is carried out by the customer or according to his/her instructions.

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

2.4 Equipment type

UWB Device for Indoor Use

2.5 Short description of the equipment under test (EUT)

The KINEXON Mesh system is a real-time location system (RTLS) designed to provide precise tracking and asset management solutions. It leverages the combined capabilities of Ultra-Wideband (UWB) technology and Bluetooth Low Energy (BLE) Mesh.

Number of tested samples: 2
S/N none (pre-production samples)

2.6 Variants of the EUT

There are no variants.

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.

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

2.7 Operation frequency and channel plan

The operating frequency band is 3100 MHz to 10600 MHz.

Channel plan FCC:

Channel number	f_c (MHz)
Channel 3	4492.8
Channel 5	6489.6

Channel plan ISCED

Channel number	f_c (MHz)
Channel 5	6489.6

2.8 Transmit operating modes

Modulation: variable pulse position modulation (PPM) in combination with binary phase shift keying (BPSK).

Data rate: 6.8 Mbit/s

2.9 Antenna

The following antennas shall be used with the EUT:

Number	Characteristic	Model number	Plug	f-range (GHz)	Max. Gain (dBi)
1	Omni	PCB antenna	None, PCB	4 – 7	5.8

2.10 Power supply system utilised

Power supply voltage, V_{nom} : 5 V_{DC}

Power supply voltage (alternative) : 3.6 V DC (internal battery)

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

2.11 Peripheral devices and interface cables

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

- USB cable for charging Model : Commercially available
- USB DC adapter Model : Samsung EP-TA200

2.12 Determination of worst case conditions for final measurement

Measurements are made in all three orthogonal axes with horizontal and vertical antenna positions to determine the worst case condition.

2.12.1 Test jig

No test jig is used.

2.12.2 Test software

The test modes of the EUTs are provided by the manufacturer.

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.

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

3 TEST RESULT SUMMARY

FCC Rule Part	RSS Rule Part	Description	Result
15.207(a) 15.521(j)	RSS-Gen, 8.8	AC power line conducted emissions	passed
15.517(b) 15.521(e)	RSS-220, 2, 5.1(a)	UWB Bandwidth	passed
---	RSS-Gen, 6.6	99 % Bandwidth	passed
15.209(a) 15.517(c) 15.521(c)(d)(h)	RSS-Gen, 8.9 RSS-220, 3.4, 5.2.1(c), 5.2.1(d)	Radiated Emissions 9 kHz to 40 GHz	passed
15.517(d)	RSS-220, 5.2.1(e)	Radiated Emissions at 1164-1240 MHz and 1559-1610 MHz	passed
15.517(e) 15.521(g)	RSS-220, 5.2.1(g)	Peak Power radiated	passed
15.203 15.521(b)	---	Antenna requirement	not applicable *1
15.204 15.521(b)	---	External radio frequency power amplifiers and antenna modifications	not applicable *1
15.521(a)(f)(i)	---	Technical requirements applicable to all UWB devices	not applicable *2

- *1 According to the applicant, the EUT has an internal PCB antenna. No other antennas can be connected to the EUT. Therefore, the requirements are regarded as fulfilled.
- *3 According to the applicant, the EUT will be used indoor only. The EUT is no imaging system. For details refer to the user manual.

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.

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

3.1 Revision history of test report

Test report No	Rev.	Issue Date	Changes
80185270-06	0	07 March 2024	Initial test report
80185270-06	1	18 April 2024	section 2.5: description update (data port). section 2.10: adding alternative power supply section 4.5.2.2.4: table height changed to 1.5 m. section 5.2.7: changing correct OBW plots
80185270-06	2	25 April 2024	section 2.6: description changed

The test report with the highest revision number replaces the previous test reports.

3.2 Final assessment

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

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

Testing commenced on : 26 January 2024

Testing concluded on : 16 February 2024

Checked by:

Tested by:

Klaus Gegenfurtner
Teamleader Radio

p. p. _____
Christopher Thaller
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 on basis of the ETSI Technical Report TR 100 028 Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1 and Part 2. The results are documented in the quality system acc. to DIN EN ISO/IEC 17025. 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 Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	$\pm 3.29 \text{ dB}$
20 dB Bandwidth	Center frequency of EUT	95%	$\pm 2.5 \times 10^{-7}$
99% Occupied Bandwidth	Center frequency of EUT	95%	$\pm 2.5 \times 10^{-7}$
Radiated Spurious Emissions	9 kHz to 30 MHz	95%	$\pm 3.53 \text{ dB}$
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	$\pm 3.71 \text{ dB}$
Radiated Spurious Emissions	1000 MHz to 10000 MHz	95%	$\pm 2.34 \text{ dB}$
Peak conducted output power	902 MHz to 928 MHz	95%	$\pm 0.35 \text{ dB}$
Conducted Spurious Emissions	9 kHz to 10000 MHz	95%	$\pm 2.15 \text{ dB}$

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

4.4 Conformity Decision Rule

The applied conformity decision rule is based on ILAC G8:09/2019 clause 4.2.1 Binary Statement for Simple Acceptance Rule ($w = 0$).

Details can be found in the procedure CSA_B_V50_29.

4.5 Measurement protocol for FCC and ISED

4.5.1 General information

CSA Group Bayern GmbH is recognized as wireless testing laboratory under the CAB identifier:

FCC: DE 0011

ISED: DE0009

4.5.2 General Standard information

The test methods used comply with ANSI C63.10 - "Testing Unlicensed Wireless Devices".

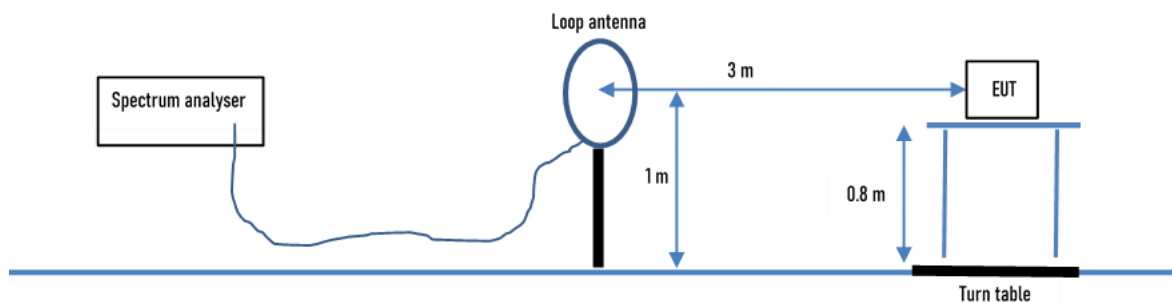
4.5.2.1 Justification

The equipment under test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral using the appropriate impedance characteristic or left unterminated. Where appropriate, cables are manually manipulated with respect to each other thus obtaining maximum disturbances from the unit.

4.5.2.2 Radiated emission

4.5.2.2.1 OATS1 test site (9 kHz - 30 MHz):

Test setup according ANSI C63.10

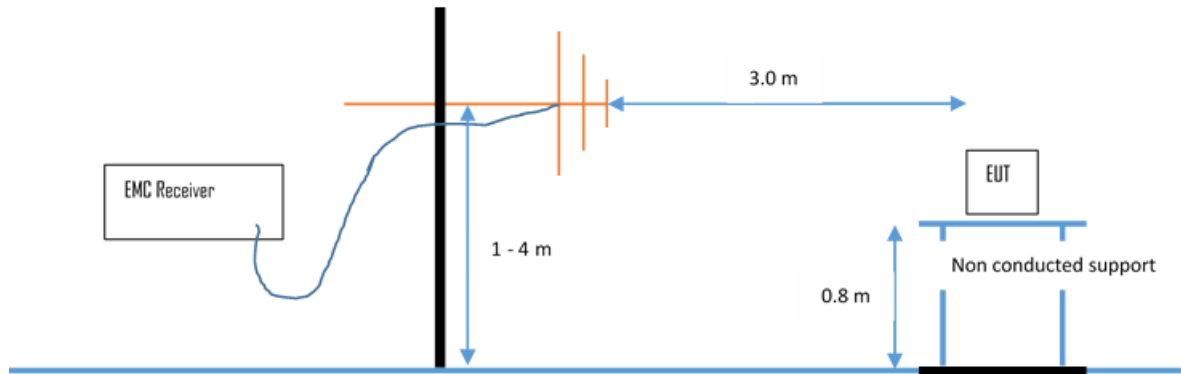


Emissions from the EUT are measured in the frequency range of 9 MHz to 30 MHz using a tuned receiver and a calibrated loop antenna. Table top equipment is placed on a 1.0 X 1.5 m non-conducting table 80 centimetres above the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screened room located outside the test area. The antenna is positioned 3, 10 or 30 metres horizontally from the EUT and is repeated vertically. To locate maximum emissions from the test sample the antenna is varied along the site axis and the EUT is rotated 360 degrees.

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

4.5.2.2.2 OATS1 test site (30 MHz - 1 GHz):

Test setup according ANSI C63.10.



Spurious emissions from the EUT are measured in the frequency range of 30 MHz to 1000 MHz using a tuned receiver and appropriate broadband linearly polarised antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection. Table top equipment is placed on a 1.0 X 1.5 m non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/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. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 metres and the EUT is rotated 360 degrees. The final level in dB μ V/m is calculated by taking the reading from the EMI receiver (Level dB μ V) and adding the correction factors and cable loss factor (dB). The FCC limit is subtracted from this result in order to provide the limit margin listed in the measurement protocol.

The resolution bandwidth setting:

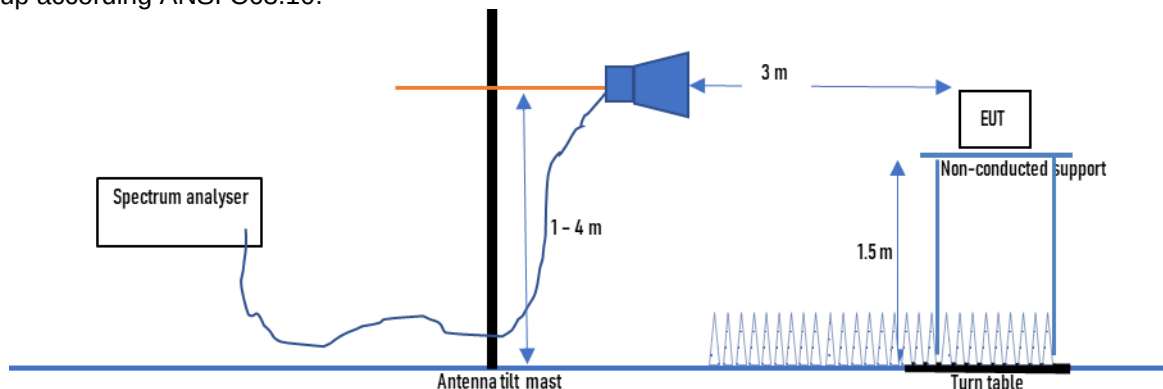
30 MHz – 1000 MHz: RBW: 120 kHz

Example:

Frequency (MHz)	Level (dB μ V)	+	Factor (dB)	=	Level (dB μ V/m)	-	Limit (dB μ V/m)	=	Delta (dB)
719.0	75.0	+	32.6	=	107.6	-	110.0	=	-2.4

4.5.2.2.3 Anechoic chamber 1 (1000 MHz – 18000 MHz)

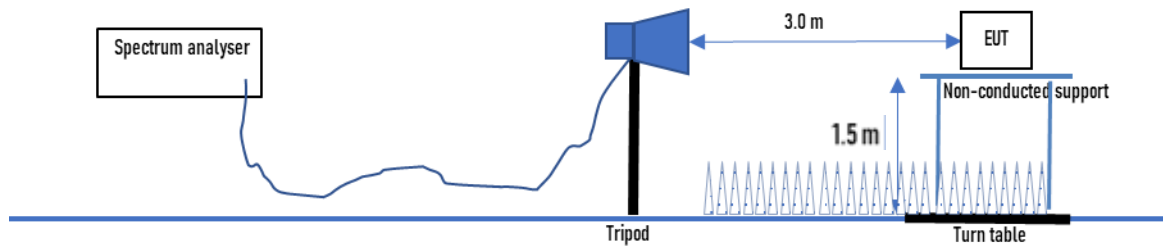
Test setup according ANSI C63.10.



Radiated emissions from the EUT are measured in the frequency range 1 GHz up to 18 GHz 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 non-conducting table, 1.5 metre above the ground plane. The turntable is fully covered with the appropriate absorber (Type VHP-12). Any controlling device is positioned such that it does not significantly influence the measurement results. Interconnecting cables that hang closer than 40 cm to the ground plane are folded back and forth in the center, forming a bundle 30 cm to 40 cm long. Measurements are made in in three orientations of the EUT and the horizontal and vertical polarization planes of measurement antenna in a fully anechoic room. The measurement antenna is adjusted and the EUT orientated to permit the measurement of the maximum emission from the EUT. The conditions determined as worst-case will then be used for the final measurements.

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

4.5.2.2.4 Anechoic chamber 1 (18 GHz – 40 GHz)



Emissions from the EUT are measured in the frequency range 18 GHz up to 40 GHz 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 non-conducting table, 0.8 metre above the ground plane. The turntable is fully covered with the appropriate absorber (Type VHP-12). Any controlling device is positioned such that it does not significantly influence the measurement results. Interconnecting cables that hang closer than 40 cm to the ground plane are folded back and forth in the center, forming a bundle 30 cm to 40 cm long. Measurements are made in three orientations of the EUT and the horizontal and vertical polarization planes of measurement antenna in a fully anechoic room. The measurement antenna is adjusted and the EUT orientated to permit the measurement of the maximum emission from the EUT. The conditions determined as worst-case will then be used for the final measurements. Where appropriate, the test distance may be reduced in order to detect emissions under better uncertainty. The limit are adopted.

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.

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

5 TEST CONDITIONS AND RESULTS

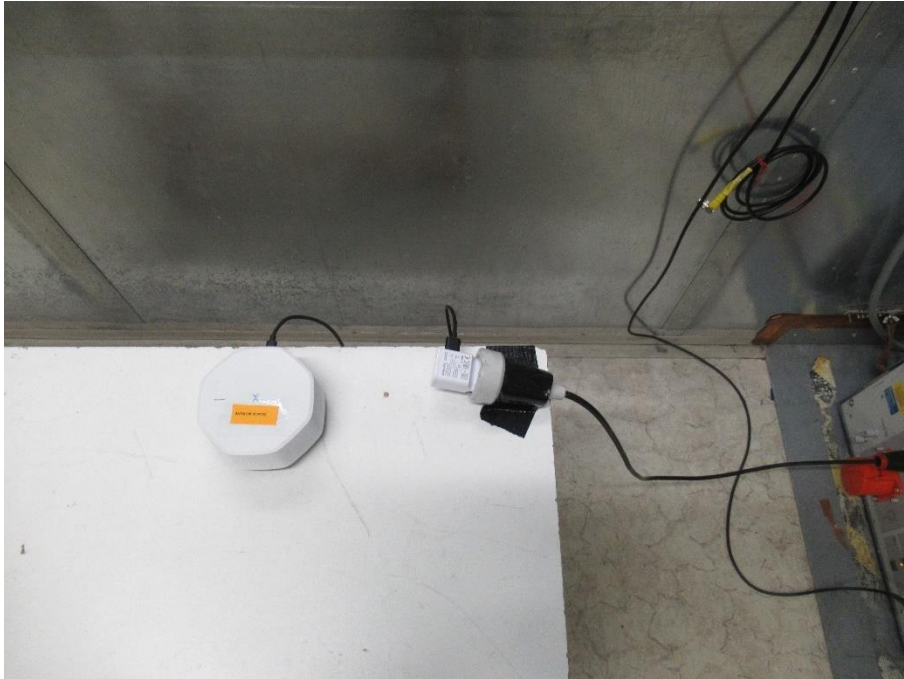
5.1 AC power line conducted emissions

For test instruments and accessories used see section 6 Part A 4.

5.1.1 Description of the test location

Test location: Shielded Room S2

5.1.2 Photo documentation of the test set-up



5.1.3 Applicable standard

According to FCC Part 15, Section 15.207(a):

Except as shown in paragraphs (b) and (c) of this Section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the given limits.

5.1.4 Description of Measurement

The measurements are performed following the procedures set out in ANSI C63.10 described under item 4.4.3. If the minimum limit margin appears to be less than 20 dB with a peak mode measurement, the emissions are re-measured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1
5.1.5 Test result

Frequency range: 0.15 MHz - 30 MHz

Min. limit margin -28.5 dB at 0.200 MHz

Limit according to FCC Part 15, Section 15.207(a):

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

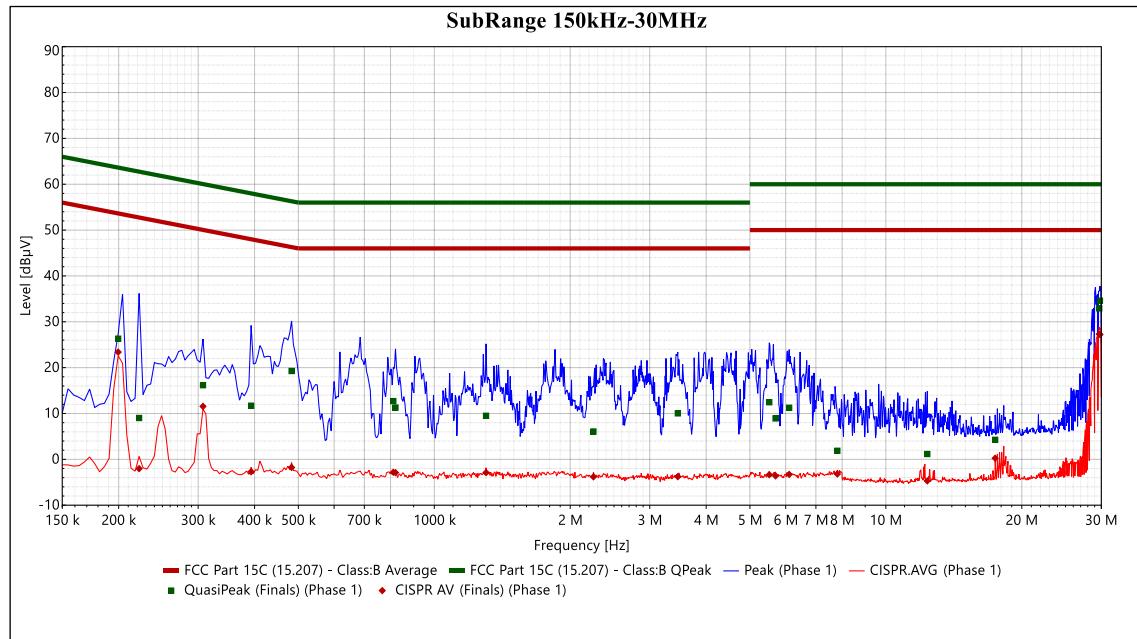
* Decreases with the logarithm of the frequency

The requirements are **FULFILLED**.

Remarks: For detailed test result please refer to following test protocols.

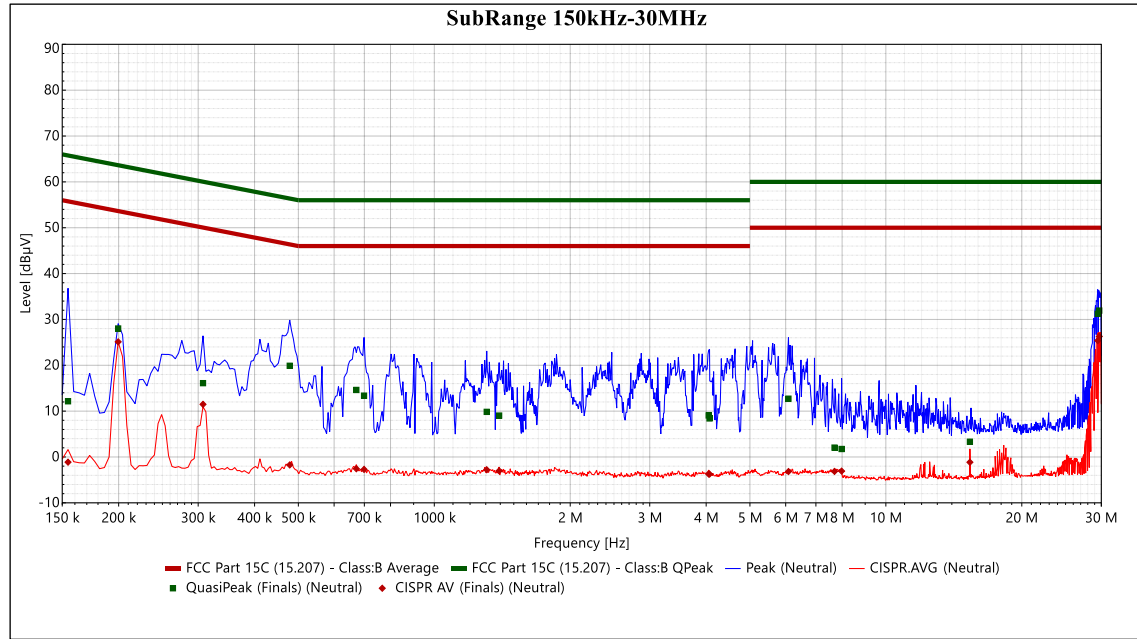
FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

5.1.6 Test protocol



Frequency (MHz)	QuasiPeak (dBμV)	QP Margin (dB)	QP Limit (dBμV)	CISPR AV (dBμV)	CISPR AV Margin (dB)	AV Limit (dBμV)
0.200	26.307	-37.324	63.631	23.393	-30.238	53.631
0.222	9.018	-53.726	62.744	-2.029	-54.772	52.744
0.307	16.166	-43.872	60.038	11.555	-38.483	50.038
0.393	11.69	-46.311	58	-2.7	-50.7	48
0.483	19.266	-37.021	56.287	-1.767	-48.054	46.287
0.812	12.702	-43.298	56	-2.824	-48.824	46
0.821	11.305	-44.695	56	-2.896	-48.896	46
1.302	9.498	-46.502	56	-2.892	-48.892	46
2.252	6.067	-49.933	56	-3.821	-49.821	46
3.462	10.029	-45.971	56	-3.781	-49.781	46
5.519	12.464	-47.536	60	-3.349	-53.349	50
5.699	8.932	-51.068	60	-3.607	-53.607	50
6.108	11.255	-48.745	60	-3.295	-53.295	50
7.809	1.867	-58.133	60	-3.199	-53.199	50
12.354	1.155	-58.845	60	-4.703	-54.703	50
17.462	4.256	-55.744	60	0.237	-49.763	50
29.688	32.913	-27.087	60	27.325	-22.675	50
29.796	34.604	-25.396	60	27.226	-22.774	50

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1



Frequency (MHz)	QuasiPeak (dBµV)	QP Margin (dB)	QP Limit (dBµV)	CISPR AV (dBµV)	CISPR AV Margin (dB)	AV Limit (dBµV)
0.155	12.145	-53.609	65.754	-1.126	-56.88	55.754
0.200	28.024	-35.607	63.631	25.113	-28.518	53.631
0.308	16.099	-43.938	60.038	11.484	-38.553	50.038
0.479	19.893	-36.472	56.365	-1.738	-48.103	46.365
0.672	14.615	-41.385	56	-2.575	-48.575	46
0.699	13.373	-42.627	56	-2.708	-48.708	46
1.307	9.842	-46.158	56	-2.776	-48.776	46
1.392	9.03	-46.97	56	-3.022	-49.022	46
4.052	9.061	-46.939	56	-3.723	-49.723	46
4.070	8.414	-47.586	56	-3.736	-49.736	46
6.086	12.713	-47.287	60	-3.178	-53.178	50
7.697	2.035	-57.965	60	-3.153	-53.153	50
7.980	1.737	-58.263	60	-3.084	-53.084	50
15.351	3.33	-56.67	60	-1.149	-51.149	50
29.463	31.217	-28.783	60	25.38	-24.62	50
29.688	31.932	-28.068	60	26.294	-23.706	50

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

5.2 UWB Bandwidth

For test instruments and accessories used see section 6 Part **CPR 3**.

5.2.1 Description of the test location

Test location: Anechoic chamber 1

5.2.2 Photo documentation of the test set-up



5.2.3 Applicable standard

According to FCC Part 15, Section 15.517(b):

The UWB bandwidth of a UWB system operating under the provisions of this section must be contained between 3100 MHz and 10,600 MHz.

According to FCC Part 15, Section 15.503(d):

Ultra-wideband (UWB) transmitter. An intentional radiator that, at any point in time, has a fractional bandwidth equal to or greater than 0.20 or has a UWB bandwidth equal to or greater than 500 MHz, regardless of the fractional bandwidth.

5.2.4 Description of Measurement

The bandwidth is measured following the procedure set out in ANSI C63-10, Item 10.1. The measurement was performed radiated at a distance of 3 m. The bandwidth was measured at an amplitude level reduced from the reference level of a modulated channel by a ratio of -10 dB. The EUT is set in TX continuous mode while measuring.

Spectrum analyser settings:

RBW: 1 MHz, VBW: 3 MHz, Detector: Peak

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1
5.2.5 Test result

channel	lowest frequency f_L (MHz)	highest frequency f_H (MHz)	permitted frequency range (GHz)	UWB bandwidth (MHz)	required UWB bandwidth (MHz)	result
3	4147.68	4837.83	3.1 – 10.6	690.15	> 500	passed
5	6218.14	6836.33	3.1 – 10.6	618.19	> 500	passed

The requirements are **FULFILLED**.

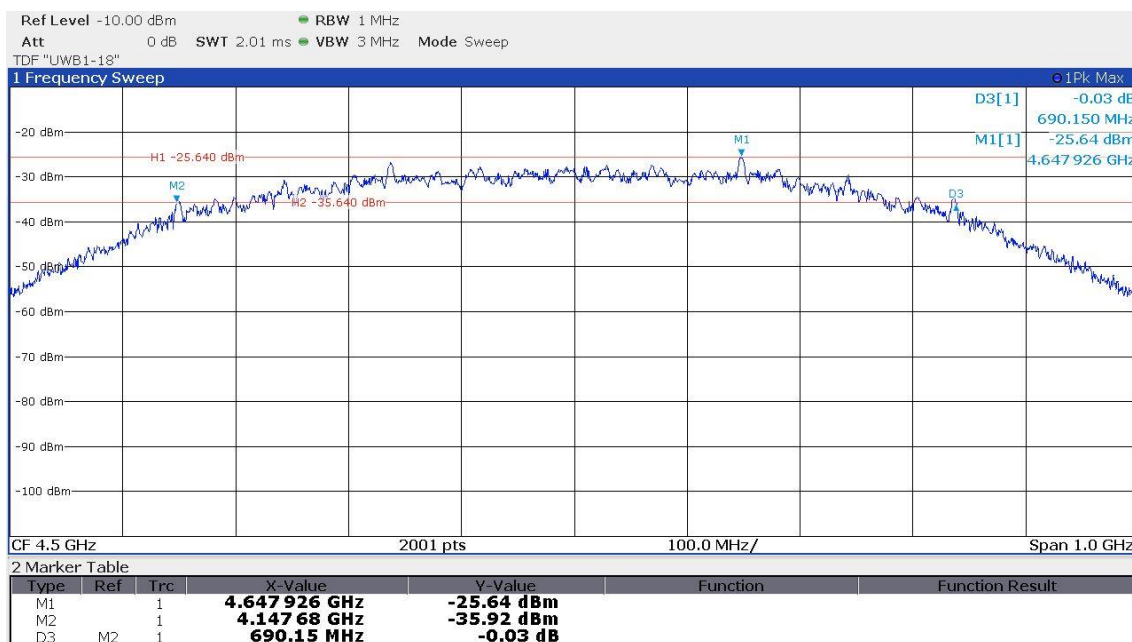
Remarks: For detailed test results please refer to following test protocols.

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.

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

5.2.6 Test protocols EBW

Channel 3



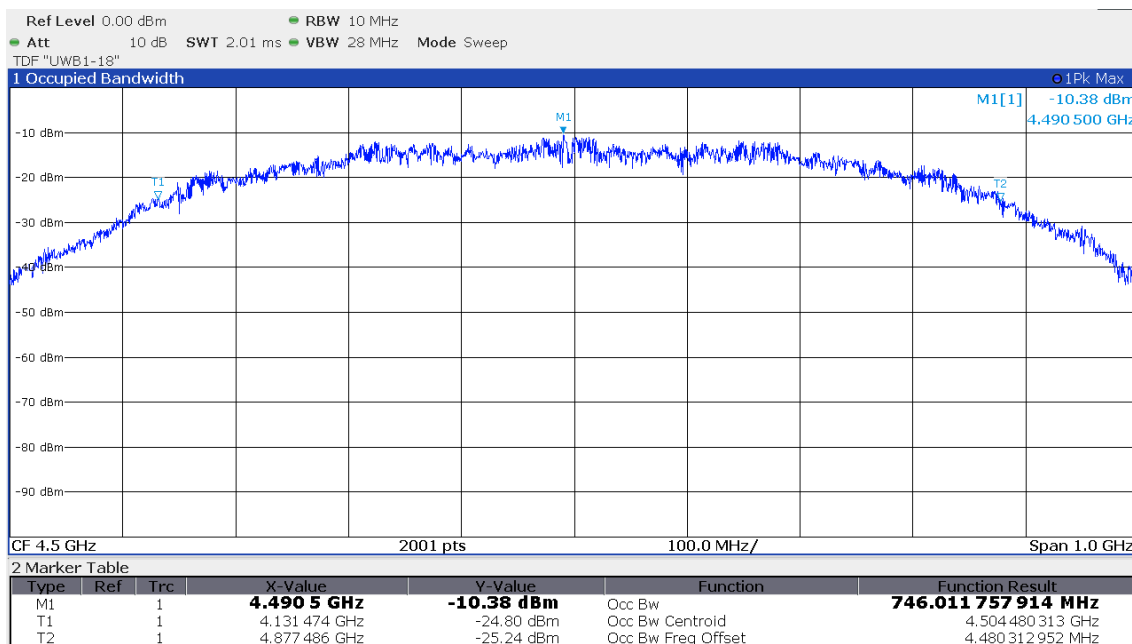
Channel 5



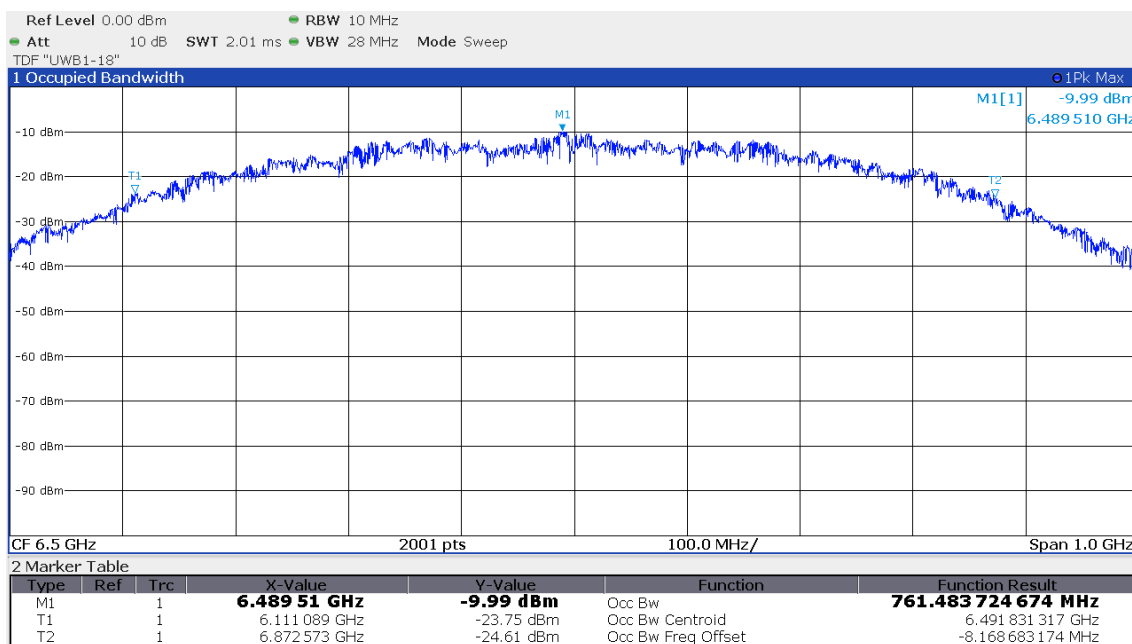
FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

5.2.7 Test protocols OBW

Channel 3



Channel 5



FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

5.3 Radiated Emissions 9 kHz to 40 GHz

For test instruments and accessories used see section 6 Part **SER 1**, **SER 2** and **SER 3**.

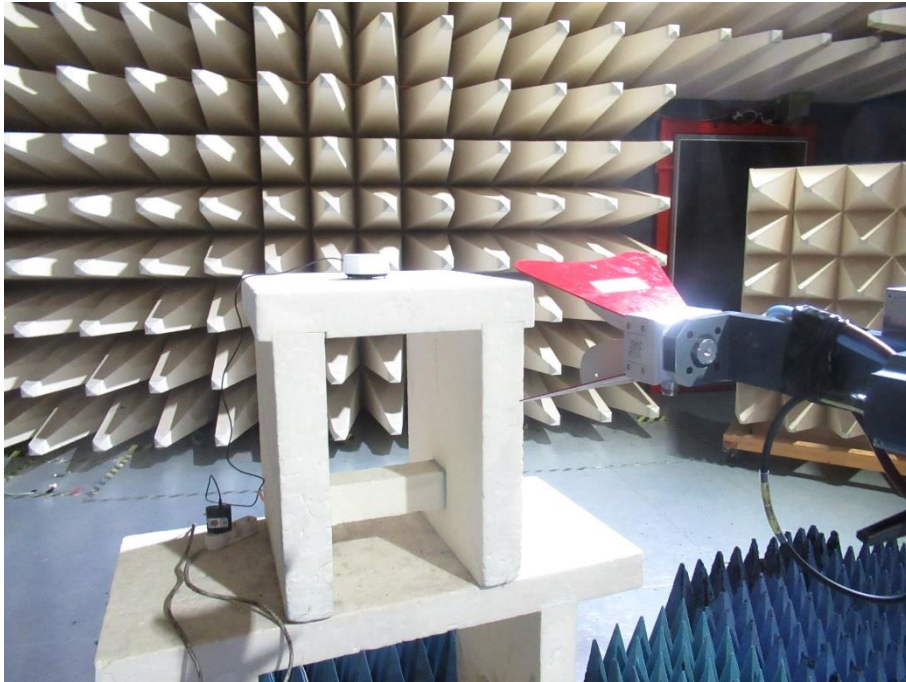
5.3.1 Description of the test location

Test location: OATS 1
Test location: Anechoic chamber 1

5.3.2 Photo documentation of the test set-up



FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1



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.

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1
5.3.3 Applicable standard

According to FCC Part 15, Section 15.517(c):

The radiated emissions at or below 960 MHz from a device operating under the provisions of this section shall not exceed the emission levels in §15.209. The radiated emissions above 960 MHz from a device operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of 1 MHz.

According to FCC Part 15, Section 15.521(c):

Emissions from digital circuitry used to enable the operation of the UWB transmitter shall comply with the limits in § 15.209, rather than the limits specified in this subpart, provided it can be clearly demonstrated that those emissions from the UWB device are due solely to emissions from digital circuitry contained within the transmitter and that the emissions are not intended to be radiated from the transmitter's antenna. Emissions from associated digital devices, as defined in § 15.3(k), e.g., emissions from digital circuitry used to control additional functions or capabilities other than the UWB transmission, are subject to the limits contained in Subpart B of this part.

5.3.4 Description of Measurement

The maximum emission is measured following the procedure set out in ANSI C63-10, item 10.2. The EUT is set in TX continuous mode while measuring.

Analyser settings:

9 kHz – 150 kHz	RBW: 200 Hz			
150 kHz - 30 MHz	RBW: 9 kHz			
30 MHz – 960 MHz	RBW: 120 kHz	Detector: QP		
960 MHz – 40 GHz	RBW: 1 MHz	VBW: 3 MHz	Detector: RMS	Sweep time: 1ms per MHz

for § 15.521(c) additionally:

960 MHz – 40 GHz	RBW: 1 MHz	VBW3: MHz	Detector: Peak/Av	Sweep time: 100 ms
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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.

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1
5.3.5 Test result
5.3.5.1 Measurement 9 kHz to 30 MHz

Note: Pre-measurements have shown, there are no detectable emissions in this frequency range. Emissions in this frequency range can be excluded because of the physical dimension of the EUT.

5.3.5.2 Measurement 30 MHz to 960 MHz

Frequency (MHz)	Reading Vert. (dBµV)	Reading Hor. (dBµV)	Correct. Vert. (dB)	Correct. Hor. (dB)	Level Vert. (dBµV/m)	Level Hor. (dBµV/m)	Limit (dBµV/m)	Dlimit (dB)
80.00	5.6	1.8	14.2	14.5	19.8	16.3	40.0	-20.2
220.00	6.6	0.5	17.7	17.4	24.3	17.9	46.0	-21.7
245.00	-6.3	-1.1	18.6	18.5	12.3	17.4	46.0	-28.6
300.00	-4.2	3.6	20.2	20.8	16.0	24.4	46.0	-21.6
360.00	-7.5	-5.9	22.1	22.5	14.6	16.6	46.0	-29.4
570.00	-9.2	-9.0	27.6	27.9	18.4	18.9	46.0	-27.1

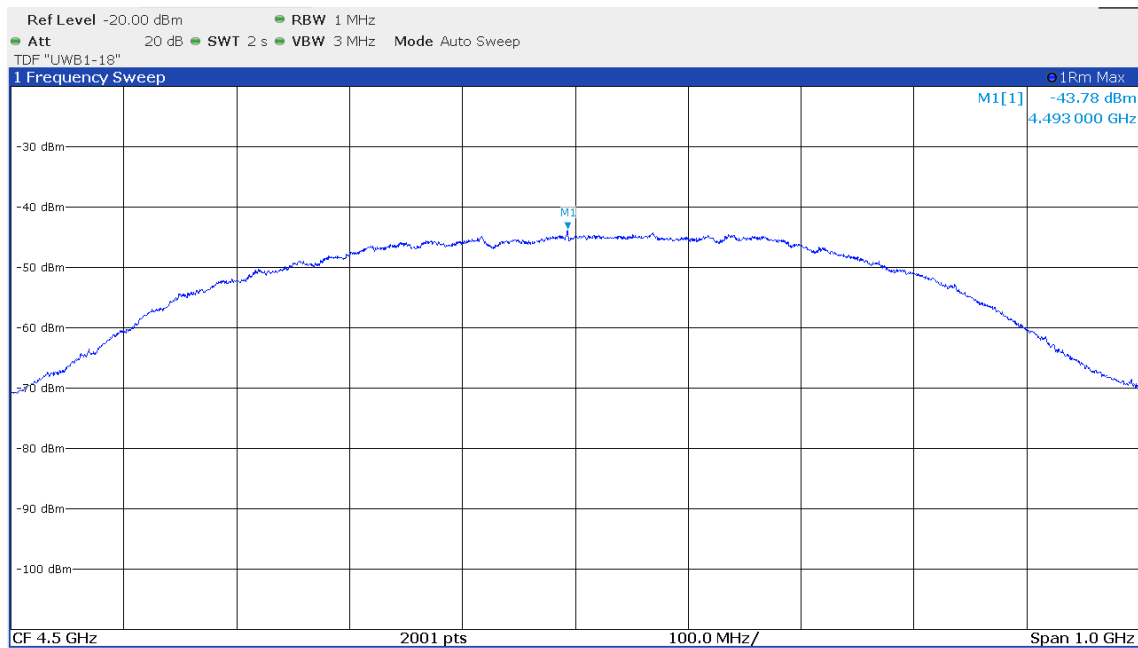
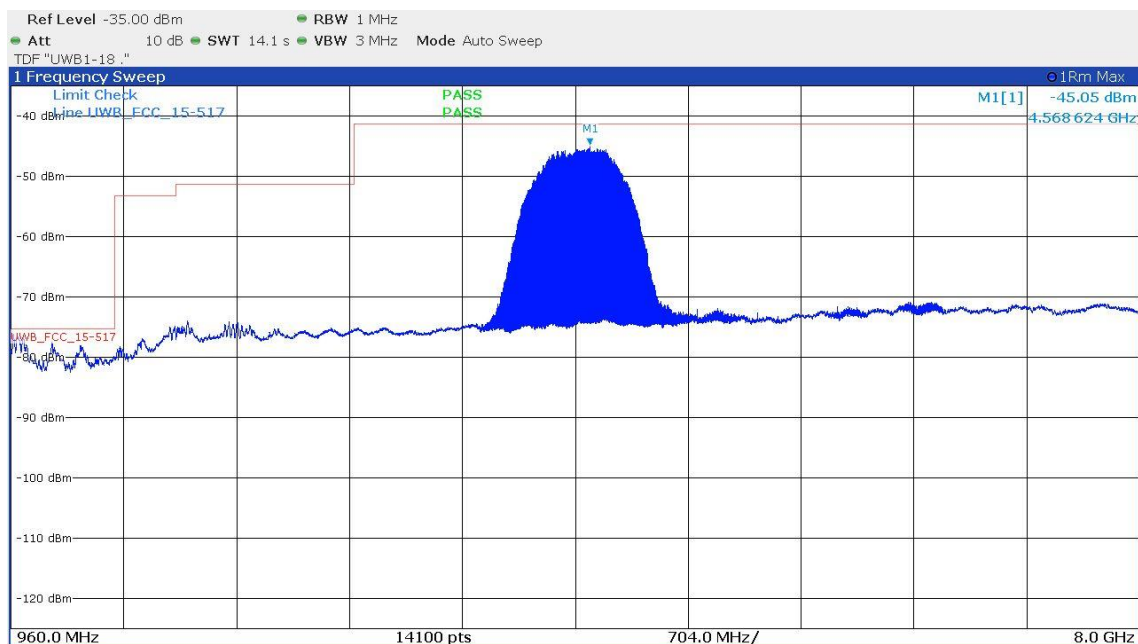
Note: Pre-scans show that no significant emissions occur in the frequency range from 30 MHz to 1000 MHz, independent on the operation mode of the EUT or channel. All recorded values represent the noise level of the test site.

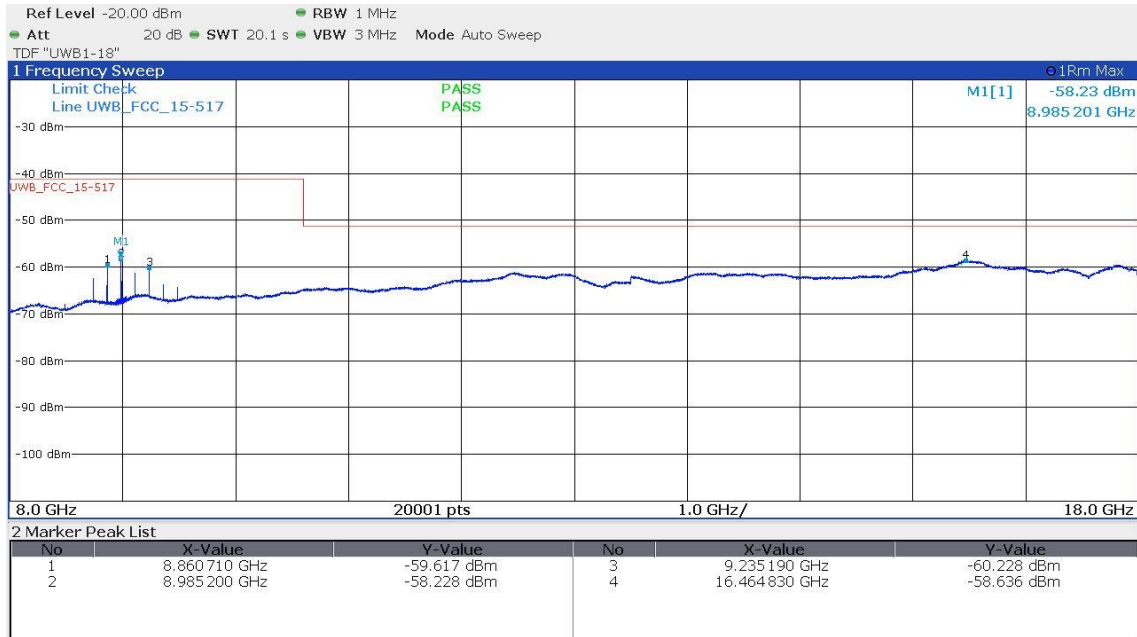
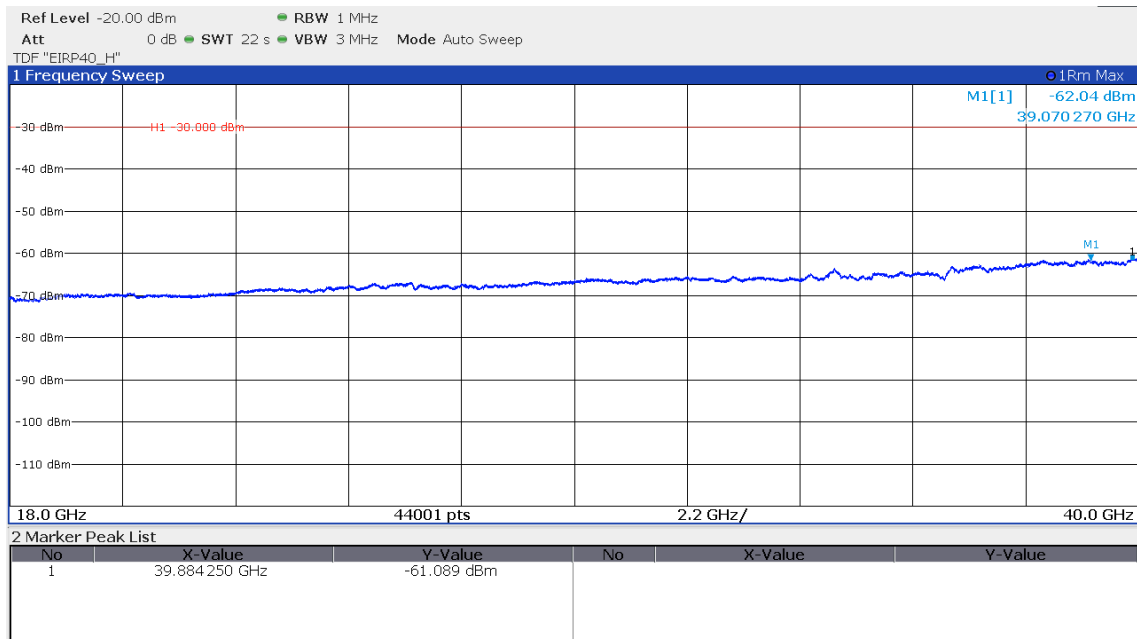
The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1
5.3.5.3 Measurement 960 MHz to 40 GHz

According to § 15.521(c), missions from digital circuitry used to enable the operation of the UWB transmitter shall comply with the limits in § 15.209. The average limit is given by 54 dBµV/m at 3 meter distance, which corresponds to an EIRP of -41.3 dBm according to ANSI C63.10 2013 clause 10.3.9.

As proven in the following measurements, no emissions outside the UWB transmission can be detected in the frequency range 960 MHz and 40 GHz and the highest emissions occurs by the UWB emission itself, which lies under the UWB limit of -41.3 dBm. Therefore, the requirements according to § 15.209 can be regarded as fulfilled.

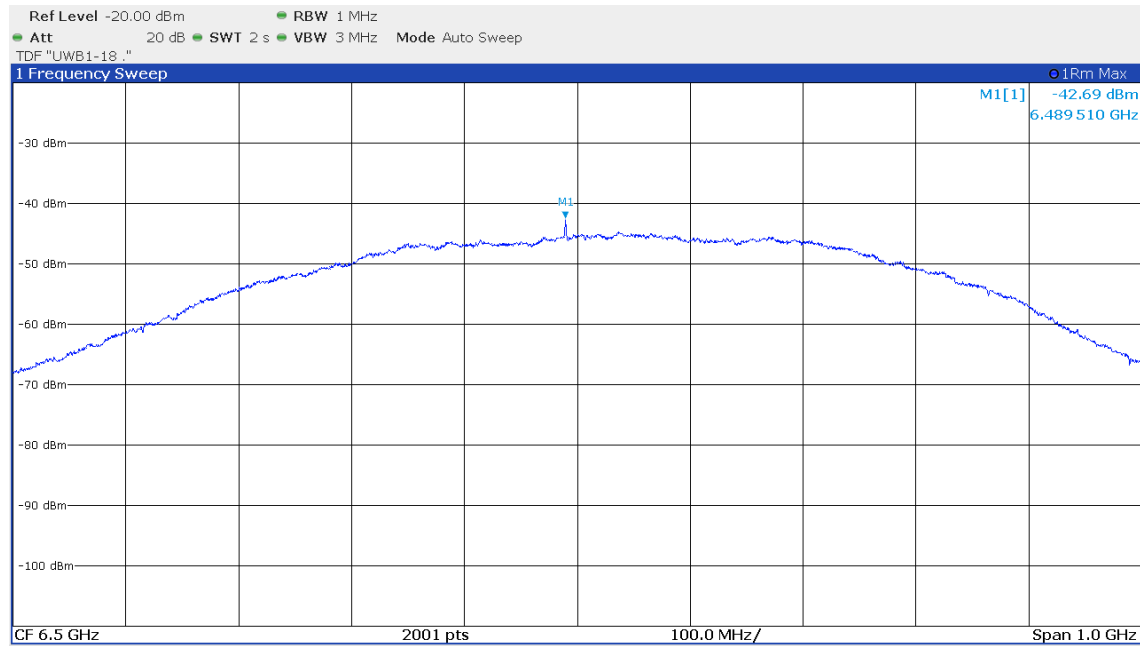
Channel 3
Mean Power

960 MHz to 18 GHz


FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

18 GHz to 40 GHz


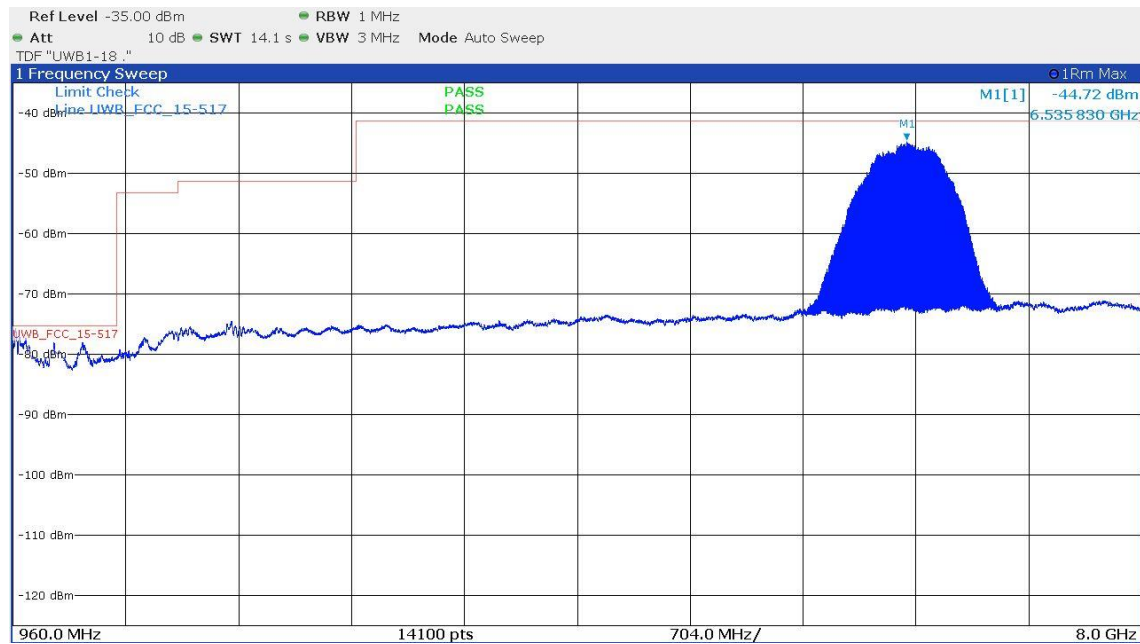
FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

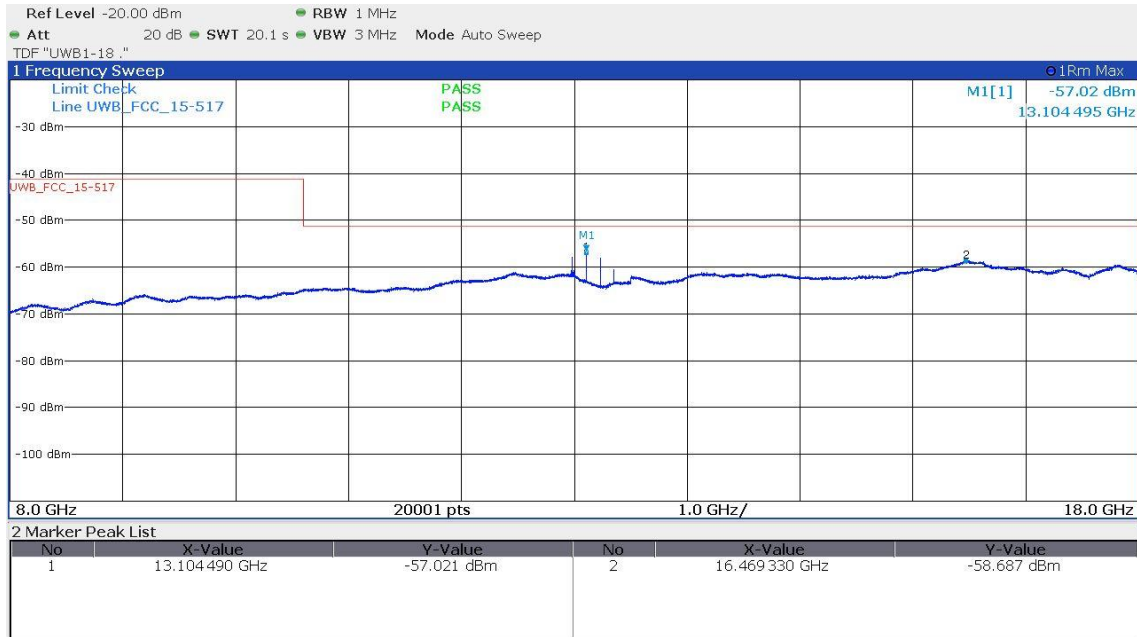
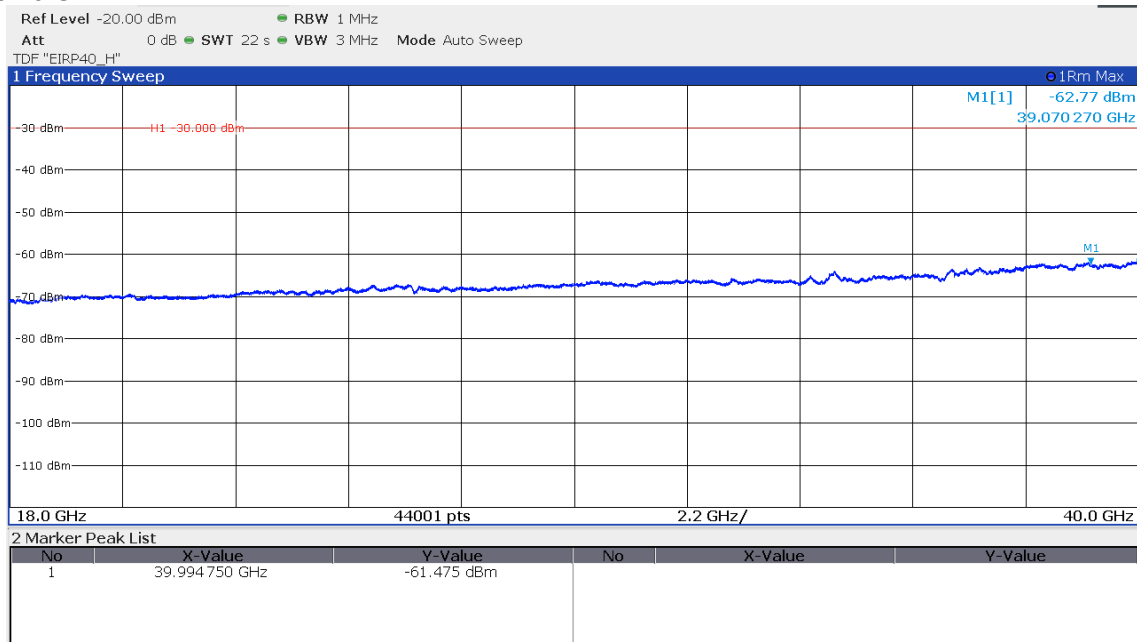
Channel 5

Mean Power



960 MHz to 18 GHz



FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

18 GHz to 40 GHz


FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1
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

Limit according §15.517(c) in the frequency range 960 MHz to 40 GHz:

Frequency in MHz	EIRP in dBm
960-1610	-75.3
1610-1990	-53.3
1990-3100	-51.3
3100-10600	-41.3
Above 10600	-51.3

Limit according RSS-220 5.2.1 (d) in the frequency range 960 MHz to 40 GHz:

Frequency in MHz	EIRP in dBm
960-1610	-75.3
1610-4750	-70.0
4750-10600	-41.3
Above 10600	-51.3

The requirements are **FULFILLED**.

Remarks: All emissions for ch5 between 1610 MHz and 4750 MHz are under RSS-220 limit of -70.0 MHz.

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

5.4 Radiated Emissions at 1164-1240 MHz and 1559-1610 MHz

For test instruments and accessories used see section 6 Part **SER 3**.

5.4.1 Description of the test location

Test location: Anechoic chamber 1

5.4.2 Photo documentation of the test set-up



5.4.3 Applicable standard

According to FCC Part 15, Section 15.517(d):

In addition to the radiated emission limits specified in the table in paragraph (c) of this section, UWB transmitters operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of no less than 1 kHz.

5.4.4 Description of Measurement

The spectral line is measured following the procedure set out in ANSI C63-10, item 10.3.10. The EUT is set in TX continuous mode while measuring.

Analyser settings:

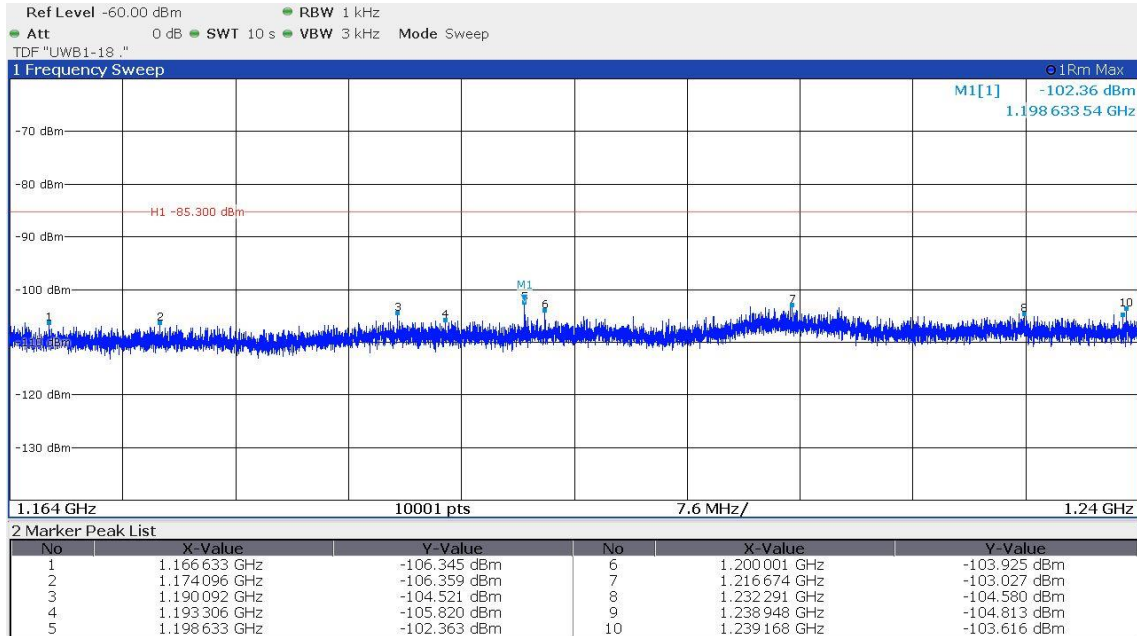
RBW: 1 kHz, VBW: 3 kHz, Detector: RMS, Sweep time: 1 ms/1kHz,

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

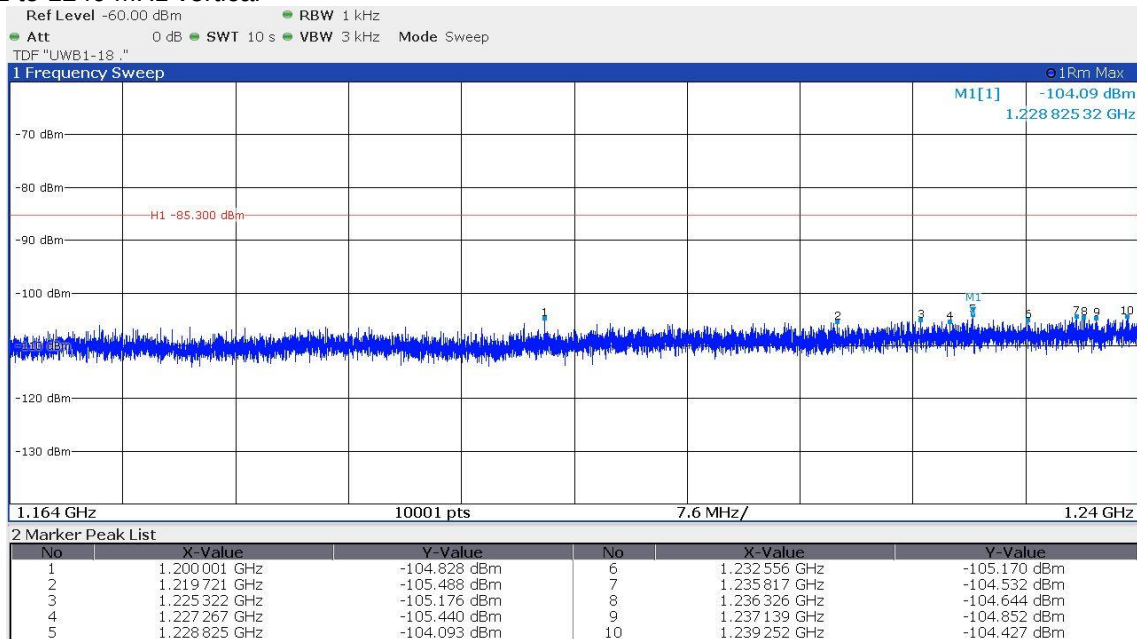
5.4.5 Test result

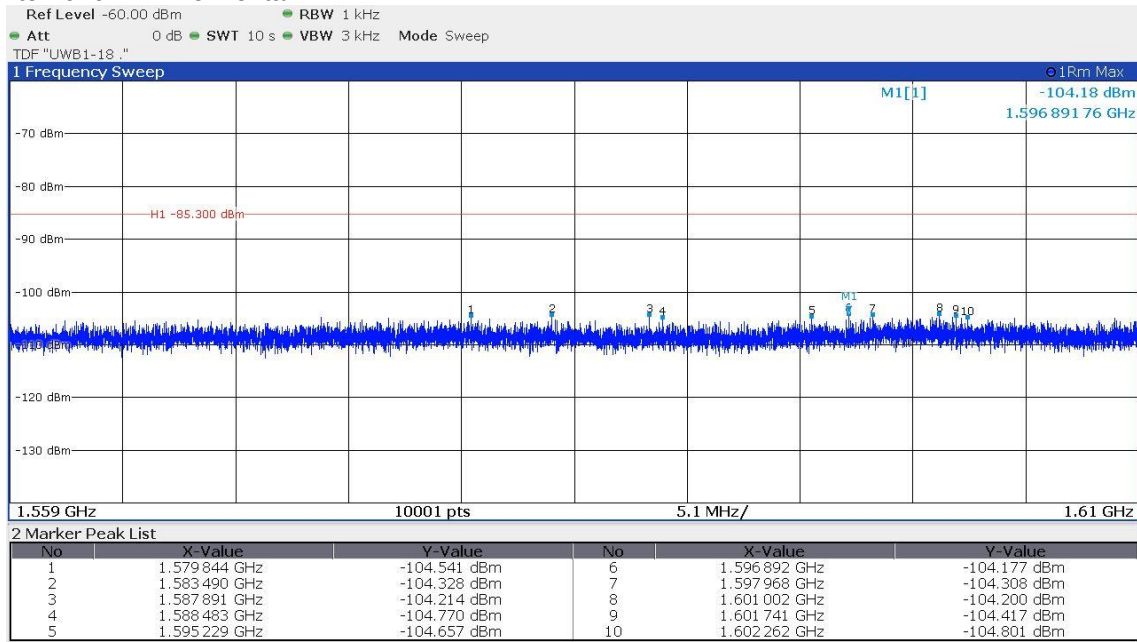
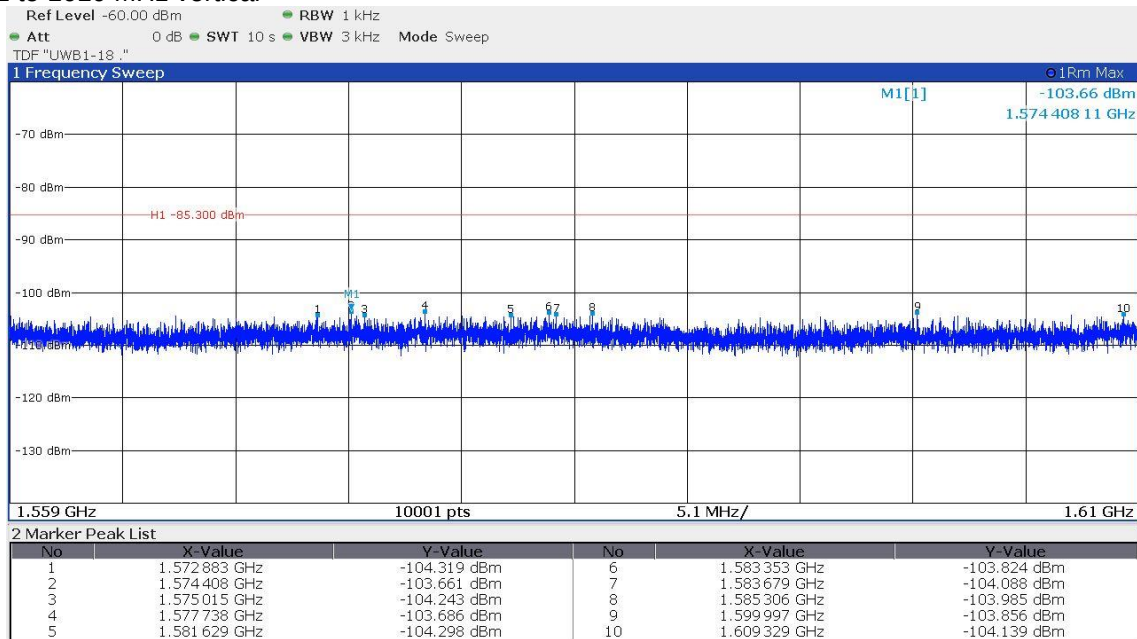
Channel 3:

1164 MHz to 1240 MHz horizontal



1164 MHz to 1240 MHz vertical

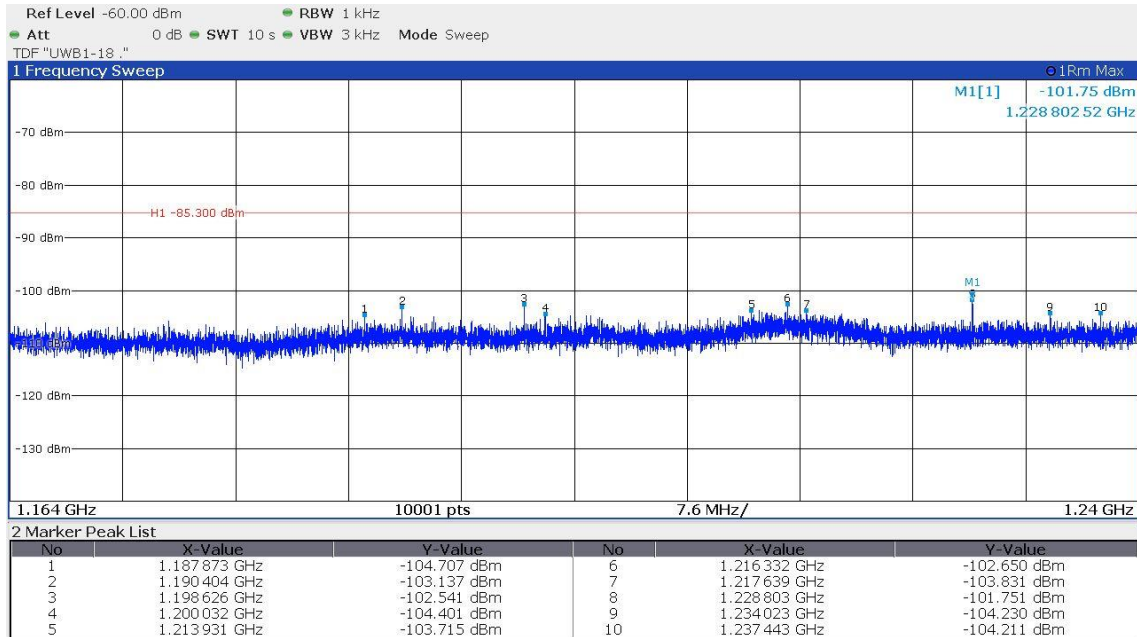


FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1
1559 MHz to 1610 MHz horizontal

1559 MHz to 1610 MHz vertical


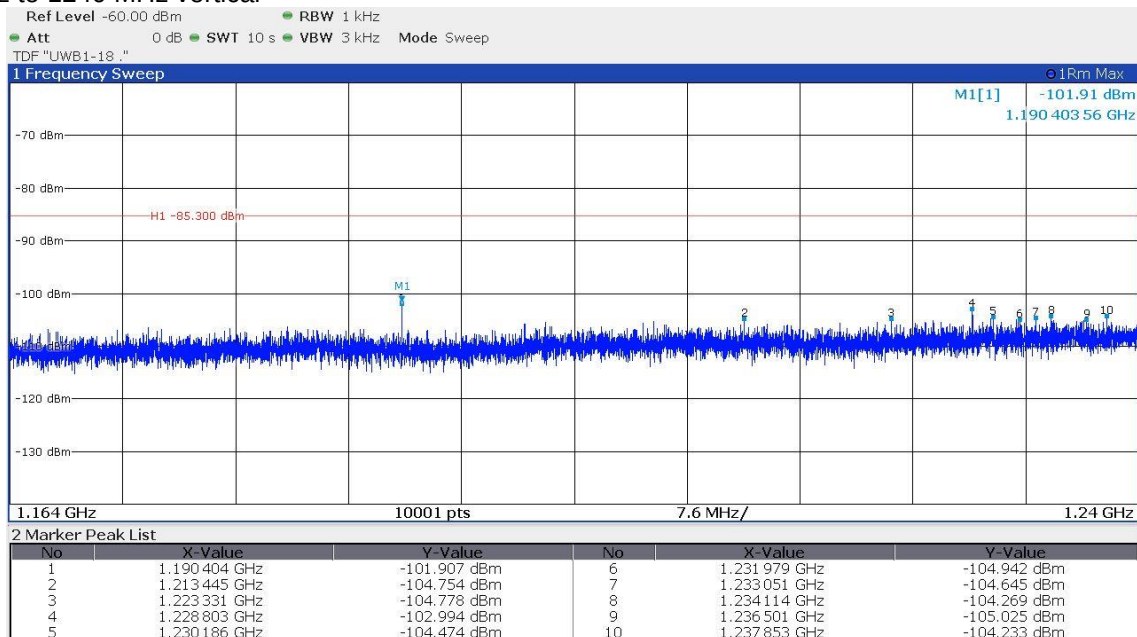
FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

Channel 5:

1164 MHz to 1240 MHz horizontal

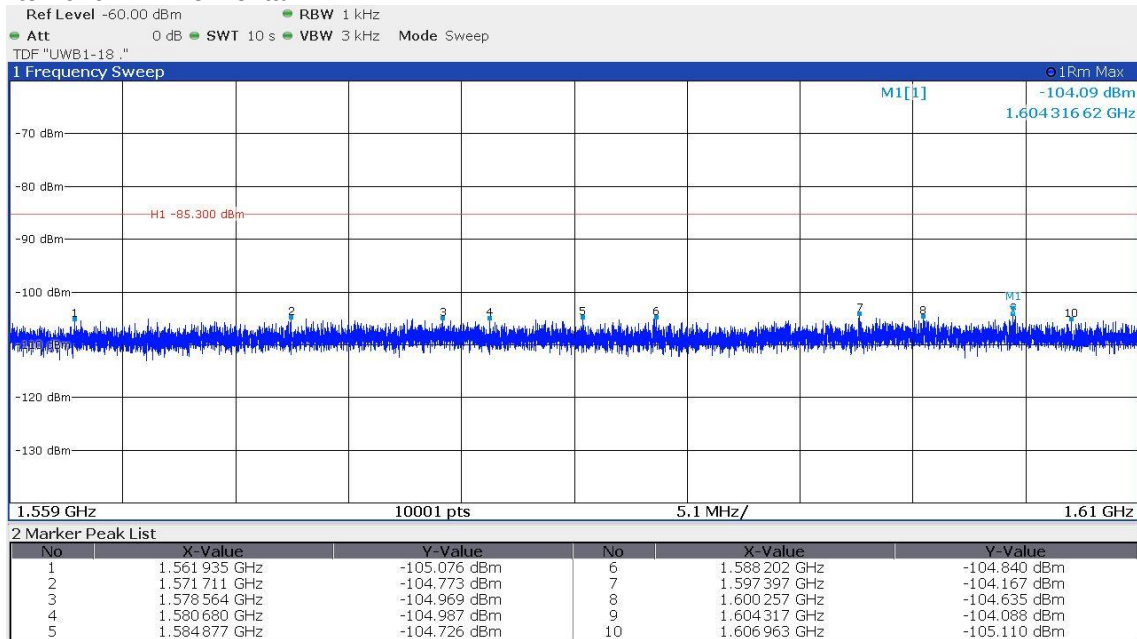


1164 MHz to 1240 MHz vertical

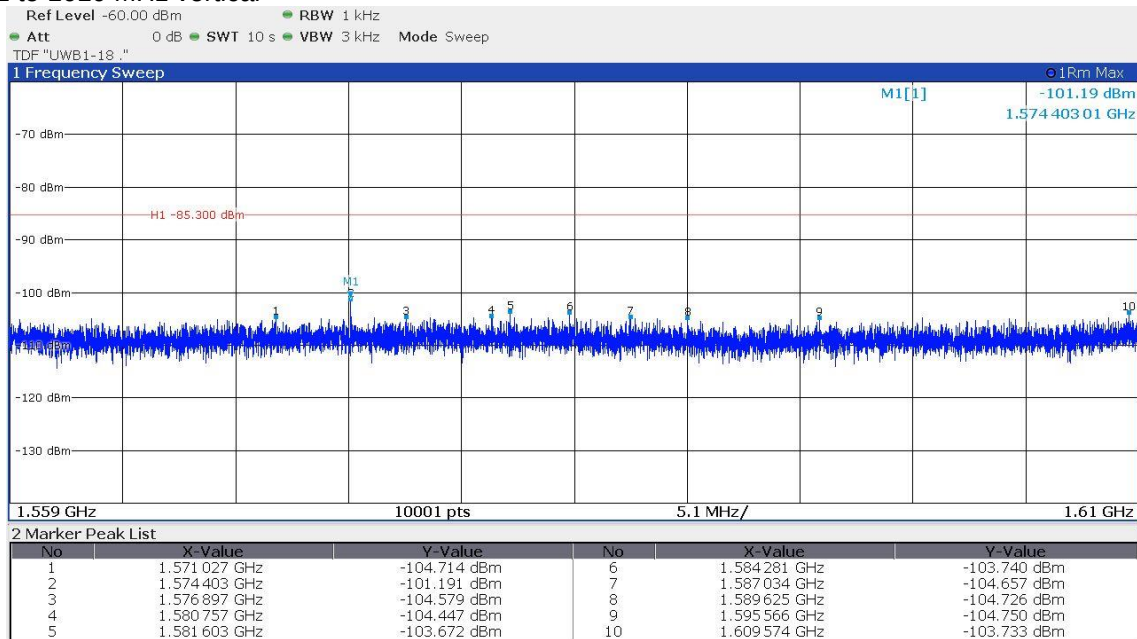


FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

1559 MHz to 1610 MHz horizontal



1559 MHz to 1610 MHz vertical



FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

Limit according §15.519(c) in the frequency

Frequency in MHz	EIRP in dBm
1164-1240	-85.3
1559-1610	-85.3

The requirements are **FULFILLED**.

Remarks: None.

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.

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

5.5 Peak Power radiated

For test instruments and accessories used see section 6 Part **CPR 3**.

5.5.1 Description of the test location

Test location: Anechoic chamber 1

5.5.2 Photo documentation of the test set-up



5.5.3 Applicable standard

According to FCC Part 15, Section 15.517(e):

There is a limit on the peak level of the emissions contained within a 50 MHz bandwidth centered on the frequency at which the highest radiated emission occurs, f_m . That limit is 0 dBm EIRP. It is acceptable to employ a different resolution bandwidth, and a correspondingly different peak emission limit, following the procedures described in §15.521.

5.5.4 Description of Measurement

The peak power is measured following the procedure set out in ANSI C63-10, item 10.3.5. The EUT is set in TX continuous mode while measuring.

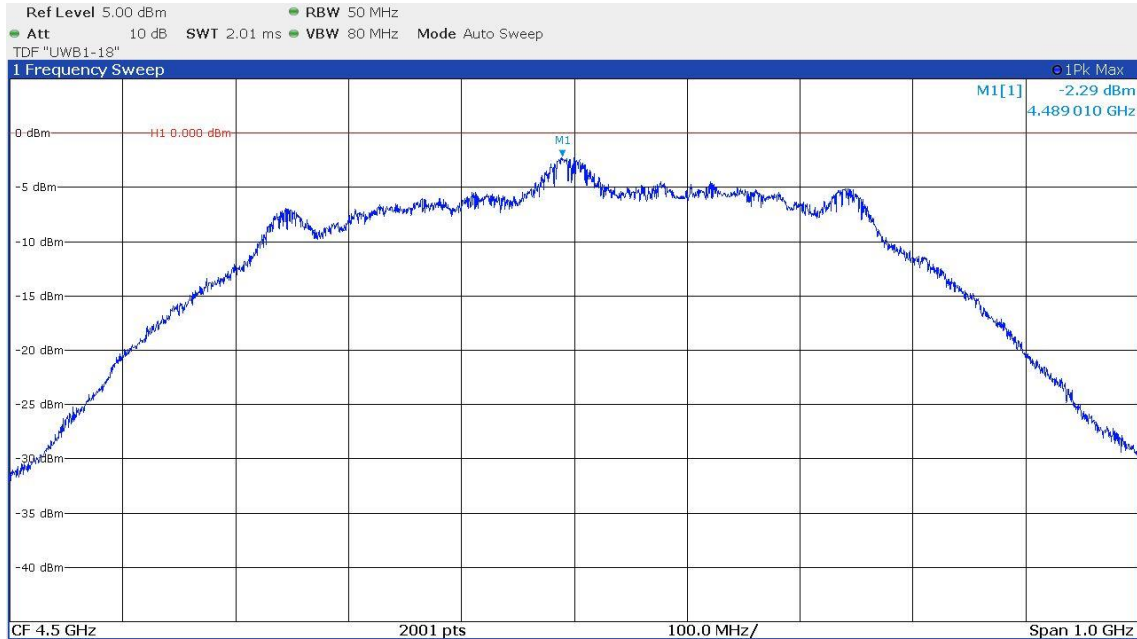
Analyser settings:

RBW: 50 MHz, VBW: 80 MHz, Detector: Peak, Trace Mode: Max hold

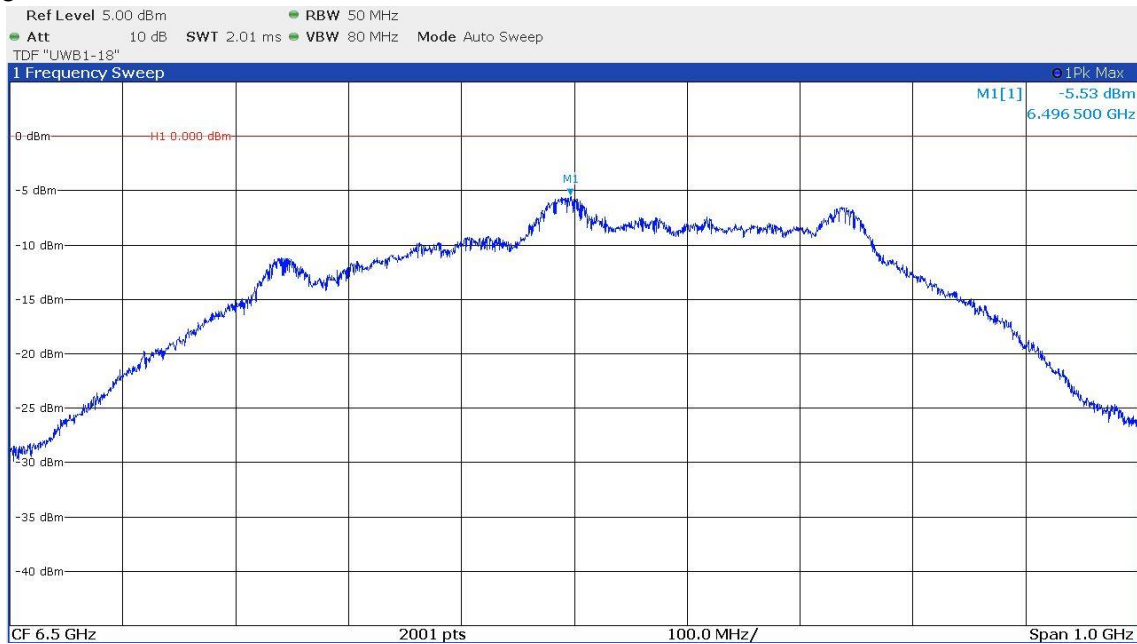
FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

5.5.5 Test result

Channel 3



Channel 5



The requirements are **FULFILLED**.

Remarks: None.

FCC ID: 2ALC5-KNX-AM1 IC: 25557-KNXAM1

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.
A 4	BAT-EMC 2023.0.8.0	01-02/68-13-001				
	ESCI	02-02/03-15-001	03/07/2024	03/07/2023		
	ESH 2 - Z 5	02-02/20-05-004	13/10/2025	13/10/2022	17/04/2024	17/04/2023
	N-4000-BNC	02-02/50-05-138				
	ESH 3 - Z 2	02-02/50-05-155	09/11/2025	09/11/2022	06/08/2024	06/02/2024
CPR 3	FSW43	02-02/11-15-001	04/05/2024	04/05/2023		
	AMF-6D-01002000-22-10P	02-02/17-15-004				
	311702-02/24-05-009	12/07/2024	12/07/2023			
	BAM 4.5-P	02-02/50-17-024				
	NCD	02-02/50-17-025				
	KK-SF106-2X11N-6,5M	02-02/50-18-016				
	BAT-EMC 2023.0.8.0	02-02/68-13-001				
SER 1	ESCI	02-02/03-05-004	05/10/2024	05/10/2023		
	HFH 2 - Z 2	02-02/24-05-020	01/06/2025	01/06/2022	05/09/2024	05/09/2023
	NW-2000-NB	02-02/50-05-113				
	KK-EF393/U-16N-21N20 m	02-02/50-12-018				
	KK-SD_7/8-2X21N-33,0M	02-02/50-15-028				
SER 2	ESVS 30	02-02/03-05-006	27/07/2024	27/07/2023		
	VULB 9168	02-02/24-05-005	20/04/2024	20/04/2023	03/05/2024	03/05/2023
	NW-2000-NB	02-02/50-05-113				
	KK-EF393/U-16N-21N20 m	02-02/50-12-018				
	KK-SD_7/8-2X21N-33,0M	02-02/50-15-028				
	50F-003 N 3 dB	02-02/50-21-010				
SER 3	FSW43	02-02/11-15-001	04/05/2024	04/05/2023		
	AMF-6D-01002000-22-10P	02-02/17-15-004				
	LNA-40-18004000-33-5P	02-02/17-20-002				
	311702-02/24-05-009	12/07/2024	12/07/2023			
	BBHA 9170	02-02/24-05-013	21/03/2026	21/03/2023	21/03/2024	21/03/2023
	BAM 4.5-P	02-02/50-17-024				
	NCD	02-02/50-17-025				
	KK-SF106-2X11N-6,5M	02-02/50-18-016				
	KMS116-GL140SE-KMS116-	02-02/50-20-026				
	BAT-EMC 2023.0.8.0	02-02/68-13-001				

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.