EMI – TEST REPORT

- FCC Part 15B -

Type / Model Name	:	A-07-12
Product Description	:	UWB Anchor
Applicant	:	Kinexon Sports & Media Inc.
Address	:	22 west 38th
		New York, NY 10018
Manufacturer	:	Kinexon GmbH
Address	:	Schellingstraße 35
		80799 München
Licence holder	:	Kinexon Sports & Media Inc.
Address	:	22 west 38th
		New York, NY 10018

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

Test Report No. : T43015-00-01GK	21. July 2017 Date of issue

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

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Contents

1 TEST STANDARDS 3

3 TEST RESULT SUMMARY 6

3.1 Final assessment 6

4 TEST ENVIRONMENT 7

4.1 Address of the test laboratory 7

4.2 Environmental conditions 7

4.3 Statement of the measurement uncertainty 7

4.4 Measurement protocol for FCC 8

5 TEST CONDITIONS AND RESULTS 10

5.1 Conducted emission 10

5.2 Radiated emission 15

6 USED TEST EQUIPMENT AND ACCESSORIES 18

1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 15 Subpart A - General (September, 2016)

Part 15, Subpart A, Section 15.31	Measurement standards
Part 15, Subpart A, Section 15.33	Frequency range of radiated measurements
Part 15, Subpart A, Section 15.35	Measurement detector functions and bandwidths

FCC Rules and Regulations Part 15 Subpart B - Unintentional Radiators (September, 2016)

Part 15, Subpart B, Section 15.107	AC Line conducted emission ☐ Class A device ☒ Class B device
Part 15, Subpart B, Section 15.109	Radiated emission, general requirements
Part 15, Subpart B, Section 15.111	Antenna power conduction

ANSI C63.4: 2014	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
CISPR 16-4-2: 2011 EN 55016-4-2: 2011	Uncertainty in EMC measurement
CISPR 22: 2008 EN 55022: 2010	Information technology equipment

2 EQUIPMENT UNDER TEST

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

2.2 Equipment category

UWB device

2.3 Short description of the equipment under test (EUT)

The technology is used in sports as well as industrial environments.
Kinexon Anchors communicate with each other and nearby Tags to obtain information on the Tag positions.

The EUT includes three radio technologies: UWB, WLAN 802.11 a/b/g/n and Bluetooth low energy

Number of tested samples:	2 (1 radiated and1 conducted sample)
Serial number:	pre-production sample
Firmware version:	2.9.0

2.4 Variants of the EUT

None

2.5 Operation frequency and channel plan

UWB is working in the frequency range 3.1 GHz to 10.6 GHz

BLE is working in the frequency range 2400 MHz to 2483.5 MHz

WLAN is working in the frequency range 2400 MHz to 2483.5 MHz and 5180 MHz to 5825 MHz

2.6 Transmit operating modes

The equipment under test was operated during the measurement under the following conditions:

- all radio technologies active

- all radio technologies off

2.7 Power supply system utilised

Power supply voltage, V_{nom} 115 V AC 60 Hz

Note: The EUT has a DC socket which can be powered with 12 V to 24 V DC. The measurements were performed with a power adapter from the shelf (ETSA120330UD), additionally the conducted emissions measurement was performed with a PoE adapter from TP-Link.

Additionally the EUT can be powered over Ethernet. A PoE adapter from TP-Link (TL-SF1008P) was used.

2.8 Peripheral devices and interface cables

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

- Computer NUC6i5SYH Model : Supplied by the client
- _____ Model : _____
- _____ Model : _____

2.9 Determination of worst case conditions for final measurement

2.9.1 Test Jig

No test jig is used.

2.9.2 Test software

3 TEST RESULT SUMMARY

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	:	24 February 2017
Testing concluded on	:	30 May 2017

Checked by:

Klaus Gegenfurtner
I confirm the correctness and Integrity of this document
2017.07.21 08:49:54 +02'00'

Klaus Gegenfurtner
Teamleader Radio

Tested by:

Konrad Graßl
I am the author of this document
2017.07.21 08:48:07 +02'00'

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.

4.4 Measurement protocol for FCC

4.4.1 General information

4.4.1.1 Test methodology

Conducted and radiated disturbance testing is performed according to the procedures set out by the International Special Committee on Radio Interference (CISPR) Publication 22, European Standard EN 55022 as shown under section 1 of this report.

4.4.1.2 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.

4.4.2 Details of test procedures

4.4.2.1 General standard information

The test methods used comply with CISPR Publication 22, EN 55022 - " Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement" and with ANSI C63.4 - "Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". 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 C63.4 and applying the CISPR 22 limits.

4.4.3 Conducted emission

4.4.3.1 Description of measurement

The final level, expressed in dBµV, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the FCC limit or to the CISPR limit.

To convert between dBµV and µV, the following conversions apply:

$$dB\mu V = 20*\log(\mu V)$$
$$\mu V = 10^{(dB\mu V/20)}$$

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection and a Line Impedance Stabilization Network (LISN) with 50 Ω / 50 µH (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimetres above the floor and is positioned 40 centimetres from the vertical ground plane (wall) of the screen room. 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.

4.4.4 Radiated emission (electrical field 30 MHz - 1 GHz)

4.4.4.1 Description of measurement

Spurious emission from the EUT is 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. The setup of the equipment under test is established in accordance with ANSI C63.4. The interface cables that are closer than 40 centimetres to the ground plane are bundled in the centre in a serpentine fashion so that they are at least 40 centimetres from the ground plane. Cables to simulators/testers (if used in this test) are routed through the centre of the table and to a screened room located outside the test area. The antenna is positioned in horizontal polarisation and is repeated vertically. To locate maximum emission 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 dBµV/m is calculated by add the antenna correction factor and cable loss factor (dB) on the reading from the EMI receiver (dBµV). The FCC or CISPR limit is subtracted from this result in order to provide the delta to limit listed in the measurement protocol.

Example:

Frequency		Reading level		Correction Factor		Level		CISPR Limit		Delta
(MHz)		(dBµV)		(dB/m)		(dBµV/m)		(dBµV/m)		(dB)
719.0		75.0	+	32.6	=	107.6	-	110.0	=	-2.4

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

4.4.5.1 Description of measurement

Radiated emission 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 80 centimetres 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 C63.4. The interface cables that are closer than 40 centimetres to the ground plane are bundled in the centre 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 centre 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 analyser set to max peak detector function and a resolution 1 MHz and video bandwidth 3 MHz for peak and 10 Hz for average 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 emission under better uncertainty and is calculated to the specified test distance.

5 TEST CONDITIONS AND RESULTS

5.1 Conducted emission

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
Used software:

5.1.2 Photo documentation of the test set-up

Please see Attachment A

5.1.3 Applicable standard

According to FCC Part 15, Section 15.107(a):
Except for Class A devices, for equipment 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 C63.4. If the minimum limit margin appears to be less than 20 dB with a peak mode measurement, the emission are re-measured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.

5.1.5 Test result

Frequency range: 0.15 MHz - 30 MHz

Min. limit margin 2.4 dB at 0.15 MHz

Limit according to FCC Part 15, Section 15.107(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

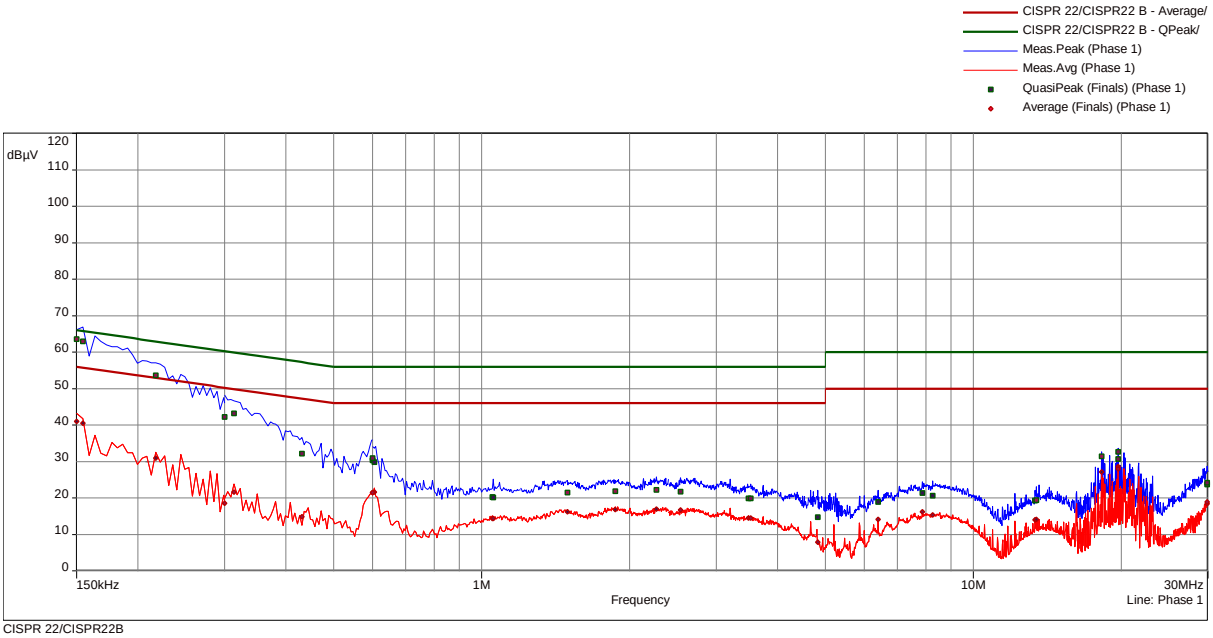
The requirements are **FULFILLED.**

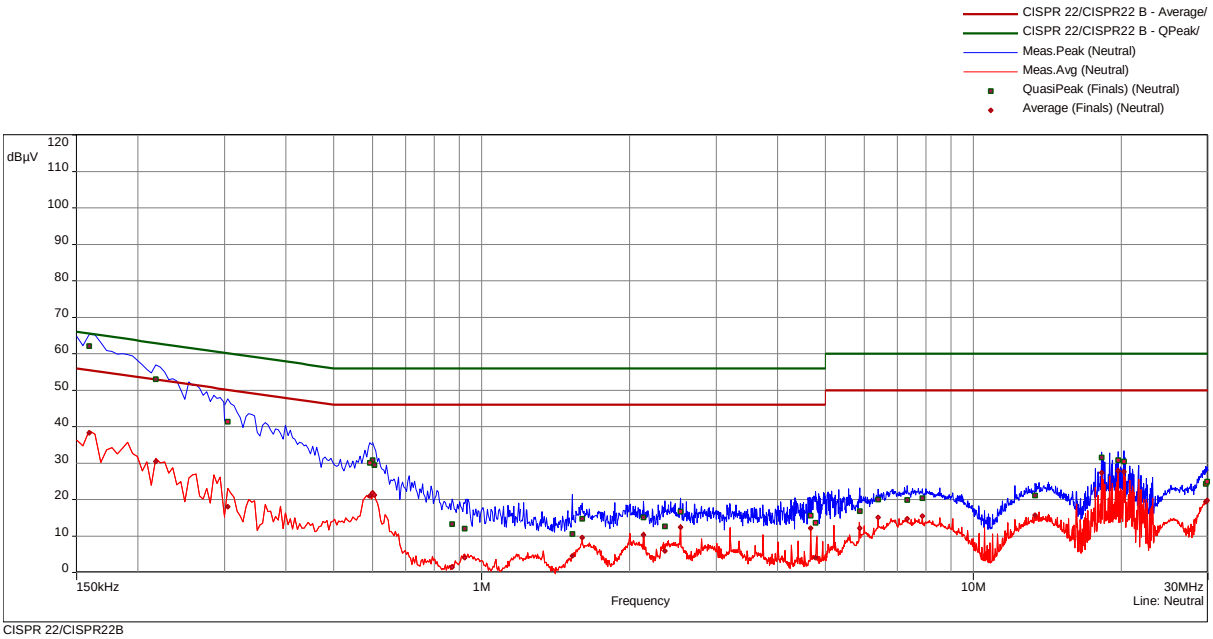
Remarks: For detailed test result please refer to following test protocols

5.1.6 Test protocol

Power adapter ETSA 120330UD

Worst case: WLAN, Bluetooth and UWB active

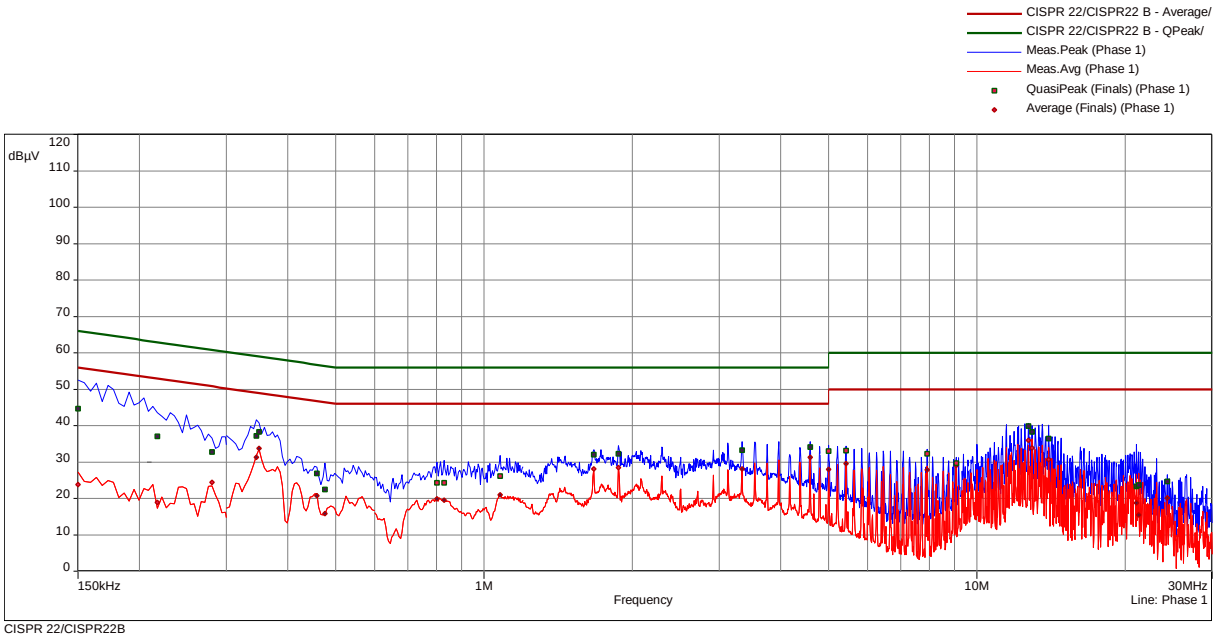




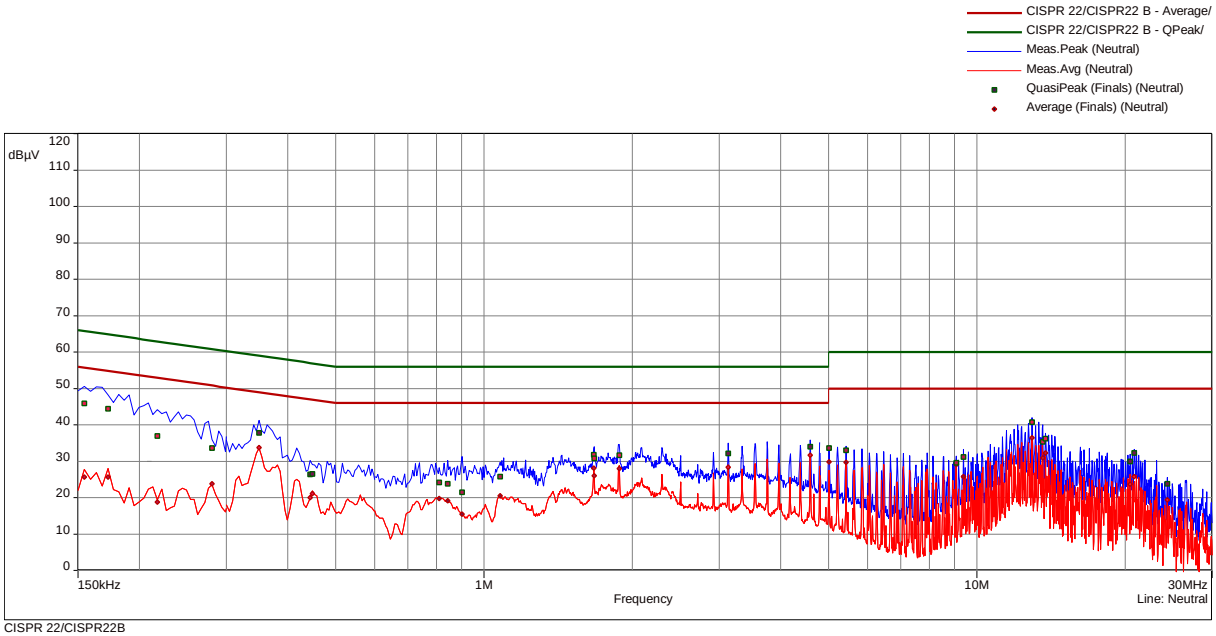
freq	SR	QP	margin	limit	AV	margin	limit	line
MHz		dB(µV)	dB	dB	dB(µV)	dB	dB	
0.15	1	63.60	2.40	66.00	41.03	14.97	56.00	Phase 1
0.1545	1	62.98	2.77	65.75	40.44	15.31	55.75	Phase 1
0.2175	1	53.64	9.27	62.91	30.90	22.01	52.91	Phase 1
0.3	2	42.19	18.05	60.24	18.49	31.75	50.24	Phase 1
0.3135	2	43.24	16.64	59.88	21.57	28.30	49.88	Phase 1
0.4305	2	32.14	25.10	57.24	14.91	32.33	47.24	Phase 1
0.6	2	30.94	25.06	56.00	21.46	24.54	46.00	Phase 1
0.6	3	30.35	25.65	56.00	21.48	24.52	46.00	Phase 1
0.6045	3	29.79	26.21	56.00	21.55	24.45	46.00	Phase 1
1.05	3	20.24	35.76	56.00	14.34	31.66	46.00	Phase 1
1.0545	3	20.11	35.89	56.00	14.38	31.62	46.00	Phase 1
1.4925	4	21.53	34.47	56.00	16.22	29.78	46.00	Phase 1
1.8705	4	21.81	34.19	56.00	16.78	29.22	46.00	Phase 1
2.2665	4	22.18	33.82	56.00	16.97	29.03	46.00	Phase 1
2.535	5	21.74	34.26	56.00	16.67	29.33	46.00	Phase 1
3.4845	5	19.89	36.11	56.00	14.44	31.56	46.00	Phase 1
3.525	5	19.83	36.17	56.00	14.47	31.53	46.00	Phase 1
4.8225	6	14.69	41.31	56.00	7.81	38.19	46.00	Phase 1
6.402	6	18.87	41.13	60.00	14.18	35.82	50.00	Phase 1
7.869	6	21.32	38.68	60.00	16.18	33.82	50.00	Phase 1
8.2695	6	20.63	39.37	60.00	15.35	34.65	50.00	Phase 1
13.3575	7	19.29	40.71	60.00	14.06	35.94	50.00	Phase 1
13.4205	7	19.41	40.59	60.00	14.11	35.89	50.00	Phase 1
18.2445	7	31.36	28.64	60.00	27.17	22.83	50.00	Phase 1
19.7085	8	32.65	27.35	60.00	28.64	21.36	50.00	Phase 1
19.713	8	30.73	29.27	60.00	27.97	22.03	50.00	Phase 1
29.892	8	23.73	36.27	60.00	18.45	31.55	50.00	Phase 1
29.8965	8	24.22	35.78	60.00	18.91	31.09	50.00	Phase 1
0.159	9	62.10	3.42	65.52	38.25	17.27	55.52	Neutral
0.2175	9	53.04	9.88	62.91	30.38	22.53	52.91	Neutral
0.3045	10	41.32	18.80	60.12	17.99	32.13	50.12	Neutral
0.5925	10	30.07	25.93	56.00	21.01	24.99	46.00	Neutral
0.6	11	30.81	25.19	56.00	21.89	24.11	46.00	Neutral
0.6045	11	29.50	26.50	56.00	21.29	24.71	46.00	Neutral
0.87	11	13.27	42.73	56.00	1.52	44.48	46.00	Neutral
0.924	11	12.00	44.00	56.00	4.01	41.99	46.00	Neutral
1.5285	12	10.58	45.42	56.00	4.54	41.46	46.00	Neutral
1.6005	12	14.77	41.23	56.00	9.54	36.46	46.00	Neutral
2.1315	12	15.07	40.93	56.00	10.33	35.67	46.00	Neutral
2.3565	12	12.70	43.30	56.00	5.94	40.06	46.00	Neutral
2.535	13	16.65	39.35	56.00	12.34	33.66	46.00	Neutral
4.668	13	15.58	40.42	56.00	12.10	33.90	46.00	Neutral
4.7715	13	13.69	42.31	56.00	4.02	41.98	46.00	Neutral
5.871	14	16.81	43.19	60.00	12.19	37.81	50.00	Neutral
6.402	14	20.00	40.00	60.00	15.06	34.94	50.00	Neutral
7.3335	14	19.94	40.06	60.00	14.72	35.28	50.00	Neutral
7.869	14	20.37	39.63	60.00	15.41	34.59	50.00	Neutral
13.3575	15	21.09	38.91	60.00	15.74	34.26	50.00	Neutral
18.2445	15	31.56	28.44	60.00	27.32	22.68	50.00	Neutral
19.713	16	30.80	29.20	60.00	27.91	22.09	50.00	Neutral
20.262	16	30.41	29.59	60.00	27.63	22.37	50.00	Neutral
29.6985	16	24.36	35.64	60.00	19.39	30.61	50.00	Neutral
29.892	16	24.96	35.04	60.00	19.79	30.21	50.00	Neutral

Power over Ethernet adapter TP-Link

Worst case: WLAN, Bluetooth and UWB active



CISPR 22/CISPR22B



CISPR 22/CISPR22B

freq	SR	QP	margin	limit	AV	margin	limit	line
MHz		dB(µV)	dB	dB	dB(µV)	dB	dB	
0.15	1	44.70	21.30	66.00	23.87	32.13	56.00	Phase 1
0.2175	1	37.01	25.91	62.91	18.89	34.02	52.91	Phase 1
0.2805	1	32.76	28.04	60.80	24.41	26.39	50.80	Phase 1
0.345	2	37.24	21.84	59.08	31.27	17.81	49.08	Phase 1
0.3495	2	38.35	20.62	58.97	33.69	15.28	48.97	Phase 1
0.4575	2	26.92	29.82	56.74	20.72	26.02	46.74	Phase 1
0.4755	2	22.45	33.97	56.42	15.81	30.61	46.42	Phase 1
0.8025	3	24.26	31.74	56.00	19.83	26.17	46.00	Phase 1
0.8295	3	24.28	31.72	56.00	19.54	26.46	46.00	Phase 1
1.077	3	26.16	29.84	56.00	20.93	25.07	46.00	Phase 1
1.668	4	32.00	24.00	56.00	28.12	17.88	46.00	Phase 1
1.875	4	32.33	23.67	56.00	28.46	17.54	46.00	Phase 1
3.336	5	33.30	22.70	56.00	28.10	17.90	46.00	Phase 1
4.587	5	34.07	21.93	56.00	31.32	14.68	46.00	Phase 1
5.0025	6	33.06	26.94	60.00	27.97	22.03	50.00	Phase 1
5.421	6	33.15	26.85	60.00	29.63	20.37	50.00	Phase 1
7.923	6	32.23	27.77	60.00	27.86	22.14	50.00	Phase 1
9.0705	6	29.70	30.30	60.00	29.11	20.89	50.00	Phase 1
12.7185	7	39.92	20.08	60.00	35.91	14.09	50.00	Phase 1
12.9255	7	38.25	21.75	60.00	33.91	16.09	50.00	Phase 1
13.9695	7	36.51	23.49	60.00	30.67	19.33	50.00	Phase 1
21.0585	8	23.36	36.64	60.00	18.77	31.23	50.00	Phase 1
21.27	8	23.64	36.36	60.00	15.50	34.50	50.00	Phase 1
24.3525	8	24.66	35.34	60.00	20.14	29.86	50.00	Phase 1
0.1545	9	45.95	19.80	65.75	25.70	30.05	55.75	Neutral
0.1725	9	44.39	20.45	64.84	25.70	29.14	54.84	Neutral
0.2175	9	36.95	25.96	62.91	18.79	34.12	52.91	Neutral
0.2805	9	33.62	27.18	60.80	23.85	26.95	50.80	Neutral
0.3495	10	37.79	21.19	58.97	33.77	15.21	48.97	Neutral
0.444	10	26.34	30.64	56.99	20.06	26.93	46.99	Neutral
0.4485	10	26.48	30.42	56.90	21.05	25.85	46.90	Neutral
0.8115	11	24.21	31.79	56.00	19.76	26.24	46.00	Neutral
0.843	11	23.80	32.20	56.00	19.16	26.84	46.00	Neutral
0.9015	11	21.48	34.52	56.00	15.43	30.57	46.00	Neutral
1.077	11	25.77	30.23	56.00	20.56	25.44	46.00	Neutral
1.668	12	31.75	24.25	56.00	28.14	17.86	46.00	Neutral
1.6725	12	30.84	25.16	56.00	26.08	19.92	46.00	Neutral
1.8795	12	31.71	24.29	56.00	27.95	18.05	46.00	Neutral
3.129	13	32.14	23.86	56.00	28.34	17.66	46.00	Neutral
4.5915	13	34.01	21.99	56.00	31.61	14.39	46.00	Neutral
5.007	14	33.64	26.36	60.00	29.77	20.23	50.00	Neutral
5.4255	14	33.05	26.95	60.00	29.73	20.27	50.00	Neutral
9.0705	14	29.61	30.39	60.00	29.13	20.87	50.00	Neutral
9.39	14	31.12	28.88	60.00	25.77	24.23	50.00	Neutral
12.9345	15	40.71	19.29	60.00	36.50	13.50	50.00	Neutral
13.605	15	35.40	24.60	60.00	30.87	19.13	50.00	Neutral
13.7715	15	36.24	23.76	60.00	32.24	17.76	50.00	Neutral
20.451	16	29.98	30.02	60.00	23.66	26.34	50.00	Neutral
20.865	16	32.26	27.74	60.00	25.80	24.20	50.00	Neutral
24.3525	16	23.82	36.18	60.00	19.35	30.65	50.00	Neutral

5.2 Radiated emission

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

5.2.1 Description of the test location

Test location: OATS 1
Test location: Anechoic chamber 1

Test distance: 3 m

5.2.2 Photo documentation of the test setup

Please see Attachment A

5.2.3 Applicable standard

According to FCC Part 15B, Section 15.109 (a):
Except for Class A digital devices, the field strength of radiated emission from unintentional radiators at a distance of 3 m shall not exceed the given limit.

5.2.4 Description of Measurement

The radiated emissions from the EUT are measured in the frequency range of 30 MHz to 1000 MHz using a tuned receiver and appropriate broadband linearly polarized antennas. The setup of the EUT and the measurement procedure is in accordance to ANSI C63.4, Item 8 and 12. In the frequency range above 1 GHz a spectrum analyser is used. If the emission level in peak mode complies with the average limit, testing is stopped and peak values will be reported, otherwise, the emission is measured in average mode again and both are reported. The EUT is measured in RX continuous mode under normal conditions.

Spectrum analyser settings:
30 MHz – 1000 MHz: RBW: 120 kHz
1000 MHz – 25 GHz: RBW: 1 MHz, VBW: 3 MHz, Sweep: Auto, Detector function: Peak

5.2.5 Test result

f < 1 GHz

Worst case: all radio technologies active

Powered with power adapter

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)
38.39	19.6	1.4	14.4	13.2	34.0	14.6	40.0	-6.0
135.68	-1.4	1.5	13.1	13.9	11.7	15.4	43.5	-28.1
216.00	8.4	1.9	12.1	12.6	20.5	14.5	43.5	-23.0
250.00	21.7	28.4	13.8	14.0	35.5	42.4	46.0	-3.6
326.57	2.2	3.2	17.7	17.3	19.9	20.5	46.0	-25.5
358.10	-1.8	-6.7	18.6	18.3	16.8	11.6	46.0	-29.2
500.00	15.3	16.4	22.5	22.3	37.8	38.7	46.0	-7.3
750.00	-1.9	-6.3	28.3	27.7	26.4	21.4	46.0	-19.6
875.00	4.1	4.1	30.7	30.3	34.8	34.4	46.0	-11.2
960.00	-7.4	-9.0	31.9	31.4	24.5	22.4	46.0	-21.5

Powered over ethernet

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)
71.60	17.2	9.6	13.5	12.9	30.7	22.5	40.0	-9.3
75.75		20.9		11.9		32.8	40.0	-7.2
86.50	-0.3	8.5	9.6	10.0	9.3	18.5	40.0	-21.5
124.98		9.5		13.2		22.7	43.5	-20.8
250.02	30.0	27.7	13.8	14.0	43.8	41.7	46.0	-2.2
375.00	2.2	5.5	19.1	18.8	21.3	24.3	46.0	-21.7
960.09	-5.7	-2.3	31.9	31.4	26.2	29.1	54.0	-24.9

f > 1 GHz

During the measurement all radio technologies were off.

Powered with power adapter

Detector	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)
Peak	1125.00		69.7		-20.4		49.3	54.0	-4.7
Peak	1124.60	64.7		-20.4		44.3		54.0	-9.7
Peak	1499.60	64.7		-20.6		44.1		54.0	-9.9

Powered over ethernet

Detector	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)
Peak	1125.00	69.7		-20.4		49.3		54.0	-4.7
Peak	1125.00		69.5		-20.4		49.1	54.0	-4.9
Peak	1374.80		64.8		-19.7		45.1	54.0	-8.9

Note: The peak measurements fulfil the average limit, therefore an average measurement is not required.

In the frequency range 18 GHz to 40 GHz no detectable values belonging to the EUT could be detected.

Limit according to FCC Part 15B, Section 15.109(a):

Frequency (MHz)	Limit (µV/m)	Limit (dBµV/m)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

The requirements are **FULFILLED.**

Remarks: The measurement is performed according to FCC Part 15A, Section 15.33(b), up to 40 GHz.

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	ESCI	02-02/03-15-001	31/05/2018	31/05/2017		
	ESH 2 - Z 5	02-02/20-05-004	26/10/2017	26/10/2015	24/05/2017	24/11/2016
	N-4000-BNC	02-02/50-05-138				
	N-1500-N	02-02/50-05-140				
	ESH 3 - Z 2	02-02/50-05-155	18/11/2019	18/11/2016	21/10/2017	21/04/2017
SER 2	ESCI	02-02/03-05-004	12/09/2017	12/09/2016		
	VULB 9168	02-02/24-05-005	12/04/2018	12/04/2017	12/10/2017	12/04/2017
	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 3	FSP 40	02-02/11-11-001	13/10/2017	13/10/2016		
	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	09/12/2017	09/12/2016
	KMS102-0.2 m	02-02/50-11-020				
	SF104/11N/11N/300MM	02-02/50-13-008				
	Ultimate 1000W	02-02/50-16-004				
	18N-20	02-02/50-17-003				
	NMS111-GL200SC01-NMS11	02-02/50-17-012				
	Bandpass Filter	02-02/50-17-019				