



Czech Metrology Institute

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Testing laboratory No. 1341 accredited by the Czech Accreditation Institute according to ČSN EN ISO/IEC 17025:2018

Laboratory: TESTCOM Praha, Hvožd'anská 3, Praha 4, 148 00
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TEST REPORT

8551-PT-E0111-22

Date of issue: September 27th, 2022

Page 1 of 1

Customer: 2N TELEKOMUNIKACE a.s.
Modřanská 621
143 01 Praha 4
Czech Republic

Manufacturer: 2N TELEKOMUNIKACE a.s.
Modřanská 621
143 01 Praha 4
Czech Republic

Subject of the test: Electromagnetic compatibility

Kind of equipment: Lift communication system

Order number.: 9216xxx

Type: 2N® Lift IP 2.0

Serial number: 52-2859-0020

Test procedure (used standard): FCC 47 CFR part 15, subpart B - Verification

Place of the test: TESTCOM Praha, Hvožd'anská 3, Praha 4, 148 00

The results of the tests have been obtained following the procedures reported in this Report and are related only to the tested item, date, place and conditions of the test. Test Report does not substitute any other document that may be required by national authorities according to relevant regulations.

Measurement equipment, date and place of test, ambient and test conditions, results of testing and statements of compliance and other relevant information are written in the Annex 1 of this Test Report.

Any comparison of measured values with the required ones as well as any other assessment is outside the terms of accreditation pursuing the CSN EN ISO/IEC 17025:2018 standard. Uncertainty of measurement (according to EA-4/02 M: 2022): The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Tested by:


Ing. Marek Svoboda, PhD.



Head of the Department:


Ing. Karel Pitaš

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Ref. No. 8551-PT-E0111-22

Customers information

Kind of Equipment: **Lift communication system**

Type Designation: **2N® Lift IP 2.0**

Order number.: **9216xxx**

Serial Number: **52-2859-0020**

Manufacturer: **2N Telekomunikace
Modřanská 621
143 01 Praha 4
Czech Republic**

Applicant: **2N Telekomunikace
Modřanská 621
143 01 Praha 4
Czech Republic**

Used Standards: **FCC 47 CFR part 15, subpart B - Verification**

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Test specification

Emission : Requirements according to

X

FCC, Part 15, Class B, verification

FCC, Part 15, Class B, DoC - all listed components

FCC, Part 15, Class B, certification

X

$f < 1000$ MHz :

Test setup and tests were performed according to CISPR 22:2008/

CISPR 32:2015

Compliance with CISPR 32 is used to demonstrate conformity with FCC requirements. This conforms with FCC Part §15.107(a) and §15.109(g).

X

$f > 1000$ MHz :

Test setup and tests were performed according to CISPR 22:2008/

CISPR 32:2015

The test results presented in this report apply only to the EUT with the test setup described. Any modification such as change, addition to or inclusion of another device will require an additional evaluation.

The support equipment listed as part of the emission tests is required to properly exercise and test the EUT.

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Summary of Tests

	Clause	Results of performed tests		
		passed	passed with modification	not passed
Conducted Emission	§15.107	passed		
Radiated Emission 30 MHz-1000 MHz	§15.109	passed		
Radiated Emission 1000 MHz-6000 MHz	§15.109	passed		

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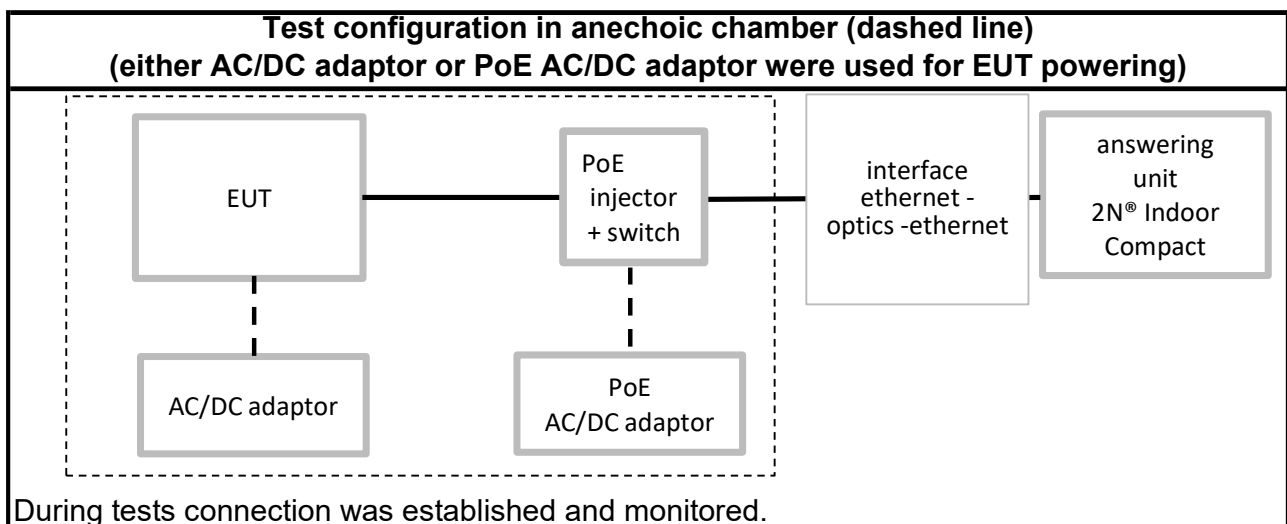
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General EUT information

Description of EUT			
☒ table top equipment		☐ floor standing equipment	
Mains voltage:	DC 12 V or DC 48 V PoE	Clock frequencies [MHz]:	< 1 GHz
The EUT is communicator. It is speakerphone designed for two-way emergency communication between the elevator and the control center. EUT is connected to external system by means of internet cable. EUT is equipped with signalization diodes. EUT is powered either by means of external AC/DC adaptor or PoE.			



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Peripheral devices used for testing

Major subassemblies or Internal peripherals				
Device	Manufacturer	Type	SN	FCC ID/Canada IC
Unit - Flush mounting, EN, with button	2N	921618BE	52-2869-0020	
Peripheral devices used for testing				
Device	Manufacturer	Type	SN	FCC ID
AC/DC adaptor	SUNNY	SYS1308-2412-W2E	G110206033809	---
PoE injector and switch	TP-link	TL-SF1005P	219B417003540	---
AC/DC adaptor for PoE injector	TP-link	T480125-2-DT	---	---
Answering unit	2N	2N® Indoor Compact	52-3023-0463	---

List of cables

Input / Output (Line)	Length [m]:	Shielded / Nonshielded
DC line input (2 wire cable)	1	N
Ethernet line (EUT to PoE injector)	1,5	N
push button two wire cable	1	N
electrical lock two wire cable	1	N

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Equipment classification : FCC Title 47 Part 15, Subpart A, ch. 15.3(i)

Class B digital device. A digital device that is marketed for use in a residential environment notwithstanding use in commercial, business and industrial environments. Examples of such devices include, but are not limited to, personal computers, calculators, and similar electronic devices that are marketed for use by the general public.

Definition : FCC Title 47 Part 15, Subpart A, ch. 15.3(k)

Digital device. (Previously defined as a computing device). An unintentional radiator (device or system) that generates and uses timing signals or pulses at a rate in excess of 9,000 pulses (cycles) per second and uses digital techniques; inclusive of telephone equipment that uses digital techniques or any device or system that generates and uses radio frequency energy for the purpose of performing data processing functions, such as electronic computations, operations, transformations, recording, filing, sorting, storage, retrieval, or transfer. A radio frequency device that is specifically subject to an emanation requirement in any other FCC Rule part or an intentional radiator subject to subpart C of this part that contains a digital device is not subject to the standards for digital devices, provided the digital device is used only to enable operation of the radio frequency device and the digital device does not control additional functions or capabilities.

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Test details

Both conducted and radiated measurements were performed and controlled by means of EMC 32 software manufactured by Rohde -Schwarz.

In case of conducted measurement the software switched the AMN to measure on different lines, in case of radiated measurement the software controlled the antenna height, polarization and turntable position.

Uncertainties of measurement according to EA - 4/16

Standard	measurement	Uncertainty [dB]	Remark
ČSN EN 55022/ ČSN EN 55032/ CISPR 22/ CISPR 32	EM field 30 MHz-300 MHz / bicon. antenna	3,6	
	EM field 30 MHz-1000 MHz /logper. antenna	3,9	
	voltage with ESH2-Z5 coupling	2,3	
	EM field 1000 MHz-6000 MHz /horn antenna (FAR)	3,7	

Uncertainty is expressed according to EA-4/16 - level of reliability is 95%.

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Conducted Emission 150 kHz - 30 MHz

Limits equivalent	FCC, Part 15 and CISPR 22/ CISPR32
Methods of measurement equivalent	ANSI C 63.4

Date of test: 12.09.2022
 Ambient temperature: 21 °C ± 3 °C
 Relative humidity: 38 % ± 10%
 Measured by: MSV
 Place of measurement: Shielded cabin Siemens, CMI-TESTCOM EMC Laboratory

Test Procedure & Setup

The test was carried out automatically by the test receiver using EMC 32 software by Rohde-Schwarz. The setup was adjusted on a wooden table with dimensions 1,5 m x 0,8 m x 0,8 m (LxWxH). Measurement was performed by means of Rohde-Schwarz EMC 32 software. Audio and video link between EUT and telephone set was established. There were performed two measurements : EUT was powered
 (1) from AC/DC adaptor
 (2) from PoE AC/DC adaptor.

Conducted limits Class B digital devices, (FCC Title 47 Part 15, Subpart B §15.107 (a))

Frequency range [MHz]	Detector type / Limit	
	Quasi-peak [dBµV]	Average [dBµV]
0.15-0.5	66-56*	56-46*
0.5 - 5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency.		

Test equipment:	Ident. No.	Last Cal./Ver.	Cal./ Ver. Interval
EMI test receiver R/S ESR7	C186	10/21	2 y
V-type AMN R/S ESH2-Z5	C135	10/21	3 y

Conducted emission data calculation

Graphics and tabular results in [dBµV] are corrected with corresponding factors (cable attenuation, AMN transducer factor)

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Legend to graphics

Blue trace : preview result PK detector
Blue diamond : final result QP detector
Green trace : preview result AV detector
Green diamond : final result AV detector
Red line : CISPR 32 Limit QP Class B
Violet line : CISPR 32 Limit AV Class B

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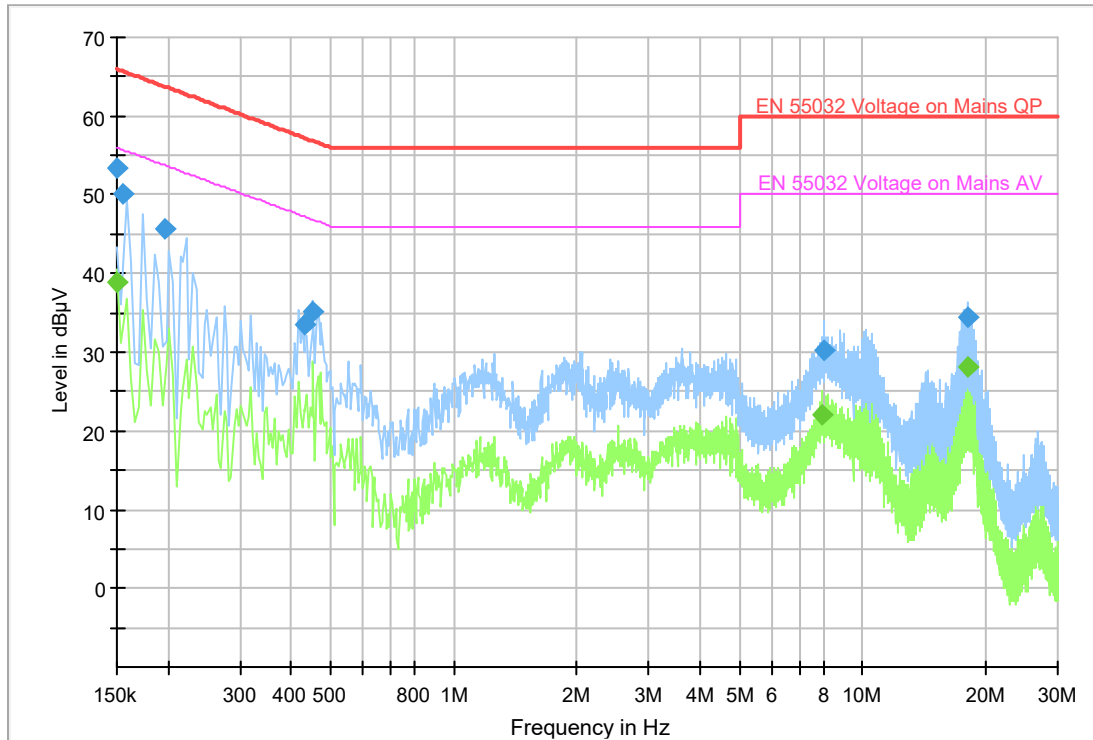
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Measured data, AC/DC adaptor powering (AC : 110 V 60 Hz)

Full Spectrum



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.150000	53.42	66.00	12.58	1000.0	10.000	N	FLO	0.0
0.155000	50.14	65.73	15.59	1000.0	10.000	N	FLO	0.0
0.197000	45.77	63.74	17.97	1000.0	10.000	N	FLO	0.0
0.434000	33.45	57.18	23.72	1000.0	10.000	L1	FLO	0.0
0.453000	35.15	56.82	21.67	1000.0	10.000	L1	FLO	0.0
8.077000	30.23	60.00	29.77	1000.0	10.000	N	FLO	0.0
18.150000	34.42	60.00	25.58	1000.0	10.000	N	FLO	0.0

Final_Result_AVG

Frequency (MHz)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.150000	39.00	56.00	17.00	1000.0	10.000	N	FLO	0.0
7.980000	21.96	50.00	28.04	1000.0	10.000	N	FLO	0.0
18.150000	28.07	50.00	21.93	1000.0	10.000	L1	FLO	0.0

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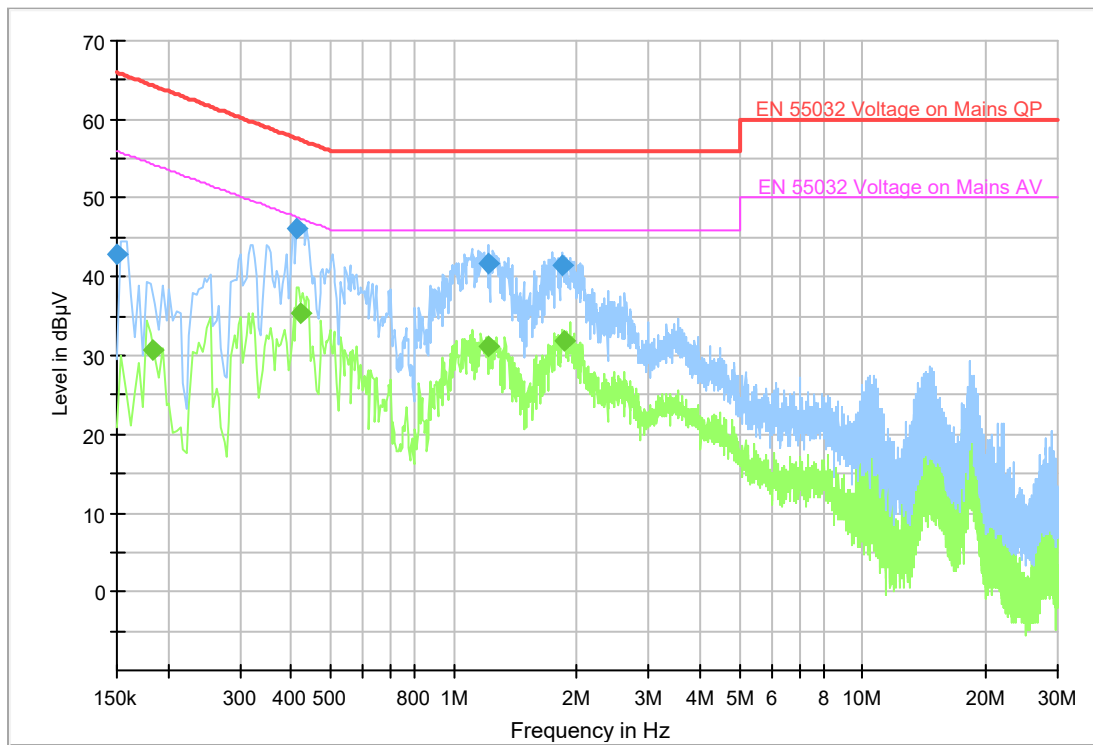
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Measured data, PoE adaptor powering (AC : 110 V 60 Hz)

Full Spectrum



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.150000	42.78	66.00	23.22	1000.0	10.000	N	FLO	0.0
0.412000	46.07	57.61	11.54	1000.0	10.000	N	FLO	0.0
1.218000	41.81	56.00	14.19	1000.0	10.000	N	FLO	0.0
1.853000	41.36	56.00	14.64	1000.0	10.000	N	FLO	0.0

Final_Result_AVG

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.183000	30.72	54.35	23.63	1000.0	10.000	N	FLO	0.0
0.423000	35.41	47.39	11.98	1000.0	10.000	N	FLO	0.0
0.424000	35.37	47.37	12.00	1000.0	10.000	N	FLO	0.0
1.221000	31.23	46.00	14.77	1000.0	10.000	N	FLO	0.0
1.867000	31.93	46.00	14.07	1000.0	10.000	N	FLO	0.0

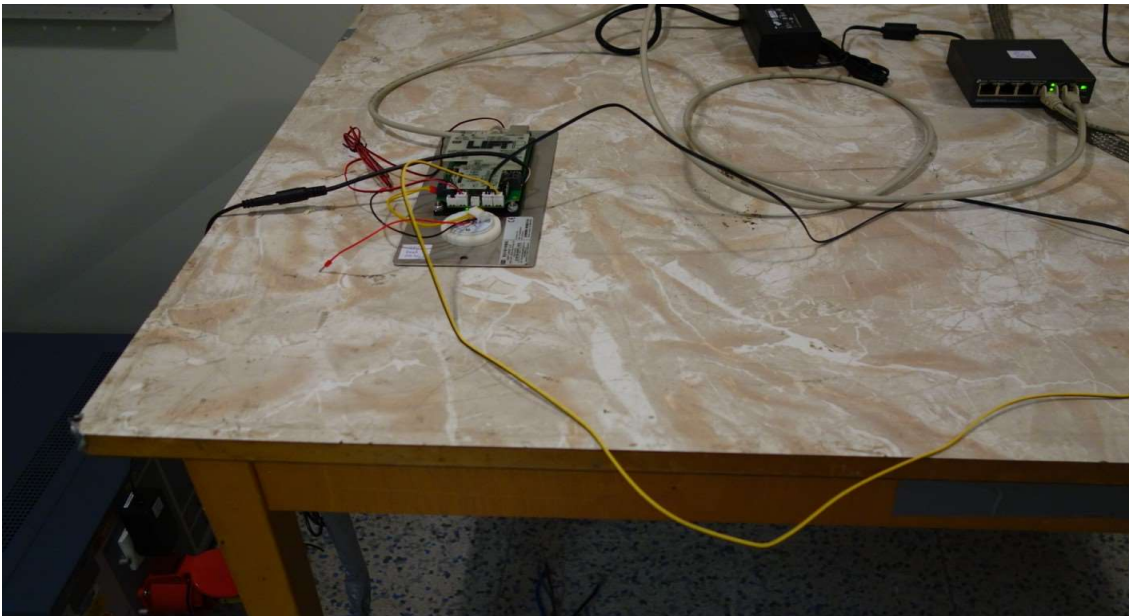
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Test setup: conducted emissions



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Radiated Emissions 30 MHz - 6GHz

Date of test: 19.05.2022, 29.8.2022
 Ambient temperature: 23 °C ± 3 °C
 Relative humidity: 35 % ± 10%
 Measured by: MSV
 Place of measurement: Anechoic chamber 3m/10m in TESTCOM

Frequency range [MHz]	Measuring distance	Antenna	Class	Result
30 - 1000	3 m	C 109	B	P
1000-6000	3 m	C 148	B	P

Result P pass F fail

Uncertainties of measurement see Page No. 5

Limits of disturbance field in measuring distance 3 m for (Class B digital devices), unintentional radiators (FCC Title 47 Part 15, Subpart B §15.109 (a))

Frequency range [MHz]	Field Strength	
	[µV/m]	[dBµV/m]
30-88	90	40.0
88-216	150	43.5
216-960	210	46.0
Above 960	300	54.0

Test equipment:	Ident. No.	Last Cal./Ver.	Cal./ Ver. Interval
EMI test receiver R/S ESR7	C186	10/21	2 y
Broadband antenna BTA-M (used below 1 GHz)	C109	11/21	2 y
Horn antenna ETS Lindgren 3115 (used above 1 GHz)	C148	1/21	2 y
Anechoic chamber 3m/10m in TESTCOM	C093	1/2022	1 y

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Field strength calculation

The field strength is calculated by adding the reading on the measuring receiver to the factors associated with preamplifiers (if any), antennas, cables.

The radiated emission tables which follow the graphical presentation of results were created by the EMC 32 software by Rohde-Schwarz. The data of field strength include the components given above.

A sample of calculation is included below :

$$E = RR + AF + CF - AG$$

Where

E field strength in dB μ V/m

RR receiver reading including preamplifier in dB μ V

CF cable attenuation factor in dB

AF antenna factor in dB/m

AG amplifier gain in dB

Example :

Assume that measured values and factors are as follows :

RR = 60 dB μ V

CF = 1.2 dB

AF = 12.6 dB/m

AG = 20 dB

Then

$$E = 60 + 1.2 + 12.6 - 20 = 43.8 \text{ dB}\mu\text{V/m}$$

Legend to graphics f < 1 GHz

Blue trace : preview result PK+ detector

Blue diamond : final result QP detector

Red line : Limit FCC Part 15 Class B, QP, 3 m

Legend to graphics f > 1 GHz

Blue trace : preview result PK+ detector

Blue diamond : final result PK+ detector

Green trace : preview result CAV detector

Green diamond : final result CAV detector

Red line : Limit FCC Part 15 Class B, PK+, 3 m

Violet line : Limit FCC Part 15 QP and CAV Class B

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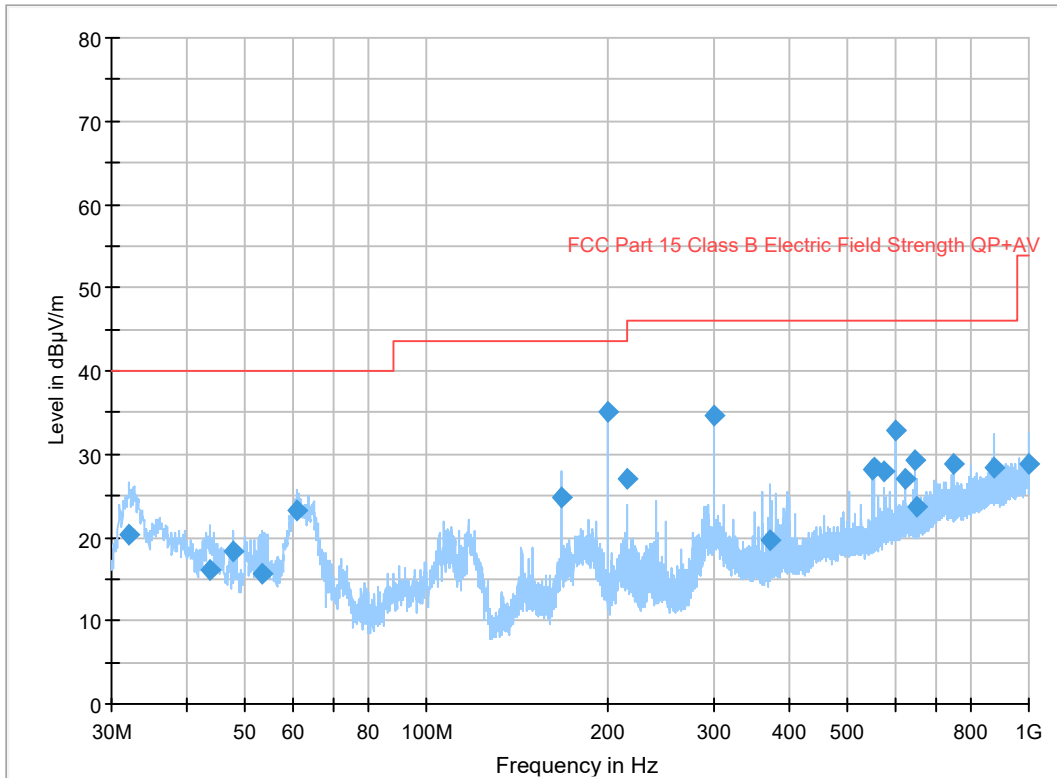
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Test results: Radiated emissions f < 1 GHz, powering : AC/DC adaptor



Final result powering : AC/DC adaptor - table

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
32.040000	20.34	40.00	19.66	1000.0	120.000	120.0	V	101.	13.9
43.740000	16.12	40.00	23.88	1000.0	120.000	125.0	V	101.	6.0
47.790000	18.38	40.00	21.62	1000.0	120.000	200.0	V	79.0	4.8
53.310000	15.73	40.00	24.27	1000.0	120.000	200.0	V	94.0	4.6
60.840000	23.28	40.00	16.72	1000.0	120.000	158.0	V	133.	6.2
168.000000	24.74	43.50	18.76	1000.0	120.000	186.0	H	11.0	9.5
200.010000	35.06	43.50	8.44	1000.0	120.000	160.0	H	236.	11.3
216.000000	26.93	43.50	16.57	1000.0	120.000	157.0	H	46.0	12.8
300.000000	34.57	46.00	11.43	1000.0	120.000	100.0	H	35.0	15.6
372.000000	19.57	46.00	26.43	1000.0	120.000	118.0	V	281.	18.0
549.990000	28.23	46.00	17.77	1000.0	120.000	164.0	H	236.	20.8
552.000000	28.30	46.00	17.70	1000.0	120.000	195.0	H	34.0	20.9
576.000000	27.96	46.00	18.04	1000.0	120.000	182.0	H	34.0	21.5
600.000000	32.75	46.00	13.25	1000.0	120.000	174.0	H	11.0	22.2
624.000000	27.12	46.00	18.88	1000.0	120.000	149.0	H	5.0	23.0
648.000000	29.17	46.00	16.83	1000.0	120.000	138.0	H	11.0	22.7
649.980000	23.75	46.00	22.25	1000.0	120.000	136.0	H	11.0	22.7
750.000000	28.89	46.00	17.11	1000.0	120.000	128.0	H	264.	25.1
875.010000	28.37	46.00	17.63	1000.0	120.000	133.0	V	226.	27.1
999.990000	28.91	53.90	24.99	1000.0	120.000	100.0	V	221.	28.6

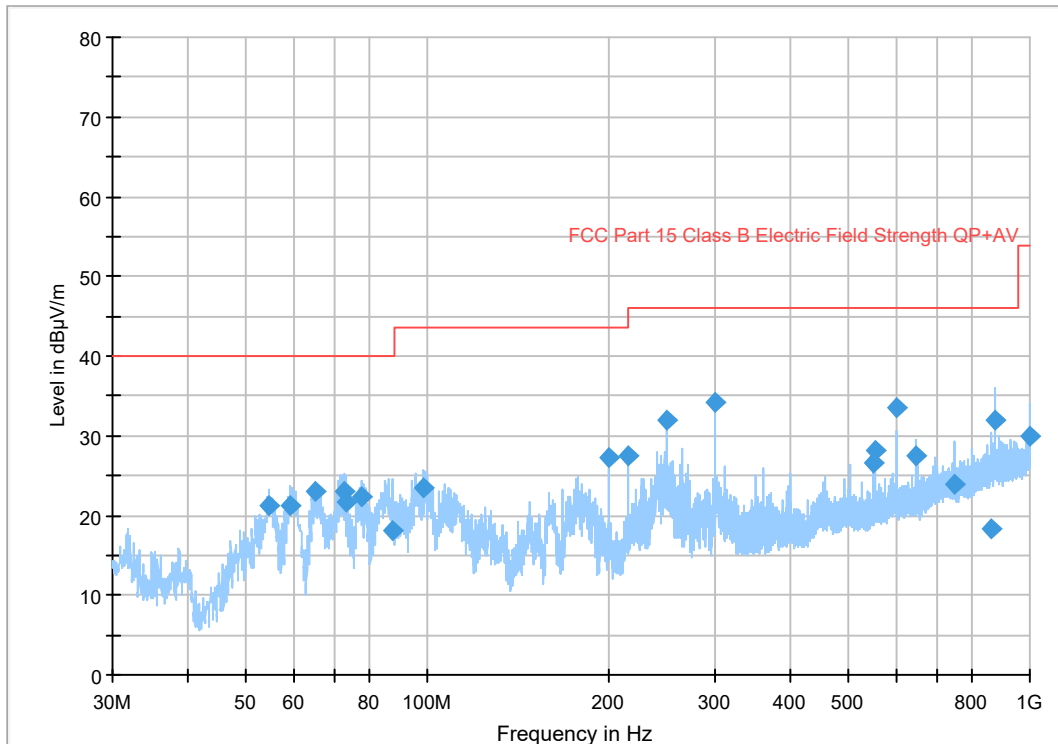
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Test results: Radiated emissions $f < 1$ GHz, powering : PoE adaptor



Final result powering :PoE adaptor - table

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
54.630000	21.16	40.00	18.84	1000.0	120.000	292.0	H	52.0	4.8
59.130000	21.15	40.00	18.85	1000.0	120.000	128.0	V	101.0	5.7
64.950000	23.09	40.00	16.91	1000.0	120.000	200.0	V	101.0	7.5
73.020000	23.04	40.00	16.96	1000.0	120.000	120.0	V	89.0	8.9
73.560000	21.57	40.00	18.43	1000.0	120.000	128.0	V	101.0	9.0
77.670000	22.27	40.00	17.73	1000.0	120.000	120.0	V	93.0	9.7
87.630000	17.99	40.00	22.01	1000.0	120.000	200.0	H	-10.0	11.0
98.400000	23.44	43.50	20.06	1000.0	120.000	110.0	V	42.0	11.5
200.010000	27.31	43.50	16.19	1000.0	120.000	180.0	H	96.0	11.3
216.000000	27.48	43.50	16.02	1000.0	120.000	158.0	H	236.0	12.8
249.990000	31.85	46.00	14.15	1000.0	120.000	139.0	H	262.0	13.6
300.000000	34.26	46.00	11.74	1000.0	120.000	126.0	H	11.0	15.6
549.990000	26.63	46.00	19.37	1000.0	120.000	300.0	H	101.0	20.8
552.000000	28.07	46.00	17.93	1000.0	120.000	131.0	V	232.0	20.9
600.000000	33.42	46.00	12.58	1000.0	120.000	162.0	H	11.0	22.2
648.000000	27.40	46.00	18.60	1000.0	120.000	139.0	H	11.0	22.7
750.000000	23.86	46.00	22.14	1000.0	120.000	271.0	H	230.0	25.1
864.000000	18.44	46.00	27.56	1000.0	120.000	157.0	H	322.0	26.8
875.010000	32.06	46.00	13.94	1000.0	120.000	151.0	V	219.0	27.1
999.990000	29.93	53.90	23.97	1000.0	120.000	251.0	H	218.0	28.6

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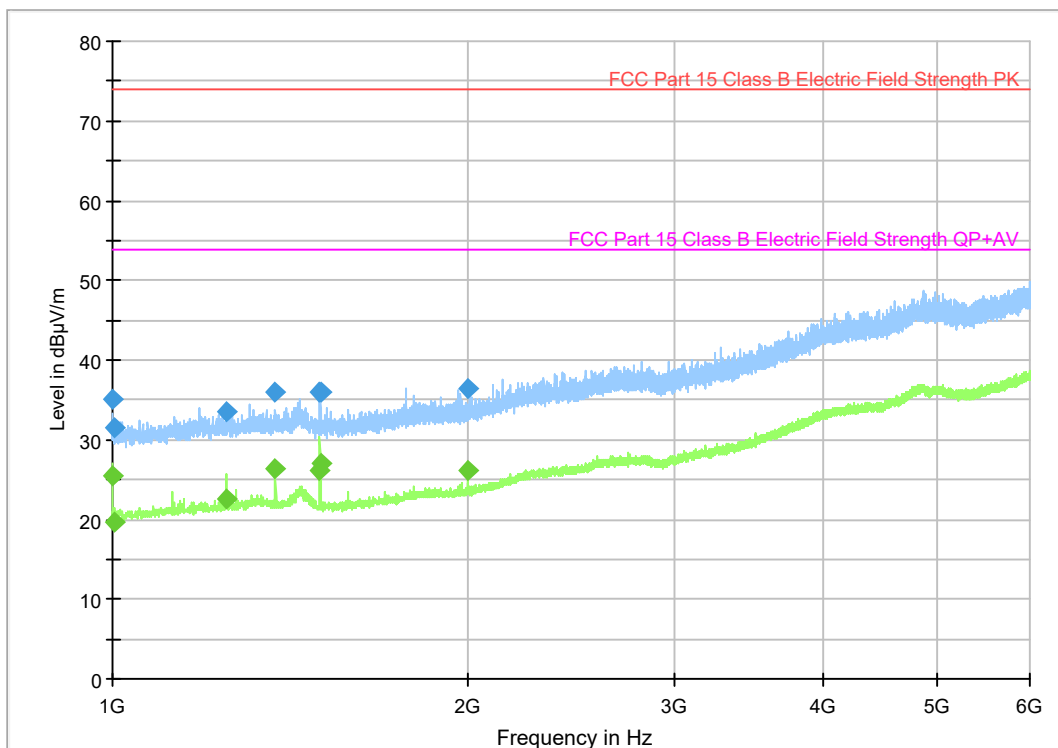
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Test results: Radiated emissions $f > 1$ GHz, AC/DC adaptor powering



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Test results: Radiated emissions $f > 1$ GHz, AC/DC adaptor powering - numerical

Final_Result_PK+

Frequency (MHz)	MaxPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1000.000000	35.01	74.00	38.99	100.0	1000.000	150.0	V	225.0
1004.800000	31.53	74.00	42.47	100.0	1000.000	250.0	V	135.0
1249.800000	33.49	74.00	40.51	100.0	1000.000	100.0	V	225.0
1375.000000	36.03	74.00	37.97	100.0	1000.000	100.0	V	135.0
1499.800000	36.07	74.00	37.93	100.0	1000.000	150.0	V	270.0
1500.200000	36.02	74.00	37.98	100.0	1000.000	200.0	V	270.0
2000.200000	36.33	74.00	37.67	100.0	1000.000	100.0	V	270.0

Final_Result_AVG

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1000.000000	25.47	53.90	28.43	100.0	1000.000	150.0	V	225.0
1004.800000	19.58	53.90	34.32	100.0	1000.000	250.0	V	135.0
1249.800000	22.54	53.90	31.36	100.0	1000.000	100.0	V	225.0
1375.000000	26.39	53.90	27.51	100.0	1000.000	100.0	V	135.0
1499.800000	26.07	53.90	27.83	100.0	1000.000	150.0	V	270.0
1500.200000	27.04	53.90	26.86	100.0	1000.000	200.0	V	270.0
2000.200000	26.06	53.90	27.84	100.0	1000.000	100.0	V	270.0

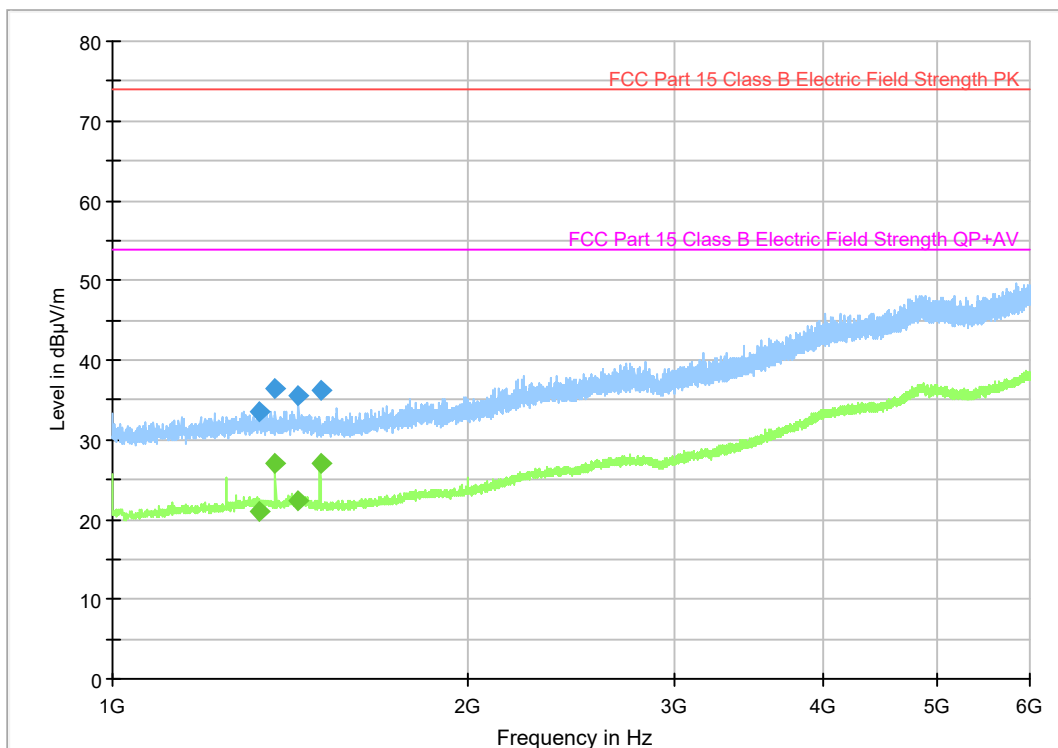
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EMC Test Report - Annex 1

Ref. No. 8551-PT-E0111-22

Test results: Radiated emissions $f > 1$ GHz, PoE powering



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Test results: Radiated emissions f >1 GHz, PoE powering - numerical**Final_Result_PK+**

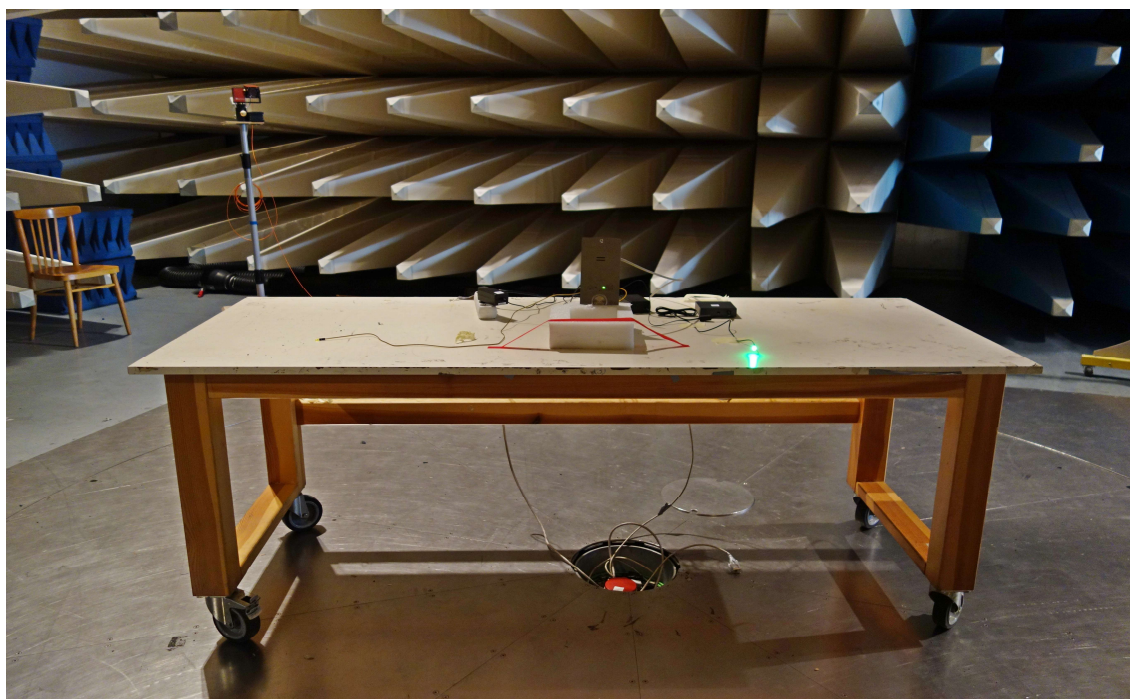
Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1333.400000	33.46	74.00	40.54	100.0	1000.000	250.0	H	180.0
1375.000000	36.45	74.00	37.55	100.0	1000.000	100.0	V	270.0
1437.000000	35.48	74.00	38.52	100.0	1000.000	250.0	V	270.0
1500.200000	36.18	74.00	37.82	100.0	1000.000	200.0	V	270.0

Final_Result_AVG

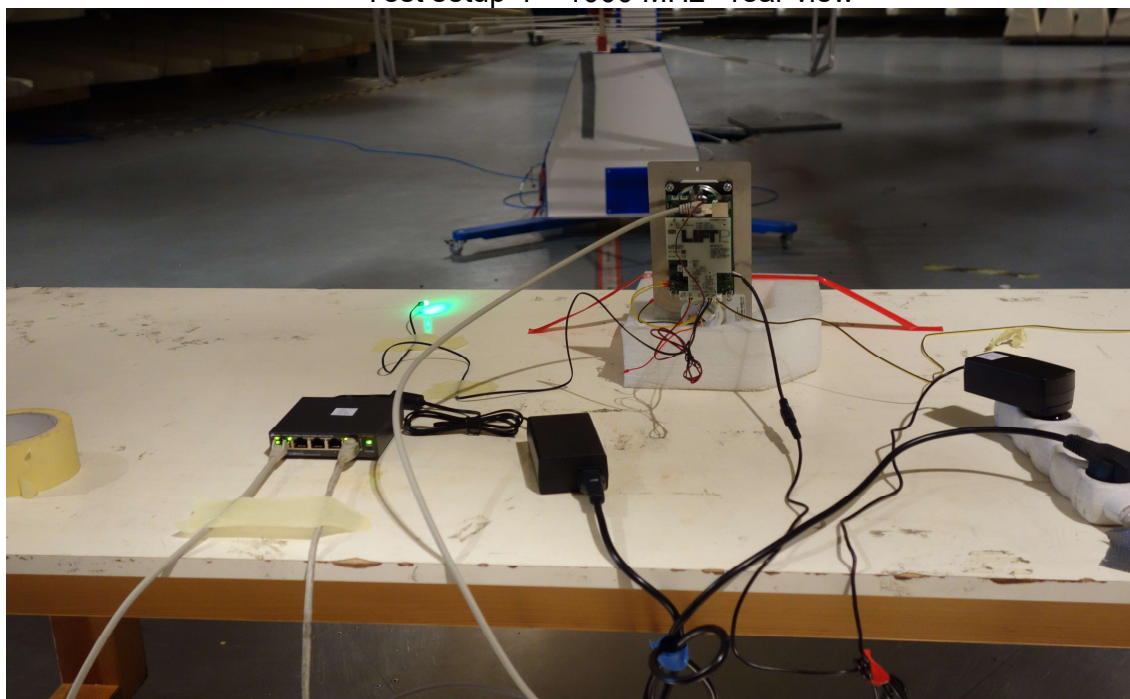
Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1333.400000	20.93	53.90	32.97	100.0	1000.000	250.0	H	180.0
1375.000000	27.13	53.90	26.77	100.0	1000.000	100.0	V	270.0
1437.000000	22.26	53.90	31.64	100.0	1000.000	250.0	V	270.0
1500.200000	27.09	53.90	26.81	100.0	1000.000	200.0	V	270.0

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Test setup $f < 1000$ MHz - front view



Test setup $f < 1000$ MHz - rear view



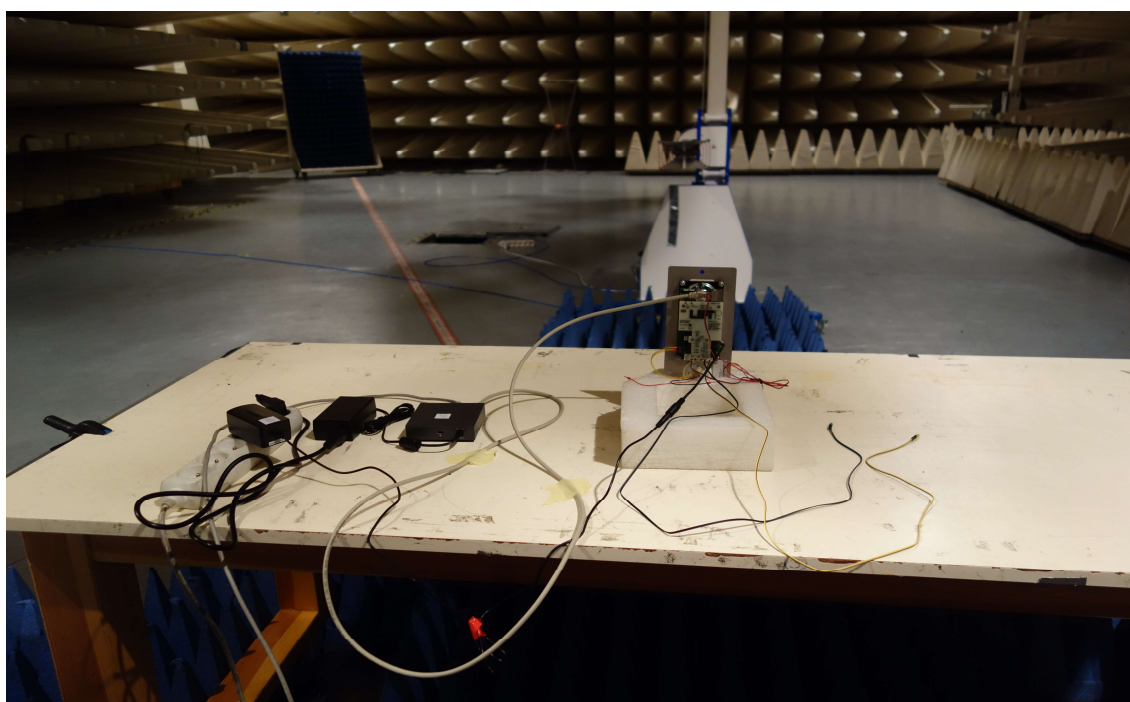
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Test setup $f > 1000$ MHz - front view



Test setup $f > 1000$ MHz - rear view



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Modifications for improvement

No modifications.

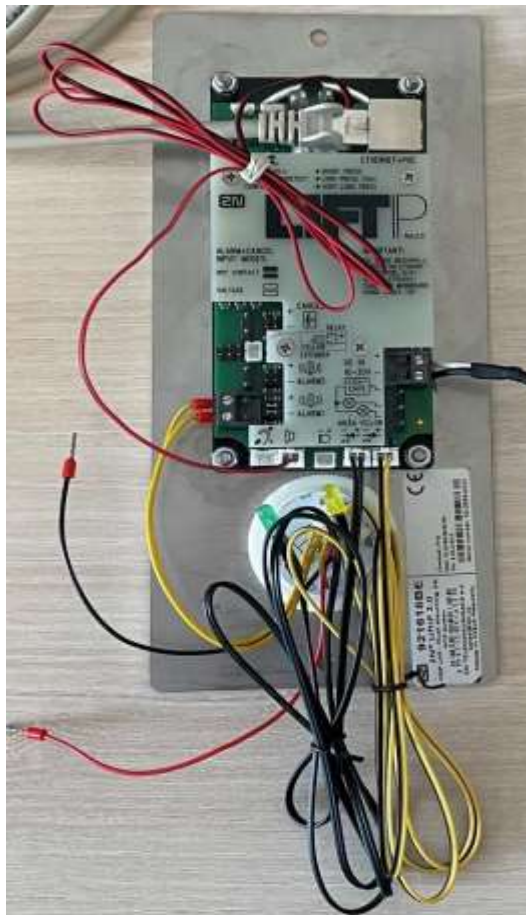
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External photo front and rear view



EUT label



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EUT AC-DC adaptor



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PoE switch with AC-DC adaptor



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