
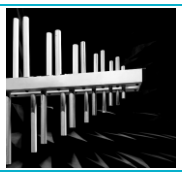
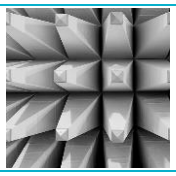

CTC advanced
member of RWTÜV group

TEST REPORT

Test Report No.: 1-8918/19-01-05

DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-01

Testing Laboratory

CTC advanced GmbH
Untertürkheimer Straße 6 – 10
66117 Saarbrücken/Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
Internet: http://www.ctcadvanced.com
e-mail: mail@ctcadvanced.com

Accredited Testing Laboratory:
The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkkS)
The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-01

Area of Testing: EMC Laboratory

Applicant

FLIR Systems AB
Antennvägen 6
187 66 Täby/SWEDEN
Phone: +46 87 53 25 00
Contact: Göran Skedung
e-mail: goran.skedung@flir.se
Phone: +46 87 53 27 59

Manufacturer

FLIR Systems AB
Antennvägen 6
187 66 Täby/SWEDEN

Test Standard/s

ETSI EN 301 489-1 V2.2.3	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility
ETSI EN 301 489-17 V3.2.4	Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard for ElectroMagnetic Compatibility
EN 55032:2015	Electromagnetic compatibility of multimedia equipment - Emission requirements (CISPR 32:2015); German version EN 55032:2015
EN 55035:2017	Electromagnetic compatibility of multimedia equipment – Immunity requirements (CISPR 35:2016, modified); German version EN 55035:2017

Test Item

Kind of product:	**Infrared camera**
Product name:	**FLIR-A8990**
Serial number:	See chapter 6.2
Hardware version:	See chapter 6.2
Software version:	See chapter 6.2

This test report is electronically signed and valid without handwritten signature. The public keys can be requested at the test laboratory to verify the electronic signatures.

Test report authorised:

cn=Uli Kraus, o=CTC advanced GmbH, ou=KRA-161129, email=uli.kraus@ctcadvanced.com, c=DE
2021.01.04 08:54:42 +01'00'

Uli Kraus
Head of Department
Electromagnetic Compatibility & Acoustics

Test performed:

cn=Christopher Schramm, o=CTC advanced GmbH, ou=SRM-200513, email=Christopher.Schramm@ctcadvanced.com, c=DE
2021.01.04 08:33:47 +01'00'

Christopher Schramm
Lab Manager
Electromagnetic Compatibility & Acoustics

1 Table of contents

2 General information

2.1 Notes

The test results of this test report relate exclusively to the test item specified in this test report. CTC advanced GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CTC advanced GmbH.
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2.2 Application details

Date of receipt of order:	2020-10-23
Date of receipt of test item:	2020-11-05
Start of test:	2020-11-05
End of test:	2020-12-10
Person(s) present during the test:	---

3 Test standard/s:

Test standard	Version	Test description
ETSI EN 301 489-1 V2.2.3	**2019-11**	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility
ETSI EN 301 489-17 V3.2.4	**2020-09**	Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard for ElectroMagnetic Compatibility
EN 55032:2015	**2016-02**	Electromagnetic compatibility of multimedia equipment - Emission requirements (CISPR 32:2015); German version EN 55032:2015
EN 55035:2017	**2018-04**	Electromagnetic compatibility of multimedia equipment – Immunity requirements (CISPR 35:2016, modified); German version EN 55035:2017

4 Test environment

Temperature:	15 °C – 35 °C
Relative humidity content:	30 % – 60 %
Air pressure:	860 hPa – 1060 hPa
Power supply:	230 V / 50 Hz

5 Test Laboratories sub-contracted

---

6 Information about test item

6.1 Test item

Radio equipment EUT A

Kind of product :	Infrared camera		
Product name :	FLIR-A8990		
Equipment classification:	equipment for fixed use and equipment for vehicular use (according to EN 301 489-1, clause 5.5)		
Environment classification:	residential, commercial and light industry, industrial and vehicular environment (according to EN 301 489-1, clause 1)		
Primary functions assessed during testing :	Infrared camera live streaming via 2,4 / 5 GHz WLAN and Ethernet		
Operating frequency range:	WLAN (2,4 GHz band) – 2,42 - 2,48 GHz WLAN (5 GHz band) – 5,15 - 5,35 GHz		
Power supply :	by external DC (Vnom DC 24 or 48 V, Vmin: DC 18 V, Vmax DC 56 V) or Power over Ethernet (PoE) (DC 56 V) via AC PoE adaptor (AC 100 – 240 V)		
Ports : (maximum cable lengths declared by manufacturer)	**Classification and description**	**Direction**	**Length**
	Infrared camera		
	DC power port (PWR/DIG.I/O)	input	> 3 m
	Wired network port (ETH/PoE, shielded)	in / output	> 3 m
	Signal/control port (ANTENNA)	in / output	< 3 m
	Signal/control port (RS232/485)	in / output	< 3 m
	AC PoE adaptor PHIHONG POE15M-1AFE		
	AC power port	input	> 3 m
	Wired network port (DATA IN, shielded)	in / output	> 3 m
	Wired network port (DATA OUT with PoE, shielded)	in / output	> 3 m
Is mounting position / usual operating position defined?		No	
Additional information:			
DC 48 V is for railway use only. When the EUT is “PoE powered”, it is connected to AC PoE adaptor PHIHONG POE15M-1AFE. This PoE adaptor and the EUT were tested together as a system. When the EUT is “DC powered”, only normal Ethernet (without PoE) is connected to EUT.			

6.2 EUT: Type, S/N etc. and short descriptions used in this test report

	Radio equipment	Product name	Serial number	Hardware version	Software version
EUT A	Infrared camera	FLIR-A8990	89900301	T300052-01	2.12.23
Note: EUT short description is used to simplify the identification of the EUT in this test report.					

6.3 Auxiliary equipment (AE): Type, S/N etc. and short descriptions

	Auxiliary equipment	Type	Serial number	Hardware version	Software version
AE 1	Laptop (PC)	Fujitsu Lifebook	DSCM537859	E782	Microsoft Windows 7 32 bit
AE 2	Ethernet Switch	LINKSYS LGS105V2	13N20F1C802985	--	--
AE 3	WLAN access point (2,4 GHz / 5 GHz band)	ASUS RT-AC51U	G8IWDV007206	Ver.:A	V3.0.0.4.378_8567
NOTE: AE short description is used to simplify the identification of the auxiliary equipment in this test report.					

7 Summary of test results

☒ All of the performed measurements are passed
☐ At least one of the performed measurements is failed

7.1 Emission

7.1.1 Enclosure

EMI Phenomenon	Frequency range	Basic standard	Result
Radiated interference field strength	30 – 1000 MHz	EN 55032 Class B	**passed**
EMI Phenomenon	**Frequency range**	**Basic standard**	**Result**
Radiated interference field strength	1000 – 6000 MHz	EN 55032 Class B	**passed**

Note: Radiated spurious emissions are covered by radio standard

7.1.2 AC Mains power Input/Output ports

EMI Phenomenon	Frequency range	Basic standard	Result
Conducted interference voltage	0,15 – 30 MHz	EN 55032 Class B	**passed**
Harmonic current emission	0 – 2 kHz	EN 61000-3-2	**NA6**
Voltage fluctuations and flicker		EN 61000-3-3	**NA7**

7.1.3 DC power Input/Output ports

EMI Phenomenon	Frequency range	Basic standard	Result
Conducted interference voltage	0,15 – 30 MHz	EN 55032 Class B	**passed**

7.1.4 Wired network port

EMI Phenomenon	Frequency range	Basic standard	Result
Conducted interference voltage	0,15 – 30 MHz	EN 55032 Class B	**passed**

7.2 Immunity

7.2.1 Enclosure

EMS Phenomenon	Frequency range	Basic standard	Result
Electrostatic discharge		EN 61000-4-2	**passed**
Radio frequency electromagnetic field	80 – 6000 MHz	EN 61000-4-3	**passed**
Magnetic fields	50 Hz	EN 61000-4-8	**NA9**

7.2.2 AC Mains power Input/Output ports

EMS Phenomenon	Frequency range	Basic standard	Result
Fast transients, common mode		EN 61000-4-4	**passed**
Surges		EN 61000-4-5	**passed**
Radio frequency, common mode	0,15 – 80 MHz	EN 61000-4-6	**passed**
Voltage dips, interruptions, and fluctuations		EN 61000-4-11	**passed**

7.2.3 DC power Input/Output ports

EMS Phenomenon	Frequency range	Basic standard	Result
Fast transients, common mode		EN 61000-4-4	**passed**
Radio frequency, common mode	0,15 – 80 MHz	EN 61000-4-6	**passed**
Transients and surges, vehicular environment		ISO 7637-2:2004	**passed**

7.2.4 Signal/Control port

EMS Phenomenon	Frequency range	Basic standard	Result
Fast transients, common mode		EN 61000-4-4	**NA4**
Radio frequency, common mode	0,15 – 80 MHz	EN 61000-4-6	**NA4**

7.2.5 Wired network port

EMS Phenomenon	Frequency range	Basic standard	Result
Fast transients, common mode		EN 61000-4-4	**passed**
Surges		EN 61000-4-5	**passed**
Radio-frequency, common mode	0,15 – 80 MHz	EN 61000-4-6	**passed**

Remarks:

NA1	Not tested because not required by used standard
NA2	Test not applicable because port does not exist
NA3	Test not applicable because port only for services
NA4	Test not applicable because port lengths not longer than 3m
NA5	Not tested because not required by customer
NA6	For equipment with a rated power of ≤75 W, other than lighting equipment, no limits are specified in this edition of the standard.
NA7	No test shall be made on equipment which is unlikely to produce significant voltage fluctuations or flicker.
NA8	Not performed, because highest internal frequency < 108 MHz
NA9	Test applies only to equipment with magnetically sensitive components or circuitry.

7.3 Performance assessment and reaction of the EUT

In case of Immunity testing (EMS): Observing or/and recording following functions:

Monitoring during continuous phenomena
(Basic standards: EN 61000-4-3, EN 61000-4-6)

- The live streaming of an infrared camera view via 2,4 GHz or 5 GHz WLAN was visually observed
  - Live view of a streamed infrared camera video via Web-Interface with the help of a Laptop
- The live streaming of an infrared camera view via Ethernet was visually observed
  - Live view of a streamed infrared camera video via Web-Interface with the help of a Laptop

Monitoring during transient phenomena
(Basic standards: EN 61000-4-2, EN 61000-4-4, EN 61000-4-5, EN 61000-4-11)

- The live streaming of an infrared camera view via 2,4 GHz or 5 GHz WLAN was visually observed
  - Live view of a streamed infrared camera video via Web-Interface with the help of a Laptop
- The live streaming of an infrared camera view via Ethernet was visually observed
  - Live view of a streamed infrared camera video via Web-Interface with the help of a Laptop

Reaction(s) of the EUT during immunity testing (EMS):

R1
-Live streaming via WLAN and Ethernet/LAN works as intended without interruptions
-No unintended reaction of any indicating devices

R2
-Device makes a restart. After restart, the WLAN and Ethernet/LAN communication links are self-recoverable.
→ To see the camera picture/live view after restart, a new login in the Web-interface (username, password) is necessary.

The above mentioned criteria are NOT compulsory the criteria of the used standard. The assessment of the reaction according to the used standard is shown by the passed/failed column of each test in chapter 7.2.

7.4 Measurement and test set-up

Note: The test configuration is in accordance with the requirements given in the standards in point 3.

7.5 Measurement uncertainty

The uncertainty of the measurement equipment fulfils CISPR 16 and the related european and national standards.

The semi anechoic chamber fulfils the requirements of CISPR 16-1 (ANSI C63.4) for a test volume of 4m ∅.

Measurement uncertainty calculations are on file and available from the test laboratory upon request.

The table below shows the measurement uncertainties for each measurement method.
The expended uncertainty (k=2 or 95%) was calculated with worst case values.

Measurement Method	Frequency area Impulse duration time	Description	Expanded uncertainty (k=2 or 95%)
Radiated Emission EN 55032, ANSI C63.4	30 MHz – 18 GHz		± 4.28 dB
Conducted Emission EN 55032, ANSI C63.4	9 kHz – 30 MHz		± 3.49 dB
Harmonics EN 61000-3-2	2...40 x f_n f_n= 50 Hz	Voltage Current	± 0.05 % ± 0.06 %
Flicker EN 61000-3-3	f_n = 50 Hz	P_{st}	± 1 %
ESD EN 61000-4-2	1/30/60ns	Current Parameter Time Parameter	± 10.5 % ± 6.6 %
Radiated Immunity EN 61000-4-3	80 MHz -6 GHz		± 22.7 %
Fast Transients EN 61000-4-4	5/50ns	Voltage Parameter Time Parameter	± 3 % ± 4 %
Surge EN 61000-4-5	1,2/50 µs, 8/20 µs	Surge voltage Surge current Time Parameter	± 5.4 % ± 6.6 % ± 2.5 %
HF Injection EN 61000-4-6	150 kHz – 80 MHz		± 6.24 %
Voltage Dips, Interruptions EN 61000-4-11		Voltage Parameter Time Parameter	± 3 % ± 3 %

8 Emission – Detailed test results

8.1 Electromagnetic radiated emissions (distance 10 m)

8.1.1 Instrumentation for test (see equipment list)

F 1	F 2	F 4b	F 5	F 6	F 7	F 8					

8.1.2 Test plan

EUT set-up	EUT A (DC 24 V)		
Operating mode	**Application**	**Limit**	**result**
Infrared camera streaming via Ethernet / radios idle	Enclosure	EN 55032 Class B	passed

EUT set-up	EUT A (DC 48 V)		
Operating mode	**Application**	**Limit**	**result**
Infrared camera streaming via Ethernet / radios idle	Enclosure	EN 55032 Class B	passed

EUT set-up	EUT A (PoE powered)		
Operating mode	**Application**	**Limit**	**result**
Infrared camera streaming via Ethernet / radios idle	Enclosure	EN 55032 Class B	passed

Remarks:	---

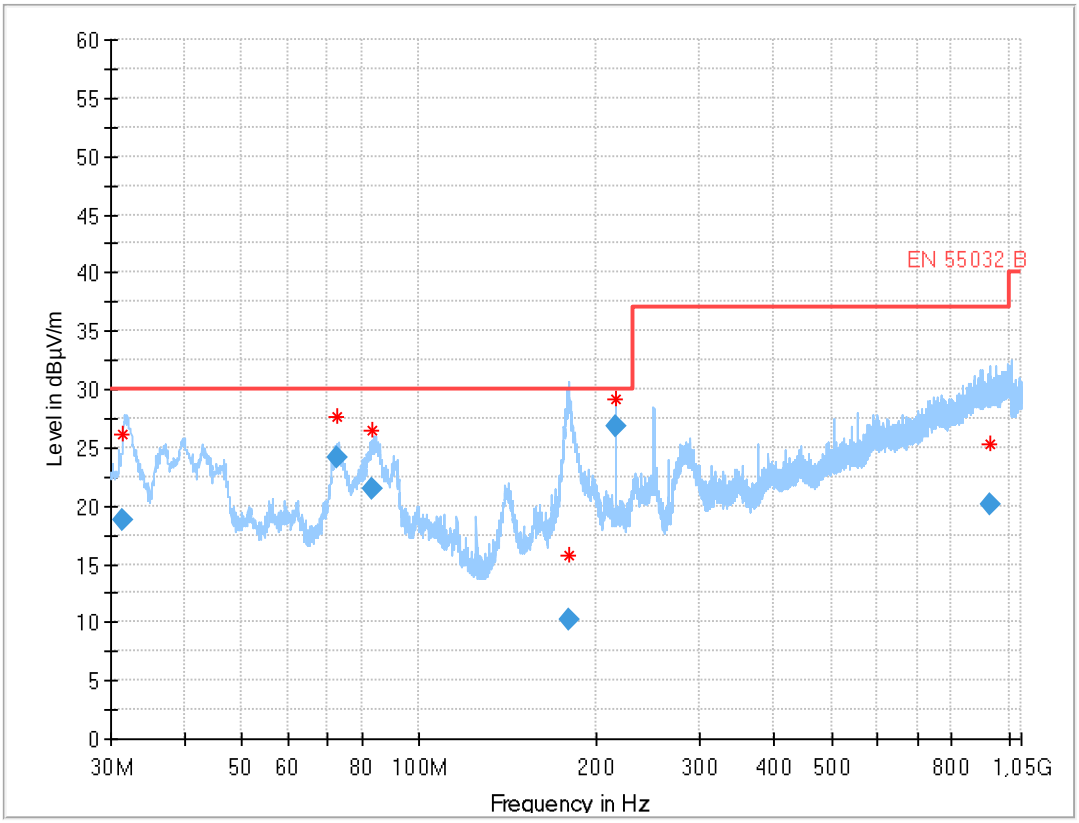
8.1.3 Radiated limits

Frequency- range	**EN 55032 Class B**	**EN 55032 Class A**
30 MHz - 230 MHz	30 dB(µV/m)	40 dB(µV/m)
230 MHz - 1000 MHz	37 dB(µV/m)	47 dB(µV/m)

8.1.4 Test results

Common Information

EUT:	FLIR A8990
Serial number:	89900301
Test description:	EN 55032 class B @ 10 m
Operating condition:	cont. live streaming via ethernet radio modules in Idle mode
Operator name:	KHN
Comment:	Powered by DC 24V, Screened ethernet cable.

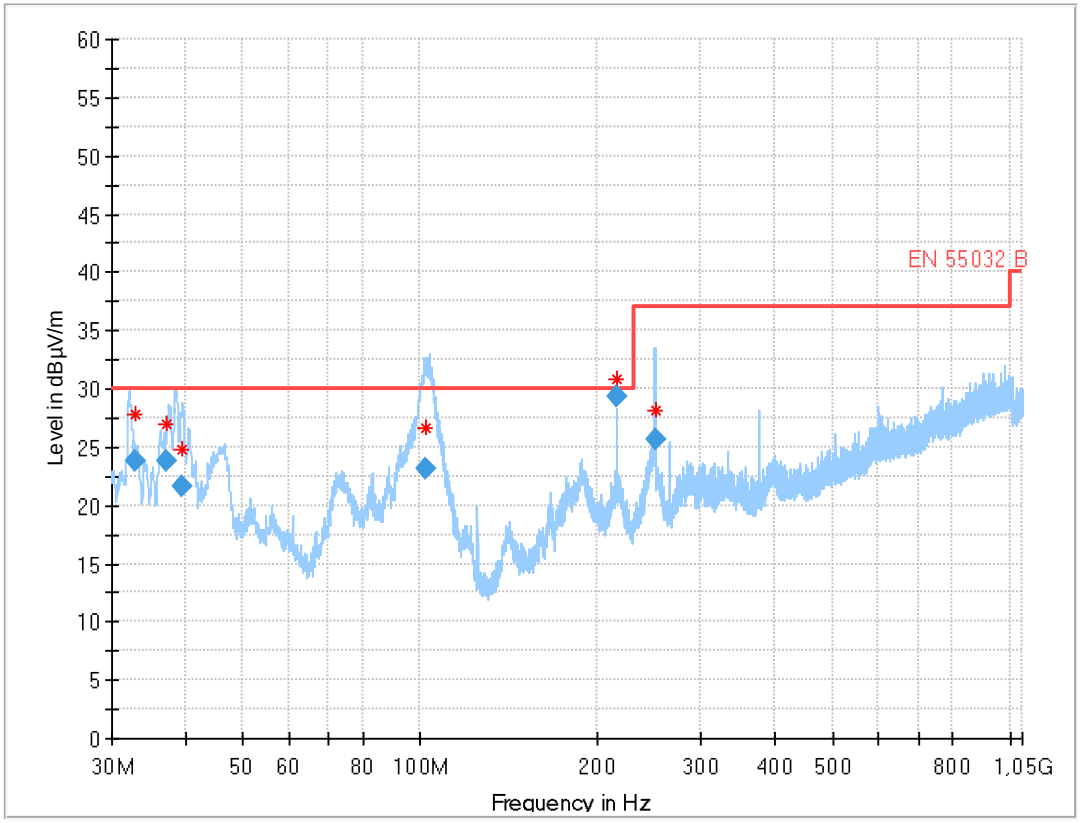


Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
31.392	18.84	30.0	11.2	1000	120.0	124.0	V	295	12
72.821	24.20	30.0	5.8	1000	120.0	266.0	V	206	9
83.160	21.44	30.0	8.6	1000	120.0	212.0	V	197	8
179.511	10.18	30.0	19.8	1000	120.0	103.0	V	-25	10
215.993	26.85	30.0	3.2	1000	120.0	134.0	V	-36	12
931.055	20.06	37.0	16.9	1000	120.0	200.0	V	-45	24

Common Information

EUT:	FLIR A8990
Serial number:	89900301
Test description:	EN 55032 class B @ 10 m
Operating condition:	IR live streaming via ethernet radio modules in idle mode
Operator name:	Hennemann
Comment:	DC: 48 V; ETH-cable: screened

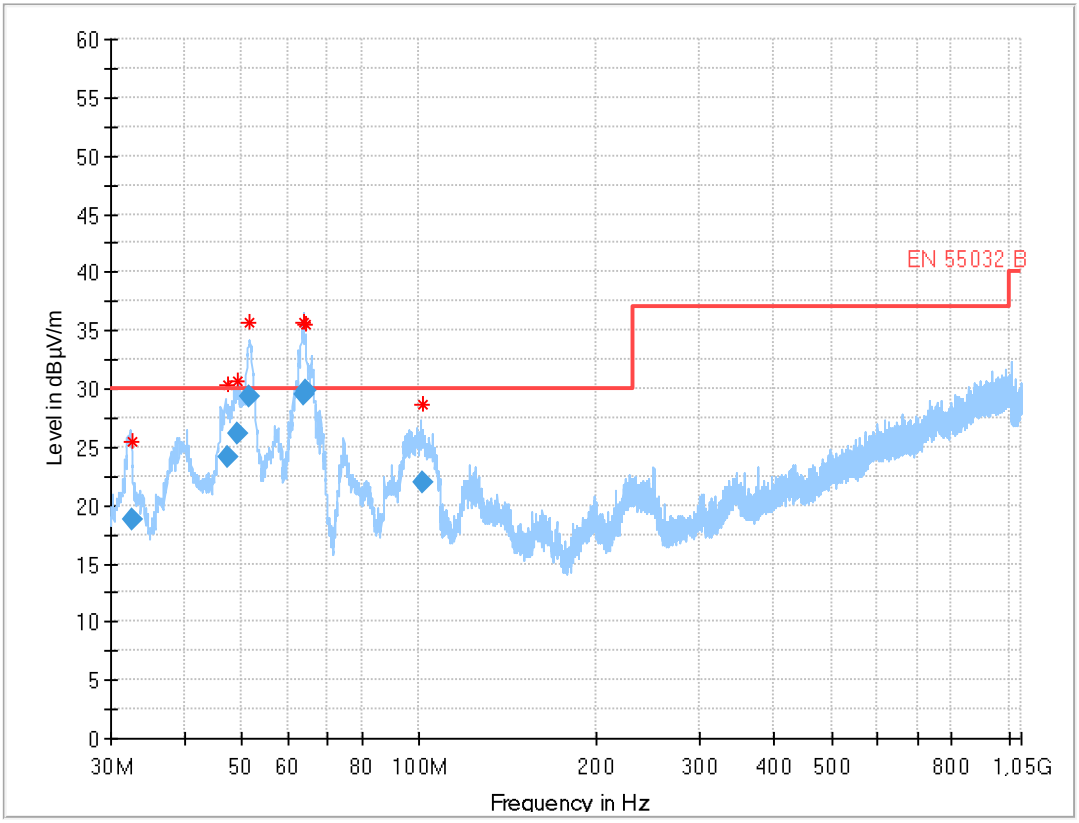


Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
32.990	23.74	30.0	6.3	1000	120.0	100.0	V	23	12
37.229	23.79	30.0	6.2	1000	120.0	200.0	V	345	13
39.313	21.55	30.0	8.5	1000	120.0	100.0	V	288	13
102.544	23.10	30.0	6.9	1000	120.0	111.0	V	208	13
216.016	29.36	30.0	0.6	1000	120.0	231.0	V	59	12
250.001	25.62	37.0	11.4	1000	120.0	103.0	V	300	13

Common Information

EUT:	FLIR A8990 + POE15m-1AFE
Serial number:	89900301 + P201500612 B1
Test description:	EN 55032 class B @ 10 m
Operating condition:	IR live streaming via ethernet radio modules in idle mode
Operator name:	Hennemann
Comment:	PoE powered; ETH-cable: screened



Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
32.525	18.79	30.0	11.2	1000	120.0	109.0	V	345	12
47.456	24.09	30.0	5.9	1000	120.0	191.0	V	65	14
49.232	26.22	30.0	3.8	1000	120.0	118.0	V	16	14
51.393	29.39	30.0	0.6	1000	120.0	103.0	V	-29	14
63.742	29.46	30.0	0.5	1000	120.0	114.0	V	192	12
64.411	29.76	30.0	0.2	1000	120.0	301.0	V	294	11
101.354	22.01	30.0	8.0	1000	120.0	400.0	V	-30	13

8.1.5 Hardware set-up

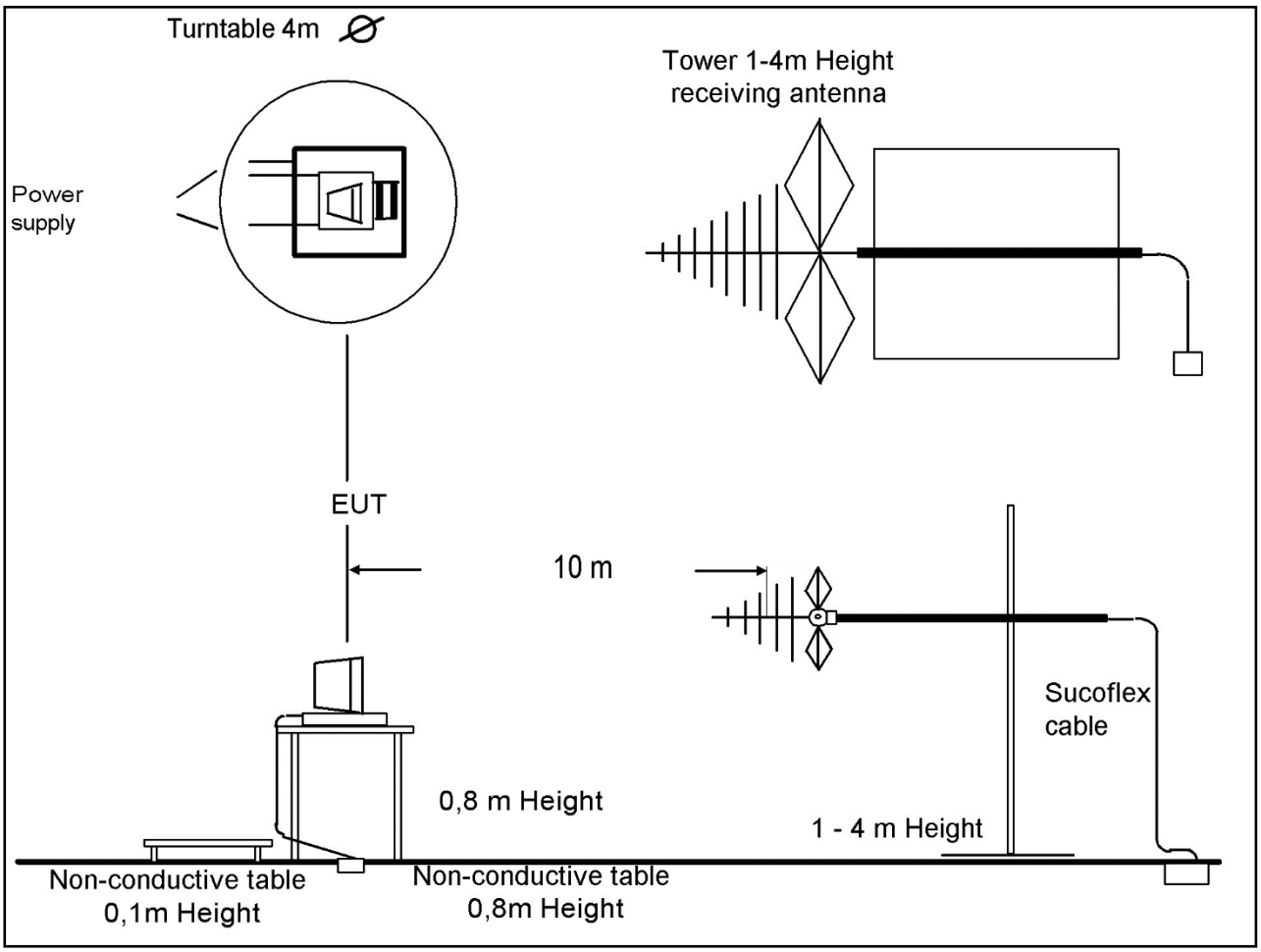
Hardware Setup: EMI radiated\VULP_10_m - [EMI radiated]

Subrange 1

Frequency Range:	30 MHz - 1 GHz
Receiver:	ESR 3 [ESR 3] @ GPIB0 (ADR 20), SN 1316.3003K03/102587, FW 3.46 SP1
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW ---
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

Software version: EMC32 V10.59.0

8.1.6 Test set-up



8.2 Electromagnetic radiated emissions (distance 5 m)

8.2.1 Instrumentation for test (see equipment list)

F 1	F 4	F 6	F 32	F 30	F 33						

8.2.2 Test Plan

EUT set-up	EUT A (DC 24 V)		
Operating mode	**Application**	**Limit**	**Result**
Infrared camera streaming via Ethernet / radios idle	Enclosure	EN 55032 Class B	passed

EUT set-up	EUT A (DC 48 V)		
Operating mode	**Application**	**Limit**	**Result**
Infrared camera streaming via Ethernet / radios idle	Enclosure	EN 55032 Class B	passed

EUT set-up	EUT A (PoE powered)		
Operating mode	**Application**	**Limit**	**Result**
Infrared camera streaming via Ethernet / radios idle	Enclosure	EN 55032 Class B	passed

Remarks:	The measured values are recalculated from 5m to 3m distance.

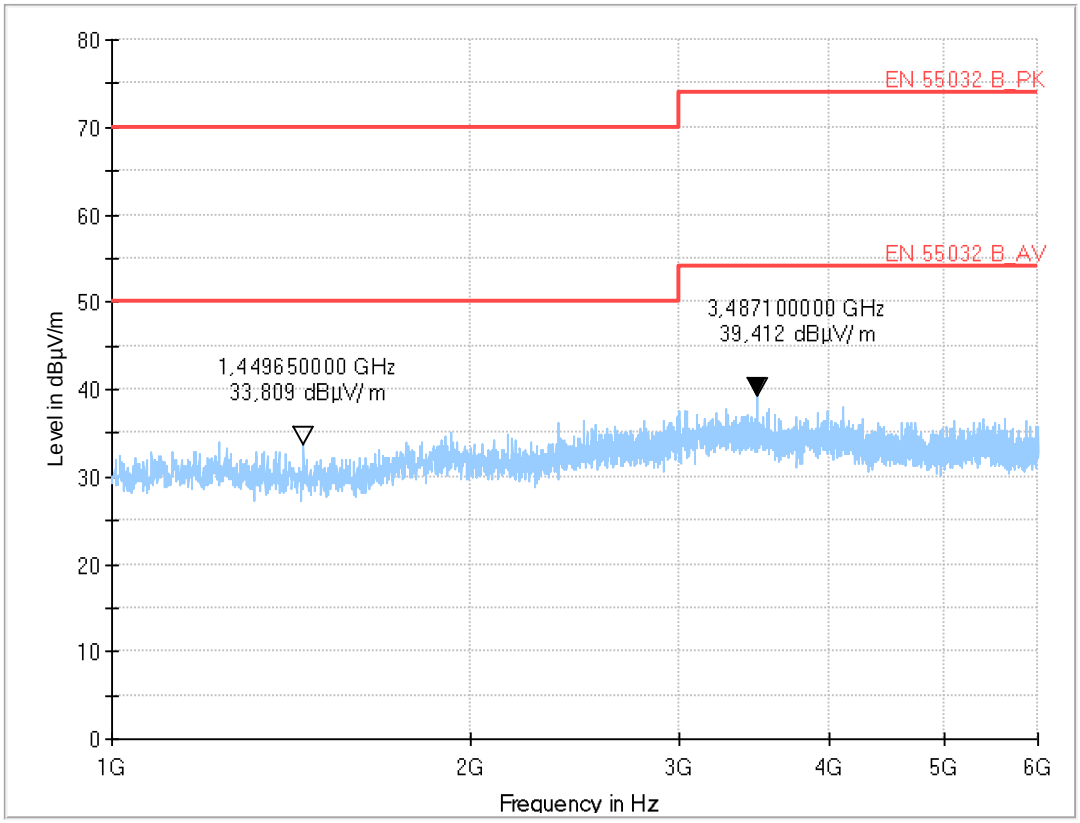
8.2.3 Radiated Limits

Frequency- range	**EN 55032 Class B**		**EN 55032 Class A**	
	peak	average	peak	average
1 GHz – 3 GHz	70dBµV/m	50 dBµV/m	76 dBµV/m	56 dBµV/m
3 GHz – 6 GHz	74 dBµV/m	54 dBµV/m	80 dBµV/m	60 dBµV/m

8.2.4 Test results

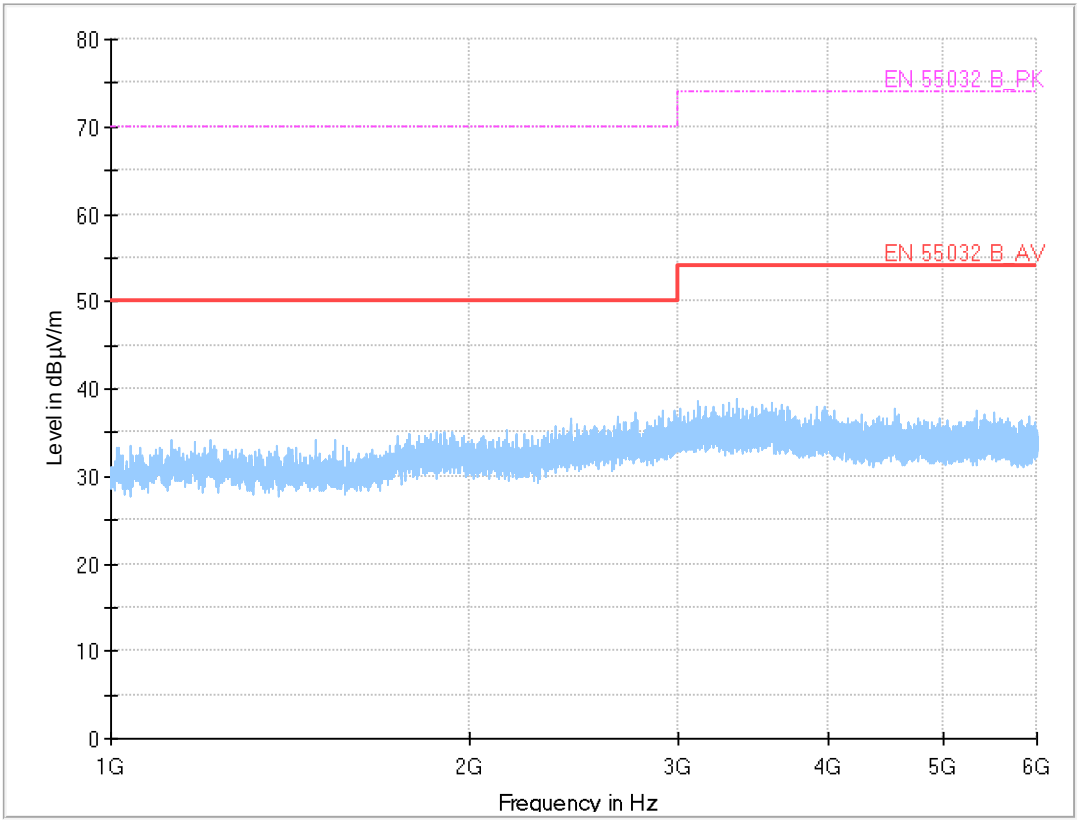
Common Information

EUT:	FLIR A8990
Serial number:	89900301
Test description:	EN 55032 class B
Operating condition:	cont. live streaming via ethernet radio modules in Idle mode
Operator name:	KHN
Comment:	Powered by DC 24V, Screened ethernet cable.



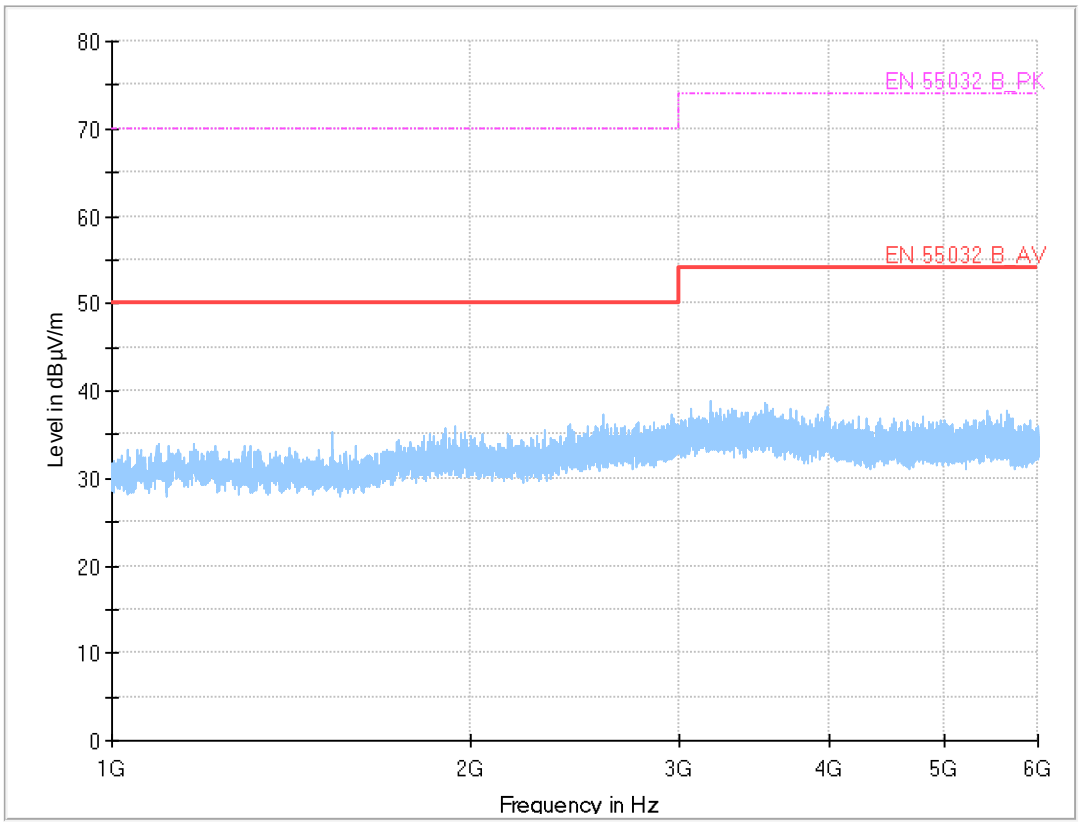
Common Information

EUT:	FLIR A8990
Serial number:	89900301
Test description:	EN 55032 class B
Operating condition:	IR live streaming via ethernet radio modules in idle mode
Operator name:	Hennemann
Comment:	DC: 48 V; ETH-cable: screened



Common Information

EUT:	FLIR A8990 + POE15m-1AFE
Serial number:	89900301 + P201500612 B1
Test description:	EN 55032 class B
Operating condition:	IR live streaming via ethernet radio modules in idle mode
Operator name:	Hennemann
Comment:	PoE powered; ETH-cable: screened



8.2.5 Hardware set-up

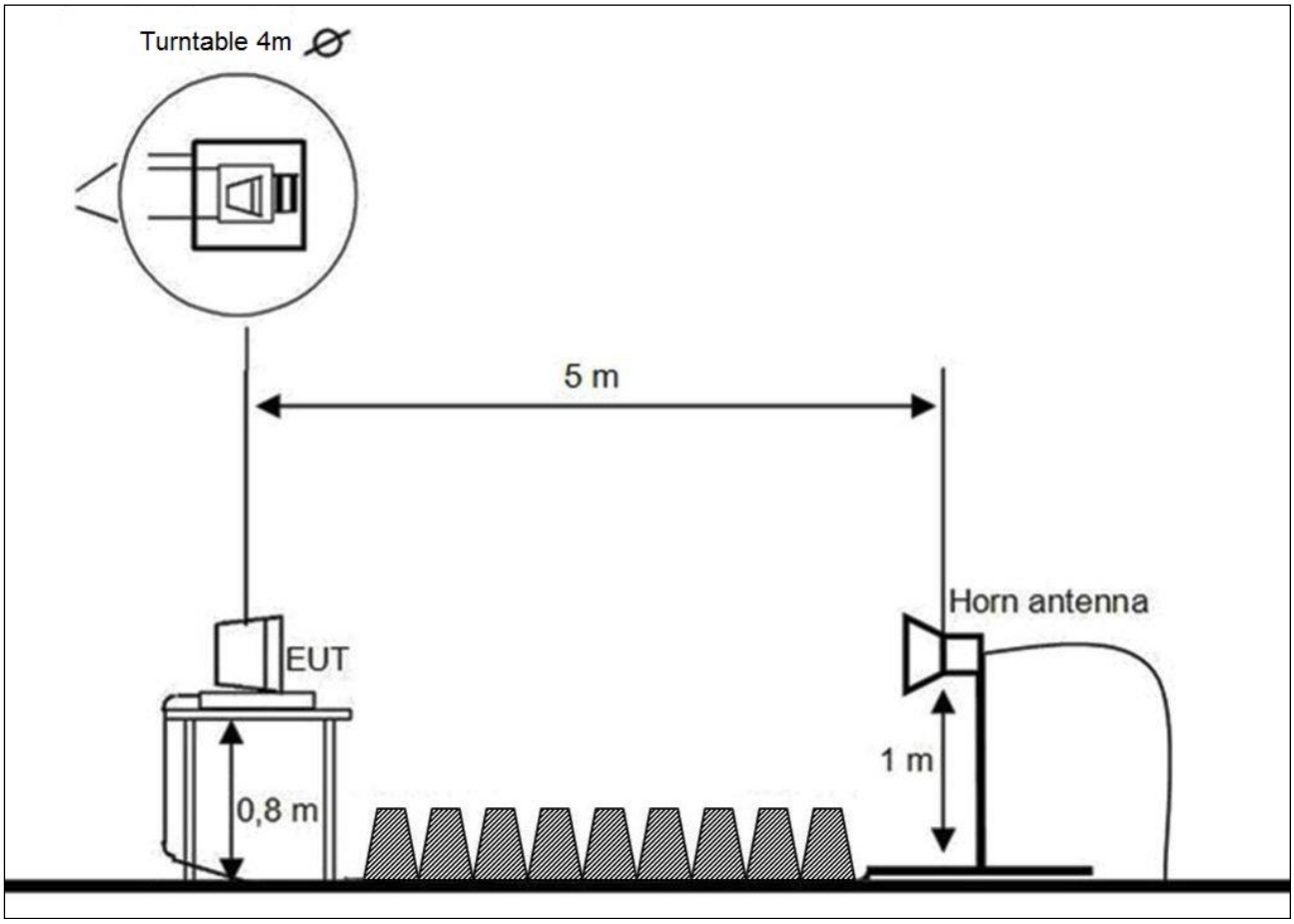
Hardware Setup: EMI radiated - [EMI radiated]

Subrange 1

Frequency Range:	1 GHz - 18 GHz
Receiver:	FSU 26 [FSU 26] @ GPIB0 (ADR 17), SN 200809/026, FW 4.71
Signal Path:	1_6_EN FW 1.0
Antenna:	EMCO 3115
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

Software version: EMC32 V10.59.0

8.2.6 Test set-up



8.3 Conducted emission

8.3.1 Instrumentation for test (see equipment list)

I 25	I 26	I 27	I 28	I 29	I 30	I 31	I 33	I 34	I 63		

8.3.2 Test plan

EUT set-up	EUT A (DC 24 V)			
Operating mode	**Port / Line**	**LISN**	**Limit**	**Result**
Infrared camera streaming via 2,4 GHz WLAN and Ethernet	DC 24 V	Two line-V Network	EN 55032 Class B	passed
Infrared camera streaming via 2,4 GHz WLAN and Ethernet	DC 24 V	Single path vehicle LISN	EN 55032 Class B	passed
Infrared camera streaming via 2,4 GHz WLAN and Ethernet	Ethernet (shielded)	ST08	EN 55032 Class B	passed

EUT set-up	EUT A (PoE powered)			
Operating mode	**Port / Line**	**LISN**	**Limit**	**Result**
Infrared camera streaming via 2,4 GHz WLAN and Ethernet	AC 230 V (at AC/DC PoE adaptor)	Two line-V Network	EN 55032 Class B	passed
Infrared camera streaming via 2,4 GHz WLAN and Ethernet	Ethernet (shielded) (at camera)	ST08	EN 55032 Class B	passed
Infrared camera streaming via 2,4 GHz WLAN and Ethernet	Ethernet (shielded) (at AC/DC PoE adaptor)	ST08	EN 55032 Class B	passed

Remark :	---

8.3.3 Conducted limits (power-line)

	EN 55032 Class B		**EN 55032 Class A**	
Frequency- range	**Quasi-Peak (dBµV)**	**Average (dBµV)**	**Quasi-Peak (dBµV)**	**Average (dBµV)**
0,15 MHz – 0,5 MHz	66-56	56-46	79	66
0,5 MHz -5 MHz	56	46	73	60
5 MHz -30 MHz	60	50	73	60

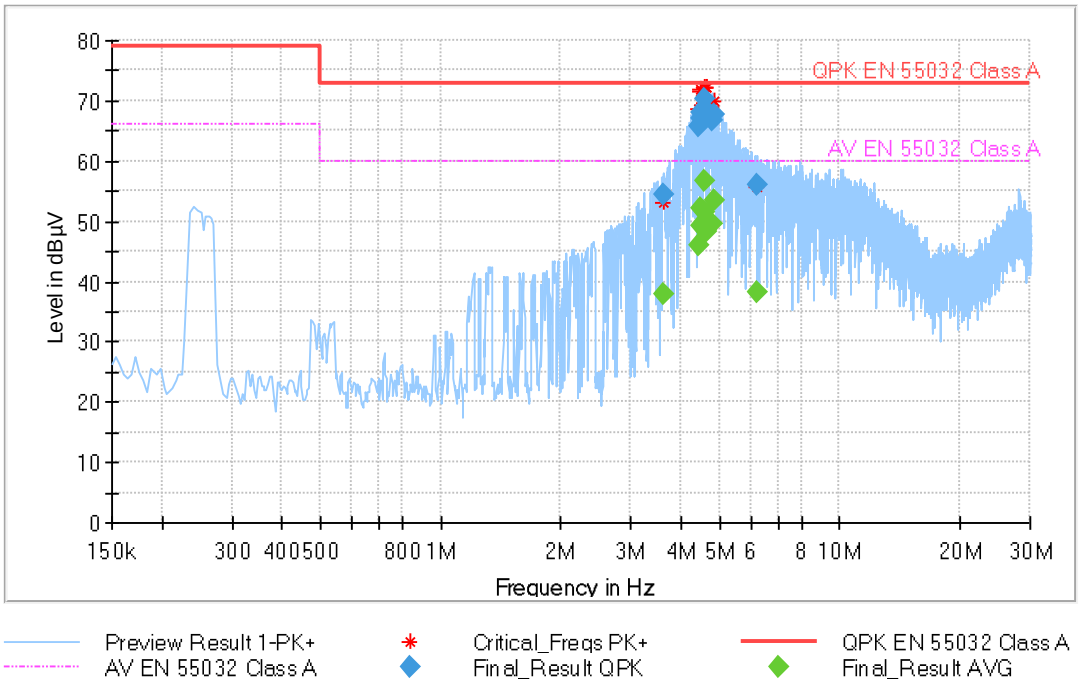
8.3.4 Conducted limits (wired network port)

	EN 55032 Class B				**EN 55032 Class A**			
Frequency- range	**Voltage limits (dBµV)**		**Current limits (dBµA)**		**Voltage limits (dBµV)**		**Current limits (dBµA)**	
	Quasi-Peak	**Average**	**Quasi-Peak**	**Average**	**Quasi-Peak**	**Average**	**Quasi-Peak**	**Average**
0,15 MHz – 0,5 MHz	84 – 74	74 – 64	40 – 30	30 – 20	97 – 87	84 – 74	53 – 43	40 – 30
0,5 MHz – 30 MHz	74	64	30	20	87	74	43	30

8.3.5 Test results of mains (plus / phase L1)

EUT Information

EUT Name:	Flir-A8990
Manufacturer:	Flir Systems AB
Operator:	von Ehren
Operating Mode:	continuous streaming via Ethernet and WLAN
Comment:	DC 24 V



Final_Result

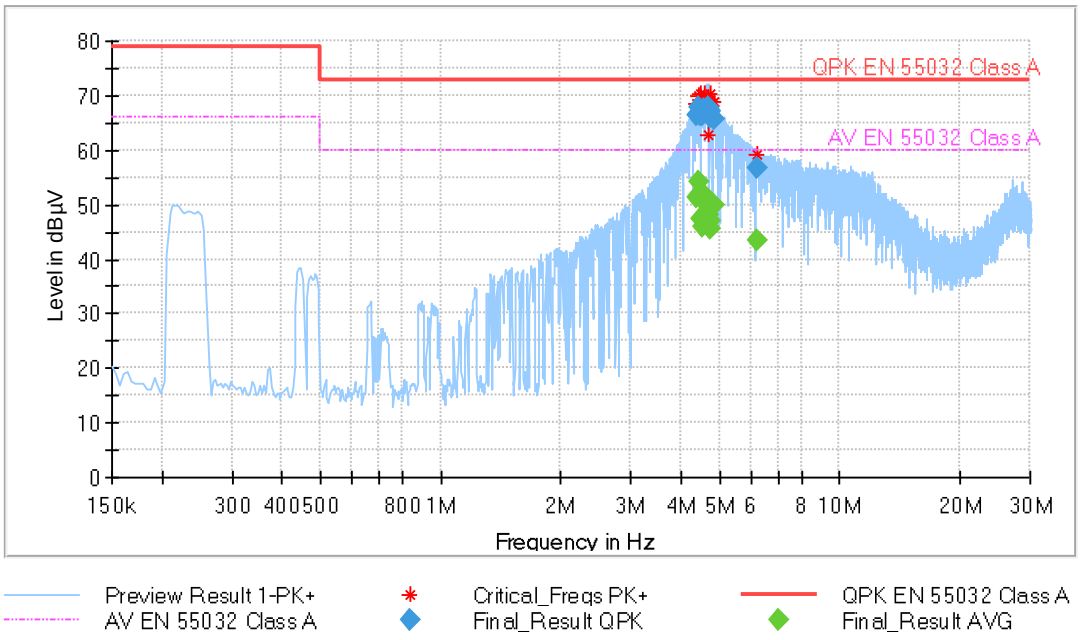
Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
3.602146	---	37.80	60.00	22.20	1000.0	9.000	L1	FLO	10.4
3.602146	54.43	---	73.00	18.57	1000.0	9.000	L1	FLO	10.4
4.418444	---	46.07	60.00	13.93	1000.0	9.000	L1	FLO	10.5
4.418444	65.82	---	73.00	7.18	1000.0	9.000	L1	FLO	10.5
4.473655	---	49.15	60.00	10.85	1000.0	9.000	L1	FLO	10.5
4.473655	66.91	---	73.00	6.09	1000.0	9.000	L1	FLO	10.5
4.506975	---	52.29	60.00	7.71	1000.0	9.000	L1	FLO	10.4
4.506975	68.02	---	73.00	4.98	1000.0	9.000	L1	FLO	10.4
4.580188	---	51.54	60.00	8.46	1000.0	9.000	L1	FLO	10.5
4.580188	68.19	---	73.00	4.81	1000.0	9.000	L1	FLO	10.5
4.593701	---	56.53	60.00	3.47	1000.0	9.000	L1	FLO	10.5
4.593701	70.17	---	73.00	2.83	1000.0	9.000	L1	FLO	10.5
4.616299	---	49.96	60.00	10.04	1000.0	9.000	L1	FLO	10.5
4.616299	67.71	---	73.00	5.29	1000.0	9.000	L1	FLO	10.5
4.639446	---	48.46	60.00	11.54	1000.0	9.000	L1	FLO	10.5
4.639446	68.27	---	73.00	4.73	1000.0	9.000	L1	FLO	10.5
4.656343	---	48.11	60.00	11.89	1000.0	9.000	L1	FLO	10.5
4.656343	67.59	---	73.00	5.41	1000.0	9.000	L1	FLO	10.5
4.771278	---	49.59	60.00	10.41	1000.0	9.000	L1	FLO	10.5
4.771278	66.60	---	73.00	6.40	1000.0	9.000	L1	FLO	10.5
4.832508	---	53.47	60.00	6.53	1000.0	9.000	L1	FLO	10.5
4.832508	67.71	---	73.00	5.29	1000.0	9.000	L1	FLO	10.5
6.194975	---	38.31	60.00	21.69	1000.0	9.000	L1	FLO	10.6
6.194975	55.96	---	73.00	17.04	1000.0	9.000	L1	FLO	10.6

EUT Information

EUT Name:	Flir-A8990
Manufacturer:	Flir Systems AB
Operator:	von Ehren
Operating Mode:	continuous streaming via Ethernet and WLAN
Comment:	DC 24 V

Common Information

Line:	Plus

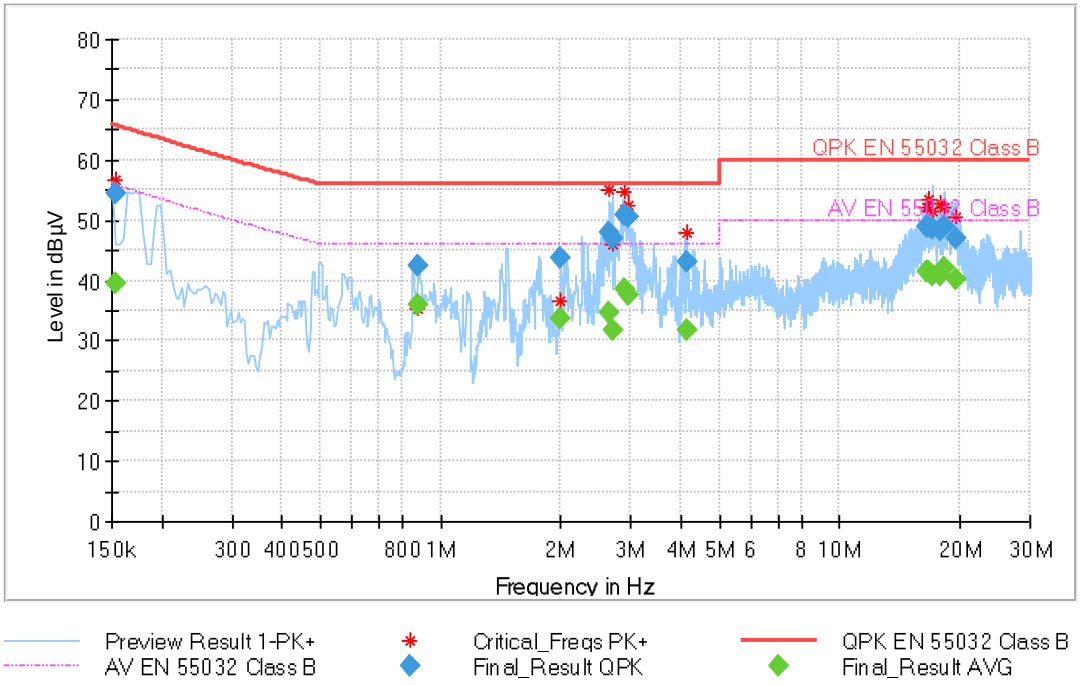


Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Corr. (dB)
4.405054	---	51.19	60.00	8.81	1000.0	9.000	10.3
4.405054	66.46	---	73.00	6.54	1000.0	9.000	10.3
4.442847	---	54.28	60.00	5.72	1000.0	9.000	10.3
4.442847	67.70	---	73.00	5.30	1000.0	9.000	10.3
4.487381	---	47.53	60.00	12.47	1000.0	9.000	10.3
4.487381	66.44	---	73.00	6.56	1000.0	9.000	10.3
4.511861	---	46.05	60.00	13.95	1000.0	9.000	10.3
4.511861	66.41	---	73.00	6.59	1000.0	9.000	10.3
4.588164	---	51.76	60.00	8.24	1000.0	9.000	10.3
4.588164	67.56	---	73.00	5.44	1000.0	9.000	10.3
4.680987	---	49.40	60.00	10.60	1000.0	9.000	10.3
4.680987	67.47	---	73.00	5.53	1000.0	9.000	10.3
4.705058	---	48.18	60.00	11.82	1000.0	9.000	10.3
4.705058	67.96	---	73.00	5.04	1000.0	9.000	10.3
4.723541	---	46.96	60.00	13.04	1000.0	9.000	10.3
4.723541	66.95	---	73.00	6.05	1000.0	9.000	10.3
4.739981	---	45.72	60.00	14.28	1000.0	9.000	10.3
4.739981	66.06	---	73.00	6.94	1000.0	9.000	10.3
4.830142	---	49.69	60.00	10.31	1000.0	9.000	10.3
4.830142	65.72	---	73.00	7.28	1000.0	9.000	10.3
6.200734	---	43.55	60.00	16.45	1000.0	9.000	10.4
6.200734	56.61	---	73.00	16.39	1000.0	9.000	10.4

EUT Information

EUT Name:	Flir-A8990
Manufacturer:	Flir Systems AB
Operator:	von Ehren
Operating Mode:	continuous streaming via Ethernet and WLAN
Comment:	PoE



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.153111	---	39.55	55.81	16.26	1000.0	9.000	L1	GND	11.0
0.153111	54.28	---	65.82	11.54	1000.0	9.000	L1	GND	11.0
0.881662	---	36.07	46.00	9.93	1000.0	9.000	L1	GND	10.0
0.881662	42.43	---	56.00	13.57	1000.0	9.000	L1	GND	10.0
1.994530	---	33.73	46.00	12.27	1000.0	9.000	L1	GND	10.2
1.994530	43.65	---	56.00	12.35	1000.0	9.000	L1	GND	10.2
2.648435	---	34.59	46.00	11.41	1000.0	9.000	L1	GND	10.3
2.648435	48.09	---	56.00	7.91	1000.0	9.000	L1	GND	10.3
2.693476	---	31.89	46.00	14.11	1000.0	9.000	L1	GND	10.3
2.693476	47.06	---	56.00	8.94	1000.0	9.000	L1	GND	10.3
2.874366	---	38.46	46.00	7.54	1000.0	9.000	L1	GND	10.3
2.874366	50.77	---	56.00	5.23	1000.0	9.000	L1	GND	10.3
2.942408	---	37.62	46.00	8.38	1000.0	9.000	L1	GND	10.3
2.942408	50.41	---	56.00	5.59	1000.0	9.000	L1	GND	10.3
4.129597	---	31.76	46.00	14.24	1000.0	9.000	L1	GND	10.4
4.129597	43.20	---	56.00	12.80	1000.0	9.000	L1	GND	10.4
16.577603	---	41.42	50.00	8.58	1000.0	9.000	L1	GND	11.2
16.577603	48.99	---	60.00	11.01	1000.0	9.000	L1	GND	11.2
16.745820	---	41.30	50.00	8.70	1000.0	9.000	L1	GND	11.2
16.745820	48.96	---	60.00	11.04	1000.0	9.000	L1	GND	11.2
17.174164	---	40.73	50.00	9.27	1000.0	9.000	L1	GND	11.3
17.174164	48.52	---	60.00	11.48	1000.0	9.000	L1	GND	11.3
17.822233	---	40.85	50.00	9.15	1000.0	9.000	L1	GND	11.3
17.822233	48.12	---	60.00	11.88	1000.0	9.000	L1	GND	11.3
18.289090	---	42.00	50.00	8.00	1000.0	9.000	L1	GND	11.4
18.289090	49.05	---	60.00	10.95	1000.0	9.000	L1	GND	11.4
19.492298	---	40.28	50.00	9.72	1000.0	9.000	L1	GND	11.5
19.492298	46.98	---	60.00	13.02	1000.0	9.000	L1	GND	11.5

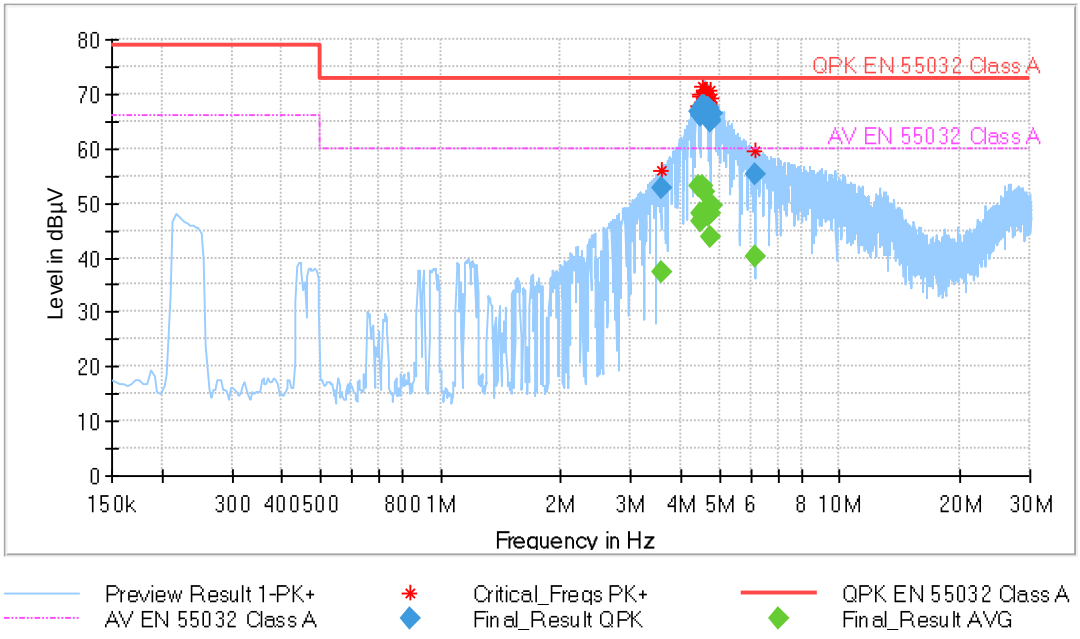
8.3.6 Test results of mains (minus / neutral N)

EUT Information

EUT Name:	Flir-A8990
Manufacturer:	Flir Systems AB
Operator:	von Ehren
Operating Mode:	continuous streaming via Ethernet and WLAN
Comment:	DC 24 V

Common Information

Line:	Minus

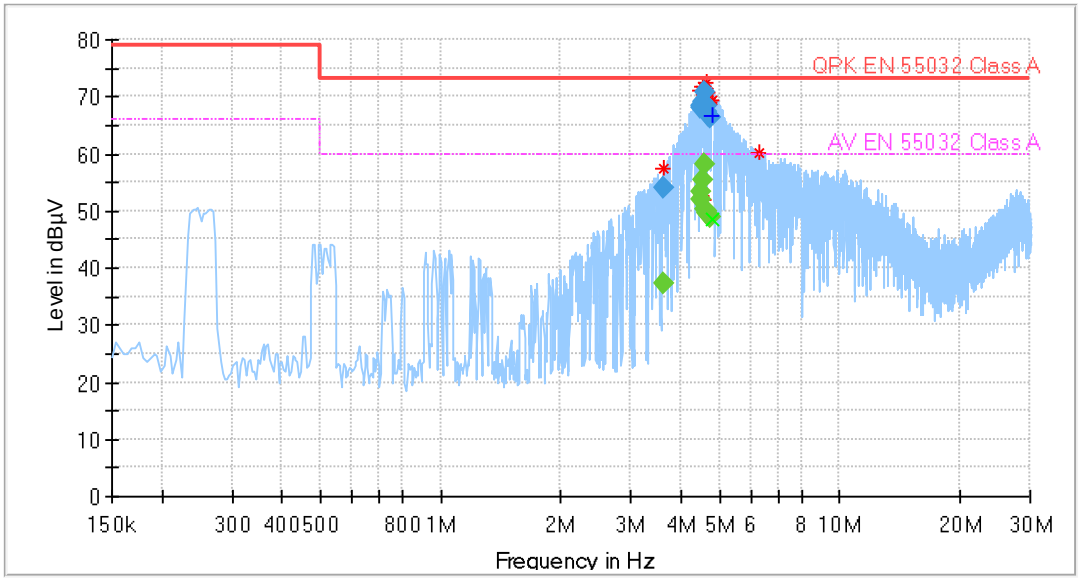


Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Corr. (dB)
3.597257	---	37.40	60.00	22.60	1000.0	9.000	10.2
3.597257	52.86	---	73.00	20.14	1000.0	9.000	10.2
4.417326	---	53.27	60.00	6.73	1000.0	9.000	10.3
4.417326	66.55	---	73.00	6.45	1000.0	9.000	10.3
4.472504	---	48.04	60.00	11.96	1000.0	9.000	10.3
4.472504	66.26	---	73.00	6.74	1000.0	9.000	10.3
4.480745	---	46.75	60.00	13.25	1000.0	9.000	10.3
4.480745	66.12	---	73.00	6.88	1000.0	9.000	10.3
4.553920	---	53.09	60.00	6.91	1000.0	9.000	10.3
4.553920	67.93	---	73.00	5.07	1000.0	9.000	10.3
4.593130	---	52.06	60.00	7.94	1000.0	9.000	10.3
4.593130	67.75	---	73.00	5.25	1000.0	9.000	10.3
4.655189	---	48.89	60.00	11.11	1000.0	9.000	10.3
4.655189	67.50	---	73.00	5.50	1000.0	9.000	10.3
4.687034	---	47.66	60.00	12.34	1000.0	9.000	10.3
4.687034	67.37	---	73.00	5.63	1000.0	9.000	10.3
4.725126	---	43.93	60.00	16.07	1000.0	9.000	10.3
4.725126	65.03	---	73.00	7.97	1000.0	9.000	10.3
4.757881	---	48.20	60.00	11.80	1000.0	9.000	10.3
4.757881	65.19	---	73.00	7.81	1000.0	9.000	10.3
4.798776	---	49.56	60.00	10.44	1000.0	9.000	10.3
4.798776	66.30	---	73.00	6.70	1000.0	9.000	10.3
6.137934	---	40.03	60.00	19.97	1000.0	9.000	10.4
6.137934	55.27	---	73.00	17.73	1000.0	9.000	10.4

EUT Information

EUT Name:	Flir-A8990
Manufacturer:	Flir Systems AB
Operator:	von Ehren
Operating Mode:	continuous streaming via Ethernet and WLAN
Comment:	DC 24 V

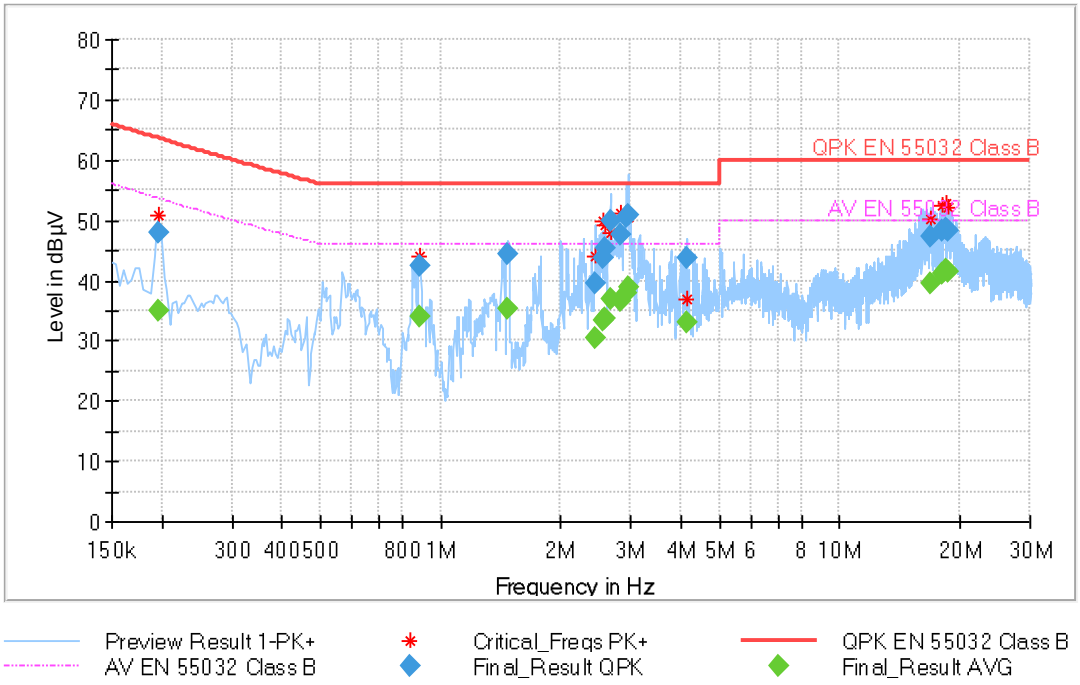


Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
3.604431	54.05	---	73.00	18.95	1000.0	9.000	N	FLO	10.4
3.604431	---	37.30	60.00	22.70	1000.0	9.000	N	FLO	10.4
4.481129	67.90	---	73.00	5.10	1000.0	9.000	N	FLO	10.5
4.481129	---	51.85	60.00	8.15	1000.0	9.000	N	FLO	10.5
4.502756	68.35	---	73.00	4.65	1000.0	9.000	N	FLO	10.4
4.502756	---	53.29	60.00	6.71	1000.0	9.000	N	FLO	10.4
4.543142	69.03	---	73.00	3.97	1000.0	9.000	N	FLO	10.5
4.543142	---	55.44	60.00	4.56	1000.0	9.000	N	FLO	10.5
4.582819	70.65	---	73.00	2.35	1000.0	9.000	N	FLO	10.5
4.582819	---	58.00	60.00	2.00	1000.0	9.000	N	FLO	10.5
4.608388	68.43	---	73.00	4.57	1000.0	9.000	N	FLO	10.5
4.608388	---	50.25	60.00	9.75	1000.0	9.000	N	FLO	10.5
4.625153	68.54	---	73.00	4.46	1000.0	9.000	N	FLO	10.5
4.625153	---	50.07	60.00	9.93	1000.0	9.000	N	FLO	10.5
4.644406	67.18	---	73.00	5.82	1000.0	9.000	N	FLO	10.5
4.644406	---	49.62	60.00	10.38	1000.0	9.000	N	FLO	10.5
4.706438	66.73	---	73.00	6.27	1000.0	9.000	N	FLO	10.5
4.706438	---	49.24	60.00	10.76	1000.0	9.000	N	FLO	10.5
4.750290	66.35	---	73.00	6.65	1000.0	9.000	N	FLO	10.5
4.750290	---	48.82	60.00	11.18	1000.0	9.000	N	FLO	10.5

EUT Information

EUT Name:	Flir-A8990
Manufacturer:	Flir Systems AB
Operator:	von Ehren
Operating Mode:	continuous streaming via Ethernet and WLAN
Comment:	PoE



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.196411	---	34.94	53.59	18.65	1000.0	9.000	N	GND	10.2
0.196411	47.92	---	63.62	15.70	1000.0	9.000	N	GND	10.2
0.886485	---	34.02	46.00	11.98	1000.0	9.000	N	GND	10.0
0.886485	42.27	---	56.00	13.73	1000.0	9.000	N	GND	10.0
1.477528	---	35.39	46.00	10.61	1000.0	9.000	N	GND	10.1
1.477528	44.51	---	56.00	11.49	1000.0	9.000	N	GND	10.1
2.440376	---	30.58	46.00	15.42	1000.0	9.000	N	GND	10.3
2.440376	39.63	---	56.00	16.37	1000.0	9.000	N	GND	10.3
2.557856	---	33.49	46.00	12.51	1000.0	9.000	N	GND	10.3
2.557856	43.74	---	56.00	12.26	1000.0	9.000	N	GND	10.3
2.593217	---	33.70	46.00	12.30	1000.0	9.000	N	GND	10.3
2.593217	45.26	---	56.00	10.74	1000.0	9.000	N	GND	10.3
2.662609	---	37.07	46.00	8.93	1000.0	9.000	N	GND	10.3
2.662609	49.99	---	56.00	6.01	1000.0	9.000	N	GND	10.3
2.824493	---	36.54	46.00	9.46	1000.0	9.000	N	GND	10.3
2.824493	47.61	---	56.00	8.39	1000.0	9.000	N	GND	10.3
2.925237	---	38.03	46.00	7.97	1000.0	9.000	N	GND	10.3
2.925237	50.42	---	56.00	5.58	1000.0	9.000	N	GND	10.3
2.957111	---	38.76	46.00	7.24	1000.0	9.000	N	GND	10.3
2.957111	50.94	---	56.00	5.06	1000.0	9.000	N	GND	10.3
4.134909	---	33.12	46.00	12.88	1000.0	9.000	N	GND	10.4
4.134909	43.82	---	56.00	12.18	1000.0	9.000	N	GND	10.4
16.989759	---	39.61	50.00	10.39	1000.0	9.000	N	GND	11.3
16.989759	47.14	---	60.00	12.86	1000.0	9.000	N	GND	11.3
18.059770	---	41.11	50.00	8.89	1000.0	9.000	N	GND	11.4
18.059770	48.24	---	60.00	11.76	1000.0	9.000	N	GND	11.4
18.545623	---	41.70	50.00	8.30	1000.0	9.000	N	GND	11.4
18.545623	48.45	---	60.00	11.55	1000.0	9.000	N	GND	11.4
18.706820	---	41.61	50.00	8.39	1000.0	9.000	N	GND	11.4
18.706820	48.22	---	60.00	11.78	1000.0	9.000	N	GND	11.4

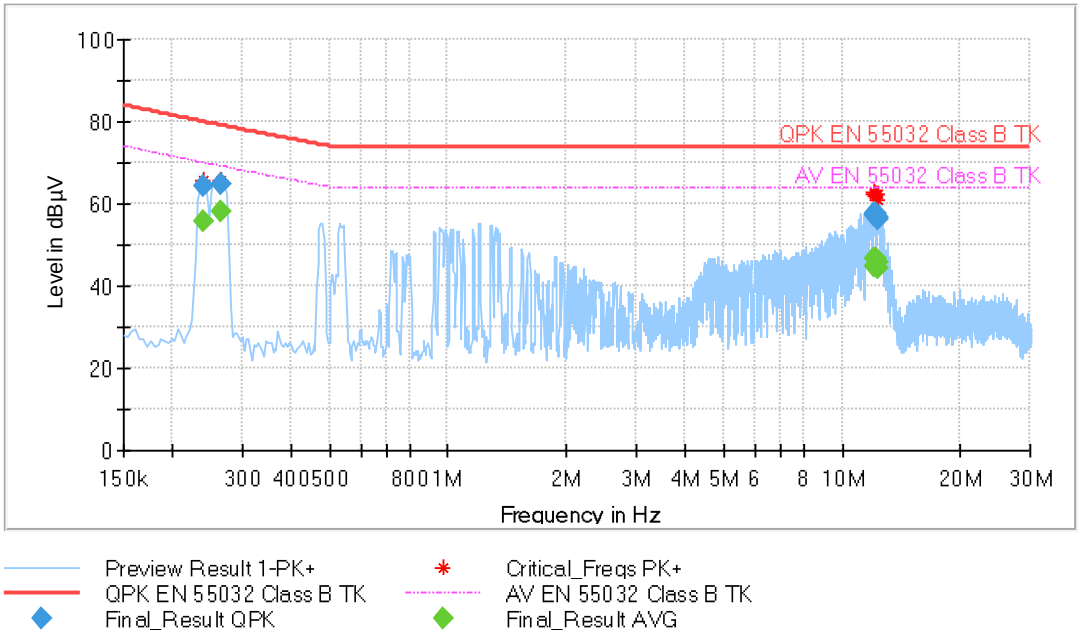
8.3.7 Test results (wired network port)

EUT Information

EUT Name:	Flir-A8990
Manufacturer:	Flir Systems AB
Operator:	von Ehren
Operating Mode:	continuous streaming via Ethernet and WLAN
Comment:	DC 24 V

Common Information

Line:	Ethernet



Final_Result

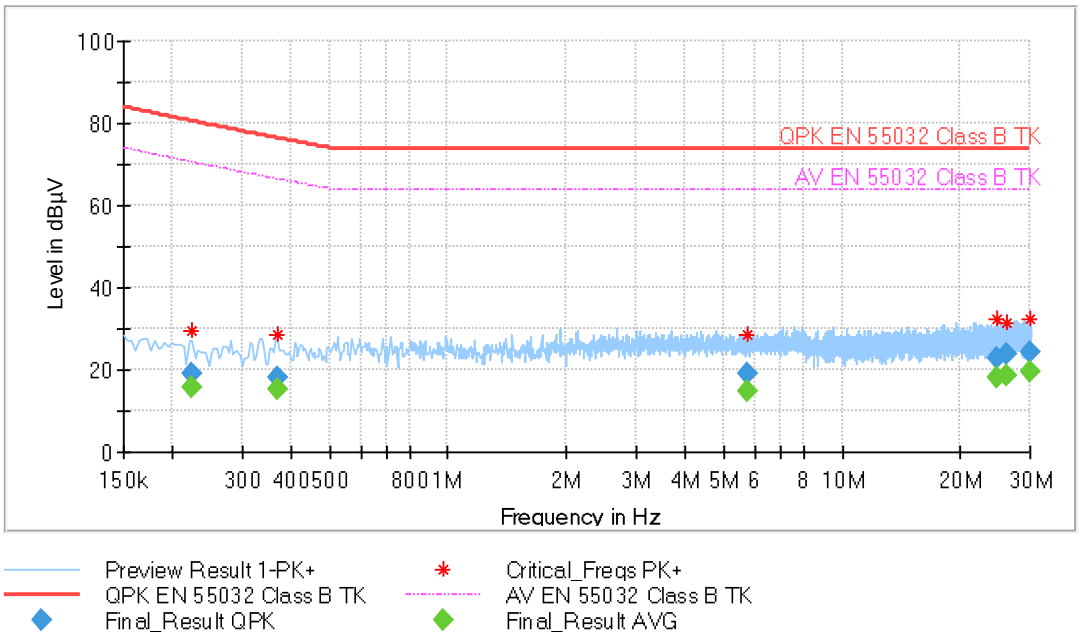
Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	PE	Corr. (dB)
0.238930	---	55.93	69.96	14.03	1000.0	9.000	GND	19.6
0.238930	64.31	---	79.98	15.67	1000.0	9.000	GND	19.6
0.266510	---	58.01	69.05	11.03	1000.0	9.000	GND	19.5
0.266510	64.56	---	79.07	14.51	1000.0	9.000	GND	19.5
12.005989	---	46.53	64.00	17.47	1000.0	9.000	GND	20.5
12.005989	57.81	---	74.00	16.19	1000.0	9.000	GND	20.5
12.089154	---	44.63	64.00	19.37	1000.0	9.000	GND	20.6
12.089154	57.26	---	74.00	16.74	1000.0	9.000	GND	20.6
12.183459	---	44.65	64.00	19.35	1000.0	9.000	GND	20.6
12.183459	57.27	---	74.00	16.73	1000.0	9.000	GND	20.6
12.227312	---	46.79	64.00	17.21	1000.0	9.000	GND	20.6
12.227312	57.53	---	74.00	16.47	1000.0	9.000	GND	20.6
12.340250	---	45.51	64.00	18.49	1000.0	9.000	GND	20.6
12.340250	56.80	---	74.00	17.20	1000.0	9.000	GND	20.6
12.350965	---	44.05	64.00	19.95	1000.0	9.000	GND	20.6
12.350965	56.33	---	74.00	17.67	1000.0	9.000	GND	20.6

EUT Information

EUT Name:	Flir-A8990
Manufacturer:	Flir Systems AB
Operator:	von Ehren
Operating Mode:	continuous streaming via Ethernet and WLAN
Comment:	PoE

Common Information

Line:	Ethernet (out)



Final_Result

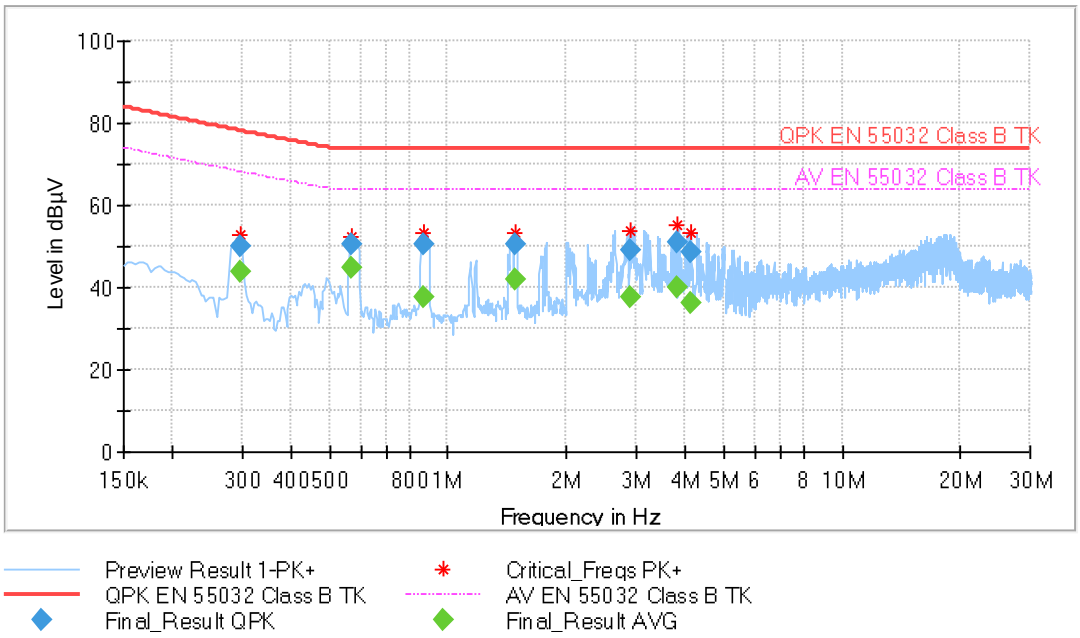
Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	PE	Corr. (dB)
0.224298	---	15.84	70.50	54.66	1000.0	9.000	GND	19.6
0.224298	19.18	---	80.52	61.34	1000.0	9.000	GND	19.6
0.370247	---	15.12	66.36	51.24	1000.0	9.000	GND	19.5
0.370247	18.28	---	76.38	58.10	1000.0	9.000	GND	19.5
5.758823	---	14.58	64.00	49.42	1000.0	9.000	GND	20.0
5.758823	19.25	---	74.00	54.75	1000.0	9.000	GND	20.0
24.638070	---	18.00	64.00	46.00	1000.0	9.000	GND	21.2
24.638070	22.84	---	74.00	51.16	1000.0	9.000	GND	21.2
26.126296	---	18.69	64.00	45.31	1000.0	9.000	GND	21.2
26.126296	23.64	---	74.00	50.36	1000.0	9.000	GND	21.2
29.899813	---	19.42	64.00	44.58	1000.0	9.000	GND	21.3
29.899813	24.52	---	74.00	49.48	1000.0	9.000	GND	21.3

EUT Information

EUT Name:	Flir-A8990
Manufacturer:	Flir Systems AB
Operator:	von Ehren
Operating Mode:	continuous streaming via Ethernet and WLAN
Comment:	PoE

Common Information

Line:	Ethernet (in)

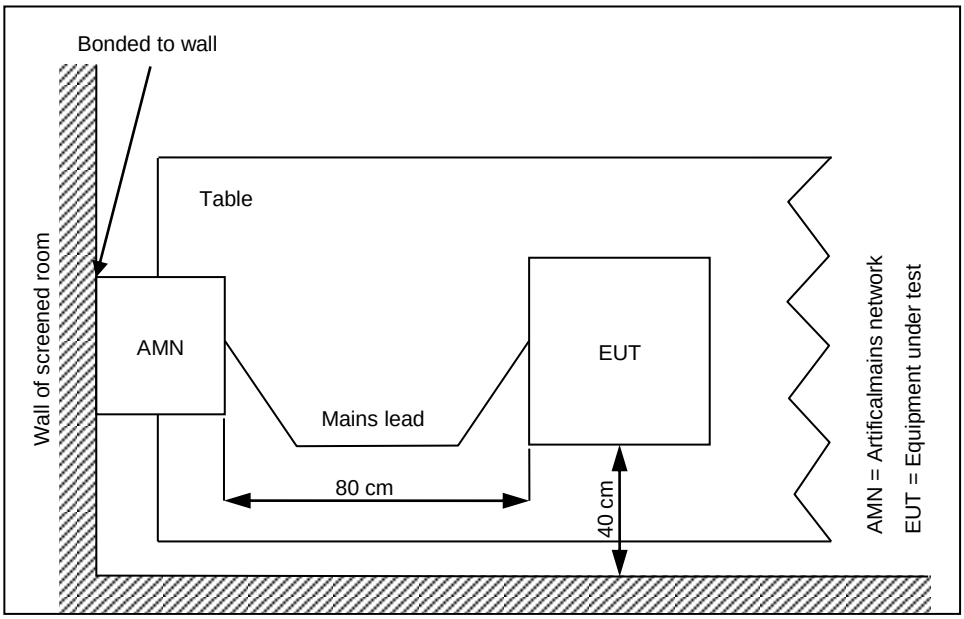


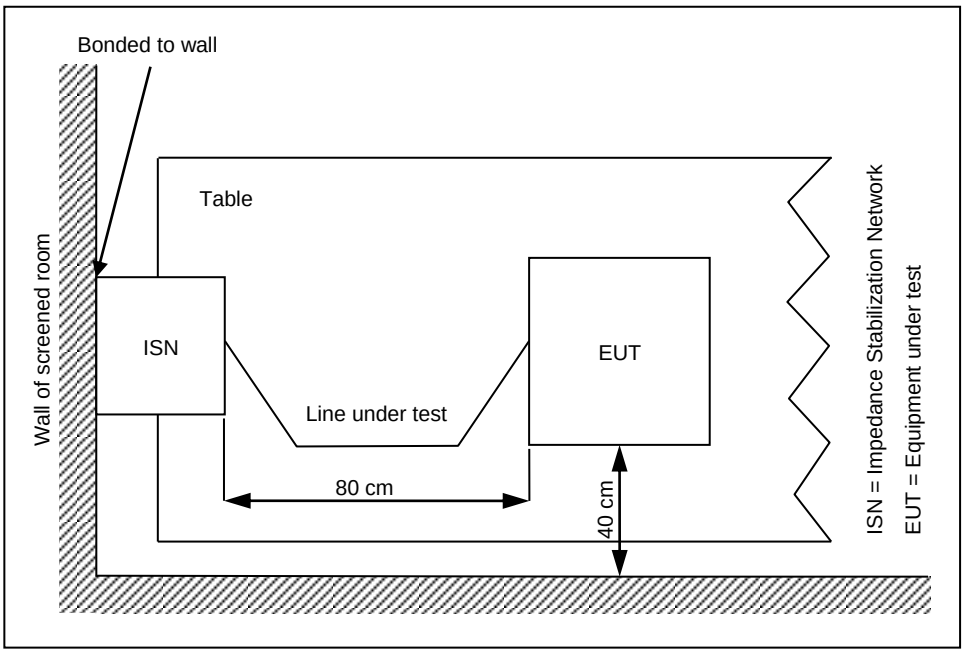
Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	PE	Corr. (dB)
0.297360	---	43.90	68.14	24.24	1000.0	9.000	GND	19.5
0.297360	49.99	---	78.16	28.17	1000.0	9.000	GND	19.5
0.569373	---	44.67	64.00	19.33	1000.0	9.000	GND	19.5
0.569373	50.51	---	74.00	23.49	1000.0	9.000	GND	19.5
0.870579	---	37.51	64.00	26.49	1000.0	9.000	GND	19.5
0.870579	50.45	---	74.00	23.55	1000.0	9.000	GND	19.5
1.479282	---	41.71	64.00	22.29	1000.0	9.000	GND	19.6
1.479282	50.54	---	74.00	23.46	1000.0	9.000	GND	19.6
2.908108	---	37.58	64.00	26.42	1000.0	9.000	GND	19.8
2.908108	49.00	---	74.00	25.00	1000.0	9.000	GND	19.8
3.834953	---	39.89	64.00	24.11	1000.0	9.000	GND	19.9
3.834953	50.72	---	74.00	23.28	1000.0	9.000	GND	19.9
4.108264	---	36.42	64.00	27.58	1000.0	9.000	GND	19.9
4.108264	48.71	---	74.00	25.29	1000.0	9.000	GND	19.9

8.3.8 Test set-up

According to EMC basic standard **EN 55032**





9 Immunity – Detailed test results

9.1 Radio frequency electromagnetic field (80 MHz to 6 GHz)

9.1.1 Instrumentation for test (see equipment list)

B 1	B 2	B 3	B 4	B 5	B 6	B 8	B 9	B 10	B 11	B 16	

9.1.2 Test plan

EUT set-up	EUT A (DC powered)				
Operating mode	op. 1: Infrared camera streaming via 2,4 GHz WLAN and Ethernet (DC 48 V) op. 2: Infrared camera streaming via 5 GHz WLAN and Ethernet (DC 48 V)				
Test condition					
Dwell time	**Field strength (unmod., rms)**	**Start frequency**	**Stop frequency**	**Frequency step**	**Modulation**
1 s	20 V/m 10 V/m	80 MHz 1000 MHz	1000 MHz 6000 MHz	log 1%	1 kHz, AM 80%
View to EUT surface	**Antenna position**		**Operating mode**	**Reaction of EUT (please refer to chapter 7.3)**	**Within specification(s) during and after test**
front side	horizontal		op. 1	R1	yes
	vertical		op. 1	R1	yes
left side	horizontal		op. 1	R1	yes
	vertical		op. 1	R1	yes
rear side	horizontal		op. 2	R1	yes
	vertical		op. 2	R1	yes
right side	horizontal		op. 2	R1	yes
	vertical		op. 2	R1	yes

Remarks:	Frequencies around the operating frequency were excluded from the measurement according to EN 301 489-17, clause 4.3. Spot frequencies according to EN 55035 were also performed. Higher test level on customer request to cover other EMC test standards.

9.1.3 Test plan

EUT set-up	EUT A (DC powered)				
Operating mode	op. 1: Infrared camera streaming via 2,4 GHz WLAN and Ethernet (DC 24 V) op. 2: Infrared camera streaming via 5 GHz WLAN and Ethernet (DC 24 V)				
Test condition					
Dwell time	**Field strength (unmod., rms)**	**Start frequency**	**Stop frequency**	**Frequency step**	**Modulation**
1 s	20 V/m 10 V/m	80 MHz 1000 MHz	1000 MHz 6000 MHz	log 1%	1 kHz, AM 80%
View to EUT surface	**Antenna position**		**Operating mode**	**Reaction of EUT (please refer to chapter 7.3)**	**Within specification(s) during and after test**
front side	horizontal		op. 1	R1	yes
	vertical		op. 1	R1	yes
left side	horizontal		op. 1	R1	yes
	vertical		op. 1	R1	yes
rear side	horizontal		op. 2	R1	yes
	vertical		op. 2	R1	yes
right side	horizontal		op. 2	R1	yes
	vertical		op. 2	R1	yes

Remarks:	Frequencies around the operating frequency were excluded from the measurement according to EN 301 489-17, clause 4.3. Spot frequencies according to EN 55035 were also performed. Higher test level on customer request to cover other EMC test standards.

9.1.4 Test plan

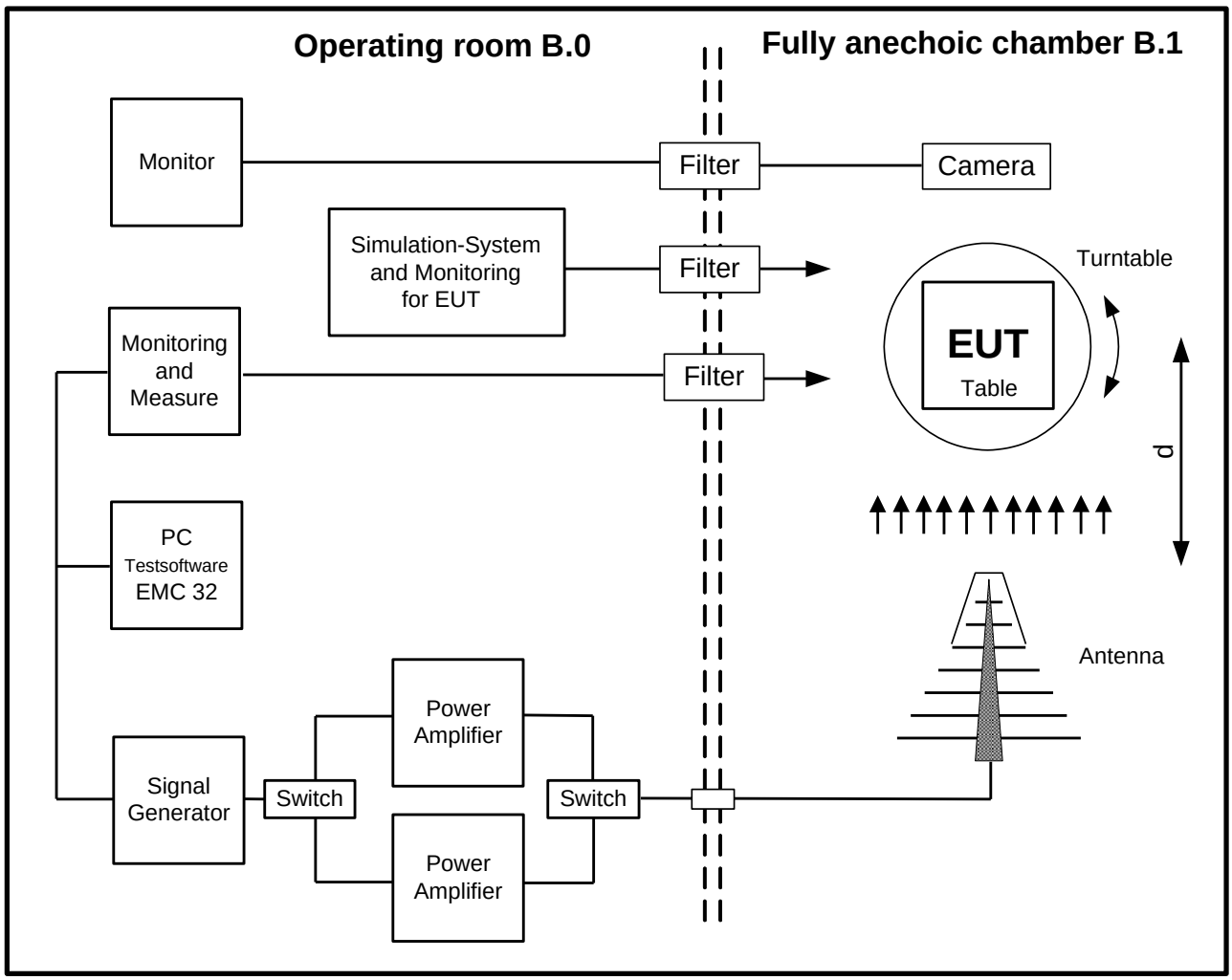
EUT set-up	EUT A (PoE powered)				
Operating mode	op. 1: Infrared camera streaming via 2,4 GHz WLAN and Ethernet op. 2: Infrared camera streaming via 5 GHz WLAN and Ethernet				
Test condition					
Dwell time	**Field strength (unmod., rms)**	**Start frequency**	**Stop frequency**	**Frequency step**	**Modulation**
1 s	3 V/m	80 MHz	6000 MHz	log 1%	1 kHz, AM 80%
View to EUT surface	**Antenna position**		**Operating mode**	**Reaction of EUT (please refer to chapter 7.3)**	**Within specification(s) during and after test**
front side	horizontal		op. 1	R1	yes
	vertical		op. 1	R1	yes
left side	horizontal		op. 1	R1	yes
	vertical		op. 1	R1	yes
rear side	horizontal		op. 2	R1	yes
	vertical		op. 2	R1	yes
right side	horizontal		op. 2	R1	yes
	vertical		op. 2	R1	yes

Remarks:	Frequencies around the operating frequency were excluded from the measurement according to EN 301 489-17, clause 4.3. Spot frequencies according to EN 55035 were also performed.

9.1.5 Test set-up

According to EMC basic standard **EN 61000-4-3**

The distance *(d)* between turntable-axis and TX-antenna-tip is 3 meter.



9.2 Radio frequency, common mode (150 kHz to 80 MHz)

9.2.1 Instrumentation for test (see equipment list)

I 4	I 5	I 6	I 7	I 8	I 9	I 13	I 14	I 63		

9.2.2 Test plan

EUT set-up	EUT A (DC powered)				
Operating mode	Infrared camera streaming via 2,4 GHz WLAN and Ethernet				
Test conditions					
Dwell time	**Test level (unmod., rms)**	**Start frequency**	**Stop frequency**	**Frequency step**	**Modulation**
1 s	10 V	150 kHz	80 MHz	log 1%	1 kHz, AM 80%
Port	**Coupling device**		**Reaction of EUT (please refer to chapter 7.3)**		**Within specification(s) during and after test**
DC 24 V	CDN M2		R1		yes
DC 48 V	CDN M2		R1		yes
Ethernet (shielded)	CDN ST08		R1		yes

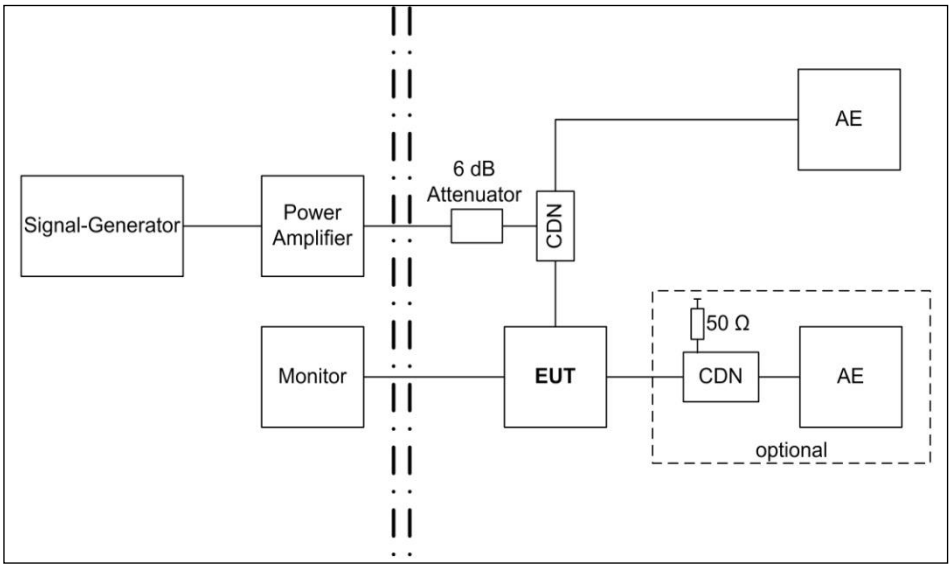
Remarks:	Higher test level on customer request to cover other EMC test standards.

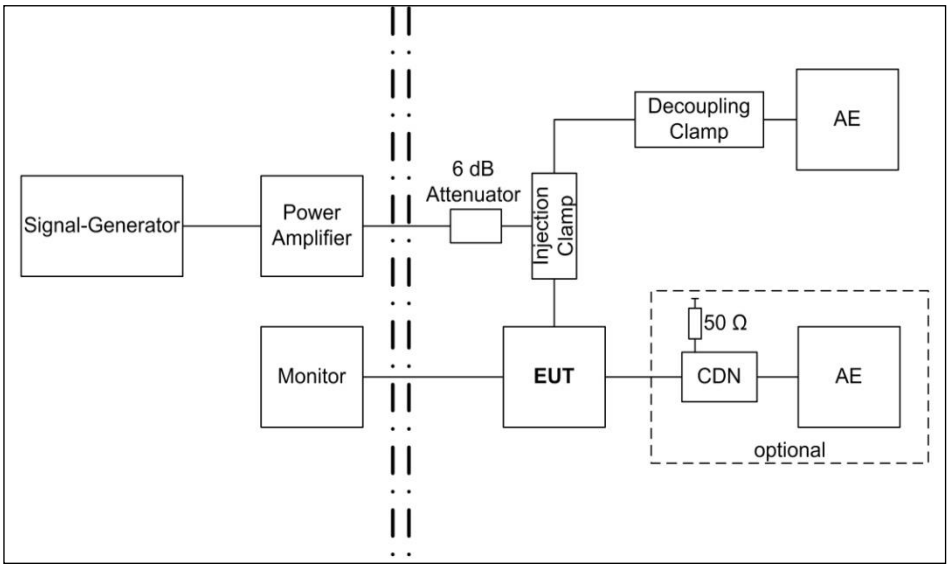
EUT set-up	EUT A (PoE powered)				
Operating mode	Infrared camera streaming via 2,4 GHz WLAN and Ethernet				
Test conditions					
Dwell time	**Test level (unmod., rms)**	**Start frequency**	**Stop frequency**	**Frequency step**	**Modulation**
1 s	3 V	150 kHz	80 MHz	log 1%	1 kHz, AM 80%
Port	**Coupling device**		**Reaction of EUT (please refer to chapter 7.3)**		**Within specification(s) during and after test**
AC 230 V (at AC/DC PoE adaptor)	CDN M3		R1		yes
Ethernet (shielded) (at camera)	CDN ST08		R1		yes
Ethernet (shielded) (at AC/DC PoE adaptor)	CDN ST08		R1		yes

Remarks:	---

9.2.3 Test set-up

According to the requirements given in **EN 61000-4-6**





9.3 Electrical fast transients (burst)

9.3.1 Instrumentation for test (see equipment list)

I 21	I 23										

9.3.2 Test plan

EUT set-up	EUT A (DC powered)				
Operating mode	Infrared camera streaming via 2,4 GHz WLAN and Ethernet				
Port	**Voltage peak**	**Coupling device**	**Repetition rate**	**Reaction of EUT (please refer to chapter 7.3)**	**Within specification(s) during and after test**
DC 24 V	+0,5 kV -0,5 kV	clamp	5 kHz	R1	yes
DC 48 V	+0,5 kV -0,5 kV	clamp	5 kHz	R1	yes
Ethernet (shielded)	+0,5 kV -0,5 kV	clamp	5 kHz	R1	yes

EUT set-up	EUT A (PoE powered)				
Operating mode	Infrared camera streaming via 2,4 GHz WLAN and Ethernet				
Port	**Voltage peak**	**Coupling device**	**Repetition rate**	**Reaction of EUT (please refer to chapter 7.3)**	**Within specification(s) during and after test**
AC 230 V (at AC/DC PoE adaptor)	+1,0 kV -1,0 kV	internal	5 kHz	R1	yes
Ethernet (shielded) (at camera)	+0,5 kV -0,5 kV	clamp	5 kHz	R1	yes
Ethernet (shielded) (at AC/DC PoE adaptor)	+0,5 kV -0,5 kV	clamp	5 kHz	R1	yes

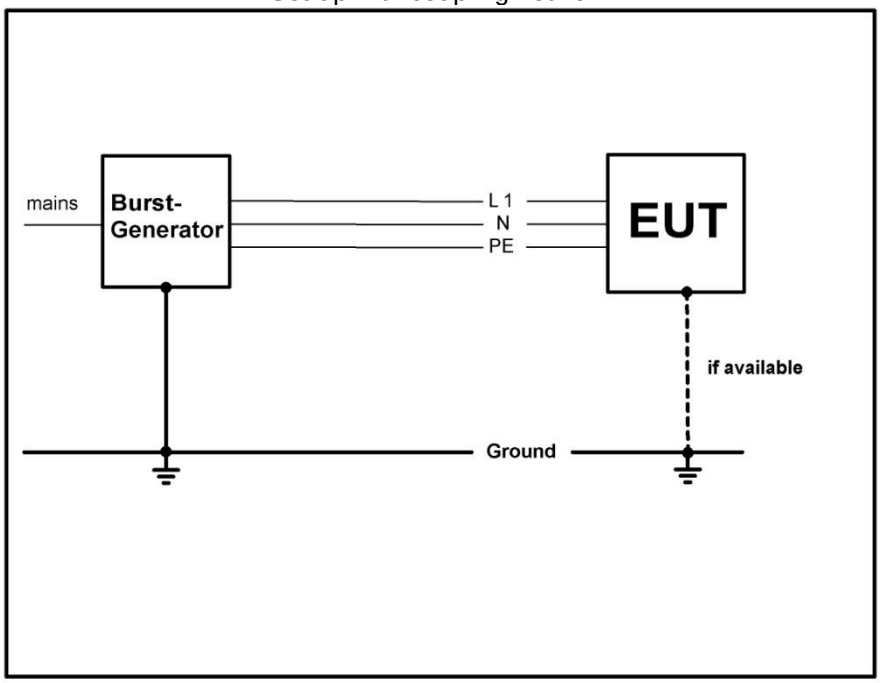
Remarks:	---

9.3.3 Test set-up

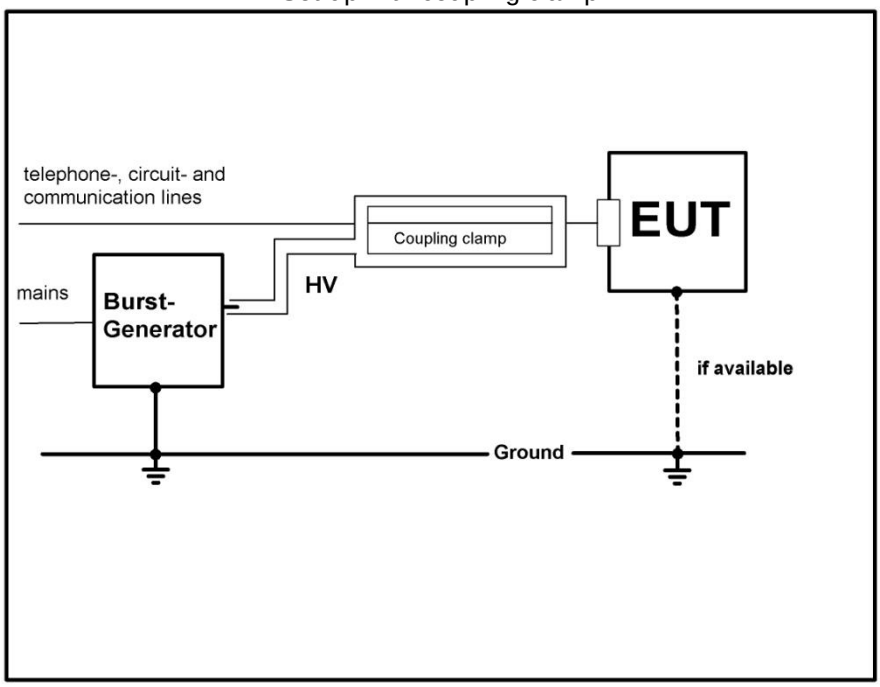
According to the requirements given in **EN 61000-4-4**

The test is intended to demonstrate the immunity of the device when subjected to types of transient interference such as that originating from switching transients (interruption of inductive loads etc.).

Set-up with coupling network



Set-up with coupling clamp



9.4 Surges (Impulse 1,2/50µs and 8/20µs)

9.4.1 Instrumentation for Test (see equipment list)

I 21											

9.4.2 Test plan

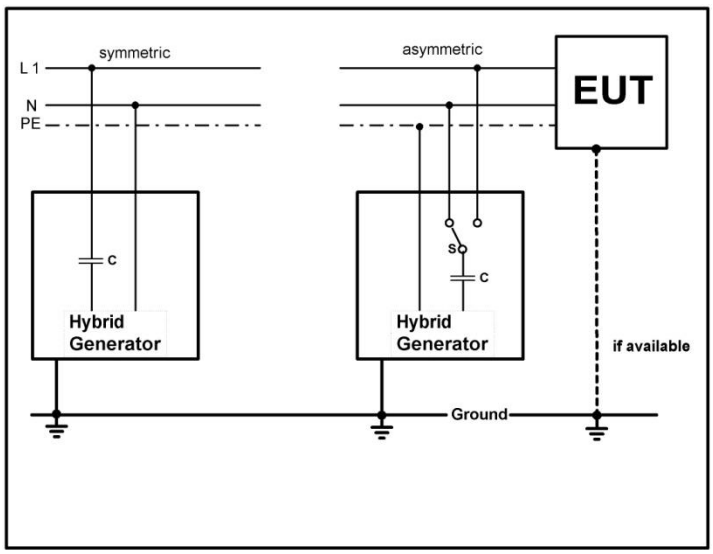
EUT set-up	EUT A (DC 24 V)				
Operating mode	Infrared camera streaming via 2,4 GHz WLAN and Ethernet				
Port	**Coupling mode**	**Requirements**	**Polarity**	**Reaction of EUT (please refer to chapter 7.3)**	**Within specification(s) during and after test**
Ethernet	shield to ground (Common mode)	Voltage: 0.5 kV Time: 1,2/50 (8/20)µs Repetition: 1 pulse/min. Phase angle: -	Number: 5 Each + / -	R1	yes

EUT set-up	EUT A (PoE powered)				
Operating mode	Infrared camera streaming via 2,4 GHz WLAN and Ethernet				
Port	**Coupling mode**	**Requirements**	**Polarity**	**Reaction of EUT (please refer to chapter 7.3)**	**Within specification(s) during and after test**
AC 230 V (at AC/DC PoE adaptor)	L1 – N (Differential mode)	Voltage: 0,5 and 1 kV Time: 1,2/50 (8/20)µs Repetition: 1 pulse/min. Phase angles: 0°, 90°, 180°, 270°.	Number: 5 Each + / -	R1	yes
AC 230 V (at AC/DC PoE adaptor)	L1 – PE N – PE (Common mode)	Voltage: 0.5, 1 and 2 kV Time: 1,2/50 (8/20)µs Repetition: 1 pulse/min. Phase angles: 0°, 90°, 180°, 270°.	Number: 5 Each + / -	R1	yes
Ethernet (shielded) (at camera)	shield to ground (Common mode)	Voltage: 0.5 kV Time: 1,2/50 (8/20)µs Repetition: 1 pulse/min. Phase angle: -	Number: 5 Each + / -	R1	yes
Ethernet (shielded) (at AC/DC PoE adaptor)	shield to ground (Common mode)	Voltage: 0.5 kV Time: 1,2/50 (8/20)µs Repetition: 1 pulse/min. Phase angle: -	Number: 5 Each + / -	R1	yes

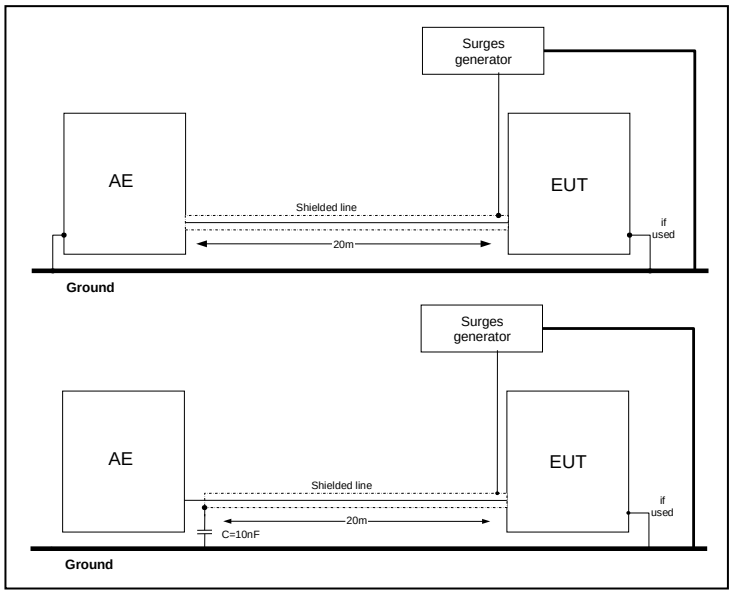
Remarks:	---

9.4.3 Test set-up

According to the requirements given in **EN 61000-4-5**



AC-Line



Shielded-Line

9.5 Voltage dips and interruptions

9.5.1 Instrumentation for test (see equipment list)

I 21	I 22										

9.5.2 Test plan

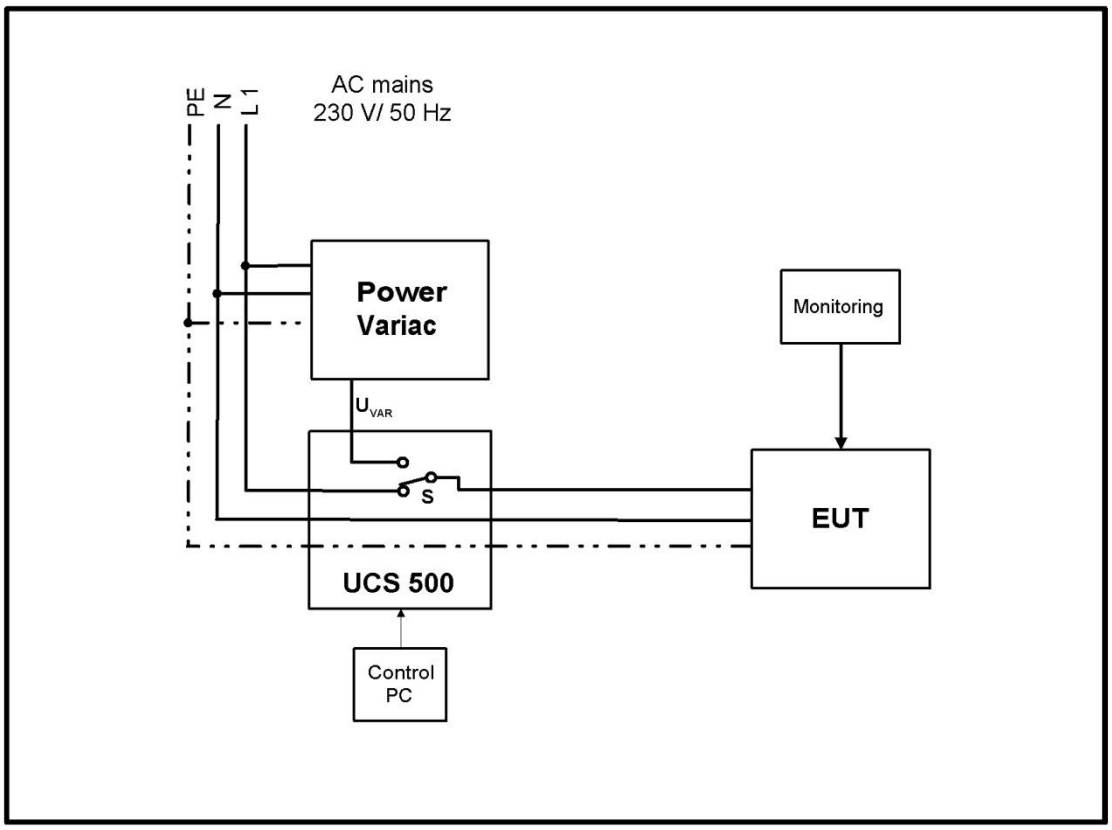
EUT set-up	EUT A (PoE powered)				
Operating mode	Infrared camera streaming via 2,4 GHz WLAN and Ethernet				
Nominal supply voltage	**Reduction**	**Phase angle**	**Duration (ms)**	**Reaction of EUT (please refer to chapter 7.3)**	**Within specification(s) during and after test**
AC 230 V (at AC/DC PoE adaptor)	30% (161 V)	0° - 315° 45° steps	500	R1	yes
AC 230 V (at AC/DC PoE adaptor)	100% (0 V)	0° - 315° 45° steps	10	R1	yes
AC 230 V (at AC/DC PoE adaptor)	100% (0 V)	0° - 315° 45° steps	20	R1	yes
AC 230 V (at AC/DC PoE adaptor)	100% (0 V)	0°	5000	R2	yes

Remarks:	--

9.5.3 Test set-up

According to the requirements given in **EN 61000-4-11**

The test is intended to demonstrate the immunity against voltage dips and short interruptions of the AC mains.



9.6 Electrostatic discharge

9.6.1 Instrumentation for test (see equipment list)

I 1	I 2	I 3									

9.6.2 Test plan

EUT set-up	EUT A (DC 24 V / DC 48 V)					
Operating mode	Infrared camera streaming via 2,4 GHz WLAN and Ethernet					
	Contact discharge to conducted surfaces and to coupling planes				**Air discharge to insulating surfaces**	
	Direct contact discharge		**Indirect contact discharge**			
Test voltage	**Reaction of EUT (please refer to chapter 7.3)**	**Within specification(s) during and after test**	**Reaction of EUT (please refer to chapter 7.3)**	**Within specification(s) during and after test**	**Reaction of EUT (please refer to chapter 7.3)**	**Within specification(s) during and after test**
+ 2 kV -2 kV	R1	yes	R1	yes	R1	yes
+ 4 kV - 4 kV	R1	yes	R1	yes	R1	yes
+ 8 kV - 8 kV	*not applicable*	---	*not applicable*	---	R1	yes

EUT set-up	EUT A (PoE powered)					
Operating mode	Infrared camera streaming via 2,4 GHz WLAN and Ethernet					
	Contact discharge to conducted surfaces and to coupling planes				**Air discharge to insulating surfaces**	
	Direct contact discharge		**Indirect contact discharge**			
Test voltage	**Reaction of EUT (please refer to chapter 7.3)**	**Within specification(s) during and after test**	**Reaction of EUT (please refer to chapter 7.3)**	**Within specification(s) during and after test**	**Reaction of EUT (please refer to chapter 7.3)**	**Within specification(s) during and after test**
+ 2 kV -2 kV	R1	yes	R1	yes	R1	yes
+ 4 kV - 4 kV	R1	yes	R1	yes	R1	yes
+ 8 kV - 8 kV	*not applicable*	---	*not applicable*	---	R1	yes

Remark:	10 Single impulses at each test point and for each test voltage.
	Direct contact discharge was performed to the Green Points on the pictures of the ESD test set-up. *Air discharge was performed to the Blue Points on the pictures of the ESD test set-up.*

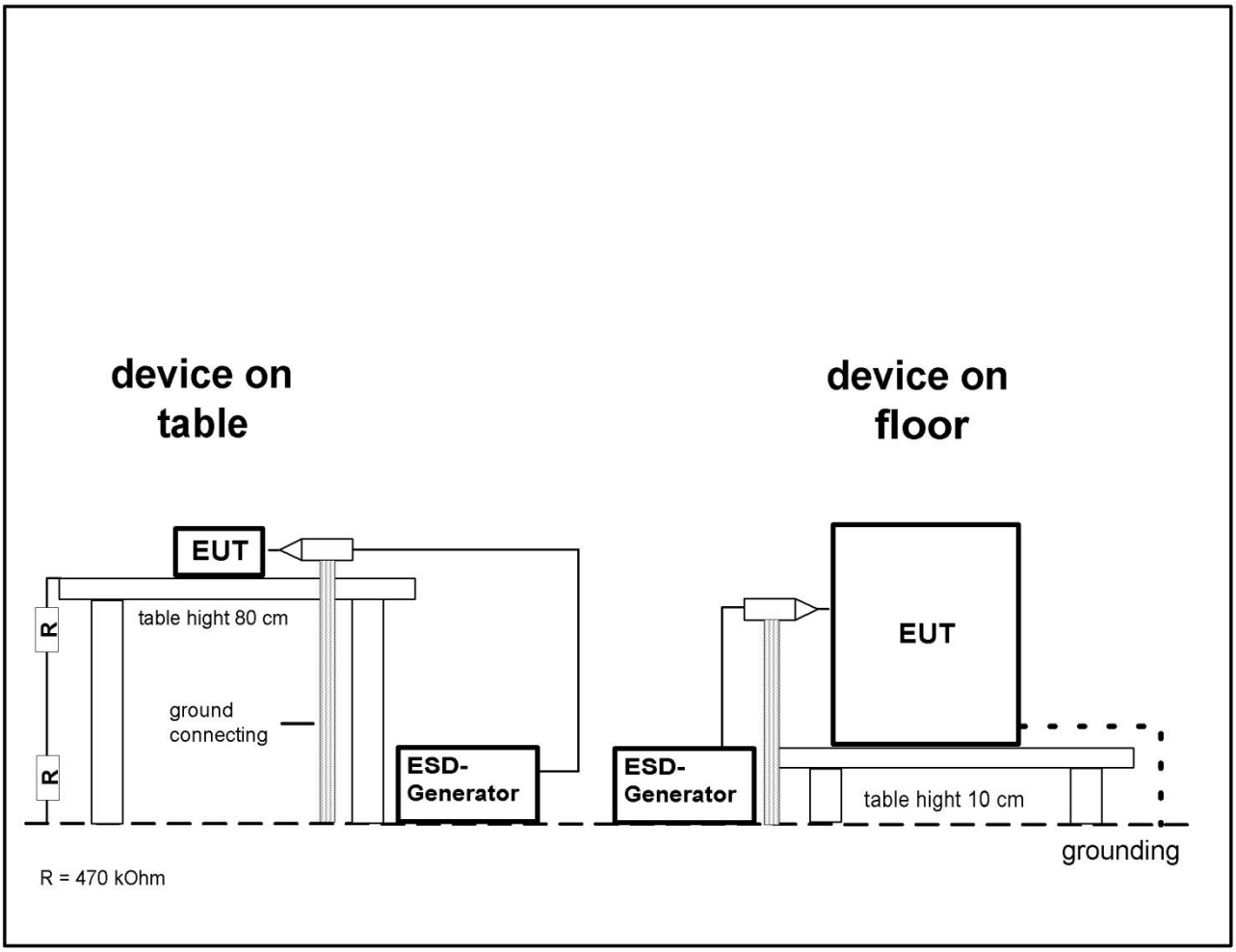
9.6.3 Climatic conditions

-	Ambient temperature:	23	°C	Ambient Temperature range:	15 °C to 35 °C
-	Relative humidity:	36	%	Relative humidity range:	30% to 60%
-	Atmospheric pressure:	1020	hPa	Atmospheric pressure range	860 hPa to 1060 hPa

9.6.4 Test set-up

According to the requirements given in **EN 61000-4-2**

This test is intended to demonstrate the immunity of the device to a discharge caused by operators.



9.7 Transients and surges, vehicular environment

9.7.1 Instrumentation for test (see equipment list)

D-200	D-201	D-202	D-203	D-204	D-205	D-206					

9.7.2 Test plan

EUT set-up	EUT A (DC 24 V)
Operating mode	Infrared camera streaming via 2,4 GHz WLAN and Ethernet

Test on 24 V DC power line (direct injection)

Pulse	Level	V_s	Number of test pulses or test time	Reaction of EUT (please refer to chapter 7.3)	Within specification(s) during and after test
1	**III**	-450 V	10 pulses	R2	yes
2a	**III**	+37 V	10 pulses	R1	yes
2b	**III**	+20 V	10 pulses	R2	yes
3a	**III**	-150 V	20 min.	R1	yes
3b	**III**	+150 V	20 min.	R1	yes
4	**III**	-12 V	10 pulses	R2	yes

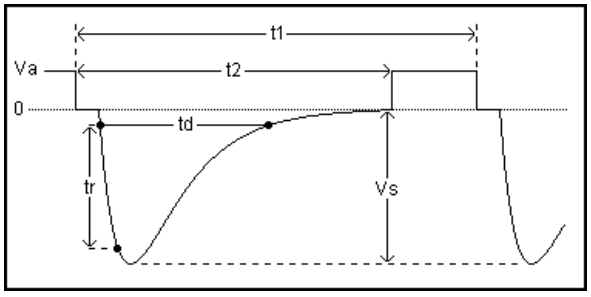
Remarks:	---

9.7.3 Test condition and test set-up

ISO 7637-2 (2004) (24 V DC)

Test Procedure				
Pulse Name:	ISO 7637-2 : 2004 : Pulse 1			
Va (Alternator):	27.0	V	Current limit:	10 A

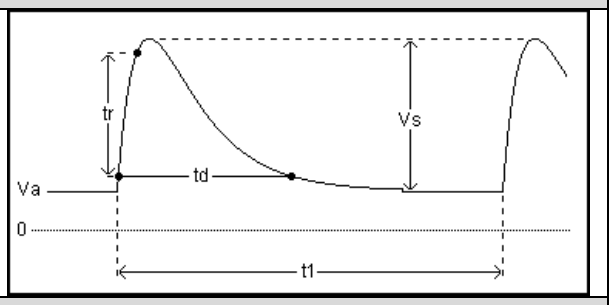
Test Setup		
Vs:	-450	V
t1:	2.5	s
t2:	200	ms
tr:	3	us
td:	1000	us
Ri:	50	Ohm
Coupling:	Battery	
Events:	10	
Test duration:	00:00:25	h



Test Result	
Pulses:	10
Result:	Test passed !

Test Procedure				
Pulse Name:	ISO 7637-2 : 2004 : Pulse 2a			
Va (Alternator):	27.0	V	Current limit:	10 A

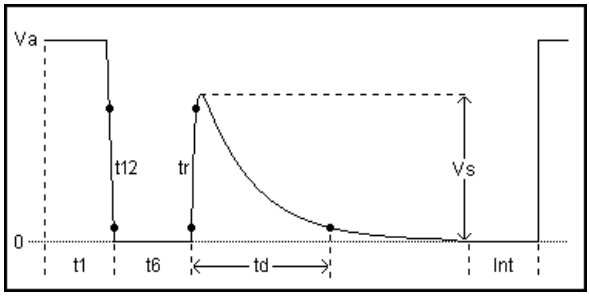
Test Setup		
Vs:	+37	V
t1:	2.5	s
tr:	1	us
td:	50	us
Ri:	2	Ohm
Coupling:	Battery	
Events:	10	
Test duration:	00:00:25	h



Test Result	
Pulses:	10
Result:	Test passed !

Test Procedure				
Pulse Name:	ISO 7637-2 : 2004 : Pulse 2b			
Va (Alternator):	27.0	V	Current limit:	10 A

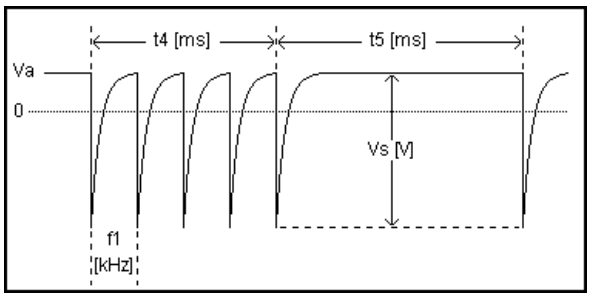
Test Setup		
Vs:	20.0	V
t1:	1.0	s
t6:	1	ms
td:	200	ms
Int:	1.0	s
Ri:	0.05	Ohm
t12:	1	ms
tr:	1	ms
Events:	10	
Test duration:	00:00:28	h



Test Result	
Pulses:	10
Result:	Test passed !

Test Procedure				
Pulse Name:	ISO 7637-2 : 2004 : Pulse 3a			
Va (Alternator):	27.0	V	Current limit:	10 A

Test Setup		
Vs:	-150	V
f1:	10	kHz
t4:	10	ms
t5:	90	ms
tr:	5	ns
td:	100	ns
Ri:	50	Ohm
Coupling:	Battery	
Test duration:	20	m

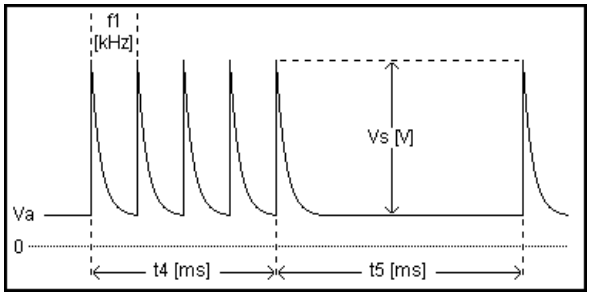


Test Result	
Result:	Test passed !

Test Procedure				
Pulse Name:	ISO 7637-2 : 2004 : Pulse 3b			
Va (Alternator):	27.0	V	Current limit:	10 A

Test Setup

Vs:	+150	V
f1:	10	kHz
t4:	10	ms
t5:	90	ms
tr:	5	ns
td:	100	ns
Ri:	50	Ohm
Coupling:	Battery	
Test duration:	20	m



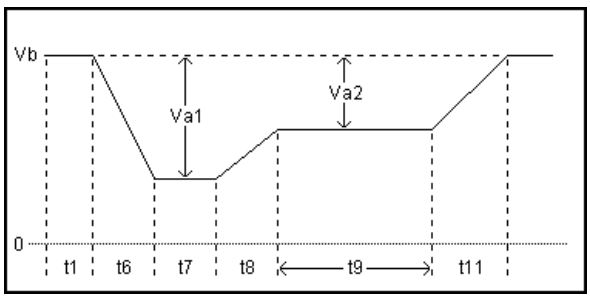
Test Result

Result:	Test passed !

Test Procedure				
Pulse Name:	ISO 7637-2 : 2004 : Pulse 4			
Vb (Battery):	24.0	V	Current limit:	10 A

Test Setup

Va1:	-12.0	V
Va2:	-5.0	V
t1:	60	s
t6:	10	ms
t7:	50	ms
t8:	50	ms
t9:	0.5	s
t11:	10	ms
Events:	10	
Test duration:	00:10:09	h



Test Result

Pulses:	10
Result:	Test passed !

10 Test equipment and ancillaries used for tests

To simplify the identification of the test equipment and/or ancillaries which were used, the reporting of the relevant test cases only refer to the test item number as specified in the table below.

No.	Instrument/Ancillary	Manufacturer	Type	Serial-No.	Internal-No.
	Radiated immunity in chamber B				
B-1	Fully anechoic chamber B	Frankonia			
B-2	Control computer	Tecline	DT6/400H1300PII	FW09910190	400000211
B-3	Software	Rohde & Schwarz	EMC 32 V10.35.02	100026/100096	300003909
B-4	Position control unit	INNCO	CO2000-P	508/22090309/L	300003923
B-5	Antenna positioner	INNCO	AS2000 P-15kg		
B-6	Stacked Log.-Per. Antenna (70 MHz – 10 GHz)	Schwarzbeck	STLP 9129	00007	300005059
B-7	Isotropic Field Probe Laser Data Interface	ETS Lindgren	HI-6105USB HI-6113	00082705 00082790	300003906b 300003906
B-8	Bi-Directional Coaxial Coupler	narda	3020A	36520	
B-9	Amplifier 80 MHz-1GHz	BONN Elektronik	BLWA 0810-250	129100	300004536
B-10	Amplifier Rack 1- 6 GHz Amplifier 1-6 GHz Power Meter Power Sensor A Power Sensor B	 BONN Elektronik Rohde & Schwarz Rohde & Schwarz Rohde & Schwarz	 BLMA 1060-100DS NRP NRP-Z91 NRP-Z91	 1510383 102066 100834 100841	 300005064 300003908 300003908.01 300003908.02
B-11	Signal generator (9 kHz – 6 GHz)	Rohde & Schwarz	SMB 100A	100108	300003795
B-12	Power meter	Rohde & Schwarz	URV 5	833658/005	300002238
B-13	Power Sensor, Insertion unit A	Rohde & Schwarz	NRV-Z2	829445/004	300002234
B-14	Power Sensor, Insertion unit B	Rohde & Schwarz	NRV-Z2	829445/008	300002235
B-15	Relay matrix	Rohde & Schwarz	RSU	316790/001	300002236
B-16	DC power supply	HP	6032A	2846A04063	300001511
	Other observation equipment in chamber B				
B-20	Voltmeter	Rohde & Schwarz	UDS5	881178/086	300000846
B-21	Radio comm. Service Monitor	Rohde & Schwarz	CMS54	100848	300003531
B-22	RF Receiver	Rohde & Schwarz	ESVP	891752/005	300002224
B-23	Relay matrix	Rohde & Schwarz	PSN	829065/003	300002221
B-24	Pneumatic controller	Heiden	2004-300	001502	300001631
B-25	Spectrum analyzer	Rohde & Schwarz	FSIQ 26	835540/018	300002681-0005
	Observation equipment, audio rack 1 in chamber B				
B-29	Band pass	IMD	EWR-QBF	2610101	300003506
B-30	Measurement amplifier	B&K	2636	1537486	300000190.01
B-31	Optical fibre microphone system	Sennheiser		keine	300003100
B-32	Artificial mouth with AF transformer	B&K	4227	1536875	300002314
B-33	sound calibrator	CR511F	CYRRUS	034689	400000205
B-34	Pneumatic Controller	Heiden	2004-300	001502	300001631
B-35	Relay matrix	Rohde & Schwarz	PSN	892176/002	300001149
B-36	Switch Control	HP	3488A	none	300001143
B-37	Selective Level Meter	HP	3586A	2509A01542	300000395
B-38	Microphone	B&K	2669	2298171	400000208
B-39	Signal generator	Rohde & Schwarz	SPN	880968/086	300001465

No.	Instrument/Ancillary	Manufacturer	Type	Serial-No.	Internal-No.
	ESD in room 006				
I-1	ESD- Generator	Schlöder	SESD 30000	402125	300003223
I-2	Pistol	Schlöder	SESD 30000	402125	300003223a
I-3	Module set	Schlöder	SESD 30000	402125	300003223b
	Conducted immunity (RF common mode) in room 006				
I-4	Signal generator	R&S	SMB100A	115311	300005612
I-5	Measurement Software	R&S	EMC 32 V10.35.02		
I-6	Milli voltmeter	R&S	URV5	831392/004	300002038
I-7	Power Sensor	R&S	URV5-Z4	830276/006	300002645.2
	Power Sensor	R&S	URV5-Z4	840310/071	300000906
I-8	Amplifier 9 kHz – 250 MHz	BONN Elektronik	BSA 0125-75	066502-02	300003544
I-9	6 dB RF attenuator	BNOS Electronics	AT 50-6-250	521013	300000842
I-10	Electromagnetic Injection clamp	Lüthi	EM 101	35197	300001708
I-11	Filter clamp	Lüthi	FTC101	4229	300000942
I-12	Filter clamp	Lüthi	FTC101	4374	300000942
I-13	CDN	MEB	M2	11145	300000889

No.	Instrument/Ancillary	Manufacturer	Type	Serial-No.	Internal-No.
I-14	CDN	MEB	M3	10723	300000837
I-15	CDN	MEB	T2	11402	400000197
I-16	CDN	MEB	S25	11309	300000902
I-17	CDN	MEB	S1/50	12261	300001739
I-18	CDN	MEB	S1/50	11243	300000899
I-19	CDN	MEB	AF2	11349	300000895
I-20	CDN	MEB	AF2	11350	300000897
I-60	CDN	TESEQ	S200	26825	300003853
I-61	CDN	TESEQ	USB/p	27029	300003852
I-62	RF Current probe (BCI clamp)	FCC	F-120-4	23	300000538
G-8	RF Current probe	FCC	F-33-4	46	300003257
I-63	CDN	TESEQ	ST08	32282	300004397
	Conducted immunity (Burst, Surges, Voltage Dips) in room 006				
I-21	Ultra Compact Simulator	EM-TEST	UCS 500 N5	V1127110133	300004257
I-22	Motor Variac	EM-TEST	MV2616-V	0397-12	300003259
I-23	Capacitive Coupling Clamp	EM-TEST	HFK	P1413132719	300004995
I-24	Coupling Decoupling Network	EMC Partner	CDN-UTP	014	300003226
	Conducted emission in room 006				
I-25	RF receiver 9 kHz – 3 GHz	R&S	ESCI 1166.5950.03	101240/003	300004427
I-26	L.I.S.N. Artificial Mains Network	Schwarzbeck	NNBM 8125	8125401	300000567
I-27	L.I.S.N. Artificial Mains Network	Schwarzbeck	NNBM 8125	8125399	300000945
I-28	Measurement Software	R&S	EMC 32 V10.35.02		
I-29	Relay Matrix	R&S	PSU	879930/008	300001148
I-30	Relay Matrix	R&S	PSU	828628/007	300002475
I-31	Computer	F+W			300003330
I-33	DC power supply	HP	6032A	2743A-02600	300001498
I-34	Two Line V-Network	R&S	ESH3-Z5	893045/003	300000585
I-37	4-Wire T-Network	R&S	EZ-10	828757/001	300000611
I-38	Loop antenna	R&S	HFH2-Z2	881058/42	300001477
	Car Pulse equipment in chamber D				
D-200	Ultra Compact Simulator	EM Test	UCS 200N	V0936105110	300003952
D-201	Voltage Drop Generator	EM Test	VDS 200N	V0936105111	300003953
D-202	Coupling network	EM Test	ACC	0495-01	300002281
D-203	Termination resistor for ACC	EM Test	Kw 50 Ohm	--	40000
D-204	Digital Phosphor Oscilloscope	Tektronix	DPO 7254	B022702	300003573
D-205	Current Probe	Tektronix	TCP0030	C024528	300004169
D-206	DC Power Supply	Agilent	N5767A	US26S7337F	300003839
	Other observation equipment in room 006				
I-48	Voltmeter	R&S	UDS5	882752/004	300001495
I-49	PDH/SDH Test Set	HP	37717A		300002072
	Observation equipment, audio rack 2 in Room 006				
I-50	Control computer				400000209
I-51	Software	ICT			
I-52	Band pass	IMD	EWR-BF	2610100	300003507
I-53	Measurement amplifier	B&K	2636	1537486	300000190
I-54	Microphone	B&K	2669	2449486	400000207
I-55	Selective Level Meter	HP	3586A	2908A01917	300000409
I-56	Switch Control Unit	HP	3488A	none	300000135
I-57	Optical fibre microphone system	Sennheiser		keine	300003100
I-58	Artificial mouth with AF transformer	B&K	4227	1536875	300002314
I-59	sound calibrator	CR511F	CIRRUS	34688	400000206

No.	Instrument/Ancillary	Manufacturer	Type	Serial-No.	Internal-No.
	Radiated emission in chamber F				
F-1	Control Computer	F+W		FW0502032	300003303
F-2	Trilog-Antenna	Schwarzbeck	VULB 9163	9163-295	---
F-3a	Amplifier	Veritech Microwave Inc.	0518C-138	- / -	- / -
F-4b	Switch	HP	3488A	- / -	300000368
F-5	EMI Test receiver	R&S	ESCI	100083	300003312
F-6	Turntable Interface-Box	EMCO / ETS-LINDGREN	Model 105637	44583	300003747
F-7	Tower/Turntable Controller	EMCO / ETS-LINDGREN	Model 2090	64672	300003746
F-8	Tower	EMCO / ETS-LINDGREN	Model 2175	64762	300003745
F-9	Ultra Notch-Filter (Ch. 62)	WRCD		9	
F-35	RF- Amplifier	Bonn	BLMA 2060-5	097392A	300003908
F-36	Stacked Microwave Log.-Per. Antenna	Schwarzbeck	STLP9149	9149-044	300003919

No.	Instrument/Ancillary	Manufacturer	Type	Serial-No.	Internal-No.
	Radiated immunity in chamber F				
F-10	Control Computer	F+W		FW0502032	300003303
F-11	Signal Generator	R&S	SMB 100A	1406.6000k02-113856	300005266
F-13	RF-Amplifier	Bonn	BLMA 0825-50	035491	300003210
F-14	Stacked Logper Antenna	Schwarzbeck	STLP9128 E	9128 E 013	300003408
F-14a	Bicon-Antenna	EMCO	3109	8906-2309	300000575
F-14b	Bicon-Antenna	Schwarzbeck	Balun VHBD 9134	3011	300005385
F-15	RF-Amplifier	Bonn	BLWA 0810-250	108105	300004536
F-15a	RF-Amplifier	ar	1000LM20	20562	-/-
F-16	Directional Coupler	ar	DC7144A	312786	300003411
F-17	Horn Antenna	ar	AT 4002	19739	300000633
F-18	Power Meter	R&S	NRP2	104973	300005114
F-19	Power sensor	R&S	NRP-Z91	103332	300005114-1
F-20	Power sensor	R&S	NRP-Z91	103333	300005114-2
F-16a	Directional coupler	emv	DC 2000	9401-1677	300000592
	Harmonics and flicker in front of chamber F				
F-21	Flicker and Harmonics Test System	Spitzenberger & Spies	PHE4500/B I PHE4500/B II	B5983 B5984	300000210
F-22	Control Unit	Spitzenberger & Spies	STE	B5980	300000210
F-23	Power Amplifier	Spitzenberger & Spies	EP 4500/B	B5976	300000210
F-24	Conect Panel	Spitzenberger & Spies	Conect panel	B5982	300000210
F-25	Power Supply	Spitzenberger & Spies	NT-EP 4500	B3977	300000210
F-26	Additional transformer	Spitzenberger & Spies	UT-EP 4500	B5978	300000210
F-27	Analyzer Reference System	Spitzenberger & Spies	ARS 16/1	A3509 07/00205	300003314
F-28	Power Supply	Hewlett Packard	6032 A	2920 A 04466	300000580
	Radiated emission in chamber F > 1GHz				
F-29	Horn antenna	Schwarzbeck	BBHA 9120B	188	300003896
F-30	Amplifier	ProNova	0518C-138	005	F 024
F-31	Amplifier	Miteq	42-00502650-28-5A	1103782	300003379
F-32	Horn antenna	Emco	3115	9709-5289	300000213
F-33	Spectrum Analyzer	R&S	FSU26	200809	300003874
F-34	Loop antenna	EMCO	6502	8905-2342	300000256

11 Observations

No observations, exceeding those reported with the single test cases, have been made.

Annex A: Photographs of the test set-up

Photo 1: Radiated emissions test setup (< 1 GHz)

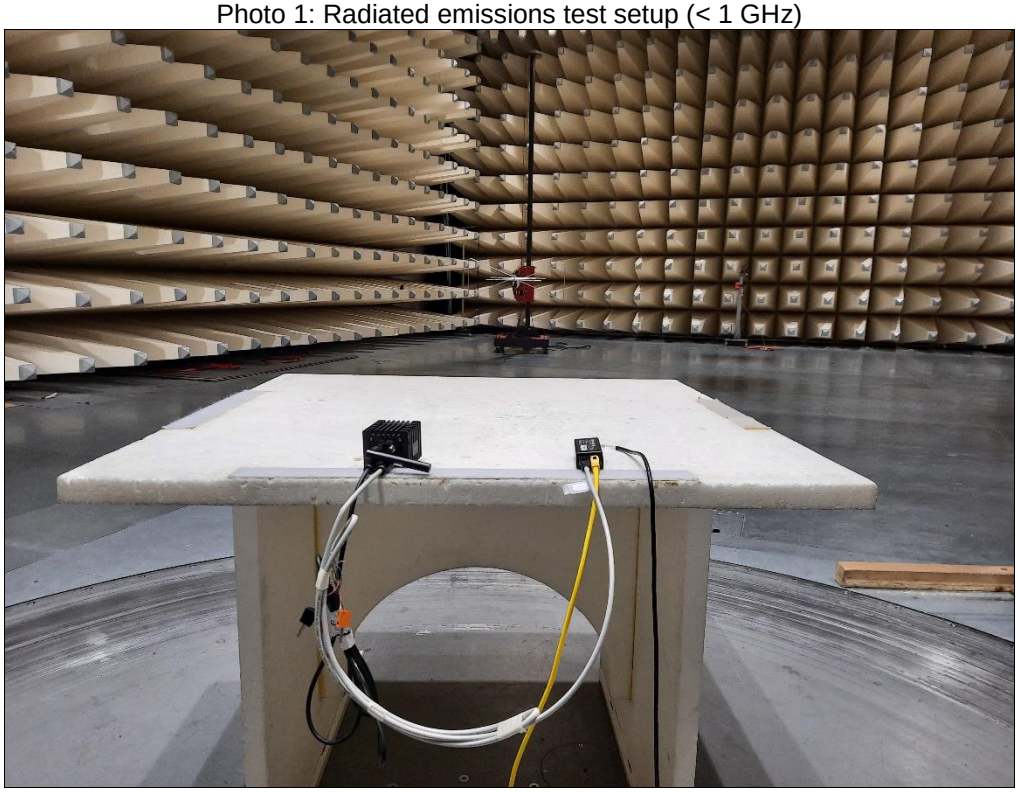


Photo 2: Radiated emissions test setup (> 1 GHz)

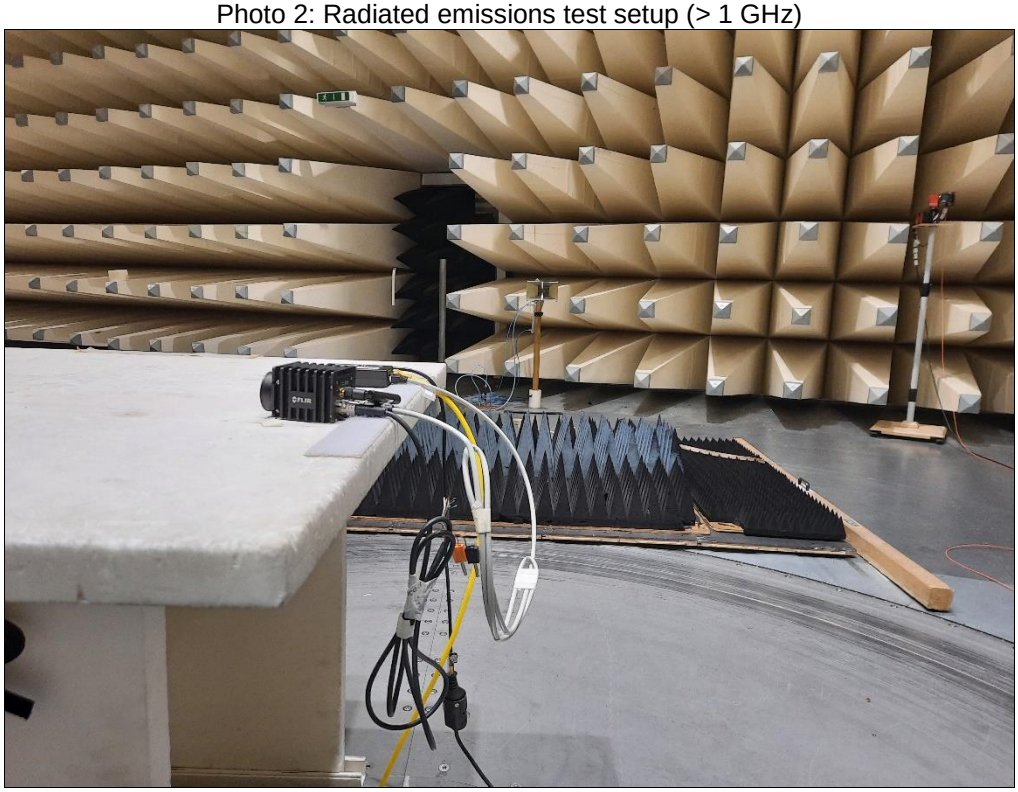


Photo 3: Radiated emissions test setup (< 1 GHz)

Photo 4: Radiated emissions test setup (> 1 GHz)

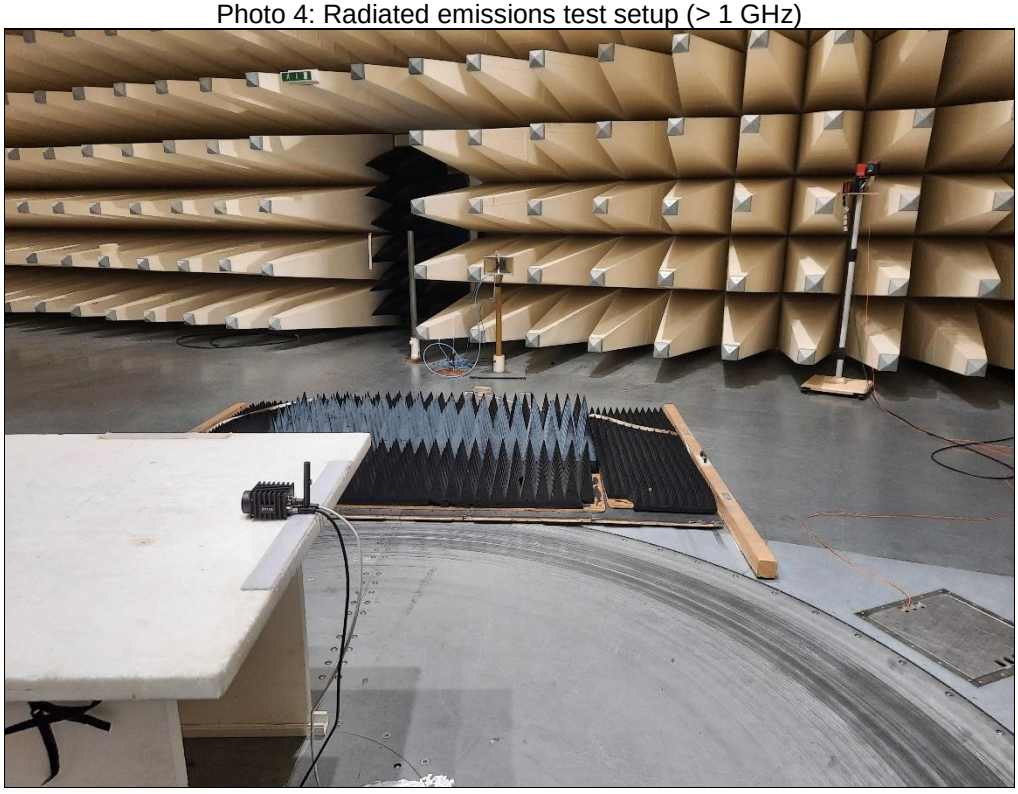


Photo 5: Conducted emissions test setup

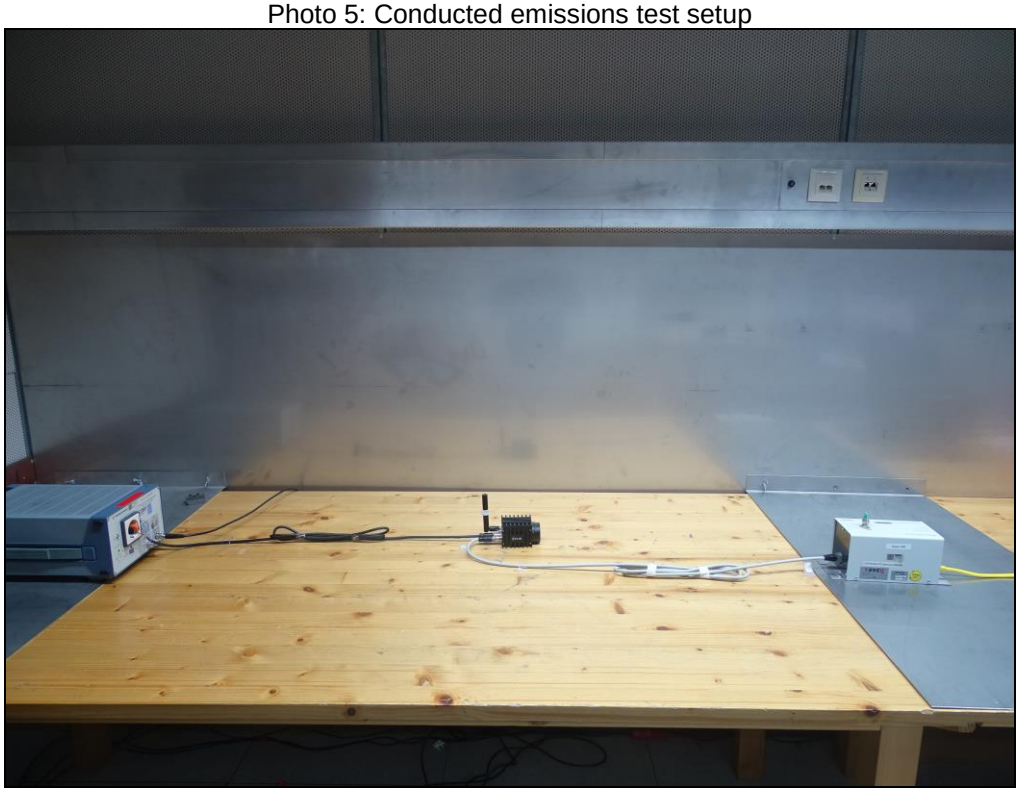


Photo 6: Conducted emissions test setup

Photo 7: Conducted emissions test setup

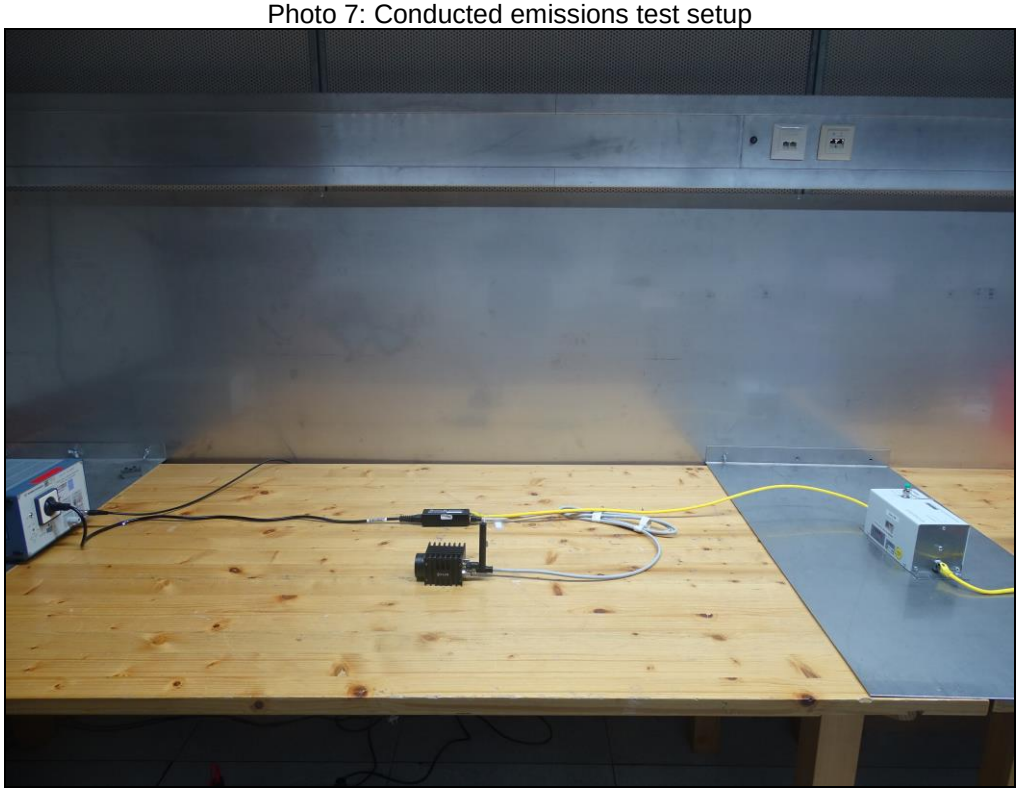


Photo 8: Conducted emissions test setup

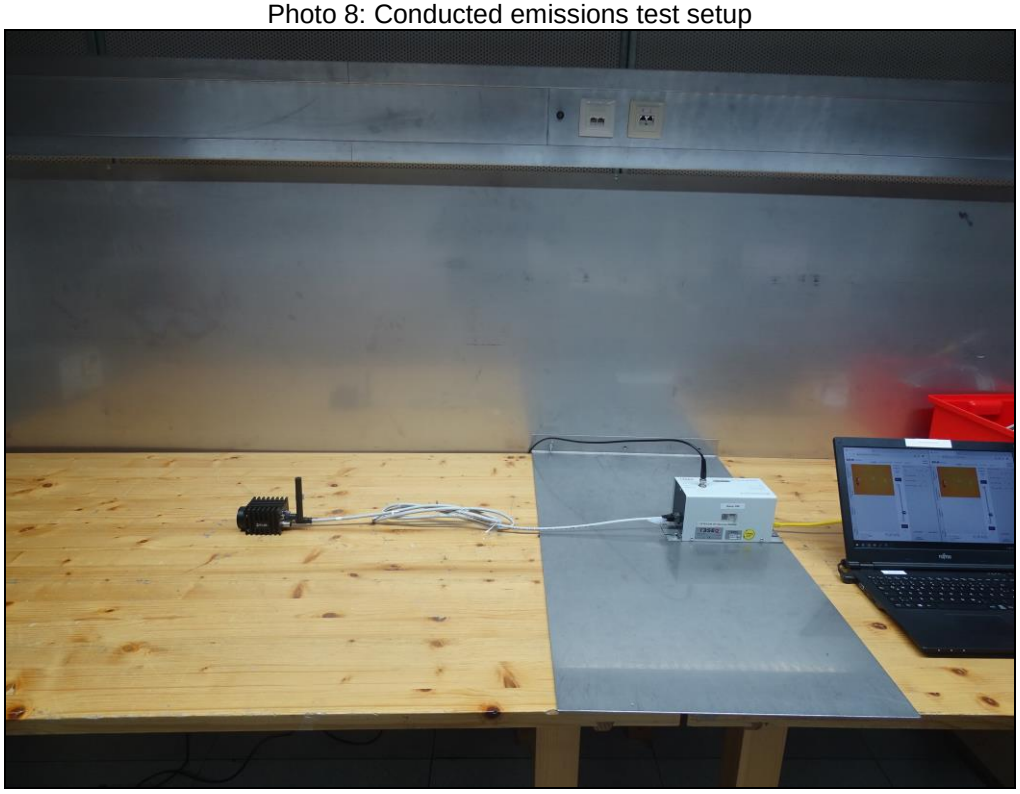


Photo 9: Conducted emissions test setup

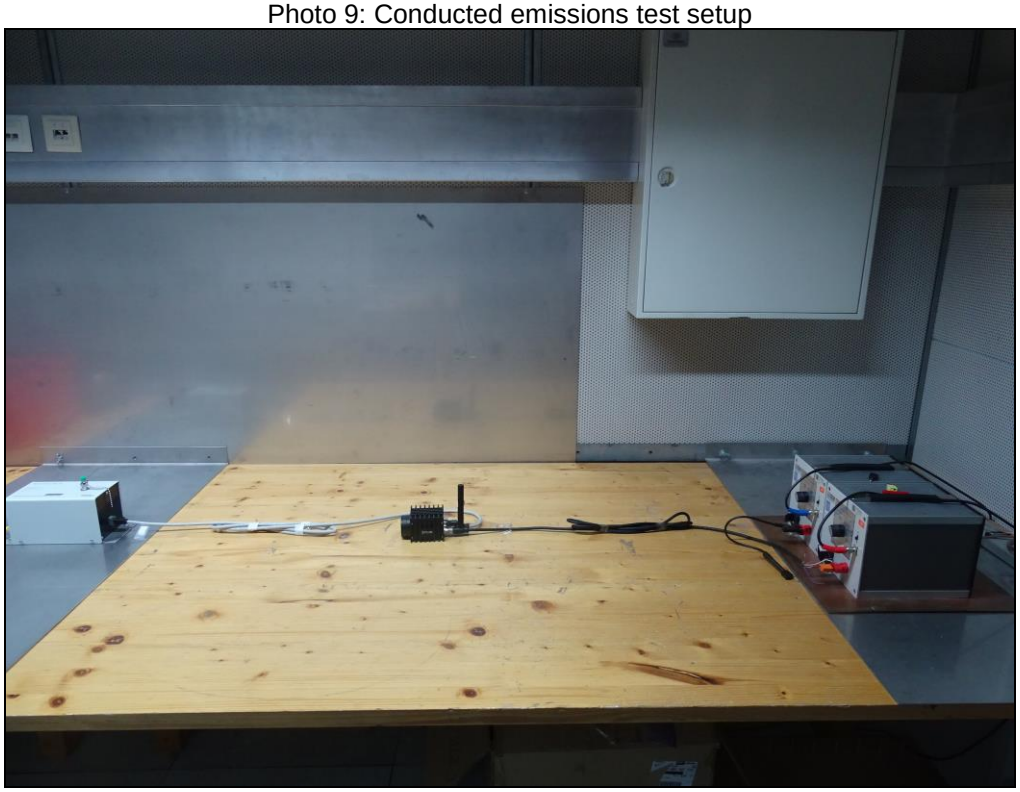


Photo 10: Radiated immunity test setup

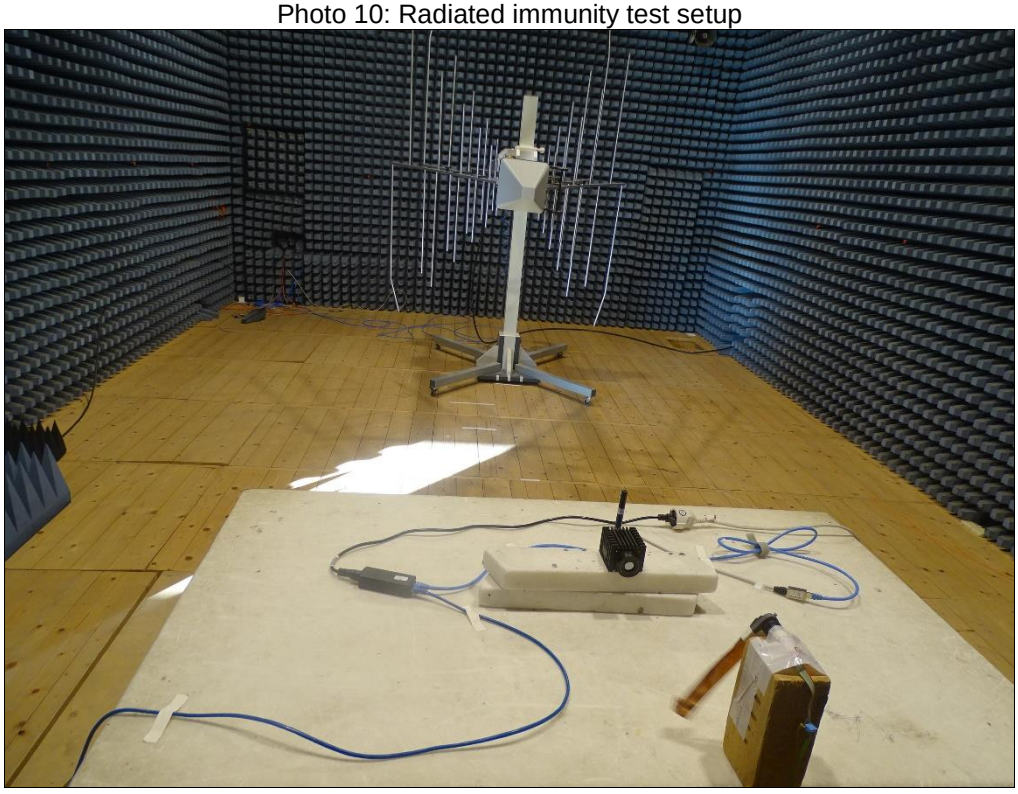


Photo 11: Radiated immunity test setup

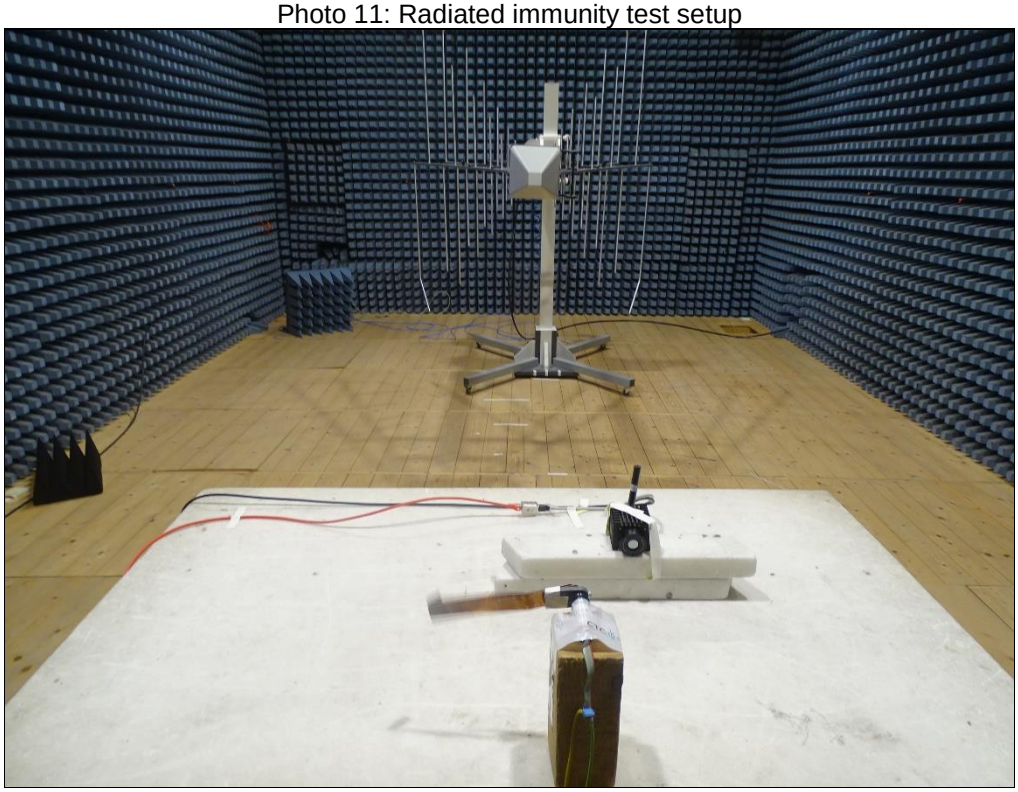


Photo 12: Radiated immunity test setup

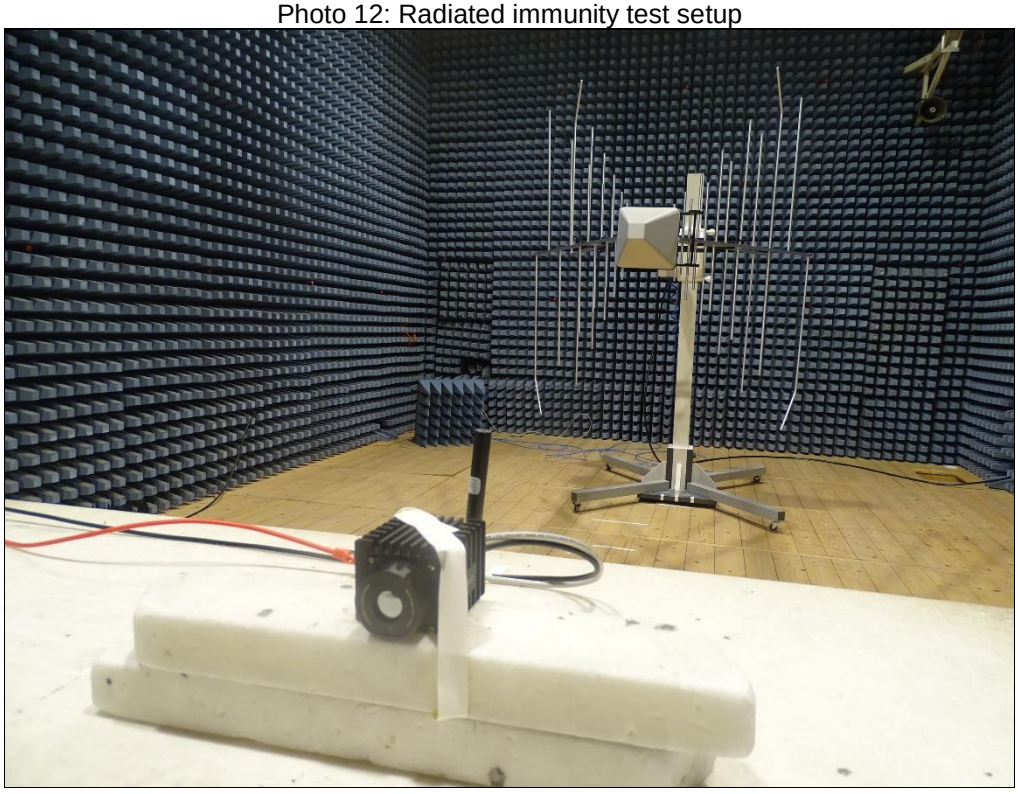


Photo 13: Example of conducted radio disturbance test setup

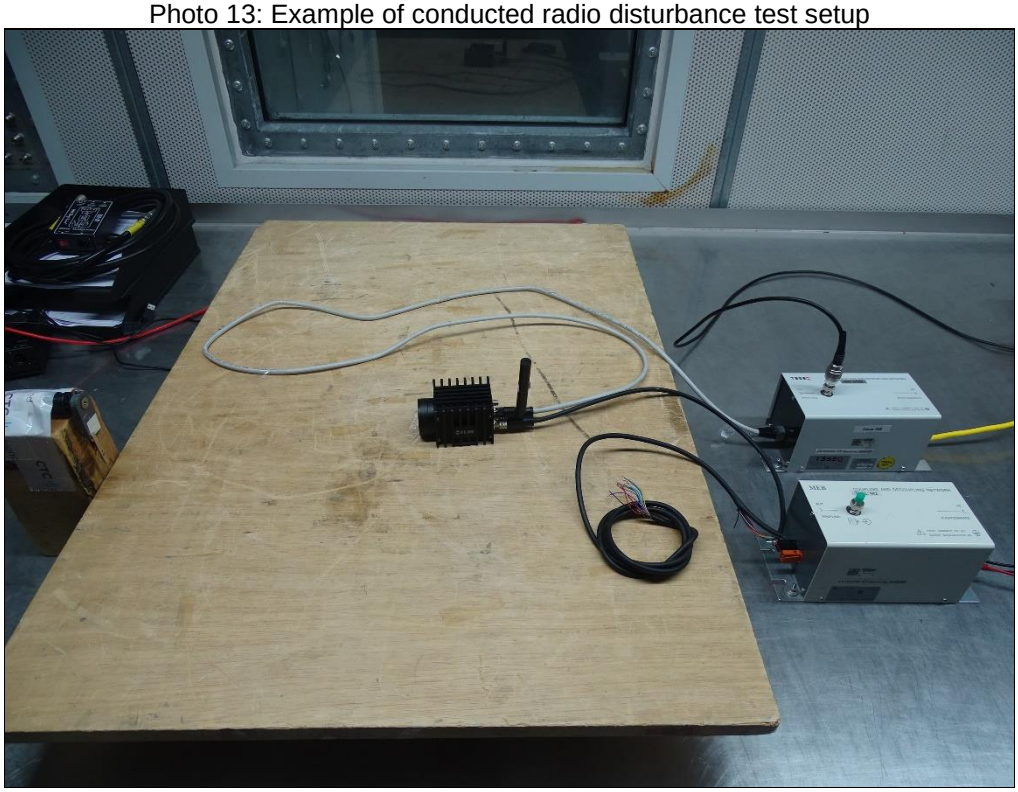


Photo 14: Example of conducted radio disturbance test setup

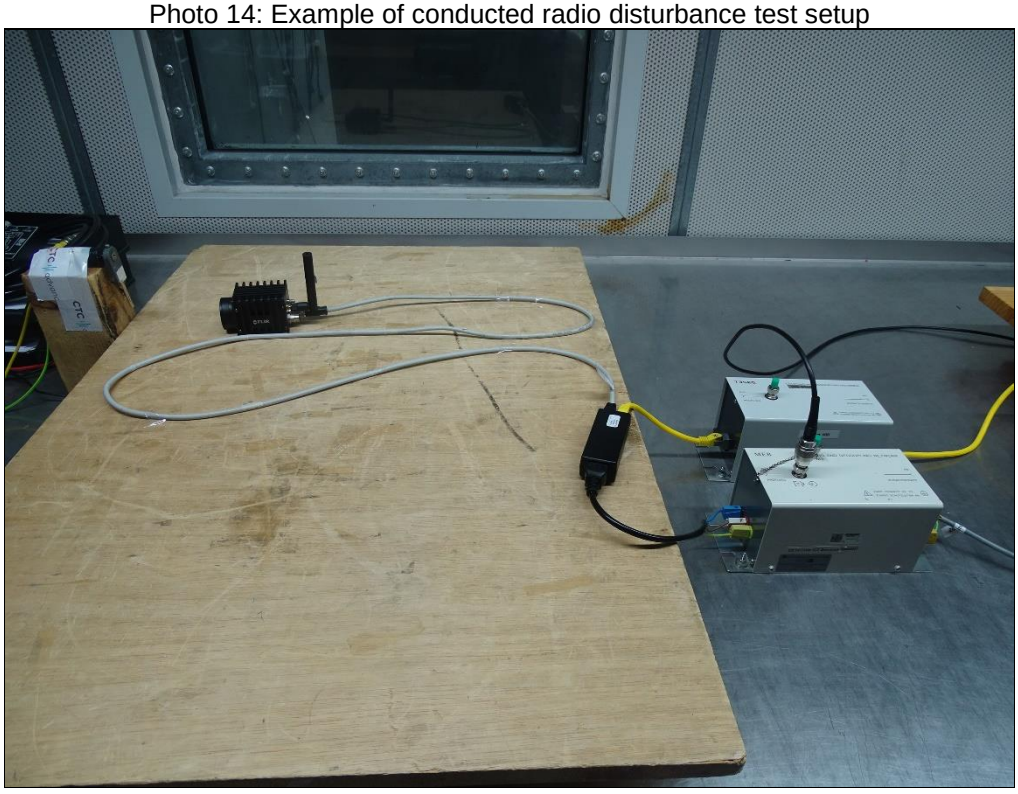


Photo 15: Burst, surges, voltage dips and interruptions test setup

Photo 16: Example of electrical fast transients test setup

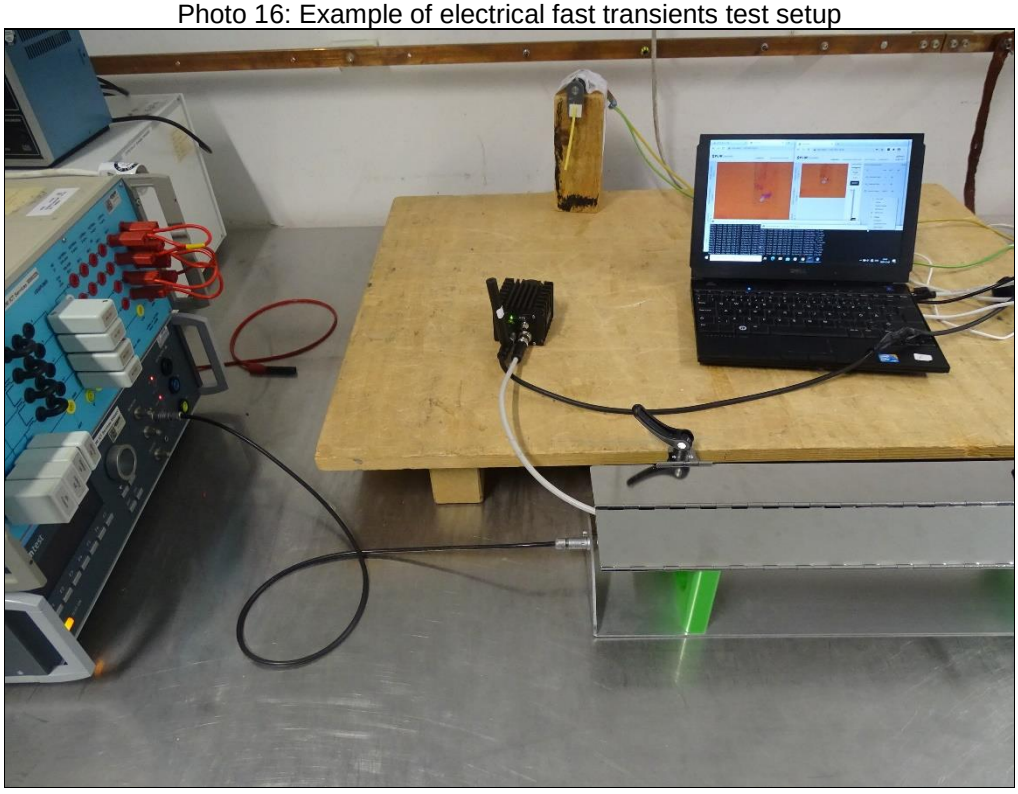


Photo 17: Example of electrical fast transients test setup

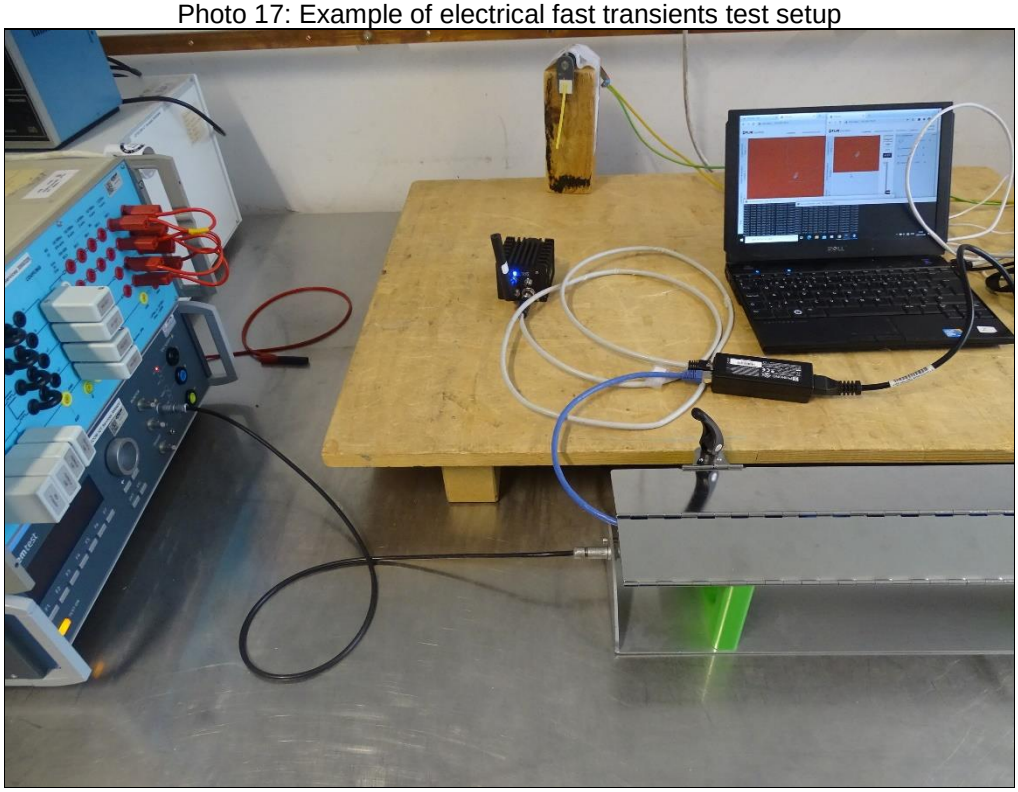


Photo 18: Surges test setup

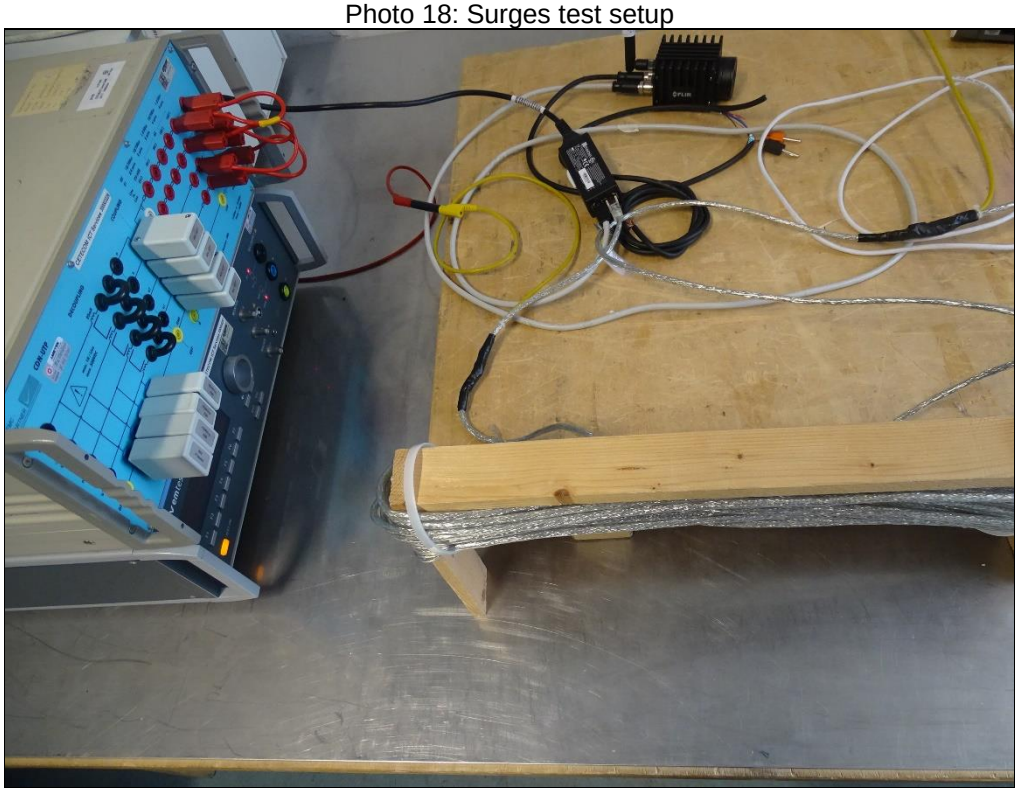


Photo 19: Surges test setup

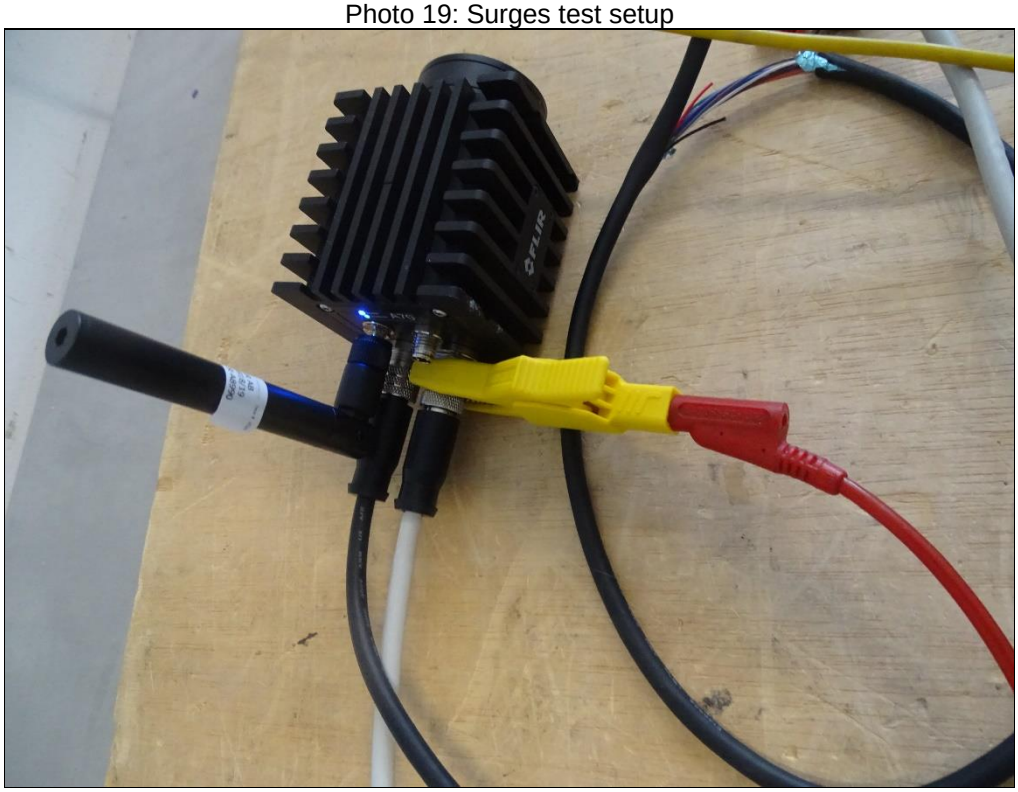


Photo 20: Example of indirect contact discharge (horizontal)

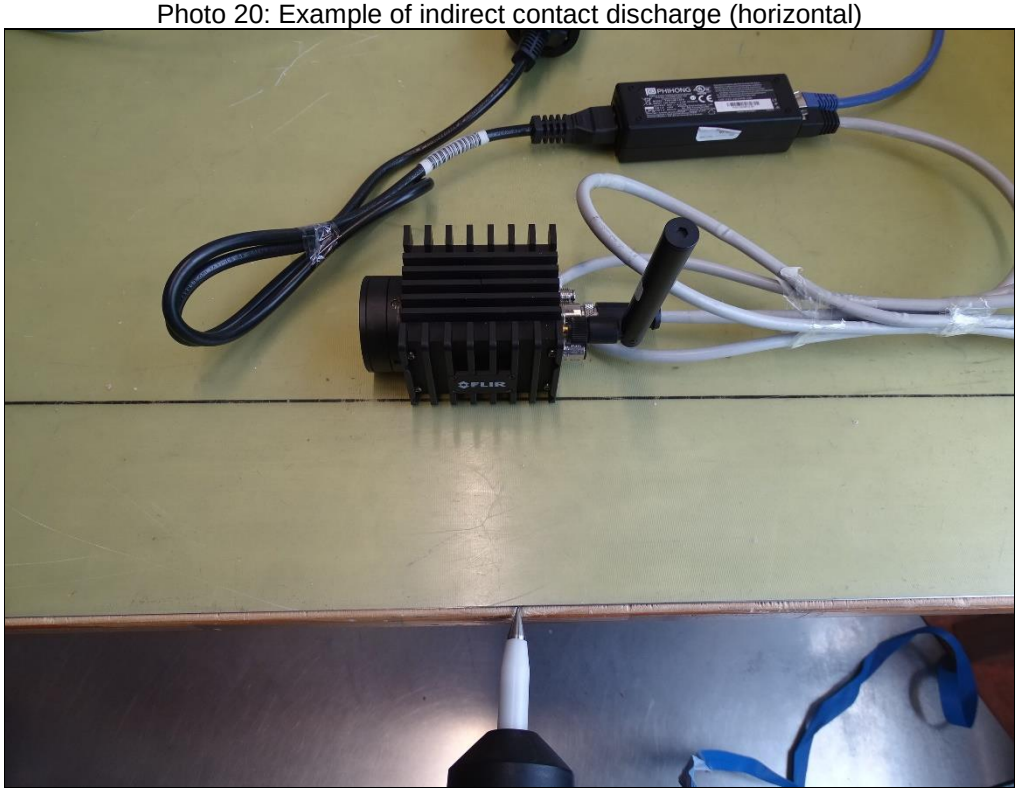


Photo 21: Example of indirect contact discharge (vertical)

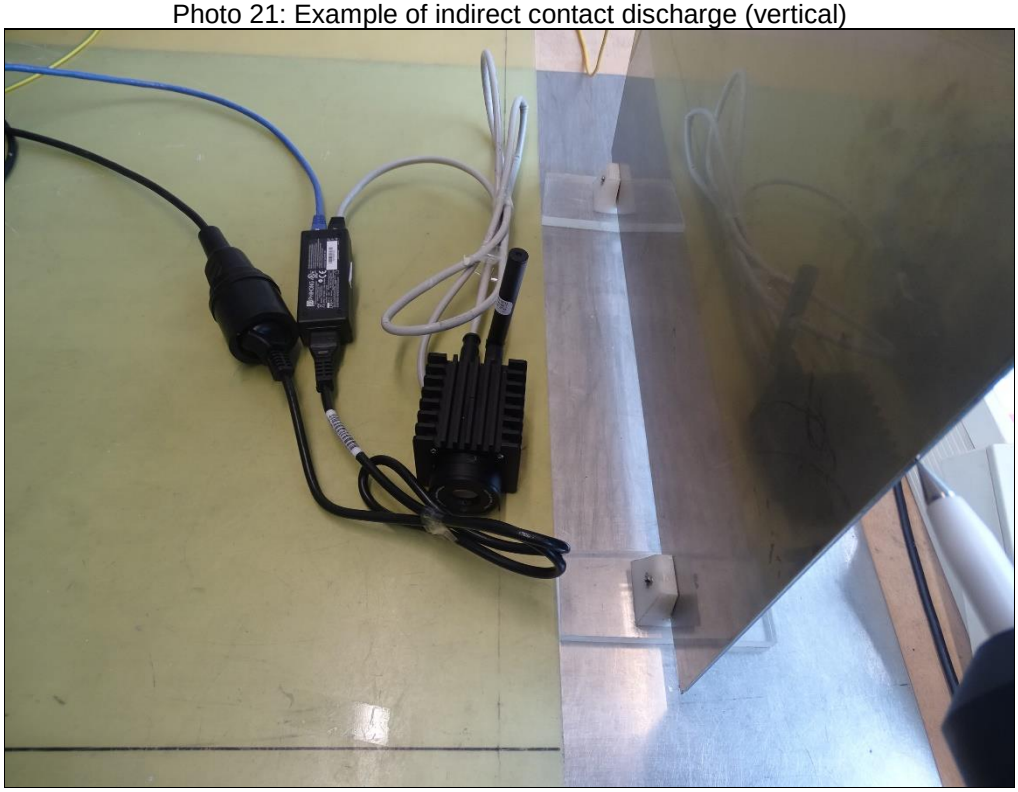


Photo 22: Contact discharge (green), air discharge (blue)

Photo 23: Contact discharge (green), air discharge (blue)

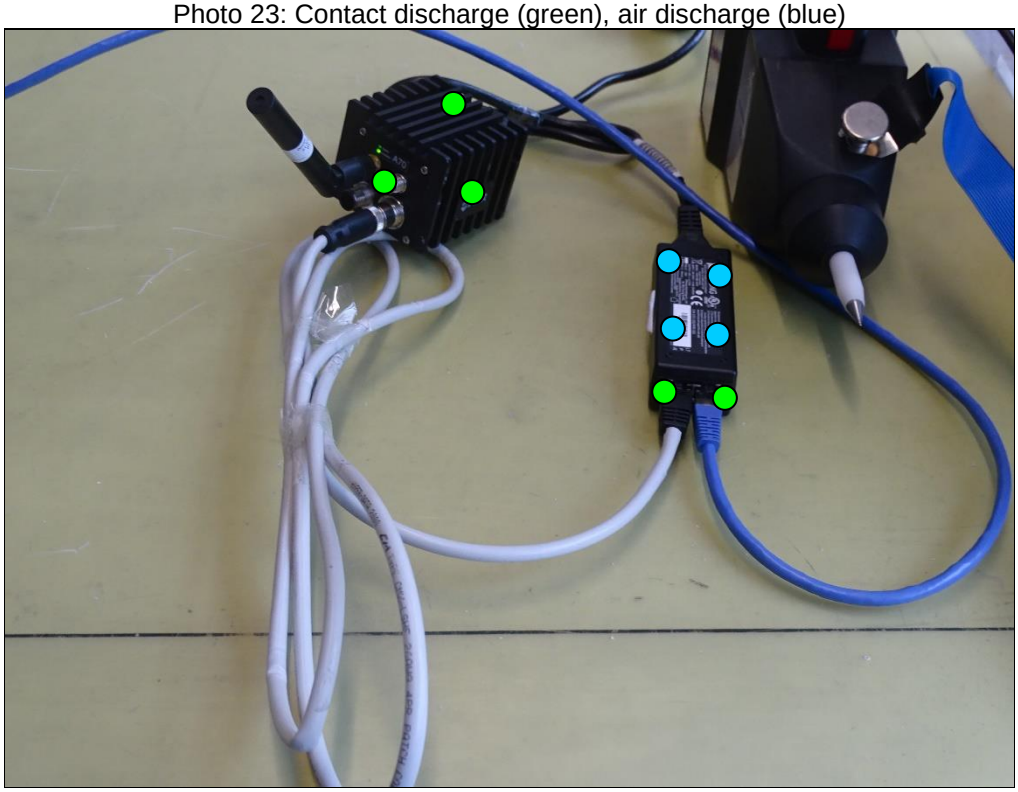


Photo 24: Example of indirect contact discharge (horizontal)

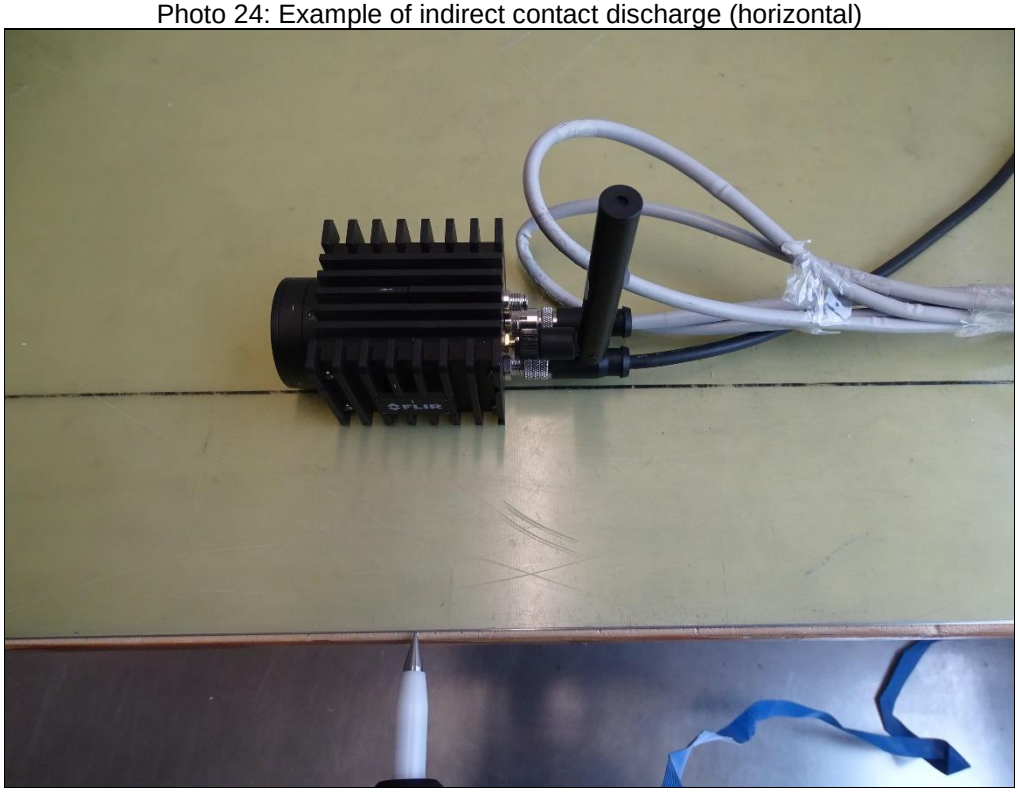


Photo 25: Example of indirect contact discharge (vertical)

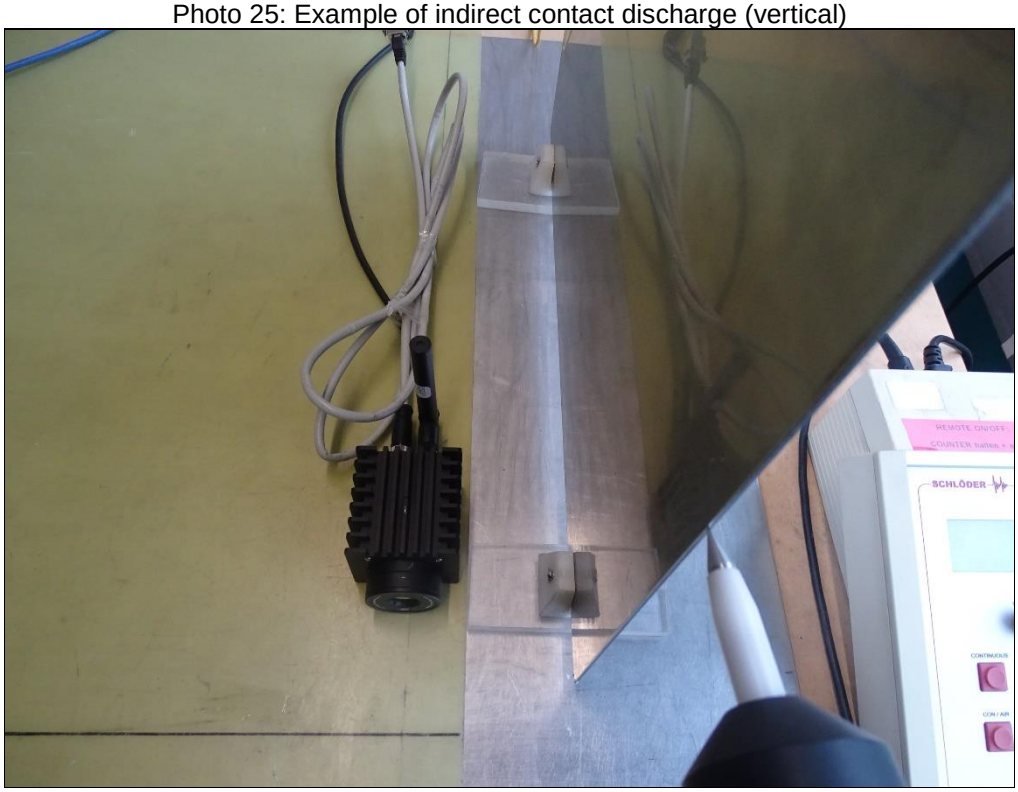


Photo 26: Contact discharge (green), air discharge (blue)

Photo 27: Contact discharge (green), air discharge (blue)

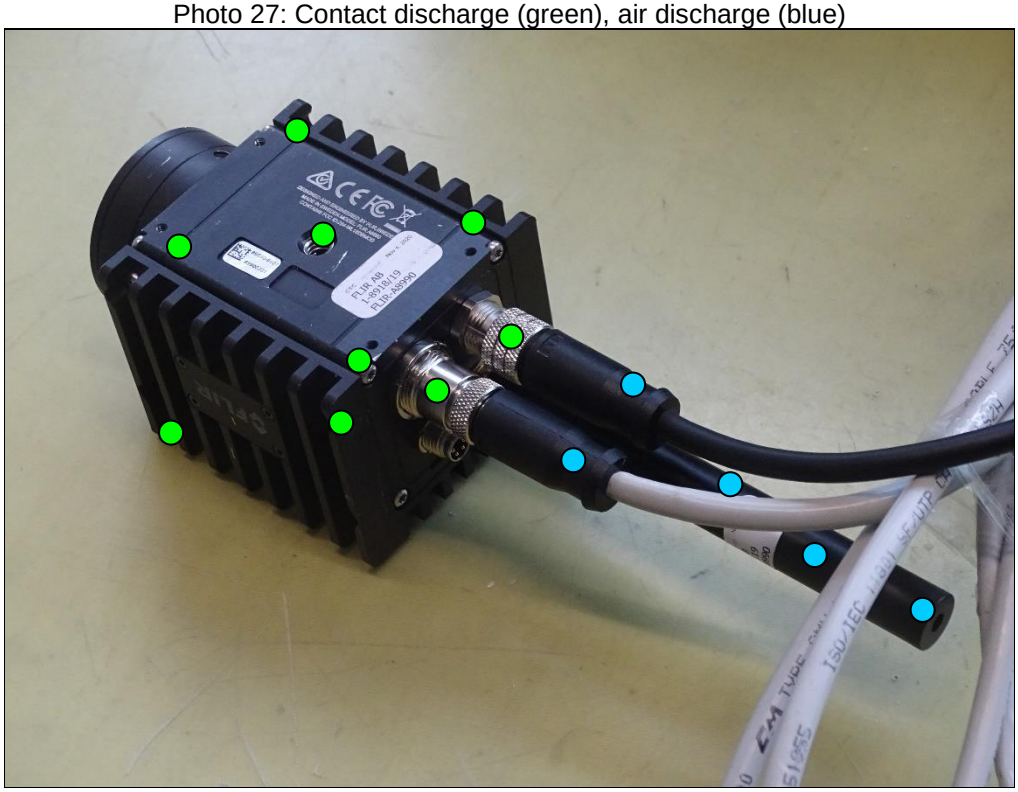
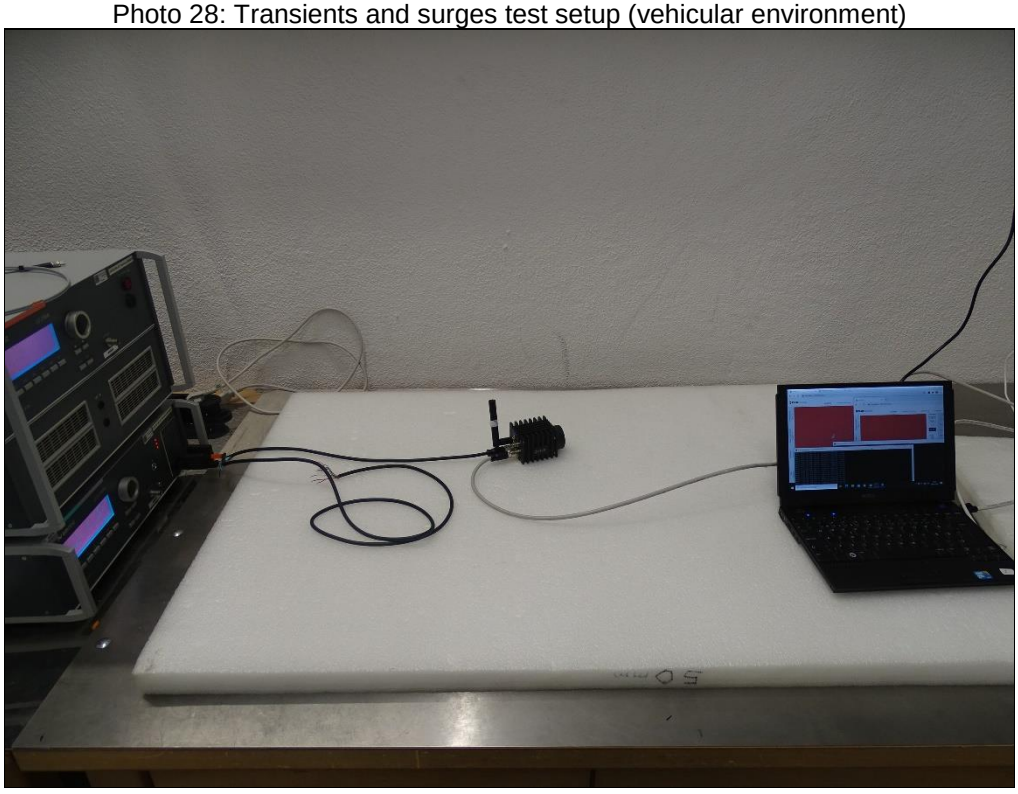


Photo 28: Transients and surges test setup (vehicular environment)



Annex B: Photographs of the EUT

Photo 29: EUT

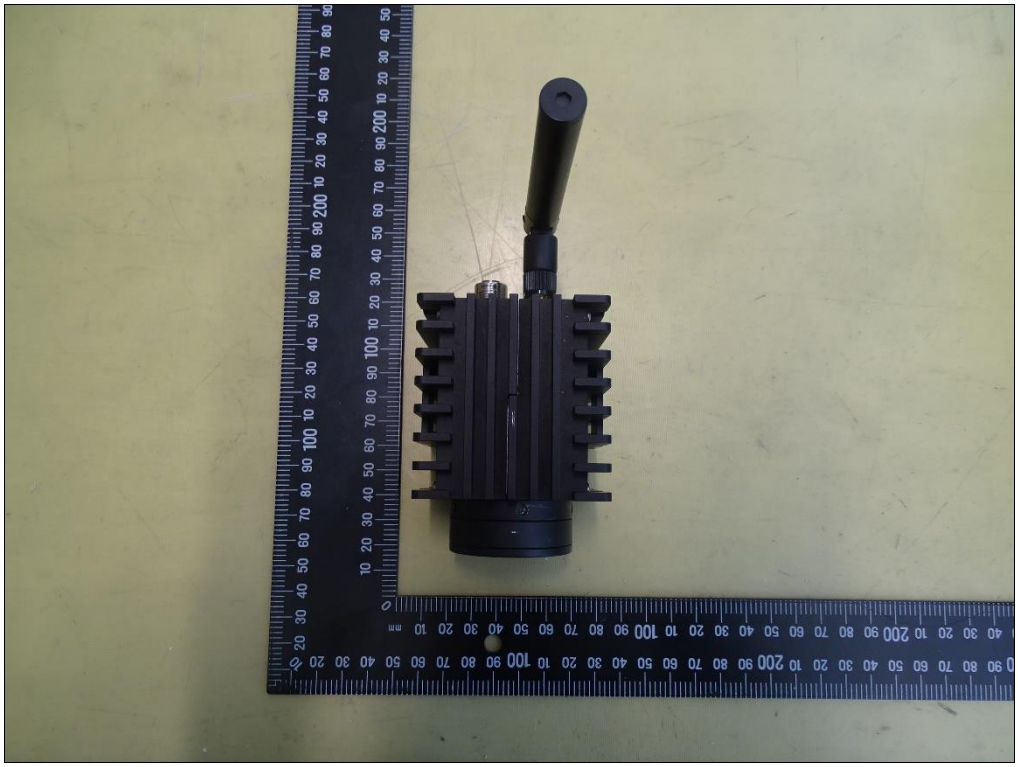


Photo 30: EUT

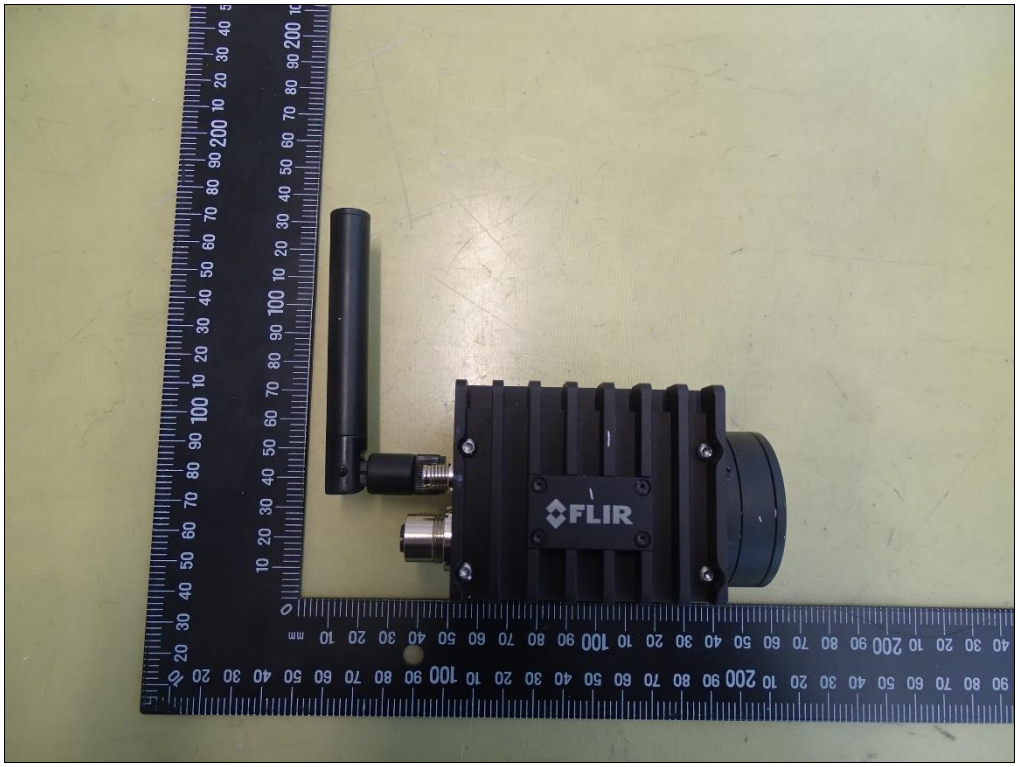


Photo 31: EUT

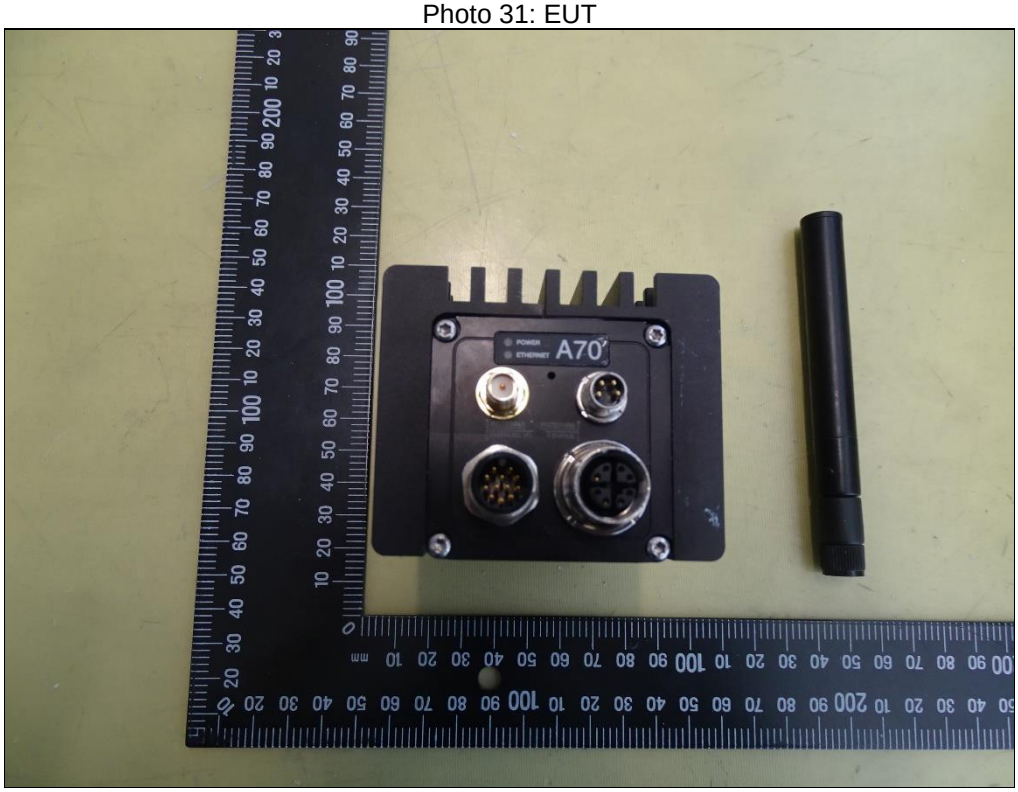


Photo 32: EUT

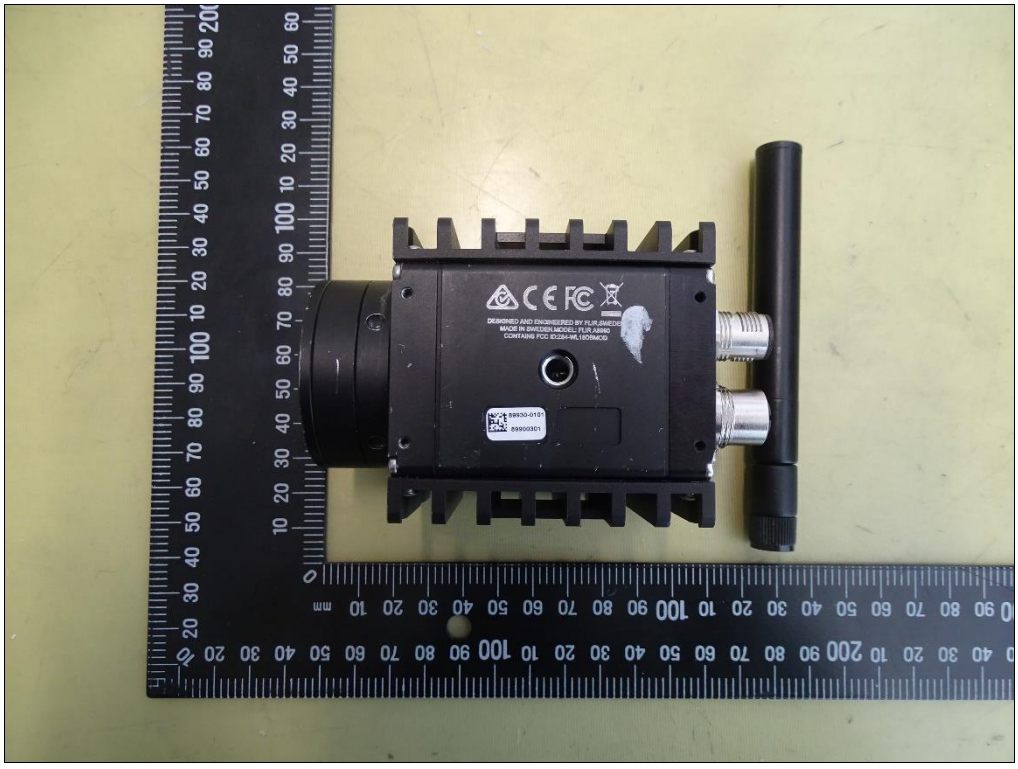


Photo 33: EUT

Photo 34: PoE AC/DC adaptor of EUT

Photo 35: PoE AC/DC adaptor of EUT

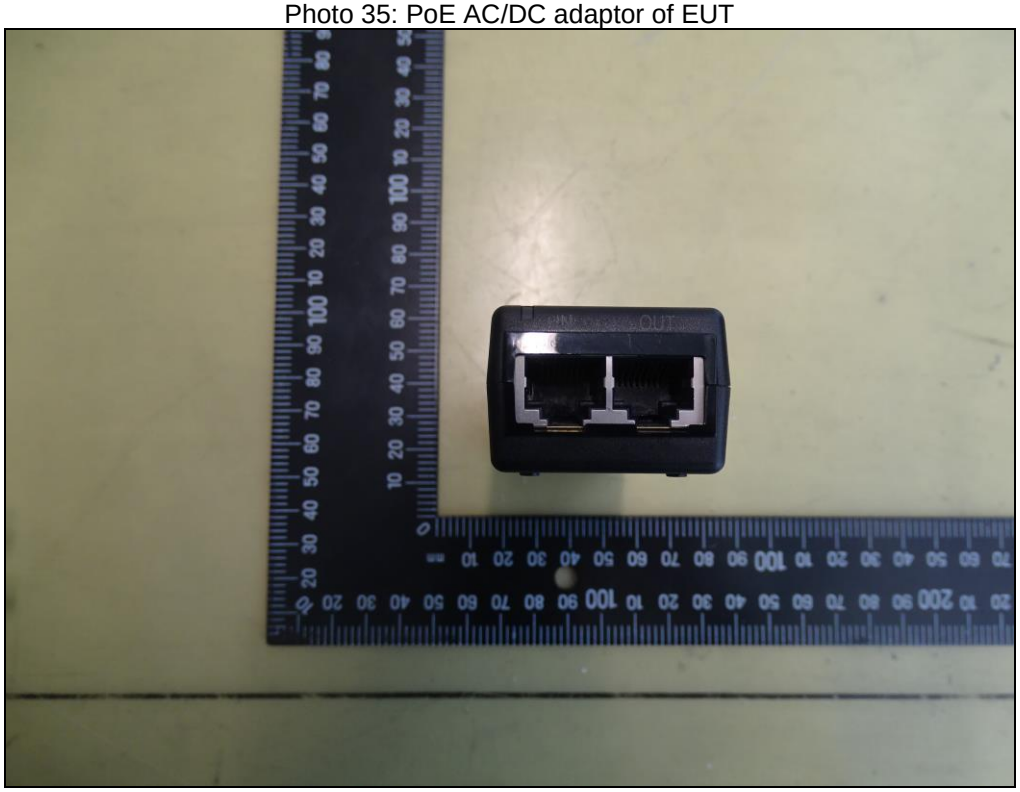


Photo 36: PoE AC/DC adaptor of EUT

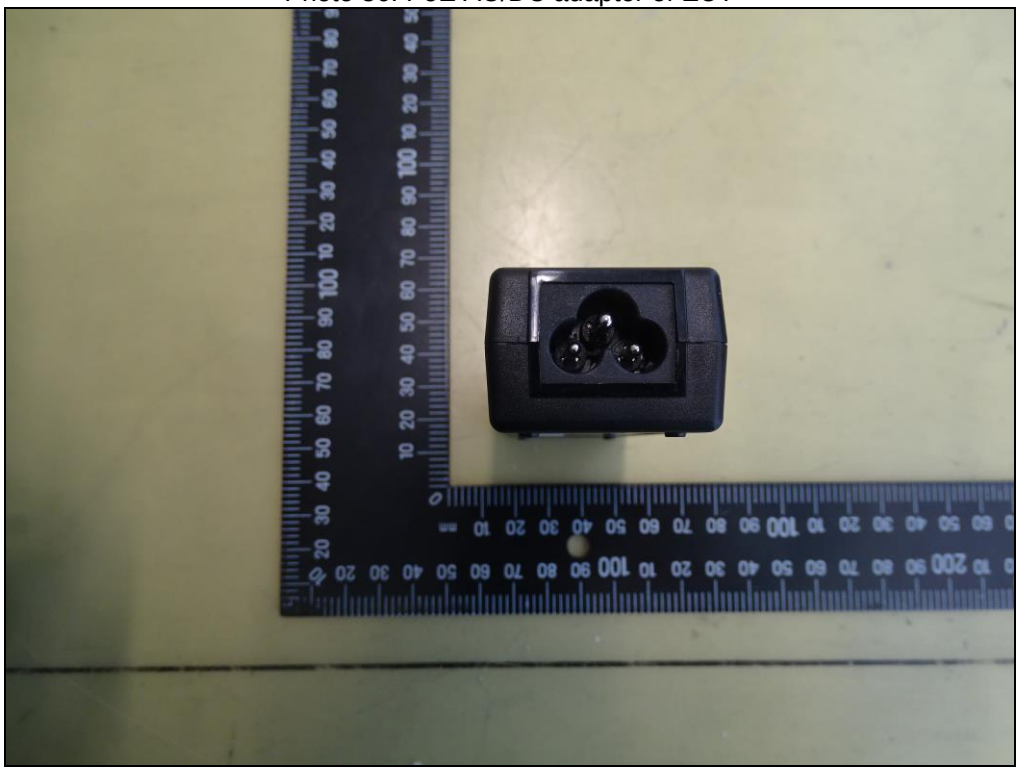
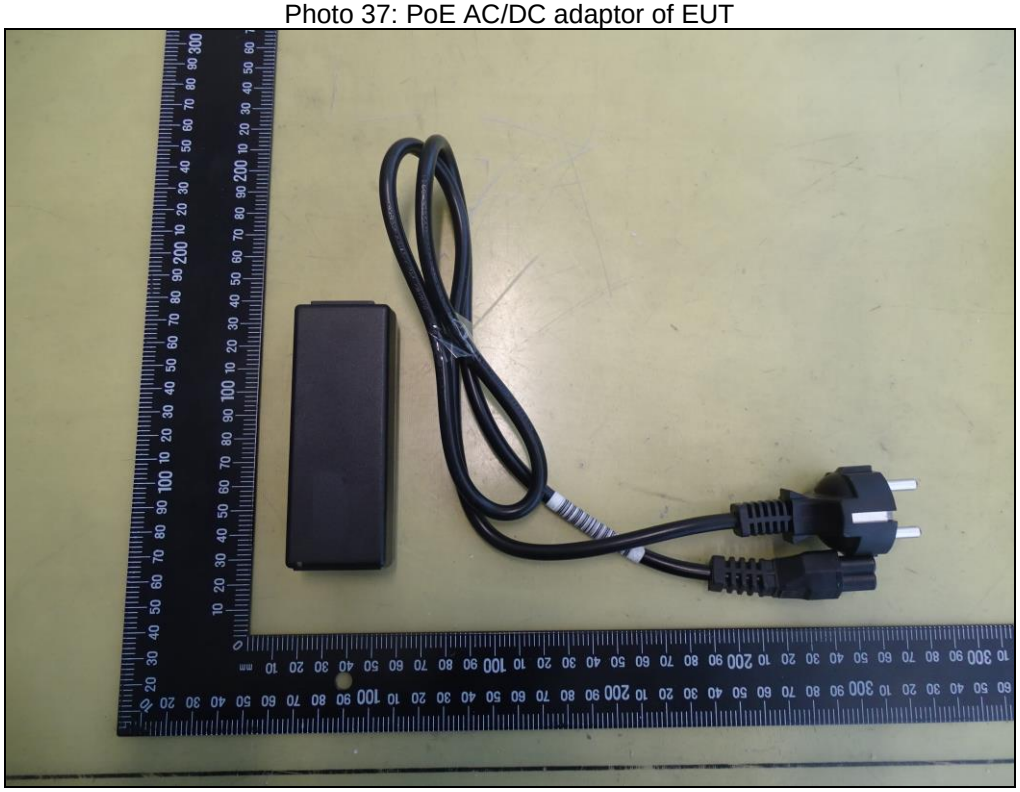


Photo 37: PoE AC/DC adaptor of EUT



Annex C: Document history

Version	Applied changes	Date of release
---	Initial release	2021-01-04

Annex D: Further information

Glossary

AMN	-	Artificial Mains Network
BT	-	Bluetooth
DUT	-	Device under Test
EMC	-	Electromagnetic Compatibility
EUT	-	Equipment under Test
FCC	-	Federal Communication Commission
FCC ID	-	Company Identifier at FCC
HW	-	Hardware
IC	-	Industry Canada
Inv. No.	-	Inventory number
LISN	-	Line Impedance Stabilization Network
ME	-	Medical electrical
N/A	-	not applicable
PoE	-	Power over Ethernet
S/N	-	Serial Number
SW	-	Software