

**Test Report acc. to FCC Title 47 CFR Part 15
relating to
DERMALOG Identification Systems GmbH
DERMALOG FLC1**

**Title 47 - Telecommunication
Part 15 - Radio Frequency Devices
Subpart B – Unintentional Radiators
Measurement Procedure:
ANSI C63.4-2014**



Deutsche
Akkreditierungsstelle
D-PL-12053-01-03



BNetzA-CAB-13/21-08

MANUFACTURER	
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Manufacturer's grantee code	2APZC
Manufacturer's address	Mittelweg 120 20148 Hamburg
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TESTING LABORATORY	
Test engineer	Mr. Ralf Trepper
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RELEVANT STANDARD	
Title	47 - Telecommunication
Part	15 - Radio Frequency Devices
Subpart	Subpart B – Unintentional Radiators
Measurement procedure	ANSI C63.4-2014

EQUIPMENT UNDER TEST (EUT)	
Equipment category	Class B digital device
Trade name	DERMALOG FLC1
Type designation	DERMALOG FLC1
Serial no.	FLC1 AA001000
Part no.	8036-0001-01
Variants	none

1. Test results

Clause	Requirements headline	Test result		
8.1	Conducted limits	Pass	Fail	Not ^{as}
8.2	Radiated emission limits	Pass	Fail	Not ^{as}

For the decision rules on conformity statements the requirements of the standard apply. If necessary the IEC Guideline 115 is taken into account.

The equipment passed all the conducted tests	Yes	No
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Signature		
Name	Mr. Ralf Trepper	Mr. Abdelouahid Ftouhi
Designation	RF Test engineer	Laboratory-Manager
Date of issue	2020-06-18	2020-06-18

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2. Introduction

This test report is **not an expert opinion** and consists of:

- Test result summary
- List of contents
- Introduction and further information
- Performance assessment
- Detailed test information

All pages have been numbered consecutively and bear the TÜV NORD Hochfrequenztechnik GmbH & Co. KG logo, the test report number, the date, the test specification in its current version as well as the type designation of the EUT. The total number of pages in this report is **25**.

The tests were carried out at:

- **TÜV NORD Hochfrequenztechnik GmbH & Co. KG, D-51069 Köln**

in a representative assembly and in accordance with the test methods and/or requirements stated in:

FCC Title 47 CFR Part 15 Subpart B & ANSI C63.4-2014

The sample of the product was received on:

- **2020-04-27**

The tests were carried out in the following period of time:

- **2020-04-28 – 2020-04-29**

3. Testing laboratory

TÜV NORD Hochfrequenztechnik GmbH & Co. KG
LESKANPARK, Gebäude 10
Waltherstr. 49-51
51069 Köln
Germany

Phone: +49 221 8888950

- FCC Registration Number: **763407**

Accredited by:

DAkKS Deutsche Akkreditierungsstelle GmbH
DAkKS accreditation number: D-PL-12053-01-00

4. Applicant

Company name : DERMALOG Identification Systems GmbH
Address : Mittelweg 120
20148 Hamburg
Country : Germany
Telephone : +49 40 413227 75
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Email : Thorsten.gaertner@dermalog.com
Date of order : 2020-04-21
References : Mr. Thorsten Gärtner

5. Product and product documentation

Samples of the following apparatus were submitted for testing:

Manufacturer : DERMALOG Identification Systems GmbH
Trademark : DERMALOG FLC1
Type designation : **DERMALOG FLC1**
Hardware version : 8036-0001-01
Serial number : FLC1 AA001000
Software release : 1.1.0
Type of equipment : Camera-System with USB interface
EUT power used : 5 V C (+- 5%)

For issuing this report the following product documentation was used:

Description	Date	Identifications
External Photographs of the Equipment Under Test (EUT)	2020-06-18	Annex no. 1
Internal Photographs of the Equipment Under Test (EUT)	2020-06-18	Annex no. 2
Label Sample	2020-06-18	Annex no. 3
Functional Description / User Manual	2020-06-18	Annex no. 4
Test Setup Photos	2020-06-18	Annex no. 5
Block Diagram	2020-06-18	Annex no. 6
Operational Description	2020-06-18	Annex no. 7
Schematics	2020-06-18	Annex no. 8
Parts List	2020-06-18	Annex no. 9

6. Conclusions, observations and comments

The test report will be filed at TÜV NORD Hochfrequenztechnik GmbH & Co. KG for a period of 10 years following the issue of this report. It may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of TÜV NORD Hochfrequenztechnik GmbH & Co. KG.

The results of the tests as stated in this report are exclusively applicable to the EUT as identified in this report. TÜV NORD Hochfrequenztechnik GmbH & Co. KG cannot be held liable for properties of the EUT that have not been observed during these tests.

TÜV NORD Hochfrequenztechnik GmbH & Co. KG assumes the sample to comply with the requirements of FCC Title 47 CFR Part 15 for the respective test sector, if the test results turn out positive.

Comments: ---

7. Operational description

7.1 EUT details

The EUT is a fever detection camera-system with a thermos camera.

7.2 EUT configuration

The EUT is connected to the laptop via an USB hub. The power supply of the EUT is via the USB port. For the conducted measurement no USB hub is used. The camera is directly connected to the laptop.

7.3 EUT measurement description

Radiated measurements

The EUT was tested in a typical fashion. During preliminary emission tests the EUT was operated in the normal operating mode (camera active) for worst case emission mode investigation. Therefore, the final qualification testing was completed with the EUT operated in this operating mode. All tests were performed with the EUT's typical voltage of 5 V DC via USB hub.

In order to establish the maximum radiation, firstly, there have been viewed all orthogonal adjustments of the test samples, secondly the test ample have been rotated at all adjustments around the own axis between 0° and 360°, and thirdly, the antenna polarization between horizontal and vertical had been varied.

Conducted measurements

Firstly, the main power of the laptop is directly connected to the artificial mains network. Secondly, the measurements have been performed at the main power of the laptop with active EUT.

8. Compliance assessment

8.1 Conducted limits

8.1.1 Regulation

(a) Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Conducted Limits		
Frequency of Emission	Quasi-Peak (QP)	Average (AV)
MHz	dB μ V	dB μ V
0.15 - 0.5	66 to 56*	56 to 46*
0.5 - 5	56	46
5 -30	60	50
*Decreases with the logarithm of the frequency		

(b) For a Class A digital device that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms LISN. Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15 - 0.5	79	66
0.5 - 30	73	60

(c) The limits shown in paragraphs (a) and (b) of this section shall not apply to carrier current systems operating as unintentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

(1) For carrier current systems containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions

(2) For all other carrier current systems: 1000 μ V within the frequency band 535-1705 kHz, as measured using a 50 μ H/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits in §15.109(e)

(d) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provision for, the use of battery chargers which permit operating while charging, AC adaptors or battery eliminators or that connect to the AC

power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

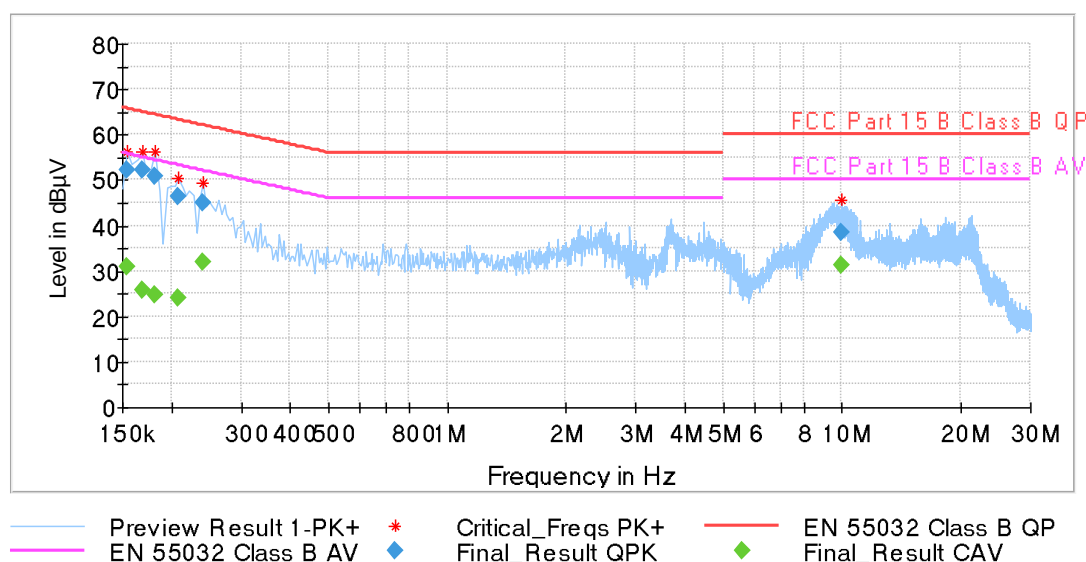
8.1.2 Test procedure

The EUT and the additional equipment (if required) are connected to the main power through a line impedance stabilization network (LISN). The LISN must be appropriate to ANSI C63.4-2014. Additional equipment must also be connected to a second LISN with the same specifications as described above (if required).

8.1.3 Result

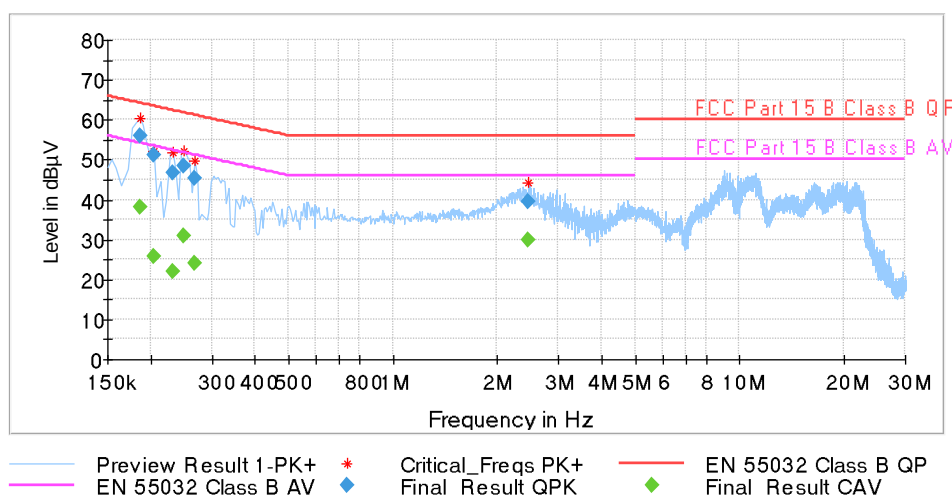
Test results for the periphery only (laptop with dedicated AC/DC adapter):

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.154500	52.15	---	65.75	13.60	1000.0	9.000	N	20.0
0.154500	---	31.05	55.75	24.71	1000.0	9.000	N	20.0
0.168000	52.10	---	65.06	12.95	1000.0	9.000	L1	20.1
0.168000	---	25.84	55.06	29.22	1000.0	9.000	L1	20.1
0.181500	50.80	---	64.42	13.62	1000.0	9.000	L1	20.1
0.181500	---	24.78	54.42	29.64	1000.0	9.000	L1	20.1
0.208500	46.22	---	63.27	17.05	1000.0	9.000	L1	20.1
0.208500	---	24.07	53.27	29.19	1000.0	9.000	L1	20.1
0.240000	---	31.83	52.10	20.27	1000.0	9.000	N	20.1
0.240000	44.94	---	62.10	17.16	1000.0	9.000	N	20.1
9.915000	---	31.23	50.00	18.77	1000.0	9.000	N	20.4
9.915000	38.45	---	60.00	21.55	1000.0	9.000	N	20.4



Test results for the periphery (laptop with dedicated AC/DC adapter) with active EUT:

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.186000	55.94	---	64.21	8.27	1000.0	9.000	N	20.0
0.186000	---	38.13	54.21	16.08	1000.0	9.000	N	20.0
0.204000	---	25.90	53.45	27.55	1000.0	9.000	L1	20.1
0.204000	51.20	---	63.45	12.25	1000.0	9.000	L1	20.1
0.231000	46.68	---	62.41	15.74	1000.0	9.000	L1	20.2
0.231000	---	21.91	52.41	30.51	1000.0	9.000	L1	20.2
0.249000	48.28	---	61.79	13.51	1000.0	9.000	N	20.1
0.249000	---	31.04	51.79	20.75	1000.0	9.000	N	20.1
0.267000	---	23.97	51.21	27.24	1000.0	9.000	L1	20.2
0.267000	45.26	---	61.21	15.95	1000.0	9.000	L1	20.2
2.458500	39.48	---	56.00	16.52	1000.0	9.000	N	20.2
2.458500	---	29.85	46.00	16.15	1000.0	9.000	N	20.2



Test Cables used	K79
Test equipment used	272, 665, 551, 60

The equipment passed the conducted tests	Yes	No	Not
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Test setup photos / test results are attached	Yes	No	Page no.:
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8.2 Radiated emission limits

8.2.1 Regulation

(a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

radiated emission from unintentional radiator**- limits @ 3 m		
Frequency of emission(MHz)	Field strength	
MHz	$\mu\text{V} / \text{m}$	$\text{dB}\mu\text{V} / \text{m}$
30 - 88	100	40.0
88 - 216	150	43.5
216 -960	200	46.0
Above 960	500	54.0
** Except for Class A digital device		

(b) The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the following:

radiated emission from unintentional radiator**- limits @ 10 m		
Frequency of emission(MHz)	Field strength	
MHz	$\mu\text{V} / \text{m}$	$\text{dB}\mu\text{V} / \text{m}$
30 - 88	90	39.1
88 - 216	150	43.5
216 -960	210	46.4
Above 960	300	49.5
** For Class A digital device		

(c) In the emission tables above, the tighter limit applies at the band edges. Sections 15.33 and 15.35 which specify the frequency range over which radiated emissions are to be measured and the detector functions and other measurement standards apply.

(d) For CB receivers, the field strength of radiated emissions within the frequency range of 25-30 MHz shall not exceed 40 microvolts/meter at a distance of 3 meters. The field strength of radiated emissions above 30 MHz from such devices shall comply with the limits in paragraph (a) of this section.

(e) Carrier current systems used as unintentional radiators or other unintentional radiators that are designed to conduct their radio frequency emissions via connecting wires or cables and that operate in the frequency range of 9 kHz to 30 MHz, including devices that deliver the radio frequency energy to transducers, such as ultrasonic devices not covered under part 18 of this chapter, shall comply with the radiated emission limits for intentional radiators provided in §15.209 for the frequency range of 9 kHz to 30 MHz. As an alternative, carrier current systems used as unintentional radiators and operating in the frequency range of 525 kHz to 1705 kHz may comply with the radiated emission limits provided in §15.221(a). At frequencies above 30 MHz, the limits in paragraph (a), (b), or (g) of this section, as appropriate, apply.

(f) For a receiver which employs terminals for the connection of an external receiving antenna, the receiver shall be tested to demonstrate compliance with the provisions of this section with an antenna connected to the antenna terminals unless the antenna conducted power is measured as specified in §15.111(a). If a permanently attached receiving antenna is used, the receiver shall be tested to demonstrate compliance with the provisions of this section.

(g) As an alternative to the radiated emission limits shown in paragraphs (a) and (b) of this section, digital devices may be shown to comply with the standards contained in Third Edition of the International Special Committee on Radio Interference (CISPR), Pub. 22, "Information Technology Equipment—Radio Disturbance Characteristics—Limits and Methods of Measurement" (incorporated by reference, see §15.38). In addition:

(1) The test procedure and other requirements specified in this part shall continue to apply to digital devices.

(2) If, in accordance with §15.33 of this part, measurements must be performed above 1000 MHz, compliance above 1000 MHz shall be demonstrated with the emission limit in paragraph (a) or (b) of this section, as appropriate. Measurements above 1000 MHz may be performed at the distance specified in the CISPR 22 publications for measurements below 1000 MHz provided the limits in paragraphs (a) and (b) of this section are extrapolated to the new measurement distance using an inverse linear distance extrapolation factor (20 dB/decade), e.g., the radiated limit above 1000 MHz for a Class B digital device is 150 $\mu\text{V/m}$, as measured at a distance of 10 meters.

(3) The measurement distances shown in CISPR Pub. 22, including measurements made in accordance with this paragraph above 1000 MHz, are considered, for the purpose of §15.31(f)(4) of this part, to be the measurement distances specified in this part.

(h) Radar detectors shall comply with the emission limits in paragraph (a) of this section over the frequency range of 11.7-12.2 GHz.

8.2.2 Test procedure

The EUT and this peripheral (when additional equipment exists) are placed on a turn table which is 0.8 m above the ground. The turn table would be allowed to rotate 360° to determine the position of the maximum emission level. The test distance between the EUT and the receiving antenna are 3m. To find the maximum emission, the polarization of the receiving antenna is changed in horizontal and vertical polarization; the position of the EUT was changed in different orthogonal determinations.

ANSI C63.4-2014 Section 8 "Radiated Emissions Testing"

Measurement procedures for electric field radiated emissions from 9kHz - 1 GHz & 1 GHz - 40 GHz are covered in Clause 8 of ANSI C63.4-2014. The ANSI C63.4-2014 measurement procedure consists of both an exploratory test and a final measurement. The exploratory test is critical to determine the frequency of all significant emissions. For each mode of operation required to be tested, the frequency spectrum is monitored. Variations in antenna height, antenna orientation, antenna polarization, EUT azimuth, and cable or wire placement is explored to produce the emission that has the highest amplitude relative to the limit.

The final measurements are made based on the findings in the exploratory testing. When making exploratory and final measurements it is necessary to maximize the measured radiated emission. Sub clause 8.3.2 of ANSI C63.4-2014 states that the measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." We consider the "cone of radiation" to be the 3 dB beam width of the measurement antenna.

While the "bore-sighting" technique is not explicitly mentioned in ANSI C63.4-2014, it is a useful technique for measurements using a directional antenna, such as a double-ridged waveguide antenna. Several precautions must be observed, including: knowledge of the beam width of the antenna and the resulting illumination area relative to the size of the EUT, estimation for source of the emission and general location within larger EUTs, measuring system sensitivity, etc.

ANSI C63.4-2014 requires that the measurement antenna is kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. That means that if the directional radiation pattern of the EUT results in a maximum emission at an upwards angle from the EUT, when a directional antenna is used to make the measurement it will be necessary for it to be pointed towards the source of the emission within the EUT. This can be done by either pointing the antenna at an angle towards the source of the emission, or by rotating the EUT, in both height and polarization, to maximize the measured emission. The emission must be kept within the illumination area of the 3 dB beamwidth of the antenna so that the maximum emission from the EUT is measured.

Radiated emissions test characteristics	
Frequency range	9 kHz – Above 960 MHz
Test distance	3 m*
Test instrumentation minimum resolution bandwidth	9 kHz (Below 30 MHz)
	120 kHz (30 MHz - 1,000 MHz)
	1 MHz (Above 1000 MHz)
Detector Type	Quasi peak and Average based on frequency range
Receive antenna scan height	1 m - 4 m
Receive antenna polarization	Vertical/horizontal

* According to Section 15.31 (f) (1): At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

8.2.3 Calculation of the field strength

The field strength is calculated by the following calculation:

Corrected Level = Receiver Level + Correction Factor (without the use of a pre-amplifier)

Corrected Level = Receiver Level + Correction Factor – Pre-amplifier (with the use of a pre-amplifier)

Receiver Level : Receiver reading without correction factors

Correction Factor : Antenna factor + cable loss

For example:

The receiver reading is 32.7 dBμV. The antenna factor for the measured frequency is +2.5 dB (1/m) and the cable factor for the measured frequency is 0.71 dB, giving a field strength of 35.91dBμV/m.

The 35.91dBμV/m value can be mathematically converted to its corresponding level in μV/m.

Level in μV/m = Common Antilogarithm (35.91/20) = 62.44

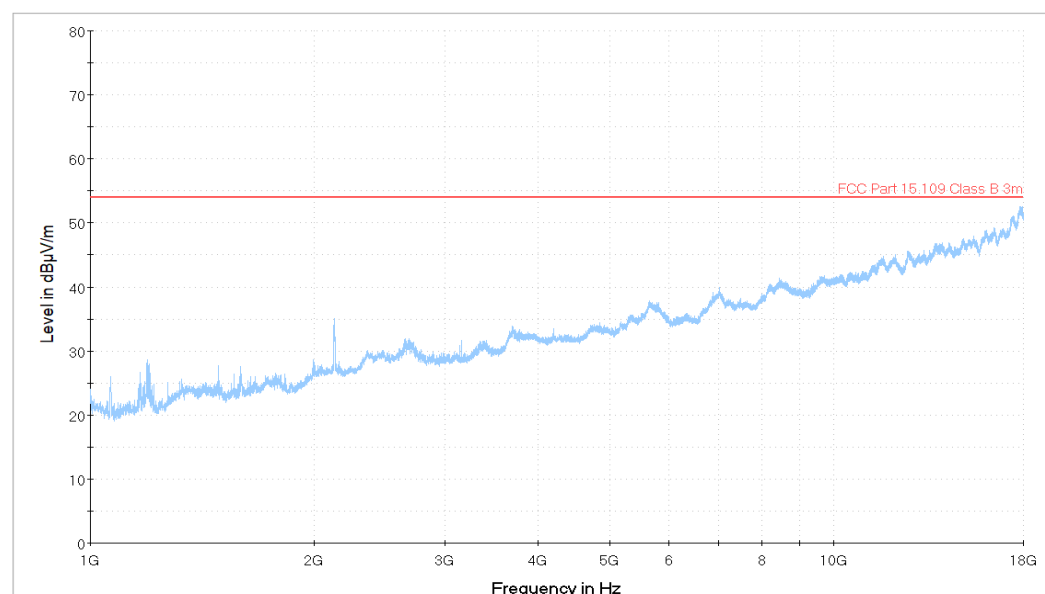
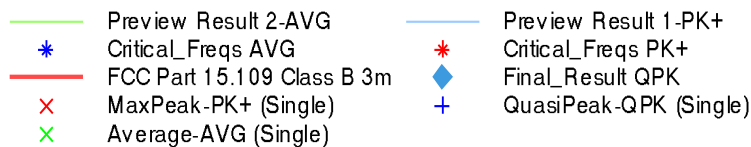
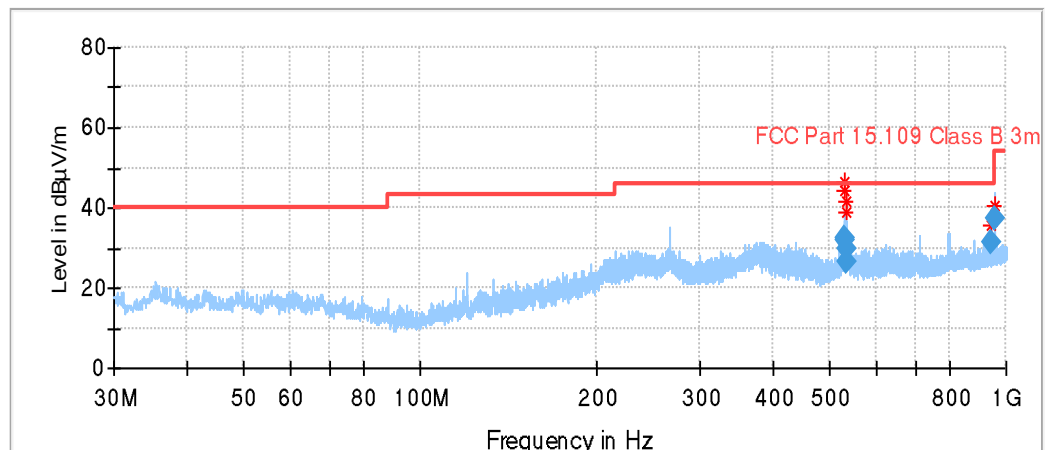
For test distance other than what is specified, but fulfilling the requirements of Section 15.31 (f) (1) the field strength is calculated by adding additionally an extrapolation factor of 20 dB/decade (inverse linear distance for field strength measurements).

8.2.4 Result

Radiated emissions (Section 15.109)

The maximum internal frequency is 2.5 GHz. Therefore, the measurements have been done up to 26.5 GHz.

Radiated measurement from 30 MHz up to 26.5 GHz:



Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
531.480000	32.58	46.00	13.42	1000.0	120.000	191.0	H	272.0
531.759000	31.80	46.00	14.20	1000.0	120.000	100.0	V	277.0
532.065000	26.47	46.00	19.53	1000.0	120.000	100.0	V	83.0
533.199000	29.76	46.00	16.24	1000.0	120.000	100.0	V	307.0
945.432000	31.26	46.00	14.74	1000.0	120.000	153.0	V	216.0
959.652000	37.55	46.00	8.45	1000.0	120.000	100.0	V	22.0
1000 – 26500	No peak detected.							

Test Cables used	K60, K101, K119, K68, K147
Test equipment used	665, 406, 445a, 444, 442, 443, 660

The equipment passed the conducted tests	Yes	No	Not *
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Test setup photos / test results are attached	Yes	No	Page no.:
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9. Additional information to the test report

Remark	Description
N.t. ¹	Not tested, because not applicable to the EUT
N.t. ²	Not tested, because not ordered

10. List of test equipment

State Apr. 30, 2020					
Marking	Manufacturer	SW/Type/Serial-No.	Last Cal./Val.	Next Cal./Val.	No.
1 Measuring Instruments					
Attenuator	Radiall	---	Nov 19	Nov 22	62
Attenuator 3dB	Suhner	6803/17	Nov 19	Nov 22	137
Attenuator 3dB / 18 GHz	Suhner	3dB/18GHz	Nov 19	Nov 22	299
Terminator	Texcan	---	Nov 19	Nov 22	304
Attenuator 6dB / 18 GHz	Suhner	6dB/18GHz	Nov 19	Nov 22	344
Attenuator 20dB / 20GHz	Parzich	40AH-20	Nov 19	Nov 22	354
Terminator	KDI	T173CS	Nov 19	Nov 22	490
Variable transformer	RFT	LS 002	---	---	154a
Variable transformer	Schunt+Ben	---	---	---	155
Power sensor	Marconi	6914	Aug 18	Aug 20	258
Power sensor	Marconi	6913	Aug 19	Aug 21	286
Power sensor	Rohde & Schwarz	NRP18SN	Nov 19	Nov 21	651
Coaxial Directional Coupler	Narda	3003-20	Jan 18	Jan 21	370/342
Coaxial directional coupler	Mini Circuits	ZFDC-20-5	Mar 20	Mar 22	434
Coaxial directional coupler	Narda+Suhner	---	Mar 20	Mar 23	472/492
Coaxial High Pass Filter	Mini circuits	NHP-700	Mai 18	Mai 21	435
Coaxial High Pass Filter	Mini circuits	NHP-200	Mai 18	Mai 21	405
Coaxial High Pass Filter	Mini circuits	NHP-25+	Mai 18	Mai 21	455
High Pass Filter	Mini circuits	VHF-3500+	Mai 18	Mai 21	451
High Pass Filter	Mini circuits	VHF-1200+	Mai 18	Mai 21	452
Bandpass Filter	Schomandl	BN86871	Nov 18	Nov 21	66
Bandpass Filter	Schomandl	BN68673	Nov 18	Nov 21	67
Low Pass Filter	Mini circuits	SLP550	Mai 18	Mai 21	273
Low Pass Filter	Mini circuits	SLP550	Mai 18	Mai 21	274
RF Current Probe 9 kHz – 30 MHz	Rohde & Schwarz	ESH2-Z1	Jun 18	Jun 21	42
VHF- Current Probe 9 kHz – 600 MHz	Rohde & Schwarz	ESV-Z1	Jun 18	Jun 21	43
Passive Test Probe – 9 kHz – 30 MHz	TÜV NORD	VDE 0876	Mai 18	Mai 21	45
Coaxial Fixed Attenuator DC – 1 GHz	Texscan	HFP50/10	Jul 17	Jul 20	60
8 Wire Impedance Stabilisation Network	Schwarzbeck	CAT5 8158	Nov 19	Nov 21	71a
T-Section - 50 W	Rohde & Schwarz	BN 42441/50	Aug 18	Aug 21	93
RF Current Injection Clamp 0.15 – 1GHz	Lüthi GmbH	EM 101	Nov 19	Nov 22	156
Absorbing Clamp MDS 30MHz – 1GHz	Lüthi GmbH	MDS-21	Nov 19	Nov 22	160
Insertion Unit	Rohde & Schwarz	URV5-Z4	Mai 19	Mai 22	162
Coaxial RF Termination - 0 – 1000 MHz	Telewave Inc.	TWL 35	Nov 18	Nov 21	164
Coaxial RF Termination - 0 – 1000 MHz	Telewave Inc.	TWL 60	Nov 18	Nov 21	165
Fixed Attenuator - DC – 1.5GHz	Bird	Mod/ 8343-060	Apr. 20	Apr. 23	177
Rotary Step Attenuator DC – 2 GHz	Texscan	TA – 50	Mar20	Mar 22	184
CDN up to 230 MHz	MEB	KEN-M 2 / M 3	Nov 19	Nov 21	264
Impulse limiter 10 dB	Rohde & Schwarz	ESH3 Z2	Mai 19	Mai 22	272
Fixed Attenuator - DC – 18 GHz 30 dB	MTS	---	Nov 17	Nov 20	275
Fixed Attenuator - DC – 18 GHz 30 dB	MTS	---	Mar 20	Mar 22	276
Passive Probe - 9 kHz – 30 MHz 2.5 kΩ	RFT	TK 121	Jun 17	Jun 20	302
Termination Resistor 50 W	Radiall	404011	Nov 18	Nov 21	309
Branching device (4x) 50W	Rohde & Schwarz	892228/20	Sep 19	Sep 22	320
Dummy-Load - 2 – 18 GHz	Narda	MODEL 367NF	Nov 19	Nov 22	343
DC Block Adapter - 0.045 – 26.5 GHz	Hewlett-Packard	11742A	Apr 18	Apr 21	356
Insertion Unit 10V 9 kHz 1000 MHz	Rohde & Schwarz	URV 5-Z2	Mai 19	Mai 22	367
RF Probe 0.02 – 1000 MHz	Rohde & Schwarz	395.2680.02	Mai 19	Mai 22	368
150W attenuator	Weinschel	49-20-33	Oct 19	Oct 22	374

Fixed Coaxial Attenuator - DC – 18 GHz	Weinschel	23-6-34	Feb 20	Feb 23	375
Insertion Unit 9 kHz – 2000 MHz	Rohde & Schwarz	URY-Z2	Oct 19	Oct 22	416
Panoramic Adapter (Monitoring)	Schwarzbeck	PAN1550	---	---	429
DC-BLOCK - DC – 6.0 GHz 50 W	Mini Circuits	BLK-6-N+	Aug 18	Aug 21	462
Terminating resistor 50Ω SMA	---	---	Nov 19	Nov 22	493
Terminating resistor 50Ω SMA	---	SC 60-601-0000-31	Nov 19	Nov 22	497
Fixed Attenuator –0 – 40 GHz	Anritsu	41KC-10	Nov 19	Nov 22	504
Fixed Attenuator – 0 – 40 GHz	Anritsu	41KC-10	Nov 19	Nov 22	505
Fixed Attenuator – 0 – 40 GHz	Anritsu	41KC-6	Nov 19	Nov 22	506
Fixed Attenuator – 0 – 40 GHz	Anritsu	41KC-3	Nov 19	Nov 22	507
Electric Dummy Load	RA-NAV Lab.	DA-75U	---	---	526
Power Splitter / Combiner	Mini Circuits	ZESC-2-11	Nov 19	Nov 22	527
3 Way Power Splitter / Combiner	Mini Circuits	ZFSC-3-1	Mar 20	Mar 23	529
3 Way Power Splitter / Combiner	Mini Circuits	ZFSC-3-1	Mar 20	Mar 23	530
RF-Attenuator - 6 dB	Haefely	---	Mar 20	Mar 23	540
RF-Attenuator - 1– 120 MHz 12 dB	Haefely	---	Mar 20	Mar 23	541
RF-Attenuator - 1– 120 MHz 39 dB	Haefely	---	Mar 20	Mar 23	542
LISN 9kHz – 30 MHz	Schwarzbeck	NNLA 8120	Jul 17	Jul 20	551
HV Probe P6013A	Tektronix	P6013A	Mai 19	Mai 22	559
VLISN 5μH	Schwarzbeck	8125-1944	Nov 19	Nov 21	585
VLISN 5μH	Schwarzbeck	8125-1945	Nov 19	Nov 21	586
20dB Attenuator, up to 18 GHz	Mini Circuit	BW-N20W5+	Nov 19	Nov 22	594
Step Attenuator - DC-18 GHz 0 to 11 dB	Hewlett-Packard	8494B	Nov 19	Nov 22	604
Analyser Reference System	Spitzenberger & Spies	ARS 16/1	Jan 20	Jan 22	606a/b/c
Capacitive Coupling Clamp 5 kV	Schlöder	SFT 415	Mai 17	Mai 20	608
RF Probes for 50 Ω Receivers	Schwarzbeck	TK 9416	---	---	612
Current probe TRMS	BEHA APROB	CHB35	Oct 19	Oct 22	652
Semi Anechoic Chamber	COMTEST	SAC-3m	Apr 19	Oct. 20	660
Maturo Turntable	Maturo	TT2.0SI (SN: TT2.05SI/817 SW: 1.0.0.4473)	---	---	667
Maturo Antenna Mast	Maturo	TAM4.5-E-10kg (SN: 10011/216/2588.01)	---	---	668
Maturo Controller	Maturo	FCU3.0/009/2588.01 (SN: 10014/2019)	---	---	669
Current probe 20 Hz – 100 MHz	Rohde & Schwarz	EZ-17 (0816.2063.03)	Mar. 20	Mar. 23	670

2 Generators

EFT/Burst Generator	Schlöder	SFT 1400	Mai 17	Mai 20	46a
Hybrid Generator	Schlöder	CWG1500	Nov 19	Nov 21	522
ESD Generator	Schlöder	SESD 216	Oct 19	Oct 21	653
Signal Generator	Rohde & Schwarz	SMB100A	Jun 18	Jun 20	571
RF Generator	Rohde & Schwarz	SGT100A	Apr 20	Apr 22	636
Signal Generator	Rohde & Schwarz	SMG	Mai 19	Mai 21	136
Signal Generator	Marconi	2042	Mai 18	Mai 20	6
Signal Generator	Marconi	2024	Mai 18	Mai 20	213
Puls Generator	EM Test	MPG 200	Cal. before use	Cal. before use	181
Surge Generator	H+H	MIG063 IN S-T	---	---	561

3. Antennas

Loop Ant. 9kHz-30MHz	Schwarzbeck	FMZB1516	Sep 19	Sep 21	23
Biconical Ant. 30-300 MHz	Schwarzbeck	VHA9103/BBA9106	Apr 20	Apr 22	80/616
Double Ridged Horn	Schwarzbeck	BBHA9120C	Oct 19	Oct 21	169
Double Ridged Horn	Schwarzbeck	BBHA 9120A	Apr 20	Apr 22	284
Tri-Log Broadband	Schwarzbeck	VULB9168	Mai 19	Mai 21	406
Broadband Horn 14-40 GHz	Schwarzbeck	BBHA9170	Nov 19	Nov 21	442
Log Per Antenna 0.7-20 GHz	Schwarzbeck	STLP9148	Mai 19	Mai 21	445a

Bilog Ant.	Schwarzbeck	CBL6111	Cal. before use	Cal. before use	167
Balun with biconical BBA9106 (TX)	Schwarzbeck [only for NSA]	VHBB9124	Nov 19	Nov 21	0796
Balun with biconical BBA9106 (RX)	Schwarzbeck [only for NSA]	VHBA9123	Nov 19	Nov 21	9758
Log periodic Ant (TX)	Schwarzbeck [only for NSA]	UHALP9108	Nov 19	Nov 21	9002
Log periodic Ant (RX)	Schwarzbeck [only for NSA]	UHALP9108	Nov 19	Nov 21	9003
Spectrum analyser Mixer 220 – 325 GHz	Radiometer Physics	SAM325	Aug 19	Aug 21	591
Dual Mode Potter Horn 220-325 GHz	Radiometer Physics	325-WR2	---	---	592
Dual Mode Potter Horn 75-110 GHz	Radiometer Physics	---	---	---	649
Gain Horn Antenna 50-75 GHz	Dorado	GH-15-20	---	---	511
Standard Gain Horn 1.7 – 2.6 GHz	Narda	645	---	---	514
W-band active Sextupler with input drive amplifier	Spacek Labs Inc.	AW-6XW-0	---	---	221a
60 to 65 GHz active frequency quadrupler	Spacek Labs Inc.	A625-4XW-0	---	---	222a
Harmonic Mixer 40-60 GHz	Rohde & Schwarz	FS-Z60	Jul 19	Jul 21	515
Gain Horn Antenna 40-60 GHz	Dorado	GH-19-20	---	---	518
Spectrum analyser Mixer 90-140 GHz	Radiometer Physics	SAM140	Aug 19	Aug 21	545
Dual Mode Potter Horn 90-140 GHz	Radiometer Physics	140-WR8	---	---	547
Spectrum analyser Mixer 140-220GHz	Radiometer Physics	SAM220	Aug 19	Aug 21	546
Dual Mode Potter Horn 140-220 GHz	Radiometer Physics	220-WR5.1	---	---	548
Harmonic Mixer 60-90 GHz	Rohde & Schwarz	FS-Z90	Jul 19	Jul 21	501
Dual Mode Potter Horn 60-90 GHz	Radiometer Physics	90-W12	---	---	549
Gain Horn 33-55 GHz	Dorado	---	---	---	383
Gain Horn 50-75 GHz	Dorado	---	---	---	384
Gain Horn 75-110 GHz	Dorado	---	---	---	385
Standard Gain Ant. 26.5-40 GHz	Maury Microwave	U211C	---	---	532/628

4. Amplifier

RF pre-amplifier 100kHz-1.3GHz	HP	8447E	Aug 18	Aug 20	166a
Mitteq amplifier 26.5-40 GHz	Mitteq	---	Mar 20	Mar 22	223a
RF pre-amplifier 1-18GHz	Narda	---	Mar 20	Mar 22	345
Mitteq Amplifier 18-26GHz	Mitteq	---	Apr. 20	Apr. 22	433
Microwave amplifier 12-18GHz	Schwarzbeck	BBV9719	Mar 20	Mar 22	443
Microwave amplifier 0.5-18GHz	Schwarzbeck	BBV9718	Mar 19	Mar 21	444

5. Test/Control software

Maturo mcApp	Maturo	SW: V3.4.9.4537 (19.04.04)	---	---	---
SPS EMC	Spitzenberger & Spies	SW: V4.1.3	---	---	---
EMV-Soft	Schlöder GmbH	SW: V11.95	---	---	---
ISMISO	EM Test AG	SW:V3.63	---	---	---

6. Power supplies

Programmable Power Supply	Fluke	PM 2813	---	---	28a
Power Supply	HP	---	---	---	125
Power Supply	Sorensen	LM 30-6	---	---	134a
Power Supply	HP	6034L	---	---	226
Regulated Power Supply	Farnell	AP60-50	---	---	408
Power Supply	EA	PSI 8080-40-DT	---	---	560
Power Supply	HP	6032A	---	---	644

7. Meters

Microwave Frequency Counter	Hewlett-Packard	5351A	Nov 18	Nov 20	130
Temperature test cabinet	Heraeus Vötsch	VMT04/35	---	---	102a
Temperature test cabinet	Brabender	TTE 32/40 H	---	---	87
Digital-Hygro-Thermometer	Greisinger	GFTH95	Nov 19	Nov 21	57a

Volt & RF Power Meter	Rohde & Schwarz	URV35	Mai 19	Mai 21	161
Spectrum Analyzer - 9 kHz – 18 GHz	Rohde & Schwarz	FSL18	Jul 18	Jul 20	171a
Multimeter	Gossen Metrawatt	Metrahit pro	Nov 19	Nov 21	215a
Radio communication Service Monitor 0.4 – 1000 MHz	Rohde & Schwarz	CMS 54	Jun 17	Jun 20	229
Humidity/Temperature Measuring device	TESTO	Testo 625	Oct 19	Oct 21	259a
Volt & RF Power Meter	Rohde & Schwarz	URV35	Nov 19	Nov 21	271
Multimeter	Gossen Metrawatt	Metrahit 26S	Aug 17	Aug 20	313
Level and Power Meter - 9 kHz – 3 GHz	Rohde & Schwarz	URY	Mar 20	Mar 22	307
Temperature test device	Ahlhorn	Almemo 2390-5 PT100	Mar 20	Mar 23	401/402
Signal & Spectrum Analyser 10 Hz-30 GHz	Rohde & Schwarz	FSV-30	Jul 19	Jul 21	502
Digital-Vacuum-/Barometer	Greisinger	GDH12AN	Oct 19	Oct 21	558
Temperature test cabinet	Weiß Umwelttechnik	WKL 34/40	Aug 18	Aug 21	562
Digital Storage Oscilloscope	Tektronix	TDS 2012C	Oct 19	Oct 21	568
Miniature Flat, Zero-Biased Schottky Detector –0.1– 18 GHz	Narda	4503A-03	Jun 17	Jun 20	613
Diode Detector – 0.1 – 2.5 GHz	Spinner	BN 7545	Sep 17	Sep 20	617
Digital-Vacuum-/Barometer	Greisinger	GDH-200-14	Oct 19	Oct 21	632
EMI Test receiver ESW26	Rohde & Schwarz	R&S ESW26 (SN: 101383/26 SW: R&S ESW1.61))	Nov 19	Nov 20	665
Signal analyser Keysight 50GHz	Keysight	UXA N9040B (SN: MY57213006 SW: A.24.58/2019.0702)	Nov 19	Nov 20	666
8.test software					
EMC32	Rohde & Schwarz	V10.60.10	---	---	---

11. Cable list

Internal Cable Number	Connector Type	Frequency Range (MHz)	Cable Length (m)	Manufacturer
4a	BNC	10 – 1500	0.50	Telemeter
14a	BNC	10 – 1000	1.00	Telemeter
17a	APC3.5	10 – 26500	2.13	Huber + Suhner
18a	APC3.5	10 – 26500	2.13	Huber + Suhner
22	BNC	10 – 1000	1.50	---
27	BNC	10 – 1000	1.00	Fabrica Milanese Cond.
40	BNC	---	0.50	Aircell
43	SMA	10 – 18000	0.50	Rosenberger
44	SMA	---	0.50	Huber + Suhner
45	SMA	10 – 18000	0.50	Huber + Suhner
48	SMA		0.50	Huber + Suhner
49	N	10 – 18000	1.00	Huber + Suhner
50	N	10 – 18000	1.00	Huber + Suhner
51	N	10 – 18000	1.00	Huber + Suhner
52	N	10 – 18000	1.00	Huber + Suhner
54	BNC	10 – 3500	1.00	Aircell
58	N	10 – 18000	2.00	Huber + Suhner
59	N	10 – 18000	1.00	Huber + Suhner
60	N	10 – 18000	2.00	Huber + Suhner
61	N	10 – 18000	1.00	Huber + Suhner
62	SMA	---	0.50	Huber + Suhner
63	SMA	10 – 18000	0.50	Huber + Suhner
64	SMA	10 – 18000	0.50	Huber + Suhner
65	APC3.5	10 – 26500	0.60	---
66	APC3.5	10 – 26500	0.60	---
67	APC3.5	10 – 26500	0.60	---
68	APC3.5	10 – 26500	0.60	---
72	BNC	---	0.40	---
73	BNC	---	0.40	---
76	SMA	10 – 30000	3.00	Gore
79	BNC/N	10 – 1000	5.00	---
80	SMA	---	0.25	Huber + Suhner
87	SMA	10 – 18000	0.15	Huber + Suhner
88	SMA	10 – 18000	0.15	Huber + Suhner
89	SMA	10 – 18000	0.15	Huber + Suhner
90	SMA	10 – 18000	0.15	Huber + Suhner
91	SMA	---	1.50	Huber + Suhner
94	BNC	---	1.10	---
95	BNC	---	0.80	---
96	BNC	---	0.80	---
100	N	10 – 26500	6.00	Rosenberg
101	N	10 – 18000	2.90	Huber + Suhner
102	SMA	10 – 18000	2.00	Huber + Suhner
111	BNC	10 – 1000	0.50	---
112	BNC	10 – 1000	0.50	---
114	SMA	10 – 18000	0.25	Huber + Suhner
116	SMA	10 – 18000	0.25	Huber + Suhner
119	N	10 – 20000	8.00	Jyebao
121	SMA	10 – 18000	1.50	Huber + Suhner
122	SMA	10 – 18000	2.00	Huber + Suhner
123	SMA	10 – 18000	2.00	Huber + Suhner
145	SMA	10 – 26500	8.00	Huber + Suhner
147	APC3.5	10 – 40000	1.50	Jyebao
148	APC3.5	10 – 40000	3.00	Jyebao

Internal Cable Number	Connector Type	Frequency Range (MHz)	Cable Length (m)	Manufacturer
151	SMA	10 – 18000	0.50	Rosenberger
152	SMA	10 – 18000	0.50	Rosenberger
154	BNC	10 – 1000	1.00	---
155	N/BNC	---	0.85	---
157	BNC	---	0.50	---
158	SMA	10 – 26500	2.00	Huber + Suhner
160	SMA	10 – 18000	0.40	Nortel Networks
161	SMA	10 – 18000	1.00	Huber + Suhner
162	APC35	10 – 26500	2.00	Huber + Suhner
163	APC3.5	10 - 26500	2.00	Huber + Suhner
164	APC3.5	10 – 26500	2.00	Huber + Suhner
165	APC2.9	10 – 26500	2.00	Huber + Suhner
166	APC3.5	10 – 40000	---	---
167	APC3.5	10 – 40000	1.00	Jyebao
168	APC3.5	10 – 40000	1.00	Jyebao
169	APC3.5	10 – 40000	1.00	Jyebao
170	APC3.5	10 – 40000	1.00	Jyebao
171	APC3.5	10 – 40000	1.00	Jyebao
172	SAM	---	0.90	Huber + Suhner
173	APC	10 – 26500	2.00	Huber + Suhner
174	APC	10 – 26500	---	Huber + Suhner
175	SMA	10 – 18000	0.40	Huber + Suhner
176	N-SMA	10 – 18000	0.50	Huber + Suhner
188	N	10 – 18000	5.00	Huber + Suhner
EMV 1	BNC	---	2.00	Henn
EMV 2	BNC	10 – 1000	2.00	Henn
EMV 4	BNC	---	9.70	Henn
EMV 5	BNC	---	3.80	Henn
EMV 6	BNC/N	10 – 1000	5.00	Lüthi
EMV 7	BNC	10 – 1000	1.50	Henn
EMV 8	BNC	10 – 1500	1.70	Henn
EMV 9	BNC	10 – 1000	1.70	Henn
EMV 11	BNC	---	5.20	Hasselt
EMV 12	BNC	10 – 1000	2.40	Hasselt
EMV 13	BNC	10 – 1000	4.10	Hasselt
EMV 14	BNC	10 – 1000	2.50	Hasselt
EMV 15	BNC	---	0.90	Henn
EMV 16	Fischer	---	2.00	---
EMV 18a	Fischer	---	1.00	---
EMV 19a	Fischer	---	1.50	---
KISN2	BNC	10 – 2000	4.80	---

12. Assembly of units or parts

Assembly of units or parts

Device	number	remarks
Notebook HP ProBook 430 G4 (S/N:5CD71109S3)	1	Windows 10 x64
7-port USB3 Gen1 HUB	1	ExSys
Dedicated AC/DC Adapter for HP Notebook	1	CT: wSTLC0A3U60O43 (with 2 ferrite)
AC/DC adapter for USB3 Hub	1	Model: ATS036T-A120 (with 2 ferrite)
3-pol cable with C6 plug for notebook	1	Without ferrite
2-pol cable with C8 plug for USB HUB	1	Without ferrite
USB cable 1m Type-A to Type-C	1	With 2 ferrite
USB cable 1m Type-C to Type-C	1	With 2 ferrite
USB cable 2m Type-C to Type-C	1	With 2 ferrite
Tripod for camera	1	---

End of test report