

TEST REPORT
of the accredited test laboratory

TÜV Nr.:INE-AT/FG-18/151

Applicant: SES-imagotag GmbH
St. Peter Gürtel 10b
A – 8042 Graz

Tested Product: Networking controller transceiver module "APG2-PCIA-A"

FCC-ID: 2ACQM-APG2-PCIA-A

IC-ID: 12154A-APG2-PCIA-A

Manufacturer: SES-imagotag GmbH
St. Peter Gürtel 10b
A – 8042 Graz

Output power / 50,0 mV/m average **power supply:** 3V DC
field strength: @ 3m distance internal battery

Frequency range: 2404 - 2479,25 MHz **Channel separation:** 0,35 MHz

Standard: FCC: 47 CFR Part 15 (15. June 2018 edition)
RSS-210 Issue 9, August 2016

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Certification Body,
Calibration Laboratory,
VerifizierungsstelleNotified Body 0408
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Test laboratory for EMC

Supervisor of EMC-laboratory:

Ing. Wilhelm Seier



01.08.2018

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checked by:

Ing. Michael Emminger

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The results of this test report only refer to the provided equipment.

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1. Applicant

Company: SES-imagotag GmbH
Department: Product & Project Manager
Address: A – 8042 Graz; St. Peter Gürtel 10b
Contact person: Mr. Philipp Jauck

EUT received on: 30.07.2018

Tests were performed on: 30.07. and 31.07.2018

2. Description of EUT

EUT: Networking controller transceiver module "APG2-PCIA-A"

Serial Number: Prototype

Manufacturer: SES-imagotag GmbH
A – 8042 Graz; St. Peter Gürtel 10b

Description: SES-imagotag GmbH provided the following configuration for the measurements:

Prototype with special test-firmware for continuous transmission

Operating mode: The measurements were carried out at the following running states:
test-firmware running, transmitting continuously

Technical data EUT: Rated voltage: 3VDC
Rated current: <1A
Rated frequency: DC

Mains voltage during the tests: 3VDC internal battery

Climatic conditions in the emc laboratory: Relative humidity: 51%
Temperature: 28°C

3. Standards / Final result

Name	Title	Deviation	Result
Title 47 CFR Part 15 15. June 2018 edition	RADIO FREQUENCY DEVICES	none	OK
RSS-210 Issue 9, August 2016	Licence-Exempt Radio Apparatus: Category I Equipment	none	OK
Result: Opinions and interpretation of testing laboratory OK: EUT passed NOK: EUT failed			

4.1 TEST OBJECT DATA

General EUT Description

This transceiver module is working in a network consisting of a controller station, so called Accesspoint, and various displays. The Accesspoint transmits information to the displays and receives acknowledgements. This device is a module to be used in displays operating in the network system. The device is equipped with a passive NFC chip onboard which does not have its own rf generation. It works as tag and can also receive information from the NFC reader station.

2.1033 (c) Technical description

2.1033 (4) Type of emission: Minimum shift keying – declared channel bandwidth 250 kHz – 'virtual' channel spacing 0,35 MHz. Only 11 channels from the channel plan are used, therefore the channel spacing in reality is much higher and varies from 2,45 MHz minimum up to 17,15 MHz.

2.1033 (5) Frequency range: 2404 – 2479,25 MHz (channel center frequencies of channel 0 up to ch. 10)

2.1033 (6) Power range and Controls: The maximum field strength measured is 50,0 mV/m average @ 3m distance. There is no power control or regulation.

2.1033 (7) Maximum output power rating: 50,0 mV/m average @ 3m distance.

2.1033 (8) DC Voltage and Current: 3 VDC (internal battery)
maximum current consumption: 28,0mA during continuous transmission

RSS-135 This standard does not apply to:

- 1.1.(a) a receiver that scans radio frequencies for the purpose of enabling its associated transmitter to avoid transmitting in an occupied frequency but which does not have the capability of decoding the message (e.g. converting it to audio voice) contained in the radio signal

Tests were performed on: July 30th and 31st 2018.

4.2 Number of channels and channel spacing

§ 2.1033

Channel plan:

Channel Number	Center frequency (MHz)	Channel spacing (MHz)
0	2404	5,95
1	2409,95	11,9
2	2421,85	2,8
3	2424,65	17,15
4	2441,8	7,35
5	2449,15	12,6
6	2461,75	7,7
7	2469,45	4,9
8	2474,35	2,45
9	2476,8	2,45
10	2479,25	

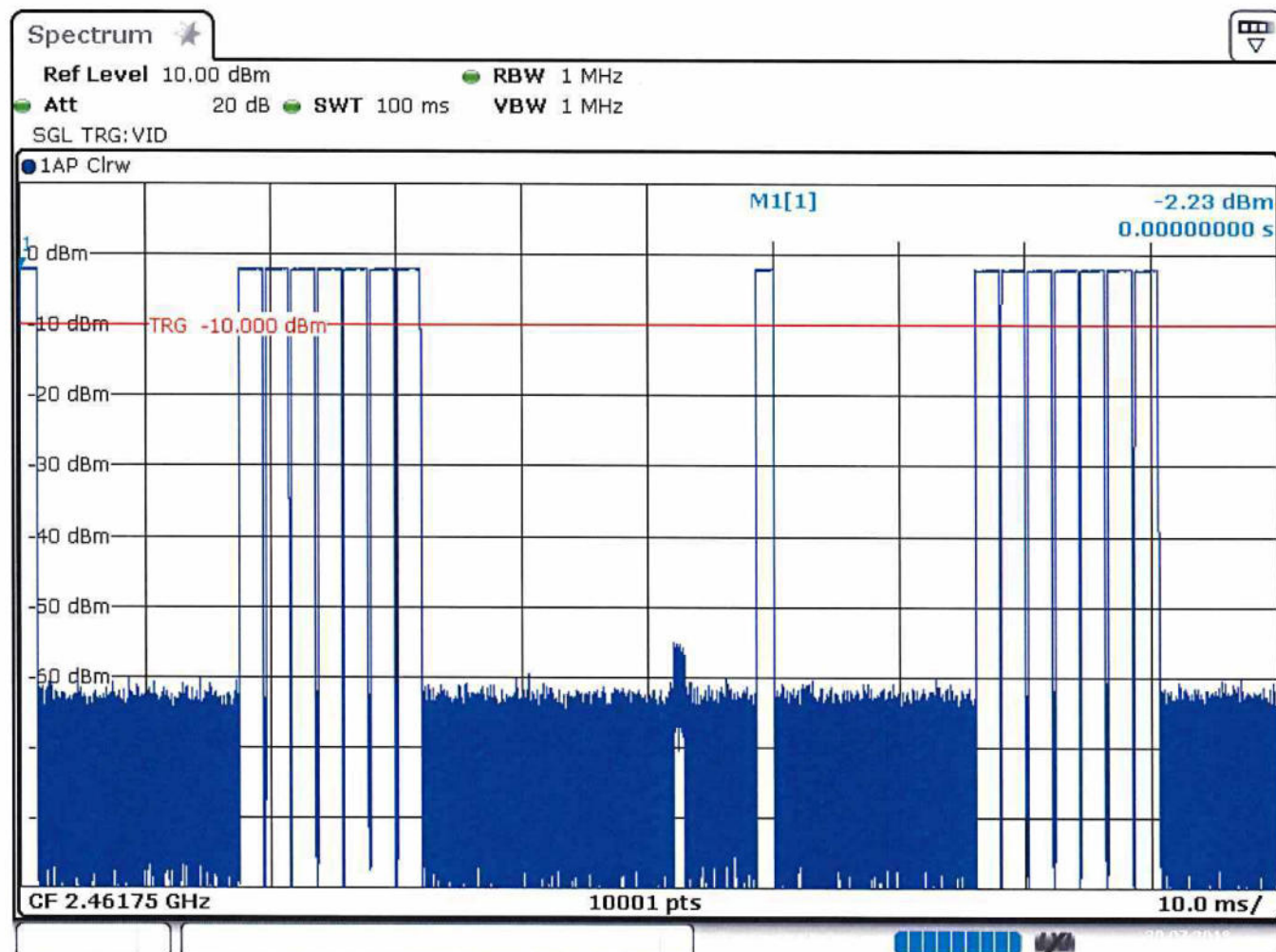
Tests were performed on channels 0, 4 and 10.

Test Equipment used: N/A

4.3 Duty Cycle measurements for averaging

§ 15.249 (e)

Mode: data transmission (worst case in 100ms)



Date: 30.JUL.2018 09:55:31

According to the timing protocol description provided by the manufacturer and attached as technical description to the application for certification, the transmission burst time was checked to not exceed the declared value. The declared value was taken for calculation, as that gives the worst case.

2 Transmission bursts of 1,48ms length and 14 transmission bursts of 1,97ms length occurring in 100ms give a duty cycle of 30,54% or an average factor of -10,3 dB. This is the maximum duty cycle according to the protocol description.

LIMIT SUBCLAUSE 15.249(e)

(e) As shown in §15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

Test Equipment used: EMV-205

4.4 Field strength of emissions at 2400 – 2483,5 MHz

§ 15.249 (a) (c)

Operating on CH 0 (2404 MHz) – Antenna 1

The maximum peak value measured was 92,6 dBµV/m = 160,3 mV/m at 3m distance.

With the averaging factor calculated on page 5 of this test report of -10,3 dB the maximum average value is then 93,8 dBµV/m = 49,0 mV/m at 3m distance.

LIMIT SUBCLAUSE 15.249(a) (c)

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

(c) Field strength limits are specified at a distance of 3 meters.

Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200

Field strength of emissions at 2400 – 2483,5 MHz

§ 15.249 (a) (c)

Operating on CH 4 (2441,8 MHz) – Antenna 1

The maximum peak value measured was 104,2 dBµV/m = 162,2 mV/m at 3m distance.

With the averaging factor calculated on page 5 of this test report of -10,3 dB the maximum average value is then 93,9 dBµV/m = 49,5 mV/m at 3m distance.

LIMIT SUBCLAUSE 15.249(a) (c)

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

(c) Field strength limits are specified at a distance of 3 meters.

Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200

Field strength of emissions at 2400 – 2483,5 MHz

§ 15.249 (a) (c)

Operating on CH 10 (2479,25 MHz) – Antenna 1

The maximum peak value measured was 104,3 dBµV/m = 164,0 mV/m at 3m distance.

With the averaging factor calculated on page 5 of this test report of -10,3 dB the maximum average value is then 94,0 dBµV/m = 50,0 mV/m at 3m distance.

LIMIT

SUBCLAUSE 15.249(a) (c)

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Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
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2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

(c) Field strength limits are specified at a distance of 3 meters.

Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200

Field strength of emissions at 2400 – 2483,5 MHz

§ 15.249 (a) (c)

Operating on CH 0 (2404 MHz) – Antenna 2

The maximum peak value measured was 92,6 dBµV/m = 160,3 mV/m at 3m distance.

With the averaging factor calculated on page 5 of this test report of -10,3 dB the maximum average value is then 93,8 dBµV/m = 49,0 mV/m at 3m distance.

LIMIT SUBCLAUSE 15.249(a) (c)

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

(c) Field strength limits are specified at a distance of 3 meters.

Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200

Field strength of emissions at 2400 – 2483,5 MHz

§ 15.249 (a) (c)

Operating on CH 4 (2441,8 MHz) – Antenna 2

The maximum peak value measured was 104,2 dBµV/m = 162,2 mV/m at 3m distance.

With the averaging factor calculated on page 5 of this test report of -10,3 dB the maximum average value is then 93,9 dBµV/m = 49,5 mV/m at 3m distance.

LIMIT SUBCLAUSE 15.249(a) (c)

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Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
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2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

(c) Field strength limits are specified at a distance of 3 meters.

Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200

Field strength of emissions at 2400 – 2483,5 MHz

§ 15.249 (a) (c)

Operating on CH 10 (2479,25 MHz) – Antenna 2

The maximum peak value measured was 104,3 dBµV/m = 164,0 mV/m at 3m distance.

With the averaging factor calculated on page 5 of this test report of -10,3 dB the maximum average value is then 94,0 dBµV/m = 50,0 mV/m at 3m distance.

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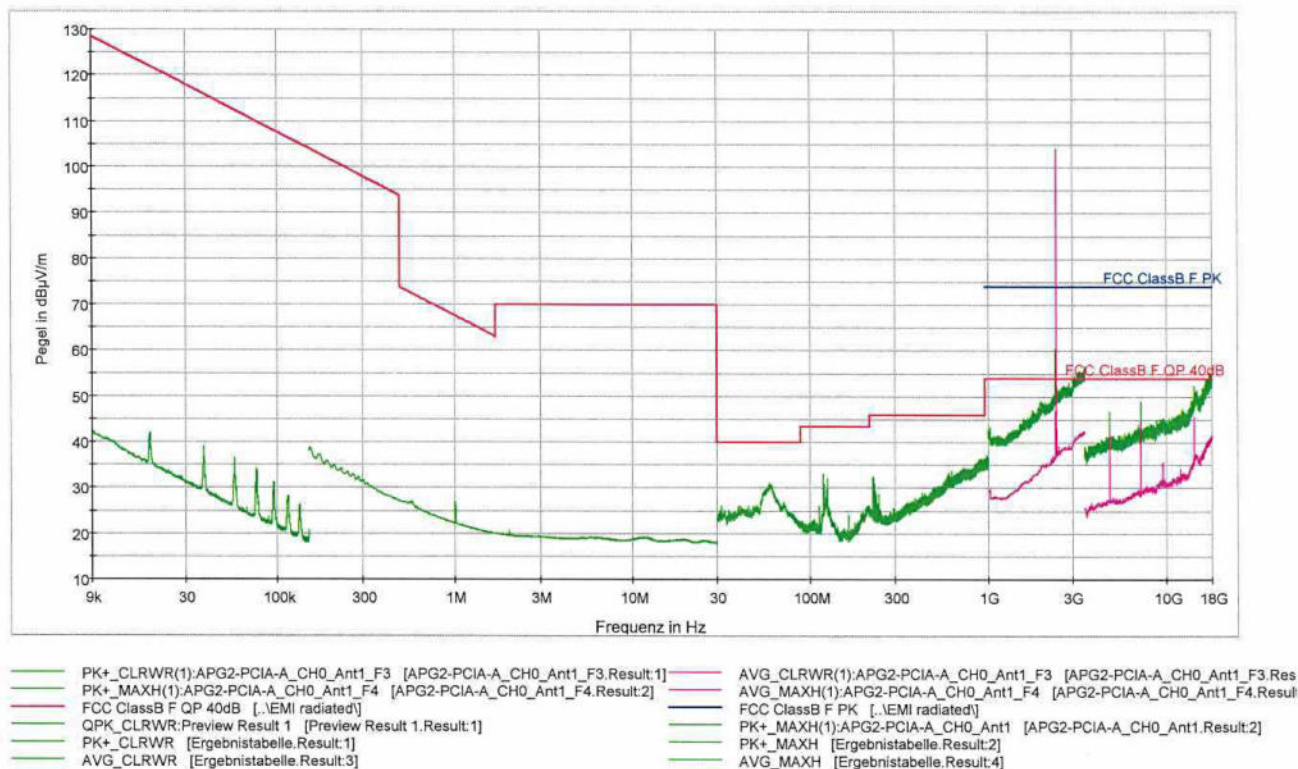
(c) Field strength limits are specified at a distance of 3 meters.

Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200

4.5 Emissions outside 2400 – 2483,5 MHz

§ 15.249 (d) (e)

Channel 0 (2404 MHz) – Antenna 1 – average values above 1 GHz are shown in magenta – green = peak



LIMIT

SUBCLAUSE 15.249(d) (e) (15.209)

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

(e) As shown in §15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30–88	100**	3
88–216	150**	3
216–960	200**	3
Above 960	500	3

Test Equipment used:

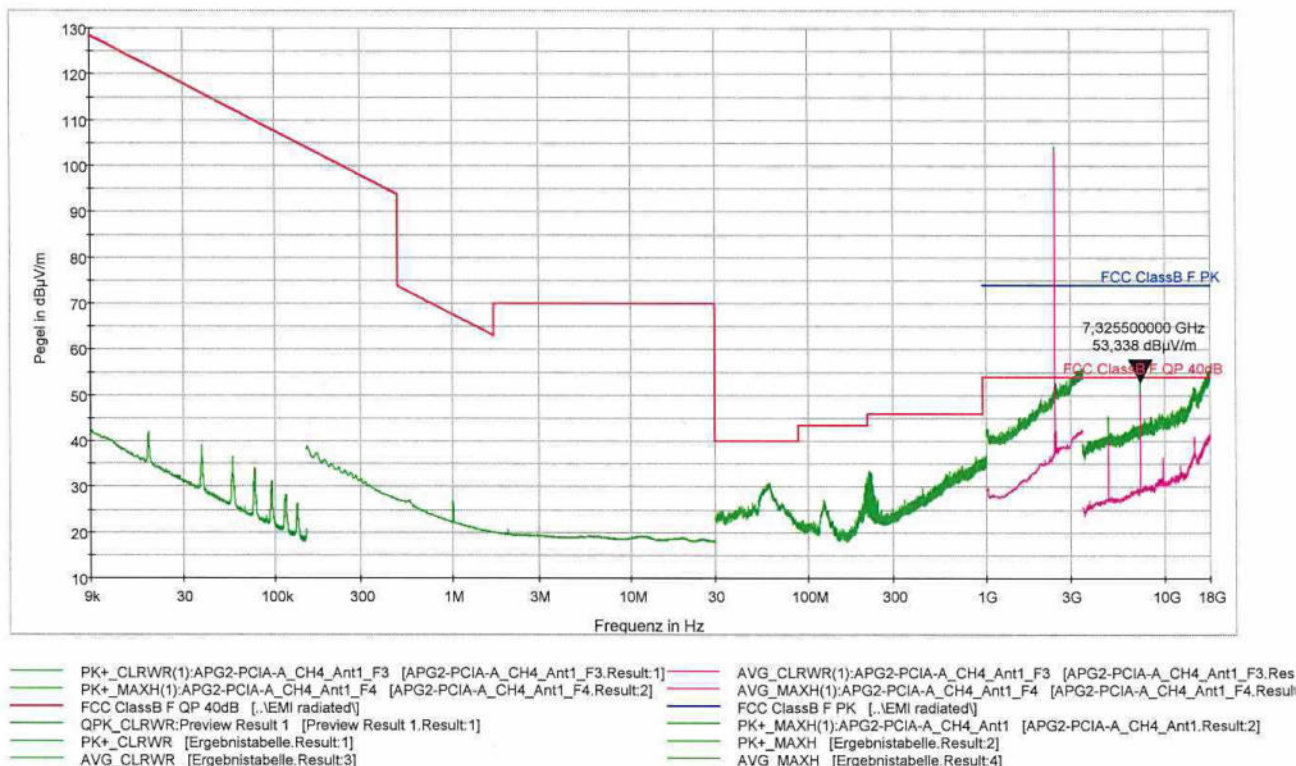
EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-200; NT-416

Remark: Although the measurements were made up to the 10th harmonic (25 GHz) the frequency range above 18 GHz is not automatized, so no graphs are available. Nevertheless no emissions above noise level were found in the frequency range above 18 GHz.

Emissions outside 2400 – 2483,5 MHz

§ 15.249 (d) (e)

Channel 4 (2441,8 MHz) – Antenna 1 – average values above 1 GHz are shown in magenta – green = peak



LIMIT

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(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

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1.705–30.0	30	30
30–88	100**	3
88–216	150**	3
216–960	200**	3
Above 960	500	3

Test Equipment used:

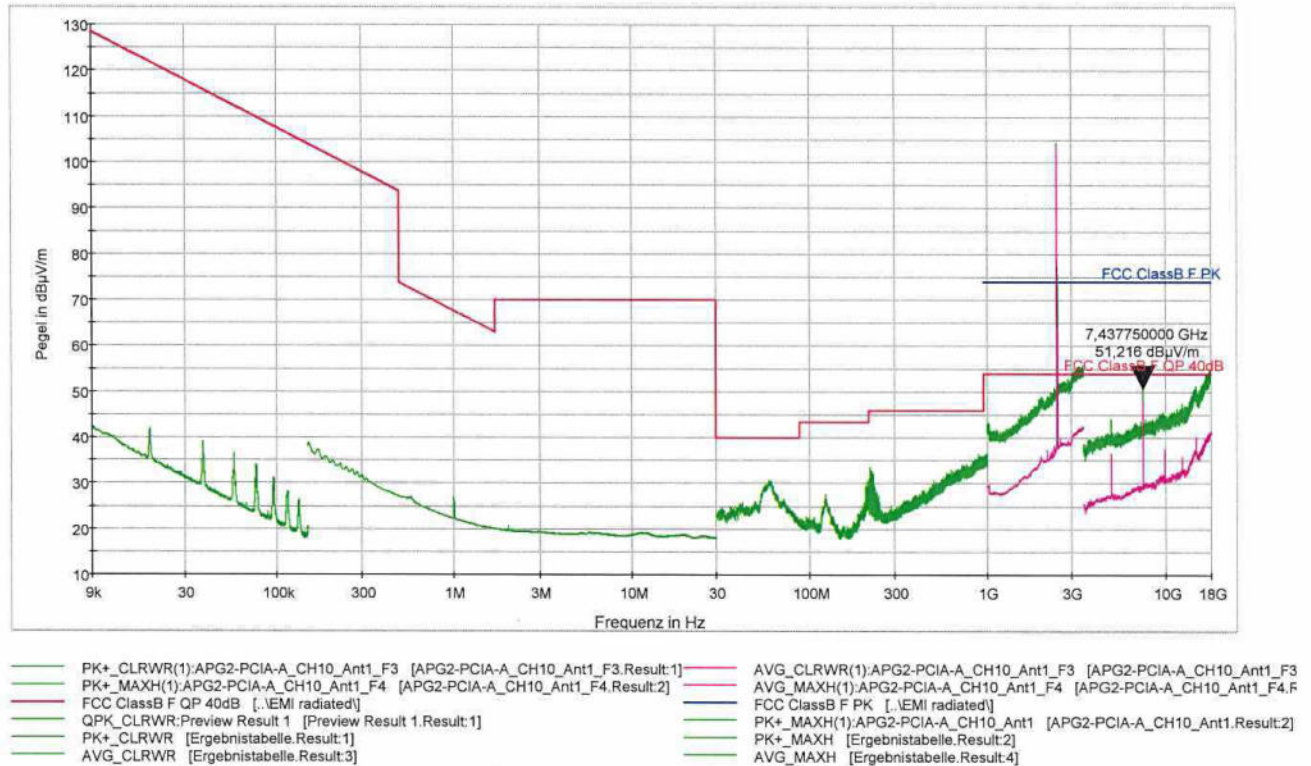
EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-200; NT-416

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Emissions outside 2400 – 2483,5 MHz

§ 15.249 (d) (e)

Channel 10 (2479,25 MHz) – Antenna 1 – average values above 1 GHz are shown in magenta – green = peak



LIMIT

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1.705–30.0	30	30
30–88	100**	3
88–216	150**	3
216–960	200**	3
Above 960	500	3

Test Equipment used:

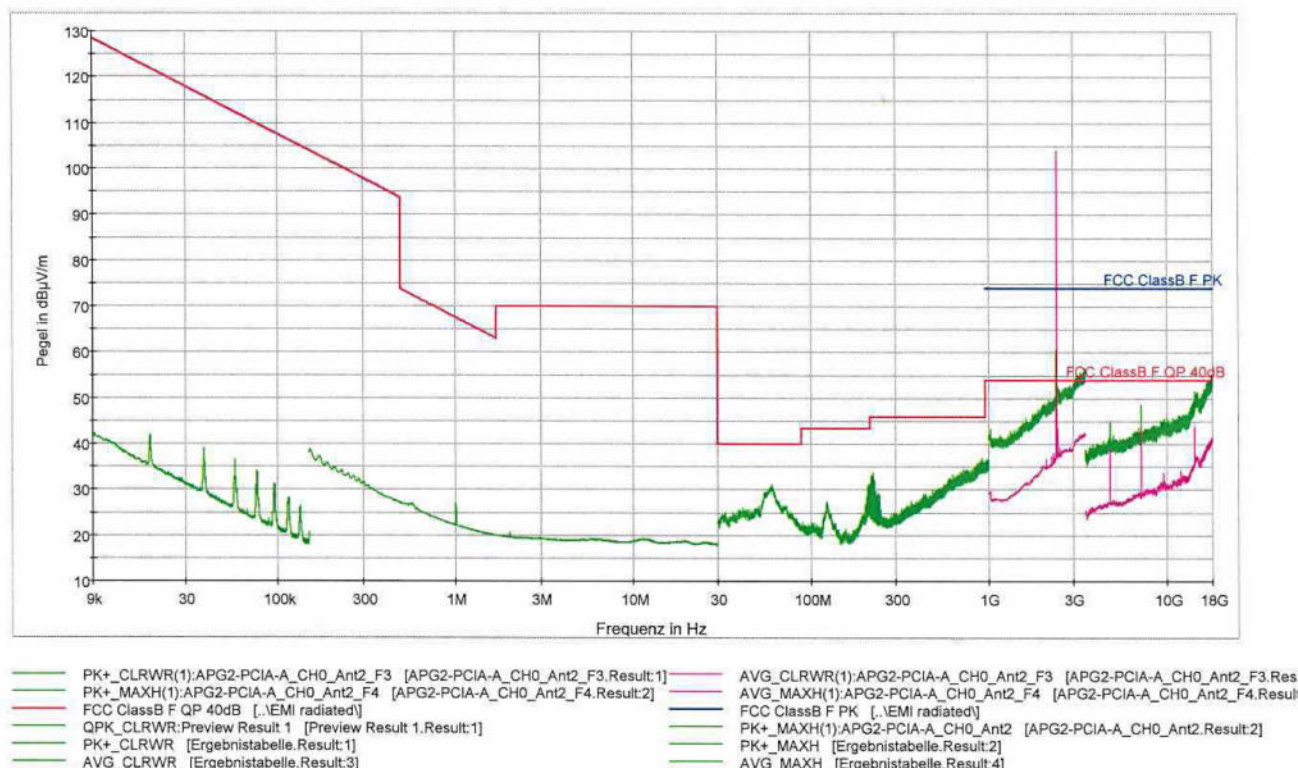
EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-200; NT-416

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Emissions outside 2400 – 2483,5 MHz

§ 15.249 (d) (e)

Channel 0 (2404 MHz) – Antenna 2 – average values above 1 GHz are shown in magenta – green = peak



LIMIT

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1.705–30.0	30	30
30–88	100**	3
88–216	150**	3
216–960	200**	3
Above 960	500	3

Test Equipment used:

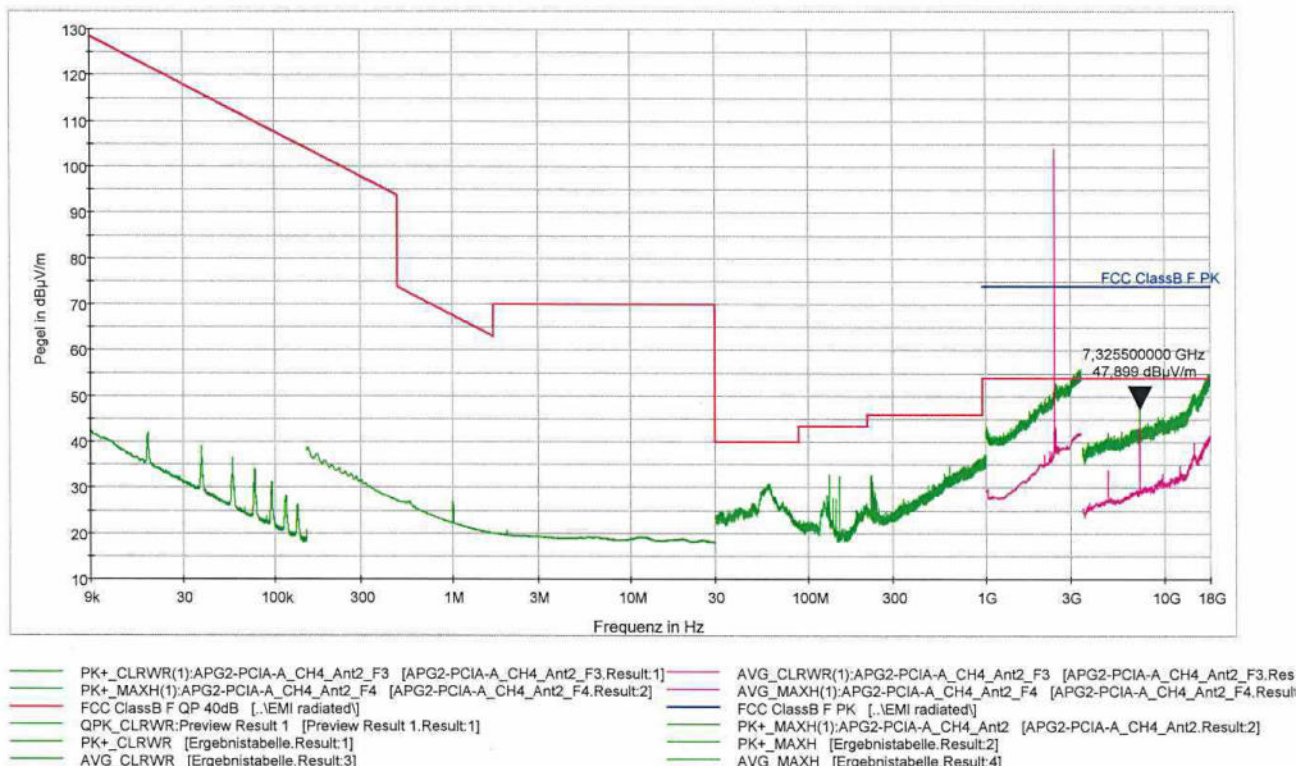
EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-200; NT-416

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§ 15.249 (d) (e)

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1.705–30.0	30	30
30–88	100**	3
88–216	150**	3
216–960	200**	3
Above 960	500	3

Test Equipment used:

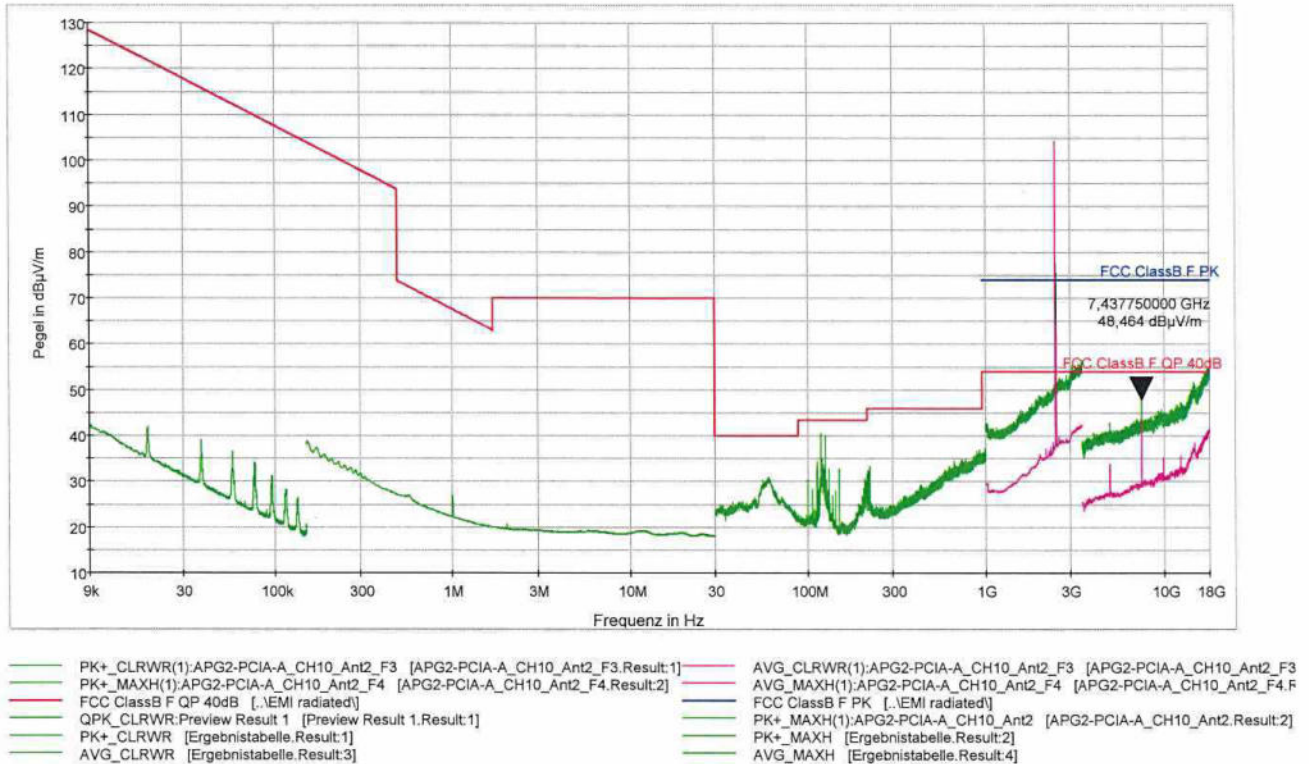
EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-200; NT-416

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Emissions outside 2400 – 2483,5 MHz

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Channel 10 (2479,25 MHz) – Antenna 2 – average values above 1 GHz are shown in magenta – green = peak



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Above 960	500	3

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EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-200; NT-416

Remark: Although the measurements were made up to the 10th harmonic (25 GHz) the frequency range above 18 GHz is not automatized, so no graphs are available. Nevertheless no emissions above noise level were found in the frequency range above 18 GHz.

Appendix 1

Test equipment used

☐ Anechoic Chamber with 3m measurement distance	NT-100	☐ Spectrumalyzer – FSP7 9 kHz – 7 GHz	NT-200
☐ Stripline according to ISO 11452-5	NT-108	☐ ESCI - Test receiver 9 kHz - 7 GHz	NT-203/1
☐ MA4000 - Antenna mast 1 - 4 m height	NT-110/1	☐ ESI26 – Test receiver 20 Hz – 26,5 GHz	NT-207
☐ DS - Turntable 0 - 400 ° Azimuth	NT-111/1	☐ Digital Radio Tester CTS55	NT-208
☐ CO3000 Controller Mast+Turntable	NT-112/1	☐ Noise-gen., ITU-R 559-2 20 Hz – 20 kHz	NT-209
☐ HUF-Z3 - Log. Per. Antenna 200 - 1000 MHz	NT-121	☐ CMTA - Radiocommunication analyzer ; 0,1 - 1000 MHz	NT-210
☐ FMZB1513 - Loop Antenna 9 kHz - 30 MHz	NT-122/1	☐ 3271 - Spectrum analyzer 100 Hz - 26,5 GHz	NT-211
☐ HFH-Z6 - Rod Antenna 9 kHz - 30 MHz	NT-123	☐ Digital Radio Tester Aeroflex 3920	NT-212/1
☐ 3121C - Dipole Antenna 28 - 1000 MHz	NT-124	☐ Mixer M28HW 26,5 GHz - 40 GHz	NT-214
☐ 3115 - Horn Antenna 1 - 18 GHz (immunity)	NT-125	☐ RubiSource T&M Timing reference	NT-216
☐ 3116 - Horn Antenna 18 - 40 GHz	NT-126	☐ Radiocommunicationanalyzer SWR 1180 MD	NT-217
☐ SAS-200/543 - Bicon. Antenna 20 MHz - 300 MHz	NT-127	☐ Mixer M19HWD 40 GHz – 60 GHz	NT-218
☐ AT-1080 - Log. Per. Antenna 80 - 1000 MHz	NT-128	☐ Mixer M12HWD 60 GHz – 90 GHz	NT-219
☐ HK-116 - bicon. Antenna 20 MHz - 300 MHz	NT-129	☐ DSO9104 Digital scope	NT-220/1
☐ HK-116 - bicon. Antenna 20 MHz - 300 MHz	NT-130	☐ TPS 2014 Digital scope	NT-222
☐ 3146 - Log. Per. Antenna 200 – 1000 MHz	NT-131	☐ Artificial Ear according to IEC 60318	NT-224
☐ VULB 9163 Trilog Antenna 30 – 3000 MHz	NT-131/1	☐ 1 kHz Sound calibrator	NT-225
☐ Loop Antenna H-Field	NT-132	☐ B10 - Harmonics and flicker analyzer	NT-232
☐ Horn Antenna 500 MHz - 2900 MHz	NT-133	☐ SRM-3006 Spectrumalyzer	NT-233/1a
☐ Horn Antenna 500 MHz - 6000 MHz	NT-133/1	☐ E-field probe SRM 75 MHz – 3 GHz	NT-234
☐ Log. per. Antenna 800 MHz - 2500 MHz	NT-134	☐ Field Meter NBM-500 incl. E- and H-Field probes	NT-240a-e
☐ Log. per. Antenna 800 MHz - 2500 MHz	NT-135	☐ Hall-Teslameter ETM-1	NT-241
☐ BiConiLog Antenna 26 MHz – 2000 MHz	NT-137	☐ EFA-3 H-field- / E-field probe	NT-243
☐ Conical Dipol Antenna PCD8250	NT-138	☐ EHP-50F H-field- / E-field probe	NT-243/1
☐ HF 906 - Horn Antenna 1 - 18 GHz (emission)	NT-139	☐ Field Meter EMR-200 100 kHz – 3 GHz	NT-244
☐ HZ-1 Antenna tripod	NT-150	☐ E-field probe 100 kHz – 3 GHz	NT-245
☐ BN 1500 Antenna tripod	NT-151	☐ H-field probe 300 kHz – 30 MHz	NT-246
☐ Ant. tripod for EN61000-4-3 Model TP1000A	NT-156		
☐ Power quality analyzer Fluke 1760 (complete set)	NT-160 - NT-173		

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☐ E-field probe 3 MHz – 18 GHz	NT-247	☐ 500W1000M7 - RF-Amplifier 80 - 1000 MHz / 500 W	NT-332
☐ H-field probe 27 MHz – 1 GHz	NT-248	☐ AS0102-65R - RF-Amplifier 1 GHz - 2 GHz	NT-333
☐ ELT-400 1 Hz – 400 kHz	NT-249	☐ APA01 – RF-Amplifier 0,5 GHz – 2,5 GHz	NT-334
☐ MDS 21 - Absorbing clamp 30 - 1000 MHz	NT-250	☐ Preamplifier 1 GHz - 4 GHz	NT-335
☐ FCC-203I EM Injection clamp	NT-251	☐ Preamplifier for GPS MKU 152 A	NT-336
☐ FCC-203I-DCN Ferrite decoupling network	NT-252	☐ Preamplifier 100 MHz – 23 GHz	NT-337
☐ PR50 Current Probe	NT-253	☐ DC Block 10 MHz – 18 GHz Model 8048	NT-338
☐ i310s Current Probe	NT-254/1	☐ 2-97201 Electronic load	NT-341
☐ Fluke 87 V True RMS Multimeter	NT-260	☐ TSX3510P - Power supply 0-30 V / 0 - 10 A	NT-344
☐ Model 2000 Digital Multimeter	NT-261	☐ TSX3510P - Power supply 0-30 V / 0 - 10 A	NT-345
☐ Fluke 87 V Digital Multimeter	NT-262/1	☐ VDS 200 Mobil-impuls-generator	NT-350
☐ ESH2-Z5-U1 Artificial mains network 4x25A	NT-300	☐ LD 200 Mobil-impuls-generator	NT-351
☐ ESH3-Z5-U1 Artificial mains network 2x10A	NT-301	☐ MPG 200 Mobil-Impuls-Generators	NT-352
☐ ESH3-Z6-U1 Artificial mains network 1x100A	NT-302	☐ EFT 200 Mobil-impuls-generator	NT-353
☐ ESH3-Z6-U1 Artificial mains network 1x100A	NT-302a	☐ AN 200 S1 Artificial Network	NT-354
☐ PHE 4500/B Power amplifier	NT-304	☐ FP-EFT 32M 3 ph. Coupling filter (Burst)	NT-400/1
☐ EZ10 T-Artificial Network	NT-305	☐ PHE 4500 - Mains impedance network	NT-401
☐ SMG - Signal generator 0,1 - 1000 MHz	NT-310	☐ IP 6.2 Coupling filter for data lines (Surge)	NT-403
☐ SMA100A - Signal generator 9 kHz - 6 GHz	NT-310/1	☐ TK 9421 High Power Volt. Probe 150 kHz - 30 MHz	NT-409
☐ RefRad Reference generator	NT-312	☐ ESH2-Z3 - Probe 9 kHz - 30 MHz	NT-410
☐ SMP 02 Signal generator 10 MHz - 20 GHz	NT-313	☐ IP 4 - Capacitive clamp (Burst)	NT-411
☐ 40 MHz Arbitrary Generator TGA1241	NT-315	☐ Highpass-Filter 100 MHz – 3 GHz	NT-412
☐ Artificial mains network NSLK 8127-PLC	NT-316	☐ Highpass-Filter 600 MHz – 4 GHz	NT-413
☐ ESD 30 System up to 25 kV	NT-321	☐ Highpass-Filter 1250 MHz – 4 GHz	NT-414
☐ PSURGE 4.1 Surge generator	NT-324	☐ Highpass-Filter 1800 MHz – 16 GHz	NT-415
☐ IMU4000 Immunity test system	NT-325/1		
☐ VCS 500-M6 Surge-Generator	NT-326		
☐ Oscillatory Wave Simulator incl. Coupling networks	NT-328a+b+c		
☐ BTA-250 - RF-Amplifier 9 kHz - 220 MHz / 250 W	NT-330		
☐ T82-50 RF-Amplifier 2 GHz – 8 GHz	NT-331		

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☐ Highpass-Filter 3500 MHz – 18 GHz	NT-416	☐ FCC-801-AF10 Coupling decoupling network	NT-461
☐ RF-Attenuator 10 dB DC – 18 GHz / 50 W	NT-417	☐ FCC-801-S25 Coupling decoupling network	NT-462
☐ RF-Attenuator 6 dB DC – 18 GHz / 50 W	NT-418	☐ FCC-801-T4 Coupling decoupling network	NT-463
☐ RF-Attenuator 3 dB DC – 18 GHz / 50 W	NT-419	☐ FCC-801-C1 Coupling decoupling network	NT-464
☐ RF-Attenuator 20 dB DC - 1000 MHz / 25 W	NT-421	☐ SW 9605 - Current probe 150 kHz – 30 MHz	NT-465/1
☐ RF-Attenuator 30 dB DC - 1000 MHz / 1 W	NT-423	☐ 95242-1 – Current probe 1 MHz – 400 MHz	NT-468
☐ RF-Attenuator 30 dB	NT-424	☐ 94106-1L-1 – Current probe 100 kHz – 450 MHz	NT-471
☐ RF-Attenuator 6 dB DC - 1000 MHz / 1 W	NT-425	☐ GA 1240 Power amplifier according to EN 61000-4-16	NT-480
☐ RF-Attenuator 6 dB DC - 1000 MHz / 1 W	NT-426	☐ Coupling networks according to EN 61000-4-16	NT-481 - NT-483
☐ RF-Attenuator 6 dB	NT-428	☐ Van der Hoofden Test Head	NT-484
☐ RF-Attenuator 0 dB - 81 dB	NT-429	☐ EMC Video/Audiosystem	NT-511/1
☐ WRU 27 - Band blocking 27 MHz	NT-430	☐ ES-K1 Version 1.71 SP2 Test software	NT-520
☐ WHJ450C9 AA - High pass 450 MHz	NT-431	☐ EMC32 Version 10.40.00 Test software	NT-520/1
☐ WHJ250C9 AA - High pass 250 MHz	NT-432	☐ SRM-TS Version 1.3 software for SRM-3000	NT-522
☐ RF-Load 150 W	NT-433	☐ SRM-TS Version 1.3.1 software for SRM-3006	NT-522/1
☐ Impedance transducer 1:4 ; 1:9 ; 1:16	NT-435	☐ Spitzenberger und Spies Test software V4.1	NT-525
☐ RF-Attenuator DC – 18 GHz 6 dB	NT-436	☐ Noise power test apparatus according to EN 55014	NT-530
☐ RF-Attenuator DC – 18 GHz 6 dB	NT-437	☐ Vertical coupling plane (ESD)	NT-531
☐ RF-Attenuator DC – 18 GHz 10 dB	NT-438	☐ Test cable #4 for EN 61000-4-6	NT-553
☐ RF-Attenuator DC – 18 GHz 20 dB	NT-439	☐ Test cable #3 for conducted emission	NT-554
☐ I+P 7780 Directional coupler 100 - 2000 MHz	NT-440	☐ Test cable #5+#6 ESD-cable (2x470k)	NT-555 + NT-556
☐ ESH3-Z2 - Pulse limiter 9 kHz - 30 MHz	NT-441	☐ Test cable #8 Sucoflex 104EA	NT-559
☐ Power Divider 6 dB/1 W/50 Ohm	NT-443	☐ Test cable #9 (for outdoor measurements)	NT-580
☐ Directional coupler 0,1 MHz – 70 MHz	NT-444	☐ Test cable #10 (for outdoor measurements)	NT-581
☐ Directional coupler 0,1 MHz – 70 MHz	NT-445	☐ Test cable #13 Sucoflex 104PE	NT-584
☐ Tube imitations according to EN 55015	NT-450	☐ Test cable #21 for SRM-3000	NT-592
☐ FCC-801-M3-16A Coupling decoupling network	NT-458	☐ Shield chamber	NT-600
☐ FCC-801-M2-50A Coupling decoupling network	NT-459	☐ Climatic chamber	M-1200
☐ FCC-801-M5-25 Coupling decoupling network	NT-460		

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☐	Anechoic Chamber 3 m / 5 m measuring distance	EMV-100	☐	Log.per Antenna 0,7 – 9 GHz STLP9149	EMV-305
☐	Turntabel 6 m diameter	EMV-101	☐	HF- Amplifier 9 kHz-250 MHz BBA150 (low noise)	EMV-306
☐	Antenna mast 1 – 4 m	EMV-102	☐	Load Dump Generator LD 200N	EMV-350
☐	Mast and Turntable controller FC-06	EMV-103	☐	Ultra Compact Symulator UCS 200N100	EMV-351
☐	EMC Video/Audiosystem	EMV-104	☐	Automotive Power fail module PFM 200N100.1	EMV-352
☐	EMC Software EMC32 Version 10.40.00	EMV-105	☐	Voltage Drop Symulator VDS 200Q100	EMV-353
☐	Hornantenna 1 – 18 GHz HF 907	EMV-110	☐	Arb. Generator AutoWave	EMV-354
☐	Antennapre.amp. 1 – 18 GHz ERZ-LNA0200-1800-30-2	EMV-111	☐	Ultra Compact Symulator UCS 500N7	EMV-355
☐	Trilog Antenna 30-3000 MHz VULB9163	EMV-112	☐	Coupling decoupling network CNI 503B7 / 32 A	EMV-356
☐	Monopol 9 kHz – 30 MHz VAMP 9243	EMV-113	☐	Coupling decoupling network CNI 503B7 / 63 A	EMV-357
☐	Antennapre.amp 18 – 40 GHz BBV 9721	EMV-114	☐	Telecom Surge Generator TSurge 7	EMV-358
☐	Hornantenna 200 – 2000 MHz AH-220	EMV-110	☐	Coupling decoupling network CNI 508N2	EMV-359
☐	DC Artificial Network PVDC 8300	EMV-150	☐	Coupling decoupling network CNV 504N2.2	EMV-360
☐	AC Artificial Network NNLK 8121 RC	EMV-151	☐	Immunity generator NSG4060/NSG4060-1	EMV-361
☐	EMI Receiver ESR26	EMV-200	☐	Coupling network CDND M316-2	EMV-362
☐	Signalgenerator 9 kHz – 40 GHz N5173B	EMV-201	☐	Coupling network CT419-5	EMV-363
☐	GPS Frequency normal B-88	EMV-202	☐	ESD Generator NSG 437	EMV-364
☐	DC Power supply N5745A	EMV-203	☐	Pulse Limiter VTSD 9561-F BNC	EMV-405
☐	Spektrum Analyzator FSV40	EMV-205	☐	Transient emission BSM200N40+BS200N100	EMV-450+451
☐	Thd Multimeter Model 2015	EMV-206	☐	Cap. Coupling Clamp HFK	EMV-455
☐	Poweramplifier PAS15000	EMV-207/abc	☐	Mag. Field System MS100N+MC26100+MC2630	EMV-456-458
☐	Inrush Current Source	EMV-208/abc	☐	Coupling network CDN M2-100A	EMV-459
☐	Arb.-generator Sycore	EMV-209	☐	Coupling network CDN M3-32A	EMV-460
☐	Harmonics/Flicker analyzer ARS 16/3	EMV-210	☐	Coupling network CDN M5-100A	EMV-461
☐	HF- Amplifier 9 kHz-250 MHz BBA150	EMV-300	☐	Current Clamp CIP 9136A	EMV-462
☐	HF- Amplifier 80 -1000 MHz BBA150	EMV-301	☐	DC Artificial Network HV-AN 150	EMV-464+465
☐	HF- Amplifier 0,8 - 6 GHz BBA150	EMV-302	☐	Coupling Clamp EM 101	EMV-466
☐	High Power Ant. 20-200 MHz VHBD 9134	EMV-303	☐	Decoupling Clamp FTC 101	EMV-467
☐	Log.per Antenna 80-2700 MHz STLP 9128 E special	EMV-304	☐	Power attenuator 10 dB / 250 Watt	EMV-469/2

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