

TEST REPORT

of the accredited test laboratory

TÜV Nr.:M/FG-15/121

Applicant:

AKG Acoustics GmbH

Laxenburger Straße 254

A - 1230 Wien

Tested Product:

Body-worn wireless microphone transmitter

FCC-ID:

V3TPT45

IC-ID:

N/A

Manufacturer:

AKG Acoustics GmbH Laxenburger Straße 254

A - 1230 Wien

Output power:

10mW erp

power supply:

1.5 VDC

Frequency range:

530 - 560 MHz

Channel separation:

25 kHz

"Band A"

ITU designator:

116KF3E

200 kHz Declared channel bandwidth:

Standard:

FCC: 47 CFR Part 74 (October 1, 2014 edition)

RSS-123 Issue 2, February, 2011

TÜV AUSTRIA SERVICES GMBH Test laboratory for EMC

Supervisor of EMC-laboratory:

Ing. Wilhelm Seier

Rundsiegel

16.01.2015

Copy Nbr.:

checked by:

Ing. Michael Emminger

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

16.01.2015

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Firmenbuchgericht/ -nummer: Wien / FN 288476 f

Bankverbindungen: UC BA 52949 001 066 IBAN AT131200052949001066 **BIC BKAUATWW** RZB 001-04.093.282 **IBAN** AT153100000104093282 **BIC RZBAATWW**

UID ATU63240488 DVR 3002476

Relative humidity: 32%



LIST OF MEASUREMENTS

The complete list of measurements called for in 47 CFR 74 and RSS-123 is given below.

SUBCLAUSE	PARAMETER TO BE MEASURED	PAGE
	Intentional Radiators	
	Test object data	3
74.861(e)(1) (6.2)	RF Power Output (erp)	4
74.861(e)(4) (7)	Frequency tolerance	
74.861(e)(5) (6.3)	Operating bandwidth	5-8
74.861(e)(6) (6.3)	Emission mask	5-8
74.861(e)(6)(iii) (6.3)	Spurious emissions	9-11

Relative humidity: 32%



TEST OBJECT DATA

General EUT Description

This audio transmitter will be used as a handheld wireless microphone. It has no antenna connector, so all technical data were measured radiated.

- 2.1033 (c) Technical description
- 2.1033 (4) Type of emission: 116KF3E Channel spacing selectable 25 kHz.
- 2.1033 (5) Frequency range selectable: 530 560 MHz
- 2.1033 (6) Power range and Controls: The output power is fixed to 10 mW.
- 2.1033 (7) Maximum output power rating: 10mW erp.
- 2.1033 (8) DC Voltage and Current: 1,5 V nominal 1V minimum (1 AA Cell)
 maximum current consumption: 190 mA
- 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

This test report is issued because of some changes in the RF circuitry. As there were no changes in the frequency determining circuitry no frequency tolerance measurements were performed. The operating bandwidth and emission mask measurements were performed only with that modulation frequency which resulted in the highest emission bandwidth during testing of original equipment.

Tests were performed Jan 12th 2015.

Relative humidity: 32%



Power Output

§ 74.261(e)(1) (6.2)

Radiated Measurement

Rated output power: 10 mW

Test conditions		Transmitter power (mW) (erp)				
		530,025 MHz	546,775 MHz	559,0 MHz		
T _{nom} (23)°C		6,37	10,81	9,12		
Maximum deviation from rated output power under normal test conditions (dB)		-1,96	+0,34	-0,40		
Measurement uncertainty			<u>+</u> 0,75 dB			

LIMIT

SUBCLAUSE 74.261 (e)(1)(ii) (Table 1 of RSS-123)

Under normal test conditons	250 mW

Test Equipment used: NT-100; NT-110; NT-111; NT-112; NT-125; NT-126; NT-150; NT-207; NT-500; NT-520; NT-550

Ambient temperature: 23°C Relative humidity: 32%

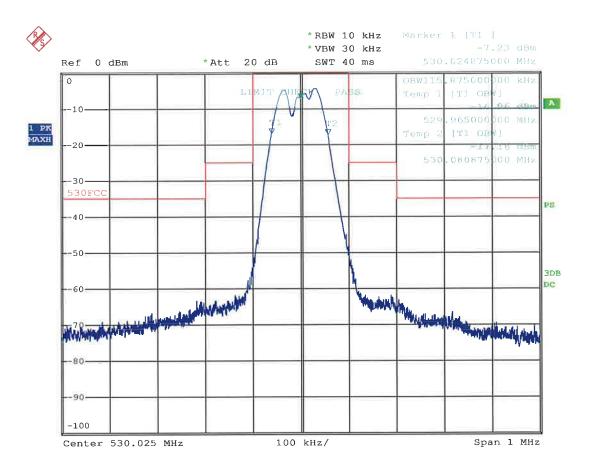
TŪV

OPERATING BANDWIDTH / EMISSION MASK

§ 74.261 (e)(5) (6.3)

The operating Bandwidth was measured at an acoustic input level 16 dB higher than that required for half of the maximum linear input level.

Measurement with audio frequency 7,5 kHz @ 530,025 MHz



Date: 12.JAN.2015 12:27:13

Measured 99% power Bandwidth: 115,875kHz

LIMIT

SUBCLAUSE 74.261 (e)(5) (Table 1 RSS-123)

The operating bandwidth shall not exceed 200 kHz.

TEST EQUIPMENT USED: NT-207

Relative humidity: 32%

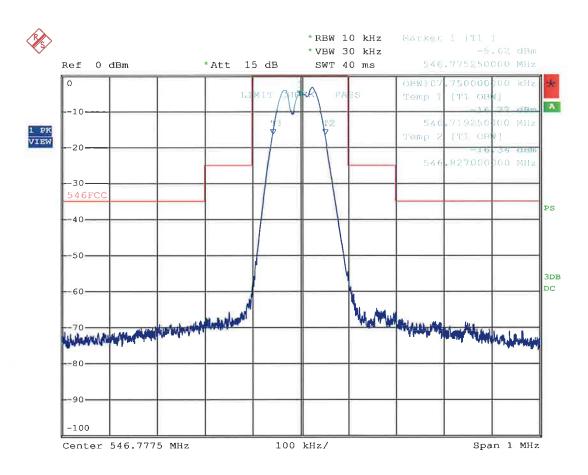


OPERATING BANDWIDTH / EMISSION MASK

§ 74.261 (e)(5) (6.3)

The operating Bandwidth was measured at an acoustic input level 16 dB higher than that required for half of the maximum linear input level.

Measurement with audio frequency 7,5 kHz @ 546,775 MHz



Date: 12.JAN.2015 11:49:32

Measured 99% power Bandwidth: 107,75kHz

LIMIT

SUBCLAUSE 74.261 (e)(5) (Table 1 RSS-123)

The operating bandwidth shall not exceed 200 kHz.

TEST EQUIPMENT USED: NT-207

Ambient temperature: 23°C Relative humidity: 32%

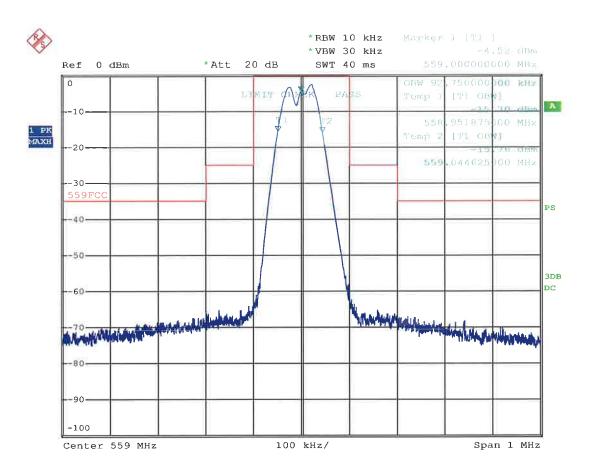
TUV

OPERATING BANDWIDTH / EMISSION MASK

§ 74.261 (e)(5) (6.3)

The operating Bandwidth was measured at an acoustic input level 16 dB higher than that required for half of the maximum linear input level.

Measurement with audio frequency 7,5 kHz @ 559,0 MHz



Date: 12.JAN.2015 12:15:07

Measured 99% power Bandwidth: 92,75kHz

LIMIT SUBCLAUSE 74.261 (e)(5) (Table 1 RSS-123)

The operating bandwidth shall not exceed 200 kHz.

TEST EQUIPMENT USED: NT-207

Relative humidity: 32%



Emissions Mask

§ 74.261 (e)(6) (6.3)

LIMIT

74.261(e)(6)

The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

- (i) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25dB;
- (ii) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35dB;
- (iii) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least 43+10log₁₀ (mean output power in watts) dB.

In deviation to above (iii) RSS-123 6.3.1 (3) requires: at least 55 + 10 Log10(TP) dB, in any 30 kHz band removed from the centre of the authorized bandwidth by more than 250% of the authorized bandwidth. The search for unwanted emissions shall be from the lowest frequency internally generated or used in the device (local oscillator, intermediate or carrier frequency), or 500 kHz below its lowest assignable frequency, whichever is the lowest frequency, to the 5th harmonic of the

highest frequency generated or used, without exceeding 23 GHz.

All plots were normalised so that 0 dB is equal to the mean output power measured in a bandwidth equal to 5 times the nominal bandwidth of the emission.

Relative humidity: 32%



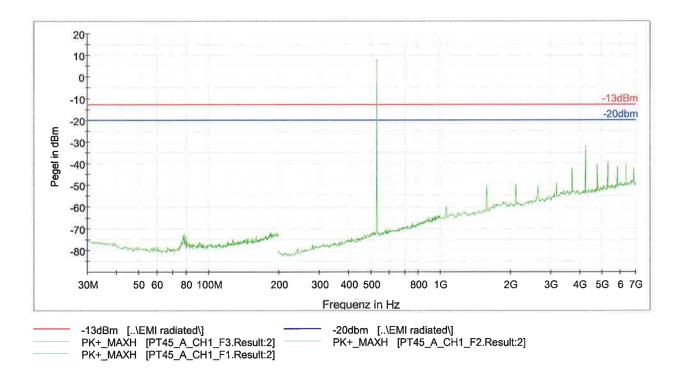
Field strength of spurious emissions of the transmitter

§ 74.261 (e)(6)(iii) (6.3)

Operating mode:

Frequency: 530,025 MHz

Modulation: unmodulated carrier



Test Equipment used: NT-100; NT-110; NT-111; NT-112; NT-125; NT-129; NT-139; NT-207; NT-337

Relative humidity: 32%



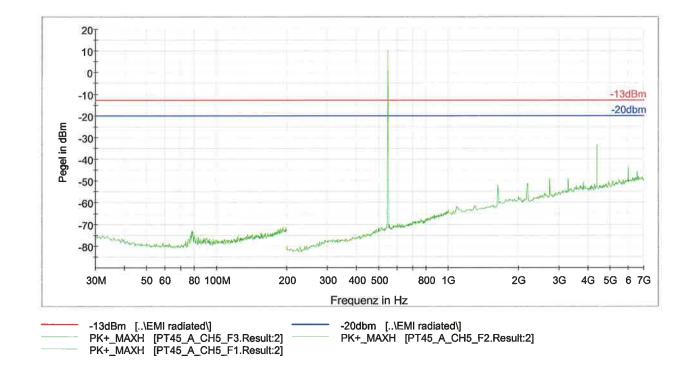
Field strength of spurious emissions of the transmitter

§ 74.261 (e)(6)(iii) (6.3)

Operating mode:

Frequency: 546,775 MHz

Modulation: unmodulated carrier



Test Equipment used: NT-100; NT-110; NT-111; NT-112; NT-125; NT-129; NT-139; NT-207; NT-337

Relative humidity: 32%



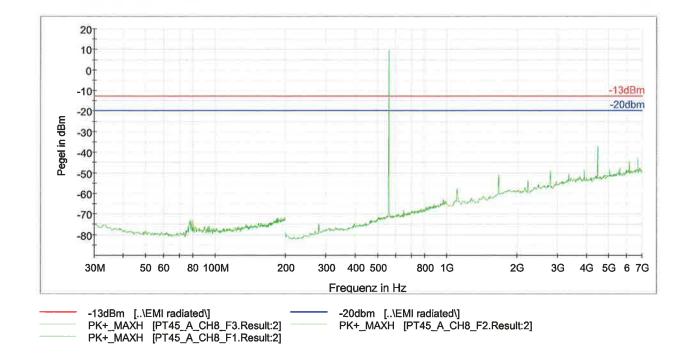
Field strength of spurious emissions of the transmitter

§ 74.261 (e)(6)(iii) (6.3)

Operating mode:

Frequency: 559,0 MHz

Modulation: unmodulated carrier



Test Equipment used: NT-100; NT-110; NT-111; NT-112; NT-125; NT-129; NT-139; NT-207; NT-337

Appendix 1 Test equipment used



	Anechoic Chamber with 3m measurement distance	NT-100	Spectrumanalyzer – 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
	HFH-Z2 - Loop Antenna 9 kHz - 30 MHz	NT-122	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
	Loop Antenna H-Field	NT-132	1 kHz Sound calibrator	NT-225
	Horn Antenna 500 MHz - 2900 MHz	NT-133	B10 - Harmonics and flicker analyzer	NT-232
	Horn Antenna 500 MHz - 6000 MHz	NT-133/1	ARS 16/3 – Harmonics- flicker analyzer	NT-232/1
	Log. per. Antenna 800 MHz - 2500 MHz	NT-134	SRM-3000 Spectrumanalyzer	NT-233
	Log. per. Antenna 800 MHz - 2500 MHz	NT-135	SRM-3006 Spectrumanalyzer	NT-233/1a
	BiConiLog Antenna 26 MHz – 2000 MHz	NT-137	E-field probe SRM 75 MHz – 3 GHz	NT-234
	Conical Dipol Antenna PCD8250	NT-138	Field Meter NBM-500 incl. E- and H-Field probes	NT-240a-d
	HF 906 - Horn Antenna 1 - 18 GHz (emission)	NT-139	Hall-Teslameter ETM-1	NT-241
	HZ-1 Antenna tripod	NT-150	EFA-3 H-field- / E-field probe	NT-243
	BN 1500 Antenna tripod	NT-151	Field Meter EMR-200 100 kHz – 3 GHz	NT-244
	Ant. tripod for EN61000-4-3 Model TP1000A	NT-156	E-field probe 100 kHz – 3 GHz	NT-245
	Power quality analyzer Fluke 1760 (complete set)	NT-160 - NT-173	H-field probe 300 kHz – 30 MHz	NT-246

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Appendix 1 (continued) Test equipment used

Immunity test system



E-field probe 3 MHz – 18 GHz	NT-247	VCS 500-M6 Surge-Generator	NT-326	[
H-field probe 27 MHz – 1 GHz	NT-248	Oscillatory Wave Simulator incl. Coupling networks	NT- 328a+b+c	7
ELT-400 1 Hz – 400 kHz	NT-249	BTA-250 - RF-Amplifier 9 kHz - 220 MHz / 250 W	NT-330	[
MDS 21 - Absorbing clamp 30 - 1000 MHz	NT-250	T82-50 RF-Amplifier 2 GHz – 8 GHz	NT-331	٦ ١
FCC-203I EM Injection clamp	NT-251	500W1000M7 - RF-Amplifier 80 - 1000 MHz / 500 W	NT-332	F
FCC-203I-DCN Ferrite decoupling network	NT-252	AS0102-65R - RF-Amplifier 1 GHz - 2 GHz	NT-333	
PR50 Current Probe	NT-253	APA01 – RF-Amplifier 0,5 GHz – 2,5 GHz	NT-334	(
i310s Current Probe	NT-254/1	Preamplifier 1 GHz - 4 GHz	NT-335	
Fluke 87 V True RMS Multimeter	NT-260	Preamplifier for GPS MKU 152 A	NT-336	
Model 2000 Digital Multimeter	NT-261	Preamplifier 100 MHz – 23 GHz	NT-337	
Fluke 87 V Digital Multimeter	NT-262/1	DC Block 10 MHz – 18 GHz Model 8048	NT-338	
ESH2-Z5-U1 Artificial mains network 4x25A	NT-300	2-97201 Electronic load	NT-341	
ESH3-Z5-U1 Artificial mains network 2x10A	NT-301	TSX3510P - Power supply 0-30 V / 0 - 10 A	NT-344	
ESH3-Z6-U1 Artificial mains network 1x100A	NT-302	TSX3510P - Power supply 0-30 V / 0 - 10 A	NT-345	
ESH3-Z6-U1 Artificial mains network 1x100A	NT-302a	VDS 200 Mobil-impuls-generator	NT-350	
PHE 4500/B Power amplifier	NT-304	LD 200 Mobil-impuls-generator	NT-351	
PAS 5000 Power amplifier	NT- 304/1a	MPG 200 Mobil-Impuls-Generators	NT-352	
EZ10 T-Artificial Network	NT-305	EFT 200 Mobil-impuls-generator	NT-353	
SMG - Signal generator 0,1 - 1000 MHz	NT-310	AN 200 S1 Artificial Network	NT-354	
SMA100A - Signal generator 9 kHz - 6 GHz	NT-310/1	FP-EFT 32M 3 ph. Coupling filter (Burst)	NT-400/1	
RefRad Reference generator	NT-312	PHE 4500 - Mains impedance network	NT-401	
SMP 02 Signal generator 10 MHz - 20 GHz	NT-313	IP 6.2 Coupling filter for data lines (Surge)	NT-403	
40 MHz Arbitrary Generator TGA1241	NT-315	TK 9421 High Power Volt. Probe 150 kHz - 30 MHz	NT-409	
Artificial mains network NSLK 8127-PLC	NT-316	ESH2-Z3 - Probe 9 kHz - 30 MHz	NT-410	
Inrush Current Source for PAS 5000	NT-317a	IP 4 - Capacitive clamp (Burst)	NT-411	
Control and measurement device Sycore	NT-318	Highpass-Filter 100 MHz – 3 GHz	NT-412	
PEFT - Burst generator up to 4 kV	NT-320	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	
TRANSIENT 1000	NT-325			

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Appendix 1 (continued) Test equipment used

Coupling decoupling network



Division Medical

	Highpass-Filter	NT-416	П	FCC-801-S25	NT-462	Technology/ Communication	
	3500 MHz – 18 GHz		_	Coupling decoupling network		Technology/ EMC	
Ш	RF-Attenuator 10 dB DC – 18 GHz / 50 W	NT-417		FCC-801-T4 Coupling decoupling network	NT-463	Department: FG	
	RF-Attenuator 6 dB DC – 18 GHz / 50 W	NT-418		FCC-801-C1 Coupling decoupling network	NT-464	Test report number: M/FG-15/121	
	RF-Attenuator 3 dB DC 18 GHz / 50 W	NT-419		F-16A - Current probe 1kHz - 70MHz	NT-465	Page: 3 of 3	
	RF-Attenuator 20 dB DC - 1000 MHz / 25 W	NT-421		95242-1 – Current probe 1 MHz – 400 MHz	NT-468	Date: 16.01.2015	
	RF-Attenuator 30 dB DC - 1000 MHz / 1 W	NT-423		94106-1L-1 – Current probe 100 kHz – 450 MHz	NT-471	Checked by:	
	RF-Attenuator 30 dB	NT-424		GA 1240 Power amplifier according to EN 61000-4-16	NT-480		
	RF-Attenuator 6 dB DC - 1000 MHz / 1 W	NT-425		Coupling networks according to EN 61000-4-16	NT-481 - NT-483		
	RF-Attenuator 6 dB DC - 1000 MHz / 1 W	NT-426		Van der Hoofden Test Head	NT-484		
	RF-Attenuator 6 dB	NT-428		PC P4 3 GHz Test computer	NT-500		
	RF-Attenuator 0 dB - 81 dB	NT-429		PC P4 1700 MHz Notebook	NT-505		
	WRU 27 - Band blocking 27 MHz	NT-430		Monitoring camera with Monitor	NT-511	ð	
	WHJ450C9 AA - High pass 450 MHz	NT-431		ES-K1 Version 1.71 SP2 Test software	NT-520		
	WHJ250C9 AA - High pass 250 MHz	NT-432		EMC32 Version 9.15 Test software	NT-520/1		
	RF-Load 150 W	NT-433		SRM-TS Version 1.3 software for SRM-3000	NT-522		
	Impedance transducer 1:4; 1:9; 1:16	NT-435		SRM-TS Version 1.3.1 software for SRM-3006	NT-522/1		
	RF-Attenuator DC – 18 GHz 6 dB	NT-436		Spitzenberger und Spies Test software V3.4	NT-525		
	RF-Attenuator DC – 18 GHz 6 dB	NT-437		Noise power test apparatus according to EN 55014	NT-530		
	RF-Attenuator DC – 18 GHz 10 dB	NT-438		Vertical coupling plane (ESD)	NT-531		
	RF-Attenuator DC – 18 GHz 20 dB	NT-439		Test cable #4 for EN 61000-4-6	NT-553		
	I+P 7780 Directional coupler 100 - 2000 MHz	NT-440		Test cable #3 for conducted emission	NT-554		
	ESH3-Z2 - Pulse limiter 9 kHz - 30 MHz	NT-441		Test cable #5+#6 ESD-cable (2x470k)	NT-555 + NT-556		
	Power Divider 6 dB/1 W/50 Ohm	NT-443		Test cable #8 Sucoflex 104EA	NT-559		
	Directional coupler 0,1 MHz – 70 MHz	NT-444		Test cable #9 (for outdoor measurements)	NT-580		
	Directional coupler 0,1 MHz – 70 MHz	NT-445		Test cable #10 (for outdoor measurements)	NT-581		
	Tube imitations according to EN 55015	NT-450		Test cable #13 Sucoflex 104PE	NT-584		
	FCC-801-M3-16A Coupling decoupling network	NT-458		Test cable #21 for SRM-3000	NT-592		
	FCC-801-M2-50A Coupling decoupling network	NT-459		Shield chamber	NT-600		
	FCC-801-M5-25 Coupling decoupling network	NT-460		Climatic chamber	M-1200		
	FCC-801-AF10	NT-461					



Description: Front view



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Description: Backside view including label



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Description: Battery compartment opened

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Description: Case opened

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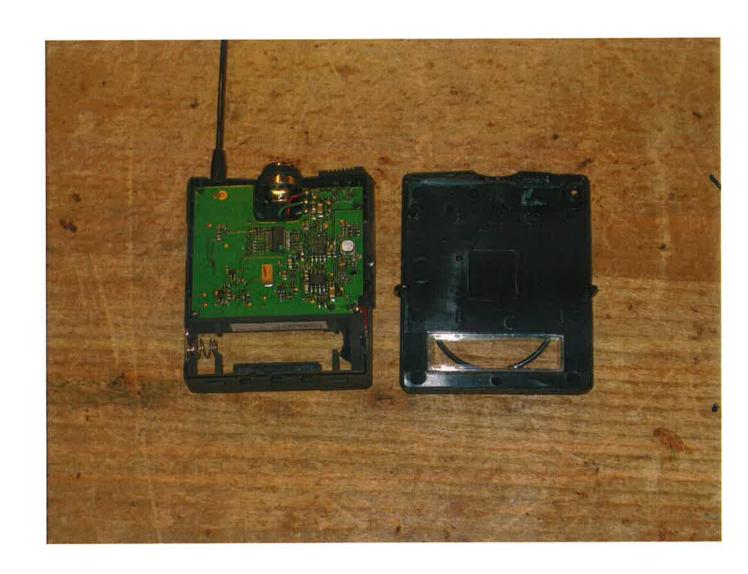
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Description: Inside view

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Description: RF screening detached

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Description: Test setup



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