





# EMC - TEST REPORT

Test Report No.: E33047-00-00NL O4. November 2008

Date of issue

Type / Model Name : HCP Best

**Product Description**: Cash register with integrated GPRS terminal

**Applicant**: HCP D.O.O.

Address : Mirka Tomića, Pasaž

37000 Kreševac, Serbia

Manufacturer : HCP D.O.O.

Address : Mirka Tomića, Pasaž

37000 Kreševac, Serbia

**Test Result** according to the standards listed in clause 1 test standards:

## **POSITIVE**



The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.



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# 1 TEST STANDARDS

The tests were performed according to following standards: EMC emission: EN 55022 : 2006+ A1:2007 ☐ Class A CISPR 22 (modified) : 2005  $\boxtimes$ EN 55024 : 1998 +A1: 2001 + A2: 2003 CISPR 24 (modified) : 1997 +A1: 2001 + A2: 2002 The standard above refers to following basic standards: 図 EN 61000-4-2 : 1995 + A1: 1998 + A2: 2001 IEC 61000-4-2 : 1995 + A1: 1998 + A2: 2000 *"*12" Electrostatic discharge immunity test (ESD) X EN 61000-4-3 : 1996 + A1: 1998 + A2: 2001 : 1996 + A1: 1998 + A2: 2001 IEC 61000-4-3 "13" Radiated, radio-frequency, electromagnetic field immunity test ⋈ EN 61000-4-4 : 1995 + A1: 2001 + A2: 2001 IEC 61000-4-4 : 1995 + A1: 2000 + A2: 2001 "14" Electrical fast transient / burst immunity test (BURST) X EN 61000-4-5 : 1995 + A1: 2001 IEC 61000-4-5 : 1995 + A1: 2000 "15" Surge immunity test (Surge) X EN 61000-4-6 : 1996 + A1: 2001 IEC 61000-4-6 : 1996 + A1: 2000 Immunity to conducted disturbances, induced by radio-frequency fields "16" : 1993 + A1: 2001 : 1993 + A1: 2000 IEC 61000-4-8 Power frequency magnetic field immunity test "18" : 1994 + A1: 2001 X EN 61000-4-11 : 1994 + A1: 2001 IEC 61000-4-11 Voltage dips, short interruptions and voltage variations immunity test "111" X EN301489-7 V1.3.1 :2005 Parly



# 2 SUMMARY

#### 2.1 General remarks

None

# 2.2 Summary for all EMC tests

	Type of test		Test result
EMC e	emission:	<b> </b>	
A4	Conducted emissions (AC mains power / DC power	)	Fulfilled
A5	Radiated emissions		Fulfilled
Immur	nity:		Performance criteria
12	Electrostatic discharge (ESD)	Fulfilled	Α
I3	Radio frequency electromagnetic field	Fulfilled	A
14	Fast transients, common mode (BURST)	Fulfilled	A
15	Surges	Fulfilled	A
16	Radio frequency, common mode	Fulfilled	A
18	Power frequency magnetic field	Fulfilled	A
l11	Voltage dips and interruptions		Not Applicable
l11	Short interruptions	/	Not Applicable

# 2.3 Final assessment

Date of receipt of test sample	:	acc. to storage records			
Testing commenced on	:	29. October 2008			
Testing concluded on	:	30. October 2008			
Checked by:			Teste	d by:	
Harald Buchwald Dipl. Ing.(FH) Manager: EMC				Norbert Lange	



# 3 EQUIPMENT UNDER TEST

## 3.1 Power supply system utilised

,	
Power supply voltage : 24 V DC	
3.2 Short description of the Equipment un	nder Test (EuT)
Cash register for retail stores with integrated GPRS Term	ninal for remote administration.
Number of tested samples: 1 Serial number: 000001	
Essential Performance of the EuT based on	customer definition:
No data errors	
EuT operation mode:	
The equipment under test was operated during the measurement and the measurement are the second and the second are the second and the second are the second	urement under the following conditions:
- continuous display data and transmit signal	
EuT monitoring:	
The equipment under test was monitored during the mea	surement by following method:
Controlled was the display and the GPRS communication	n.
<b>EuT configuration:</b> (The CDF filled by the applicant can be viewed at the tes	t laboratory.)
The following peripheral devices and interface cables	s were connected during the measurements:
- none Mo	del :
- <u>Mo</u>	del :
- unscreened power cables	
Modifications during the EMC test:	None



## 3.3 Performance level

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance level defined by its manufacturer or the requestor of the test, or agreed between the manufacturer and the purchaser of the product.

Definition related to the performance level:
<ul><li></li></ul>
<u>Criterion A:</u> Definition: normal performance within limits specified by the manufacturer, requestor or purchaser:
No data errors
Criterion B:  Definition: temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention:  none
Criterion C: Definition: temporary loss of function or degradation of performance, the correction of which requires operator intervention:
none
<u>Criterion D:</u> Definition: loss of function or degradation of performance, which is not recoverable, owing to damage to hardware or software, or loss of data:
none



# TEST ENVIRONMENT

#### 4.1 Address of the test laboratory

mikes-testingpartners gmbh **Ohmstrasse 2-4** 94342 STRASSKIRCHEN **GERMANY** 

#### Representative of the applicant during measurements 4.2

Mr. Mijajlovic and Mr. Vraštić was present at all times during the EMC assessment testing. He also participated in the performance assessment of the device with regard to the ESSENTIAL PERFORMANCE.

#### 4.3 **Environmental conditions**

During the measurement the environmental conditions were within the listed ranges:

86-106 kPa

15-35 ° C Temperature: Humidity: 30-60 % Atmospheric pressure:

#### 4.4 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16-4-2 /11.2003 "Uncertainties, statistics and limit modelling - Uncertainty in EMC measurements" and is documented in the quality system acc. to DIN EN ISO/IEC 17025. For all measurements shown in this report, the measurement uncertainty of the test laboratory, mikestestingpartners gmbh, is below the measurement uncertainty as defined by CISPR. Therefore, no special measures must be taken into consideration with regard to the limits according to CISPR.

Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.



# 5 TEST CONDITIONS AND RESULTS

#### 5.1 Conducted disturbance

For test instruments and accessories used see section 6 Part A 4.

## **Legend for tables**:

QP-L ... QuasiPeak reading including correction factor AV-L ... Average reading including correction factor D-Limit... Measured value to limit delta (margin)

#### 5.1.1 Description of the test location

Test location: Shielded Room S2

#### 5.1.2 Photo documentation of the test set-up



### 5.1.3 Test result

Frequency range:	0.15 MHZ - 30 MHZ

Min. limit margin >5 dB

The requirements are **FULFILLED**.

Remarks:	Notice



#### 5.1.4 Test protocol

Test point: Plus Result: passed

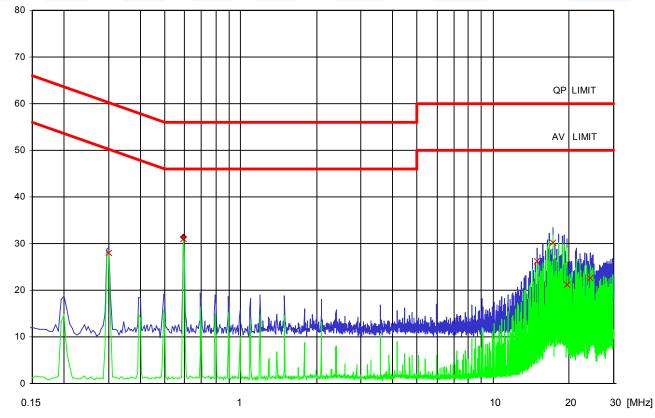
Operation mode: continuous display data

Remarks: none
Date: 29.10.2008
Tested by: Norbert Lange

_					
Freq	QP-L	D -Limit	Freq	AV-L	D -Limit
kHz	dΒ[μV]	QP [dB]	kHz	dΒ[μV]	AV [dB]
595	31,4	24,6	300	28	22,2
			595	31	15,0
			14915	26,2	23,8
			17300	30,2	19,8
			19685	21,2	28,8
			24350	22,6	27,4
	7				

Freq	QP- L	D -Limit	Freq	AV-L	D -Limit
kHz	dΒ[μV]	QP [dB]	kHz	dB[μV]	AV [dB]
	8			//	3-2-

dB [ $\mu$ V] Legend PK: — AV: — Detector: QP:  $\blacklozenge$  AV:  $\times$ 



mikes-testingpartners gmbh Ohmstrasse 2-4  $\cdot$  94342 STRASSKIRCHEN  $\cdot$  GERMANY Tel.:+49(0)9424-94810  $\cdot$  Fax:+49(0)9424-9481240

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Test point: Minus

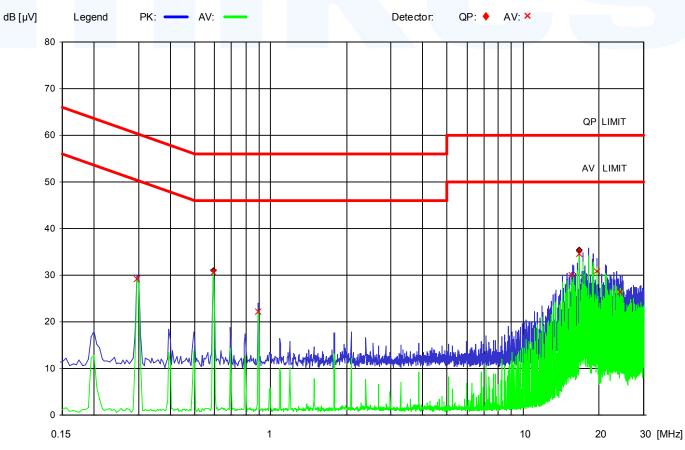
Operation mode: continuous display data

Remarks: none
Date: 29.10.2008
Tested by: Norbert Lange

F	00.1	D 111	F	A) / I	D 11
Freq	QP-L	D -Limit	Freq	AV-L	D -Limit
kHz	dΒ[μV]	QP [dB]	kHz	dB[μV]	AV [dB]
595	31,1	24,9	295	29,2	21,2
16685	35,4	24,6	595	30,6	15,4
			895	22,2	23,8
			15595	30,1	19,9
			16685	34,6	15,4
			19665	30,9	19,1
			24330	26,4	23,6
			·		
		70			

Freq	QP- L	D -Limit	Freq	AV-L	D -Limit
kHz	dΒ[μV]	QP [dB]	kHz	dB[µV]	AV [dB]
100					
		1//			
		1/4	777		

Result: passed



mikes-testingpartners gmbh Ohmstrasse 2-4 · 94342 STRASSKIRCHEN · GERMANY Tel.:+49(0)9424-94810 · Fax:+49(0)9424-9481240

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### 5.2 Radiated disturbance (electric field)

For test instruments and accessories used see section 6 Part A 5.

#### Legend for tables:

Level vert. QuasiPeak reading including correction factor with vertical polarization of the antenna Level hor. QuasiPeak reading including correction factor with horizontal polarization of the antenna

Limit Limit of the appropriate standard
DLimit... Measured value to limit delta (margin)

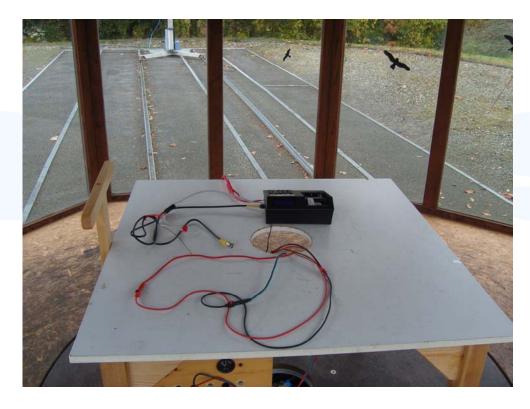
Noise Characteristic of disturbance (narrowband or broadband)

#### 5.2.1 Description of the test location

Test location: OATS 2

Test distance: 10 metres

#### 5.2.2 Photo documentation of the test set-up



#### 5.2.3 Test result

Frequency range: 30 MHz - 1000 MHz

Min. limit margin >5 dB

The requirements are **FULFILLED**.

Remarks: None



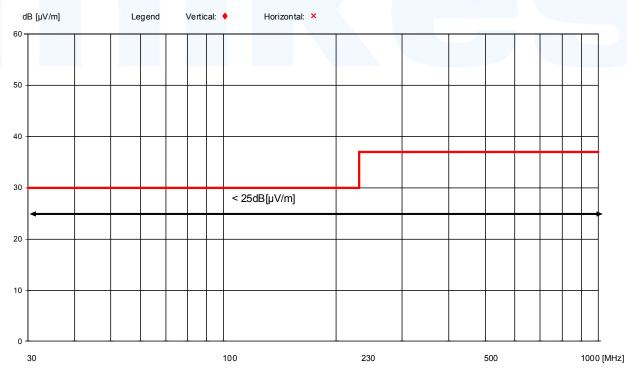
#### 5.2.4 Test protocol

Operation mode: continuous display data Result: passed

Remarks: none
Date: 29.10.2008
Tested by: Norbert Lange

F	Martinal	l law-a-tal	D 1 : #	Maine
Frequency	Vertical	Horizontal	D -Limit	Noise
MHz	dB[μV/m]	dB[μV/m]		
30-1000	< 25	< 25		
	6			
	7			

Frequency	Vertical	Horizontal	D -Limit	Noise
MHz	dB[μV/m]	dB[μV/m]		
1397				6
				1997
100				





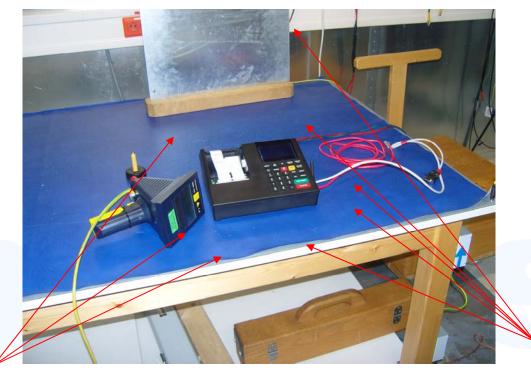
# 5.3 Electrostatic discharge

For test instruments and accessories used see section 6 Part I 2.

#### 5.3.1 Description of the test location

Test location: Shielded Room S3

#### 5.3.2 Photo documentation of the test set-up

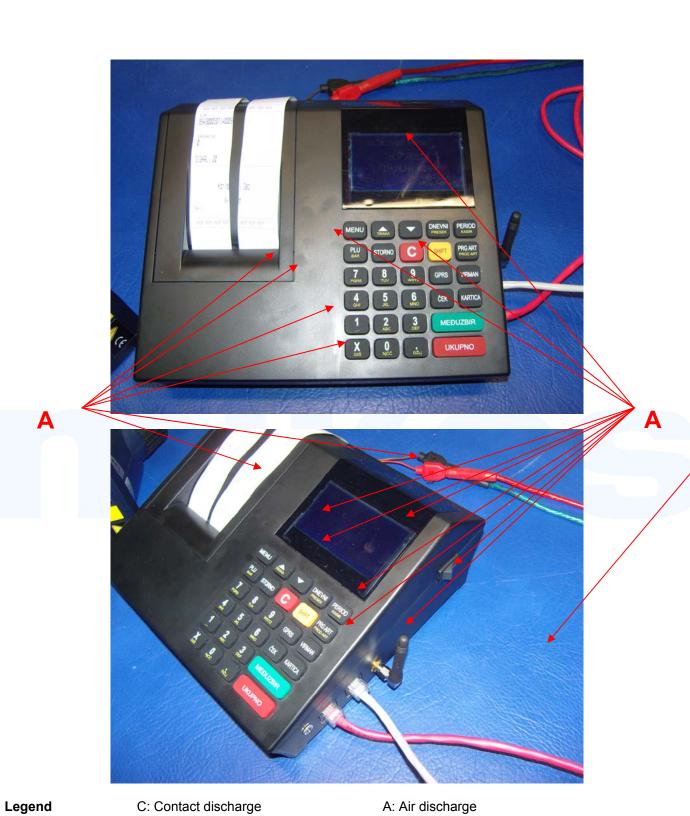




Legend

C: Contact discharge







5.3.3 Test specification					
Contact discharge voltage:	2 kV / 4 kV				
Air discharge voltage:	2 kV / 4 kV /	8 kV			
Discharge impedance:	330 $\Omega$ / 150 pF	330 Ω / 150 pF			
Discharge factor:	≥ 1 sec.				
Number of discharges:	≥ 10				
Type of discharge:	Direct discharge:	- Contact discharge - Air discharge			
	Indirect discharge:	- Contact discharge			
Polarity:	- negative	- positive			
Discharge location:	- see photo documentation of the test set-up				
5.3.4 Test result					
The requirements are <b>FULFILLED</b> .		Performance Criterion: A			
Remarks: During the test no deviation	was detected to the select	cted operation mode(s).			
<del></del>					



## 5.4 Radiated, radio-frequency, electromagnetic field

For test instruments and accessories used see section 6 Part I 3.

#### 5.4.1 Description of the test location

Test location: Anechoic Chamber A2

#### 5.4.2 Photo documentation of the test set-up



# 5.4.3 Test specification

Frequency range: 80 MHz to 1000 MHz

Field strength: 3 V/m

<u>EuT - antenna distance:</u> 3 m

Modulation: AM: 80 % / sinusoidal: 1000Hz

Frequency step: 1 % with 3 s dwell time

<u>Antenna polarisation:</u> - horizontal - vertical

#### 5.4.4 Test result

The requirements are **FULFILLED**. Performance Criterion: **A** 

**Remarks:** During the test no deviation was detected to the selected operation mode(s).



#### 5.5 Electrical fast transients / Burst

For test instruments and accessories used see section 6 Part I 4.

#### 5.5.1 Description of the test location

Test location: Shielded Room S3

#### 5.5.2 Photo documentation of the test set-up



#### 5.5.3 Test specification

Coupling network: 0.5 kV

Coupling clamp: 0.5 kV

Burst frequency: 5.0 kHz

<u>Coupling duration:</u>  $\geq$  60 sec.

<u>Polarity:</u> - negative - positive



5.5.4 Coupling points	
Cable description:	DC power line
Screening: Status: Signal transmission: Length:	unscreened active analogue 1 m
Cable description:	RS 232
Screening: Status: Signal transmission: Length:	screened passive digital 3 m
5.5.5 Test result	
The requirements are <b>FULFILLED</b> .	Performance Criterion: A
Remarks: During the test no det	viation was detected to the selected operation mode(s).



#### 5.6 Surge

For test instruments and accessories used see section 6 Part I 5.

#### 5.6.1 Description of the test location

Test location: AREA 4

#### 5.6.2 Photo documentation of the test set-up



#### 5.6.3 Test specification

Pulse amplitude-Power line unsym: 0.5 kV

Source impedance: 12  $\Omega$  + 9 $\mu$ F

Number of surges: 5 Surges/Phase angle

Phase angle: 0 °

Repetition rate: 60 sec.

<u>Polarity:</u> - negative - positive



504 O				
5.6.4 Coupling	ng points			
Cable description	on:	DC power line		
Screening: Status: Signal transmiss Length:	sion:	unscreened active analogue 1 m		
5.6.5 Test re	sult			
The requiremen	ts are <b>FULFILLED</b> .			Performance Criterion: A
Remarks:	During the test no dev	viation was detecte	ed to the selected ope	eration mode(s).



# 5.7 Conducted disturbances induced by radio-frequency fields

For test instruments and accessories used see section 6 Part I 6.

#### 5.7.1 Description of the test location

Test location: Shielded Room S3

#### 5.7.2 Photo documentation of the test set-up



#### 5.7.3 Test specification

Frequency range: 0.15 MHz to 80 MHz

<u>Test voltage:</u> 3 V

Modulation: AM: 80 % / sinusoidal: 1000Hz

Frequency step: 1 % with 3 s dwell time



5.7.4	Coupling po	ints					
Cable	e description (Po	ort1):	DC power line				
Statu	al transmission:						
Cable	e description (Po	ort2):	Artifical hand				
Statu	al transmission:						
Cable	e description (Po	ort3):	RS232				
Statu	al transmission:		screened passive digital 3 m				
The f	ollowing CDN's	were connected	during the test at the	ne ports:			
	Tested	(R	Nu efer to ONo. A		CDN at po		ent)
	Port	1	2	3	4	5	6
	1	004	Artifical hand				
	2	004	Autificant Island	044			
		()()/1					
	3	- 004	Artifical hand	014			
	4	- 004	Artifical fiariu	014			
		004	Artifical flatio	014			
<b>5.7.5</b> The r	4 5 6 Test result	e FULFILLED.	eviation was detected			Performance	Criterion: A



# 5.8 Power frequency magnetic field

For test instruments and accessories used see section 6 Part I 8.

### 5.8.1 Description of the test location

Test location: AREA 1

### 5.8.2 Photo documentation of the test set-up



#### 5.8.3 Test specification

<u>Test frequency:</u>	50 Hz / 60 Hz
<del></del>	

Continuous field: 1 A/m

<u>Duration (Continuous field):</u> 60 sec. each Axis

Axis: x-axis y-axis z-axis

### 5.8.4 Test result

The requirement	ts are <b>FULFILLED</b> .	Performance Criterion: <b>A</b>
Remarks:	During the test no deviation was detected to the selected operation	n mode(s).
-		



# 6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used, in addition to the test accessories, are calibrated and verified regularly.

Test ID	Model / Type	Kind of Equipment	Manufacturer	Equipment No.
A 4 Schwarz München		ESHS 30 02-02/03-05-002	EMI Test Receiver	Rohde &
	NNLK 8129	LISN	Schwarzbeck Mess-Elektronik	02-02/20-05-001
	ESH 2 - Z 5	LISN	Rohde & Schwarz München	02-02/20-05-004
	N-4000-BNC	RF Cable	mikes-testingpartners gmbh	02-02/50-05-138
	N-1500-N	RF Cable	mikes-testingpartners gmbh	02-02/50-05-140
	ESH 3 - Z 2	Pulse Limiter	Rohde & Schwarz München	02-02/50-05-155
A 5	ESVS 30	EMI Test Receiver	Rohde & Schwarz München	02-02/03-05-003
	BBA 9106 / VHA 9103	Biconical Antenna	Schwarzbeck Mess-Elektronik	02-02/24-05-002
	UHALP 9108 A	Log. Per. Antenna	Schwarzbeck Mess-Elektronik	02-02/24-05-003
	KK-EF393-21N-16	RF Cable 20 m	Huber + Suhner	02-02/50-05-035
	HF 7/8 inch	Antenna Cable 20 m	Huber + Suhner	02-02/50-05-116
	RG 214/U	RF Cable 2 m	Huber + Suhner	02-02/50-05-117
I 2	CMU 200		Rohde & Schwarz München	02-02/05-07-001
	NSG 435	ESD Generator	Schaffner Elektrotest GmbH	02-02/09-05-002
	THL-313	Thermo-Hygro-Meter	PTL Dr. Grabenhorst GmbH	02-02/15-05-001
	UHALP 9108 A	Log. Per. Antenna	Schwarzbeck Mess-Elektronik	02-02/24-05-022
Ι3	SMT 03	Signal Generator	Rohde & Schwarz München	02-02/05-05-009
	CMU 200		Rohde & Schwarz München	02-02/05-07-001
	NRVD	Dual Channel Power Meter	Rohde & Schwarz München	02-02/07-05-004
	NRV-Z1	Diode Power Sensor	Rohde & Schwarz München	02-02/07-05-017
	NRV-Z1	Diode Power Sensor	Rohde & Schwarz München	02-02/07-05-018
	500W1000A	RF Amplifier	Amplifier Research	02-02/17-05-010
	CBL6140A	Bilog Antenna	Schaffner Elektrotest GmbH	02-02/24-05-018
	UHALP 9108 A	Log. Per. Antenna	Schwarzbeck Mess-Elektronik	02-02/24-05-022
	KK-RG393/U-3	RF Cable 3 m	Huber + Suhner	02-02/50-05-018
	50 Ohm / 10 dB	Attenuator	Huber + Suhner	02-02/50-05-064
	DC6180A	Coupler	Amplifier Research	02-02/50-05-107
	N-2000-N	RF Cable	mikes-testingpartners gmbh	02-02/50-05-108
	RG 393/U 50 Ohm	RF Cable	mikes-testingpartners gmbh	02-02/50-06-024
I 4	CMU 200	Radio Communication Test	Rohde & Schwarz München	02-02/05-07-001
	NSG 2025	Burst Generator	Schaffner Elektrotest GmbH	02-02/09-05-003
	CDN 8014	Coupling Clamp	Schaffner Elektrotest GmbH	02-02/22-05-001
	UHALP 9108 A	Log. Per. Antenna	Schwarzbeck Mess-Elektronik	02-02/24-05-022
I 5	CMU 200	Radio Communication Test	Rohde & Schwarz München	02-02/05-07-001
	NSG 2050	Surge Generator	Schaffner Elektrotest GmbH	02-02/09-05-004
	PNW 2050	Pulse Network	Schaffner Elektrotest GmbH	02-02/09-05-007
	CDN 133	Coupling Network	Schaffner Elektrotest GmbH	02-02/22-05-019
	UHALP 9108 A	Log. Per. Antenna	Schwarzbeck Mess-Elektronik	02-02/24-05-022



Test ID	Model / Type	Kind of Equipment	Manufacturer	Equipment No.
I 6SML 01	Signal Generator	Rohde & Schwarz München	02-02/05-05-001	
	CMU 200	Radio Communication Test	Rohde & Schwarz München	02-02/05-07-001
	URV 5 - Z 4	RF Probe 100 V	Rohde & Schwarz München	02-02/07-05-002
	NRVS	Single Channel Power Mete	Rohde & Schwarz München	02-02/07-05-007
	75A250	RF Amplifier	Amplifier Research	02-02/17-05-008
	F-120-9	RF Clamp	FCC Fischer Custom Comm.	02-02/22-05-014
	CDN M216	Coupling Network	Schaffner Elektrotest GmbH	02-02/22-05-004
	UHALP 9108 A	Log. Per. Antenna	Schwarzbeck Mess-Elektronik	02-02/24-05-022
	10 dB / 18 GHz / 50 Ohm	Attenuator 10 dB	Huber + Suhner	02-02/50-05-037
	JFW 50FH-006-100-2	RF Attenuator 6 dB/100 W	jfw	02-02/50-05-056
	N-500-N	RF Cable	mikes-testingpartners gmbh	02-02/50-05-059
	N-3000-N	RF Cable	mikes-testingpartners gmbh	02-02/50-05-226
	N-140-BNC	RF Cable	mikes-testingpartners gmbh	02-02/50-06-035
I 8	Helmholtz	Magnetic Field Coil	mikes-testingpartners gmbh	02-02/24-05-021
	EMV D 30000/PAS	Testsystem	Spitzenberger + Spies	02-02/30-05-006
	ARS 16/3	Analyser Reference System	Spitzenberger + Spies	02-02/30-05-007





# 7 Detailed measurement uncertainty

#### 7.1 Overview

Measurement instrumentation uncertainty shall be taken into account when determining compliance or non-compliance with a disturbance limit.

The measurement instrumentation uncertainty for a test laboratory shall be evaluated. The standard uncertainty u(xi) in decibels and the sensitivity coefficient ci shall be evaluated for the estimate xi of each quantity. The combined standard uncertainty uc(y) of the estimate y of the measurand shall be calculated as

$$u_{\rm c}(y) = \sqrt{\sum_i c_i^2 \ u^2(x_i)}$$

The expanded measurement instrumentation uncertainty  $U_{lab}$  for a test laboratory shall be calculated as  $U_{lab} = 2 u_{c}(y)$ 

$$U_{\text{lab}} = 2 u_{\text{c}}(y)$$

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If *U*lab is less than or equal to *U*cispr in the table below, then:

- compliance is deemed to occur if no measured disturbance exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance exceeds the disturbance limit.

If *U*lab is greater than *U*cispr in the table below, then:

- compliance is deemed to occur if no measured disturbance, increased by (Ulab Ucispr), exceeds the disturbance limit:
- non-compliance is deemed to occur if any measured disturbance, increased by  $(U_{lab} U_{cispr})$ , exceeds the disturbance limit.

#### 7.2 Definitions and symbols

Xi Input quantity xi estimate of Xi

u(xi) standard uncertainty of xi

ci sensitivity coefficient

uc(y) (combined) standard uncertainty of y

Y result of a measurement, (the estimate of the measurand), corrected for all recognised significant

systematic effects
U expanded uncertainty of y

# 7.3 Measurement uncertainty

Measurement	U <sub>lab</sub> [dB]	U <sub>CISPR</sub> [dB]
Conducted disturbance	+ 3,60 / - 3,64	4,00
Radiated disturbance (electic field)	+ 3,86 / - 3,91	5,20
- 10 m test distance		
<ul> <li>Frequency range: 30 MHz – 300 MHz</li> </ul>		
Radiated disturbance (electic field)	+ 4,11 / - 4,11	5,20
- 10 m test distance		
<ul> <li>Frequency range: 300 MHz – 1000 MHz</li> </ul>		

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