

TEST REPORT

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EUT DESCRIPTION Microwave access control
EUT TRADEMARK POLITEC
EUT MODEL MANA DT

REFERENCE STANDARDS : EN 301489-1 V1.8.1 (2008)
EN 301 489-3 V1.4.1 (2002-08)

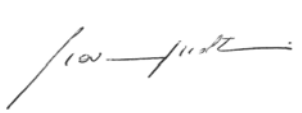
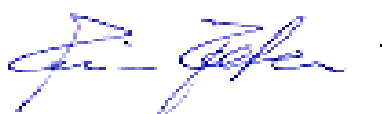
TEST REPORT NUMBER EMCTR_111362_1

TEST REPORT ISSUE DATE 25/11/2011; REV. 1 05/12/2011
TESTING LABORATORY Prima Ricerca & Sviluppo S.r.l.
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TESTING LOCATION As Above

DATE OF TEST SAMPLE RECEIPT 14/11/2011
DATE OF TEST 14/11/2011
TESTED BY Massimo Maltempi

APPROVED BY Giovanni Molteni



The test results reported in this test report shall refer only to the sample actually tested and shall not refer or be deemed to refer to bulk from which such a sample may be said to have been obtained.

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Note:

EMCTR_111362-1 REPLACE EMCTR_111362-0 ISSUED 25/11/2011

1. HS REQUIREMENTS AND CONFORMANCE TEST SPECIFICATIONS TABLE

Harmonized Standard EN 301 489-1					
The following technical requirements and test specifications are relevant to the presumption of conformity under article 3.1(b) of the R&TTE Directive					
Technical Requirement reference			Technical Requirement Conditionality		Test Specification
No	Description	Reference: Clause No	U/C	Condition	Reference: Clause No
1	Enclosure of ancillary equipment measured on a stand alone basis	8.2	U		8.2
2	DC power input/output ports	8.3	C	Only where equipment has DC power input and/or output ports	8.3
3	DC power input ports	8.3	C	Only for equipment intended to be used in a vehicular environment and powered from the vehicle power supply	8.3
4	AC mains power input/output ports	8.4	C	Only where equipment has AC mains power input and/or output ports	8.4
5	Harmonic current emission (AC mains input port)	8.5	C	Only where equipment has AC mains power input ports	8.5
6	Voltage fluctuations and flicker (AC mains input ports)	8.6	C	Only where equipment has AC mains power input ports	8.6
7	Telecommunication ports	8.7	C	Only where equipment has telecommunications ports	8.7
8	Radio frequency electromagnetic field (80 MHz to 1 000 MHz and 1 400 MHz to 2 700 MHz)	9.2	U		9.2
9	Electrostatic discharge	9.3	U		9.3
10	Fast transients common mode	9.4	U		9.4
11	Radio frequency common mode	9.5	U		9.5
12	Transients and surges in the vehicular environment	9.6	C	Only where compliance to Directive 2004/104/EC [23] is required	9.6
13	Voltage dips and interruptions	9.7	C	Only where equipment has AC mains power input ports	9.7
14	Surges, line to line and line to ground	9.8	C	Only where equipment has AC mains power input ports and/or telecommunications ports	9.8
15	Broadband electromagnetic interference (emissions) generated by the ESA	B.2.1	C	Only where compliance to Directive 2004/104/EC [23] is required	B.2.1
16	Narrow-band electromagnetic interference (emissions) generated by the ESA	B 2.2	C	Only where compliance to Directive 2004/104/EC [23] is required	B.2.2
17	Immunity of the ESA to transient disturbances conducted along the supply lines	B 2.3	C	Only where compliance to Directive 2004/104/EC [23] is required	B.2.3
18	Conducted disturbances (emissions) caused by the ESA	B 2.4	C	Only where compliance to Directive 2004/104/EC [23] is required	B.2.4



Table 6: Special conditions for EMC immunity tests

Reference to clauses in EN 301 489-1 [1]	Special product-related conditions, additional to or modifying the test conditions in EN 301 489-1 [1], clause 9
9.2.2: Test method; Radio frequency electromagnetic field	Attention: The width of the steps for the test frequency increments is class-dependent: - for SRDs of class 1 or class 2, the stepped frequency increments shall be 1 % of the momentary used test frequency; - for SRDs of class 3, the stepped frequency increments shall be 10 % of the momentary used test frequency.
9.5.2: Test method; Radio frequency, common mode	Attention: The width of the steps for the test frequency increments is class-dependent: - for SRDs of class 1 or class 2, the stepped frequency increments shall be 1 % of the momentary used test frequency in the frequency range 5 MHz to 80 MHz; - for SRDs of class 3, the stepped frequency increments shall be 10 % of the momentary used test frequency in the frequency range 5 MHz to 80 MHz.
9.7.3: Performance criteria; Voltage dips and interruptions	Attention: The performance criteria are equipment class dependent: For a voltage dip corresponding to a reduction of the supply voltage of 30 % for 10 ms the performance criteria CT or CR specified in clauses 6.4 or 6.6 shall apply as appropriate. For a voltage dip corresponding to a reduction of the supply voltage of 60 % for 100 ms the following class-dependent performance criteria shall apply: - for transmitters, belonging to class 1 equipment, the performance criteria CT (see clause 6.4); - for transmitters, belonging to class 2 or 3 equipment, the performance criteria TT (see clause 6.5); - for receivers, belonging to class 1 equipment, the performance criteria CR (see clause 6.6); - for receivers, belonging to class 2 or 3 equipment, the performance criteria TR (see clause 6.7). For a voltage interruption corresponding to a reduction of the supply voltage of > 95 % for 5 000 ms the performance criteria TT or TR specified in clauses 6.5 or 6.7 shall apply as appropriate.

1. TECHNICAL INFORMATION OF EQUIPMENT UNDER TEST (EUT)

1.1 Identification EUT

Brand name: POLITEC s.r.l.
 Manufacturer : POLITEC s.r.l.
 Type of equipment: Microwave access control
 Model name or No. : MANA DT
 Part number : id. ****
 Serial No.: *****
 Derivate Model name or No. : *****
 Country of manufacturer: *Italy*

1.2 Technical data

R&TTE category : Short Range Devices (SRD) and ancillary equipment
 Equipment Classification (in acc. to Cl. 5.5 of the EN 301 489-1) : Portable or mobile equipment or combinations of equipment, when used in conjunction with a charger powered from the AC mains, shall in addition fulfil the requirements of radio and ancillary equipment for fixed use (see tables 2 and 3 in clauses 7.1 and 7.2 of EN 301 489-1 [1])
 Performance assessment (in acc. to Cl. 5 of the EN 301 489-3) :

- **5.2 Equipment which can provide a continuous communications link**
The provisions of EN 301 489-1 [1], clause 5.2, shall apply.
- **5.3 Equipment which does not provide a continuous communications link**
The provisions of EN 301 489-1 [1], clause 5.3, shall apply with the following modification: for equipment type III the manufacturer shall always define the test method(s) for the assessment of the actual level of performance or degradation of performance during and/or after the EMC exposure.
- **5.4 Ancillary equipment**
The provisions of EN 301 489-1 [1], clause 5.4, shall apply.

 Category of performance criteria (in acc. to Cl. 6 of the EN 301 489-3) :

- Performance criteria for Continuous phenomena applied to Transmitters
- Performance criteria for Transient phenomena applied to Transmitters
- Performance criteria for Continuous phenomena applied to Receivers
- Performance criteria for Transient phenomena applied to Receivers
- Performance criteria for ancillary equipment tested on a stand alone basis

 Single or Multiple Unit : Multiple (TX and RX component)
 Input current: Max 200 mA TX , 200 mA RX
 EUT Dimensions : see manufacturer documentation
 EUT standing: On wall



1.3 GSM Technical data

Identification of the module and its characteristics :

MANUFACTURER POLITEC s.r.l.
TYPE Microwave access control

Banda di frequenze:	24,000 – 24,25 GHz (annex 1 sub-part j)	
Frequency band:		
Frequenza operativa:	24,000 – 24,25 GHz	
Operating frequency:		
Canali:	1	
Number of channels:		
Spaziatura dei canali:	NA	
Channel bandwidth:		
TX canalizzato (banda stretta) :	NA	
TX chanalized (narrow band) :		
TX non canalizzato (banda larga): TX not chanalized (broad band):	TX not chanalized	
Tipo di modulazione :	AM	
Type of modulation :		
Potenza RF di uscita (ERP) :	19,4 dBm	
RF Power Output (ERP):		
Tipologia dell'antenna :	Integral antenna in waveguide	
Type of antenna :		
Guadagno d'antenna:	not applicable	
Antenna gain:		
Dimensioni dell'antenna TX:	See photograph documentation	
Size/ length of antenna :		
Designazione ITU :		
ITU Designation :		
Modalità operativa:	Full duplex	DUPLEX
Operating mode:		SPACING
Duty cycle:	100%	
Receiver input sensitivity	-103 dBi	

Class of SRD equipment	Risk assessment of receiver performance
1	Highly reliable SRD communication media; e.g. serving human life inherent systems (may result in a physical risk to a person)
2	Medium reliable SRD communication media; e.g. causing inconvenience to persons, which cannot simply be overcome by other means
3	Standard reliable SRD communication media; e.g. inconvenience to persons, which can simply be overcome by other means (e.g. manual)

1.4 Exclusion bands for devices

The frequencies on which Short Range Devices (SRD) are intended to operate, shall be excluded from the conducted and radiated RF immunity tests.

The frequencies on which the SRD transmitters are intended to operate shall be excluded from conducted and radiated emission measurements when performed in transmit mode of operation.

There shall be no frequency exclusion band applied to emission measurements of SRD receivers, and/or associated ancillary equipment.

The emission measurement and immunity test exclusions are referred to as "exclusion bands" and are defined in the clauses 4.3.1 and 4.3.2 of the present document.

Receiver and receivers of duplex transceivers exclusion band

Table 2: Exclusion bands for Short Range Devices

Operating Receiver Frequency f_o	EMC exclusion band for SRD equipment		
	Receiver Class 1	Receiver Class 2	Receiver Class 3
< 300 kHz	$f_o \pm 200$ kHz (see note 1)	$f_o \pm 300$ kHz (see note 1)	$f_o \pm 300$ kHz (see note 1)
300 kHz to < 30 MHz	$f_o \pm 2$ MHz (see note 1)	$f_o \pm 3$ MHz (see note 1)	$f_o \pm 5$ MHz (see note 1)
30 MHz to < 1 GHz	$f_o \pm 10$ MHz, or $\pm 2\% \times f_o$, whichever is greater	$f_o \pm 15$ MHz, or $\pm 5\% \times f_o$, whichever is greater	$f_o \pm 15$ MHz, or $10\% \times f_o$ whichever is greater
1 GHz to < 2 GHz	$f_o \pm 75$ MHz (see note 2)	$f_o \pm 100$ MHz (see note 2)	$f_o \pm 300$ MHz (see note 2)
NOTE 1:	Measurements shall not be carried out below 150 kHz.		
NOTE 2:	Operating frequencies above 2 GHz do not require an exclusion band as there are no immunity tests required above 2 GHz.		

4.3.2 Exclusion band for transmitters

For transmitters operating, or intended to operate, in a channelized frequency band, the exclusion band is three times the maximum occupied bandwidth allowed for that service, centred around the operating frequency.

For wide band transmitters, i.e. transmitters in a non-channelized frequency band, the exclusion band is twice the intended operating frequency band centred around the centre frequency of the intended operating frequency band.

In case the receiver and transmitter are tested together as a system (see EN 301 489-1 [1], clause 4.2.5) the exclusion band defined for receivers or the exclusion band defined for transmitters shall be used, whichever is greater.

1.5 Modifications incorporated in E.U.T.

The following items are the modifications introduced in the equipment under test :

- None



1.6 **Ports identification**

This section contains descriptions of all ports, the length and the type of the cable provided by manufacturer needed for the tests.

Moreover it is specified if the ports are ever or optionally connected.

Port	Description	Maximum length	Connection	Ancillaries / Modules / Support Equipment	
1	Enclosure	Plastic and metallic case	----	Screws	----
2	AC power input/output ports	230 Vac 50Hz	----	----	None
3	DC power input/output ports	12Vdc internal battery	< 3 meter	Internal Connector	None
4	Signals Ports	Port Not present	----	----	None
5	Telec. Port	Port no present	----	----	None

Note: During the tests all cables must be what provided the manufacturer or the same that used in the real employment of the EUT.

1.7 **Auxiliary equipment**

- none

1.8 Primary functions of the EUT

The following table describes the primary functions and the representative parameter of the equipment under test according the manufacturer specifications:

<i>Primary function</i>	<i>Representative parameter</i>
Microwave access control	Tx/Rx synchronization, access condition

1.9 Performance of equipment under test

With reference to the above specified primary functions, the following table defines the acceptable level of the performance or permissible loss of function and the observation mode for each representative parameter of the equipment under test according to the technical instructions by the manufacturer.

<i>Representative parameter</i>	<i>Acceptable level of performance</i>	<i>Observation mode</i>		
		<i>Acquisition</i>	<i>Test equipment</i>	<i>Test n.</i>
Maintenance of Tx/Rx synchronization	No loss of communication link.	Led synchronization status	operator by camera	All immunity tests
Access control	No false detection	Led colour status	operator by camera	

1.10 Performance criteria

Performance criteria for Continuous phenomena applied to Transmitters (CT)

For equipment of type I or II including ancillary equipment tested on a stand alone basis, the performance criteria A of the applicable class as given in clause 6.3 shall apply.

For equipment of type II or type III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence.

Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

Performance criteria for Transient phenomena applied to Transmitters (TT)

For equipment of type I or II, including ancillary equipment tested on a stand alone basis, the performance criteria B of the applicable class as given in clause 6.3 shall apply, except for power interruptions exceeding a certain time the performance criteria deviations are specified in clause 7.2.2.

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence.

Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

Performance criteria for Continuous phenomena applied to Receivers (CR)

For equipment of type I or II, including ancillary equipment tested on a stand alone basis, the performance criteria A of the applicable class as given in clause 6.3 shall apply.

For equipment of type II or III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence.

Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

Performance criteria for Transient phenomena applied to Receivers (TR)

For equipment of type I or II, including ancillary equipment tested on a stand alone basis, the performance criteria B of the applicable class as given in clause 6.3 shall apply, except for power interruptions exceeding a certain time the performance criteria deviations are specified in clause 7.2.2.

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence.

Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

Performance criteria for ancillary equipment tested on a stand alone basis

The provision of EN 301 489-1 [1], clause 6.4, shall apply.

2. Operating test modes and test conditions

The equipment has been tested according to the operative conditions described in the user/installation manual provided by the manufacturer and by following reference standards :

Reference European Standards:

- EN 301 489-1 V1.8.1 (2008) Electromagnetic compatibility and Radio spectrum Matters (ERM);
ElectroMagnetic Compatibility (EMC) standard for radio equipment and services;
Part 1: Common technical requirements
- EN 301 489-3 V1.4.1 (2002-08) Electromagnetic compatibility and Radio spectrum Matters (ERM);
ElectroMagnetic Compatibility (EMC) standard for radio equipment and services;
Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 40 GHz

In the following table there are the operating conditions adopted during tests identified by an indicator (#..) at which has been referred the item "Operating condition of the equipment under test" of all technical sheets of the tests (see Section 4)

Operating condition	Description
#1	Communication link between TX/RX component
#2	Stand-by mode

3. Summary of test results

3.1 Emission tests

Phenomenon	Application	Basic standard	Operating condition	Test result
Radiated disturbance	Enclosure of ancillary equipment	EN 55022 (2006) + A1 (2007)	#1	Within the limit
Conducted emission	AC mains input/output port	EN 55022 (2006) + A1 (2007)	#1	Within the limit
	DC input/output port	EN 55022 (2006) + A1 (2007)	Not applicable: port no present	
	Telecommunication Port	EN 55022 (2006) + A1 (2007)	Not applicable: port no present	
Harmonic current emissions	AC mains input/output port	EN 61000-3-2 (2006)	Not applicable: power < 75W	
Voltage fluctuations and flicker	AC mains input/output port	EN 61000-3-3 (1994) + A1(1995)	#1	Within the limit

¹ Applicable to apparatus covered within the scope of IEC 61000-3-2, IEC 61000-3-3 or IEC 61000-3-12.

² Applicable only to switching operation in thermostatically controlled appliances

³ Ref. Tab. of Section 2

3.2 Immunity tests

Port	Phenomena	Basic standard EN 50130-4	Operating condition	Result
1	Enclosure	EM radiated field, AM 80%	#1 - #2	Within the limit
		Electrostatic Discharge (ESD)	#1 - #2	Within the limit
2	AC mains	Fast transients	#1 - #2	Within the limit
		RF common mode	#1 - #2	Within the limit
		Surge	#1 - #2	Within the limit
		Voltage dips/interruptions	#1 - #2	Within the limit
3	DC power	Fast transients	Not applicable: port no present	
		RF common mode		
		Surge		
4	Transients and surges	DC power input ports (for 12V powered equipment)	Not applicable:	
		DC power input ports (for 24V powered equipment)		
5	Signal / Control lines	Fast transients	Not applicable: port no present	
		RF common mode		
		Surge		
6	Telecommunication port	Fast transients	Not applicable: port no present	
		RF common mode		
		Surge		

¹ Applicable only to apparatus containing devices susceptible to magnetic fields.

² Applicable only to input ports.

³ Not applicable to input ports intended for connection to a battery or a rechargeable battery which must be removed or disconnected from the apparatus for recharging. Apparatus with a DC power input port intended for use with an AC-DC power adaptor shall be tested on the AC power input of the AC-DC power adaptor specified by the manufacturer or, where none is so specified, using a typical AC-DC power adaptor. DC ports, which are not intended to be connected to a DC distribution network are treated as signal ports.

⁴ Not applicable to input ports intended for connection to a battery or a rechargeable battery which must be removed or disconnected from the apparatus for recharging. Apparatus with a DC power input port intended for use with an AC-DC power adaptor shall be tested on the AC power input of the AC-DC power adaptor specified by the manufacturer or, where none is so specified, using a typical AC-DC power adaptor. The test is applicable to DC power input ports intended to be connected permanently to cables longer than 3 m.

⁵ Applicable only to ports interfacing with cables whose total length according to the manufacturer's functional spec. may exceed 3m

⁶ Applicable only to ports interfacing with cables whose total length according to the manufacturer's functional spec. may exceed 30 m.

⁷ Where normal functioning cannot be achieved because of the impact of the CDN on the EUT, this test is not required.

⁸ Ref. Tab. of Section 2

4. TEST RESULTS

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**TEST
1.**

EMISSION OF VOLTAGE FLUCTUATIONS AND FLICKER

**REFERENCE
DOCUMENT**

EN 61000-3-3
"Electromagnetic compatibility (EMC) - Part 3 Limits
Section 3 : Limits of voltage fluctuations and flicker in low-voltage supply systems for
equipment with rated current $\leq 16A$ "

- **TEST SETUP:** Acc. to par. 6.6 of basic standard
- **TEST LOCATION:** Low frequency phenomena area
- **TEST EQUIPMENT USED FOR TEST:** Power Network Simulator Spitzenberger Mod. EMV D 15000/PAS
Analyser Reference system Mod. ARS16/3
Oscillator, device control unit SYCORE

- **TESTED PORT:** AC mains > 220V
- **EMISSION LIMITS:** Acc. to par. 5 of basic std.
- **MEASUREMENT UNCERTAINTY:** Level of confidence = 95%
Degree of freedom = 10
Coverage factor $k_p = 2,28$
Combined uncertainty = 5,606 %

TEST CONDITIONS:	MEASURED
Ambient temperature : 15 - 35 °C	24 ± 3 °C
Ambient humidity : 25 - 75 %rH	40 ± 5 %rH
Pressure : 85 - 106 kPa (860 mbar - 1060 mbar)	950 ± 50 mbar
Voltage :	230 Vac ± 3%

OPERATING CONDITION (Rif. Section. 2) : #1

RESULT: WITHIN THE LIMITS



Name: Massimo Maltempo Serial no: Prototype
 Department: EMC Operating modes: --
 Company: PRIMA RICERCA E SVILUPPO Comment1: --
 Test report no: Comment2: --
 Device: access control Comment3: --
 Specimen: Comment4: --
 Manufacturer: POLITEC Date: 28.11.2011
 Type: Microwave control access Test date: 28.11.2011

Test conditions: EN 61000-3-3:1995+A1+A2 / 230 V / 50 Hz / Phase L1 / Obs 1 x 5 min / Ztest (0.400+j0.25)

FLICKER: Test PASS!

Time	Pmax	Pst	Sliding Plt	d(t)>3.30% [s]	dmax [%]	dc [%]	PASS	FAIL
19:53:53	0.000	0.0070	-	0.000	0.008	-	X	
Limits:		1.000	0.650	0.500	4.000	3.300		
Plt: 0.003058 (calculated over 12 periods)							X	
Evaluated: PST, PLT, Sliding PLT, dc, dmax, d(t)								

FLICKER: Source test PASS!

Time	Pmax	Pst	Sliding Plt	d(t)>3.30% [s]	dmax [%]	dc [%]	PASS	FAIL
19:53:53	0.000	0.0060	-	0.000	0.010	-	X	
Plt: 0.002621 (calculated over 12 periods)								
Evaluated: PST <= 0.4 dmax < 20% dmax1								

Tested with EMC test software V2.41/PA65000 by Spitzenberger+Spies GmbH & Co. KG, Schmidstr 32-34, D-94234 Weiching, 28.11.2011

**TEST
2.**

**EMISSION OF MAINS TERMINAL DISTURBANCE VOLTAGE
(CONTINUOUS DISTURBANCE)**

**REFERENCE
DOCUMENT**

EN 55022
"Limits and methods of measurement of radio interference characteristics of information technology equipment"

- **TEST SETUP:** Acc. to par. 5.2 of reference document
- **TEST LOCATION:** Semianechoic chamber
- **TEST EQUIPMENT USED FOR TEST:** EMI receiver Rohde & Schwarz Mod. ESU40
Artificial Network Rohde & Schwarz Mod. ESH3-Z5
FCC F61

- **TESTED PORT:** AC Mains Input Port, DC power input/output port, telecommunication port
- **FREQUENCY RANGE:** 0.15 - 30 MHz
- **EMISSION LIMITS:** Acc. to Tab. 2 of reference document
- **MEASUREMENT UNCERTAINTY:** Total uncertainty (k=2) \pm 2.5 dB

TEST CONDITIONS:	MEASURED
Ambient temperature : 15 - 35 °C	24 \pm 3 °C
Ambient humidity : 25 - 75 %rH	40 \pm 5 %rH
Pressure : 85 - 106 kPa (860 mbar - 1060 mbar)	950 \pm 50 mbar
Voltage :	230 Vac \pm 3%

OPERATING CONDITION (Rif. Section. 2) : #1

RESULT: WITHIN THE LIMITS

Common Information

Test Description: EMC32 Standard Report Setup
 Operating Conditions:
 Operator Name:

EMI Auto Test Template: Voltage with 2-Line-LISN

Hardware Setup: Voltage with 2-Line-LISN
 Measurement Type: 2 Line LISN
 Frequency Range: 150 kHz - 30 MHz
 Graphics Level Range: 0 dBuV - 80 dBuV

Preview Measurements:
 Scan Test Template: Voltage with 2-Line-LISN pre

Data Reduction:
 Limit Line #1: EN 55022 V QP
 Limit Line #2: EN 55022 V AV
 Peak Search: 6 dB
 Maximum Results: 6
 Subrange Maxima: 0
 Maxima per Subrange: 1
 Acceptance Offset: -10 dB
 Maximum Number of Results: 6

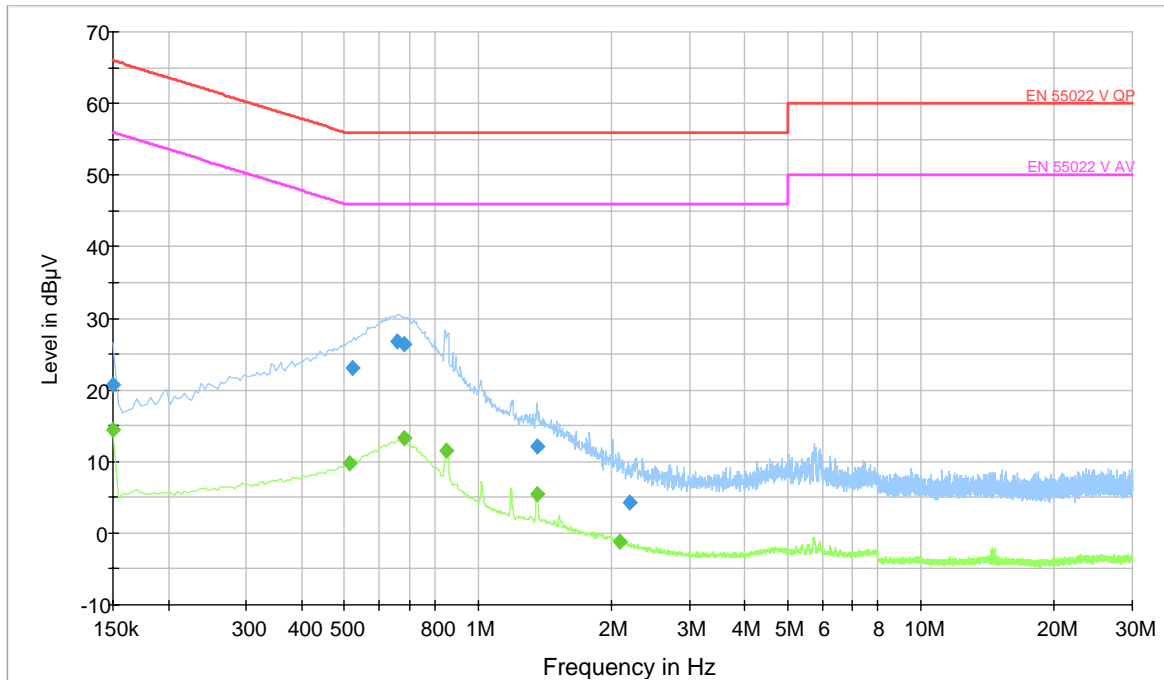
Frequency Zoom:
 Zoom Scan Template: Voltage with 2-Line-LISN max

Final Measurements:
 Template for Single Meas.: Voltage with 2-Line-LISN fin

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
150 kHz - 30 MHz	QuasiPeak; CAverage	9 kHz	1.5 s	Receiver

Report Settings:
 Report Template: Sample EMI Auto Test Report
 Create Electronic Report: RTF
 Document Name: EMI Report - Voltage with 2-Line-LISN

Voltage_with_2_Line_lisn_OSP



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	20.7	1000.0	9.000	GND	L1	10.0	45.30	66.00	
0.520000	23.1	1000.0	9.000	GND	L1	10.0	32.90	56.00	
0.656000	26.8	1000.0	9.000	GND	L1	10.1	29.20	56.00	
0.684000	26.4	1000.0	9.000	GND	N	10.0	29.60	56.00	
1.360000	12.0	1000.0	9.000	GND	N	10.1	44.00	56.00	
2.200000	4.3	1000.0	9.000	GND	L1	10.2	51.70	56.00	

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	14.4	1000.0	9.000	GND	L1	10.0	41.60	56.00	
0.512000	9.8	1000.0	9.000	GND	N	10.0	36.20	46.00	
0.680000	13.3	1000.0	9.000	GND	N	10.0	32.70	46.00	
0.848000	11.4	1000.0	9.000	GND	N	10.1	34.60	46.00	
1.360000	5.4	1000.0	9.000	GND	N	10.1	40.60	46.00	
2.084000	-1.1	1000.0	9.000	GND	L1	10.2	47.10	46.00	

**TEST
3.**

**ELECTROMAGNETIC RADIATED FIELD DISTURBANCE
EMISSION TEST**

**REFERENCE
DOCUMENT**

CISPR 16-2-3

- **TEST SETUP:** Acc. To Par. 7.4 of the ref. Std.
- **TEST LOCATION:** Semi-anechoic chamber (CISPR 16-1 :1993)
Siemens+Matsushita type B84117-D6019-T232
Measure distance 3 meters
- **TEST EQUIPMENT USED FOR TEST:** EMI receiver Rohde & Schwarz Mod. ESU40
Chase Antenna Mod. CBL 6111 A
Rohde & Schwarz Antenna HL50
- **TESTED PORT:** Enclosure
- **FREQUENCY RANGE:** 30 - 6000 MHz
- **EMISSION LIMITS:** Acc. to Tab. 1 of EN 61000-6-3
- **UNCERTAINTY OF MEASURE:** Level of confidence = 95%
Degree of freedom = 10
Coverage factor $k_p= 2,28$
Combined uncertainty = 4,49 dB

TEST CONDITIONS:	MEASURED
Ambient temperature : 15 - 35 °C	24 ± 3 °C
Ambient humidity : 25 - 75 %rH	40 ± 5 %rH
Pressure : 85 - 106 kPa (860 mbar - 1060 mbar)	950 ± 50 mbar
Voltage :	230 Vac ± 3%

OPERATING CONDITION (Rif. Section. 2) : #1

RESULT: WITHIN THE LIMIT



EMI Auto Test Template: EN 55022 Field Strength

Hardware Setup: Electric Field Strength 55022
 Measurement Type: Open-Area-Test-Site
 Frequency Range: 1 GHz - 6 GHz
 Graphics Level Range: 0 dBµV/m - 80 dBµV/m

Preview Measurements:
 Scan Test Template: EN 55022 Field Strength pre

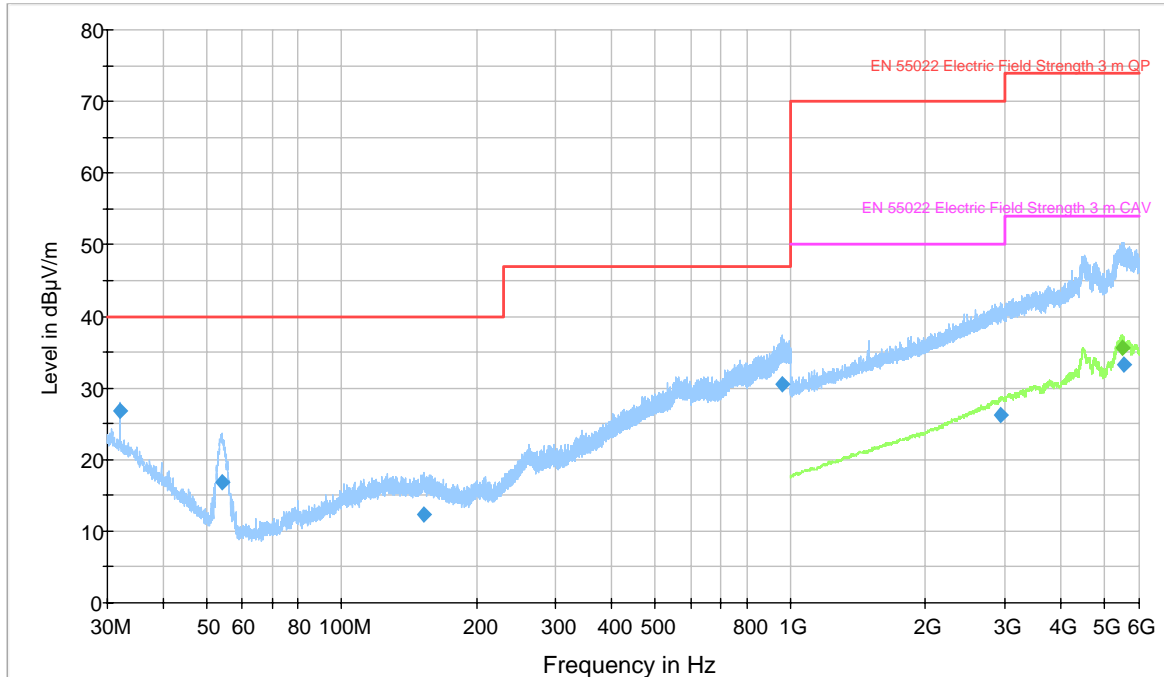
Data Reduction:
 Limit Line #1: EN 55022 Electric Field Strength 3 m QP
 Limit Line #2: EN 55022 6G PK
 Limit Line #3: EN 55022 6G AV
 Peak Search: 10 dB
 Maximum Results: 6
 Subrange Maxima: 0
 Maxima per Subrange: 1
 Acceptance Offset: -10 dB
 Maximum Number of Results: 10

Adjustment:
 Template for Single Meas.: EN 55022 Field Strength fin

Final Measurements:
 Template for Single Meas.: EN 55022 Field Strength fin

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1 GHz	MaxPeak	120 kHz	0.01 s	Receiver
1 GHz - 6 GHz	MaxPeak; Average	1 MHz	1 s	Receiver

Electric Field Strength with Scans OSP



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
32.000000	26.7	1000.0	120.000	306.0	H	28.0	18.5	13.3	40.0
54.080000	16.9	1000.0	120.000	100.0	V	102.0	8.0	23.1	40.0
152.080000	12.3	1000.0	120.000	150.0	V	206.0	12.8	27.7	40.0
959.280000	30.6	1000.0	120.000	246.0	H	23.0	29.5	16.4	47.0
2952.400000	26.1	1000.0	1000.000	103.0	V	21.0	1.5	43.9	70.0
5555.600000	33.3	1000.0	1000.000	100.0	V	102.0	10.5	40.7	74.0

Final Result 2

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
5490.800000	35.6	1000.0	1000.000	333.0	V	-13.0	10.9	18.4	54.0

**TEST
4.**

IMMUNITY TO RADIATED RF ELECTROMAGNETIC FIELD

**REFERENCE
DOCUMENT**

EN 61000-4-3
Electromagnetic Compatibility (EMC) - Part 4 Testing and measuring techniques
Section 3 : Radiated radio-frequency electromagnetic field - Immunity test

- **TEST SETUP:** Acc. to par. 7 of Basic standard
- **TEST LOCATION:** Semi-anechoic chamber (CISPR 16-1 :1993)
Siemens+Matsushita type B84117-D6019-T232
Measure distance 3 meters
- **TEST EQUIPMENT USED FOR TEST:**

RF Signal generator	R&S mod. SME 03	5kHz - 3GHz
RF Amplifiers	AR 250L 250W	150kHz - 220MHz
	AR100W 100W	220MHz - 1000MHz
	25S1G4	800MHz-4200MHz
Directional Coupler	AR-DC2500	10 kHz – 220 MHz
	AR-DC6180	80 – 1000 MHz
	AR-DC7144A	0,8 – 4,2 GHz
Transmitting antenna	FSA mod. S13014/1	80MHz - 1GHz
	Electro Metrics mod. 6961	1GHz - 18GHz
Software	EMC32S	
- **TESTED PORT:** Enclosure
- **FREQUENCY RANGE:** 80 MHz - 1000MHz 3 V/m, 80% AM (1kHz)
1400 MHz-2700MHz 3 V/m, 80% AM (1kHz)
- **SCAN DATA:** 1s - 1% log.
- **IMMUNITY LEVEL:** 3 V/m, 80% AM (1kHz)
- **PERFORMANCE CRITERION** A
- **MEASUREMENT UNCERTAINTY:** Level of confidence = 95% Degree of freedom = 10
Coverage factor $k_p = 2,28$ Combined uncertainty = 10,5 %

TEST CONDITIONS:		MEASURED
Ambient temperature :	15 - 35 °C	24 ± 3 °C
Ambient humidity :	25 - 75 %rH	40 ± 5 %rH
Pressure :	85 - 106 kPa (860 mbar - 1060 mbar)	950 ± 50 mbar
Voltage :		230 Vac ± 3%

OPERATING CONDITION (Rif. Section. 2) : #1, #2

RESULT: WITHIN THE LIMIT

TEST RESULTS

80-1000 MHz AM, 80% 1kHz, 3V/m

POLAR.	VERTICAL			HORIZONTAL			NOTES	
	PORT	WITHIN THE LIMIT	OUT OF LIMIT		WITHIN THE LIMIT	OUT OF LIMIT		
		A	B	C	A	B		C
ENCLOSURE front side	√			√			No performance degradation on both operative conditions	
ENCLOSURE rear side	√			√			No performance degradation on both operative conditions	

1,4 – 2,7 GHz AM, 80% 1kHz, 3V/m

POLAR.	VERTICAL			HORIZONTAL			NOTES	
	PORT	WITHIN THE LIMIT	OUT OF LIMIT		WITHIN THE LIMIT	OUT OF LIMIT		
		A	B	C	A	B		C
ENCLOSURE front side	√			√			No performance degradation on both operative conditions	
ENCLOSURE rear side	√			√			No performance degradation on both operative conditions	

**TEST
5.**

IMMUNITY TO ELECTROSTATIC DISCHARGE (ESD)

**REFERENCE
DOCUMENT**

EN 61000-4-2
Electromagnetic Compatibility (EMC) - Part 4 Testing and measuring techniques
Section 2 - Electrostatic discharge immunity test.

- **TEST SETUP:** Acc. to par. 7 of Basic standard
- **TEST LOCATION:** Transitory phenomena area
- **TEST EQUIPMENT USED FOR TEST:** ESD generator EM TEST Mod. Dito
Discharge impedance 330 ohm / 150 pF

- **TESTED PORT:** Enclosure
- **IMMUNITY LEVEL:** $\pm 6\text{kV}$ (direct and indirect contact) ; $\pm 8\text{kV}$ (direct air)
- **NUMBER OF DISCHARGES AND TIME BETWEEN SUCCESSIVE PULSES:** 10 positive and 10 negative for each point of discharge (1 discharge / second)
- **PERFORMANCE CRITERION** B
- **MEASUREMENT UNCERTAINTY:** Level of confidence = 95%
Degree of freedom = 10
Coverage factor $k_p= 2,28$
Combined uncertainty of peak voltage level = 3,09 %
Combined uncertainty of peak current level = 8,52 %
Combined uncertainty of rise time = 5,45 %
Combined uncertainty of curve decay points at 30 and 60 ns = 10,22 %

TEST CONDITIONS:	MEASURED
Ambient temperature : 15 - 35 °C	24 \pm 3 °C
Ambient humidity : 25 - 75 %rH	40 \pm 5 %rH
Pressure : 85 - 106 kPa (860 mbar - 1060 mbar)	950 \pm 50 mbar
Voltage :	230Vca \pm 3%

OPERATING CONDITION (Rif. Section. 2) : #1,#2

RESULT: WITHIN THE LIMIT

TEST RESULTS

DIRECT CONTACT DISCHARGE (for conductive surfaces)

- Level : 2,4, 6 kV
- For each voltage and polarity, apply 10 discharges.
- Enter the number of times the system responded according to a level A, B or C.

TEST RESULTS		Pol.	PERFORMANCE CRITERIA			NOTES
			WITHIN THE LIMIT		OUT OF LIMIT	
Discharge point			A	B	C	
1	Screws	+	10			No performance degradation
		-	10			
2	Metallic Enclosure	+	10			No performance degradation
		-	10			

DIRECT AIR DISCHARGE (for not conductive surfaces)

- Level : 4, 6, 8 kV
- For each voltage and polarity, apply 10 discharges.
- Enter the number of times the system responded according to a level A, B or C.

TEST RESULTS		Pol.	PERFORMANCE CRITERIA			NOTES
			WITHIN THE LIMIT		OUT OF LIMIT	
Discharge point			A	B	C	
3	Plastic enclosure top side	+	H			No performance degradation
		-	H			
4	Plastic enclosure front side	+	H			No performance degradation
		-	H			
4	Plastic enclosure rear side	+	H			No performance degradation
		-	H			

NOTES : H = HIGH IMPEDENCE SURFACE, ESD CANNOT BE REPRODUCED.

INDIRECT DISCHARGE TO VCP (VERTICAL COUPLING PLANE)

- Level : 2, 4, 6kV
- For each voltage and polarity, apply 10 discharges.
- Enter the number of times the system responded according to a level A, B or C.

TEST RESULTS		Pol.	PERFORMANCE CRITERIA			NOTES
			WITHIN THE LIMIT		OUT OF LIMIT	
Discharge point			A	B	C	
5	Front side	+	10			No performance degradation
		-	10			
6	Rear side	+	10			No performance degradation
		-	10			
7	Left side	+	10			No performance degradation
		-	10			
8	Right side	+	10			No performance degradation
		-	10			

INDIRECT DISCHARGE TO HCP (HORIZONTAL COUPLING PLANE)

- Level : 2, 4, 6kV
- For each voltage and polarity, apply 10 discharges.
- Enter the number of times the system responded according to a level A, B or C.

TEST RESULTS		Pol.	PERFORMANCE CRITERIA			NOTES
			WITHIN THE LIMIT		OUT OF LIMIT	
Discharge point			A	B	C	
9		+	10			Not Applicable ¹
		-	10			

Not applicable for EUT standing floor

¹ Only for EUT standing on the table

**TEST
6.**

IMMUNITY TO FAST TRANSIENTS / BURSTS

**REFERENCE
DOCUMENT**

EN 61000-4-4
Electromagnetic Compatibility (EMC) - Part 4 Testing and measuring techniques
Section 4 - Electrical fast transient burst immunity test.

- **TEST SETUP:** Acc. to par. 7 of Basic standard
- **TEST LOCATION:** Transitory phenomena area
- **TEST EQUIPMENT USED FOR TEST:** Burst Generator EM Test Mod. CWS500

- **TESTED PORT:** AC Power Input/Output Ports, DC Power Input/Output Ports, signals/controls lines and functional Earth ports
- **IMMUNITY LEVEL:** AC Power: $\pm 2kV$
DC Power: $\pm 2kV$
Signals/control lines: $\pm 1kV$
Functional Earth Ports: $\pm 1kV$
- **PERFORMANCE CRITERION** B
- **MEASUREMENT UNCERTAINTY:** Level of confidence = 95%
Degree of freedom = 10
Coverage factor $k_p = 2,28$
Combined uncertainty of peak voltage level = 10,16 %
Combined uncertainty of rise time = 20,08 %
Combined uncertainty of frequency 5 kHz = 1,82 %
Combined uncertainty of duration = 20,08 %

TEST CONDITIONS:	MEASURED
Ambient temperature : 15 - 35 °C	24 \pm 3 °C
Ambient humidity : 25 - 75 %rH	40 \pm 5 %rH
Pressure : 85 - 106 kPa (860 mbar - 1060 mbar)	950 \pm 50 mbar
Voltage :	230 Vac \pm 3%

OPERATING CONDITION (Rif. Section. 2) : #1,#2

RESULT: WITHIN THE LIMIT



PORT n. 2 : AC (PORT OF MEASURE)

TEST	COUPLING MODE	IMMUNITY LEVEL	POLAR.	DISTURB. DURATION	REPETITION FREQ.	TEST DURATION
TEST 1	L1 - Ref. ground	2KV	±	15 ms	5 kHz	60 s
TEST 2	L2 - Ref. ground	2kV	±	15 ms	5 kHz	60 s
TEST 3	L3 - Ref. ground	2KV	±	15 ms	5 kHz	60 s
TEST RESULT		PERFORMANCE CRITERIA			NOTES	
	POL.	WITHIN THE LIMIT		OUT OF LIMIT		
		A	B	C		
TEST 1	+ -	✓			No performance degradation	
TEST 2	+ -	✓			No performance degradation	
TEST 3	+ -	✓			No performance degradation	

**TEST
7.**

IMMUNITY TO SURGE

**REFERENCE
DOCUMENT**

EN 61000-4-5
Electromagnetic Compatibility (EMC) - Part 4 Testing and measuring techniques
Section 5 - Surge immunity test.

- TEST SETUP: Acc. to par. 7 of ref. Std.
- TEST LOCATION: Transitory phenomena area
- TEST EQUIPMENT USED FOR TEST: Surge Generator EM TEST CWS500N
Surge Generator HAEFELY Mod. PST
Coupling Network HAEFELY mod. IP6.2
Decoupling Network HAEFELY mod.DEC1A
- TESTED PORT: AC Input Power Port, DC power Input/Output Ports and signal control lines (if cables length may exceed 30m.)
- IMMUNITY LEVEL: AC: $\pm 1\text{kV}$ (differential mode) ; $\pm 2\text{kV}$ (common mode)
DC: $\pm 0,5\text{kV}$ (diff. mode) ; $\pm 0,5\text{kV}$ (common mode)
Signals : $\pm 1\text{kV}$ (Line to Earth)
- NUMBER OF SURGES: 5 positive and 5 negative at the selected points
- TIME INTERVAL BETWEEN SUCCESSIVE PULSES: 1 min.
- PERFORMANCE CRITERION: B
- MEASUREMENT UNCERTAINTY: Level of confidence = 95%
Degree of freedom = 10
Coverage factor $k_p = 2,28$
Combined uncertainty of peak voltage level = 9,36 %
Combined uncertainty of rise time = 22,62 %
Combined uncertainty of short-circuit current = 8,92 %
Combined uncertainty of duration = 22,32 %

TEST CONDITIONS:	MEASURED
Ambient temperature : 15 - 35 °C	24 \pm 3 °C
Ambient humidity : 25 - 75 %rH	40 \pm 5 %rH
Pressure : 85 - 106 kPa (860 mbar - 1060 mbar)	950 \pm 50 mbar
Voltage :	230 Vac \pm 3%

OPERATING CONDITION (Rif. Section. 2) : #1

RESULT: WITHIN THE LIMIT

TEST RESULTS

PORT n. 2 : AC (PORT OF MEASURE)

TEST	COUPLING MODE	TEST VOLTAGE	IMPEDENCE COUPLING	TEST FREQUENCY	PHASES ANGLE (φ)
TEST 1	L1 - PE (COMMON MODE)	$\pm 2\text{kV}$	$10 \Omega + 9 \mu\text{F}$	1pul./min.	$0^\circ..315^\circ (i=90^\circ)$
TEST 2	L2 - PE (COMMON MODE)	$\pm 2\text{kV}$	$10 \Omega + 9 \mu\text{F}$	1pul./min.	$0^\circ..315^\circ (i=90^\circ)$
TEST 3	L3 - PE (COMMON MODE)	$\pm 2\text{kV}$	$10 \Omega + 9 \mu\text{F}$	1pul./min.	$0^\circ..315^\circ (i=90^\circ)$
TEST 4	L1 – L2 (DIFF. MODE)	$\pm 1\text{kV}$	$10 \Omega + 9 \mu\text{F}$	1pul./min.	$0^\circ..315^\circ (i=90^\circ)$
TEST 5	L1 – L3 (DIFF. MODE)	$\pm 1\text{kV}$	$10 \Omega + 9 \mu\text{F}$	1pul./min.	$0^\circ..315^\circ (i=90^\circ)$
TEST 6	L2 – L3 (DIFF. MODE)	$\pm 1\text{kV}$	$10 \Omega + 9 \mu\text{F}$	1pul./min.	$0^\circ..315^\circ (i=90^\circ)$

RESULT	φ ($^\circ$)	Performance Criteria			NOTES	Reference Standard Acceptance criteria
		WITHIN THE LIMIT		OUT OF LIMIT		
		A	B	C		
TEST 1÷3	0°	✓			No performance degradation	
	90°	✓				
	180°	✓				
	270°	✓				
TEST 4÷6	0°	✓			No performance degradation	
	90°	✓				
	180°	✓				
	270°	✓				

**TEST
8.**

**IMMUNITY TO CONDUCTED RF-DISTURBANCES
(COMMON MODE)**

**REFERENCE
DOCUMENT**

EN 61000-4-6
Electromagnetic Compatibility (EMC) - Part 4 Testing and measuring techniques
Section 6 - Conducted disturbances induced by radio frequency fields immunity test -
.Electromagnetic compatibility.

- TEST SETUP: Acc. to par.7 of Basic std.
- TEST LOCATION: Semi-anechoic chamber
- TEST EQUIPMENT USED FOR TEST:

RF signal Gen	SME 03	5kHz - 3GHz
RF Amplif.	AR 250L 250W	0.01MHz - 220MHz
Directional Coupler	AR-DC2500	10 kHz – 220 MHz
CDN	M2/M3 (16 A)	150kHz - 230MHz
	M5 (25 A)	150kHz - 230MHz
EM Clamp	Mod. F-2031	150kHz - 230MHz
RF Attenuator	6dB	50 ohm 250 Watt
- PORT TO TEST: AC Power Input/Output Ports, DC Power Input/Output Ports, signals/controls lines and functional Earth ports
- FREQUENCY RANGE: 150 kHz - 80 MHz
- SCAN DATA: 1s - 1% log.
- IMMUNITY LEVEL: 10V (rms unmodulated), 80% AM, 1 kHz
- PERFORMANCE CRITERION: A
- MEASUREMENT UNCERTAINTY:
 - Level of confidence = 95%
 - Degree of freedom = 10
 - Coverage factor $k_p= 2,28$
 - Combined uncertainty = 2,24 %

TEST CONDITIONS:	MEASURED
Ambient temperature : 15 - 35 °C	24 ± 3 °C
Ambient humidity : 25 - 75 %rH	40 ± 5 %rH
Pressure : 85 - 106 kPa (860 mbar - 1060 mbar)	950 ± 50 mbar
Voltage :	230 Vac ± 3%

OPERATING CONDITION (Rif. Section. 2) : #1

RESULT: WITHIN THE LIMIT

TEST RESULTS

AM 80% 1kHz 3V

PORT n.	PERFORMANCE CRITERIA			NOTES	Reference Standard Acceptance criteria
	WITHIN THE LIMIT	OUT OF LIMIT			
	A	B	C		
2 (AC Port of measure)	✓			No performance degradation	
3 (DC Power Ports)	-----			-----	
4 (Control / Signal lines)	-----			-----	

**TEST
9.**

IMMUNITY TO VOLTAGE DIPS / SHORT INTERRUPTIONS

REFERENCE DOCUMENT

EN 61000-4-11
Electromagnetic Compatibility (EMC) - Part 4 Testing and measuring techniques
Section 11 - Voltage dips, short interruptions and voltage variations - Immunity test .

- TEST SETUP: Acc. to par.7 of Basic Std.
- TEST LOCATION: Low frequency phenomena area
- TEST EQUIPMENT USED FOR TEST: Power Network Simulator Spitzenberger + Spies
Mod. PHE 5000/PAS/D

- TESTED PORT: AC Power Input ports
- TIME INTERVAL BETWEEN SUCCESSIVE PULSES: 10s
- IMMUNITY LEVEL (reduction of the supply voltage) : > 95% for 5s ; 30% for 500ms;
> 95% for 20ms; > 95% for 10 ms

- PERFORMANCE CRITERION: B and C
- MEASUREMENT UNCERTAINTY: Level of confidence = 95%
Degree of freedom = 10
Coverage factor $k_p= 2,28$
Combined uncertainty of interruption voltage = 3,86 %
Combined uncertainty of reduction voltage = 3,86 %
Combined uncertainty of duration = 3,02 %

TEST CONDITIONS:	MEASURED
Ambient temperature : 15 - 35 °C	24 ± 3 °C
Ambient humidity : 25 - 75 %rH	40 ± 5 %rH
Pressure : 85 - 106 kPa (860 mbar - 1060 mbar)	950 ± 50 mbar
Voltage :	230 Vac ± 3%

OPERATING CONDITION (Rif. Section. 2) : #1

RESULT: WITHIN THE LIMITS

TEST RESULTS

Voltage Dips PORT N. 1 : AC (PORT OF MEASURE)

TEST LEVEL			WITHIN THE LIMIT	OUT OF LIMIT		NOTES	Reference Standard Acceptance criteria
%rid.	T (ms)	φ (°)	A	B	C		
>95%	10	0°	✓			No performance degradation	
		90°	✓				
		180°	✓				
		270°	✓				
>95%	20	0°	✓			No performance degradation	
		90°	✓				
		180°	✓				
		270°	✓				
TEST LEVEL			WITHIN THE LIMIT			NOTES	
30%	500	0°	✓			No performance degradation	
		90°	✓				
		180°	✓				
		270°	✓				

Voltage interruption

TEST LEVEL			WITHIN THE LIMIT			NOTES	Reference Standard Acceptance criteria
%rid.	T (ms)	φ (°)	A	B	C		
>95%	5000	0°	✓			No performance degradation (battery power)	
		90°	✓				
		180°	✓				
		270°	✓				

Note:

5. EUT TECHNICAL DOCUMENTATION

5.1 Wiring diagrams

	Document reference (n., edition, date, ...)
WIRING DIAGRAM	<ul style="list-style-type: none"> • <i>See manufacturer document</i>
PART LIST	<ul style="list-style-type: none"> • <i>See manufacturer document</i>

5.2 Technical manual

	Document reference (n., edition, date, ...)
<i>Installation Manual</i>	MANA Politec MW2

5.3 Photographic documentation

PHOTO N° 1 – EUT IDENTIFICATION



PHOTO N° 2 – RADIATED EMISSION SETUP

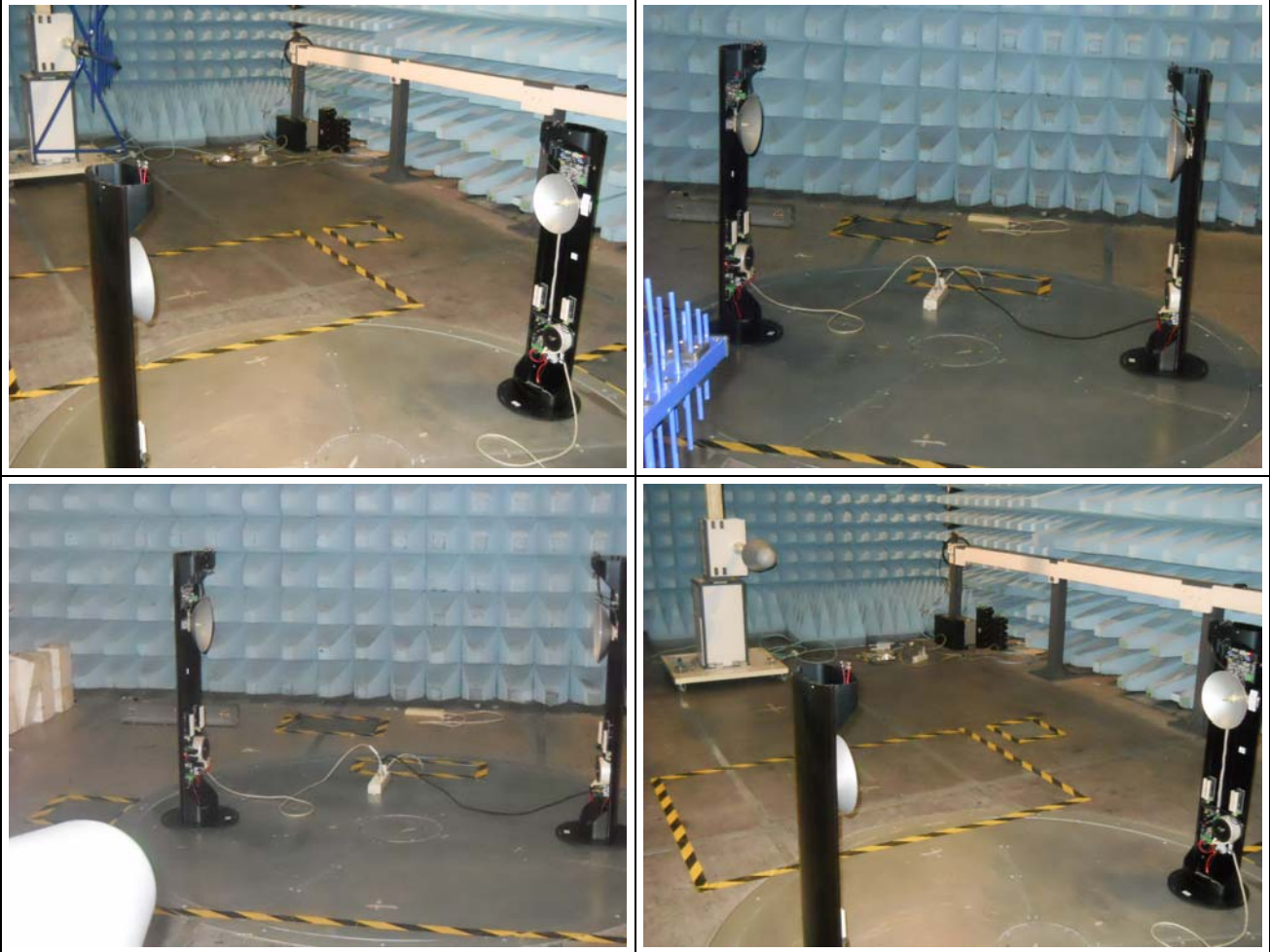


PHOTO N° 3 – IMMUNITY RADIATED SETUP

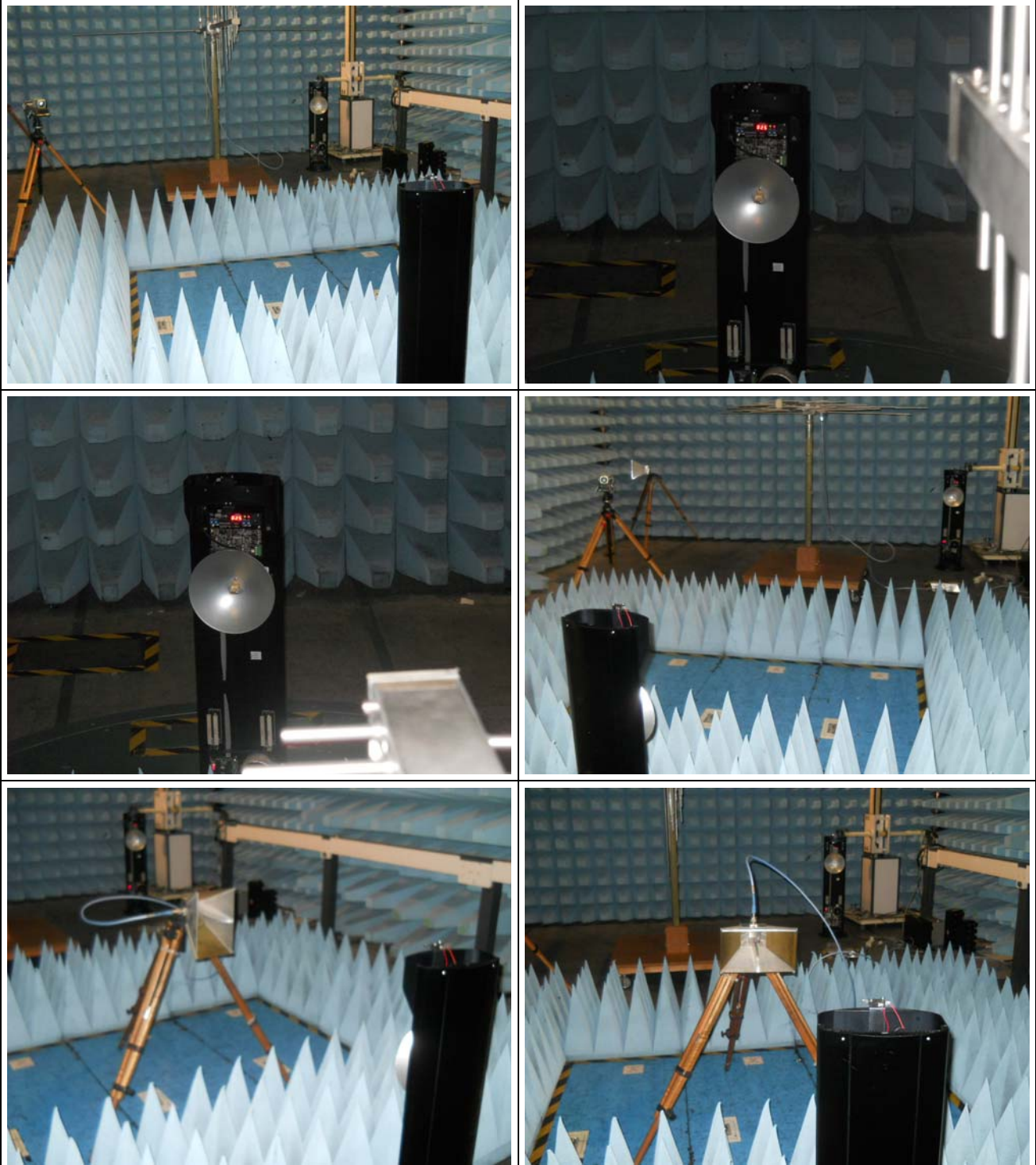


PHOTO N° 4 – ESD POINT

