

## Test Report issued under the responsibility of:

## **ENL Testing Laboratory**



# **TEST REPORT IFC** 60601-1-2

IEC 60601-1-2  Medical electrical equipment - EMC requirements					
Report reference No:	20111230.A01.01				
Date of issue:	2011-December-14				
Total number of pages:	34				
CB Testing Laboratory: Address:	Mettler -Toledo AG, ENL Testing Laboratory Heuwinkelstrasse 3 CH-8606 Nänikon Switzerland STS 008				
Applicant's name:	Metanor AG				
Address:	Murgtalstrasse 20, CH-9542 Münchwilen Mr. Martin Kuhn				
Test specification:					
Standard:	IEC 60601-1-2: 2007				
Test procedure:	□ CB □ CCA □ CE				
Non-standard test method:	N/A				
Test Report Form No:					
Test Report Form(s) Originator:	ENL Testing Laboratory				
Master TRF:	Dated: 2011-09-19				
Test item description:	biomedical instrument				
Trade Mark:	Bionik AG				
Manufacturer:	Metanor AG Murgtalstrasse 20, CH-9542 Münchwilen				
Model/Type reference:	01040001.02P / Biosyn 17-2				
Ratings	2xNiMH 9V E-Block 250mAh				

Page 2 of 34 Report No.: **20111230.A01.01** 

	CB Testing Laboratory:	Mettler-Toledo AG, ENL Te	sting Laboratory
Testin	g location/ address:	Heuwinkelstrasse 3 CH-8606 Nänikon Switzerland	
	Associated CB Test Laboratory:		
Testir	g location/ address:		
	Tested by (name + signature):	Marc Scheurmann Project Leader, EMC	Me
	Approved by (+ signature):	Bernhard Merk Team Leader, EMC	B. Hele
	Testing procedure: TMP		
	Tested by (name + signature):		
	Approved by (+ signature):		
Testir	g location/ address:		
	Testing procedure: WMT		
	Tested by (name + signature):		
	Witnessed by (+ signature):		
	Approved by (+ signature):		
Testir	g location/ address:		
	Testing procedure: SMT		
	Tested by (name + signature):		
	Approved by (+ signature):		
	Supervised by (+ signature):		
Testir	g location/ address:		
	Testing procedure: RMT		
	Tested by (name + signature):		
	Approved by (+ signature):		
Testin	Supervised by (+ signature):  ng location/ address:		

Page 3 of 34 Report No.: **20111230.A01.01** 

List of Attachments (including a total number of pages in each attachment):						
Documents included / attached to this report (descript	ion)	Page Numbers				
		1)				
		1)				
		1)				
Supplementary information:						
All attached test reports and documents are number	ered separately (Page x of y).					
Summary of testing:						
Tests performed (name of test and test clause):	Testing location:					
Complete test performed  Mettler-Toledo AG, ENL Testing Laboratory Heuwinkelstrasse 3 CH-8606 Nänikon Switzerland						
Summary of compliance with National Differences The standard EN 60601-1-2: 2007 has minor common		0604 4 2:2007				
The text of the International Standard IEC 60601-1-2: European Standard with agreed common modification	2007 was approved by CENELEC a					
Annex A, Subclause 4.2: Replace the last sentence by: These HAZARDS shall be considered in the RISK MANAGEMENT PROCESS.						
☐ The product fulfils the requirements of the correspondence	onding EN standards EN 60601-1-2:	2007				
Summary of testing:						

The tested product complies with the standard.

Page 4 of 34 Report No.: 20111230.A01.01

# Copy of marking plate CE Type: Biosyn17-2 Model No: 01040001.02P Serial No: 01010.0006-01P 2 x NiMH 9 V E-Block Power: 250 mAh Made in Switzerland

Page 5 of 34 Report No.: **20111230.A01.01** 

Test item particulars	
Classification of installation and use	Table standing
Supply Connection	Battery
Possible test case verdicts:	
- test case does not apply to the test object:	N/A
- test object does meet the requirement:	P (Pass)
- test object does not meet the requirement:	F (Fail)
Testing:	
Date of receipt of test item	2011-December-14
Date (s) of performance of tests:	2011-December-14 to 2011-December-14
General remarks:	
The test results presented in this report relate only to the This report shall not be reproduced, except in full, with laboratory.  "(see Enclosure #)" refers to additional information applies appended table)" refers to a table appended to the	nout the written approval of the Issuing testing pended to the report.
Throughout this report a ☐ comma / ☒ point is used	as the decimal separator.
Manufacturer's Declaration per sub-clause 6.2.5 of IE	CEE 02:
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided	☐ Yes ☐ Not applicable
When differences exist; they shall be identified in the 0	General product information section.
Name and address of factory (ies)	Metanor AG Murgtalstrasse 20, CH-9542 Münchwilen
General product information:	
These cover pages to the automated Mettler-Toledo E decision 51/2009.	EMC test reports are issued according IECEE CMC
These cover pages belongs to the Mettler-Toledo AG number.	test report. Both reports have the same report

## Contents

Part 1	Customer information	7
Part 2	Data of the test objects	8
Part 3	Accessories	
Part 4	Operating mode during test	
Part 5	Tests plan	
Emi	ssion EN 60601-1-2 class B equipment	11
	nunity EN 60601-1-2 Basic standard	
	1 Identification	
	2 Test records / graphs	
	liated emission	
Rac	liated RF on: Equipment or systems	23
ESI	D: Air discharges	25
	D: Contact discharges	
ESI	D: Indirect discharges	29
<b>Appendix</b>		31
Appendix		
Appendix		

Page 7 of 34 Report No.: 20111230.A01.01

#### Part 1 **Customer information**

Name of the company: Metanor AG

Address

Street: Murgtalstrasse 20 CH-9542 Münchwilen City / zip code: Country:

Switzerland

Telephone No.: +41 71 969 69 19 Email: info@metanor.com Contact person: Mr. Martin Kuhn

Page 8 of 34 Report No.: **20111230.A01.01** 

## Part 2 Data of the test objects

Number of instruments: 1

Address

Name of manufacturer:

Street:

Murgtalstrasse 20

City / zip code:

CH-9542 Münchwilen

#### **Test object**

Test object	Manufacturer's identification	Identification number. of the testing laboratory	Software version
1	01010.0006-01P	EMV SN 11000079	

Operating instructions: not available Data sheet: not available

Power cable: DC-cable Length power cable: 1.8m

Number of ports: 3

Type of ports: IN, OUT, Ext. Length port cable: 2.2m 2.2m 2.2m

#### **Additional information**

As supplied condition: Mr. Martin Kuhn

Technical data: --

EUT's mains voltage (EU): 230VAC, 50Hz EUT's mains voltage (US for FCC): 120VAC, 60Hz OPERA No.: 11001548 Page 9 of 34 Report No.: **20111230.A01.01** 

### Part 3 Accessories

1. Additional accessory

Number of instruments: 1
Name of manufacturer: Friwo

Model / type: 3342-FW73333SM/15

Serial No.: ---

Function description: External power adapter

Power cable: DC cable Length power cable: 1.8 m

2. Additional accessory

Number of instruments: 1
Name of manufacturer: Agilent
Model / type: 33521A
Serial No.: MY50000179

Function description: Function/Arbitrary Waveform Generator

Data cable: Coax cable Length data cable: 2.2m

3. Additional accessory

Number of instruments:

Name of manufacturer: Good Will Instrument (GW Instek)

Model / type: GDS-1152A Serial No.: EJ151106

Function description: Digital Storage Oscilloscope

Data cable: Coax cable Length data cable: 2.2m

Page 10 of 34 Report No.: **20111230.A01.01** 

Part 4		Operating m	ode during	y test
	Not	in operation		
$\overline{\checkmark}$	Con	tinuous operation		
	Part	ly in operation as o	described in te	est record
	Pow	er supply:		
	✓	Electrical supply	system:	230VAC, 50Hz 120VAC, 60Hz
		Others:		
Operating				easuring mode
Admissible	devia	itions:	Recognisa	able waveform
Check on				
Display:				ontrolled of Oscilloscope on set systems
Interface:			OUT-Port	
Test instru	ment:		Oscillosco	ope (see page 9)
Operating	cond	ition:	Different of	operating modes were tested, see remarks of each test.

Page 11 of 34 Report No.: 20111230.A01.01

#### Tests plan Part 5

### Emission EN 60601-1-2 class B equipment

Ref. Doc.: IEC 60601-1-2:2007

Test description and Standard	Verdict	Remarks
Radiated emission (ISM)	Р	Class B
EN 55011:2007 +A2:2007		30-1000MHz
Ref. Doc.: CISPR 11:2003+A1:2004+A2:2006		Group 1 equipment
Conducted emission (ISM)	N	Class B
EN 55011:2007 +A2:2007(ISM)		0.15-30MHz
Ref. Doc.: CISPR 11:2003+A1:2004+A2:2006		
Harmonic	N	0-2kHz
EN 61000-3-2:2006		Class A: P < 75W → Test is not
Ref. Doc.: IEC 61000-3-2:2005		required
Flicker	N	Unlikely to produce significant voltage
EN 61000-3-3:1995+A1:2001+A2:2005		fluctuations or flicker
Ref. Doc.: IEC 61000-3-3:1994/A2:2005		

Legend: Cr. Criteria

-- No test was performed
P Test passed
F Test failed

D Instrument is defective N Test is not required

Page 12 of 34 Report No.: **20111230.A01.01** 

## Immunity EN 60601-1-2 Basic standard

Ref. Doc.: IEC 60601-1-2:2007

Radiated RF on Equipment or systems   EN 61000-4-3:2006+A1:2008   Ref. Doc.: IEC 61000-4-3:2006   Magnetic field power frequency   EN 61000-4-8:1993+A1:2001   Ref. Doc.: IEC 61000-4-8:1993/A1:2000   N   Only for EUT with magnetically sensitive components.   3A/m   Onducted RF induced on cables   EN 61000-4-6:2007   Ref. Doc.: IEC 61000-4-6:2003 + A1:2004 + A2:2006   Burst on Power supply lines.   EN 61000-4-4:2004   Ref. Doc.: IEC 61000-4-4:2004   Ref. Doc.: IEC 61000-4-4:2004   Ref. Doc.: IEC 61000-4-4:2004   Ref. Doc.: IEC 61000-4-1:2004   Ref. Doc.: IEC 61000-4-1:2004   Ref. Doc.: IEC 61000-4-1:2005   N   Dip: <5%, 0.5 cycles   Dip: 70%, 25 cycles   Interruption: <5%, 250 cycles   Interruption: <5%, 250 cycles   Surge on power lines   N   0.5kV L/R   EN 61000-4-5:2006   N   O.5kV L/R   EN 61000-4-5:2006   N   O.5kV L/R   EN 61000-4-5:2006   N   O.5kV L/R   EN 61000-4-5:2006   Interruption: <5%, 250 cycles	Test description and Standard	Verdict	Remarks
Ref. Doc.: IEC 61000-4-3:2006         N         Only for EUT with magnetically sensitive components.           Ref. Doc.: IEC 61000-4-8:1993+A1:2001         3A/m         Sensitive components.           Ref. Doc.: IEC 61000-4-8:1993/A1:2000         N         0.15MHz - 80MHz 3Vemf           Conducted RF induced on cables EN 61000-4-6:2007         N         0.15MHz - 80MHz 3Vemf           Ref. Doc.: IEC 61000-4-6:2003 + A1:2004 + A2:2006         N         2.0kV           Burst on Power supply lines. EN 61000-4-4:2004         N         2.0kV           Burst on I/O, signal and control lines EN 61000-4-4:2004         N         1.0kV           EN 61000-4-4:2004 Ref. Doc.: IEC 61000-4-4:2004         N         Dip: <5%, 0.5 cycle		Р	80MHz - 2500MHz, 3V/m
Magnetic field power frequency         N         Only for EUT with magnetically sensitive components.           Ref. Doc.: IEC 61000-4-8:1993/A1:2000         3A/m           Conducted RF induced on cables         N         0.15MHz - 80MHz 3Vemf           EN 61000-4-6:2007         N         0.15MHz - 80MHz 3Vemf           Ref. Doc.: IEC 61000-4-6:2003 + A1:2004 + A2:2006         N         2.0kV           Burst on Power supply lines.         N         2.0kV           EN 61000-4-4:2004         N         1.0kV           Burst on I/O, signal and control lines         N         1.0kV           EN 61000-4-4:2004         N         Dip: <5%, 0.5 cycle			
EN 61000-4-8:1993+A1:2001  Ref. Doc.: IEC 61000-4-8:1993/A1:2000  Conducted RF induced on cables EN 61000-4-6:2007 Ref. Doc.: IEC 61000-4-6:2003 + A1:2004 + A2:2006  Burst on Power supply lines. EN 61000-4-4:2004 Ref. Doc.: IEC 61000-4-4:2004 Burst on I/O, signal and control lines EN 61000-4-4:2004 Ref. Doc.: IEC 61000-4-4:2004  Mains dips, interruptions, variations EN 61000-4-11:2004 Ref. Doc.: IEC 61000-4-11:2005 Surge on power lines  N 0.15MHz - 80MHz 3Vemf  N 1.0kV  1.0kV  Dip: <5%, 0.5 cycles Dip: 40%, 5 cycles Interruption: <5%, 250 cycles Interruption: <5%, 250 cycles Surge on power lines		NI	Only for ELIT with magnetically
Ref. Doc.: IEC 61000-4-8:1993/A1:2000       3A/m         Conducted RF induced on cables       N         EN 61000-4-6:2007       N         Ref. Doc.: IEC 61000-4-6:2003 + A1:2004 + A2:2006       N         Burst on Power supply lines.       N         EN 61000-4-4:2004       N         Burst on I/O, signal and control lines       N         EN 61000-4-4:2004       N         Ref. Doc.: IEC 61000-4-4:2004       N         Mains dips, interruptions, variations       N         EN 61000-4-11:2004       Dip: <5%, 0.5 cycle	. ,	IN	
Conducted RF induced on cables EN 61000-4-6:2007 Ref. Doc.: IEC 61000-4-6:2003 + A1:2004 + A2:2006  Burst on Power supply lines. EN 61000-4-4:2004 Ref. Doc.: IEC 61000-4-4:2004  Burst on I/O, signal and control lines EN 61000-4-4:2004 Ref. Doc.: IEC 61000-4-4:2004  Mains dips, interruptions, variations EN 61000-4-11:2004 Ref. Doc.: IEC 61000-4-11:2005  N Dip: <5%, 0.5 cycle Dip: 40%, 5 cycles Interruption: <5%, 250 cycles Surge on power lines  N O.15MHz - 80MHz 3Vemf  O.15MHz -			•
EN 61000-4-6:2007 Ref. Doc.: IEC 61000-4-6:2003 + A1:2004 + A2:2006  Burst on Power supply lines. EN 61000-4-4:2004 Ref. Doc.: IEC 61000-4-4:2004  Burst on I/O, signal and control lines EN 61000-4-4:2004 Ref. Doc.: IEC 61000-4-4:2004  Mains dips, interruptions, variations EN 61000-4-11:2004 Ref. Doc.: IEC 61000-4-11:2005  Surge on power lines  N		N	0
A2:2006   Burst on Power supply lines.   N   2.0kV			
Burst on Power supply lines. EN 61000-4-4:2004 Ref. Doc.: IEC 61000-4-4:2004 Burst on I/O, signal and control lines EN 61000-4-4:2004 Ref. Doc.: IEC 61000-4-4:2004 Mains dips, interruptions, variations EN 61000-4-11:2004 Ref. Doc.: IEC 61000-4-11:2005  Surge on power lines  N 2.0kV  1.0kV  Dip: <5%, 0.5 cycle Dip: 40%, 5 cycles Interruption: <5%, 250 cycles N 0.5kV L/N	Ref. Doc.: IEC 61000-4-6:2003 + A1:2004 +		
EN 61000-4-4:2004 Ref. Doc.: IEC 61000-4-4:2004  Burst on I/O, signal and control lines EN 61000-4-4:2004 Ref. Doc.: IEC 61000-4-4:2004  Mains dips, interruptions, variations EN 61000-4-11:2004 Ref. Doc.: IEC 61000-4-11:2005  Surge on power lines  N 1.0kV  Dip: <5%, 0.5 cycle Dip: 40%, 5 cycles Dip: 70%, 25 cycles Interruption: <5%, 250 cycles N 0.5kV L/N	A2:2006		
Ref. Doc.: IEC 61000-4-4:2004       N       1.0kV         Burst on I/O, signal and control lines       N       1.0kV         EN 61000-4-4:2004       N       Dip: <5%, 0.5 cycle		N	2.0kV
Burst on I/O, signal and control lines EN 61000-4-4:2004 Ref. Doc.: IEC 61000-4-4:2004  Mains dips, interruptions, variations EN 61000-4-11:2004 Ref. Doc.: IEC 61000-4-11:2005  Surge on power lines  N 1.0kV  Dip: <5%, 0.5 cycle Dip: 40%, 5 cycles Dip: 70%, 25 cycles Interruption: <5%, 250 cycles N 0.5kV L/N			
EN 61000-4-4:2004  Ref. Doc.: IEC 61000-4-4:2004  Mains dips, interruptions, variations EN 61000-4-11:2004  Ref. Doc.: IEC 61000-4-11:2005  Ref. Doc.: IEC 61000-4-11:2005  Surge on power lines  N Dip: <5%, 0.5 cycle Dip: 40%, 5 cycles Dip: 70%, 25 cycles Interruption: <5%, 250 cycles			4.01.14
Ref. Doc.: IEC 61000-4-4:2004       N       Dip: <5%, 0.5 cycle		N	1.0kV
Mains dips, interruptions, variations         N         Dip: <5%, 0.5 cycle           EN 61000-4-11:2004         Dip: 40%, 5 cycles           Ref. Doc.: IEC 61000-4-11:2005         Dip: 70%, 25 cycles           Interruption: <5%, 250 cycles			
EN 61000-4-11:2004 Ref. Doc.: IEC 61000-4-11:2005 Dip: 40%, 5 cycles Dip: 70%, 25 cycles Interruption: <5%, 250 cycles  N 0.5kV L/N		N	Din: <5% 0.5 cycle
Ref. Doc.: IEC 61000-4-11:2005         Dip: 70%, 25 cycles           Interruption: <5%, 250 cycles		IN	
Surge on power lines    Interruption: <5%, 250 cycles   N   0.5kV L/N			
Surge on power lines N 0.5kV L/N			
EN 61000-4-5:2006	Surge on power lines	N	
1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	EN 61000-4-5:2006		1.0kV L/E and N/E
Ref. Doc.: IEC 61000-4-5:2005			
Surge on I/O, DC-Input and DC-Output N Power ports	•	N	•
EN 61000-4-5:2006 1.0kV L/PE			
Ref. Doc.: IEC 61000-4-5:2005 0.5kV L/L			
Surge on I/O, AC Input and AC output  N Power ports		N	
EN 61000-4-5:2006 1.0kV L/PE			
Ref. Doc.: IEC 61000-4-5:2005         0.5kV L/L           ESD         P         6kV Contact discharge		D	
EN 61000-4-2:1995+A1:1998+A2:2001		F	0
Ref. Doc.: IEC 61000-4-2:1995/A2:2000			OKV All discharge

Legend: Cr. Criteria

-- No test was performed

P Test passed F Test failed

D Instrument is defectiveN Test is not required

Page 13 of 34 Report No.: **20111230.A01.01** 

#### Standards:

Note: The text of the International Standard (IEC) was approved by CENELEC (EN) as an European Standard with minor modifications (see page 3).

All EN-Standards are referenced to IEC- Standards with same content.

For details, see the corresponding protocols in appendix

- a) The statistical determination of the conformity of series manufactured instruments was not performed.
- b) Radiated and conducted emission performed in accordance with EN55011 (ISM)

Page 14 of 34 Report No.: **20111230.A01.01** 

## Appendix 1 Identification

Equipment under test (EUT)



Page 15 of 34 Report No.: **20111230.A01.01** 

## Appendix 2 Test records / graphs

#### **Radiated emission**

Test according to standard: EN55011 Class B						
Type:	Biosyn 17-2		Identification No.:	EMV SN 11000079		
Customer:	Metanor AG		Contact person:	Mr. Martin Kuhn		
Date of test: 2011-December-14 09:30 <sup>1</sup> 2011-December-14 10:20 <sup>2</sup> Ambient climate: 23.8°C, 40.9%r.H., 960mBar 23.8°C, 41.4%r.H., 960mBar 23.8°C, 40.9%r.H., 960mBar 24.8°C, 40.9%r.H.,						
EUT's mains voltage (DC or AC/Hz voltage): 9VDC battery mode						

Auxiliary equipment including cable length: See page Part 3 (Peripheral units)

Preview measurement in the Analyser-Mode (sweep) Final measurement in the Receiver-Mode (scan)

#### Max. emission level:

The maximum emission level of the EUT was searched and the measurement positions (antenna heights, antenna polarizations and turntable position) have been documented in the test report

Max EM-field searching parameters:

Turntable: 12 turntable positions and 12 steps with 30 degrees for one rotation

Antenna: Three antenna heights

Polarisation: For each antenna heights two polarisations (vertical and horizontal)

<sup>1</sup> Measurement 1: Measured at frequency 100kHz; Test setup 1, Power supply battery mode

TRF No. IECEMCa

-

<sup>&</sup>lt;sup>2</sup> Measurement 2: Measured at frequency 1MHz; Test setup 1, Power supply battery mode

<sup>&</sup>lt;sup>3</sup> Measurement 3: Measured in battery charging mode; Test setup 2, External power supply adapter

Page 16 of 34 Report No.: **20111230.A01.01** 

#### **Test result: Radiated emission Measurement 1**

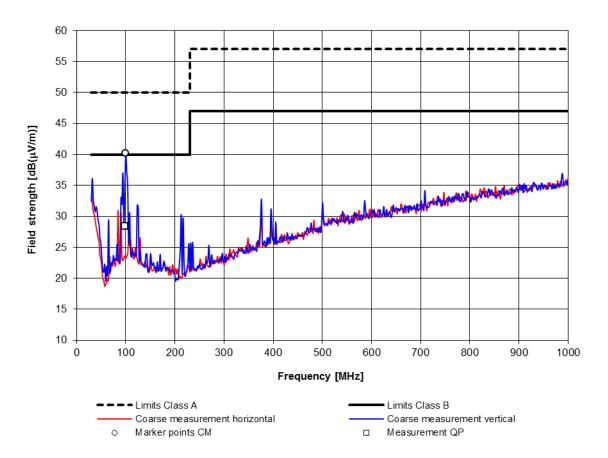
EUT: Biosyn 17-2, Id-no: EMV SN 11000079

The Graphical result should be interpreted as follows:

Curve red and blue are Coarse Measurements (CM) and measured with the peak detector. Marker points are Quasi Peak measurement (QP)

The Coarse Measurements (CM) points, which are exceeding the limit are marked with marker points (CM) and remeasured with the QP (quasi peak) detector. The results are marked with Quasi Peak marker points (QP).

Field strength measurement at 3m distance in the frequency range of 30 MHz to 1000 MHz Limits Class B



Marker points from coarse measurement				Measure	ement with tes	st receiver		
Frequency [MHz]	Field strength (at 3m distance) [dBuV/m]	Polarization	Frequency [MHz]	Field strength (at 3m distance) [dBuV/m]	Limits [dBuV/m]	Margin [dB]	Antenna position [cm]	Turntable position [Degrees]
99.98	40.24	vertical	98.8	28.4	40	11.6	300	240

#### Remarks:

Tested with external frequency of 100kHz applied on IN-Port.

EUT switched on "e3, high".

"IN"- and "OUT"-electrodes were grounded with artificial hands.

Page 17 of 34 Report No.: **20111230.A01.01** 

#### Test result: Radiated emission Measurement 2

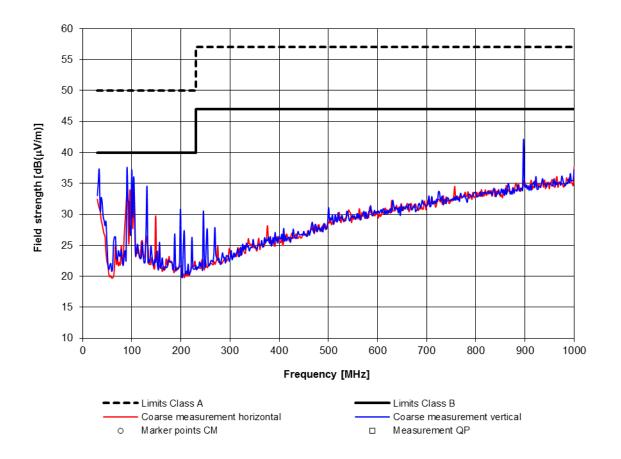
EUT: Biosyn 17-2, Id-no: EMV SN 11000079

The Graphical result should be interpreted as follows:

Curve red and blue are Coarse Measurements (CM) and measured with the peak detector. Marker points are Quasi Peak measurement (QP)

The Coarse Measurements (CM) points, which are exceeding the limit are marked with marker points (CM) and remeasured with the QP (quasi peak) detector. The results are marked with Quasi Peak marker points (QP).

Field strength measurement at 3m distance in the frequency range of 30 MHz to 1000 MHz Limits Class B



#### Remarks:

Tested with external frequency of 1MHz applied on Ext.-Port.

EUT switched on "Ext".

"IN"- and "OUT"-electrodes were grounded with artificial hands.

Page 18 of 34 Report No.: **20111230.A01.01** 

#### **Test result: Radiated emission Measurement 3**

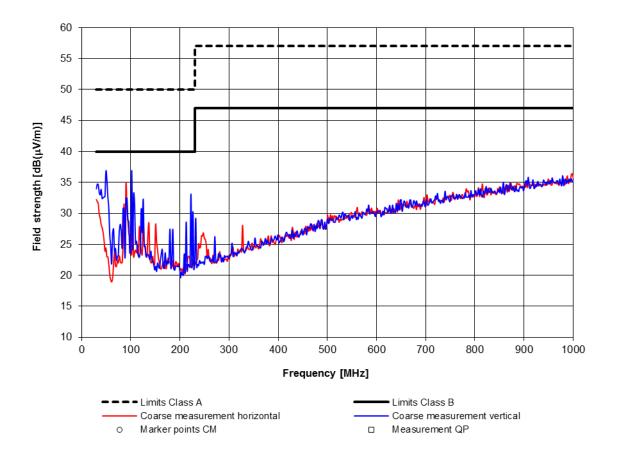
EUT: Biosyn 17-2, Id-no: EMV SN 11000079

The Graphical result should be interpreted as follows:

Curve red and blue are Coarse Measurements (CM) and measured with the peak detector. Marker points are Quasi Peak measurement (QP)

The Coarse Measurements (CM) points, which are exceeding the limit are marked with marker points (CM) and remeasured with the QP (quasi peak) detector. The results are marked with Quasi Peak marker points (QP).

Field strength measurement at 3m distance in the frequency range of 30 MHz to 1000 MHz Limits Class B



## Remarks: Tested performed in battery charging mode

Photo 1: Turntable with front side of EUT

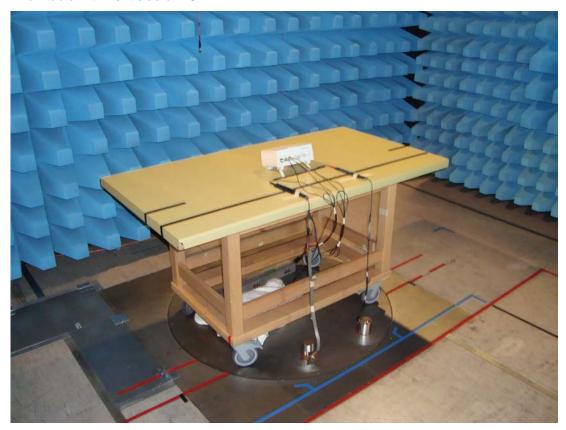


Photo 2: Turntable with right side of EUT

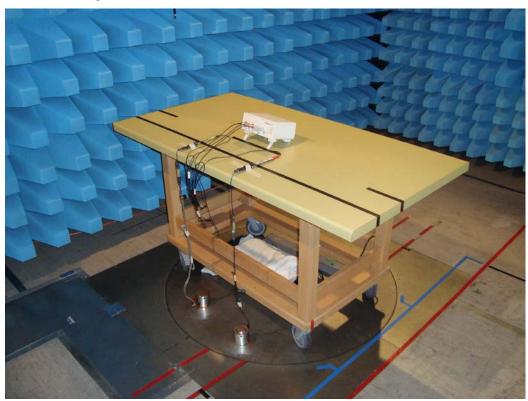


Photo 3: Turntable with rear side of EUT



Photo 4: Turntable with left side of EUT



Photo 1: Turntable with front side of EUT



Photo 2: Turntable with right side of EUT



Photo 3: Turntable with rear side of EUT



Photo 4: Turntable with left side of EUT



Page 23 of 34 Report No.: 20111230.A01.01

### Radiated RF on: Equipment or systems

Test according to standard: EN 61000-4-3 / Crit. A						
Type: Biosyn 17-2 Identification no.: EMV SN 11000079						
Customer:	Metanor AG		Contact person:	Mr. Martin Kuhn		
Date of test: 2011-December-14 12:07 Ambient climate: 23.8°C, 41.4%r.H., 959mBar						
EUT's mains voltage (DC or AC/Hz voltage): 9VDC battery mode						

Auxiliary equipment including cable length: See page Part 3 (Peripheral units)

Frequency range:	80 to 1000MHz 1.4-2GHz 2-2.5GHz	Frequency step size:	1%
Frequency step duration:	1 sec	Modulation:	1 kHz, 80% AM
Limit:	3 V/m 3 V/m 3 V/m		
Maximum deviation:	See page 10	Testing weight (for balances):	

#### EUT side:

Front	Х	Antenna horizontally polarised		Antenna vertically polarised
Right	х	Antenna horizontally polarised		Antenna vertically polarised
Rear		Antenna horizontally polarised		Antenna vertically polarised
Left		Antenna horizontally polarised		Antenna vertically polarised
Number of graphs:		Measurement deviation and/or		Field deviation

Two EUT position tested because of the small size of the EUT External frequency port connected to waveform generator. "OUT"-port connected to electrode and oscilloscope. "IN"- and "OUT"-electrodes were grounded with artificial hands.

## Test set-up: Radiated RF on: Equipment or systems

Photo 1: Turntable with front side of EUT



Photo 2: Turntable with right side of EUT



## **ESD:** Air discharges

Test according to standard: EN 61000-4-2 / Crit. B							
Type: Biosyn 17-2 Identification no.: EMV SN 11000079							
Customer:	Metanor AG		Contact person:	Mr. Martin Kuhn			
Date of test:	2011-December-14	17:55	Ambient climate:	22.5°C, 41.9%r.H., 960mBar			
EUT's mains	EUT's mains voltage (DC or AC/Hz voltage): 9VDC battery mode						

Auxiliary equipment including cable length: See page Part 3 (Peripheral units)

Time interval between two discharges:		1 sec	Number of discharges per point and polarity:		10
Nominal voltage: Discharge po (documented			Polarity		
8KV	picture	•	Positive	Negative	
Effective value			Loss of function or performance		
2kV; 4kV	L1		None	None	
6kV; 8kV	L1		None	None None	

Effective value	2 <sup>nd</sup> Discharge point	Loss of function	n or performance
2kV; 4kV	L2	None	None
6kV; 8kV	L2	None	None

Effective value	3 <sup>rd</sup> Discharge point	Loss of function	n or performance
2kV; 4kV	L3	None	None
6kV; 8kV	L3	None	None

Effective value	4 <sup>th</sup> Discharge point	Loss of function	n or performance
2kV; 4kV	L4	None	None
6kV; 8kV	L4	None	None

Effective value	5 <sup>th</sup> Discharge point	Loss of function	n or performance
2kV; 4kV	L5	None	None
6kV; 8kV	L5	None	None

Remarks: --

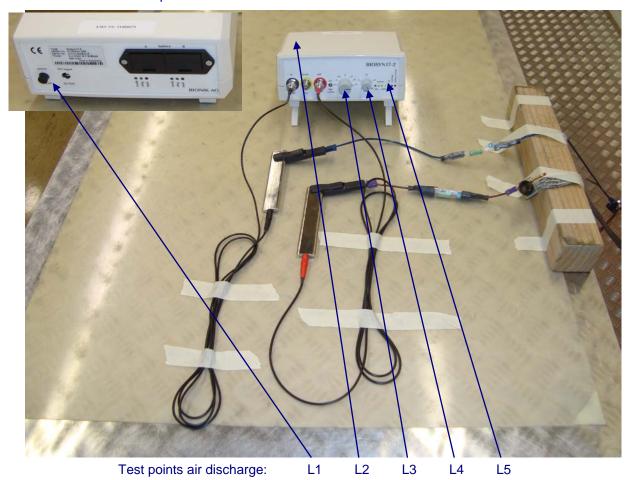
Tested with internal frequency generator.
"IN"- and "OUT"-electrodes were grounded with artificial hands.

Page 26 of 34 Report No.: **20111230.A01.01** 

## Test set-up: ESD: Air discharges

EUT: Biosyn 17-2, Id-no: EMV SN 11000079

Photo: EUT view with test points marked



## **ESD: Contact discharges**

Test according to standard: EN 61000-4-2 / Crit. B							
Type: Biosyn 17-2 Identification no.: EMV SN 11000079							
Customer:	Metanor AG		Contact person:	Mr. Martin Kuhn			
Date of test:	2011-December-14	18:10	Ambient climate:	22.5°C, 41.9%r.H., 960mBar			
EUT's mains	EUT's mains voltage (DC or AC/Hz voltage): 9VDC battery mode						

Auxiliary equipment including cable length: See page Part 3 (Peripheral units)

Time interval between two discharges: 1 sec		Number of discharges per polarity:	er point and	10	
Nominal voltage:	Discharge	points	Pol	arity	
6KV	(documented by a picture)		Positive	Negative	
Effective value	1 <sup>st</sup> discharg	e point	Loss of function	n or performance	
2KV; 4KV	K1		None	None	
6KV	K1		None	None	
	nd				
Effective value	2 <sup>nd</sup> discharg	ge point	Loss of function	or performance	
2KV; 4KV	K2		None	None	
6KV	K2		None	None	
			1		
Effective value	3 <sup>rd</sup> discharge point		Loss of function or performance		
2KV; 4KV	К3		None	None	
6KV	K3		None	None	
Effective value	4th dia da anna	! - !	l and of femalian		
Effective value	4 <sup>th</sup> discharg	e point		or performance	
2KV; 4KV	K4		None	None	
6KV	K4		None	None	
Effective value	5 <sup>th</sup> discharg	o point	Loop of function	or porformance	
		e point		or performance	
2KV; 4KV	K5		None	None	
6KV	K5		None	None	
Effective value	6 <sup>th</sup> discharg	e point	Loss of function	or performance	
2KV; 4KV	K6	o pome	None	None	
6KV	K6		None	None	

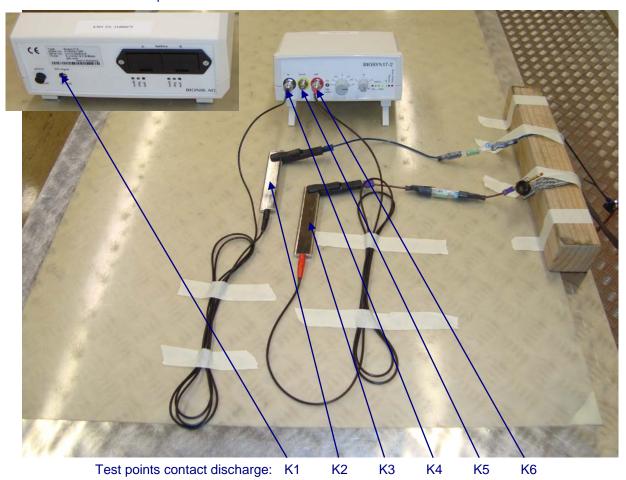
Tested with internal frequency generator.
"IN"- and "OUT"-electrodes were grounded with artificial hands.

Page 28 of 34 Report No.: **20111230.A01.01** 

## **Test set-up: Contact discharges**

EUT: Biosyn 17-2, Id-no: EMV SN 11000079

Photo: EUT view with test points marked



Page 29 of 34 Report No.: 20111230.A01.01

## **ESD: Indirect discharges**

Test according to standard: EN 61000-4-2 / Crit. B							
Type: Biosyn 17-2 Identification no.: EMV SN 11000079							
Customer:	Metanor AG		Contact person:	Mr. Martin Kuhn			
Date of test:	2011-December-14	18:10	Ambient climate:	22.5°C, 41.9%r.H., 960mBar			
EUT's mains	EUT's mains voltage (DC or AC/Hz voltage): 9VDC battery mode						

Auxiliary equipment including cable length: See page Part 3 (Peripheral units)

Time interval between two discharges:	1 sec	Number of discharges per point and polarity:	10
---------------------------------------	-------	--	----

Effective value	Horizontal coupling plane	Loss of function or performance	
2KV	Front	None	None
4KV	Front	None	None
2KV	Right	None	None
4KV	Right	None	None
2KV	Left	None	None
4KV	Left	None	None

Effective value	Vertical coupling plane	Loss of function or performance	
2KV	Front	None	None
4KV	Front	None	None
2KV	Right	None	None
4KV	Right	None	None
2KV	Rear	None	None
4KV	Rear	None	None
2KV	Left	None	None
4KV	Left	None	None

#### Remarks:

Tested with internal frequency generator. "IN"- and "OUT"-electrodes were grounded with artificial hands.

Page 30 of 34 Report No.: **20111230.A01.01** 

## Test set-up: Indirect discharges

EUT: Biosyn 17-2, Id-no: EMV SN 11000079

Photo: EUT with vertical coupling plate



Page 31 of 34 Report No.: **20111230.A01.01** 

## Appendix 3 Additional documentation of the test

None

## Appendix 4 Documentation of the test and the EUT

None

Page 32 of 34 Report No.: **20111230.A01.01** 

## **Appendix 5** Test and measurement equipment

## **Measurement Uncertainty:**

The measurement uncertainty (with 95% confidence level) for the EMC tests were according to the standard used

Equipment	ENL Identification No.	Comment
Radiated emission		
Faraday chamber, Siemens	ENL-P 000 / 0008	Used
Ultra broadband antenna, model HL562 Ultralog, R&S	ENL-P 098 / 0315	Used
Ultra broadband antenna, model 3142D (BiConiLog), ETS Lindgren	ENL-P 098 / 0435	Used
EMI test receiver, model ESIB 7, R&S	ENL-P 098 / 0291	Used
Decoupling clamp, FTZ40X15E	ENL-P 102 / 0275-7	Used
AC power supply, model KBT 150 C, Behlmann	ENL-P 015 / 0085	
Digital wattmeter, model 2100, Valhalla Sci. Inc.	ENL-P 015 / 0086	
Set of coaxial cable	ENL-P 102 / 0120	
Software, Compliance 3E V4.01		Used
Software, Labview V8.6		Used

Conducted emission		
Faraday room 1,8 x 2,2 x 3m, Siemens	ENL-P 014 / 0083	Used
Artificial network (3-Phase) model ESH2-Z5	ENL-P 014 / 0079	
2-line-V-network (1-Phase) model ESH3-Z5	ENL-P 014 / 0080	Used
Pulse limiter, model ESH3-Z2, R&S	ENL-P 014 / 0082	Used
R.F. current probe, Solar Elect. Co	ENL-P 000 / 0333	
Multimeter, model 189, Fluke	ENL-P 000 / 0278	
AC power supply, model KBT 150 C, Behlmann	ENL-P 015 / 0085	Used
Digital wattmeter, model 2100, Valhalla Sci. Inc.	ENL-P 015 / 0086	Used
Transformer, model RRTL, REO		Used
Software, Compliance 3E V4.01		Used
Software, ESIB-K1 V1.2		Used

Equipment	ENL Identification No.	Comment
Radiated RF		
Faraday chamber, Siemens	ENL-P 000 / 0008	Used
Ultra broadband antenna, model HL562 Ultralog, R&S	ENL-P 098 / 0315	Used
Ultra broadband antenna, model 3142D (BiConiLog), ETS Lindgren	ENL-P 098 / 0435	Used
Controller for turntable and antenna mast HD100		Used
High field biconical antenna, model 3109, EMCO	ENL-P 086 / 0104	
Antenna mast, model MA231		Used
Antenna coaxial cable, model RG_214_U, RG_214_Hiflex		Used
R.F. power amplifier AR 150W1000, Emitec AG	ENL-P 000 / 0402	Used
R.F. power amplifier 250WA250S, Emitec AG	ENL-P 097 / 0185	Used
R.F. power amplifier 75W CBA 9429, Emitec AG	ENL-P 000 / 0363	Used
Signal generator, model SML03, R&S	ENL-P 000 / 0364	Used
Power sensor, model NRP-Z91, R&S	ENL-P 000 / 0383	Used
USB adapter, model NRP-Z4	ENL-P 000 / 0383	Used
Coupler, model DC2600, Emitec AG	ENL-P 097 / 0183	Used
Coupler, model C6934-12, Werlatone	ENL-P 000 / 0316	Used
Coupler, model C6187-10, Werlatone	ENL-P 000 / 0382	Used
Attenuator, model 50FH-050-300, JFW	ENL-P 000 / 0292	Used
R.F. E-field sensor, model Holaday	ENL-P 000 / 0366	
R.F. switch, Pischzan	ENL-P 000 / 0365	Used
Amplifiers control panel, wm		Used
Sensor tripod, model PS2000	ENL-P 105 / 0156	
Decoupling clamp FTZ40X15E	ENL-P 106 / 0168	Used
Camera systems: camera DSP 1/4" SCC-C4301P, dome camera SCC-C6405P, panel SSC-2000P, 4 channel triplex recorder SHR-2024P, 17" monitor SMT-171P, supplement, Samsung	ENL-P 100 / 0387	Used
Software, Compliance 3I V4.01		Used
Software, Labview V7.1		Used

Burst		
Burst generator, model EFT503, EM Test AG	ENL-P 000 / 0308	Used
Capacitive interference coupling device, teseq	ENL-P 023 / 0148	Used
3-phase couple network, model CNI503A, Emitec AG	ENL-P 000 / 0399	Used
Software, ISMIEC V4.10, EM-Test		Used

Equipment	ENL Identification No.	Comment
Conducted RF		
Wave simulator, model CWS500N1, EM Test AG	ENL-P 000 / 0407	Used
Attenuator 6dB, model 50FH-006-100, JFW	ENL-P 106 / 0165	Used
RF current-injection clamp, model EM101, Lüthi	ENL-P 106 / 0166	Used
Decoupling clamp, model FTC101	ENL-P 106 / 0167	
Decoupling clamp, model FGZ40X15E	ENL-P 106 / 0168	
Coupling / decoupling network, model CDN801-M1, Lüthi	ENL-P 106 / 0179	
Coupling / decoupling network, model CDN801-M2/M3	ENL-P 106 / 0169	Used
Coupling / decoupling network, model CDN801-M5, Lüthi	ENL-P 106 / 0170	
Coupling / decoupling network, model CDN S9, EM Test AG	ENL-P 106 / 0206	
Coupling / decoupling network, model CDN S25,EM Test AG	ENL-P 106 / 0207	
Coupling / decoupling network, model CDN L-801 S9, Lüthi	ENL-P 106 / 0359	
Coupling / decoupling network, model CDN TWP 4x2, wm	ENL-P 106 / 0424	Used
Coupling / decoupling network, model CDN USB, wm	ENL-P 106 / 0423	
R.F. cable set, Huber & Suhner	ENL-P 106 / 0171	Used
Software, icd.control V5.0.16, EM-Test		Used

AC mains voltage dips and interruptions, variations		
Control unit (Variac), model MV6500R	ENL-P 112 / 0281	Used
Variac unit, model MV6500	ENL-P 112 / 0280	Used
Oscilloscope, model TDS220, Tektronix	ENL-P 112 / 0279	Used
AC switching unit, model 718-1165 V2.1, teseq	ENL-P 112 / 0282	Used
Software, WIN2110SII V2.2.0.5, teseq		Used

Surge		
Surge generator, model VCS 500-M, EM Test AG	ENL-P 000 / 0398	Used
Surge coupling/decoupling networks CNV504A,EM Test AG	ENL-P 000 / 0400	Used
3-phase couple network, model CNI503A, Emitec AG	ENL-P 000 / 0399	Used
Software, ISMIEC V4.10, EM-Test		Used

ESD		
ESD simulator, model ESD 30, EM Test AG	ENL-P 024 / 0149	Used
Air discharge module, model ESD18, EM Test AG	ENL-P 024 / 0150	Used
Relay discharge module, model ESD18 (contact discharge)	ENL-P 024 / 0151	Used
Electrostatic field meter, model 775, Ion Systems	ENL-P 000 / 0336	Used