

Технически изисквания за
изпълнение на поръчката
/Технически спецификации
попълнени/

Критерий за оценка на офертите



III. ТЕХНИЧЕСКИ ИЗИСКВАНИЯ ЗА ИЗПЪЛНЕНИЕ НА ПОРЪЧКАТА

Наименование на материала за доставка: Доставка на балансови електромери, комуникаращи и функциониращи с използваните в „ЧЕЗ Разпределение България“ АД комуникационни устройства (рутер) тип RTR512.7-6LY за изграждане на балансово мерене

Мерна единица: Брой

Характеристика на материала

Техническата спецификация се отнася за трифазен статичен многотарифен електромер за балансово измерване, клас на точност минимум индекс А или по добър, с LCD дисплей и вграден тарифен часовников превключвател.

Използване

Електромерът е предназначен за измерване на активна енергия по тарифи.

Съответствие на предложеното изпълнение със стандартизационните документи:

Електромерът трябва да отговаря на приложимите български и международни стандарти или еквиваленти и на техните валидни изменения и поправки:

- Директива 2004/22/EC - „Directive 2004/22/EC of the European Parliament and of the Council of 31 March 2004 on measuring instruments (MID)“, относно средствата за измерване.

За предлаганите електромери кандидатът трябва да предостави подписани и подпечатани документи, удостоверяващи надеждната комуникация с използваните в „ЧЕЗ Разпределение България“ АД комуникационни устройства (рутер) тип RTR512.7-6LY – и за това, че:

- Предлаганият електромер позволява интегриране с използваната в „ЧЕЗ Разпределение България“ АД система за дистанционно отчитане и управление ADD – SMART IMS (SIMS), базирана на ADDAX технология, осигурява надеждна комуникация и поддържа всички функции (отчитане, сверяване на часовника и други), използвани в момента при работа на системата.
- Предлаганият електромер позволява интегриране, надеждна комуникация и функциониране с използваните в ЧЕЗ Разпределение България АД комуникационни устройства (рутер) тип RTR512.7-6LY.

Документи:

№ по ред	Наименование	Приложение No. или текст
1.1	ЕО сертификат за изследване на типа съгласно модул В на НСИОССИ (Directive 2004/22/EC, Annex B), вкл. приложенията „Типово изпитване“. Доклад на нотифициращия орган за оценяване на съответствието, описващ извършените дейности, и резултатите от тях.	ЕО сертификат за изследване на типа № SK10-MI003-SMU009
1.2	Една от следните декларации: Декларация за съответствие с типа, основано на осигуряване качеството на производството съгласно модул D на НСИОССИ (Directive 2004/22/EC, Annex D). Декларацията трябва да бъде придружена със заключението за съответствие на системата по качеството, издадено от нотифициращия орган, и неговия идентификационен номер; или Декларация за съответствие с типа, основано на проверка на продукта съгласно модул F на НСИОССИ (Directive 2004/22/EC, Annex F).. Декларацията трябва да бъде придружена с издадения от нотифициращия орган сертификат за съответствие по отношение на извършваните изследвания и изпитвания и неговия идентификационен номер;	Сертификат за качеството на производството Annex D SK12-QD-SMU006
1.3	Протоколи от проведени изпитвания с приложени резултати от одобрението на типа – заверени копия, с приложен списък на отделните изпитвания; сертификат/ акредитация на от нотифициращия орган, провел типови изпитвания – заверено копие.	Протоколи от проведени изпитвания от SP Swedish National Testing and Research Institute

1.4	Електромерите трябва да са конструирани, произведени и изпитани съгласно EN 50470-1 и EN 50470-3, клас на точност минимум индекс А или по-добър	Анекс към ЕО сертификат за изследване на типа № SK10-MI003-SMU009 Клас на точност С
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ТЕХНИЧЕСКИ СПЕЦИФИКАЦИИ

1 Електромери балансови -трифазни

Параметър/Описание	Изискване	Предложение	
1.Съответствие със стандарти	IEC60687 или еквивалентен	Да	
	IEC61036 или еквивалентен	Да	
	IEC61268 или еквивалентен	Да	
	IEC61038 или еквивалентен	Да	
	IEC62052-11 или еквивалентен	Да	
	IEC62053-21 или еквивалентен	Да	
	IEC62056-21 или еквивалентен	Да	
	DIN43857-2, DIN43859(с изключение на диаметъра на свързващите клеми) или еквивалентен	Да	
	DIN43857-4, DIN43859(с изключение на дълбочината на капака на клемния блок) или еквивалентен	Да	
2.Клас на точност	- За активна енергия	Минимум индекс А или по добър	Клас С
	- При не балансирано захранване от 2% електромерът трябва да бъде в класа на точност	Задължително	Да
3.Параметри на околната среда	-Температурен интервал	-10°C.....+45°C	Да
	-Граничен работен интервал	-20°C.....+55°C	Да
	-Температура на съхранение и транспорт	-25°C.....+70°C	Да
	-Относителна влажност	80%	Да
4.Системни условия	- Схеми на свързване * трифазен за свързване с ТТ	Триелементна/четир ипроводна	Да
	-Възможности за включване на трифазния балансов триелементен (4-Wire) електромер към двуелементни (Ar0n) схеми	Задължително	Да
	- Напрежение	3x230/400V	Да



	- Номинален ток * трифазен за свързване с ТТ	5А	Да	
	- Максимален ток * трифазен за свързване с ТТ	Два пъти номиналния (при $I_n=1A$ максималния трябва да бъде повече от 6А)	10А	
	- Максимален ток при краткотрайно претоварване	20 x I_{max} за 0.5 сек.	Да	
	- Ток на чувствителност	$\leq 0.2\% \cdot I_n$		
	-Честота	50Hz	Да	
	-Неналичие на самоход:когато електромерът е под напрежение в интервала (0.8-1.2).Un и липса на ток, изхода на електромера (светодиода)не трябва да генерира повече от един импулс	Задължително	Да	
	-Собствена консумация	*напрежена верига -Активна мощност -Пълна мощност	<2 W <10 VA	Да
		* токова верига	<1 VA	Да
5.Измервани величини	-Енергия	kWh	Да	
	- Брой тарифи * За активна енергия	Минимум 4	Да	
	- Превключване на тарифите	С управление от вградения часовник или от софтуера на системата, като с приоритет да бъде системата	Да	
	- Програмиране на тарифите * Дневно с 4 сезона	Съгласно ПИКЕЕ	Да	
	- Измерване и запамяване на товарите криви	Задължително	Да	
6.Възможност на измерването	- Предварително дефиниране на билинг периодите	Задължително	Да	
	- Определяне на край на билинг период	*Ръчно – на място посредством бутон	Препоръчителни	Да
		*Автоматично- по зададен календарен график	Задължително	Да
		*Посредством РС и софтуер за обслужване	Задължително	Да
	- Капацитет за товари криви	При 60 мин. интервали поне 40 дни	Да	Да
	- Отчитане на статус на събития	*повишено(понижено) напрежение	Задължително	Да
		*наличие на диференциален ток	Задължително	Да
- Регистриране на ток в обратна посока	Задължително	Да	Да	
7. Комуникация	- Възможност за комуникация с персонален компютър	Задължително	Да	
	- Програмиран е/ настройка	* На място и/или дистанционно	Задължително	Да
		*Посредством РС	Задължително	Да



	- Отчитане на измерваните величини	* на място, визуално	Задължително	Да	
		* на място, посредством РС	Задължително	Да	
		* Дистанционно	Задължително	Да	
	- PLC комуникация		Задължително	Да	
	* Чрез вграден PL модем				
	- Импулсни входове		Препоръчителни	Не	
	- Импулсни изходи		Задължително	Да	
8. Часовник	- Наличие на вграден часовник		Задължително	Да	
	- Източник на измерването		От кварцов осцилатор	Да	
	- Грешка на часовник	* В нормален режим	<0,5 сек /ден	Да	
		* При резервно захранване за 36 часа	<1,5 сек	Да	
		* При изменение на температурата	<0,1сек/°C на ден	Да	
- Възможност за синхронизиране от друг електромер или централно, чрез комуникационно устройство посредством комуникационни портове		Задължително	Да		
9.Превключване на тарифите	- С използване на вградения часовник		Задължително	Да	
	- Чрез външна команда от софтуера на системата		Задължително	Да	
10.Механични изисквания	- Степен на защита		≥IP51	Да	
	- Негоримост		Задължително	Да	
	- Защита от корозия за времето на нормален експлоатационен живот		Задължително	Да	
	- Клемен блок за предно свързване (несиметрично)		Съгласно DIN	Да	
11. Защита	- Възможност за пломбиране	* Капака на електромера	Задължително	Да	
		* Капака на клемния блок	Задължително	Да	
	- Отчитане на необичайни събития,опити за отваряне на електромера, брой отпадания на напрежението и др.		Задължително	Да	
12. Експлоатационен живот			Поне 15 години	Да	
13. Дисплей	- тип		LCD	Да	
	- живот на дисплея		Поне 15 години	Да	
	- брой цифри		Поне 5 за цяло число и 2 след десетичната запетая	Да	
	- информация за визуализация	* броячи		Задължително	Да
		* моментни стойности на измерваните величини		Задължително	Да
		* индикатори на събития		Задължително	Да
	- Циклично извеждане на информацията		Задължително	Да	
	- Програмиране на продължителността на визуализация на стойностите		Задължително	Да	
- Програмиране на вида и реда на визуализация на величините		Задължително	Да		



14. Захранване	- Вътрешно	При трифазните електромери трифазно захранване. Работи при присъствие на кое да е линейно напрежение или фаза и неутрала	Да
15. Параметризиран е на електромера	- Трябва да се представи софтуера за параметризиране на електромера на български или английски	Задължително	Да
	- не се допуска нулиране на броячите чрез оптичния интерфейс или чрез PLC	Задължително	Да

IV. КРИТЕРИЙ ЗА ОЦЕНКА НА ОФЕРТИТЕ.

Критерият за оценка на офертите е «най-ниска цена».

Допустимост на участниците.

Условие за допустимост на участниците до разглеждане на ценовото им предложение е изискването те да са представили всички изискуеми документи, посочени в т. 2. „Съдържание на офертата“ от Глава V. „Указания за подготовка и подаване на оферта“ от документацията за участие, без да е констатирана нередовност по отношение на тях,

Оценка на офертите.

Оценката на офертите, класирането на участниците и определянето на Изпълнител се извършва по реда на ЗОП и настоящата документация, при критерий за оценка: „най-ниска цена“. На първо място се класира участникът, предложил най-ниска цена за изпълнение предмета на поръчката.



Документи, удостоверяващи надеждната
комуникация с използваните в „ЧЕЗ
Разпределение България“ АД комуникационни
устройства (рутер) тип RTR512.7-6L/Y





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ДЕКЛАРАЦИЯ

удостоверяваща надеждната комуникация с използваните в „ЧЕЗ
Разпределение България“ АД комуникационни устройства (рутер)
тип RTR512.7-6L/Y

Долуподписаният Стефан Даджат Дикарло, с ЕГН 5802154641, в качеството ми на Изпълнителен Директор на фирма АДД България ООД, участник в процедура за възлагане на обществена поръчка № PPD 15-006 с наименование:

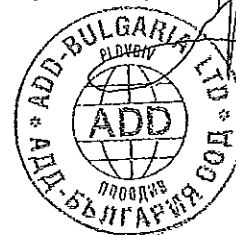
„Доставка на балансови електромери, комуникиращи и функциониращи с използваните в „ЧЕЗ Разпределение България“ АД комуникационни устройства (рутер) тип RTR512.7-6L/Y за изграждане на балансово мерене“

Декларирам, че:

1. Предлаганият електромер позволява интегриране с използваната в „ЧЕЗ Разпределение България“ АД система за дистанционно отчитане и управление ADD – SMART IMS (SIMS), базирана на ADDAX технология, осигурява надеждна комуникация и поддържа всички функции (отчитане, сверяване на часовника и други), използвани в момента при работа на системата.
2. Предлаганият електромер позволява интегриране, надеждна комуникация и функциониране с използваните в ЧЕЗ Разпределение България АД комуникационни устройства (рутер) тип RTR512.7-6L/Y.

12.02.2015

Стефан Дикарло





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ДЕКЛАРАЦИЯ

Относно възможността собствената консумация в токовите вериги на електромера да е по-малко от 1VA

Долуподписаният Стефан Даджат Дикарло, с ЕГН 5802154641, в качеството ми на Управител на фирма АДД България ООД, участник в процедура за възлагане на обществена поръчка № PPD 15-006 с наименование:

„Доставка на балансови електромери, комуникиращи и функциониращи с използваните в „ЧЕЗ Разпределение България“ АД комуникационни устройства (рутер) тип RTR512.7-6L/Y за изграждане на балансово мерене“

Декларирам, че:

във връзка с т. III. 2. от протокола от проведено договаряне от 26.02.2015г. изпратихме запитване до производителя и получихме отговор, че собствената консумация в токовите вериги на електромера е по-малко от 1VA.

Установената собствена консумация в токовите вериги на електромера е 0,08VA.

16.03.2015

Стефан Дикарло





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ДЕКЛАРАЦИЯ

относно предоставянето на протокол от акредитирана лаборатория за тип NP73 по т. 1.3 от изискваните документи

Долуподписаният Стефан Даджат Дикарло, с ЕГН 5802154641, в качеството ми на Управител на фирма АДД България ООД, участник в процедура за възлагане на обществена поръчка № PPD 15-006 с наименование:

„Доставка на балансови електромери, комуникиращи и функциониращи с използваните в „ЧЕЗ Разпределение България“ АД комуникационни устройства (рутер) тип RTR512.7-6L/Y за изграждане на балансово мерене“

Декларирам, че:

във връзка с т. III. 3. от протокола от проведено договаряне от 26.02.2015г. производителят се намира във финална фаза на процедура по придобиване на протоколи от проведени изпитвания с приложени резултати от одобрението на типа за трифазен индиректен електромер.

Като доказателство на горе декларираното прилагаме вече издадени протоколи за монофазен и трифазен директен електромери.

Имаме уверението от тестващата лаборатория и декларираме, че в случай на одобрение на АДД България ООД като доставчик, ще предоставим съответните протоколи заедно с доставката на електромерите.

13.03.2015

Стефан Дикарло



Приложения:

1. Протоколи от проведени изпитвания с приложени резултати за монофазен електромер
2. Протоколи от проведени изпитвания с приложени резултати за трифазен директен електромер.

ЕО сертификат и Анекс към него за
изследване на типа № SK10-
MI003-SMU009





ES CERTIFIKÁT TYPU

EC – Type-examination certificate

Číslo dokumentu: SK 10-MI003-SMU009 Revision 4
Document number: Revízia 4 nahrádza certifikát zo dňa 4. mája 2012
Revision 4 replaces the certificate issued by May 4, 2012

V súlade s: nariadením vlády Slovenskej republiky č. 294/2005 Z. z. o meradlách
In accordance with: v znení nariadenia vlády SR č. 445/2010 Z. z., ktorým sa preberá smernica
Európskeho parlamentu a rady 2004/22/ES v znení smernice 2009/137/ES
Government Ordinance of the Slovak Republic No. 294/2005 Coll., on measuring instruments as amended by Government Ordinance No. 445/2010 Coll. which implemented the Directive 2004/22/EC on measuring instruments as amended by Directive 2009/137/EC of the European Parliament and Council

Žiadateľ: Transtech, a.s.
Issued to: Jilemnického 4, 080 01 Prešov, Slovenská republika

Výrobca: ADD Production S.R.L.
Manufacturer: 36, Dragomirna str., MD-20 68 Chisinau, Republic of Moldova

Druh meradla: Elektromer (MI-003) / trojfázový statický elektromer
Type of instrument: Active electrical energy meters (MI-003) / three – phase static electricity meter

Označenie typu: NP73
Type designation:

Základné požiadavky: príloha č. 1 a príloha MI-003 k nariadeniu vlády SR č. 294/2005 Z. z.
Essential requirements: v znení nariadenia vlády SR č. 445/2010 Z. z.
Annex No. 1 and Annex MI-003 to Government Ordinance of SR No. 294/2005 Coll. as amended by Government Ordinance No. 445/2010 Coll.

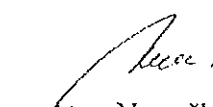
Platnosť do: 9. marca 2020
Valid until: March 9, 2020

Notifikovaná osoba: 1781
Notified body:

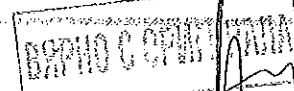
Dátum vydania: 18. marca 2013
Date of issue: March 18, 2013

Základné charakteristiky, popis meradla a podmienky schválenia sú uvedené v prílohe, ktorá je súčasťou tohto certifikátu. Certifikát vrátane prílohy má spolu 10 strán.
Essential characteristics, instrument description and approval conditions are set out in the appendix hereto, which forms the part of the certificate. The certificate including the appendix contains 10 pages.




Anna Nemečková
zástupca notifikovanej osoby
representative of Notified body

Poznámka: ES certifikát typu je bez pečiatky a podpisu neplatný. Tento ES certifikát typu môže byť rozmnožovaný len celý a nezmenený. Rozmnožovať jeho časti je možné len s písomným súhlasom Slovenského metrologického ústavu.
Note: EC-type examination certificate without signature and seal is not valid. This EC-type examination certificate may not be reproduced other than in full. Extracts may be taken only with the permission of the Slovak Institute of Metrology.



1 Instructions and standards used within assessment

1.1 Generally binding instructions

The mentioned type of measuring instruments has been assessed from the point of view of requirements for the given measuring instrument type established by the Slovak Republic Government Ordinance No. 294/2005 Coll. on measuring instruments as amended by Government Ordinance No. 445/2010 Coll. (hereafter as „Government Ordinance“), which implemented the Directive 2004/22/EC on measuring instruments as amended by Directive 2009/137/EC of the European Parliament and Council.

Essential requirements for the given measuring instrument type are in the Annex No. 1 “Essential requirements” and in the Annex No. M1-003 “Active electrical energy meters” of the Government Ordinance.

1.2 Harmonised standards and normative documents used:

- EN 50470-1 Electricity metering equipment (a.c.) – Part 1: General requirements, tests and test conditions – Metering equipment (class indexes A, B and C) (2007).
- EN 50470-3 Electricity metering equipment (a.c.) – Part 3: Particular requirements – Static meters for active energy (class indexes A, B and C) (2007).

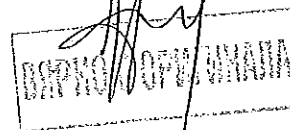
1.3 Other related standards:

- EN 62052-11 Electricity measuring equipment (a. c.) – General requirements, tests and test conditions – Part 11: Metering equipment (2003)
- EN 62053-21 Electricity measuring equipment (a.c.) Particular requirements Part 21: Static meters for active energy (class indexes 1 a 2) (2003)
- EN 62053-22 Electricity measuring equipment (a.c.) Particular requirements Part 22: Static meters for active energy (class indexes 0,2 S a 0,5 S) (2003)
- EN 62053-23 Electricity measuring equipment (a.c.) Particular requirements Part 23: Static meters for reactive energy (class indexes 2 a 3) (2003)

2 Type marking

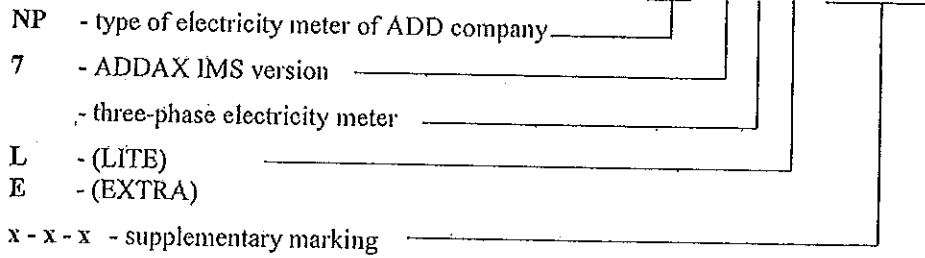
**Three-phase static electricity meter
type NP73**

- Accuracy class: A, B (electricity meter for direct connection)
C (electricity meter for indirect connection)
- Mechanical environment class: M1
- Electromagnetic environment class: E2
- Climatic environment class: from -40°C to +70°C




Type of construction marking of electricity meter type NP73

NP 7 3 x . x - x - x



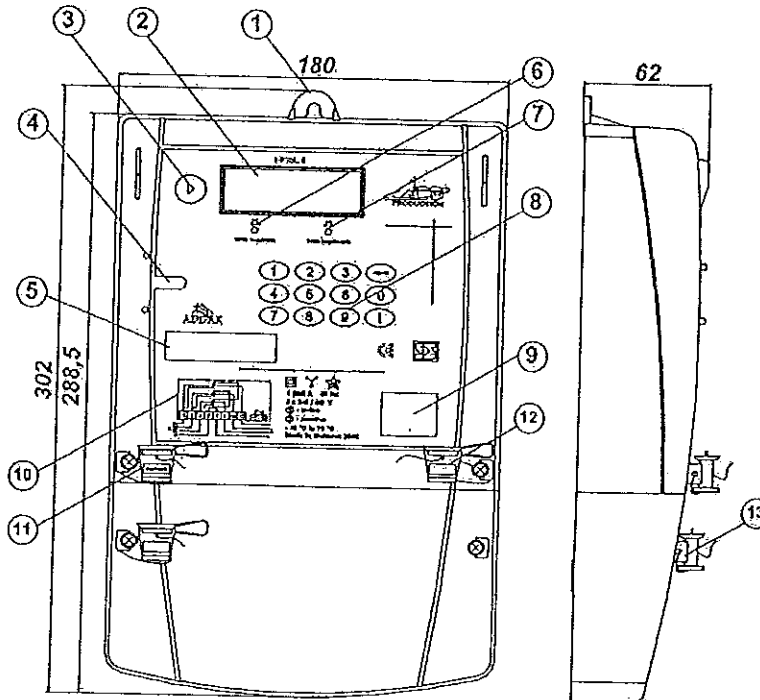
Note:

Supplementary marking of electricity meter x - x - x it is unambiguous numeric code, by which the producer exactly specifies the particular type of active electricity meter with its optional functions, e.g. the type of display, number of supplementary relays, types of used sensors and other optional attributes, which are described in technical documentation of active electricity meter.

Supplementary functions, optional according to customer requirements are not subject of assessment according to aforementioned Government Ordinance.

3 Measuring instrument description

Illustration of three-phase static electricity meter type NP73



- | | |
|---|--|
| 1 mounting bracket | 8 keyboard (optional, depending on electricity meter type of construction) |
| 2 LCD display | 9 description of OBIS code (optional, depending on electricity meter type of construction) |
| 3 push-button | 10 wiring scheme |
| 4 optical output | 11 manufacturer's seal |
| 5 bar code and electricity meter number | 12 metrology laboratory's seal |
| 6 LED pulse output for active energy | 13 assembly seal |
| 7 LED pulse output for reactive energy | |



The illustration represents general shape of electricity meter with maximum equipment. For individual type of construction some components may or may not miss or may be implemented in restricted range.

Characteristics

Static three-phase electricity meters of the type range NP73 are assigned for measurement of active and reactive energy in alternating networks with frequency 50 Hz or 60 Hz. Electricity meters allow recording and remote data transmission to information centre in order to check of electricity consumed and its processing for commercial purposes on the basis of multirate measurement. Electricity meters enable the checking of immediate taking power, the control of electricity supplies to customers using relays, the protection against tampering with measuring instrument. Electricity meters are equipped with the device for two-way communication by power line for the need of remote settlement in the measuring system (Smart IMS).

Working conditions

Measurand: Active energy
 Range :
 - reference voltages U_n : 3x57,7/100V; 3x120/208V; 3x230/400V; 3x240/415V
 - reference frequency f_{ref} : 50 Hz or 60 Hz

Electricity meters for direct connection -currents:
 - build-up current I_{st} :
 - for accuracy class A 0,025A; 0,05A; 0,075A
 - for accuracy class B 0,02A; 0,04A; 0,06A
 - minimum current I_{min} : 0,25A; 0,5A; 0,75A
 - transient current I_{tr} : 0,5A; 1A; 1,5A
 - reference current I_{ref} : 5A; 10A; 15A
 - maximum current I_{max} : 80A; 100A

Electricity meters for indirect connection -currents:
 - build-up current I_{st} : 0,0025A; 0,005A
 - minimum current I_{min} : 0,025A; 0,05A
 - transient current I_{tr} : 0,125A; 0,25A
 - nominal current I_n : 2,5A; 5A
 - maximum current I_{max} : 10A

Accuracy class:
 - electricity meter for direct connection: A or B (according to EN 50470-3)
 - electricity meter for indirect connection: C (according to EN 50470-3)

Climatic environment class: from -40°C to +70°C

Mechanical environment class: M1

Electromagnetic environment class: E2

3.1 Type of construction description:

3.1.1 Construction

The principle of electricity meter operation is based on analogue - digital conversion of signal and subsequent digital signal processing. Input voltage sensing is done by precise voltage dividers. To measure currents in phases and neutral electricity meter is equipped with measuring current transformers. Analogue values of signals are converted to digital values and monitored data values are calculated on the basis of scanned input variables. Data displaying is executed by electronic LCD display.

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Construction of three-phase static electricity meter of type range NP73 consists of the following functional units:

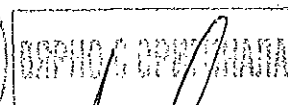
- power unit is intended to supply other functional units. A battery or capacitor could secure backup power supply,
- communication interface – power lines modem ensures data exchange by low voltage alternating power line (LV PL). Depending on type of construction, the electricity meters support three type of modulation (FSK, S-FSK, OFDM)
- measuring unit is created of voltage and current transducers. Voltage transducer is realised by precise voltage divider. For scanning, the currents in phases and neutral are used measuring current transformers,
- control unit performs the following functions:
 - measuring of voltage, current and temperature signals from relevant transducers,
 - conversion of analogue results into digital form,
 - the location of the measurement results in voltage independent memory,
 - the support of real-time hours,
 - the support of communication through local optical port,
 - data transfer via modem of power line and external communication modules,
 - information displaying,
 - signals generating on test output,
 - control of cut off relay,
 - control of secondary load,
 - registration of opening of electricity meter case and terminal cover,
 - control of magnetic field transducer,
 - power line modem signal generating on crossing by zero.

The control unit includes the following elements:

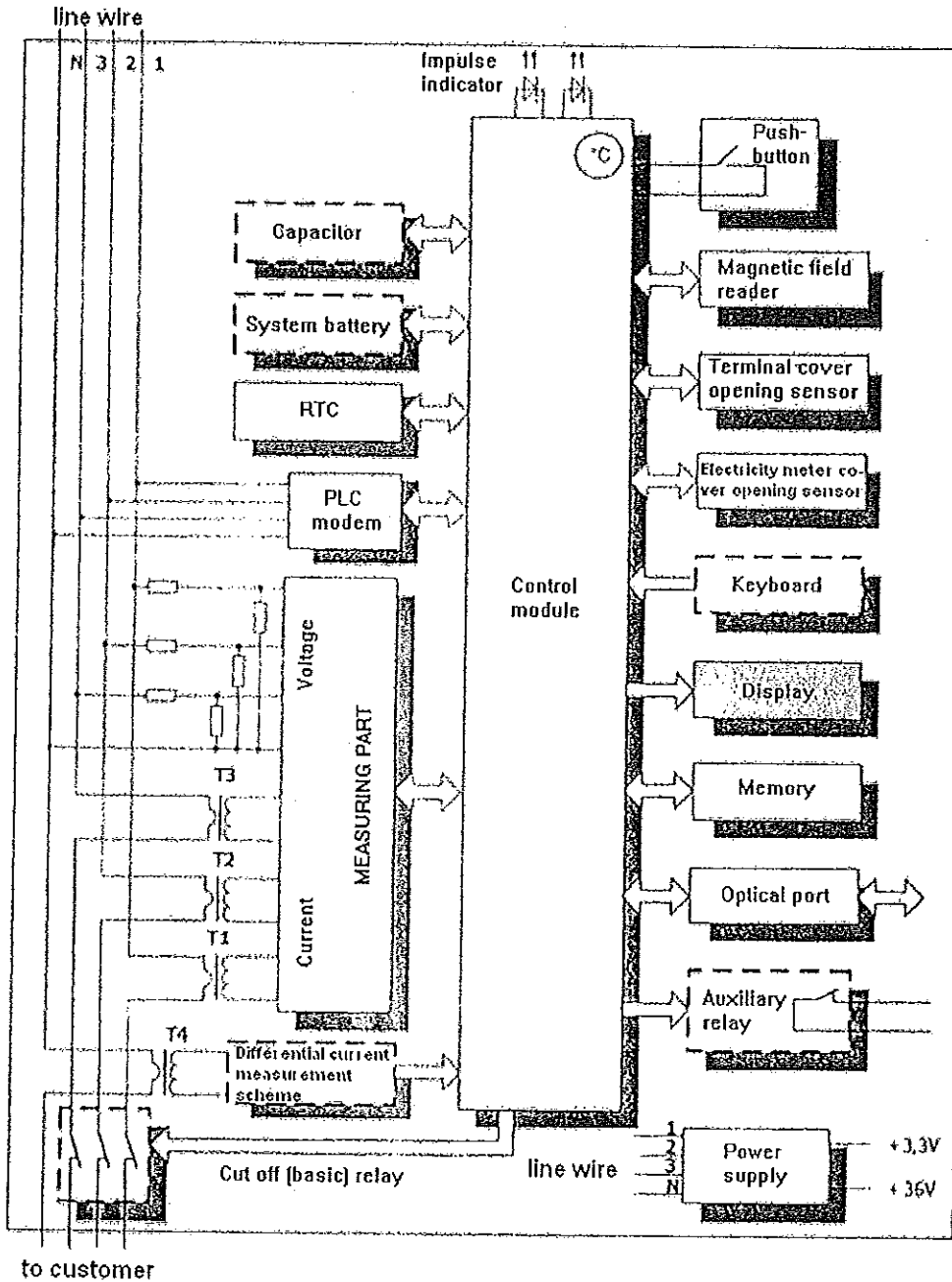
- a) Local optical port dedicated to communication with electricity meter in the case of parameterisation, data transmission, service and firmware update
 - b) Voltage-independent memory intended to store measured data, calibration configurations and factors, to update operating firmware through power line modem.
 - c) Push button dedicated to viewing the screens and cut off relay connection.
 - d) The transducers of opening electricity meter and terminal cover are dedicated to the registration of unauthorised manipulation with electricity meter.
 - e) Magnetic field transducer is dedicated to the registration of magnetic field that affects the operation of the measuring instrument.
- the unit of load control is created by cut off relay, which enables to disconnect the customer from the network (while the measuring instrument is in operation), or by auxiliary relay for disconnecting power load,
 - a display unit (liquid crystal display) provides information about electricity consumption.

According to type of construction the electricity meters are equipped with:

- test outputs LED diodes for active and reactive energy,
- built-in real-time clock and calendar with timestamp for data and events,
- keyboard with twelve signs for prepayment system (optional, depending on the type construction), auxiliary communication module type M-Bus or GSM/GPRS to support of data transmission with others devices.

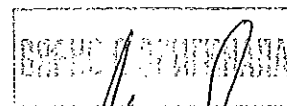



Block diagram of electricity meter



Electricity meter is placed in case, which consists of the base, cap, terminal and its cover. Base and terminal cover of electricity meter are made of impact-resistant polycarbonate. Lid of electricity meter is made of impact-resistant transparent polycarbonate.

Protection against intervention to electricity meter system is ensured by sealing the position of the screws by which the lid is bolted to the bottom of measuring instrument. Protection against the access to electricity meter terminal is ensured by sealing two screws by which the terminal cover is screwed to the bottom of measuring instrument.



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3.1.2 Measured value processing - hardware, software.

Electricity meter reads electrical currents and voltage through input circuits that properly adapt the signals for measuring circuit input. Analogue value of signals are converted to digital values and further processed. The values of power, consumed energy and all other monitored data are calculated on the basis of scanned input variables. Measured values are displayed on LCD display. All observed data are stored in non-volatile memory, where the data are maintained also in the case of a long voltage failure.

Used company software ensures execution of all functions of electricity meter associated with control of input measuring pulse, calculation and archiving of measured energy and power, data displaying and so on. The software consists of the three separate parts, application, communication and measurement. Updates are available in application part (e.g., functional possibilities extension) and in communication part (improved communication features, change modulation type, etc.). Measuring section is constant. Information security is ensured by the following elements:

- "protection of manufacturer's know-how" (during the update the software is in code form, installed software is not possible to read),
- "protection against improper use of code" (new software is tested for confirmation of completeness and authenticity confirmation before it installing),
- ensuring of data archiving (exclusion of data loss archiving in the permanent memory)
- controlled access to data (data transmission by more access environments and levels that correspond to category of user's system),
- access by optical port is secured by password.

Software structure is described in the document ADD-Technology - Static electricity meters range NP71 and NP73. Software regulation ADDM.411152.001 SD.

3.1.3 Indication of the measurement results

Electricity meter is equipped with a built-in LCD display for displaying measured data and technical information. Displaying information are specifying at configuration of electricity meter. Electricity meters of type NP73 provide data identification in the form of symbols and / or OBIS codes.

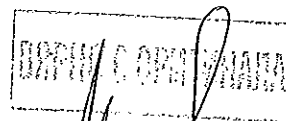
3.1.4 Optional (additional) equipment and functions subject to Government Ordinance requirements (they are subject of assessment according to Government Ordinance)

Functional possibilities of electricity meters range NP73 depend on type of construction. They can be changed and expanded during the development of hardware and software of measuring instrument.

Electricity meters provide the following features:

- support for DLMS/COSEM (standard data model, standard communication protocols for optical port, default language messaging),
- measured and stored parameters (electricity meter depending on type of construction gives the measured and calculated values of the parameters that characterise the energy consumption),
- registration of multiple rates (programmable rate structure up to six registers),
- load profile measurement (option of four interval profiles),
- record of events (registration and processing of external and internal events that affect provided functions of electricity meter, the possibility up to five types of protocols of the event),
- PLC communication through modem (it enables to integrate electricity meter into measuring system),
- data transmission (through low voltage power line (LV PL) - the main communication channel, an optical port - additional channel for local data transmission and electricity meter parameters adjustment),
- test pulse outputs (LEDs) for active and reactive power (they enable control of metrological parameters),
- protection against unauthorised interventions (it monitor the opening of electricity meter or terminal cover, reverse phase sequence; unacceptable differential current, external magnetic fields over 200 mT),

load control (electricity meter is equipped with a relay (80/100A) for remote disconnecting / connecting of consumer or auxiliary relay (5A), which can through an external contactor to disconnect or to connect power load at the time of peak load),



- power quality check (the measure gives the average value of voltage drop, increase or loss of voltage, frequency network),
- prepayment system (possibility of payment for supply of electricity on the account, or by prepayment),
- own self-test to determine immediate technical condition of electricity meter,
- auxiliary communication module (two types of communication modules to support of data transmission of other intelligent devices).

Functions integrated in measuring instrument, which must comply with Government Ordinance are as follows:

- measurement of active energy (absolute value),
- measurement of active energy in the direction of consumption,
- measurement of active energy in the direction of consumption in six rates,
- measurement of active energy in the direction of supply,
- measurement of active energy consumption in the direction of supply in the six rates.

3.2 Integrated (additional) equipment's and functions, which are not the subject of assessment according to Government Ordinance

Functions integrated in measuring instrument, which are not subject to requirements of the Government Ordinance, are as follows:

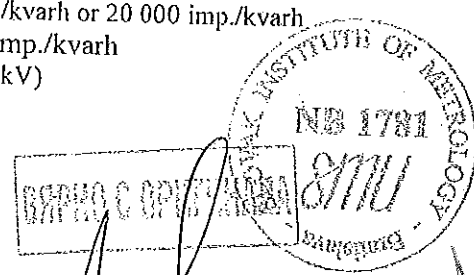
- measurement of immediate active power in phase and maximum (intervals 15, 30, 60 min; 1 day),
- measurement of immediate voltage on phase and average voltage on phase at given time,
- measurement of immediate current at each phase,
- measurement of immediate current on line wire for neutral,
- the difference between phase and neutral currents,
- reactive energy measurement in the direction of consumption,
- measurement of reactive energy in quadrant 1 to 4,
- measurement of inductive reactive power,
- measurement of reactive capacitance energy,
- measuring of time; date,
- measurement of frequency.

4 Basic technical characteristics

4.1 Additional technical characteristics

Operating voltage range:	0.8 U_n to 1.2 U_n
Operating frequency range:	50 Hz ($\pm 2\%$) or 60 Hz ($\pm 2\%$)
Power Consumption:	
- Current circuit:	< 2,5 VA
- Voltage circuit:	< 2 W / 10VA
- Voltage circuit when connecting to an additional communication interface RS-485 or USB:	< 3 W / 10VA
Electricity meter constant for direct connection:	
- active energy	1000 imp./kWh or 2000 imp./kWh
- reactive energy	1000 imp./kvarh or 2000 imp./kvarh
Electricity meter constant for indirect connection:	
- active energy	10 000 imp./kWh or 20 000 imp./kWh or 50 000 imp./kWh
- reactive energy	10 000 imp./kvarh or 20 000 imp./kvarh or 50 000 imp./kvarh
Basic communication interface:	PL (LV 0,4 kV)
Additional communication interface:	optical port
IP code:	IP 54

*с упрощенной
реализацией
функций*



5 Basic metrological characteristics

Accuracy class for measuring of active energy (according to electricity meter type construction)

- for direct connection: A, B (according to EN 50470-3) or
2, 1 (according to EN 62053-21)
- for indirect connection: C (according to EN 50470-3) or
0,5S (according to EN 62053-22)

Accuracy class for measuring of reactive energy: 2 (according to EN 62053-23)

6 Interfaces and compatibility conditions

Electricity meter is equipped with a customer LCD display and optical pulse output LED (for active energy). Furthermore, electricity meter is equipped with basic communication interface PL (LV 0,4 kV), optical port, additional communication interfaces M-Bus or RS-485 or USB, additional communication module type GSM/GPRS.

Electricity meter supports standard specification DLMS/COSEM. It provides functional and information compatibility with standard solutions of other manufacturers for measuring systems.

7 Results of conformity assessment

From test results, assessments and evaluations stated in the evaluation report No. 091/102/13, Revision 4 of the date March 18-th, 2013, that technical design of the measuring instrument – three-phase static electricity meter type NP73 complies with technical requirements of Government Ordinance of the Slovak Republic No. 294/2005 Coll. on measuring instruments as amended by Government Ordinance No. 445/2010 Coll., Annex No.1 on MI-003 and EN 50470-1 and EN 50470-3. The drawings and technical documentation used during the conformity assessment are saved in document No. NO-218/13.

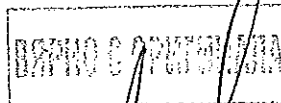
Note: Tests of the meter, relating to the measurements active energy, were carried out according to standard EN 50470-1: 2007 and EN 50470-3:2007.

Tests of the meter, relating to the measurements reactive energy, were carried out according to standard EN 62052-11: 2003 and EN 62053-23:2003.

8 Data placed on the measuring instrument

On each measuring instrument or in documentation for product in line with the Annex No. 1 of Government Ordinance, EN 50470-1 and EN 50470-3, have to be stated at least following data:

- manufacturer mark or his name,
- serial number and year of manufacturing,
- marking of electricity meter type,
- number of EC – type examination certificate,
- 'CE' marking and supplementary metrology mark "M xx",
- electricity meter accuracy class,
- unit of measured energy,
- number of phases and wires, what the meter is intended for (using graphical symbol),
- current measuring range,
- reference voltage,
- reference frequency,
- electricity meter constant,
- working temperature range of electricity meter or class of climatic environment,
- mark of insulation type (using graphical symbol).



9 Conditions for conformity assessment of produced measuring instruments with approved type

Measuring instruments introduced in the market in accordance with procedure for conformity assessment according to D or F Annexes of Government Ordinance have to correspond to technical descriptions according to item 3 of this Annex and have to in the tests to meet the requirements stated in No. 1 and MI-003 Annexes of Government Ordinance; EN 50470-1 and EN 50470-3.

A producer or a notified body respectively in line with the conformity assessment procedure according to D or F Annexes of Government Ordinance may only perform a metrological test.

Check measuring instruments function in use:

Documentation of procedures settings, calibration of electricity meters or hardware and software identifying is contained in the documents listed in the evaluation report No. 091/102/13, Revision 4.

10 Measures necessary for assurance of measuring instrument integrity

10.1 Identification

Measuring instrument has to correspond to description according to item 3 a marking according to 8 of this Annex number of EC Type-examination certificate is stated on each piece of measuring instrument. Conformity mark placement governs according to § 7 of Government Ordinance.

10.2 Measuring instrument ensuring

Before the assessment of conformity according to Annex D and F the measuring instrument is ensured by following way.

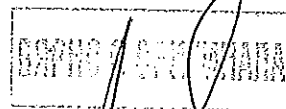
- protection against intervention into electricity meter system is ensured by sealing the position of the screws, the lid of the electricity meter, which is bolted to the bottom on two points. (The sealing is executed after that electricity meter is verified and marked by the seal).
- protection against access to electricity meter's terminal is secured by sealing screws position by which the terminal's cover is screwed to the bottom of electricity meter in two points. (The sealing is executed after connecting electricity meter to electricity grid by assembly seal).

11 Assembly requirements and conditions of use

Assembly requirements and conditions of use are listed in the manufacturer's documentation - User's Guide and ADDM.411152.309 and ADDM.411152.311.



Assessment was performed by: Mr. Ján Hanák




Сертификат за качеството на
производството Annex D SK12-QD-SMU006





CERTIFIKÁT

Certificate

systému kvality podľa nariadenia vlády Slovenskej republiky č. 294/2005 Z. z. o meradlách
 v znení nariadenia vlády SR č. 455/2010 Z. z., príloha D
 Of a quality management system according to EC Directive 2004/22/EC as amended by Directive 2009/137/EC, Annex D

Číslo dokumentu:
Document number:

SK 12-QD-SMU006

Revision 1

V súlade s:
In accordance with:

nariadením vlády Slovenskej republiky č. 294/2005 Z. z. o meradlách
 v znení NV SR č. 445/2010 Z. z., ktorým sa preberá smernica Európskeho
 parlamentu a rady 2004/22/ES v znení smernice 2009/137/ES
 *Government Ordinance of the Slovak Republic No. 294/2005 Coll., on measuring
 instruments as amended by Government Ordinance No. 445/2010 Coll. which
 implemented the Directive 2004/22/EC on measuring instruments as amended by
 Directive 2009/137/EC of the European Parliament and Council*

Žiadateľ:
Applicant:

TRANSTECH, a.s.
Jilemnického 4, 080 01 Prešov, Slovak Republic

Výrobca:
Manufacturer:

ADD Production s.r.l.
Str. Dragomirna 36, Chisinau MD-2008, Republic of Moldova

Kategória meradla:
Measuring instrument categories:

Elektromery (MI-003)
Active electrical energy meters (MI-003)

Spôsobilosť pre:
Eligible for:

vyhlásenie o zhode na základe zabezpečenia kvality výrobného
 procesu v súlade s požiadavkami ustanovenými nariadením vlády
 Slovenskej republiky č. 294/2005 Z. z. o meradlách v znení NV SR
 č. 445/2010 Z. z., príloha D
 *Declaration of conformity based on quality assurance of the production process
 in accordance with Directive 2004/22/EC as amended by Directive 2009/137/EC
 of the Parliament and Council, Annex D*

Platnosť do:
Valid until:

12. novembra 2015
November 12, 2015

Počet strán:
Number of pages:

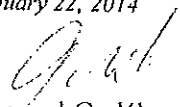
2

Notifikovaná osoba:
Notified body:

Slovenský metrologický ústav 1781
Slovak Institute of Metrology 1781

Dátum vydania:
Date of issue:

22. január 2014
January 22, 2014


Emanuel Godál
zástupca notifikovanej osoby
representative of Notified body



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Rozsah platnosti:

Scope:

Pracovisko:

ADD Production s.r.l.

Site:

Str. Dragomirna 36, Chisinau MD-2008, Republic of Moldova

Druh meradla:

Jednofázový statický elektromer

Measuring instrument types:

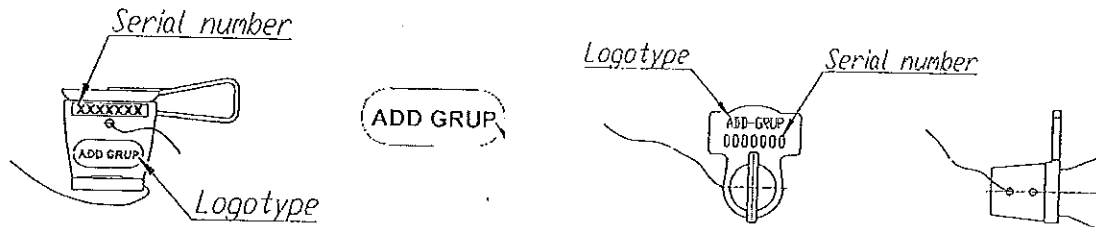
Single-phase static electricity meter

Trojfázový statický elektromer

Three-phase static electricity meter

Zabezpečovacie značky:

Security marks:



Poznámky:

Remarks:

Podkladom na vystavenie tohto certifikátu boli výsledky posúdenia a zistení vykonaných v súlade s postupom stanoveným v prílohe D nariadenia vlády Slovenskej republiky č. 294/2005 Z. z. o meradlách uvedené v správe č. 006/QD/12.

Systém kvality výrobcu je periodicky preverovaný v súlade s prílohou D, čl. 4 nariadenia vlády Slovenskej republiky č. 294/2005 Z. z. o meradlách.

Výrobca je oprávnený umiestniť na meradlá vyrábané v súlade so schváleným typom identifikačný kód notifikovanej osoby 1781. Zásady používania certifikátu sú stanovené v dohode č. 082/NO/12.

The results of appraisal and findings carried in accordance with Annex D Directive 2004/22/EC, are recorded in Report No. 006/QD/12, with represent the base of issuing of the certificate.

The quality management system of manufacturer is under permanent surveillance according to Annex D No. 4 of the Directive 2004/22/EC.

The company is entitled to provide the metrology marking for the measuring instruments produced within the scope of this approved the quality management system the notified body identification number 1781. The principle of the use of certificate is given in agreement No. 082/NO/12.

Bratislava 22. január 2014

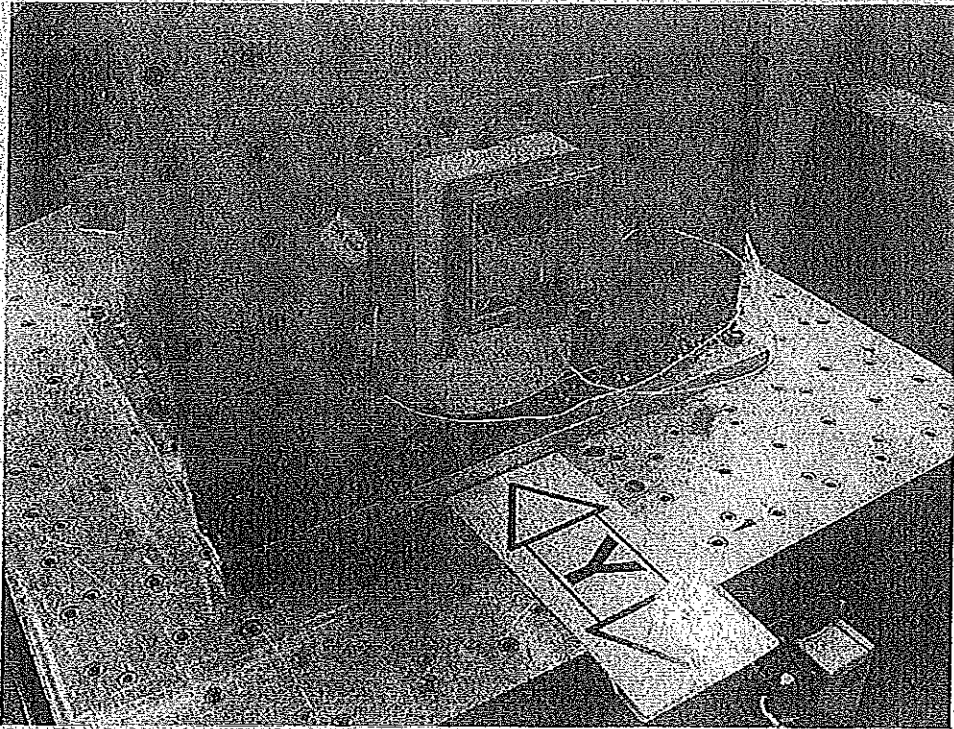


Протоколи от проведени изпитания от
SP Swedish National Testing and
Research Institute

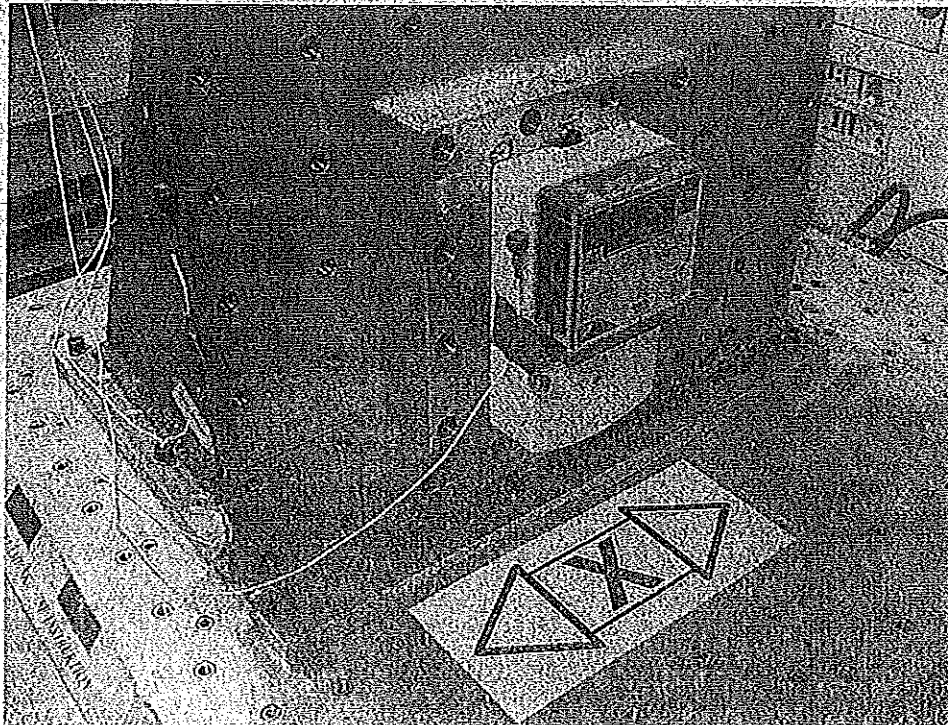




Vibration test.

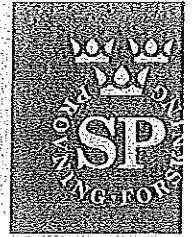


Mounting Y-direction

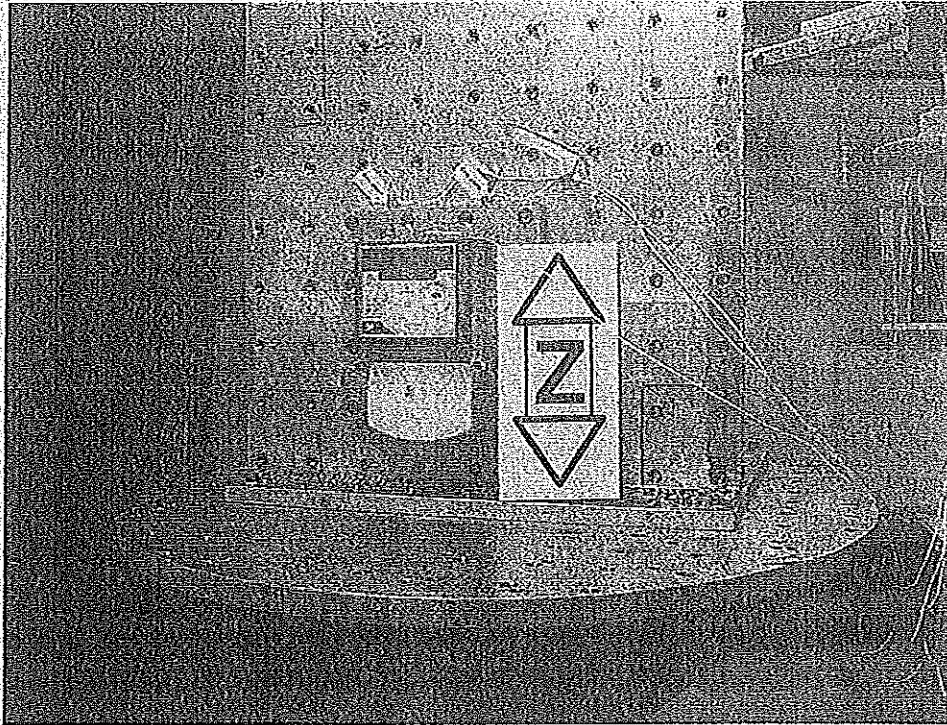


Mounting X-direction

ВЕРНО С ОРИГИНАЛА



Vibration test.

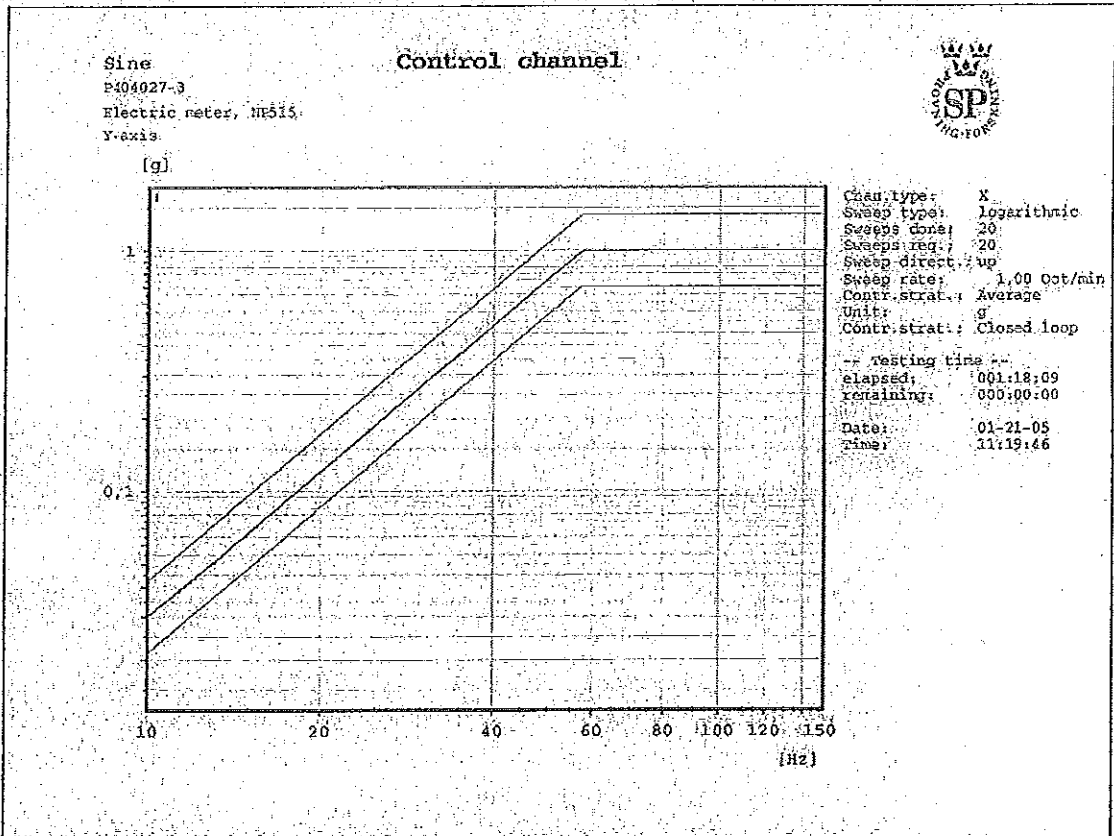


Mounting Z-direction

OSCAR & OSMUND



Frequency spectrum of the control signal.



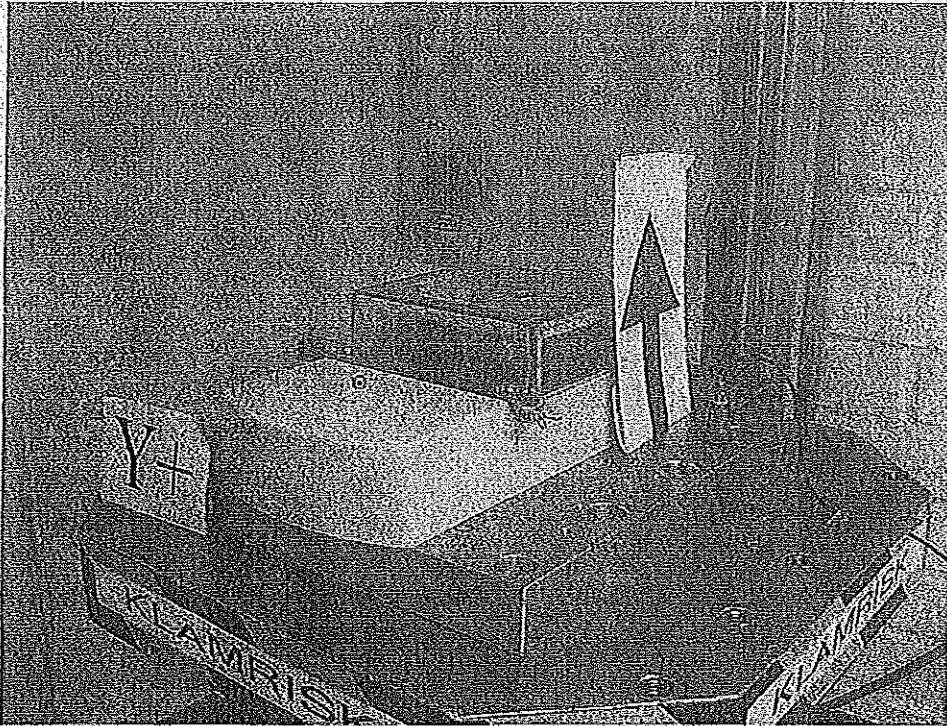
C:\Vcon\Dat\Elmätare\Elmätare_050121\Sine_Y_001.rsn

EXAMINERAD OCH GODKÄNT
[Signature]

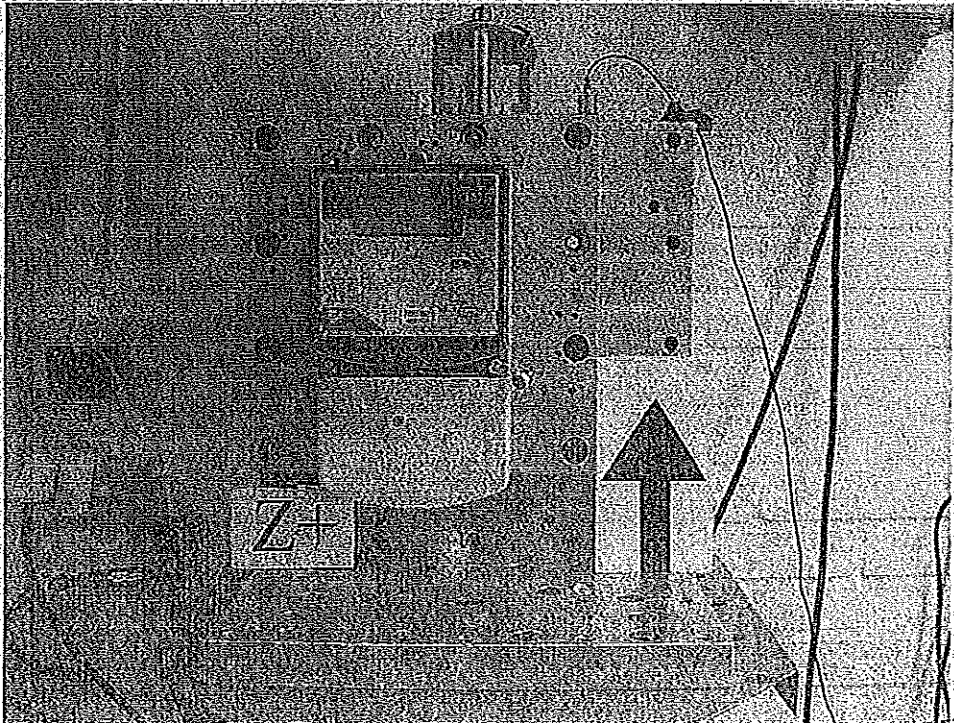
[Signature]



Shock test.



Mounting position +Y-direction.

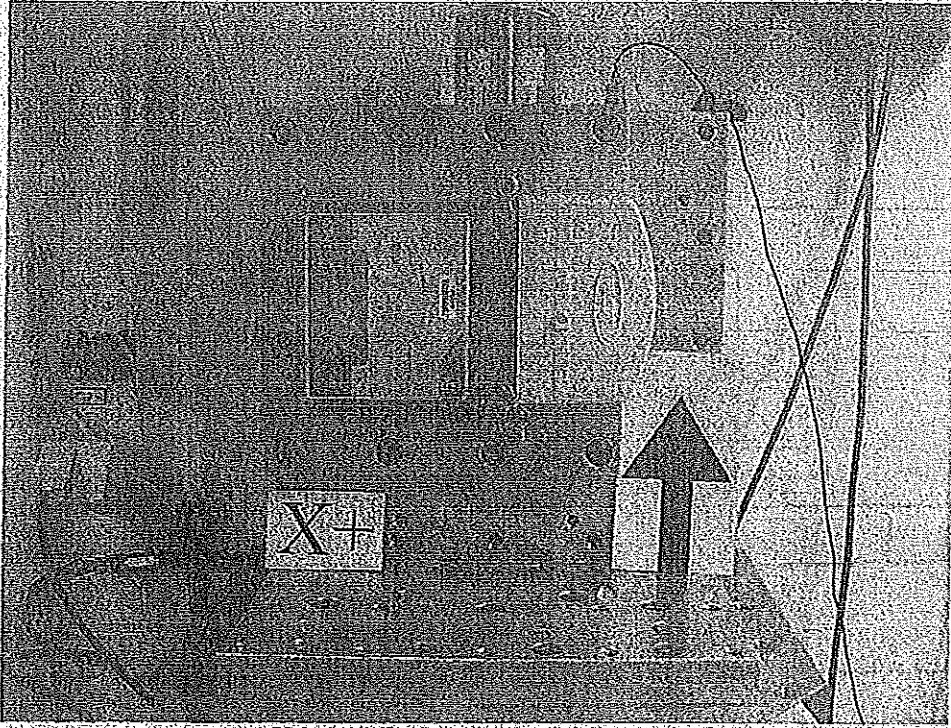


Mounting position +Z-direction.

EXTRÖ C O F F I C I A L T



Shock test.

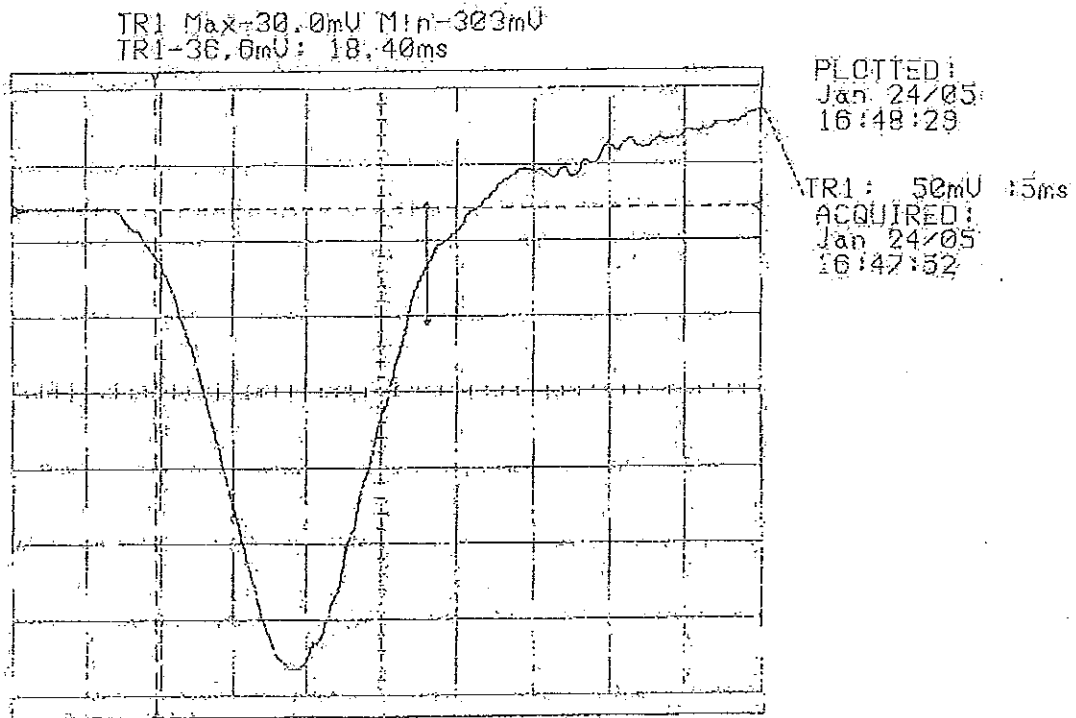


Mounting position +X-direction

BRPHO & CHATTAN



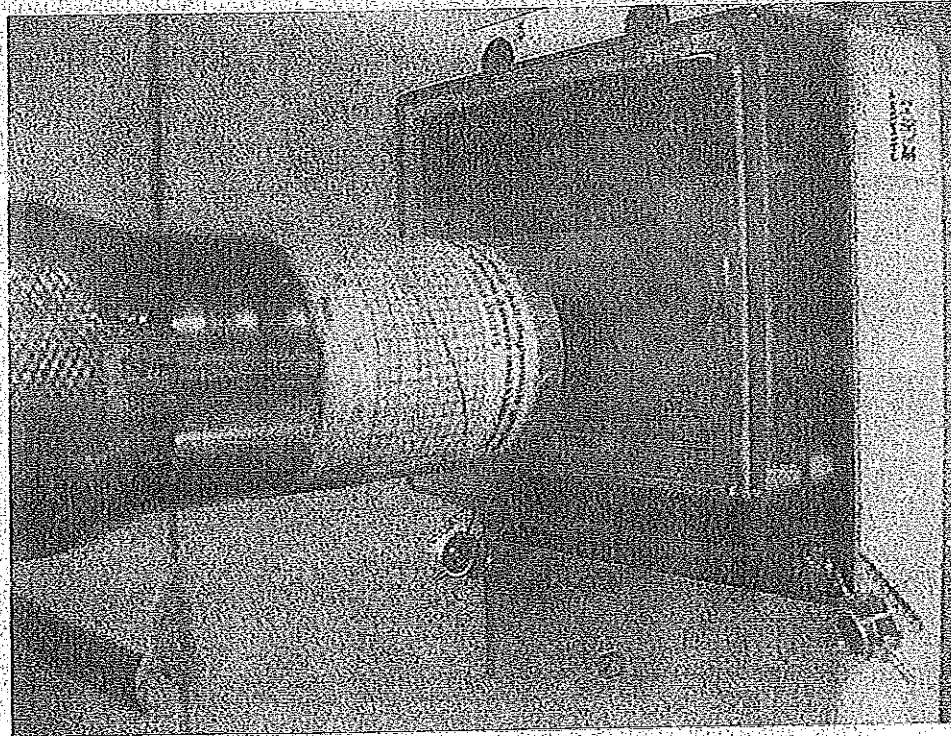
Shock test, a typical control pulse.



ERIK O. CHRISTIANSSON



Spring hammer test



Spring hammer test

GRUND & BENTZONEN

ADD GRUP Europé AB
ÅKERSBERGA

Handled by, department
Henrik Andersson
Electronics
+46 33 16 55 74, henrik.andersson@sp.se

Date
2005-01-28

Reference
P404027-04:A

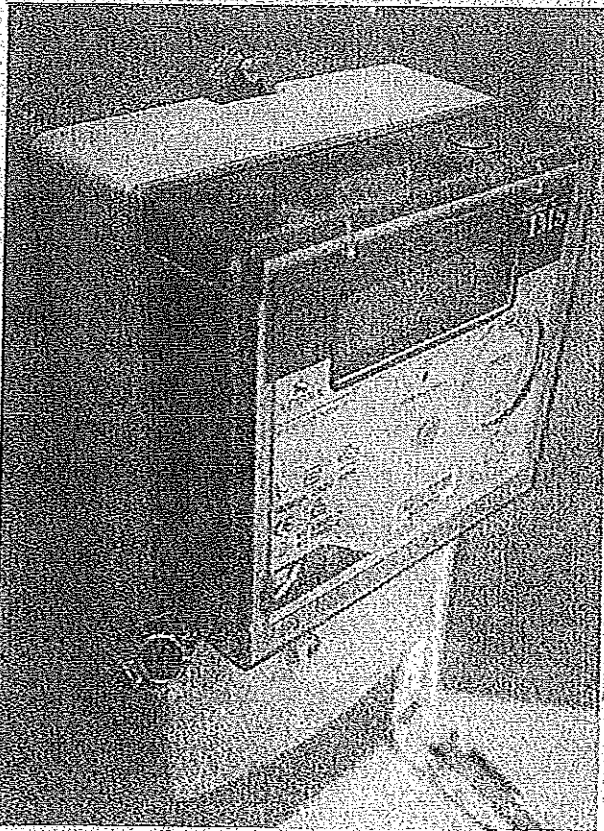
Classification of degree of protection provided by enclosure

1 Client

ADD GRUP Europé AB, Åkersberga, Sweden.

2 Test item

Electricity meter Add-Grup type NP515.23D-1E1ALNI, with serial No. 00325268.



Test item in position for tests

The test item arrived at the department for Electronics on 2005-01-24.

DEPART



3 Commission

Classification of degree of protection provided by enclosure according to IEC 60529:2001, IP 51.

The tests shall be performed without openings, for electrical connections, in the terminal cover. The dust test shall be performed according to the specifications for category 2 enclosures.

4 Performance

The tests were performed by Henrik Andersson between 2005-01-24 and 2005-01-25, according to the commission.

The test item was mounted in normal position of use on a flat metal plate during the tests. The original fixing holes were used.

4.1 Test with probe (IP 5X)

The test was performed with a $\varnothing 1$ mm test probe, pushed against all openings of the test item with a force of 1 N.

4.2 Dust test (IP 5X)

The test item was exposed to talcum powder in a dust chamber during 8 h.

The amount of talcum powder was 2 kg per m^3 of the test chamber volume.

4.3 Drip test (IP X1)

The test item was exposed to dripping water during 10 min.

The water flow rate was 1 mm/min.

The temperature of the test item was $23\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ and the water temperature was within $5\text{ }^{\circ}\text{C}$ of the test item temperature.

5 Result

Compartment for electronic circuitry:

The requirements for protection against penetrating solid objects, dust and water according to IP 51 were fulfilled.

The test probe did not penetrate the compartment. No dust and no water did penetrate the compartment.

DRYND C. OYUNMAVA



Compartment for mains terminals:

The requirements for protection against penetrating dust according to IP 5X were not fulfilled.

Dust was observed on creepage distances between terminals.

The requirements for protection against penetrating solid objects according to IP 5X were fulfilled.

The test probe did not penetrate the compartment.

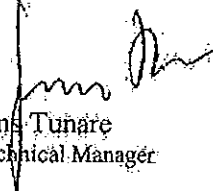
The requirements for protection against penetrating water according to IP X1 were fulfilled.

No water was observed on or between terminals.

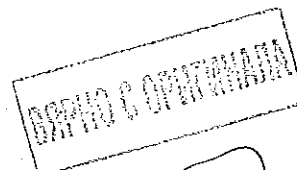
Measuring uncertainties are specified in SP-Method 1486, 2nd edition.

The test results apply to the tested item only.

SP Swedish National Testing and Research Institute
Electronics - Electrical Safety


Jens Tunare
Technical Manager


Henrik Andersson
Technical Officer



ADD GRUP Europe AB
ÅKERSBERGA

Handled by department
Henrik Andersson
Electronics
+46 33 16 55 74, henrik.andersson@sp.se

Date
2005-01-28

Reference
P404027-04:B

Glow-wire tests

1 Client

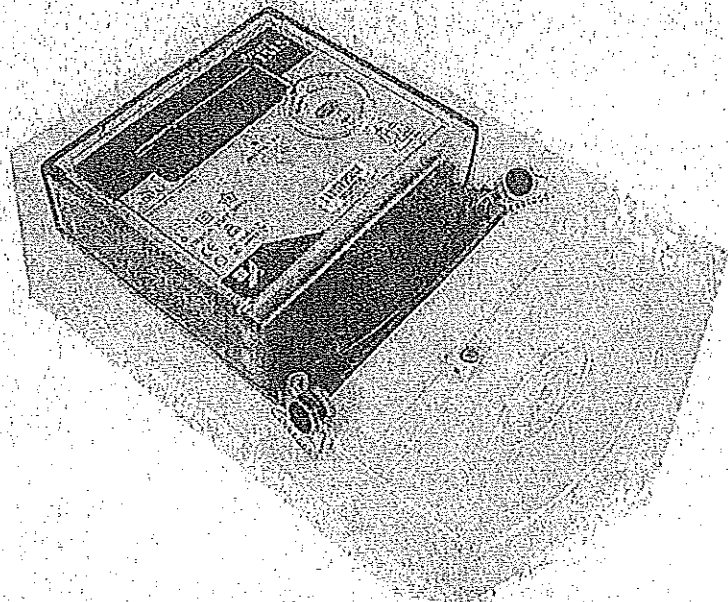
ADD GRUP Europe AB, Åkersberga, Sweden.

2 Test items

Plastic parts of electricity meter Add Grup type NP515.23D-1E1ALNI, with serial No. 00325268, according to below:

- Meter base, Makrolon 2807
- Transparent cover, Makrolon 2807
- Terminal cover, Makrolon 2807
- Internal plastic plate with marking plate, Makrolon 2807
- Terminal block, Makrolon 9415

The material specifications are according to material list provided by the client.



SP
SWE
G. RO

The test items arrived at the department for Electronics on 2005-01-24.



3 Commission

Glow-wire testing according to IEC 60695-2-10:2000 + IEC 60695-2-11:2000.

4 Performance

The tests were performed by Henrik Andersson on 2005-01-27.

The specimens were arranged so that the surface in contact with the tip of the glow-wire was vertical.

The tip of the glow-wire was brought into contact with the specimens for 30 s ± 1 s.

The test was made on one specimen of each material.

5 Result

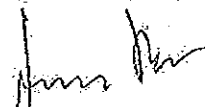
Test item	Test temperature	Test result
Meter base, Makrolon 2807	650 °C	No flame and no glowing - OK
Transparent cover, Makrolon 2807	650 °C	No flame and no glowing - OK
Terminal cover, Makrolon 2807	650 °C	No flame and no glowing - OK
Internal plastic plate with marking plate, Makrolon 2807	650 °C	No flame and no glowing - OK
Terminal block, Makrolon 9415	960 °C	Flames extinguish within 30 s after removal of the glow-wire, no ignition of the tissue-paper - OK

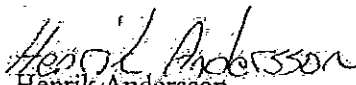
All the tested items did fulfil the requirements.

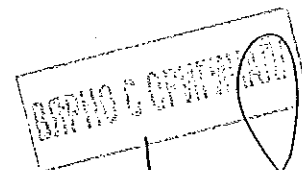
Measuring uncertainties are specified in SP-Method 2204, 2nd edition, 2nd revision.

The test results apply to the tested items only.

SP Swedish National Testing and Research Institute
Electronics - Electrical Safety

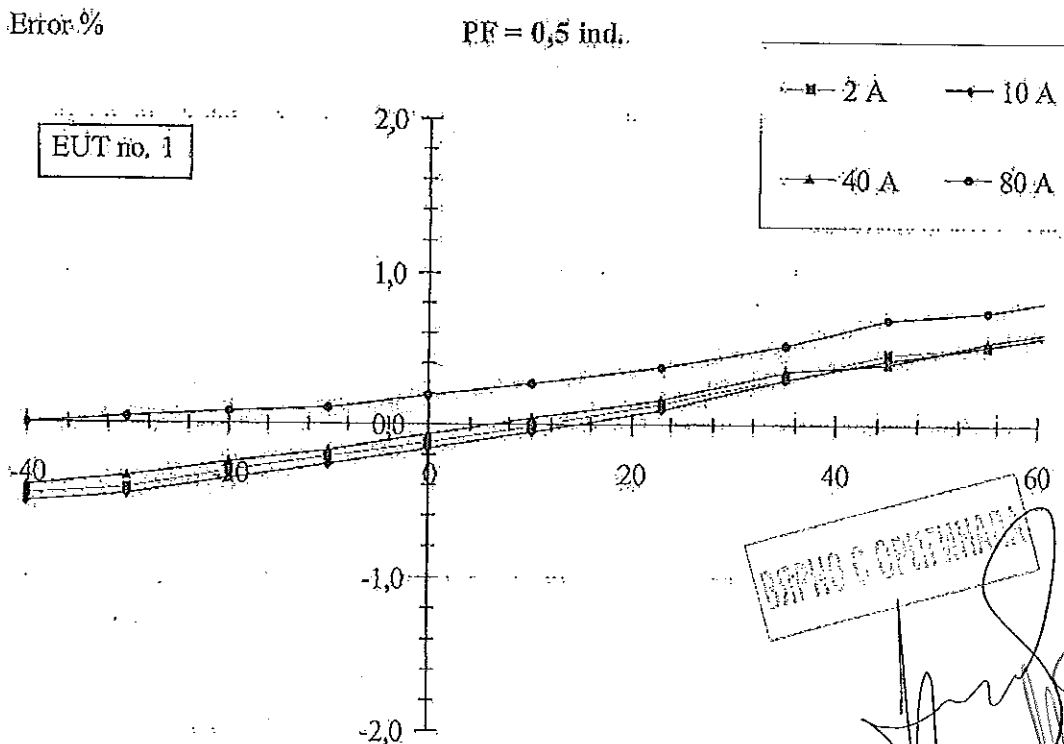
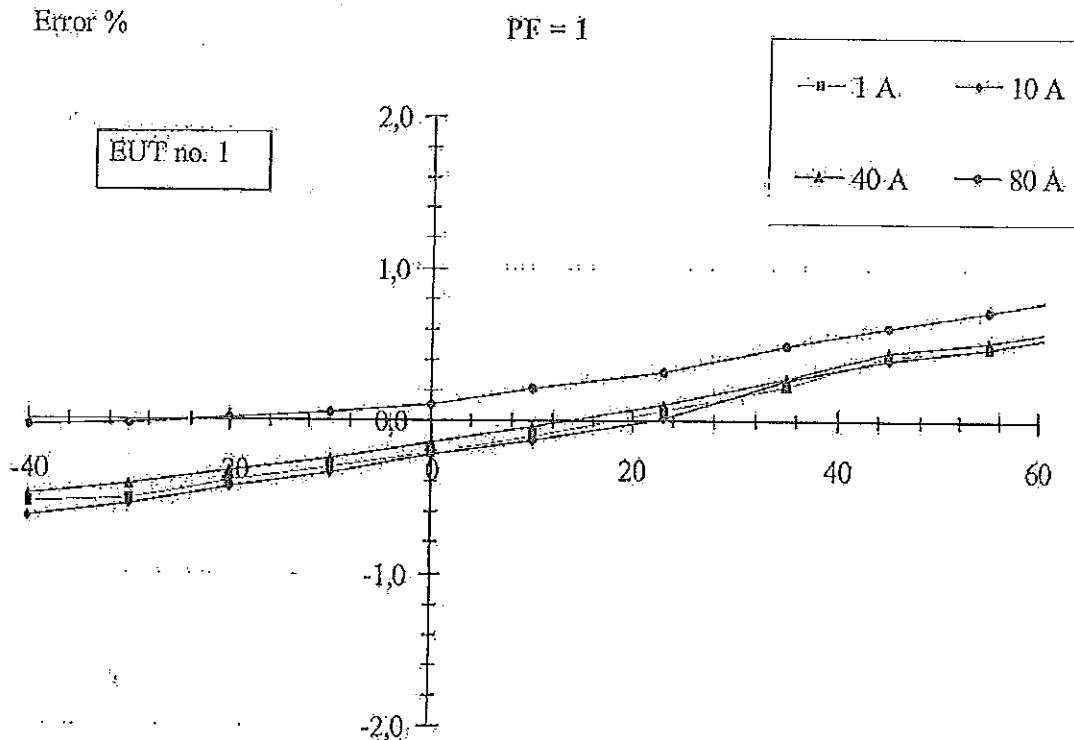

Jens Tuñare
Technical Manager


Henrik Andersson
Technical Officer





Percentage error as a function of ambient temperature
Add Grp, NP515.23D-1E1ALNNI 1*230/400, 10(80)





Handled by, department:

Lasse Bergsten
Electronics
033-16 54 00, lasse.bergsten@sp.se

ADD GRUPP Europe AB
ÅKERSBERGA

EMC test on NP515 (5 appendices)

Test object

NP515.23D-1E1ALNNI, s/n 320435

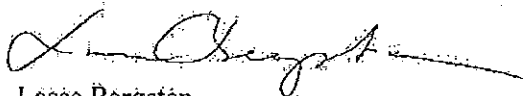
Summary

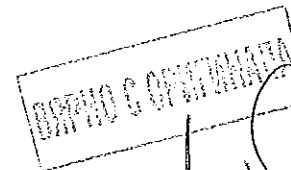
EMC tests as specified below have been performed.

Standard	Compliant	Appendix	Remarks
Emission: EN 50065-1 (2001)	Yes		
Radiated emission 30-1000 MHz	Yes	2	
Conducted emission, spurious 3kHz-30 MHz	Yes	3	
Transmitter signalling level	Yes	4	

SP Swedish National Testing and Research Institute
Electronics - EMC

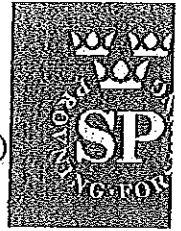

Jan Welinder
Technical Manager


Lasse Bergsten
Technical Office



REPORT

Date: 2005-02-21 Reference: P404027-02A Page: 1 (1)



Appendix 1

General test conditions

Emission measurement

Operation mode : A 300W load was connected to comply with the test condition specified in EN 62052-11. Intermittent transmitting on the mains was occurring automatically with a special test PROM.


Uncertainties

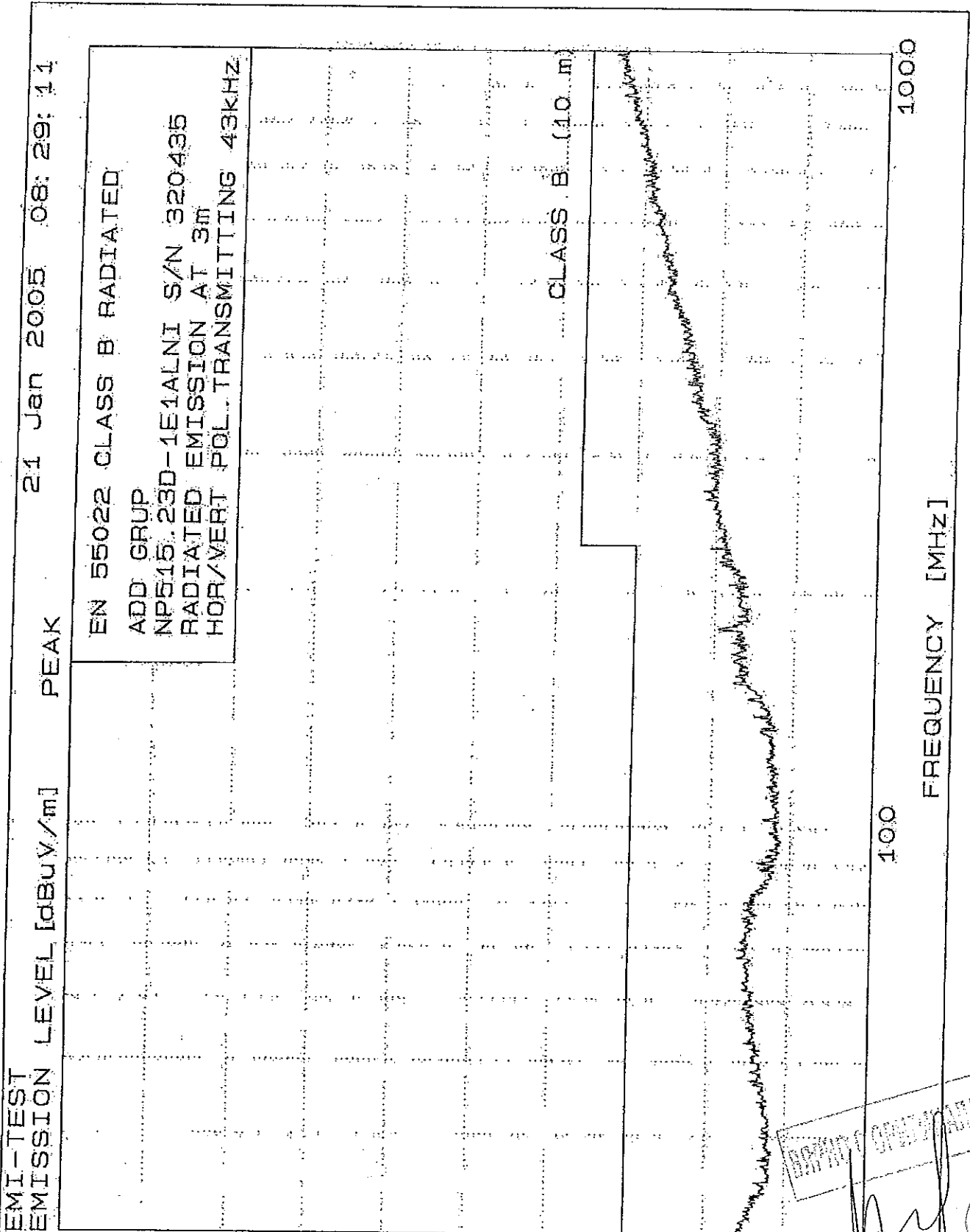
Measurement and test instrument uncertainties are described in the quality assurance documentation EL-QD 8.3


Reservation

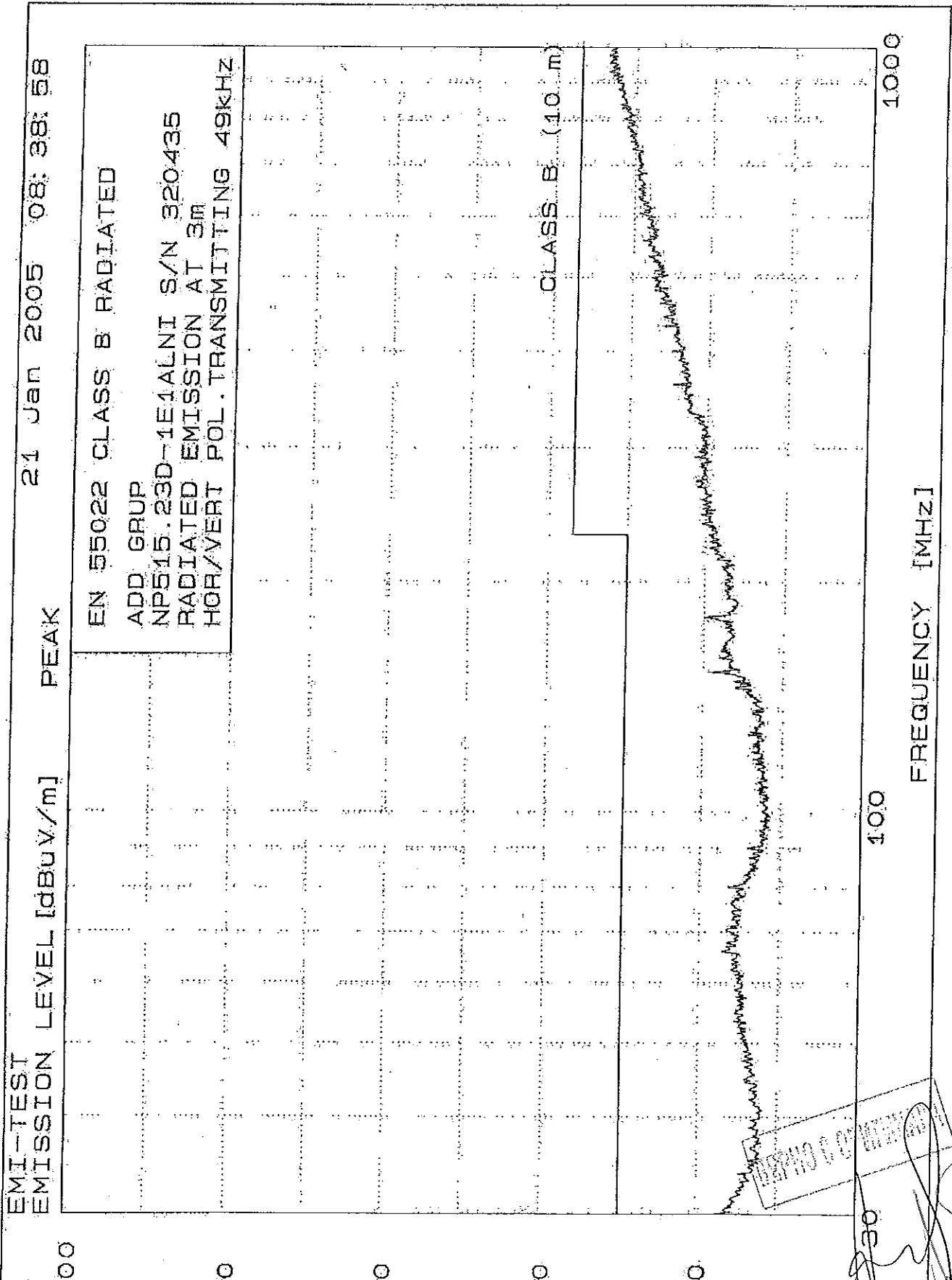
The test results in this report apply only to the particular Equipment Under Test (EUT) as declared in the report.

ESPINO G. OPIETZABEA

Sign: 




 LABORATORY CONTROL AREA





Appendix 3.

Conducted emission measurements

Date	Temperature	Humidity
2005-01-20	20 °C ± 3 °C	25 % ± 5 %

Test set-up and Procedure

Measurements were performed on the 230 V phase and neutral connected to the artificial mains network.

The measurement is first performed with peak detector. Emission on frequencies close to or above the limits is controlled with quasipeak and/or average detector.

Measurement equipment	SP number
HP 8566B Spectrum analyser	501437
HP 85685A Preselector	501438
HP Quasipeak adapter	500183
HP 85869A EMI measurement software	
Schwartzbeck NNLA 8120	500574
HP 150 kHz high pass filter	503184
LISN Addon 3-9 kHz (own manufacture)	-

Result

The emission spectra are shown in diagram 1 and 2 when transmitting on 43 and 49 kHz respectively.

Emission above the limit is present only in the permitted frequency band 3-95 kHz.

Emission below limit?	Yes
-----------------------	-----

BRANDS & CERTIFICATION



8.2 Frequency variation: $\pm 2\%$
Additional error compared to 50 Hz.

Voltage /V	Current /A	Power factor	EUT no. 3 Single-phase Additional percentage error at	
			49 Hz	51 Hz
230	0,5	1	0,00	-0,04
	10		0,00	-0,01
	80		0,01	-0,02
	1	0,5 ind.	0,09	-0,07
	10		0,01	-0,07
	80		-0,02	-0,09

8.2 Harmonic components in the current and voltage circuits

Harmonic	Voltage /V	Current /A	Power factor	EUT no. 1
				Three-phase Additional percentage error
5 th	230	40	1	0,24

8.2 DC and even harmonics in the AC current circuit

DC component	Voltage /V	Current /A	Power factor	EUT no. 1
				Three-phase Additional percentage error
Positive	230	80/√2	1	1,0
Negative				2,5

The uncertainty of the test results is within $\pm 0,6\%$.

DATE: 03/21/2005



8.2 Odd-harmonics in the AC current circuit

Harmonics	Voltage /V	Current /A	Power factor	EUT no. 1 Three-phase Additional percentage error
Odd	230	5	1	0,0

8.2 Sub-harmonics in the AC current circuit

Harmonics	Voltage /V	Current /A	Power factor	EUT no. 1 Three-phase Additional percentage error
Sub	230	5	1	-0,6

8.2 Continuous magnetic induction of external origin

Continuous magnetic induction	Voltage /V	Current /A	Power factor	EUT no. 1 Three-phase Additional percentage error (worst case)
Front Side	230	10	1	<0,1 <0,1

8.2 Magnetic induction of external origin

Magnetic induction	Voltage /V	Current /A	Power factor	EUT no. 1 Three-phase Additional percentage error (worst case)
0,5 mT	230	10	1	0,8

Handwritten signature and a rectangular stamp with illegible text.



8.2 Operation of accessories

Operation of accessories energised	Voltage /V	Current /A	Power factor	EUT no. 1
				Three-phase Additional percentage error
Communication	230	0,5	1	<0,3

8.2 Test of ambient temperature influence:

Range of ambient temperature /°C	Voltage /V	Current /A	Power factor	EUT no. 1 Temperature coefficient /%/K
-10 to +45 Expanded to -40 to +70	230	1	1	0,02
		2	0,5 ind.	0,01
		10	1	0,02
		10	0,5 ind.	0,02
		40	1	0,02
		40	0,5 ind.	0,01
		80	1	0,01
		80	0,5 ind.	0,01
		1	1	0,01
		2	0,5 ind.	0,01
		10	1	0,01
		10	0,5 ind.	0,01
		40	1	0,01
		40	0,5 ind.	0,01
		80	1	0,01
		80	0,5 ind.	0,01

The uncertainty of the test results is within $\pm 0,01$ %/K.

The rest of the test results are stated in a graph, see enclosure C.

8.3.1 Initial start-up of the meter

EUT no. 2

The meter is functional within 5 s after the rated voltage is applied to the meter terminals.

8.3.2 Test of no-load condition

EUT no. 2

During this test the output device of the meter did not emit more than one pulse.

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10-03-2005
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EMI-TEST
EMISSION LEVEL [dBuV] PEAK 20 Jan 2005 08:59:22

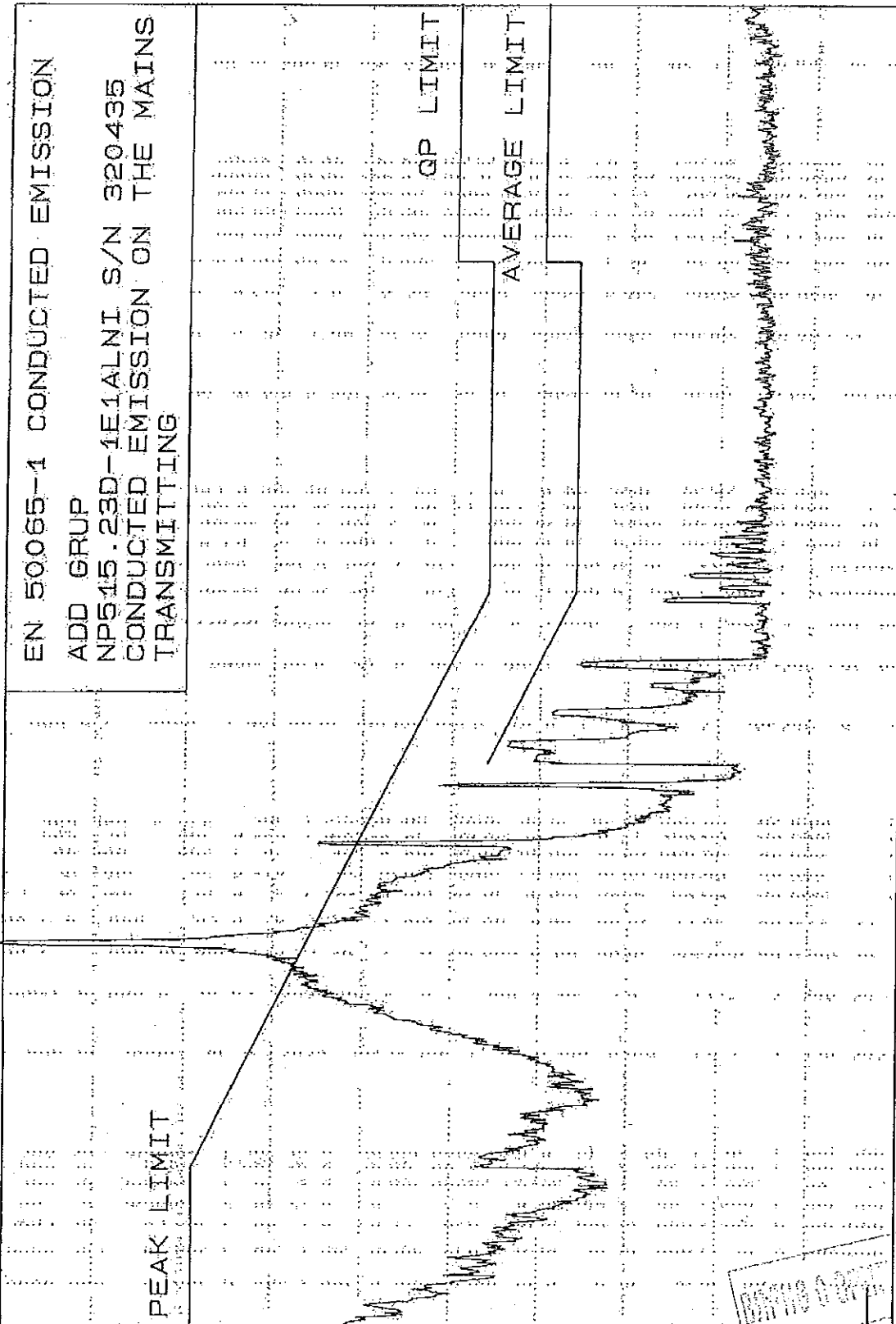
EN 50065-1 CONDUCTED EMISSION
ADD GRUP
NP615.23D-1E1ALNI S/N 320435
CONDUCTED EMISSION ON THE MAINS
TRANSMITTING

PEAK LIMIT

QP LIMIT

AVERAGE LIMIT

0 .01 .1 1 10 30
FREQUENCY [MHZ]



Sign: *[Signature]*

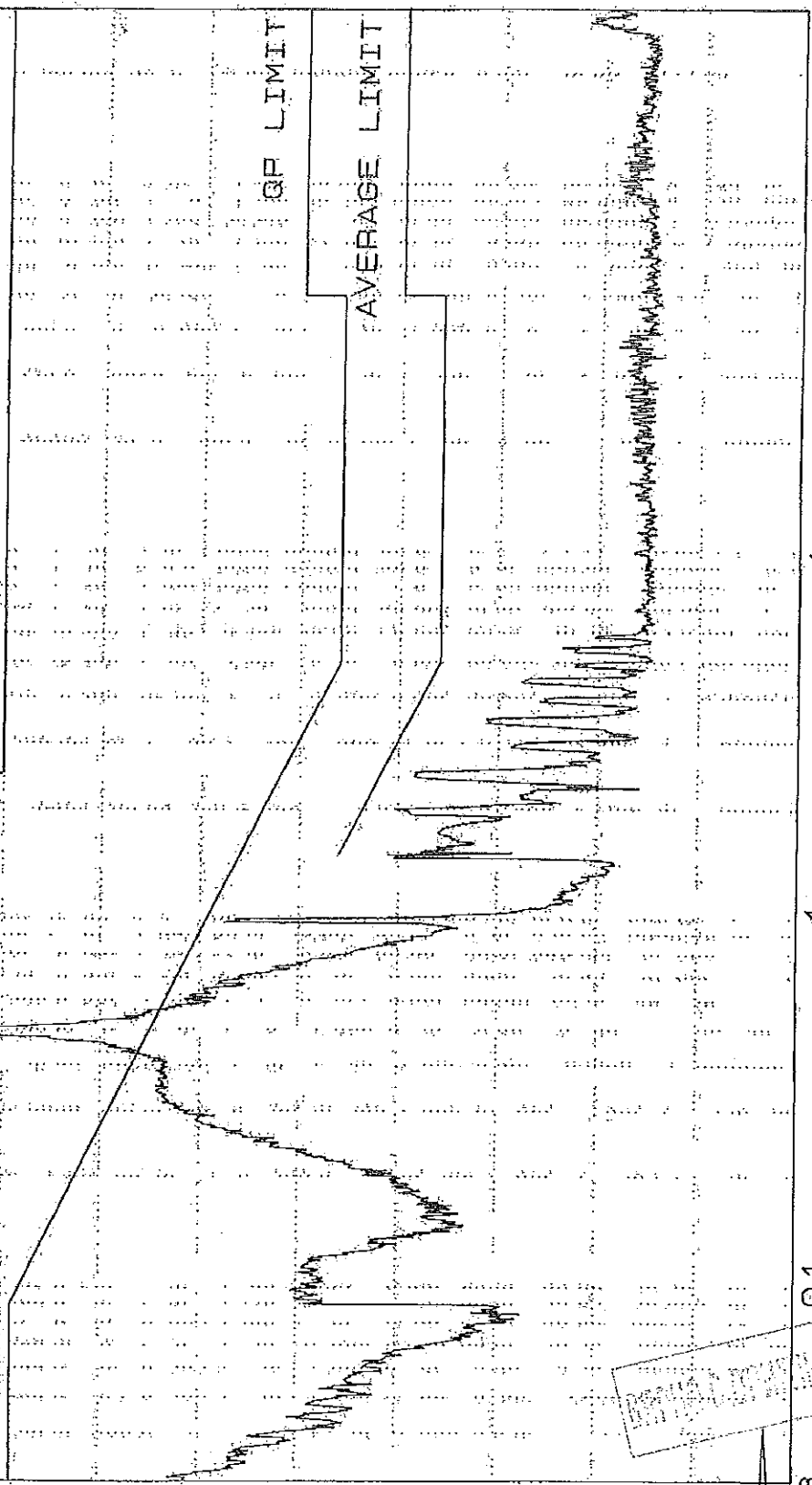
EMI-TEST EMISSION LEVEL [dBuV] PEAK 20 Jan 2005 10:08:35

EN 50065-1 CONDUCTED EMISSION
ADD GRUP
NP515.23D-1E1ALNI S/N 320435
CONDUCTED EMISSION ON THE MAINS
TRANSMITTING 49 KHZ

PEAK LIMIT

QP LIMIT

AVERAGE LIMIT



0.1 1 10 30
FREQUENCY [MHz]

01

003



Transmission signalling level

Date	Temperature	Humidity
2005-01-20	20 °C ±3 °C	25 % ±5 %

Test set-up and Procedure

Measurements with peak detector were performed on the 230 V phase and neutral connected to the artificial mains network during transmitting. The output level was measured with a bandwidth equal or greater than the transmitting signal bandwidth (-20 dB bandwidth measured with 100 Hz bandwidth).

Additionally measurement with 200 Hz measurement bandwidth was performed.

Measurement equipment	SP number
HP 8566B Spectrum analyser	501437
HP 85685A Preselector	501438
HP Quasipeak adapter	500183
HP 85869A EMI measurement software	
Schwartzbeck NNLA 8120	500574
LISN Addon 3-9 kHz (own manufacture)	*

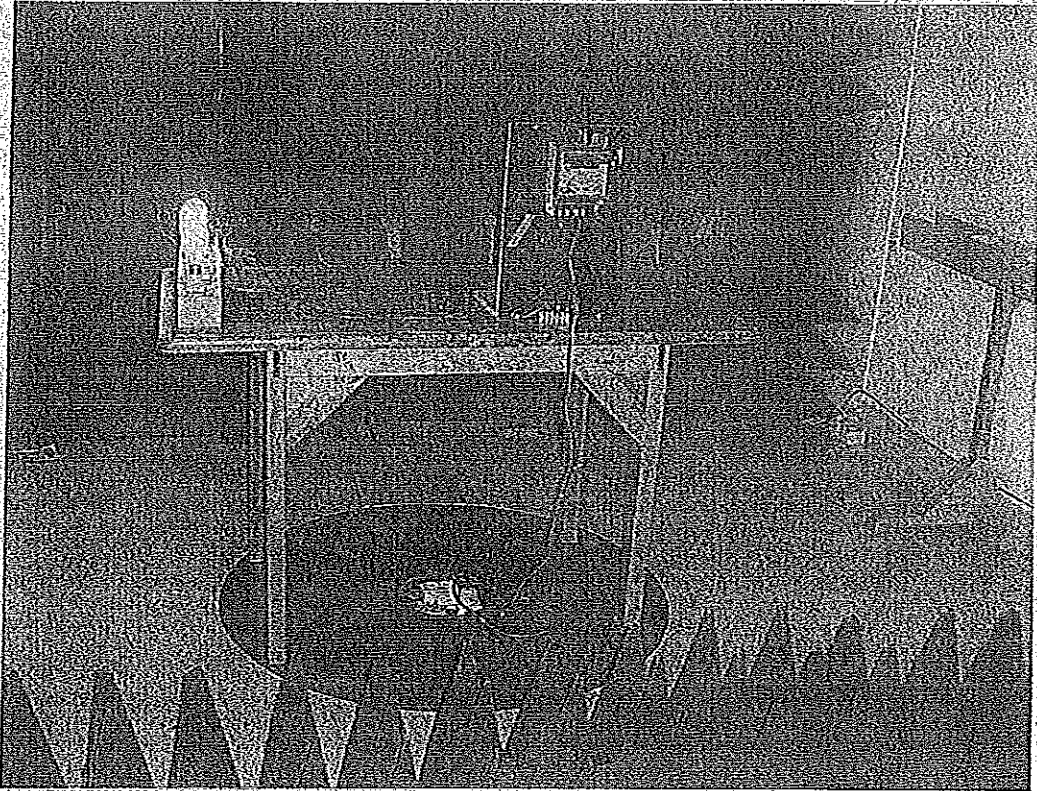
Result

The bandwidth is 2.18 kHz@43 kHz and 2.33 kHz@49 kHz measured with 100 Hz bandwidth and the level measured with 3 kHz BW is 116.6 dBµV@43 kHz and 116.3dBµV@49 kHz. According to EN 50065-1 it shall not exceed 124.7 and 123.9 dBµV respectively (narrowband signalling). The output level measured with 200 Hz bandwidth is 112 dBµV (limit 120 dBµV).

Emission below limits?	Yes
------------------------	-----



Appendix 5



Radiated emission measurement

[Handwritten signature]
STATE OF MICHIGAN
DEPARTMENT OF TRANSPORTATION

[Handwritten signature]



REPORT

Issued by an Accredited Laboratory

Date:
2005-02-21

Reference
P404027-02B

Page
1 (1)



Handled by, department
Lasse Bergsten,

Electronics
033-16 54 00, lasse.bergsten@sp.se

ADD-GRUP Europé AB
ÅKERSBERGA

EMC test on NP515.23D (10 appendices)

Test object

NP515.23D-1E1ALNI s/n 322460 and 325184

Summary

EMC-tests according to EN 62 052-11:2003 and EN 62053-21:2003, Alternating current static watt-hour meters for active energy (classes 1 and 2), have been performed. The performance requirements and control method during the immunity tests are specified in appendix 1.

Standard	Compliant ^(*)	Appendix	Remarks
EN 62 052-11:2003			
Clause 7.3.2 Impulse voltage test.	Yes	2	
Clause 7.3.3 AC voltage test	Yes	2	
Clause 7.5.2 ESD test	Yes	3	
Clause 7.5.3 RF radiated immunity test	Yes	4	
Clause 7.5.4 Fast transient burst test	Yes	5	
Clause 7.5.5 RF conducted immunity test	Yes	6	
Clause 7.5.6 Surge test	Yes	7	
Clause 7.5.8 RF emission measurement			
Radiated ^(*)	Yes	8	
Conducted	Yes	9	

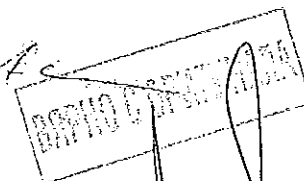
^(*) Requirements according to EN 62053-21.

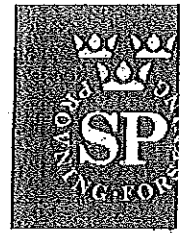
^(*) The RF emission reported is not based on measurements on an open area test site, which is the reference method according to EN 55022, but on measurements performed in an anechoic shielded chamber. The used method does not meet the EN 55022 requirements for alternative test sites. A 3 m measuring distance has been used that, based on experience from comparative measurements, gives sufficient margins to judged compliance.

SP Swedish National Testing and Research Institute
Electronics- EMC


Jan Welinder
Technical Manager


Lasse Bergsten
Technical Officer





Appendix 1

Performance test and requirements

Functional tests before, during and after the immunity tests were performed in order to verify compliance with the performance criteria as specified by the relevant specification.

Immunity test

Performance criteria: In normal operation no measurement error greater than specified and no change due to disturbance in any registers are allowed. After the tests normal performance is required.

Operation mode during RF immunity and EFT-burst test: A reference meter placed outside the disturbed test area is connected in series with the test object and is measuring the same power at base current. The measurement value from the reference meter and the value measured by the test object (taken from the test output LED via an opto link) are compared in a test program and saved on file. During the test with radiated RF immunity test at increased severity the test is performed with no load.

Operation mode during other immunity tests: The test object is connected to power, with a load as specified for the test. Insulation test is performed without other external connection than the test generator. If required for the application of the disturbance, cables of suitable length are connected to the terminals.

Emission measurement

Functional mode during emission measurements: Power on with 300W load.

Test equipment

Video camera with monitor	
EMC immunity reference meter test equipment	502176
Zera ED 7441 Meter test equipment	501246

The functional test equipment was operated by MTh personnel at SP. Verification of operation of the EUT after the test was performed by MTh personnel at SP.

Uncertainties

Measurement and test instrument uncertainties are described in the quality assurance documentation EL-QD 8.3.



Appendix 2

Insulation tests

Date	Temperature	Humidity
2005-01-27	22 °C ± 3 °C	19 % ± 5 %

Test object: s/n 325184
 Functional mode: Not connected to the mains
 Test severity: Impulse voltage: 6 kV_{peak} to earth and between circuits > 40 V
 AC voltage: 4 kV_{eff} to earth; 2 kV_{eff} between circuits > 40 V
 Perf. requirement: No flashover is allowed

Test set-up and procedure

Impulse voltage test

Test is performed according to clause 7.3.2.1 and 7.3.2.2 in EN 62052-11. The voltage impulse is applied 10 times with each polarity between terminal 1 (high) and 2 (low) according to the table below. Terminals with specified maximum voltage < 40 V are all connected to terminal 2 (low). Voltage breakdowns are noted.

AC voltage test

Test is performed according to clause 7.4 in EN 62053-21. The voltage is applied for 1 minute between terminal 1 (high) and 2 (low). The case is covered with AL-foil which is connected to terminal 2. Terminals with specified maximum voltage < 40 V are all connected to terminal 2 (low). Voltage breakdowns are noted.

Test equipment	SP number
Haefely P12, Surge generator	500185
HP 54820A, Oscilloscope	502784

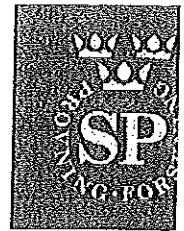
The terminals according to the table below were tested

Impulse voltage test			AC voltage test		
Term 1	Term 2	Notes	Term 1	Term 2	Notes
1-6	Al-foil	OK	1-6	Al-foil	4 kV, OK
1-3	All other	OK			

Results

No interference was noted after the test. No breakdowns occurred during the tests.

DAVID G. THORVALDSSON



Electrostatic discharge test

Date	Temperature	Humidity
2005-01-20	21 °C ± 3 °C	27 % ± 5 %

Applied standard: EN 61000-4-2 (1995) with amendments A1, A2.

Test object: s/n 322460
 Functional mode: Normal, without current
 Test severity: 8 kV contact discharge, 15 kV air discharge
 Performance requirement: No change in registers of more than 0,0196 kWh. Normal function after the test.

Test Set-up and Procedure

The test object was placed on a horizontal coupling plane (HCP) 0.8 m above a ground plane and insulated from the it by a 1 mm plastic sheet.

Air discharges were applied to selected insulated test points. In order to find sensitive points, the ESD/gun tip was scanned over insulated surfaces of the test object.

Contact discharges were applied to selected metallic test points and to coupling planes. Tests on vertical coupling plane (VCP) were made in front of non-metallic surfaces of the test object.

10 discharges of each polarity were applied on each selected test points. Surfaces on the test object without leakage to ground which could accommodate electrical charges were discharged between each test with a carbon fibre brush or, if metallic, with a bleeder resistor.

Performance criterion: B

Test equipment	SP number
HAEFELY PSD25B, ESD-gun	502518

Results

Test points	Discharge type*	Result
Screws, VCP, HCP	Cd 8 kV	OK
Case	Ad 15 kV	OK

*) cd=contact discharge, ad=air discharge

No interference was noted during the test. No change occurred in the kWh-registers.

DAVID C. OBERHALLER



Immunity to radiated electromagnetic field

Date	Temperature	Humidity
2005-01-20	20 °C ± 3 °C	25 % ± 5 %

Applied standard: EN 61000-4-3 (2002) with amendment A1.

Test object: s/n 322460
 Functional mode: Power measurement at base current
 Test severity: Fast check: 80-2000 MHz, 20 V/m, 80 % AM at 1 kHz
 Verification at 10 V/m, 80 % AM at 1 kHz
 Performance requirement: Measurement accuracy better than 2% (class I)

Functional mode: Without load current
 Test severity: 80-2000 MHz, 30 V/m 80% AM at 1 kHz
 Performance requirement: Max register change or test output registration less than 0.0184 kWh

Test Set-up and Procedure

During the test the EUT was placed on a wooden table on the turntable in a fully anechoic chamber. The antenna distance during the test was 1 m. The antenna height was 1,3 m. Test was performed with both horizontal and vertical polarisation of the antenna and with the EUT irradiated on the front and on the left side.

If performance outside the requirements is noted during the fast check, verification at 10 V/m according to the reference is made.

Test equipment	SP number
Anechoic chamber	7:314
Control Program SP/IMM 3.20	
R&S SMT06, Signal generator	503290
R&S NRT, RF Power meter	503860
R&S Z44, RF sensor head	503861
AR 250W1000AM6, Amplifier	503858
AR 50S1G4AM1, Amplifier	503859
CHASE 6121A, Bilog antenna	502461
AR AT4002A, Horn antenna	503190
Error- and pulse counter unit for energy meters	502888
Reference energy meter	502884

Results

No measurement error greater than 2% was noted during the test with base current.

4 extra pulses (0,0004 kWh) and no change in registers were noted during the test with no current.



Immunity to electrical fast transient/burst

Date	Temperature	Humidity
2005-02-04	22 °C ± 3 °C	25 % ± 5 %

Applied standard: EN 61000-4-4 (1995) with amendments A1, A2.

Test object: s/n 322460

Test severity

Voltage and current circuits: 4 kV
 I/O terminals > 40 V: 2 kV
 Performance requirement: Measurement accuracy better than 4 % (class I)

Test set-up and procedure

The EUT was placed on a ground plane and insulated from it by a 0.1 m thick insulator. The disturbances were applied to the power cable by direct injection. I/O-cables were tested with the capacitive coupling clamp. The disturbance was applied with both positive and negative polarity, 1 minute in each polarity.

Test equipment	SP number
Transient 1000	503 094
Capacitive coupling clamp	503 172

Results

The tested cables were:

Cable/Connected to terminal	Level kV	Dir / Cap	Results
Mains terminals	4	dir	Pass, error < 1 %

Performance requirements fulfilled? Yes

ORFÈVRE C. CHIFFREUR



Immunity to injected radio frequent disturbances

Date	Temperature	Humidity
2005-01-27	20 °C ± 3 °C	18 % ± 5 %

Applied standard: EN 61000-4-6 (1996) with amendment A1.

Test object: s/n 322460
 Functional mode: Power measurement at base current
 Test severity: Verification at 10 V/m, 80 % AM at 1 kHz
 Performance requirement: Measurement accuracy better than 2% (class 1)

Test Set-up and Procedure

During the test the EUT was placed on a conducting table. The input and output power cables were connected to coupling/decoupling networks. The disturbance was connected to the input power terminals. The output power terminals were not tested, since for physical reasons they are equivalent with the input power terminals.

The output terminals 15, 23 and 24 were tested with an EM-clamp.

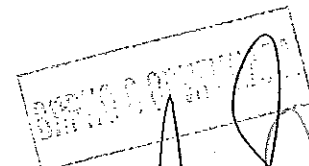
Performance criterion: A

Test equipment	SP number
Anechoic chamber	7314
R&S SMT06, Signal generator	503290
R&S NRT RF Power meter	503860
R&S NAP-Z8	501741
KALMUS 137C	501607
CDN 801-6 M2/M3	502555
CDN 801-6 M3	502680

Result

No measurement error greater than 2% was noted during the test.

Performance requirements fulfilled?	Yes
-------------------------------------	-----





Appendix 8

Radiated emission measurement

Test site	Date	Temperature	Humidity
Shielded room	2005-01-20	20 °C ± 3 °C	25 % ± 5 %

Applied standard: EN 55022 (1998) with amendments A1, A2.

Test object: s/n 322460.

Test set-up and Procedure

Measurement of radiated emission was performed in a fully anechoic chamber. The EUT was measured in 8 directions (45° apart). The measurements were performed with both horizontal and vertical polarisation of the antenna. The antenna distance was 3 m and the antenna height 1.3 m. The test set-up is shown in appendix 10.

The measurement is first performed with peak detector. Emission on frequencies close to or above the limit is controlled with quasipeak detector. Emission lower than the 10 m emission limit is deemed to comply with the requirement, when performing the measurement at a distance of 3 m.

Emission above the limit is verified on an open area test site with a measurement distance of 10 m.

Measurement equipment	SP number
Anechoic chamber	7314
HP 8566B Spectrum analyser	501437
HP 85685A Preselector	501438
HP 85650A Quasipeak adapter	500183
HP 85869A EMI measurement software	
Chase Bilog antenna CBL 6121A	502460

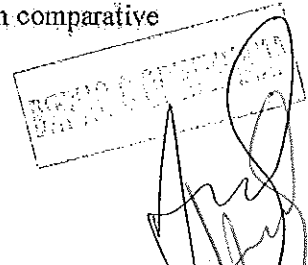
Result

The emission is shown in diagram 1. No emission is above the limit.

Emission below class B limit?	Yes
-------------------------------	-----

Comment

The RF emission reported is not based on measurements on an open area test site, which is the reference method according to EN 55022, but on measurements performed in an anechoic shielded chamber. The used method does not meet the EN 55022 requirements for alternative test sites. A 3 m measuring distance has been used that, based on experience from comparative measurements, gives margins to judge compliance.



hp
100

EMI-TEST
EMISSION

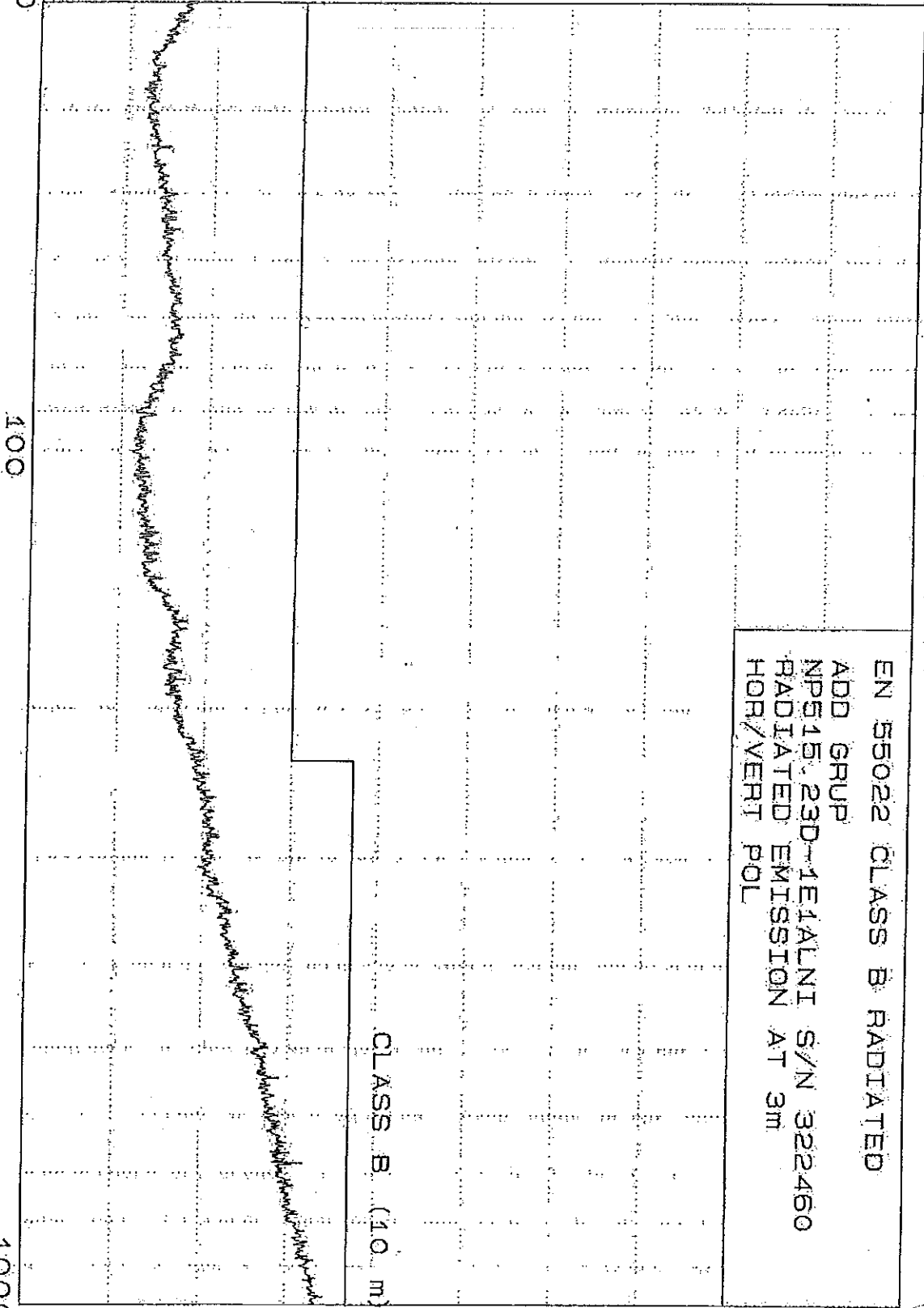
LEVEL [dBuV/m]

PEAK

20 Jan 2005 08:29:28

EN 55022 CLASS B RADIATED
ADD GRUP
NPS15.23D-1E1ALNI S/N 322460
RADIATED EMISSION AT 3m
HOR/VERT POL

80
60
40
20
30



FREQUENCY [MHZ]

[Handwritten signature]
2005 JAN 20 08:29:28



Conducted emission measurement

Date	Temperature	Humidity
2005-01-20	20 °C ± 3 °C	25 % ± 5 %

Applied standard: EN 55022, (1998) with amendments A1, A2,

Test object: s/n.322460

Test set-up and Procedure

Measurements were performed on the 230V phase and neutral,

The measurement is first performed with peak detector, Emission on frequencies close to or above the limit is controlled with quasipeak and/or average detector

Measurement equipment	SP number
HP 8566B Spectrum analyser	501437
HP 85685A Preselector	501438
HP 85650A Quasipeak adapter	500183
HP 85869A EMI measurement software	
Schwartzbeck NNLA 8120	500574

Result:

The emission spectrum is shown in diagram I.

Emission below class B limit?	Yes
-------------------------------	-----

Stamp: SOCIÉTÉ PUBLIQUE
 Signature: [Handwritten signature]

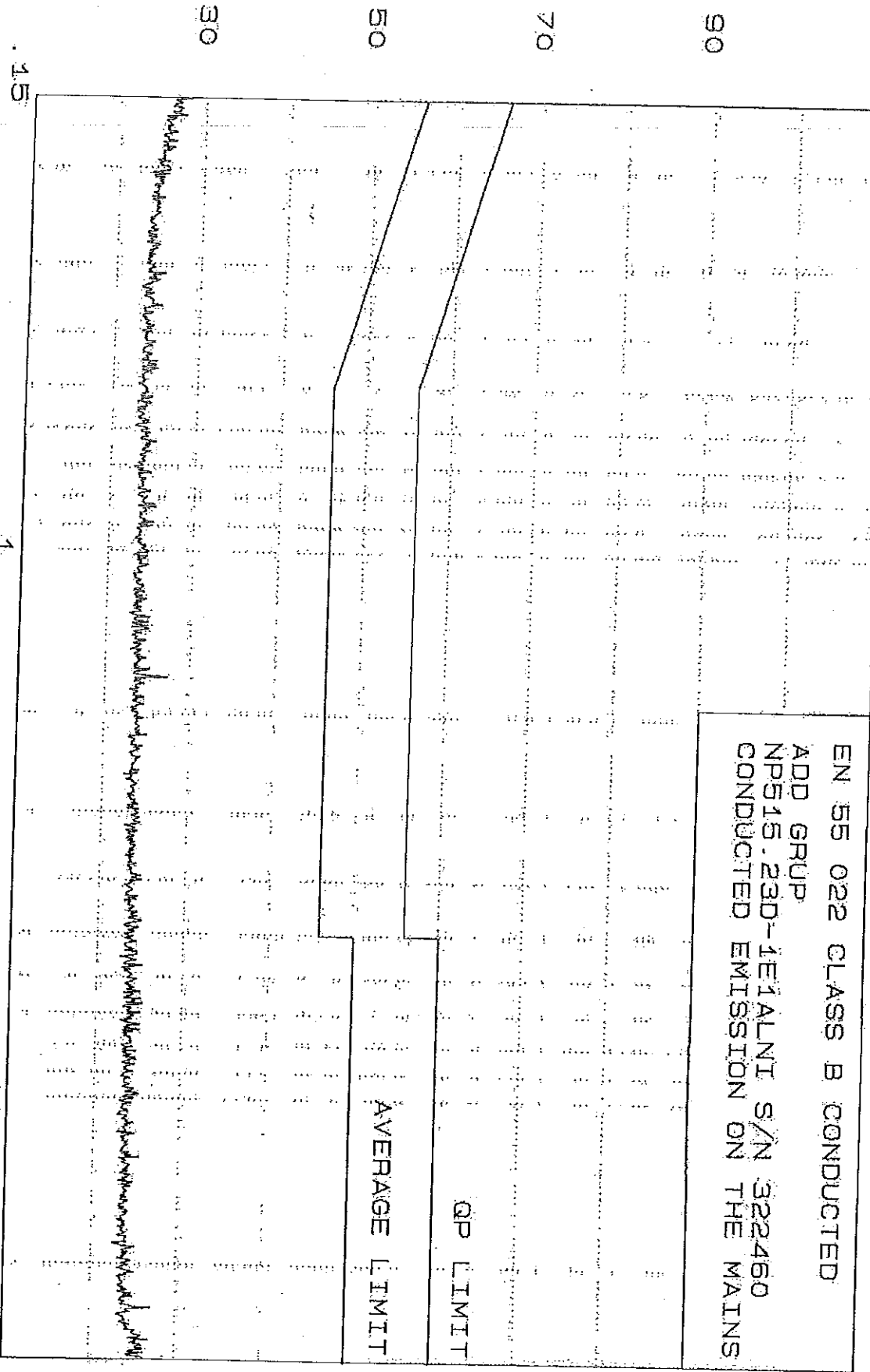
np
110

EMI-TEST
EMISSION LEVEL [dBuV]

PEAK

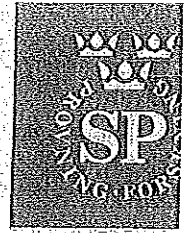
20 Jan 2005 08:37:47

EN 55 022 CLASS B CONDUCTED
ADD GRUP
NP515.230-1E1ALNT S/N 322460
CONDUCTED EMISSION ON THE MAINS



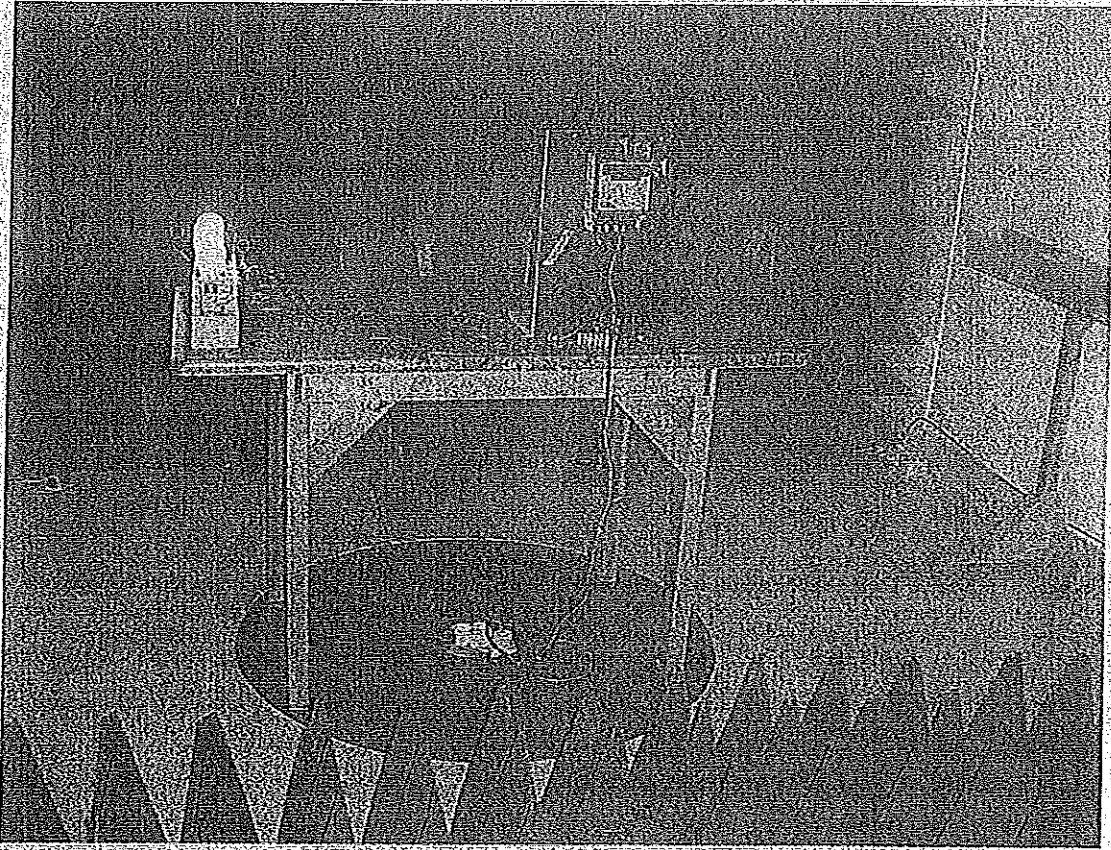
FREQUENCY [MHz]

15 1 10 30

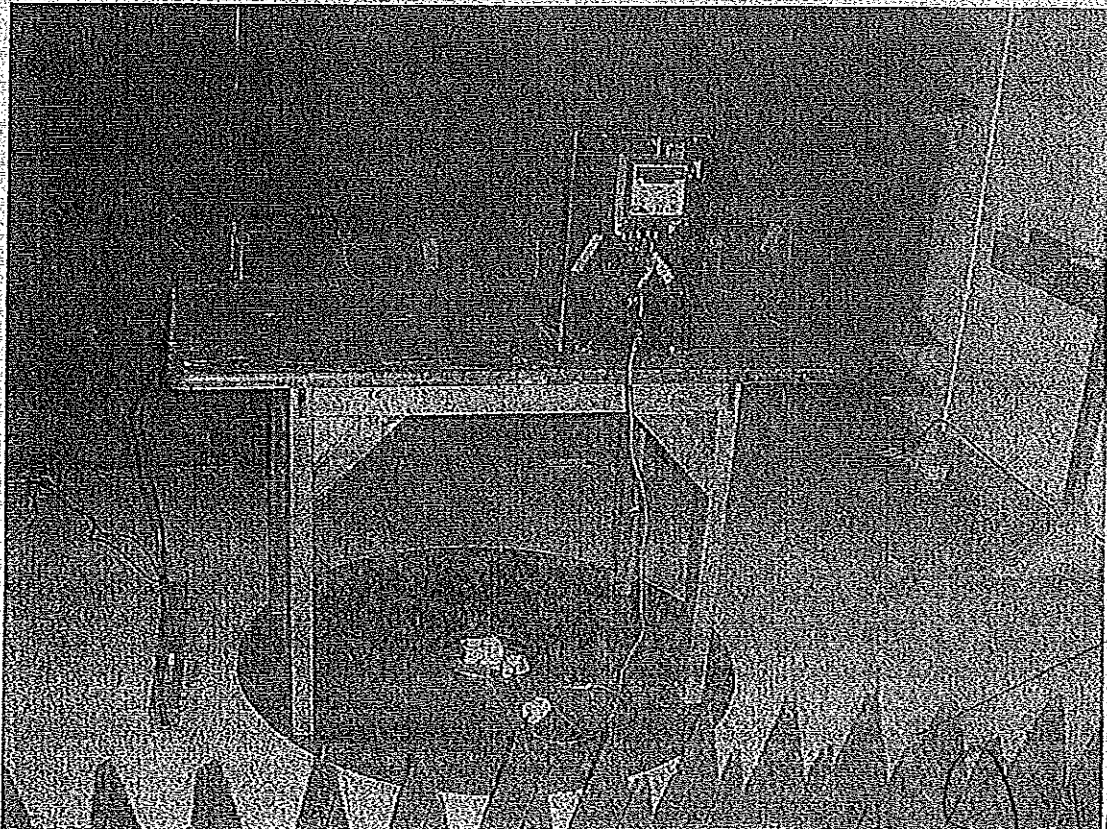


Appendix 10

Test setup



Radiated emission measurement





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2005-02-21

Reference
P404027-02C

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1 (1)



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ADD GRUP Europe AB
ÅKERSBERGA

Insulation tests on NP515

(2 appendices)

Test object

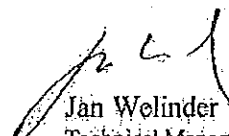
NP515.23D-1E1ALNI, s/n 325443

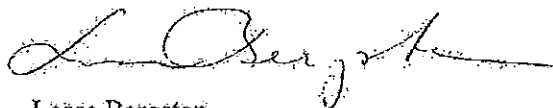
Summary

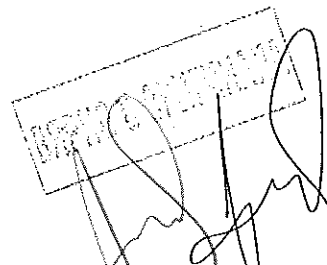
Insulation tests after humidity test according to EN 62 052-11:2003 Electricity metering equipment, have been performed. The performance requirements and control methods are specified in appendix 1.

Standard	Compliant	Appendix	Remarks
EN 62 052-11:2003			
Clause 7.3.2 Impulse voltage test	Yes	2	
Clause 7.3.3 AC voltage test	Yes	2	

SP Swedish National Testing and Research Institute
Electronics - EMC


Jan Welinder
Technical Manager


Lasse Bergsten
Technical Officer





Appendix 1

Performance test and requirements

Functional tests before, during and after the immunity tests were performed in order to verify compliance with the performance criteria as specified by the relevant specification.

Immunity test

Performance criteria: In normal operation no measurement error greater than specified and no change due to disturbance in any registers are allowed. After the tests normal performance is required.

Operation mode during RF immunity and EFT-burst test: A reference meter placed outside the disturbed test area is connected in series with the test object and is measuring the same power at base current. The measurement value from the reference meter and the value measured by the test object (taken from the test output LED via an opto link) are compared in a test program and saved on file. During the test with radiated RF immunity test at increased severity the test is performed with no load.

Operation mode during other immunity tests: The test object is connected to power, with a load as specified for the test. Insulation test is performed without other external connection than the test generator. If required for the application of the disturbance, cables of suitable length are connected to the terminals.

Emission measurement

Functional mode during emission measurements: Power on with 300W load.

Test equipment

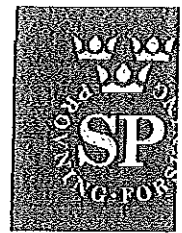
Video camera with monitor	
EMC immunity reference meter test equipment	502176
Zera ED 7441 Meter test equipment	501246

The functional test equipment was operated by MTh personnel at SP. Verification of operation of the EUT after the test was performed by MTh personnel at SP.

Uncertainties

Measurement and test instrument uncertainties are described in the quality assurance documentation EL-QD 8.3.

Stamp: **SP**
Signature: [Handwritten signature]



Appendix 2

Insulation tests

Date	Temperature	Humidity
2005-01-27	22 °C ± 3 °C	19. % ± 5 %

Test object: s/n 325443
 Functional mode: Not connected to the mains
 Test severity: Impulse voltage: 4,8 kV_{peak} to earth and between circuits > 40 V
 AC voltage: 3.2 kV_{eff} to earth; 1.6 kV_{eff} between circuits > 40 V
 Perf. requirement: No flashover is allowed

Test set-up and procedure

Impulse voltage test

Test is performed according to clause 7.3.2.1 and 7.3.2.2 in EN 62052-11. The voltage impulse is applied 10 times with each polarity between terminal 1 (high) and 2 (low) according to the table below. Terminals with specified maximum voltage < 40 V are all connected to terminal 2 (low). Voltage breakdowns are noted.

AC voltage test

Test is performed according to clause 7.4 in EN 62053-21. The voltage is applied for 1 minute between terminal 1 (high) and 2 (low). The case is covered with Al-foil which is connected to terminal 2. Terminals with specified maximum voltage < 40 V are all connected to terminal 2 (low). Voltage breakdowns are noted.

Test equipment	SP number
Hæfely P12, Surge generator	500185
HP 54820A, Oscilloscope	502784

The terminals according to the table below were tested

Impulse voltage test			AC voltage test		
Term 1	Term 2	Notes	Term 1	Term 2	Notes
1-6	Al-foil	OK	1-6	Al-foil	4 kV, OK
1-3	All other	OK			

Results

No interference was noted after the test. No breakdowns occurred during the tests.

Handwritten signature and a rectangular stamp with illegible text.



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Date
2005-02-21

Reference
P404027-02D

Impulse voltage test on NP 515 (1 appendix)

Test object

NP 515.23D-1E1ALNI, s/n 325184

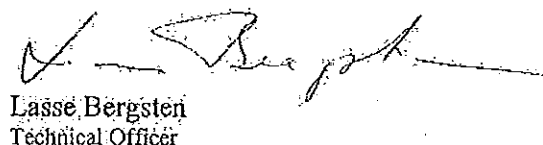
Summary

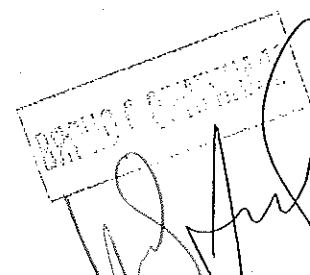
Impulse voltage test as specified below have been performed. The performance requirements and control method after the test is specified in EN 62053-21, Alternating current static watt-hour meters for active energy (classes 1 and 2).

Standard	Compliant	Appendix	Remarks
SP-MET 1618			
Impulse voltage test	Yes	1	

SP Swedish National Testing and Research Institute
Electronics - EMC


Jan Welinder
Technical Manager


Lasse Bergsten
Technical Officer





Impulse voltage test according to SP-MET 1618

Date	Temperature	Humidity
2005-02-03	21 °C ± 3 °C	24 % ± 5 %

Severity

12 kV_{peak}, 1.2/50 μs impulse voltage according to IEC 60 with 0.125 μF charge capacitor (9 joule stored energy) and 40 ohm series resistance (300 ampère maximum current).

Test method

The test object was exposed for 10 positive and 10 negative impulses with about 5 seconds interval between each combination of terminals as specified below. The impulse voltage waveform is supervised on an oscilloscope. All other terminals were left unconnected.

The functional performance was controlled after the test.

Test equipment

Haefely P12, Surge generator	500185
HP 54820A, Oscilloscope	502784
Zera ED 7441 Meter test equipment	501 246

Result

Terminal High	Terminal Low	Notes
1-3	4-6	OK

No insulation breakdowns were noted during the test. The performance was normal after the test.

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Date
2005-02-15

Reference
P404027-3

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1 (3)



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ADD GRUP Europe' AB
Rallarvägen 41
184 40 ÅKERSBERGA

Mechanical environmental tests of watt-hour meter

(1 appendix)

1 Client

ADD GRUP Europe' AB, Rallarvägen 41, 184 40 Åkersberga

2 Test object

One watt-hour meter, Type: NP515.23D-1B1ALNNI, Serial No: 325424, EUT nr: 4.
The test object was brought to SP Product Safety on 21 of January, 2005.

2 Commission

Mechanical environmental tests according to EN 62052-11, 2003:

5.2.1 Spring hammer test

5.2.2 Shock test

5.2.3 Vibration test

The watt-hour meter shall not be in operation during the tests.

Performance test according to EN 62052-11 shall be carried out after the mechanical tests.

3.1 Spring hammer test

The kinetic energy of the spring hammer shall be $0,2 J \pm 0,02 J$, according to EN 62052-11, 2003.

Three impacts on each of the outer surfaces of the meter cover in accordance with IEC 60068-2-75.

3.2 Shock test

Half sine shock test according to IEC 60068-2-27, Test Ea.

Acceleration peak:

30 g

Pulse duration:

18 ms

Number of pulses:

3 positive and 3 neg. in each of three mutually perpendicular axes



3.3 Vibration test

Sinusoidal vibration test according to IEC 60068-2-6, test Fc.

Frequency range:	10 – 150 Hz
Amplitude 10 – 57 Hz:	0.075 mm
Acceleration 57 – 150 Hz:	1 g
Duration:	10 sweep cycles in each of three mutually perpendicular axes
Sweep rate:	1 octave/min

4 Performance

The spring hammer test, the shock test and the vibration test was carried out according to the standards and with the severities stated above.

The tests were performed by Jörgen Eriksson during the period 21 to 24 of January 2005. The test sequence was vibration test, shock test and spring hammer test.

Performance test was carried out by Bo Larsson.

4.1 Mounting

The watt-hour meter was mounted to a 30 mm Al-plate by three M6 screws through the normal mounting holes. Mounting, test directions, test attitudes and control accelerometer locations are shown in the photos, see appendix.

4.2 Vibration test

The vibration test was carried out without remarks.

The test sequence was y-, x- and z-direction.

A typical control frequency spectrum is shown in the appendix.

4.3 Shock test

The shock test was carried out without remarks.

The test sequence was +y, -y, +z, -z, +x and -x direction.

A typical control pulse is shown in the appendix.

4.4 Spring hammer test

The spring hammer test was carried out without remarks.

5 Result

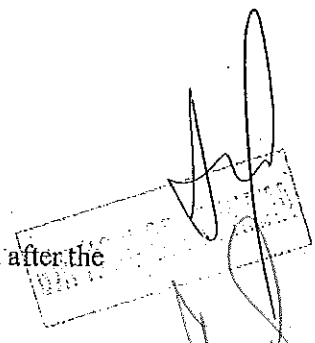
5.1 Mechanical tests

No damage was found after the tests.

5.2 Performance test

No influence on the measurement accuracy or any other functions was noted after the mechanical tests.

Acceleration measuring uncertainty is evident from SP-method 1606, rev. 4.





SP Swedish National Testing and Research Institute
Electronics – Environmental Durability

Klas Hagborg
Technical Manager

Jörgen Eriksson
Technical Officer

Appendix

Photos and diagrams:

Test equipment

Spring hammer

Shock tester

Accelerometer

Vibrator system

Ch1 accelerometer

Performance test

Zera ED 7441

SP No: 503 658

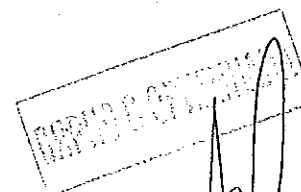
SP No: 500 125

BoK 4384 1416761

SP No: 503 435

758 channel 1

SP No: 500 125



ПРОТОКОЛИ ОТ ПРОВЕДЕНИ
ИЗПИТВАНИЯ С ПРИЛОЖЕНИ
РЕЗУЛТАТИ ЗА ТРИФАЗЕН ДИРЕКТЕН
ЕЛЕКТРОМЕР



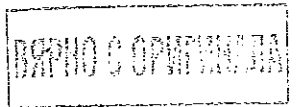
Calibration Certificate No.: CC9916/15 Page 1 of 5

The calibration laboratory of Applied Precision is accredited for conformance with ISO 17025 by Slovak National Accreditation service SNAS.

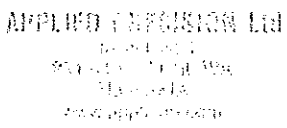
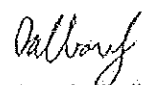
This calibration certificate documents the traceability to national standards, which realize the units of measurement according to the international System of Units (SI)

This calibration certificate applies only to the item identified and may not be reproduced except in full with the specific written permission of Applied Precision Ltd. Calibration certificates without signature are not valid.

Object Three-Phase Electronic Electricity Meter
Manufacturer ADD Production
Type NP73
Serial Number 00167022
Class B
Customer Transtech a.s.
Jilemnického 4
080 01 Prešov
Slovakia



Date of Calibration **4th February 2015**

Seal / Date	Approved Signatory	Person in charge
 4 th February 2015	 Ladislav Grno	 Marek Ralbovsky



Calibration Certificate No.: CC9916/15

Page 2 of 5

Calibration Report

Description of Calibration

The calibration was performed as direct comparison of the laboratory Reference Meter with the tested meter.

Site of Calibration

Calibration Laboratory of Applied Precision, Bratislava, Staviteľska 1.

Ambient Environment

23 ± 3 °C, 40±10% relative humidity

Standards

Reference Standard RS 2330E, S/N 1204060534, accuracy class 0.02.
Fluke 5720A, AC-DC Calibrator, S/N: 7900209

Traceability

Laboratory standards are traceable to Czech National Standards (ČMI) and Slovak National Standards (SMÚ). The laboratory Reference Standard is subject of periodical calibration against the primary standards.

Czech National Standards (ČMI) are traceable to German National Standards (PTB) and U.K. National Standards (NPL).

Uncertainties

Uncertainties of measurement are:

- 0.010% for active power at $\cos\varphi=1$,
- 0.020% for active power at $\cos\varphi=0.5$,
- 0.013% for active power at $\cos\varphi=0.8$,
- 0.010% for reactive power at $\sin\varphi=1$,
- 0.020% for reactive power at $\sin\varphi=0.5$
- 0.040% for reactive power at $\sin\varphi=0.25$

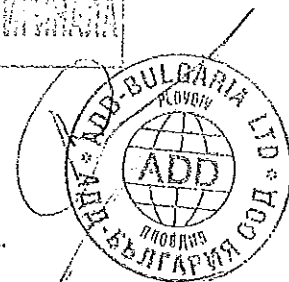
Uncertainties are valid for measurements in following ranges:

Voltage range: 5V – 500V, Current range: 1mA – 120A, Frequency range: 40 – 70Hz.

Declared expanded measurement uncertainties are product of standard uncertainty and expansion coefficient $k=2$ which at normal probability distribution corresponds to coverage of approximately 95%.

The standard uncertainty is determined according to EA-4/02 document.

ВЪПРОС С ОПИТНИКА

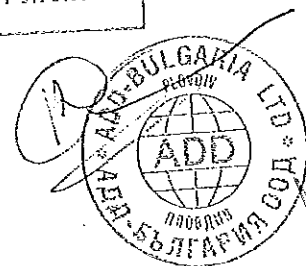


Measurement Results

Temperature Measurement

Test Name	Temperature (°C)				-40	-25	-10	5
	U [V]	I [A]	PF	Channel	Error [%]	Error [%]	Error [%]	Error [%]
I _{min}	230	0.25	1	L123	0.5811	0.3859	0.2741	0.1692
10% I _{men}	230	0.5	1	L123	0.5710	0.3890	0.2908	0.2004
10% I _{men} 0.5L	230	0.5	0.5L	L123	0.5418	0.3859	0.2745	0.1837
10% I _{men} 0.8C	230	0.5	0.8C	L123	0.5643	0.3994	0.2942	0.1959
100% I _{men}	230	5	1	L123	0.5688	0.4128	0.2920	0.1904
100% I _{men} 0.5L	230	5	0.5L	L123	0.5418	0.3792	0.2707	0.1781
100% I _{men} 0.8C	230	5	0.8C	L123	0.5823	0.4240	0.3020	0.1959
I _{max}	230	100	1	L123	0.5518	0.3953	0.2674	0.1753
I _{max} 0.5L	230	100	0.5L	L123	0.3949	0.2361	0.1101	0.0245
I _{max} 0.8C	230	100	0.8C	L123	0.6171	0.4588	0.3266	0.2330
10% I _{men} R	230	0.5	1	L1	0.4330	0.2763	0.2227	0.1179
10% I _{men} S	230	0.5	1	L2	0.5272	0.3624	0.2261	0.1179
10% I _{men} T	230	0.5	1	L3	0.5295	0.3725	0.2350	0.1335
10% I _{men} R 0.5L	230	0.5	0.5L	L1	0.3154	0.1904	0.1369	0.0267
10% I _{men} S 0.5L	230	0.5	0.5L	L2	0.3848	0.2551	0.1034	-0.0033
10% I _{men} T 0.5L	230	0.5	0.5L	L3	0.4924	0.3378	0.2361	0.1279
100% I _{men} R	230	5	1	L1	0.4408	0.3166	0.2127	0.1168
100% I _{men} S	230	5	1	L2	0.6036	0.4408	0.3233	0.2060
100% I _{men} T	230	5	1	L3	0.5778	0.4285	0.3132	0.2116
100% I _{men} 0.5L R	230	5	0.5L	L1	0.4083	0.2853	0.1892	0.1101
100% I _{men} 0.5L S	230	5	0.5L	L2	0.4991	0.3557	0.2350	0.1279
100% I _{men} 0.5L T	230	5	0.5L	L3	0.6047	0.4375	0.3412	0.2261
I _{max} R	230	100	1	L1	0.4274	0.2987	0.1982	0.1001
I _{max} S	230	100	1	L2	0.5879	0.4296	0.2996	0.2015
I _{max} T	230	100	1	L3	0.6531	0.4285	0.3635	0.1971
I _{max} 0.5L R	230	100	0.5L	L1	0.4363	0.3065	0.1926	0.1068
I _{max} 0.5L S	230	100	0.5L	L2	0.5922	0.4307	0.2964	0.1982
I _{max} 0.5L T	230	100	0.5L	L3	0.5587	0.4307	0.3658	0.4475

ВАЖНО С ОБЯЗАНАТА

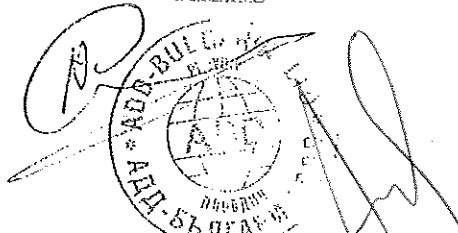


Measurement Results

Temperature Measurement

Test Name	Temperature (°C)				23	30	40	55	70
	U [V]	I [A]	PF	Channel	Error [%]	Error [%]	Error [%]	Error [%]	Error [%]
Imin	230	0.25	1	L123	0.1023	0.1090	0.0812	0.0256	0.0300
10% Imin	230	0.5	1	L123	0.1302	0.1289	0.1034	0.0588	0.0563
10% Imin 0.5L	230	0.5	0.5L	L123	0.1046	0.1034	0.0700	0.0489	0.0823
10% Imin 0.8C	230	0.5	0.8C	L123	0.0923	0.0812	0.0545	0.0156	0.0111
100% Imin	230	5	1	L123	0.1246	0.1112	0.0812	0.0623	0.0489
100% Imin 0.5L	230	5	0.5L	L123	0.1279	0.1090	0.0834	0.0723	0.0956
100% Imin 0.8C	230	5	0.8C	L123	0.1224	0.1123	0.0678	0.0478	0.0256
Imax	230	100	1	L123	0.1057	0.0888	0.0463	0.0300	0.0300
Imax 0.5L	230	100	0.5L	L123	-0.0300	-0.0511	-0.0822	-0.0888	-0.0799
Imax 0.8C	230	100	0.8C	L123	0.1569	0.1402	0.1001	0.0812	0.0700
10% Imin R	230	0.5	1	L1	0.0712	0.0867	0.0311	0.0100	0.0945
10% Imin S	230	0.5	1	L2	0.0656	0.0422	-0.0100	-0.0455	-0.0533
10% Imin T	230	0.5	1	L3	0.1012	0.0756	0.0178	-0.0056	0.0022
10% Imin R 0.5L	230	0.5	0.5L	L1	0.0267	0.0167	-0.0378	-0.0144	0.0734
10% Imin S 0.5L	230	0.5	0.5L	L2	-0.0988	-0.0877	-0.1675	-0.1896	-0.1476
10% Imin T 0.5L	230	0.5	0.5L	L3	0.0422	0.0445	0.0125	-0.0056	0.0033
100% Imin R	230	5	1	L1	0.0656	0.0645	0.0311	0.0211	0.0712
100% Imin S	230	5	1	L2	0.1291	0.1090	0.0667	0.0356	0.0578
100% Imin T	230	5	1	L3	0.1447	0.1268	0.0901	0.0611	0.0700
100% Imin 0.5L R	230	5	0.5L	L1	0.0867	0.0834	0.0589	0.0845	0.1614
100% Imin 0.5L S	230	5	0.5L	L2	0.0578	0.0434	0.0022	0.0011	0.0600
100% Imin 0.5L T	230	5	0.5L	L3	0.1614	0.1614	0.1179	0.1112	0.1291
Imax R	230	100	1	L1	0.0456	0.0345	-0.0011	0.0056	0.0567
Imax S	230	100	1	L2	0.1101	0.0888	0.0388	0.0156	0.0422
Imax T	230	100	1	L3	0.3694	0.0956	0.0767	0.0434	0.0488
Imax 0.5L R	230	100	0.5L	L1	0.0522	0.0345	0.0044	0.0056	0.0467
Imax 0.5L S	230	100	0.5L	L2	0.1079	0.0901	0.0438	0.0133	0.0378
Imax 0.5L T	230	100	0.5L	L3	0.1146	0.0988	0.0600	0.2913	0.0489

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Measurement Results

Test According to EN 62053-21

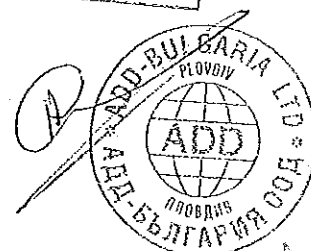
Test Name	U [V]	I [A]	PF	Channel	Error [%]
115% Umen	264.5	0	1	L123	Passed
Náb. 0.4% Imen	230	0.02	1	L123	Passed
5% Imen	230	0.25	1	L123	0.1157
10% Imen	230	0.5	1	L123	0.1480
10% Imen 0.5L	230	0.5	0.5L	L123	0.1391
10% Imen 0.8C	230	0.5	0.8C	L123	0.0823
50% Imen	230	2.5	1	L123	0.1236
50% Imen 0.5L	230	2.5	0.5L	L123	0.1424
50% Imen 0.8C	230	2.5	0.8C	L123	0.1112
100% Imen	230	5	1	L123	0.1314
100% Imen 0.5L	230	5	0.5L	L123	0.1413
100% Imen 0.8C	230	5	0.8C	L123	0.1257
I _{max}	230	100	1	L123	0.1112
100% Imen R	230	5	1	L1	0.0812
100% Imen S	230	5	1	L2	0.1357
100% Imen T	230	5	1	L3	0.1525
100% Imen 0.5L R	230	5	0.5L	L1	0.0979
100% Imen 0.5L S	230	5	0.5L	L2	0.0656
100% Imen 0.5L T	230	5	0.5L	L3	0.1861
Číselník 4 kWh	230	100	1	L123	0.0407

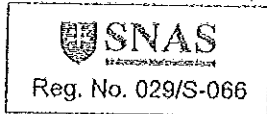
Test According to EN 62053-21 addendum A.2 + A.3

Test Name	U [V]	I [A]	PF	Channel	Error [%]
5th Harmonic	230	5	1	L123	0.1536
Phase Fired	230	5	1	L123	0.1302
Bust Fire	230	5	1	L123	0.2395

End of Calibration Certificate

ВЪРНО С ОПРИМАТА





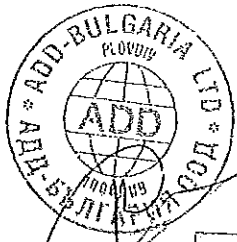
Skúšobňa
Fakulty elektrotechniky a informatiky STU
Ilkovičova 3, 812 19 Bratislava

Tel: 02/602 91 631, 602 91 152
Fax: 02/6544 0227

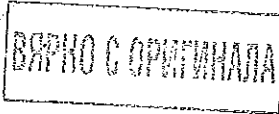
TEST REPORT

No.: 49/14/SL EMK
Year: 2014

Applicant: Slovenský metrologický ústav
Oddelenie certifikácie a výkonu štátnej správy
Karloveská 63, 842 55 Bratislava



Tested equipment: Three-phase electricity meter
of type NP73



SLOVENSKÁ TECHNICKÁ UNIVERZITA
BRATISLAVA
FAKULTA ELEKTROTECHNIKY A INFORMATIKY
Akreditovaná skúšobňa
Ilkovičova 3, 812 19 Bratislava

Approved:
Assoc. Prof. K. Kováč, PhD.
Head of Test house of FEI STU

Bratislava 28. 10. 2014

Notes: All test results are valid only for tested equipment. Publication of test report content is not allowed without customer confirmation. Test report may be copied only as a whole, otherwise only with confirmation of Test house of FEI STU in Bratislava. This test report is issued in Slovak and English languages: the Slovak version only of this document can be considered as an original.

SFEI STU v BRATISLAVE	SKÚSOBNA Fakulty elektrotechniky a informatiky STU	Ilkovičova 3 812 19 BRATISLAVA
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Test subject: Three-phase electricity meter of type NP73

Serial number: 00167022

Manufacturer: ADD-PRODUCTION S.R.L., 139 Decebal blvd., Chisinau MD-2060, Republic of Moldova

Test: Measurement of emissions and immunity test according to EN 50470-1: 2006 and EN 50470-3: 2006

Applicant: Slovenský metrologický ústav, Oddelenie certifikácie a výkonu štátnej správy, Karloveská 63, 842 55 Bratislava 50

Date of test sample submission: 8. 10. 2014

Number of tested samples: 1

Date of measurement: 9. 10. - 15. 10. 2014

Place of measurement: EMC Test Laboratory of SFEI STU Bratislava

Test report contains:

Text pages: 15
Tables: 8
Appendices: 4
Figures: 7

Distribution: Number of pcs
SFEI STU: 1 pc
Applicant: 1 pc

Conditions of measurements and tests:

Identification of test equipment is shown in Fig. 1.

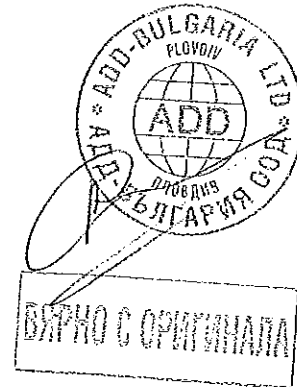
Measured set contained:

- electricity meter,
- power supply cable 1.5 m long,
- resistive load connected by power cable 1.5 m long.

Explanation: If the measured set was modified due to any measurement or test conditions, it is noticed on a page corresponding to the measurement or test.

Power supply: 3 × 396 V AC

Atmospheric conditions: Temperature: 22 - 24 °C
Rel. humidity: 56 - 59 %



A handwritten signature in black ink, located in the bottom right corner of the page.

SFEI STU v BRATISLAVE	SKUŠOBNA Fakulty elektrotechniky a informatiky STU	Ilkovičova 3 812 19 BRATISLAVA
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Test results:

Table 1: Results of conducted and radiated emissions measurement:

No.	Measurement	Method / Configuration of measured set	Limit	Conclusion / Emission class	Page
1	Conducted emissions	EN 55016-2-1 EN 55022	EN 55022	complies / class B	4
2	Radiated emissions	EN 55016-2-3 EN 55022	EN 55022	complies / class B	5

Conclusion: Electricity meter complies with requirements set by EN 50470-1: 2006 of electromagnetic interferences for electricity metering equipment within the range shown in the table 1.

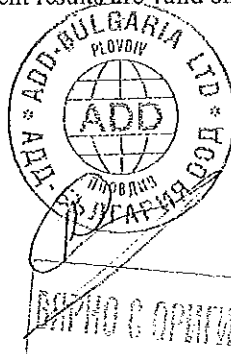
Table 2: Results of immunity tests

No.	Test	Method	Critical change value		Page
			Request of EN 50470-1, 50470-3	Conclusion	
1	Immunity against electrostatic discharges	EN 61000-4-2	0.069 kWh (without current)	complies	6
2	Immunity against HF electromagnetic field	EN 61000-4-3	±2 % (class B) / 0.069 kWh (without current)	complies	7
3	Immunity against EFT/Burst pulses	EN 61000-4-4	±4 % (class B)	complies	8
4	Immunity against SURGE pulses	EN 61000-4-5	0.069 kWh (without current)	complies	9
5	Immunity against conducted interference	EN 61000-4-6	±2 % (class B)	complies	10
6	Immunity against voltage dips and short interruptions	EN 61000-4-11	0.069 kWh (without current)	complies	11

Note: Electromagnetic disturbance may cause a temporary degradation or a loss of performance, but it cannot cause bigger additional error as a critical change value is (EN 50470-1, Part 7.4.3. for given tests without current and EN 50470-3, Part 8.5 (Table 9) for tests with current).

Conclusion: Electricity meter complies with requirements set by EN 50470-1: 2006 of electromagnetic susceptibility for electricity metering equipment within the range shown in the table 2.

Test laboratory declares, that measurement results are valid only for measured subject.



Assoc. Prof. Karol Kováč, PhD.
Head of EMC Laboratory

SFEI STU v BRATISLAVE	SKÚŠOBŇA Fakulty elektrotechniky a informatiky STU	Ilkovičova 3 812 19 BRATISLAVA
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Test: Measurement of conducted emissions according to
EN 55 022:2010

Test subject: Three-phase electricity meter of type NP73

Serial number: 00167022

Manufacturer: ADD-PRODUCTION S.R.L., 139 Deccebal blvd., Chisinau MD-2060,
Republic of Moldova

Date of measurement: 9. 10. 2014

Test instrumentation:

- test receiver R&S ESPI 7 – Ser. No. 101268,
- V line impedance stabilization network Schwarzbeck NNLK 8121– Ser. No. 8121-527,fl
- transient limiter HP 11947A – Ser. No. 3107A00791,
- semi-anechoic shielded chamber with measurement place according to EN 55022.

Auxiliary instrumentation:

- ammeter PROVA11, Ser. no. 02200567,
- resistive load.

Metrological properties:

Measuring place was verified according to CISPR 16-1 on 1. 9. 2011, measuring report
KP-11/06/EMK, ESPI 7 R&S Certificate of Calibration No.: 20-280819 from 15. 12. 2009.

Conditions of measurement:

Measurement place was arranged according to EN 55022 (Fig. 2). The electricity meter was
connected in direct connection, 1-phase network.

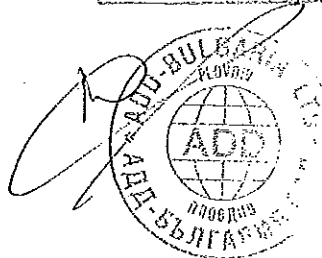
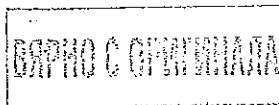
Output current to load: 3×1 A
Frequency range: 0.15 – 30 MHz

Measurement results:

Measurement results of mains conducted tests are shown in appendix MCE 14 49.

Conclusion:

Maximal level of disturbing conducted emissions is below limit of EN 50470-1:2006.



SFEI STU v BRATISLAVE	SKÚŠOBNA Fakulty elektrotechniky a informatiky STU	Ilkovičova 3 812 19 BRATISLAVA
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Test: Measurement of radiated emissions according to
EN 55 022:2010

Test subject: Three-phase electricity meter of type NP73

Serial number: 00167022

Manufacturer: ADD-PRODUCTION S.R.L., 139 Decebal Blvd., Chisinau MD-2060,
Republic of Moldova

Date of measurement: 9. 10. 2014

Test instrumentation:

- test receiver R&S ESPI 7 – Ser. No. 101268,
- rf measuring preamplifier 10 kHz - 5 GHz, Sonoma 352 – Ser. No. 303123,
- Trilog measuring antenna 30 - 3000 MHz, Schwarzbeck – VULB 9163 - Ser. No. 9163-360,
- semi-anechoic shielded chamber with measurement place according to EN 55022.

Auxiliary instrumentation:

- ammeter PROVA11, Ser. No. 02200567,
- resistive load.

Metrological properties:

ESPI 7 R&S Certificate of Calibration No.: 20-280819 from 15. 12. 2009, measuring place was verified according to CISPR 16-1 on 3. 1. 2011, measuring report KP-11/01EMK.

Conditions of measurement:

Measurement place was arranged according to EN 55 022 (Fig. 3). The electricity meter was connected in direct connection, 1-phase network.

Output current to load: 3×1 A
 Frequency range: 30 –1000 MHz.
 Measuring distance: 3 m
 Height of antenna: 1 – 4 m

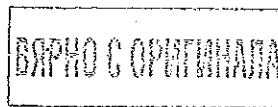
Measurements were performed for both polarizations of receiving antenna.

Measurement results:

Measurement results in frequency range are given in appendix MRE 14 49.

Conclusion:

Maximal level of disturbing conducted emissions is below limit of EN 50470-1:2006.



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Test: Test of immunity against electrostatic discharge according to EN 61000-4-2:2009

Test subject: Three-phase electricity meter of type NP73

Serial number: 00167022

Manufacturer: ADD-PRODUCTION S.R.L., 139 Decebal blvd., Chisinau MD-2060, Republic of Moldova

Date of measurement: 10. 10. 2014

Test instrumentation:

- electrostatic discharge simulator Haefely Trench PESD 1600 – Ser. No. H 606 113,
- testing place according to EN 61000-4-2.

Metrological properties:

Testing place was verified according to EN 61000-4-2 on 16. 5. 2012, measuring report KP-12/01/EMK.

Conditions of test:

Test place was arranged according to EN 61000-4-2 (Fig. 4). Tested electricity meter was tested without any load. Ten pulses were applied for every test level and polarity. Before and after the application of test sequence the status of the display was checked.

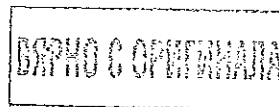
Test results:

Table 3: Result of electrostatic discharge test:

Discharge type	Test level	Request of standard	Test results
Indirect – contact discharge	±8 kV	< 0.069 kWh	complies
Direct - contact discharge	±8 kV	< 0.069 kWh	complies
Direct - air (on the plastic part)	±15 kV	< 0.069 kWh	complies

Conclusion:

Immunity level of tested device complies with requirements set by EN 50470-1:2006.



SFEI STU v BRATISLAVE	SKÚŠOBŇA Fakulty elektrotechniky a informatiky STU	Ilkovičova 3 812 19 BRATISLAVA
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Test: Test of immunity against electromagnetic field according to EN 61000-4-3:2006

Test subject: Three-phase electricity meter of type NP73

Serial number: 00167022

Manufacturer: ADD-PRODUCTION S.R.L., 139 Decebal Blvd., Chisinau MD-2060, Republic of Moldova

Date of measurement: 14. 10. 2014

Test instrumentation:

- signal generator Agilent E8257D – Ser. No. MY45141271,
- power amplifier 150W1000, Amplifier Research – Ser. No. 0333238,
- power amplifier Milmega AS0840-30/17 – Ser. No. 1030085,
- Trilog measuring antenna 30 - 3000 MHz Schwarzbeck VULB 9163 – Ser. No. 9163-360,
- Logperiodic antenna R&S HL023A1 – Ser. No. 321 286/079,
- test place in anechoic shielded chamber according to EN 61000-4-3.

Auxiliary instrumentation:

- ammeter PROVA11 – Ser. No. 02200567,
- period meter with optic sensor Kmer1/08,
- oscilloscope Tektronix DPO 4104 – Ser. No. C021008,
- resistive load,
- power supply Kmer1/04.

Metrological properties:

Testing place was verified according to EN 61000-4-3 on 4. 10. 2013, measuring report KP-13/01/EMK.

Conditions of test:

Test place was arranged according to EN 61000-4-3 (Fig. 5). The electricity meter was connected in direct connection, 1-phase network. During the test current through load was set to 10; 1; 1 A and the period of output pulses was measured by oscilloscope and period meter. Signal output was connected to oscilloscope and period meter situated outside the test chamber by unshielded cable via feedthrough filters.

Test results:

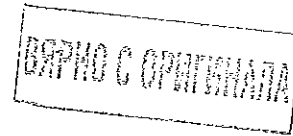
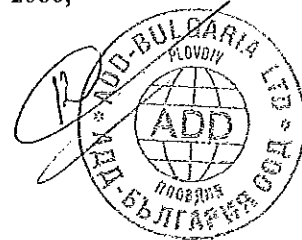
Table 4: Result of immunity test against electromagnetic field

Condition	Frequency range	Polarization	Test level	Request of standard	Test results
with current	80 – 2000 MHz	horizontal	10V/m	±2 %	complies
with current	80 – 2000 MHz	vertical	10V/m	±2 %	complies
without current	80 – 2000 MHz	horizontal	30V/m	< 0.069 kWh	complies
without current	80 – 2000 MHz	vertical	30V/m	< 0.069 kWh	complies

Explanation: Measurement results are shown in appendix MRS 14 49. Error of reading was less than ±2 % tolerance at test level 10 V/m (Table 9, EN 50470-3). During the test without current false pulse was not noticed.

Conclusion:

Immunity level of tested device complies with requirements set by EN 50470-1:2006 and EN 50470-3:2006.



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Test: Test of immunity against EFT/Burst according to EN 61000-4-4:2004

Test subject: Three-phase electricity meter of type NP73

Serial number: 00167022

Manufacturer: ADD-PRODUCTION S.R.L., 139 Decebal blvd., Chisinau MD-2060, Republic of Moldova

Date of measurement: 10. 10. 2014

Test instrumentation:

- EFT/Burst simulator EFT500N5 – Ser. No. V0947105565,
- capacitive clamp according to EN 61000-4-4,
- CDN for 3×400V/16A according to EN 61000-4-4
- test place for immunity against EFT/Burst testing according to EN 61000-4-4.

Auxiliary instrumentation:

- ammeter PROVA11– Ser. No. 02200567,
- resistive load decoupled by clamp EM101,
- stopwatch.

Metrological properties:

Testing generator was verified according to EN 61000-4-4 on 14. 9. 2011, measuring report KP-11/08/EMK.

Conditions of test:

Test place was arranged according to EN 61000-4-4 (Fig. 6). The electricity meter was connected in direct connection, 1-phase network. The level of the pulses was gradually rising from 2 kV to the nominal value and its polarity was changing. During the test current through the load was set to 1 A. The period of 5 output pulses was measured by stopwatch and compared (with or without disturbance).

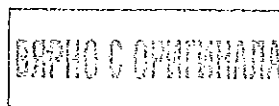
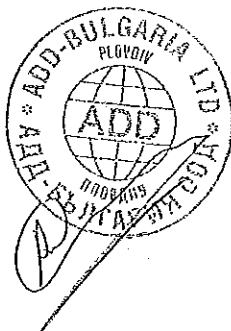
Test results:

Table 5: Result of immunity test against EFT/Burst $f = 5 \text{ kHz}$, 15/300 ms

Wire	Coupling	Test level	Request of standard	Test results
L1 / L2 / L3 / N	CDN	$\pm 2 / 4 \text{ kV}$	$\pm 4 \%$	complies
output	Cap. clamp	$\pm 2 / 4 \text{ kV}$	$\pm 4 \%$	complies

Conclusion:

Immunity level of tested device complies with requirements set by EN 50470-1:2006 and EN 50470-3:2006.



SFEI STU V BRATISLAVE	SKUŠOBŇA Fakulty elektrotechniky a informatiky STU	Ilkovičova 3 812 19 BRATISLAVA
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Test: Test of immunity against SURGE pulses according to EN 61000-4-5:2006

Test subject: Three-phase electricity meter of type NP73

Serial number: 00167022

Manufacturer: ADD-PRODUCTION S.R.L., 139 Decebal blvd., Chisinau MD-2060, Republic of Moldova

Date of measurement: 13. 10. 2014

Test instrumentation:

- a. surge simulator VCS 500-M, EM TEST – Ser. No. V0548100910,
- b. test place according to EN 61000-4-5.

Metrological properties:

Test simulator was verified according to EN 61000-4-5 on 16. 9. 2011, measuring report KP-11/09/EMK.

Conditions of measurement:

Test place was arranged according to EN 61000-4-5. Tested electricity meter was tested without current in the current circuits. The pulses were applied between phase and ground connection point. Five pulses of both polarities were applied with repetition time of 1 minute. Before and after the application of test sequence the status of the display was checked.

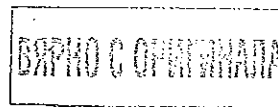
Test results:

Table 6: Result of immunity test against SURGE

Tested port	Coupling impedance	Test level	Request of standard	Test results
L - N	2 Ω	± 4 kV	< 0,069 kWh	complies
L2 - L3	2 Ω	± 4 kV	< 0,069 kWh	complies

Conclusion:

Immunity level of tested device complies with requirements set by EN 50470-1:2006.



SFEI STU v BRATISLAVE	SKUŠOBNA Fakulty elektrotechniky a informatiky STU	Ilkovičova 3 812 19 BRATISLAVA
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Test: Test of immunity against conducted interference according to EN 61000-4-6:2009

Test subject: Three-phase electricity meter of type NP73

Serial number: 00167022

Manufacturer: ADD-PRODUCTION S.R.L., 139 Decebal blvd., Chisinau MD-2060, Republic of Moldova

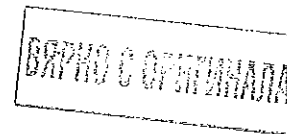
Date of measurement: 14. 10. 2014

Test instrumentation:

- signal generator Agilent E8257D – Ser. No. MY45141271,
- power amplifier AR 10W1000 – Ser. No. 6759,
- set of coupling/decoupling networks (CDN) according to EN 61000-4-6,
- injection clamp EM101 – Ser. No. 35639
- attenuator 6 dB/10 W,
- test place according to EN 61000-4-6.

Auxiliary instrumentation:

- ammeter PROVA11 – Ser. No. 02200567,
- period meter with optic sensor Kmer1/08,
- oscilloscope Tektronix DPO 4104 – Ser. No. C021008,
- resistive load,
- power supply Kmer1/04.



Metrological properties:

Test place and CDNs were verified according to EN 61000-4-6 on 13.9.2011, measuring report KP-11/07/EMK.

Conditions of measurement:

Test place was arranged according to EN 61000-4-6 (Fig. 7). The electricity meter was connected in direct connection, 1-phase network. During the test current through load was set to 3×5 A and the period of output pulses was measured by oscilloscope and period meter. Signal output was connected to oscilloscope and period meter situated outside the test chamber by unshielded cable via feedthrough filters.

Test results:

Table 7: Result of immunity test against conducted interference.

Cable	CDN	Frequency range	Test level	Request of standard	Test results
Voltage terminals	M-4	0.15 – 80 MHz	10 V	±2 %	complies
Output	EM-101	0.15 – 80 MHz	10 V	±2 %	complies

Explanation: Measurement results are shown in appendix MCS 14 49. Error of reading was less than ±2 % tolerance at test level 10 V (Table 9, EN 50470-3).

Conclusion:

Immunity level of tested device complies with requirements set by EN 50470-1:2006 and EN 50470-3:2006.

SFEI STU v BRATISLAVE	SKÚŠOBNA Fakulty elektrotechniky a informatiky STU	Ilkovičova 3 812 19 BRATISLAVA
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Test: Test of immunity against voltage dips, short interruptions and voltage fluctuations according to EN 50470-1:2006.

Test subject: Three-phase electricity meter of type NP73

Serial number: 00167022

Manufacturer: ADD-PRODUCTION S.R.L., 139 Decebal Blvd., Chisinau MD-2060, Republic of Moldova

Date of measurement: 10. 10. 2014

Test instrumentation:

a. programmable AC source Chroma 61503 – Ser. No. 00000128.

Metrological properties:

Test place was verified according to EN 61000-4-11 on 11.10.2011, measuring report KP-11/10/EMK.

Conditions of measurement:

Test place was arranged according to EN 50470-1. Fluctuations and dips of voltage were generated by programmable AC source. Tested electricity meter was connected as single-phase one. Before and after the application of test sequence the status of the display was checked.

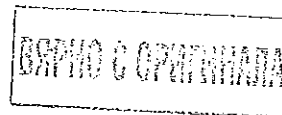
Test results:

Table 8: Result of immunity test against voltage dips and short interruptions AC

Interference type	Duration	Request of standard	Test results
voltage interruption of 100%	1 period	< 0.069 kWh	complies
combining interruption	3 × 0.5 s interruption with restoring time 100 ms	< 0.069 kWh	complies
voltage dip of 50 %	1 minute	< 0.069 kWh	complies

Conclusion:

Immunity level of tested device complies with requirements set by EN 50470-1:2006.



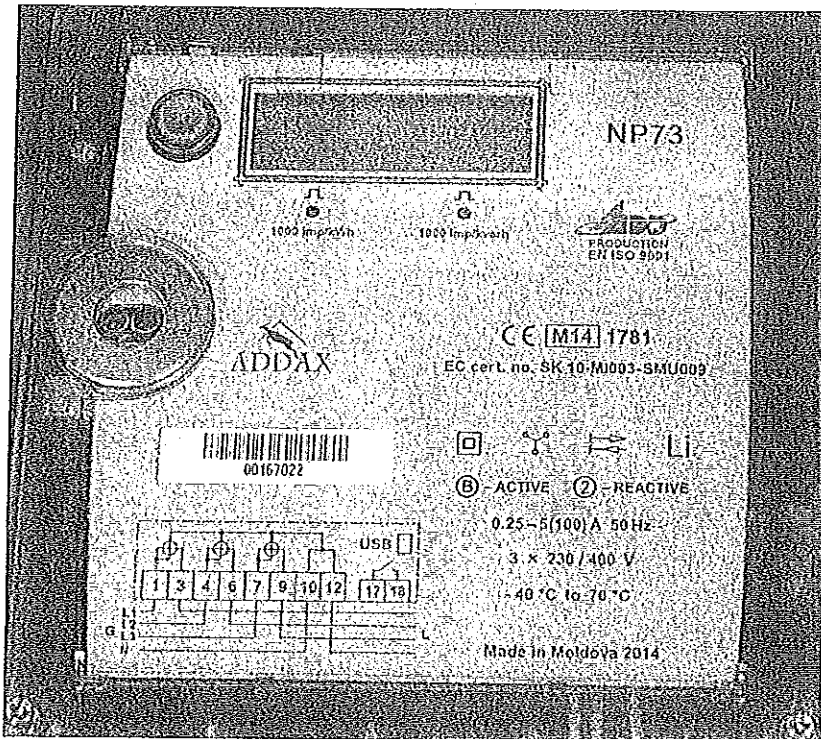


Fig.1: Identification of the equipment.

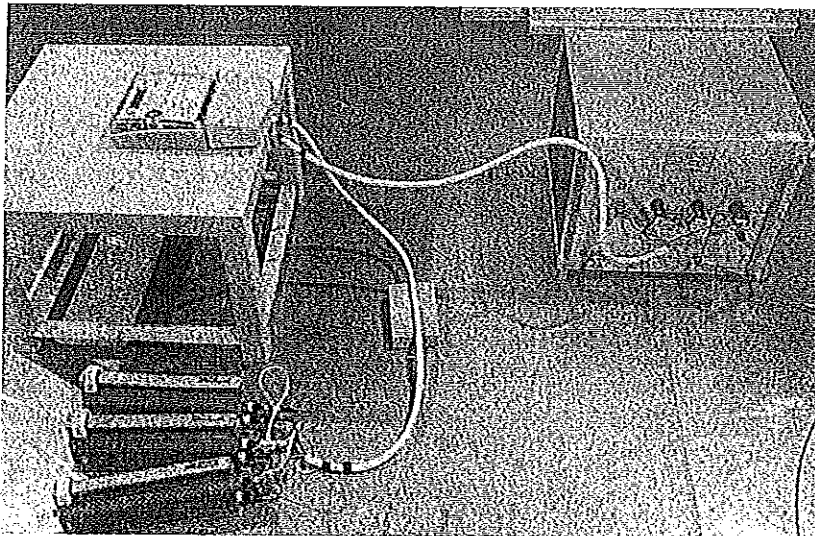


Fig.2: Arrangement of measured sample during conducted emission measurement.

BRATSKO C. OPERATORNA

SFEI STU v BRATISLAVE	SKUŠOBNA Fakulty elektrotechniky a informatiky STU	Ilkovičova 3 812 19 BRATISLAVA
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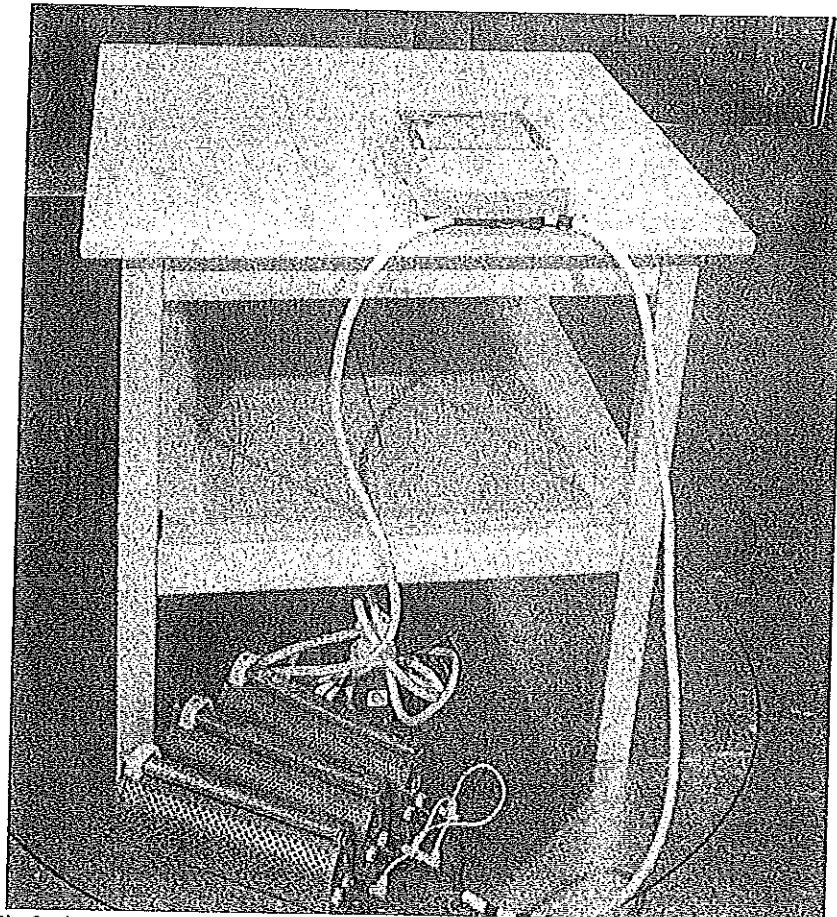


Fig.3: Arrangement of measured sample during radiated emission measurement.

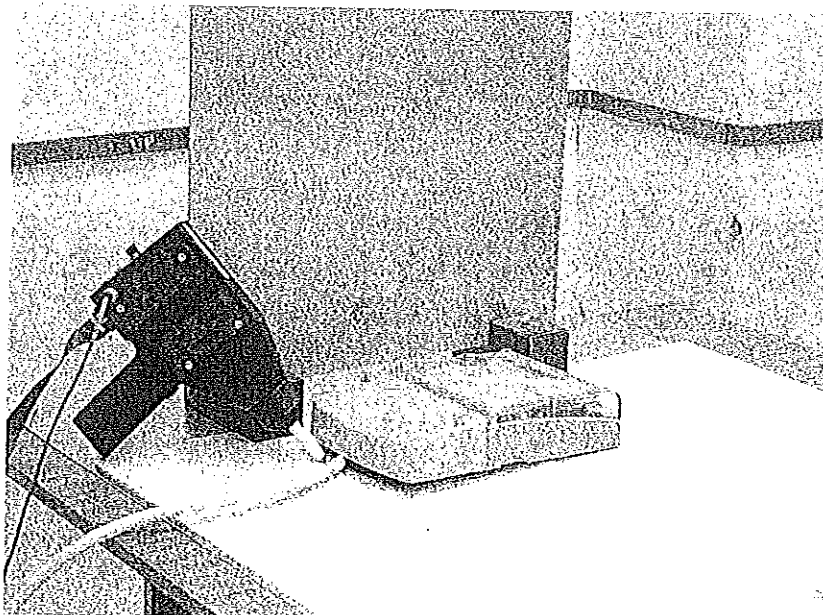


Fig.4: Arrangement of tested sample during the test according to EN 61000-4-2.

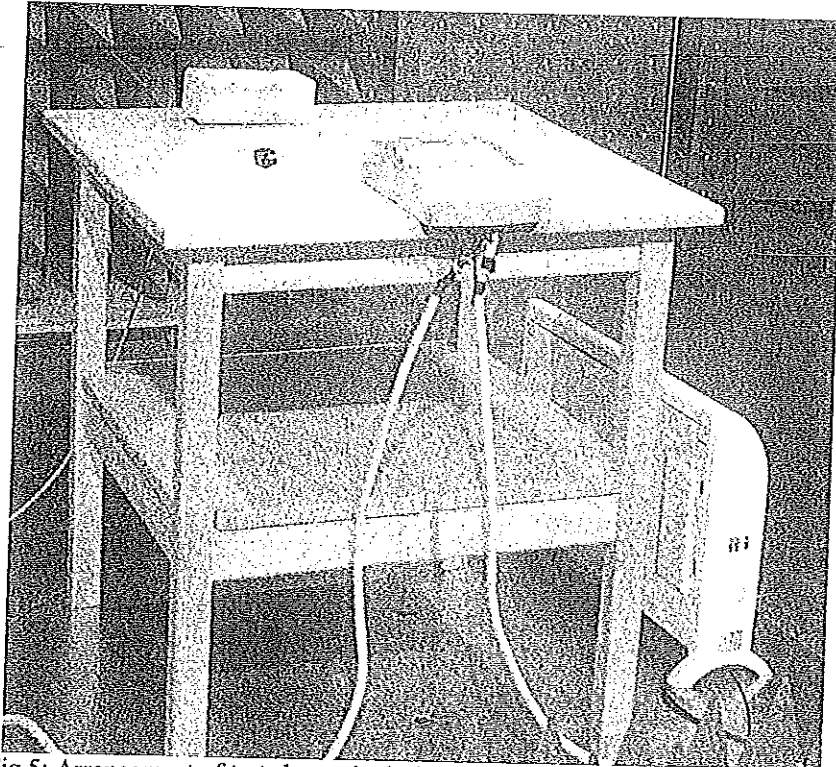


Fig.5: Arrangement of tested sample during the test according to EN 61000-4-3.

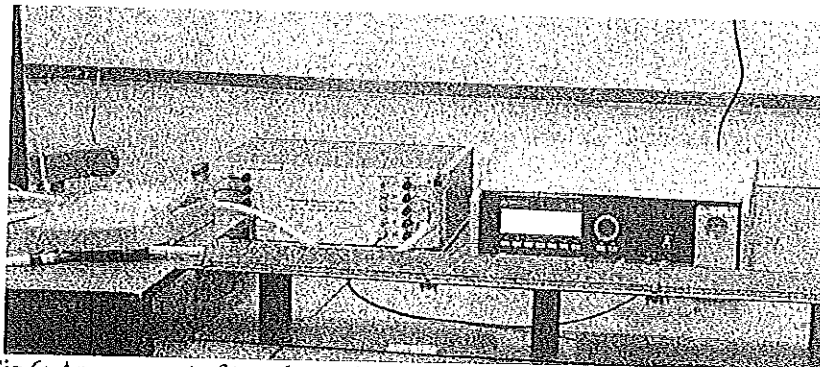


Fig.6: Arrangement of tested sample during the test according to EN 61000-4-4.

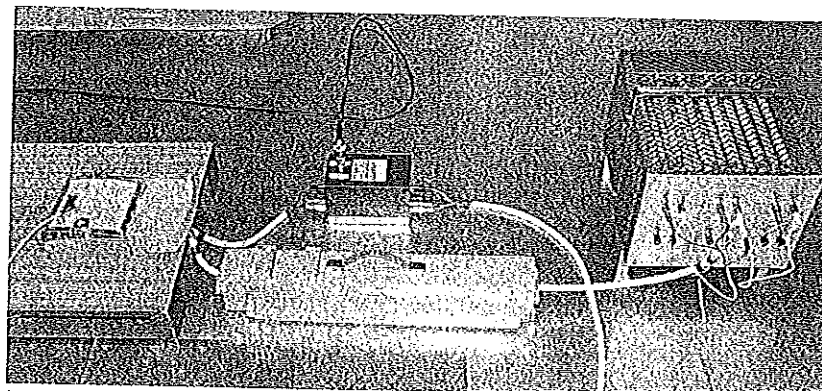


Fig.7: Arrangement of tested sample during the test according to EN 61000-4-6.

SFEI STU v BRATISLAVE	SKÚŠOBŇA Fakulty elektrotechniky a informatiky STU	Ilkovičova 3 812 19 BRATISLAVA
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Place and date of test report edition: Bratislava, 28. 10. 2014

Test executed by: A. Krammer, MSc.

Report created by: J. Hallon, PhD.

Test results verified by: Assoc. Prof. K. Kováč, PhD

————— End of test report —————



EMI Measurement Test Report

Conducted Emission

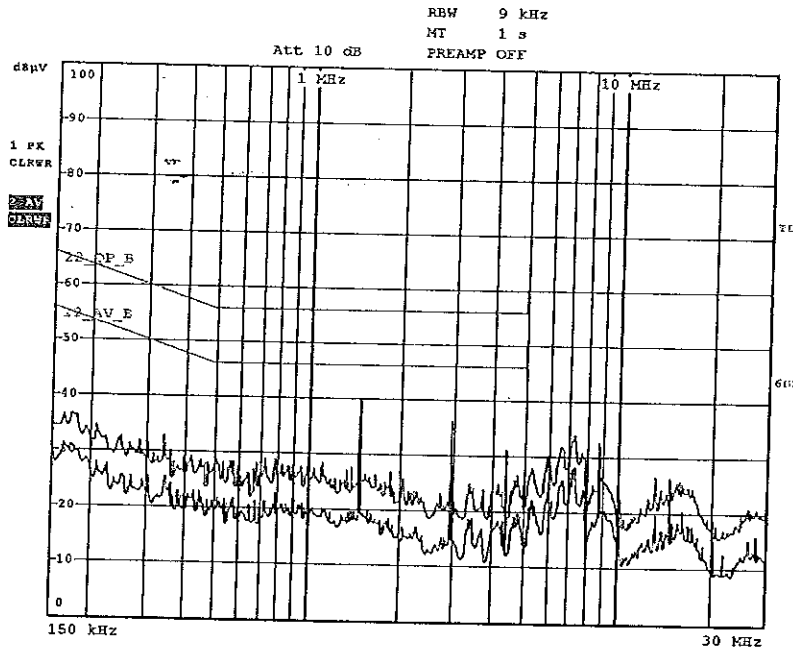
Equipment Under Test: NP73
Operating Conditions: 3 x1 A
Operator: A. Krammer
Test Specification: EN 55022
Limit: B class
Date: 9. 10. 2014

Measurement 1: L1

Scan Settings (1 Range)

Frequencies			Receiver Settings		Detectors			
Start	Stop	Step	Res BW	M-Time	Pre-measurement		Final-measurement	
150 kHz	30 MHz	4 kHz	9 kHz	100 ms	PK+	AV	QP	AV

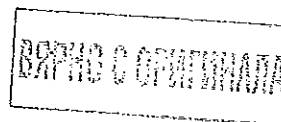
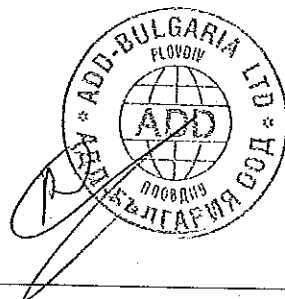
Pre-measurement Graph



Final Measurement Results

Explanation:

As the peak detector values were more than 6 dB below limit, the quasi-peak values were not measured.

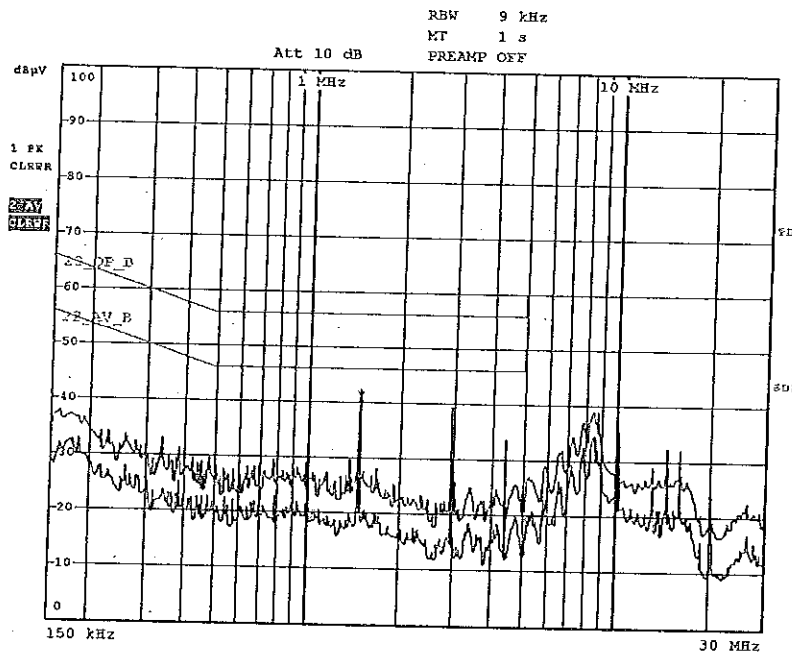


Measurement 2: L2

Scan Settings (1 Range)

Frequencies			Receiver Settings		Detectors			
Start	Stop	Step	Res BW	M-Time	Pre-measurement		Final-measurement	
150 kHz	30 MHz	4 kHz	9 kHz	100 ms	PK+	AV	QP	AV

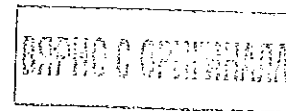
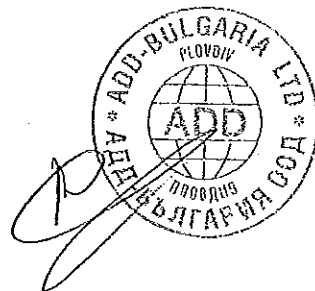
Pre-measurement Graph



Final Measurement Results

Trace	Frequency [MHz]	Level [dBµV]	Limit [dBµV]	Delta Limit [dB]
AV	1.470	40.99	46.00	-5.01

* = limit exceeded

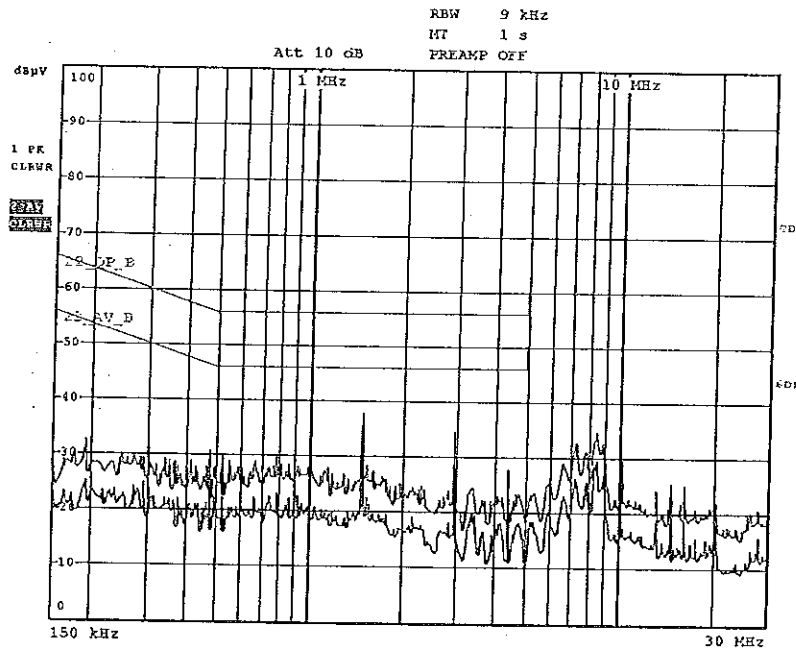


Measurement 3: L3

Scan Settings (1 Range)

Frequencies			Receiver Settings		Detectors			
Start	Stop	Step	Res BW	M-Time	Pre-measurement		Final-measurement	
150 kHz	30 MHz	4 kHz	9 kHz	100 ms	PK+	AV	QP	AV

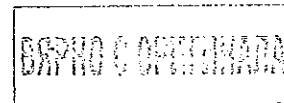
Pre-measurement Graph



Final Measurement Results

Explanation:

As the peak detector values were more than 6 dB below limit, the quasi-peak values were not measured.

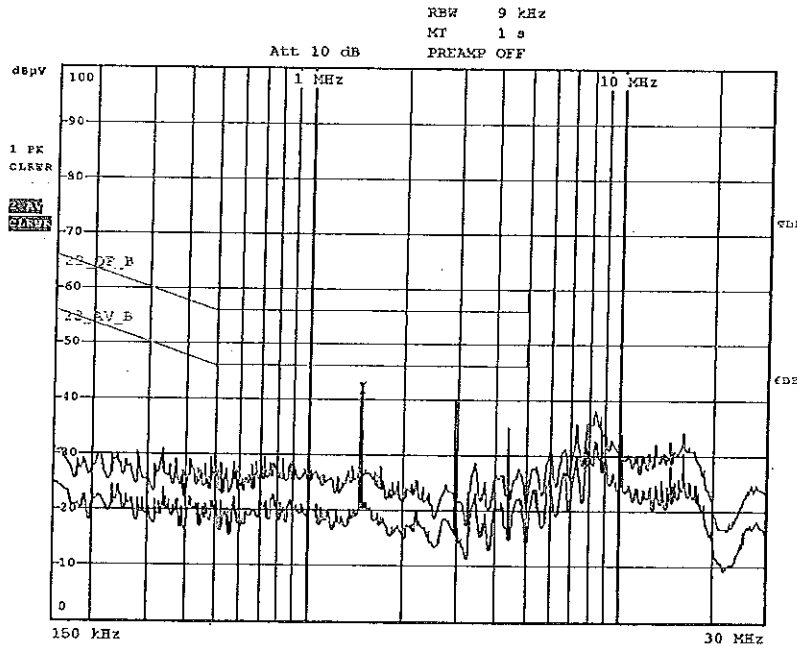


Measurement 4: N

Scan Settings (1 Range)

Frequencies			Receiver Settings		Detectors			
Start	Stop	Step	Res BW	M-Time	Pre-measurement		Final-measurement	
150 kHz	30 MHz	4 kHz	9 kHz	100 ms	PK+	AV	QP	AV

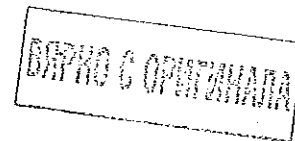
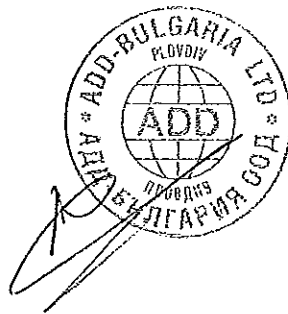
Pre-measurement Graph



Final Measurement Results

Trace	Frequency [MHz]	Level [dBµV]	Limit [dBµV]	Delta Limit [dB]
AV	1.470	42.26	46.00	-3.74

* = limit exceeded



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EMI Measurement Test Report

Radiated Emission

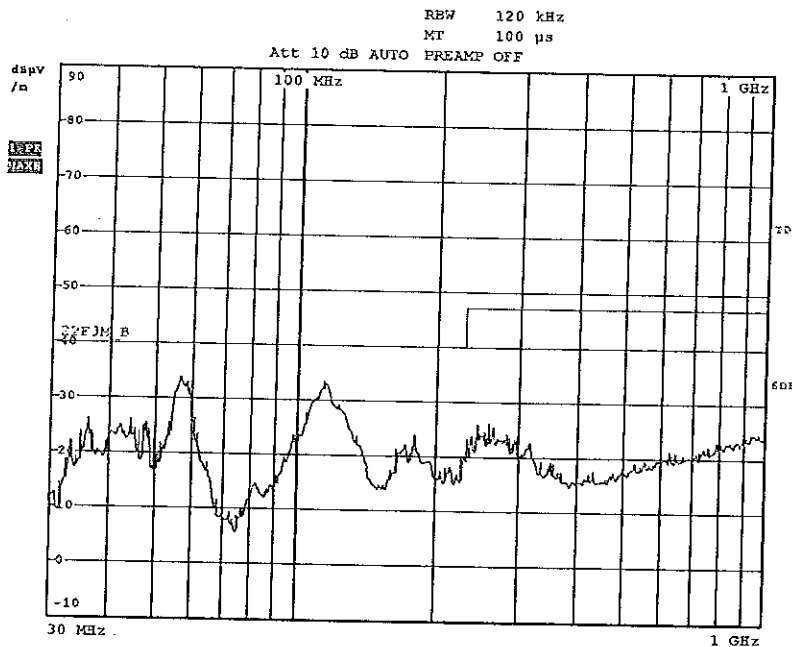
Equipment Under Test: NP73
Operating Conditions: 3 × 1 A
Operator: A. Krammer
Test Specification: EN 55022
Limit: B class
Date: 9. 10. 2014

Measurement 1: Horizontal

Scan Settings (1 Range)

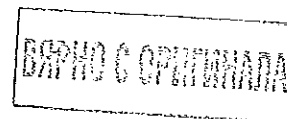
Frequencies			Receiver Settings		Detectors	
Start	Stop	Step	Res BW	M-Time	Pre-measurement	Final-measurement
30 MHz	1000 MHz	40 kHz	120 kHz	1 ms	PK+	QP

Pre-measurement Graph



Final Measurement Results:

Explanation: As the peak detector values were more than 6 dB below limit, the quasi-peak values were not measured.

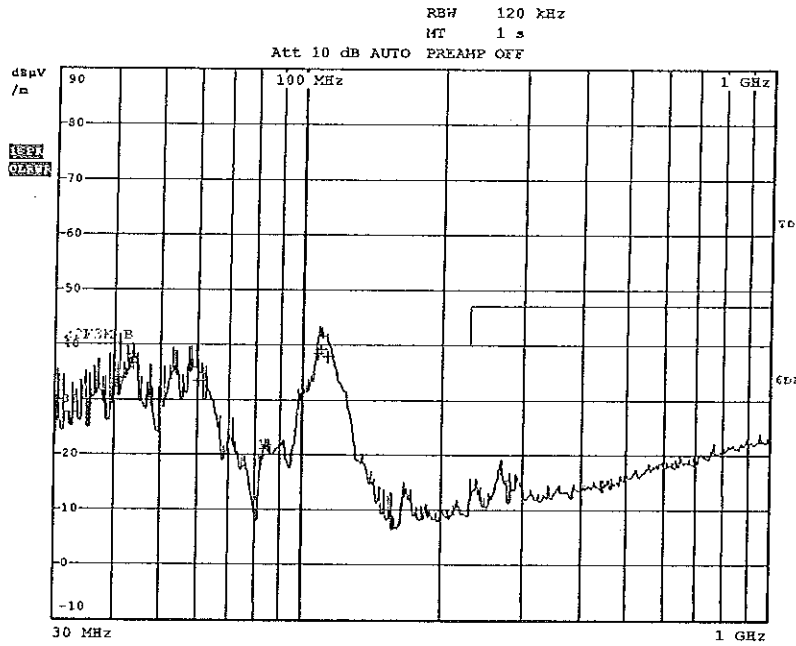


Measurement 2: Vertical

Scan Settings (1 Range)

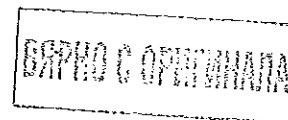
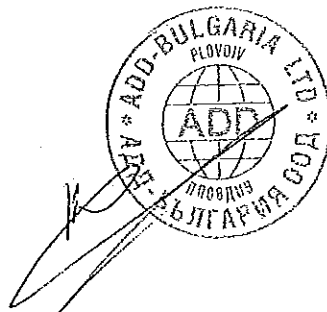
Frequencies			Receiver Settings		Detectors	
Start	Stop	Step	Res BW	M-Time	Pre-measurement	Final-measurement
30 MHz	1000 MHz	40 kHz	120 kHz	1 ms	PK+	QP

Pre-measurement Graph



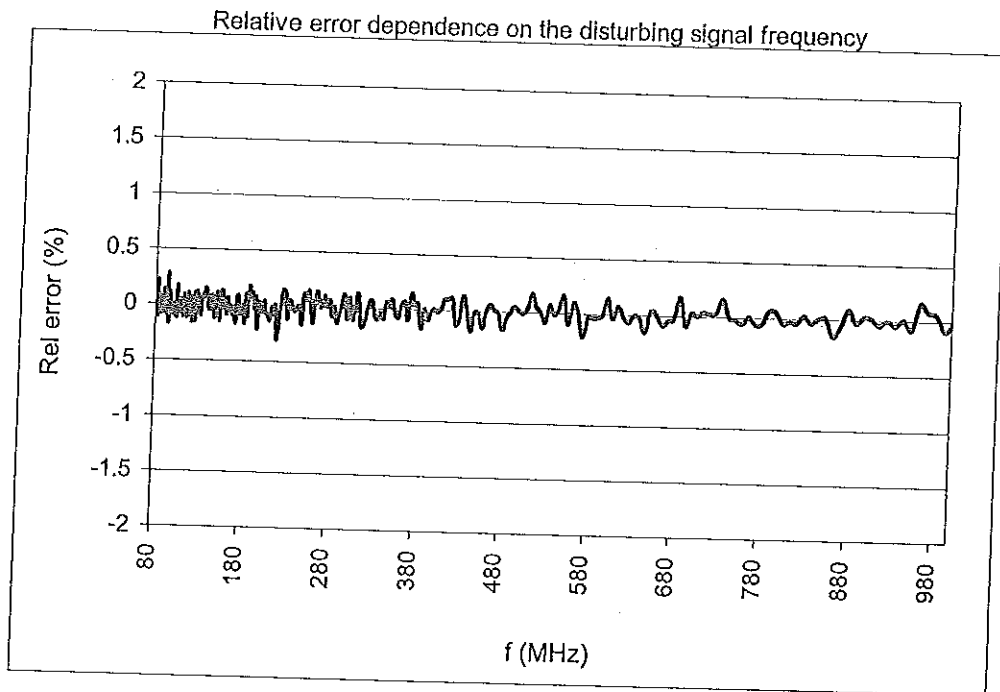
Final Measurement Results:

Trace	Frequency [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Delta Limit [dB]
QP	41.160	34.01	40.00	-5.99
QP	43.380	36.69	40.00	-3.31
QP	60.520	33.44	40.00	-6.56
QP	109.200	38.36	40.00	-1.64
QP	110.240	39.25	40.00	-0.75
QP	114.680	37.82	40.00	-2.18



Test of immunity to radiated rf electromagnetic fields

Object : NP73
Date : 14.10.2014
Standard : EN STN 61000-4-3
Test level : 10V/m
Polarisation : horizontal



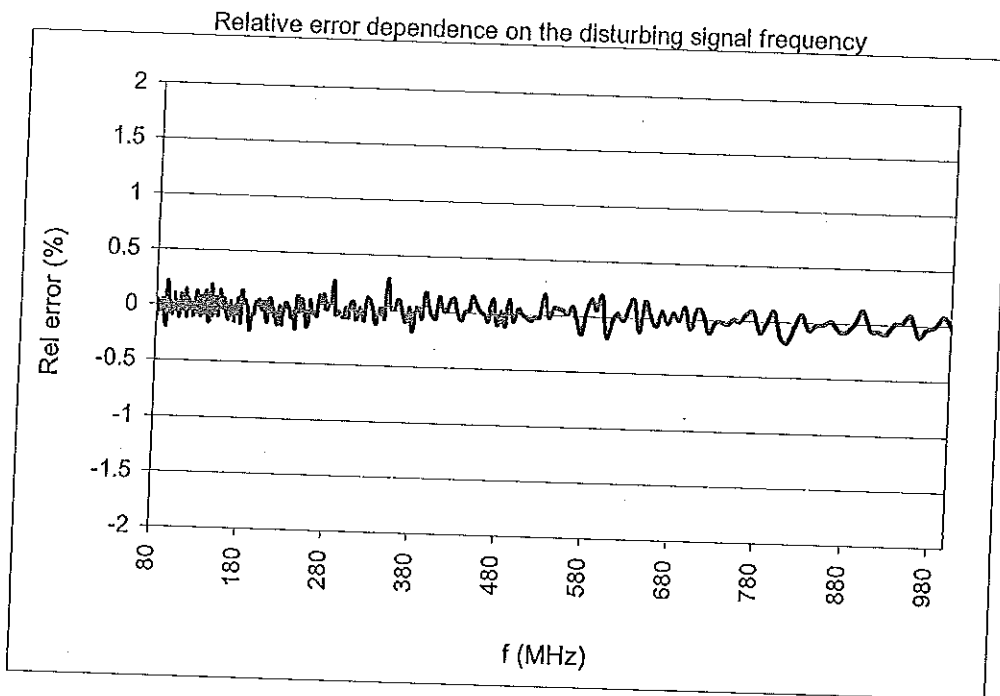
Maximal errors : + 0.27 %
- 0.30 %

ВЪРНО С ОПРЕДЕЛЕНА



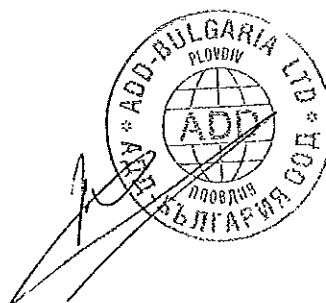
Test of immunity to radiated rf electromagnetic fields

Object : NP73
Date : 14.10.2014
Standard : EN STN 61000-4-3
Test level : 10V/m
Polarisation : vertical



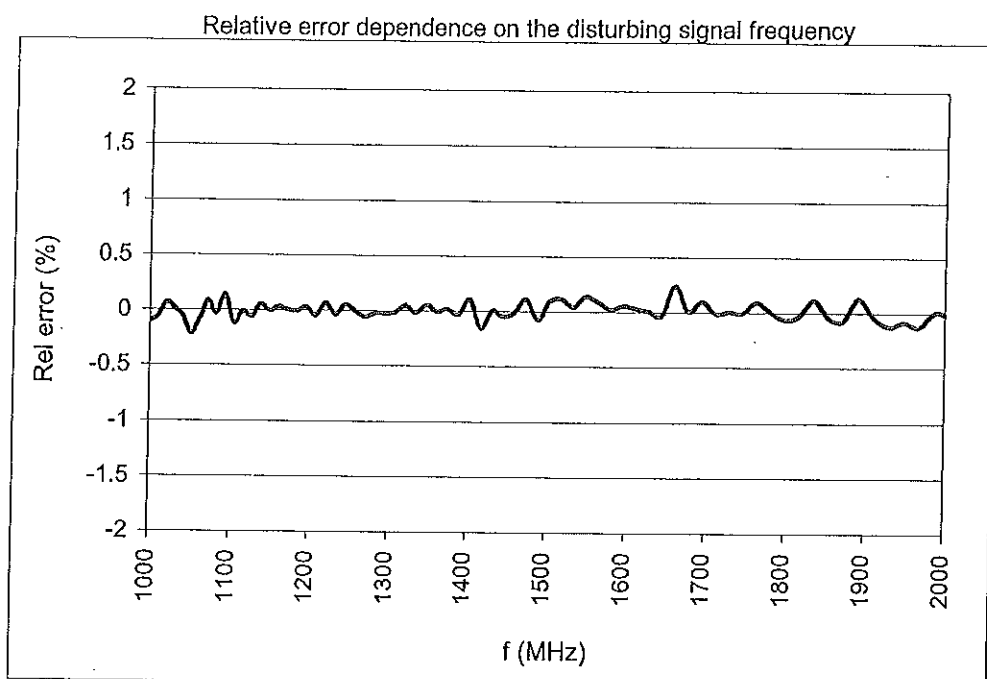
Maximal errors : + 0.28 %
- 0.21 %

БЪЛГАРСКО СЕРТИФИКАЦИОННО АГЕНСТВО



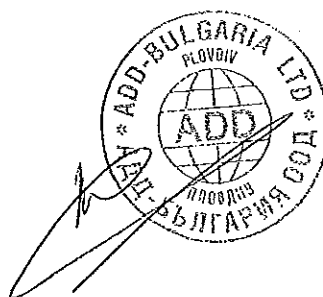
Test of immunity to radiated rf electromagnetic fields

Object : NP73
Date : 14.10.2014
Standard : EN STN 61000-4-3
Test level : 10V/m
Polarisation : horizontal



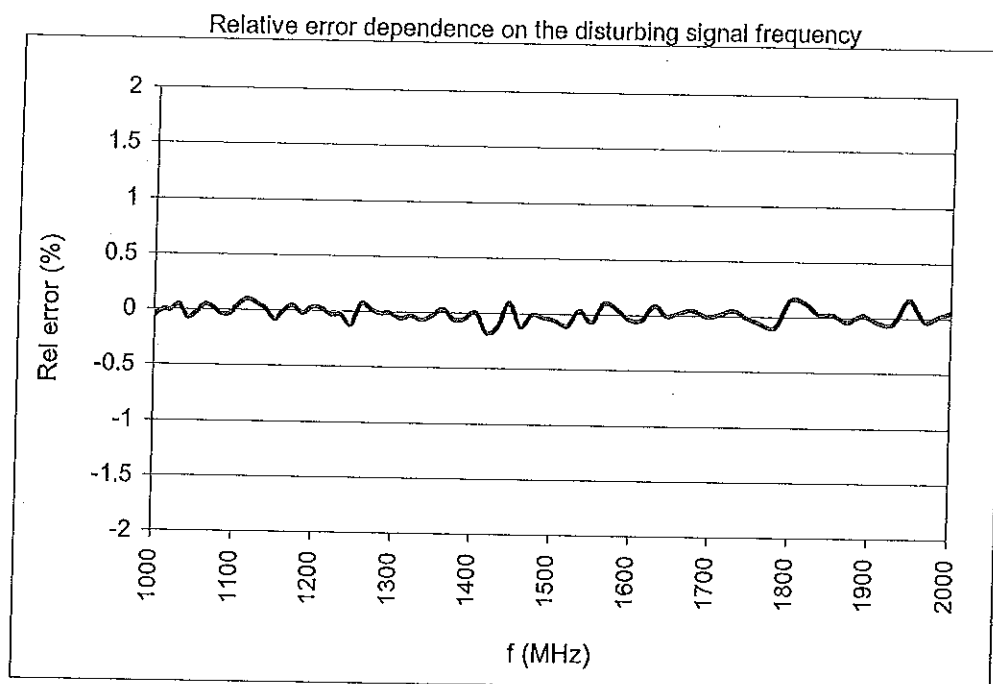
Maximal errors : + 0.24 %
- 0.21 %

БЯРНО С ОВАТОВАНАТА



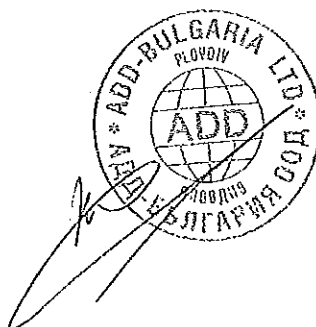
Test of immunity to radiated rf electromagnetic fields

Object : NP73
Date : 14.10.2014
Standard : EN STN 61000-4-3
Test level : 10V/m
Polarisation : vertical



Maximal errors : + 0.17 %
- 0.17 %

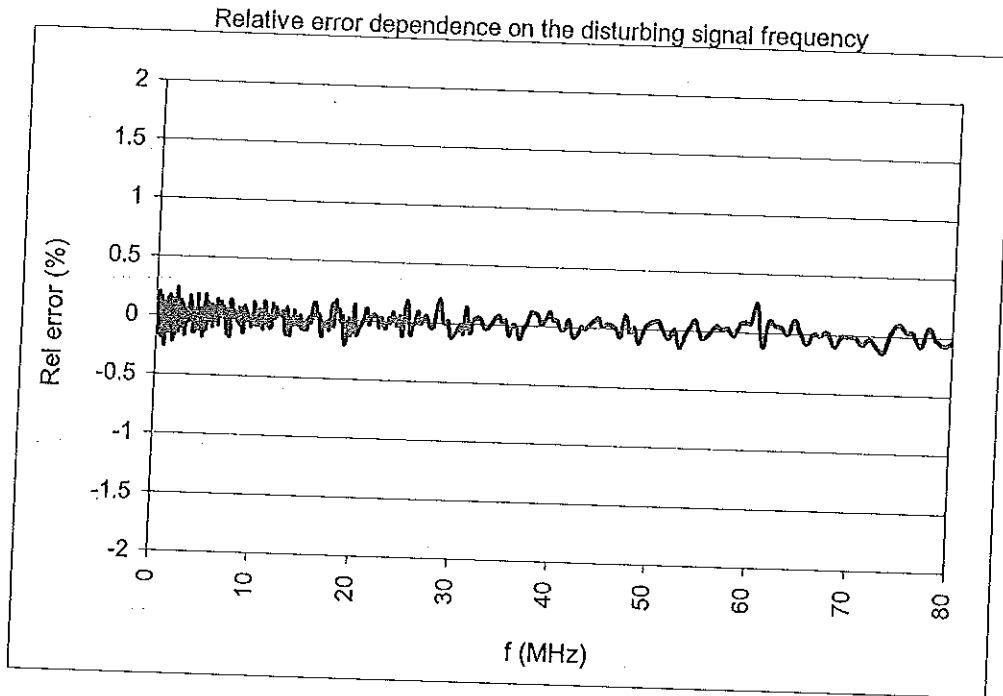
ВАЖНО С ОРЪГИНАЛА



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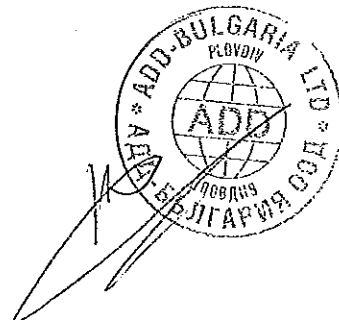
Test of immunity to conducted disturbance induced by rf voltages

Object : NP73
Date : 14. 10. 2014
Standard : EN STN 61000-4-6
Test level : 10V
Applied CDN: M-2
Port : Voltage



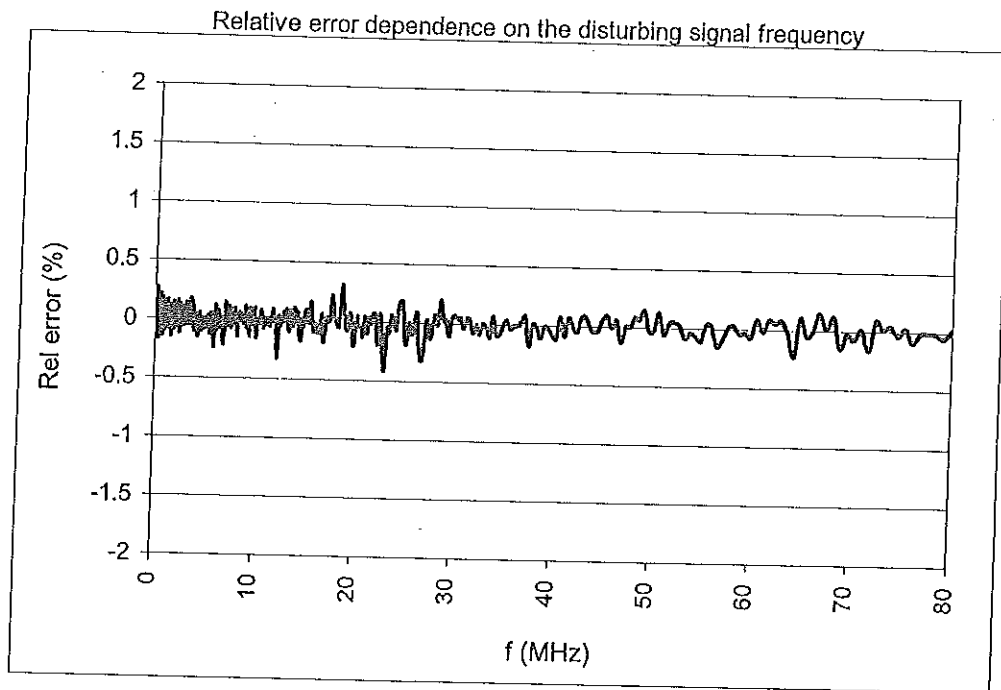
Maximal errors : + 0.24 %
- 0.25 %

ОРФНО С ОУЧЕБНАТА

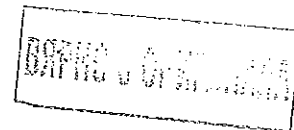


Test of immunity to conducted disturbance induced by rf voltages

Object : NP73
Date : 14. 10. 2014
Standard : EN STN 61000-4-6
Test level : 10V
Applied CDN: EM-101
Port : Output



Maximal errors : + 0.31 %
- 0.41 %



ПРОТОКОЛИ ОТ ПРОВЕДЕНИ
ИЗПИТВАНИЯ С ПРИЛОЖЕНИ
РЕЗУЛТАТИ ЗА МОНОФАЗЕН
ЕЛЕКТРОМЕР



Calibration Certificate No.: CC9917/15

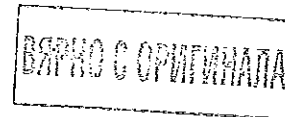
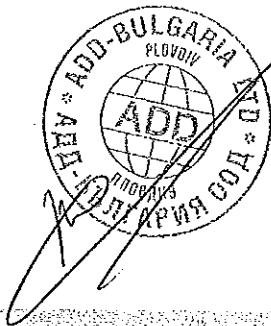
Page 1 of 4

The calibration laboratory of Applied Precision is accredited for conformance with ISO 17025 by Slovak National Accreditation service SNAS.

This calibration certificate documents the traceability to national standards, which realize the units of measurement according to the international System of Units (SI)

This calibration certificate applies only to the item identified and may not be reproduced except in full with the specific written permission of Applied Precision Ltd. Calibration certificates without signature are not valid.

Object Single-Phase Electronic Electricity Meter
Manufacturer ADD Production
Type NP71
Serial Number 11400593
Class B
Customer Transtech a.s.
Jilemnického 4
080 01 Prešov
Slovakia



Date of Calibration


4th February 2015

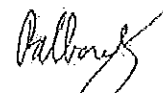
Seal / Date

Approved Signatory

Person in charge

APPLIED PRECISION LTD
081 01 PREŠOV
SLOVAKIA
www.appliedp.com

v z 



4th February 2015

Ladislav Grno

Marek Ralbovsky



Calibration Certificate No.: CC9917/15

Page 2 of 4

Calibration Report

Description of Calibration

The calibration was performed as direct comparison of the laboratory Reference Meter with the tested meter.

Site of Calibration

Calibration Laboratory of Applied Precision, Bratislava, Stavtelska 1.

Ambient Environment

23 ± 3 °C, 40±10% relative humidity

Standards

Reference Standard RS 2130S, S/N 1200080381, accuracy class 0.01.
Fluke 5720A, AC-DC Calibrator, S/N: 7900209

Traceability

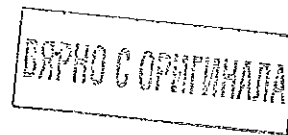
Laboratory standards are traceable to Czech National Standards (ČMI) and Slovak National Standards (SMÚ). The laboratory Reference Standard is subject of periodical calibration against the primary standards.

Czech National Standards (ČMI) are traceable to German National Standards (PTB) and U.K. National Standards (NPL).

Uncertainties

Uncertainties of measurement are:

- 0.010% for active power at $\cos\varphi=1$,
- 0.020% for active power at $\cos\varphi=0.5$,
- 0.013% for active power at $\cos\varphi=0.8$,
- 0.010% for reactive power at $\sin\varphi=1$,
- 0.020% for reactive power at $\sin\varphi=0.5$
- 0.040% for reactive power at $\sin\varphi=0.25$



Uncertainties are valid for measurements in following ranges:

Voltage range: 5V – 500V, Current range: 1mA – 120A, Frequency range: 40 – 70Hz.

Declared expanded measurement uncertainties are product of standard uncertainty and expansion coefficient $k=2$ which at normal probability distribution corresponds to coverage of approximately 95%.

The standard uncertainty is determined according to EA-4/02 document.



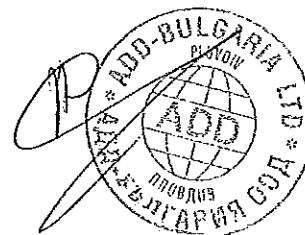
Measurement Results

Temperature Measurement

Test Name	Temperature (°C)				-40	-25	-10	5
	U [V]	I [A]	PF	Channel	Error [%]	Error [%]	Error [%]	Error [%]
Imin	230	0.25	1	L1	-0.8808	-1.1086	-0.8088	-0.3214
10% I _{men}	230	0.5	1	L1	-0.6395	-0.6705	-0.4932	-0.1785
10% I _{men} 0.5L	230	0.5	0.5L	L1	-0.9791	-1.1521	-0.9061	-0.3057
10% I _{men} 0.8C	230	0.5	0.8C	L1	-0.8614	-0.9476	-0.6863	-0.2527
100% I _{men}	230	5	1	L1	-0.5876	-0.4920	-0.3179	-0.1442
100% I _{men} 0.5L	230	5	0.5L	L1	-0.5920	-0.5228	-0.3444	-0.1520
100% I _{men} 0.8C	230	5	0.8C	L1	-0.5887	-0.4975	-0.3157	-0.1442

Test Name	Temperature (°C)				23	30	40	55	70
	U [V]	I [A]	PF	Channel	Error [%]	Error [%]	Error [%]	Error [%]	Error [%]
Imin	230	0.25	1	L1	-0.1386	-0.1984	-0.1331	-0.1597	-0.0666
10% I _{men}	230	0.5	1	L1	0.0334	0.0890	0.1246	0.2116	0.2374
10% I _{men} 0.5L	230	0.5	0.5L	L1	-0.0522	-0.0943	0.0378	-0.0632	0.0551
10% I _{men} 0.8C	230	0.5	0.8C	L1	0.0245	0.0712	0.0935	0.1469	0.1960
100% I _{men}	230	5	1	L1	0.0623	0.1291	0.2428	0.3848	0.5205
100% I _{men} 0.5L	230	5	0.5L	L1	0.0723	0.1369	0.2238	0.3781	0.5115
100% I _{men} 0.8C	230	5	0.8C	L1	0.0656	0.1324	0.2361	0.3680	0.5250

ВЪРНО С ОПИТНАТА



Calibration Certificate No.: CC9917/15

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Measurement Results

Test According to EN 62053-21

Test Name	U [V]	I [A]	PF	Channel	Error [%]
115% Umen	264.5	0	1	L1	Passed
Náb. 0,4% Imen	230	0.02	1	L1	Passed
5% Imen	230	0.25	1	L1	-0.1498
10% Imen	230	0.5	1	L1	0.0300
10% Imen 0.5L	230	0.5	0.5L	L1	0.0600
10% Imen 0.8C	230	0.5	0.8C	L1	0.0100
50% Imen	230	2.5	1	L1	-0.0100
50% Imen 0.5L	230	2.5	0.5L	L1	0.0700
50% Imen 0.8C	230	2.5	0.8C	L1	0.0801
100% Imen	230	5	1	L1	0.0200
100% Imen 0.5L	230	5	0.5L	L1	0.0801
100% Imen 0.8C	230	5	0.8C	L1	0.0600
I _{max}	230	100	1	L1	0.1201
Číselník 4 kWh	230	100	1	L1	0.2238

Test According to EN 62053-21 addendum A.2 + A.3

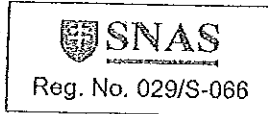
Test Name	U [V]	I [A]	PF	Channel	Error [%]
5th Harmonic	230	5	1	L1	0.0689
Phase Fired	230	5	1	L1	-0.0284
Bust Fire	230	5	1	L1	0.0478

End of Calibration Certificate

ВЕРНО С ОПИШНАТА



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Skúšobňa
Fakulty elektrotechniky a informatiky STU
Ilkovičova 3, 812 19 Bratislava

Tel: 02/602 91 631, 602 91 152
Fax: 02/6544 0227

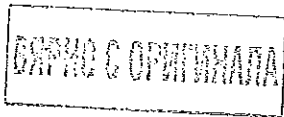
TEST REPORT

No.: 48/14/SL EMK
Year: 2014

Applicant: Slovenský metrologický ústav
Oddelenie certifikácie a výkonu štátnej správy
Karloveská 63, 842 55 Bratislava



Tested equipment: Single-phase electricity meter
of type NP71



SLOVENSKÁ TECHNICKÁ UNIVERZITA
BRATISLAVA
FAKULTA ELEKTROTECHNIKY A INFORMATIKY
- Akreditovaná skúšobňa -
Ilkovičova č. 3, 812 19 Bratislava

Approved:
Assoc. Prof. K. Kováč, PhD.
Head of Test house of FEI STU

Bratislava 28. 10. 2014

Notes: All test results are valid only for tested equipment. Publication of test report content is not allowed without customer confirmation. Test report may be copied only as a whole, otherwise only with confirmation of Test house of FEI STU in Bratislava. This test report is issued in Slovak and English languages; the Slovak version only of this document can be considered as an original.

SFEI STU v BRATISLAVE	SKÚŠOBNA Fakulty elektrotechniky a informatiky STU	Ilkovičova 3 812 19 BRATISLAVA
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Test subject: Single-phase electricity meter of type NP71

Serial number: 11400593

Manufacturer: ADD-PRODUCTION S.R.L., 139 Decebal Blvd., Chisinau MD-2060, Republic of Moldova

Test: Measurement of emissions and immunity test according to EN 50470-1: 2006 and EN 50470-3: 2006

Applicant: Slovenský metrologický ústav, Oddelenie certifikácie a výkonu štátnej správy, Karloveská 63, 842 55 Bratislava 50

Date of test sample submission: 8. 10. 2014

Number of tested samples: 1

Date of measurement: 9. 10. - 15. 10. 2014

Place of measurement: EMC Test Laboratory of SFEI STU Bratislava

Test report contains:

Text pages: 15
Tables: 8
Appendices: 4
Figures: 7

Distribution: Number of pcs
SFEI STU: 1 pc
Applicant: 1 pc

Conditions of measurements and tests:

Identification of test equipment is shown in Fig. 1.

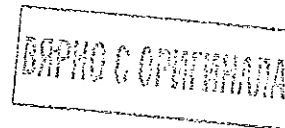
Measured set contained:

- electricity meter,
- power supply cable 1.5 m long,
- resistive load connected by power cable 1.5 m long.

Explanation: If the measured set was modified due to any measurement or test conditions, it is noticed on a page corresponding to the measurement or test.

Power supply: 223-225 V AC

Atmospheric conditions: Temperature: 22 - 24 °C
Rel. humidity: 56 - 59 %



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Test results:

Table 1: Results of conducted and radiated emissions measurement:

No.	Measurement	Method / Configuration of measured set	Limit	Conclusion / Emission class	Page
1	Conducted emissions	EN 55016-2-1 EN 55022	EN 55022	complies / class B	4
2	Radiated emissions	EN 55016-2-3 EN 55022	EN 55022	complies / class B	5

Conclusion: Electricity meter complies with requirements set by EN 50470-1: 2006 of electromagnetic interferences for electricity metering equipment within the range shown in the table 1.

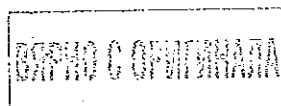
Table 2: Results of immunity tests

No.	Test	Method	Critical change value		Page
			Request of EN 50470-1, 50470-3	Conclusion	
1	Immunity against electrostatic discharges	EN 61000-4-2	0.023 kWh (without current)	complies	6
2	Immunity against HF electromagnetic field	EN 61000-4-3	$\pm 2\%$ (class B) / 0.023 kWh (without current)	complies	7
3	Immunity against EFT/Burst pulses	EN 61000-4-4	$\pm 4\%$ (class B)	complies	8
4	Immunity against SURGE pulses	EN 61000-4-5	0.023 kWh (without current)	complies	9
5	Immunity against conducted interference	EN 61000-4-6	$\pm 2\%$ (class B)	complies	10
6	Immunity against voltage dips and short interruptions	EN 61000-4-11	0.023 kWh (without current)	complies	11

Note: Electromagnetic disturbance may cause a temporary degradation or a loss of performance, but it cannot cause bigger additional error as a critical change value is (EN 50470-1, Part 7.4.3. for given tests without current and EN 50470-3, Part 8.5 (Table 9) for tests with current).

Conclusion: Electricity meter complies with requirements set by EN 50470-1: 2006 of electromagnetic susceptibility for electricity metering equipment within the range shown in the table 2.

Test laboratory declares, that measurement results are valid only for measured subject.



Assoc. Prof. Karol Kováč, PhD.
Head of EMC Laboratory



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Test: Measurement of conducted emissions according to
EN 55 022:2010

Test subject: Single-phase electricity meter of type NP71

Serial number: 11400593

Manufacturer: ADD-PRODUCTION S.R.L., 139 Deccebal blvd., Chisinau MD-2060,
Republic of Moldova

Date of measurement: 9. 10. 2014

Test instrumentation:

- test receiver R&S ESPI 7 – Ser. No. 101268,
- V line impedance stabilization network R&S ESH3-Z5 – Ser. No. 846128/015,II
- transient limiter HP 11947A – Ser. No. 3107A00791,
- semi-anechoic shielded chamber with measurement place according to EN 55022.

Auxiliary instrumentation:

- ammeter PROVA11, Ser. no. 02200567,
- resistive load.

Metrological properties:

Measuring place was verified according to CISPR 16-1 on 1. 9. 2011, measuring report KP-11/06/EMK, ESPI 7 R&S Certificate of Calibration No.: 20-280819 from 15. 12. 2009.

Conditions of measurement:

Measurement place was arranged according to EN 55022 (Fig. 2). The electricity meter was connected in direct connection, 1-phase network.

Output current to load: 1 A

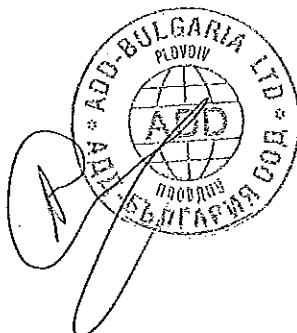
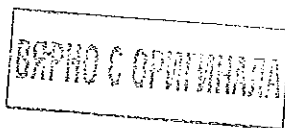
Frequency range: 0.15 – 30 MHz

Measurement results:

Measurement results of mains conducted tests are shown in appendix MCE 14 48.

Conclusion:

Maximal level of disturbing conducted emissions is below limit of EN 50470-1:2006.



SFEI STU v BRATISLAVE	SKUŠOBŇA Fakulty elektrotechniky a informatiky STU	Ilkovičova 3 812 19 BRATISLAVA
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Test: Measurement of radiated emissions according to
EN 55 022:2010

Test subject: Single-phase electricity meter of type NP71

Serial number: 11400593

Manufacturer: ADD-PRODUCTION S.R.L., 139 Decebal blvd., Chisinau MD-2060,
Republic of Moldova

Date of measurement: 9. 10. 2014

Test instrumentation:

- test receiver R&S ESPI 7 – Ser. No. 101268,
- rf measuring preamplifier 10 kHz - 5 GHz, Sonoma 352 – Ser. No. 303123,
- Trilog measuring antenna 30 - 3000 MHz, Schwarzbeck – VULB 9163 - Ser. No. 9163-360,
- semi-anechoic shielded chamber with measurement place according to EN 55022.

Auxiliary instrumentation:

- ammeter PROVA11, Ser. No. 02200567,
- resistive load.

Metrological properties:

ESPI 7 R&S Certificate of Calibration No.: 20-280819 from 15. 12. 2009, measuring place was verified according to CISPR 16-1 on 3. 1. 2011, measuring report KP-11/01EMK.

Conditions of measurement:

Measurement place was arranged according to EN 55 022 (Fig. 3). The electricity meter was connected in direct connection, 1-phase network.

Output current to load: 1 A
Frequency range: 30 –1000 MHz.
Measuring distance: 3 m
Height of antenna: 1 – 4 m

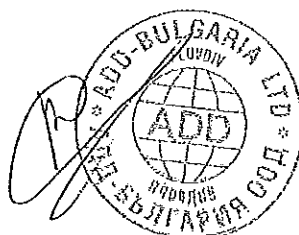
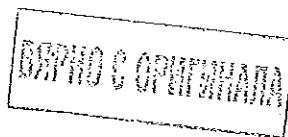
Measurements were performed for both polarizations of receiving antenna.

Measurement results:

Measurement results in frequency range are given in appendix MRE 14 48.

Conclusion:

Maximal level of disturbing conducted emissions is below limit of EN 50470-1:2006.



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Test: Test of immunity against electrostatic discharge according to EN 61000-4-2:2009

Test subject: Single-phase electricity meter of type NP71

Serial number: 11400593

Manufacturer: ADD-PRODUCTION S.R.L., 139 Decebal Blvd., Chisinau MD-2060, Republic of Moldova

Date of measurement: 10. 10. 2014

Test instrumentation:

- a. electrostatic discharge simulator Haefely Trench PESD 1600 – Ser. No. H 606 113,
- b. testing place according to EN 61000-4-2.

Metrological properties:

Testing place was verified according to EN 61000-4-2 on 16. 5. 2012, measuring report KP-12/01/EMK.

Conditions of test:

Test place was arranged according to EN 61000-4-2 (Fig. 4). Tested electricity meter was tested without any load. Ten pulses were applied for every test level and polarity. Before and after the application of test sequence the status of the display was checked.

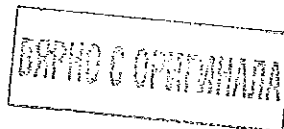
Test results:

Table 3: Result of electrostatic discharge test:

Discharge type	Test level	Request of standard	Test results
Indirect – contact discharge	±8 kV	< 0.023 kWh	complies
Direct - contact discharge	±8 kV	< 0.023 kWh	complies
Direct - air (on the plastic part)	±15 kV	< 0.023 kWh	complies

Conclusion:

Immunity level of tested device complies with requirements set by EN 50470-1:2006.



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Test: Test of immunity against electromagnetic field according to EN 61000-4-3:2006

Test subject: Single-phase electricity meter of type NP71

Serial number: 11400593

Manufacturer: ADD-PRODUCTION S.R.L., 139 Decebal blvd., Chisinau MD-2060, Republic of Moldova

Date of measurement: 13. 10. 2014

Test instrumentation:

- signal generator Agilent E8257D – Ser. No. MY45141271,
- power amplifier 150W1000, Amplifier Research – Ser. No. 0333238,
- power amplifier Milmega AS0840-30/17 – Ser. No. 1030085,
- Trilog measuring antenna 30 - 3000 MHz Schwarzbeck VULB 9163 – Ser. No. 9163-360,
- Logperiodic antenna R&S HL023A1 – Ser. No. 321 286/079,
- test place in anechoic shielded chamber according to EN 61000-4-3.

Auxiliary instrumentation:

- ammeter PROVA11 – Ser. No. 02200567,
- period meter with optic sensor Kmer1/08,
- oscilloscope Tektronix DPO 4104 – Ser. No. C021008,
- resistive load,
- power supply Kmer1/04.

Metrological properties:

Testing place was verified according to EN 61000-4-3 on 4. 10. 2013, measuring report KP-13/01/EMK.

Conditions of test:

Test place was arranged according to EN 61000-4-3 (Fig. 5). The electricity meter was connected in direct connection, 1-phase network. During the test current through load was set to 10 A and the period of output pulses was measured by oscilloscope and period meter. Signal output was connected to oscilloscope and period meter situated outside the test chamber by unshielded cable via feedthrough filters.

Test results:

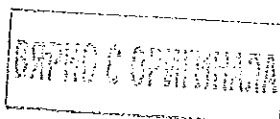
Table 4: Result of immunity test against electromagnetic field

Condition	Frequency range	Polarization	Test level	Request of standard	Test results
with current	80 – 2000 MHz	horizontal	10V/m	±2 %	complies
with current	80 – 2000 MHz	vertical	10V/m	±2 %	complies
without current	80 – 2000 MHz	horizontal	30V/m	< 0.023 kWh	complies
without current	80 – 2000 MHz	vertical	30V/m	< 0.023 kWh	complies

Explanation: Measurement results are shown in appendix MRS 14 48. Error of reading was less than ±2 % tolerance at test level 10 V/m (Table 9, EN 50470-3). During the test without current false pulse was not noticed.

Conclusion:

Immunity level of tested device complies with requirements set by EN 50470-1:2006 and EN 50470-3:2006.



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Test: Test of immunity against EFT/Burst according to EN 61000-4-4:2004

Test subject: Single-phase electricity meter of type NP71

Serial number: 11400593

Manufacturer: ADD-PRODUCTION S.R.L., 139 Decebal blvd., Chisinau MD-2060, Republic of Moldova

Date of measurement: 10. 10. 2014

Test instrumentation:

- EFT/Burst simulator EFT500N5 – Ser. No. V0947105565,
- capacitive clamp according to EN 61000-4-4,
- test place for immunity against EFT/Burst testing according to EN 61000-4-4.

Auxiliary instrumentation:

- ammeter PROVA11 – Ser. No. 02200567,
- resistive load decoupled by clamp EM101,
- stopwatch.

Metrological properties:

Testing generator was verified according to EN 61000-4-4 on 14. 9. 2011, measuring report KP-11/08/EMK.

Conditions of test:

Test place was arranged according to EN 61000-4-4 (Fig. 6). The electricity meter was connected in direct connection, 1-phase network. The level of the pulses was gradually rising from 2 kV to the nominal value and its polarity was changing. During the test current through the load was set to 1 A. The period of 5 output pulses was measured by stopwatch and compared (with or without disturbance).

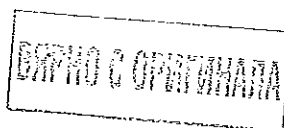
Test results:

Table 5: Result of immunity test against EFT/Burst $f = 5 \text{ kHz}$, 15/300 ms

Wire	Coupling	Test level	Request of standard	Test results
L/N	CDN	$\pm 2 / 4 \text{ kV}$	$\pm 4 \%$	complies
output	Cap. clamp	$\pm 2 / 4 \text{ kV}$	$\pm 4 \%$	complies

Conclusion:

Immunity level of tested device complies with requirements set by EN 50470-1:2006 and EN 50470-3:2006.



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Test: Test of immunity against SURGE pulses according to EN 61000-4-5:2006

Test subject: Single-phase electricity meter of type NP71

Serial number: 11400593

Manufacturer: ADD-PRODUCTION S.R.L., 139 Decebal blvd., Chisinau MD-2060, Republic of Moldova

Date of measurement: 13. 10. 2014

Test instrumentation:

- a. surge simulator VCS 500-M, EM TEST – Ser. No. V0548100910,
- b. test place according to EN 61000-4-5.

Metrological properties:

Test simulator was verified according to EN 61000-4-5 on 16. 9. 2011, measuring report KP-11/09/EMK.

Conditions of measurement:

Test place was arranged according to EN 61000-4-5. Tested electricity meter electricity meter was tested without current in the current circuits. The pulses were applied between between phase and ground connection point. Five pulses of both polarities were applied with repetition time of 1 minute. Before and after the application of test sequence the status of the display was checked.

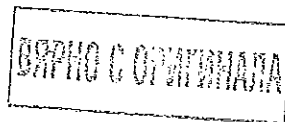
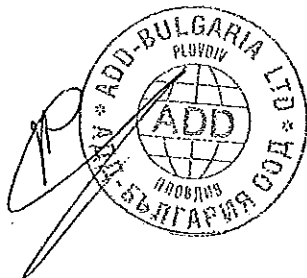
Test results:

Table 6: Result of immunity test against SURGE

Tested port	Coupling impedance	Test level	Request of standard	Test results
L - N	2 Ω	±4 kV	< 0,023 kWh	complies

Conclusion:

Immunity level of tested device complies with requirements set by EN 50470-1:2006.



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Test: Test of immunity against conducted interference according to EN 61000-4-6:2009

Test subject: Single-phase electricity meter of type NP71

Serial number: 11400593

Manufacturer: ADD-PRODUCTION S.R.L., 139 Decebal blvd., Chisinau MD-2060, Republic of Moldova

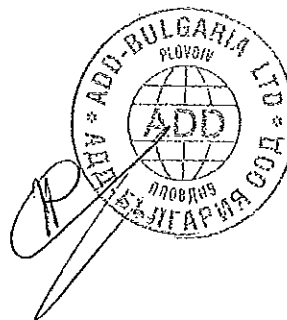
Date of measurement: 14. 10. 2014

Test instrumentation:

- signal generator Agilent E8257D – Ser. No. MY45141271,
- power amplifier AR 10W1000 – Ser. No. 6759,
- set of coupling/decoupling networks (CDN) according to EN 61000-4-6,
- injection clamp Lüthi EM101 – Ser. No. 35639
- attenuator 6 dB/10 W,
- test place according to EN 61000-4-6.

Auxiliary instrumentation:

- ammeter PROVA11 – Ser. No. 02200567,
- period meter with optic sensor Kmer1/08,
- oscilloscope Tektronix DPO 4104 – Ser. No. C021008,
- resistive load,
- power supply Kmer1/04.



Metrological properties:

Test place and CDNs were verified according to EN 61000-4-6 on 13.9.2011, measuring report KP-11/07/EMK.

Conditions of measurement:

Test place was arranged according to EN 61000-4-6 (Fig. 7). The electricity meter was connected in direct connection, 1-phase network. During the test current through load was set to 10 A and the period of output pulses was measured by oscilloscope and period meter. Signal output was connected to oscilloscope and period meter situated outside the test chamber by unshielded cable via feedthrough filters.

Test results:

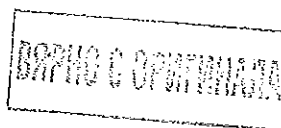
Table 7: Result of immunity test against conducted interference.

Cable	CDN	Frequency range	Test level	Request of standard	Test results
Voltage terminals	M-2	0.15 – 80 MHz	10 V	±2 %	complies
Output	AF-2P	0.15 – 80 MHz	10 V	±2 %	complies

Explanation: Measurement results are shown in appendix MCS 14 48. Error of reading was less than ±2 % tolerance at test level 10 V (Table 9, EN 50470-3).

Conclusion:

Immunity level of tested device complies with requirements set by EN 50470-1:2006 and EN 50470-3:2006.



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Test: Test of immunity against voltage dips, short interruptions and voltage fluctuations according to EN 50470-1:2006.

Test subject: Single-phase electricity meter of type NP71

Serial number: 11400593

Manufacturer: ADD-PRODUCTION S.R.L., 139 Decebal blvd., Chisinau MD-2060, Republic of Moldova

Date of measurement: 10. 10. 2014

Test instrumentation:
a. programmable AC source Chroma 61503 – Ser. No. 00000128.

Metrological properties:
Test place was verified according to EN 61000-4-11 on 11.10.2011, measuring report KP-11/10/EMK.

Conditions of measurement:
Test place was arranged according to EN 50470-1. Fluctuations and dips of voltage were generated by programmable AC source. Before and after the application of test sequence the status of the display was checked.

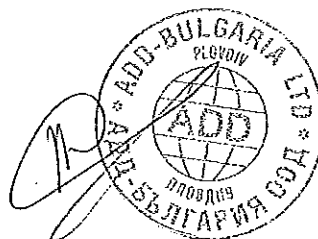
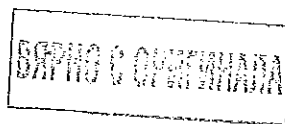
Test results:

Table 8: Result of immunity test against voltage dips and short interruptions AC

Interference type	Duration	Request of standard	Test results
voltage interruption of 100%	1 period	< 0.023 kWh	complies
combining interruption	3 × 0.5 s interruption with restoring time 100 ms	< 0.023 kWh	complies
voltage dip of 50 %	1 minute	< 0.023 kWh	complies

Conclusion:

Immunity level of tested device complies with requirements set by EN 50470-1:2006.



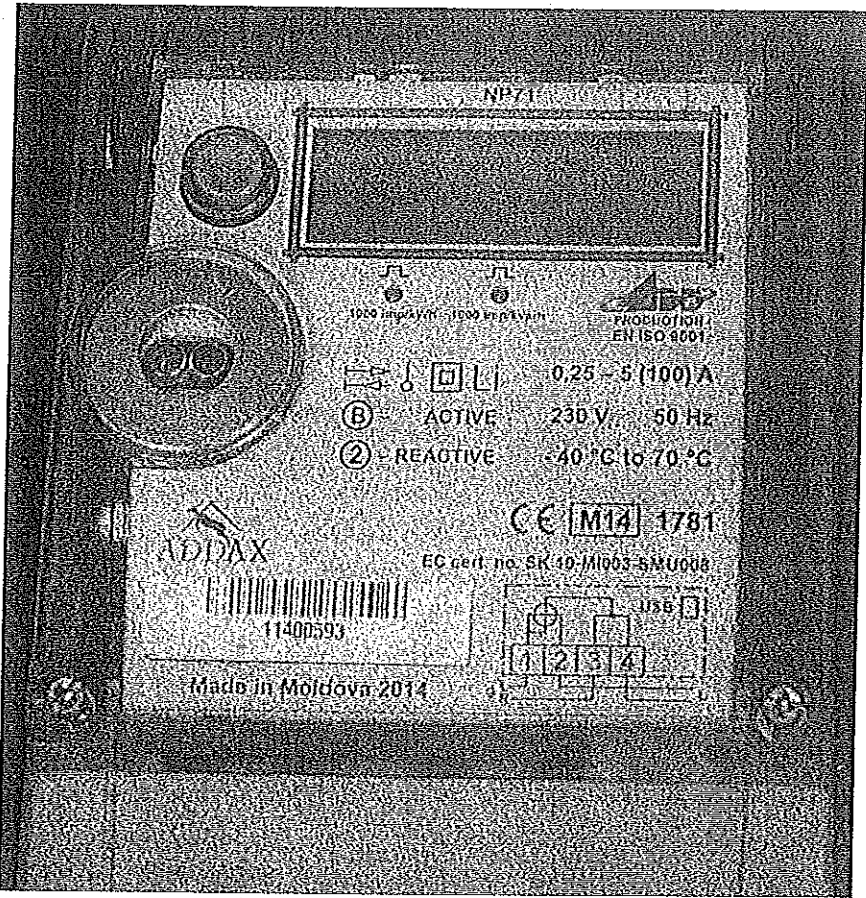


Fig. 1: Identification of the equipment.

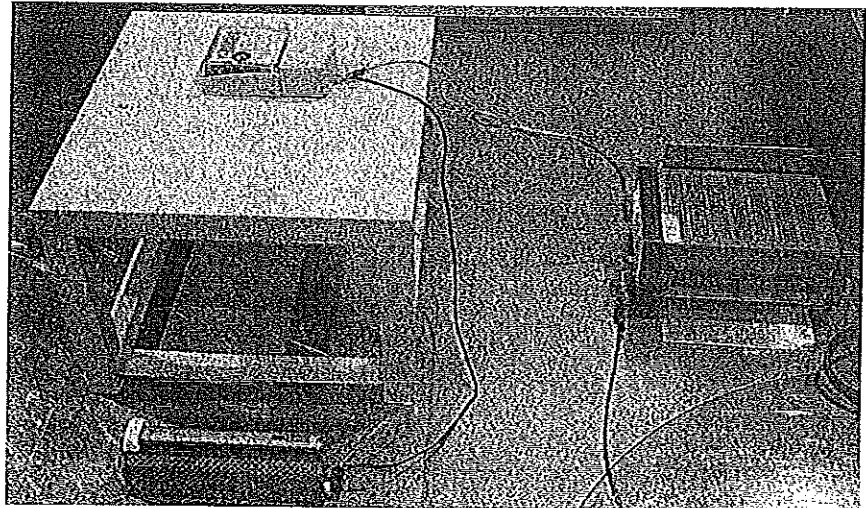
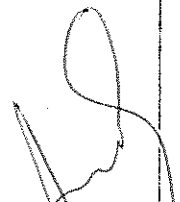
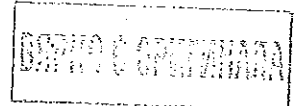
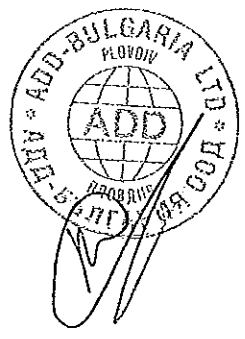


Fig.2: Arrangement of measured sample during conducted emission measurement.



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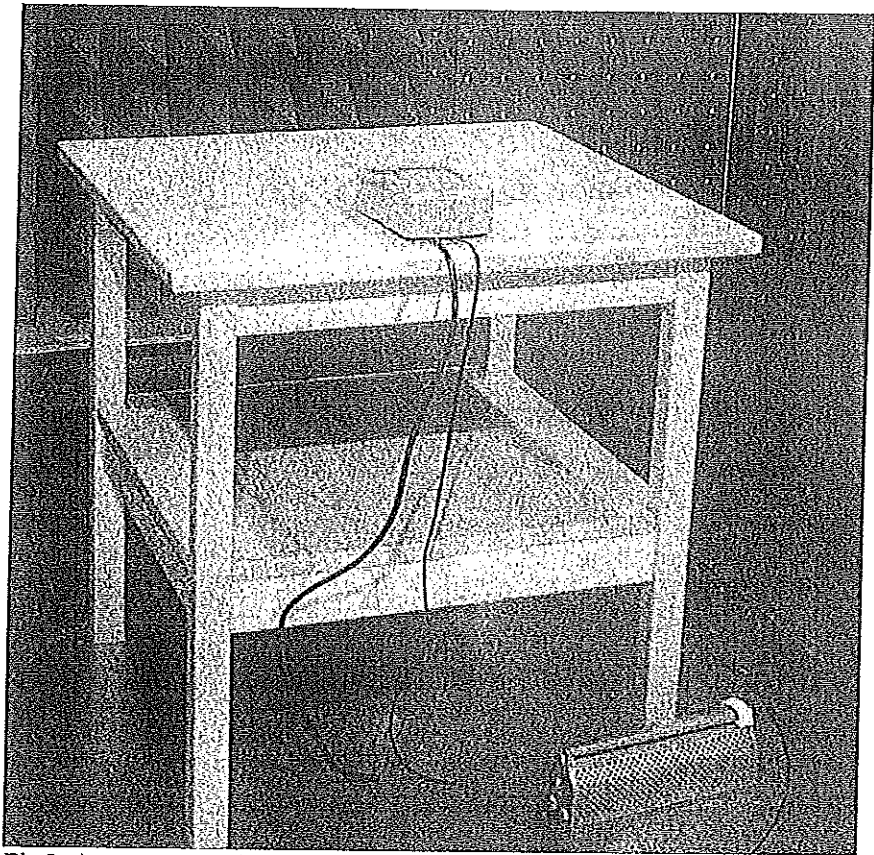


Fig.3: Arrangement of measured sample during radiated emission measurement.

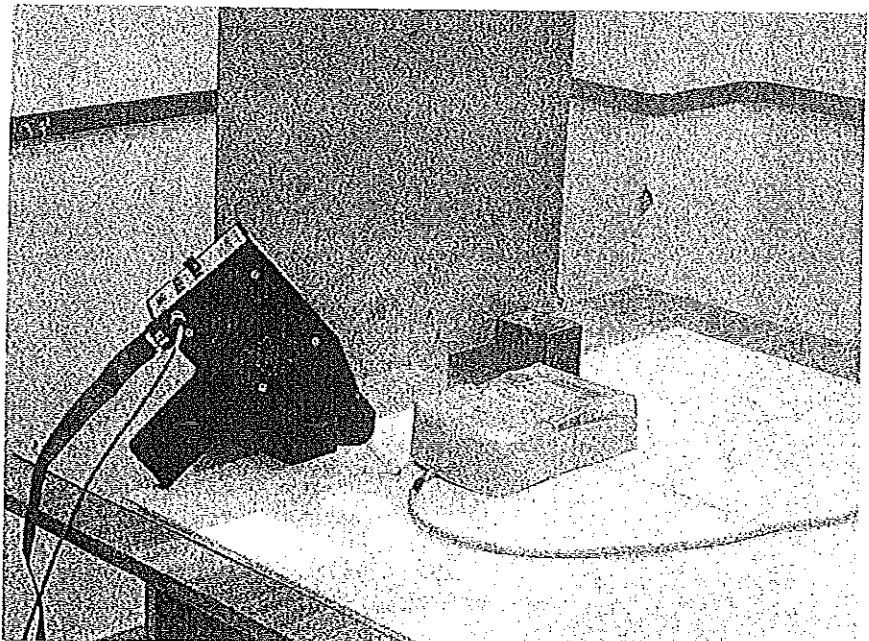
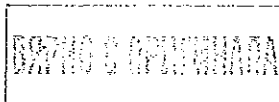
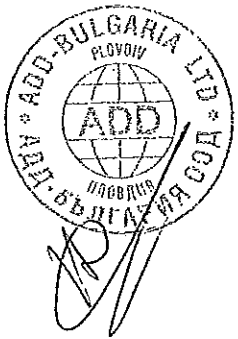


Fig.4: Arrangement of tested sample during the test according to EN 61000-4-2.



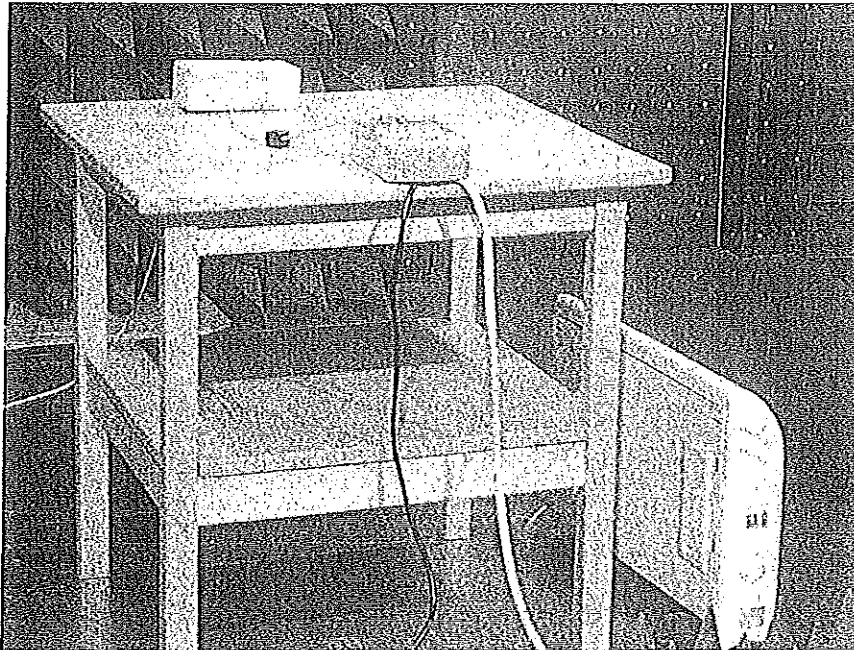


Fig.5: Arrangement of tested sample during the test according to EN 61000-4-3.

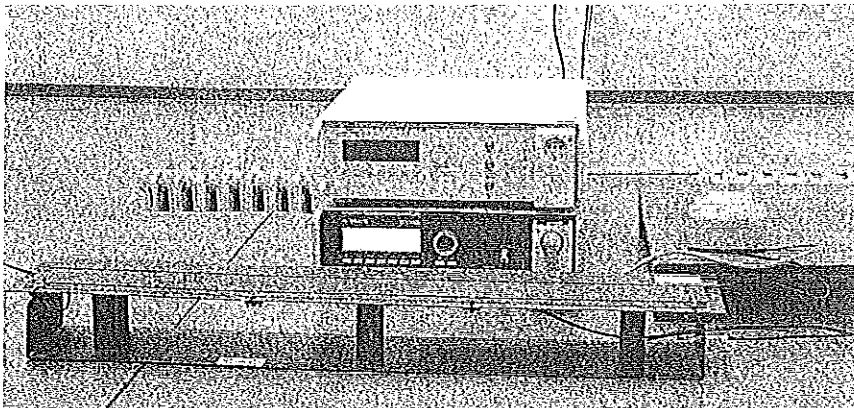


Fig.6: Arrangement of tested sample during the test according to EN 61000-4-4.

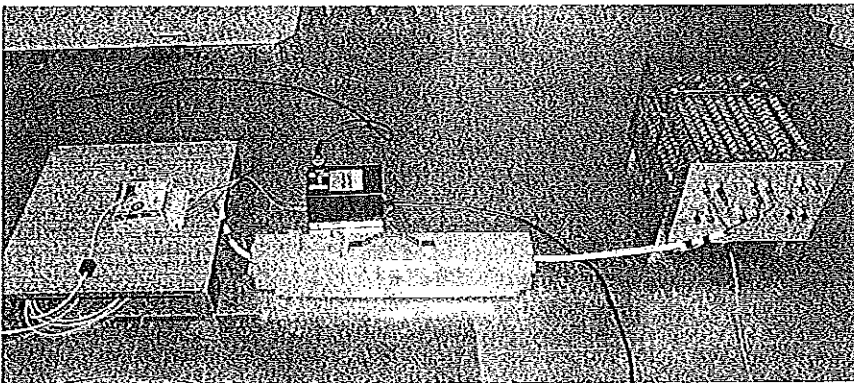
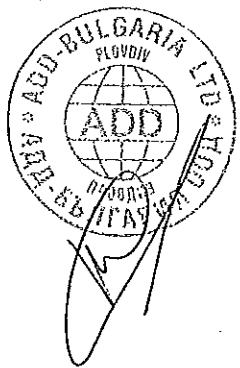


Fig.7: Arrangement of tested sample during the test according to EN 61000-4-6.



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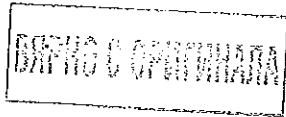
Place and date of test report edition: Bratislava, 28. 10. 2014

Test executed by: A. Krammer, MSc.

Report created by: J. Hallon, PhD.

Test results verified by: Assoc. Prof. K. Kováč, PhD

————— End of test report —————



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EMI Measurement Test Report Conducted Emission

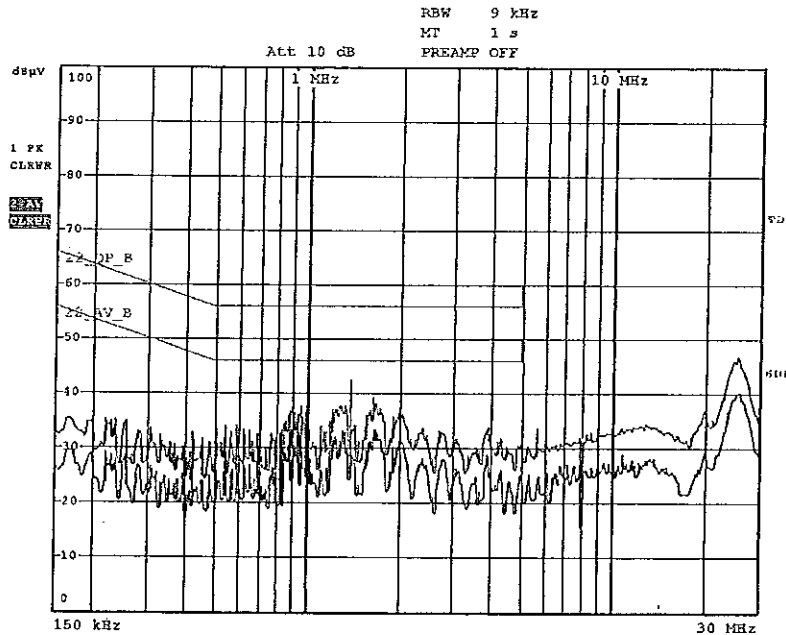
Equipment Under Test: NP71
Operating Conditions: 1 A
Operator: A. Krammer
Test Specification: EN 55022
Limit: B class
Date: 9. 10. 2014

Measurement 1: V1

Scan Settings (1 Range)

Frequencies			Receiver Settings		Detectors			
Start	Stop	Step	Res BW	M-Time	Pre-measurement		Final-measurement	
150 kHz	30 MHz	4 kHz	9 kHz	100 ms	PK+	AV	QP	AV

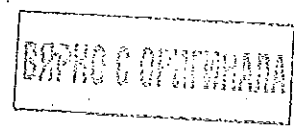
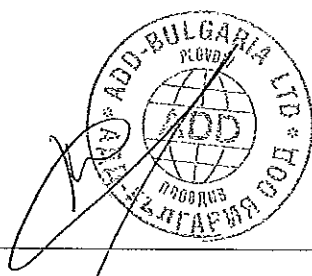
Pre-measurement Graph



Final Measurement Results

Explanation:

As the peak detector values were more than 6 dB below limit, the quasi-peak values were not measured.

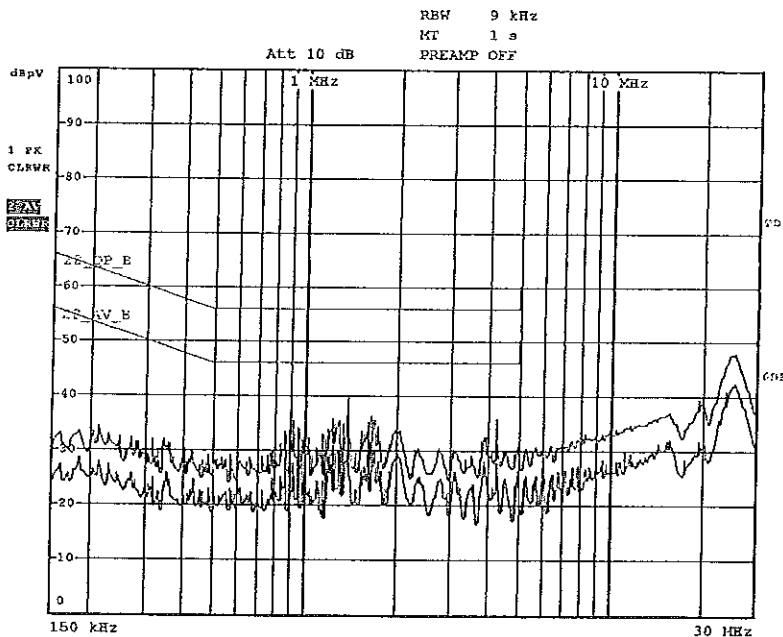


Measurement 2: V2

Scan Settings (1 Range)

Frequencies			Receiver Settings		Detectors			
Start	Stop	Step	Res BW	M-Time	Pre-measurement		Final-measurement	
150 kHz	30 MHz	4 kHz	9 kHz	100 ms	PK+	AV	QP	AV

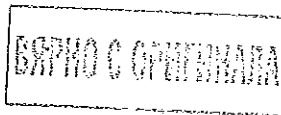
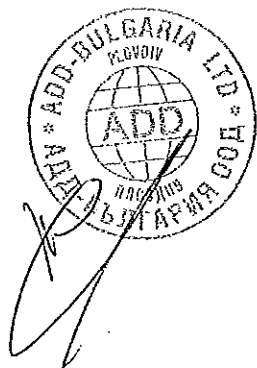
Pre-measurement Graph



Final Measurement Results

Explanation:

As the peak detector values were more than 6 dB below limit, the quasi-peak values were not measured.



EMI Measurement Test Report Radiated Emission

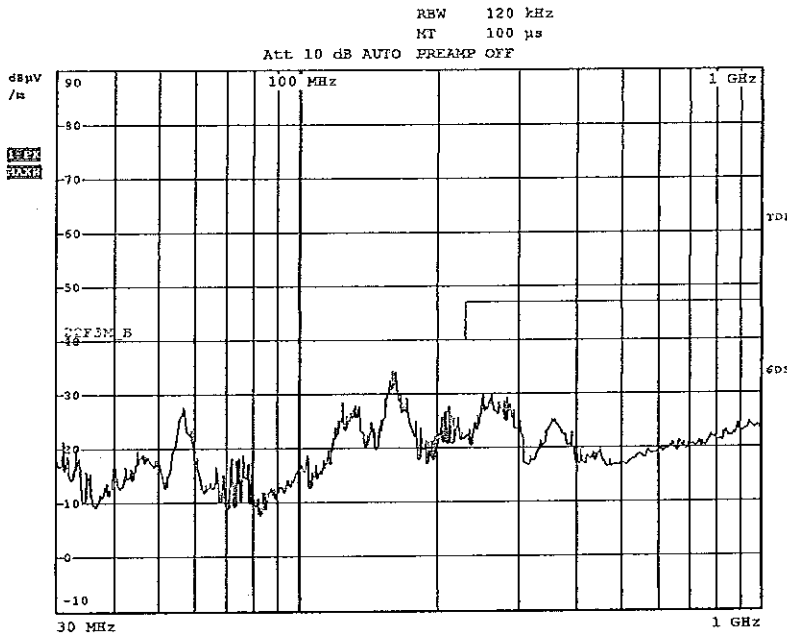
Equipment Under Test: NP71
Operating Conditions: 1 A
Operator: A. Krammer
Test Specification: EN 55022
Limit: B class
Date: 9. 10. 2014

Measurement 1: Horizontal

Scan Settings (1 Range)

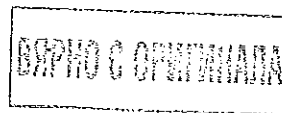
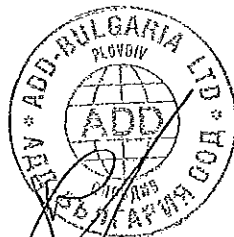
Frequencies			Receiver Settings		Detectors	
Start	Stop	Step	Res BW	M-Time	Pre-measurement	Final-measurement
30 MHz	1000 MHz	40 kHz	120 kHz	1 ms	PK+	QP

Pre-measurement Graph



Final Measurement Results:

Explanation: As the peak detector values were more than 6 dB below limit, the quasi-peak values were not measured.

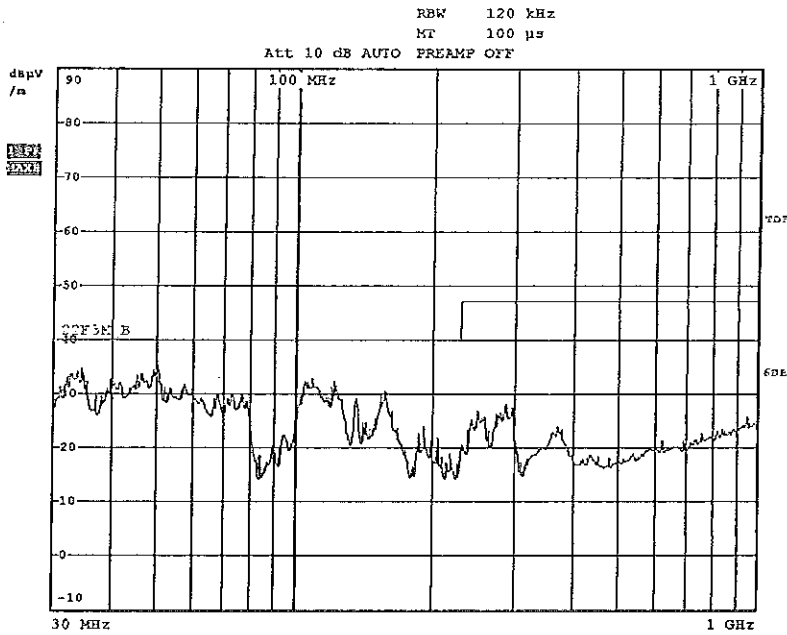


Measurement 2: Vertical

Scan Settings (1 Range)

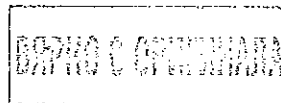
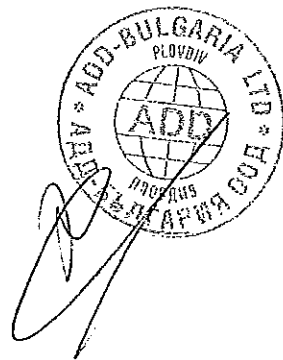
Frequencies			Receiver Settings		Detectors	
Start	Stop	Step	Res BW	M-Time	Pre-measurement	Final-measurement
30 MHz	1000 MHz	40 kHz	120 kHz	1 ms	PK+	QP

Pre-measurement Graph



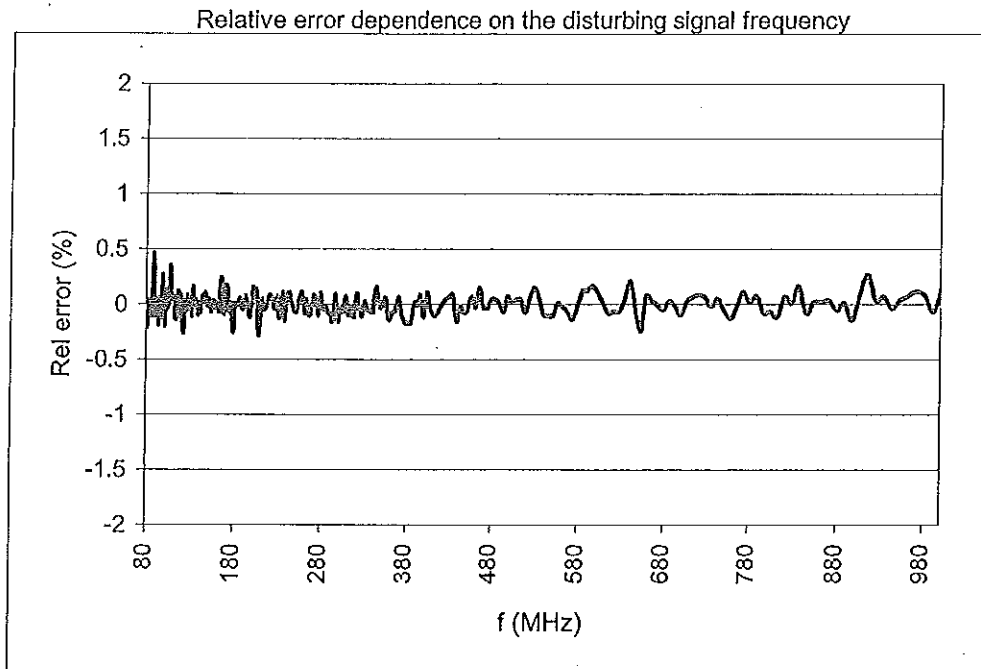
Final Measurement Results:

Explanation: As the peak detector values were more than 6 dB below limit, the quasi-peak values were not measured.

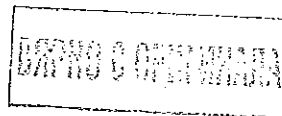
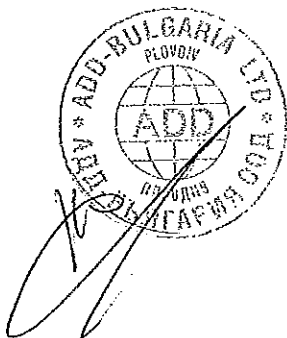


Test of immunity to radiated rf electromagnetic fields

Object : NP71
Date : 14.10.2014
Standard : EN STN 61000-4-3
Test level : 10V/m
Polarisation : horizontal

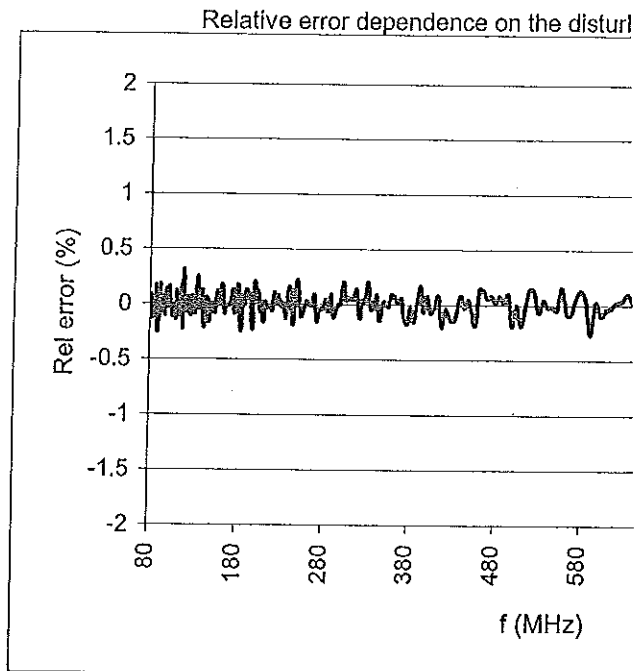


Maximal errors : + 0.45 %
- 0.27 %



Test of immunity to radiated rf electro

Object : NP71
Date : 14.10.2014
Standard : EN STN 61000-4-3
Test level : 10V/m
Polarisation : vertical



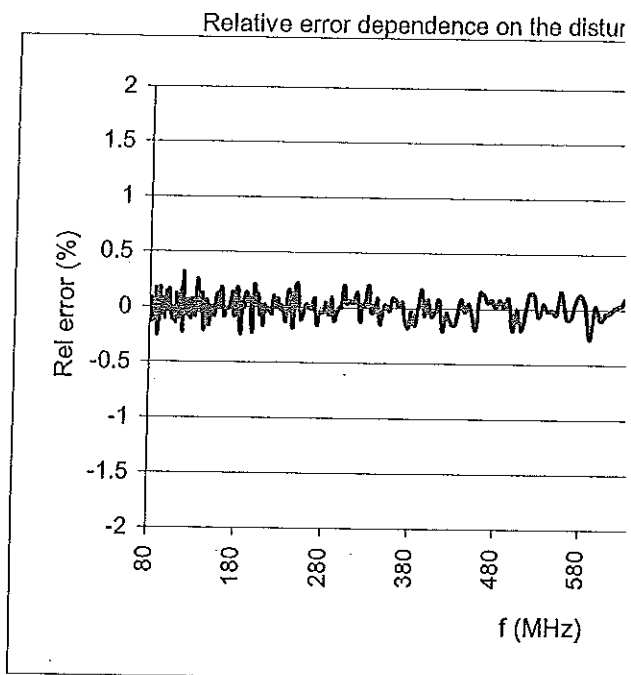
Maximal errors : + 0.31 %
 - 0.27 %



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Test of immunity to radiated rf electric

Object : NP71
Date : 14.10.2014
Standard : EN STN 61000-4-3
Test level : 10V/m
Polarisation : vertical

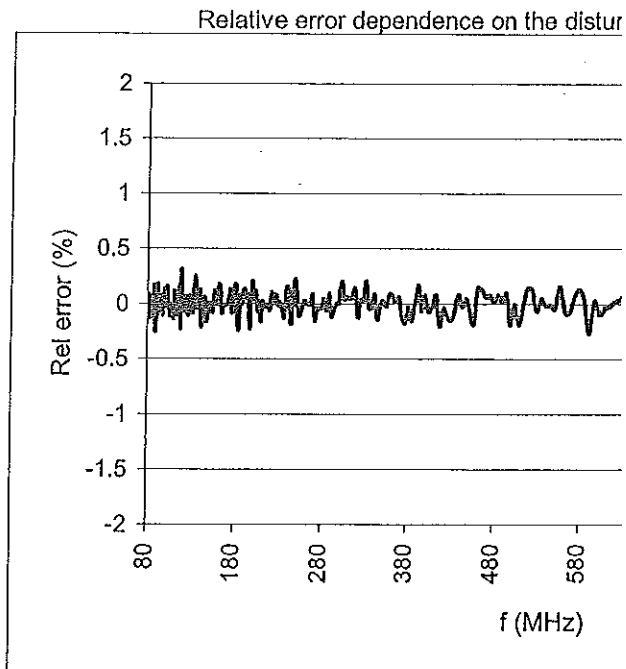


Maximal errors : + 0.31 %
- 0.27 %



Test of immunity to radiated rf electro

Object : NP71
Date : 14.10.2014
Standard : EN STN 61000-4-3
Test level : 10V/m
Polarisation : vertical



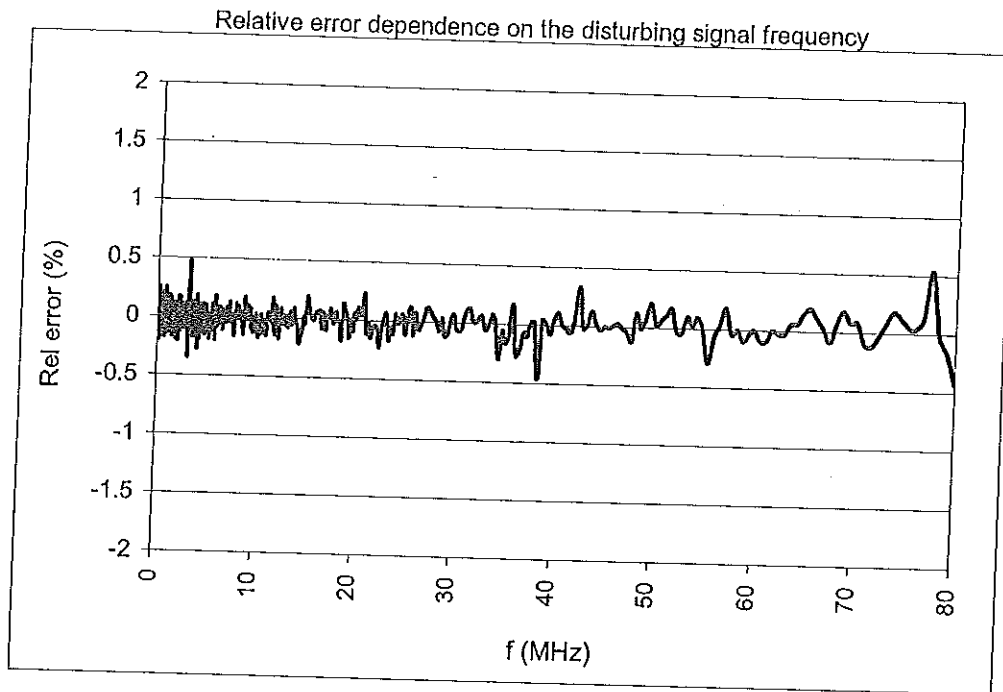
Maximal errors : + 0.31 %
- 0.27 %



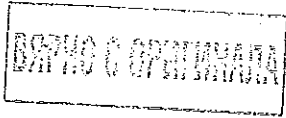
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Test of immunity to conducted disturbance induced by rf voltages

Object : NP71
Date : 14. 10. 2014
Standard : EN STN 61000-4-6
Test level : 10V
Applied CDN: M-2
Port : Voltage

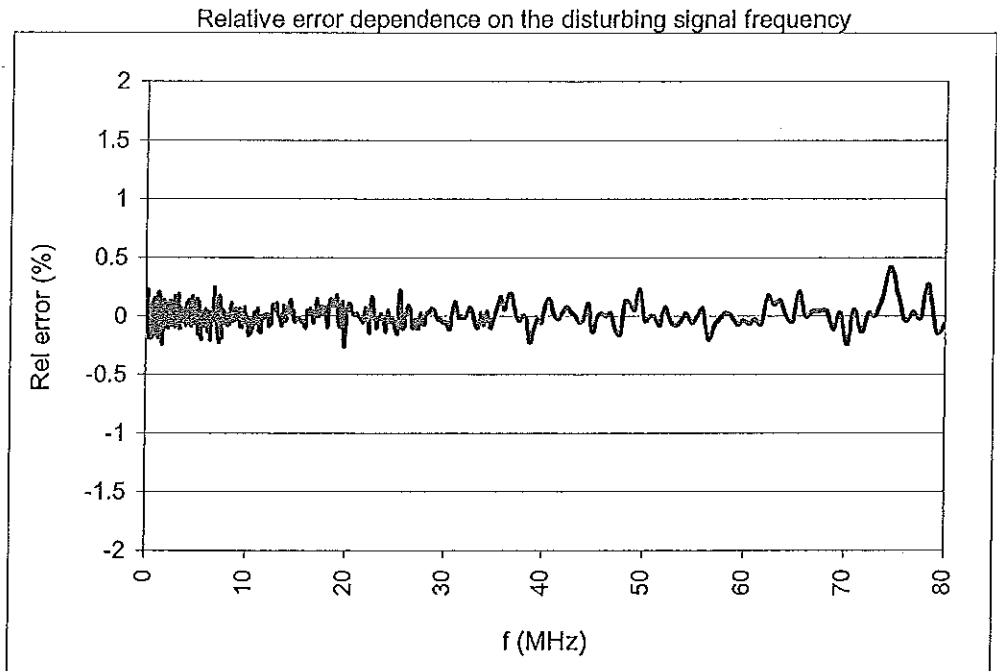


Maximal errors : + 0.53 %
- 0.46 %

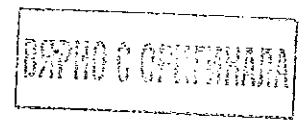
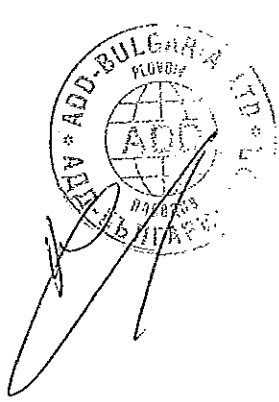


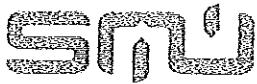
Test of immunity to conducted disturbance induced by rf voltages

Object : NP71
Date : 14. 10. 2014
Standard : EN STN 61000-4-6
Test level : 10V
Applied CDN: EM-101
Port : Output



Maximal errors : + 0.42 %
- 0.26 %





TEST REPORT

No.: 0101/300/221/P/14

Test type: Partial type examination
Measuring instrument: Single-phase static electricity meter
Type: NP71 SN 11400593
voltage 230V;
current 0,25-5(100)A and frequency 50Hz;
constant 1000 imp./kWh; 1000 imp./kvarh.

Manufacturer:
Business name: ADD PRODUCTION s.r.l
Address: 36, Dragomirna str.
Kishinev, MD-2068 Moldova
IČO: Republic of Moldova

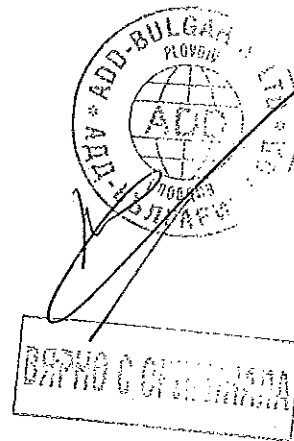
Customer:
Business name: Transtech a.s.
Address: Jilemnického 4
080 01 Prešov, SR
IČO: 36481459

Date of test: 3.11. - 7.11.2014

Task number: 361 386a

Number of pages: 8

Number of attachments: -



Date:
7.11.2014

Tests executed by:

Ing. J. Hanák,

Ing. J. Šlučiak

Approved:

Ing. Štefan Gašparík

Measurement standards used:

- STN EN 50470-1 Electricity metering equipment (AC). Part 1: General requirements, tests and test conditions – Metering equipment (class indexes A, B and C) (2007)
- STN EN 50470-3 Electricity metering equipment (AC). Part 3: Particular requirements – Static meters for active energy (class indexes A, B and C) (2007)
- STN EN 62052-11 Electricity metering equipment (AC). General requirements, tests and test conditions – Part 11: Metering equipment (2003)
- STN EN 62053-23 Electricity metering equipment (AC). Particular requirements Part 23: Static meters for reactive energy (classes 2 and 3) (2003)

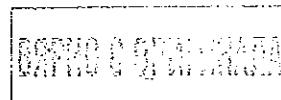
Test equipment: Measuring station with reference standard RS 2310S, SN 1096050236, Traceability of reference standard is ensured to national standards of SMU.

Uncertainty of measurement: Expanded uncertainty of measurement errors for tested instrument was $U_{k=2} = \pm 0,10\%$. The reported expanded uncertainty of measurement is stated as the combined standard uncertainty of measurement multiplied by the coverage factor $k = 2$, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA Publication EA-4/02.

EN 50470-3 point 8.1 and 8.7.2 Accuracy tests at reference conditions

Electric meter NP71 SN 11400593; voltage 230V; current 0,25-5(100)A; Active energy - consumption			
I	cos φ	Balanced load	
		Errors (%) L1	Error limits (%)
I_{min}	1	0,08	± 1,5
I_{tr}	1	0,12	± 1,0
	0,5ind.	0,13	± 1,0
	0,8cap.	0,12	± 1,0
I_{ref}	1	0,01	± 1,0
	0,5ind.	0,00	± 1,0
	0,8cap.	0,01	± 1,0
I_{max}	1	0,08	± 1,0
	0,5ind.	0,07	± 1,0
	0,8cap.	0,12	± 1,0

Passed



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Electric meter NP71 SN 11400593; voltage 230V; current 0,25-5(100)A; Active energy - supply			
I	cos φ	Balanced load	
		Errors (%) L1	Error limits (%)
I _{min}	1	0,09	± 1,5
I _{tr}	1	0,12	± 1,0
	0,5ind.	0,14	± 1,0
	0,8cap.	0,12	± 1,0
I _{ref}	1	0,02	± 1,0
	0,5ind.	0,01	± 1,0
	0,8cap.	0,01	± 1,0
I _{max}	1	0,08	± 1,0
	0,5ind.	0,07	± 1,0
	0,8cap.	0,12	± 1,0

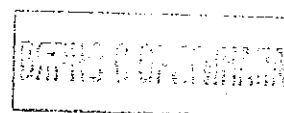
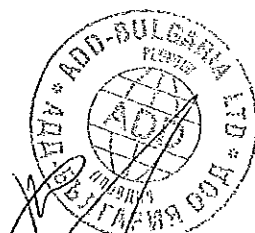
Passed

EN 50470-3 point 8.2 and 8.7.4 Repeatability

Repeability was determined from 5 repeated measurements. The value of repeatability was determined as a difference of maximum and minimum value of error at the same load. Repeatability in every tested item was smaller than 1/10th of limits of intrinsic errors in % .

Repeatability- electric meter NP71 SN 11400593; voltage 230V; current 0,25-5(100)A; Active energy - consumption									
I	cos φ	Error 1 (%)	Error 2 (%)	Error 3 (%)	Error 4 (%)	Error 5 (%)	n _{max.} -n _{min.} (%)	Standard deviation (%)	Error limits (%)
I _{min}	1	0,08	0,09	0,11	0,10	0,08	0,03	0,01	± 1,5
I _{tr}	1	0,10	0,12	0,08	0,10	0,10	0,04	0,01	± 1,0
	0,5ind.	0,08	0,12	0,12	0,12	0,08	0,04	0,02	± 1,0
	0,8cap.	0,08	0,13	0,12	0,10	0,08	0,05	0,02	± 1,0
I _{ref}	1	0,01	0,00	0,01	0,00	0,01	0,01	0,01	± 1,0
	0,5ind.	0,01	0,00	0,00	0,00	0,01	0,01	0,01	± 1,0
	0,8cap.	0,00	0,04	0,00	0,02	0,00	0,04	0,02	± 1,0
I _{max}	1	0,06	0,08	0,08	0,09	0,08	0,03	0,01	± 1,0
	0,5ind.	0,06	0,07	0,06	0,07	0,07	0,01	0,01	± 1,0
	0,8kap.	0,12	0,12	0,12	0,12	0,12	0,00	0,01	± 1,0

Passed



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EN 50470-3 point 8.7.10 Test of meter constant

Measurement was realized in reference conditions at I_{\max} and $\cos \varphi=1$. The difference between the error detected by the test output and subtracting from the LCD was max. 0,02%, which is smaller than 1/10th of error limit in % for the tested point.

Passed

EN 50470-3 point 8.7.9.2 Test of start-up

Tested electric meter was functional within 5s after the reference voltage was applied to the terminal.

Passed

EN 50470-3 point 8.7.9.4 Test of starting

Tested electric meter started and continued to register at starting current $I_{st} = 20 \text{ mA}$, reference voltage and $\cos \varphi=1$.

Passed

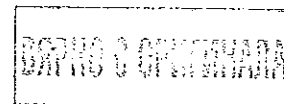
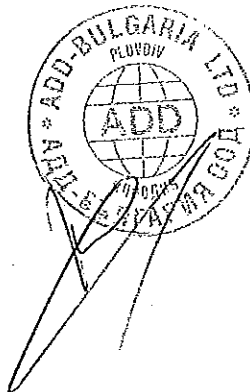
EN 50470-3 point 8.7.9.3 Test of no-load condition

Test of electric meter was conducted at opened circuit (no current flowing) and test voltage $U_{\text{test}}=115\%$ of reference value. Minimal test period was calculated according to formula:

$$\Delta t \geq \frac{240 \cdot 10^3}{k \cdot m \cdot U_{\text{test}} \cdot I_{st}} \text{ min}$$

For tested electric meter the value was calculated $\Delta t = 52,2 \text{ min}$. During the test was not detected any pulse.

Passed

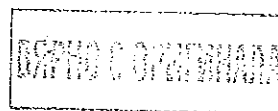
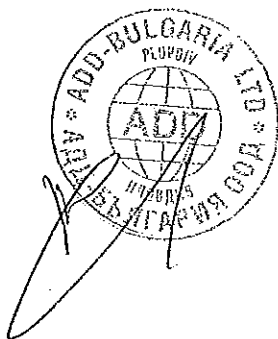


EN 50470-3 point 8.7.5 Test of effect of influence quantities

EN 50470-3 point 8.7.5.3 Voltage variation $\pm 10\%$

electric meter NP71 SN 11400593; voltage 230V; current 0,25-5(100)A; Active energy				
I(A)	cos φ	U(V)	Additional error due to voltage variation $\pm 10\%$	
			Balanced load	
			Errors (%) L1	Error limits (%)
I_{tr}	1	207	0,16	$\pm 1,0$
		253	0,20	$\pm 1,0$
	0,5ind.	207	0,18	$\pm 1,5$
		253	0,25	$\pm 1,5$
	0,8cap.	207	0,23	$\pm 1,5$
		253	0,03	$\pm 1,5$
I_{ref}	1	207	0,03	$\pm 1,0$
		253	0,05	$\pm 1,0$
	0,5ind.	207	0,07	$\pm 1,5$
		253	0,05	$\pm 1,5$
	0,8cap.	207	0,05	$\pm 1,5$
		253	0,03	$\pm 1,5$
I_{max}	1	207	0,06	$\pm 1,0$
		253	0,11	$\pm 1,0$
	0,5ind.	207	0,08	$\pm 1,5$
		253	0,11	$\pm 1,5$
	0,8cap.	207	0,16	$\pm 1,5$
		253	0,16	$\pm 1,5$

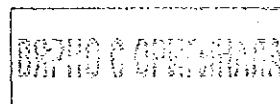
Passed



EN 50470-3 point 8.7.5.4 Frequency variation $\pm 2\%$

electric meter NP71 SN 11400593; voltage 230V; current 0,25-5(100)A; Active energy				
I(A)	cos φ	f(Hz)	Additional error due to frequency variation $\pm 2\%$	
			Balanced load	
			Errors (%) L1	Error limits (%)
I_{tr}	1	49	0,21	$\pm 0,5$
		51	0,22	$\pm 0,5$
	0,5ind.	49	0,37	$\pm 0,7$
		51	0,31	$\pm 0,7$
	0,8cap.	49	0,17	$\pm 0,7$
		51	0,18	$\pm 0,7$
I_{ref}	1	49	0,03	$\pm 0,5$
		51	0,03	$\pm 0,5$
	0,5ind.	49	0,01	$\pm 0,7$
		51	0,04	$\pm 0,7$
	0,8cap.	49	0,04	$\pm 0,7$
		51	0,01	$\pm 0,7$
I_{max}	1	49	0,05	$\pm 0,5$
		51	0,10	$\pm 0,5$
	0,5ind.	49	0,06	$\pm 0,7$
		51	0,10	$\pm 0,7$
	0,8cap.	49	0,14	$\pm 0,7$
		51	0,14	$\pm 0,7$

Passed

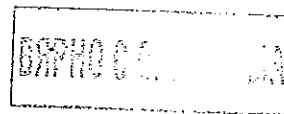


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EN 62053-23 point 8.1 Limits of error due to variation of the current

electric meter NP71 SN 11400593; voltage 230V; current 0,25-5(100)A; Reactive energy			
I(A)	sin φ	Errors (%)	Error limits (%) class 2
0,05 I _b	1	0,02	± 2,5
0,1 I _b	1	0,11	± 2,0
	0,5ind.	0,02	± 2,5
	0,5cap.	0,11	± 2,5
0,2 I _b	1	0,08	± 2,0
	0,5ind.	0,11	± 2,0
	0,5cap.	0,12	± 2,0
I _b	1	0,08	± 2,0
	0,5ind.	0,04	± 2,0
	0,5cap.	0,10	± 2,0
I _{max}	1	0,10	± 2,0
	0,5ind.	0,09	± 2,0
	0,5cap.	0,05	± 2,0

Passed



EN 62053-23 point 8.2 Limits of error due to influence quantities

Voltage variation $\pm 10\%$

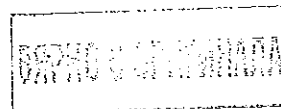
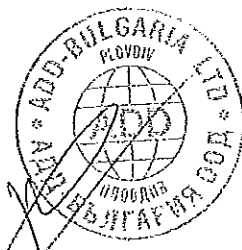
electric meter NP71 SN 11400593; voltage 230V; current 0,25-5(100)A;				
Reactive energy				
I(A)	sin ϕ	U(V)	Additional error due to voltage variation $\pm 10\%$	
			Errors (%)	Error limits (%) class 2
0,05 I _b	1	207	0,16	$\pm 1,0$
		253	0,11	$\pm 1,0$
I _{max}	1	207	0,11	$\pm 1,0$
		253	0,11	$\pm 1,0$
0,1 I _b	0,5ind.	207	0,07	$\pm 1,5$
		253	0,09	$\pm 1,5$
	0,5cap.	207	0,13	$\pm 1,5$
		253	0,15	$\pm 1,5$
I _{max}	0,5 ind.	207	0,10	$\pm 1,5$
		253	0,07	$\pm 1,5$
	0,5cap	207	0,11	$\pm 1,5$
		253	0,04	$\pm 1,5$

Passed

Frequency variation $\pm 2\%$

electric meter NP71 SN 11400593; voltage 230V; current 0,25-5(100)A;				
Reactive energy				
I(A)	sin ϕ	Frequency (Hz)	Additional error due to frequency variation $\pm 2\%$	
			Errors (%)	Error limits (%) class 2
0,05 I _b	1	49	0,13	$\pm 2,5$
		51	0,11	$\pm 2,5$
I _{max}	1	49	0,03	$\pm 2,5$
		51	0,14	$\pm 2,5$
0,1 I _b	0,5ind.	49	0,07	$\pm 2,5$
		51	-0,01	$\pm 2,5$
	0,5cap.	49	0,09	$\pm 2,5$
		51	0,10	$\pm 2,5$
I _{max}	0,5ind.	49	0,12	$\pm 2,5$
		51	-0,03	$\pm 2,5$
	0,5cap	49	0,07	$\pm 2,5$
		51	-0,03	$\pm 2,5$

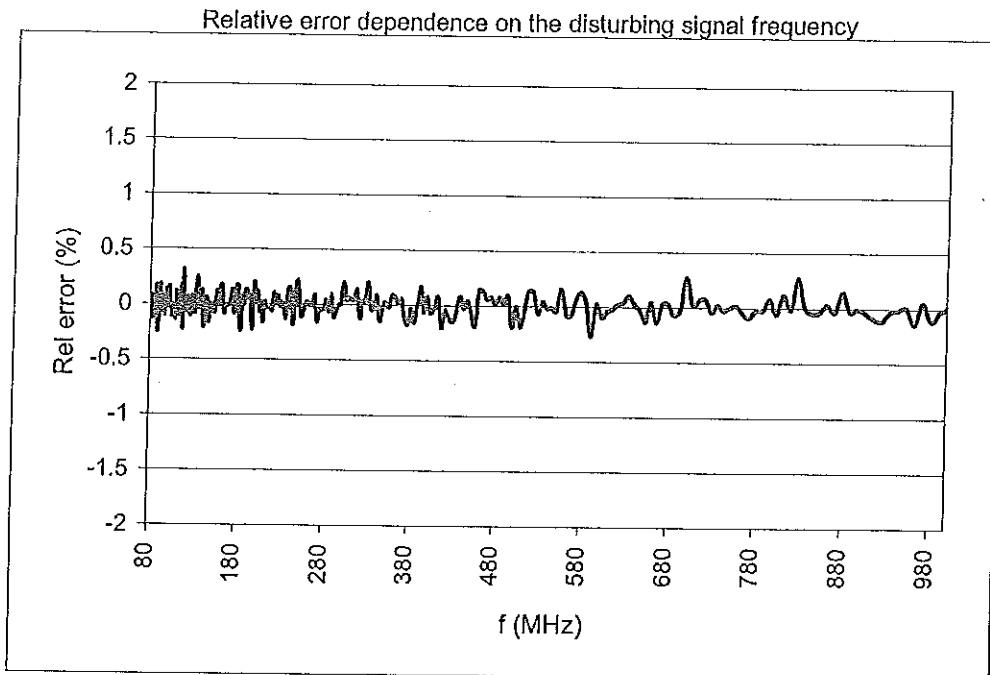
Passed



[Handwritten signature]

Test of immunity to radiated rf electromagnetic fields

Object : NP71
Date : 14.10.2014
Standard : EN STN 61000-4-3
Test level : 10V/m
Polarisation : vertical



Maximal errors : + 0.31 %
- 0.27 %

